

# COSEL

# EMTRON

A FORTEC GROUP MEMBER

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[ POWER SUPPLY ]

[ NOISE FILTER ]

# 2020 2021

# PRODUCT CATALOG



## Before using our product

### ■ Warning

- ◆ When the product is in operation, inside there are components which have high voltage and high temperature. They may cause electrical shock or burn if you touch the internal components.
- ◆ Do not modify, disassemble or remove the enclosure of the product. This may cause electrical shock, burn or fire hazard.
- ◆ When the product is operating, keep your hands and face away from it. This may cause injury by accident.

### ■ Attention

- ◆ It is necessary to read the instruction manual and catalog. Please confirm the content of the catalog and instruction manual before you use our products.
- ◆ We make every effort to improve quality and reliability of our products. However the product may accidentally malfunction or fail. Therefore, please ensure fail safe function of your product when our product is used in equipment where high reliability is required (such as nuclear control, aerospace, life-support, traffic control etc.).
- ◆ If the product is used in an environment where water, moisture, dust, strong electromagnetic field or corrosive gas is present, it may cause the failure of the internal components of the product.
- ◆ The life-limited components (such as electrolytic capacitor, internal fan.) should be replaced periodically. Please arrange for the appropriate overhaul period depending on the usage environment.
- ◆ When you export the product, please comply with all appropriate export-related laws, and procedures.

\* The content of the catalog may be changed without advanced notice.  
If necessary, please request product specification from our representatives before ordering.

## Environmentally Friendly Products and its Symbol

We have developed a new internal evaluation system on environmental burdens in order to provide our customers with information on our products and our efforts to promote the development of environmentally friendly products since 2010.

We are looking at the following 3 items in evaluating our products to reduce their environmental burdens.

- (1) Environmental burdens generated when our products are in operation at customers' site.
- (2) Environmental burdens generated when our products are manufactured at our factories.
- (3) Environmental burdens generated when materials and components we purchase are manufactured.

Based on the above 3 items, we set our own criteria to certify and register products which satisfy our criteria as "Eco Products." These Eco Products are highly efficient in reducing environmental burdens. To promote Eco Products, we developed the following symbol which represent Eco Products.



We will proactively expand our Eco Products to create an environmentally friendly low-carbon recycling-oriented society and to continue to grow with our customers.



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PCA

PBA/PBW

PJA

PLA

ADA

FETA

SC

LHA

LFA

LGA

LFP

TUHS

MG

SUS/SUCS

SFS/SFCS

SFLS

STMG

BRNS

BRFS/BRDS

CHS

CQHS

CBS

DHS

DBS

TUNS

TUXS

DPG

DPF

AME

RB

ACE

KH

KL

KR

LMA

GMA

GHA

PMA

ACE-H

EMI/EMC Filter

# OUTLINE



■ Head office / R&D center



■ Tateyama factory

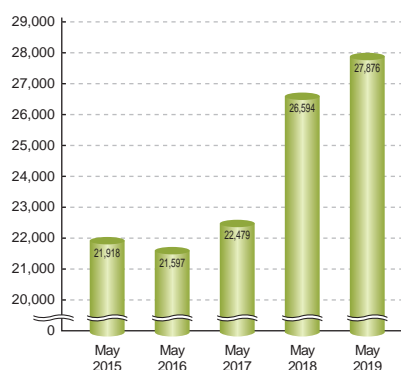
# Company Guidance

- Established : July 26, 1969.
- Paid Capital : 2,055 Million Yen
- CEO : Masato Tanikawa
- Annual Sales : 27,876 Million Yen (As of May 2019)  
(Consolidated)
- Employees : 680 (As of May 2019)
- Subsidiaries : COSEL U.S.A., INC.  
COSEL EUROPE GmbH  
COSEL ASIA LTD.  
COSEL (SHANGHAI) ELECTRONICS CO., LTD.  
WUXI COSEL ELECTRONICS CO., LTD.  
SHANGHAI COSEL INTERNATIONAL TRADING CO., LTD.  
COSEL VIETNAM CO., LTD  
POWERBOX INTERNATIONAL AB

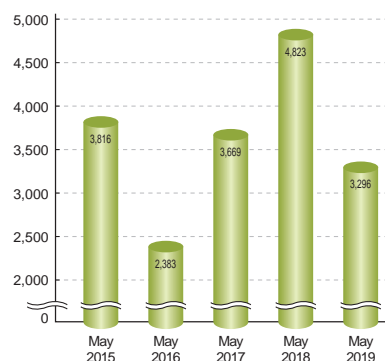
- History :
  - J u l . 1969 Established ELCO CO., LTD.
  - A p r . 1978 Introduced QC circle activities.
  - J u n . 1978 Became Pure-Power Supply Business-Play.
  - M a y . 1982 Introduced TQC activities (Now changed to TQM activities).
  - J u n . 1983 Introduced Hoshin Management (Business Goal Management) activities.
  - M a r . 1988 Introduced Toyota Production System activities.
  - M a r . 1989 Tateyama Factory completed.
  - A p r . 1990 Established COSEL U. S. A., INC. (Former U. S. ELCO INC.) in San Jose, USA.
  - A p r . 1992 Changed company name to COSEL CO., LTD. from ELCO CO., LTD.
  - J u n . 1993 Acquired ISO9001.
  - M a y . 1995 Set a representative in Hong Kong, China.
  - M a y . 1996 Introduced TPM (Total Plant Maintenance) activities.
  - J u l . 1997 Established COSEL EUROPE GmbH in Frankfurt, Germany.
  - M a y . 1998 Established COSEL ASIA LTD. in Hong Kong, China.
  - J a n . 1999 Shares listed on the Second Sections of the Tokyo Stock Exchange and Nagoya Stock Exchange both.
  - Dec. 1999 Acquired ISO14001.
  - M a y . 2000 Shares listed on the First Section of the Tokyo Stock Exchange.
  - N o v . 2002 Established COSEL (SHANGHAI) ELECTRONICS CO., LTD. in Shanghai, China.
  - M a r . 2005 Entering EMI filter Business.
  - F e b . 2006 Successfully completed the RoHS Directive conformity.
  - N o v . 2011 Established SHANGHAI COSEL INTERNATIONAL TRADING CO., LTD. in Shanghai, China.
  - Dec. 2011 Established WUXI COSEL ELECTRONICS CO., LTD. in Wuxi, China.
  - A u g . 2015 Established COSEL VEITNAM CO., LTD in Ho Chi Minh City, Vietnam.
  - J u n . 2018 Acquired POWERBOX INTERNATIONAL AB

## Data




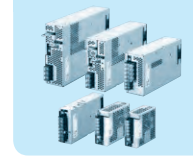



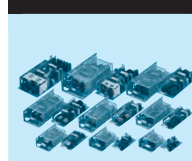

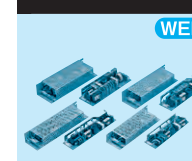





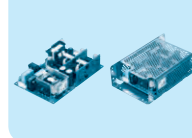
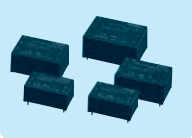
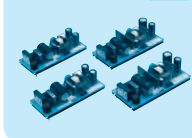
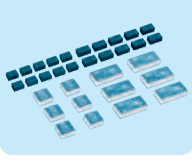

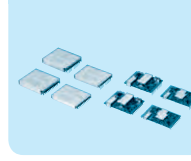
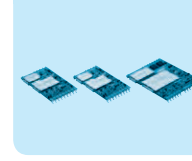
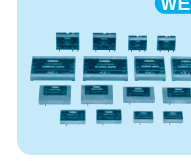

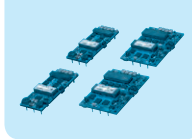

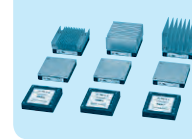
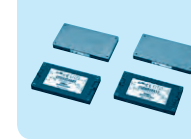
**Annual sales**  
(Consolidated)  
(Unit: Million Yen)



**Net profit/ loss before tax**  
(Consolidated)  
(Unit: Million Yen)



## AC-DC Power Supplies

<b>Enclosed Type</b>	Single output				
	<b>PCA series</b>	<b>PBA series</b>	<b>PLA series</b>	<b>PJA series</b>	<b>ADA series</b>
					
	Single output				
	<b>LHA series</b>	<b>LFP series</b>	<b>LFA series</b>	<b>LEP series</b> <span style="float: right;">WEB</span>	<b>LEA series</b> <span style="float: right;">WEB</span>
					
<b>DIN Rail Type</b>	Single output		Redundancy Module		
	<b>KH series</b>	<b>KL series</b>	<b>KR series</b>		
					
<b>Configurable Type</b>	Multiple output			Single output	
	<b>AME series</b>	<b>ACE series</b>	<b>RB series</b>	<b>TUHS series</b>	<b>VAF series</b> <span style="float: right;">WEB</span>
					
<b>PCB Mount Type</b>	Single/Multiple output				
	<b>MG series</b>	<b>SUS-SUW/SUCS-SUCW SUTS-SUTW series</b>	<b>SFS/SFCS series</b>	<b>SFLS series</b>	<b>ZUS-ZUW ZTS-ZTW series</b> <span style="float: right;">WEB</span>
					
<b>Bus Converter - Power Module Type</b>	Single output				
	<b>CHS series</b>	<b>CES-CQS series</b> <span style="float: right;">WEB</span>	<b>CQHS series</b>	<b>CBS series</b>	<b>CDS series</b> <span style="float: right;">WEB</span>
					

## DC-DC Converters

- PCA
- PBA/PBW
- PJA
- PLA
- ADA
- FETA
- SC
- LHA
- LFA
- LGA
- LFP
- TUHS
- MG
- NS/SUC/SUT
- SPS/SPCS
- SFLS
- STMG
- BRNS
- BRFS/BRDS
- CHS
- CQHS
- CBS
- DHS
- DBS
- TUNS
- TUXS
- DPG
- DPF
- AME
- RB
- ACE
- KH
- KL
- KR
- LMA
- GMA
- GHA
- PMA
- ACE-H
- EMI/EMC Filter

FETA series		FCA series <span style="float: right;">WEB</span>		Multiple output		Front-end		PBW series		SC series		STA series <span style="float: right;">WEB</span>	

LDA series <span style="float: right;">WEB</span>		LGA series		Multiple output		LEB series <span style="float: right;">WEB</span>		LDC series <span style="float: right;">WEB</span>	

Medical Type	Single/Multiple output				
	GMA series	GHA series	LMA series	PMA series	ACE-H series

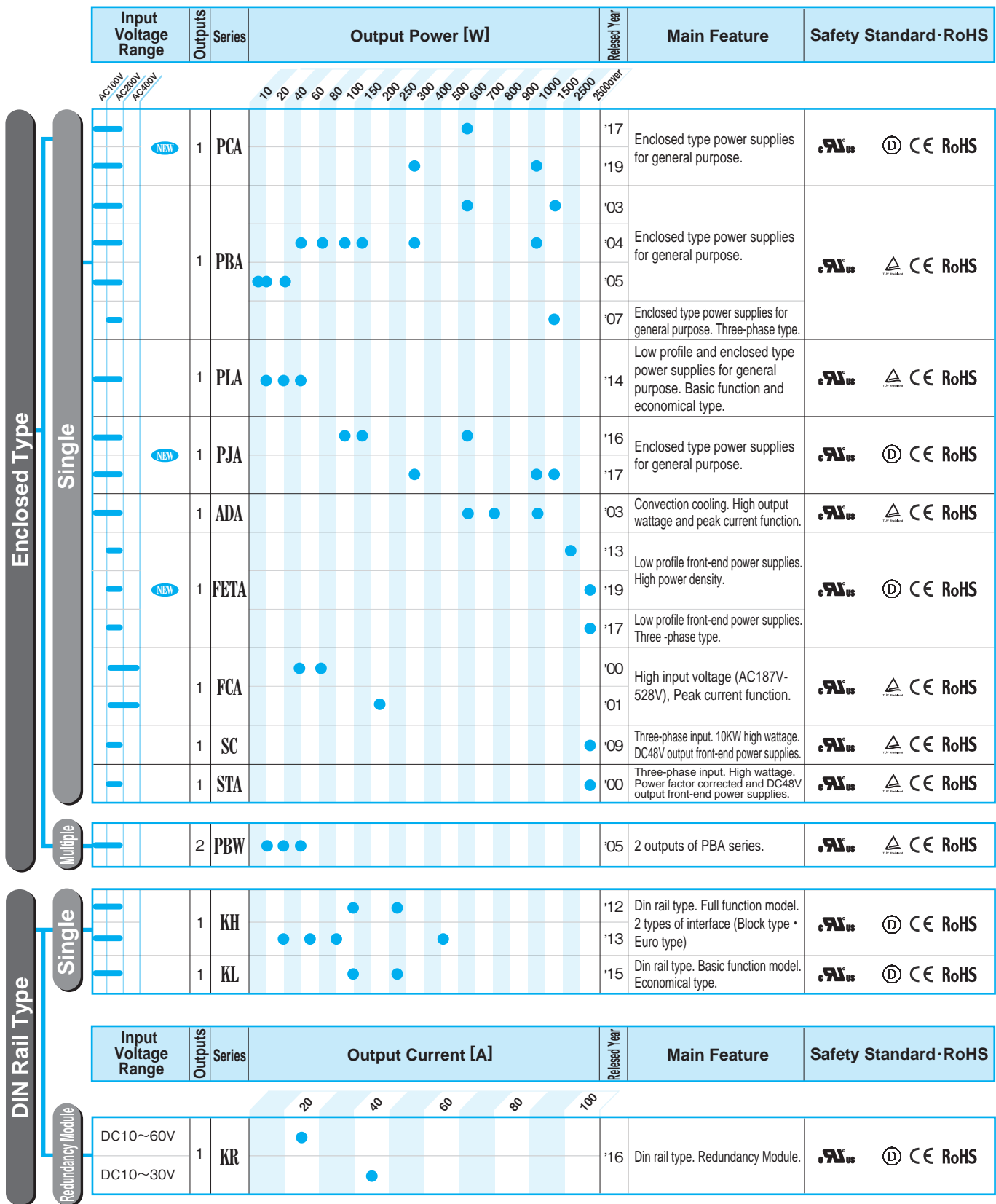
Bus Converter- Power Module Type	VAA series <span style="float: right;">WEB</span>		Single output		PFC Front-end module	
			TUNS series	TUXS series	DPG series	DPF series

POL Type	Value-added		Single output	
	STMG series	BRNS series	BRFS/BRDS series	

DHS series	DBS series
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[Notice]  
WEB : Specifications available on the Cosel website only.

## Cosel with the global safety standards





### Configurable Type

Input Voltage Range	Outputs	Series	Output Power [W]	Release Year	Main Feature	Safety Standard · RoHS
AC100V AC200V AC400V	4 6	NEW AME	20 40 60 100 200 300 400 500 600 700 800 900 1k 2k 3k 4k	'19	Low profile (1U) type. Available to select 4-6 channels among many output · current modules.	.FAL. Ⓣ CE RoHS
4 5 6			ACE	'01	Available to select 4-6 channels among many output · current modules.	
NEW 3		RB	'00	Available to selection 1-3 channels among many output · current modules.	.FAL. Ⓣ Ⓣ CE RoHS	

### Open Frame/Enclosed Type

Input Voltage Range	Outputs	Series	Output Power [W]	Release Year	Main Feature	Safety Standard · RoHS
AC100V AC200V AC400V	1	NEW LHA	5 10 15 20 40 80 100 150 200 300 400 500 1000 1500	'19	Succeeding series of LFA series.	.FAL. Ⓣ CE RoHS
LFP			'12	Peak current function. Succeeding series of LEP series.	.FAL. Ⓣ CE RoHS	
LEP		'13	Peak current function.	.FAL. Ⓣ CE RoHS		
LFA		'09	Open frame type power supplies for general purpose. Succeeding series of LEA series.	.FAL. Ⓣ CE RoHS		
LFA		'10	Open frame type power supplies for general purpose.	.FAL. Ⓣ CE RoHS		
LEA		'99	Open frame type power supplies for general purpose.	.FAL. Ⓣ CE RoHS		
LDA		'94	Open frame type power supplies for general purpose.	.FAL. Ⓣ CE RoHS		
LDA		'95	Open frame type power supplies for general purpose.	.FAL. Ⓣ CE RoHS		
LDA		'97	Open frame type power supplies for general purpose.	.FAL. Ⓣ CE RoHS		
LGA	'08	AC100V input open frame type power supplies for general purpose.	.FAL. Ⓣ CE RoHS			
2	LEB	'00	2 Outputs of LEA series.	.FAL. Ⓣ CE RoHS		
3	LDC	'94	3 Outputs of LDA series.	.FAL. Ⓣ CE RoHS		
LDC	'95	3 Outputs of LDA series.	.FAL. Ⓣ CE RoHS			

### Medical Type

Input Voltage Range	Outputs	Series	Output Power [W]	Release Year	Main Feature	Safety Standard · RoHS
AC100V AC200V AC400V	1	NEW GMA	10 20 40 60 80 100 150 200 250 300 400 500 600 700 800 900 1000 1500 1500W <sub>max</sub>	'17	Open frame type 2X4 inches. For medical applications	.FAL. Ⓣ CE RoHS
GHA			'13	Open frame type 3X5 inches. Conduction cooling. For medical applications		
GHA		'15	-SNF: Optional with FAN.	.FAL. Ⓣ CE RoHS		
GHA		'16	-SNF: Optional with FAN.	.FAL. Ⓣ CE RoHS		
LMA	'14	Open frame type Peak current function. For medical applications.	.FAL. Ⓣ CE RoHS			
PMA	'10	Enclosed type For medical applications.	.FAL. Ⓣ CE RoHS			
AC100V AC200V AC400V	4 5 6	ACE-H	20 40 60 100 200 300 400 500 600 700 800 900 1k 2k 3k 4k 5k 6k 7k <sub>over</sub>	'11	Multiple output in large power with 1-4CH(ACE300F), 1-5CH(ACE450F, 650F) 1-6CH(ACE900F) Harmonic attenuator Universal input voltage range.	.FAL. Ⓣ CE RoHS

- PCA
- PBA/PBW
- PJA
- PLA
- ADA
- FETA
- SC
- LHA
- LFA
- LGA
- LFP
- TUHS
- MG
- NS/SUC/NT
- SFS/SFCS
- SFLS
- STMG
- BRNS
- BRNS/BRDS
- CHS
- CQHS
- CBS
- DHS
- DBS
- TUNS
- TUXS
- DPG
- DPF
- AME
- RB
- ACE
- KH
- KL
- KR
- LMA
- GMA
- GHA
- PMA
- ACE-H
- EMI/EMC Filter

POL Type

Single

Input Voltage Range	Outputs	Series	Output Current [A]											Released Year	Main Feature	Safety Standard · RoHS		
			6	12	20	30	40	50	80	100	120	150						
DC3~14.4V	1	BRNS	●	●	●									'13	Compact size · Wide input			RoHS
DC4.5~14.0V <small>NEW</small>	1	BRFS				●								'13	Compact size · Fast transient response			RoHS
						●		●	●					'14	Compact size · Fast transient response			
DC4.5~14.0V <small>NEW</small>	1	BRDS					●			●	●			'18	Compact size · Fast transient response			RoHS
						●		●	●		●	●		'17	Compact size · Fast transient response, PMBus			

Bus Converter · Power Module Type

Single

Input Voltage Range	Outputs	Series	Output Power [W]											Released year	Main Feature	Safety Standard · RoHS							
			5	10	15	20	40	80	100	150	200	300	400					500	1000				
DC24V DC24V DC24V DC48V DC48V DC48V AC100V AC200V	1	CHS															'17	DC24V input bus converter, 1/16 brick size			RoHS		
																		'15				DC24V input bus converter, 1/8 brick size	
																						'18	DC24V input bus converter, 1/4 brick size
																						'14	DC48V input bus converter, 1/32 brick size
																						'11	DC48V input bus converter, 1/16 brick size
																						'16	DC48V input bus converter, 1/8 brick size
																						'11	DC48V input bus converter, 1/4 brick size
																						'13	DC48V input bus converter, 1/8 brick size
																						'17	DC48V input bus converter, 1/4 brick size
																						'13	DC48V input bus converter, 1/4 brick size
																'18	DC48V input bus converter, 1/4 brick size						
	1	CES														'03	DC24V · 48V input bus converter, 1/8 brick size			CE RoHS			
	1	CQS														'03	DC24V · 48V input bus converter, 1/4 brick size			RoHS			
	1	CQHS														'10	DC48V input, brick size			RoHS			
	1	CBS														'01	DC24V · 48V input, half brick size			RoHS			
															'05	DC24V · 48V input, half brick size							
	1	CDS														'00	DC24V · 48V input, full brick size			RoHS			
	1	DHS														'10	DC110V input, small brick size			RoHS			
															'09	DC280V input, small brick size							
	1	DBS														'03	DC110V input, full function and full brick size			RoHS			
															'00	DC280V input, full function and full brick size							
	1	TUNS														'12	AC100/200V input. Complied with harmonic regulations. Isolated type. Brick size			RoHS			
	1	TUXS														'15	AC100/200V input. High efficiency. Complied with harmonic regulations. Isolated type.			CE RoHS			
															'17	AC100/200V input. High efficiency. Complied with harmonic regulations. Isolated type.							
	1	DPG														'10	AC100/200V input. Compact size. Complied with harmonic regulations.			RoHS			
	1	DPF														'00	AC100/200V input. High wattage. Complied with harmonic regulations.			RoHS			

PCB Mount Type

Single

Multiple

Input Voltage Range	Outputs	Series	Output Power [W]										Released Year	Main Feature	Safety Standard - RoHS	
			1.5	3	5	6	10	15	20	25	30	40				80
DC6V DC12V DC24V DC36V DC48V DC60V DC75V DC90V DC100V DC200V	1	MGS	•	•	•	•	•	•	•	•	•	•	•	'10 '16	Global standard DC/DC converter for general purpose.	UL CE RoHS
	1	MGFS	•	•	•	•	•	•	•	•	•	•	•	'10 '17 '19	Wide-input global standard DC/DC converter for general purpose.	UL CE RoHS
	1	MGXS	•	•	•	•	•	•	•	•	•	•	•	'18	Wide-input (DC6-60V) global standard DC/DC converter.	UL CE RoHS
	1	STMG	•	•	•	•	•	•	•	•	•	•	•	'13	Value-added type of MGFS series	CE RoHS
	1	SUS/SUCS	•	•	•	•	•	•	•	•	•	•	•	'04	Compact and thin DC/DC Converter for general purpose	UL CE RoHS
	1	SUTS	•	•	•	•	•	•	•	•	•	•	•	'09	Vertical type of SUCS series	UL CE RoHS
	1	SFS	•	•	•	•	•	•	•	•	•	•	•	'05 '03	Thin SMD/DIP type DC/DC converter	UL CE RoHS
	1	SFCS	•	•	•	•	•	•	•	•	•	•	•	'07	SFS series with metal cover	UL CE RoHS
	1	SFLS	•	•	•	•	•	•	•	•	•	•	•	'07	Thin SMD type DC/DC converter	UL CE RoHS
	1	ZUS	•	•	•	•	•	•	•	•	•	•	•	'96	DC/DC converter for general purpose	UL CE RoHS
	1	ZTS	•	•	•	•	•	•	•	•	•	•	•	'98	Vertical type of ZUS series	UL CE RoHS
	1	TUHS	•	•	•	•	•	•	•	•	•	•	•	'14 '15	AC100/200V input, compact size	UL CE RoHS
	1	VAF	•	•	•	•	•	•	•	•	•	•	•	'99	AC100/200V input	UL CE RoHS
	1	VAA	•	•	•	•	•	•	•	•	•	•	•	'98	AC100V input	UL RoHS
	2	MGW	•	•	•	•	•	•	•	•	•	•	•	'10 '16	2 outputs of MG series	UL CE RoHS
	2	MGFW	•	•	•	•	•	•	•	•	•	•	•	'10 '17 '19	Wide-input global standard DC/DC converter for general purpose.	UL CE RoHS
	2	MGXW	•	•	•	•	•	•	•	•	•	•	•	'18	2 outputs of MGX series	UL CE RoHS
	2	STMG	•	•	•	•	•	•	•	•	•	•	•	'13	Value-added type of MGFW series	CE RoHS
	2	SUW/SUCW	•	•	•	•	•	•	•	•	•	•	•	'04	SU series with metal cover	UL CE RoHS
	2	SUTW	•	•	•	•	•	•	•	•	•	•	•	'09	Vertical type of SUCW series	UL CE RoHS
	2	ZUW	•	•	•	•	•	•	•	•	•	•	•	'96	2 outputs of ZU series	UL CE RoHS
	2	ZTW	•	•	•	•	•	•	•	•	•	•	•	'98	Vertical type of ZUW series	UL CE RoHS

- PCA
- PBA/PBW
- PJA
- PLA
- ADA
- FETA
- SC
- LHA
- LFA
- LGA
- LFP
- TUHS
- MG
- NS/SUCNT
- SFS/SFCS
- SFLS
- STMG
- BRNS
- BRNS/BRDS
- CHS
- CQHS
- CBS
- DHS
- DBS
- TUNS
- TUXS
- DPG
- DPF
- AME
- RB
- ACE
- KH
- KL
- KR
- LMA
- GMA
- GHA
- PMA
- ACE-H
- EMI/EMC Filter

When a failure in product is found, contact our distributors or our sales subsidiaries.

## 1. Free Repair

Repair is free of charge when the following cases apply:

- (1) If the product returned is still within warranty period and damages are due to component failure.
- (2) Damages are due to Cosel's manufacturing and design errors.

## 2. Charged Repair

Repair is charged when the following cases apply:

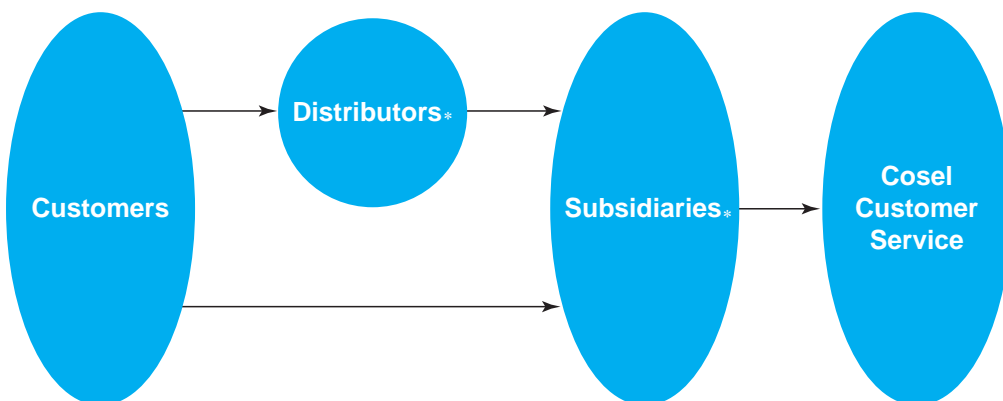
- (1) Products' warranty period has expired.
- (2) Electrical or physical damages are caused by customer.
- (3) The product returned is over 6 months from first operation but no problem is found after analysis.
- (4) Damages are due to use outside of our published specifications.
- (5) Damages are caused by Acts of God such as fire, flood, earthquake, etc.
- (6) Time-deteriorating parts such as electrolytic capacitors, cooling fans, etc. are replaced.

## 3. Warranty After Repair

- (1) As for the products whose regular warranty period has expired, the repaired products will have a 3-month warranty.

## 4. Repair and Service Network

When a failure in product is found, please return the products in the following way:



\* Please refer to Sales Network in this catalog.



Medical electric equipment



Power Factor Correction



World wide



Safety Approvals



EMI



Inrush current limiting



OCP



OVP



Remote ON/OFF

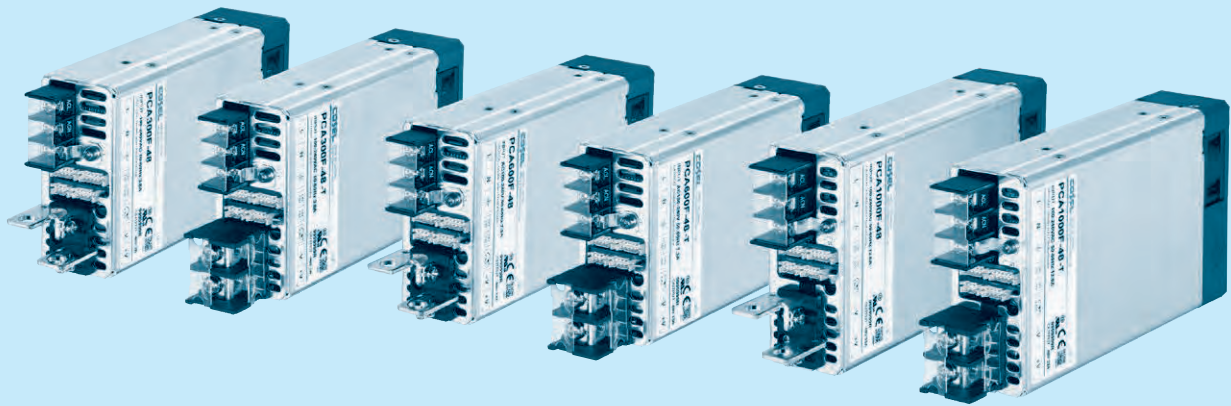


Parallel Operation



1U

# PCA-series



PCA300F

PCA600F

PCA1000F

## Feature

Low profile (41mm, 1.61 inch = meet to 1U height)  
 Universal input 85 - 264VAC  
 (Refer to "Derating", when using at 85 - 90VAC)  
 DC input 88 - 370VDC possible : Excluding PCA1000F  
 (Refer to "Derating", when using at 88 - 110VDC)  
 For medical electric equipment  
 (ANSI/AAMI ES60601-1, EN60601-1 3rd)  
 Medical Isolation Grade 2MOPP  
 With AUX output 12V 0.1A (Voltage variable range 5 - 12V)  
 Constant current regulation  
 Output voltage can be varied to near 0V (Refer to item 2.6)  
 With various alarms  
 Parallel Operation / N+1 Parallel Redundancy Operation possible  
 Monitoring function by communication and various setting values can be changed (Refer to item 2.11)

## Safety agency approval

· UL62368-1, C-UL (CSA62368-1), EN62368-1,  
 ANSI/AAMI ES60601-1, EN60601-1 3rd

## Up to 5-year warranty (Refer to Instruction Manual)

## CE marking

Low Voltage Directive  
 RoHS Directive

## EMI

- PCA300F, PCA600F  
 Complies with FCC-B, CISPR32-B, EN55011-B, EN55032-B, VCCI-B
- PCA1000F  
 Complies with FCC-A, CISPR32-A, EN55011-A, EN55032-A, VCCI-A

## EMS Compliance : EN61204-3, EN61000-6-2

IEC60601-1-2 (2014), EN60601-1-2 (2015)

EN61000-4-2  
 EN61000-4-3  
 EN61000-4-4  
 EN61000-4-5  
 EN61000-4-6  
 EN61000-4-8  
 EN61000-4-11

# PCA300F

PC A 300 F -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*7
- C :with Coating
- G :Low leakage current
- T :Terminal Block Style
- I :with PMBus interface
- F2 :Reverse air exhaust type
- P3 :Master-slave Operation
- W1 :Alarm function

For option details, refer to instruction manual 6.1.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PCA300F-5	PCA300F-12	PCA300F-15	PCA300F-24	PCA300F-32	PCA300F-48
MAX OUTPUT WATTAGE[W]	300	324	330	336	320	336
DC OUTPUT	5V 60A	12V 27A	15V 22A	24V 14A	32V 10A	48V 7A

## SPECIFICATIONS

MODEL		PCA300F-5	PCA300F-12	PCA300F-15	PCA300F-24	PCA300F-32	PCA300F-48	
INPUT	VOLTAGE	[VAC] 85 - 264 1 φ						
		[VDC] *1 88 - 370						
	CURRENT[A]	ACIN 100V 3.8typ						
		ACIN 230V 1.6typ						
	FREQUENCY[Hz]	50/60 (45 - 66)						
	EFFICIENCY[%]	ACIN 100V	(Io=50%) 86typ	87typ	87typ	88typ	88typ	88typ
			(Io=100%) 87typ	88typ	88typ	89typ	89typ	89typ
		ACIN 230V	(Io=50%) 87typ	88typ	88typ	89typ	89typ	89typ
			(Io=100%) 89typ	90typ	90typ	91typ	91typ	91typ
	POWER FACTOR	ACIN 100V	0.98typ (Io=100%)					
ACIN 230V		0.95typ (Io=100%)						
INRUSH CURRENT[A]	ACIN 100V*2	20/40 typ (Io=100%) (Primary inrush current / Secondary inrush current) (More than 3 sec. to re-start)						
	ACIN 230V*2	40/40 typ (Io=100%) (Primary inrush current / Secondary inrush current) (More than 3 sec. to re-start)						
LEAKAGE CURRENT[ma]	0.5max (ACIN 240V 60Hz, Io=100%, According to IEC60601-1)							
OUTPUT	VOLTAGE[V]	5	12	15	24	32	48	
	CURRENT[A]	60	27	22	14	10	7	
	LINE REGULATION[mV]	20max	48max	60max	96max	128max	192max	
	LOAD REGULATION[mV]	40max	100max	120max	150max	150max	480max	
	RIPPLE[mVp-p]	0 to +50°C *3*4	160max	240max	240max	240max	320max	480max
		-20 to 0°C *3	280max	320max	320max	320max	420max	640max
	RIPPLE NOISE[mVp-p]	0 to +50°C *3*4	240max	300max	300max	300max	400max	600max
		-20 to 0°C *3	320max	360max	360max	360max	480max	720max
	TEMPERATURE REGULATION[mV]	0 to +50°C *4	50max	120max	150max	240max	320max	480max
		-20 to +50°C *4	75max	180max	180max	290max	400max	600max
	DRIFT[mV]	*5 20max	48max	60max	96max	128max	192max	
	START-UP TIME[ms]	700typ (ACIN 100/230V Io=100%)						
	HOLD-UP TIME[ms]	20typ (ACIN 230V Io=80%) / 16typ (ACIN 230V Io=100%)						
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	3.00 to 6.00	7.20 to 14.40	9.00 to 18.00	14.40 to 28.80	19.20 to 38.40	28.80 to 57.60		
OUTPUT VOLTAGE SETTING[V]	5.00 to 5.05	12.00 to 12.12	15.00 to 15.15	24.00 to 24.24	32.00 to 32.32	48.00 to 48.48		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (Recovers automatically, Hiccup overcurrent)						
	OVERVOLTAGE PROTECTION[V]	6.25 to 7.00	15.00 to 16.80	18.75 to 21.00	30.00 to 33.60	40.00 to 44.80	60.00 to 67.20	
	REMOTE SENSING	Provided						
	REMOTE ON/OFF (RC)	Provided						
	DC_OK LAMP	LED (Blue)						
	ALARM LAMP	LED (Orange)						
COMMUNICATION FUNCTION	Provided (Extended UART)							
ISOLATION	INPUT-OUTPUT	AC4,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 2MOPP						
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 1MOPP						
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)						
	OUTPUT-AUX · RC · PG · INFO · DS · ADDR0 · ADDR1 · ADDR2	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)						
ENVIRONMENT	OPERATING TEMP., HUMIDITY AND ALTITUDE	-20 to +70°C, 20 - 90%RH (Non condensing)						
	STORAGE TEMP., HUMIDITY AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing)						
	VIBRATION	10 - 55Hz 19.6m/s <sup>2</sup> (2G) 3minutes period, 60minutes each along X, Y and Z axis						
	IMPACT	196.1m/s <sup>2</sup> (20G) 11ms, once each X, Y and Z axis						
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL62368-1, EN62368-1, C-UL (equivalent to CAN/CSA-C22.2 No.62368-1), ANSI/AAMI ES60601-1, EN60601-1 3rd, C-UL (equivalent to CAN/CSA-C22.2 No.60601-1), Complies with IEC60601-1-2 4th Ed.						
	CONDUCTED NOISE	Complies with FCC Part15 classB, VCCI-B, CISPR32-B, EN55011-B, EN55032-B						
	HARMONIC ATTENUATOR *6	Complies with IEC61000-3-2 (class A)						

## SPECIFICATIONS

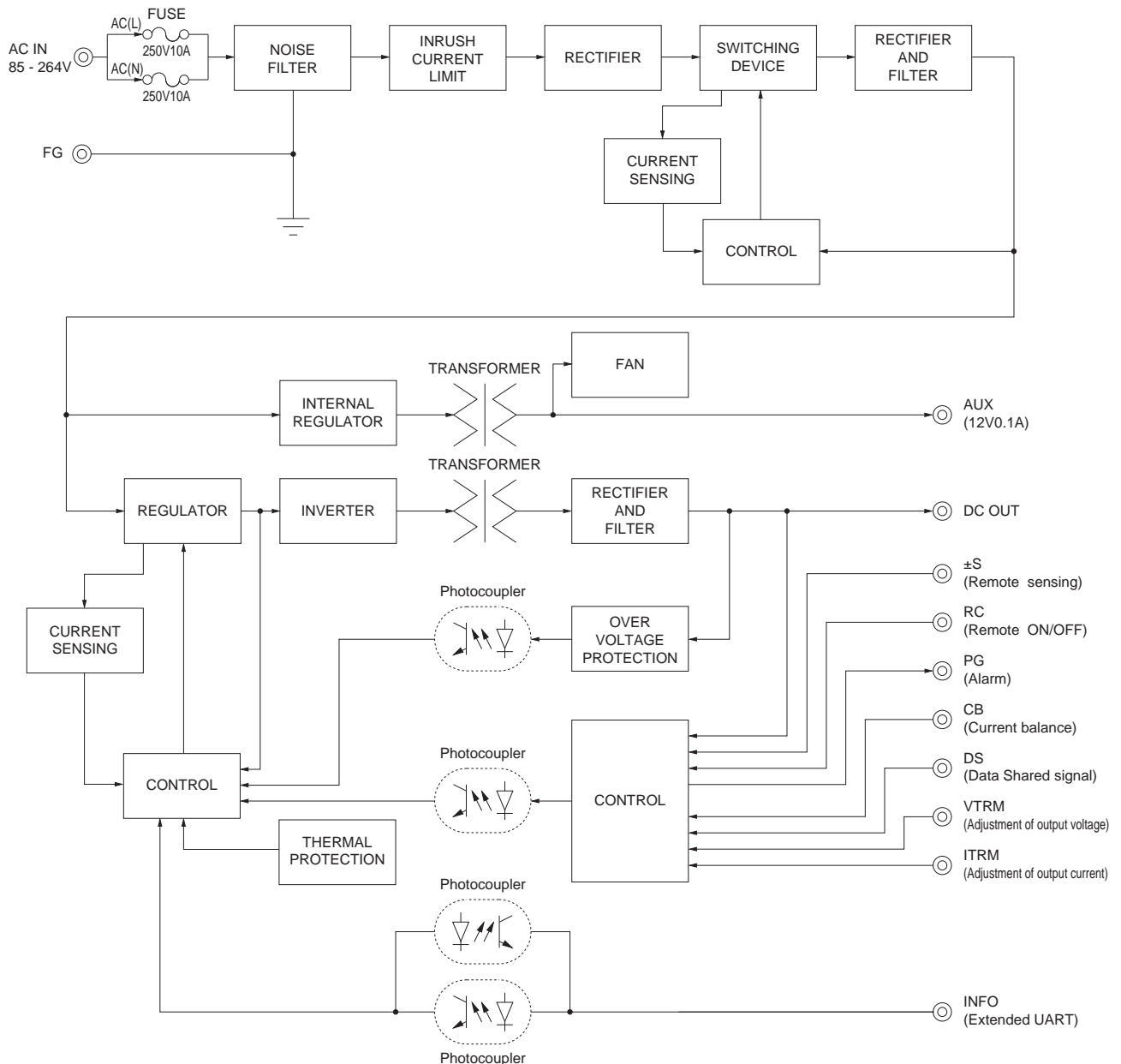
OTHERS	CASE SIZE/WEIGHT	89 X 41 X 152mm [3.50 X 1.61 X 5.98 inches] (without terminal block and screw) (W X H X D) / 840g max
	COOLING METHOD	Forced cooling (internal fan)

- \*1 DC input safety agency approvals deleted.
- \*2 The value is primary surge. The current of input surge to a built-in EMI/EMS Filter(0.2ms or less) is excluded.
- \*3 Measured by 20MHz oscilloscope or Ripple-Noise meter (equivalent to KEISOKU-GIKEN:RM103). Please refer to the instruction manual 1.2.
- \*4 5V output product, the maximum temperature of 40°C.
- \*5 Drift is the change in DC output for an eight hours period after a half-hour warm-up at 25°C.
- \*6 Please contact us about another class.
- \*7 The listed options may affect the published standard specifications. Please contact us for detailed product specifications and safety approvals.
- \* A sound may occur from power supply at pulse loading.

## Features

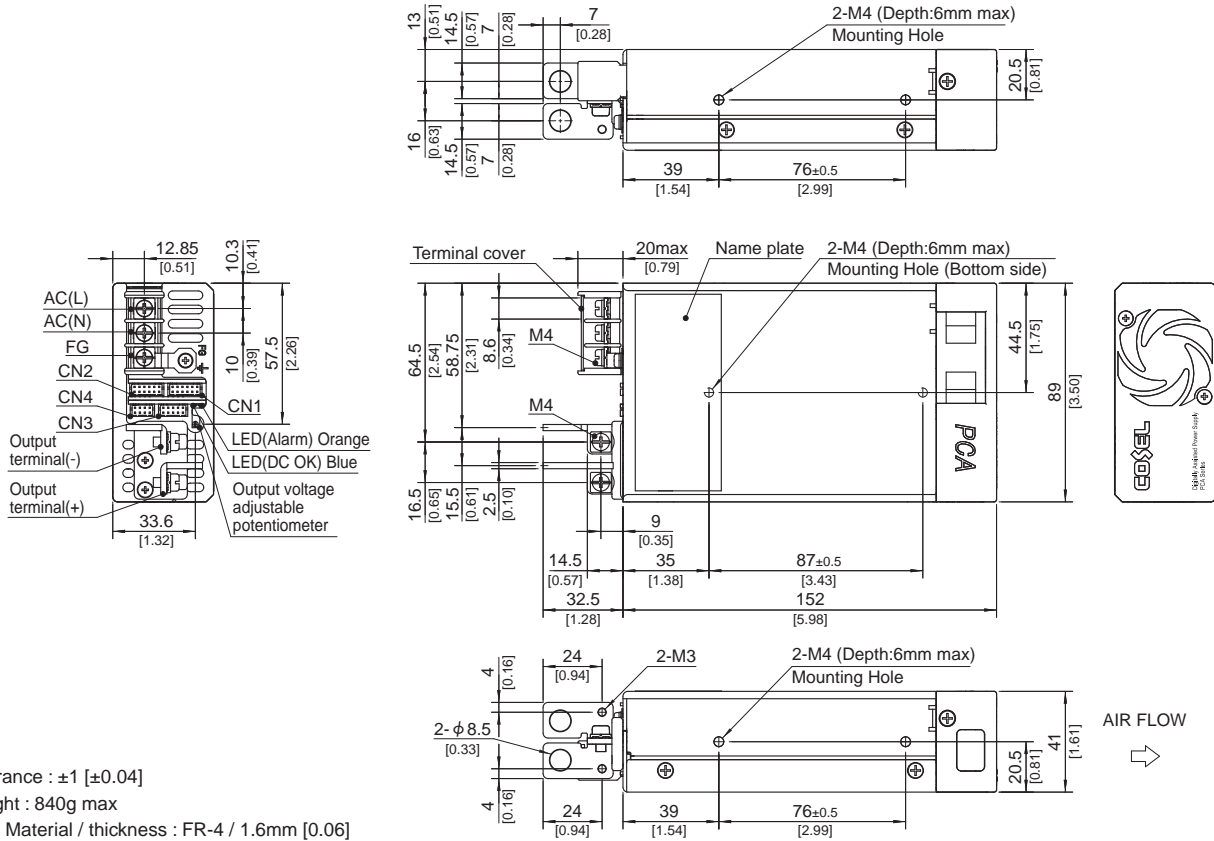
- Low profile (41mm, 1.61 inch = meet to 1U height)
- Universal input 85 - 264VAC
- DC input 88 - 370VDC possible
- For medical electric equipment (ANSI/AAMI ES60601-1, EN60601-1 3rd, IEC60601-1-2 4th Ed.)
- Medical Isolation Grade 2MOPP
- With AUX output 12V 0.1A (Voltage variable range 5 - 12V)
- Constant current regulation
- Output voltage can be varied to near 0V (Refer to Instruction Manual item 2.6)
- With various alarms
- Parallel Operation / N+1 Parallel Redundancy Operation possible
- Monitoring function by communication and various setting values can be changed (Refer to Instruction Manual item 2.11)

## Block diagram



External view

<PCA300F-□ (Bus Bar Style) >

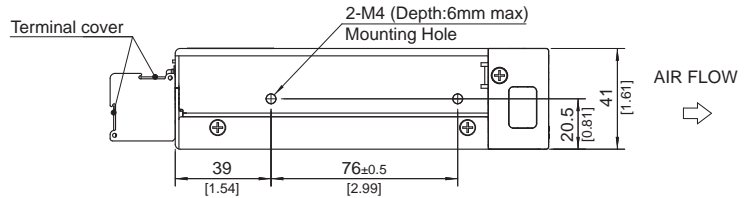
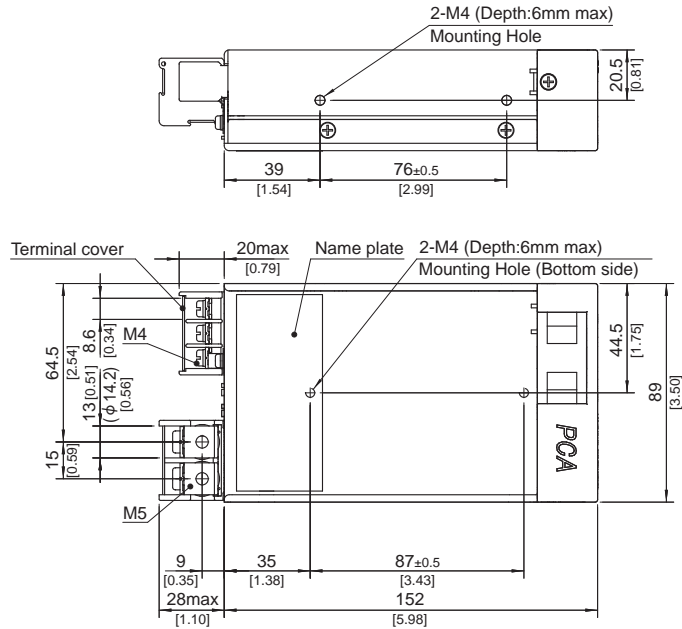
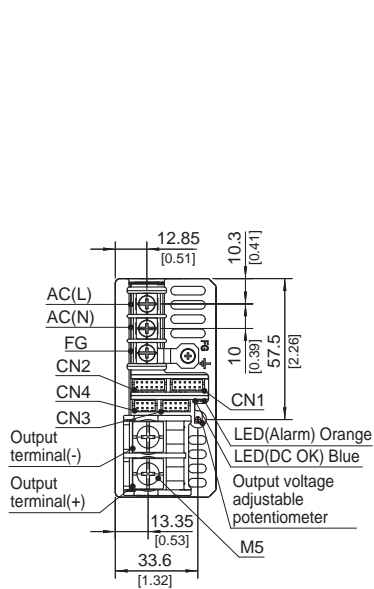


- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 840g max
- ※ PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis Material : Aluminum
- ※ Fan cover Material : PBT
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 1.2N·m max
- ※ Input and output terminal screw tightening torque
  - M3 0.6N·m max
  - M4 1.6N·m max
- ※ Please connect safety ground to FG terminal on the unit.



## External view

<PCA300F-□-T (Terminal Block Style) >

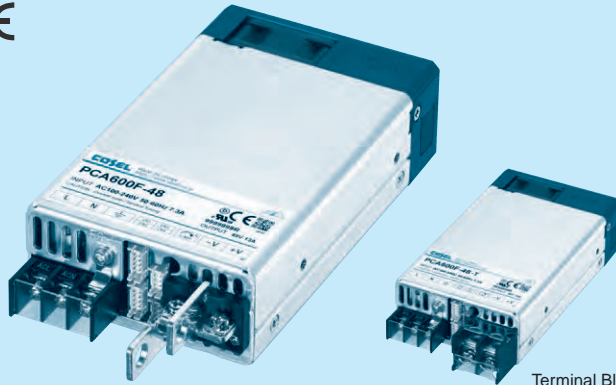


- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 840g max
- ※ PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis Material : Aluminum
- ※ Fan cover Material : PBT
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 1.2N·m max
- ※ Input and output terminal screw tightening torque
  - M4 1.6N·m max
  - M5 2.5N·m max
- ※ Please connect safety ground to FG terminal on the unit.

# PCA600F

PC A 600 F -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-16-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*7
- C : with Coating
- G : Low leakage current
- T : Terminal Block Style (Only 12V, 15V, 24V, 32V and 48V)
- I : with PMBus interface
- F2 : Reverse air exhaust type
- P3 : Master-slave Operation
- W1 : Alarm function

For option details, refer to instruction manual 6.1.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PCA600F-5	PCA600F-12	PCA600F-15	PCA600F-24	PCA600F-32	PCA600F-48
MAX OUTPUT WATTAGE[W]	600	636	645	648	640	624
DC OUTPUT	5V 120A	12V 53A	15V 43A	24V 27A	32V 20A	48V 13A

## SPECIFICATIONS

	MODEL	PCA600F-5	PCA600F-12	PCA600F-15	PCA600F-24	PCA600F-32	PCA600F-48	
INPUT	VOLTAGE [VAC]	85 - 264 1 φ (Output derating is required at less than 90V. Refer to "Derating")						
	[VDC] *1	88 - 370 (Output derating is required at less than 110V. Refer to "Derating")						
	CURRENT[A]	ACIN 100V	7.3typ					
		ACIN 230V	3.2typ					
	FREQUENCY[Hz]	50/60 (45 - 66)						
	EFFICIENCY[%]	ACIN 100V	(Io=50%)	90typ	91typ	91typ	91typ	91typ
			(Io=100%)	89typ	90typ	90typ	91typ	91typ
		ACIN 230V	(Io=50%)	92typ	92typ	92typ	93typ	93typ
			(Io=100%)	91typ	92typ	92typ	93typ	93typ
	POWER FACTOR	ACIN 100V	0.98typ (Io=100%)					
ACIN 230V		0.95typ (Io=100%)						
INRUSH CURRENT[A]	ACIN 100V*2	20/40 typ (Io=100%) (Primary inrush current / Secondary inrush current) (More than 3 sec. to re-start)						
	ACIN 230V*2	40/40 typ (Io=100%) (Primary inrush current / Secondary inrush current) (More than 3 sec. to re-start)						
LEAKAGE CURRENT[ma]	0.5max (ACIN 240V 60Hz, Io=100%, According to IEC60601-1)							
OUTPUT	VOLTAGE[V]	5	12	15	24	32	48	
	CURRENT[A]	120	53	43	27	20	13	
	LINE REGULATION[mV]	20max	48max	60max	96max	128max	192max	
	LOAD REGULATION[mV]	40max	100max	120max	150max	150max	480max	
	RIPPLE[mVp-p]	0 to +50°C *3*4	160max	240max	240max	240max	320max	480max
		-20 to 0°C *3	280max	320max	320max	320max	420max	640max
	RIPPLE NOISE[mVp-p]	0 to +50°C *3*4	240max	300max	300max	300max	400max	600max
		-20 to 0°C *3	320max	360max	360max	360max	480max	720max
	TEMPERATURE REGULATION[mV]	0 to +50°C *4	50max	120max	150max	240max	320max	480max
		-20 to +50°C *4	75max	180max	180max	290max	400max	600max
	DRIFT[mV]	*5	20max	48max	60max	96max	128max	192max
	START-UP TIME[ms]	700typ (ACIN 100/230V Io=100%)						
	HOLD-UP TIME[ms]	20typ (ACIN 230V Io=80%) / 16typ (ACIN 230V Io=100%)						
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	3.00 to 6.00	7.20 to 14.40	9.00 to 18.00	14.40 to 28.80	19.20 to 38.40	28.80 to 57.60	
OUTPUT VOLTAGE SETTING[V]	5.00 to 5.05	12.00 to 12.12	15.00 to 15.15	24.00 to 24.24	32.00 to 32.32	48.00 to 48.48		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (Recovers automatically, Hiccup overcurrent)						
	OVERVOLTAGE PROTECTION[V]	6.25 to 7.00	15.00 to 16.80	18.75 to 21.00	30.00 to 33.60	40.00 to 44.80	60.00 to 67.20	
	REMOTE SENSING	Provided						
	REMOTE ON/OFF (RC)	Provided						
	DC_OK LAMP	LED (Blue)						
	ALARM LAMP	LED (Orange)						
COMMUNICATION FUNCTION	Provided (Extended UART)							
ISOLATION	INPUT-OUTPUT	AC4,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 2MOPP						
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 1MOPP						
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)						
	OUTPUT - AUX · RC · PG · INFO · DS · ADDR0 · ADDR1 · ADDR2	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)						
ENVIRONMENT	OPERATING TEMP., HUMIDITY AND ALTITUDE	-20 to +70°C, 20 - 90%RH (Non condensing)						
	STORAGE TEMP., HUMIDITY AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing)						
	VIBRATION	10 - 55Hz 19.6m/s <sup>2</sup> (2G) 3minutes period, 60minutes each along X, Y and Z axis						
	IMPACT	196.1m/s <sup>2</sup> (20G) 11ms, once each X, Y and Z axis						
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL62368-1, EN62368-1, C-UL (equivalent to CAN/CSA-C22.2 No.62368-1), ANSI/AAMI ES60601-1, EN60601-1 3rd, C-UL (equivalent to CAN/CSA-C22.2 No.60601-1), Complies with IEC60601-1-2 4th Ed.						
	CONDUCTED NOISE	Complies with FCC Part15 classB, VCCI-B, CISPR32-B, EN55011-B, EN55032-B						
	HARMONIC ATTENUATOR *6	Complies with IEC61000-3-2 (class A)						

**SPECIFICATIONS**

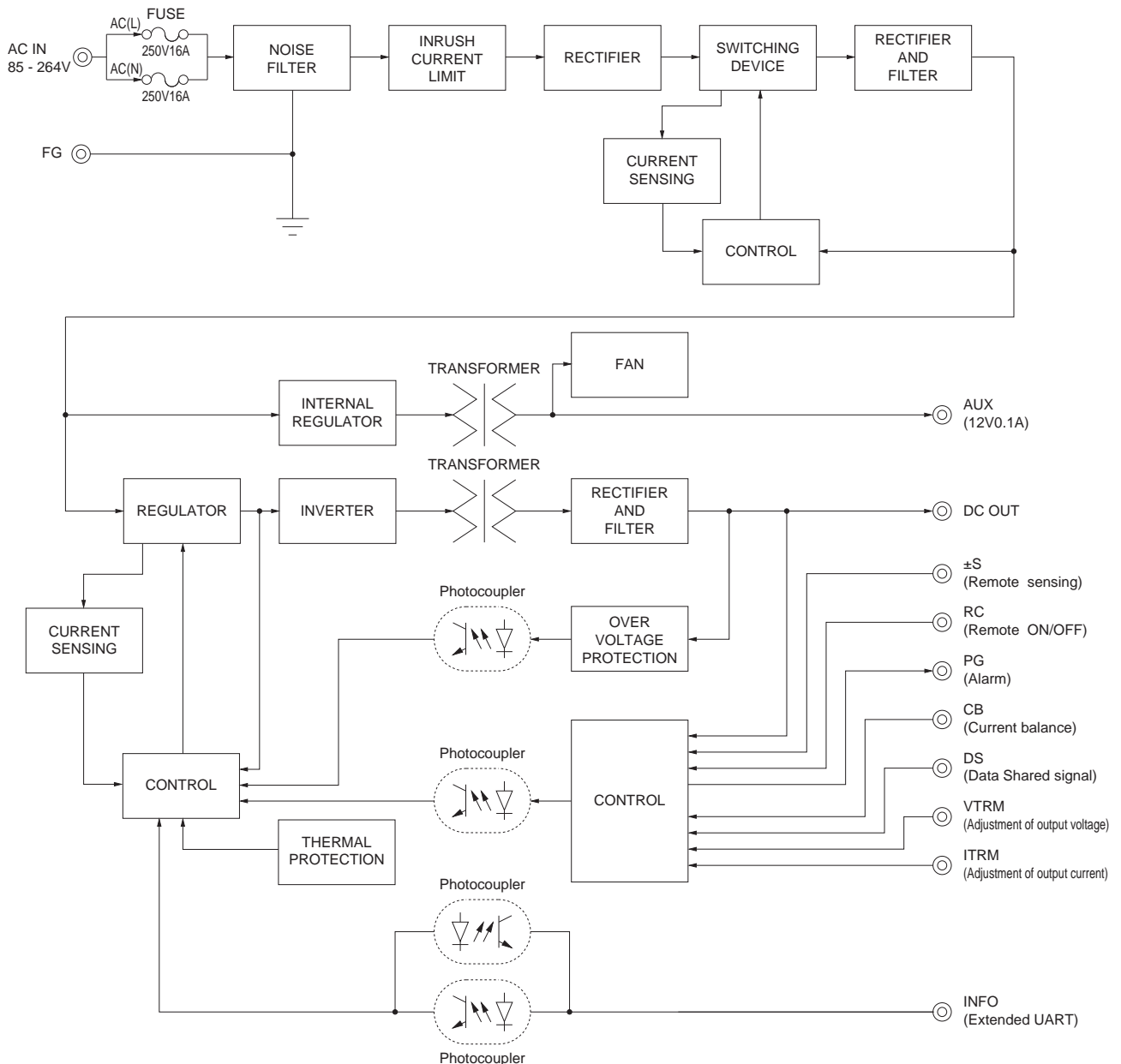
OTHERS	CASE SIZE/WEIGHT	89 X 41 X 152mm [3.50 X 1.61 X 5.98 inches] (without terminal block and screw) (W X H X D) / 840g max
	COOLING METHOD	Forced cooling (internal fan)

- \*1 DC input safety agency approvals deleted.
- \*2 The value is primary surge. The current of input surge to a built-in EMI/EMS Filter(0.2ms or less) is excluded.
- \*3 Measured by 20MHz oscilloscope or Ripple-Noise meter (equivalent to KEISOKU-GIKEN:RM103). Please refer to the instruction manual 1.2.
- \*4 5V output product, the maximum temperature of 40°C.
- \*5 Drift is the change in DC output for an eight hours period after a half-hour warm-up at 25°C.
- \*6 Please contact us about another class.
- \*7 The listed options may affect the published standard specifications. Please contact us for detailed product specifications and safety approvals.
- \* A sound may occur from power supply at pulse loading.

**Features**

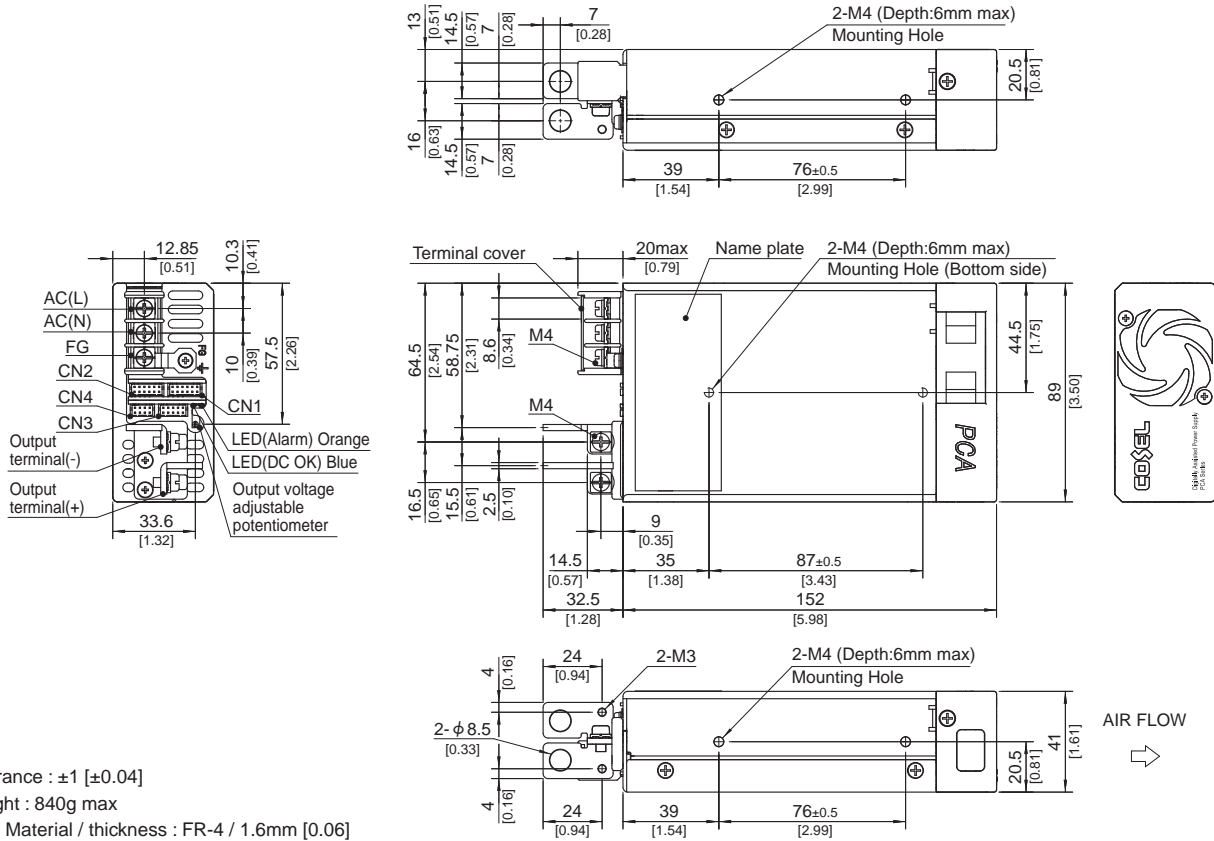
- Low profile (41mm, 1.61 inch = meet to 1U height)
- Universal input 85 - 264VAC (Refer to “Derating”, when using at 85 - 90VAC)
- DC input 88 - 370VDC possible (Refer to when using at 88 - 110VDC)
- For medical electric equipment (ANSI/AAMI ES60601-1, EN60601-1 3rd, IEC60601-1-2 4th Ed.)
- Medical Isolation Grade 2MOPP
- With AUX output 12V 0.1A (Voltage variable range 5 - 12V)
- Constant current regulation
- Output voltage can be varied to near 0V (Refer to Instruction Manual item 2.6)
- With various alarms
- Parallel Operation / N+1 Parallel Redundancy Operation possible
- Monitoring function by communication and various setting values can be changed (Refer to Instruction Manual item 2.11)

**Block diagram**



External view

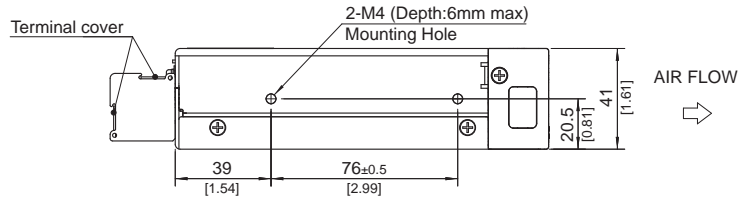
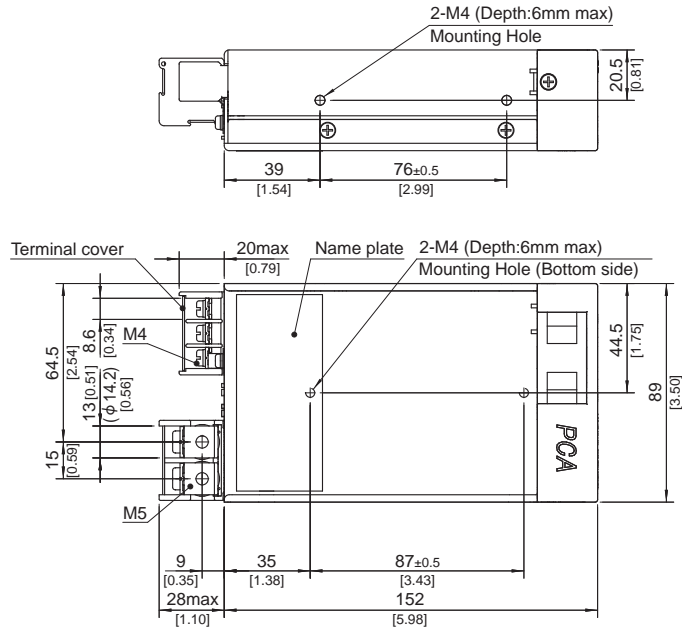
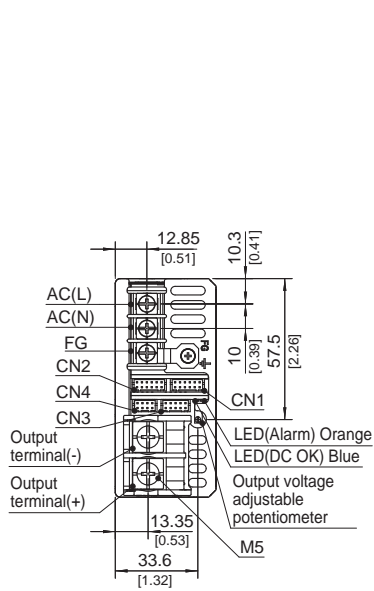
<PCA600F-□ (Bus Bar Style) >



- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 840g max
- ※ PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis Material : Aluminum
- ※ Fan cover Material : PBT
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 1.2N·m max
- ※ Input and output terminal screw tightening torque
  - M3 0.6N·m max
  - M4 1.6N·m max
- ※ Please connect safety ground to FG terminal on the unit.

## External view

<PCA600F-□-T (Terminal Block Style) >



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 840g max
- ※ PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis Material : Aluminum
- ※ Fan cover Material : PBT
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 1.2N·m max
- ※ Input and output terminal screw tightening torque
  - M4 1.6N·m max
  - M5 2.5N·m max
- ※ Please connect safety ground to FG terminal on the unit.

# PCA1000F

PC A 1000 F -5 -□

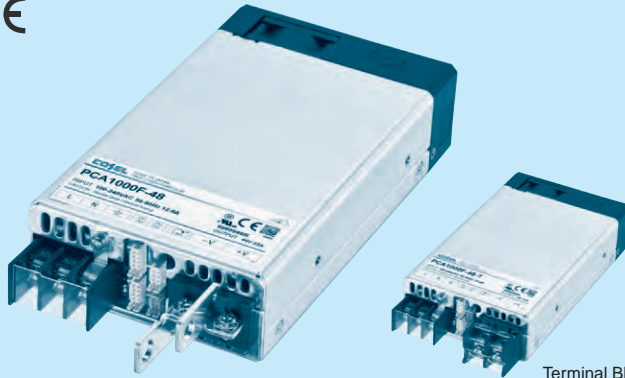
① ② ③ ④ ⑤ ⑥



RoHS



2MOPP



Terminal Block Style

Example recommended EMI/EMC filter  
NAC-20-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*6
- C : with Coating
- G : Low leakage current
- T : Terminal Block Style (Only 24V, 32V and 48V)
- I : with PMBus interface
- F2 : Reverse air exhaust type
- P3 : Master-slave Operation
- W1 : Alarm function
- E1 : EMI classB (Only 24V, 32V and 48V)

For option details, refer to instruction manual 6.1.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PCA1000F-5	PCA1000F-12	PCA1000F-15	PCA1000F-24	PCA1000F-32	PCA1000F-48
MAX OUTPUT WATTAGE[W]	1000	1056	1050	1056	1056	1056
DC OUTPUT	5V 200A	12V 88A	15V 70A	24V 44A	32V 33A	48V 22A

## SPECIFICATIONS

	MODEL	PCA1000F-5	PCA1000F-12	PCA1000F-15	PCA1000F-24	PCA1000F-32	PCA1000F-48	
INPUT	VOLTAGE [VAC]	85 - 264 1 φ (Output derating is required at less than 90V. Refer to "Derating")						
	CURRENT[A]	ACIN 100V	12.0typ					
		ACIN 230V	5.3typ					
	FREQUENCY[Hz]	50/60 (45 - 66)						
	EFFICIENCY[%]	ACIN 100V	(Io=50%)	90typ	91typ	91typ	91typ	91typ
			(Io=100%)	89typ	90typ	90typ	91typ	91typ
		ACIN 230V	(Io=50%)	92typ	92typ	92typ	93typ	93typ
			(Io=100%)	91typ	92typ	92typ	93typ	93typ
	POWER FACTOR	ACIN 100V	0.98typ (Io=100%)					
		ACIN 230V	0.95typ (Io=100%)					
INRUSH CURRENT[A]	ACIN 100V*1	20/40 typ (Io=100%) (Primary inrush current / Secondary inrush current) (More than 3 sec. to re-start)						
	ACIN 230V*1	40/40 typ (Io=100%) (Primary inrush current / Secondary inrush current) (More than 3 sec. to re-start)						
LEAKAGE CURRENT[ma]	0.5max (ACIN 240V 60Hz, Io=100%, According to IEC60601-1)							
OUTPUT	VOLTAGE[V]	5	12	15	24	32	48	
	CURRENT[A]	200	88	70	44	33	22	
	LINE REGULATION[mV]	20max	48max	60max	96max	128max	192max	
	LOAD REGULATION[mV]	40max	100max	120max	150max	150max	480max	
	RIPPLE[mVp-p]	0 to +50°C *2*3	160max	240max	240max	240max	320max	480max
		-20 to 0°C *2	280max	320max	320max	320max	420max	640max
	RIPPLE NOISE[mVp-p]	0 to +50°C *2*3	240max	300max	300max	300max	400max	600max
		-20 to 0°C *2	320max	360max	360max	360max	480max	720max
	TEMPERATURE REGULATION[mV]	0 to +50°C *3	50max	120max	150max	240max	320max	480max
		-20 to +50°C *3	75max	180max	180max	290max	400max	600max
DRIFT[mV]	*4	20max	48max	60max	96max	128max	192max	
START-UP TIME[ms]	700typ (ACIN 100/230V Io=100%)							
HOLD-UP TIME[ms]	20typ (ACIN 230V Io=80%) / 16typ (ACIN 230V Io=100%)							
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	3.00 to 6.00	7.20 to 14.40	9.00 to 18.00	14.40 to 28.80	19.20 to 38.40	28.80 to 57.60		
OUTPUT VOLTAGE SETTING[V]	5.00 to 5.05	12.00 to 12.12	15.00 to 15.15	24.00 to 24.24	32.00 to 32.32	48.00 to 48.48		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (Recovers automatically, Hiccup overcurrent)						
	OVERVOLTAGE PROTECTION[V]	6.25 to 7.00	15.00 to 16.80	18.75 to 21.00	30.00 to 33.60	40.00 to 44.80	60.00 to 67.20	
	REMOTE SENSING	Provided						
	REMOTE ON/OFF (RC)	Provided						
	DC_OK LAMP	LED (Blue)						
	ALARM LAMP	LED (Orange)						
COMMUNICATION FUNCTION	Provided (Extended UART)							
ISOLATION	INPUT-OUTPUT	AC4,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 2MOPP						
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 1MOPP						
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)						
	OUTPUT-AUX-RC-PG-INFO-DS-ADDR0-ADDR1-ADDR2	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)						
ENVIRONMENT	OPERATING TEMP., HUMIDITY AND ALTITUDE	-20 to +70°C, 20 - 90%RH (Non condensing)						
	STORAGE TEMP., HUMIDITY AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing)						
	VIBRATION	10 - 55Hz 19.6m/s <sup>2</sup> (2G) 3minutes period, 60minutes each along X, Y and Z axis						
	IMPACT	196.1m/s <sup>2</sup> (20G) 11ms, once each X, Y and Z axis						
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL62368-1, EN62368-1, C-UL (equivalent to CAN/CSA-C22.2 No.62368-1), ANSI/AAMI ES60601-1, EN60601-1 3rd, C-UL (equivalent to CAN/CSA-C22.2 No.60601-1), Complies with IEC60601-1-2 4th Ed.						
	CONDUCTED NOISE	Complies with FCC Part15 classA, VCCI-A, CISPR32-A, EN55011-A, EN55032-A						
	HARMONIC ATTENUATOR *5	Complies with IEC61000-3-2 (class A)						

## SPECIFICATIONS

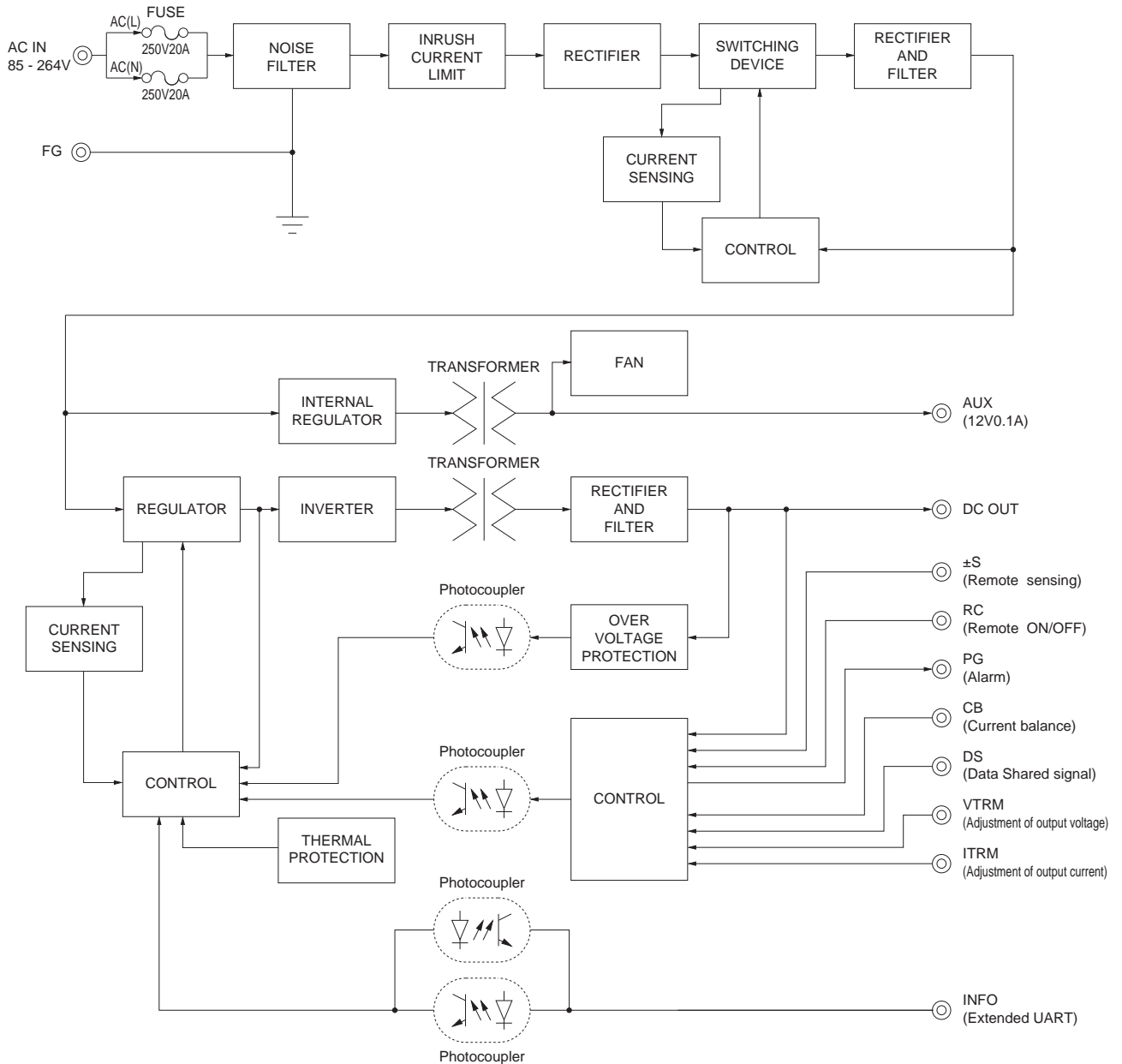
OTHERS	CASE SIZE/WEIGHT	102×41×178mm [4.02×1.61×7.01 inches] (without terminal block and screw) (W×H×D) / 1.2kg max
	COOLING METHOD	Forced cooling (internal fan)

- \*1 The value is primary surge. The current of input surge to a built-in EMI/EMS Filter(0.2ms or less) is excluded.
- \*2 Measured by 20MHz oscilloscope or Ripple-Noise meter (equivalent to KEISOKU-GIKEN:RM103). Please refer to the instruction manual 1.2.
- \*3 5V, 12V, 15V output product, the maximum temperature of 40°C.
- \*4 Drift is the change in DC output for an eight hours period after a half-hour warm-up at 25°C.
- \*5 Please contact us about another class.
- \*6 The listed options may affect the published standard specifications. Please contact us for detailed product specifications and safety approvals.
- \* A sound may occur from power supply at pulse loading.

### Features

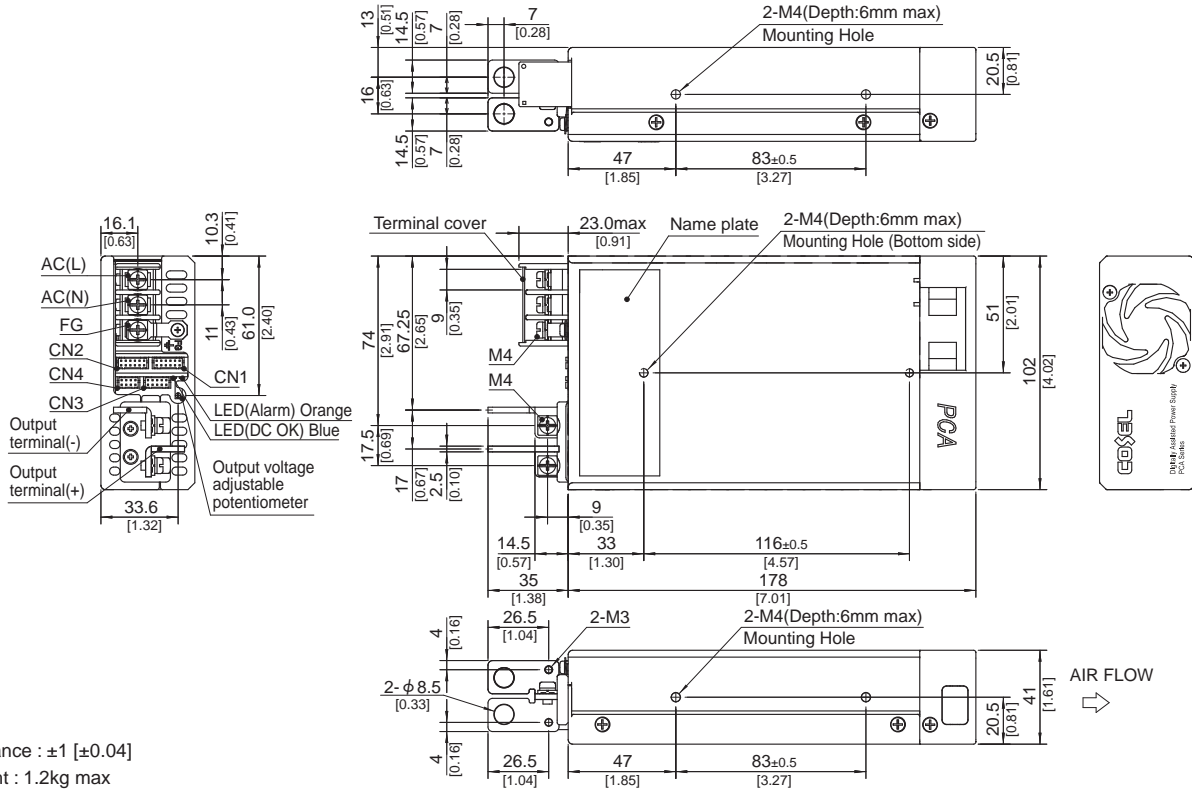
- Low profile (41mm, 1.61 inch = meet to 1U height)
- Universal input 85 - 264VAC (Refer to “Derating”, when using at 85 - 90VAC)
- For medical electric equipment (ANSI/AAMI ES60601-1, EN60601-1 3rd, IEC60601-1-2 4th Ed.)
- Medical Isolation Grade 2MOPP
- With AUX output 12V 0.1A (Voltage variable range 5 - 12V)
- Constant current regulation
- Output voltage can be varied to near 0V (Refer to Instruction Manual item 2.6)
- With various alarms
- Parallel Operation / N+1 Parallel Redundancy Operation possible
- Monitoring function by communication and various setting values can be changed (Refer to Instruction Manual item 2.11)

### Block diagram



External view

<PCA1000F-□ (Bus Bar Style) >

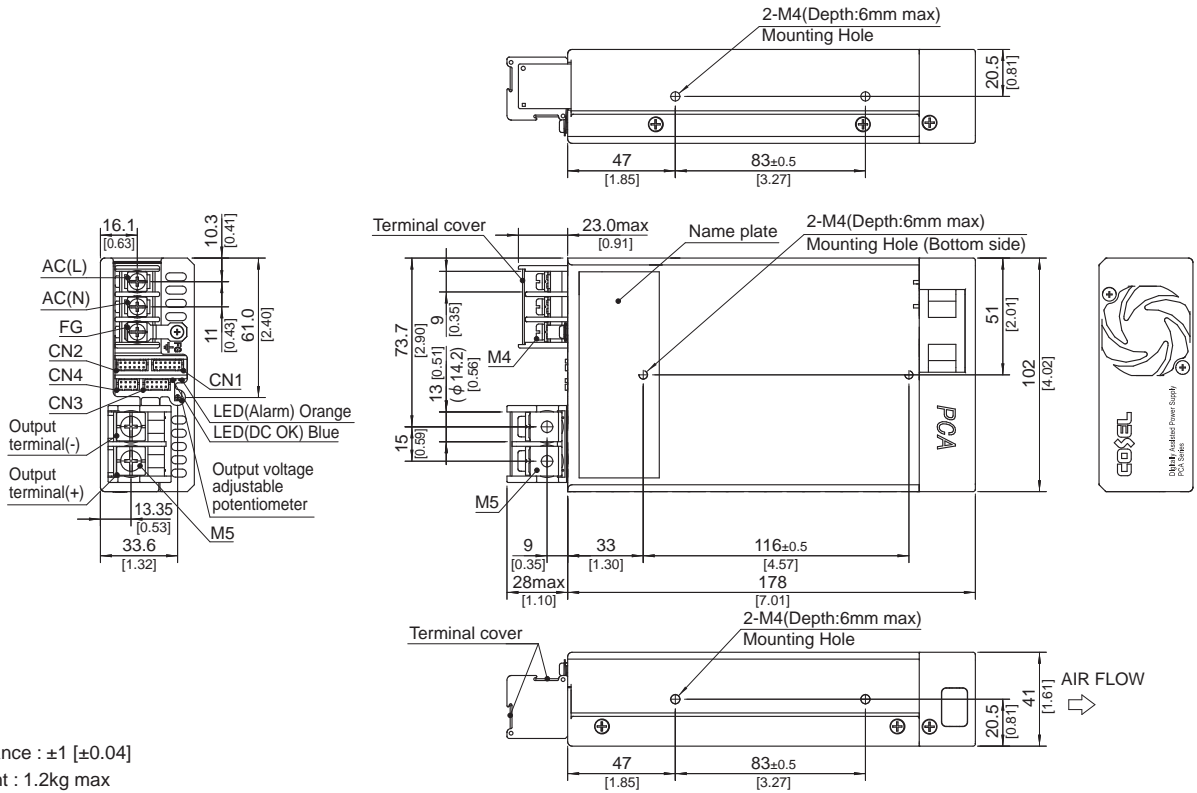


- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 1.2kg max
- ※ PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis Material : Aluminum
- ※ Fan cover Material : PBT
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 1.2N·m max
- ※ Input and output terminal screw tightening torque
  - M3 0.6N·m max
  - M4 1.6N·m max
- ※ Please connect safety ground to FG terminal on the unit.



## External view

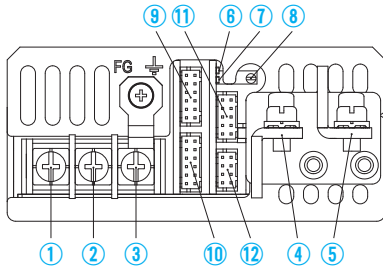
<PCA1000F-□-T (Terminal Block Style) >



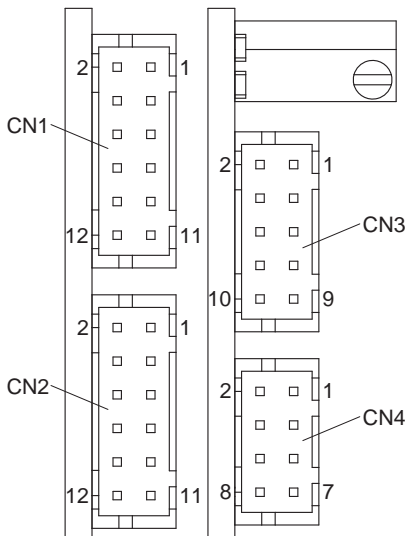
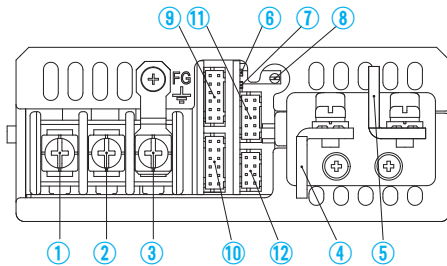
- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 1.2kg max
- ※ PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis Material : Aluminum
- ※ Fan cover Material : PBT
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 1.2N·m max
- ※ Input and output terminal screw tightening torque
  - M4 1.6N·m max
  - M5 2.5N·m max
- ※ Please connect safety ground to FG terminal on the unit.

Terminal Blocks

● PCA300F, PCA600F



● PCA1000F



Connector pin numbers

- ①AC (L) } Input Terminals 85 - 264VAC 1 φ 45 - 66Hz
- ②AC (N) } (M4) 88 - 370VDC (Excluding PCA1000F)
- ③Frame ground (M4)
- ④-Output
- ⑤+Output
- ⑥LED for fault condition detection (ALARM)
- ⑦LED for output voltage confirmation (DC\_OK)
- ⑧Output voltage adjustable potentiometer
- ⑨CN1 } Connectors
- ⑩CN2 }
- ⑪CN3 }
- ⑫CN4 }

Pin Configuration and Functions of CN1, CN2

Pin No.	Function	Ground level	
1	+S	+Remote sensing	COM
2	N.C.	No connection	-
3	N.C.	No connection	-
4	-S	-Remote sensing	COM
5	VTRM	Adjustment of output voltage	COM
6	COM	Common ground (for signal)	COM
7	INFO	Extended UART signal	SGND
8	CB	Current Balance	COM
9	DS	Data Shared signal	SGND
10	SGND	Signal ground	SGND
11	RC2	Remote ON/OFF	RCG
12	RCG	Remote ON/OFF ground	RCG

\* Each terminal of CN1 and CN2 are connected inside the power supply.

Pin Configuration and Functions of CN3

Pin No.	Function	Ground level	
1	AUX	Auxiliary output	AUXG
2	AUXG	Auxiliary output ground	AUXG
3	RC1	Remote ON/OFF	AUXG
4	AUXG	Auxiliary output ground	AUXG
5	PG	Alarm	PGG
6	PGG	Alarm ground	PGG
7	ITRM	Adjustment of output current	COM
8	COM	Common ground (for signal)	COM
9	VTRM_EN	Enable Vtrm	COM
10	SLV_EN	Enable Slave mode *1	COM

Pin Configuration and Functions of CN4

Pin No.	Function	Ground level	
1	SDA	Serial data *2	SGND
2	SGND	Signal ground	SGND
3	SCL	Serial clock *2	SGND
4	SMBA	SMBAlert *2	SGND
5	ADDR0	Address bit 0	SGND
6	ADDR1	Address bit 1	SGND
7	ADDR2	Address bit 2	SGND
8	SGND	Signal ground	SGND

Matching connectors and terminals

Connector	Housing	Terminal	Mfr.
CN1	S12B-PHDSS	PHDR-12VS	Reel : SPHD-002T-P0.5 Loose : BPHD-001T-P0.5 *3 BPHD-002T-P0.5 *3 J.S.T
CN2	S12B-PHDSS	PHDR-12VS	
CN3	S10B-PHDSS	PHDR-10VS	
CN4	S8B-PHDSS	PHDR-8VS	

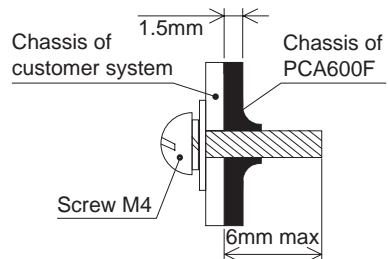
\*1 For -P3 option.

\*2 For -I option.

\*3 The manufacturer prepares only the ratchet hand.

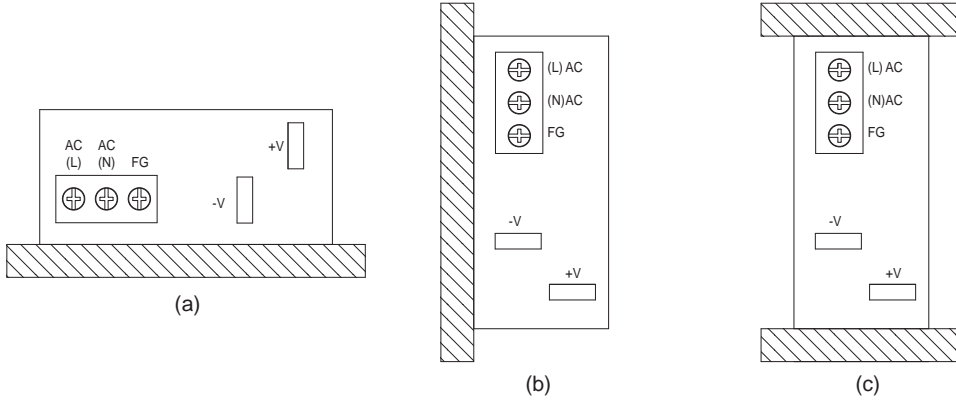
Assembling and Installation Method

■ To keep enough isolation between screws and internal components, the length of mounting screws should not exceed right figure.



**Assembling and Installation Method**

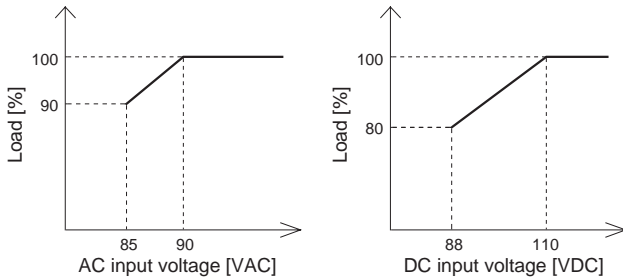
- Please do not block built-in fans and ventilation holes. When the power supply is mounted by screws, please consider its weight and set it in place. (Please see below.)
- If you use a power supply in a dusty environment, it can give a cause for a failure. Please consider taking such countermeasures as installing an air filter near the suction area of the system to prevent a failure.



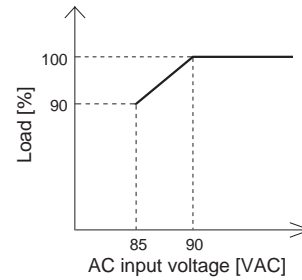
In case of (c), fix it from both directions.

**Derating**

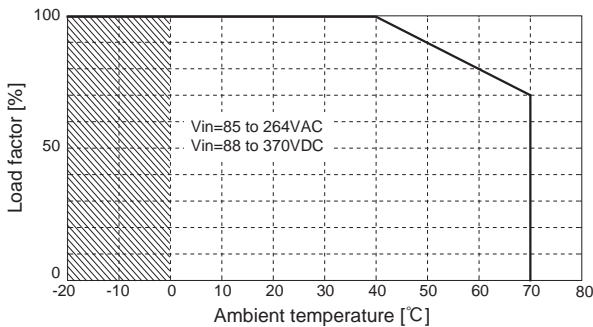
- PCA600F Derating curve depends on AC/DC input voltage



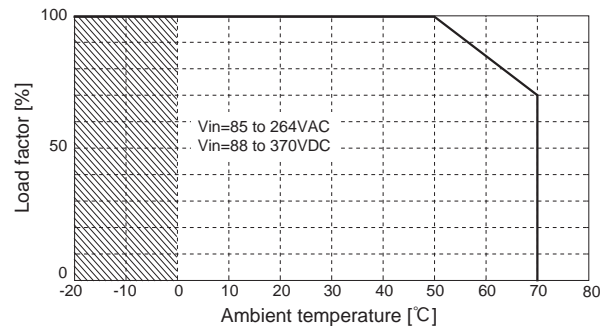
- PCA1000F Derating curve depends on AC/DC input voltage



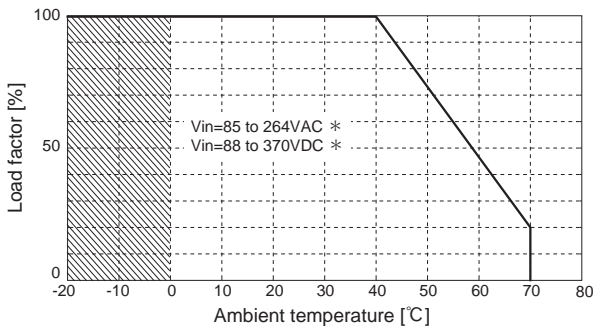
- PCA300F-5 Ambient Temperature Derating Curve



- PCA300F-12, -15, -24, -32, -48 Ambient Temperature Derating Curve

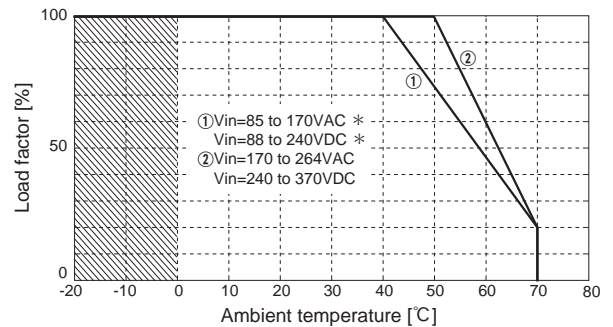


- PCA600F-5 Ambient Temperature Derating Curve



\*With derating due to input voltage

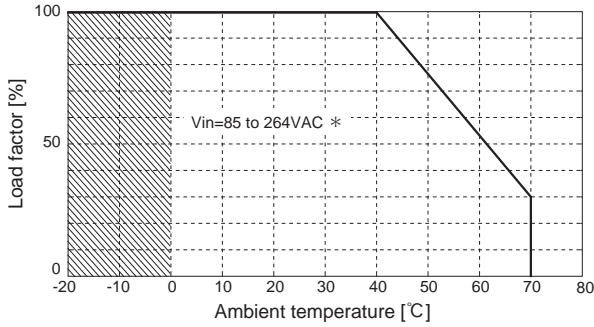
- PCA600F-12, -15, -24, -32, -48 Ambient Temperature Derating Curve



\*With derating due to input voltage

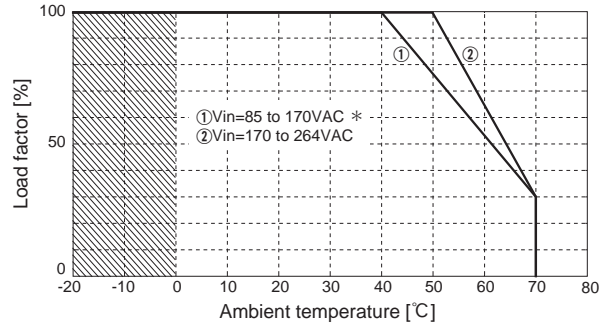
Derating

● PCA1000F-5, -12, -15  
Ambient Temperature Derating Curve



\*With derating due to input voltage

● PCA1000F-24, -32, -48  
Ambient Temperature Derating Curve



\*With derating due to input voltage

- Specifications for ripple and ripple noise changes in the shaded area.
- The ambient temperature is defined as the temperature of the air (at the fan side) that the built-in cooling fan draws in the power supply.

Instruction Manual

◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/PCA/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>



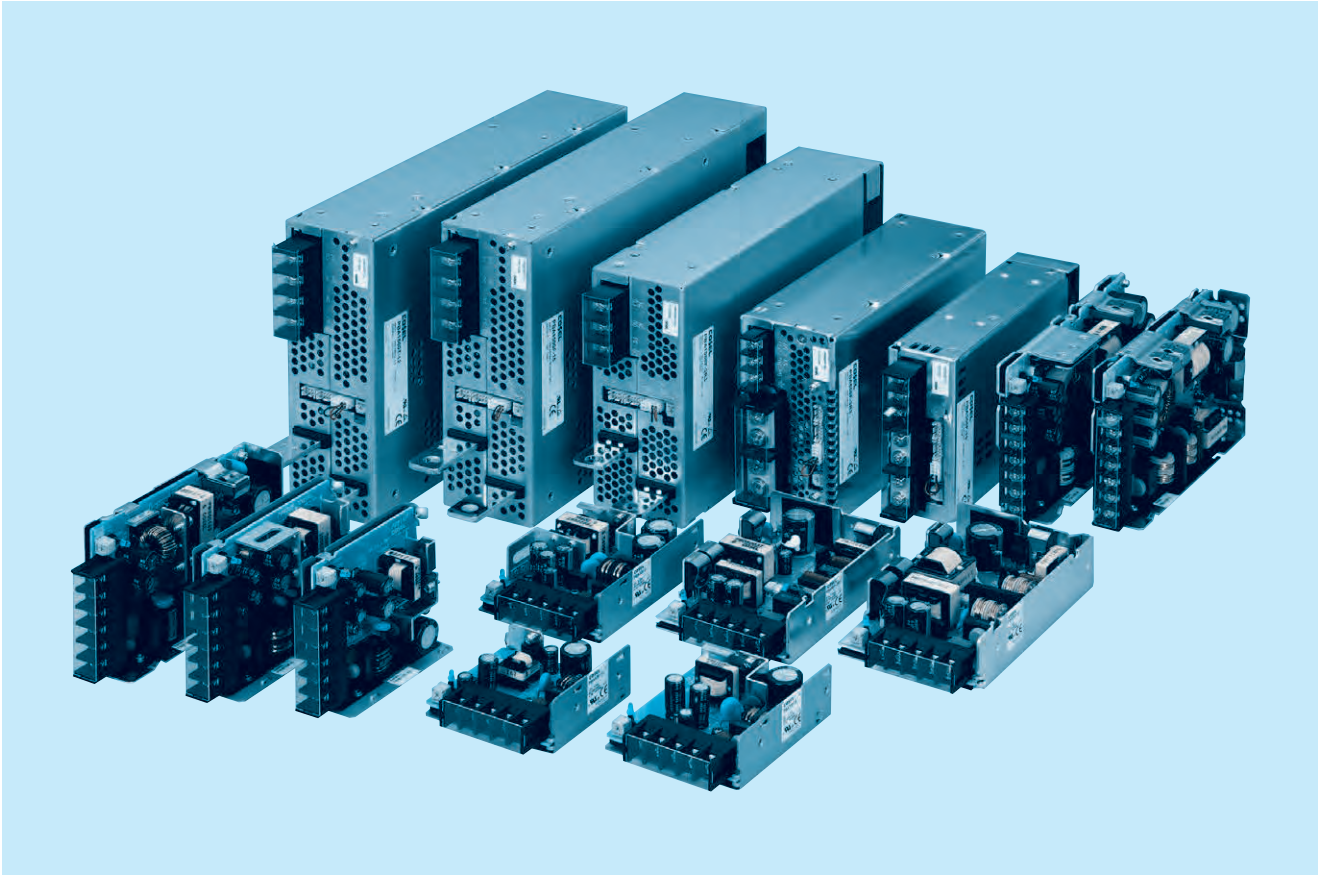
Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	Inrush current protection circuit	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
PCA300F	Active filter	15 - 400	3.8	250V 10A	Relay	FR-4	-	Yes	Yes	Yes
	Buck converter	88								
	Full - bridge converter	44								
PCA600F	Active filter	15 - 400	7.3	250V 16A	Relay	FR-4	-	Yes	Yes	Yes
	Buck converter	88								
	Full - bridge converter	44								
PCA1000F	Active filter	15 - 400	12.0	250V 20A	Relay	FR-4	-	Yes	Yes	Yes
	Buck converter	88								
	Full - bridge converter	44								

\* The value of input current is at ACIN 100VAC and rated load.



# PBA, PBW-series



## Feature

- Small-size & light weight
- Harmonic attenuator (Complies with IEC61000-3-2) : except PBA1500T
- Universal input (AC85 - 264V) : PBA1500T(AC170 - 264V 3 φ)
- Efficiency increased with synchronous rectification technology (PBA50F - 150F)
- Variety of option (PBA10F - 150F, PBW15F - 50F)
- Parallel operation and Parallel redundancy operation (PBA300F - 1500F, PBA1500T)
- Fan alarm, Remote ON/OFF and other functions (PBA300F - 1500F, PBA1500T)

## Safety agency approvals

- UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178
- UL508 (PBA10F - 150F, -24, with cover)
- Complies with DEN-AN

## EMI

- Complies with FCC-B, CISPR22-B, EN55011-B, EN55022-B, VCCI-B

## 5-year warranty (refer to Instruction Manual)

## CE marking

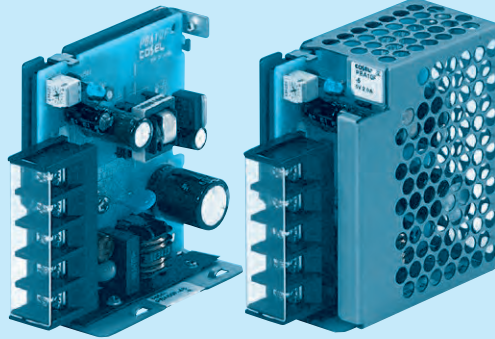
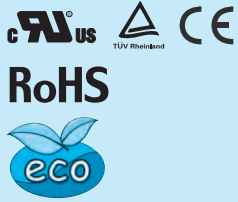
- Low Voltage Directive
- RoHS Directive

## EMS Compliance : EN61204-3, EN61000-6-2

- EN61000-4-2
- EN61000-4-3
- EN61000-4-4
- EN61000-4-5
- EN61000-4-6
- EN61000-4-8
- EN61000-4-11

# PBA10F

PB A 10 F -□ -□  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**NAC-06-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \*A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5
- C : with Coating
- G : Low leakage current
- E : Low leakage current and EMI class A
- T : Vertical terminal block
- J : Connector type
- N : with Cover (UL508 is acquired)
- M : with DIN rail and Cover
- V : Output voltage setting potentiometer externally

Cover is optional

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PBA10F-5	PBA10F-12	PBA10F-24
MAX OUTPUT WATTAGE[W]	10	10.8	12
DC OUTPUT	5V 2A	12V 0.9A	24V 0.5A

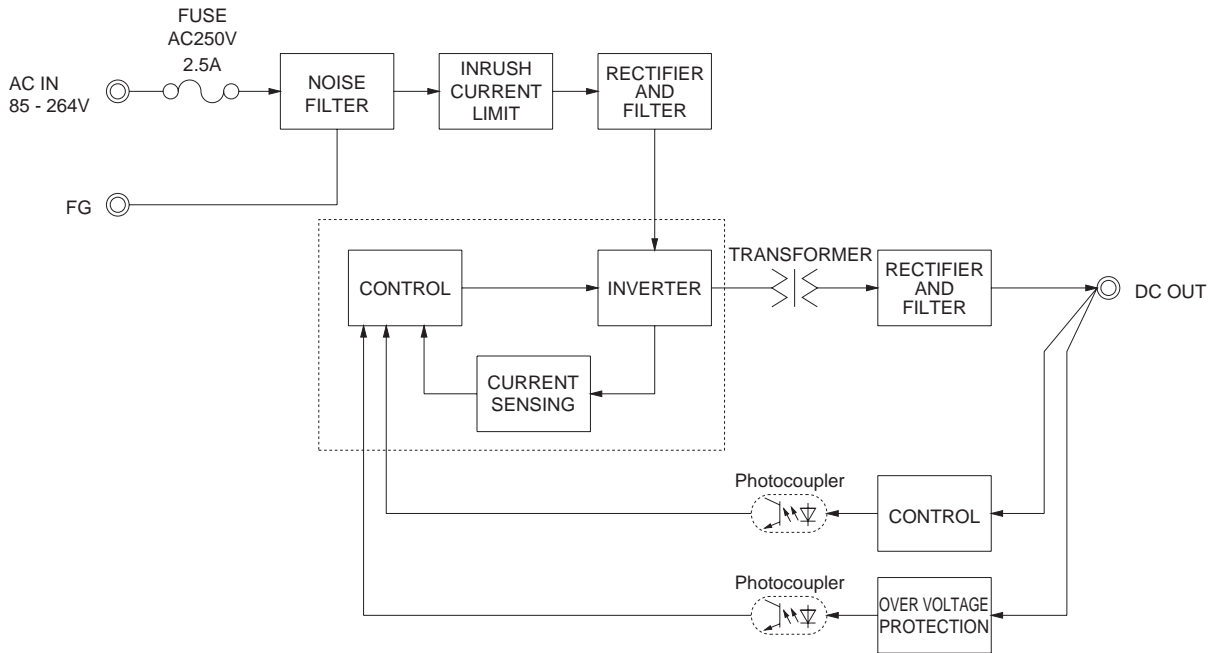
## SPECIFICATIONS

	MODEL	PBA10F-5	PBA10F-12	PBA10F-24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ or DC110 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *3)			
	CURRENT[A]	ACIN 100V	0.30typ (Io=100%)		
		ACIN 200V	0.20typ (Io=100%)		
	FREQUENCY[Hz]	50/60 (47 - 440) or DC			
	EFFICIENCY[%]	ACIN 100V	74typ	76typ	77typ
		ACIN 200V	74typ	76typ	77typ
	INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%)		
ACIN 200V		30typ (Io=100%)			
LEAKAGE CURRENT[ma]	0.15/0.30max (ACIN 100V/240V 60Hz, Io=100%, According to IEC60950-1.DENAN)				
OUTPUT	VOLTAGE[V]	5	12	24	
	CURRENT[A]	2	0.9	0.5	
	LINE REGULATION[mV] *6	20max	48max	96max	
	LOAD REGULATION[mV] *6	40max	100max	150max	
	RIPPLE[mVp-p]	0 to +50°C *1	80max	120max	120max
		-10 - 0°C *1	140max	160max	160max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max	150max	150max
		-10 - 0°C *1	160max	180max	180max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	120max	240max
		-10 to +50°C	60max	150max	290max
	DRIFT[mV] *2	20max	48max	96max	
START-UP TIME[ms]	200typ (ACIN 100V, Io=100%) *Start-up time is 700ms typ for less than 1minute of applying input again from turning off the input voltage.				
HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)				
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	4.50 - 5.50	10.0 - 13.2	19.2 - 27.0		
OUTPUT VOLTAGE SETTING[V]	5.00 - 5.15	12.00 - 12.48	24.00 - 24.96		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rated current and recovers automatically			
	OVERVOLTAGE PROTECTION[V]	5.75 - 7.00	15.0 - 18.0	30.0 - 37.0	
	OPERATING INDICATION	LED (Green)			
	REMOTE ON/OFF	None			
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)			
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)			
	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)			
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-10 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max			
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max			
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis			
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN			
	CONDUCTED NOISE	Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B			
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Not built-in to active filter *4) *7			
OTHERS	CASE SIZE/WEIGHT	31 × 78 × 68mm [1.22 × 3.07 × 2.68 inches] (without terminal block) (W×H×D) / 150g max (with cover : 180g max)			
	COOLING METHOD	Convection			

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \*3 Derating is required.  
 \*4 When two or more units are used,they may not comply with the harmonic attenuator. Please contact us for details.

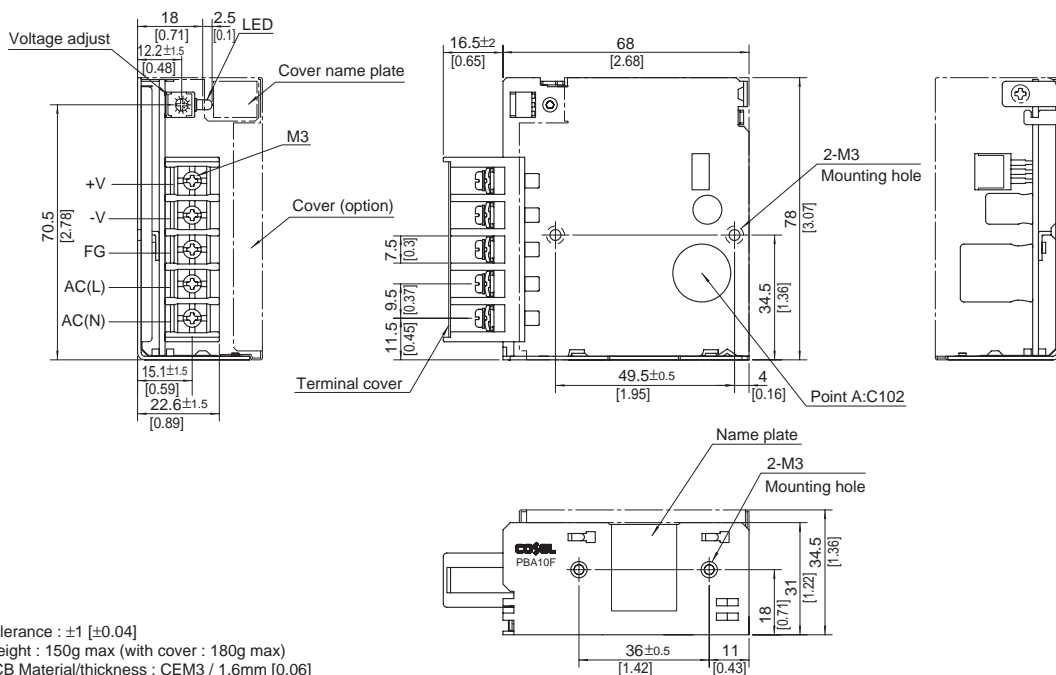
\*5 Please contact us about safety approvals for the model with option.  
 \*6 Please contact us about dynamic load and input response.  
 \*7 Please contact us about class C.  
 \* Parallel operation with other model is not possible.  
 \* Derating is required when operated with cover.  
 \* A sound may occur from power supply at peak loading.

Block diagram



External view

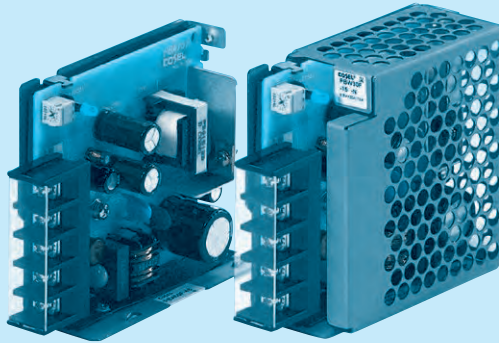
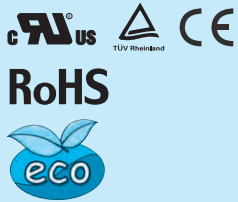
※ External size of option T,J,N1 and V is different from standard model and refer to 7 Option of instruction manual for details.



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 150g max (with cover : 180g max)
- ※ PCB Material/thickness : CEM3 / 1.6mm [0.06]
- ※ Chassis material : Electric galvanizing steel board
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque :  $0.6N \cdot m$  (6.3kgf  $\cdot$  cm)max
- ※ Screw tightening torque : M3  $0.8N \cdot m$  (8.5kgf  $\cdot$  cm)max
- ※ Please connect safety ground to the unit in 2-M3 holes.

# PBA15F

PB A 15 F - □ - □  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**NAC-06-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \*A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5
- C : with Coating
- G : Low leakage current
- E : Low leakage current and EMI class A
- T : Vertical terminal block
- J : Connector type
- N : with Cover (UL508 is acquired [5V, 12V, 24V])
- NI : with DIN rail and Cover
- V : Output voltage setting potentiometer externally

Cover is optional

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PBA15F-3R3	PBA15F-5	PBA15F-9	PBA15F-12	PBA15F-15	PBA15F-24	PBA15F-48
MAX OUTPUT WATTAGE[W]	9.9	15	15.3	15.6	15	16.8	16.8
DC OUTPUT	3.3V 3A	5V 3A	9V 1.7A	12V 1.3A	15V 1A	24V 0.7A	48V 0.35A

## SPECIFICATIONS

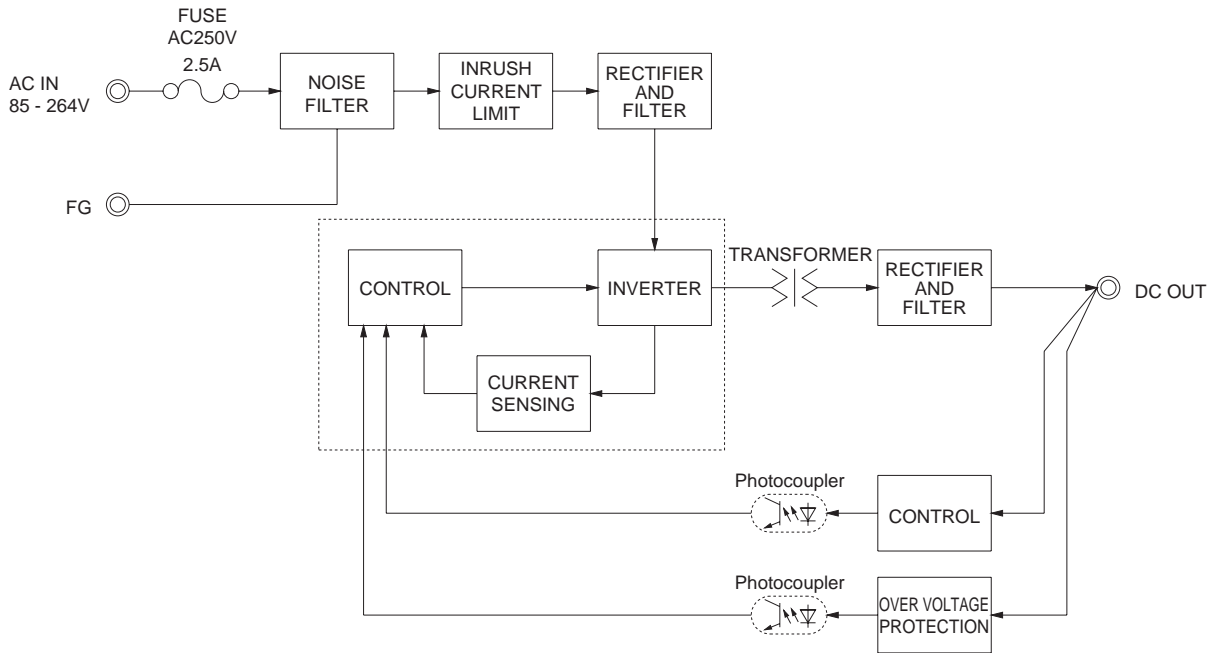
	MODEL	PBA15F-3R3	PBA15F-5	PBA15F-9	PBA15F-12	PBA15F-15	PBA15F-24	PBA15F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ or DC110 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *3)							
	CURRENT[A]	ACIN 100V	0.30typ (Io=100%)	0.4typ (Io=100%)					
		ACIN 200V	0.15typ (Io=100%)	0.2typ (Io=100%)					
	FREQUENCY[Hz]	50/60 (47 - 440) or DC							
	EFFICIENCY[%]	ACIN 100V	68typ	74typ	75typ	75typ	77typ	75typ	75typ
		ACIN 200V	68typ	75typ	77typ	78typ	80typ	78typ	78typ
	INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) (At cold start)						
ACIN 200V		30typ (Io=100%) (At cold start)							
LEAKAGE CURRENT[ma]	0.15/0.30max (ACIN 100V/240V 60Hz, Io=100%, According to IEC60950-1.DENAN)								
OUTPUT	VOLTAGE[V]	3.3	5	9	12	15	24	48	
	CURRENT[A]	3	3	1.7	1.3	1	0.7	0.35	
	LINE REGULATION[mV] *6	20max	20max	36max	48max	60max	96max	192max	
	LOAD REGULATION[mV] *6	40max	40max	100max	100max	120max	150max	240max	
	RIPPLE[mVp-p]	0 to +50°C *1	80max	80max	120max	120max	120max	120max	150max
		-10 - 0°C *1	140max	140max	160max	160max	160max	160max	200max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max	120max	150max	150max	150max	150max	250max
		-10 - 0°C *1	160max	160max	180max	180max	180max	180max	300max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	90max	120max	150max	240max	480max
		-10 to +50°C	60max	60max	120max	150max	180max	290max	600max
	DRIFT[mV] *2	20max	20max	36max	48max	60max	96max	192max	
START-UP TIME[ms]	200typ(ACIN 100V, Io=100%) *Start-up time is 700ms typ for less than 1minute of applying input again from turning off the input voltage.								
HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)								
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 - 3.60	4.50 - 5.50	7.50 - 10.0	10.0 - 13.2	13.2 - 18.0	19.2 - 27.0	39.0 - 53.0		
OUTPUT VOLTAGE SETTING[V]	3.30 - 3.40	5.00 - 5.15	9.00 - 9.36	12.00 - 12.48	15.00 - 15.60	24.00 - 24.96	48.00 - 49.92		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rated current and recovers automatically							
	OVERVOLTAGE PROTECTION[V]	4.00 - 5.25	5.75 - 7.00	11.5 - 14.0	15.0 - 18.0	20.0 - 25.0	30.0 - 37.0	58.0 - 65.0	
	OPERATING INDICATION	LED (Green)							
	REMOTE ON/OFF	None							
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)							
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)							
	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)							
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-10 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max							
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max							
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis							
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis							
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN							
	CONDUCTED NOISE	Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B							
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Not built-in to active filter *4) *7							
OTHERS	CASE SIZE/WEIGHT	31 × 78 × 85mm [1.22 × 3.07 × 3.35 inches] (without terminal block) (W×H×D) / 200g max (with cover : 235g max)							
	COOLING METHOD	Convection							

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \*3 Derating is required.  
 \*4 When two or more units are used,they may not comply with the harmonic attenuator. Please contact us for details.

\*5 Please contact us about safety approvals for the model with option.  
 \*6 Please contact us about dynamic load and input response.  
 \*7 Please contact us about class C.  
 \* Parallel operation with other model is not possible.  
 \* Derating is required when operated with cover.  
 \* A sound may occur from power supply at peak loading.

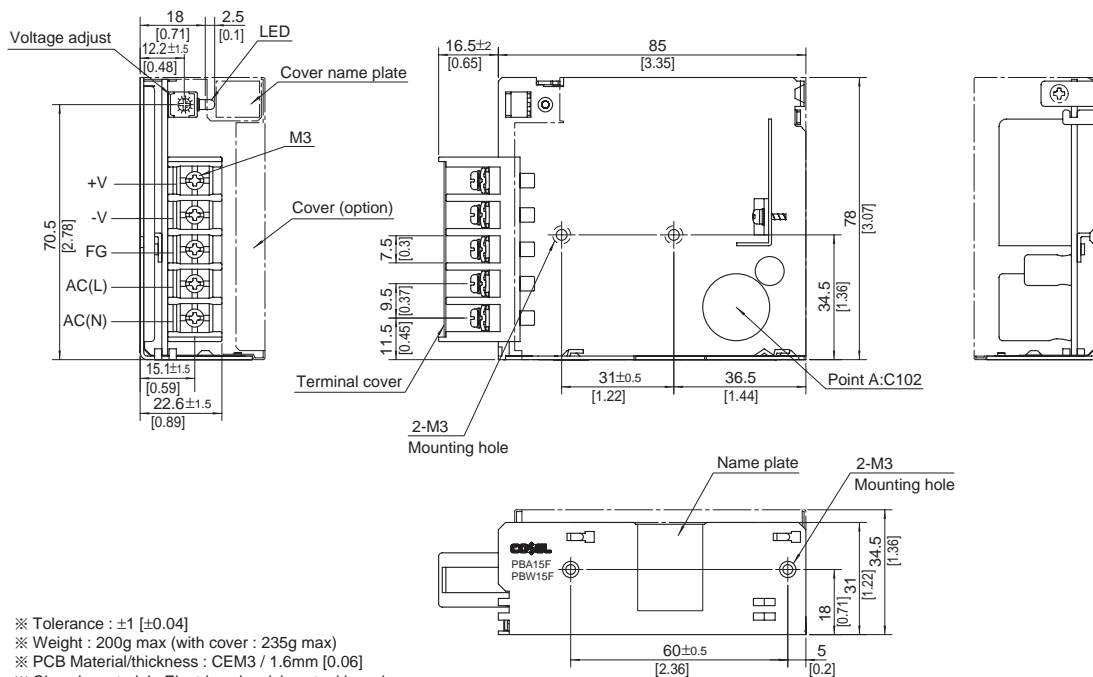


Block diagram



External view

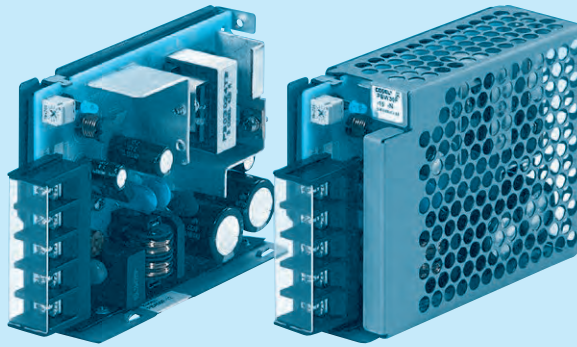
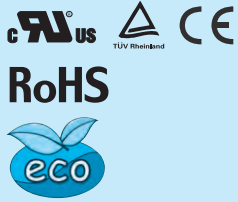
※ External size of option T,J,N1 and V is different from standard model and refer to 7 Option of instruction manual for details.



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 200g max (with cover : 235g max)
- ※ PCB Material/thickness : CEM3 / 1.6mm [0.06]
- ※ Chassis material : Electric galvanizing steel board
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 0.6N • m (6.3kgf • cm) max
- ※ Screw tightening torque : M3 0.8N • m (8.5kgf • cm) max
- ※ Please connect safety ground to the unit in 2-M3 holes.

# PBA30F

PB A 30 F -□ -□  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**NAC-06-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \*A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5
- C : with Coating
- G : Low leakage current
- E : Low leakage current and EMI class A
- T : Vertical terminal block
- J : Connector type
- N : with Cover (UL508 is acquired [5V, 12V, 24V])
- N1 : with DIN rail and Cover
- V : Output voltage setting potentiometer externally

Cover is optional

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PBA30F-3R3	PBA30F-5	PBA30F-9	PBA30F-12	PBA30F-15	PBA30F-24	PBA30F-48
MAX OUTPUT WATTAGE[W]	19.8	30	30.6	30	30	31.2	31.2
DC OUTPUT	3.3V 6A	5V 6A	9V 3.4A	12V 2.5A	15V 2A	24V 1.3A	48V 0.65A

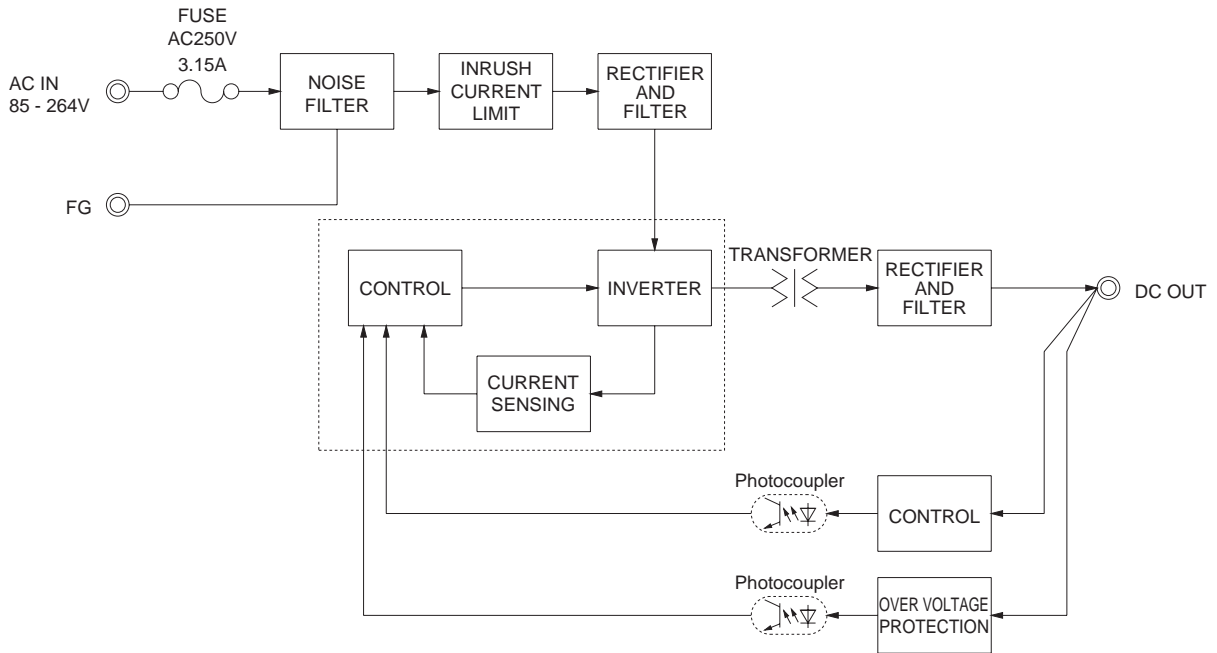
## SPECIFICATIONS

	MODEL	PBA30F-3R3	PBA30F-5	PBA30F-9	PBA30F-12	PBA30F-15	PBA30F-24	PBA30F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ or DC110 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *3)							
	CURRENT[A]	ACIN 100V	0.50typ (Io=100%)		0.70typ (Io=100%)				
		ACIN 200V	0.30typ (Io=100%)		0.40typ (Io=100%)				
	FREQUENCY[Hz]	50/60 (47 - 440) or DC							
	EFFICIENCY[%]	ACIN 100V	68typ	74typ	75typ	76typ	78typ	78typ	79typ
		ACIN 200V	69typ	77typ	77typ	78typ	81typ	81typ	81typ
	INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) (At cold start)						
	ACIN 200V	30typ (Io=100%) (At cold start)							
LEAKAGE CURRENT[ma]	0.30/0.65max (ACIN 100V/240V 60Hz, Io=100%, According to IEC60950-1.DENAN)								
OUTPUT	VOLTAGE[V]	3.3	5	9	12	15	24	48	
	CURRENT[A]	6	6	3.4	2.5	2	1.3	0.65	
	LINE REGULATION[mV] *6	20max	20max	36max	48max	60max	96max	192max	
	LOAD REGULATION[mV] *6	40max	40max	100max	100max	120max	150max	240max	
	RIPPLE[mVp-p]	0 to +50°C *1	80max	80max	120max	120max	120max	120max	150max
		-10 - 0°C *1	140max	140max	160max	160max	160max	160max	200max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max	120max	150max	150max	150max	150max	250max
		-10 - 0°C *1	160max	160max	180max	180max	180max	180max	300max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	90max	120max	150max	240max	480max
		-10 to +50°C	60max	60max	120max	150max	180max	290max	600max
	DRIFT[mV] *2	20max	20max	36max	48max	60max	96max	192max	
	START-UP TIME[ms]	200typ(ACIN 100V, Io=100%) *Start-up time is 700ms typ for less than 1minute of applying input again from turning off the input voltage.							
HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)								
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 - 3.60	4.50 - 5.50	7.50 - 10.0	10.0 - 13.2	13.2 - 18.0	19.2 - 27.0	39.0 - 53.0		
OUTPUT VOLTAGE SETTING[V]	3.30 - 3.40	5.00 - 5.15	9.00 - 9.36	12.00 - 12.48	15.00 - 15.60	24.00 - 24.96	48.00 - 49.92		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rated current and recovers automatically							
	OVERVOLTAGE PROTECTION[V]	4.00 - 5.25	5.75 - 7.00	11.5 - 14.0	15.0 - 18.0	20.0 - 25.0	30.0 - 37.0	58.0 - 65.0	
	OPERATING INDICATION	LED (Green)							
	REMOTE ON/OFF	None							
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)							
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)							
	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)							
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-10 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max							
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max							
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis							
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis							
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN							
	CONDUCTED NOISE	Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B							
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Not built-in to active filter *4) *7							
OTHERS	CASE SIZE/WEIGHT	31 × 78 × 103mm [1.22 × 3.07 × 4.06 inches] (without terminal block) (W × H × D) / 270g max (with cover : 310g max)							
	COOLING METHOD	Convection							

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \*3 Derating is required.  
 \*4 When two or more units are used,they may not comply with the harmonic attenuator. Please contact us for details.

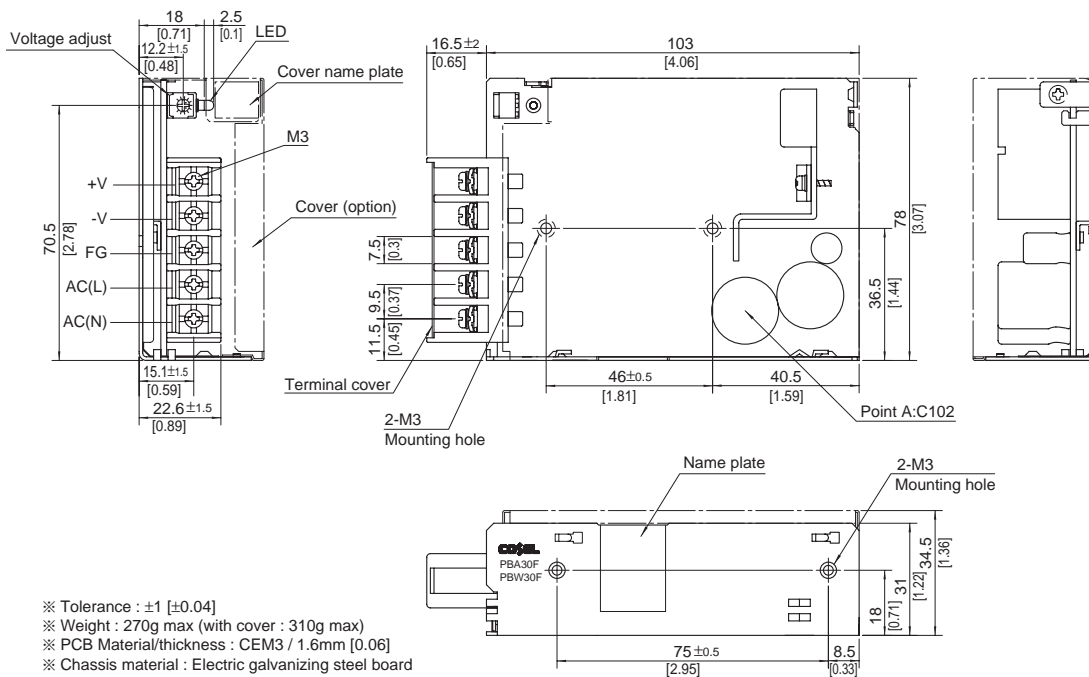
\*5 Please contact us about safety approvals for the model with option.  
 \*6 Please contact us about dynamic load and input response.  
 \*7 Please contact us about class C.  
 \* Parallel operation with other model is not possible.  
 \* Derating is required when operated with cover.  
 \* A sound may occur from power supply at peak loading.

Block diagram



External view

※ External size of option T,J,N1 and V is different from standard model and refer to 7 Option of instruction manual for details.

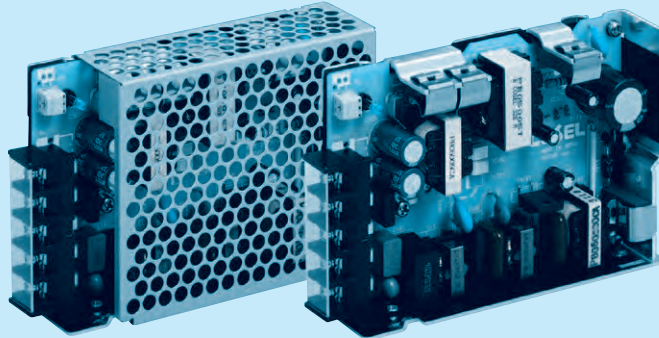
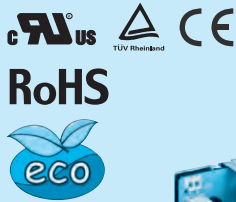


- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 270g max (with cover : 310g max)
- ※ PCB Material/thickness : CEM3 / 1.6mm [0.06]
- ※ Chassis material : Electric galvanizing steel board
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque :  $0.6\text{N} \cdot \text{m}$  (6.3kgf  $\cdot$  cm)max
- ※ Screw tightening torque : M3  $0.8\text{N} \cdot \text{m}$  (8.5kgf  $\cdot$  cm)max
- ※ Please connect safety ground to the unit in 2-M3 holes.

# PBA50F

PB A 50 F -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5
- C :with Coating
- G :Low leakage current (0.15mA max / ACIN 240V)
- E :Low leakage current and EMI class A (0.5mA max / ACIN 240V)
- T :Vertical terminal block
- J :Connector type
- R :with Remote ON/OFF
- N :with Cover (Only 24V UL508 is acquired)
- Nt :with DIN rail and Cover
- V :Output voltage setting potentiometer externaly

Cover is optional

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PBA50F-3R3	PBA50F-5	PBA50F-9	PBA50F-12	PBA50F-15	PBA50F-24	PBA50F-36	PBA50F-48
MAX OUTPUT WATTAGE[W]	33	50	50.4	51.6	52.5	52.8	50.4	52.8
DC OUTPUT	3.3V 10A	5V 10A	9V 5.6A	12V 4.3A	15V 3.5A	24V 2.2A	36V 1.4A	48V 1.1A

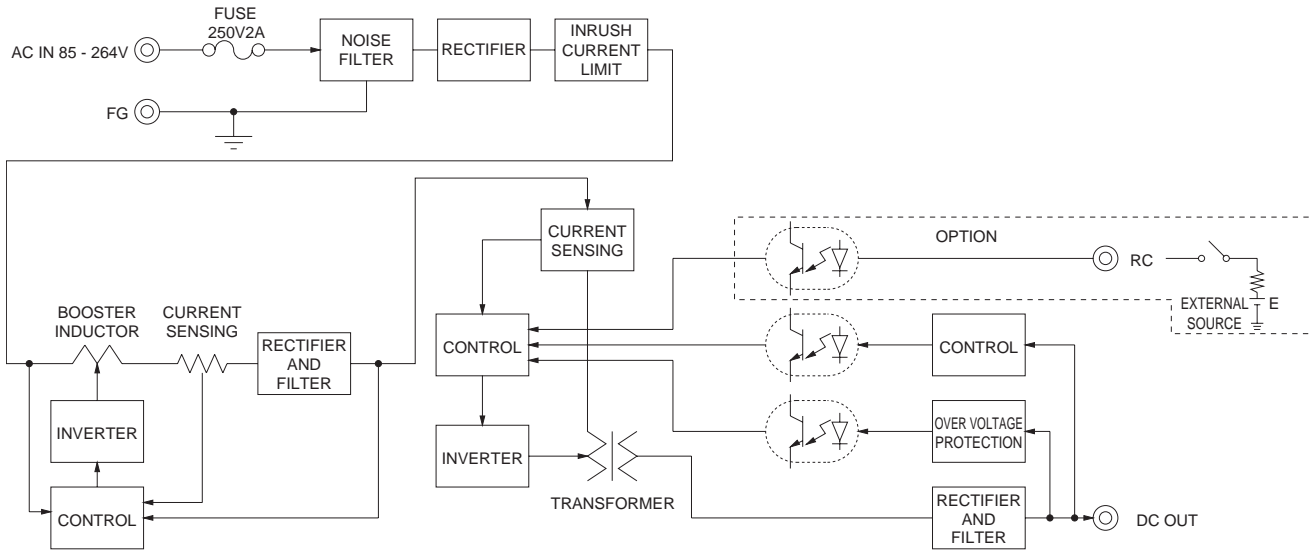
## SPECIFICATIONS

MODEL	PBA50F-3R3	PBA50F-5	PBA50F-9	PBA50F-12	PBA50F-15	PBA50F-24	PBA50F-36	PBA50F-48		
INPUT	VOLTAGE[V] AC85 - 264 1 φ or DC120 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *4)									
	CURRENT[A]	ACIN 100V	0.5typ	0.7typ						
		ACIN 200V	0.3typ	0.4typ						
	FREQUENCY[Hz]	50/60 (47 - 63)								
	EFFICIENCY[%]	ACIN 100V	75typ	80typ	79typ	80typ	81typ	82typ	83typ	83typ
		ACIN 200V	76typ	82typ	81typ	82typ	83typ	84typ	85typ	85typ
	POWER FACTOR(lo=100%)	ACIN 100V	0.98typ	0.99typ						
ACIN 200V		0.87typ	0.93typ							
INRUSH CURRENT[A]	ACIN 100V	15typ (lo=100%) (At cold start)								
	ACIN 200V	30typ (lo=100%) (At cold start)								
LEAKAGE CURRENT[mA]	0.4/0.75max (ACIN 100V/240V 60Hz, lo=100%, According to IEC60950-1.DENAN)									
OUTPUT	VOLTAGE[V]	3.3	5	9	12	15	24	36	48	
	CURRENT[A]	10	10	5.6	4.3	3.5	2.2	1.4	1.1	
	LINE REGULATION[mV]	20max	20max	36max	48max	60max	96max	144max	192max	
	LOAD REGULATION[mV]	40max	40max	100max	100max	120max	150max	240max	240max	
	RIPPLE[mVp-p]	0 to +50°C *1	80max	80max	120max	120max	120max	120max	150max	150max
		-10 - 0°C *1	140max	140max	160max	160max	160max	160max	200max	200max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max	120max	150max	150max	150max	150max	250max	250max
		-10 - 0°C *1	160max	160max	180max	180max	180max	180max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	90max	120max	150max	240max	360max	480max
		-10 to +50°C	60max	60max	120max	150max	180max	290max	450max	600max
	DRIFT[mV]	*2	20max	20max	36max	48max	60max	96max	144max	192max
START-UP TIME[ms]	350typ(ACIN 100V, lo=100%)									
HOLD-UP TIME[ms]	20typ (ACIN 100V, lo=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 - 3.63	4.00 - 5.50	7.50 - 10.0	10.0 - 13.2	13.2 - 18.0	19.2 - 27.0	28.8 - 39.6	39.0 - 53.0		
OUTPUT VOLTAGE SETTING[V]	3.30 - 3.40	5.00 - 5.15	9.00 - 9.36	12.00 - 12.48	15.00 - 15.60	24.00 - 24.96	35.00 - 37.44	48.00 - 49.92		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rated current and recovers automatically								
	OVERVOLTAGE PROTECTION[V]	4.00 - 5.25	5.75 - 7.00	11.5 - 14.0	15.0 - 18.0	20.0 - 25.0	30.0 - 37.0	43.0 - 50.0	58.0 - 65.0	
	OPERATING INDICATION	LED (Green)								
REMOTE ON/OFF	Optional (Required external power source)									
ISOLATION	INPUT-OUTPUT - RC	*3 AC3.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)								
	INPUT-FG	AC2.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)								
	OUTPUT - RC-FG	*3 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)								
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-10 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max								
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis								
IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis									
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN								
	CONDUCTED NOISE	Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B								
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 *6								
OTHERS	CASE SIZE/WEIGHT	31 x 82 x 120mm [1.22 x 3.23 x 4.72 inches] (without terminal block) (W x H x D) / 280g max (with cover : 325g max)								
	COOLING METHOD	Convection								

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \*3 Applicable when Remote ON/OFF(optional) is added. RC is insulated with input, output and FG.  
 \*4 Derating is required.

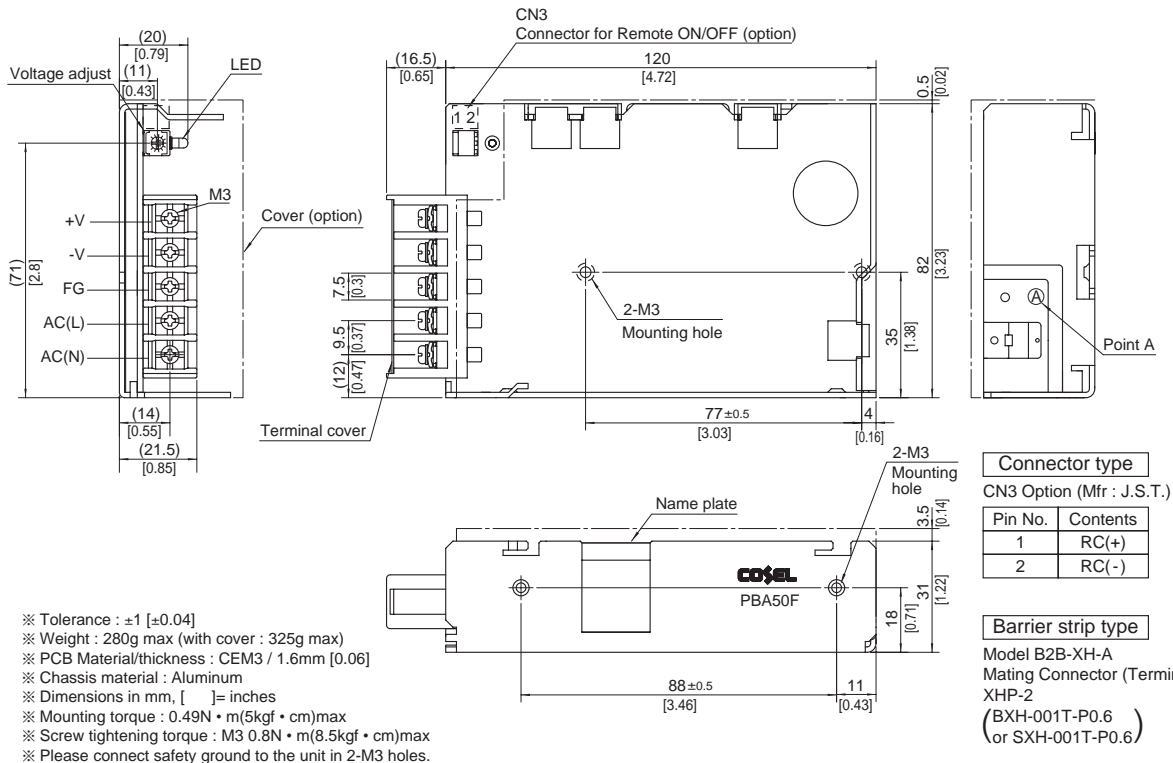
\*5 Please contact us about safety approvals for the model with option.  
 \*6 Please contact us about class C.  
 \* Parallel operation with other model is not possible.  
 \* Derating is required when operated with cover.  
 \* A sound may occur from power supply at peak loading.

Block diagram



External view

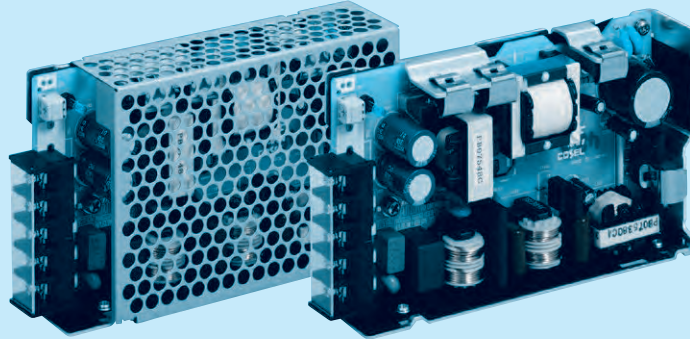
※ External size of option T,J,R,N1 and V is different from standard model and refer to 7 Option of instruction manual for details.



# PBA75F

PB A 75 F -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5
- C :with Coating
- G :Low leakage current (0.15mA max / ACIN 240V)
- E :Low leakage current and EMI class A (0.5mA max / ACIN 240V)
- T :Vertical terminal block
- J :Connector type
- R :with Remote ON/OFF
- N :with Cover (Only 24V UL508 is acquired)
- Nt :with DIN rail and Cover
- V :Output voltage setting potentiometer external-ly

Cover is optional

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PBA75F-3R3	PBA75F-5	PBA75F-9	PBA75F-12	PBA75F-15	PBA75F-24	PBA75F-36	PBA75F-48
MAX OUTPUT WATTAGE[W]	49.5	75	75.6	75.6	75	76.8	75.6	76.8
DC OUTPUT	3.3V 15A	5V 15A	9V 8.4A	12V 6.3A	15V 5A	24V 3.2A	36V 2.1A	48V 1.6A

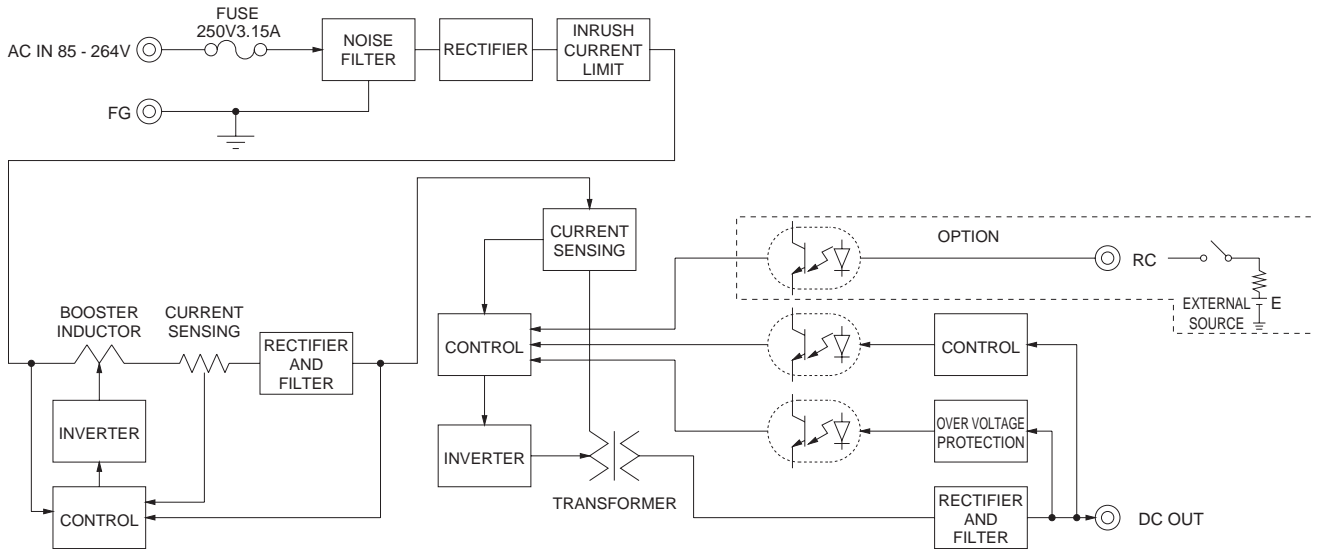
## SPECIFICATIONS

MODEL	PBA75F-3R3	PBA75F-5	PBA75F-9	PBA75F-12	PBA75F-15	PBA75F-24	PBA75F-36	PBA75F-48	
<b>INPUT</b>	AC85 - 264 1 φ or DC120 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *4)								
CURRENT[A]	ACIN 100V	0.7typ	1.0typ						
	ACIN 200V	0.4typ	0.5typ						
FREQUENCY[Hz]	50/60 (47 - 63)								
EFFICIENCY[%]	ACIN 100V	77typ	81typ	80typ	81typ	82typ	83typ	84typ	
	ACIN 200V	78typ	83typ	82typ	83typ	84typ	85typ	86typ	
POWER FACTOR(lo=100%)	ACIN 100V	0.98typ	0.99typ						
	ACIN 200V	0.87typ	0.93typ						
INRUSH CURRENT[A]	ACIN 100V	15typ (lo=100%) (At cold start)							
	ACIN 200V	30typ (lo=100%) (At cold start)							
LEAKAGE CURRENT[mA]	0.4/0.75max (ACIN 100V/240V 60Hz, lo=100%, According to IEC60950-1.DENAN)								
<b>OUTPUT</b>	VOLTAGE[V]	3.3	5	9	12	15	24	36	
CURRENT[A]		15	15	8.4	6.3	5	3.2	2.1	
LINE REGULATION[mV]		20max	20max	36max	48max	60max	96max	144max	
LOAD REGULATION[mV]		40max	40max	100max	100max	120max	150max	240max	
RIPPLE[mVp-p]	0 to +50°C *1	80max	80max	120max	120max	120max	120max	150max	
	-10 - 0°C *1	140max	140max	160max	160max	160max	160max	200max	
RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max	120max	150max	150max	150max	150max	250max	
	-10 - 0°C *1	160max	160max	180max	180max	180max	180max	300max	
TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	90max	120max	150max	240max	360max	
	-10 to +50°C	60max	60max	120max	150max	180max	290max	450max	
DRIFT[mV]	*2	20max	20max	36max	48max	60max	96max	144max	
START-UP TIME[ms]		350typ(ACIN 100V, lo=100%)							
HOLD-UP TIME[ms]		20typ (ACIN 100V, lo=100%)							
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		2.85 - 3.63	4.00 - 5.50	7.50 - 10.0	10.0 - 13.2	13.2 - 18.0	19.2 - 27.0	28.8 - 39.6	
OUTPUT VOLTAGE SETTING[V]		3.30 - 3.40	5.00 - 5.15	9.00 - 9.36	12.00 - 12.48	15.00 - 15.60	24.00 - 24.96	36.00 - 37.44	
OVERCURRENT PROTECTION	Works over 105% of rated current and recovers automatically								
	OVERVOLTAGE PROTECTION[V]	4.00 - 5.25	5.75 - 7.00	11.5 - 14.0	15.0 - 18.0	20.0 - 25.0	30.0 - 37.0	43.0 - 50.0	
OPERATING INDICATION	LED (Green)								
REMOTE ON/OFF	Optional (Required external power source)								
ISOLATION	INPUT-OUTPUT - RC	*3 AC3.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)							
	INPUT-FG	AC2.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)							
OUTPUT - RC-FG	*3 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)								
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-10 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max							
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C; 20 - 90%RH (Non condensing) 9,000m (30,000feet) max							
VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis								
IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis								
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN							
	CONDUCTED NOISE	Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B							
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 *6							
OTHERS	CASE SIZE/WEIGHT	32 x 82 x 135mm [1.26 x 3.23 x 5.31 inches] (without terminal block) (W x H x D) / 350g max (with cover : 400g max)							
	COOLING METHOD	Convection							

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \*3 Applicable when Remote ON/OFF(optional) is added. RC is insulated with input, output and FG.  
 \*4 Derating is required.

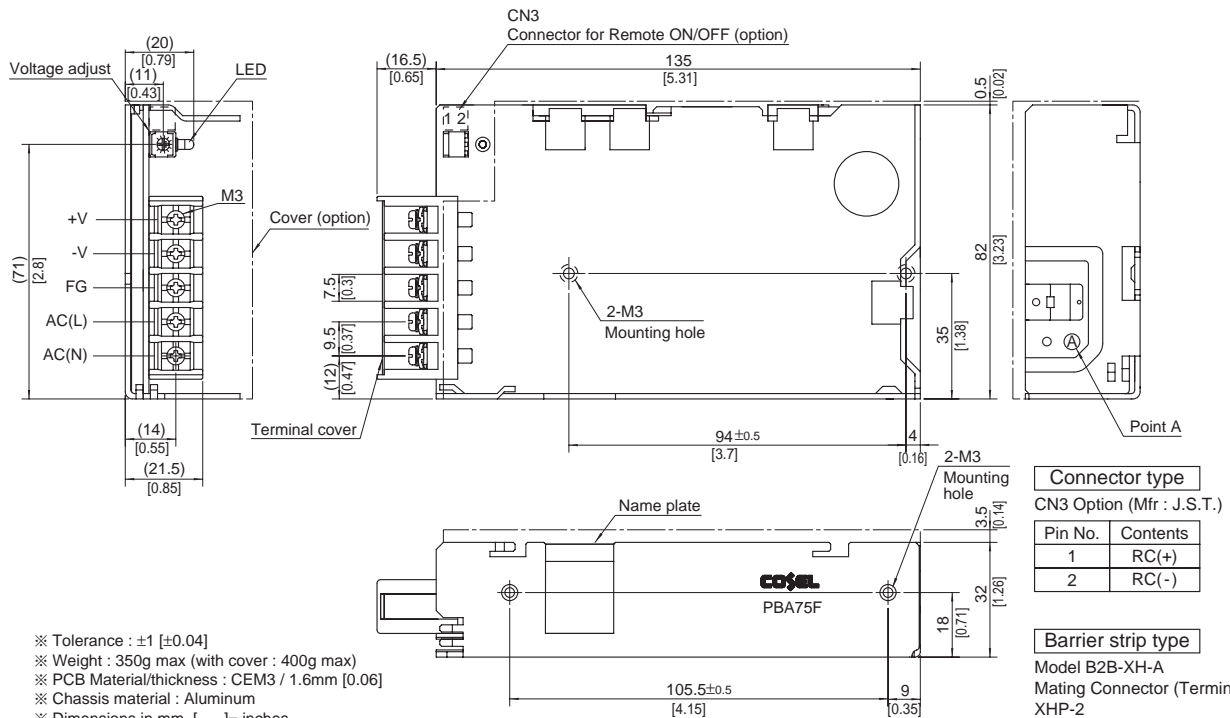
\*5 Please contact us about safety approvals for the model with option.  
 \*6 Please contact us about class C.  
 \* Parallel operation with other model is not possible.  
 \* Derating is required when operated with cover.  
 \* A sound may occur from power supply at peak loading.

Block diagram



External view

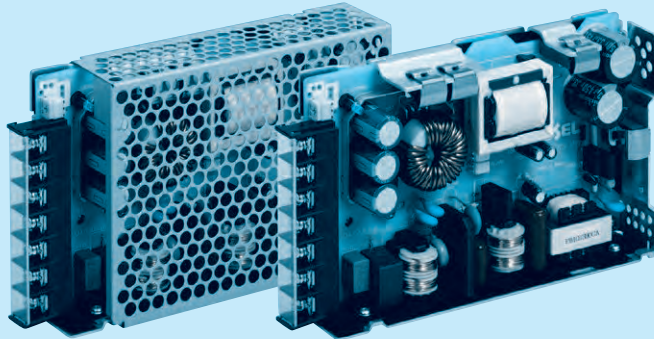
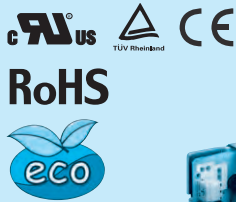
※ External size of option T,J,R,N1 and V is different from standard model and refer to 7 Option of instruction manual for details.



- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 350g max (with cover : 400g max)
- ※ PCB Material/thickness : CEM3 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 0.49N • m(5kgf • cm)max
- ※ Screw tightening torque : M3 0.8N • m(8.5kgf • cm)max
- ※ Please connect safety ground to the unit in 2-M3 holes.

# PBA100F

① PB ② A ③ 100 ④ F ⑤ -5 ⑥ -□



Example recommended EMI/EMC filter  
NAC-06-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5  
C : with Coating  
G : Low leakage current (0.15mA max / ACIN 240V)  
E : Low leakage current and EMI class A (0.5mA max / ACIN 240V)  
T : Vertical terminal block  
J : Connector type (Only -12,-15,-24,-36,-48)  
R : with Remote ON/OFF  
N : with Cover (Only 24V UL508 is acquired)  
NI : with DIN rail and Cover  
V : Output voltage setting potentiometer external

Cover is optional

\* Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PBA100F-3R3	PBA100F-5	PBA100F-9	PBA100F-12	PBA100F-15	PBA100F-24	PBA100F-36	PBA100F-48
MAX OUTPUT WATTAGE[W]	66	100	94.5	102	105	108	100.8	100.8
DC OUTPUT	3.3V 20A	5V 20A	9V 10.5A	12V 8.5A	15V 7A	24V 4.5A	36V 2.8A	48V 2.1A

## SPECIFICATIONS

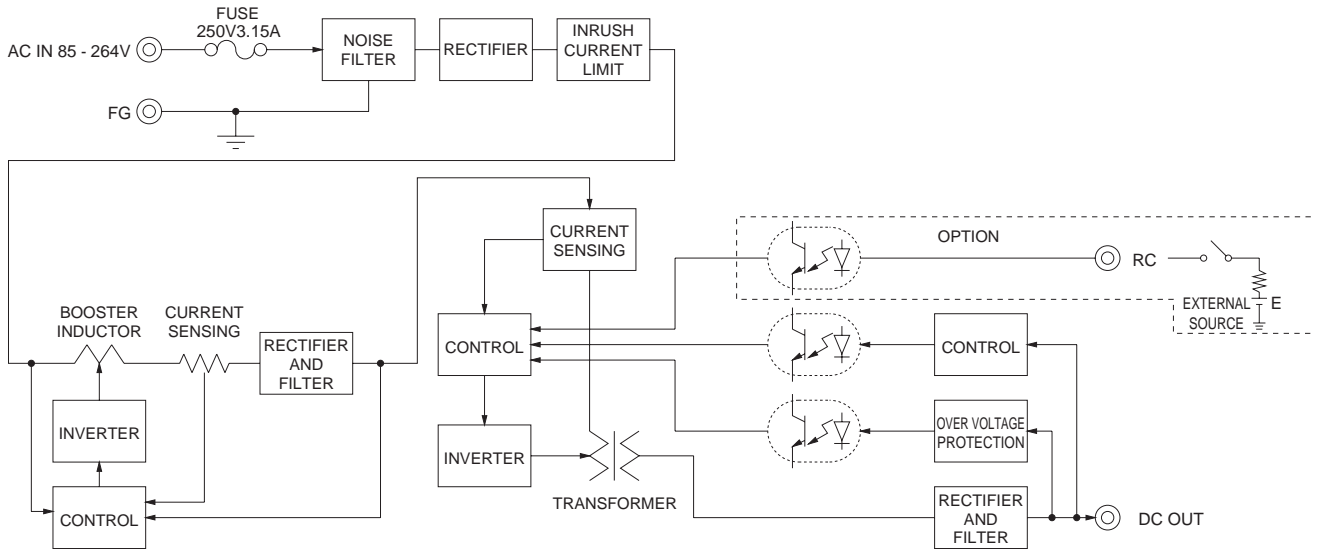
MODEL	PBA100F-3R3	PBA100F-5	PBA100F-9	PBA100F-12	PBA100F-15	PBA100F-24	PBA100F-36	PBA100F-48	
<b>INPUT</b>	VOLTAGE[V] AC85 - 264 1 φ or DC120 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *4) CURRENT[A] ACIN 100V 0.9typ 1.3typ ACIN 200V 0.5typ 0.7typ FREQUENCY[Hz] 50/60 (47 - 63) EFFICIENCY[%] ACIN 100V 77typ 82typ 80typ 81typ 83typ 84typ 84typ 84typ ACIN 200V 79typ 84typ 82typ 83typ 86typ 86typ 86typ 86typ POWER FACTOR(lo=100%) ACIN 100V 0.98typ 0.99typ ACIN 200V 0.87typ 0.93typ INRUSH CURRENT[A] ACIN 100V 20typ (lo=100%) (At cold start) ACIN 200V 40typ (lo=100%) (At cold start) LEAKAGE CURRENT[mA] 0.4/0.75max (ACIN 100V/240V 60Hz, lo=100%, According to IEC60950-1.DENAN)								
<b>OUTPUT</b>	VOLTAGE[V]	3.3	5	9	12	15	24	36	48
	CURRENT[A]	20	20	10.5	8.5	7	4.5	2.8	2.1
	LINE REGULATION[mV]	20max	20max	36max	48max	60max	96max	144max	192max
	LOAD REGULATION[mV]	40max	40max	100max	100max	120max	150max	240max	240max
	RIPPLE[mVp-p]	0 to +50°C *1 80max -10 - 0°C *1 140max	80max 140max	120max 160max	120max 160max	120max 160max	120max 160max	150max 200max	150max 200max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1 120max -10 - 0°C *1 160max	120max 160max	150max 180max	150max 180max	150max 180max	150max 180max	250max 300max	250max 300max
	TEMPERATURE REGULATION[mV]	0 to +50°C 50max -10 to +50°C 60max	50max 60max	90max 120max	120max 150max	150max 180max	240max 290max	360max 450max	480max 600max
	DRIFT[mV]	*2 20max	20max	36max	48max	60max	96max	144max	192max
	START-UP TIME[ms]	350typ (ACIN 100V, lo=100%)							
	HOLD-UP TIME[ms]	20typ (ACIN 100V, lo=100%)							
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 - 3.63	4.00 - 5.50	7.50 - 10.0	10.0 - 13.2	13.2 - 18.0	19.2 - 27.0	28.8 - 39.6	39.0 - 53.0
	OUTPUT VOLTAGE SETTING[V]	3.20 - 3.40	5.00 - 5.15	9.00 - 9.36	12.00 - 12.48	15.00 - 15.60	24.00 - 24.96	36.00 - 37.44	48.00 - 49.92
<b>PROTECTION CIRCUIT AND OTHERS</b>	OVERCURRENT PROTECTION	Works over 105% of rated current and recovers automatically							
	OVERVOLTAGE PROTECTION[V]	4.00 - 5.25	5.75 - 7.00	11.5 - 14.0	15.0 - 18.0	20.0 - 25.0	30.0 - 37.0	43.0 - 50.0	58.0 - 65.0
	OPERATING INDICATION	LED (Green)							
	REMOTE SENSING	Optional (Only -3R3, -5 Option -K)							
	REMOTE ON/OFF	Optional (Required external power source)							
<b>ISOLATION</b>	INPUT-OUTPUT - RC	*3 AC3.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)							
	INPUT-FG	AC2.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)							
	OUTPUT - RC-FG	*3 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)							
<b>ENVIRONMENT</b>	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max							
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max							
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis							
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis							
<b>SAFETY AND NOISE REGULATIONS</b>	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN							
	CONDUCTED NOISE	Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B							
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 *6							
<b>OTHERS</b>	CASE SIZE/WEIGHT	32 x 93 x 147mm [1.26 x 3.66 x 5.79 inches] (without terminal block) (W x H x D) / 440g max (with cover : 500g max)							
	COOLING METHOD	Convection							

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter (equivalent to KEISOKU-GIKEN :RM101).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \*3 Applicable when Remote ON/OFF (optional) is added. RC is insulated with input, output and FG.  
 \*4 Derating is required.

\*5 Please contact us about safety approvals for the model with option.  
 \*6 Please contact us about class C.  
 \* Parallel operation with other model is not possible.  
 \* Derating is required when operated with cover.  
 \* A sound may occur from power supply at peak loading.

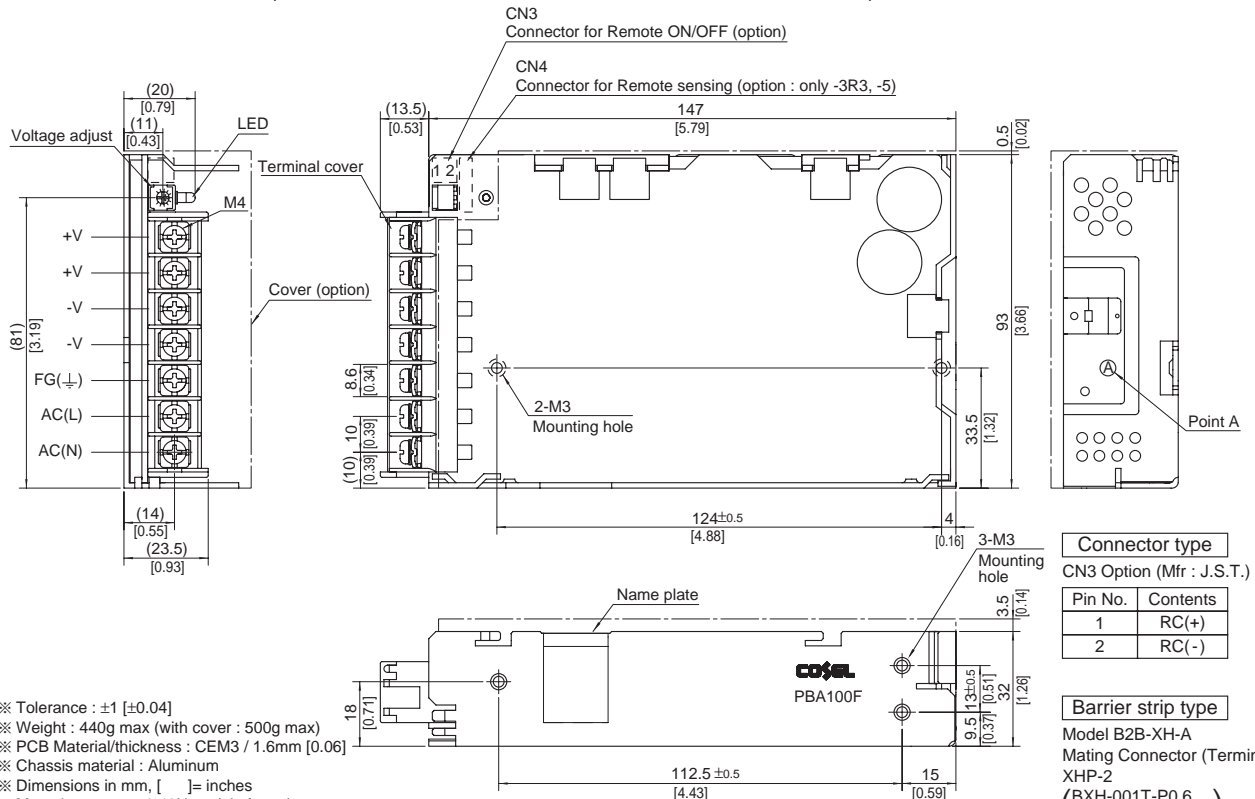


## Block diagram



## External view

※ External size of option T,J,R,N1,V and K is different from standard model and refer to 7 Option of instruction manual for details.



Connector type	
CN3 Option (Mfr : J.S.T.)	
Pin No.	Contents
1	RC(+)
2	RC(-)

### Barrier strip type

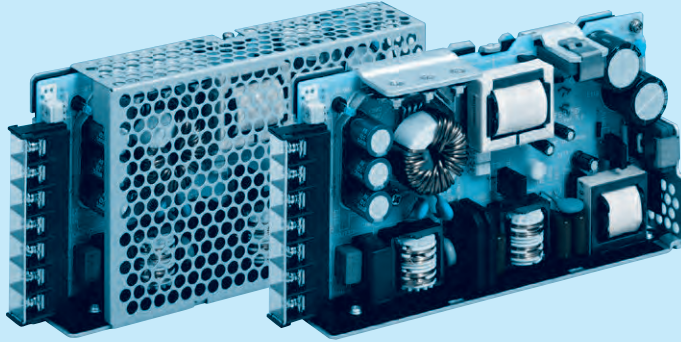
Model B2B-XH-A  
Mating Connector (Terminal)  
XHP-2  
(BXH-001T-P0.6  
or SXH-001T-P0.6)

- ※ Tolerance :  $\pm 1$  [±0.04]
- ※ Weight : 440g max (with cover : 500g max)
- ※ PCB Material/thickness : CEM3 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 0.49N · m (5kgf · cm) max
- ※ Mounting torque : M4:1.6N · m (16.9kgf · cm) max
- ※ Please connect safety ground to FG terminal on the unit.

# PBA150F

PB A 150 F -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5  
C :with Coating  
G :Low leakage current (0.15mA max / ACIN 240V)  
E :Low leakage current and EMI class A (0.5mA max / ACIN 240V)  
T :Vertical terminal block  
J :Connector type (Only -12,-15,-24,-36,-48)  
R :with Remote ON/OFF  
N :with Cover (Only 24V UL508 is acquired)  
NI :with DIN rail and Cover  
V :Output voltage setting potentiometer externaly

Cover is optional

\* Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PBA150F-3R3	PBA150F-5	PBA150F-9	PBA150F-12	PBA150F-15	PBA150F-24	PBA150F-36	PBA150F-48
MAX OUTPUT WATTAGE[W]	99	150	150.3	156	150	156	154.8	158.4
DC OUTPUT	3.3V 30A	5V 30A	9V 16.7A	12V 13A	15V 10A	24V 6.5A	36V 4.3A	48V 3.3A

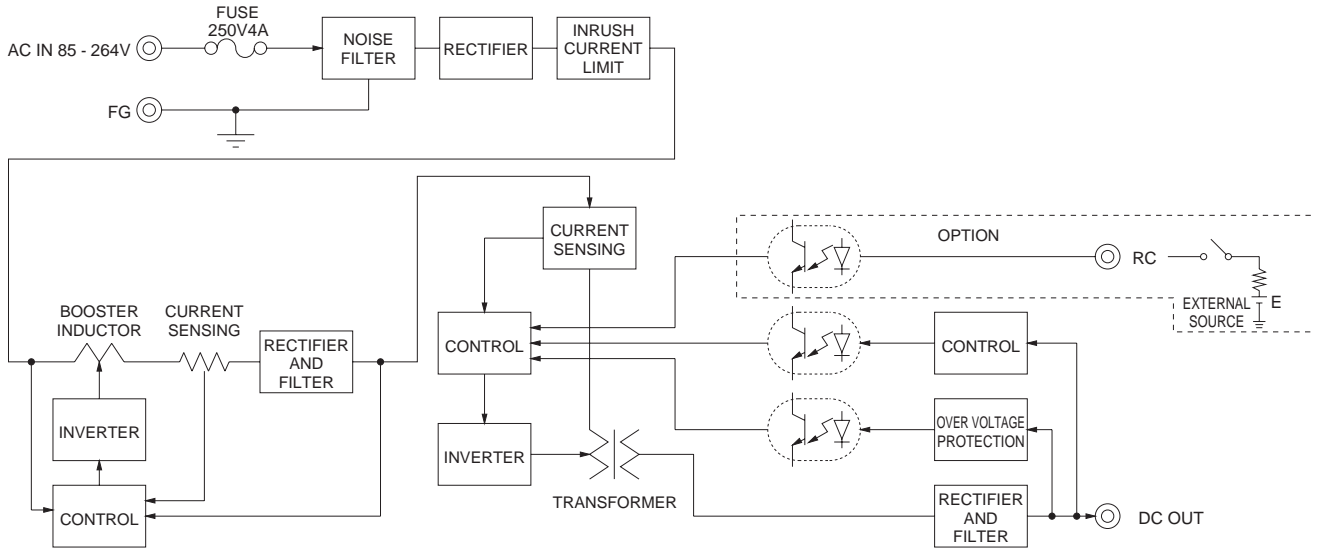
## SPECIFICATIONS

	MODEL	PBA150F-3R3	PBA150F-5	PBA150F-9	PBA150F-12	PBA150F-15	PBA150F-24	PBA150F-36	PBA150F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ or DC120 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *4)								
	CURRENT[A]	ACIN 100V	1.3typ	2.0typ						
		ACIN 200V	0.7typ	1.0typ						
	FREQUENCY[Hz]	50/60 (47 - 63)								
	EFFICIENCY[%]	ACIN 100V	80typ	83typ	82typ	83typ	84typ	85typ	85typ	85typ
		ACIN 200V	82typ	86typ	85typ	86typ	87typ	88typ	88typ	88typ
	POWER FACTOR(lo=100%)	ACIN 100V	0.98typ	0.99typ						
		ACIN 200V	0.87typ	0.93typ						
	INRUSH CURRENT[A]	ACIN 100V	20typ (lo=100%) (At cold start)							
		ACIN 200V	40typ (lo=100%) (At cold start)							
LEAKAGE CURRENT[mA]	0.4/0.75max (ACIN 100V/240V 60Hz, lo=100%, According to IEC60950-1.DENAN)									
OUTPUT	VOLTAGE[V]	3.3	5	9	12	15	24	36	48	
	CURRENT[A]	30	30	16.7	13	10	6.5	4.3	3.3	
	LINE REGULATION[mV]	20max	20max	36max	48max	60max	96max	144max	192max	
	LOAD REGULATION[mV]	40max	40max	100max	100max	120max	150max	240max	240max	
	RIPPLE[mVp-p]	0 to +50°C *1	80max	80max	120max	120max	120max	120max	150max	150max
		-10 - 0°C *1	140max	140max	160max	160max	160max	160max	200max	200max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max	120max	150max	150max	150max	150max	250max	250max
		-10 - 0°C *1	160max	160max	180max	180max	180max	180max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	90max	120max	150max	240max	360max	480max
		-10 to +50°C	60max	60max	120max	150max	180max	290max	450max	600max
	DRIFT[mV]	*2	20max	20max	36max	48max	60max	96max	144max	192max
	START-UP TIME[ms]	350typ(ACIN 100V, lo=100%)								
	HOLD-UP TIME[ms]	20typ (ACIN 100V, lo=100%)								
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 - 3.63	4.00 - 5.50	7.50 - 10.0	10.0 - 13.2	13.2 - 18.0	19.2 - 27.0	28.8 - 39.6	39.0 - 53.0	
	OUTPUT VOLTAGE SETTING[V]	3.30 - 3.40	5.00 - 5.15	9.00 - 9.36	12.00 - 12.48	15.00 - 15.60	24.00 - 24.96	36.00 - 37.44	48.00 - 49.92	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rated current and recovers automatically								
	OVERVOLTAGE PROTECTION[V]	4.00 - 5.25	5.75 - 7.00	11.5 - 14.0	15.0 - 18.0	20.0 - 25.0	30.0 - 37.0	43.0 - 50.0	58.0 - 65.0	
	OPERATING INDICATION	LED (Green)								
	REMOTE SENSING	Optional (Only -3R3, -5 Option -K)								
ISOLATION	REMOTE ON/OFF	Optional (Required external power source)								
	INPUT-OUTPUT - RC	*3	AC3.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)							
	INPUT-FG	*3	AC2.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)							
ENVIRONMENT	OUTPUT - RC-FG	*3	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)							
	OPERATING TEMP.,HUMID.AND ALTITUDE	-10 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max								
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max								
SAFETY AND NOISE REGULATIONS	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis								
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis								
	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN								
OTHERS	CONDUCTED NOISE	Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B								
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 *6								
OTHERS	CASE SIZE/WEIGHT	34 x 93 x 168mm [1.34 x 3.66 x 6.61 inches] (without terminal block) (W x H x D) / 560g max (with cover : 630g max)								
	COOLING METHOD	Convection								

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
\*3 Applicable when Remote ON/OFF(optional) is added. RC is insulated with input, output and FG.  
\*4 Derating is required.

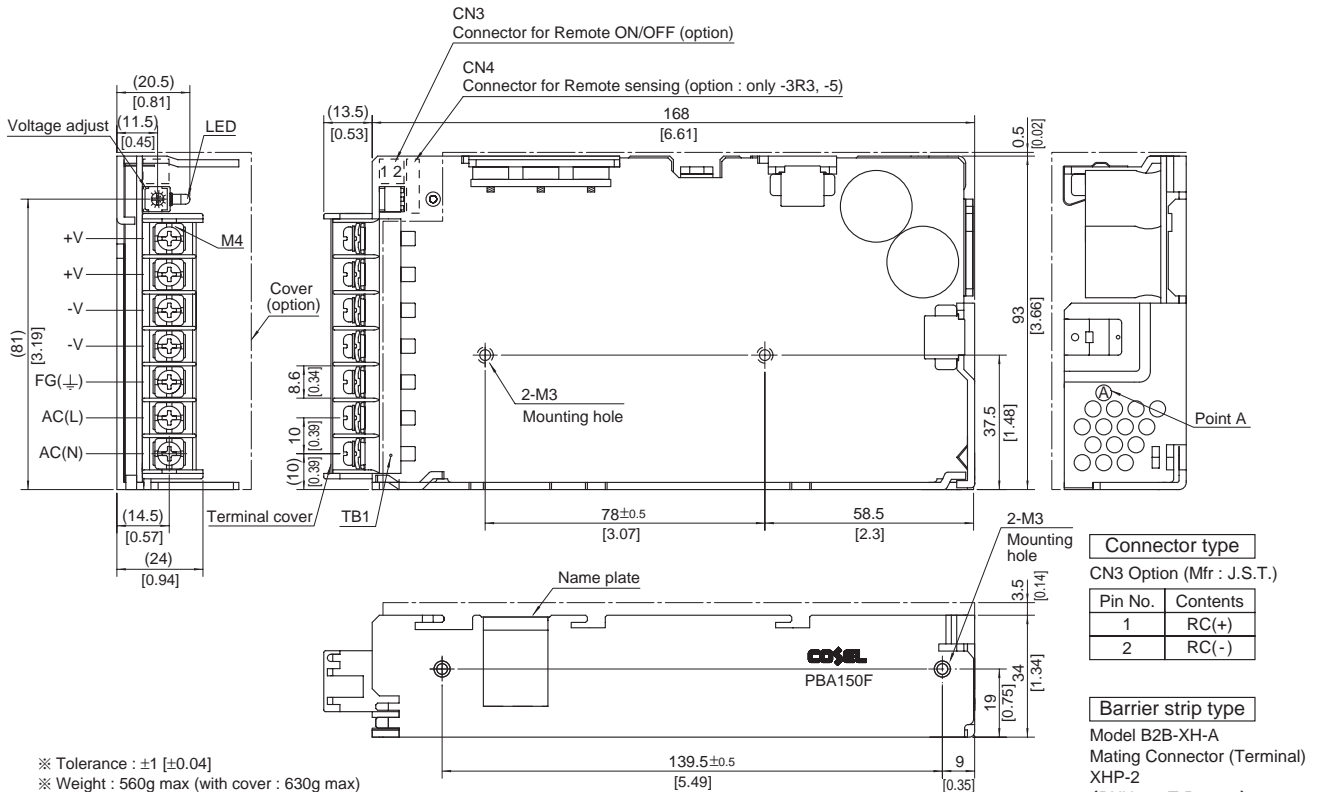
\*5 Please contact us about safety approvals for the model with option.  
\*6 Please contact us about class C.  
\* Parallel operation with other model is not possible.  
\* Derating is required when operated with cover.  
\* A sound may occur from power supply at peak loading.

## Block diagram



## External view

※ External size of option T,J,R,N1,V and K is different from standard model and refer to 7 Option of instruction manual for details.

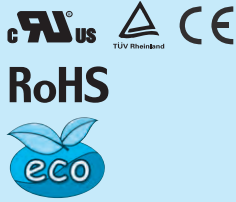


- ※ Tolerance :  $\pm 1$  [±0.04]
- ※ Weight : 560g max (with cover : 630g max)
- ※ PCB Material/thickness : CEM3 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 0.49N · m (5kgf · cm) max
- ※ Mounting torque : M4:1.6N · m (16.9kgf · cm) max
- ※ Keep drawing current per pin below 20A for TB1.
- ※ Please connect safety ground to FG terminal on the unit.

# PBA300F

PB A 300 F -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5
- C :with Coating
- G :Low leakage current
- U :Operation stop voltage is set at a lower value
- F3 :Reverse air exhaust type
- F4 :Low speed fan
- N1 :with DIN rail

Refer to instruction manual 7.1.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PBA300F-3R3	PBA300F-5	PBA300F-7R5	PBA300F-12	PBA300F-15	PBA300F-24	PBA300F-36	PBA300F-48
MAX OUTPUT WATTAGE[W]	198	300	300	324	330	336	324	336
DC OUTPUT	ACIN 100V	3.3V 60A	5V 60A	7.5V 40A	12V 27A	15V 22A	24V 14A	36V 9A
	ACIN 200V *3	3.3V 60A	5V 60A	7.5V 40A	12V 27A	15V 22A	24V 14(16.5)A	36V 9A

## SPECIFICATIONS

MODEL	PBA300F-3R3	PBA300F-5	PBA300F-7R5	PBA300F-12	PBA300F-15	PBA300F-24	PBA300F-36	PBA300F-48		
INPUT	VOLTAGE[V] AC85 - 264 1φ or DC120 - 350 (AC50 or DC70 Please refer to the instruction manual 7. option *4)									
	CURRENT[A]	ACIN 100V	3typ	4.1typ						
		ACIN 200V	1.6typ	2typ						
	FREQUENCY[Hz]	50/60 (47 - 63)								
	EFFICIENCY[%]	ACIN 100V	68typ	74typ	76typ	78typ	78typ	79typ	81typ	79typ
		ACIN 200V	71typ	77typ	79typ	81typ	81typ	82typ	84typ	82typ
	POWER FACTOR	ACIN 100V	0.98typ (Io=100%)							
ACIN 200V		0.95typ (Io=100%)								
INRUSH CURRENT[A]	ACIN 100V	20/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More then 3 sec. to re-start)								
	ACIN 200V	40/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More then 3 sec. to re-start)								
LEAKAGE CURRENT[mA]	0.45/0.75max (ACIN 100V/240V 60Hz, Io=100%, According to IEC60950-1.DENAN)									
OUTPUT	VOLTAGE[V]	3.3	5	7.5	12	15	24	36	48	
	CURRENT[A]	ACIN 100V	60	60	40	27	22	14	9	7
		ACIN 200V *3	60	60	40	27	22	14(16.5)	9	7
	LINE REGULATION[mV]	20max	20max	36max	48max	60max	96max	144max	192max	
	LOAD REGULATION[mV]	40max	40max	60max	100max	120max	150max	150max	300max	
	RIPPLE[mVp-p]	0 to +50°C *1	80max	80max	120max	120max	120max	120max	150max	150max
		-20 - 0°C *1	140max	140max	160max	160max	160max	160max	160max	400max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max	120max	150max	150max	150max	150max	200max	200max
		-20 - 0°C *1	160max	160max	180max	180max	180max	180max	240max	500max
	TEMPERATURE REGULATION[mV]	0 to +50°C	40max	50max	75max	120max	150max	240max	360max	480max
		-20 to +50°C	60max	75max	120max	180max	180max	290max	440max	600max
DRIFT [mV]	*2	12max	20max	30max	48max	60max	96max	144max	192max	
START-UP TIME[ms]	300typ(ACIN 100/200V, Io=100%) *Start-up time is 500ms typ for less than 1minute of applying input again from turning off the input voltage.									
HOLD-UP TIME[ms]	20typ (ACIN 100/200V, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.64 - 3.96	3.96 - 6.00	5.25 - 8.25	8.25 - 13.20	10.50 - 16.50	16.50 - 26.40	25.20 - 39.60	38.40 - 56.00		
OUTPUT VOLTAGE SETTING[V]	3.30 - 3.40	5.00 - 5.15	7.50 - 7.80	12.00 - 12.48	15.00 - 15.60	24.00 - 24.96	36.00 - 37.44	48.00 - 49.92		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rated current or 101% of peak current and recovers automatically								
	OVERVOLTAGE PROTECTION[V]	4.3 - 6.3	6.5 - 8.0	9.0 - 11.6	14.4 - 18.6	18.0 - 23.3	28.8 - 37.2	43.2 - 54.0	57.6 - 80.0	
	OPERATING INDICATION	LED (Green)								
	REMOTE SENSING	Provided								
ISOLATION	REMOTE ON/OFF	Provided								
	INPUT-OUTPUT · RC	AC3.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)								
	INPUT-FG	AC2.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)								
	OUTPUT · RC · AUX-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)								
ENVIRONMENT	OUTPUT-RC · AUX	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)								
	OPERATING TEMP.,HUMID.AND ALTITUDE	-20 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max								
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis								
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis								
	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN								
	CONDUCTED NOISE	Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B								
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 *6								
OTHERS	CASE SIZE/WEIGHT	102 X 42 X 170mm [4.02 X 1.65 X 6.69 inches] (without terminal block and screw) (W X H X D) /1.0kg max								
	COOLING METHOD	Forced cooling (internal fan)								

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).

\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
\*3 () means peak current. Peak loading for 10s. And Duty 35% max, refer to Instruction manual in detail.

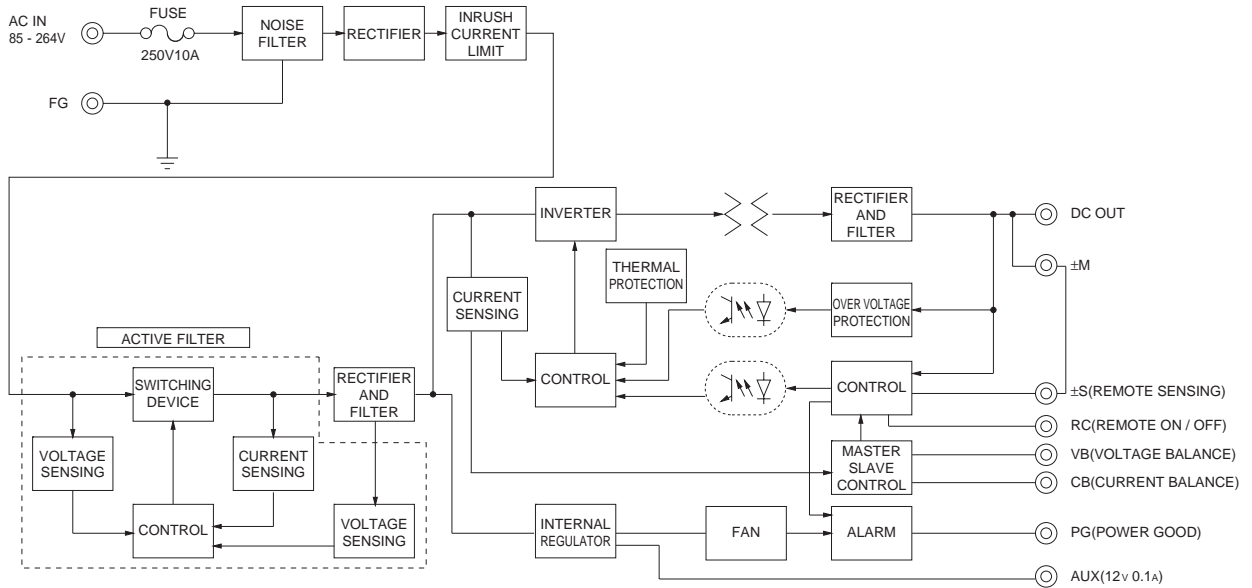
\*4 Derating is required.Consult us for details.

\*5 Please contact us about safety approvals for the model with option.

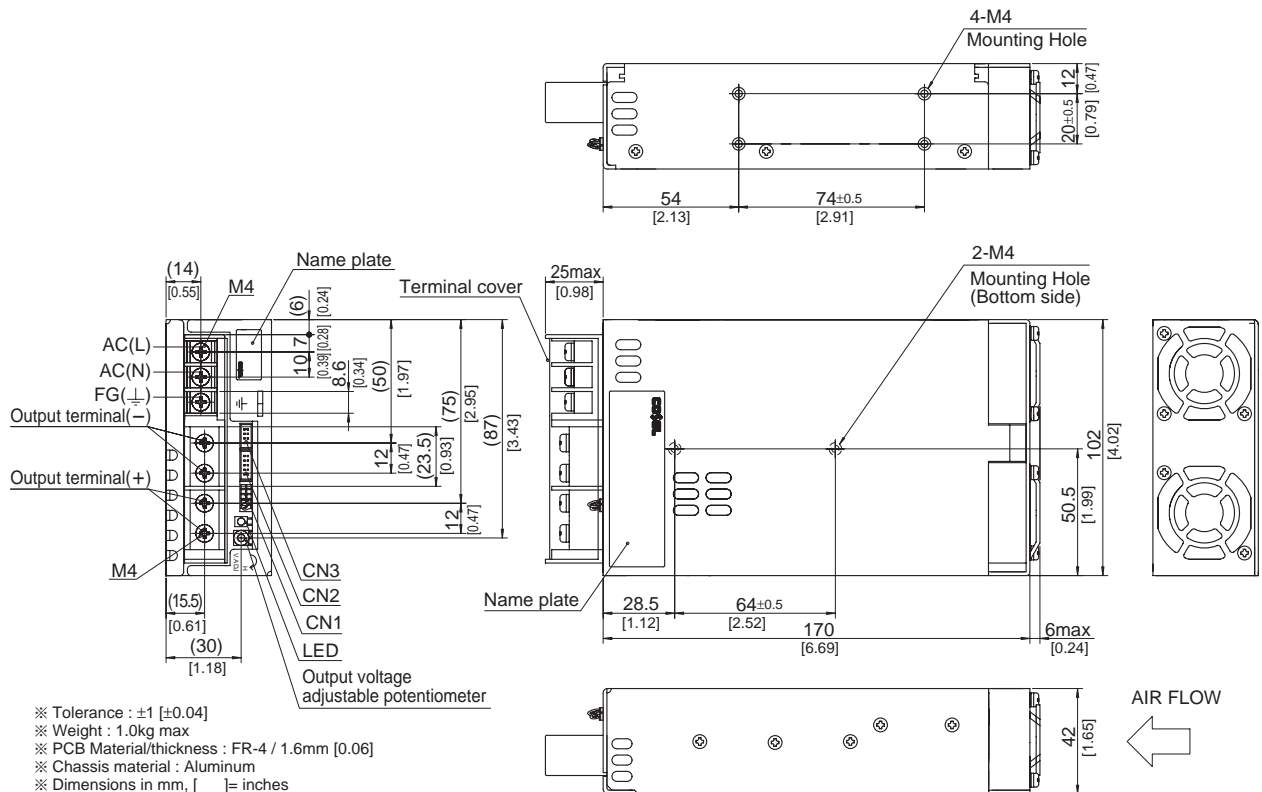
\*6 Please contact us about class C.

\* A sound may occur from power supply at pulse loading.

## Block diagram



## External view

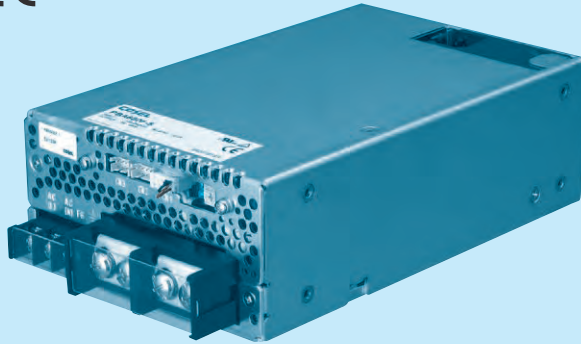
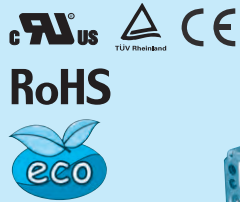


- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 1.0kg max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 1.2N · m max
- ※ Screw tightening torque : 1.6N · m max
- ※ The housing for the remote sensing unused is mounted on CN1
- ※ Please connect safety ground to FG terminal on the unit.

# PBA600F

PB A 600 F -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-16-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*6
- C :with Coating
- G :Low leakage current
- U :Operation stop voltage is set at a lower value
- F1 :With Long-Life fan
- F3 :Reverse air exhaust type
- F4 :Low speed fan

Refer to instruction manual 7.1.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PBA600F-3R3	PBA600F-5	PBA600F-7R5	PBA600F-12	PBA600F-15	PBA600F-24	PBA600F-36	PBA600F-48	
MAX OUTPUT WATTAGE[W]	396	600	600	636	645	648	648	624	
DC OUTPUT	ACIN 100V	3.3V 120A	5V 120A	7.5V 80A	12V 53A	15V 43A	24V 27A	36V 18A	48V 13A
	ACIN 200V *3	3.3V 120A	5V 120A	7.5V 80A	12V 53A	15V 43A	24V 27(31)A	36V 18A	48V 13A

## SPECIFICATIONS

MODEL	PBA600F-3R3	PBA600F-5	PBA600F-7R5	PBA600F-12	PBA600F-15	PBA600F-24	PBA600F-36	PBA600F-48		
INPUT	VOLTAGE[V] AC85 - 264 1φ or DC120 - 350 (AC50 or DC70 Please refer to the instruction manual 7. option *5)									
	CURRENT[A]	ACIN 100V	5.8typ	8.2typ						
		ACIN 200V	3typ	4.1typ						
	FREQUENCY[Hz] 50/60 (47 - 63)									
	EFFICIENCY[%]	ACIN 100V	70typ	75typ	76typ	79typ	79typ	81typ	82typ	81typ
		ACIN 200V	72typ	77typ	79typ	82typ	82typ	84typ	84typ	83typ
	POWER FACTOR	ACIN 100V	0.98typ (Io=100%)							
ACIN 200V		0.95typ (Io=100%)								
INRUSH CURRENT[A]	ACIN 100V	20/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 3 sec. to re-start)								
	ACIN 200V	40/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 3 sec. to re-start)								
LEAKAGE CURRENT[mA] 0.45/0.75max (ACIN 100V/240V 60Hz, Io=100%, According to IEC60950-1, DENAN)										
OUTPUT	VOLTAGE[V]	3.3	5	7.5	12	15	24	36	48	
	CURRENT[A]	ACIN 100V	120	120	80	53	43	27	18	13
		ACIN 200V *3	120	120	80	53	43	27(31)	18	13
	LINE REGULATION[mV] 20max									
	LOAD REGULATION[mV] 40max									
	RIPPLE[mVp-p]	0 to +50°C *1	80max	80max	120max	120max	120max	120max	150max	150max
		-20 - 0°C *1	140max	140max	160max	160max	160max	160max	160max	400max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max	120max	150max	150max	150max	150max	200max	200max
		-20 - 0°C *1	160max	160max	180max	180max	180max	180max	240max	500max
	TEMPERATURE REGULATION[mV]	0 to +50°C	40max	50max	75max	120max	150max	240max	360max	480max
-20 to +50°C		60max	75max	120max	180max	180max	290max	440max	600max	
DRIFT[mV]	*2	12max	20max	30max	48max	60max	96max	144max	192max	
START-UP TIME[ms]	400typ(ACIN 100/200V, Io=100%) *Start-up time is 500ms typ for less than 1minute of applying input again from turning off the input voltage.									
HOLD-UP TIME[ms]	20typ (ACIN 100/200V, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.64 - 3.96	3.96 - 6.00	5.25 - 8.25	8.25 - 13.20	10.50 - 16.50	16.50 - 26.40	25.20 - 39.60	38.40 - 56.00		
OUTPUT VOLTAGE SETTING[V]	3.30 - 3.40	5.00 - 5.15	7.50 - 7.80	12.00 - 12.48	15.00 - 15.60	24.00 - 24.96	36.00 - 37.44	48.00 - 49.92		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION Works over 105% of rated current or 101% of peak current and recovers automatically									
	OVERVOLTAGE PROTECTION[V] *4 Vo+0.66 - 1.32 Vo+1.0 - 2.0 Vo+1.5 - 3.0 Vo+2.4 - 4.8 Vo+3.0 - 6.0 Vo+4.8 - 9.6 Vo+7.2 - 14.4 Vo+4.8 - 12.0									
	OPERATING INDICATION LED (Green)									
	REMOTE SENSING Provided									
REMOTE ON/OFF Provided										
ISOLATION	INPUT-OUTPUT · RC AC3.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)									
	INPUT-FG AC2.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)									
	OUTPUT · RC · AUX-FG AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)									
	OUTPUT-RC · AUX AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)									
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE -20 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max									
	STORAGE TEMP.,HUMID.AND ALTITUDE -20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max									
	VIBRATION 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis									
IMPACT 196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis										
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS (At only AC input) UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN									
	CONDUCTED NOISE Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B									
	HARMONIC ATTENUATOR Complies with IEC61000-3-2 *7									
OTHERS	CASE SIZE/WEIGHT 120×61×190mm [4.72×2.4×7.48 inches] (without terminal block and screw) (W×H×D) /1.6kg max									
	COOLING METHOD Forced cooling (internal fan)									

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).

\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.

\*3 ( ) means peak current. Peak loading for 10s. And Duty 35% max, refer to Instruction manual in detail.

\*4 Overvoltage protection circuit to follow to output voltage setting. Standard overvoltage protection circuit is please contact us for details.

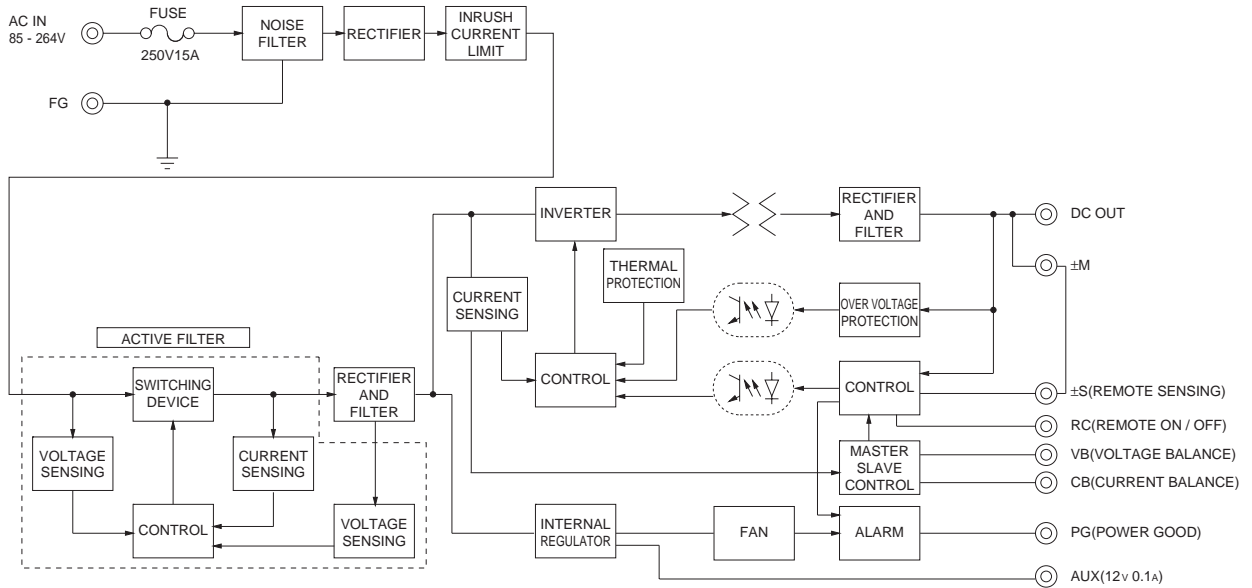
\*5 Derating is required.Consult us for details.

\*6 Please contact us about safety approvals for the model with option.

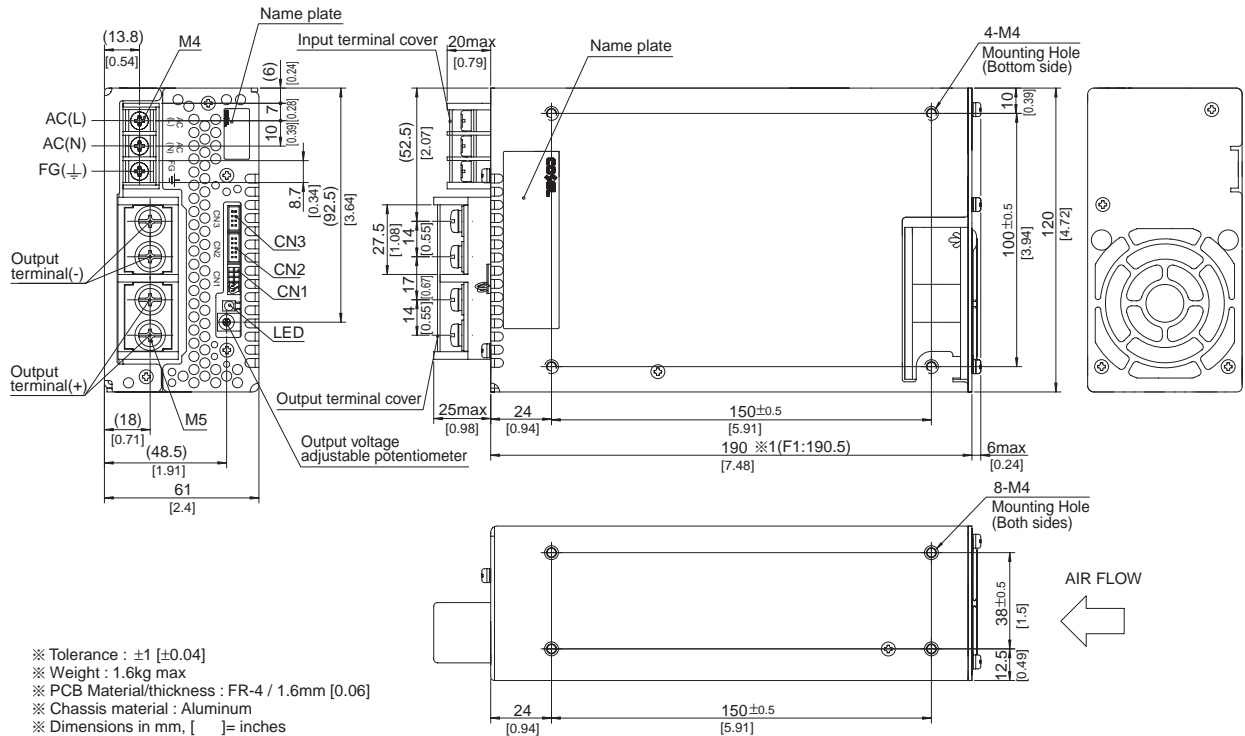
\*7 Please contact us about class C.

\* A sound may occur from power supply at pulse loading.

## Block diagram



## External view

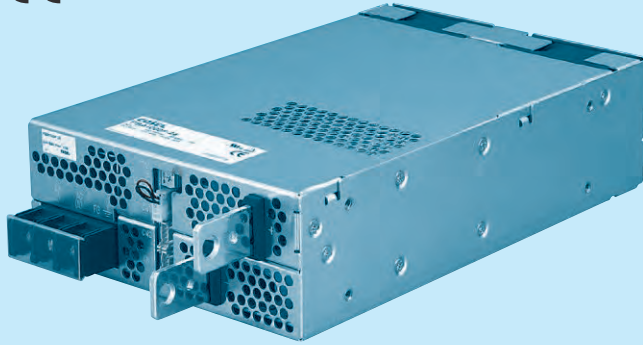
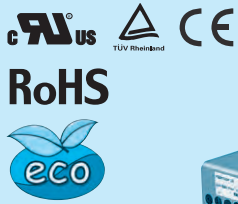


- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 1.6kg max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 1.2N · m (12.8kgf · cm) max
- ※ Screw tightening torque : M4 1.6N · m (16.9kgf · cm) max  
M5 2.5N · m (24.5kgf · cm) max
- ※ The housing for the remote sensing unused is mounted on CN1
- ※ 1 F1(Optional):190.5
- ※ Please connect safety ground to FG terminal on the unit.

# PBA1000F

PB A 1000 F -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-20-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*6
- C :with Coating
- G :Low leakage current
- U :Operation stop voltage is set at a lower value
- F1 :With Long-Life fan
- F3 :Reverse air exhaust type
- F4 :Low speed fan

Refer to instruction manual 7.1.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PBA1000F-3R3	PBA1000F-5	PBA1000F-7R5	PBA1000F-12	PBA1000F-15	PBA1000F-24	PBA1000F-36	PBA1000F-48	
MAX OUTPUT WATTAGE[W]	660	1000	1005	1056	1050	1056	1044	1056	
DC OUTPUT	ACIN 100V	3.3V 200A	5V 200A	7.5V 134A	12V 88A	15V 70A	24V 44A	36V 29A	48V 22A
	ACIN 200V *3	3.3V 200A	5V 200A	7.5V 134A	12V 88A	15V 70A	24V 44(51)A	36V 29A	48V 22A

## SPECIFICATIONS

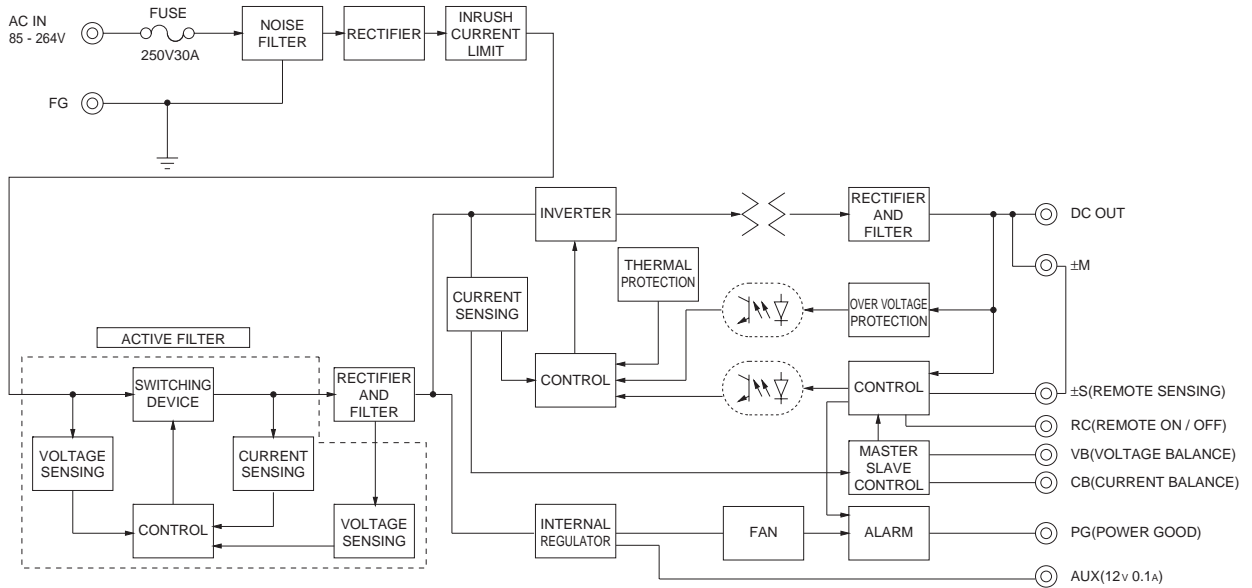
	MODEL	PBA1000F-3R3	PBA1000F-5	PBA1000F-7R5	PBA1000F-12	PBA1000F-15	PBA1000F-24	PBA1000F-36	PBA1000F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ or DC120 - 350 (AC50 or DC70 Please refer to the instruction manual 7. option *5)								
	CURRENT[A]	ACIN 100V	9typ	13typ						
		ACIN 200V	5typ	7typ						
	FREQUENCY[Hz]	50/60 (47 - 63)								
	EFFICIENCY[%]	ACIN 100V	74typ	79typ	80typ	82typ	82typ	84typ	84typ	84typ
		ACIN 200V	76typ	81typ	83typ	84typ	84typ	86typ	86typ	86typ
	POWER FACTOR	ACIN 100V	0.98typ (Io=100%)							
		ACIN 200V	0.95typ (Io=100%)							
	INRUSH CURRENT[A]	ACIN 100V	20/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 10 sec. to re-start)							
		ACIN 200V	40/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 10 sec. to re-start)							
LEAKAGE CURRENT[mA]	0.5/1.0max (ACIN 100V/240V 60Hz, Io=100%, According to IEC60950-1, DENAN)									
OUTPUT	VOLTAGE[V]	3.3	5	7.5	12	15	24	36	48	
	CURRENT[A]	ACIN 100V	200	200	134	88	70	44	29	22
		ACIN 200V *3	200	200	134	88	70	44(51)	29	22
	LINE REGULATION[mV]	20max	20max	36max	48max	60max	96max	144max	192max	
	LOAD REGULATION[mV]	40max	40max	60max	100max	120max	150max	150max	300max	
	RIPPLE[mVp-p]	0 to +50°C *1	80max	80max	120max	120max	120max	120max	150max	150max
		-20 - 0°C *1	140max	140max	160max	160max	160max	160max	160max	400max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max	120max	150max	150max	150max	150max	200max	200max
		-20 - 0°C *1	160max	160max	180max	180max	180max	180max	240max	500max
	TEMPERATURE REGULATION[mV]	0 to +50°C	40max	50max	75max	120max	150max	240max	360max	480max
		-20 to +50°C	60max	75max	120max	180max	180max	290max	440max	600max
	DRIFT[mV]	*2	12max	20max	30max	48max	60max	96max	144max	192max
	START-UP TIME[ms]	400typ(ACIN 100/200V, Io=100%) *Start-up time is 500ms typ for less than 1minute of applying input again from turning off the input voltage.								
HOLD-UP TIME[ms]	20typ (ACIN 100/200V, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.64 - 3.96	3.96 - 6.00	5.25 - 8.25	8.25 - 13.20	10.50 - 16.50	16.50 - 26.40	25.20 - 39.60	38.40 - 56.00		
OUTPUT VOLTAGE SETTING[V]	3.30 - 3.40	5.00 - 5.15	7.50 - 7.80	12.00 - 12.48	15.00 - 15.60	24.00 - 24.96	36.00 - 37.44	48.00 - 49.92		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rated current or 101% of peak current and recovers automatically								
	OVERVOLTAGE PROTECTION[V] *4	Vo+0.66 - 1.32	Vo+1.0 - 2.0	Vo+1.5 - 3.0	Vo+2.4 - 4.8	Vo+3.0 - 6.0	Vo+4.8 - 9.6	Vo+7.2 - 14.4	Vo+4.8 - 12.0	
	OPERATING INDICATION	LED (Green)								
	REMOTE SENSING	Provided								
REMOTE ON/OFF	Provided									
ISOLATION	INPUT-OUTPUT · RC	AC3.000V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)								
	INPUT-FG	AC2.000V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)								
	OUTPUT · RC · AUX-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)								
	OUTPUT-RC · AUX	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)								
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-20 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max								
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis								
IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis									
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN								
	CONDUCTED NOISE	Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B								
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 *7								
OTHERS	CASE SIZE/WEIGHT	150×61×240mm [5.91×2.4×9.45 inches] (without terminal block and screw) (W×H×D) /2.2kg max								
	COOLING METHOD	Forced cooling (internal fan)								

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).  
Ripple and ripple noise is measured on measuring board with capacitor of 22 μF within 150mm from the output terminal.  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
\*3 () means peak current. Peak loading for 10s. And Duty 35% max, refer to Instruction manual in detail.

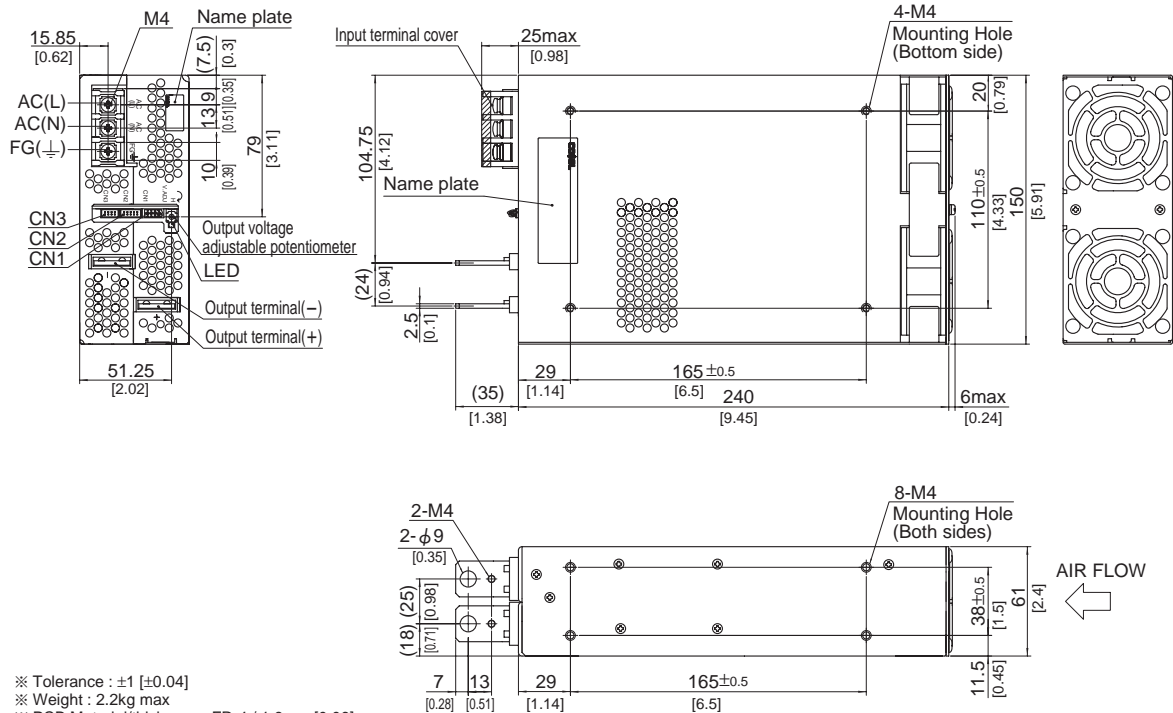
\*4 Overvoltage protection circuit to follow to output voltage setting. Standard overvoltage protection circuit is please contact us for details.  
\*5 Derating is required. Consult us for details.  
\*6 Please contact us about safety approvals for the model with option.  
\*7 Please contact us about class C.  
\* A sound may occur from power supply at pulse loading.



## Block diagram



## External view

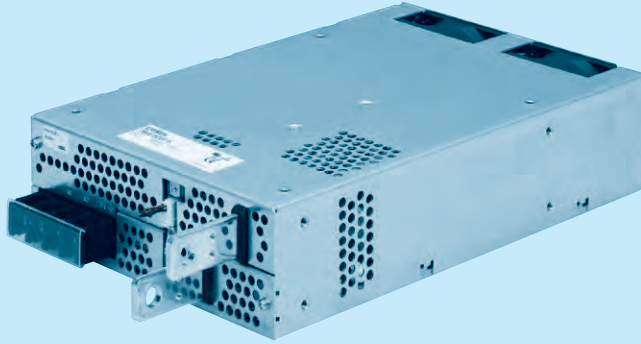
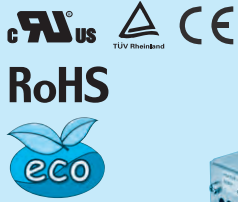


- ※ Tolerance :  $\pm 1$  [±0.04]
- ※ Weight : 2.2kg max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque :  $1.2\text{N} \cdot \text{m}$  (12.8kgf · cm)max
- ※ Screw tightening torque :  $1.6\text{N} \cdot \text{m}$  (16.9kgf · cm)max
- ※ The housing for the remote sensing unused is mounted on CN1
- ※ Please connect safety ground to FG terminal on the unit.

# PBA1500F

PB A 1500 F -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-20-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*6
- C :with Coating
- G :Low leakage current
- U :Operation stop voltage is set at a lower value
- F1 :With Long-Life fan
- F3 :Reverse air exhaust type
- F4 :Low speed fan

Refer to instruction manual 7.1.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PBA1500F-3R3	PBA1500F-5	PBA1500F-7R5	PBA1500F-12	PBA1500F-15	PBA1500F-24	PBA1500F-36	PBA1500F-48
MAX OUTPUT WATTAGE[W]	990	1500	1500	1500	1500	1680	1692	1680
DC OUTPUT	ACIN 100V	3.3V 300A	5V 300A	7.5V 200A	12V 125A	15V 100A	24V 65A	36V 42A
	ACIN 200V *3	3.3V 300A	5V 300A	7.5V 200A	12V 125A	15V 100A	24V 70(105)A	36V 47(70)A

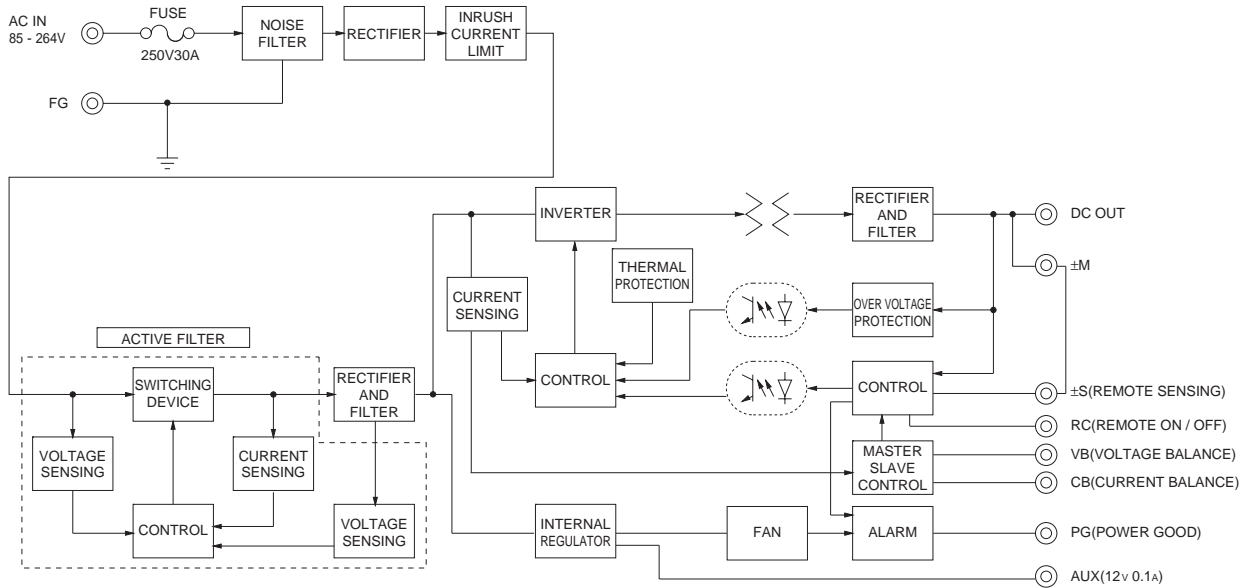
## SPECIFICATIONS

	MODEL	PBA1500F-3R3	PBA1500F-5	PBA1500F-7R5	PBA1500F-12	PBA1500F-15	PBA1500F-24	PBA1500F-36	PBA1500F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ or DC120 - 370 (AC50 or DC70 Please refer to the instruction manual 7. option *5)								
	CURRENT[A]	ACIN 100V	15typ	19typ						
		ACIN 200V	8typ	10typ						
	FREQUENCY[Hz]	50/60 (47 - 63)								
	EFFICIENCY[%]	ACIN 100V	72typ	77typ	81typ	81typ	83typ	84typ	84typ	84typ
		ACIN 200V	75typ	81typ	83typ	84typ	86typ	87typ	87typ	87typ
	POWER FACTOR	ACIN 100V	0.98typ (Io=100%)							
ACIN 200V		0.95typ (Io=100%)								
INRUSH CURRENT[A]	ACIN 100V	20/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 10 sec. to re-start)								
	ACIN 200V	40/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 10 sec. to re-start)								
LEAKAGE CURRENT[mA]	0.9/1.5max (ACIN 100V/240V 60Hz, Io=100%, According to IEC60950-1, DENAN)									
OUTPUT	VOLTAGE[V]	3.3	5	7.5	12	15	24	36	48	
	CURRENT[A]	ACIN 100V	300	300	200	125	100	65	42	32
		ACIN 200V *3	300	300	200	125	100	70(105)	47(70)	35
	LINE REGULATION[mV]	20max	20max	36max	48max	60max	96max	144max	192max	
	LOAD REGULATION[mV]	40max	40max	60max	100max	120max	150max	150max	300max	
	RIPPLE[mVp-p]	0 to +50°C *1	80max	80max	120max	120max	120max	120max	150max	150max
		-20 - 0°C *1	140max	140max	160max	160max	160max	160max	160max	400max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max	120max	150max	150max	150max	150max	200max	200max
		-20 - 0°C *1	160max	160max	180max	180max	180max	180max	240max	500max
	TEMPERATURE REGULATION[mV]	0 to +50°C	40max	50max	75max	120max	150max	240max	360max	480max
		-20 to +50°C	60max	75max	120max	180max	180max	290max	440max	600max
	DRIFT[mV]	*2	12max	20max	30max	48max	60max	96max	144max	192max
	START-UP TIME[ms]	600typ(ACIN 100/200V, Io=100%)								
HOLD-UP TIME[ms]	20typ (ACIN 100/200V, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.64 - 3.96	3.96 - 6.00	5.25 - 8.25	8.25 - 13.20	10.50 - 16.50	16.50 - 26.40	25.20 - 39.60	38.40 - 56.00		
OUTPUT VOLTAGE SETTING[V]	3.30 - 3.40	5.00 - 5.15	7.50 - 7.80	12.00 - 12.48	15.00 - 15.60	24.00 - 24.96	36.00 - 37.44	48.00 - 49.92		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rated current or 101% of peak current and recovers automatically								
	OVERVOLTAGE PROTECTION[V] *4	Vo+0.66 - 1.32	Vo+1.0 - 2.0	Vo+1.5 - 3.0	Vo+2.4 - 4.8	Vo+3.0 - 6.0	Vo+4.8 - 9.6	Vo+7.2 - 14.4	Vo+4.8 - 12.0	
	OPERATING INDICATION	LED (Green)								
	REMOTE SENSING	Provided								
ISOLATION	REMOTE ON/OFF	Provided								
	INPUT-OUTPUT · RC	AC3.000V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)								
	INPUT-FG	AC2.000V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)								
	OUTPUT · RC · AUX-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)								
ENVIRONMENT	OUTPUT-RC · AUX	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)								
	OPERATING TEMP.,HUMID.AND ALTITUDE	-20 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max								
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis								
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis								
	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN								
	CONDUCTED NOISE	Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B, additional EMI/EMC Filter required for meeting class B								
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 *7								
OTHERS	CASE SIZE/WEIGHT	178×61×268mm [7.01×2.4×10.55 inches] (without terminal block and screw) (W×H×D) /3.4kg max								
	COOLING METHOD	Forced cooling (internal fan)								

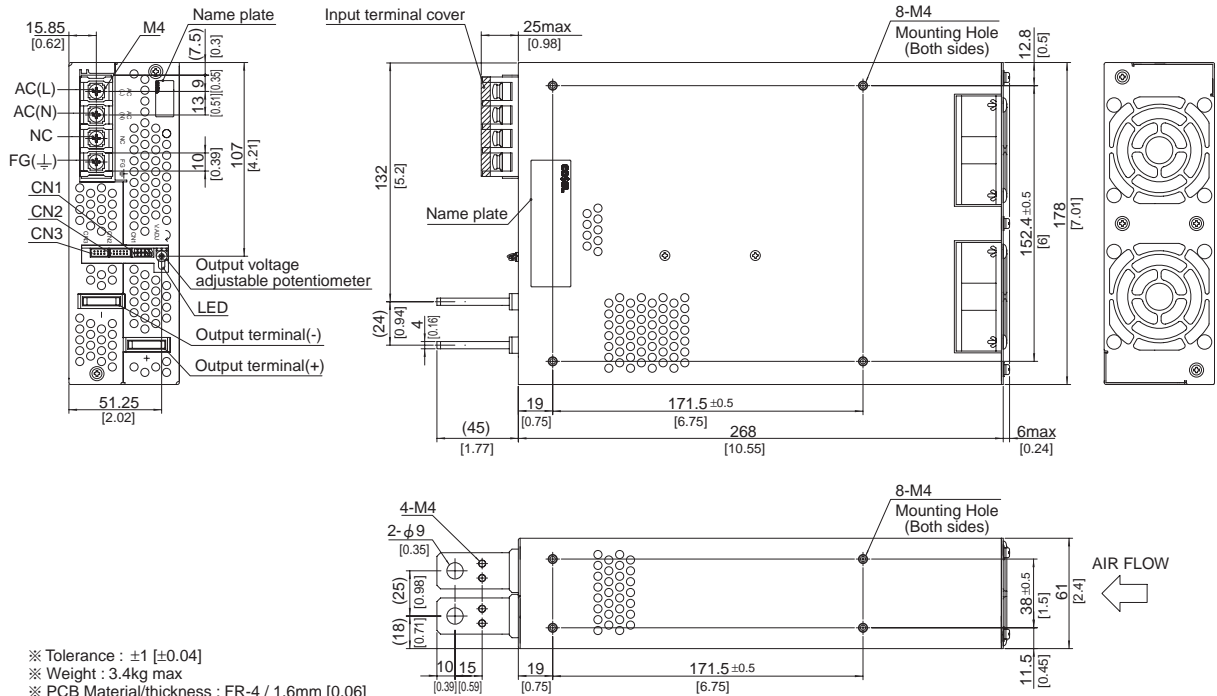
\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).  
Ripple and ripple noise is measured on measuring board with capacitor of 22 μF within 150mm from the output terminal.  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
\*3 () means peak current. Peak loading for 10s. And Duty 35% max, refer to Instruction manual in detail.

\*4 Overvoltage protection circuit to follow to output voltage setting. Standard overvoltage protection circuit is please contact us for details.  
\*5 Derating is required. Consult us for details.  
\*6 Please contact us about safety approvals for the model with option.  
\*7 Please contact us about class C.  
\* A sound may occur from power supply at pulse loading.

## Block diagram



## External view

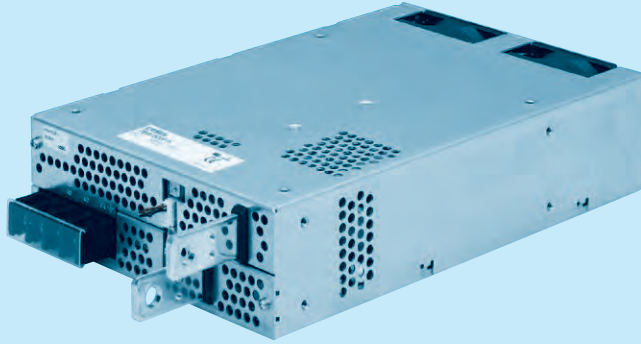


- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 3.4kg max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque :  $1.2\text{N} \cdot \text{m}$  ( $12.8\text{kgf} \cdot \text{cm}$ ) max
- ※ Screw tightening torque :  $1.6\text{N} \cdot \text{m}$  ( $16.9\text{kgf} \cdot \text{cm}$ ) max
- ※ The housing for the remote sensing unused is mounted on CN1
- ※ Please connect safety ground to FG terminal on the unit.

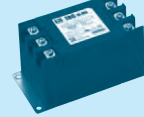
# PBA1500T

PB A 1500 T -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
TAC-10-683



\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Triple input phase
- ⑤ Output voltage
- ⑥ Optional \*6
- C :with Coating
- G :Low leakage current
- U :Operation stop voltage is set at a lower value
- F1 :With Long-Life fan
- F3 :Reverse air exhaust type
- F4 :Low speed fan

Refer to instruction manual 7.1.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PBA1500T-5	PBA1500T-12	PBA1500T-24	PBA1500T-48
MAX OUTPUT WATTAGE[W]	1500	1500	1680	1680
DC OUTPUT	ACIN 200V *3 5V 300A	12V 125A	24V 70(105)A	48V 35A

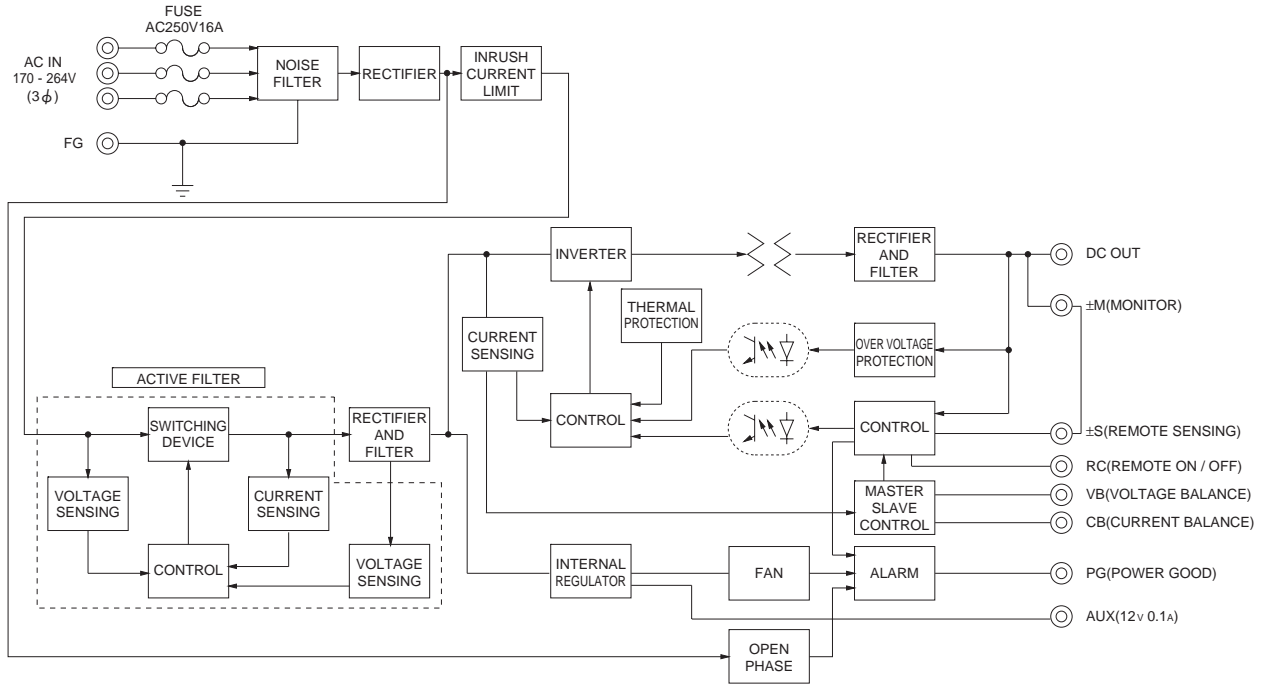
## SPECIFICATIONS

	MODEL	PBA1500T-5	PBA1500T-12	PBA1500T-24	PBA1500T-48	
INPUT	VOLTAGE[V]	AC170 - 264 3φ (AC100 Please refer to the instruction manual 7. option *5)				
	CURRENT[A]	ACIN 200V 6typ				
	FREQUENCY[Hz]	50/60 (47 - 63)				
	EFFICIENCY[%]	ACIN 200V 81typ	84typ	87typ	87typ	
	POWER FACTOR	ACIN 200V 0.95typ (Io=100%)				
	INRUSH CURRENT[A]	ACIN 200V 40/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 10 sec. to re-start)				
OUTPUT	LEAKAGE CURRENT[μA]	1.5max (ACIN 240V 60Hz, Io=100%, According to IEC60950-1, DENAN)				
	VOLTAGE[V]	5	12	24	48	
	CURRENT[A]	ACIN 200V *3 300	125	70(105)	35	
	LINE REGULATION[mV]	20max	48max	96max	192max	
	LOAD REGULATION[mV]	40max	100max	150max	300max	
	RIPPLE[mVp-p]	0 to +50°C *1	80max	120max	120max	150max
		-20 - 0°C *1	140max	160max	160max	400max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max	150max	150max	200max
		-20 - 0°C *1	160max	180max	180max	500max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	120max	240max	480max
		-20 to +50°C	75max	180max	290max	600max
	DRIFT[mV]	*2 20max	48max	96max	192max	
	START-UP TIME[ms]	300typ(ACIN 200V, Io=100%) * Start-up time is 500ms typ for less than 1 minute of applying input again from turning off the input voltage.				
HOLD-UP TIME[ms]	20typ (ACIN 200V, Io=100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	3.96 - 6.00	8.25 - 13.20	16.50 - 26.40	38.40 - 56.00		
OUTPUT VOLTAGE SETTING[V]	5.00 - 5.15	12.00 - 12.48	24.00 - 24.96	48.00 - 49.92		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rated current or 101% of peak current and recovers automatically				
	OVERVOLTAGE PROTECTION[V] *4	Vo+1.0 - 2.0	Vo+2.4 - 4.8	Vo+4.8 - 9.6	Vo+2.0 - 12.0	
	OPERATING INDICATION	LED (Green)				
	REMOTE SENSING	Provided				
ISOLATION	REMOTE ON/OFF	Provided				
	INPUT-OUTPUT · RC	AC3,000V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)				
	INPUT-FG	AC2,000V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)				
	OUTPUT · RC · AUX-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)				
ENVIRONMENT	OUTPUT-RC · AUX	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)				
	OPERATING TEMP., HUMID. AND ALTITUDE	-20 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max				
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis				
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis				
	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN				
	CONDUCTED NOISE	Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B, additional EMI/EMC Filter required for meeting class B				
OTHERS	CASE SIZE/WEIGHT	178×61×268mm [7.01×2.4×10.55 inches] (without terminal block and screw) (W×H×D) /3.4kg max				
	COOLING METHOD	Forced cooling (internal fan)				

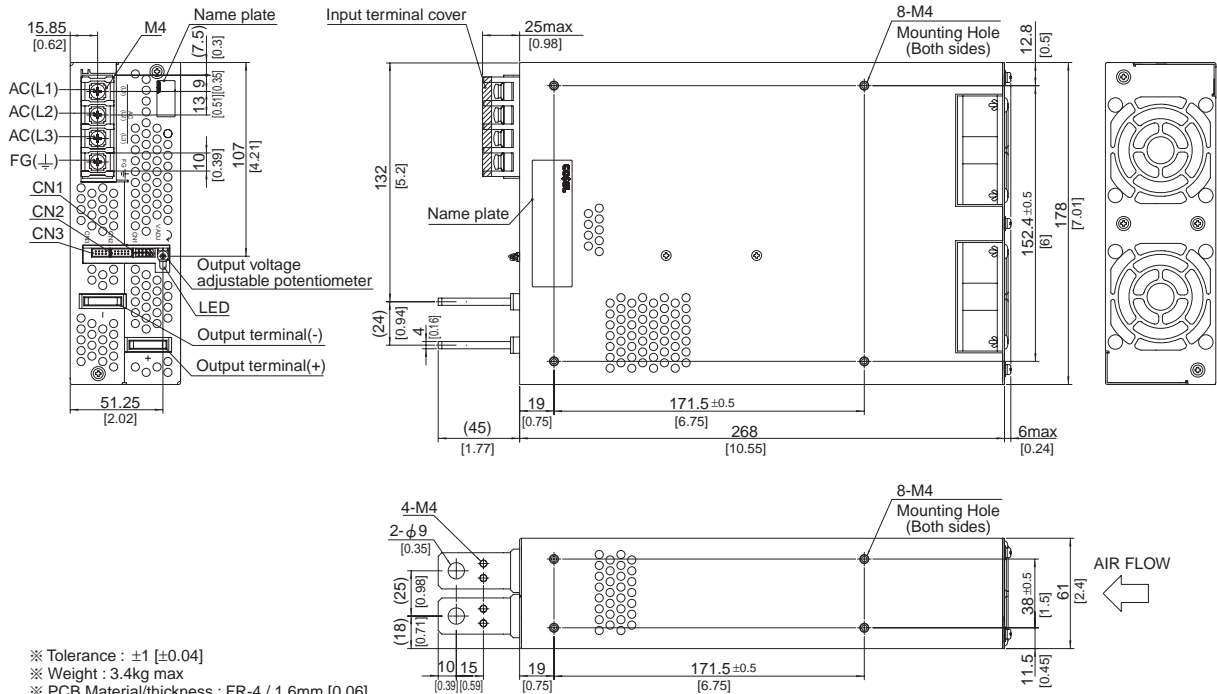
\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).  
Ripple and ripple noise is measured on measuring board with capacitor of 22 μF within 150mm from the output terminal.  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
\*3 () means peak current. Peak loading for 10s. And Duty 35% max, refer to Instruction manual in detail.

\*4 Overvoltage protection circuit to follow to output voltage setting. Standard overvoltage protection circuit is please contact us for details.  
\*5 Derating is required. Consult us for details.  
\*6 Please contact us about safety approvals for the model with option.  
\* A sound may occur from power supply at pulse loading.

## Block diagram



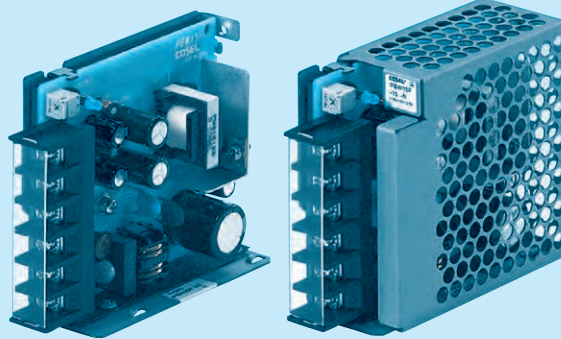
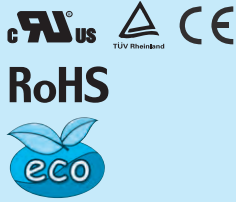
## External view



- ※ Tolerance :  $\pm 1 \pm 0.04$
- ※ Weight : 3.4kg max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque :  $1.2N \cdot m (12.8kgf \cdot cm)$  max
- ※ Screw tightening torque :  $1.6N \cdot m (16.9kgf \cdot cm)$  max
- ※ The housing for the remote sensing unused is mounted on CN1
- ※ Please connect safety ground to unit in M4 holes.

# PBW15F

PB W 15 F - □ - □  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**NAC-06-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*10
- C : with Coating
- G : Low leakage current

E : Low leakage current and EMI class A

T : Vertical terminal block  
 J : Connector type  
 N : with Cover  
 NI : with DIN rail  
 V : Output voltage setting potentiometer externally

Cover is optional

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

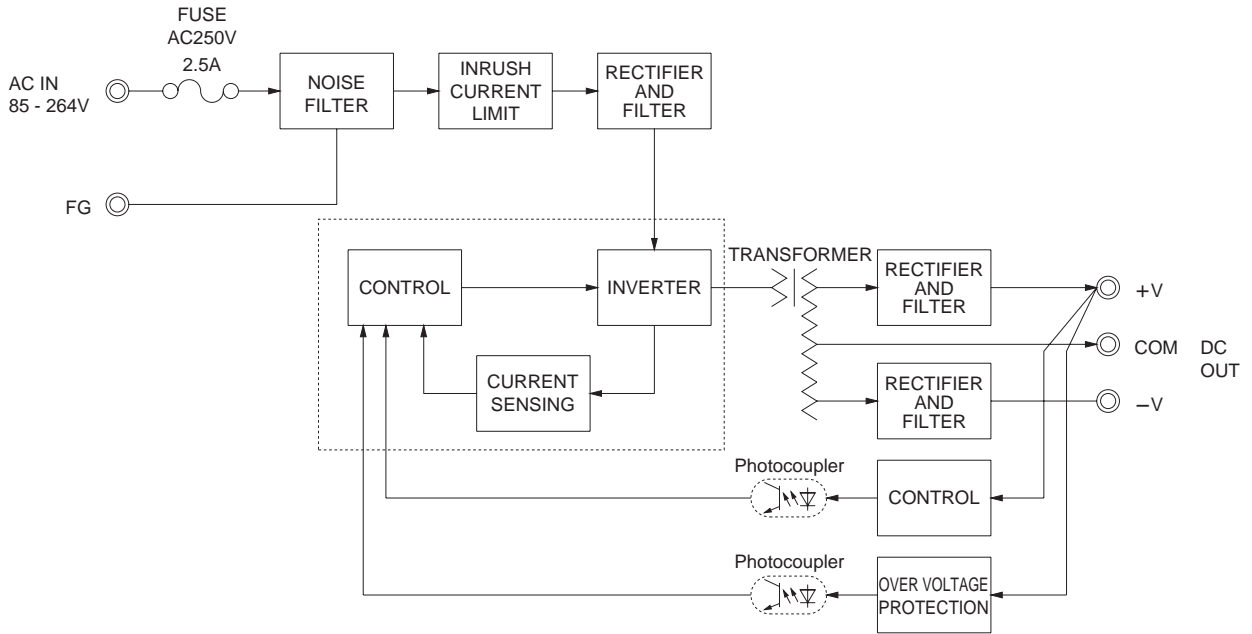
MODEL	PBW15F-12	PBW15F-15
MAX OUTPUT WATTAGE[W]	16.8	15.0
DC OUTPUT	VOLTAGE[V] *6	±12 ( +24 )
	CURRENT1[A]	0.7
	CURRENT2[A] *5	1.4
		1.0

## SPECIFICATIONS

	MODEL	PBW15F-12	PBW15F-15	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ or DC110 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *8)		
	CURRENT[A]	ACIN 100V	0.40typ (CURRENT1)	
		ACIN 200V	0.20typ (CURRENT1)	
	FREQUENCY[Hz]	50/60 (47 - 440) or DC		
	EFFICIENCY[%]	ACIN 100V	74typ (CURRENT1)	78typ (CURRENT1)
		ACIN 200V	77typ (CURRENT1)	80typ (CURRENT1)
	INRUSH CURRENT[A]	ACIN 100V	15typ (CURRENT1) (At cold start)	
ACIN 200V		30typ (CURRENT1) (At cold start)		
LEAKAGE CURRENT[mA]	0.15/0.30max (ACIN 100V/240V 60Hz, Io=100%, According to IEC60950-1.DENAN)			
OUTPUT	VOLTAGE[V]	±12	±15	
	CURRENT1[A]	0.7	0.5	
	CURRENT2[A] *5	1.4	1.0	
	LINE REGULATION[mV] *3	60max	60max	
	LOAD REGULATION 1[mV] *3	600max	600max	
	LOAD REGULATION 2[mV] *4	750max	750max	
	RIPPLE[mVp-p]	0 to +50°C *1	120max	120max
		-10 - 0°C *1	160max	160max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	150max	150max
		-10 - 0°C *1	180max	180max
	TEMPERATURE REGULATION[mV]	0 to +50°C	120max	150max
		-10 to +50°C	150max	180max
	DRIFT[mV] *2	48max		
	START-UP TIME[ms]	200typ(ACIN 100V, Io=100%) * Start-up time is 700ms typ for less than 1minute of applying input again from turning off the input voltage.		
HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)			
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	9.60 - 13.2 (+V and -V are simultaneously adjusted)		13.2 - 16.5 (+V and -V are simultaneously adjusted)	
OUTPUT VOLTAGE SETTING[V]	11.5 - 12.5 (+V and -V CURRENT1)		14.4 - 15.6 (+V and -V CURRENT1)	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rated current and recovers automatically		
	OVERVOLTAGE PROTECTION[V]	16.8 - 24.0	20.0 - 29.0	
	OPERATING INDICATION	LED (Green)		
ISOLATION	REMOTE ON/OFF	None		
	INPUT-OUTPUT	AC3.000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)		
	INPUT-FG	AC2.000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)		
ENVIRONMENT	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)		
	OPERATING TEMP.,HUMID.AND ALTITUDE	-10 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max		
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max		
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis		
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis		
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN		
	CONDUCTED NOISE	Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B		
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Not built-in to active filter *7) *12		
OTHERS	CASE SIZE/WEIGHT	31 X 78 X 85mm [1.22 X 3.07 X 3.35 inches] (without terminal block) (W X H X D) / 200g max (with cover : 235g max)		
	COOLING METHOD	Convection		

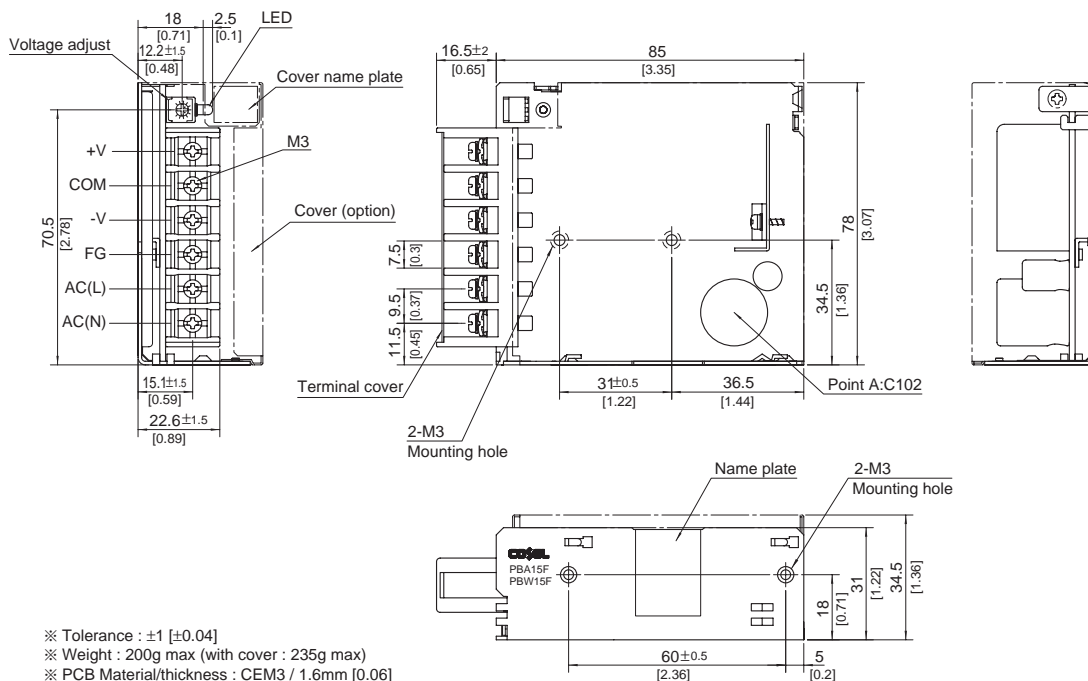
\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN : RM101).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \*3 Figures for 0 to rated current 1.The current not measured side is fixed.  
 \*4 Figures for 0 to rated current 2.The current not measured side is fixed.  
 \*5 The sum of +power -power must be less than output power.  
 \*6 ±12, ±15 can be used as +24 and +30.  
 \*7 When two or more units are used, they may not comply with the harmonic attenuator. Please contact us for details.  
 \*8 Derating is required.  
 \*9 Figures to rated current 1.  
 \*10 Please contact us about safety approvals for the model with option.  
 \*11 Please contact us about dynamic load and input response.  
 \*12 Please contact us about class C.  
 \* Parallel operation with other model is not possible.  
 \* Derating is required when operated with cover.  
 \* A sound may occur from power supply at peak loading.

Block diagram



External view

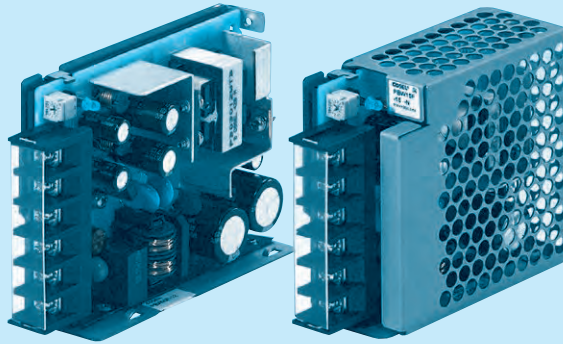
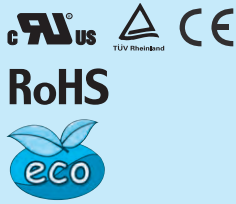
※ External size of option T,J,N1 and V is different from standard model and refer to 7 Option of instruction manual for details.



- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 200g max (with cover : 235g max)
- ※ PCB Material/thickness : CEM3 / 1.6mm [0.06]
- ※ Chassis material : Electric galvanizing steel board
- ※ Dimensions in mm, [ ]= inches
- ※ Mounting torque : 0.6N • m(6.3kgf • cm)max
- ※ Screw tightening torque : M3 0.8N • m(8.5kgf • cm)max
- ※ Please connect safety ground to the unit in 2-M3 holes.

# PBW30F

PB W 30 F - □ - □  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**NAC-06-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*10
- C :with Coating
- G :Low leakage current

E :Low leakage current and EMI class A

T :Vertical terminal block  
 J :Connector type  
 N :with Cover  
 NI :with DIN rail  
 V :Output voltage setting potentiometer externally

Cover is optional

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PBW30F-5	PBW30F-12	PBW30F-15
MAX OUTPUT WATTAGE[W]	15	31.2	30.0
DC OUTPUT	VOLTAGE[V] *6	±5 ( +10 )	±12 ( +24 )
	CURRENT1[A]	1.5	1.3
	CURRENT2[A] *5	2.0	1.7

## SPECIFICATIONS

	MODEL	PBW30F-5	PBW30F-12	PBW30F-15	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ or DC110 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *8)			
	CURRENT[A]	ACIN 100V	0.4typ (CURRENT1)	0.7typ (CURRENT1)	
		ACIN 200V	0.25typ (CURRENT1)	0.4typ (CURRENT1)	
	FREQUENCY[Hz]	50/60 (47 - 440) or DC			
	EFFICIENCY[%]	ACIN 100V	75typ (CURRENT1)	77typ (CURRENT1)	78typ (CURRENT1)
		ACIN 200V	75typ (CURRENT1)	81typ (CURRENT1)	79typ (CURRENT1)
INRUSH CURRENT[A]	ACIN 100V	15typ (CURRENT1) (At cold start)			
	ACIN 200V	30typ (CURRENT1) (At cold start)			
	LEAKAGE CURRENT[mA]	0.30/0.65max (ACIN 100V/240V 60Hz, Io=100%, According to IEC60950-1.DENAN)			
OUTPUT	VOLTAGE[V]	±5 / (+10V reference number)	±12 / (+24V reference number)	±15 / (+30V reference number)	
	CURRENT1[A]	1.5 / 1.5	1.3 / 1.3	1.0 / 1.0	
	CURRENT2[A] *5	2.0 / -	1.7 / -	1.4 / -	
	LINE REGULATION[mV] *3	20max / 36max	60max / 96max	60max / 96max	
	LOAD REGULATION 1[mV] *3	250max / 100max	600max / 150max	600max / 150max	
	LOAD REGULATION 2[mV] *4	500max / -	750max / -	750max / -	
	RIPPLE[mVp-p]	0 to +50°C *1	80max / 240max	120max / 240max	120max / 240max
		-10 - 0°C *1	140max / 320max	160max / 320max	160max / 320max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max / 300max	150max / 300max	150max / 300max
		-10 - 0°C *1	160max / 360max	180max / 360max	180max / 360max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	120max	150max
		-10 to +50°C	60max	150max	180max
	DRIFT[mV] *2	20max	48max	60max	
	START-UP TIME[ms]	200typ(ACIN 100V, Io=100%) * Start-up time is 70ms typ for less than 1minute of applying input again from turning off the input voltage.			
HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)				
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	4.99 - 6.00 (+V and -V are simultaneously adjusted)	9.60 - 13.2 (+V and -V are simultaneously adjusted)	13.2 - 16.5 (+V and -V are simultaneously adjusted)		
OUTPUT VOLTAGE SETTING[V]	4.99 - 5.30 (+V and -V CURRENT1)	11.5 - 12.5 (+V and -V CURRENT1)	14.4 - 15.6 (+V and -V CURRENT1)		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rated current and recovers automatically			
	OVERVOLTAGE PROTECTION[V]	6.90 - 10.0	16.8 - 24.0	20.0 - 29.0	
	OPERATING INDICATION	LED (Green)			
	REMOTE ON/OFF	None			
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)			
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-10 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max			
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max			
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis			
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN			
	CONDUCTED NOISE	Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B			
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Not built-in to active filter *7) *12			
OTHERS	CASE SIZE/WEIGHT	31 X 78 X 103mm [1.22 X 3.07 X 4.06 inches] (without terminal block) (W X H X D) / 270g max (with cover : 310g max)			
	COOLING METHOD	Convection			

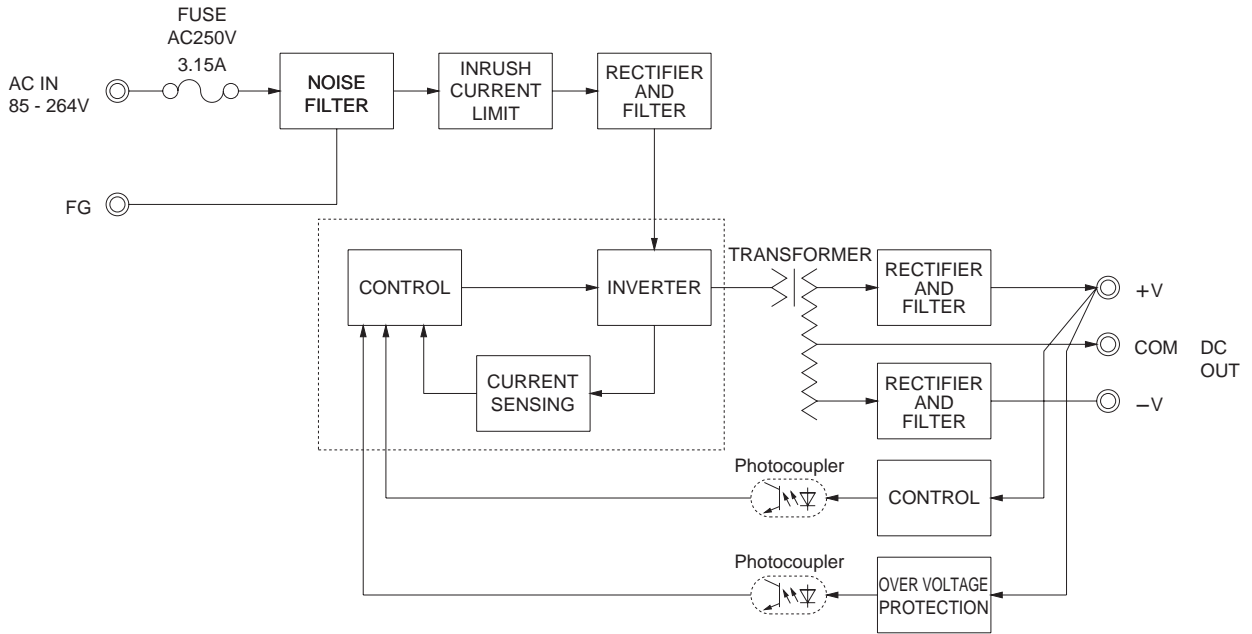
\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN : RM101).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \*3 Figures for 0 to rated current 1.The current not measured side is fixed.  
 \*4 Figures for 0 to rated current 2.The current not measured

side is fixed.  
 \*5 The sum of +power -power must be less than output power.  
 \*6 ±5, ±12, ±15 can be used as +10, +24 and +30.  
 \*7 When two or more units are used, they may not comply with the harmonic attenuator. Please contact us for details.  
 \*8 Derating is required.  
 \*9 Figures to rated current 1.

\*10 Please contact us about safety approvals for the model with option.  
 \*11 Please contact us about dynamic load and input response.  
 \*12 Please contact us about class C.  
 \* Parallel operation with other model is not possible.  
 \* Derating is required when operated with cover.  
 \* A sound may occur from power supply at peak loading.

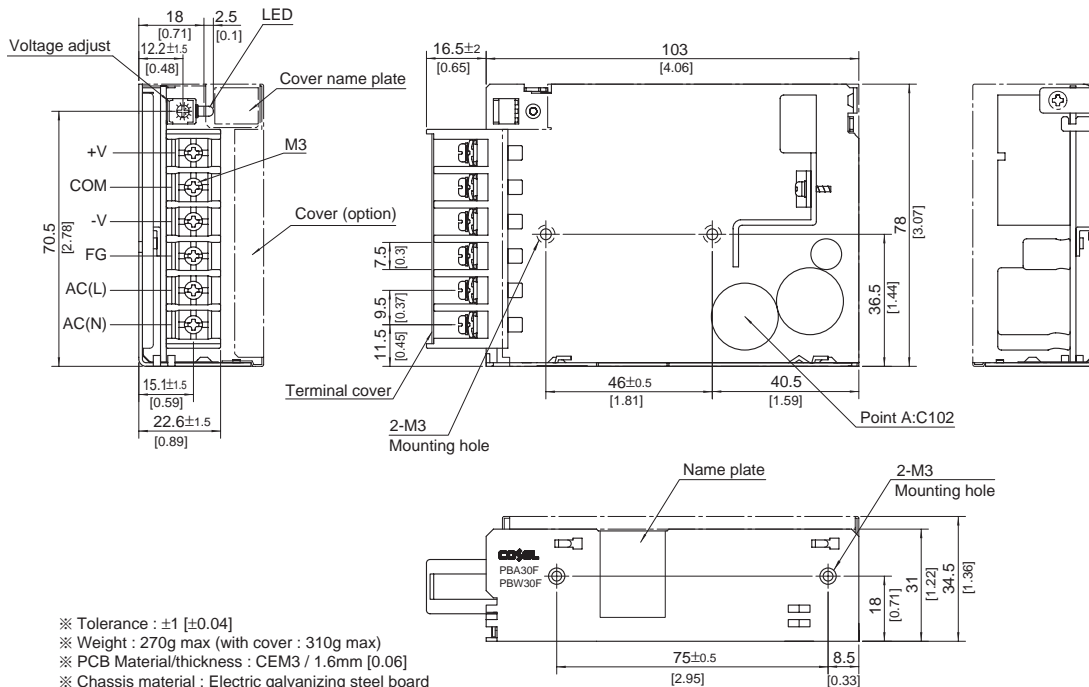


Block diagram



External view

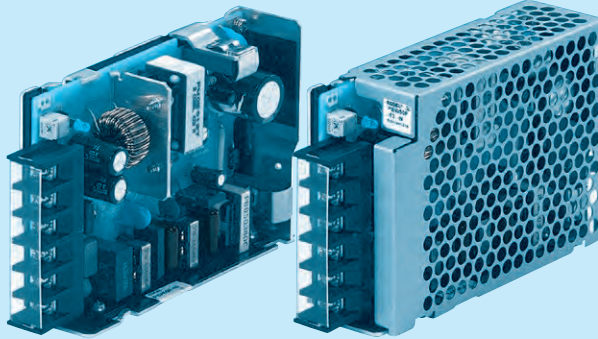
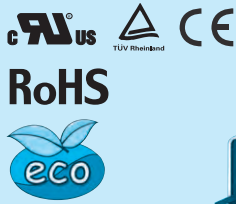
※ External size of option T,J,N1 and V is different from standard model and refer to 7 Option of instruction manual for details.



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 270g max (with cover : 310g max)
- ※ PCB Material/thickness : CEM3 / 1.6mm [0.06]
- ※ Chassis material : Electric galvanizing steel board
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque :  $0.6\text{N} \cdot \text{m}$  (6.3kgf  $\cdot$  cm)max
- ※ Screw tightening torque :  $M3\ 0.8\text{N} \cdot \text{m}$  (8.5kgf  $\cdot$  cm)max
- ※ Please connect safety ground to the unit in 2-M3 holes.

# PBW50F

PB W 50 F - □ - □  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**NAC-06-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*9
- C : with Coating
- G : Low leakage current (0.15mA max / ACIN 240V)
- E : Low leakage current and EMI class A (0.5mA max / ACIN 240V)
- T : Vertical terminal block
- J : Connector type
- R : with Remote ON/OFF
- N : with Cover
- NI : with DIN rail
- V : Output voltage setting potentiometer external

Cover is optional

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

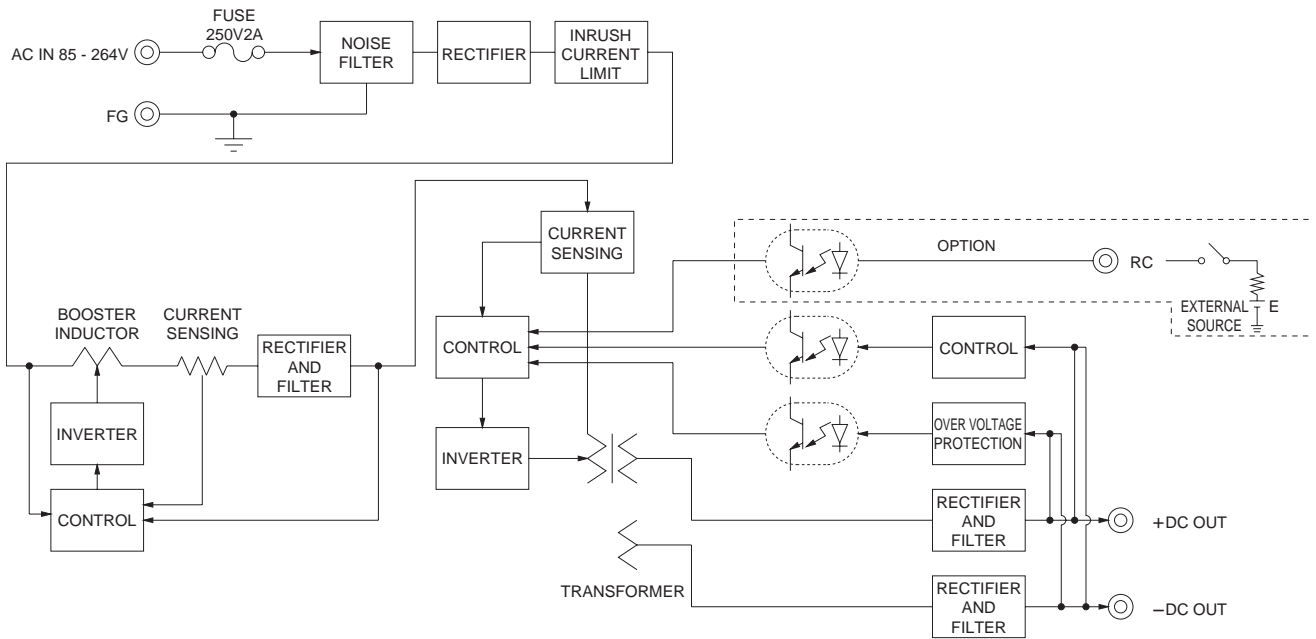
MODEL	PBW50F-5	PBW50F-12	PBW50F-15
MAX OUTPUT WATTAGE[W]	30	50.4	51
VOLTAGE[V]	±5 (+10)	±12 (+24)	±15 (+30)
DC OUTPUT	CURRENT1[A]	2.1	1.7
	CURRENT2[A]	2.7	2.4

## SPECIFICATIONS

	MODEL	PBW50F-5	PBW50F-12	PBW50F-15	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ or DC120 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *3)			
	CURRENT[A]	ACIN 100V	0.45typ (CURRENT1)	0.70typ (CURRENT1)	
		ACIN 200V	0.30typ (CURRENT1)	0.40typ (CURRENT1)	
	FREQUENCY[Hz]	50/60 (47 - 63)			
	EFFICIENCY[%]	ACIN 100V	76typ (CURRENT1)	81typ (CURRENT1)	81typ (CURRENT1)
		ACIN 200V	77typ (CURRENT1)	83typ (CURRENT1)	83typ (CURRENT1)
	POWER FACTOR(lo=100%)	ACIN 100V	0.98typ	0.99typ	
ACIN 200V		0.87typ	0.93typ		
INRUSH CURRENT[A]	ACIN 100V	15typ (CURRENT1) (At cold start)			
	ACIN 200V	30typ (CURRENT1) (At cold start)			
LEAKAGE CURRENT[mA]	0.40/0.75max (ACIN 100V/240V 60Hz, lo=100%, According to IEC60950-1.DENAN)				
OUTPUT	VOLTAGE[V]	±5 / (+10V reference number)	±12 / (+24V reference number)	±15 / (+30V reference number)	
	CURRENT1[A]	3.0 / 3.0	2.1 / 2.1	1.7 / 1.7	
	CURRENT2[A]	4.0 / -	2.7 / -	2.4 / -	
	LINE REGULATION[mV]	20max / 36max	48max / 96max	60max / 96max	
	LOAD REGULATION 1[mV]	250max / 100max	600max / 150max	600max / 150max	
	LOAD REGULATION 2[mV]	500max / -	750max / -	750max / -	
	RIPPLE[mVp-p]	0 to +50°C *1	80max / 240max	120max / 240max	120max / 240max
		-10 - 0°C *1	140max / 320max	160max / 320max	160max / 320max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max / 300max	150max / 300max	150max / 300max
		-10 - 0°C *1	160max / 360max	180max / 360max	180max / 360max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	120max	150max
		-10 to +50°C	60max	150max	180max
	DRIFT[mV]	20max	48max	60max	
	START-UP TIME[ms]	350typ(ACIN 100V, lo=100%)			
HOLD-UP TIME[ms]	20typ (ACIN 100V, lo=100%)				
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	4.99 - 6.00 (+V and -V are simultaneously adjusted)	9.60 - 13.2 (+V and -V are simultaneously adjusted)	13.2 - 16.5 (+V and -V are simultaneously adjusted)		
OUTPUT VOLTAGE SETTING[V]	4.99 - 5.30 (+V and -V CURRENT1)	11.5 - 12.5 (+V and -V CURRENT1)	14.4 - 15.6 (+V and -V CURRENT1)		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rated current and recovers automatically			
	OVERVOLTAGE PROTECTION[V]	6.90 - 10.0	16.8 - 24.0	20.0 - 29.0	
	OPERATING INDICATION	LED (Green)			
ISOLATION	REMOTE ON/OFF	Optional (Required external power source)			
	INPUT-OUTPUT - RC	*7 AC3.000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	INPUT-FG	AC2.000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
ENVIRONMENT	OUTPUT - RC-FG	*7 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)			
	OPERATING TEMP.,HUMID.AND ALTITUDE	-10 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max			
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max			
SAFETY AND NOISE REGULATIONS	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis			
	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN			
OTHERS	CONDUCTED NOISE	Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B			
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 *10			
OTHERS	CASE SIZE/WEIGHT	31 x 82 x 120mm [1.22 x 3.23 x 4.72 inches] (without terminal block) (W x H x D) / 280g max (with cover : 325g max)			
	COOLING METHOD	Convection			

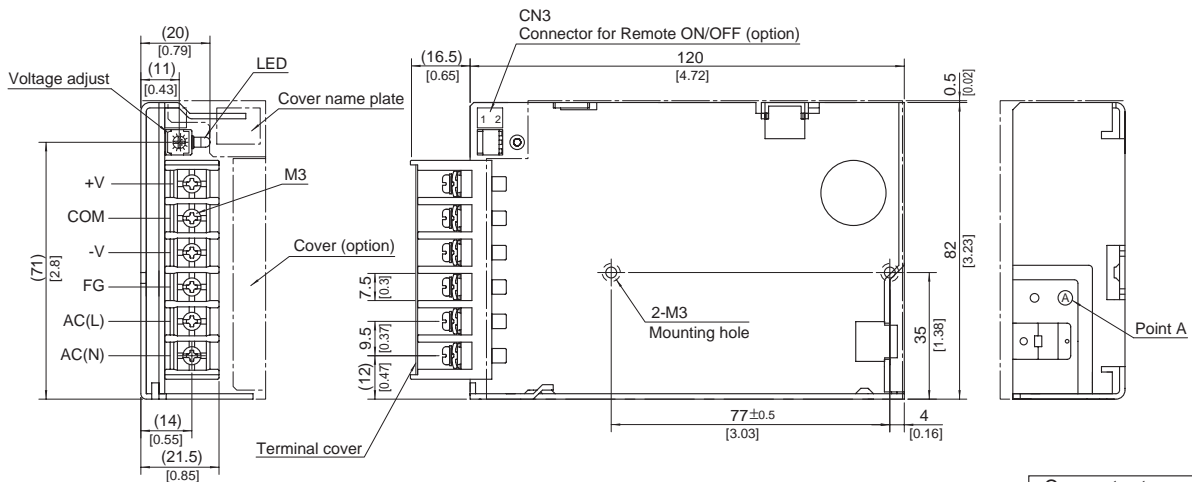
\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN : RM101).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \*3 Derating is required.  
 \*4 Figures for 0 to rated current 1.The current not measured side is fixed.  
 \*5 Figures for 0 to rated current 2.The current not measured side is fixed.  
 \*6 The sum of +power -power must be less than output power.  
 \*7 RC is applied to remote ON/OFF option. RC is isolated with input/output and FG.  
 \*8 ±5, ±12, ±15 can be used as +10,+24 and +30.  
 \*9 Please contact us about safety approvals for the model with option.  
 \*10 Please contact us about class C.  
 \* Parallel operation with other model is not possible.  
 \* Derating is required when operated with cover.  
 \* A sound may occur from power supply at peak loading.

Block diagram



External view

※ External size of option T,J,R,N1 and V is different from standard model and refer to 7 Option of instruction manual for details.



- ※ Tolerance :  $\pm 1 [\pm 0.04]$
- ※ Weight : 280g max (with cover : 325g max)
- ※ PCB Material/thickness : CEM3 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque :  $0.49N \cdot m (5kgf \cdot cm)$  max
- ※ Screw tightening torque :  $M3 0.8N \cdot m (8.5kgf \cdot cm)$  max
- ※ Please connect safety ground to the unit in 2-M3 holes.

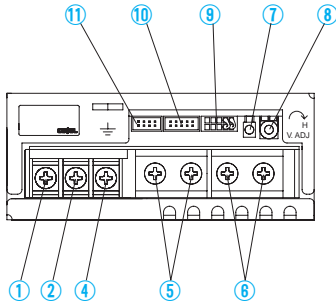
Connector type	
CN3 Option (Mfr : J.S.T.)	
Pin No.	Contents
1	RC(+)
2	RC(-)

Barrier strip type  
 Model B2B-XH-A  
 Mating Connector (Terminal)  
 XHP-2  
 (BXH-001T-P0.6  
 or SXH-001T-P0.6)

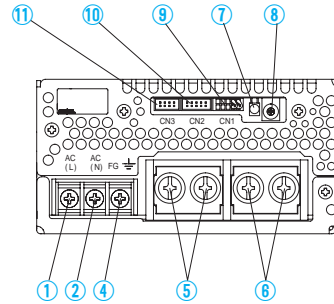
Terminal Blocks

\*The following information covers PBA300F - 1500F. Please see External View for PBA10F - 150F and PBW15F - 50F.

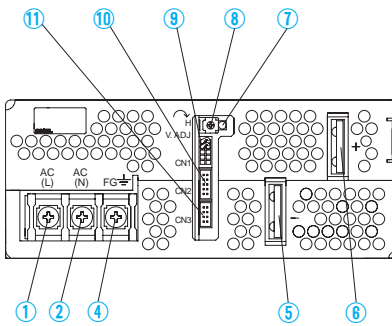
● PBA300F



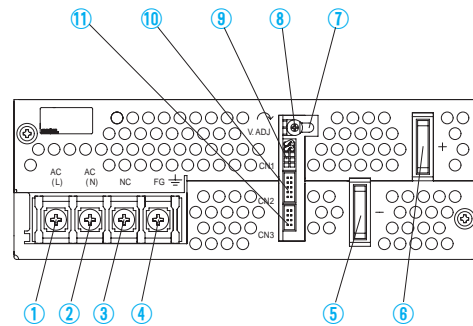
● PBA600F



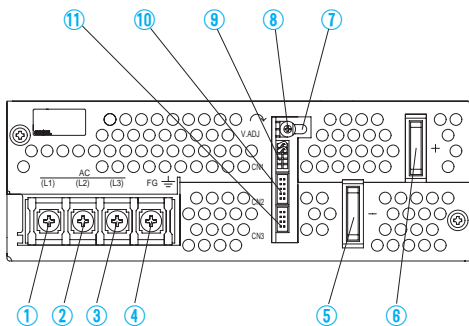
● PBA1000F



● PBA1500F



● PBA1500T



\*PBA300F - 1500F

- ① AC (L) } Input Terminals AC85 - 264V  $\phi$  47 - 63Hz
- ② AC (N) } (M4)
- ③ NC
- ④ Frame ground (M4  $\perp$ )
- ⑤ -Output
- ⑥ +Output
- ⑦ LED
- ⑧ Output voltage adjustable potentiometer
- ⑨ CN1 } Connectors
- ⑩ CN2 }
- ⑪ CN3 }

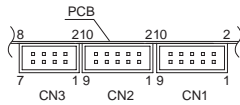
\*Please see Optional Parts for dedicated harnesses.

\*PBA1500T

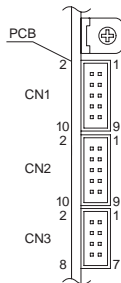
- ① AC (L1)
- ② AC (L2)
- ③ AC (L3)
- ④ Frame ground (M4  $\perp$ )
- ⑤ -Output
- ⑥ +Output
- ⑦ LED
- ⑧ Output voltage adjustable potentiometer
- ⑨ CN1 } Connectors
- ⑩ CN2 }
- ⑪ CN3 }

Terminal Blocks

● PBA300F, 600F Pin Configuration



● PBA1000F, 1500F Pin Configuration



Pin Configuration and Functions of CN1 and CN2

Pin No.	Function
1	+M : Self sensing terminal. (Do not wire for external connection.)
2	+S : +Sensing
3	-M : Self sensing terminal. (Do not wire for external connection.)
4	-S : -Sensing
5	VB : Voltage balance
6	CB : Current balance
7	TRM : Adjustment of output voltage
8	-S : -Sensing
9	RC2 : Remote ON/OFF
10	RCG : Remote ON/OFF (GND)

Pin Configuration and Functions of CN3

Pin No.	Function
1	-S : -Sensing
2	-S : -Sensing
3	AUX : Auxiliary output (12V 0.1A)
4	RC1 : Remote ON/OFF
5	AUXG : Auxiliary output (GND)
6	N.C. : No connection
7	PG : Alarm
8	PGG : Alarm (GND)

\*Common signs among CN1, CN2 and CN3 such as -S represent the same potential.

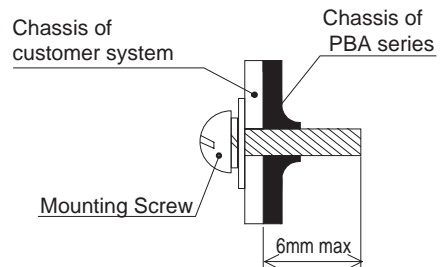
Matching connectors and terminals on CN1, CN2 and CN3

Connector	Housing	Terminal	Mfr.
CN1 CN2	S10B-PHDSS PHDR-10VS	Reel : SPHD-002T-P0.5 Loose : BPHD-001T-P0.5	J.S.T.
CN3	S8B-PHDSS PHDR-08VS		

Assembling and Installation Method

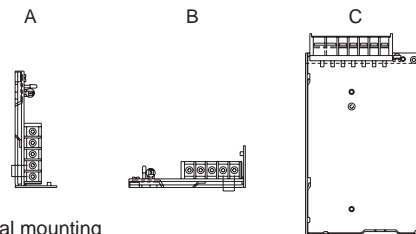
Installation Method

■ Do not insert a screw more than 6mm from the outside of a power supply to keep enough insulation distance between the screw and internal components.



● PBA10F, PBA15F, PBW15F, PBA30F, PBW30F, PBA50F, PBW50F, PBA75F, PBA100F and PBA150F

- If you use two or more power supplies side by side, please keep a sufficient distance between them to allow enough air ventilation.
- Ambient temperature around each power supply should not exceed the temperature range shown in "derating".



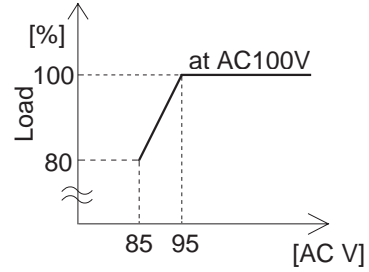
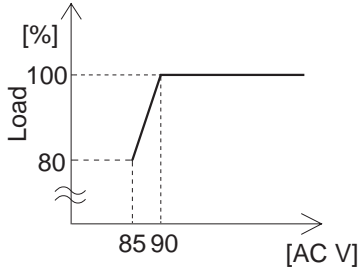
Normal mounting

● PBA300F, PBA600F, PBA1000F, PBA1500F and PBA1500T

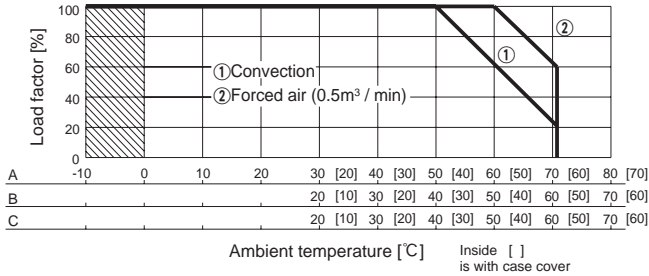
- The power supplies have a built-in forced cooling fan. Do not block ventilation at the suction side (terminal block side) and its opposite side (fan installation side). If you need to secure a power supply by screws, securely fix it, taking into consideration of its weight. You can install it in any direction.
- If you use a power supply in a dusty environment, it can give a cause for a failure. Please consider taking such countermeasures as installing an air filter near the suction area of the system to prevent a failure.
- In PBA300F, PBA1500F and PBA1500T, ventilation holes are located on the mounting side. If you would like to install the unit by using that side, please contact us for details.

Derating

- PBA10F, PBA15F, PBW15F, PBA30F, PBW30F
- PBA1500F Input voltage Derating Curve

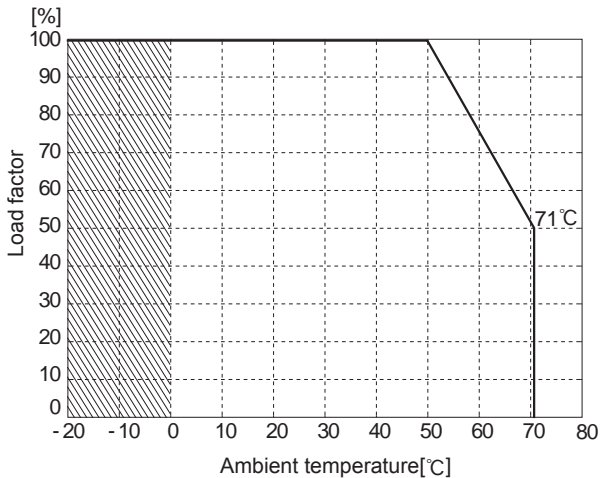


- PBA10F, PBA15F, PBW15F, PBA30F, PBW30F, PBA50F, PBW50F, PBA75F, PBA100F, PBA150F Ambient temperature derating curve



- In the hatched area, the specification of Ripple, Ripple Noise is different from other area.
- The ambient temperature should be measured 5 to 10 cm away from the power supply so that it won't be influenced by the heat from the power supply. Please consult us for more details.
- Make sure the temperature at point A is less than the temperatures shown in Instruction Manual 4.

- PBA300F, PBA600F, PBA1000F, PBA1500F, PBA1500T Ambient temperature derating curve



- In the hatched area, the specification of Ripple, Ripple Noise is different from other area.
- Derating curve depending on an ambient temperature (temperature of air sucked in for a cooling purpose) is shown above.

## Instruction Manual

◆ It is necessary to read the “Instruction Manual” and “Before using our product” before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/PBA/>  
 Instruction Manual <https://en.cosel.co.jp/product/powersupply/PBW/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

PBA



PBW



NOTICE



## Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	Inrush current protection circuit	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
PBA10F	Flyback converter	100	0.3	250V 2.5A	LF	CEM-3	Yes		Yes	*1
PBA15F	Flyback converter	100	0.4		Thermistor	CEM-3	Yes		Yes	*1
PBA30F	Flyback converter	100	0.7		Thermistor	CEM-3	Yes		Yes	*1
PBA50F	Active filter	60 - 550	0.7	250V 2A	Thermistor	CEM-3	Yes		Yes	*1
	Forward converter	130								
PBA75F	Active filter	60 - 550	1.0	250V 3.15A	Thermistor	CEM-3	Yes		Yes	*1
	Forward converter	120								
PBA100F	Active filter	60 - 550	1.3	250V 3.15A	Thermistor	CEM-3	Yes		Yes	*1
	Forward converter	120								
PBA150F	Active filter	60 - 550	2.0	250V 4A	Thermistor	CEM-3	Yes		Yes	*1
	Forward converter	120								
PBA300F	Active filter	230	4.1	250V 10A	SCR	FR-4		Yes	Yes	Yes
	Forward converter	330								
PBA600F	Active filter	130	8.2	250V 15A	SCR	FR-4		Yes	Yes	Yes
	Forward converter	330								
PBA1000F	Active filter	130	13	250V 30A	SCR	FR-4		Yes	Yes	Yes
	Forward converter	280								
PBA1500F	Active filter	130	19	250V 30A	SCR	FR-4		Yes	Yes	Yes
	Forward converter	200								
PBA1500T	Active filter	130	6	250V 16A	SCR	FR-4		Yes	Yes	Yes
	Forward converter	200								
PBW15F	Flyback converter	100	0.4	250V 2.5A	Thermistor	CEM-3	Yes		Yes	*1
PBW30F	Flyback converter	100	0.7	250V 3.15A	Thermistor	CEM-3	Yes		Yes	*1
PBW50F	Active filter	60 - 550	0.7	250V 2A	Thermistor	CEM-3	Yes		Yes	*1
	Forward converter	130								

\*1 Refer to Series/Parallel Operation of Instruction Manual.

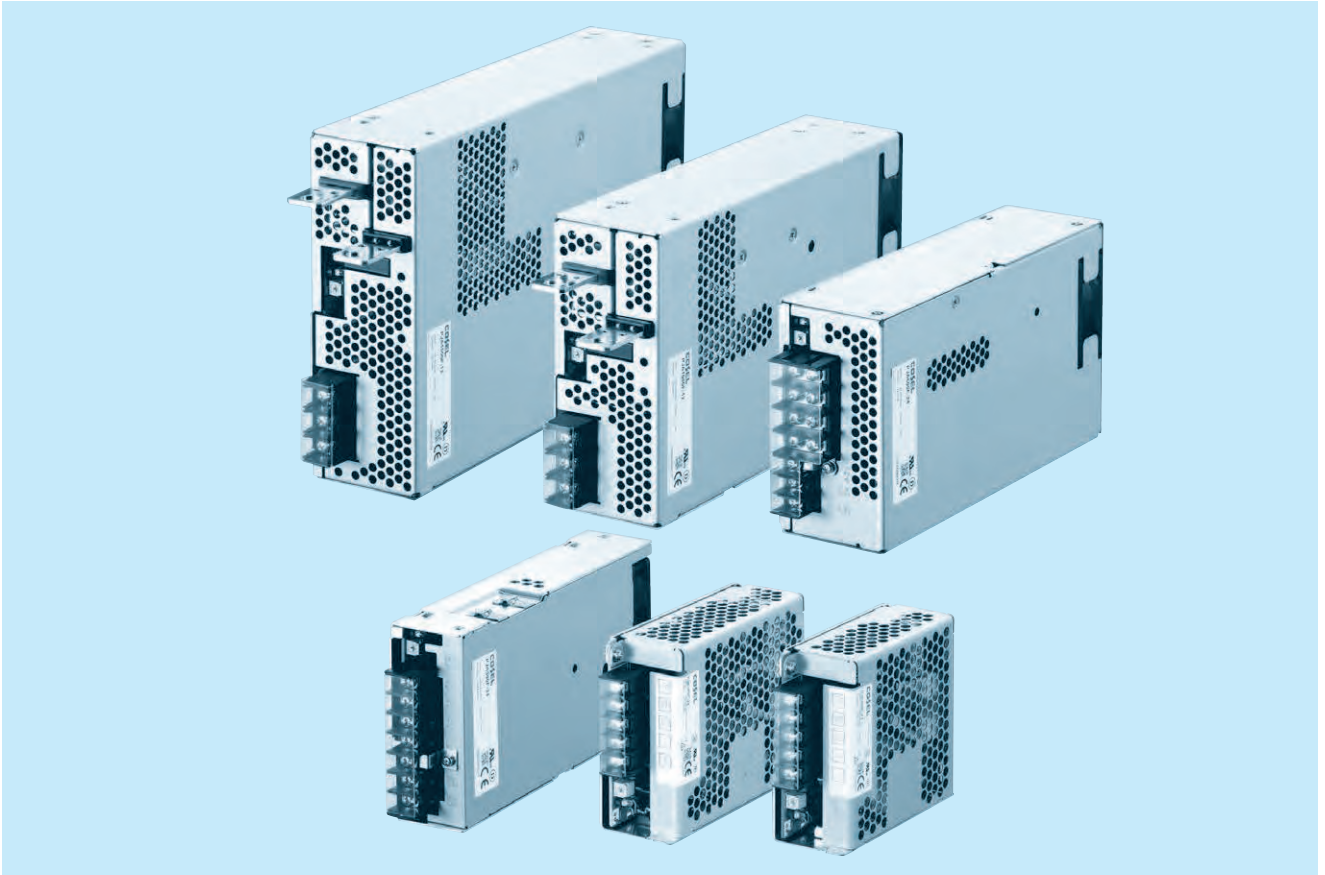
\* The value of input current is at ACIN 100V and rated load, ACIN 200V 3 φ and rated load in PBA1500T.







# PJA-series



## Feature

Low Profile (PJA100F, 150F, 300F : 1U size)  
(PJA600F, 1000F, 1500F : 2U size)  
Wide temperature range (-20°C to +70°C, Derating is required)  
Harmonic attenuator (Complies with IEC61000-3-2 class A)  
Universal input (AC85 - 264V, Derating is required)  
Low power consumption at no load  
Complies with SEMI F-47 (PJA1000F, 1500F can meet at 200V input range only)  
Many optional functions

## Safety agency approvals

UL62368-1, C-UL (CSA62368-1), EN62368-1  
UL508 (PJA100F, 150F)  
Complies with DEN-AN

## 5-year warranty (See Instruction Manual)

## CE marking

Low Voltage Directive  
RoHS Directive

## EMI

Complies with FCC-B, CISPR22-B, EN55011-B, EN55022-B, VCCI-B  
(PJA1500F: Class A. In conducted noise, it can meet class B by additional EMI/EMC filter.)

## EMS Compliance : EN61204-3, EN61000-6-2

EN61000-4-2  
EN61000-4-3  
EN61000-4-4  
EN61000-4-5  
EN61000-4-6  
EN61000-4-8  
EN61000-4-11

# PJA100F

PJ A 100 F -□ -□

① ② ③ ④ ⑤ ⑥

PJA



Example recommended EMI/EMC filter  
NAC-04-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*6
- C : with Coating
- R : Remote on/off (Required external power source)
- J : EP (Tyco Electronics) connector type
- J1 : VH (J.S.T.) connector type
- T : Vertical terminal block
- N2 : with DIN rail

See 6.1 in Instruction Manual.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

## SPECIFICATIONS

\* Please consider "PBA100F-5-N" about 5V output with case cover.

MODEL		PJA100F-12	PJA100F-15	PJA100F-24	PJA100F-36	PJA100F-48
VOLTAGE[V]		AC85 - 264 1 φ (Output derating is required at AC85V - 115V. Refer to "Derating" and instruction manual 1.1, 3)				
CURRENT[A]	ACIN 100V	1.2typ (Io=90%)				
	ACIN 115V	1.1typ (Io=100%)				
	ACIN 230V	0.6typ (Io=100%)				
FREQUENCY[Hz]		50 / 60 (47 - 63)				
EFFICIENCY[%]	ACIN 100V	82typ (Io=90%)	83typ (Io=90%)	85typ (Io=90%)	86typ (Io=90%)	86typ (Io=90%)
	ACIN 115V	82typ (Io=100%)	83typ (Io=100%)	85typ (Io=100%)	86typ (Io=100%)	86typ (Io=100%)
	ACIN 230V	85typ (Io=100%)	86typ (Io=100%)	88typ (Io=100%)	89typ (Io=100%)	89typ (Io=100%)
POWER FACTOR	ACIN 100V	0.98typ (Io=90%)				
	ACIN 115V	0.98typ (Io=100%)				
	ACIN 230V	0.90typ (Io=100%) * Power factor correction is stopped at AC250V or more.				
INRUSH CURRENT[A]	ACIN 100V	16typ (Io=90%) Ta=25°C at cold start				
	ACIN 115V	16typ (Io=100%) Ta=25°C at cold start				
	ACIN 230V	32typ (Io=100%) Ta=25°C at cold start				
LEAKAGE CURRENT[ma]		0.75max (ACIN 240V, 60Hz, Io=100%. According to IEC62368-1 and DEN-AN)				
VOLTAGE[V]		12	15	24	36	48
CURRENT[A]	ACIN 85-115V	Output derating is required at ACIN 115V or less (Refer to "Derating")				
	ACIN 115V-264V	8.4	6.7	4.3	2.8	2.1
WATTAGE[W]		Output derating is required at ACIN 115V or less (Refer to "Derating")				
ACIN 85-115V		100.8	100.5	103.2	100.8	100.8
ACIN 115V-264V		100.8	100.5	103.2	100.8	100.8
LINE REGULATION[mV]		*3 48max	60max	96max	144max	192max
LOAD REGULATION [mV]	Io=30 to 100%	100max	120max	150max	150max	300max
	Io=0 to 30%	Burst operation (Please contact us about detail)				
RIPPLE[mVp-p]	0 to +40°C	120max	120max	120max	150max	150max
	-10 to 0°C	160max	160max	160max	200max	400max
	Io: load factor	Io=0 to 30%	500max	500max	500max	500max
RIPPLE NOISE[mVp-p]	0 to +40°C	150max	150max	150max	200max	200max
	-10 to 0°C	180max	180max	180max	240max	500max
	Io: load factor	Io=0 to 30%	600max	600max	600max	600max
TEMPERATURE REGULATION[mV]	0 to +40°C	120max	150max	240max	360max	480max
	-10 to +40°C	180max	180max	290max	440max	600max
DRIFT[mV]		*2 48max	60max	96max	144max	192max
START-UP TIME[ms]		500typ (ACIN 115V, Io=100%) Ta=25°C				
HOLD-UP TIME[ms]		20typ (ACIN 115V, Io=100%)				
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		10.80 to 13.20	13.50 to 16.50	21.60 to 26.40	32.40 to 39.60	43.20 to 52.80
OUTPUT VOLTAGE SETTING[V]		12.00 to 12.48	15.00 to 15.60	24.00 to 24.96	36.00 to 37.44	48.00 to 49.92
OVERCURRENT PROTECTION		Works over 105% of rating and recovers automatically				
OVERVOLTAGE PROTECTION[V]		13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	41.40 to 50.40	54.00 to 67.20
OPERATING INDICATION		LED (Green)				
REMOTE SENSING		Not provided				
REMOTE ON/OFF		Optional (Required external power source. Option -R)				
ISOLATION	INPUT-OUTPUT • RC	*8 AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At room temperature)				
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At room temperature)				
	OUTPUT • RC-FG	*8 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)				
	OUTPUT-RC	*8 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)				
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE *4	-20 to +70°C (Refer to "Derating"), 20 - 90%RH (Non condensing), 3,000m (10,000 feet) max				
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) max				
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axes				
IMPACT		196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axes				
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL62368-1, C-UL (CSA62368-1), EN62368-1, UL508 (Except option -J, -J1) Complies with DEN-AN				
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B				
	HARMONIC ATTENUATOR	*7 Complies with IEC61000-3-2 class A				

## SPECIFICATIONS

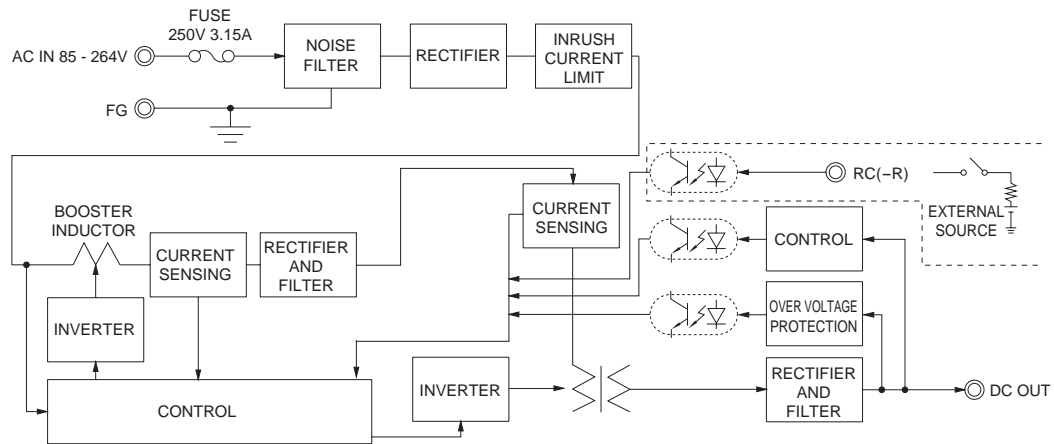
OTHERS	CASE SIZE/WEIGHT	41 X 97 X 109mm [1.61 X 3.82 X 4.29 inches] (Excluding terminal block and screw) (W X H X D) / 500g max
	COOLING METHOD	Convection
WARRANTY	WARRANTY	*5 5 years (subject to the operating conditions)

- \*1 This is the result of measurement of the testing board with capacitors of 22  $\mu$ F and 0.1  $\mu$ F placed at 150 mm from the output terminals by a 20 MHz oscilloscope or a ripple-noise meter equivalent to Keisoku-Giken RM103. See 1.6 of Instruction Manual for more details. When the load factor is 0 - 30%, the switching power loss is reduced by burst operation, which will cause ripple and ripple noise to go beyond the specifications.
- \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- \*3 Consult us about dynamic load and input response. Measure the output voltage by using the average mode of the tester to deal with the burst operation at 30% load or less.
- \*4 Output power derating is required. Refer to "Derating".
- \*5 See 4 in Instruction Manual for more details.
- \*6 Consult us about safety agency approvals for the models with optional functions.
- \*7 Consult us about other classes.
- \*8 The RC terminal is added to option -R models. The RC terminal is isolated from input, output, and FG.
- \* Do not use the power supply in overcurrent conditions or in unspecified input voltage ranges. Otherwise the internal components may be damaged.
- \* Parallel operation is not possible with this mode.
- \* Sound noise may be heard from the power supply when used for pulse load.

## Features

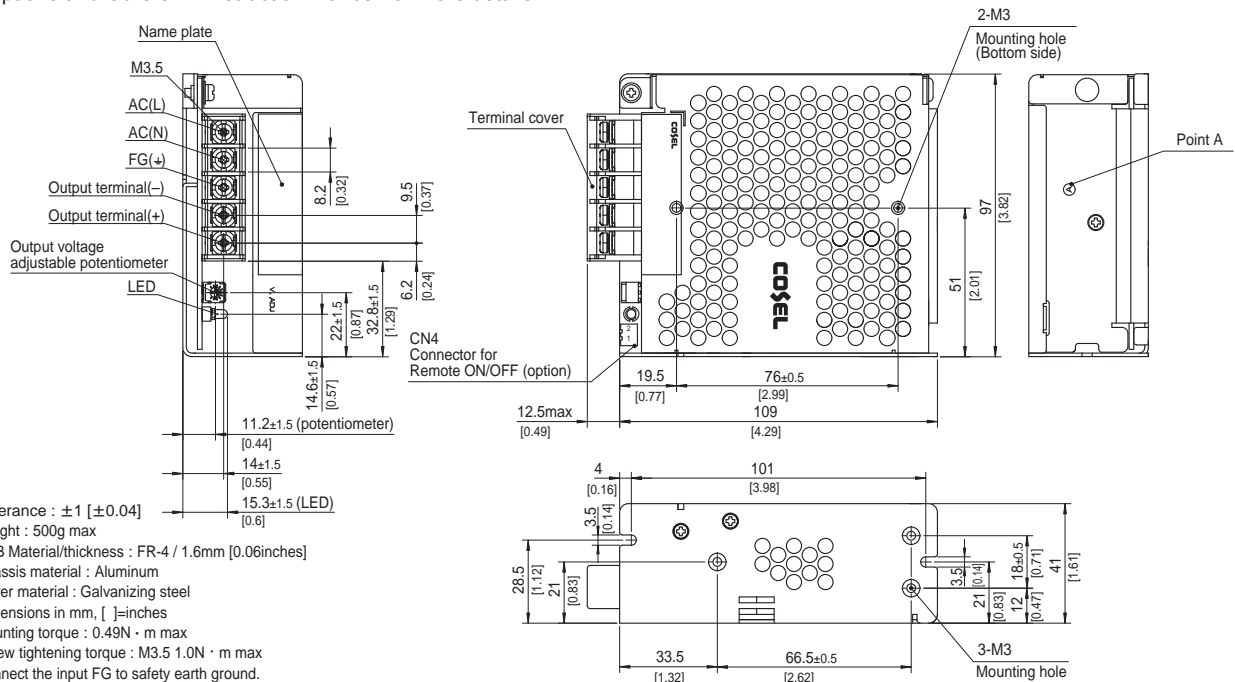
- Compact design (Depth: 109mm 4.29inches)
- High efficiency (88%typ PJA100F-24, AC230Vin, 100% load)
- Low power consumption (1.5W typ AC240Vin, no load at standard model)
- UL508 approved (Except option -J, -J1), and complies with SEMI F47 (see instruction manual 1.1)
- Various connection interface options (vertical terminal [-T], AMP connector [-J], [-J1])

## Block diagram



## External view

The external size of -R option, -J option, -J1 option, -N2 option and -T option models is different from the standard model. See "6. Options and Others" in Instruction Manual for more details.



- \* Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- \* Weight : 500g max
- \* PCB Material/thickness : FR-4 / 1.6mm [0.06inches]
- \* Chassis material : Aluminum
- \* Cover material : Galvanizing steel
- \* Dimensions in mm, [ ]=inches
- \* Mounting torque : 0.49N · m max
- \* Screw tightening torque : M3.5 1.0N · m max
- \* Connect the input FG to safety earth ground.

# PJA150F

PJ A 150 F -□ -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-04-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*6
- C : with Coating
- R : Remote on/off (Required external power source)
- J : EP (Tyco Electronics) connector type
- J1 : VH (J.S.T.) connector type
- T : Vertical terminal block
- N2 : with DIN rail

See 6.1 in Instruction Manual.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

## SPECIFICATIONS

\* Please consider "PBA150F-5-N" about 5V output with case cover.

MODEL		PJA150F-12	PJA150F-15	PJA150F-24	PJA150F-36	PJA150F-48
VOLTAGE[V]		AC85 - 264 1 φ (Output derating is required at AC85V - 115V. Refer to "Derating" and instruction manual 1.1, 3)				
CURRENT[A]	ACIN 100V	1.7typ (Io=90%)				
	ACIN 115V	1.6typ (Io=100%)				
	ACIN 230V	0.8typ (Io=100%)				
FREQUENCY[Hz]		50 / 60 (47 - 63)				
EFFICIENCY[%]	ACIN 100V	84typ (Io=90%)	84typ (Io=90%)	87typ (Io=90%)	87typ (Io=90%)	87typ (Io=90%)
	ACIN 115V	84typ (Io=100%)	84typ (Io=100%)	87typ (Io=100%)	87typ (Io=100%)	87typ (Io=100%)
	ACIN 230V	87typ (Io=100%)	87typ (Io=100%)	90typ (Io=100%)	90typ (Io=100%)	90typ (Io=100%)
POWER FACTOR	ACIN 100V	0.98typ (Io=90%)				
	ACIN 115V	0.98typ (Io=100%)				
	ACIN 230V	0.93typ (Io=100%) * Power factor correction is stopped at AC250V or more.				
INRUSH CURRENT[A]	ACIN 100V	16typ (Io=90%) Ta=25°C at cold start				
	ACIN 115V	16typ (Io=100%) Ta=25°C at cold start				
	ACIN 230V	32typ (Io=100%) Ta=25°C at cold start				
LEAKAGE CURRENT[ma]		0.75max (ACIN 240V, 60Hz, Io=100%. According to IEC62368-1 and DEN-AN)				
VOLTAGE[V]		12	15	24	36	48
CURRENT[A]	ACIN 85-115V	Output derating is required at ACIN 115V or less (Refer to "Derating")				
	ACIN 115V-264V	12.5	10	6.4	4.2	3.2
WATTAGE[W]	ACIN 85-115V	Output derating is required at ACIN 115V or less (Refer to "Derating")				
	ACIN 115V-264V	150.0	150.0	153.6	151.2	153.6
LINE REGULATION[mV] *3		48max	60max	96max	144max	192max
LOAD REGULATION [mV] *3	Io=30 to 100%	100max	120max	150max	150max	300max
	Io=0 to 30%	Burst operation (Please contact us about detail)				
RIPPLE[mVp-p] *1	0 to +40°C	120max	120max	120max	150max	150max
	-10 to 0°C	160max	160max	160max	200max	400max
	Io: load factor	500max	500max	500max	500max	500max
RIPPLE NOISE[mVp-p] *1	0 to +40°C	150max	150max	150max	200max	200max
	-10 to 0°C	180max	180max	180max	240max	500max
	Io: load factor	600max	600max	600max	600max	600max
TEMPERATURE REGULATION[mV]	0 to +40°C	120max	150max	240max	360max	480max
	-10 to +40°C	180max	180max	290max	440max	600max
DRIFT[mV] *2		48max	60max	96max	144max	192max
START-UP TIME[ms]		500typ (ACIN 115V, Io=100%) Ta=25°C				
HOLD-UP TIME[ms]		20typ (ACIN 115V, Io=100%)				
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		10.80 to 13.20	13.50 to 16.50	21.60 to 26.40	32.40 to 39.60	43.20 to 52.80
OUTPUT VOLTAGE SETTING[V]		12.00 to 12.48	15.00 to 15.60	24.00 to 24.96	36.00 to 37.44	48.00 to 49.92
OVERCURRENT PROTECTION		Works over 105% of rating and recovers automatically				
OVERVOLTAGE PROTECTION[V]		13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	41.40 to 50.40	54.00 to 67.20
OPERATING INDICATION		LED (Green)				
REMOTE SENSING		Not provided				
REMOTE ON/OFF		Optional (Required external power source. Option -R)				
ISOLATION	INPUT-OUTPUT • RC *8	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At room temperature)				
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At room temperature)				
	OUTPUT • RC-FG *8	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)				
	OUTPUT-RC *8	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *4	-20 to +70°C (Refer to "Derating"), 20 - 90%RH (Non condensing), 3,000m (10,000 feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) max				
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axes				
IMPACT		196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axes				
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL62368-1, C-UL (CSA62368-1), EN62368-1, UL508 (Except option -J, -J1) Complies with DEN-AN				
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B				
	HARMONIC ATTENUATOR *7	Complies with IEC61000-3-2 class A				

## SPECIFICATIONS

OTHERS	CASE SIZE/WEIGHT	41 X 97 X 129mm [1.61 X 3.82 X 5.08 inches] (Excluding terminal block and screw) (W X H X D) / 600g max
	COOLING METHOD	Convection
WARRANTY	WARRANTY	*5 5 years (subject to the operating conditions)

- \*1 This is the result of measurement of the testing board with capacitors of 22 μF and 0.1 μF placed at 150 mm from the output terminals by a 20 MHz oscilloscope or a ripple-noise meter equivalent to Keisoku-Giken RM103.  
See 1.6 of Instruction Manual for more details.  
When the load factor is 0 - 30%, the switching power loss is reduced by burst operation, which will cause ripple and ripple noise to go beyond the specifications.
- \*2 Drift is the change in DC output for an eight hour period after a half-

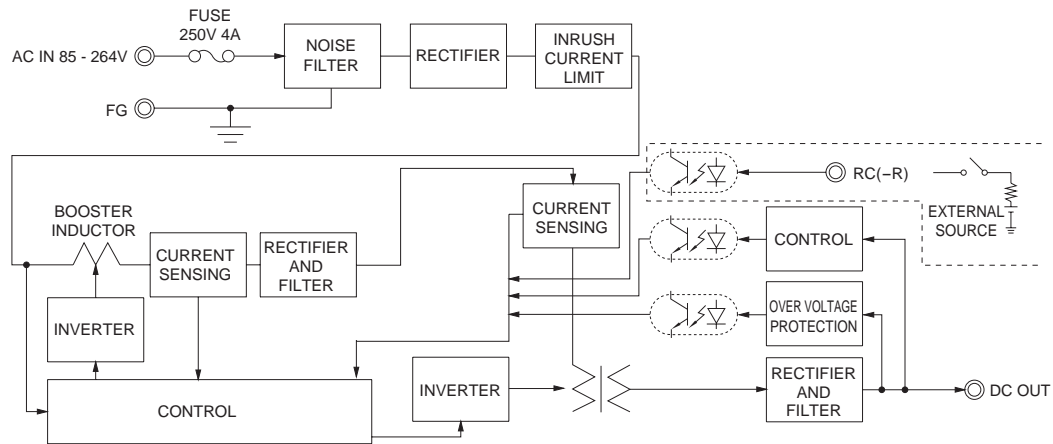
- hour warm-up at 25°C.
- \*3 Consult us about dynamic load and input response. Measure the output voltage by using the average mode of the tester to deal with the burst operation at 30% load or less.
- \*4 Output power derating is required. Refer to "Derating".
- \*5 See 4 in Instruction Manual for more details.
- \*6 Consult us about safety agency approvals for the models with optional functions.
- \*7 Consult us about other classes.
- \*8 The RC terminal is added to option -R models. The RC terminal is

- isolated from input, output, and FG.
- \* Do not use the power supply in overcurrent conditions or in unspecified input voltage ranges. Otherwise the internal components may be damaged.
- \* Parallel operation is not possible with this mode.
- \* Sound noise may be heard from the power supply when used for pulse load.

## Features

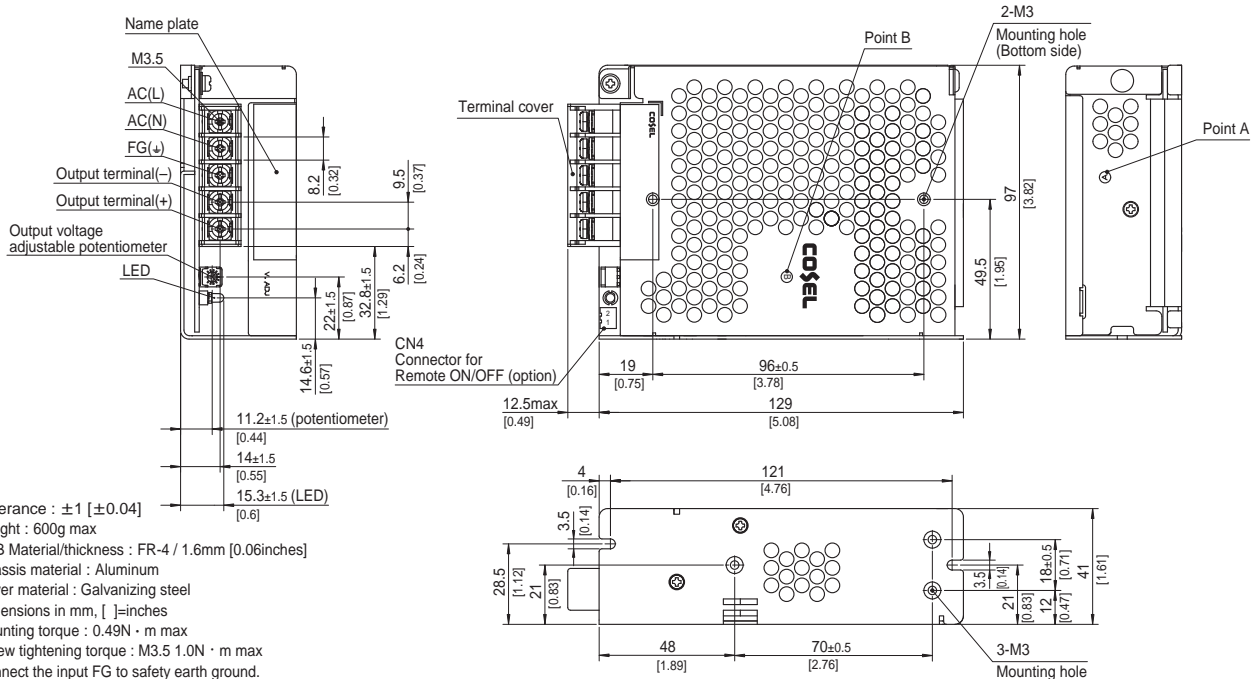
- Compact design (Depth: 129mm 5.08inches)
- High efficiency (90%typ PJA150F-24, AC230Vin, 100% load)
- Low power consumption (1.5W typ AC240Vin, no load at standard model)
- UL508 approved (Except option -J, -J1), and complies with SEMI F47 (see instruction manual 1.1)
- Various connection interface options (vertical terminal [-T], AMP connector [-J], [-J1])

## Block diagram



## External view

The external size of -R option, -J option, -J1 option, -N2 option and -T option models is different from the standard model. See "6. Options and Others" in Instruction Manual for more details.



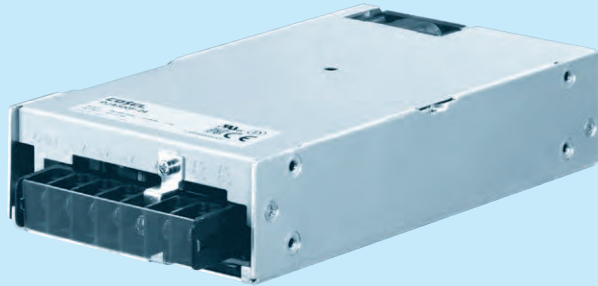
- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 600g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06inches]
- ※ Chassis material : Aluminum
- ※ Cover material : Galvanizing steel
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque : 0.49N · m max
- ※ Screw tightening torque : M3.5 1.0N · m max
- ※ Connect the input FG to safety earth ground.

# PJA300F

PJ A 300 F -□ -□

① ② ③ ④ ⑤ ⑥

PJA



Example recommended EMI/EMC filter  
NAC-06-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*6
- C : with Coating
- G : Low leakage current
- V : External potentiometer for output voltage adjustment
- R : Remote on/off (Required external power source)
- F4: Low speed fan

See 6.1 in Instruction Manual.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EML regulations.

## SPECIFICATIONS

	MODEL	PJA300F-5	PJA300F-12	PJA300F-15	PJA300F-24	PJA300F-36	PJA300F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Output derating is required at AC85V - 100V. Refer to "Derating" and instruction manual 1.1, 3)						
	CURRENT[A]	ACIN 100V	3.5typ (Io=100%)	3.9typ (Io=100%)				
		ACIN 115V	3.0typ (Io=100%)	3.3typ (Io=100%)				
		ACIN 230V	1.5typ (Io=100%)	1.7typ (Io=100%)				
	FREQUENCY[Hz]	50 / 60 (47 - 63)						
	EFFICIENCY[%]	ACIN 100V	73typ (Io=100%)	79typ (Io=100%)	81typ (Io=100%)	82typ (Io=100%)	83typ (Io=100%)	82typ (Io=100%)
		ACIN 115V	74typ (Io=100%)	80typ (Io=100%)	82typ (Io=100%)	83typ (Io=100%)	83typ (Io=100%)	83typ (Io=100%)
		ACIN 230V	77typ (Io=100%)	82typ (Io=100%)	84typ (Io=100%)	86typ (Io=100%)	87typ (Io=100%)	86typ (Io=100%)
	POWER FACTOR	ACIN 100V	0.99typ (Io=100%)					
		ACIN 115V	0.98typ (Io=100%)					
ACIN 230V		0.95typ (Io=100%)						
INRUSH CURRENT[A]	ACIN 100V	20typ (Io=100%) Ta=25°C at cold start						
	ACIN 115V	20typ (Io=100%) Ta=25°C at cold start						
	ACIN 230V	40typ (Io=100%) Ta=25°C at cold start						
LEAKAGE CURRENT[ma]	0.75max (ACIN 240V, 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)							
OUTPUT	VOLTAGE[V]	5	12	15	24	36	48	
	CURRENT[A]	ACIN 85-100V	Output derating is required at ACIN 100V or less (Refer to "Derating")					
		ACIN 100V-264V	50	25	20	12.5	8.4	6.3
	WATTAGE[W]	ACIN 85-100V	Output derating is required at ACIN 100V or less (Refer to "Derating")					
		ACIN 100V-264V	250	300	300	300	302.4	302.4
	LINE REGULATION[mV]	*3	20max	48max	60max	96max	144max	192max
	LOAD REGULATION[mV]	*3	40max	100max	120max	150max	150max	300max
	RIPPLE[mVp-p]	0 to +50°C	80max	120max	120max	120max	150max	150max
		*1 -10 to 0°C	140max	160max	160max	160max	160max	400max
	RIPPLE NOISE[mVp-p]	0 to +50°C	120max	150max	150max	150max	200max	200max
		*1 -10 to 0°C	160max	180max	180max	180max	240max	500max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	120max	150max	240max	360max	480max
		*1 -10 to +50°C	75max	180max	180max	290max	440max	600max
	DRIFT[mV]	*2	20max	48max	60max	96max	144max	192max
	START-UP TIME[ms]		300typ (ACIN 100V, Io=100%)					
HOLD-UP TIME[ms]		20typ (ACIN 100V, Io=100%)						
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		4.50 to 5.50	10.80 to 13.20	13.50 to 16.50	21.60 to 26.40	32.40 to 39.60	43.20 to 52.80	
OUTPUT VOLTAGE SETTING[V]		5.00 to 5.15	12.00 to 12.48	15.00 to 15.60	24.00 to 24.96	36.00 to 37.44	48.00 to 49.92	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically						
	OVERVOLTAGE PROTECTION[V]	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	41.40 to 50.40	55.20 to 67.20	
	OPERATING INDICATION	LED (Green)						
	REMOTE SENSING	Not provided						
REMOTE ON/OFF	Optional (Required external power source. Option -R)							
ISOLATION	INPUT-OUTPUT • RC	*9	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At room temperature)					
	INPUT-FG		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At room temperature)					
	OUTPUT • RC-FG	*9	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)					
	OUTPUT-RC	*9	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)					
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *4	-20 to +70°C (Refer to "Derating"), 20 - 90%RH (Non condensing), 3,000m (10,000 feet) max						
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) max						
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axes						
IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axes							
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL62368-1, C-UL (CSA62368-1), EN62368-1 Complies with DEN-AN						
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B						
	HARMONIC ATTENUATOR *8	Complies with IEC61000-3-2 class A						

## SPECIFICATIONS

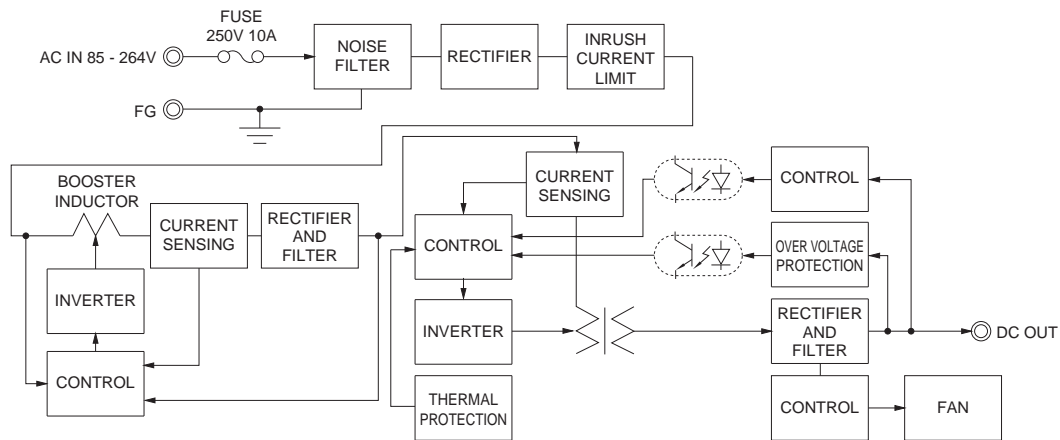
OTHERS	CASE SIZE/WEIGHT	102 X 41 X 190mm [4.02 X 1.61 X 7.48 inches] (Excluding terminal block and screw) (W X H X D) / 1.0kg max
	COOLING METHOD	*7 Forced cooling (internal fan)
WARRANTY	WARRANTY	*5 5 years (subject to the operating conditions)

- \*1 This is the result of measurement of the testing board with capacitors of 22 μF and 0.1 μF placed at 150 mm from the output terminals by a 20 MHz oscilloscope or a ripple-noise meter equivalent to Keisoku-Giken RM103. See 1.6 of Instruction Manual for more details.
- \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- \*3 Consult us about dynamic load and input response.
- \*4 Output power derating is required. Refer to "Derating".
- \*5 See 4 in Instruction Manual for more details.
- \*6 Consult us about safety agency approvals for the models with optional functions.
- \*7 The fan speed slows down at no load.
- \*8 Consult us about other classes.
- \*9 The RC terminal is added to option -R models. The RC terminal is isolated from input, output, and FG.
- \* Do not use the power supply in overcurrent conditions or in unspecified input voltage ranges. Otherwise the internal components may be damaged.
- \* Parallel operation is not possible with this mode.
- \* Sound noise may be heard from the power supply when used for pulse load.

## Features

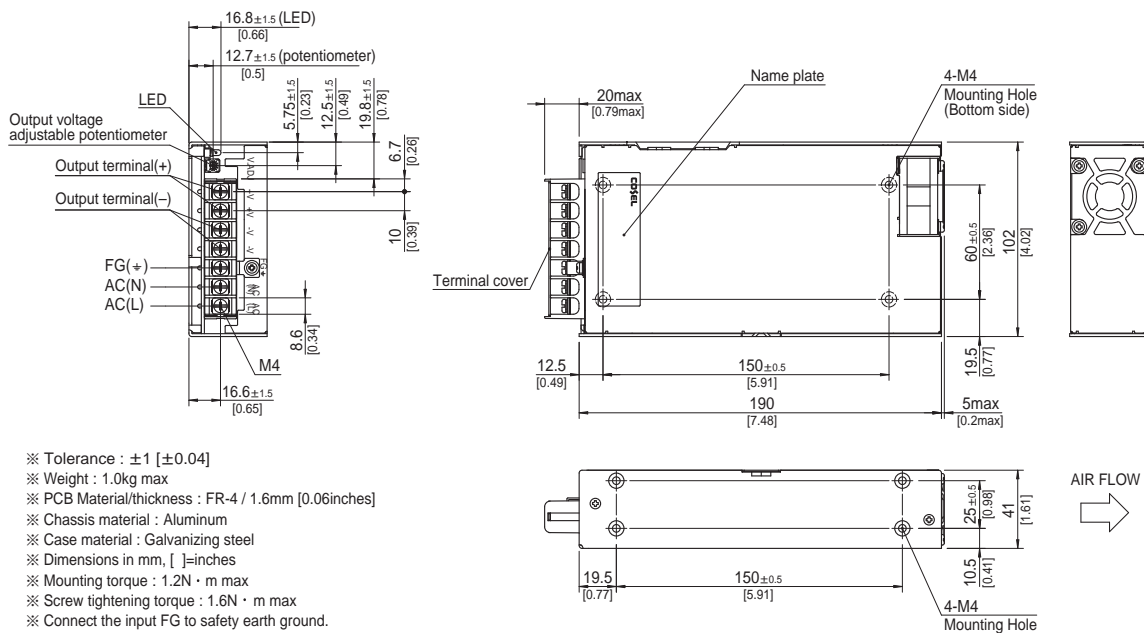
- Cost-effective
- Longer life (see Instruction Manual)
- Low profile (meets 1U height = 41 mm or 1.61 inches)
- Wide operating temperature range (-20°C to +70°C Refer to "Derating")
- Slow fan speed at no load
- Complies with SEMI F-47
- Many optional functions

## Block diagram



## External view

The external size of -V option and -R option models is different from the standard model. See "6. Options and Others" in Instruction Manual for more details.



# PJA600F

PJ A 600 F - □ - □

① ② ③ ④ ⑤ ⑥

PJA



Example recommended EMI/EMC filter  
NAC-16-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*6
- C : with Coating
- G : Low leakage current
- V : External potentiometer for output voltage adjustment
- W: Parallel operation, LV alarm and Remote sensing
- R : Remote on/off (Required external power source)
- F4: Low speed fan

See 6.1 in Instruction Manual.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

## SPECIFICATIONS

	MODEL	PJA600F-5	PJA600F-12	PJA600F-15	PJA600F-24	PJA600F-36	PJA600F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Output derating is required at AC85V - 100V. Refer to "Derating" and instruction manual 1.1, 3)						
	CURRENT[A]	ACIN 100V	6.7typ (Io=100%)	7.5typ (Io=100%)				
		ACIN 115V	5.7typ (Io=100%)	6.5typ (Io=100%)				
		ACIN 230V	2.8typ (Io=100%)	3.2typ (Io=100%)				
	FREQUENCY[Hz]	50 / 60 (47 - 63)						
	EFFICIENCY[%]	ACIN 100V	76typ (Io=100%)	81typ (Io=100%)	82typ (Io=100%)	84typ (Io=100%)	85typ (Io=100%)	85typ (Io=100%)
		ACIN 115V	77typ (Io=100%)	82typ (Io=100%)	82typ (Io=100%)	85typ (Io=100%)	86typ (Io=100%)	85typ (Io=100%)
		ACIN 230V	79typ (Io=100%)	84typ (Io=100%)	85typ (Io=100%)	88typ (Io=100%)	88typ (Io=100%)	88typ (Io=100%)
	POWER FACTOR	ACIN 100V	0.99typ (Io=100%)					
		ACIN 115V	0.98typ (Io=100%)					
ACIN 230V		0.95typ (Io=100%)						
INRUSH CURRENT[A]	ACIN 100V	20/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 3sec to re-start)						
	ACIN 115V	20/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 3sec to re-start)						
	ACIN 230V	40/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 3sec to re-start)						
LEAKAGE CURRENT[ma]	1.5max (ACIN 240V, 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)							
OUTPUT	VOLTAGE[V]	5	12	15	24	36	48	
	CURRENT[A]	ACIN 85-100V	Output derating is required at ACIN 100V or less (Refer to "Derating")					
		ACIN 100V-264V	100	50	40	25	16.7	12.5
	WATTAGE[W]	ACIN 85-100V	Output derating is required at ACIN 100V or less (Refer to "Derating")					
		ACIN 100V-264V	500	600	600	600	601.2	600
	LINE REGULATION[mV]	*7	20max	48max	60max	96max	144max	192max
	LOAD REGULATION[mV]	*7	40max	100max	120max	150max	150max	300max
	RIPPLE[mVp-p]	0 to +50°C	80max	120max	120max	120max	150max	150max
		-20 to 0°C	140max	160max	160max	160max	160max	400max
	RIPPLE NOISE[mVp-p]	0 to +50°C	120max	150max	150max	150max	200max	200max
		-20 to 0°C	160max	180max	180max	180max	240max	500max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	120max	150max	240max	360max	480max
		-20 to +50°C	75max	180max	180max	290max	440max	600max
	DRIFT[mV]	*2	20max	48max	60max	96max	144max	192max
	START-UP TIME[ms]	300typ (ACIN 100V, Io=100%)						
HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)							
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	4.50 to 5.50		10.80 to 13.20		13.50 to 16.50		21.60 to 26.40	
OUTPUT VOLTAGE SETTING[V]	5.00 to 5.15		12.00 to 12.48		15.00 to 15.60		24.00 to 24.96	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically						
	OVERVOLTAGE PROTECTION[V]	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	41.40 to 50.40	55.20 to 67.20	
	OPERATING INDICATION	LED (Green)						
	REMOTE SENSING	Optional (Option -W)						
	REMOTE ON/OFF	Optional (Required external power source. Option -R)						
ISOLATION	INPUT-OUTPUT • RC	*3 AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At room temperature)						
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At room temperature)						
	OUTPUT • RC-FG	*3 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)						
	OUTPUT-RC	*3 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)						
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *4	-20 to +70°C (Refer to "Derating"), 20 - 90%RH (Non condensing), 3,000m (10,000 feet) max						
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) max						
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axes						
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axes						
	AGENCY APPROVALS	UL62368-1, C-UL (CSA62368-1), EN62368-1 Complies with DEN-AN						
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B						
HARMONIC ATTENUATOR *9	Complies with IEC61000-3-2 class A							



## SPECIFICATIONS

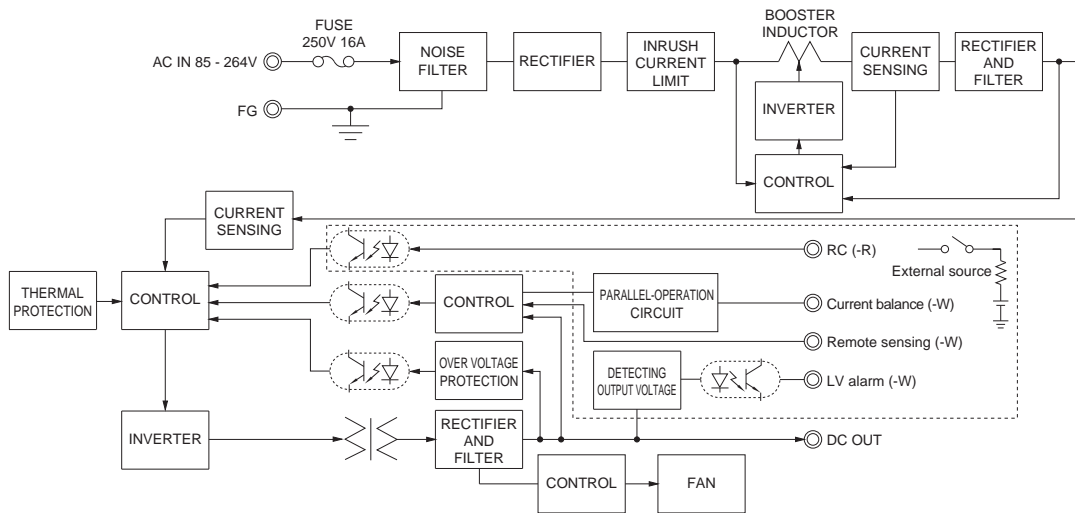
OTHERS	CASE SIZE/WEIGHT	120×61×215mm [4.72×2.40×8.46 inches] (Excluding terminal block and screw) (W×H×D) / 2.0kg max
	COOLING METHOD	*8 Forced cooling (internal fan)
WARRANTY	WARRANTY	*5 5 years (subject to the operating conditions)

- \*1 This is the result of measurement of the testing board with capacitors of 22  $\mu$ F and 0.1  $\mu$ F placed at 150 mm from the output terminals by a 20 MHz oscilloscope or a ripple-noise meter equivalent to Keisoku-Giken RM103.  
See 1.6 of Instruction Manual for more details.
- \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- \*3 The RC terminal is added to option -R models. The RC terminal is isolated from input, output, and FG.
- \*4 Output power derating is required. Refer to "Derating".
- \*5 See 4 in Instruction Manual for more details.
- \*6 Consult us about safety agency approvals for the models with optional functions.
- \*7 Consult us about dynamic load and input response.
- \*8 The fan speed slows down at no load.
- \*9 Consult us about other classes.
- \* Do not use the power supply in overcurrent conditions or in unspecified input voltage ranges. Otherwise the internal components may be damaged.
- \* Parallel operation is allowed for PLA600FA models with the -W option only.
- \* Sound noise may be heard from the power supply when used for pulse load.

## Features

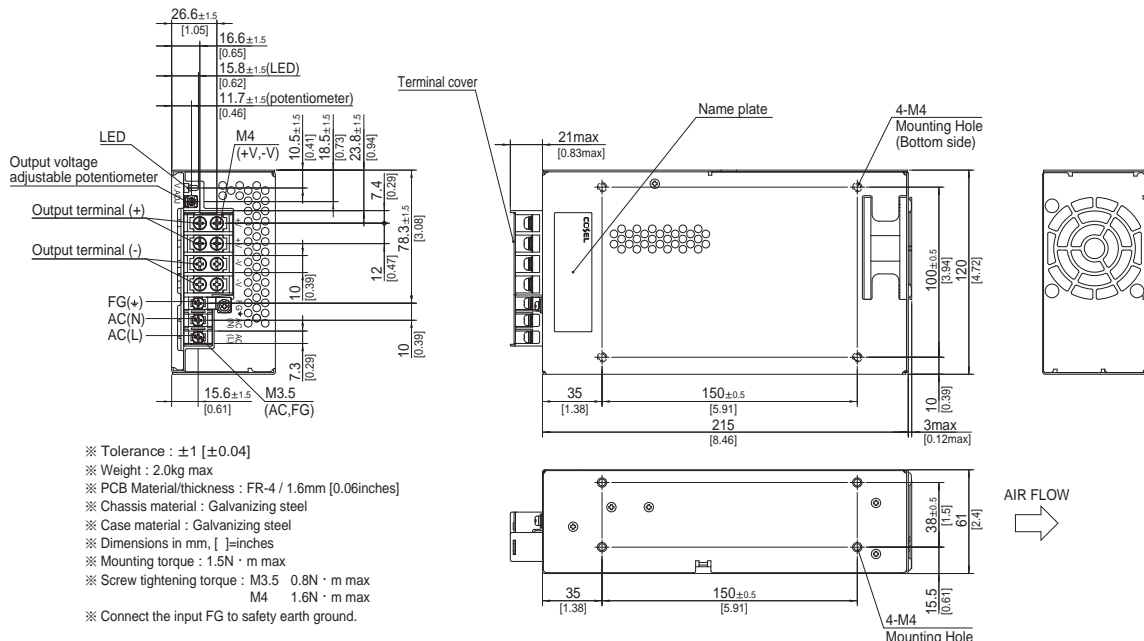
- Cost-effective
- Longer life (see Instruction Manual)
- Low profile (meets 2U height = 61 mm or 2.40 inches)
- Wide operating temperature range (-20°C to +70°C Refer to "Derating")
- Slow fan speed at no load
- Complies with SEMI F-47
- Many optional functions

## Block diagram



## External view

The external size of -W option, -W option and -R option models is different from the standard model. See "6. Options and Others" in Instruction Manual for more details.



# PJA1000F

PJ A 1000 F -□ -□

① ② ③ ④ ⑤ ⑥

PJA



Example recommended EMI/EMC filter  
NAC-20-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*8
- C : with Coating
- G : Low leakage current
- V : External potentiometer for output voltage adjustment
- W : Parallel operation, LV alarm and Remote sensing
- R : Remote on/off (Required external power source)

See 6.1 in Instruction Manual.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EML regulations.

## SPECIFICATIONS

	MODEL	PJA1000F-12	PJA1000F-15	PJA1000F-24	PJA1000F-36	PJA1000F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Output derating is required at AC85V - 115V. Refer to "Derating" and instruction manual 1.1, 3)					
	CURRENT[A]	ACIN 100V	12.5typ (Io=90%)				
		ACIN 115V	11.0typ (Io=100%)				
		ACIN 230V	5.5typ (Io=100%)				
	FREQUENCY[Hz]	50 / 60 (47 - 63)					
	EFFICIENCY[%]	ACIN 100V	81typ (Io=90%)	82typ (Io=90%)	84typ (Io=90%)	84typ (Io=90%)	84typ (Io=90%)
		ACIN 115V	82typ (Io=100%)	82typ (Io=100%)	85typ (Io=100%)	85typ (Io=100%)	85typ (Io=100%)
ACIN 230V		85typ (Io=100%)	85typ (Io=100%)	88typ (Io=100%)	88typ (Io=100%)	88typ (Io=100%)	
POWER FACTOR	ACIN 100V	0.98typ (Io=90%)					
	ACIN 115V	0.98typ (Io=100%)					
	ACIN 230V	0.95typ (Io=100%)					
INRUSH CURRENT[A]	ACIN 100V	15/30typ (Io=90%) (Primary inrush current /Secondary inrush current) (More than 10sec to re-start)					
	ACIN 115V	15/30typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 10sec to re-start)					
	ACIN 230V	30/30typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 10sec to re-start)					
LEAKAGE CURRENT[ma]	1.5max (ACIN 240V, 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)						
OUTPUT	VOLTAGE[V]	12	15	24	36	48	
	CURRENT[A]	ACIN 85-115V	Output derating is required at ACIN 115V or less (Refer to "Derating")				
		ACIN 115V-264V	84	67	42	28	21
	WATTAGE[W]	ACIN 85-115V	Output derating is required at ACIN 115V or less (Refer to "Derating")				
		ACIN 115V-264V	1008	1005	1008	1008	1008
	LINE REGULATION[mV]	*2	48max	60max	96max	144max	192max
	LOAD REGULATION[mV]	*2	100max	120max	150max	150max	300max
	RIPPLE[mVp-p]	0 to +50°C	180max	180max	120max	150max	200max
		*1 -20 to 0°C	240max	240max	160max	200max	500max
	RIPPLE NOISE[mVp-p]	0 to +50°C	210max	210max	150max	200max	300max
		*1 -20 to 0°C	270max	270max	180max	240max	600max
	TEMPERATURE REGULATION[mV]	0 to +50°C	120max	150max	240max	360max	480max
		*2 -20 to +50°C	180max	180max	290max	440max	600max
	DRIFT[mV]	*3	48max	60max	96max	144max	192max
START-UP TIME[ms]	800typ (ACIN 115V, Io=100%)						
HOLD-UP TIME[ms]	20typ (ACIN 115V, Io=100%)						
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	10.80 to 13.50	13.50 to 17.30	20.40 to 28.50	30.60 to 40.80	40.80 to 55.20		
OUTPUT VOLTAGE SETTING[V]	12.00 to 12.48	15.00 to 15.60	24.00 to 24.96	36.00 to 37.44	48.00 to 49.92		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically					
	OVERVOLTAGE PROTECTION[V]	14.40 to 17.40	18.00 to 21.80	28.80 to 34.80	43.20 to 52.20	57.00 to 67.20	
	OPERATING INDICATION	LED (Green)					
	REMOTE SENSING	Optional (Option -W)					
	REMOTE ON/OFF	Optional (Required external power source. Option -R)					
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At room temperature)					
	INPUT-FG	AC2,000V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At room temperature)					
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)					
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *4	-20 to +70°C (Refer to "Derating"), 20 - 90%RH (Non condensing), 3,000m (10,000 feet) max					
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) max					
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axes					
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axes					
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL62368-1, C-UL (CSA62368-1), EN62368-1 Complies with DEN-AN					
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B					
	HARMONIC ATTENUATOR *5	Complies with IEC61000-3-2 class A					

## SPECIFICATIONS

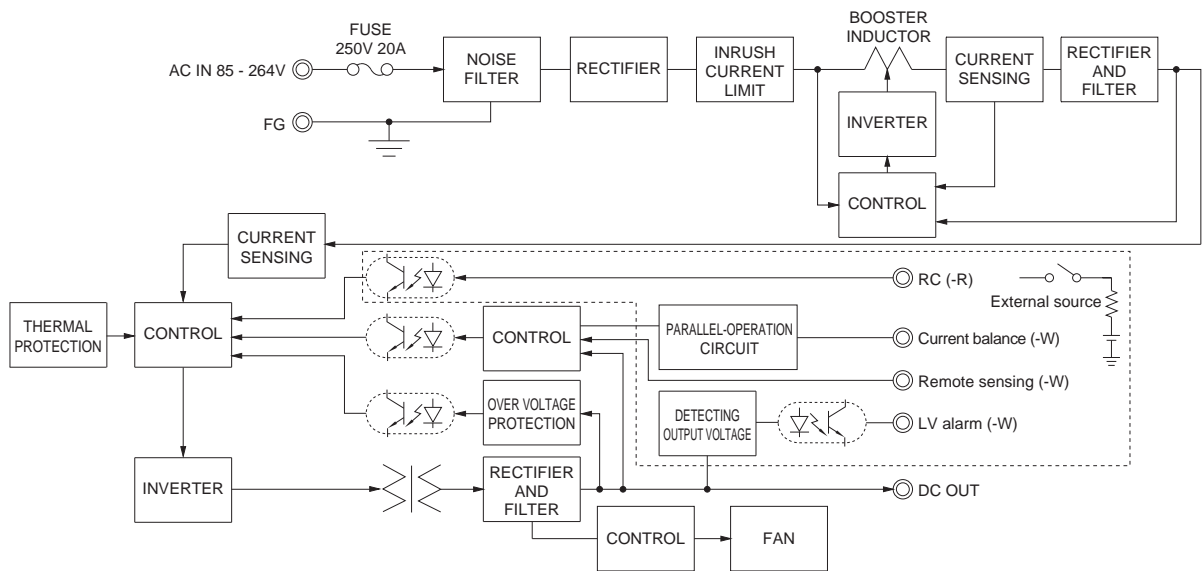
OTHERS	CASE SIZE/WEIGHT	150×61×240mm [5.91×2.40×9.45 inches] (Excluding terminal block and screw) (W×H×D) / 2.8kg max
	COOLING METHOD	*6 Forced cooling (internal fan)
WARRANTY	WARRANTY	*7 5 years (subject to the operating conditions)

- \*1 This is the result of measurement of the testing board with capacitors of 22 μF and 0.1 μF placed at 150 mm from the output terminals by a 20 MHz oscilloscope or a ripple-noise meter equivalent to Keisoku-Giken RM103.  
See 1.6 of Instruction Manual for more details.
- \*2 Consult us about dynamic load and input response.
- \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- \*4 Output power derating is required. Refer to "Derating".
- \*5 Consult us about other classes.
- \*6 The fan speed slows down or stops at no load.
- \*7 See 4 in Instruction Manual for more details.
- \*8 Consult us about safety agency approvals for the models with optional functions.
- \* Do not use the power supply in overcurrent conditions or in unspecified input voltage ranges. Otherwise the internal components may be damaged.
- \* Parallel operation is not possible with this mode.
- \* Audible noise may be heard from the power supply when used for pulse load.

## Features

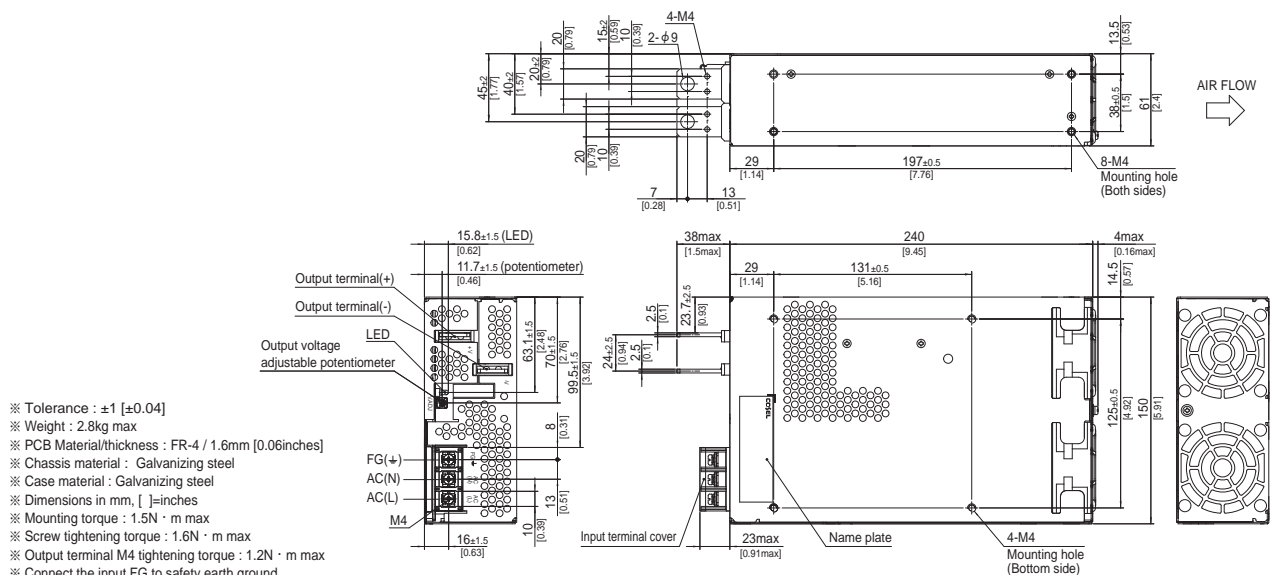
- Cost-effective
- Longer life (see Instruction Manual)
- Low profile (meets 2U height = 61 mm or 2.4 inches)
- Wide operating temperature range (-20°C to +70°C Refer to "Derating")
- Stop or slow fan speed at no load

## Block diagram



## External view

The external size of -V option, -W option and -R option models is different from the standard model. See "6. Options and Others" in Instruction Manual for more details.



# PJA1500F

PJ A 1500 F -□ -□  
 ① ② ③ ④ ⑤ ⑥

PJA



Example recommended EMI/EMC filter  
**NAC-20-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*8
- C : with Coating
- G : Low leakage current
- V : External potentiometer for output voltage adjustment
- W : Parallel operation, LV alarm and Remote sensing
- R : Remote on/off (Required external power source)

See 6.1 in Instruction Manual.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

## SPECIFICATIONS

	MODEL	PJA1500F-12	PJA1500F-15	PJA1500F-24	PJA1500F-36	PJA1500F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Output derating is required at AC85V - 115V. Refer to "Derating" and instruction manual 1.1, 3)					
	CURRENT[A]	ACIN 100V	18typ (Io=90%)				
		ACIN 115V	16typ (Io=100%)				
		ACIN 230V	8typ (Io=100%)				
	FREQUENCY[Hz]	50 / 60 (47 - 63)					
	EFFICIENCY[%]	ACIN 100V	81typ (Io=90%)	82typ (Io=90%)	84typ (Io=90%)	84typ (Io=90%)	84typ (Io=90%)
		ACIN 115V	82typ (Io=100%)	82typ (Io=100%)	85typ (Io=100%)	85typ (Io=100%)	84typ (Io=100%)
		ACIN 230V	85typ (Io=100%)	85typ (Io=100%)	88typ (Io=100%)	88typ (Io=100%)	87typ (Io=100%)
	POWER FACTOR	ACIN 100V	0.98typ (Io=90%)				
		ACIN 115V	0.98typ (Io=100%)				
ACIN 230V		0.95typ (Io=100%)					
INRUSH CURRENT[A]	ACIN 100V	15/30typ (Io=90%) (Primary inrush current /Secondary inrush current) (More than 10sec to re-start)					
	ACIN 115V	15/30typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 10sec to re-start)					
	ACIN 230V	30/30typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 10sec to re-start)					
LEAKAGE CURRENT[ma]	1.5max (ACIN 240V, 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)						
OUTPUT	VOLTAGE[V]	12	15	24	36	48	
	CURRENT[A]	ACIN 85-115V	Output derating is required at ACIN 115V or less (Refer to "Derating")				
		ACIN 115V-264V	125	100	64	42	32
	WATTAGE[W]	ACIN 85-115V	Output derating is required at ACIN 115V or less (Refer to "Derating")				
		ACIN 115V-264V	1500	1500	1536	1512	1536
	LINE REGULATION[mV]	*2	48max	60max	96max	144max	192max
	LOAD REGULATION[mV]	*2	100max	120max	150max	150max	300max
	RIPPLE[mVp-p]	0 to +50°C	180max	180max	120max	150max	200max
		*1 -20 to 0°C	240max	240max	160max	200max	500max
	RIPPLE NOISE[mVp-p]	0 to +50°C	210max	210max	150max	200max	300max
		*1 -20 to 0°C	270max	270max	270max	240max	600max
	TEMPERATURE REGULATION[mV]	0 to +50°C	120max	150max	240max	360max	480max
		*1 -20 to +50°C	180max	180max	290max	440max	600max
	DRIFT[mV]	*3	48max	60max	96max	144max	192max
	START-UP TIME[ms]	800typ (ACIN 115V, Io=100%)					
	HOLD-UP TIME[ms]	20typ (ACIN 115V, Io=100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	10.80 to 13.50	13.50 to 17.30	20.40 to 28.50	30.60 to 40.80	40.80 to 55.20		
OUTPUT VOLTAGE SETTING[V]	12.00 to 12.48	15.00 to 15.60	24.00 to 24.96	36.00 to 37.44	48.00 to 49.92		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically					
	OVERVOLTAGE PROTECTION[V]	14.40 to 17.40	18.00 to 21.80	28.80 to 34.80	43.20 to 52.20	57.00 to 67.20	
	OPERATING INDICATION	LED (Green)					
	REMOTE SENSING	Optional (Option -W)					
	REMOTE ON/OFF	Optional (Required external power source. Option -R)					
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At room temperature)					
	INPUT-FG	AC2,000V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At room temperature)					
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)					
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *4	-20 to +70°C (Refer to "Derating"), 20 - 90%RH (Non condensing), 3,000m (10,000 feet) max					
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) max					
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axes					
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axes					
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL62368-1, C-UL (CSA62368-1), EN62368-1, Complies with DEN-AN					
	CONDUCTED NOISE	Complies with FCC-A, VCCI-A, CISPR22-A, EN55011-A, EN55022-A, additional EMI/EMC Filter is required for meeting class B					
	HARMONIC ATTENUATOR *5	Complies with IEC61000-3-2 class A					

## SPECIFICATIONS

OTHERS	CASE SIZE/WEIGHT	178×61×268mm [7.01×2.40×10.55 inches] (Excluding terminal block and screw) (W×H×D) / 3.5kg max
	COOLING METHOD	*6 Forced cooling (internal fan)
WARRANTY	WARRANTY	*7 5 years (subject to the operating conditions)

- \*1 This is the result of measurement of the testing board with capacitors of 22  $\mu$ F and 0.1  $\mu$ F placed at 150 mm from the output terminals by a 20 MHz oscilloscope or a ripple-noise meter equivalent to Keisoku-Giken RM103.  
See 1.6 of Instruction Manual for more details.
- \*2 Consult us about dynamic load and input response.

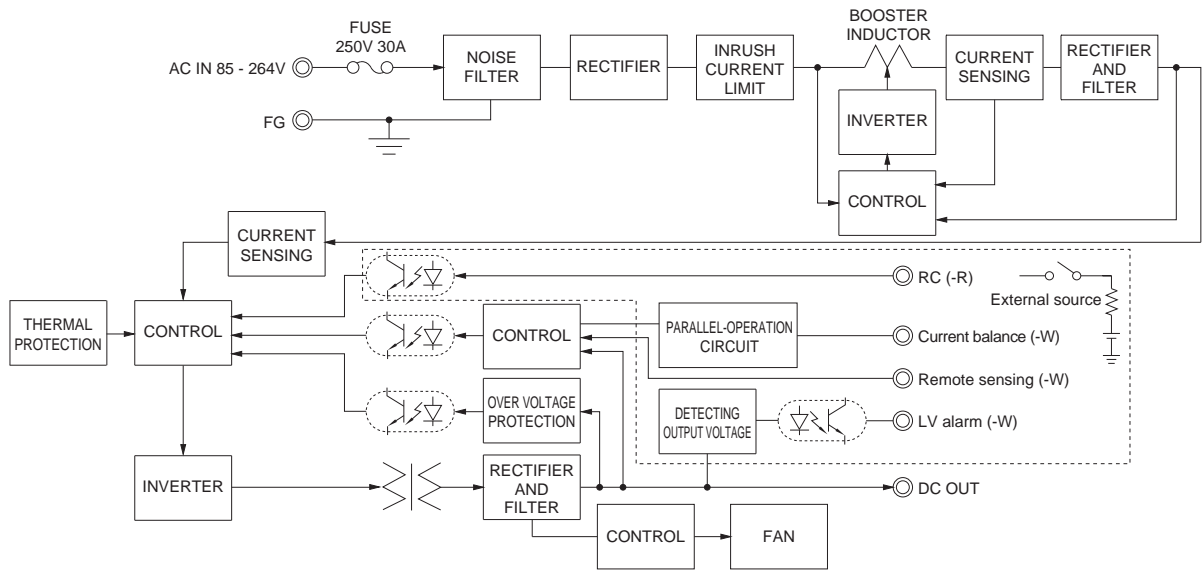
- \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- \*4 Output power derating is required. Refer to "Derating".
- \*5 Consult us about other classes.
- \*6 The fan speed slows down or stops at no load.
- \*7 See 4 in Instruction Manual for more details.

- \*8 Consult us about safety agency approvals for the models with optional functions.
- \* Do not use the power supply in overcurrent conditions or in unspecified input voltage ranges. Otherwise the internal components may be damaged.
- \* Parallel operation is not possible with this mode.
- \* Audible noise may be heard from the power supply when used for pulse load.

### Features

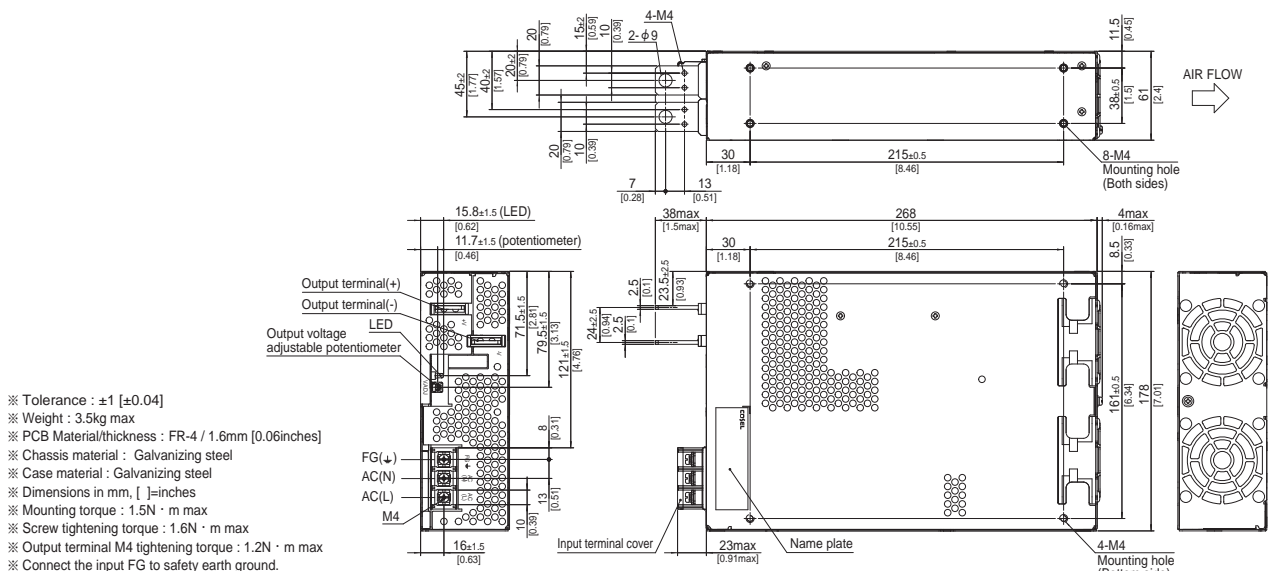
- Cost-effective
- Wide operating temperature range (-20°C to +70°C Refer to "Derating")
- Longer life (see Instruction Manual)
- Stop or slow fan speed at no load
- Low profile (meets 2U height = 61 mm or 2.4 inches)

### Block diagram



### External view

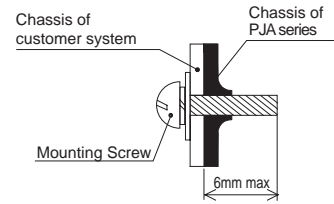
The external size of -V option, -W option and -R option models is different from the standard model. See "6. Options and Others" in Instruction Manual for more details.



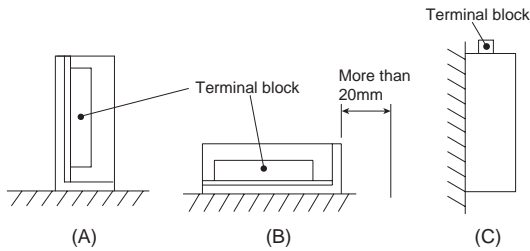
- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 3.5kg max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06inches]
- ※ Chassis material : Galvanizing steel
- ※ Case material : Galvanizing steel
- ※ Dimensions in mm, [ ] =inches
- ※ Mounting torque : 1.5N · m max
- ※ Screw tightening torque : 1.6N · m max
- ※ Output terminal M4 tightening torque : 1.2N · m max
- ※ Connect the input FG to safety earth ground.

Assembling and Installation Method

- Do not insert a screw more than 6mm from the outside of a power supply to keep enough insulation distance between the screw and internal components.

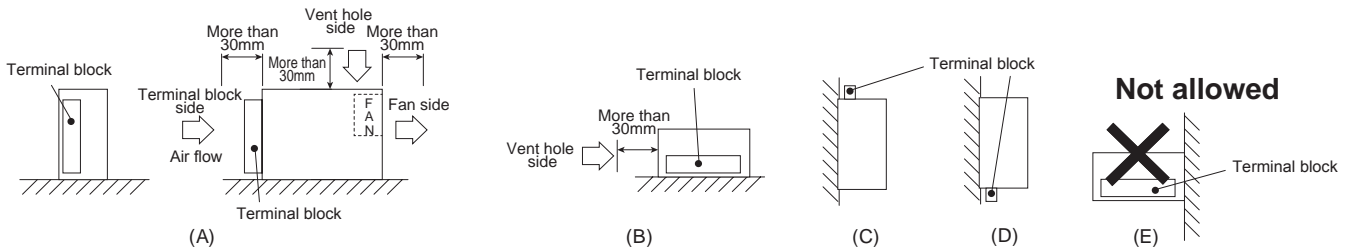


PJA100F, PJA150F

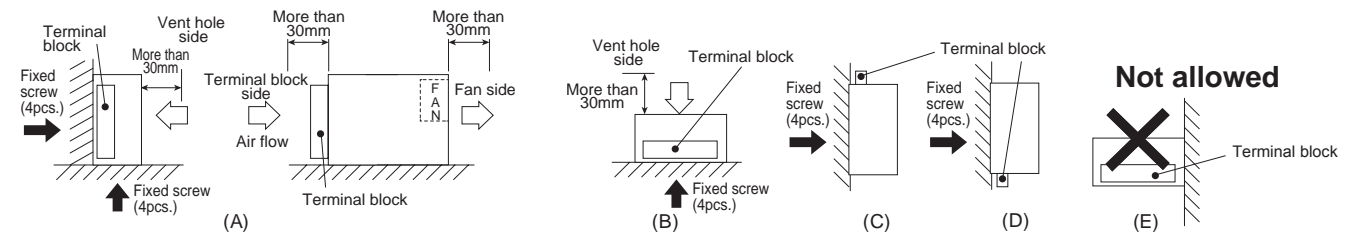


- If you use two or more power supplies side by side, please keep a sufficient distance between them to allow enough air ventilation.
- Ambient temperature around each power supply should not exceed the temperature range shown in "derating".

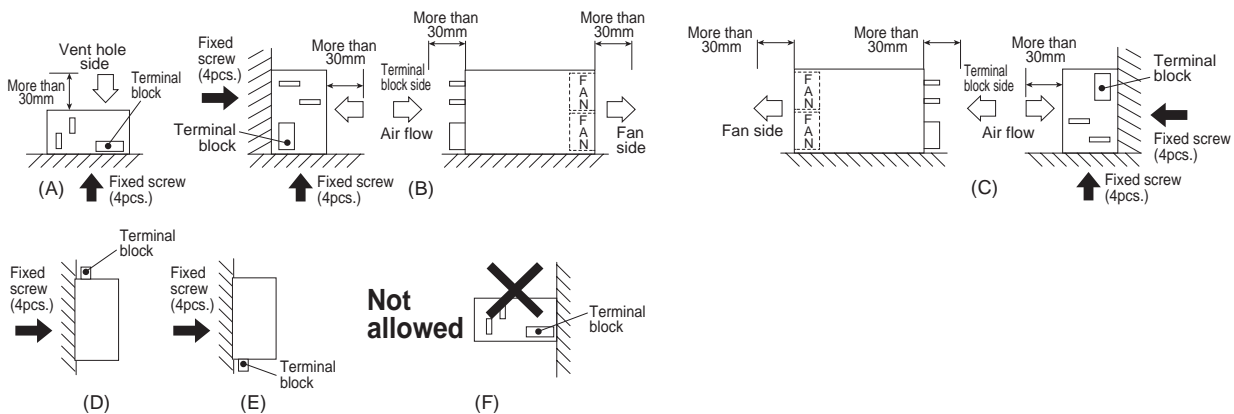
PJA300F



PJA600F



PJA1000F, PJA1500F

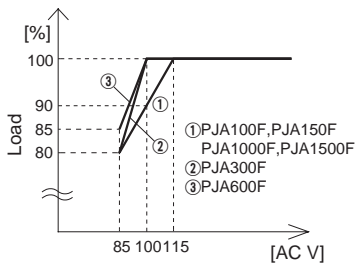


Assembling and Installation Method

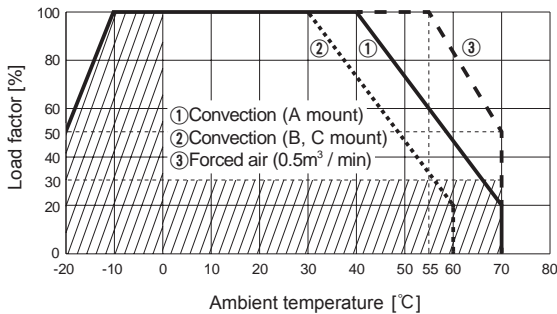
- When mounting the power supply with screws, it is recommended that this be done as shown above . If other methods are used, be sure the weight of the power supply is taken into account.
- Avoid the not allowed installation method as it gives excessive stress to the mounting holes.
- Do not block air flow of the built-in fan (terminal block and ventilation hole).
- If the power supply is used in a dusty environment, use an airfilter. Make sure air flow is not blocked.
- If the built-in fan stops, thermal protection will work and the output will stop.
- The life expectancy (R(t)=90%) of the built-in fan varies depending on the operating condition.

Derating

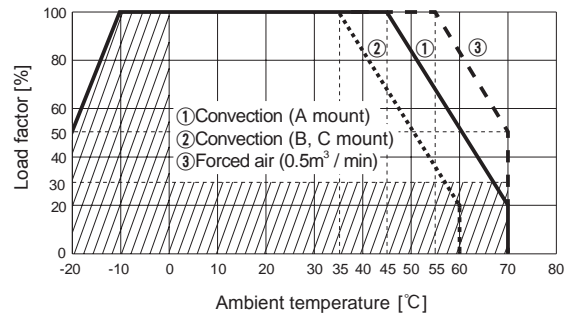
Input voltage Derating Curve



PJA100F/150F-12,15 Ambient temperature Derating Curve (Reference value)

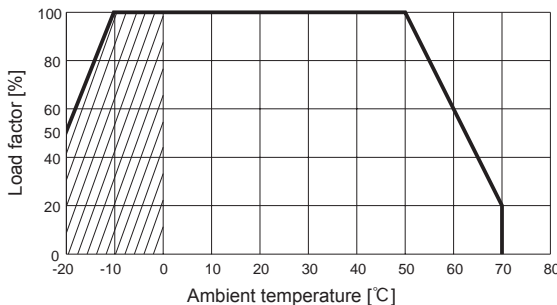


PJA100F/150F-24,36,48 Ambient temperature Derating Curve (Reference value)

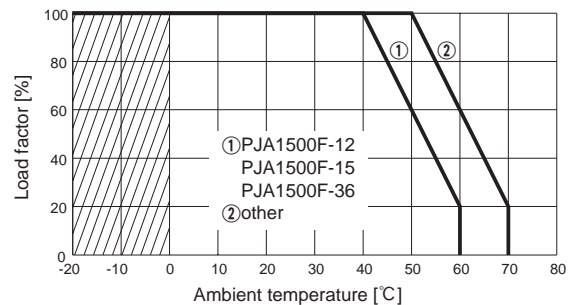


- In the hatched area, the specification of Ripple, Ripple Noise is different from other area.
- The ambient temperature should be measured 5 to 10 cm away from the power supply so that it won't be influenced by the heat from the power supply. Please consult us for more details.
- Make sure the temperature at point A and point B is less than the temperatures shown in Instruction Manual 3.

PJA300F Ambient temperature Derating Curve



PJA600F/1000F/1500F Ambient temperature Derating Curve



- The ambient temperature is defined as the temperature of the air (at the terminal block side) that the built-in cooling fan blows into the power supply. Please pay attention to the heat generated by the input and output wires. Please consult us for more details.

◆ It is necessary to read the “Instruction Manual” and “Before using our product” before you use our product.

Instruction Manual      <https://en.cosel.co.jp/product/powersupply/PJA/>  
 Before using our product      <https://en.cosel.co.jp/technical/caution/index.html>

PJA



NOTICE



## Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	Inrush current protection circuit	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
PJA100F	Active filter	40 to 160	1.2 *1	250V 3.15A	Thermistor	FR-4		Yes	Yes	No
	Flyback converter	20 to 150 *2								
PJA150F	Active filter	40 to 160	1.7 *1	250V 4A	Thermistor	FR-4		Yes	Yes	No
	Flyback converter	20 to 150 *2								
PJA300F	Active filter	60	3.9 *3	250V 10A	Thermistor	FR-4		Yes	Yes	No
	Forward converter	140								
PJA600F	Active filter	60	7.5 *3	250V 16A	SCR	FR-4		Yes	Yes	*4
	Forward converter	220								
PJA1000F	Active filter	65	12.5 *1	250V 20A	TRIAC	FR-4		Yes	Yes	*4
	Forward converter	210								
PJA1500F	Active filter	65	18.0 *1	250V 30A	TRIAC	FR-4		Yes	Yes	*4
	Forward converter	210								

\*1 The input current shown is at ACIN 100V and 90% load.

\*2 The burst mode frequency varies according to the operating conditions. Consult us for more details.

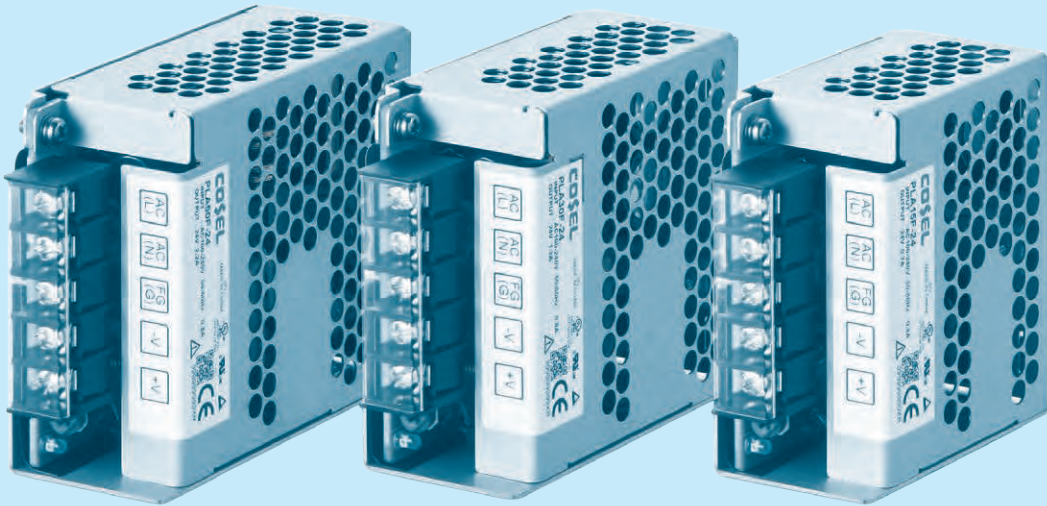
\*3 The input current shown is at ACIN 100V and 100% load.

\*4 Parallel operation is possible with -W option, see “6.Option and Other” in Instruction Manual.





# PLA-series



## Feature

- Low Profile (1U size)
- Wide temperature range (-20°C to +70°C, Derating is required)
- Harmonic attenuator (Complies with IEC61000-3-2 class A)
- Universal input (AC85 - 264V, Derating is required)
- Low power consumption at no load
- Complies with SEMI F-47
- Many optional functions

## Safety agency approvals

- UL60950-1, C-UL (CSA60950-1), EN60950-1, EN62368-1, EN50178
- UL508 (PLA15F-50F) approved
- Complies with DEN-AN

## 5-year warranty (See Instruction Manual)

## CE marking

- Low Voltage Directive
- RoHS Directive

## EMI

- Complies with FCC-B, CISPR22-B, EN55011-B, EN55022-B, VCCI-B

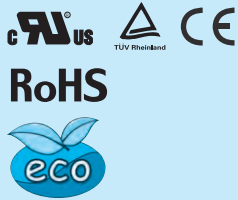
## EMS Compliance : EN61204-3, EN61000-6-2

- EN61000-4-2
- EN61000-4-3
- EN61000-4-4
- EN61000-4-5
- EN61000-4-6
- EN61000-4-8
- EN61000-4-11

# PLA15F

① PL    ② A    ③ 15    ④ F    ⑤ -□    ⑥ -□

PLA



Example recommended EMI/EMC filter  
NAC-04-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*7
- C : with Coating
- J : Connector interface
- T : Vertical terminal block
- N□ : with DIN rail

See 6.1 in Instruction Manual.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

## SPECIFICATIONS

	MODEL	PLA15F-5	PLA15F-12	PLA15F-15	PLA15F-24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Output derating is required at AC85V - 115V. Refer to "Derating" and instruction manual 1.1, 3) *3				
	CURRENT[A]	ACIN 100V	0.4typ (Io=90%)			
		ACIN 115V	0.4typ (Io=100%)			
		ACIN 230V	0.25typ (Io=100%)			
	FREQUENCY[Hz]	50 / 60 (47 - 63)				
	EFFICIENCY[%]	ACIN 100V	72.5typ (Io=90%)	75.5typ (Io=90%)	77.0typ (Io=90%)	78.0typ (Io=90%)
		ACIN 115V	73.5typ (Io=100%)	77.0typ (Io=100%)	78.5typ (Io=100%)	79.0typ (Io=100%)
		ACIN 230V	75.5typ (Io=100%)	78.5typ (Io=100%)	79.5typ (Io=100%)	80.0typ (Io=100%)
	INRUSH CURRENT[A]	ACIN 100V	16typ (Io=90%) Ta=25°C at cold start			
		ACIN 115V	16typ (Io=100%) Ta=25°C at cold start			
ACIN 230V		32typ (Io=100%) Ta=25°C at cold start				
LEAKAGE CURRENT[ma]	0.30max (ACIN 115V / 240V, 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)					
OUTPUT	VOLTAGE[V]	5	12	15	24	
	CURRENT[A]	3	1.3	1	0.7	
	WATTAGE[W]	ACIN 85-115V	Output derating is required at ACIN 115V or less (Refer to "Derating")			
		ACIN 115V-264V	15.0	15.6	15.0	16.8
	LINE REGULATION[mV] *4	20max	48max	60max	96max	
	LOAD REGULATION[mV] *4	40max	100max	120max	150max	
	RIPPLE[mVp-p] *1	0 to +50°C	80max	120max	120max	120max
		-10 to 0°C	140max	160max	160max	160max
		Io=0 to 35%	160max	240max	240max	280max
	RIPPLE NOISE[mVp-p] *1	0 to +50°C	120max	150max	150max	150max
		-10 to 0°C	160max	180max	180max	180max
		Io=0 to 35%	240max	300max	300max	320max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	120max	150max	240max
		-10 to +50°C	60max	150max	180max	290max
	DRIFT[mV] *2	20max	48max	60max	96max	
START-UP TIME[ms]	200typ (ACIN 115V, Io=100%) *Start-up time is 700 ms typ for less than 1 minute of applying input again from turning off the input voltage.					
HOLD-UP TIME[ms]	20typ (ACIN 115V, Io=100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	4.50 to 5.50	10.80 to 13.20	13.50 to 16.50	21.60 to 26.40		
OUTPUT VOLTAGE SETTING[V]	5.00 to 5.15	12.00 to 12.48	15.00 to 15.60	24.00 to 24.96		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION[V]	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	
	OPERATING INDICATION	LED (Green)				
	REMOTE SENSING	Not provided				
REMOTE ON/OFF	Not provided					
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At room temperature)				
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At room temperature)				
	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At room temperature)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *5	-20 to +70°C, 20 - 90%RH (Non condensing), 3,000m (10,000 feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) max				
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axes				
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axes				
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN62368-1, EN50178, UL508 (Except option -J) Complies with DEN-AN				
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B				
	HARMONIC ATTENUATOR *8	Complies with IEC61000-3-2 class A				

## SPECIFICATIONS

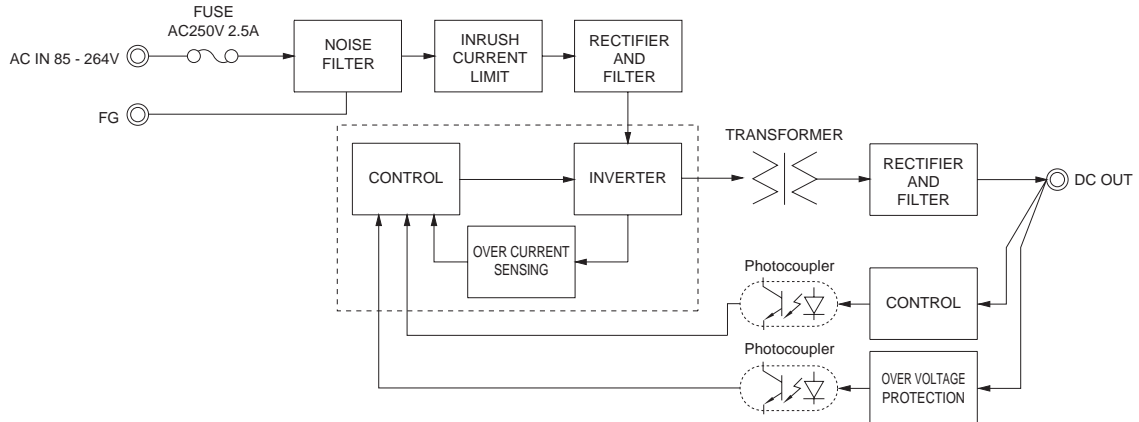
OTHERS	CASE SIZE/WEIGHT	38×80×73mm [1.50×3.15×2.87 inches] (Excluding terminal block and screw) (W×H×D) / 250g max
	COOLING METHOD	Convection
WARRANTY	WARRANTY	*6 5 years (subject to the operating conditions)

- \*1 This is the result of measurement of the testing board with capacitors of 22 μF and 0.1 μF placed at 150 mm from the output terminals by a 20 MHz oscilloscope or a ripple-noise meter equivalent to Keisoku-Giken RM103. See 1.6 of Instruction Manual for more details. When the load factor is 0 - 35%, the switching power loss is reduced by burst operation, which will cause ripple and ripple noise to go beyond the specifications.
- \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- \*3 As for DC input, consult us for advice.
- \*4 Consult us about dynamic load and input response. Measure the output voltage by using the average mode of the tester to deal with the burst operation at 35% load or less.
- \*5 Output power derating is required. Refer to "Derating".
- \*6 See 4 in Instruction Manual for more details.
- \*7 Consult us about safety agency approvals for the models with optional functions.
- \*8 Consult us about other classes.
- \* Do not use the power supply in overcurrent conditions or in unspecified input voltage ranges. Otherwise the internal components may be damaged.
- \* Parallel operation is not possible with this mode.
- \* Sound noise may be heard from the power supply when used for pulse load.

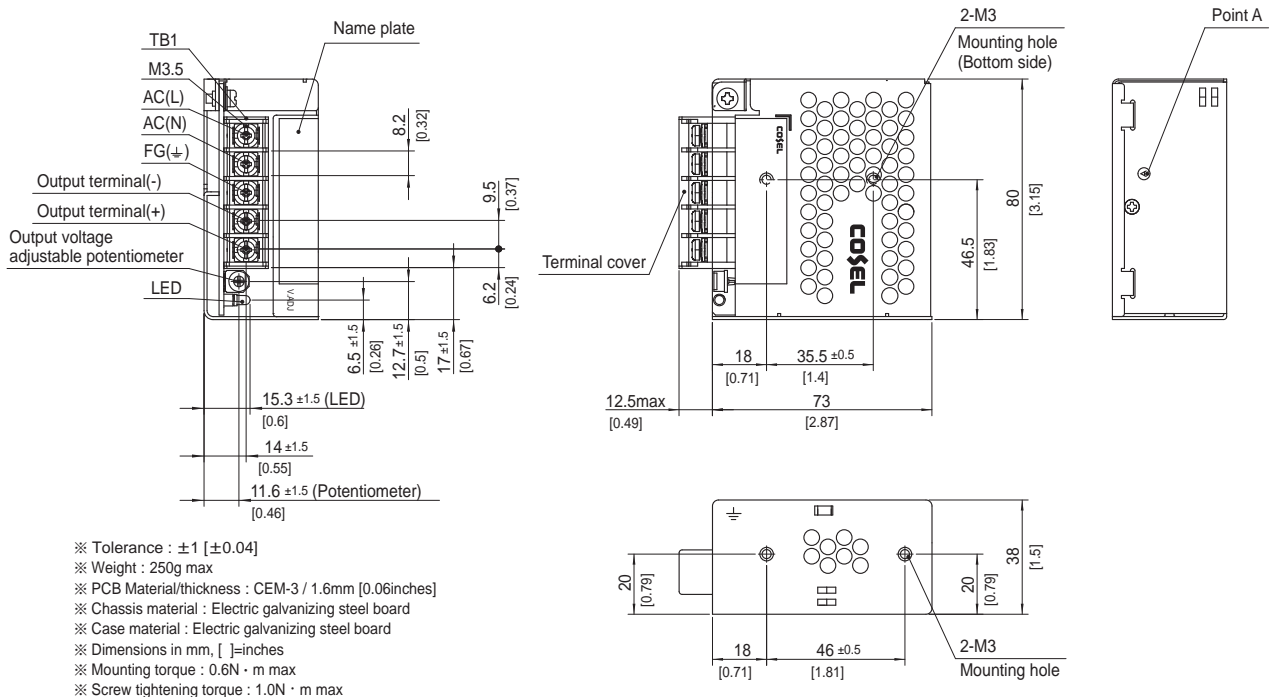
## Features

- Compact design (Depth: 73mm 2.87inches)
- Low power consumption (1.0W typ AC240Vin, no load at standard model)
- UL508 approved (Except option -J), and complies with SEMI F47
- Various connection interface options (vertical terminal [-T], AMP connector [-J])

## Block diagram



## External view



# PLA30F

PL A 30 F -□ -□  
 ① ② ③ ④ ⑤ ⑥

PLA



Example recommended EMI/EMC filter  
**NAC-04-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*7
- C : with Coating
- J : Connector interface
- T : Vertical terminal block
- N□ : with DIN rail

See 6.1 in Instruction Manual.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

## SPECIFICATIONS

	MODEL	PLA30F-5	PLA30F-12	PLA30F-15	PLA30F-24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Output derating is required at AC85V - 115V. Refer to "Derating" and instruction manual 1.1, 3) *3				
	CURRENT[A]	ACIN 100V	0.7typ (Io=90%)			
		ACIN 115V	0.7typ (Io=100%)			
		ACIN 230V	0.4typ (Io=100%)			
	FREQUENCY[Hz]	50 / 60 (47 - 63)				
	EFFICIENCY[%]	ACIN 100V	73.0typ (Io=90%)	80.0typ (Io=90%)	81.0typ (Io=90%)	82.5typ (Io=90%)
		ACIN 115V	74.0typ (Io=100%)	80.5typ (Io=100%)	81.5typ (Io=100%)	83.0typ (Io=100%)
ACIN 230V		77.0typ (Io=100%)	81.0typ (Io=100%)	82.0typ (Io=100%)	83.5typ (Io=100%)	
INRUSH CURRENT[A]	ACIN 100V	16typ (Io=90%) Ta=25°C at cold start				
	ACIN 115V	16typ (Io=100%) Ta=25°C at cold start				
	ACIN 230V	32typ (Io=100%) Ta=25°C at cold start				
LEAKAGE CURRENT[ma]	0.65max (ACIN 115V / 240V, 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)					
OUTPUT	VOLTAGE[V]	5	12	15	24	
	CURRENT[A]	6	2.5	2	1.3	
	WATTAGE[W]	ACIN 85-115V	Output derating is required at ACIN 115V or less (Refer to "Derating")			
		ACIN 115V-264V	30.0	30.0	30.0	31.2
	LINE REGULATION[mV] *4	20max	48max	60max	96max	
	LOAD REGULATION[mV] *4	40max	100max	120max	150max	
	RIPPLE[mVp-p] *1	0 to +50°C	80max	120max	120max	120max
		-10 to 0°C	140max	160max	160max	160max
	RIPPLE NOISE[mVp-p] *1	0 to +50°C	120max	150max	150max	150max
		-10 to 0°C	160max	180max	180max	180max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	120max	150max	240max
		-10 to +50°C	60max	150max	180max	290max
	DRIFT[mV] *2	20max	48max	60max	96max	
	START-UP TIME[ms]	150typ (ACIN 115V, Io=100%)				
HOLD-UP TIME[ms]	20typ (ACIN 115V, Io=100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	4.50 to 5.50	10.80 to 13.20	13.50 to 16.50	21.60 to 26.40		
OUTPUT VOLTAGE SETTING[V]	5.00 to 5.15	12.00 to 12.48	15.00 to 15.60	24.00 to 24.96		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION[V]	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	
	OPERATING INDICATION	LED (Green)				
	REMOTE SENSING	Not provided				
ISOLATION	REMOTE ON/OFF	Not provided				
	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At room temperature)				
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At room temperature)				
ENVIRONMENT	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At room temperature)				
	OPERATING TEMP., HUMID. AND ALTITUDE *5	-20 to +70°C, 20 - 90%RH (Non condensing), 3,000m (10,000 feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) max				
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axes				
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axes				
	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN62368-1, EN50178, UL508 (Except option -J) Complies with DEN-AN				
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B				
HARMONIC ATTENUATOR *8	Complies with IEC61000-3-2 class A					

## SPECIFICATIONS

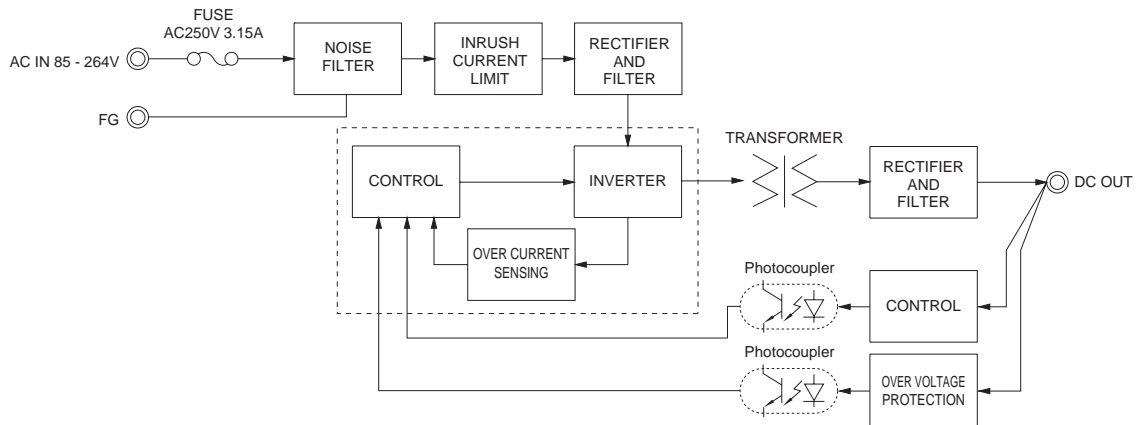
OTHERS	CASE SIZE/WEIGHT	38 × 80 × 88mm [1.50 × 3.15 × 3.46 inches] (Excluding terminal block and screw) (W × H × D) / 330g max
	COOLING METHOD	Convection
WARRANTY	WARRANTY	*6 5 years (subject to the operating conditions)

- \*1 This is the result of measurement of the testing board with capacitors of 22 μF and 0.1 μF placed at 150 mm from the output terminals by a 20 MHz oscilloscope or a ripple-noise meter equivalent to Keisoku-Giken RM103.  
See 1.6 of Instruction Manual for more details.
- \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- \*3 As for DC input, consult us for advice.
- \*4 Consult us about dynamic load and input response.
- \*5 Output power derating is required. Refer to "Derating".
- \*6 See 4 in Instruction Manual for more details.
- \*7 Consult us about safety agency approvals for the models with optional functions.
- \*8 Consult us about other classes.
- \* Do not use the power supply in overcurrent conditions or in unspecified input voltage ranges. Otherwise the internal components may be damaged.
- \* Parallel operation is not possible with this mode.
- \* Sound noise may be heard from the power supply when used for pulse load.

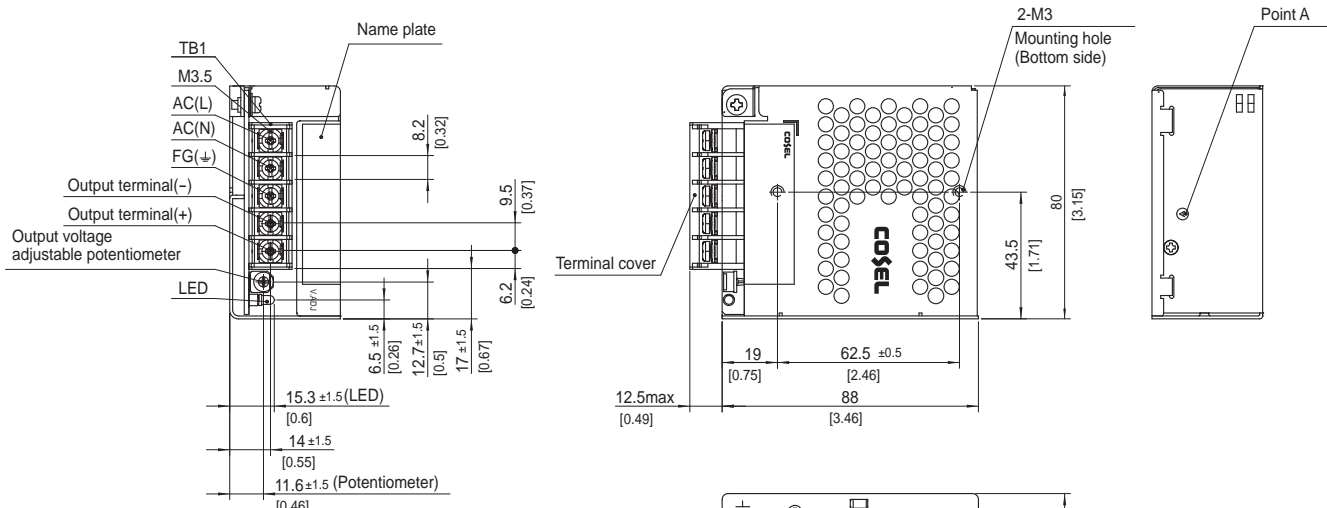
## Features

- Compact design (Depth: 88mm 3.46inches)
- UL508 approved (Except option -J), and complies with SEMI F47
- Various connection interface options (vertical terminal [-T], AMP connector [-J])

## Block diagram



## External view

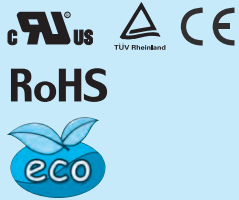


- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 330g max
- ※ PCB Material/thickness : CEM-3 / 1.6mm [0.06inches]
- ※ Chassis material : Electric galvanizing steel board
- ※ Case material : Electric galvanizing steel board
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque : 0.6N · m max
- ※ Screw tightening torque : 1.0N · m max

# PLA50F

PL A 50 F -□ -□  
 ① ② ③ ④ ⑤ ⑥

PLA



Example recommended EMI/EMC filter  
**NAC-04-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*7  
 C : with Coating  
 J : Connector interface  
 T : Vertical terminal block  
 □ : with DIN rail

See 6.1 in Instruction Manual.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

## SPECIFICATIONS

MODEL		PLA50F-5	PLA50F-12	PLA50F-15	PLA50F-24
<b>VOLTAGE[V]</b>		AC85 - 264 1 φ (Output derating is required at AC85V - 115V. Refer to "Derating" and instruction manual 1.1, 3) *3			
<b>CURRENT[A]</b>	ACIN 100V	0.6typ (Io=90%)	0.7typ (Io=90%)		
	ACIN 115V	0.6typ (Io=100%)	0.7typ (Io=100%)		
	ACIN 230V	0.3typ (Io=100%)	0.4typ (Io=100%)		
<b>FREQUENCY[Hz]</b>		50 / 60 (47 - 63)			
<b>EFFICIENCY[%]</b>	ACIN 100V	74.5typ (Io=90%)	80.0typ (Io=90%)	80.0typ (Io=90%)	81.5typ (Io=90%)
	ACIN 115V	75.0typ (Io=100%)	80.5typ (Io=100%)	80.5typ (Io=100%)	82.0typ (Io=100%)
	ACIN 230V	76.5typ (Io=100%)	82.0typ (Io=100%)	82.0typ (Io=100%)	84.0typ (Io=100%)
<b>POWER FACTOR</b>	ACIN 100V	0.97typ (Io=90%)	0.98typ (Io=90%)		
	ACIN 115V	0.97typ (Io=100%)	0.98typ (Io=100%)		
	ACIN 230V	0.85typ (Io=100%)	0.87typ (Io=100%)		
<b>INRUSH CURRENT[A]</b>	ACIN 100V	16typ (Io=90%) Ta=25°C at cold start			
	ACIN 115V	16typ (Io=100%) Ta=25°C at cold start			
	ACIN 230V	32typ (Io=100%) Ta=25°C at cold start			
<b>LEAKAGE CURRENT[ma]</b>		0.75max (ACIN 115V / 240V, 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)			
<b>VOLTAGE[V]</b>		5	12	15	24
<b>CURRENT[A]</b>		8	4.3	3.5	2.2
<b>WATTAGE[W]</b>	ACIN 85-115V	Output derating is required at ACIN 115V or less (Refer to "Derating")			
	ACIN 115V-264V	40.0	51.6	52.5	52.8
<b>LINE REGULATION[mV]</b> *4		20max	48max	60max	96max
<b>LOAD REGULATION[mV]</b> *4		40max	100max	120max	150max
<b>RIPPLE[mVp-p]</b> *1	0 to +45°C	80max	120max	120max	120max
	-10 to 0°C	140max	160max	160max	160max
<b>RIPPLE NOISE[mVp-p]</b> *1	0 to +45°C	120max	150max	150max	150max
	-10 to 0°C	160max	180max	180max	180max
<b>TEMPERATURE REGULATION[mV]</b>	0 to +45°C	50max	120max	150max	240max
	-10 to +45°C	60max	150max	180max	290max
<b>DRIFT[mV]</b> *2		20max	48max	60max	96max
<b>START-UP TIME[ms]</b>		350typ (ACIN 115V, Io=100%)			
<b>HOLD-UP TIME[ms]</b>		20typ (ACIN 115V, Io=100%)			
<b>OUTPUT VOLTAGE ADJUSTMENT RANGE[V]</b>		4.50 to 5.50	10.80 to 13.20	13.50 to 16.50	21.60 to 26.40
<b>OUTPUT VOLTAGE SETTING[V]</b>		5.00 to 5.15	12.00 to 12.48	15.00 to 15.60	24.00 to 24.96
<b>OVERCURRENT PROTECTION</b>		Works over 105% of rating and recovers automatically			
<b>OVERVOLTAGE PROTECTION[V]</b>		5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60
<b>OPERATING INDICATION</b>		LED (Green)			
<b>REMOTE SENSING</b>		Not provided			
<b>REMOTE ON/OFF</b>		Not provided			
<b>INPUT-OUTPUT</b>		AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At room temperature)			
<b>INPUT-FG</b>		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At room temperature)			
<b>OUTPUT-FG</b>		AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At room temperature)			
<b>OPERATING TEMP., HUMID. AND ALTITUDE *5</b>		-20 to +70°C, 20 - 90%RH (Non condensing), 3,000m (10,000 feet) max			
<b>STORAGE TEMP., HUMID. AND ALTITUDE</b>		-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) max			
<b>VIBRATION</b>		10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axes			
<b>IMPACT</b>		196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axes			
<b>AGENCY APPROVALS</b>		UL60950-1, C-UL (CSA60950-1), EN60950-1, EN62368-1, EN50178, UL508 (Except option -J) Complies with DEN-AN			
<b>CONDUCTED NOISE</b>		Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B			
<b>HARMONIC ATTENUATOR *8</b>		Complies with IEC61000-3-2 class A			

## SPECIFICATIONS

OTHERS	CASE SIZE/WEIGHT	38 × 80 × 99mm [1.50 × 3.15 × 3.90 inches] (Excluding terminal block and screw) (W × H × D) / 400g max
	COOLING METHOD	Convection
WARRANTY	WARRANTY	*6 5 years (subject to the operating conditions)

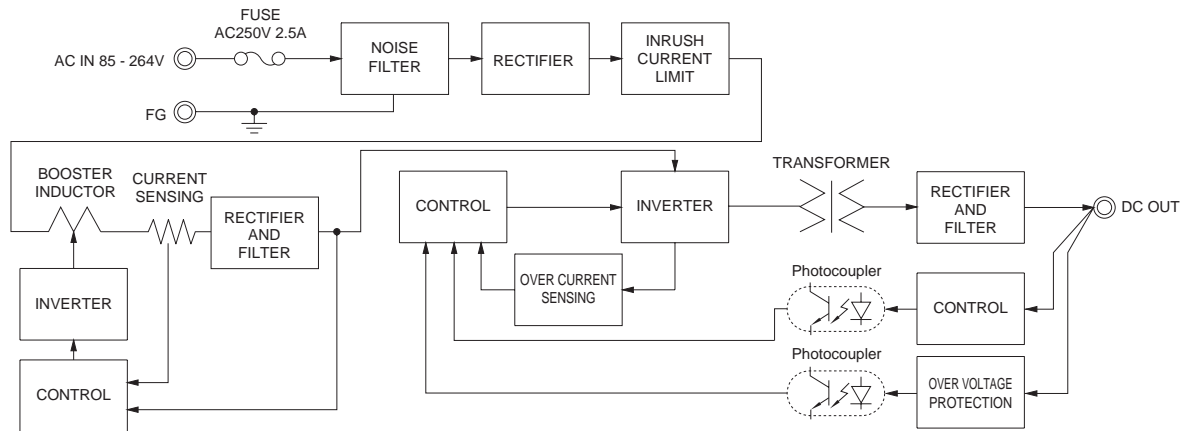
PLA

- \*1 This is the result of measurement of the testing board with capacitors of 22 μF and 0.1 μF placed at 150 mm from the output terminals by a 20 MHz oscilloscope or a ripple-noise meter equivalent to Keisoku-Giken RM103.  
See 1.6 of Instruction Manual for more details.
- \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- \*3 As for DC input, consult us for advice.
- \*4 Consult us about dynamic load and input response.
- \*5 Output power derating is required. Refer to "Derating".
- \*6 See 4 in Instruction Manual for more details.
- \*7 Consult us about safety agency approvals for the models with optional functions.
- \*8 Consult us about other classes.
- \* Do not use the power supply in overcurrent conditions or in unspecified input voltage ranges. Otherwise the internal components may be damaged.
- \* Parallel operation is not possible with this mode.
- \* Sound noise may be heard from the power supply when used for pulse load.

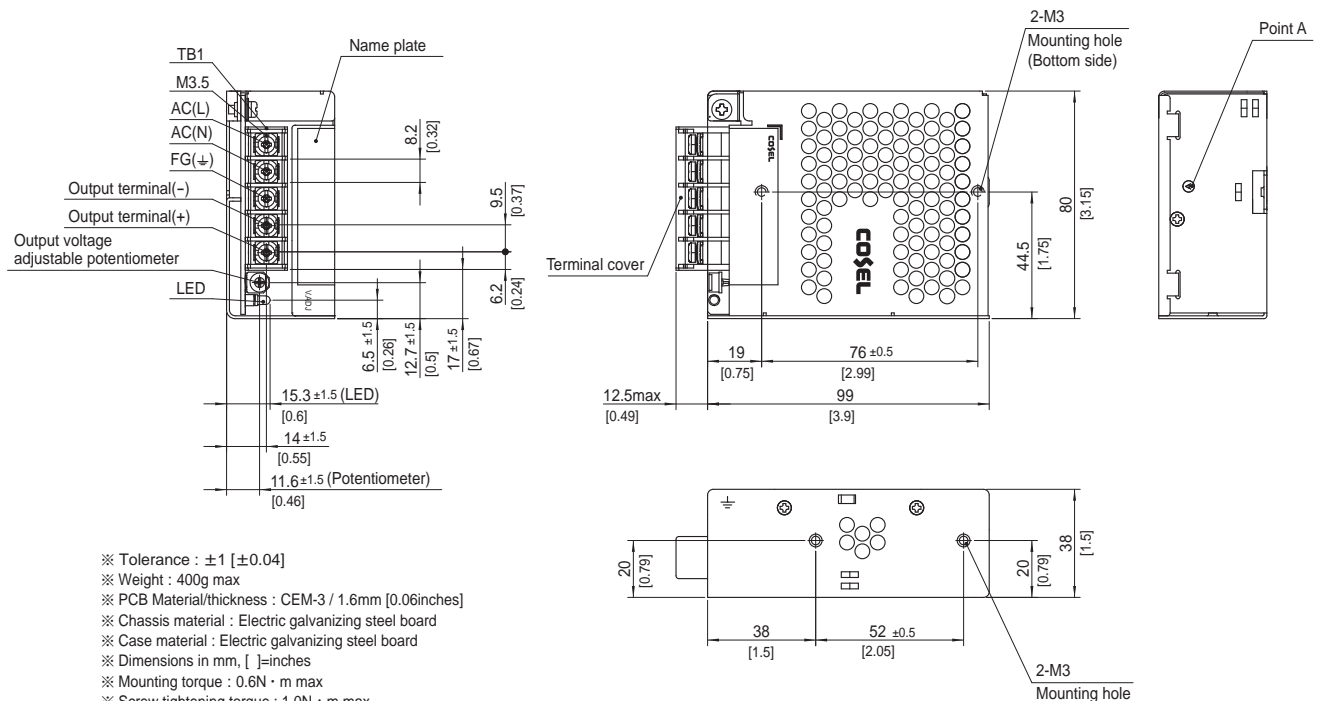
## Features

- Compact design (Depth: 99mm 3.90inches)
- UL508 approved (Except option -J), and complies with SEMI F47
- Various connection interface options (vertical terminal [-T], AMP connector [-J])

## Block diagram



## External view

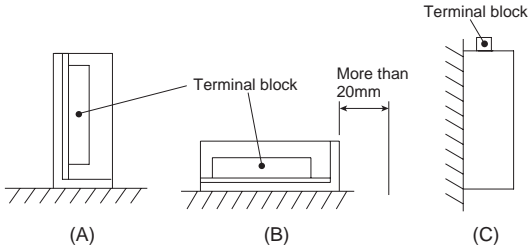
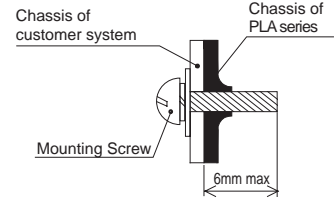


Assembling and Installation Method

PLA

Installation method

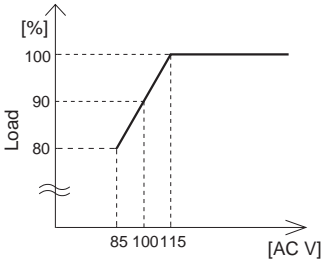
Do not insert a screw more than 6mm from the outside of a power supply to keep enough insulation distance between the screw and internal components.



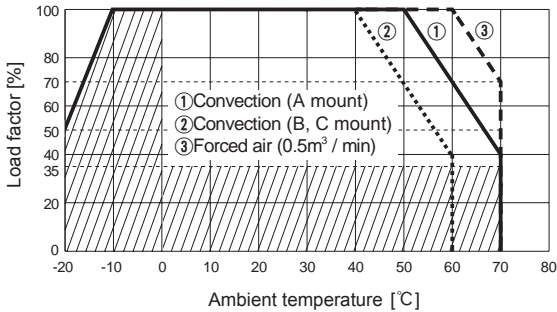
If you use two or more power supplies side by side, please keep a sufficient distance between them to allow enough air ventilation.  
 Ambient temperature around each power supply should not exceed the temperature range shown in "Derating".

Derating

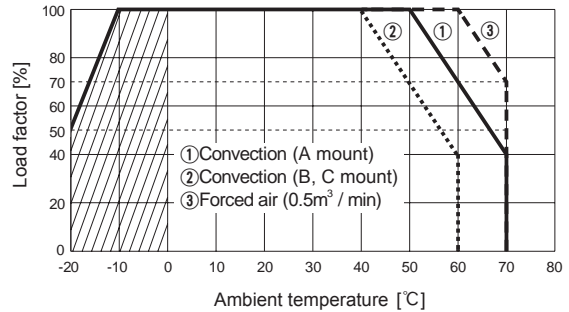
Input voltage Derating Curve



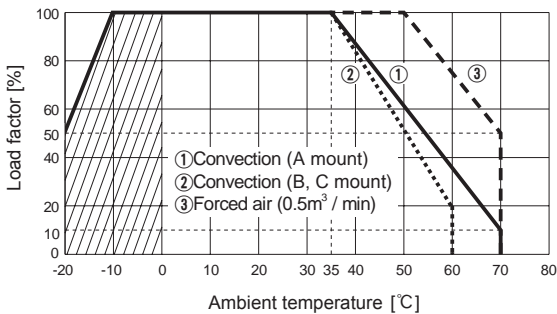
PLA15F Ambient temperature Derating Curve (Reference value)



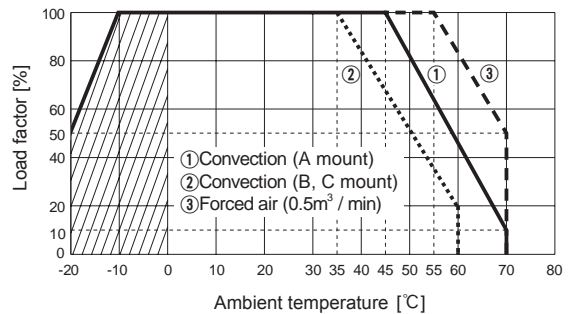
PLA30F Ambient temperature Derating Curve (Reference value)



PLA50F-5 Ambient temperature Derating Curve (Reference value)



PLA50F-12,-15,-24 Ambient temperature Derating Curve (Reference value)





### Derating

- In the hatched area, the specification of Ripple, Ripple Noise is different from other area.
- The ambient temperature should be measured 5 to 10 cm away from the power supply so that it won't be influenced by the heat from the power supply. Please consult us for more details.
- The derating curve by the ambient temperature shows the operating temperature range for a 3-year continuous use. It shows not the limit of use but the temperature of an expected life. Consult us for the operation limit temperature.
- Make sure the temperature at point A and point B is less than the temperatures shown in Instruction Manual 3.

### Instruction Manual

- ◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual      <https://en.cosel.co.jp/product/powersupply/PLA/>  
 Before using our product      <https://en.cosel.co.jp/technical/caution/index.html>

PLA



NOTICE



### Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	Inrush current protection circuit	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
PLA15F	Flyback converter	100	0.4 *	250V 2.5A	Thermistor	CEM-3	Yes		Yes	No
PLA30F	Flyback converter	130	0.7 *	250V 3.15A	Thermistor	CEM-3	Yes		Yes	No
PLA50F	Active filter	60 to 440	0.7 *	250V 2.5A	Thermistor	CEM-3	Yes		Yes	No
	Flyback converter	130								

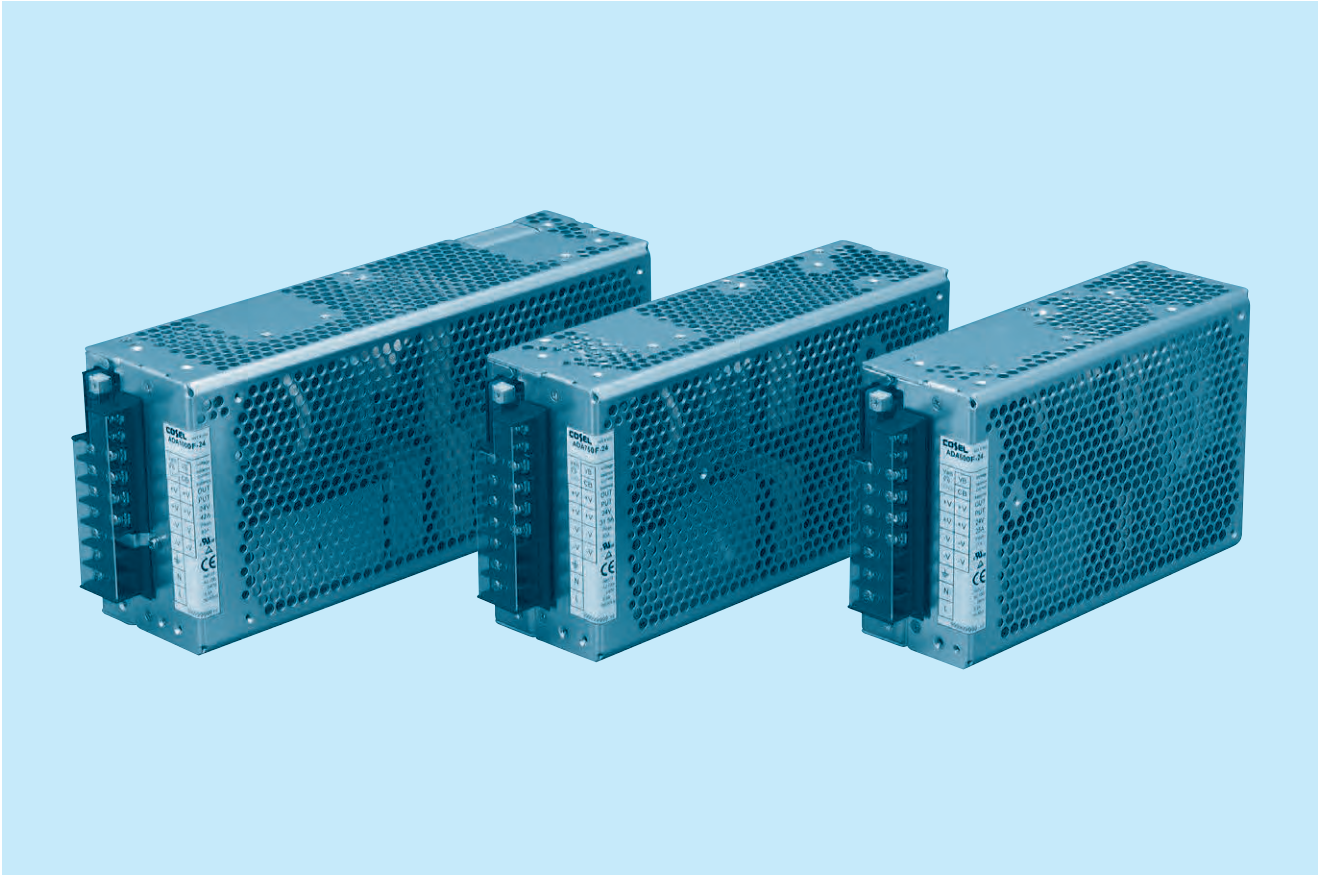
\* The input current shown is at ACIN 100V and 100% load.





# ADA-series

ADA



## Feature

- High power & peak power
- Power up with fan (optional)
- Parallel operation / master-slave operation / N+1 redundant (optional)
- Harmonic attenuator (Complies with IEC61000-3-2)
- Universal input voltage (AC85 - 264V)
- Optional : remote ON/OFF, alarms
- Current monitor
- DIN rail (35mm) optional

## Safety agency approvals

- UL60950-1, C-UL(CSA60950-1), EN60950-1, EN62368-1, EN50178
- Complies with DEN-AN

## EMI

- Complies with FCC-B, CISPR22-B, EN55022-B, VCCI-B

## 5-year warranty (refer to Instruction Manual)

## Optional parts

- Harness
- Fan unit
- Attachment

## CE marking

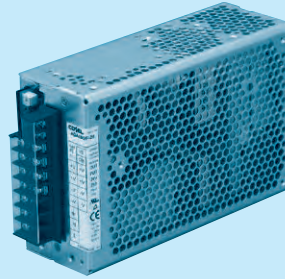
- Low Voltage Directive
- RoHS Directive

## EMS Compliance : EN61204-3, EN61000-6-2

- EN55022-B
- EN61000-3-2
- EN61000-4-2
- EN61000-4-3
- EN61000-4-4
- EN61000-4-5
- EN61000-4-6
- EN61000-4-8
- EN61000-4-11

# ADA600F

① ADA ② 600 ③ F ④ -24 ⑤ -□



Example recommended EMI/EMC filter  
NAC-20-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
  - ② Output wattage
  - ③ Universal input
  - ④ Output voltage
  - ⑤ Optional \*7
  - G : Low leakage current
  - E : Low leakage current and EMI class A
  - F : with Fan unit
  - T : Vertical terminal block
  - J : Connector type
  - C : with Coating
  - R : Remote ON/OFF
  - N1: DIN rail
  - W: Alarms and Redundant operation
- Specification is changed at option, refer to Instruction Manual.

Please refer to derating curve, because the rated load current depends on cooling method that is convection cooling or forced air.

\* Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

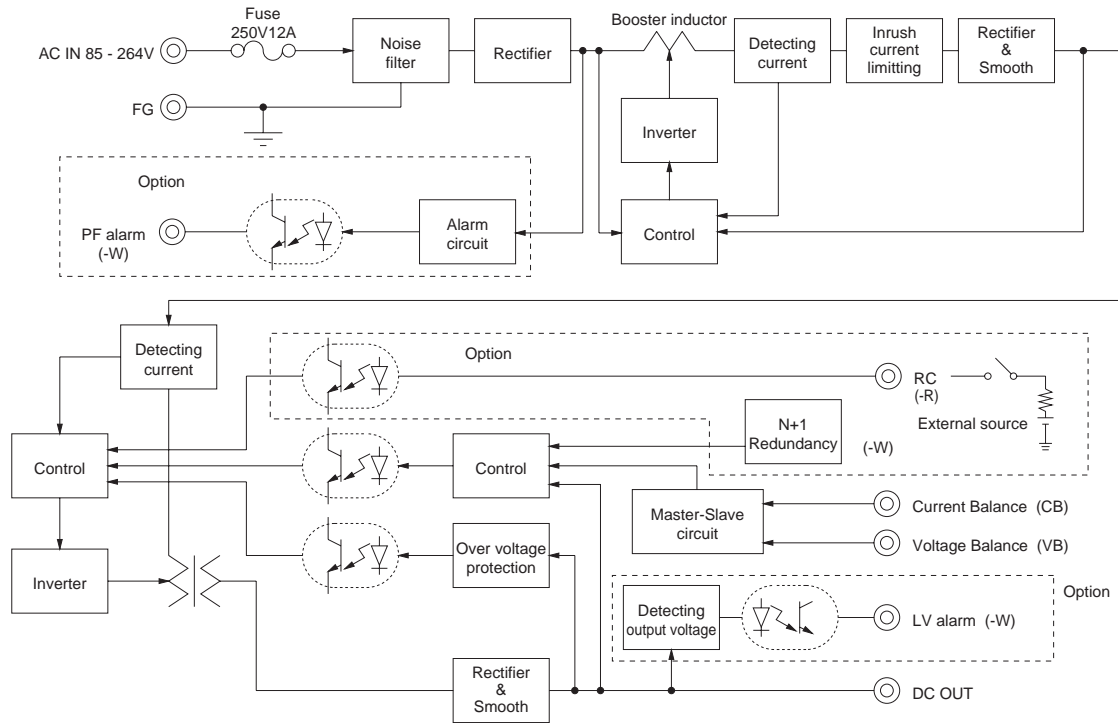
## SPECIFICATIONS

	MODEL	ADA600F-24	ADA600F-30	ADA600F-36	ADA600F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ or DC 120 - 350 (AC64 or DC90 optionally available *6)				
	FREQUENCY[Hz]	50/60 (47 - 63) or DC				
	EFFICIENCY[%]	ACIN 100V	84typ (Io=100%)	86typ (Io=100%)	86typ (Io=100%)	86typ (Io=100%)
		ACIN 200V	86typ (Io=100%)	87typ (Io=100%)	87typ (Io=100%)	89typ (Io=100%)
	POWER FACTOR	ACIN 100V	0.99typ (Io=100%)			
		ACIN 200V	0.98typ (Io=100%)			
INRUSH CURRENT[A]	ACIN 100V *1	20typ (Io=100%) (More than 3sec.to re-start)				
	ACIN 200V *1	40typ (Io=100%) (More than 3sec.to re-start)				
LEAKAGE CURRENT[mA]		0.75max (60Hz, According to IEC62368-1 and DEN-AN) (Io=100%)				
OUTPUT	VOLTAGE[V]	24	30	36	48	
	CURRENT[A]	ACIN 100V *2	14 (Peak 25) convection	11 (Peak 20) convection	9 (Peak 16.5) convection	6.5 (Peak 12.5) convection
		ACIN 100V *2	21 (Peak 25) forced air	16.5 (Peak 20) forced air	14 (Peak 16.5) forced air	10.5 (Peak 12.5) forced air
		ACIN 200V *2	15 (Peak 31) convection	12 (Peak 24.5) convection	10 (Peak 20.5) convection	7 (Peak 15.5) convection
		ACIN 200V *2	25 (Peak 31) forced air	20 (Peak 24.5) forced air	16.5 (Peak 20.5) forced air	12.5 (Peak 15.5) forced air
LINE REGULATION[mV]	96max	120max	144max	192max		
LOAD REGULATION[mV]	150max	180max	240max	300max		
RIPPLE[mVp-p]	0 to +50°C *3	120max	160max	200max	200max	
	-10 - 0°C *3	160max	230max	260max	300max	
RIPPLE NOISE[mVp-p]	0 to +50°C *3	150max	190max	230max	250max	
	-10 - 0°C *3	180max	250max	280max	400max	
TEMPERATURE REGULATION[mV]	0 to +50°C	240max	300max	360max	480max	
DRIFT[mV]	*4	96max	120max	144max	192max	
START-UP TIME[ms]		500max (ACIN 100V, Io=100%)				
HOLD-UP TIME[ms]		20typ (ACIN 100V, Io=100%)				
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		21.6 - 27.0	27.0 - 33.0	33.0 - 41.0	41.0 - 52.8	
OUTPUT VOLTAGE SETTING[V]		23.5 - 24.5	29.0 - 31.0	35.0 - 37.0	47.0 - 49.0	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 101% of peak current and recovers automatically				
	OVERVOLTAGE PROTECTION[V]	31 - 34.5	40 - 48	51 - 60	64 - 76	
	OPERATING INDICATION	LED (Green)				
	ALARM OUTPUT	Detecting low input voltage(PF), detecting low output voltage(LV). (Optional : -W, refer to Instruction Manual 6)				
	REMOTE ON/OFF(RC)	Requirement for external source (Option : -R, refer to Instruction Manual 6)				
ISOLATION	INPUT-OUTPUT · RC	*5 AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)				
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)				
	OUTPUT · RC-FG	*5 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +71°C, 20 - 90%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max				
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis				
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis				
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN62368-1, EN60065, EN50178 Complies with DEN-AN				
	CONDUCTED NOISE	Complies with FCC-B, CISPR22-B, EN55022-B, VCCI-B				
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 *8				
OTHERS	CASE SIZE/WEIGHT	65 x 127 x 195mm [2.56 x 5 x 7.68 inches] (W x H x D) (without terminal block) /1.5kg max				
	COOLING METHOD	Convection/Forced air				

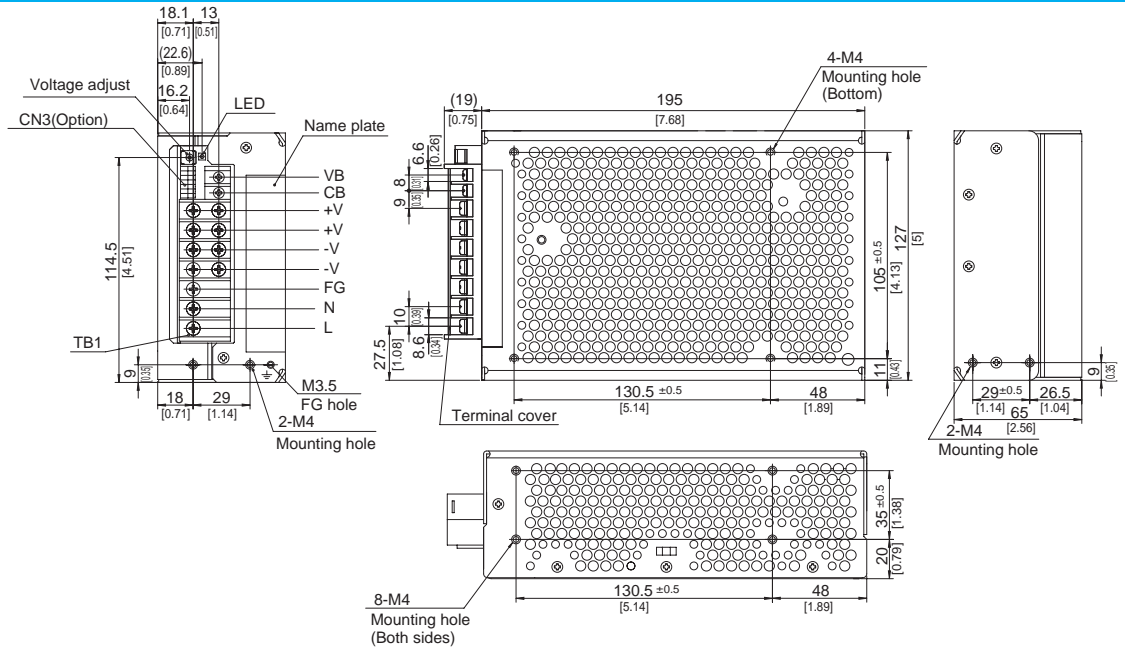
\*1 The value is primary surge. The current of input surge to a built-in EMI/EMC Filter (0.2ms or less) is excluded.  
 \*2 Peak loading for 10sec. And Duty 35% max. Refer to Instruction Manual 4. Forced air is shown in "Derating".  
 \*3 This is the value that measured on measuring board with capacitor of 22 μF within 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM101).

\*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*5 Applicable when remote control (optional) is added.  
 \*6 Derating is required. Consult us for details.  
 \*7 Please contact us about safety approvals for the model with option.  
 \*8 Please contact us about class C.  
 \* A sound may occur from power supply at pulse loading.

## Block diagram



## External view



### ※ Pin assign

Symbol	Function	Screw type
VB	Voltage balance	M3
CB	Current balance	
+V	Output terminal(+)	M4
-V	Output terminal(-)	
FG	Frame ground	
L	AC(L)	

Average 21A max per pin for TB1

### CN3(Optional)

Pin No.	Function
1	RC+ : Remote ON/OFF+(+R)
2	RC- : Remote ON/OFF(-R)
3-8	NC : N.C.
9	LV+ : LV Alarm(-W)
10	LV- : LV Alarm ground(-W)
11-12	NC : N.C.
13	PF+ : PF Alarm(-W)
14	PF- : PF Alarm ground(-W)

Connector	Mating connector	Terminal	Mfr.
CN3	S14B-PHDSS	PHDR-14VS	J.S.T

※ 1 Ratchet Hand is nothing

※ Tolerance : ±1 [=0.04]

※ Weight : 1.5kg max

※ PCB material / thickness : FR-4 / 1.6mm [0.06]

※ Chassis and cover material : aluminium

※ Dimensions in mm, [ ] = inches

※ Mounting torque : 1.2N · m(12.8kgf · cm) max

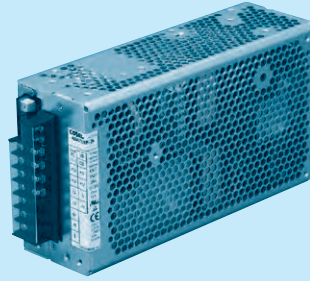
※ Screw tightening torque

M4 : 1.6N · m(16.3kgf · cm) max, M3 : 0.8N · m(8.5kgf · cm) max

※ I/O terminal for option-J and -T is shown in Instruction Manual 6.

# ADA750F

① ADA ② 750 ③ F ④ -24 ⑤ -□



Example recommended EMI/EMC filter  
NAC-20-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
  - ② Output wattage
  - ③ Universal input
  - ④ Output voltage
  - ⑤ Optional \*7
  - G : Low leakage current
  - E : Low leakage current and EMI class A
  - F : with Fan unit
  - T : Vertical terminal block
  - J : Connector type
  - C : with Coating
  - R : Remote ON/OFF
  - N1: DIN rail
  - W: Alarms and Redundant operation
- Specification is changed at option, refer to Instruction Manual.

Please refer to derating curve, because the rated load current depends on cooling method that is convection cooling or forced air.

\* Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

## SPECIFICATIONS

	MODEL	ADA750F-24	ADA750F-30	ADA750F-36	ADA750F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ or DC 120 - 350 (AC64 or DC90 optionally available *6)				
	FREQUENCY[Hz]	50/60 (47 - 63) or DC				
	EFFICIENCY[%]	ACIN 100V	86typ (Io=100%)	86typ (Io=100%)	87typ (Io=100%)	87typ (Io=100%)
		ACIN 200V	88typ (Io=100%)	88typ (Io=100%)	89typ (Io=100%)	89typ (Io=100%)
	POWER FACTOR	ACIN 100V	0.99typ (Io=100%)			
		ACIN 200V	0.98typ (Io=100%)			
INRUSH CURRENT[A]	ACIN 100V *1	20typ (Io=100%) (More than 3sec.to re-start)				
	ACIN 200V *1	40typ (Io=100%) (More than 3sec.to re-start)				
LEAKAGE CURRENT[mA]		0.75max (60Hz, According to IEC62368-1 and DEN-AN) (Io=100%)				
OUTPUT	VOLTAGE[V]	24	30	36	48	
	CURRENT[A]	ACIN 100V *2	17 (Peak 42) convection	13.5 (Peak 33.5) convection	11 (Peak 28) convection	8 (Peak 21) convection
		ACIN 100V *2	25 (Peak 42) forced air	20 (Peak 33.5) forced air	16.5 (Peak 28) forced air	12.5 (Peak 21) forced air
		ACIN 200V *2	19 (Peak 63) convection	15 (Peak 50) convection	12.5 (Peak 42) convection	9 (Peak 31.5) convection
		ACIN 200V *2	31.5 (Peak 63) forced air	24.5 (Peak 50) forced air	20.5 (Peak 42) forced air	15.5 (Peak 31.5) forced air
	LINE REGULATION[mV]	96max	120max	144max	192max	
LOAD REGULATION[mV]	150max	180max	240max	300max		
RIPPLE[mVp-p]	0 to +50°C *3	120max	160max	200max	200max	
	-10 - 0°C *3	160max	230max	260max	300max	
RIPPLE NOISE[mVp-p]	0 to +50°C *3	150max	190max	230max	250max	
	-10 - 0°C *3	180max	250max	280max	400max	
TEMPERATURE REGULATION[mV]	0 to +50°C	240max	300max	360max	480max	
DRIFT[mV]	*4	96max	120max	144max	192max	
START-UP TIME[ms]		500max (ACIN 100V, Io=100%)				
HOLD-UP TIME[ms]		20typ (ACIN 100V, Io=100%)				
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		21.6 - 27.0	27.0 - 33.0	33.0 - 41.0	41.0 - 52.8	
OUTPUT VOLTAGE SETTING[V]		23.5 - 24.5	29.0 - 31.0	35.0 - 37.0	47.0 - 49.0	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 101% of peak current and recovers automatically				
	OVERVOLTAGE PROTECTION[V]	31 - 34.5	40 - 48	51 - 60	64 - 76	
	OPERATING INDICATION	LED (Green)				
	ALARM OUTPUT	Detecting low input voltage(PF), detecting low output voltage(LV). (Optional : -W, refer to Instruction Manual 6)				
REMOTE ON/OFF(RC)	Requirement for external source (Option : -R, refer to Instruction Manual 6)					
ISOLATION	INPUT-OUTPUT · RC *5	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)				
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)				
	OUTPUT · RC-FG *5	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +71°C, 20 - 90%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max				
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis				
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis				
	AGENCY APPROVALS	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN62368-1, EN60065, EN50178 Complies with DEN-AN				
	CONDUCTED NOISE	Complies with FCC-B, CISPR22-B, EN55022-B, VCCI-B				
OTHERS	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 *8				
	CASE SIZE/WEIGHT	70 x 127 x 230mm [2.76 x 5 x 9.06 inches] (W x H x D) (without terminal block) /1.9kg max				
	COOLING METHOD	Convection/Forced air				

\*1 The value is primary surge. The current of input surge to a built-in EMI/EMC Filter (0.2ms or less) is excluded.

\*2 Peak loading for 10sec. And Duty 35% max. Refer to Instruction Manual 4. Forced air is shown in "Derating".

\*3 This is the value that measured on measuring board with capacitor of 22 μF within 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM101).

\*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*5 Applicable when remote control (optional) is added.

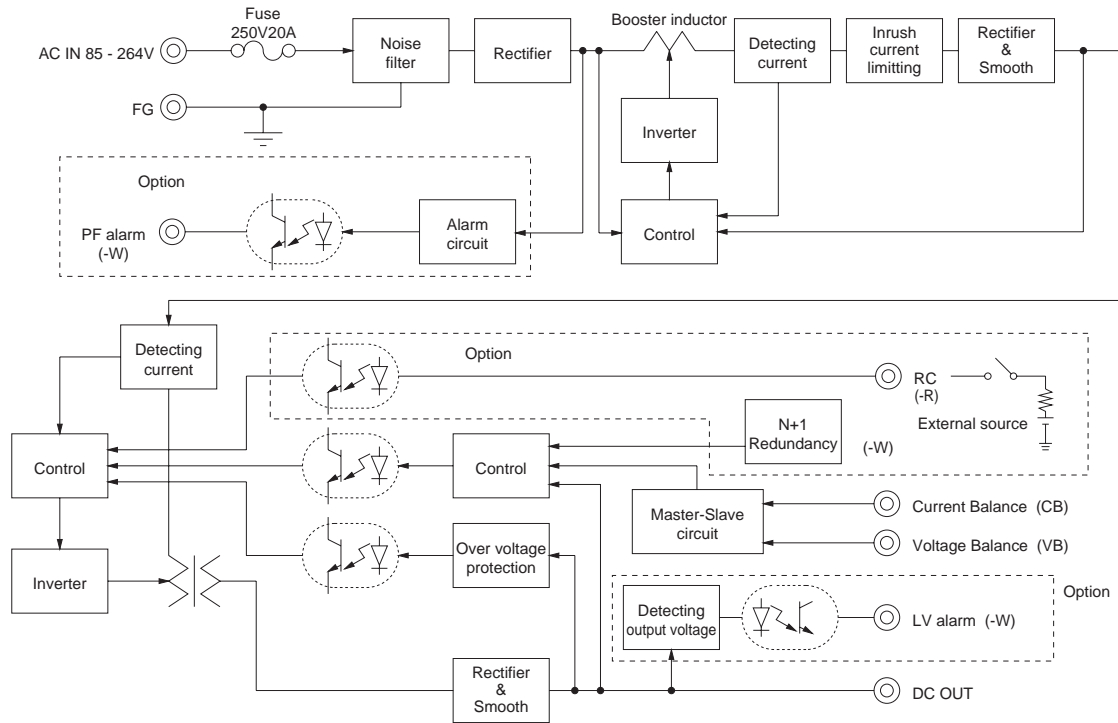
\*6 Derating is required. Consult us for details.

\*7 Please contact us about safety approvals for the model with option.

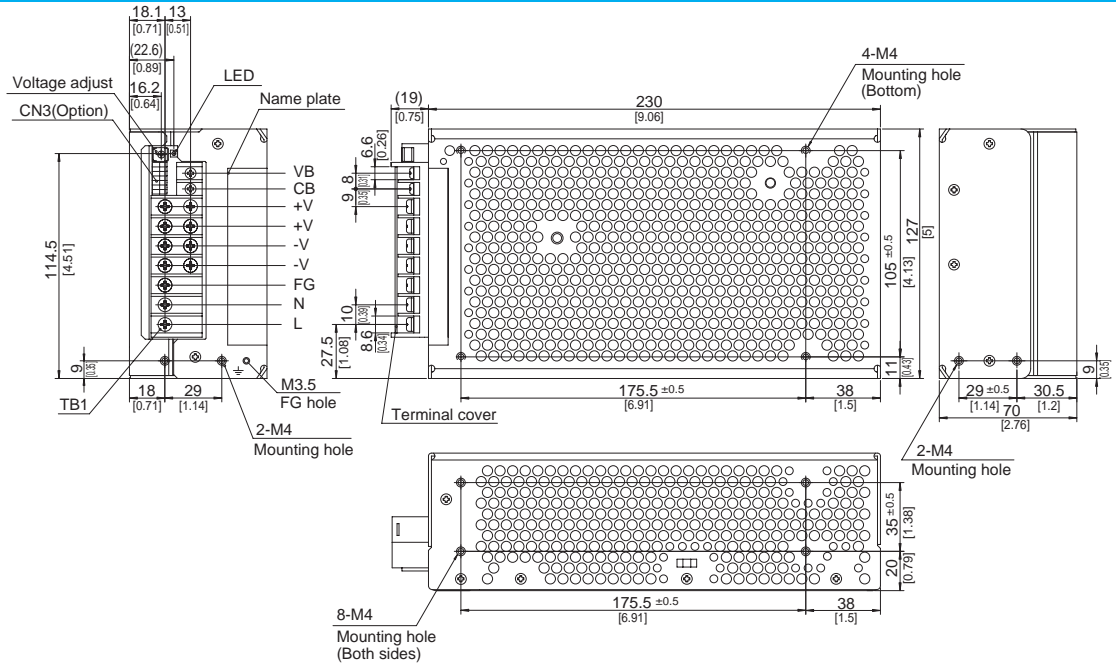
\*8 Please contact us about class C.

\* A sound may occur from power supply at pulse loading.

## Block diagram



## External view



### ※ Pin assign

Symbol	Function	Screw type
VB	Voltage balance	M3
CB	Current balance	
+V	Output terminal(+)	M4
-V	Output terminal(-)	
+V	Output terminal(+)	
-V	Output terminal(-)	
FG	Frame ground	
N	AC(N)	
L	AC(L)	

Average 21A max per pin for TB1

- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 1.9kg max
- ※ PCB material / thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis and cover material : aluminium
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 1.2N • m (12.8kgf • cm) max
- ※ Screw tightening torque

M4 : 1.6N • m (16.9kgf • cm) max, M3 : 0.8N • m (8.5kgf • cm) max  
 ※ I/O terminal for option-J and -T is shown in Instruction Manual 6.

### CN3(Optional)

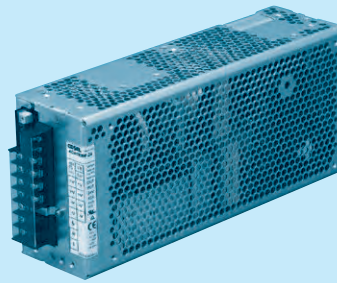
Pin No.	Function
1	RC+ : Remote ON/OFF+(+R)
2	RC- : Remote ON/OFF(-R)
3-8	NC : N.C.
9	LV+ : LV Alarm(-W)
10	LV- : LV Alarm ground(-W)
11-12	NC : N.C.
13	PF+ : PF Alarm(-W)
14	PF- : PF Alarm ground(-W)

Connector	Mating connector	Terminal	Mfr.
CN3	S14B-PHDS5	PHDR-14VS	Chain:SPHD-002T-P0.5
			Loose:BPHD-001T-P0.5 BPHD-002T-P0.5 **

※ 1 Ratchet Hand is nothing

# ADA1000F

① ADA 1000 ② F ③ -24 ④ - ⑤ □



Example recommended EMI/EMC filter  
NAC-20-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
  - ② Output wattage
  - ③ Universal input
  - ④ Output voltage
  - ⑤ Optional \*7
  - G : Low leakage current
  - E : Low leakage current and EMI class A
  - F : with Fan unit
  - T : Vertical terminal block
  - J : Connector type
  - C : with Coating
  - R : Remote ON/OFF
  - N1: DIN rail
  - W: Alarms and Redundant operation
- Specification is changed at option, refer to Instruction Manual.

Please refer to derating curve, because the rated load current depends on cooling method that is convection cooling or forced air.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

## SPECIFICATIONS

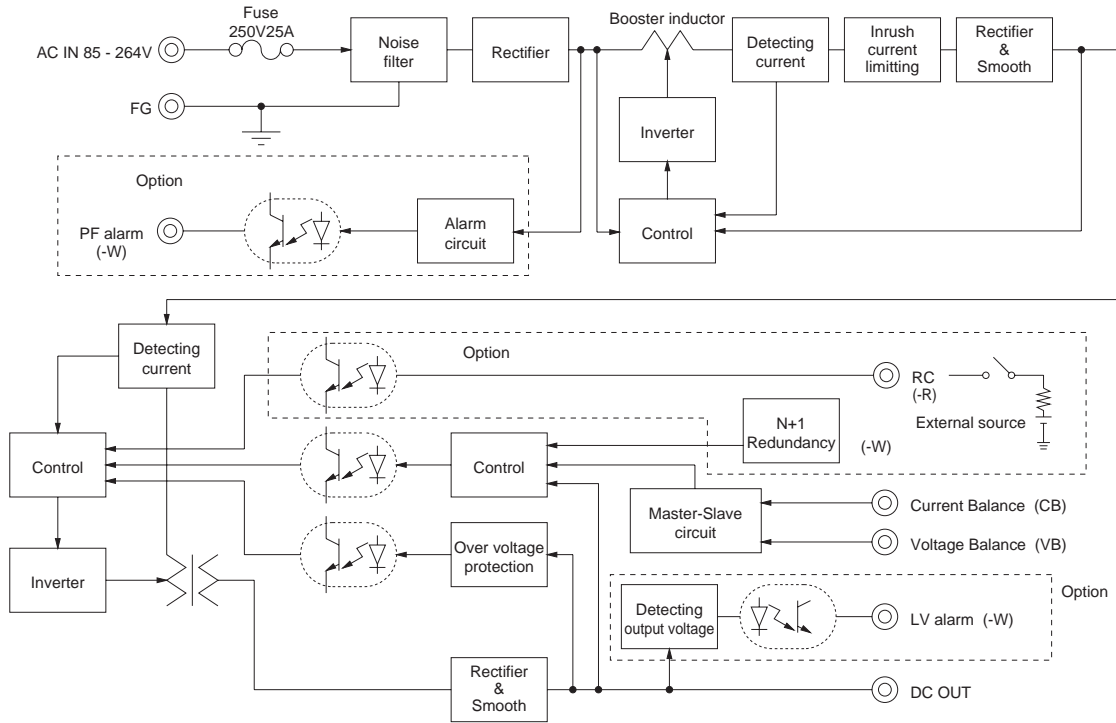
	MODEL	ADA1000F-24	ADA1000F-30	ADA1000F-36	ADA1000F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ or DC 120 - 350 (AC64 or DC90 optionally available *6)				
	FREQUENCY[Hz]	50/60 (47 - 63) or DC				
	EFFICIENCY[%]	ACIN 100V	86typ (Io=100%)	86typ (Io=100%)	87typ (Io=100%)	87typ (Io=100%)
		ACIN 200V	88typ (Io=100%)	88typ (Io=100%)	89typ (Io=100%)	89typ (Io=100%)
	POWER FACTOR	ACIN 100V	0.99typ (Io=100%)			
		ACIN 200V	0.98typ (Io=100%)			
INRUSH CURRENT[A]	ACIN 100V *1	20typ (Io=100%) (More than 3sec.to re-start)				
	ACIN 200V *1	40typ (Io=100%) (More than 3sec.to re-start)				
LEAKAGE CURRENT[ma]		0.75max (60Hz, According to IEC62368-1 and DEN-AN) (Io=100%)				
OUTPUT	VOLTAGE[V]	24	30	36	48	
	CURRENT[A]	ACIN 100V *2	21 (Peak 63) convection	16.5 (Peak 50) convection	14 (Peak 42) convection	10.5 (Peak 31.5) convection
		ACIN 100V *2	33 (Peak 63) forced air	26 (Peak 50) forced air	22 (Peak 42) forced air	16.5 (Peak 31.5) forced air
		ACIN 200V *2	25 (Peak 83) convection	20 (Peak 66) convection	16.5 (Peak 55) convection	11.5 (Peak 41.5) convection
		ACIN 200V *2	42 (Peak 83) forced air	33.5 (Peak 66) forced air	28 (Peak 55) forced air	21 (Peak 41.5) forced air
	LINE REGULATION[mV]	96max	120max	144max	192max	
	LOAD REGULATION[mV]	150max	180max	240max	300max	
	RIPPLE[mVp-p]	0 to +50°C *3	120max	160max	200max	200max
		-10 - 0°C *3	160max	230max	260max	300max
	RIPPLE NOISE[mVp-p]	0 to +50°C *3	150max	190max	230max	250max
-10 - 0°C *3		180max	250max	280max	400max	
TEMPERATURE REGULATION[mV]	0 to +50°C	240max	300max	360max	480max	
DRIFT[mV]	*4	96max	120max	144max	192max	
START-UP TIME[ms]		500max (ACIN 100V, Io=100%)				
HOLD-UP TIME[ms]		20typ (ACIN 100V, Io=100%)				
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		21.6 - 27.0	27.0 - 33.0	33.0 - 41.0	41.0 - 52.8	
OUTPUT VOLTAGE SETTING[V]		23.5 - 24.5	29.0 - 31.0	35.0 - 37.0	47 - 49	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 101% of peak current and recovers automatically				
	OVERVOLTAGE PROTECTION[V]	31 - 34.5	40 - 48	51 - 60	64 - 76	
	OPERATING INDICATION	LED (Green)				
	ALARM OUTPUT	Detecting low input voltage(PF), detecting low output voltage(LV). (Optional : -W, refer to Instruction Manual 6)				
	REMOTE ON/OFF(RC)	Requirement for external source (Option : -R, refer to Instruction Manual 6)				
ISOLATION	INPUT-OUTPUT · RC	*5 AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)				
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)				
	OUTPUT · RC-FG	*5 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)				
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-10 to +71°C, 20 - 90%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max				
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max				
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis				
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis				
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL(CSA60950-1), EN60950-1, EN62368-1, EN60065, EN50178 Complies with DEN-AN				
	CONDUCTED NOISE	Complies with FCC-B, CISPR22-B, EN55022-B, VCCI-B				
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 *8				
OTHERS	CASE SIZE/WEIGHT	75 x 127 x 280mm [2.95 x 5 x 11.02 inches] (W x H x D) (without terminal block) /2.5kg max				
	COOLING METHOD	Convection/Forced air				

\*1 The value is primary surge. The current of input surge to a built-in EMI/EMC Filter (0.2ms or less) is excluded.  
\*2 Peak loading for 10sec. And Duty 35% max. Refer to Instruction Manual 4. Forced air is shown in "Derating".  
\*3 This is the value that measured on measuring board with capacitor of 22 μF within 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM101).

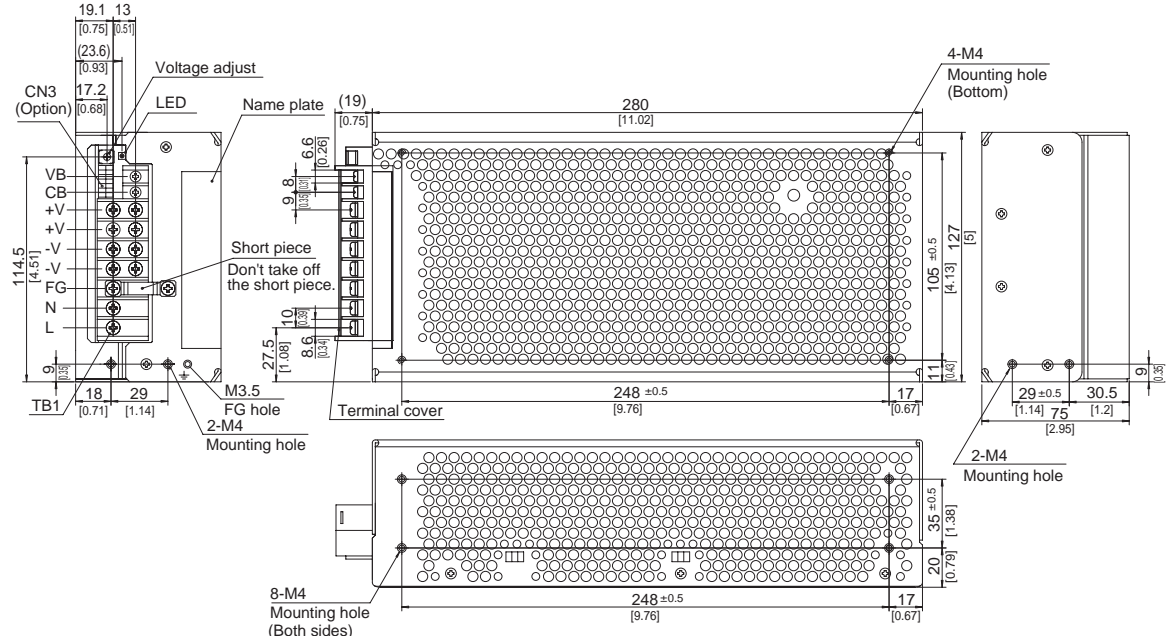
\*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
\*5 Applicable when remote control (optional) is added.  
\*6 Derating is required. Consult us for details.  
\*7 Please contact us about safety approvals for the model with option.  
\*8 Please contact us about class C.  
\* A sound may occur from power supply at pulse loading.



## Block diagram



## External view



### ※ Pin assign

Symbol	Function	Screw type
VB	Voltage balance	M3
CB	Current balance	
+V	Output terminal(+)	
-V	Output terminal(-)	
+V	Output terminal(+)	M4
-V	Output terminal(-)	
FG	Frame ground	
N	AC(N)	
L	AC(L)	

Average 21A max per pin for TB1

- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 2.5kg max
- ※ PCB material / thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis and cover material : aluminium
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 1.2N · m (12.8kgf · cm) max
- ※ Screw tightening torque
- ※ M4 : 1.6N · m (16.3kgf · cm) max, M3 : 0.8N · m (8.5kgf · cm) max
- ※ I/O terminal for option-J and -T is shown in Instruction Manual 6.

### CN3(Optional)

Pin No.	Function
1	RC+ : Remote ON/OFF+(+R)
2	RC- : Remote ON/OFF(-R)
3-8	NC : N.C.
9	LV+ : LV Alarm(-W)
10	LV- : LV Alarm ground(-W)
11-12	NC : N.C.
13	PF+ : PF Alarm(-W)
14	PF- : PF Alarm ground(-W)

Connector	Mating connector	Terminal	Mfr.
CN3	S14B-PHDSS	Chain:SPHD-002T-P0.5 Loose:BPHD-001T-P0.5 BPHD-002T-P0.5*	J.S.T

\* 1 Ratchet Hand is nothing

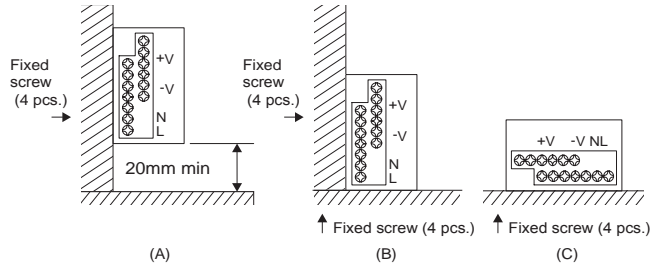
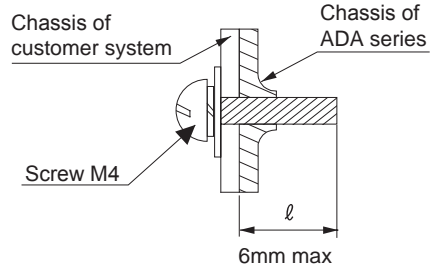
Assembling and Installation Method

Installation method

■ The screw should be inserted up to 6mm max from outside of the power supply to keep a distance between inside parts and an isolation.

■ When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation. Ambient temperature around each power supply should not exceed the temperature range shown in “derating”.

■ Fix firmly, considering weight, though it can be used by the installation method shown in right figure.



Derating

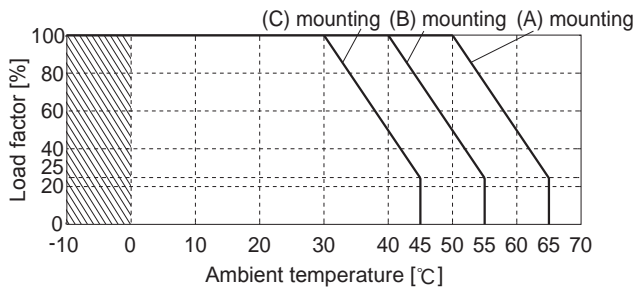
■ Derating by ambient temperature

Load factor 100% in each derating curve means rating current in Specifications. Please note load factor 100% depends on input voltage and cooling method. In the hatched area the specification of Ripple, Ripple Noise is different from other area.

■ Convection cooling

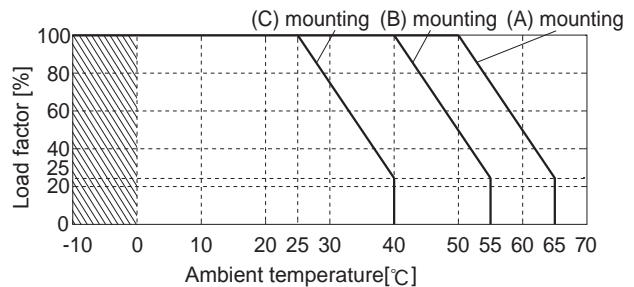
- ① Install the unit to apply enough convection as shown in “Installation method”.
- ② Do not block the ventilation hole.

● ADA600F Ambient temperature Derating Curve (convection cooling)



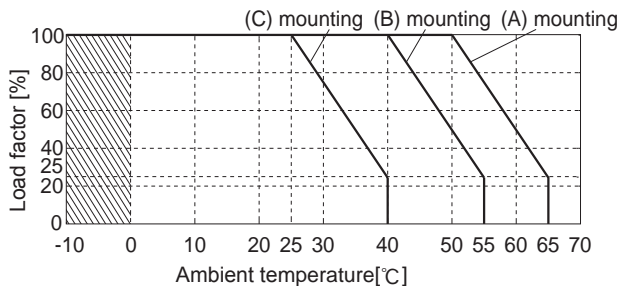
\* In case of ADA600F-24, load factor 100% means output 24V, 14A at ACIN100V, 24V, 15A at ACIN200V.

● ADA750F Ambient temperature Derating Curve (convection cooling)



\* In case of ADA750F-24, load factor 100% means output 24V, 17A at ACIN100V, 24V, 19A at ACIN200V.

● ADA1000F Ambient temperature Derating Curve (convection cooling)



\* In case of ADA1000F-24, load factor 100% means output 24V, 21A at ACIN100V, 24V, 25A at ACIN200V.

## Derating

### ■ Forced air cooling

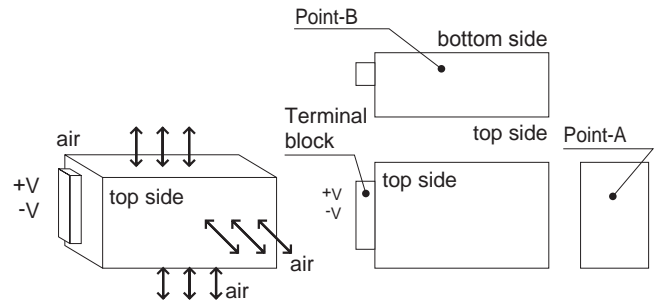
① Please give the entire power supply in ventilation so that the temperature of point A and B in right figure is made below a specified temperature. Point A and B are displayed in chassis.

- Point A 60C or less and point B 65C or less at Ta = 50C
- Point A 80C or less and point B 80C or less at Ta = 71C

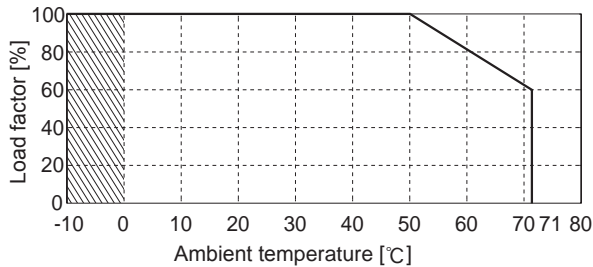
Remarks : Please avoid cooling only bottom chassis.

- ② Ventilation is done evenly and do not block the ventilation hole.
- ③ The confirmation of point A and B in unnecessary when optional fun unit is used. Refer to instruction manual 6. Option.

\*The derating curve at forced air is common in ADA600F to ADA1000F.



### ● AD600F-1000F Ambient temperature Derating Curve (forced air)



\*In case of ADA600F-24, load factor 100% means output 24V, 21A at ACIN100V, 24V, 25A at ACIN200V.

\*In case of ADA750F-24, load factor 100% means output 24V, 25A at ACIN100V, 24V, 31.5A at ACIN200V.

\*In case of ADA1000F-24, load factor 100% means output 24V, 33A at ACIN100V, 24V, 42A at ACIN200V.

## Instruction Manual

◆ It is necessary to read the “Instruction Manual” and “Before using our product” before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/ADA/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>



## Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
ADA600F	Active filter	85	5.9 (Peak 7.0)	250V 12A	SCR	FR-4		Yes	Yes	Yes
	Forward converter	130								
ADA750F	Active filter	85	6.9 (Peak11.8)	250V 20A	SCR	FR-4		Yes	Yes	Yes
	Forward converter	130								
ADA1000F	Active filter	85	9.5 (Peak18.2)	250V 25A	SCR	FR-4		Yes	Yes	Yes
	Forward converter	130								

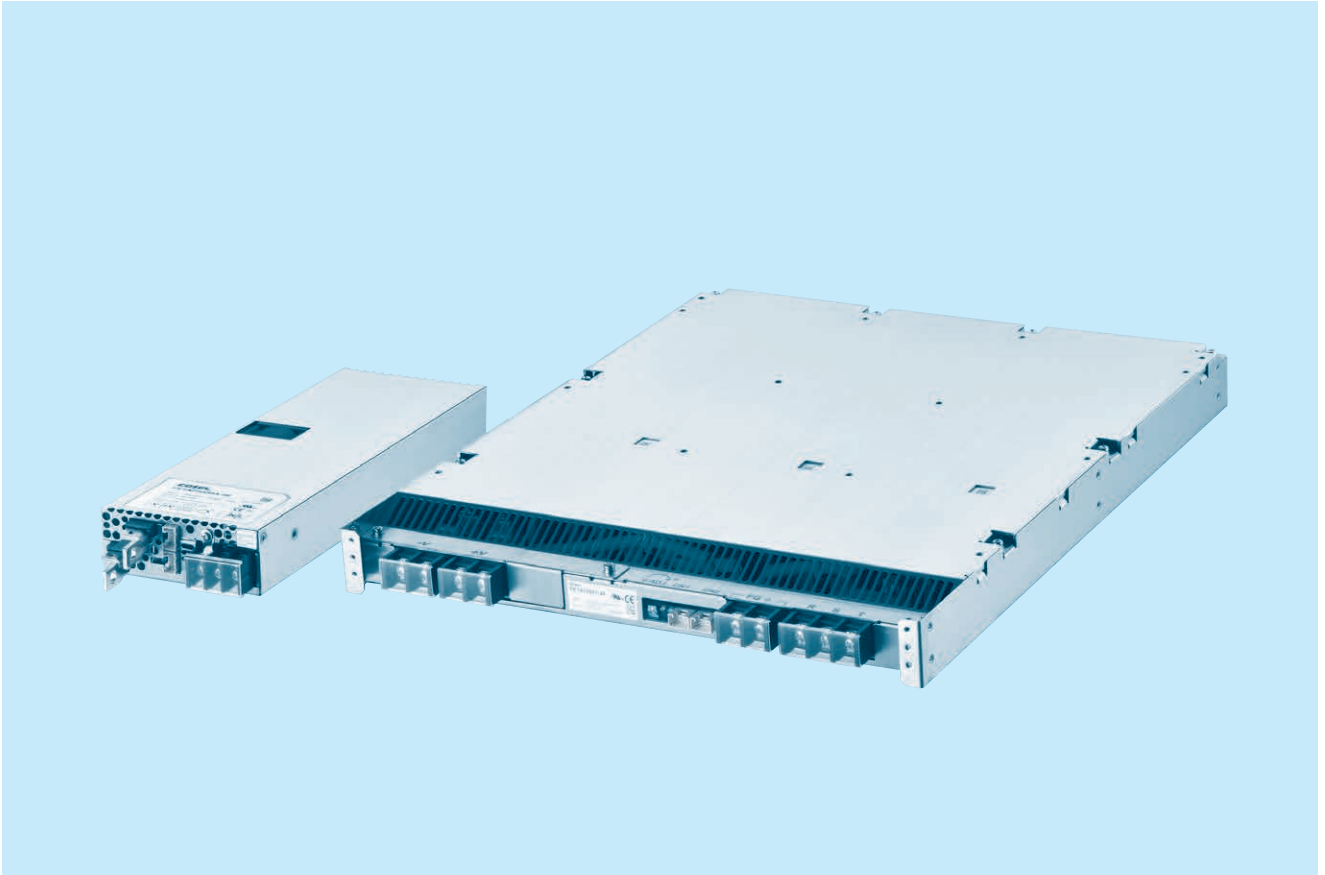
\* Refer to Instruction Manual.  
 \* The value of input current is at ACIN 100V and rated load (peak).





# FETA-series

FETA



## Feature

- High power density
- Low profile (Meets 1U height.)
- High output voltage (FETA7000T-144, FETA7000ST-144)
- High efficiency
- Harmonic attenuator  
(FETA2500BA, 3000BA, 7000ST : Complies with IEC61000-3-2 Class A  
FETA7000T : Complies with IEC61000-3-12)
- Complies with SEMI F47
- Parallel Operation / Parallel Redundancy Operation
- Alarm signals, Remote ON / OFF and other functions

## Safety agency approvals

UL62368-1, C-UL(CSA62368-1), EN62368-1

## EMI

Complies with FCC Part 15-A, CISPR32-A, EN55032-A, VCCI-A  
(FETA7000ST : Complies with FCC Part 15-A, CISPR32-A, EN55032-A, VCCI-A by connecting an external EMI/EMC filter)

## 3-year warranty (Refer to Instruction Manual)

## CE marking

Low voltage Directive  
RoHS Directive

## EMS Compliance : EN61204-3, EN61000-6-2

EN61000-4-2  
EN61000-4-3  
EN61000-4-4  
EN61000-4-5  
EN61000-4-6  
EN61000-4-8  
EN61000-4-11

# FETA2500BA

FET A 2500 B A -□□ -□

① ② ③ ④ ⑤ ⑥ ⑦



Example recommended EMI/EMC filter  
NAC-20-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ 200/230V input
- ⑤ Version
- ⑥ Output voltage
- ⑦ Optional
- F2: Reverse air exhaust
- R: with Remote ON/OFF
- Positive logic control

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

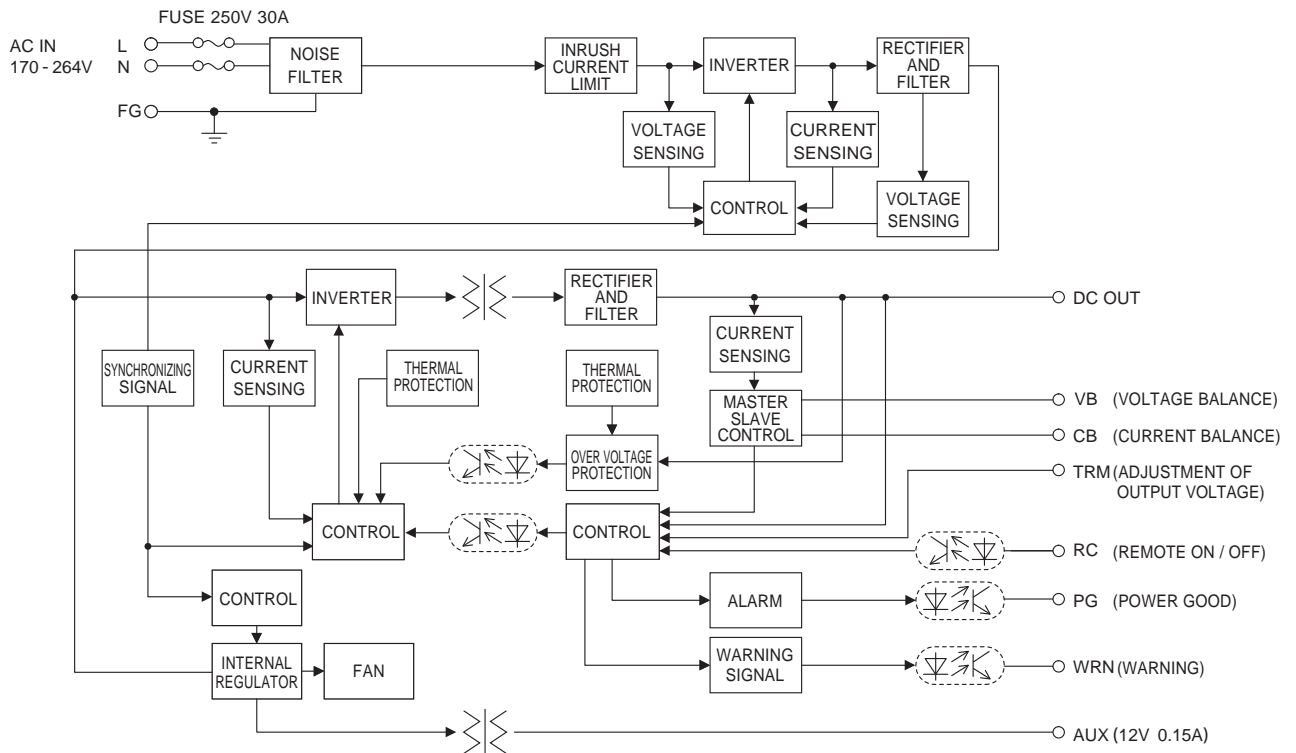
MODEL	FETA2500BA-36	FETA2500BA-48
MAX OUTPUT WATTAGE[W]	1980	2496
DC OUTPUT	36V 55A	48V 52A

## SPECIFICATIONS

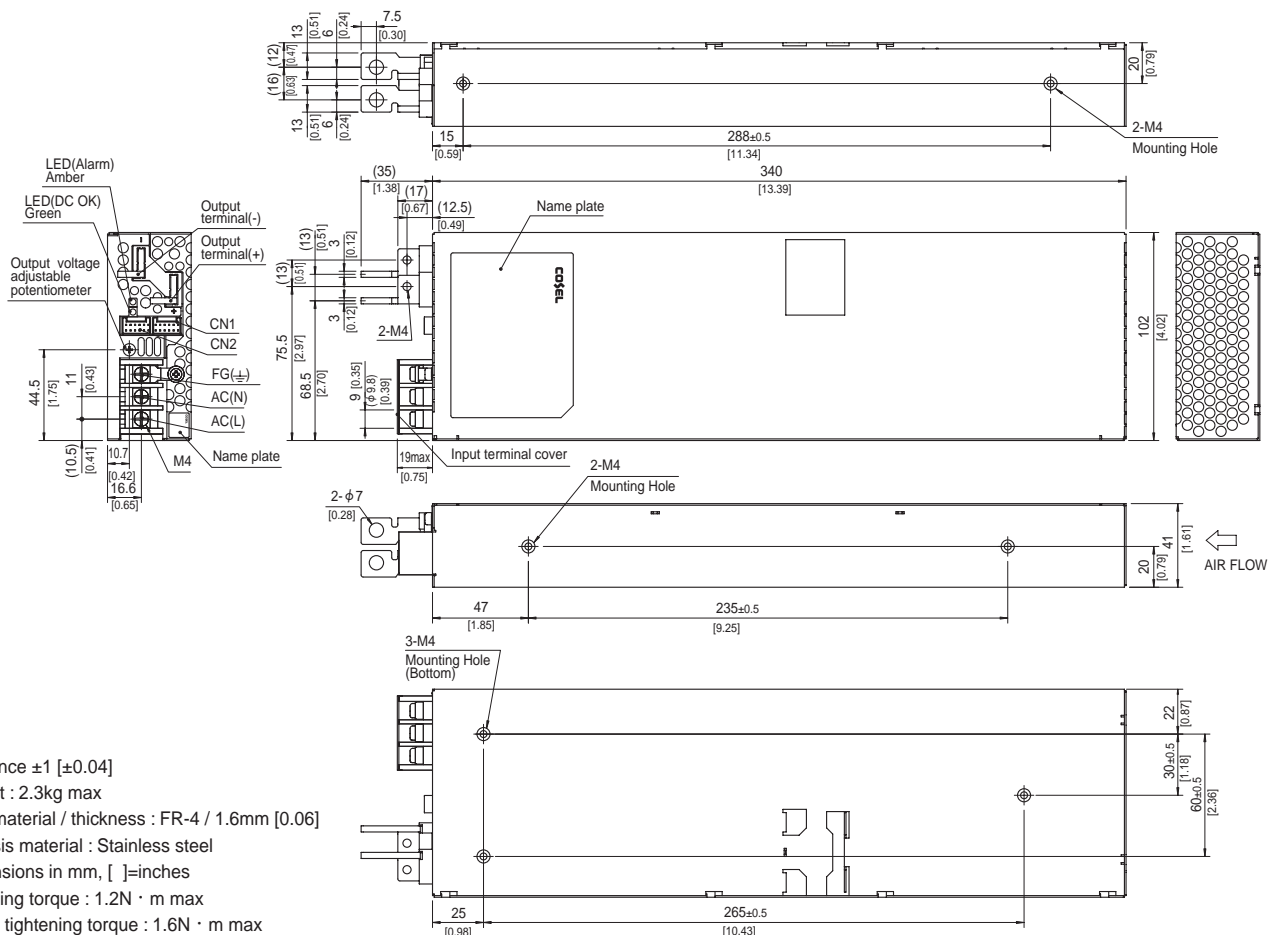
	MODEL	FETA2500BA-36	FETA2500BA-48	
INPUT	VOLTAGE[V]	AC170 - 264 1 φ (Output derating is required at AC170V - 180V. Refer to "Derating")		
	CURRENT[A]	ACIN 200V	11.3typ	
	FREQUENCY[Hz]		50 / 60 (47 - 63)	
	EFFICIENCY[%]	ACIN 230V	80typ (Io=10%)	83typ (Io=10%)
			87typ (Io=20%)	89typ (Io=20%)
			91typ (Io=50%)	92.5typ (Io=50%)
			90typ (Io=100%)	91.5typ (Io=100%)
POWER FACTOR	ACIN 230V	0.98typ (Io=100%)		
INRUSH CURRENT[A]	ACIN 200V	20max / 60max (Primary inrush current /Secondary inrush current) (More than 10 sec. to re-start)		
LEAKAGE CURRENT[mA]		0.85max (ACIN 240V 60Hz, Io=100%, According to IEC62368-1)		
OUTPUT	VOLTAGE[V]	36	48	
	CURRENT[A]	ACIN 170V-180V	Output derating is required at ACIN 180V or less (refer to "Derating")	
		ACIN 180V-264V	55	52
	LINE REGULATION[mV]		144max	192max
	LOAD REGULATION[mV]		360max	480max
	RIPPLE[mVp-p]	0 to +50°C	300max	360max
		-10 to 0°C	360max	480max
	RIPPLE NOISE[mVp-p]	0 to +50°C	360max	480max
		-10 to 0°C	480max	600max
	TEMPERATURE REGULATION[mV]	0 to +50°C	360max	480max
		-10 to +50°C	440max	600max
	DRIFT[mV]		144max	192max
	START-UP TIME[s]		1.7max (ACIN 200V, Io=100%)	
	HOLD-UP TIME[ms]	ACIN 200V	10typ (Io=100%)	
20typ (Io=50%)				
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		28.80 - 39.60	38.40 - 52.80	
OUTPUT VOLTAGE SETTING[V]		36.00 - 37.44	48.00 - 49.92	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Activate over 105% - 120% of rated current and recovers automatically. (Output voltage shuts down when the output voltage continuously drops due to overcurrent protection.)		
	OVERVOLTAGE PROTECTION[V]	42.00 - 45.00	56.00 - 60.00	
	DC_OK LAMP	LED (Green)		
	ALARM LAMP	LED (Amber)		
	REMOTE ON/OFF	Provided		
ISOLATION	INPUT-OUTPUT-AUX-RC-WRN-PG	AC3,000V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At room temperature)		
	INPUT-FG	AC2,000V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At room temperature)		
	OUTPUT-AUX-RC-WRN-PG-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)		
	OUTPUT-AUX-RC-WRN-PG	AC100V 1minute, Cutoff current = 100mA, DC100V 50MΩ min (At room temperature)		
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-10 to +70°C (Refer to "Derating"), 20 - 90%RH (Non condensing), 3,000m (10,000 feet) max		
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +85°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) max		
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis		
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis		
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL62368-1, C-UL (CSA62368-1), EN62368-1		
	CONDUCTED NOISE	Complies with FCC Part 15-A, CISPR32-A, EN55032-A, VCCI-A		
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 Class A		
OTHERS	CASE SIZE/WEIGHT	102 X 41 X 340mm [4.02 X 1.61 X 13.39 inches] (W X H X D) / 2.3kg max		
	COOLING METHOD	Forced cooling (internal fan)		

\*1 AUX output power is not included.  
 \*2 The current of input surge to a built-in noise filter (0.2ms or less) is excluded.  
 \*3 Measured by 500MHz oscilloscope.  
 \*4 Ripple and ripple noise is measured on measuring board with capacitor of 22μF within 150mm from the output terminal.  
 \*5 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*6 Can't be used above the rated output current and the rated output power.  
 \*7 When the output voltage is adjusted to higher than 49.92V and the load factor is over 70% of the rated current, if the load current changes quickly (< 200msec), the output voltage drops approximately 5V below the setting voltage.  
 \*8 Output voltage recovers from protection by shutting down the input voltage and waiting more than 10 seconds then turning on AC input again, or turning off the output voltage by remote control.  
 \*9 Please contact us about another class.  
 \*10 Case size contains neither the terminal blocks, connector and screw.  
 \*11 To meet the specifications, do not operate over-loaded condition.  
 \*12 A sound may occur from power supply at peak loading.

## Block diagram



## External view



- \* Tolerance  $\pm 1$  [ $\pm 0.04$ ]
- \* Weight : 2.3kg max
- \* PCB material / thickness : FR-4 / 1.6mm [0.06]
- \* Chassis material : Stainless steel
- \* Dimensions in mm, [ ]=inches
- \* Mounting torque : 1.2N · m max
- \* Screw tightening torque : 1.6N · m max
- \* Please connect safety ground to FG terminal on the unit.

# FETA3000BA

FET A 3000 B A -□□ -□  
 ① ② ③ ④ ⑤ ⑥ ⑦



Example recommended EMI/EMC filter  
**NAC-20-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
  - ② Single output
  - ③ Output wattage
  - ④ 200/230V input
  - ⑤ Version
  - ⑥ Output voltage
  - ⑦ Optional
- R: with Remote ON/OFF  
 Positive logic control

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	FETA3000BA-48
MAX OUTPUT WATTAGE[W]	*1 2976
DC OUTPUT	48V 62A

## SPECIFICATIONS

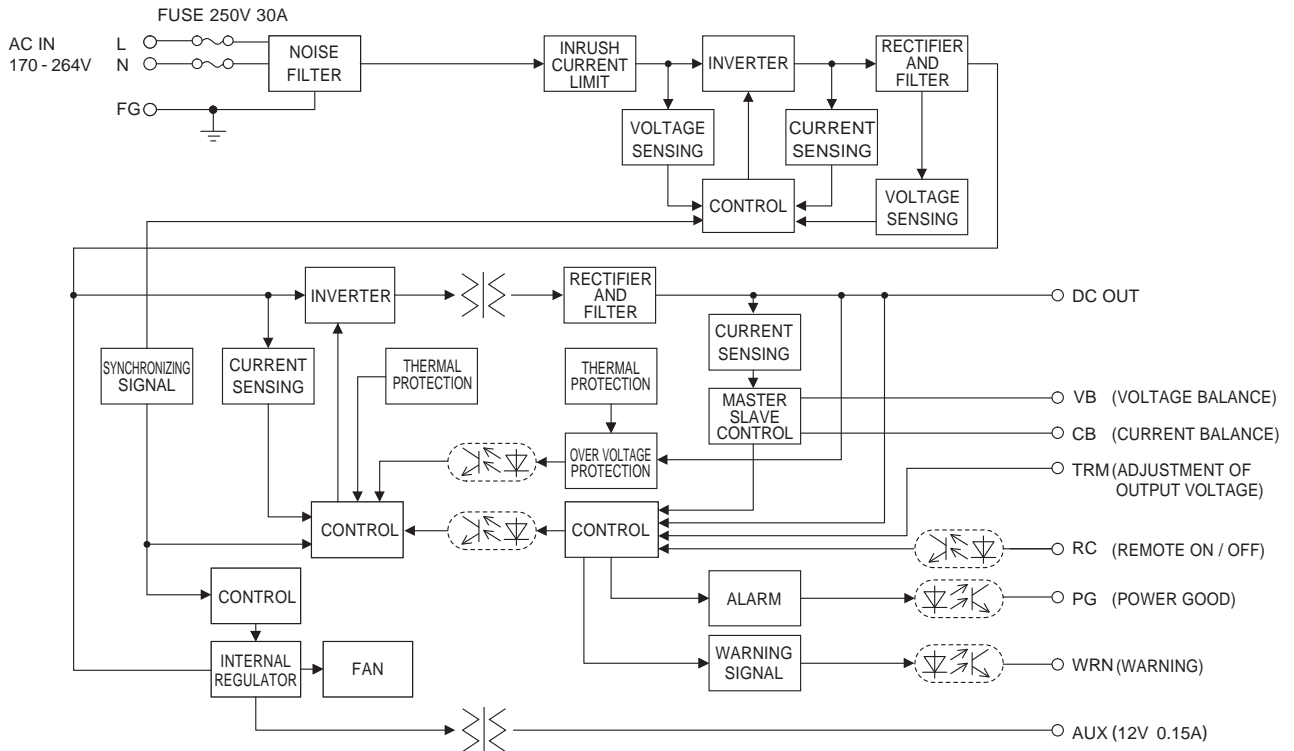
	MODEL	FETA3000BA-48	
INPUT	VOLTAGE[V]	AC170 - 264 1 φ (Output derating is required at AC170V - 180V. Refer to "Derating")	
	CURRENT[A]	ACIN 200V 16.6typ	
	FREQUENCY[Hz]	50 / 60 (47 - 63)	
	EFFICIENCY[%]	ACIN 230V	82typ (Io=10%)
			90typ (Io=20%)
			93typ (Io=50%)
			91.5typ (Io=100%)
POWER FACTOR	ACIN 230V 0.98typ (Io=100%)		
INRUSH CURRENT[A]	ACIN 200V *2 20max / 80max (Primary inrush current /Secondary inrush current) (More than 10 sec. to re-start)		
LEAKAGE CURRENT[ma]	0.85max (ACIN 240V 60Hz, Io=100%, According to IEC62368-1)		
OUTPUT	VOLTAGE[V]	48	
	CURRENT[A]	ACIN 170V-180V	Output derating is required at ACIN 180V or less (refer to "Derating")
		ACIN 180V-264V	62
	LINE REGULATION[mV]	192max	
	LOAD REGULATION[mV]	480max	
	RIPPLE[mVp-p]	0 to +50°C *3	360max (Vo=15 - 52.8[V]) *4
		-10 to 0°C *3	480max (Vo=15 - 52.8[V]) *4
	RIPPLE NOISE[mVp-p]	0 to +50°C *3	600max (Vo=15 - 52.8[V]) *4
		-10 to 0°C *3	720max (Vo=15 - 52.8[V]) *4
	TEMPERATURE REGULATION[mV]	0 to +50°C	480max
		-10 to +50°C	600max
	DRIFT[mV]	*4	192max
	START-UP TIME[s]	*5	1.7max (ACIN 200V, Io=100%)
	HOLD-UP TIME[ms]	ACIN 200V	10typ (Io=100%)
20typ (Io=50%)			
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*6	38.40 - 52.80	
OUTPUT VOLTAGE SETTING[V]		48.00 - 49.00	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Activate over 105% - 120% of rated current and recovers automatically. (Output voltage shuts down when the output voltage continuously drops due to overcurrent protection.) *7	
	OVERVOLTAGE PROTECTION[V]	*7 56.00 - 60.00	
	DC_OK LAMP	LED (Green)	
	ALARM LAMP	LED (Amber)	
	REMOTE ON/OFF	Provided	
ISOLATION	INPUT-OUTPUT·AUX·RC·WRN·PG	AC3,000V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At room temperature)	
	INPUT-FG	AC2,000V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At room temperature)	
	OUTPUT·AUX·RC·WRN·PG-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)	
	OUTPUT-AUX·RC·WRN·PG	AC100V 1minute, Cutoff current = 100mA, DC100V 50MΩ min (At room temperature)	
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-10 to +70°C (Refer to "Derating"), 20 - 90%RH (Non condensing), 3,000m (10,000 feet) max	
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +85°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) max	
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis	
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis	
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL62368-1, C-UL (CSA62368-1), EN62368-1	
	CONDUCTED NOISE	Complies with FCC Part 15-A, CISPR32-A, EN55032-A, VCCI-A	
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 Class A *8	
OTHERS	CASE SIZE/WEIGHT	*9 102 X 41 X 340mm [4.02 X 1.61 X 13.39 inches] (W X H X D) / 2.3kg max	
	COOLING METHOD	Forced cooling (internal fan)	

\*1 AUX output power is not included.  
 \*2 The current of input surge to a built-in noise filter (0.2ms or less) is excluded.  
 \*3 Measured by 500MHz oscilloscope.  
 Ripple and ripple noise is measured on measuring board with capacitor of 22μF within 150mm from the output terminal.  
 \*4 The output voltage should not be adjusted to 15V or less because the ripple and ripple noise would be out of specs and the unit would make the audible noise.  
 \*5 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*6 Can't be used above the rated output current and the rated output power.  
 \*7 Output voltage recovers from protection by shutting down the input voltage and waiting

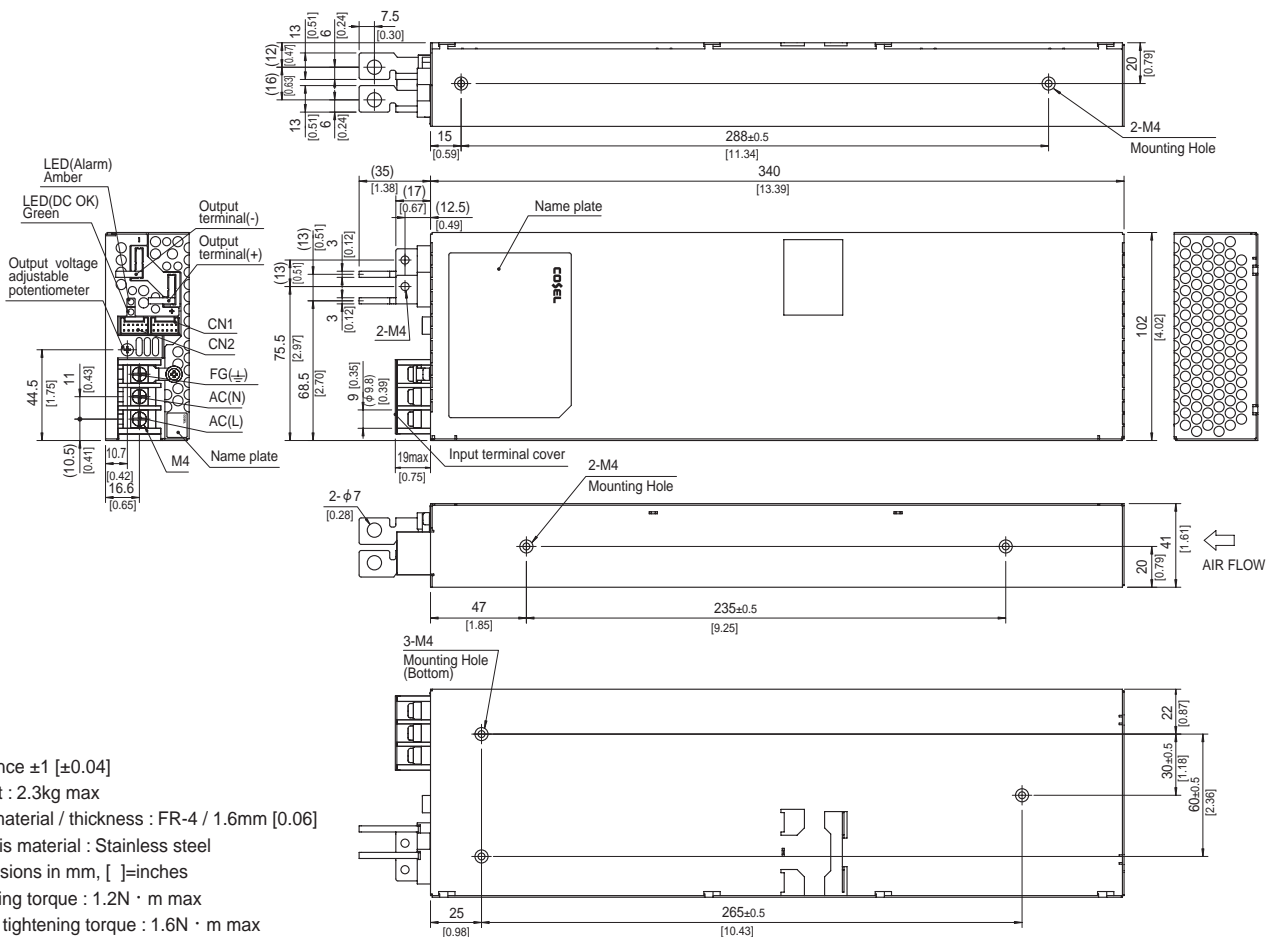
more than 10 seconds then turning on AC input again, or turning off the output voltage by remote control.  
 \*8 Please contact us about another class.  
 \*9 Case size contains neither the terminal blocks, connector and screw.  
 \* To meet the specifications, do not operate over-loaded condition.  
 \* A sound may occur from power supply at peak loading.



## Block diagram



## External view

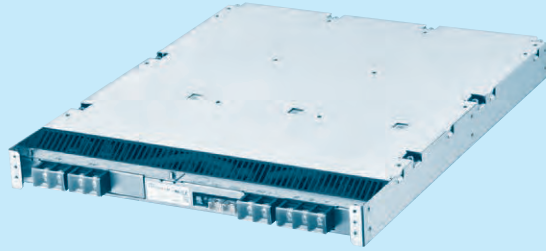


- \* Tolerance  $\pm 1$  [ $\pm 0.04$ ]
- \* Weight : 2.3kg max
- \* PCB material / thickness : FR-4 / 1.6mm [0.06]
- \* Chassis material : Stainless steel
- \* Dimensions in mm, [ ]=inches
- \* Mounting torque : 1.2N · m max
- \* Screw tightening torque : 1.6N · m max
- \* Please connect safety ground to FG terminal on the unit.

# FETA7000T

FET A 7000 T -

① ② ③ ④ ⑤



Example recommended EMI/EMC filter  
TAC-30-683



\*A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Triple input phase
- ⑤ Output voltage

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	FETA7000T-48	FETA7000T-144
MAX OUTPUT WATTAGE[W]	*1 7113	7488
DC OUTPUT	48V 148.2A	144V 52A

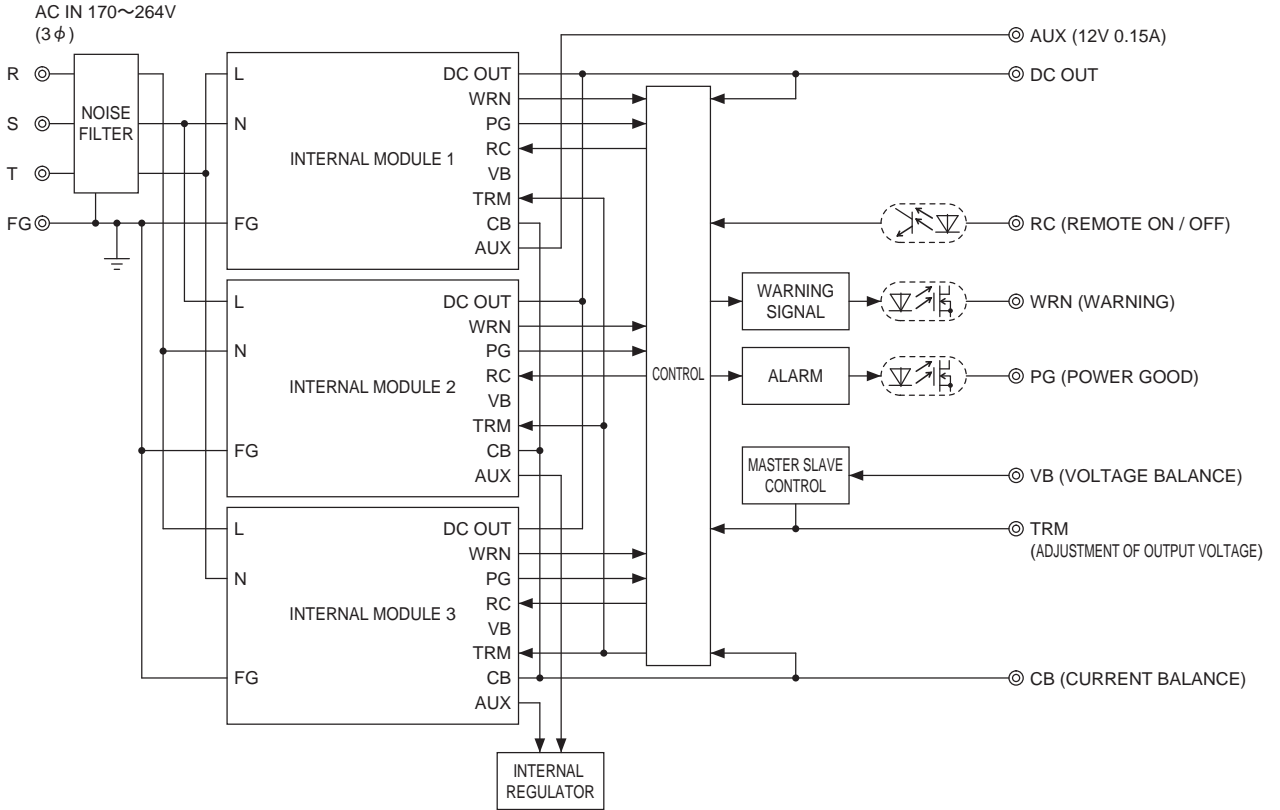
## SPECIFICATIONS

	MODEL	FETA7000T-48	FETA7000T-144	
INPUT	VOLTAGE[V]	AC170 - 264 3 φ (Output derating is required at AC170V - 180V. Refer to "Derating")		
	CURRENT[A]	ACIN 200V	22.7typ	
	FREQUENCY[Hz]	50 / 60 (47 - 63)		
	EFFICIENCY[%]	ACIN 230V	90.5% (Io=100%)	
	POWER FACTOR	ACIN 230V	0.98typ (Io=100%)	
	INRUSH CURRENT[A]	ACIN 200V *2	30max / 60max (Primary inrush current / Secondary inrush current) (More than 10 sec. to re-start)	
OUTPUT	LEAKAGE CURRENT[mA]	3.0max (ACIN 240V 60Hz, Io=100%, According to IEC62368-1)		
	VOLTAGE[V]	48	144	
	CURRENT[A]	ACIN 170V-180V	Output derating is required at ACIN 180V or less (refer to "Derating")	
		ACIN 180V-264V	148.2	52
	LINE REGULATION[mV]	192max		
	LOAD REGULATION[mV]	960max		
	RIPPLE[mVp-p]	0 to +40°C *3	360max	720max
		-10 to 0°C *3	480max	960max
	RIPPLE NOISE[mVp-p]	0 to +40°C *3	480max	960max
		-10 to 0°C *3	600max	1200max
	TEMPERATURE REGULATION[mV]	0 to +40°C	480max	2200max
		-10 to +40°C	600max	2800max
	DRIFT[mV]	*4	192max	384max
	START-UP TIME[s]	1.7max (ACIN 200V, Io=100%)		
HOLD-UP TIME[ms]	ACIN 200V	10typ (Io=100%)		
		20typ (Io=50%)		
OUTPUT VOLTAGE ADJUSTMENT RANGE[V] *5	28.8 - 52.8 *6			
OUTPUT VOLTAGE SETTING[V]	47 - 49			
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (Recovers automatically, Hiccup overcurrent) (Output voltage shuts down when the output voltage continuously drops due to overcurrent protection.) *8		
	OVERVOLTAGE PROTECTION[V] *8	56 - 60	168 - 180	
	DC_OK LAMP	LED (Green)		
	ALARM LAMP	LED (Amber)		
REMOTE ON/OFF	Provided			
ISOLATION	INPUT-OUTPUT-AUX-RC-WRN-PG	AC3,000V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)		
	INPUT-FG	AC2,000V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)		
	OUTPUT-AUX-RC-WRN-PG-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)		
	OUTPUT-AUX-RC-WRN-PG	AC100V 1minute, Cutoff current = 100mA, DC100V 50MΩ min (At room temperature)		
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +60°C (Refer to "Derating"), 20 - 90%RH (Non condensing), 3,000m (10,000 feet) max		
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) max		
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis		
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis		
	AGENCY APPROVALS	UL62368-1, C-UL (CSA62368-1), EN62368-1		
	CONDUCTED NOISE	Complies with FCC Part15-A, CISPR32-A, EN55032-A, VCCI-A		
OTHERS	HARMONIC ATTENUATOR	Complies with IEC61000-3-12		
	CASE SIZE/WEIGHT *9	388 X 43 X 475mm [15.28 X 1.69 X 18.70 inches] (W X H X D) / 11kg max		
	COOLING METHOD	Forced cooling (internal fan)		

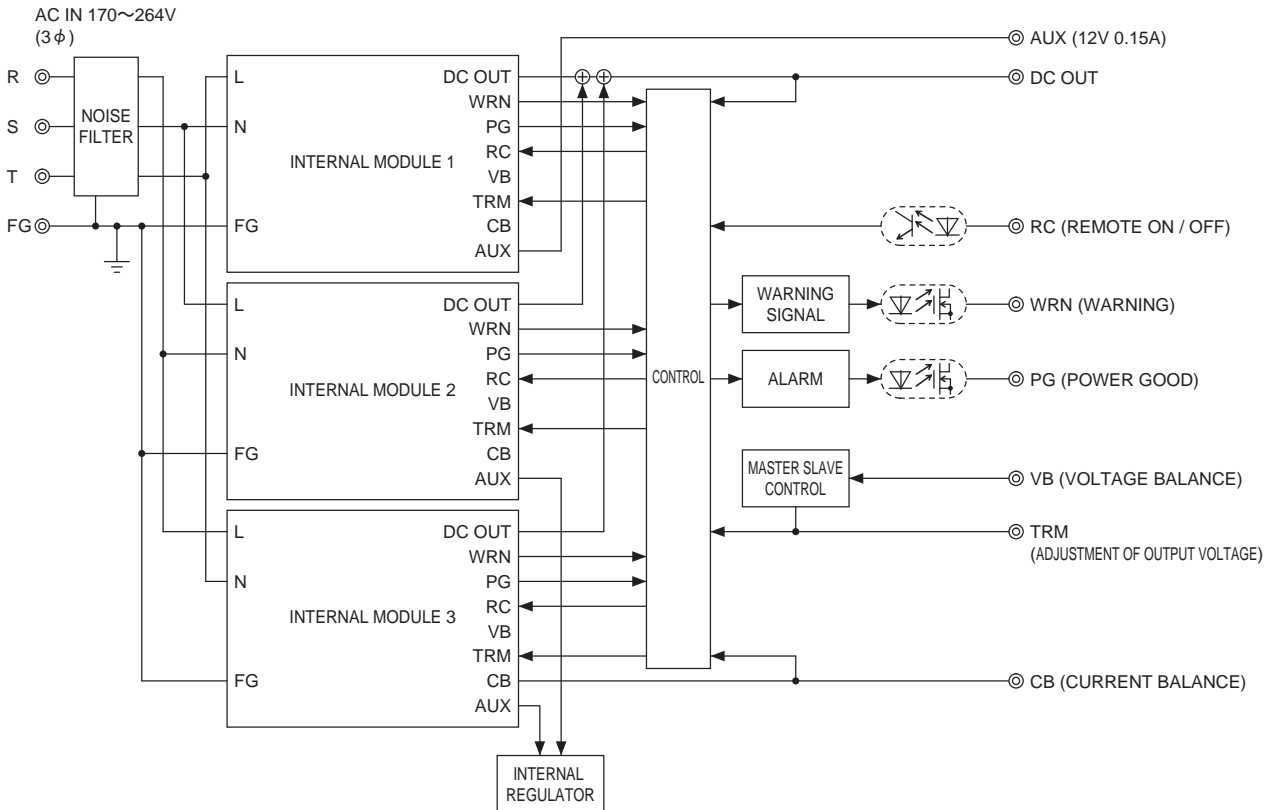
\*1 AUX output power is not included.  
 \*2 The current of input surge to a built-in noise filter (0.2ms or less) is excluded.  
 \*3 Measured by 500MHz oscilloscope.  
 Ripple and ripple noise is measured on measuring board with capacitor of 22μF within 150mm from the output terminal.  
 \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*5 Can't be used above the rated output current and the rated output power.  
 \*6 When the output voltage is adjusted to higher than 49.92V and the load factor is over 70% of the rated current, if the load current changes quickly (< 200msec), the output voltage drops approximately 5V below the setting voltage.  
 \*7 When the output voltage is adjusted to higher than 149.82V and the load factor is over 70% of the rated current, if the load current changes quickly (<200msec), the output voltage drops approximately 15V below the setting voltage.  
 \*8 Output voltage recovers from protection by shutting down the input voltage and waiting more than 10 seconds then turning on AC input again, or turning off the output voltage by remote control.  
 \*9 Case size contains neither the terminal blocks, connector and screw.  
 \* To meet the specifications, do not operate over-loaded condition.  
 \* A sound may occur from power supply at peak loading.

## Block diagram

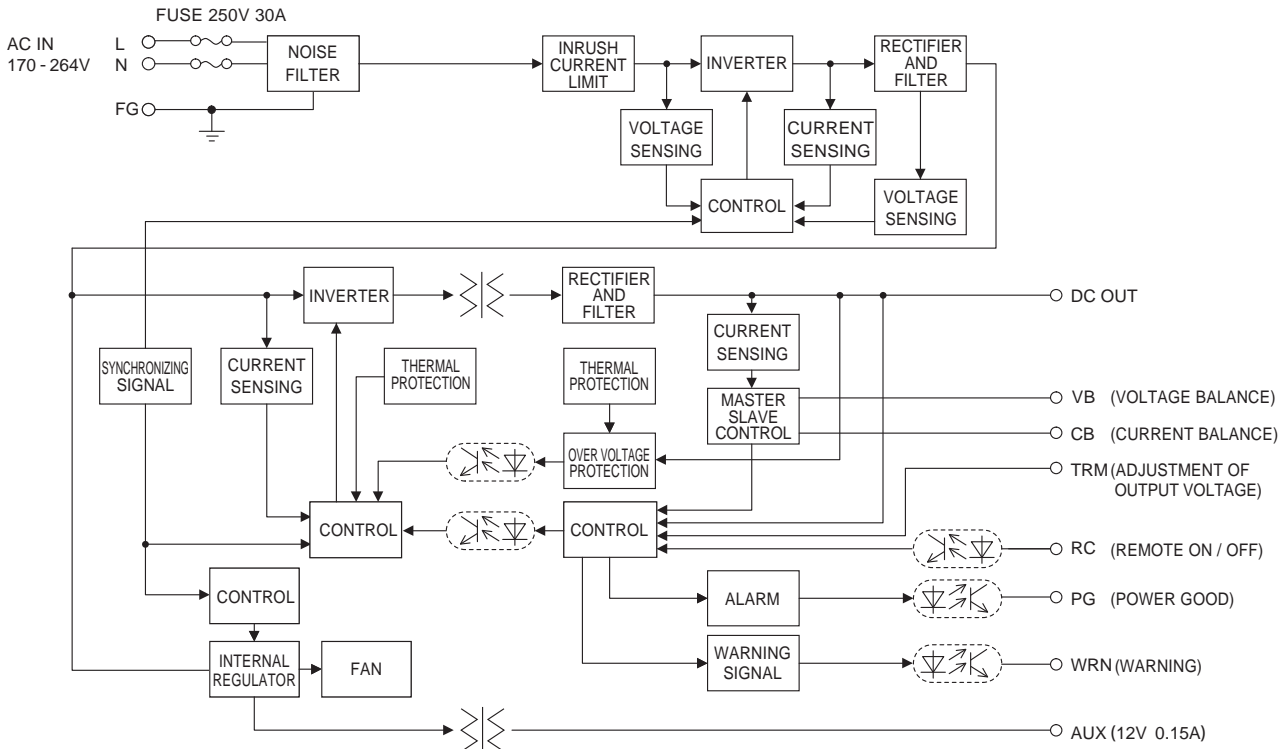
### ● FETA7000T-48



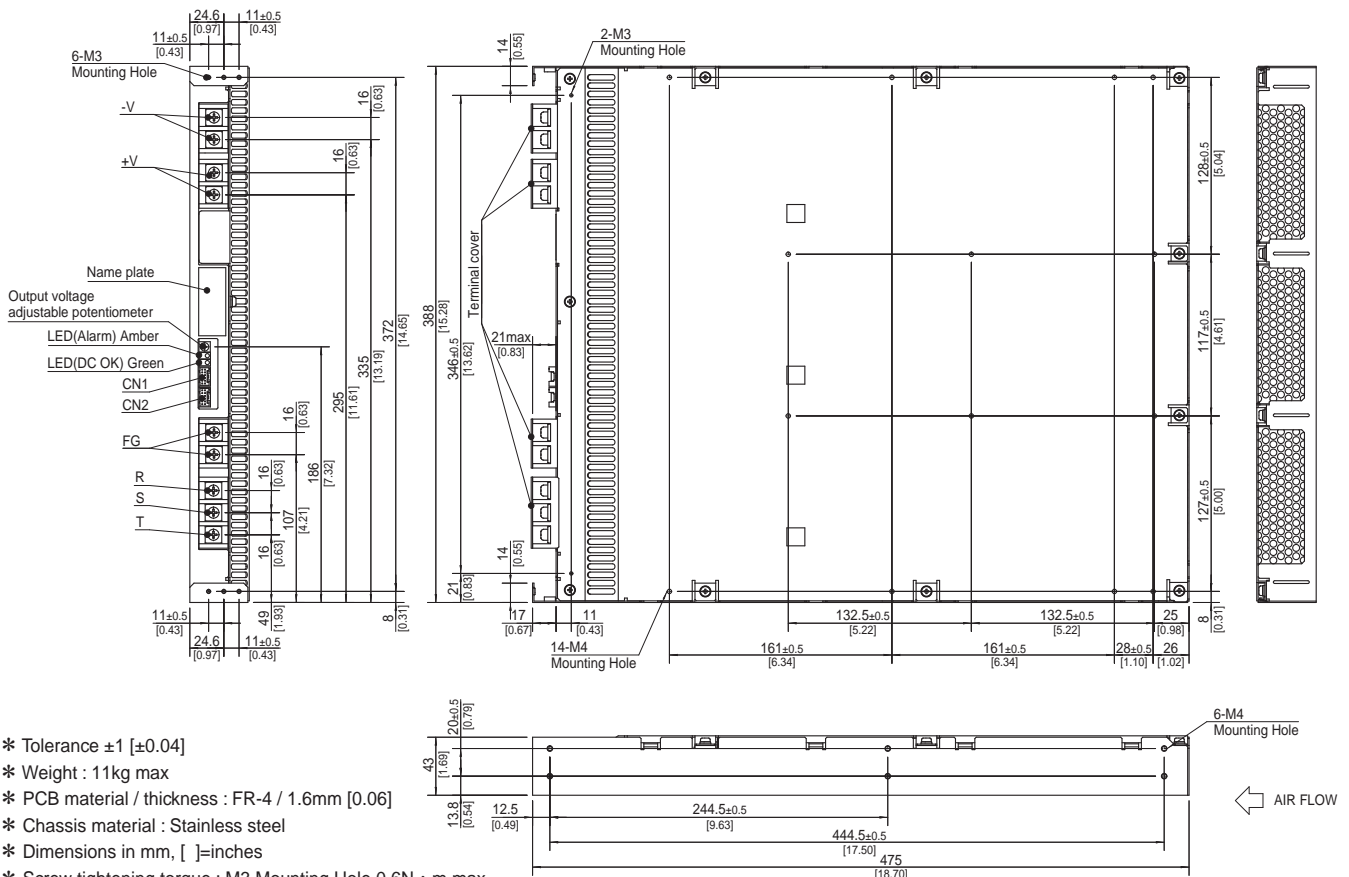
### ● FETA7000T-144



Block diagram of internal module



External view



- \* Tolerance  $\pm 1$  [ $\pm 0.04$ ]
- \* Weight : 11kg max
- \* PCB material / thickness : FR-4 / 1.6mm [0.06]
- \* Chassis material : Stainless steel
- \* Dimensions in mm, [ ]=inches
- \* Screw tightening torque : M3 Mounting Hole 0.6N · m max  
M4 Mounting Hole 1.2N · m max  
M5 Input terminal 3.0N · m max
- \* Please connect safety ground to FG terminal on the unit.



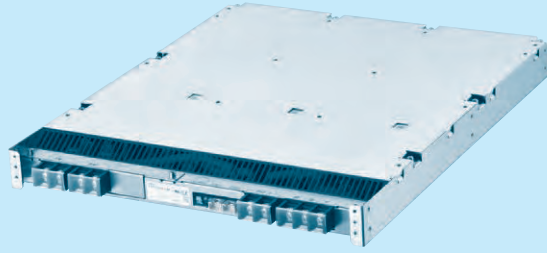
# FETA7000ST

FET A 7000 ST -□□

① ② ③ ④ ⑤



RoHS



- ① Series name
- ② Single output
- ③ Output wattage
- ④ 3 φ 4-Wire
- ⑤ Output voltage

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	FETA7000ST-48	FETA7000ST-144
MAX OUTPUT WATTAGE[W]	*1 7113	7488
DC OUTPUT	48V 148.2A	144V 52A

## SPECIFICATIONS

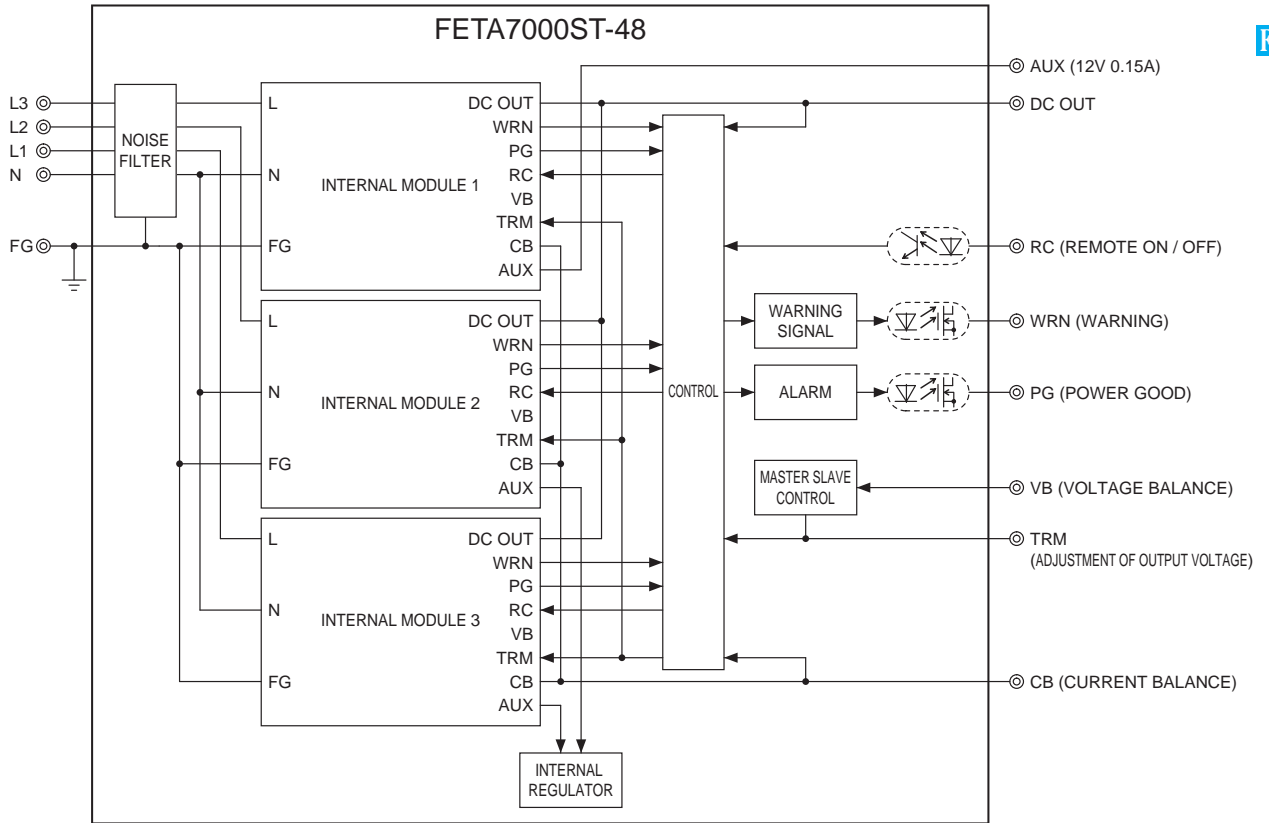
	MODEL	FETA7000ST-48	FETA7000ST-144	
INPUT	VOLTAGE[V]	AC300 - 480 3 φ 4-Wire (Output derating is required at AC300V - 320V. Refer to "Derating")		
	CURRENT[A]	ACIN 400V *2	11.4typ	
	FREQUENCY[Hz]	50 / 60 (47 - 63)		
	EFFICIENCY[%]	ACIN 400V	90.5% (Io=100%)	
	POWER FACTOR	ACIN 400V	0.98typ (Io=100%)	
	INRUSH CURRENT[A]	ACIN 400V *3	40max / 80max (Primary inrush current / Secondary inrush current) (More than 10 sec. to re-start)	
	LEAKAGE CURRENT[mA]	5.0max (ACIN 480V 60Hz, Io=100%, According to IEC62368-1)		
OUTPUT	VOLTAGE[V]	48	144	
	CURRENT[A]	ACIN 300V-320V ACIN 320V-480V	Output derating is required at ACIN 320V or less (refer to "Derating") 148.2	
	LINE REGULATION[mV]	192max		
	LOAD REGULATION[mV]	960max		
	RIPPLE[mVp-p]	0 to +40°C *4	360max	720max
		-10 to 0°C *4	480max	960max
	RIPPLE NOISE[mVp-p]	0 to +40°C *4	480max	960max
		-10 to 0°C *4	600max	1200max
	TEMPERATURE REGULATION[mV]	0 to +40°C	480max	2200max
		-10 to +40°C	600max	2800max
	DRIFT[mV]	*5	192max	384max
	START-UP TIME[s]	1.7max (ACIN 400V, Io=100%)		
	HOLD-UP TIME[ms]	ACIN 400V	10typ (Io=100%)	
			20typ (Io=50%)	
OUTPUT VOLTAGE ADJUSTMENT RANGE[V] *6	28.8 - 52.8 *7			
OUTPUT VOLTAGE SETTING[V]	47 - 49			
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (Recovers automatically, Hiccup overcurrent) (Output voltage shuts down when the output voltage continuously drops due to overcurrent protection.) *9		
	OVERVOLTAGE PROTECTION[V] *8	56 - 60		
	DC_OK LAMP	LED (Green)		
	ALARM LAMP	LED (Amber)		
REMOTE ON/OFF	Provided			
ISOLATION	INPUT-OUTPUT-AUX-RC-WRN-PG	AC3,000V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)		
	INPUT-FG	AC2,000V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)		
	OUTPUT-AUX-RC-WRN-PG-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At room temperature)		
	OUTPUT-AUX-RC-WRN-PG	AC100V 1minute, Cutoff current = 100mA, DC100V 50MΩ min (At room temperature)		
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +60°C (Refer to "Derating"), 20 - 90%RH (Non condensing), 3,000m (10,000 feet) max		
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) max		
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis		
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis		
	AGENCY APPROVALS	UL62368-1, C-UL (CSA62368-1), EN62368-1		
	CONDUCTED NOISE	Complies with FCC Part15-A, CISPR32-A, EN55032-A, VCCI-A with an external EMI/EMC filter. (refer to Instruction manual)		
OTHERS	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 Class A *10		
	CASE SIZE/WEIGHT *11	388 X 43 X 475mm [15.28 X 1.69 X 18.70 inches] (W X H X D) / 11kg max		
	COOLING METHOD	Forced cooling (internal fan)		

- \*1 AUX output power is not included.
- \*2 The current flowing through the neutral line increases when AC input voltage is over AC456V 3 φ 4-Wire. The flowing current will vary according to the input voltage and the load current. The maximum flowing current will be 18A.
- \*3 The current of input surge to a built-in noise filter (0.2ms or less) is excluded.
- \*4 Measured by 500MHz oscilloscope. Ripple and ripple noise is measured on measuring board with capacitor of 22μF within 150mm from the output terminal.
- \*5 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.
- \*6 Can't be used above the rated output current and the rated output power.
- \*7 When the output voltage is adjusted to higher than 49.92V and the load factor is over 70% of the rated current, if the load current changes quickly (< 200msec), the output voltage drops approximately 5V below the setting voltage.
- \*8 When the output voltage is adjusted to higher than 149.82V and the load factor is over 70% of the rated current, if the load current changes quickly (< 200msec), the output voltage drops approximately 15V below the setting voltage.
- \*9 Output voltage recovers from protection by shutting down the input voltage and waiting more than 10 seconds then turning on AC input again, or turning off the output voltage by remote control.
- \*10 Please contact us about another class.
- \*11 Case size contains neither the terminal blocks, connector and screw. To meet the specifications, do not operate over-loaded condition. A sound may occur from power supply at peak loading.

## Block diagram

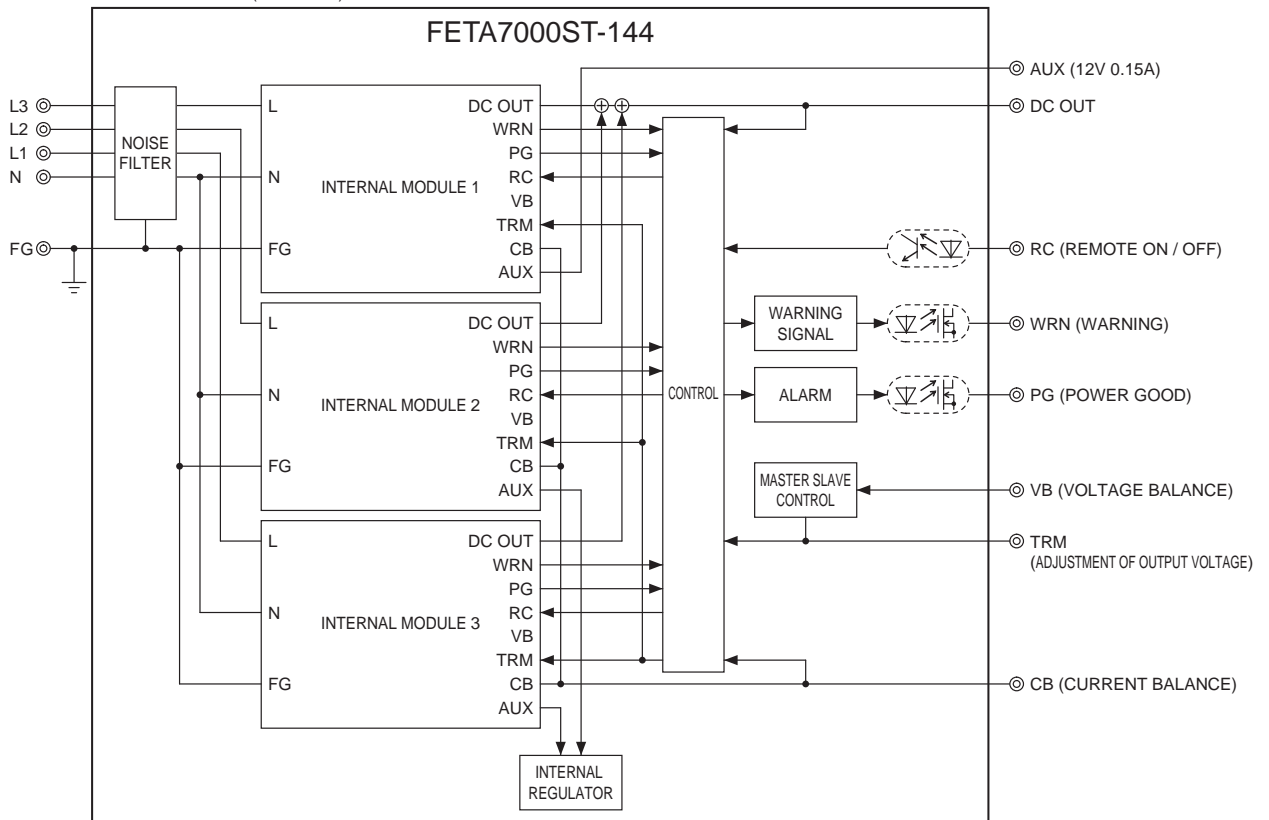
### ●FETA7000ST-48

AC IN 300~480V (3φ 4-Wire)

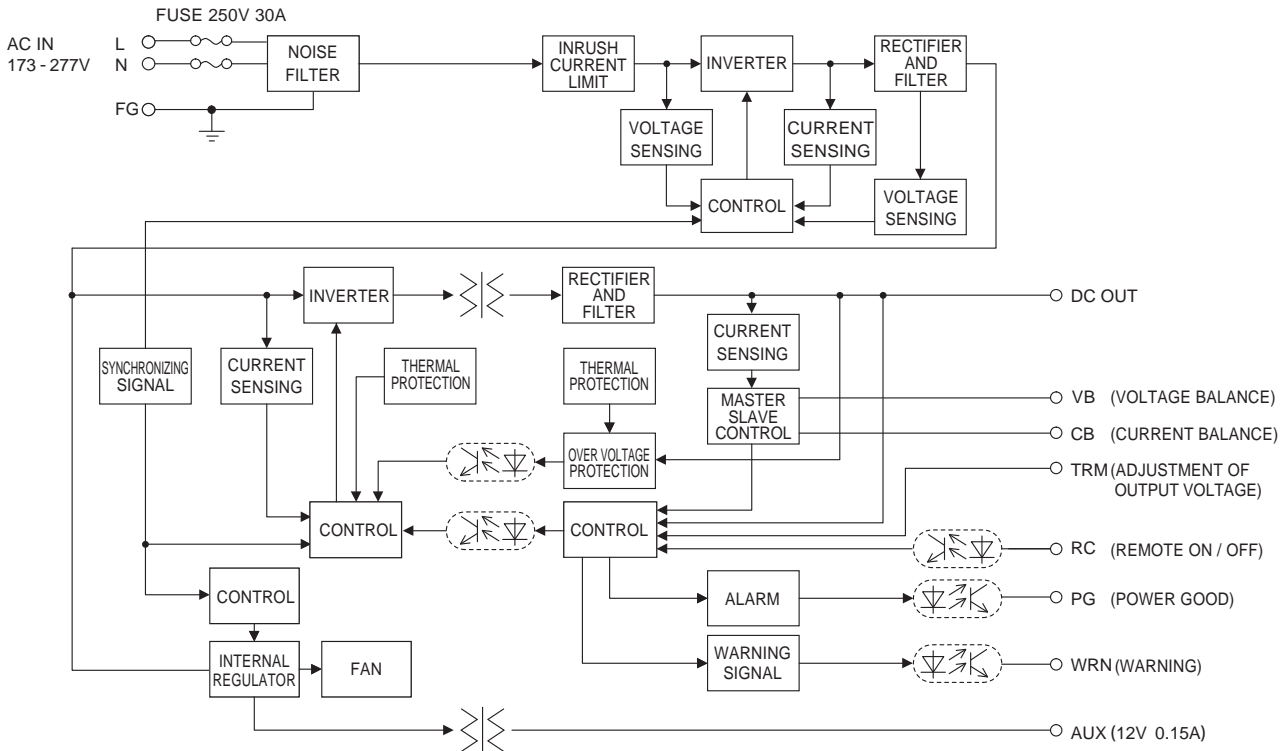


### ●FETA7000ST-144

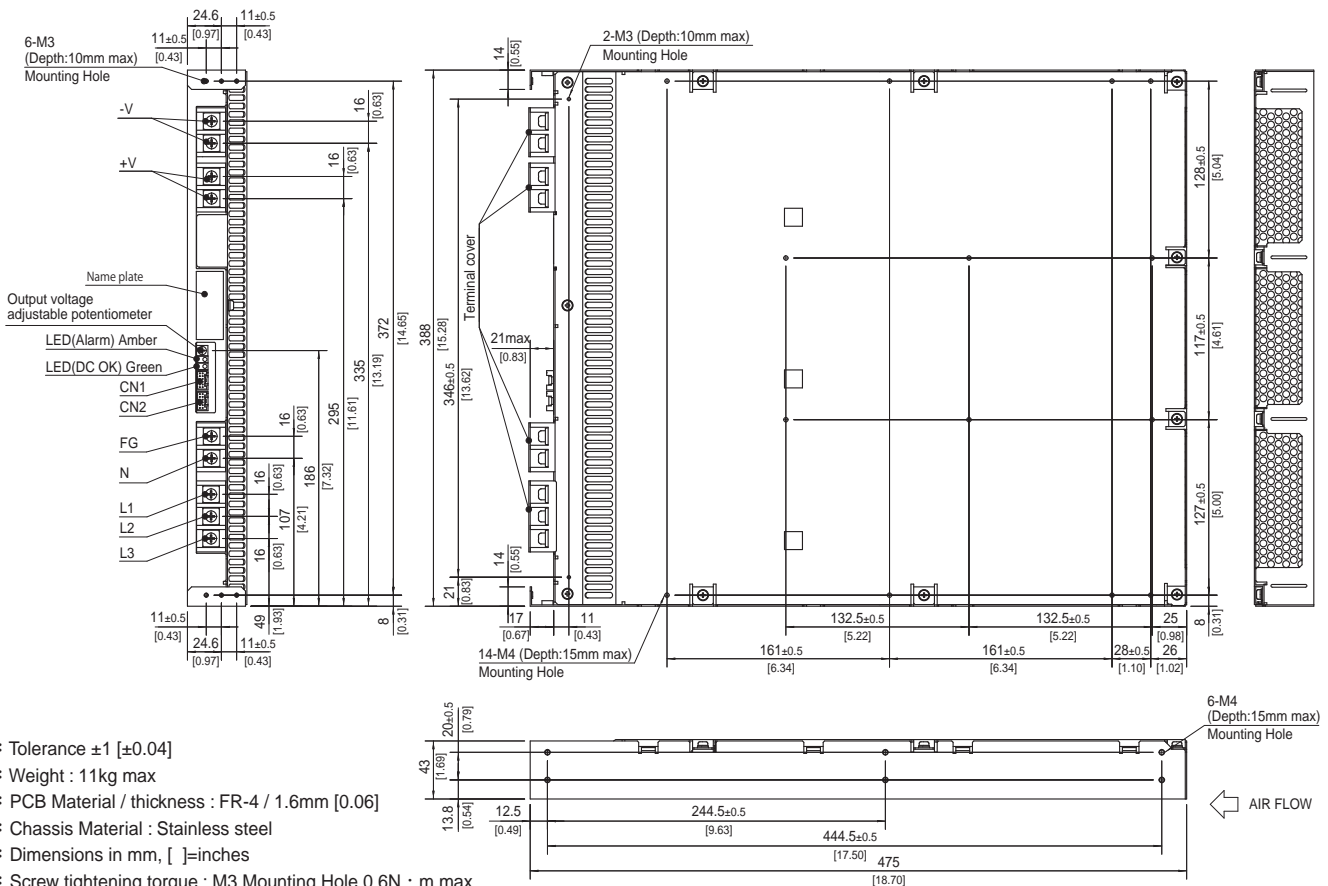
AC IN 300~480V (3φ 4-Wire)



## Block diagram of internal module



## External view

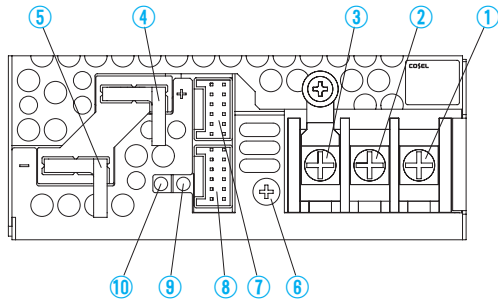


- \* Tolerance  $\pm 1$  [ $\pm 0.04$ ]
- \* Weight : 11kg max
- \* PCB Material / thickness : FR-4 / 1.6mm [0.06]
- \* Chassis Material : Stainless steel
- \* Dimensions in mm, [ ]=inches
- \* Screw tightening torque : M3 Mounting Hole 0.6N · m max  
M4 Mounting Hole 1.2N · m max  
M5 Terminal block 3.0N · m max
- \* Please connect safety ground to FG terminal on the unit.



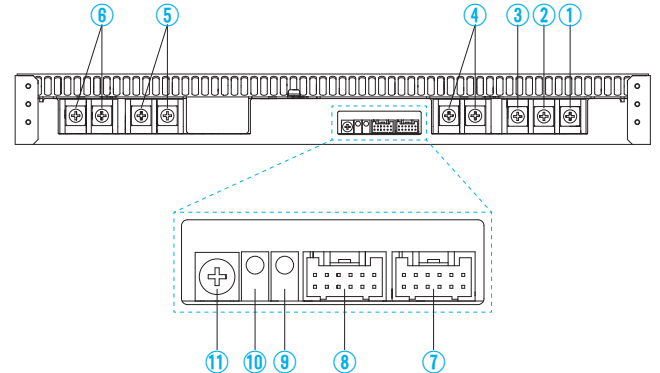
## Terminal Blocks

### FETA2500BA, 3000BA



- ①AC (L) } Input Terminals AC170 - 264V 1 φ 47 - 63Hz
- ②AC (N) } (M4)
- ③Frame ground (M4 ±)
- ④+Output
- ⑤-Output
- ⑥Output voltage adjustable potentiometer
- ⑦CN1 } Connectors
- ⑧CN2 }
- ⑨LED for output voltage confirmation (DC\_OK)
- ⑩LED for fault condition detection (ALARM)

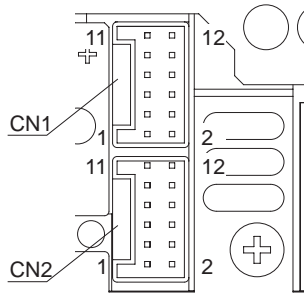
### FETA7000T



- ①AC (T) } Input Terminals AC170 - 264V 3 φ 47 - 63Hz
- ②AC (S) } (M5)
- ③AC (R) }
- ④Frame ground (M5 ±)
- ⑤+Output
- ⑥-Output
- ⑦CN2 } Connectors
- ⑧CN1 }
- ⑨LED for output voltage confirmation (DC\_OK)
- ⑩LED for fault condition detection (ALARM)
- ⑪Output voltage adjustable potentiometer

### FETA2500BA, 3000BA

#### Pin Configuration and Functions of CN1, CN2

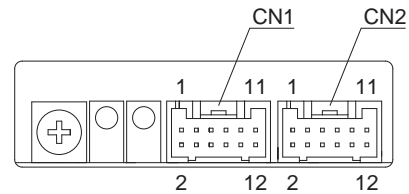


Pin No.	Pin Name	Function
1	AUXG	Auxiliary power output (GND)
2	AUX	Auxiliary power output
3	WRNG	Warning signal (GND)
4	WRN	Warning signal
5	PGG	Alarm signal (GND)
6	PG	Alarm signal
7	RCG	Remote ON/OFF (GND)
8	RC	Remote ON/OFF
9	COM	Signal ground
10	TRM	Adjustment of output voltage
11	VB	Voltage Balance
12	CB	Current Balance

Connector	Housing	Terminal	Mfr.
CN1 CN2	S12B-PUDSS-1 PUDP-12V-S	Reel : SPUD-001T-P0.5 or SPUD-002T-P0.5	J.S.T

### FETA7000T

#### Pin Configuration and Functions of CN1, CN2



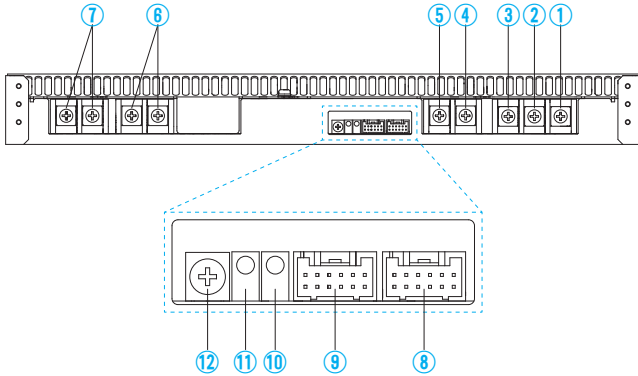
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8	RC	Remote ON/OFF
9	COM	Signal ground
10	TRM	Adjustment of output voltage
11	VB	Voltage Balance
12	CB	Current Balance

Connector	Housing	Terminal	Mfr.
CN1 CN2	S12B-PUDSS-1 PUDP-12V-S	Reel : SPUD-001T-P0.5 or SPUD-002T-P0.5	J.S.T

## Terminal Blocks

### FETA7000ST

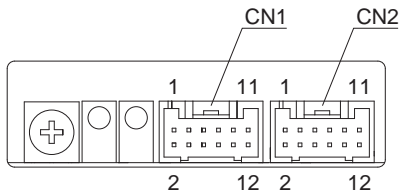
FETA



- ① AC (L3)
  - ② AC (L2)
  - ③ AC (L1)
  - ④ AC (N)
  - ⑤ Frame ground (M5  $\perp$ )
  - ⑥ +Output
  - ⑦ -Output
  - ⑧ CN2
  - ⑨ CN1
  - ⑩ LED for output voltage confirmation (DC\_OK)
  - ⑪ LED for fault condition detection (ALARM)
  - ⑫ Output voltage adjustable potentionmeter
- Input Terminals AC170 - 264V 3  $\phi$  - 4 wire 47 - 63Hz (M5)
- Connectors

### FETA7000ST

#### Pin Configuration and Functions of CN1, CN2



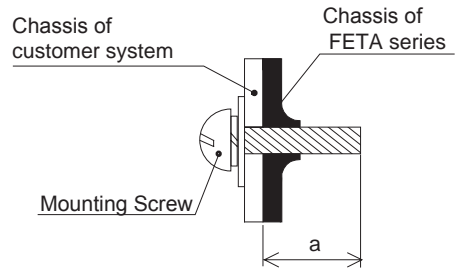
Pin No.	Pin Name	Function
1	AUXG	Auxiliary power output (GND)
2	AUX	Auxiliary power output
3	WRNG	Warning signal (GND)
4	WRN	Warning signal
5	PGG	Alarm signal (GND)
6	PG	Alarm signal
7	RCG	Remote ON/OFF (GND)
8	RC	Remote ON/OFF
9	COM	Signal ground
10	TRM	Adjustment of output voltage
11	VB	Voltage Balance
12	CB	Current Balance

Connector	Housing	Terminal	Mfr.
CN1 CN2	S12B-PUDSS-1 PUDP-12V-S	Reel : SPUD-001T-P0.5 or SPUD-002T-P0.5	J.S.T

## Assembling and Installation Method

### Installation Method

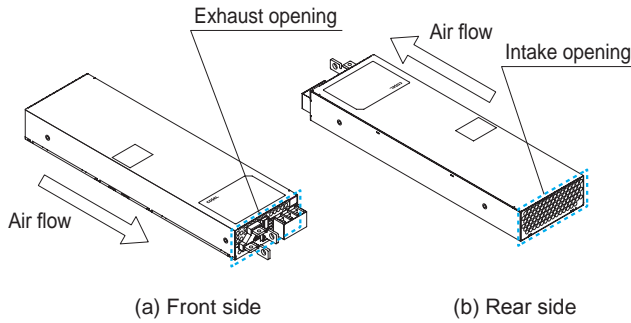
- Screw mounting requires considering the product weight for safety fixtures.
- To keep enough insulation distance between screws and internal components, length of the mounting screw should not exceed recommendation as shown in right figure.



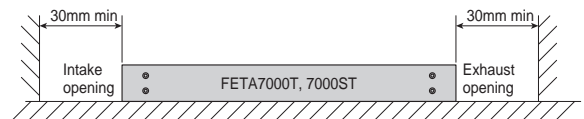
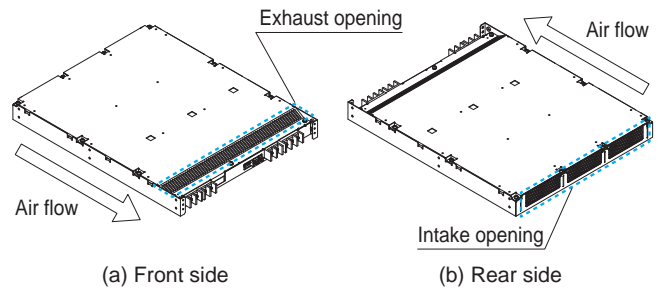
Model	Mounting hole	a (Max penetration length)
FETA2500BA, 3000BA	Bottom	6mm max
	Side	4.5mm max
FETA7000T, 7000ST	Side	15mm max

- The power supplies have a built-in forced cooling fan. Do not block ventilation at the suction side and its opposite side.
- \* Reverse airflow option (-F2) is available for FETA2500BA. Refer to Instruction manual.
- If you use a power supply in a dusty environment, it can cause a failure. Please consider taking such countermeasures as installing an air filter near the suction area of the system to prevent a failure.

### ● FETA2500BA, 3000BA

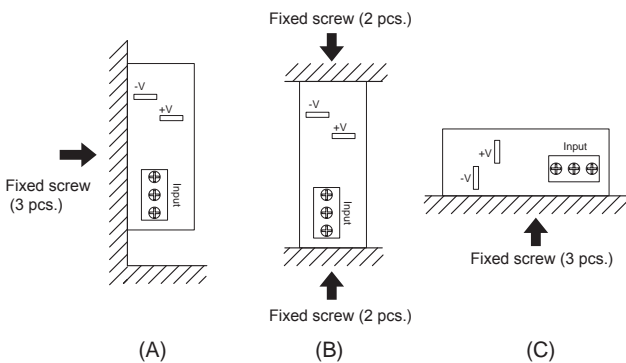


### ● FETA7000T, 7000ST

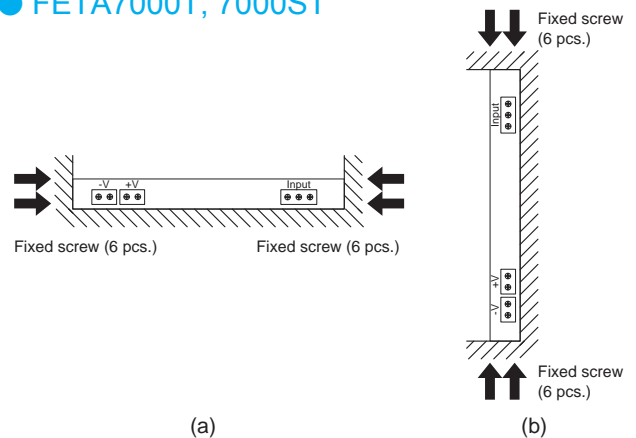


- When mounting the power supply with screws, it is recommended that this be done as shown below. If other methods are used, be sure the weight of the power supply is taken into account.

### ● FETA2500BA, 3000BA



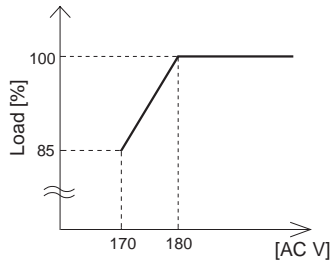
### ● FETA7000T, 7000ST



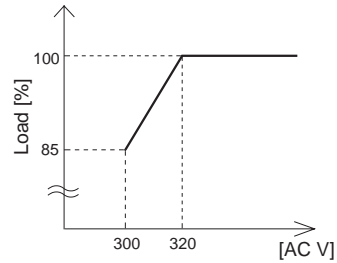
Derating

● Input Voltage Derating Curve

FETA2500BA, 3000BA, 7000T

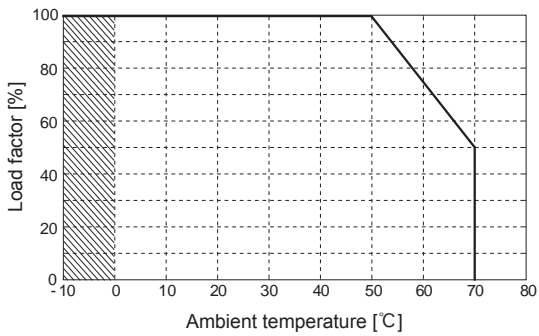


FETA7000ST

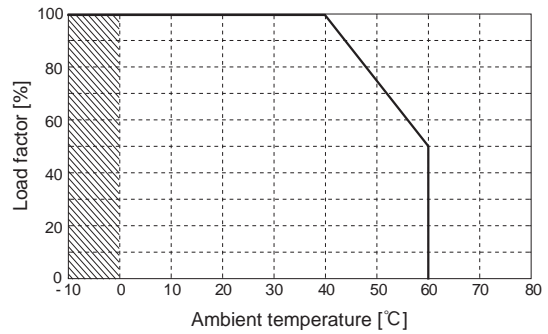


● Ambient Temperature Derating Curve

FETA2500BA, FETA3000BA



FETA7000T, FETA7000ST



■ Specifications for ripple and ripple noise changes in the shaded area.

Instruction Manual

◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/FETA/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

FETA



NOTICE



## Basic Characteristics Data

FETA

Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	Inrush current protection circuit	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
FETA2500BA	Active filter	47	13.8	250V 30A	Relay	FR-4		Yes	Yes	Yes
	Phase-shift Full-bridge converter	94								
FETA3000BA	Active filter	47	16.6	250V 30A	Relay	FR-4		Yes	Yes	Yes
	Phase-shift Full-bridge converter	94								
FETA7000T	Active filter	47	23.9	250V 30A	Relay	FR-4		Yes	Yes	Yes
	Phase-shift Full-bridge converter	94								

\* The value of input current is at ACIN 200V and rated load.

Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	Inrush current protection circuit	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
FETA7000ST	Active filter	47	12.0	250V 30A	Relay	FR-4		Yes	Yes	Yes
	Phase-shift Full-bridge converter	94								

\* The value of input current is at ACIN 400V and rated load.

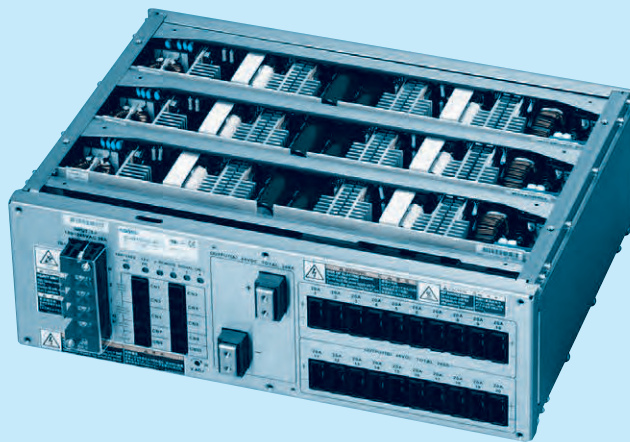




# SC-series

SC

## DC48V Front end power supply



SCHA10000T



SCDA10000T

### Feature

- High power, AC-DC front end power supply
- Three-phase input(AC160 - 264V 3 φ)
- High efficiency (90%), High power factor (0.99)
- Harmonic attenuator (Complies with IEC61000-3-12)
- Complies with SEMI F47
- Wide output voltage adjustable range approximately 0 to 52.8V (Optional)
- Constant current regulation provided with additional external components (Optional)
- Parallel operation and Parallel redundancy operation (SCHA10000T)
- System ON / OFF (Remote ON / OFF)
- Alarms
- Output Voltage Monitor
- Parallel Control (Start in / out)
- Remote Signal ON / OFF

### Safety agency approvals

UL60950-1, C-UL, EN60950-1

### 3-year warranty

### CE marking

Low Voltage Directive  
RoHS Directive

### EMI

Complies with EN55011 Group1-A, EN55022-A,  
CISPR22-A, FCC Part15 classA

### EMS Compliance : EN61204-3, EN61000-6-2

EN61000-4-2  
EN61000-4-3  
EN61000-4-4  
EN61000-4-5  
EN61000-4-6  
EN61000-4-8  
EN61000-4-11

# SCHA 10000T/SCDA 10000T

SC H A 10000 T -48 -□

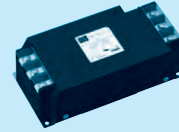
① ② ③ ④ ⑤ ⑥ ⑦



SCHA10000T

SCDA10000T

Example recommended EMI/EMC filter  
Filter TAC-50-223



\*A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② External form  
H:Wide front interface  
D:Compact front interface
- ③ Single output
- ④ Output wattage
- ⑤ Three-phase input
- ⑥ Output voltage
- ⑦ Optional

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

## SPECIFICATIONS

	MODEL	SCHA10000T-48	SCDA10000T-48	
INPUT	VOLTAGE[V]	AC160 - 264 3 φ		
	CURRENT[A]	ACIN200V	35typ	
	FREQUENCY[Hz]	50/60 (47 - 63)		
	EFFICIENCY[%]	ACIN200-240V	90typ	
	POWER FACTOR	ACIN200-240V	0.99typ (Io=100%)	
	INRUSH CURRENT[A]	ACIN240V *1	60typ / 80typ (Primary inrush current /Secondary inrush current) (More than 3 sec. to re-start)	
	LEAKAGE CURRENT[mA]	5.0max (ACIN 240V 60Hz, Io=0 - 100%, According to IEC60950-1)		
OUTPUT	VOLTAGE[V]	48		
	CURRENT[A]	208		
	WATTAGE[W]	9,984		
	LINE REGULATION[mV]	192max		
	LOAD REGULATION[mV]	720max		
	RIPPLE[mVp-p]	0 to +50°C *2	150max	
	RIPPLE NOISE[mVp-p]	0 to +50°C *2	200max (BW:500MHz)	
	TEMPERATURE REGULATION[mV]	0 to +50°C	240max	
	DRIFT[mV]	*3	192max	
	START-UP TIME[ms]	*6	750max (ACIN 200V, Io=100%)	
	HOLD-UP TIME[ms]	20typ (ACIN200V, Io=100%)		
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	43.2 - 52.8			
OUTPUT VOLTAGE SETTING[V]	47.0 - 49.0			
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Activate over 105% - 120% of rated current and recovers automatically. (Shut down if low-voltage protection activated)		
	OVERVOLTAGE PROTECTION[V]	*4	56.0 - 59.0 (shut down)	
	LOW-VOLTAGE PROTECTION[V]	*4	28.8 - 33.6 (shut down)	
	OPERATING INDICATION	LED : Green (48VDC output), White (AC IN)		
	ALARM OUTPUT	Detecting low input voltage, detecting open phase, detecting low output voltage		
REMOTE ON/OFF (SYSTEM ON/OFF)	Provided			
ISOLATION	(INPUT) - (OUTPUT - SYSTEM ON/OFF - REMOTE SIGNAL ON/OFF - ALARM)	AC3,000V 1minute, Cutoff current = 100mA, DC2,200V 1minute, Cutoff current = 1mA (At Room Temperature) DC500V 50MΩ min (At Room Temperature)		
	(INPUT) - (FG)	AC2,000V 1minute, Cutoff current = 100mA, DC2,200V 1minute, Cutoff current = 1mA (At Room Temperature) DC500V 50MΩ min (At Room Temperature)		
	(OUTPUT - SYSTEM ON/OFF - REMOTE SIGNAL ON/OFF - ALARM) - (FG)	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)		
	(OUTPUT) - (SYSTEM ON/OFF - REMOTE SIGNAL ON/OFF - ALARM)	AC100V 1minute, Cutoff current = 50mA, DC100V 10MΩ min (At Room Temperature)		
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	0 to +50°C, 20 - 85%RH (Non condensing), 3,000m(10,000feet) max (Refer to Cooling method)		
	STORAGE TEMP., HUMID. AND ALTITUDE	-25 to +85°C, 20 - 90%RH (Non condensing), 9,000m(30,000feet) max		
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 30 minutes each along X, Y and Z axis		
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis		
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1 complies		
	CONDUCTED NOISE	Complies with EN55011 Group1-A, EN55022-A, CISPR22-A, FCC part15 classA, additional EMI/EMC Filter required for meeting class B		
	HARMONIC ATTENUATOR	Complies with IEC61000-3-12		
OTHERS	CASE SIZE/WEIGHT *5	459 X 150 X 320mm [18.07 X 5.91 X 12.6 inches] (W X H X D)/23kg max	310.5 X 150 X 510mm [12.22 X 5.91 X 20.08 inches] (W X H X D)/20kg max	
	COOLING METHOD	Forced cooling (require external fan)		

\*1 The current of input surge to a built-in noise filter (0.2ms or less) is excluded.

\*2 Measured by 500MHz oscilloscope.

\*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*4 To recover output voltage, recycle input voltage after 3 or more seconds.

\*5 Case size contains neither the terminal blocks, connector and screw nor.

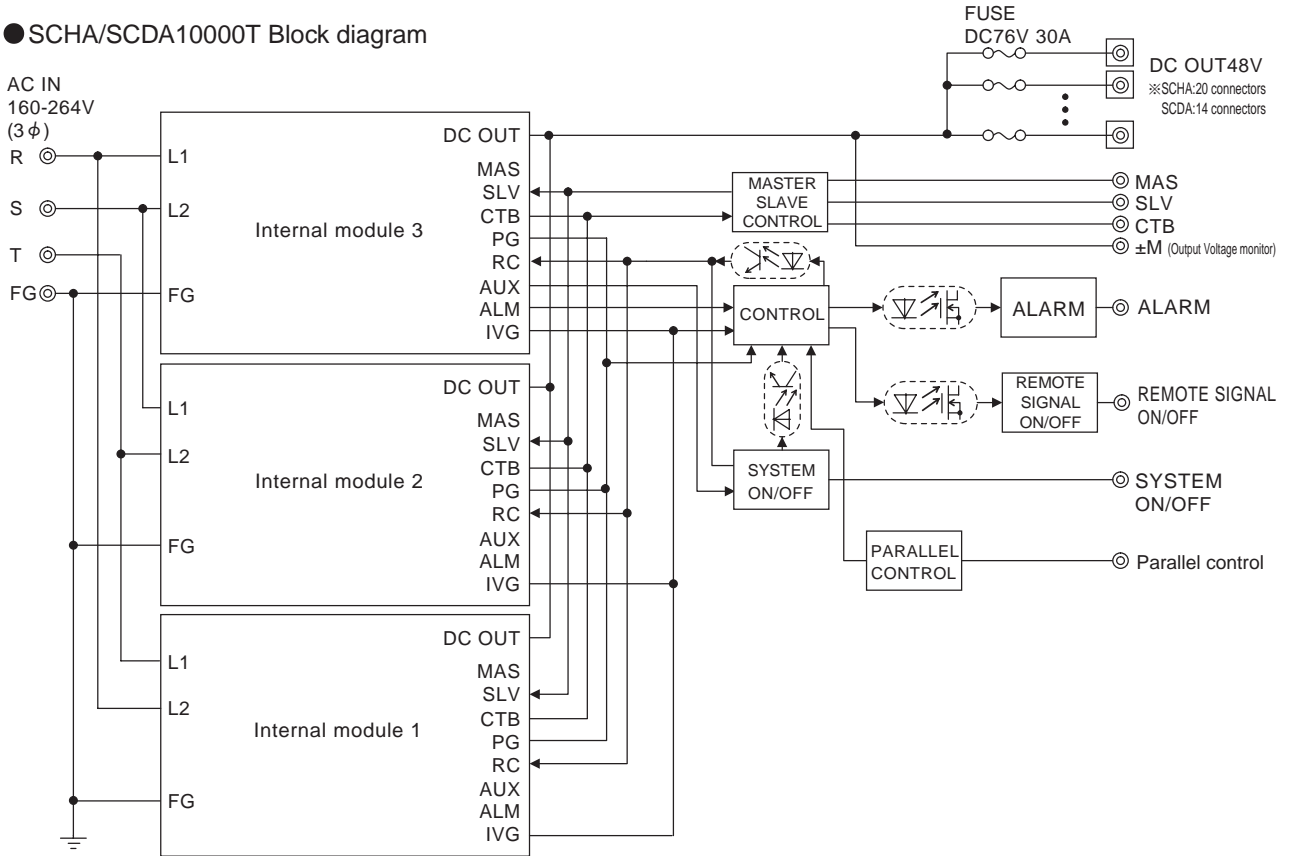
\*6 When input voltage recycling is needed for output recovery, AC power shall be removed and cycled after 3 seconds to reset the protection circuit.

Please contact us when it's necessary to restart the power supply in less than 3 seconds.

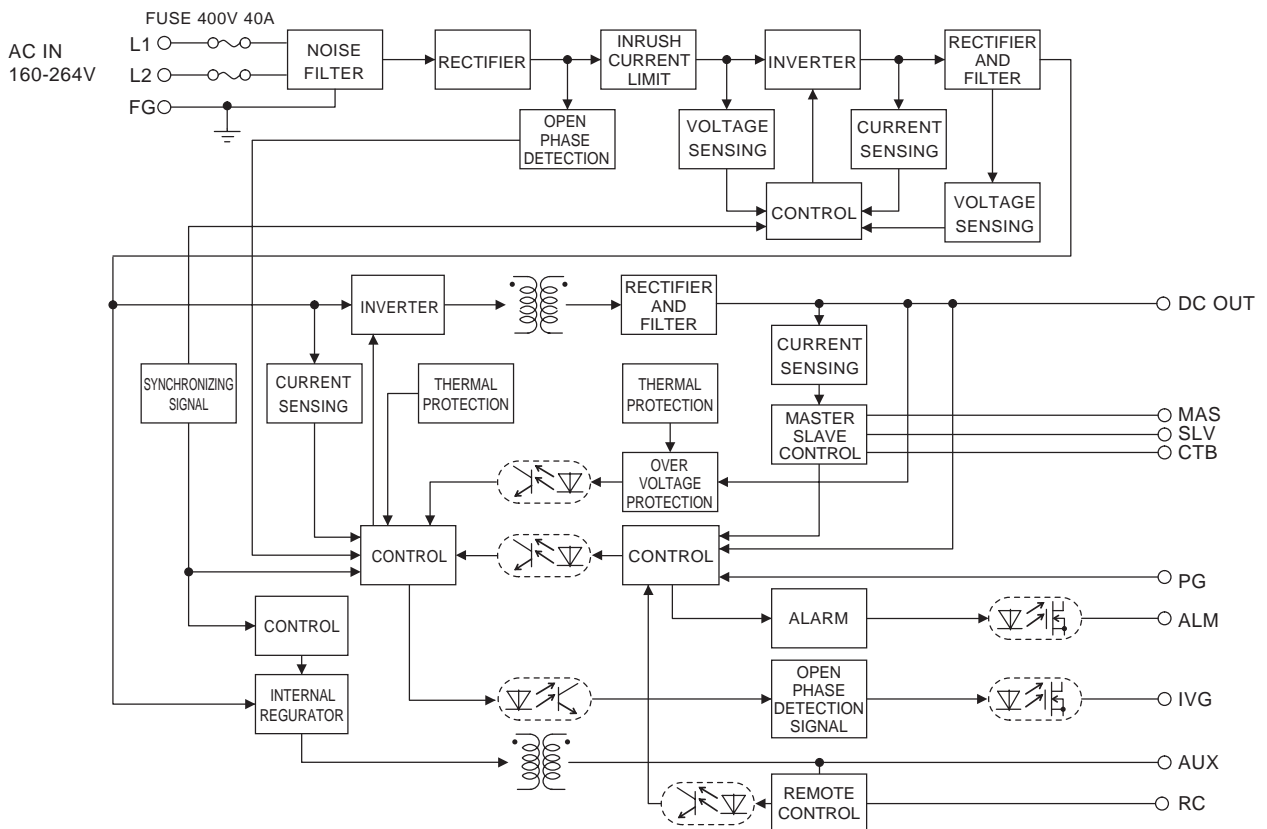


## SCHA/SCDA1000T Block diagram

### ● SCHA/SCDA1000T Block diagram

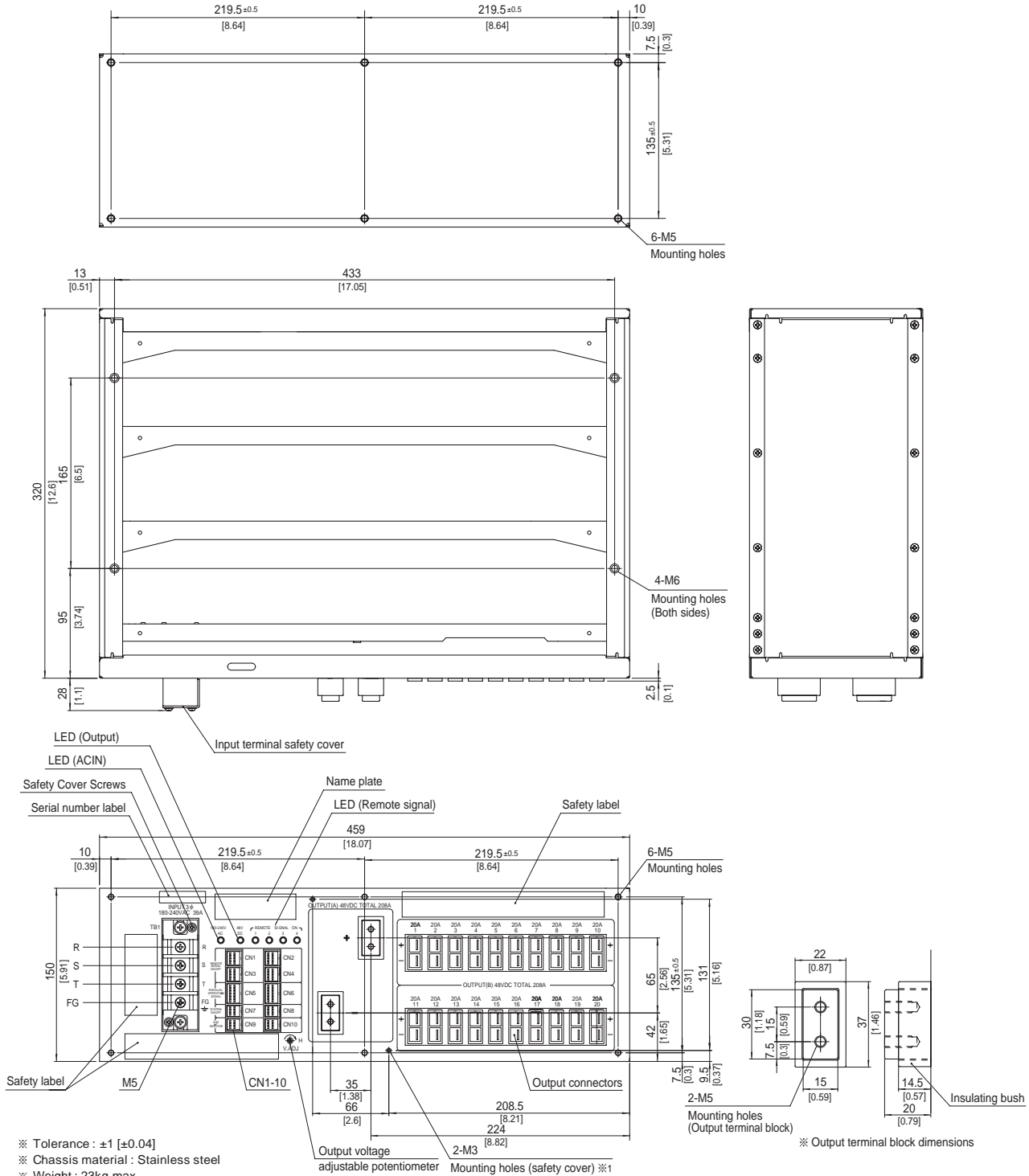


### ● Internal module Block diagram



## SCHA1000T external view

SC



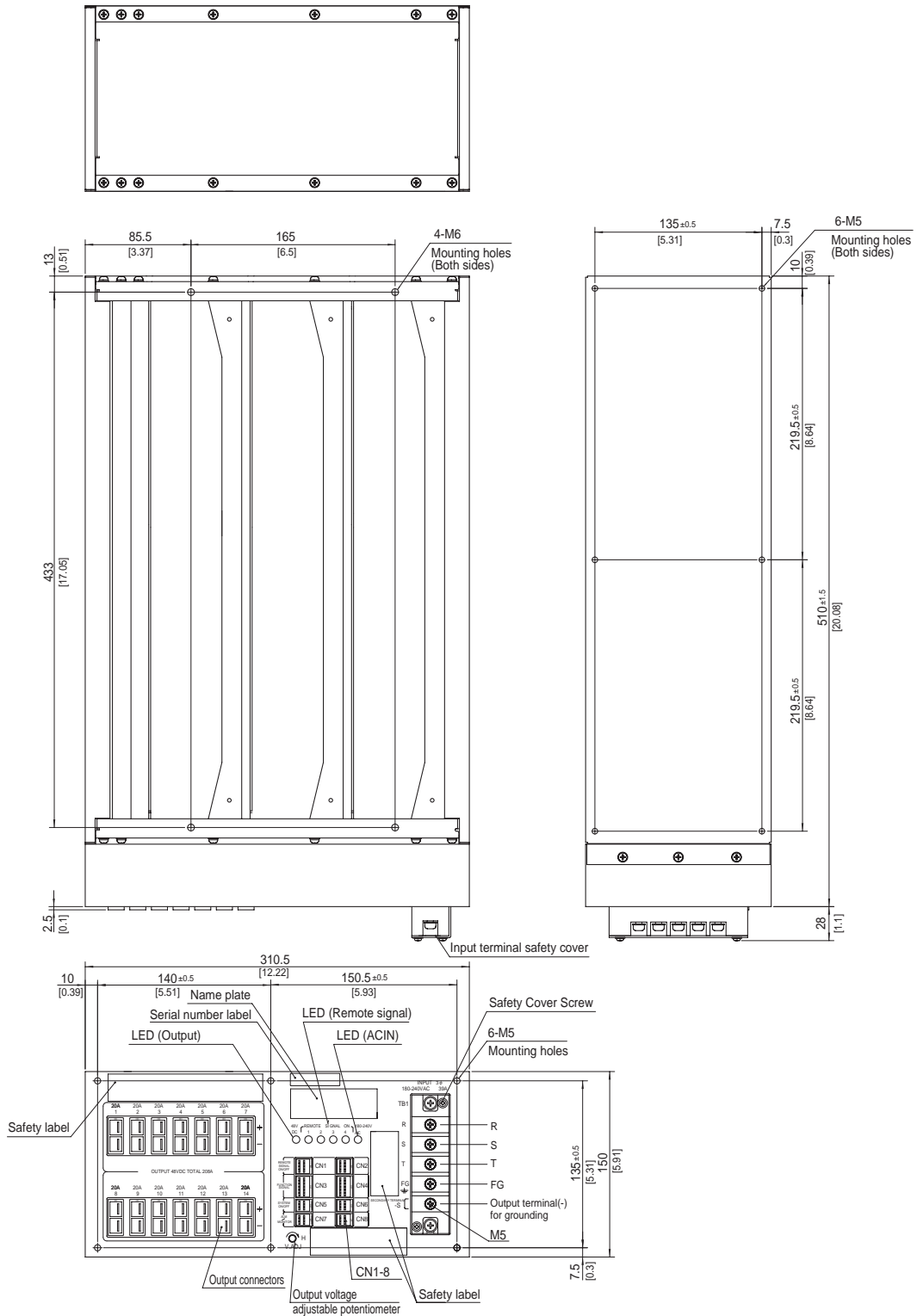
- ※ Tolerance : ±1 [±0.04]
- ※ Chassis material : Stainless steel
- ※ Weight : 23kg max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.04]
- ※ Dimensions in mm, [ ]=inches
- ※ Screw tightening torque : M5 Mounting Hole 3.0N · m (30.7kgf · cm) max
- : M6 Mounting Hole 5.4N · m (55.2kgf · cm) max
- : M5 Mounting Hole(Output terminal block) 2.7N · m (27.6kgf · cm) max
- : M5 Input terminal 3.0N · m (30.7kgf · cm) max
- : M3 Mounting Hole (safety cover) 0.6N · m (6.2kgf · cm) max
- : M3 Input terminal safety cover 0.6N · m (6.2kgf · cm) max

- ※ LED (ACIN) : White with AC input
- ※ LED (Output) : Green with 48VDC output
- ※ LED (Remote signal) : Green (Indicates Remote signal status)

※ 1 Bus-bar safety cover, optional accessory.

## SCDA10000T external view

SC



※ Tolerance : ±1 [±0.04]

※ Chassis material : Stainless steel

※ Weight : 20kg max

※ PCB Material/thickness : FR-4 / 1.6mm [0.04]

※ Dimensions in mm, [ ]=inches

※ Screw tightening torque : M5 Mounting Hole 3.0N · m (30.7kgf · cm) max  
 : M6 Mounting Hole 5.4N · m (55.2kgf · cm) max  
 : M5 Input terminal 3.0N · m (30.7kgf · cm) max  
 : M3 Input terminal safety cover 0.6N · m (6.2kgf · cm) max

※ LED (ACIN) : White with AC input

※ LED (Output) : Green with 48VDC output

※ LED (Remote signal) : Green (Indicates Remote signal status)

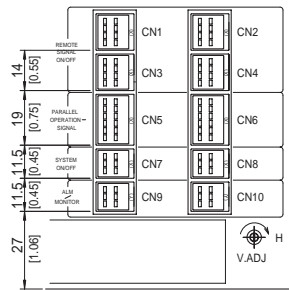
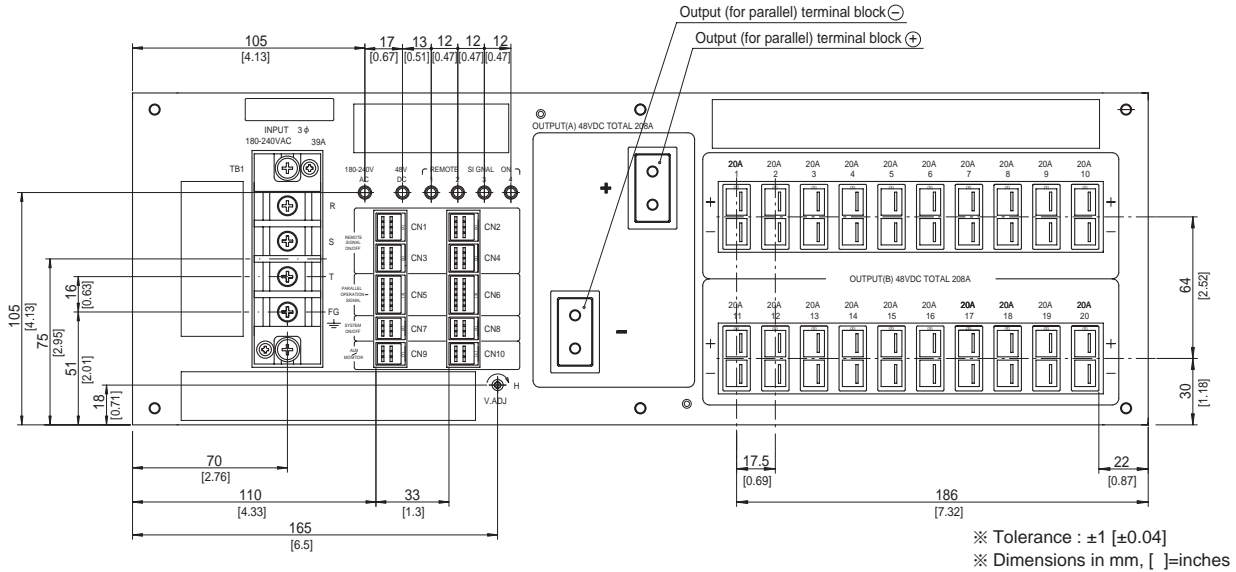
※ Output terminal(-) for grounding

-Output terminal(-) is internally connected to DC48V Output (-).

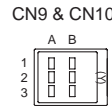
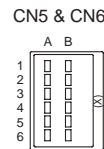
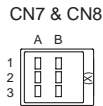
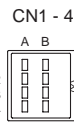
-Output terminal(-) : For grounding to stabilize secondary output by connecting to system ground (earth).

-Can not draw current through output terminal(-) for grounding.

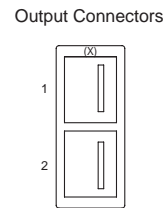
SCHA1000T external view (front panel)



CN1-10 location dimensions



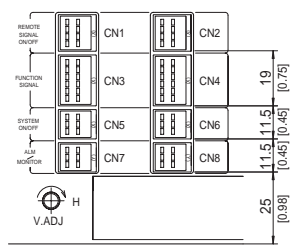
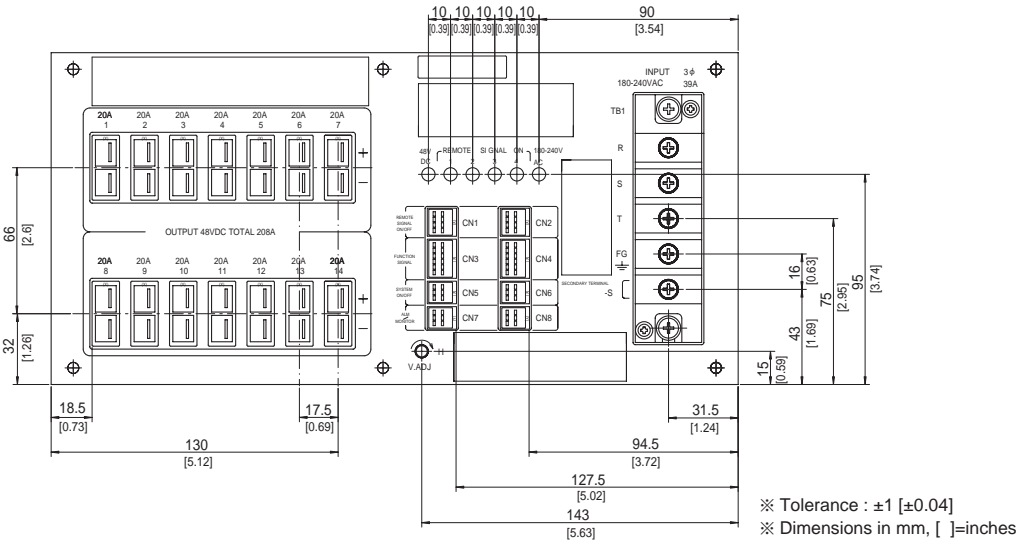
Connector pin numbers



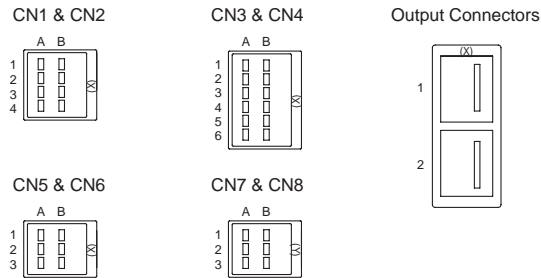
SCHA1000T Functions & Connectors

Connector	Housing	Mfr.	Pin No.	Function
Output connector	1-353080-2	1-179958-2	Tyco Electronics AMP	1 Output (+) 2 Output (-)
CN1-CN4	1318125-1	1-1318119-4	Tyco Electronics AMP	1A Remote signal ON/OFF 1+ 1B Remote signal ON/OFF 1- 2A Remote signal ON/OFF 2+ 2B Remote signal ON/OFF 2- 3A Remote signal ON/OFF 3+ 3B Remote signal ON/OFF 3- 4A Remote signal ON/OFF 4+ 4B Remote signal ON/OFF 4-
CN5 & CN6	1318126-1	1-1318118-6	Tyco Electronics AMP	1A,1B MAS: Master 2A,2B SLV: Slave 3A,3B CTB: Current balance 4A,4B PCNT: Parallel control 5A,5B COM:GND 6A,6B N.C.
CN7 & CN8	1318124-1	1-1318119-3	Tyco Electronics AMP	1A,1B System ON/OFF + 3A,3B System ON/OFF - 2A,2B N.C.
CN9 & CN10	1318124-2	2-1318119-3	Tyco Electronics AMP	1A,1B Alarm + 3A,3B Alarm - 2A +M: Output voltage monitor+ 2B -M: Output voltage monitor-

## SCDA10000T external view (front panel)



CN1-8 location dimensions



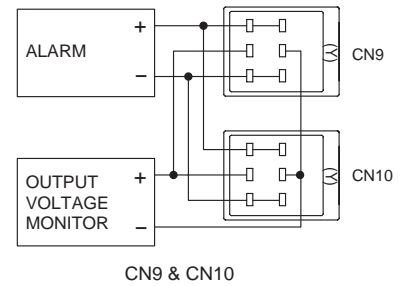
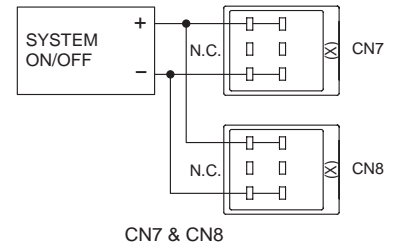
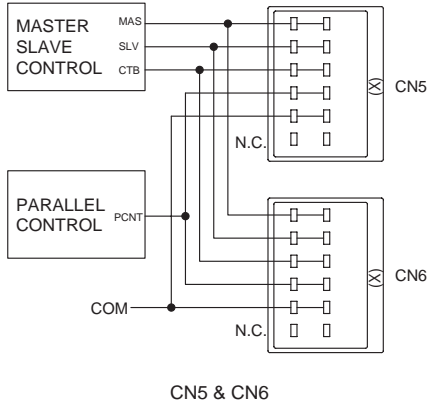
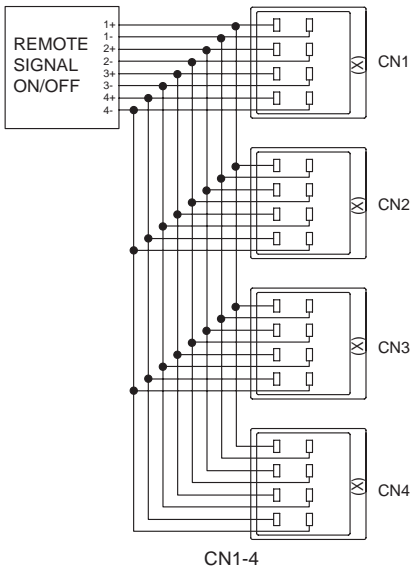
Connector pin numbers

### SCDA10000T Functions & Connectors

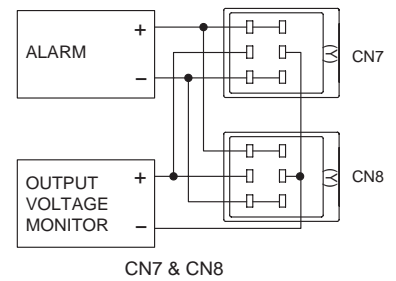
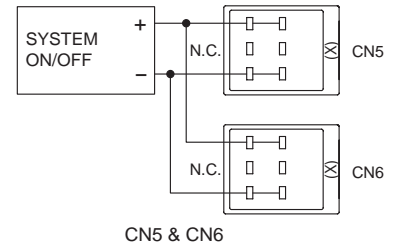
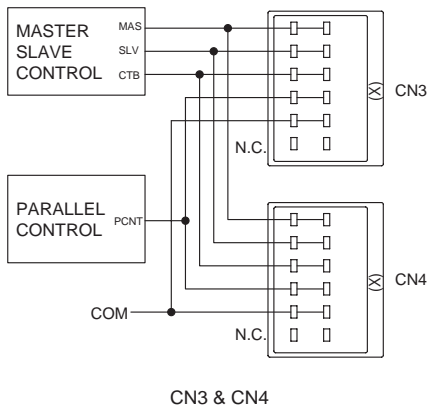
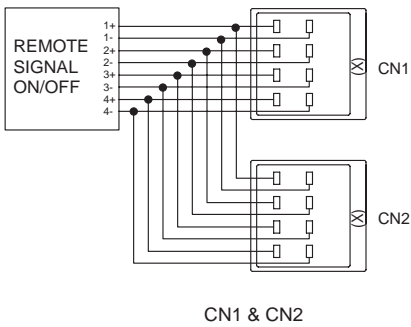
Connector	Housing	Mfr.	Pin No.	Function	
Output connector	1-353080-2	1-179958-2	1	Output (+)	
			2	Output (-)	
CN1 & CN2	1318125-1	1-1318119-4	Tyco Electronics AMP	1A	Remote signal ON/OFF 1+
				1B	Remote signal ON/OFF 1-
				2A	Remote signal ON/OFF 2+
				2B	Remote signal ON/OFF 2-
				3A	Remote signal ON/OFF 3+
				3B	Remote signal ON/OFF 3-
				4A	Remote signal ON/OFF 4+
				4B	Remote signal ON/OFF 4-
CN3 & CN4	1318126-1	1-1318118-6	Tyco Electronics AMP	1A,1B	MAS: Master
				2A,2B	SLV: Slave
				3A,3B	CTB: Current balance
				4A,4B	PCNT: Parallel control
				5A,5B	COM:GND
				6A,6B	N.C.
CN5 & CN6	1318124-1	1-1318119-3	Tyco Electronics AMP	1A,1B	System ON/OFF +
				3A,3B	System ON/OFF -
				2A,2B	N.C.
CN7 & CN8	1318124-2	2-1318119-3	Tyco Electronics AMP	1A,1B	Alarm +
				3A,3B	Alarm -
				2A	+M: Output voltage monitor+
				2B	-M: Output voltage monitor-

## Connection diagram of function connectors

### ● SCHA10000T



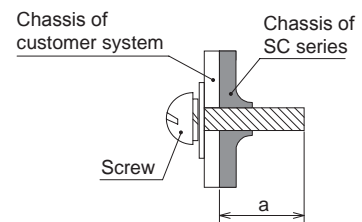
### ● SCDA10000T



## Assembling and Installation Method

### Installation method

- Screw mounting has to be consider the product weight for safety fixture.
- To keep enough insulation distance between screws and internal components, length of the mounting screw should not exceed recommendation as right figure.



Mounting hole	Diameter	a (Max penetration length)
Chassis	M6	8mm max
	M5	7mm max
Output terminal block (SCHA10000T)	M5	10mm max
Safety cover (Bus bar) (SCHA10000T)	M3	7mm max

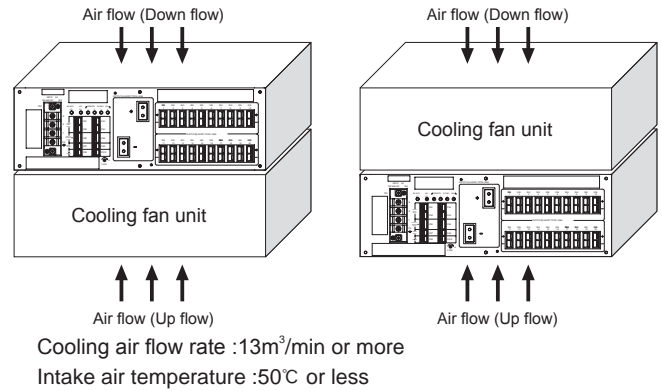
## Assembling and Installation Method

### Cooling Method

This power supply unit is designed for assuming external cooling fans. Follow instruction of cooling condition as follows.

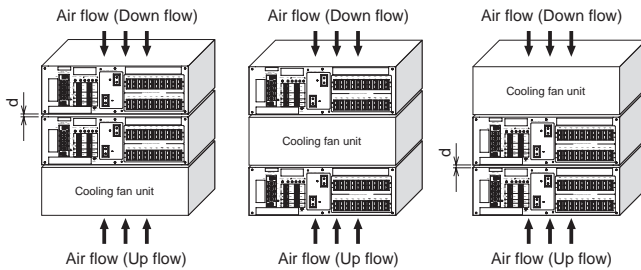
- Built into cooling air flow line in the system (Duct structure air cooling) for uniform cooling air flow.
- Number of stacked units is up to 3, as shown in Fig① and Fig②.
- Air flow direction is either Up or Down as shown in Fig① to Fig③.
- Clearance between stacked units is  $1.5\text{mm} \leq d \leq 6\text{mm}$ .
- Fig① to Fig③ show the position of cooling fan unit.
- Contact us for more information if your design utilizes other cooling methods.
- Stacking 4 units or more is not allowed.

① Cooling methods for use of single unit



SC

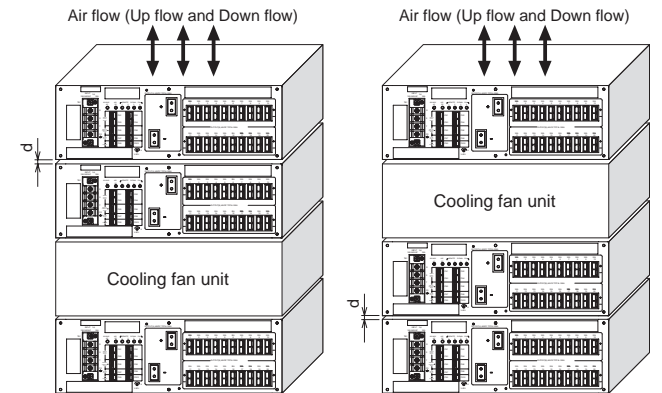
② Cooling methods for use of 2 units



d : gap of power supply units. ( $1.5\text{mm} \leq d \leq 6\text{mm}$ )

Cooling air flow rate :  $13\text{m}^3/\text{min}$  or more  
Intake air temperature :  $35^\circ\text{C}$  or less

③ Cooling methods for use of 3 units



d : gap of power supply units. ( $1.5\text{mm} \leq d \leq 6\text{mm}$ )

Cooling air flow rate :  $13\text{m}^3/\text{min}$  or more  
Intake air temperature :  $35^\circ\text{C}$  or less

## Instruction Manual

- ◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/SC/>

Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

SC



NOTICE



## Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	Inrush current protection circuit	PCB/Pattern		
						Material	Single sided	Double sided
SCHA 10000T	Active filter	65	35	400V 40A	SCR	FR-4		Double and Multi
	Forward converter	130						
SCDA 10000T	Active filter	65	35	400V 40A	SCR	FR-4		Double and Multi
	Forward converter	130						

\* The value of input current is at ACIN 200V 3φ and rated load.

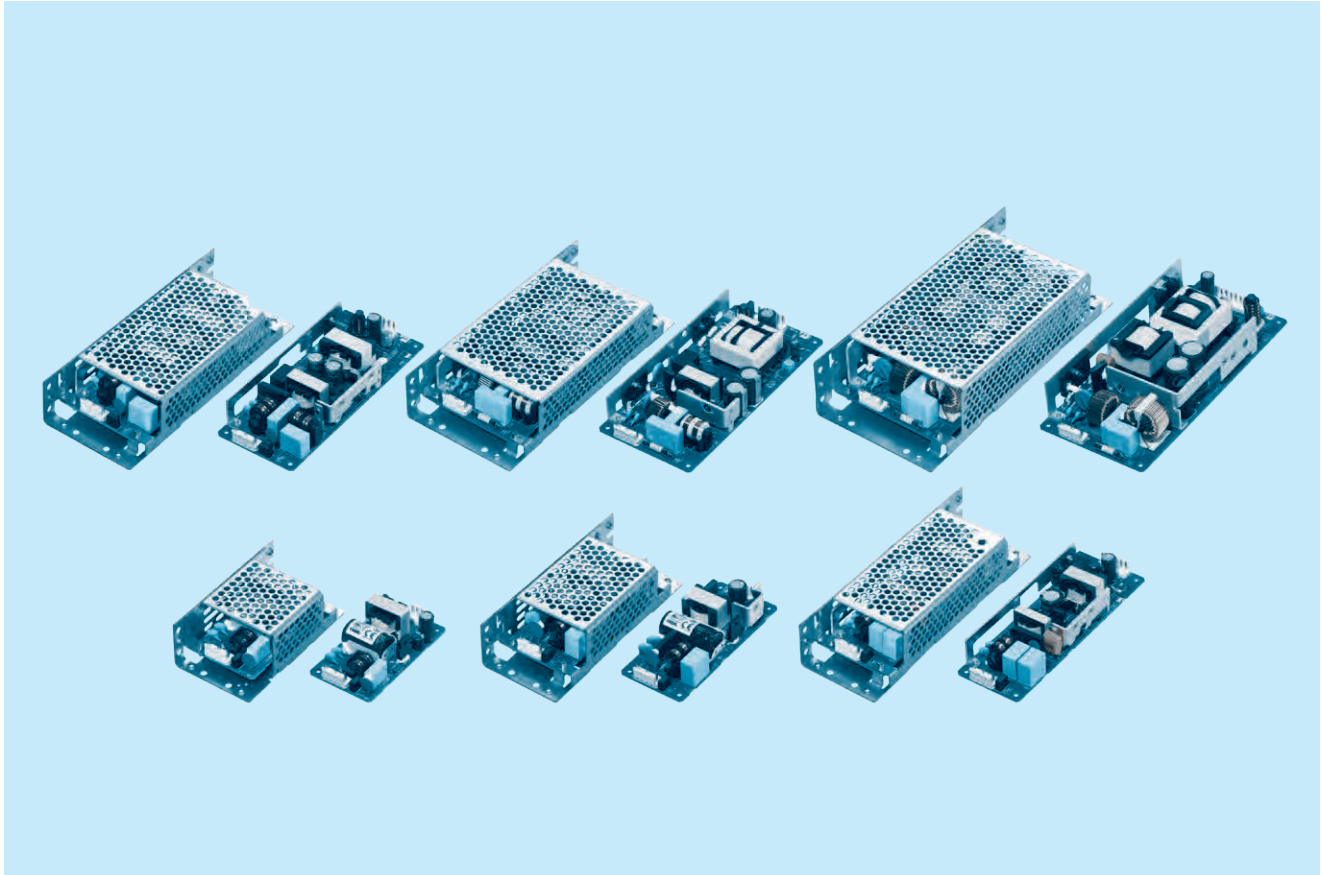






# LHA-series

LHA



## Feature

- EN62477-1 (OVC III)
- Low profile
- Small and compact PCB construction
- Built-in inrush current, overcurrent and overvoltage protection circuits
- Harmonic attenuator (Complies with IEC61000-3-2)
- Power factor correction (LHA75F-300F)
- Universal input (85-264VAC)
- Built-in reducing standby power circuit

## Safety agency approvals

- UL62368-1, c-UL (equivalent to CAN/CSA-C22.2 No.62368-1), EN62368-1
- EN62477-1 (OVC III) : LHA150F, 300F

## 5-year warranty (refer to Instruction Manual)

## CE marking

- Low Voltage Directive
- RoHS Directive

## EMI

- Complies with FCC-B, CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, VCCI-B

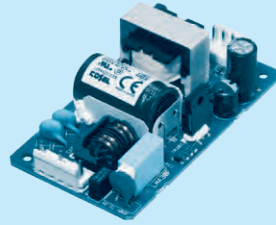
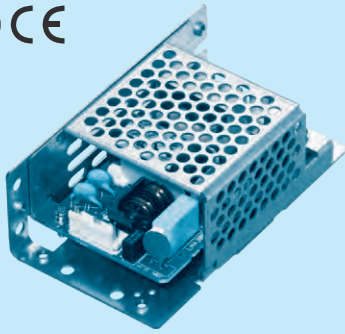
## EMS Compliance : EN61204-3, EN61000-6-2

- EN61000-4-2
- EN61000-4-3
- EN61000-4-4
- EN61000-4-5
- EN61000-4-6
- EN61000-4-8
- EN61000-4-11

# LHA30F

LH A 30 F -□□ -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
EAC-03-472



High voltage pulse noise type : EAP series  
Low leakage current type : EAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*1
- C : with Coating
- G : Low leakage current
- J4 : EP(Tyco)connector type
- S : with Chassis
- SN : with Chassis & cover
- Y : with Potentiometer

For option details, refer to Instruction Manual 6.

This power supply is manufactured by SMD technology. The stress to PCB like twisting or bending causes the defect of the unit, so handle the unit with care.  
\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LHA30F-3R3-Y	LHA30F-5	LHA30F-12	LHA30F-15	LHA30F-24
MAX OUTPUT WATTAGE[W]	*2 19.8	30	30	30	31.2
DC OUTPUT	*2 3.3V6A	5V6A	12V2.5A	15V2A	24V1.3A

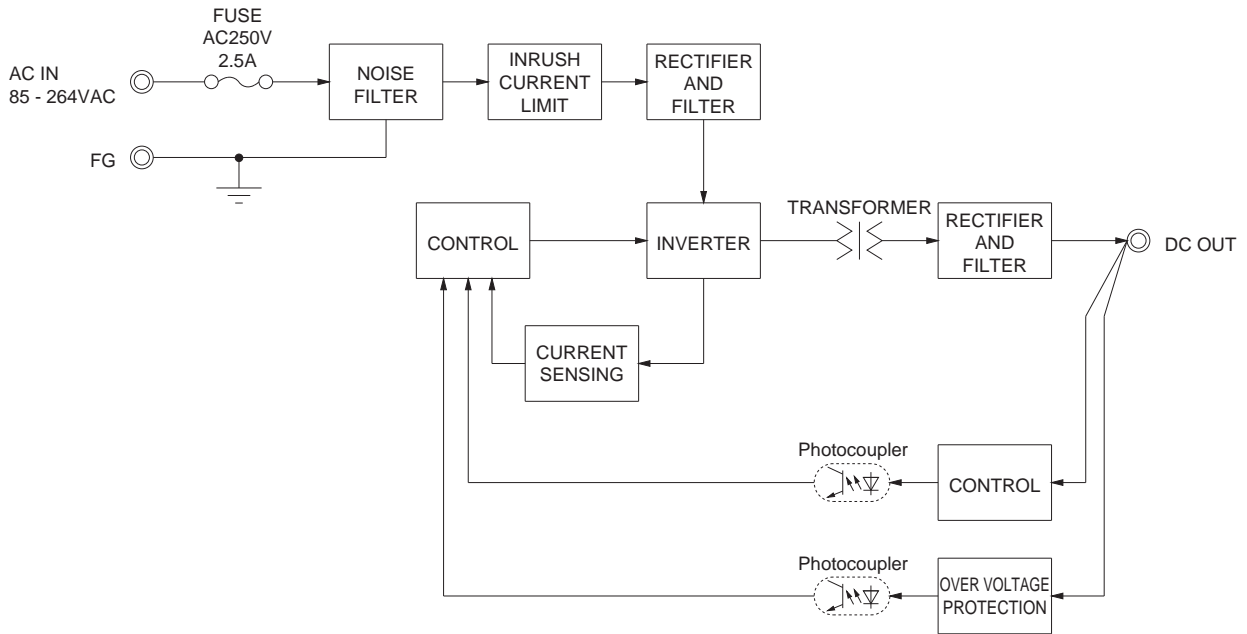
## SPECIFICATIONS

	MODEL	LHA30F-3R3-Y	LHA30F-5	LHA30F-12	LHA30F-15	LHA30F-24		
INPUT	VOLTAGE[VAC]	*2 85 - 264 1 φ (Refer to "Derating" and Instruction Manual 3)						
	CURRENT[A]	ACIN 100V	0.42typ	0.62typ				
		ACIN 230V	0.23typ	0.32typ				
	FREQUENCY[Hz]	50 / 60 (45 - 440)						
	EFFICIENCY[%]	ACIN 100V	83.0typ	83.0typ	85.0typ	85.5typ	87.0typ	
		ACIN 230V	85.5typ	87.0typ	88.5typ	89.0typ	90.0typ	
	INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) Ta=25°C at cold start					
	ACIN 230V	35typ (Io=100%) Ta=25°C at cold start						
LEAKAGE CURRENT[mA]	0.20 / 0.45max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC62368-1)							
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24		
	CURRENT[A]	*2 6.0	6.0	2.5	2.0	1.3		
	LINE REGULATION[mV]	*3 20max	20max	48max	60max	96max		
	LOAD REGULATION[mV]	*3 40max	40max	100max	120max	150max		
	RIPPLE[mVp-p]	*4	0 to +50°C	80max	80max	120max	120max	120max
			-10 to 0°C	140max	140max	160max	160max	160max
			Io=0 to 15%	300max	300max	300max	300max	300max
	RIPPLE NOISE[mVp-p]	*4	0 to +50°C	120max	120max	150max	150max	150max
			-10 to 0°C	160max	160max	180max	180max	180max
			Io=0 to 15%	360max	360max	360max	360max	360max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	120max	150max	240max	
		-10 to +50°C	60max	60max	150max	180max	290max	
	DRIFT[mV]	*5 20max	20max	48max	60max	96max		
	START-UP TIME[ms]	40typ (ACIN 100V, Io=100%)						
HOLD-UP TIME[ms]	25typ (ACIN 100V, Io=100%) / 170typ (ACIN 230V, Io=100%)							
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 to 3.63		Fixed ("Y"option is available for adjusting output voltage between ±10%)					
OUTPUT VOLTAGE SETTING[V]	3.30 to 3.40	4.90 to 5.30	11.50 to 12.50	14.40 to 15.60	23.00 to 25.00			
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically						
	OVERVOLTAGE PROTECTION	4.00 to 5.25	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60		
	OPERATING INDICATION	Not provided						
	REMOTE SENSING	Not provided						
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)						
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)						
	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 100MΩ min (At Room Temperature)						
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	*2 -10 to +70°C, 20 - 90%RH (Non condensing), 5,000m (16,500feet) max						
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max						
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis						
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis						
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL62368-1, c-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1						
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR11-B, CISPR32-B, EN55011-B, EN55032-B						
	HARMONIC ATTENUATOR	*6 Complies with IEC61000-3-2 (Class A) (No built-in power factor correction)						
OTHERS	CASE SIZE/WEIGHT	50 X 27 X 87.5mm [1.97 X 1.07 X 3.44 inches] (W X H X D) / 100g max (with chassis & cover : 210g max)						
	COOLING METHOD	*2 Convection/Forced air (Requires external fan) (Refer to "Derating" and Instruction Manual 3)						

\*1 The listed options may affect the published standard specifications. Please contact us for detailed product specifications.  
\*2 Derating is required.  
\*3 At low load conditions, the burst mode operation will start. To check load regulation, you will need to measure the characteristics at average mode with instruments.  
\*4 This is the value that measured on measuring board with capacitor of 22 μF and 0.1 μF at 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM104).  
Ripple and ripple noise spec is change at Io=0 to 15% by burst operation.

\*5 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
\*6 Please contact us about another class. When two or more units are operating it may not comply with the IEC61000-3-2. Please contact us for details.  
\* To meet the specification, do not operate overload condition.  
\* Parallel operation is not possible.  
\* Sound noise may be generated by power supply in case of pulse load.

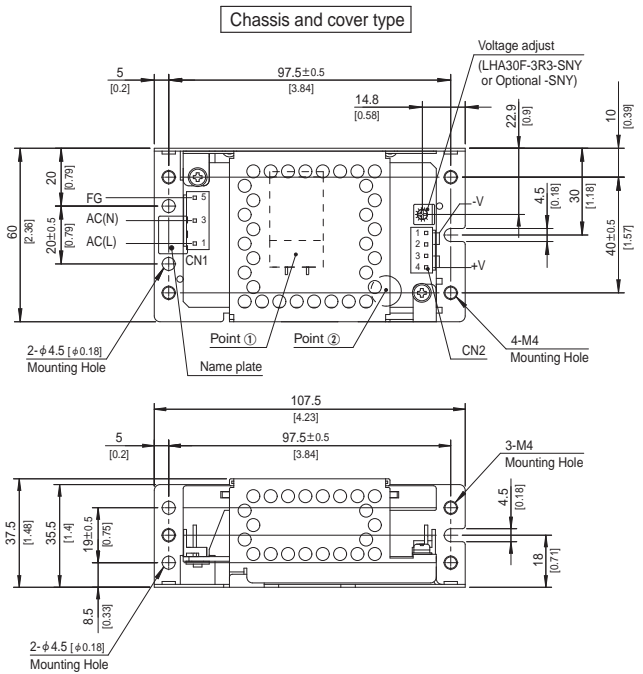
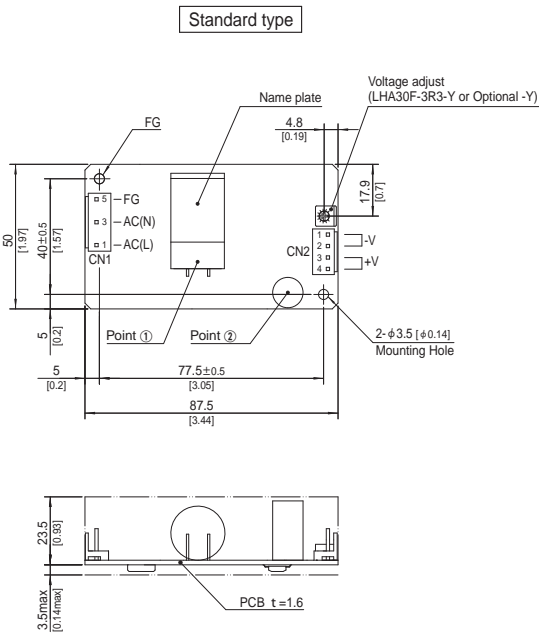
## Block diagram



LHA

## External view

※ External size of option is different from standard type.



- ※ The back side of PCB of the power supply is assembled some SMDs.  
Be careful not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm [0.31] length or more for isolation.  
And do not use press-fitting bush.
- ※ Point ①, Point ② are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating connector	Terminal
CN1	B3P5-VH	VHR-5N
		Chain SVH-21T-P1.1
CN2	B4P-VH	Chain SVH-21T-P1.1
		Loose BVH-21T-P1.1

(Mfr: J.S.T.)

- ※ I/O Connector is Mfr.J.S.T.
- ※ Option:-J4:EP (Tyco Electronics) connector type.

Pin No.	Input
1	AC(L)
2	
3	AC(N)
4	
5	FG

Pin No.	Output
1, 2	-V
3, 4	+V

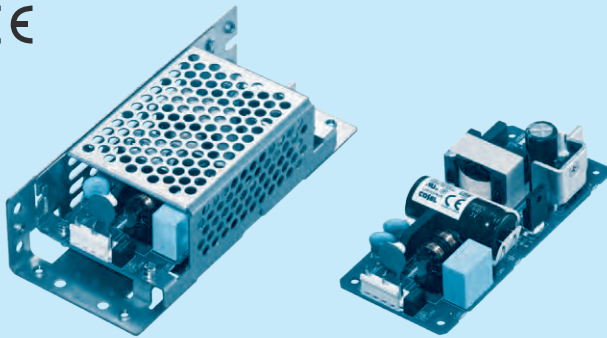
※ Keep drawing current per pin below 5A for CN2.

- ※ Tolerance :  $\pm 1 [\pm 0.04]$
- ※ Weight : 100g max (with chassis and cover : 210g max)
- ※ PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Dimensions in mm, [ ]=inches
- ※ Please connect safety ground to FG terminal on the unit.
- ※ Optional chassis and cover material : Hot-dip galvanizing steel board
- ※ Mounting torque (Mounting hole of chassis) : 1.5N·m max

# LHA50F

LH A 50 F -□□ -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
EAC-03-472



High voltage pulse noise type : EAP series  
Low leakage current type : EAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*1
- C : with Coating
- G : Low leakage current
- J4 : EP(Tyco)connector type
- S : with Chassis
- SN : with Chassis & cover
- Y : with Potentiometer

For option details, refer to Instruction Manual 6.

This power supply is manufactured by SMD technology. The stress to PCB like twisting or bending causes the defect of the unit, so handle the unit with care.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LHA50F-3R3-Y	LHA50F-5	LHA50F-12	LHA50F-15	LHA50F-24	LHA50F-36	LHA50F-48
MAX OUTPUT WATTAGE[W]	*2 26.4	40	51.6	52.5	50.4	50.4	52.8
DC OUTPUT	*2 3.3V8A	5V8A	12V4.3A	15V3.5A	24V2.1A	36V1.4A	48V1.1A

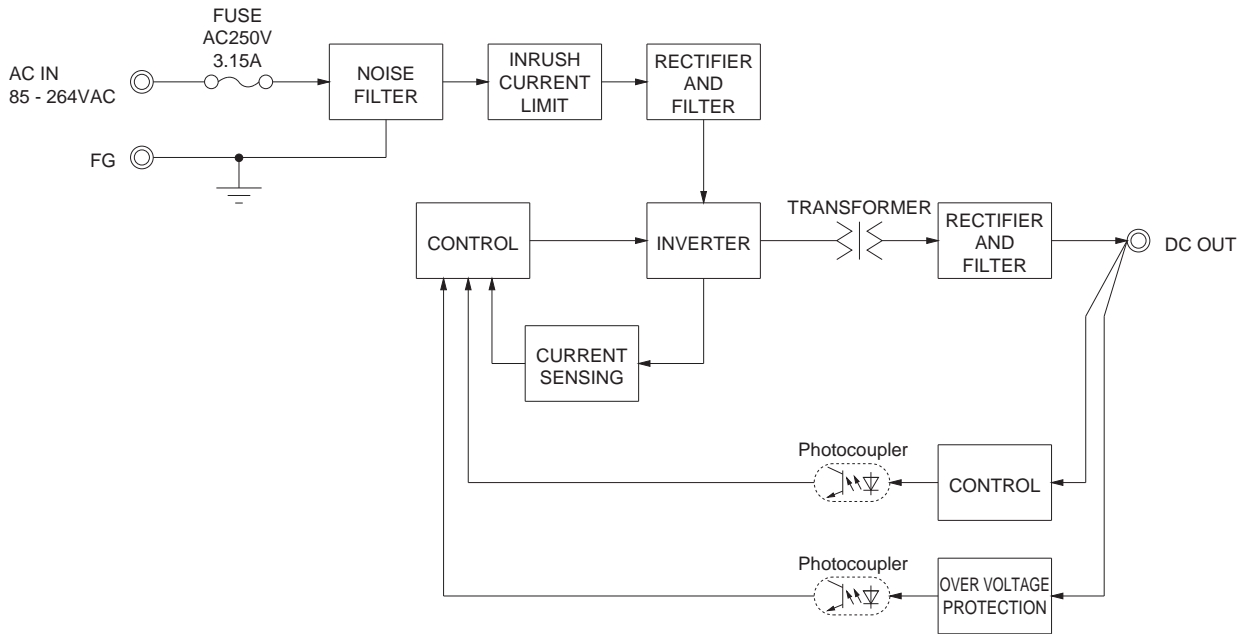
## SPECIFICATIONS

	MODEL	LHA50F-3R3-Y	LHA50F-5	LHA50F-12	LHA50F-15	LHA50F-24	LHA50F-36	LHA50F-48		
INPUT	VOLTAGE[VAC]	*2 85 - 264 1 φ (Refer to "Derating" and Instruction Manual 3)								
	CURRENT[A]	ACIN 100V	0.56typ	0.82typ	1.05typ					
		ACIN 230V	0.30typ	0.42typ		0.52typ				
	FREQUENCY[Hz]	50 / 60 (45 - 440)								
	EFFICIENCY[%]	ACIN 100V	80.0typ	83.0typ	87.0typ	85.5typ	86.0typ	86.5typ	86.5typ	
		ACIN 230V	83.5typ	86.5typ	90.5typ	89.0typ	89.0typ	90.0typ	90.0typ	
INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) Ta=25°C at cold start								
	ACIN 230V	35typ (Io=100%) Ta=25°C at cold start								
LEAKAGE CURRENT[mA]	0.30 / 0.65max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC62368-1)									
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	36	48		
	CURRENT[A]	*2 8.0	8.0	4.3	3.5	2.1	1.4	1.1		
	LINE REGULATION[mV]	*3 20max	20max	48max	60max	96max	144max	192max		
	LOAD REGULATION[mV]	*3 40max	40max	100max	120max	150max	240max	240max		
	RIPPLE[mVp-p]	*4	0 to +50°C	80max	80max	120max	120max	150max	150max	
			-10 to 0°C	140max	140max	160max	160max	160max	200max	200max
			Io=0 to 15%	300max	300max	300max	300max	300max	300max	300max
	RIPPLE NOISE[mVp-p]	*4	0 to +50°C	120max	120max	150max	150max	250max	250max	
			-10 to 0°C	160max	160max	180max	180max	180max	300max	300max
			Io=0 to 15%	360max	360max	360max	360max	360max	360max	360max
	TEMPERATURE REGULATION[mV]		0 to +50°C	50max	50max	120max	150max	240max	360max	
			-10 to +50°C	60max	60max	150max	180max	290max	450max	
	DRIFT[mV]	*5	20max	20max	48max	60max	96max	144max	192max	
START-UP TIME[ms]	40typ (ACIN 100V, Io=100%)									
HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%) / 140typ (ACIN 230V, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 to 3.63 Fixed ("Y"option is available for adjusting output voltage between ±10%)									
OUTPUT VOLTAGE SETTING[V]	3.30 to 3.40	4.90 to 5.30	11.50 to 12.50	14.40 to 15.60	23.00 to 25.00	34.50 to 37.50	46.00 to 50.00			
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	OVERVOLTAGE PROTECTION	4.00 to 5.25	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	41.40 to 50.40	55.20 to 67.20		
	OPERATING INDICATION	Not provided								
	REMOTE SENSING	Not provided								
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)								
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)								
	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 100MΩ min (At Room Temperature)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	*2 -10 to +70°C, 20 - 90%RH (Non condensing), 5,000m (16,500feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis								
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis								
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL62368-1, c-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1								
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR11-B, CISPR32-B, EN55011-B, EN55032-B								
	HARMONIC ATTENUATOR	*6 Complies with IEC61000-3-2 (Class A) (No built-in power factor correction)								
OTHERS	CASE SIZE/WEIGHT	50 X 27 X 112mm [1.97 X 1.07 X 4.41 inches] (W X H X D) / 140g max (with chassis & cover : 280g max)								
	COOLING METHOD	*2 Convection/Forced air (Requires external fan) (Refer to "Derating" and Instruction Manual 3)								

\*1 The listed options may affect the published standard specifications. Please contact us for detailed product specifications.  
 \*2 Derating is required.  
 \*3 At low load conditions, the burst mode operation will start. To check load regulation, you will need to measure the characteristics at average mode with instruments.  
 \*4 This is the value that measured on measuring board with capacitor of 22 μF and 0.1 μF at 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM104).  
 Ripple and ripple noise spec is change at Io=0 to 15% by burst operation.

\*5 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*6 Please contact us about another class. When two or more units are operating it may not comply with the IEC61000-3-2. Please contact us for details.  
 \* To meet the specification, do not operate overload condition.  
 \* Parallel operation is not possible.  
 \* Sound noise may be generated by power supply in case of pulse load.

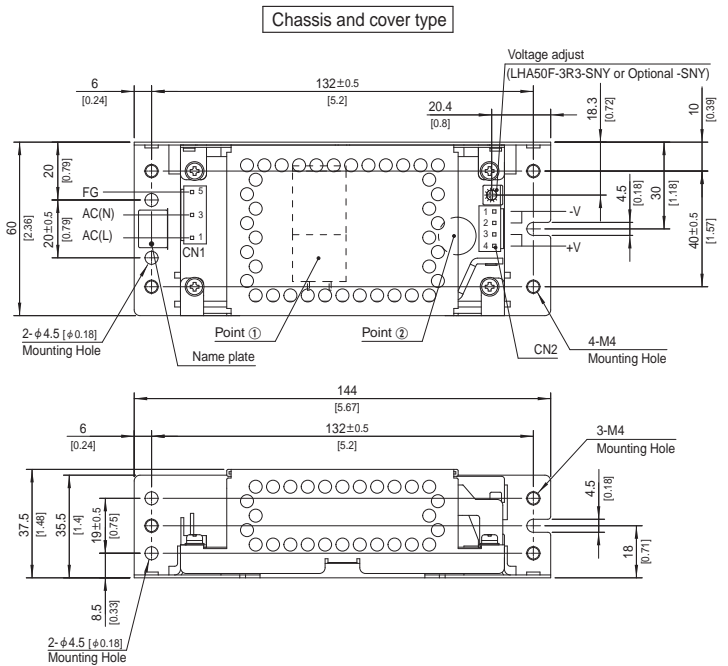
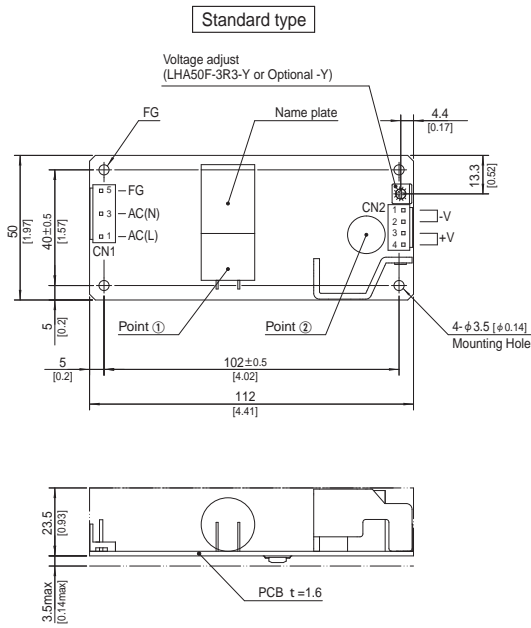
## Block diagram



LHA

## External view

※ External size of option is different from standard type.



- ※ 4 Mounting holes are existing.
- ※ The back side of PCB of the power supply is assembled some SMDs.  
Be careful not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm [0.31] length or more for isolation.  
And do not use press-fitting bush.
- ※ Point ①, Point ② are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating connector	Terminal
CN1	B3P5-VH	Chain SVH-21T-P1.1
		Loose BVH-21T-P1.1
CN2	B4P-VH	Chain SVH-21T-P1.1
		Loose BVH-21T-P1.1

(Mfr: J.S.T.)

- ※ I/O Connector is Mfr.J.S.T.
- ※ Option:-J4:EP (Tyco Electronics) connector type.

CN1	
Pin No.	Input
1	AC(L)
2	
3	AC(N)
4	
5	FG

CN2	
Pin No.	Output
1, 2	-V
3, 4	+V

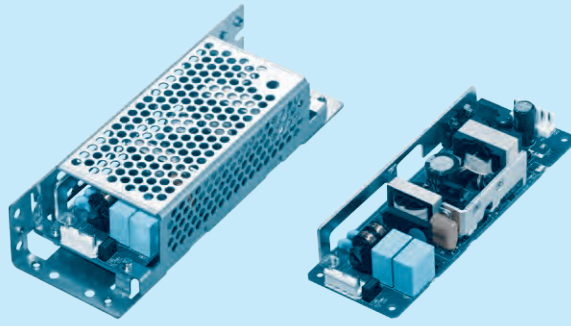
※ Keep drawing current per pin below 5A for CN2.

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 140g max (with chassis and cover : 280g max)
- ※ PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Dimensions in mm, [ ]=inches
- ※ Please connect safety ground to FG terminal on the unit.
- ※ Optional chassis and cover material : Hot-dip galvanizing steel board
- ※ Mounting torque (Mounting hole of chassis) : 1.5N·m max

# LHA75F

LH A 75 F -□□ -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
EAC-03-472



High voltage pulse noise type : EAP series  
Low leakage current type : EAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*1
- C : with Coating
- G : Low leakage current
- J4 : EP(Tyco)connector type
- S : with Chassis
- SN : with Chassis & cover
- Y : with Potentiometer

For option details, refer to Instruction Manual 6.

This power supply is manufactured by SMD technology. The stress to PCB like twisting or bending causes the defect of the unit, so handle the unit with care.  
\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LHA75F-3R3-Y	LHA75F-5	LHA75F-12	LHA75F-15	LHA75F-24	LHA75F-36	LHA75F-48
MAX OUTPUT WATTAGE[W]	*2 39.6	60	75.6	75	76.8	75.6	76.8
DC OUTPUT	*2 3.3V12A	5V12A	12V6.3A	15V5A	24V3.2A	36V2.1A	48V1.6A

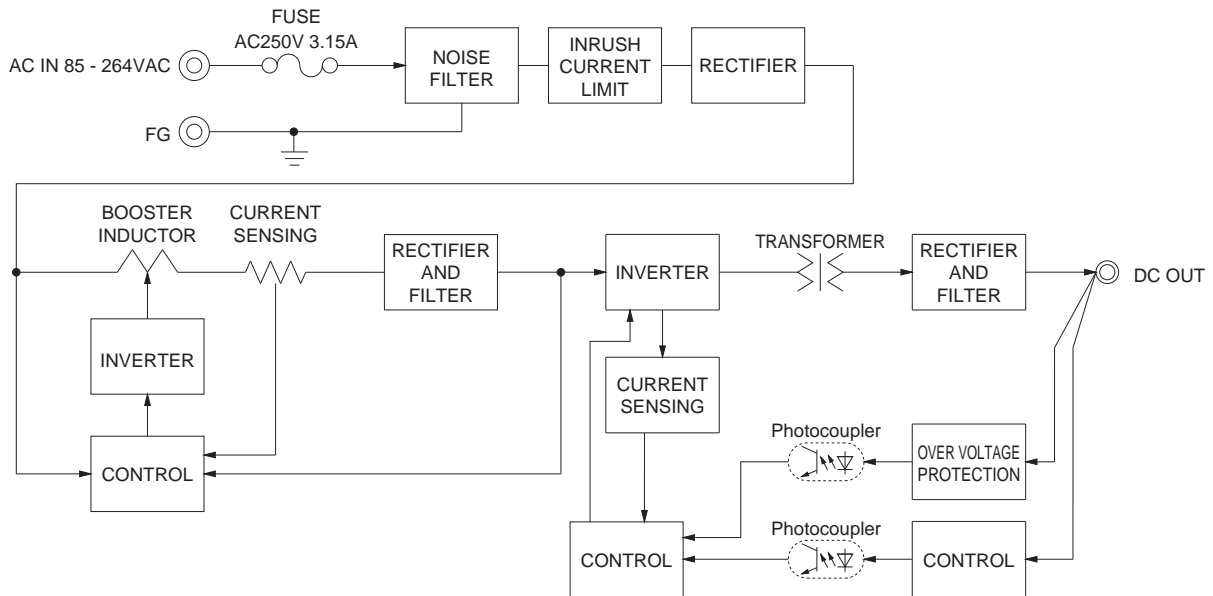
## SPECIFICATIONS

	MODEL	LHA75F-3R3-Y	LHA75F-5	LHA75F-12	LHA75F-15	LHA75F-24	LHA75F-36	LHA75F-48	
INPUT	VOLTAGE[VAC]	*2 85 - 264 1 φ (Refer to "Derating" and Instruction Manual 3)							
	CURRENT[A]	ACIN 100V	0.6typ	0.8typ	0.9typ				
		ACIN 230V	0.3typ	0.4typ	0.5typ				
	FREQUENCY[Hz]	50 / 60 (45 - 66)							
	EFFICIENCY[%]	ACIN 100V	74.0typ	79.0typ	84.5typ	85.5typ	86.0typ	87.5typ	87.5typ
		ACIN 230V	75.0typ	81.0typ	86.5typ	87.5typ	88.0typ	89.5typ	89.5typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.96typ	0.97typ					
ACIN 230V		0.70typ	0.80typ						
INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) Ta=25°C at cold start							
	ACIN 230V	35typ (Io=100%) Ta=25°C at cold start							
LEAKAGE CURRENT[mA]	0.40 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC62368-1)								
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	36	48	
	CURRENT[A]	*2 12.0	12.0	6.3	5.0	3.2	2.1	1.6	
	LINE REGULATION[mV]	*3 20max	20max	48max	60max	96max	144max	192max	
	LOAD REGULATION[mV]	*3 40max	40max	100max	120max	150max	240max	240max	
	RIPPLE[mVp-p]	0 to +50°C *7	80max	80max	120max	120max	120max	150max	150max
		-10 to 0°C	140max	140max	160max	160max	160max	200max	200max
		Io=0 to 15%	300max	300max	360max	500max	500max	500max	500max
	RIPPLE NOISE[mVp-p]	0 to +50°C *7	120max	120max	150max	150max	150max	250max	250max
		-10 to 0°C	160max	160max	180max	180max	180max	300max	300max
		Io=0 to 15%	360max	360max	400max	600max	600max	600max	600max
	TEMPERATURE REGULATION[mV]	0 to +50°C *7	50max	50max	120max	150max	240max	360max	480max
		-10 to +50°C *7	60max	60max	150max	180max	290max	450max	600max
	DRIFT[mV]	*5 20max	20max	48max	60max	96max	144max	192max	
	START-UP TIME[ms]	100typ (ACIN 100V, Io=100%)							
HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)								
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 to 3.63		Fixed ("Y"option is available for adjusting output voltage between ±10%)						
OUTPUT VOLTAGE SETTING[V]	3.30 to 3.40	4.90 to 5.30	11.50 to 12.50	14.40 to 15.60	23.00 to 25.00	34.50 to 37.50	46.00 to 50.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically							
	OVERVOLTAGE PROTECTION	4.00 to 5.25	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	41.40 to 50.40	55.20 to 67.20	
	OPERATING INDICATION	Not provided							
	REMOTE SENSING	Not provided							
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)							
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)							
	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 100MΩ min (At Room Temperature)							
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *2	-10 to +70°C, 20 - 90%RH (Non condensing), 5,000m (16,500feet) max							
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max							
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis							
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis							
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL62368-1, c-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1							
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR11-B, CISPR32-B, EN55011-B, EN55032-B							
	HARMONIC ATTENUATOR *6	Complies with IEC61000-3-2 (Class A)							
OTHERS	CASE SIZE/WEIGHT	50 X 27 X 150mm [1.97 X 1.07 X 5.91 inches] (W X H X D) / 190g max (with chassis & cover : 370g max)							
	COOLING METHOD	*2 Convection/Forced air (Requires external fan) (Refer to "Derating" and Instruction Manual 3)							

\*1 The listed options may affect the published standard specifications. Please contact us for detailed product specifications.  
 \*2 Derating is required.  
 \*3 At low load conditions, the burst mode operation will start. To check load regulation, you will need to measure the characteristics at average mode with instruments.  
 \*4 This is the value that measured on measuring board with capacitor of 22 μF and 0.1 μF at 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM104).

\*5 Ripple and ripple noise spec is change at Io=0 to 15% by burst operation.  
 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*6 Please contact us about another class.  
 \*7 3.3V and 5V output product, the maximum temperature of 40°C.  
 \*8 To meet the specification, do not operate overload condition.  
 \*9 Parallel operation is not possible.  
 \*10 Sound noise may be generated by power supply in case of pulse load.

## Block diagram

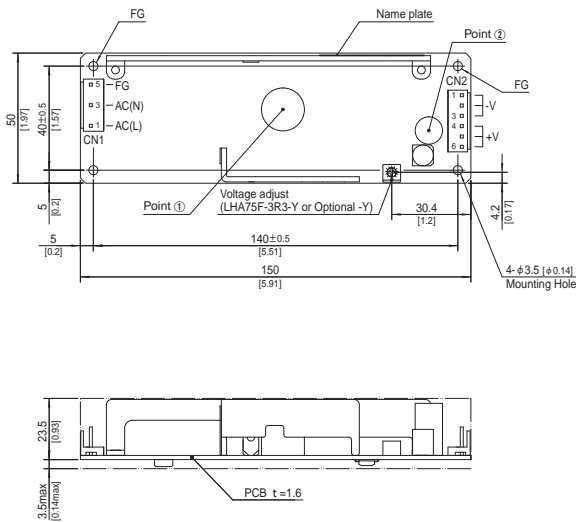


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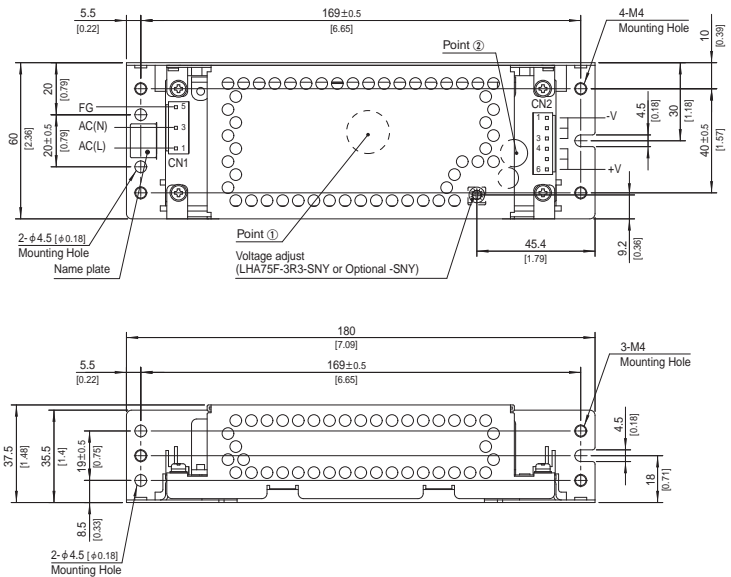
## External view

※ External size of option is different from standard type.

Standard type



Chassis and cover type



- ※ 4 Mounting holes are existing.
- ※ The back side of PCB of the power supply is assembled some SMDs.  
Be careful not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm [0.31] length or more for isolation.  
And do not use press-fitting bush.
- ※ Point ①, Point ② are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating connector	Terminal
CN1	B3P5-VH	VHR-5N
		Chain SVH-21T-P1.1
CN2	B6P-VH	Chain SVH-21T-P1.1
		Loose BVH-21T-P1.1

(Mfr: J.S.T.)

- ※ I/O Connector is Mfr.J.S.T.
- ※ Option:-J4:EP (Tyco Electronics) connector type.

Pin No.	Input
1	AC(L)
2	
3	AC(N)
4	
5	FG

Pin No.	Output
1 to 3	-V
4 to 6	+V

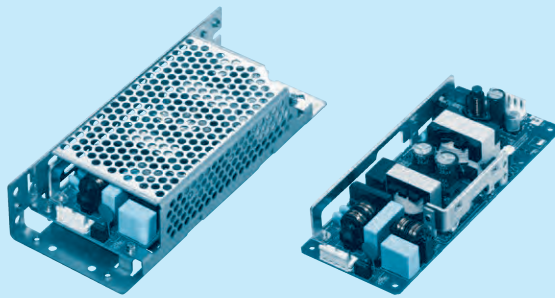
※ Keep drawing current per pin below 5A for CN2.

- ※ Tolerance :  $\pm 1 [\pm 0.04]$
- ※ Weight : 190g max (with chassis and cover : 370g max)
- ※ PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Dimensions in mm, [ ]=inches
- ※ Please connect safety ground to FG terminal on the unit.
- ※ Optional chassis and cover material : Hot-dip galvanizing steel board
- ※ Mounting torque (Mounting hole of chassis) : 1.5N·m max

# LHA100F

LH A 100 F -□□ -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
EAC-03-472



High voltage pulse noise type : EAP series  
Low leakage current type : EAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*1
- C : with Coating
- G : Low leakage current
- J4 : EP(Tyco)connector type
- R2 : with Remote ON/OFF
- S : with Chassis
- SN : with Chassis & cover
- Y : with Potentiometer

For option details, refer to Instruction Manual 6.

This power supply is manufactured by SMD technology. The stress to PCB like twisting or bending causes the defect of the unit, so handle the unit with care.  
\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LHA100F-5	LHA100F-12	LHA100F-15	LHA100F-24	LHA100F-36	LHA100F-48
MAX OUTPUT WATTAGE[W]	*2 75	102	100.5	103.2	100.8	100.8
DC OUTPUT	*2 5V15A	12V8.5A	15V6.7A	24V4.3A	36V2.8A	48V2.1A

## SPECIFICATIONS

	MODEL	LHA100F-5	LHA100F-12	LHA100F-15	LHA100F-24	LHA100F-36	LHA100F-48	
INPUT	VOLTAGE[VAC]	*2 85 - 264 1 φ (Refer to "Derating" and Instruction Manual 3)						
	CURRENT[A]	ACIN 100V	1.0typ	1.2typ				
		ACIN 230V	0.5typ	0.6typ				
	FREQUENCY[Hz]	50 / 60 (45 - 66)						
	EFFICIENCY[%]	ACIN 100V	82.0typ	87.0typ	88.0typ	86.5typ	87.0typ	87.0typ
		ACIN 230V	84.0typ	89.0typ	90.0typ	89.0typ	89.0typ	89.0typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.97typ	0.97typ				
		ACIN 230V	0.83typ	0.87typ				
INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) Ta=25°C at cold start						
	ACIN 230V	35typ (Io=100%) Ta=25°C at cold start						
LEAKAGE CURRENT[mA]	0.40 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC62368-1)							
OUTPUT	VOLTAGE[V]	5	12	15	24	36	48	
	CURRENT[A]	*2 15.0	8.5	6.7	4.3	2.8	2.1	
	LINE REGULATION[mV]	*3 20max	48max	60max	96max	144max	192max	
	LOAD REGULATION[mV]	*3 40max	100max	120max	150max	240max	240max	
	RIPPLE[mVp-p]	0 to +50°C *7	80max	120max	120max	120max	150max	150max
		-10 to 0°C	140max	160max	160max	160max	200max	200max
		Io=0 to 15%	300max	360max	500max	500max	500max	500max
	RIPPLE NOISE[mVp-p]	0 to +50°C *7	120max	150max	150max	150max	250max	250max
		-10 to 0°C	160max	180max	180max	180max	300max	300max
		Io=0 to 15%	360max	400max	600max	600max	600max	600max
	TEMPERATURE REGULATION[mV]	0 to +50°C *7	50max	120max	150max	240max	360max	480max
		-10 to +50°C *7	60max	150max	180max	290max	450max	600max
	DRIFT[mV]	*5 20max	48max	60max	96max	144max	192max	
	START-UP TIME[ms]	100typ (ACIN 100V, Io=100%)						
	HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)						
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed ("Y"option is available for adjusting output voltage between ±10%)							
OUTPUT VOLTAGE SETTING[V]	4.90 to 5.30	11.50 to 12.50	14.40 to 15.60	23.00 to 25.00	34.50 to 37.50	46.00 to 50.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically						
	OVERVOLTAGE PROTECTION	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	41.40 to 50.40	55.20 to 67.20	
	OPERATING INDICATION	Not provided						
	REMOTE SENSING	Not provided						
REMOTE CONTROL (RC)	Option (Refer to Instruction Manual 6.1)							
ISOLATION	INPUT-OUTPUT-RC	*8 AC3,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)						
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)						
	OUTPUT-RC-FG	*8 AC500V 1minute, Cutoff current = 25mA, DC500V 100MΩ min (At Room Temperature)						
	OUTPUT-RC	*8 AC100V 1minute, Cutoff current = 25mA, DC100V 10MΩ min (At Room Temperature)						
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	*2 -10 to +70°C, 20 - 90%RH (Non condensing), 5,000m (16,500feet) max						
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max						
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis						
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis						
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL62368-1, c-UL (equivalent to CAN/CSA-C22.2No.62368-1), EN62368-1						
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR11-B, CISPR32-B, EN55011-B, EN55032-B						
	HARMONIC ATTENUATOR	*6 Complies with EN61000-3-2 (Class A)						
OTHERS	CASE SIZE/WEIGHT	62 X 27 X 155mm [2.44 X 1.07 X 6.10 inches] (W X H X D) / 250g max (with chassis & cover : 450g max)						
	COOLING METHOD	*2 Convection/Forced air (Requires external fan) (Refer to "Derating" and Instruction Manual 3)						

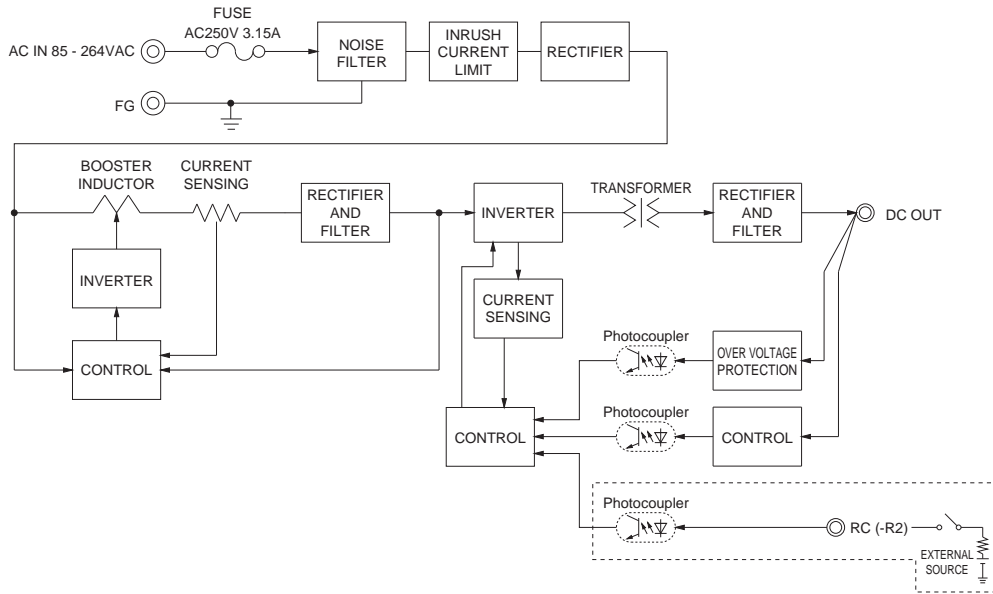
\*1 The listed options may affect the published standard specifications. Please contact us for detailed product specifications.  
\*2 Derating is required.  
\*3 At low load conditions, the burst mode operation will start. To check load regulation, you will need to measure the characteristics at average mode with instruments.  
\*4 This is the value that measured on measuring board with capacitor

of 22 μF and 0.1 μF at 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM104).  
Ripple and ripple noise spec is change at Io=0 to 15% by burst operation.  
\*5 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*6 Please contact us about another class.  
\*7 5V output product, the maximum temperature of 40°C.  
\*8 Applicable when Remote ON/OFF (optional) is added.  
\* To meet the specification, do not operate overload condition.  
\* Parallel operation is not possible.  
\* Sound noise may be generated by power supply in case of pulse load.



## Block diagram

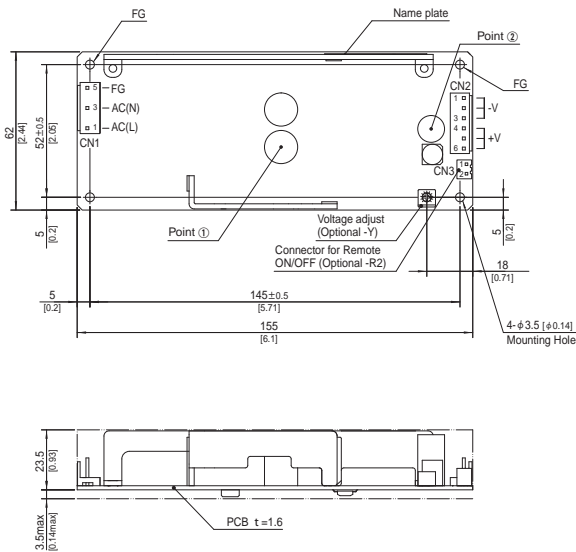


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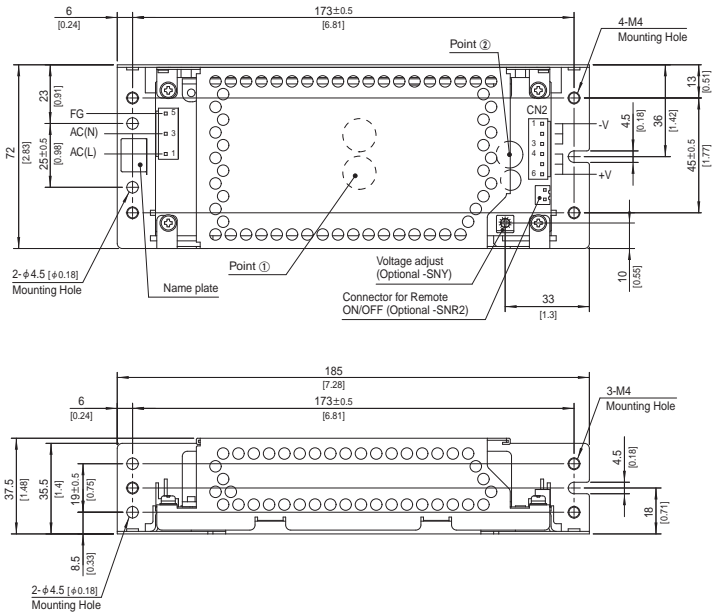
## External view

※ External size of option is different from standard type.

Standard type



Chassis and cover type



- ※ 4 Mounting holes are existing.
- ※ The back side of PCB of the power supply is assembled some SMDs.  
Be careful not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm [0.31] length or more for isolation.  
And do not use press-fitting bush.
- ※ Point ①, Point ② are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating connector	Terminal
CN1	B3P5-VH	VHR-5N
		Chain SVH-21T-P1.1
CN2	B6P-VH	VHR-6N
		Chain SVH-21T-P1.1
		Loose BVH-21T-P1.1

(Mfr: J.S.T.)

- ※ I/O Connector is Mfr.J.S.T.
- ※ Option:-J4:EP (Tyco Electronics) connector type.

Pin No.	Input
1	AC(L)
2	
3	AC(N)
4	
5	FG

Pin No.	Output
1 to 3	-V
4 to 6	+V

CN3 Option (Mfr:J.S.T.)

PIN No.	Contents
1	RC(+)
2	RC(-)

Model B2B-XH-A  
Mating Connector (Terminal)  
XHP-2  
(BXH-001T-P0.6  
or SXH-001T-P0.6)

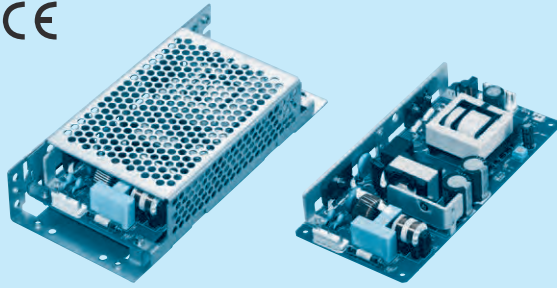
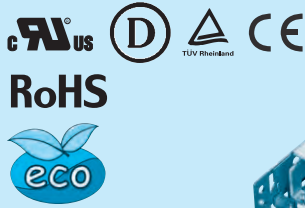
※ Keep drawing current per pin below 5A for CN2.

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 250g max (with chassis and cover : 450g max)
- ※ PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Dimensions in mm, [ ]=inches
- ※ Please connect safety ground to FG terminal on the unit.
- ※ Optional chassis and cover material : Hot-dip galvanizing steel board
- ※ Mounting torque (Mounting hole of chassis) : 1.5N·m max

# LHA150F

LH A 150 F -□□ -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
EAC-03-472



High voltage pulse noise type : EAP series  
Low leakage current type : EAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*1
- C : with Coating
- G : Low leakage current
- J4 : EP(Tyco)connector type
- R2 : with Remote ON/OFF
- S : with Chassis
- SN : with Chassis & cover
- U1 : Can be attached the external capacitor unit
- Y : with Potentiometer

This power supply is manufactured by SMD technology. The stress to PCB like twisting or bending causes the defect of the unit, so handle the unit with care.  
\* Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

For option details, refer to Instruction Manual 6.

MODEL	LHA150F-12	LHA150F-24	LHA150F-36	LHA150F-48
MAX OUTPUT WATTAGE[W]	150	151.2	151.2	153.6
DC OUTPUT	12V 12.5A	24V 6.3A	36V 4.2A	48V 3.2A

## SPECIFICATIONS

	MODEL	LHA150F-12	LHA150F-24	LHA150F-36	LHA150F-48	
INPUT	VOLTAGE[VAC]	85 - 264 1 φ (Refer to "Derating" and Instruction Manual 3)				
	CURRENT[A]	ACIN 100V	1.8typ			
		ACIN 230V	0.8typ			
	FREQUENCY[Hz]	50 / 60 (45 - 66)				
	EFFICIENCY[%]	ACIN 100V	86.5typ	89.0typ	89.5typ	90.0typ
		ACIN 230V	89.5typ	92.0typ	92.5typ	93.0typ
	POWER FACTOR (lo=100%)	ACIN 100V	0.99typ			
ACIN 230V		0.91typ				
INRUSH CURRENT[A]	ACIN 100V	15typ (lo=100%) Ta=25°C at cold start				
	ACIN 230V	35typ (lo=100%) Ta=25°C at cold start				
LEAKAGE CURRENT[μA]	0.40 / 0.75max (ACIN 100V / 240V 60Hz, lo=100%, According to IEC62368-1)					
OUTPUT	VOLTAGE[V]	12	24	36	48	
	CURRENT[A]	12.5	6.3	4.2	3.2	
	LINE REGULATION[mV]	48max	96max	144max	192max	
	LOAD REGULATION[mV]	100max	150max	240max	240max	
	RIPPLE[mVp-p]	0 to +50°C	120max	120max	150max	150max
		-10 to 0°C	160max	160max	200max	200max
		lo=0 to 10%	160max	160max	200max	200max
	RIPPLE NOISE[mVp-p]	0 to +50°C	150max	150max	250max	250max
		-10 to 0°C	180max	180max	300max	300max
		lo=0 to 10%	230max	230max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +50°C	120max	240max	360max	480max
		-10 to +50°C	150max	290max	450max	600max
	DRIFT[mV]	48max	96max	144max	192max	
	START-UP TIME[ms]	700typ (ACIN 100V, lo=100%)				
HOLD-UP TIME[ms]	20typ (ACIN 100V, lo=100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed ("Y" option is available for adjusting output voltage between +10%, -5%)					
OUTPUT VOLTAGE SETTING[V]	11.50 to 12.50	23.00 to 25.00	34.50 to 37.50	46.00 to 50.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION	13.80 to 16.80	27.60 to 33.60	41.40 to 50.40	55.20 to 67.20	
	OPERATING INDICATION	Not provided				
	REMOTE SENSING	Not provided				
ISOLATION	REMOTE ON/OFF	Option (Refer to Instruction Manual 6.1)				
	INPUT-OUTPUT-RC	AC3,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)				
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)				
	OUTPUT-RC-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 100MΩ min (At Room Temperature)				
ENVIRONMENT	OUTPUT-RC	AC100V 1minute, Cutoff current = 25mA, DC100V 10MΩ min (At Room Temperature)				
	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +70°C, 20 - 90%RH (Non condensing), 3,000m (10,000feet) max (EN62477-1 (OVC III) : 2,000m (6,600feet) max)				
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max				
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis				
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis				
	AGENCY APPROVALS	UL62368-1, c-UL (equivalent to CAN/CSA-22.2 No.62368-1), EN62368-1, EN62477-1 (OVC III)				
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR11-B, CISPR32-B, EN55011-B, EN55032-B				
OTHERS	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A)				
	CASE SIZE/WEIGHT	75 X 27 X 160mm [2.95 X 1.07 X 6.30 inches] (W X H X D) / 320g max (with chassis & cover : 570g max)				
	COOLING METHOD	Convection/Forced air (Requires external fan) (Refer to "Derating" and Instruction Manual 3)				

\*1 The listed options may affect the published standard specifications. Please contact us for detailed product specifications.

\*2 Derating is required.

\*3 At low load conditions, the burst mode operation will start. To check load regulation, you will need to measure the characteristics at average mode with instruments.

\*4 This is the value that measured on measuring board with capacitor of 22 μF and 0.1 μF at 150mm from output terminal. Measured

by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM104).  
Ripple and ripple noise spec is change at lo=0 to 10% by burst operation.

\*5 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*6 Please contact us about another class.

\*7 12V output product, the maximum temperature of 40°C.

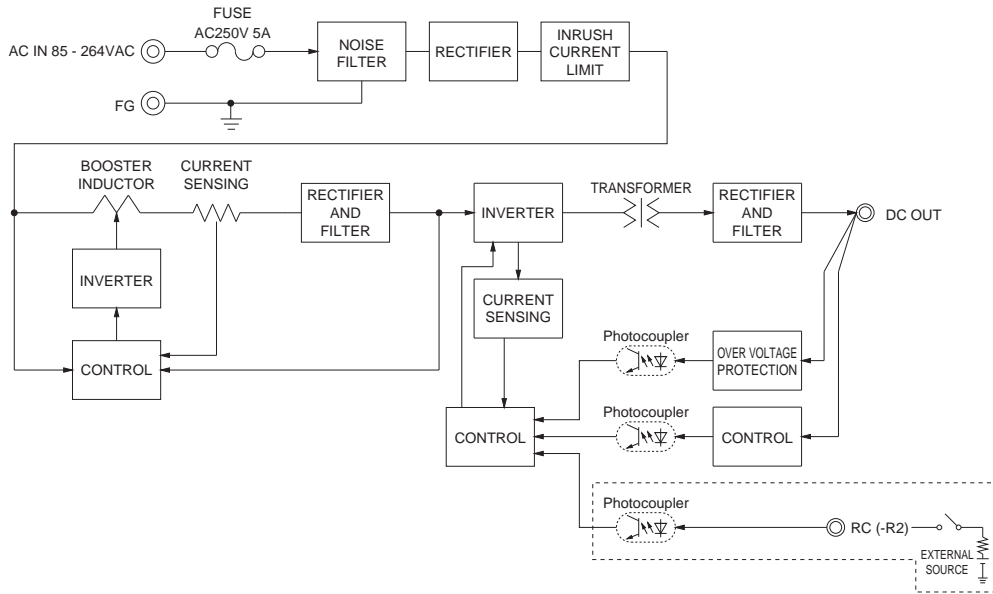
\*8 Applicable when Remote ON/OFF (optional) is added.

\* To meet the specification, do not operate overload condition.

\* Parallel operation is not possible.

\* Sound noise may be generated by power supply in case of pulse load.

## Block diagram

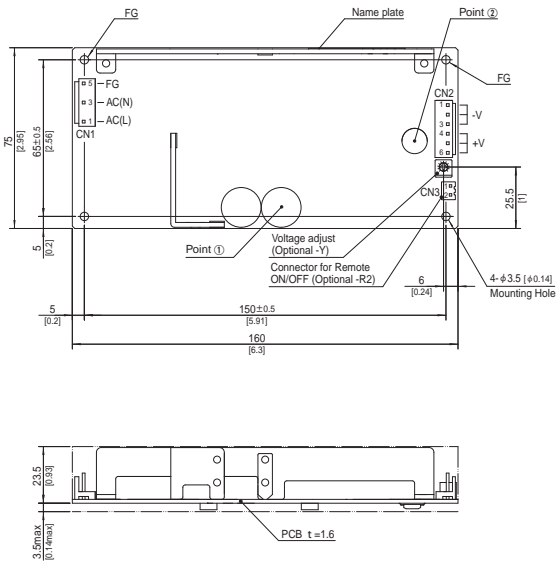


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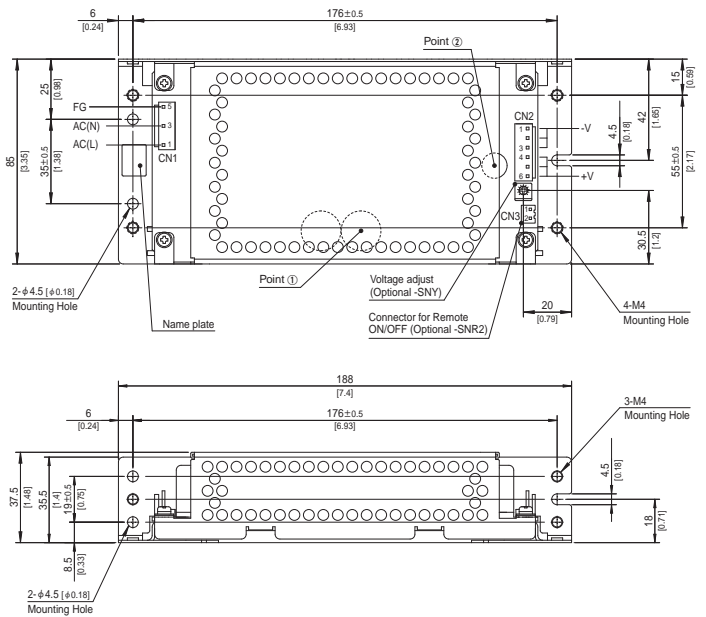
## External view

※ External size of option is different from standard type.

Standard type



Chassis and cover type



- ※ 4 Mounting holes are existing.
- ※ The back side of PCB of the power supply is assembled some SMDs.  
Be careful not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm [0.31] length or more for isolation.  
And do not use press-fitting bush.
- ※ Point ①, Point ② are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating connector	Terminal
CN1	B3P5-VH	Chain SVH-21T-P1.1
		Loose BVH-21T-P1.1
CN2	B6P-VH	Chain SVH-21T-P1.1
		Loose BVH-21T-P1.1

(Mfr: J.S.T.)

- ※ I/O Connector is Mfr.J.S.T.
- ※ Option:-J4:EP (Tyco Electronics) connector type.

CN1

Pin No.	Input
1	AC(L)
2	
3	AC(N)
4	
5	FG

CN2

Pin No.	Output
1 to 3	-V
4 to 6	+V

CN3 Option (Mfr:J.S.T.)

PIN No.	Contents
1	RC(+)
2	RC(-)

Model B2B-XH-A  
Mating Connector (Terminal)  
XHP-2  
(BXH-001T-P0.6  
or SXH-001T-P0.6)

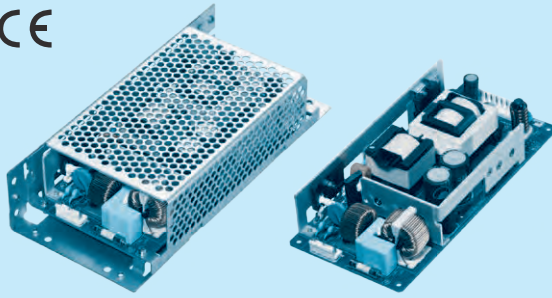
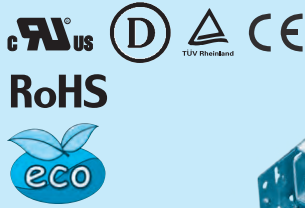
※ Keep drawing current per pin below 5A for CN2.

- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 320g max (with chassis and cover : 570g max)
- ※ PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Dimensions in mm, [ ]=inches
- ※ Please connect safety ground to FG terminal on the unit.
- ※ Optional chassis and cover material : Hot-dip galvanizing steel board
- ※ Mounting torque (Mounting hole of chassis) : 1.5N·m max

# LHA300F

LH A 300 F -□□ -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
EAC-06-472



High voltage pulse noise type : EAP series  
Low leakage current type : EAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*1
- C : with Coating
- G : Low leakage current
- J4 : EP(Tyco)connector type
- J5 : 8 pin type(Output connector)
- R2 : with Remote ON/OFF
- S : with Chassis
- SN : with Chassis & cover
- T : Terminal block type
- U1 : Can be attached the external capacitor unit

This power supply is manufactured by SMD technology. The stress to PCB like twisting or bending causes the defect of the unit, so handle the unit with care.

\* Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

For option details, refer to Instruction Manual 6.

MODEL	LHA300F-12-Y	LHA300F-24-Y	LHA300F-48-Y
MAX OUTPUT WATTAGE[W]	300	300	302.4
DC OUTPUT	12V 25A	24V 12.5A	48V 6.3A

## SPECIFICATIONS

	MODEL	LHA300F-12-Y	LHA300F-24-Y	LHA300F-48-Y	
INPUT	VOLTAGE[VAC]	*2 85 - 264 1 φ (Refer to "Derating" and Instruction Manual 3)			
	CURRENT[A]	ACIN 100V	3.5typ		
		ACIN 230V	1.6typ		
	FREQUENCY[Hz]	50 / 60 (45 - 66)			
	EFFICIENCY[%]	ACIN 100V	90.0typ	91.5typ	92.0typ
		ACIN 230V	92.0typ	93.5typ	94.0typ
	POWER FACTOR (lo=100%)	ACIN 100V	0.99typ		
ACIN 230V		0.93typ			
INRUSH CURRENT[A]	ACIN 100V	20typ (lo=100%) Ta=25°C at cold start			
	ACIN 230V	40typ (lo=100%) Ta=25°C at cold start			
LEAKAGE CURRENT[mA]	0.40 / 0.75max (ACIN 100V / 240V 60Hz, lo=100%, According to IEC62368-1)				
OUTPUT	VOLTAGE[V]	12	24	48	
	CURRENT[A]	*2 25.0	12.5	6.3	
	LINE REGULATION[mV]	*3 48max	96max	192max	
	LOAD REGULATION[mV]	*3 100max	150max	240max	
	RIPPLE[mVp-p]	0 to +50°C *7	120max	120max	150max
		-10 to 0°C	160max	160max	200max
		lo=0 to 10%	160max	160max	200max
	RIPPLE NOISE[mVp-p]	0 to +50°C *7	150max	150max	250max
		-10 to 0°C	180max	180max	300max
		lo=0 to 10%	180max	180max	300max
	TEMPERATURE REGULATION[mV]	0 to +50°C *7	120max	240max	480max
		-10 to +50°C *7	150max	290max	600max
	DRIFT[mV]	*5 48max	96max	192max	
	START-UP TIME[ms]	700typ (ACIN 100V, lo=100%)			
HOLD-UP TIME[ms]	25typ (ACIN 100V, lo=100%)				
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	11.40 to 13.20	22.80 to 26.40	45.60 to 52.80		
OUTPUT VOLTAGE SETTING[V]	12.00 to 12.48	24.00 to 24.96	48.00 to 49.92		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically			
	OVERVOLTAGE PROTECTION	13.80 to 16.80	27.60 to 33.60	55.20 to 67.20	
	OPERATING INDICATION	Not provided			
	REMOTE SENSING	Not provided			
REMOTE ON/OFF	Option (Refer to Instruction Manual 6.1)				
ISOLATION	INPUT-OUTPUT-RC	*8 AC3,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)			
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)			
	OUTPUT-RC-FG	*8 AC500V 1minute, Cutoff current = 25mA, DC500V 100MΩ min (At Room Temperature)			
	OUTPUT-RC	*8 AC100V 1minute, Cutoff current = 25mA, DC100V 10MΩ min (At Room Temperature)			
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	*2 -10 to +70°C, 20 - 90%RH (Non condensing), 3,000m (10,000feet) max (EN62477-1 (OVC III) : 2,000m (6,600feet) max)			
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max			
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis			
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL62368-1, c-UL (equivalent to CAN/CSA-22.2 No.62368-1), EN62368-1, EN62477-1 (OVC III)			
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR11-B, CISPR32-B, EN55011-B, EN55032-B			
	HARMONIC ATTENUATOR	*6 Complies with IEC61000-3-2 (Class A)			
OTHERS	CASE SIZE/WEIGHT	84 × 37 × 180mm [3.31 × 1.46 × 7.09 inches] (W × H × D) / 580g max (with chassis & cover : 890g max)			
	COOLING METHOD	*2 Convection/Forced air (Requires external fan) (Refer to "Derating" and Instruction Manual 3)			

\*1 The listed options may affect the published standard specifications. Please contact us for detailed product specifications.

\*2 Derating is required.

\*3 At low load conditions, the burst mode operation will start. To check load regulation, you will need to measure the characteristics at average mode with instruments.

\*4 This is the value that measured on measuring board with capacitor of 22 μF and 0.1 μF at 150mm from output terminal. Measured

by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM104).

Ripple and ripple noise spec is change at lo=0 to 10% by burst operation.

\*5 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*6 Please contact us about another class.

\*7 12V output product, the maximum temperature of 35°C.

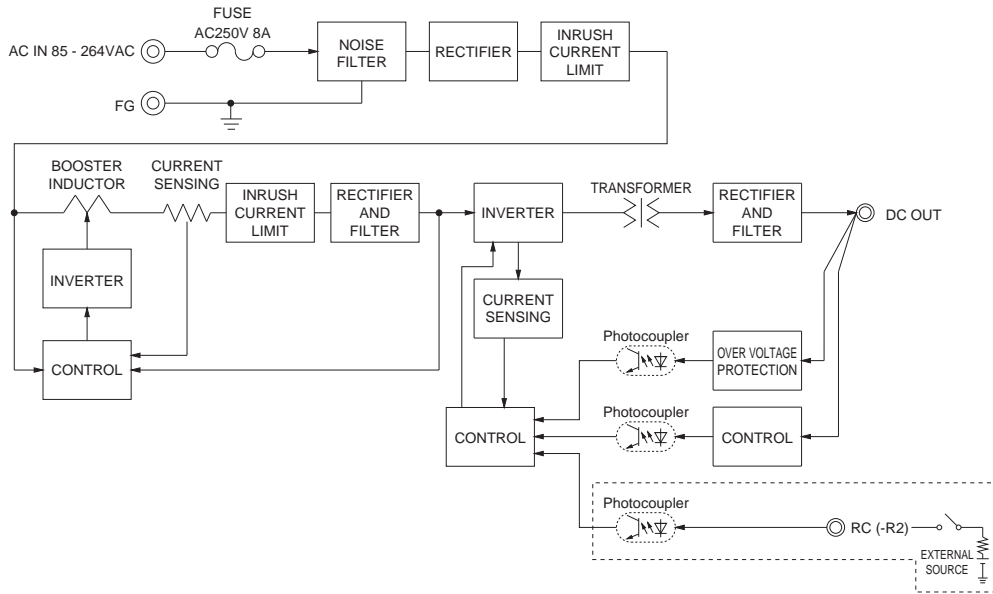
\*8 Applicable when Remote ON/OFF (optional) is added.

To meet the specification, do not operate overload condition.

Parallel operation is not possible.

Sound noise may be generated by power supply in case of pulse load.

## Block diagram

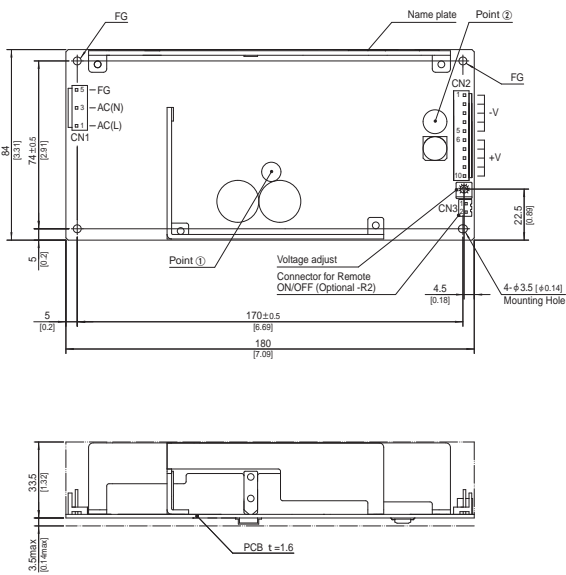


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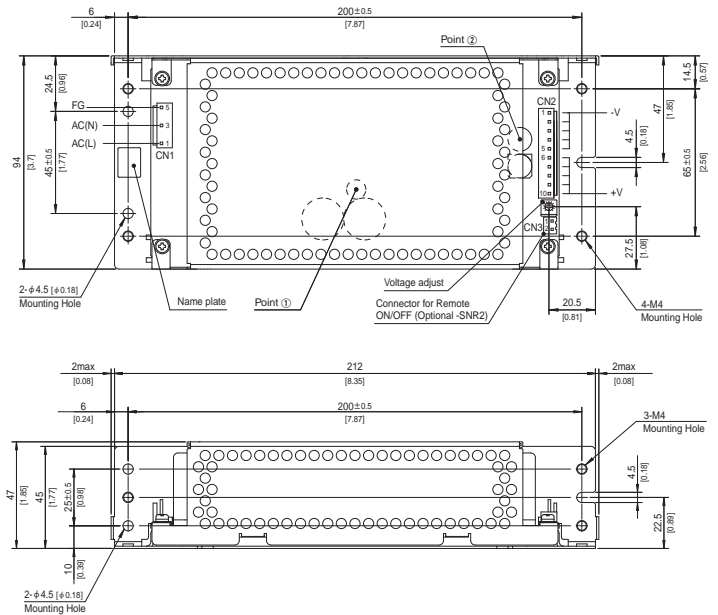
## External view

※ External size of option is different from standard type.

Standard type



Chassis and cover type



- ※ 4 Mounting holes are existing.
- ※ The back side of PCB of the power supply is assembled some SMDs.  
Be careful not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm [0.31] length or more for isolation.  
And do not use press-fitting bush.
- ※ Point ①, Point ② are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating connector	Terminal
CN1	B3P5-VH	Chain SVH-21T-P1.1
		Loose BVH-21T-P1.1
CN2	B10P-VH	Chain SVH-21T-P1.1
		Loose BVH-21T-P1.1

(Mfr: J.S.T.)

- ※ I/O Connector is Mfr.J.S.T.
- ※ Option:-J4:EP (Tyco Electronics) connector type.
- ※ Option:-J5:Output connector as 8 pin type.

CN1

Pin No.	Input
1	AC(L)
2	
3	AC(N)
4	
5	FG

CN2

Pin No.	Output
1 to 5	-V
6 to 10	+V

※ Keep drawing current per pin below 5A for CN2.

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 580g max (with chassis and cover : 890g max)
- ※ PCB Material / thickness : FR-4 / 1.6mm [0.06]
- ※ Dimensions in mm, [ ]=inches
- ※ Please connect safety ground to FG terminal on the unit.
- ※ Optional chassis and cover material : Hot-dip galvanizing steel board
- ※ Mounting torque (Mounting hole of chassis) : 1.5N·m max

CN3 Option (Mfr:J.S.T.)

PIN No.	Contents
1	RC(+)
2	RC(-)

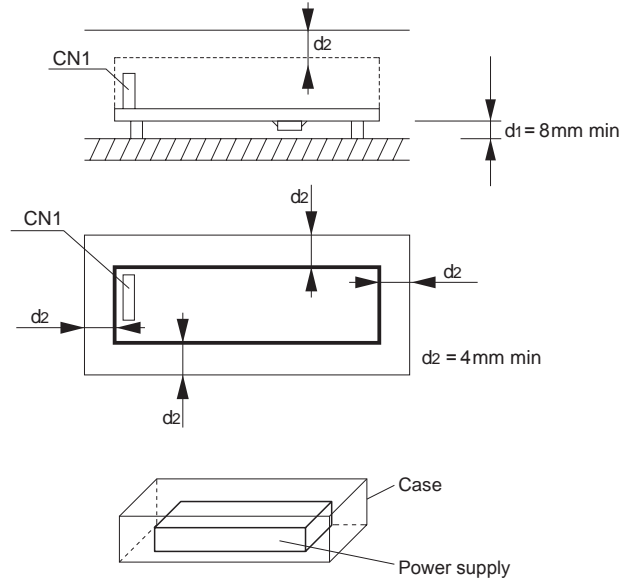
Model B2B-XH-A  
Mating Connector (Terminal)  
XHP-2  
(BXH-001T-P0.6  
or SXH-001T-P0.6)

Assembling and Installation Method

Installation method

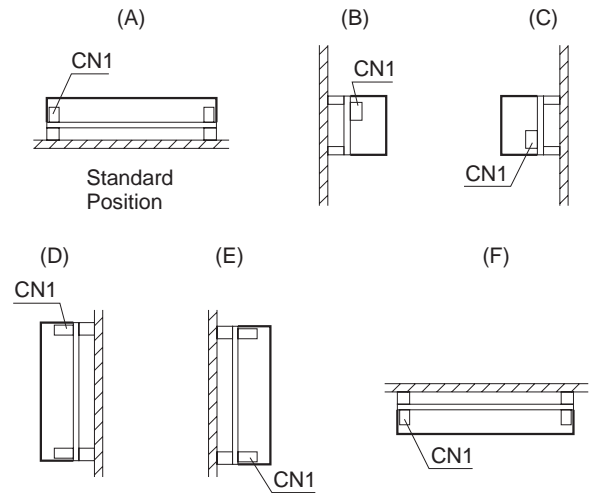
■ This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.

■ In case of metal chassis, keep the distance between  $d_1$  &  $d_2$  for to insulate between lead of component and metal chassis, use the spacer of 8mm or more between  $d_1$ . If it is less than  $d_1$  &  $d_2$ , insert the insulation sheet between power supply and metal chassis.



■ There is a possibility that it is not possible to cool enough when the power supply is used by the sealing up space as showing in right figure. Please use it after confirming the temperature of point ① and point ② of Instruction Manual right figure.

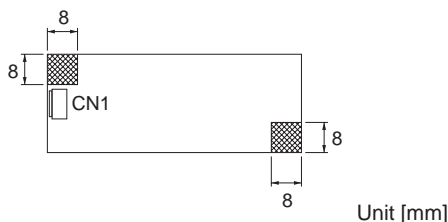
■ (F) mounting is not possible when unit is with case cover, but if you need to operate unit by (F) positioning with case cover, temperature / load derating is necessary. For more details, please contact our sales or engineering departments.



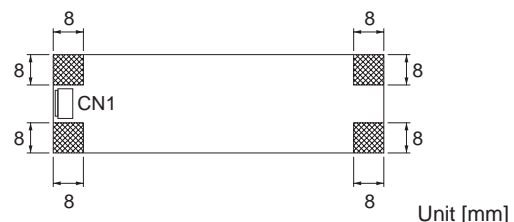
Mounting screw

■ The mounting screw should be  $\phi 3\text{mm}$ . The hatched area shows the allowance of metal parts for mounting.

● LHA30F



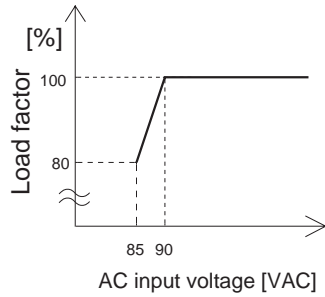
● LHA50F, LHA75F, LHA100F, LHA150F, LHA300F



■ If metallic fittings are used on the component side of the board, ensure there is no contact with surface mounted components.  
 ■ This product uses SMD technology. Please avoid the PCB installation method which includes the twisting stress or the bending stress.

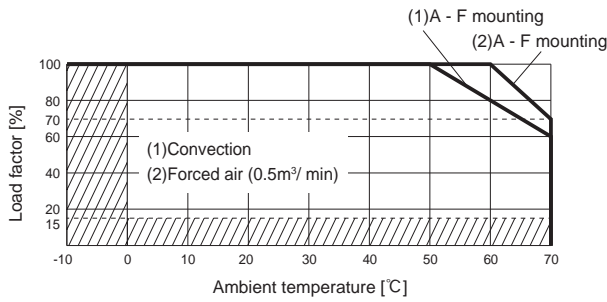
Derating

● Derating curve for input voltage

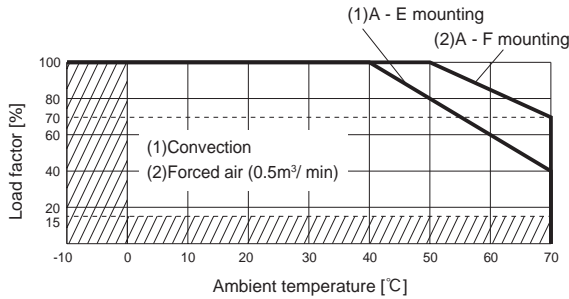


LHA

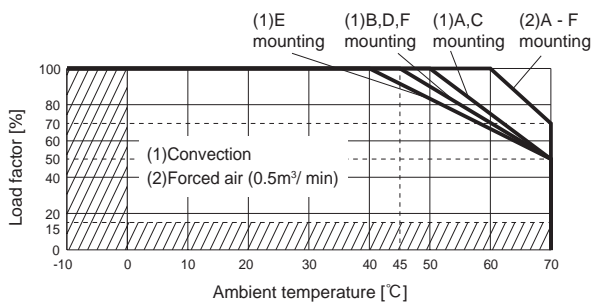
● LHA30F-3R3-Y, -5, -12, -15, -24  
Ambient temperature derating curve  
(Reference value)



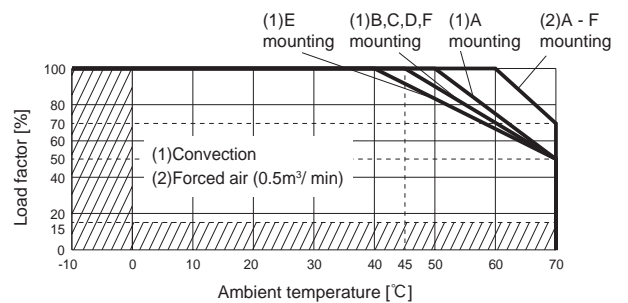
● LHA30F-3R3-SNY, -5-SN, -12-SN, -15-SN, -24-SN  
Ambient temperature derating curve  
(Reference value)



● LHA50F-3R3-Y, -5, -24, -36, -48  
Ambient temperature derating curve  
(Reference value)

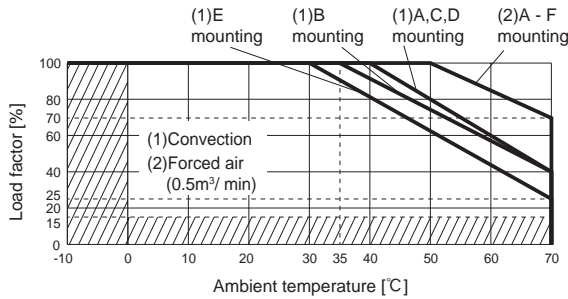


● LHA50F-12, -15  
Ambient temperature derating curve  
(Reference value)

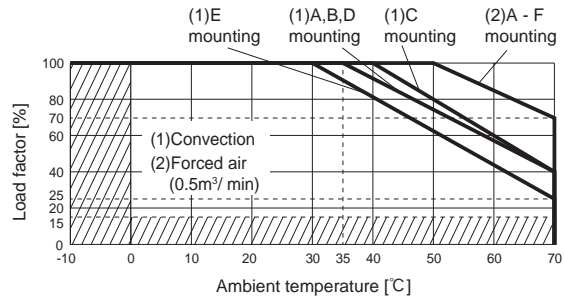


Derating

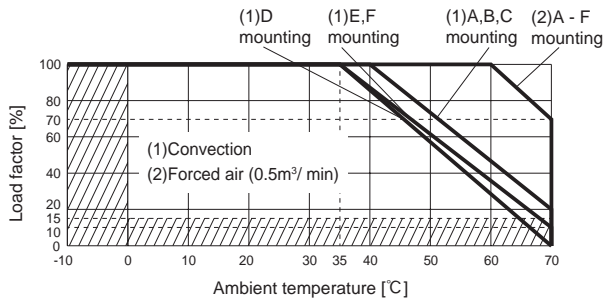
- LHA50F-3R3-SNY, -12-SN, -24-SN, -36-SN, -48-SN  
Ambient temperature derating curve  
(Reference value)



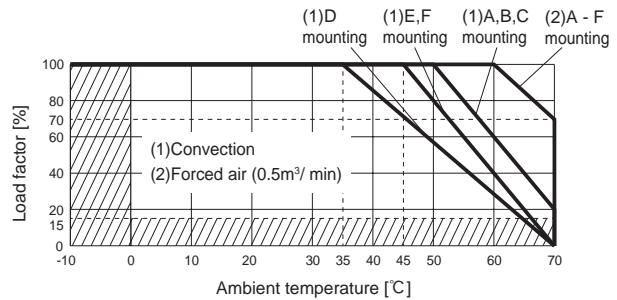
- LHA50F-5-SN, -15-SN  
Ambient temperature derating curve  
(Reference value)



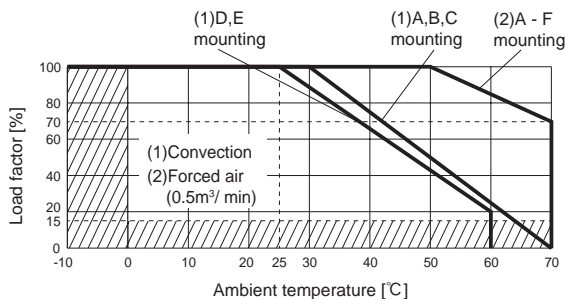
- LHA75F-3R3-Y, -5  
Ambient temperature derating curve  
(Reference value)



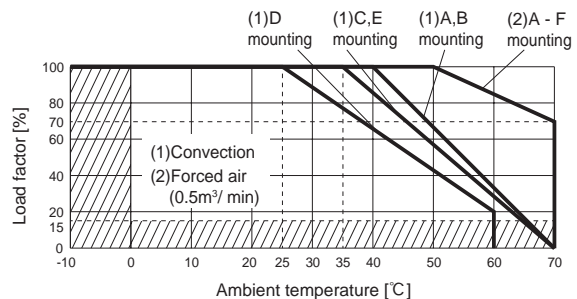
- LHA75F-12, -15, -24, -36, -48  
Ambient temperature derating curve  
(Reference value)



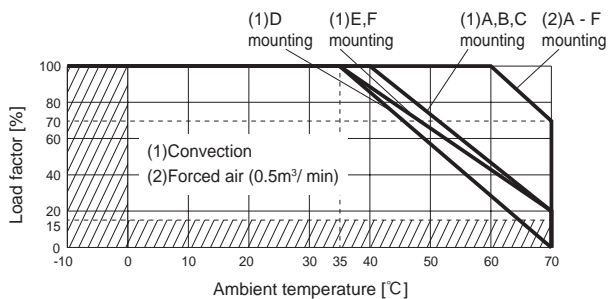
- LHA75F-3R3-SNY, -5-SN  
Ambient temperature derating curve  
(Reference value)



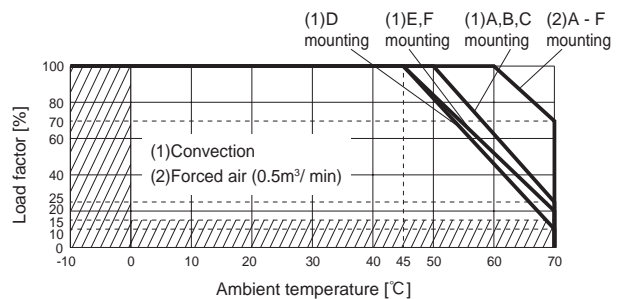
- LHA75F-12-SN, -15-SN, -24-SN, -36-SN, -48-SN  
Ambient temperature derating curve  
(Reference value)



- LHA100F-5  
Ambient temperature derating curve  
(Reference value)



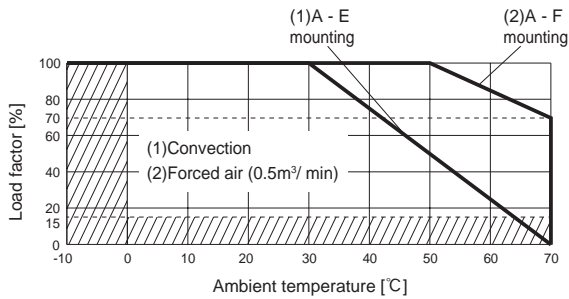
- LHA100F-12, -15, -24, -36, -48  
Ambient temperature derating curve  
(Reference value)



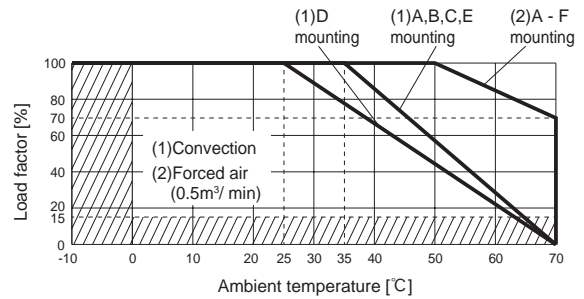


Derating

- LHA100F-5-SN  
Ambient temperature derating curve  
(Reference value)

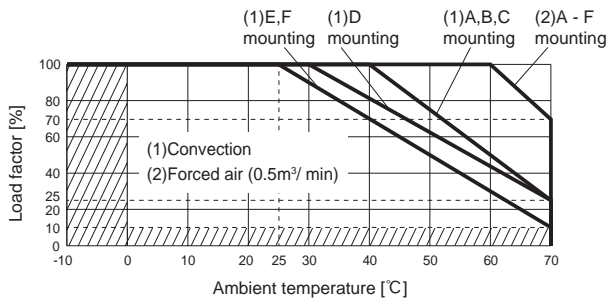


- LHA100F-12-SN, -15-SN, -24-SN, -36-SN, -48-SN  
Ambient temperature derating curve  
(Reference value)

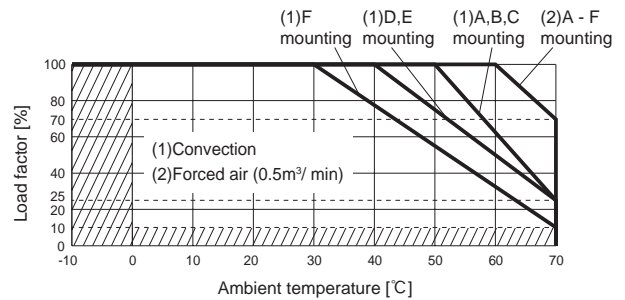


LHA

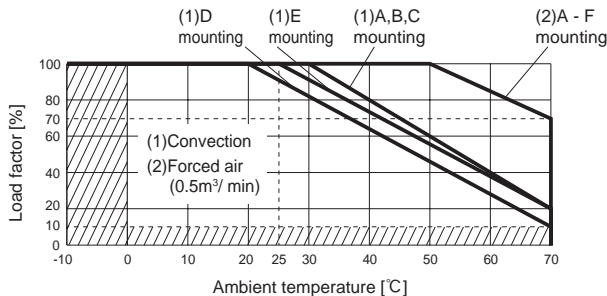
- LHA150F-12  
Ambient temperature derating curve  
(Reference value)



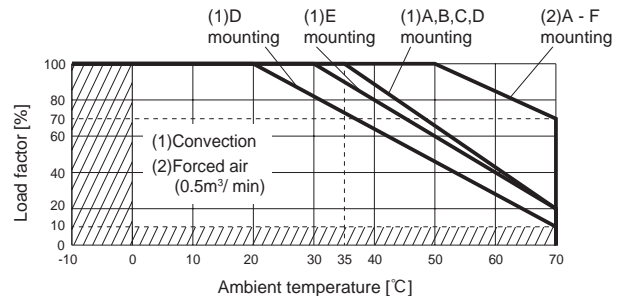
- LHA150F-24, -36, -48  
Ambient temperature derating curve  
(Reference value)



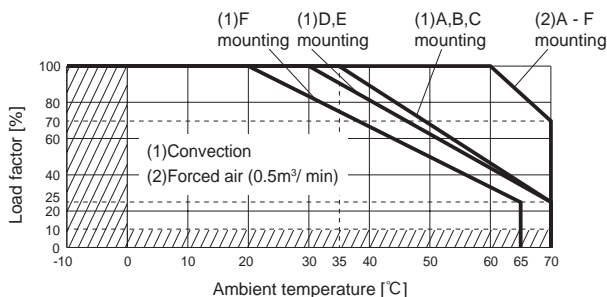
- LHA150F-12-SN  
Ambient temperature derating curve  
(Reference value)



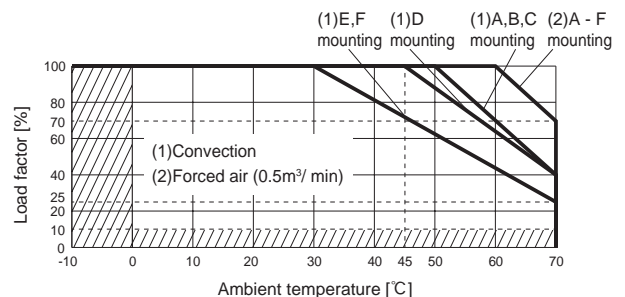
- LHA150F-24-SN, -36-SN, -48-SN  
Ambient temperature derating curve  
(Reference value)



- LHA300F-12-Y  
Ambient temperature derating curve  
(Reference value)

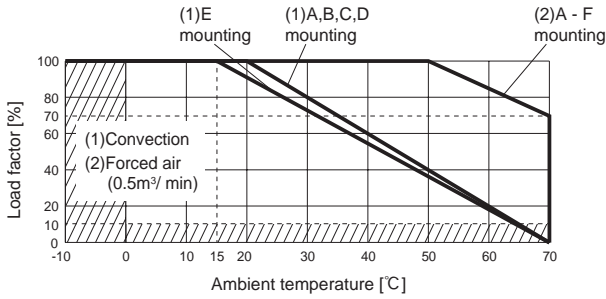


- LHA300F-24-Y, -48-Y  
Ambient temperature derating curve  
(Reference value)

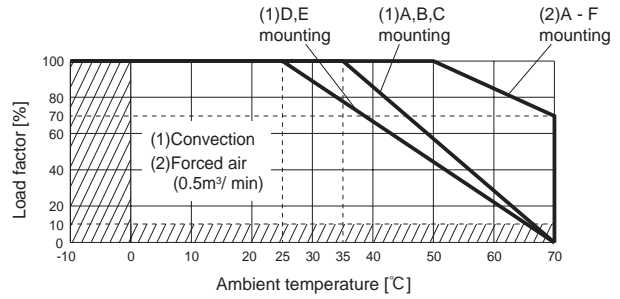


Derating

● LHA300F-12-SNY  
Ambient temperature derating curve  
(Reference value)



● LHA300F-24-SNY, -48-SNY  
Ambient temperature derating curve  
(Reference value)



- The operative ambient temperature is different by with / without chassis cover or mounting position.  
Note: In the hatched area, the specification of Ripple, Ripple Noise is different from other area.
- Make sure the case temperature at point ① and point ② is less than the temperatures shown in Instruction Manual 3.
- The ambient temperature should be measured 5 to 10 cm away from the power supply so that it won't be influenced by the heat from the power supply. Please contact us for more details.

Instruction Manuals

◆ Please see catalog and instructionmanual before you use.

Instruction Manuals <https://en.cosel.co.jp/product/powersupply/LHA/>  
Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

LHA



NOTICE



Basic Characteristics Data

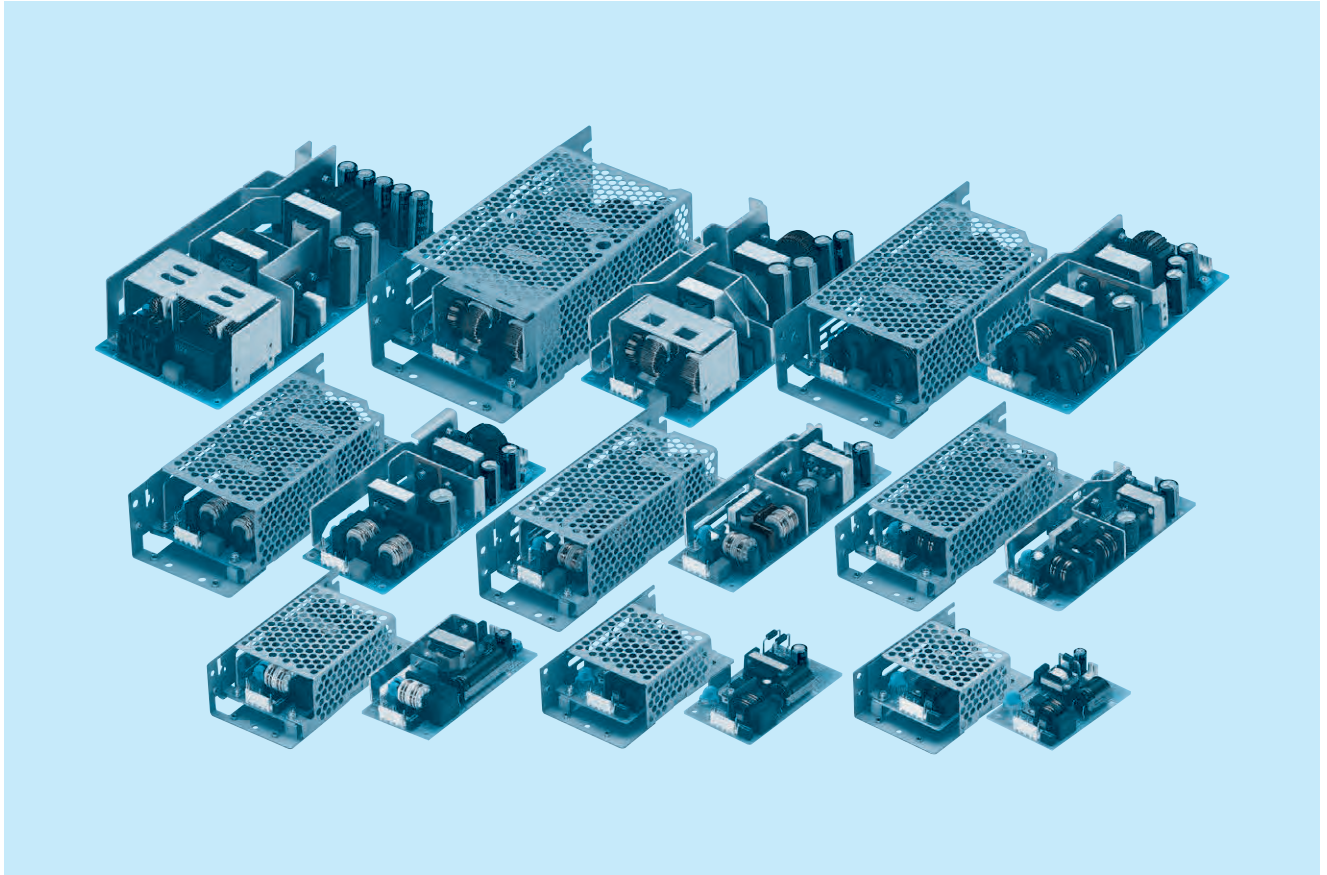
Model	Circuit method	Switching frequency [kHz] *1 *2	Input current *3 [A]	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
					Material	Single sided	Double sided	Series operation	Parallel operation
LHA30F	Flyback converter	30 to 120	0.62	Thermistor	FR-4	-	Yes	Yes	No
LHA50F	Flyback converter	30 to 120	1.05	Thermistor	FR-4	-	Yes	Yes	No
LHA75F	Active filter	25 to 155	0.9	Thermistor	FR-4	-	Yes	Yes	No
	Flyback converter	60 to 115							
LHA100F	Active filter	20 to 150	1.2	Thermistor	FR-4	-	Yes	Yes	No
	Flyback converter	45 to 110							
LHA150F	Active filter	20 to 150	1.8	Thermistor	FR-4	-	Yes	Yes	No
	LLC resonant converter	90 to 280							
LHA300F	Active filter	20 to 150	3.5	Thermistor	FR-4	-	Yes	Yes	No
	LLC resonant converter	65 to 200							

\*1 The value changes depending on input and load.  
\*2 Burst operation at light loading, frequency is change by use condition. Please contact us about detail.  
\*3 The value of input current is at ACIN 100V and rated load.



# LFA-series

LFA



## Feature

- Small and compact PCB construction
- Built-in inrush current, overcurrent and overvoltage protection circuits
- Harmonic attenuator (Complies with IEC61000-3-2)
- Universal input (AC85-264V)
- Power factor correction (LFA50F-300F)
- Built-in reducing standby power circuit (LFA10F, 15F)

## Safety agency approvals

- UL60950-1, C-UL(CSA60950-1), EN60950-1, EN62368-1, EN50178, EN60065
- Complies with DEN-AN

## EMI

- Complies with FCC-B, CISPR22-B, EN55011-B, EN55022-B, VCCI-B

## 5-year warranty (refer to Instruction Manual)

## CE marking

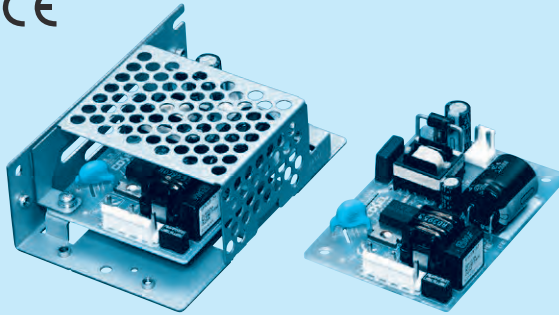
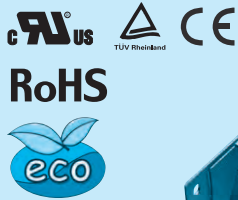
- Low Voltage Directive
- RoHS Directive

## EMS Compliance : EN61204-3, EN61000-6-2

- EN61000-4-2
- EN61000-4-3
- EN61000-4-4
- EN61000-4-5
- EN61000-4-6
- EN61000-4-8
- EN61000-4-11

# LFA10F

LF A 10 F -□ -□  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**NAC-04-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional
- C : with Coating
- G : Low leakage current
- J1 : VH(J.S.T.)connector type
- S : with Chassis
- SN : with Chassis & cover
- Y : with Potentiometer

Specification is changed at option, refer to Instruction Manual.

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
 \*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LFA10F-3R3-Y	LFA10F-5	LFA10F-12	LFA10F-15	LFA10F-24
MAX OUTPUT WATTAGE[W]	6.6	10	10.8	10.5	12
DC OUTPUT	3.3V 2A	5V 2A	12V 0.9A	15V 0.7A	24V 0.5A

## SPECIFICATIONS

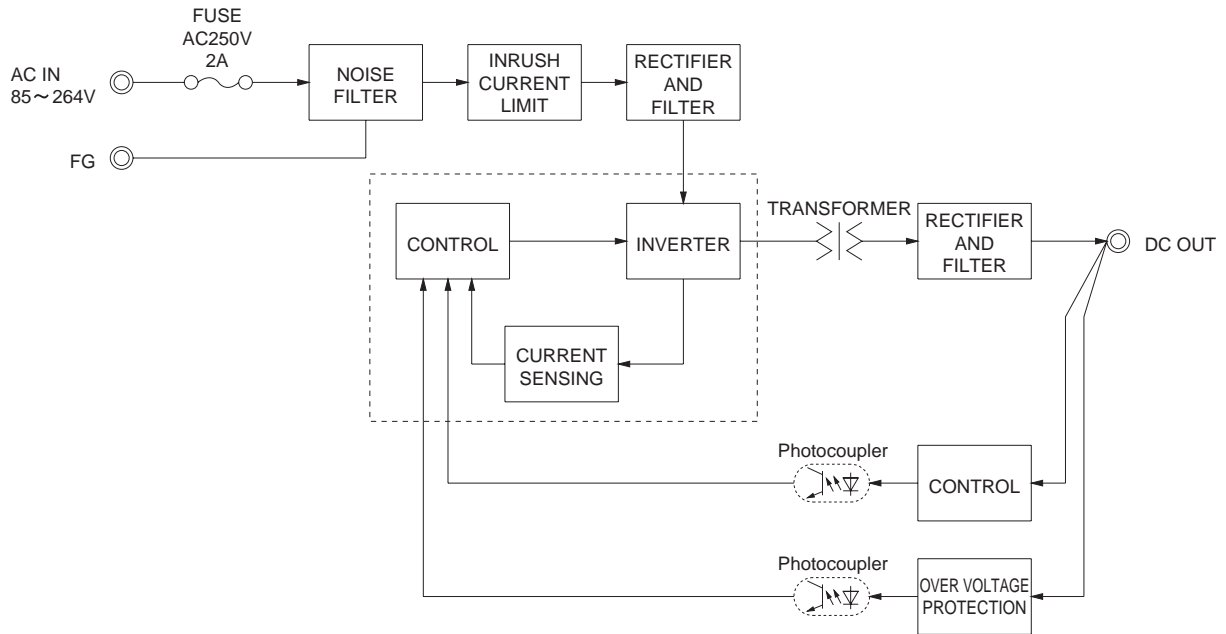
	MODEL	LFA10F-3R3-Y	LFA10F-5	LFA10F-12	LFA10F-15	LFA10F-24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating", Instruction Manual 1 and 3) *3					
	CURRENT[A]	ACIN 100V	0.18typ (Io=100%)	0.26typ (Io=100%)			
		ACIN 200V	0.11typ (Io=100%)	0.16typ (Io=100%)			
	FREQUENCY[Hz]	50 / 60 (47 - 440)					
	EFFICIENCY[%]	ACIN 100V	68.0typ	74.0typ	76.5typ	77.5typ	79.5typ
		ACIN 200V	68.5typ	76.0typ	79.0typ	80.0typ	83.0typ
INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%)					
	ACIN 200V	30typ (Io=100%)					
	LEAKAGE CURRENT[ma]	0.15/0.30max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)					
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	
	CURRENT[A]	2.0	2.0	0.9	0.7	0.5	
	LINE REGULATION[mV]	*5 20max	20max	48max	60max	96max	
	LOAD REGULATION[mV]	*5 40max	40max	100max	120max	150max	
	RIPPLE[mVp-p]	0 to +50°C	80max	80max	120max	120max	120max
		-10 - 0°C	140max	140max	160max	160max	160max
		Io=0 - 35%	190max	160max	240max	240max	280max
	RIPPLE NOISE[mVp-p]	0 to +50°C	120max	120max	150max	150max	150max
		-10 - 0°C	160max	160max	180max	180max	180max
		Io=0 - 35%	240max	240max	300max	300max	320max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	120max	150max	240max
		-10 to +50°C	60max	60max	150max	180max	290max
	DRIFT[mV]	*2 20max	20max	48max	60max	96max	
START-UP TIME[ms]	200typ (ACIN 100V, Io=100%) * Start-up time is 700ms typ for less than 1 minute of applying input again from turning off the input voltage.						
HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)						
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 to 3.63	Fixed ("Y"option is available for adjusting output voltage between ±10%)					
OUTPUT VOLTAGE SETTING[V]	3.30 to 3.40	4.90 to 5.30	11.50 to 12.50	14.40 to 15.60	23.00 to 25.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically					
	OVERVOLTAGE PROTECTION	4.00 to 5.25	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	
	OPERATING INDICATION	Not provided					
	REMOTE SENSING	Not provided					
ISOLATION	REMOTE ON/OFF	Not provided					
	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)					
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)					
	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)					
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +70°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000 feet) max *3					
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) max					
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis					
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis					
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN62368-1, EN60065, EN50178 Complies with DEN-AN					
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55011-B, EN55022-B					
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *6 (Not built-in to active filter) *4					
OTHERS	CASE SIZE/WEIGHT	50 X 22 X 73.5mm [1.97 X 0.87 X 2.89 inches] (W X H X D) / 55g max (with chassis & cover : 150g max)					
	COOLING METHOD	Convection (Refer to "Derating", Instruction Manual 3) *3					

\*1 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103). A circuit reducing standby power is built in this unit. Therefore, the internal switch element is intermittent operated, and the Ripple/Ripple Noise specification in load

factor Io=0-35% is different. Please refer to the Instruction Manual 1.7.  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output. Derating is required.  
 \*3 When two or more units are operating it may not comply with the IEC61000-3-2.

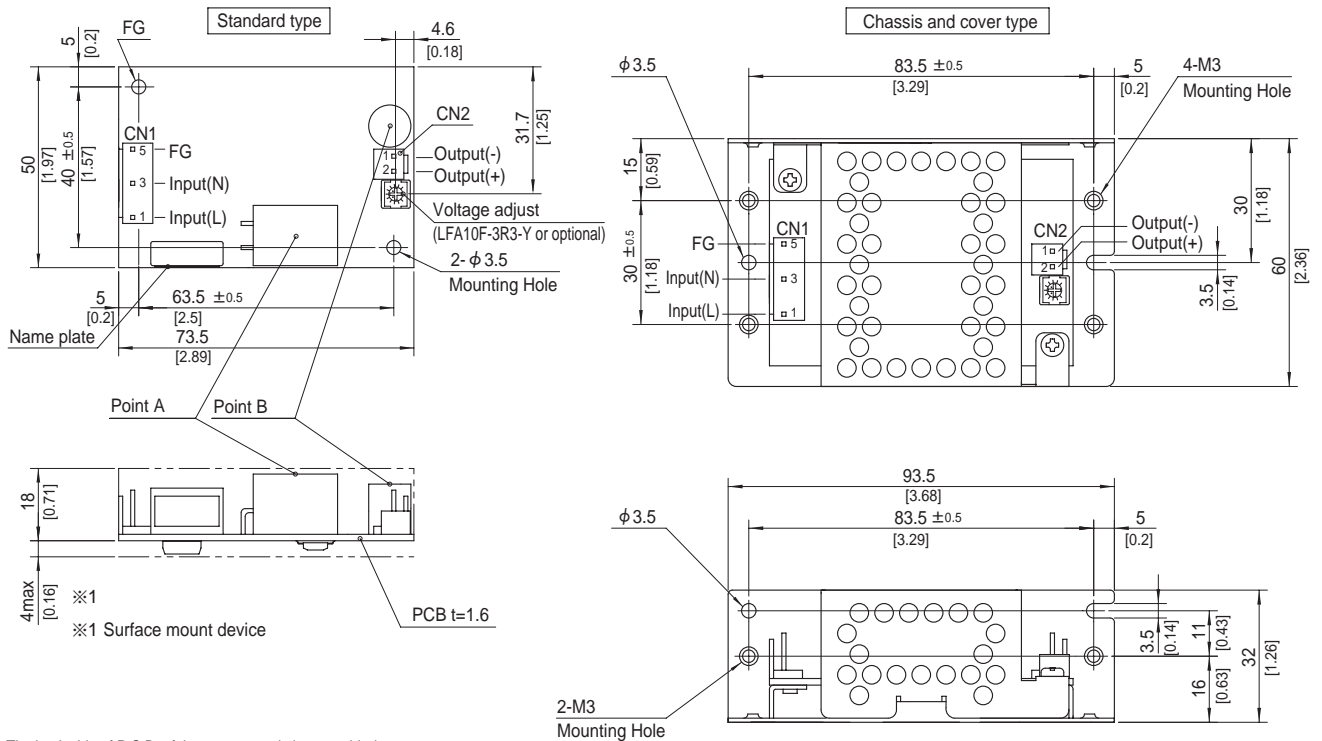
Please contact us for details.  
 \*5 Please contact us about dynamic load and input response.  
 \*6 Please contact us about another class.  
 \* To meet the specifications. Do not operate over-loaded condition. Parallel operation is not possible.  
 \* Derating is required when operated with chassis and cover.  
 \* Sound noise may be generated by power supply in case of pulse load.

## Block diagram



LFA

## External view



※ The back side of P.C.B. of the power supply is assembled some SMDs.

Be attention not to bump against the attached area by vibration.

※ Use the spacer of 8mm length or more regarding insulation.

And do not use press-fitting bush.

※ Point A, Point B are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating connector	Terminal	Chain	Terminal
CN1	1-1123724-3	1-1123722-5	Chain	1123721-1
			Loose	1318912-1
CN2	1-1123723-2	1-1123722-2	Chain	1123721-1
			Loose	1318912-1

(Mfr:Tyco Electronics)

※ I/O Connector is Mfr. Tyco Electronics

※ Option:-J1:(J.S.T) connector type. Refer to Instruction Manual 6.

### <PIN CONNECTION>

#### CN1

Pin No.	Input
1	AC(L)
2	
3	AC(N)
4	
5	FG

#### CN2

Pin No.	Output
1	-V
2	+V

※ Tolerance : ±1 [±0.04]

※ Weight : 55g max (with chassis & cover : 150g max)

※ PCB material / thickness : CEM3 / 1.6mm

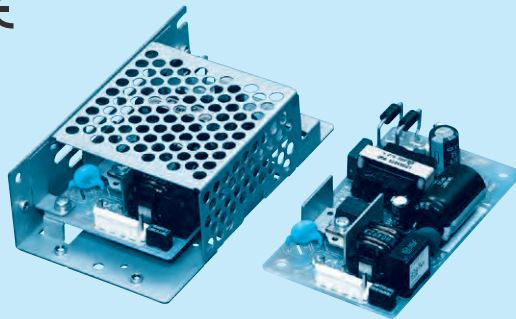
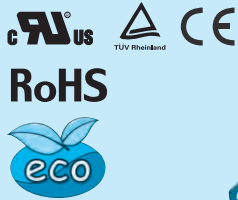
※ Optional chassis and cover material : Electric galvanizing steel board.

※ Dimensions in mm, [ ]=inches

※ Mounting torque (Mounting hole of chassis) : 0.6N · m (6.3kgf · cm) max

# LFA15F

LF A 15 F -□ -□  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**NAC-04-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional
- C : with Coating
- G : Low leakage current
- J1 : VH(J.S.T.)connector type
- S : with Chassis
- SN : with Chassis & cover
- Y : with Potentiometer

Specification is changed at option, refer to Instruction Manual.

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
 \*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LFA15F-3R3-Y	LFA15F-5	LFA15F-12	LFA15F-15	LFA15F-24
MAX OUTPUT WATTAGE[W]	9.9	15	15.6	15	16.8
DC OUTPUT	3.3V 3A	5V 3A	12V 1.3A	15V 1A	24V 0.7A

## SPECIFICATIONS

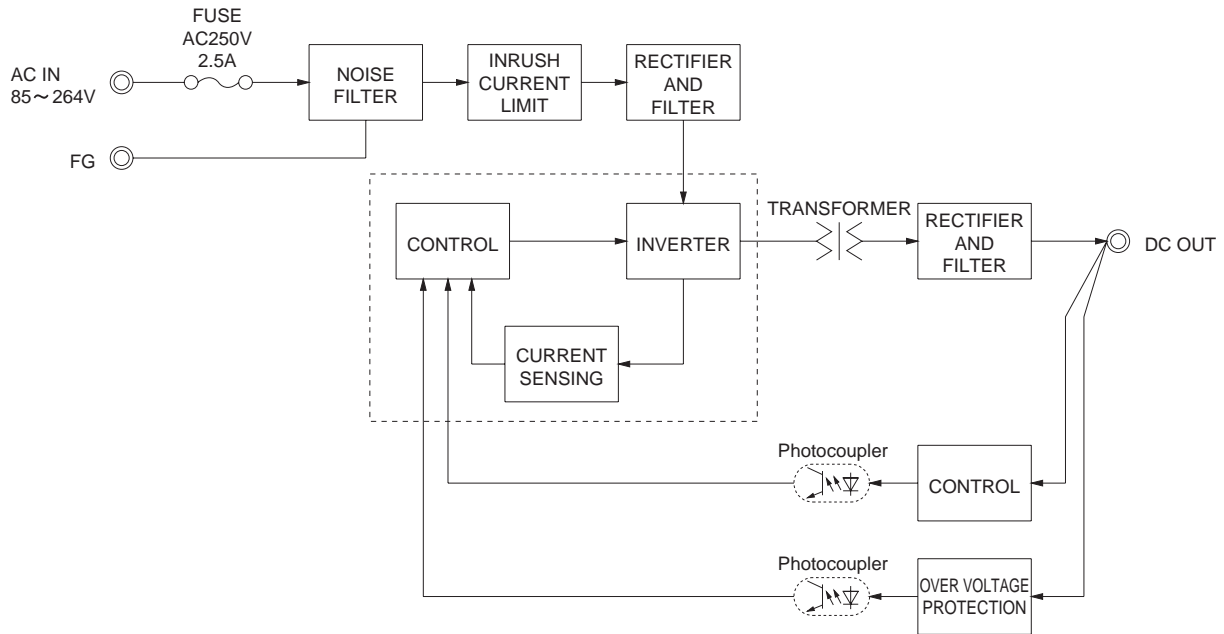
	MODEL	LFA15F-3R3-Y	LFA15F-5	LFA15F-12	LFA15F-15	LFA15F-24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating", Instruction Manual 1 and 3) *3					
	CURRENT[A]	ACIN 100V	0.24typ (Io=100%)	0.35typ (Io=100%)			
		ACIN 200V	0.15typ (Io=100%)	0.20typ (Io=100%)			
	FREQUENCY[Hz]	50 / 60 (47 - 440)					
	EFFICIENCY[%]	ACIN 100V	68.0typ	73.0typ	76.0typ	77.0typ	78.0typ
		ACIN 200V	69.0typ	76.0typ	78.5typ	80.0typ	81.5typ
INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) (At cold start) (Ta=25°C)					
	ACIN 200V	30typ (Io=100%) (At cold start) (Ta=25°C)					
LEAKAGE CURRENT[ma]	0.15/0.30max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)						
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	
	CURRENT[A]	3.0	3.0	1.3	1.0	0.7	
	LINE REGULATION[mV]	*5 20max	20max	48max	60max	96max	
	LOAD REGULATION[mV]	*5 40max	40max	100max	120max	150max	
	RIPPLE[mVp-p]	0 to +50°C	80max	80max	120max	120max	120max
		-10 - 0°C	140max	140max	160max	160max	160max
		Io=0 - 35%	190max	160max	240max	240max	280max
	RIPPLE NOISE[mVp-p]	0 to +50°C	120max	120max	150max	150max	150max
		-10 - 0°C	160max	160max	180max	180max	180max
		Io=0 - 35%	240max	240max	300max	300max	320max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	120max	150max	240max
		-10 to +50°C	60max	60max	150max	180max	290max
	DRIFT[mV]	*2 20max	20max	48max	60max	96max	
START-UP TIME[ms]	200typ (ACIN 100V, Io=100%) * Start-up time is 700ms typ for less than 1 minute of applying input again from turning off the input voltage.						
HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)						
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 to 3.63		Fixed ("Y"option is available for adjusting output voltage between ±10%)				
OUTPUT VOLTAGE SETTING[V]	3.30 to 3.40		4.90 to 5.30		11.50 to 12.50 14.40 to 15.60 23.00 to 25.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically					
	OVERVOLTAGE PROTECTION	4.00 to 5.25	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	
	OPERATING INDICATION	Not provided					
	REMOTE SENSING	Not provided					
ISOLATION	REMOTE ON/OFF	Not provided					
	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)					
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)					
ENVIRONMENT	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)					
SAFETY AND NOISE REGULATIONS	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +70°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000 feet) max *3					
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) max					
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis					
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis					
OTHERS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN62368-1, EN60065, EN50178 Complies with DEN-AN					
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55011-B, EN55022-B					
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *6 (Not built-in to active filter) *4					
OTHERS	CASE SIZE/WEIGHT	50 X 22 X 87.5mm [1.97 X 0.87 X 3.44 inches] (W X H X D) / 80g max (with chassis & cover : 190g max)					
	COOLING METHOD	Convection (Refer to "Derating", Instruction Manual 3) *3					

\*1 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103). A circuit reducing standby power is built in this unit. Therefore, the internal switch element is intermittent operated, and the Ripple/Ripple Noise specification in load

factor Io=0-35% is different. Please refer to the Instruction Manual 1.7.  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output. Derating is required.  
 \*3 When two or more units are operating it may not comply with the IEC61000-3-2.

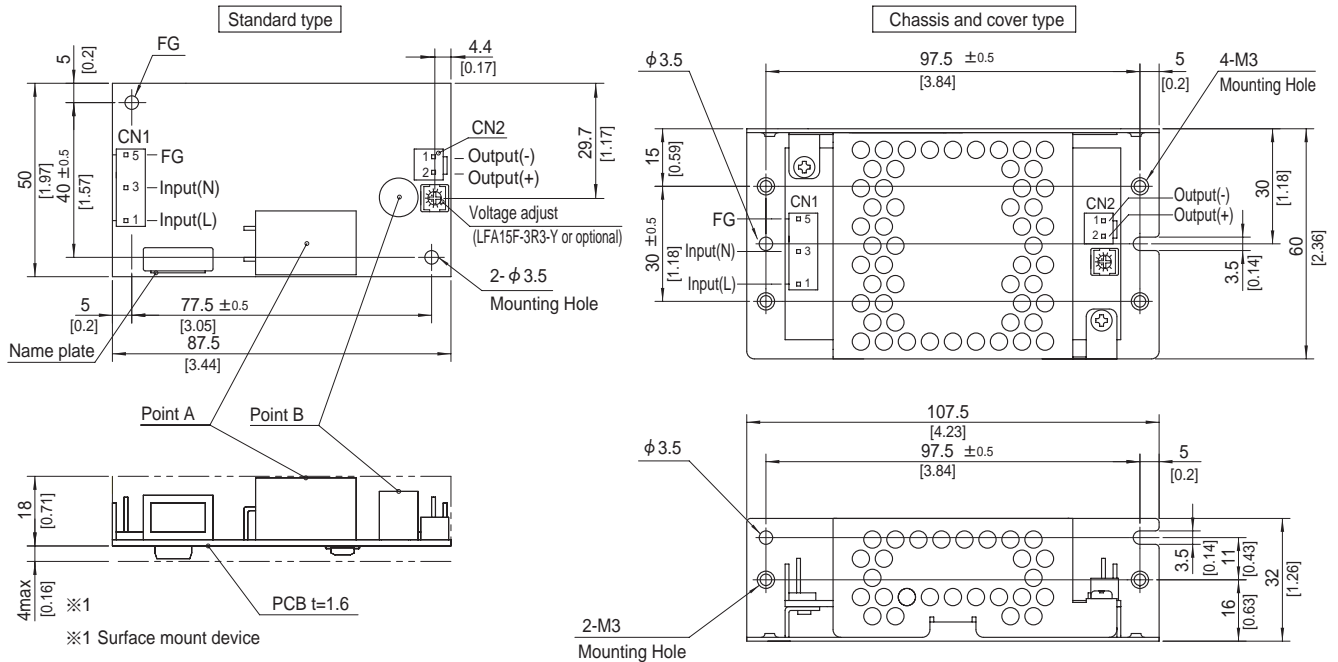
Please contact us for details.  
 \*5 Please contact us about dynamic load and input response.  
 \*6 Please contact us about another class.  
 \* To meet the specifications. Do not operate over-loaded condition. Parallel operation is not possible.  
 \* Derating is required when operated with chassis and cover.  
 \* Sound noise may be generated by power supply in case of pulse load.

## Block diagram



LFA

## External view



- ※ The back side of P.C.B. of the power supply is assembled some SMDs.  
Be attention not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm length or more regarding insulation.  
And do not use press-fitting bush.
- ※ Point A, Point B are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating connector	Terminal	Terminal
CN1	1-1123722-5	Chain	1123721-1
		Loose	1318912-1
		Chain	1123721-1
CN2	1-1123722-2	Chain	1123721-1
		Loose	1318912-1

(Mfr:Tyco Electronics)

- ※ I/O Connector is Mfr. Tyco Electronics
- ※ Option-J1:(J.S.T) connector type. Refer to Instruction Manual 6.

### <PIN CONNECTION>

#### CN1

Pin No.	Input
1	AC(L)
2	
3	AC(N)
4	
5	FG

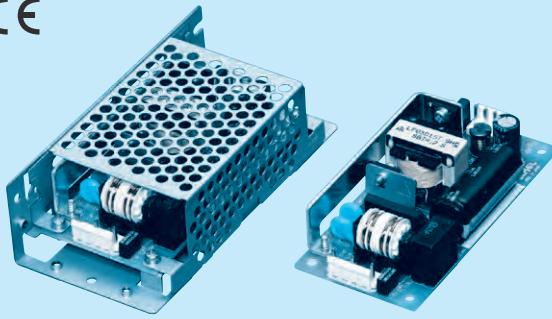
#### CN2

Pin No.	Output
1	-V
2	+V

- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 80g max (with chassis & cover : 190g max)
- ※ PCB material / thickness : CEM3 / 1.6mm
- ※ Optional chassis and cover material : Electric galvanizing steel board.
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque (Mounting hole of chassis) : 0.6N · m (6.3kgf · cm) max

# LFA30F

LF A 30 F -□ -□  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**NAC-04-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional
- C : with Coating
- G : Low leakage current
- J1 : VH(J.S.T.)connector type
- S : with Chassis
- SN : with Chassis & cover
- Y : with Potentiometer

Specification is changed at option, refer to Instruction Manual.

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
 \*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LFA30F-3R3-Y	LFA30F-5	LFA30F-12	LFA30F-15	LFA30F-24
MAX OUTPUT WATTAGE[W]	19.8	30.0	30.0	30.0	31.2
DC OUTPUT	3.3V 6A	5V 6A	12V 2.5A	15V 2A	24V 1.3A

## SPECIFICATIONS

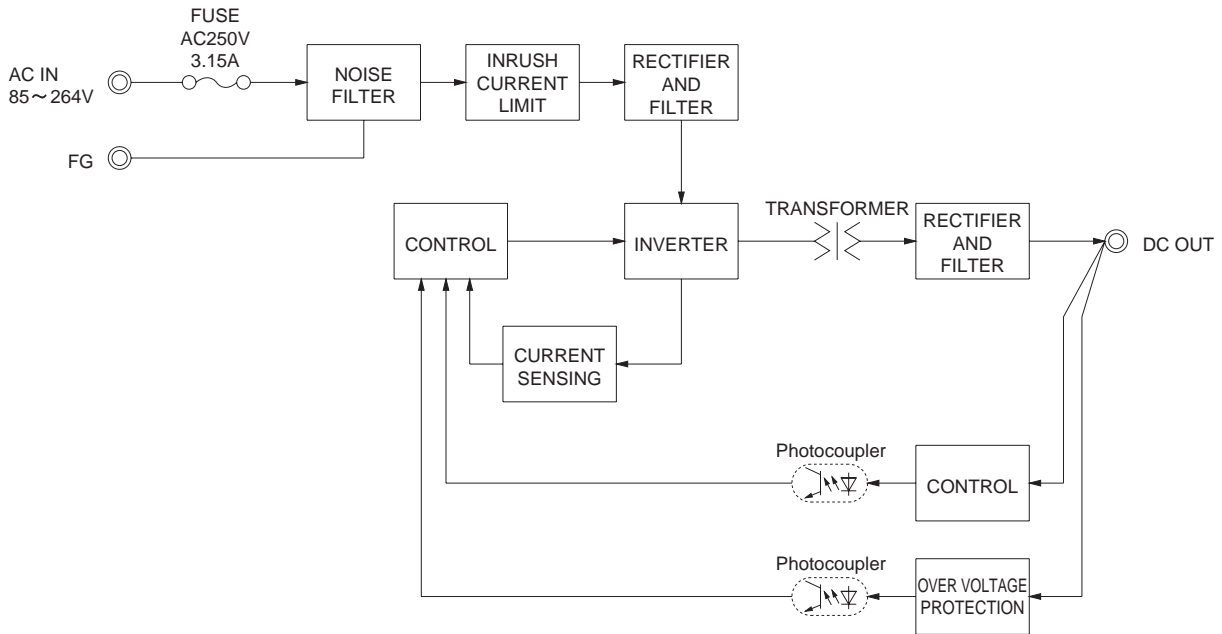
	MODEL	LFA30F-3R3-Y	LFA30F-5	LFA30F-12	LFA30F-15	LFA30F-24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating", Instruction Manual 1 and 3) *3					
	CURRENT[A]	ACIN 100V	0.50typ (Io=100%)	0.65typ (Io=100%)			
		ACIN 200V	0.30typ (Io=100%)	0.35typ (Io=100%)			
	FREQUENCY[Hz]	50 / 60 (47 - 440)					
	EFFICIENCY[%]	ACIN 100V	73typ	76typ	79typ	81typ	82typ
		ACIN 200V	75typ	79typ	81typ	83typ	84typ
INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) (At cold start) (Ta=25°C)					
	ACIN 200V	30typ (Io=100%) (At cold start) (Ta=25°C)					
LEAKAGE CURRENT[mA]	0.30 / 0.65max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)						
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	
	CURRENT[A]	6.0	6.0	2.5	2.0	1.3	
	LINE REGULATION[mV] *5	20max	20max	48max	60max	96max	
	LOAD REGULATION[mV] *5	40max	40max	100max	120max	150max	
	RIPPLE[mVp-p]	0 to +50°C *1	80max	80max	120max	120max	120max
		-10 - 0°C *1	140max	140max	160max	160max	160max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max	120max	150max	150max	150max
		-10 - 0°C *1	160max	160max	180max	180max	180max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	120max	150max	240max
		-10 to +50°C	60max	60max	150max	180max	290max
	DRIFT[mV] *2	20max	20max	48max	60max	96max	
	START-UP TIME[ms]	150typ (ACIN 100V, Io=100%)					
HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)						
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 to 3.63	Fixed ("Y"option is available for adjusting output voltage between ±10%)					
OUTPUT VOLTAGE SETTING[V]	3.30 to 3.40	4.90 to 5.30	11.50 to 12.50	14.40 to 15.60	23.00 to 25.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically					
	OVERVOLTAGE PROTECTION	4.00 to 5.25	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	
	OPERATING INDICATION	Not provided					
	REMOTE SENSING	Not provided					
ISOLATION	REMOTE ON/OFF	Not provided					
	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)					
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)					
ENVIRONMENT	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)					
	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +70°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000feet) max *3					
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max					
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis					
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis					
	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN62368-1, EN60065, EN50178 Complies with DEN-AN					
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55011-B, EN55022-B					
OTHERS	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *6 (Not built-in to active filter) *4					
	CASE SIZE/WEIGHT	50 × 26.5 × 105mm [1.97 × 1.04 × 4.13 inches] (W × H × D) / 130g max (with chassis & cover : 260g max)					
	COOLING METHOD	Convection (Refer to "Derating", Instruction Manual 3) *3					

\*1 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal.  
 Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*3 Derating is required.

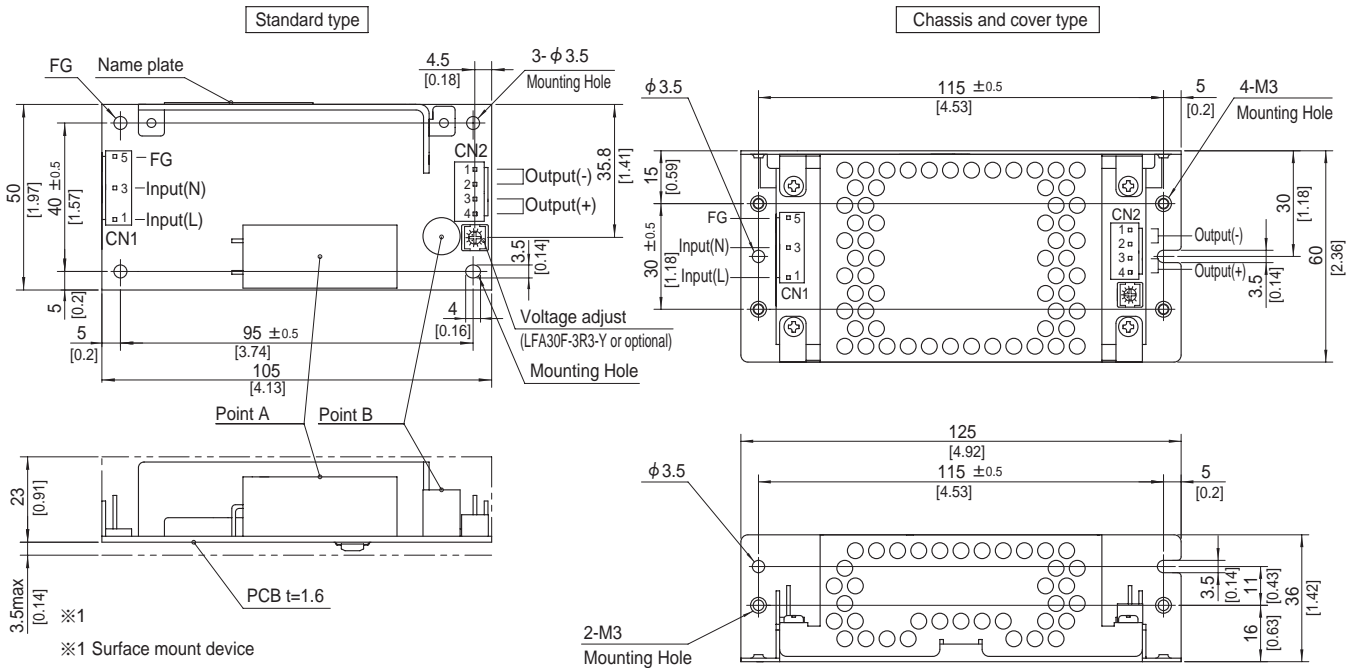
\*4 When two or more units are operating it may not comply with the IEC61000-3-2. Please contact us for details.  
 \*5 Please contact us about dynamic load and input response.  
 \*6 Please contact us about another class.  
 \* To meet the specifications. Do not operate over-loaded condition.  
 \* Parallel operation is not possible.  
 \* Derating is required when operated with chassis and cover.  
 \* Sound noise may be generated by power supply in case of pulse load.



## Block diagram



## External view



- ※ 4 Mounting holes are existing.
- ※ The back side of P.C.B. of the power supply is assembled some SMDs.
- Be attention not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm length or more regarding insulation.
- And do not use press-fitting bush.
- ※ Point A, Point B are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating connector	Terminal
CN1	1-1123724-3	Chain 1123721-1
		Loose 1318912-1
CN2	1-1123723-4	Chain 1123721-1
		Loose 1318912-1

(Mfr:Tyco Electronics)

- ※ I/O Connector is Mfr. Tyco Electronics
- ※ Option:-J1:(J.S.T) connector type. Refer to Instruction Manual 6.

### <PIN CONNECTION>

CN1	
Pin No.	Input
1	AC(L)
2	
3	AC(N)
4	
5	FG

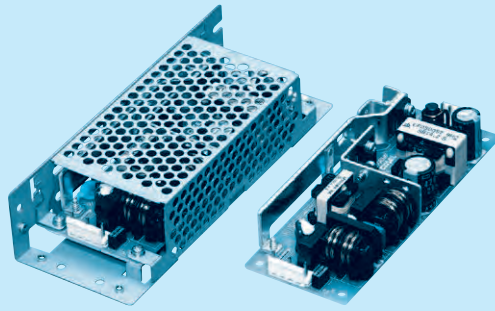
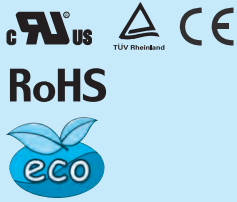
CN2	
Pin No.	Output
1, 2	-V
3, 4	+V

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight: 130g max (with chassis & cover : 260g max)
- ※ PCB material / thickness : CEM3 / 1.6mm
- ※ Optional chassis and cover material : Electric galvanizing steel board.
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque (Mounting hole of chassis) : 0.6N · m (6.3kgf · cm) max

※ Keep drawing current per pin below 5A for CN2.

# LFA50F

LF A 50 F -□ -□  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**NAC-04-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
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- ⑤ Output voltage
- ⑥ Optional
- C : with Coating
- G : Low leakage current
- J1 : VH(J.S.T.)connector type
- S : with Chassis
- SN : with Chassis & cover
- Y : with Potentiometer

Specification is changed at option, refer to Instruction Manual.

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
 \*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LFA50F-3R3-Y	LFA50F-5	LFA50F-12	LFA50F-15	LFA50F-24	LFA50F-36	LFA50F-48
MAX OUTPUT WATTAGE[W]	33	50	51.6	52.5	50.4	50.4	52.8
DC OUTPUT	3.3V 10A	5V 10A	12V 4.3A	15V 3.5A	24V 2.1A	36V 1.4A	48V 1.1A

## SPECIFICATIONS

	MODEL	LFA50F-3R3-Y	LFA50F-5	LFA50F-12	LFA50F-15	LFA50F-24	LFA50F-36	LFA50F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating", Instruction Manual 1 and 3) *3							
	CURRENT[A]	ACIN 100V	0.47typ (Io=100%)	0.67typ (Io=100%)					
		ACIN 200V	0.27typ (Io=100%)	0.36typ (Io=100%)					
	FREQUENCY[Hz]	50 / 60 (47 - 63)							
	EFFICIENCY[%]	ACIN 100V	73.5typ	77.5typ	80.0typ	80.5typ	81.5typ	82.0typ	81.0typ
		ACIN 200V	74.0typ	79.0typ	81.5typ	81.5typ	83.0typ	83.5typ	82.5typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.96typ	0.97typ					
		ACIN 200V	0.83typ	0.90typ					
	INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) (At cold start) (Ta=25°C)						
		ACIN 200V	30typ (Io=100%) (At cold start) (Ta=25°C)						
LEAKAGE CURRENT[mA]	0.40 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)								
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	36	48	
	CURRENT[A]	10.0	10.0	4.3	3.5	2.1	1.4	1.1	
	LINE REGULATION[mV]	*4	20max	20max	48max	60max	96max	144max	192max
	LOAD REGULATION[mV]	*4	40max	40max	100max	120max	150max	240max	240max
	RIPPLE[mVp-p]	0 to +50°C *1	80max	80max	120max	120max	150max	150max	150max
		-10 -0°C *1	140max	140max	160max	160max	160max	200max	200max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max	120max	150max	150max	150max	250max	250max
		-10 -0°C *1	160max	160max	180max	180max	180max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	120max	150max	240max	360max	480max
		-10 to +50°C	60max	60max	150max	180max	290max	450max	600max
	DRIFT[mV]	*2	20max	20max	48max	60max	96max	144max	192max
	START-UP TIME[ms]	350typ (ACIN 100V, Io=100%)							
	HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)							
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 to 3.63	Fixed ("Y"option is available for adjusting output voltage between ±10%)						
OUTPUT VOLTAGE SETTING[V]	3.30 to 3.40	4.90 to 5.30	11.50 to 12.50	14.40 to 15.60	23.00 to 25.00	34.50 to 37.50	46.00 to 50.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically							
	OVERVOLTAGE PROTECTION	4.00 to 5.25	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	41.40 to 50.40	55.20 to 67.20	
	OPERATING INDICATION	Not provided							
	REMOTE SENSING	Not provided							
ISOLATION	REMOTE ON/OFF	Not provided							
	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)							
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)							
ENVIRONMENT	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)							
	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +70°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000feet) max *3							
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max							
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis							
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis							
	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN62368-1, EN60065, EN50178 Complies with DEN-AN							
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55011-B, EN55022-B							
OTHERS	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *5							
	CASE SIZE/WEIGHT	50 X 26.5 X 132mm [1.97 X 1.04 X 5.20 inches] (W X H X D) / 165g max (with chassis & cover : 325g max)							
	COOLING METHOD	Convection (Refer to "Derating", Instruction Manual 3) *3							

\*1 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal.  
 Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).

\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*3 Derating is required.

\*4 Please contact us about dynamic load and input response.

\*5 Please contact us about another class.

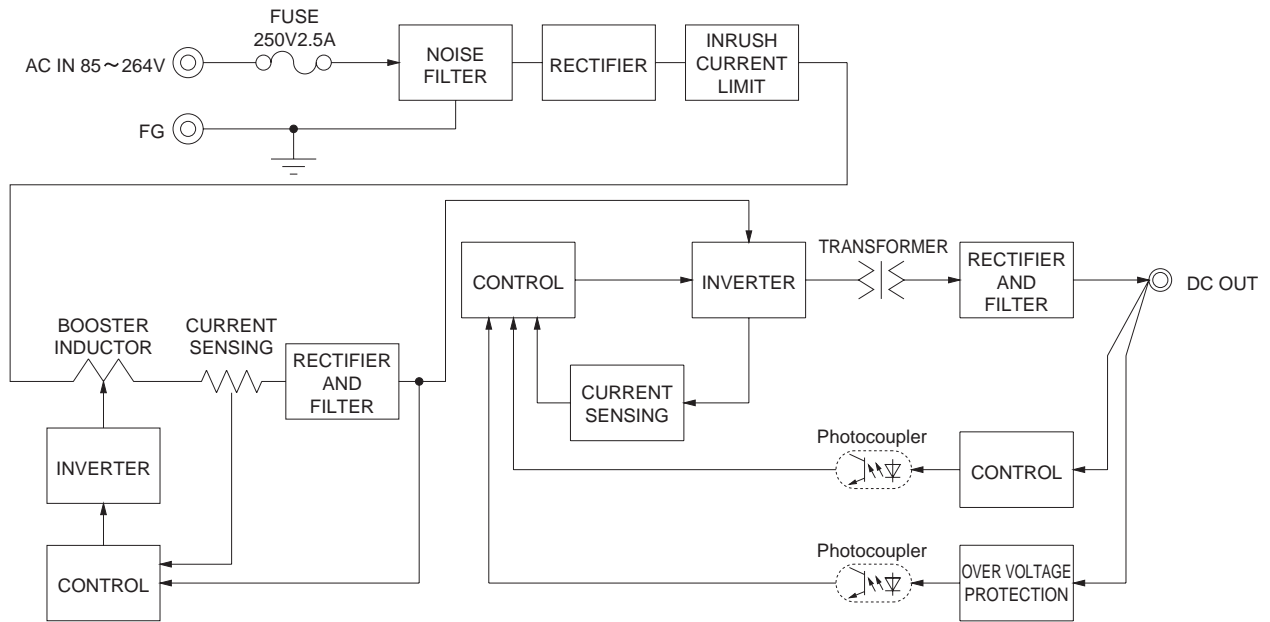
\* To meet the specifications. Do not operate over-loaded condition.

\* Parallel operation is not possible.

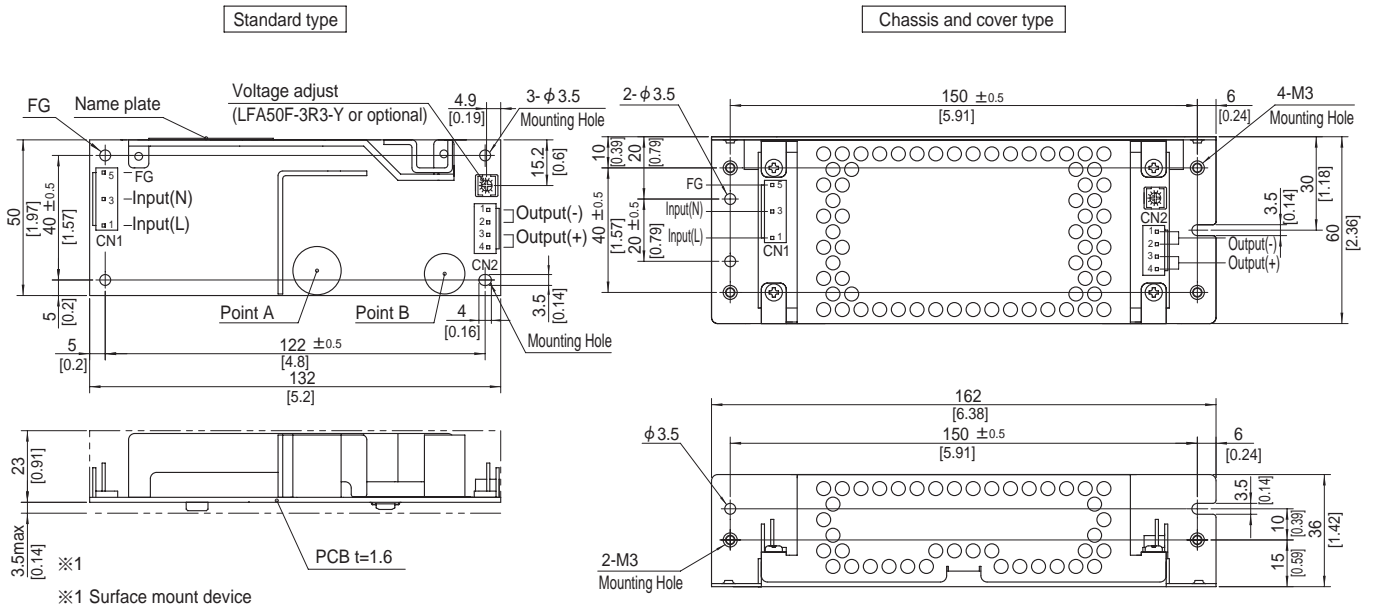
\* Derating is required when operated with chassis and cover.

\* Sound noise may be generated by power supply in case of pulse load.

## Block diagram



## External view



- ※ 4 Mounting holes are existing.
- ※ The back side of P.C.B. of the power supply is assembled some SMDs.  
Be attention not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm length or more regarding insulation.  
And do not use press-fitting bush.
- ※ Point A, Point B are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating connector	Terminal
CN1	1-1123724-3	1-1123722-5 Chain 1123721-1
		Loose 1318912-1
CN2	1-1123723-4	1-1123722-4 Chain 1123721-1
		Loose 1318912-1

(Mfr:Tyco Electronics)

- ※ I/O Connector is Mfr. Tyco Electronics
- ※ Option:-J1:(J.S.T) connector type. Refer to Instruction Manual 6.

### <PIN CONNECTION>

#### CN1

Pin No.	Input
1	AC(L)
2	
3	AC(N)
4	
5	FG

#### CN2

Pin No.	Output
1, 2	-V
3, 4	+V

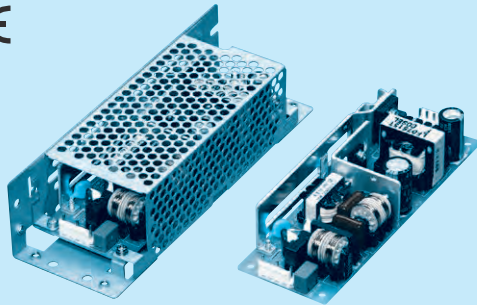
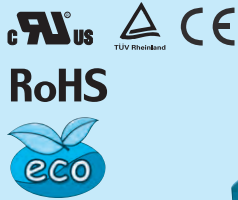
- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 165g max (with chassis & cover : 325g max)
- ※ PCB material / thickness : CEM3 / 1.6mm
- ※ Optional chassis and cover material : Electric galvanizing steel board.
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque (Mounting hole of chassis) : 0.6N · m (6.3kgf · cm) max

- ※ Keep drawing current per pin below 5A for CN2.

# LFA75F

LF A 75 F -□ -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-04-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional
- C : with Coating
- G : Low leakage current
- J1 : VH(J.S.T.)connector type
- S : with Chassis
- SN : with Chassis & cover
- Y : with Potentiometer

Specification is changed at option, refer to Instruction Manual.

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LFA75F-3R3-Y	LFA75F-5	LFA75F-12	LFA75F-15	LFA75F-24	LFA75F-36	LFA75F-48
MAX OUTPUT WATTAGE[W]	49.5	75	75.6	75	76.8	75.6	76.8
DC OUTPUT	3.3V 15A	5V 15A	12V 6.3A	15V 5A	24V 3.2A	36V 2.1A	48V 1.6A

## SPECIFICATIONS

	MODEL	LFA75F-3R3-Y	LFA75F-5	LFA75F-12	LFA75F-15	LFA75F-24	LFA75F-36	LFA75F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating", Instruction Manual 1 and 3) *3							
	CURRENT[A]	ACIN 100V	0.70typ (Io=100%)	1.00typ (Io=100%)					
		ACIN 200V	0.40typ (Io=100%)	0.50typ (Io=100%)					
	FREQUENCY[Hz]	50 / 60 (47 - 63)							
	EFFICIENCY[%]	ACIN 100V	73.5typ	78.0typ	81.5typ	81.5typ	82.5typ	82.5typ	82.5typ
		ACIN 200V	75.0typ	80.0typ	83.0typ	83.0typ	84.5typ	84.5typ	84.5typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.96typ	0.97typ					
		ACIN 200V	0.83typ	0.90typ					
INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) (At cold start) (Ta=25°C)							
	ACIN 200V	30typ (Io=100%) (At cold start) (Ta=25°C)							
LEAKAGE CURRENT[mA]	0.40 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)								
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	36	48	
	CURRENT[A]	15.0	15.0	6.3	5.0	3.2	2.1	1.6	
	LINE REGULATION[mV]	*4	20max	20max	48max	60max	96max	144max	192max
	LOAD REGULATION[mV]	*4	40max	40max	100max	120max	150max	240max	240max
	RIPPLE[mVp-p]	0 to +50°C *1	80max	80max	120max	120max	120max	150max	150max
		-10 -0°C *1	140max	140max	160max	160max	160max	200max	200max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max	120max	150max	150max	150max	250max	250max
		-10 -0°C *1	160max	160max	180max	180max	180max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	120max	150max	240max	360max	480max
		-10 to +50°C	60max	60max	150max	180max	290max	450max	600max
	DRIFT[mV]	*2	20max	20max	48max	60max	96max	144max	192max
	START-UP TIME[ms]	350typ (ACIN 100V, Io=100%)							
	HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)							
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 to 3.63	Fixed ("Y"option is available for adjusting output voltage between ±10%)							
OUTPUT VOLTAGE SETTING[V]	3.30 to 3.40	4.90 to 5.30	11.50 to 12.50	14.40 to 15.60	23.00 to 25.00	34.50 to 37.50	46.00 to 50.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically							
	OVERVOLTAGE PROTECTION	4.00 to 5.25	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	41.40 to 50.40	55.20 to 67.20	
	OPERATING INDICATION	Not provided							
	REMOTE SENSING	Not provided							
ISOLATION	REMOTE ON/OFF	Not provided							
	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)							
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)							
ENVIRONMENT	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)							
	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +70°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000feet) max *3							
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max							
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis							
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis							
	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN62368-1, EN60065, EN50178 Complies with DEN-AN							
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55011-B, EN55022-B							
OTHERS	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *5							
	CASE SIZE/WEIGHT	50 X 33.5 X 150mm [1.97 X 1.32 X 5.91 inches] (W X H X D) / 230g max (with chassis & cover : 440g max)							
	COOLING METHOD	Convection (Refer to "Derating", Instruction Manual 3) *3							

\*1 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal.  
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).

\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*3 Derating is required.

\*4 Please contact us about dynamic load and input response.

\*5 Please contact us about another class.

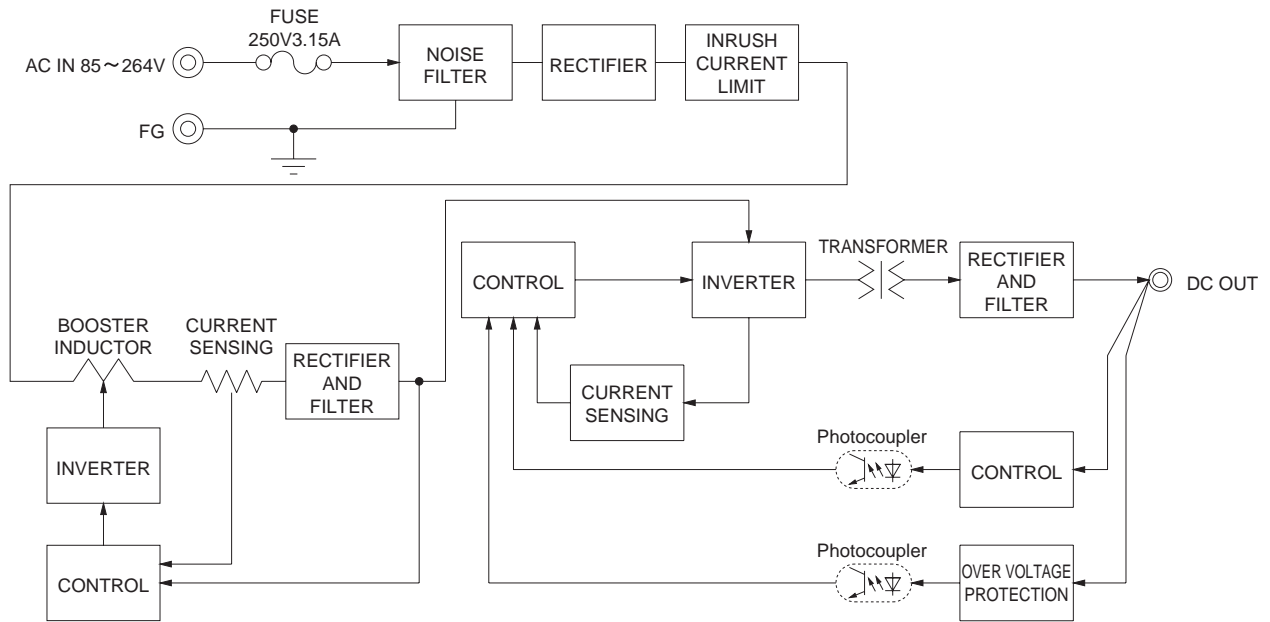
\* To meet the specifications. Do not operate over-loaded condition.

\* Parallel operation is not possible.

\* Derating is required when operated with chassis and cover.

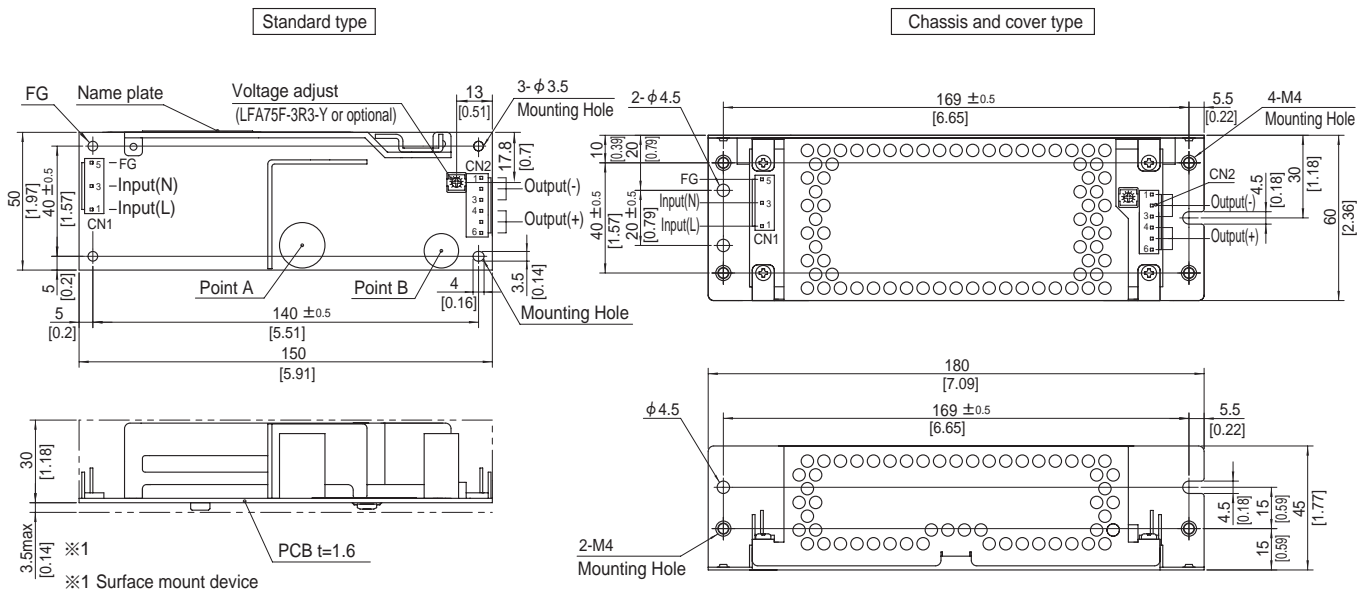
\* Sound noise may be generated by power supply in case of pulse load.

## Block diagram



LFA

## External view



- ※ 4 Mounting holes are existing.
- ※ The back side of P.C.B. of the power supply is assembled some SMDs.  
Be attention not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm length or more regarding insulation.  
And do not use press-fitting bush.
- ※ Point A, Point B are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating connector	Terminal
CN1	1-1123724-3	Chain 1123721-1
		Loose 1318912-1
CN2	1-1123723-6	Chain 1123721-1
		Loose 1318912-1

(Mfr:Tyco Electronics)

- ※ I/O Connector is Mfr. Tyco Electronics
- ※ Option:-J1:(J.S.T) connector type. Refer to Instruction Manual 6.

### <PIN CONNECTION>

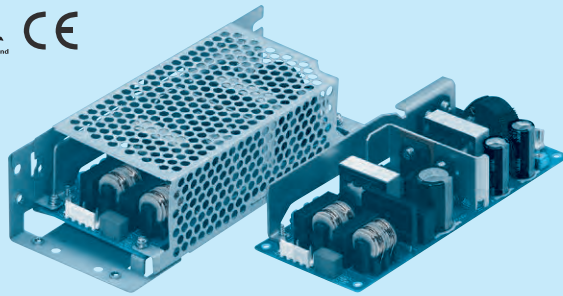
CN1		CN2	
Pin No.	Input	Pin No.	Output
1	AC(L)	1 to 3	-V
2		4 to 6	+V
3	AC(N)		
4			
5	FG		

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 230g max (with chassis & cover : 440g max)
- ※ PCB material / thickness : CEM3 / 1.6mm
- ※ Optional chassis and cover material : Electric galvanizing steel board.
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque (Mounting hole of chassis) :  $1.5N \cdot m$  (16kgf  $\cdot$  cm) max

※ Keep drawing current per pin below 5A for CN2.

# LFA100F

LF A 100 F -□ -□  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**NAC-04-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*1
- C : with Coating
- G : Low leakage current
- H : with the function to be acceptable to output peak current (only 24V)
- J1 : VH(J.S.T.)connector type
- R : with Remote ON/OFF
- R2 : with Remote ON/OFF
- S : with Chassis
- SN : with Chassis & cover
- Y : with Potentiometer

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
 \* Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

Please refer to Instruction manual 6.

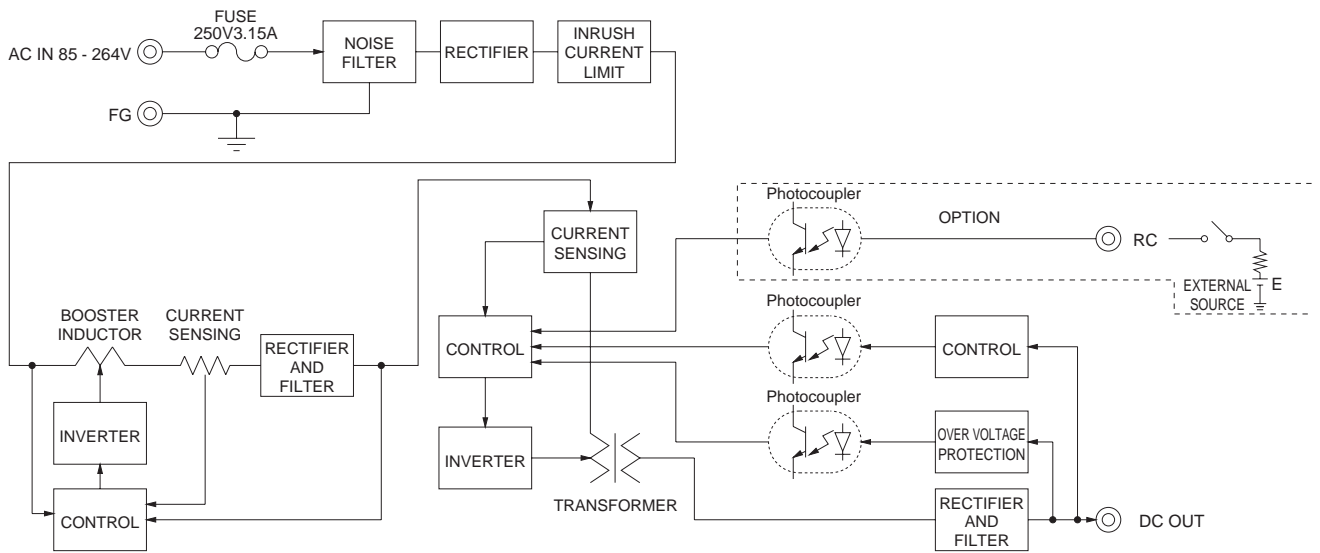
MODEL	LFA100F-3R3-Y	LFA100F-5-Y	LFA100F-12	LFA100F-15	LFA100F-24	LFA100F-24-H	LFA100F-36	LFA100F-48
MAX OUTPUT WATTAGE[W]	*5 66	100	102	100.5	103.2	103.2 (129.6)	100.8	100.8
DC OUTPUT	*5 3.3V 20A	5V 20A	12V 8.5A	15V 6.7A	24V 4.3A	24V 4.3 (5.4)A	36V 2.8A	48V 2.1A

## SPECIFICATIONS

	MODEL	LFA100F-3R3-Y	LFA100F-5-Y	LFA100F-12	LFA100F-15	LFA100F-24	LFA100F-24-H	LFA100F-36	LFA100F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating", Instruction Manual 1 and 3) *4								
	CURRENT[A]	ACIN 100V	0.9typ (Io=100%)		1.3typ (Io=100%)					
		ACIN 200V	0.5typ (Io=100%)		0.7typ (Io=100%)					
	FREQUENCY[Hz]	50 / 60 (47 - 63)								
	EFFICIENCY[%]	ACIN 100V	77.0typ	82.0typ	82.0typ	83.0typ	84.0typ	84.0typ	84.0typ	84.5typ
		ACIN 200V	79.0typ	84.0typ	84.5typ	85.5typ	87.0typ	87.0typ	87.0typ	87.0typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.98typ		0.99typ					
ACIN 200V		0.92typ		0.95typ						
INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) (At cold start) (Ta=25°C)								
	ACIN 200V	30typ (Io=100%) (At cold start) (Ta=25°C)								
LEAKAGE CURRENT[ma]	0.40 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)									
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	24	36	48	
	CURRENT[A]	*5 20	20	8.5	6.7	4.3	4.3 (Peak 5.4)	2.8	2.1	
	LINE REGULATION[mV]	*7 20max	20max	48max	60max	96max	96max	144max	192max	
	LOAD REGULATION[mV]	*7 40max	40max	100max	120max	150max	150max	240max	240max	
	RIPPLE[mVp-p]	0 to +50°C *2	80max	80max	120max	120max	120max	240max	150max	150max
		-10 -0°C *2	140max	140max	160max	160max	160max	320max	200max	200max
	RIPPLE NOISE[mVp-p]	0 to +50°C *2	120max	120max	150max	150max	150max	300max	250max	250max
		-10 -0°C *2	160max	160max	180max	180max	180max	360max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	120max	150max	240max	240max	360max	480max
		-10 to +50°C	60max	60max	150max	180max	290max	290max	450max	600max
	DRIFT[mV]	*3 20max	20max	48max	60max	96max	96max	144max	192max	
	START-UP TIME[ms]	350typ (ACIN 100V, Io=100%)								
	HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)								
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 to 3.63		4.50 to 5.50		Fixed ("Y"option is available for adjusting output voltage)				
OUTPUT VOLTAGE SETTING[V]	3.30 to 3.40	5.00 to 5.15	11.50 to 12.50	14.40 to 15.60	23.00 to 25.00	23.00 to 25.00	34.50 to 37.50	46.00 to 50.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically								
	OVERVOLTAGE PROTECTION	4.00 to 5.25	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	27.60 to 33.60	41.40 to 50.40	55.20 to 67.20	
	OPERATING INDICATION	Not provided								
	REMOTE SENSING	Not provided								
	REMOTE ON/OFF	Option (Refer to Instruction Manual)								
ISOLATION	INPUT-OUTPUT-RC	*6 AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)								
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)								
	OUTPUT-RC-FG	*6 AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)								
	OUTPUT-RC	*6 AC100V 1minute, Cutoff current = 25mA, DC100V 10MΩ min (At Room Temperature)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *4	-10 to +70°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis								
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis								
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN62368-1, EN60065, EN50178 Complies with DEN-AN								
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55011-B, EN55022-B								
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *8								
OTHERS	CASE SIZE/WEIGHT	62 X 33.5 X 155mm [2.44 X 1.32 X 6.10 inches] (W X H X D) / 280g max (with chassis & cover : 480g max)								
	COOLING METHOD	Convection (Refer to "Derating", Instruction Manual 3) *4								

\*1 Specification is changed at option, refer to Instruction Manual.  
 \*2 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal.  
 \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant  
 \*4 at the rated input/output.  
 \*5 ( ) means peak current. There is a possibility that an internal device is damaged when the specification is exceeded. Please contact us about the detail.  
 \*6 Applicable when Remote ON/OFF (optional) is added.  
 \*7 Please contact us about dynamic load and input response.  
 \*8 Please contact us about another class.  
 \*9 To meet the specifications. Do not operate over-loaded condition.  
 \*10 Parallel operation is not possible.  
 \*11 Derating is required when operated with chassis and cover.  
 \*12 Sound noise may be generated by power supply in case of pulse load.

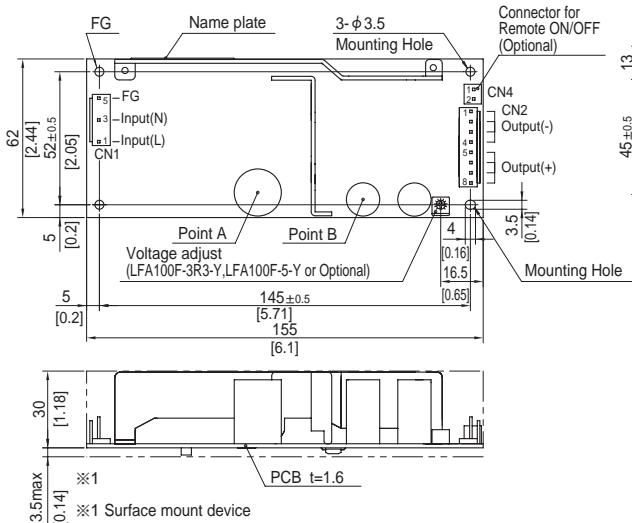
## Block diagram



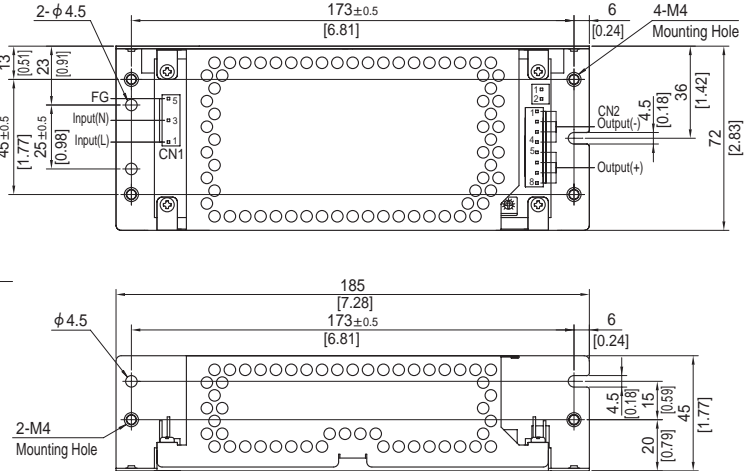
## External view

※ External size of option is different from standard model.

Standard type



Chassis and cover type



- ※ 4 Mounting holes are existing.
- ※ The back side of P.C.B. of the power supply is assembled some SMDs.  
Be attention not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm length or more regarding insulation.  
And do not use press-fitting bush.
- ※ Point A, Point B are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating connector	Terminal
CN1	1-1123724-3	Chain Loose 1123721-1
	1-1123722-5	Chain Loose 1318912-1
CN2	1-1123723-8	Chain Loose 1123721-1
	1-1123722-8	Chain Loose 1318912-1

(Mfr:Tyco Electronics)

- ※ I/O Connector is Mfr. Tyco Electronics
- ※ Option:-J1:VH(J.S.T) connector type.

### <PIN CONNECTION>

CN1		CN2	
Pin No.	Input	Pin No.	Output
1	AC(L)	1 to 4	-V
2		5 to 8	+V
3	AC(N)		
4			
5	FG		

※ Keep drawing current per pin below 5A for CN2.

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 280g max (with chassis & cover : 480g max)
- ※ PCB material : CEM3
- ※ Optional chassis and cover material : Electric galvanizing steel board.
- ※ Dimensions in mm, [ ] =inches
- ※ Mounting torque (Mounting hole of chassis) :  $1.5N \cdot m$  (16kgf · cm) max

### Connector type

CN4 Option (Mfr:J.S.T)

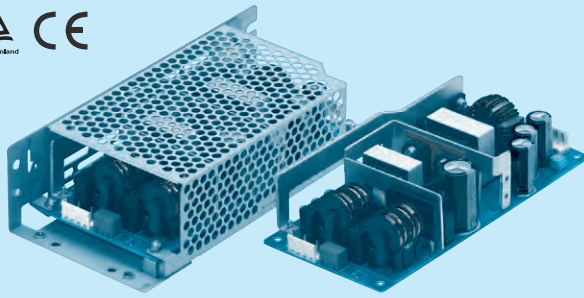
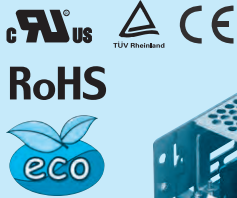
PIN No.	Contents
1	RC(+)
2	RC(-)

### Barrier strip type

Model B2B-XH-A  
Mating Connector (Terminal)  
XHP-2  
(BXH-001T-P0.6  
or SXH-001T-P0.6)

# LFA150F

LF A 150 F -□ -□  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**NAC-04-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
  - ② Single output
  - ③ Output wattage
  - ④ Universal input
  - ⑤ Output voltage
  - ⑥ Optional \*1
  - C : with Coating
  - G : Low leakage current
  - H : with the function to be acceptable to output peak current (only 24V)
  - J1 : VH(J.S.T.)connector type
  - R : with Remote ON/OFF
  - R2 : with Remote ON/OFF
  - S : with Chassis
  - SN : with Chassis & cover
  - Y : with Potentiometer
- Please refer to Instruction manual 6.

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
 \* Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LFA150F-3R3-Y	LFA150F-5-Y	LFA150F-12	LFA150F-15	LFA150F-24	LFA150F-24-H	LFA150F-36	LFA150F-48
MAX OUTPUT WATTAGE[W]	99	150	150	150	151.2	151.2 (189.6)	151.2	153.6
DC OUTPUT	3.3V 30A	5V 30A	12V 12.5A	15V 10A	24V 6.3A	24V 6.3 (7.9)A	36V 4.2A	48V 3.2A

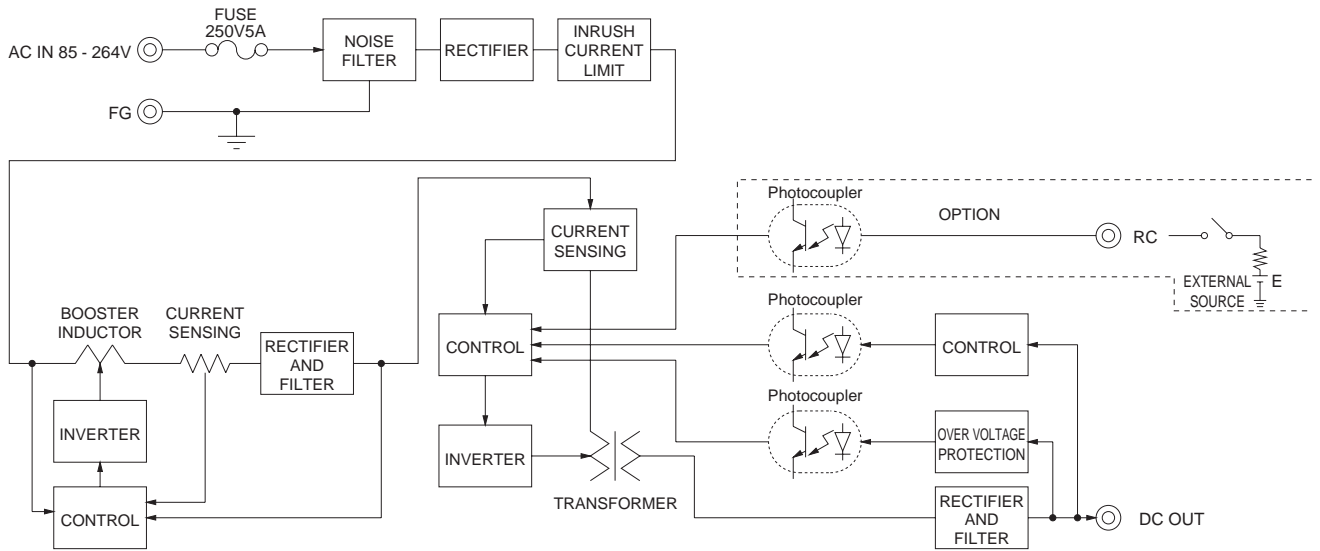
## SPECIFICATIONS

	MODEL	LFA150F-3R3-Y	LFA150F-5-Y	LFA150F-12	LFA150F-15	LFA150F-24	LFA150F-24-H	LFA150F-36	LFA150F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating", Instruction Manual 1 and 3) *4								
	CURRENT[A]	ACIN 100V	1.4typ (Io=100%)	2.0typ (Io=100%)						
		ACIN 200V	0.7typ (Io=100%)	1.0typ (Io=100%)						
	FREQUENCY[Hz]	50 / 60 (47 - 63)								
	EFFICIENCY[%]	ACIN 100V	80.0typ	82.5typ	82.5typ	84.0typ	85.0typ	85.0typ	85.0typ	85.5typ
		ACIN 200V	82.0typ	85.5typ	85.0typ	86.5typ	87.5typ	87.5typ	87.5typ	88.0typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.98typ	0.99typ						
ACIN 200V		0.92typ	0.95typ							
INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) (At cold start) (Ta=25°C)								
	ACIN 200V	30typ (Io=100%) (At cold start) (Ta=25°C)								
LEAKAGE CURRENT[ma]	0.40 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)									
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	24	36	48	
	CURRENT[A]	30	30	12.5	10	6.3	6.3 (Peak 7.9)	4.2	3.2	
	LINE REGULATION[mV]	20max	20max	48max	60max	96max	96max	144max	192max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	150max	150max	240max	240max	
	RIPPLE[mVp-p]	0 to +40°C *2	80max	80max	120max	120max	120max	240max	150max	150max
		-10 - 0°C *2	140max	140max	160max	160max	160max	320max	200max	200max
	RIPPLE NOISE[mVp-p]	0 to +40°C *2	120max	120max	150max	150max	150max	300max	250max	250max
		-10 - 0°C *2	160max	160max	180max	180max	180max	360max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +40°C	50max	50max	120max	150max	240max	240max	360max	480max
		-10 to +40°C	60max	60max	150max	180max	290max	290max	450max	600max
	DRIFT[mV]	20max	20max	48max	60max	96max	96max	144max	192max	
	START-UP TIME[ms]	350typ (ACIN 100V, Io=100%)								
	HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)								
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 to 3.63		4.50 to 5.50		Fixed ("Y"option is available for adjusting output voltage)				
OUTPUT VOLTAGE SETTING[V]	3.30 to 3.40	5.00 to 5.15	11.50 to 12.50	14.40 to 15.60	23.00 to 25.00	23.00 to 25.00	34.50 to 37.50	46.00 to 50.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically								
	OVERVOLTAGE PROTECTION	4.00 to 5.25	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	27.60 to 33.60	41.40 to 50.40	55.20 to 67.20	
	OPERATING INDICATION	Not provided								
	REMOTE SENSING	Not provided								
	REMOTE ON/OFF	Option (Refer to Instruction Manual)								
ISOLATION	INPUT-OUTPUT-RC	*6 AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)								
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)								
	OUTPUT-RC-FG	*6 AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)								
	OUTPUT-RC	*6 AC100V 1minute, Cutoff current = 25mA, DC100V 10MΩ min (At Room Temperature)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *4	-10 to +70°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis								
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis								
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN62368-1, EN60065, EN50178 Complies with DEN-AN								
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55011-B, EN55022-B								
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *8								
OTHERS	CASE SIZE/WEIGHT	75 X 37.0 X 160mm [2.95 X 1.46 X 6.30 inches] (W X H X D) / 390g max (with chassis & cover : 650g max)								
	COOLING METHOD	Convection (Refer to "Derating", Instruction Manual 3) *4								

\*1 Specification is changed at option, refer to Instruction Manual.  
 \*2 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal.  
 \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant  
 \*4 at the rated input/output.  
 \*5 ( ) means peak current. There is a possibility that an internal device is damaged when the specification is exceeded. Please contact us about the detail.  
 \*6 Applicable when remote control (optional) is added.  
 \*7 Please contact us about dynamic load and input response.  
 \*8 Please contact us about another class.  
 \*9 To meet the specifications. Do not operate over-loaded condition.  
 \*10 Parallel operation is not possible.  
 \*11 Derating is required when operated with chassis and cover.  
 \*12 Sound noise may be generated by power supply in case of pulse load.



## Block diagram

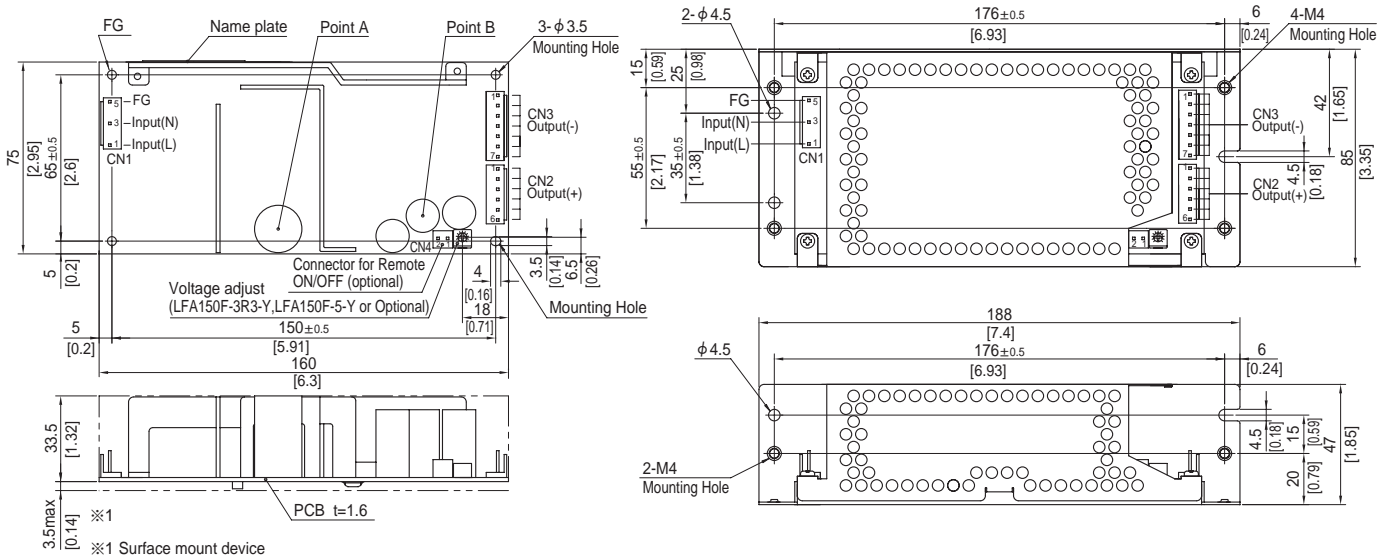


## External view

※ External size of option is different from standard model.

Standard type

Chassis and cover type



- ※ 4 Mounting holes are existing.
- ※ The back side of P.C.B. of the power supply is assembled some SMDs.  
Be attention not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm length or more regarding insulation.  
And do not use press-fitting bush.
- ※ Point A, Point B are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating connector	Terminal
CN1	1-1123724-3	1123721-1
		1318912-1
CN2	1-1123723-6	1123721-1
		1318912-1
CN3	1-1123723-7	1123721-1
		1318912-1

(Mfr:Tyco Electronics)

- ※ I/O Connector is Mfr. Tyco Electronics
- ※ Option:-J1:VH(J.S.T) connector type.

### <PIN CONNECTION>

CN1		CN2		CN3	
Pin No.	Input	Pin No.	Output	Pin No.	Output
1	AC(L)	1 to 6	+V	1 to 7	-V
2					
3	AC(N)				
4					
5	FG				

※ Keep drawing current per pin below 5A for CN2,CN3.

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 390g max (with chassis & cover : 650g max)
- ※ PCB material : CEM3
- ※ Optional chassis and cover material : Electric galvanizing steel board.
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque (Mounting hole of chassis) :1.5N · m (16kgf · cm) max

### Connector type

CN4 Option (Mfr.J.S.T)

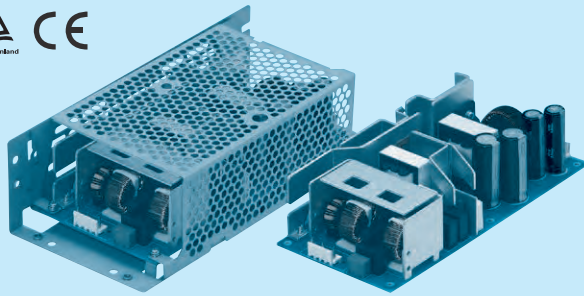
PIN No.	Contents
1	RC(+)
2	RC(-)

### Barrier strip type

Model B2B-XH-A  
Mating Connector (Terminal)  
XHP-2  
( BXH-001T-P0.6  
or SXH-001T-P0.6 )

# LFA240F

LF A 240 F -□ -□  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**NAC-06-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*1
- C : with Coating
- G : Low leakage current
- H : with the function to be acceptable to output peak current (only 24V)
- J1 : VH(J.S.T.)connector type
- R : with Remote ON/OFF
- R2 : with Remote ON/OFF
- S : with Chassis
- SN : with Chassis & cover
- T : Vertical terminal block
- Y : with Potentiometer

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
 \* Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

Please refer to Instruction manual 6.

MODEL	LFA240F-24	LFA240F-24-H	LFA240F-36	LFA240F-48
MAX OUTPUT WATTAGE[W]	240	240 (300)	241.2	240
DC OUTPUT	24V 10A	24V 10 (12.5)A	36V 6.7A	48V 5A

## SPECIFICATIONS

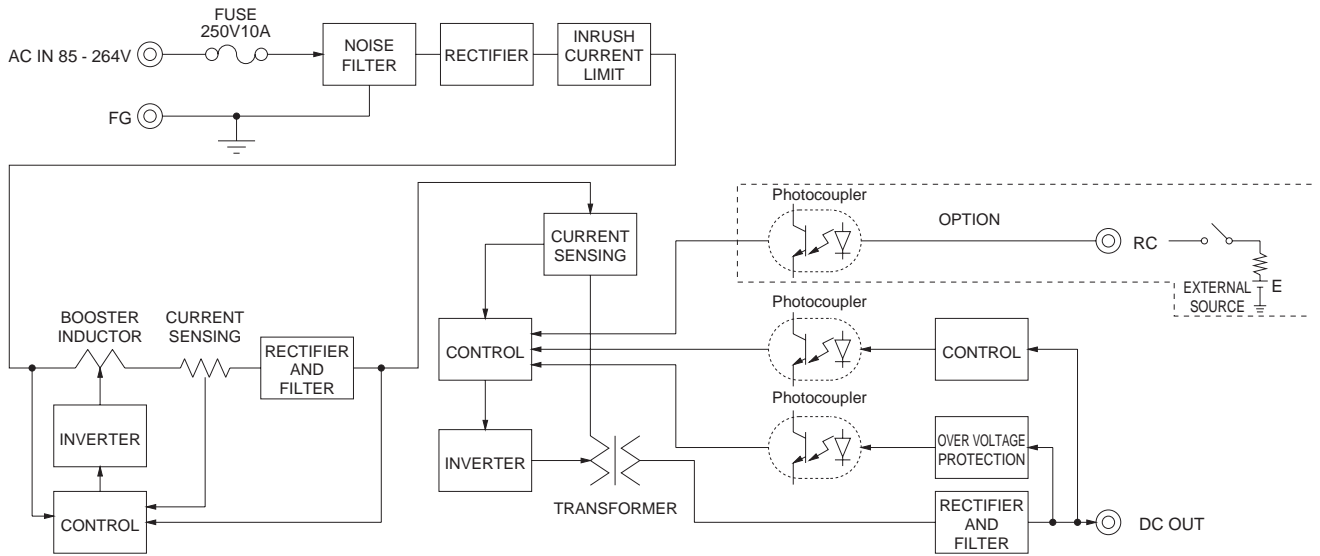
	MODEL	LFA240F-24	LFA240F-24-H	LFA240F-36	LFA240F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1φ (Refer to "Derating", Instruction Manual 1 and 3) *4				
	CURRENT[A]	ACIN 100V	3.3typ (Io=100%)			
		ACIN 200V	1.7typ (Io=100%)			
	FREQUENCY[Hz]	50 / 60 (47 - 63)				
	EFFICIENCY[%]	ACIN 100V	84.5typ	84.5typ	84.5typ	84.5typ
		ACIN 200V	87.5typ	87.5typ	87.5typ	87.5typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.99typ			
		ACIN 200V	0.95typ			
INRUSH CURRENT[A]	ACIN 100V	15 / 30typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 3 sec. to re-start)				
	ACIN 200V	30 / 30typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 3 sec. to re-start)				
LEAKAGE CURRENT[mA]	0.40 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)					
OUTPUT	VOLTAGE[V]	24	24	36	48	
	CURRENT[A]	10	10 (Peak12.5)	6.7	5	
	LINE REGULATION[mV]	96max	96max	144max	192max	
	LOAD REGULATION[mV]	150max	150max	240max	240max	
	RIPPLE[mVp-p]	0 to +40°C *2	120max	240max	150max	150max
		-10 -0°C *2	160max	320max	200max	200max
	RIPPLE NOISE[mVp-p]	0 to +40°C *2	150max	300max	250max	250max
		-10 -0°C *2	180max	360max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +40°C	240max	240max	360max	480max
		-10 to +40°C	290max	290max	450max	600max
	DRIFT[mV]	96max	96max	144max	192max	
	START-UP TIME[ms]	350typ (ACIN 100V, Io=100%)				
	HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)				
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed ("Y"option is available for adjusting output voltage)				
OUTPUT VOLTAGE SETTING[V]	23.00 to 25.00	23.00 to 25.00	34.50 to 37.50	46.00 to 50.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically				
	OVERVOLTAGE PROTECTION	27.60 to 33.60	27.60 to 33.60	41.40 to 50.40	55.20 to 67.20	
	OPERATING INDICATION	Not provided				
	REMOTE SENSING	Not provided				
	REMOTE ON/OFF	Option (Refer to Instruction Manual)				
ISOLATION	INPUT-OUTPUT-RC	*6 AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)				
	INPUT-FG	*6 AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)				
	OUTPUT-RC-FG	*6 AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)				
	OUTPUT-RC	*6 AC100V 1minute, Cutoff current = 25mA, DC100V 10MΩ min (At Room Temperature)				
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE *4	-10 to +70°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000feet) max				
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max				
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis				
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis				
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN62368-1, EN60065, EN50178 Complies with DEN-AN				
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55011-B, EN55022-B				
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *8				
OTHERS	CASE SIZE/WEIGHT	84 X 46.5 X 180mm [3.31 X 1.83 X 7.09 inches] (W X H X D) / 550g max (with chassis & cover : 880g max)				
	COOLING METHOD	Convection (Refer to "Derating", Instruction Manual 3) *4				

\*1 Specification is changed at option, refer to Instruction Manual.  
 \*2 This is the value that measured on measuring board with capacitor of 22μF at 150mm from output terminal.  
 Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).  
 \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant

at the rated input/output.  
 \*4 Derating is required.  
 \*5 ( ) means peak current. There is a possibility that an internal device is damaged when the specification is exceeded. Please contact us about the detail.  
 \*6 Applicable when remote control (optional) is added.  
 \*7 Please contact us about dynamic load and input response.

\*8 Please contact us about another class.  
 \* To meet the specifications. Do not operate over-loaded condition.  
 \* Parallel operation is not possible.  
 \* Derating is required when operated with chassis and cover.  
 \* Sound noise may be generated by power supply in case of pulse load.

## Block diagram

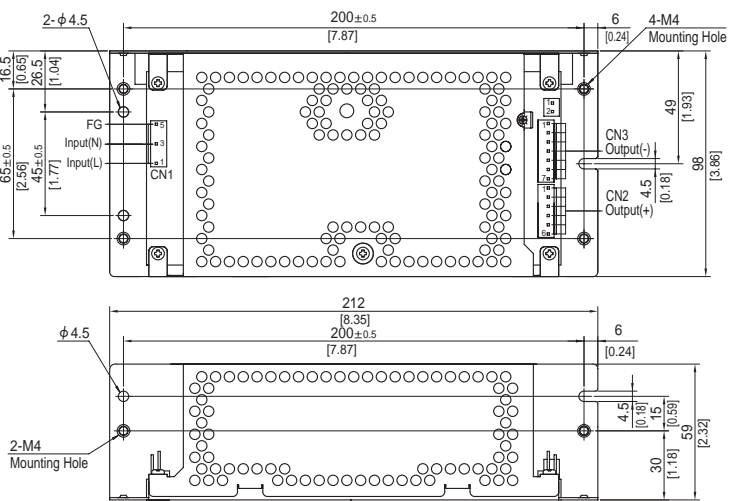
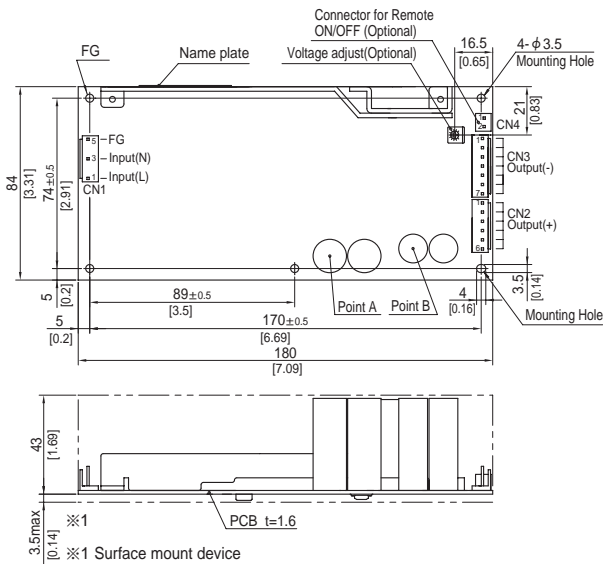


## External view

※ External size of option is different from standard model.

Standard type

Chassis and cover type



- ※ 5 Mounting holes are existing.
- ※ The back side of P.C.B. of the power supply is assembled some SMDs.
- Be attention not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm length or more regarding insulation.
- And do not use press-fitting bush.
- ※ Point A, Point B are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating connector	Terminal
CN1	1-1123724-3	Chain 1123721-1
		Loose 1318912-1
CN2	1-1123723-6	Chain 1123721-1
		Loose 1318912-1
CN3	1-1123723-7	Chain 1123721-1
		Loose 1318912-1

(Mfr:Tyco Electronics)

- ※ I/O Connector is Mfr. Tyco Electronics
- ※ Option:-J1:VH(J.S.T) connector type.

### <PIN CONNECTION>

CN1		CN2		CN3	
Pin No.	Input	Pin No.	Output	Pin No.	Output
1	AC(L)	1 to 6	+V	1 to 7	-V
2					
3	AC(N)				
4					
5	FG				

※ Keep drawing current per pin below 5A for CN2,CN3.

- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 550g max (with chassis & cover : 880g max)
- ※ PCB material : CEM3
- ※ Optional chassis and cover material : Electric galvanizing steel board.
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque (Mounting hole of chassis) :1.5N · m (16kgf · cm) max

### Connector type

CN4 Option (Mfr:J.S.T)

PIN No.	Contents
1	RC(+)
2	RC(-)

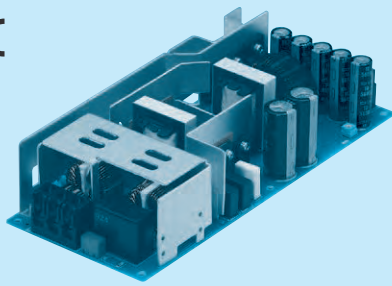
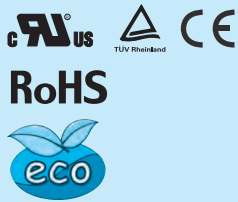
### Barrier strip type

Model B2B-XH-A  
Mating Connector (Terminal)  
XHP-2  
( BXH-001T-P0.6  
or SXH-001T-P0.6 )

# LFA300F

LF A 300 F -□ -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*1
- C : with Coating
- G : Low leakage current
- H : with the function to be acceptable to output peak current  
(Only 24V, 30V, 36V and 48V)
- J : EP (Tyco Electronics) connector type  
(Except 3.3V and 5V)
- J1 : VH (J.S.T.) connector type  
(Except 3.3V and 5V)
- R : with Remote ON/OFF
- R2 : with Remote ON/OFF
- S : with Chassis
- SNF : with Chassis & cover & fan  
(Only 5V, 12V and 24V)
- T1 : Horizontal terminal block

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

Please refer to Instruction manual 6.

MODEL	LFA300F-3R3-TY	LFA300F-5-TY	LFA300F-12-TY	LFA300F-15-TY	LFA300F-24-TY	LFA300F-24-HTY	LFA300F-30-TY	LFA300F-36-TY	LFA300F-48-TY	
MAX OUTPUT WATTAGE[W]	198	300	324	330	336	336 (456)	330	338.4	336	
DC OUTPUT	Convection	3.3V 40A	5V 40A	12V 17A	15V 14A	24V 12.5A	24V 12.5 (19A)	30V 10A	36V 8.4A	48V 6.3A
	Forced air	3.3V 60A	5V 60A	12V 27A	15V 22A	24V 14A	24V 14 (19A)	30V 11A	36V 9.4A	48V 7A

## SPECIFICATIONS

	MODEL	LFA300F-3R3-TY	LFA300F-5-TY	LFA300F-12-TY	LFA300F-15-TY	LFA300F-24-TY	LFA300F-24-HTY	LFA300F-30-TY	LFA300F-36-TY	LFA300F-48-TY	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating", Instruction Manual 1 and 3) *4									
	CURRENT[A]	ACIN 100V	2.7typ (Io=100%)	4.1typ (Io=100%)							
		ACIN 200V	1.4typ (Io=100%)	2.0typ (Io=100%)							
	FREQUENCY[Hz]	50 / 60 (47 - 63)									
	EFFICIENCY[%]	ACIN 100V	75.0typ	79.0typ	80.0typ	81.5typ	85.0typ	85.0typ	85.5typ	85.5typ	85.5typ
		ACIN 200V	77.0typ	82.5typ	83.0typ	84.5typ	88.0typ	88.0typ	88.0typ	88.0typ	88.0typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.98typ	0.99typ							
		ACIN 200V	0.92typ	0.95typ							
INRUSH CURRENT[A]	ACIN 100V	15 / 30typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 3 sec. to re-start)									
	ACIN 200V	30 / 30typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 3 sec. to re-start)									
LEAKAGE CURRENT[ma]	0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)										
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	24	30	36	48	
	CURRENT[A]	Convection	40	40	17	14	12.5	12.5 (Peak19)	10	8.4	6.3
		Forced air	60	60	27	22	14	14 (Peak19)	11	9.4	7
	LINE REGULATION[mV]	20max	20max	48max	60max	96max	96max	144max	144max	192max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	150max	150max	240max	240max	240max	
	RIPPLE[mVp-p]	0 to +40C *2	80max	80max	120max	120max	120max	240max	150max	150max	150max
		-10 - 0C *2	140max	140max	160max	160max	160max	320max	200max	200max	200max
	RIPPLE NOISE[mVp-p]	0 to +40C *2	120max	120max	150max	150max	150max	300max	250max	250max	250max
		-10 - 0C *2	160max	160max	180max	180max	180max	360max	300max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +40C	50max	50max	120max	150max	240max	240max	360max	360max	480max
		-10 to +40C	60max	60max	150max	180max	290max	290max	450max	450max	600max
	DRIFT[mV]	20max	20max	48max	60max	96max	96max	144max	144max	192max	
START-UP TIME[ms]	350typ (ACIN 100V, Io=100%)										
HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)										
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 to 3.63	4.50 to 5.50	10.80 to 13.20	13.50 to 16.50	21.60 to 27.50	21.60 to 27.50	27.00 to 33.00	32.40 to 39.60	39.60 to 52.80		
OUTPUT VOLTAGE SETTING[V]	3.30 to 3.40	5.00 to 5.15	12.00 to 12.48	15.00 to 15.60	24.00 to 24.96	24.00 to 24.96	30.00 to 31.20	36.00 to 37.44	48.00 to 49.92		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically									
	OVERVOLTAGE PROTECTION	4.00 to 5.25	5.75 to 7.00	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	27.60 to 33.60	34.50 to 42.00	41.40 to 50.40	55.20 to 67.20	
	OPERATING INDICATION	Not provided									
	REMOTE SENSING	Not provided									
ISOLATION	REMOTE ON/OFF	Option (Refer to Instruction Manual)									
	INPUT-OUTPUT-RC	*6 AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)									
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)									
	OUTPUT-RC-FG	*6 AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)									
ENVIRONMENT	OUTPUT-RC	*6 AC100V 1minute, Cutoff current = 25mA, DC100V 10MΩ min (At Room Temperature)									
	OPERATING TEMP., HUMID. AND ALTITUDE *4	-10 to +70°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000feet) max									
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max									
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis									
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis									
	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN62368-1, EN60065, EN50178 Complies with DEN-AN									
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55011-B, EN55022-B									
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *8									
OTHERS	CASE SIZE/WEIGHT	95X52.5X222mm [3.74X2.07X8.74 inches] (W X H X D) (without terminal block) / 810g max (with chassis & cover : 1,270g max)									
	COOLING METHOD	Convection / Forced air (Refer to "Derating", Instruction Manual 3) *4									

\*1 Specification is changed at option, refer to Instruction Manual.

\*2 This is the value that measured on measuring board with capacitor of 22μF at 150mm from output terminal.

Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).

\*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant

at the rated input/output.

\*4 Derating is required.

\*5 ( ) means peak current. There is a possibility that an internal device is damaged when the specification is exceeded. Please contact us about the detail.

\*6 Applicable when remote control (optional) is added.

\*7 Please contact us about dynamic load and input response.

\*8 Please contact us about another class.

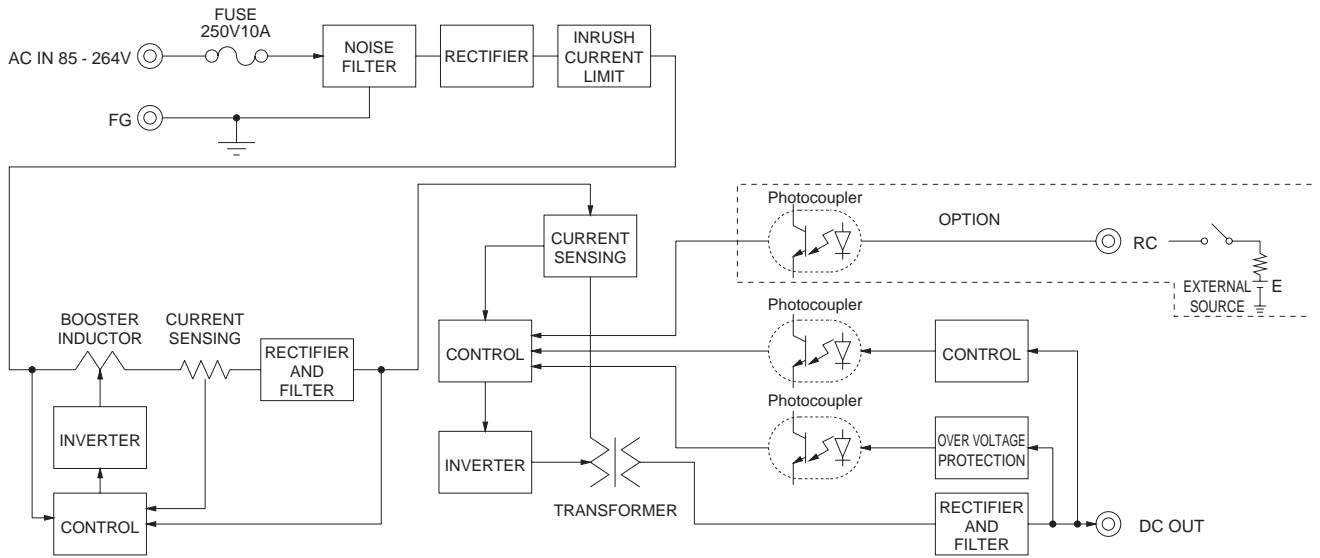
\* To meet the specifications. Do not operate over-loaded condition.

\* Parallel operation is not possible.

\* Derating is required when operated with chassis and cover.

\* Sound noise may be generated by power supply in case of pulse load.

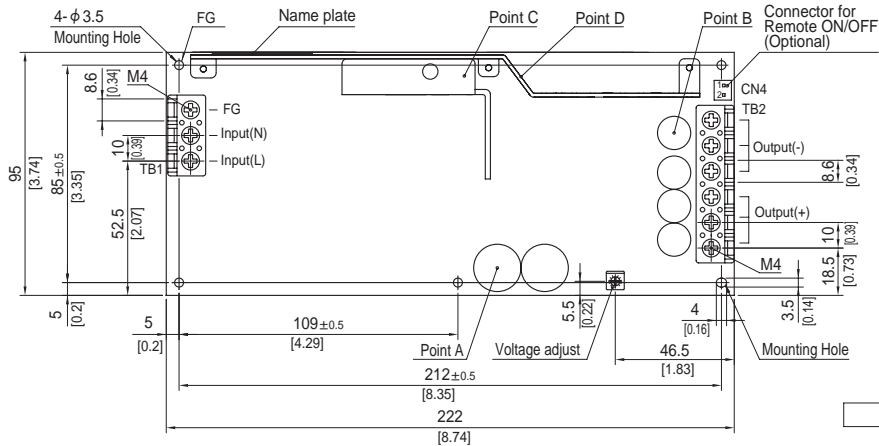
## Block diagram



## External view

※ External size of option is different from standard model.

Standard type



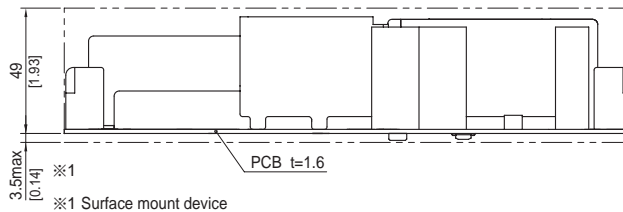
Connector type

CN4 Option (Mfr.:J.S.T)

PIN No.	Contents
1	RC(+)
2	RC(-)

Barrier strip type

Model B2B-XH-A  
Mating Connector (Terminal)  
XHP-2  
( BXH-001T-P0.6  
or SXH-001T-P0.6 )



- ※ 5 Mounting holes are existing.
- ※ The back side of P.C.B. of the power supply is assembled some SMDs.  
Be attention not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm length or more regarding insulation.  
And do not use press-fitting bush.
- ※ Point A, Point B, Point C, Point D are thermometry points.  
Please refer to Instruction Manual 3.
- ※ Keep drawing current per pin below 20A for TB2.

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 810g max (with chassis & cover : 1,270g max)
- ※ PCB material : CEM3
- ※ Dimensions in mm, [ ]=inches
- ※ Screw tightening torque : M4 1.6N · m (16.9kgf · cm) max

Assembling and Installation Method

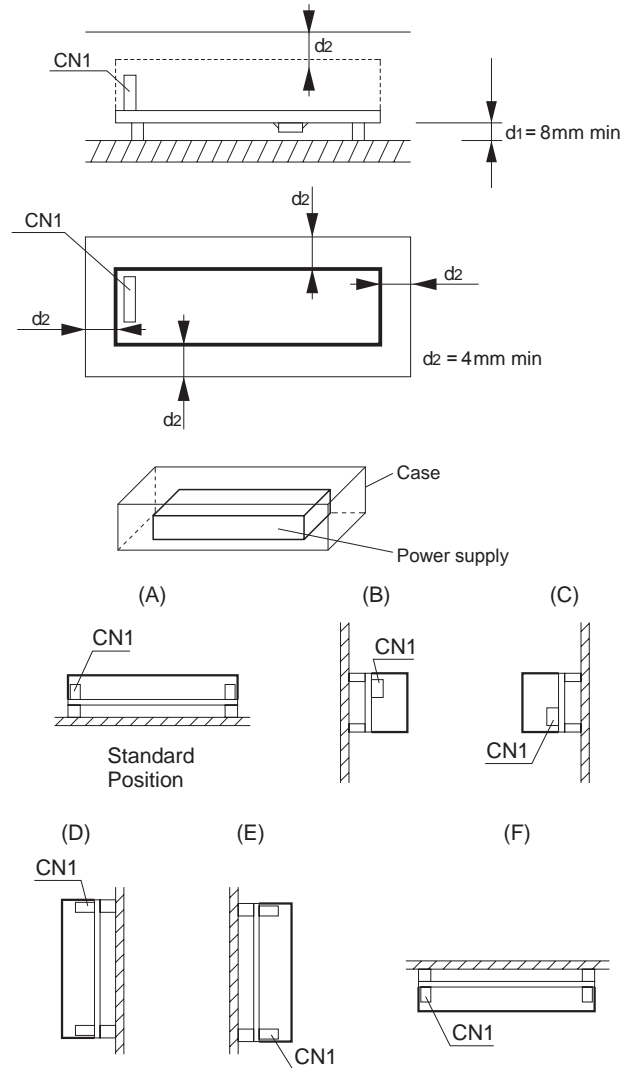
Installation method

■ This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.

■ In case of metal chassis, keep the distance between d1 & d2 for to insulate between lead of component and metal chassis, use the spacer of 8mm or more between d1. If it is less than d1 & d2, insert the insulation sheet between power supply and metal chassis.

■ There is a possibility that it is not possible to cool enough when the power supply is used by the sealing up space as showing in right figure. Please use it after confirming the temperature of point A and point B of Instruction Manual 3.

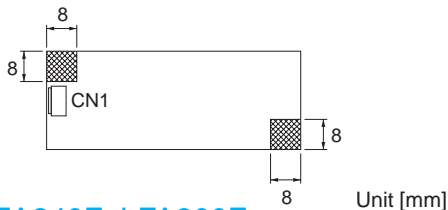
■ (F) mounting is not possible when unit is with case cover, but if need to operate unit by (F) positioning with case cover, temperature / load derating is necessary. For more details, please contact our sales or engineering departments.



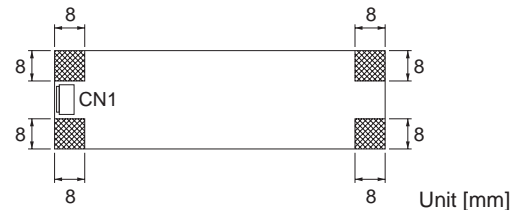
Mounting screw

■ The mounting screw should be M3. The hatched area shows the allowance of metal parts for mounting.

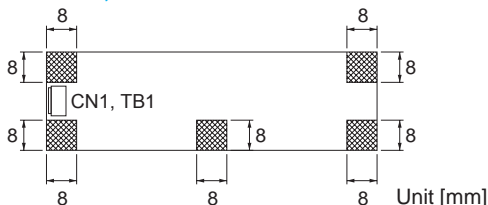
● LFA10F, LFA15F



● LFA30F, LFA50F, LFA75F, LFA100F, LFA150F



● LFA240F, LFA300F



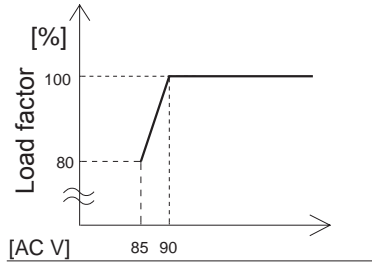
■ If metallic fittings are used on the component side of the board, ensure there is no contact with surface mounted components.

■ This product uses SMD technology. Please avoid the PCB installation method which includes the twisting stress or the bending stress.

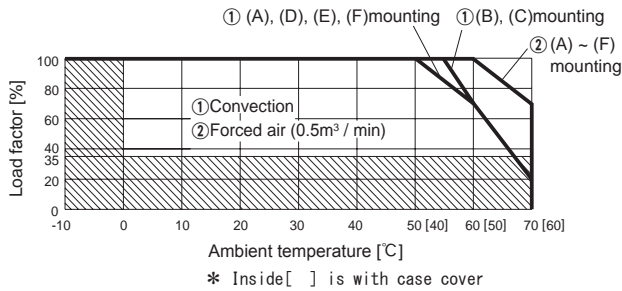
\*Recommendation to electrically connect FG to metal chassis for reducing noise.

Derating

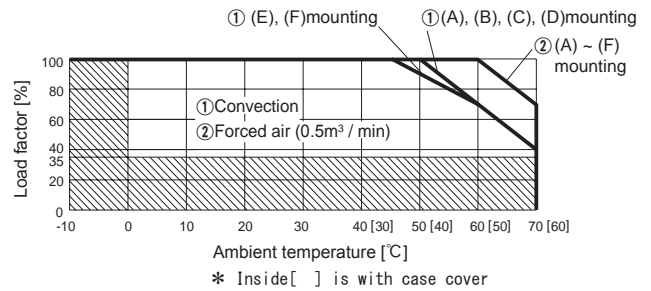
Derating curve for input voltage



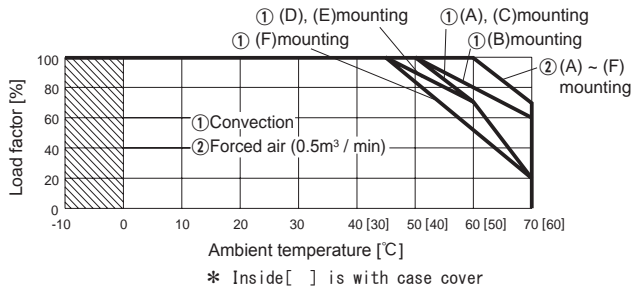
LFA10F Ambient temperature derating curve (Reference value)



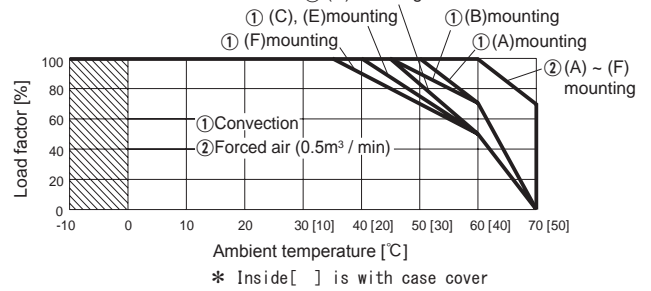
LFA15F Ambient temperature derating curve (Reference value)



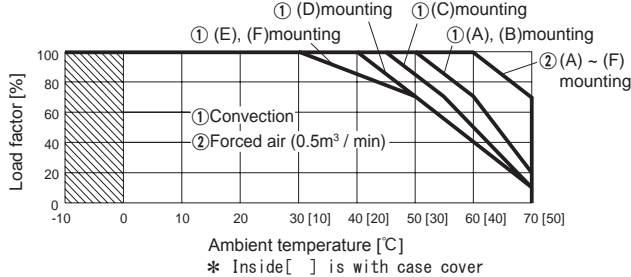
LFA30F Ambient temperature derating curve (Reference value)



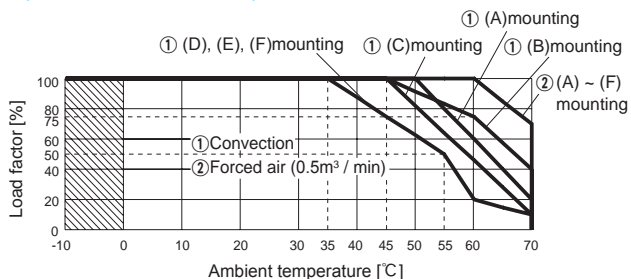
LFA50F Ambient temperature derating curve (Reference value)



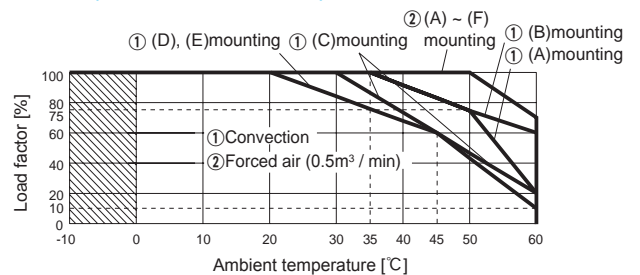
LFA75F Ambient temperature derating curve (Reference value)



LFA100F Ambient temperature derating curve (Reference value)

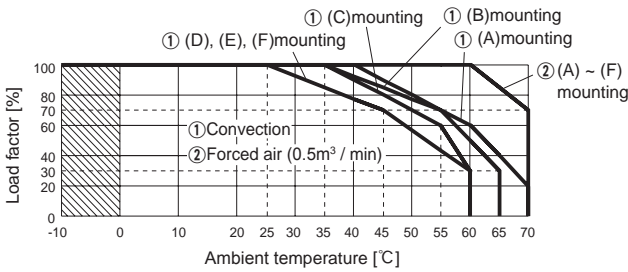


LFA100F-□-SN Ambient temperature derating curve (Reference value)

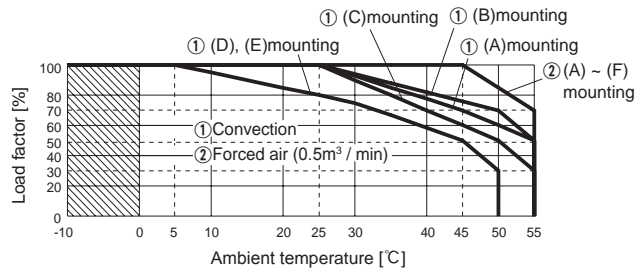


Derating

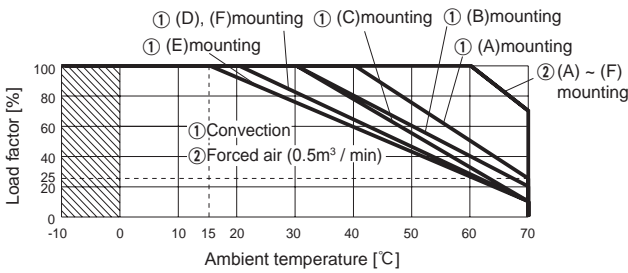
● LFA150F Ambient temperature derating curve (Reference value)



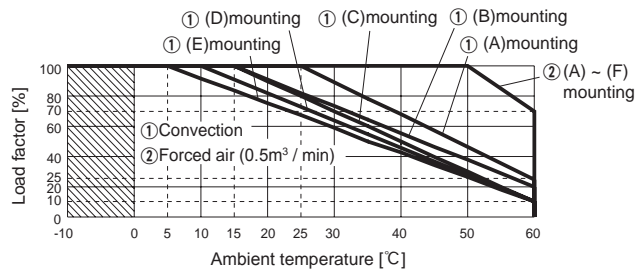
● LFA150F-□-SN Ambient temperature derating curve (Reference value)



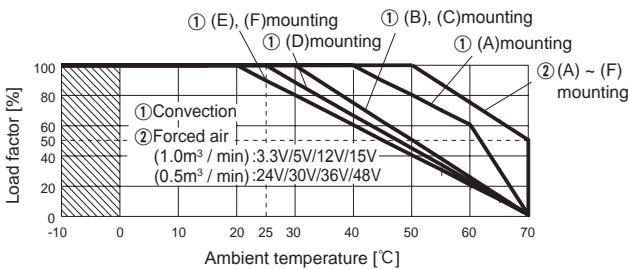
● LFA240F Ambient temperature derating curve (Reference value)



● LFA240F-□-SN Ambient temperature derating curve (Reference value)



● LFA300F Ambient temperature derating curve (Reference value)



Output voltage	Output power[W]	
	①Convection	②Forced air
3.3V	132.0	198.0
5V	200.0	300.0
12V	204.0	324.0
15V	210.0	330.0
24V	300.0	336.0
30V	300.0	330.0
36V	302.4	338.4
48V	302.4	336.0

- The operative ambient temperature is different by with / without chassis cover or mounting position.  
Note: In the hatched area, the specification of Ripple, Ripple Noise is different from other area.
- Make sure the temperature at point A and point B is less than the temperatures shown in Instruction Manual 3.
- The ambient temperature should be measured 5 to 10 cm away from the power supply so that it won't be influenced by the heat from the power supply. Please consult us for more details.

Instruction Manual

◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/LFA/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

LFA



NOTICE





## Basic Characteristics Data

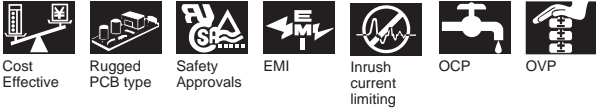
Model	Circuit method	Switching frequency [kHz]	Input current *1 [A]	Inrush current protection	PCB/Pattern			Series/Parallel operation availability *2	
					Material	Single sided	Double sided	Series operation	Parallel operation
LFA10F	Flyback converter	100	0.26	LF	CEM-3	Yes		Yes	No
LFA15F	Flyback converter	100	0.35	Thermistor	CEM-3	Yes		Yes	No
LFA30F	Flyback converter	130	0.65	Thermistor	CEM-3	Yes		Yes	No
LFA50F	Active filter	60-440	0.67	Thermistor	CEM-3	Yes		Yes	No
	Flyback converter	130							
LFA75F	Active filter	60-440	1.0	Thermistor	CEM-3	Yes		Yes	No
	Flyback converter	130							
LFA100F	Active filter	60	1.3	Thermistor	CEM-3		Yes	Yes	No
	Forward converter	140							
LFA150F	Active filter	60	2.0	Thermistor	CEM-3		Yes	Yes	No
	Forward converter	140							
LFA240F	Active filter	60	3.3	SCR	CEM-3		Yes	Yes	No
	Forward converter	140							
LFA300F	Active filter	60	4.1	SCR	CEM-3		Yes	Yes	No
	Forward converter	140							

\*1 The value of input current is at ACIN 100V and rated load.

\*2 Refer to Instruction Manual 2.

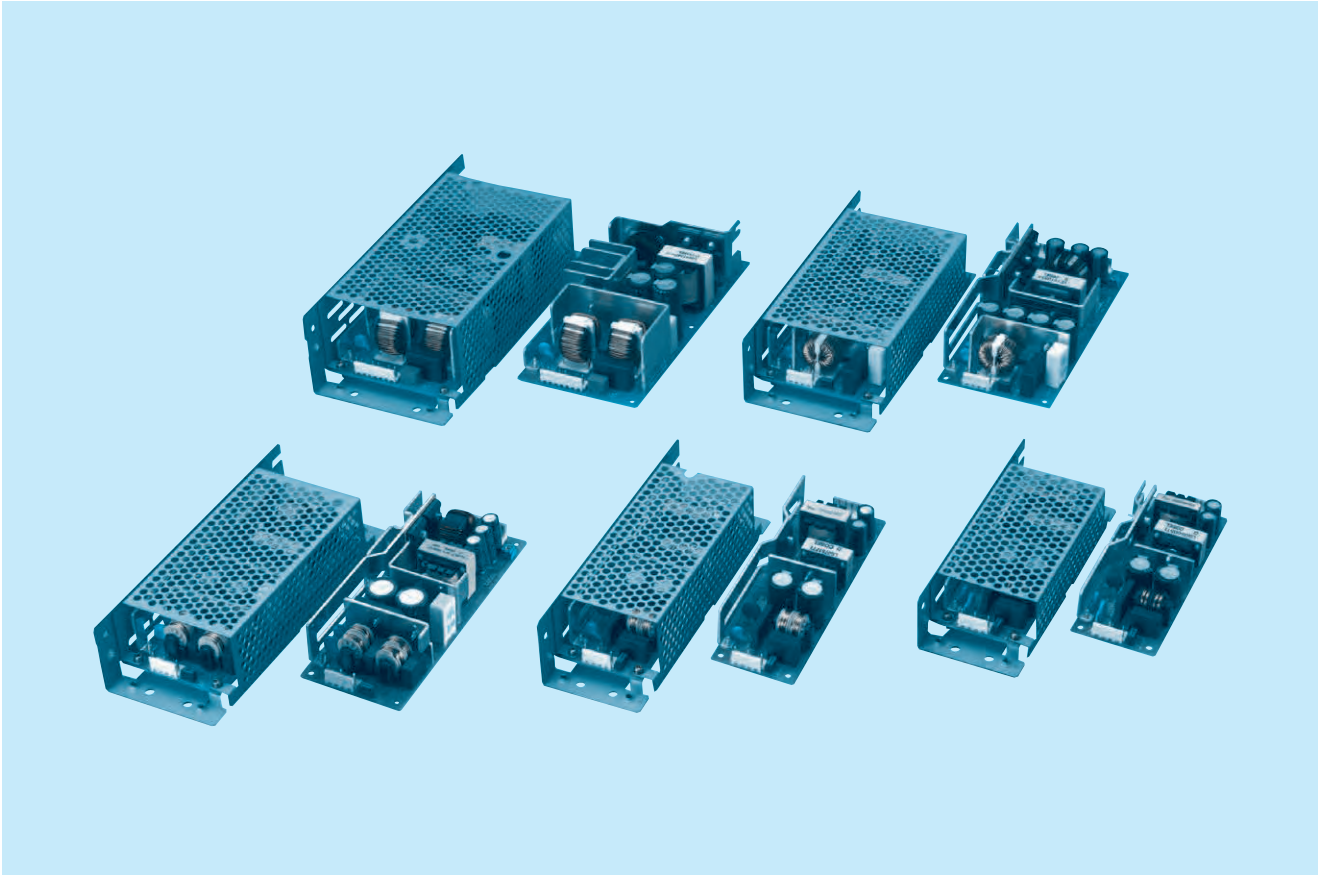
LFA





# LGA-series

LGA



## ■ Feature

Small and compact PCB construction  
Built-in inrush current, overcurrent and overvoltage protection circuits

## ■ Safety agency approvals

UL60950-1, C-UL(CSA60950-1) recognized, EN60950-1 approved  
Complies with DEN-AN

## ■ EMI

Complies with FCC-B, CISPR22-B, EN55011-B, EN55022-B, VCCI-B

## ■ 5-year warranty (refer to Instruction Manual)

## ■ CE marking

Low Voltage Directive  
RoHS Directive

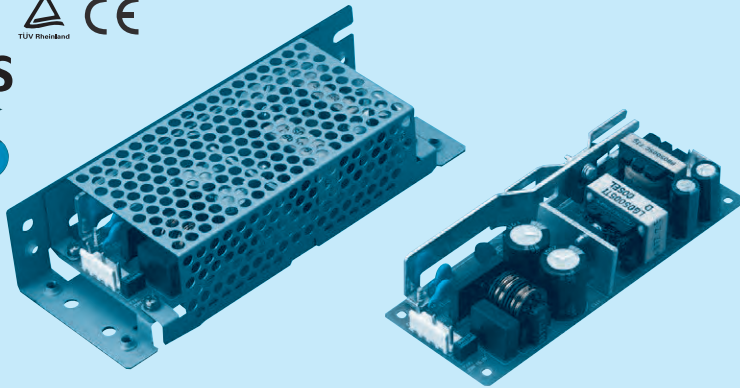
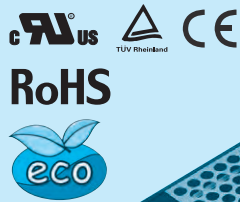
## ■ EMS Compliance : EN61204-3, EN61000-6-2

EN61000-4-2  
EN61000-4-3  
EN61000-4-4  
EN61000-4-5  
EN61000-4-6  
EN61000-4-8  
EN61000-4-11

# LGA50A

LG A 50 A -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ 100/120V input
- ⑤ Output voltage
- ⑥ Optional
- C :with Coating
- G :Low leakage current
- H :with the function to be acceptable to output peak current (only 24V)
- J1 :VH(J.S.T.)connector type
- S :with Chassis
- SN:with Chassis & cover
- Y :with Potentiometer

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LGA50A-3R3-Y	LGA50A-5	LGA50A-12	LGA50A-15	LGA50A-24	LGA50A-24-H	LGA50A-48
MAX OUTPUT WATTAGE[W]	33	50	51.6	52.5	60	60	62.4
DC OUTPUT	3.3V 10A	5V 10A	12V 4.3A	15V 3.5A	24V 2.5A	24V 2.5 (Peak 3.2) A	48V 1.3A

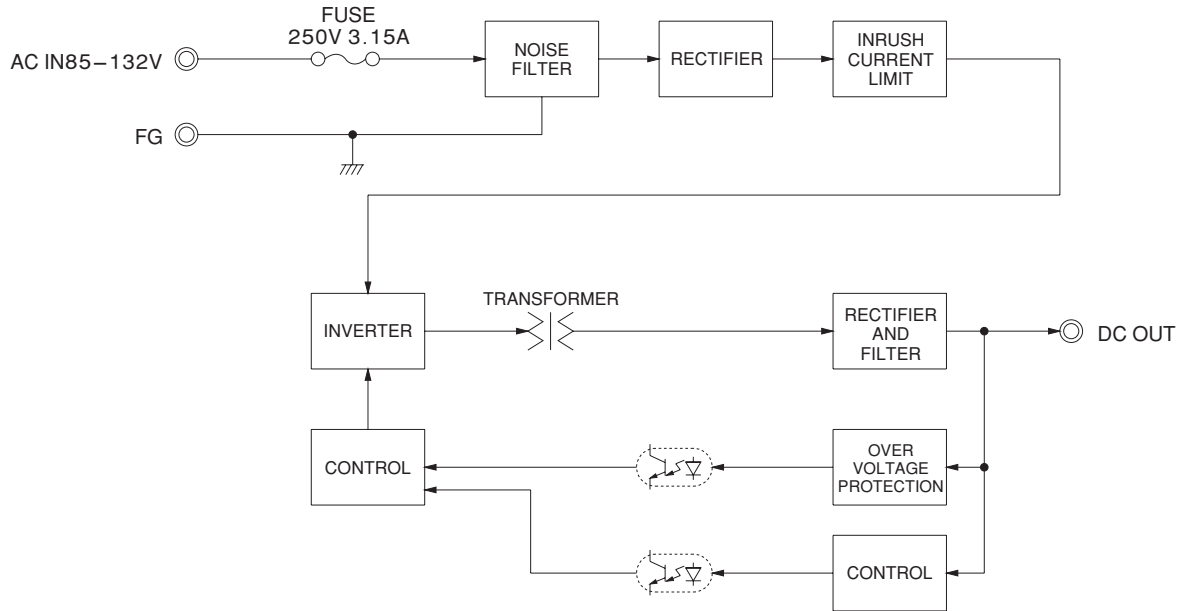
## SPECIFICATIONS

MODEL	LGA50A-3R3-Y	LGA50A-5	LGA50A-12	LGA50A-15	LGA50A-24	LGA50A-24-H	LGA50A-48											
INPUT	VOLTAGE[V]																	
	AC85 - 132 1 φ (Refer to "Derating", Instruction Manual 1 and 3)																	
	CURRENT[A]		ACIN 100V		0.8typ (Io=100%)				1.3typ (Io=100%)									
	FREQUENCY[Hz]																	
	47 - 440 (Refer to Instruction Manual 1.1)																	
	EFFICIENCY[%]		ACIN 100V		74.0typ (Io=100%)		79.0typ (Io=100%)		82.0typ (Io=100%)		83.0typ (Io=100%)		85.0typ (Io=100%)		85.0typ (Io=100%)		85.0typ (Io=100%)	
INRUSH CURRENT[A]		ACIN 100V		30typ (Io=100%), (At cold start), (Ta= 25°C)														
LEAKAGE CURRENT[ma]		0.5max (ACIN 100V, 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)																
OUTPUT	VOLTAGE[V]		3.3		5		12		15		24		24		48			
	CURRENT[A]		*3		10.0		10.0		4.3		3.5		2.5		2.5 (Peak 3.2)		1.3	
	LINE REGULATION[mV]		20max		20max		48max		60max		96max		96max		192max			
	LOAD REGULATION[mV]		40max		40max		100max		120max		150max		150max		300max			
	RIPPLE[mVp-p]		0 to +50°C *1		80max		80max		120max		120max		120max		240max		150max	
			-10 - 0°C *1		140max		140max		160max		160max		160max		320max		200max	
	RIPPLE NOISE[mVp-p]		0 to +50°C *1		120max		120max		150max		150max		150max		300max		350max	
			-10 - 0°C *1		160max		160max		180max		180max		180max		360max		400max	
	TEMPERATURE REGULATION[mV]		0 to +50°C *4		50max		50max		120max		150max		240max		240max		480max	
			-10 to +50°C *4		60max		60max		150max		180max		290max		290max		600max	
	DRIFT[mV]		*2		20max		20max		48max		60max		96max		96max		192max	
	START-UP TIME[ms]		200max (ACIN 100V, Io=100%)															
	HOLD-UP TIME[ms]		20typ (ACIN 100V, Io=100%)															
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		2.85 - 3.63		Fixed ("Y" which can be adjusted the output is available as optional ± 10%)														
OUTPUT VOLTAGE SETTING[V]		3.30 - 3.40		4.90 - 5.30		11.50 - 12.50		14.40 - 15.60		23.00 - 25.00		23.00 - 25.00		46.00 - 50.00				
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION		Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically															
	OVERVOLTAGE PROTECTION		4.00 - 5.25		5.75 - 7.00		13.80 - 16.80		17.30 - 21.00		27.60 - 35.00		27.60 - 35.00		55.20 - 67.20			
	OPERATING INDICATION		Not provided															
	REMOTE SENSING		Not provided															
REMOTE ON/OFF		Not provided																
ISOLATION	INPUT-OUTPUT		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)															
	INPUT-FG		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)															
	OUTPUT-FG		AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)															
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE		-10 to +60°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000feet) max															
	STORAGE TEMP., HUMID. AND ALTITUDE		-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max															
	VIBRATION		10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis															
	IMPACT		196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis															
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS		UL60950-1, C-UL (CSA60950-1), EN60950-1 Complies with DEN-AN															
	CONDUCTED NOISE		Complies with FCC-B, VCCI-B, CISPR-B, EN55011-B, EN55022-B															
OTHERS	CASE SIZE/WEIGHT		50 X 28.5 X 132mm [1.97 X 1.12 X 5.2 inches] (W X H X D) / 160g max (with chassis & cover : 320g max)															
	COOLING METHOD		Convection (Refer to "Derating", Instruction Manual 3)															

\*1 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal.  
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM-103).  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
\*3 Peak loading for 10sec. And Duty 35% max. or less is acceptable if the total wattage is less than the rated wattage (24V:60W).  
Refer to instruction Manual 6. In detail.

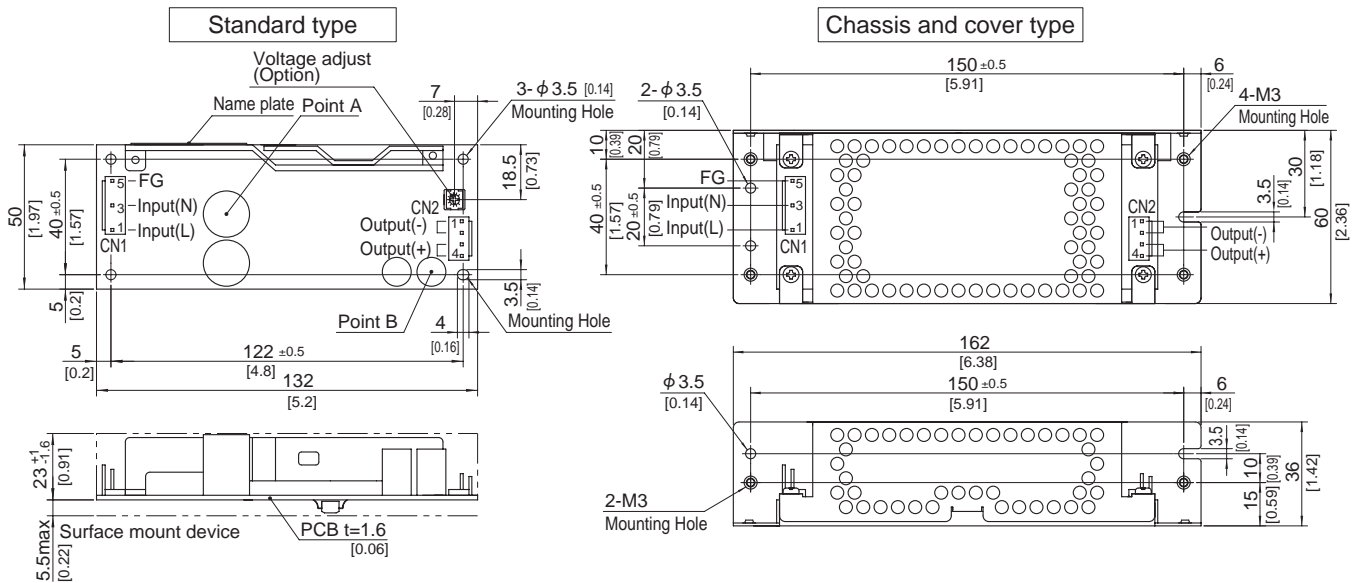
\*4 Only output 24V and 48V DC models are applied that the upper temperature limit is 45°C.  
\* Avoid prolonged use under over - load.  
\* Parallel operation with other model is not possible.  
\* Derating is required when operated with chassis and cover.  
\* A sound may occur from power supply at pulse loading.

Block diagram



LGA

External view



- ※ This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care. Take care for SMD parts on the back to come in contact because of the vibration and not to break down.
- ※ Use the spacer of 8mm length or more.
- ※ 4 Mounting holes are existing.

※Mounting torque:0.6N.m(6.3kgf.cm)max

I/O Connector	Mating connector	Terminal
CN1	1-1123724-3	Chain 1123721-1
		Loose 1318912-1
CN2	1-1123723-4	Chain 1123721-1
		Loose 1318912-1

(Mfr:Tyco Electronics AMP)

※I/O Connector is Mfr Tyco Electronics AMP  
 ※Option:-J1:VH(J.S.T) connector type.  
 Refer to instruction Manual 6.

<PIN CONNECTION>

CN1		CN2	
Pin No.	Input	Pin No.	Output
1	AC(L)	1, 2	-V
2			
3	AC(N)	3, 4	+V
4			
5	FG		

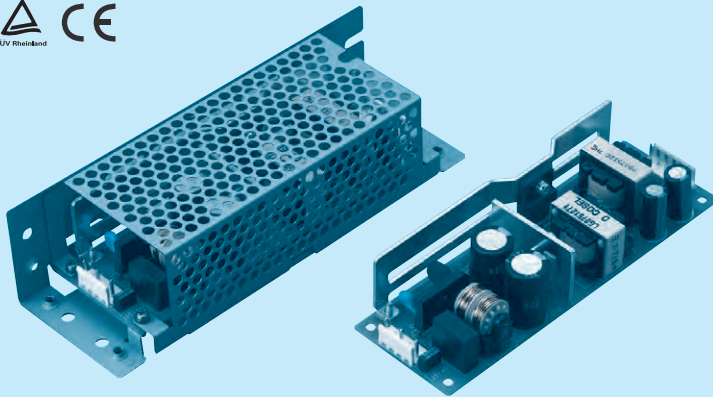
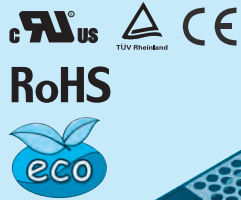
※Keep drawing current per pin below 5A for CN2.

- ※Tolerance : ±1 [±0.04]
- ※Weight : 160g max (with chassis & cover : 320g max)
- ※PCB material / thickness : CEM3 / 1.6mm [0.06]
- ※Optional chassis and cover material : Electric galvanizing steel board.
- ※Dimensions in mm, [ ]=inches

# LGA75A

LG A 75 A -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ 100/120V input
- ⑤ Output voltage
- ⑥ Optional
- C :with Coating
- G :Low leakage current
- H :with the function to be acceptable to output peak current (only 24V)
- J1 :VH(J.S.T.)connector type
- S :with Chassis
- SN:with Chassis & cover
- Y :with Potentiometer

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

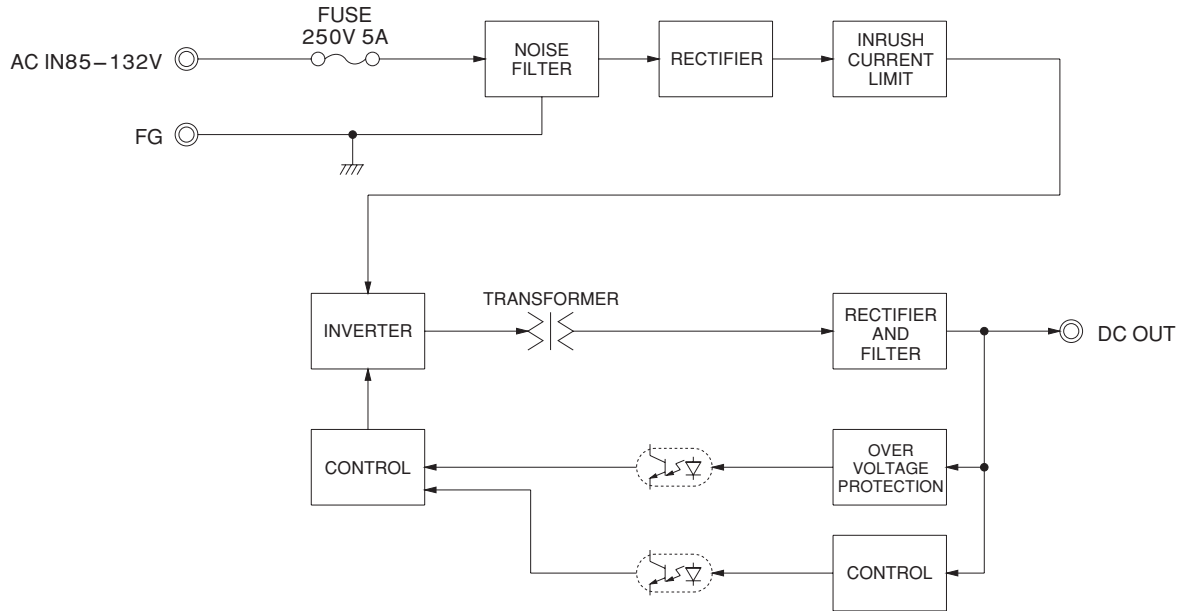
MODEL	LGA75A-3R3-Y	LGA75A-5	LGA75A-12	LGA75A-15	LGA75A-24	LGA75A-24-H	LGA75A-48
MAX OUTPUT WATTAGE[W]	49.5	75	75.6	75	76.8	76.8	76.8
DC OUTPUT	3.3V 15A	5V 15A	12V 6.3A	15V 5A	24V 3.2A	24V 3.2 (Peak 4.2) A	48V 1.6A

## SPECIFICATIONS

MODEL	LGA75A-3R3-Y	LGA75A-5	LGA75A-12	LGA75A-15	LGA75A-24	LGA75A-24-H	LGA75A-48		
INPUT	VOLTAGE[V]	AC85 - 132 1 φ (Refer to "Derating", Instruction Manual 1 and 3)							
	CURRENT[A]	ACIN 100V 1.3typ (Io=100%)	1.7typ (Io=100%)						
	FREQUENCY[Hz]	47 - 440 (Refer to Instruction Manual 1.1)							
	EFFICIENCY[%]	ACIN 100V 75.0typ (Io=100%)	79.0typ (Io=100%)	83.0typ (Io=100%)	84.0typ (Io=100%)	86.0typ (Io=100%)	86.0typ (Io=100%)	86.0typ (Io=100%)	
	INRUSH CURRENT[A]	ACIN 100V 30typ (Io=100%), (At cold start), (Ta= 25°C)							
LEAKAGE CURRENT[ma]	0.5max (ACIN 100V, 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)								
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	24	48	
	CURRENT[A]	*3 15.0	15.0	6.3	5.0	3.2	3.2 (Peak 4.2)	1.6	
	LINE REGULATION[mV]	20max	20max	48max	60max	96max	96max	192max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	150max	150max	300max	
	RIPPLE[mVp-p]	0 to +50°C *1	80max	80max	120max	120max	120max	240max	150max
		-10 - 0°C *1	140max	140max	160max	160max	160max	320max	200max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max	120max	150max	150max	150max	300max	350max
		-10 - 0°C *1	160max	160max	180max	180max	180max	360max	400max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	120max	150max	240max	240max	480max
		-10 to +50°C	60max	60max	150max	180max	290max	290max	600max
	DRIFT[mV]	*2 20max	20max	48max	60max	96max	96max	192max	
	START-UP TIME[ms]	200max (ACIN 100V, Io=100%)							
HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)								
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 - 3.63	Fixed ("Y" which can be adjusted the output is available as optional ± 10%)							
OUTPUT VOLTAGE SETTING[V]	3.30 - 3.40	4.90 - 5.30	11.50 - 12.50	14.40 - 15.60	23.00 - 25.00	23.00 - 25.00	46.00 - 50.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically							
	OVERVOLTAGE PROTECTION	4.00 - 5.25	5.75 - 7.00	13.80 - 16.80	17.30 - 21.00	27.60 - 35.00	27.60 - 35.00	55.20 - 67.20	
	OPERATING INDICATION	Not provided							
	REMOTE SENSING	Not provided							
ISOLATION	REMOTE ON/OFF	Not provided							
	INPUT-OUTPUT	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)							
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)							
ENVIRONMENT	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)							
	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +60°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000feet) max							
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max							
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis							
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis							
	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1 Complies with DEN-AN							
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55011-B, EN55022-B							
OTHERS	CASE SIZE/WEIGHT	50 X 34.5 X 150mm [1.97 X 1.36 X 5.91 inches] (W X H X D) / 200g max (with chassis & cover : 410g max)							
	COOLING METHOD	Convection (Refer to "Derating", Instruction Manual 3)							

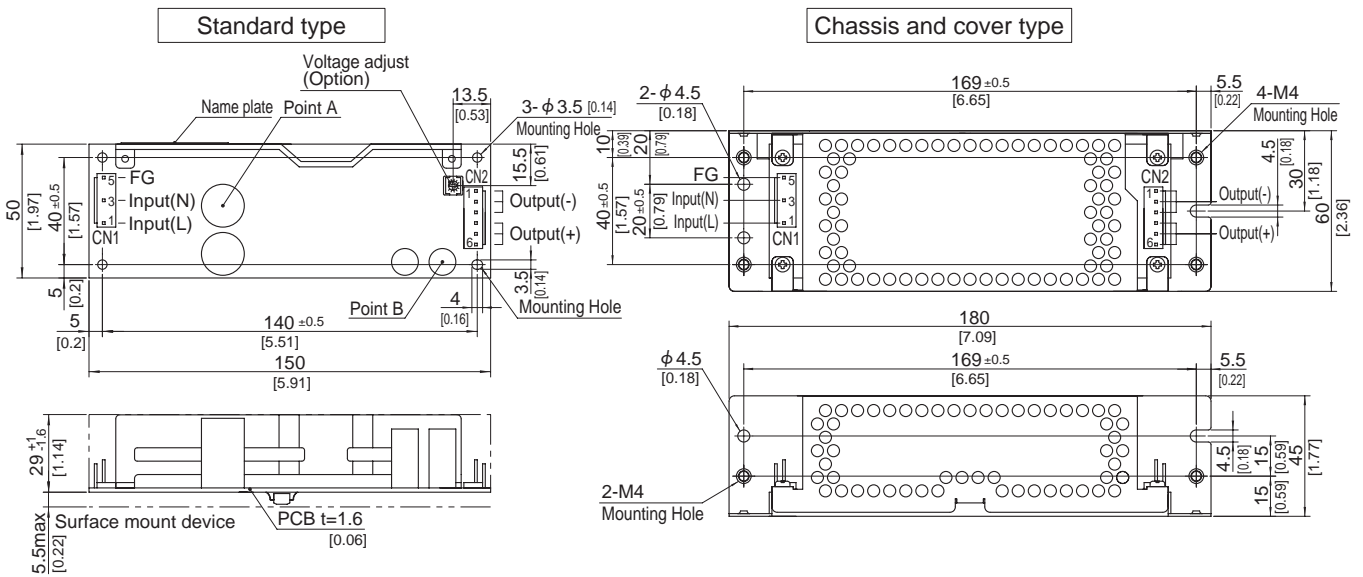
\*1 This is the value that measured on measuring board with capacitor of 22 μ F at 150mm from output terminal.  
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM-103).  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
\*3 Peak loading for 10sec. And Duty 35% max. or less is acceptable if the total wattage is less than the rated wattage.  
Refer to instruction Manual 6. In detail.  
\* Avoid prolonged use under over - load.  
\* Parallel operation with other model is not possible.  
\* Derating is required when operated with chassis and cover.  
\* A sound may occur from power supply at pulse loading.

Block diagram



LGA

External view



※ This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care. Take care for SMD parts on the back to come in contact because of the vibration and not to break down.

※ Use the spacer of 8mm length or more.  
 ※ 4 Mounting holes are existing.

I/O Connector	Mating connector	Terminal
CN1	1-1123724-3	Chain 1123721-1
		Loose 1318912-1
CN2	1-1123723-6	Chain 1123721-1
		Loose 1318912-1

(Mfr:Tyco Electronics AMP)

※I/O Connector is Mfr Tyco Electronics AMP  
 ※Option:-J1:VH(J.S.T) connector type.  
 Refer to instruction Manual 6.

※Mounting torque:1.5N•m(16kgf•cm)max

<PIN CONNECTION>

CN1		CN2	
Pin No.	Input	Pin No.	Output
1	AC(L)	1 to 3	-V
2			
3	AC(N)	4 to 6	+V
4			
5	FG		

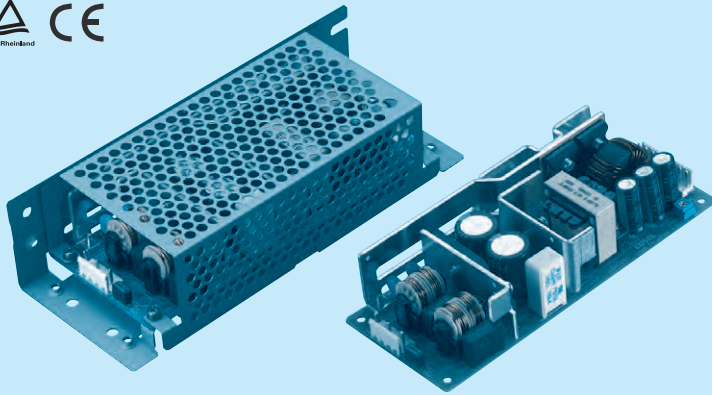
※Tolerance : ±1 [±0.04]  
 ※Weight : 200g max (with chassis & cover : 410g max)  
 ※PCB material / thickness : CEM3 / 1.6mm [0.06]  
 ※Optional chassis and cover material : Electric galvanizing steel board.  
 ※Dimensions in mm, [ ] =inches

※Keep drawing current per pin below 5A for CN2.

# LGA100A

LG A 100 A -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ 100/120V input
- ⑤ Output voltage
- ⑥ Optional
- C :with Coating
- G :Low leakage current
- H :with the function to be acceptable to output peak current (only 24V)
- J1 :VH(J.S.T.)connector type
- S :with Chassis
- SN:with Chassis & cover
- Y :with Potentiometer

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LGA100A-3R3-Y	LGA100A-5-Y	LGA100A-12	LGA100A-15	LGA100A-24	LGA100A-24-H	LGA100A-48
MAX OUTPUT WATTAGE[W]	66	100	102	105	103.2	103.2	100.8
DC OUTPUT	3.3V 20A	5V 20A	12V 8.5A	15V 7A	24V 4.3A	24V 4.3 (Peak 5.4) A	48V 2.1A

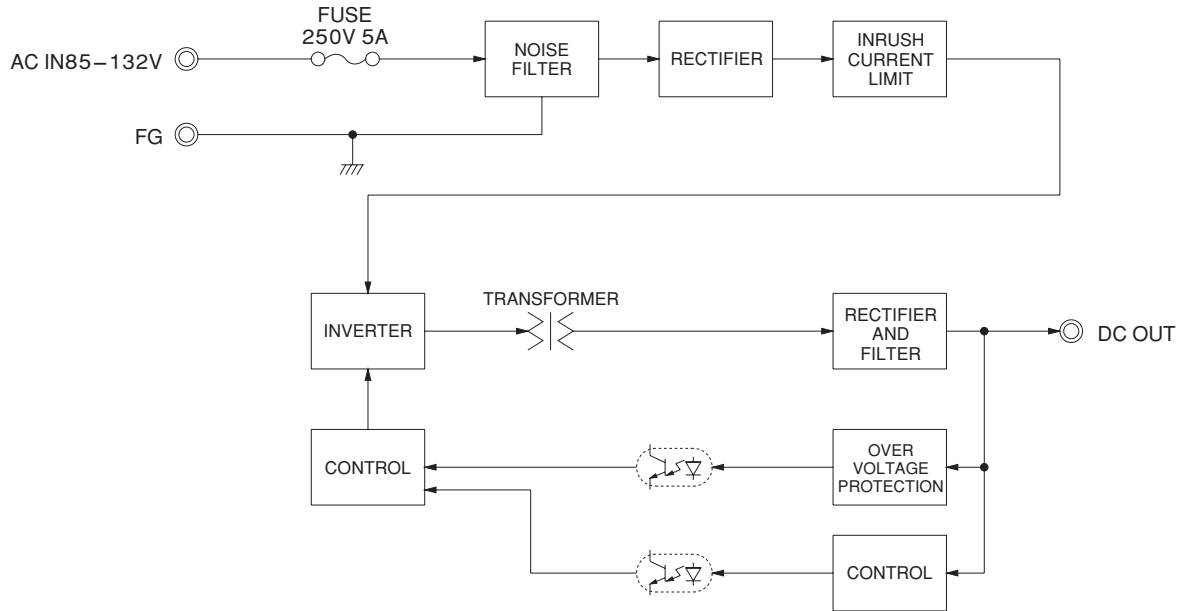
## SPECIFICATIONS

	MODEL	LGA100A-3R3-Y	LGA100A-5-Y	LGA100A-12	LGA100A-15	LGA100A-24	LGA100A-24-H	LGA100A-48	
INPUT	VOLTAGE[V]	AC85 - 132 1 φ (Refer to "Derating", Instruction Manual 1 and 3)							
	CURRENT[A]	ACIN 100V 1.6typ (Io=100%)	2.4typ (Io=100%)						
	FREQUENCY[Hz]	47 - 440 (Refer to Instruction Manual 1.1)							
	EFFICIENCY[%]	ACIN 100V 76.0typ (Io=100%)	80.0typ (Io=100%)	83.0typ (Io=100%)	84.0typ (Io=100%)	85.5typ (Io=100%)	85.5typ (Io=100%)	85.5typ (Io=100%)	
	INRUSH CURRENT[A]	ACIN 100V 15typ (Io=100%, More than 10sec. to re-start)							
	LEAKAGE CURRENT[ma]	0.5max (ACIN 100V, 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)							
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	24	48	
	CURRENT[A]	*3 20.0	20.0	8.5	7.0	4.3	4.3 (Peak 5.4)	2.1	
	LINE REGULATION[mV]	20max	20max	48max	60max	96max	96max	192max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	150max	150max	300max	
	RIPPLE[mVp-p]	0 to +50°C *1	80max	80max	120max	120max	120max	240max	150max
		-10 - 0°C *1	140max	140max	160max	160max	160max	320max	200max
	RIPPLE NOISE[mVp-p]	0 to +50°C *1	120max	120max	150max	150max	150max	300max	350max
		-10 - 0°C *1	160max	160max	180max	180max	180max	360max	400max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	120max	150max	240max	240max	480max
		-10 to +50°C	60max	60max	150max	180max	290max	290max	600max
	DRIFT[mV]	*2 20max	20max	48max	60max	96max	96max	192max	
	START-UP TIME[ms]	200max (ACIN 100V, Io=100%)							
	HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)							
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 - 3.63	4.50 - 5.50	Fixed ("Y" which can be adjusted the output is available as optional ±10%)						
OUTPUT VOLTAGE SETTING[V]	3.30 - 3.40	5.00 - 5.15	11.50 - 12.50	14.40 - 15.60	23.00 - 25.00	23.00 - 25.00	46.00 - 50.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically							
	OVERVOLTAGE PROTECTION	4.00 - 5.25	5.75 - 7.00	13.80 - 16.80	17.30 - 21.00	27.60 - 35.00	27.60 - 35.00	55.20 - 67.20	
	OPERATING INDICATION	Not provided							
	REMOTE SENSING	Not provided							
ISOLATION	REMOTE ON/OFF	Not provided							
	INPUT-OUTPUT	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)							
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)							
ENVIRONMENT	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)							
	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +60°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000feet) max							
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max							
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis							
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis							
	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1 Complies with DEN-AN							
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55011-B, EN55022-B							
OTHERS	CASE SIZE/WEIGHT	62 X 35.5 X 155mm [2.44 X 1.4 X 6.1 inches] (W X H X D) / 300g max (with chassis & cover : 530g max)							
	COOLING METHOD	Convection (Refer to "Derating", Instruction Manual 3)							

\*1 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal.  
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM-103).  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
\*3 Peak loading for 10sec. And Duty 35% max. or less is acceptable if the total wattage is less than the rated wattage.  
Refer to instruction Manual 6. In detail.  
\* Avoid prolonged use under over - load.  
\* Parallel operation with other model is not possible.  
\* Derating is required when operated with chassis and cover.  
\* A sound may occur from power supply at pulse loading.

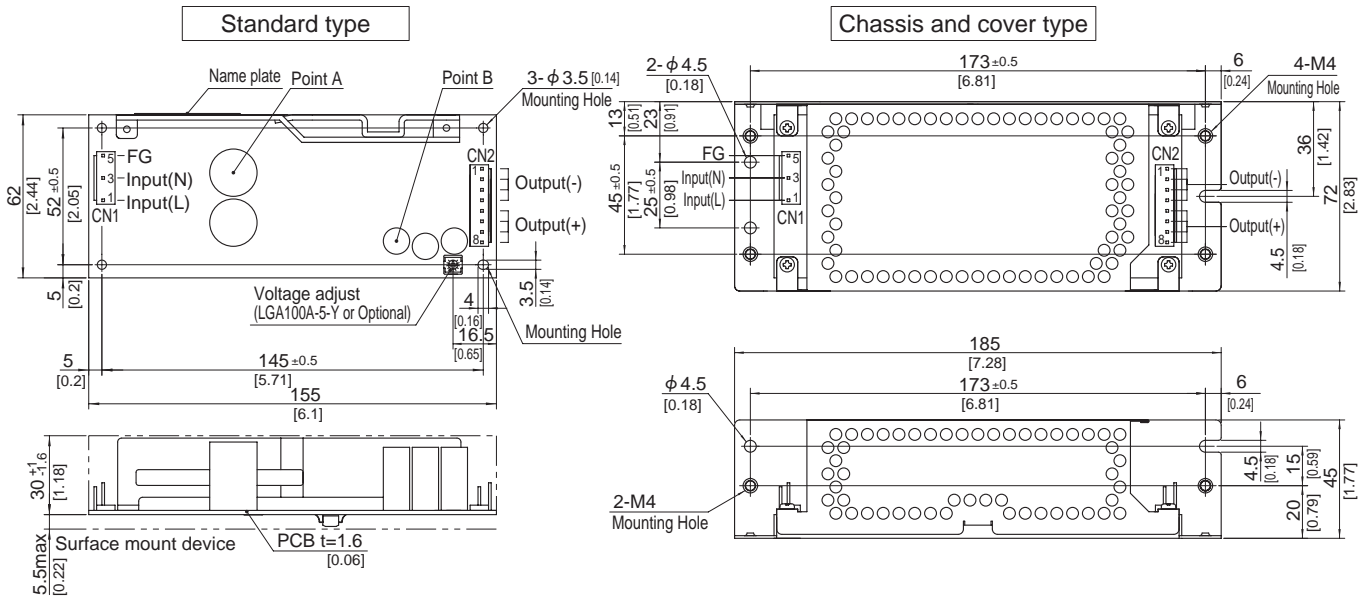


## Block diagram



LGA

## External view



※ This power supply is manufactured by SMD technology.  
The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
Take care for SMD parts on the back to come in contact because of the vibration and not to break down.

※ Use the spacer of 8mm length or more.  
※ 4 Mounting holes are existing.

I/O Connector	Mating connector	Terminal
CN1	1-1123724-3	Chain 1123721-1
		Loose 1318912-1
CN2	1-1123723-8	Chain 1123721-1
		Loose 1318912-1

(Mfr: Tyco Electronics AMP)

※ I/O Connector is Mfr Tyco Electronics AMP  
※ Option: J1: VH(J.S.T) connector type.  
Refer to instruction Manual 6.

### <PIN CONNECTION>

CN1		CN2	
Pin No.	Input	Pin No.	Output
1	AC(L)	1 to 4	-V
2			
3	AC(N)	5 to 8	+V
4			
5	FG		

※ Keep drawing current per pin below 5A for CN2.

※ Mounting torque: 1.5N•m (16kgf•cm) max

※ Tolerance : ±1 [±0.04]

※ Weight : 300g max (with chassis & cover : 530g max)

※ PCB material / thickness : CEM3 / 1.6mm [0.06]

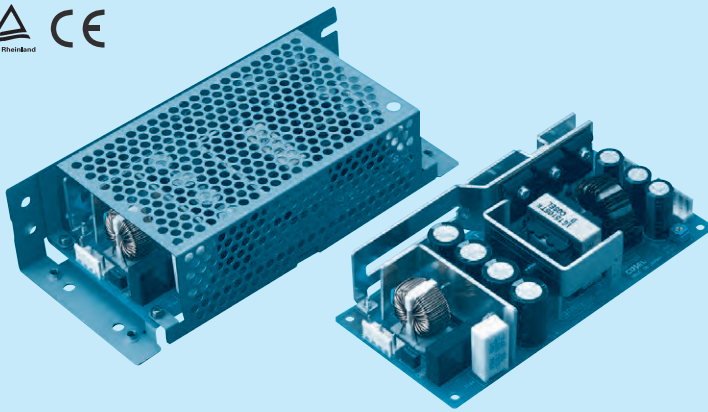
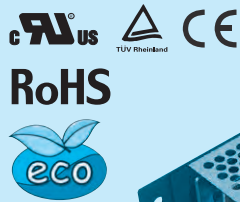
※ Optional chassis and cover material : Electric galvanizing steel board.

※ Dimensions in mm, [ ] = inches

# LGA150A

LG A 150 A -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ 100/120V input
- ⑤ Output voltage
- ⑥ Optional
- C :with Coating
- G :Low leakage current
- H :with the function to be acceptable to output peak current (only 24V)
- J1 :VH(J.S.T.)connector type
- S :with Chassis
- SN:with Chassis & cover
- Y :with Potentiometer

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

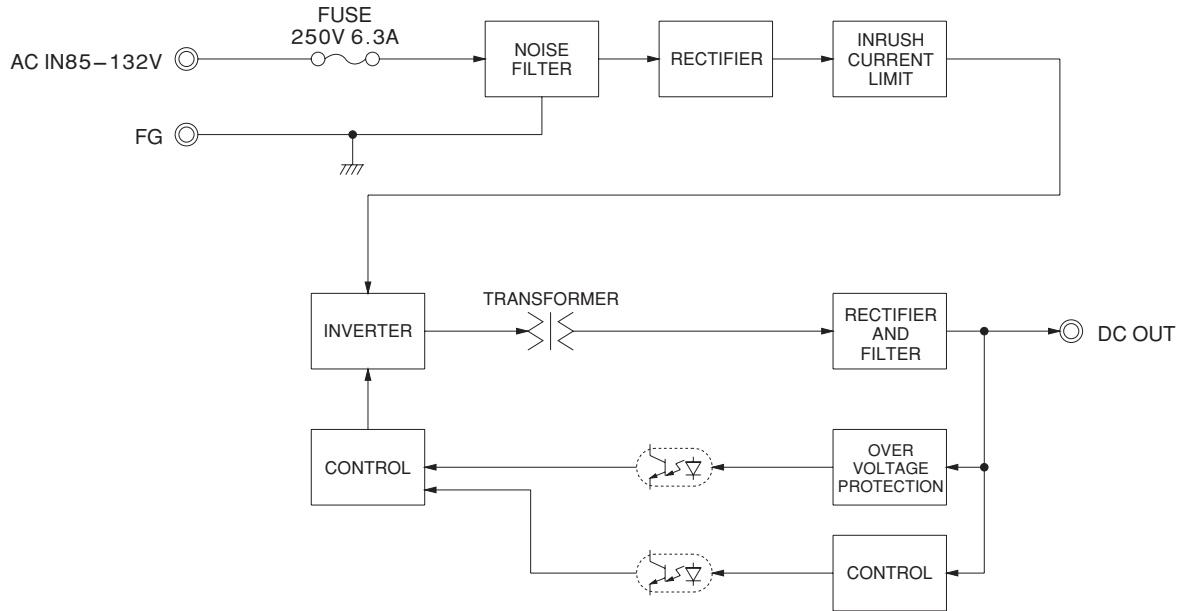
MODEL	LGA150A-3R3-Y	LGA150A-5-Y	LGA150A-12	LGA150A-15	LGA150A-24	LGA150A-24-H	LGA150A-48
MAX OUTPUT WATTAGE[W]	99	150	150	150	151.2	151.2	153.6
DC OUTPUT	3.3V 30A	5V 30A	12V 12.5A	15V 10A	24V 6.3A	24V 6.3 (Peak 7.9) A	48V 3.2A

## SPECIFICATIONS

	MODEL	LGA150A-3R3-Y	LGA150A-5-Y	LGA150A-12	LGA150A-15	LGA150A-24	LGA150A-24-H	LGA150A-48	
INPUT	VOLTAGE[V]	AC85 - 132 1 φ (Refer to "Derating", Instruction Manual 1 and 3)							
	CURRENT[A]	ACIN 100V 2.6typ (Io=100%)	3.6typ (Io=100%)						
	FREQUENCY[Hz]	47 - 440 (Refer to Instruction Manual 1.1)							
	EFFICIENCY[%]	ACIN 100V 76.0typ (Io=100%)	82.0typ (Io=100%)	84.5typ (Io=100%)	85.5typ (Io=100%)	87.0typ (Io=100%)	87.0typ (Io=100%)	87.0typ (Io=100%)	
	INRUSH CURRENT[A]	ACIN 100V 15 /15 typ (Primary / Secondary Surge Current, Io=100%, More than 10sec. to re-start)							
LEAKAGE CURRENT[ma]	0.5max (ACIN 100V, 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)								
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	24	48	
	CURRENT[A]	*3 30.0	30.0	12.5	10.0	6.3	6.3 (Peak 7.9)	3.2	
	LINE REGULATION[mV]	20max	20max	48max	60max	96max	96max	192max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	150max	150max	300max	
	RIPPLE[mVp-p]	0 to +40°C *1	80max	80max	120max	120max	120max	240max	150max
		-10 - 0°C *1	140max	140max	160max	160max	160max	320max	200max
	RIPPLE NOISE[mVp-p]	0 to +40°C *1	120max	120max	150max	150max	150max	300max	350max
		-10 - 0°C *1	160max	160max	180max	180max	180max	360max	400max
	TEMPERATURE REGULATION[mV]	0 to +40°C	50max	50max	120max	150max	240max	240max	480max
		-10 to +40°C	60max	60max	150max	180max	290max	290max	600max
	DRIFT[mV]	*2 20max	20max	48max	60max	96max	96max	192max	
START-UP TIME[ms]	200max (ACIN 100V, Io=100%)								
HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)								
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 - 3.63	4.50 - 5.50	Fixed ("Y" which can be adjusted the output is available as optional ± 10%)						
OUTPUT VOLTAGE SETTING[V]	3.30 - 3.40	5.00 - 5.15	11.50 - 12.50	14.40 - 15.60	23.00 - 25.00	23.00 - 25.00	46.00 - 50.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically							
	OVERVOLTAGE PROTECTION	4.00 - 5.25	5.75 - 7.00	13.80 - 16.80	17.30 - 21.00	27.60 - 35.00	27.60 - 35.00	55.20 - 67.20	
	OPERATING INDICATION	Not provided							
	REMOTE SENSING	Not provided							
ISOLATION	REMOTE ON/OFF	Not provided							
	INPUT-OUTPUT	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)							
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)							
ENVIRONMENT	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)							
	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +60°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000feet) max							
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max							
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis							
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis							
	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1 Complies with DEN-AN							
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55011-B, EN55022-B							
OTHERS	CASE SIZE/WEIGHT	75 X 39 X 160mm [2.95 X 1.54 X 6.3 inches] (W X H X D) / 420g max (with chassis & cover : 650g max)							
	COOLING METHOD	Convection (Refer to "Derating", Instruction Manual 3)							

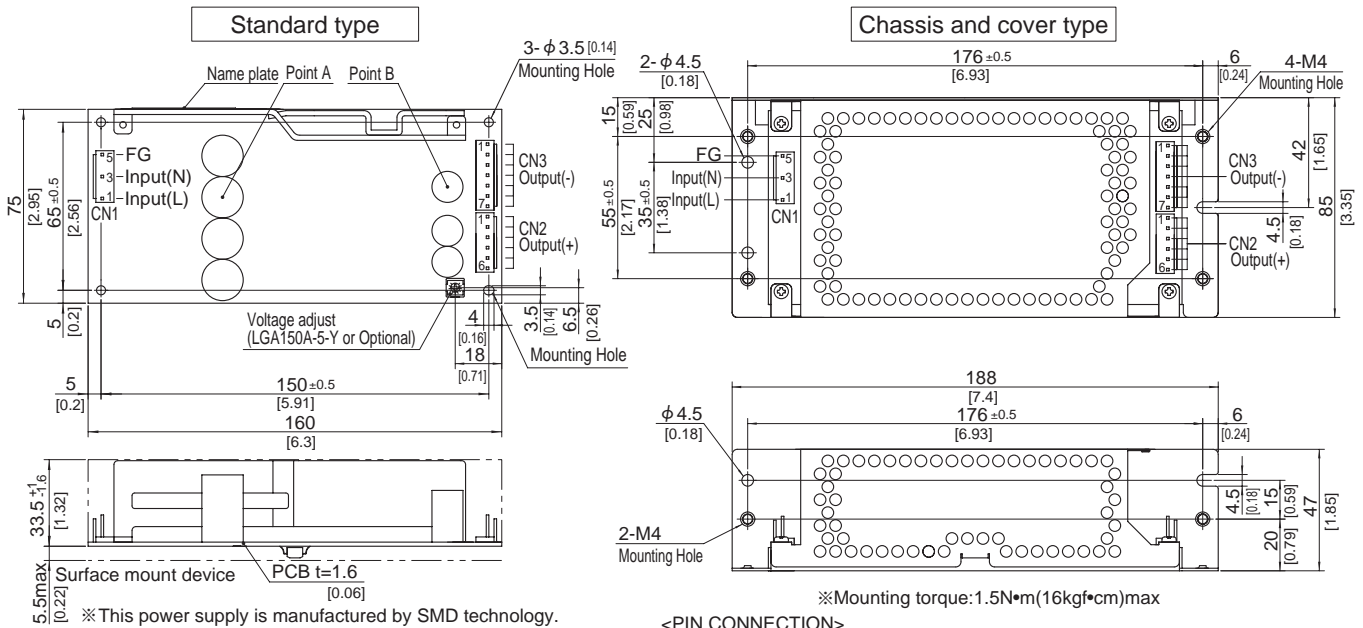
\*1 This is the value that measured on measuring board with capacitor of 22 μ F at 150mm from output terminal.  
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM-103).  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
\*3 Peak loading for 10sec. And Duty 35% max. or less is acceptable if the total wattage is less than the rated wattage.  
Refer to instruction Manual 6. In detail.  
\* Avoid prolonged use under over - load.  
\* Parallel operation with other model is not possible.  
\* Derating is required when operated with chassis and cover.  
\* A sound may occur from power supply at pulse loading.

## Block diagram



LGA

## External view



※Mounting torque: 1.5N•m (16kgf•cm) max

### <PIN CONNECTION>

CN1		CN2		CN3	
Pin No.	Input	Pin No.	Output	Pin No.	Output
1	AC(L)	1 to 6	+V	1 to 7	-V
2					
3	AC(N)				
4					
5	FG				

※Keep drawing current per pin below 5A for CN2,CN3.

※Tolerance : ±1 [±0.04]

※Weight : 420g max (with chassis & cover : 650g max)

※PCB material / thickness : CEM3 / 1.6mm [0.06]

※Optional chassis and cover material : Electric galvanizing steel board.

※Dimensions in mm, [ ]=inches

- ※ This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care. Take care for SMD parts on the back to come in contact because of the vibration and not to break down.
- ※ Use the spacer of 8mm length or more.
- ※ 4 mounting holes are existing.

I/O Connector	Mating connector	Terminal	
CN1	1-1123724-3	1-1123722-5	Chain 1123721-1
			Loose 1318912-1
CN2	1-1123723-6	1-1123722-6	Chain 1123721-1
			Loose 1318912-1
CN3	1-1123723-7	1-1123722-7	Chain 1123721-1
			Loose 1318912-1

(Mfr: Tyco Electronics AMP)

※I/O Connector is Mfr Tyco Electronics AMP

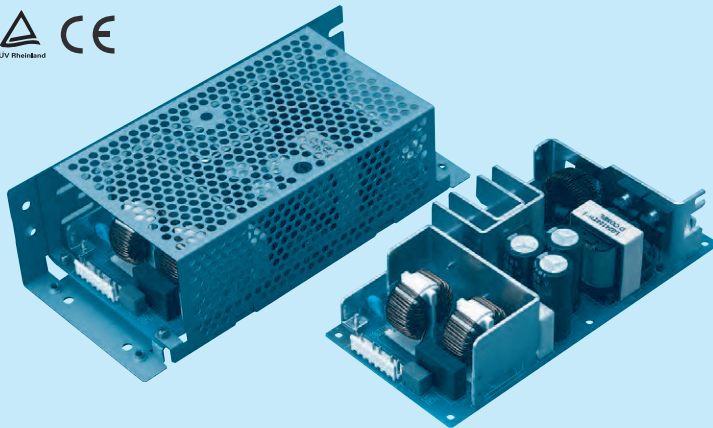
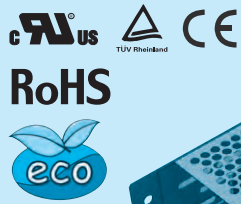
※Option: J1: VH(J.S.T) connector type.

Refer to instruction Manual 6.

# LGA240A

LG A 240 A -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-16-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ 100/120V input
- ⑤ Output voltage
- ⑥ Optional
- C :with Coating
- G :Low leakage current
- H :with the function to be acceptable to output peak current (only 24V)
- J1 :VH(J.S.T.)connector type
- S :with Chassis
- SN:with Chassis & cover
- T :Vertical terminal block
- Y :with Potentiometer

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

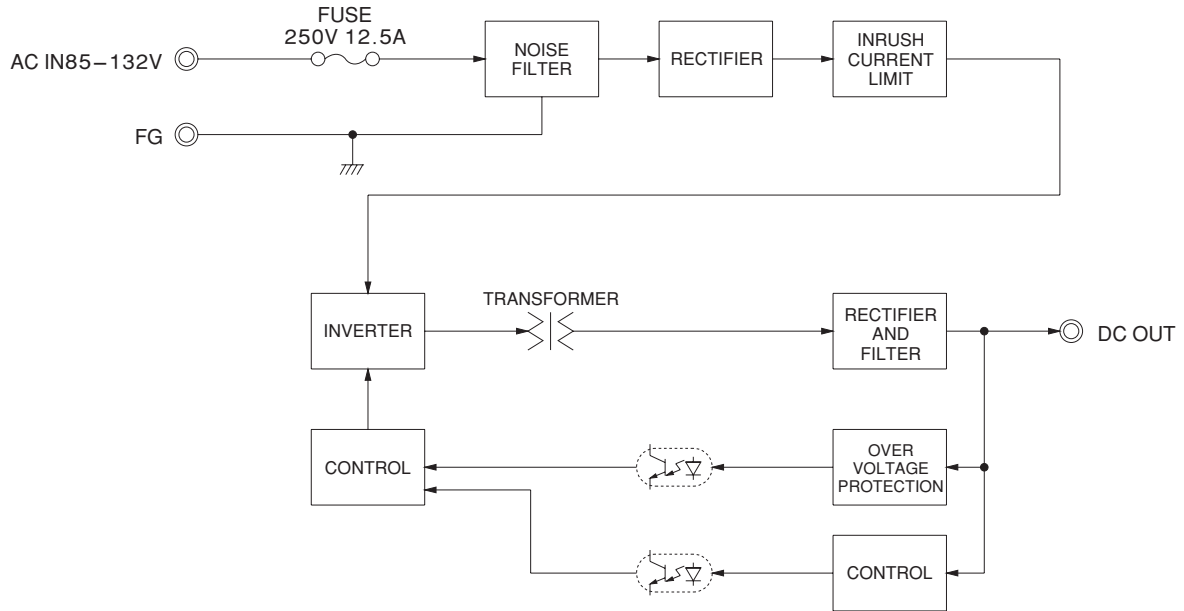
MODEL	LGA240A-24	LGA240A-24-H
MAX OUTPUT WATTAGE[W]	240	240
DC OUTPUT	24V 10A	24V 10 (Peak 12.5) A

## SPECIFICATIONS

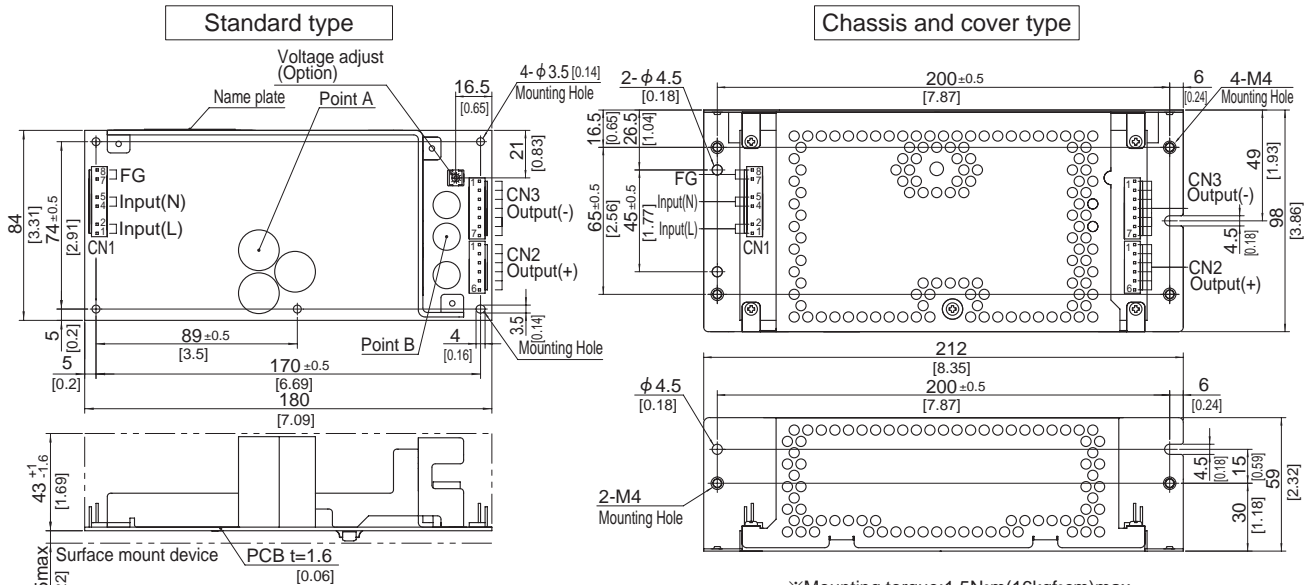
	MODEL	LGA240A-24	LGA240A-24-H	
INPUT	VOLTAGE[V]	AC85 - 132 1 φ (Refer to "Derating", Instruction Manual 1 and 3)		
	CURRENT[A]	ACIN 100V	5.0typ (Io=100%)	
	FREQUENCY[Hz]	47 - 440 (Refer to Instruction Manual 1.1)		
	EFFICIENCY[%]	ACIN 100V	86.5typ (Io=100%)	86.5typ (Io=100%)
	INRUSH CURRENT[A]	ACIN 100V	15 / 20 typ (Primary / Secondary Surge Current, Io=100%, More than 10sec. to re-start)	
	LEAKAGE CURRENT[ma]	0.5max (ACIN 100V, 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)		
OUTPUT	VOLTAGE[V]	24		
	CURRENT[A]	*3	10.0	10.0 (Peak 12.5)
	LINE REGULATION[mV]	96max		
	LOAD REGULATION[mV]	150max		
	RIPPLE[mVp-p]	0 to +40°C *1	120max	240max
		-10 - 0°C *1	160max	320max
	RIPPLE NOISE[mVp-p]	0 to +40°C *1	150max	300max
		-10 - 0°C *1	180max	360max
	TEMPERATURE REGULATION[mV]	0 to +40°C	240max	240max
		-10 to +40°C	290max	290max
	DRIFT[mV]	*2	96max	96max
	START-UP TIME[ms]	200max (ACIN 100V, Io=100%)		
	HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)		
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed ("Y" which can be adjusted the output is available as optional ±10%)			
OUTPUT VOLTAGE SETTING[V]	23.00 - 25.00	23.00 - 25.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically		
	OVERVOLTAGE PROTECTION	27.60 - 35.00	27.60 - 35.00	
	OPERATING INDICATION	Not provided		
	REMOTE SENSING	Not provided		
ISOLATION	REMOTE ON/OFF	Not provided		
	INPUT-OUTPUT	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)		
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)		
ENVIRONMENT	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)		
	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +60°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000feet) max		
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max		
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis		
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis		
	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1 Complies with DEN-AN		
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55011-B, EN55022-B		
OTHERS	CASE SIZE/WEIGHT	84 × 48.5 × 180mm [3.31 × 1.91 × 7.09 inches] (W × H × D) / 590g max (with chassis & cover : 880g max)		
	COOLING METHOD	Convection (Refer to "Derating", Instruction Manual 3)		

\*1 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal.  
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM-103).  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
\*3 Peak loading for 10sec. And Duty 35% max. or less is acceptable if the total wattage is less than the rated wattage.  
Refer to instruction Manual 6. In detail.  
\* Avoid prolonged use under over - load.  
\* Parallel operation with other model is not possible.  
\* Derating is required when operated with chassis and cover.  
\* A sound may occur from power supply at pulse loading.

## Block diagram



## External view



- ※ This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care. Take care for SMD parts on the back to come in contact because of the vibration and not to break down.
- ※ Use the spacer of 8mm length or more.
- ※ 5 Mounting holes are existing.

I/O Connector	Mating connector	Terminal	
CN1	7-1565036-6	1-1123722-8	Chain 1123721-1
			Loose 1318912-1
CN2	1-1123723-6	1-1123722-6	Chain 1123721-1
			Loose 1318912-1
CN3	1-1123723-7	1-1123722-7	Chain 1123721-1
			Loose 1318912-1

(Mfr: Tyco Electronics AMP)

- ※ I/O Connector is Mfr Tyco Electronics AMP
- ※ Option: -J1: VH(J.S.T) connector type. Refer to instruction Manual 6.

※ Mounting torque: 1.5N•m(16kgf•cm)max

### <PIN CONNECTION>

CN1		CN2		CN3	
Pin No.	Input	Pin No.	Output	Pin No.	Output
1, 2	AC(L)	1 to 6	+V	1 to 7	-V
3					
4, 5	AC(N)				
6					
7, 8	FG				

※ Keep drawing current per pin below 5A for CN1, CN2 and CN3.

※ Tolerance : ±1 [±0.04]

※ Weight : 590g max (with chassis & cover : 880g max)

※ PCB material / thickness : CEM3 / 1.6mm [0.06]

※ Optional chassis and cover material : Electric galvanizing steel board.

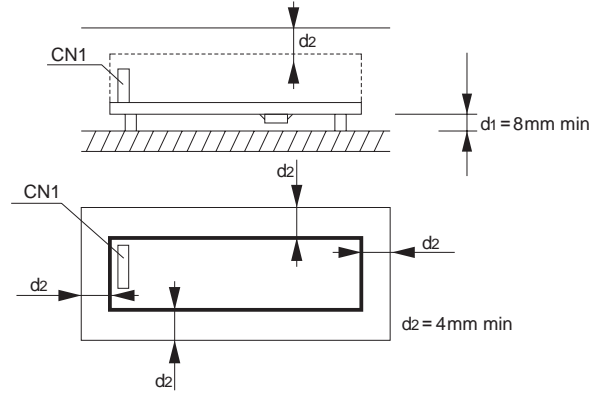
※ Dimensions in mm, [ ]=inches

Assembling and Installation Method

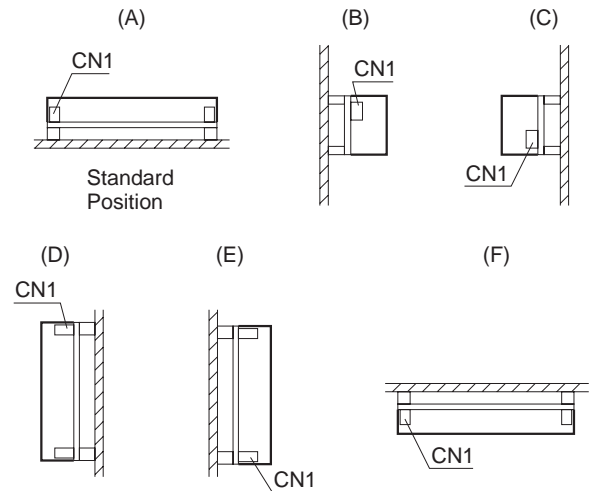
Installation method

■ This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.

■ In case of metal chassis, keep the distance between d1 & d2 for to insulate between lead of component and metal chassis, use the spacer of 8mm or more between d1. If it is less than d1 & d2, insert the insulation sheet between power supply and metal chassis.

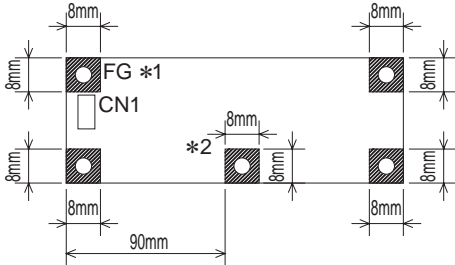


■ (F) mounting should be operated by Forced air.



Mounting screw

■ The mounting screw should be M3. The hatched area shows the allowance of metal parts for mounting.

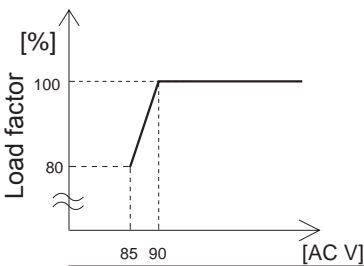


- \*1 Recommendation to electrically connect FG to metal reducing noise.
- \*2 LGA240A only Refer to External view for location

■ If metallic fittings are used on the component side of the board, ensure there is no contact with surface mounted components.

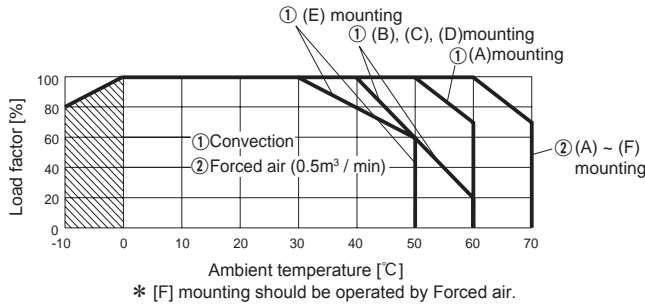
Derating

● Derating curve for input voltage

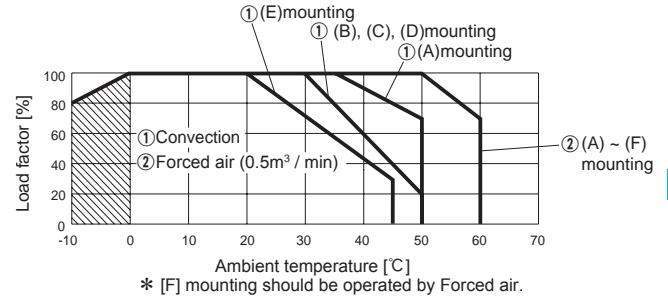


Derating

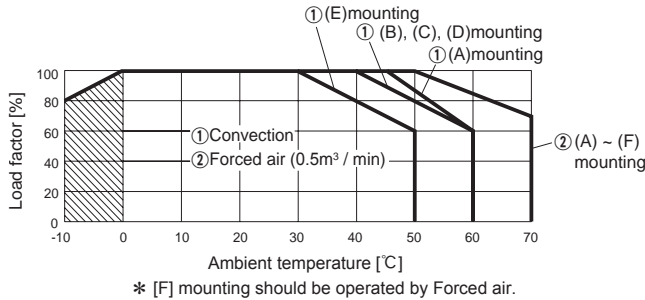
● LGA50A-3R3-Y, -5, -12, -15  
Ambient temperature derating curve



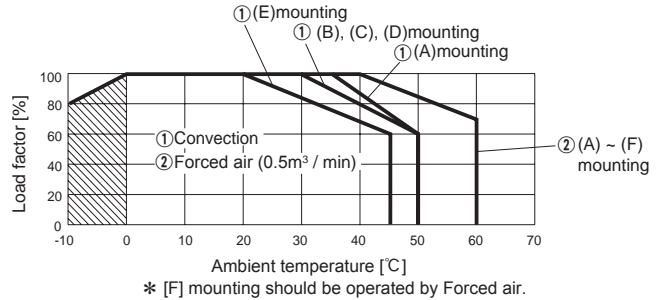
● LGA50A-3R3-Y, -5, -12, -15 -SN (with Chassis & Cover)  
Ambient temperature derating curve



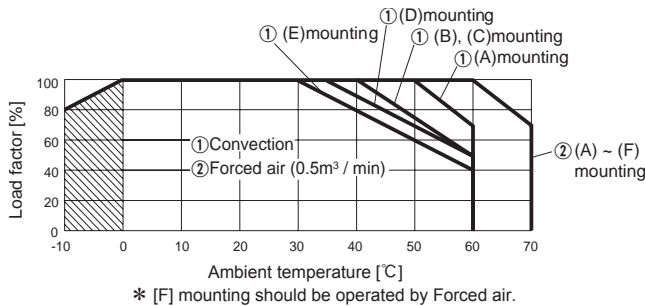
● LGA50A-24, -48  
Ambient temperature derating curve



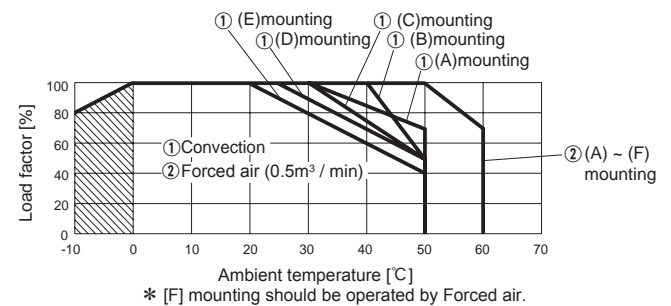
● LGA50A-24, -48 -SN (with Chassis & Cover)  
Ambient temperature derating curve



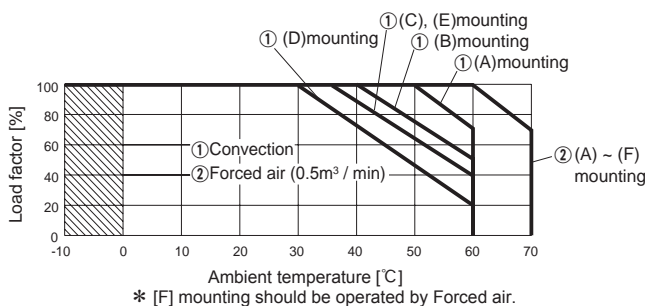
● LGA75A-□  
Ambient temperature derating curve



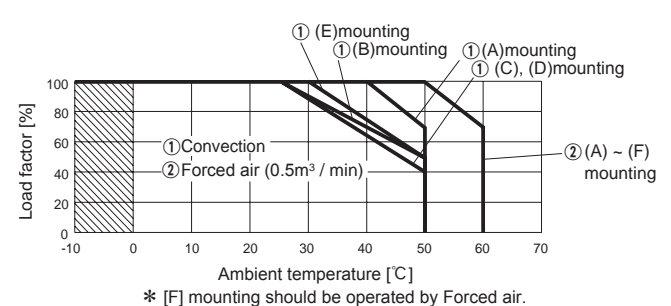
● LGA75A-□-SN (with Chassis & Cover)  
Ambient temperature derating curve



● LGA100A-□  
Ambient temperature derating curve

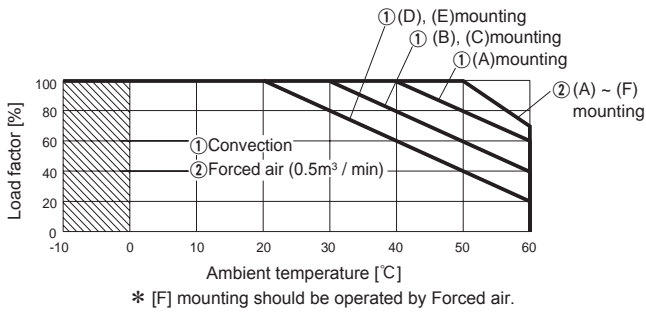


● LGA100A-□-SN (with Chassis & Cover)  
Ambient temperature derating curve

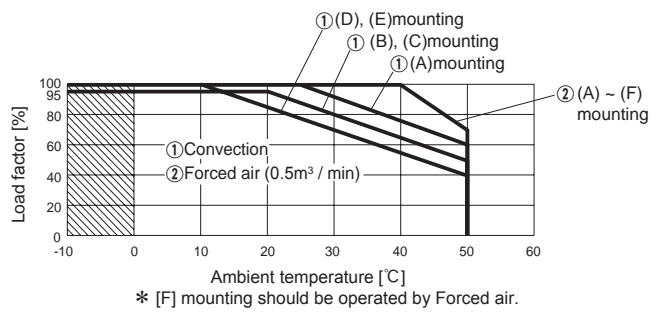


Derating

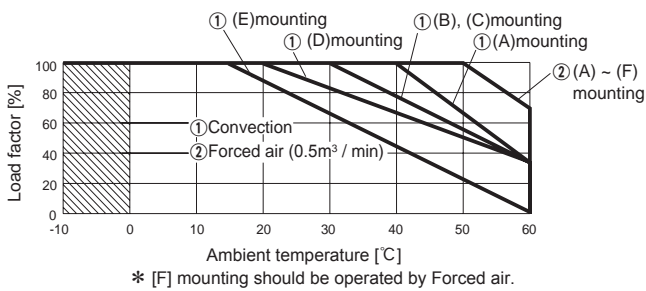
● LGA150A-□ Ambient temperature derating curve



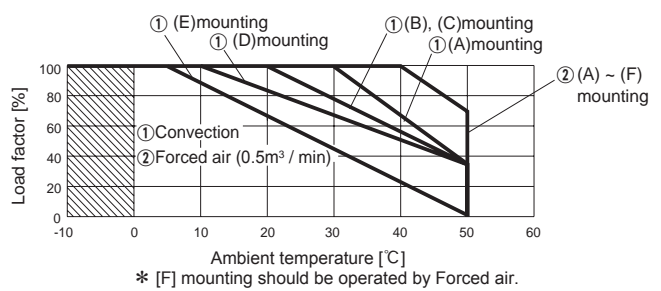
● LGA150A-□-SN (with Chassis & Cover) Ambient temperature derating curve



● LGA240A-□ Ambient temperature derating curve



● LGA240A-□-SN (with Chassis & Cover) Ambient temperature derating curve



■ The operative ambient temperature is different by with / without chassis cover or mounting position.

Note: In the hatched area, the specification of Ripple, Ripple Noise is different from other area.

■ Make sure the temperature at point A and point B is less than the temperatures shown in Instruction Manual 3.

■ The ambient temperature should be measured 5 to 10 cm away from the power supply so that it won't be influenced by the heat from the power supply. Please consult us for more details.

Instruction Manual

◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/LGA/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

LGA



NOTICE



Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current *1 [A]	Inrush current protection	PCB/Pattern			Series/Parallel operation availability *2	
					Material	Single sided	Double sided	Series operation	Parallel operation
LGA50A	Forward Converter	130	1.3	Thermistor	CEM-3	Yes		Yes	No
LGA75A	Forward Converter	130	1.7	Thermistor	CEM-3	Yes		Yes	No
LGA100A	Forward Converter	130	2.4	SCR	CEM-3	Yes		Yes	No
LGA150A	Forward Converter	130	3.6	SCR	CEM-3	Yes		Yes	No
LGA240A	Forward Converter	130	5.0	SCR	CEM-3	Yes		Yes	No

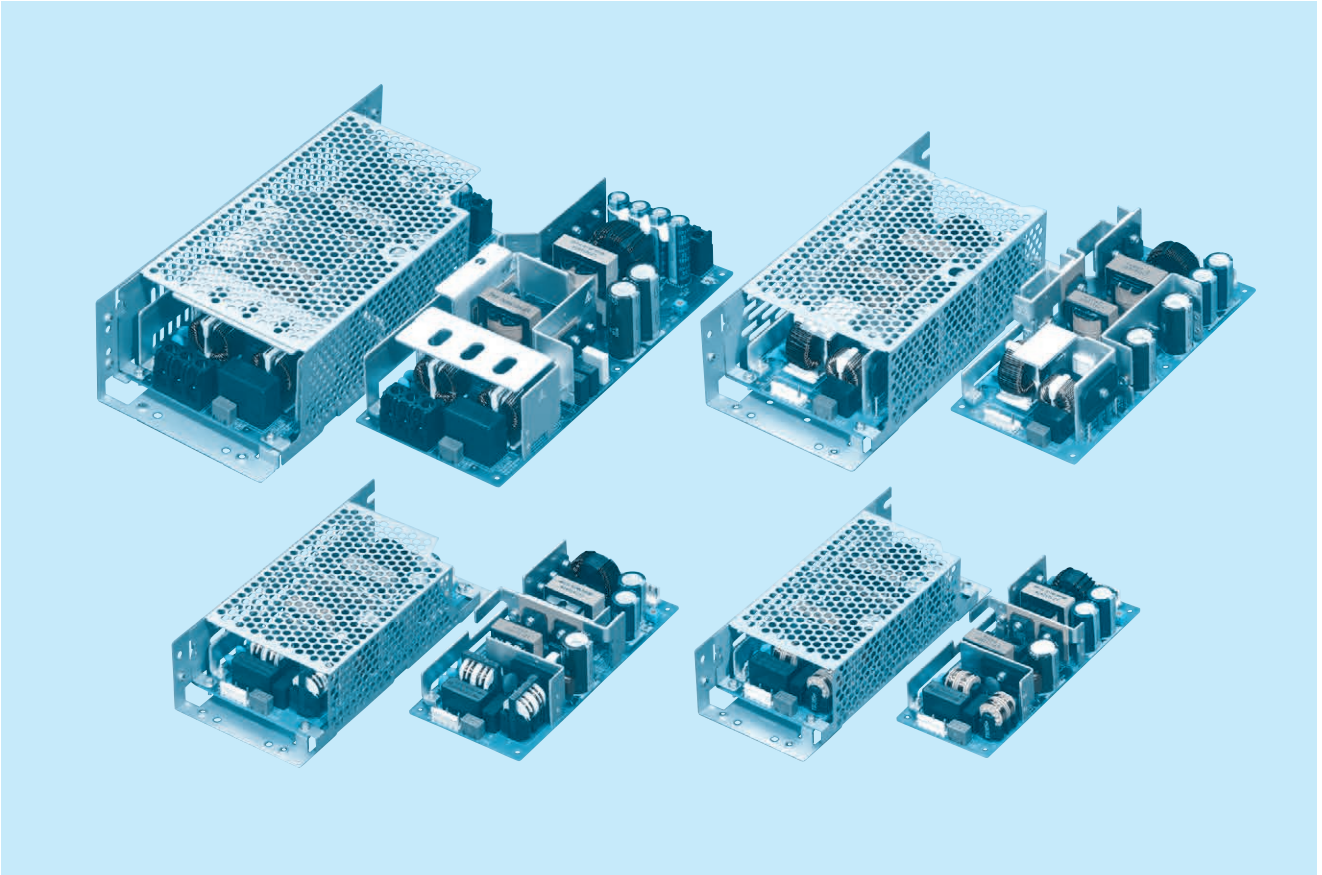
\*1 The value of input current is at ACIN 100V and rated load.

\*2 Refer to Instruction Manual 2.





# LFP-series



LFP

## Feature

- High power & peak power
- Small and compact PCB construction
- Built-in inrush current, overcurrent and overvoltage protection circuits
- Harmonic attenuator (Complies with IEC61000-3-2 class A)
- Universal input (AC85-264V)
- Power factor correction

## Safety agency approvals

UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178  
Complies with DEN-AN

## EMI

Complies with FCC-B, CISPR22-B, EN55011-B, EN55022-B, VCCI-B

## 5-year warranty (refer to Instruction Manual)

## CE marking

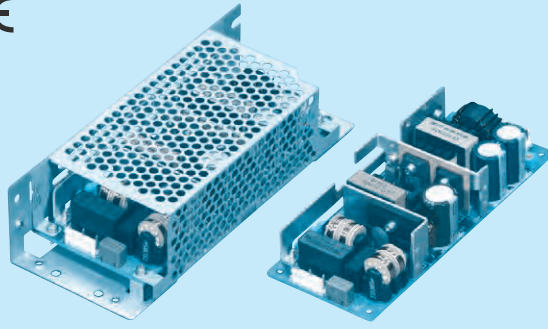
Low Voltage Directive  
RoHS Directive

## EMS Compliance : EN61204-3, EN61000-6-2

- EN61000-4-2
- EN61000-4-3
- EN61000-4-4
- EN61000-4-5
- EN61000-4-6
- EN61000-4-8
- EN61000-4-11

# LFP100F

① LF ② P ③ 100 ④ F ⑤ -□ ⑥ -□



Example recommended EMI/EMC filter  
NAC-04-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*1
- C : with Coating
- G : Low leakage current
- J1 : VH(J.S.T.)connector type
- R : with Remote ON/OFF
- R2 : with Remote ON/OFF
- S : with Chassis
- SN : with Chassis & cover

Please refer to Instruction manual 7.

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

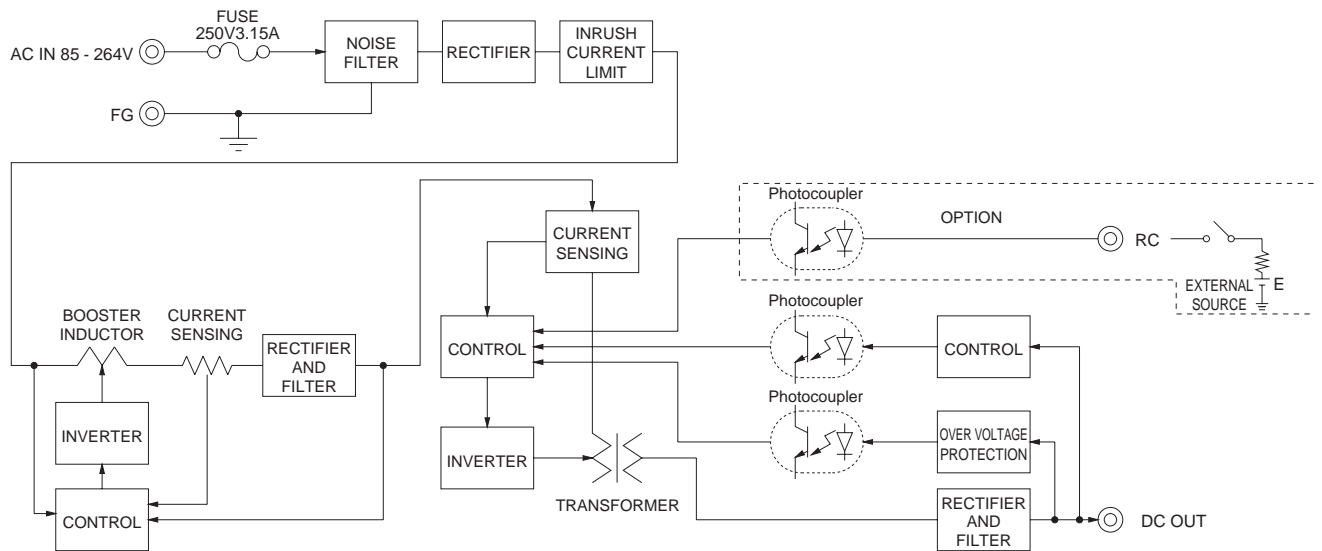
MODEL	LFP100F-24-Y	LFP100F-36-Y	LFP100F-48-Y
MAX OUTPUT WATTAGE[W]	*2 103.2 (206.4)	100.8 (201.6)	100.8 (201.6)
DC OUTPUT	*2 24V 4.3A (8.6A)	36V 2.8A (5.6A)	48V 2.1A (4.2A)

## SPECIFICATIONS

	MODEL	LFP100F-24-Y	LFP100F-36-Y	LFP100F-48-Y	
INPUT	VOLTAGE[V]	AC85 - 264 1φ (Refer to "Derating", Instruction Manual 1 and 3) *5			
	CURRENT[A]	ACIN 100V	1.3typ (Io=100%)		
		ACIN 200V	0.7typ (Io=100%)		
	FREQUENCY[Hz]	50 / 60 (47 - 63)			
	EFFICIENCY[%]	ACIN 100V	84.0typ (Io=100%)		84.0typ (Io=100%)
		ACIN 200V	87.0typ (Io=100%)		87.0typ (Io=100%)
	POWER FACTOR	ACIN 100V	0.99typ (Io=100%)		
ACIN 200V		0.95typ (Io=100%)			
INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) (At cold start) (Ta=25°C)			
	ACIN 200V	30typ (Io=100%) (At cold start) (Ta=25°C)			
LEAKAGE CURRENT[mA]	0.40 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)				
OUTPUT	VOLTAGE[V]	24	36	48	
	CURRENT[A]	*2 4.3 (Peak 8.6)	2.8 (Peak 5.6)	2.1 (Peak 4.2)	
	LINE REGULATION[mV]	*7 96max	144max	192max	
	LOAD REGULATION[mV]	*7 150max	240max	240max	
	RIPPLE[mVp-p]	*3 0 to +50°C	120max	150max	150max
		-10 - 0°C	160max	200max	200max
	RIPPLE NOISE[mVp-p]*3	0 to +50°C	150max	250max	250max
		-10 - 0°C	180max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +50°C	240max	360max	480max
		-10 to +50°C	290max	450max	600max
	DRIFT[mV]	*4 96max	144max	192max	
	START-UP TIME[ms]	350typ (ACIN 100V, Io=100%)			
	HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)			
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	21.60 to 27.50		32.40 to 39.60	39.60 to 52.80	
OUTPUT VOLTAGE SETTING[V]	24.00 to 24.96		36.00 to 37.44	48.00 to 49.92	
OVERCURRENT PROTECTION	Works over 101% of rating and recovers automatically				
OVERVOLTAGE PROTECTION[V]	27.60 to 33.60		41.40 to 50.40	55.20 to 67.20	
OPERATING INDICATION	Not provided				
REMOTE SENSING	Not provided				
REMOTE ON/OFF	Option (Refer to Instruction Manual 6)				
ISOLATION	INPUT-OUTPUT-RC	*6 AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	OUTPUT-RC-FG	*6 AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)			
	OUTPUT-RC	*6 AC100V 1minute, Cutoff current = 25mA, DC100V 10MΩ min (At Room Temperature)			
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *5	-10 to +70°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000feet) max			
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max			
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis			
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis			
	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN			
OTHERS	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B			
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *8			
	CASE SIZE/WEIGHT	62 X 33 X 155mm [2.44 X 1.30 X 6.10 inches] (W X H X D) / 290g max (with chassis & cover : 480g max)			
	COOLING METHOD	Convection (Refer to "Derating", Instruction Manual 3) *5			

\*1 Specification is changed at option, refer to Instruction Manual.  
 \*2 Peak loading for 10sec. And Duty 40% max, refer to Instruction Manual 6. In detail.  
 ( ) means peak current. There is a possibility that an internal device is damaged when the specification is exceeded.  
 \*3 This is the value that measured on measuring board with capacitor of 22μF at 150mm from output terminal.  
 Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).  
 \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*5 Derating is required.  
 \*6 Applicable when remote control (optional) is added.  
 \*7 Please contact us about dynamic load and input response.  
 \*8 Please contact us about another class.  
 \* To meet the specifications. Do not operate over-loaded condition.  
 \* Parallel operation is not possible.  
 \* Derating is required when operated with chassis and cover.  
 \* Sound noise may be generated by power supply in case of pulse load.

## Block diagram

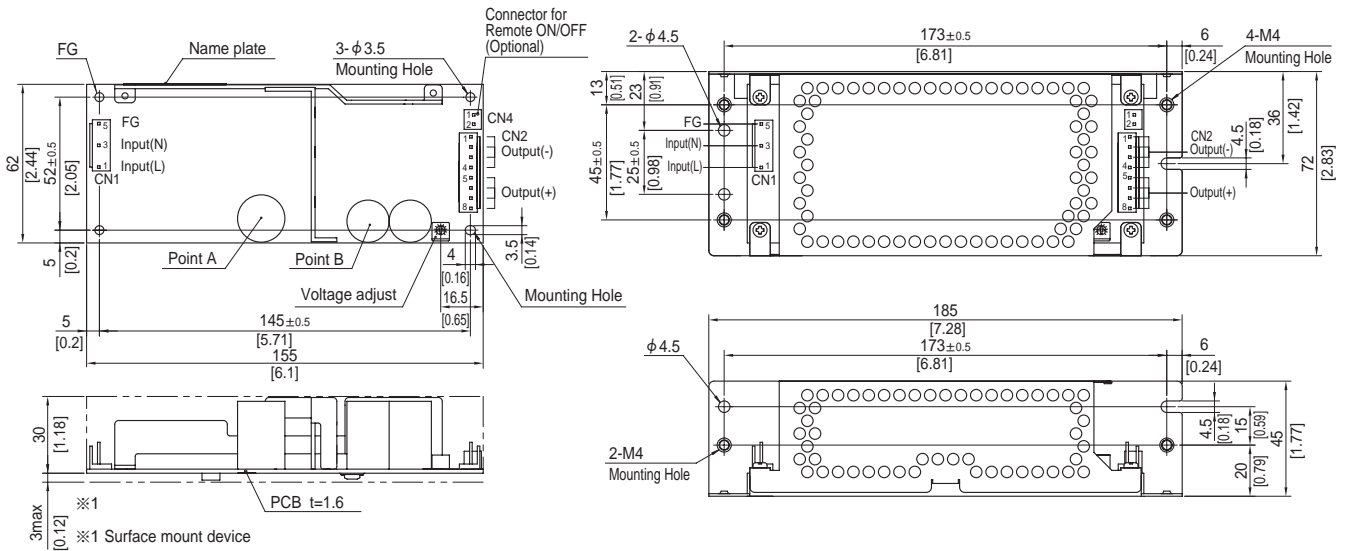


## External view

※ External size of option is different from standard model.

Standard type

Chassis and cover type



- ※ 4 Mounting holes are existing.
- ※ The back side of P.C.B. of the power supply is assembled some SMDs.  
Be attention not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm length or more regarding insulation.  
And do not use press-fitting bush.
- ※ Point A, Point B are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating connector	Terminal
CN1	1-1123724-3	Chain 1123721-1 Loose 1318912-1
CN2	1-1123723-8	Chain 1123721-1 Loose 1318912-1

(Mfr:Tyco Electronics)

- ※ I/O Connector is Mfr. Tyco Electronics
- ※ Option:-J1:VH(J.S.T) connector type.

### <PIN CONNECTION>

CN1		CN2	
Pin No.	Input	Pin No.	Output
1	AC(L)	1 to 4	-V
2		5 to 8	+V
3	AC(N)		
4			
5	FG		

※ Keep drawing current per pin below 5A for CN2.

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 290g max (with chassis & cover : 480g max)
- ※ PCB material : CEM3
- ※ Optional chassis and cover material : Electric galvanizing steel board.
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque (Mounting hole of chassis) :  $1.5N \cdot m$  (16kgf · cm) max

### Connector type

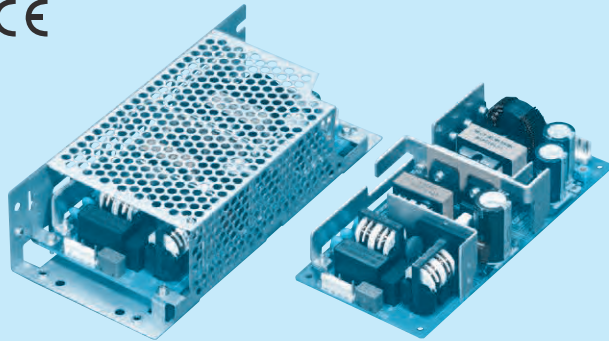
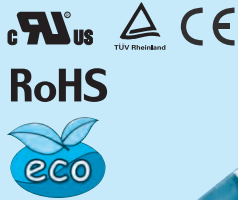
CN4 Option (Mfr:J.S.T)	
PIN No.	Contents
1	RC(+)
2	RC(-)

### Barrier strip type

Model B2B-XH-A  
Mating Connector (Terminal)  
XHP-2  
( BXH-001T-P0.6  
or SXH-001T-P0.6 )

# LFP150F

LF P 150 F -□ -□  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**NAC-04-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*1
- C : with Coating
- G : Low leakage current
- J1 : VH(J.S.T.)connector type
- R : with Remote ON/OFF
- R2 : with Remote ON/OFF
- S : with Chassis
- SN : with Chassis & cover

Please refer to Instruction manual 7.

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
 \*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LFP150F-24-Y	LFP150F-36-Y	LFP150F-48-Y
MAX OUTPUT WATTAGE[W]	*2 151.2 (302.4)	151.2 (302.4)	153.6 (307.2)
DC OUTPUT	*2 24V 6.3A (12.6A)	36V 4.2A (8.4A)	48V 3.2A (6.4A)

## SPECIFICATIONS

	MODEL	LFP150F-24-Y	LFP150F-36-Y	LFP150F-48-Y	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating", Instruction Manual 1 and 3) *5			
	CURRENT[A]	ACIN 100V	2.0typ (Io=100%)		
		ACIN 200V	1.0typ (Io=100%)		
	FREQUENCY[Hz]	50 / 60 (47 - 63)			
	EFFICIENCY[%]	ACIN 100V	85.5typ (Io=100%)		85.5typ (Io=100%)
		ACIN 200V	88.0typ (Io=100%)		88.0typ (Io=100%)
	POWER FACTOR	ACIN 100V	0.99typ (Io=100%)		
ACIN 200V		0.95typ (Io=100%)			
INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) (At cold start) (Ta=25°C)			
	ACIN 200V	30typ (Io=100%) (At cold start) (Ta=25°C)			
LEAKAGE CURRENT[mA]	0.40 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)				
OUTPUT	VOLTAGE[V]	24	36	48	
	CURRENT[A]	*2 6.3 (Peak 12.6)	4.2 (Peak 8.4)	3.2 (Peak 6.4)	
	LINE REGULATION[mV]	*7 96max	144max	192max	
	LOAD REGULATION[mV]	*7 150max	240max	240max	
	RIPPLE[mVp-p]	*3 0 to +50°C	120max	150max	150max
		-10 - 0°C	160max	200max	200max
	RIPPLE NOISE[mVp-p]*3	0 to +50°C	150max	250max	250max
		-10 - 0°C	180max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +50°C	240max	360max	480max
		-10 to +50°C	290max	450max	600max
	DRIFT[mV]	*4 96max	144max	192max	
	START-UP TIME[ms]	350typ (ACIN 100V, Io=100%)			
	HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)			
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	21.60 to 27.50		32.40 to 39.60	39.60 to 52.80	
OUTPUT VOLTAGE SETTING[V]	24.00 to 24.96		36.00 to 37.44	48.00 to 49.92	
OVERCURRENT PROTECTION	Works over 101% of rating and recovers automatically				
OVERVOLTAGE PROTECTION[V]	27.60 to 33.60		41.40 to 50.40	55.20 to 67.20	
OPERATING INDICATION	Not provided				
REMOTE SENSING	Not provided				
REMOTE ON/OFF	Option (Refer to Instruction Manual 6)				
ISOLATION	INPUT-OUTPUT-RC	*6 AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	OUTPUT-RC-FG	*6 AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)			
	OUTPUT-RC	*6 AC100V 1minute, Cutoff current = 25mA, DC100V 10MΩ min (At Room Temperature)			
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *5	-10 to +70°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000feet) max			
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max			
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis			
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis			
	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN			
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B			
OTHERS	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *8			
	CASE SIZE/WEIGHT	75 X 36.5 X 160mm [2.95 X 1.44 X 6.30 inches] (W X H X D) / 380g max (with chassis & cover : 610g max)			
	COOLING METHOD	Convection (Refer to "Derating", Instruction Manual 3) *5			

\*1 Specification is changed at option, refer to Instruction Manual.

\*2 Peak loading for 10sec. And Duty 40% max, refer to Instruction Manual 6. In detail.

( ) means peak current. There is a possibility that an internal device is damaged when the specification is exceeded.

\*3 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal.

Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).

\*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*5 Derating is required.

\*6 Applicable when remote control (optional) is added.

\*7 Please contact us about dynamic load and input response.

\*8 Please contact us about another class.

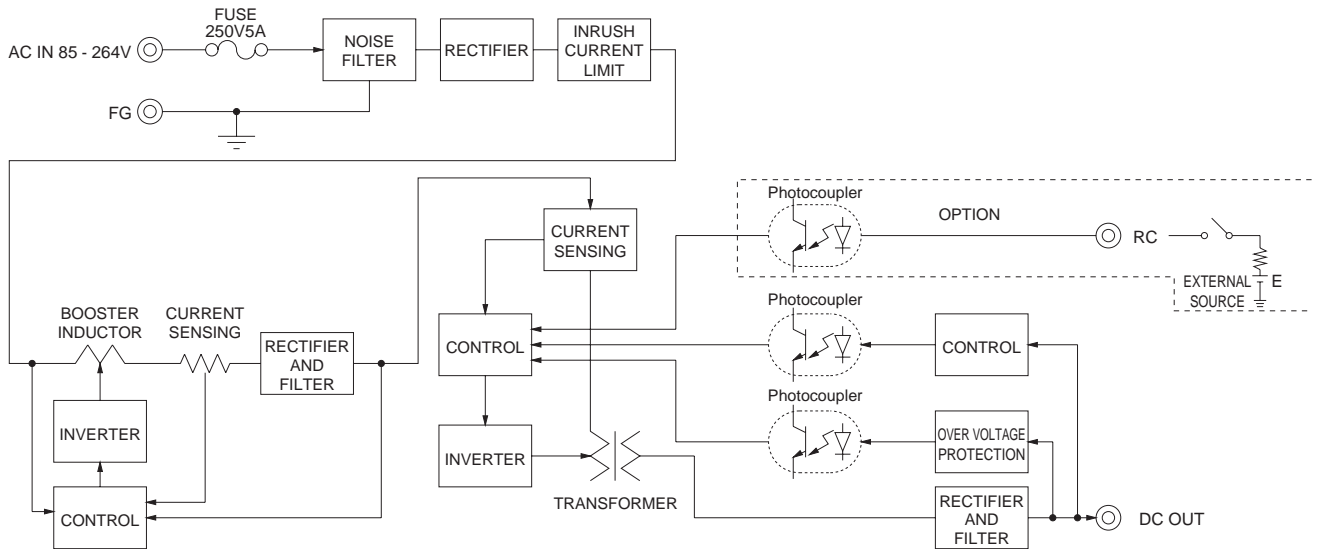
\* To meet the specifications. Do not operate over-loaded condition.

\* Parallel operation is not possible.

\* Derating is required when operated with chassis and cover.

\* Sound noise may be generated by power supply in case of pulse load.

## Block diagram

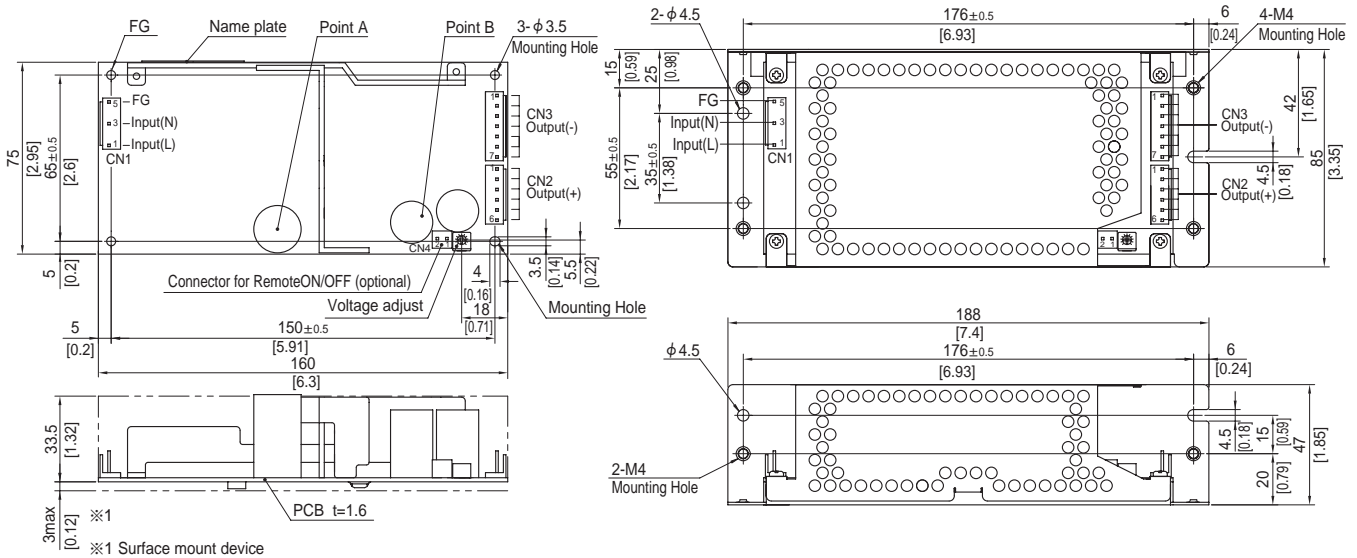


## External view

※ External size of option is different from standard model.

Standard type

Chassis and cover type



- ※ 4 Mounting holes are existing.
- ※ The back side of P.C.B. of the power supply is assembled some SMDs.
- Be attention not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm length or more regarding insulation.
- And do not use press-fitting bush.
- ※ Point A, Point B are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating connector	Terminal
CN1	1-1123724-3	Chain 1123721-1
		Loose 1318912-1
CN2	1-1123723-6	Chain 1123721-1
		Loose 1318912-1
CN3	1-1123723-7	Chain 1123721-1
		Loose 1318912-1

(Mfr:Tyco Electronics)

- ※ I/O Connector is Mfr. Tyco Electronics
- ※ Option:-J1:VH(J.S.T) connector type.

### <PIN CONNECTION>

CN1		CN2		CN3	
Pin No.	Input	Pin No.	Output	Pin No.	Output
1	AC(L)	1 to 6	+V	1 to 7	-V
2					
3	AC(N)				
4					
5	FG				

※ Keep drawing current per pin below 5A for CN2,CN3.

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 380g max (with chassis & cover : 610g max)
- ※ PCB material : CEM3
- ※ Optional chassis and cover material : Electric galvanizing steel board.
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque (Mounting hole of chassis) :1.5N · m (16kgf · cm) max

### Connector type

CN4 Option (Mfr:J.S.T)

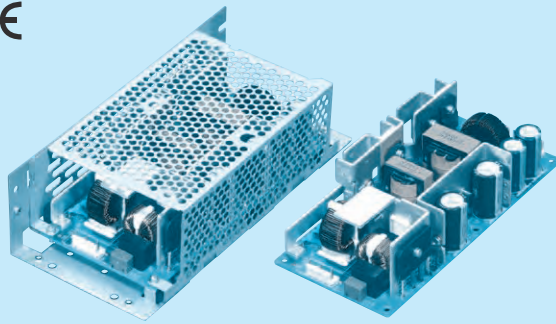
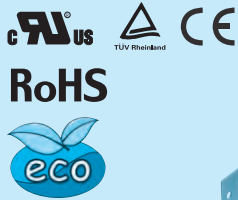
PIN No.	Contents
1	RC(+)
2	RC(-)

### Barrier strip type

Model B2B-XH-A  
Mating Connector (Terminal)  
XHP-2  
( BXH-001T-P0.6  
or SXH-001T-P0.6 )

# LFP240F

LF P 240 F -□ -□  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**NAC-06-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*1
- C : with Coating
- G : Low leakage current
- J1 : VH(J.S.T.)connector type
- R : with Remote ON/OFF
- R2 : with Remote ON/OFF
- S : with Chassis
- SN : with Chassis & cover
- T : Vertical terminal block
- U1 : Can be attached the external capacitor unit

Please refer to Instruction manual 7.

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
 \* Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

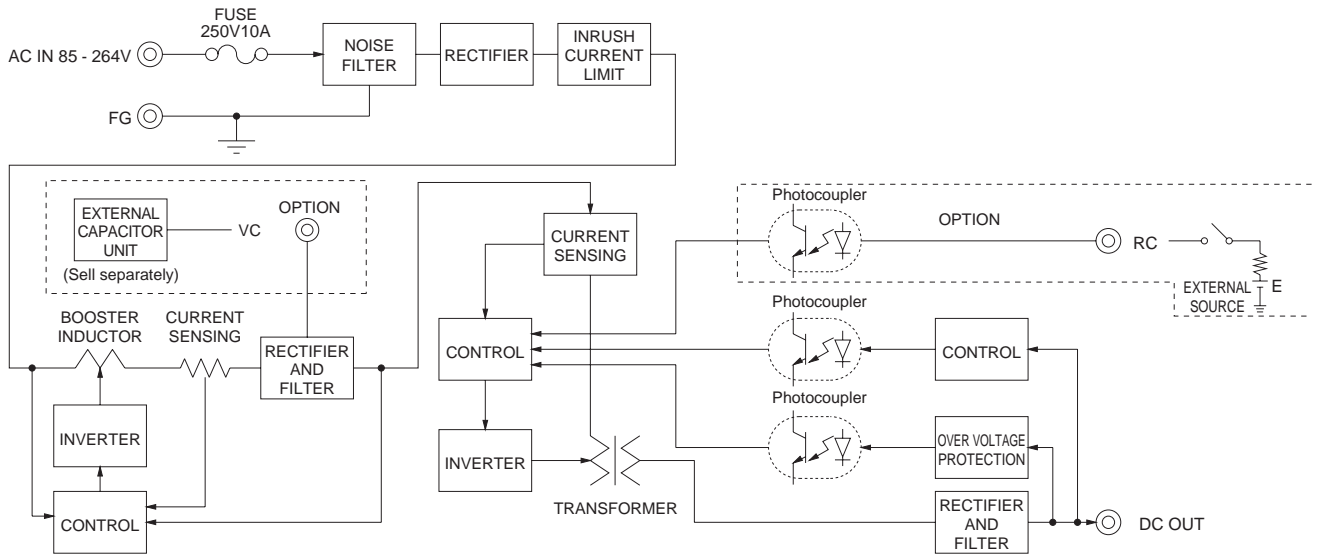
MODEL	LFP240F-24-Y	LFP240F-30-Y	LFP240F-36-Y	LFP240F-48-Y
MAX OUTPUT WATTAGE[W]	*2 300 (480)	300 (480)	302.4 (482.4)	302.4 (480)
DC OUTPUT	Convection	24V 10A (20A)	30V 8A (16A)	36V 6.7A (13.4A)
	Forced air	24V 12.5A (20A)	30V 10A (16A)	36V 8.4A (13.4A)

## SPECIFICATIONS

	MODEL	LFP240F-24-Y	LFP240F-30-Y	LFP240F-36-Y	LFP240F-48-Y	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating", Instruction Manual 1 and 3) *5				
	CURRENT[A]	ACIN 100V	3.6typ (Io=100%)			
		ACIN 200V	1.8typ (Io=100%)			
	FREQUENCY[Hz]	50 / 60 (47 - 63)				
	EFFICIENCY[%]	ACIN 100V	86.0typ (Io=100%)			
		ACIN 200V	88.5typ (Io=100%)			
	POWER FACTOR	ACIN 100V	0.99typ (Io=100%)			
		ACIN 200V	0.95typ (Io=100%)			
	INRUSH CURRENT[A]	ACIN 100V	15 / 30typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 3 sec. to re-start)			
		ACIN 200V	30 / 30typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 3 sec. to re-start)			
LEAKAGE CURRENT[ma]	0.40 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)					
OUTPUT	VOLTAGE[V]	24	30	36	48	
	CURRENT[A]	Convection *2	10 (Peak 20)	8 (Peak 16)	6.7 (Peak 13.4)	5 (Peak 10)
		Forced air *2	12.5 (Peak 20)	10 (Peak 16)	8.4 (Peak 13.4)	6.3 (Peak 10)
	LINE REGULATION[mV]	*7 96max	144max	144max	192max	
	LOAD REGULATION[mV]	*7 150max	240max	240max	240max	
	RIPPLE[mVp-p]	*3 0 to +50°C	120max	150max	150max	150max
		-10 - 0°C	160max	200max	200max	200max
	RIPPLE NOISE[mVp-p]*3	0 to +50°C	150max	250max	250max	250max
		-10 - 0°C	180max	300max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +50°C	240max	360max	360max	480max
		-10 to +50°C	290max	450max	450max	600max
	DRIFT[mV]	*4 96max	144max	144max	192max	
	START-UP TIME[ms]	350typ (ACIN 100V, Io=100%)				
	HOLD-UP TIME[ms]	*9 20typ (ACIN 100V, Io=100%)				
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	21.60 to 27.50				
OUTPUT VOLTAGE SETTING[V]	24.00 to 24.96		30.00 to 31.20		32.40 to 39.60	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 101% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION[V]	27.60 to 33.60	34.50 to 42.00	41.40 to 50.40	55.20 to 67.20	
	OPERATING INDICATION	Not provided				
	REMOTE SENSING	Not provided				
	REMOTE ON/OFF	Option (Refer to Instruction Manual 6)				
ISOLATION	INPUT-OUTPUT-RC	*6 AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)				
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)				
	OUTPUT-RC-FG	*6 AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)				
	OUTPUT-RC	*6 AC100V 1minute, Cutoff current = 25mA, DC100V 10MΩ min (At Room Temperature)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *5	-10 to +70°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max				
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis				
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis				
	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN				
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B				
OTHERS	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *8				
	CASE SIZE/WEIGHT	84 X 46 X 180mm [3.31 X 1.81 X 7.09 inches] (W X H X D) / 540g max (with chassis & cover : 860g max)				
	COOLING METHOD	Convection / Forced air (Refer to "Derating", Instruction Manual 3) *5				

\*1 Specification is changed at option, refer to Instruction Manual.  
 \*2 Peak loading for 10sec. And Duty 40% max, refer to Instruction Manual 6. In detail.  
 ( ) means peak current. There is a possibility that an internal device is damaged when the specification is exceeded.  
 \*3 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal.  
 \*4 Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).  
 \*5 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*6 Derating is required.  
 \*7 Applicable when remote control (optional) is added.  
 \*8 Please contact us about dynamic load and input response.  
 \*9 Please contact us about another class.  
 \*10 By attaching an external capacitor unit, it is possible to extend the hold-up time.  
 \*11 To meet the specifications. Do not operate over-loaded condition.  
 \*12 Parallel operation is not possible.  
 \*13 Derating is required when operated with chassis and cover.  
 \*14 Sound noise may be generated by power supply in case of pulse load.

## Block diagram

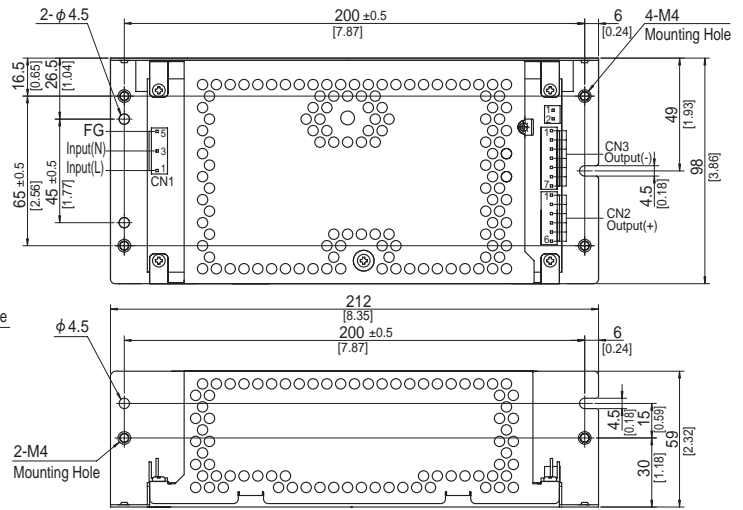
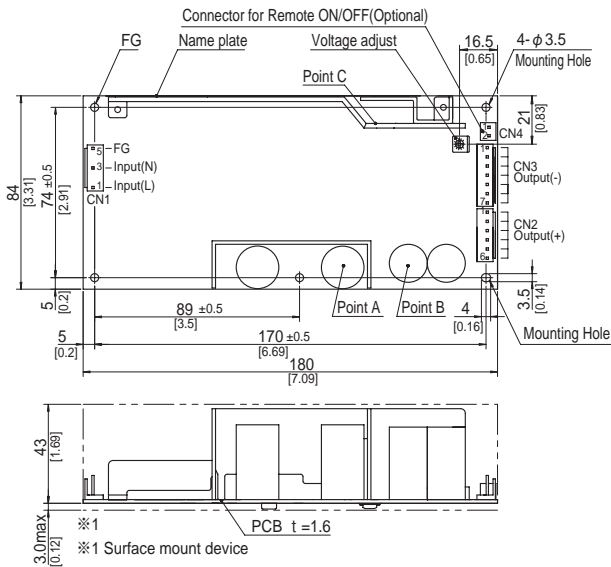


## External view

※ External size of option is different from standard model.

Standard type

Chassis and cover type



- ※ 5 Mounting holes are existing.
- ※ The back side of P.C.B. of the power supply is assembled some SMDs.  
Be attention not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm length or more regarding insulation.  
And do not use press-fitting bush.
- ※ Point A, Point B, Point C are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating connector	Terminal
CN1	1-1123724-3	Chain 1123721-1
		Loose 1318912-1
CN2	1-1123723-6	Chain 1123721-1
		Loose 1318912-1
CN3	1-1123723-7	Chain 1123721-1
		Loose 1318912-1

(Mfr:Tyco Electronics)

- ※ I/O Connector is Mfr. Tyco Electronics
- ※ Option:-J1:VH(J.S.T) connector type.

### <PIN CONNECTION>

CN1		CN2		CN3	
Pin No.	Input	Pin No.	Output	Pin No.	Output
1	AC(L)	1 to 6	+V	1 to 7	-V
2					
3	AC(N)				
4					
5	FG				

※ Keep drawing current per pin below 5A for CN2,CN3.

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 540g max (with chassis & cover : 860g max)
- ※ PCB material : CEM3
- ※ Optional chassis and cover material : Electric galvanizing steel board.
- ※ Dimensions in mm, [ ] =inches
- ※ Mounting torque (Mounting hole of chassis) :  $1.5N \cdot m$  (16kgf · cm) max

### Connector type

CN4 Option (Mfr:J.S.T)

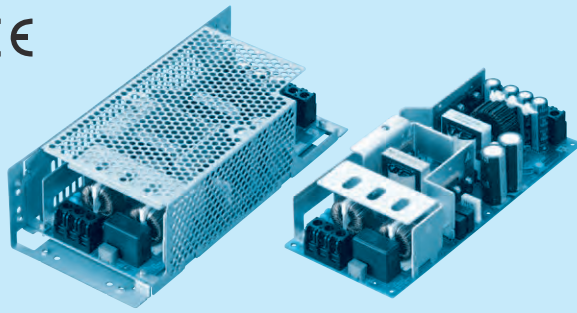
PIN No.	Contents
1	RC(+)
2	RC(-)

### Barrier strip type

Model B2B-XH-A  
Mating Connector (Terminal)  
XHP-2  
( BXH-001T-P0.6  
or SXH-001T-P0.6 )

# LFP300F

LF P 300 F -□ -□  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**NAC-06-472**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*1
- C : with Coating
- G : Low leakage current
- J : EP (Tyco Electronics) connector type
- J1 : VH (J.S.T.) connector type
- R : with Remote ON/OFF
- R2 : with Remote ON/OFF S
- S : with Chassis
- SN : with Chassis & cover
- SNF : with Chassis & cover & fan (Only 24V)
- T1 : Horizontal terminal block
- U1 : Can be attached the external capacitor unit

LFP

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
 \* Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LFP300F-24-TY	LFP300F-30-TY	LFP300F-36-TY	LFP300F-48-TY
MAX OUTPUT WATTAGE[W]	360 (600)	360 (600)	360 (604.8)	360 (604.8)
DC OUTPUT	Convection	24V 12.5A (25A)	30V 10A (20A)	48V 6.3A (12.6A)
	Forced air	24V 15A (25A)	30V 12A (20A)	48V 7.5A (12.6A)

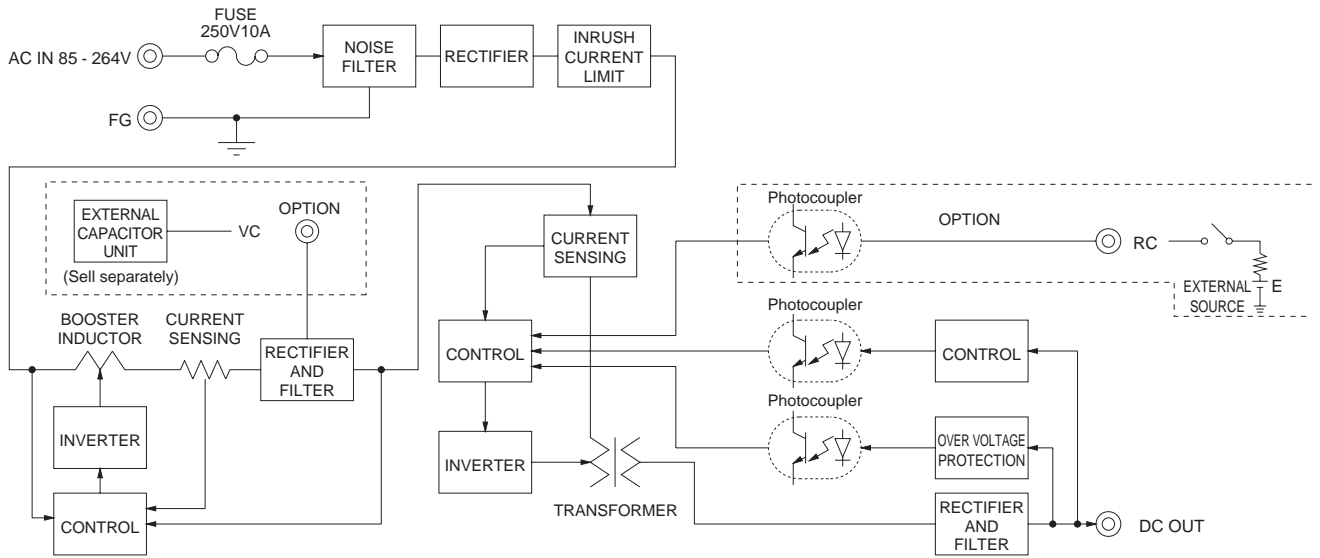
## SPECIFICATIONS

	MODEL	LFP300F-24-TY	LFP300F-30-TY	LFP300F-36-TY	LFP300F-48-TY	
INPUT	VOLTAGE[V]	AC85 - 264 1φ (Refer to "Derating", Instruction Manual 1 and 3) *5				
	CURRENT[A]	ACIN 100V	4.3typ (Io=100%)			
		ACIN 200V	2.2typ (Io=100%)			
	FREQUENCY[Hz]	50 / 60 (47 - 63)				
	EFFICIENCY[%]	ACIN 100V	85.0typ (Io=100%)	85.5typ (Io=100%)	85.5typ (Io=100%)	85.5typ (Io=100%)
		ACIN 200V	88.0typ (Io=100%)	88.0typ (Io=100%)	88.0typ (Io=100%)	88.0typ (Io=100%)
	POWER FACTOR	ACIN 100V	0.99typ (Io=100%)			
ACIN 200V		0.95typ (Io=100%)				
INRUSH CURRENT[A]	ACIN 100V	15 / 30typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 3 sec. to re-start)				
	ACIN 200V	30 / 30typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 3 sec. to re-start)				
LEAKAGE CURRENT[ma]	0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)					
OUTPUT	VOLTAGE[V]	24	30	36	48	
	CURRENT[A]	ACIN 100V *2	12.5 (Peak 22) Convection	10 (Peak 18) Convection	8.4 (Peak 14.6) Convection	6.3 (Peak 11) Convection
			15 (Peak 22) Forced air	12 (Peak 18) Forced air	10 (Peak 14.6) Forced air	7.5 (Peak 11) Forced air
		ACIN 200V *2	12.5 (Peak 25) Convection	10 (Peak 20) Convection	8.4 (Peak 16.8) Convection	6.3 (Peak 12.6) Convection
			15 (Peak 25) Forced air	12 (Peak 20) Forced air	10 (Peak 16.8) Forced air	7.5 (Peak 12.6) Forced air
	LINE REGULATION[mV]	*7	96max	144max	144max	192max
	LOAD REGULATION[mV]	*7	150max	240max	240max	240max
	RIPPLE[mVp-p]	*3	0 to +40°C	120max	150max	150max
			-10 - 0°C	160max	200max	200max
	RIPPLE NOISE[mVp-p]*3		0 to +40°C	150max	250max	250max
			-10 - 0°C	180max	300max	300max
	TEMPERATURE REGULATION[mV]		0 to +40°C	240max	360max	480max
			-10 to +40°C	290max	450max	600max
	DRIFT[mV]	*4	96max	144max	144max	192max
START-UP TIME[ms]		350typ (ACIN 100V, Io=100%)				
HOLD-UP TIME[ms]	*9	20typ (ACIN 100V, Io=100%)				
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		21.60 to 27.50	27.00 to 33.00	32.40 to 39.60	39.60 to 52.80	
OUTPUT VOLTAGE SETTING[V]		24.00 to 24.96	30.00 to 31.20	36.00 to 37.44	48.00 to 49.92	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 101% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION[V]	27.60 to 33.60	34.50 to 42.00	41.40 to 50.40	55.20 to 67.20	
	OPERATING INDICATION	Not provided				
	REMOTE SENSING	Not provided				
REMOTE ON/OFF	Option (Refer to Instruction Manual 6)					
ISOLATION	INPUT-OUTPUT-RC	*6	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	INPUT-FG		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	OUTPUT-RC-FG	*6	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)			
	OUTPUT-RC	*6	AC100V 1minute, Cutoff current = 25mA, DC100V 10MΩ min (At Room Temperature)			
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *5	-10 to +70°C, 20 - 90%RH (Non condensing) (Refer to "Derating", Instruction Manual 3), 3,000m (10,000feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max				
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis				
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis				
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS (At only AC input)	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN50178 Complies with DEN-AN				
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B				
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *8				
OTHERS	CASE SIZE/WEIGHT	95X52.5X222mm [3.74X2.07X8.74 inches] (W X H X D) (without terminal block) / 810g max (with chassis & cover : 1,270g max)				
	COOLING METHOD	Convection / Forced air (Refer to "Derating", Instruction Manual 3) *5				

\*1 Specification is changed at option, refer to Instruction Manual.  
 \*2 Peak loading for 10sec. And Duty 40% max, refer to Instruction Manual 6. In detail.  
 ( ) means peak current. There is a possibility that an internal device is damaged when the specification is exceeded.  
 \*3 This is the value that measured on measuring board with capacitor of 22μF at 150mm from output terminal.  
 \*4 Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).  
 \*5 Derating is required.  
 \*6 Applicable when remote control (optional) is added.  
 \*7 Please contact us about dynamic load and input response.  
 \*8 Please contact us about another class.  
 \*9 By attaching an external capacitor unit, it is possible to extend the hold-up time.  
 \* To meet the specifications. Do not operate over-loaded condition.  
 \* Parallel operation is not possible.  
 \* Derating is required when operated with chassis and cover.  
 \* Sound noise may be generated by power supply in case of pulse load.



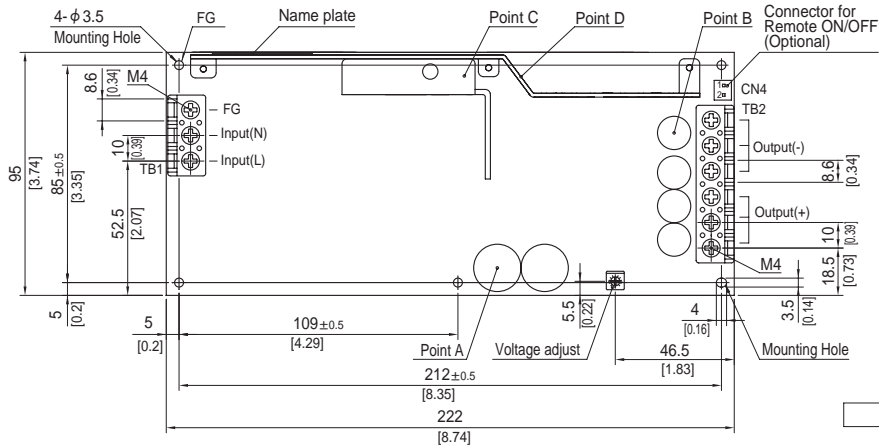
## Block diagram



## External view

※ External size of option is different from standard model.

Standard type



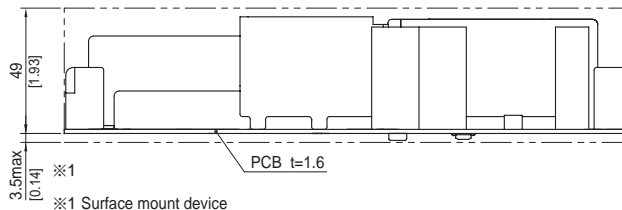
Connector type

CN4 Option (Mfr.:J.S.T)

PIN No.	Contents
1	RC(+)
2	RC(-)

Barrier strip type

Model B2B-XH-A  
Mating Connector (Terminal)  
XHP-2  
( BXH-001T-P0.6  
or SXH-001T-P0.6 )



- ※ 5 Mounting holes are existing.
- ※ The back side of P.C.B. of the power supply is assembled some SMDs.  
Be attention not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm length or more regarding insulation.  
And do not use press-fitting bush.
- ※ Point A, Point B, Point C, Point D are thermometry points.  
Please refer to Instruction Manual 3.
- ※ Keep drawing current per pin below 20A for TB2.

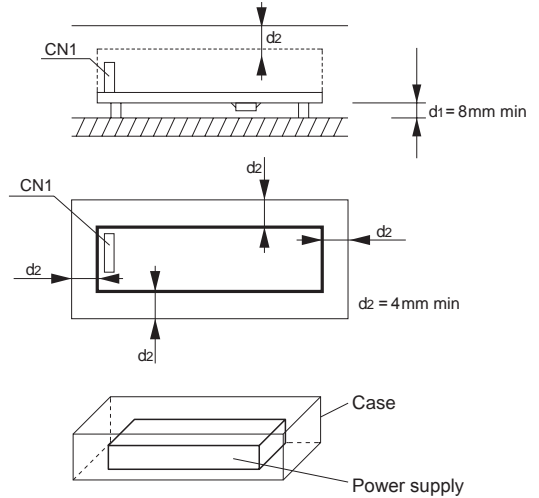
- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 810g max (with chassis & cover : 1,270g max)
- ※ PCB material : CEM3
- ※ Dimensions in mm, [ ]=inches
- ※ Screw tightening torque : M4 1.6N · m (16.9kgf · cm) max

Assembling and Installation Method

Installation method

■ This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.

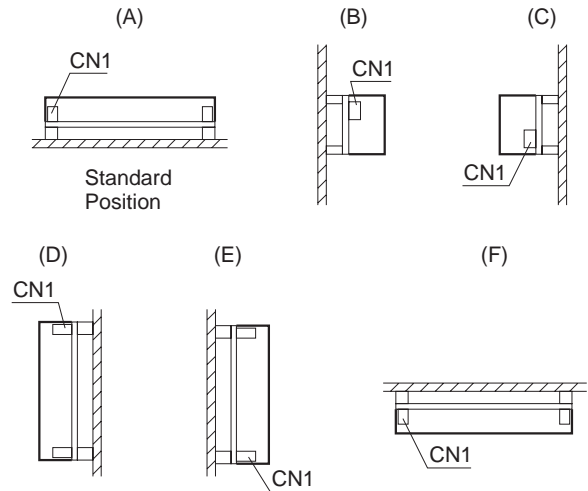
■ In case of metal chassis, keep the distance between d1 & d2 for to insulate between lead of component and metal chassis, use the spacer of 8mm or more between d1. If it is less than d1 & d2, insert the insulation sheet between power supply and metal chassis.



■ There is a possibility that it is not possible to cool enough when the power supply is used by the sealing up space as showing in right figure. Please use it after confirming the temperature of point A and point B of Instruction Manual 3.

■ (F) of LFP300F is not possible. (F) mounting is not possible when unit is with case cover, but if need to operate unit by (F) positioning with case cover, temperature / load derating is necessary.

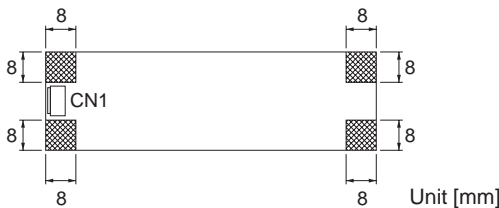
For more details, please contact our sales or engineering departments.



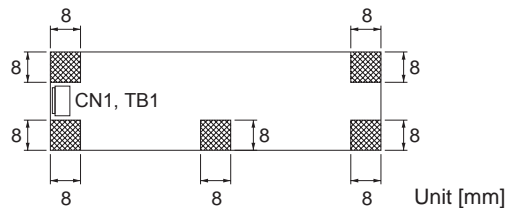
Mounting screw

■ The mounting screw should be M3. The hatched area shows the allowance of metal parts for mounting.

● LFP100F, LFP150F



● LFP240F, LFP300F



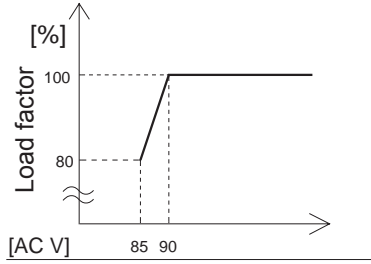
■ If metallic fittings are used on the component side of the board, ensure there is no contact with surface mounted components.

■ This product uses SMD technology. Please avoid the PCB installation method which includes the twisting stress or the bending stress.

\*Recommendation to electrically connect FG to metal chassis for reducing noise.

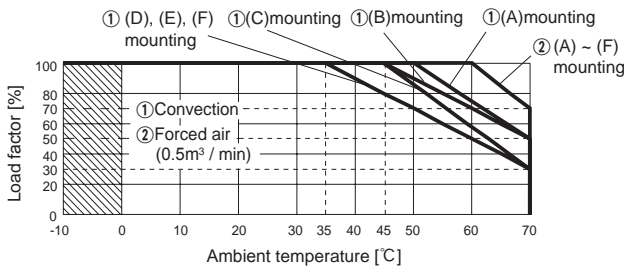
Derating

● Derating curve for input voltage

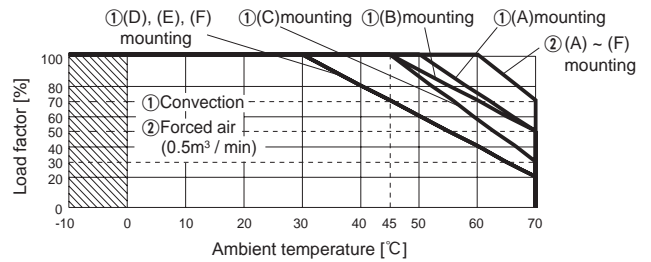


LFP

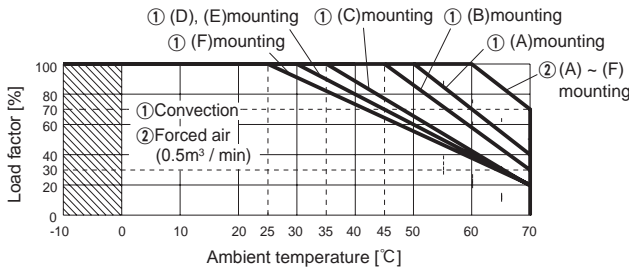
● LFP100F Ambient temperature derating curve (Reference value)



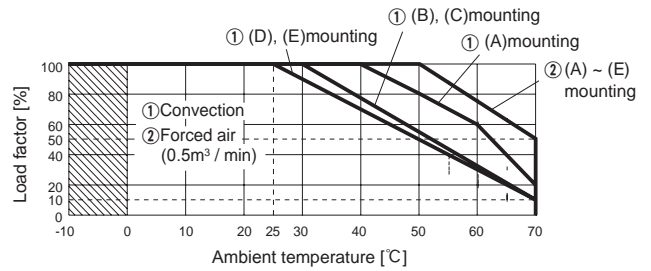
● LFP150F Ambient temperature derating curve (Reference value)



● LFP240F Ambient temperature derating curve (Reference value)



● LFP300F Ambient temperature derating curve (Reference value)



Output voltage	Output power[W]	
	①Convection	②Forced air
24V	240.0	300.0
30V	240.0	300.0
36V	241.2	302.4
48V	240.0	302.4

Output voltage	Output power[W]	
	①Convection	②Forced air
24V	300.0	360.0
30V	300.0	360.0
36V	302.4	360.0
48V	302.4	360.0

■ The operative ambient temperature is different by with / without chassis cover or mounting position.

Note: In the hatched area, the specification of Ripple, Ripple Noise is different from other area.

■ Make sure the temperature at point A and point B is less than the temperatures shown in Instruction Manual 3.

■ The ambient temperature should be measured 5 to 10 cm away from the power supply so that it won't be influenced by the heat from the power supply. Please consult us for more details.

## Instruction Manual

◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual      <https://en.cosel.co.jp/product/powersupply/LFP/>  
 Before using our product      <https://en.cosel.co.jp/technical/caution/index.html>

LFP



NOTICE



## Basic Characteristics Data

LFP

Model	Circuit method	Switching frequency [kHz]	Input current *1 [A]	Inrush current protection	PCB/Pattern			Series/Parallel operation availability *2	
					Material	Single sided	Double sided	Series operation	Parallel operation
LFP100F	Active filter	60	1.3	Thermistor	CEM-3		Yes	Yes	No
	Forward converter	130							
LFP150F	Active filter	60	2.0	Thermistor	CEM-3		Yes	Yes	No
	Forward converter	130							
LFP240F	Active filter	60	3.6	SCR	CEM-3		Yes	Yes	No
	Forward converter	130							
LFP300F	Active filter	60	4.3	SCR	CEM-3		Yes	Yes	No
	Forward converter	140							

\*1 The value of input current is at ACIN 100V and rated load.

\*2 Refer to Instruction Manual 2.



World wide



Isolated



Safety Approvals

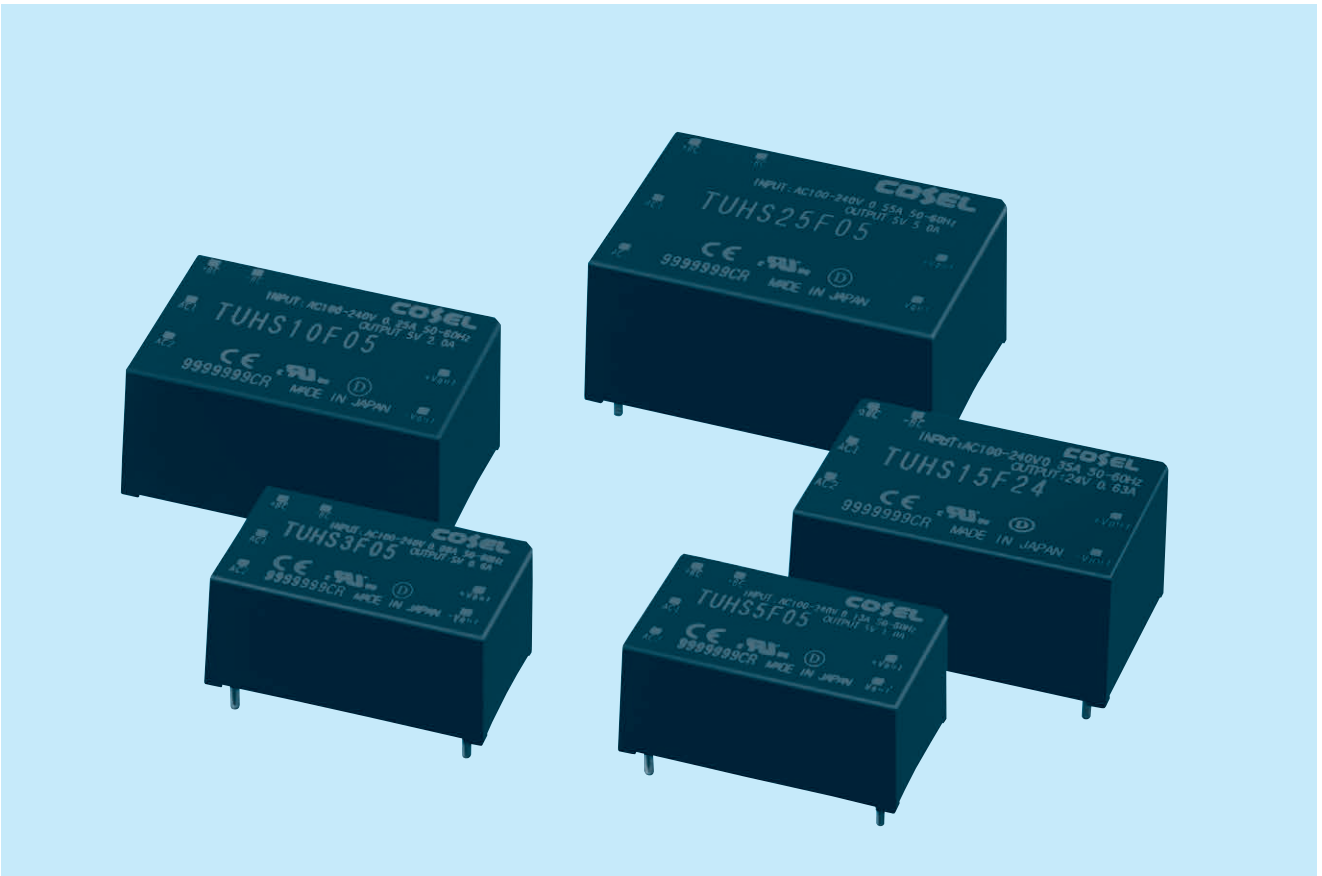


OCP



OVP

# TUHS-series



TUHS

## Feature

- P.C.board mount AC-DC Converter
- Design flexibility for Hold-Up time and expected life
- Small size
- Built-in overcurrent and overvoltage protection circuits
- High efficiency by synchronous rectification technology (TUHS25)
- Not built-in aluminum and tantalum electrolytic capacitor

## CE marking

- Low voltage directive
- RoHS Directive

## Safety Approval

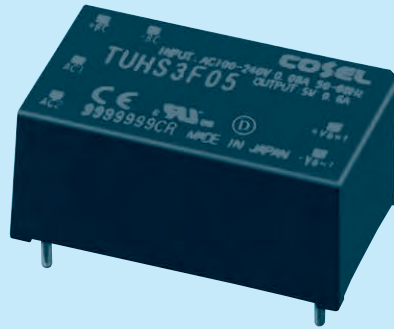
- UL60950-1, C-UL, EN60950-1

## 5-year warranty

# TUHS3

TUH S 3 F 05

① ② ③ ④ ⑤



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal Input
- ⑤ Output voltage

□ Class II

\* Avoid short circuit between +BC and -BC. It may cause the failure of inside components.  
 \* To use TUHS, external components are required. Refer to the instruction manual for details.

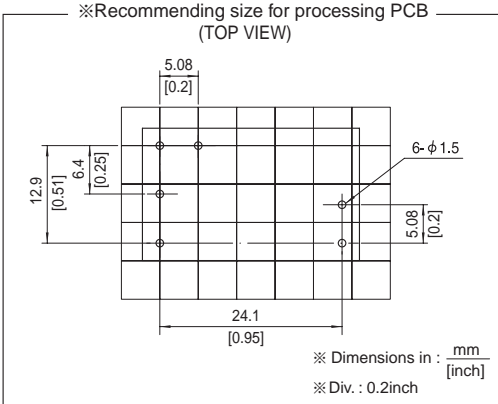
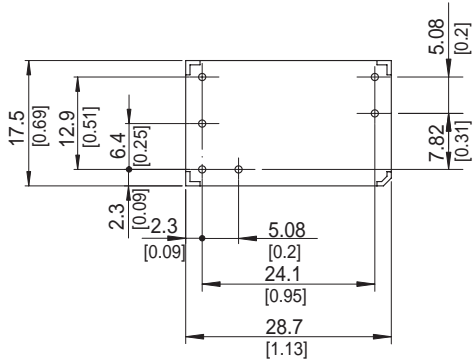
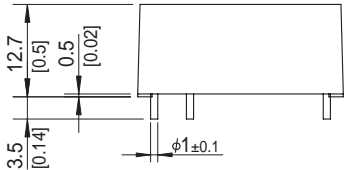
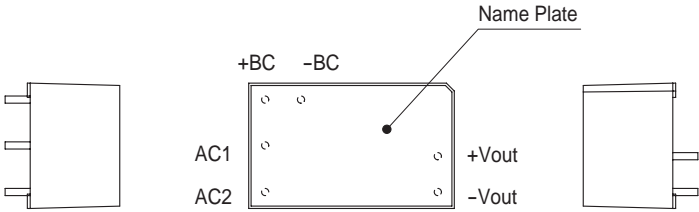
MODEL	TUHS3F05	TUHS3F12	TUHS3F15	TUHS3F24
MAX OUTPUT WATTAGE[W]	3.00	3.00	3.00	3.12
DC OUTPUT	5V 0.6A	12V 0.25A	15V 0.2A	24V 0.13A

## SPECIFICATIONS

	MODEL	TUHS3F05	TUHS3F12	TUHS3F15	TUHS3F24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ DC120 - 370				
	CURRENT[A]	ACIN 100V	0.08typ (Io=100%)			
		ACIN 200V	0.05typ (Io=100%)			
	FREQUENCY[Hz]	50/60 (47 - 63)				
	EFFICIENCY[%]	ACIN 100V	79typ	81typ	81typ	81typ
		ACIN 200V	78typ	79typ	79typ	79typ
INRUSH CURRENT	Limited by external components					
OUTPUT	VOLTAGE[V]	5	12	15	24	
	CURRENT[A]	0.6	0.25	0.2	0.13	
	LINE REGULATION[mV]	20max	48max	60max	96max	
	LOAD REGULATION[mV]	40max	100max	120max	150max	
	RIPPLE[mVp-p]	30 to 100% Load *1	120max	160max	160max	200max
		0 to 30% Load AC85V - 240V *1	400max	480max	480max	580max
	RIPPLE NOISE[mVp-p]	30 to 100% Load *1	160max	200max	200max	240max
		0 to 30% Load AC85V - 240V *1	480max	560max	560max	660max
	TEMPERATURE REGULATION[mV]	0 to +85°C	100max	180max	240max	360max
		-40 to +85°C	150max	270max	360max	480max
DRIFT[mV]	*2	20max	48max	60max	96max	
OUTPUT VOLTAGE SETTING[V]		4.90 - 5.30	11.40 - 12.60	14.25 - 15.75	23.00 - 25.00	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recover automatically				
	OVERVOLTAGE PROTECTION[V]	5.50 - 8.00	13.20 - 19.20	16.50 - 24.00	26.40 - 38.40	
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max				
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis				
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis				
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1				
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55022-B *3				
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) (Not built-in to active filter)				
OTHERS	CASE SIZE/WEIGHT	28.7 X 12.7 X 17.5mm[1.13 X 0.50 X 0.69 inches] (W X H X D) / 15g max				
	COOLING METHOD	Convection / Forced air				

\*1 Refer to instruction manual for measuring method of electric characteristics.  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated value.  
 \*3 Do not ground secondly circuit, in case of a standard adapted.  
 \* Measured with 18μF capacitor as Cbc.

External view



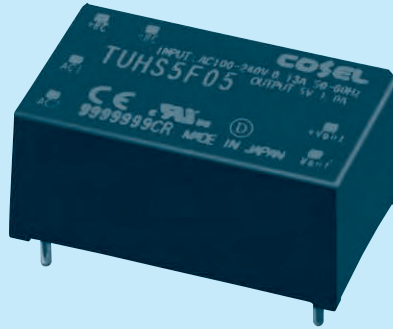
- ※ Tolerance :  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Weight : 15g max
- ※ Case material : PBT
- ※ Pin material : Copper
- ※ Plating treatment of pin : Lead free plating
- ※ Dimensions in mm, [ ]=inches

TUHS

# TUHS5

TUH S 5 F 05

① ② ③ ④ ⑤



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal Input
- ⑤ Output voltage

□ Class II

\* Avoid short circuit between +BC and -BC. It may cause the failure of inside components.  
 \* To use TUHS, external components are required. Refer to the instruction manual for details.

MODEL	TUHS5F05	TUHS5F12	TUHS5F15	TUHS5F24
MAX OUTPUT WATTAGE[W]	5.00	5.40	5.10	5.28
DC OUTPUT	5V 1A	12V 0.45A	15V 0.34A	24V 0.22A

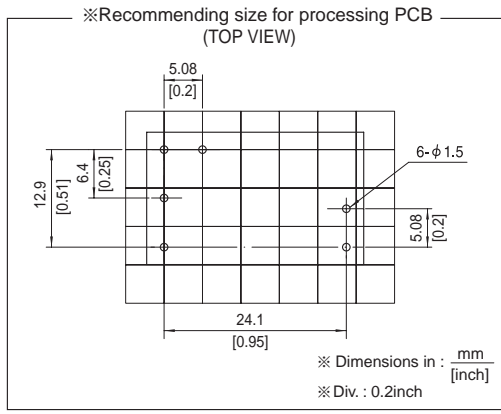
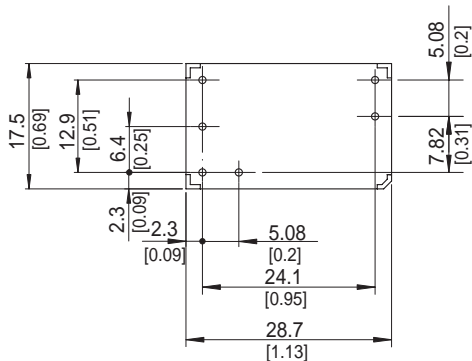
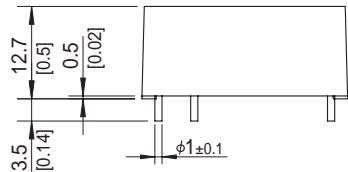
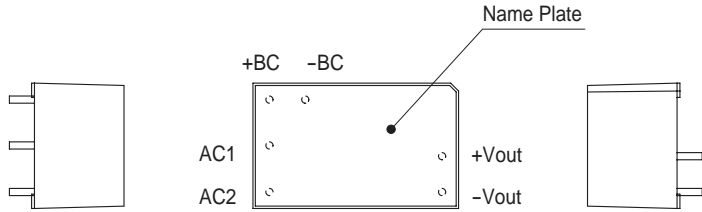
## SPECIFICATIONS

	MODEL	TUHS5F05	TUHS5F12	TUHS5F15	TUHS5F24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ DC120 - 370				
	CURRENT[A]	ACIN 100V	0.13typ (Io=100%)			
		ACIN 200V	0.08typ (Io=100%)			
	FREQUENCY[Hz]	50/60 (47 - 63)				
	EFFICIENCY[%]	ACIN 100V	78typ	82typ	82typ	83typ
		ACIN 200V	79typ	82typ	82typ	83typ
INRUSH CURRENT	Limited by external components					
OUTPUT	VOLTAGE[V]	5	12	15	24	
	CURRENT[A]	1	0.45	0.34	0.22	
	LINE REGULATION[mV]	20max	48max	60max	96max	
	LOAD REGULATION[mV]	40max	100max	120max	150max	
	RIPPLE[mVp-p]	30 to 100% Load *1	120max	160max	160max	200max
		0 to 30% Load AC85V - 240V *1	400max	480max	480max	580max
	RIPPLE NOISE[mVp-p]	30 to 100% Load *1	160max	200max	200max	240max
		0 to 30% Load AC85V - 240V *1	480max	560max	560max	660max
	TEMPERATURE REGULATION[mV]	0 to +80°C	100max	180max	240max	360max
		-40 to +80°C	150max	270max	360max	480max
DRIFT[mV]	*2	20max	48max	60max	96max	
OUTPUT VOLTAGE SETTING[V]		4.90 - 5.30	11.40 - 12.60	14.25 - 15.75	23.00 - 25.00	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recover automatically				
	OVERVOLTAGE PROTECTION[V]	5.50 - 8.00	13.20 - 19.20	16.50 - 24.00	26.40 - 38.40	
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max				
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis				
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis				
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1				
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55022-B *3				
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) (Not built-in to active filter)				
OTHERS	CASE SIZE/WEIGHT	28.7 X 12.7 X 17.5mm[1.13 X 0.50 X 0.69 inches] (W X H X D) / 15g max				
	COOLING METHOD	Convection / Forced air				

\*1 Refer to instruction manual for measuring method of electric characteristics.  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated value.  
 \*3 Do not ground secondly circuit, in case of a standard adapted.  
 \* Measured with 22μF capacitor as Cbc.



External view



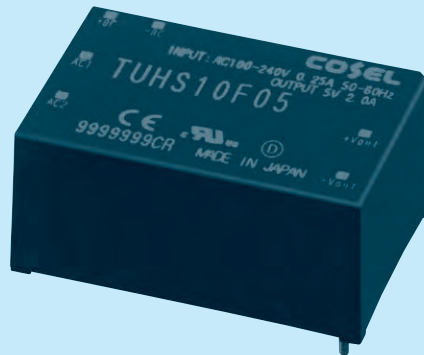
- ※ Tolerance : ±0.5 [±0.02]
- ※ Weight : 15g max
- ※ Case material : PBT
- ※ Pin material : Copper
- ※ Plating treatment of pin : Lead free plating
- ※ Dimensions in mm, [ ]=inches

TUHS

# TUHS10

TUH S 10 F 05

① ② ③ ④ ⑤



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal Input
- ⑤ Output voltage

□ Class II

\* Avoid short circuit between +BC and -BC. It may cause the failure of inside components.  
 \* To use TUHS, external components are required. Refer to the instruction manual for details.

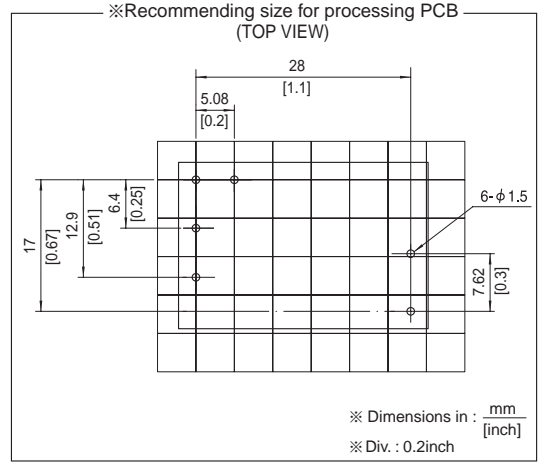
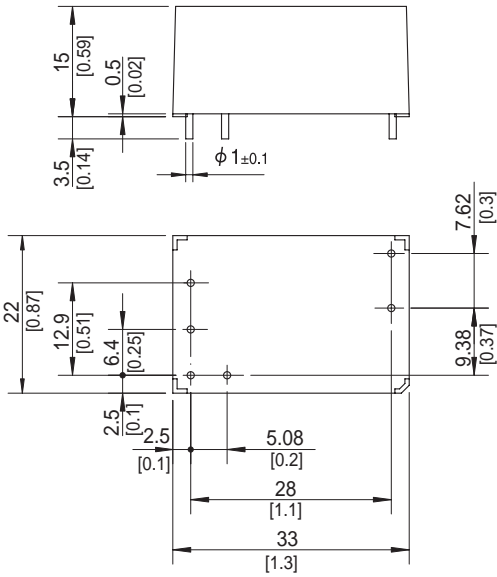
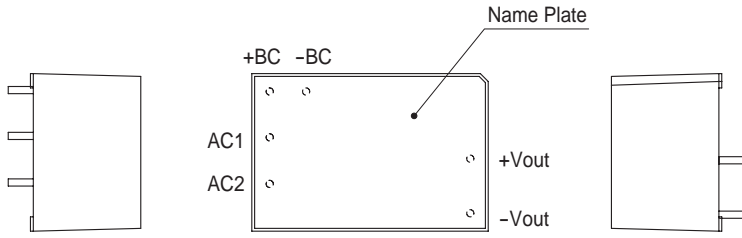
MODEL	TUHS10F05	TUHS10F12	TUHS10F15	TUHS10F24
MAX OUTPUT WATTAGE[W]	10.00	10.80	10.10	10.80
DC OUTPUT	5V 2A	12V 0.9A	15V 0.67A	24V 0.45A

## SPECIFICATIONS

	MODEL	TUHS10F05	TUHS10F12	TUHS10F15	TUHS10F24	
INPUT	VOLTAGE[V]	AC85 - 264 1φ DC120 - 370				
	CURRENT[A]	ACIN 100V	0.25typ (Io=100%)			
		ACIN 200V	0.14typ (Io=100%)			
	FREQUENCY[Hz]	50/60 (47 - 63)				
	EFFICIENCY[%]	ACIN 100V	81typ	85typ	85typ	86typ
ACIN 200V		82typ	85typ	85typ	87typ	
INRUSH CURRENT	Limited by external components					
OUTPUT	VOLTAGE[V]	5	12	15	24	
	CURRENT[A]	2	0.9	0.67	0.45	
	LINE REGULATION[mV]	20max	48max	60max	96max	
	LOAD REGULATION[mV]	40max	100max	120max	150max	
	RIPPLE[mVp-p]	30 to 100% Load *1	120max	160max	160max	200max
		0 to 30% Load AC85V - 240V *1	400max	480max	480max	580max
	RIPPLE NOISE[mVp-p]	30 to 100% Load *1	160max	200max	200max	240max
		0 to 30% Load AC85V - 240V *1	480max	560max	560max	660max
	TEMPERATURE REGULATION[mV]	0 to +70°C	100max	180max	240max	360max
		-40 to +70°C	150max	270max	360max	480max
DRIFT[mV]	*2	20max	48max	60max	96max	
OUTPUT VOLTAGE SETTING[V]	4.90 - 5.30	11.40 - 12.60	14.25 - 15.75	23.00 - 25.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recover automatically				
	OVERVOLTAGE PROTECTION[V]	5.50 - 8.00	13.20 - 19.20	16.50 - 24.00	26.40 - 38.40	
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max				
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis				
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis				
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1				
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55022-B *3				
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) (Not built-in to active filter)				
OTHERS	CASE SIZE/WEIGHT	33.0 X 15.0 X 22.0mm [1.3 X 0.59 X 0.86 inches] (W X H X D) / 25g max				
	COOLING METHOD	Convection / Forced air				

\*1 Refer to instruction manual for measuring method of electric characteristics.  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated value.  
 \*3 Do not ground secondly circuit, in case of a standard adapted.  
 \* Measured with 47μF capacitor as Cbc.

External view



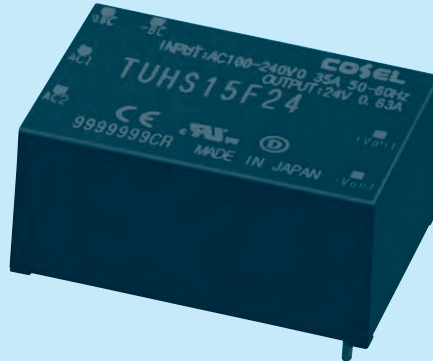
- ※ Tolerance :  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Weight : 25g max
- ※ Case material : PBT
- ※ Pin material : Copper
- ※ Plating treatment of pin : Lead free plating
- ※ Dimensions in mm, [ ]=inches

TUHS

# TUHS15

TUH S 15 F 12

① ② ③ ④ ⑤



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal Input
- ⑤ Output voltage

□ Class II

\* Avoid short circuit between +BC and -BC. It may cause the failure of inside components.  
 \* To use TUHS, external components are required. Refer to the instruction manual for details.

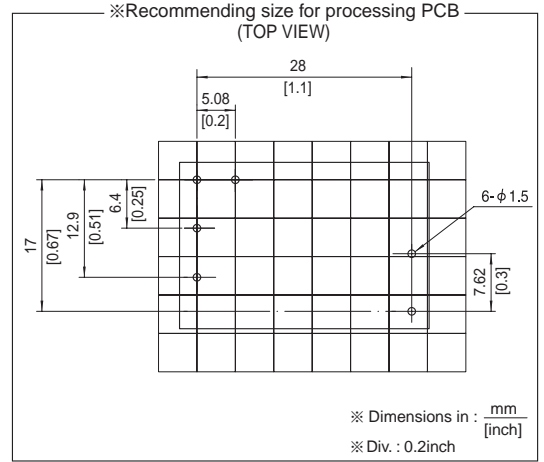
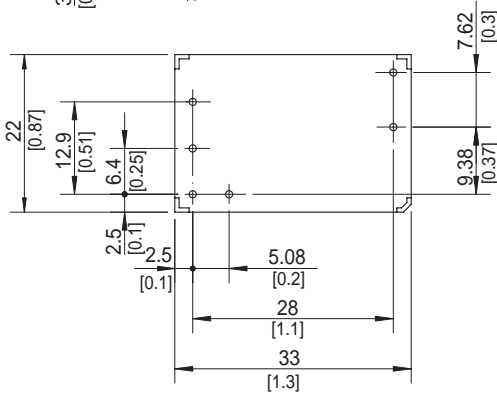
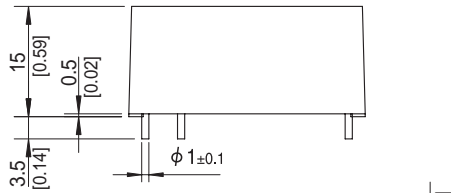
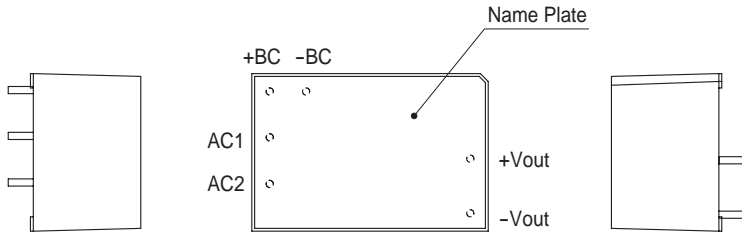
MODEL	TUHS15F12	TUHS15F15	TUHS15F24
MAX OUTPUT WATTAGE[W]	15.00	15.00	15.12
DC OUTPUT	12V 1.25A	15V 1A	24V 0.63A

## SPECIFICATIONS

	MODEL	TUHS15F12	TUHS15F15	TUHS15F24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ DC120 - 370			
	CURRENT[A]	ACIN 100V	0.35typ (Io=100%)		
		ACIN 200V	0.18typ (Io=100%)		
	FREQUENCY[Hz]	50/60 (47 - 63)			
	EFFICIENCY[%]	ACIN 100V	85typ	85typ	86typ
		ACIN 200V	85typ	85typ	87typ
INRUSH CURRENT	Limited by external components				
OUTPUT	VOLTAGE[V]	12	15	24	
	CURRENT[A]	1.25	1	0.63	
	LINE REGULATION[mV]	48max	60max	96max	
	LOAD REGULATION[mV]	100max	120max	150max	
	RIPPLE[mVp-p]	30 to 100% Load *1	160max	160max	200max
		0 to 30% Load AC85V - 240V *1	480max	480max	580max
	RIPPLE NOISE[mVp-p]	30 to 100% Load *1	200max	200max	240max
		0 to 30% Load AC85V - 240V *1	560max	560max	660max
	TEMPERATURE REGULATION[mV]	0 to +50°C	180max	240max	360max
		-40 to +50°C	270max	360max	480max
DRIFT[mV]	*2 48max	60max	96max		
OUTPUT VOLTAGE SETTING[V]	11.40 - 12.60	14.25 - 15.75	23.00 - 25.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recover automatically			
	OVERVOLTAGE PROTECTION[V]	13.20 - 19.20	16.50 - 24.00	26.40 - 38.40	
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)			
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max			
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max			
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis			
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1			
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55022-B *3			
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) (Not built-in to active filter)			
OTHERS	CASE SIZE/WEIGHT	33.0 X 15.0 X 22.0mm [1.3 X 0.59 X 0.86 inches] (W X H X D) / 25g max			
	COOLING METHOD	Convection / Forced air			

\*1 Refer to instruction manual for measuring method of electric characteristics.  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated value.  
 \*3 Do not ground secondly circuit, in case of a standard adapted.  
 \* Measured with 68μF capacitor as Cbc.

External view



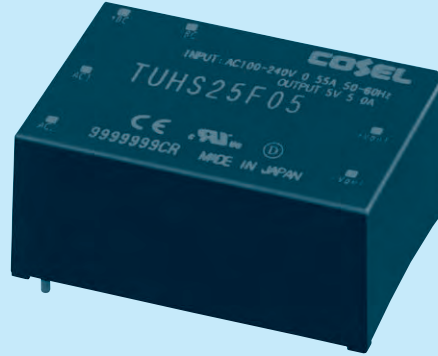
- ※ Tolerance :  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Weight : 25g max
- ※ Case material : PBT
- ※ Pin material : Copper
- ※ Plating treatment of pin : Lead free plating
- ※ Dimensions in mm, [ ]=inches

TUHS

# TUHS25

TUH S 25 F 05

① ② ③ ④ ⑤



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal Input
- ⑤ Output voltage

□ Class II

\* Avoid short circuit between +BC and -BC. It may cause the failure of inside components.  
 \* To use TUHS, external components are required. Refer to the instruction manual for details.

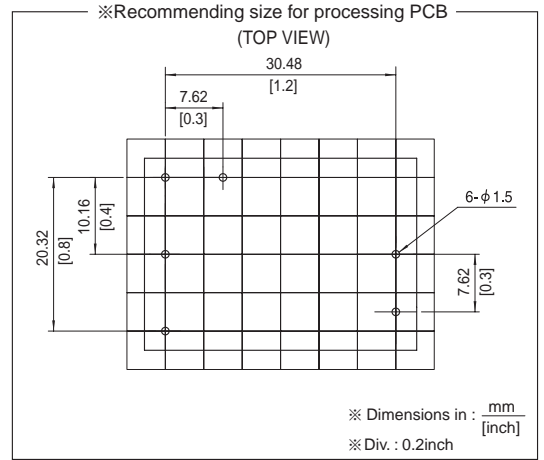
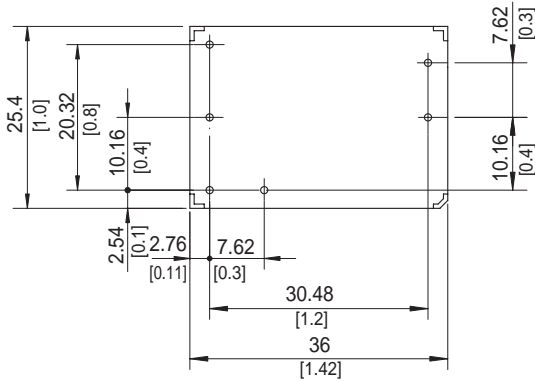
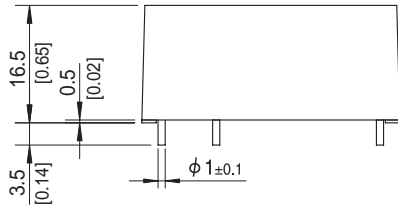
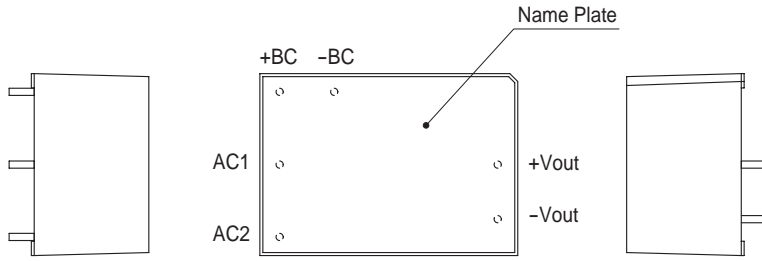
MODEL	TUHS25F05	TUHS25F12	TUHS25F15	TUHS25F24
MAX OUTPUT WATTAGE[W]	25.00	25.20	25.50	26.40
DC OUTPUT	5V 5A	12V 2.1A	15V 1.7A	24V 1.1A

## SPECIFICATIONS

	MODEL	TUHS25F05	TUHS25F12	TUHS25F15	TUHS25F24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ DC120 - 370				
	CURRENT[A]	ACIN 100V	0.55typ (Io=100%)			
		ACIN 200V	0.35typ (Io=100%)			
	FREQUENCY[Hz]	50/60 (47 - 63)				
	EFFICIENCY[%]	ACIN 100V	87typ	88typ	88typ	89typ
		ACIN 200V	87typ	88typ	88typ	90typ
INRUSH CURRENT	Limited by external components					
OUTPUT	VOLTAGE[V]	5	12	15	24	
	CURRENT[A]	5	2.1	1.7	1.1	
	LINE REGULATION[mV]	20max	48max	60max	96max	
	LOAD REGULATION[mV]	40max	100max	120max	150max	
	RIPPLE[mVp-p]	30 to 100% Load *1	120max	160max	160max	200max
		0 to 30% Load AC85V - 240V *1	400max	480max	480max	580max
	RIPPLE NOISE[mVp-p]	30 to 100% Load *1	160max	200max	200max	240max
		0 to 30% Load AC85V - 240V *1	480max	560max	560max	660max
	TEMPERATURE REGULATION[mV]	0 to +50°C	100max	180max	240max	360max
		-40 to +50°C	150max	270max	360max	480max
DRIFT[mV]	*2	20max	48max	60max	96max	
OUTPUT VOLTAGE SETTING[V]	4.90 - 5.30	11.40 - 12.60	14.25 - 15.75	23.00 - 25.00		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recover automatically				
	OVERVOLTAGE PROTECTION[V]	5.50 - 8.00	13.20 - 19.20	16.50 - 24.00	26.40 - 38.40	
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max				
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis				
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis				
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1				
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR-B, EN55022-B *3				
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) (Not built-in to active filter)				
OTHERS	CASE SIZE/WEIGHT	36.0 X 16.5 X 25.4mm [1.42 X 0.65 X 1.0 inches] (W X H X D) / 40g max				
	COOLING METHOD	Convection / Forced air				

\*1 Refer to instruction manual for measuring method of electric characteristics.  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated value.  
 \*3 Do not ground secondly circuit, in case of a standard adapted.  
 \* Measured with 120μF capacitor as Cbc.

External view

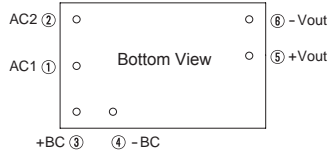


- ※ Tolerance :  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Weight : 40g max
- ※ Case material : PBT
- ※ Pin material : Copper
- ※ Plating treatment of pin : Lead free plating
- ※ Dimensions in mm, [ ]=inches

TUHS

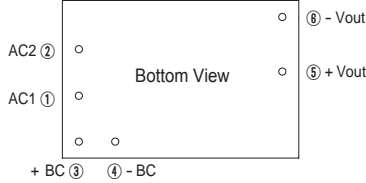
Pin Configuration

●TUHS3/TUHS5

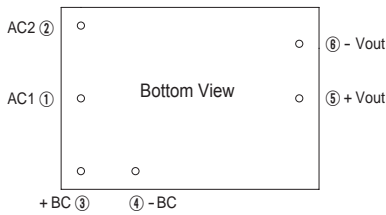


No.	Pin Connection	Function
①	AC1	AC input
②	AC2	
③	+BC	+BC output
④	-BC	-BC output
⑤	+VOUT	+DC output
⑥	-VOUT	-DC output

●TUHS10/TUHS15



●TUHS25



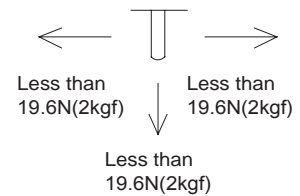
Implementation • Mounting Method

Mounting method

- The unit can be mounted in any direction. When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation. The temperature around each power supply should not exceed the temperature range shown in derating curve.
- Avoid placing the AC input line pattern layout underneath the unit. It will increase the line conducted noise. Make sure to leave an ample distance between the line pattern layout and the unit. Also avoid placing the DC output line pattern underneath the unit because it may increase the output noise. Lay out the pattern away from the unit.
- Avoid placing the signal line pattern layout underneath the unit because the power supply might become unstable. Lay out the pattern away from the unit.

Stress to the pins

- Applying excessive stress to the input or output pins of the power module may damage internal connections. Avoid applying stress in excess of that shown in right figure.
- Input/output pin are soldered to the PCB internally. Do not pull or bend a lead powerfully.
- If it is expected that stress is applied to the input/output pin due to vibration or impact, reduce the stress to the pin by taking such measures as fixing the unit to the PCB by silicone rubber, etc.

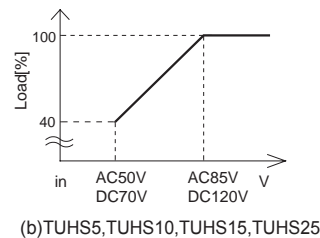
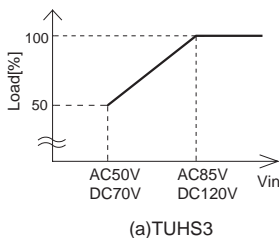


Soldering

- Flow soldering: 260°C for up to 15 seconds.
- Soldering iron (26W): 450°C for up to 5 seconds.

Derating

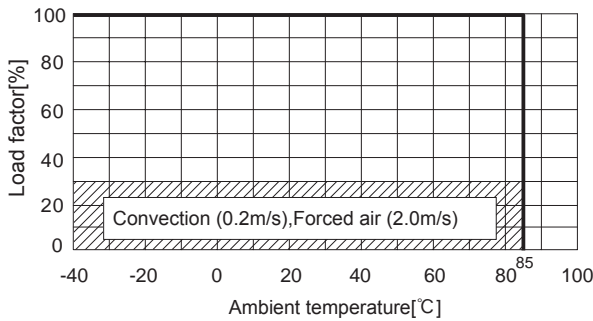
●Derating curve for input voltage





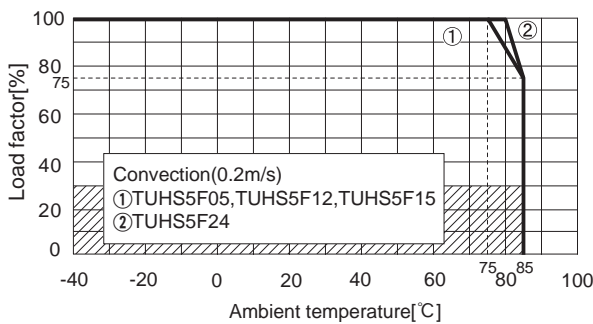
Derating

- TUHS3F Ambient temperature derating curve (Reference value)

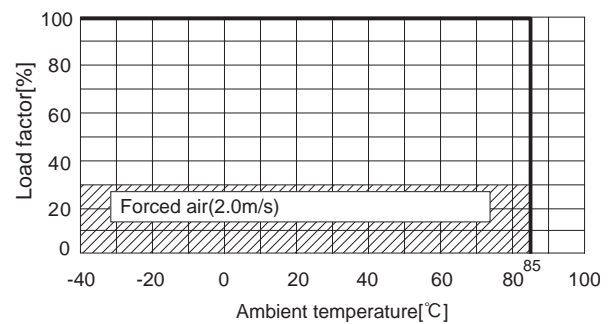


TUHS

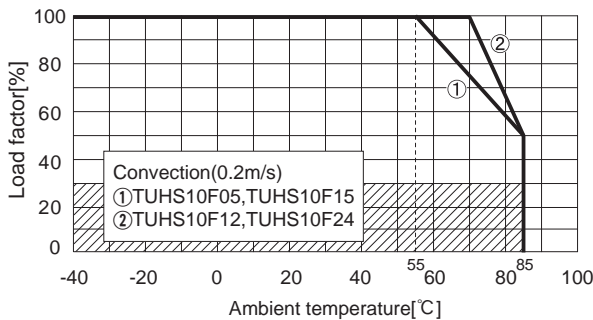
- TUHS5F Ambient temperature derating curve at convection cooling (Reference value)



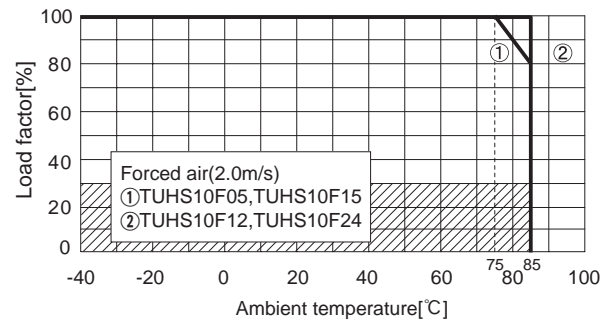
- TUHS5F Ambient temperature derating curve at forced air (Reference value)



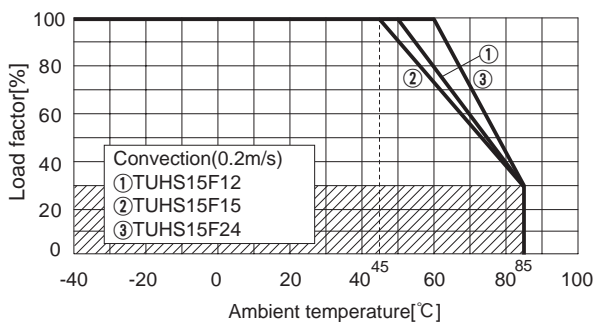
- TUHS10F Ambient temperature derating curve at convection cooling (Reference value)



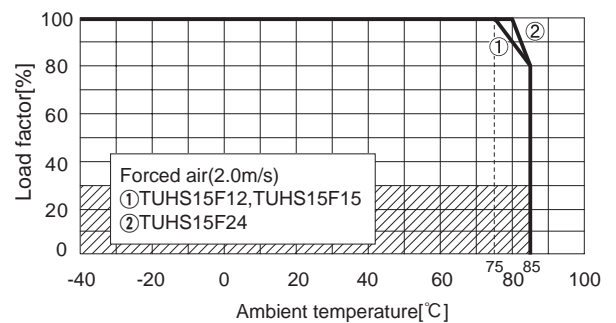
- TUHS10F Ambient temperature derating curve at forced air (Reference value)



- TUHS15F Ambient temperature derating curve at convection cooling (Reference value)

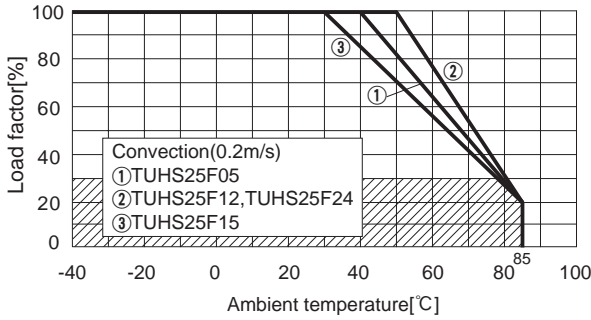


- TUHS15F Ambient temperature derating curve at forced air (Reference value)

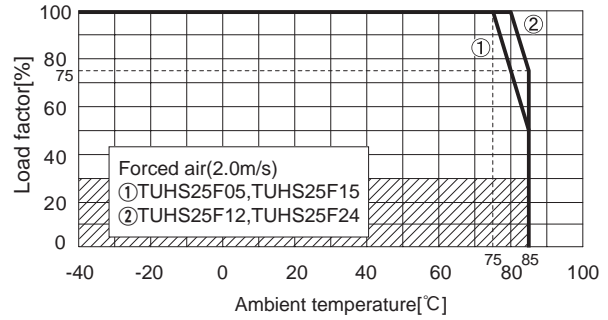


Derating

● TUHS25F Ambient temperature derating curve at convection cooling (Reference value)



● TUHS25F Ambient temperature derating curve at forced air (Reference value)



TUHS

- Derating curve is shown below. Note: In the hatched area, the specification of Ripple, Ripple Noise is different from other area.
- Please have sufficient ventilation to keep the temperature of point A in Instruction Manual6. Please also make sure that the ambient temperature does not exceed 85C.

Instruction Manual

- ◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/TUHS/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

TUHS



NOTICE



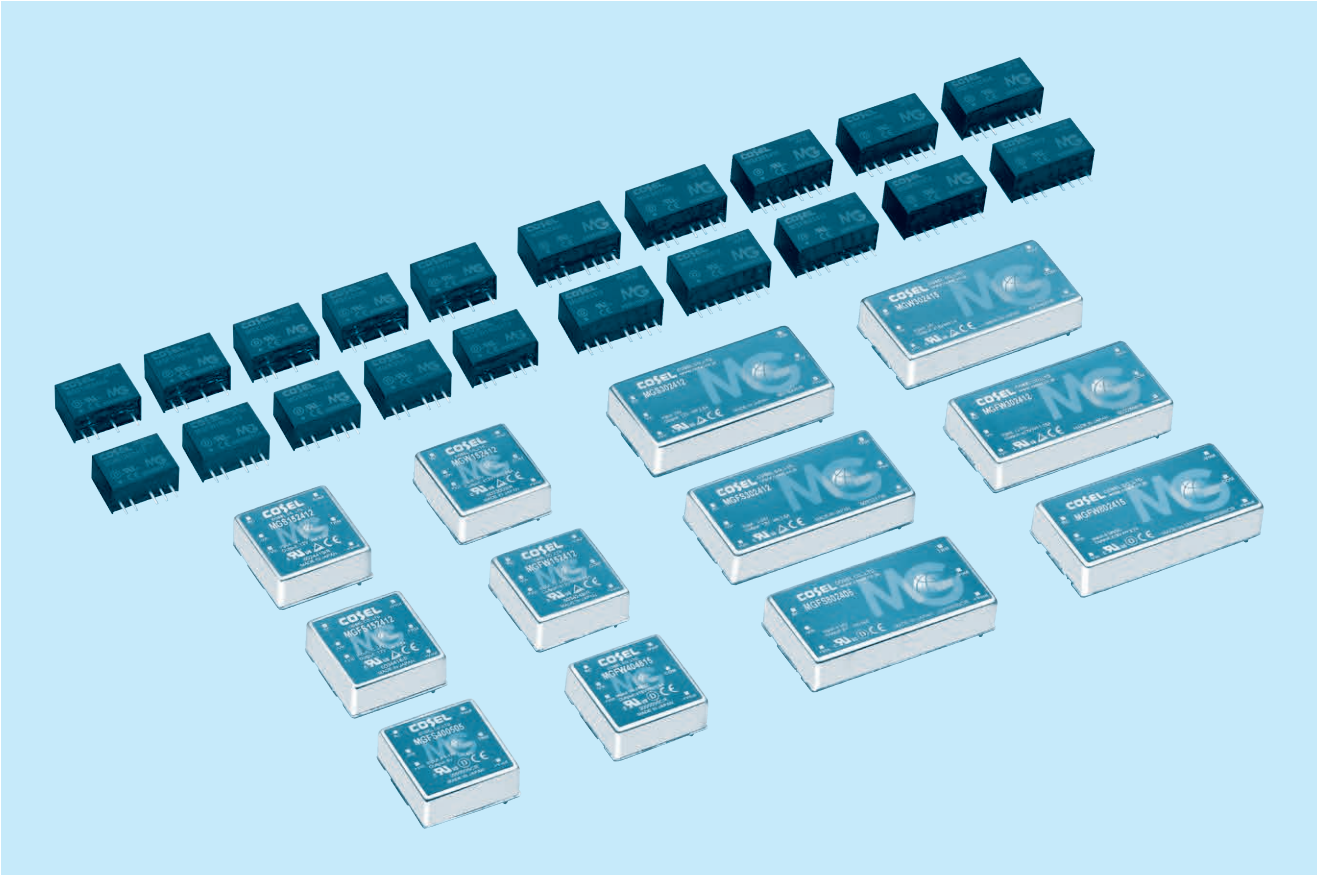
Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A]	Inrush current protection circuit	PCB/Pattern			Series/Parallel operation availability	
					Material	Single sided	Double sided	Series operation	Parallel operation
TUHS3F	Flyback converter	80-250 *3	*1	Resistor	glass fabric base,epoxy resin		Yes	Yes	*2
TUHS5F	Flyback converter	80-250 *3	*1	Resistor	glass fabric base,epoxy resin		Yes	Yes	*2
TUHS10F	Flyback converter	80-250 *3	*1	Resistor	glass fabric base,epoxy resin		Yes	Yes	*2
TUHS15F	Flyback converter	80-250 *3	*1	Resistor	glass fabric base,epoxy resin		Yes	Yes	*2
TUHS25F	Flyback converter	80-250 *3	*1	Thermistor	glass fabric base,epoxy resin		Yes	Yes	*2

\*1 Refer to Specification.  
 \*2 Refer to instruction manual.  
 \*3 The value changes depending on input and load.



# MG-series



MG

## Feature

- Industry Standard SIP6 (MG1R5/MG3), SIP8 (MG6/MG10), 1" X 1" (MG15/MG40), 1" X 2" (MG30/MG80)
- Wide input range DC4.5-13V/DC9-36V/DC18-76V (MGFS/MGFW)
- Ultra wide input range DC6-60V (MGXS/MGXW)
- High efficiency by synchronized rectification circuit (MGS10/MGFS10/MGS15/MGFS15/MGS30/MGFS30/MGFS40/MGFW40/MGFS80/MGFW80)
- 6 sided shield (MG15/MG30/MG40/MG80)
- I/O isolation voltage DC1,500V (1 minute)
- Built-in overcurrent protection circuits (recovers automatically)
- Built-in overvoltage protection circuits (MG30/MG40/MG80)
- Built-in remote ON/OFF (MG6/MG10/MG15/MG30/MG40/MG80)
- Output voltage adjustability by external variable resistor (MGS15/MGFS15/MGS30/MGFS30/MGFS40/MGFS80)
- High reliability : not built-in aluminum and tantalum electrolytic capacitor

## CE marking

- Low Voltage Directive
- RoHS Directive

## Safety agency approvals

- UL60950-1, C-UL, EN60950-1 (MG1R5/MG3/MG6/MG10/MG15/MG30)
- UL62368-1, C-UL, EN62368-1 (MG40/MG80)

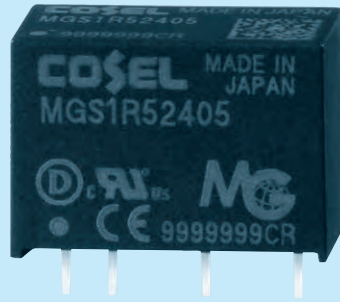
## 10-year warranty

- Refer to the instruction manual

# MGS1R5

MG S 1R5 24 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- Y2: Output voltage adjustable (+10%, -5%)

MODEL	MGS1R5053R3	MGS1R50505	MGS1R50512	MGS1R50515	MGS1R5123R3	MGS1R51205	MGS1R51212	MGS1R51215
MAX OUTPUT WATTAGE[W]	1.32	1.50	1.56	1.50	1.32	1.50	1.56	1.50
DC OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12
	CURRENT[A]	0.4	0.3	0.13	0.1	0.4	0.3	0.13

## SPECIFICATIONS

	MODEL	MGS1R5053R3	MGS1R50505	MGS1R50512	MGS1R50515	MGS1R5123R3	MGS1R51205	MGS1R51212	MGS1R51215	
INPUT	VOLTAGE[V]	DC4.5 - 9 (Surge voltage 12.5V, 100ms max)				DC9 - 18 (Surge voltage 25V, 100ms max)				
	CURRENT[A]	*1 0.33typ	0.37typ	0.37typ	0.36typ	0.14typ	0.15typ	0.16typ	0.15typ	
	EFFICIENCY[%]	*1 80typ	82typ	85typ	84typ	80typ	83typ	84typ	84typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	0.4	0.3	0.13	0.1	0.4	0.3	0.13	0.1	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	RIPPLE[mVp-p]	*2 120max	120max	150max	150max	120max	120max	150max	150max	
	RIPPLE NOISE[mVp-p]	*2 200max	200max	200max	200max	200max	200max	200max	200max	
	TEMPERATURE REGULATION[mV]	-20 to +85°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +85°C	80max	80max	240max	290max	80max	80max	240max	290max
	DRIFT[mV]	*3 20max	20max	48max	60max	20max	20max	48max	60max	
	START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)								
OUTPUT VOLTAGE SETTING[V]	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								

MODEL	MGS1R5243R3	MGS1R52405	MGS1R52412	MGS1R52415	MGS1R5483R3	MGS1R54805	MGS1R54812	MGS1R54815
MAX OUTPUT WATTAGE[W]	1.32	1.50	1.56	1.50	1.32	1.50	1.56	1.50
DC OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12
	CURRENT[A]	0.4	0.3	0.13	0.1	0.4	0.3	0.13

## SPECIFICATIONS

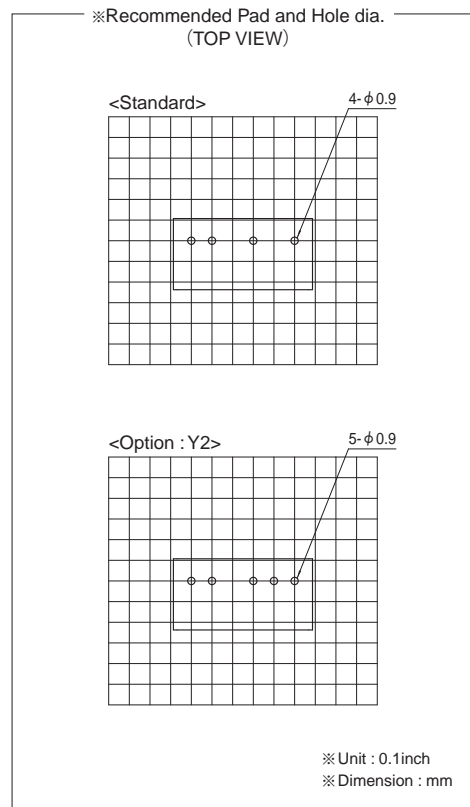
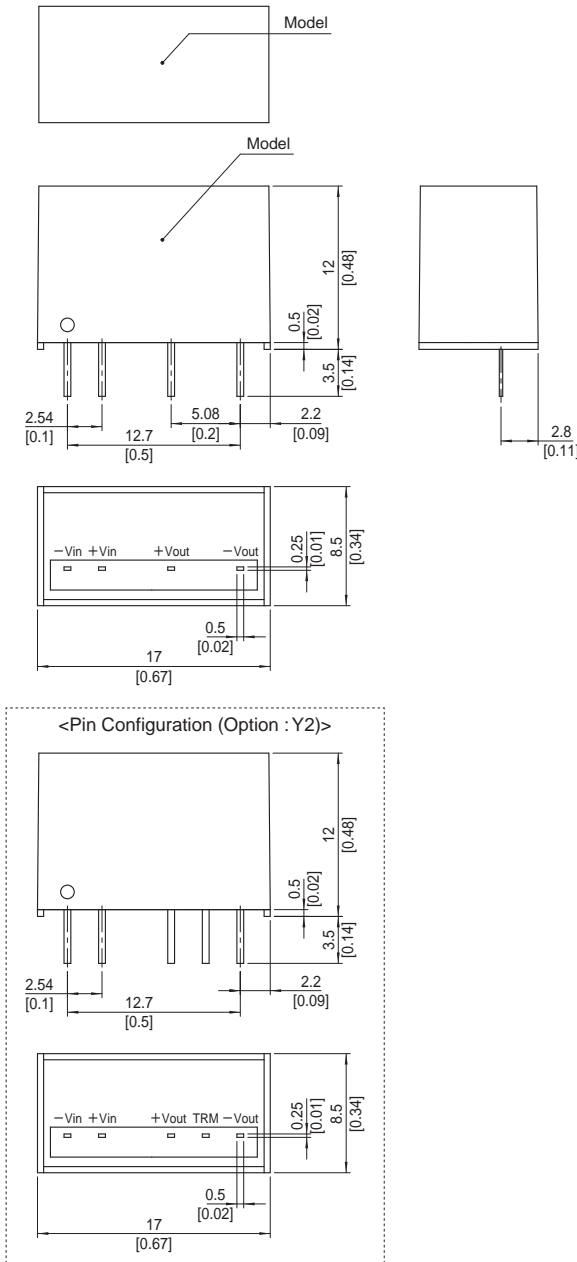
	MODEL	MGS1R5243R3	MGS1R52405	MGS1R52412	MGS1R52415	MGS1R5483R3	MGS1R54805	MGS1R54812	MGS1R54815	
INPUT	VOLTAGE[V]	DC18 - 36 (Surge voltage 50V, 100ms max)				DC36 - 76 (Surge voltage 100V, 100ms max)				
	CURRENT[A]	*1 0.071typ	0.079typ	0.080typ	0.077typ	0.036typ	0.040typ	0.040typ	0.039typ	
	EFFICIENCY[%]	*1 78typ	80typ	82typ	82typ	77typ	80typ	82typ	82typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	0.4	0.3	0.13	0.1	0.4	0.3	0.13	0.1	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	RIPPLE[mVp-p]	*2 120max	120max	150max	150max	120max	120max	150max	150max	
	RIPPLE NOISE[mVp-p]	*2 200max	200max	200max	200max	200max	200max	200max	200max	
	TEMPERATURE REGULATION[mV]	-20 to +85°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +85°C	80max	80max	240max	290max	80max	80max	240max	290max
	DRIFT[mV]	*3 20max	20max	48max	60max	20max	20max	48max	60max	
	START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)								
OUTPUT VOLTAGE SETTING[V]	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								

### GENERAL SPECIFICATIONS

<b>ISOLATION</b>	<b>INPUT-OUTPUT</b>	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)
<b>ENVIRONMENT</b>	<b>OPERATING TEMP.,HUMID.AND ALTITUDE</b>	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max
	<b>STORAGE TEMP.,HUMID.AND ALTITUDE</b>	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	<b>VIBRATION</b>	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis
	<b>IMPACT</b>	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis
<b>SAFETY</b>	<b>AGENCY APPROVALS</b>	UL60950-1, C-UL, EN60950-1
<b>OTHERS</b>	<b>CASE SIZE/WEIGHT</b>	17.0×12.0×8.5mm [0.67×0.48×0.34 inches] (W×H×D) / 4g max
	<b>COOLING METHOD</b>	Convection/Forced air

- \*1 Rated input 5V, 12V, 24V or 48V DC I<sub>o</sub>=100%
- \*2 Ripple and ripple noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins.
- \*3 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.
- \* MGW1R5xx12/MGW1R5xx15 is available as single output, +24V/+30V

### External view

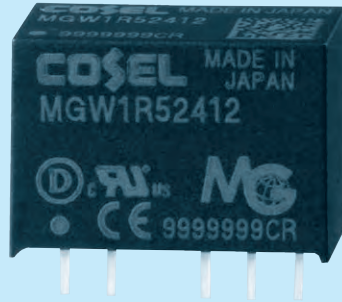


- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal material : Copper
- ※ Planting treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 4g max

MGW1R5

MG W 1R5 24 12 -□

① ② ③ ④ ⑤ ⑥



- ① Series name  
 ② Dual output  
 ③ Output wattage  
 ④ Input voltage  
 ⑤ Output voltage  
 ⑥ Optional

MODEL	MGW1R50512	MGW1R50515	MGW1R51212	MGW1R51215	MGW1R52412	MGW1R52415	MGW1R54812	MGW1R54815	
MAX OUTPUT WATTAGE[W]	1.56	1.50	1.56	1.50	1.56	1.50	1.56	1.50	
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30
	CURRENT[A]	0.065	0.05	0.065	0.05	0.065	0.05	0.065	0.05

## SPECIFICATIONS

	MODEL	MGW1R50512	MGW1R50515	MGW1R51212	MGW1R51215	MGW1R52412	MGW1R52415	MGW1R54812	MGW1R54815	
INPUT	VOLTAGE[V]	DC4.5 - 9 (Surge voltage 12.5V, 100ms max)		DC9 - 18 (Surge voltage 25V, 100ms max)		DC18 - 36 (Surge voltage 50V, 100ms max)		DC36 - 76 (Surge voltage 100V, 100ms max)		
	CURRENT[A] *2	0.38typ	0.38typ	0.16typ	0.16typ	0.080typ	0.079typ	0.041typ	0.040typ	
	EFFICIENCY[%] *2	83typ	81typ	83typ	81typ	82typ	80typ	81typ	80typ	
OUTPUT	VOLTAGE[V]	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	
	CURRENT[A]	0.065	0.05	0.065	0.05	0.065	0.05	0.065	0.05	
	LINE REGULATION[mV]	60max	75max	60max	75max	60max	75max	60max	75max	
	LOAD REGULATION[mV]	*3	480max	600max	480max	600max	480max	600max	480max	600max
		*4	600max	750max	600max	750max	600max	750max	600max	750max
	RIPPLE[mVp-p] *5	150max	150max	150max	150max	150max	150max	150max	150max	
	RIPPLE NOISE[mVp-p] *5	200max	200max	200max	200max	200max	200max	200max	200max	
	TEMPERATURE REGULATION[mV]	-20 to +85°C	210max	260max	210max	260max	210max	260max	210max	260max
		-40 to +85°C	320max	390max	320max	390max	320max	390max	320max	390max
	DRIFT[mV] *6	48max	60max	48max	60max	48max	60max	48max	60max	
START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)									
OUTPUT VOLTAGE SETTING[V]	11.64 - 12.36	14.55 - 15.45	11.64 - 12.36	14.55 - 15.45	11.64 - 12.36	14.55 - 15.45	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis								
	IMPACT	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis								
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1								
OTHERS	CASE SIZE/WEIGHT	17.0 × 12.0 × 8.5mm [0.67 × 0.48 × 0.34 inches] (W × H × D) / 4g max								
	COOLING METHOD	Convection/Forced air								

\*1 Single output +24V, +30V with no use of COM.

\*2 Rated input 5V, 12V, 24V or 48V DC I<sub>o</sub>=100%

\*3 Symmetrical loading from 20% to 100%.

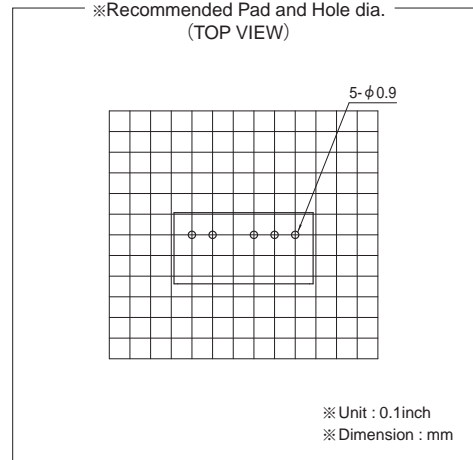
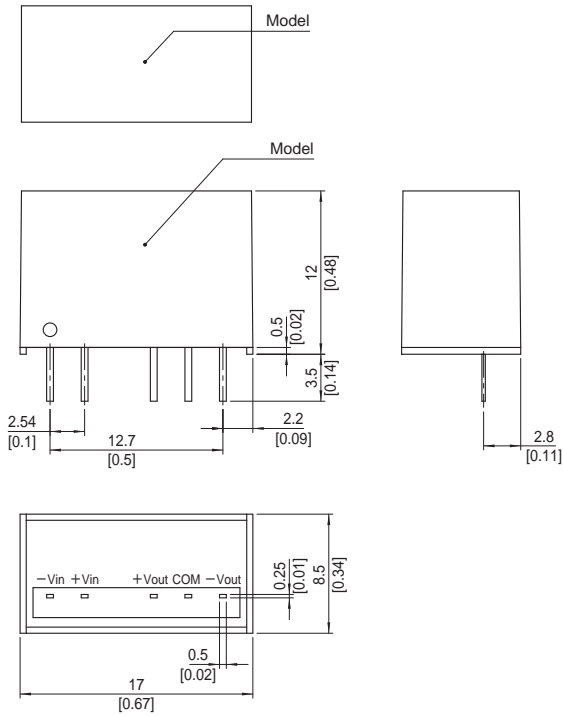
\*4 Symmetrical loading from 0% to 100%.

\*5 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins. (20MHz Oscilloscope)

\*6 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.

\* Parallel operation with other model is not possible.

External view



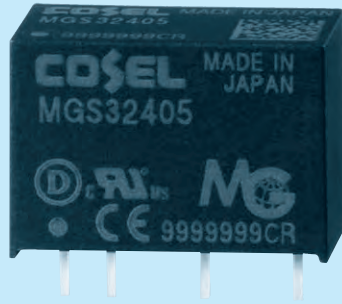
- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 4g max

MG

# MGS3

MG S 3 24 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- Y2: Output voltage adjustable (+10%, -5%)

MODEL	MGS3053R3	MGS30505	MGS30512	MGS30515	MGS3123R3	MGS31205	MGS31212	MGS31215	
MAX OUTPUT WATTAGE[W]	2.64	3.0	3.0	3.0	2.64	3.0	3.0	3.0	
DC OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15
	CURRENT[A]	0.8	0.6	0.25	0.2	0.8	0.6	0.25	0.2

## SPECIFICATIONS

	MODEL	MGS3053R3	MGS30505	MGS30512	MGS30515	MGS3123R3	MGS31205	MGS31212	MGS31215
INPUT	VOLTAGE[V]	DC4.5 - 9 (Surge voltage 12.5V, 100ms max)				DC9 - 18 (Surge voltage 25V, 100ms max)			
	CURRENT[A]	*1 0.67typ	0.73typ	0.71typ	0.71typ	0.28typ	0.30typ	0.29typ	0.30typ
	EFFICIENCY[%]	*1 79typ	82typ	85typ	85typ	80typ	83typ	86typ	85typ
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15
	CURRENT[A]	0.8	0.6	0.25	0.2	0.8	0.6	0.25	0.2
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max
	LOAD REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max
	RIPPLE[mVp-p]	*2 120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	*2 200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +75°C 50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +75°C 80max	80max	240max	290max	80max	80max	240max	290max
	DRIFT[mV]	*3 20max	20max	48max	60max	20max	20max	48max	60max
	START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)							
PROTECTION CIRCUIT	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically							

MODEL	MGS3243R3	MGS32405	MGS32412	MGS32415	MGS3483R3	MGS34805	MGS34812	MGS34815	
MAX OUTPUT WATTAGE[W]	2.64	3.0	3.0	3.0	2.64	3.0	3.0	3.0	
DC OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15
	CURRENT[A]	0.8	0.6	0.25	0.2	0.8	0.6	0.25	0.2

## SPECIFICATIONS

	MODEL	MGS3243R3	MGS32405	MGS32412	MGS32415	MGS3483R3	MGS34805	MGS34812	MGS34815
INPUT	VOLTAGE[V]	DC18 - 36 (Surge voltage 50V, 100ms max)				DC36 - 76 (Surge voltage 100V, 100ms max)			
	CURRENT[A]	*1 0.14typ	0.15typ	0.15typ	0.15typ	0.071typ	0.079typ	0.074typ	0.074typ
	EFFICIENCY[%]	*1 80typ	82typ	85typ	85typ	78typ	80typ	85typ	85typ
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15
	CURRENT[A]	0.8	0.6	0.25	0.2	0.8	0.6	0.25	0.2
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max
	LOAD REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max
	RIPPLE[mVp-p]	*2 120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	*2 200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +75°C 50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +75°C 80max	80max	240max	290max	80max	80max	240max	290max
	DRIFT[mV]	*3 20max	20max	48max	60max	20max	20max	48max	60max
	START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)							
PROTECTION CIRCUIT	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically							

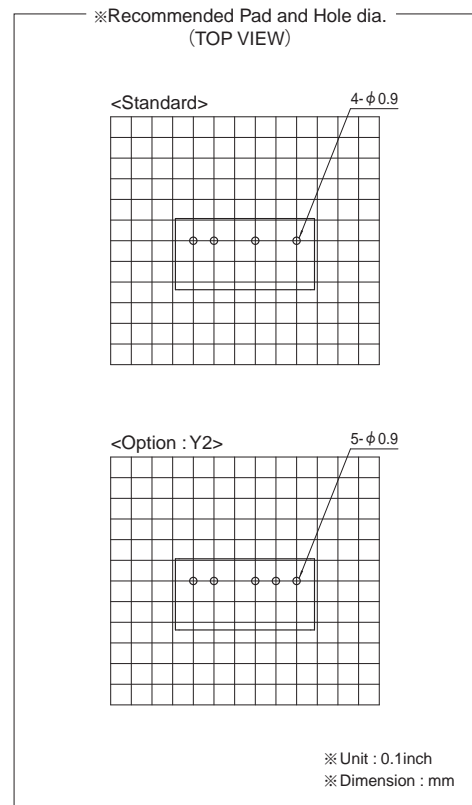
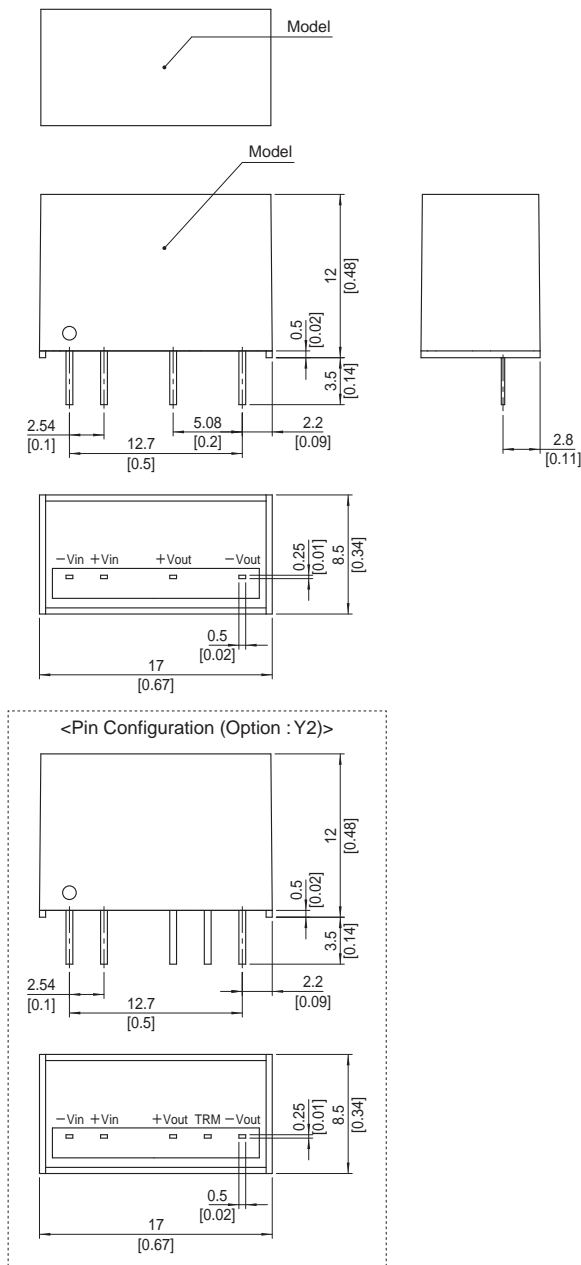


### GENERAL SPECIFICATIONS

<b>ISOLATION</b>	<b>INPUT-OUTPUT</b>	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)
<b>ENVIRONMENT</b>	<b>OPERATING TEMP.,HUMID.AND ALTITUDE</b>	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max
	<b>STORAGE TEMP.,HUMID.AND ALTITUDE</b>	-40 to +100°C, 20 to d95%RH (Non condensing), 9,000m (30,000feet) max
	<b>VIBRATION</b>	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis
	<b>IMPACT</b>	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis
<b>SAFETY</b>	<b>AGENCY APPROVALS</b>	UL60950-1, C-UL, EN60950-1
<b>OTHERS</b>	<b>CASE SIZE/WEIGHT</b>	17.0×12.0×8.5mm [0.67×0.48×0.34 inches] (W×H×D) / 4g max
	<b>COOLING METHOD</b>	Convection/Forced air

- \*1 Rated input 5V, 12V, 24V or 48V DC I<sub>o</sub>=100%
- \*2 Ripple and ripple noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins.
- \*3 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.
- \* MGW3xx12/MGW3xx15 is available as single output, +24V/+30V

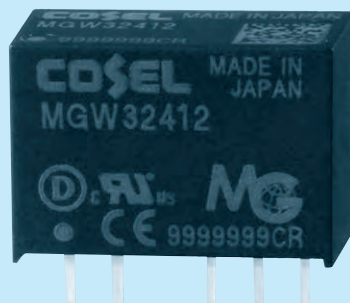
### External view



- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal material : Copper
- ※ Planting treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 4g max

# MGW3

① MG ② W ③ 3 ④ 24 ⑤ 12 ⑥ -□



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional

MG

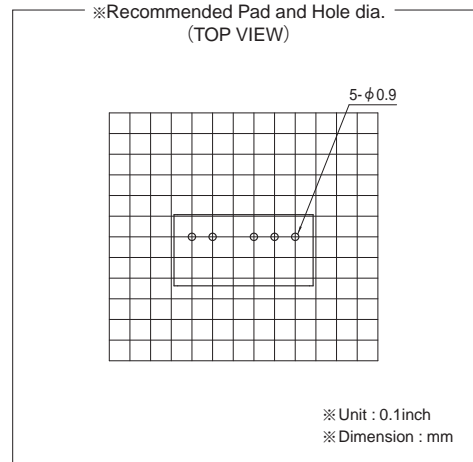
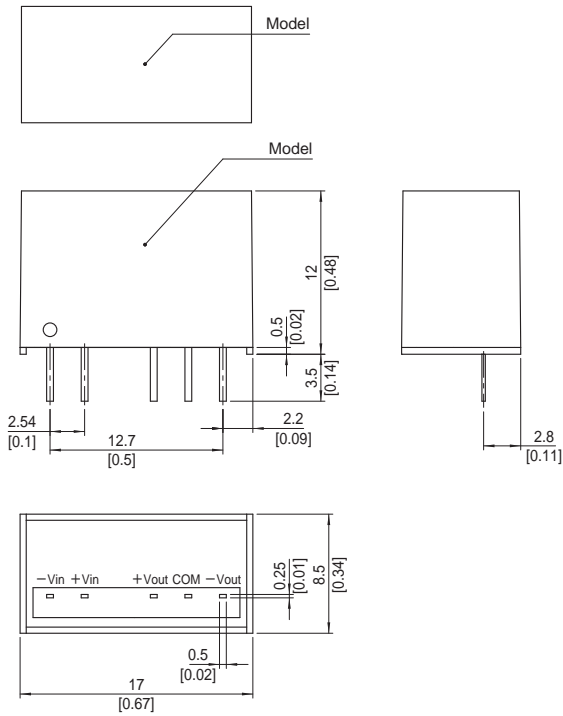
MODEL	MGW30512	MGW30515	MGW31212	MGW31215	MGW32412	MGW32415	MGW34812	MGW34815
MAX OUTPUT WATTAGE[W]	3.12	3.00	3.12	3.00	3.12	3.00	3.12	3.00
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24
	CURRENT[A]	0.13	0.1	0.13	0.1	0.13	0.1	0.13

## SPECIFICATIONS

	MODEL	MGW30512	MGW30515	MGW31212	MGW31215	MGW32412	MGW32415	MGW34812	MGW34815	
INPUT	VOLTAGE[V]	DC4.5 - 9 (Surge voltage 12.5V, 100ms max)		DC9 - 18 (Surge voltage 25V, 100ms max)		DC18 - 36 (Surge voltage 50V, 100ms max)		DC36 - 76 (Surge voltage 100V, 100ms max)		
	CURRENT[A] *2	0.76typ	0.74typ	0.31typ	0.31typ	0.16typ	0.16typ	0.080typ	0.077typ	
	EFFICIENCY[%] *2	83typ	82typ	84typ	83typ	83typ	83typ	82typ	82typ	
OUTPUT	VOLTAGE[V]	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	
	CURRENT[A]	0.13	0.1	0.13	0.1	0.13	0.1	0.13	0.1	
	LINE REGULATION[mV]	60max	75max	60max	75max	60max	75max	60max	75max	
	LOAD REGULATION[mV]	*3	480max	600max	480max	600max	480max	600max	480max	600max
		*4	600max	750max	600max	750max	600max	750max	600max	750max
	RIPPLE[mVp-p] *5	150max	150max	150max	150max	150max	150max	150max	150max	
	RIPPLE NOISE[mVp-p] *5	200max	200max	200max	200max	200max	200max	200max	200max	
	TEMPERATURE REGULATION[mV]	-20 to +70°C	180max	220max	180max	220max	180max	220max	180max	220max
		-40 to +70°C	290max	340max	290max	340max	290max	340max	290max	340max
	DRIFT[mV] *6	48max	60max	48max	60max	48max	60max	48max	60max	
START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)									
OUTPUT VOLTAGE SETTING[V]	11.64 - 12.36	14.55 - 15.45	11.64 - 12.36	14.55 - 15.45	11.64 - 12.36	14.55 - 15.45	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis								
	IMPACT	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis								
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1								
OTHERS	CASE SIZE/WEIGHT	17.0 X 12.0 X 8.5mm [0.67 X 0.48 X 0.34 inches] (W X H X D) / 4g max								
	COOLING METHOD	Convection/Forced air								

\*1 Single output +24V, +30V with no use of COM.  
 \*2 Rated input 5V, 12V, 24V or 48V DC I<sub>o</sub>=100%  
 \*3 Symmetrical loading from 20% to 100%.  
 \*4 Symmetrical loading from 0% to 100%.  
 \*5 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins. (20MHz Oscilloscope)  
 \*6 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.  
 \* Parallel operation with other model is not possible.

External view



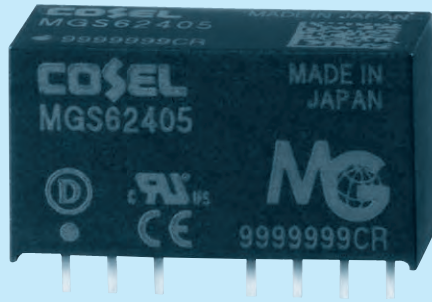
- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 4g max

MG

# MGS6

MG S 6 24 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- Y2: Output voltage adjustable (+10%, -5%)

MODEL	MGS6053R3	MGS60505	MGS60512	MGS60515	MGS6123R3	MGS61205	MGS61212	MGS61215
MAX OUTPUT WATTAGE[W]	5.28	6.0	6.0	6.0	5.28	6.0	6.0	6.0
DC OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12
	CURRENT[A]	1.6	1.2	0.5	0.4	1.6	1.2	0.5

## SPECIFICATIONS

	MODEL	MGS6053R3	MGS60505	MGS60512	MGS60515	MGS6123R3	MGS61205	MGS61212	MGS61215	
INPUT	VOLTAGE[V]	DC4.5 - 9 (Surge voltage 12.5V, 100ms max)				DC9 - 18 (Surge voltage 25V, 100ms max)				
	CURRENT[A]	*1 1.31typ	1.42typ	1.37typ	1.37typ	0.54typ	0.59typ	0.57typ	0.57typ	
	EFFICIENCY[%]	*1 81typ	85typ	88typ	88typ	82typ	85typ	89typ	89typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	1.6	1.2	0.5	0.4	1.6	1.2	0.5	0.4	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	RIPPLE[mVp-p]	lo=30% -	75max	75max	100max	100max	75max	75max	100max	100max
		lo=0 - 30%	225max	225max	300max	300max	225max	225max	300max	300max
	RIPPLE NOISE[mVp-p]	lo=30% -	120max	120max	150max	150max	120max	120max	150max	150max
		lo=0 - 30%	300max	300max	400max	400max	300max	300max	400max	400max
	TEMPERATURE REGULATION[mV]	-20 to +70°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +70°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV]	*3 20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	30max (Minimum input, lo=100%)									
OUTPUT VOLTAGE SETTING[V]	3.21 - 3.42		4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

MODEL	MGS6243R3	MGS62405	MGS62412	MGS62415	MGS6483R3	MGS64805	MGS64812	MGS64815
MAX OUTPUT WATTAGE[W]	5.28	6.0	6.0	6.0	5.28	6.0	6.0	6.0
DC OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12
	CURRENT[A]	1.6	1.2	0.5	0.4	1.6	1.2	0.5

## SPECIFICATIONS

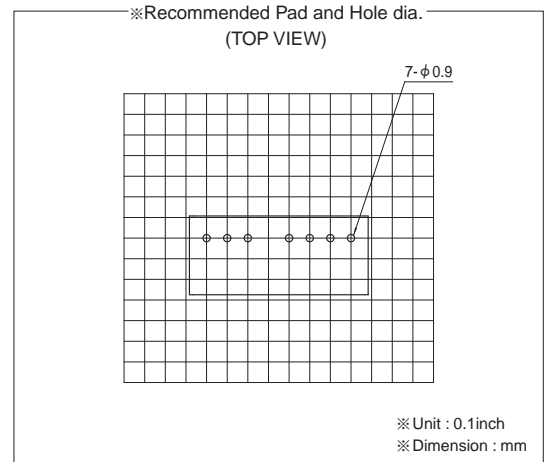
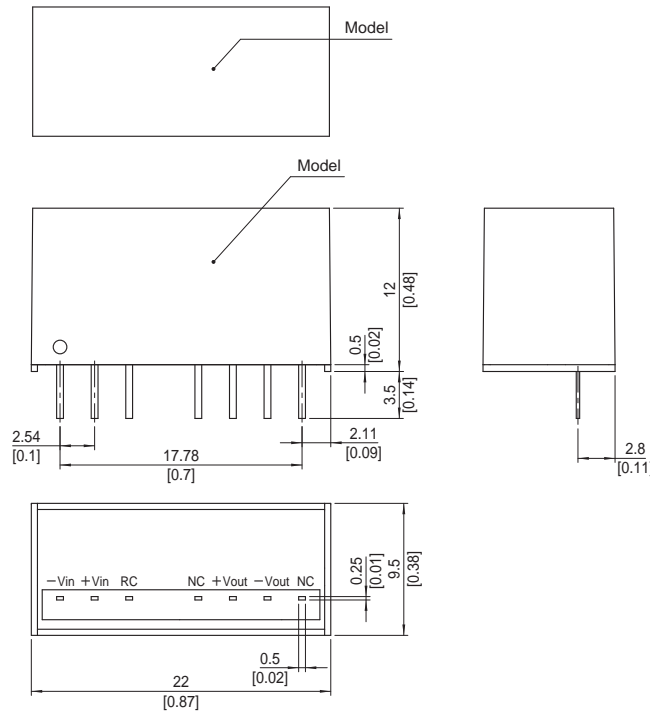
	MODEL	MGS6243R3	MGS62405	MGS62412	MGS62415	MGS6483R3	MGS64805	MGS64812	MGS64815	
INPUT	VOLTAGE[V]	DC18 - 36 (Surge voltage 50V, 100ms max)				DC36 - 76 (Surge voltage 100V, 100ms max)				
	CURRENT[A]	*1 0.27typ	0.30typ	0.29typ	0.29typ	0.14typ	0.15typ	0.15typ	0.15typ	
	EFFICIENCY[%]	*1 82typ	85typ	89typ	89typ	81typ	85typ	89typ	89typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	1.6	1.2	0.5	0.4	1.6	1.2	0.5	0.4	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	RIPPLE[mVp-p]	lo=30% -	75max	75max	100max	100max	75max	75max	100max	100max
		lo=0 - 30%	225max	225max	300max	300max	225max	225max	300max	300max
	RIPPLE NOISE[mVp-p]	lo=30% -	120max	120max	150max	150max	120max	120max	150max	150max
		lo=0 - 30%	300max	300max	400max	400max	300max	300max	400max	400max
	TEMPERATURE REGULATION[mV]	-20 to +70°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +70°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV]	*3 20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	30max (Minimum input, lo=100%)									
OUTPUT VOLTAGE SETTING[V]	3.21 - 3.42		4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

### GENERAL SPECIFICATIONS

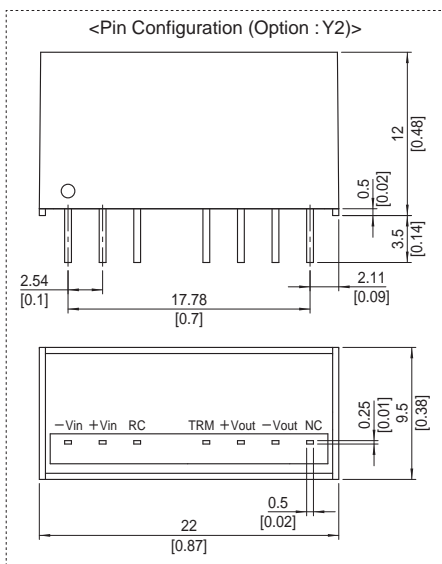
<b>ISOLATION</b>	<b>INPUT-OUTPUT</b>	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)
<b>ENVIRONMENT</b>	<b>OPERATING TEMP., HUMID. AND ALTITUDE</b>	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max
	<b>STORAGE TEMP., HUMID. AND ALTITUDE</b>	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	<b>VIBRATION</b>	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis
	<b>IMPACT</b>	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis
<b>SAFETY</b>	<b>AGENCY APPROVALS</b>	UL60950-1, C-UL, EN60950-1
<b>OTHERS</b>	<b>CASE SIZE/WEIGHT</b>	22.0×12.0×9.5mm [0.87×0.48×0.38 inches] (W×H×D) / 7g max
	<b>COOLING METHOD</b>	Convection/Forced air

- \*1 Rated input 5V, 12V, 24V or 48V DC I<sub>o</sub>=100%
- \*2 Ripple and ripple noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins.
- \*3 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.
- \* MGW6xx12/MGW6xx15 is available as single output, +24V/+30V

### External view



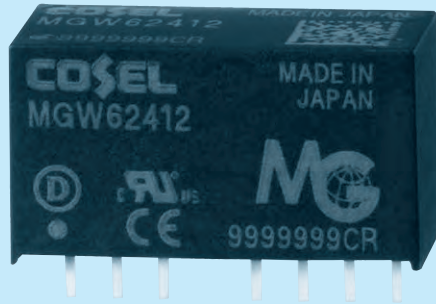
- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal material : Copper
- ※ Planting treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 7g max



# MGW6

MG W 6 24 12 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- Y2: Output voltage adjustable (+10%, -5%)

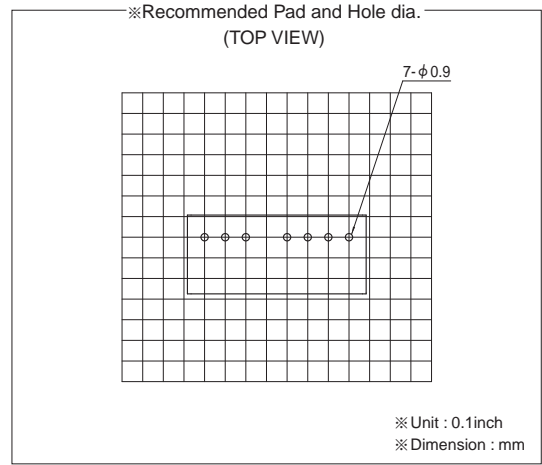
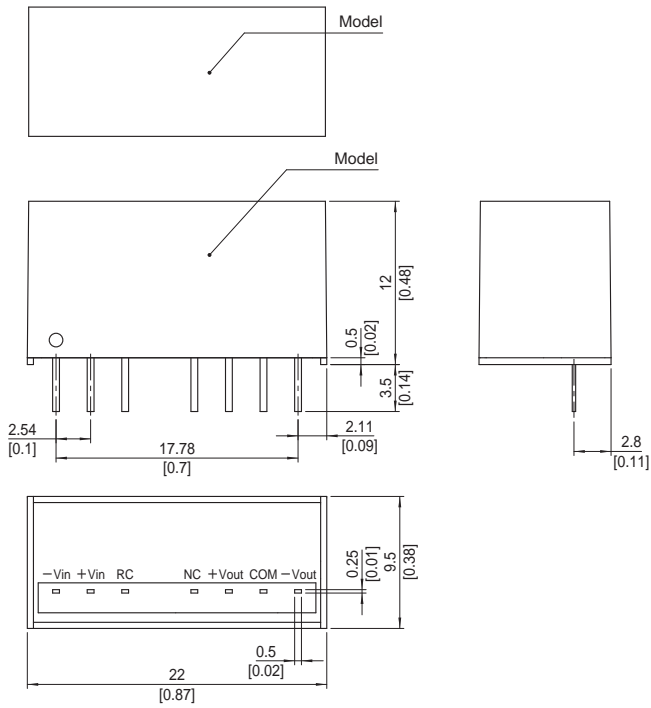
MODEL	MGW60512	MGW60515	MGW61212	MGW61215	MGW62412	MGW62415	MGW64812	MGW64815	
MAX OUTPUT WATTAGE[W]	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30
	CURRENT[A]	0.25	0.2	0.25	0.2	0.25	0.2	0.25	0.2

## SPECIFICATIONS

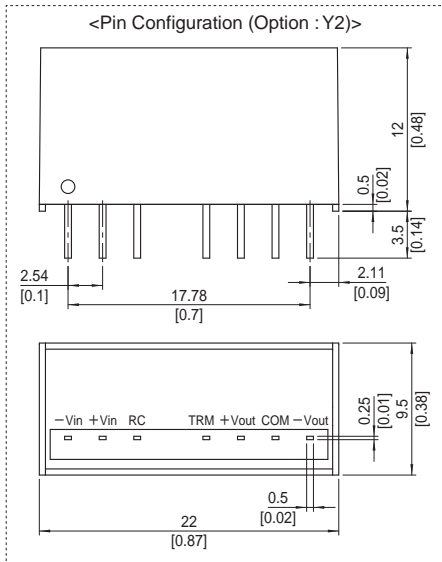
	MODEL	MGW60512	MGW60515	MGW61212	MGW61215	MGW62412	MGW62415	MGW64812	MGW64815	
INPUT	VOLTAGE[V]	DC4.5 - 9 (Surge voltage 12.5V, 100ms max)		DC9 - 18 (Surge voltage 25V, 100ms max)		DC18 - 36 (Surge voltage 50V, 100ms max)		DC36 - 76 (Surge voltage 100V, 100ms max)		
	CURRENT[A] *2	1.38typ	1.38typ	0.57typ	0.57typ	0.29typ	0.29typ	0.15typ	0.15typ	
	EFFICIENCY[%] *2	87typ	87typ	88typ	88typ	88typ	88typ	88typ	88typ	
OUTPUT	VOLTAGE[V]	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	
	CURRENT[A]	0.25	0.2	0.25	0.2	0.25	0.2	0.25	0.2	
	LINE REGULATION[mV]	60max	75max	60max	75max	60max	75max	60max	75max	
	LOAD REGULATION[mV]	*3	480max	600max	480max	600max	480max	600max	480max	600max
		*4	600max	750max	600max	750max	600max	750max	600max	750max
	RIPPLE[mVp-p]	Po=30% to Po=0 to 30% *5	120max	120max	120max	120max	120max	120max	120max	120max
		Po=0 to 30% *5	480max	480max	360max	360max	360max	360max	360max	360max
	RIPPLE NOISE[mVp-p]	Po=30% to Po=0 to 30% *5	200max	200max	200max	200max	200max	200max	200max	200max
		Po=0 to 30% *5	600max	600max	500max	500max	500max	500max	500max	500max
	TEMPERATURE REGULATION[mV]	-20 to +70°C	180max	220max	180max	220max	180max	220max	180max	220max
-40 to +70°C		290max	340max	290max	340max	290max	340max	290max	340max	
DRIFT[mV] *6	48max	60max	48max	60max	48max	60max	48max	60max		
START-UP TIME[ms]	30max (Minimum input, Io=100%)									
OUTPUT VOLTAGE SETTING[V]	11.64 - 12.36	14.55 - 15.45	11.64 - 12.36	14.55 - 15.45	11.64 - 12.36	14.55 - 15.45	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								
ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis								
	IMPACT	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis								
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1								
OTHERS	CASE SIZE/WEIGHT	22.0 X 12.0 X 9.5mm [0.87 X 0.48 X 0.38 inches] (W X H X D) / 7g max								
	COOLING METHOD	Convection/Forced air								

\*1 Single output +24V, +30V with no use of COM.  
 \*2 Rated input 5V, 12V, 24V or 48V DC Io=100%  
 \*3 Symmetrical loading from 20% to 100%.  
 \*4 Symmetrical loading from 0% to 100%.  
 \*5 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins. (20MHz Oscilloscope). Po:Output wattage.  
 \*6 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.  
 \* Parallel operation with other model is not possible.

External view



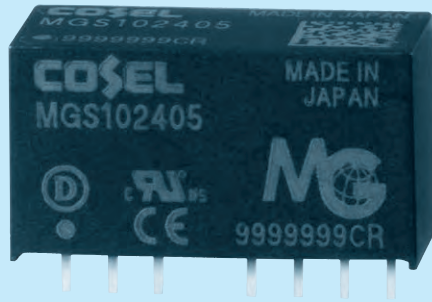
- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 7g max



# MGS10

MG S 10 24 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- Y2: Output voltage adjustable (+10%, -5%)

MODEL	MGS10053R3	MGS100505	MGS100512	MGS100515	MGS10123R3	MGS101205	MGS101212	MGS101215	
MAX OUTPUT WATTAGE[W]	8.58	10.0	10.8	10.5	8.58	10.0	10.8	10.5	
DC OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15
	CURRENT[A]	2.6	2.0	0.9	0.7	2.6	2.0	0.9	0.7

## SPECIFICATIONS

	MODEL	MGS10053R3	MGS100505	MGS100512	MGS100515	MGS10123R3	MGS101205	MGS101212	MGS101215	
INPUT	VOLTAGE[V]	DC4.5 - 9 (Surge voltage 12.5V, 100ms max)				DC9 - 18 (Surge voltage 25V, 100ms max)				
	CURRENT[A]	*1 2.02typ	2.30typ	2.46typ	2.39typ	0.83typ	0.94typ	1.02typ	0.99typ	
	EFFICIENCY[%]	*1 85typ	87typ	88typ	88typ	87typ	89typ	89typ	89typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	2.6	2.0	0.9	0.7	2.6	2.0	0.9	0.7	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	RIPPLE[mVp-p]	Io=30% -	75max	75max	100max	100max	75max	75max	100max	100max
		Io=0 - 30%	225max	225max	300max	300max	225max	225max	300max	300max
	RIPPLE NOISE[mVp-p]	Io=30% -	120max	120max	150max	150max	120max	120max	150max	150max
		Io=0 - 30%	300max	300max	400max	400max	300max	300max	400max	400max
	TEMPERATURE REGULATION[mV]	-20 to +50C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +50C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV]	*3 20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	30max (Minimum input, Io=100%)									
OUTPUT VOLTAGE SETTING[V]	3.21 - 3.42		4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

MODEL	MGS10243R3	MGS102405	MGS102412	MGS102415	MGS10483R3	MGS104805	MGS104812	MGS104815	
MAX OUTPUT WATTAGE[W]	8.58	10.0	10.8	10.5	8.58	10.0	10.8	10.5	
DC OUTPUT	VOLTAGE[V]	*1 3.3	5	12	15	3.3	5	12	15
	CURRENT[A]	2.6	2.0	0.9	0.7	2.6	2.0	0.9	0.7

## SPECIFICATIONS

	MODEL	MGS10243R3	MGS102405	MGS102412	MGS102415	MGS10483R3	MGS104805	MGS104812	MGS104815	
INPUT	VOLTAGE[V]	DC18 - 36 (Surge voltage 50V, 100ms max)				DC36 - 76 (Surge voltage 100V, 100ms max)				
	CURRENT[A]	*1 0.42typ	0.47typ	0.50typ	0.49typ	0.21typ	0.24typ	0.25typ	0.25typ	
	EFFICIENCY[%]	*1 87typ	89typ	90typ	90typ	87typ	89typ	90typ	90typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	2.6	2.0	0.9	0.7	2.6	2.0	0.9	0.7	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	RIPPLE[mVp-p]	Io=30% -	75max	75max	100max	100max	75max	75max	100max	100max
		Io=0 - 30%	225max	225max	300max	300max	225max	225max	300max	300max
	RIPPLE NOISE[mVp-p]	Io=30% -	120max	120max	150max	150max	120max	120max	150max	150max
		Io=0 - 30%	300max	300max	400max	400max	300max	300max	400max	400max
	TEMPERATURE REGULATION[mV]	-20 to +50C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +50C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV]	*3 20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	30max (Minimum input, Io=100%)									
OUTPUT VOLTAGE SETTING[V]	3.21 - 3.42		4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

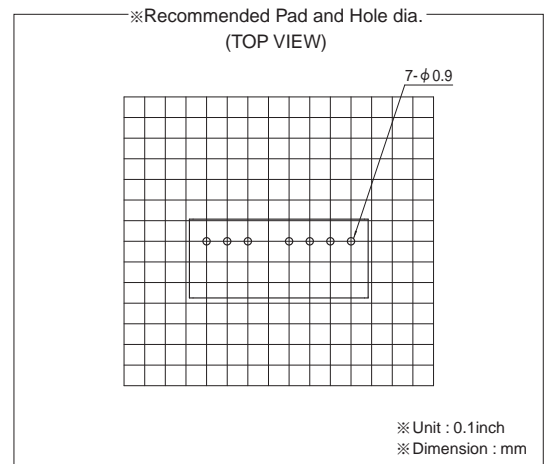
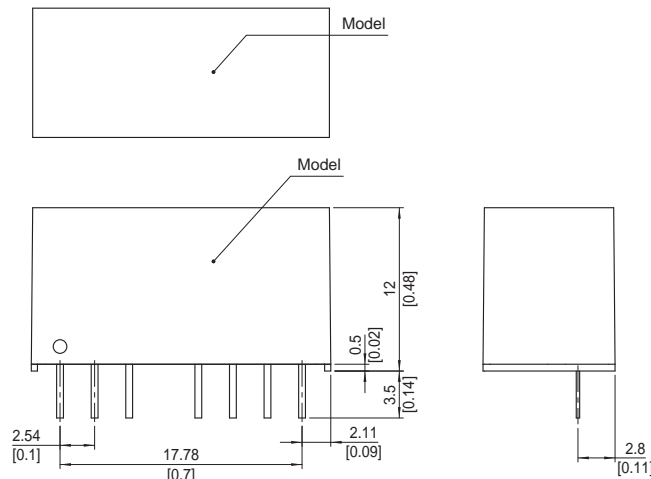


## GENERAL SPECIFICATIONS

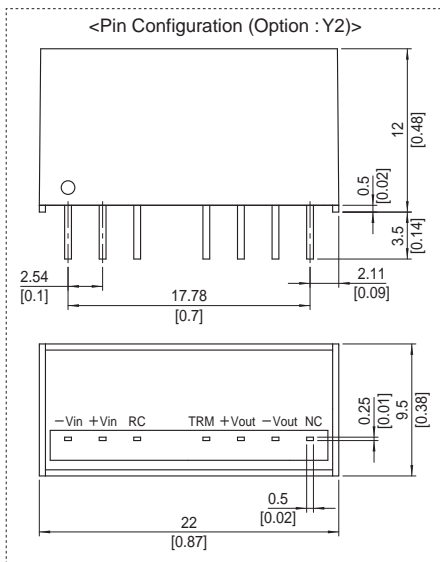
<b>ISOLATION</b>	<b>INPUT-OUTPUT</b>	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)
<b>ENVIRONMENT</b>	<b>OPERATING TEMP., HUMID. AND ALTITUDE</b>	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max
	<b>STORAGE TEMP., HUMID. AND ALTITUDE</b>	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	<b>VIBRATION</b>	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis
	<b>IMPACT</b>	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis
<b>SAFETY</b>	<b>AGENCY APPROVALS</b>	UL60950-1, C-UL, EN60950-1
<b>OTHERS</b>	<b>CASE SIZE/WEIGHT</b>	22.0×12.0×9.5mm [0.87×0.48×0.38 inches] (W×H×D) / 7g max
	<b>COOLING METHOD</b>	Convection/Forced air

- \*1 Rated input 5V, 12V, 24V or 48V DC I<sub>o</sub>=100%
- \*2 Ripple and ripple noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins.
- \*3 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.
- \* MGW10xx12/MGW10xx15 is available as single output, +24V/+30V

### External view



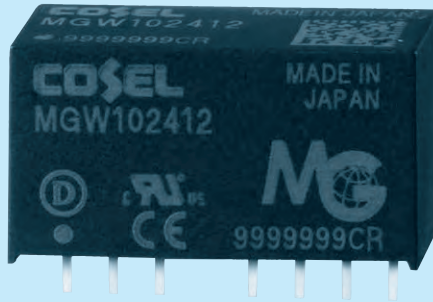
- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ] = inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 7g max



# MGW10

MG W 10 24 12 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- Y2: Output voltage adjustable (+10%, -5%)

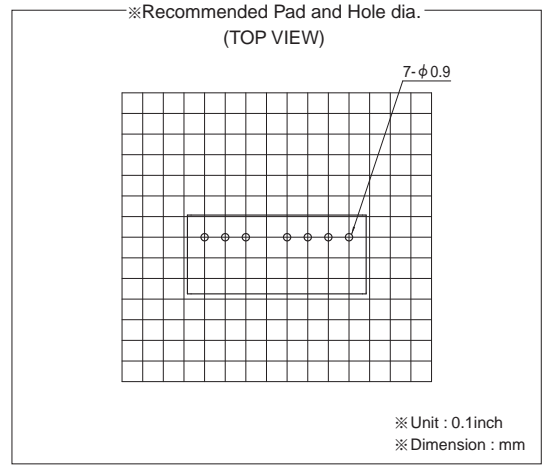
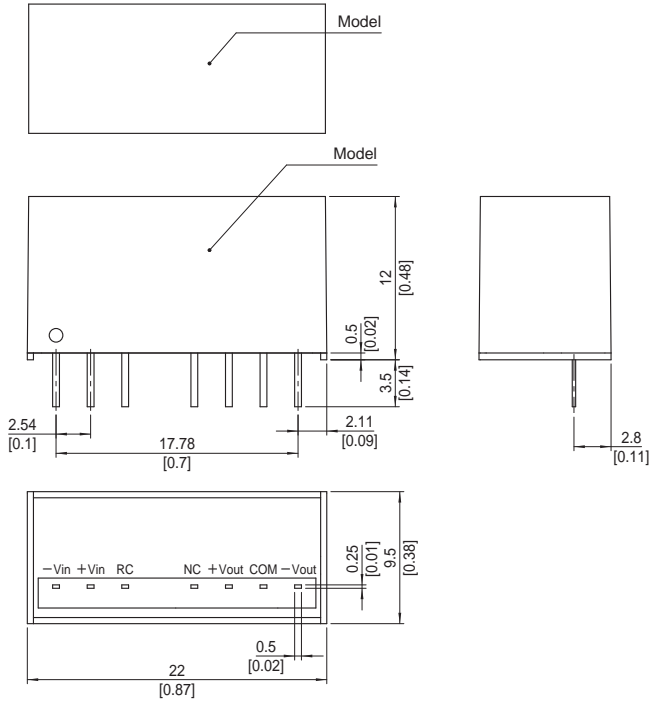
MODEL	MGW100512	MGW100515	MGW101212	MGW101215	MGW102412	MGW102415	MGW104812	MGW104815
MAX OUTPUT WATTAGE[W]	10.08	10.20	10.08	10.20	10.08	10.20	10.08	10.20
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24
	CURRENT[A]	0.42	0.34	0.42	0.34	0.42	0.34	0.42

## SPECIFICATIONS

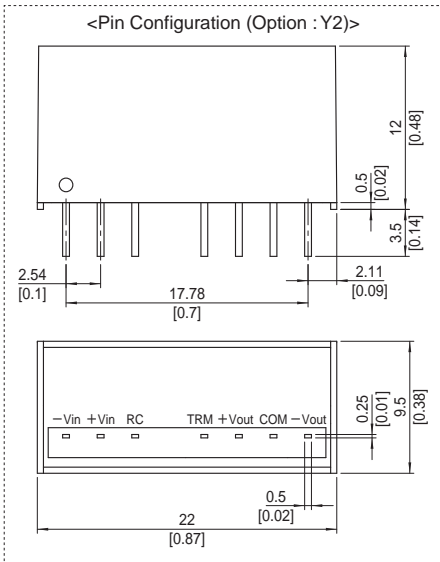
	MODEL	MGW100512	MGW100515	MGW101212	MGW101215	MGW102412	MGW102415	MGW104812	MGW104815	
INPUT	VOLTAGE[V]	DC4.5 - 9 (Surge voltage 12.5V, 100ms max)		DC9 - 18 (Surge voltage 25V, 100ms max)		DC18 - 36 (Surge voltage 50V, 100ms max)		DC36 - 76 (Surge voltage 100V, 100ms max)		
	CURRENT[A] *2	2.38typ	2.40typ	0.97typ	0.97typ	0.49typ	0.49typ	0.24typ	0.25typ	
	EFFICIENCY[%] *2	85typ	85typ	87typ	88typ	87typ	88typ	88typ	88typ	
OUTPUT	VOLTAGE[V]	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	
	CURRENT[A]	0.42	0.34	0.42	0.34	0.42	0.34	0.42	0.34	
	LINE REGULATION[mV]	60max	75max	60max	75max	60max	75max	60max	75max	
	LOAD REGULATION[mV]	*3	480max	600max	480max	600max	480max	600max	480max	600max
		*4	600max	750max	600max	750max	600max	750max	600max	750max
	RIPPLE[mVp-p]	Po=30% to	120max	120max	120max	120max	120max	120max	120max	120max
		*5 Po=0 to 30%	480max	480max	360max	360max	360max	360max	360max	360max
	RIPPLE NOISE[mVp-p]	Po=30% to	200max	200max	200max	200max	200max	200max	200max	200max
		*5 Po=0 to 30%	600max	600max	500max	500max	500max	500max	500max	500max
	TEMPERATURE REGULATION[mV]	-20 to +50°C	150max	180max	150max	180max	150max	180max	150max	180max
	-40 to +50°C	240max	290max	240max	290max	240max	290max	240max	290max	
DRIFT[mV] *6		48max	60max	48max	60max	48max	60max	48max	60max	
START-UP TIME[ms]		30max (Minimum input, Io=100%)								
OUTPUT VOLTAGE SETTING[V]		11.64 - 12.36	14.55 - 15.45	11.64 - 12.36	14.55 - 15.45	11.64 - 12.36	14.55 - 15.45	11.64 - 12.36	14.55 - 15.45	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								
ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis								
	IMPACT	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis								
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1								
OTHERS	CASE SIZE/WEIGHT	22.0 X 12.0 X 9.5mm [0.87 X 0.48 X 0.38 inches] (W X H X D) / 7g max								
	COOLING METHOD	Convection/Forced air								

\*1 Single output +24V, +30V with no use of COM.  
 \*2 Rated input 5V, 12V, 24V or 48V DC Io=100%  
 \*3 Symmetrical loading from 20% to 100%.  
 \*4 Symmetrical loading from 0% to 100%.  
 \*5 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins. (20MHz Oscilloscope). Po:Output wattage.  
 \*6 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.  
 \* Parallel operation with other model is not possible.

External view



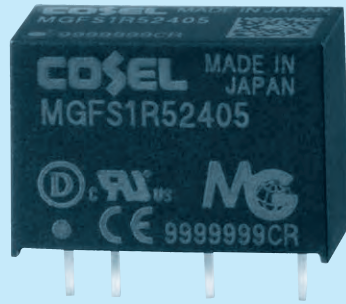
- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal material : Copper
- ※ Planting treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 7g max



# MGFS1R5

MGF S 1R5 24 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- Y2: Output voltage adjustable (+10%, -5%)

MODEL	MGFS1R5243R3	MGFS1R52405	MGFS1R52412	MGFS1R52415
MAX OUTPUT WATTAGE[W]	1.32	1.50	1.56	1.50
DC OUTPUT	VOLTAGE[V]	3.3	5	12
	CURRENT[A]	0.4	0.3	0.13

## SPECIFICATIONS

	MODEL	MGFS1R5243R3	MGFS1R52405	MGFS1R52412	MGFS1R52415	
INPUT	VOLTAGE[V]	DC9 - 36(Surge voltage 50V,100ms max)				
	CURRENT[A]	*1 0.072typ	0.079typ	0.079typ	0.077typ	
	EFFICIENCY[%]	*1 77typ	80typ	83typ	82typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	0.4	0.3	0.13	0.1	
	LINE REGULATION[mV]	20max	20max	48max	60max	
	LOAD REGULATION[mV]	20max	20max	48max	60max	
	RIPPLE[mVp-p]	*2 120max	120max	150max	150max	
	RIPPLE NOISE[mVp-p]	*2 200max	200max	200max	200max	
	TEMPERATURE REGULATION[mV]	-20 to +85°C	50max	50max	150max	180max
		-40 to +85°C	80max	80max	240max	290max
	DRIFT[mV]	*3 20max	20max	48max	60max	
	START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)				
PROTECTION CIRCUIT	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				

MODEL	MGFS1R5483R3	MGFS1R54805	MGFS1R54812	MGFS1R54815
MAX OUTPUT WATTAGE[W]	1.32	1.50	1.56	1.50
DC OUTPUT	VOLTAGE[V]	3.3	5	12
	CURRENT[A]	0.4	0.3	0.13

## SPECIFICATIONS

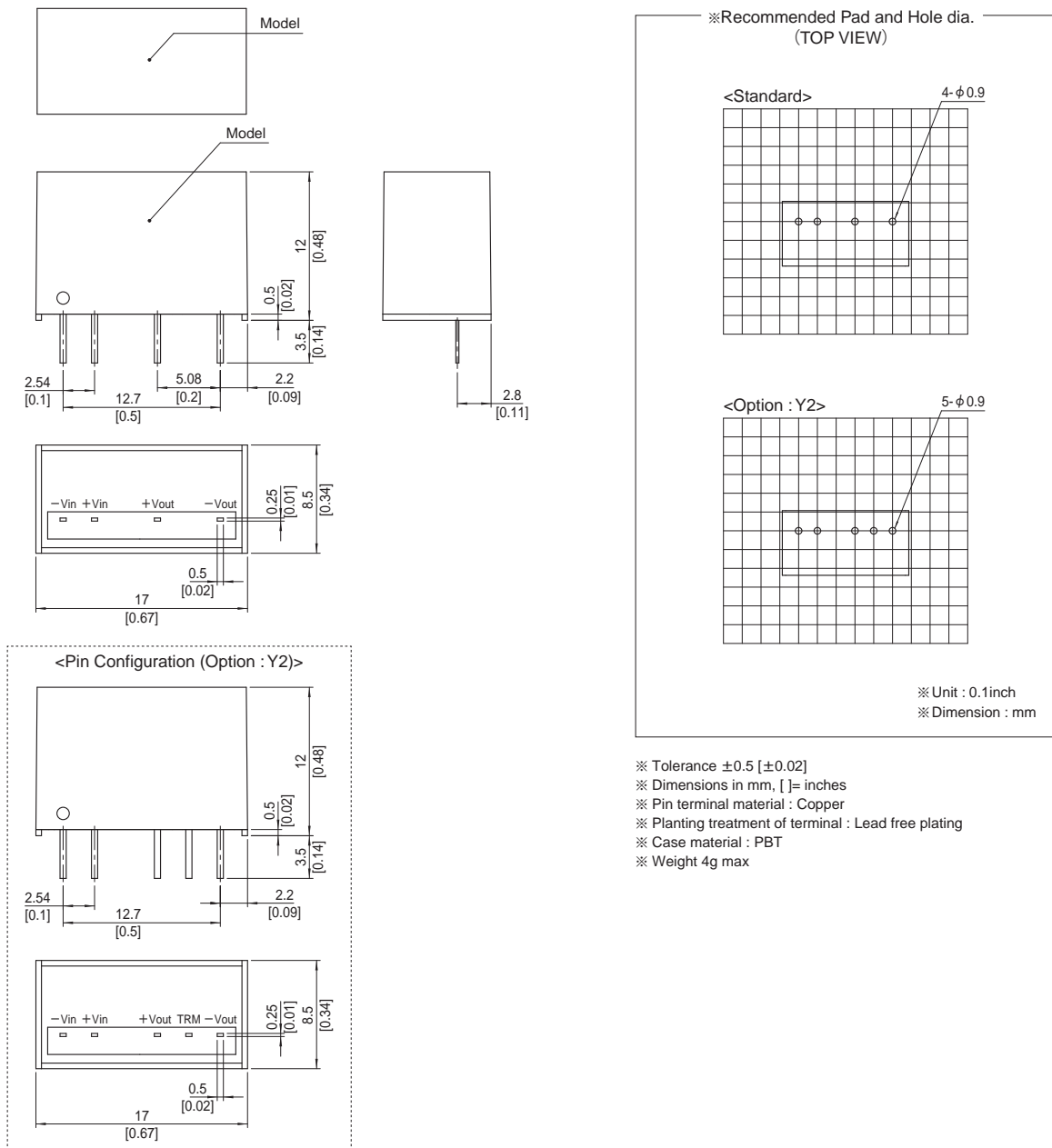
	MODEL	MGFS1R5483R3	MGFS1R54805	MGFS1R54812	MGFS1R54815	
INPUT	VOLTAGE[V]	DC18 - 76(Surge voltage 100V,100ms max)				
	CURRENT[A]	*1 0.037typ	0.040typ	0.040typ	0.039typ	
	EFFICIENCY[%]	*1 76typ	79typ	82typ	81typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	0.4	0.3	0.13	0.1	
	LINE REGULATION[mV]	20max	20max	48max	60max	
	LOAD REGULATION[mV]	20max	20max	48max	60max	
	RIPPLE[mVp-p]	*2 120max	120max	150max	150max	
	RIPPLE NOISE[mVp-p]	*2 200max	200max	200max	200max	
	TEMPERATURE REGULATION[mV]	-20 to +85°C	50max	50max	150max	180max
		-40 to +85°C	80max	80max	240max	290max
	DRIFT[mV]	*3 20max	20max	48max	60max	
	START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)				
PROTECTION CIRCUIT	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				

## GENERAL SPECIFICATIONS

<b>ISOLATION</b>	<b>INPUT-OUTPUT</b>	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)
<b>ENVIRONMENT</b>	<b>OPERATING TEMP.,HUMID.AND ALTITUDE</b>	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max
	<b>STORAGE TEMP.,HUMID.AND ALTITUDE</b>	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	<b>VIBRATION</b>	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis
	<b>IMPACT</b>	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis
<b>SAFETY</b>	<b>AGENCY APPROVALS</b>	UL60950-1, C-UL, EN60950-1
<b>OTHERS</b>	<b>CASE SIZE/WEIGHT</b>	17.0×12.0×8.5mm [0.67×0.48×0.34 inches] (W×H×D) / 4g max
	<b>COOLING METHOD</b>	Convection/Forced air

- \*1 Rated input 24V or 48V DC I<sub>o</sub>=100%
- \*2 Ripple and ripple noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins.
- \*3 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.
- \* MGFW1R5xx12/MGFW1R5xx15 is available as single output, +24V/+30V

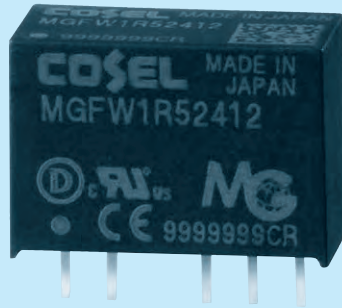
### External view



MGFW1R5

MGF W 1R5 24 12 -□

① ② ③ ④ ⑤ ⑥



- ① Series name  
 ② Dual output  
 ③ Output wattage  
 ④ Input voltage  
 ⑤ Output voltage  
 ⑥ Optional

MODEL	MGFW1R52412	MGFW1R52415	MGFW1R54812	MGFW1R54815
MAX OUTPUT WATTAGE[W]	1.56	1.50	1.56	1.50
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±12 or +24
	CURRENT[A]	0.065	0.05	0.065

## SPECIFICATIONS

	MODEL	MGFW1R52412	MGFW1R52415	MGFW1R54812	MGFW1R54815	
INPUT	VOLTAGE[V]	DC9 - 36 (Surge voltage 50V, 100ms max)		DC18 - 76 (Surge voltage 100V, 100ms max)		
	CURRENT[A] *2	0.081typ	0.079typ	0.041typ	0.040typ	
	EFFICIENCY[%] *2	81typ	80typ	81typ	79typ	
OUTPUT	VOLTAGE[V]	±12 (+24)	±15 (+30)	±12 (+24)	±15 (+30)	
	CURRENT[A]	0.065	0.05	0.065	0.05	
	LINE REGULATION[mV]	60max	75max	60max	75max	
	LOAD REGULATION[mV]	*3	480max	600max	480max	600max
		*4	600max	750max	600max	750max
	RIPPLE[mVp-p] *5	150max	150max	150max	150max	
	RIPPLE NOISE[mVp-p] *5	200max	200max	200max	200max	
	TEMPERATURE REGULATION[mV]	-20 to +85°C	210max	260max	150max	180max
		-40 to +85°C	320max	390max	240max	290max
	DRIFT[mV] *6	48max	60max	48max	60max	
START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)					
OUTPUT VOLTAGE SETTING[V]	11.64 - 12.36	14.55 - 15.45	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max				
	VIBRATION	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis				
	IMPACT	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis				
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1				
OTHERS	CASE SIZE/WEIGHT	17.0 X 12.0 X 8.5mm [0.67 X 0.48 X 0.34 inches] (W X H X D) / 4g max				
	COOLING METHOD	Convection/Forced air				

\*1 Single output +24V, +30V with no use of COM.

\*2 Rated input 24V or 48V DC I<sub>o</sub>=100%

\*3 Symmetrical loading from 20% to 100%.

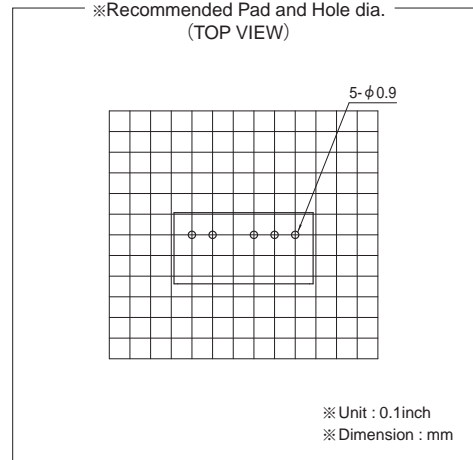
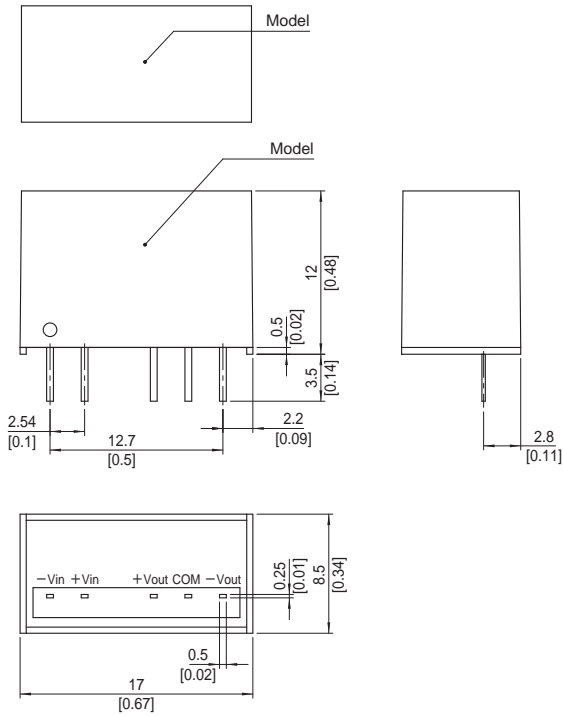
\*4 Symmetrical loading from 0% to 100%.

\*5 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins.

\*6 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.

\* Parallel operation with other model is not possible.

External view



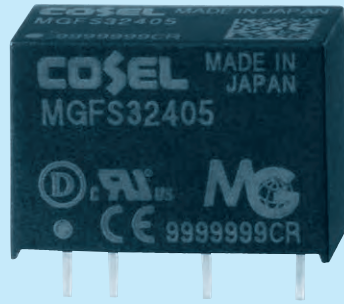
- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 4g max

MG

# MGFS3

MGF S 3 24 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- Y2: Output voltage adjustable (+10%, -5%)

MODEL	MGFS3243R3	MGFS32405	MGFS32412	MGFS32415
MAX OUTPUT WATTAGE[W]	2.64	3.00	3.00	3.00
DC OUTPUT	VOLTAGE[V]	3.3	5	12
	CURRENT[A]	0.8	0.6	0.25

## SPECIFICATIONS

	MODEL	MGFS3243R3	MGFS32405	MGFS32412	MGFS32415
INPUT	VOLTAGE[V]	DC9 - 36 (Surge voltage 50V,100ms max) (Refer to "Derating" for input voltage derating.)			
	CURRENT[A]	*1 0.15typ	0.16typ	0.15typ	0.15typ
	EFFICIENCY[%]	*1 78typ	81typ	85typ	84typ
OUTPUT	VOLTAGE[V]	3.3	5	12	15
	CURRENT[A]	0.8	0.6	0.25	0.2
	LINE REGULATION[mV]	20max	20max	48max	60max
	LOAD REGULATION[mV]	20max	20max	48max	60max
	RIPPLE[mVp-p]	*2 120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	*2 200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +75°C 50max	50max	150max	180max
		-40 to +75°C 80max	80max	240max	290max
	DRIFT[mV]	*3 20max	20max	48max	60max
	START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)			
PROTECTION CIRCUIT	OUTPUT VOLTAGE SETTING[V]	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45
	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically			

MODEL	MGFS3483R3	MGFS34805	MGFS34812	MGFS34815
MAX OUTPUT WATTAGE[W]	2.64	3.00	3.00	3.00
DC OUTPUT	VOLTAGE[V]	3.3	5	12
	CURRENT[A]	0.8	0.6	0.25

## SPECIFICATIONS

	MODEL	MGFS3483R3	MGFS34805	MGFS34812	MGFS34815
INPUT	VOLTAGE[V]	DC18 - 76 (Surge voltage 100V,100ms max) (Refer to "Derating" for input voltage derating.)			
	CURRENT[A]	*1 0.072typ	0.079typ	0.076typ	0.076typ
	EFFICIENCY[%]	*1 77typ	80typ	83typ	83typ
OUTPUT	VOLTAGE[V]	3.3	5	12	15
	CURRENT[A]	0.8	0.6	0.25	0.2
	LINE REGULATION[mV]	20max	20max	48max	60max
	LOAD REGULATION[mV]	20max	20max	48max	60max
	RIPPLE[mVp-p]	*2 120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	*2 200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +75°C 50max	50max	150max	180max
		-40 to +75°C 80max	80max	240max	290max
	DRIFT[mV]	*3 20max	20max	48max	60max
	START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)			
PROTECTION CIRCUIT	OUTPUT VOLTAGE SETTING[V]	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45
	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically			

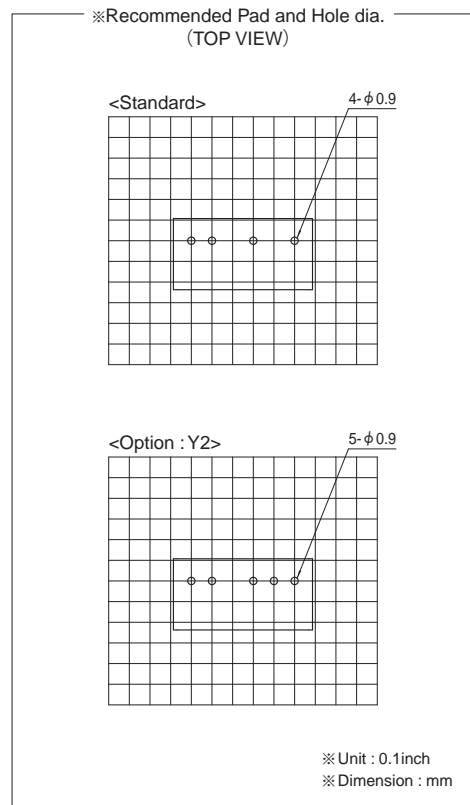
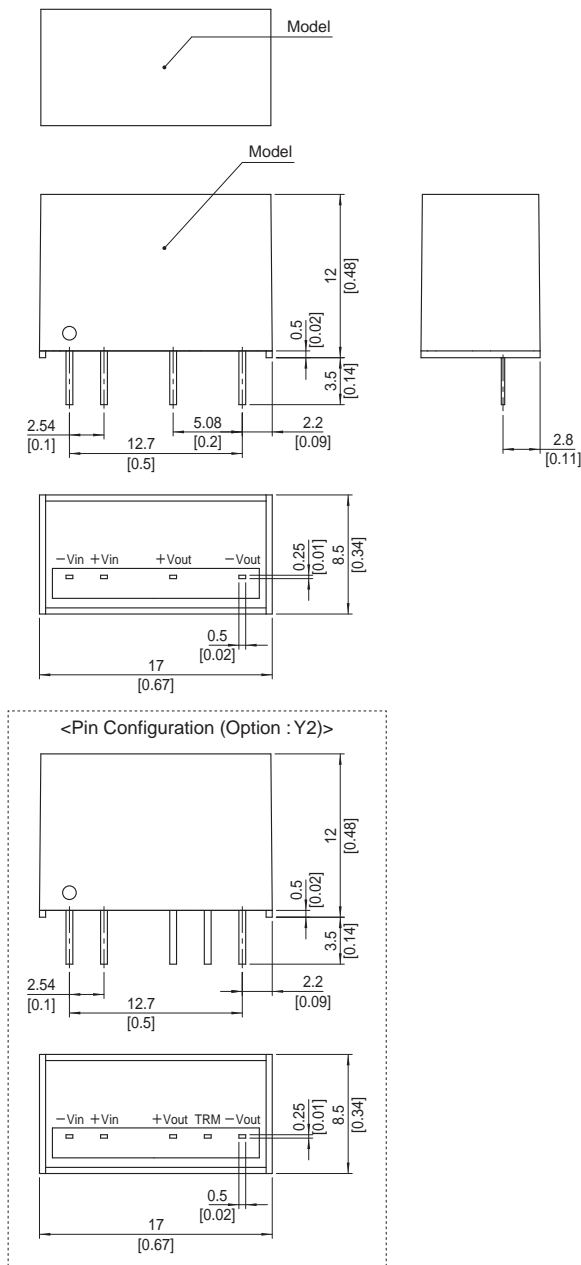


### GENERAL SPECIFICATIONS

<b>ISOLATION</b>	<b>INPUT-OUTPUT</b>	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)
<b>ENVIRONMENT</b>	<b>OPERATING TEMP.,HUMID.AND ALTITUDE</b>	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max
	<b>STORAGE TEMP.,HUMID.AND ALTITUDE</b>	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	<b>VIBRATION</b>	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis
	<b>IMPACT</b>	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis
<b>SAFETY</b>	<b>AGENCY APPROVALS</b>	UL60950-1, C-UL, EN60950-1
<b>OTHERS</b>	<b>CASE SIZE/WEIGHT</b>	17.0×12.0×8.5mm [0.67×0.48×0.34 inches] (W×H×D) / 4g max
	<b>COOLING METHOD</b>	Convection/Forced air

- \*1 Rated input 24V or 48V DC I<sub>o</sub>=100%
- \*2 Ripple and ripple noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins.
- \*3 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.
- \* MGFW3xx12/MGFW3xx15 is available as single output, +24V/+30V

### External view

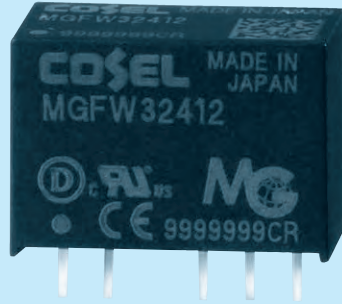


- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal material : Copper
- ※ Planting treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 4g max

# MGFW3

MGF W 3 24 12 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional

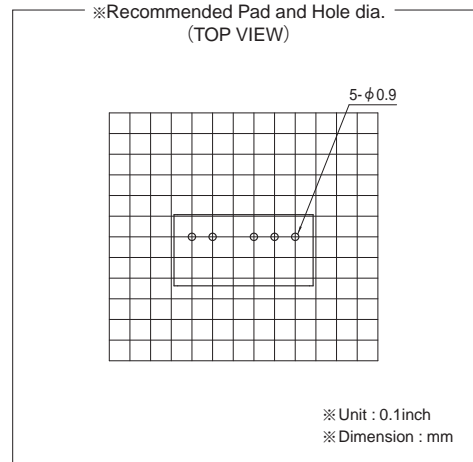
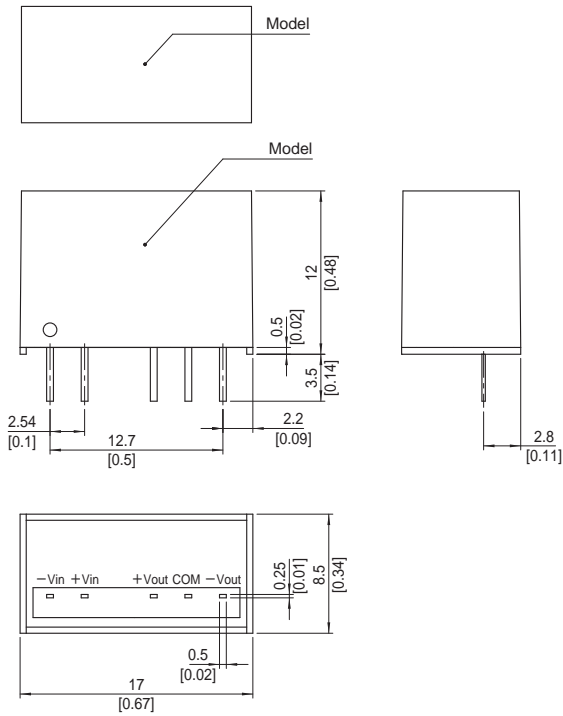
MODEL	MGFW32412	MGFW32415	MGFW34812	MGFW34815
MAX OUTPUT WATTAGE[W]	3.12	3.00	3.12	3.00
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±12 or +24
	CURRENT[A]	0.13	0.1	0.13

## SPECIFICATIONS

	MODEL	MGFW32412	MGFW32415	MGFW34812	MGFW34815	
INPUT	VOLTAGE[V]	DC9 - 36 (Surge voltage 50V,100ms max) (Refer to "Derating" for input voltage derating.)		DC18 - 76 (Surge voltage 100V,100ms max) (Refer to "Derating" for input voltage derating.)		
	CURRENT[A] *2	0.16typ	0.16typ	0.081typ	0.078typ	
	EFFICIENCY[%] *2	82typ	82typ	81typ	81typ	
OUTPUT	VOLTAGE[V]	±12 (+24)	±15 (+30)	±12 (+24)	±15 (+30)	
	CURRENT[A]	0.13	0.1	0.13	0.1	
	LINE REGULATION[mV]	60max	75max	60max	75max	
	LOAD REGULATION[mV]	*3	480max	600max	480max	600max
		*4	600max	750max	600max	750max
	RIPPLE[mVp-p] *5	150max	150max	150max	150max	
	RIPPLE NOISE[mVp-p] *5	200max	200max	200max	200max	
	TEMPERATURE REGULATION[mV]	-20 to +70°C	180max	220max	180max	220max
		-40 to +70°C	290max	340max	290max	340max
	DRIFT[mV] *6	48max	60max	48max	60max	
START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)					
OUTPUT VOLTAGE SETTING[V]	11.64 - 12.36	14.55 - 15.45	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max				
	VIBRATION	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis				
	IMPACT	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis				
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1				
OTHERS	CASE SIZE/WEIGHT	17.0×12.0×8.5mm [0.67×0.48×0.34 inches] (W×H×D) / 4g max				
	COOLING METHOD	Convection/Forced air				

- \*1 Single output +24V, +30V with no use of COM.
- \*2 Rated input 24V or 48V DC I<sub>o</sub>=100%
- \*3 Symmetrical loading from 20% to 100%.
- \*4 Symmetrical loading from 0% to 100%.
- \*5 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins.
- \*6 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.

External view



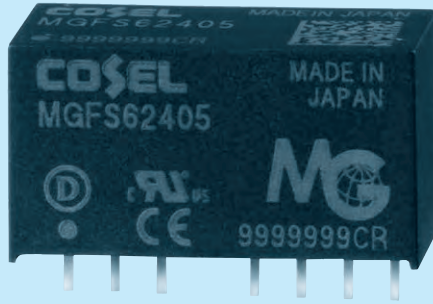
- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 4g max

MG

# MGFS6

MGF S 6 24 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- Y2: Output voltage adjustable (+10%, -5%)

MODEL	MGFS6243R3	MGFS62405	MGFS62412	MGFS62415
MAX OUTPUT WATTAGE[W]	5.28	6.0	6.0	6.0
DC OUTPUT	VOLTAGE[V]	3.3	5	12
	CURRENT[A]	1.6	1.2	0.5

## SPECIFICATIONS

	MODEL	MGFS6243R3	MGFS62405	MGFS62412	MGFS62415	
INPUT	VOLTAGE[V]	DC9 - 36 (Surge voltage 50V,100ms max)				
	CURRENT[A]	*1 0.28typ	0.30typ	0.29typ	0.29typ	
	EFFICIENCY[%]	*1 80typ	84typ	88typ	88typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	1.6	1.2	0.5	0.4	
	LINE REGULATION[mV]	20max	20max	48max	60max	
	LOAD REGULATION[mV]	20max	20max	48max	60max	
	RIPPLE[mVp-p]	Io=30% -	75max	75max	100max	100max
		Io=0 - 30%	*2 225max	225max	300max	300max
	RIPPLE NOISE[mVp-p]	Io=30% -	120max	120max	150max	150max
		Io=0 - 30%	*2 300max	300max	400max	400max
	TEMPERATURE REGULATION[mV]	-20 to +65°C	50max	50max	150max	180max
		-40 to +65°C	80max	80max	240max	290max
	DRIFT[mV]	*3 20max	20max	48max	60max	
START-UP TIME[ms]	30max (Minimum input, Io=100%)					
OUTPUT VOLTAGE SETTING[V]	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)				

MODEL	MGFS6483R3	MGFS64805	MGFS64812	MGFS64815
MAX OUTPUT WATTAGE[W]	5.28	6.0	6.0	6.0
DC OUTPUT	VOLTAGE[V]	3.3	5	12
	CURRENT[A]	1.6	1.2	0.5

## SPECIFICATIONS

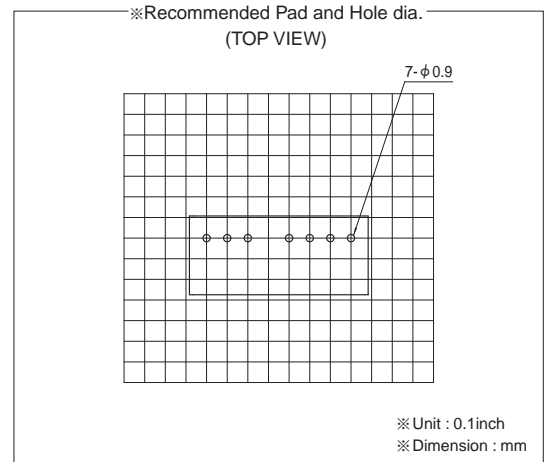
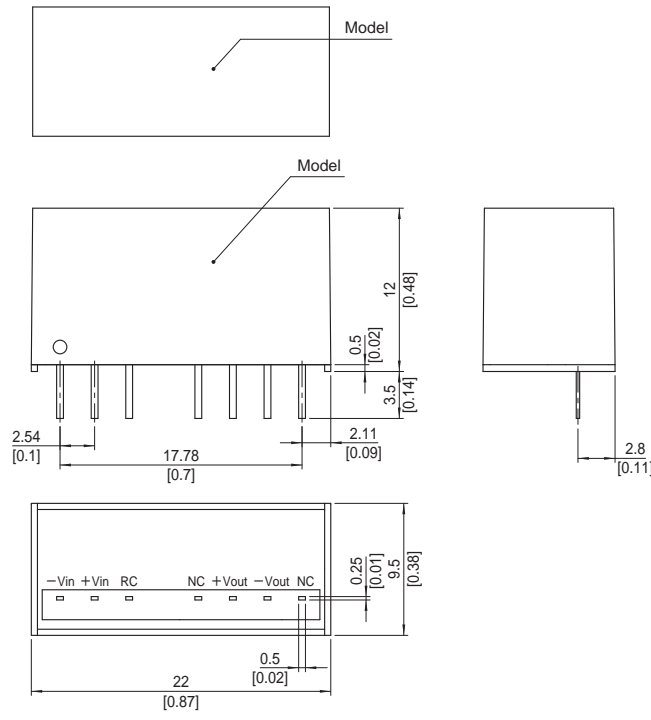
	MODEL	MGFS6483R3	MGFS64805	MGFS64812	MGFS64815	
INPUT	VOLTAGE[V]	DC18 - 76 (Surge voltage 100V, 100ms max)				
	CURRENT[A]	*1 0.14typ	0.15typ	0.15typ	0.15typ	
	EFFICIENCY[%]	*1 80typ	84typ	88typ	88typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	1.6	1.2	0.5	0.4	
	LINE REGULATION[mV]	20max	20max	48max	60max	
	LOAD REGULATION[mV]	20max	20max	48max	60max	
	RIPPLE[mVp-p]	Io=30% -	75max	75max	100max	100max
		Io=0 - 30%	*2 225max	225max	300max	300max
	RIPPLE NOISE[mVp-p]	Io=30% -	120max	120max	150max	150max
		Io=0 - 30%	*2 300max	300max	400max	400max
	TEMPERATURE REGULATION[mV]	-20 to +65°C	50max	50max	150max	180max
		-40 to +65°C	80max	80max	240max	290max
	DRIFT[mV]	*3 20max	20max	48max	60max	
START-UP TIME[ms]	30max (Minimum input, Io=100%)					
OUTPUT VOLTAGE SETTING[V]	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)				

GENERAL SPECIFICATIONS

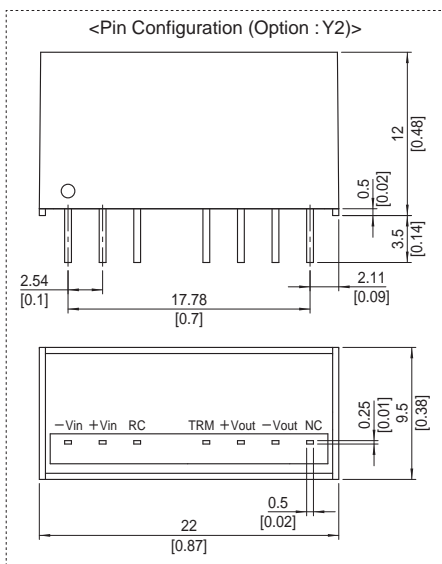
ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	22.0×12.0×9.5mm [0.87×0.48×0.38 inches] (W×H×D) / 7g max
	COOLING METHOD	Convection/Forced air

- \*1 Rated input 24V or 48V DC I<sub>o</sub>=100%
- \*2 Ripple and ripple noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins.
- \*3 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.
- \* MGFW6xx12/MGFW6xx15 is available as single output, +24V/+30V

External view



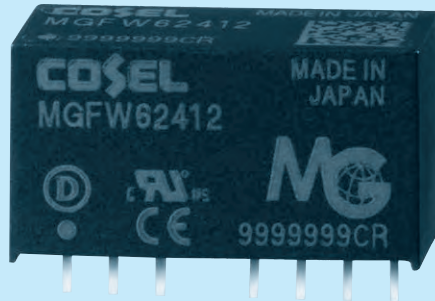
- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal material : Copper
- ※ Planting treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 7g max



# MGFW6

MGFW62412-□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- Y2: Output voltage adjustable (+10%, -5%)

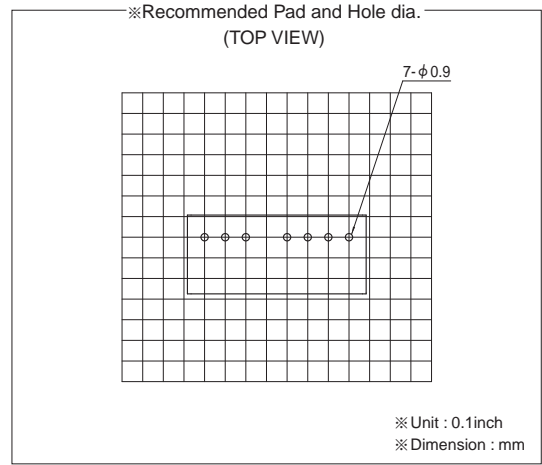
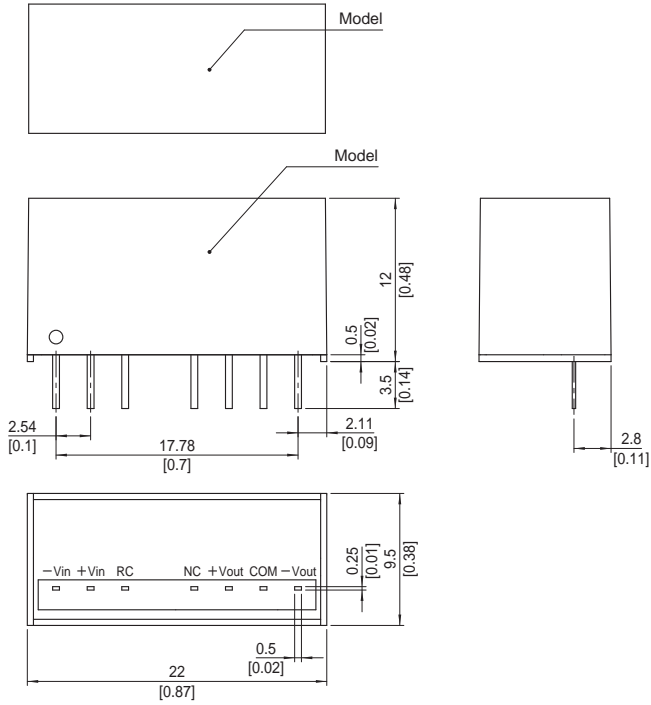
MODEL	MGFW62412	MGFW62415	MGFW64812	MGFW64815
MAX OUTPUT WATTAGE[W]	6.00	6.00	6.00	6.00
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±15 or +30
	CURRENT[A]	0.25	0.2	0.2

## SPECIFICATIONS

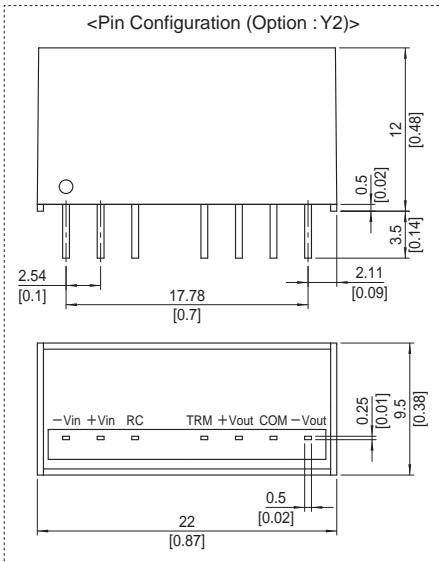
	MODEL	MGFW62412	MGFW62415	MGFW64812	MGFW64815	
INPUT	VOLTAGE[V]	DC9 - 36 (Surge voltage 50V,100ms max)		DC18 - 76 (Surge voltage 100V,100ms max)		
	CURRENT[A] *2	0.29typ	0.29typ	0.15typ	0.15typ	
	EFFICIENCY[%] *2	87typ	88typ	88typ	88typ	
OUTPUT	VOLTAGE[V]	±12 (+24)	±15 (+30)	±12 (+24)	±15 (+30)	
	CURRENT[A]	0.25	0.2	0.25	0.2	
	LINE REGULATION[mV]	60max	75max	60max	75max	
	LOAD REGULATION[mV]	*3	480max	600max	480max	600max
		*4	600max	750max	600max	750max
	RIPPLE[mVp-p]	Po=30% *5	120max	120max	120max	120max
		Po=0 - 30%	360max	360max	360max	360max
	RIPPLE NOISE[mVp-p]	Po=30% *5	200max	200max	200max	200max
		Po=0 - 30%	500max	500max	500max	500max
	TEMPERATURE REGULATION[mV]	-20 to +75°C	190max	230max	190max	230max
		-40 to +75°C	300max	360max	300max	360max
DRIFT[mV] *6		48max	60max	48max	60max	
START-UP TIME[ms]	30max (Minimum input, Io=100%)					
OUTPUT VOLTAGE SETTING[V]		11.64 - 12.36	14.55 - 15.45	11.64 - 12.36	14.55 - 15.45	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)				
ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)				
ENVIRONMENT	OPERATING TEMP,HUMID.AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max				
	STORAGE TEMP,HUMID.AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max				
	VIBRATION	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis				
	IMPACT	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis				
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1				
OTHERS	CASE SIZE/WEIGHT	22.0×12.0×9.5mm [0.87×0.48×0.38 inches] (W×H×D) / 7g max				
	COOLING METHOD	Convection/Forced air				

\*1 Single output +24V, +30V with no use of COM.  
 \*2 Rated input 5V, 12V, 24V or 48V DC Io=100%  
 \*3 Symmetrical loading from 20% to 100%.  
 \*4 Symmetrical loading from 0% to 100%.  
 \*5 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins. Po:Output wattage.  
 \*6 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.  
 \* Parallel operation with other model is not possible.

External view



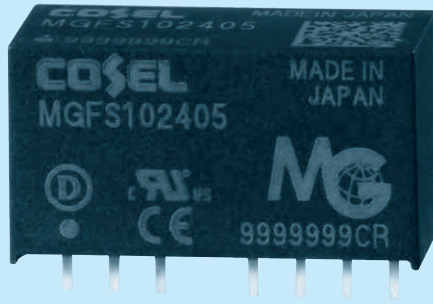
- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 7g max



# MGFS10

MGF S 10 24 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- Y2: Output voltage adjustable (+10%, -5%)

MODEL	MGFS10243R3	MGFS102405	MGFS102412	MGFS102415
MAX OUTPUT WATTAGE[W]	8.58	10.0	10.8	10.5
DC OUTPUT	VOLTAGE[V]	3.3	5	12
	CURRENT[A]	2.6	2.0	0.9

## SPECIFICATIONS

	MODEL	MGFS10243R3	MGFS102405	MGFS102412	MGFS102415	
INPUT	VOLTAGE[V]	DC9 - 36 (Surge voltage 50V,100ms max) (Refer to "Derating" for input voltage derating.)				
	CURRENT[A]	*1 0.42typ	0.48typ	0.51typ	0.50typ	
	EFFICIENCY[%]	*1 86typ	88typ	89typ	89typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	2.6	2.0	0.9	0.7	
	LINE REGULATION[mV]	20max	20max	48max	60max	
	LOAD REGULATION[mV]	20max	20max	48max	60max	
	RIPPLE[mVp-p]	*2	Io=30% -	75max	75max	100max
			Io=0 - 30%	225max	225max	300max
	RIPPLE NOISE[mVp-p]	*2	Io=30% -	120max	120max	150max
			Io=0 - 30%	300max	300max	400max
	TEMPERATURE REGULATION[mV]	*3	-20 to +55°C	50max	50max	150max
			-40 to +55°C	80max	80max	240max
DRIFT[mV]		20max	20max	48max	60max	
START-UP TIME[ms]		30max (Minimum input, Io=100%)				
OUTPUT VOLTAGE SETTING[V]		3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)				

MODEL	MGFS10483R3	MGFS104805	MGFS104812	MGFS104815
MAX OUTPUT WATTAGE[W]	8.58	10.0	10.8	10.5
DC OUTPUT	VOLTAGE[V]	3.3	5	12
	CURRENT[A]	2.6	2.0	0.9

## SPECIFICATIONS

	MODEL	MGFS10483R3	MGFS104805	MGFS104812	MGFS104815	
INPUT	VOLTAGE[V]	DC18 - 76 (Surge voltage 100V,100ms max) (Refer to "Derating" for input voltage derating.)				
	CURRENT[A]	*1 0.21typ	0.24typ	0.26typ	0.25typ	
	EFFICIENCY[%]	*1 86typ	88typ	89typ	89typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	2.6	2.0	0.9	0.7	
	LINE REGULATION[mV]	20max	20max	48max	60max	
	LOAD REGULATION[mV]	20max	20max	48max	60max	
	RIPPLE[mVp-p]	*2	Io=30% -	75max	75max	100max
			Io=0 - 30%	225max	225max	300max
	RIPPLE NOISE[mVp-p]	*2	Io=30% -	120max	120max	150max
			Io=0 - 30%	300max	300max	400max
	TEMPERATURE REGULATION[mV]	*3	-20 to +55°C	50max	50max	150max
			-40 to +55°C	80max	80max	240max
DRIFT[mV]		20max	20max	48max	60max	
START-UP TIME[ms]		30max (Minimum input, Io=100%)				
OUTPUT VOLTAGE SETTING[V]		3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)				

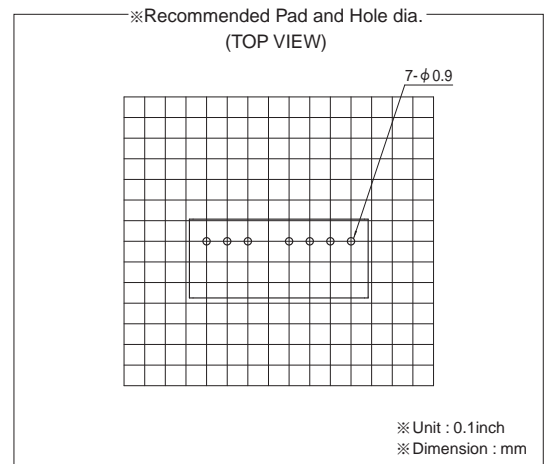
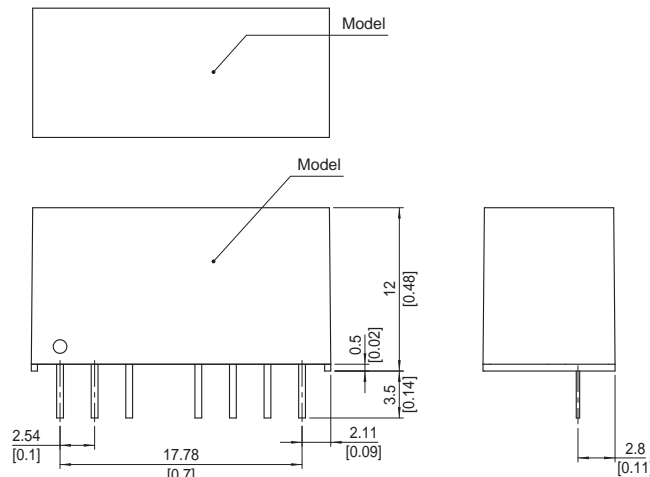


## GENERAL SPECIFICATIONS

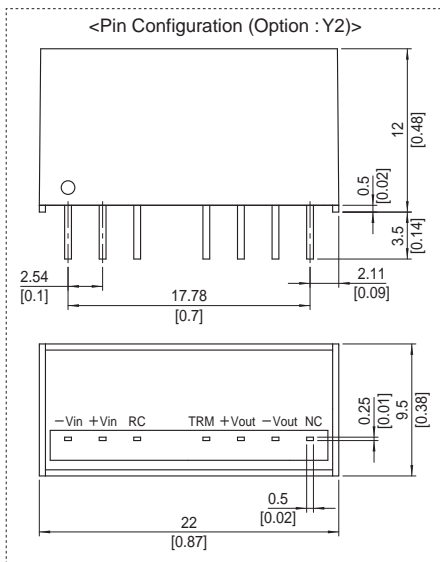
<b>ISOLATION</b>	<b>INPUT-OUTPUT</b>	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)
<b>ENVIRONMENT</b>	<b>OPERATING TEMP., HUMID. AND ALTITUDE</b>	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max
	<b>STORAGE TEMP., HUMID. AND ALTITUDE</b>	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	<b>VIBRATION</b>	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis
	<b>IMPACT</b>	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis
<b>SAFETY</b>	<b>AGENCY APPROVALS</b>	UL60950-1, C-UL, EN60950-1
<b>OTHERS</b>	<b>CASE SIZE/WEIGHT</b>	22.0×12.0×9.5mm [0.87×0.48×0.38 inches] (W×H×D) / 7g max
	<b>COOLING METHOD</b>	Convection/Forced air

- \*1 Rated input 24V or 48V DC I<sub>o</sub>=100%
- \*2 Ripple and ripple noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins.
- \*3 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.
- \* MGFW10xx12/MGFW10xx15 is available as single output, +24V/+30V

### External view



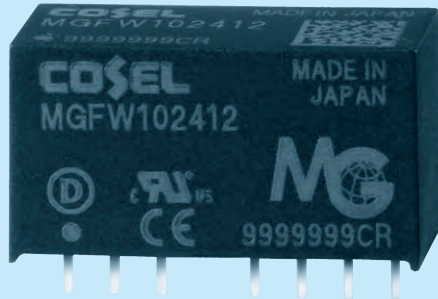
- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ] = inches
- ※ Pin terminal material : Copper
- ※ Planting treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 7g max



# MGFW10

MGF W 10 24 12 -

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- Y2: Output voltage adjustable (+10%, -5%)

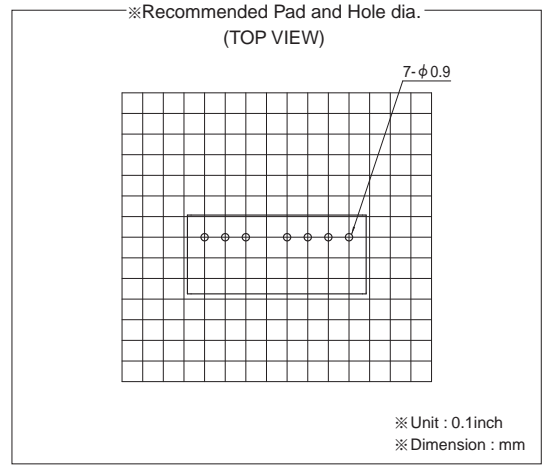
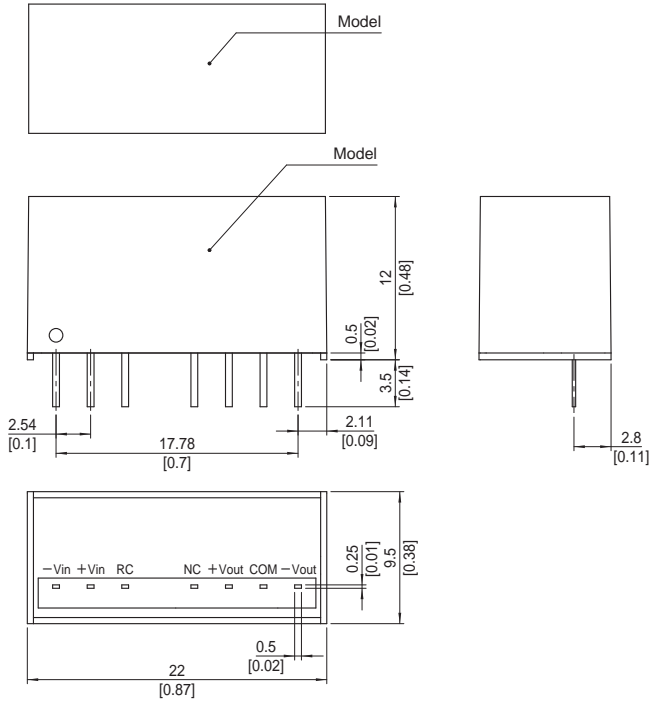
MODEL	MGFW102412	MGFW102415	MGFW104812	MGFW104815
MAX OUTPUT WATTAGE[W]	10.08	10.20	10.08	10.20
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±12 or +24
	CURRENT[A]	0.42	0.34	0.42

## SPECIFICATIONS

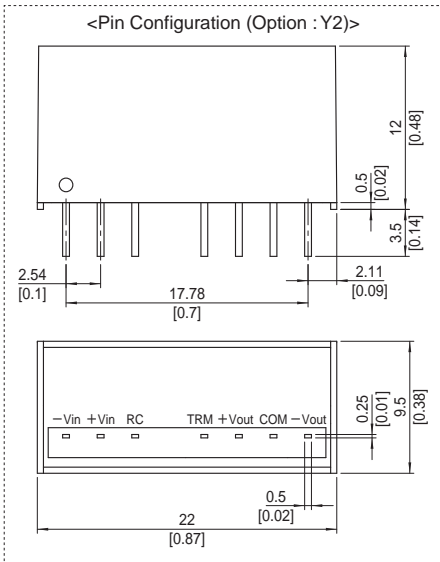
	MODEL	MGFW102412	MGFW102415	MGFW104812	MGFW104815	
INPUT	VOLTAGE[V]	DC9 - 36 (Surge voltage 50V,100ms max) (Refer to "Derating" for input voltage derating.)		DC18 - 76 (Surge voltage 100V,100ms max) (Refer to "Derating" for input voltage derating.)		
	CURRENT[A] *2	0.49typ	0.49typ	0.25typ	0.25typ	
	EFFICIENCY[%] *2	87typ	87typ	87typ	88typ	
OUTPUT	VOLTAGE[V]	±12 (+24)	±15 (+30)	±12 (+24)	±15 (+30)	
	CURRENT[A]	0.42	0.34	0.42	0.34	
	LINE REGULATION[mV]	60max	75max	60max	75max	
	LOAD REGULATION[mV]	*3	480max	600max	480max	600max
		*4	600max	750max	600max	750max
	RIPPLE[mVp-p]	Po=30% -	120max	120max	120max	120max
		*5 Po=0 - 30%	360max	360max	360max	360max
	RIPPLE NOISE[mVp-p]	Po=30% -	200max	200max	200max	200max
		*5 Po=0 - 30%	500max	500max	500max	500max
	TEMPERATURE REGULATION[mV]	-20 to +50°C	150max	180max	150max	180max
-40 to +50°C		240max	290max	240max	290max	
DRIFT[mV] *6	48max	60max	48max	60max		
START-UP TIME[ms]	30max (Minimum input, Io=100%)					
OUTPUT VOLTAGE SETTING[V]	11.64 - 12.36	14.55 - 15.45	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)				
ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max				
	VIBRATION	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis				
	IMPACT	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis				
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1				
OTHERS	CASE SIZE/WEIGHT	22.0x12.0x9.5mm [0.87x0.48x0.38 inches] (WXHXD) / 7g max				
	COOLING METHOD	Convection/Forced air				

- \*1 Single output +24V, +30V with no use of COM.
- \*2 Rated input 5V, 12V, 24V or 48V DC Io=100%
- \*3 Symmetrical loading from 20% to 100%.
- \*4 Symmetrical loading from 0% to 100%.
- \*5 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins. Po:Output wattage.
- \*6 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.

External view



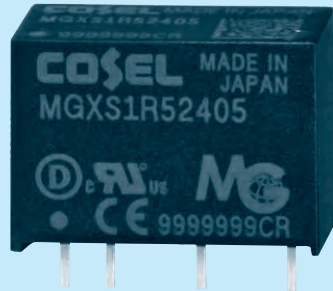
- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal material : Copper
- ※ Planting treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 7g max



# MGXS1R5

MGX S 1R5 24 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- Y2: Output voltage adjustable (+10%, -5%)

MODEL	MGXS1R5243R3	MGXS1R52405	MGXS1R52412	MGXS1R52415
MAX OUTPUT WATTAGE[W]	1.32	1.50	1.56	1.50
DC OUTPUT	VOLTAGE[V]	3.3	5	12
	CURRENT[A]	0.4	0.3	0.13

## SPECIFICATIONS

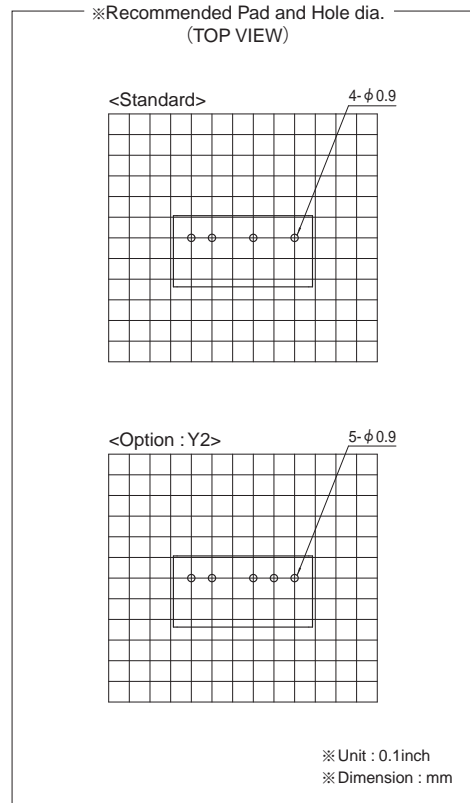
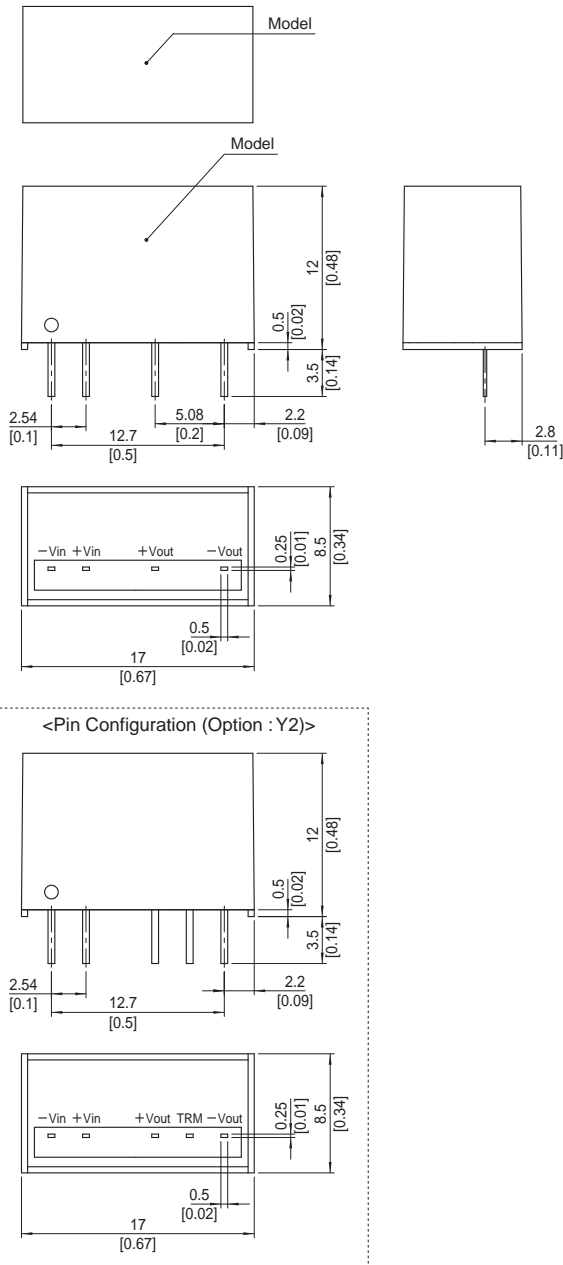
	MODEL	MGXS1R5243R3	MGXS1R52405	MGXS1R52412	MGXS1R52415	
INPUT	VOLTAGE[V]	DC6 - 60 (Surge voltage 76V, 100ms max) (Refer to "Derating" for input voltage derating.)				
	CURRENT[A]	*1 0.072typ	0.080typ	0.080typ	0.077typ	
	EFFICIENCY[%]	*1 77typ	79typ	82typ	82typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	0.4	0.3	0.13	0.1	
	LINE REGULATION[mV]	20max	20max	48max	60max	
	LOAD REGULATION[mV]	20max	20max	48max	60max	
	RIPPLE[mVp-p]	*2 120max	120max	150max	150max	
	RIPPLE NOISE[mVp-p]	*2 200max	200max	200max	200max	
	TEMPERATURE REGULATION[mV]	-20 to +85°C	50max	50max	150max	180max
		-40 to +85°C	80max	80max	240max	290max
	DRIFT[mV]	*3 20max	20max	48max	60max	
	START-UP TIME[ms]	30max				
OUTPUT VOLTAGE SETTING[V]	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				

## GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	17.0×12.0×8.5mm [0.67×0.48×0.34 inches] (W×H×D) / 4g max
	COOLING METHOD	Convection/Forced air

- \*1 Rated input 24V DC I<sub>o</sub>=100%
- \*2 Ripple and ripple noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins.
- \*3 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.
- \* MGXW1R52412/MGXW1R52415 is available as single output, +24V/+30V

External view

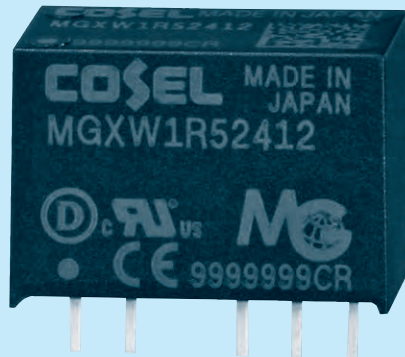


- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 4g max

MGXW1R5

MGX W 1R5 24 12 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional

MODEL	MGXW1R52412	MGXW1R52415
MAX OUTPUT WATTAGE[W]	1.56	1.50
DC OUTPUT	VOLTAGE[V] *1	±12 or +24
	CURRENT[A]	0.065

## SPECIFICATIONS

	MODEL	MGXW1R52412	MGXW1R52415	
INPUT	VOLTAGE[V]	DC6 - 60 (Surge voltage 76V, 100ms max) (Refer to "Derating" for input voltage derating.)		
	CURRENT[A] *2	0.082typ	0.079typ	
	EFFICIENCY[%] *2	80typ	80typ	
OUTPUT	VOLTAGE[V]	±12 (+24)	±15 (+30)	
	CURRENT[A]	0.065	0.05	
	LINE REGULATION[mV]	60max	75max	
	LOAD REGULATION[mV]	*3	480max	600max
		*4	600max	750max
	RIPPLE[mVp-p] *5	150max	150max	
	RIPPLE NOISE[mVp-p] *5	200max	200max	
	TEMPERATURE REGULATION[mV]	-20 to +85°C	210max	260max
		-40 to +85°C	320max	390max
	DRIFT[mV] *6	48max	60max	
START-UP TIME[ms]	30max			
OUTPUT VOLTAGE SETTING[V]	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically		

## GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000Ω min (20±15°C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	17.0×12.0×8.5mm [0.67×0.48×0.34 inches] (W×H×D) / 4g max
	COOLING METHOD	Convection/Forced air

\*1 Single output +24V, +30V with no use of COM.

\*2 Rated input 24V DC I<sub>o</sub>=100%

\*3 Symmetrical loading from 20% to 100%.

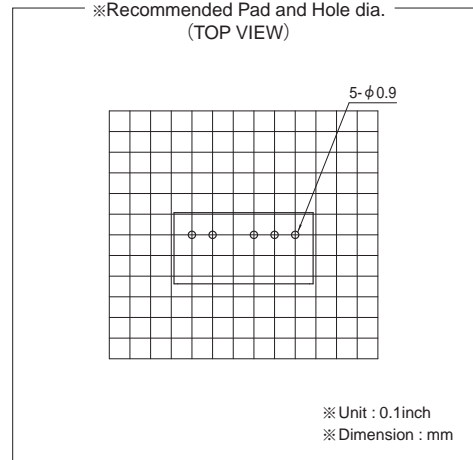
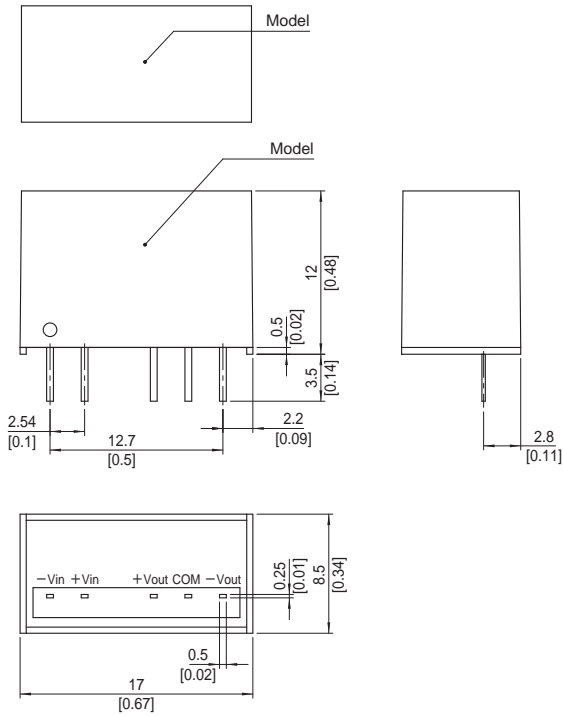
\*4 Symmetrical loading from 0% to 100%.

\*5 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins. (20MHz Oscilloscope)

\*6 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.

\* Parallel operation with other model is not possible.

External view



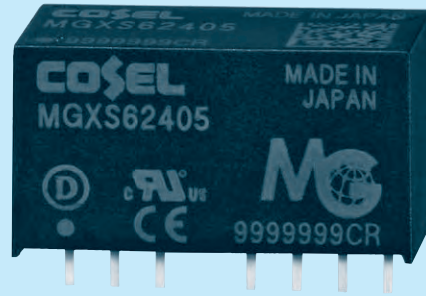
- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 4g max

MG

# MGXS6

MGX S 6 24 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- Y2: Output voltage adjustable (+10%, -5%)

MODEL	MGXS6243R3	MGXS62405	MGXS62412	MGXS62415
MAX OUTPUT WATTAGE[W]	5.28	6.0	6.0	6.0
DC OUTPUT	VOLTAGE[V]	3.3	5	12
	CURRENT[A]	1.6	1.2	0.5

## SPECIFICATIONS

	MODEL	MGXS6243R3	MGXS62405	MGXS62412	MGXS62415	
INPUT	VOLTAGE[V]	DC6 - 60 (Surge voltage 76V, 100ms max) (Refer to "Derating" for input voltage derating.)				
	CURRENT[A]	*1 0.26typ	0.29typ	0.29typ	0.29typ	
	EFFICIENCY[%]	*1 85typ	88typ	87typ	87typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	1.6	1.2	0.5	0.4	
	LINE REGULATION[mV]	20max	20max	48max	60max	
	LOAD REGULATION[mV]	20max	20max	48max	60max	
	RIPPLE[mVp-p]	Io=30% -	75max	75max	100max	100max
		Io=0 - 30%	225max	225max	300max	300max
		Vi=DC48 - 60V	225max	225max	300max	300max
	RIPPLE NOISE[mVp-p]	Io=30% -	120max	120max	150max	150max
		Io=0 - 30%	300max	300max	400max	400max
		Vi=DC48 - 60V	300max	300max	400max	400max
	TEMPERATURE REGULATION[mV]	-20 to +75°C	50max	50max	150max	180max
	-40 to +75°C	80max	80max	240max	290max	
DRIFT[mV]	*3	20max	20max	48max	60max	
START-UP TIME[ms]		30max				
OUTPUT VOLTAGE SETTING[V]		3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)				

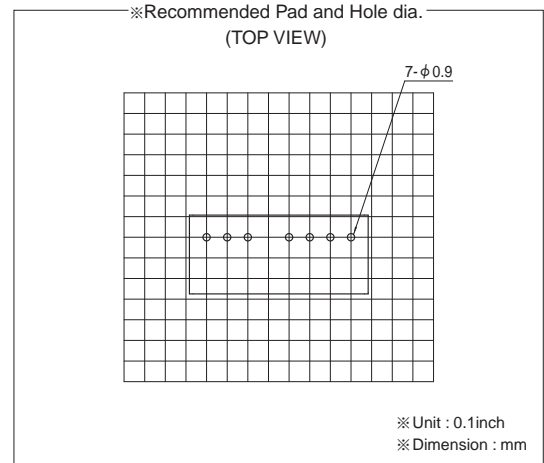
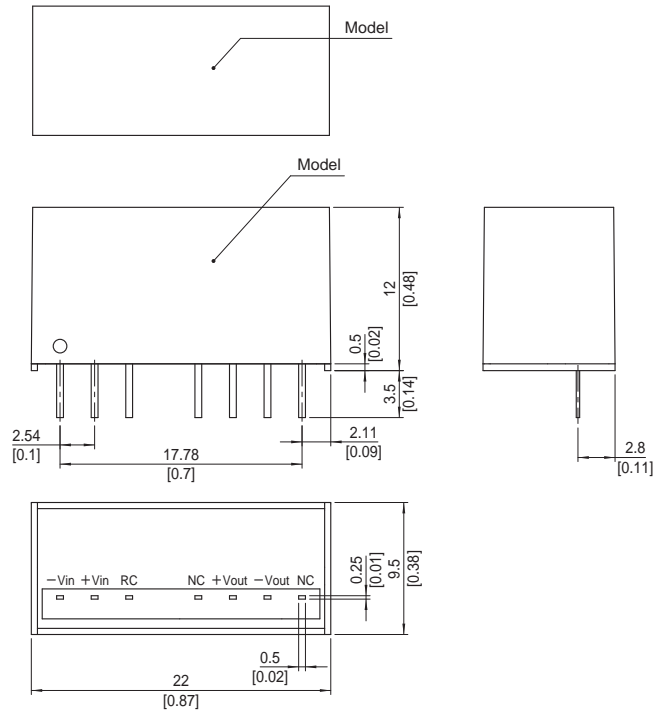
## GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	22.0 × 12.0 × 9.5mm [0.87 × 0.48 × 0.38 inches] (W × H × D) / 7g max
	COOLING METHOD	Convection/Forced air

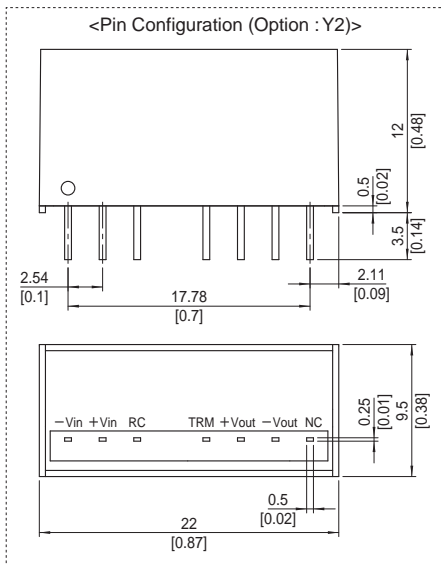
- \*1 Rated input 24V DC Io=100%
- \*2 Ripple and ripple noise is measured by using test board with ceramic capacitor 1μF at 50mm from output pins.
- \*3 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.
- \* MGXW62412/MGXW62415 is available as single output, +24V/+30V



External view



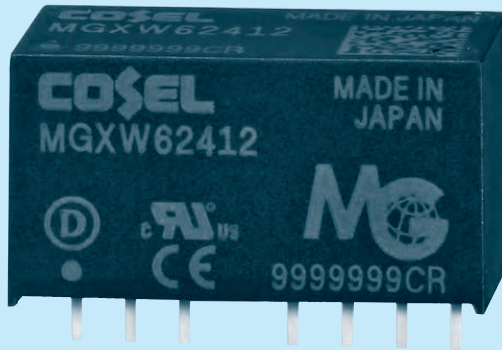
- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 7g max



# MGXW6

MGX W 6 24 12 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- Y2: Output voltage adjustable (+10%, -5%)

MODEL	MGXW62412	MGXW62415
MAX OUTPUT WATTAGE[W]	6.00	6.00
DC OUTPUT	VOLTAGE[V] *1	±12 or +24
	CURRENT[A]	0.25

## SPECIFICATIONS

	MODEL	MGXW62412	MGXW62415	
INPUT	VOLTAGE[V]	DC6 - 60 (Surge voltage 76V, 100ms max) (Refer to "Derating" for input voltage derating.)		
	CURRENT[A] *2	0.29typ	0.29typ	
	EFFICIENCY[%] *2	87typ	87typ	
OUTPUT	VOLTAGE[V]	±12 (+24)	±15 (+30)	
	CURRENT[A]	0.25	0.2	
	LINE REGULATION[mV]	60max	75max	
	LOAD REGULATION[mV]	*3	480max	600max
		*4	600max	750max
	RIPPLE[mVp-p] *5	Po=30% -	120max	120max
		Po=0 - 30%	480max	480max
		Vin=DC48 - 60V	480max	480max
	RIPPLE NOISE[mVp-p] *5	Po=30% -	200max	200max
		Po=0 - 30%	600max	600max
		Vin=DC48 - 60V	600max	600max
	TEMPERATURE REGULATION[mV]	-20 to +75°C	190max	230max
		-40 to +75°C	300max	360max
DRIFT[mV] *6	48max	60max		
START-UP TIME[ms]	30max			
OUTPUT VOLTAGE SETTING[V]	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically		
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)		

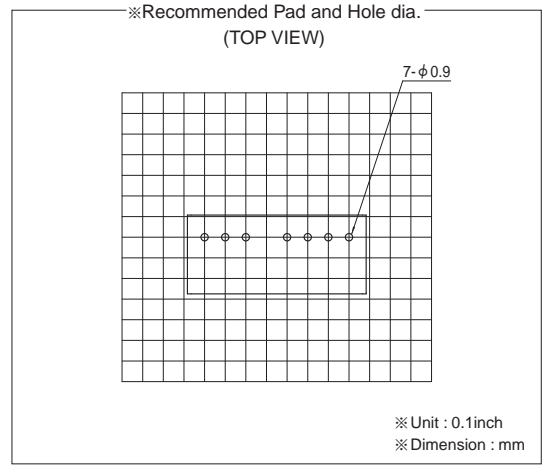
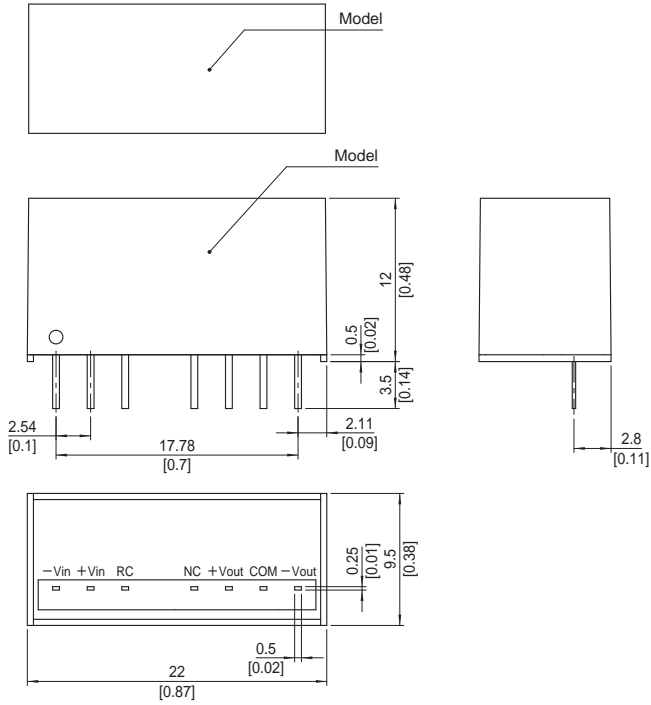
## GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current=10mA, DC500V 1,000MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz 98.0m/s <sup>2</sup> (10G), 3minute period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s <sup>2</sup> (50G) 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	22.0×12.0×9.5mm [0.87×0.48×0.38 inches] (W×H×D) / 7g max
	COOLING METHOD	Convection/Forced air

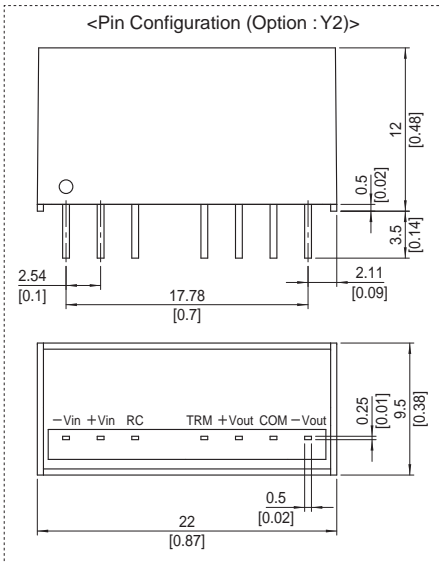
\*1 Single output +24V, +30V with no use of COM.  
 \*2 Rated input 24V DC Io=100%  
 \*3 Symmetrical loading from 20% to 100%.  
 \*4 Symmetrical loading from 0% to 100%.  
 \*5 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 1μF at

\*6 50mm from output pins. (20MHz Oscilloscope). Po: Output wattage.  
 \* Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.  
 \* Parallel operation with other model is not possible.

External view

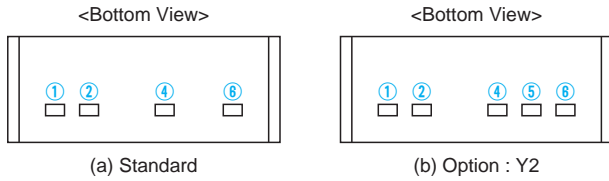


- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : PBT
- ※ Weight 7g max



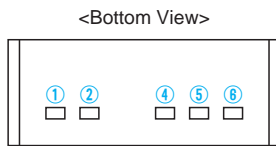
## Pin configuration

### ●MG1R5/MG3 Single Output



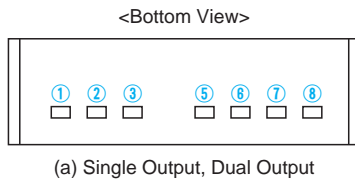
Pin No.	Pin Name	Function
①	-Vin	-DC Input
②	+Vin	+DC Input
④	+Vout	+DC Output
⑤	NP	No Pin
	TRM	Output Voltage Adjustment (Option:Refer to instruction manual 1.5)
⑥	-Vout	-DC Output

### ●MG1R5/MG3 Dual Output



Pin No.	Pin Name	Function
①	-Vin	-DC Input
②	+Vin	+DC Input
④	+Vout	+DC Output
⑤	COM	GND of Output Voltage
⑥	-Vout	-DC Output

### ●MG6/MG10 Single Output, Dual Output



Pin No.	Pin Name	Function
①	-Vin	-DC Input
②	+Vin	+DC Input
③	RC	Remote ON/OFF
⑤	NC	No Connect
	TRM	Output Voltage Adjustment (Option:Refer to instruction manual 1.5)
⑥	+Vout	+DC Output
⑦	-Vout	-DC Output (for Single Output)
	COM	GND of Output Voltage (for Dual Output)
⑧	NC	No Connect (for Single Output)
	-Vout	-DC Output (for Dual Output)

## Assembling and Installation Method

### Installation

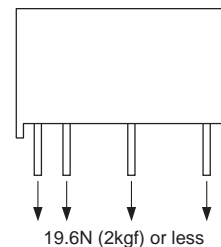
- When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation. Ambient temperature around each power supply should not exceed the temperature range shown in "Derating".

### Soldering Conditions

- (1) Flow Soldering : 260°C 15 seconds or less
- (2) Soldering Iron : maximum 360°C 5 seconds or less

### Stress to Pin

- Applying excessive stress to the input or output pins of the power module may damage internal connections. Avoid applying stress in excess of that shown in right figure.
- Input/output pin are soldered to the PCB internally.  
Do not pull or bend a lead powerfully.
- If it is expected that stress is applied to the input/output pin due to vibration or impact, reduce the stress to the pin by taking such measures as fixing the unit to the PCB by silicone rubber, etc.
- Due to prevent failure, PS should not be pulled after soldering with PCB.

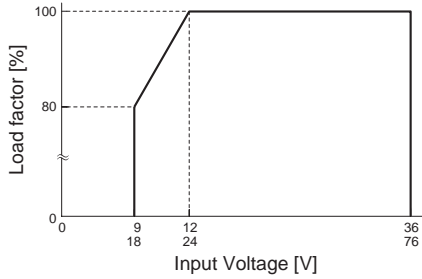


## Derating

### Derating curve for input voltage

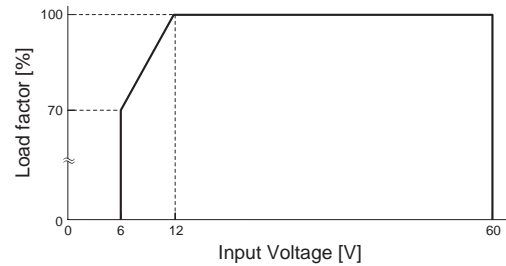
#### ● MGF3/MGFS10

■ MGF3, MGF3, MGFS10 and MGFW10 has derating by input voltage is required. shown below.



#### ● MGX1R5/MGX6

■ MGXS1R5, MGXW1R5, MGXS6 and MGXW6 has derating by input voltage is required. shown below.



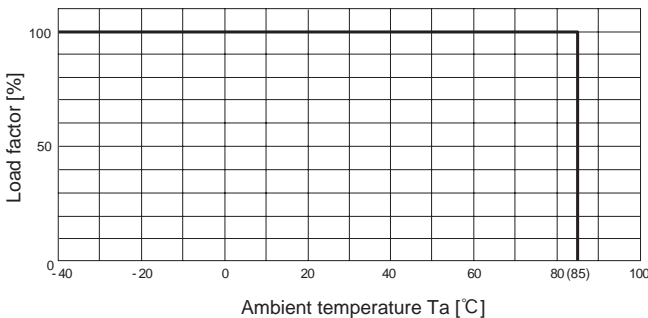
### Ambient temperature derating curve

■ It is necessary to note thermal fatigue life by power cycle. Please reduce the temperature fluctuation range as much as possible when the up and down of temperature are frequently generated.

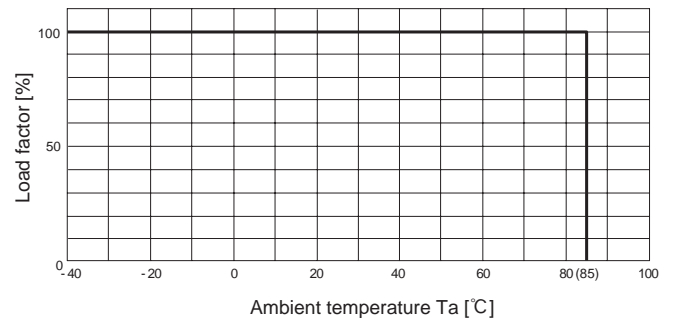
■ In case of forced air, ventilation must keep the temperature of point below the temperatures shown in Instruction Manual 7.

#### ● MGS1R5/MGW1R5 (Rated Input Voltage)

(1) In the case of Convection Cooling (Reference)

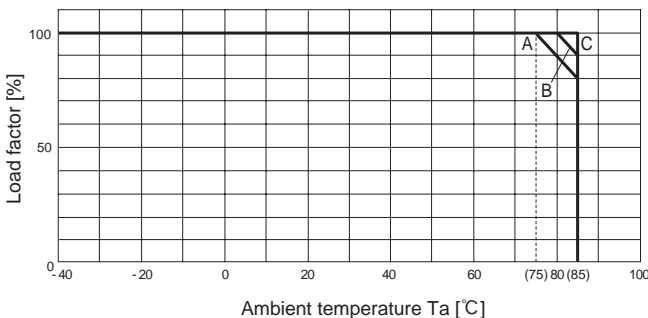


(2) In the case of Forced Air Cooling (1.0m/s) (Reference)

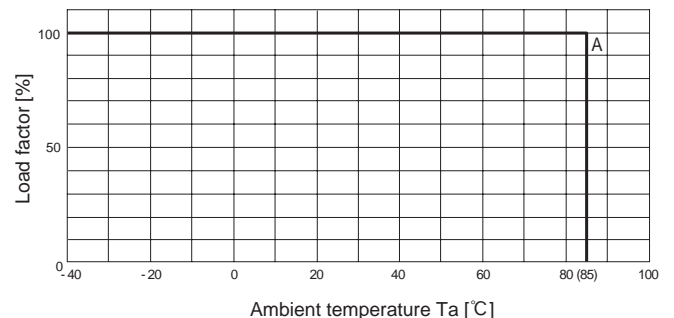


#### ● MGS3/MGW3 (Rated Input Voltage)

(1) In the case of Convection Cooling (Reference)



(2) In the case of Forced Air Cooling (1.0m/s) (Reference)



Output Voltage Input Voltage	3.3	5	12	15	±12	±15
5	B	B	C	C	B	B
12	B	C	C	C	B	C
24	B	C	C	C	B	C
48	A	A	C	C	B	C

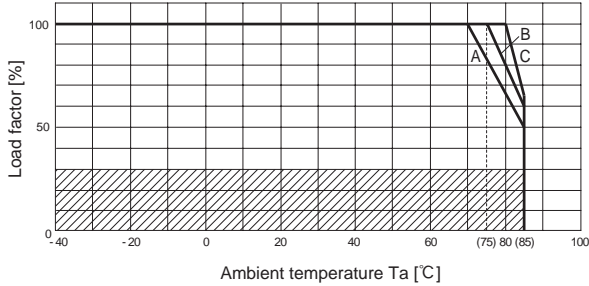
Output Voltage Input Voltage	3.3	5	12	15	±12	±15
5	A	A	A	A	A	A
12	A	A	A	A	A	A
24	A	A	A	A	A	A
48	A	A	A	A	A	A

Derating

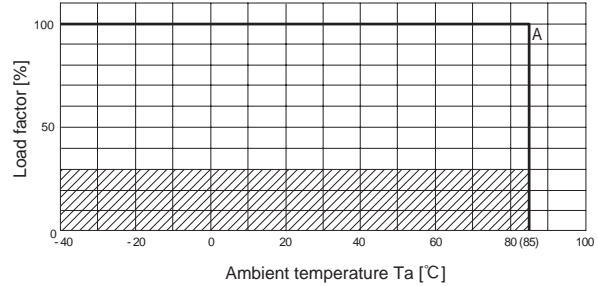
● MGS6/MGW6 (Rated Input Voltage)

■ In the hatched area, the specification of Ripple, Ripple Noise is different from other area.

(1) In the case of Convection Cooling (Reference)



(2) In the case of Forced Air Cooling (1.0m/s) (Reference)



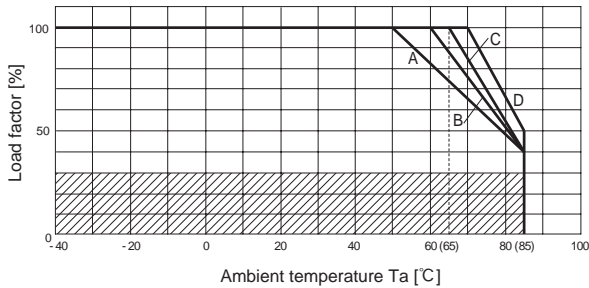
Output Voltage Input Voltage	3.3	5	12	15	±12	±15
5	A	B	B	C	C	C
12	A	B	C	C	C	C
24	A	B	C	C	C	C
48	A	A	C	C	C	C

Output Voltage Input Voltage	3.3	5	12	15	±12	±15
5	A	A	A	A	A	A
12	A	A	A	A	A	A
24	A	A	A	A	A	A
48	A	A	A	A	A	A

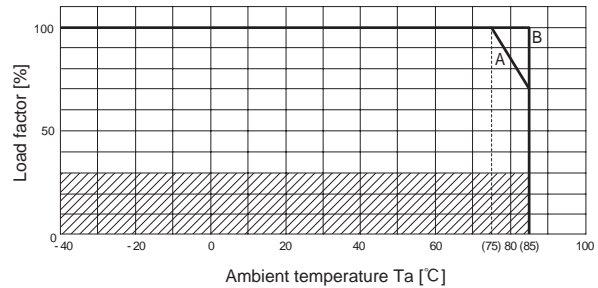
● MGS10/MGW10 (Rated Input Voltage)

■ In the hatched area, the specification of Ripple, Ripple Noise is different from other area.

(1) In the case of Convection Cooling (Reference)



(2) In the case of Forced Air Cooling (1.0m/s) (Reference)

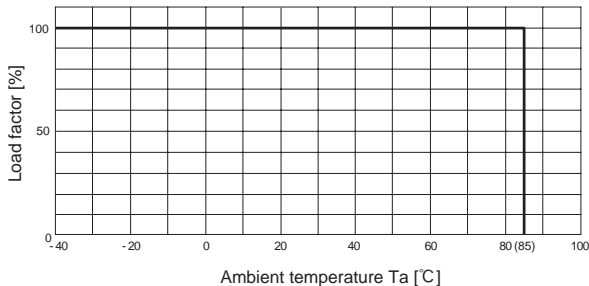


Output Voltage Input Voltage	3.3	5	12	15	±12	±15
5	A	A	A	A	A	A
12	C	C	C	D	B	B
24	B	C	C	D	B	C
48	B	C	C	D	B	C

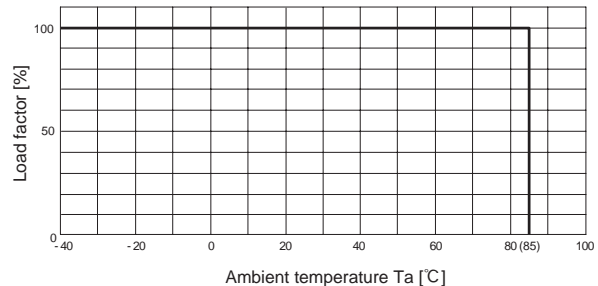
Output Voltage Input Voltage	3.3	5	12	15	±12	±15
5	A	A	A	A	A	A
12	B	B	B	B	B	B
24	B	B	B	B	B	B
48	B	B	B	B	B	B

● MGFS1R5/MGFW1R5 (Rated Input Voltage)

(1) In the case of Convection Cooling (Reference)



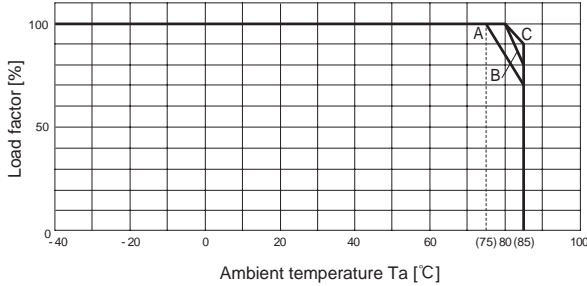
(2) In the case of Forced Air Cooling (1.0m/s) (Reference)



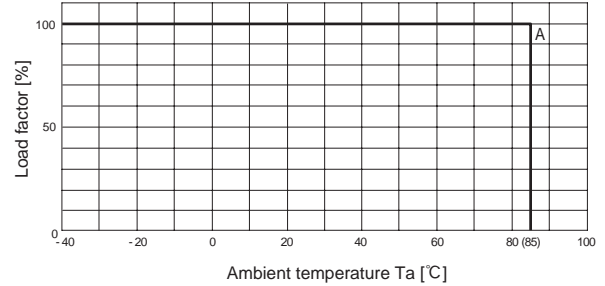
## Derating

### ● MGFS3/MGFW3 (Rated Input Voltage)

(1) In the case of Convection Cooling (Reference)



(2) In the case of Forced Air Cooling (1.0m/s) (Reference)



Output Voltage Input Voltage	3.3	5	12	15	±12	±15
12-24	A	A	C	C	C	C
24-48	A	A	B	B	B	B

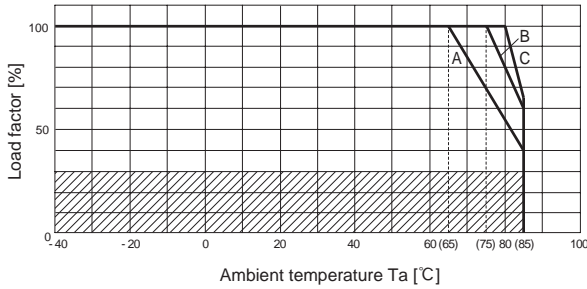
Output Voltage Input Voltage	3.3	5	12	15	±12	±15
12-24	A	A	A	A	A	A
24-48	A	A	A	A	A	A

MG

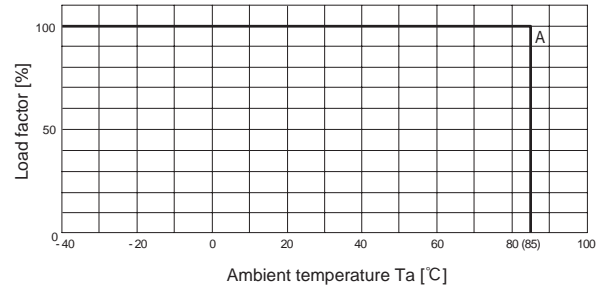
### ● MGFS6/MGFW6 (Rated Input Voltage)

■ In the hatched area, the specification of Ripple, Ripple Noise is different from other area.

(1) In the case of Convection Cooling (Reference)



(2) In the case of Forced Air Cooling (1.0m/s) (Reference)



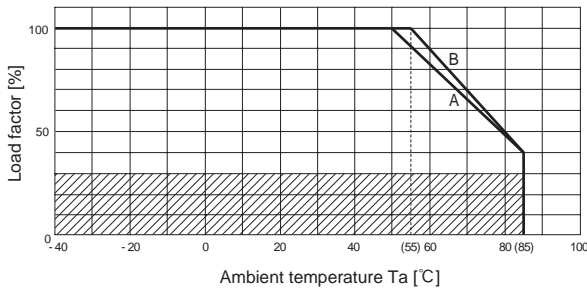
Output Voltage Input Voltage	3.3	5	12	15	±12	±15
12-24	A	A	C	C	C	C
24-48	A	A	C	C	B	B

Output Voltage Input Voltage	3.3	5	12	15	±12	±15
12-24	A	A	A	A	A	A
24-48	A	A	A	A	A	A

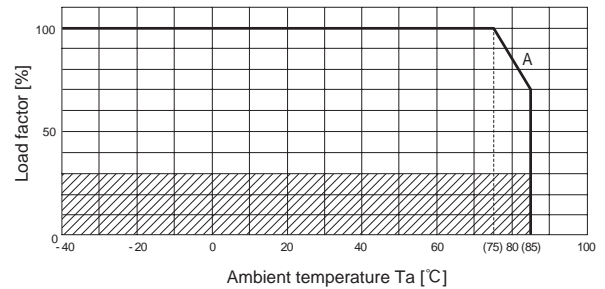
### ● MGFS10/MGFW10 (Rated Input Voltage)

■ In the hatched area, the specification of Ripple, Ripple Noise is different from other area.

(1) In the case of Convection Cooling (Reference)



(2) In the case of Forced Air Cooling (1.0m/s) (Reference)



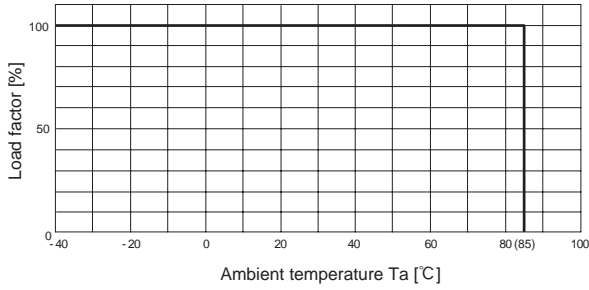
Output Voltage Input Voltage	3.3	5	12	15	±12	±15
12-24	B	B	B	B	A	A
24-48	B	B	B	B	B	B

Output Voltage Input Voltage	3.3	5	12	15	±12	±15
12-24	A	A	A	A	A	A
24-48	A	A	A	A	A	A

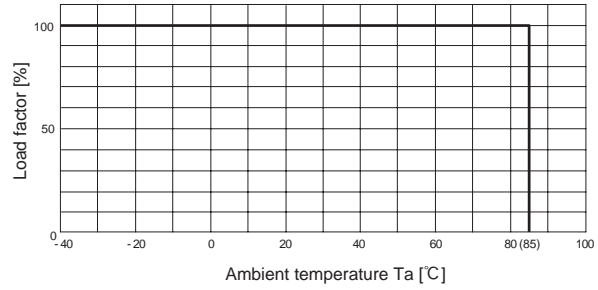
## Derating

### ● MGXS1R5/MGXW1R5 (Rated Input Voltage)

(1) In the case of Convection Cooling (Reference)



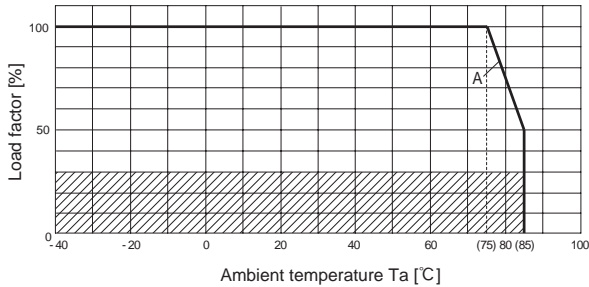
(2) In the case of Forced Air Cooling (1.0m/s) (Reference)



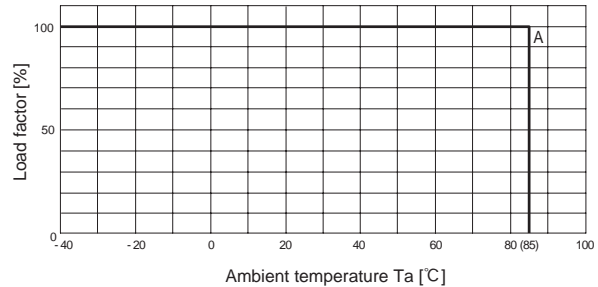
### ● MGXS6/MGFXW6 (Rated Input Voltage)

■ In the hatched area, the specification of Ripple, Ripple Noise is different from other area.

(1) In the case of Convection Cooling (Reference)



(2) In the case of Forced Air Cooling (1.0m/s) (Reference)



Output Voltage	3.3	5	12	15	±12	±15
Input Voltage	A	A	A	A	A	A
12-48	A	A	A	A	A	A

Output Voltage	3.3	5	12	15	±12	±15
Input Voltage	A	A	A	A	A	A
12-48	A	A	A	A	A	A

## Instruction Manual

◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual	<a href="https://en.cosel.co.jp/product/powersupply/MGS/">https://en.cosel.co.jp/product/powersupply/MGS/</a>
Instruction Manual	<a href="https://en.cosel.co.jp/product/powersupply/MGW/">https://en.cosel.co.jp/product/powersupply/MGW/</a>
Instruction Manual	<a href="https://en.cosel.co.jp/product/powersupply/MGFS/">https://en.cosel.co.jp/product/powersupply/MGFS/</a>
Instruction Manual	<a href="https://en.cosel.co.jp/product/powersupply/MGFW/">https://en.cosel.co.jp/product/powersupply/MGFW/</a>
Instruction Manual	<a href="https://en.cosel.co.jp/product/powersupply/MGXS/">https://en.cosel.co.jp/product/powersupply/MGXS/</a>
Instruction Manual	<a href="https://en.cosel.co.jp/product/powersupply/MGXW/">https://en.cosel.co.jp/product/powersupply/MGXW/</a>
Before using our product	<a href="https://en.cosel.co.jp/technical/caution/index.html">https://en.cosel.co.jp/technical/caution/index.html</a>

MGS



MGFS



MGXS



MGW



MGFW



MGXW



NOTICE



## Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz] (reference)	Input current [A]	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
					Material	Single sided	Double sided	Series operation	Parallel operation
MG1R5	Flyback converter	200-1500 *3	*1	-	glass fabric base,epoxy resin		Yes	Yes	*2
MGF1R5	Flyback converter	120-1500 *3	*1	-	glass fabric base,epoxy resin		Yes	Yes	*2
MGX1R5	Flyback converter	60-1000 *3	*1	-	glass fabric base,epoxy resin		Yes	Yes	*2
MG3	Flyback converter	200-1500 *3	*1	-	glass fabric base,epoxy resin		Yes	Yes	*2
MGF3	Flyback converter	120-1500 *3	*1	-	glass fabric base,epoxy resin		Yes	Yes	*2
MG6	Flyback converter	160-1500 *3	*1	-	glass fabric base,epoxy resin		Yes	Yes	*2
MGF6	Flyback converter	120-1500 *3	*1	-	glass fabric base,epoxy resin		Yes	Yes	*2
MGX6	Flyback converter	100-1000 *3	*1	-	glass fabric base,epoxy resin		Yes	Yes	*2
MG10	Flyback converter	160-1500 *3	*1	-	glass fabric base,epoxy resin		Yes	Yes	*2
MGF10	Flyback converter	120-1500 *3	*1	-	glass fabric base,epoxy resin		Yes	Yes	*2

\*1 Refer to Specification.

\*2 Refer to Instruction Manual.

\*3 The value changes depending on input and load.





# MGS15

MG S 15 24 05 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- G : Capacitor between Input and Output is removed.
- R : with Remote ON/OFF (Positive logic control)

MODEL	MGS15123R3	MGS151205	MGS151212	MGS151215	MGS15243R3	MGS152405	MGS152412	MGS152415	
MAX OUTPUT WATTAGE[W]	13.2	15	15.6	15	13.2	15	15.6	15	
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12	15
	CURRENT[A]	4	3	1.3	1	4	3	1.3	1

## SPECIFICATIONS

	MODEL	MGS15123R3	MGS151205	MGS151212	MGS151215	MGS15243R3	MGS152405	MGS152412	MGS152415	
INPUT	VOLTAGE[V]	DC9 - 18				DC18 - 36				
	CURRENT[A] *2	1.28typ	1.44typ	1.49typ	1.42typ	0.63typ	0.70typ	0.73typ	0.70typ	
	EFFICIENCY[%] *2	86typ	87typ	87typ	88typ	87typ	89typ	89typ	89typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	4	3	1.3	1	4	3	1.3	1	
	LINE REGULATION[mV]	13.2max	20max	48max	60max	13.2max	20max	48max	60max	
	LOAD REGULATION[mV]	13.2max	20max	48max	60max	13.2max	20max	48max	60max	
	RIPPLE[mVp-p] *3	-20 to +60°C	75max	75max	100max	100max	75max	75max	100max	100max
		-40 to -20°C	100max	100max	120max	120max	100max	100max	120max	120max
	RIPPLE NOISE[mVp-p] *3	-20 to +60°C	75max	75max	100max	100max	75max	75max	100max	100max
		-40 to -20°C	150max	150max	150max	150max	150max	150max	150max	150max
	TEMPERATURE REGULATION[mV]	-20 to +60°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +60°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	30max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) Available to adjust ±10% by external variable resistor									
OUTPUT VOLTAGE SETTING[V]*5	3.296 - 3.404	4.975 - 5.137	11.857 - 12.243	14.839 - 15.321	3.296 - 3.404	4.975 - 5.137	11.857 - 12.243	14.839 - 15.321		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)								

MODEL	MGS15483R3	MGS154805	MGS154812	MGS154815	
MAX OUTPUT WATTAGE[W]	13.2	15	15.6	15	
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15
	CURRENT[A]	4	3	1.3	1

## SPECIFICATIONS

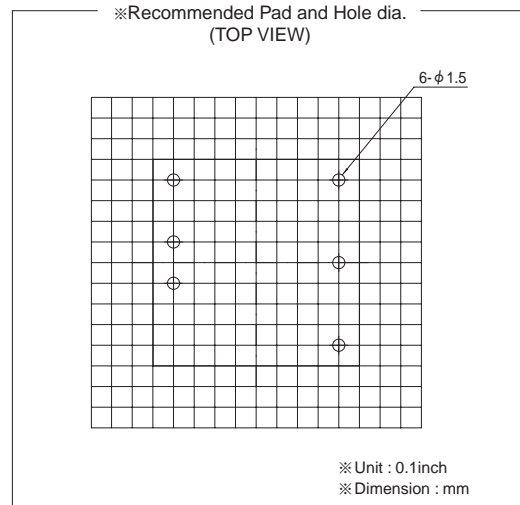
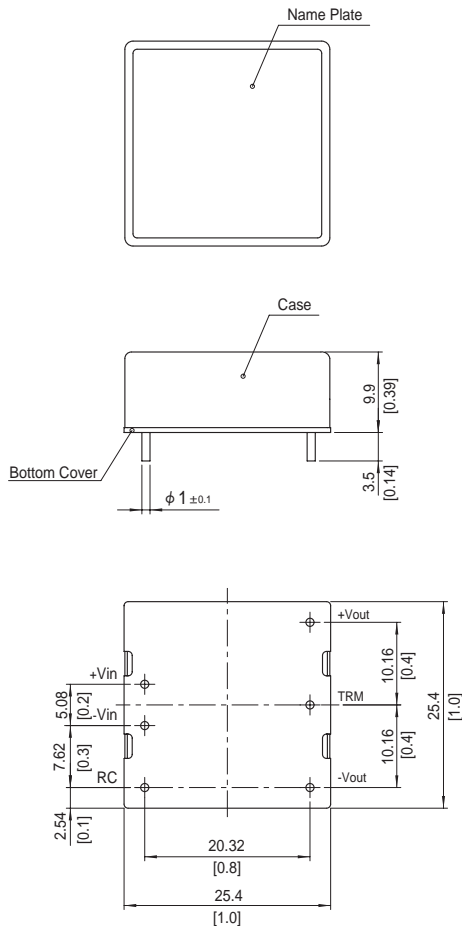
	MODEL	MGS15483R3	MGS154805	MGS154812	MGS154815	
INPUT	VOLTAGE[V]	DC36 - 76				
	CURRENT[A] *2	0.32typ	0.35typ	0.36typ	0.35typ	
	EFFICIENCY[%] *2	87typ	89typ	90typ	90typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	4	3	1.3	1	
	LINE REGULATION[mV]	13.2max	20max	48max	60max	
	LOAD REGULATION[mV]	13.2max	20max	48max	60max	
	RIPPLE[mVp-p] *3	-20 to +60°C	75max	75max	100max	100max
		-40 to -20°C	100max	100max	120max	120max
	RIPPLE NOISE[mVp-p] *3	-20 to +60°C	75max	75max	100max	100max
		-40 to -20°C	150max	150max	150max	150max
	TEMPERATURE REGULATION[mV]	-20 to +60°C	50max	50max	150max	180max
		-40 to +60°C	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max		
START-UP TIME[ms]	30max (Minimum input, Io=100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±10% adjustable by external VR					
OUTPUT VOLTAGE SETTING[V]*5	3.296 - 3.404	4.975 - 5.137	11.857 - 12.243	14.839 - 15.321		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)				

### GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	DC1,500V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
	INPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
	OUTPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	25.4 X 9.9 X 25.4mm [1 X 0.39 X 1 inches] (W X H X D) / 20g max
	COOLING METHOD	Convection/Forced air

- \*1 MGW15xx05/MGW15xx12/MGW15xx15 is available as single output, +10V/+24V/+30V
- \*2 Rated input 12V, 24V or 48V DC Io=100%
- \*3 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 22μF at 50mm from output pins. (20MHz Oscilloscope)
- \*4 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \*5 Rated input voltage (DC12V, DC24V, DC48V), rated output wattage, ambient temperature at 25°C.
- \* Parallel operation with other model is not possible.

### External view

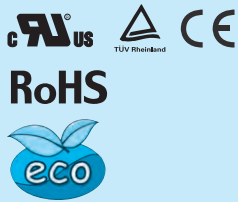


- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Bottom Cover : FR4 (t=0.6) [t=0.024]
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight 20g max

# MGW15

MG W 15 24 05 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- G : Capacitor between Input and Output is removed.
- R : with Remote ON/OFF (Positive logic control)

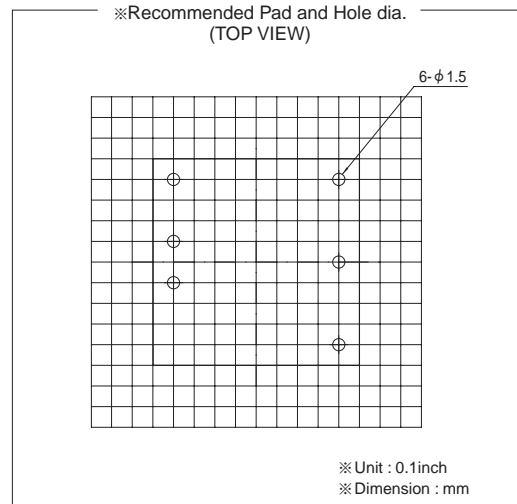
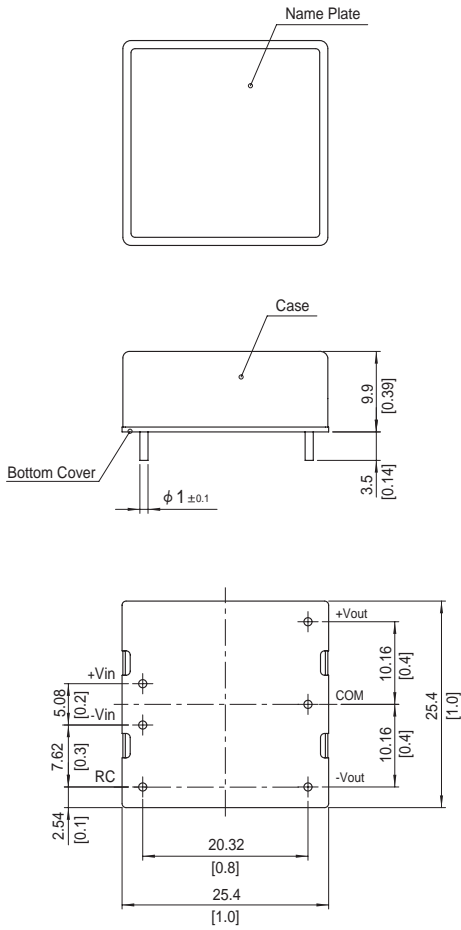
MODEL	MGW151205	MGW151212	MGW151215	MGW152405	MGW152412	MGW152415	MGW154805	MGW154812	MGW154815	
MAX OUTPUT WATTAGE[W]	15	15.6	15	15	15.6	15	15	15.6	15	
DC OUTPUT	VOLTAGE[V] *1	±5 or +10	±12 or +24	±15 or +30	±5 or +10	±12 or +24	±15 or +30	±5 or +10	±12 or +24	±15 or +30
	CURRENT[A]	1.5	0.65	0.5	1.5	0.65	0.5	1.5	0.65	0.5

## SPECIFICATIONS

	MODEL	MGW151205	MGW151212	MGW151215	MGW152405	MGW152412	MGW152415	MGW154805	MGW154812	MGW154815	
INPUT	VOLTAGE[V]	DC9 - 18			DC18 - 36			DC36 - 76			
	CURRENT[A] *2	1.48typ	1.49typ	1.42typ	0.74typ	0.74typ	0.70typ	0.37typ	0.37typ	0.35typ	
	EFFICIENCY[%] *2	84typ	87typ	88typ	84typ	88typ	89typ	84typ	89typ	89typ	
OUTPUT	VOLTAGE[V]	±5(+10)	±12(+24)	±15(+30)	±5(+10)	±12(+24)	±15(+30)	±5(+10)	±12(+24)	±15(+30)	
	CURRENT[A]	1.5	0.65	0.5	1.5	0.65	0.5	1.5	0.65	0.5	
	LINE REGULATION[mV]	40max	60max	75max	40max	60max	75max	40max	60max	75max	
	LOAD REGULATION[mV]	*3	500max *5	600max	750max	500max *5	600max	750max	500max *5	600max	750max
		*4	250max	480max	600max	250max	480max	600max	250max	480max	600max
	RIPPLE[mVp-p] *6	-20 to +60°C	100max	100max	100max	100max	100max	100max	100max	100max	100max
		-40 to -20°C	120max	120max	120max	120max	120max	120max	120max	120max	120max
	RIPPLE NOISE[mVp-p] *6	-20 to +60°C	100max	100max	100max	100max	100max	100max	100max	100max	100max
		-40 to -20°C	150max	150max	150max	150max	150max	150max	150max	150max	150max
	TEMPERATURE REGULATION[mV]	-20 to +60°C	50max	150max	180max	50max	150max	180max	50max	150max	180max
-40 to +60°C		80max	240max	290max	80max	240max	290max	80max	240max	290max	
DRIFT[mV] *7	50max	50max	60max	50max	50max	60max	50max	50max	60max		
START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)										
OUTPUT VOLTAGE SETTING[V]*8	4.935 - 5.240	11.765 - 12.492	14.602 - 15.505	4.935 - 5.240	11.765 - 12.492	14.602 - 15.505	4.935 - 5.240	11.765 - 12.492	14.602 - 15.505		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically									
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)									
ISOLATION	INPUT-OUTPUT	DC1,500V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)									
	INPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)									
	OUTPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)									
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max									
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max									
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis									
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis									
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1									
OTHERS	CASE SIZE/WEIGHT	25.4 × 9.9 × 25.4mm [1 × 0.39 × 1 inches] (W × H × D) / 20g max									
	COOLING METHOD	Convection/Forced air									

\*1 Single output +10V, +24V, +30V with no use of COM.  
 \*2 Rated input 12V, 24V or 48V I<sub>o</sub>=100%  
 \*3 An output load is 100%, the other load is 5% to 100%.  
 \*4 An output load is 100%, the other load is 20% to 100%.  
 \*5 Refer to the instruction manual 11.  
 \*6 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 22μF at 50mm from output pins. (20MHz Oscilloscope)  
 \*7 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.  
 \*8 Rated input voltage (DC12V, DC24V, DC48V), rated output wattage, ambient temperature at 25°C.  
 \* Parallel operation with other model is not possible.

External view



- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Bottom Cover : FR4 (t=0.6) [t=0.024]
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight 20g max

# MGS30

MG S 30 24 05 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- G : Capacitor between Input and Output is removed.
- R : with Remote ON/OFF (Positive logic control)

MODEL	MGS30123R3	MGS301205	MGS301212	MGS301215	MGS30243R3	MGS302405	MGS302412	MGS302415
MAX OUTPUT WATTAGE[W]	26.4	30	30	30	26.4	30	30	30
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12
	CURRENT[A]	8	6	2.5	2	8	6	2.5

## SPECIFICATIONS

	MODEL	MGS30123R3	MGS301205	MGS301212	MGS301215	MGS30243R3	MGS302405	MGS302412	MGS302415	
INPUT	VOLTAGE[V]	DC9 - 18				DC18 - 36				
	CURRENT[A] *2	2.45typ	2.75typ	2.78typ	2.78typ	1.21typ	1.36typ	1.36typ	1.36typ	
	EFFICIENCY[%] *2	90typ	91typ	90typ	90typ	91typ	92typ	92typ	92typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	8	6	2.5	2	8	6	2.5	2	
	LINE REGULATION[mV]	13.2max	20max	48max	60max	13.2max	20max	48max	60max	
	LOAD REGULATION[mV]	13.2max	20max	48max	60max	13.2max	20max	48max	60max	
	RIPPLE[mVp-p] *3	-20 to +60°C	75max	75max	100max	100max	75max	75max	100max	100max
		-40 to -20°C	100max	100max	120max	120max	100max	100max	120max	120max
	RIPPLE NOISE[mVp-p] *3	-20 to +60°C	75max	75max	100max	100max	75max	75max	100max	100max
		-40 to -20°C	150max	150max	150max	150max	150max	150max	150max	150max
	TEMPERATURE REGULATION[mV]	-20 to +60°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +60°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	30max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±10% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V]*5	3.296 - 3.404	4.975 - 5.137	11.857 - 12.243	14.839 - 15.321	3.296 - 3.404	4.975 - 5.137	11.857 - 12.243	14.839 - 15.321		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	OVERVOLTAGE PROTECTION	Works over 120 to 160% of rating								
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)								

MODEL	MGS30483R3	MGS304805	MGS304812	MGS304815
MAX OUTPUT WATTAGE[W]	26.4	30	30	30
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12
	CURRENT[A]	8	6	2.5

## SPECIFICATIONS

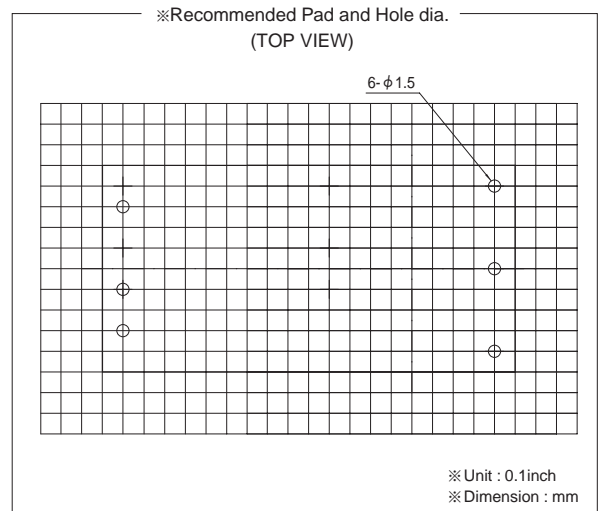
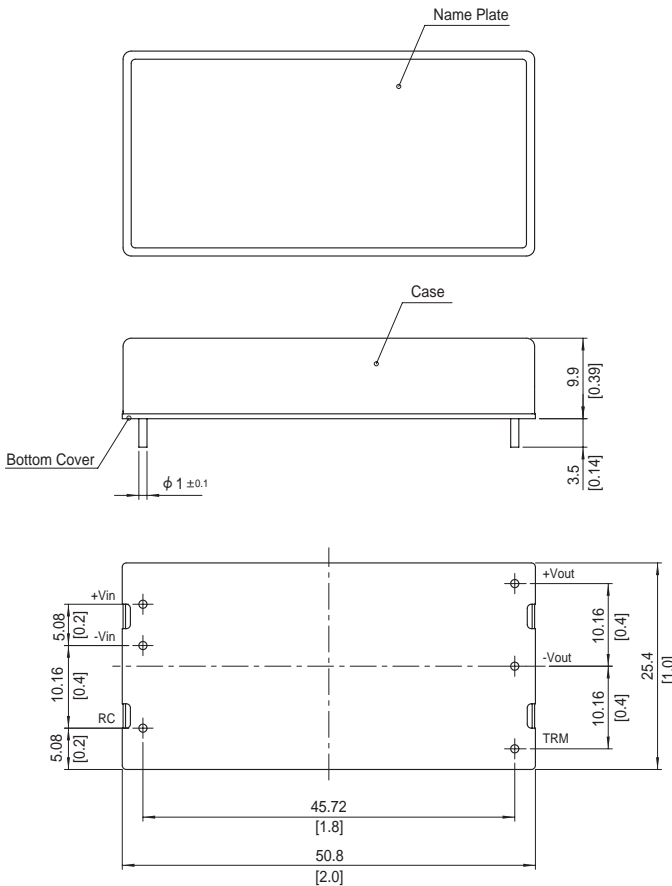
	MODEL	MGS30483R3	MGS304805	MGS304812	MGS304815	
INPUT	VOLTAGE[V]	DC36 - 76				
	CURRENT[A] *2	0.61typ	0.68typ	0.68typ	0.68typ	
	EFFICIENCY[%] *2	91typ	92typ	92typ	92typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	8	6	2.5	2	
	LINE REGULATION[mV]	13.2max	20max	48max	60max	
	LOAD REGULATION[mV]	13.2max	20max	48max	60max	
	RIPPLE[mVp-p] *3	-20 to +60°C	75max	75max	100max	100max
		-40 to -20°C	100max	100max	120max	120max
	RIPPLE NOISE[mVp-p] *3	-20 to +60°C	75max	75max	100max	100max
		-40 to -20°C	150max	150max	150max	150max
	TEMPERATURE REGULATION[mV]	-20 to +60°C	50max	50max	150max	180max
		-40 to +60°C	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max		
START-UP TIME[ms]	30max (Minimum input, Io=100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±10% adjustable by external VR					
OUTPUT VOLTAGE SETTING[V]*5	3.296 - 3.404	4.975 - 5.137	11.857 - 12.243	14.839 - 15.321		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION	Works over 120 to 160% of rating				
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)				

### GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	DC1,500V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
	INPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
	OUTPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	25.4 X 9.9 X 50.8mm [1 X 0.39 X 2 inches] (W X H X D) / 40g max
	COOLING METHOD	Convection/Forced air

- \*1 MGW30xx05/MGW30xx12/MGW30xx15 is available as single output, +10V/+24V/+30V
- \*2 Rated input 12V, 24V or 48V DC I<sub>o</sub>=100%
- \*3 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 22μF at 50mm from output pins. (20MHz Oscilloscope)
- \*4 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \*5 Rated input voltage (DC12V, DC24V, DC48V), rated output wattage, ambient temperature at 25°C.
- \* Parallel operation with other model is not possible.

### External view

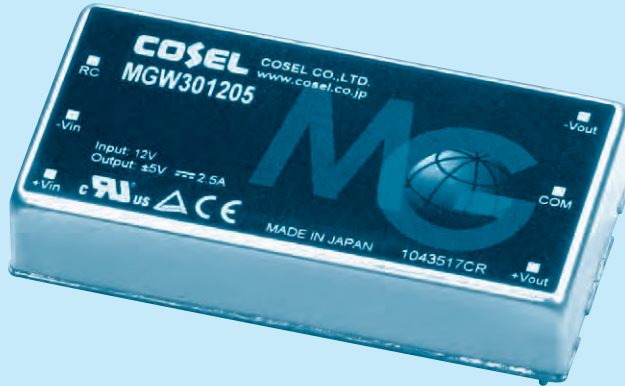


- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Bottom Cover : FR4 (t=0.6) [t=0.024]
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight 40g max

# MGW30

MG W 30 24 05 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- G : Capacitor between Input and Output is removed.
- R : with Remote ON/OFF (Positive logic control)

MG

MODEL	MGW301205	MGW301212	MGW301215	MGW302405	MGW302412	MGW302415	MGW304805	MGW304812	MGW304815	
MAX OUTPUT WATTAGE[W]	25	30	30	25	30	30	25	30	30	
DC OUTPUT	VOLTAGE[V] *1	±5 or +10	±12 or +24	±15 or +30	±5 or +10	±12 or +24	±15 or +30	±5 or +10	±12 or +24	±15 or +30
	CURRENT[A]	2.5	1.25	1	2.5	1.25	1	2.5	1.25	1

## SPECIFICATIONS

	MODEL	MGW301205	MGW301212	MGW301215	MGW302405	MGW302412	MGW302415	MGW304805	MGW304812	MGW304815	
INPUT	VOLTAGE[V]	DC9 - 18			DC18 - 36			DC36 - 76			
	CURRENT[A] *2	2.42typ	2.78typ	2.78typ	1.20typ	1.38typ	1.38typ	0.60typ	0.70typ	0.70typ	
	EFFICIENCY[%] *2	86typ	90typ	90typ	87typ	91typ	91typ	87typ	90typ	90typ	
OUTPUT	VOLTAGE[V]	±5(+10)	±12(+24)	±15(+30)	±5(+10)	±12(+24)	±15(+30)	±5(+10)	±12(+24)	±15(+30)	
	CURRENT[A]	2.5	1.25	1	2.5	1.25	1	2.5	1.25	1	
	LINE REGULATION[mV]	40max	60max	75max	40max	60max	75max	40max	60max	75max	
	LOAD REGULATION[mV]	*3	500max *5	600max	750max	500max *5	600max	750max	500max *5	600max	750max
		*4	250max	480max	600max	250max	480max	600max	250max	480max	600max
	RIPPLE[mVp-p] *6	-20 to +60°C	100max	100max	100max	100max	100max	100max	100max	100max	100max
		-40 to -20°C	120max	120max	120max	120max	120max	120max	120max	120max	120max
	RIPPLE NOISE[mVp-p] *6	-20 to +60°C	100max	100max	100max	100max	100max	100max	100max	100max	100max
		-40 to -20°C	150max	150max	150max	150max	150max	150max	150max	150max	150max
	TEMPERATURE REGULATION[mV]	-20 to +60°C	50max	150max	180max	50max	150max	180max	50max	150max	180max
-40 to +60°C		80max	240max	290max	80max	240max	290max	80max	240max	290max	
DRIFT[mV] *7	50max	50max	60max	50max	50max	60max	50max	50max	60max		
START-UP TIME[ms]	30max (Minimum input, Io=100%)										
OUTPUT VOLTAGE SETTING[V]*8	4.935 - 5.240	11.765 - 12.492	14.602 - 15.505	4.935 - 5.240	11.765 - 12.492	14.602 - 15.505	4.935 - 5.240	11.765 - 12.492	14.602 - 15.505		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically									
	OVERVOLTAGE PROTECTION	Works over 120 to 160% of rating (Total of +V and -V)									
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)									
ISOLATION	INPUT-OUTPUT	DC1,500V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)									
	INPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)									
	OUTPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)									
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max									
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max									
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis									
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis									
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1									
OTHERS	CASE SIZE/WEIGHT	25.4 X 9.9 X 50.8mm [1 X 0.39 X 2 inches] (W X H X D) / 40g max									
	COOLING METHOD	Convection/Forced air									

\*1 Single output +10V, +24V, +30V with no use of COM.

\*2 Rated input 12V, 24V or 48V DC Io=100%

\*3 Symmetrical loading from 5% to 100%.

\*4 Symmetrical loading from 20% to 100%.

\*5 Refer to the instruction manual 11.

\*6 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 22μF at 50mm from output pins. (20MHz Oscilloscope)

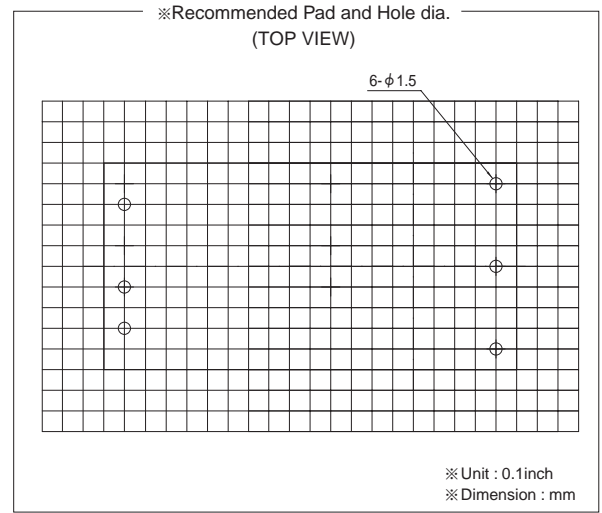
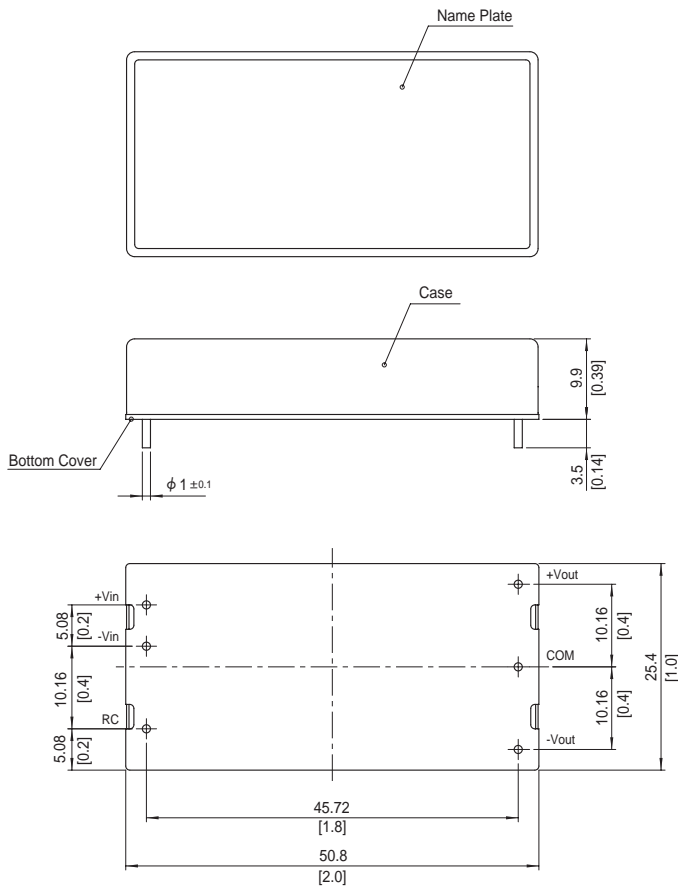
\*7 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.

\*8 Rated input voltage (DC12V, DC24V, DC48V), rated output wattage, ambient temperature at 25°C.

\* Parallel operation with other model is not possible.



External view



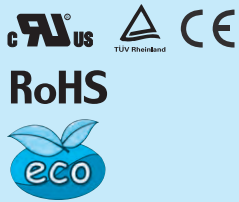
- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Bottom Cover : FR4 (t=0.6) [t=0.024]
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight 40g max

MG

# MGFS15

MGF S 15 24 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- G : Capacitor between Input and Output is removed.
- R : with Remote ON/OFF (Positive logic control)

MODEL	MGFS15243R3	MGFS152405	MGFS152412	MGFS152415
MAX OUTPUT WATTAGE[W]	13.2	15	15.6	15
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12
	CURRENT[A]	4	3	1.3

## SPECIFICATIONS

	MODEL	MGFS15243R3	MGFS152405	MGFS152412	MGFS152415	
INPUT	VOLTAGE[V]	DC9 - 36				
	CURRENT[A] *2	0.63typ	0.71typ	0.73typ	0.70typ	
	EFFICIENCY[%] *2	87typ	88typ	89typ	89typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	4	3	1.3	1	
	LINE REGULATION[mV]	13.2max	20max	48max	60max	
	LOAD REGULATION[mV]	13.2max	20max	48max	60max	
	RIPPLE[mVp-p]	-20 to +60°C	75max	75max	100max	100max
		*3 -40 to -20°C	100max	100max	120max	120max
	RIPPLE NOISE[mVp-p]	-20 to +60°C	75max	75max	100max	100max
		*3 -40 to -20°C	150max	150max	150max	150max
	TEMPERATURE REGULATION[mV]	-20 to +60°C	50max	50max	150max	180max
		-40 to +60°C	80max	80max	240max	290max
	DRIFT[mV] *4	20max	20max	48max	60max	
START-UP TIME[ms]	30max (Minimum input, Io=100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±10% adjustable by external VR					
OUTPUT VOLTAGE SETTING[V]*5	3.296 - 3.404	4.975 - 5.137	11.857 - 12.243	14.839 - 15.321		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)				

MODEL	MGFS15483R3	MGFS154805	MGFS154812	MGFS154815
MAX OUTPUT WATTAGE[W]	13.2	15	15.6	15
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12
	CURRENT[A]	4	3	1.3

## SPECIFICATIONS

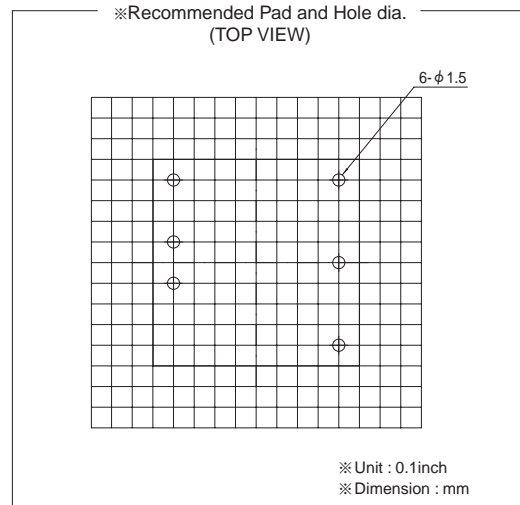
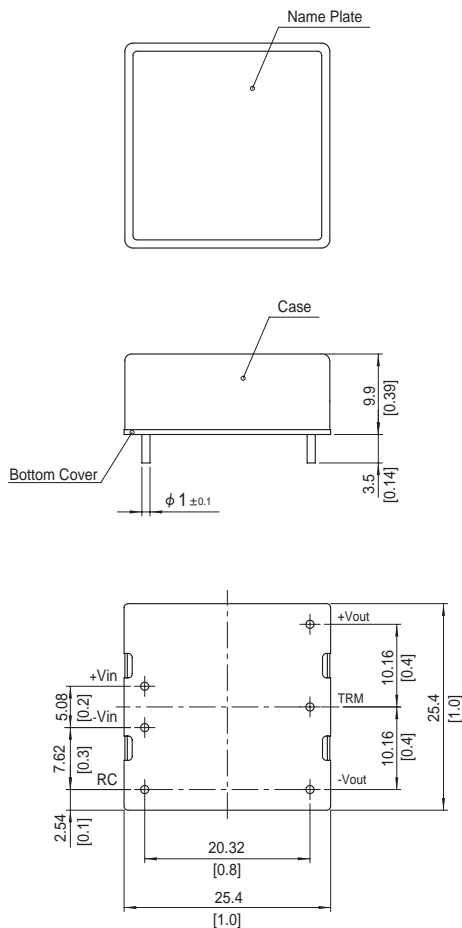
	MODEL	MGFS15483R3	MGFS154805	MGFS154812	MGFS154815	
INPUT	VOLTAGE[V]	DC18 - 76				
	CURRENT[A] *2	0.32typ	0.36typ	0.37typ	0.35typ	
	EFFICIENCY[%] *2	87typ	88typ	88typ	89typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	4	3	1.3	1	
	LINE REGULATION[mV]	13.2max	20max	48max	60max	
	LOAD REGULATION[mV]	13.2max	20max	48max	60max	
	RIPPLE[mVp-p]	-20 to +60°C	75max	75max	100max	100max
		*3 -40 to -20°C	100max	100max	120max	120max
	RIPPLE NOISE[mVp-p]	-20 to +60°C	75max	75max	100max	100max
		*3 -40 to -20°C	150max	150max	150max	150max
	TEMPERATURE REGULATION[mV]	-20 to +60°C	50max	50max	150max	180max
		-40 to +60°C	80max	80max	240max	290max
	DRIFT[mV] *4	20max	20max	48max	60max	
START-UP TIME[ms]	30max (Minimum input, Io=100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±10% adjustable by external VR					
OUTPUT VOLTAGE SETTING[V]*5	3.296 - 3.404	4.975 - 5.137	11.857 - 12.243	14.839 - 15.321		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)				

### GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	DC1,500V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
	INPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
	OUTPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	25.4 X 9.9 X 25.4mm [1 X 0.39 X 1 inches] (W X H X D) / 20g max
	COOLING METHOD	Convection/Forced air

- \*1 MGFW15xx05/MGFW15xx12/MGFW15xx15 is available as single output, +10V/+24V/+30V
- \*2 Rated input 12V, 24V or 48V DC Io=100%
- \*3 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 22μF at 50mm from output pins. (20MHz Oscilloscope)
- \*4 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \*5 Rated input voltage (DC24V, DC48V), rated output wattage, ambient temperature at 25°C.
- \* Parallel operation with other model is not possible.

### External view



- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Bottom Cover : FR4 (t=0.6) [t=0.024]
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight 20g max

# MGFW15

MGF W 15 24 05 -□



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- G : Capacitor between Input and Output is removed.
- R : with Remote ON/OFF (Positive logic control)

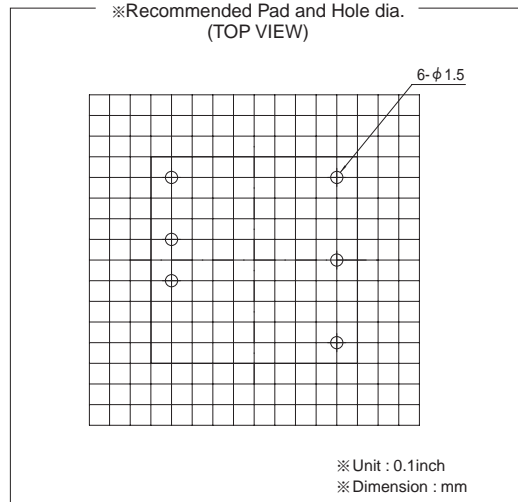
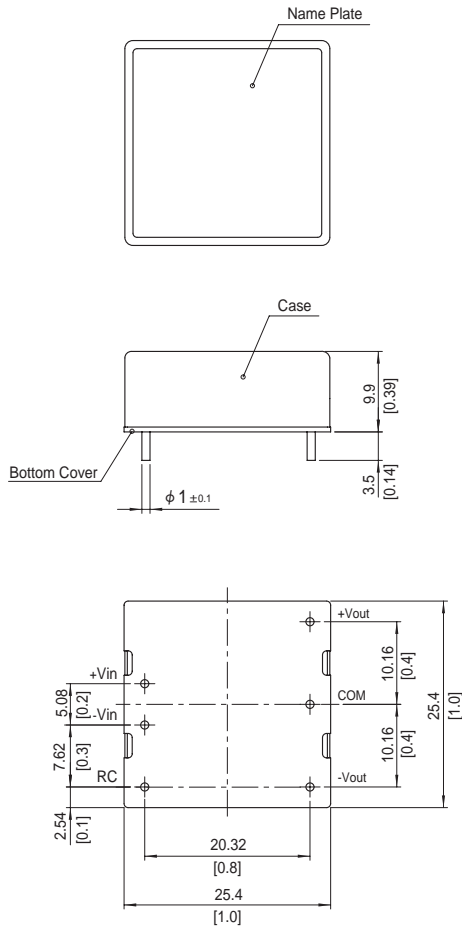
MODEL	MGFW152405	MGFW152412	MGFW152415	MGFW154805	MGFW154812	MGFW154815
MAX OUTPUT WATTAGE[W]	15	15.6	15	15	15.6	15
DC OUTPUT	VOLTAGE[V] *1	±5 or +10	±12 or +24	±15 or +30	±5 or +10	±12 or +24
	CURRENT[A]	1.5	0.65	0.5	1.5	0.65

## SPECIFICATIONS

	MODEL	MGFW152405	MGFW152412	MGFW152415	MGFW154805	MGFW154812	MGFW154815	
INPUT	VOLTAGE[V]	DC9 - 36			DC18 - 76			
	CURRENT[A] *2	0.74typ	0.74typ	0.70typ	0.37typ	0.37typ	0.36typ	
	EFFICIENCY[%] *2	84typ	88typ	89typ	84typ	87typ	88typ	
OUTPUT	VOLTAGE[V]	±5(+10)	±12(+24)	±15(+30)	±5(+10)	±12(+24)	±15(+30)	
	CURRENT[A]	1.5	0.65	0.5	1.5	0.65	0.5	
	LINE REGULATION[mV]	40max	60max	75max	40max	60max	75max	
	LOAD REGULATION[mV]	*3	500max *5	600max	750max	500max *5	600max	750max
		*4	250max	480max	600max	250max	480max	600max
	RIPPLE[mVp-p] *6	-20 to +60°C	100max	100max	100max	100max	100max	100max
		-40 to -20°C	120max	120max	120max	120max	120max	120max
	RIPPLE NOISE[mVp-p] *6	-20 to +60°C	100max	100max	100max	100max	100max	100max
		-40 to -20°C	150max	150max	150max	150max	150max	150max
	TEMPERATURE REGULATION[mV]	-20 to +60°C	50max	150max	180max	50max	150max	180max
		-40 to +60°C	80max	240max	290max	80max	240max	290max
DRIFT[mV] *7	50max	50max	60max	50max	50max	60max		
START-UP TIME[ms]	30max (Minimum input, Io=100%)							
OUTPUT VOLTAGE SETTING[V]*8	4.935 - 5.240	11.765 - 12.492	14.602 - 15.505	4.935 - 5.240	11.765 - 12.492	14.602 - 15.505		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically						
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)						
ISOLATION	INPUT-OUTPUT	DC1,500V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)						
	INPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)						
	OUTPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)						
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTIITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max						
	STORAGE TEMP.,HUMID.AND ALTIITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max						
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis						
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis						
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1						
OTHERS	CASE SIZE/WEIGHT	25.4×9.9×25.4mm [1×0.39×1 inches] (W×H×D) / 20g max						
	COOLING METHOD	Convection/Forced air						

\*1 Single output +10V, +24V, +30V with no use of COM.  
 \*2 Rated input 12V, 24V or 48V DC Io=100%  
 \*3 Symmetrical loading from 5% to 100%.  
 \*4 Symmetrical loading from 20% to 100%.  
 \*5 Refer to the instruction manual 11.  
 \*6 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 22μF at 50mm from output pins. (20MHz Oscilloscope)  
 \*7 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.  
 \*8 Rated input voltage (DC24V, DC48V), rated output wattage, ambient temperature at 25°C.  
 \* Parallel operation with other model is not possible.

External view

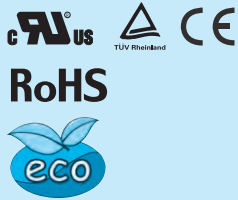


- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Bottom Cover : FR4 (t=0.6) [t=0.024]
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight 20g max

# MGFS30

MGF S 30 24 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- G : Capacitor between Input and Output is removed.
- R : with Remote ON/OFF (Positive logic control)

MODEL	MGFS30243R3	MGFS302405	MGFS302412	MGFS302415
MAX OUTPUT WATTAGE[W]	24.75	30	30	30
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12
	CURRENT[A]	7.5	6	2.5
				2

## SPECIFICATIONS

	MODEL	MGFS30243R3	MGFS302405	MGFS302412	MGFS302415	
INPUT	VOLTAGE[V]	DC9 - 36				
	CURRENT[A] *2	1.16typ	1.39typ	1.40typ	1.40typ	
	EFFICIENCY[%] *2	89typ	90typ	89typ	89typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	7.5	6	2.5	2	
	LINE REGULATION[mV]	13.2max	20max	48max	60max	
	LOAD REGULATION[mV]	13.2max	20max	48max	60max	
	RIPPLE[mVp-p]	-20 to +60°C	75max	75max	100max	100max
		*3 -40 to -20°C	100max	100max	120max	120max
	RIPPLE NOISE[mVp-p]	-20 to +60°C	75max	75max	100max	100max
		*3 -40 to -20°C	150max	150max	150max	150max
	TEMPERATURE REGULATION[mV]	-20 to +60°C	50max	50max	150max	180max
		-40 to +60°C	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max		
START-UP TIME[ms]	30max (Minimum input, Io=100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±10% adjustable by external VR					
OUTPUT VOLTAGE SETTING[V]*5	3.296 - 3.404	4.975 - 5.137	11.857 - 12.243	14.839 - 15.321		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION	Works over 120 to 160% of rating				
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)				

MODEL	MGFS30483R3	MGFS304805	MGFS304812	MGFS304815
MAX OUTPUT WATTAGE[W]	24.75	30	30	30
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12
	CURRENT[A]	7.5	6	2.5
				2

## SPECIFICATIONS

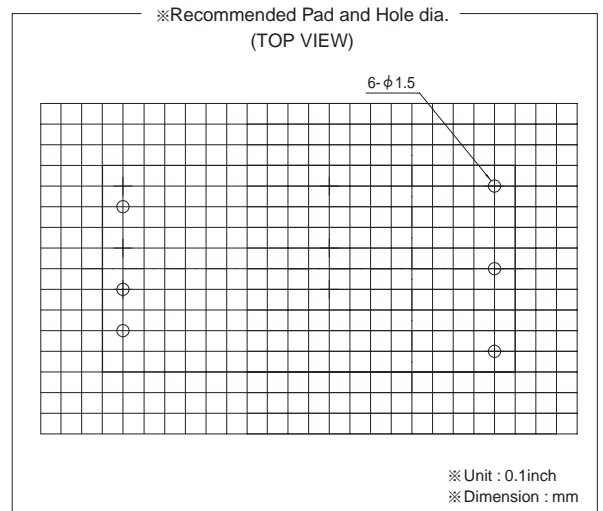
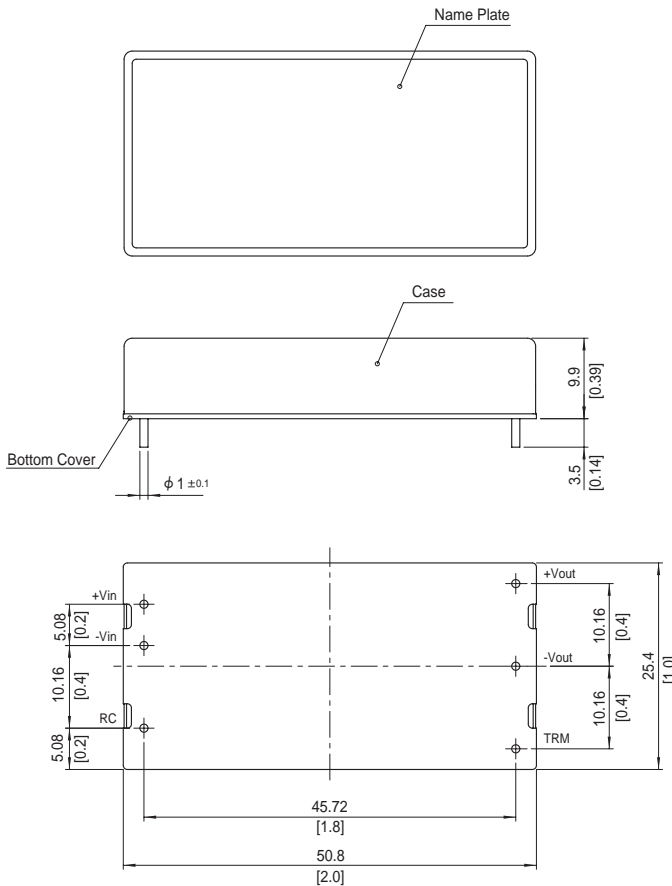
	MODEL	MGFS30483R3	MGFS304805	MGFS304812	MGFS304815	
INPUT	VOLTAGE[V]	DC18 - 76				
	CURRENT[A] *2	0.58typ	0.70typ	0.70typ	0.70typ	
	EFFICIENCY[%] *2	89typ	90typ	89typ	89typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	7.5	6	2.5	2	
	LINE REGULATION[mV]	13.2max	20max	48max	60max	
	LOAD REGULATION[mV]	13.2max	20max	48max	60max	
	RIPPLE[mVp-p]	-20 to +60°C	75max	75max	100max	100max
		*3 -40 to -20°C	100max	100max	120max	120max
	RIPPLE NOISE[mVp-p]	-20 to +60°C	75max	75max	100max	100max
		*3 -40 to -20°C	150max	150max	150max	150max
	TEMPERATURE REGULATION[mV]	-20 to +60°C	50max	50max	150max	180max
		-40 to +60°C	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max		
START-UP TIME[ms]	30max (Minimum input, Io=100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±10% adjustable by external VR					
OUTPUT VOLTAGE SETTING[V]*5	3.296 - 3.404	4.975 - 5.137	11.857 - 12.243	14.839 - 15.321		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION	Works over 120 to 160% of rating				
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)				

GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	DC1,500V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
	INPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
	OUTPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	25.4 X 9.9 X 50.8mm [1 X 0.39 X 2 inches] (W X H X D) / 40g max
	COOLING METHOD	Convection/Forced air

- \*1 MGF30xx05/MGF30xx12/MGF30xx15 is available as single output, +10V/+24V/+30V
- \*2 Rated input 12V, 24V or 48V DC Io=100%
- \*3 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 22μF at 50mm from output pins. (20MHz Oscilloscope)
- \*4 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \*5 Rated input voltage (DC24V, DC48V), rated output wattage, ambient temperature at 25°C.
- \* Parallel operation with other model is not possible.

External view

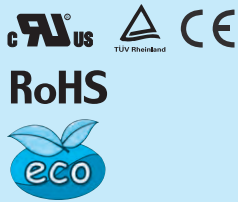


- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Bottom Cover : FR4 (t=0.6) [t=0.024]
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight 40g max

# MGFW30

MGF W 30 24 05 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- G : Capacitor between Input and Output is removed.
- R : with Remote ON/OFF (Positive logic control)

MODEL	MGFW302405	MGFW302412	MGFW302415	MGFW304805	MGFW304812	MGFW304815
MAX OUTPUT WATTAGE[W]	20	30	30	20	30	30
DC OUTPUT	VOLTAGE[V] *1	±5 or +10	±12 or +24	±15 or +30	±5 or +10	±12 or +24
	CURRENT[A]	2	1.25	1	2	1.25

## SPECIFICATIONS

	MODEL	MGFW302405	MGFW302412	MGFW302415	MGFW304805	MGFW304812	MGFW304815	
INPUT	VOLTAGE[V]	DC9 - 36			DC18 - 76			
	CURRENT[A] *2	0.98typ	1.42typ	1.44typ	0.49typ	0.71typ	0.72typ	
	EFFICIENCY[%] *2	85typ	88typ	87typ	85typ	88typ	87typ	
OUTPUT	VOLTAGE[V]	±5(+10)	±12(+24)	±15(+30)	±5(+10)	±12(+24)	±15(+30)	
	CURRENT[A]	2	1.25	1	2	1.25	1	
	LINE REGULATION[mV]	40max	60max	75max	40max	60max	75max	
	LOAD REGULATION[mV]	*3	500max *5	600max	750max	500max *5	600max	750max
		*4	250max	480max	600max	250max	480max	600max
	RIPPLE[mVp-p] *6	-20 to +60°C	100max	100max	100max	100max	100max	100max
		-40 to -20°C	120max	120max	120max	120max	120max	120max
	RIPPLE NOISE[mVp-p] *6	-20 to +60°C	100max	100max	100max	100max	100max	100max
		-40 to -20°C	150max	150max	150max	150max	150max	150max
	TEMPERATURE REGULATION[mV]	-20 to +60°C	50max	150max	180max	50max	150max	180max
		-40 to +60°C	80max	240max	290max	80max	240max	290max
DRIFT[mV] *7	50max	50max	60max	50max	50max	60max		
START-UP TIME[ms]	30max (Minimum input, Io=100%)							
OUTPUT VOLTAGE SETTING[V]*8	4.935 - 5.240	11.765 - 12.492	14.602 - 15.505	4.935 - 5.240	11.765 - 12.492	14.602 - 15.505		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically						
	OVERVOLTAGE PROTECTION	Works over 120 to 160% of rating (Total of +V and -V)						
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)						
ISOLATION	INPUT-OUTPUT	DC1,500V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)						
	INPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)						
	OUTPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)						
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max						
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max						
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis						
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis						
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1						
OTHERS	CASE SIZE/WEIGHT	25.4 X 9.9 X 50.8mm [1 X 0.39 X 2 inches] (W X H X D) / 40g max						
	COOLING METHOD	Convection/Forced air						

\*1 Single output +10V, +24V, +30V with no use of COM.

\*2 Rated input 12V, 24V or 48V DC Io=100%

\*3 Symmetrical loading from 5% to 100%.

\*4 Symmetrical loading from 20% to 100%.

\*5 Refer to the instruction manual 11.

\*6 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 22μF at 50mm from output pins. (20MHz Oscilloscope)

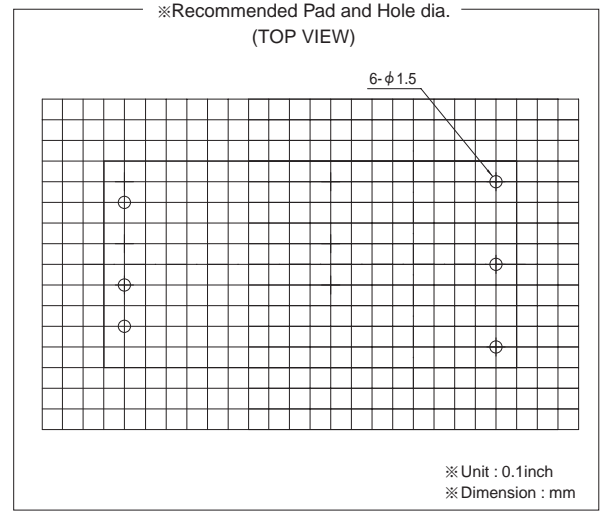
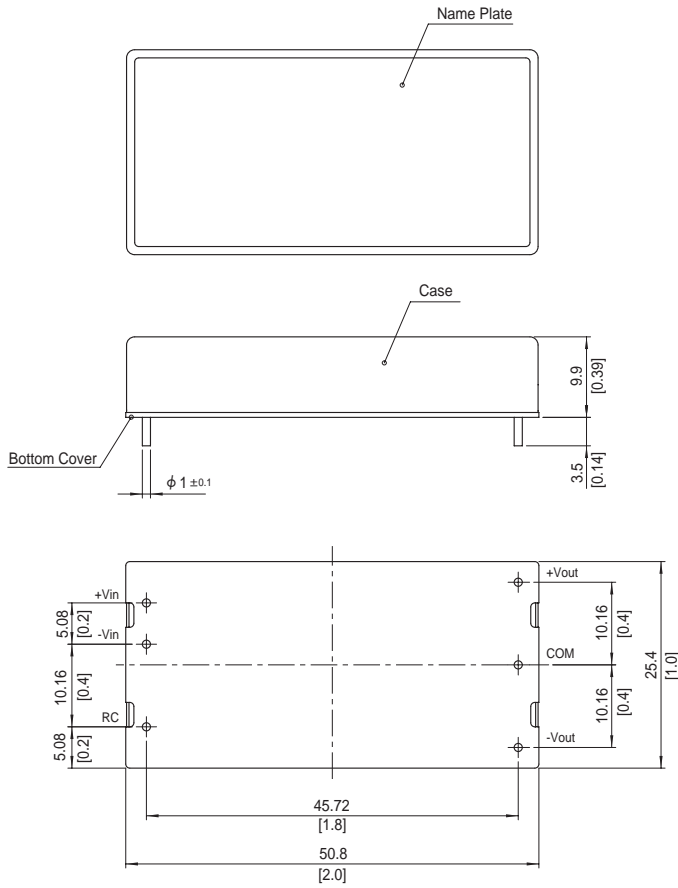
\*7 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.

\*8 Rated input voltage (DC24V, DC48V), rated output wattage, ambient temperature at 25°C.

\* Parallel operation with other model is not possible.



External view



- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Bottom Cover : FR4 (t=0.6) [t=0.024]
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight 40g max

MG

# MGFS40

MGF S 40 24 05 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- G : Capacitor between Input and Output is removed.
- R : with Remote ON/OFF (Positive logic control)

MODEL	MGFS40053R3	MGFS400505	MGFS400512	MGFS400515	MGFS40243R3	MGFS402405	MGFS402412	MGFS402415
MAX OUTPUT WATTAGE[W]	26.4	30	30	30	33	40	40.8	40.5
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12
	CURRENT[A]	8	6	2.5	2	10	8	3.4

## SPECIFICATIONS

	MODEL	MGFS40053R3	MGFS400505	MGFS400512	MGFS400515	MGFS40243R3	MGFS402405	MGFS402412	MGFS402415	
INPUT	VOLTAGE[V]	DC4.5 - 13 (Surge Voltage 15V, 100ms max)				DC9 - 36 (Surge Voltage 50V, 100ms max)				
	CURRENT[A] *2	6.21typ	6.90typ	6.90typ	6.82typ	1.54typ	1.83typ	1.85typ	1.83typ	
	EFFICIENCY[%] *2	85typ	87typ	87typ	88typ	89typ	91typ	92typ	92typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	8	6	2.5	2	10	8	3.4	2.7	
	LINE REGULATION[mV]	13.2max	20max	48max	60max	13.2max	20max	48max	60max	
	LOAD REGULATION[mV]	13.2max	20max	48max	60max	13.2max	20max	48max	60max	
	RIPPLE[mVp-p]	-20 to +60°C	75max	75max	100max	100max	75max	75max	100max	100max
		*3 -40 to -20°C	100max	100max	120max	120max	100max	100max	120max	120max
	RIPPLE NOISE[mVp-p]	-20 to +60°C	75max	75max	100max	100max	75max	75max	100max	100max
		*3 -40 to -20°C	150max	150max	150max	150max	150max	150max	150max	150max
	TEMPERATURE REGULATION[mV]	-20 to +60°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +60°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV]	*4	20max	20max	48max	60max	20max	20max	48max	60max	
START-UP TIME[ms]		30max (Minimum input, Rated load)								
OUTPUT VOLTAGE ADJUSTMENT RANGE		Fixed (TRM pin open) ±10% adjustable by external VR								
OUTPUT VOLTAGE SETTING[V]*5		3.296 - 3.404	4.975 - 5.137	11.857 - 12.243	14.839 - 15.321	3.296 - 3.404	4.975 - 5.137	11.857 - 12.243	14.839 - 15.321	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	OVERVOLTAGE PROTECTION	Work over 115 to 140% of rating								
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)								

MODEL	MGFS40483R3	MGFS404805	MGFS404812	MGFS404815
MAX OUTPUT WATTAGE[W]	33	40	40.8	40.5
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12
	CURRENT[A]	10	8	3.4

## SPECIFICATIONS

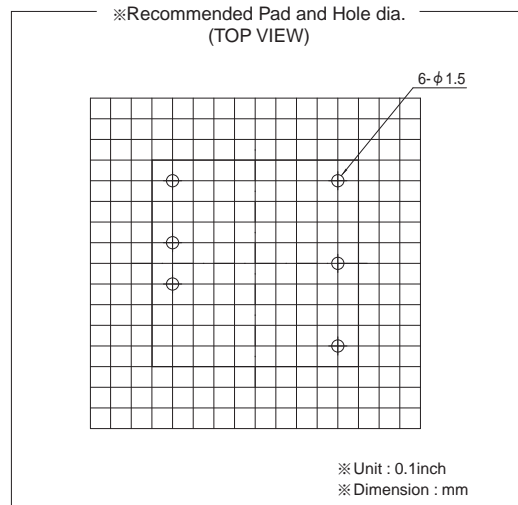
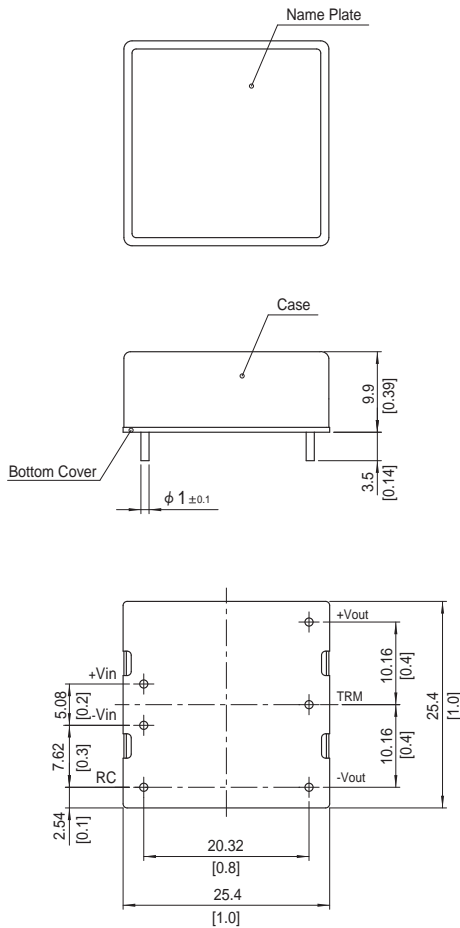
	MODEL	MGFS40483R3	MGFS404805	MGFS404812	MGFS404815	
INPUT	VOLTAGE[V]	DC18 - 76 (Surge Voltage 100V, 100ms max)				
	CURRENT[A] *2	0.77typ	0.92typ	0.92typ	0.92typ	
	EFFICIENCY[%] *2	89typ	91typ	92typ	92typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	10	8	3.4	2.7	
	LINE REGULATION[mV]	13.2max	20max	48max	60max	
	LOAD REGULATION[mV]	13.2max	20max	48max	60max	
	RIPPLE[mVp-p]	-20 to +60°C	75max	75max	100max	100max
		*3 -40 to -20°C	100max	100max	120max	120max
	RIPPLE NOISE[mVp-p]	-20 to +60°C	75max	75max	100max	100max
		*3 -40 to -20°C	150max	150max	150max	150max
	TEMPERATURE REGULATION[mV]	-20 to +60°C	50max	50max	150max	180max
		-40 to +60°C	80max	80max	240max	290max
DRIFT[mV]	*4	20max	20max	48max	60max	
START-UP TIME[ms]		30max (Minimum input, Rated load)				
OUTPUT VOLTAGE ADJUSTMENT RANGE		Fixed (TRM pin open) ±10% adjustable by external VR				
OUTPUT VOLTAGE SETTING[V]*5		3.296 - 3.404	4.975 - 5.137	11.857 - 12.243	14.839 - 15.321	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION	Work over 115 to 140% of rating				
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)				

GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	DC1,500V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
	INPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
	OUTPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL62368-1, C-UL(CSA62368-1), EN62368-1
OTHERS	CASE SIZE/WEIGHT	25.4 X 9.9 X 25.4mm (W X H X D) / 30g max
	COOLING METHOD	Convection/Forced air

- \*1 MGF40xx12/MGF40xx15 is available as single output +24V/+30V
- \*2 Rated input voltage (DC5V, DC24V, DC48V) I<sub>o</sub>=100%
- \*3 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 22μF and Recommended Capacitance at 50mm from output pins. (20MHz Oscilloscope)
- \*4 Drift is the DC output accuracy for eight hour period after a half-hour warm-up at 25°C
- \*5 Rated input voltage (DC5V, DC24V, DC48V), rated output wattage, ambient temperature at 25°C
- \* Parallel operation with other model is not possible.

External view

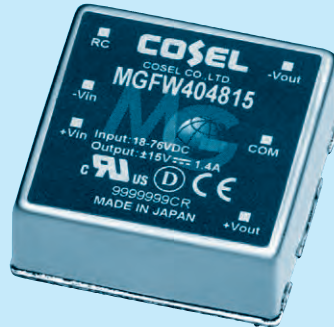


- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Bottom Cover : FR4 (t=0.6) [t=0.024]
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight 30g max

# MGFW40

MGF W 40 24 12 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- G : Capacitor between Input and Output is removed.
- R : with Remote ON/OFF (Positive logic control)

MG

MODEL	MGFW400512	MGFW400515	MGFW402412	MGFW402415	MGFW404812	MGFW404815	
MAX OUTPUT WATTAGE[W]	31.2	30	40.8	42	40.8	42	
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30
	CURRENT[A]	1.3	1	1.7	1.4	1.7	1.4

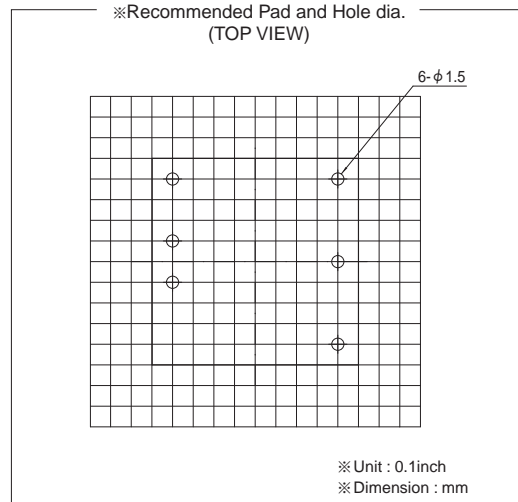
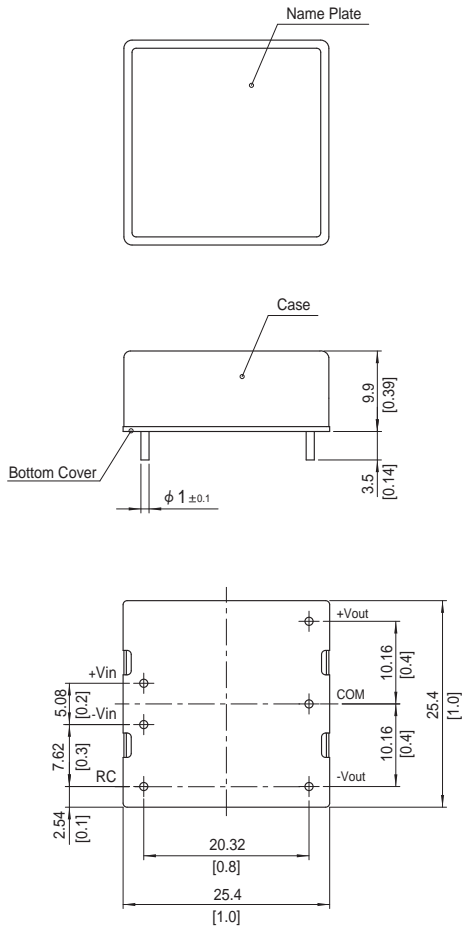
## SPECIFICATIONS

	MODEL	MGFW400512	MGFW400515	MGFW402412	MGFW402415	MGFW404812	MGFW404815	
INPUT	VOLTAGE[V]	DC4.5 - 13 (Surge Voltage 15V, 100ms max)		DC9 - 36 (Surge Voltage 50V, 100ms max)		DC18 - 76 (Surge Voltage 100V, 100ms max)		
	CURRENT[A] *2	7.26typ	6.90typ	1.87typ	1.92typ	0.93typ	0.96typ	
	EFFICIENCY[%] *2	86typ	87typ	91typ	91typ	91typ	91typ	
OUTPUT	VOLTAGE[V]	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	
	CURRENT[A]	1.3	1	1.7	1.4	1.7	1.4	
	LINE REGULATION[mV]	60max	75max	60max	75max	60max	75max	
	LOAD REGULATION[mV]	*3	600max	750max	600max	750max	600max	750max
		*4	480max	600max	480max	600max	480max	600max
	RIPPLE[mVp-p] *5	-20 to +60°C	100max	100max	100max	100max	100max	100max
		-40 to -20°C	120max	120max	120max	120max	120max	120max
	RIPPLE NOISE[mVp-p] *5	-20 to +60°C	100max	100max	100max	100max	100max	100max
		-40 to -20°C	150max	150max	150max	150max	150max	150max
	TEMPERATURE REGULATION[mV]	-20 to +60°C	150max	180max	150max	180max	150max	180max
		-40 to +60°C	240max	290max	240max	290max	240max	290max
DRIFT[mV] *6	50max	60max	50max	60max	50max	60max		
START-UP TIME[ms]	30max (Minimum input, Rated load)							
OUTPUT VOLTAGE SETTING[V]*7	11.765 - 12.492	14.602 - 15.505	11.765 - 12.492	14.602 - 15.505	11.765 - 12.492	14.602 - 15.505		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically						
	OVERVOLTAGE PROTECTION	Work over 115 to 140% of rating (Total of +Vo and -Vo)						
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)						
ISOLATION	INPUT-OUTPUT	DC1,500V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)						
	INPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)						
	OUTPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)						
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max						
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max						
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis						
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis						
SAFETY	AGENCY APPROVALS	UL62368-1, C-UL (CSA62368-1), EN62368-1						
OTHERS	CASE SIZE/WEIGHT	25.4 × 9.9 × 25.4mm (W × H × D) / 30g max						
	COOLING METHOD	Convection/Forced air						

\*1 Single output +24V/+30V with no use of COM  
 \*2 Rated input voltage(DC5V, DC24V, DC48V) Io=100%  
 \*3 Symmetrical loading from 0% to 100%  
 \*4 Symmetrical loading from 20% to 100%  
 \*5 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 22μF and Recommended Capacitance at 50mm from output pins. (20MHz Oscilloscope)  
 \*6 Drift is the DC output accuracy for eight hour period after a half-hour warm-up at 25°C

\*7 Rated input voltage (DC5V, DC24V, DC48V), rated output wattage, ambient temperature at 25°C  
 \* Parallel operation with other model is not possible.

External view



- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Bottom Cover : FR4 (t=0.6) [t=0.024]
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight 30g max

MG

# MGFS80

MGF S 80 24 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- G : Capacitor between Input and Output is removed.
- R : with Remote ON/OFF (Positive logic control)

MODEL	MGFS80243R3	MGFS802405	MGFS802412	MGFS802415
MAX OUTPUT WATTAGE[W]	59.4	80	80.4	81
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12
	CURRENT[A]	18	16	6.7
				5.4

## SPECIFICATIONS

	MODEL	MGFS80243R3	MGFS802405	MGFS802412	MGFS802415	
INPUT	VOLTAGE[V]	DC9 - 36 (Surge Voltage 50V, 100ms max)				
	CURRENT[A] *2	2.69typ	3.60typ	3.56typ	3.59typ	
	EFFICIENCY[%] *2	92typ	93typ	94typ	94typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	18	16	6.7	5.4	
	LINE REGULATION[mV]	13.2max	20max	48max	60max	
	LOAD REGULATION[mV]	20max	20max	48max	60max	
	RIPPLE[mVp-p] *3	-20 to +60°C	75max	75max	100max	100max
		-40 to -20°C	100max	100max	120max	120max
		Io=0 to 10%	200max	200max	240max	240max
	RIPPLE NOISE[mVp-p] *3	-20 to +60°C	75max	75max	100max	100max
		-40 to -20°C	150max	150max	150max	150max
		Io=0 to 10%	250max	250max	270max	270max
	TEMPERATURE REGULATION[mV]	-20 to +60°C	50max	50max	150max	180max
		-40 to +60°C	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max		
START-UP TIME[ms]	30max (Minimum input, Rated load)					
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±10% adjustable by external VR					
OUTPUT VOLTAGE SETTING[V]*5	3.296 - 3.404	4.975 - 5.137	11.857 - 12.243	14.839 - 15.321		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION	Work over 115 to 140% of rating				
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)				

MODEL	MGFS80483R3	MGFS804805	MGFS804812	MGFS804815
MAX OUTPUT WATTAGE[W]	59.4	80	80.4	81
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12
	CURRENT[A]	18	16	6.7
				5.4

## SPECIFICATIONS

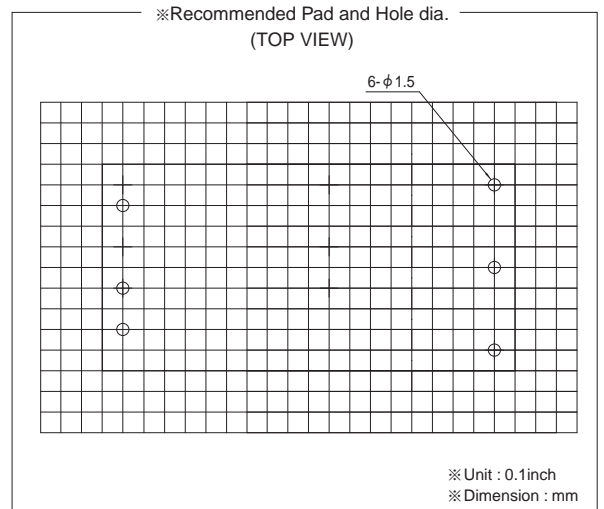
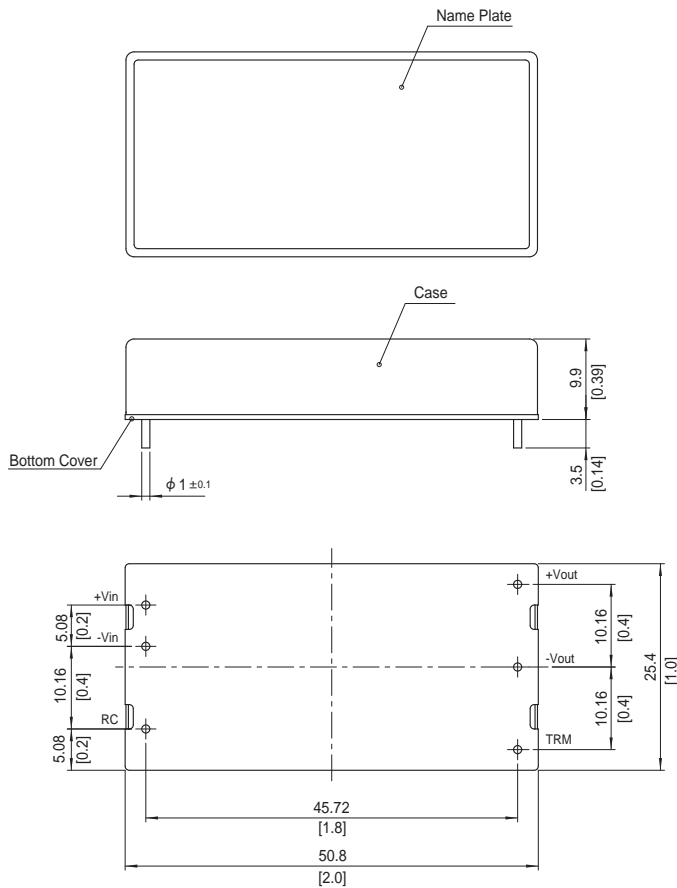
	MODEL	MGFS80483R3	MGFS804805	MGFS804812	MGFS804815	
INPUT	VOLTAGE[V]	DC18 - 76 (Surge Voltage 100V, 100ms max)				
	CURRENT[A] *2	1.35typ	1.80typ	1.78typ	1.80typ	
	EFFICIENCY[%] *2	92typ	93typ	94typ	94typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	18	16	6.7	5.4	
	LINE REGULATION[mV]	13.2max	20max	48max	60max	
	LOAD REGULATION[mV]	20max	20max	48max	60max	
	RIPPLE[mVp-p] *3	-20 to +60°C	75max	75max	100max	100max
		-40 to -20°C	100max	100max	120max	120max
		Io=0 to 10%	200max	200max	240max	240max
	RIPPLE NOISE[mVp-p] *3	-20 to +60°C	75max	75max	100max	100max
		-40 to -20°C	150max	150max	150max	150max
		Io=0 to 10%	250max	250max	270max	270max
	TEMPERATURE REGULATION[mV]	-20 to +60°C	50max	50max	150max	180max
		-40 to +60°C	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max		
START-UP TIME[ms]	30max (Minimum input, Rated load)					
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±10% adjustable by external VR					
OUTPUT VOLTAGE SETTING[V]*5	3.296 - 3.404	4.975 - 5.137	11.857 - 12.243	14.839 - 15.321		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION	Work over 115 to 140% of rating				
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)				

**GENERAL SPECIFICATIONS**

ISOLATION	INPUT-OUTPUT	DC1,500V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
	INPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
	OUTPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL62368-1, C-UL(CSA62368-1), EN62368-1
OTHERS	CASE SIZE/WEIGHT	25.4 X 9.9 X 50.8mm (W X H X D) / 50g max
	COOLING METHOD	Convection/Forced air

- \*1 MGF80xx12/MGF80xx15 is available as single output +24V/+30V
- \*2 Rated input voltage (DC24V, DC48V) Io=100%
- \*3 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 22μF and Recommended Capacitance at 50mm from output pins. (20MHz Oscilloscope)
- \*4 Drift is the DC output accuracy for eight hour period after a half-hour warm-up at 25°C
- \*5 Rated input voltage (DC24V, DC48V), rated output wattage, ambient temperature at 25°C
- \* Parallel operation with other model is not possible.

**External view**



- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Bottom Cover : FR4 (t=0.6) [t=0.024]
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight 50g max

# MGFW80

MGF W 80 24 12 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- G : Capacitor between Input and Output is removed.
- R : with Remote ON/OFF (Positive logic control)

MODEL	MGFW802412	MGFW802415	MGFW804812	MGFW804815
MAX OUTPUT WATTAGE[W]	81.6	81	81.6	81
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±15 or +30
	CURRENT[A]	3.4	2.7	3.4

## SPECIFICATIONS

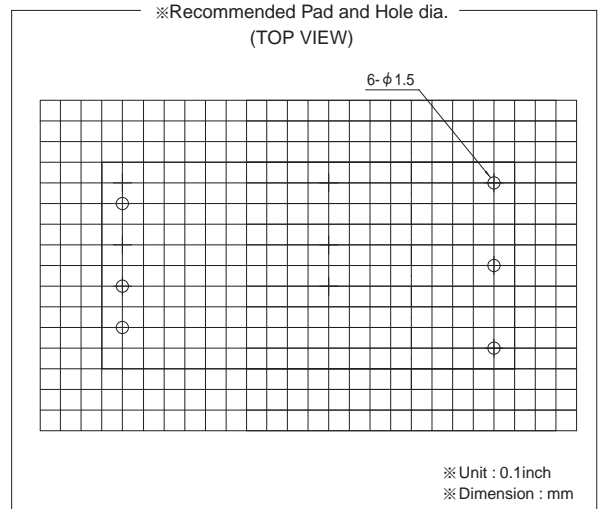
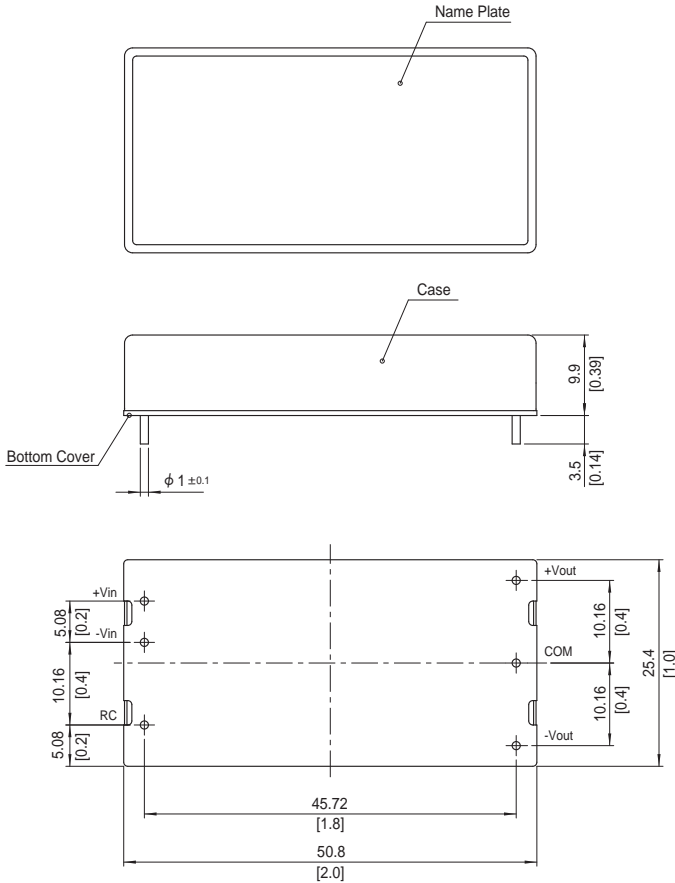
	MODEL	MGFW802412	MGFW802415	MGFW804812	MGFW804815	
INPUT	VOLTAGE[V]	DC9 - 36 (Surge Voltage 50V, 100ms max)		DC18 - 76 (Surge Voltage 100V, 100ms max)		
	CURRENT[A] *2	3.62typ	3.59typ	1.81typ	1.80typ	
	EFFICIENCY[%] *2	94typ	94typ	94typ	94typ	
OUTPUT	VOLTAGE[V]	±12 or +24	±15 or +30	±12 or +24	±15 or +30	
	CURRENT[A]	3.4	2.7	3.4	2.7	
	LINE REGULATION[mV]	60max	75max	60max	75max	
	LOAD REGULATION[mV]	*3	600max	750max	600max	750max
		*4	480max	600max	480max	600max
	RIPPLE[mVp-p]	-20 to +60°C	100max	100max	100max	100max
		-40 to -20°C	120max	120max	120max	120max
		Io=0 to 10%	240max	240max	240max	240max
	RIPPLE NOISE[mVp-p]	-20 to +60°C	100max	100max	100max	100max
		-40 to -20°C	150max	150max	150max	150max
Io=0 to 10%		270max	270max	270max	270max	
TEMPERATURE REGULATION[mV]	-20 to +60°C	150max	180max	150max	180max	
	-40 to +60°C	240max	290max	240max	290max	
DRIFT[mV] *6	50max	60max	50max	60max		
START-UP TIME[ms]	30max (Minimum input, Rated load)					
OUTPUT VOLTAGE SETTING[V]*7	11.765 - 12.492	14.602 - 15.505	11.765 - 12.492	14.602 - 15.505		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION	Work over 115 to 140% of rating (Total of +Vo and -Vo)				
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)				
ISOLATION	INPUT-OUTPUT	DC1,500V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)				
	INPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)				
	OUTPUT-CASE	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)				
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,400feet) max				
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max				
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis				
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis				
SAFETY	AGENCY APPROVALS	UL62368-1, C-UL (CSA62368-1), EN62368-1				
OTHERS	CASE SIZE/WEIGHT	25.4 X 9.9 X 50.8mm (W X H X D) / 50g max				
	COOLING METHOD	Convection/Forced air				

\*1 Single output +24V/+30V with no use of COM  
 \*2 Rated input voltage(DC24V, DC48V) Io=100%  
 \*3 Symmetrical loading from 0% to 100%  
 \*4 Symmetrical loading from 20% to 100%  
 \*5 Ripple and Ripple Noise is measured by using test board with ceramic capacitor 22μF and

\*6 Drift is the DC output accuracy for eight hour period after a half-hour warm-up at 25°C  
 \*7 Rated input voltage (DC24V, DC48V), rated output wattage, ambient temperature at 25°C  
 \* Parallel operation with other model is not possible.



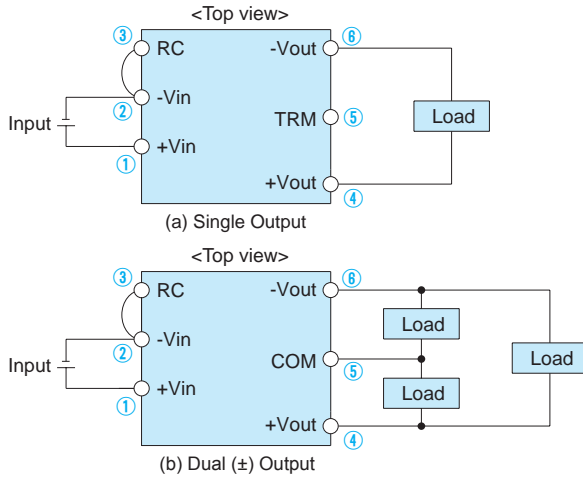
External view



- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal material : Copper
- ※ Plating treatment of terminal : Lead free plating
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Bottom Cover : FR4 ( $t=0.6$ ) [ $t=0.024$ ]
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight 50g max

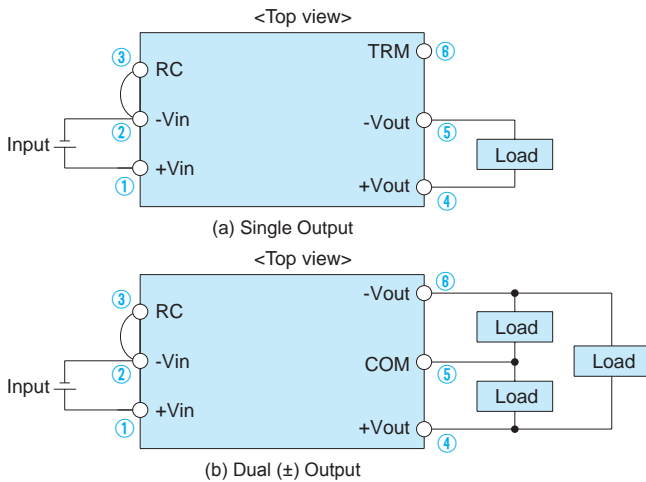
## Pin configuration

### ●MG15/MG40 Single Output and Dual ( $\pm$ ) Output



Pin No.	Pin Name	Function
①	+Vin	+DC Input
②	-Vin	-DC Input
③	RC	Remote ON/OFF
④	+Vout	+DC Output
⑤	TRM	Output Voltage Adjustment (Refer to instruction manual 1.5)
	COM	GND of Output Voltage (for Dual Output)
⑥	-Vout	-DC Output

### ●MG30/MG80 Single Output and Dual ( $\pm$ ) Output



Pin No.	Pin Name	Function
①	+Vin	+DC Input
②	-Vin	-DC Input
③	RC	Remote ON/OFF
④	+Vout	+DC Output
⑤	-Vout	-DC Output (for Single Output)
	COM	GND of Output Voltage (for Dual Output)
⑥	TRM	Output Voltage Adjustment (Refer to instruction manual 1.5)
	-Vout	-DC Output (for Dual Output)

## Assembling and Installation Method

### Installation

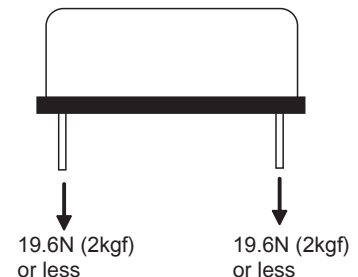
- When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation. Ambient temperature around each power supply should not exceed the temperature range shown in "Derating".

### Soldering Conditions

- (1) Flow Soldering : 260°C 15 seconds or less
- (2) Soldering Iron : maximum 360°C 5 seconds or less

### Stress to Pin

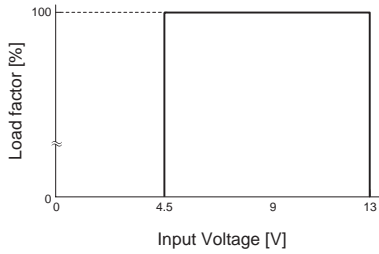
- Applying excessive stress to the input or output pins of the power module may damage internal connections. Avoid applying stress in excess of that shown in right figure.
- Input/output pin are soldered to the PCB internally. Do not pull or bend a lead powerfully.
- If it is expected that stress is applied to the input/output pin due to vibration or impact, reduce the stress to the pin by taking such measures as fixing the unit to the PCB by silicone rubber, etc.
- Due to prevent failure, PS should not be pulled after soldering with PCB.



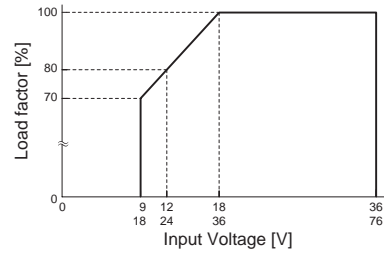
## Derating

### Derating curve for input voltage

#### ● MGF 4005



#### ● MGF 4024, MGF 4048, MGF 8024 and MGF 8048



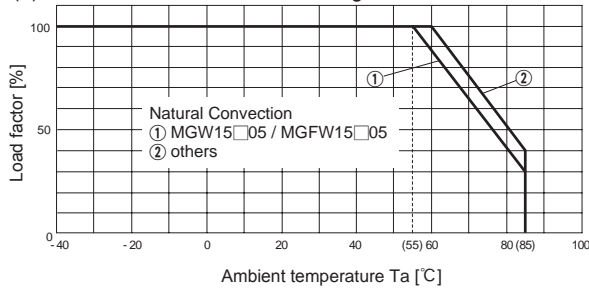
### Ambient temperature derating curve

■ It is necessary to note thermal fatigue risk by power cycle. Please reduce the temperature fluctuation range as much as possible when the up and down of temperature are frequently generated.

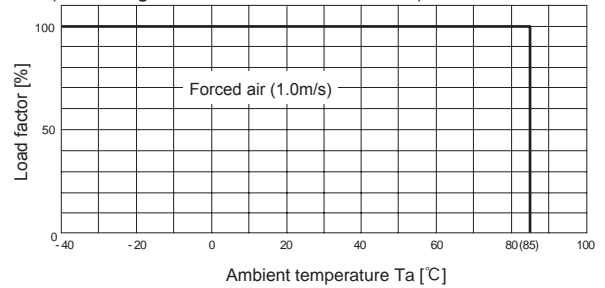
■ In case of forced air, ventilation must keep the temperature of point below the temperatures shown in Instruction Manual 7.

#### ● MG15/MGF15 (Rated Input Voltage)

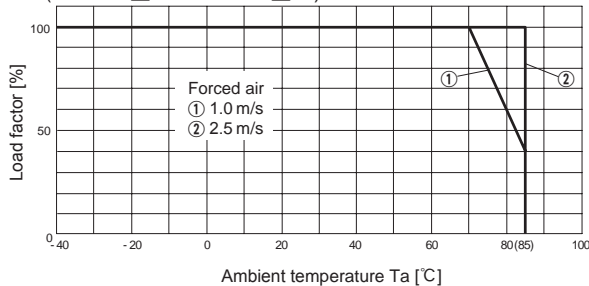
(1) In the case of Convection Cooling



(2) In the case of Forced Air Cooling (1.0m/s)  
(Excluding MGW1505/MGFW1505)

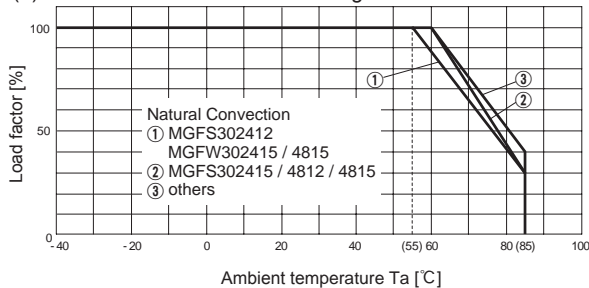


(3) In the case of Forced Air Cooling (1.0m/s, 2.5m/s)  
(MGW1505/MGFW1505)

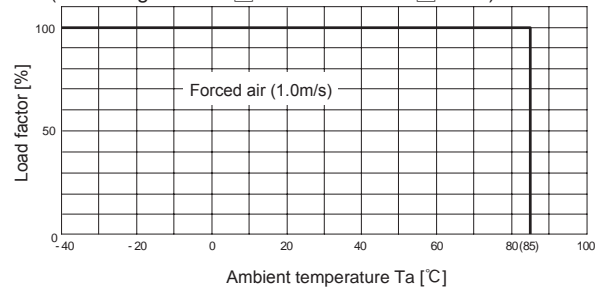


#### ● MG30/MGF30 (Rated Input Voltage)

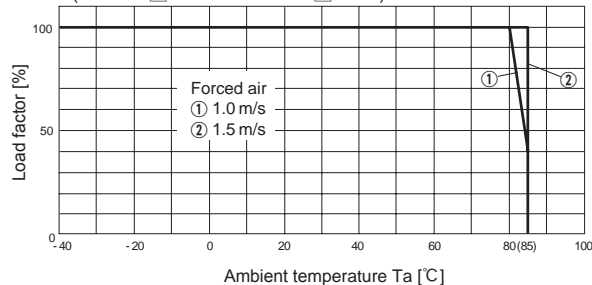
(1) In the case of Convection Cooling



(2) In the case of Forced Air Cooling (1.0m/s)  
(Excluding MGW3005 and MGFW3012/15)



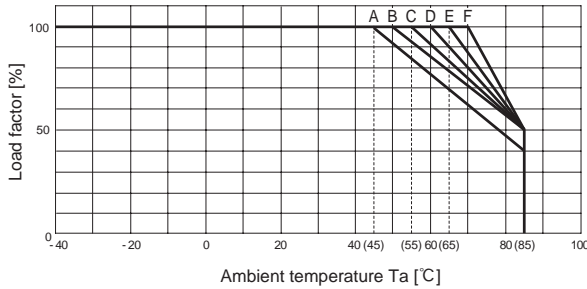
(3) In the case of Forced Air Cooling (1.0m/s, 1.5m/s)  
(MGW3005 and MGFW3012/15)



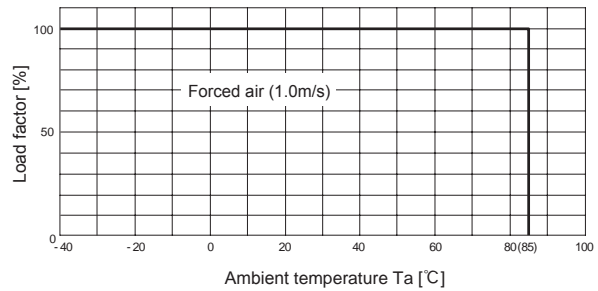
## Derating

### ●MGF40 (Rated Input Voltage)

(1) In the case of Convection Cooling



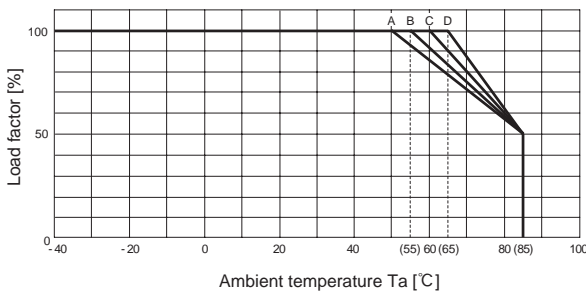
(2) In the case of Forced Air Cooling (1.0m/s)



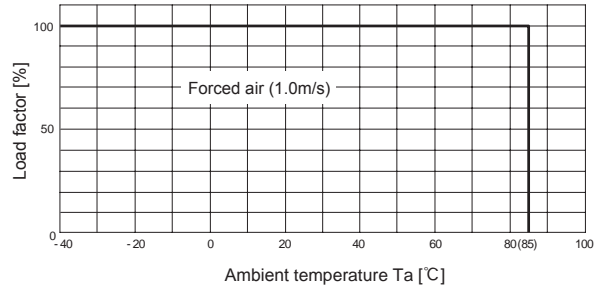
Input Voltage[V]	Output Voltage[V]					
	3.3	5	12	15	±12	±15
5	B	A	B	C	B	B
24	E	D	E	F	E	E
48	F	D	F	E	E	E

### ●MGF80 (Rated Input Voltage)

(1) In the case of Convection Cooling



(2) In the case of Forced Air Cooling (1.0m/s)



Input Voltage[V]	Output Voltage[V]					
	3.3	5	12	15	±12	±15
24	B	A	C	C	C	C
48	C	B	C	D	C	C

## Instruction Manual

- ◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual	<a href="https://en.cosel.co.jp/product/powersupply/MGS/">https://en.cosel.co.jp/product/powersupply/MGS/</a>
Instruction Manual	<a href="https://en.cosel.co.jp/product/powersupply/MGW/">https://en.cosel.co.jp/product/powersupply/MGW/</a>
Instruction Manual	<a href="https://en.cosel.co.jp/product/powersupply/MGFS/">https://en.cosel.co.jp/product/powersupply/MGFS/</a>
Instruction Manual	<a href="https://en.cosel.co.jp/product/powersupply/MGFW/">https://en.cosel.co.jp/product/powersupply/MGFW/</a>
Before using our product	<a href="https://en.cosel.co.jp/technical/caution/index.html">https://en.cosel.co.jp/technical/caution/index.html</a>



## Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz] (reference)	Input current [A]	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
					Material	Single sided	Double sided	Series operation	Parallel operation
MG15	Flyback converter	445-495	*1	-	glass fabric base,epoxy resin		Yes	Yes	*2
MGF15	Flyback converter	445-495	*1	-	glass fabric base,epoxy resin		Yes	Yes	*2
MG30	Forward converter	380-460	*1	-	glass fabric base,epoxy resin		Yes	Yes	*2
MGF30	Forward converter	380-460	*1	-	glass fabric base,epoxy resin		Yes	Yes	*2
MGF40	Flyback converter	100-1500 *3	*1	-	glass fabric base,epoxy resin		Yes	Yes	*2
MGF80	Flyback converter	100-1500 *3	*1	-	glass fabric base,epoxy resin		Yes	Yes	*2

\*1 Refer to Specification.

\*2 Refer to Instruction Manual.

\*3 The value changes depending on input and load.



Low Profile



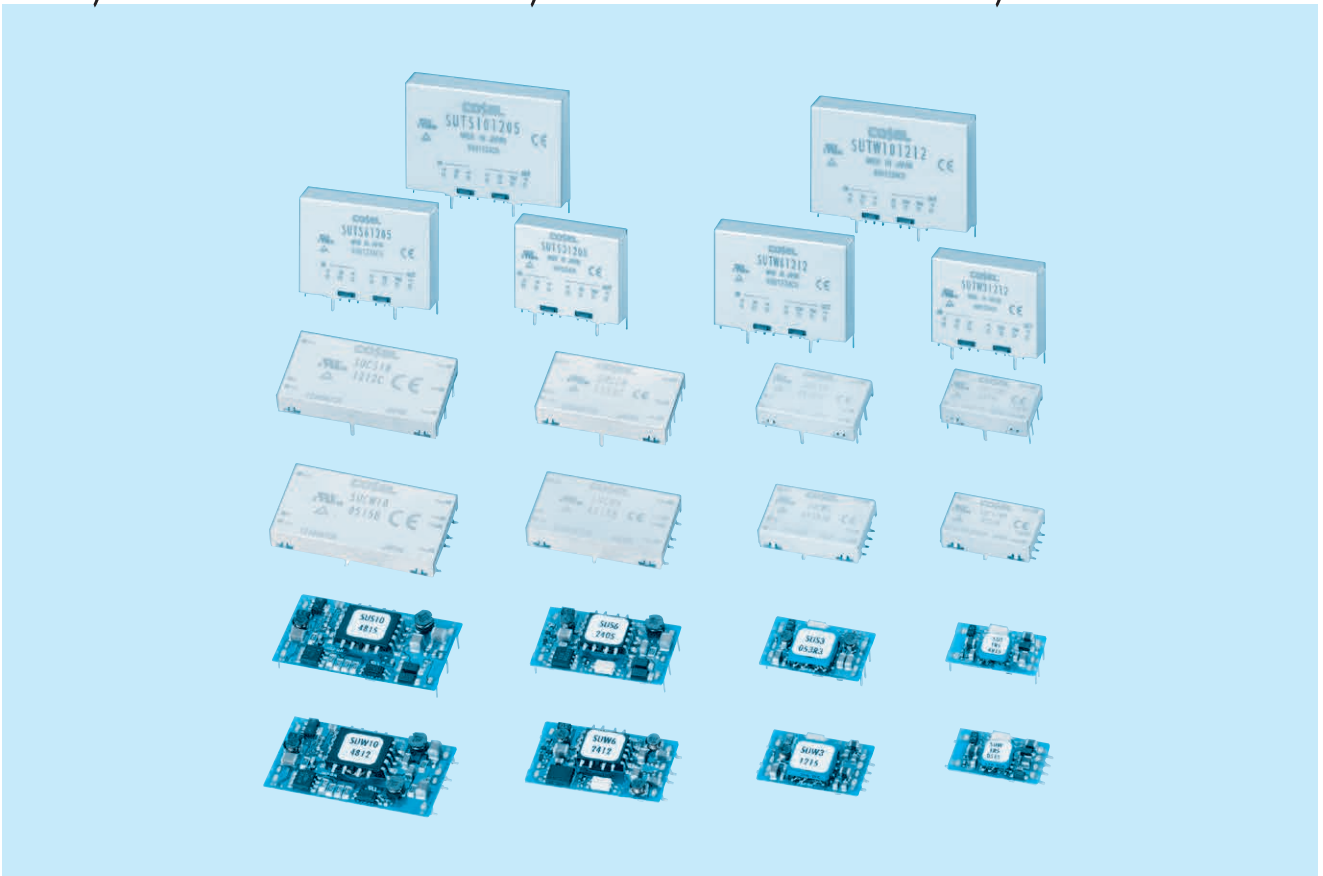
Isolated



OCP

Safety  
Approvals

# SUS, SUW-series / SUCS, SUCW-series / SUTS, SUTW-series



SU·SUC·SUT

## Feature

- SMD mounting type and through-hole mounting type
- High efficiency (synchronous rectifier circuit)
- Built-in overcurrent protection circuits
- Built-in remote ON/OFF (SU / SUC / SUT 3-10)
- High reliability : not built-in aluminum and tantalum electrolytic capacitor

## CE marking

- Low Voltage Directive
- RoHS Directive

## Safety agency approvals

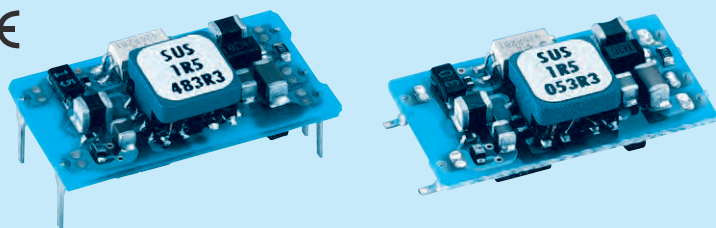
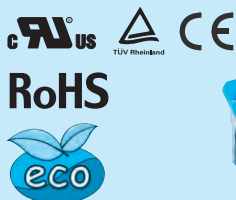
- UL60950-1, C-UL, EN60950-1

## 5-year warranty

# SUS1R5

SU S 1R5 12 05 B P

① ② ③ ④ ⑤ ⑥ ⑦



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Mounting type  
B : SMD  
C : DIP
- ⑦ Packing form  
Blank: Plastic cover  
P : Tray (SMD type)

MODEL	SUS1R5053R3	SUS1R50505	SUS1R50512	SUS1R50515	SUS1R5123R3	SUS1R51205	SUS1R51212	SUS1R51215
MAX OUTPUT WATTAGE[W]	1.32	1.5	1.56	1.5	1.32	1.5	1.56	1.5
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12
	CURRENT[A]	0.4	0.3	0.13	0.1	0.4	0.3	0.13

## SPECIFICATIONS

	MODEL	SUS1R5053R3	SUS1R50505	SUS1R50512	SUS1R50515	SUS1R5123R3	SUS1R51205	SUS1R51212	SUS1R51215	
INPUT	VOLTAGE[V]	DC4.5 - 9				DC9 - 18				
	CURRENT[A] *2	0.377typ	0.405typ	0.422typ	0.405typ	0.153typ	0.164typ	0.171typ	0.164typ	
	EFFICIENCY[%] *2	70typ	74typ	74typ	74typ	72typ	76typ	76typ	76typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	0.4	0.3	0.13	0.1	0.4	0.3	0.13	0.1	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically									

PROTECTION CIRCUIT AND OTHERS

MODEL	SUS1R5243R3	SUS1R52405	SUS1R52412	SUS1R52415	SUS1R5483R3	SUS1R54805	SUS1R54812	SUS1R54815
MAX OUTPUT WATTAGE[W]	1.32	1.5	1.56	1.5	1.32	1.5	1.56	1.5
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12
	CURRENT[A]	0.4	0.3	0.13	0.1	0.4	0.3	0.13

## SPECIFICATIONS

	MODEL	SUS1R5243R3	SUS1R52405	SUS1R52412	SUS1R52415	SUS1R5483R3	SUS1R54805	SUS1R54812	SUS1R54815	
INPUT	VOLTAGE[V]	DC18 - 36				DC36 - 76				
	CURRENT[A] *2	0.076typ	0.082typ	0.084typ	0.081typ	0.038typ	0.041typ	0.042typ	0.041typ	
	EFFICIENCY[%] *2	72typ	76typ	77typ	77typ	72typ	76typ	77typ	77typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	0.4	0.3	0.13	0.1	0.4	0.3	0.13	0.1	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically									

PROTECTION CIRCUIT AND OTHERS

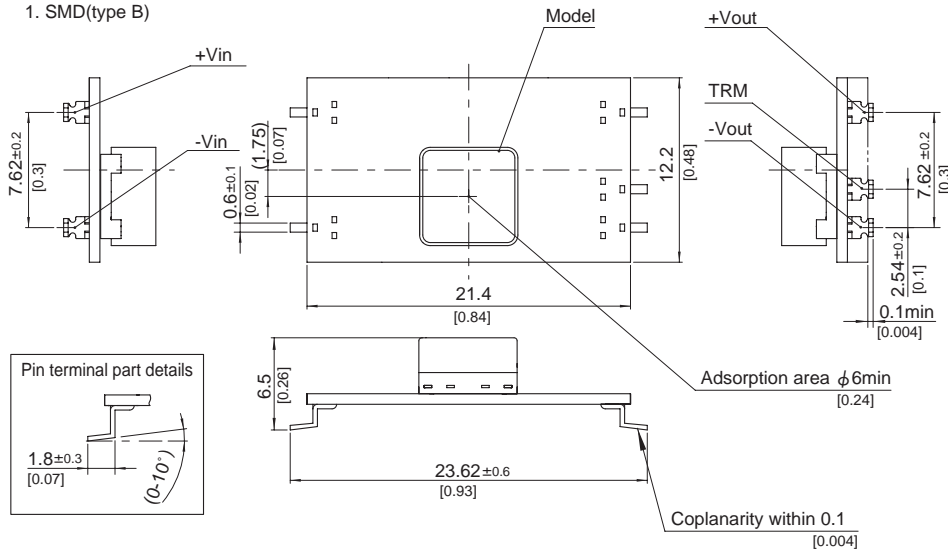
GENERAL SPECIFICATIONS

<b>ISOLATION</b>	<b>INPUT-OUTPUT</b>	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
<b>ENVIRONMENT</b>	<b>OPERATING TEMP., HUMID. AND ALTITUDE</b>	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	<b>STORAGE TEMP., HUMID. AND ALTITUDE</b>	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max
	<b>VIBRATION</b>	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis
	<b>IMPACT</b>	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis
<b>SAFETY</b>	<b>AGENCY APPROVALS</b>	UL60950-1, C-UL, EN60950-1
<b>OTHERS</b>	<b>CASE SIZE/WEIGHT</b>	21.4 X 6.5 X 12.2mm [0.84 X 0.26 X 0.48 inches] (W X H X D) / 2g max
	<b>COOLING METHOD</b>	Convection/Forced air

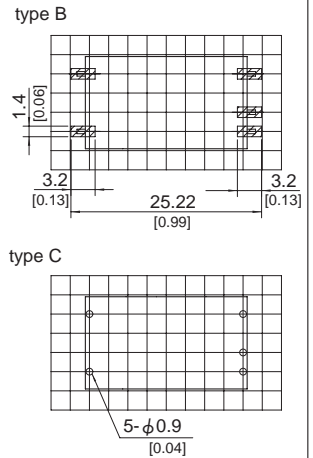
- \*1 SUW1R5x12/SUW1R5x15 is available as single output, +24V/+30V.
- \*2 Rated input 5V, 12V, 24V or 48V DC I<sub>o</sub>=100%
- \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.
- \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.

External view

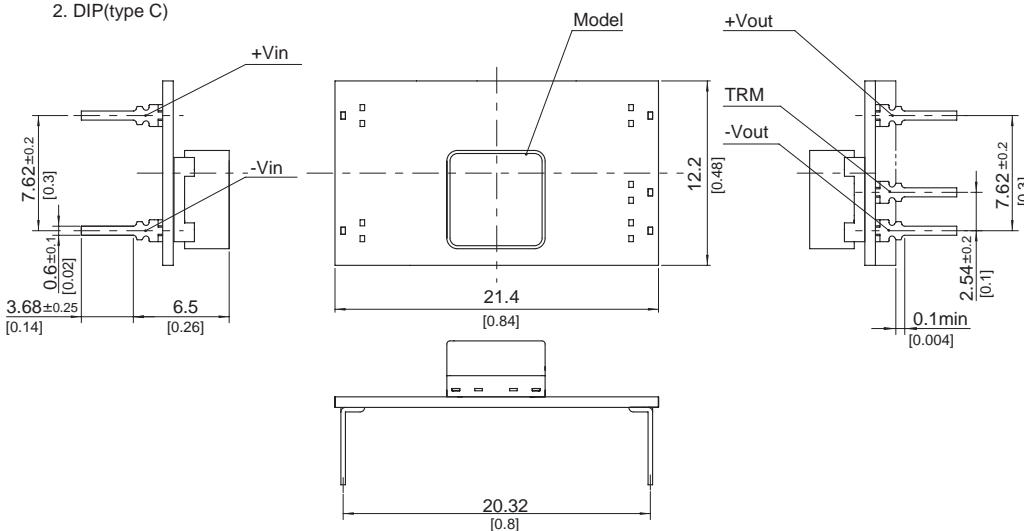
1. SMD(type B)



Recommended Pad and Hole dia. (TOP VIEW)



2. DIP(type C)



- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal thickness : 0.3±0.1 [0.012]
- ※ Pin terminal material : Copper alloy
- ※ Plating treatment of terminal : Lead free plating
- ※ Weight : 2g max

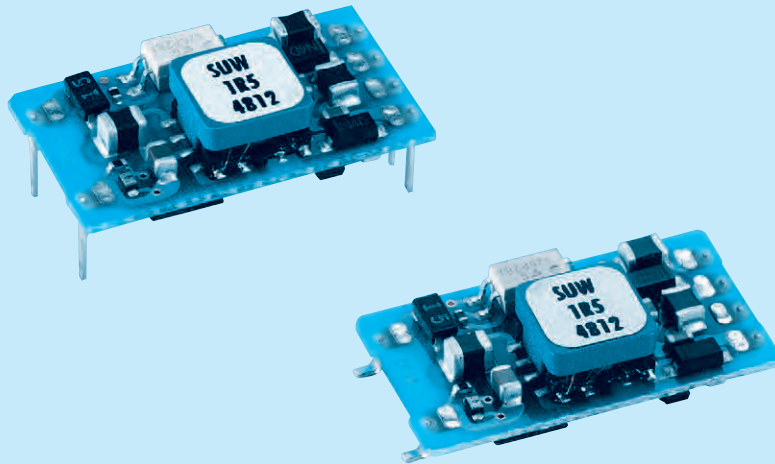
# SUW1R5

SU W 1R5 12 12 B P

① ② ③ ④ ⑤ ⑥ ⑦



RoHS



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Mounting type  
B :SMD  
C :DIP
- ⑦ Packing form  
Blank:Plastic cover  
P :Tray (SMD type)

MODEL	SUW1R50512	SUW1R50515	SUW1R51212	SUW1R51215	SUW1R52412	SUW1R52415	SUW1R54812	SUW1R54815	
MAX OUTPUT WATTAGE[W]	1.56	1.5	1.56	1.5	1.56	1.5	1.56	1.5	
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30
	CURRENT[A]	0.065	0.05	0.065	0.05	0.065	0.05	0.065	0.05

## SPECIFICATIONS

	MODEL	SUW1R50512	SUW1R50515	SUW1R51212	SUW1R51215	SUW1R52412	SUW1R52415	SUW1R54812	SUW1R54815	
INPUT	VOLTAGE[V]	DC4.5 - 9		DC9 - 18		DC18 - 36		DC36 - 76		
	CURRENT[A] *2	0.433typ	0.417typ	0.173typ	0.167typ	0.087typ	0.083typ	0.043typ	0.042typ	
	EFFICIENCY[%] *2	72typ	72typ	75typ	75typ	75typ	75typ	75typ	75typ	
OUTPUT	VOLTAGE[V]	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	
	CURRENT[A]	0.065	0.05	0.065	0.05	0.065	0.05	0.065	0.05	
	LINE REGULATION[mV]	60max	75max	60max	75max	60max	75max	60max	75max	
	LOAD REGULATION[mV]	600max	750max	600max	750max	600max	750max	600max	750max	
	RIPPLE[mVp-p]	-20 to +55°C *3	120max	120max	120max	120max	120max	120max	120max	120max
		-40 to -20°C *3	150max	150max	150max	150max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	150max	150max	150max	150max	150max	150max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	150max	180max	150max	180max	150max	180max	150max	180max
	-40 to +55°C	240max	290max	240max	290max	240max	290max	240max	290max	
DRIFT[mV] *4	50max	60max	50max	60max	50max	60max	50max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±5%)	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max								
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis								
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis								
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1								
OTHERS	CASE SIZE/WEIGHT	21.4 × 6.5 × 12.2mm [0.84 × 0.26 × 0.48 inches] (W×H×D) / 2g max								
	COOLING METHOD	Convection/Forced air								

\*1 Output pins can be connected in series to make a 24V/30V output.

\*2 Rated input 5V, 12V, 24V or 48V DC Io=100%

\*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.

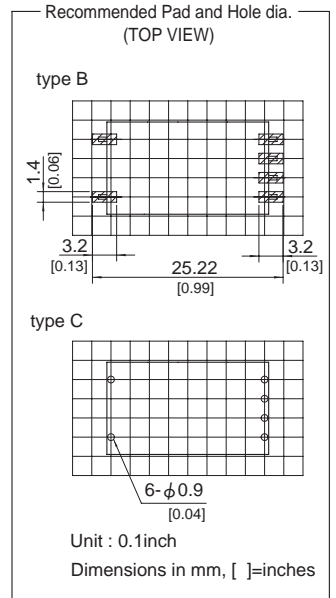
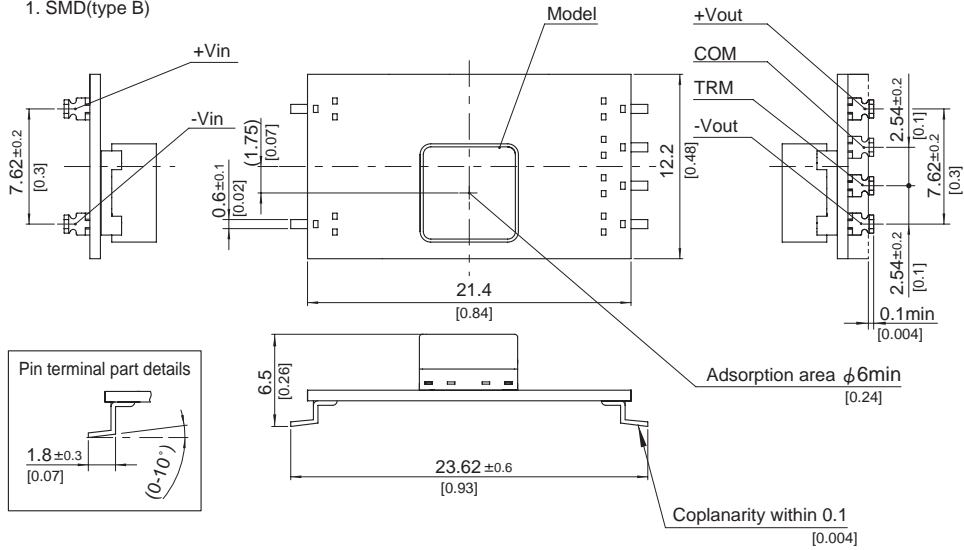
\*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.

\* Parallel operation with other model is not possible.

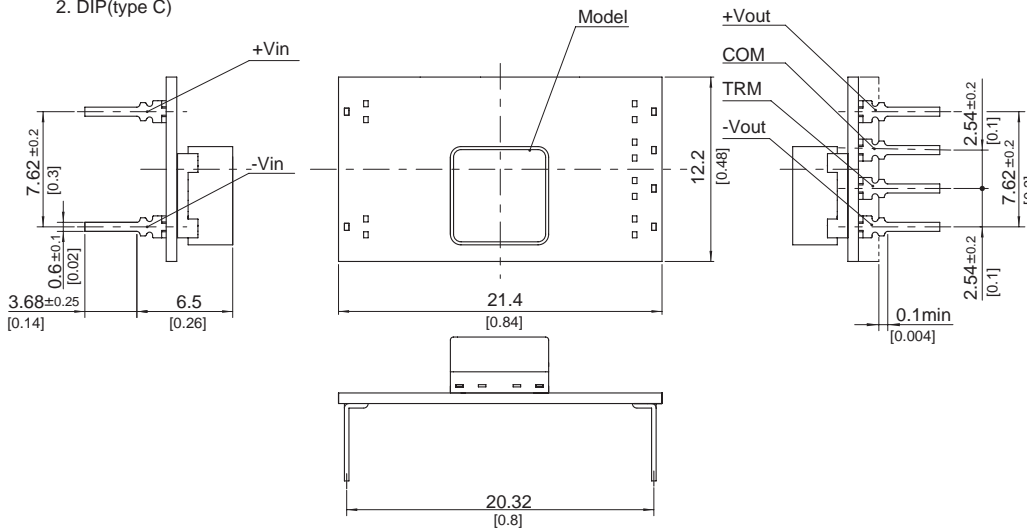


External view

1. SMD(type B)



2. DIP(type C)

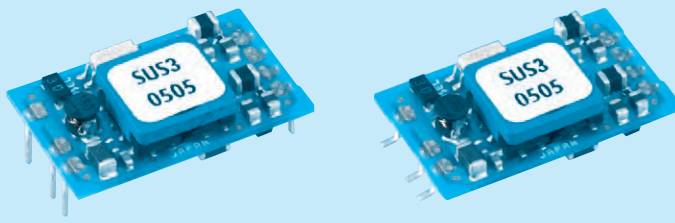
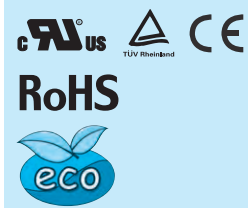


- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal thickness : 0.3±0.1 [0.012]
- ※ Pin terminal material : Copper alloy
- ※ Plating treatment of terminal : Lead free plating
- ※ Weight : 2g max

# SUS3

SU S 3 12 05 B P - □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Mounting type  
B : SMD  
C : DIP
- ⑦ Packing form  
Blank: Plastic cover  
P : Tray (SMD type)
- ⑧ Optional  
G : Capacitor between Input and Output is removed.

MODEL	SUS3053R3	SUS30505	SUS30512	SUS30515	SUS3123R3	SUS31205	SUS31212	SUS31215	
MAX OUTPUT WATTAGE[W]	1.98	3	3	3	1.98	3	3	3	
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12	15
	CURRENT[A]	0.6	0.6	0.25	0.2	0.6	0.6	0.25	0.2

## SPECIFICATIONS

	MODEL	SUS3053R3	SUS30505	SUS30512	SUS30515	SUS3123R3	SUS31205	SUS31212	SUS31215	
INPUT	VOLTAGE[V]	DC4.5 - 9				DC9 - 18				
	CURRENT[A] *2	0.536typ	0.780typ	0.760typ	0.760typ	0.218typ	0.317typ	0.309typ	0.313typ	
	EFFICIENCY[%] *2	74typ	77typ	79typ	79typ	76typ	79typ	81typ	80typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	0.6	0.6	0.25	0.2	0.6	0.6	0.25	0.2	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

MODEL	SUS3243R3	SUS32405	SUS32412	SUS32415	SUS3483R3	SUS34805	SUS34812	SUS34815	
MAX OUTPUT WATTAGE[W]	1.98	3	3	3	1.98	3	3	3	
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12	15
	CURRENT[A]	0.6	0.6	0.25	0.2	0.6	0.6	0.25	0.2

## SPECIFICATIONS

	MODEL	SUS3243R3	SUS32405	SUS32412	SUS32415	SUS3483R3	SUS34805	SUS34812	SUS34815	
INPUT	VOLTAGE[V]	DC18 - 36				DC36 - 76				
	CURRENT[A] *2	0.110typ	0.159typ	0.155typ	0.157typ	0.056typ	0.080typ	0.078typ	0.078typ	
	EFFICIENCY[%] *2	75typ	79typ	81typ	80typ	74typ	79typ	81typ	81typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	0.6	0.6	0.25	0.2	0.6	0.6	0.25	0.2	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

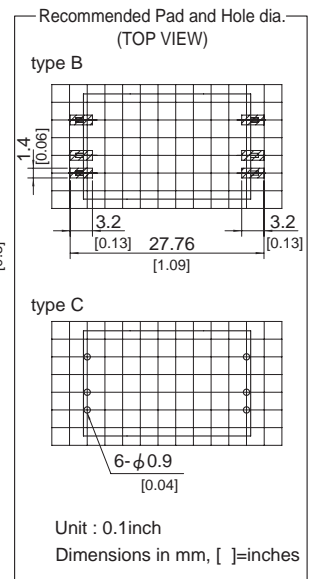
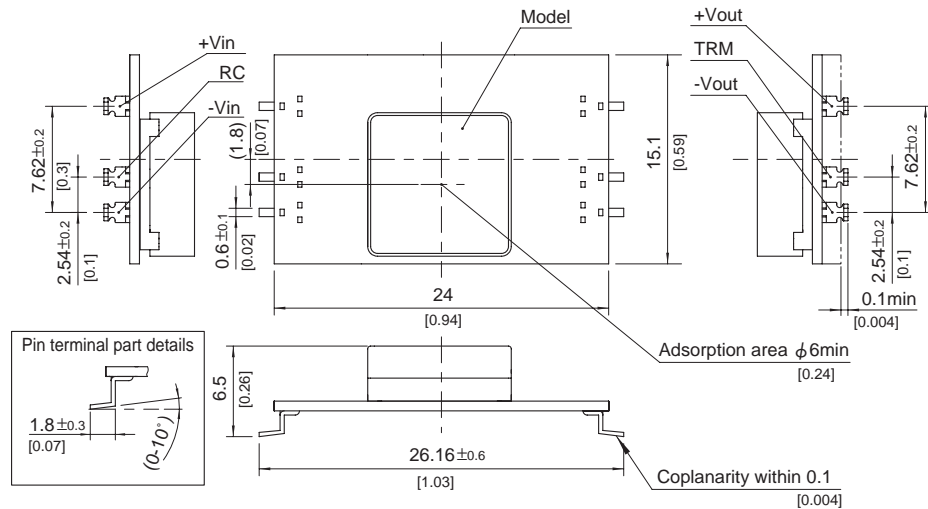
**GENERAL SPECIFICATIONS**

<b>ISOLATION</b>	<b>INPUT-OUTPUT</b>	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
<b>ENVIRONMENT</b>	<b>OPERATING TEMP.,HUMID.AND ALTITUDE</b>	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	<b>STORAGE TEMP.,HUMID.AND ALTITUDE</b>	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max
	<b>VIBRATION</b>	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis
	<b>IMPACT</b>	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis
<b>SAFETY</b>	<b>AGENCY APPROVALS</b>	UL60950-1, C-UL, EN60950-1
<b>OTHERS</b>	<b>CASE SIZE/WEIGHT</b>	24 X 6.5 X 15.1mm [0.94 X 0.26 X 0.59 inches] (W X H X D) / 3g max
	<b>COOLING METHOD</b>	Convection/Forced air

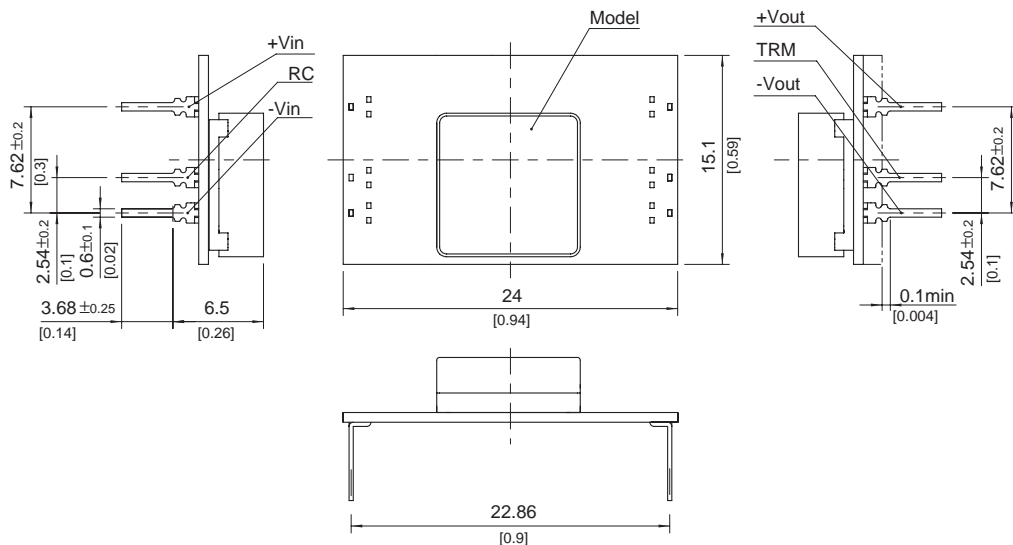
- \*1 SUW3xx12/SUW3xx15 is available as single output, +24V/+30V.
- \*2 Rated input 5V, 12V, 24V or 48V DC I<sub>o</sub>=100%
- \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.
- \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.

**External view**

1.SMD(type B)



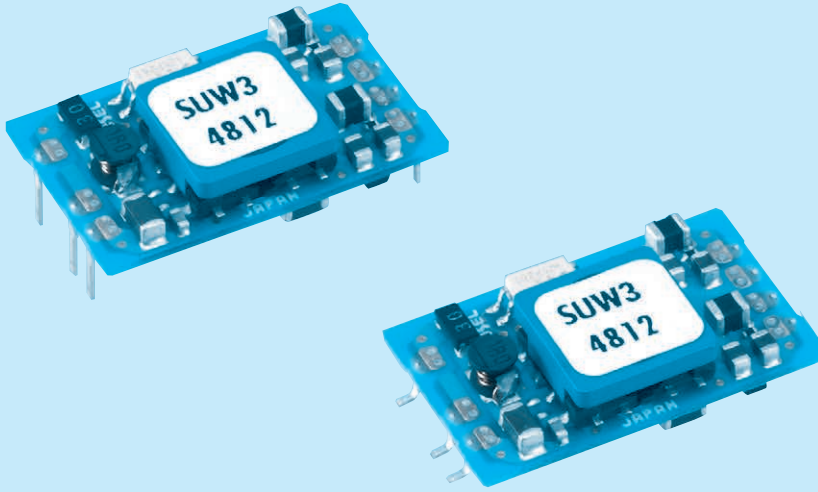
2.DIP(type C)



- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal thickness : 0.3±0.1 [0.012]
- ※ Pin terminal material : Copper alloy
- ※ Plating treatment of terminal : Lead free plating
- ※ Weight : 3g max

# SUW3

SU W 3 12 12 B P - □  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Mounting type  
B : SMD  
C : DIP
- ⑦ Packing form  
Blank: Plastic cover  
P : Tray (SMD type)
- ⑧ Optional  
G : Capacitor between Input and Output is removed.

MODEL	SUW30512	SUW30515	SUW31212	SUW31215	SUW32412	SUW32415	SUW34812	SUW34815	
MAX OUTPUT WATTAGE[W]	3.12	3	3.12	3	3.12	3	3.12	3	
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30
	CURRENT[A]	0.13	0.1	0.13	0.1	0.13	0.1	0.13	0.1

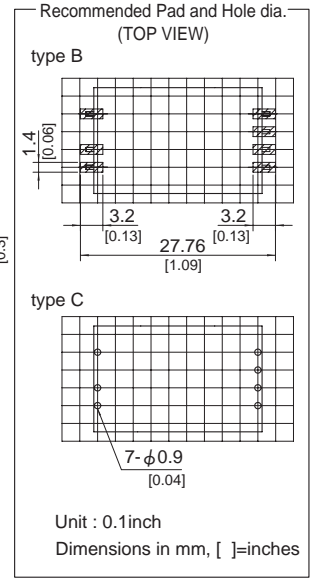
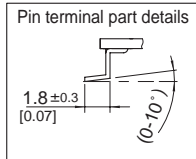
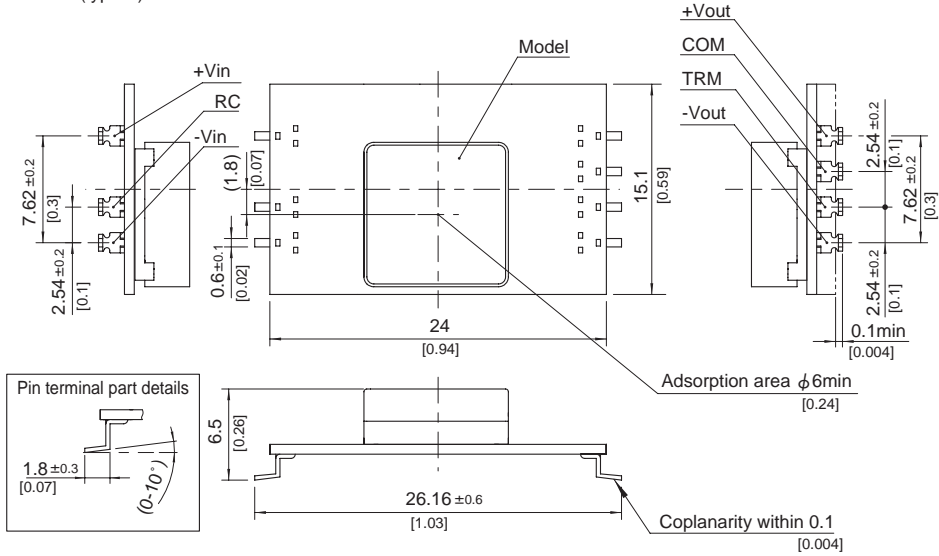
## SPECIFICATIONS

	MODEL	SUW30512	SUW30515	SUW31212	SUW31215	SUW32412	SUW32415	SUW34812	SUW34815	
INPUT	VOLTAGE[V]	DC4.5 - 9		DC9 - 18		DC18 - 36		DC36 - 76		
	CURRENT[A] *2	0.822typ	0.790typ	0.334typ	0.321typ	0.167typ	0.161typ	0.084typ	0.081typ	
	EFFICIENCY[%] *2	76typ	76typ	78typ	78typ	78typ	78typ	78typ	78typ	
OUTPUT	VOLTAGE[V]	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	
	CURRENT[A]	0.13	0.1	0.13	0.1	0.13	0.1	0.13	0.1	
	LINE REGULATION[mV]	60max	75max	60max	75max	60max	75max	60max	75max	
	LOAD REGULATION[mV]	600max	750max	600max	750max	600max	750max	600max	750max	
	RIPPLE[mVp-p]	-20 to +55°C *3	120max	120max	120max	120max	120max	120max	120max	120max
		-40 to -20°C *3	150max	150max	150max	150max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	150max	150max	150max	150max	150max	150max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	150max	180max	150max	180max	150max	180max	150max	180max
	-40 to +55°C	240max	290max	240max	290max	240max	290max	240max	290max	
DRIFT[mV] *4	50max	60max	50max	60max	50max	60max	50max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±5%)	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								
ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis								
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis								
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1								
OTHERS	CASE SIZE/WEIGHT	24 × 6.5 × 15.1mm [0.94 × 0.26 × 0.59 inches] (W × H × D) / 3g max								
	COOLING METHOD	Convection/Forced air								

\*1 Output pins can be connected in series to make a 24V/30V output.  
 \*2 Rated input 5V, 12V, 24V or 48V DC Io=100%  
 \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.  
 \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \* Parallel operation with other model is not possible.

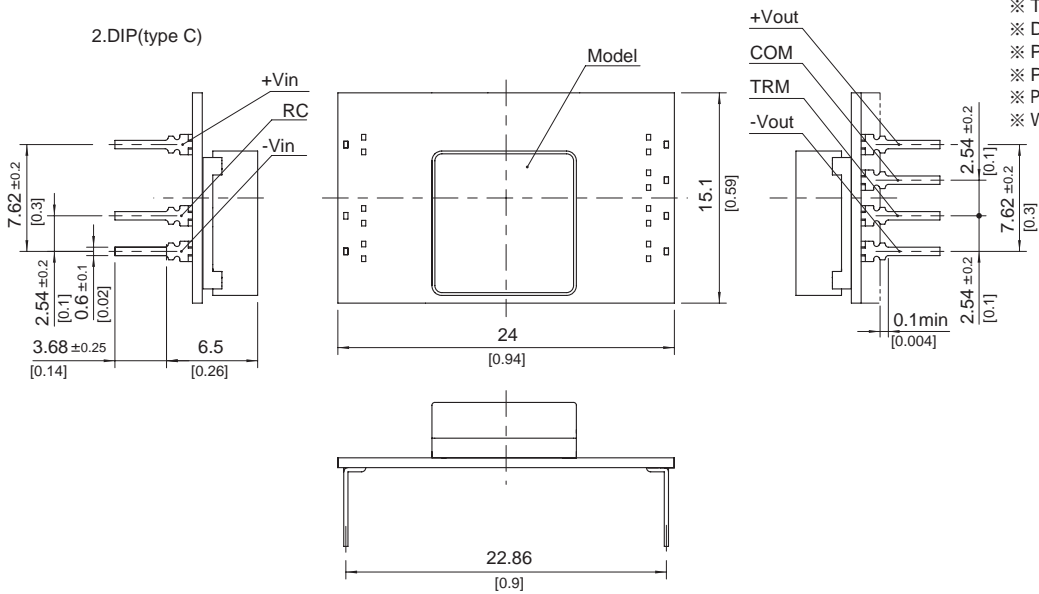
External view

1.SMD(type B)



Unit : 0.1inch  
Dimensions in mm, [ ]=inches

2.DIP(type C)

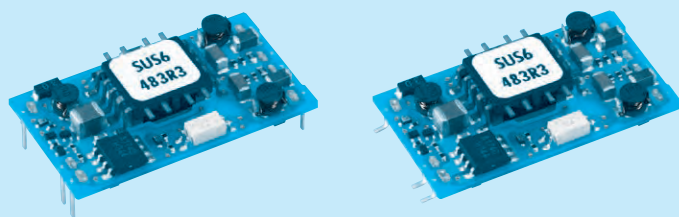
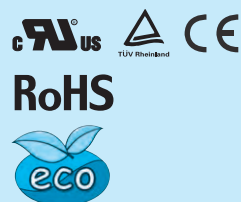


- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal thickness : 0.3±0.1 [0.012]
- ※ Pin terminal material : Copper alloy
- ※ Plating treatment of terminal : Lead free plating
- ※ Weight : 3g max

# SUS6

SU S 6 12 05 B P - □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Mounting type  
B : SMD  
C : DIP
- ⑦ Packing form  
Blank: Plastic cover  
P : Tray (SMD type)
- ⑧ Optional  
G : Capacitor between Input and Output is removed.

MODEL	SUS6053R3	SUS60505	SUS60512	SUS60515	SUS6123R3	SUS61205	SUS61212	SUS61215	
MAX OUTPUT WATTAGE[W]	3.96	5	6	6	4.46	6	6	6	
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12	15
	CURRENT[A]	1.2	1	0.5	0.4	1.35	1.2	0.5	0.4

## SPECIFICATIONS

	MODEL	SUS6053R3	SUS60505	SUS60512	SUS60515	SUS6123R3	SUS61205	SUS61212	SUS61215	
INPUT	VOLTAGE[V]	DC4.5 - 9				DC9 - 18				
	CURRENT[A] *2	1.100typ	1.316typ	1.500typ	1.500typ	0.502typ	0.617typ	0.588typ	0.588typ	
	EFFICIENCY[%] *2	72typ	76typ	80typ	80typ	74typ	81typ	85typ	85typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	1.2	1	0.5	0.4	1.35	1.2	0.5	0.4	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

MODEL	SUS6243R3	SUS62405	SUS62412	SUS62415	SUS6483R3	SUS64805	SUS64812	SUS64815	
MAX OUTPUT WATTAGE[W]	4.46	6	6	6	4.46	6	6	6	
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12	15
	CURRENT[A]	1.35	1.2	0.5	0.4	1.35	1.2	0.5	0.4

## SPECIFICATIONS

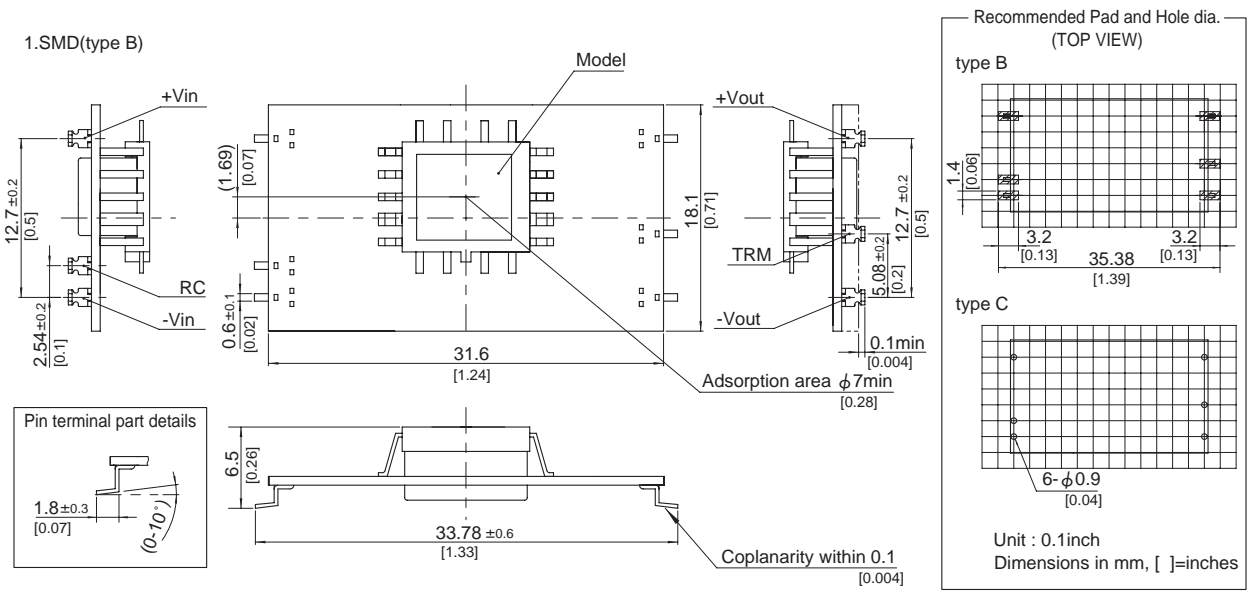
	MODEL	SUS6243R3	SUS62405	SUS62412	SUS62415	SUS6483R3	SUS64805	SUS64812	SUS64815	
INPUT	VOLTAGE[V]	DC18 - 36				DC36 - 76				
	CURRENT[A] *2	0.248typ	0.309typ	0.291typ	0.291typ	0.121typ	0.154typ	0.145typ	0.145typ	
	EFFICIENCY[%] *2	75typ	81typ	86typ	86typ	77typ	81typ	86typ	86typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	1.35	1.2	0.5	0.4	1.35	1.2	0.5	0.4	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

### GENERAL SPECIFICATIONS

<b>ISOLATION</b>	<b>INPUT-OUTPUT</b>	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
<b>ENVIRONMENT</b>	<b>OPERATING TEMP.,HUMID.AND ALTITUDE</b>	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	<b>STORAGE TEMP.,HUMID.AND ALTITUDE</b>	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max
	<b>VIBRATION</b>	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis
	<b>IMPACT</b>	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis
<b>SAFETY</b>	<b>AGENCY APPROVALS</b>	UL60950-1, C-UL, EN60950-1
<b>OTHERS</b>	<b>CASE SIZE/WEIGHT</b>	31.6×6.5×18.1mm [1.24×0.26×0.71 inches] (W×H×D) / 4g max
	<b>COOLING METHOD</b>	Convection/Forced air

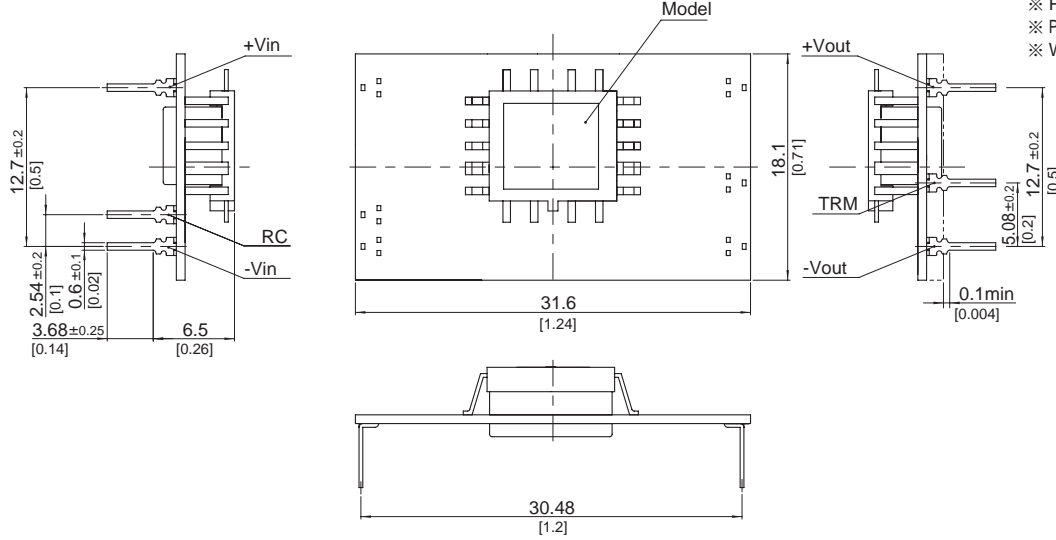
- \*1 SUW6xx12/SUW6xx15 is available as single output, +24V/+30V.
- \*2 Rated input 5V, 12V, 24V or 48V DC I<sub>o</sub>=100%
- \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.
- \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.

### External view



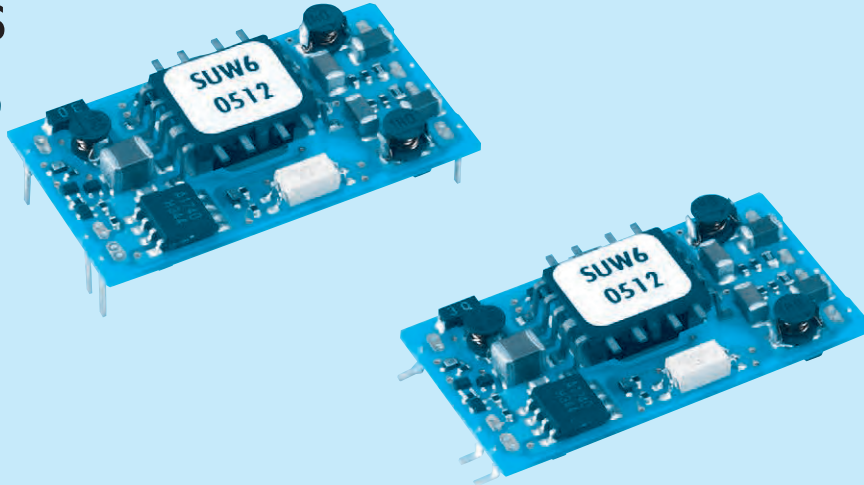
- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal thickness : 0.3±0.1 [0.012]
- ※ Pin terminal material : Copper alloy
- ※ Plating treatment of terminal : Lead free plating
- ※ Weight : 4g max

### 2.DIP(type C)



# SUW6

SU W 6 12 12 B P - □  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Mounting type  
B : SMD  
C : DIP
- ⑦ Packing form  
Blank: Plastic cover  
P : Tray (SMD type)
- ⑧ Optional  
G : Capacitor between Input and Output is removed.

MODEL	SUW60512	SUW60515	SUW61212	SUW61215	SUW62412	SUW62415	SUW64812	SUW64815	
MAX OUTPUT WATTAGE[W]	6	6	6	6	6	6	6	6	
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30
	CURRENT[A]	0.25	0.2	0.25	0.2	0.25	0.2	0.25	0.2

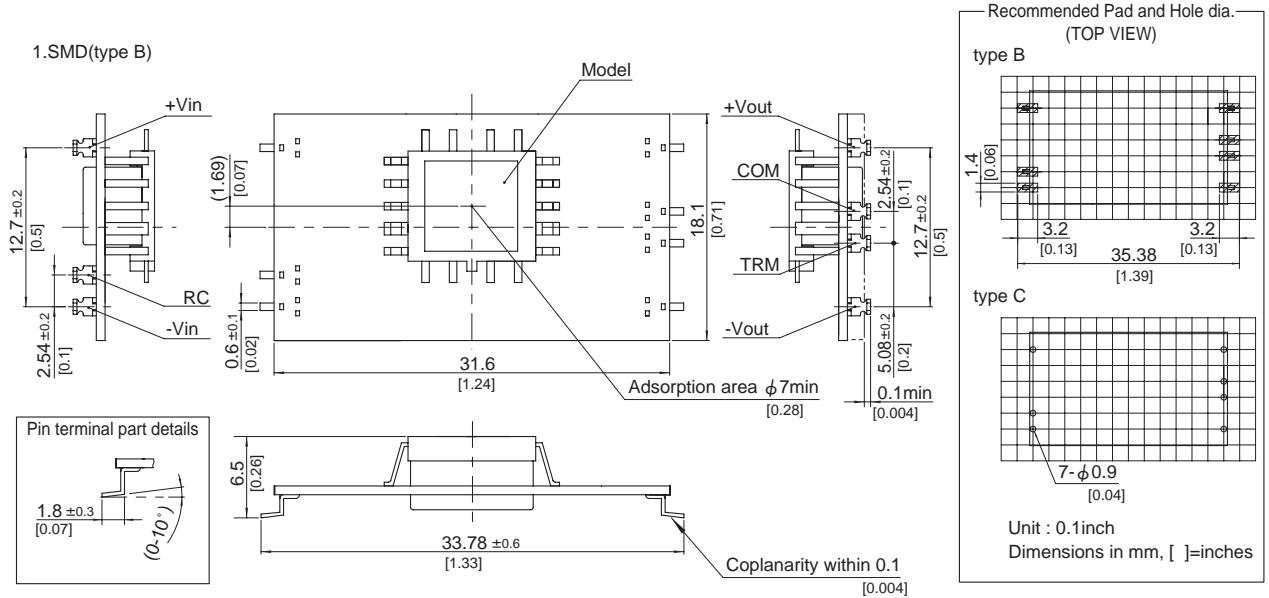
## SPECIFICATIONS

	MODEL	SUW60512	SUW60515	SUW61212	SUW61215	SUW62412	SUW62415	SUW64812	SUW64815	
INPUT	VOLTAGE[V]	DC4.5 - 9		DC9 - 18		DC18 - 36		DC36 - 76		
	CURRENT[A] *2	1.538typ	1.538typ	0.588typ	0.588typ	0.291typ	0.291typ	0.145typ	0.145typ	
	EFFICIENCY[%] *2	78typ	78typ	85typ	85typ	86typ	86typ	86typ	86typ	
OUTPUT	VOLTAGE[V]	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	
	CURRENT[A]	0.25	0.2	0.25	0.2	0.25	0.2	0.25	0.2	
	LINE REGULATION[mV]	60max	75max	60max	75max	60max	75max	60max	75max	
	LOAD REGULATION[mV]	600max	750max	600max	750max	600max	750max	600max	750max	
	RIPPLE[mVp-p]	-20 to +55°C *3	120max	120max	120max	120max	120max	120max	120max	120max
		-40 to -20°C *3	150max	150max	150max	150max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	150max	150max	150max	150max	150max	150max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	150max	180max	150max	180max	150max	180max	150max	180max
	-40 to +55°C	240max	290max	240max	290max	240max	290max	240max	290max	
DRIFT[mV] *4	50max	60max	50max	60max	50max	60max	50max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±5%)	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								
ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis								
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis								
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1								
OTHERS	CASE SIZE/WEIGHT	31.6 × 6.5 × 18.1mm [1.24 × 0.26 × 0.71 inches] (W × H × D) / 4g max								
	COOLING METHOD	Convection/Forced air								

\*1 Output pins can be connected in series to make a 24V/30V output.  
 \*2 Rated input 5V, 12V, 24V or 48V DC Io=100%  
 \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.  
 \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \* Parallel operation with other model is not possible.

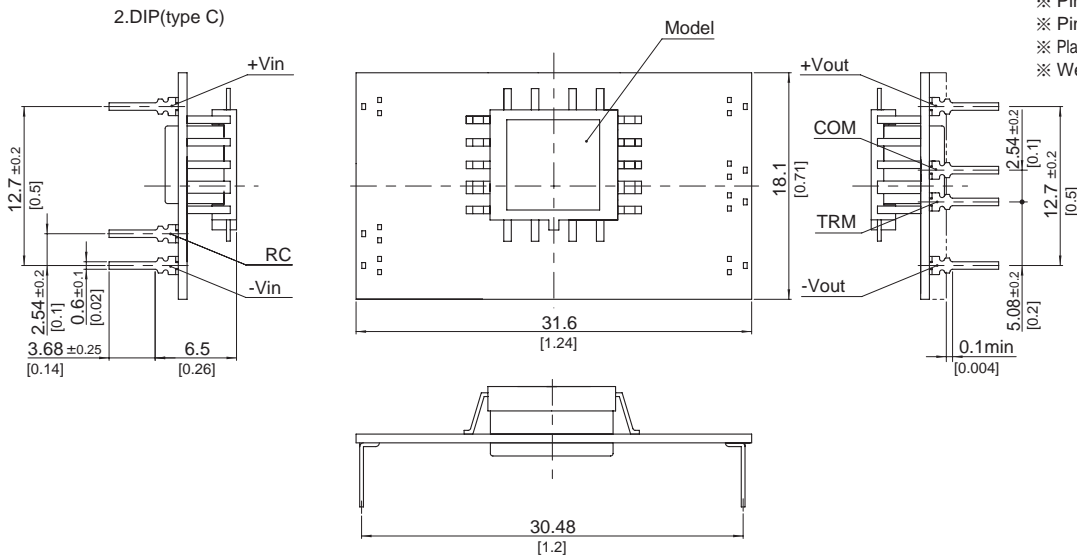


External view



NASUC/SUT

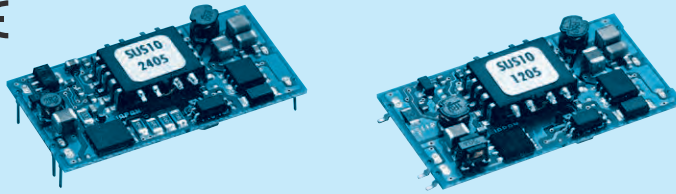
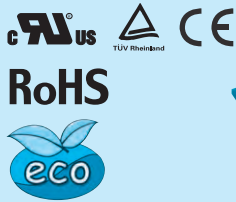
- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal thickness :  $0.3 \pm 0.1$  [0.012]
- ※ Pin terminal material : Copper alloy
- ※ Plating treatment of terminal : Lead free plating
- ※ Weight : 4g max



# SUS10

SU S 10 12 05 B P - □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Mounting type  
B : SMD  
C : DIP
- ⑦ Packing form  
Blank: Plastic cover  
P : Tray (SMD type)
- ⑧ Optional  
G : Capacitor between Input and Output is removed.

MODEL	SUS10053R3	SUS100505	SUS100512	SUS100515	SUS10123R3	SUS101205	SUS101212	SUS101215
MAX OUTPUT WATTAGE[W]	8.58	10	10.8	10.5	8.58	10	12	12
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12
	CURRENT[A]	2.6	2	0.9	0.7	2.6	2	1

## SPECIFICATIONS

	MODEL	SUS10053R3	SUS100505	SUS100512	SUS100515	SUS10123R3	SUS101205	SUS101212	SUS101215	
INPUT	VOLTAGE[V]	DC4.5 - 9				DC9 - 18				
	CURRENT[A] *2	2.12typ	2.41typ	2.54typ	2.47typ	0.872typ	0.980typ	1.15typ	1.15typ	
	EFFICIENCY[%] *2	81typ	83typ	85typ	85typ	82typ	85typ	87typ	87typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	2.6	2	0.9	0.7	2.6	2	1	0.8	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

MODEL	SUS10243R3	SUS102405	SUS102412	SUS102415	SUS10483R3	SUS104805	SUS104812	SUS104815
MAX OUTPUT WATTAGE[W]	8.58	10	12	12	8.58	10	12	12
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12
	CURRENT[A]	2.6	2	1	0.8	2.6	2	1

## SPECIFICATIONS

	MODEL	SUS10243R3	SUS102405	SUS102412	SUS102415	SUS10483R3	SUS104805	SUS104812	SUS104815	
INPUT	VOLTAGE[V]	DC18 - 36				DC36 - 76				
	CURRENT[A] *2	0.436typ	0.490typ	0.575typ	0.575typ	0.218typ	0.245typ	0.287typ	0.287typ	
	EFFICIENCY[%] *2	82typ	85typ	87typ	87typ	82typ	85typ	87typ	87typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	2.6	2	1	0.8	2.6	2	1	0.8	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

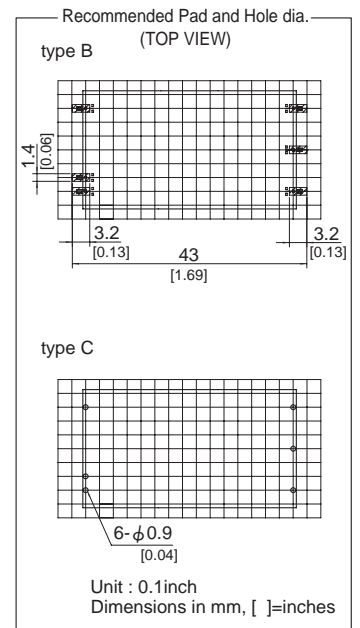
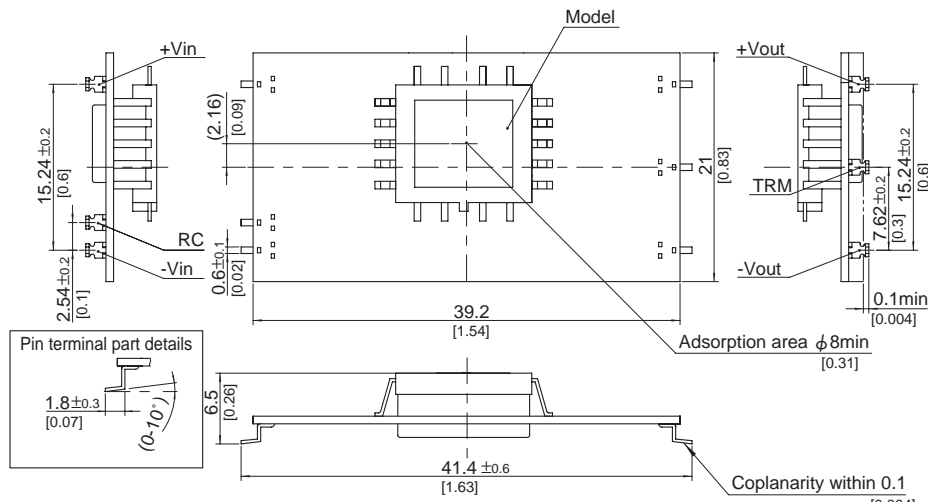
### GENERAL SPECIFICATIONS

<b>ISOLATION</b>	<b>INPUT-OUTPUT</b>	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
<b>ENVIRONMENT</b>	<b>OPERATING TEMP., HUMID. AND ALTITUDE</b>	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	<b>STORAGE TEMP., HUMID. AND ALTITUDE</b>	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max
	<b>VIBRATION</b>	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis
	<b>IMPACT</b>	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis
<b>SAFETY</b>	<b>AGENCY APPROVALS</b>	UL60950-1, C-UL, EN60950-1
<b>OTHERS</b>	<b>CASE SIZE/WEIGHT</b>	39.2 X 6.5 X 21.0mm [1.54 X 0.26 X 0.83 inches] (W x H x D) / 6g max
	<b>COOLING METHOD</b>	Convection/Forced air

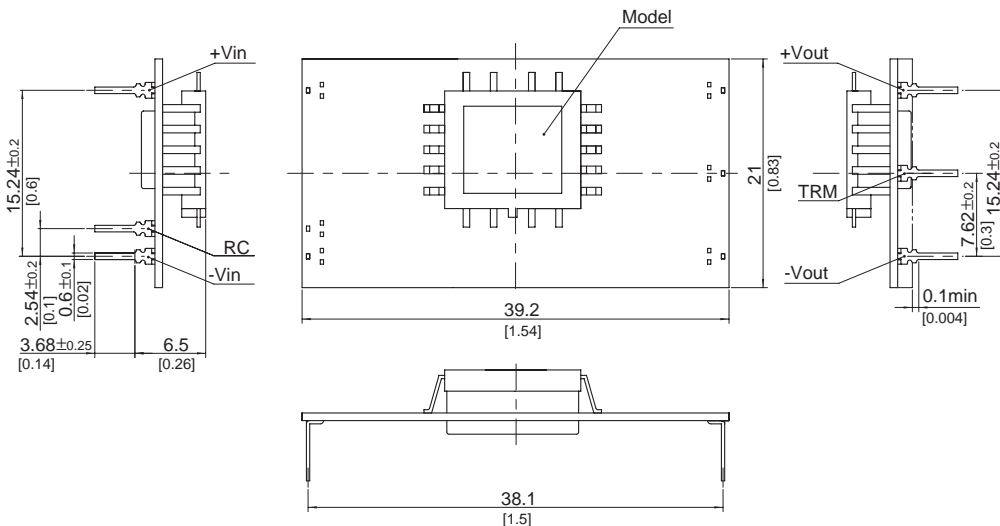
- \*1 SUW10xx12/SUW10xx15 is available as single output, +24V/+30V.
- \*2 Rated input 5V, 12V, 24V or 48V DC I<sub>o</sub>=100%
- \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.
- \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.

### External view

1. SMD (type B)



2. DIP (type C)



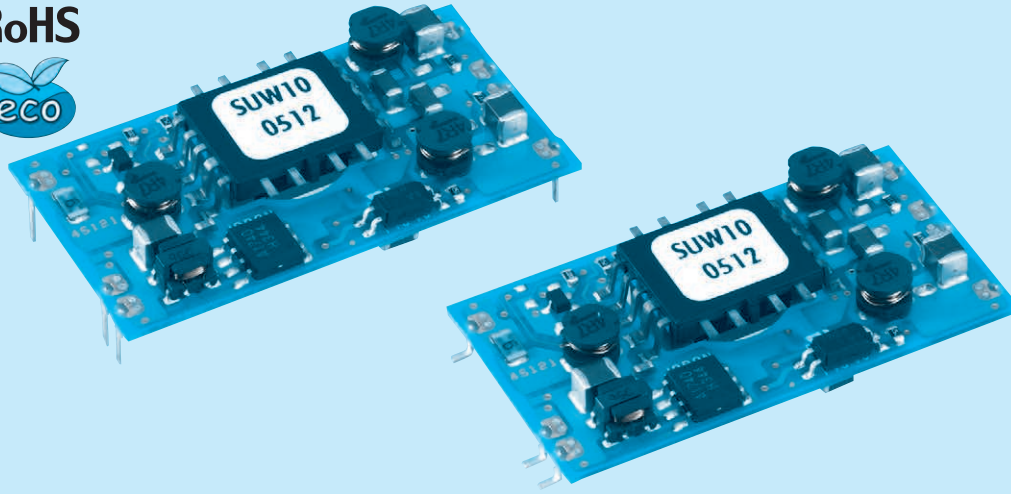
- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal thickness : 0.3±0.1 [0.012]
- ※ Pin terminal material : Copper alloy
- ※ Plating treatment of terminal : Lead free plating
- ※ Weight : 6g max

# SUW10

SU W 10 12 12 B P - □  
 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧



RoHS



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Mounting type  
B : SMD  
C : DIP
- ⑦ Packing form  
Blank: Plastic cover  
P : Tray(SMD type)
- ⑧ Optional  
G : Capacitor between Input and Output is removed.

MODEL	SUW100512	SUW100515	SUW101212	SUW101215	SUW102412	SUW102415	SUW104812	SUW104815	
MAX OUTPUT WATTAGE[W]	10.8	10.5	10.8	10.5	10.8	10.5	10.8	10.5	
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30
	CURRENT[A]	0.45	0.35	0.45	0.35	0.45	0.35	0.45	0.35

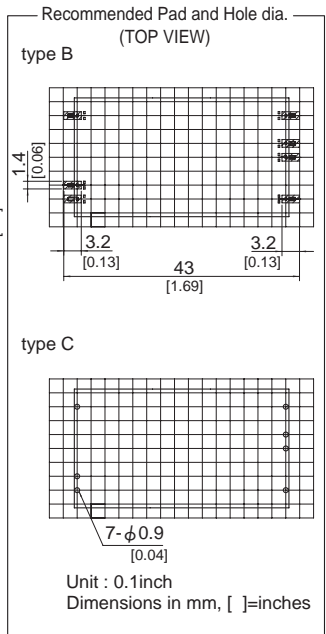
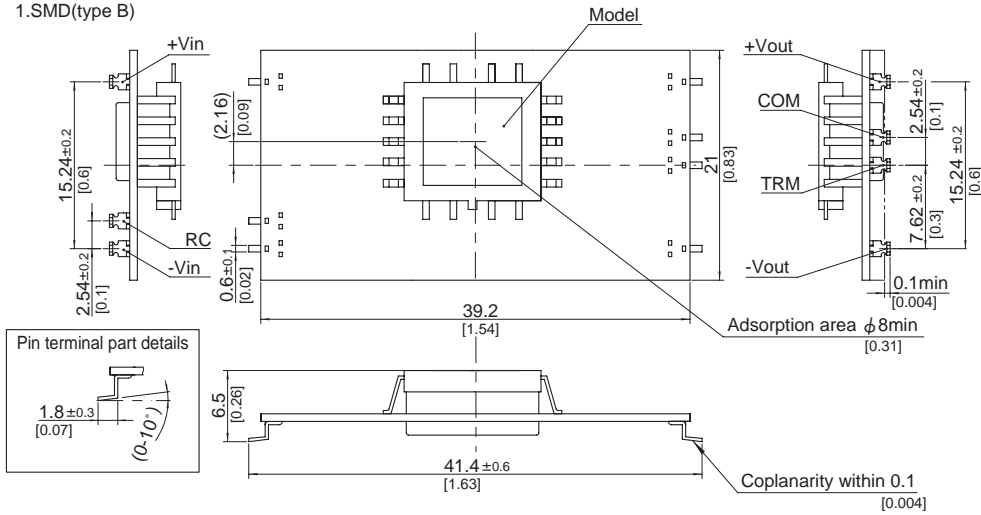
## SPECIFICATIONS

	MODEL	SUW100512	SUW100515	SUW101212	SUW101215	SUW102412	SUW102415	SUW104812	SUW104815	
INPUT	VOLTAGE[V]	DC4.5 - 9		DC9 - 18		DC18 - 36		DC36 - 76		
	CURRENT[A] *2	2.51typ	2.44typ	1.05typ	1.02typ	0.523typ	0.509typ	0.262typ	0.254typ	
	EFFICIENCY[%] *2	86typ	86typ	86typ	86typ	86typ	86typ	86typ	86typ	
OUTPUT	VOLTAGE[V]	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	
	CURRENT[A]	0.45	0.35	0.45	0.35	0.45	0.35	0.45	0.35	
	LINE REGULATION[mV]	60max	75max	60max	75max	60max	75max	60max	75max	
	LOAD REGULATION[mV]	600max	750max	600max	750max	600max	750max	600max	750max	
	RIPPLE[mVp-p]	-20 to +55°C *3	120max	120max	120max	120max	120max	120max	120max	120max
		-40 to -20°C *3	150max	150max	150max	150max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	150max	150max	150max	150max	150max	150max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	150max	180max	150max	180max	150max	180max	150max	180max
		-40 to +55°C	240max	290max	240max	290max	240max	290max	240max	290max
DRIFT[mV] *4	50max	60max	50max	60max	50max	60max	50max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±5%)	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								
ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis								
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis								
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1								
OTHERS	CASE SIZE/WEIGHT	39.2 × 6.5 × 21.0mm [1.54 × 0.26 × 0.83 inches] (W × H × D) / 6g max								
	COOLING METHOD	Convection/Forced air								

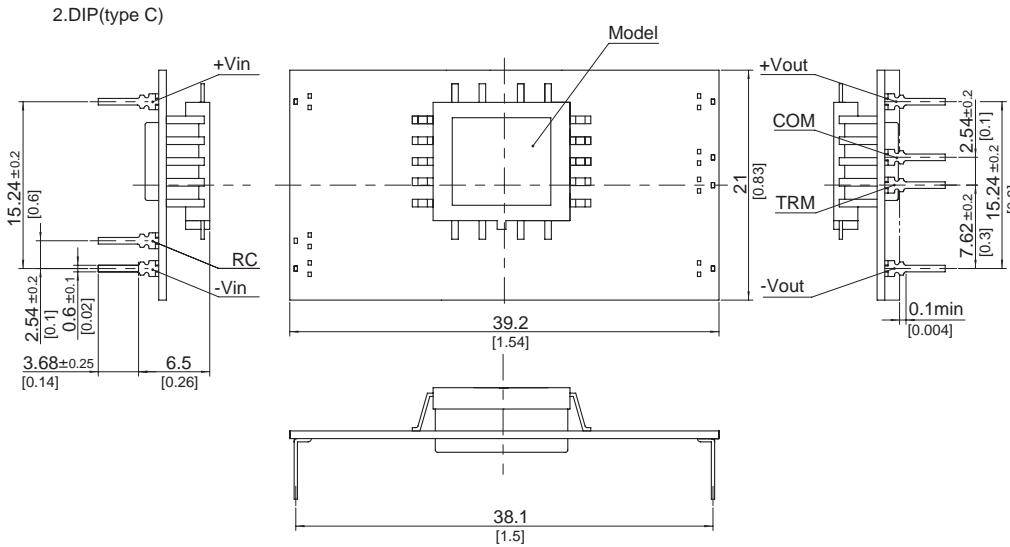
\*1 Output pins can be connected in series to make a 24V/30V output.  
 \*2 Rated input 5V, 12V, 24V or 48V DC Io=100%  
 \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.  
 \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \* Parallel operation with other model is not possible.

External view

1.SMD(type B)



2.DIP(type C)

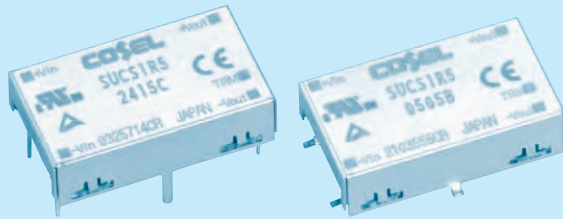
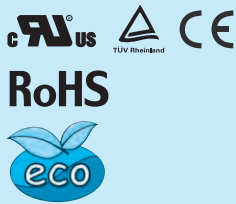


- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal thickness : 0.3±0.1 [0.012]
- ※ Pin terminal material : Copper alloy
- ※ Plating treatment of terminal : Lead free plating
- ※ Weight : 6g max

# SUCS1R5

SUC S 1R5 12 05 B P - □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧



- ① Series name
  - ② Single output
  - ③ Output wattage
  - ④ Input voltage
  - ⑤ Output voltage
  - ⑥ Mounting type  
B :SMD  
C :DIP
  - ⑦ Packing form  
Blank:Plastic cover  
P :Tray (SMD type)
  - ⑧ Optional  
C :with coating (only DIP type)\*
- \*Safety standards are pending

MODEL	SUCS1R5053R3	SUCS1R50505	SUCS1R50512	SUCS1R50515	SUCS1R5123R3	SUCS1R51205	SUCS1R51212	SUCS1R51215
MAX OUTPUT WATTAGE[W]	1.32	1.5	1.56	1.5	1.32	1.5	1.56	1.5
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12
	CURRENT[A]	0.4	0.3	0.13	0.1	0.4	0.3	0.13

## SPECIFICATIONS

	MODEL	SUCS1R5053R3	SUCS1R50505	SUCS1R50512	SUCS1R50515	SUCS1R5123R3	SUCS1R51205	SUCS1R51212	SUCS1R51215	
INPUT	VOLTAGE[V]	DC4.5 - 9				DC9 - 18				
	CURRENT[A] *2	0.388typ	0.417typ	0.433typ	0.417typ	0.157typ	0.169typ	0.176typ	0.169typ	
	EFFICIENCY[%] *2	68typ	72typ	72typ	72typ	70typ	74typ	74typ	74typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	0.4	0.3	0.13	0.1	0.4	0.3	0.13	0.1	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically									

PROTECTION CIRCUIT AND OTHERS

MODEL	SUCS1R5243R3	SUCS1R52405	SUCS1R52412	SUCS1R52415	SUCS1R5483R3	SUCS1R54805	SUCS1R54812	SUCS1R54815
MAX OUTPUT WATTAGE[W]	1.32	1.5	1.56	1.5	1.32	1.5	1.56	1.5
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12
	CURRENT[A]	0.4	0.3	0.13	0.1	0.4	0.3	0.13

## SPECIFICATIONS

	MODEL	SUCS1R5243R3	SUCS1R52405	SUCS1R52412	SUCS1R52415	SUCS1R5483R3	SUCS1R54805	SUCS1R54812	SUCS1R54815	
INPUT	VOLTAGE[V]	DC18 - 36				DC36 - 76				
	CURRENT[A] *2	0.079typ	0.084typ	0.087typ	0.083typ	0.039typ	0.042typ	0.043typ	0.042typ	
	EFFICIENCY[%] *2	70typ	74typ	75typ	75typ	70typ	74typ	75typ	75typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	0.4	0.3	0.13	0.1	0.4	0.3	0.13	0.1	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically									

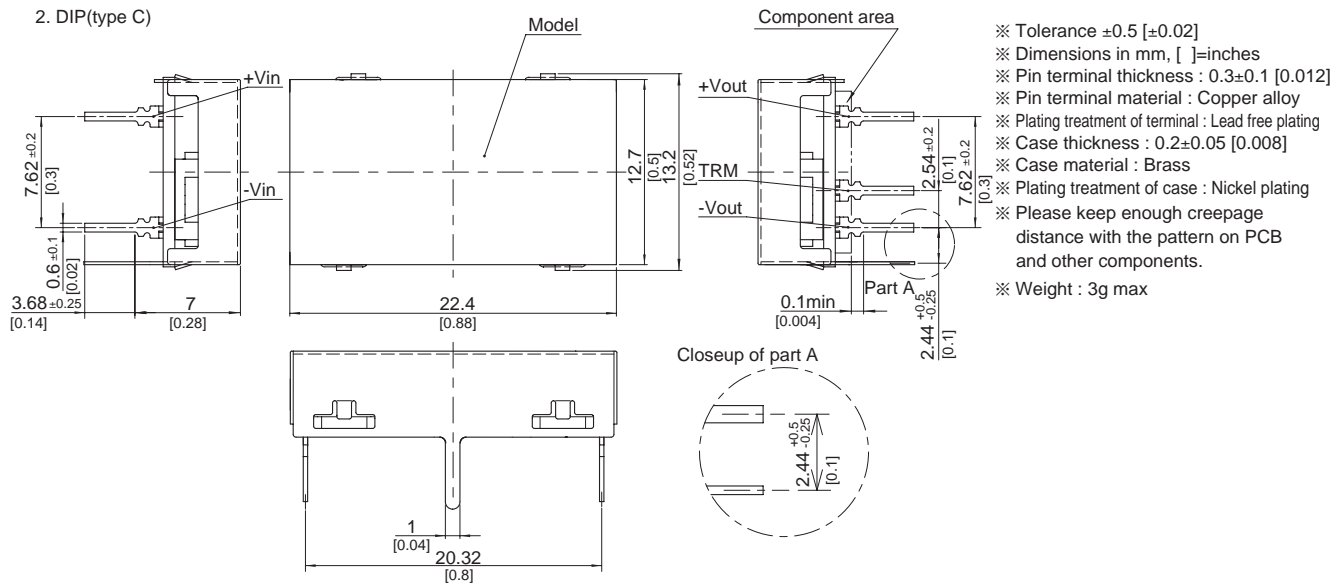
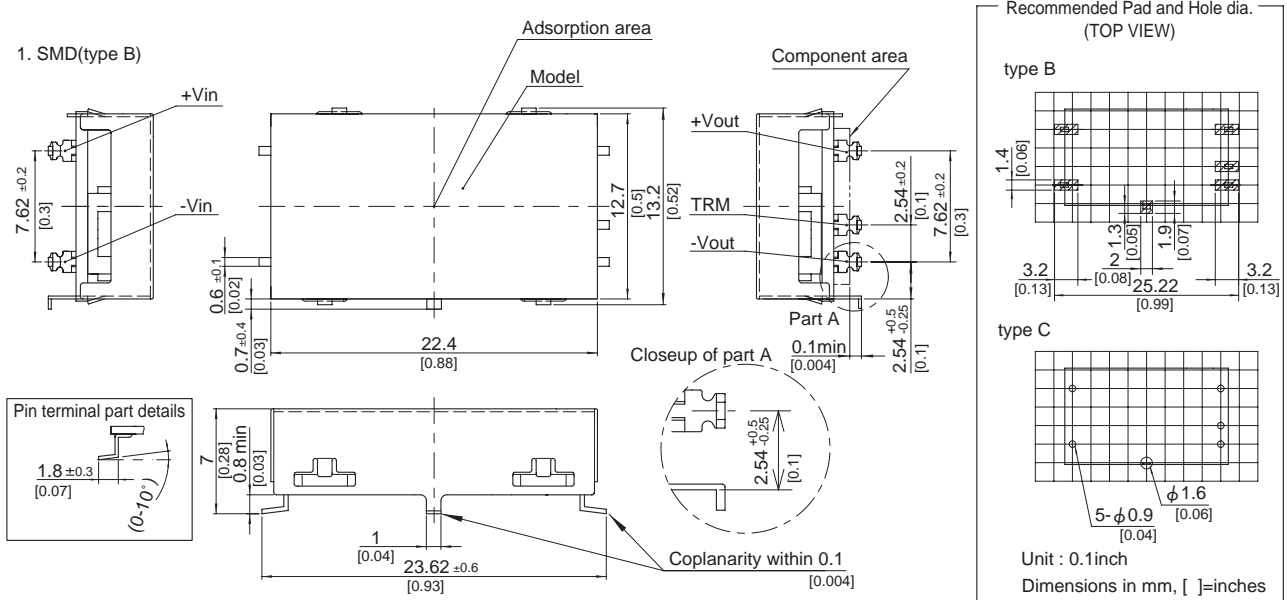
PROTECTION CIRCUIT AND OTHERS

## GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (20 $\pm$ 15 $^{\circ}$ C)
	INPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (20 $\pm$ 15 $^{\circ}$ C)
	OUTPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (20 $\pm$ 15 $^{\circ}$ C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85 $^{\circ}$ C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100 $^{\circ}$ C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 98.0m/s $^2$ (10G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s $^2$ (50G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	22.4 x 7.0 x 13.2mm [0.88 x 0.28 x 0.52 inches] (W x H x D) / 3g max
	COOLING METHOD	Convection/Forced air

- \*1 SUCW1R5xx12/SUCW1R5xx15 is available as single output, +24V/+30V.
- \*2 Rated input 5V, 12V, 24V or 48V DC I<sub>o</sub>=100%
- \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.
- \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25 $^{\circ}$ C.
- \* Parallel operation with other model is not possible.

### External view

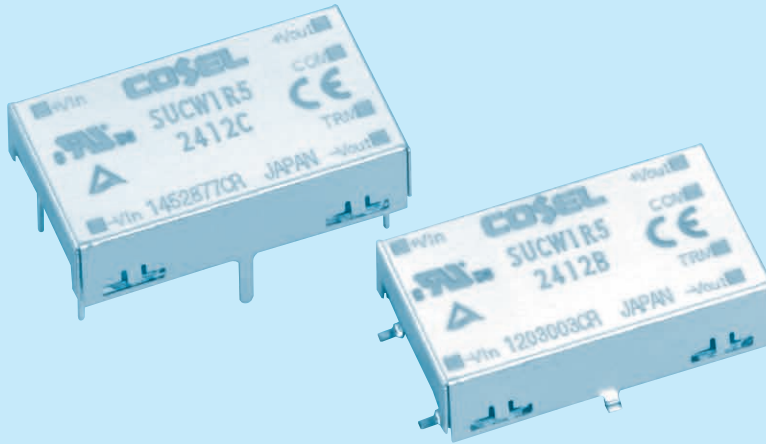
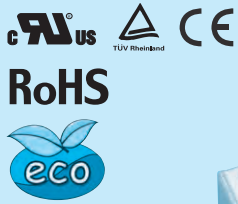


- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal thickness :  $0.3 \pm 0.1$  [0.012]
- ※ Pin terminal material : Copper alloy
- ※ Plating treatment of terminal : Lead free plating
- ※ Case thickness :  $0.2 \pm 0.05$  [0.008]
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight : 3g max

# SUCW1R5

SUC W 1R5 12 12 B P -□

① ② ③ ④ ⑤ ⑥ ⑦ ⑧



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Mounting type  
B : SMD  
C : DIP
- ⑦ Packing form  
Blank: Plastic cover  
P : Tray (SMD type)
- ⑧ Optional  
C : with coating (only DIP type)\*

\* Safety standards are pending

MODEL	SUCW1R50512	SUCW1R50515	SUCW1R51212	SUCW1R51215	SUCW1R52412	SUCW1R52415	SUCW1R54812	SUCW1R54815	
MAX OUTPUT WATTAGE[W]	1.56	1.5	1.56	1.5	1.56	1.5	1.56	1.5	
DC OUTPUT	VOLTAGE[V] *1	± 12 or +24	± 15 or +30	± 12 or +24	± 15 or +30	± 12 or +24	± 15 or +30	± 12 or +24	± 15 or +30
	CURRENT[A]	0.065	0.05	0.065	0.05	0.065	0.05	0.065	0.05

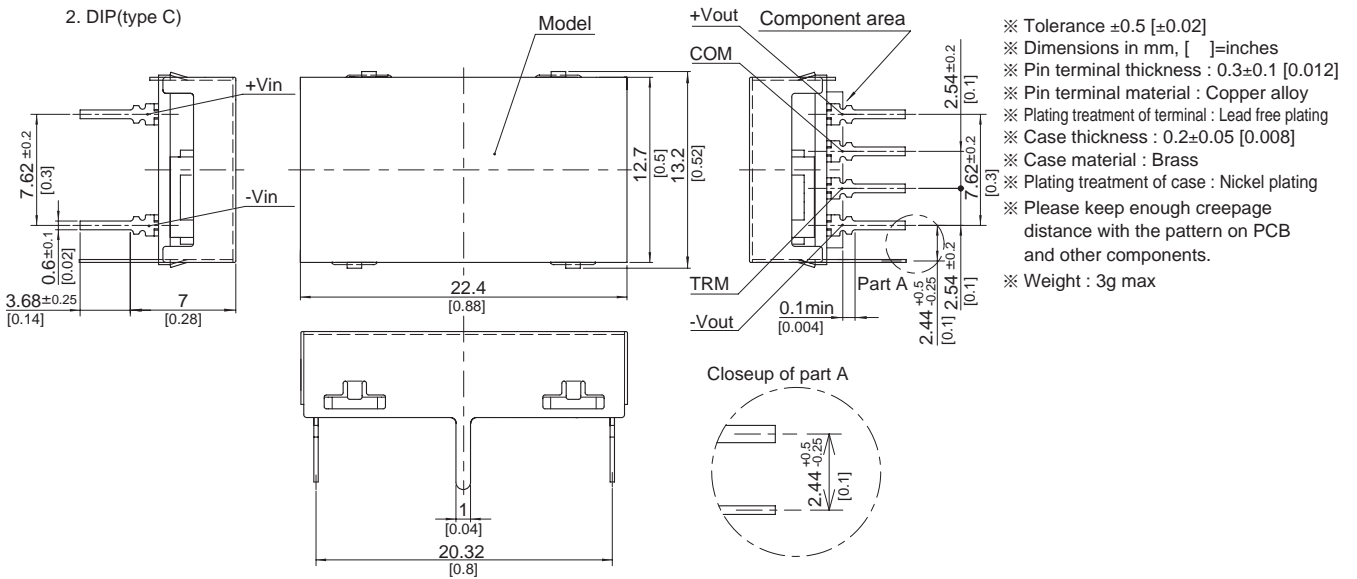
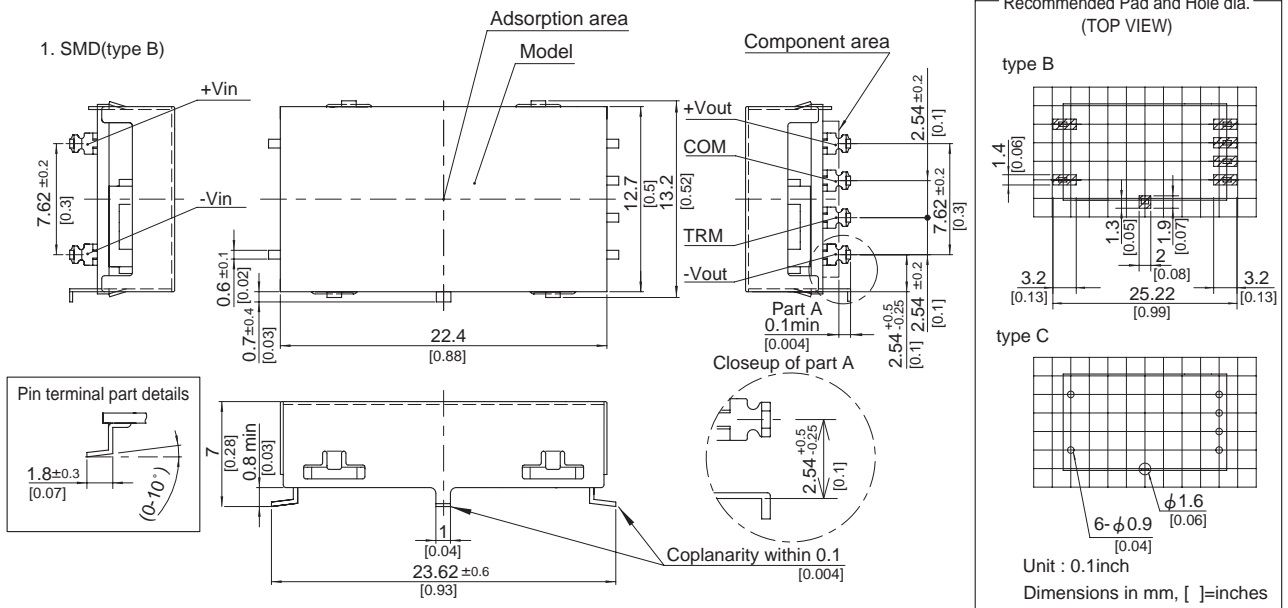
## SPECIFICATIONS

	MODEL	SUCW1R50512	SUCW1R50515	SUCW1R51212	SUCW1R51215	SUCW1R52412	SUCW1R52415	SUCW1R54812	SUCW1R54815	
INPUT	VOLTAGE[V]	DC4.5 - 9		DC9 - 18		DC18 - 36		DC36 - 76		
	CURRENT[A] *2	0.446typ	0.429typ	0.178typ	0.171typ	0.089typ	0.086typ	0.045typ	0.043typ	
	EFFICIENCY[%] *2	70typ	70typ	73typ	73typ	73typ	73typ	73typ	73typ	
OUTPUT	VOLTAGE[V]	± 12(+24)	± 15(+30)	± 12(+24)	± 15(+30)	± 12(+24)	± 15(+30)	± 12(+24)	± 15(+30)	
	CURRENT[A]	0.065	0.05	0.065	0.05	0.065	0.05	0.065	0.05	
	LINE REGULATION[mV]	60max	75max	60max	75max	60max	75max	60max	75max	
	LOAD REGULATION[mV]	600max	750max	600max	750max	600max	750max	600max	750max	
	RIPPLE[mVp-p]	-20 to +55°C *3	120max	120max	120max	120max	120max	120max	120max	120max
		-40 to -20°C *3	150max	150max	150max	150max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	150max	150max	150max	150max	150max	150max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	150max	180max	150max	180max	150max	180max	150max	180max
		-40 to +55°C	240max	290max	240max	290max	240max	290max	240max	290max
DRIFT[mV] *4	50max	60max	50max	60max	50max	60max	50max	60max		
START-UP TIME[ms]	20max (Minimum input, I <sub>o</sub> =100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±5%)	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75		
PROTECTION CIRCuits AND	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	INPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	OUTPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis								
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis								
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1								
OTHERS	CASE SIZE/WEIGHT	22.4 × 7.0 × 13.2mm [0.88 × 0.28 × 0.52 inches] (W × H × D) / 3g max								
	COOLING METHOD	Convection/Forced air								

\*1 Output pins can be connected in series to make a 24V/30V output.  
 \*2 Rated input 5V, 12V, 24V or 48V DC I<sub>o</sub>=100%  
 \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.  
 \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \* Parallel operation with other model is not possible.



## External view

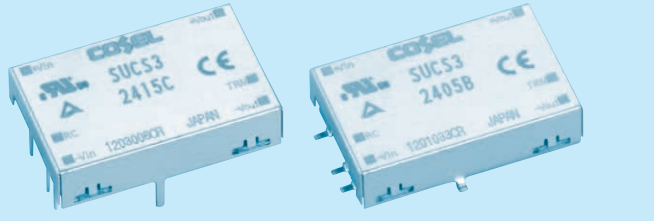


- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal thickness :  $0.3 \pm 0.1$  [0.012]
- ※ Pin terminal material : Copper alloy
- ※ Plating treatment of terminal : Lead free plating
- ※ Case thickness :  $0.2 \pm 0.05$  [0.008]
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight : 3g max

# SUCS3

SUC S 3 12 05 B P - □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Mounting type  
B :SMD  
C :DIP
- ⑦ Packing form  
Blank:Plastic cover  
P :Tray (SMD type)
- ⑧ Optional  
G :Capacitor between Input and Output is removed.  
C :with coating (only DIP type)\*  
\* Safety standards are pending

MODEL	SUCS3053R3	SUCS30505	SUCS30512	SUCS30515	SUCS3123R3	SUCS31205	SUCS31212	SUCS31215
MAX OUTPUT WATTAGE[W]	1.98	3	3	3	1.98	3	3	3
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12
	CURRENT[A]	0.6	0.6	0.25	0.2	0.6	0.6	0.25

## SPECIFICATIONS

	MODEL	SUCS3053R3	SUCS30505	SUCS30512	SUCS30515	SUCS3123R3	SUCS31205	SUCS31212	SUCS31215	
INPUT	VOLTAGE[V]	DC4.5 - 9				DC9 - 18				
	CURRENT[A] *2	0.550typ	0.800typ	0.780typ	0.780typ	0.223typ	0.325typ	0.317typ	0.321typ	
	EFFICIENCY[%] *2	72typ	75typ	77typ	77typ	74typ	77typ	79typ	78typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	0.6	0.6	0.25	0.2	0.6	0.6	0.25	0.2	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

MODEL	SUCS3243R3	SUCS32405	SUCS32412	SUCS32415	SUCS3483R3	SUCS34805	SUCS34812	SUCS34815
MAX OUTPUT WATTAGE[W]	1.98	3	3	3	1.98	3	3	3
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12
	CURRENT[A]	0.6	0.6	0.25	0.2	0.6	0.6	0.25

## SPECIFICATIONS

	MODEL	SUCS3243R3	SUCS32405	SUCS32412	SUCS32415	SUCS3483R3	SUCS34805	SUCS34812	SUCS34815	
INPUT	VOLTAGE[V]	DC18 - 36				DC36 - 76				
	CURRENT[A] *2	0.114typ	0.163typ	0.159typ	0.161typ	0.057typ	0.082typ	0.080typ	0.080typ	
	EFFICIENCY[%] *2	73typ	77typ	79typ	78typ	72typ	77typ	79typ	79typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	0.6	0.6	0.25	0.2	0.6	0.6	0.25	0.2	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

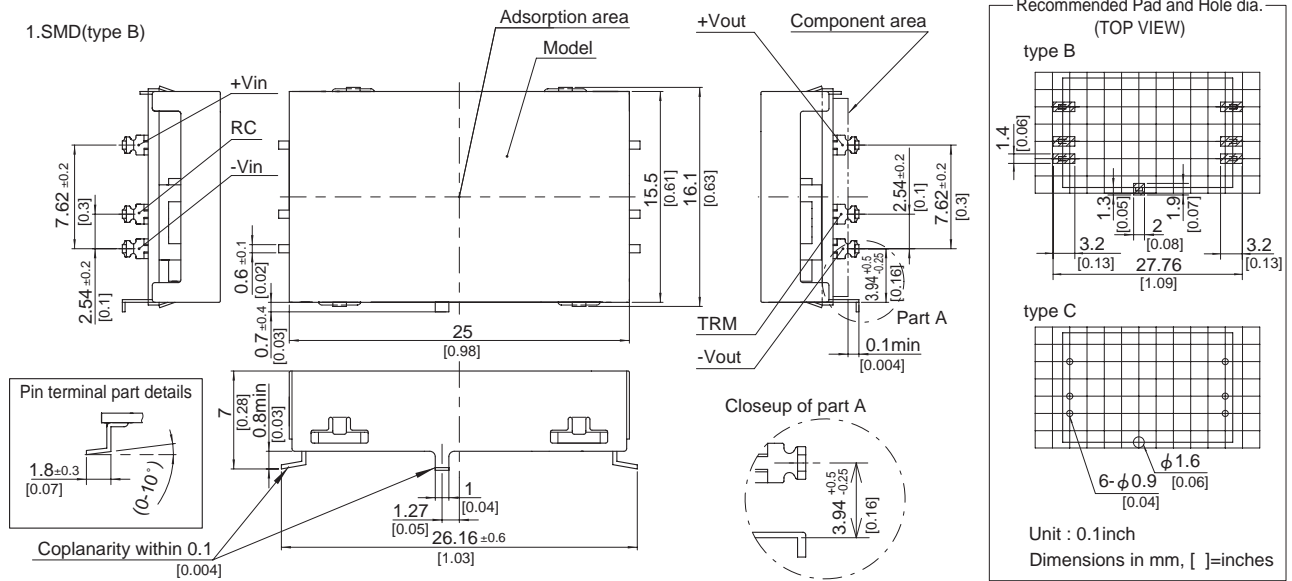
GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
	INPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
	OUTPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	25 × 7.0 × 16.1mm [0.98 × 0.28 × 0.63 inches] (W×H×D) / 5g max
	COOLING METHOD	Convection/Forced air

- \*1 SUCW3xx12/SUCW3xx15 is available as single output, +24V/+30V.
- \*2 Rated input 5V, 12V, 24V or 48V DC I<sub>o</sub>=100%
- \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.
- \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.

External view

NE-SUC/UT

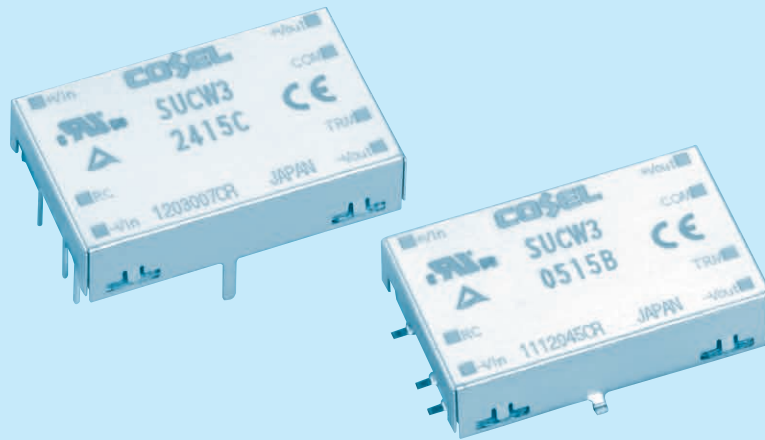
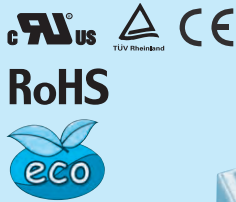


- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal thickness : 0.3±0.1 [0.012]
- ※ Pin terminal material : Copper alloy
- ※ Plating treatment of terminal : Lead free plating
- ※ Case thickness : 0.2±0.05 [0.008]
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight : 5g max

# SUCW3

SUC W 3 12 12 B P - □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧



- ① Series name
  - ② Dual output
  - ③ Output wattage
  - ④ Input voltage
  - ⑤ Output voltage
  - ⑥ Mounting type  
B : SMD  
C : DIP
  - ⑦ Packing form  
Blank: Plastic cover  
P : Tray (SMD type)
  - ⑧ Optional  
G : Capacitor between Input and Output is removed.  
C : with coating (only DIP type)\*
- \* Safety standards are pending

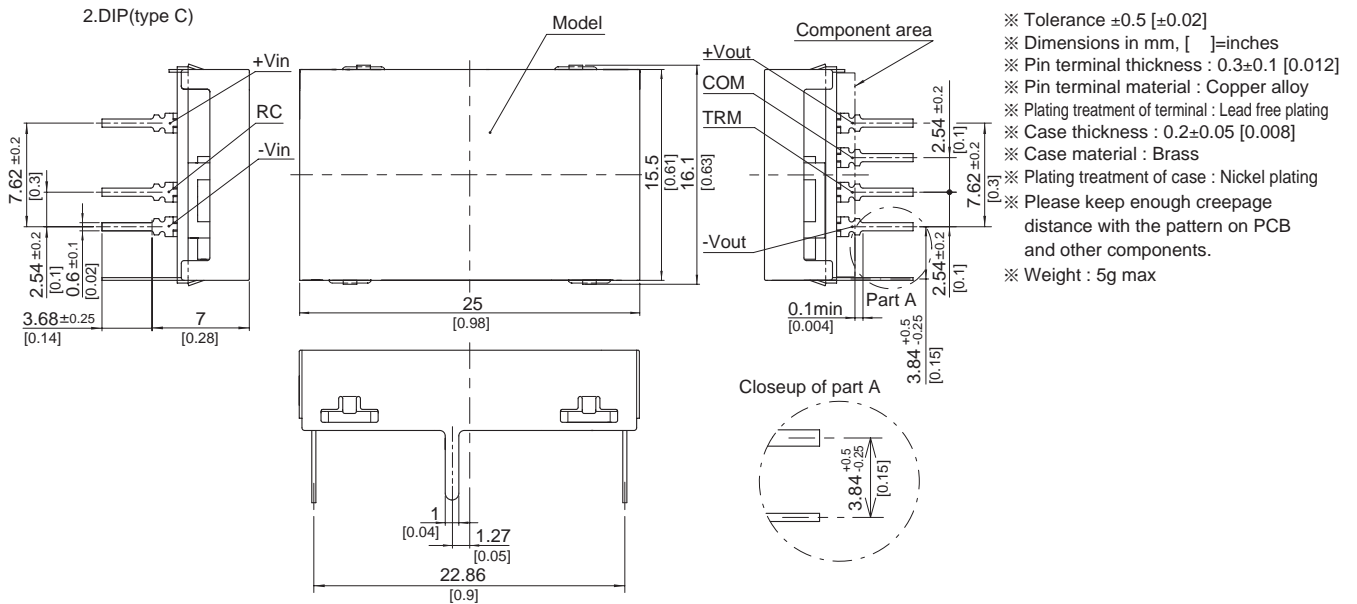
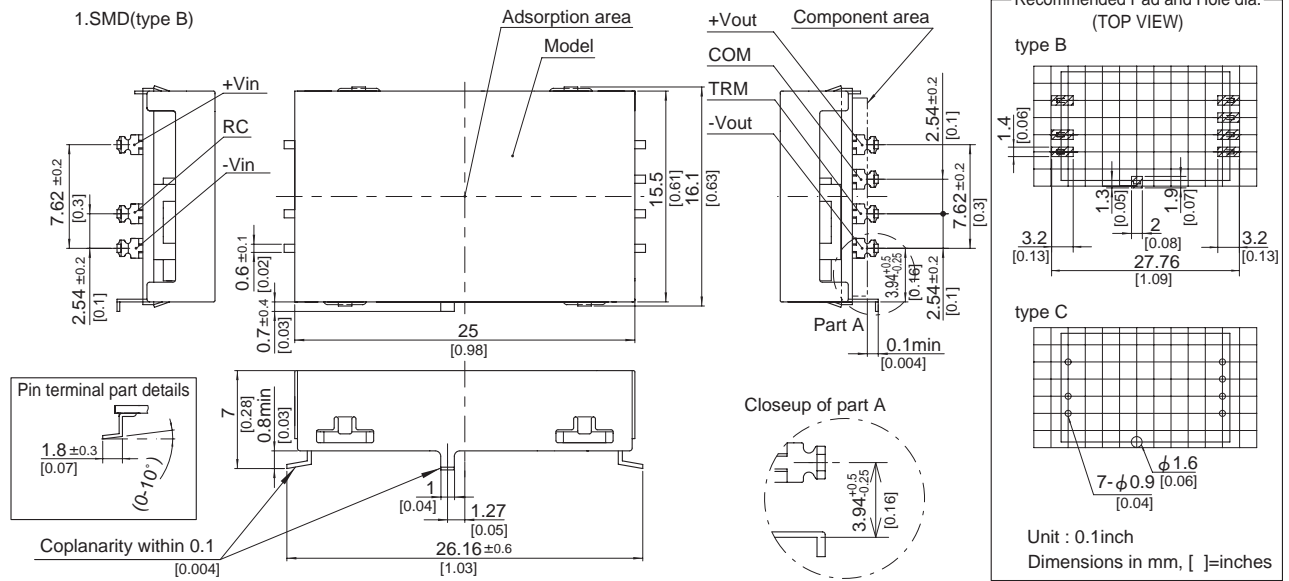
MODEL	SUCW30512	SUCW30515	SUCW31212	SUCW31215	SUCW32412	SUCW32415	SUCW34812	SUCW34815
MAX OUTPUT WATTAGE[W]	3.12	3	3.12	3	3.12	3	3.12	3
DC OUTPUT	VOLTAGE[V]*1	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±12 or +24	±15 or +30
	CURRENT[A]	0.13	0.1	0.13	0.1	0.13	0.13	0.1

## SPECIFICATIONS

	MODEL	SUCW30512	SUCW30515	SUCW31212	SUCW31215	SUCW32412	SUCW32415	SUCW34812	SUCW34815	
INPUT	VOLTAGE[V]	DC4.5 - 9		DC9 - 18		DC18 - 36		DC36 - 76		
	CURRENT[A]	*2 0.844typ	0.811typ	0.343typ	0.329typ	0.172typ	0.165typ	0.086typ	0.083typ	
	EFFICIENCY[%]	*2 74typ	74typ	76typ	76typ	76typ	76typ	76typ	76typ	
OUTPUT	VOLTAGE[V]	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	
	CURRENT[A]	0.13	0.1	0.13	0.1	0.13	0.1	0.13	0.1	
	LINE REGULATION[mV]	60max	75max	60max	75max	60max	75max	60max	75max	
	LOAD REGULATION[mV]	600max	750max	600max	750max	600max	750max	600max	750max	
	RIPPLE[mVp-p]	-20 to +55°C *3	120max	120max	120max	120max	120max	120max	120max	120max
		-40 to -20°C *3	150max	150max	150max	150max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	150max	150max	150max	150max	150max	150max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	150max	180max	150max	180max	150max	180max	150max	180max
		-40 to +55°C	240max	290max	240max	290max	240max	290max	240max	290max
DRIFT[mV]	*4 50max	60max	50max	60max	50max	60max	50max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±5%)	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								
ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	INPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	OUTPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis								
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis								
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1								
OTHERS	CASE SIZE/WEIGHT	25 × 7.0 × 16.1mm [0.98 × 0.28 × 0.63 inches] (W × H × D) / 5g max								
	COOLING METHOD	Convection/Forced air								

\*1 Output pins can be connected in series to make a 24V/30V output.  
 \*2 Rated input 5V, 12V, 24V or 48V DC Io=100%  
 \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.  
 \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \* Parallel operation with other model is not possible.

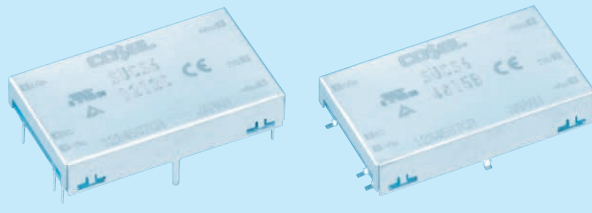
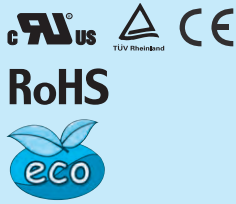
External view



# SUCS6

SUC S 6 12 05 B P - □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Mounting type  
B :SMD  
C :DIP
- ⑦ Packing form  
Blank:Plastic cover  
P :Tray (SMD type)
- ⑧ Optional  
G :Capacitor between Input and Output is removed.  
C :with coating (only DIP type)\*  
\* Safety standards are pending

MODEL	SUCS6053R3	SUCS60505	SUCS60512	SUCS60515	SUCS6123R3	SUCS61205	SUCS61212	SUCS61215	
MAX OUTPUT WATTAGE[W]	3.96	5	6	6	4.46	6	6	6	
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12	15
	CURRENT[A]	1.2	1	0.5	0.4	1.35	1.2	0.5	0.4

## SPECIFICATIONS

	MODEL	SUCS6053R3	SUCS60505	SUCS60512	SUCS60515	SUCS6123R3	SUCS61205	SUCS61212	SUCS61215	
INPUT	VOLTAGE[V]	DC4.5 - 9				DC9 - 18				
	CURRENT[A] *2	1.100typ	1.316typ	1.500typ	1.500typ	0.502typ	0.617typ	0.588typ	0.588typ	
	EFFICIENCY[%] *2	72typ	76typ	80typ	80typ	74typ	81typ	85typ	85typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	1.2	1	0.5	0.4	1.35	1.2	0.5	0.4	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

MODEL	SUCS6243R3	SUCS62405	SUCS62412	SUCS62415	SUCS6483R3	SUCS64805	SUCS64812	SUCS64815	
MAX OUTPUT WATTAGE[W]	4.46	6	6	6	4.46	6	6	6	
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12	15
	CURRENT[A]	1.35	1.2	0.5	0.4	1.35	1.2	0.5	0.4

## SPECIFICATIONS

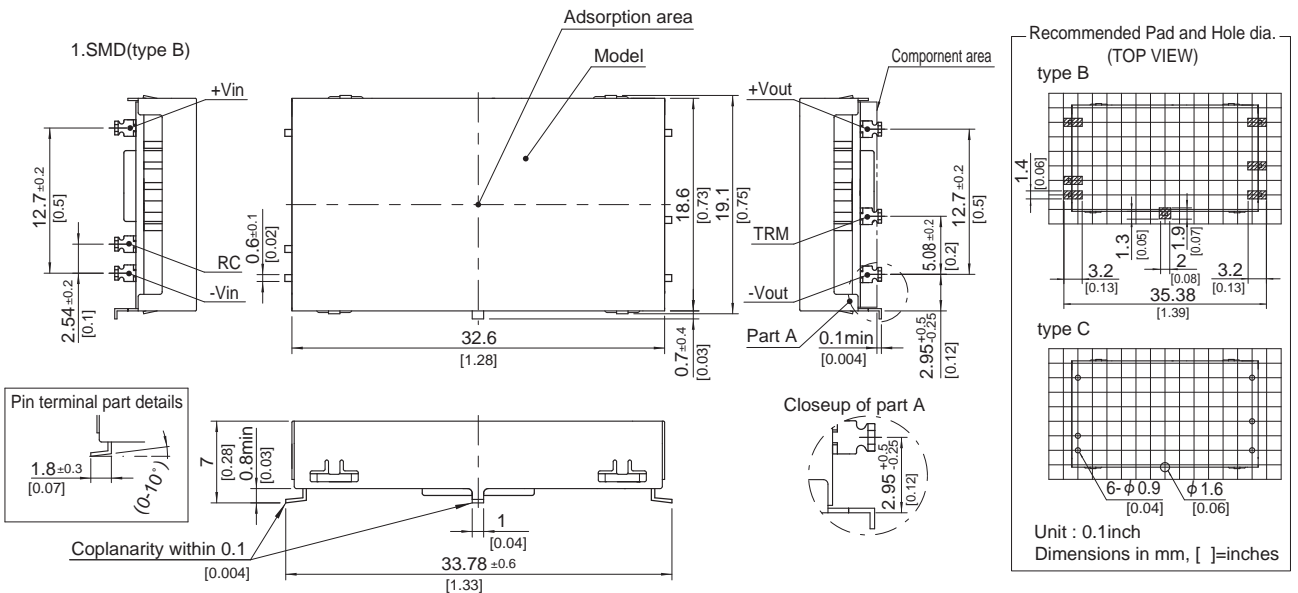
	MODEL	SUCS6243R3	SUCS62405	SUCS62412	SUCS62415	SUCS6483R3	SUCS64805	SUCS64812	SUCS64815	
INPUT	VOLTAGE[V]	DC18 - 36				DC36 - 76				
	CURRENT[A] *2	0.248typ	0.309typ	0.291typ	0.291typ	0.121typ	0.154typ	0.145typ	0.145typ	
	EFFICIENCY[%] *2	75typ	81typ	86typ	86typ	77typ	81typ	86typ	86typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	1.35	1.2	0.5	0.4	1.35	1.2	0.5	0.4	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

### GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (20 $\pm$ 15 $^{\circ}$ C)
	INPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (20 $\pm$ 15 $^{\circ}$ C)
	OUTPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (20 $\pm$ 15 $^{\circ}$ C)
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85 $^{\circ}$ C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100 $^{\circ}$ C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 98.0m/s $^2$ (10G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s $^2$ (50G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	32.6 $\times$ 7.0 $\times$ 19.1mm [1.28 $\times$ 0.28 $\times$ 0.75 inches] (W $\times$ H $\times$ D) / 7g max
	COOLING METHOD	Convection/Forced air

- \*1 SUCW6xx12/SUCW6xx15 is available as single output, +24V/+30V.
- \*2 Rated input 5V, 12V, 24V or 48V DC I<sub>o</sub>=100%
- \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.
- \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25 $^{\circ}$ C.
- \* Parallel operation with other model is not possible.

### External view

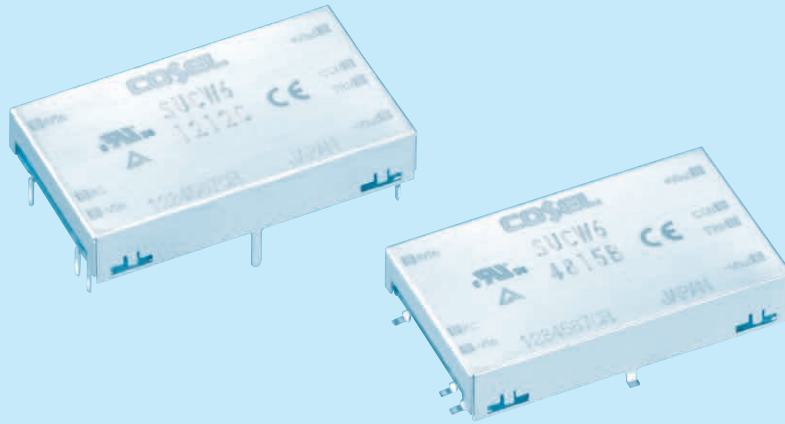
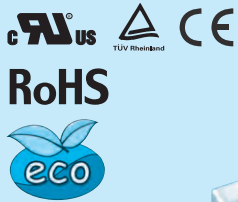


- \* Tolerance  $\pm$ 0.5 [ $\pm$ 0.02]
- \* Dimensions in mm, [ ]=inches
- \* Pin terminal thickness : 0.3 $\pm$ 0.1 [0.012]
- \* Pin terminal material : Copper alloy
- \* Plating treatment of terminal : Lead free plating
- \* Case thickness : 0.2 $\pm$ 0.05 [0.008]
- \* Case material : Brass
- \* Plating treatment of case : Nickel plating
- \* Please keep enough creepage distance with the pattern on PCB and other components.
- \* Weight : 7g max

# SUCW6

SUC W 6 12 12 B P - □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧



- ① Series name
  - ② Dual output
  - ③ Output wattage
  - ④ Input voltage
  - ⑤ Output voltage
  - ⑥ Mounting type  
B : SMD  
C : DIP
  - ⑦ Packing form  
Blank: Plastic cover  
P : Tray (SMD type)
  - ⑧ Optional  
G : Capacitor between Input and Output is removed.  
C : with coating (only DIP type)\*
- \* Safety standards are pending

MODEL	SUCW60512	SUCW60515	SUCW61212	SUCW61215	SUCW62412	SUCW62415	SUCW64812	SUCW64815
MAX OUTPUT WATTAGE[W]	6	6	6	6	6	6	6	6
DC OUTPUT	VOLTAGE[V]*1	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±12 or +24	±15 or +30
	CURRENT[A]	0.25	0.2	0.25	0.2	0.25	0.25	0.2

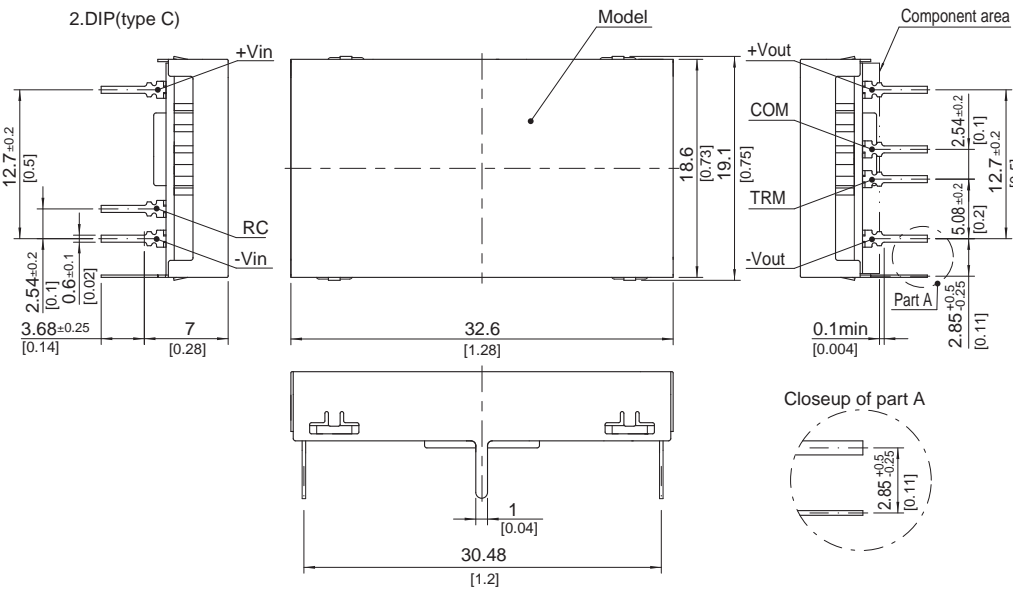
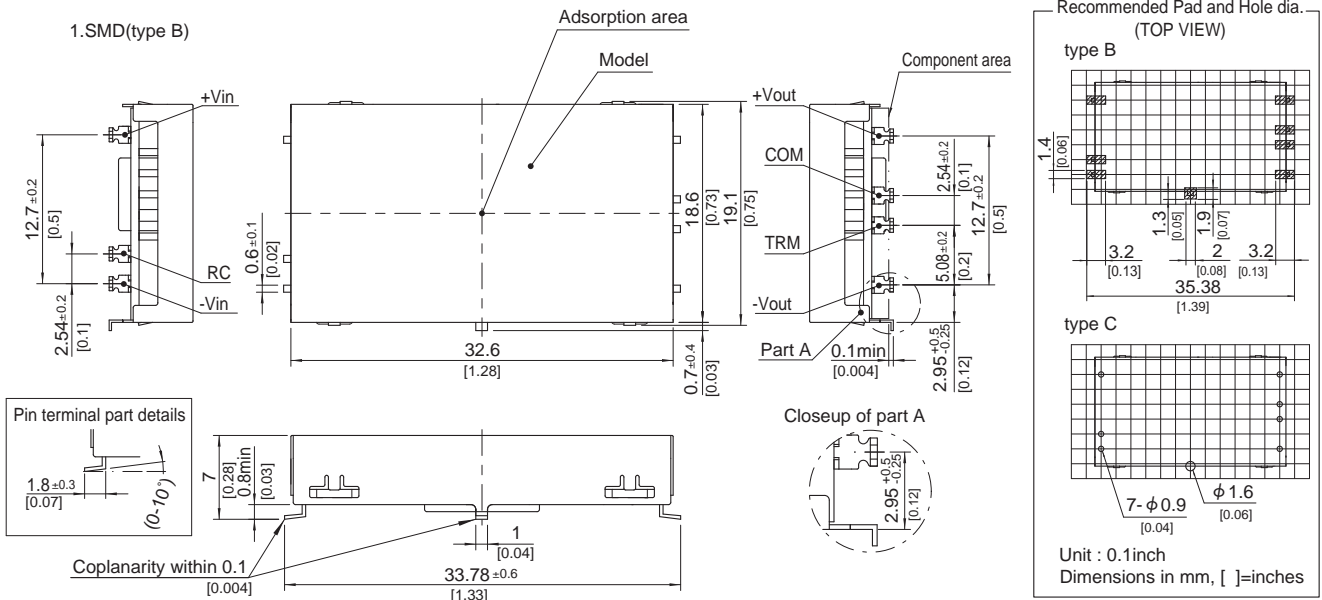
## SPECIFICATIONS

	MODEL	SUCW60512	SUCW60515	SUCW61212	SUCW61215	SUCW62412	SUCW62415	SUCW64812	SUCW64815	
INPUT	VOLTAGE[V]	DC4.5 - 9		DC9 - 18		DC18 - 36		DC36 - 76		
	CURRENT[A]	*2 1.538typ	1.538typ	0.588typ	0.588typ	0.291typ	0.291typ	0.145typ	0.145typ	
	EFFICIENCY[%]	*2 78typ	78typ	85typ	85typ	86typ	86typ	86typ	86typ	
OUTPUT	VOLTAGE[V]	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	
	CURRENT[A]	0.25	0.2	0.25	0.2	0.25	0.2	0.25	0.2	
	LINE REGULATION[mV]	60max	75max	60max	75max	60max	75max	60max	75max	
	LOAD REGULATION[mV]	600max	750max	600max	750max	600max	750max	600max	750max	
	RIPPLE[mVp-p]	-20 to +55°C *3	120max	120max	120max	120max	120max	120max	120max	120max
		-40 to -20°C *3	150max	150max	150max	150max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	150max	150max	150max	150max	150max	150max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	150max	180max	150max	180max	150max	180max	150max	180max
		-40 to +55°C	240max	290max	240max	290max	240max	290max	240max	290max
DRIFT[mV]	*4 50max	60max	50max	60max	50max	60max	50max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±5%)	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								
ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	INPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	OUTPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis								
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis								
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1								
OTHERS	CASE SIZE/WEIGHT	32.6 × 7.0 × 19.1mm [1.28 × 0.28 × 0.75 inches] (W × H × D) / 7g max								
	COOLING METHOD	Convection/Forced air								

\*1 Output pins can be connected in series to make a 24V/30V output.  
 \*2 Rated input 5V, 12V, 24V or 48V DC Io=100%  
 \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.  
 \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \* Parallel operation with other model is not possible.



External view



- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal thickness : 0.3±0.1 [0.012]
- ※ Pin terminal material : Copper alloy
- ※ Plating treatment of terminal : Lead free plating
- ※ Case thickness : 0.2±0.05 [0.008]
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight : 7g max

# SUCS10

SUC S 10 12 05 B P - □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧



- ① Series name
  - ② Single output
  - ③ Output wattage
  - ④ Input voltage
  - ⑤ Output voltage
  - ⑥ Mounting type  
B :SMD  
C :DIP
  - ⑦ Packing form  
Blank:Plastic cover  
P :Tray (SMD type)
  - ⑧ Optional  
G :Capacitor between Input and Output is removed.  
C :with coating (only DIP type)\*
- \* Safety standards are pending

MODEL	SUCS10053R3	SUCS100505	SUCS100512	SUCS100515	SUCS10123R3	SUCS101205	SUCS101212	SUCS101215
MAX OUTPUT WATTAGE[W]	8.58	10	10.8	10.5	8.58	10	12	12
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12
	CURRENT[A]	2.6	2	0.9	0.7	2.6	2	0.8

## SPECIFICATIONS

	MODEL	SUCS10053R3	SUCS100505	SUCS100512	SUCS100515	SUCS10123R3	SUCS101205	SUCS101212	SUCS101215	
INPUT	VOLTAGE[V]	DC4.5 - 9				DC9 - 18				
	CURRENT[A] *2	2.12typ	2.41typ	2.54typ	2.47typ	0.872typ	0.980typ	1.15typ	1.15typ	
	EFFICIENCY[%] *2	81typ	83typ	85typ	85typ	82typ	85typ	87typ	87typ	
	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
OUTPUT	CURRENT[A]	2.6	2	0.9	0.7	2.6	2	1	0.8	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
	DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max	
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

MODEL	SUCS10243R3	SUCS102405	SUCS102412	SUCS102415	SUCS10483R3	SUCS104805	SUCS104812	SUCS104815
MAX OUTPUT WATTAGE[W]	8.58	10	12	12	8.58	10	12	12
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12
	CURRENT[A]	2.6	2	1	0.8	2.6	2	1

## SPECIFICATIONS

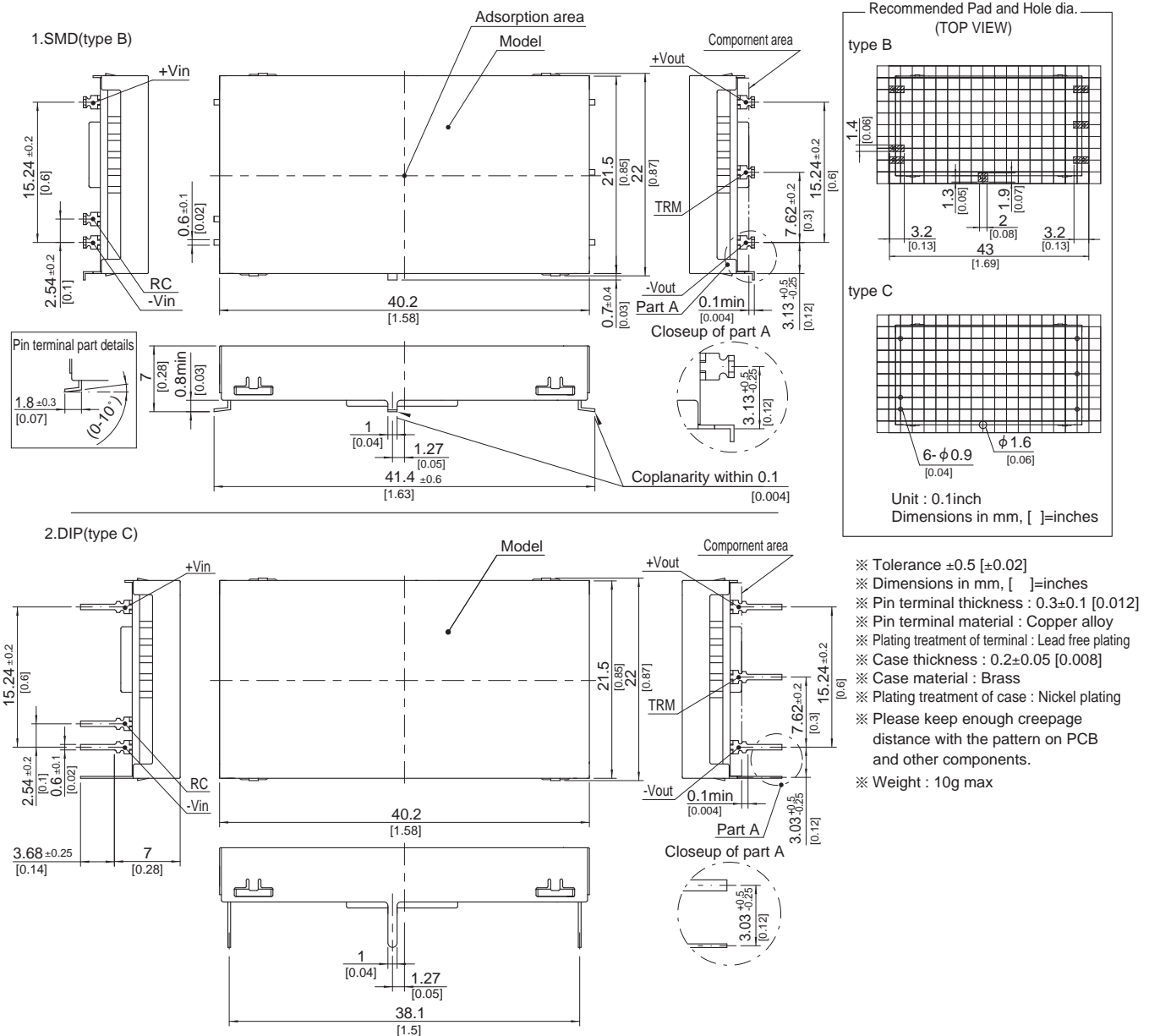
	MODEL	SUCS10243R3	SUCS102405	SUCS102412	SUCS102415	SUCS10483R3	SUCS104805	SUCS104812	SUCS104815	
INPUT	VOLTAGE[V]	DC18 - 36				DC36 - 76				
	CURRENT[A] *2	0.436typ	0.490typ	0.575typ	0.575typ	0.218typ	0.245typ	0.287typ	0.287typ	
	EFFICIENCY[%] *2	82typ	85typ	87typ	87typ	82typ	85typ	87typ	87typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	2.6	2	1	0.8	2.6	2	1	0.8	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

**GENERAL SPECIFICATIONS**

ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (20 $\pm$ 15 $^{\circ}$ C)
	INPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (20 $\pm$ 15 $^{\circ}$ C)
	OUTPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (20 $\pm$ 15 $^{\circ}$ C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85 $^{\circ}$ C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100 $^{\circ}$ C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 98.0m/s $^2$ (10G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s $^2$ (50G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	40.2 x 7.0 x 22.0mm [1.58 x 0.28 x 0.87 inches] (W x H x D) / 10g max
	COOLING METHOD	Convection/Forced air

- \*1 SUCW10xx12/SUCW10xx15 is available as single output, +24V/+30V.
- \*2 Rated input 5V, 12V, 24V or 48V DC I<sub>o</sub>=100%
- \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.
- \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25 $^{\circ}$ C.
- \* Parallel operation with other model is not possible.

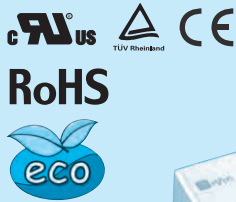
**External view**



# SUCW10

SUC W 10 12 12 B P - □

① ② ③ ④ ⑤ ⑥ ⑦ ⑧



- ① Series name
  - ② Dual output
  - ③ Output wattage
  - ④ Input voltage
  - ⑤ Output voltage
  - ⑥ Mounting type  
B : SMD  
C : DIP
  - ⑦ Packing form  
Blank: Plastic cover  
P : Tray (SMD type)
  - ⑧ Optional  
G : Capacitor between Input and Output is removed.  
C : with coating (only DIP type)\*
- \* Safety standards are pending

MODEL	SUCW100512	SUCW100515	SUCW101212	SUCW101215	SUCW102412	SUCW102415	SUCW104812	SUCW104815
MAX OUTPUT WATTAGE[W]	10.8	10.5	10.8	10.5	10.8	10.5	10.8	10.5
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±12 or +24	±15 or +30
	CURRENT[A]	0.45	0.35	0.45	0.35	0.45	0.45	0.35

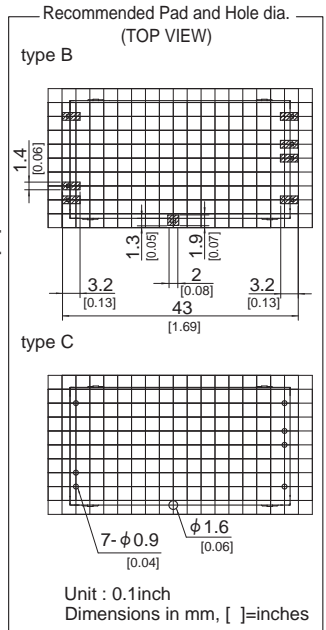
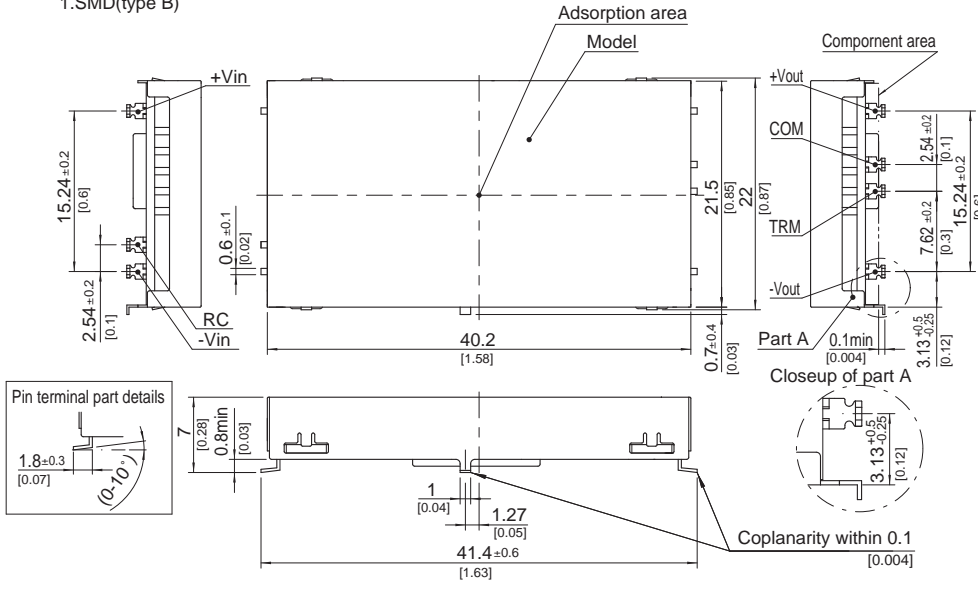
## SPECIFICATIONS

	MODEL	SUCW100512	SUCW100515	SUCW101212	SUCW101215	SUCW102412	SUCW102415	SUCW104812	SUCW104815	
INPUT	VOLTAGE[V]	DC4.5 - 9		DC9 - 18		DC18 - 36		DC36 - 76		
	CURRENT[A] *2	2.51typ	2.44typ	1.05typ	1.02typ	0.523typ	0.509typ	0.262typ	0.254typ	
	EFFICIENCY[%] *2	86typ	86typ	86typ	86typ	86typ	86typ	86typ	86typ	
OUTPUT	VOLTAGE[V]	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	
	CURRENT[A]	0.45	0.35	0.45	0.35	0.45	0.35	0.45	0.35	
	LINE REGULATION[mV]	60max	75max	60max	75max	60max	75max	60max	75max	
	LOAD REGULATION[mV]	600max	750max	600max	750max	600max	750max	600max	750max	
	RIPPLE[mVp-p]	-20 to +55°C *3	120max	120max	120max	120max	120max	120max	120max	120max
		-40 to -20°C *3	150max	150max	150max	150max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	150max	150max	150max	150max	150max	150max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	150max	180max	150max	180max	150max	180max	150max	180max
		-40 to +55°C	240max	290max	240max	290max	240max	290max	240max	290max
DRIFT[mV] *4	50max	60max	50max	60max	50max	60max	50max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±5%)	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								
ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	INPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	OUTPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis								
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis								
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1								
OTHERS	CASE SIZE/WEIGHT	40.2 × 7.0 × 22.0mm [1.58 × 0.28 × 0.87 inches] (W × H × D) / 10g max								
	COOLING METHOD	Convection/Forced air								

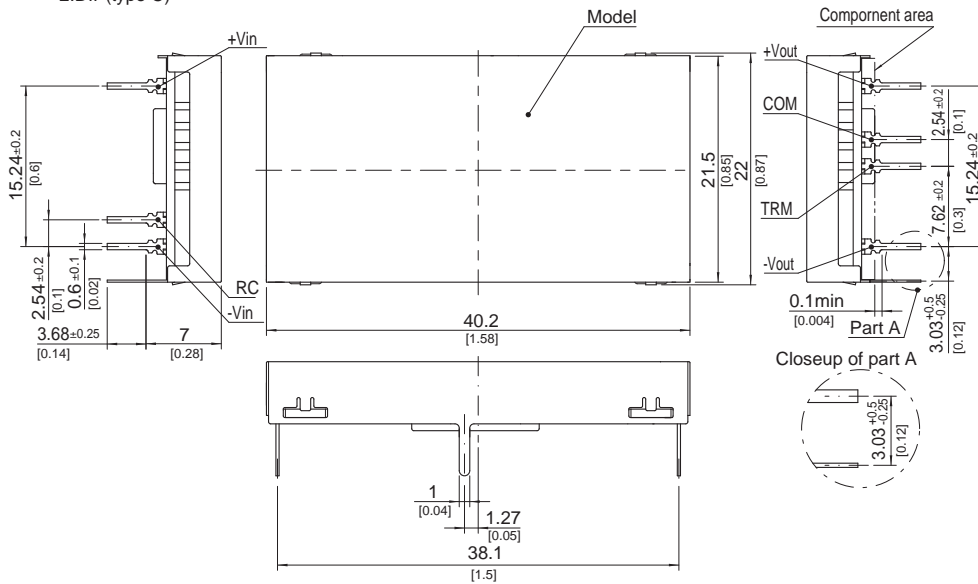
\*1 Output pins can be connected in series to make a 24V/30V output.  
 \*2 Rated input 5V, 12V, 24V or 48V DC Io=100%  
 \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.  
 \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \* Parallel operation with other model is not possible.

External view

1.SMD(type B)



2.DIP(type C)

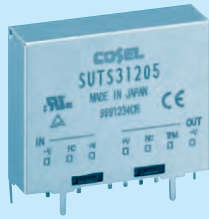
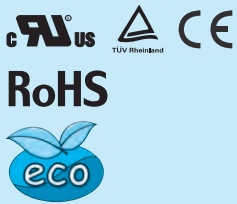


- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]=inches
- ※ Pin terminal thickness : 0.3±0.1 [0.012]
- ※ Pin terminal material : Copper alloy
- ※ Plating treatment of terminal : Lead free plating
- ※ Case thickness : 0.2±0.05 [0.008]
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight : 10g max

# SUTS3

SUT S 3 12 05 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
  - ② Single output
  - ③ Output wattage
  - ④ Input voltage
  - ⑤ Output voltage
  - ⑥ Optional
- G :Capacitor between Input and Output is removed.

MODEL	SUTS3053R3	SUTS30505	SUTS30512	SUTS30515	SUTS3123R3	SUTS31205	SUTS31212	SUTS31215	
MAX OUTPUT WATTAGE[W]	1.98	3	3	3	1.98	3	3	3	
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12	15
	CURRENT[A]	0.6	0.6	0.25	0.2	0.6	0.6	0.25	0.2

## SPECIFICATIONS

	MODEL	SUTS3053R3	SUTS30505	SUTS30512	SUTS30515	SUTS3123R3	SUTS31205	SUTS31212	SUTS31215	
INPUT	VOLTAGE[V]	DC4.5 - 9				DC9 - 18				
	CURRENT[A] *2	0.550typ	0.800typ	0.780typ	0.780typ	0.223typ	0.325typ	0.317typ	0.321typ	
	EFFICIENCY[%] *2	72typ	75typ	77typ	77typ	74typ	77typ	79typ	78typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	0.6	0.6	0.25	0.2	0.6	0.6	0.25	0.2	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

MODEL	SUTS3243R3	SUTS32405	SUTS32412	SUTS32415	SUTS3483R3	SUTS34805	SUTS34812	SUTS34815	
MAX OUTPUT WATTAGE[W]	1.98	3	3	3	1.98	3	3	3	
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12	15
	CURRENT[A]	0.6	0.6	0.25	0.2	0.6	0.6	0.25	0.2

## SPECIFICATIONS

	MODEL	SUTS3243R3	SUTS32405	SUTS32412	SUTS32415	SUTS3483R3	SUTS34805	SUTS34812	SUTS34815	
INPUT	VOLTAGE[V]	DC18 - 36				DC36 - 76				
	CURRENT[A] *2	0.114typ	0.163typ	0.159typ	0.161typ	0.057typ	0.082typ	0.080typ	0.080typ	
	EFFICIENCY[%] *2	73typ	77typ	79typ	78typ	72typ	77typ	79typ	79typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	0.6	0.6	0.25	0.2	0.6	0.6	0.25	0.2	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

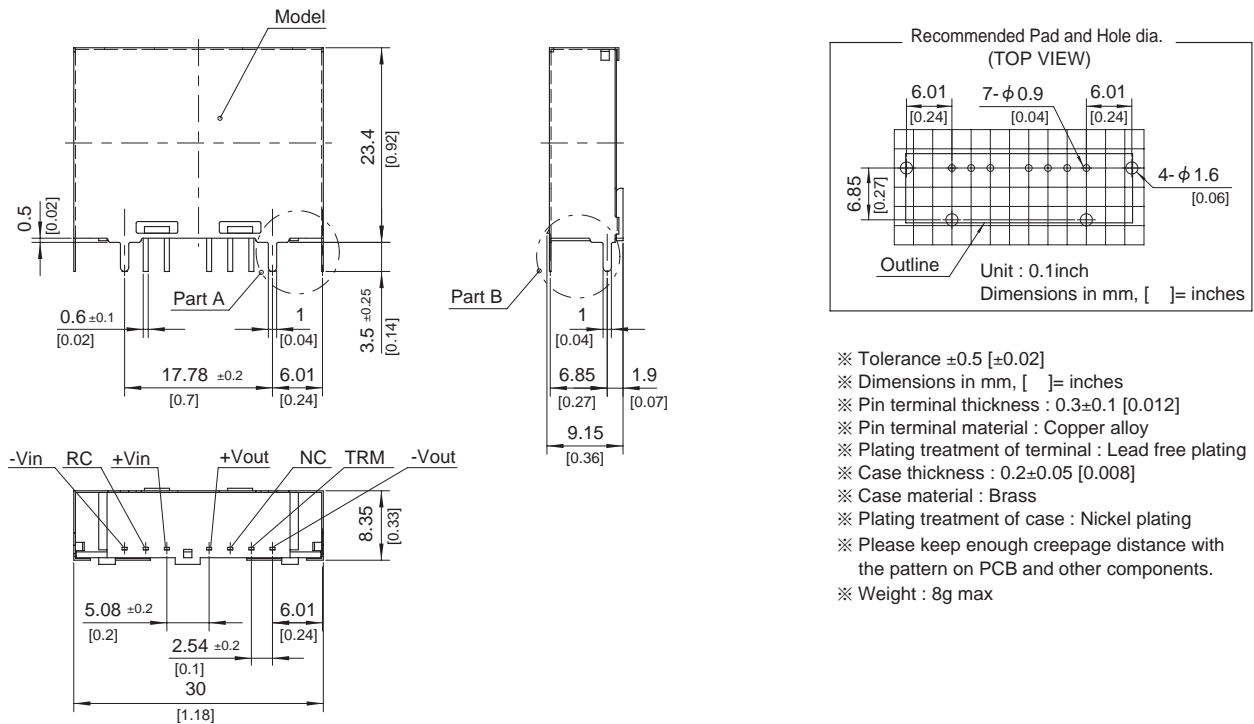
GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
	INPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
	OUTPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	30.0 × 23.4 × 9.15mm [1.18 × 0.92 × 0.36 inches] (W×H×D) / 8g max
	COOLING METHOD	Convection/Forced air

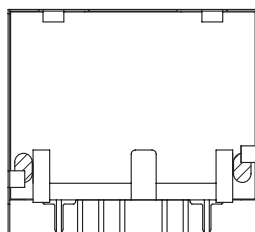
- \*1 SUTW3xx12/SUTW3xx15 is available as single output, +24V/+30V.
- \*2 Rated input 5V, 12V, 24V or 48V DC Io=100%
- \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.
- \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- \* Parallel operation with other model is not possible.

External view

SUTS3

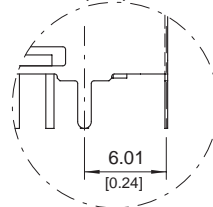


※ Back View

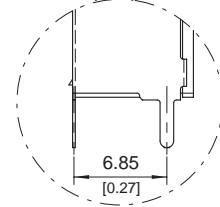


▨ : Conduction Area

Closeup of part A



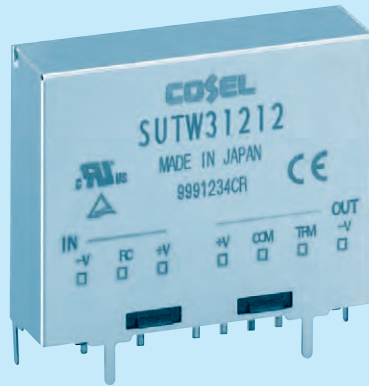
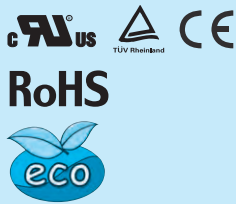
Closeup of part B



# SUTW3

SUT W 3 12 12 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- G :Capacitor between Input and Output is removed.

MODEL	SUTW30512	SUTW30515	SUTW31212	SUTW31215	SUTW32412	SUTW32415	SUTW34812	SUTW34815	
MAX OUTPUT WATTAGE[W]	3.12	3	3.12	3	3.12	3	3.12	3	
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30
	CURRENT[A]	0.13	0.1	0.13	0.1	0.13	0.1	0.13	0.1

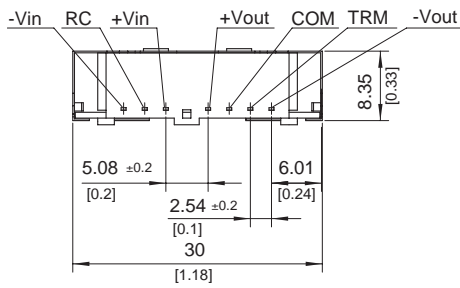
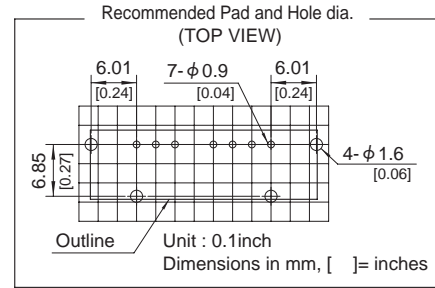
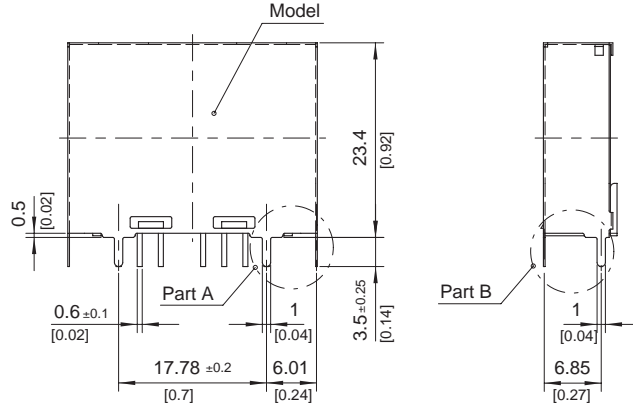
## SPECIFICATIONS

	MODEL	SUTW30512	SUTW30515	SUTW31212	SUTW31215	SUTW32412	SUTW32415	SUTW34812	SUTW34815	
INPUT	VOLTAGE[V]	DC4.5 - 9		DC9 - 18		DC18 - 36		DC36 - 76		
	CURRENT[A] *2	0.844typ	0.811typ	0.343typ	0.329typ	0.172typ	0.165typ	0.086typ	0.083typ	
	EFFICIENCY[%] *2	74typ	74typ	76typ	76typ	76typ	76typ	76typ	76typ	
OUTPUT	VOLTAGE[V]	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	
	CURRENT[A]	0.13	0.1	0.13	0.1	0.13	0.1	0.13	0.1	
	LINE REGULATION[mV]	60max	75max	60max	75max	60max	75max	60max	75max	
	LOAD REGULATION[mV]	600max	750max	600max	750max	600max	750max	600max	750max	
	RIPPLE[mVp-p]	-20 to +55°C *3	120max	120max	120max	120max	120max	120max	120max	120max
		-40 to -20°C *3	150max	150max	150max	150max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	150max	150max	150max	150max	150max	150max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	150max	180max	150max	180max	150max	180max	150max	180max
		-40 to +55°C	240max	290max	240max	290max	240max	290max	240max	290max
DRIFT[mV] *4	50max	60max	50max	60max	50max	60max	50max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±5%)	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								
ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	INPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	OUTPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis								
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis								
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1								
OTHERS	CASE SIZE/WEIGHT	30.0 × 23.4 × 9.15mm [1.18 × 0.92 × 0.36 inches] (W × H × D) / 8g max								
	COOLING METHOD	Convection/Forced air								

\*1 Output pins can be connected in series to make a 24V/30V output.  
 \*2 Rated input 5V, 12V, 24V or 48V DC Io=100%  
 \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.  
 \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \* Parallel operation with other model is not possible.

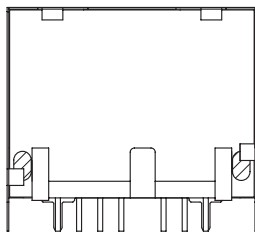


External view

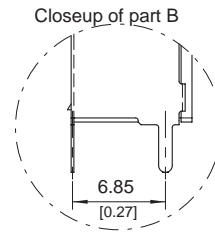
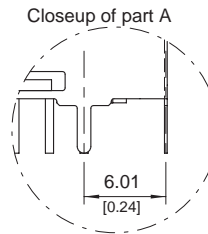


- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ] = inches
- ※ Pin terminal thickness :  $0.3 \pm 0.1$  [0.012]
- ※ Pin terminal material : Copper alloy
- ※ Plating treatment of terminal : Lead free plating
- ※ Case thickness :  $0.2 \pm 0.05$  [0.008]
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight : 8g max

※ Back View



: Conduction Area



# SUTS6

SUT S 6 12 05 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
  - ② Single output
  - ③ Output wattage
  - ④ Input voltage
  - ⑤ Output voltage
  - ⑥ Optional
- G :Capacitor between Input and Output is removed.

MODEL	SUTS6053R3	SUTS60505	SUTS60512	SUTS60515	SUTS6123R3	SUTS61205	SUTS61212	SUTS61215	
MAX OUTPUT WATTAGE[W]	3.96	5	6	6	4.46	6	6	6	
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12	15
	CURRENT[A]	1.2	1	0.5	0.4	1.35	1.2	0.5	0.4

## SPECIFICATIONS

	MODEL	SUTS6053R3	SUTS60505	SUTS60512	SUTS60515	SUTS6123R3	SUTS61205	SUTS61212	SUTS61215	
INPUT	VOLTAGE[V]	DC4.5 - 9				DC9 - 18				
	CURRENT[A] *2	1.100typ	1.316typ	1.500typ	1.500typ	0.502typ	0.617typ	0.588typ	0.588typ	
	EFFICIENCY[%] *2	72typ	76typ	80typ	80typ	74typ	81typ	85typ	85typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	1.2	1	0.5	0.4	1.35	1.2	0.5	0.4	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

MODEL	SUTS6243R3	SUTS62405	SUTS62412	SUTS62415	SUTS6483R3	SUTS64805	SUTS64812	SUTS64815	
MAX OUTPUT WATTAGE[W]	4.46	6	6	6	4.46	6	6	6	
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12	15
	CURRENT[A]	1.35	1.2	0.5	0.4	1.35	1.2	0.5	0.4

## SPECIFICATIONS

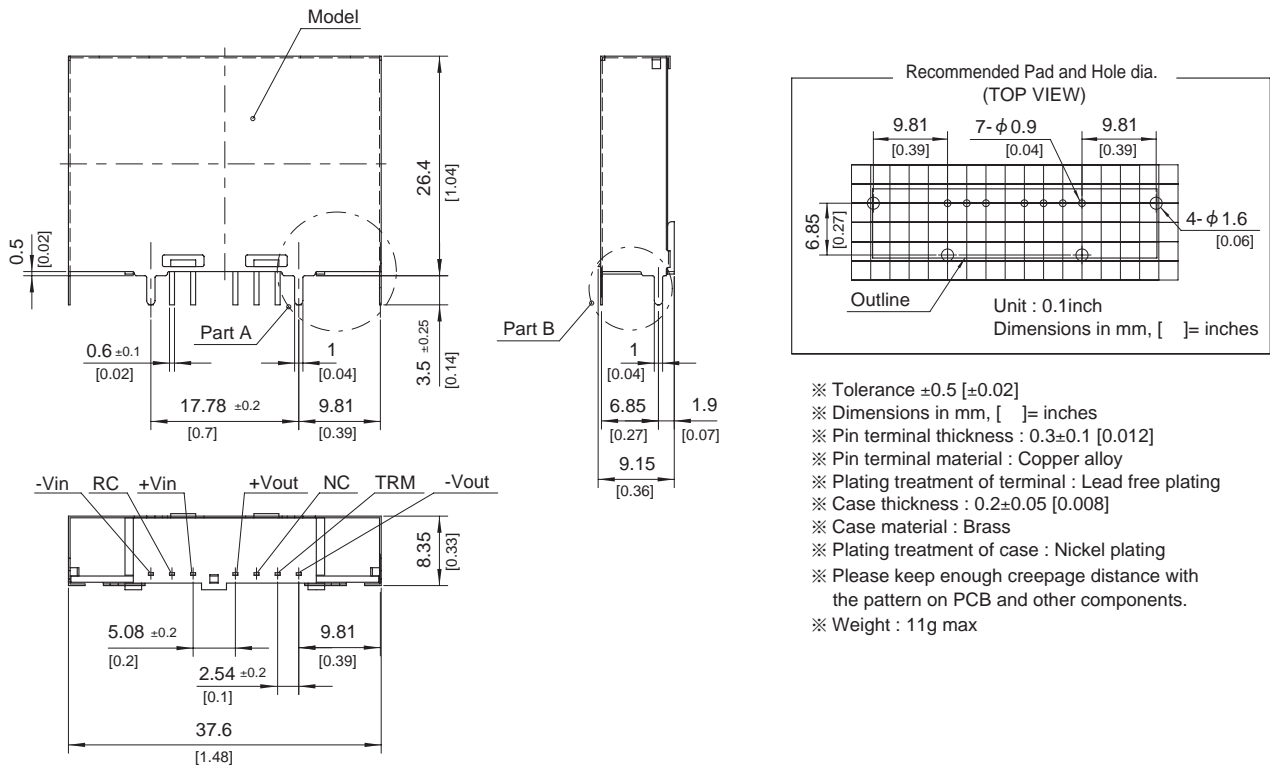
	MODEL	SUTS6243R3	SUTS62405	SUTS62412	SUTS62415	SUTS6483R3	SUTS64805	SUTS64812	SUTS64815	
INPUT	VOLTAGE[V]	DC18 - 36				DC36 - 76				
	CURRENT[A] *2	0.248typ	0.309typ	0.291typ	0.291typ	0.121typ	0.154typ	0.145typ	0.145typ	
	EFFICIENCY[%] *2	75typ	81typ	86typ	86typ	77typ	81typ	86typ	86typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	1.35	1.2	0.5	0.4	1.35	1.2	0.5	0.4	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

## GENERAL SPECIFICATIONS

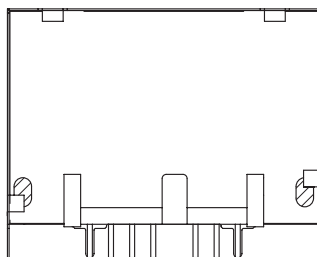
ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (20 $\pm$ 15 $^{\circ}$ C)
	INPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (20 $\pm$ 15 $^{\circ}$ C)
	OUTPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (20 $\pm$ 15 $^{\circ}$ C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85 $^{\circ}$ C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100 $^{\circ}$ C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 98.0m/s $^2$ (10G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s $^2$ (50G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	37.6 $\times$ 26.4 $\times$ 9.15mm [1.48 $\times$ 1.04 $\times$ 0.36 inches] (W $\times$ H $\times$ D) / 11g max
	COOLING METHOD	Convection/Forced air

- \*1 SUTW6xx12/SUTW6xx15 is available as single output, +24V/+30V.
- \*2 Rated input 5V, 12V, 24V or 48V DC I<sub>o</sub>=100%
- \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.
- \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25 $^{\circ}$ C.
- \* Parallel operation with other model is not possible.

### External view

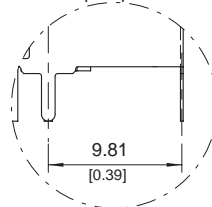


※ Back View

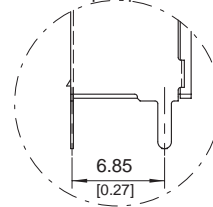


▨ : Conduction Area

Closeup of part A



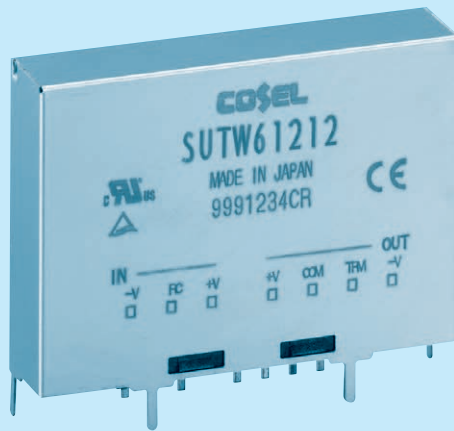
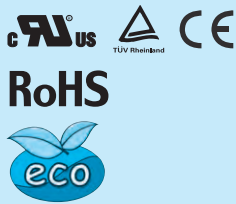
Closeup of part B



# SUTW6

SUT W 6 12 12 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- G : Capacitor between Input and Output is removed.

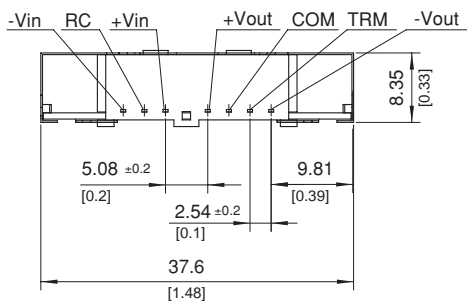
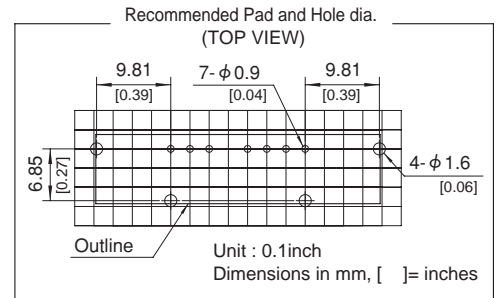
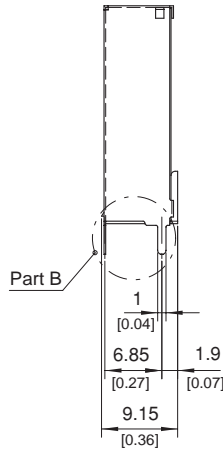
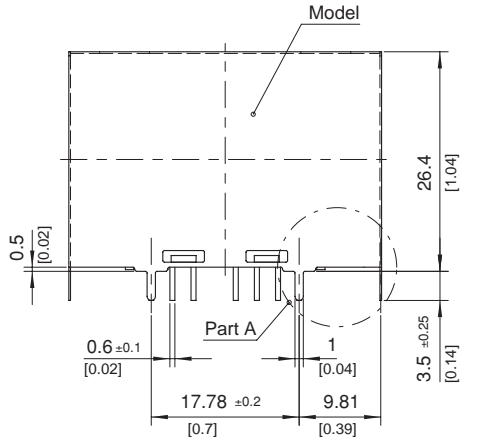
MODEL	SUTW60512	SUTW60515	SUTW61212	SUTW61215	SUTW62412	SUTW62415	SUTW64812	SUTW64815	
MAX OUTPUT WATTAGE[W]	6	6	6	6	6	6	6	6	
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30
	CURRENT[A]	0.25	0.2	0.25	0.2	0.25	0.2	0.25	0.2

## SPECIFICATIONS

	MODEL	SUTW60512	SUTW60515	SUTW61212	SUTW61215	SUTW62412	SUTW62415	SUTW64812	SUTW64815	
INPUT	VOLTAGE[V]	DC4.5 - 9		DC9 - 18		DC18 - 36		DC36 - 76		
	CURRENT[A] *2	1.538typ	1.538typ	0.588typ	0.588typ	0.291typ	0.291typ	0.145typ	0.145typ	
	EFFICIENCY[%] *2	78typ	78typ	85typ	85typ	86typ	86typ	86typ	86typ	
OUTPUT	VOLTAGE[V]	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	
	CURRENT[A]	0.25	0.2	0.25	0.2	0.25	0.2	0.25	0.2	
	LINE REGULATION[mV]	60max	75max	60max	75max	60max	75max	60max	75max	
	LOAD REGULATION[mV]	600max	750max	600max	750max	600max	750max	600max	750max	
	RIPPLE[mVp-p]	-20 to +55°C *3	120max	120max	120max	120max	120max	120max	120max	120max
		-40 to -20°C *3	150max	150max	150max	150max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	150max	150max	150max	150max	150max	150max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	150max	180max	150max	180max	150max	180max	150max	180max
		-40 to +55°C	240max	290max	240max	290max	240max	290max	240max	290max
DRIFT[mV] *4	50max	60max	50max	60max	50max	60max	50max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±5%)	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								
ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	INPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	OUTPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis								
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis								
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1								
OTHERS	CASE SIZE/WEIGHT	37.6 × 26.4 × 9.15mm [1.84 × 1.04 × 0.36 inches] (W × H × D) / 11g max								
	COOLING METHOD	Convection/Forced air								

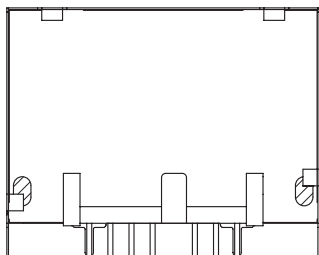
\*1 Output pins can be connected in series to make a 24V/30V output.  
 \*2 Rated input 5V, 12V, 24V or 48V DC Io=100%  
 \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.  
 \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \* Parallel operation with other model is not possible.

External view



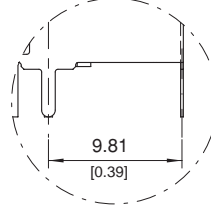
- ※ Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal thickness :  $0.3 \pm 0.1$  [0.012]
- ※ Pin terminal material : Copper alloy
- ※ Plating treatment of terminal : Lead free plating
- ※ Case thickness :  $0.2 \pm 0.05$  [0.008]
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight : 11g max

※ Back View

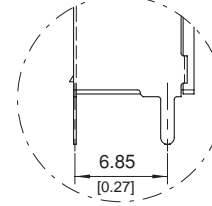


: Conduction Area

Closeup of part A



Closeup of part B



# SUTS10

SUT S 10 12 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
  - ② Single output
  - ③ Output wattage
  - ④ Input voltage
  - ⑤ Output voltage
  - ⑥ Optional
- G : Capacitor between Input and Output is removed.

MODEL	SUTS10053R3	SUTS100505	SUTS100512	SUTS100515	SUTS10123R3	SUTS101205	SUTS101212	SUTS101215
MAX OUTPUT WATTAGE[W]	8.58	10	10.8	10.5	8.58	10	12	12
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12
	CURRENT[A]	2.6	2	0.9	0.7	2.6	2	1

## SPECIFICATIONS

	MODEL	SUTS10053R3	SUTS100505	SUTS100512	SUTS100515	SUTS10123R3	SUTS101205	SUTS101212	SUTS101215	
INPUT	VOLTAGE[V]	DC4.5 - 9				DC9 - 18				
	CURRENT[A] *2	2.12typ	2.41typ	2.54typ	2.47typ	0.872typ	0.980typ	1.15typ	1.15typ	
	EFFICIENCY[%] *2	81typ	83typ	85typ	85typ	82typ	85typ	87typ	87typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	2.6	2	0.9	0.7	2.6	2	1	0.8	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
	DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max	
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

MODEL	SUTS10243R3	SUTS102405	SUTS102412	SUTS102415	SUTS10483R3	SUTS104805	SUTS104812	SUTS104815
MAX OUTPUT WATTAGE[W]	8.58	10	12	12	8.58	10	12	12
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12	15	3.3	5	12
	CURRENT[A]	2.6	2	1	0.8	2.6	2	1

## SPECIFICATIONS

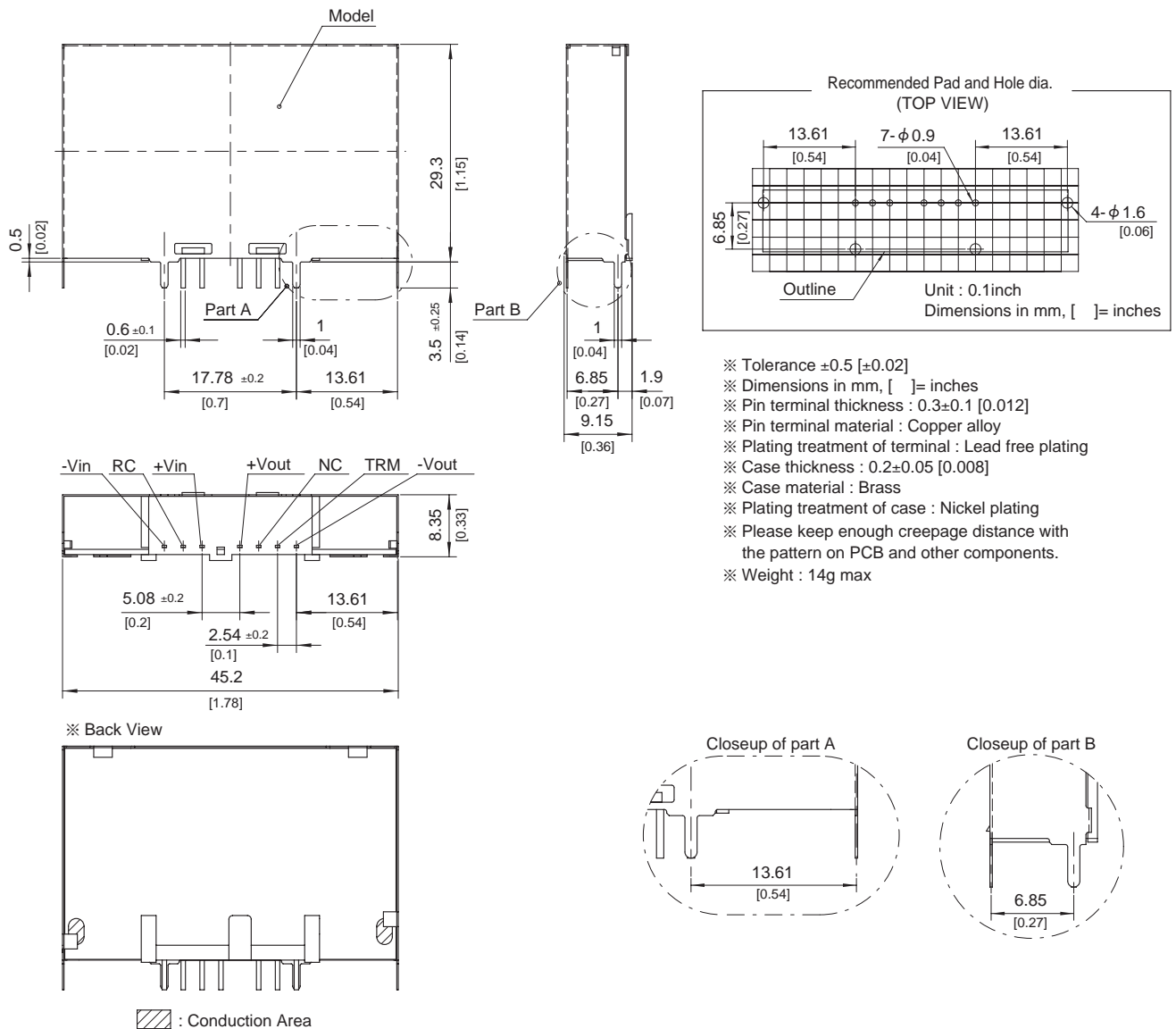
	MODEL	SUTS10243R3	SUTS102405	SUTS102412	SUTS102415	SUTS10483R3	SUTS104805	SUTS104812	SUTS104815	
INPUT	VOLTAGE[V]	DC18 - 36				DC36 - 76				
	CURRENT[A] *2	0.436typ	0.490typ	0.575typ	0.575typ	0.218typ	0.245typ	0.287typ	0.287typ	
	EFFICIENCY[%] *2	82typ	85typ	87typ	87typ	82typ	85typ	87typ	87typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	2.6	2	1	0.8	2.6	2	1	0.8	
	LINE REGULATION[mV]	20max	20max	48max	60max	20max	20max	48max	60max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	40max	40max	100max	120max	
	RIPPLE[mVp-p]	-20 to +55°C *3	80max	80max	120max	120max	80max	80max	120max	120max
		-40 to -20°C *3	120max	120max	150max	150max	120max	120max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	120max	120max	150max	150max	120max	120max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	50max	50max	150max	180max	50max	50max	150max	180max
		-40 to +55°C	80max	80max	240max	290max	80max	80max	240max	290max
	DRIFT[mV] *4	20max	20max	48max	60max	20max	20max	48max	60max	
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±3%)	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45	3.21 - 3.42	4.90 - 5.21	11.64 - 12.36	14.55 - 15.45		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								

## GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (20 $\pm$ 15 $^{\circ}$ C)
	INPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (20 $\pm$ 15 $^{\circ}$ C)
	OUTPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (20 $\pm$ 15 $^{\circ}$ C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85 $^{\circ}$ C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100 $^{\circ}$ C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 98.0m/s $^2$ (10G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	490.3m/s $^2$ (50G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	45.2 x 29.3 x 9.15mm [1.78 x 1.15 x 0.36 inches] (W x H x D) / 14g max
	COOLING METHOD	Convection/Forced air

- \*1 SUTW10xx12/SUTW10xx15 is available as single output, +24V/+30V.
- \*2 Rated input 5V, 12V, 24V or 48V DC I<sub>o</sub>=100%
- \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.
- \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25 $^{\circ}$ C.
- \* Parallel operation with other model is not possible.

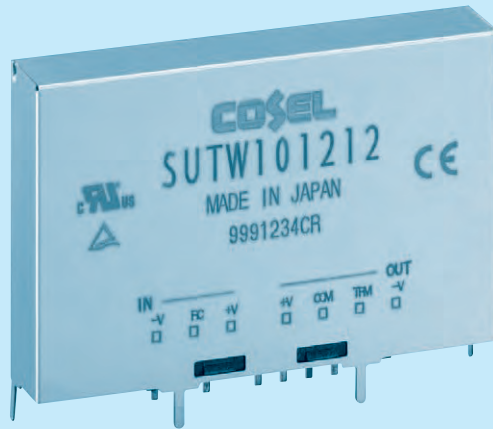
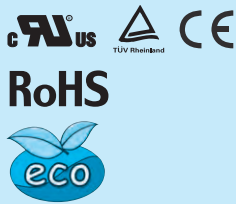
### External view



# SUTW10

SUT W 10 12 12 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- G : Capacitor between Input and Output is removed.

MODEL	SUTW100512	SUTW100515	SUTW101212	SUTW101215	SUTW102412	SUTW102415	SUTW104812	SUTW104815
MAX OUTPUT WATTAGE[W]	10.8	10.5	10.8	10.5	10.8	10.5	10.8	10.5
DC OUTPUT	VOLTAGE[V] *1	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24	±15 or +30	±12 or +24
	CURRENT[A]	0.45	0.35	0.45	0.35	0.45	0.35	0.45

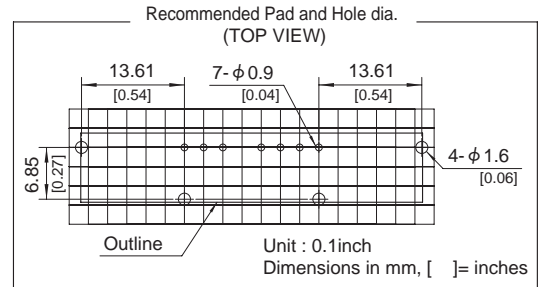
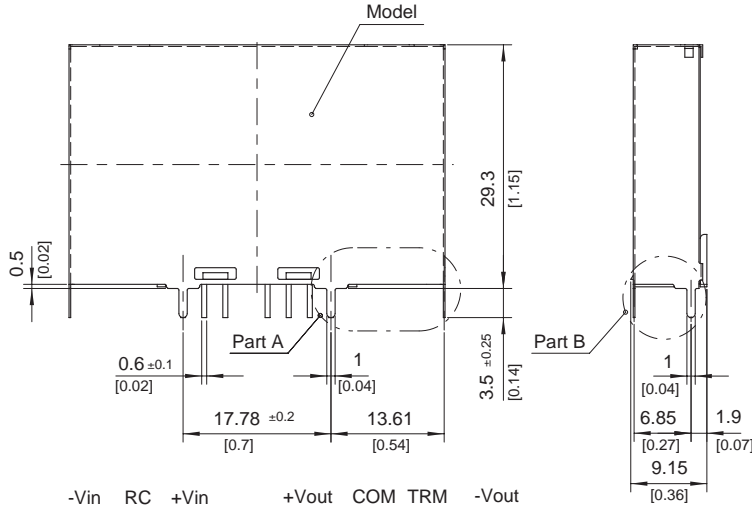
## SPECIFICATIONS

	MODEL	SUTW100512	SUTW100515	SUTW101212	SUTW101215	SUTW102412	SUTW102415	SUTW104812	SUTW104815	
INPUT	VOLTAGE[V]	DC4.5 - 9		DC9 - 18		DC18 - 36		DC36 - 76		
	CURRENT[A] *2	2.51typ	2.44typ	1.05typ	1.02typ	0.523typ	0.509typ	0.262typ	0.254typ	
	EFFICIENCY[%] *2	86typ	86typ	86typ	86typ	86typ	86typ	86typ	86typ	
OUTPUT	VOLTAGE[V]	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	±12(+24)	±15(+30)	
	CURRENT[A]	0.45	0.35	0.45	0.35	0.45	0.35	0.45	0.35	
	LINE REGULATION[mV]	60max	75max	60max	75max	60max	75max	60max	75max	
	LOAD REGULATION[mV]	600max	750max	600max	750max	600max	750max	600max	750max	
	RIPPLE[mVp-p]	-20 to +55°C *3	120max	120max	120max	120max	120max	120max	120max	120max
		-40 to -20°C *3	150max	150max	150max	150max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +55°C *3	150max	150max	150max	150max	150max	150max	150max	150max
		-40 to -20°C *3	200max	200max	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	-20 to +55°C	150max	180max	150max	180max	150max	180max	150max	180max
		-40 to +55°C	240max	290max	240max	290max	240max	290max	240max	290max
DRIFT[mV] *4	50max	60max	50max	60max	50max	60max	50max	60max		
START-UP TIME[ms]	20max (Minimum input, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open) ±5% adjustable by external VR									
OUTPUT VOLTAGE SETTING[V] (±5%)	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75	11.40 - 12.60	14.25 - 15.75		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)								
ISOLATION	INPUT-OUTPUT	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	INPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	OUTPUT-CASE	AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 98.0m/s <sup>2</sup> (10G), 3minutes period, 60minutes each along X, Y and Z axis								
	IMPACT	490.3m/s <sup>2</sup> (50G), 11ms, once each along X, Y and Z axis								
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1								
OTHERS	CASE SIZE/WEIGHT	45.2 × 29.3 × 9.15mm [1.78 × 1.15 × 0.36 inches] (W × H × D) / 14g max								
	COOLING METHOD	Convection/Forced air								

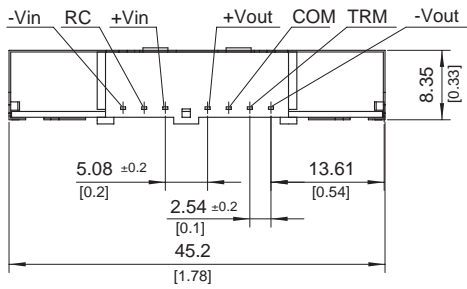
\*1 Output pins can be connected in series to make a 24V/30V output.  
 \*2 Rated input 5V, 12V, 24V or 48V DC Io=100%  
 \*3 Ripple and Ripple Noise is measured by using measuring board with capacitor with in 25mm from output pin terminals.  
 \*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \* Parallel operation with other model is not possible.



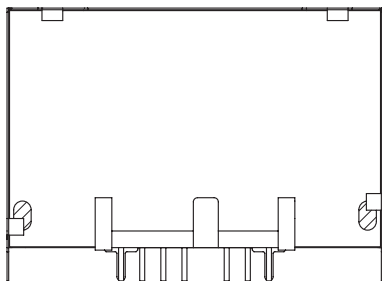
External view



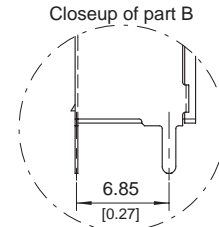
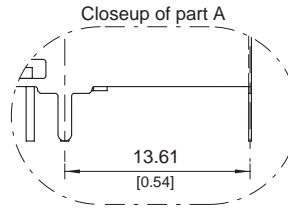
- ※ Tolerance ±0.5 [±0.02]
- ※ Dimensions in mm, [ ]= inches
- ※ Pin terminal thickness : 0.3±0.1 [0.012]
- ※ Pin terminal material : Copper alloy
- ※ Plating treatment of terminal : Lead free plating
- ※ Case thickness : 0.2±0.05 [0.008]
- ※ Case material : Brass
- ※ Plating treatment of case : Nickel plating
- ※ Please keep enough creepage distance with the pattern on PCB and other components.
- ※ Weight : 14g max



※ Back View

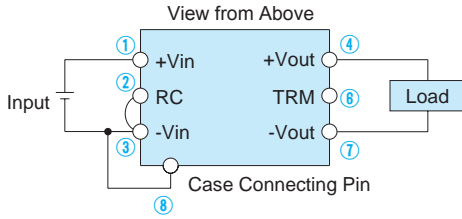


: Conduction Area

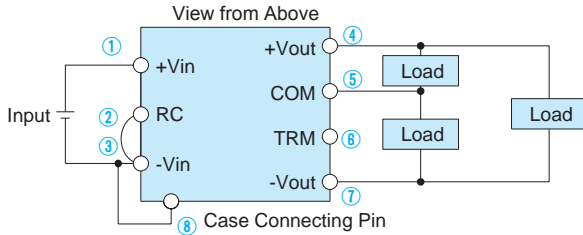


## Pin Configuration

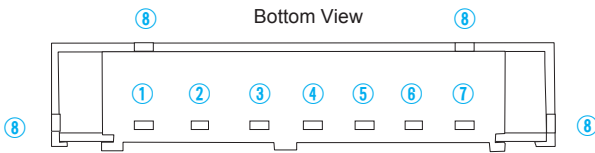
### ● SU/SUC Single Output



### ● SU/SUC Dual ( $\pm$ ) Output



### ● SU/SUC Single Output, Dual ( $\pm$ ) Output



Pin No.	Pin Terminal Name	Function
①	+Vin	+DC Input
②	RC	Remote ON/OFF (excluding 1R5)
③	-Vin	-DC Input
④	+Vout	+DC Output
⑤	COM	GND of Output Voltage (for Dual Output)
⑥	TRM	Output Voltage Adjustment (please see Instruction Manual 1.4)
⑦	-Vout	-DC Output
⑧	Case Connecting Pin	If connected to -Vin, a case potential becomes fixed and radiation noise decreases (applicable only to SUC series).

Pin No.	Pin Terminal Name	Function
①	-Vin	-DC Input
②	RC	Remote ON/OFF
③	+Vin	+DC Input
④	+Vout	+DC Output
⑤	NC (Single output) COM (Dual output)	GND of Output Voltage
⑥	TRM	Output Voltage Adjustment
⑦	-Vout	-DC Output
⑧	Case Connecting Pin	If connected to -Vin, a case potential becomes fixed and radiation noise decreases.

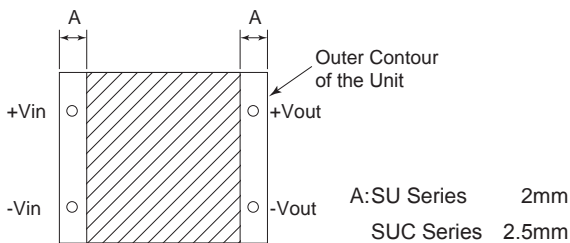
#### ■ Case Connecting Pin Terminal

Units come with a case connecting pin terminal. If this pin terminal is connected to -Vin, radiation noise from the main body decreases. Solder the case connecting pin terminal to PCB to improve reliability.

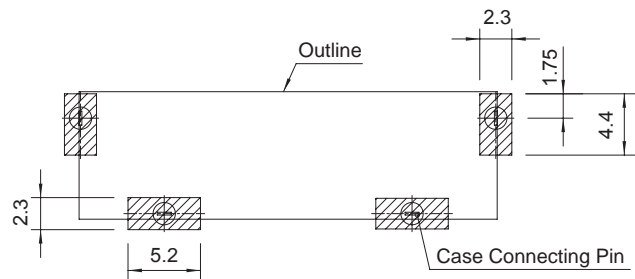
## Assembling and Installation Method

### Installation

- You can install the units in any direction. Place them in such a way that there is enough ventilation so that heat does not get accumulated around them.
- Do not place a rand or a pattern layout in the hatched area shown in below. Doing so may cause insulation failure on the PCB surface on which the power supply is mounted.



Area where Pattern Layout should not be Placed for SU/SUC



Area where Pattern Layout should not be Placed for SUT

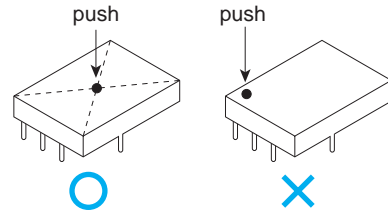
Assembling and Installation Method

Automatic Mounting (TYPE: BP)

■ To mount SU series automatically, use the transformer area near the center of the PCB as a pickup point. To mount SUC series automatically, use the central area of the case as a pickup point. If the bottom dead point of a suction nozzle is too low when mounting, excessive force is applied to the transformer, which could cause damage. Please mount carefully. Please see the External View for details of the pickup point.

Hand Mounting (TYPE: B, C SUT)

- To mount SU series manually, it must be push the transformer placed center of PS.
- To mount SUC series manually, it must be push the center of case.
- Due to prevent failure, PS should not be pull after soldering with PCB.



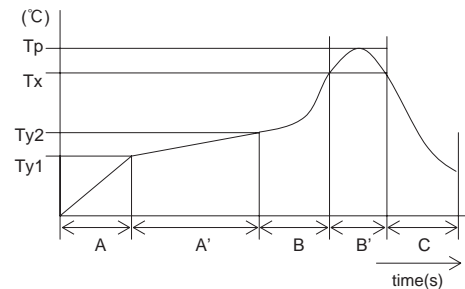
Soldering Conditions

(1) Reflow Soldering (except SUT, SUC□□C-C)

- Right figure shows conditions for the reflow soldering for SU/SUC series. Please make sure that the temperatures of pin terminals +Vin and -Vout shown in right figure . do not exceed the temperatures shown in right figure.
- If time or temperature of the reflow soldering goes beyond the conditions, reliability of internal components may be compromised. Please use the unit under the recommended reflow conditions.
- With this reflow profile, internal solder melts down. When transporting the unit within the reflow oven, please do not give vibration to the unit.
- Please avoid reflow soldering after applying adhesive or coating to the unit.
- You can reflow solder up to 2 times. Do not reflow solder when the power supply is mounted on the back surface of the PCB because the unit may drop.



\*View from Above

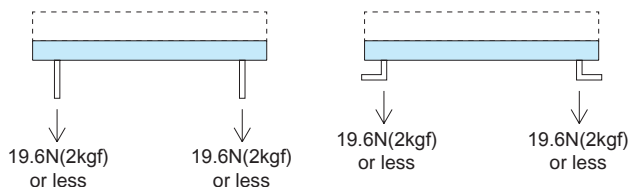


A	1.0 - 5.0°C/s
A'	Ty1 : 160 ±20°C
	Ty2 : 180 ±20°C
	Ty1 - Ty2 : 120s max
B	1.0 - 5.0°C/s
B'	Tp : Max 245°C 10s max
	Tx : 220°C or more : 70s max
C	1.0 - 5.0°C/s

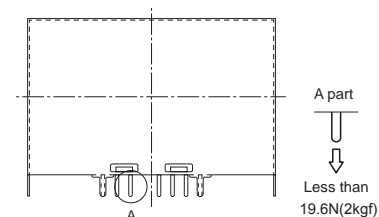
- (2) Flow Soldering : 260°C 15 seconds or less
- (3) Soldering Iron : maximum 360°C 5 seconds or less

Stress to Pin Terminals

- If too much stress is applied to input/output pin terminals of the power supply, internal connection may come down. If you apply stress as shown below, please kept it at 19.6N (2kgf) or less vertically.
- Input/output pin terminals are soldered to the PCB internally. Do not pull or bend a lead powerfully.
- If it is expected that stress is applied to the input/output pin terminals due to vibration or impact, reduce the stress to the pin terminals by taking such measures as fixing the unit to the PCB by silicone rubber, etc.



Strength of Input/Output Pin Terminals for SU/SUC



Strength of Input/Output Pin Terminals for SUT

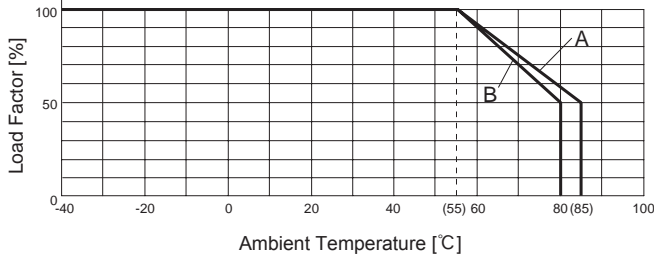
Derating

Ambient temperature derating curve

- It is necessary to note thermal fatigue life by power cycle. Please reduce the temperature fluctuation range as much as possible when the up and down of temperature are frequently generated.
- In the case of forced air cooling, please have sufficient ventilation to keep the temperature of point in Instruction Manual 7. Please also make sure that the ambient temperature does not exceed 85°C.

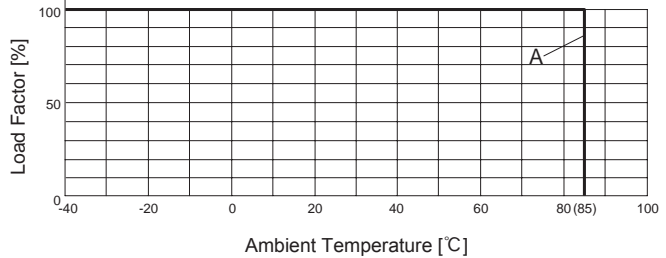
SU/SUC1R5

(1) In the case of Convection Cooling



Output Voltage(V) Input Voltage(V)	3.3	5	12	15	±12	±15
5	A	A	A	A	A	A
12	A	A	A	A	A	A
24	A	A	A	A	A	A
48	B	B	B	B	B	B

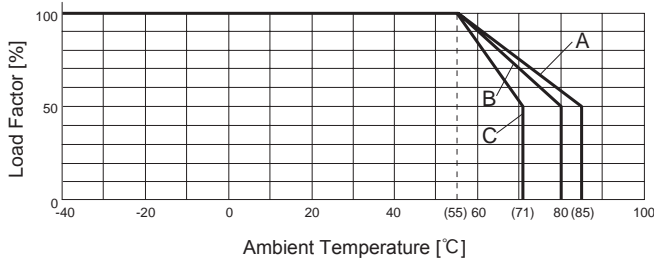
(2) In the case of Forced Air Cooling (1m/s)



Output Voltage(V) Input Voltage(V)	3.3	5	12	15	±12	±15
5	A	A	A	A	A	A
12	A	A	A	A	A	A
24	A	A	A	A	A	A
48	A	A	A	A	A	A

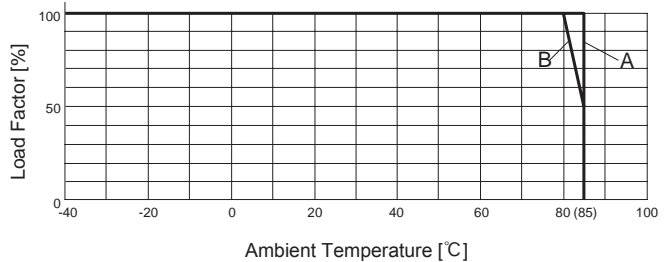
SU/SUC3

(1) In the case of Convection Cooling



Output Voltage(V) Input Voltage(V)	3.3	5	12	15	±12	±15
5	A	A	B	B	A	B
12	A	A	B	B	A	B
24	A	A	B	B	A	B
48	B	B	B	B	A	C

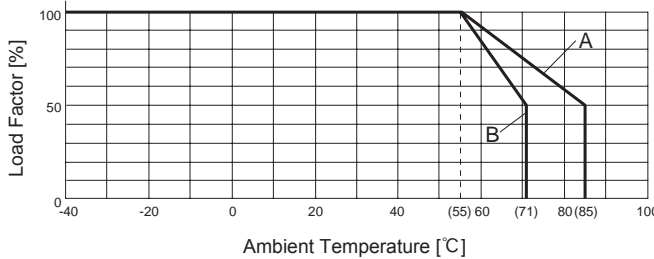
(2) In the case of Forced Air Cooling (1m/s)



Output Voltage(V) Input Voltage(V)	3.3	5	12	15	±12	±15
5	A	B	B	B	B	B
12	A	A	A	A	A	B
24	A	A	B	A	A	B
48	A	A	A	A	A	B

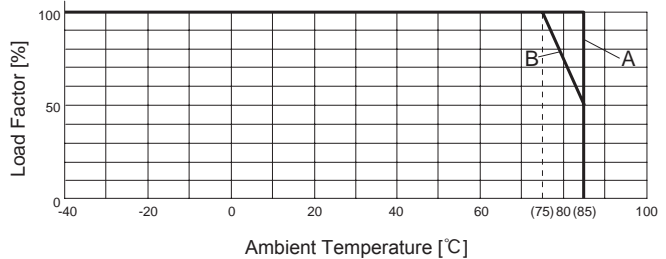
SU/SUC6

(1) In the case of Convection Cooling



Output Voltage(V) Input Voltage(V)	3.3	5	12	15	±12	±15
5	B	B	B	B	B	B
12	B	B	B	B	B	B
24	B	B	B	B	B	B
48	B	B	A	A	A	A

(2) In the case of Forced Air Cooling (1m/s)

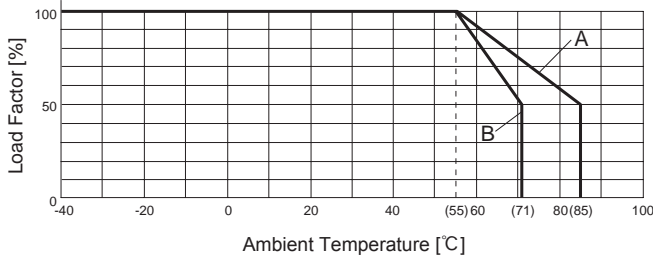


Output Voltage(V) Input Voltage(V)	3.3	5	12	15	±12	±15
5	B	B	A	A	A	A
12	B	B	A	A	A	A
24	B	B	A	A	A	A
48	B	B	A	A	A	A

Derating

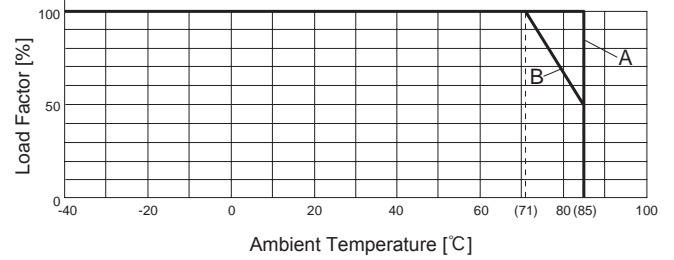
● SU/SUC10

(1) In the case of Convection Cooling



Output Voltage(V) Input Voltage(V)	3.3	5	12	15	±12	±15
5	B	A	A	A	A	A
12	B	A	A	A	A	A
24	B	A	A	A	A	A
48	B	B	B	B	B	B

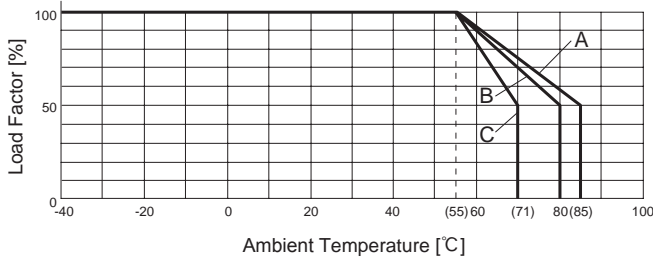
(2) In the case of Forced Air Cooling (1m/s)



Output Voltage(V) Input Voltage(V)	3.3	5	12	15	±12	±15
5	B	B	B	B	A	A
12	B	B	B	B	A	A
24	B	B	B	B	A	A
48	B	B	B	B	B	B

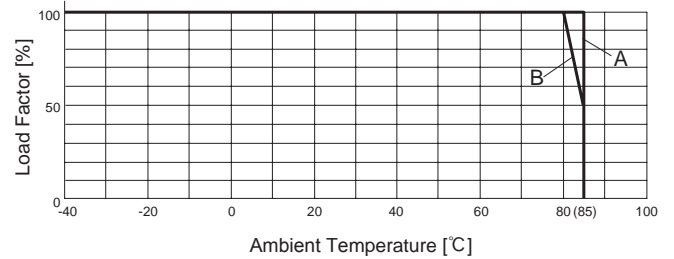
● SUT3

(1) In the case of Convection Cooling



Output Voltage(V) Input Voltage(V)	3.3	5	12	15	±12	±15
5	A	A	B	B	A	B
12	A	A	B	B	A	B
24	A	A	B	B	A	B
48	B	B	B	B	A	C

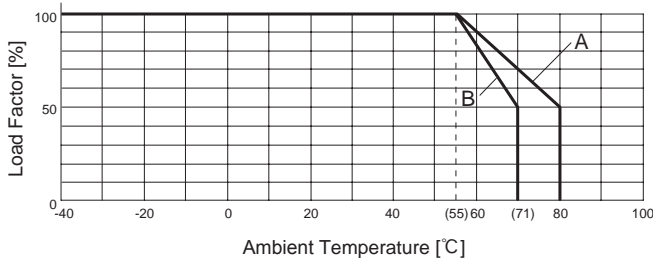
(2) In the case of Forced Air Cooling (1m/s)



Output Voltage(V) Input Voltage(V)	3.3	5	12	15	±12	±15
5	A	B	B	B	B	B
12	A	A	A	A	A	B
24	A	A	B	A	A	B
48	A	A	A	A	A	B

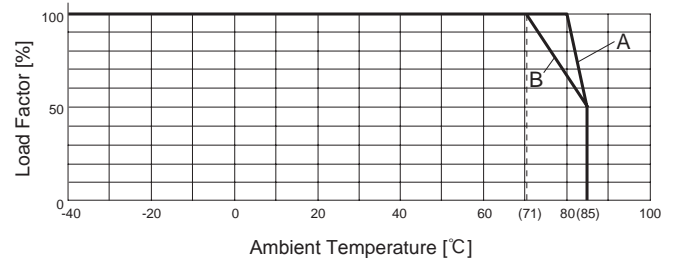
● SUT6

(1) In the case of Convection Cooling



Output Voltage(V) Input Voltage(V)	3.3	5	12	15	±12	±15
5	B	B	B	B	B	B
12	B	B	B	B	B	B
24	B	B	B	B	B	B
48	B	B	A	A	A	A

(2) In the case of Forced Air Cooling (1m/s)

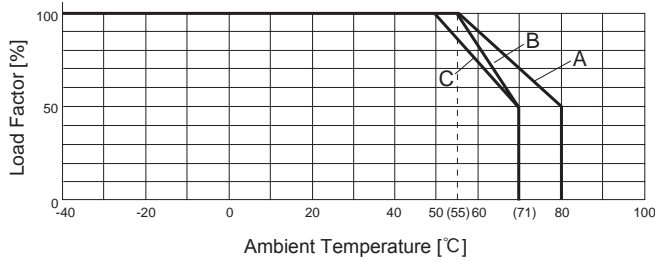


Output Voltage(V) Input Voltage(V)	3.3	5	12	15	±12	±15
5	B	B	B	B	B	B
12	B	B	A	A	A	A
24	B	B	A	A	A	A
48	B	B	A	A	A	A

## Derating

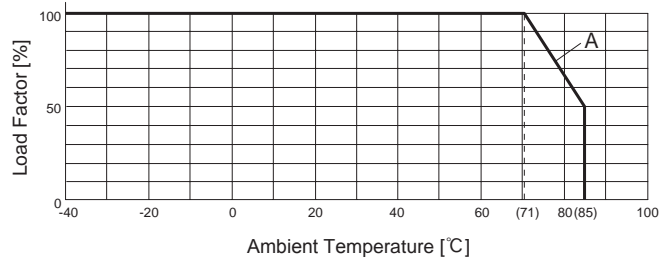
### SUT10

(1) In the case of Convection Cooling



Output Voltage(V) Input Voltage(V)	3.3	5	12	15	±12	±15
5	C	C	A	A	C	C
12	B	A	A	A	B	A
24	C	C	C	C	C	B
48	C	C	C	C	C	C

(2) In the case of Forced Air Cooling (1m/s)



Output Voltage(V) Input Voltage(V)	3.3	5	12	15	±12	±15
5	A	A	A	A	A	A
12	A	A	A	A	A	A
24	A	A	A	A	A	A
48	A	A	A	A	A	A

## Instruction Manual

◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual	<a href="https://en.cosel.co.jp/product/powersupply/SUS/">https://en.cosel.co.jp/product/powersupply/SUS/</a>
Instruction Manual	<a href="https://en.cosel.co.jp/product/powersupply/SUW/">https://en.cosel.co.jp/product/powersupply/SUW/</a>
Instruction Manual	<a href="https://en.cosel.co.jp/product/powersupply/SUCS/">https://en.cosel.co.jp/product/powersupply/SUCS/</a>
Instruction Manual	<a href="https://en.cosel.co.jp/product/powersupply/SUCW/">https://en.cosel.co.jp/product/powersupply/SUCW/</a>
Instruction Manual	<a href="https://en.cosel.co.jp/product/powersupply/SUTS/">https://en.cosel.co.jp/product/powersupply/SUTS/</a>
Instruction Manual	<a href="https://en.cosel.co.jp/product/powersupply/SUTW/">https://en.cosel.co.jp/product/powersupply/SUTW/</a>
Before using our product	<a href="https://en.cosel.co.jp/technical/caution/index.html">https://en.cosel.co.jp/technical/caution/index.html</a>

SUS



SUCS



SUTS



SUW



SUCW



SUTW



NOTICE



## Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz] (reference)	Input current [A]	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
					Material	Single sided	Double sided	Series operation	Parallel operation
SU/SUC1R5	Flyback converter	350 - 1900	Refer to Table1,2	-	glass fabric base,epoxy resin		Yes	Yes	*1
SU/SUC3	Flyback converter	200 - 1400	Refer to Table1,2	-	glass fabric base,epoxy resin		Yes	Yes	*1
SU/SUC6	Flyback converter	230 - 1950	Refer to Table1,2	-	glass fabric base,epoxy resin		Yes	Yes	*1
SU/SUC10	Flyback converter	250 - 300	Refer to Table1,2	-	glass fabric base,epoxy resin		Yes	Yes	*1
SUT3	Flyback converter	200 - 1400	Refer to Table1,2	-	glass fabric base,epoxy resin		Yes	Yes	*1
SUT6	Flyback converter	230 - 1950	Refer to Table1,2	-	glass fabric base,epoxy resin		Yes	Yes	*1
SUT10	Flyback converter	250 - 300	Refer to Table1,2	-	glass fabric base,epoxy resin		Yes	Yes	*1

\*1 Refer to Instruction Manual.

\* The value of input current is measured at rated input and load.

Table1 (SUS\*\*\* +5V output)

[A]

Output Power	Input Voltage			
	5V	12V	24V	48V
1.5W	0.41	0.16	0.08	0.04
3W	0.78	0.32	0.16	0.08
6W	1.32	0.62	0.31	0.15
10W	2.41	0.98	0.49	0.25

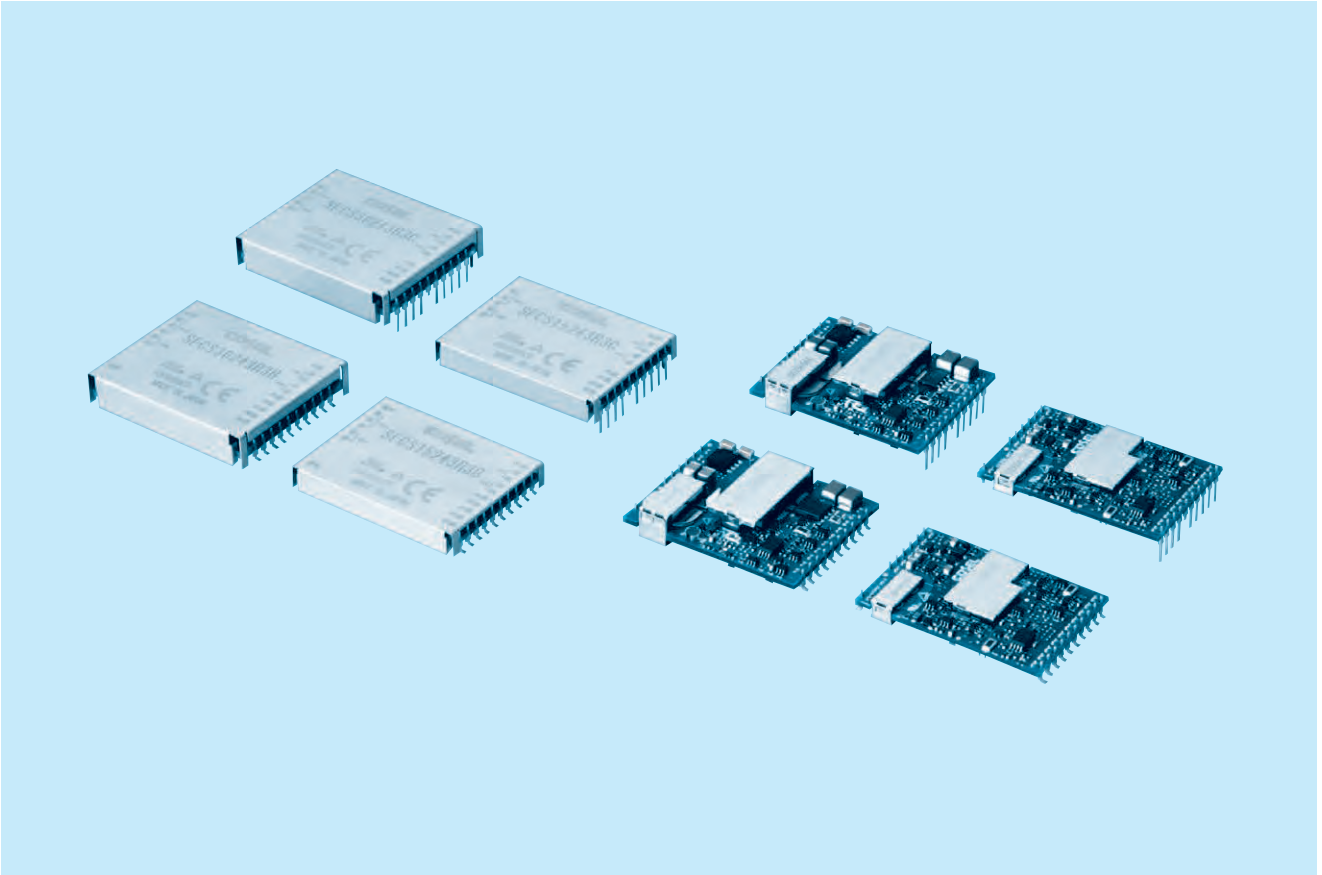
Table2 (SUW\*\*\* ±12V output)

[A]

Output Power	Input Voltage			
	5V	12V	24V	48V
1.5W	0.43	0.17	0.09	0.04
3W	0.82	0.33	0.17	0.08
6W	1.54	0.59	0.29	0.15
10W	2.51	1.05	0.52	0.26



# SFS-series / SFCS-series



SFS/SFCS

## ■ Feature

- SMD mounting type and through-hole mounting type
- High efficiency (synchronous rectifier circuit)
- Parallel operation is possible
- Built-in overcurrent, overvoltage and lowvoltage circuits
- Built-in remote ON/OFF, alarm
- High reliability : not built-in aluminum and tantalum electrolytic capacitor

## ■ CE marking

- Low Voltage Directive
- RoHS Directive

## ■ Safety agency approvals

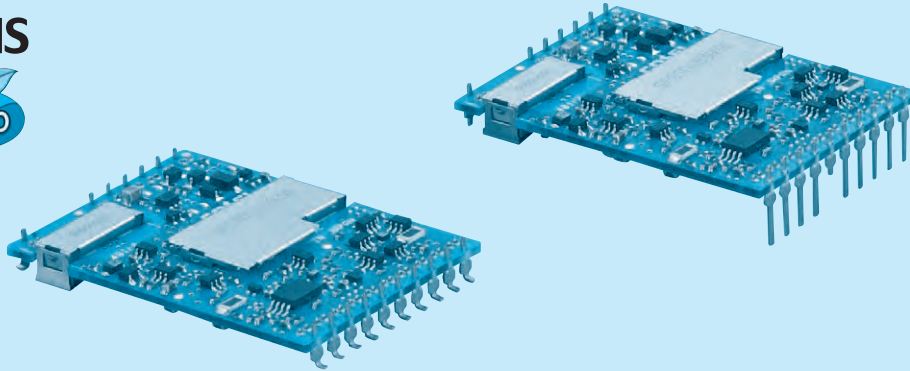
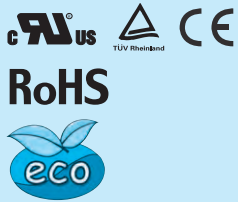
- UL60950-1, C-UL, EN60950-1

## ■ 5-year warranty

# SFS10

**SF S 10 48 3R3 B**

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
48:DC36 - 76V
- ⑤ Output voltage
- ⑥ Mounting type  
(Soldering process)  
B : SMD(Pb-free solder)  
C : DIP(Pb-free solder)

SFS/SFCS

MODEL	SFS10481R2	SFS10481R5	SFS10481R8	SFS10482R5	SFS10483R3	SFS104805	SFS104812	SFS104815
MAX OUTPUT WATTAGE[W]	4.2	5.25	5.4	7.5	9.9	10.0	10.8	10.5
DC OUTPUT	1.2V 3.5A	1.5V 3.5A	1.8V 3A	2.5V 3A	3.3V 3A	5V 2A	12V 0.9A	15V 0.7A

## SPECIFICATIONS

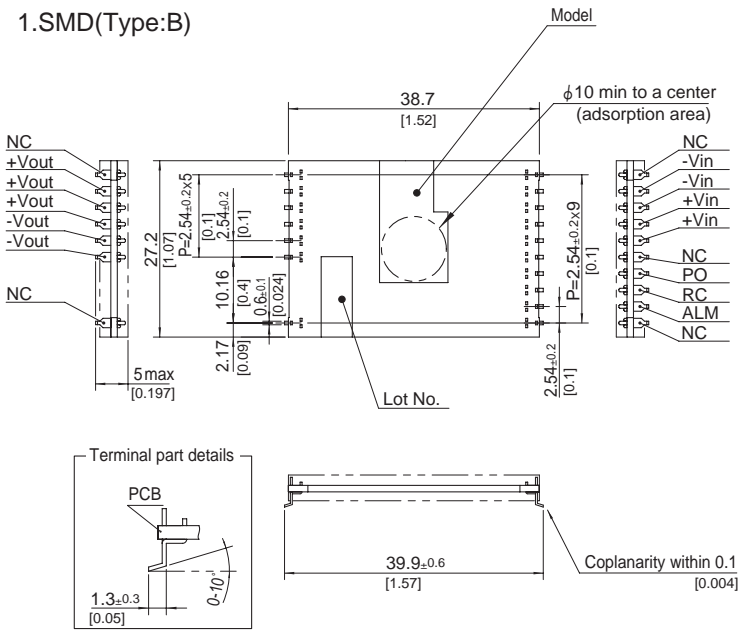
	MODEL	SFS10481R2	SFS10481R5	SFS10481R8	SFS10482R5	SFS10483R3	SFS104805	SFS104812	SFS104815	
INPUT	VOLTAGE[V]	DC36 - 76								
	CURRENT[A]	*1 0.11typ	0.13typ	0.13typ	0.18typ	0.23typ	0.23typ	0.26typ	0.25typ	
	EFFICIENCY[%]	*1 80typ	82typ	84typ	86typ	88typ	89typ	88typ	88typ	
	START-UP VOLTAGE[V]	DC32 - 36								
	HYSTERESIS VOLTAGE[V]	DC2 min								
OUTPUT	VOLTAGE[V]	1.2	1.5	1.8	2.5	3.3	5	12	15	
	CURRENT[A]	3.5	3.5	3	3	3	2	0.9	0.7	
	VOLTAGE ACCURACY[%]	+5, -3								
	RIPPLE[mVp-p]	25max						120max		
	RIPPLE NOISE[mVp-p]	50max						150max		
	START-UP TIME[ms]	20 - 200max (DCIN 48V, Io=100%)								
PROTECTION CIRCUIT AND OTHERS	OUTPUT VOLTAGE SETTING *1	±1% of rated output voltage								
	OVERCURRENT PROTECTION	Works over 103% of rating								
	OVERVOLTAGE PROTECTION	Works at 120 - 140% of rating								
	LOWVOLTAGE PROTECTION	Works at 90% max of rating								
ISOLATION	REMOTE ON/OFF	Provided(RC open : ON, short between RC and +Vin : OFF)								
ENVIRONMENT	INPUT-OUTPUT	DC1,500V 1minute, DC500V 50MΩ min (20±15°C)								
	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing), 3,000m (10,000feet) max								
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max (SMD:Refer to the Instruction Manual)								
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis								
SAFETY	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis								
	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1								
OTHERS	CASE SIZE/WEIGHT	38.7×5.0×27.2mm [1.52×0.197×1.07 inches] (W×H×D) /12g max								
	COOLING METHOD	Convection								

\*1 At rated input(DC48V), rated load and 25°C

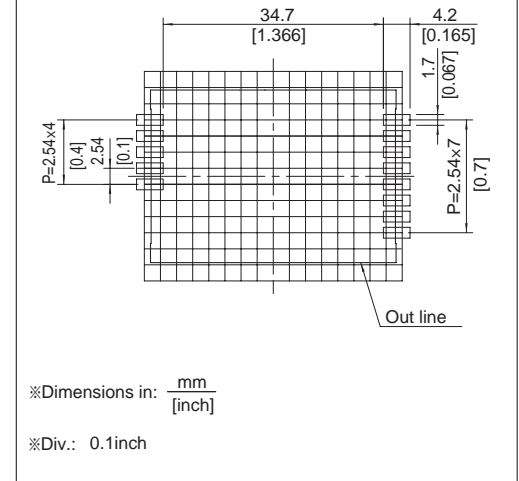


External view

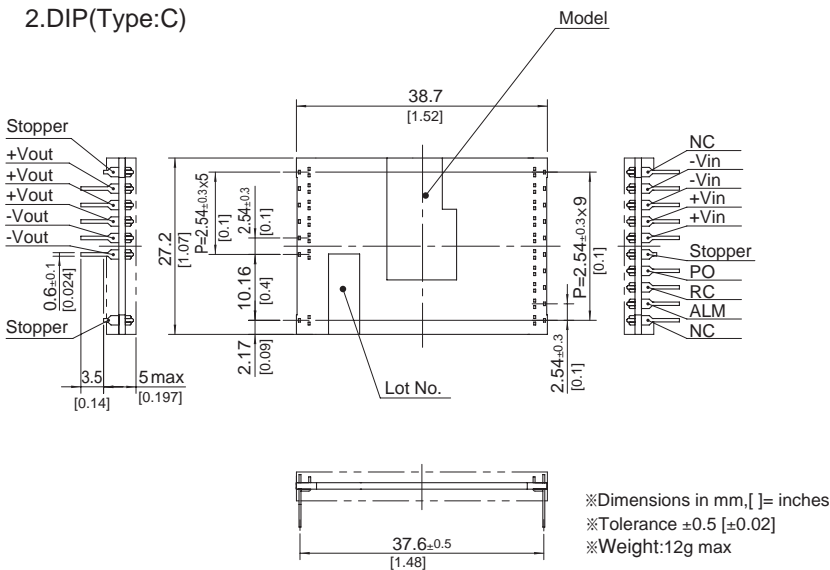
1.SMD(Type:B)



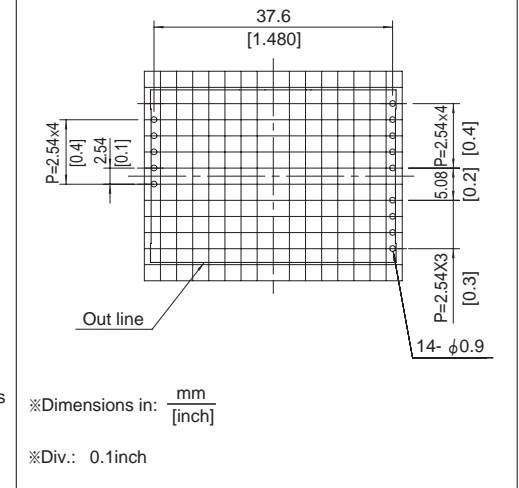
Recommended size for processing PCB (TOP VIEW)



2.DIP(Type:C)



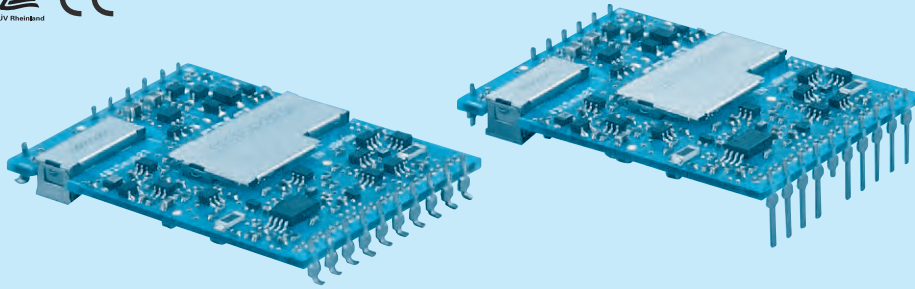
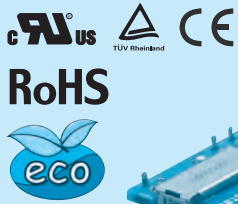
Recommended size for processing PCB (TOP VIEW)



# SFS15

SF S 15 48 3R3 B

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
24:DC18 - 36V  
48:DC36 - 76V
- ⑤ Output voltage
- ⑥ Mounting type  
(Soldering process)  
B : SMD (Pb-free solder)  
C : DIP (Pb-free solder)

MODEL	SFS15242R5	SFS15243R3	SFS152405	SFS152412	SFS152415
MAX OUTPUT WATTAGE[W]	11.25	14.85	15.0	15.0	15.0
DC OUTPUT	2.5V 4.5A	3.3V 4.5A	5V 3A	12V 1.25A	15V 1A

## SPECIFICATIONS

	MODEL	SFS15242R5	SFS15243R3	SFS152405	SFS152412	SFS152415
INPUT	VOLTAGE[V]	DC18 - 36				
	CURRENT[A]	*1 0.54typ	0.7typ	0.69typ	0.7typ	0.7typ
	EFFICIENCY[%]	*1 87typ	89typ	90typ	89typ	89typ
	START-UP VOLTAGE[V]	DC16 - 18				
	HYSTERESIS VOLTAGE[V]	DC1 min				
OUTPUT	VOLTAGE[V]	2.5	3.3	5	12	15
	CURRENT[A]	4.5	4.5	3	1.25	1
	VOLTAGE ACCURACY[%]	+5, -3				
	RIPPLE[mVp-p]	25max			120max	
	RIPPLE NOISE[mVp-p]	50max			150max	
	START-UP TIME[ms]	20 - 200max (DCIN 24V, Io=100%)				
PROTECTION CIRCUIT AND OTHERS	OUTPUT VOLTAGE SETTING *1	±1% of rated output voltage				
	OVERCURRENT PROTECTION	Works over 103% of rating				
	OVERVOLTAGE PROTECTION	Works at 120 - 140% of rating				
	LOWVOLTAGE PROTECTION	Works at 90% max of rating				
	REMOTE ON/OFF	Provided(RC open : ON, short between RC and +Vin : OFF)				

MODEL	SFS15481R2	SFS15481R5	SFS15481R8	SFS15482R5	SFS15483R3	SFS154805	SFS154812	SFS154815
MAX OUTPUT WATTAGE[W]	6.24	7.8	8.1	11.25	14.85	15.0	15.0	15.0
DC OUTPUT	1.2V 5.2A	1.5V 5.2A	1.8V 4.5A	2.5V 4.5A	3.3V 4.5A	5V 3A	12V 1.25A	15V 1A

## SPECIFICATIONS

	MODEL	SFS15481R2	SFS15481R5	SFS15481R8	SFS15482R5	SFS15483R3	SFS154805	SFS154812	SFS154815	
INPUT	VOLTAGE[V]	DC36 - 76								
	CURRENT[A]	*1 0.16typ	0.2typ	0.2typ	0.27typ	0.35typ	0.35typ	0.35typ	0.35typ	
	EFFICIENCY[%]	*1 82typ	83typ	85typ	87typ	89typ	90typ	89typ	89typ	
	START-UP VOLTAGE[V]	DC32 - 36								
	HYSTERESIS VOLTAGE[V]	DC2 min								
OUTPUT	VOLTAGE[V]	1.2	1.5	1.8	2.5	3.3	5	12	15	
	CURRENT[A]	5.2	5.2	4.5	4.5	4.5	3	1.25	1	
	VOLTAGE ACCURACY[%]	+5, -3								
	RIPPLE[mVp-p]	25max						120max		
	RIPPLE NOISE[mVp-p]	50max						150max		
	START-UP TIME[ms]	20 - 200max (DCIN 48V, Io=100%)								
PROTECTION CIRCUIT AND OTHERS	OUTPUT VOLTAGE SETTING *1	±1% of rated output voltage								
	OVERCURRENT PROTECTION	Works over 103% of rating								
	OVERVOLTAGE PROTECTION	Works at 120 - 140% of rating								
	LOWVOLTAGE PROTECTION	Works at 90% max of rating								
	REMOTE ON/OFF	Provided(RC open : ON, short between RC and +Vin : OFF)								

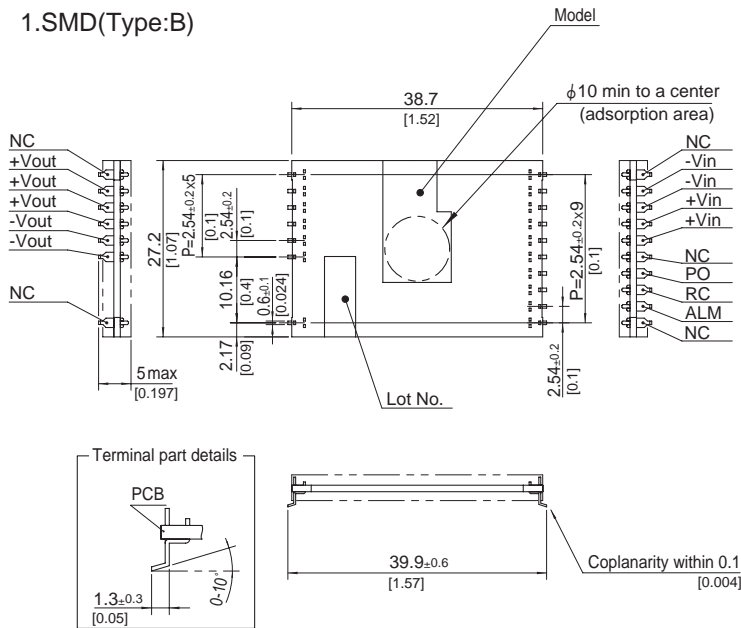
**GENERAL SPECIFICATIONS**

<b>ISOLATION</b>	<b>INPUT-OUTPUT</b>	DC1,500V 1minute, DC500V 50MΩ min (20±15°C)
<b>ENVIRONMENT</b>	<b>OPERATING TEMP.,HUMID.AND ALTIUDE</b>	-40 to +85°C, 20 - 95%RH (Non condensing), 3,000m (10,000feet) max
	<b>STORAGE TEMP.,HUMID.AND ALTIUDE</b>	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max (SMD:Refer to the Instruction Manual)
	<b>VIBRATION</b>	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis
	<b>IMPACT</b>	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis
<b>SAFETY</b>	<b>AGENCY APPROVALS</b>	UL60950-1, C-UL (CSA60950-1), EN60950-1
<b>OTHERS</b>	<b>CASE SIZE/WEIGHT</b>	38.7×5.0×27.2mm [1.52×0.197×1.07 inches] (W×H×D) /12g max
	<b>COOLING METHOD</b>	Convection

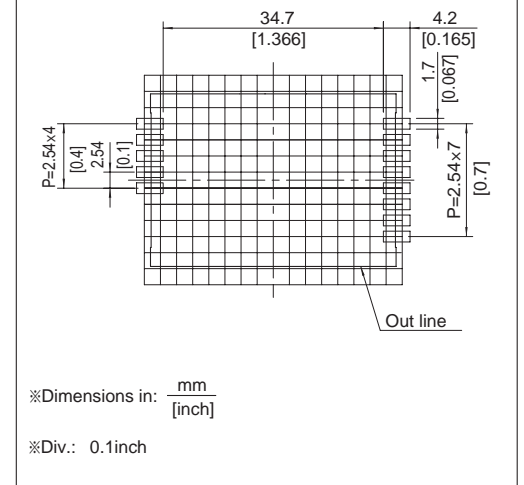
\*1 At rated input(DC24V, DC48V), rated load and 25°C

**External view**

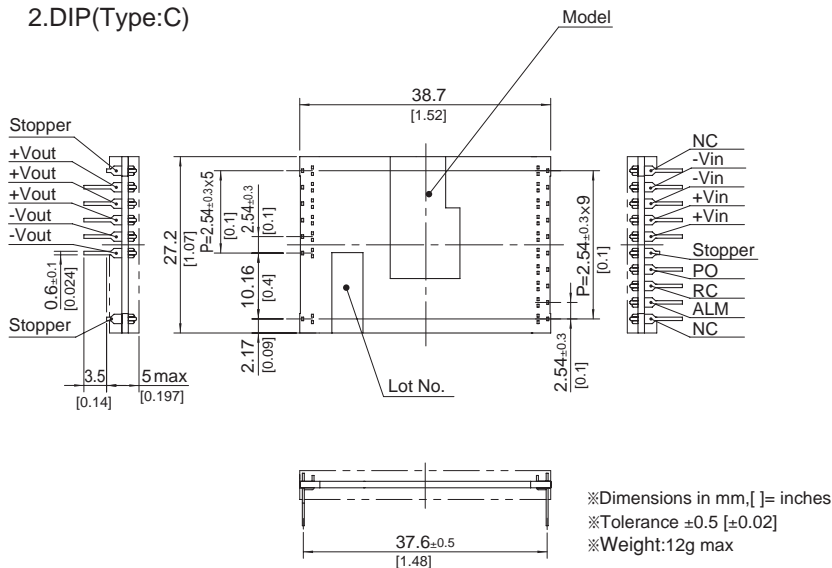
**1.SMD(Type:B)**



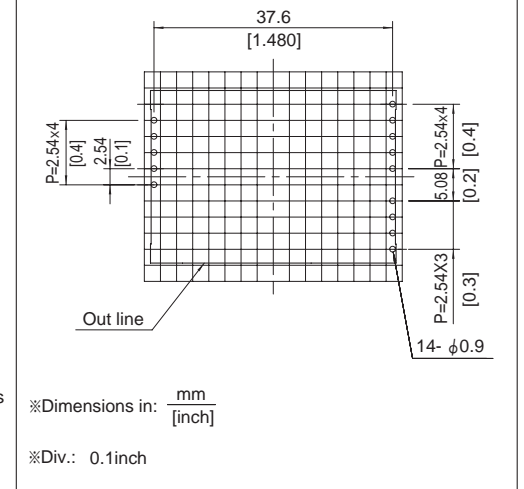
**Recommended size for processing PCB (TOP VIEW)**



**2.DIP(Type:C)**



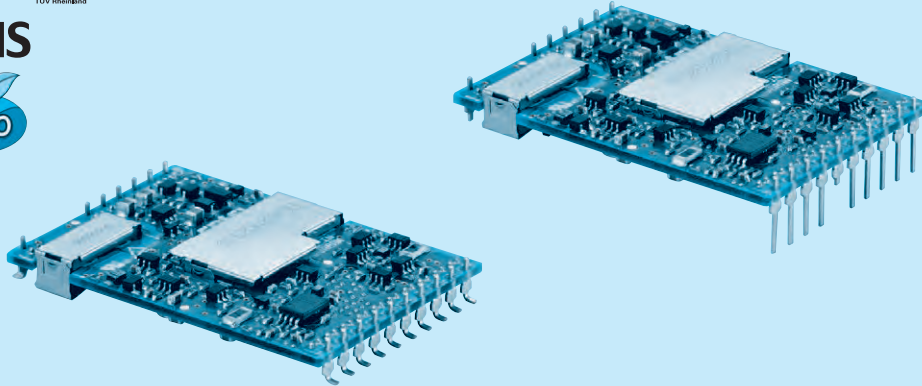
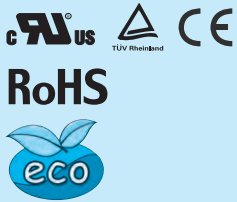
**Recommended size for processing PCB (TOP VIEW)**



# SFS20

SF S 20 48 3R3 B

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
48:DC36 - 76V
- ⑤ Output voltage
- ⑥ Mounting type  
(Soldering process)  
B :SMD(Pb-free solder)  
C :DIP(Pb-free solder)

SFS/SFCS

MODEL	SFS20481R5	SFS20481R8	SFS20482R5	SFS20483R3	SFS204805
MAX OUTPUT WATTAGE[W]	13.5	14.4	17.5	19.8	20.0
DC OUTPUT	1.5V 9A	1.8V 8A	2.5V 7A	3.3V 6A	5V 4A

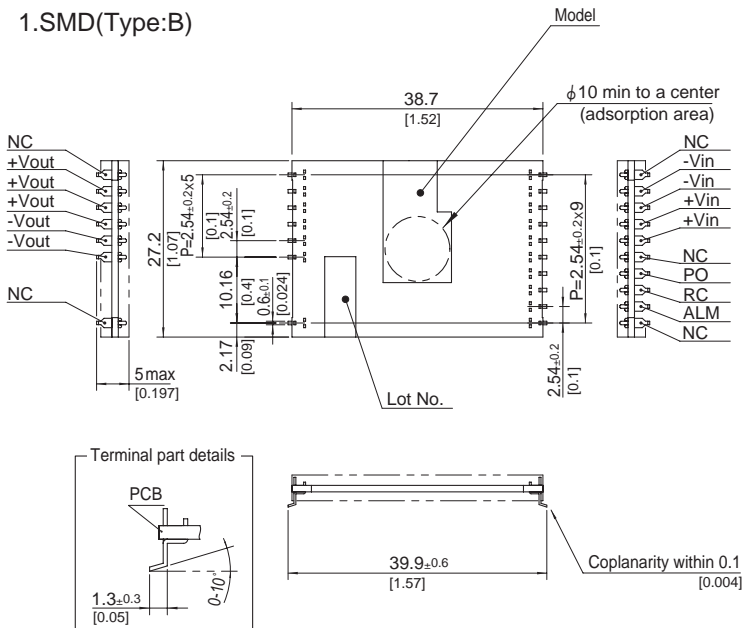
## SPECIFICATIONS

	MODEL	SFS20481R5	SFS20481R8	SFS20482R5	SFS20483R3	SFS204805
INPUT	VOLTAGE[V]	DC36 - 76				
	CURRENT[A]	*1 0.33typ	0.35typ	0.41typ	0.46typ	0.46typ
	EFFICIENCY[%]	*1 86typ	85typ	88typ	90typ	90typ
	START-UP VOLTAGE[V]	DC32 - 36				
	HYSTERESIS VOLTAGE[V]	DC2 min				
OUTPUT	VOLTAGE[V]	1.5	1.8	2.5	3.3	5
	CURRENT[A]	9	8	7	6	4
	VOLTAGE ACCURACY[%]	+5, -3				
	RIPPLE[mVp-p]	50max				
	RIPPLE NOISE[mVp-p]	50max				
	START-UP TIME[ms]	20 - 200max (DCIN 48V, Io=100%)				
PROTECTION CIRCUIT AND OTHERS	OUTPUT VOLTAGE SETTING *1	+2, -1% of rated output voltage				
	OVERCURRENT PROTECTION	Works over 103% of rating				
	OVERVOLTAGE PROTECTION	Works at 115 - 145% of rating				
	LOWVOLTAGE PROTECTION	Works at 95% max of rating				
ISOLATION	REMOTE ON/OFF	Provided(RC open : ON, short between RC and +Vin : OFF)				
	INPUT-OUTPUT	DC1,500V 1minute, DC500V 50MΩ min (20±15°C)				
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing), 3,000m (10,000feet) max				
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max (SMD:Refer to the Instruction Manual)				
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis				
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis				
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL(CSA60950-1), EN60950-1				
OTHERS	CASE SIZE/WEIGHT	38.7 × 5.0 × 27.2mm [1.52 × 0.197 × 1.07 inches] (W × H × D) /12g max				
	COOLING METHOD	Convection/Forced air				

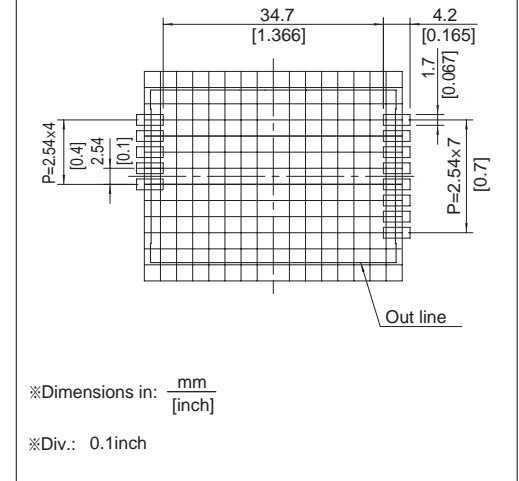
\*1 At rated input(DC48V), rated load and 25°C

External view

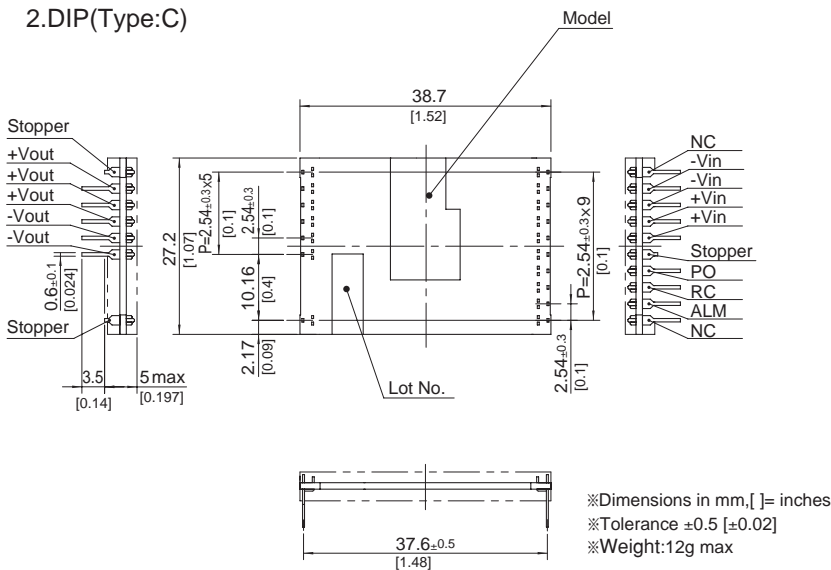
1.SMD(Type:B)



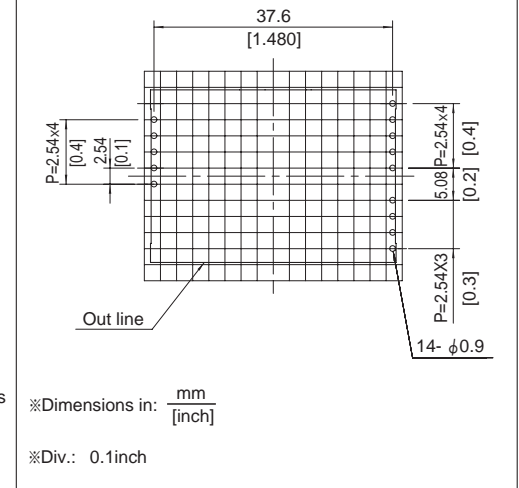
Recommended size for processing PCB (TOP VIEW)



2.DIP(Type:C)



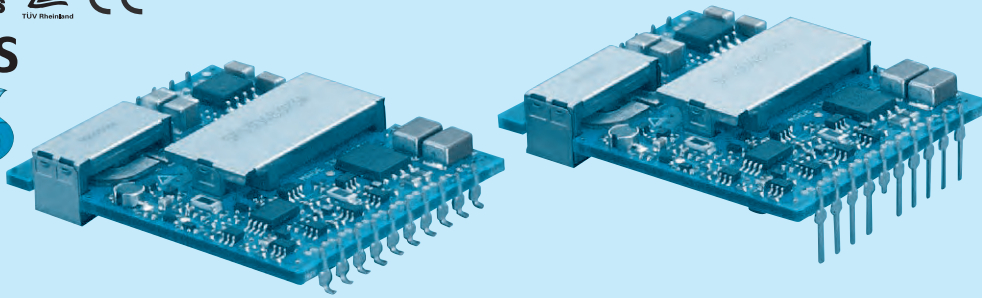
Recommended size for processing PCB (TOP VIEW)



# SFS30

SF S 30 48 3R3 B

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
24:DC18 - 36V  
48:DC36 - 76V
- ⑤ Output voltage
- ⑥ Mounting type  
(Soldering process)  
B : SMD(Pb-free solder)  
C : DIP(Pb-free solder)

MODEL	SFS30242R5	SFS30243R3	SFS302405	SFS302412	SFS302415
MAX OUTPUT WATTAGE[W]	22.5	29.7	30.0	30.0	30.0
DC OUTPUT	2.5V 9A	3.3V 9A	5V 6A	12V 2.5A	15V 2A

## SPECIFICATIONS

	MODEL	SFS30242R5	SFS30243R3	SFS302405	SFS302412	SFS302415
INPUT	VOLTAGE[V]	DC18 - 36				
	CURRENT[A]	*1 1.04typ	1.36typ	1.36typ	1.36typ	1.39typ
	EFFICIENCY[%]	*1 90typ	91typ	92typ	92typ	90typ
	START-UP VOLTAGE[V]	DC16 - 18				
	HYSTERESIS VOLTAGE[V]	DC1 min				
OUTPUT	VOLTAGE[V]	2.5	3.3	5	12	15
	CURRENT[A]	9	9	6	2.5	2
	VOLTAGE ACCURACY[%]	+5, -3				
	RIPPLE[mVp-p]	25max			120max	
	RIPPLE NOISE[mVp-p]	50max			150max	
	START-UP TIME[ms]	20 - 200max (DCIN 24V, Io=100%)				
PROTECTION CIRCUIT AND OTHERS	OUTPUT VOLTAGE SETTING *1	± 1% of rated output voltage				
	OVERCURRENT PROTECTION	Works over 103% of rating				
	OVERVOLTAGE PROTECTION	Works at 120 - 140% of rating				
	LOWVOLTAGE PROTECTION	Works at 90% max of rating				
	REMOTE ON/OFF	Provided(RC open : ON, short between RC and +Vin : OFF)				

MODEL	SFS30481R2	SFS30481R5	SFS30481R8	SFS30482R5	SFS30483R3	SFS304805	SFS304810	SFS304812	SFS304815
MAX OUTPUT WATTAGE[W]	12.48	15.6	16.2	22.5	29.7	30.0	30.0	30.0	30.0
DC OUTPUT	1.2V 10.4A	1.5V 10.4A	1.8V 9A	2.5V 9A	3.3V 9A	5V 6A	10V 3A	12V 2.5A	15V 2A

## SPECIFICATIONS

	MODEL	SFS30481R2	SFS30481R5	SFS30481R8	SFS30482R5	SFS30483R3	SFS304805	SFS304810	SFS304812	SFS304815	
INPUT	VOLTAGE[V]	DC36 - 76									
	CURRENT[A]	*1 0.30typ	0.37typ	0.38typ	0.52typ	0.67typ	0.68typ	0.69typ	0.68typ	0.68typ	
	EFFICIENCY[%]	*1 86typ	87.5typ	89typ	91typ	92typ	92.5typ	91typ	92typ	92typ	
	START-UP VOLTAGE[V]	DC32 - 36									
	HYSTERESIS VOLTAGE[V]	DC2 min									
OUTPUT	VOLTAGE[V]	1.2	1.5	1.8	2.5	3.3	5	10	12	15	
	CURRENT[A]	10.4	10.4	9	9	9	6	3	2.5	2	
	VOLTAGE ACCURACY[%]	+5, -3									
	RIPPLE[mVp-p]	25max						120max			
	RIPPLE NOISE[mVp-p]	50max						150max			
	START-UP TIME[ms]	20 - 200max (DCIN 48V, Io=100%)									
PROTECTION CIRCUIT AND OTHERS	OUTPUT VOLTAGE SETTING *1	± 1% of rated output voltage									
	OVERCURRENT PROTECTION	Works over 103% of rating									
	OVERVOLTAGE PROTECTION	Works at 120 - 140% of rating									
	LOWVOLTAGE PROTECTION	Works at 90% max of rating									
	REMOTE ON/OFF	Provided(RC open : ON, short between RC and +Vin : OFF)									

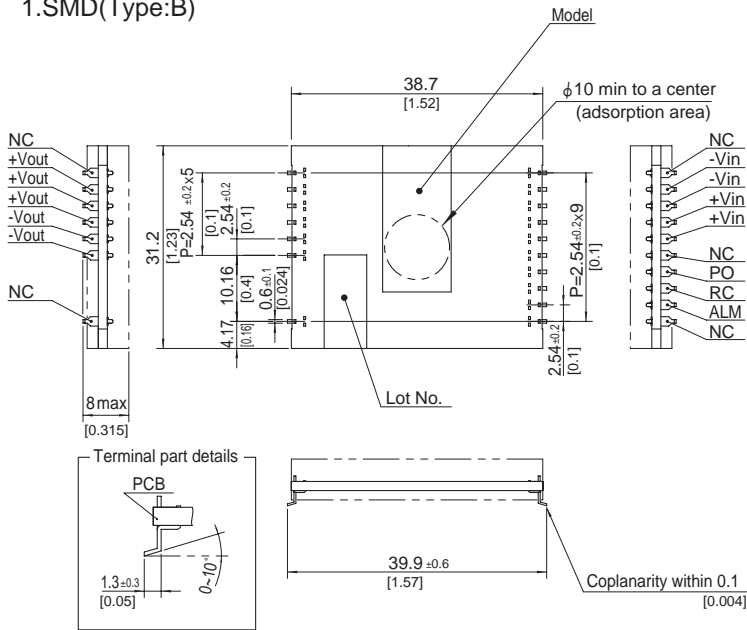
**GENERAL SPECIFICATIONS**

<b>ISOLATION</b>	<b>INPUT-OUTPUT</b>	DC1,500V 1minute, DC500V 50MΩ min (20±15°C)
<b>ENVIRONMENT</b>	<b>OPERATING TEMP.,HUMID.AND ALTITUDE</b>	-40 to +85°C, 20 - 95%RH (Non condensing), 3,000m (10,000feet) max
	<b>STORAGE TEMP.,HUMID.AND ALTITUDE</b>	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max (SMD:Refer to the Instruction Manual)
	<b>VIBRATION</b>	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis
	<b>IMPACT</b>	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis
<b>SAFETY</b>	<b>AGENCY APPROVALS</b>	UL60950-1, C-UL (CSA60950-1), EN60950-1
<b>OTHERS</b>	<b>CASE SIZE/WEIGHT</b>	38.7×8.0×31.2mm [1.52×0.315×1.23 inches] (W×H×D) /20g max
	<b>COOLING METHOD</b>	Convection/Forced air

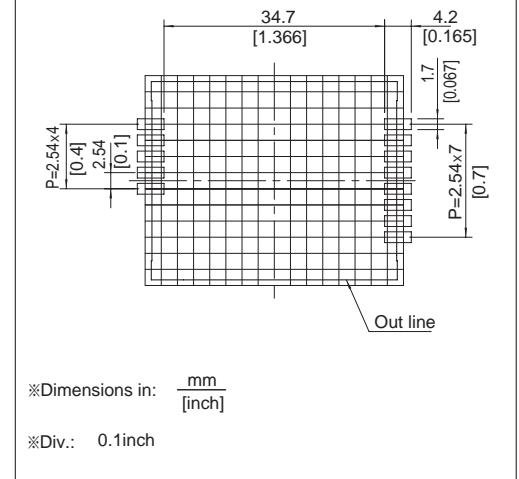
\*1 At rated input(DC24V, DC48V), rated load and 25°C

**External view**

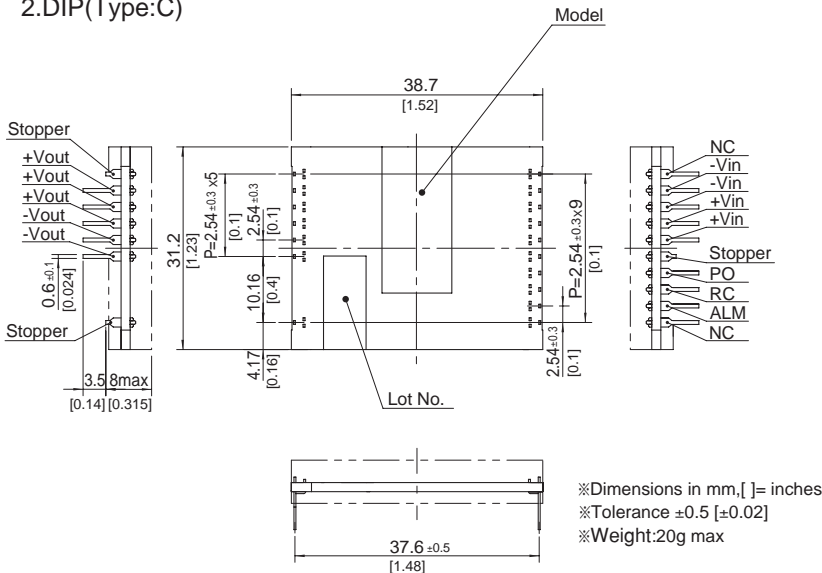
**1.SMD(Type:B)**



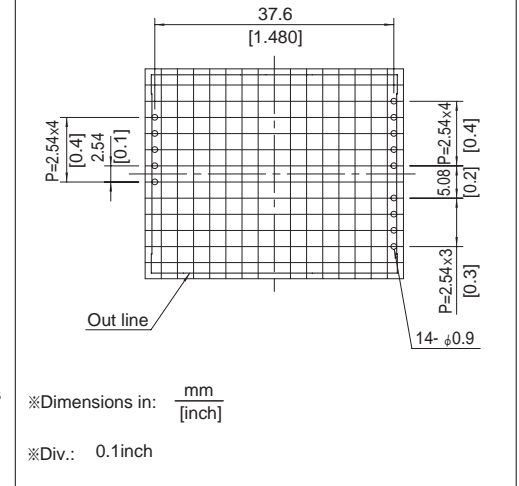
**Recommended size for processing PCB (TOP VIEW)**



**2.DIP(Type:C)**



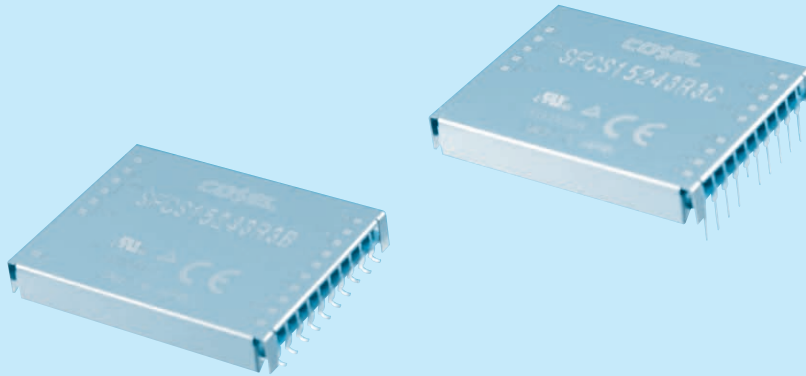
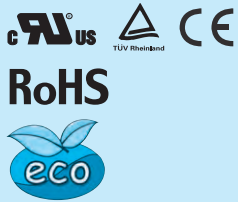
**Recommended size for processing PCB (TOP VIEW)**



# SFCS15

SFC S 15 24 3R3 C

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
24:DC18 - 36V  
48:DC36 - 76V
- ⑤ Output voltage
- ⑥ Mounting type  
B : SMD  
C : DIP

MODEL	SFCS15243R3	SFCS152405	SFCS152412	SFCS152415	SFCS15483R3	SFCS154805	SFCS154812	SFCS154815
MAX OUTPUT WATTAGE[W]	14.85	15.0	15.0	15.0	14.85	15.0	15.0	15.0
DC OUTPUT	3.3V 4.5A	5V 3A	12V 1.25A	15V 1A	3.3V 4.5A	5V 3A	12V 1.25A	15V 1A

## SPECIFICATIONS

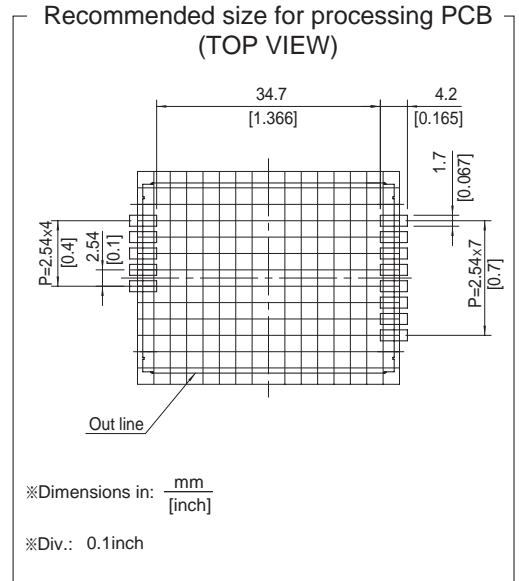
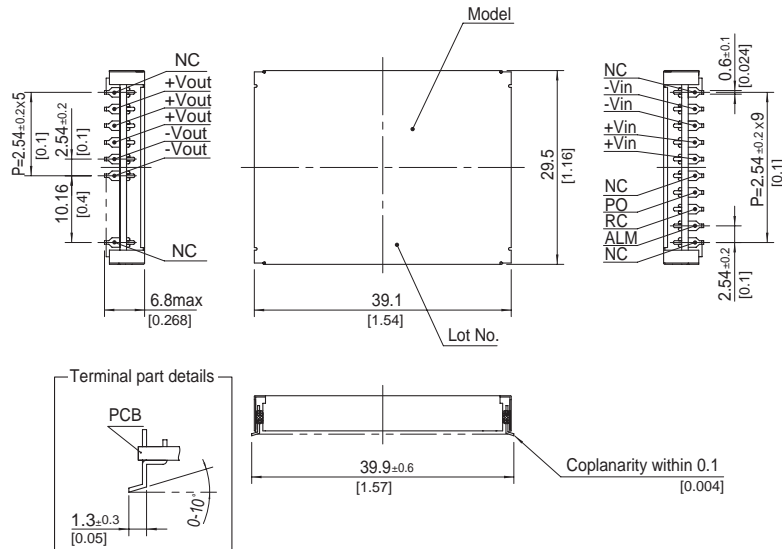
	MODEL	SFCS15243R3	SFCS152405	SFCS152412	SFCS152415	SFCS15483R3	SFCS154805	SFCS154812	SFCS154815	
INPUT	VOLTAGE[V]	DC18 - 36				DC36 - 76				
	CURRENT[A]	*1 0.7typ	0.69typ	0.7typ	0.7typ	0.35typ	0.35typ	0.35typ	0.35typ	
	EFFICIENCY[%]	*1 89typ	90typ	89typ	89typ	89typ	90typ	89typ	89typ	
	START-UP VOLTAGE[V]	DC16 - 18				DC32 - 36				
	HYSTERESIS VOLTAGE[V]	DC1 min				DC2 min				
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	4.5	3	1.25	1	4.5	3	1.25	1	
	VOLTAGE ACCURACY[%]	+5, -3								
	RIPPLE[mVp-p]	25max			120max		25max		120max	
	RIPPLE NOISE[mVp-p]	50max			150max		50max		150max	
	START-UP TIME[ms]	20 - 200max (DCIN 24V, Io=100%)				20 - 200max (DCIN 48V, Io=100%)				
PROTECTION CIRCUIT AND OTHERS	OUTPUT VOLTAGE SETTING *1	±1% of rated output voltage								
	OVERCURRENT PROTECTION	Works over 103% of rating								
	OVERVOLTAGE PROTECTION	Works at 120 - 140% of rating								
	LOWVOLTAGE PROTECTION	Works at 90% max of rating								
ISOLATION	REMOTE ON/OFF	Provided(RC open : ON, short between RC and +Vin : OFF)								
	INPUT-OUTPUT	DC1,000V or AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)								
	INPUT-CASE	DC500V or AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
ENVIRONMENT	OUTPUT-CASE	DC500V or AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing), 3,000m (10,000feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max (SMD:Refer to the Instruction Manual)								
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis								
SAFETY	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis								
	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1								
OTHERS	CASE SIZE/WEIGHT	39.1 × 6.8 × 29.5mm [1.54 × 0.268 × 1.16 inches] (W × H × D) /16g max								
	COOLING METHOD	Convection								

\*1 At rated input(DC24V, DC48V), rated load and 25°C

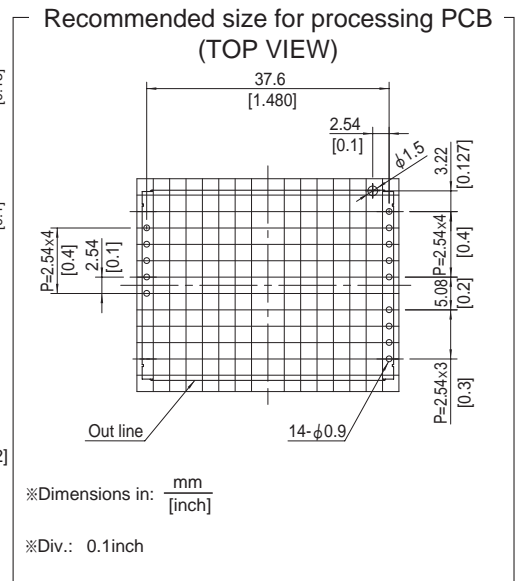
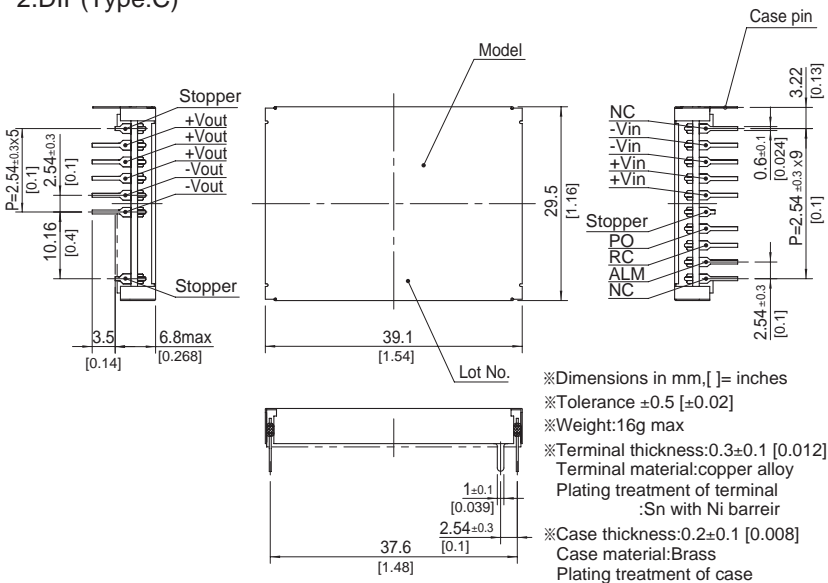


External view

1.SMD(Type:B)



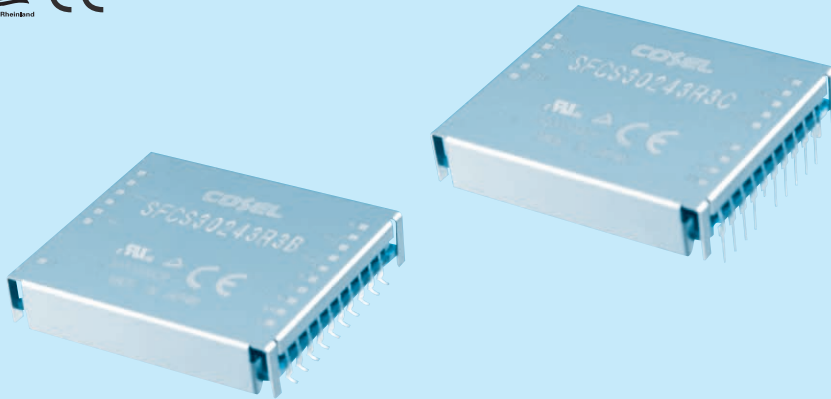
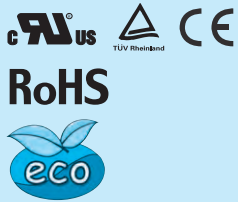
2.DIP(Type:C)



# SFCS30

**SFC**   **S**   **30**   **24**   **3R3**   **C**

①   ②   ③   ④   ⑤   ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
24:DC18 - 36V  
48:DC36 - 76V
- ⑤ Output voltage
- ⑥ Mounting type  
B : SMD  
C : DIP

SFS/SFCS

MODEL	SFCS30243R3	SFCS302405	SFCS302412	SFCS302415	SFCS30483R3	SFCS304805	SFCS304812	SFCS304815
MAX OUTPUT WATTAGE[W]	29.7	30.0	30.0	30.0	29.7	30.0	30.0	30.0
DC OUTPUT	3.3V 9A	5V 6A	12V 2.5A	15V 2A	3.3V 9A	5V 6A	12V 2.5A	15V 2A

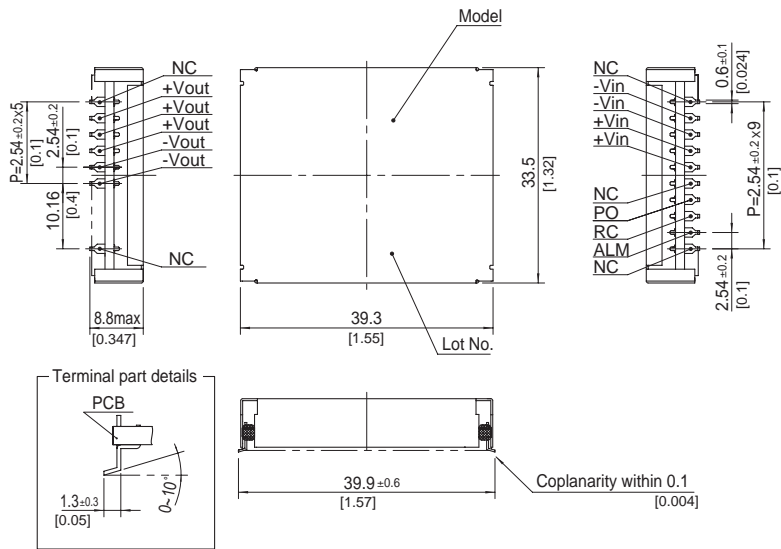
## SPECIFICATIONS

	MODEL	SFCS30243R3	SFCS302405	SFCS302412	SFCS302415	SFCS30483R3	SFCS304805	SFCS304812	SFCS304815	
INPUT	VOLTAGE[V]	DC18 - 36				DC36 - 76				
	CURRENT[A]	*1 1.36typ	1.36typ	1.36typ	1.39typ	0.67typ	0.68typ	0.68typ	0.68typ	
	EFFICIENCY[%]	*1 91typ	92typ	92typ	90typ	92typ	92.5typ	92typ	92typ	
	START-UP VOLTAGE[V]	DC16 - 18				DC32 - 36				
	HYSTERESIS VOLTAGE[V]	DC1 min				DC2 min				
OUTPUT	VOLTAGE[V]	3.3	5	12	15	3.3	5	12	15	
	CURRENT[A]	9	6	2.5	2	9	6	2.5	2	
	VOLTAGE ACCURACY[%]	+5, -3								
	RIPPLE[mVp-p]	25max			120max		25max		120max	
	RIPPLE NOISE[mVp-p]	50max			150max		50max		150max	
	START-UP TIME[ms]	20 - 200max (DCIN 24V, Io=100%)					20 - 200max (DCIN 48V, Io=100%)			
PROTECTION CIRCUIT AND OTHERS	OUTPUT VOLTAGE SETTING *1	±1% of rated output voltage								
	OVERCURRENT PROTECTION	Works over 103% of rating								
	OVERVOLTAGE PROTECTION	Works at 120 - 140% of rating								
	LOWVOLTAGE PROTECTION	Works at 90% max of rating								
ISOLATION	REMOTE ON/OFF	Provided(RC open : ON, short between RC and +Vin : OFF)								
	INPUT-OUTPUT	DC1,000V or AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)								
	INPUT-CASE	DC500V or AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
ENVIRONMENT	OUTPUT-CASE	DC500V or AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing), 3,000m (10,000feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max (SMD:Refer to the Instruction Manual)								
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis								
SAFETY	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis								
	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1								
OTHERS	CASE SIZE/WEIGHT	39.3 × 8.8 × 33.5mm [1.55 × 0.347 × 1.32 inches] (W × H × D) /25g max								
	COOLING METHOD	Convection / Forced air								

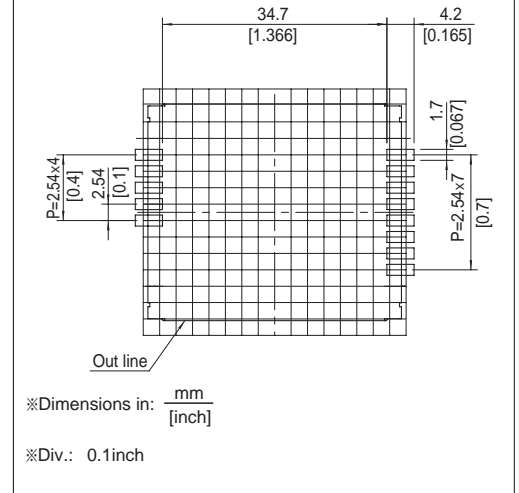
\*1 At rated input(DC24V, DC48V), rated load and 25°C

External view

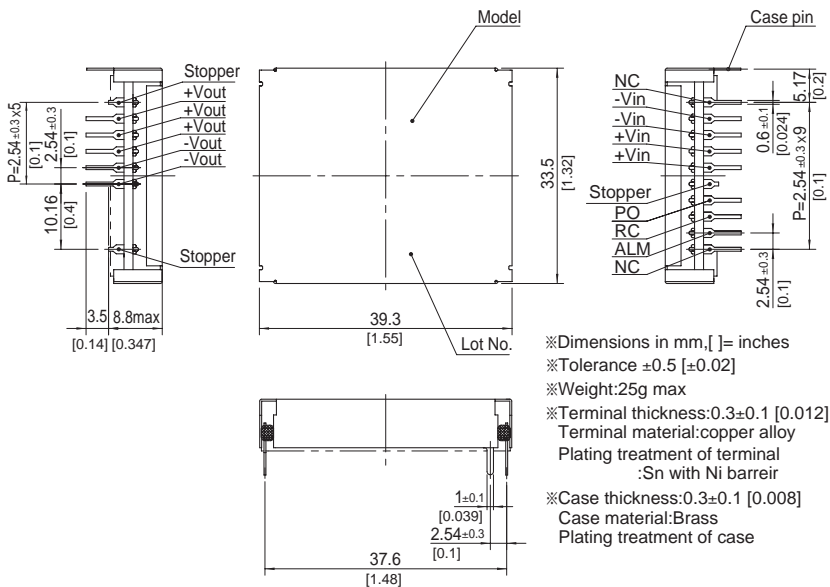
1.SMD(Type:B)



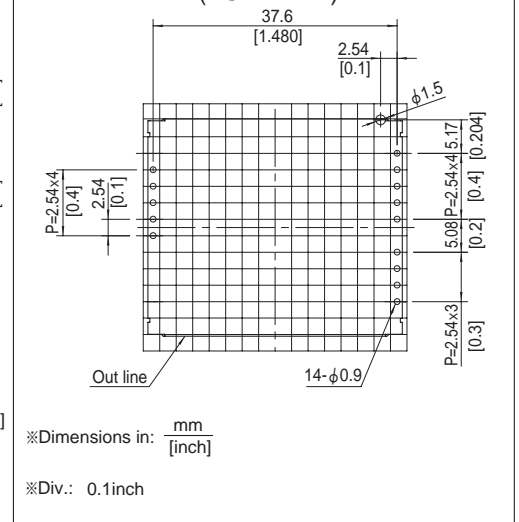
Recommended size for processing PCB (TOP VIEW)



2.DIP(Type:C)

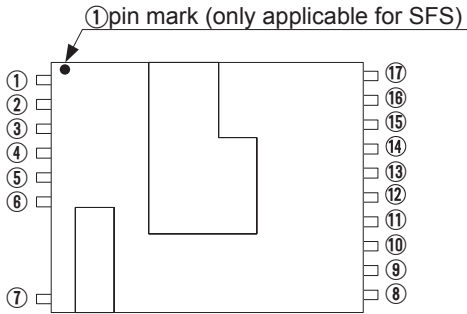


Recommended size for processing PCB (TOP VIEW)

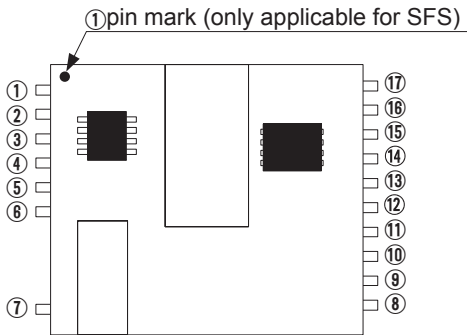


## Pin Configuration

### SFS10 / SFS15 / SFS20 / SFCS15



### SFS30 / SFCS30



No.	Pin Name	Function
①	NC(SMD)	Not connected / Adhesive dispensing
	Stopper(DIP)	Stopper
②	+Vout	+DC output
③	+Vout	+DC output
④	+Vout	+DC output
⑤	-Vout	-DC output
⑥	-Vout	-DC output
⑦	NC(SMD)	Not connected / Adhesive dispensing
	Stopper(DIP)	Stopper
⑧	NC(SMD)	Not connected / Adhesive dispensing
	NC(DIP)	Not connected
⑨	ALM	Alarm
⑩	RC	Remote ON / OFF
⑪	PO	Start in / out
⑫	NC(SMD)	Not connected
	Stopper(DIP)	Stopper
⑬	+Vin	+DC input
⑭	+Vin	+DC input
⑮	-Vin	-DC input
⑯	-Vin	-DC input
⑰	NC(SMD)	Not connected / Adhesive dispensing
	NC(DIP)	Not connected
Case connecting pin		Isolated from internal circuit Only applicable for SFCS type C (DIP)

## Implementation · Mounting Method

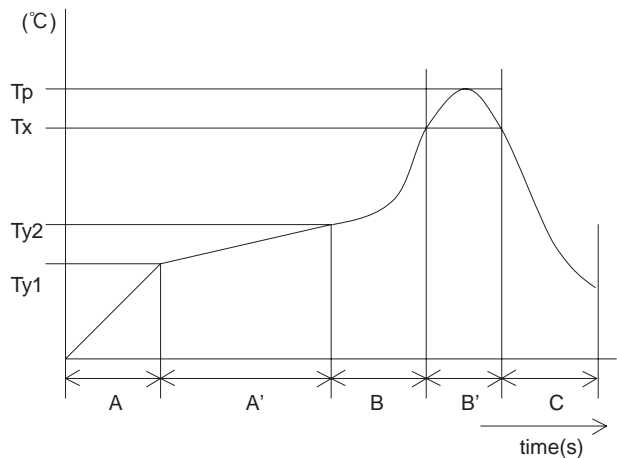
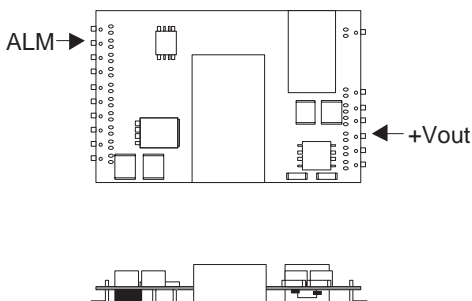
### Automatic mounting

- SFS / SFCS series is designed to have a large flat area in the center of the top surface to serve as a pick up point for automated vacuum pick and place equipment.
- An excessively low bottom dead point of the suction nozzle imposes great force on the core of SFS series during mounting, causing cracked core. So during mounting, take enough care.

### Soldering temperature

#### (1) Reflow soldering

- Below and right figure show the conditions of reflow soldering. Please verify the temperature of the ALM pin and +Vout pin satisfy to reflow condition.
- Improper reflow condition may degrade the reliability of the internal components.
- While soldering, having vibration or impact on the unit should be avoided, because of solder melting.



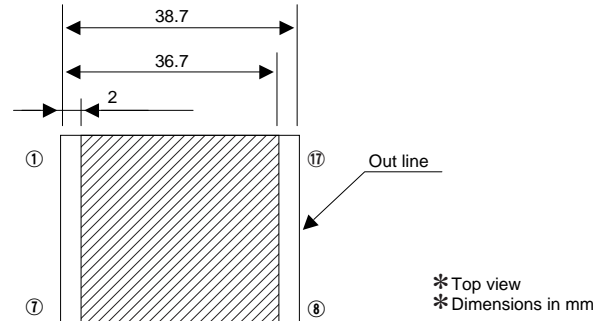
A	1.0 - 5.0°C / s
A'	Ty1 : 160±10°C Ty2 : 180±10°C Ty1 - Ty2 : 120s max
B	1.0 - 5.0°C / s
B'	Tp : Max245°C 10s max Tx : 220°C or more : 70s max
C	1.0 - 5.0°C / s

Implementation · Mounting Method

- (2) Flow soldering
  - 260°C, less than 15 seconds.
- (3) Soldering iron
  - 340°C to 360°C, less than 5 seconds.

Mounting method

- Avoid placing pattern layout in hatched area in right figure to insulate between pattern and power supply.



Stress to the product

- SFS/SFCS series transformer core and choke coil core are attached by glue, and there is a cover over the core, which is attached by a clasp. There is a possibility that the core will be removed and power supply will be damaged when it took stress by the fall or some kind of stress.

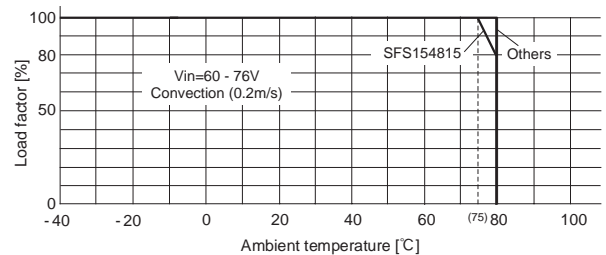
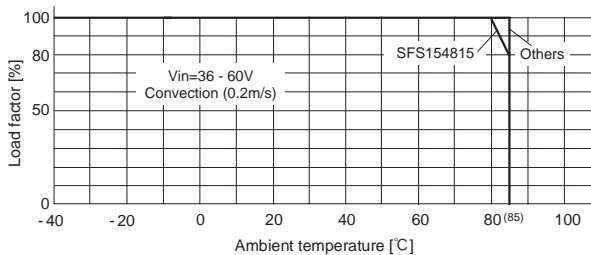
Derating

Ambient temperature derating curve

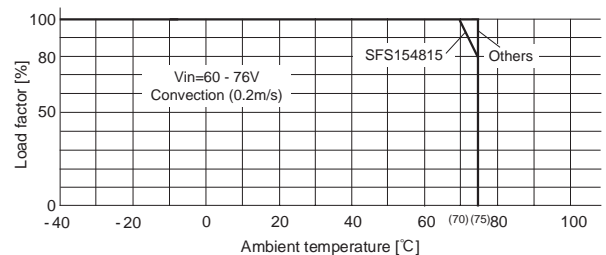
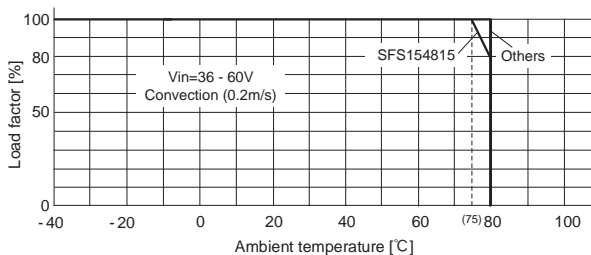
- It is necessary to note thermal fatigue life by power cycle. Please reduce the temperature fluctuation range as much as possible when the up and down of temperature are frequently generated.
- In case of forced air, ventilation must keep the temperature of point A and B below the temperatures shown in Instruction Manual 8.

● SFS1048, SFS1548

(1) Single and series operation



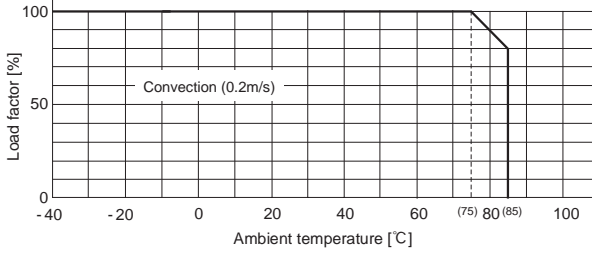
(2) Parallel operation



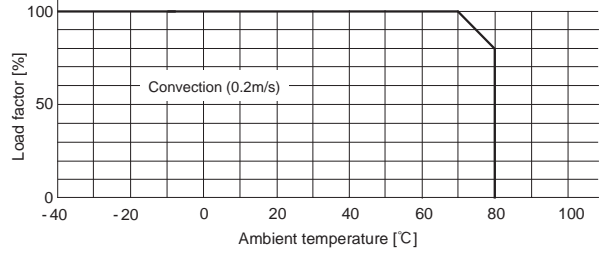
Derating

SFS1524, SFCS15

(1) Single and series operation



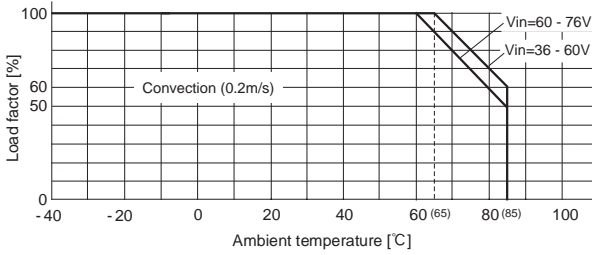
(2) Parallel operation



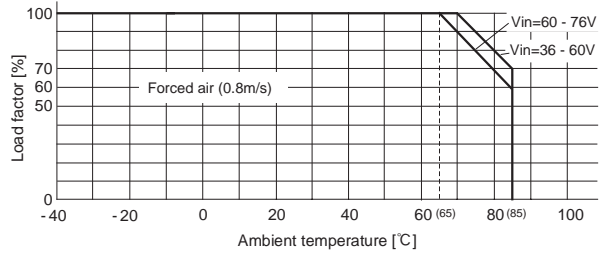
SFS2048

(1) Single, series and parallel operation

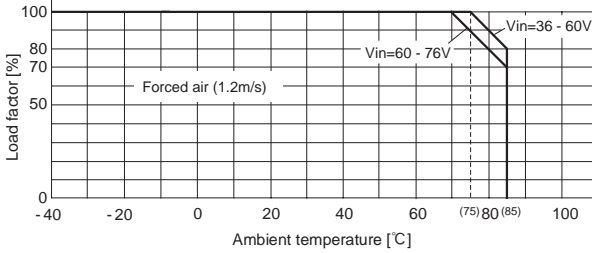
① Natural convection cooling (0.2m/s)



② Forced air cooling (0.8m/s)



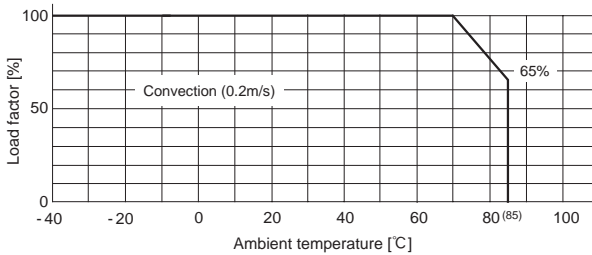
③ Forced air cooling (1.2m/s)



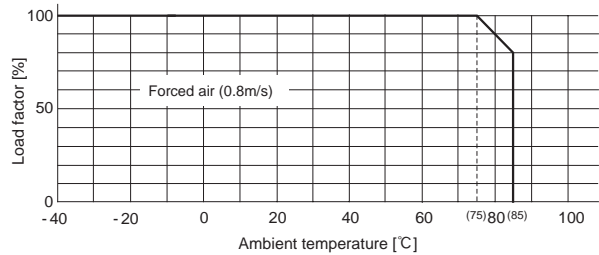
SFS3024, SFCS30

(1) Single and series operation

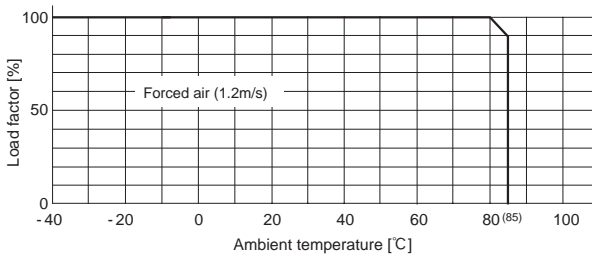
① Natural convection cooling (0.2m/s)



② Forced air cooling (0.8m/s)



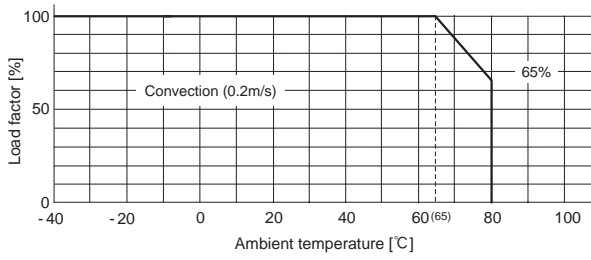
③ Forced air cooling (1.2m/s)



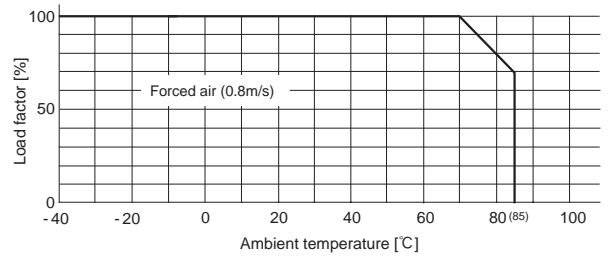
Derating

(2) Parallel operation

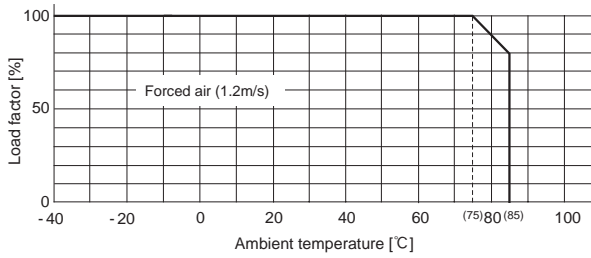
① Natural convection cooling (0.2m/s)



② Forced air cooling (0.8m/s)



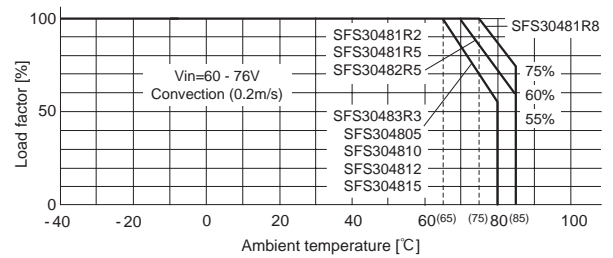
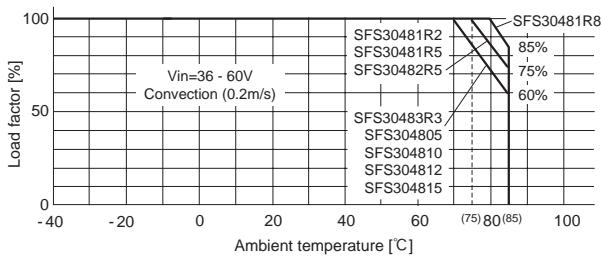
③ Forced air cooling (1.2m/s)



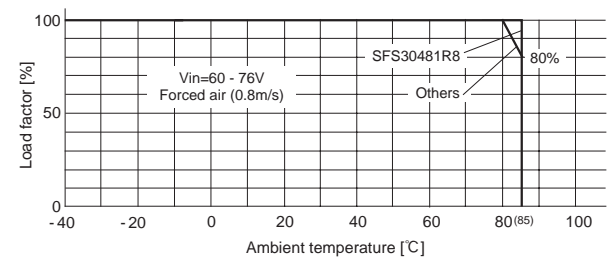
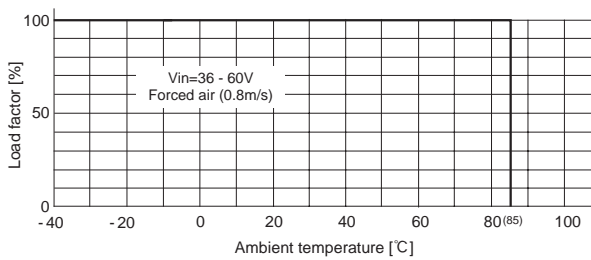
SFS3048

(1) Single and series operation

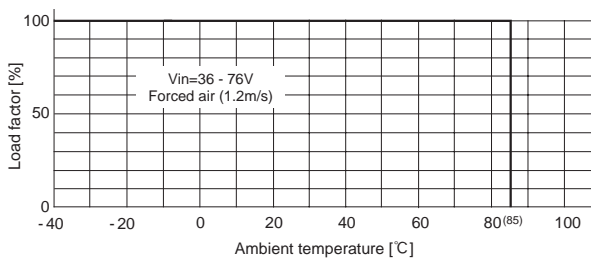
① Natural convection cooling (0.2m/s)



② Forced air cooling (0.8m/s)



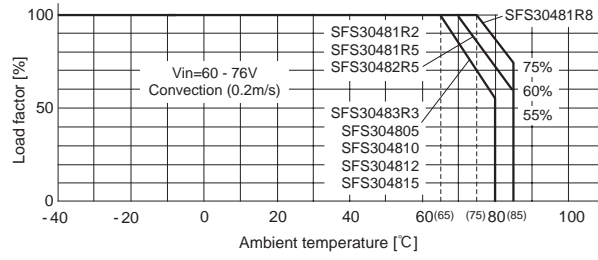
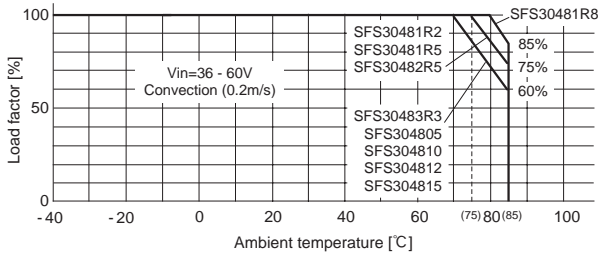
③ Forced air cooling (1.2m/s)



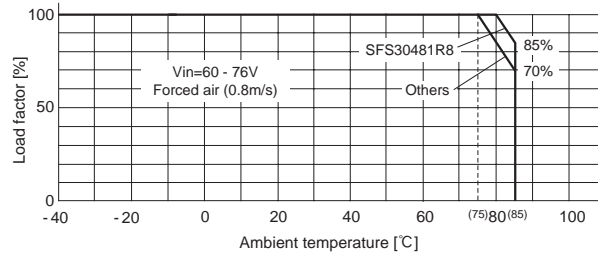
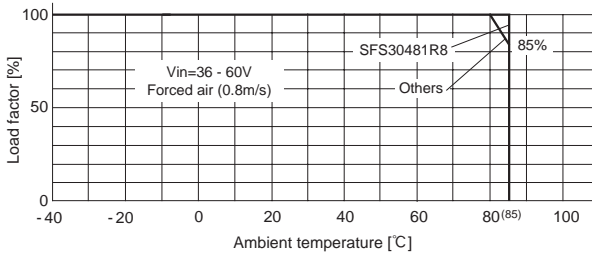
Derating

(2) Parallel operation

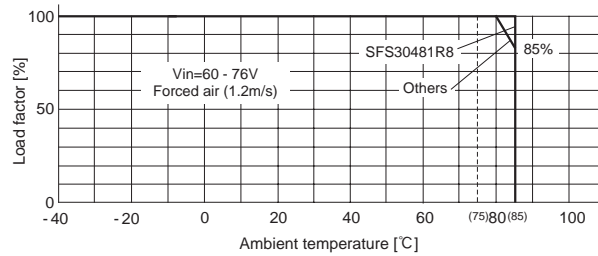
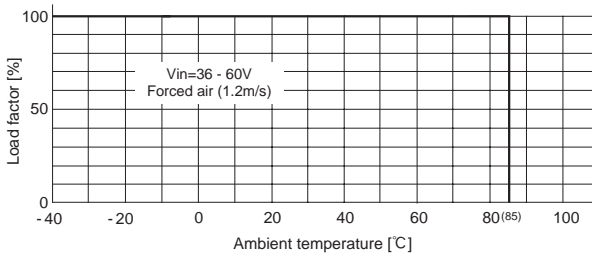
① Natural convection cooling (0.2m/s)



② Forced air cooling (0.8m/s)



③ Forced air cooling (1.2m/s)



Instruction Manual

◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

- Instruction Manual <https://en.cosel.co.jp/product/powersupply/SFS/>
- Instruction Manual <https://en.cosel.co.jp/product/powersupply/SFCS/>
- Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

SFS



SFCS



NOTICE



Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
SFS10	Single ended forward converter	570 - 670	*1	-	-	glass fabric base.epoxy resin		Multilayer	Yes	Yes
SFS15 SFCS15	Single ended forward converter	570 - 670	*1	-	-	glass fabric base.epoxy resin		Multilayer	Yes	Yes
SFS20	Single ended forward converter	570 - 670	*1	-	-	glass fabric base.epoxy resin		Multilayer	Yes	Yes
SFS30 SFCS30	Single ended forward converter	440 - 530	*1	-	-	glass fabric base.epoxy resin		Multilayer	Yes	Yes

\*1 Refer to Specification.





Low Profile



Isolated



Safety Approvals



OCP



OVP

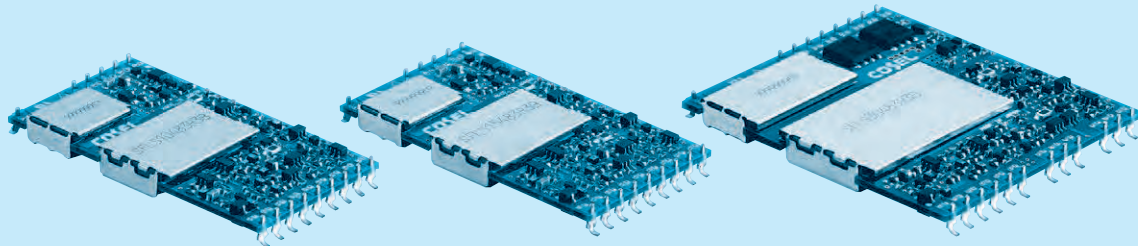


Remote ON/OFF



Parallel Operation

# SFLS-series



SFLS

## Feature

- Low profile SMD mounting type
- High efficiency (synchronous rectifier circuit)
- Parallel operation is possible
- Built-in overcurrent, overvoltage and lowvoltage circuits
- Built-in remote ON/OFF, alarm
- Built-in Power ready / Sequence control

## CE marking

- Low Voltage Directive
- RoHS Directive

## Safety agency approvals

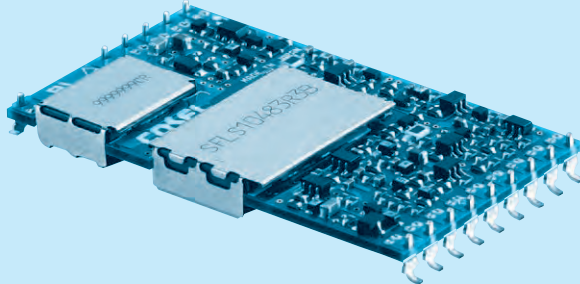
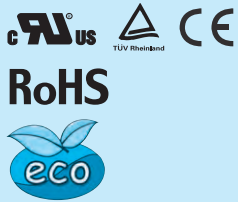
- UL60950-1, C-UL, EN60950-1

## 5-year warranty

# SFLS10

**SFL**   **S**   **10**   **48**   **3R3**   **B**

①   ②   ③   ④   ⑤   ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
48:DC36 - 76V
- ⑤ Output voltage
- ⑥ Mounting type  
B :SMD

SFLS

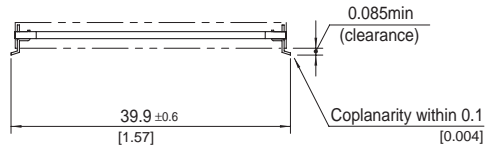
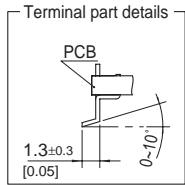
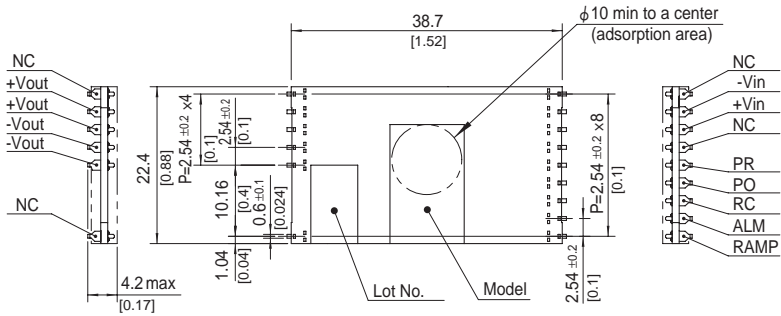
MODEL	SFLS10482R5	SFLS10483R3	SFLS104805
MAX OUTPUT WATTAGE[W]	7.5	9.9	10.0
DC OUTPUT	2.5V 3A	3.3V 3A	5V 2A

## SPECIFICATIONS

	MODEL	SFLS10482R5	SFLS10483R3	SFLS104805
INPUT	VOLTAGE[V]	DC36 - 76		
	CURRENT[A] *1	0.18typ	0.24typ	0.24typ
	EFFICIENCY[%] *1	86typ	87typ	88typ
	START-UP VOLTAGE[V]	DC32 - 36		
	HYSTERESIS VOLTAGE[V]	DC2 min		
OUTPUT	VOLTAGE[V]	2.5	3.3	5
	CURRENT[A]	3	3	2
	VOLTAGE ACCURACY[%]	+5, -3		
	RIPPLE[mVp-p]	25max		
	RIPPLE NOISE[mVp-p]	50max		
	START-UP TIME[ms]	20 - 100max (DCIN 48V, Io=100%)		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 103% of rating		
	OVERVOLTAGE PROTECTION	Works at 115 - 150% of rating		
	LOWVOLTAGE PROTECTION	Works at 93% max of rating		
	REMOTE ON/OFF	Provided(RC open : ON, short between RC and +Vin : OFF)		
ISOLATION	INPUT-OUTPUT	DC1,500V 1minute, DC500V 50MΩ min (20±15℃)		
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85℃, 20 - 95%RH (Non condensing), 3,000m (10,000feet) max		
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100℃, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max (Refer to the Instruction Manual)		
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis		
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis		
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1		
OTHERS	CASE SIZE/WEIGHT	38.7 × 4.2 × 22.4mm [1.52 × 0.166 × 0.88 inches] (W × H × D) / 8g max		
	COOLING METHOD	Convection		

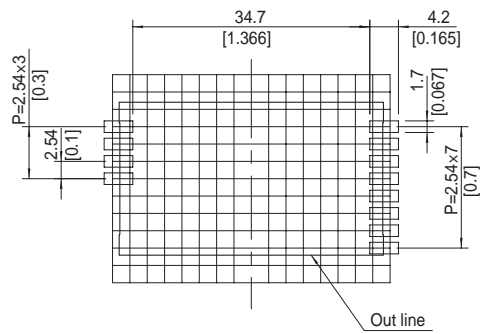
\*1 At rated input(DC48V), rated load and 25℃

External view



- ※Dimensions in mm, [ ]= inches
- ※Tolerance ±0.5 [±0.02]
- ※Weight: 8g max
- ※Terminal thickness: 0.3±0.1 [0.012]
- Terminal material: copper alloy
- Plating treatment of terminal: Sn with Ni barrier

Recommended size for processing PCB (TOP VIEW)

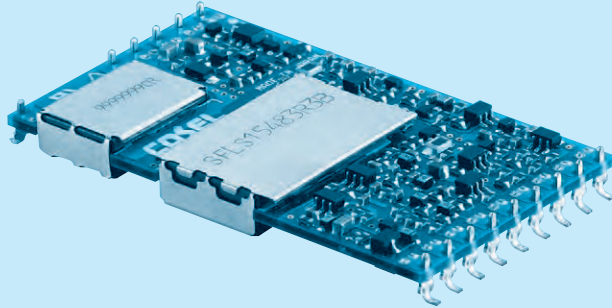
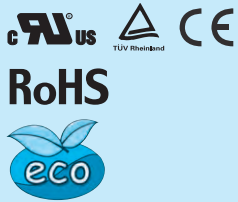


- ※Dimensions in:  $\frac{\text{mm}}{\text{[inch]}}$
- ※Div.: 0.1inch

# SFLS15

SFL S 15 48 3R3 B

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
48:DC36 - 76V
- ⑤ Output voltage
- ⑥ Mounting type  
B :SMD

SFLS

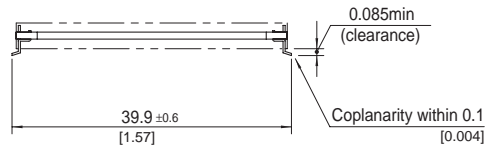
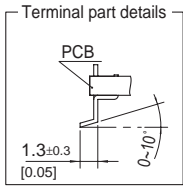
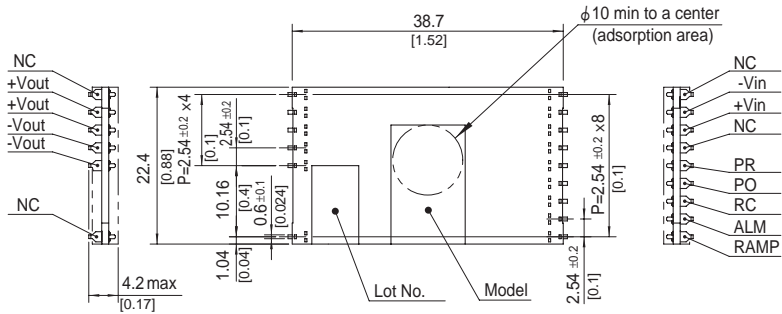
MODEL	SFLS15481R2	SFLS15481R5	SFLS15481R8	SFLS15482R5	SFLS15483R3	SFLS154805	SFLS15485R2	SFLS154812
MAX OUTPUT WATTAGE[W]	6.24	7.8	8.1	11.25	14.85	15.0	15.6	15.0
DC OUTPUT	1.2V 5.2A	1.5V 5.2A	1.8V 4.5A	2.5V 4.5A	3.3V 4.5A	5V 3A	5.2V 3A	12V 1.25A

## SPECIFICATIONS

	MODEL	SFLS15481R2	SFLS15481R5	SFLS15481R8	SFLS15482R5	SFLS15483R3	SFLS154805	SFLS15485R2	SFLS154812
INPUT	VOLTAGE[V]	DC36 - 76							
	CURRENT[A]	*1 0.16typ	0.20typ	0.20typ	0.27typ	0.35typ	0.35typ	0.37typ	0.35typ
	EFFICIENCY[%]	*1 81typ	82typ	85typ	87typ	89typ	89typ	89typ	89typ
	START-UP VOLTAGE[V]	DC32 - 36							
	HYSTERESIS VOLTAGE[V]	DC2 min							
OUTPUT	VOLTAGE[V]	1.2	1.5	1.8	2.5	3.3	5	5.2	12
	CURRENT[A]	5.2	5.2	4.5	4.5	4.5	3	3	1.25
	VOLTAGE ACCURACY[%]	+5, -3							
	RIPPLE[mVp-p]	25max							120max
	RIPPLE NOISE[mVp-p]	50max							150max
	START-UP TIME[ms]	20 - 100max (DCIN 48V, Io=100%)							
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 103% of rating							
	OVERVOLTAGE PROTECTION	Works at 115 - 160% of rating			Works at 115 - 150% of rating				
	LOWVOLTAGE PROTECTION	Works at 93% max of rating							
	REMOTE ON/OFF	Provided(RC open : ON, short between RC and +Vin : OFF)							
ISOLATION	INPUT-OUTPUT	DC1,500V 1minute, DC500V 50MΩ min (20±15°C)							
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing), 3,000m (10,000feet) max							
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max (Refer to the Instruction Manual)							
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis							
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis							
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1							
OTHERS	CASE SIZE/WEIGHT	38.7 × 4.2 × 22.4mm [1.52 × 0.166 × 0.88 inches] (W × H × D) / 8g max							
	COOLING METHOD	Convection							

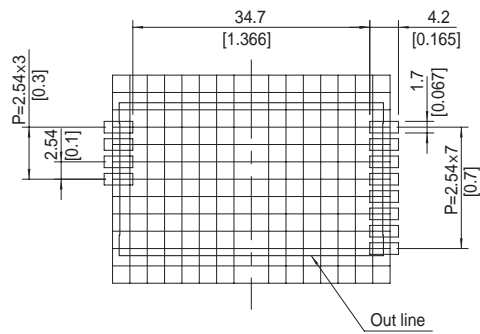
\*1 At rated input(DC48V), rated load and 25°C

External view



- ※Dimensions in mm, [ ]= inches
- ※Tolerance  $\pm 0.5$  [  $\pm 0.02$  ]
- ※Weight: 8g max
- ※Terminal thickness:  $0.3 \pm 0.1$  [  $0.012$  ]
- Terminal material: copper alloy
- Plating treatment of terminal: Sn with Ni barrier

Recommended size for processing PCB (TOP VIEW)



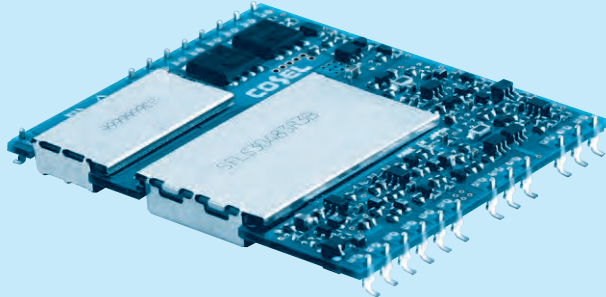
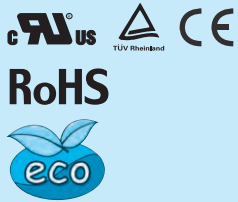
※Dimensions in:  $\frac{\text{mm}}{\text{[inch]}}$

※Div.: 0.1inch

# SFLS30

**SFL S 30 48 3R3 B**

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
48:DC36 - 76V
- ⑤ Output voltage
- ⑥ Mounting type  
B :SMD

SFLS

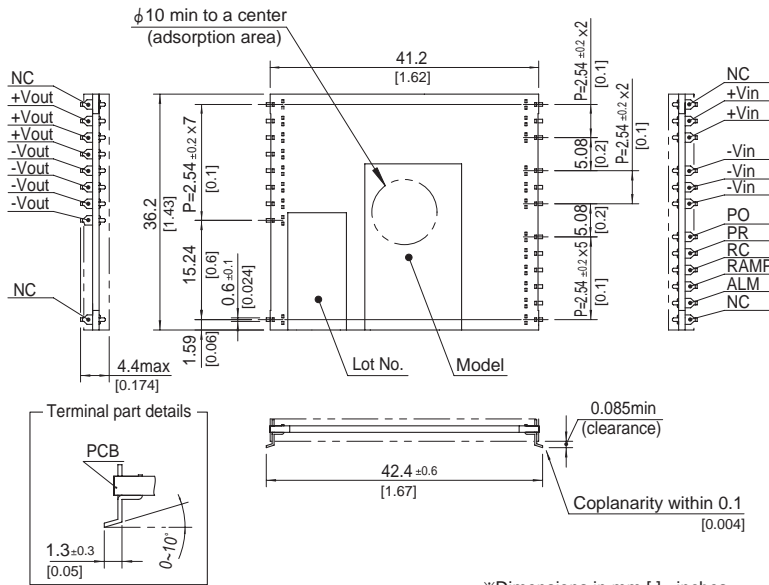
MODEL	SFLS30481R2	SFLS30481R5	SFLS30481R8	SFLS30482R5	SFLS30483R3	SFLS304805
MAX OUTPUT WATTAGE[W]	14.4	16.5	19.8	25.0	29.7	30.0
DC OUTPUT	1.2V 12A	1.5V 11A	1.8V 11A	2.5V 10A	3.3V 9A	5V 6A

## SPECIFICATIONS

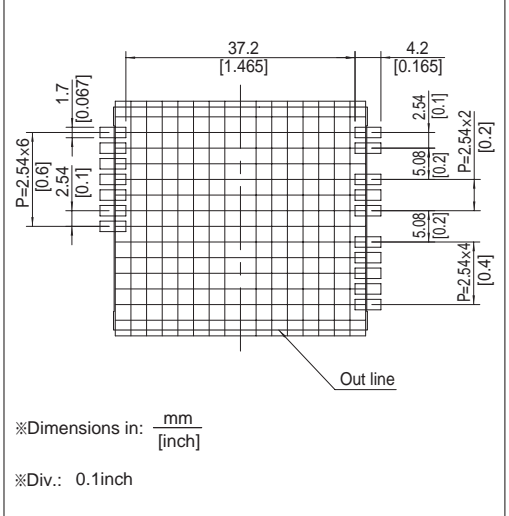
	MODEL	SFLS30481R2	SFLS30481R5	SFLS30481R8	SFLS30482R5	SFLS30483R3	SFLS304805
INPUT	VOLTAGE[V]	DC36 - 76					
	CURRENT[A]	*1 0.36typ	0.40typ	0.47typ	0.58typ	0.68typ	0.69typ
	EFFICIENCY[%]	*1 84typ	86typ	88typ	90typ	91typ	91typ
	START-UP VOLTAGE[V]	DC32 - 36					
	HYSTERESIS VOLTAGE[V]	DC2 min					
OUTPUT	VOLTAGE[V]	1.2	1.5	1.8	2.5	3.3	5
	CURRENT[A]	12	11	11	10	9	6
	VOLTAGE ACCURACY[%]	+5, -3					
	RIPPLE[mVp-p]	25max					
	RIPPLE NOISE[mVp-p]	50max					
START-UP TIME[ms]	20 - 100max (DCIN 48V, Io=100%)						
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 103% of rating					
	OVERVOLTAGE PROTECTION	Works at 115 - 160% of rating			Works at 115 - 150% of rating		
	LOWVOLTAGE PROTECTION	Works at 93% max of rating					
	REMOTE ON/OFF	Provided(RC open : ON, short between RC and +Vin : OFF)					
ISOLATION	INPUT-OUTPUT	DC1,500V 1minute, DC500V 50MΩ min (20±15°C)					
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing), 3,000m (10,000feet) max					
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max (Refer to the Instruction Manual)					
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis					
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis					
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1					
OTHERS	CASE SIZE/WEIGHT	41.2 × 4.4 × 36.2mm [1.62 × 0.174 × 1.43 inches] (W × H × D) / 16g max					
	COOLING METHOD	Convection					

\*1 At rated input(DC48V), rated load and 25°C

External view



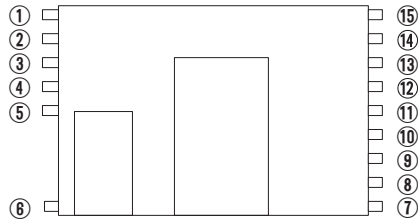
Recommended size for processing PCB (TOP VIEW)



- ※Dimensions in mm, [ ]= inches
- ※Tolerance  $\pm 0.5$  [ $\pm 0.02$ ]
- ※Weight: 16g max
- ※Terminal thickness:  $0.3 \pm 0.1$  [ $0.012$ ]
- Terminal material: copper alloy
- Plating treatment of terminal : Sn with Ni barreir

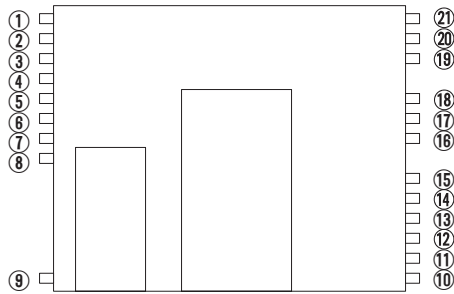
## Pin Configuration

### SFLS10 / SFLS15



No.	Pin Name	Function
①	NC	Not connected / Adhesive dispensing
②,③	+Vout	+DC output
④,⑤	-Vout	-DC output
⑥	NC	Not connected / Adhesive dispensing
⑦	RAMP	Ramp-rate control
⑧	ALM	Alarm
⑨	RC	Remote ON/OFF
⑩	PO	Start in/out
⑪	PR	Power ready / Sequence control
⑫	NC	Not connected
⑬	+Vin	+DC input
⑭	-Vin	-DC input
⑮	NC	Not connected / Adhesive dispensing

### SFLS30



No.	Pin Name	Function
①	NC	Not connected / Adhesive dispensing
②,③,④	+Vout	+DC output
⑤,⑥,⑦,⑧	-Vout	-DC output
⑨,⑩	NC	Not connected / Adhesive dispensing
⑪	ALM	Alarm
⑫	RAMP	Ramp-rate control
⑬	RC	Remote ON/OFF
⑭	PR	Power ready / Sequence control
⑮	PO	Start in/out
⑯, ⑰, ⑱	-Vin	-DC input
⑲, ⑳	+Vin	+DC input
㉑	NC	Not connected / Adhesive dispensing

## Assembling and Installation Method

### Automatic mounting

- SFLS series is designed to have a large flat area in the center of the top surface to serve as a pick up point for automated vacuum pick and place equipment.
- An excessively low bottom dead point of the suction nozzle imposes great force on the core during mounting, causing cracked core. So during mounting, take enough care.

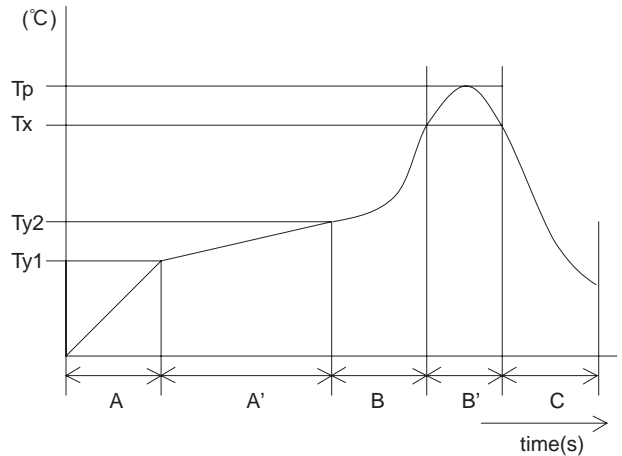
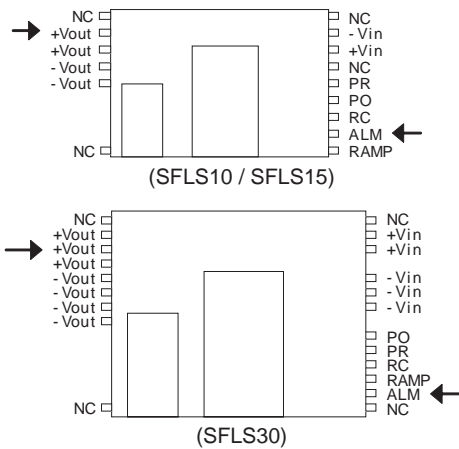


Implementation · Mounting Method

Soldering temperature

(1) Reflow soldering

- Below and right figure show the conditions of reflow soldering. Please verify the temperature of the ALM pin and +Vout pin satisfy to reflow condition.
- Improper reflow condition may degrade the reliability of the internal components.
- While soldering, having vibration or impact on the unit should be avoided, because of solder melting.



A	1.0 - 5.0°C/s
A'	Ty1 : 160±10°C Ty2 : 180±10°C Ty1 - Ty2 : 120s max
B	1.0 - 5.0°C/s
B'	Tp : Max245°C 10s max Tx : 220°C or more : 70s max
C	1.0 - 5.0°C/s

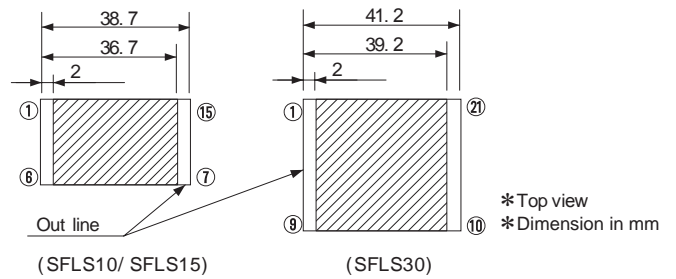
SFLS

(2) Soldering iron

- 340°C to 360°C, less than 5 seconds.

Mounting method

- Avoid placing pattern layout in hatched area in right figure to insulate between pattern and power supply.



Stress to the product

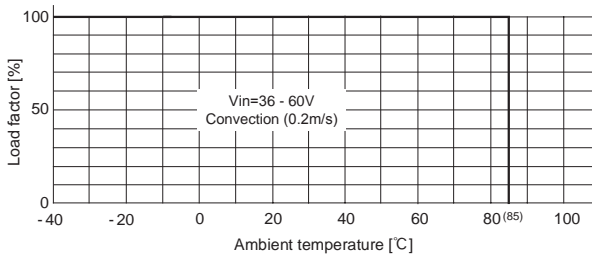
- SFLS series transformer core and choke coil core are attached by glue, and there is a cover over the core, which is attached by a clasp. There is a possibility that the core will be removed and power supply will be damaged when it took stress by the fall or some kind of stress.

Derating

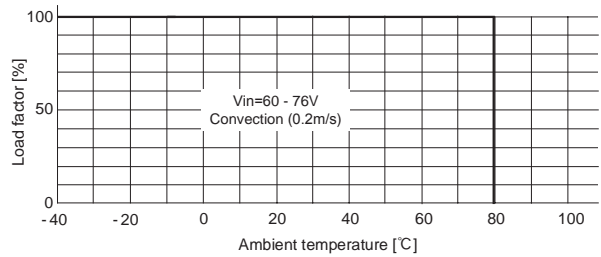
Ambient temperature derating curve

It is necessary to note thermal fatigue life by power cycle. Please reduce the temperature fluctuation range as much as possible when the up and down of temperature are frequently generated.

① Vin=DC36V - 60V



② Vin=DC60V - 76V



SFLS

Instruction Manuals

Please see catalog and instruction manual before you use.

Instruction Manuals <https://en.cosel.co.jp/product/powersupply/SFLS/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

SFLS



NOTICE



Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current	Rated input fuse	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
SFLS10	Single ended forward converter	630 - 710	*1	-	-	glass fabric base,epoxy resin		Multilayer	Yes	Yes
SFLS15	Single ended forward converter	630 - 710	*1	-	-	glass fabric base,epoxy resin		Multilayer	Yes	Yes
SFLS30	Single ended forward converter	480 - 540	*1	-	-	glass fabric base,epoxy resin		Multilayer	Yes	Yes

\*1 Refer to Specification.



Isolated



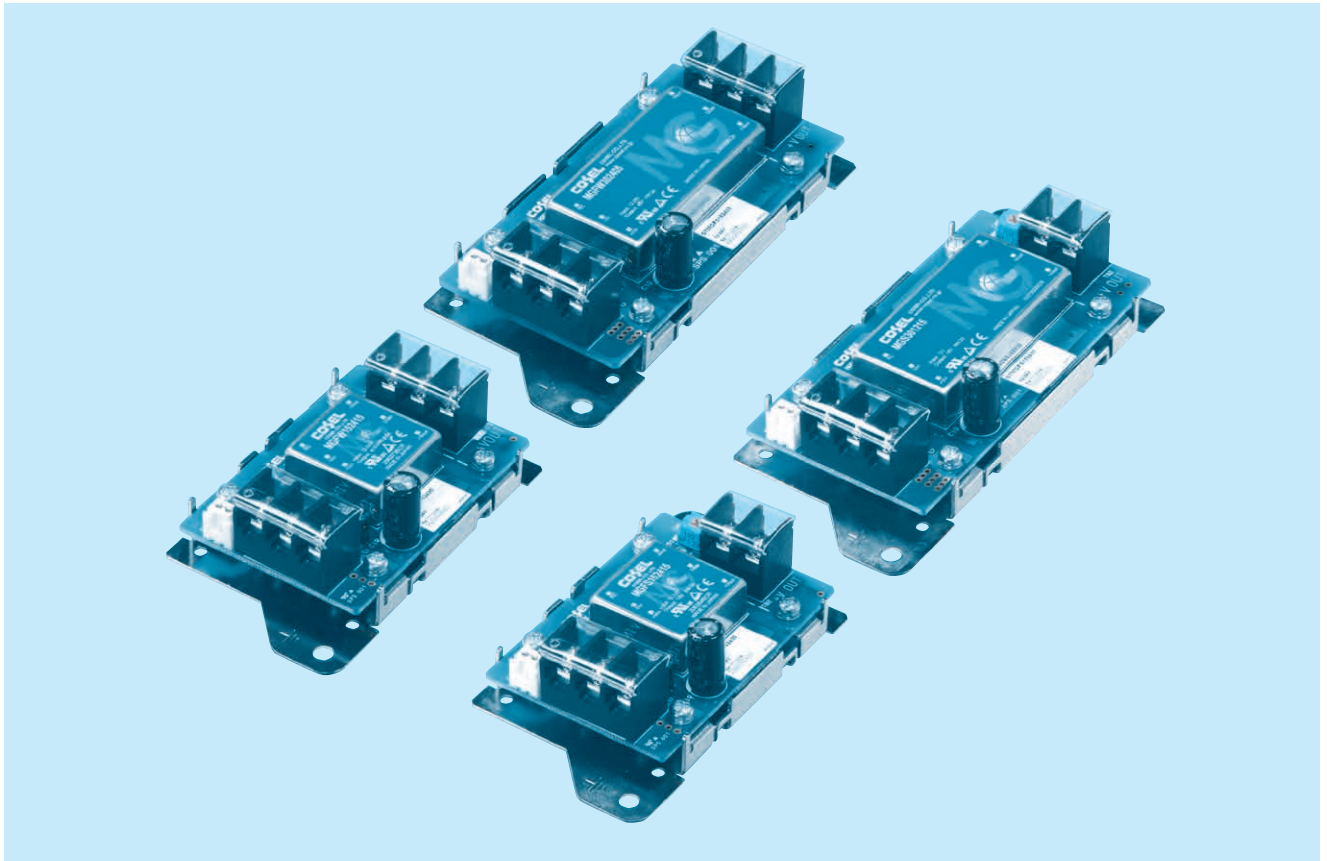
OCP



OVP

Remote  
ON/OFFWide 4 :1  
input

# STMG-series



STMG

## Feature

- Isolated unit type DC-DC converter
- Wide input voltage DC9-36V/DC18-76V
- Various lineups
- Available connector interface (option)
- Available case cover (option)
- Available DIN rail attachment (option)
- Built in Overcurrent protection (recovery automatically)
- Built in Overvoltage protection (for STMG30)
- Built in Remote ON/OFF
- Built in Output voltage adjustment (for single output,  $\pm 10\%$ )

## Safety agency approvals

UL60950-1 C-UL EN60950-1 Complies

## CE marking

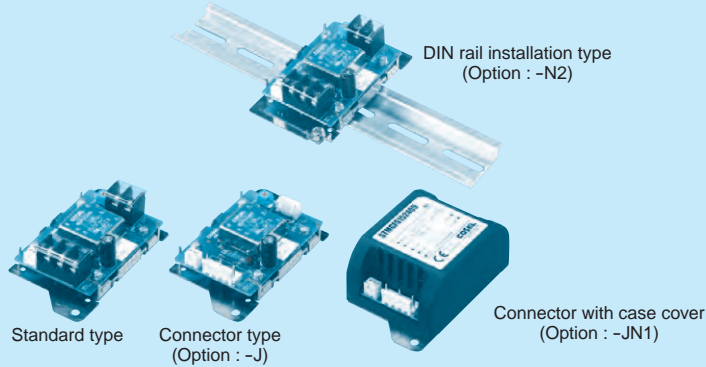
Low voltage Directive  
RoHS Directive

## 5-year warranty (refer to Instruction Manual)

# STMGFS15

STMGF S 15 24 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
  - G : Capacitor between Input and Output is removed.
  - R : with Remote ON/OFF (Positive logic control)
  - J : Input/Output Connector
  - JN1 : Connector with case cover
  - N2 : With DIN rail installation type
  - JN3 : Connector with cover(plastic) and DIN rail installation type
  - V : Output voltage setting potentiometer externally

\* Please remove short piece on CN4 to enable remote ON/OFF function.

MODEL	STMGFS15243R3	STMGFS152405	STMGFS152412	STMGFS152415
MAX OUTPUT WATTAGE[W]	13.2	15	15.6	15
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12
	CURRENT[A]	4	3	1.3

## SPECIFICATIONS

	MODEL	STMGFS15243R3	STMGFS152405	STMGFS152412	STMGFS152415	
INPUT	VOLTAGE[V]	DC9 - 36				
	CURRENT[A] *2	0.63typ	0.71typ	0.73typ	0.70typ	
	EFFICIENCY[%] *2	87typ	88typ	89typ	89typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	4	3	1.3	1	
	LINE REGULATION[mV]	13.2max	20max	48max	60max	
	LOAD REGULATION[mV]	60max	60max	100max	120max	
	RIPPLE[mVp-p] *3	0 to +60°C	75max	75max	100max	100max
		-20 to +60°C	100max	100max	120max	120max
	RIPPLE NOISE[mVp-p] *3	0 to +60°C	120max	120max	150max	150max
		-20 to +60°C	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	0 to +60°C	50max	50max	150max	180max
		-20 to +60°C	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max		
START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE	2.97 - 3.63	4.50 - 5.50	10.80 - 13.20	13.50 - 16.50		
OUTPUT VOLTAGE SETTING[V]*5	3.29 - 3.41	4.97 - 5.14	11.85 - 12.25	14.83 - 15.33		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)				

MODEL	STMGFS15483R3	STMGFS154805	STMGFS154812	STMGFS154815
MAX OUTPUT WATTAGE[W]	13.2	15	15.6	15
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12
	CURRENT[A]	4	3	1.3

## SPECIFICATIONS

	MODEL	STMGFS15483R3	STMGFS154805	STMGFS154812	STMGFS154815	
INPUT	VOLTAGE[V]	DC18 - 76				
	CURRENT[A] *2	0.32typ	0.36typ	0.37typ	0.35typ	
	EFFICIENCY[%] *2	87typ	88typ	88typ	89typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	4	3	1.3	1	
	LINE REGULATION[mV]	13.2max	20max	48max	60max	
	LOAD REGULATION[mV]	60max	60max	100max	120max	
	RIPPLE[mVp-p] *3	0 to +60°C	75max	75max	100max	100max
		-20 to +60°C	100max	100max	120max	120max
	RIPPLE NOISE[mVp-p] *3	0 to +60°C	120max	120max	150max	150max
		-20 to +60°C	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	0 to +60°C	50max	50max	150max	180max
		-20 to +60°C	80max	80max	240max	290max
DRIFT[mV] *4	20max	20max	48max	60max		
START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE	2.97 - 3.63	4.50 - 5.50	10.80 - 13.20	13.50 - 16.50		
OUTPUT VOLTAGE SETTING[V]*5	3.29 - 3.41	4.97 - 5.14	11.85 - 12.25	14.83 - 15.33		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)				

## GENERAL SPECIFICATIONS

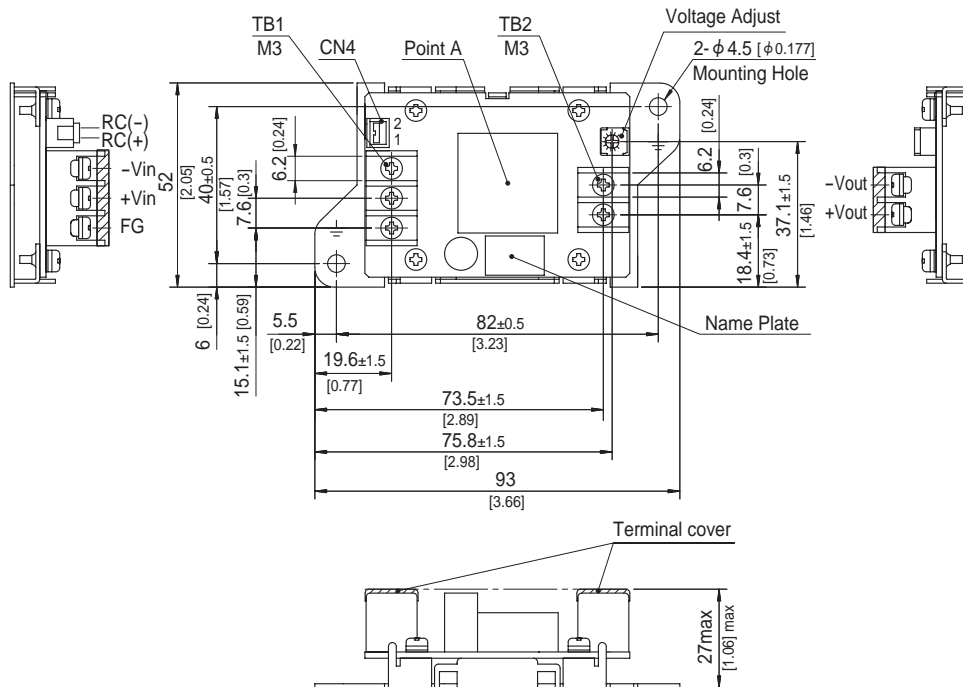
ISOLATION	INPUT · RC-OUTPUT	DC1,500V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
	INPUT · RC-FG	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
	OUTPUT-FG	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-20 to +70°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1 Complies
OTHERS	CASE SIZE/WEIGHT	52x27x93mm [2.05x1.06x3.66 inches] (W×H×D) / 110g max (When the option is set, refer to the page STMG-4)
	COOLING METHOD	Convection/Forced air

- \*1 STMGFW15xx05/STMGFW15xx12/STMGFW15xx15 is available as single output, +10V/+24V/+30V
- \*2 Rated input 12V, 24V or 48V DC lo=100%
- \*3 Measured by 100MHz oscilloscope or Ripple-Noise meter (Equivalent to KIKUSUI-GIKEN : RM103).
- \*4 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \*5 Rated input voltage (DC24V, DC48V), rated output wattage, ambient temperature at 25°C.
- \* Parallel operation with other model is not possible.

### External view

#### Standard type

\* External view of option G, R are the same as standard model.  
External view of other type options, please refer to the page STMG-4.



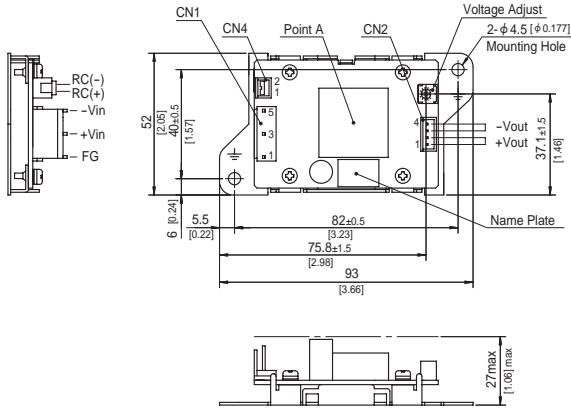
	I/O Connector		Mating Connector	Terminal
Remote ON/OFF	CN4	B2B-XH	XHP-2	Chain : SXH-001T-P0.6 Loose : BXH-001T-P0.6

(Mfr.: J.S.T.)

- \* Tolerance ±1
- \* Dimensions in mm, [ ]=inches
- \* Weight : 110g max
- \* PCB material / thickness : FR-4 / 1.6mm
- \* Mounting plate : Iron (surface finishing : nickel plating) t=1.0 [0.04]
- \* Terminal block screw tightening torque M3 : 0.8N · m (8.5kgf · cm) max
- \* CN4 has been installed short piece as factory setting (Except option R).  
When remote ON/OFF is used, please remove the installed short piece.

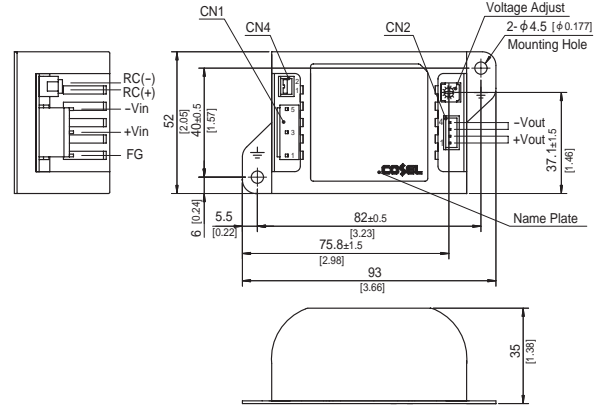
## External view (Option type)

### Connector type (-J)



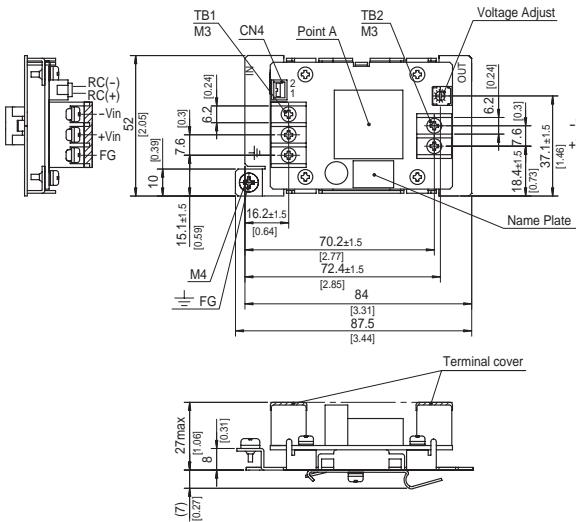
### Case cover and connector type (-JN1)

\* The specifications of terminal block and Case cover type can not be set.

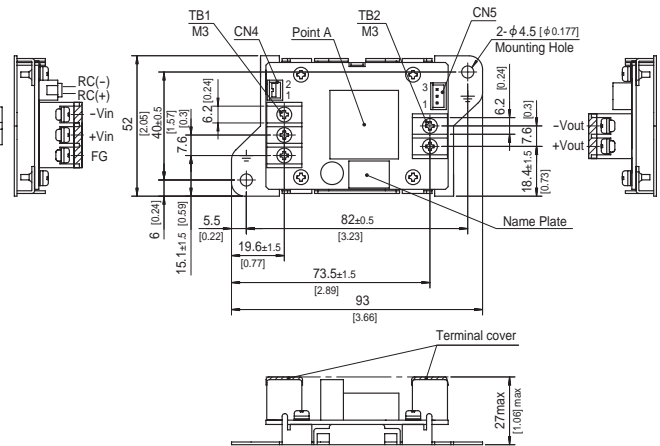


STMG

### DIN rail installation type (-N2)



### External voltage variable volume type (-V)



	I/O Connector		Mating Connector	Terminal
Connector Type Input	CN1	B3P5-VH	VHR-5N	Chain : SVH-21T-P1.1 Loose : BVH-21T-P1.1
Connector Type Output	CN2	B4P-XH	XHP-4	Chain : SXH-001T-P0.6 Loose : BXH-001T-P0.6
Remote ON/OFF	CN4	B2B-XH	XHP-2	Chain : SXH-001T-P0.6 Loose : BXH-001T-P0.6
External voltage variable volume type	CN5	B3B-XH	XHP-3	Chain : SXH-001T-P0.6 Loose : BXH-001T-P0.6

(Mfr.:J.S.T.)

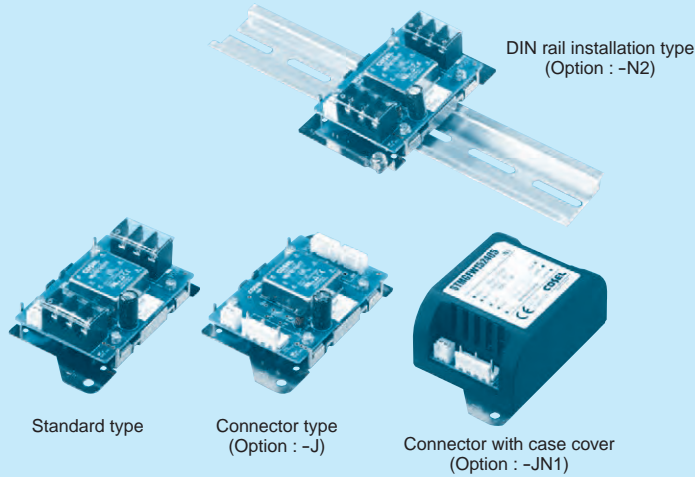
- \* Tolerance ±1
- \* Dimensions in mm, [ ]=inches
- \* Weight : Standard & Connector type 110g max  
Case cover & DIN rail installation type 120g max
- \* PCB material / thickness : FR-4 / 1.6mm
- \* Mounting plate : Iron (surface finishing : nickel plating) t=1.0 [0.04]
- \* Case : PBT
- \* Terminal block screw tightening torque M3 : 0.8N · m (8.5kgf · cm) max
- \* CN4 has been installed jumper as factory setting (Except option R).  
When remote ON/OFF is used , please remove the installed jumper.
- \* Connector Type : Keep drawing current per pin below 2.5A for CN2.



# STMGF15

STMGF W 15 24 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
  - G : Capacitor between Input and Output is removed.
  - R : with Remote ON/OFF (Positive logic control)
  - J : Input/Output Connector
  - JN1 : Connector with case cover
  - N2 : With DIN rail installation type
  - JN3 : Connector with cover(plastic) and DIN rail installation type

\*When the option is set specifications may vary.

\*Please remove short piece on CN4 to enable remote ON/OFF function.

MODEL	STMGF152405	STMGF152412	STMGF152415	STMGF154805	STMGF154812	STMGF154815
MAX OUTPUT WATTAGE[W]	15	15.6	15	15	15.6	15
DC OUTPUT	VOLTAGE[V] *1	±5 or +10	±12 or +24	±15 or +30	±5 or +10	±12 or +24
	CURRENT[A]	1.5	0.65	0.5	1.5	0.65

## SPECIFICATIONS

	MODEL	STMGF152405	STMGF152412	STMGF152415	STMGF154805	STMGF154812	STMGF154815	
INPUT	VOLTAGE[V]	DC9 - 36			DC18 - 76			
	CURRENT[A] *2	0.74typ	0.74typ	0.70typ	0.37typ	0.37typ	0.36typ	
	EFFICIENCY[%] *2	84typ	88typ	89typ	84typ	87typ	88typ	
OUTPUT	VOLTAGE[V]	±5(+10)	±12(+24)	±15(+30)	±5(+10)	±12(+24)	±15(+30)	
	CURRENT[A]	1.5	0.65	0.5	1.5	0.65	0.5	
	LINE REGULATION[mV]	40max	60max	75max	40max	60max	75max	
	LOAD REGULATION[mV]	*3	500max *5	600max	750max	500max *5	600max	750max
		*4	250max	480max	600max	250max	480max	600max
	RIPPLE[mVp-p] *6	0 to +60°C	100max	100max	100max	100max	100max	100max
		-20 to +60°C	120max	120max	120max	120max	120max	120max
	RIPPLE NOISE[mVp-p] *6	0 to +60°C	150max	150max	150max	150max	150max	150max
		-20 to +60°C	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	0 to +60°C	50max	150max	180max	50max	150max	180max
		-20 to +60°C	80max	240max	290max	80max	240max	290max
DRIFT[mV] *7	50max	50max	60max	50max	50max	60max		
START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)							
OUTPUT VOLTAGE SETTING[V]*8	4.93 - 5.24	11.76 - 12.50	14.60 - 15.51	4.93 - 5.24	11.76 - 12.50	14.60 - 15.51		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically						
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)						
ISOLATION	INPUT · RC-OUTPUT	DC1,500V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)						
	INPUT · RC-FG	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)						
	OUTPUT-FG	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)						
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-20 to +70°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max						
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max						
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis						
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis						
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1 Complies						
OTHERS	CASE SIZE/WEIGHT	52×27×93mm [2.05×1.06×3.66 inches] (W×H×D) / 110g max (When the option is set, refer to the page STMG-7)						
	COOLING METHOD	Convection/Forced air						

\*1 Single output +10V, +24V, +30V with no use of COM.

\*2 Rated input 12V, 24V or 48V DC I<sub>o</sub>=100%

\*3 Symmetrical loading from 5% to 100%.

\*4 Symmetrical loading from 20% to 100%.

\*5 Refer to the instruction manual 6.

\*6 Measured by 100MHz oscilloscope or Ripple-Noise meter (Equivalent to KIKUSUI-GIKEN : RM103).

\*7 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.

\*8 Rated input voltage (DC24V, DC48V), rated output wattage, ambient temperature at 25°C.

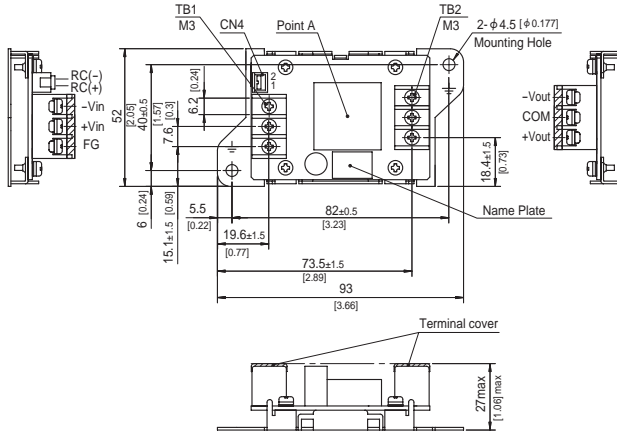
\* Parallel operation with other model is not possible.



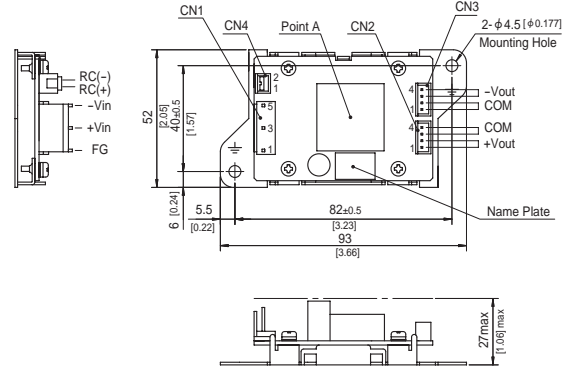
External view

Standard type

\* External view of option G, R are the same as standard model.

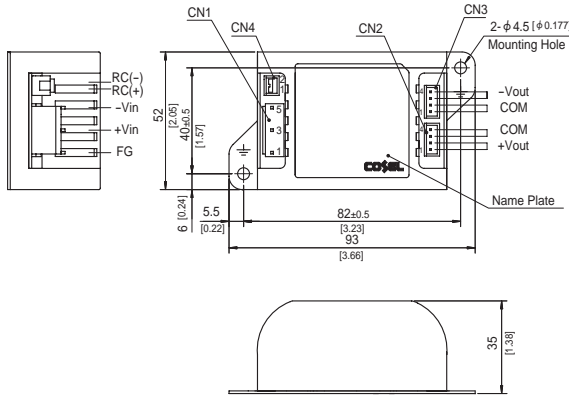


Connector type (-J)

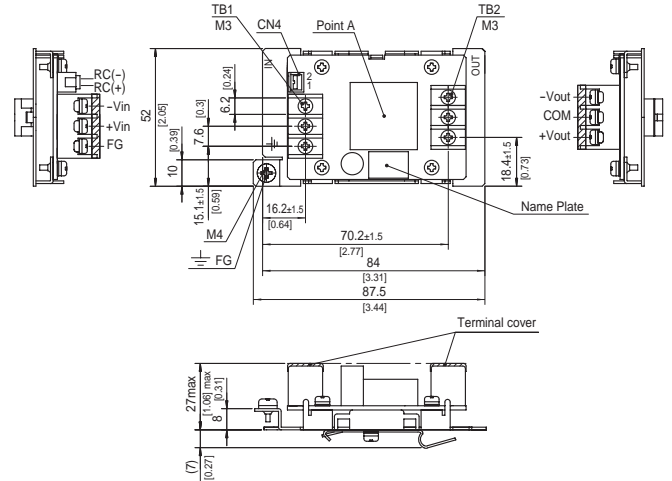


Case cover and connector type (-JN1)

\* The specifications of terminal block and Case cover type can not be set.



DIN rail installation type (-N2)



	I/O Connector		Mating Connector	Terminal
Connector Type Input	CN1	B3P5-VH	VHR-5N	Chain : SVH-21T-P1.1 Loose : BVH-21T-P1.1
Connector Type Output	CN2, CN3	B4B-XH	XHP-4	Chain : SXH-001T-P0.6 Loose : BXH-001T-P0.6
Remote ON/OFF	CN4	B2B-XH	XHP-2	Chain : SXH-001T-P0.6 Loose : BXH-001T-P0.6

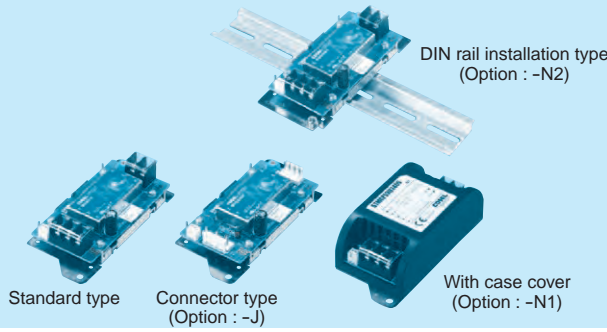
(Mfr.:J.S.T.)

- \* Tolerance ±1
- \* Dimensions in mm, [ ]=inches
- \* Weight : Standard & Connector type 110g max  
Case cover & DIN rail installation type 120g max
- \* PCB material / thickness : FR-4 / 1.6mm
- \* Mounting plate : Iron (surface finishing : nickel plating) t=1.0 [0.04]
- \* Case : PBT
- \* Terminal block screw tightening torque M3 : 0.8N · m (8.5kgf · cm) max
- \* CN4 has been installed jumper as factory setting (Except option R).  
When remote ON/OFF is used , please remove the installed jumper.
- \* Connector Type : Keep drawing current per pin below 2.5A for CN2,CN3.

# STMGFS30

STMGF S 30 24 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
  - ② Single output
  - ③ Output wattage
  - ④ Input voltage
  - ⑤ Output voltage
  - ⑥ Optional
    - G : Capacitor between Input and Output is removed.
    - R : with Remote ON/OFF (Positive logic control)
    - J : Input/Output Connector
    - N1 : With case cover
    - N2 : With DIN rail installation type
    - N3 : With cover(plastic) and DIN rail installation type
    - V : Output voltage setting potentiometer externally
- \*When the option is set specifications may vary.

\*Please remove short piece on CN4 to enable remote ON/OFF function.

MODEL	STMGFS30243R3	STMGFS302405	STMGFS302412	STMGFS302415
MAX OUTPUT WATTAGE[W]	24.75	30	30	30
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12
	CURRENT[A]	7.5	6	2.5

## SPECIFICATIONS

	MODEL	STMGFS30243R3	STMGFS302405	STMGFS302412	STMGFS302415	
INPUT	VOLTAGE[V]	DC9 - 36				
	CURRENT[A] *2	1.16typ	1.39typ	1.40typ	1.40typ	
	EFFICIENCY[%] *2	89typ	90typ	89typ	89typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	7.5	6	2.5	2	
	LINE REGULATION[mV]	13.2max	20max	48max	60max	
	LOAD REGULATION[mV]	60max	60max	100max	120max	
	RIPPLE[mVp-p] *3	0 to +60°C	75max	75max	100max	100max
		-20 to +60°C	100max	100max	120max	120max
	RIPPLE NOISE[mVp-p] *3	0 to +60°C	120max	120max	150max	150max
		-20 to +60°C	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	0 to +60°C	50max	50max	150max	180max
		-20 to +60°C	80max	80max	240max	290max
	DRIFT[mV] *4	20max	20max	48max	60max	
START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE	2.97 - 3.63	4.50 - 5.50	10.80 - 13.20	13.50 - 16.50		
OUTPUT VOLTAGE SETTING[V]*5	3.29 - 3.41	4.97 - 5.14	11.85 - 12.25	14.83 - 15.33		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION[V]	Works over 120 to 160% of rating				
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)				

MODEL	STMGFS30483R3	STMGFS304805	STMGFS304812	STMGFS304815
MAX OUTPUT WATTAGE[W]	24.75	30	30	30
DC OUTPUT	VOLTAGE[V] *1	3.3	5	12
	CURRENT[A]	7.5	6	2.5

## SPECIFICATIONS

	MODEL	STMGFS30483R3	STMGFS304805	STMGFS304812	STMGFS304815	
INPUT	VOLTAGE[V]	DC18 - 76				
	CURRENT[A] *2	0.58typ	0.70typ	0.70typ	0.70typ	
	EFFICIENCY[%] *2	89typ	90typ	89typ	89typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	
	CURRENT[A]	7.5	6	2.5	2	
	LINE REGULATION[mV]	13.2max	20max	48max	60max	
	LOAD REGULATION[mV]	60max	60max	100max	120max	
	RIPPLE[mVp-p] *3	0 to +60°C	75max	75max	100max	100max
		-20 to +60°C	100max	100max	120max	120max
	RIPPLE NOISE[mVp-p] *3	0 to +60°C	120max	120max	150max	150max
		-20 to +60°C	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	0 to +60°C	50max	50max	150max	180max
		-20 to +60°C	80max	80max	240max	290max
	DRIFT[mV] *4	20max	20max	48max	60max	
START-UP TIME[ms]	30max (Minimum input, I <sub>o</sub> =100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE	2.97 - 3.63	4.50 - 5.50	10.80 - 13.20	13.50 - 16.50		
OUTPUT VOLTAGE SETTING[V]*5	3.29 - 3.41	4.97 - 5.14	11.85 - 12.25	14.83 - 15.33		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION[V]	Works over 120 to 160% of rating				
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)				

## GENERAL SPECIFICATIONS

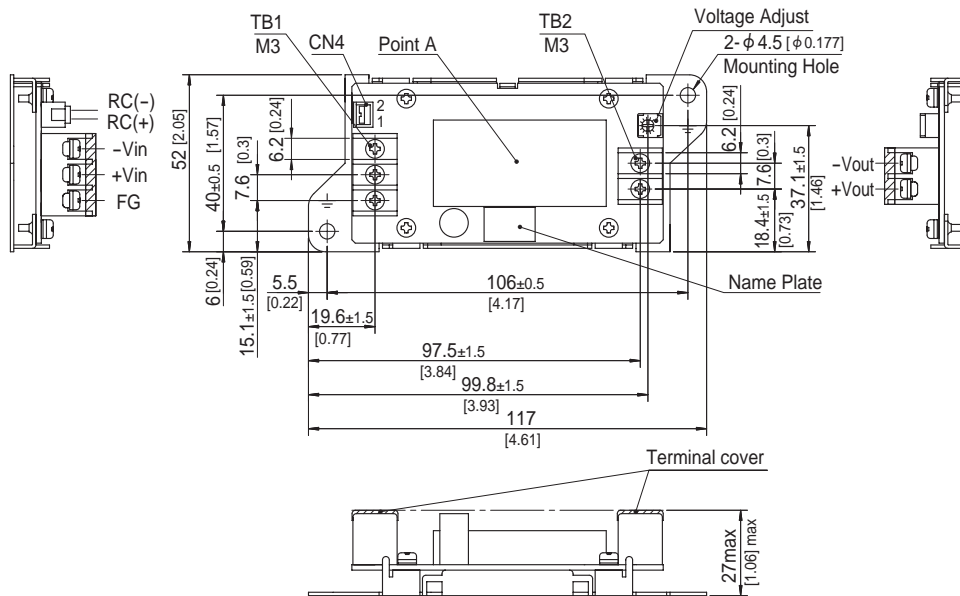
ISOLATION	INPUT · RC-OUTPUT	DC1,500V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
	INPUT · RC-FG	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
	OUTPUT-FG	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-20 to +70°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1 Complies
OTHERS	CASE SIZE/WEIGHT	52x27x117mm [2.05x1.06x4.61 inches] (W×H×D) / 140g max (When the option is set, refer to the page STMG-10)
	COOLING METHOD	Convection/Forced air

- \*1 STMGFW30xx05/STMGFW30xx12/STMGFW30xx15 is available as single output, +10V/+24V/+30V
- \*2 Rated input 12V, 24V or 48V DC Io=100%
- \*3 Measured by 100MHz oscilloscope or Ripple-Noise meter (Equivalent to KIKUSUI-GIKEN : RM103).
- \*4 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.
- \*5 Rated input voltage (DC24V, DC48V), rated output wattage, ambient temperature at 25°C.
- \* Parallel operation with other model is not possible.

### External view

#### Standard type

\* External view of option G, R are the same as standard model.  
External view of other type options, please refer to the page STMG-10.



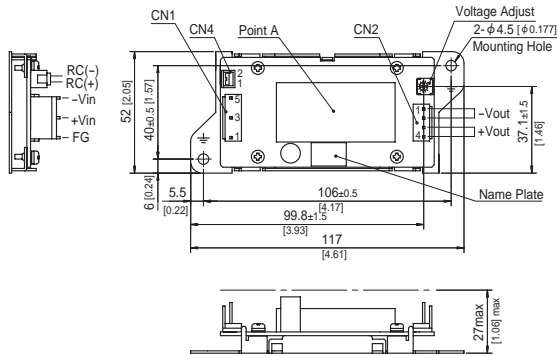
	I/O Connector		Mating Connector	Terminal
Remote ON/OFF	CN4	B2B-XH	XHP-2	Chain : SXH-001T-P0.6 Loose : BXH-001T-P0.6

(Mfr.: J.S.T.)

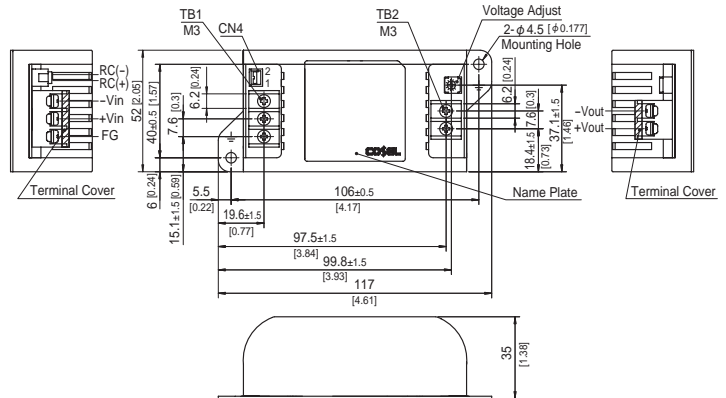
- \* Tolerance ±1
- \* Dimensions in mm, [ ]=inches
- \* Weight : 140g max
- \* PCB material / thickness : FR-4 / 1.6mm
- \* Mounting plate : Iron (surface finishing : nickel plating) t=1.0 [0.04]
- \* Terminal block screw tightening torque M3 : 0.8N · m (8.5kgf · cm) max
- \* CN4 has been installed jumper as factory setting (Except option R).  
When remote ON/OFF is used , please remove the installed jumper.

## External view (Option type)

### Connector type (-J)

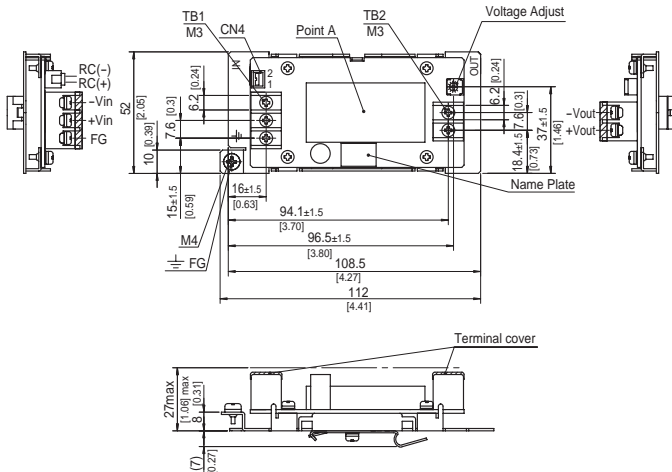


### Case cover type (-N1)

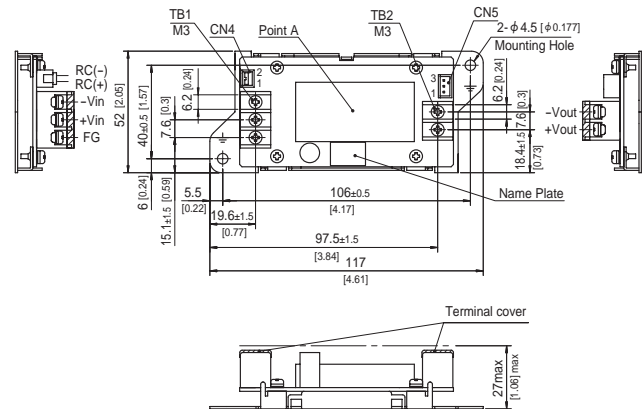


STMG

### DIN rail installation type (-N2)



### External voltage variable volume type (-V)



	I/O Connector		Mating Connector	Terminal
Connector Type Input	CN1	B3P5-VH	VHR-5N	Chain : SVH-21T-P1.1 Loose : BVH-21T-P1.1
Connector Type Output	CN2	B4P-VH	VHR-4N	Chain : SVH-21T-P1.1 Loose : BVH-21T-P1.1
Remote ON/OFF	CN4	B2B-XH	XHP-2	Chain : SXH-001T-P0.6 Loose : BXH-001T-P0.6
External voltage variable volume type	CN5	B3B-XH	XHP-3	Chain : SXH-001T-P0.6 Loose : BXH-001T-P0.6

(Mfr.:J.S.T.)

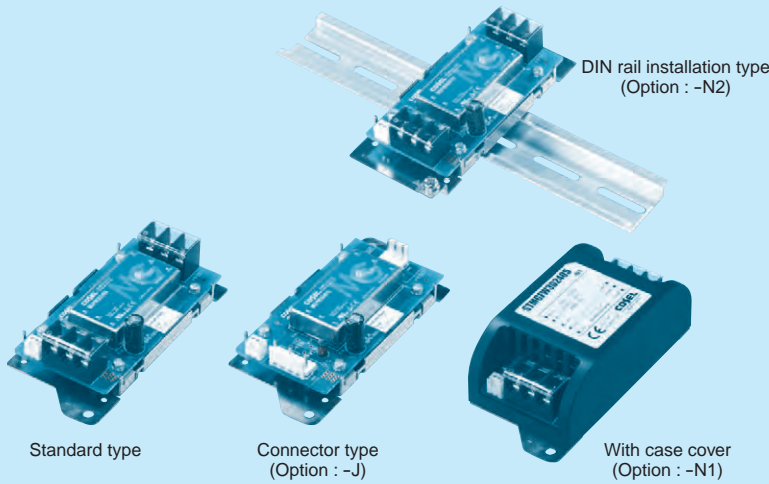
- \* Tolerance ±1
- \* Dimensions in mm, [ ]=inches
- \* Weight : Standard & Connector type 140g max  
Case cover & DIN rail installation type 160g max
- \* PCB material / thickness : FR-4 / 1.6mm
- \* Mounting plate : Iron (surface finishing : nickel plating) t=1.0 [0.04]
- \* Case : PBT
- \* Terminal block screw tightening torque M3 : 0.8N · m (8.5kgf · cm) max
- \* CN4 has been installed jumper as factory setting (Except option R).  
When remote ON/OFF is used, please remove the installed jumper.
- \* Connector Type : Keep drawing current per pin below 5A for CN2.



# STMGF30

STMGF W 30 24 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Dual output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
  - G : Capacitor between Input and Output is removed.
  - R : with Remote ON/OFF (Positive logic control)
  - J : Input/Output Connector
  - N1 : With case cover
  - N2 : With DIN rail installation type
  - N3 : With cover(plastic) and DIN rail installation type

\*When the option is set specifications may vary.

\*Please remove short piece on CN4 to enable remote ON/OFF function.

MODEL	STMGF302405	STMGF302412	STMGF302415	STMGF304805	STMGF304812	STMGF304815
MAX OUTPUT WATTAGE[W]	20	30	30	20	30	30
DC OUTPUT	VOLTAGE[V] *1	±5 or +10	±12 or +24	±15 or +30	±5 or +10	±12 or +24
	CURRENT[A]	2	1.25	1	2	1.25

## SPECIFICATIONS

	MODEL	STMGF302405	STMGF302412	STMGF302415	STMGF304805	STMGF304812	STMGF304815	
INPUT	VOLTAGE[V]	DC9 - 36			DC18 - 76			
	CURRENT[A] *2	0.98typ	1.42typ	1.44typ	0.49typ	0.71typ	0.72typ	
	EFFICIENCY[%] *2	85typ	88typ	87typ	85typ	88typ	87typ	
OUTPUT	VOLTAGE[V]	±5(+10)	±12(+24)	±15(+30)	±5(+10)	±12(+24)	±15(+30)	
	CURRENT[A]	2	1.25	1	2	1.25	1	
	LINE REGULATION[mV]	40max	60max	75max	40max	60max	75max	
	LOAD REGULATION[mV]	*3	500max *5	600max	750max	500max *5	600max	750max
		*4	250max	480max	600max	250max	480max	600max
	RIPPLE[mVp-p] *6	0 to +60°C	100max	100max	100max	100max	100max	100max
		-20 to +60°C	120max	120max	120max	120max	120max	120max
	RIPPLE NOISE[mVp-p] *6	0 to +60°C	150max	150max	150max	150max	150max	150max
		-20 to +60°C	200max	200max	200max	200max	200max	200max
	TEMPERATURE REGULATION[mV]	0 to +60°C	50max	150max	180max	50max	150max	180max
		-20 to +60°C	80max	240max	290max	80max	240max	290max
DRIFT[mV] *7	50max	50max	60max	50max	50max	60max		
START-UP TIME[ms]	30max (Minimum input, Io=100%)							
OUTPUT VOLTAGE SETTING[V]*8	4.93 - 5.24	11.76 - 12.50	14.60 - 15.51	4.93 - 5.24	11.76 - 12.50	14.60 - 15.51		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically						
	OVERVOLTAGE PROTECTION[V]	Works over 120 to 160% of rating (Total of +V and -V)						
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)						
ISOLATION	INPUT · RC-OUTPUT	DC1,500V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)						
	INPUT · RC-FG	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)						
	OUTPUT-FG	DC1,000V 1minute, Cutoff current = 10mA, DC500V 1,000MΩ min (20±15°C)						
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-20 to +70°C, 20 to 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max						
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 to 95%RH (Non condensing), 9,000m (30,000feet) max						
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis						
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis						
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1 Complies						
OTHERS	CASE SIZE/WEIGHT	52 X 27 X 117mm [2.05x1.06x4.61 inches] (W X H X D) / 140g max (When the option is set, refer to the page STMG-11)						
	COOLING METHOD	Convection/Forced air						

\*1 Single output +10V, +24V, +30V with no use of COM.

\*2 Rated input 12V, 24V or 48V DC Io=100%

\*3 Symmetrical loading from 5% to 100%.

\*4 Symmetrical loading from 20% to 100%.

\*5 Refer to the instruction manual 6.

\*6 Measured by 100MHz oscilloscope or Ripple-Noise meter (Equivalent to KIKUSUI-GIKEN : RM103).

\*7 Drift is the DC output accuracy for eight hours period after a half-hour warm-up at 25°C.

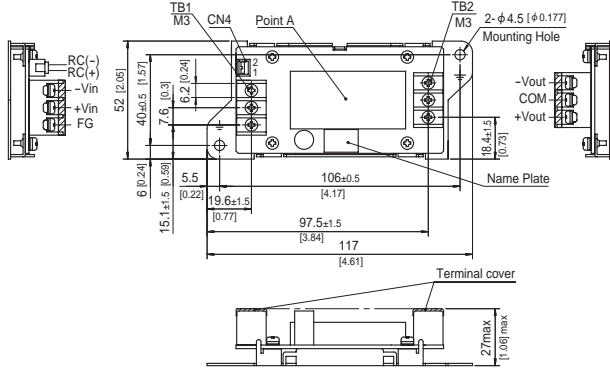
\*8 Rated input voltage (DC24V, DC48V), rated output wattage, ambient temperature at 25°C.

\* Parallel operation with other model is not possible.

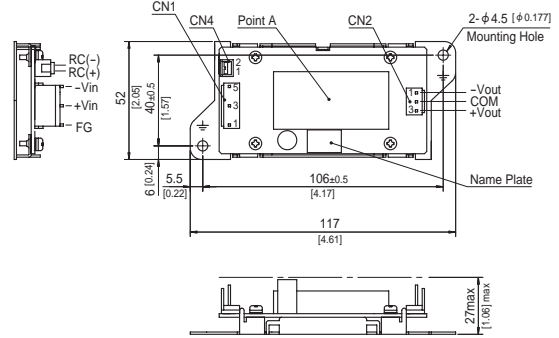
External view

Standard type

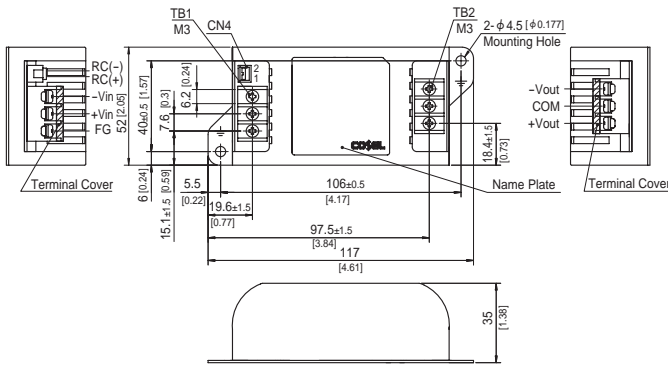
\* External view of option G, R are the same as standard model.



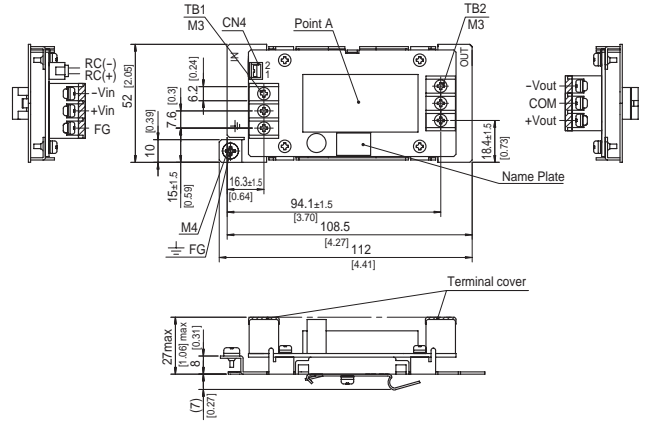
Connector type (-J)



Case cover type (-N1)



DIN rail installation type (-N2)



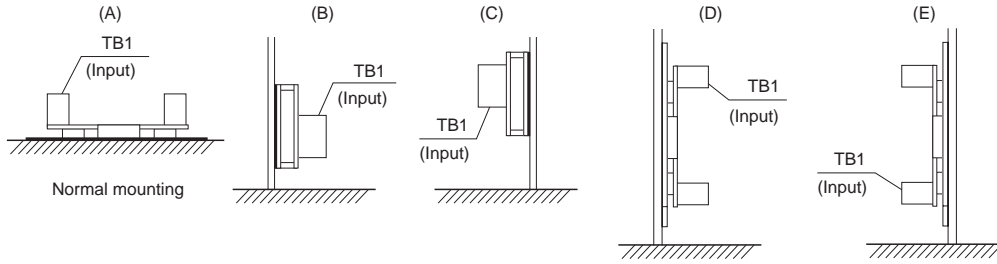
	I/O Connector		Mating Connector	Terminal
Connector Type Input	CN1	B3P5-VH	VHR-5N	Chain : SVH-21T-P1.1 Loose : BVH-21T-P1.1
Connector Type Output	CN2	B3P-VH	VHR-3N	Chain : SVH-21T-P1.1 Loose : BVH-21T-P1.1
Remote ON/OFF	CN4	B2B-XH	XHP-2	Chain : SXH-001T-P0.6 Loose : BXH-001T-P0.6

(Mfr.:J.S.T.)

- \* Tolerance ±1
- \* Dimensions in mm, [ ]=inches
- \* Weight : Standard & Connector type 140g max  
Case cover & DIN rail installation type 160g max
- \* PCB material / thickness : FR-4 / 1.6mm
- \* Mounting plate : Iron (surface finishing : nickel plating) t=1.0 [0.04]
- \* Case : PBT
- \* Terminal block screw tightening torque M3 : 0.8N · m (8.5kgf · cm) max
- \* CN4 has been installed jumper as factory setting (Except option R).  
When remote ON/OFF is used, please remove the installed jumper.
- \* Connector Type : Keep drawing current per pin below 5A for CN2.

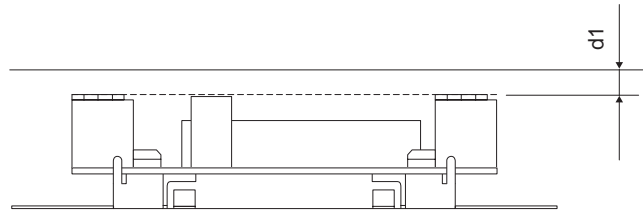
Assembling and Installation Method

Installation



- Derating curve varies depending on the mounting direction. Refer to “Derating”
- Please note that a power supply and chassis will become hot depending on mounting direction or operating condition.

■ In case of metal chassis, keep the distance between  $d_1$  for to insulate between lead of component and metal chassis. If it is less than  $d_1$ , insert the insulation sheet between power supply and metal chassis.



$d_1=4\text{mm min.}$

STMG

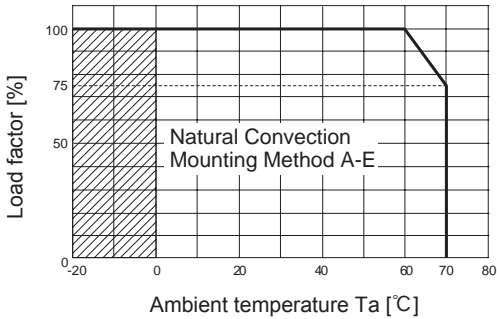
Derating

● STMGFS15/STMGF15 Ambient temperature derating curve

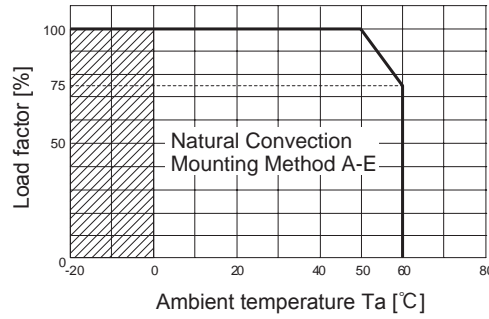
■ Specifications for ripple and ripple noise changes in the shaded area.

■ In the case of Convection Cooling

If you derate the output current, you can use the unit in the temperature range from  $-20\text{C}$  to the maximum temperature shown below.



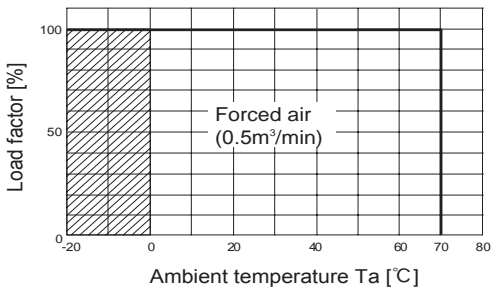
(1) Standard type (No Case cover type)



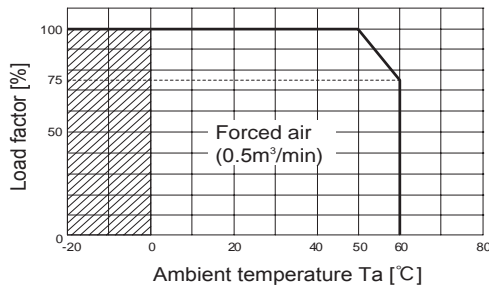
(2) Case cover type

■ In the case of Forced Air Cooling

In case of forced air cooling, please have sufficient ventilation to keep the temperature of point A in Instruction Manual5 at  $105\text{C}$  or below. Please also make sure that the ambient temperature does not exceed the range shown in below.



(1) Standard type (No Case cover type)



(2) Case cover type



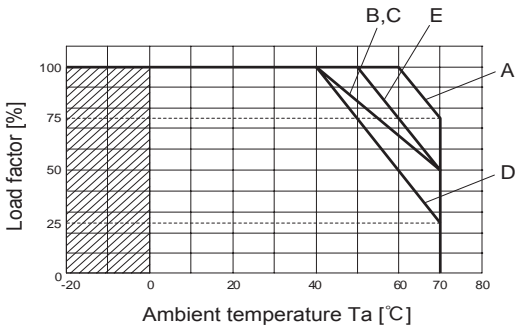
Derating

● STMGFS30/STMGFW30 Ambient temperature derating curve

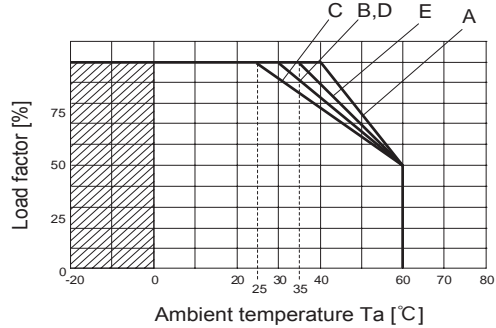
■ Specifications for ripple and ripple noise change in the shaded area.

■ In the case of Convection Cooling

If you derate the output current, you can use the unit in the temperature range from -20°C to the maximum temperature shown below.



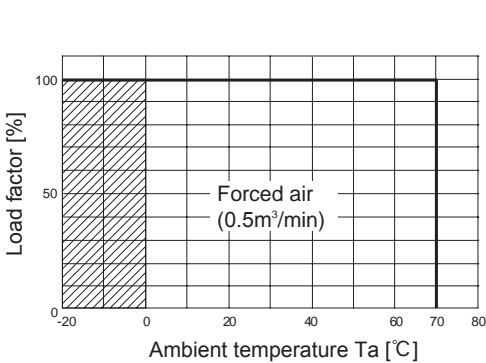
(1) Standard type (No Case cover type)



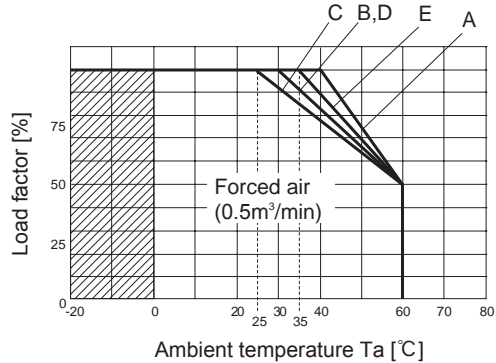
(2) Case cover type

■ In the case of Forced Air Cooling

In case of forced air cooling, please have sufficient ventilation to keep the temperature of point A in Instruction Manual5 at 105°C or below. Please also make sure that the ambient temperature does not exceed the range shown in below.



(1) Standard type (No Case cover type)



(2) Case cover type

STMG

Instruction Manual

◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

- Instruction Manual <https://en.cosel.co.jp/product/powersupply/STMGFS/>
- Instruction Manual <https://en.cosel.co.jp/product/powersupply/STMGFW/>
- Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

STMGFS



STMGFW



NOTICE



Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz] (reference)	Input current [A]	Inrush current protection	PCB/Pattern *3			Series/Parallel operation	
					Material	Single sided	Double sided	Series operation	Parallel operation
STMGF15	Flyback converter	445-495	*1	-	glass fabric base,epoxy resin		○	Yes	*2
STMGF30	Forward converter	380-460	*1	-	glass fabric base,epoxy resin		○	Yes	*2

\*1 Refer to Specification.  
 \*2 Refer to the Instruction Manual.  
 \*3 MG series with the power supply unit, please refer to the basic characteristics of the MG series data.





Low Profile



Safety Approvals



OCP



Remote ON/OFF

# BRNS-series



BRNS

## ■ Feature

- Small size and high efficiency non-isolated DC-DC converter.
- Wide input voltage 3.0V to 14.4V.
- Adjustment of the gain control depending on external capacitor is unnecessary.
- Built-in remote ON/OFF, Power good, Frequency synchronization.
- Built-in overcurrent and thermal protection (auto recovery type) functions.

## ■ CE marking

RoHS Directive

## ■ Safety agency approvals

UL60950-1, C-UL, EN60950-1

## ■ 5-year warranty

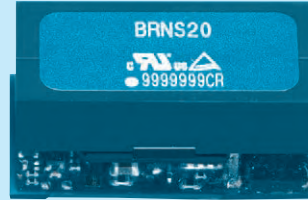
# BRNS

BRN S 20 -□

① ② ③ ④



RoHS



- ① Series name
- ② Single output
- ③ Output current  
6: 6A  
12: 12A  
20: 20A
- ④ Optional  
R : Positive logic remote on/off  
I : No clock output for frequency synchronization  
Y1 : Suitable control for external capacitor over 470 μF

MODEL	BRNS6	BRNS12	BRNS20
MAX OUTPUT CURRENT[A]	6.0	12.0	20.0
DC OUTPUT	0.6 - 5.5		

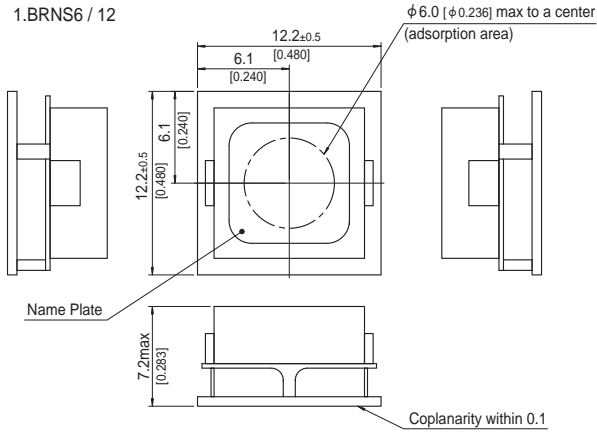
## SPECIFICATIONS

	MODEL	BRNS6	BRNS12	BRNS20
INPUT	VOLTAGE[V]	DC3.0 - 14.4		
	CURRENT[A]	*1 0.70 typ	1.40 typ	2.30 typ
	EFFICIENCY[%]	*1 86 typ	86 typ	87 typ
OUTPUT	VOLTAGE[V]	*2 0.6 - 5.5	0.6 - 5.5	0.6 - 5.5
	CURRENT[A]	6	12	20
	LINE REGULATION1[mV] Vo ≤ 1.8V	10		
	LINE REGULATION2[%Vo] Vo > 1.8V	0.5		
	LOAD REGULATION1[mV] Vo ≤ 1.8V	10		
	LOAD REGULATION2[%Vo] Vo > 1.8V	0.5		
	OUTPUT VOLTAGE SETTING [%Vo]	±1.0		
	RIPPLE[mVp-p]	*3 25		
	RIPPLE NOISE[mVp-p]	*3 50		
	DRIFT[%Vo]	*4 ±0.5		
	START-UP TIME[ms]	4.5 typ		
OUTPUT VOLTAGE ADJUSTMENT RANGE [V]		Adjustable by external resistor		
		0.6 - 5.5		
OUTPUT VOLTAGE REGULATION [%Vo]*5		±3.0		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (auto recovery type)		
	REMOTE SENSING	Available (+S only)		Available
	REMOTE ON/OFF	Available Negative logic L:ON, H:OFF		
ISOLATION	INPUT-OUTPUT	non-isolated		
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20-95%RH (Non condensing) (Refer to "Derating") 3,000m (10,000feet) max		
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20-95%RH (Non condensing), 9,000m (30,000feet) max		
	VIBRATION	10-55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis		
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis		
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL(CSA60950-1), EN60950		
OTHERS	CASE SIZE/WEIGHT	12.2 × 7.2 × 12.2mm [0.48 × 0.28 × 0.48 inches] (W × H × D) / 4g max	20.3 × 8.5 × 11.4mm [0.80 × 0.35 × 0.45 inches] (W × H × D) / 6g max	
	COOLING METHOD	Convection / Forced air		

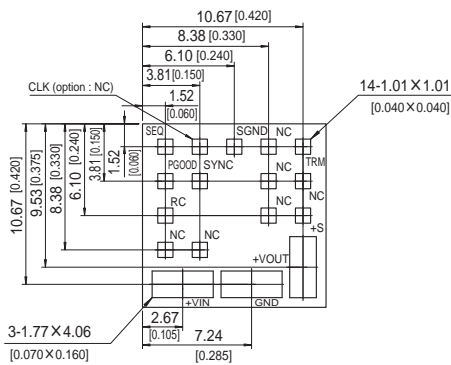
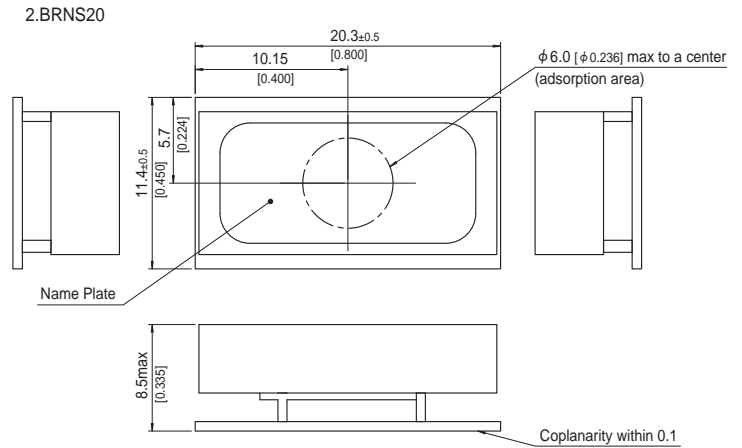
\*1 At rated input (DC12V) and rated output (1.2V) Ta=25°C.  
 \*2 Output voltage is adjusted to the minimum when TRM is opened.  
 \*3 Ripple and ripple noise is measured by using measuring board with ceramic capacitor at 25mm from output pin.  
 At rated input (DC12V) and rated output (1.2V).  
 \*4 Drift is the change in DC output for an eight hour period after a half - hour warm - up at 25°C, with the input voltage held.  
 \*5 Output voltage setting is added line regulation and load regulation and temperature regulation used resistance of the 0.5% tolerance.

External view

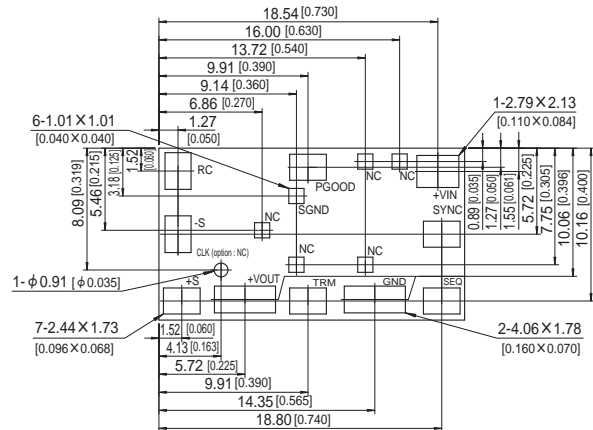
1. BRNS6 / 12



2. BRNS20

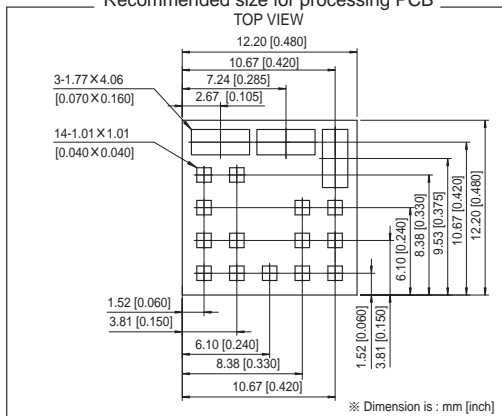


- ※ Tolerance :  $\pm 0.3$
- ※ Dimensions in mm, [ ] = inches
- ※ Weight : 4.0g max
- ※ Terminal material : PCB pattern
- ※ Plating treatment of terminal : Gold flashing

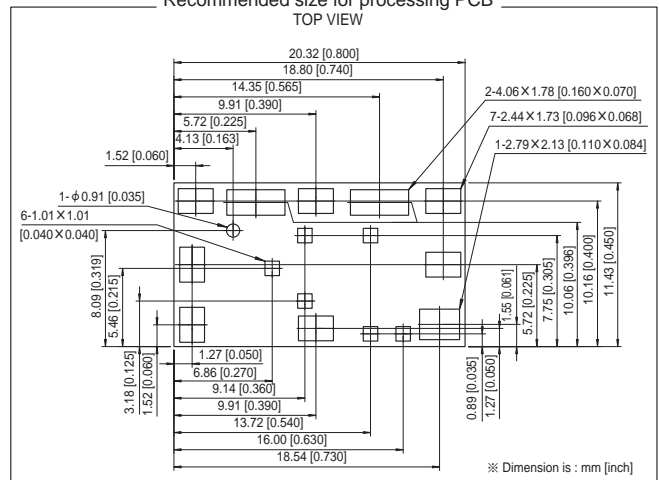


- ※ Tolerance :  $\pm 0.3$
- ※ Dimensions in mm, [ ] = inches
- ※ Weight : 6.0g max
- ※ Terminal material : PCB pattern
- ※ Plating treatment of terminal : Gold flashing

Recommended size for processing PCB

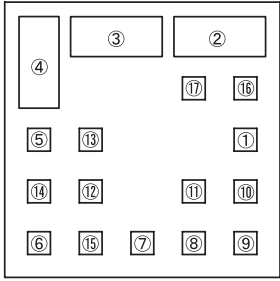


Recommended size for processing PCB



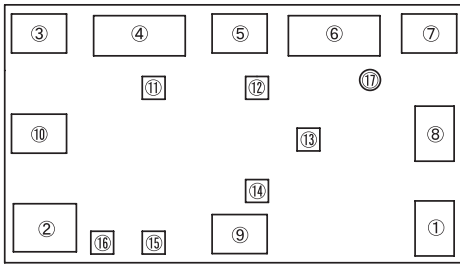
## Pin Configuration

### BRNS6/12



\*BOTTOM VIEW

### BRNS20



\*BOTTOM VIEW

Pin No.		Pin Connection	Function
BRNS 6/12	BRNS 20		
①		RC	Remote ON/OFF
②		+VIN	+DC input
③	④	GND	GND(-DC input, -DC output)
④	⑥	+VOUT	+DC output
⑤	⑦	+S	+Remote sensing
⑥	⑤	TRM	Adjustment of output voltage
⑦	⑭	SGND	Signal GND
⑧	⑰	CLK(NC)	Clock output
⑨	③	SEQ	Control of Start up time and turn
⑩	⑨	PGOOD	Power good
⑪	⑩	SYNC	Input for frequency synchronization
⑫	⑧	-S	NC : BRNS6/12 -Remote sensing : BRNS20
⑬	⑪	NC	NC
⑭	⑬	NC	NC
⑮	⑫	NC	NC
⑯	⑯	NC	NC
⑰	⑮	NC	NC

## Implementation · Mounting Method

### Mounting method

■ The unit can be mounted in any direction. When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation. The temperature around each power supply should not exceed the temperature range shown in "Derating".

### Automatic Mounting

■ To mount BRNS series automatically, use the coil area near the center of the PCB as an adsorption point. Please see the External View for details of the adsorption point.

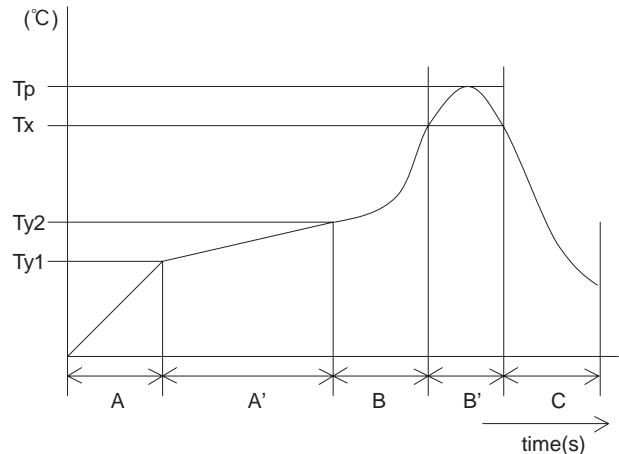
### Soldering

■ Right figure shows condition for reflow of BRNS series. Please make sure that the temperature of board's pattern near by +VOUT and GND terminal.

■ While soldering, having vibration or impact on the unit should be avoided, because of solder melting.

■ Please do not do the implementation except the reflow.

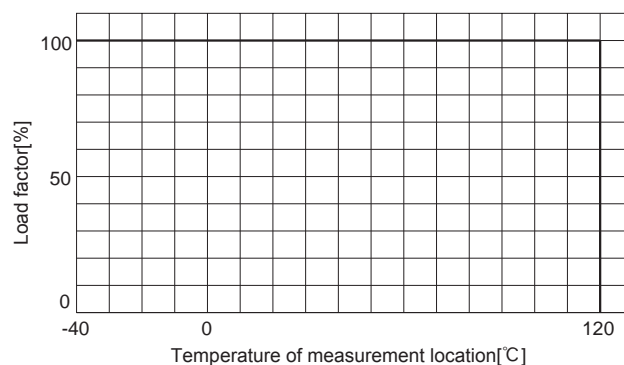
■ Because some parts drops, please do not do reflow of the back side.



A	1.0 - 5.0°C/ s
A'	Ty1 : 160 ± 10°C Ty2 : 180 ± 10°C Ty1 - Ty2 : 120s max
B	1.0 - 5.0°C/ s
B'	Tp : Max245°C 10s max Tx : 220°C or more : 70s max
C	1.0 - 5.0°C/ s

## Derating

- Make sure the temperatures measurement locations shown from Instruction Manual 8 are on or under the derating curve in right figure. Ambient temperature must be kept at 85°C or under.



## Instruction Manual

- It is necessary to read the “Instruction Manual” and “Before using our product” before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/BRNS/>

Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

BRNS



NOTICE



BRNS

## Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz] (reference)	Input current [A]	Inrush current protection	PCB/Pattern			Series/Parallel operation	
					Material	Single sided	Double sided	Series operation	Parallel operation
BRNS6	Buck Converter	600	* 1	-	glass fabric base,epoxy resin	-	Multilayer	-	-
BRNS12	Buck Converter	600	* 1	-	glass fabric base,epoxy resin	-	Multilayer	-	-
BRNS20	Buck Converter	600	* 1	-	glass fabric base,epoxy resin	-	Multilayer	-	-

\*1 Refer to Specification.







Low Profile



Safety Approvals

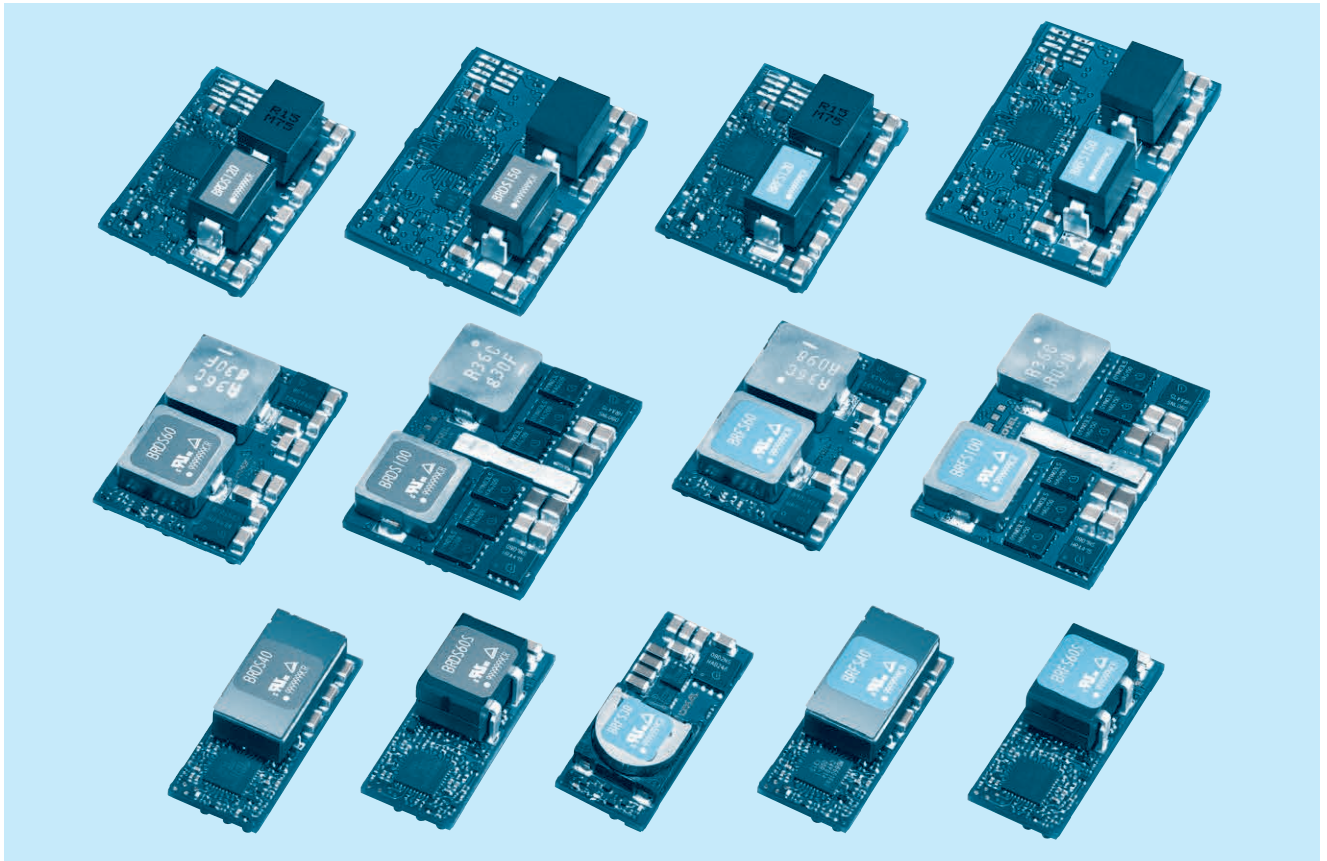


OCP



Remote ON/OFF

# BRFS/BRDS-series



BRFS/BRDS

## Feature

- Small size and high efficiency non-isolated DC-DC converter.
- Wide input voltage 4.5V to 14.0V.
- Fast transient response by Robust control.
- Built-in remote ON/OFF, Power good, Start-up sequence.
- Built-in overcurrent and thermal protection (auto recovery type) functions.
- PMBus interface for programming, margining, and telemetry (BRDS-series).

## CE marking

- Low Voltage Directive
- RoHS Directive

## Safety agency approvals

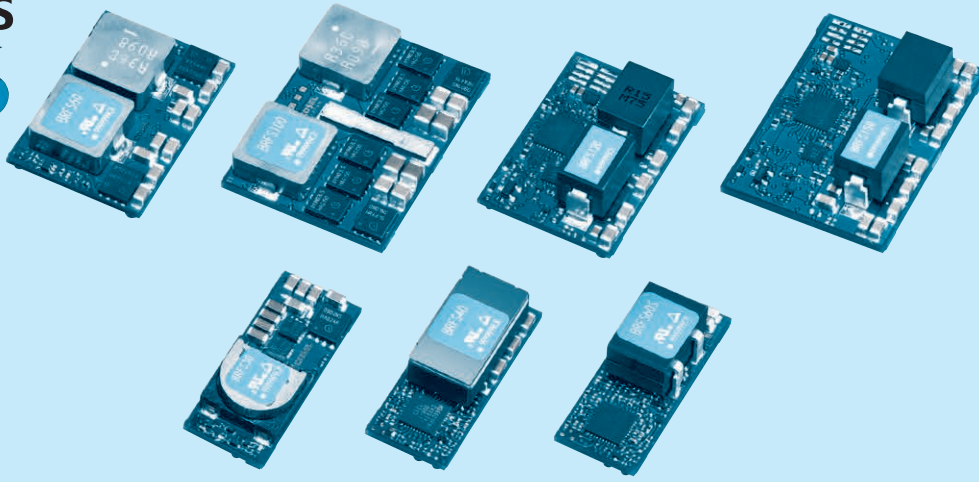
- UL60950-1, C-UL, EN60950-1

## 5-year warranty

# BRFS

BRF S 60 S -□

① ② ③ ④ ⑤



- ① Series name
- ② Single output
- ③ Output current  
30:30A  
40:40A  
60:60A  
100:100A  
120:120A  
150:150A
- ④ Type  
Blank : Standard type  
S : Small type (only 60A)
- ⑤ Optional  
R : Positive logic remote on/off  
I : POWERGOOD (only BRFS30/40/60S)  
\*Other models has POWERGOOD function normally.  
P : Parallel operation (only BRFS40/60S)  
Y1 : Fast transient response (only BRFS100)  
L : High thermal dissipation (BRFS120 and BRFS150)

MODEL	BRFS30	BRFS40	BRFS60	BRFS60S	BRFS100	BRFS120	BRFS150
MAX OUTPUT CURRENT[A]	30.0	40.0	60.0	60.0	100.0	120.0	150.0
DC OUTPUT	0.8 - 3.63V	0.6 - 2.0V	0.7 - 2.0V	0.6 - 2.0V	0.7 - 2.0V	0.6 - 1.8V	0.6 - 1.8V *7

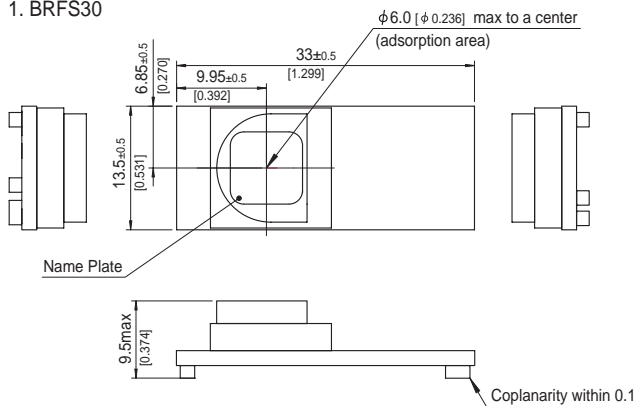
## SPECIFICATIONS

	MODEL	BRFS30	BRFS40	BRFS60	BRFS60S	BRFS100	BRFS120	BRFS150	
INPUT	VOLTAGE[V]	DC4.5 - 14.0							
	CURRENT[A]	*1 3.41 typ	4.52 typ	6.82 typ	6.71 typ	11.24 typ	13.50 typ	16.90 typ	
	EFFICIENCY[%]	*1 88.0 typ	88.5 typ	88.0 typ	89.5 typ	89.0 typ	89.0 typ	89.0 typ	
OUTPUT	VOLTAGE[V]	*2 0.8 - 3.63	0.6 - 2.0	0.7 - 2.0	0.6 - 2.0	0.7 - 2.0	0.6 - 1.8	0.6 - 1.8 *7	
	CURRENT[A]	30	40	60	60	100	120	150	
	LINE REGULATION[mV]	5							
	LOAD REGULATION[mV]	5							
	RIPPLE[mVp-p]	*3 25							
	RIPPLE NOISE[mVp-p]	*3 50							
	OUTPUT VOLTAGE SETTING [%Vo]	±1							
	DRIFT[mV]	*4 5							
	START-UP TIME[ms]	8.0 typ			12.0 typ *6		8.0 typ	12.0 typ *6	
	OUTPUT VOLTAGE ADJUSTMENT RANGE [V]	Adjustable by external resistor							
	0.8 - 3.63	0.6 - 2.0	0.7 - 2.0	0.6 - 2.0	0.7 - 2.0	0.6 - 1.8	0.6 - 1.8 *7		
OUTPUT VOLTAGE TOTAL REGULATION [%Vo]*5	±3								
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (auto recovery type)							
	REMOTE SENSING	Available (+S only)		Available	Available (+S only)	Available			
	REMOTE ON/OFF	Available Negative logic L:ON, H:OFF							
ISOLATION	INPUT-OUTPUT	non-isolated							
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20-95%RH (Non condensing) (Refer to "Derating") 3,000m (10,000feet) max							
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20-95%RH (Non condensing), 9,000m (30,000feet) max							
	VIBRATION	10-55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis							
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis							
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1							
OTHERS	CASE SIZE/WEIGHT	33.0X9.5X13.5mm [1.3X0.37X0.53 inches] (WXHXD) / 10g max	33.0X10.9X13.5mm [1.3X0.43X0.53 inches] (WXHXD) / 12g max	33.0X8.0X22.9mm [1.3X0.31X0.9 inches] (WXHXD) / 15g max	33.0X12.7X13.5mm [1.3X0.5X0.53 inches] (WXHXD) / 12g max	38.0X8.5X27.7mm [1.5X0.33X1.09 inches] (WXHXD) / 22g max	33.0X12.7X22.9mm [1.3X0.5X0.9 inches] (WXHXD) / 14g max	38.0X13.8X27.7mm [1.5X0.54X1.09 inches] (WXHXD) / 21g max	
	COOLING METHOD	Convection / Forced air							

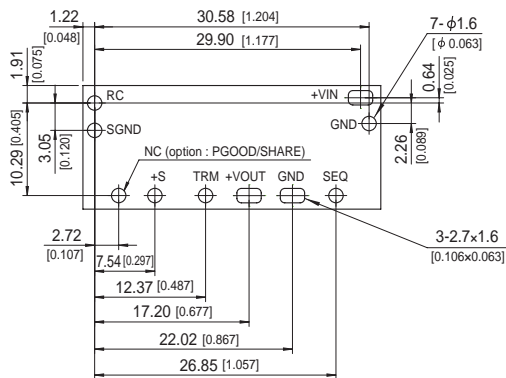
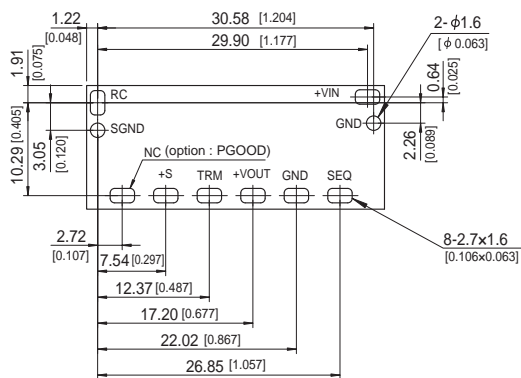
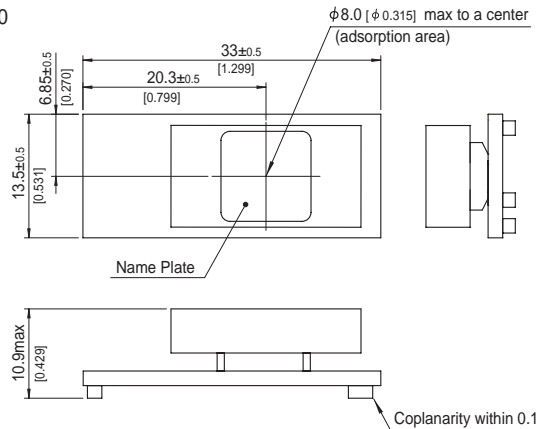
\*1 At rated input (DC12V) and rated output (1.2V) Ta=25°C.  
 \*2 Output voltage is adjusted to the minimum when TRM is opened.  
 \*3 Ripple and ripple noise is measured by using measuring board with ceramic capacitor at 50mm from output pin.  
 \*4 Drift is the change in DC output for an eight hour period after a half - hour warm - up at 25°C, with the input voltage held.  
 \*5 Output voltage setting is added line regulation and load regulation and temperature regulation used resistance of the 0.5% tolerance.  
 \*6 The start-up time when using the RC terminal is same as other BRFS.  
 \*7 The output voltage adjustment area determines by the input voltage.

External view

1. BRFS30

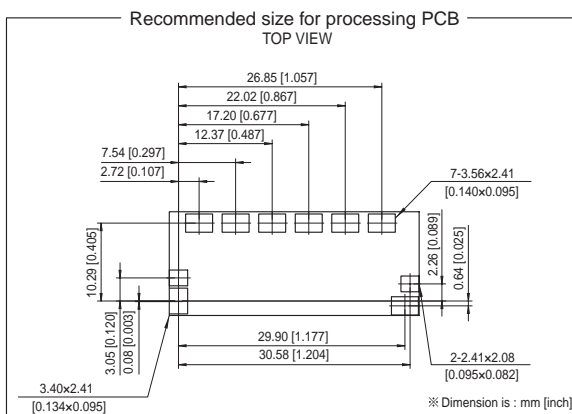


2. BRFS40



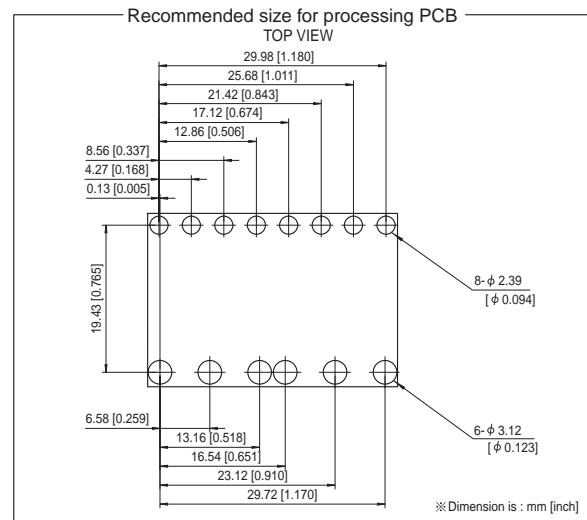
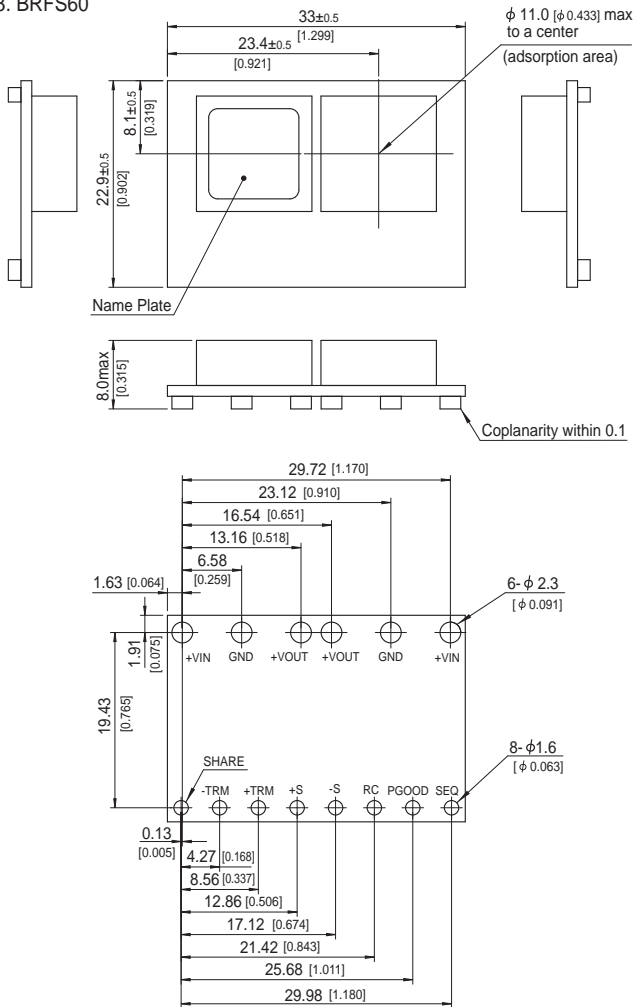
- ※ Tolerance : ±0.3 [±0.012]
- ※ Dimensions in mm, [ ]=inches
- ※ Weight : 10g max
- ※ Terminal material : copper
- ※ Plating treatment of terminal : Lead free plating

- ※ Tolerance : ±0.3 [±0.012]
- ※ Dimensions in mm, [ ]=inches
- ※ Weight : 12g max
- ※ Terminal material : copper
- ※ Plating treatment of terminal : Lead free plating



External view

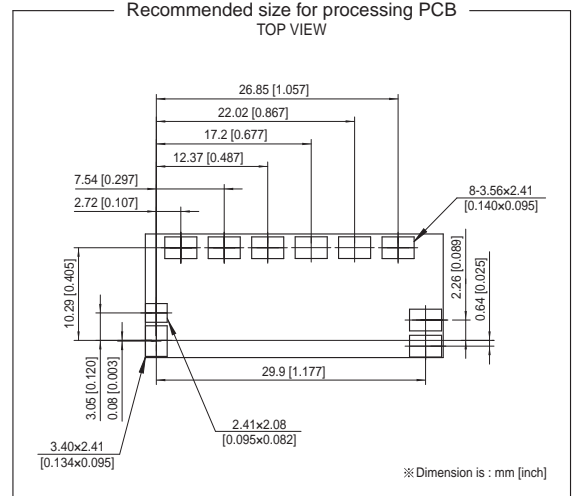
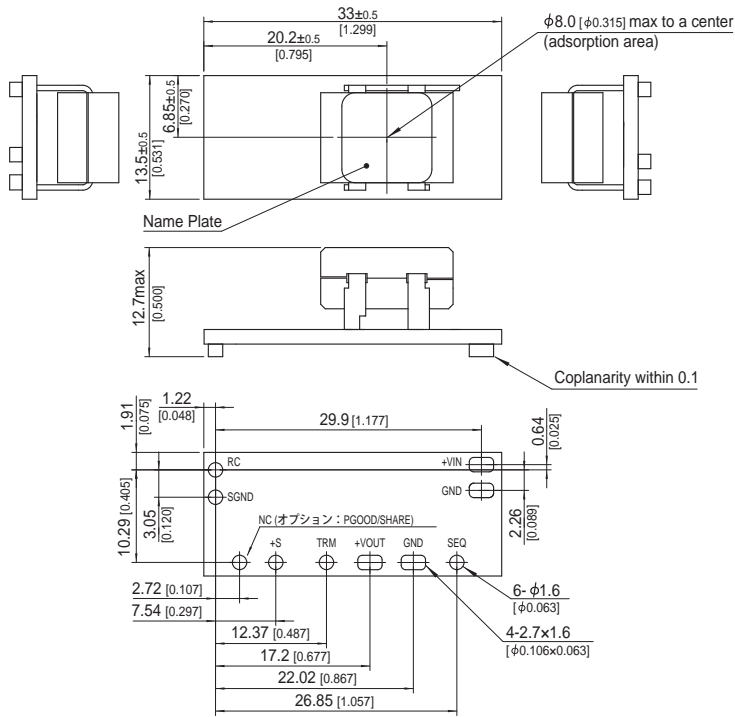
3. BRFS60



- ※ Tolerance :  $\pm 0.3$  [ $\pm 0.012$ ]
- ※ Dimensions in mm, [ ]=inches
- ※ Weight : 15g max
- ※ Terminal material : copper
- ※ Plating treatment of terminal : Lead free plating

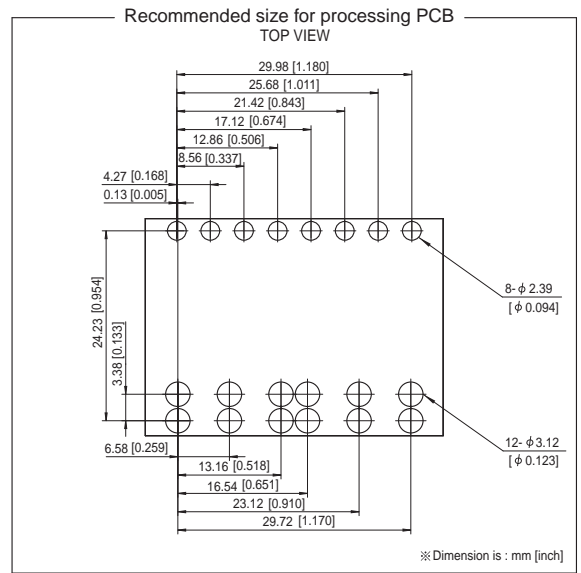
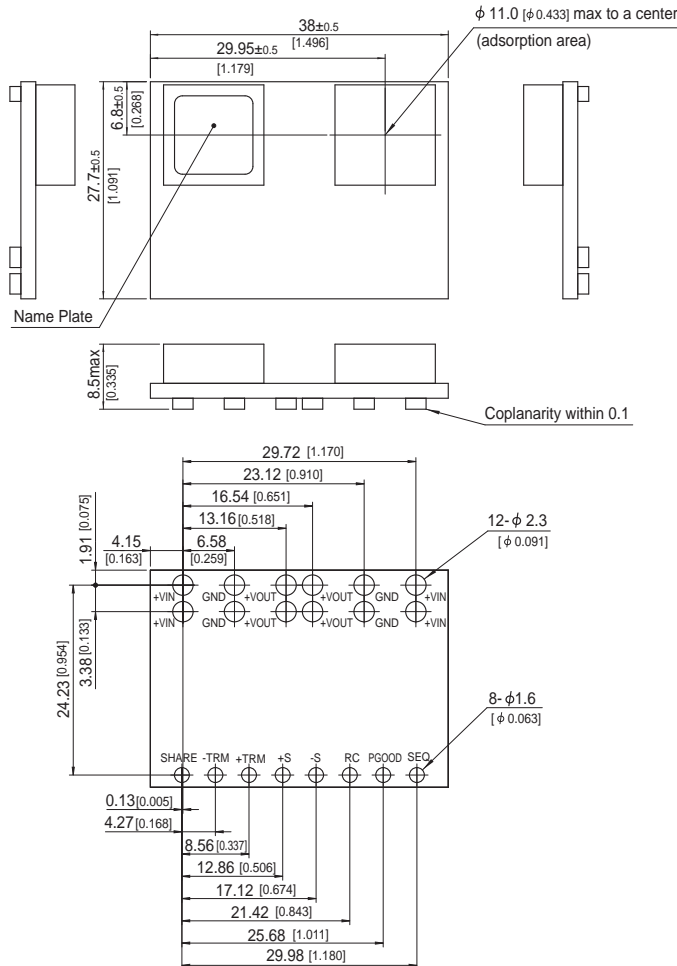
External view

4. BRFS60S



- ※ Tolerance :  $\pm 0.3$  [ $\pm 0.012$ ]
- ※ Dimensions in mm, [ ]=inches
- ※ Weight : 12g max
- ※ Terminal material : copper
- ※ Plating treatment of terminal : Lead free plating

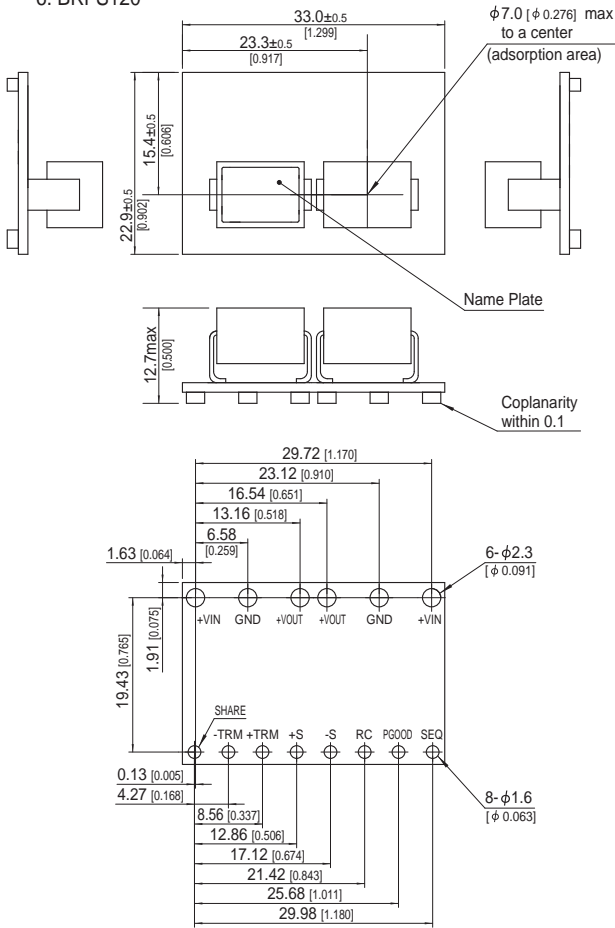
5. BRFS100



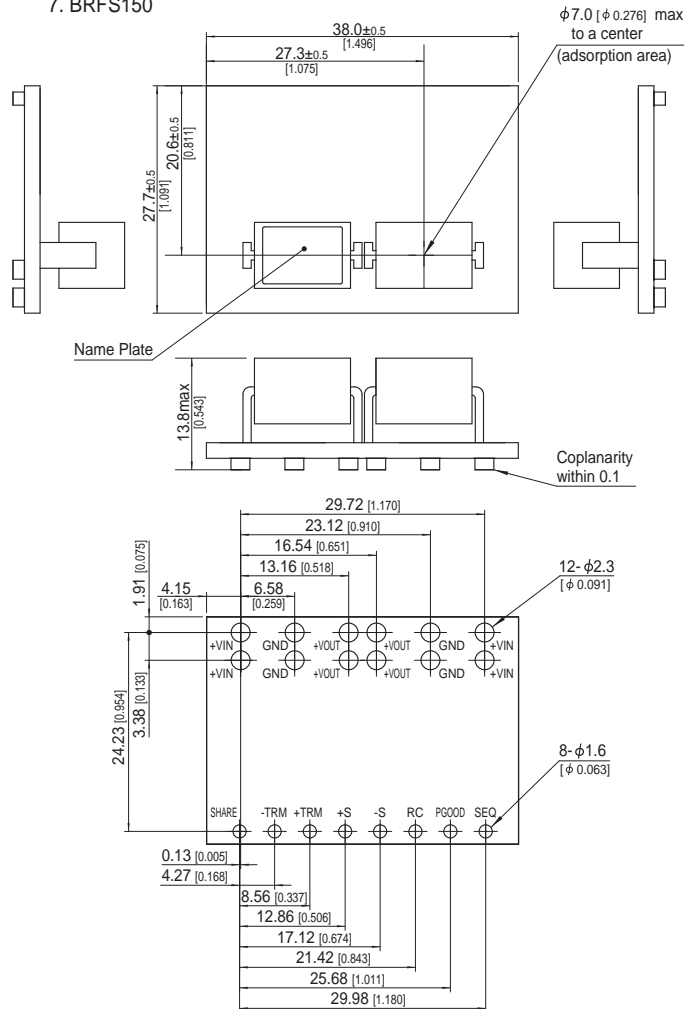
- ※ Tolerance :  $\pm 0.3$  [ $\pm 0.012$ ]
- ※ Dimensions in mm, [ ]=inches
- ※ Weight : 22g max
- ※ Terminal material : copper
- ※ Plating treatment of terminal : Lead free plating

External view

6. BRFS120

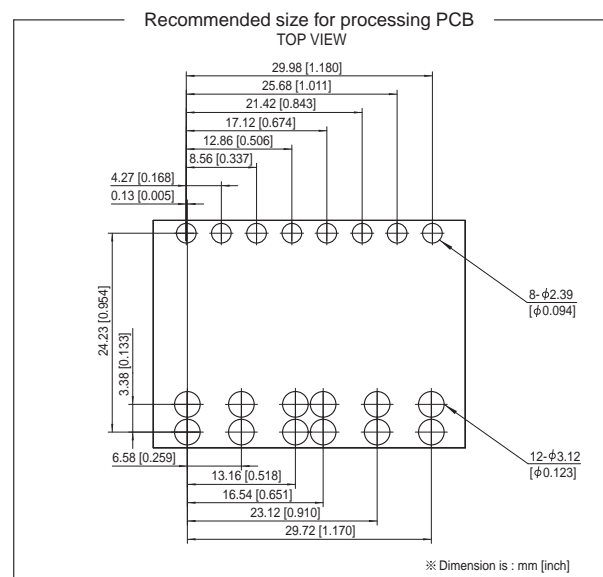
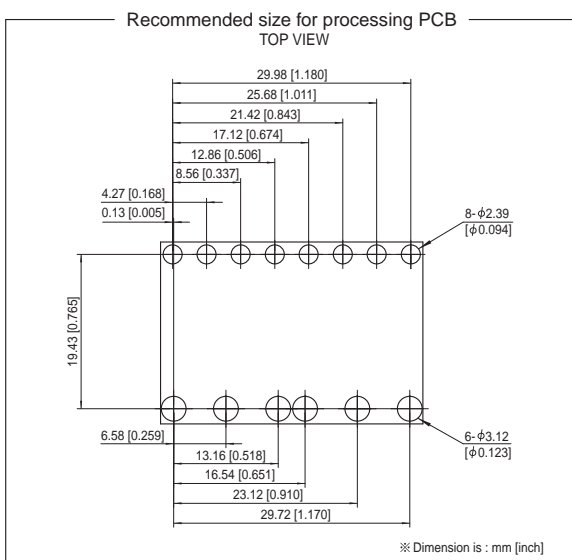


7. BRFS150



- ※ Tolerance :  $\pm 0.3$  [ $\pm 0.012$ ]
- ※ Dimensions in mm, [ ]=inches
- ※ Weight : 14g max
- ※ Terminal material : copper
- ※ Plating treatment of terminal : Lead free plating

- ※ Tolerance :  $\pm 0.3$  [ $\pm 0.012$ ]
- ※ Dimensions in mm, [ ]=inches
- ※ Weight : 21g max
- ※ Terminal material : copper
- ※ Plating treatment of terminal : Lead free plating

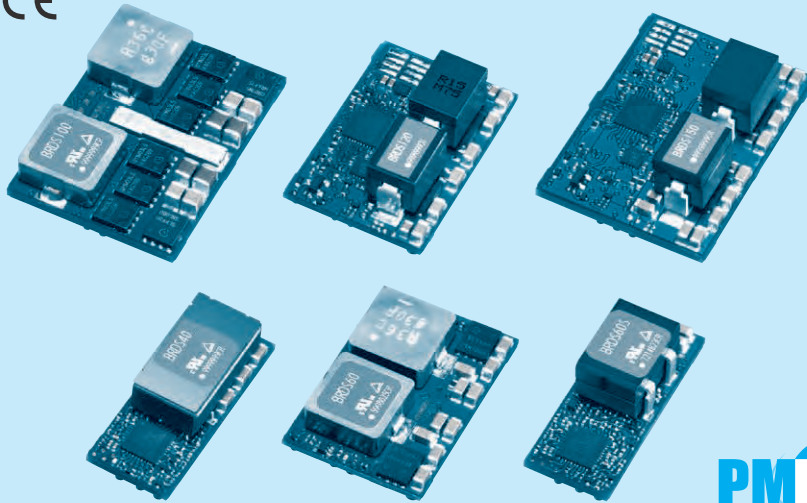




# BRDS

BRD S 100  -

① ② ③ ④ ⑤



- ① Series name
- ② Single output
- ③ Output current  
40:40A  
60:60A  
100:100A  
120:120A  
150:150A
- ④ Type  
Blank: Standard type  
S: Small type (Only 60A)
- ⑤ Optional  
R: Positive logic remote on/off  
L: High thermal dissipation (BRDS120 and BRDS150)

MODEL	BRDS40	BRDS60	BRDS60S	BRDS100	BRDS120	BRDS150
MAX OUTPUT CURRENT[A]	40.0	60.0	60.0	100.0	120.0	150.0
DC OUTPUT	0.6 - 2.0V	0.7 - 2.0V	0.6 - 2.0V	0.7 - 2.0V	0.6 - 1.8V	0.6 - 1.8V *6

## SPECIFICATIONS

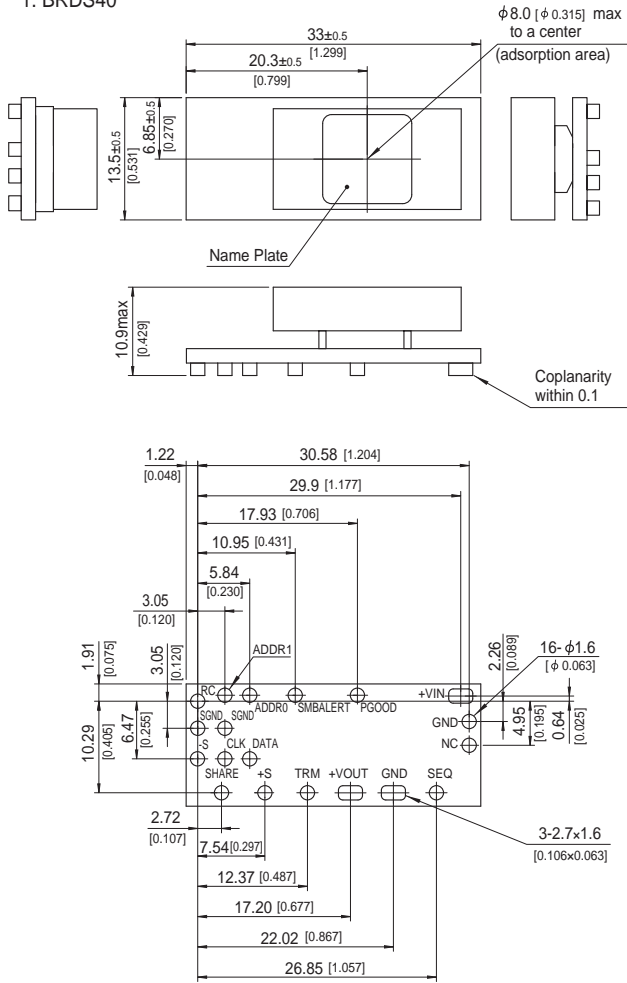
	MODEL	BRDS40	BRDS60	BRDS60S	BRDS100	BRDS120	BRDS150
INPUT	VOLTAGE[V]	DC4.5 - 14.0					
	CURRENT[A]	*1 4.52 typ	6.82 typ	6.71 typ	11.24 typ	13.50 typ	16.90 typ
	EFFICIENCY[%]	*1 88.5 typ	88.0 typ	89.5 typ	89.0 typ	89.0 typ	89.0 typ
OUTPUT	VOLTAGE[V]	*2 0.6 - 2.0	0.7 - 2.0	0.6 - 2.0	0.7 - 2.0	0.6 - 1.8	0.6 - 1.8 *6
	CURRENT[A]	40	60	60	100	120	150
	LINE REGULATION[mV]	5					
	LOAD REGULATION[mV]	5					
	RIPPLE[mVp-p]	*3 25					
	RIPPLE NOISE[mVp-p]	*3 50					
	OUTPUT VOLTAGE SETTING [%Vo]	±1					
	DRIFT[mV]	*4 5					
	START-UP TIME[ms]	12.0 typ					
	OUTPUT VOLTAGE ADJUSTMENT RANGE [V]	Adjustable by external resistor					
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (auto recovery type)					
	REMOTE SENSING	Available					
ISOLATION	REMOTE ON/OFF	Available Negative logic L:ON, H:OFF					
	INPUT-OUTPUT	non-isolated					
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20-95%RH (Non condensing) (Refer to "Derating") 3,000m (10,000feet) max					
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20-95%RH (Non condensing), 9,000m (30,000feet) max					
	VIBRATION	10-55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis					
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis					
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1					
OTHERS	CASE SIZE/WEIGHT	33.0×10.9×13.5mm [1.3×0.43×0.53 inches] (W×H×D) / 12g max	33.0×8.0×22.9mm [1.3×0.31×0.9 inches] (W×H×D) / 15g max	33.0×12.7×13.5mm [1.3×0.5×0.53 inches] (W×H×D) / 12g max	38.0×8.5×27.7mm [1.5×0.33×1.09 inches] (W×H×D) / 22g max	33.0×12.7×22.9mm [1.3×0.5×0.9 inches] (W×H×D) / 14g max	38.0×13.8×27.7mm [1.5×0.54×1.09 inches] (W×H×D) / 21g max
	COOLING METHOD	Convection / Forced air					

\*1 At rated input (DC12V) and rated output (1.2V) Ta=25°C.  
 \*2 Output voltage is adjusted to the minimum when TRM is opened.  
 \*3 Ripple and ripple noise is measured by using measuring board with ceramic capacitor at 50mm from output pin.  
 \*4 Drift is the change in DC output for an eight hour period after a half - hour warm - up at 25°C, with the input voltage held.  
 \*5 Output voltage setting is added line regulation and load regulation and temperature regulation used resistance of the 0.5% tolerance.  
 \*6 The output voltage adjustment area determines by the input voltage.  
 \* This product is subject to a license from PAI Capital LLC related to digital power technology patents owned by PAI Capital LLC.



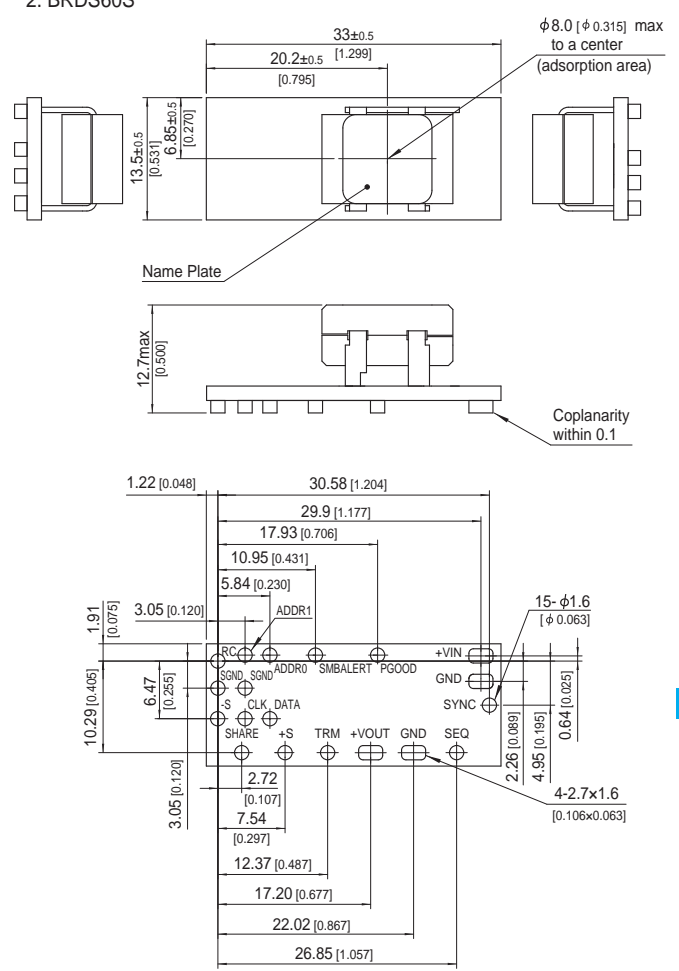
External view

1. BRDS40

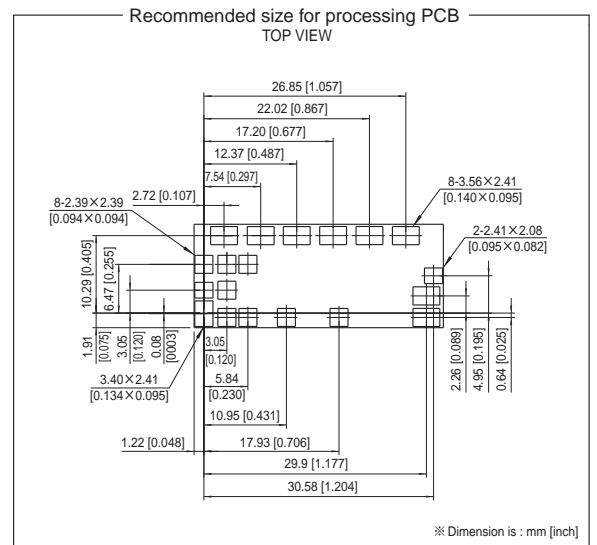
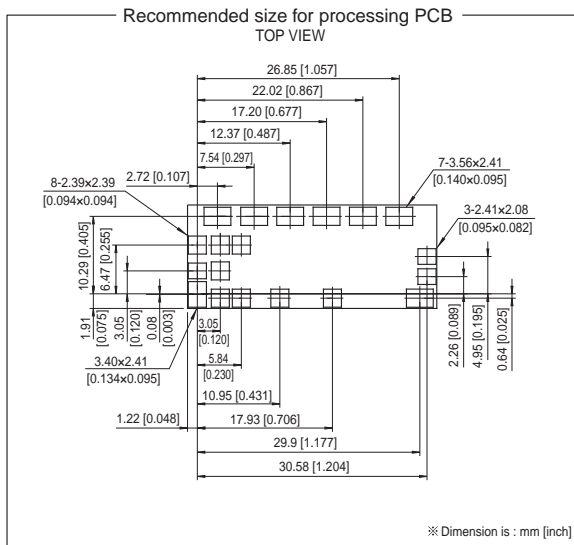


- ※ Tolerance :  $\pm 0.3$  [ $\pm 0.012$ ]
- ※ Dimensions in mm, [ ] =inches
- ※ Weight : 12g max
- ※ Terminal material : copper
- ※ Plating treatment of terminal : Lead free plating

2. BRDS60S

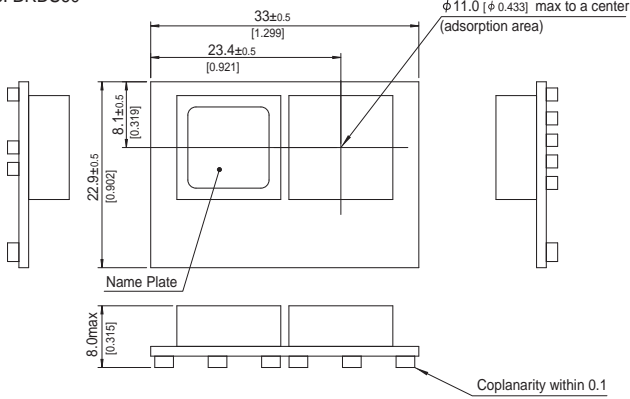


- ※ Tolerance :  $\pm 0.3$  [ $\pm 0.012$ ]
- ※ Dimensions in mm, [ ] =inches
- ※ Weight : 12g max
- ※ Terminal material : copper
- ※ Plating treatment of terminal : Lead free plating

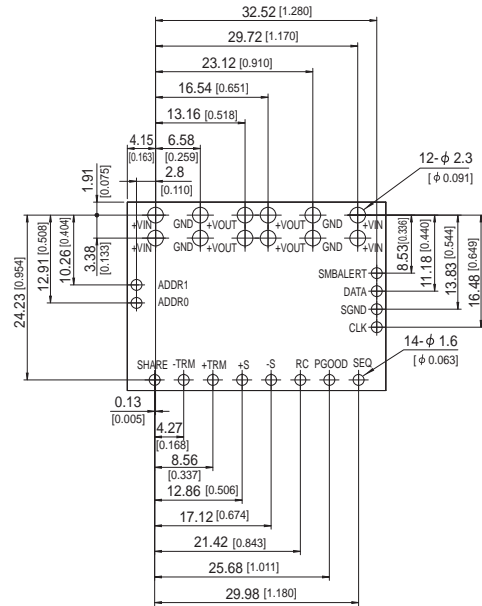
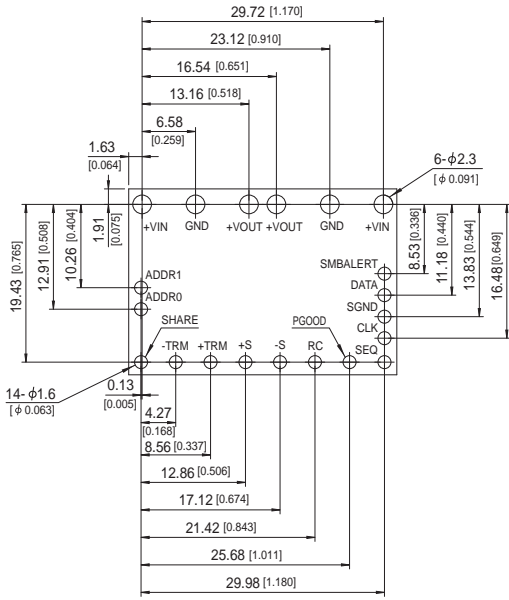
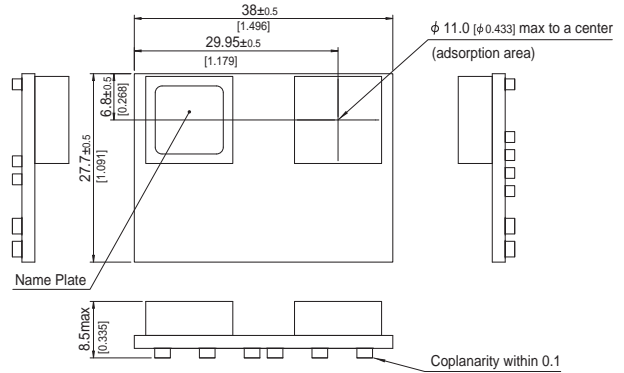


External view

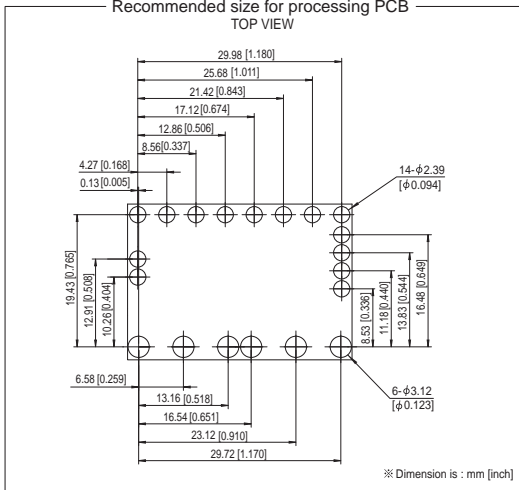
3. BRDS60



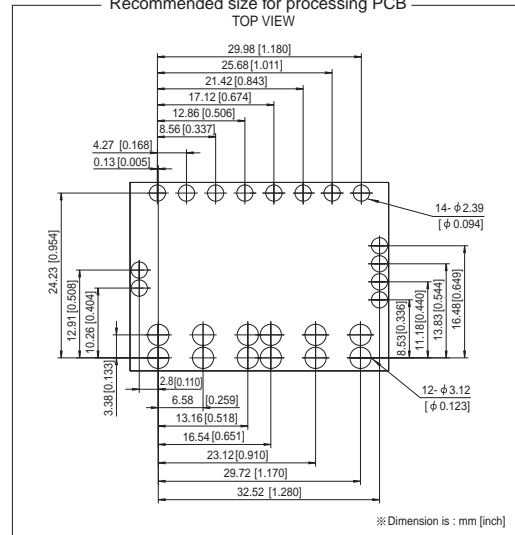
4. BRDS100



Recommended size for processing PCB TOP VIEW



Recommended size for processing PCB TOP VIEW

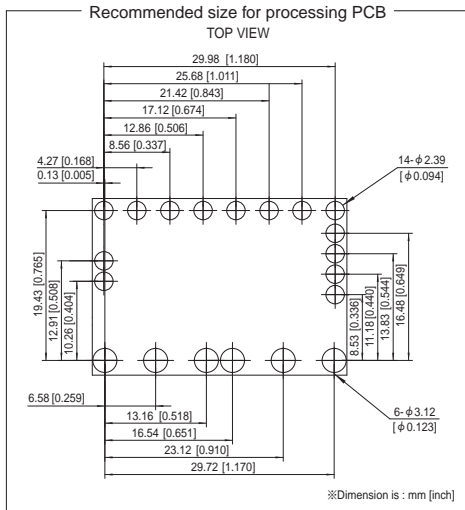
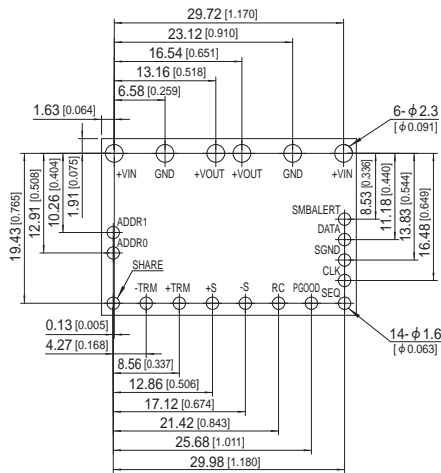
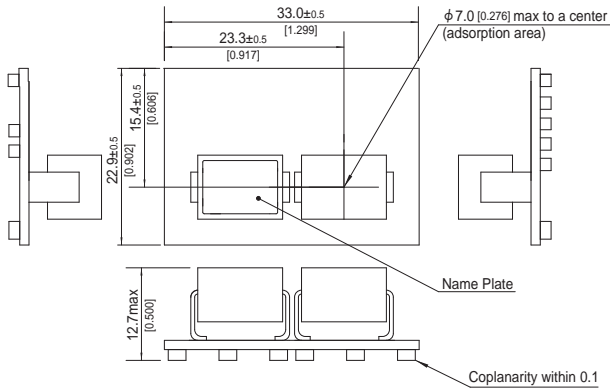


- ※ Tolerance : ±0.3 [±0.012]
- ※ Dimensions in mm, [ ]=inches
- ※ Weight : 15g max
- ※ Terminal material : copper
- ※ Plating treatment of terminal : Lead free plating

- ※ Tolerance : ±0.3 [±0.012]
- ※ Dimensions in mm, [ ]=inches
- ※ Weight : 22g max
- ※ Terminal material : copper
- ※ Plating treatment of terminal : Lead free plating

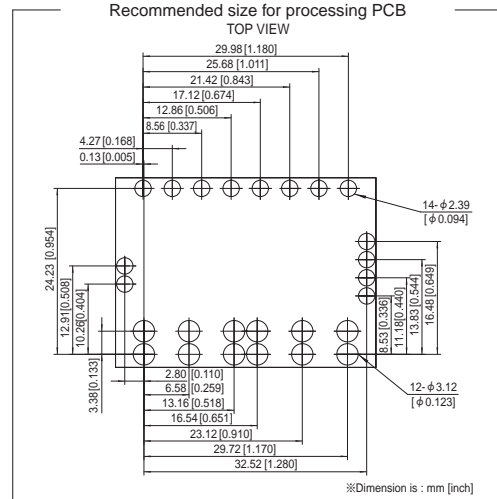
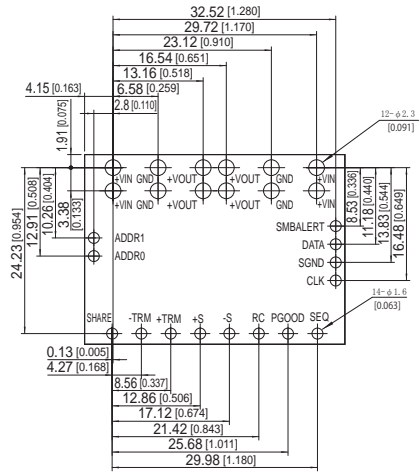
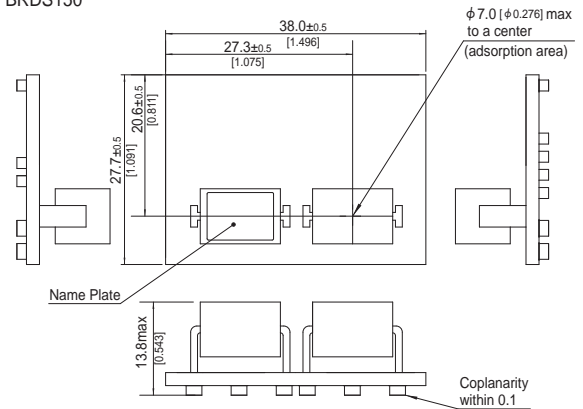
External view

5. BRDS120



- ※ Tolerance : ±0.3 [±0.012]
- ※ Dimensions in mm, [ ] =inches
- ※ Weight : 14g max
- ※ Terminal material : copper
- ※ Plating treatment of terminal : Lead free plating

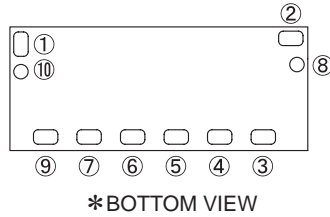
6. BRDS150



- ※ Tolerance : ±0.3 [±0.012]
- ※ Dimensions in mm, [ ] =inches
- ※ Weight : 21g max
- ※ Terminal material : copper
- ※ Plating treatment of terminal : Lead free plating

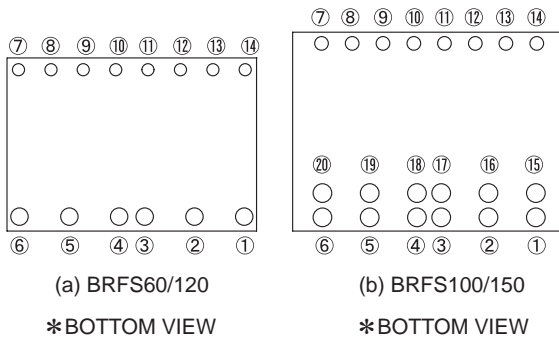
## Pin Connection

### ●BRFS30/40/60S



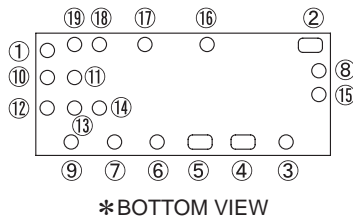
Pin No.	Pin Connection	Function
①	RC	Remote ON/OFF
②	+VIN	+DC input
③	SEQ	Control of Start up time and turn
④	GND	GND (-DC input, -DC output)
⑤	+VOUT	+DC output
⑥	TRM	Adjustment of output voltage
⑦	+S	+Remote sensing
⑧	GND	GND (-DC input, -DC output)
⑨	NC(PGOOD/SHARE)	NC (optional : Power good, SHARE (BRFS40/60S))
⑩	SGND	Signal GND

### ●BRFS60/100/120/150



Pin No.	Pin Connection	Function
① (15)	+VIN	+DC input
② (16)	GND	GND (-DC input, -DC output)
③ (17)	+VOUT	+DC output
④ (18)	+VOUT	+DC output
⑤ (19)	GND	GND (-DC input, -DC output)
⑥ (20)	+VIN	+DC input
⑦	SEQ	Control of Start up time and turn
⑧	PGOOD	Power good
⑨	RC	Remote ON/OFF
⑩	-S	-Remote sensing
⑪	+S	+Remote sensing
⑫	+TRM	+Adjustment of output voltage
⑬	-TRM	-Adjustment of output voltage
⑭	SHARE	Parallel operation

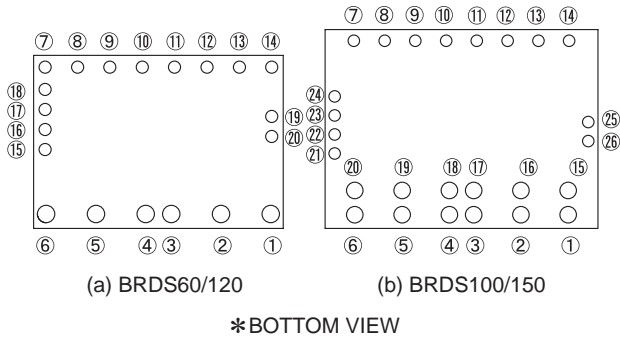
### ●BRDS40/60S



Pin No.	Pin Connection	Function
①	RC	Remote ON/OFF
②	+VIN	+DC input
③	SEQ	Control of Start up time and turn
④	GND	GND (-DC input, -DC output)
⑤	+VOUT	+DC output
⑥	TRM	Adjustment of output voltage
⑦	+S	+Remote sensing
⑧	GND	GND (-DC input, -DC output)
⑨	SHARE	Parallel operation
⑩	SGND	Signal GND
⑪	SGND	Signal GND
⑫	-S	-Remote sensing
⑬	CLK	PMBus communication clock input
⑭	DATA	PMBus communication data input & output
⑮	NC/SYNC	NC/Switching frequency synchronization (BRDS40/60S)
⑯	PGOOD	Power good
⑰	SMBALERT	PMBus alarm output
⑱	ADDR0	Address setting
⑲	ADDR1	Address setting

Pin Configuration

●BRDS60/100/120/150



Pin No.		Pin Connection	Function
BRDS60 /120	BRDS100 /150		
①	① ⑮	+VIN	+DC input
②	② ⑯	GND	GND (-DC input, -DC output)
③	③ ⑰	+VOUT	+DC output
④	④ ⑱	+VOUT	+DC output
⑤	⑤ ⑲	GND	GND (-DC input, -DC output)
⑥	⑥ ⑳	+VIN	+DC input
⑦	⑦	SEQ	Control of Start up time and turn
⑧	⑧	PGOOD	Power good
⑨	⑨	RC	Remote ON/OFF
⑩	⑩	-S	-Remote sensing
⑪	⑪	+S	+Remote sensing
⑫	⑫	+TRM	+Adjustment of output voltage
⑬	⑬	-TRM	-Adjustment of output voltage
⑭	⑭	SHARE	Parallel operation
⑮	⑰	SMBALERT	PMBus alarm output
⑯	⑱	DATA	PMBus communication data input & output
⑰	⑳	SGND	Signal GND
⑱	㉑	CLK	PMBus communication clock input
⑲	㉒	ADDR0	Address setting
⑳	㉓	ADDR1	Address setting

Implementation · Mounting Method

Mounting method

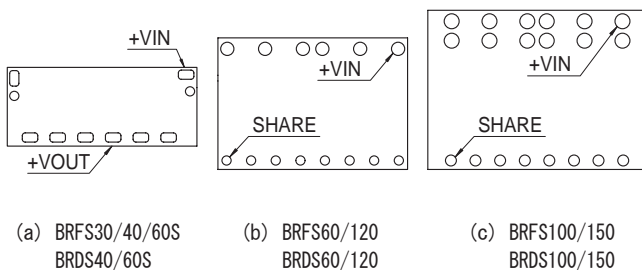
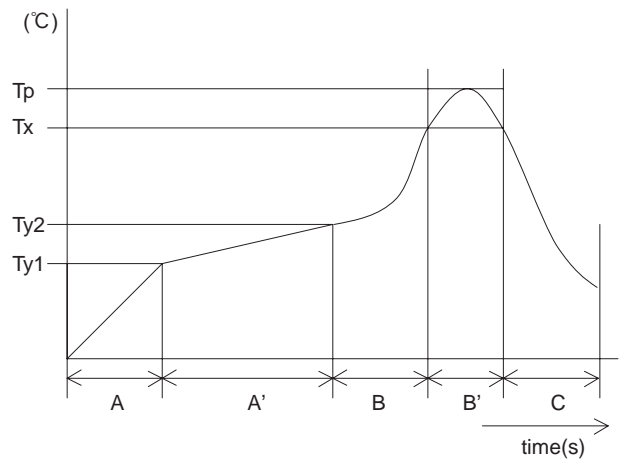
■The unit can be mounted in any direction. When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation. The temperature around each power supply should not exceed the temperature range shown in “Derating”.

Automatic Mounting

■To mount BRFS/BRDS series automatically, use the coil area near the center of the PCB as an adsorption point. Please see the External View for details of the adsorption point.

Soldering

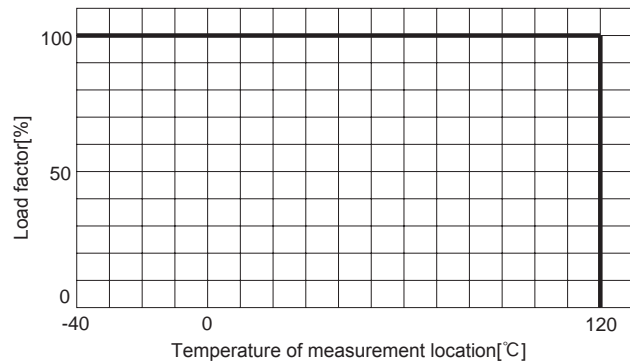
- Right figure shows condition for reflow of BRFS/BRDS series. Please make sure that the temperature of pin shown in (a),(b) and(c) do not exceed the temperatures shown in right figure .
- While soldering, having vibration or impact on the unit should be avoided, because of solder melting.
- Please do not do the implementation except the reflow.
- Because some parts drops , please do not do reflow of the back side.



A	1.0 - 5.0°C/ s
A'	Ty1 : 160±10°C Ty2 : 180±10°C Ty1 - Ty2 : 120s max
B	1.0 - 5.0°C/ s
B'	Tp : Max245°C 10s max Tx : 220°C or more : 70s max
C	1.0 - 5.0°C/ s

## Derating

■ Make sure the temperatures measurement locations shown from Instruction Manual 8 are on or under the derating curve in right figure. Ambient temperature must be kept at 85°C or under.



## Instruction Manual

◆ It is necessary to read the “Instruction Manual” and “Before using our product” before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/BRFS/>  
 Instruction Manual <https://en.cosel.co.jp/product/powersupply/BRNS/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>



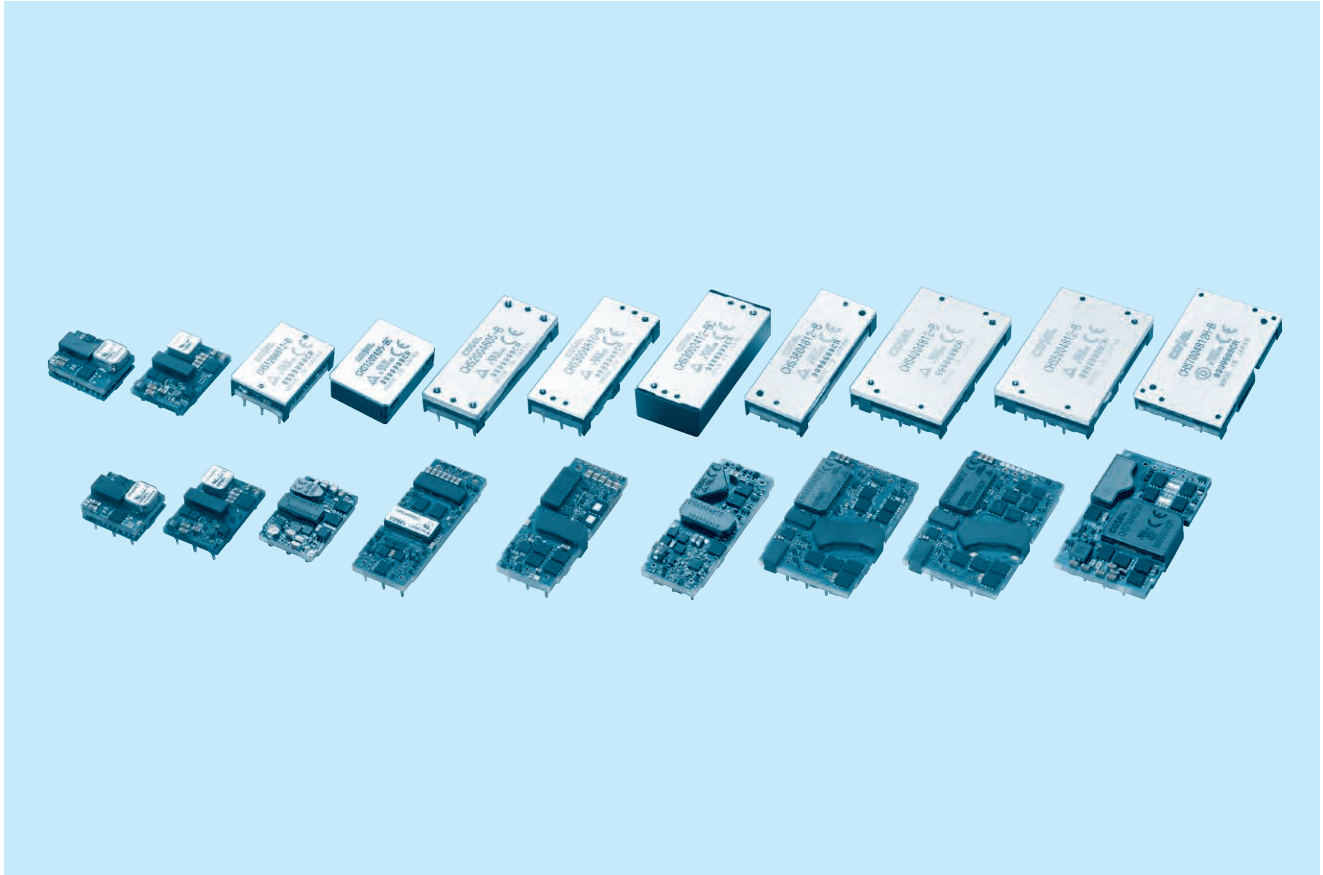
## Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz] (reference)	Input current [A]	Inrush current protection	PCB/Pattern			Series/Parallel operation	
					Material	Single sided	Double sided	Series operation	Parallel operation
BRFS30	Buck Converter	300	*1	-	glass fabric base,epoxy resin	-	Multilayer	-	*3
BRFS40	Buck Converter	300	*1	-	glass fabric base,epoxy resin	-	Multilayer	-	*3
BRFS60	Buck Converter	300 *2	*1	-	glass fabric base,epoxy resin	-	Multilayer	-	*3
BRFS60S	Buck Converter	300 *2	*1	-	glass fabric base,epoxy resin	-	Multilayer	-	*3
BRFS100	Buck Converter	300 *2	*1	-	glass fabric base,epoxy resin	-	Multilayer	-	*3
BRFS120	Buck Converter	400 *2	*1	-	glass fabric base,epoxy resin	-	Multilayer	-	*3
BRFS150	Buck Converter	400 *2	*1	-	glass fabric base,epoxy resin	-	Multilayer	-	*3
BRDS40	Buck Converter	300	*1	-	glass fabric base,epoxy resin	-	Multilayer	-	*3
BRDS60	Buck Converter	300 *2	*1	-	glass fabric base,epoxy resin	-	Multilayer	-	*3
BRDS60S	Buck Converter	300 *2	*1	-	glass fabric base,epoxy resin	-	Multilayer	-	*3
BRDS100	Buck Converter	300 *2	*1	-	glass fabric base,epoxy resin	-	Multilayer	-	*3
BRDS120	Buck Converter	400 *2	*1	-	glass fabric base,epoxy resin	-	Multilayer	-	*3
BRDS150	Buck Converter	400 *2	*1	-	glass fabric base,epoxy resin	-	Multilayer	-	*3

\*1 Refer to Specification.  
 \*2 These models have 2 phase interleave, and the ripple frequency is double the switching frequency.  
 \*3 Refer to the Instruction Manual.



# CHS-series



CHS

## ■ Feature

- High efficiency 96% (CHS7004812H)
- Compact DC-DC Converter, "BRICK SIZE" which has been standard size for Telecommunication Market
- High density
- High reliability : not built-in aluminum and tantalum electrolytic capacitor
- Built-in overcurrent, overvoltage and thermal protection circuits
- Built-in remote ON/OFF

## ■ CE marking

- Low Voltage Directive
- RoHS Directive

## ■ Safety agency approvals

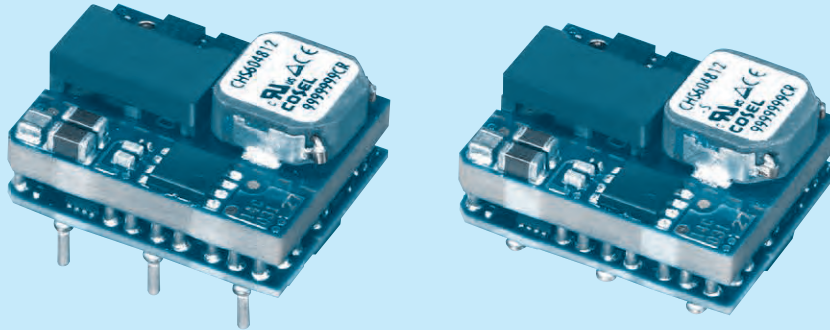
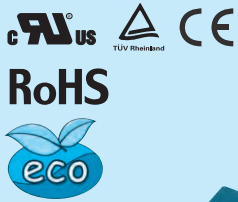
- UL60950-1, C-UL, EN60950-1 (CHS60, CHS80, CHS120, CHS200, CHS300, CHS380, CHS400, CHS500)
- UL62368-1, C-UL, EN62368-1 (CHS700)

## ■ 5-year warranty

# CHS60

CH S 60 48 3R3 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output power
- ④ Input voltage  
48:DC36 - 76V
- ⑤ Output voltage  
3R3:3.3V  
05:5.0V  
12:12V
- ⑥ Optional  
R :with Remote ON/OFF  
Positive logic control  
U :Shut down in protection  
circuit working  
S :SMD

MODEL	CHS60483R3	CHS604805	CHS604812
MAX OUTPUT WATTAGE[W]	59.4	60.0	72.0
DC OUTPUT	3.3V 18A	5V 12A	12V 6A

## CHS SPECIFICATIONS

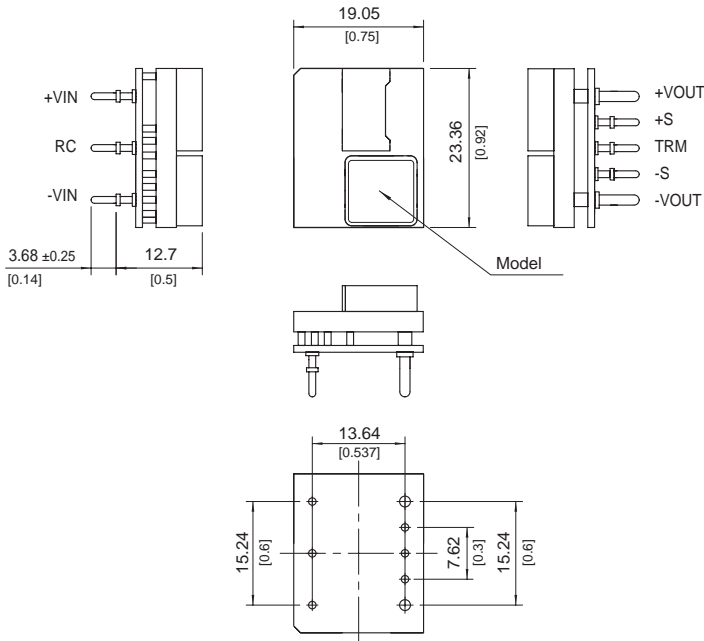
	MODEL	CHS60483R3	CHS604805	CHS604812	
INPUT	VOLTAGE[V]	DC36 - 76			
	CURRENT[A]	*1 1.36typ	1.34typ	1.63typ	
	EFFICIENCY[%]	*1 91.5typ	93.0typ	92.5typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	
	CURRENT[A]	18	12	6	
	LINE REGULATION[mV]	10max			
	LOAD REGULATION[mV]	10max			
	RIPPLE	[mVrms] *2	30max	30max	50max
		[mVp-p] *2	80max	100max	150max
	RIPPLE NOISE[mVp-p] *2	120max	150max	180max	
	TEMPERATURE REGULATION[mV]	66max	100max	240max	
	DRIFT[mV] *3	16max	20max	40max	
	START-UP TIME[ms]	50max (DCIN 48V, Io=100%)			
OUTPUT VOLTAGE ADJUSTMENT RANGE *4	Fixed (TRM pin open), adjustable by external resistor				
OUTPUT VOLTAGE SETTING	-10% / +15%	-10% / +20%	-20% / +10%		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (Auto restart)			
	OVERVOLTAGE PROTECTION	120% - 140% (Auto restart)	125% - 145% (Auto restart)	115% - 135% (Auto restart)	
	REMOTE SENSING	Provided			
	REMOTE ON/OFF	Provided (Negative Logic L : ON, H :OFF)			
ISOLATION	INPUT-OUTPUT	DC2,250V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)			
ENVIRONMENT	OPERATING TEMP,HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,000 feet) max			
	STORAGE TEMP,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max			
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis			
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1			
OTHERS	CASE SIZE/WEIGHT	19.05 X 12.7 X 23.36mm [0.75 X 0.5 X 0.92 inches] (W X H X D) / 15g max			
	COOLING METHOD	Convection / Forced air			

\*1 At rated input (DC48V) and rated load. Ta=25°C, 2m/s.  
 \*2 Ripple and ripple noise is measured by using measuring board with ceramic capacitor 22 μF.  
 \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*4 Refer to the instruction manual for input voltage derating.



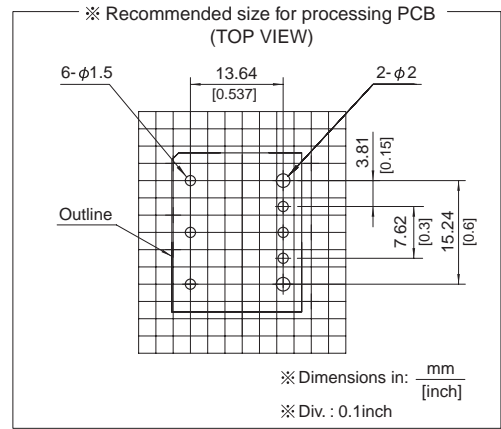
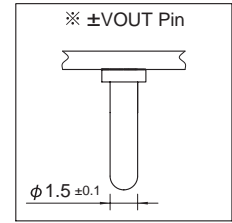
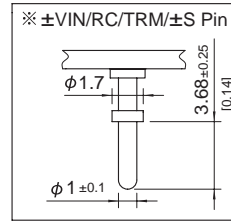
External view

1. DIP

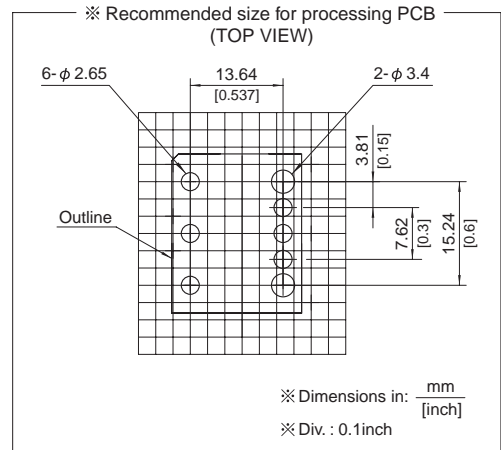
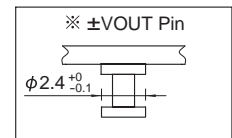
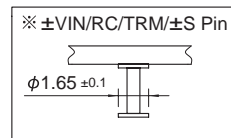
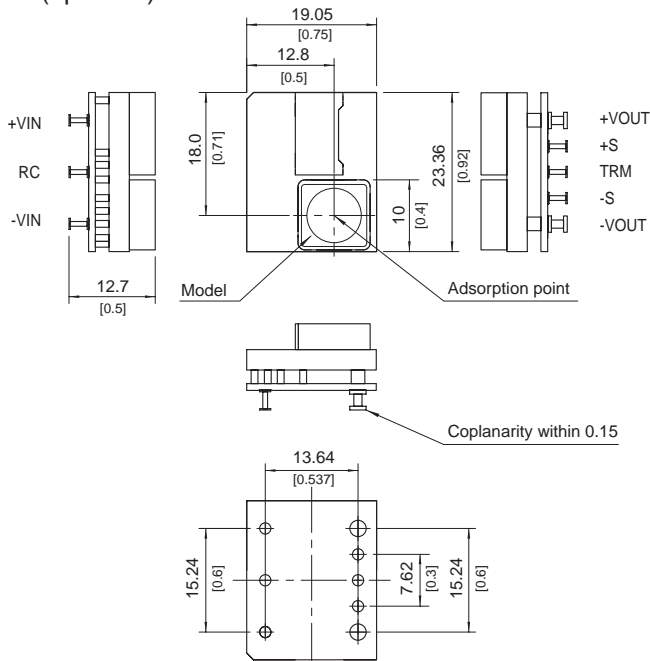


※ Tolerance: ±0.5 [±0.02]

※ Dimensions in mm, [ ]=inches



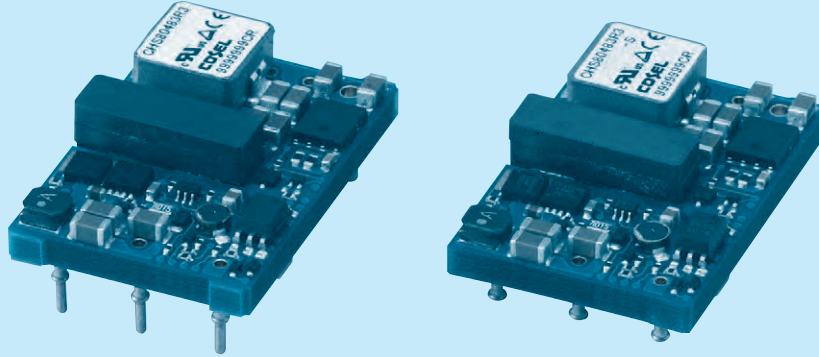
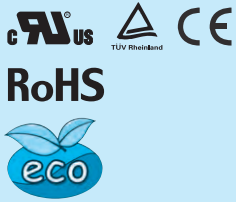
2. SMD (option S)



# CHS80

CH S 80 48 05 -

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output power
- ④ Input voltage  
48:DC36-76V
- ⑤ Output voltage  
3R:3.3V  
05:5.0V  
12:12V
- ⑥ Optional  
R :with Remote ON/OFF  
Positive logic control  
U :Shut down in protection  
circuit working  
S :SMD

MODEL	CHS80483R3	CHS804805	CHS804812
MAX OUTPUT WATTAGE[W]	82.5	80.0	90.0
DC OUTPUT	3.3V 25A	5.0V 16A	12V 7.5A

## CHS SPECIFICATIONS

	MODEL	CHS80483R3	CHS804805	CHS804812	
INPUT	VOLTAGE[V]	DC36 - 76			
	CURRENT[A]	*1 1.86typ	1.81typ	2.03typ	
	EFFICIENCY[%]	*1 92typ	92typ	92typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	
	CURRENT[A]	25	16	7.5	
	LINE REGULATION[mV]	10max			
	LOAD REGULATION[mV]	10max			
	RIPPLE	[mVrms] *2	30max	30max	50max
		[mVp-p] *2	80max	100max	150max
	RIPPLE NOISE[mVp-p]	*2 120max	150max	180max	
	TEMPERATURE REGULATION[mV]	66max	100max	240max	
	DRIFT[mV]	*3 16max	20max	40max	
	START-UP TIME[ms]	200max (DCIN 48V, Io=100%)			
	OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open), adjustable by external resistor			
OUTPUT VOLTAGE SETTING	±1.6%				
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (Auto restart)			
	OVERVOLTAGE PROTECTION	120% - 140% (Auto restart)	125% - 145% (Auto restart)	115% - 135% (Auto restart)	
	REMOTE SENSING	Provided			
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)			
ISOLATION	INPUT-OUTPUT	DC2,250V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)			
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max			
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max			
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis			
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1			
OTHERS	CASE SIZE/WEIGHT	33.0 x 10.5 x 22.76mm [1.3 x 0.41 x 0.9 inches] (W x H x D) / 21g max			
	COOLING METHOD	Convection / Forced air			

\*1 At rated input(DC48V) and rated load. Ta=25°C, 2m/s.

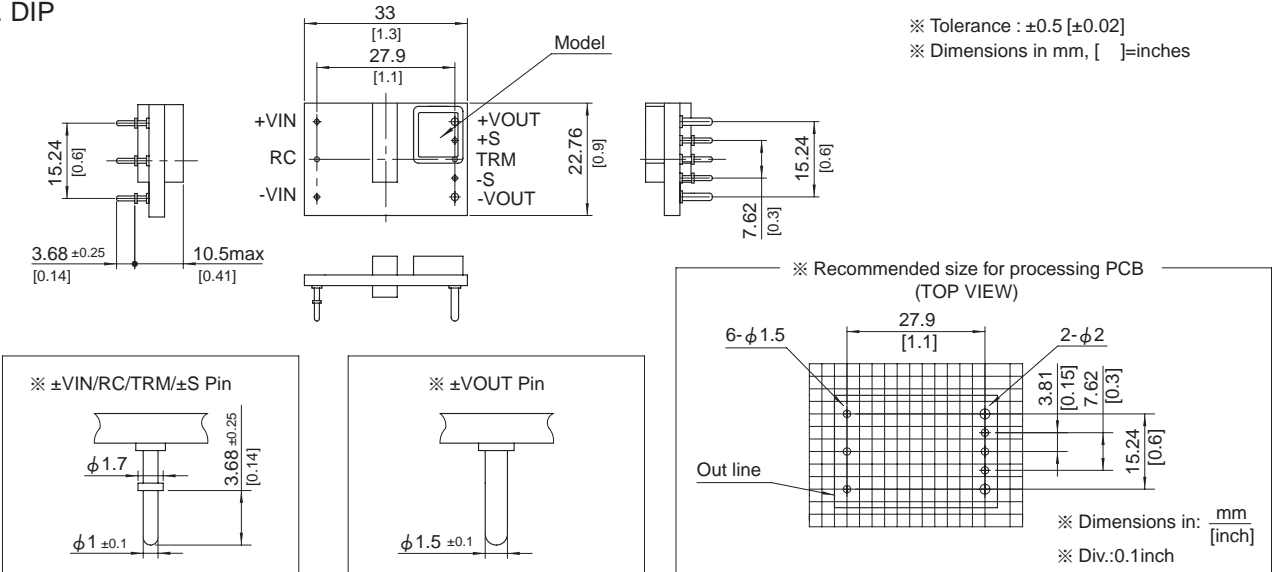
\*2 Ripple and ripple noise is measured by using measuring board with ceramic capacitor 22 μF.

\*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

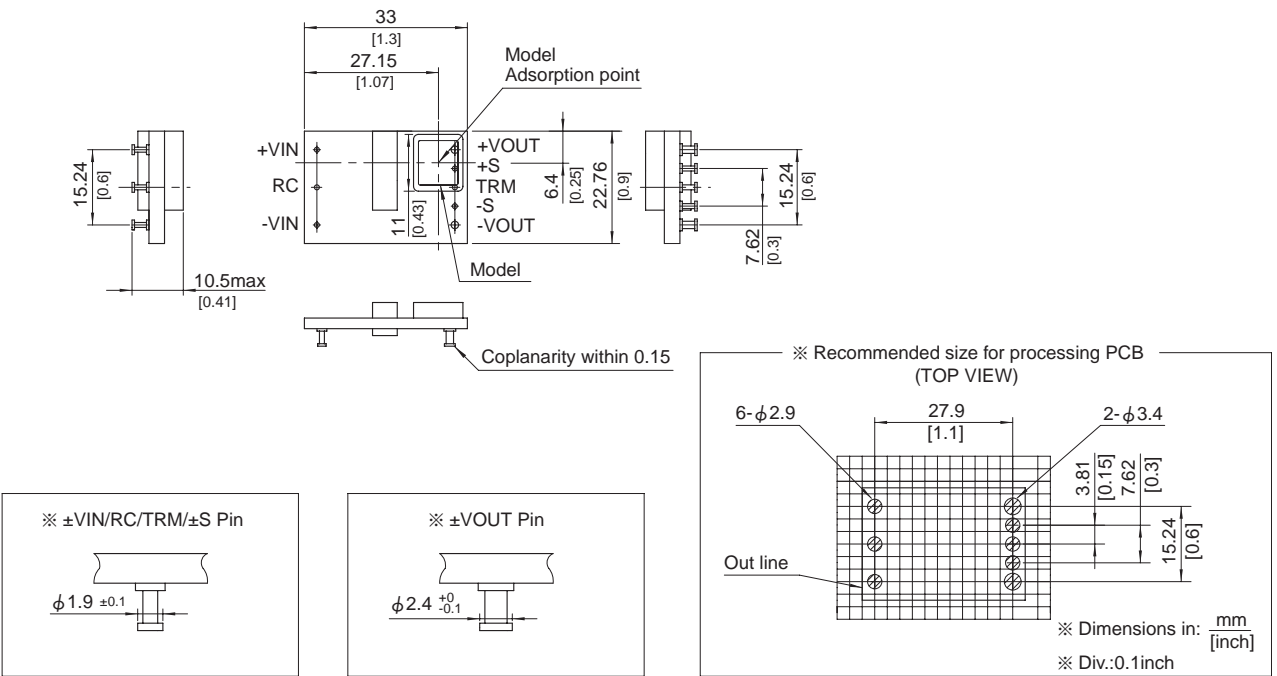
\*4 Refer to the instruction manual for input voltage derating.

External view

1. DIP



2. SMD (optionS)



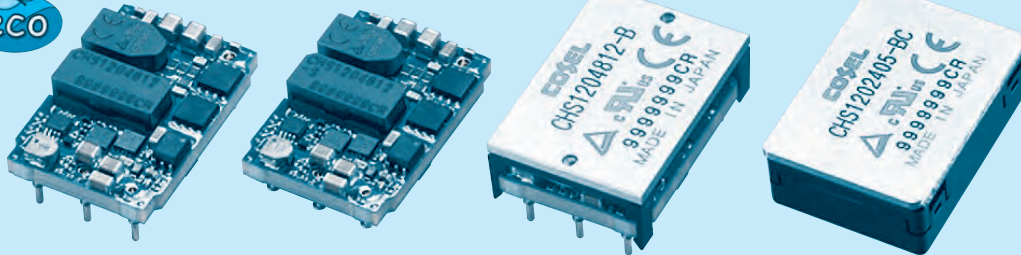
# CHS120

CH S 120 48 05 - □

① ② ③ ④ ⑤ ⑥



RoHS



- ① Series name
- ② Single output
- ③ Output power
- ④ Input voltage  
24:DC18 - 36V  
48:DC36 - 76V
- ⑤ Output voltage  
3R3:3.3V  
05:5.0V  
12:12V  
15:15V  
24:24V
- ⑥ Optional  
R :with Remote ON/OFF  
Positive logic control  
U :Shut down in protection  
circuit working  
S :SMD  
B :BasePlate option  
BC:Baseplate and case option  
(only CHS12024)  
L2:Pin length 5.3mm  
L5:5pins option  
(+S,-S,TRM less)

MODEL	CHS1202405	CHS1202412	CHS1202415	CHS1202424
MAX OUTPUT WATTAGE[W]	120.0	120.0	120.0	100.8
DC OUTPUT	5V 24A	12V 10A	15V 8A	24V 4.2A

## SPECIFICATIONS

	MODEL	CHS1202405	CHS1202412	CHS1202415	CHS1202424	
INPUT	VOLTAGE[V]	DC18 - 36				
	CURRENT[A]	*1 5.41typ	5.47typ	5.50typ	4.65typ	
	EFFICIENCY[%]	*1 92.5typ	91.5typ	91typ	90.5typ	
OUTPUT	VOLTAGE[V]	5	12	15	24	
	CURRENT[A]	24	10	8	4.2	
	LINE REGULATION[mV]	10max	24max	30max	48max	
	LOAD REGULATION[mV]	10max	24max	30max	48max	
	RIPPLE	[mVrms]*2	40max	50max	60max	83max
		[mVp-p]*2	120max	150max	180max	250max
	RIPPLE NOISE[mVp-p]	*2 150max	180max	210max	280max	
	TEMPERATURE REGULATION[mV]	100max	240max	300max	480max	
	DRIFT[mV]	*3 20max	40max	50max	80max	
	START-UP TIME[ms]	50max (DCIN 24V, Io=100%)				
	OUTPUT VOLTAGE ADJUSTMENT RANGE *4	Fixed (TRM pin open), adjustable by external resistor -10% / +20%				
OUTPUT VOLTAGE SETTING	±1.6%					
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (Auto restart)				
	OVERVOLTAGE PROTECTION	125% - 150% (Auto restart)	115% - 135% (Auto restart)	110% - 130% (Auto restart)	115% - 135% (Auto restart)	
	REMOTE SENSING	Provided				
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)				

MODEL	CHS120483R3	CHS1204805	CHS1204812	CHS1204815	CHS1204824
MAX OUTPUT WATTAGE[W]	99.0	120.0	120.0	120.0	100.8
DC OUTPUT	3.3V 30A	5V 24A	12V 10A	15V 8A	24V 4.2A

## SPECIFICATIONS

	MODEL	CHS120483R3	CHS1204805	CHS1204812	CHS1204815	CHS1204824	
INPUT	VOLTAGE[V]	DC36 - 76					
	CURRENT[A]	*1 2.23typ	2.69typ	2.69typ	2.72typ	2.31typ	
	EFFICIENCY[%]	*1 92.5typ	93typ	93typ	92typ	91typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	
	CURRENT[A]	30	24	10	8	4.2	
	LINE REGULATION[mV]	10max			30max	48max	
	LOAD REGULATION[mV]	10max			30max	48max	
	RIPPLE	[mVrms]*2	30max	30max	50max	60max	83max
		[mVp-p]*2	80max	100max	150max	180max	250max
	RIPPLE NOISE[mVp-p]	*2 120max	150max	180max	210max	280max	
	TEMPERATURE REGULATION[mV]	66max	100max	240max	300max	480max	
	DRIFT[mV]	*3 16max	20max	40max	50max	80max	
	START-UP TIME[ms]	50max (DCIN 48V, Io=100%)					
	OUTPUT VOLTAGE ADJUSTMENT RANGE *4	Fixed (TRM pin open), adjustable by external resistor -10% / +15%					
OUTPUT VOLTAGE SETTING	±1.6%						
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (Auto restart)					
	OVERVOLTAGE PROTECTION	120% - 140% (Auto restart)	125% - 145% (Auto restart)	115% - 135% (Auto restart)	110% - 130% (Auto restart)	115% - 135% (Auto restart)	
	REMOTE SENSING	Provided					
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)					

## GENERAL SPECIFICATIONS

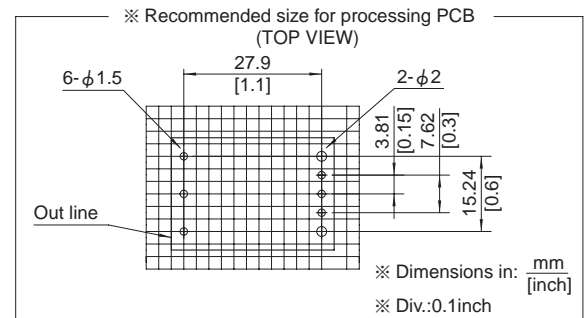
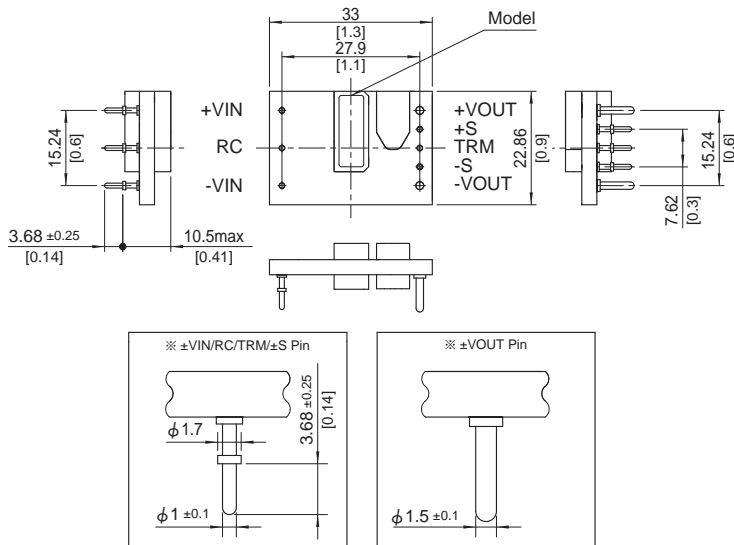
ISOLATION	INPUT-OUTPUT	DC2,250V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
	INPUT-BASEPLATE *5 *6	DC2,250V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
	OUTPUT-BASEPLATE *5 *6	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,000feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis
SAFETY	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis
	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1
OTHERS	CASE SIZE/WEIGHT	33.0×10.5×22.86mm [1.3×0.41×0.9 inches] (W×H×D) / 19g max
		33.5×12.7×23.36mm [1.32×0.5×0.92 inches] (W×H×D) / 28g max *5
		36.5×12.7×26.5mm [1.44×0.5×1.04 inches] (W×H×D) / 32g max *6
	COOLING METHOD	Convection/Forced air/Conduction

- \*1 At rated input (DC24V, DC48V) and rated load. Ta=25°C, 2m/s.
- \*2 Ripple and ripple noise is measured by using measuring board with ceramic capacitor 22 μF.
- \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- \*4 Refer to the instruction manual for input voltage derating.
- \*5 BasePlate Option.
- \*6 Baseplate and case option.

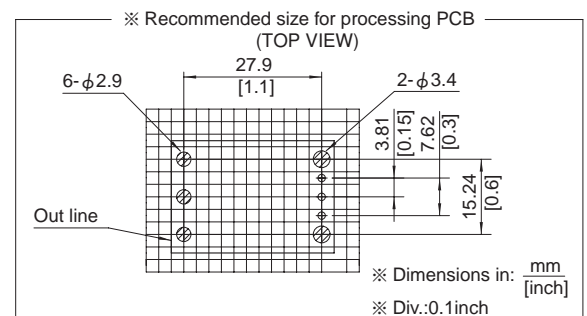
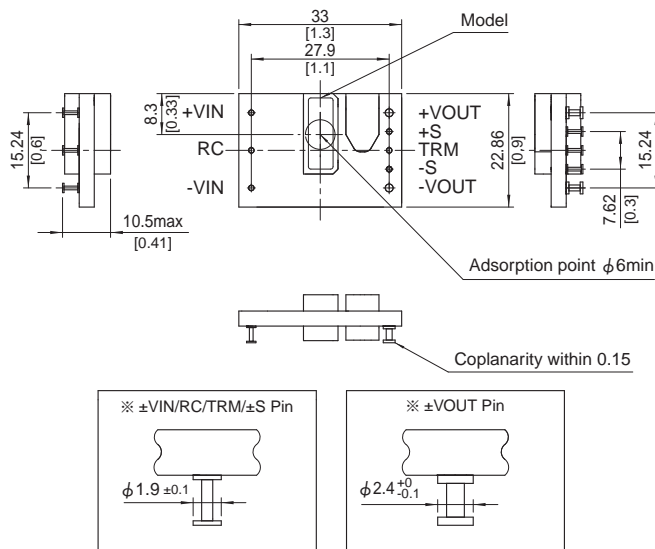
### External view

#### 1. DIP

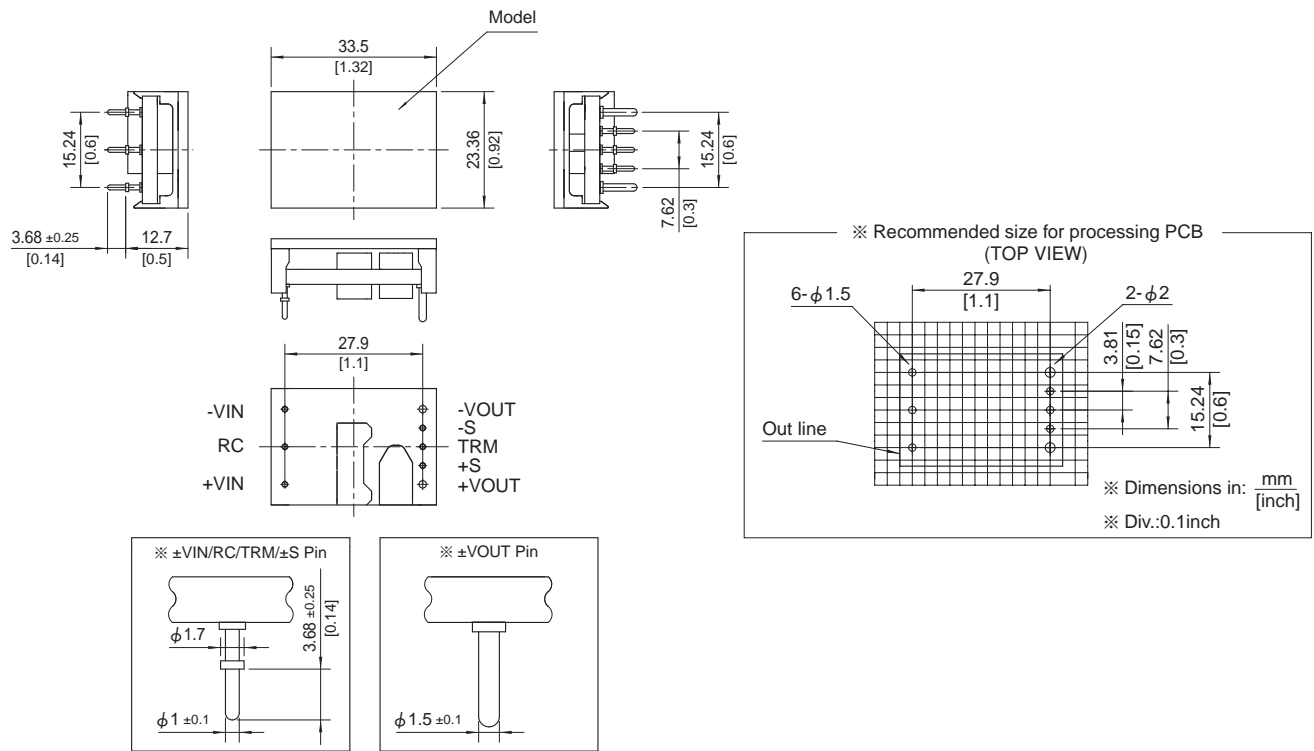
※ Tolerance : ±0.5  
 ※ Dimensions in mm, [ ]=inches



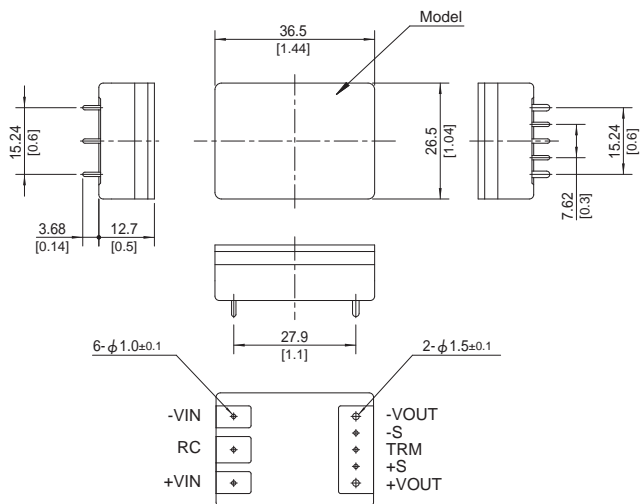
#### 2. SMD (option S)



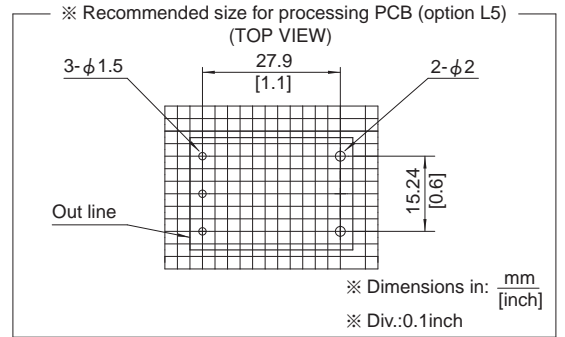
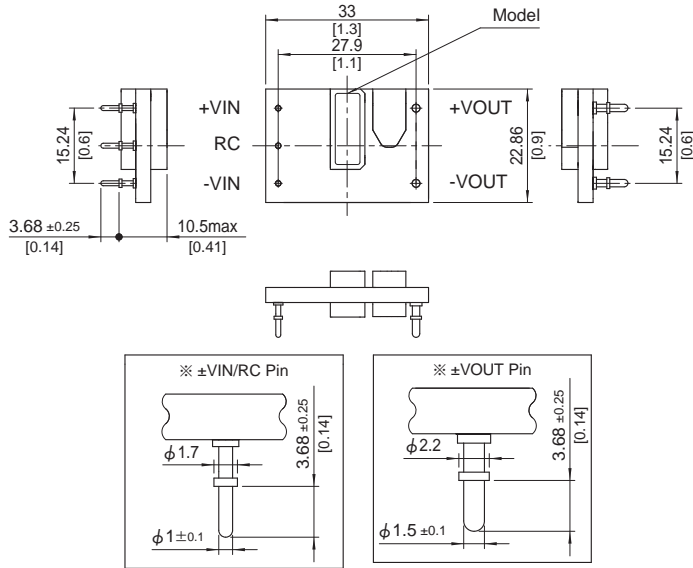
### 3. BasePlate (option B)



### 4. Baseplate and case (option BC)



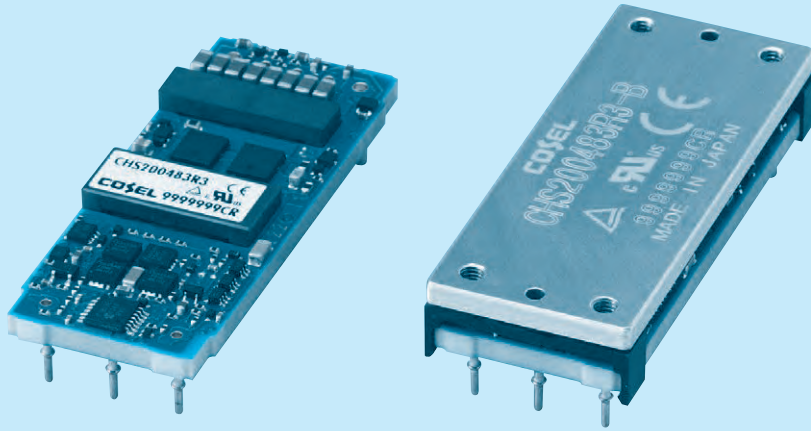
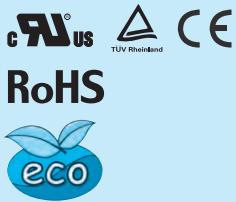
5. 5 pins type (option L5)



# CHS200

CH S 200 48 05 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output power  
48:DC36-76V
- ④ Input voltage  
48:DC36-76V
- ⑤ Output voltage  
3R3:3.3V  
05:5.0V  
12:12V
- ⑥ Optional  
R :with Remote ON/OFF  
Positive logic control  
U :Shut down in protection  
circuit working  
B :BasePlate option with  
Mounting hole M3  
L2:Pin length 5.3mm  
L5:5pins option  
(+S,-S,TRM less)

MODEL	CHS200483R3	CHS2004805	CHS2004812
MAX OUTPUT WATTAGE[W]	165.0	200.0	192.0
DC OUTPUT	3.3V 50A	5.0V 40A	12V 16A

## SPECIFICATIONS

	MODEL	CHS200483R3	CHS2004805	CHS2004812	
INPUT	VOLTAGE[V]	DC36 - 76			
	CURRENT[A]	*1 3.70typ	4.43typ	4.26typ	
	EFFICIENCY[%]	*1 93typ	94typ	94typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	
	CURRENT[A]	50	40	16	
	LINE REGULATION[mV]	10max			
	LOAD REGULATION[mV]	10max			
	RIPPLE	[mVrms] *2	30max	30max	50max
		[mVp-p] *2	80max	100max	150max
	RIPPLE NOISE[mVp-p]	*2 120max	150max	180max	
	TEMPERATURE REGULATION[mV]	66max	100max	240max	
	DRIFT[mV]	*3 16max	20max	40max	
	START-UP TIME[ms]	200max (DCIN 48V, Io=100%)			
OUTPUT VOLTAGE ADJUSTMENT RANGE	*4 Fixed (TRM pin open), adjustable by external resistor -10% / +15%		-10% / +20%	-10% / +10%	
OUTPUT VOLTAGE SETTING	± 1.6%				
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (Auto restart)			
	OVERVOLTAGE PROTECTION	120% - 140% (Auto restart)	125% - 145% (Auto restart)	115% - 135% (Auto restart)	
	REMOTE SENSING	Provided			
	REMOTE ON/OFF	Provided (Negative logic L:ON, H:OFF)			
ISOLATION	INPUT-OUTPUT	DC2,250V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)			
	INPUT-BASEPLATE	*5 DC2,250V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)			
	OUTPUT-BASEPLATE	*5 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)			
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max			
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max			
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis			
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1			
OTHERS	CASE SIZE/WEIGHT	57.9 × 10.5 × 22.76mm [2.28 × 0.41 × 0.9 inches] (W × H × D) / 30g max 58.4 × 12.7 × 23.26mm [2.3 × 0.5 × 0.92 inches] (W × H × D) / 45g max *5			
	COOLING METHOD	Convection / Forced air / Conduction			

\*1 At rated input(DC48V) and rated load. Ta=25°C, 2m/s.

\*2 Ripple and ripple noise is measured by using measuring board with ceramic capacitor 22 μF.

\*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

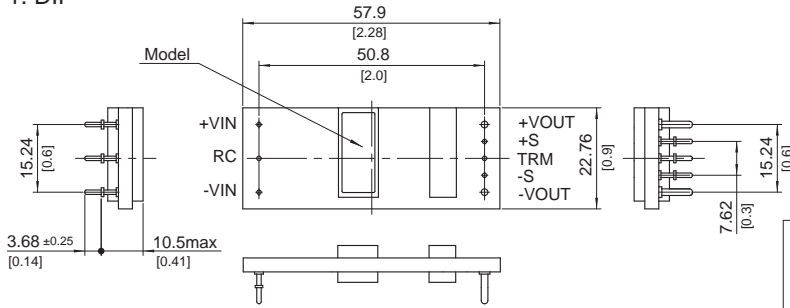
\*4 Refer to the instruction manual for input voltage derating.

\*5 BasePlate Option.

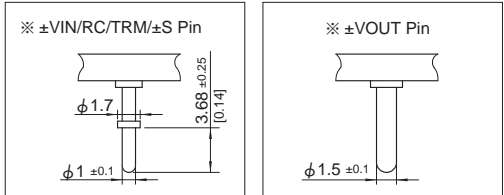


External view

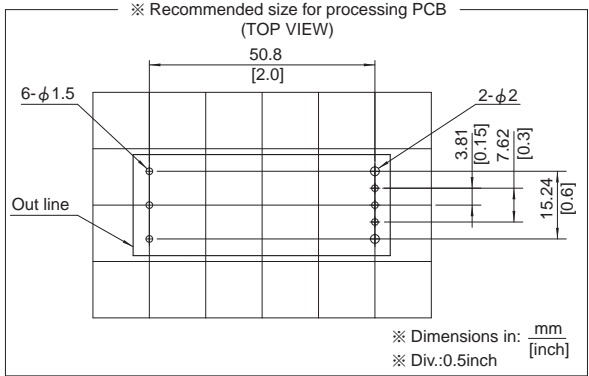
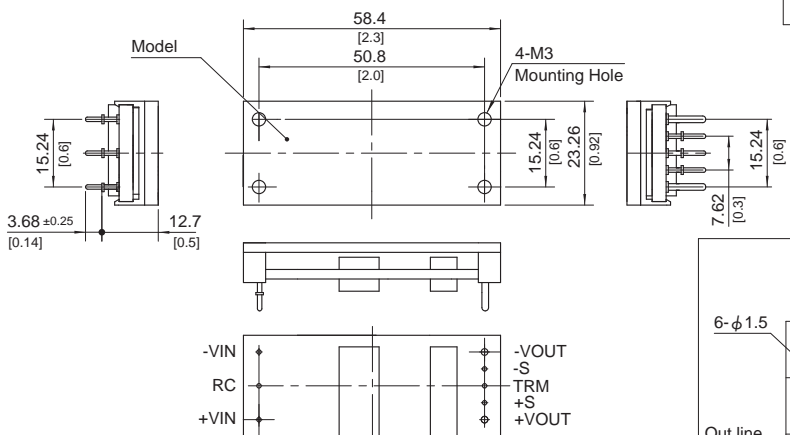
1. DIP



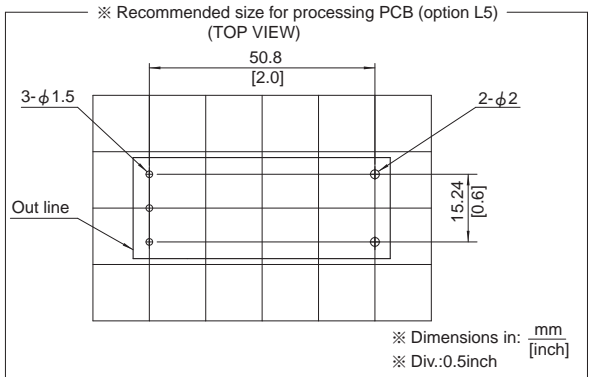
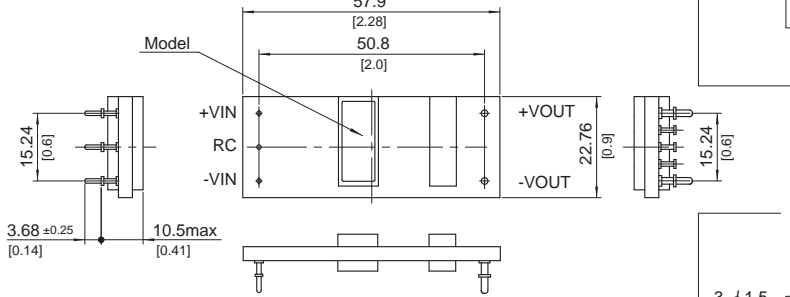
※ Tolerance : ±0.5 [±0.02]  
 ※ Dimensions in mm, [ ]=inches



2. BasePlate (optionB)



3. 5pins type (option L5)

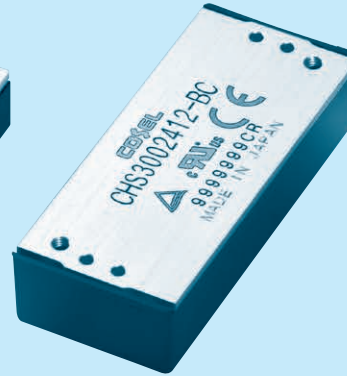
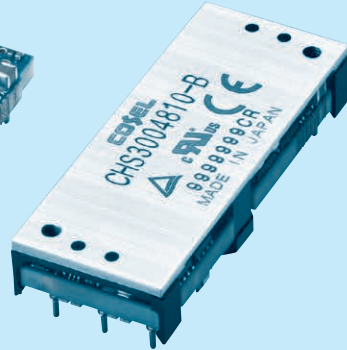
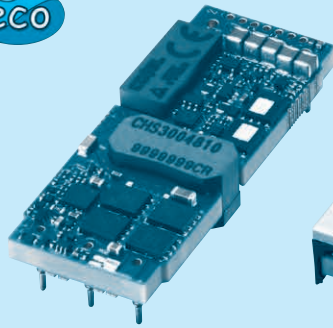


CHS

# CHS300

CH S 300 48 10 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output power
- ④ Input voltage  
24:DC18 - 36V  
48:DC36 - 76V
- ⑤ Output voltage  
05:5V  
10:10V  
12:12V  
12H:12V (High efficiency type)  
15:15V  
24:24V  
28:28V  
32:32V  
48:48V
- ⑥ Optional  
R :with Remote ON/OFF  
Positive logic control  
U :Shut down in protection  
circuit working  
B :Baseplate option with  
mounting hole M3  
BC:Baseplate and case option  
with mounting hole M3  
(only CHS30024)  
L2:Pin length 5.3mm  
L5:5pins option  
(+S,-S,TRM less)  
I :with the PMBus interface  
(only CHS3004810/4812)

MODEL	CHS3002405	CHS3002412	CHS3002415	CHS3002424	CHS3002428	CHS3002432	CHS3002448
MAX OUTPUT WATTAGE[W]	200.0	200.4	202.5	252.0	252.0	252.8	254.4
DC OUTPUT	5V 40A	12V 16.7A	15V 13.5A	24V 10.5A	28V 9A	32V 7.9A	48V 5.3A

## SPECIFICATIONS

MODEL	CHS3002405	CHS3002412	CHS3002415	CHS3002424	CHS3002428	CHS3002432	CHS3002448		
INPUT	VOLTAGE[V]	DC18 - 36							
	CURRENT[A]	*1 8.91typ	9.08typ	9.02typ	11.17typ	11.17typ	11.21typ	11.34typ	
	EFFICIENCY[%]	*1 93.5typ	92.0typ	93.5typ	94.0typ	94.0typ	94.0typ	93.5typ	
OUTPUT	VOLTAGE[V]	5	12	15	24	28	32	48	
	CURRENT[A]	40	16.7	13.5	10.5	9	7.9	5.3	
	LINE REGULATION[mV]	10max	24max	30max	48max	56max	64max	96max	
	LOAD REGULATION[mV]	10max	24max	30max	48max	56max	64max	96max	
	RIPPLE	[mVrms]	*2 40max	50max	100max	90max	90max	90max	110max
		[mVp-p]	*2 120max	150max	280max	250max	250max	250max	300max
	RIPPLE NOISE[mVp-p]	*2 150max	180max	300max	280max	280max	280max	350max	
	TEMPERATURE REGULATION[mV]	120max	240max	300max	480max	560max	640max	960max	
	DRIFT[mV]	*3 20max	40max	50max	80max	90max	120max	180max	
	START-UP TIME[ms]	50max (DCIN 24V, Io=100%)							
OUTPUT VOLTAGE ADJUSTMENT RANGE	*4 Fixed (TRM pin open), adjustable by external resistor -20% / +20%   -20% / +10%   -20% / +5%   -10% / +10%   -10% / +10%   -10% / +10%   -10% / +10%								
OUTPUT VOLTAGE SETTING	*1 ±1.6%								
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (Auto restart)							
	OVERVOLTAGE PROTECTION	125% - 145% (Auto restart)	115% - 135% (Auto restart)	110% - 130% (Auto restart)	115% - 135% (Auto restart)	115% - 135% (Auto restart)	115% - 135% (Auto restart)	115% - 135% (Auto restart)	
	REMOTE SENSING	Provided							
	REMOTE ON/OFF	Provided (Negative Logic L : ON, H :OFF)							

MODEL	CHS3004810	CHS3004812	CHS3004812H	CHS3004815	CHS3004824	CHS3004828	CHS3004832	CHS3004848
MAX OUTPUT WATTAGE[W]	300.0	300.0	300.0	300.0	300.0	302.8	300.8	302.4
DC OUTPUT	10V 30A	12V 25A	12V 25A	15V 20A	24V 12.5A	28V 10.8A	32V 9.4A	48V 6.3A

## SPECIFICATIONS

MODEL	CHS3004810	CHS3004812	CHS3004812H	CHS3004815	CHS3004824	CHS3004828	CHS3004832	CHS3004848		
INPUT	VOLTAGE[V]	DC36 - 76								
	CURRENT[A]	*1 6.61typ	6.61typ	6.55typ	6.61typ	6.61typ	6.67typ	6.63typ	6.70typ	
	EFFICIENCY[%]	*1 94.5typ	94.5typ	95.5typ	94.5typ	94.5typ	94.5typ	94.5typ	94.0typ	
OUTPUT	VOLTAGE[V]	10	12	12	15	24	28	32	48	
	CURRENT[A]	30	25	25	20	12.5	10.8	9.4	6.3	
	LINE REGULATION[mV]	*6 20max	24max	24max	30max	48max	56max	64max	96max	
	LOAD REGULATION[mV]	*6 20max	24max	24max	30max	48max	56max	64max	96max	
	RIPPLE	[mVrms]	*2 40max	50max	50max	70max	90max	90max	90max	130max
		[mVp-p]	*2 120max	150max	150max	180max	250max	250max	250max	350max
	RIPPLE NOISE[mVp-p]	*2 150max	180max	180max	200max	280max	280max	280max	380max	
	TEMPERATURE REGULATION[mV]	200max	240max	240max	300max	480max	560max	640max	960max	
	DRIFT[mV]	*3 30max	40max	40max	50max	80max	90max	120max	180max	
	START-UP TIME[ms]	50max (DCIN 48V, Io=100%)								
OUTPUT VOLTAGE ADJUSTMENT RANGE	*4 Fixed (TRM pin open), adjustable by external resistor -10% / +10%   -10% / +10%   -10% / +10%   -10% / +10%   -10% / +10%   -10% / +10%   -10% / +10%   -20% / +15%									
OUTPUT VOLTAGE SETTING	*1 ±1.6%									
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (Auto restart)								
	OVERVOLTAGE PROTECTION	115% - 135% (Auto restart)	115% - 135% (Auto restart)	115% - 135% (Auto restart)	115% - 135% (Auto restart)	115% - 135% (Auto restart)	115% - 135% (Auto restart)	115% - 135% (Auto restart)	120% - 140% (Auto restart)	
	REMOTE SENSING	Provided								
	REMOTE ON/OFF	Provided (Negative Logic L : ON, H :OFF)								

## GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	DC2,250V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
	INPUT-BASEPLATE *5,*7	DC2,250V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
	OUTPUT-BASEPLATE *5,*7	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,000 feet) max
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1
OTHERS	CASE SIZE/WEIGHT	58.4×11.0×22.86mm [2.3×0.43×0.9 inches] (W×H×D) / 38g max
		58.9×12.7×23.26mm [2.32×0.5×0.92 inches] (W×H×D) / 50g max *5
		61.1×14.3×26.1 [2.41×0.56×1.03inches] (W×H×D) / 57g max *7
	COOLING METHOD	Convection / Forced air / Conduction

\*1 At rated input (DC24V, DC48V) and rated load. Ta=25°C, 2m/s.

\*2 Ripple and ripple noise is measured by using measuring board with ceramic capacitor 0.1 μF or 22 μF. (Refer to instruction manual for wiring output pin)

\*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*4 Refer to the instruction manual for input voltage derating.

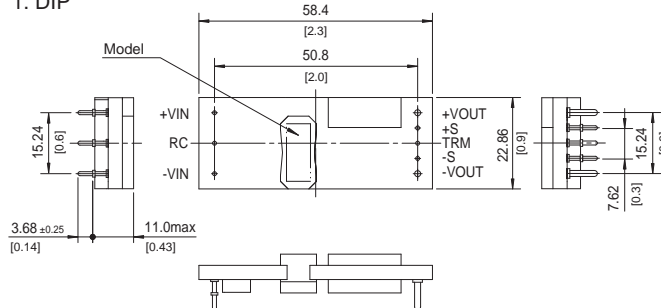
\*5 BasePlate Option.

\*6 At input voltage DC36 - 76V (CHS3004810, CHS3004812), DC40 - 76V (CHS3004812H).

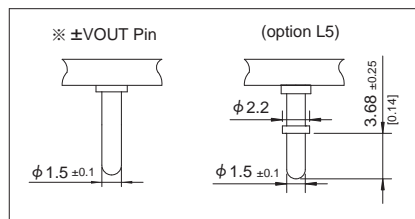
\*7 Baseplate and case option.

# External view

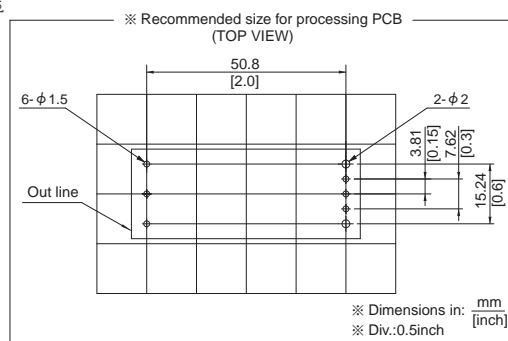
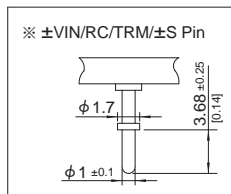
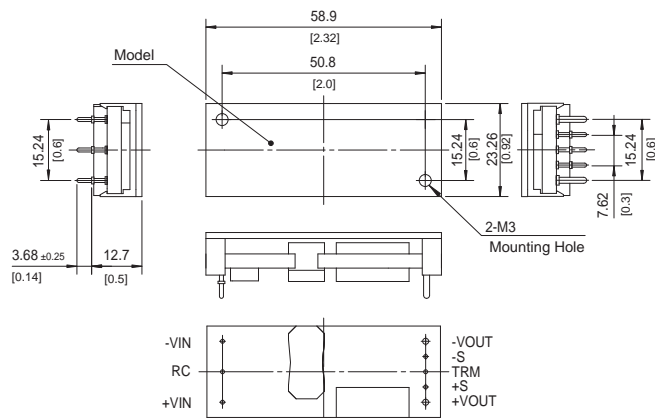
## 1. DIP



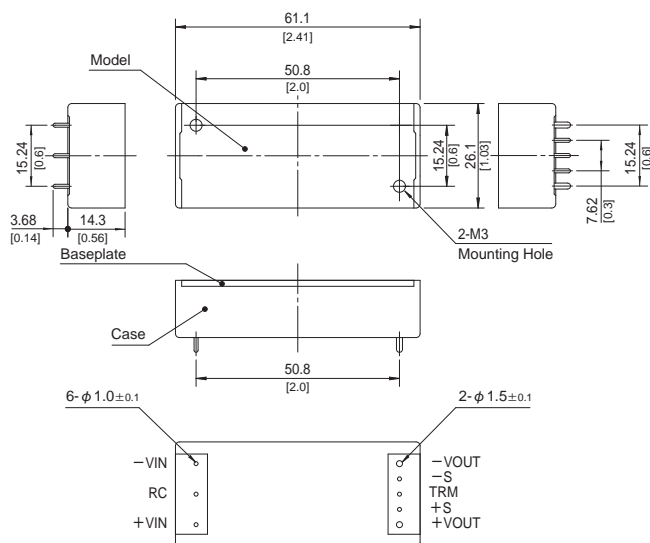
※ Tolerance: ±0.5 [±0.02]  
 ※ Dimensions in mm, [ ]=inches



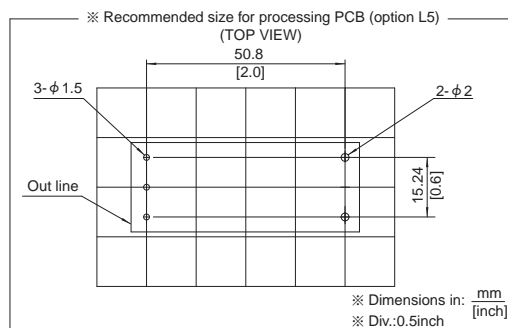
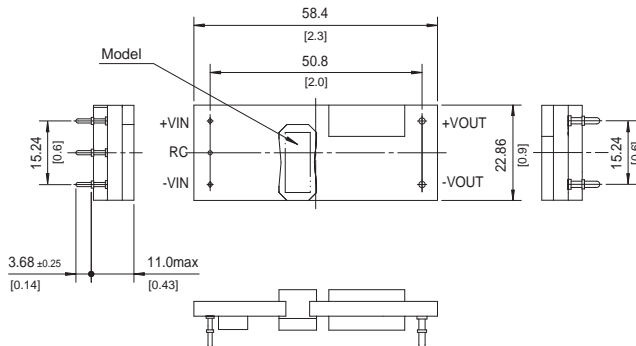
## 2. BasePlate (optionB)



## 3. Baseplate and case (option BC)



## 4. 5pins type (option L5)



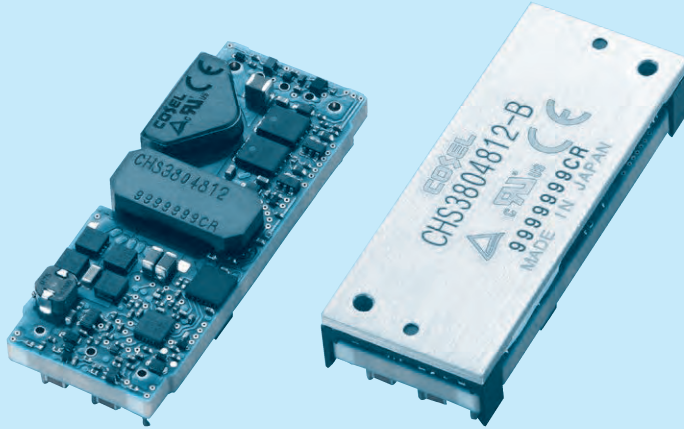
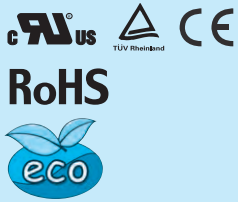
\* Please contact us about external view of the PMBus interface (option I).



# CHS380

CH S 380 48 12 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output power
- ④ Input voltage  
48:DC36 - 76V
- ⑤ Output voltage  
10:10V  
12:12V  
12H:12V(High efficiency type)
- ⑥ Optional  
R :with Remote ON/OFF  
Positive logic control  
U :Shut down in protection  
circuit working  
B :BasePlate option with  
Mounting hole M3  
L2:Pin length 5.3mm  
L5:5pins type (+S,-S,TRM  
less)

MODEL	CHS3804810	CHS3804812	CHS3804812H
MAX OUTPUT WATTAGE[W]	380.0	384.0	384.0
DC OUTPUT	10V 38A	12V 32A	12V 32A

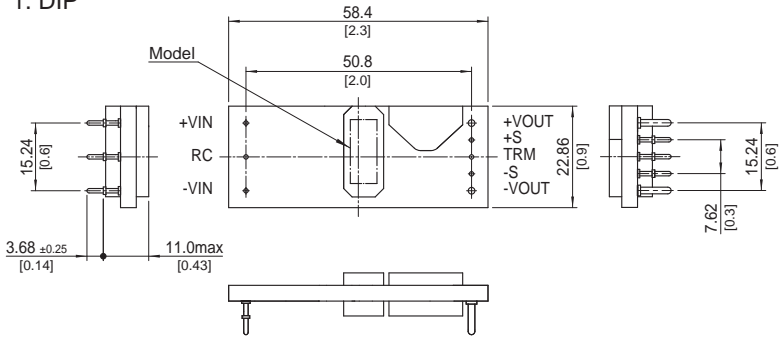
## SPECIFICATIONS

	MODEL	CHS3804810	CHS3804812	CHS3804812H	
INPUT	VOLTAGE[V]	DC36 - 76			
	CURRENT[A]	*1 8.42typ	8.47typ	8.42typ	
	EFFICIENCY[%]	*1 94.0typ	94.5typ	95.0typ	
OUTPUT	VOLTAGE[V]	10	12	12	
	CURRENT[A]	38	32	32	
	LINE REGULATION[mV]	*6 20max	24max	24max	
	LOAD REGULATION[mV]	*6 20max	24max	24max	
	RIPPLE	[mVrms]	*2 40max	50max	60max
		[mVp-p]	*2 120max	150max	180max
	RIPPLE NOISE[mVp-p]	*2 150max	180max	200max	
	TEMPERATURE REGULATION[mV]	200max	240max	240max	
	DRIFT[mV]	*3 30max	40max	40max	
	START-UP TIME[ms]	50max (DCIN 48V, I <sub>o</sub> =100%)			
OUTPUT VOLTAGE ADJUSTMENT RANGE	*4 Fixed (TRM pin open), adjustable by external resistor -10% / +10%				
OUTPUT VOLTAGE SETTING	*1 ±1.6%				
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (Auto restart)			
	OVERVOLTAGE PROTECTION	115% - 135% (Auto restart)			
	REMOTE SENSING	Provided			
	REMOTE ON/OFF	Provided (Negative Logic L : ON, H :OFF)			
ISOLATION	INPUT-OUTPUT	DC2,250V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)			
	INPUT-BASEPLATE	*5 DC2,250V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)			
	OUTPUT-BASEPLATE	*5 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)			
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,000 feet) max			
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max			
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis			
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950			
OTHERS	CASE SIZE/WEIGHT	58.4 × 11.0 × 22.86mm [2.3 × 0.43 × 0.9 inches] (W × H × D) / 38g max			
	COOLING METHOD	58.9 × 12.7 × 23.26mm [2.32 × 0.5 × 0.92 inches] (W × H × D) / 50g max *5 Convection / Forced air / Conduction			

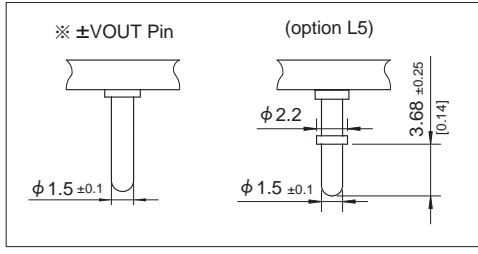
\*1 At rated input (DC48V) and rated load. Ta=25°C, 2m/s.  
 \*2 Ripple and ripple noise is measured by using measuring board with ceramic capacitor 22 μF.  
 \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*4 Refer to the instruction manual for input voltage derating.  
 \*5 BasePlate Option.  
 \*6 At input voltage DC36-76V(CHS3804810, CHS3804812), DC40-76V(CHS3804812H).

External view

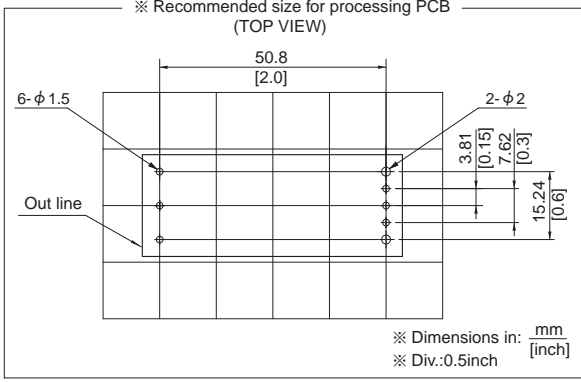
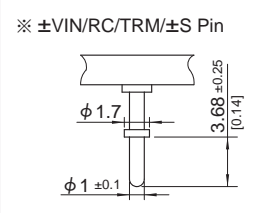
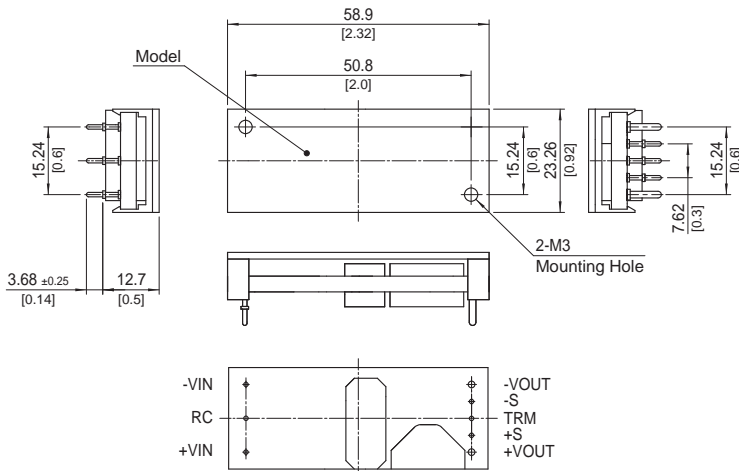
1. DIP



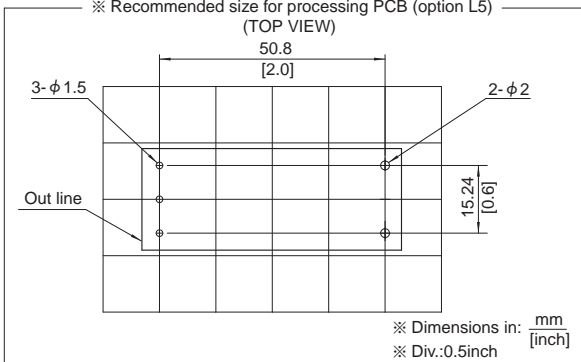
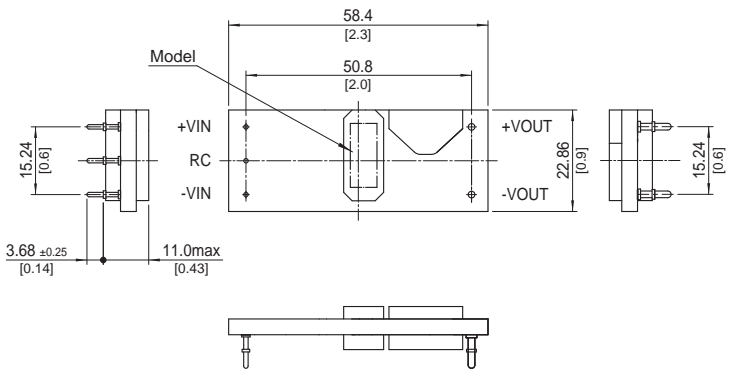
※ Tolerance: ±0.5 [±0.02]  
 ※ Dimensions in mm, [ ]=inches



2. BasePlate (optionB)



3. Parallel operation (option P)  
5pins type (option L5)



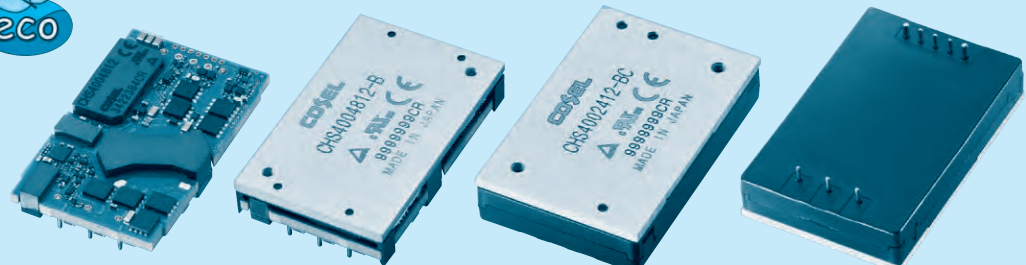
# CHS400

CH S 400 48 12 - □

① ② ③ ④ ⑤ ⑥



RoHS



- ① Series name
- ② Single output
- ③ Output power
- ④ Input voltage  
24:DC18 - 36V  
48:DC36 - 76V
- ⑤ Output voltage  
10:10V  
12:12V  
12H:12V(High efficiency type)  
15:15V  
24:24V  
28:28V  
32:32V  
48:48V
- ⑥ Optional  
R :with Remote ON/OFF  
Positive logic control  
U :Shut down in protection circuit working  
B :BasePlate option with Mounting hole M3  
BC:Baseplate and case option with Mounting hole M3 (only CHS40024)  
P :Parallel operation (5Pins :without +S,-S and TRM) (Only CHS40048)  
L2:Pin length 5.3mm  
L5:5pins type (+S,-S,TRM less)  
I :with the PMBus interface (Only CHS4004812)

MODEL	CHS4002412	CHS4002415	CHS4002424	CHS4002428	CHS4002432	CHS4002448
MAX OUTPUT WATTAGE[W]	318.0	397.5	348.0	350.0	352.0	302.4
DC OUTPUT	12V 26.5A	15V 26.5A	24V 14.5A	28V 12.5A	32V 11A	48V 6.3A

## SPECIFICATIONS

	MODEL	CHS4002412	CHS4002415	CHS4002424	CHS4002428	CHS4002432	CHS4002448	
INPUT	VOLTAGE[V]	DC18 - 36						
	CURRENT[A]	*1 14.17typ	17.53typ	15.43typ	15.51typ	15.60typ	13.40typ	
	EFFICIENCY[%]	*1 93.5typ	94.5typ	94.0typ	94.0typ	94.0typ	94.0typ	
OUTPUT	VOLTAGE[V]	12	15	24	28	32	48	
	CURRENT[A]	26.5	26.5	14.5	12.5	11	6.3	
	LINE REGULATION[mV]	24max	30max	48max	56max	64max	96max	
	LOAD REGULATION[mV]	24max	30max	48max	56max	64max	96max	
	RIPPLE	[mVrms] *2	60max	60max	90max	90max	90max	110max
		[mVp-p] *2	180max	180max	250max	250max	250max	300max
	RIPPLE NOISE[mVp-p]	*2 200max	200max	280max	280max	280max	350max	
	TEMPERATURE REGULATION[mV]	240max	300max	480max	560max	640max	960max	
	DRIFT[mV]	*3 40max	50max	80max	90max	120max	180max	
	START-UP TIME[ms]	50max (DCIN 24V, Io=100%)						
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4	Fixed (TRM pin open), adjustable by external resistor						
		-20% / +10%	-20% / +5%	-20% / +10%	-20% / +10%	-20% / +10%	-20% / +10%	
OUTPUT VOLTAGE SETTING[V]	*1	±1.6%	±1.6%	±1.6%	±1.6%	±1.6%	±1.6%	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (Auto restart)						
	OVERVOLTAGE PROTECTION	115% - 135% (Auto restart)	110% - 130% (Auto restart)	115% - 135% (Auto restart)	115% - 135% (Auto restart)	115% - 135% (Auto restart)	115% - 135% (Auto restart)	
	REMOTE SENSING	Provided						
	REMOTE ON/OFF	Provided (Negative Logic L : ON, H :OFF)						



MODEL	CHS4004810	CHS4004812	CHS4004812H	CHS4004815	CHS4004824	CHS4004828	CHS4004832	CHS4004848
MAX OUTPUT WATTAGE[W]	400.0	396.0	396.0	397.5	396.0	392.0	400.0	403.2
DC OUTPUT	10V 40A	12V 33A	12V 33A	15V 26.5A	24V 16.5A	28V 14A	32V 12.5A	48V 8.4A

## SPECIFICATIONS

	MODEL	CHS4004810	CHS4004812	CHS4004812H	CHS4004815	CHS4004824	CHS4004828	CHS4004832	CHS4004848	
INPUT	VOLTAGE[V]	DC36 - 76								
	CURRENT[A]	*1 8.82typ	8.68typ	8.64typ	8.76typ	8.73typ	8.64typ	8.82typ	8.94typ	
	EFFICIENCY[%]	*1 94.5typ	95typ	95.5typ	94.5typ	94.5typ	94.5typ	94.5typ	94.0typ	
OUTPUT	VOLTAGE[V]	10	12	12	15	24	28	32	48	
	CURRENT[A]	40	33	33	26.5	16.5	14	12.5	8.4	
	LINE REGULATION[mV]	*8 20max	24max	24max	30max	48max	56max	64max	96max	
	LOAD REGULATION[mV]	*7 20max	24max	24max	30max	48max	56max	64max	96max	
	RIPPLE	[mVrms]	*2 60max	60max	60max	70max	100max	100max	100max	110max
		[mVp-p]	*2 160max	180max	180max	200max	280max	280max	280max	300max
	RIPPLE NOISE[mVp-p]	*2 180max	200max	200max	220max	300max	300max	300max	350max	
	TEMPERATURE REGULATION[mV]	200max	240max	240max	300max	480max	560max	640max	960max	
	DRIFT[mV]	*3 30max	40max	40max	50max	80max	90max	120max	180max	
	START-UP TIME[ms]	50max (DCIN 48V, Io=100%)								
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed (TRM pin open), adjustable by external resistor (N/A : parallel operation)								
	OUTPUT VOLTAGE SETTING[V]	*1 ±1.6%	±1.6%	±1.6%	±1.6%	±1.6%	±1.6%	±1.6%	±1.6%	
	PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (Auto restart)							
OVERVOLTAGE PROTECTION		115% - 135% (Auto restart)								
REMOTE SENSING		Provided (N/A : parallel operation)								
REMOTE ON/OFF		Provided (Negative Logic L : ON, H :OFF)								

## GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	DC2,250V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
	INPUT-BASEPLATE	*5,*6 DC2,250V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
	OUTPUT-BASEPLATE	*5,*6 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,000 feet) max
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950
OTHERS	CASE SIZE/WEIGHT	58.4×9.5×36.8mm [2.3×0.37×1.45 inches] (W×H×D) / 60g max
		58.9×12.7×37.3mm [2.32×0.5×1.47 inches] (W×H×D) / 90g max *5
		61.6×12.7×40.3mm [2.43×0.5×1.59 inches] (W×H×D) / 90g max *6
	COOLING METHOD	Convection / Forced air / Conduction

\*1 At rated input (DC24V, DC48V) and rated load. Ta=25°C, 2m/s.

\*2 Ripple and ripple noise is measured by using measuring board with ceramic capacitor 0.1 μF or 22 μF. (Refer to instruction manual for wiring output pin)

\*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*4 Refer to the instruction manual for input voltage derating.

\*5 Baseplate Option.

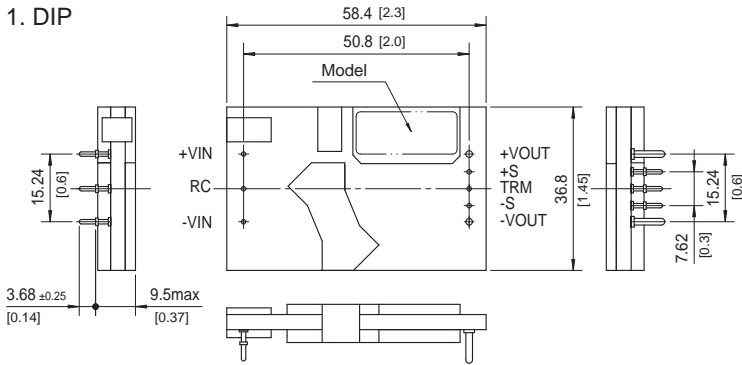
\*6 Baseplate and case option.

\*7 Parallel operation Option is not included.

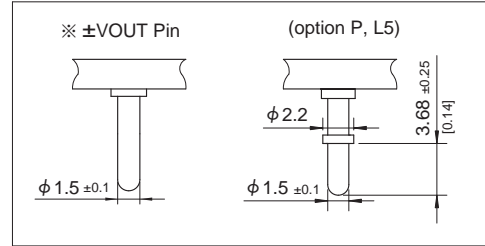
\*8 At input voltage DC36-76V(CHS4004810, CHS4004812), DC40-76V(CHS4004812H).

# External view

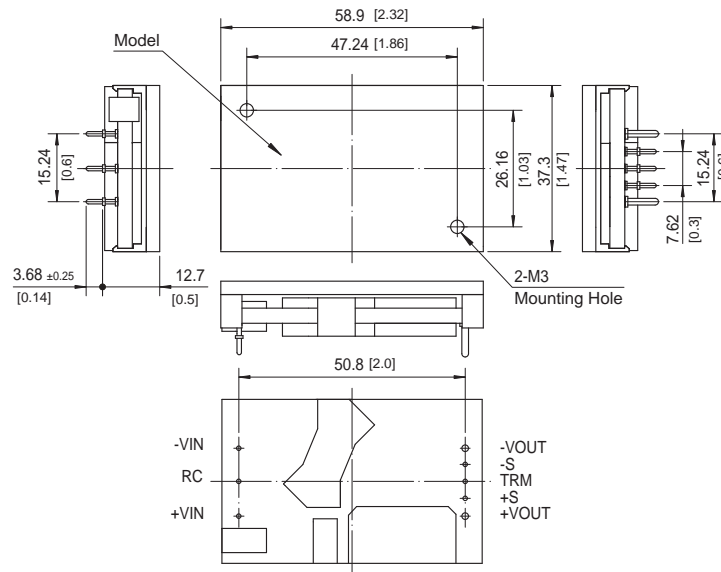
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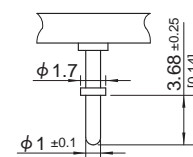
※ Tolerance: ±0.5 [±0.02]  
 ※ Dimensions in mm, [ ]=inches



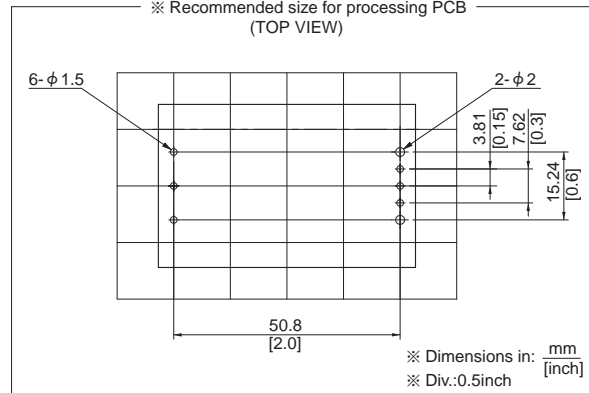
## 2. BasePlate (optionB)



※ ±VIN/RC/TRM/±S Pin

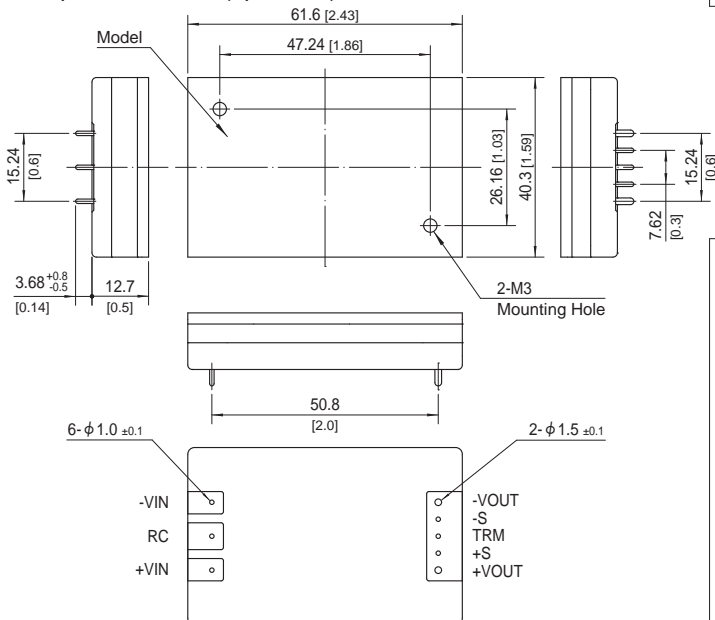


※ Recommended size for processing PCB (TOP VIEW)

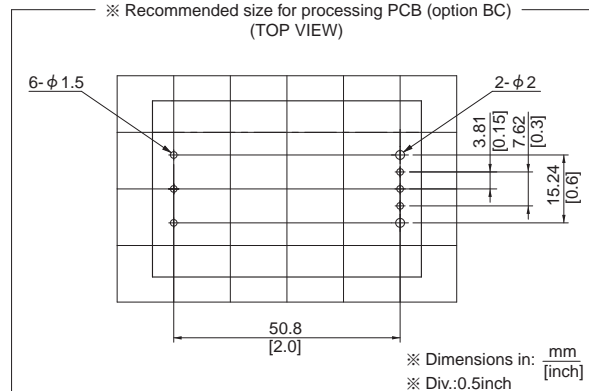


※ Dimensions in: mm [inch]  
 ※ Div.:0.5inch

## 3. Baseplate and case (optionBC)



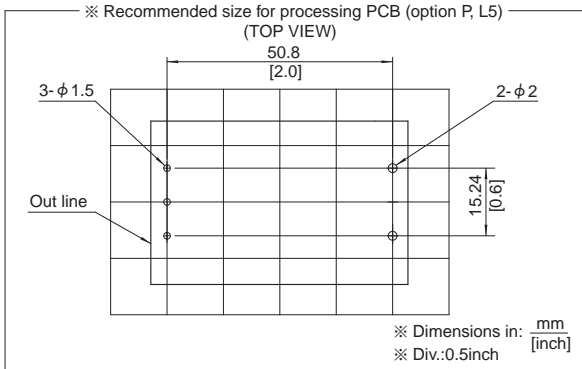
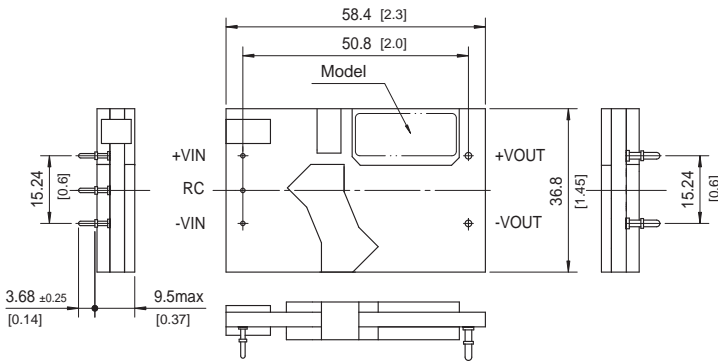
※ Recommended size for processing PCB (option BC) (TOP VIEW)



※ Dimensions in: mm [inch]  
 ※ Div.:0.5inch

External view

4. Parallel operation (option P)  
5pins type (option L5)

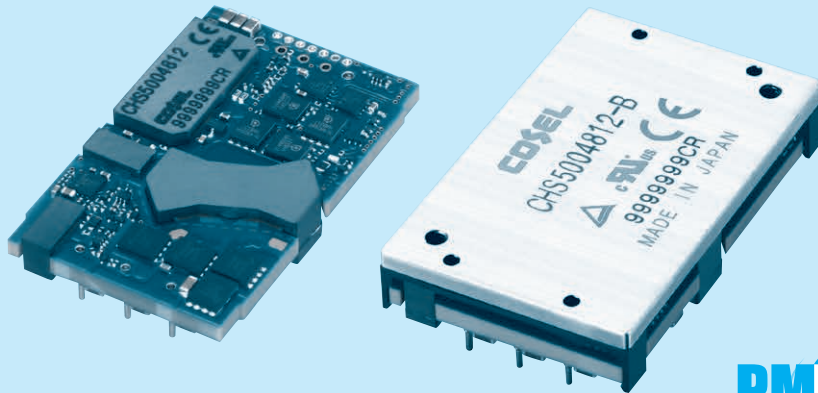
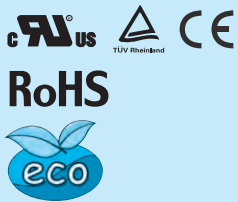


\* Please contact us about external view of the PMBus interface (option I).

# CHS500

CH S 500 48 12 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output power
- ④ Input voltage  
48:DC36 - 76V
- ⑤ Output voltage  
12:12V
- ⑥ Optional
  - R :with Remote ON/OFF  
Positive logic control
  - U :Shut down in protection  
circuit working
  - B :BasePlate option with  
Mounting hole M3
  - P : Parallel operation (5Pins  
:without +S,-S and TRM)
  - L2:Pin length 5.3mm
  - L5:5pins type (+S,-S,TRM  
less)
  - I :with the PMBus interface  
(Only CHS5004812)

MODEL	CHS5004812
MAX OUTPUT WATTAGE[W]	504.0
DC OUTPUT	12V 42A

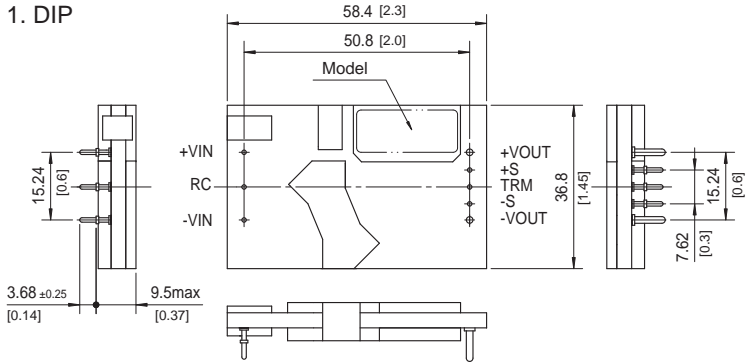
## SPECIFICATIONS

	MODEL	CHS5004812	
INPUT	VOLTAGE[V]	DC36 - 76	
	CURRENT[A]	*1 11.06typ	
	EFFICIENCY[%]	*1 95typ	
OUTPUT	VOLTAGE[V]	12	
	CURRENT[A]	42	
	LINE REGULATION[mV]	24max	
	LOAD REGULATION[mV]	*6 24max	
	RIPPLE	[mVrms] *2	60max
		[mVp-p] *2	180max
	RIPPLE NOISE[mVp-p]	*2 200max	
	TEMPERATURE REGULATION[mV]	240max	
	DRIFT[mV]	*3 40max	
	START-UP TIME[ms]	50max (DCIN 48V, Io=100%)	
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4 Fixed (TRM pin open), adjustable by external resistor (N/A : parallel operation) -10% / +10%		
OUTPUT VOLTAGE SETTING[V]	*1 *5 ±1.6%		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (Auto restart)	
	OVERVOLTAGE PROTECTION	115% - 135% (Auto restart)	
	REMOTE SENSING	Provided (N/A : parallel operation)	
	REMOTE ON/OFF	Provided (Negative Logic L : ON, H :OFF)	
ISOLATION	INPUT-OUTPUT	DC2,250V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)	
	INPUT-BASEPLATE	*5 DC2,250V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)	
	OUTPUT-BASEPLATE	*5 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)	
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,000 feet) max	
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max	
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis	
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis	
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950	
OTHERS	CASE SIZE/WEIGHT	58.4×9.5×36.8mm [2.3×0.37×1.45 inches] (W×H×D) / 60g max 58.9×12.7×37.3mm [2.32×0.5×1.47 inches] (W×H×D) / 90g max *5	
	COOLING METHOD	Convection / Forced air / Conduction	

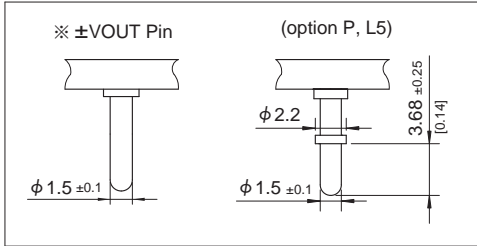
\*1 At rated input (DC48V) and rated load. Ta=25°C, 2m/s.  
 \*2 Ripple and ripple noise is measured by using measuring board with ceramic capacitor 22 μF.  
 \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*4 Refer to the instruction manual for input voltage derating.  
 \*5 BasePlate Option.  
 \*6 Parallel operation Option is not included.

External view

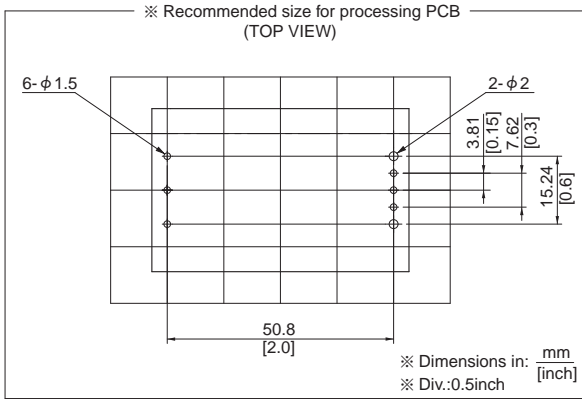
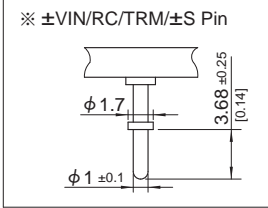
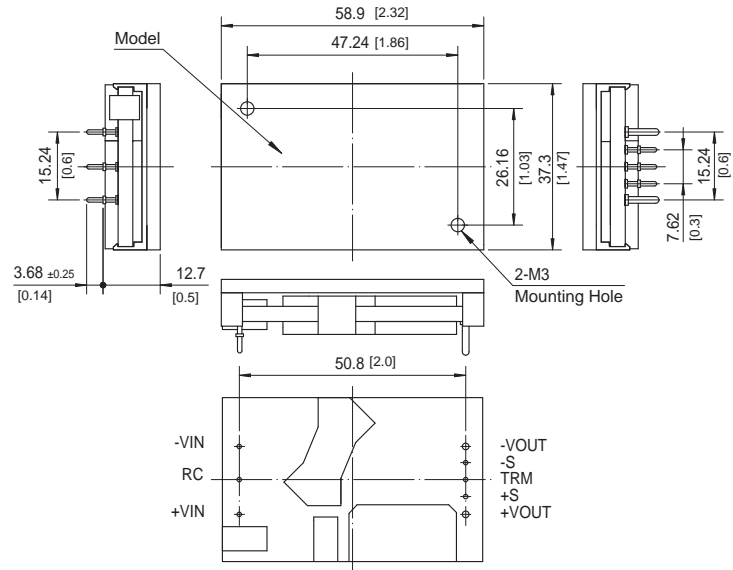
1. DIP



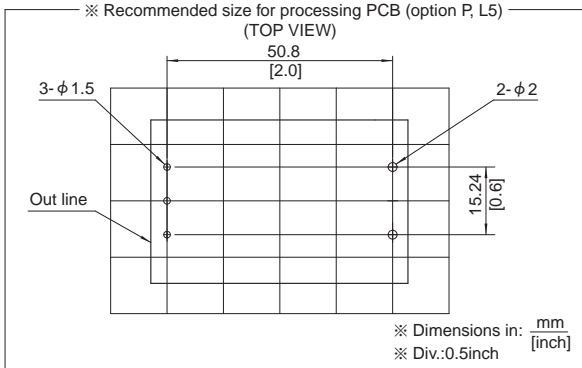
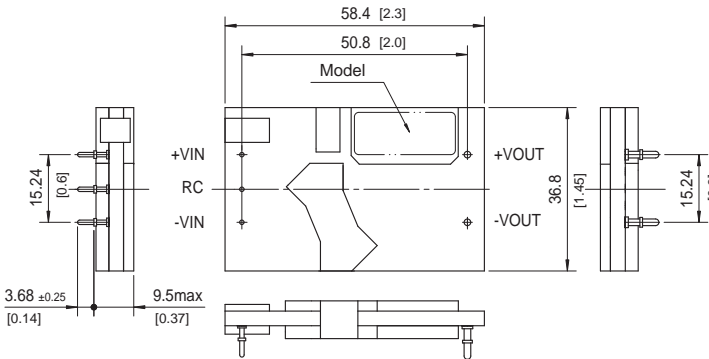
※ Tolerance: ±0.5 [±0.02]  
※ Dimensions in mm, [ ]=inches



2. BasePlate (optionB)



3. Parallel operation (option P)  
5pins type (option L5)

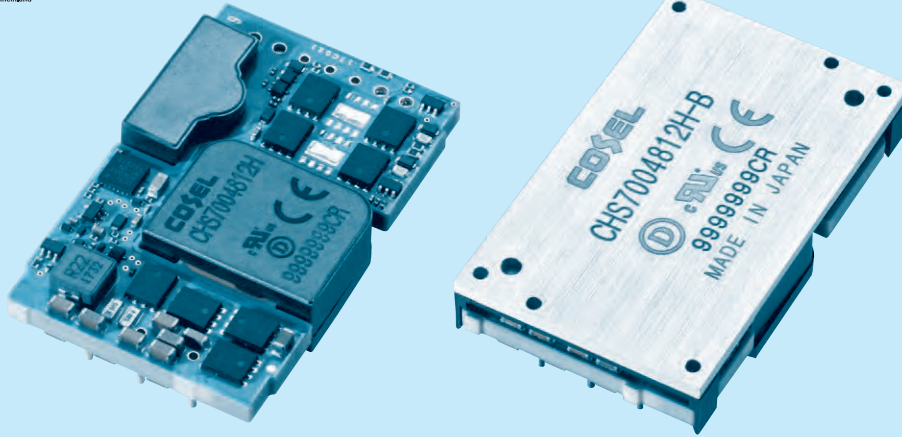
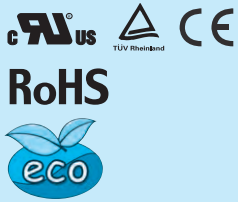


\*Please contact us about external view of the PMBus interface (option I).

# CHS700

CH S 700 48 12 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
  - ② Single output
  - ③ Output power
  - ④ Input voltage  
48:DC36 - 76V
  - ⑤ Output voltage  
12H:12V (High efficiency type)
  - ⑥ Optional  
R :with Remote ON/OFF  
Positive logic control  
U :Shut down in protection  
circuit working  
B :BasePlate option with  
Mounting hole M3  
L2:Pin length 5.3mm  
L5:5pins type (Pin No. 4, 6,  
7, 8, 10 less)  
L7:7pins type (Pin No. 6, 7, 8  
less)  
L8:8pins type (Pin No. 4, 10  
less)
- \*Refer to the "Pin Configuration"  
for pin assign.

MODEL	CHS7004812H
MAX OUTPUT WATTAGE[W]	702.0
DC OUTPUT	12V 58.5A

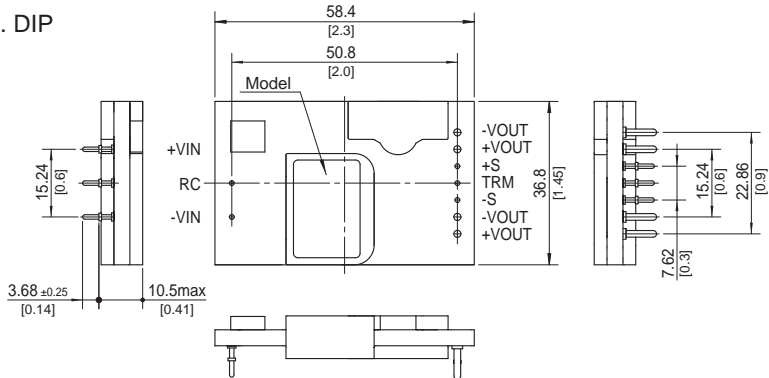
## SPECIFICATIONS

	MODEL	CHS7004812H	
INPUT	VOLTAGE[V]	DC36 - 76	
	CURRENT[A]	*1 15.3typ	
	EFFICIENCY[%]	*1 96typ	
OUTPUT	VOLTAGE[V]	12	
	CURRENT[A]	58.5	
	LINE REGULATION[mV]	*6 24max	
	LOAD REGULATION[mV]	*6 24max	
	RIPPLE	[mVrms] *2	80max
		[mVp-p] *2	240max
	RIPPLE NOISE[mVp-p]	*2 280max	
	TEMPERATURE REGULATION[mV]	240max	
	DRIFT[mV]	*3 40max	
	START-UP TIME[ms]	50max (DCIN 48V, Io=100%)	
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4 Fixed (TRM pin open), adjustable by external resistor -20% / +10%	
OUTPUT VOLTAGE SETTING[V]	*1 *6 ±1.6%		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (Auto restart)	
	OVERVOLTAGE PROTECTION	115% - 135% (Auto restart)	
	REMOTE SENSING	Provided	
	REMOTE ON/OFF	Provided (Negative Logic L : ON, H : OFF)	
ISOLATION	INPUT-OUTPUT	DC2,250V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)	
	INPUT-BASEPLATE	*5 DC2,250V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)	
	OUTPUT-BASEPLATE	*5 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)	
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 5,000m (16,000 feet) max	
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max	
	VIBRATION	10-55Hz 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis	
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis	
SAFETY	AGENCY APPROVALS	UL62368-1, C-UL (CSA62368-1), EN62368-1	
OTHERS	CASE SIZE/WEIGHT	58.4 X 10.5 X 36.8mm [2.3 X 0.41 X 1.45 inches] (W X H X D) / 72g max 58.9 X 12.7 X 37.3mm [2.32 X 0.5 X 1.47 inches] (W X H X D) / 100g max *5	
	COOLING METHOD	Convection / Forced air / Conduction	

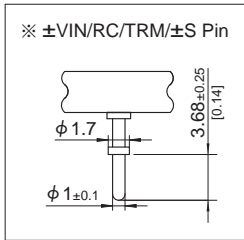
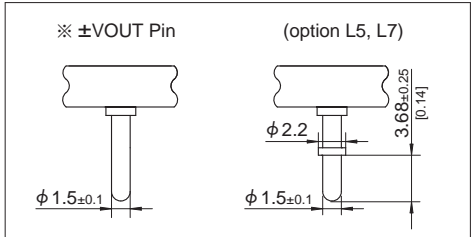
\*1 At rated input (DC48V) and rated load. Ta=25°C, 2m/s.  
 \*2 Ripple and ripple noise is measured by using measuring board with ceramic capacitor 22 μF  
 \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*4 Refer to the instruction manual for input voltage derating.  
 \*5 BasePlate Option.  
 \*6 At input voltage DC40-76V.

External view

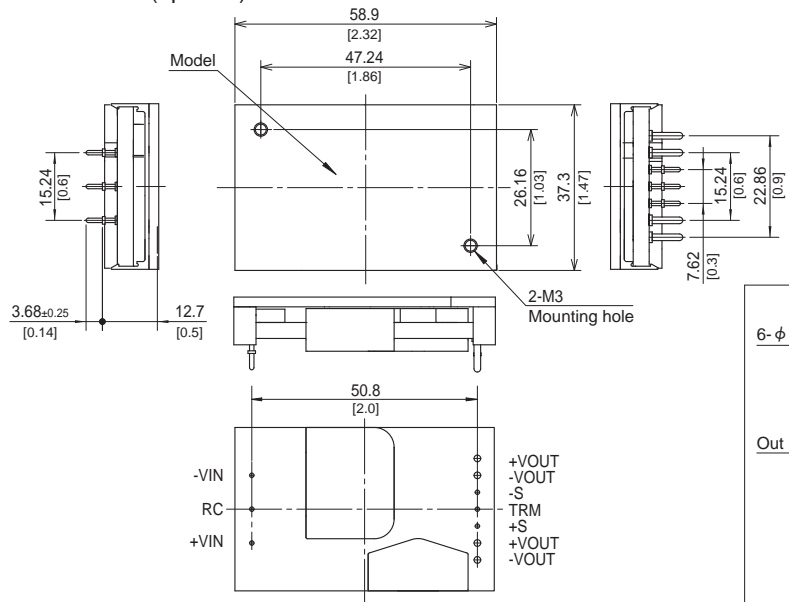
1. DIP



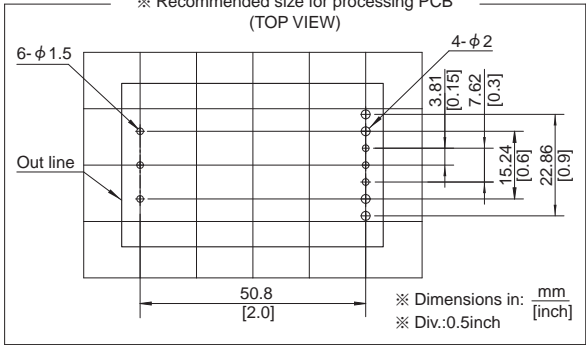
※ Tolerance:±0.5  
※ Dimensions in mm, [ ]=inches



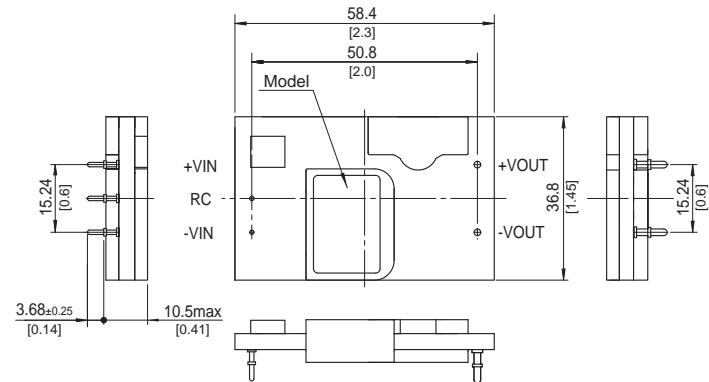
2. BasePlate (optionB)



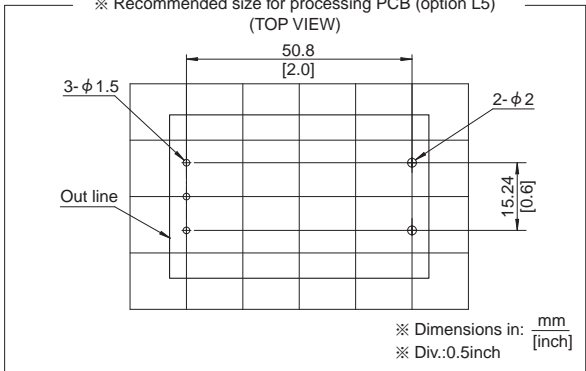
※ Recommended size for processing PCB (TOP VIEW)



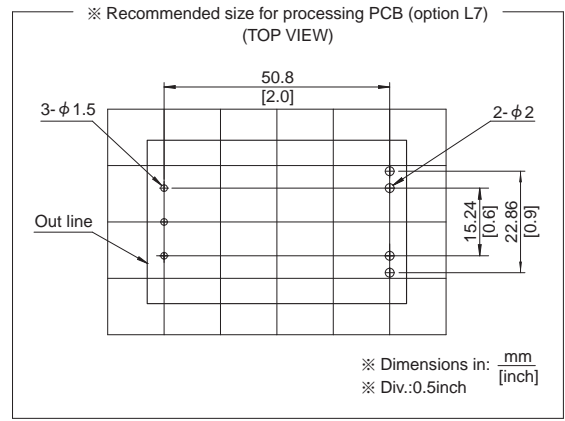
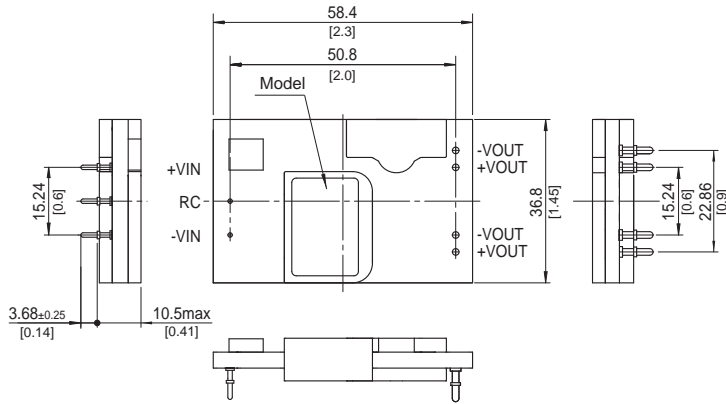
3. 5pins type (option L5)



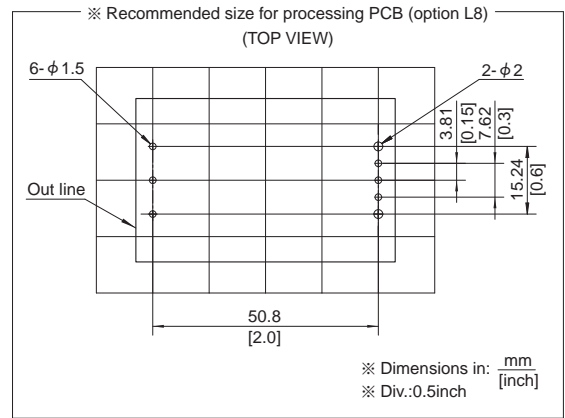
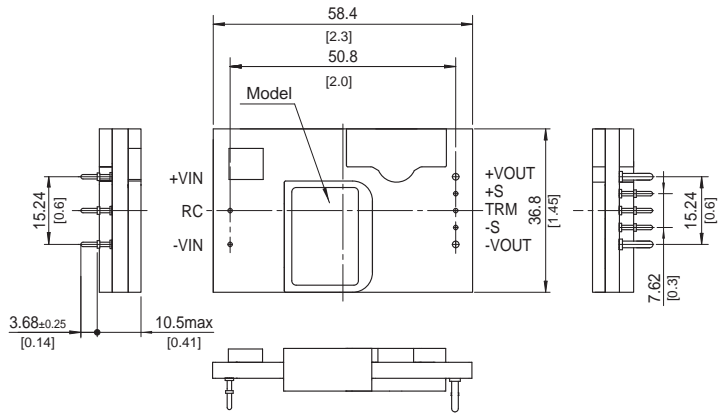
※ Recommended size for processing PCB (option L5) (TOP VIEW)



4. 7pins type (option L7)



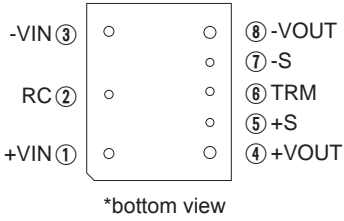
5. 8pins type (option L8)



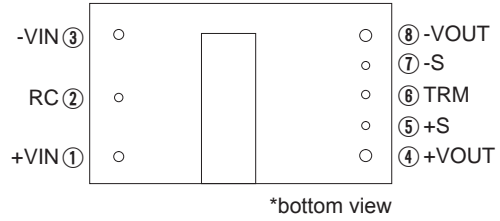


## Pin Configuration

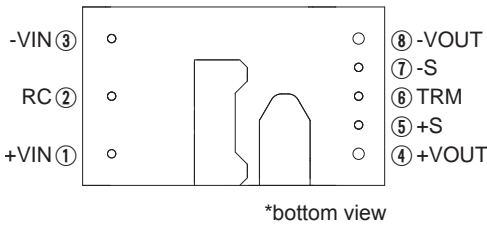
### ●CHS60



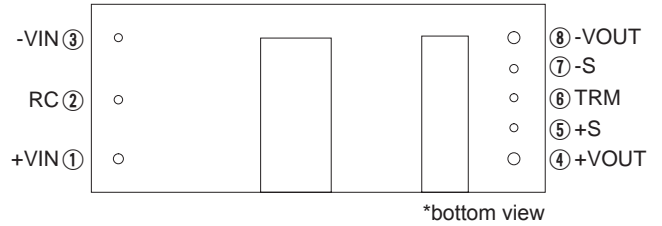
### ●CHS80



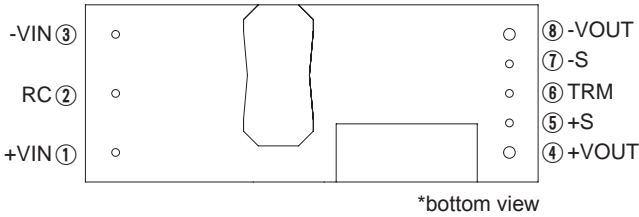
### ●CHS120



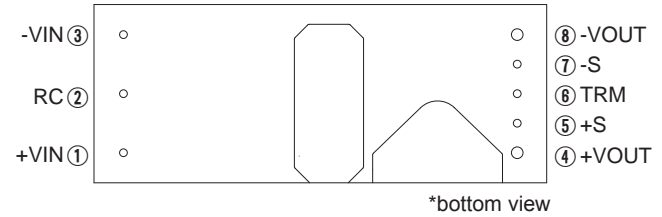
### ●CHS200



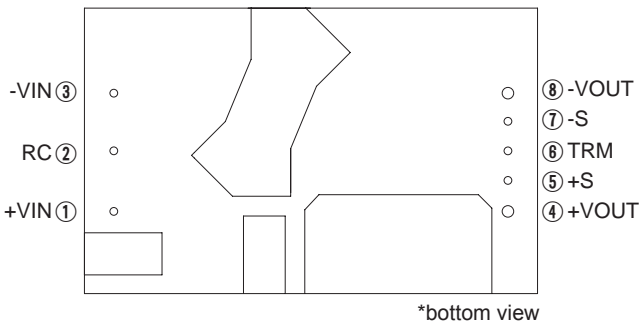
### ●CHS300



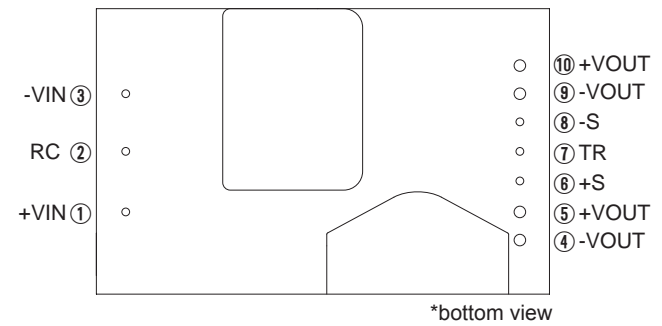
### ●CHS380



### ●CHS400/CHS500



### ●CHS700

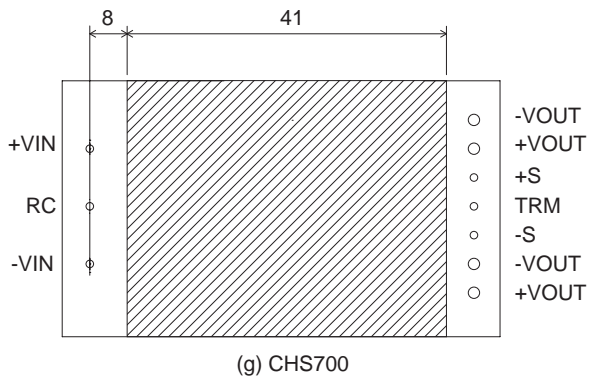
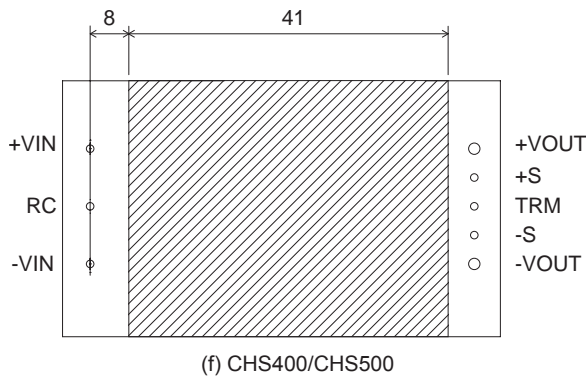
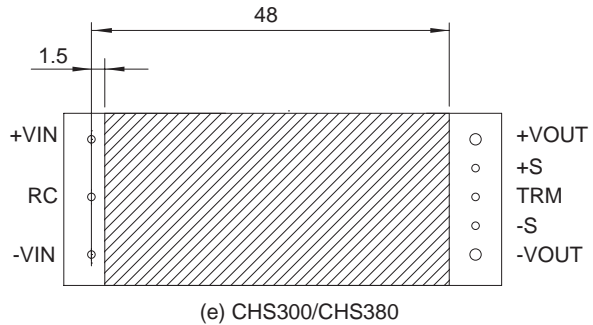
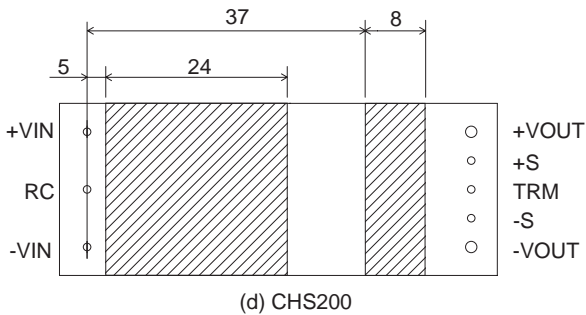
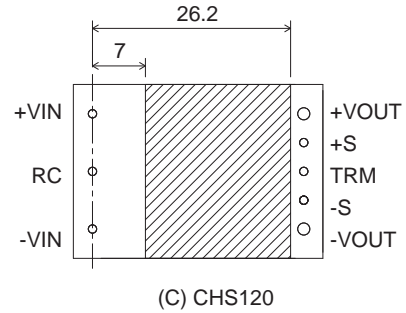
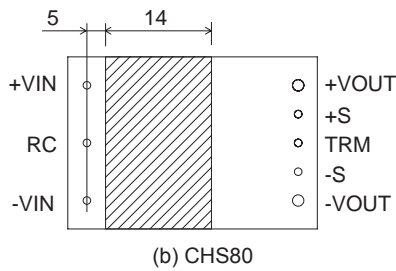
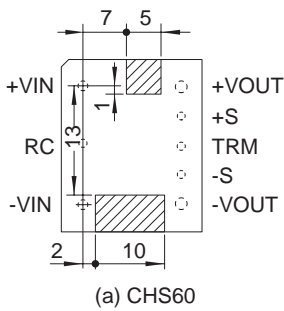


No.		Pin Connection	Function
CHS60, CHS80, CHS120, CHS200, CHS300, CHS380, CHS400, CHS500	CHS700		
①	①	+VIN	+DC input
②	②	RC	Remote ON/OFF
③	③	-VIN	-DC input
④	⑤,⑩	+VOUT	+DC output
⑤	⑥	+S	+Remote sensing
⑥	⑦	TRM	Adjustment of output voltage
⑦	⑧	-S	-Remote sensing
⑧	④,⑨	-VOUT	-DC output

Implementation · Mounting Method

Mounting method

- The unit can be mounted in any direction. When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation. The temperature around each power supply should not exceed the temperature range shown in Instruction Manual 8.
- Avoid placing the DC input line pattern layout underneath the unit. It will increase the line conducted noise. Make sure to leave an ample distance between the line pattern layout and the unit. Also avoid placing the DC output line pattern underneath the unit because it may increase the output noise. Lay out the pattern away from the unit.
- Avoid placing the signal line pattern layout underneath the unit because the power supply might become unstable. Lay out the pattern away from the unit.
- Avoid placing pattern layout in hatched area shown in below to insulate between pattern and power supply.



Dimensions in mm

Automatic Mounting (CHS series:option S)

- To mount CHS series automatically, use the inductor area near the output pin as an adsorption point. Please see the External View for details of the adsorption point. If the bottom dead point of a suction nozzle is too low when mounting excessive force is applied to the inductor, it could cause damage. Please mount carefully.

Implementation · Mounting Method

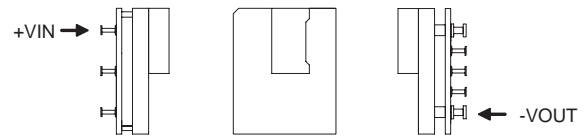
Soldering

- (1)Flow Soldering : 260°C                      15 seconds or less
- (2)Soldering Iron : maximum 450°C        5 seconds or less
- (3)Reflow Soldering (option “-S”)

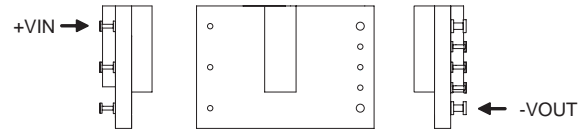
■Right figure shows conditions for the reflow soldering for option “-S” of CHS series. Please make sure that the temperatures of pin terminals +VIN and -VOUT shown in right figure do not exceed the temperatures shown in below.

■If time or temperature of the reflow soldering goes beyond the conditions, reliability of internal components may be compromised.

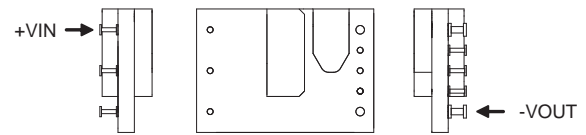
Please use the unit under the recommended reflow conditions.



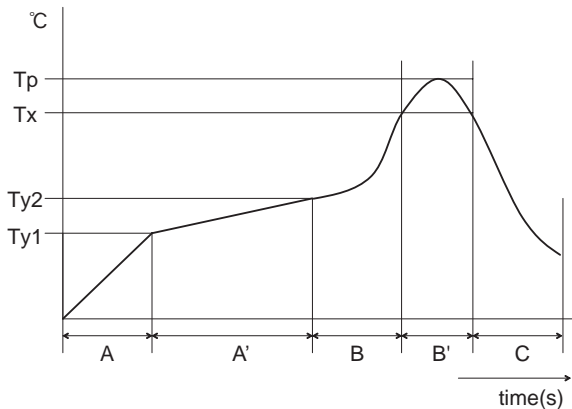
(a) CHS60



(b) CHS80



(c) CHS120



A	1.0 - 5.0°C/s
A'	Ty1:160±10°C Ty2:180±10°C Ty1 - Ty2:120s max
B	1.0 - 5.0°C/s
B'	Tp:Max245°C 10s max Tx:220°C or more:70s max
C	1.0 - 5.0°C/s

Notes to use option “-S”

- Solder iron or other similar methods are not recommended soldering method for option “-S”because it may not be able to retain connection reliability between the PCB and the Pins. Solder reflow is the acceptable mounting system for the option.
- Option “-S”is not reusable product after soldered on any application PCB.

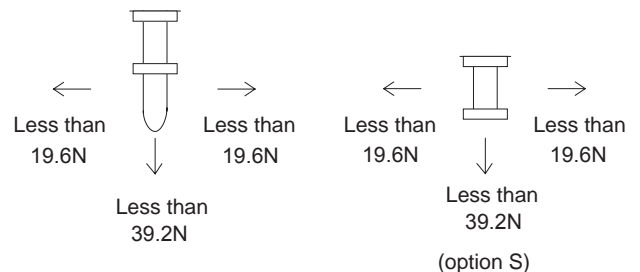
Stress to the pins

■When too much stress is applied to the pins of the power supply, the internal connection may be weakened.

As shown in right figure, avoid applying stress of more than 19.6N (2kgf) to the pins horizontally and more than 39.2N (4kgf) vertically.

- The pins are soldered on PWB internally. Therefore, do not pull bend them with strong force.
- Fix the unit on PCB (using silicone rubber or fixing fittings) to reduce the stress to the pins.
- The base plate at Option“B”and “BC”is attached by glue.

When fixed to cabinet with screw, fix the power module before soldering the input and output pins to prevent the power modulebeing damaged.



Stress to the product

■CHS series transformer core and choke coil core are attached by glue.

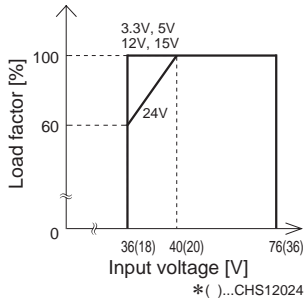
There is a possibility that the core will be removed and power supply will be damaged when they receive stress by the fall or somekind of stress.

■The base plate at Option“B”and “BC”is attached by glue. There is a possibility that the base plate will be removed and power supply will be damaged when they receive stress by the fall or some kind of stress.

Derating

Input Derating

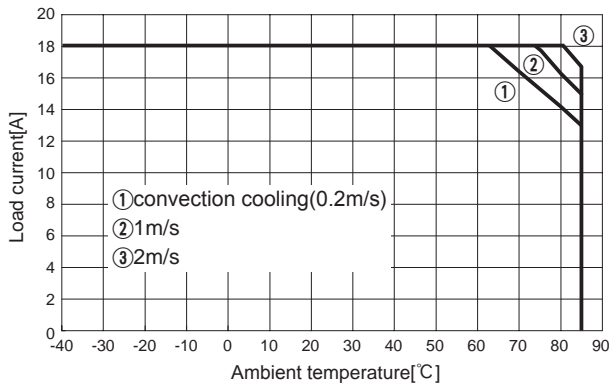
●CHS120 Input Derating



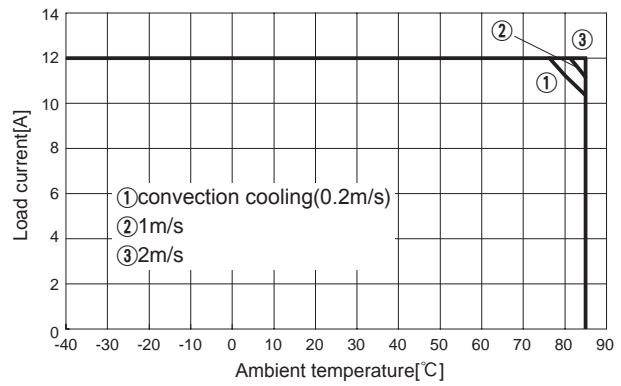
Ambient temperature derating

■Shown the thermal curve with measuring as shown in Instruction Manual 8 Measuring method. Verify final design by actual temperature measurement. Make sure the temperatures at temperature measurement locations shown from Instruction Manual 8. It should not exceed the derating curve in Instruction Manual 8.

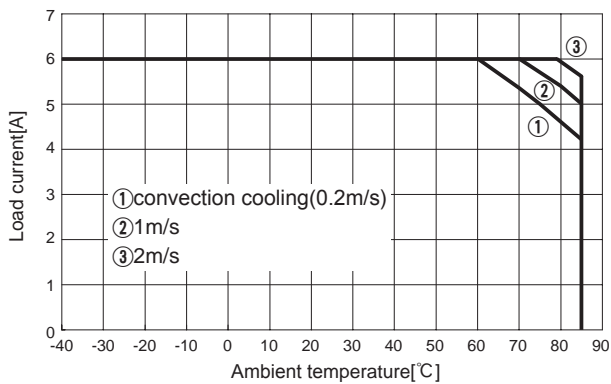
●CHS60483R3 Ambient temperature derating (Vin=48V Reference value)



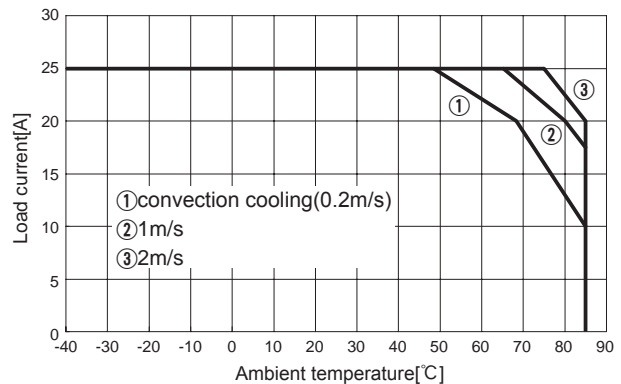
●CHS604805 Ambient temperature derating (Vin=48V Reference value)



●CHS604812 Ambient temperature derating (Vin=48V Reference value)

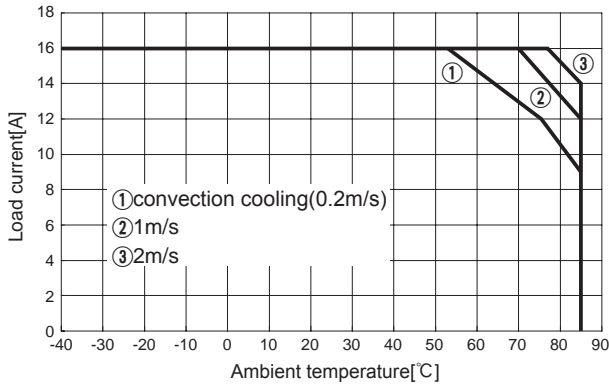


●CHS80483R3 Ambient temperature derating (Vin=48V Reference value)

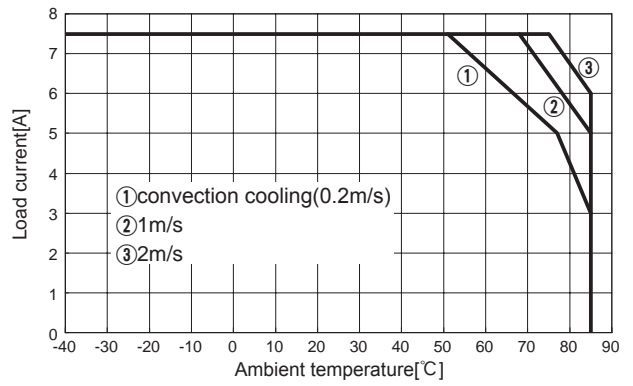


Derating

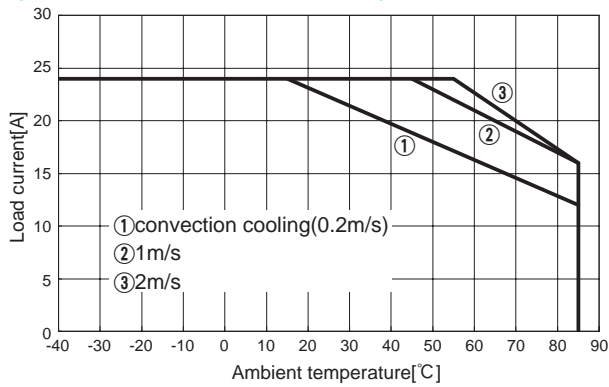
●CHS804805 Ambient temperature derating (Vin=48V Reference value)



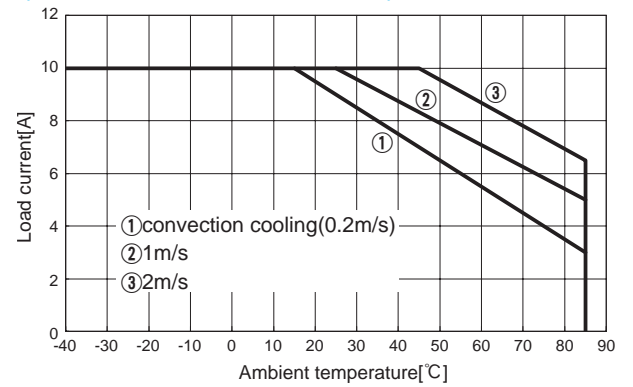
●CHS804812 Ambient temperature derating (Vin=48V Reference value)



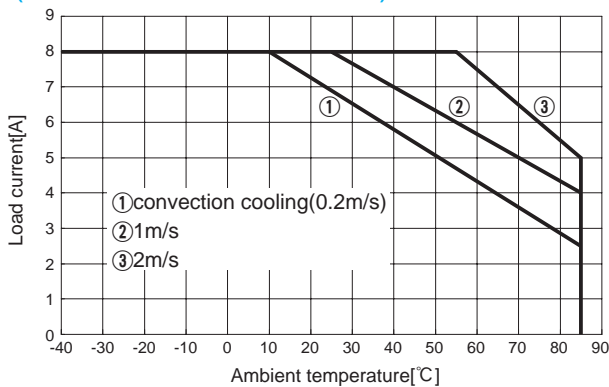
●CHS1202405 Ambient temperature derating (Vin=24V Reference value)



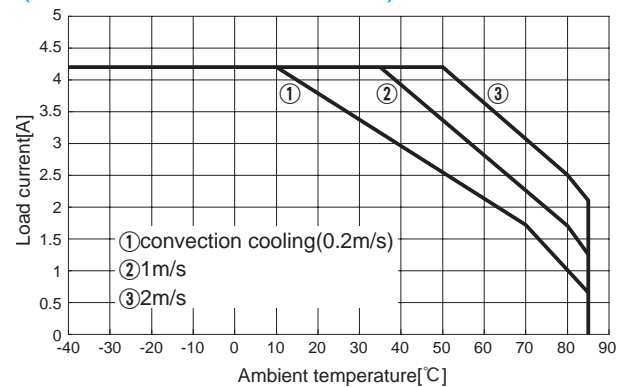
●CHS1202412 Ambient temperature derating (Vin=24V Reference value)



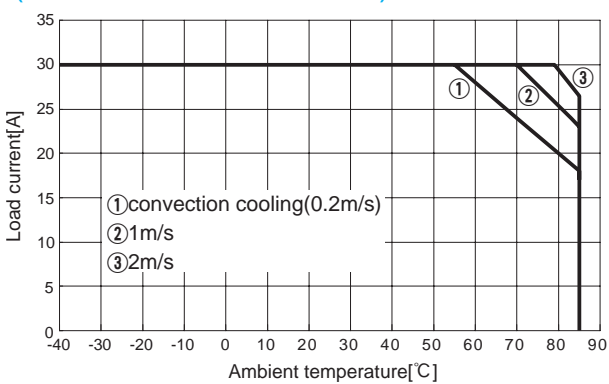
●CHS1202415 Ambient temperature derating (Vin=24V Reference value)



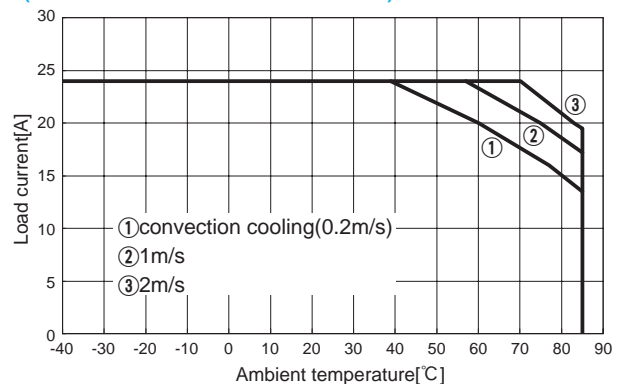
●CHS1202424 Ambient temperature derating (Vin=24V Reference value)



●CHS120483R3 Ambient temperature derating (Vin=48V Reference value)



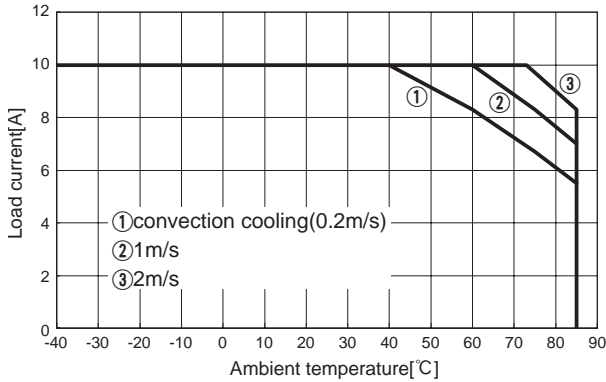
●CHS1204805 Ambient temperature derating (Vin=48V Reference value)



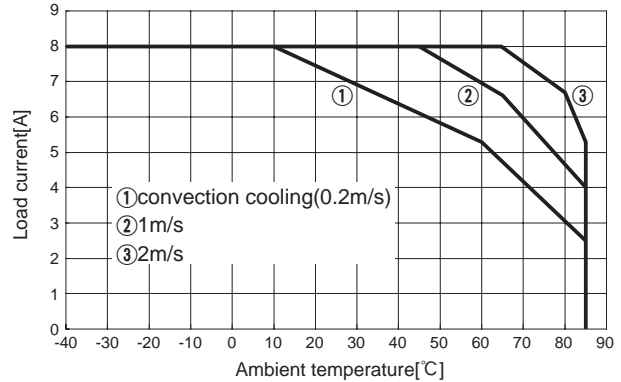
CHS

Derating

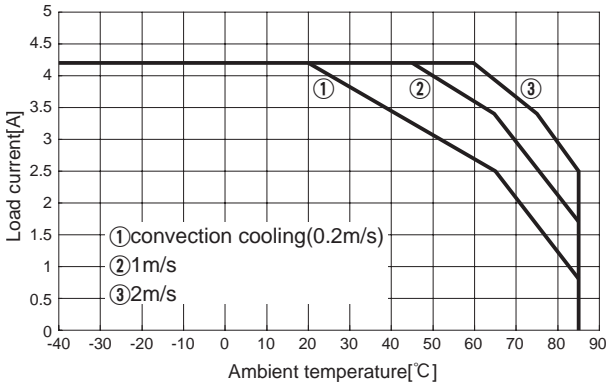
●CHS1204812 Ambient temperature derating (Vin=48V Reference value)



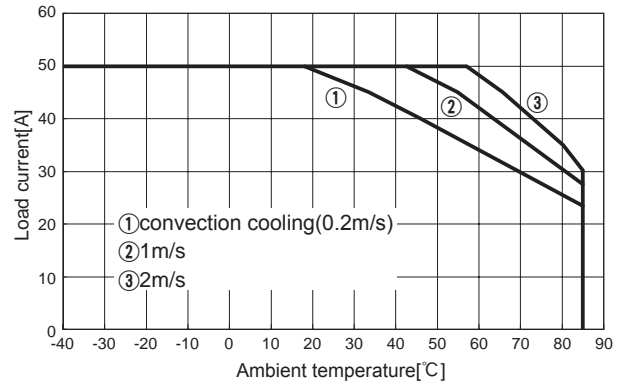
●CHS1204815 Ambient temperature derating (Vin=48V Reference value)



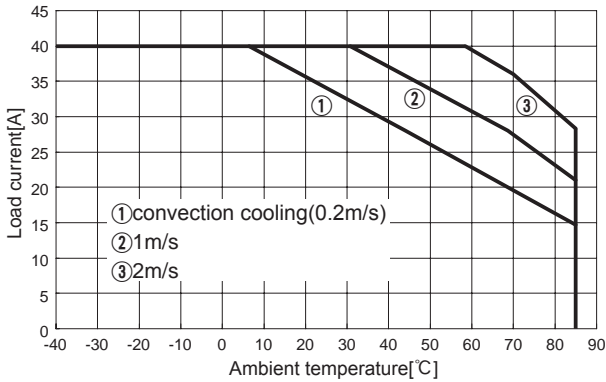
●CHS1204824 Ambient temperature derating (Vin=48V Reference value)



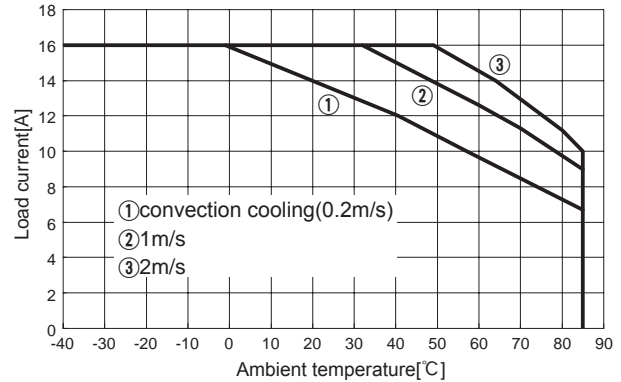
●CHS200483R3 Ambient temperature derating (Vin=48V Reference value)



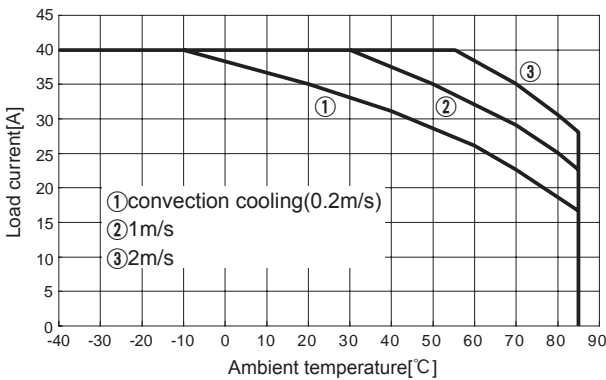
●CHS2004805 Ambient temperature derating (Vin=48V Reference value)



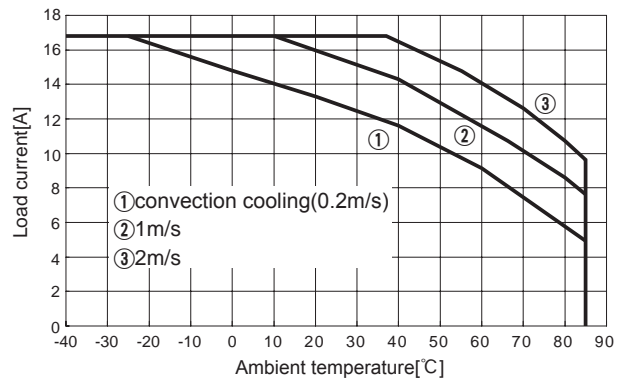
●CHS2004812 Ambient temperature derating (Vin=48V Reference value)



●CHS3002405 Ambient temperature derating (Vin=24V Reference value)



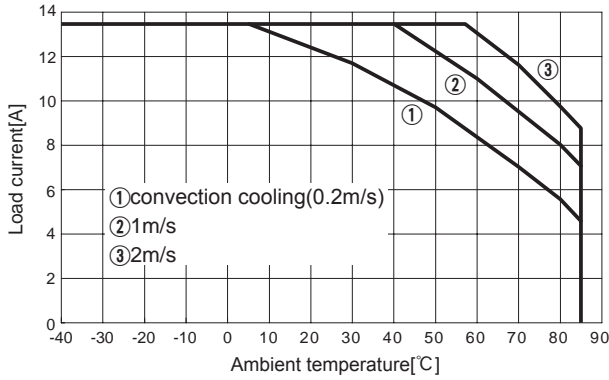
●CHS3002412 Ambient temperature derating (Vin=24V Reference value)



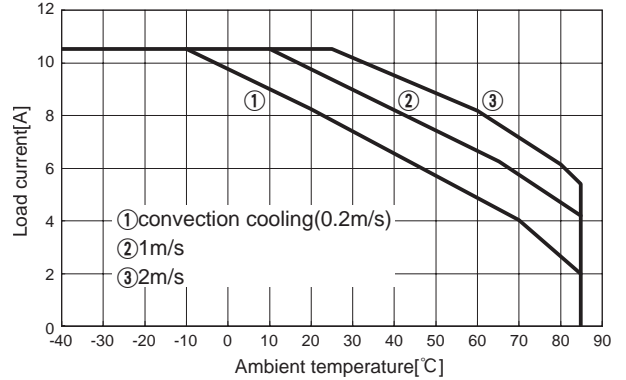
CHS

Derating

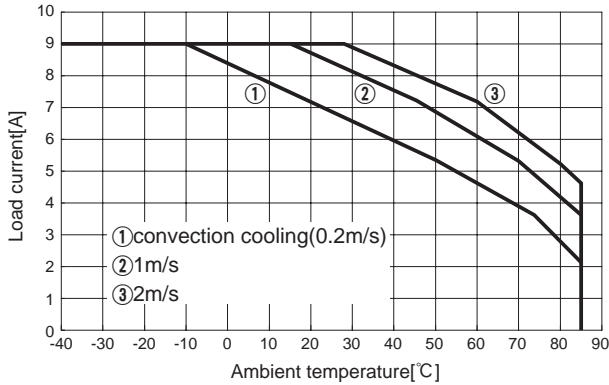
● CHS3002415 Ambient temperature derating (Vin=24V Reference value)



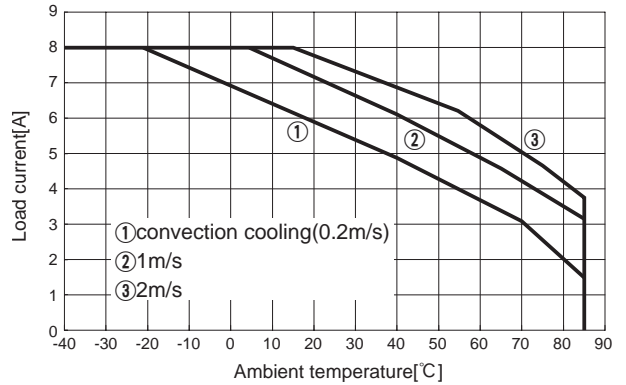
● CHS3002424 Ambient temperature derating (Vin=24V Reference value)



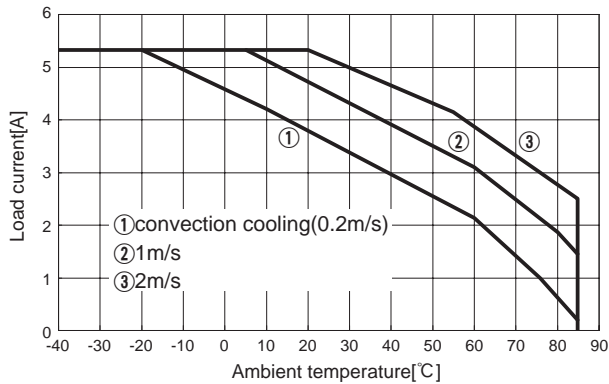
● CHS3002428 Ambient temperature derating (Vin=24V Reference value)



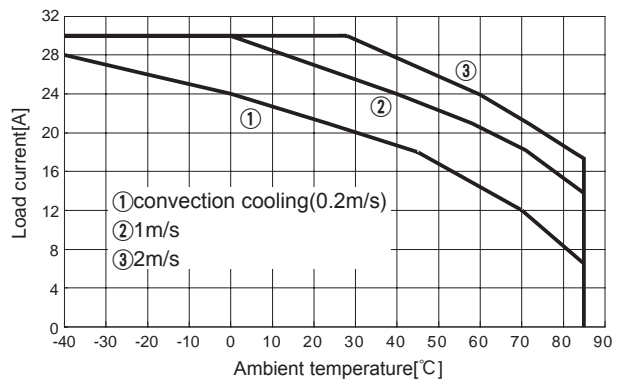
● CHS3002432 Ambient temperature derating (Vin=24V Reference value)



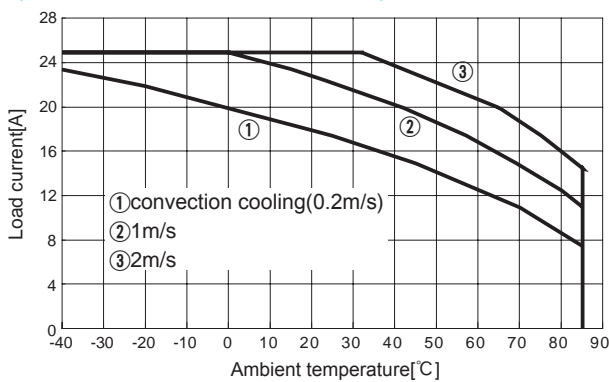
● CHS3002448 Ambient temperature derating (Vin=24V Reference value)



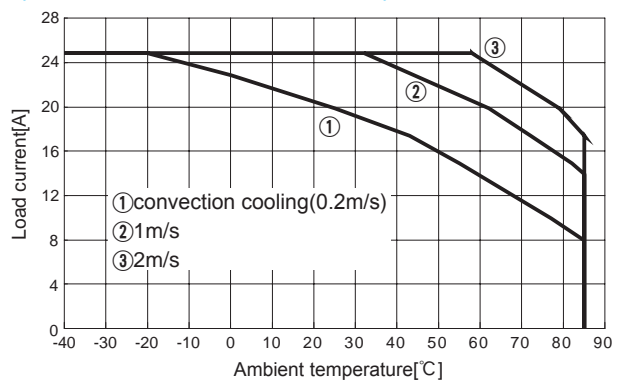
● CHS3004810 Ambient temperature derating (Vin=48V Reference value)



● CHS3004812 Ambient temperature derating (Vin=48V Reference value)



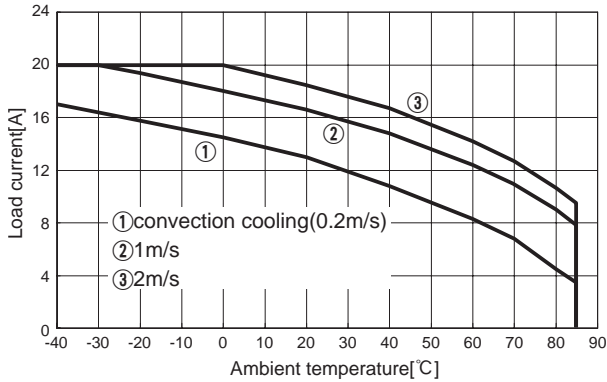
● CHS3004812H Ambient temperature derating (Vin=48V Reference value)



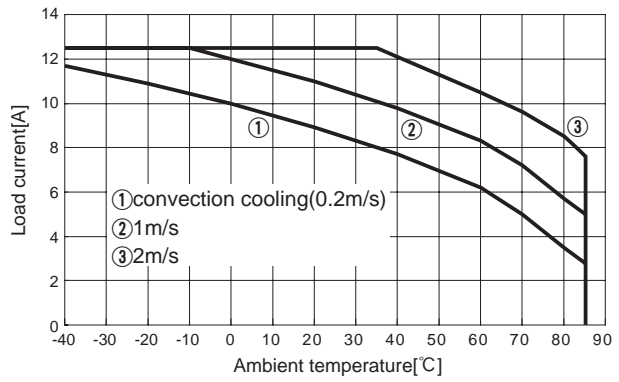
CHS

Derating

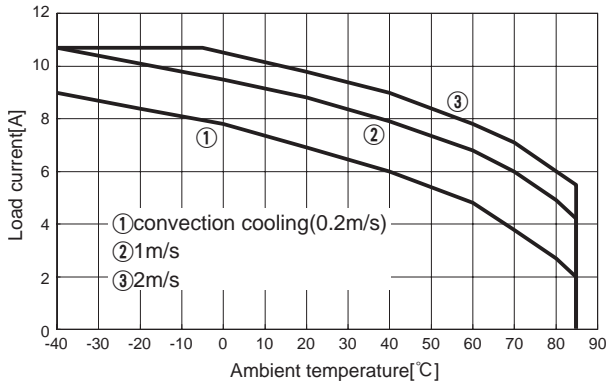
●CHS3004815 Ambient temperature derating (Vin=48V Reference value)



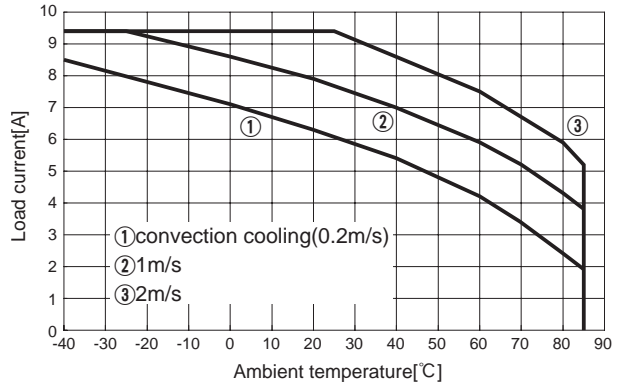
●CHS3004824 Ambient temperature derating (Vin=48V Reference value)



●CHS3004828 Ambient temperature derating (Vin=48V Reference value)

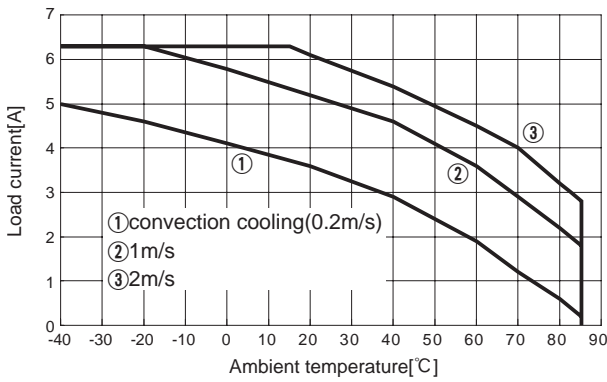


●CHS3004832 Ambient temperature derating (Vin=48V Reference value)

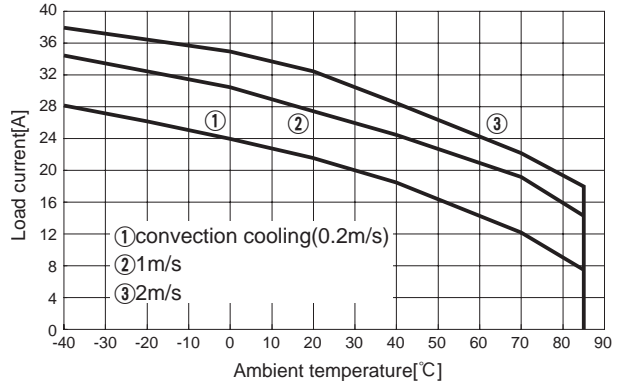


CHS

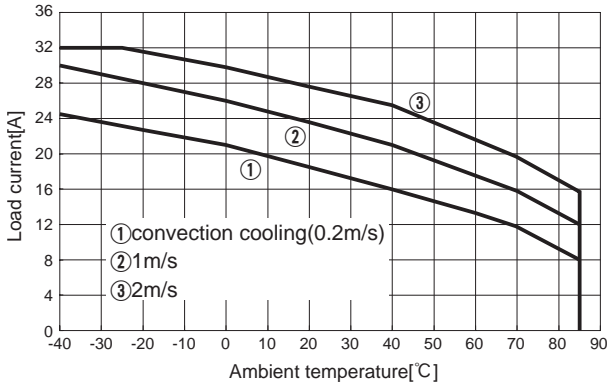
●CHS3004848 Ambient temperature derating (Vin=48V Reference value)



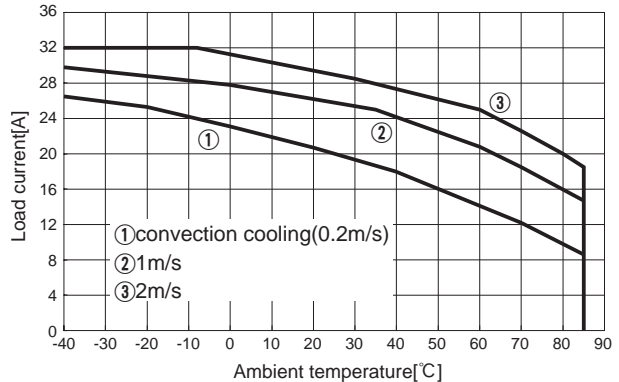
●CHS3804810 Ambient temperature derating (Vin=48V Reference value)



●CHS3804812 Ambient temperature derating (Vin=48V Reference value)



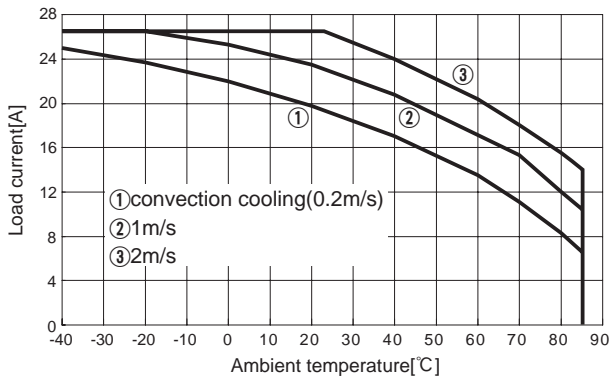
●CHS3804812H Ambient temperature derating (Vin=48V Reference value)



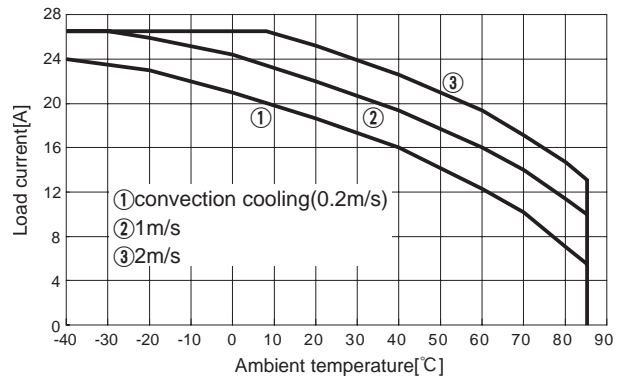


Derating

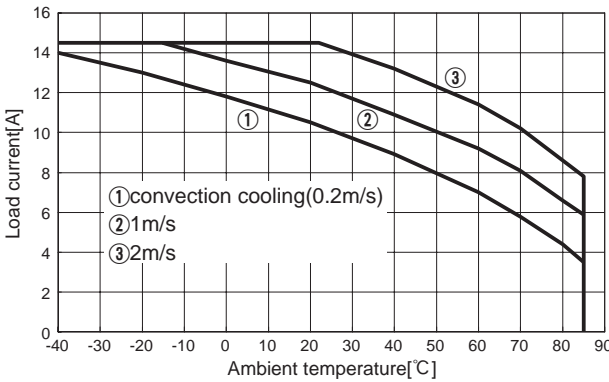
● CHS4002412 Ambient temperature derating (Vin=24V Reference value)



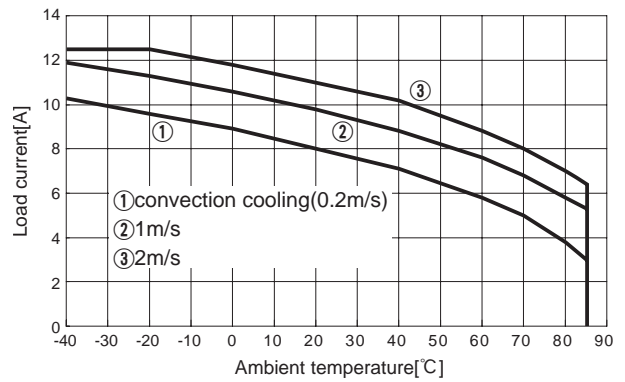
● CHS4002415 Ambient temperature derating (Vin=24V Reference value)



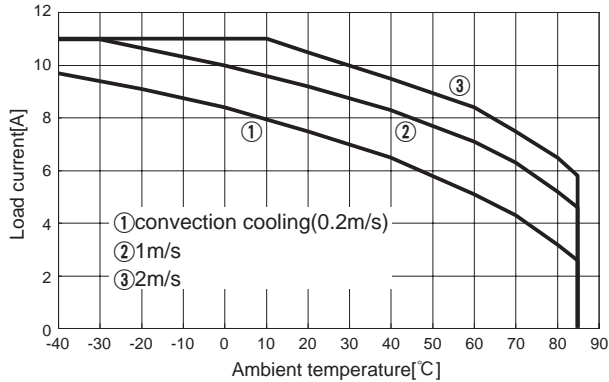
● CHS4002424 Ambient temperature derating (Vin=24V Reference value)



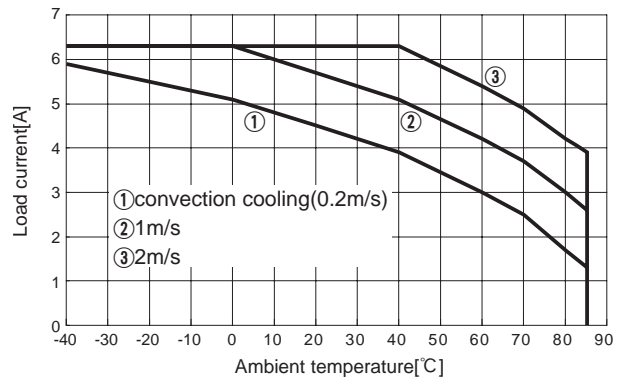
● CHS4002428 Ambient temperature derating (Vin=24V Reference value)



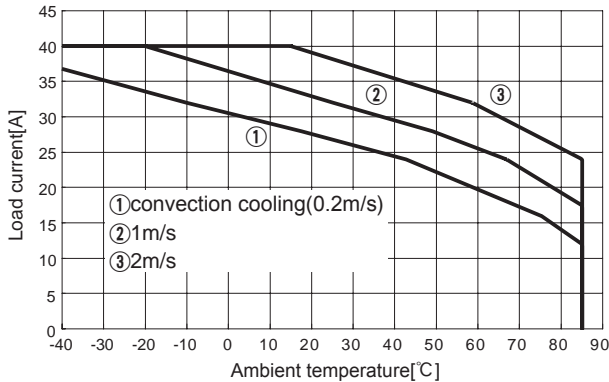
● CHS4002432 Ambient temperature derating (Vin=24V Reference value)



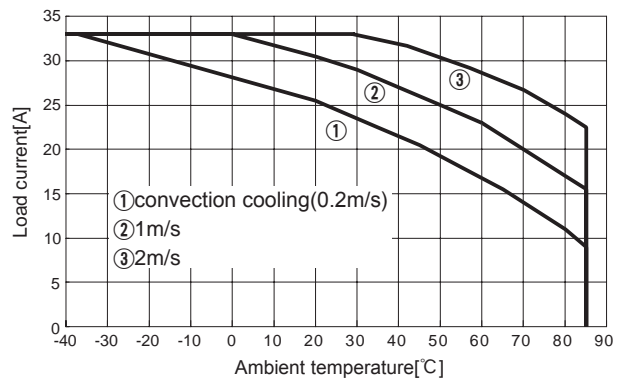
● CHS4002448 Ambient temperature derating (Vin=24V Reference value)



● CHS4004810 Ambient temperature derating (Vin=48V Reference value)



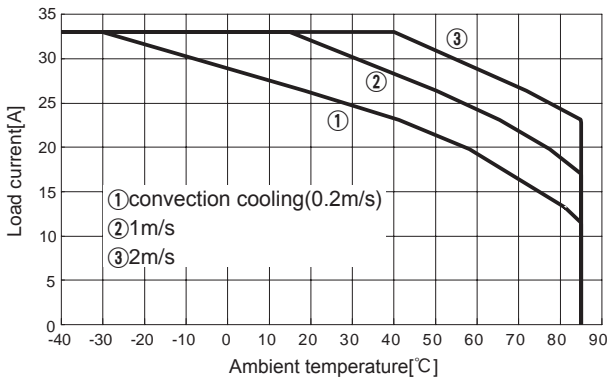
● CHS4004812 Ambient temperature derating (Vin=48V Reference value)



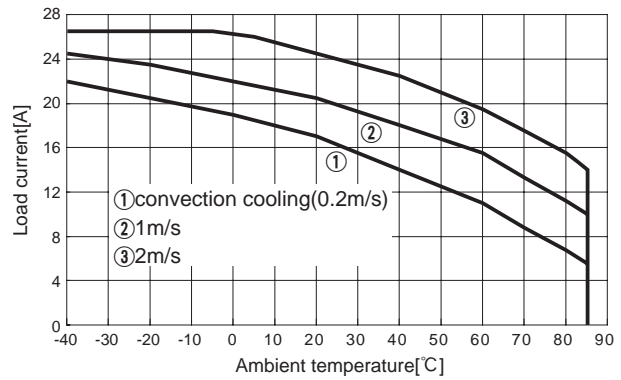
CHS

Derating

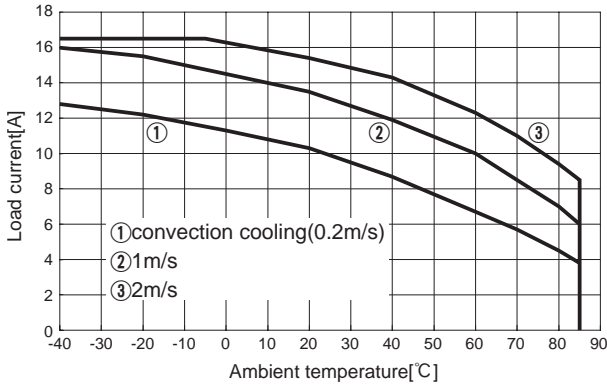
●CHS4004812H Ambient temperature derating (Vin=48V Reference value)



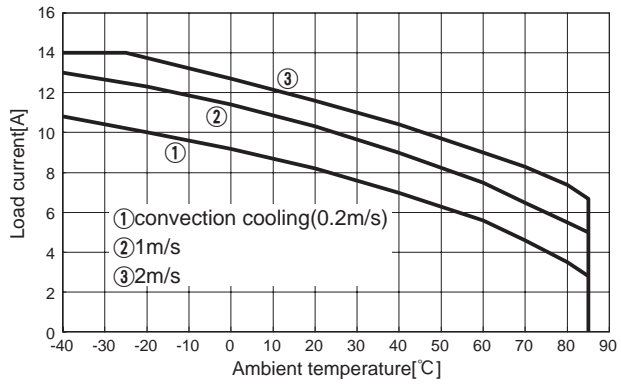
●CHS4004815 Ambient temperature derating (Vin=48V Reference value)



●CHS4004824 Ambient temperature derating (Vin=48V Reference value)

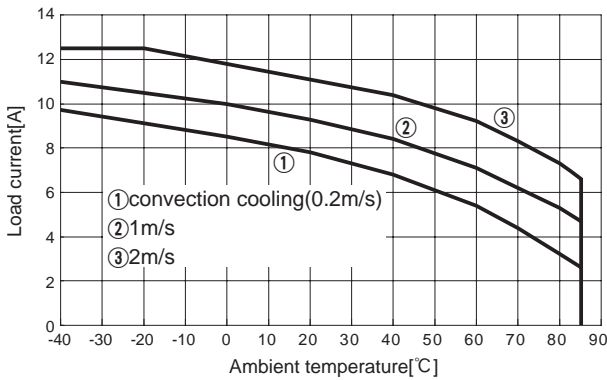


●CHS4004828 Ambient temperature derating (Vin=48V Reference value)

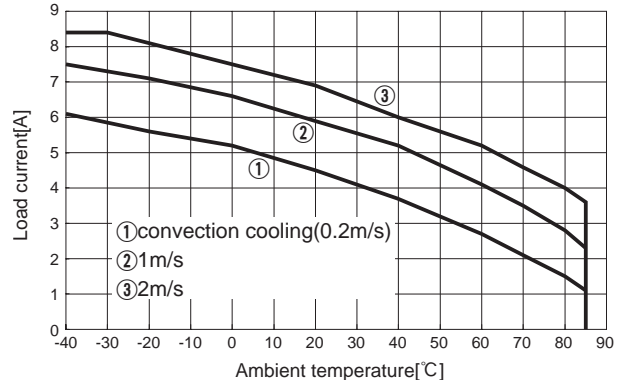


CHS

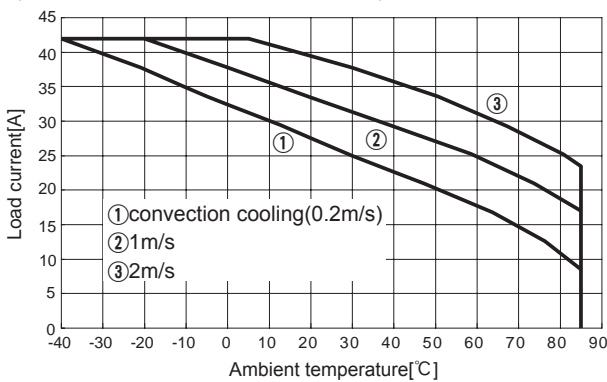
●CHS4004832 Ambient temperature derating (Vin=48V Reference value)



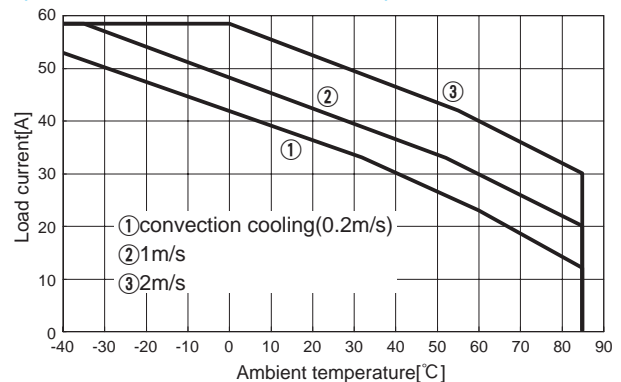
●CHS4004848 Ambient temperature derating (Vin=48V Reference value)



●CHS5004812 Ambient temperature derating (Vin=48V Reference value)



●CHS7004812H Ambient temperature derating (Vin=48V Reference value)



## Instruction Manuals

◆ Please see catalog and instruction manual before you use.

Instruction Manuals <https://en.cosel.co.jp/product/powersupply/CHS/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

CHS



NOTICE



## Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current	Rated input fuse	Inrush current protection	PCB/Pattern			Series/Redundancy operation availability	
						Material	Single sided	Double sided	Series operation	Redundancy operation
CHS60	Foward converter	440	* 1	-	-	glass fabric base, epoxy resin		Multilayer	Yes	* 2
CHS80	Half-bridge converter	250	* 1	-	-	glass fabric base, epoxy resin		Multilayer	Yes	* 2
CHS12024	Half-bridge converter	180	* 1	-	-	glass fabric base, epoxy resin		Multilayer	Yes	* 2
CHS12048	Half-bridge converter	200	* 1	-	-	glass fabric base, epoxy resin		Multilayer	Yes	* 2
CHS200	Full-bridge converter	150	* 1	-	-	glass fabric base, epoxy resin		Multilayer	Yes	* 2
CHS30024 (05,12,15)	Full-bridge converter	170	* 1	-	-	glass fabric base, epoxy resin		Multilayer	Yes	* 2
CHS30024 (24,28,32,48)	Full-bridge converter	170	* 1	-	-	glass fabric base, epoxy resin		Multilayer	Yes	* 2
CHS30048 (10,12,12H)	Full-bridge converter	170	* 1	-	-	glass fabric base, epoxy resin		Multilayer	Yes	* 2
CHS30048 (15,24,28,32,48)	Full-bridge converter	170	* 1	-	-	glass fabric base, epoxy resin		Multilayer	Yes	* 2
CHS380 (4810,4812)	Full-bridge converter	200	* 1	-	-	glass fabric base, epoxy resin		Multilayer	Yes	* 2
CHS380 (4812H)	Full-bridge converter	180	* 1	-	-	glass fabric base, epoxy resin		Multilayer	Yes	* 2
CHS40024	Full-bridge converter	150	* 1	-	-	glass fabric base, epoxy resin		Multilayer	Yes	* 2
CHS40048 (10,12,12H)	Full-bridge converter	150	* 1	-	-	glass fabric base, epoxy resin		Multilayer	Yes	* 2
CHS40048 (15,24,28,32,48)	Full-bridge converter	150	* 1	-	-	glass fabric base, epoxy resin		Multilayer	Yes	* 2
CHS500	Full-bridge converter	150	* 1	-	-	glass fabric base, epoxy resin		Multilayer	Yes	* 2
CHS700	Full-bridge converter	160	* 1	-	-	glass fabric base, epoxy resin		Multilayer	Yes	* 2

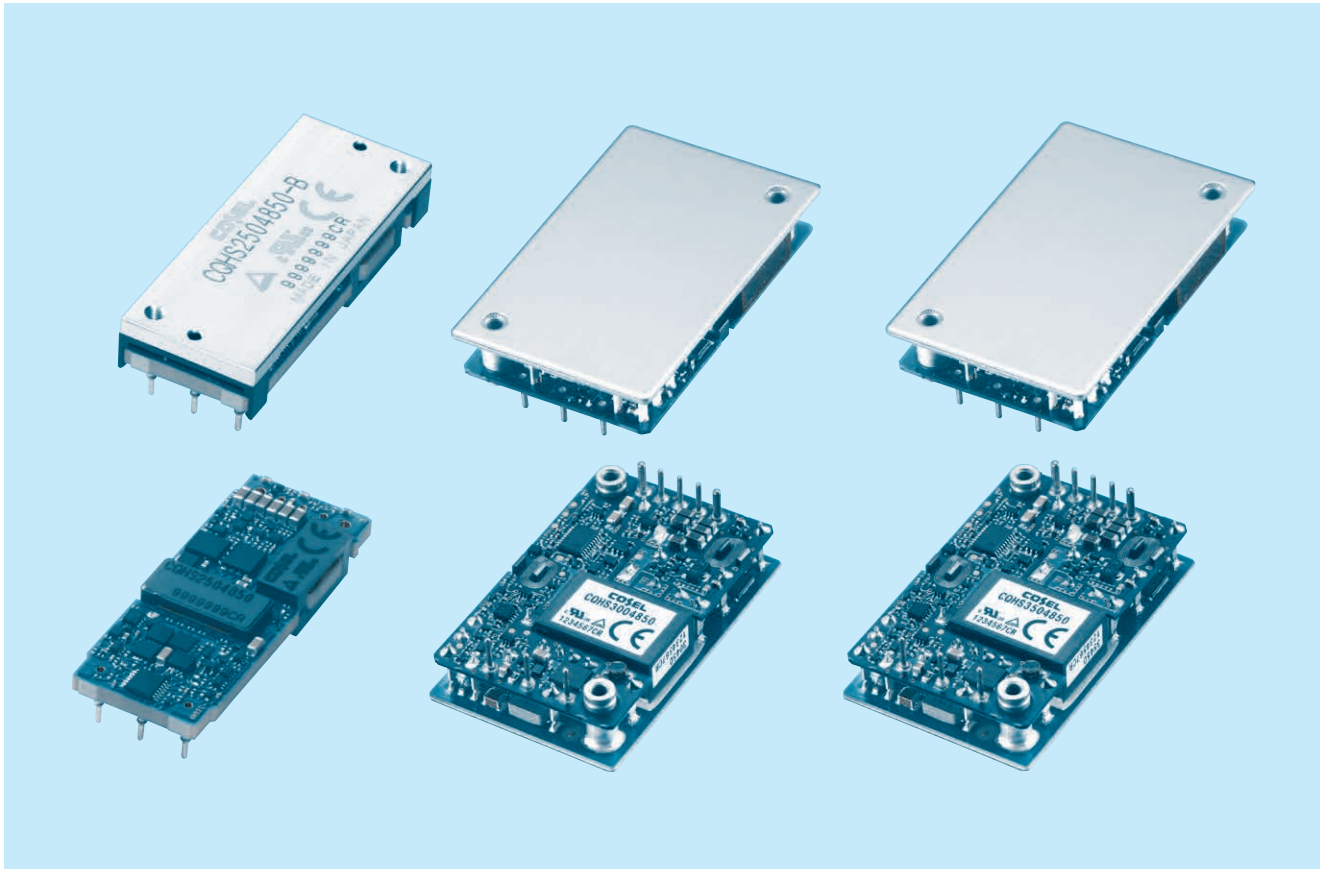
\* 1 Refer to Specification.

\* 2 Refer to Instruction Manual.





# CQHS-series



CQHS

## ■ Feature

- Compact DC-DC Converter, " BRICK SIZE" which has been standard size for Telecommunication Market
- High efficiency (synchronous rectifier circuit)
- High density
- High reliability : not built-in aluminum and tantalum electrolytic capacitor
- Built-in overcurrent, overvoltage and thermal protection circuits
- Built-in remote ON/OFF
- Mounting hole (M3 tapped)

## ■ CE marking

- Low Voltage Directive
- RoHS Directive

## ■ Safety agency approvals

- UL60950-1, C-UL, EN60950-1

## ■ 5-year warranty

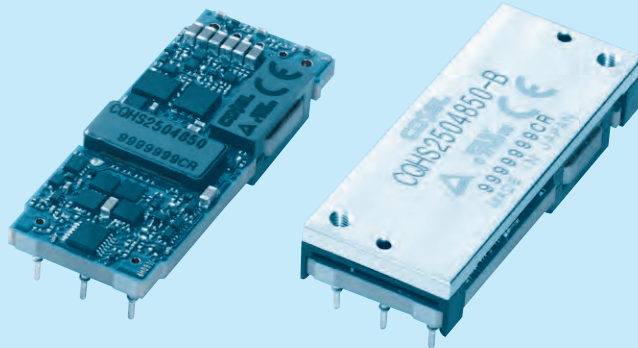
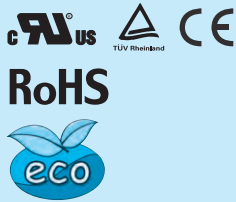
## ■ Optional parts

- Heat sink (optional parts : CQHS300/CQHS350)

# CQHS250

CQH S 250 48 50 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
48:DC36 - 76V
- ⑤ Output voltage
- ⑥ Optional
- R :with Remote ON/OFF  
Positive logic control
- N :Auto restart in protection  
circuit working
- B :Base plate option with  
Mounting hole M3
- L2:Pin length 5.3mm

MODEL	CQHS2504832	CQHS2504850
MAX OUTPUT WATTAGE[W]	252.8	250
DC OUTPUT	32V 7.9A	50V 5.0A

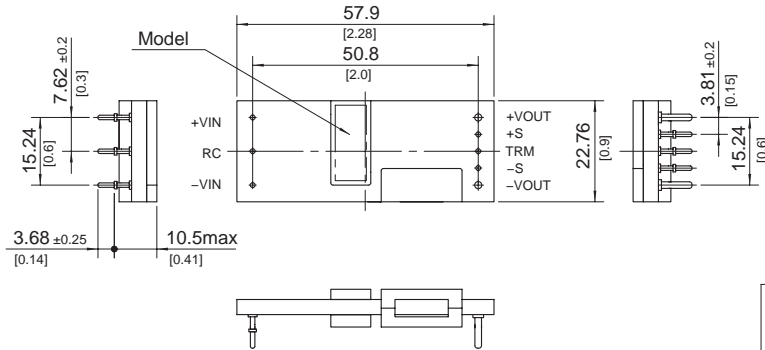
## SPECIFICATIONS

	MODEL	CQHS2504832	CQHS2504850	
INPUT	VOLTAGE[V]	DC36 - 76		
	CURRENT[A]	5.60typ	5.54typ	
	EFFICIENCY[%]	94typ	94typ	
	START-UP VOLTAGE[V]	DC32 - 36		
	HYSTERESIS VOLTAGE[V]	DC2 min		
OUTPUT	VOLTAGE[V]	32	50	
	CURRENT[A]	7.9	5.0	
	LINE REGULATION[mV]	64max	100max	
	LOAD REGULATION[mV]	64max	100max	
	RIPPLE[mVp-p]	-20 to +85°C Vin=36-60V *2	255max	400max
		-20 to +85°C Vin=60-76V *2	320max	500max
		-40 to -20°C *2	320max	500max
	RIPPLE NOISE[mVp-p]	-20 to +85°C *2	320max	500max
		-40 to -20°C *2	410max	650max
	TEMPERATURE REGULATION[mV]	-40 to +85°C	640max	1000max
	DRIFT[mV]	*3	120max	185max
START-UP TIME[ms]	200max (DCIN 48V, Io=100%)			
OUTPUT VOLTAGE ADJUSTMENT RANGE[V] *4	Fixed (TRM pin open), adjustable by external resistor			
	26.88 - 35.20	45.0 - 55.0		
OUTPUT VOLTAGE SETTING[V]*1	31.68 - 32.32	49.50 - 50.50		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating, low voltage protection (shut down) function is built-in.		
	OVERVOLTAGE PROTECTION[V]	36.80 - 44.80	56.50 - 67.50	
	REMOTE SENSING	Provided		
	REMOTE ON/OFF	Provided (Negative Logic L : ON, H :OFF)		
ISOLATION	INPUT-OUTPUT	DC1,500V or AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)		
	INPUT-BASE PLATE	*5 DC1,500V or AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)		
	OUTPUT-BASE PLATE	*5 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)		
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max		
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max		
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis		
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis		
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1		
OTHERS	CASE SIZE/WEIGHT	57.9 × 10.5 × 22.76mm [2.28 × 0.41 × 0.9 inches] (W × H × D) / 30g max		
	COOLING METHOD	58.4 × 12.7 × 23.26mm [2.3 × 0.5 × 0.92 inches] (W × H × D) / 45g max *5		
	COOLING METHOD	Convection / Forced air / Conduction		

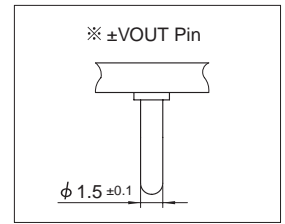
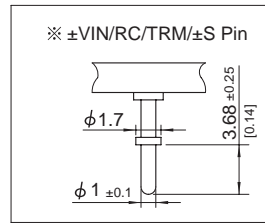
\*1 At rated input(DC48V), rated load. Ta= 25°C, 2m/s.  
 \*2 Ripple and ripple noise is measured by using measuring board. Refer to the manual.  
 \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*4 When the input voltage is in the range of DC36-40V, output voltage is limited. Refer to the manual.  
 \*5 Base Plate Option.

External view

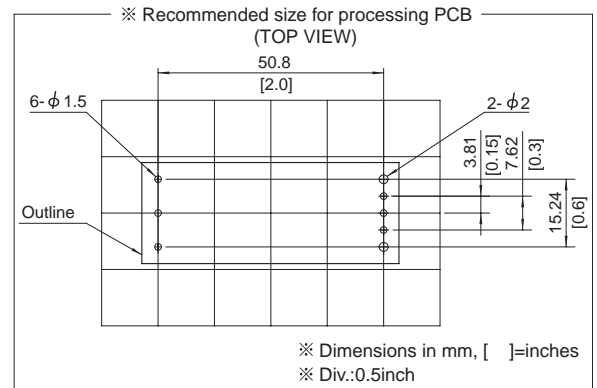
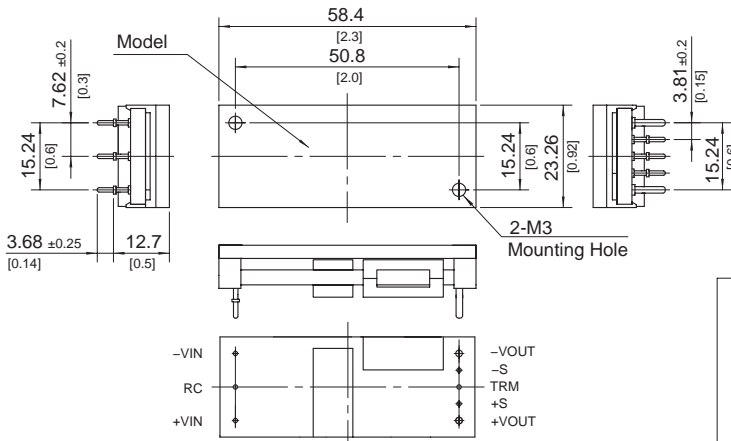
1. DIP



- ※ Tolerance : ±0.5 [±0.02]
- ※ Weight : 30g max(DIP)
- 45g max(Base Plate)
- ※ Dimensions in mm, [ ]=inches



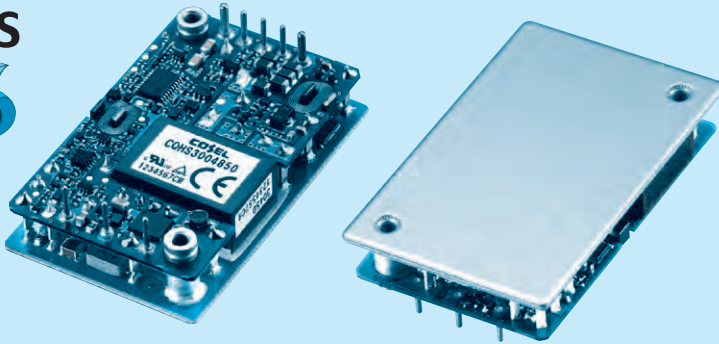
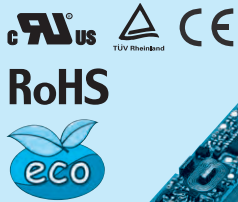
2. Base Plate (option B)



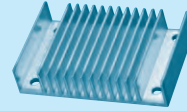
# CQHS300

CQH S 300 48 50 -□

① ② ③ ④ ⑤ ⑥



\*Providing heat sink as option



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
48:DC36 - 76V
- ⑤ Output voltage
- ⑥ Optional
- R :with Remote ON/OFF  
Positive logic control
- T :with Mounting hole  
φ 3.4 thru

MODEL	CQHS3004832	CQHS3004850
MAX OUTPUT WATTAGE[W]	300.8	300
DC OUTPUT	32V 9.4A	50V 6A

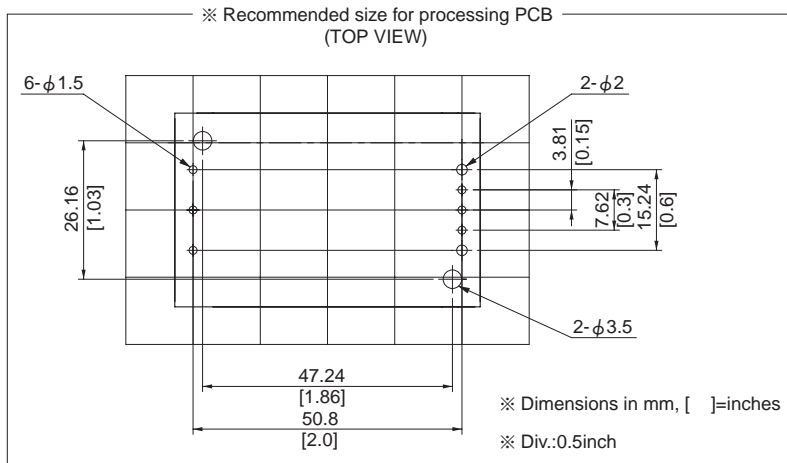
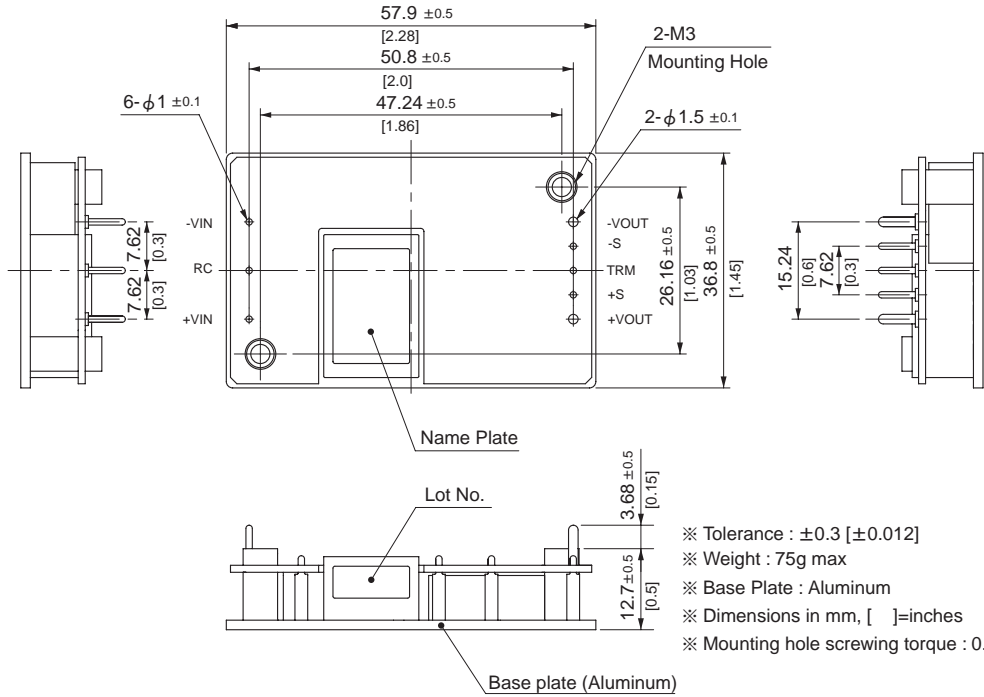
## SPECIFICATIONS

	MODEL	CQHS3004832	CQHS3004850	
INPUT	VOLTAGE[V]	DC36 - 76		
	CURRENT[A]	6.67typ	6.65typ	
	EFFICIENCY[%]	94typ	94typ	
	START-UP VOLTAGE[V]	DC32 - 36		
	HYSTERESIS VOLTAGE[V]	DC2 min		
OUTPUT	VOLTAGE[V]	32	50	
	CURRENT[A]	9.4	6.0	
	LINE REGULATION[mV]	64max	100max	
	LOAD REGULATION[mV]	64max	100max	
	RIPPLE[mVp-p]	-20 to +100°C *2	255max	400max
		-40 to -20°C Vin=36-60V *2	320max	500max
		-40 to -20°C Vin=60-76V *2	400max	500max
	RIPPLE NOISE[mVp-p]	-20 to +100°C *2	320max	500max
		-40 to -20°C *2	410max	650max
	TEMPERATURE REGULATION[mV]	0 to +65°C	320max	500max
		-40 to +100°C	640max	1000max
DRIFT[mV]	*3	120max	185max	
START-UP TIME[ms]		200max (DCIN 48V, Io=100%)		
OUTPUT VOLTAGE ADJUSTMENT RANGE[V] *4		Fixed (TRM pin open), adjustable by external resistor		
		27.2 - 35.2	45.0 - 55.0	
OUTPUT VOLTAGE SETTING[V]*1		31.68 - 32.32	49.50 - 50.50	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating, low voltage protection (shut down) function is built-in.		
	OVERVOLTAGE PROTECTION[V]	36.80 - 44.80	56.50 - 67.50	
	REMOTE SENSING	Provided		
REMOTE ON/OFF	Provided (Negative Logic L : ON, H :OFF)			
ISOLATION	INPUT-OUTPUT	DC1,500V or AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)		
	INPUT-BASE PLATE	DC1,500V or AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)		
	OUTPUT-BASE PLATE	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)		
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max		
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max		
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis		
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis		
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1		
OTHERS	CASE SIZE/WEIGHT	57.9×12.7×36.8mm [2.28×0.5×1.45 inches] (W×H×D) / 75g max		
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)		

\*1 At rated input(DC48V), rated load, and aluminum base plate temperature 25°C.  
 \*2 Ripple and ripple noise is measured by using measuring board with recommended capacitor Co & the film capacitor 0.1 μF.  
 \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*4 When the input voltage is in the range of DC36-40V, output voltage is limited. Refer to the manual.



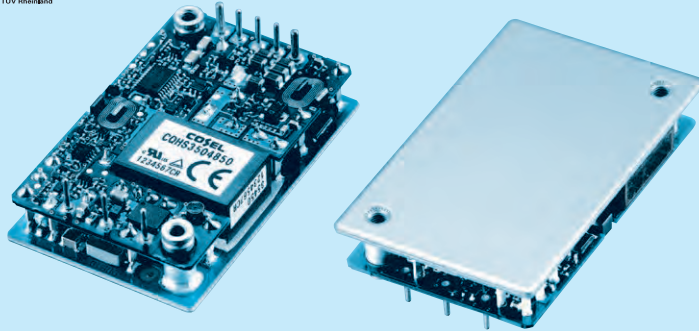
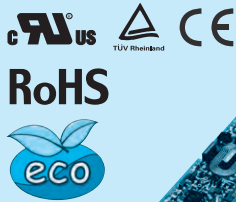
External view



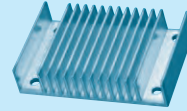
# CQHS350

CQH S 350 48 50 -□

① ② ③ ④ ⑤ ⑥



\*Providing heat sink as option



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
48:DC36 - 65V
- ⑤ Output voltage
- ⑥ Optional
- R :with Remote ON/OFF  
Positive logic control
- T :with Mounting hole  
φ 3.4 thru

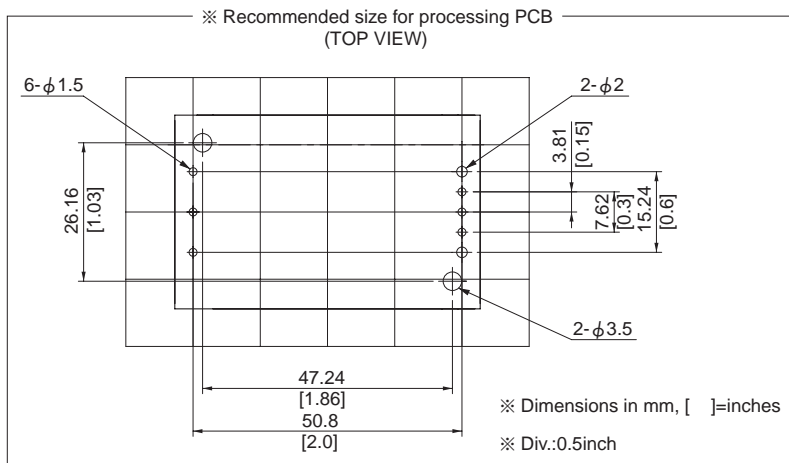
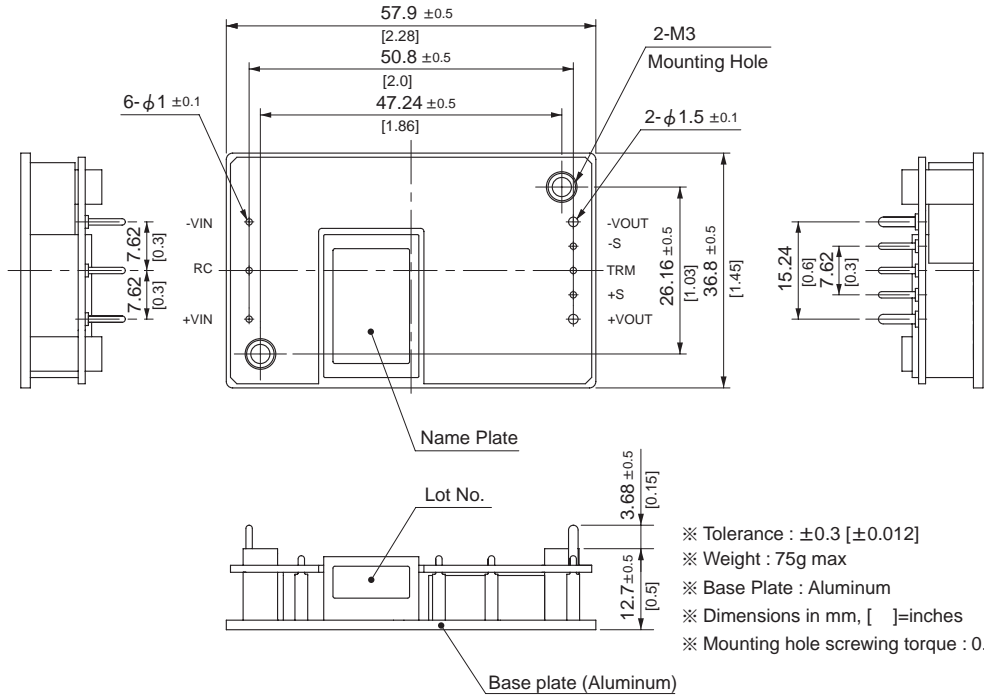
MODEL	CQHS3504832	CQHS3504850
MAX OUTPUT WATTAGE[W]	352	350
DC OUTPUT	32V 11A	50V 7A

## SPECIFICATIONS

	MODEL	CQHS3504832	CQHS3504850	
INPUT	VOLTAGE[V]	DC36 - 65		
	CURRENT[A]	7.8typ	7.76typ	
	EFFICIENCY[%]	94typ	94typ	
	START-UP VOLTAGE[V]	DC32 - 36		
	HYSTERESIS VOLTAGE[V]	DC2 min		
OUTPUT	VOLTAGE[V]	32	50	
	CURRENT[A]	11.0 *5	7.0	
	LINE REGULATION[mV]	64max	100max	
	LOAD REGULATION[mV]	64max	100max	
	RIPPLE[mVp-p]	-20 to +100°C *2	255max	400max
		-40 to -20°C Vin=36-60V *2	320max	500max
		-40 to -20°C Vin=60-65V *2	400max	500max
	RIPPLE NOISE[mVp-p]	-20 to +100°C *2	320max	500max
		-40 to -20°C *2	410max	650max
	TEMPERATURE REGULATION[mV]	0 to +65°C	320max	500max
		-40 to +100°C	640max	1000max
	DRIFT[mV]	*3	120max	185max
START-UP TIME[ms]	200max (DCIN 48V, Io=100%)			
OUTPUT VOLTAGE ADJUSTMENT RANGE[V] *4	Fixed (TRM pin open), adjustable by external resistor			
	26.88 - 35.20			
	45.0 - 55.0			
OUTPUT VOLTAGE SETTING[V]*1	31.68 - 32.32	49.50 - 50.50		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating, low voltage protection (shut down) function is built-in.		
	OVERVOLTAGE PROTECTION[V]	36.80 - 44.80	56.50 - 67.50	
	REMOTE SENSING	Provided		
	REMOTE ON/OFF	Provided (Negative Logic L : ON, H :OFF)		
ISOLATION	INPUT-OUTPUT	DC1,500V or AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)		
	INPUT-BASE PLATE	DC1,500V or AC500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)		
	OUTPUT-BASE PLATE	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)		
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max		
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max		
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis		
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis		
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1		
OTHERS	CASE SIZE/WEIGHT	57.9×12.7×36.8mm [2.28×0.5×1.45 inches] (W×H×D) / 75g max		
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)		

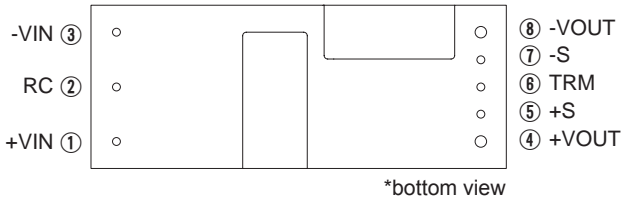
\*1 At rated input(DC48V), rated load, and aluminum base plate temperature 25°C.  
 \*2 Ripple and ripple noise is measured by using measuring board with recommended capacitor Co & the film capacitor 0.1 μF.  
 \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*4 When the input voltage is in the range of DC36-40V, output voltage is limited. Refer to the manual.  
 \*5 Rated current is increased adjusting output voltage to lower than rated output voltage. Refer to the manual.

External view



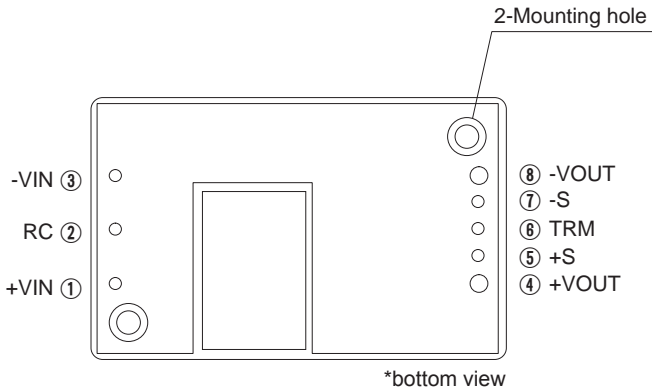
## Pin Configuration

### ● CQHS250



No.	Pin Name	Function
①	+VIN	+DC input
②	RC	Remote ON/OFF
③	-VIN	-DC input
④	+VOUT	+DC output
⑤	+S	+Remote sensing
⑥	TRM	Adjustment of output voltage
⑦	-S	-Remote sensing
⑧	-VOUT	-DC output
-	Mounting hole	Mounting hole

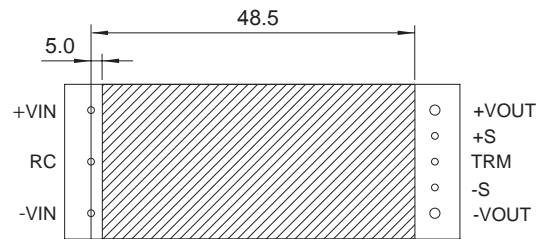
### ● CQHS300/CQHS350



## Implementation · Mounting Method

### Mounting method

- When multiple power modules are used side by side, position them with sufficient spaces to allow adequate air ventilation so that the temperature of each power module will remain within the temperature range shown in the “Derating”.
- Do not pass the DC input pattern underneath the power module as this will increase conducted noise. Place the DC input pattern away from the power module. Do not pass the DC output pattern underneath the power module as this will increase output noise. Place the DC output pattern away from the power module.
- High frequency noise is radiated from the power module. When mounting the power module on a PCB, leave a copper pattern on the PCB to let it act as a shield and connect this pattern to the mounting hole.
- Avoid placing pattern layout in hatched area shown in right figure to insulate between pattern and power supply.



### ● CQHS300/CQHS350

- Soldering CQHS series with printed board must be done under the flat condition by using the mounting hole and fixing with the screw.  
If CQHS series is inclined and it's mounted, the insulation of the internal components and printed board might not be kept.
- When a heat sink cannot be fixed on the base plate side, order the power module with “-T” option. A heat sink can be mounted by affixing a M3 tap on the heat sink.  
Please make sure a mounting hole will be connected to a grounding capacitor CY.

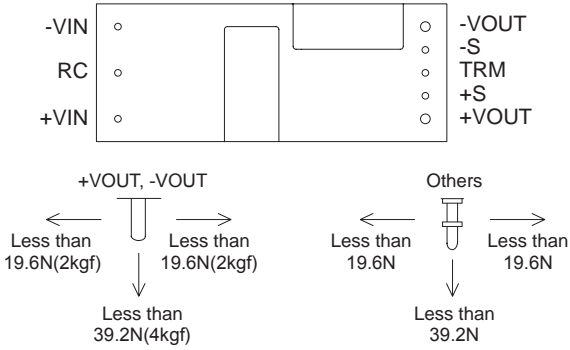
	Mounting hole
Standard	M3 tapped
Optional : -T	φ 3.4 thru

Implementation · Mounting Method

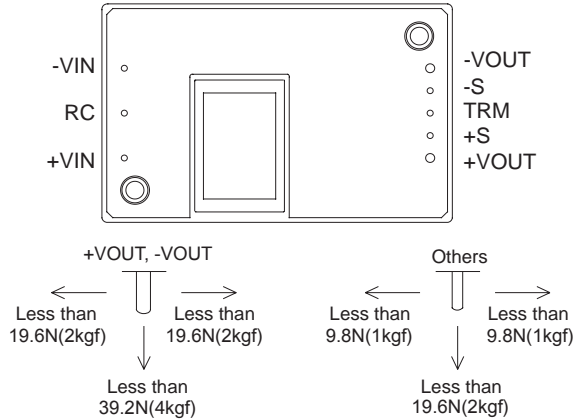
Stress onto the pins

- Applying excessive stress to the input or output pins of the power module may damage internal connections. Avoid applying stress in excess of that shown in below.
- Input and output pins are soldered onto the internal PCB. Do not bend or pull the leads with excessive force.

●CQHS250



●CQHS300/CQHS350



●CQHS300/CQHS350

- As unexpected stress may be applied to the pins, set the diameter of the PCB mounting hole at 3.5mm.
- As unexpected stress may be applied to the pins from vibration or shock, fix the power module by using the mounting holes screws to reduce stress.
- Fix the power module to the PCB with the screws before soldering the input and output pins to prevent the PCB pattern being damaged.

CQHS

Soldering temperature

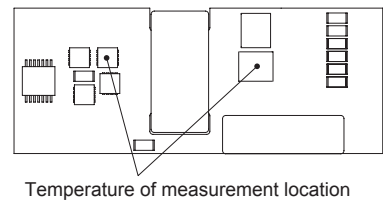
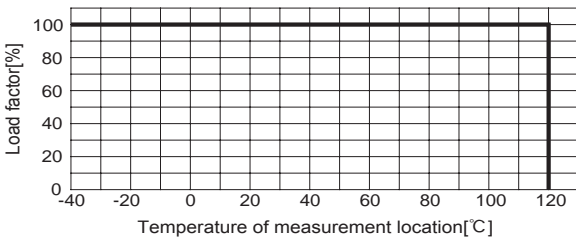
- Flow soldering : 260°C for up to 15 seconds.
- Soldering iron (26W) : 450°C for up to 5 seconds.

Derating

- It is necessary to note the thermal fatigue life by power cycle. Please reduce the temperature fluctuation range as much as possible when the up and down of the temperature are frequently generated. Contact us for more information on cooling methods.

●CQHS250

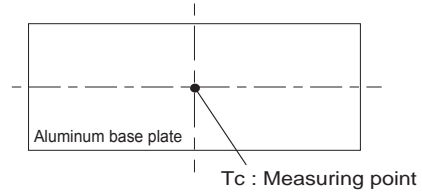
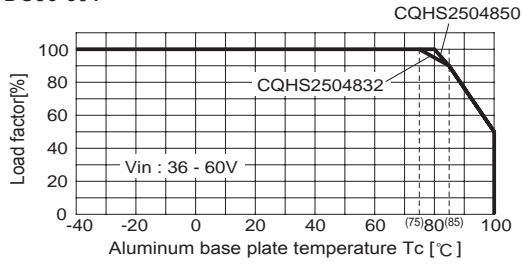
- Use with the convection cooling or the forced air cooling. Make sure the temperatures at temperature measurement locations shown below are on or under the derating curve. Ambient temperature must be kept at 85°C or under.



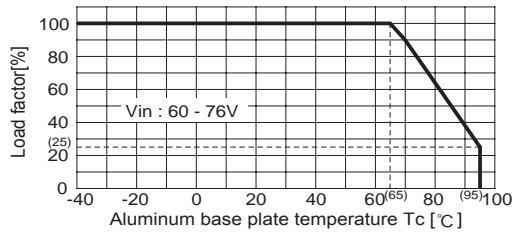
- For option “B” which is used with the convection cooling, forced air cooling or conduction cooling, use the temperature measurement location as shown in below.

Derating

① Vin=DC36-60V



② Vin=DC60-76V



● CQHS300/CQHS350

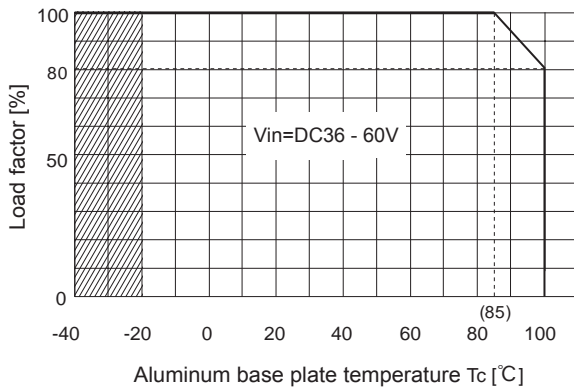
■ Use the power modules with conduction cooling (e.g. heat dissipation from the aluminum base plate to the attached heat sink).

Below figure shows the derating curves with respect to the aluminum base plate temperature. Note that operation within the hatched areas will cause a significant level of ripple and ripple noise. Contact us for more information on cooling methods.

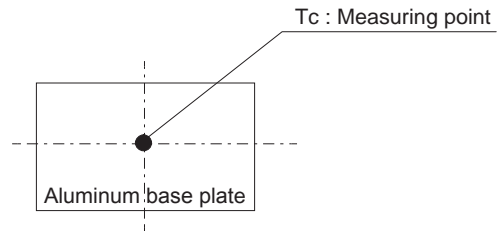
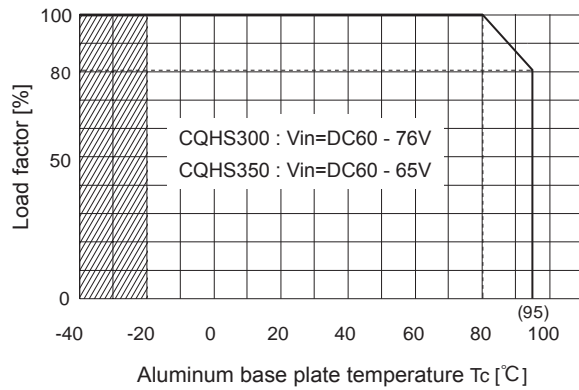
■ Please measure the temperature on the aluminum base plate edge side when you cannot measure the temperature of the center part of the aluminum base plate. In this case, please take 5deg temperature margin from the derating characteristic of below figure .

CQHS

① Vin=DC36-60V



② CQHS300 : Vin=DC60 - 76V CQHS350 : Vin=DC60 - 65V



Instruction Manual

◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/CQHS/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

CQHS



NOTICE



## Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current	Rated input fuse	Inrush current protection	PCB/Pattern			Series/Redundancy operation availability	
						Material	Single sided	Double sided	Series operation	Redundancy operation
CQHS250	Full-bridge converter	140	*1	-	-	glass fabric base, epoxy resin		Multilayer	Yes	*2
CQHS300	Forward converter	250	*1	-	-	Aluminum	Yes		Yes	*2
CQHS350	Forward converter	250	*1	-	-	Aluminum	Yes		Yes	*2

\*1 Refer to Specification.

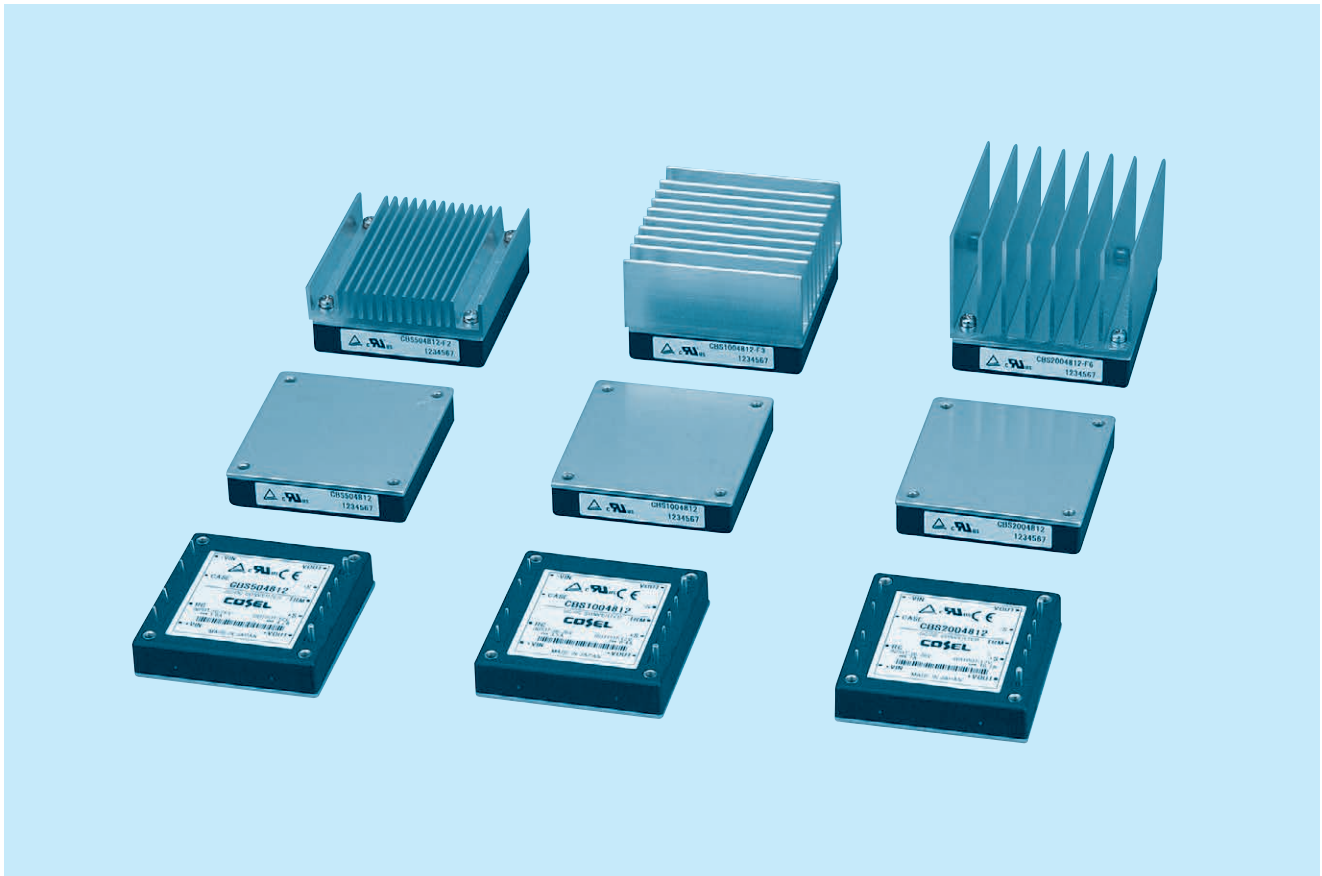
\*2 Refer to Instruction Manual.







# CBS-series



CBS

## ■ Feature

- Compact DC-DC Converter, "HALF BRICK" which has been standard size for Telecommunication Market
- High efficiency
- High density
- High reliability : not built-in aluminum and tantalum electrolytic capacitor
- Built-in overcurrent, overvoltage and thermal protection circuits
- Built-in remote ON/OFF
- Mounting hole (M3 tapped)

## ■ CE marking

- Low Voltage Directive
- RoHS Directive

## ■ Safety agency approvals

- UL60950-1, C-UL recognized, TÜV approved

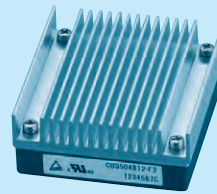
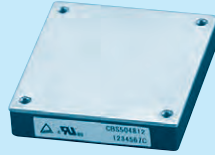
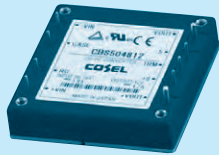
## ■ 5-year warranty

## ■ Optional parts

Optional parts	Model
Heat sink	CBS50, CBS100, CBS200

# CBS50

① CB ② S ③ 50 ④ 48 ⑤ 12 - □ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
24:DC18 - 36V  
48:DC36 - 76V
- ⑤ Output voltage
- ⑥ Optional  
R :with Remote ON/OFF  
  Positive logic control  
T :with Mounting hole  
  φ3.4 thru  
□ :with Addition of a  
  Heat sink

MODEL	CBS50241R8	CBS50242R5	CBS502403	CBS502405	CBS502412	CBS502415	CBS502424	CBS502428
MAX OUTPUT WATTAGE[W]	21.06	29.25	38.6	50.0	50.4	51.0	50.4	50.4
DC OUTPUT	1.8V 11.7A	2.5V 11.7A	3.3V 11.7A	5V 10A	12V 4.2A	15V 3.4A	24V 2.1A	28V 1.8A

## SPECIFICATIONS

	MODEL	CBS50241R8	CBS50242R5	CBS502403	CBS502405	CBS502412	CBS502415	CBS502424	CBS502428	
INPUT	VOLTAGE[V]	DC18 - 36								
	CURRENT[A]	1.24typ	1.58typ	2.04typ	2.48typ	2.39typ	2.44typ	2.41typ	2.41typ	
	EFFICIENCY[%]	71typ	77typ	79typ	84typ	88typ	87typ	87typ	87typ	
OUTPUT	VOLTAGE[V]	1.8	2.5	3.3	5	12	15	24	28	
	CURRENT[A]	11.7	11.7	11.7	10	4.2	3.4	2.1	1.8	
	LINE REGULATION[mV]	10max	10max	10max	10max	24max	30max	48max	56max	
	LOAD REGULATION[mV]	10max	10max	10max	10max	24max	30max	48max	56max	
	RIPPLE[mVp-p]	-20 to +100°C	80max	80max	80max	80max	120max	120max	120max	120max
		-40 to -20°C	120max	120max	120max	120max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +100°C	120max	120max	120max	120max	150max	150max	150max	150max
		-40 to -20°C	200max	200max	200max	200max	200max	200max	250max	250max
	TEMPERATURE REGULATION[mV]	0 to +65°C	35max	35max	35max	50max	120max	150max	240max	280max
		-40 to +100°C	66max	66max	66max	100max	240max	300max	480max	560max
DRIFT[mV]	16max	16max	16max	20max	40max	60max	90max	90max		
START-UP TIME[ms]	200max (DCIN 24V, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed (TRM pin open), adjustable by external resistor									
OUTPUT VOLTAGE SETTING[V]	1.70 - 1.98	1.98 - 2.75	1.98 - 3.63	3.0 - 5.5	7.2 - 13.2	9.0 - 16.5	14.4 - 26.4	16.8 - 30.8		
OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically									
OVERVOLTAGE PROTECTION[V]	2.16 - 2.88	3.00 - 4.00	4.00 - 5.50	5.75 - 7.00	13.80 - 16.80	17.25 - 21.00	27.60 - 33.60	32.20 - 39.20		
REMOTE SENSING	Provided									
REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)									

MODEL	CBS50481R8	CBS50482R5	CBS504803	CBS504805	CBS504812	CBS504815	CBS504824	CBS504828
MAX OUTPUT WATTAGE[W]	21.06	29.25	38.6	50.0	50.4	51.0	50.4	50.4
DC OUTPUT	1.8V 11.7A	2.5V 11.7A	3.3V 11.7A	5V 10A	12V 4.2A	15V 3.4A	24V 2.1A	28V 1.8A

## SPECIFICATIONS

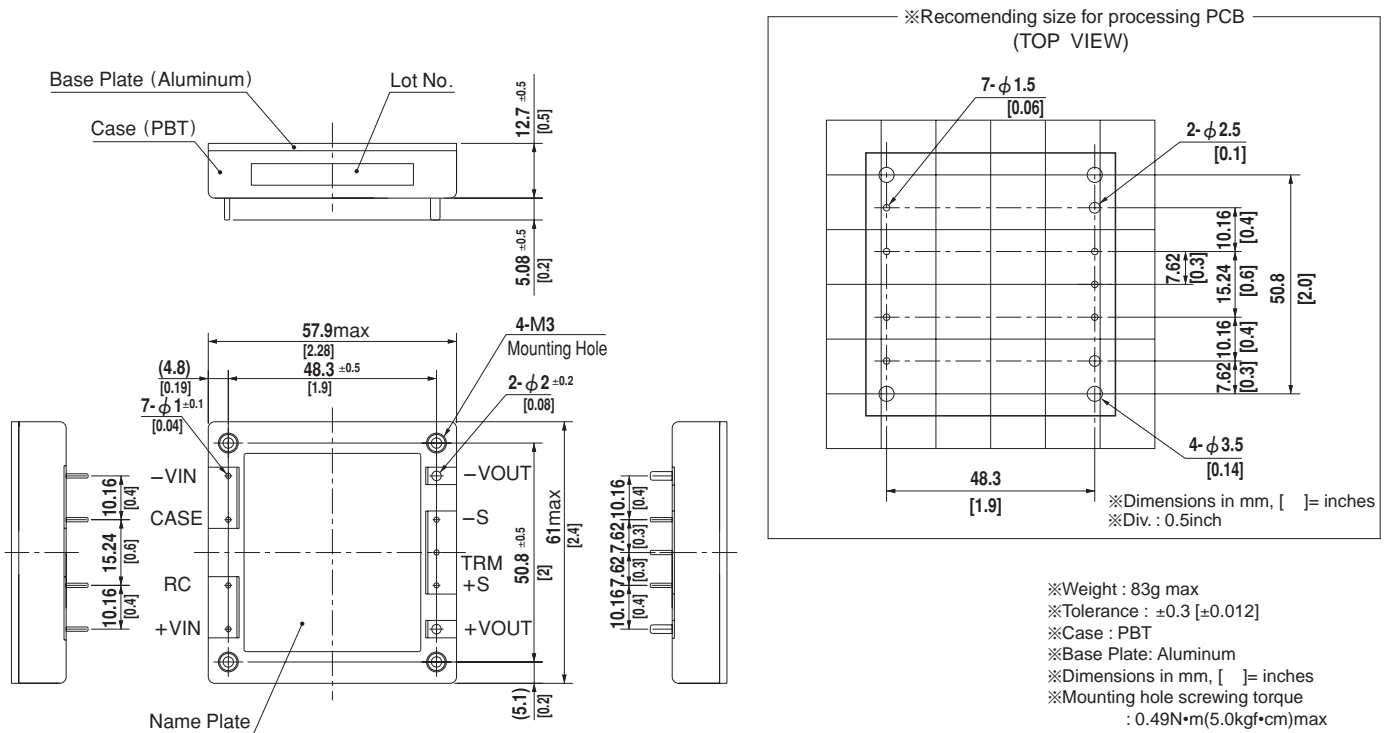
	MODEL	CBS50481R8	CBS50482R5	CBS504803	CBS504805	CBS504812	CBS504815	CBS504824	CBS504828	
INPUT	VOLTAGE[V]	DC36 - 76								
	CURRENT[A]	0.62typ	0.79typ	1.01typ	1.23typ	1.18typ	1.21typ	1.19typ	1.19typ	
	EFFICIENCY[%]	71typ	77typ	80typ	85typ	89typ	88typ	88typ	88typ	
OUTPUT	VOLTAGE[V]	1.8	2.5	3.3	5	12	15	24	28	
	CURRENT[A]	11.7	11.7	11.7	10	4.2	3.4	2.1	1.8	
	LINE REGULATION[mV]	10max	10max	10max	10max	24max	30max	48max	56max	
	LOAD REGULATION[mV]	10max	10max	10max	10max	24max	30max	48max	56max	
	RIPPLE[mVp-p]	-20 to +100°C	80max	80max	80max	80max	120max	120max	120max	120max
		-40 to -20°C	120max	120max	120max	120max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +100°C	120max	120max	120max	120max	150max	150max	150max	150max
		-40 to -20°C	200max	200max	200max	200max	200max	200max	250max	250max
	TEMPERATURE REGULATION[mV]	0 to +65°C	35max	35max	35max	50max	120max	150max	240max	280max
		-40 to +100°C	66max	66max	66max	100max	240max	300max	480max	560max
DRIFT[mV]	16max	16max	16max	20max	40max	60max	90max	90max		
START-UP TIME[ms]	200max (DCIN 48V, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed (TRM pin open), adjustable by external resistor									
OUTPUT VOLTAGE SETTING[V]	1.70 - 1.98	1.98 - 2.75	1.98 - 3.63	3.0 - 5.5	7.2 - 13.2	9.0 - 16.5	14.4 - 26.4	16.8 - 30.8		
OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically									
OVERVOLTAGE PROTECTION[V]	2.16 - 2.88	3.00 - 4.00	4.00 - 5.50	5.75 - 7.00	13.80 - 16.80	17.25 - 21.00	27.60 - 33.60	32.20 - 39.20		
REMOTE SENSING	Provided									
REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)									

GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15℃)
	INPUT-CASE PIN, BASE PLATE	DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15℃)
	OUTPUT-CASE PIN, BASE PLATE	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15℃)
ENVIRONMENT	OPERATING TEMP.HUMID.AND ALTITUDE	-40 to +100℃ (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	STORAGE TEMP.HUMID.AND ALTITUDE	-40 to +100℃, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	57.9×12.7×61.0mm [2.28×0.5×2.4 inches](W×H×D) / 83g max
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)

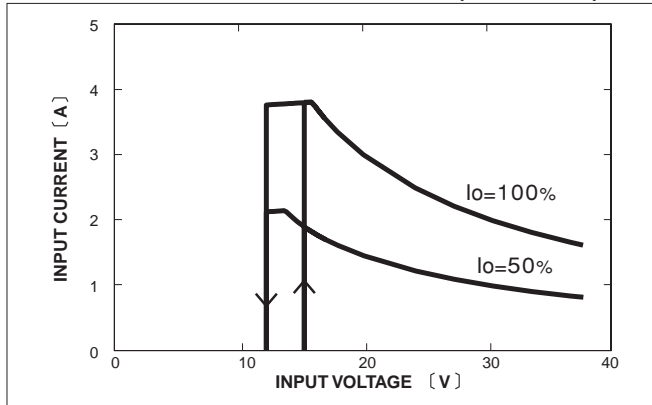
- \*1 At rated input(DC24V,DC48V) and rated load.
- \*2 Ripple and ripple noise is measured by using measuring board with recommended capacitor Co & the film capacitor 0.1 μF. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM101).
- \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25℃, with the input voltage held constant at the rated input/output.
- \*4 When the input voltage is in the range of DC18 - 20V, DC36 - 40V, output voltage adjustment range is 60 - 105% (except for 1R8/2R5).

External view

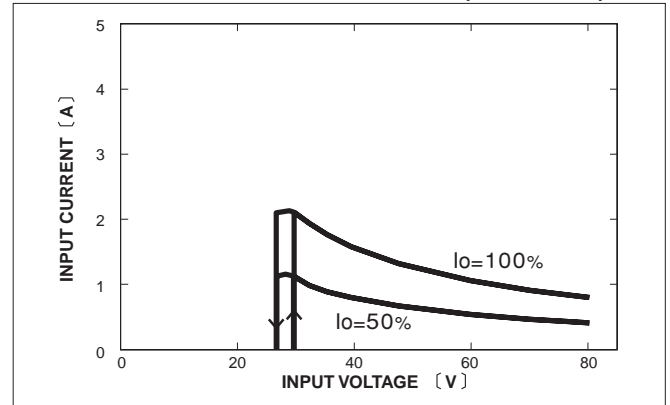


Performance data

INPUT CURRENT CHARACTERISTICS (CBS502428)



INPUT CURRENT CHARACTERISTICS (CBS504828)



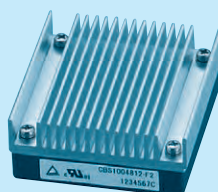
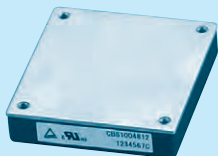
# CBS100

CB S 100 48 12 -

① ② ③ ④ ⑤ ⑥



RoHS



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
24:DC18 - 36V  
48:DC36 - 76V
- ⑤ Output voltage
- ⑥ Optional  
R :with Remote ON/OFF  
  Positive logic control  
T :with Mounting hole  
  φ3.4 thru  
 :with Addition of a  
  Heat sink

MODEL	CBS100241R8	CBS100242R5	CBS1002403	CBS1002405	CBS1002412	CBS1002415	CBS1002424	CBS1002428
MAX OUTPUT WATTAGE[W]	42.12	58.50	77.2	100.0	100.8	100.5	100.8	100.8
DC OUTPUT	1.8V 23.4A	2.5V 23.4A	3.3V 23.4A	5V 20A	12V 8.4A	15V 6.7A	24V 4.2A	28V 3.6A

## SPECIFICATIONS

	MODEL	CBS100241R8	CBS100242R5	CBS1002403	CBS1002405	CBS1002412	CBS1002415	CBS1002424	CBS1002428	
INPUT	VOLTAGE[V]	DC18 - 36								
	CURRENT[A]	2.47typ	3.17typ	4.07typ	5.02typ	4.77typ	4.81typ	4.83typ	4.83typ	
	EFFICIENCY[%]	71typ	77typ	79typ	83typ	88typ	87typ	87typ	87typ	
OUTPUT	VOLTAGE[V]	1.8	2.5	3.3	5	12	15	24	28	
	CURRENT[A]	23.4	23.4	23.4	20	8.4	6.7	4.2	3.6	
	LINE REGULATION[mV]	10max	10max	10max	10max	24max	30max	48max	56max	
	LOAD REGULATION[mV]	10max	10max	10max	10max	24max	30max	48max	56max	
	RIPPLE[mVp-p]	-20 to +100°C	80max	80max	80max	80max	120max	120max	120max	120max
		-40 to -20°C	120max	120max	120max	120max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +100°C	120max	120max	120max	120max	150max	150max	150max	150max
		-40 to -20°C	200max	200max	200max	200max	200max	200max	250max	250max
	TEMPERATURE REGULATION[mV]	0 to +65°C	35max	35max	35max	50max	120max	150max	240max	280max
		-40 to +100°C	66max	66max	66max	100max	240max	300max	480max	560max
DRIFT[mV]	16max	16max	16max	20max	40max	60max	90max	90max		
START-UP TIME[ms]	200max (DCIN 24V, I <sub>o</sub> =100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed (TRM pin open), adjustable by external resistor									
OUTPUT VOLTAGE SETTING[V]	1.77 - 1.88	2.46 - 2.61	3.25 - 3.45	4.90 - 5.20	11.74 - 12.46	14.55 - 15.45	23.28 - 24.72	27.16 - 28.84		
OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically									
OVERVOLTAGE PROTECTION[V]	2.16 - 2.88	3.00 - 4.00	4.00 - 5.50	5.75 - 7.00	13.80 - 16.80	17.25 - 21.00	27.60 - 33.60	32.20 - 39.20		
REMOTE SENSING	Provided									
REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)									

MODEL	CBS100481R8	CBS100482R5	CBS1004803	CBS1004805	CBS1004812	CBS1004815	CBS1004824	CBS1004828
MAX OUTPUT WATTAGE[W]	42.12	58.50	77.2	100.0	100.8	100.5	100.8	100.8
DC OUTPUT	1.8V 23.4A	2.5V 23.4A	3.3V 23.4A	5V 20A	12V 8.4A	15V 6.7A	24V 4.2A	28V 3.6A

## SPECIFICATIONS

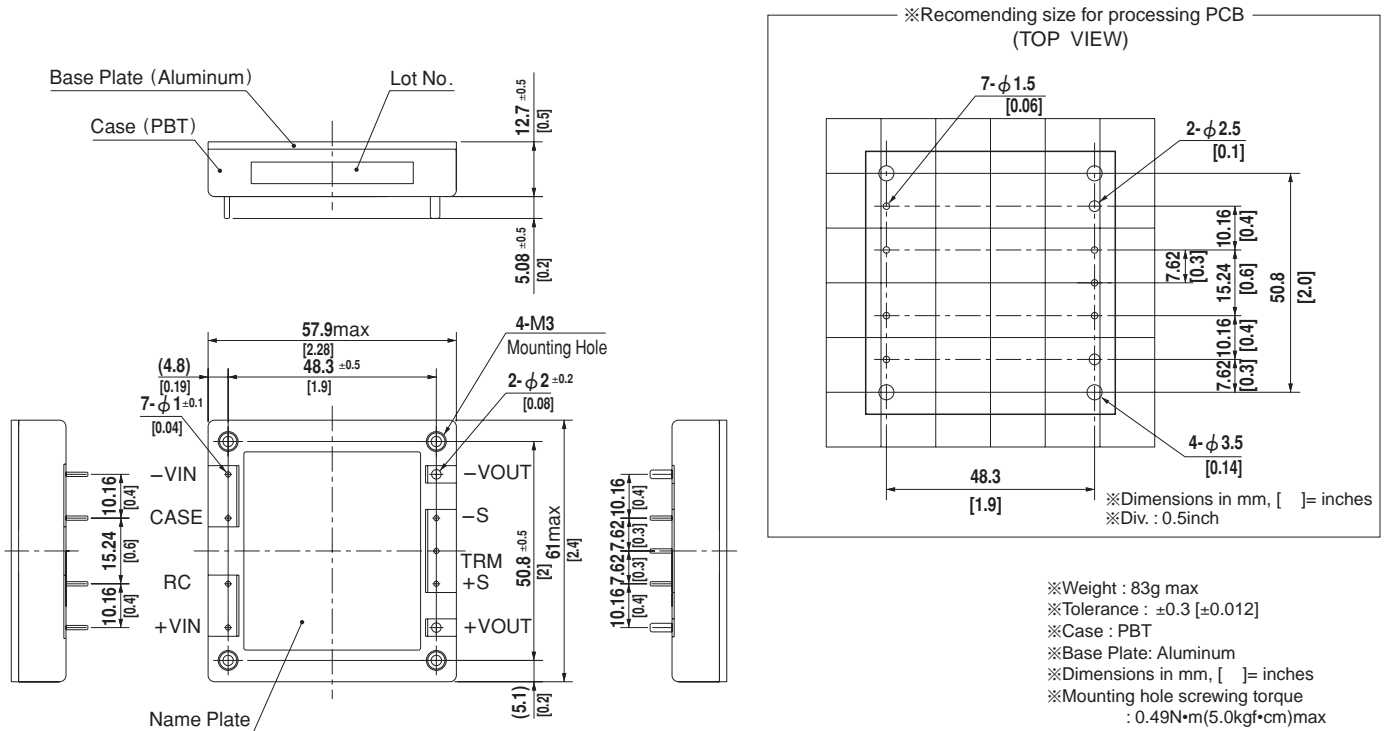
	MODEL	CBS100481R8	CBS100482R5	CBS1004803	CBS1004805	CBS1004812	CBS1004815	CBS1004824	CBS1004828	
INPUT	VOLTAGE[V]	DC36 - 76								
	CURRENT[A]	1.24typ	1.58typ	2.01typ	2.48typ	2.36typ	2.38typ	2.39typ	2.39typ	
	EFFICIENCY[%]	71typ	77typ	80typ	84typ	89typ	88typ	88typ	88typ	
OUTPUT	VOLTAGE[V]	1.8	2.5	3.3	5	12	15	24	28	
	CURRENT[A]	23.4	23.4	23.4	20	8.4	6.7	4.2	3.6	
	LINE REGULATION[mV]	10max	10max	10max	10max	24max	30max	48max	56max	
	LOAD REGULATION[mV]	10max	10max	10max	10max	24max	30max	48max	56max	
	RIPPLE[mVp-p]	-20 to +100°C	80max	80max	80max	80max	120max	120max	120max	120max
		-40 to -20°C	120max	120max	120max	120max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +100°C	120max	120max	120max	120max	150max	150max	150max	150max
		-40 to -20°C	200max	200max	200max	200max	200max	200max	250max	250max
	TEMPERATURE REGULATION[mV]	0 to +65°C	35max	35max	35max	50max	120max	150max	240max	280max
		-40 to +100°C	66max	66max	66max	100max	240max	300max	480max	560max
DRIFT[mV]	16max	16max	16max	20max	40max	60max	90max	90max		
START-UP TIME[ms]	200max (DCIN 48V, I <sub>o</sub> =100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed (TRM pin open), adjustable by external resistor									
OUTPUT VOLTAGE SETTING[V]	1.77 - 1.88	2.46 - 2.61	3.25 - 3.45	4.90 - 5.20	11.74 - 12.46	14.55 - 15.45	23.28 - 24.72	27.16 - 28.84		
OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically									
OVERVOLTAGE PROTECTION[V]	2.16 - 2.88	3.00 - 4.00	4.00 - 5.50	5.75 - 7.00	13.80 - 16.80	17.25 - 21.00	27.60 - 33.60	32.20 - 39.20		
REMOTE SENSING	Provided									
REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)									

GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15℃)
	INPUT-CASE PIN, BASE PLATE	DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15℃)
	OUTPUT-CASE PIN, BASE PLATE	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15℃)
ENVIRONMENT	OPERATING TEMP.HUMID.AND ALTITUDE	-40 to +100℃ (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	STORAGE TEMP.HUMID.AND ALTITUDE	-40 to +100℃, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	57.9×12.7×61.0mm [2.28×0.5×2.4 inches] (W×H×D) / 83g max
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)

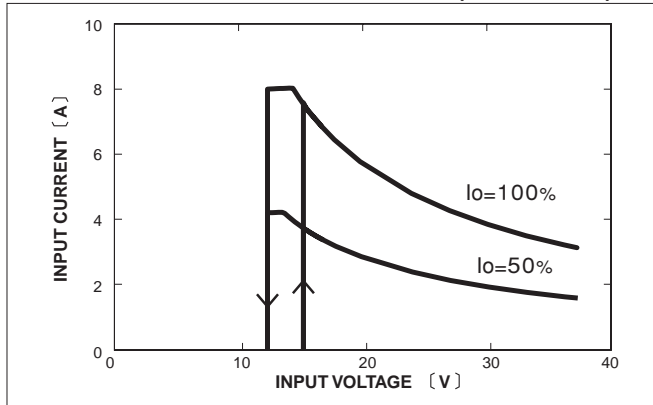
- \*1 At rated input(DC24V,DC48V) and rated load.
- \*2 Ripple and ripple noise is measured by using measuring board with recommended capacitor Co & the film capacitor 0.1 μF. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM101).
- \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25℃, with the input voltage held constant at the rated input/output.
- \*4 When the input voltage is in the range of DC18 - 20V, DC36 - 40V output voltage adjustment range is 60 - 105% (except for 1R8/2R5).

External view

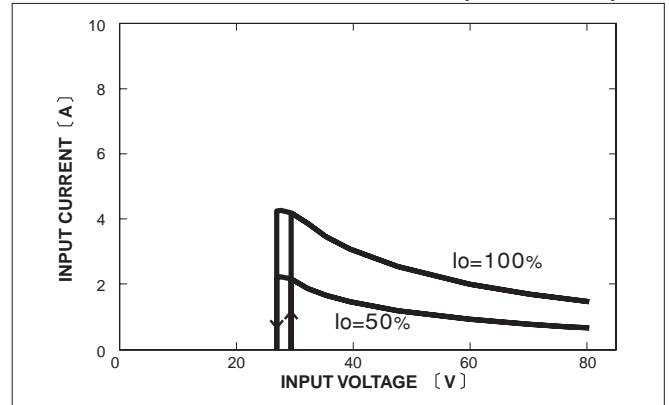


Performance data

INPUT CURRENT CHARACTERISTICS (CBS1002428)



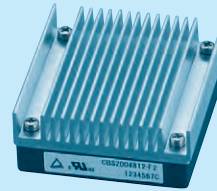
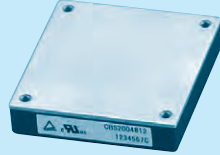
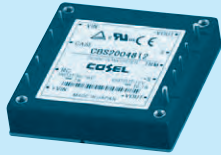
INPUT CURRENT CHARACTERISTICS (CBS1004828)



# CBS200

CB S 200 48 12 -

① ② ③ ④ ⑤ ⑥



- ① Series name
  - ② Single output
  - ③ Output wattage
  - ④ Input voltage  
24:DC18 - 36V  
48:DC36 - 76V
  - ⑤ Output voltage
  - ⑥ Optional
- R :with Remote ON/OFF  
Positive logic control  
T :with Mounting hole  
φ3.4 thru  
:with Addition of a Heat sink

MODEL	CBS200241R8	CBS200242R5	CBS2002403	CBS2002405	CBS2002412	CBS2002415	CBS2002424	CBS2002428
MAX OUTPUT WATTAGE[W]	63.00	87.50	115.5	150.0	200.4	201.0	201.6	201.6
DC OUTPUT	1.8V 35A	2.5V 35A	3.3V 35A	5V 30A	12V 16.7A	15V 13.4A	24V 8.4A	28V 7.2A

## SPECIFICATIONS

	MODEL	CBS200241R8	CBS200242R5	CBS2002403	CBS2002405	CBS2002412	CBS2002415	CBS2002424	CBS2002428	
INPUT	VOLTAGE[V]	DC18 - 36								
	CURRENT[A]	*1 3.75typ	4.80typ	6.09typ	7.62typ	9.60typ	9.63typ	9.66typ	9.66typ	
	EFFICIENCY[%]	*1 70typ	76typ	79typ	82typ	87typ	87typ	87typ	87typ	
OUTPUT	VOLTAGE[V]	1.8	2.5	3.3	5	12	15	24	28	
	CURRENT[A]	35	35	35	30	16.7	13.4	8.4	7.2	
	LINE REGULATION[mV]	10max	10max	10max	10max	24max	30max	48max	56max	
	LOAD REGULATION[mV]	10max	10max	10max	10max	24max	30max	48max	56max	
	RIPPLE[mVp-p]	-20 to +100°C ±2	80max	80max	80max	80max	120max	120max	120max	120max
		-40 to -20°C ±2	120max	120max	120max	120max	150max	150max	150max	150max
	RIPPLE NOISE[mVp-p]	-20 to +100°C ±2	120max	120max	120max	120max	150max	150max	150max	150max
		-40 to -20°C ±2	200max	200max	200max	200max	200max	200max	250max	250max
	TEMPERATURE REGULATION[mV]	0 to +65°C	35max	35max	35max	50max	120max	150max	240max	280max
		-40 to +100°C	66max	66max	66max	100max	240max	300max	480max	560max
DRIFT[mV]	*3	16max	16max	16max	20max	40max	60max	90max	90max	
START-UP TIME[ms]	200max (DCIN 24V, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4	Fixed (TRM pin open), adjustable by external resistor								
OUTPUT VOLTAGE SETTING[V]		1.70 - 1.98	1.98 - 2.75	1.98 - 3.63	3.0 - 5.5	7.2 - 13.2	9.0 - 16.5	14.4 - 26.4	16.8 - 30.8	
OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically									
OVERVOLTAGE PROTECTION[V]		2.16 - 2.88	3.00 - 4.00	4.00 - 5.50	5.75 - 7.00	13.80 - 16.80	17.25 - 21.00	27.60 - 33.60	32.20 - 39.20	
REMOTE SENSING	Provided									
REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)									

MODEL	CBS200481R8	CBS200482R5	CBS2004803	CBS2004805	CBS2004812	CBS2004815	CBS2004824	CBS2004828	CBS2004848
MAX OUTPUT WATTAGE[W]	63.00	87.50	115.5	150.0	200.4	201.0	201.6	201.6	201.6
DC OUTPUT	1.8V 35A	2.5V 35A	3.3V 35A	5V 30A	12V 16.7A	15V 13.4A	24V 8.4A	28V 7.2A	48V 4.2A

## SPECIFICATIONS

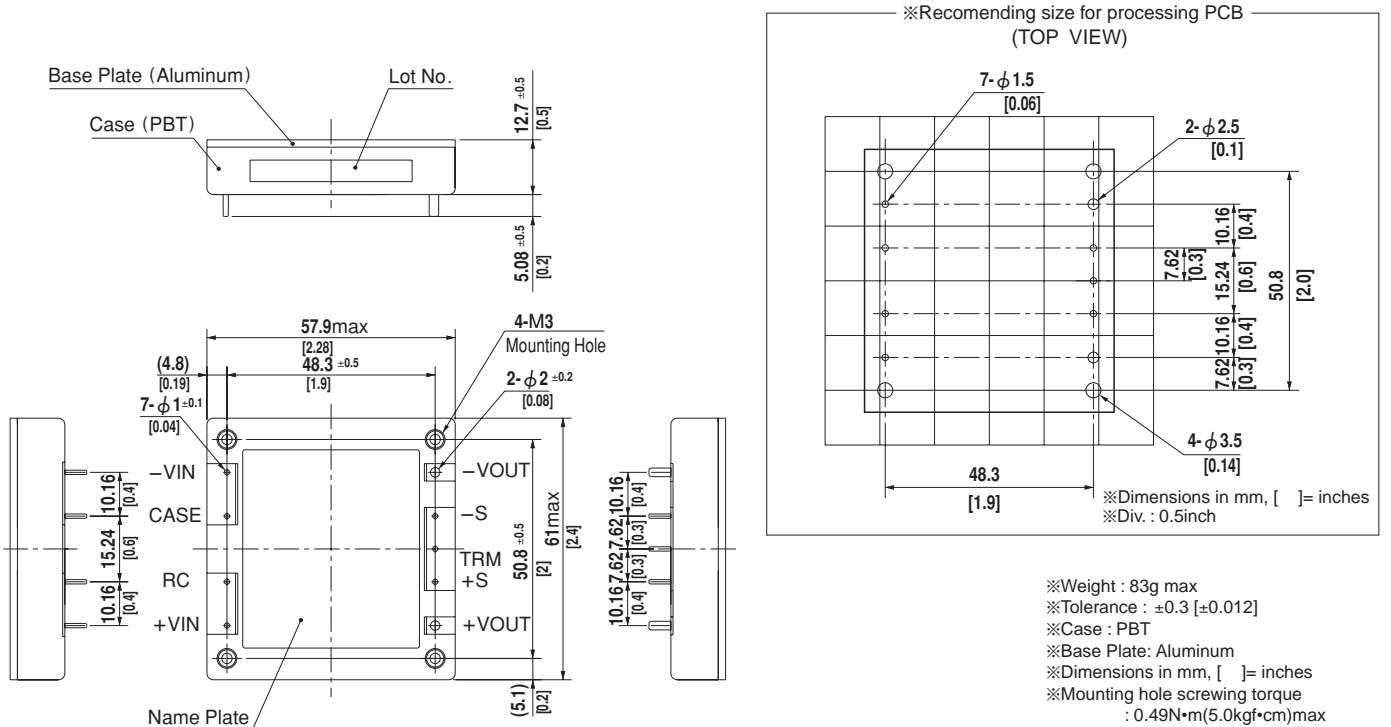
	MODEL	CBS200481R8	CBS200482R5	CBS2004803	CBS2004805	CBS2004812	CBS2004815	CBS2004824	CBS2004828	CBS2004848	
INPUT	VOLTAGE[V]	DC36 - 76									
	CURRENT[A]	*1 1.88typ	2.40typ	3.01typ	3.77typ	4.74typ	4.76typ	4.77typ	4.77typ	4.77typ	
	EFFICIENCY[%]	*1 70typ	76typ	80typ	83typ	88typ	88typ	88typ	88typ	88typ	
OUTPUT	VOLTAGE[V]	1.8	2.5	3.3	5	12	15	24	28	48	
	CURRENT[A]	35	35	35	30	16.7	13.4	8.4	7.2	4.2	
	LINE REGULATION[mV]	10max	10max	10max	10max	24max	30max	48max	56max	96max	
	LOAD REGULATION[mV]	10max	10max	10max	10max	24max	30max	48max	56max	96max	
	RIPPLE[mVp-p]	-20 to +100°C ±2	80max	80max	80max	80max	120max	120max	120max	120max	200max
		-40 to -20°C ±2	120max	120max	120max	120max	150max	150max	150max	150max	250max
	RIPPLE NOISE[mVp-p]	-20 to +100°C ±2	120max	120max	120max	120max	150max	150max	150max	150max	250max
		-40 to -20°C ±2	200max	200max	200max	200max	200max	200max	250max	250max	400max
	TEMPERATURE REGULATION[mV]	0 to +65°C	35max	35max	35max	50max	120max	150max	240max	280max	480max
		-40 to +100°C	66max	66max	66max	100max	240max	300max	480max	560max	960max
DRIFT[mV]	*3	16max	16max	16max	20max	40max	60max	90max	90max	180max	
START-UP TIME[ms]	200max (DCIN 48V, Io=100%)										
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4	Fixed (TRM pin open), adjustable by external resistor									
OUTPUT VOLTAGE SETTING[V]		1.70 - 1.98	1.98 - 2.75	1.98 - 3.63	3.0 - 5.5	7.2 - 13.2	9.0 - 16.5	14.4 - 26.4	16.8 - 30.8	43.2 - 52.8	
OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically										
OVERVOLTAGE PROTECTION[V]		2.16 - 2.88	3.00 - 4.00	4.00 - 5.50	5.75 - 7.00	13.80 - 16.80	17.25 - 21.00	27.60 - 33.60	32.20 - 39.20	55.20 - 67.20	
REMOTE SENSING	Provided										
REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)										

GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15℃)
	INPUT-CASE PIN, BASE PLATE	DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15℃)
	OUTPUT-CASE PIN, BASE PLATE	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15℃)
ENVIRONMENT	OPERATING TEMP.HUMID.AND ALTITUDE	-40 to +100℃ (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	STORAGE TEMP.HUMID.AND ALTITUDE	-40 to +100℃, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1
OTHERS	CASE SIZE/WEIGHT	57.9×12.7×61.0mm [2.28×0.5×2.4 inches] (W×H×D) / 83g max
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)

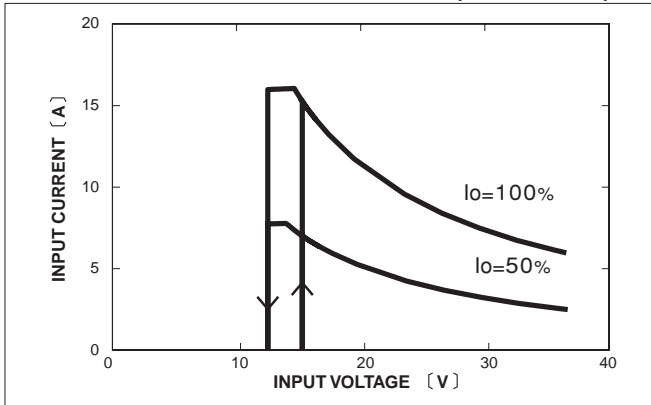
- \*1 At rated input(DC24V,DC48V) and rated load.
- \*2 Ripple and ripple noise is measured by using measuring board with recommended capacitor Co & the film capacitor 0.1 μF. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM101).
- \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25℃, with the input voltage held constant at the rated input/output.
- \*4 When the input voltage is in the range of DC18 - 20V, DC36 - 40V, output voltage adjustment range is 60 - 105% (except for 1R8/2R5/48).

External view

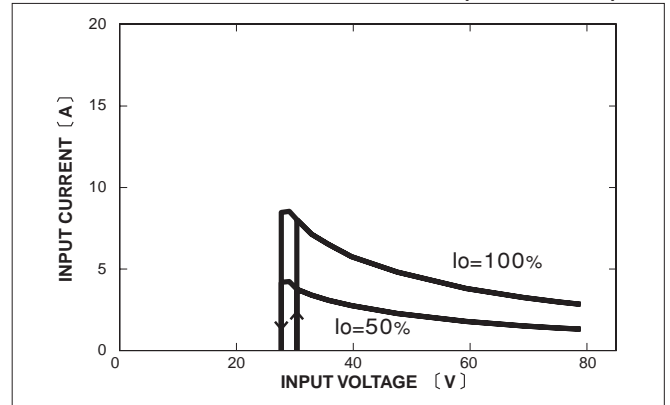


Performance data

INPUT CURRENT CHARACTERISTICS (CBS2002428)



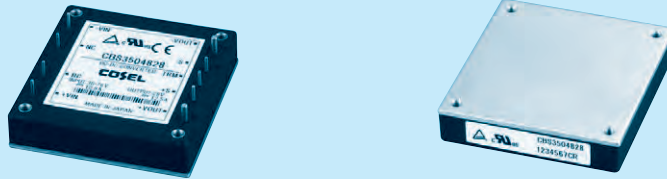
INPUT CURRENT CHARACTERISTICS (CBS2004828)



# CBS350

CB S 350 48 12 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage
- ⑤ Output voltage
- ⑥ Optional
- R :with Remote ON/OFF  
Positive logic control
- T :with Mounting hole  
φ 3.4 thru

MODEL	CBS3502412	CBS3502424	CBS3502428	CBS3502432	CBS3502448	CBS3504812	CBS3504824	CBS3504828	CBS3504832	CBS3504848
<b>MAX OUTPUT WATTAGE[W]</b>	300	348	350	352	302	348	348	350	352	350
<b>DC OUTPUT</b>	12V 25A	24V 14.5A	28V 12.5A	32V 11A	48V 6.3A	12V 29A	24V 14.5A	28V 12.5A	32V 11A	48V 7.3A

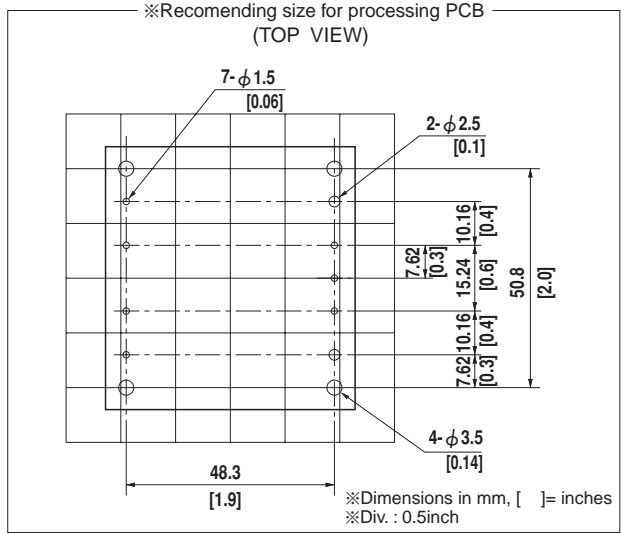
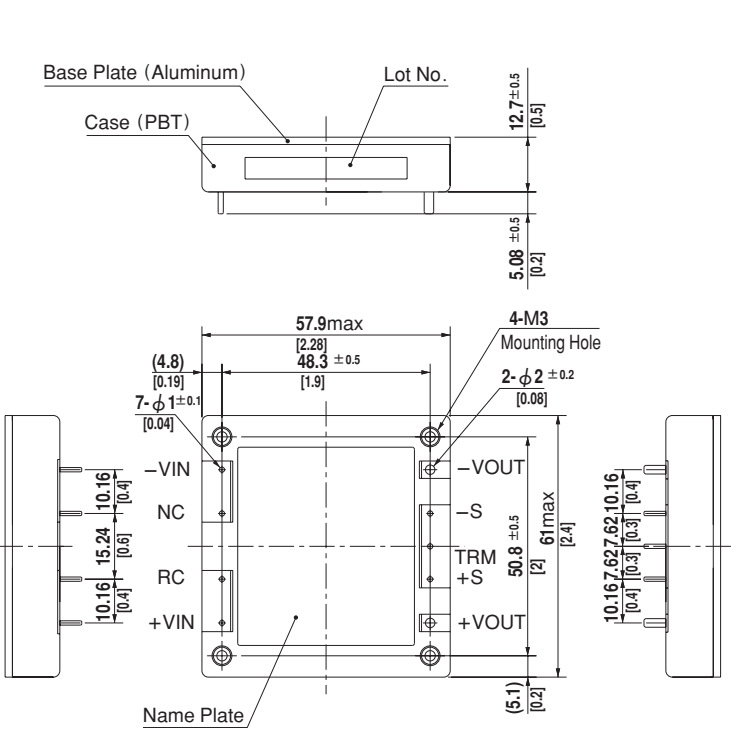
## SPECIFICATIONS

	MODEL	CBS3502412	CBS3502424	CBS3502428	CBS3502432	CBS3502448	CBS3504812	CBS3504824	CBS3504828	CBS3504832	CBS3504848	
INPUT	<b>VOLTAGE[V]</b>	DC20 - 36					DC36 - 76					DC36 - 60
	<b>CURRENT[A]</b>	*1 14.5typ	16.7typ	16.4typ	16.5typ	14.0typ	8.33typ	8.15typ	8.10typ	8.15typ	8.15typ	
	<b>EFFICIENCY[%]</b>	*1 86typ	87typ	89typ	89typ	90typ	87typ	89typ	90typ	90typ	91typ	
OUTPUT	<b>VOLTAGE[V]</b>	12	24	28	32	48	12	24	28	32	48	
	<b>CURRENT[A]</b>	25	14.5	12.5	11	6.3	29	14.5	12.5	11	7.3	
	<b>LINE REGULATION[mV]</b>	24max	48max	56max	64max	96max	24max	48max	56max	64max	96max	
	<b>LOAD REGULATION[mV]</b>	24max	48max	56max	64max	96max	24max	48max	56max	64max	96max	
	<b>RIPPLE[mVp-p]</b>	-20 to +100°C *2	120max	150max	180max	180max	300max	120max	150max	180max	180max	300max
		-40 to -20°C *2	150max	180max	220max	220max	360max	150max	180max	220max	220max	360max
		0 to 15%Load *2	240max	300max	360max	360max	600max	240max	300max	360max	360max	600max
	<b>RIPPLE NOISE[mVp-p]</b>	-20 to +100°C *2	150max	180max	220max	220max	360max	150max	180max	220max	220max	360max
		-40 to -20°C *2	200max	250max	280max	280max	500max	200max	250max	280max	280max	500max
		0 to 15%Load *2	300max	360max	440max	440max	720max	300max	360max	440max	440max	720max
<b>TEMPERATURE REGULATION[mV]</b>	0 to +65°C	120max	240max	280max	320max	480max	120max	240max	280max	320max	480max	
	-40 to +100°C	240max	480max	560max	640max	960max	240max	480max	560max	640max	960max	
<b>DRIFT[mV]</b>	*3	40max	90max	90max	120max	180max	40max	90max	90max	120max	180max	
<b>START-UP TIME[ms]</b>		200max (DCIN 24V, Io=100%)					200max (DCIN 48V, Io=100%)					
<b>OUTPUT VOLTAGE ADJUSTMENT RANGE[V]</b>	*4	Fixed (TRM pin open), adjustable by external resistor										
		7.2 - 13.2	14.4 - 26.4	16.8 - 30.8	25.6 - 35.2	38.4 - 52.8	7.2 - 13.2	14.4 - 26.4	16.8 - 30.8	25.6 - 35.2	38.4 - 55.2	
<b>OUTPUT VOLTAGE SETTING[V]</b>	*1	11.88 - 12.12	23.76 - 24.24	27.72 - 28.28	31.68 - 32.32	47.52 - 48.48	11.88 - 12.12	23.76 - 24.24	27.72 - 28.28	31.68 - 32.32	47.52 - 48.48	
PROTECTION CIRCUIT AND OTHERS	<b>OVERCURRENT PROTECTION</b>	Works over 105% of rating and recovers automatically										
	<b>OVERVOLTAGE PROTECTION[V]</b>	13.80 - 16.80	27.60 - 33.60	32.20 - 39.20	36.80 - 44.80	57.50 - 63.00	13.80 - 16.80	27.60 - 33.60	32.20 - 39.20	36.80 - 44.80	57.50 - 63.00	
	<b>REMOTE SENSING</b>	Provided										
	<b>REMOTE ON/OFF</b>	Provided (Negative logic L : ON, H : OFF)										
ISOLATION	<b>INPUT-OUTPUT</b>	DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15°C)										
	<b>INPUT-BASE PLATE</b>	DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15°C)										
	<b>OUTPUT-BASE PLATE</b>	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)										
ENVIRONMENT	<b>OPERATING TEMP.HUMID.AND ALTITUDE</b>	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to DERATING CURVE), 3,000m (10,000feet) max										
	<b>STORAGE TEMP.HUMID.AND ALTITUDE</b>	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max										
	<b>VIBRATION</b>	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis										
	<b>IMPACT</b>	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis										
SAFETY	<b>AGENCY APPROVALS</b>	UL60950-1, C-UL, EN60950-1										
OTHERS	<b>CASE SIZE/WEIGHT</b>	57.9 × 12.7 × 61.0mm [2.28 × 0.5 × 2.4 inches] (W × H × D) / 83g max										
	<b>COOLING METHOD</b>	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)										

\*1 At rated input(DC24V,DC48V), rated load, and aluminum base plate temperature 25°C.  
 \*2 Ripple and ripple noise is measured by using measuring board with recommended capacitor Co & the film capacitor 0.1 μF. Refer to the manual.  
 \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*4 When the input voltage is in the range of DC20 - 22V, DC36 - 40V, output voltage is limited. Refer to the manual.



External view

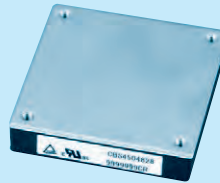
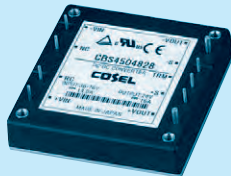


- ※Weight : 83g max
- ※Tolerance : ±0.3 [±0.012]
- ※Case : PBT
- ※Base Plate: Aluminum
- ※Dimensions in mm, [ ]= inches
- ※Mounting hole screwing torque : 0.49N•m(5.0kgf•cm)max

# CBS450

CB S 450 48 28 - □

① ② ③ ④ ⑤ ⑥



- ① Series name
  - ② Single output
  - ③ Output wattage
  - ④ Input voltage
  - ⑤ Output voltage
  - ⑥ Optional
- R :with Remote ON/OFF  
Positive logic control  
T :with Mounting hole  
φ 3.4 thru

MODEL	CBS4504824	CBS4504828	CBS4504832
MAX OUTPUT WATTAGE[W]	456	448	400
DC OUTPUT	24V 19A	28V 16A	32V 12.5A

## SPECIFICATIONS

	MODEL	CBS4504824	CBS4504828	CBS4504832	
INPUT	VOLTAGE[V]	DC38 - 60	DC36 - 76	DC36 - 76	
	CURRENT[A]	*1 10.6typ	10.5typ	9.3typ	
	EFFICIENCY[%]	*1 90typ	91typ	91typ	
OUTPUT	VOLTAGE[V]	24	28	32	
	CURRENT[A]	19	16	12.5	
	LINE REGULATION[mV]	48max	56max	64max	
	LOAD REGULATION[mV]	48max	56max	64max	
	RIPPLE[mVp-p]	-20 to +100°C *2	180max	210max	210max
		-40 to -20°C *2	220max	260max	260max
		0 to 15%Load *2	360max	430max	430max
	RIPPLE NOISE[mVp-p]	-20 to +100°C *2	220max	260max	260max
		-40 to -20°C *2	280max	330max	330max
		0 to 15%Load *2	440max	520max	520max
TEMPERATURE REGULATION[mV]	0 to +65°C	240max	280max	280max	
	-40 to +100°C	480max	560max	560max	
DRIFT[mV]	*3 90max	90max	120max		
START-UP TIME[ms]	200max (DCIN 48V, Io=100%)				
OUTPUT VOLTAGE ADJUSTMENT RANGE[V] *4	Fixed (TRM pin open), adjustable by external resistor				
	19.2 - 26.0	16.8 - 32.2	25.6 - 35.2		
OUTPUT VOLTAGE SETTING[V] *1	23.52 - 24.48	27.44 - 28.56	31.36 - 32.64		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically			
	OVERVOLTAGE PROTECTION[V]	27.60 - 33.60	32.20 - 39.20	36.80 - 44.80	
	REMOTE SENSING	Provided			
	REMOTE ON/OFF	Provided (Negative logic L : ON, H : OFF)			
ISOLATION	INPUT-OUTPUT	DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15°C)			
	INPUT-BASE PLATE	DC1,500V or AC1,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min(20±15°C)			
	OUTPUT-BASE PLATE	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)			
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max			
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max			
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis			
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1			
OTHERS	CASE SIZE/WEIGHT	57.9×12.7×61.0mm [2.28×0.5×2.4 inches] (W×H×D) / 83g max			
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)			

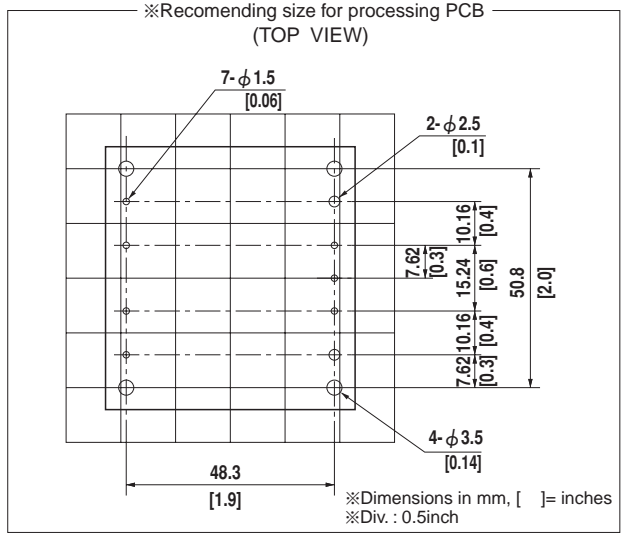
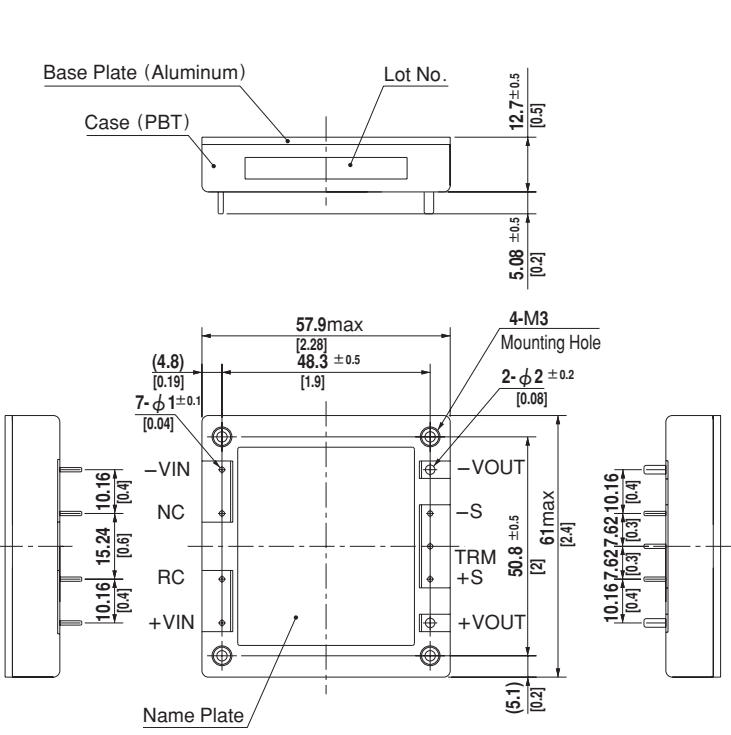
\*1 At rated input(DC48V), rated load, and aluminum base plate temperature 25°C.

\*2 Ripple and ripple noise is measured by using measuring board with recommended capacitor Co & the film capacitor 0.1 μF. Refer to the manual.

\*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

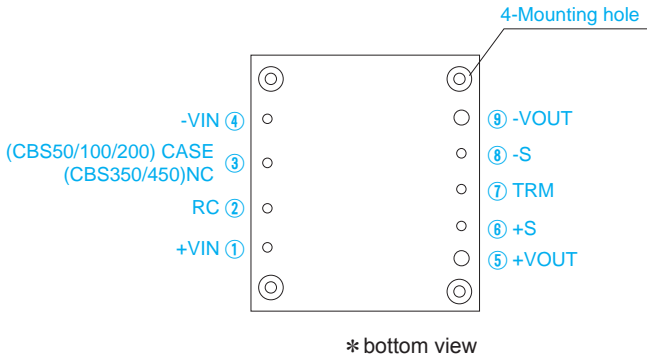
\*4 Refer to the manual for the input range.

External view



- ※Weight : 83g max
- ※Tolerance : ±0.3 [±0.012]
- ※Case : PBT
- ※Base Plate: Aluminum
- ※Dimensions in mm, [ ]= inches
- ※Mounting hole screwing torque : 0.49N•m(5.0kgf•cm)max

## Pin Configuration



No.	Pin Name	Function
①	+VIN	+DC input
②	RC	Remote ON/OFF
③	NC	No connection (CBS350/450)
	CASE	Wiring base plate (CBS50/100/200)
④	-VIN	-DC input
⑤	+VOUT	+DC output
⑥	+S	+Remote sensing
⑦	TRM	Adjustment of output voltage
⑧	-S	-Remote sensing
⑨	-VOUT	-DC output
—	Mounting hole	Mounting hole

## Implementation • Mounting Method

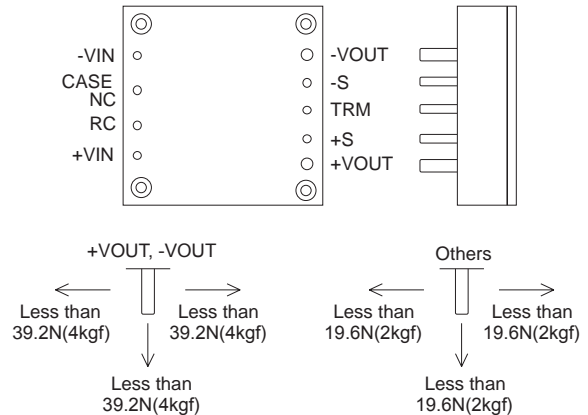
### Mounting method

- When multiple power modules are used side by side, position them with sufficient spaces to allow adequate air ventilation so that the aluminum base plate temperature of each power module will remain within the temperature range shown in the "derating".
- Do not pass the DC input pattern underneath the power module as this will increase conducted noise. Place the DC input pattern away from the power module. Do not pass the DC output pattern underneath the power module as this will increase output noise. Place the DC output pattern away from the power module.
- High frequency noise is radiated from the power module. When mounting the power module on a PCB, leave a copper pattern on the PCB to let it act as a shield and connect this pattern to the CASE pin (CBS50/100/200) or the mounting hole.
- When a heat sink cannot be fixed on the base plate side, order the power module with "-T" option. A heat sink can be mounted by affixing a M3 tap on the heat sink. In case of CBS350/450, make sure a mounting hole will be connected to a grounding capacitor CY.

	Mounting hole
Standard	M3 tapped
Optional : -T	φ 3.4 thru

### Stress onto the pins

- Applying excessive stress to the input or output pins of the power module may damage internal connections. Avoid applying stress in excess of that shown in right figure.
- Input and output pins are soldered onto the internal PCB. Do not bend or pull the leads with excessive force.
- As unexpected stress may be applied to the pins, set the diameter of the PCB mounting hole at 3.5mm.
- As unexpected stress may be applied to the pins from vibration or shock, fix the power module by using the mounting holes with screws to reduce stress.
- Fix the power module to the PCB with the screws before soldering the input and output pins to prevent the PCB pattern being damaged.



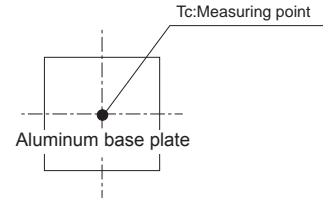
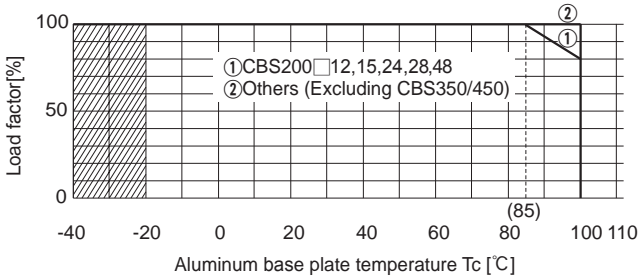
### Soldering temperature

- Flow soldering : 260°C for up to 15 seconds.
- Soldering iron (26W) : 450°C for up to 5 seconds.

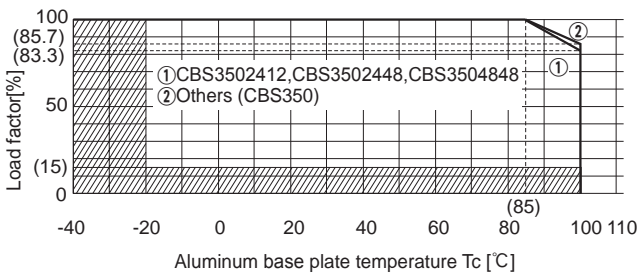
**Derating**

- Use the power modules with conduction cooling (e.g. heat dissipation from the aluminum base plate to the attached heat sink). Below shows the derating curves with respect to the aluminum base plate temperature. Note that operation within the hatched areas will cause a significant level of ripple and ripple noise. Contact us for more information on cooling methods.
- It is necessary to note thermal fatigue life by power cycle. Please reduce the temperature fluctuation range as much as possible when the up and down of temperature are frequently generated. Contact for more information on cooling methods.

● **CBS50, CBS100, CBS200**

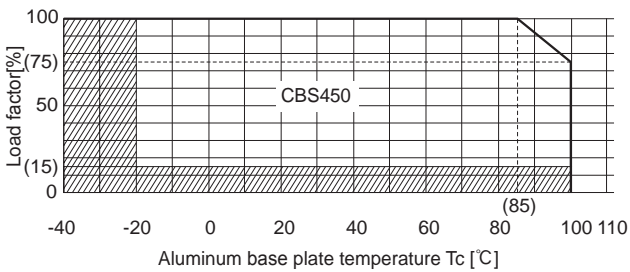


● **CBS350**



CBS

● **CBS400**



**Instruction Manual**

- ◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/CBS/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>



## Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	Inrush current protection	PCB/Pattern			Series/Redundancy operation availability	
						Material	Single sided	Double sided	Series operation	Redundancy operation
CBS50	Forward converter	310	Refer to table No.1	-	-	Aluminum	Yes		Yes	*1
CBS100	Forward converter	370		-	-	Aluminum	Yes		Yes	*1
CBS200	Forward converter	370		-	-	Aluminum	Yes		Yes	*1
CBS350	Forward converter	370		-	-	Aluminum	Yes		Yes	*1
CBS450	Forward converter	370		-	-	Aluminum	Yes		Yes	*1

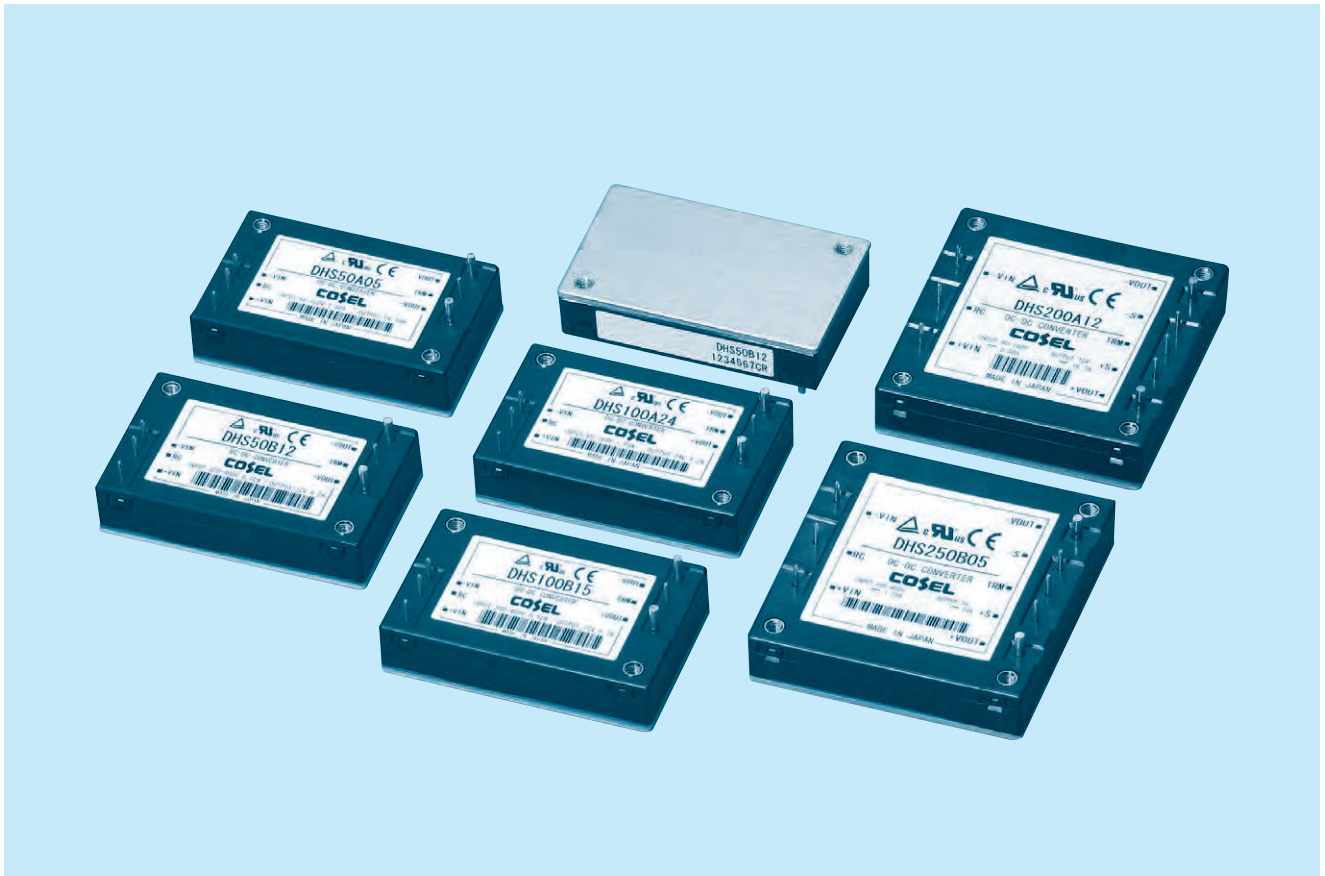
\*1 Refer to Instruction Manual.

Table1. The value of input current (at rated input voltage and rated load) [A]

Model	Output Voltage									
	1.8V	2.5V	3.3V	5V	12V	15V	24V	28V	32V	48V
CBS5024	1.2	1.6	2.0	2.5	2.4	2.4	2.4	2.4	-	-
CBS5048	0.6	0.8	1.0	1.3	1.2	1.2	1.2	1.2	-	-
CBS10024	2.5	3.2	4.1	5.0	4.8	4.8	4.8	4.8	-	-
CBS10048	1.2	1.6	2.0	2.5	2.4	2.4	2.4	2.4	-	-
CBS20024	3.8	4.8	6.1	7.6	9.6	9.6	9.7	9.7	-	-
CBS20048	1.9	2.4	3.0	3.8	4.8	4.8	4.8	4.8	-	4.8
CBS35024	-	-	-	-	15	-	17	17	17	14
CBS35048	-	-	-	-	8.4	-	8.2	8.1	8.2	8.2
CBS45048	-	-	-	-	-	-	10.6	10.5	9.3	-



# DHS-series



DHS

## Feature

- Ideal for distributed power systems
- Thin and small size
- Built-in overcurrent, overvoltage and thermal protection circuits
- Built-in remote ON/OFF
- Mounting hole (M3 tapped)

## CE marking

- Low Voltage Directive
- RoHS Directive

## Safety agency approvals

- UL60950-1, C-UL, EN60950-1

## 5-year warranty

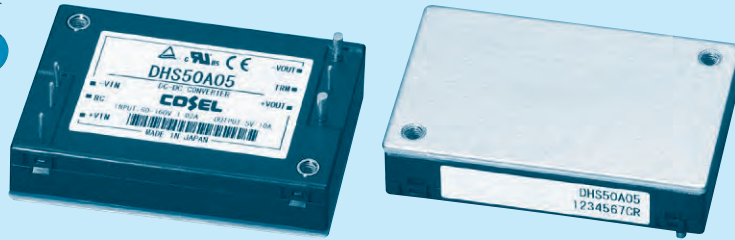
## Optional parts

- Heat sink

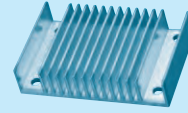
# DHS50A

DH S 50 A 05 -□

① ② ③ ④ ⑤ ⑥



\*Providing heat sink as option



- ① Series name
- ② Single output
- ③ Output wattage
- ④ A : DC60-160V
- ⑤ Output voltage
- ⑥ Optional
- T : with Mounting hole (φ 3.4 thru)

MODEL	DHS50A05	DHS50A12	DHS50A15	DHS50A24
MAX OUTPUT WATTAGE[W]	50.0	50.4	51.0	50.4
DC OUTPUT	5V 10A	12V 4.2A	15V 3.4A	24V 2.1A

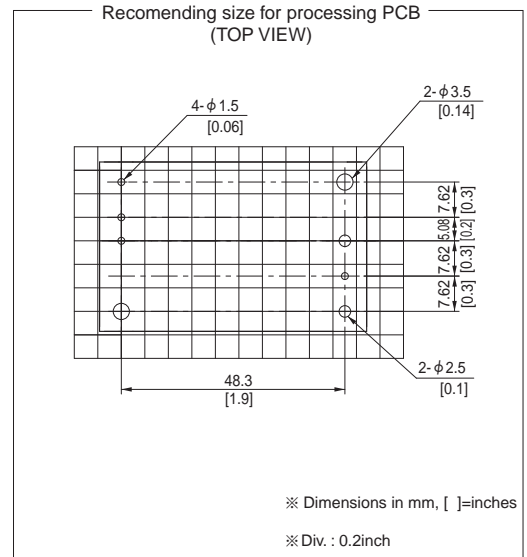
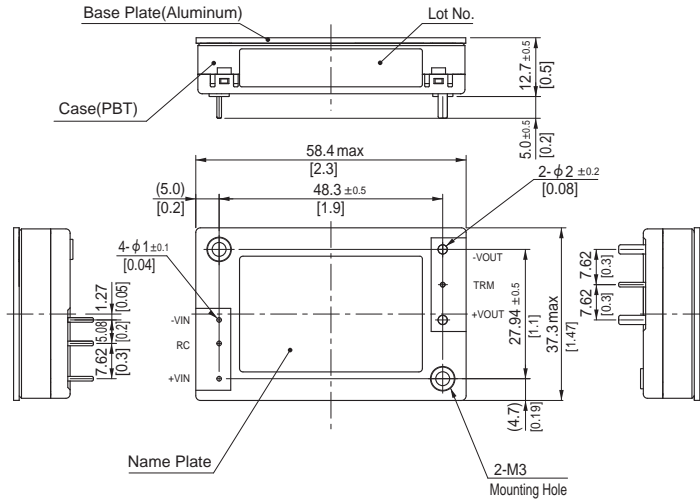
## SPECIFICATIONS

	MODEL	DHS50A05	DHS50A12	DHS50A15	DHS50A24	
INPUT	VOLTAGE[V]	DC60 - 160				
	CURRENT[A]	0.55A	0.55A	0.55A	0.55A	
	EFFICIENCY[%]	84.0typ	86.0typ	86.0typ	86.0typ	
		*1				
OUTPUT	VOLTAGE[V]	5	12	15	24	
	CURRENT[A]	10	4.2	3.4	2.1	
	LINE REGULATION[mV]	10max	24max	30max	48max	
	LOAD REGULATION[mV]	10max	24max	30max	48max	
	RIPPLE[mVp-p]	0 to +100°C *2	80max	120max	120max	120max
		-40 to 0°C *2	120max	150max	150max	150max
		0 to 15% Load *2	160max	240max	240max	240max
	RIPPLE NOISE[mVp-p]	0 to +100°C *2	120max	150max	150max	150max
		-40 to 0°C *2	200max	200max	200max	250max
		0 to 15% Load *2	240max	300max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +65°C	50max	120max	150max	240max
		-40 to +100°C	100max	240max	300max	480max
	DRIFT[mV]	*3	20max	40max	60max	90max
START-UP TIME[ms]	200max (DCIN 110V, Io=100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4	Fixed (TRM pin open), adjustable by external VR or external voltage				
		4.50 - 6.00	10.80 - 13.20	13.50 - 16.50	21.60 - 26.40	
OUTPUT VOLTAGE SETTING[V]		4.97 - 5.13	11.91 - 12.29	14.76 - 15.24	23.62 - 24.38	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION[V]	6.30 - 7.60	13.90 - 17.55	17.25 - 21.75	27.60 - 34.80	
	REMOTE SENSING	nothing				
	REMOTE ON/OFF	Provided (Negative Logic L : ON, H : OFF)				
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)				
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)				
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max				
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis Complies with IEC61373 Category 1 Class B				
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis Complies with IEC61373 Category 1 Class B				
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1				
OTHERS	CASE SIZE/WEIGHT	58.4 × 12.7 × 37.3mm [2.3 × 0.5 × 1.47 inches] (W × H × D) / 60g max				
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)				

\*1 At rated input(DC110V) and rated load.  
 \*2 Ripple and ripple noise is measured by using measuring board. Refer to the manual  
 \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*4 Refer to the manual for input range.



External view



- ※ Tolerance : ±0.3 [±0.012]
- ※ Weight : 60g max
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting hole screwing torque : 0.49N · m (5.0kgf · cm) max

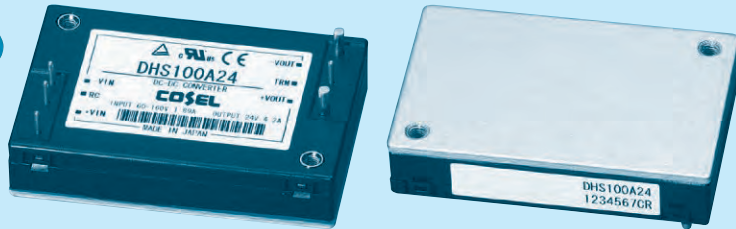
# DHS100A

DH S 100 A 05 -□

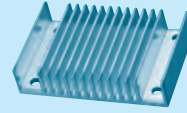
① ② ③ ④ ⑤ ⑥



RoHS



\*Providing heat sink as option



- ① Series name
- ② Single output
- ③ Output wattage
- ④ A : DC60-160V
- ⑤ Output voltage
- ⑥ Optional
- T : with Mounting hole (φ 3.4 thru)

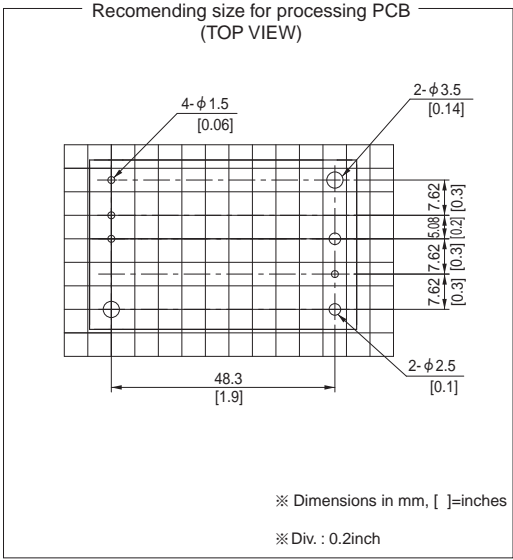
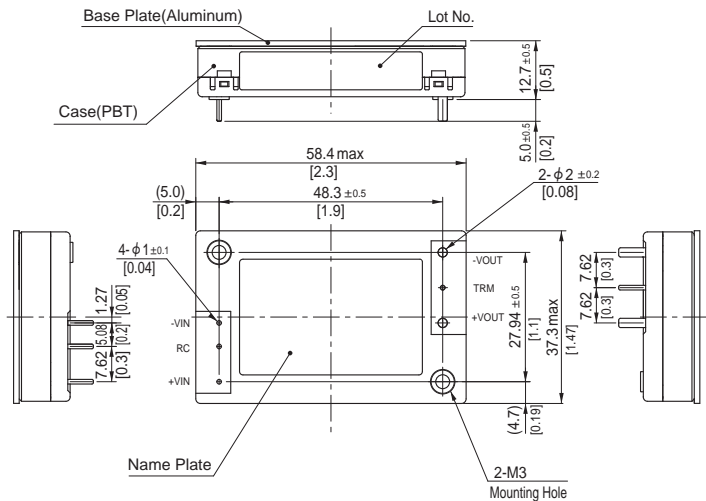
MODEL	DHS100A05	DHS100A12	DHS100A15	DHS100A24
MAX OUTPUT WATTAGE[W]	100.0	100.8	100.5	100.8
DC OUTPUT	5V 20A	12V 8.4A	15V 6.7A	24V 4.2A

## SPECIFICATIONS

	MODEL	DHS100A05	DHS100A12	DHS100A15	DHS100A24	
INPUT	VOLTAGE[V]	DC60 - 160				
	CURRENT[A]	1.1A	1.1A	1.1A	1.1A	
	EFFICIENCY[%]	85.0typ	88.0typ	88.0typ	88.0typ	
OUTPUT	VOLTAGE[V]	5	12	15	24	
	CURRENT[A]	20	8.4	6.7	4.2	
	LINE REGULATION[mV]	10max	24max	30max	48max	
	LOAD REGULATION[mV]	10max	24max	30max	48max	
	RIPPLE[mVp-p]	0 to +100°C *2	80max	120max	120max	120max
		-40 to 0°C *2	120max	150max	150max	150max
		0 to 15% Load *2	160max	240max	240max	240max
	RIPPLE NOISE[mVp-p]	0 to +100°C *2	120max	150max	150max	150max
		-40 to 0°C *2	200max	200max	200max	250max
		0 to 15% Load *2	240max	300max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +65°C	50max	120max	150max	240max
		-40 to +100°C	100max	240max	300max	480max
	DRIFT[mV]	*3	20max	40max	60max	90max
START-UP TIME[ms]	200max (DCIN 110V, Io=100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4 Fixed (TRM pin open), adjustable by external VR or external voltage					
OUTPUT VOLTAGE SETTING[V]	4.50 - 6.00	10.80 - 13.20	13.50 - 16.50	21.60 - 26.40		
OUTPUT VOLTAGE SETTING[V]	4.97 - 5.13	11.91 - 12.29	14.76 - 15.24	23.62 - 24.38		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION[V]	6.30 - 7.60	13.90 - 17.55	17.25 - 21.75	27.60 - 34.80	
	REMOTE SENSING	nothing				
REMOTE ON/OFF	Provided (Negative Logic L : ON, H : OFF)					
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)				
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)				
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max				
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis Complies with IEC61373 Category 1 Class B				
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis Complies with IEC61373 Category 1 Class B				
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1				
OTHERS	CASE SIZE/WEIGHT	58.4 × 12.7 × 37.3mm [2.3 × 0.5 × 1.47 inches] (W × H × D) / 60g max				
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)				

\*1 At rated input(DC110V) and rated load.  
 \*2 Ripple and ripple noise is measured by using measuring board. Refer to the manual.  
 \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*4 Refer to the manual for input range.

External view



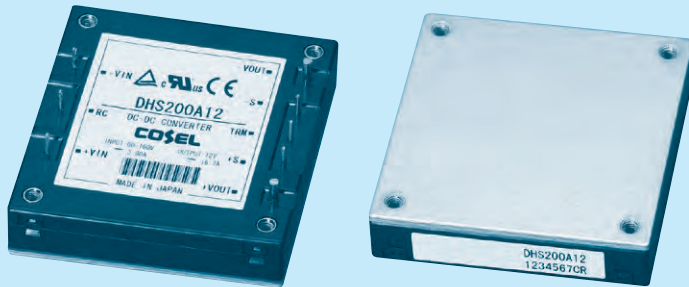
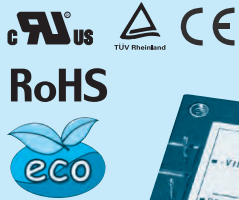
※ Dimensions in mm, [ ]=inches  
 ※ Div. : 0.2inch

- ※ Tolerance : ±0.3 [±0.012]
- ※ Weight : 60g max
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting hole screwing torque : 0.49N · m (5.0kgf · cm) max

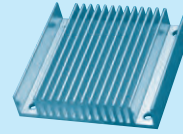
# DHS200A

DH S 200 A 05 -□

① ② ③ ④ ⑤ ⑥



\*Providing heat sink as option



- ① Series name
- ② Single output
- ③ Output wattage
- ④ A : DC60-160V
- ⑤ Output voltage
- ⑥ Optional  
T : with Mounting hole (φ 3.4 thru)

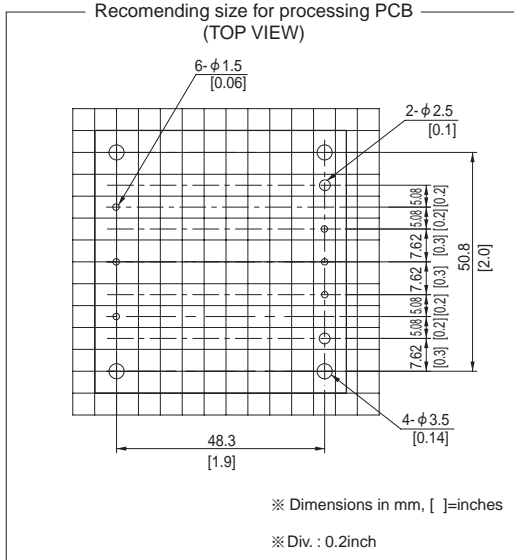
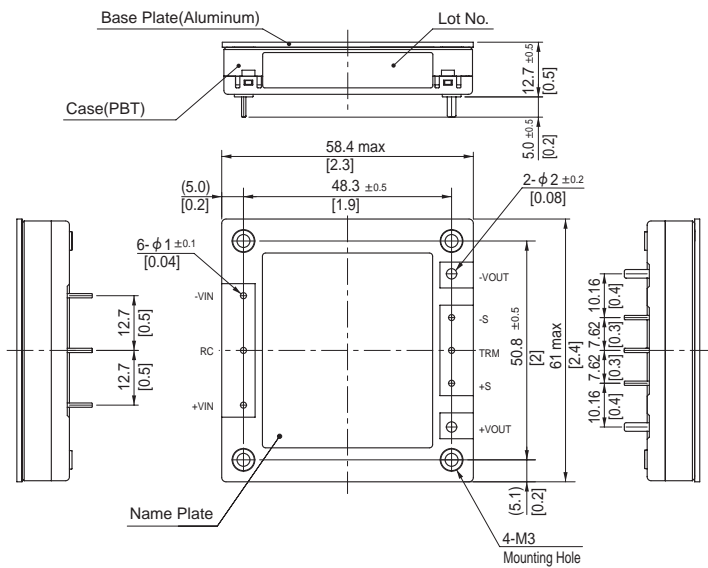
MODEL	DHS200A05	DHS200A12	DHS200A15	DHS200A24
MAX OUTPUT WATTAGE[W]	200.0	200.4	201.0	201.6
DC OUTPUT	5V 40A	12V 16.7A	15V 13.4A	24V 8.4A

## SPECIFICATIONS

	MODEL	DHS200A05	DHS200A12	DHS200A15	DHS200A24	
INPUT	VOLTAGE[V]	DC60 - 160				
	CURRENT[A]	2.1A	2.1A	2.1A	2.1A	
	EFFICIENCY[%]	87.0typ	88.0typ	88.0typ	88.0typ	
OUTPUT	VOLTAGE[V]	5	12	15	24	
	CURRENT[A]	40	16.7	13.4	8.4	
	LINE REGULATION[mV]	10max	24max	30max	48max	
	LOAD REGULATION[mV]	10max	24max	30max	48max	
	RIPPLE[mVp-p]	0 to +100°C*2	80max	120max	120max	120max
		-40 to 0°C *2	120max	150max	150max	150max
		0 to 15% Load*2	160max	240max	240max	240max
	RIPPLE NOISE[mVp-p]	0 to +100°C*2	120max	150max	150max	150max
		-40 to 0°C *2	200max	200max	200max	250max
		0 to 15% Load*2	240max	300max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +65°C	50max	120max	150max	240max
		-40 to +100°C	100max	240max	300max	480max
	DRIFT[mV]	*3	20max	40max	60max	90max
START-UP TIME[ms]	200max (DCIN 110V, Io=100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4	Fixed (TRM pin open), adjustable by external VR or external voltage				
		3.00 - 6.00	7.20 - 13.20	9.00 - 16.50	14.40 - 26.40	
OUTPUT VOLTAGE SETTING[V]		4.97 - 5.13	11.91 - 12.29	14.76 - 15.24	23.62 - 24.38	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION[V]	6.30 - 7.30	13.90 - 16.35	17.25 - 20.25	27.60 - 32.40	
	REMOTE SENSING	Provided				
REMOTE ON/OFF	Provided (Negative Logic L : ON, H :OFF)					
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)				
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)				
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)				
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTIITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max				
	STORAGE TEMP.,HUMID.AND ALTIITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max				
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis Complies with IEC61373 Category 1 Class B				
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis Complies with IEC61373 Category 1 Class B				
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1				
OTHERS	CASE SIZE/WEIGHT	58.4 × 12.7 × 61mm [2.3 × 0.5 × 2.4 inches] (W × H × D) / 100g max				
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)				

\*1 At rated input(DC110V) and rated load.  
 \*2 Ripple and ripple noise is measured by using measuring board. Refer to the manual.  
 \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*4 Refer to the manual for input range.

External view



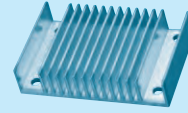
- ※ Dimensions in mm, [ ]=inches
- ※ Div. : 0.2inch
- ※ Tolerance : ±0.3 [±0.012]
- ※ Weight : 100g max
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting hole screwing torque : 0.49N · m (5.0kgf · cm) max

# DHS50B

DH S 50 B 05 -□

① ② ③ ④ ⑤ ⑥

\*Providing heat sink as option



- ① Series name
- ② Single output
- ③ Output wattage
- ④ B : DC200-400V
- ⑤ Output voltage
- ⑥ Optional  
T : with Mounting hole (φ 3.4 thru)



RoHS



MODEL	DHS50B03	DHS50B05	DHS50B12	DHS50B15	DHS50B24	DHS50B28
MAX OUTPUT WATTAGE[W]	33.0	50.0	50.4	51.0	50.4	50.4
DC OUTPUT	3.3V 10A	5V 10A	12V 4.2A	15V 3.4A	24V 2.1A	28V 1.8A

## SPECIFICATIONS

	MODEL	DHS50B03	DHS50B05	DHS50B12	DHS50B15	DHS50B24	DHS50B28	
INPUT	VOLTAGE[V]	DC200 - 400						
	CURRENT[A]	*1 0.15A	0.22A	0.22A	0.22A	0.22A	0.22A	
	EFFICIENCY[%]	*1 77.0typ	80.0typ	83.0typ	83.0typ	83.0typ	82.0typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	28	
	CURRENT[A]	10	10	4.2	3.4	2.1	1.8	
	LINE REGULATION[mV]	10max	10max	24max	30max	48max	56max	
	LOAD REGULATION[mV]	10max	10max	24max	30max	48max	56max	
	RIPPLE[mVp-p]	0 to +100°C *2	80max	80max	120max	120max	120max	120max
		-40 to 0°C *2	120max	120max	150max	150max	150max	150max
		0 to 15% Load *2	160max	160max	240max	240max	240max	240max
	RIPPLE NOISE[mVp-p]	0 to +100°C *2	120max	120max	150max	150max	150max	150max
		-40 to 0°C *2	200max	200max	200max	200max	250max	250max
		0 to 15% Load *2	240max	240max	300max	300max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +65°C	35max	50max	120max	150max	240max	280max
		-40 to +100°C	66max	100max	240max	300max	480max	560max
	DRIFT[mV]	*3	16max	20max	40max	60max	90max	90max
	START-UP TIME[ms]	200max (DCIN 280V, Io=100%)						
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4	Fixed (TRM pin open), adjustable by external VR or external voltage						
		2.97 - 3.96	4.50 - 6.00	10.80 - 13.20	13.50 - 16.50	21.60 - 26.40	25.20 - 30.80	
OUTPUT VOLTAGE SETTING[V]		3.30 - 3.40	4.97 - 5.13	11.91 - 12.29	14.76 - 15.24	23.62 - 24.38	27.56 - 28.44	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically						
	OVERVOLTAGE PROTECTION[V]	4.20 - 5.70	6.30 - 7.60	13.90 - 17.55	17.25 - 21.75	27.60 - 34.80	32.20 - 40.60	
	REMOTE SENSING	None						
	REMOTE ON/OFF	Provided (Negative Logic L : ON, H : OFF)						
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)						
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)						
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)						
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max						
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max						
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis						
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis						
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1						
OTHERS	CASE SIZE/WEIGHT	58.4 × 12.7 × 37.3mm [2.3 × 0.5 × 1.47 inches] (W × H × D) / 60g max						
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)						

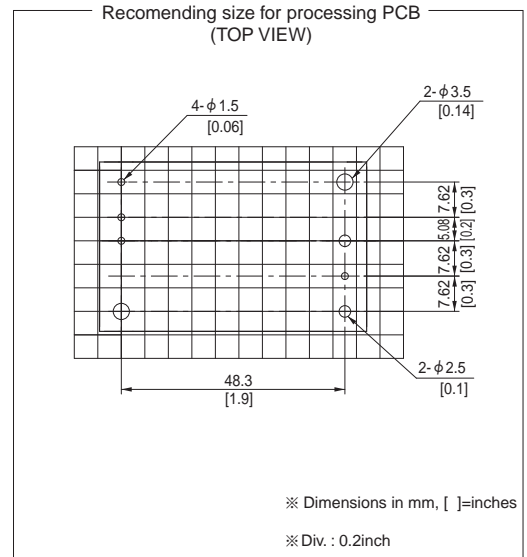
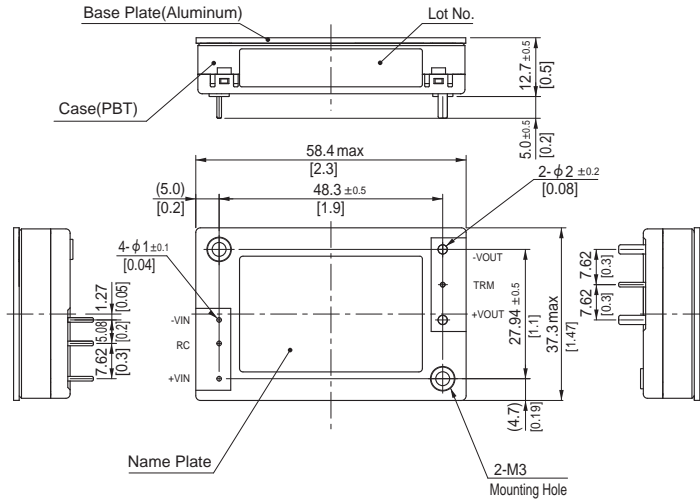
\*1 At rated input(DC280V) and rated load.

\*2 Ripple and ripple noise is measured by using measuring board. Refer to the manual

\*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*4 Refer to the manual for input range.

External view



※ Dimensions in mm, [ ]=inches  
 ※ Div. : 0.2inch

- ※ Tolerance : ±0.3 [±0.012]
- ※ Weight : 60g max
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting hole screwing torque : 0.49N · m (5.0kgf · cm) max

# DHS100B

DH S 100 B 05 -□

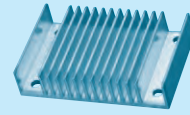
① ② ③ ④ ⑤ ⑥



RoHS



\*Providing heat sink as option



- ① Series name
- ② Single output
- ③ Output wattage
- ④ B : DC200-400V
- ⑤ Output voltage
- ⑥ Optional  
T : with Mounting hole (φ 3.4 thru)

MODEL	DHS100B03	DHS100B05	DHS100B12	DHS100B15	DHS100B24	DHS100B28
MAX OUTPUT WATTAGE[W]	66.0	100.0	100.8	100.5	100.8	100.8
DC OUTPUT	3.3V 20A	5V 20A	12V 8.4A	15V 6.7A	24V 4.2A	28V 3.6A

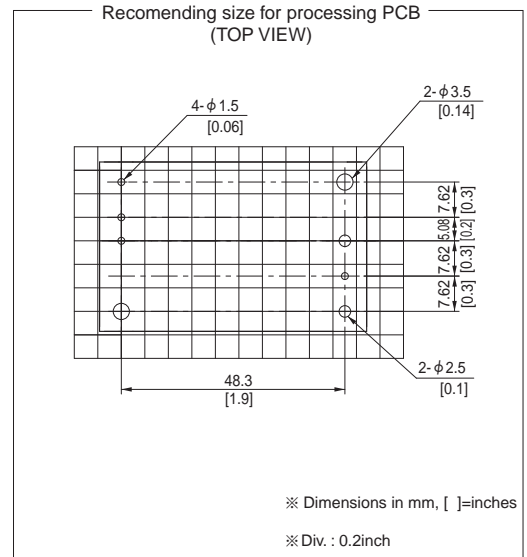
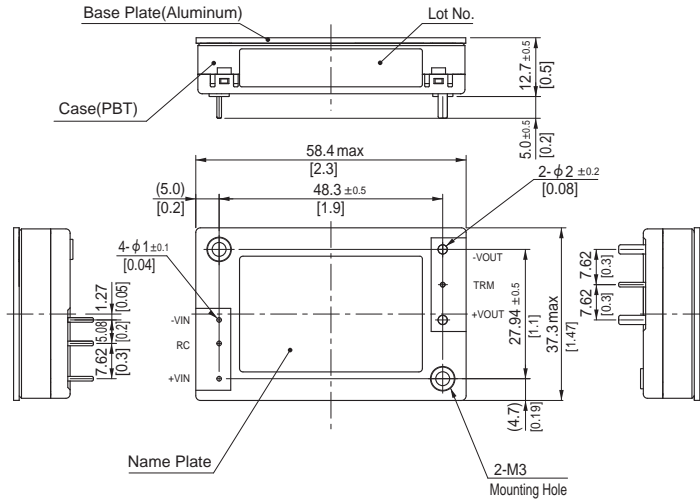
## SPECIFICATIONS

	MODEL	DHS100B03	DHS100B05	DHS100B12	DHS100B15	DHS100B24	DHS100B28	
INPUT	VOLTAGE[V]	DC200 - 400						
	CURRENT[A]	0.30A	0.44A	0.42A	0.42A	0.42A	0.42A	
	EFFICIENCY[%]	79.0typ	82.0typ	85.0typ	86.0typ	86.0typ	86.0typ	
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	28	
	CURRENT[A]	20	20	8.4	6.7	4.2	3.6	
	LINE REGULATION[mV]	10max	10max	24max	30max	48max	56max	
	LOAD REGULATION[mV]	10max	10max	24max	30max	48max	56max	
	RIPPLE[mVp-p]	0 to +100°C*	80max	80max	120max	120max	120max	120max
		-40 to 0°C *	120max	120max	150max	150max	150max	150max
		0 to 15% Load*	160max	160max	240max	240max	240max	240max
	RIPPLE NOISE[mVp-p]	0 to +100°C*	120max	120max	150max	150max	150max	150max
		-40 to 0°C *	200max	200max	200max	200max	250max	250max
		0 to 15% Load*	240max	240max	300max	300max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +65°C	35max	50max	120max	150max	240max	280max
		-40 to +100°C	66max	100max	240max	300max	480max	560max
	DRIFT[mV]	16max	20max	40max	60max	90max	90max	
START-UP TIME[ms]	200max (DCIN 280V, Io=100%)							
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed (TRM pin open), adjustable by external VR or external voltage							
	2.97 - 3.96	4.50 - 6.00	10.80 - 13.20	13.50 - 16.50	21.60 - 26.40	25.20 - 30.80		
OUTPUT VOLTAGE SETTING[V]	3.30 - 3.40	4.97 - 5.13	11.91 - 12.29	14.76 - 15.24	23.62 - 24.38	27.56 - 28.44		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically						
	OVERVOLTAGE PROTECTION[V]	4.20 - 5.70	6.30 - 7.60	13.90 - 17.55	17.25 - 21.75	27.60 - 34.80	32.20 - 40.60	
	REMOTE SENSING	None						
	REMOTE ON/OFF	Provided (Negative Logic L : ON, H :OFF)						
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)						
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)						
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)						
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max						
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max						
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis						
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis						
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1						
OTHERS	CASE SIZE/WEIGHT	58.4 X 12.7 X 37.3mm [2.3 X 0.5 X 1.47 inches] (W X H X D) / 60g max						
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)						

\*1 At rated input(DC280V) and rated load.  
 \*2 Ripple and ripple noise is measured by using measuring board. Refer to the manual.  
 \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*4 Refer to the manual for input range.



External view



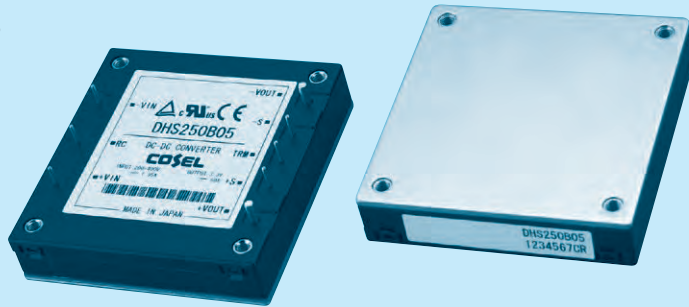
※ Dimensions in mm, [ ]=inches  
 ※ Div. : 0.2inch

- ※ Tolerance : ±0.3 [±0.012]
- ※ Weight : 60g max
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting hole screwing torque : 0.49N · m (5.0kgf · cm) max

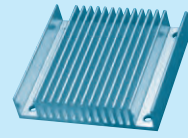
# DHS250B

DH S 250 B 05 -□

① ② ③ ④ ⑤ ⑥



\*Providing heat sink as option



- ① Series name
- ② Single output
- ③ Output wattage
- ④ B : DC200-400V
- ⑤ Output voltage
- ⑥ Optional
- T : with Mounting hole (φ 3.4 thru)

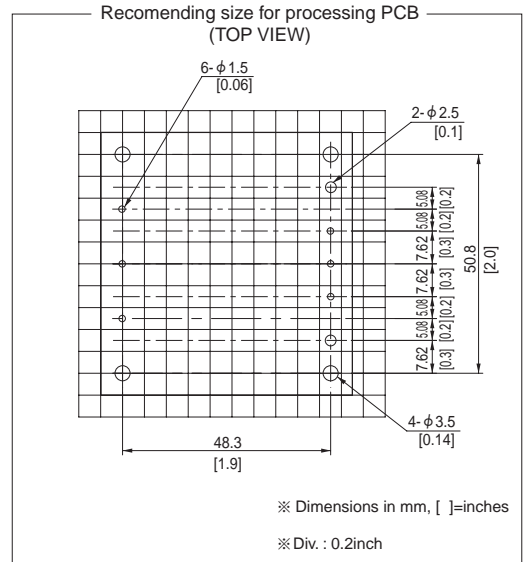
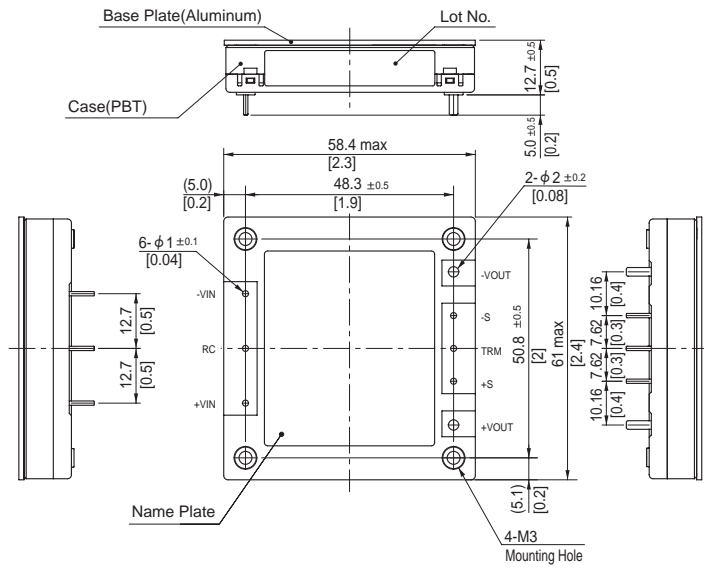
MODEL	DHS250B03	DHS250B05	DHS250B07	DHS250B12	DHS250B15	DHS250B24	DHS250B28	DHS250B48
MAX OUTPUT WATTAGE[W]	165.0	250.0	247.5	252.0	247.5	252.0	252.0	249.6
DC OUTPUT	3.3V 50A	5V 50A	7.5V 33A	12V 21A	15V 16.5A	24V 10.5A	28V 9.0A	48V 5.2A

## SPECIFICATIONS

	MODEL	DHS250B03	DHS250B05	DHS250B07	DHS250B12	DHS250B15	DHS250B24	DHS250B28	DHS250B48	
INPUT	VOLTAGE[V]	DC200 - 400								
	CURRENT[A]	0.67A	1.0A	1.0A	1.0A	1.0A	1.0A	1.0A	1.0A	
	EFFICIENCY[%]	88.0typ	90.0typ	88.0typ	88.0typ	88.0typ	88.0typ	88.0typ	89.0typ	
OUTPUT	VOLTAGE[V]	3.3	5	7.5	12	15	24	28	48	
	CURRENT[A]	50	50	33	21	16.5	10.5	9.0	5.2	
	LINE REGULATION[mV]	10max	10max	20max	24max	30max	48max	56max	96max	
	LOAD REGULATION[mV]	10max	10max	20max	24max	30max	48max	56max	96max	
	RIPPLE[mVp-p]	0 to +100°C	80max	80max	100max	120max	120max	120max	120max	200max
		-40 to 0°C	120max	120max	130max	150max	150max	150max	150max	250max
		0 to 15% Load	160max	160max	200max	240max	240max	240max	240max	400max
	RIPPLE NOISE[mVp-p]	0 to +100°C	120max	120max	130max	150max	150max	150max	150max	250max
		-40 to 0°C	200max	200max	200max	200max	200max	250max	250max	400max
		0 to 15% Load	240max	240max	260max	300max	300max	300max	300max	500max
	TEMPERATURE REGULATION[mV]	0 to +65°C	35max	50max	70max	120max	150max	240max	280max	480max
		-40 to +100°C	66max	100max	140max	240max	300max	480max	560max	960max
	DRIFT[mV]	16max	20max	30max	40max	60max	90max	90max	180max	
START-UP TIME[ms]	200max (DCIN 280V, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed (TRM pin open), adjustable by external VR or external voltage									
OUTPUT VOLTAGE SETTING[V]	1.98 - 3.96	3.00 - 6.00	4.50 - 8.25	7.20 - 13.20	9.00 - 16.50	14.40 - 26.40	16.80 - 30.80	28.80 - 52.80		
	3.30 - 3.40	4.97 - 5.13	7.43 - 7.67	11.91 - 12.29	14.76 - 15.24	23.62 - 24.38	27.56 - 28.44	47.24 - 48.76		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	OVERVOLTAGE PROTECTION[V]	4.20 - 4.85	6.30 - 7.30	8.70 - 10.20	13.90 - 16.35	17.25 - 20.25	27.60 - 32.40	32.20 - 37.80	55.20 - 64.80	
	REMOTE SENSING	Provided								
	REMOTE ON/OFF	Provided (Negative Logic L : ON, H : OFF)								
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)								
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max								
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max								
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis								
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis								
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1								
OTHERS	CASE SIZE/WEIGHT	58.4 × 12.7 × 61mm [2.3 × 0.5 × 2.4 inches] (W × H × D) / 100g max								
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)								

\*1 At rated input (DC280V) and rated load.  
 \*2 Ripple and ripple noise is measured by using measuring board. Refer to the manual.  
 \*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*4 Refer to the manual for input range.

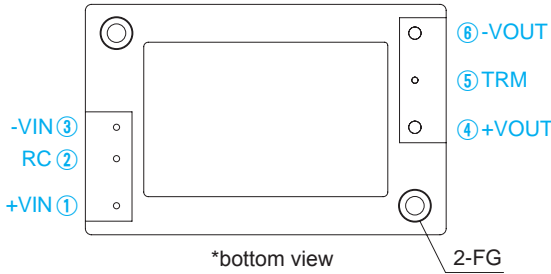
External view



- ※ Dimensions in mm, [ ]=inches
- ※ Div. : 0.2inch
- ※ Tolerance :  $\pm 0.3$  [ $\pm 0.012$ ]
- ※ Weight : 100g max
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting hole screwing torque :  $0.49\text{N} \cdot \text{m}$  (5.0kgf · cm) max

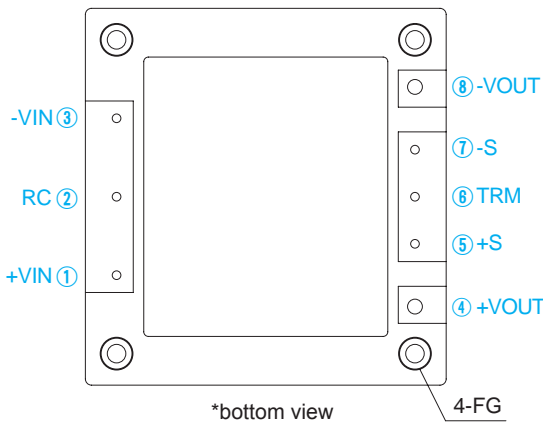
Pin Configuration

DHS50/100



No.		Pin Connection	Function
DHS50/100	DHS200/250		
①	①	+VIN	+DC input
②	②	RC	Remote ON/OFF
③	③	-VIN	-DC input
④	④	+VOUT	+DC output
—	⑤	+S	+Remote sensing
⑤	⑥	TRM	Adjustment of output voltage
—	⑦	-S	-Remote sensing
⑥	⑧	-VOUT	-DC output
—	—	Mounting hole	Mounting hole

DHS200/250

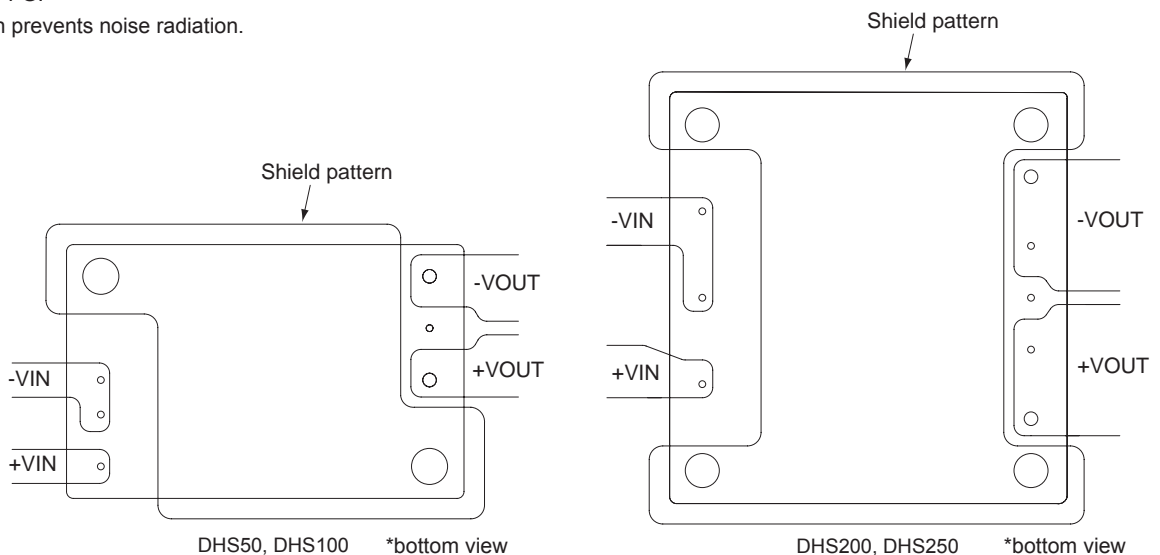


Implementation • Mounting Method

DHS

Mounting method

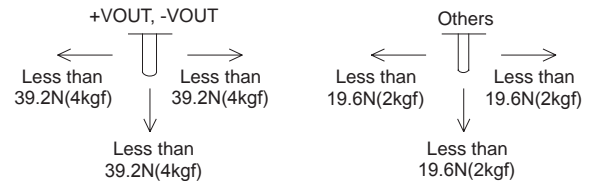
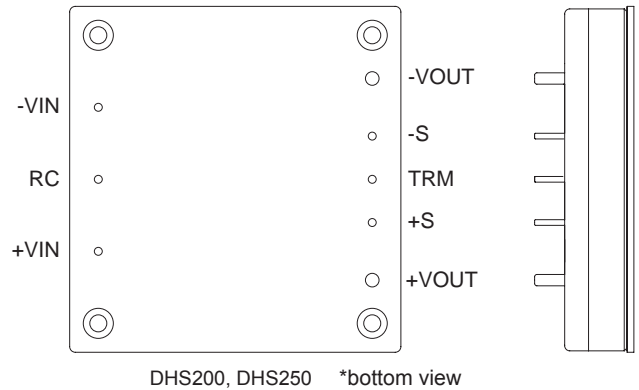
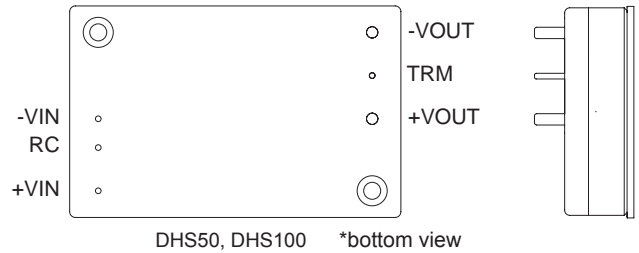
- The unit can be mounted in any direction. When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation. Aluminum base plate temperature around each power supply should not exceed the temperature range shown in "Derating".
- Avoid placing the DC input line pattern layout underneath the unit, it will increase the line conducted noise. Make sure to leave an ample distance between the line pattern layout and the unit. Also avoid placing the DC output line pattern underneath the unit because it may increase the output noise. Lay out the pattern away from the unit.
- High-frequency noise radiates directly from the unit to the atmosphere. Therefore, design the shield pattern on the printed circuit board and connect its one to FG. The shield pattern prevents noise radiation.



Implementation • Mounting Method

Stress onto the pins

- Applying excessive stress to the input or output pins of the power module may damage internal connections. Avoid applying stress in excess of that shown in right figure.
- Input and output pins are soldered onto the internal PCB. Do not bend or pull the leads with excessive force.
- As unexpected stress may be applied to the pins, set the diameter of the PCB mounting hole at 3.5mm.
- As unexpected stress may be applied to the pins from vibration or shock, fix the power module by using the mounting holes with screws to reduce stress.
- Fix the power module to the PCB with the screws before soldering the input and output pins to prevent the PCB pattern being damaged.



Soldering temperature

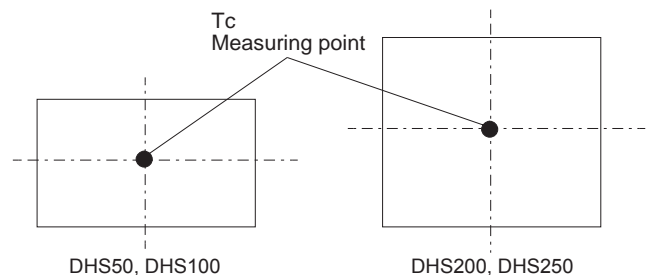
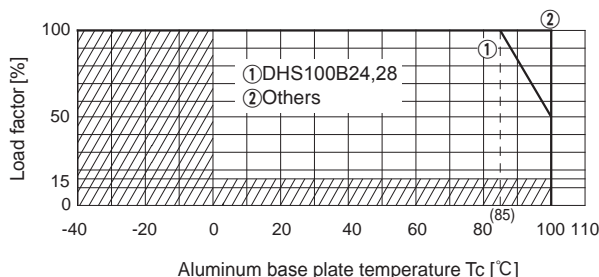
- Flow soldering : 260°C for up to 15 seconds.
- Soldering iron (26W) : 450°C for up to 5 seconds.

DHS

Derating

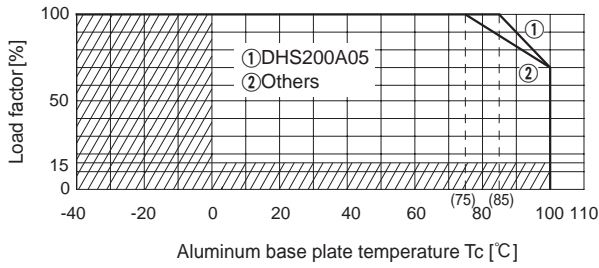
- Use the power modules with conduction cooling (e.g. heat dissipation from the aluminum base plate to the attached heat sink).Below shows the derating curves with respect to the aluminum base plate temperature. Note that operation within the hatched areas will cause a significant level of ripple and ripple noise.
- Please measure the temperature on the aluminum base plate edge side when you cannot measure the temperature of the center part of the aluminum base plate. In this case, please take 5deg temperature margin from the derating characteristic of below.
- It is necessary to note the thermal fatigue life by power cycle. Please reduce the temperature fluctuation range as much as possible when the up and down of the temperature are frequently generated. Contact us for more information on cooling methods.

● DHS50, DHS100

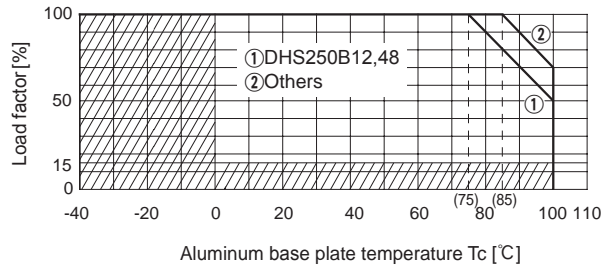


Derating

DHS200



DHS250



Instruction Manual

◆ It is necessary to read the “Instruction Manual” and “Before using our product” before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/DHS/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

DHS



NOTICE



Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	PCB/Pattern			Series/Parallel operation availability	
					Material	Single sided	Double sided	Series operation	Parallel operation
DHS50A DHS50B	Forward converter	470	*1	-	Aluminum	Yes		Yes	*2
DHS100A DHS100B	Forward converter	470	*1	-	Aluminum	Yes		Yes	*2
DHS200A DHS250B	Forward converter	360	*1	-	Aluminum	Yes		Yes	*2

\*1 Refer to Specification.  
 \*2 Refer to Instruction Manual.

DHS



# DBS-series



DBS

## ■ Feature

- Ideal for distributed power systems
- Thin and small size
- Built-in overcurrent, overvoltage and thermal protection circuits
- Built-in remote ON/OFF (on both side of input and output)
- Inverter operating monitoring (IOG)
- Mounting hole (M3 tapped)
- The beat noise is decreased by installing of the crystal oscillator (DBS700)

## ■ CE marking

- Low Voltage Directive
- RoHS Directive

## ■ Safety agency approvals

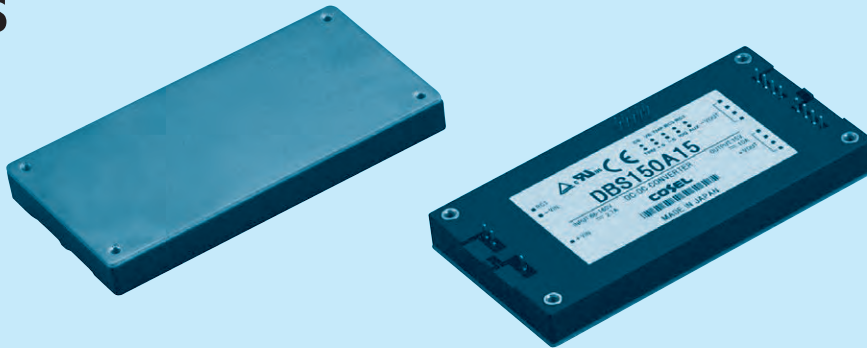
- UL, C-UL recognized, TÜV approved

## ■ 5-year warranty

# DBS100A/DBS150A

DB S 150 A 15

① ② ③ ④ ⑤



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
A :DC110V input
- ⑤ Output voltage

MODEL	DBS100A05	DBS100A13R8	DBS150A12	DBS150A15	DBS150A24
MAX OUTPUT WATTAGE[W]	100	100.7	150	150	151
DC OUTPUT	5V 20A	13.8V 7.3A	12V 12.5A	15V 10A	24V 6.3A

## SPECIFICATIONS

	MODEL	DBS100A05	DBS100A13R8	DBS150A12	DBS150A15	DBS150A24	
INPUT	VOLTAGE[V]	DC45 - 160		DC66 - 160			
	CURRENT[A]	*1 1.11typ	1.10typ	1.57typ	1.59typ	1.58typ	
	EFFICIENCY[%]	*1 82typ	83typ	87typ	86typ	87typ	
OUTPUT	VOLTAGE[V]	5	13.8	12	15	24	
	CURRENT[A]	20	7.3	12.5	10	6.3	
	LINE REGULATION[mV]	20max	60max	40max	60max	95max	
	LOAD REGULATION[mV]	40max	150max	100max	150max	190max	
	RIPPLE[mVp-p]	0 to +85°C *2	80max	120max	120max	120max	120max
		-20 - 0°C *2	140max	160max	160max	160max	160max
	RIPPLE NOISE[mVp-p]	0 to +85°C *2	100max	150max	150max	150max	150max
		-20 - 0°C *2	150max	180max	180max	180max	180max
	TEMPERATURE REGULATION[mV]	0 to +65°C	50max	180max	120max	180max	280max
		-20 to +85°C	85max	310max	200max	310max	480max
DRIFT[mV]	*3 20max	60max	40max	60max	90max		
START-UP TIME[ms]	200max (DCIN 110V, Io=100%)						
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open), 60 - 110% adjustable by external VR or external voltage						
OUTPUT VOLTAGE SETTING[V]	4.90 - 5.20	13.25 - 14.35	11.60 - 12.60	14.40 - 15.60	23.04 - 24.96		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically					
	OVERVOLTAGE PROTECTION	5.75 - 7.00V	15.87 - 19.32V	13.80 - 16.80V	17.25 - 21.00V	27.60 - 33.60V	
	REMOTE SENSING	Provided					
	REMOTE ON/OFF	Provided (On both side of input and output)					
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)					
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)					
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)					
	OUTPUT-RC2.RC3	AC100V 1minute, Cutoff current = 100mA, DC100V 10MΩ min (20±15°C)					
ENVIRONMENT	OPERATING TEMP.HUMID.AND ALTTITUDE *4	-20 to +85°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max					
	STORAGE TEMP.HUMID.AND ALTTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max					
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis					
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms once each along X, Y and Z axis					
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1					
OTHERS	CASE SIZE/WEIGHT	61 × 12.7 × 116.8mm [2.4 × 0.5 × 4.6 inches] (W×H×D) / 150g max					
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)					

\*1 At rated input(DC110V) and rated load.

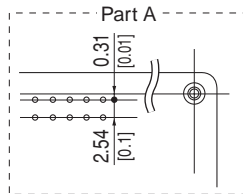
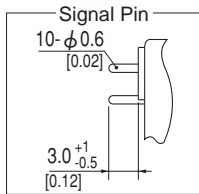
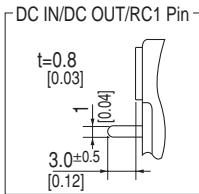
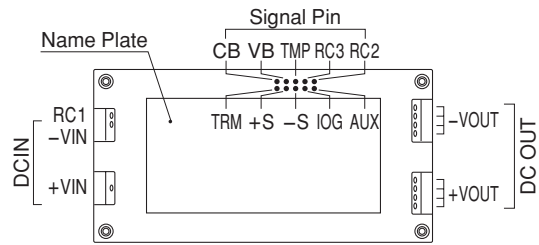
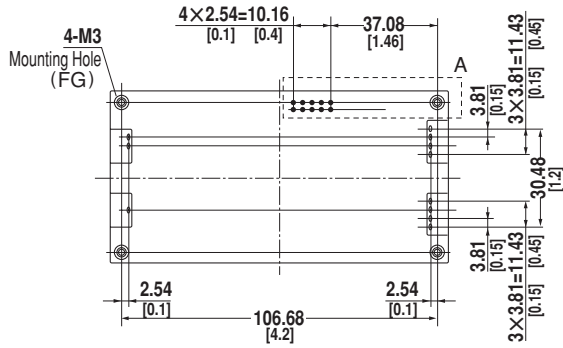
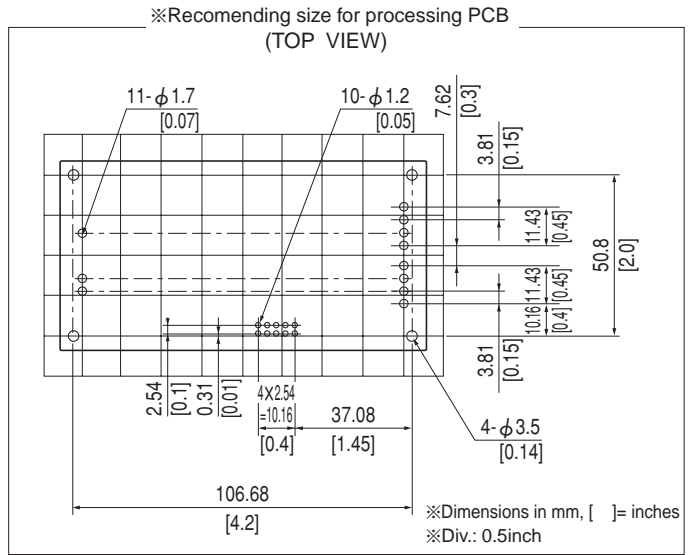
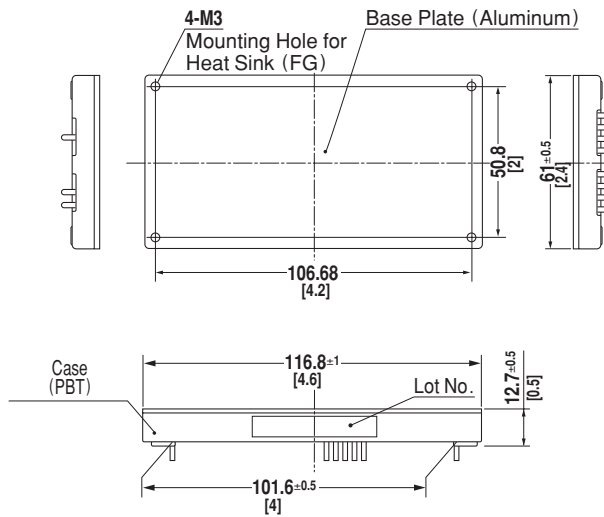
\*2 Ripple and ripple noise is measured by using measuring board with the recommended capacitor Co & the film capacitor 0.1 μF. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM101). Refer to the manual.

\*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*4 Please consult us in regard to use from -40°C.



## External view

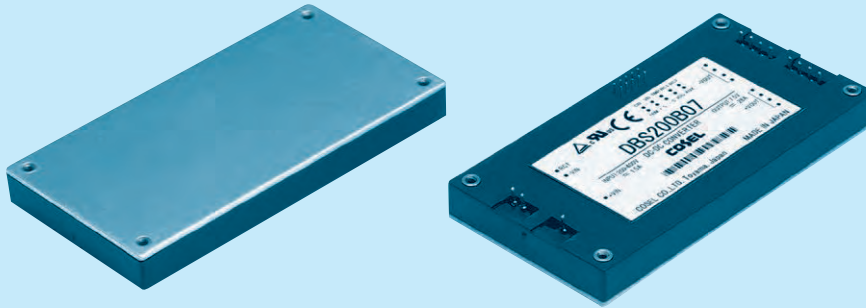


- ※Weight: 150g max
- ※Tolerance: ±0.3 [±0.012]
- ※Base Plate: Aluminum
- ※Dimensions in mm, [ ] = inches
- ※Mounting hole screwing torque: 0.49N·m(5.0kgf·cm)

# DBS200B

DB S 200 B 03

① ② ③ ④ ⑤



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
B : DC200 - 400V
- ⑤ Output voltage

MODEL	DBS200B03	DBS200B05	DBS200B07	DBS200B12
MAX OUTPUT WATTAGE[W]	165	200	210	240
DC OUTPUT	3.3V 50A	5V 40A	7.5V 28A	12V 20A

## SPECIFICATIONS

	MODEL	DBS200B03	DBS200B05	DBS200B07	DBS200B12	
INPUT	VOLTAGE[V]	DC200 - 400				
	CURRENT[A]	*1 0.75typ	0.86typ	0.87typ	0.99typ	
	EFFICIENCY[%]	*1 79typ	83typ	86typ	87typ	
OUTPUT	VOLTAGE[V]	3.3	5	7.5	12	
	CURRENT[A]	50	40	28	20	
	LINE REGULATION[mV]	16max	20max	30max	40max	
	LOAD REGULATION[mV]	30max	40max	60max	100max	
	RIPPLE[mVp-p]	0 to +85°C *2	80max	80max	100max	120max
		-20 - 0°C *2	140max	140max	150max	160max
	RIPPLE NOISE[mVp-p]	0 to +85°C *2	100max	100max	140max	150max
		-20 - 0°C *2	150max	150max	160max	180max
	TEMPERATURE REGULATION[mV]	0 to +65°C	35max	50max	75max	120max
		-20 to +85°C	60max	85max	130max	200max
DRIFT[mV]	*3	16max	20max	30max	40max	
START-UP TIME[ms]	200max (DCIN 280V, Io=100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open), 60 - 110% adjustable by external VR or external voltage					
OUTPUT VOLTAGE SETTING[V]	3.25 - 3.45	4.90 - 5.20	7.25 - 7.85	11.60 - 12.60		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION	4.00 - 5.50V	5.75 - 7.00V	8.60 - 10.50V	13.80 - 16.80V	
	REMOTE SENSING	Provided				
	REMOTE ON/OFF	Provided (On both side of input and output)				
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)				
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)				
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)				
	OUTPUT-RC2.RC3	AC100V 1minute, Cutoff current = 100mA, DC100V 10MΩ min (20±15°C)				
ENVIRONMENT	OPERATING TEMP.HUMID.AND ALTITUDE *4	-20 to +85°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max				
	STORAGE TEMP.HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max				
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis				
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms once each along X, Y and Z axis				
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1, EN50178 Complies with DEN-AN and IEC60950-1				
OTHERS	CASE SIZE/WEIGHT	61 × 12.7 × 116.8mm [2.4 × 0.5 × 4.6 inches] (W×H×D) / 150g max				
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)				

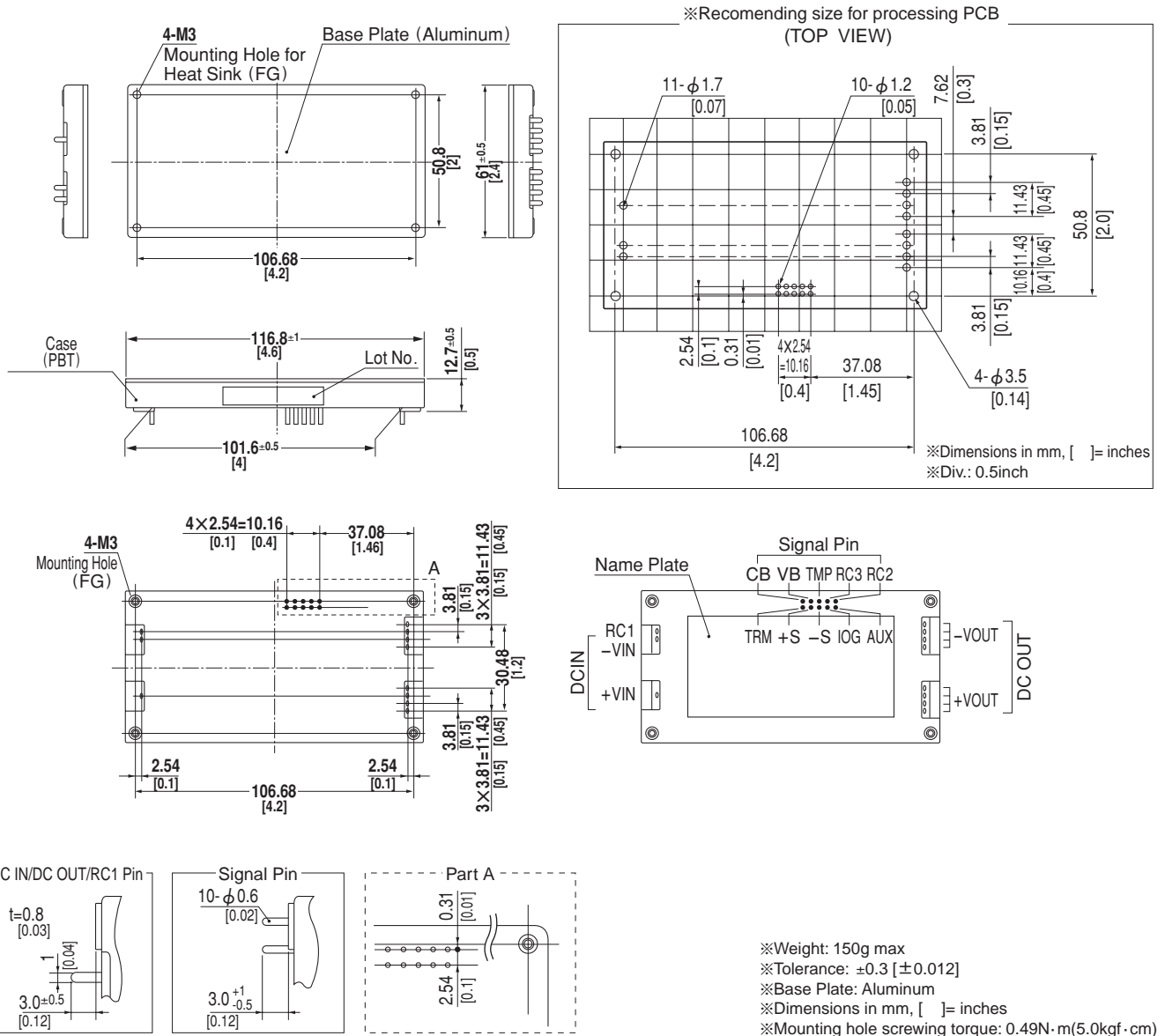
\*1 At rated input(DC280V) and rated load.

\*2 Ripple and ripple noise is measured by using measuring board with the recommended capacitor Co & the film capacitor 0.1 μF. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM101). Refer to the manual.

\*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*4 Please consult us in regard to use from -40°C.

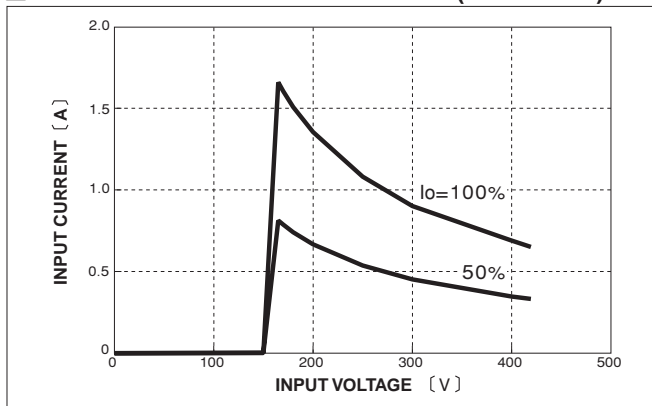
## External view



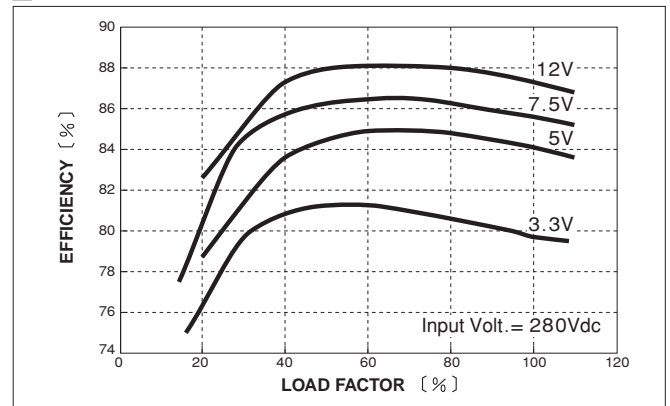
DBS

## Performance data

### INPUT CURRENT CHARACTERISTICS (DBS200B12)



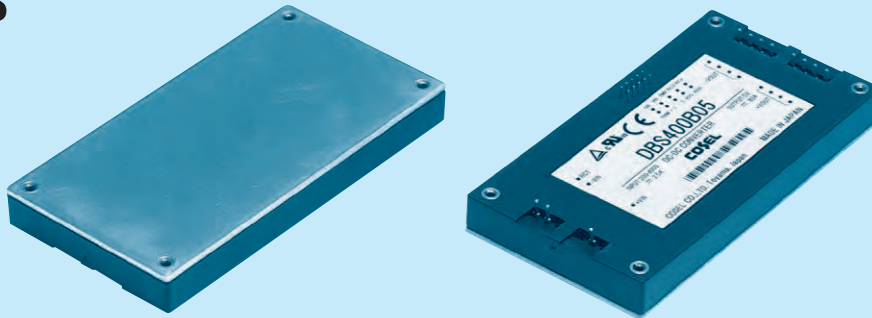
### EFFICIENCY CHARACTERISTICS



# DBS400B

DB S 400 B 03

① ② ③ ④ ⑤



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
B : DC200 - 400V
- ⑤ Output voltage

MODEL	DBS400B03	DBS400B05	DBS400B07	DBS400B12	DBS400B15	DBS400B18	DBS400B24	DBS400B28
MAX OUTPUT WATTAGE[W]	264	400	405	408	405	396	408	406
DC OUTPUT	3.3V 80A	5V 80A	7.5V 54A	12V 34A	15V 27A	18V 22A	24V 17A	28V 14.5A

## SPECIFICATIONS

	MODEL	DBS400B03	DBS400B05	DBS400B07	DBS400B12	DBS400B15	DBS400B18	DBS400B24	DBS400B28	
INPUT	VOLTAGE[V]	DC200 - 400								
	CURRENT[A]	*1 1.19typ	1.72typ	1.68typ	1.67typ	1.66typ	1.61typ	1.67typ	1.63typ	
	EFFICIENCY[%]	*1 79typ	83typ	86typ	87typ	87typ	89typ	87typ	88typ	
OUTPUT	VOLTAGE[V]	3.3	5	7.5	12	15	18	24	28	
	CURRENT[A]	80	80	54	34	27	22	17	14.5	
	LINE REGULATION[mV]	16max	20max	30max	40max	60max	60max	95max	95max	
	LOAD REGULATION[mV]	30max	40max	60max	100max	150max	150max	190max	190max	
	RIPPLE[mVp-p]	0 to +85°C *2	80max	80max	100max	120max	120max	120max	120max	120max
		-20 - 0°C *2	140max	140max	150max	160max	160max	160max	160max	160max
	RIPPLE NOISE[mVp-p]	0 to +85°C *2	100max	100max	140max	150max	150max	150max	150max	150max
		-20 - 0°C *2	150max	150max	160max	180max	180max	180max	180max	180max
	TEMPERATURE REGULATION[mV]	0 to +65°C	35max	50max	75max	120max	180max	180max	280max	280max
		-20 to +85°C	60max	85max	130max	200max	310max	310max	480max	480max
DRIFT[mV]	*3	16max	20max	30max	40max	60max	60max	90max	90max	
START-UP TIME[ms]	200max (DCIN 280V, Io=100%)									
OUTPUT VOLTAGE ADJUSTMENT RANGE	Fixed (TRM pin open), 60 - 110% adjustable by external VR or external voltage									
OUTPUT VOLTAGE SETTING[V]	3.25 - 3.45	4.90 - 5.20	7.25 - 7.85	11.60 - 12.60	14.40 - 15.60	17.28 - 18.72	23.04 - 24.96	26.88 - 29.12		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically								
	OVERVOLTAGE PROTECTION	4.00 - 5.50V	5.75 - 7.00V	8.60 - 10.50V	13.80 - 16.80V	17.25 - 21.00V	20.70 - 25.20V	27.60 - 33.60V	32.20 - 39.20V	
	REMOTE SENSING	Provided								
	REMOTE ON/OFF	Provided (On both side of input and output)								
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)								
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)								
	OUTPUT-RC2.RC3	AC100V 1minute, Cutoff current = 100mA, DC100V 10MΩ min (20±15°C)								
ENVIRONMENT	OPERATING TEMP.HUMID.AND ALTITUDE *4	-20 to +85°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max								
	STORAGE TEMP.HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max								
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis								
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms once each along X, Y and Z axis								
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1, EN50178 Complies with DEN-AN and IEC60950-1								
OTHERS	CASE SIZE/WEIGHT	61 × 12.7 × 116.8mm [2.4 × 0.5 × 4.6 inches] (W×H×D) / 180g max								
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)								

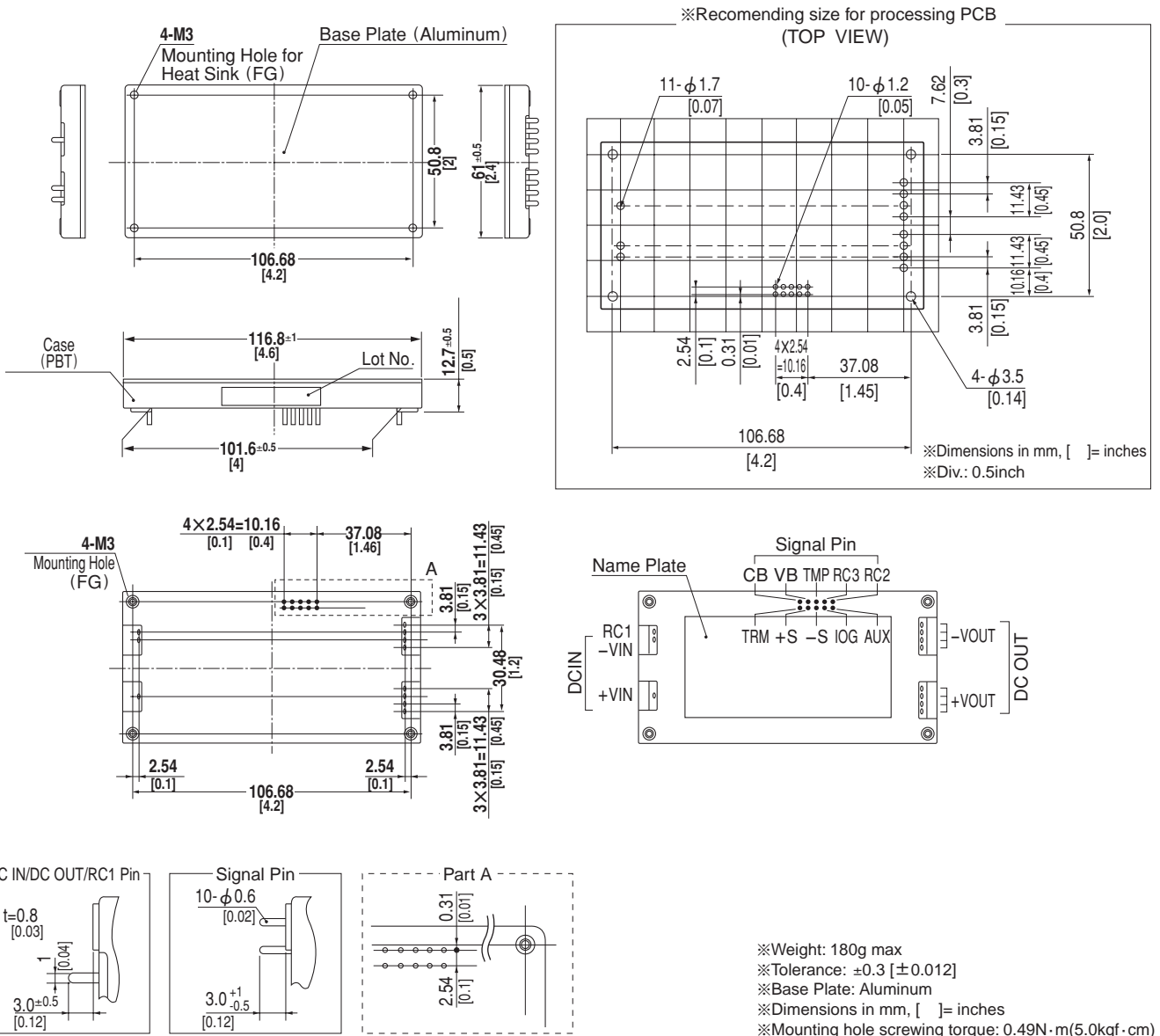
\*1 At rated input(DC280V) and rated load.

\*2 Ripple and ripple noise is measured by using measuring board with the recommended capacitor Co & the film capacitor 0.1 μF. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN:RM101). Refer to the manual.

\*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*4 Please consult us in regard to use from -40°C.

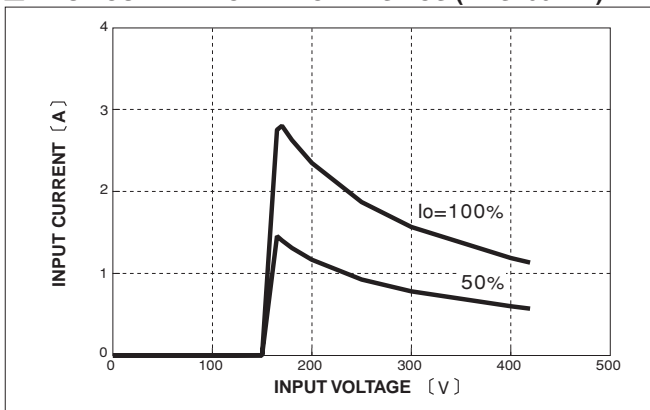
## External view



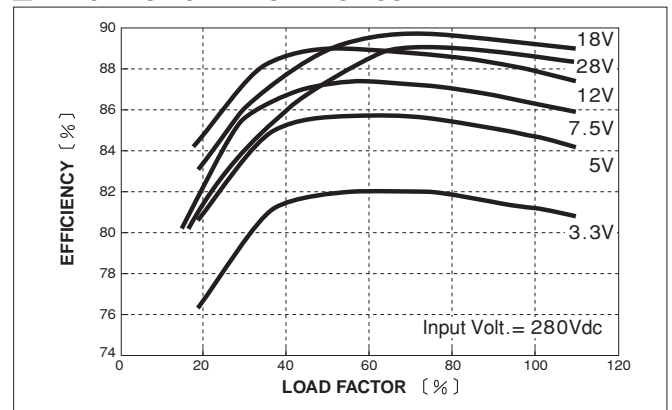
DBS

## Performance data

### INPUT CURRENT CHARACTERISTICS (DBS400B12)



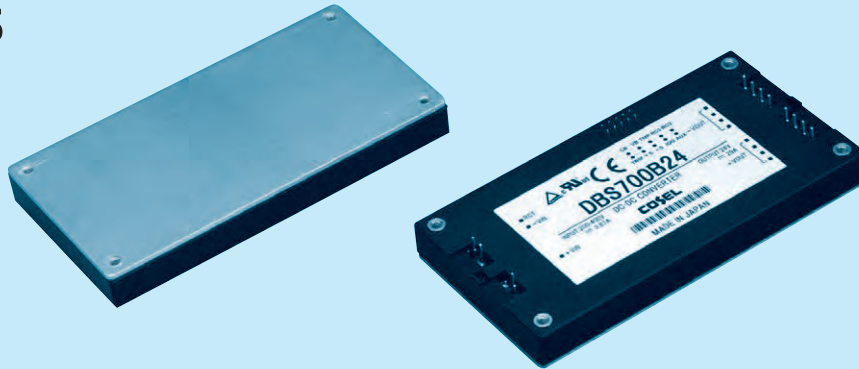
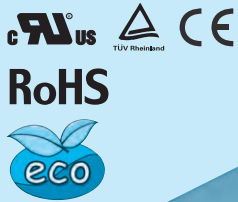
### EFFICIENCY CHARACTERISTICS



# DBS700B

DB S 700 B 28 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Input voltage  
B : DC200 - 400V
- ⑤ Output voltage
- ⑥ Optional  
T : with Mounting hole  
(φ 3.4 thru)

MODEL	DBS700B12	DBS700B24	DBS700B28	DBS700B36	DBS700B48
MAX OUTPUT WATTAGE[W]	696	696	700	702	696
DC OUTPUT	12V 58A	24V 29A	28V 25A	36V 19.5A	48V 14.5A

## SPECIFICATIONS

	MODEL	DBS700B12	DBS700B24	DBS700B28	DBS700B36	DBS700B48	
INPUT	VOLTAGE[V]	DC200 - 400					
	CURRENT[A]	*1 2.76typ	2.76typ	2.76typ	2.76typ	2.73typ	
	EFFICIENCY[%]	*1 90.0typ	90.0typ	90.5typ	90.0typ	91.0typ	
OUTPUT	VOLTAGE[V]	12	24	28	36	48	
	CURRENT[A]	58	29	25	19.5	14.5	
	LINE REGULATION[mV]	40max	95max	95max	95max	120max	
	LOAD REGULATION[mV]	100max	190max	190max	200max	240max	
	RIPPLE[mVp-p]	0 to +100°C <sup>*2</sup>	120max	120max	120max	150max	200max
		-40 to 0°C <sup>*2</sup>	160max	160max	160max	200max	250max
	RIPPLE NOISE[mVp-p]	0 to +100°C <sup>*2</sup>	150max	150max	150max	200max	250max
		-40 to 0°C <sup>*2</sup>	180max	180max	180max	240max	400max
	TEMPERATURE REGULATION[mV]	0 to +65°C	120max	280max	280max	360max	480max
		-40 to +100°C	200max	480max	480max	680max	960max
DRIFT[mV]	*3 40max	90max	90max	120max	180max		
START-UP TIME[ms]	200max (DCIN 280V, I <sub>o</sub> =100%)						
OUTPUT VOLTAGE ADJUSTMENT RANGE	*4 Fixed (TRM pin open), 60 - 110% adjustable by external VR or external voltage						
OUTPUT VOLTAGE SETTING[V]	11.64 - 12.36	23.28 - 24.72	27.16 - 28.84	34.92 - 37.08	46.56 - 49.44		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically					
	OVERVOLTAGE PROTECTION	14.40 - 16.80V	27.60 - 33.60V	32.20 - 39.20V	41.40 - 50.40V	55.20 - 63.00V	
	REMOTE SENSING	Provided					
	REMOTE ON/OFF	Provided (On both side of input and output)					
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)					
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)					
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)					
	OUTPUT-RC2,RC3	AC100V 1minute, Cutoff current = 100mA, DC100V 10MΩ min (20±15°C)					
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max					
	STORAGE TEMP.,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max					
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> , 3minutes period, 60minutes each along X, Y and Z axis					
	IMPACT	196.1m/s <sup>2</sup> , 11ms once each along X, Y and Z axis					
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1, EN50178					
OTHERS	CASE SIZE/WEIGHT	61 × 12.7 × 116.8mm [2.4 × 0.5 × 4.6 inches] (W × H × D) / 180g max					
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)					

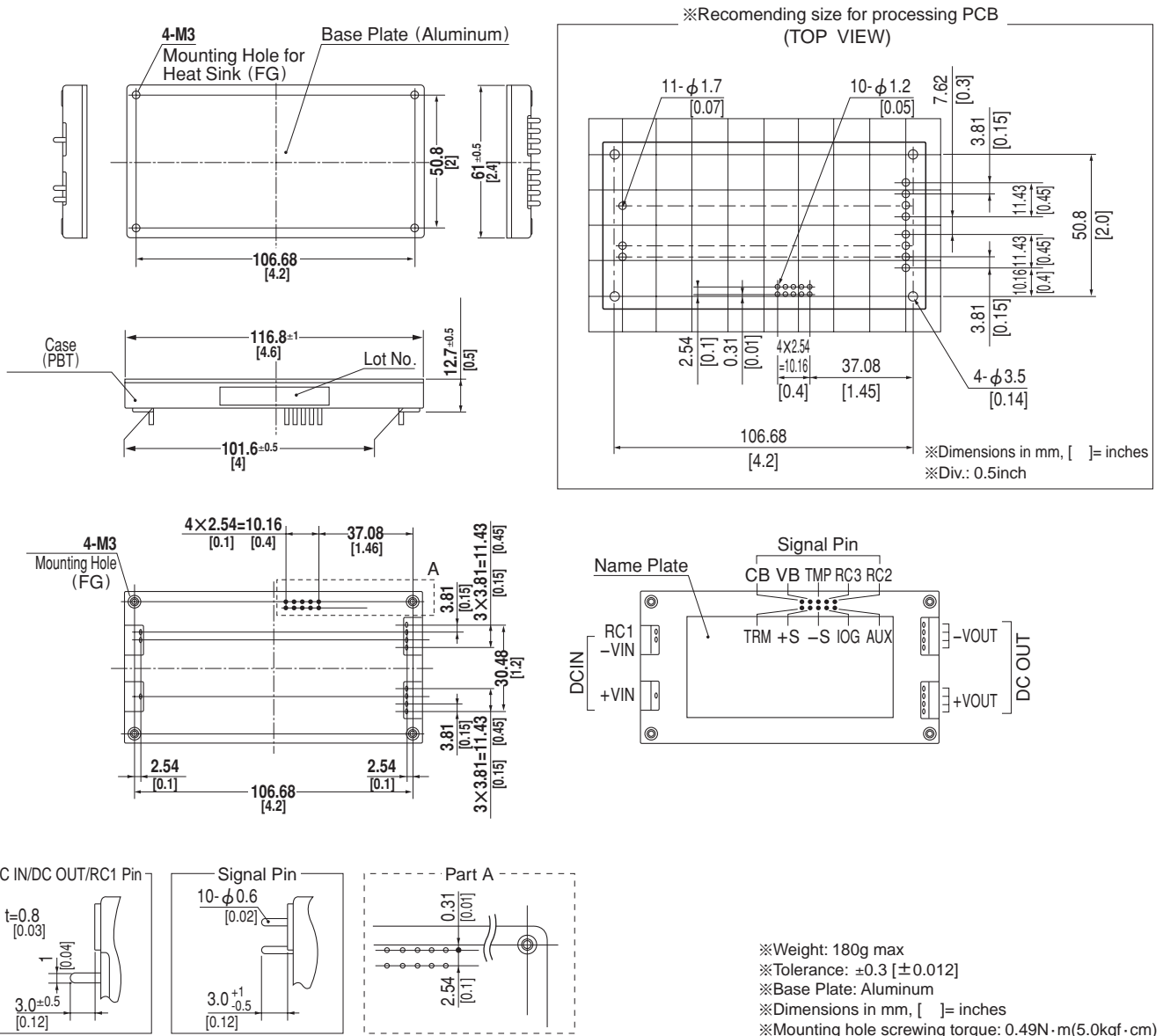
\*1 At rated input(DC280V) and rated load.

\*2 Ripple and ripple noise is measured by using measuring board with the recommended capacitor Co & the film capacitor 0.1 μF. Refer to the manual.

\*3 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*4 Refer to the manual for the input range.

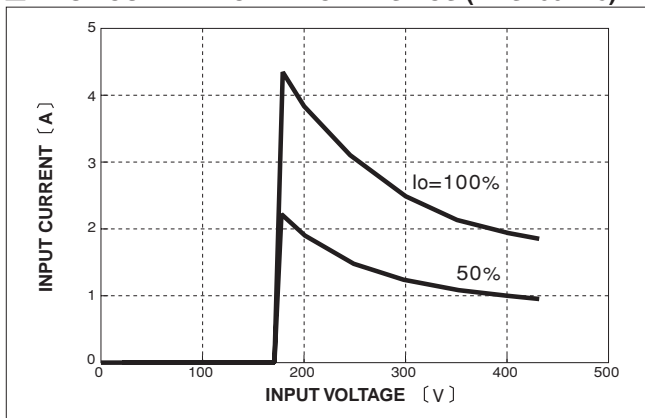
## External view



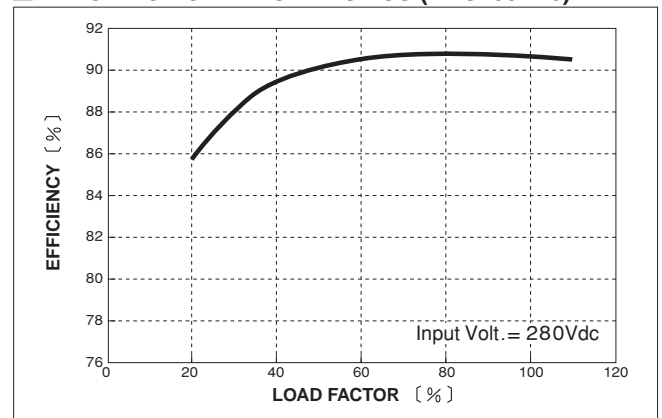
DBS

## Performance data

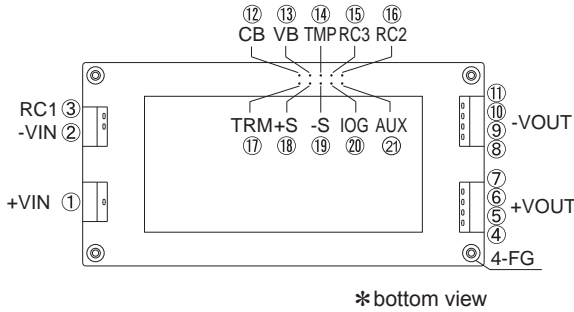
INPUT CURRENT CHARACTERISTICS (DBS700B28)



EFFICIENCY CHARACTERISTICS (DBS700B28)



## Pin Configuration

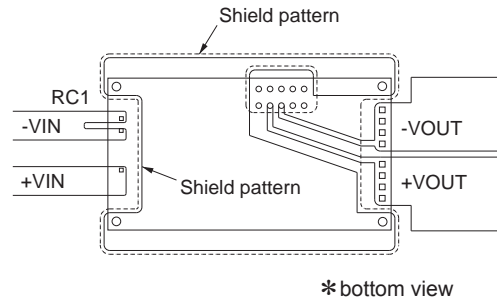


NO.	Pin Connection	Function
①	+VIN	+DC input
②	-VIN	-DC input
③	RC1	Remote ON/OFF(Input side)
④ ⑤ ⑥ ⑦	+VOUT	+DC output
⑧ ⑨ ⑩ ⑪	-VOUT	-DC output
⑫	CB	Current balance
⑬	VB	Voltage balance
⑭	TMP	Thermal detection signal
⑮	RC3	Remote ON/OFF(output side)
⑯	RC2	
⑰	TRM	Adjustment of output voltage
⑱	+S	+Remote sensing
⑲	-S	-Remote sensing
⑳	IOG	Inverter operation monitor
㉑	AUX	Auxiliary power supply
—	FG	Mounting hole(FG)

## Implementation • Mounting Method

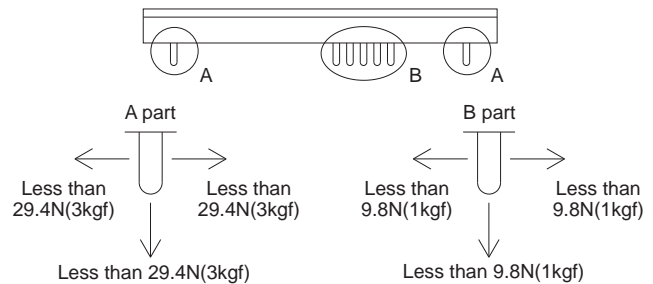
### Mounting method

- The unit can be mounted in any direction. When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation. Aluminum base plate temperature around each power supply should not exceed the temperature range shown in "Derating".
- Avoid placing the DC input line pattern lay out underneath the unit, it will increase the line conducted noise. Make sure to leave an ample distance between the line pattern lay out and the unit. Also avoid placing the DC output line pattern underneath the unit because it may increase the output noise. Lay out the pattern away from the unit.
- High-frequency noise radiates directly from the unit to the atmosphere. Therefore, design the shield pattern on the printed circuit board and connect its one to FG. The shield pattern prevents noise radiation.



### Stress onto the pins

- When too much stress is applied to the pins of the power supply, the internal connection may be weakened. As shown in right figure avoid applying stress of more than 29.4N (3kgf) on the input pins/output pins (A part) and more than 9.8N (1kgf) to the signal pins (B part).
- The pins are soldered on PCB internally, therefore, do not pull or bend them with abnormal forces.
- Mounting hole diameter of PCB should be 3.5mm to reduce the stress onto the pins.
- Fix the unit on PCB(fixing fittings) by screws to reduce the stress onto the pins. Be sure to mount the unit first, then solder the unit.



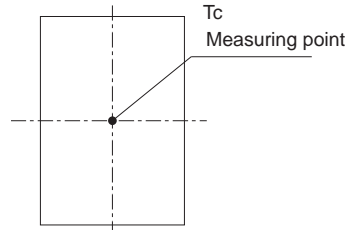
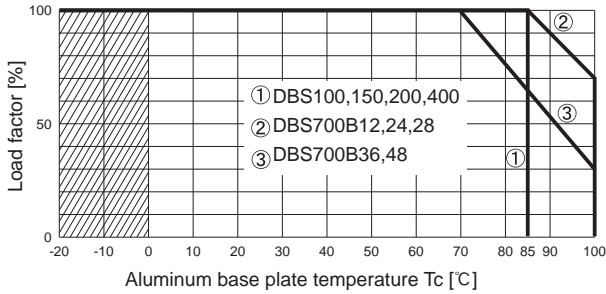
### Soldering temperature

- Flow soldering : 260°C less than 15 seconds.
- Soldering iron
  - DC IN/DC OUT/RC1 : 450°C less than 5 seconds.
  - Signal pins : 350°C less than 3 seconds (less than 20W)



### Derating

- Use with the conduction cooling (e.g. heat radiation by conduction from the aluminum base plate to the attached heat sink). Below shows the derating curve based on the aluminum base plate temperature. In the hatched area, the specification of ripple and ripple noise is different from other areas.
- It is necessary to note thermal fatigue life by power cycle. Please reduce the temperature fluctuation range as much as possible when the up and down of temperature are frequently generated. Contact for more information on cooling methods.



### Instruction Manual

- ◆ It is necessary to read the “Instruction Manual” and “Before using our product” before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/DBS/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

DBS



NOTICE



### Basic Characteristics Data

DBS

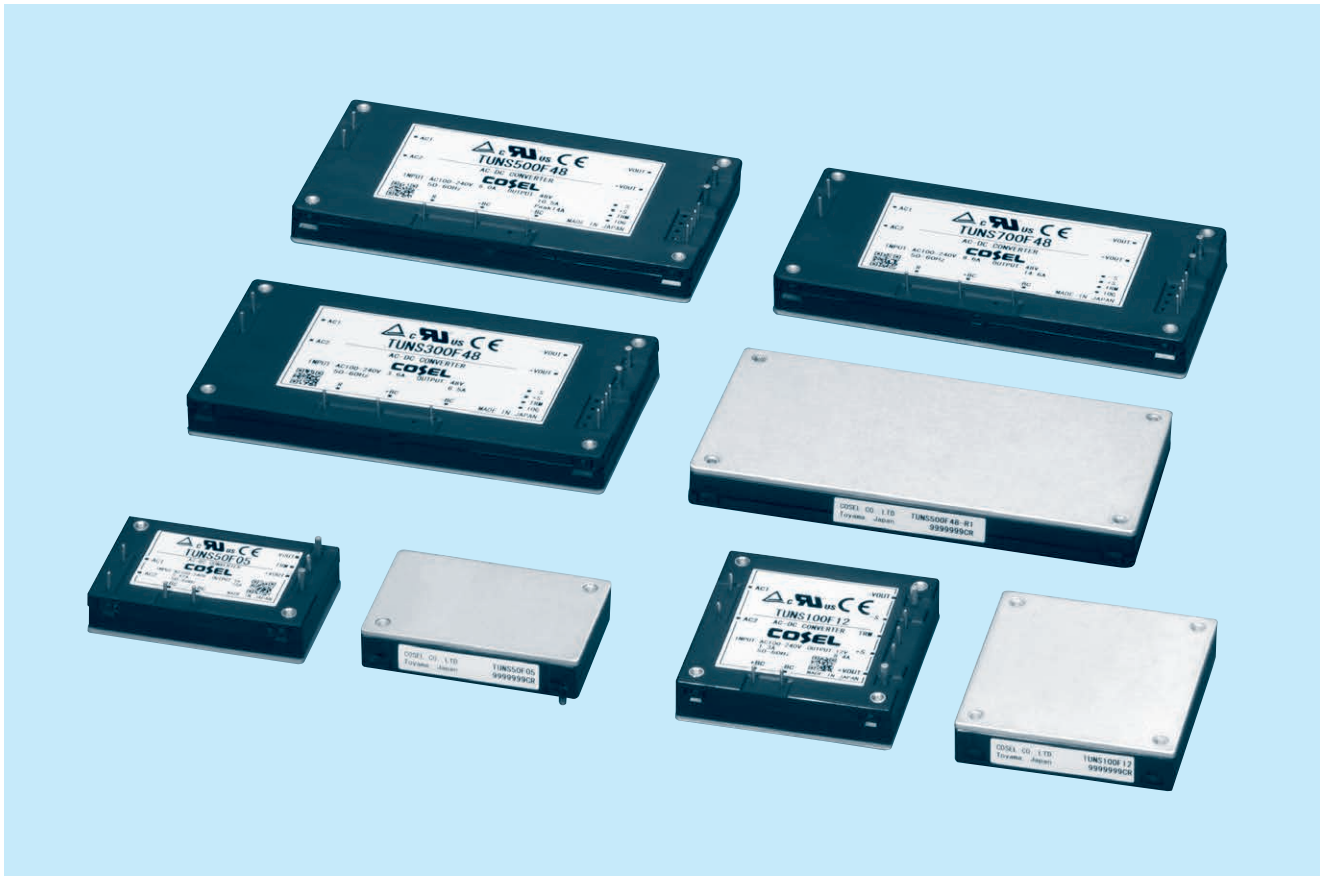
Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
DBS100A	Forward converter	370	1.10 *1	-	-	Aluminum	Yes		Yes	Yes
DBS150A	Forward converter	370	1.59 *1	-	-	Aluminum	Yes		Yes	Yes
DBS200B	Forward converter	370	0.99 *1	-	-	Aluminum	Yes		Yes	Yes
DBS400B	Forward converter	370	1.72 *1	-	-	Aluminum	Yes		Yes	Yes
DBS700B	Forward converter	381	2.76 *1	-	-	Aluminum	Yes		Yes	Yes

\*1 The value of input current is at rated input and rated load.





# TUNS-series



TUNS

## Feature

- AC-DC Power Module Type Converter
- Harmonic attenuator (Complies with IEC61000-3-2 class A)
- Thin and small size
- Built-in overcurrent, overvoltage and thermal protection circuits
- Mounting hole (M3 tapped)
- Peak current (TUNS500F)

## CE marking

- Low voltage directive
- RoHS Directive

## Safety Approval

- UL60950-1, C-UL, EN60950-1

## 5-year warranty

## Optional parts

- Heat sink

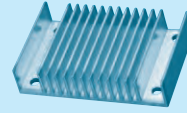
# TUNS50F

TUN S 50 F 05 -□

① ② ③ ④ ⑤ ⑥



\*Providing heat sink as option



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal Input
- ⑤ Output voltage
- ⑥ Optional
- T : with Mounting hole (φ 3.4 thru)

\*Avoid short circuit between +BC and -BC. It may cause the failure of inside components.  
 \*Keep TRM open, if output voltage adjustment is not necessary.

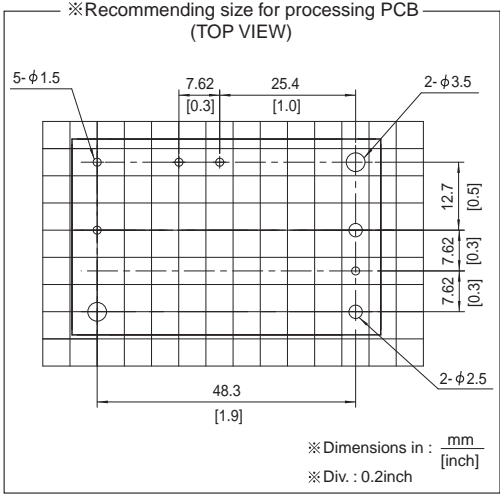
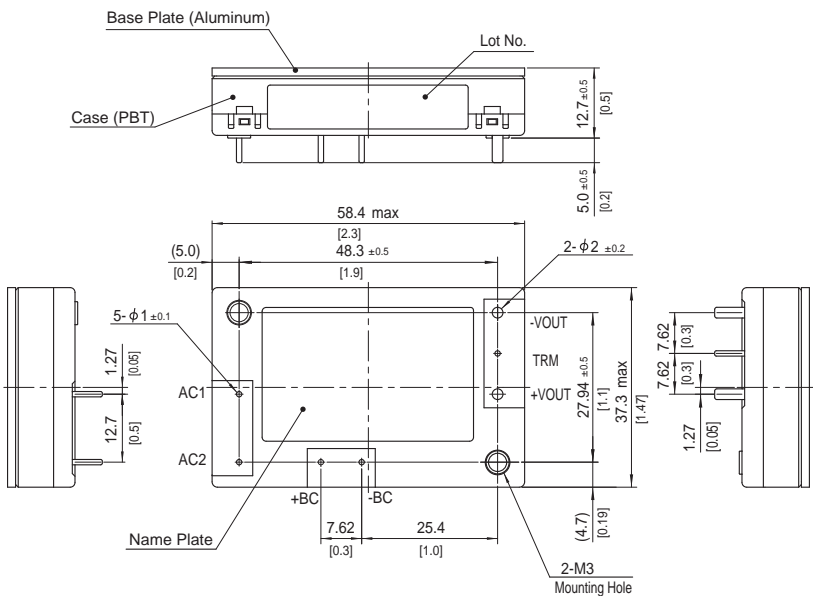
MODEL	TUNS50F05	TUNS50F12	TUNS50F24
MAX OUTPUT WATTAGE[W]	50.0	50.4	50.4
DC OUTPUT	5V 10A	12V 4.2A	24V 2.1A

## SPECIFICATIONS

	MODEL	TUNS50F05	TUNS50F12	TUNS50F24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating")			
	CURRENT[A]	ACIN 100V	0.67typ (Io=100%)		
		ACIN 200V	0.35typ (Io=100%)		
	FREQUENCY[Hz]	50/60 (47 - 63)			
	EFFICIENCY[%]	ACIN 100V	79typ	83typ	84typ
		ACIN 200V	81typ	84typ	86typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.95typ		
		ACIN 200V	0.90typ		
INRUSH CURRENT	Limited by external components (Thermistor)				
LEAKAGE CURRENT[mA]	0.75max (ACIN 240V 60Hz, Io=100%, According to IEC60950-1)				
OUTPUT	VOLTAGE[V]	5	12	24	
	CURRENT[A]	10	4.2	2.1	
	LINE REGULATION[mV]	10max	24max	48max	
	LOAD REGULATION[mV]	10max	24max	48max	
	RIPPLE[mVp-p]	0 to +100°C *1	80max	120max	120max
		-40 to 0°C *1	120max	150max	150max
		0 to 15% Load *1	200max	280max	380max
	RIPPLE NOISE[mVp-p]	0 to +100°C *1	120max	150max	150max
		-40 to 0°C *1	200max	200max	250max
		0 to 15% Load *1	280max	360max	460max
	TEMPERATURE REGULATION[mV]	0 to +65°C	50max	120max	240max
		-40 to +100°C	100max	240max	480max
	DRIFT[mV]	*2	20max	40max	90max
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed (TRM pin open), adjustable by external resistor or external signal				
		4.50 - 6.00	10.80 - 13.20	21.60 - 26.40	
OUTPUT VOLTAGE SETTING[V]		4.97 - 5.13	11.91 - 12.29	23.62 - 24.38	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically			
	OVERVOLTAGE PROTECTION[V]	6.30 - 7.00	13.90 - 16.35	27.60 - 32.40	
	REMOTE SENSING	Not provided			
	REMOTE ON/OFF	Not provided			
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)			
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)			
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)			
ENVIRONMENT	OPERATING TEMP,HUMID.AND ALTITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max			
	STORAGE TEMP,HUMID.AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max			
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis			
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN50178			
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *3			
OTHERS	CASE SIZE/WEIGHT	58.4 X 12.7 X 37.3mm [2.3 X 0.5 X 1.47 inches] (W X H X D) / 80g max			
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)			

\*1 Refer to instruction manual for measuring method of electric characteristics.  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*3 Please contact us about another class.

External view

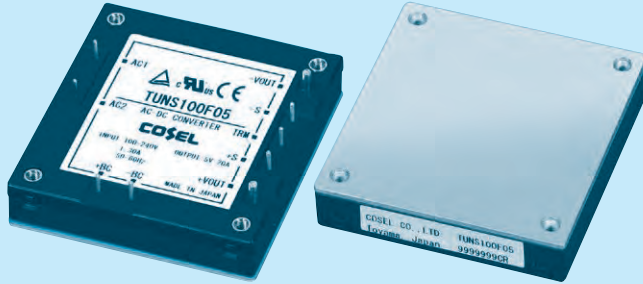


- ※ Tolerance : ±0.3 [±0.012]
- ※ Weight : 80g max
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting hole screwing torque : 0.49N · m (5.0kgf · cm) max

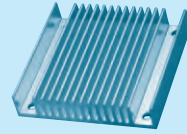
# TUNS100F

TUN S 100 F 05 -□

① ② ③ ④ ⑤ ⑥



\*Providing heat sink as option



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal Input
- ⑤ Output voltage
- ⑥ Optional
- T : with Mounting hole (φ 3.4 thru)

- \*Avoid short circuit between +BC and -BC. It may cause the failure of inside components.
- \*Keep TRM open, if output voltage adjustment is not necessary.
- \*If remote sensing is not necessary, connect between +Vout & +S and between -Vout & -S.

MODEL	TUNS100F05	TUNS100F12	TUNS100F24
MAX OUTPUT WATTAGE[W]	100.0	100.8	100.8
DC OUTPUT	5V 20A	12V 8.4A	24V 4.2A

## SPECIFICATIONS

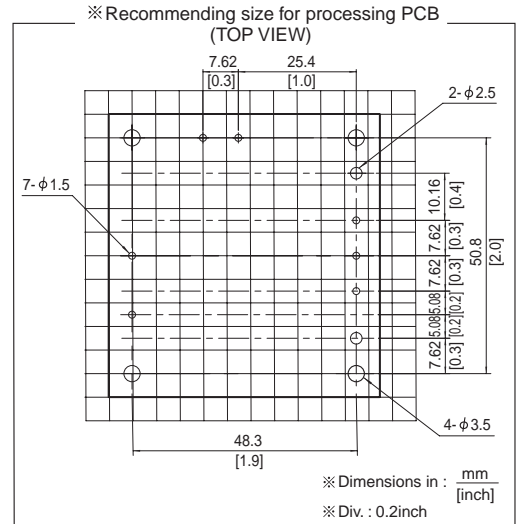
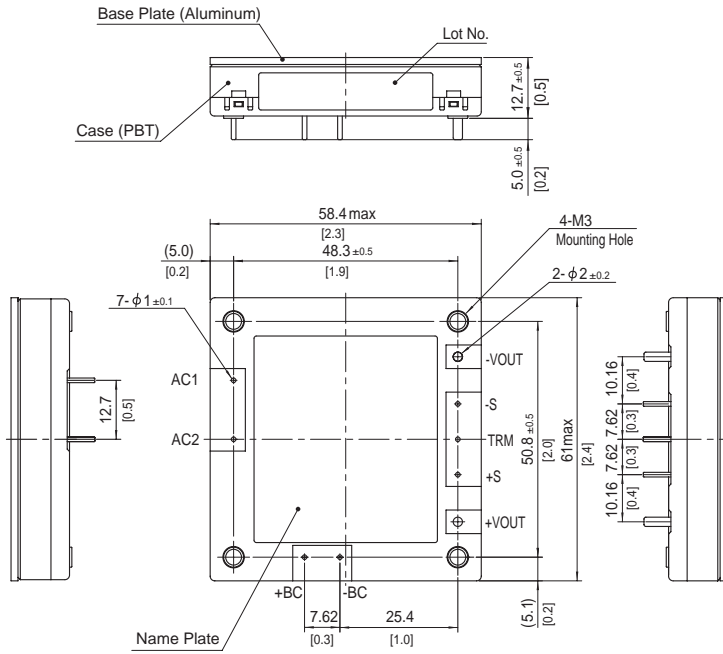
	MODEL	TUNS100F05	TUNS100F12	TUNS100F24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating")			
	CURRENT[A]	ACIN 100V	1.3typ (Io=100%)		
		ACIN 200V	0.7typ (Io=100%)		
	FREQUENCY[Hz]	50/60 (47 - 63)			
	EFFICIENCY[%]	ACIN 100V	82typ	83typ	84typ
		ACIN 200V	85typ	85typ	86typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.95typ		
		ACIN 200V	0.90typ		
INRUSH CURRENT	Limited by external components (Thermistor)				
LEAKAGE CURRENT[mA]	0.75max (ACIN 240V 60Hz, Io=100%, According to IEC60950-1)				
OUTPUT	VOLTAGE[V]	5	12	24	
	CURRENT[A]	20	8.4	4.2	
	LINE REGULATION[mV]	10max	24max	48max	
	LOAD REGULATION[mV]	10max	24max	48max	
	RIPPLE[mVp-p]	0 to +100°C *1	80max	120max	120max
		-40 to 0°C *1	120max	150max	150max
		0 to 15% Load *1	160max	240max	240max
	RIPPLE NOISE[mVp-p]	0 to +100°C *1	120max	150max	150max
		-40 to 0°C *1	200max	200max	250max
		0 to 15% Load *1	240max	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +65°C	50max	120max	240max
		-40 to +100°C	100max	240max	480max
DRIFT[mV]	*2	20max	40max	90max	
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed (TRM pin open), adjustable by external resistor or external signal				
	4.50 - 6.00	10.80 - 13.20	21.60 - 26.40		
OUTPUT VOLTAGE SETTING[V]	4.97 - 5.13	11.91 - 12.29	23.62 - 24.38		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically			
	OVERVOLTAGE PROTECTION[V]	6.30 - 7.00	13.90 - 16.35	27.60 - 32.40	
	REMOTE SENSING	Provided			
	REMOTE ON/OFF	Not provided			
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)			
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)			
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)			
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max			
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max			
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis			
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN50178			
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *3			
OTHERS	CASE SIZE/WEIGHT	58.4 × 12.7 × 61.0mm [2.3 × 0.5 × 2.4 inches] (W × H × D) / 120g max			
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)			

\*1 Refer to instruction manual for measuring method of electric characteristics.

\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*3 Please contact us about another class.

## External view

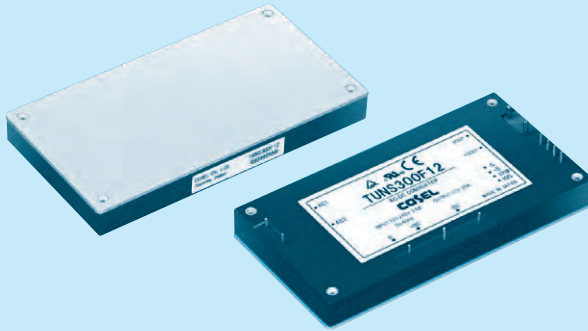
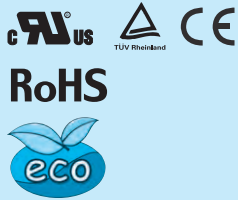


- ※ Tolerance :  $\pm 0.3$  [ $\pm 0.012$ ]
- ※ Weight : 120g max
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting hole screwing torque :  $0.49\text{N} \cdot \text{m}$  (5.0kgf · cm) max

# TUNS300F

TUN S 300 F 48 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal Input
- ⑤ Output voltage
- ⑥ Optional
  - T : with Mounting hole (φ 3.4 thru)
  - Y1: Output voltage adjustment range ±20% (Only 48V)
  - R1: with Remote ON/OFF
  - R2: with Remote ON/OFF (Low standby power)

\* Avoid short circuit between +BC/R and -BC. It may cause the failure of inside components.  
 \* Keep TRM open, if output voltage adjustment is not necessary.  
 \* If remote sensing is not necessary, connect between +Vout & +S and between -Vout & -S.

MODEL	TUNS300F12	TUNS300F28	TUNS300F48
MAX OUTPUT WATTAGE[W]	300	308	312
DC OUTPUT	12V 25A	28V 11A	48V 6.5A

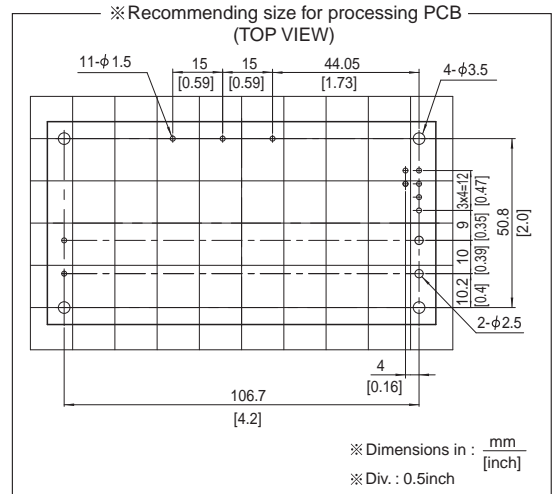
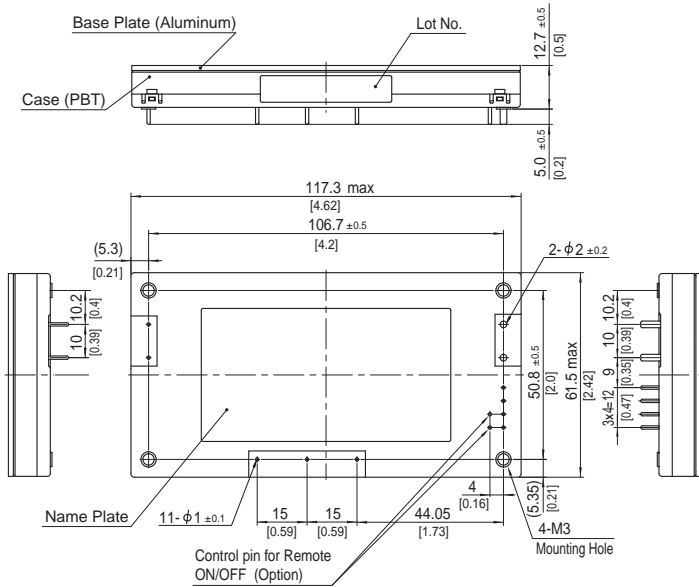
## SPECIFICATIONS

	MODEL	TUNS300F12	TUNS300F28	TUNS300F48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ			
	CURRENT[A]	ACIN 100V	3.6typ (Io=100%)		
		ACIN 200V	1.8typ (Io=100%)		
	FREQUENCY[Hz]	50/60 (47 - 63)			
	EFFICIENCY[%]	ACIN 100V	84typ	87typ	87typ
		ACIN 200V	86typ	89typ	90typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.96typ		
		ACIN 200V	0.93typ		
INRUSH CURRENT	Limited by external resistance				
LEAKAGE CURRENT[ma]	0.75max (ACIN 240V 60Hz, Io=100%, According to IEC60950-1)				
OUTPUT	VOLTAGE[V]	12	28	48	
	CURRENT[A]	25	11	6.5	
	LINE REGULATION[mV]	24max	56max	96max	
	LOAD REGULATION[mV]	24max	56max	96max	
	RIPPLE[mVp-p]	0 to +100°C*1	120max	180max	250max
		-40 to 0°C*1	150max	200max	300max
	RIPPLE NOISE[mVp-p]	0 to +100°C*1	150max	200max	300max
		-40 to 0°C*1	200max	300max	450max
	TEMPERATURE REGULATION[mV]	0 to +65°C	120max	280max	480max
		-40 to +100°C	240max	560max	960max
DRIFT[mV]	*2	40max	90max	180max	
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed (TRM pin open), adjustable by external resistor or external signal 9.60 - 14.40				
OUTPUT VOLTAGE SETTING[V]	11.91 - 12.29	22.40 - 33.60	38.40 - 52.80 (-Y1 Option : 38.4 - 57.6)		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically			
	OVERVOLTAGE PROTECTION[V]	15.00 - 16.80	35.00 - 39.20	55.20 - 64.80 (-Y1 Option : 60.0 - 67.2)	
	REMOTE SENSING	Provided			
	REMOTE ON/OFF	Optional (External power supply is required)			
ISOLATION	INPUT-OUTPUT · RC	*4 AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)			
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)			
	OUTPUT · RC-FG	*4 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)			
	OUTPUT-RC	*4 AC100V 1minute, Cutoff current = 100mA, DC100V 10MΩ min (20±15°C)			
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max			
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max			
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis			
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1			
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *3			
OTHERS	CASE SIZE/WEIGHT	117.3 × 12.7 × 61.5mm [4.62 × 0.5 × 2.42 inches] (W × H × D) / 190g max			
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)			

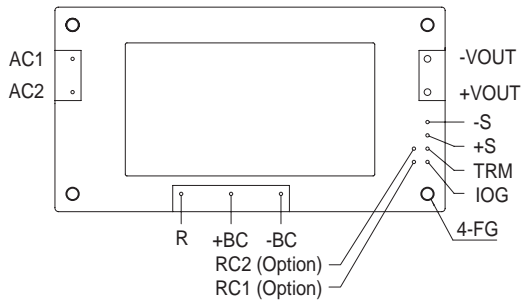
\*1 Refer to instruction manual for measuring method of electric characteristics.  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*3 Please contact us about another class.  
 \*4 "RC" is applicable when remote control (optional) is added.



## External view



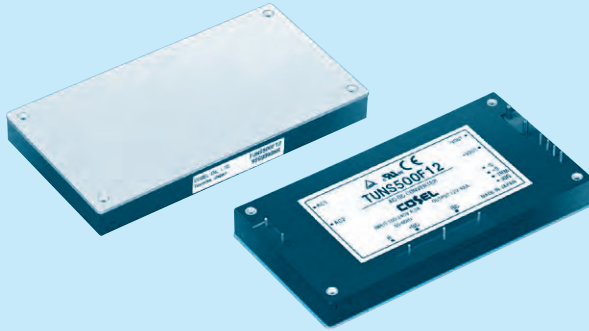
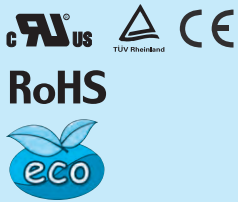
- ※ Tolerance : ±0.3 [±0.012]
- ※ Weight : 190g max
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting hole screwing torque : 0.49N · m (5.0kgf · cm) max



# TUNS500F

TUN S 500 F 48 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal Input
- ⑤ Output voltage
- ⑥ Optional
  - T : with Mounting hole (φ 3.4 thru)
  - Y1: Output voltage adjustment range ±20% (Only 48V)
  - R1: with Remote ON/OFF
  - R2: with Remote ON/OFF (Low standby power)

\* Avoid short circuit between +BC/R and -BC. It may cause the failure of inside components.  
 \* Keep TRM open, if output voltage adjustment is not necessary.  
 \* If remote sensing is not necessary, connect between +Vout & +S and between -Vout & -S.

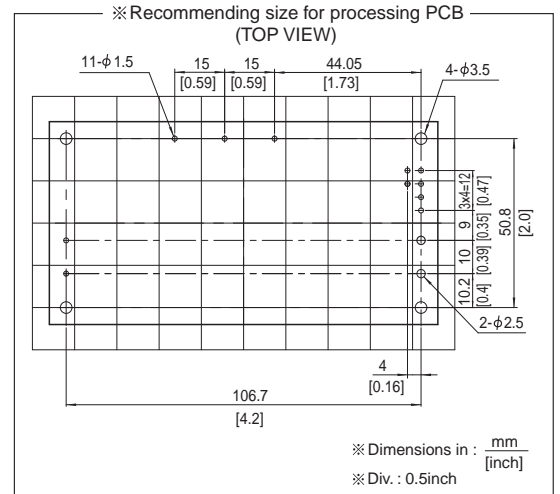
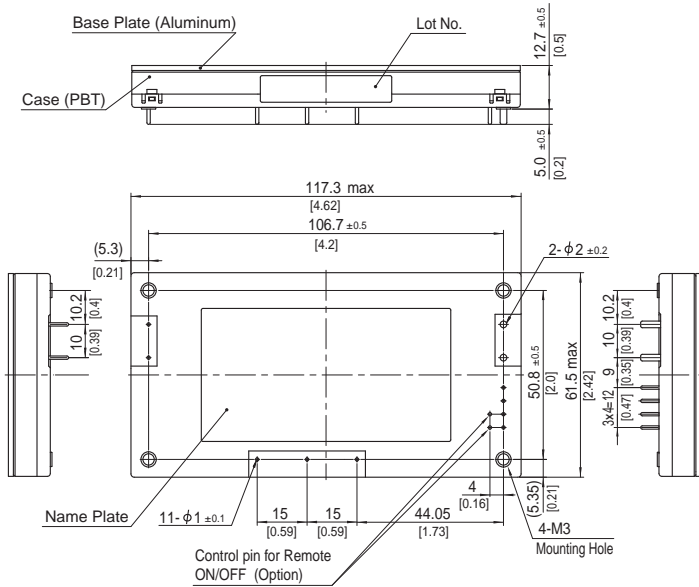
MODEL	TUNS500F12	TUNS500F28	TUNS500F48
MAX OUTPUT WATTAGE[W]	504	504	504
DC OUTPUT	12V 42A (Peak 55A)	28V 18A (Peak 24A)	48V 10.5A (Peak 14A)

## SPECIFICATIONS

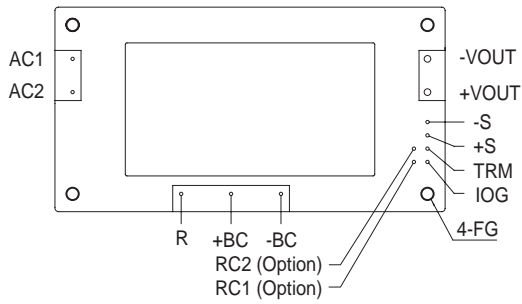
	MODEL	TUNS500F12	TUNS500F28	TUNS500F48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ			
	CURRENT[A]	ACIN 100V	6.0typ (Io=100%)		
		ACIN 200V	3.0typ (Io=100%)		
	FREQUENCY[Hz]	50/60 (47 - 63)			
	EFFICIENCY[%]	ACIN 100V	84typ	87typ	88typ
		ACIN 200V	86typ	90typ	90.5typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.96typ		
		ACIN 200V	0.93typ		
INRUSH CURRENT	Limited by external resistance				
LEAKAGE CURRENT[ma]	0.75max (ACIN 240V 60Hz, Io=100%, According to IEC60950-1)				
OUTPUT	VOLTAGE[V]	12	28	48	
	CURRENT[A]	*3 42 (Peak 55)	18 (Peak 24)	10.5 (Peak 14)	
	LINE REGULATION[mV]	24max	56max	96max	
	LOAD REGULATION[mV]	24max	56max	96max	
	RIPPLE[mVp-p]	0 to +100°C *1	120max	180max	250max
		-40 to 0°C *1	150max	200max	300max
	RIPPLE NOISE[mVp-p]	0 to +100°C *1	150max	200max	300max
		-40 to 0°C *1	200max	300max	450max
	TEMPERATURE REGULATION[mV]	0 to +65°C	120max	280max	480max
		-40 to +100°C	240max	560max	960max
	DRIFT[mV]	*2 40max	90max	180max	
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed (TRM pin open), adjustable by external resistor or external signal 9.60 - 14.40				
OUTPUT VOLTAGE SETTING[V]	11.91 - 12.29	27.56 - 28.44	38.40 - 52.80 (-Y1 Option : 38.4 - 57.6)		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 101% of peak current and recovers automatically			
	OVERVOLTAGE PROTECTION[V]	15.00 - 16.80	35.00 - 39.20	55.20 - 64.80 (-Y1 Option : 60.0 - 67.2)	
	REMOTE SENSING	Provided			
	REMOTE ON/OFF	Optional (External power supply is required)			
ISOLATION	INPUT-OUTPUT · RC	*5 AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)			
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)			
	OUTPUT · RC-FG	*5 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)			
	OUTPUT-RC	*5 AC100V 1minute, Cutoff current = 100mA, DC100V 10MΩ min (20±15°C)			
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max			
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max			
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis			
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1			
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *4			
OTHERS	CASE SIZE/WEIGHT	117.3 × 12.7 × 61.5mm [4.62 × 0.5 × 2.42 inches] (W × H × D) / 190g max			
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)			

\*1 Refer to instruction manual for measuring method of electric characteristics.  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*3 ( ) means peak current. Avoid operating with peak current continuously. It may cause failure of the components inside the product. There are limitation of available condition of the peak current, such as peak time, duty etc. (Refer to the instruction manual in detail).  
 \*4 Please contact us about another class.  
 \*5 "RC" is applicable when remote control (optional) is added.

## External view



- ※ Tolerance :  $\pm 0.3$  [ $\pm 0.012$ ]
- ※ Weight : 190g max
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting hole screwing torque :  $0.49\text{N} \cdot \text{m}$  (5.0kgf · cm) max



# TUNS700F

TUN S 700 F 48 -□  
 ① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal Input
- ⑤ Output voltage
- ⑥ Optional
  - T : with Mounting hole (φ 3.4 thru)
  - Y1: Output voltage adjustment range ±20% (Only 48V)
  - R1: with Remote ON/OFF
  - R2: with Remote ON/OFF (Low standby power)
  - P : Parallel operation (Output voltage trimming disabled, Remote sensing disabled)

\* Avoid short circuit between +BC/R and -BC. It may cause the failure of inside components.  
 \* Keep TRM open, if output voltage adjustment is not necessary.  
 \* If remote sensing is not necessary, connect between +Vout & +S and between -Vout & -S.

MODEL	TUNS700F12	TUNS700F28	TUNS700F48
MAX OUTPUT WATTAGE[W]	700.8	700.0	700.8
DC OUTPUT	12V 58.4A	28V 25A	48V 14.6A

## SPECIFICATIONS

	MODEL	TUNS700F12	TUNS700F28	TUNS700F48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ			
	CURRENT[A]	ACIN 100V	8.6typ (Io=100%)		
		ACIN 200V	4.1typ (Io=100%)		
	FREQUENCY[Hz]	50/60 (47 - 63)			
	EFFICIENCY[%]	ACIN 100V	83typ	86typ	87typ
		ACIN 200V	86typ	89typ	90typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.96typ		
		ACIN 200V	0.93typ		
INRUSH CURRENT	Limited by external resistance				
LEAKAGE CURRENT[mA]	0.75max (ACIN 240V 60Hz, Io=100%, According to IEC60950-1)				
OUTPUT	VOLTAGE[V]	12	28	48	
	CURRENT[A]	58.4	25	14.6	
	LINE REGULATION[mV]	24max	56max	96max	
	LOAD REGULATION[mV]	24max	56max	96max	
	RIPPLE[mVp-p]	0 to +100°C *1	120max	180max	250max
		-40 to 0°C *1	150max	200max	300max
	RIPPLE NOISE[mVp-p]	0 to +100°C *1	150max	200max	300max
		-40 to 0°C *1	200max	300max	450max
	TEMPERATURE REGULATION[mV]	0 to +65°C	120max	280max	480max
		-40 to +100°C	240max	560max	960max
	DRIFT[mV]	*2 40max	90max	180max	
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed (TRM pin open), adjustable by external resistor or external signal			
OUTPUT VOLTAGE SETTING[V]	9.60 - 14.40	22.40 - 33.60	38.40 - 52.80 (-Y1 Option : 38.4 - 57.6)		
	11.91 - 12.29	27.56 - 28.44	47.24 - 48.76		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically			
	OVERVOLTAGE PROTECTION[V]	15.00 - 16.80	35.00 - 39.20	55.20 - 64.80 (-Y1 Option : 60.0 - 67.2)	
	REMOTE SENSING	Provided			
	REMOTE ON/OFF	Optional (External power supply is required)			

MODEL	TUNS700F12-P	TUNS700F28-P	TUNS700F48-P
MAX OUTPUT WATTAGE[W]	700.8	700.0	700.8
DC OUTPUT	12V 58.4A	28V 25A	48V 14.6A

## SPECIFICATIONS

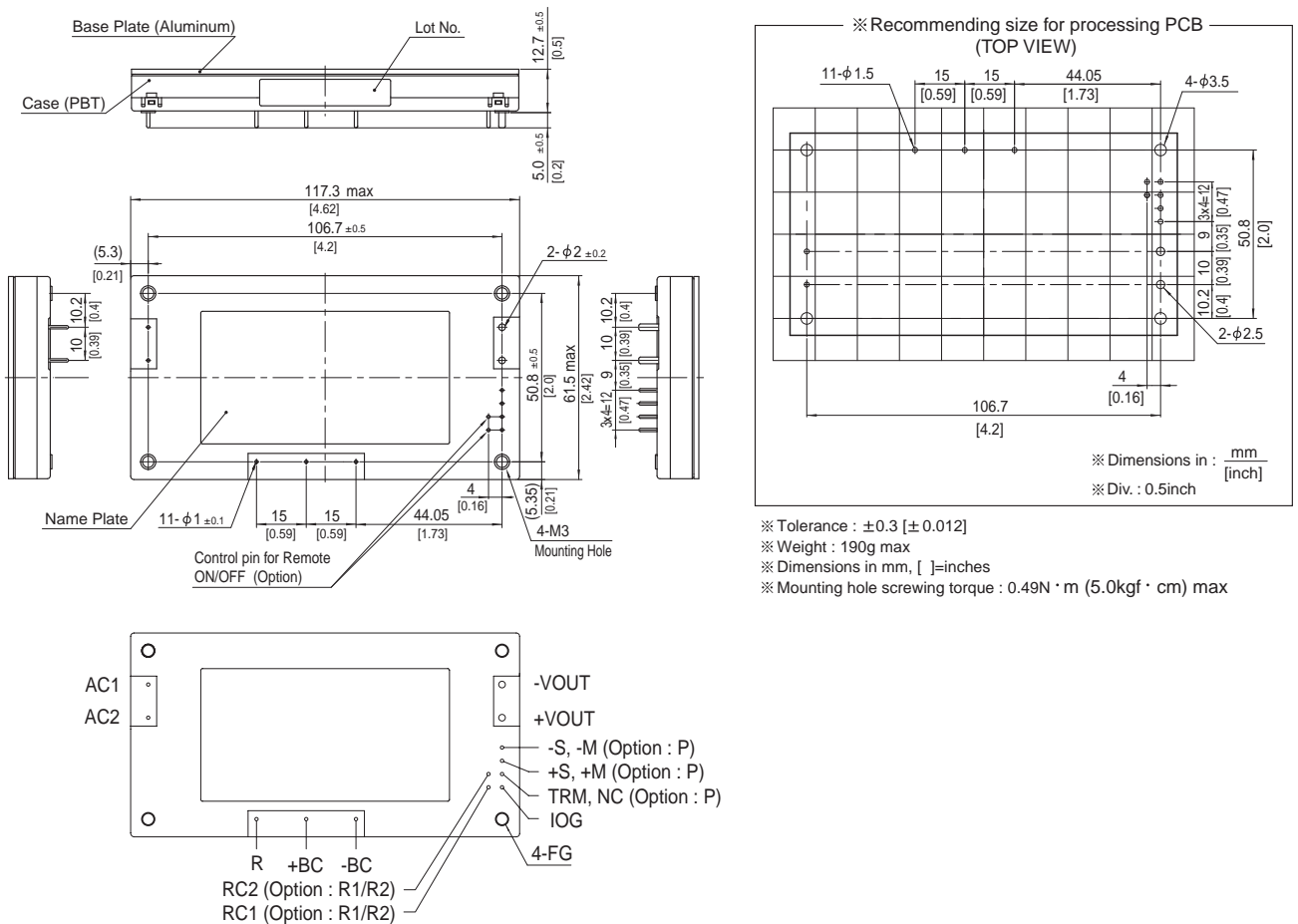
	MODEL	TUNS700F12-P	TUNS700F28-P	TUNS700F48-P	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ			
	CURRENT[A]	ACIN 100V	8.6typ (Io=100%)		
		ACIN 200V	4.1typ (Io=100%)		
	FREQUENCY[Hz]	50/60 (47 - 63)			
	EFFICIENCY[%]	ACIN 100V	83typ	86typ	87typ
		ACIN 200V	86typ	89typ	90typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.96typ		
		ACIN 200V	0.93typ		
INRUSH CURRENT	Limited by external resistance				
LEAKAGE CURRENT[mA]	0.75max (ACIN 240V 60Hz, Io=100%, According to IEC60950-1)				
OUTPUT	VOLTAGE[V]	12	28	48	
	CURRENT[A]	58.4	25	14.6	
	VOLTAGE ACCURACY[%]	+5, -3	+5, -3	+5, -3	
	RIPPLE[mVp-p]	0 to +100°C *1	240max	360max	600max
		-40 to 0°C *1	300max	400max	700max
	RIPPLE NOISE[mVp-p]	0 to +30% Load *1	360max	540max	900max
		0 to +100°C *1	300max	400max	700max
		-40 to 0°C *1	400max	600max	1000max
		0 to +30% Load *1	450max	600max	1000max
	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically			
	OVERVOLTAGE PROTECTION[V]	15.00 - 16.80	35.00 - 39.20	55.20 - 64.80	
	REMOTE ON/OFF	Optional (External power supply is required)			

## GENERAL SPECIFICATIONS

ISOLATION	INPUT-OUTPUT · RC	*4 AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)
	OUTPUT · RC-FG	*4 AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)
	OUTPUT-RC	*4 AC100V 1minute, Cutoff current = 100mA, DC100V 10MΩ min (20±15°C)
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000 feet) max
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *3
OTHERS	CASE SIZE/WEIGHT	117.3×12.7×61.5mm [4.62×0.5×2.42 inches] (W×H×D) / 190g max
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)

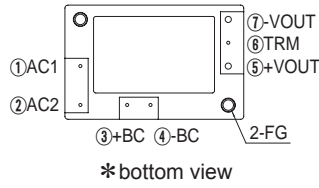
- \*1 Refer to instruction manual for measuring method of electric characteristics.
- \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.
- \*3 Please contact us about another class.
- \*4 "RC" is applicable when remote control (optional) is added.

### External view

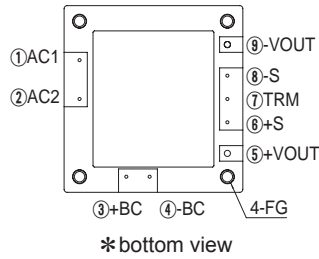


## Pin Configuration

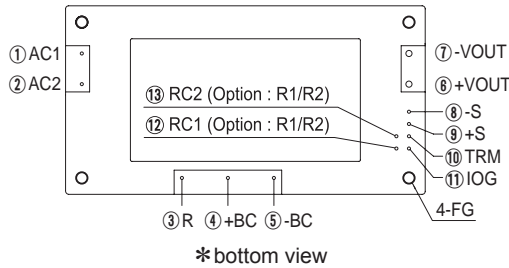
### ● TUNS50F



### ● TUNS100F



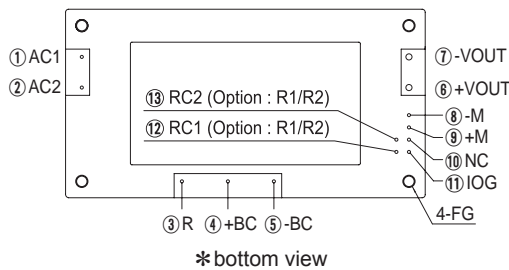
### ● TUNS300F/TUNS500F/TUNS700F



No.		Pin Connection	Function
TUNS50F	TUNS100F		
①	①	AC1	AC input
②	②	AC2	
③	③	+BC	+BC output
④	④	-BC	-BC output
⑤	⑤	+VOUT	+DC output
⑦	⑨	-VOUT	-DC output
-	⑧	-S	Remote sensing (-)
-	⑥	+S	Remote sensing (+)
⑥	⑦	TRM	Adjustment of output voltage
-	-	FG	Mounting hole (FG)

No.	Pin Connection	Function
①	AC1	AC input
②	AC2	
③	R	External resistor for inrush current protection
④	+BC	+BC output
⑤	-BC	-BC output
⑥	+VOUT	+DC output
⑦	-VOUT	-DC output
⑧	-S	Remote sensing (-)
⑨	+S	Remote sensing (+)
⑩	TRM	Adjustment of output voltage
⑪	IOG	Inverter operation monitor
⑫	RC1	Remote ON/OFF (Option)
⑬	RC2	
-	FG	Mounting hole (FG)

### ● TUNS700F□□-P (OPTION)



No.	Pin Connection	Function
⑧	-M	Output voltage monitor terminal
⑨	+M	
⑩	NC	No connection

Other than the above are the same as standard products.

Implementation • Mounting Method

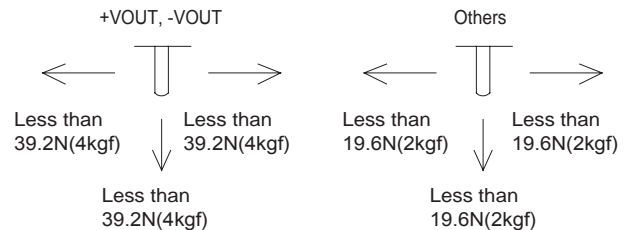
Mounting method

- The unit can be mounted in any direction. When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation. Aluminum base plate temperature of each power supply should not exceed the temperature range shown in “derating”.
- Avoid placing the AC input line pattern layout underneath the unit. It will increase the line conducted noise. Make sure to leave an ample distance between the line pattern layout and the unit. Also avoid placing the DC output line pattern underneath the unit because it may increase the output noise. Lay out the pattern away from the unit.
- Avoid placing the signal line pattern layout underneath the unit because the power supply might become unstable. Lay out the pattern away from the unit.
- High-frequency noise radiates directly from the unit to the atmosphere. Therefore, design the shield pattern on the printed circuit board and connect it to FG. The shield pattern prevents noise radiation.
- When a heat sink cannot be fixed on the base plate side, order the power module with “-T” option. A heat sink can be mounted by affixing a M3 tap on the heat sink. Please make sure a mounting hole will be connected to a grounding capacitor CY.

	Mounting hole
Standard	M3 tapped
Optional : -T	φ 3.4 thru

Stress onto the pins

- When too much stress is applied to the pins may damage internal connections. Avoid applying stress in excess of that shown in right figure.
- The pins are soldered onto the internal PCB. Therefore, Do not bend or pull the leads with excessive force.
- Mounting hole diameter of PCB should be 3.5mm to reduce the stress to the pins.
- Fix the unit on PCB (fixing fittings) by screws to reduce the stress to the pins. Be sure to mount the unit first, then solder the unit.



Soldering temperature

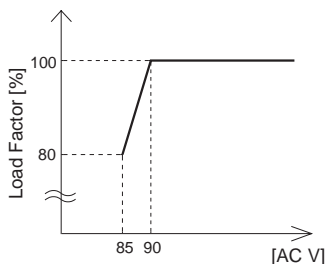
- Flow soldering : 260°C for up to 15 seconds.
- Soldering iron (26W) : 450°C for up to 5 seconds.

TUNS

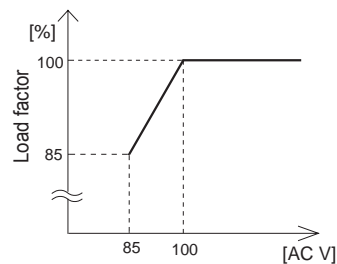
Derating

Input voltage derating curve

● TUNS50F/100F



● TUNS700F



Derating

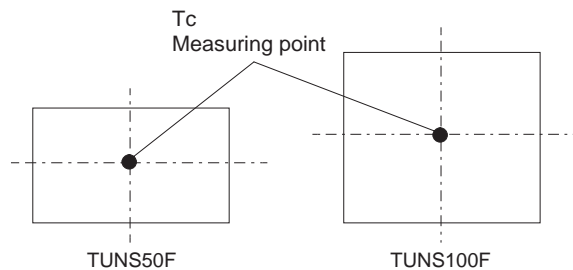
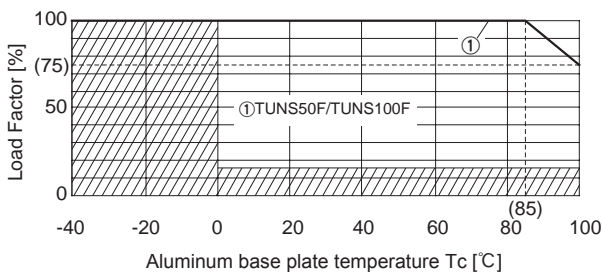
Output voltage derating curve

■ Use the power modules with conduction cooling (e.g. heat dissipation from the aluminum base plate to the attached heat sink).

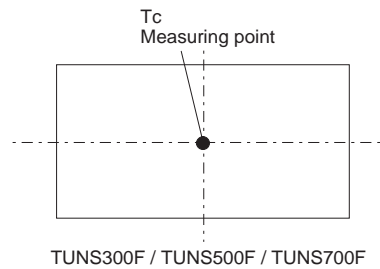
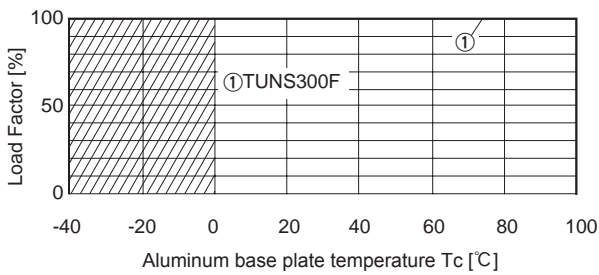
Below shows the derating curves with respect to the aluminum base plate temperature. Note that operation within the hatched areas will cause a significant level of ripple and ripple noise.

■ Please measure the temperature on the aluminum base plate edge side when you cannot measure the temperature of the center part of the aluminum base plate. In this case, please take 5deg temperature margin from the derating characteristics shown in below. Please reduce the temperature fluctuation range as much as possible when the up and down of the temperature are frequently generated. Contact us for more information on cooling methods.

● TUNS50F/100F

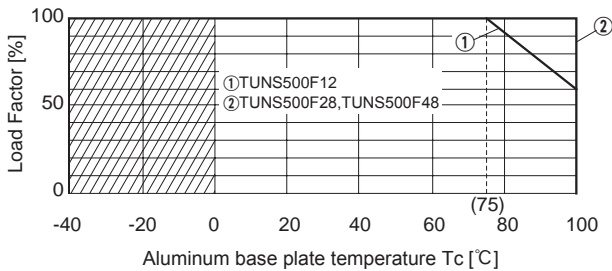


● TUNS300F

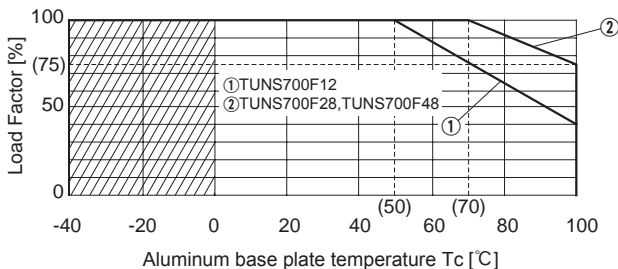


TUNS

● TUNS500F



● TUNS700F





## Instruction Manual

◆ It is necessary to read the “Instruction Manual” and “Before using our product” before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/TUNS/>

Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

TUNS



NOTICE



## Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A] *1	Inrush current protection circuit	PCB/Pattern			Series/Parallel operation availability	
					Material	Single sided	Double sided	Series operation	Parallel operation
TUNS50F	Active filter	80-600	0.67	Thermistor	Aluminum	Yes		Yes	*2
	Flyback converter	100-300							
TUNS100F	Active filter	80-600	1.3	Thermistor	Aluminum	Yes		Yes	*2
	Forward converter	300							
TUNS300F	Active filter	100	3.6	SCR	Aluminum	Yes		Yes	*2
	Half-bridge converter	400							
TUNS500F	Active filter	100	6.0	SCR	Aluminum	Yes		Yes	*2
	Half-bridge converter	400							
TUNS700F	Active filter	100	8.6	SCR	Aluminum	Yes		Yes	*2
	Half-bridge converter	400							

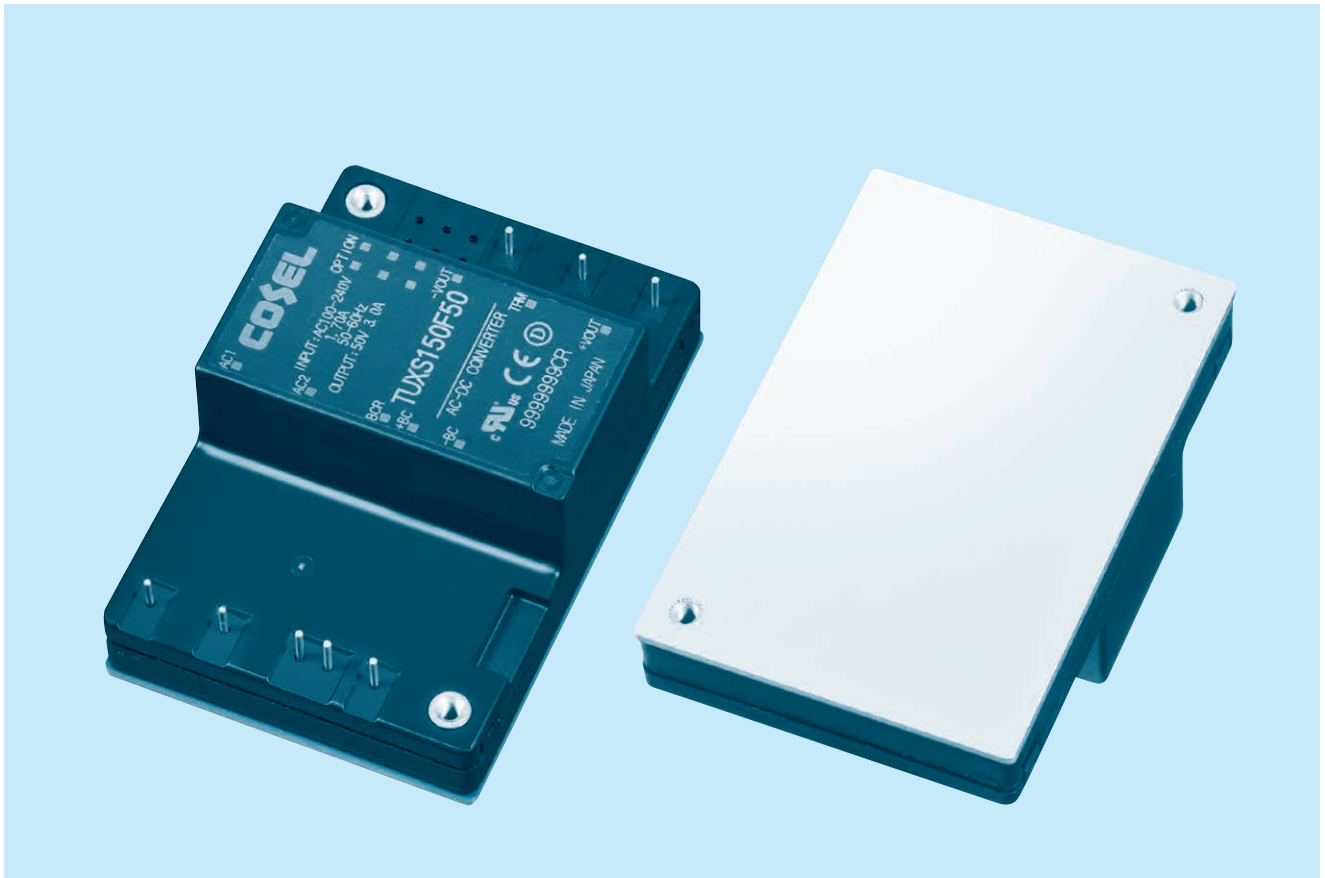
\*1 The value of input current is at ACIN 100V and rated load.

\*2 Refer to instruction manual.





# TUXS-series



TUXS

## Feature

- AC-DC Power Module Type Converter
- Harmonic attenuator (Complies with IEC61000-3-2 class A)
- Small size
- Built-in overcurrent, overvoltage and thermal protection circuits
- Mounting hole (M3 tapped)
- High efficiency 94%

## CE marking

- Low voltage directive
- RoHS Directive

## Safety Approval

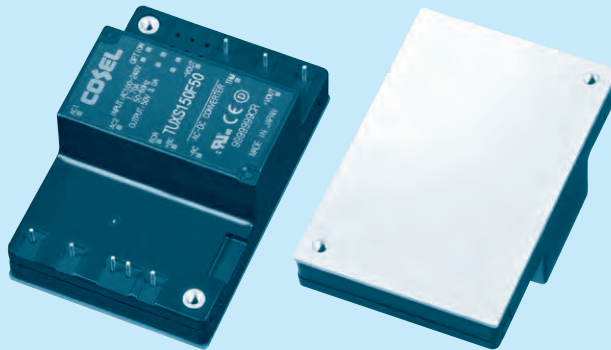
- UL60950-1, C-UL, EN60950-1

## 5-year warranty

# TUXS150F

TUX S 150 F 50 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal Input
- ⑤ Output voltage
- ⑥ Optional
  - T : with Mounting hole (φ 3.4 thru)
  - N : Auto restart in protection circuit working

\* Avoid short circuit between +BC and -BC. It may cause the failure of inside components.  
 \* Keep TRM open, if output voltage adjustment is not necessary.

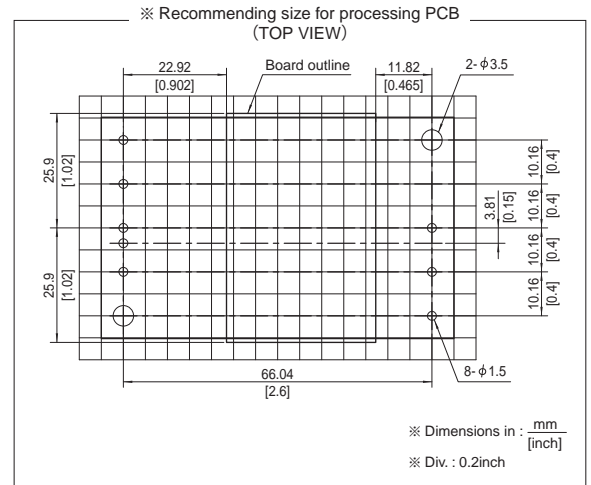
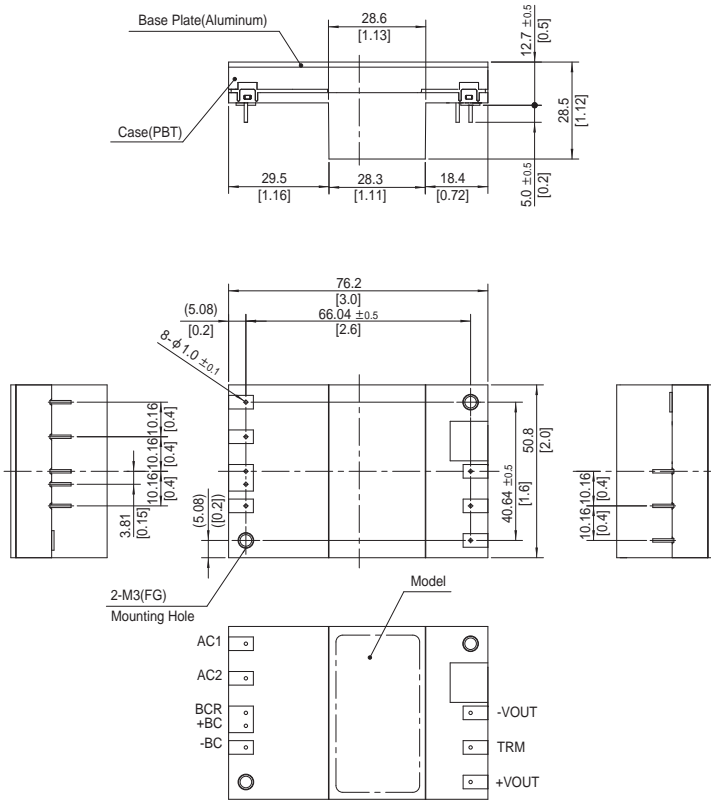
MODEL	TUXS150F50
MAX OUTPUT WATTAGE[W]	150.0
DC OUTPUT	50V 3A

## SPECIFICATIONS

MODEL		TUXS150F50	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ	
	CURRENT[A]	ACIN 100V	1.70typ (Io=100%)
		ACIN 200V	0.80typ (Io=100%)
	FREQUENCY[Hz]	50/60 (45 - 66)	
	EFFICIENCY[%]	ACIN 100V	93typ
		ACIN 200V	94typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.96typ
		ACIN 200V	0.93typ
	INRUSH CURRENT	Limited by external components (Thermistor)	
	LEAKAGE CURRENT[mA]	0.75max (ACIN 240V 60Hz, Io=100%, According to IEC60950-1)	
OUTPUT	VOLTAGE[V]	50	
	CURRENT[A]	3	
	LINE REGULATION[mV]	100max	
	LOAD REGULATION[mV]	100max	
	RIPPLE[mVp-p]	-20 to +100°C *1	200max
		-40 to -20°C *1	300max
	RIPPLE NOISE[mVp-p]	-20 to +100°C *1	200max
		-40 to -20°C *1	300max
	TEMPERATURE REGULATION[mV]	0 to +100°C	500max
		-40 to +100°C	1000max
DRIFT[mV]	*2	200max	
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed (TRM pin open), adjustable by external resistor or external signal 45.0 - 55.0		
OUTPUT VOLTAGE SETTING[V]	49.2 - 50.8		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically	
	OVERVOLTAGE PROTECTION[V]	57.5 - 67.5	
	REMOTE SENSING	Not provided	
	REMOTE ON/OFF	Not provided	
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)	
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)	
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)	
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 4,000m (13,000 feet) max	
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max	
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis	
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis	
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN50178	
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *3	
OTHERS	CASE SIZE/WEIGHT	76.2×28.5×50.8mm [3.0×1.12×2.0 inches] (W×H×D) / 150g max	
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)	

\*1 Refer to instruction manual for measuring method of electric characteristics.  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*3 Please contact us about another class.

## External view

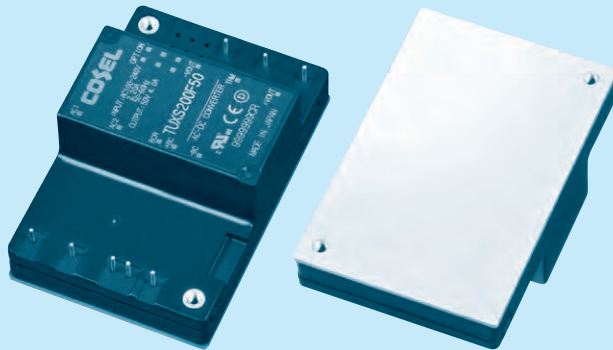


- ※ Tolerance :  $\pm 0.3$  [ $\pm 0.012$ ]
- ※ Weight : 150g max
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting hole screwing torque : 0.49N/m (5.0kgf/cm) max

# TUXS200F

TUX S 200 F 50 -□

① ② ③ ④ ⑤ ⑥



- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal Input
- ⑤ Output voltage
- ⑥ Optional
  - T : with Mounting hole (φ 3.4 thru)
  - N : Auto restart in protection circuit working

\* Avoid short circuit between +BC and -BC. It may cause the failure of inside components.  
 \* Keep TRM open, if output voltage adjustment is not necessary.

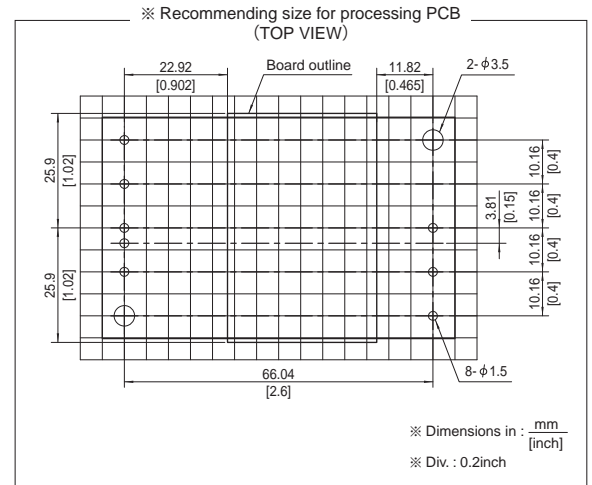
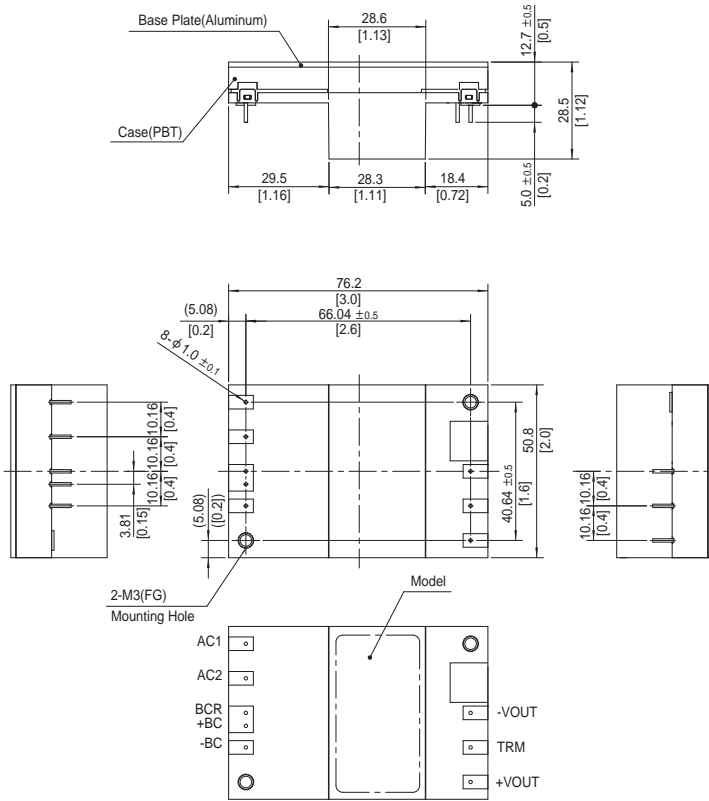
MODEL	TUXS200F24	TUXS200F28	TUXS200F32	TUXS200F42	TUXS200F50
MAX OUTPUT WATTAGE[W]	199.2	196.0	198.4	197.4	200.0
DC OUTPUT	24V 8.3A	28V 7.0A	32V 6.2A	42V 4.7A	50V 4.0A

## SPECIFICATIONS

	MODEL	TUXS200F24	TUXS200F28	TUXS200F32	TUXS200F42	TUXS200F50	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ					
	CURRENT[A]	ACIN 100V	2.20typ (Io=100%)				
		ACIN 200V	1.10typ (Io=100%)				
	FREQUENCY[Hz]	50/60 (45 - 66)					
	EFFICIENCY[%]	ACIN 100V	90typ	90typ	91typ	91typ	92typ
		ACIN 200V	91typ	91typ	92typ	92typ	93typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.96typ				
		ACIN 200V	0.93typ				
INRUSH CURRENT	Limited by external components (Thermistor)						
LEAKAGE CURRENT[ma]	0.75max (ACIN 240V 60Hz, Io=100%, According to IEC60950-1)						
OUTPUT	VOLTAGE[V]	24	28	32	42	50	
	CURRENT[A]	8.3	7.0	6.2	4.7	4.0	
	LINE REGULATION[mV]	48max	56max	64max	84max	100max	
	LOAD REGULATION[mV]	48max	56max	64max	84max	100max	
	RIPPLE[mVp-p]	-20 to +100°C *1	144max	168max	192max	252max	300max
		-40 to -20°C *1	192max	224max	256max	336max	400max
	RIPPLE NOISE[mVp-p]	-20 to +100°C *1	144max	168max	192max	252max	300max
		-40 to -20°C *1	192max	224max	256max	336max	400max
	TEMPERATURE REGULATION[mV]	0 to +100°C	240max	280max	320max	420max	500max
		-40 to +100°C	480max	560max	640max	820max	1000max
	DRIFT[mV]	*2	96max	112max	128max	168max	200max
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	Fixed (TRM pin open), adjustable by external resistor or external signal						
OUTPUT VOLTAGE SETTING[V]	21.60 - 26.40	25.20 - 30.80	28.80 - 35.20	37.80 - 46.20	45.00 - 55.00		
	23.62 - 24.38	27.55 - 28.45	31.49 - 32.51	41.33 - 42.67	49.20 - 50.80		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically					
	OVERVOLTAGE PROTECTION[V]	27.60 - 28.80	32.20 - 33.60	36.80 - 38.40	48.30 - 50.40	57.50 - 60.00	
	REMOTE SENSING	Not provided					
	REMOTE ON/OFF	Not provided					
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)					
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (20±15°C)					
	OUTPUT-FG	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (20±15°C)					
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 4,000m (13,000 feet) max					
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000 feet) max					
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis					
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis					
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN50178					
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *3					
OTHERS	CASE SIZE/WEIGHT	76.2×28.5×50.8mm [3.0×1.12×2.0 inches] (W×H×D) / 150g max					
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)					

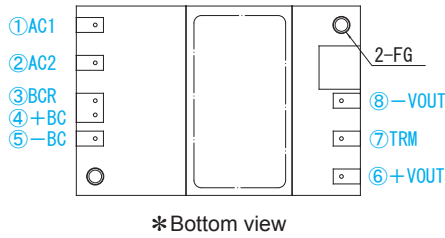
\*1 Refer to instruction manual for measuring method of electric characteristics.  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*3 Please contact us about another class.

## External view



- ※ Tolerance :  $\pm 0.3$  [ $\pm 0.012$ ]
- ※ Weight : 150g max
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting hole screwing torque : 0.49N/m (5.0kgf/cm) max

## Pin Configuration



No.	Pin Connection	Function
①	AC1	AC input
②	AC2	
③	BCR	+BC output
④	+BC	+BC output
⑤	-BC	-BC output
⑥	+VOUT	+DC output
⑦	TRM	Adjustment of output voltage
⑧	-VOUT	-DC output
-	FG	Mounting hole (FG)

## Implementation • Mounting Method

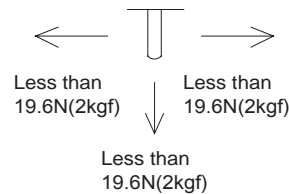
### Mounting method

- The unit can be mounted in any direction. When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation. Aluminum base plate temperature of each power supply should not exceed the temperature range shown in "Derating".
- Avoid placing the AC input line pattern layout underneath the unit. It will increase the line conducted noise. Make sure to leave an ample distance between the line pattern layout and the unit. Also avoid placing the DC output line pattern underneath the unit because it may increase the output noise. Lay out the pattern away from the unit.
- Avoid placing the signal line pattern layout underneath the unit because the power supply might become unstable. Lay out the pattern away from the unit.
- High-frequency noise radiates directly from the unit to the atmosphere. Therefore, design the shield pattern on the printed circuit board and connect it to FG.  
The shield pattern prevents noise radiation.
- When a heat sink cannot be fixed on the base plate side, order the power module with "-T" option. A heat sink can be mounted by affixing a M3 tap on the heat sink. Please make sure a mounting hole will be connected to a grounding capacitor CY.

Mounting hole	
Standard	M3 tapped
Optional : -T	φ 3.4 thru

### Stress onto the pins

- When too much stress is applied to the pins may damage internal connections. Avoid applying stress in excess of that shown in right figure.
- The pins are soldered onto the internal PCB.  
Therefore, Do not bend or pull the leads with excessive force.
- Mounting hole diameter of PCB should be 3.5mm to reduce the stress to the pins.
- Fix the unit on PCB (fixing fittings) by screws to reduce the stress to the pins. Be sure to mount the unit first, then solder the unit.



### Soldering

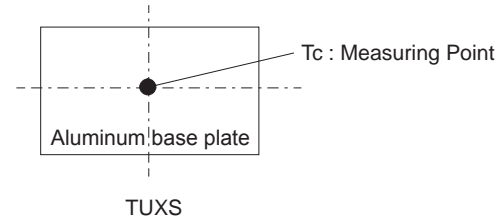
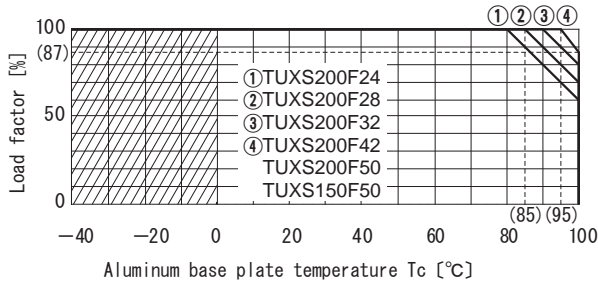
- Flow soldering : 260°C less than 15 seconds.
- Soldering iron (26W) : 450°C less than 5 seconds.



Derating

Output voltage derating curve

- Use the power modules with conduction cooling (e.g. heat dissipation from the aluminum base plate to the attached heat sink). Below shows the derating curves with respect to the aluminum base plate temperature. Note that operation within the hatched areas will cause a significant level of ripple and ripple noise.
- Please measure the temperature on the aluminum base plate edge side when you cannot measure the temperature of the center part of the aluminum base plate. In this case, please take 5deg temperature margin from the derating characteristics shown in Below. Please reduce the temperature fluctuation range as much as possible when the up and down of the temperature are frequently generated. Contact us for more information on cooling methods.



Instruction Manual

- ◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/TUXS/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

TUXS



NOTICE



Basic Characteristics Data

TUXS

Model	Circuit method	Switching frequency [kHz]	Input current [A] *1	Inrush current protection circuit	PCB/Pattern			Series/Parallel operation availability	
					Material	Single sided	Double sided	Series operation	Parallel operation
TUXS150F	Active filter	80-600	1.70	Thermistor	Aluminum	Yes		Yes	*2
	LLC resonant converter	100-300							
TUXS200F	Active filter	80-600	2.20	Thermistor	Aluminum	Yes		Yes	*2
	LLC resonant converter	100-300							

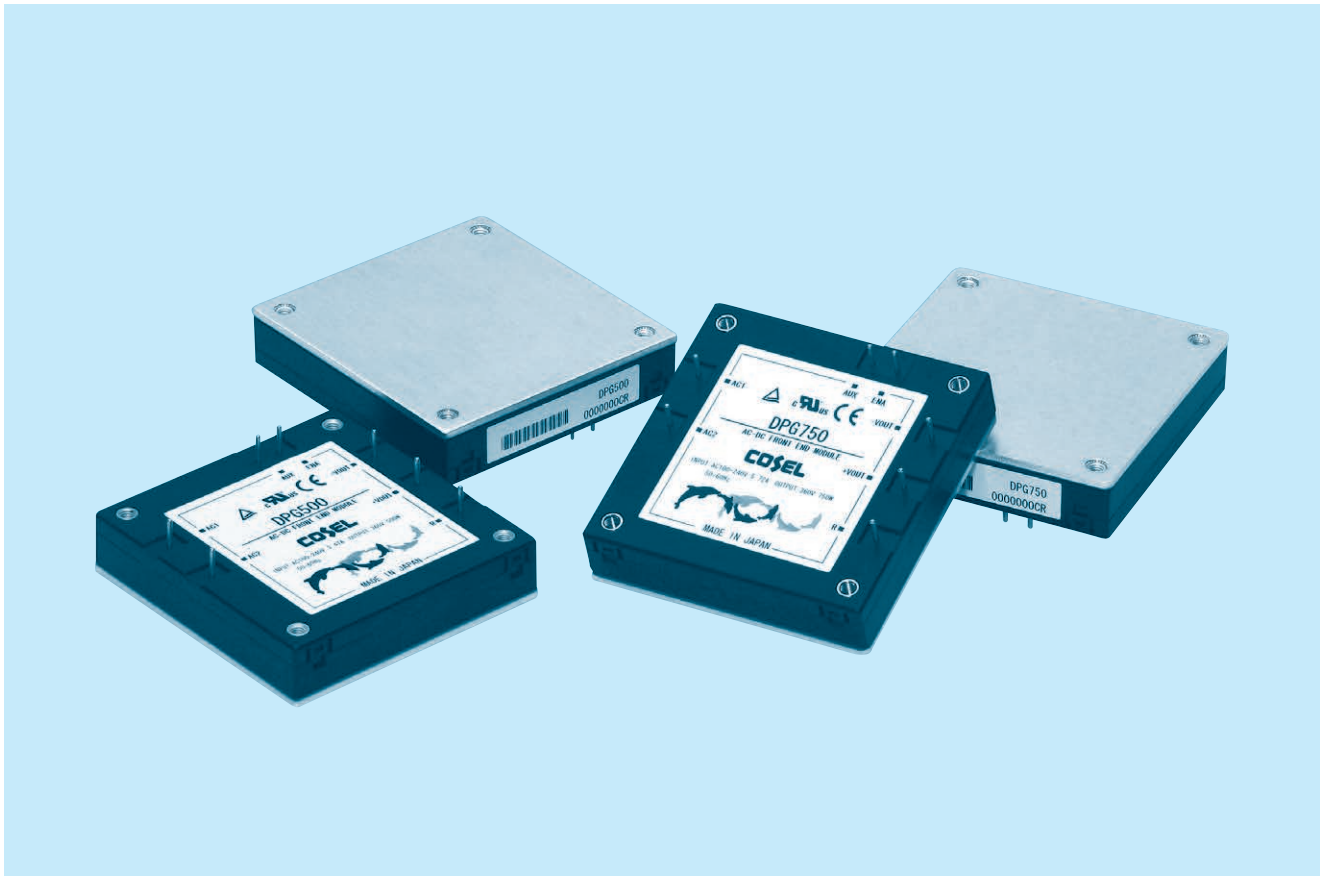
\*1 The value of input current is at ACIN 100V and rated load.  
 \*2 Refer to instruction manual.



Power  
Factor  
CorrectionWorld  
wideLow  
ProfileSafety  
ApprovalsInrush  
current  
limiting

OVP

# DPG-series



## ■ Power factor correction module

### ■ Feature

Harmonic attenuator (Complies with IEC61000-3-2)  
 High efficiency 93% (AC100V), 96% (AC200V)  
 Universal input voltage (AC85 - 264V)  
 Built-in inrush current protection  
 Built-in overvoltage and thermal protection circuits  
 Enable signal (ENA)  
 Auxiliary power supply for external signal (AUX)  
 Ideal for distributed power systems

### ■ 5-year warranty

## ■ CE marking

Low Voltage Directive  
 RoHS Directive

## ■ Safety agency approvals

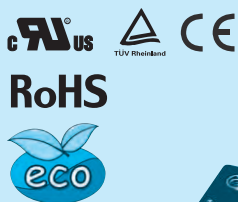
UL, C-UL recognized, TÜV approved

DPG

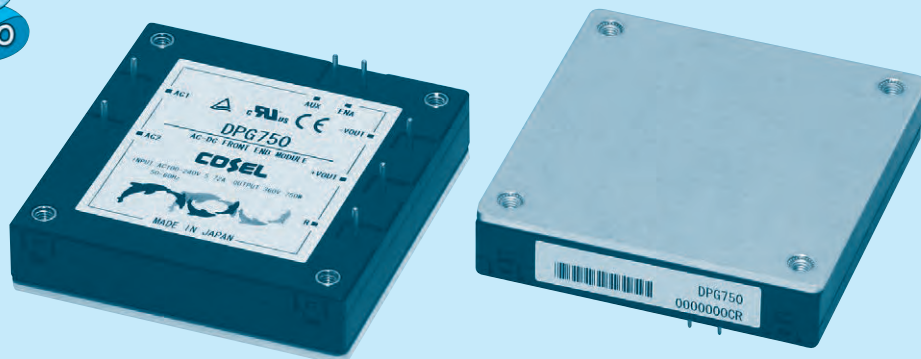
# DPG

DPG 750 -□

① ② ③



- ① Series name
- ② Output power  
500 : 500W (ACIN 200V)  
750 : 750W (ACIN 200V)
- ③ Optional  
T : with Mounting hole  
(φ 3.4 thru)



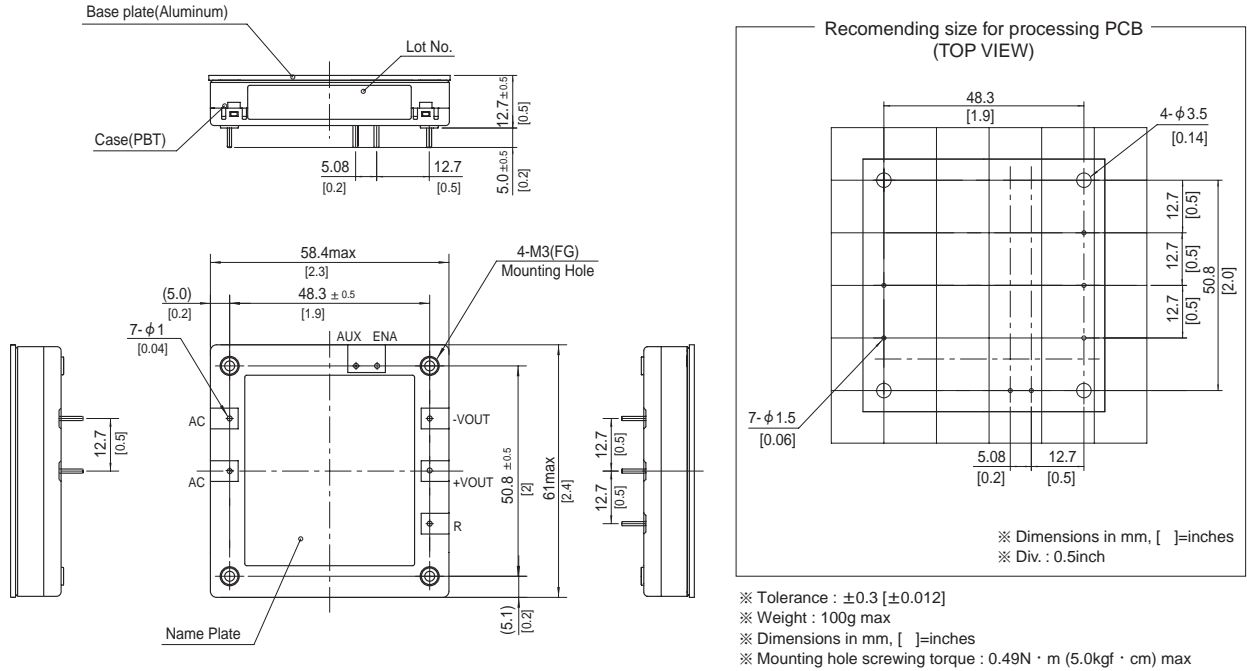
MODEL	DPG500		DPG750	
AC INPUT[V]	AC85 - 264	AC170 - 264	AC85 - 264	AC170 - 264
MAX OUTPUT WATTAGE[W]	*1 300	500	500	750
DC OUTPUT VOLTAGE[V]	*2 360			

## SPECIFICATIONS

	MODEL	DPG500		DPG750	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ	AC170 - 264 1 φ	AC85 - 264 1 φ	AC170 - 264 1 φ
	POWER FACTOR CORRECTION RANGE[V]	AC85 - 264 1 φ			
	CURRENT[A]	3.47typ (ACIN 100V)	2.86typ (ACIN 200V)	5.72typ (ACIN 100V)	4.24typ (ACIN 200V)
	FREQUENCY[Hz]	50/60 (47 - 63) Hz			
	INRUSH CURRENT[A]	Limited by external resistance			
	EFFICIENCY[%]	92typ (ACIN 100V)	95typ (ACIN 200V)	93typ (ACIN 100V)	96typ (ACIN 200V)
	POWER FACTOR	0.96typ (ACIN 100V)	0.93typ (ACIN 200V)	0.96typ (ACIN 100V)	0.93typ (ACIN 200V)
	LEAKAGE CURRENT[mA]	0.75 max (60Hz, According to IEC60950 and DEN-AN)			
OUTPUT	WATTAGE[W]	*1 300	500	500	750
	VOLTAGE[V]	*2 360			
	VOLTAGE ACCURACY	*3 ±2%			
PROTECTION CIRCUIT AND OTHERS	OVERVOLTAGE PROTECTION[V]	DC400 - 450V The power factor corrector function stops			
	ENA	*4	Enable signal, Open-drain output, Maximum sink current 10mA, Maximum allowance voltage 35V		
	OTHERS	*5	Parallel operation impossible , Thermal protection		
ISOLATION	INPUT-OUTPUT	Non isolated			
	INPUT, OUTPUT-FG	AC2,800V 1minute Cutoff current = 10mA, DC500V, 50MΩ min (20±15°C)			
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-40 to +100°C (On aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating") 3,000m (10,000feet) max			
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +100°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max			
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each along X, Y and Z axis			
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1, EN50178 Complies with DEN-AN and IEC60950-1			
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 *6			
OTHERS	CASE SIZE/WEIGHT	58.4 × 12.7 × 61mm [2.3 × 0.5 × 2.4 inches] (W × H × D) / 100g max			
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)			

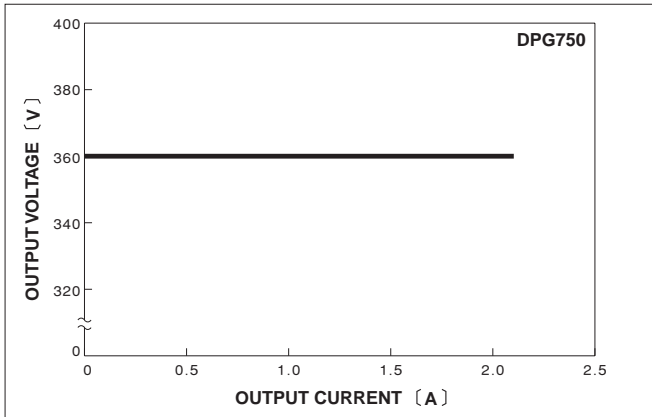
- \*1 Refer to "Derating".
- \*2 When the input voltage is more than 240V, the output voltage becomes the value proportional to the input voltage.
- \*3 The value included the output setting and the line regulation, the load regulation and the temperature regulation. However, the input voltage is less than 240V.
- \*4 Refer to the instruction Manual.
- \*5 The thermal protection stops the power factor corrector function and the ENA signal.
- \*6 Please contact us about class C.

## External view

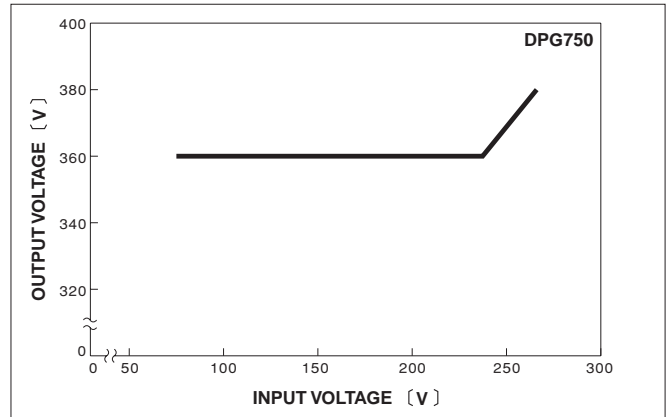


## Performance data

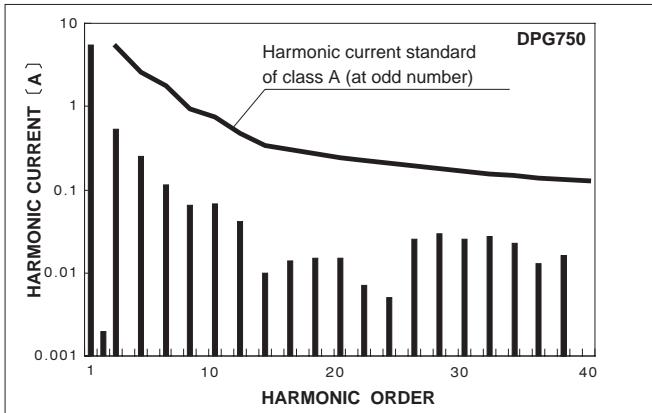
### ■ STATIC CHARACTERISTICS (AC230V)



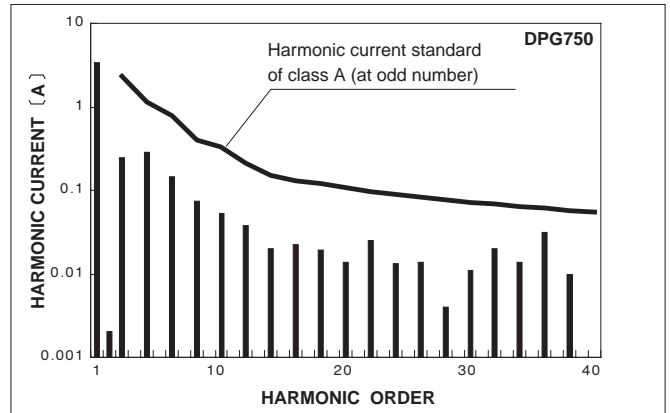
### ■ OUTPUT VOLTAGE FOR INPUT



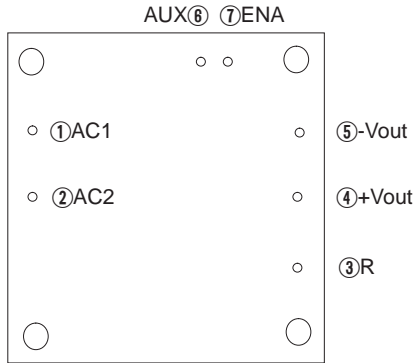
### ■ HARMONIC CURRENT (AC100V)



### ■ HARMONIC CURRENT (AC230V)



Pin Configuration



\*Bottom View

No.	Pin Connection	Function
①	AC1	AC Input
②	AC2	
③	R	External resistor for inrush current protection
④	+VOUT	+DC output
⑤	-VOUT	-DC output
⑥	AUX	Auxiliary power supply for external signal
⑦	ENA	Enable signal

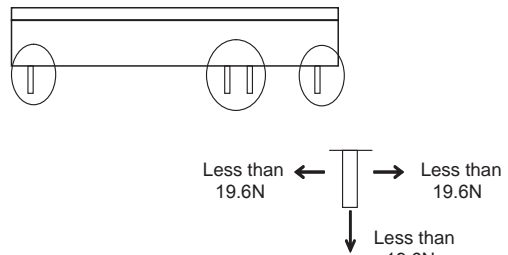
Implementation • Mounting Method

Mounting method

- The unit can be mounted in any direction. When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation. Aluminum base plate temperature around each power supply should not exceed the temperature range shown in “Derating”.
- Avoid placing the AC input line pattern lay out underneath the unit, it will increase the line conducted noise. Make sure to leave an ample distance between the line pattern lay out and the unit. Also avoid placing the DC output line pattern of DC-DC converter underneath the unit because it may increase the output noise. Lay out the pattern away from the unit.
- High-frequency noise radiates directly from the unit to the atmosphere. Therefore, design the shield pattern on the printed circuit board and connect its one to FG. The shield pattern prevents noise radiation.

Stress onto the pins

- When too much stress is applied to the pins may damage internal connections. Avoid applying stress in excess of that shown in right figure.
- The pins are soldered onto the internal PCB. Therefore, Do not bend or pull the leads with excessive force.
- Mounting hole diameter of PCB should be 3.5mm to reduce the stress to the pins.
- Fix the unit on PCB (fixing fittings) by screws to reduce the stress to the pins. Be sure to mount the unit first, then solder the unit.



Soldering

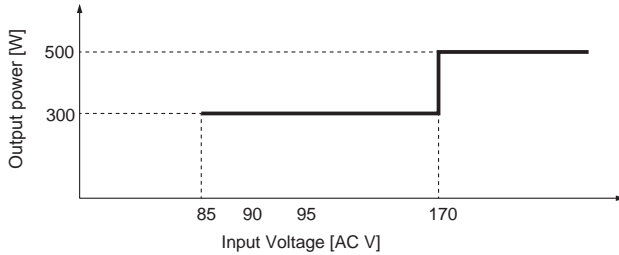
- Flow soldering : 260°C less than 15 seconds.
- Soldering iron : 450°C less than 5 seconds.

Derating

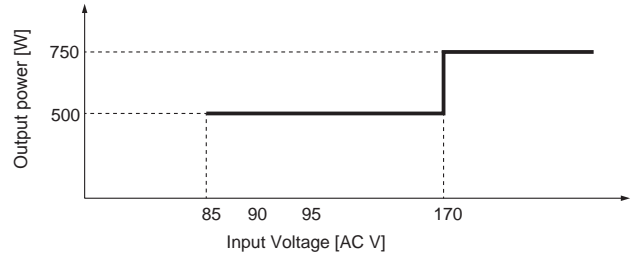
Derating curve for input voltage

Below shows rated output for each input voltage section. Maximum output should be within this range.

DPG500



DPG750

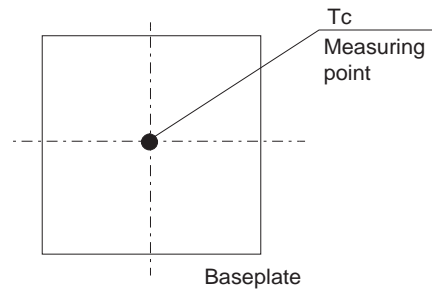
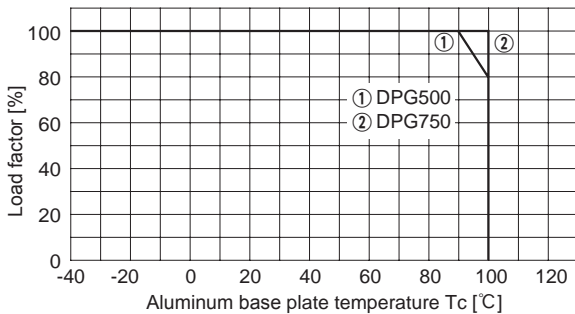


Output voltage derating curve

Use with the conduction cooling (e.g. heat radiation by conduction from the aluminum base plate to the attached heat sink). Below shows the derating curve based on the aluminum base plate temperature. In the hatched area, the specification of Ripple and Ripple Noise is different from other areas.

Please measure the temperature on the aluminum base plate edge side when you cannot measure the temperature of the center part of the aluminum base plate. In this case, please take 5deg temperature margin from the derating characteristic of Below.

It is necessary to note the thermal fatigue life by power cycle. Please reduce the temperature fluctuation range as much as possible when the up and down of the temperature are frequently generated. Contact us for more information on cooling methods.



DPG

Instruction Manual

It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/DPG/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>



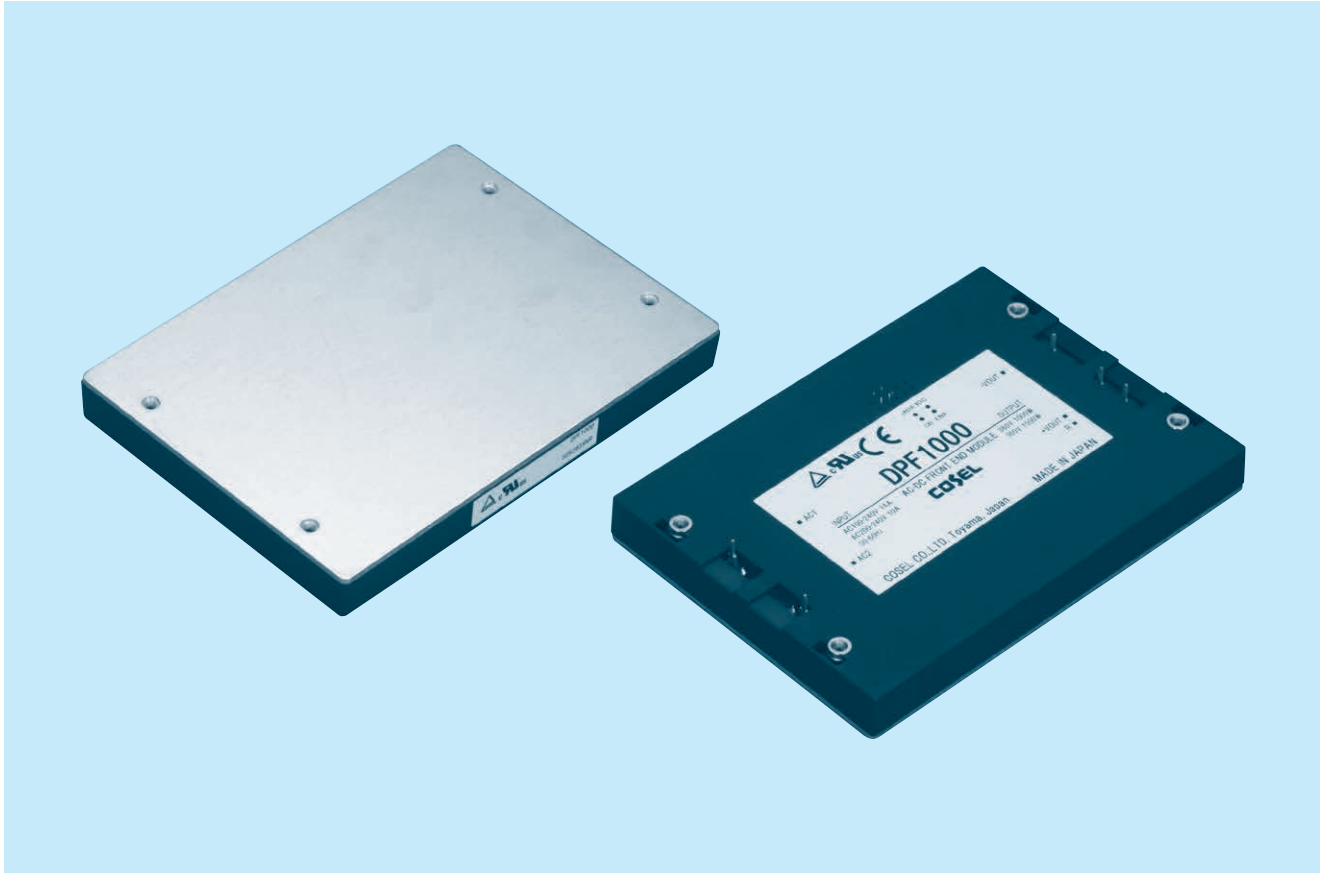
**Basic Characteristics Data**

Model	Circuit method	Switching frequency [kHz]	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
				Material	Single sided	Double sided	Series operation	Parallel operation
DPG500	Active filter	130	SCR	Aluminum	Yes		No	No
DPG750	Active filter	130	SCR	Aluminum	Yes		No	No





# DPF-series



## ■ Power factor correction module

### ■ Feature

- Harmonic attenuator (Complies with IEC61000-3-2)
- High efficiency 90% (AC100V), 95% (AC200V)
- Universal input voltage (AC85 - 264V)
- Built-in inrush current protection
- Parallel operation is possible (Built-in current balancing function)
- Built-in overvoltage and thermal protection circuits
- Inverter operation monitoring (IOG)
- Enable signal (ENA)
- Auxiliary power supply for external signal (AUX)
- Ideal for distributed power systems

### ■ 5-year warranty

## ■ CE marking

- Low Voltage Directive
- RoHS Directive

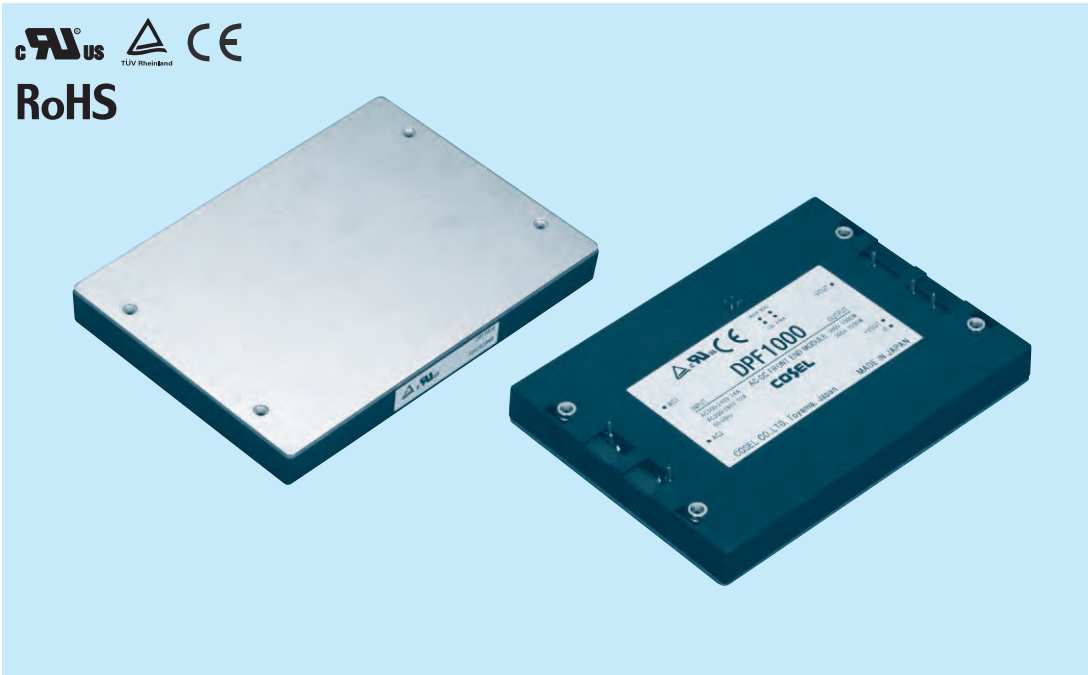
## ■ Safety agency approvals

- UL, C-UL recognized, TÜV approved

# DPF1000

## DPF 1000

① ②



① Series name  
② Output wattage

MODEL	DPF1000	
AC INPUT[V]	AC85 - 264	AC170 - 264
MAX OUTPUT WATTAGE[W]	1,000	1,500
DC OUTPUT VOLTAGE[V]	DC360	

### SPECIFICATIONS

	MODEL	DPF1000
INPUT	VOLTAGE[V]	AC85 - 264 1 φ
	POWER FACTOR CORRECTION RANGE[V]	AC85 - 255 1 φ
	CURRENT[A]	11.5typ (ACIN 100V)
	FREQUENCY[Hz]	50/60 (47 - 63)
	INRUSH CURRENT[A]	Limited by external resistance
	EFFICIENCY[%]	90typ (ACIN 100V)
	POWER FACTOR	0.98typ (ACIN 100V)
	LEAKAGE CURRENT[mA]	0.75max (60Hz, According to IEC60950 and DEN-AN)
OUTPUT	WATTAGE[W] *1	1,000
	VOLTAGE[V] *2	DC360
	VOLTAGE ACCURACY[V] *3	±20
PROTECTION CIRCUIT AND OTHERS	OVERVOLTAGE PROTECTION[V]	DC400 - 450 The power factor corrector function stops
	IOG	Inverter operation monitoring, Open-collector output, Maximum sink current 10mA, Maximum allowance voltage 35V
	ENA	Enable signal, Open-collector output, Maximum sink current 10mA, Maximum allowance voltage 35V
	AUX	Auxiliary power supply for external signal, Output voltage:6.5 - 8.5V maximum, Output current:10mA
ISOLATION	OTHERS	Parallel operation possible (Current balancing function), N+1 redundant operation possible, Thermal protection
	INPUT-OUTPUT	Non isolated
ENVIRONMENT	INPUT, OUTPUT-FG	AC3,000V 1minute Cutoff current = 10mA, DC500V, 50MΩmin (20±15°C)
	OPERATING TEMP.HUMID.AND ALTITUDE *4	-20 to +85°C (Aluminum base plate), 20 - 95%RH (Non condensing) (Refer to "Derating"), 3,000m (10,000feet) max
	STORAGE TEMP.HUMID.AND ALTITUDE	-40 to +85°C, 20 - 95%RH (Non condensing), 9,000m (30,000feet) max
	VIBRATION	10 - 55Hz, 49.0m/s <sup>2</sup> (5G), 3minutes period, 60minutes each along X, Y and Z axis
SAFETY	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis
	AGENCY APPROVALS	UL60950-1, C-UL, EN60950-1, EN50178 Complies with DEN-AN and IEC60950-1
OTHERS	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 *5
	CASE SIZE/WEIGHT	118.6 × 12.7 × 85mm [4.67 × 0.5 × 3.35 inches] (W × H × D) /200g max
	COOLING METHOD	Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)

\*1 Refer to "Derating".

\*2 When the input voltage is more than 255V, the power factor corrector function stops, and the output voltage becomes rectified AC input voltage.

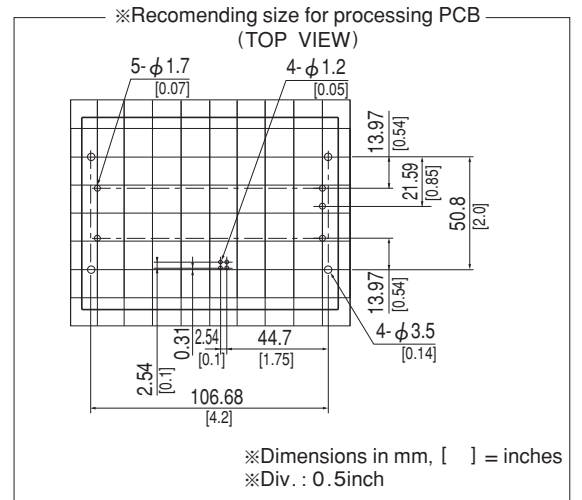
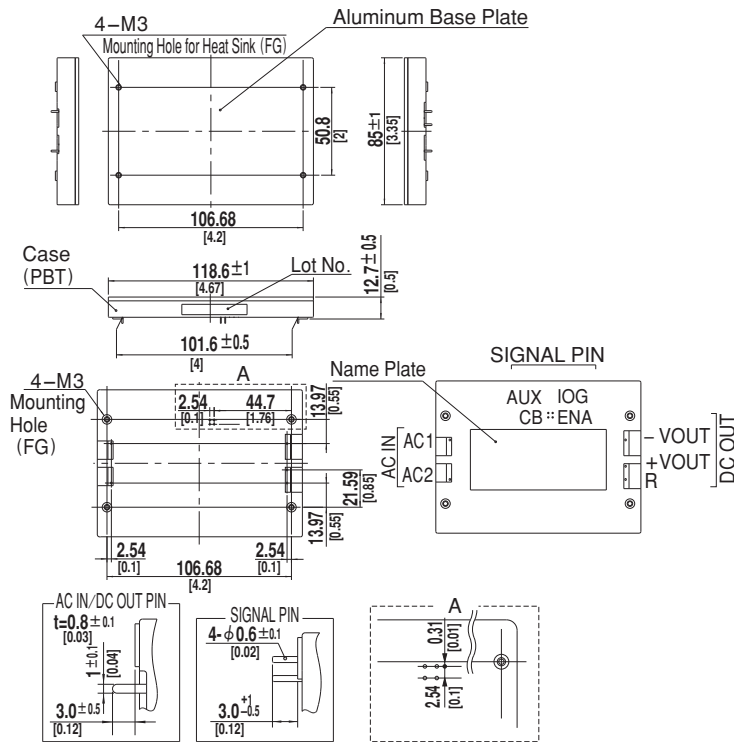
\*3 The value included the output setting and the line regulation, the load regulation and the temperature regulation.  
However, the input voltage is in the power factor correction range.

\*4 Please consult us in regard to use from -40°C.

\*5 Please contact us about class C.

\* External components are required. Refer to standard connection method.

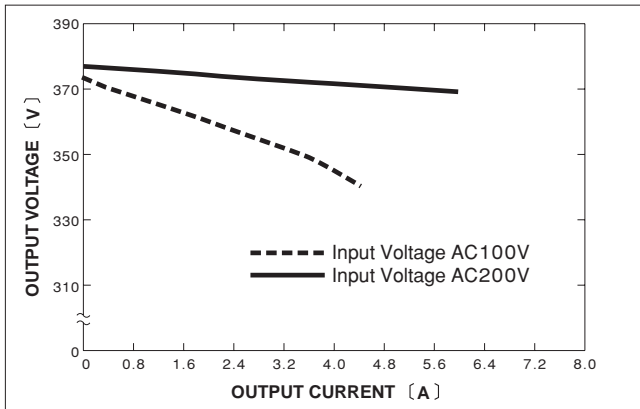
## External view



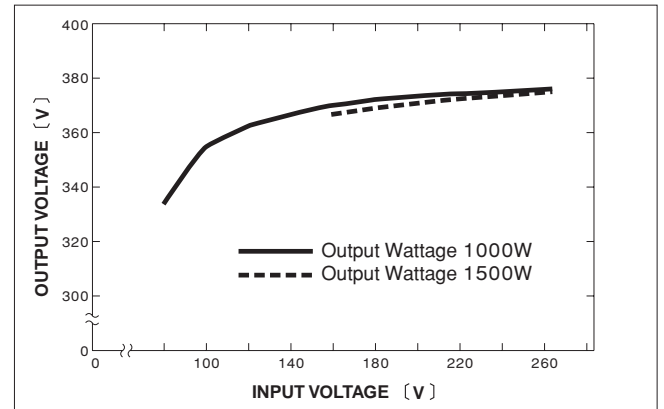
- ※Weight: 200g max
- ※Tolerance:  $\pm 0.3$  [ $\pm 0.012$ ]
- ※Dimensions in mm, [ ] = inches
- ※Base Plate: Aluminum
- ※Mounting torque
- Mounting hole screwing torque 0.49N·m (5.0kgf·cm) max

## Performance data

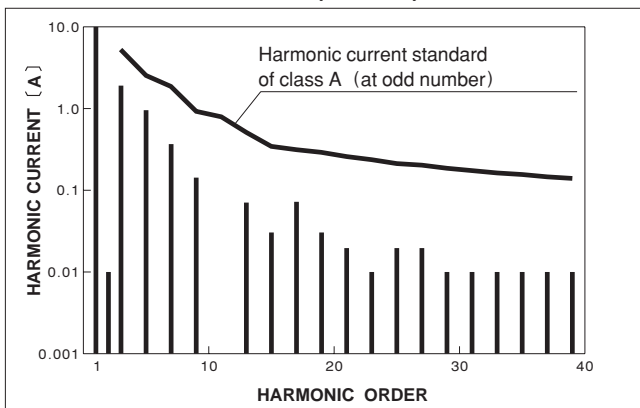
### ■ STATIC CHARACTERISTICS



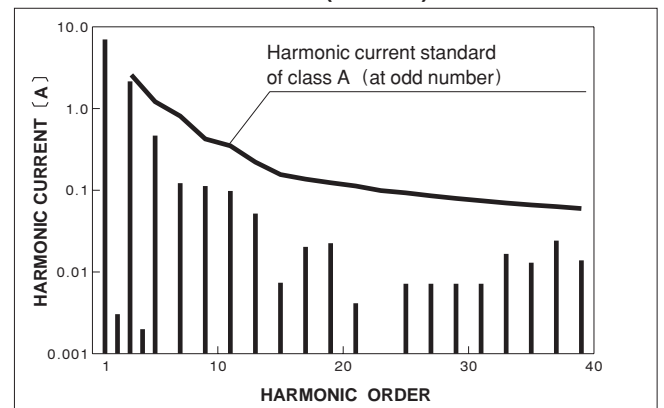
### ■ OUTPUT VOLTAGE FOR INPUT



### ■ HARMONIC CURRENT (AC100V)

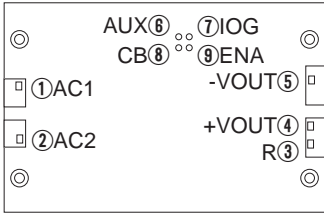


### ■ HARMONIC CURRENT (AC230V)



DPF

## Pin Configuration



★ Bottom View

No.	Pin connection	Function
①	AC1	AC Input
②	AC2	
③	R	External resistor for inrush current protection
④	+VOUT	+DC Output
⑤	-VOUT	-DC Output
⑥	AUX	Auxiliary power supply for external signal
⑦	IOG	Inverter operation monitor
⑧	CB	Current balance
⑨	ENA	Enable signal

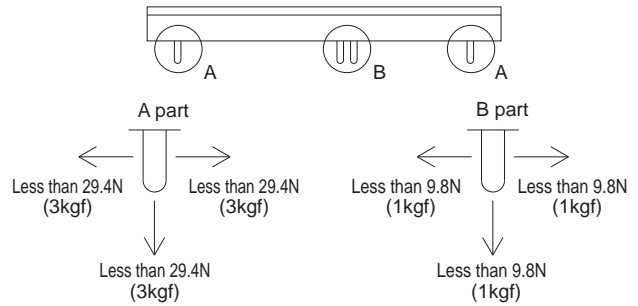
## Implementation • Mounting Method

### Installation method

- The unit can be mounted in any direction. When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation. Aluminum base plate temperature around each power supply should not exceed the temperature range shown in derating curve.
- Avoid placing the AC input line pattern lay out underneath the unit, it will increase the line conducted noise. Make sure to leave an ample distance between the line pattern lay out and the unit. Also avoid placing the DC output line pattern of DC-DC converter underneath the unit because it may increase the output noise. Lay out the pattern away from the unit.
- High-frequency noise radiates directly from the unit to the atmosphere. Therefore, design the shield pattern on the printed circuit board and connect its one to FG. The shield pattern prevents noise radiation.

### Stress onto the pins

- When too much stress is applied to the pins of the power supply, the internal connection may be weakened. As shown in right figure avoid applying stress of more than 29.4N(3kgf) on the input pins/output pins(A part) and more than 9.8N(1kgf) to the signal pins(B-part).
- The pins are soldered on PCB internally, therefore, do not pull or bend them with abnormal forces.
- Fix the unit on PCB(fixing fittings) to reduce the stress onto the pins.



## DPF

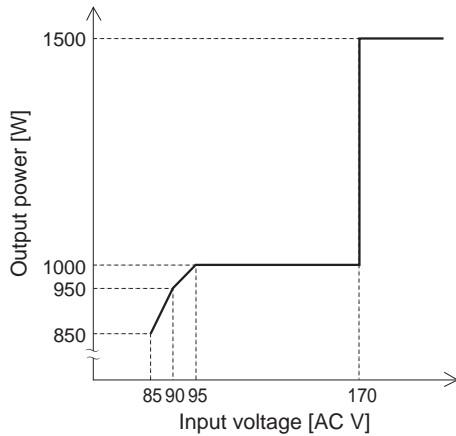
### Soldering

- Flow soldering : 260°C less than 15 seconds.
- Soldering iron
  - AC IN/DC OUT/R pins : 450°C less than 5 seconds.
  - Signal pins : 350°C less than 3 seconds(less than 20W)

Derating

Derating curve for input voltage

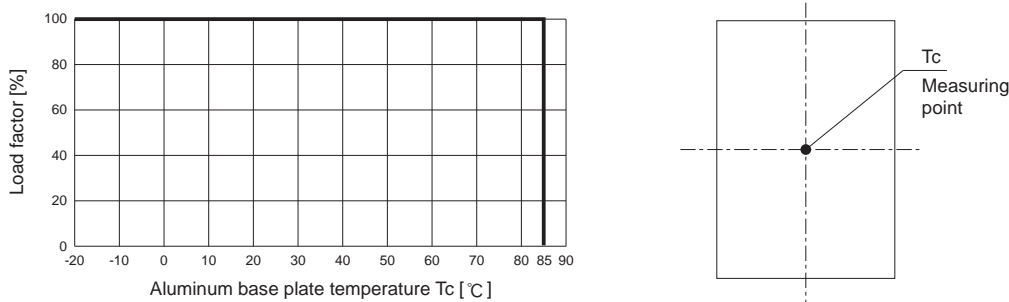
Below shows rated output for each input voltage section. Maximum output should be within this range.



Output voltage derating curve

Use with the conduction cooling (e.g. heat radiation by conduction from the aluminum base plate to the attached heat sink). Below shows the derating curve based on the aluminum base plate temperature. In the hatched area, the specification of Ripple and Ripple Noise is different from other areas.

It is necessary to note thermal fatigue life by power cycle. Please reduce the temperature fluctuation range as much as possible when the up and down of temperature are frequently generated. Contact for more information on cooling methods.



DPF

Instruction Manual

It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/DPF/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

DPF



NOTICE



Basic Characteristics Data

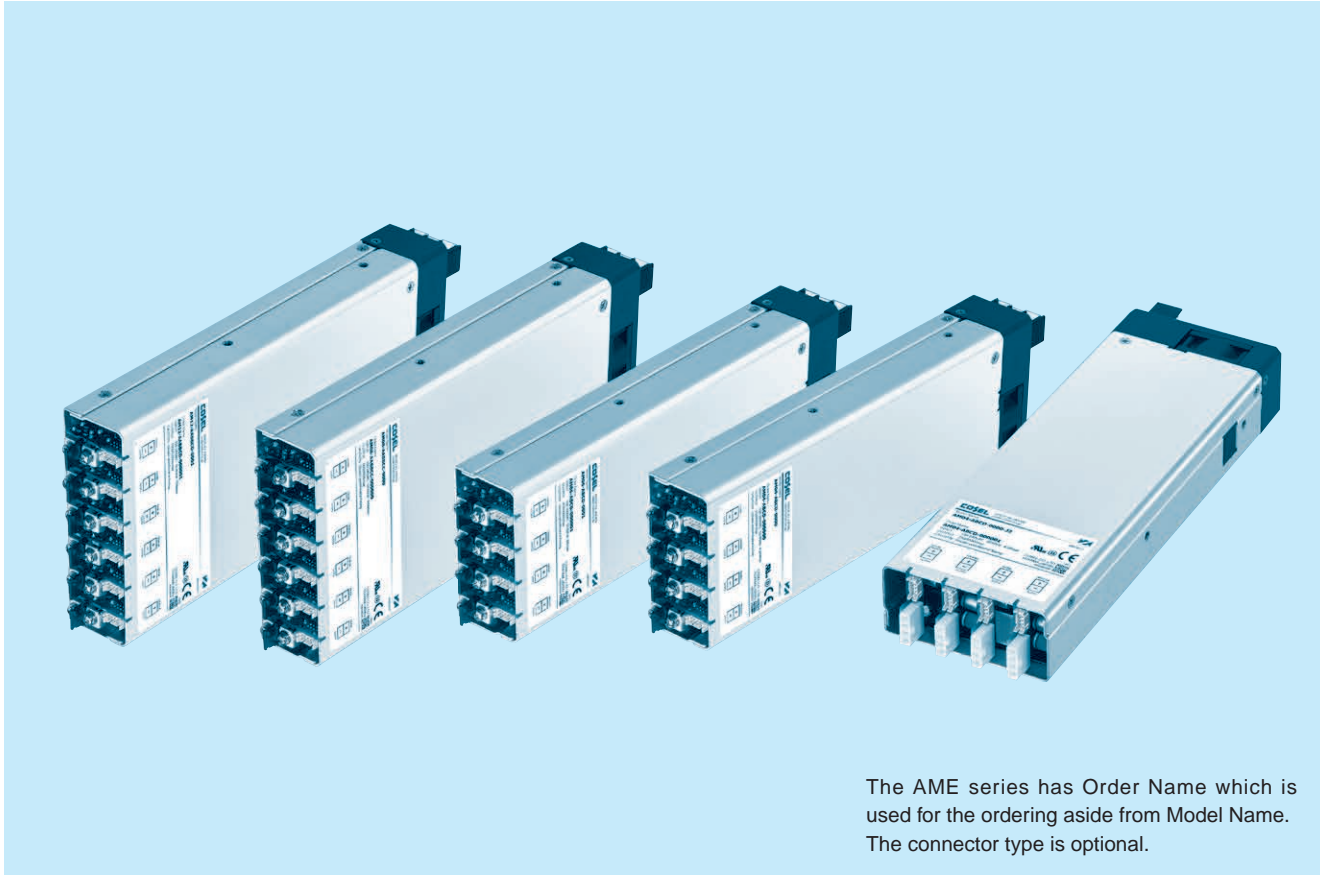
Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
DPF1000	Active filter	130	11.5 *1	-	SCR	Aluminum	Yes		No	Yes
			8.5 *2							

\*1 The value of input current is at ACIN 100V and 1000W load.  
 \*2 The value of input current is at ACIN 200V and 1500W load.





# AME-series



The AME series has Order Name which is used for the ordering aside from Model Name. The connector type is optional.

## Feature

- Flexible modular system architecture provides various output configuration
- Low profile (41mm, 1.61inch=meet to 1U height)
- Universal input (AC85-264V)
- For medical electric equipment (ANSI/AAMI ES60601-1, EN60601-1 3rd, IEC60601-1-2 4th Ed.)
- With AUX output 5V 1A
- Global inhibit, Remote ON/OFF control
- Connector type output terminal (Option)
- Monitoring function and some parameter changes by communication are available (Option)

## Safety agency approvals

- UL62368-1, ANSI/AAMI ES60601-1
- C-UL (CAN/CSA62368-1), C-UL (CAN/CSA60601-1)
- EN62368-1, EN60601-1 3rd

## 5-year warranty (refer to Instruction Manual)

## CE marking

- Low Voltage Directive
- RoHS Directive

## EMI

- Complies with FCC-B, CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, VCCI-B

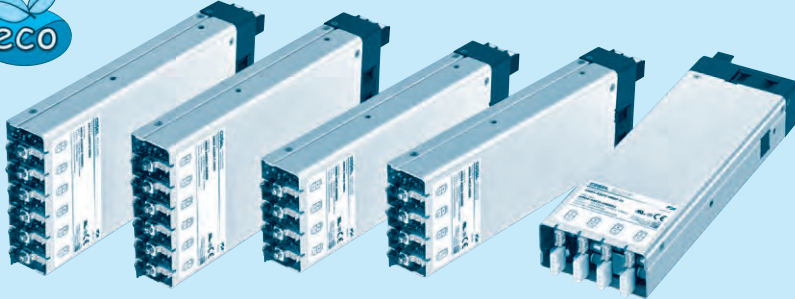
## EMS Compliance : EN61204-3, EN61000-6-2 IEC60601-1-2 (2014), EN60601-1-2 (2015)

- EN61000-4-2
- EN61000-4-3
- EN61000-4-4
- EN61000-4-5
- EN61000-4-6
- EN61000-4-8
- EN61000-4-11

# AME series

AM   -       -     -

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪



Output connector type (option: -J2)

The AME series has Order Name which is used for the ordering aside from Model Name.

Example recommended EMI/EMC filter  
 AME400F NAC-06-472  
 AME600F NAC-10-472  
 AME800F NAC-16-472  
 AME1200F NAC-20-472



High voltage pulse noise type: NAP series  
 Low leakage current type: NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Abbreviation for series name of AME series
- ② Abbreviation for output power of AME series  
 04 : AME400F  
 06 : AME600F  
 08 : AME800F  
 12 : AME1200F
- ③ Slot 6 Output module
- ④ Slot 5 Output module
- ⑤ Slot 4 Output module
- ⑥ Slot 3 Output module
- ⑦ Slot 2 Output module
- ⑧ Slot 1 Output module
- ⑨ Parallel code
- ⑩ Series code
- ⑪ Option \*6  
 A : 12V/0.1A AUX instead of 5V1A  
 R : Reversed logic remote on/off  
 J2 : Output connector type  
 J3 : CN1/CN2/CN3 Molex connectors  
 C : with Coating  
 F3 : Reverse air exhaust type  
 G : Low leakage current  
 I3 : with Extended-UART interface  
 I : with PMBus interface  
 Refer to instruction manual 7.1

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

## SPECIFICATIONS

	MODEL	AME400F	AME600F	AME800F	AME1200F	
INPUT	VOLTAGE [VAC]	85-264 1 φ				
	CURRENT [A]	ACIN 100V	3.0typ	5.0typ	7.0typ	12typ
		ACIN 230V	2.0typ	3.2typ	4.0typ	6.4typ
	FREQUENCY [Hz]	50/60 (45 - 66)				
	EFFICIENCY [%]	ACIN 100V	85typ	87typ	87typ	88typ
		ACIN 230V	89typ	91typ	90typ	91typ
	POWER FACTOR	ACIN 100V	0.98typ	0.98typ	0.98typ	0.98typ
		ACIN 230V	0.95typ	0.95typ	0.95typ	0.95typ
INRUSH CURRENT [A]	ACIN 100V	15/50typ (Po = 100%)(Primary inrush current / Secondary inrush current) (More than 3 sec. to re-start)				
	ACIN 230V	35/50typ (Po = 100%)(Primary inrush current / Secondary inrush current) (More than 3 sec. to re-start)				
LEAKAGE CURRENT [mA]	0.30max (ACIN 240V 60Hz, Io = 100%, According to IEC60601-1)					
OUTPUT	NUMBER OF SLOT	4		6		
	TOTAL OUTPUT [W]	ACIN 90-150V	250	400	600	1000
		ACIN 170-264V	400	600	800	1200
	START-UP TIME [ms]	800typ (ACIN 100V, Po = 100%)				
HOLD-UP TIME [ms]	20typ (ACIN230V, Po = 80%) / 16typ (ACIN230V, Po = 100%)					
FUNCTION	AUXILIARY POWER (AUX)	5V1A				
	GLOBAL INHIBIT (GI)	Provided				
	ALARM (PR)	Provided				
ISOLATION	INPUT - OUTPUT	4,000VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At Room Temperature) 2MOPP				
	INPUT - FG	2,000VAC 1minute, Cutoff current = 10mA, 500VDC 50MΩ min (At Room Temperature) 1MOPP				
	OUTPUT - FG	500VAC 1minute, Cutoff current = 100mA, 500VDC 50MΩ min (At Room Temperature)				
	OUTPUT - RC, LV, AUX, PR, GI	500VAC 1minute, Cutoff current = 100mA, 500VDC 50MΩ min (At Room Temperature)				
ENVIRONMENT	OPERATING TEMP., HUMIDITY, AND ALTITUDE	-20 to +70°C, 20 - 90%RH (Non condensing)				
	STORAGE TEMP., HUMIDITY, AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing)				
	VIBRATION	10 - 55Hz 19.6m/s <sup>2</sup> (2G) 3minutes period, 60minutes each along X, Y and Z axis				
	IMPUCT	196.1m/s <sup>2</sup> (20G) 11ms, once each X, Y and Z axis				
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL62368-1, C-UL (CAN/CSA-C22.2 No.62368-1), EN62368-1, ANSI/AAMI ES60601-1, C-UL (CAN/CSA-C22.2 No.60601-1), EN60601-1 3rd Complies with IEC60601-1-2 4th Ed.				
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR11-B, CISPR32-B, EN55011-B, EN55032-B				
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (classA)				
OTHERS	CASE SIZE	89 X 41 X 257mm (W X H X D) [3.50 X 1.61 X 10.12 inches]		127 X 41 X 257mm (W X H X D) [5.00 X 1.61 X 10.12 inches]		
	WEIGHT [kg]	1.2max		1.8max		
	COOLING METHOD	Forced cooling (internal fan)				

\*1 The current of input surge to a built-in EMI/EMS Filter(0.2ms or less) is excluded.  
 \*2 Refer to "Derating".  
 \*3 Each output module, RC, LV, AUX, PR, and GI are isolated.  
 \*4 Case size contains neither the terminal blocks, screw nor other projections.  
 \*5 Please contact us about other classes.  
 \*6 Please contact us about safety approvals for the model with option.  
 \*7 At the total output power.  
 The value depends on the combination of output modules or load factor.  
 \* The audible noise might be emitted from the power supply at the pulse load.

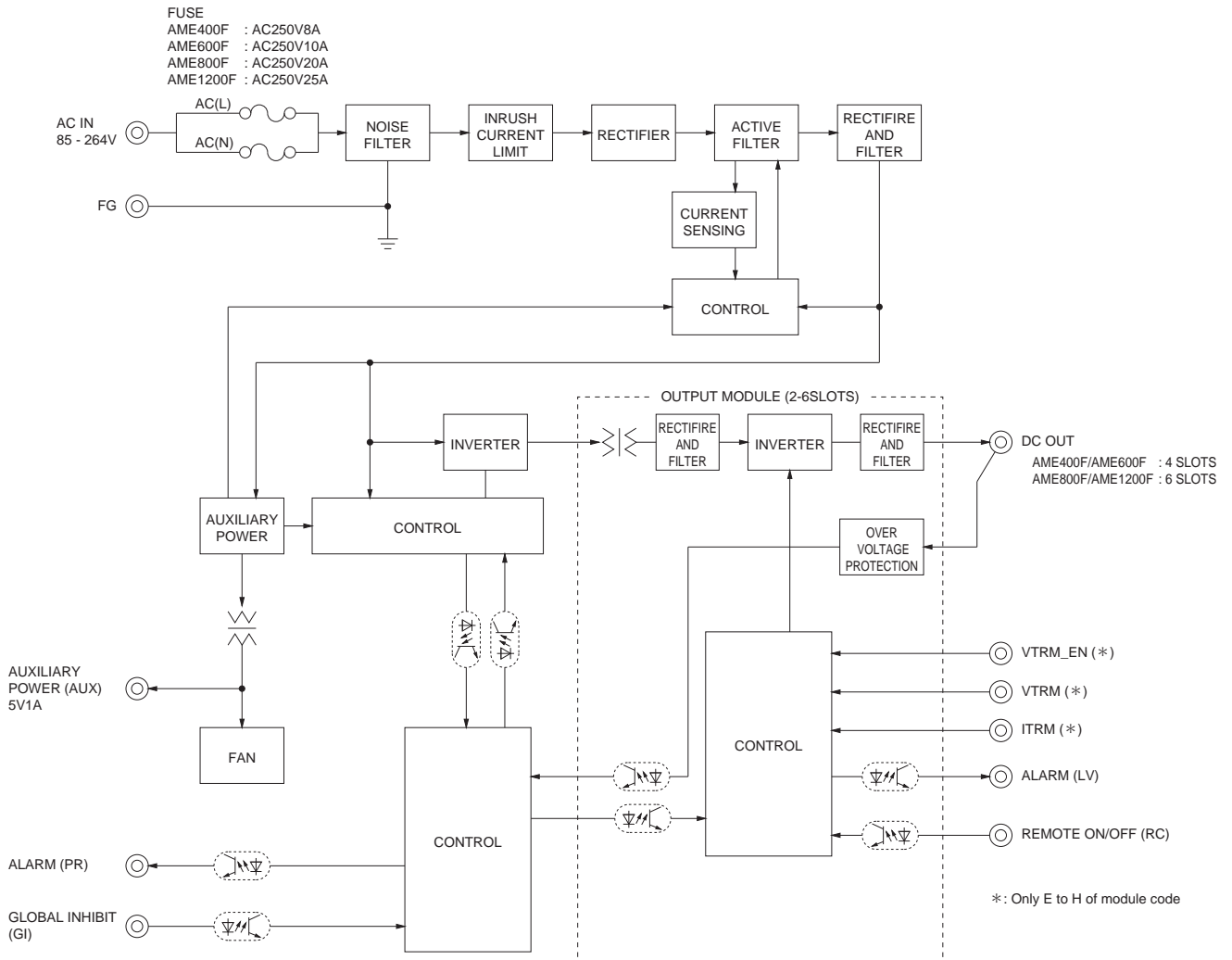


Output module specifications

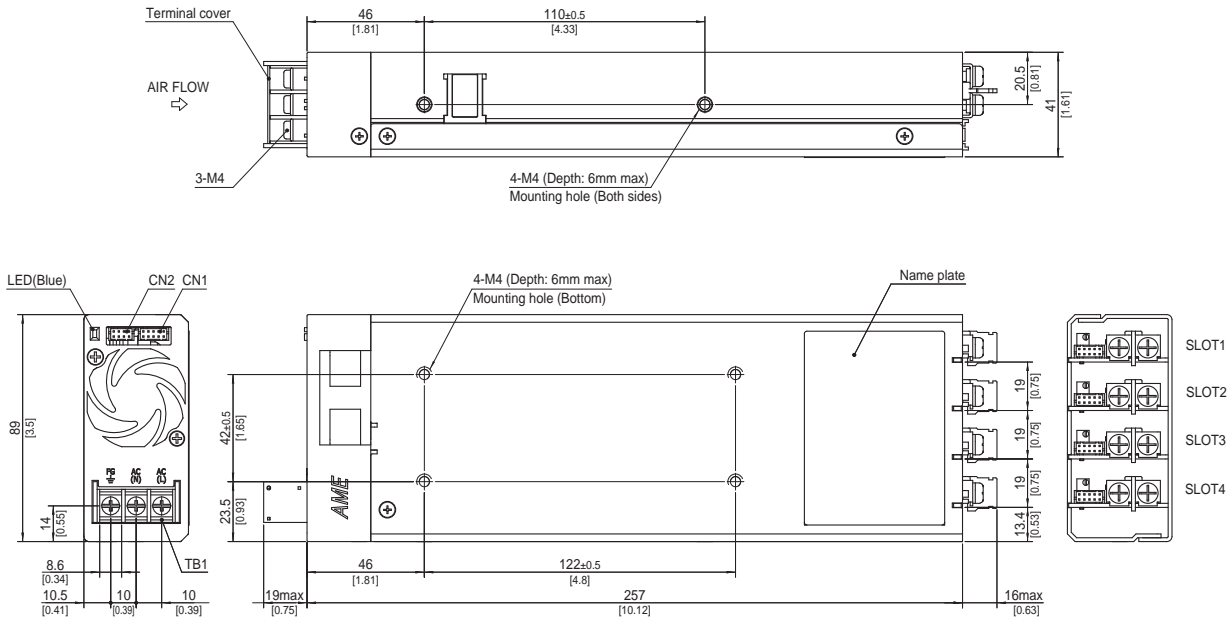
ITEM	CODE	120W suitable single output				240W suitable single output			
		A	B	C	D	E	F	G	H
Number of slots used		1	1	1	1	1	1	1	1
VOLTAGE [V]		+5	+12	+24	+48	+5	+12	+24	+48
MINIMUM CURRENT [A]		0	0	0	0	0	0	0	0
CURRENT [A]		12	8.5	5	2.5	32	20	10	5
PEAK CURRENT [A]	*3	-	-	-	-	-	-	15	7.5
LINE REGULATION [mV] max		20	48	96	192	20	48	96	192
LOAD REGULATION [mV] max		40	100	150	240	40	100	150	240
RIPPLE [mVp-p] max	0 to +50°C *1	150	150	250	400	150	150	250	400
	-20 to 0°C *1	200	200	300	450	200	200	300	450
RIPPLE NOISE [mVp-p] max	0 to +50°C *1	200	200	300	450	200	200	300	450
	-20 to 0°C *1	250	250	350	500	250	250	350	500
TEMPERATURE COEFFICIENT [mV] max	0 to +50°C	50	120	240	480	50	120	240	480
DRIFT [mV] max	*2	20	48	96	192	20	48	96	192
OUTPUT VOLTAGE SETTING [V]		5.00 to 5.15	12.00 to 12.48	24.00 to 24.96	48.00 to 49.92	5.00 to 5.15	12.00 to 12.48	24.00 to 24.96	48.00 to 49.92
OUTPUT VOLTAGE ADJUSTMENT RANGE [V]		4.0 to 6.0	9.6 to 14.4	19.2 to 28.8	38.4 to 57.6	3.0 to 6.0	7.2 to 14.4	14.4 to 28.8	28.8 to 57.6
OVERCURRENT PROTECTION [A]		Works over 105% min of rated current. Automatic recovery. Hiccup mode.				Works over 105% min of rated current or 101% min of peak current. Automatic recovery. Hiccup mode.			
OVERVOLTAGE PROTECTION [V]		6.5 to 7.8	15.0 to 18.6	30.0 to 37.2	60.0 to 74.4	Vo+1.0 to 1.5	Vo+1.2 to 2.4	Vo+2.4 to 4.8	Vo+4.8 to 7.2
FUNCTION		Remote ON/OFF (RC), Alarm (LV) DC_OK (LED: Blue)				Remote ON/OFF (RC), Alarm (LV), Remote sensing (+S/-S), Output voltage adjustment (VTRM), Constant output current adjustment (ITRM), DC_OK (LED: Blue)			

- \*1 Measured by 20MHz oscilloscope or Ripple-Noise meter (equivalent to KEISOKUGIKEN: RM104).
- \*2 Drift is the change in DC output for an eight hours period after a half-hour warm-up at 25°C.
- \*3 The peak current should be under the following conditions.  
Duration: 5s or less  
Duty: 35% or less  
Average current: Rated current or less

Block diagram



## AME400F/AME600F external view



※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]

※ Weight : 1.2kg max

※ PCB Material/thickness : FR-4 / 1.6mm [0.06]

※ Chassis material : Aluminum

※ Fan cover Material : PBT

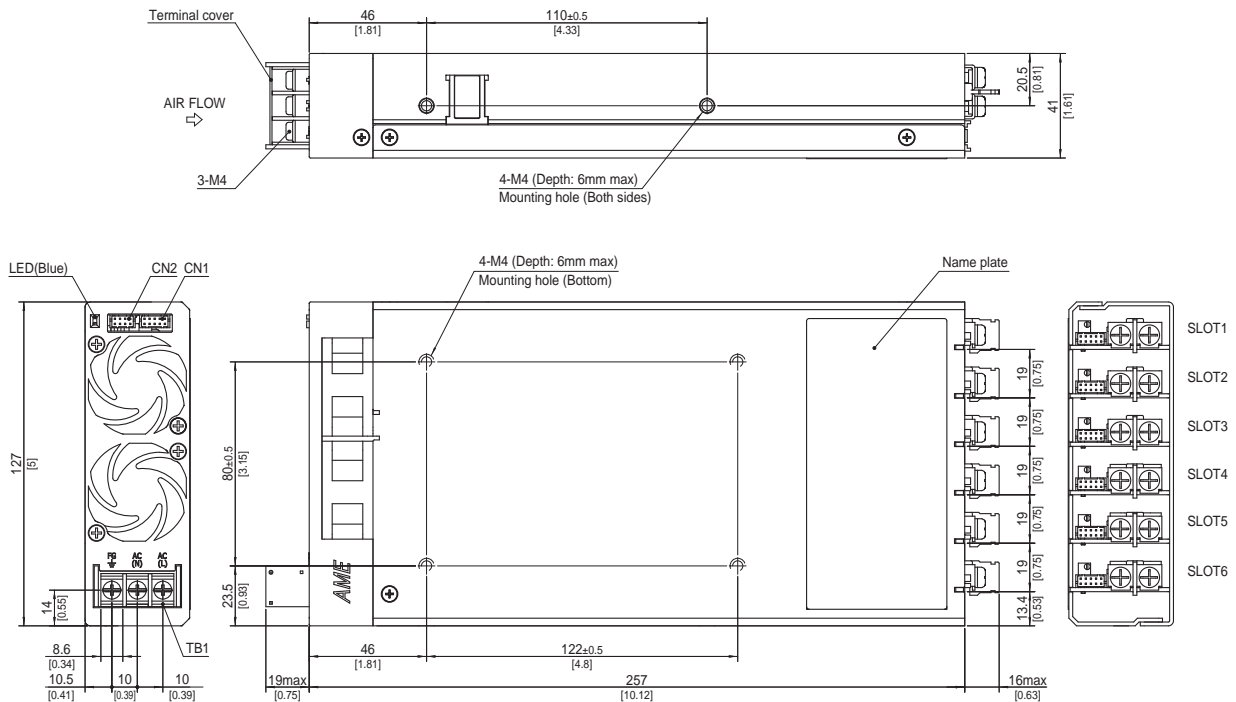
※ Dimensions in mm, [ ] = inches

※ Mounting torque M4 : 1.2N·m max

※ Input and output terminal screw tightening torque M4 : 1.6N·m max

※ Please connect safety ground to FG terminal on the unit.

## AME800F/AME1200F external view



※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]

※ Weight : 1.8kg max

※ PCB Material/thickness : FR-4 / 1.6mm [0.06]

※ Chassis material : Aluminum

※ Fan cover Material : PBT

※ Dimensions in mm, [ ] = inches

※ Mounting torque M4 : 1.2N·m max

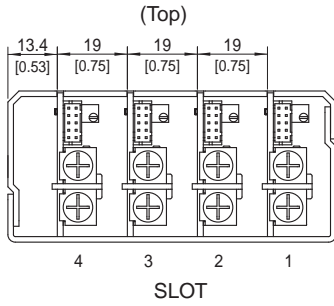
※ Input and output terminal screw tightening torque M4 : 1.6N·m max

※ Please connect safety ground to FG terminal on the unit.

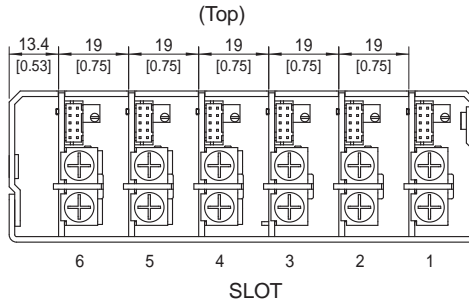
Output module and connector pin assign

1. Output side view

AME400F/AME600F Output side view

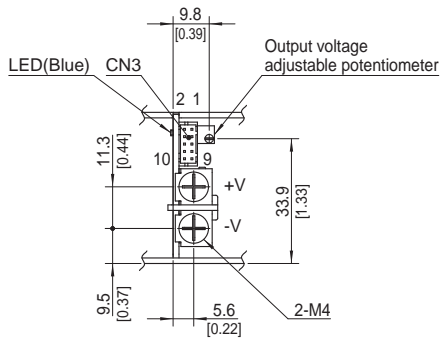


AME800F/AME1200F Output side view



※Tolerance :  $\pm 1$  [ $\pm 0.04$ ]  
 ※Dimensions in mm, [ ]=inches

2. Output module side view

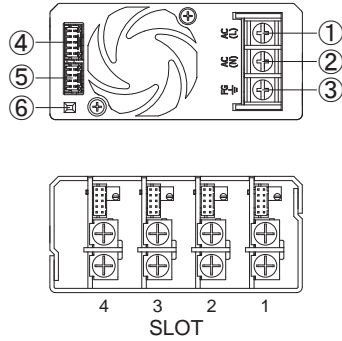


Module : A-H

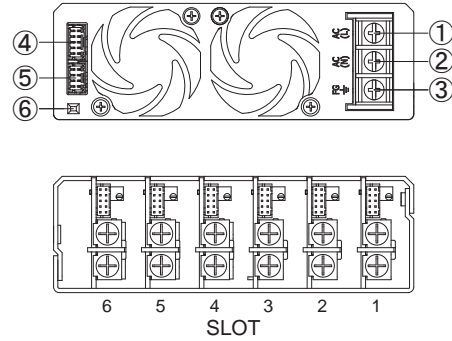
※Tolerance :  $\pm 1$  [ $\pm 0.04$ ]  
 ※Dimensions in mm, [ ]=inches

Terminal Blocks

● AME400F/AME600F

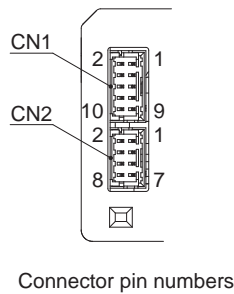


● AME800F/AME1200F



- ① AC (L) } Input Terminals 85 - 264VAC 1 φ 45 - 66Hz
- ② AC (N) } (M4)
- ③ Frame ground (M4)
- ④ CN1 } Connector for functions
- ⑤ CN2 }
- ⑥ LED (DC\_OK)

● Pin Configuration and Functions



Connector pin numbers

Pin configuration and function of CN1

Pin No.	Function		Ground level
1	AUX	: Auxiliary power	AUXG
2	AUXG	: Auxiliary power ground	AUXG
3	GI1	: Global inhibit	AUXG
4	AUXG	: Auxiliary power ground	AUXG
5	GI2	: Global inhibit	GIG
6	GIG	: Global inhibit ground	GIG
7	N.C.	: No connection	-
8	N.C.	: No connection	-
9	PR	: PR Alarm	PRG
10	PRG	: PR Alarm ground	PRG

Pin configuration and function of CN2

Pin No.	Function		Ground level
1	N.C.	: No connection	-
2	N.C.	: No connection	-
3	N.C.	: No connection	-
4	N.C.	: No connection	-
5	N.C.	: No connection	-
6	N.C.	: No connection	-
7	N.C.	: No connection	-
8	N.C.	: No connection	-

\* Do not connect anything to N.C. pins.

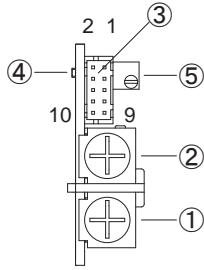
Matching connectors and terminals

Connector	Housing	Terminal	Mfr.
CN1	S10B-PHDSS	PHDR-10VS Reel : SPHD-002T-P0.5 Loose : BPHD-001T-P0.5 *1 BPHD-002T-P0.5 *1	J.S.T

\*1 The manufacturer can offer only ratchet hand tool.

Terminal Blocks

● Output module



Module : A-H

- ①-Output (M4)
- ②+Output (M4)
- ③CN3 (Connector for functions)
- ④LED (DC\_OK)
- ⑤Potentiometer to adjust output voltage

Pin configuration and function of CN3 (Applying module:A-D)

Pin No.	Function		Ground level
1	RC	: Remote ON/OFF	RCG
2	RCG	: Remote ON/OFF ground	RCG
3	LV	: LV Alarm	LVG
4	LVG	: LV Alarm ground	LVG
5	N.C.	: No connection	-
6	N.C.	: No connection	-
7	N.C.	: No connection	-
8	N.C.	: No connection	-
9	N.C.	: No connection	-
10	N.C.	: No connection	-

\* Do not connect anything to N.C. pins.

Pin configuration and function of CN3 (Applying module: E-H)

Pin No.	Function		Ground level
1	RC	: Remote ON/OFF	RCG
2	RCG	: Remote ON/OFF ground	RCG
3	LV	: LV Alarm	LVG
4	LVG	: LV Alarm ground	LVG
5	+S	: + Remote sensing	COM
6	-S	: - Remote sensing	COM
7	COM	: Common ground for signal	COM
8	ITRM	: Output current adjustment	COM
9	VTRM_EN	: Enable VTRM	COM
10	VTRM	: Output voltage adjustment	COM

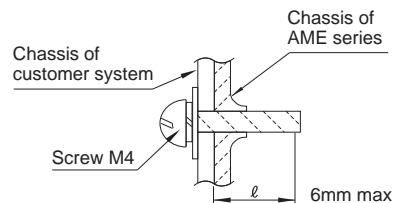
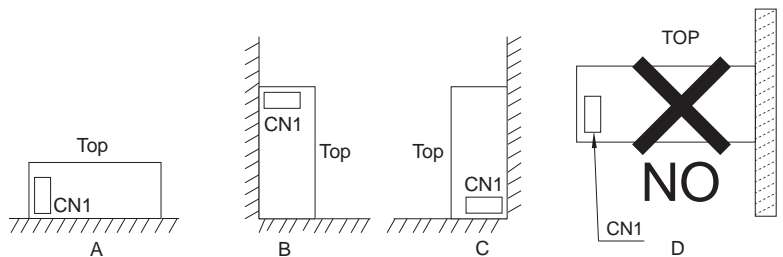
Matching connectors and terminals

Connector	Housing	Terminal	Mfr.
CN3	S10B-PHDSS	PHDR-10VS	Reel : SPHD-002T-P0.5 Loose : BPHD-001T-P0.5 *1 BPHD-002T-P0.5 *1

\*1 The manufacturer prepares only the ratchet hand.

Assembling and Installation Method

- The unit has cooling fans.  
Ensure that the inlet and outlet vents are not blocked.
- If the unit is used in dusty environment, please consider installing the air filter so that cooling efficiency will not get worse. In that case, please pay sufficient attention to airflow.
- Figures to the right are the recommended installation method when the unit is mounted by screws. When the unit is installed by any other method, please take into account of its weight and secure it.
- Avoid the D installation method in the figure to the right because it will cause stress on the mounting holes.
- Maximum length from the outside of the unit of the mounting screws is 6mm so that the isolation to internal components is ensured. (Refer to right figure).



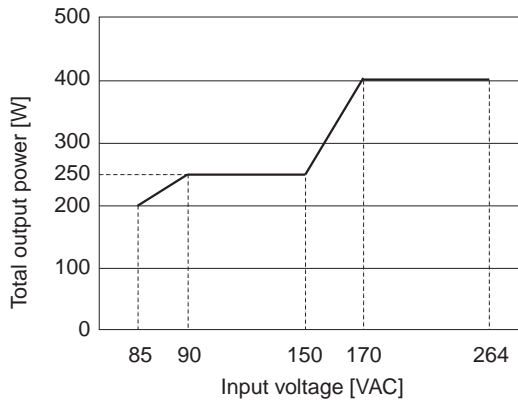
AME

**Derating**

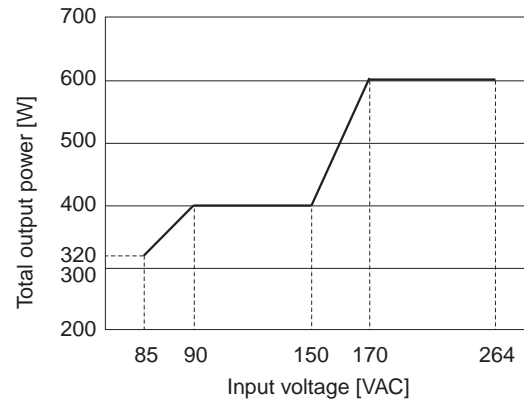
■ The AME series is comprised multiple combination output. Both the maximum output of each module and total maximum output have to be within the specs. Definition of load factor is shown in Instruction Manual 5.

**Derating curve for input voltage**

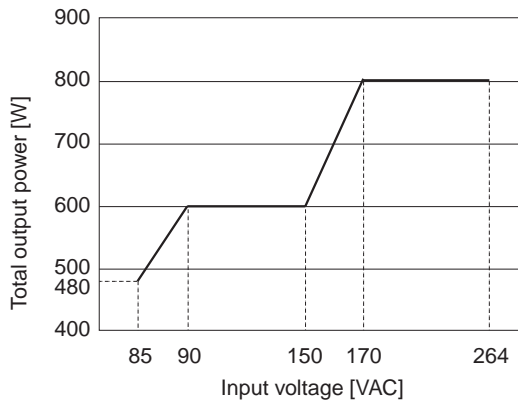
● **AME400F**



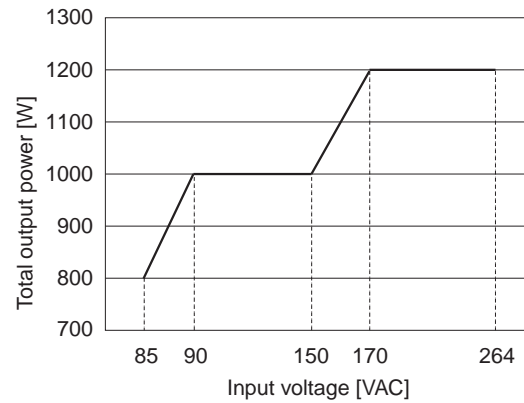
● **AME600F**



● **AME800F**



● **AME1200F**



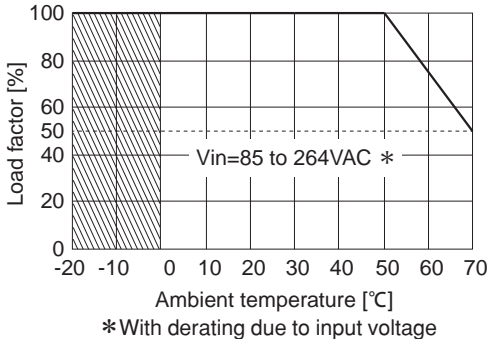
Derating

Derating curve for ambient temperature

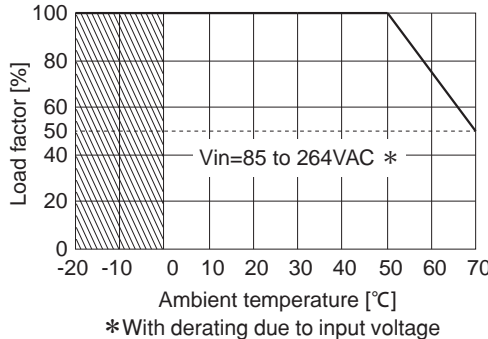
Derating curve for ambient temperature

The derating curve for the ambient temperature (inlet temperature for cooling) is shown in below. The specifications of the ripple and noise in the hatching area below are different.

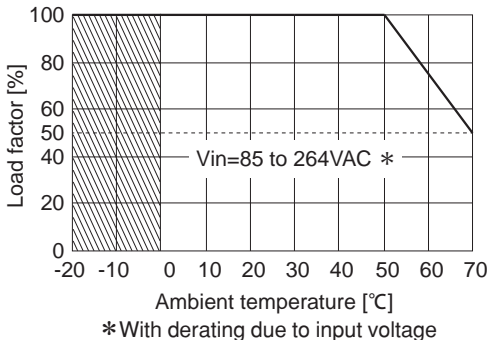
AME400F



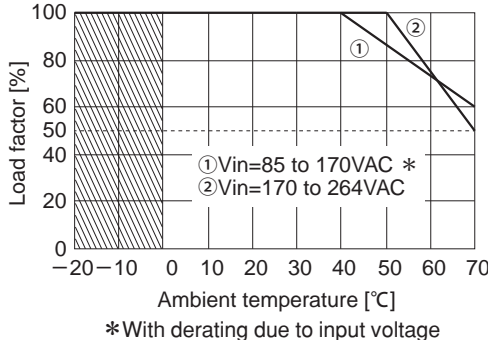
AME600F



AME800F



AME1200F



Instruction Manual

It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual

<https://en.cosel.co.jp/product/powersupply/AME/>

Before using our product

<https://en.cosel.co.jp/technical/caution/index.html>

AME



NOTICE



## Basic Characteristics Data

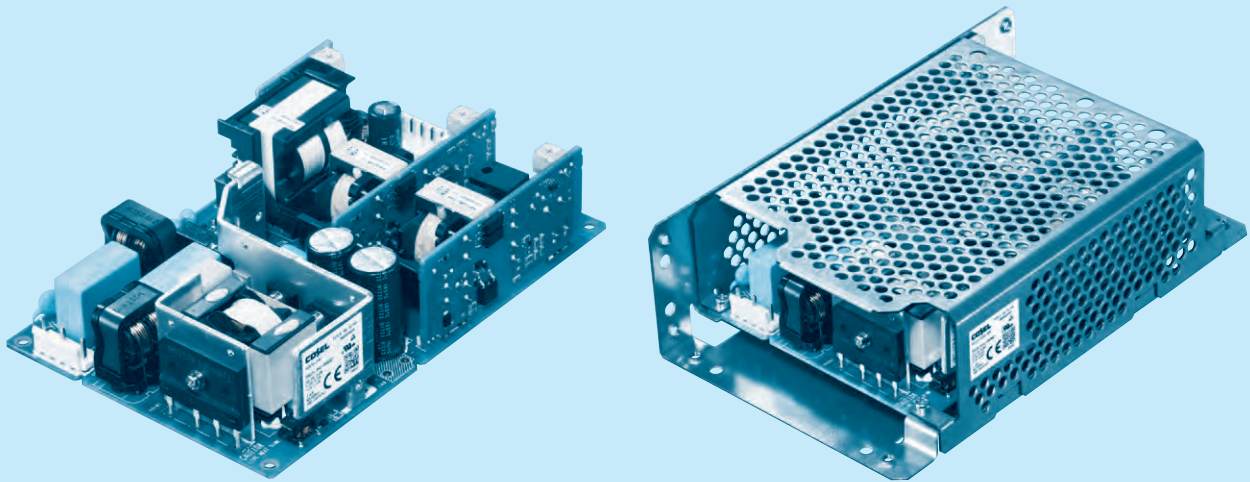
Model	Circuit method	Switching frequency [kHz]	Inrush current protection circuit	PCB/Pattern			Series/Parallel operation availability	
				Material	Single sided	Double sided	Series operation	Parallel operation
Input module of AME400F	Active filter	67	Relay	FR-4	-	Multilayer	N/A	N/A
	Half-bridge converter	133						
Input module of AME600F	Active filter	67	Relay	FR-4	-	Multilayer	N/A	N/A
	Half-bridge converter	133						
Input module of AME800F	Active filter	67	Relay	FR-4	-	Multilayer	N/A	N/A
	Half-bridge converter	133						
Input module of AME1200F	Active filter	67	Relay	FR-4	-	Multilayer	N/A	N/A
	Half-bridge converter	133						
Output module of A-D	Buck converter	266	-	FR-4	-	Multilayer	*1	N/A
Output module of E-H	Buck converter	266	-	FR-4	-	Multilayer	*1	*1

\*1 Series or parallel operation is available with identical output modules in a unit.





# RB-series



The RB series has Order Name which is used for the ordering aside from Model Name.

## Feature

Flexible modular system architecture provides various output configurations.  
Multiple outputs of driving system + control system are packaged together, ideal for robot controller.  
Meets OVC III  
The output of slot 3 and the other outputs have a reinforced insulation structure.

## Safety agency approvals

UL62368-1  
C-UL (CAN/CSA-C22.2 No.62368-1)  
EN62368-1  
EN62477-1 (OVC III)  
Complies with EN61558-2-16 (OVC III)

## 5-year warranty (Refer to Instruction Manual)

## CE marking

Low Voltage Directive  
RoHS Directive

## EMI

Complies with FCC-B, CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, VCCI-B

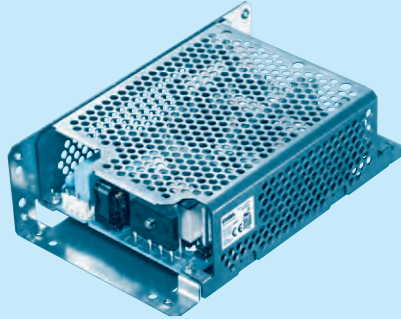
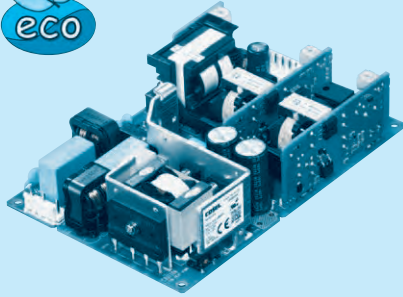
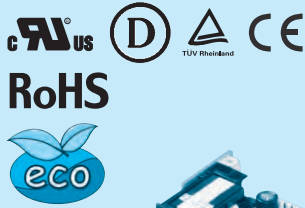
## EMS Compliance : EN61204-3, EN61000-6-2

EN61000-4-2  
EN61000-4-3  
EN61000-4-4  
EN61000-4-5  
EN61000-4-6  
EN61000-4-8  
EN61000-4-11

# RBC200F

RB C 200 F -    -

① ② ③ ④ ⑤ ⑥ ⑦ ⑧



Example recommended EMI/EMC filter  
NAC-04-472



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Multiple output
- ③ Abbreviation power of RB series  
200 : 207W
- ④ Universal input
- ⑤ Slot 3 module code
- ⑥ Slot 2 module code
- ⑦ Slot 1 module code
- ⑧ Optional \*6  
C : with Coating  
G : Low leakage current  
R : with Remote ON/OFF  
S : with Chassis  
SN : with Chassis & cover  
T : Vertical terminal block  
U1 : can attach an external capacitor unit  
I3 : with Extended-UART interface

Specification changes when options are added. Please refer to the instruction manual 8.1.

\* This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defects to the unit, so handle the unit with care.  
The RB series has Order Name which is used for the ordering aside from Model Name.

## SPECIFICATIONS

MODEL		RBC200F	
INPUT	VOLTAGE [VAC]	*1 AC85 - 264 1 φ	
	CURRENT [A]	ACIN 100V	2.4typ
		ACIN 230V	1.1typ
	FREQUENCY [Hz]	50/60 (45 - 66)	
	EFFICIENCY [%]	ACIN 100V	89.5typ
		ACIN 230V	91.0typ
	POWER FACTOR	ACIN 100V	0.99typ
		ACIN 230V	0.93typ
INRUSH CURRENT [A]	ACIN 100V	15typ	
	ACIN 230V	30typ	
LEAKAGE CURRENT [mA]	0.40 / 0.75max (ACIN 100/240V 60Hz, Io=100%, According to IEC62368-1)		
OUTPUT	NUMBER OF SLOT	3	
	TOTAL OUTPUT [W]	207	
	START-UP TIME [ms]	*2 350typ (ACIN 100V)	
	HOLD-UP TIME [ms]	*2 20typ (ACIN 100V)	
FUNCTION	REMOTE ON/OFF	Optional R (Refer to Instruction Manual)	
ISOLATION	INPUT - OUTPUT, RC	*4 *7 AC3,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)	
	INPUT - FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)	
	OUTPUT - FG	V3 - FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)
		V1, V2, RC - FG *7	AC 500V 1minute, Cutoff current = 100mA, DC500V 100MΩ min (At Room Temperature)
	OUTPUT - OUTPUT	V1, V2, RC - V3 *7	AC3,000V 1minute, Cutoff current = 10mA, DC500V 100MΩ min (At Room Temperature)
		V1 - V2	AC 500V 1minute, Cutoff current = 100mA, DC500V 100MΩ min (At Room Temperature)
ENVIRONMENT	V1, V2 - RC *7	AC 100V 1minute, Cutoff current = 100mA, DC500V 100MΩ min (At Room Temperature)	
	OPERATING TEMP., HUMID. AND ALTITUDE	*1 -20 to +70°C, 20 - 90%RH (Non condensing), 3,000m (10,000feet) max	
	STORAGE TEMP., HUMID. AND ALTITUDE	-30 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max	
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis	
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis	
	AGENCY APPROVALS	UL62368-1, C-UL (equivalent to CAN/CSA-C22.2 No.62368-1), EN62368-1, EN62477-1 (OVC III), Complies with EN61558-2-16 (OVC III)	
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR11-B, CISPR32-B, EN55011-B, EN55032-B	
OTHERS	HARMONIC ATTENUATOR	*5 Complies with IEC61000-3-2 (class A)	
	SIZE	101 X 38.3 X 152 mm [3.98 X 1.5 X 5.98 inches] (W X H X D), with terminal block 101 X 38.3 X 164 mm [3.98 X 1.5 X 6.46 inches] (W X H X D)	
	WEIGHT [g]	450max	
COOLING METHOD	*1 Convection / Forced air (Refer to "Derating")		

- \*1 Derating is required.
- \*2 The value at 200W output. The value depends on output modules and their combinations.
- \*3 More than 3 sec, to re-start.
- \*4 Values when V1, V2 and V3 are all shorted.
- \*5 Please contact us about another class.
- \*6 Specification is changed at option, please contact us for detail.
- \*7 This specifications of "ALM, INFO" are the same as RC.
- \* To meet the specifications. Do not operate over-loaded condition.
- \* Parallel operation is not possible.
- \* Sound noise may be generated by power supply in case of pulse load.

## Output module specifications

		Slot 1 140W suitable single output			
ITEM	CODE	V	W	Y	Z
Number of slots used		1	1	1	1
VOLTAGE [V]		+12	+15	+24	+48
MINIMUM CURRENT [A]		0	0	0	0
CURRENT [A]		10	8.5	6	3
MAX OUTPUT WATTAGE [W]		120	127.5	144	144
LINE REGULATION [mV] max		48	60	96	192
LOAD REGULATION [mV] max		100	120	150	240
RIPPLE [mVp-p] max		120	120	120	380
	0 to +50°C	120	120	120	380
	*1 -20 to 0°C	240	240	240	480
RIPPLE NOISE [mVp-p] max		150	150	150	480
	0 to +50°C	150	150	150	480
	*1 -20 to 0°C	300	300	300	580
TEMPERATURE		120	150	240	480
COEFFICIENT [mV] max		150	180	290	600
DRIFT [mV] max		*4 48	60	96	192
OUTPUT VOLTAGE SETTING [V]		12.00 to 12.48	15.00 to 15.60	24.00 to 24.96	48.00 to 49.92
OUTPUT VOLTAGE ADJUSTMENT RANGE [V]		11.40 to 13.20	14.25 to 16.50	22.80 to 26.40	45.60 to 52.80
OVERCURRENT PROTECTION [A]	*6	Works over 105% of rating and recovers automatically			
OVERVOLTAGE PROTECTION [V]		14.40 to 17.40	18.00 to 21.75	28.80 to 34.80	57.60 to 67.20

		Slot 2, Slot 3 15W suitable single output			Slot 2 15W suitable dual output	
ITEM	CODE	B	C	D	E	F
Number of slots used		1	1	1	1	1
VOLTAGE [V]		+5	+12	+24	±12	±15
MINIMUM CURRENT [A]		0	0	0	0	0
CURRENT [A]		3	1.3	0.65	0.6	0.5
MAX OUTPUT WATTAGE [W]		15	15.6	15.6	14.4	15
LINE REGULATION [mV] max		20	48	96	48	60
LOAD REGULATION [mV] max	*5	40	100	150	600	650
RIPPLE [mVp-p] max		80	120	120	120	120
	0 to +50°C	80	120	120	120	120
	*1 -20 to 0°C	140	160	160	160	160
RIPPLE NOISE [mVp-p] max		120	150	150	150	150
	0 to +50°C	120	150	150	150	150
	*1 -20 to 0°C	160	180	180	180	180
TEMPERATURE		50	120	240	120	150
COEFFICIENT [mV] max		60	150	290	150	180
DRIFT [mV] max	*4	20	48	96	48	60
OUTPUT VOLTAGE SETTING [V]		5.00 to 5.20	12.00 to 12.48	24.00 to 24.96	12.00 to 12.48	15.00 to 15.60
OUTPUT VOLTAGE ADJUSTMENT RANGE [V]		4.50 to 5.50	10.80 to 13.20	21.60 to 26.40	10.80 to 13.20	13.50 to 16.50
OVERCURRENT PROTECTION [A]	*6	Works over 105% of rating and recovers automatically				
OVERVOLTAGE PROTECTION [V]		5.75 to 8.00	13.80 to 19.20	28.80 to 38.40	13.80 to 19.20	17.25 to 24.00

		Slot 2, Slot 3 30W suitable single output						Slot 2 30W suitable dual output	
ITEM	CODE	G	H	J	K	L	M	P	Q
Number of slots used		1	1	1	1	1	1	1	1
VOLTAGE [V]		+3.3	+5	+12	+16.5	+24	+48	±12	±15
MINIMUM CURRENT [A]		0	0	0	0	0	0	0	0
CURRENT [A]		5	5	2.5	1.9	1.3	0.65	0.7	0.7
MAX OUTPUT WATTAGE [W]		16.5	25	30	31.4	31.2	31.2	16.8	21
LINE REGULATION [mV] max		20	20	48	66	96	192	48	60
LOAD REGULATION [mV] max	*5	40	40	100	120	150	240	600	650
RIPPLE [mVp-p] max		80	80	120	120	120	150	120	120
	0 to +50°C	80	80	120	120	120	150	120	120
	*1 *2 -20 to 0°C	140	140	160	160	160	250	160	160
RIPPLE NOISE [mVp-p] max		120	120	150	150	150	250	150	150
	0 to +50°C	120	120	150	150	150	250	150	150
	*1 *3 -20 to 0°C	160	160	180	180	180	350	180	180
TEMPERATURE		50	50	120	165	240	480	120	150
COEFFICIENT [mV] max		60	60	150	200	290	600	150	180
DRIFT [mV] max	*4	20	20	48	66	96	192	48	60
OUTPUT VOLTAGE SETTING [V]		3.30 to 3.40	5.00 to 5.20	12.00 to 12.48	16.50 to 17.16	24.00 to 24.96	48.00 to 49.92	12.00 to 12.48	15.00 to 15.60
OUTPUT VOLTAGE ADJUSTMENT RANGE [V]		2.97 to 3.63	4.50 to 5.50	10.80 to 13.20	14.85 to 18.15	21.60 to 26.40	43.20 to 52.80	10.80 to 13.20	13.50 to 16.50
OVERCURRENT PROTECTION [A]	*6	Works over 105% of rating and recovers automatically							
OVERVOLTAGE PROTECTION [V]		4.00 to 5.25	5.75 to 7.00	13.80 to 16.80	18.90 to 23.10	28.80 to 34.80	57.60 to 67.20	14.40 to 18.00	18.00 to 22.50

\*1 This is the value that measured on measuring board with capacitor of 22μF at 150mm from output terminal.

Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).

\*2 At the G module, ripple is 120 mV(Ta=0 to 50°C) 160 mV(Ta=-20 to 0°C) at 5% or less load because of reduction of standby power.

\*3 At the G module, ripple noise is 160mV(Ta=0 to 50°C) 200mV(Ta=-20 to 0°C) at 5% or less load because of reduction of standby power.

\*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*5 Figures for 0 to rated current. The current not measured side is rated current. (module E, F, P, Q).

\*6 The output is shut down when the overcurrent state continues for 5 minutes.

\* To meet the specifications. Do not operate over-loaded condition.

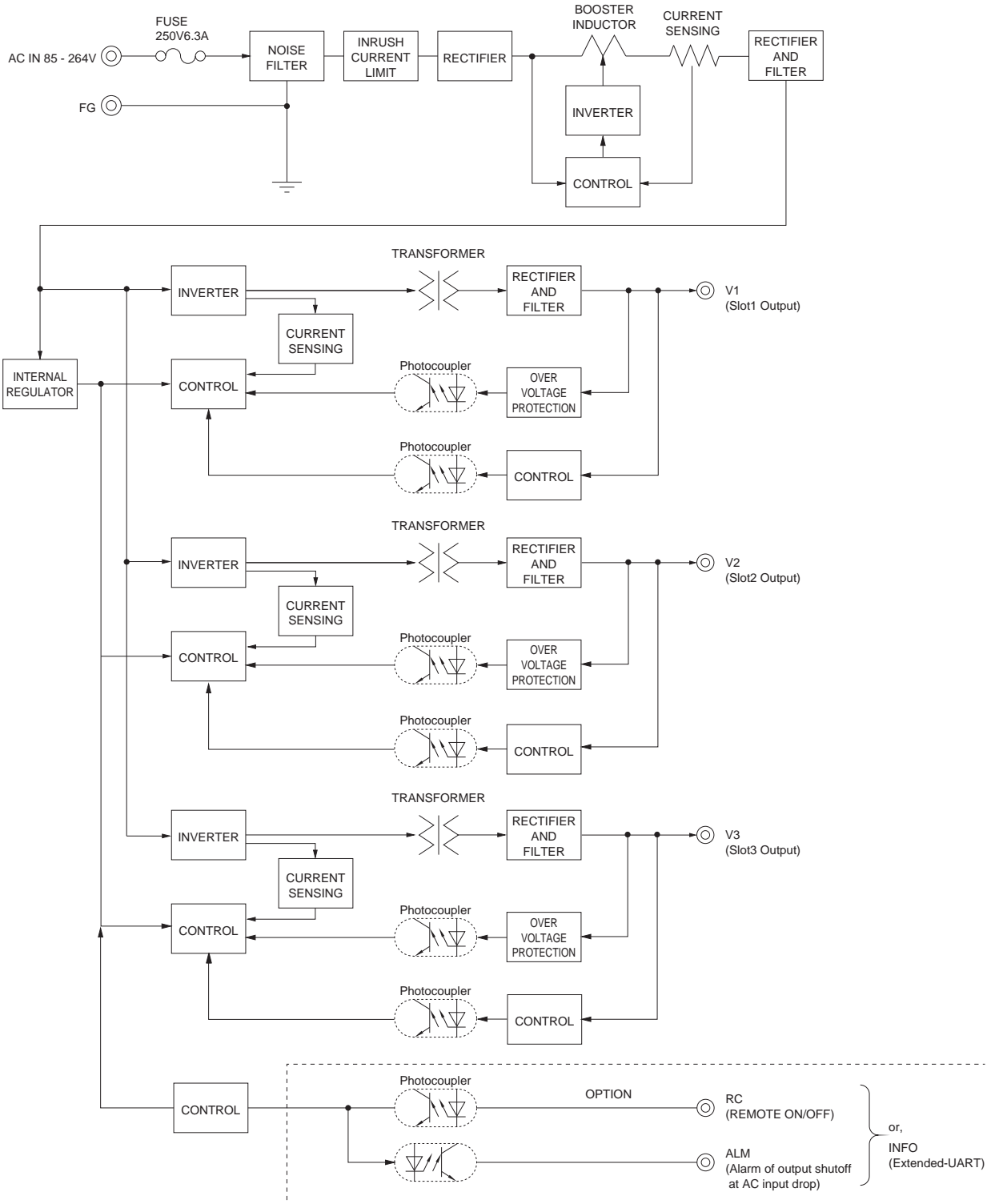
\* Parallel operation is not possible.

\* Sound noise may be generated by power supply in case of pulse load.

Features

- Flexible modular system architecture provides various output configurations
- Multiple outputs of driving system + control system are packaged together, ideal for robot controller
- Meets OVC III (EN62477-1 approved, EN61558-2-16 compliant)
- The output of slot 3 and the other outputs have a reinforced insulation structure
- Remote control function (optional)

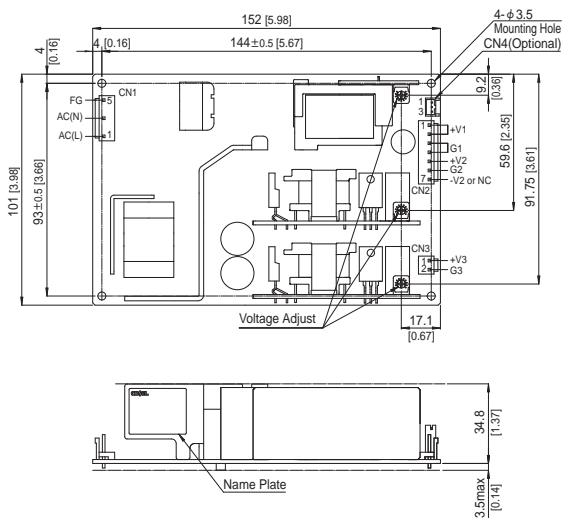
Block diagram



RB

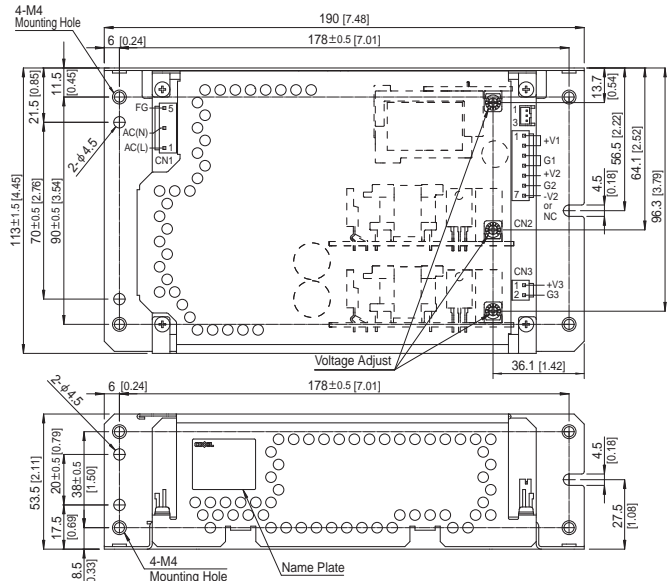
## External view

### Standard type



- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 450g max
- ※ There are a total of four attachment holes.
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque : 0.6N·m max
- ※ PCB Material / thickness : FR-4 / 1.7mm [0.07]

### Chassis and cover type



- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 820g max
- ※ There are a total of four attachment holes.
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque (Mounting hole of chassis) : 1.5N·m max
- ※ PCB Material / thickness : FR-4 / 1.7mm [0.07]

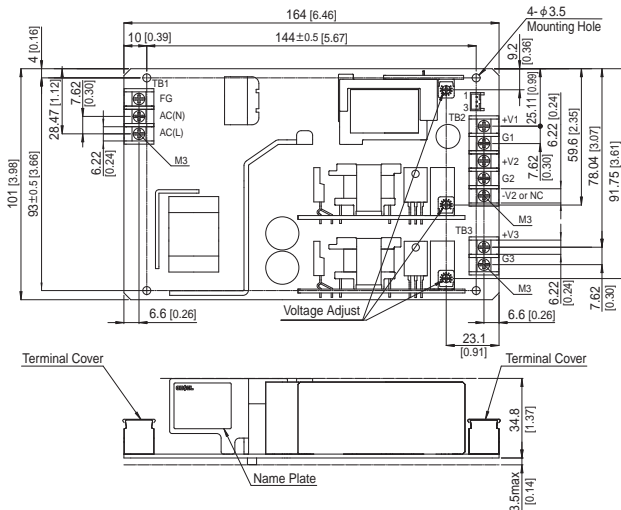
I/O Connector	Mating connector	Terminal
CN1	B3P5-VH	VHR-5N
		Chain : SVH-21T-P1.1
		Loose : BVH-21T-P1.1
CN2	B7P-VH	VHR-7N
		Chain : SVH-21T-P1.1
		Loose : BVH-21T-P1.1
CN3	B2P-VH	VHR-2N
		Chain : SVH-21T-P1.1
		Loose : BVH-21T-P1.1
CN4 Optional	BH3B-PH	PHR-3
		Chain : SPH-002T-P0.5S
		Loose : BPH-002T-P0.5S

(Mfr : J.S.T.)

CN1		CN2		CN3		CN4 (Optional)	
Pin No.	Input	Pin No.	Output	Pin No.	Output	Pin No.	Function
1	AC (L)	1	+V1	1	+V3	1	※1
2	-	2	+V1	2	G3	2	
3	AC (N)	3	G1			3	
4	-	4	G1				
5	FG	5	+V2				
		6	G2				
		7	NC or -V2				

- ※1 The function of CN4 varies depending on optional. Please refer to the instruction manual.
- ※ Pin no.2 and 4 is NC at CN1.
- ※ Maximum current per contact at CN2 is 5A.
- ※ Pin no.7 of CN2 is NC when slot 2 module is single output.

### Vertical terminal block type

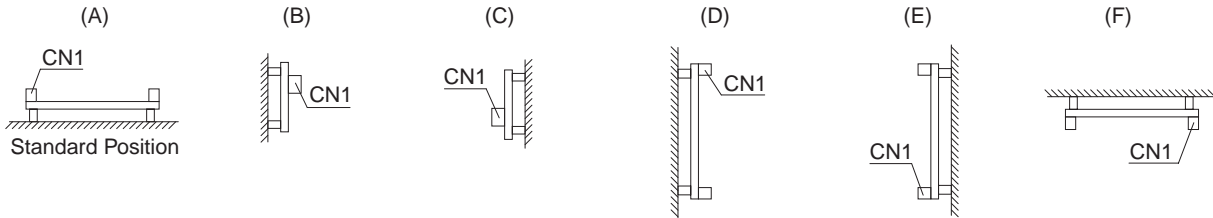
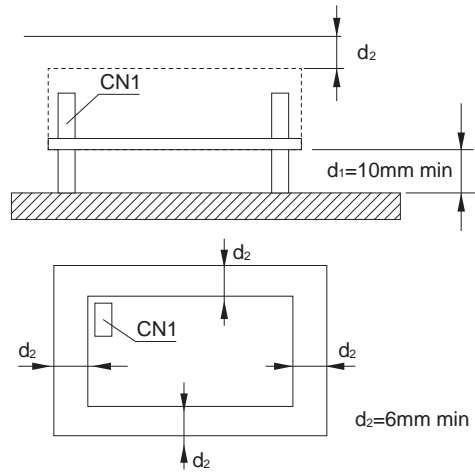


- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 470g max
- ※ There are a total of four attachment holes.
- ※ Dimensions in mm, [ ]=inches
- ※ Screw tightening torque : 0.8N·m max
- ※ Mounting torque : 0.6N·m max
- ※ PCB Material / thickness : FR-4 / 1.7mm [0.07]

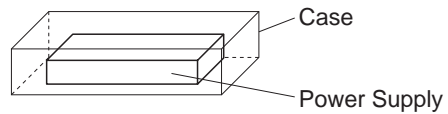
Assembling and Installation Method

Mounting method

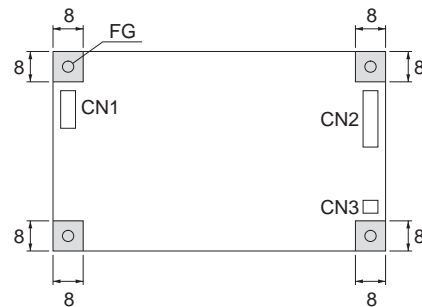
- This power supply is manufactured by SMD technology. Do not touch any SMD components on the unit. Be especially careful when handling.
- If using a metal chassis, keep proper insulation between the component and metal chassis, use the spacer of 10mm or more between bottom of power supply and metal chassis. If  $d_1$  and/or  $d_2$  are less than the value mentioned in right figure, insert an insulating sheet with reinforced insulation between the power supply unit and metal chassis. The following distance is not satisfactory for cooling condition. Please refer to "Derating" and Instruction Manual 4 for cooling method.
- Installation method shown below is possible.



- There is a possibility that it is not possible to cool enough when the power supply is used by the sealing up space as showing in right figure. Please use it after confirming the temperature of points 1 through 5 of Instruction Manual 4.



- The mounting screw should be M3. The hatched area shows the allowance of metal parts for mounting.

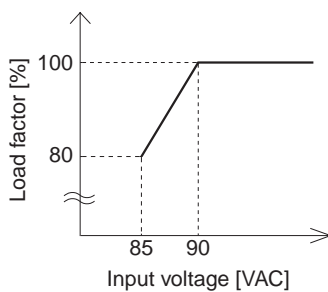


RB

Derating

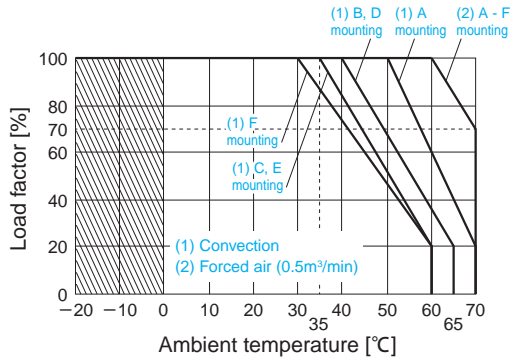
- Refer to the Instruction Manual 5 for the definition of load factor.

Input Voltage Derating Curve



Derating

Ambient Temperature Derating Curve (Reference value)



\*Specifications for ripple and ripple noise changes in the shaded area.

■ Please make sure the maximum component temperature rise given in Instruction Manual 4 is not exceeded.

Instruction Manual

◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/RB/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>



Basic Characteristics Data

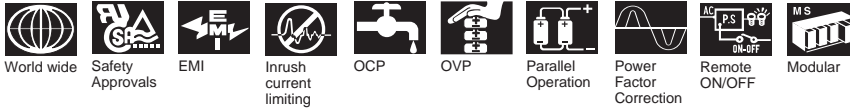
Model	Circuit method	Switching frequency [kHz]	Input current [A]	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
					Material	Single sided	Double sided	Series operation	Parallel operation
Input module of RBC200F	Active filter	40 - 220	2.4 *1	Relay	FR-4	-	Yes	No	No
Output module of V, W, Y, Z	LLC resonant converter	90 - 180	-	-	FR-4	-	Yes	No	No
Output module of B, C, D, G, H, J, K, L	Flyback converter	60 - 120	-	-	FR-4	-	Yes	Yes *2	No
Output module of E, F, M, P, Q	Flyback converter	60 - 120	-	-	FR-4	-	Yes	No	No

\*1 The value at ACIN 100V and 200W output.

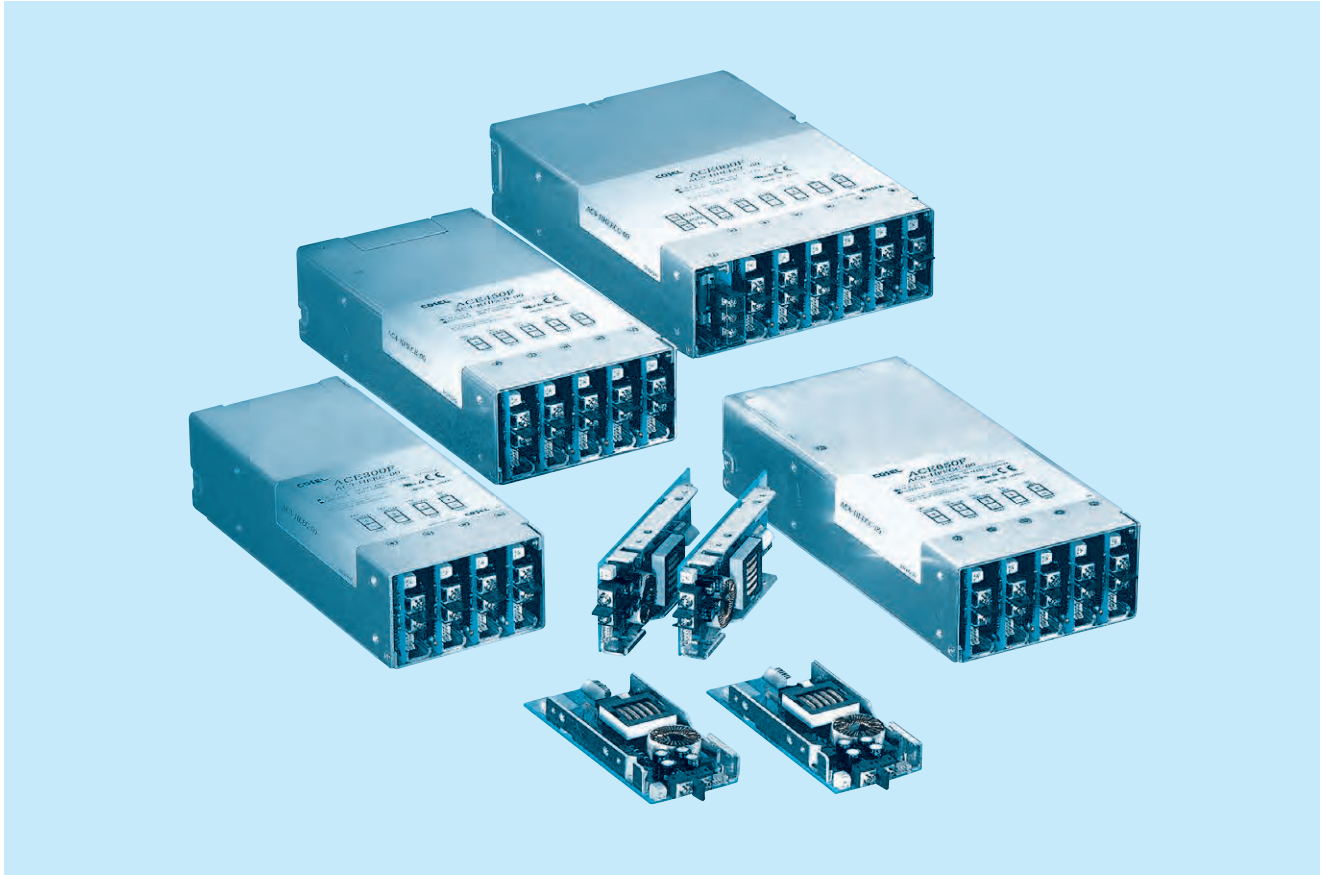
\*2 Series operation is possible only if Slot 2 and Slot 3 are the same module. (Refer to Instruction Manual 3.1)







# ACE-series



## Feature

Flexible modular system architecture provides various output configuration  
 Harmonic attenuator (Complies with IEC61000-3-2)  
 Universal input (AC85 - 264V)  
 Remote ON/OFF control, alarm

## Safety agency approvals

UL60950-1, C-UL (CSA60950-1), EN60950-1, EN50178  
 Complies with DEN-AN  
 UL60601-1, C-UL (CSA601.1), EN60601-1 approvals (optional)

## EMI

Complies with FCC-B, CISPR22-B,  
 EN55022-B, VCCI-B

## 3-year warranty

## CE marking

Low Voltage Directive  
 RoHS Directive

## EMS Compliance : EN61204-3, EN61000-6-2

EN61000-4-2  
 EN61000-4-3  
 EN61000-4-4  
 EN61000-4-5  
 EN61000-4-6  
 EN61000-4-8  
 EN61000-4-11

IEC60601-1-2 (2014), EN60601-1-2 (2015) (optional)

ACE

# ACE series

AC  -       -   -

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

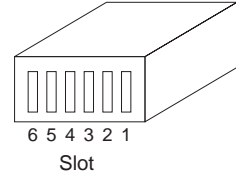


Example recommended EMI/EMC filter  
 ACE300F NAC-06-472  
 ACE450F NAC-10-472  
 ACE650F NAC-20-472  
 ACE900F NAC-20-472



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Abbreviation type name of ACE series
- ② Abbreviation power of ACE series  
 3 : ACE300F  
 4 : ACE450F  
 6 : ACE650F  
 9 : ACE900F
- ③ Slot 6 Output module
- ④ Slot 5 Output module
- ⑤ Slot 4 Output module
- ⑥ Slot 3 Output module
- ⑦ Slot 2 Output module
- ⑧ Slot 1 Output module
- ⑨ Parallel code
- ⑩ Option (series code) \*8  
 Refer to instruction manual 6.1 Safety : UL60601-1, EN60601-1 Refer to instruction manual 8, for details.



\* Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

\* The number of slot is different depending on the model.  
 \* Empty slot is code:O

## SPECIFICATIONS

	MODEL	ACE300F	ACE450F	ACE650F	ACE900F	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ / DC120 - 350 (option=-U AC70 or DC100 - refer to instruction manual 6)				
	FREQUENCY[Hz]	47 - 63				
	CURRENT[A]	AC100V *1	3.7typ	5.7typ	8.0typ	11typ
		AC200V *1	2.0typ	3.1typ	4.2typ	5.7typ
	POWER FACTOR	AC100V *1	0.99typ			
		AC200V *1	0.95typ			
	INRUSH CURRENT [A]	AC100V *2	15 / 30typ *7			15 / 50typ *7
		AC200V *2	30 / 30typ *7			30 / 50typ *7
	EFFICIENCY[%]	AC100V *1	74typ	75typ	77typ	77typ
		AC200V *1	78typ	78typ	80typ	80typ
LEAKAGE CURRENT[mA]	AC100V *3	0.5max				
	AC230V *3	0.95max				
OUTPUT	NUMBER OF SLOT	4	5	5	6	
	TOTAL OUTPUT[W]	AC90 - 150V *4	250	400	600	800 (Peak 1k)
		AC170 - 264V *4	300	450	650	900 (Peak 1k)
	START-UP TIME[ms]	500max (ACIN100V, Io=100%)				
	HOLD-UP TIME[ms] *1	20typ (ACIN100V, Io=100%)				
FUNCTION	AUXILIARY POWER (AUX)	12V 0.1A (Only for Remote ON/OFF) (option=-J 5V0.1A)				
	ALARM (PR)	FAN alarm, LINE alarm				
ISOLATION	INPUT-OUTPUT, RC, AUX	AC3,000V 1minute, Cutoff current=10mA, DC500V 50MΩ min (At Room Temperature)				
	INPUT-FG	AC2,000V 1minute, Cutoff current=10mA, DC500V 50MΩ min (At Room Temperature)				
	OUTPUT, RC, AUX(PR)-FG *5	AC500V 1minute, Cutoff current=100mA, DC500V 50MΩ min (At Room Temperature)				
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *4	-20 to +70°C, 20 - 90%RH (Non condensing) 3,000m (10,000feet) max				
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max				
	VIBRATION	19.6m/s <sup>2</sup> (2G) , 10 - 55Hz, 3minutes period, 60minutes each along X, Y and Z axis				
	IMPACT	196.1m/s <sup>2</sup> (20G) , 11ms, once each X, Y and Z axis				
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, EN62368-1, EN50178, Complies with DEN-AN (At only AC input) UL60601-1, EN60601-1 (At only AC input), Complies with IEC60601-1-2 4th Ed. (Refer to instruction manual 8)				
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B and EN55022-B				
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 *9				
OTHERS	CASE SIZE *6	103X63.5X254mm (W X H X D) [4.06 X 2.5 X 10 inches]	127X63.5X254mm (W X H X D) [5 X 2.5 X 10 inches]	127X63.5X279mm (W X H X D) [5 X 2.5 X 10.98 inches]	177.5X63.5X254mm (W X H X D) [6.99 X 2.5 X 10 inches]	
	WEIGHT[kg]	1.7max	2.2max	2.4max	3.0max	
	COOLING METHOD	Forced cooling (built-in)				

\*1 In case of modular power supply, the value changes by composing and load factor of installed output modules. The values in specifications mean each the model are composed of voluntary modules that are 5V (code : C), 12V (code : E), 24V (code : H) and the output power is total

output wattage under the prescribed conditions.  
 \*2 More than 3sec. to restart. Io=100%  
 \*3 Complies with IEC62368-1 and DEN-AN 60Hz and 100% load.  
 \*4 Refer to "Derating" in detail.  
 \*5 Each output module, RC and AUX are isolated.

\*6 Case size contains neither the terminal blocks, screw nor.  
 \*7 Primary inrush current / Secondary inrush current.  
 \*8 Please contact us about safety approvals for the model with option.  
 \*9 Please contact us about class C.  
 \* A sound may occur from power supply at pulse loading.

Output module specifications

ITEM	CODE	150W suitable single output									50W suitable single output					75W dual output						
		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	Y*7	W*7	Z*7	9*7		
Number of slots used		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
VOLTAGE[V]		+2	+3.3	+5	+7.5	+12	+15	+18	+24	+34	+48	+3.3	+5	+12	+15	+24	±5	±12	±15	±24		
MINIMUM CURRENT[A]		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
CURRENT1[A]		26	26	26	18	13	10	8.5	6.5	4.5	3.2	10	10	5	4	2.5	3	3.2	2.5	1.6		
CURRENT2[A]		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	4.2	3.5	2.5		
PEAK CURRENT[A]	*1	—	—	—	—	14	12	10	8	5.5	4	—	—	—	—	—	—	5	4	—		
LINE REGULATION[mV]max		20	20	20	36	48	60	72	96	120	192	20	20	48	60	96	20	48	60	60		
LOAD REGULATION1[mV]max*5		40	40	40	100	100	120	120	150	180	300	40	40	100	120	150	250	600	600	600		
LOAD REGULATION2[mV]max*6		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	500	750	750	750		
RIPPLE [mVp-p]max	0 to +50°C *2 -20 to 0°C *2	80 140	80 140	80 140	120 160	120 160	120 160	120 160	120 160	120 160	150 300	80 140	80 140	120 160	120 160	120 160	80 140	80 160	120 160	120 160		
RIPPLE NOISE [mVp-p]max	0 to +50°C *2 -20 to 0°C *2	120 160	120 160	120 160	150 180	150 180	150 180	150 180	150 180	150 180	350 400	120 160	120 160	150 180	150 180	150 180	120 160	150 180	150 180	150 180		
TEMPERATURE COEFFICIENT[mV]max	0 to +50°C	50	50	50	90	120	150	180	240	300	480	50	50	120	150	240	50	120	150	150		
DRIFT[mV]max	*3	20	20	20	36	48	60	72	96	120	192	20	20	48	60	96	20	48	60	60		
OUTPUT VOLTAGE SETTING[V]		2.00-2.20	3.25-3.45	4.99-5.30	7.20-7.80	11.5-12.5	14.4-15.6	17.3-18.7	23.0-25.0	33.0-35.0	46.0-50.0	3.25-3.45	4.99-5.30	11.5-12.5	14.4-15.6	23.0-25.0	4.99-5.30	11.5-12.5	14.4-15.6	23.0-25.0		
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	*4	1.60-2.60	2.60-3.60	4.00-5.50	6.00-8.20	9.00-13.2	13.2-16.5	16.5-19.2	19.2-26.4	27.2-37.4	38.4-52.8	2.60-3.60	4.00-5.50	9.00-13.2	13.2-16.5	19.2-26.4	4.99-6.00	9.60-13.2	13.2-16.5	19.2-26.4		
OVERCURRENT PROTECTION[A]		Works over 105%min of rated current or 101%min of peak current. Automatic recovery.																				
OVERVOLTAGE PROTECTION[V]		3.00-4.80	4.00-5.25	Works at 115 - 140% of rated voltage									4.00-5.25	Works at 115 - 140% of rated voltage					6.90-8.40	13.8-16.8	17.25-21.0	27.6-33.6
FUNCTION		Remotesensing, remote ON/OFF, alarm (LV)											Remote ON/OFF, alarm (LV)									

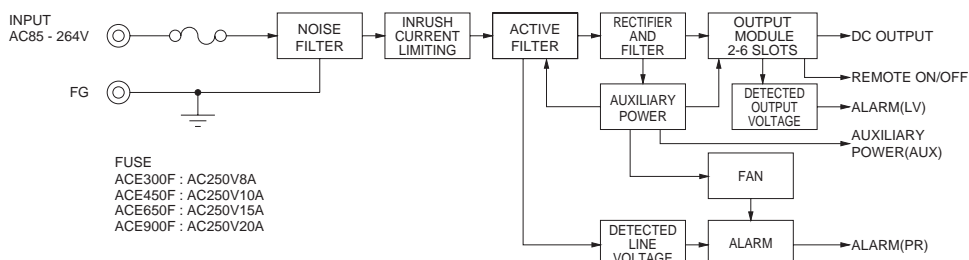
ITEM	CODE	300W suitable single output									100W insulation dual output						150W dual output		★		
		2A	2B	2C	2D	2E	2F	2G	2H	2J	2K	S*8	T*8	U*8	Q*7	V*7	I				
Number of slots used		2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1				
VOLTAGE[V]		+2	+3.3	+5	+7.5	+12	+15	+18	+24	+34	V1:+5 V2:+5	V1:+5 V2:+12	V1:+5 V2:+24	±12	±15						
MINIMUM CURRENT[A]		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
CURRENT1[A]		60	60	60	40	25	20	17	14	10	7	10	5	10	4.2	10	2.1	6.4	5.5		
CURRENT2[A]		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	7			
PEAK CURRENT[A]	*1	—	—	—	—	34	27	23	20	14	10	—	—	—	—	—	10	8			
LINE REGULATION[mV]max		20	20	20	36	48	60	72	96	120	192	20	20	20	48	20	96	48	60		
LOAD REGULATION1[mV]max*5		40	40	40	100	100	120	120	150	180	300	40	40	40	100	40	150	600	600		
LOAD REGULATION2[mV]max*6		—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	750	750			
RIPPLE [mVp-p]max	0 to +50°C *2 -20 to 0°C *2	80 140	80 140	80 140	120 160	120 160	120 160	120 160	120 160	120 160	150 300	80 140	80 140	80 140	120 160	120 160	80 140	120 160	200 200		
RIPPLE NOISE [mVp-p]max	0 to +50°C *2 -20 to 0°C *2	120 160	120 160	120 160	150 180	150 180	150 180	150 180	150 180	150 180	350 400	120 160	120 160	120 160	150 180	120 160	150 180	230 350	230		
TEMPERATURE COEFFICIENT[mV]max	0 to +50°C	50	50	50	90	120	150	180	240	300	480	50	50	120	50	240	120	150			
DRIFT[mV]max	*3	20	20	20	36	48	60	72	96	120	192	20	20	20	48	20	96	48	60		
OUTPUT VOLTAGE SETTING[V]		2.00-2.20	3.25-3.45	4.99-5.30	7.20-7.80	11.5-12.5	14.4-15.6	17.3-18.7	23.0-25.0	33.0-35.0	46.0-50.0	4.99-5.30	4.99-5.30	4.99-5.30	11.5-12.5	4.99-5.30	11.5-12.5	14.4-15.6			
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		1.60-2.60	2.60-3.60	4.00-5.50	6.00-8.20	9.00-13.2	13.2-16.5	16.5-19.2	19.2-26.4	27.2-37.4	38.4-52.8	4.99-5.50	3.00-5.50	4.99-5.50	7.50-13.2	4.99-5.50	15.0-26.4	9.60-13.2	13.2-16.5		
OVERCURRENT PROTECTION[A]		Works over 105%min of rated current or 101%min of peak current. Automatic recovery.																			
OVERVOLTAGE PROTECTION[V]		3.00-4.80	4.00-5.25	Works at 115 - 140% of rated voltage									Remote ON/OFF						Same as W,Z		—
FUNCTION		Remotesensing, remote ON/OFF, alarm (LV)											Remote ON/OFF								—

- \*1 Operating condition of peak current : Peak current is less than 10sec., duty is less than 35% and average current is less than rated current. (rated current2 at Module W, Z, 9, Q and V)
- \*2 Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN : RM101). Ripple and Ripple Noise is measured by using measuring board with capacitor of 22 μF within 150mm from output terminal.
- \*3 Drift is changed in DC output for an eight hour period after half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.
- \*4 When the output voltage of module A is used less than 2.0V, keep minimum output current 2.6A.
- \*5 It is a value from 0 to rated output current1. The current on non-measurement side is fixed.
- \*6 It is a value from 0 to rated output current2. The current on non-measurement side is fixed.
- \*7 The sum of +power and -power must be less than output power(Y:50W, W:76.8W, Z:75W, 9:76.8W, Q:153.6W, V:165W).

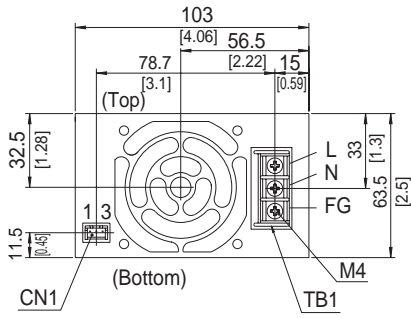
- \*8 Ratings of V2 can draw up to 50% of rated current at the time of 0A in load of V1. (Only module S,T,U refer to instruction manual 5 for details.)
- \* Each output of module Y,Z, 9, Q and V is a ground common type (not isolated),each output of module S,T and U is isolated.
- \* For ACE300F,450F and 650F , input and output terminals can be set at the same side if Input module (code:I) is installed instead of the most left module.
- \* Modules which can correspond to medical electrical equipment (UL2601-1, EN60601-1) are all modules except module S, T and U. Refer to instruction manual 8. for details.

ACE

Block diagram



## ACE300F external view



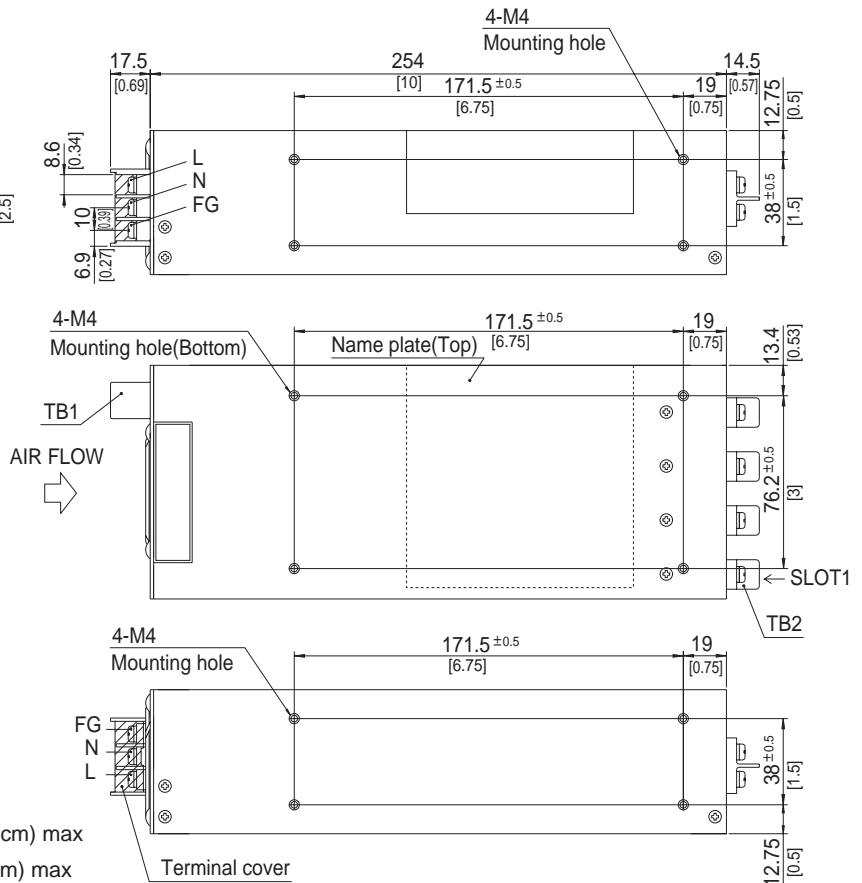
Pin connection and function of CN1

Pin No.	Function
1	G : Auxiliary power ground
2	PR : PR alarm
3	AUX : Auxiliary power (only remote ON/OFF)

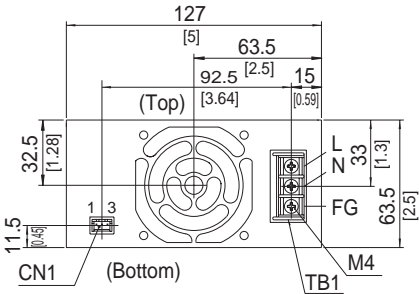
Mating connector and terminal of CN1

Connector	Mating connector	Terminal	Mfr.
CN1	S3B-XH-A	XHP-3 Reel : SXH-001T-P0.6 Bulk : BXH-001T-P0.6	J.S.T.

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 1.7kg max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminium
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque :  $1.2\text{N} \cdot \text{m}$  (12.8kgf · cm) max
- ※ Screw tightening torque M4 :  $1.6\text{N} \cdot \text{m}$  (16.9kgf · cm) max  
M3 :  $0.8\text{N} \cdot \text{m}$  (8.5kgf · cm) max



## ACE450F external view



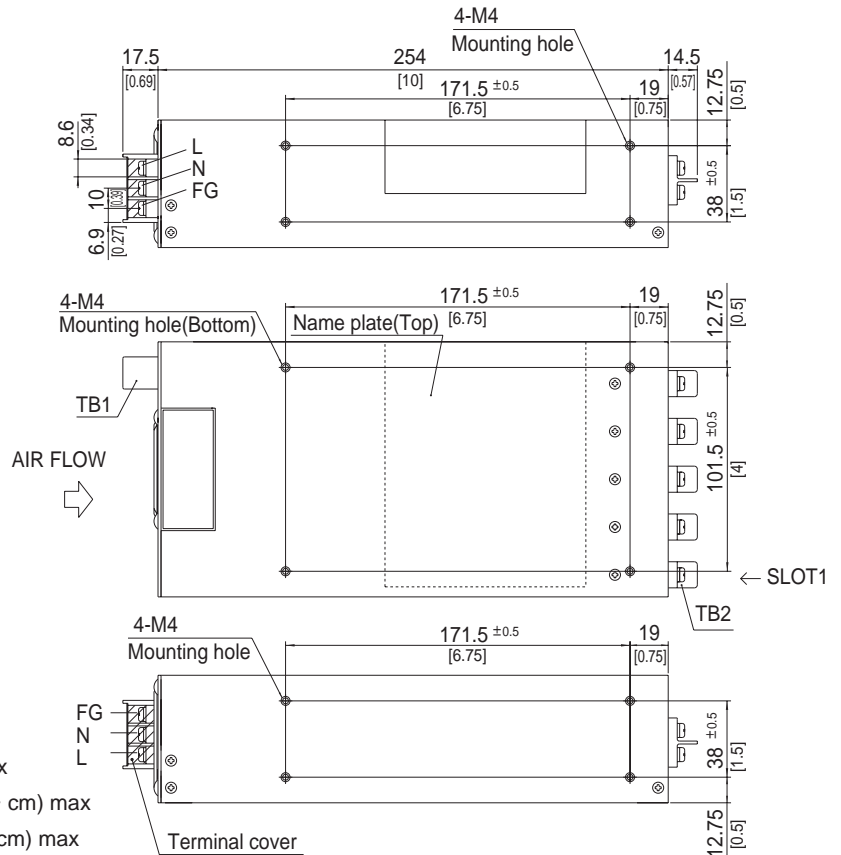
Pin connection and function of CN1

Pin No.	Function
1	G : Auxiliary power ground
2	PR : PR alarm
3	AUX : Auxiliary power (only remote ON/OFF)

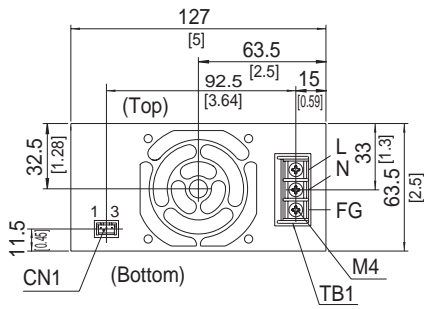
Mating connector and terminal of CN1

Connector	Mating connector	Terminal	Mfr.
CN1	S3B-XH-A	XHP-3 Reel : SXH-001T-P0.6 Bulk : BXH-001T-P0.6	J.S.T.

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 2.2kg max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminium
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque :  $1.2\text{N} \cdot \text{m}$  (12.8kgf · cm) max
- ※ Screw tightening torque M4 :  $1.6\text{N} \cdot \text{m}$  (16.9kgf · cm) max  
M3 :  $0.8\text{N} \cdot \text{m}$  (8.5kgf · cm) max



**ACE650F external view**



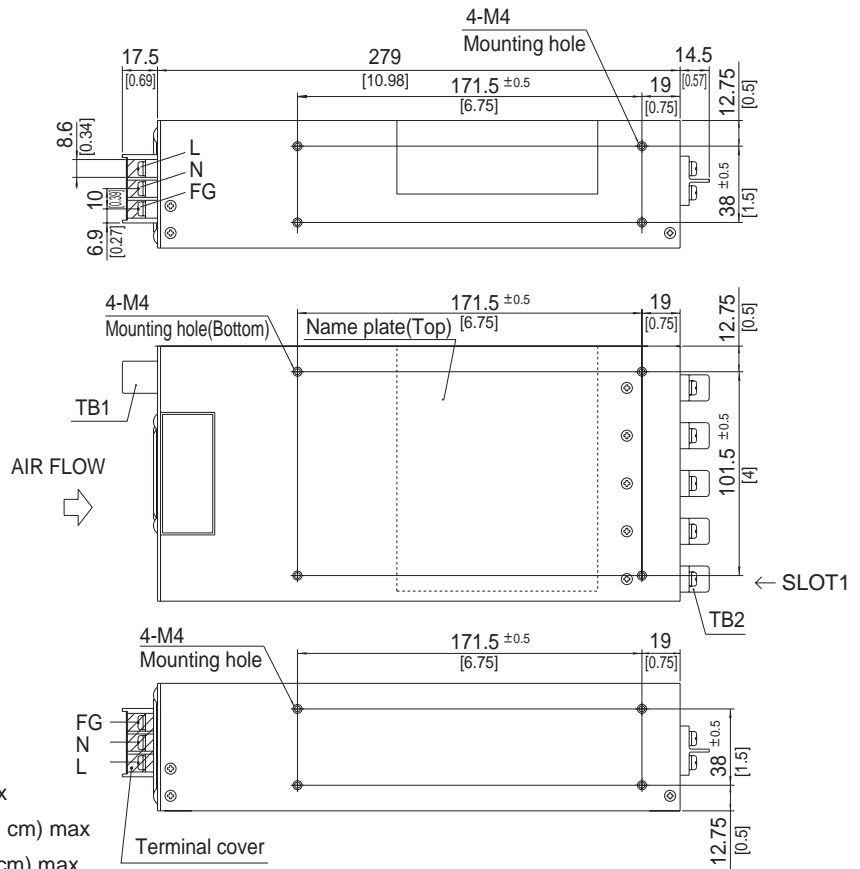
Pin connection and function of CN1

Pin No.	Function
1	G : Auxiliary power ground
2	PR : PR alarm
3	AUX : Auxiliary power (only remote ON/OFF)

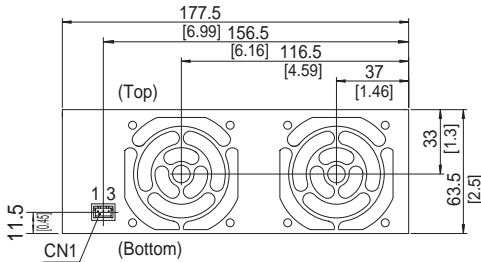
Mating connector and terminal of CN1

Connector	Mating connector	Terminal	Mfr.
CN1	S3B-XH-A	XHP-3 Reel : SXH-001T-P0.6 Bulk : BXH-001T-P0.6	J.S.T.

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 2.4kg max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminium
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque : 1.2N · m (12.8kgf · cm) max
- ※ Screw tightening torque M4 : 1.6N · m (16.9kgf · cm) max  
M3 : 0.8N · m (8.5kgf · cm) max



**ACE900F external view**



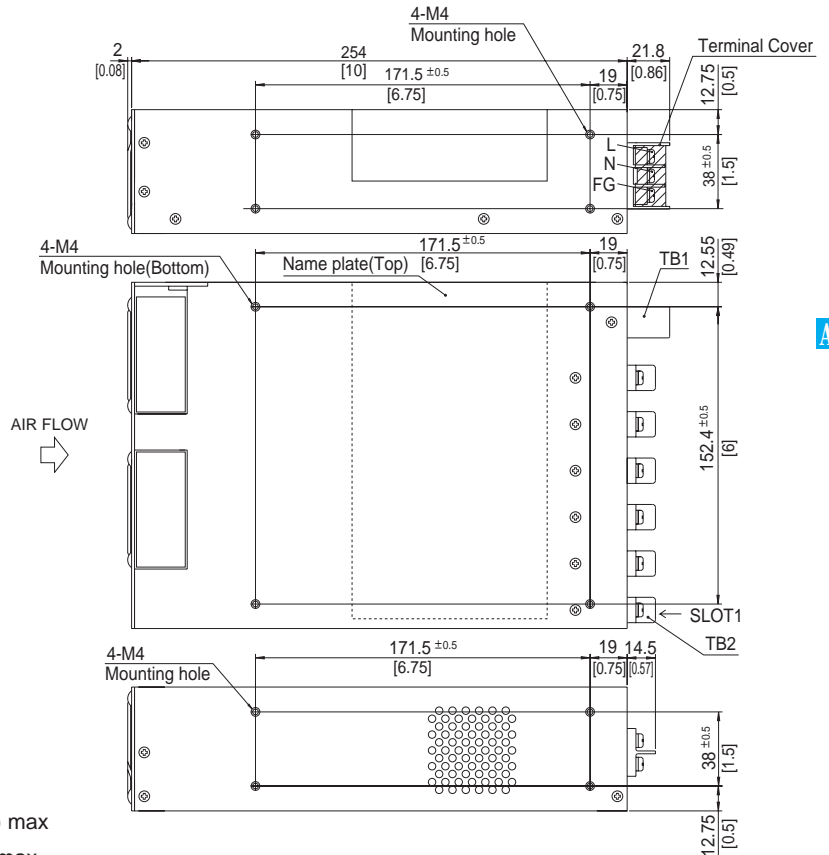
Pin connection and function of CN1

Pin No.	Function
1	G : Auxiliary power ground
2	PR : PR alarm
3	AUX : Auxiliary power (only remote ON/OFF)

Mating connector and terminal of CN1

Connector	Mating connector	Terminal	Mfr.
CN1	S3B-XH-A	XHP-3 Reel : SXH-001T-P0.6 Bulk : BXH-001T-P0.6	J.S.T.

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 3kg max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminium
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque : 1.2N · m (12.8kgf · cm) max
- ※ Screw tightening torque M4 : 1.6N · m (16.9kgf · cm) max  
M3 : 0.8N · m (8.5kgf · cm) max

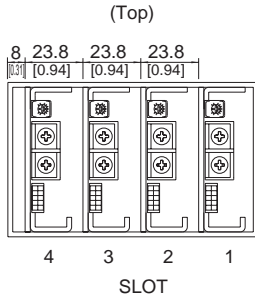


ACE

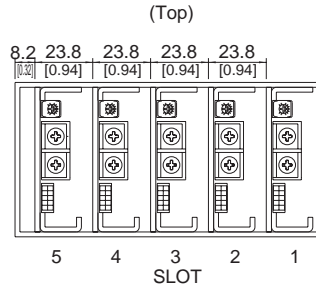
**Output module and connector pin assign**

**1. Output side view**

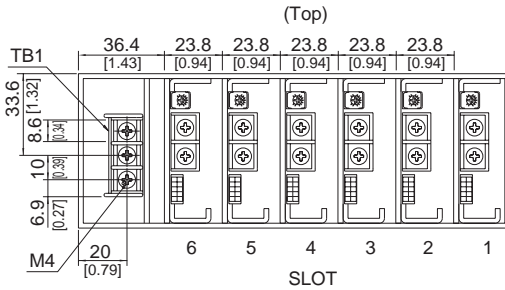
ACE300F Output side view



ACE450F/650F Output side view

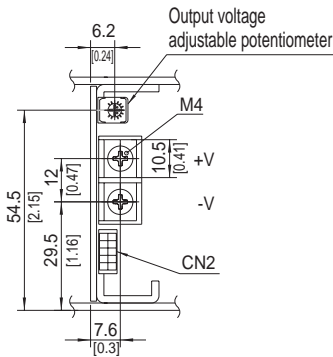


ACE900F Output side view

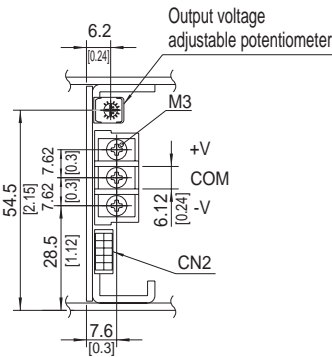


※Tolerance : ±1 [±0.04]  
※Dimensions in mm, [ ] =inches

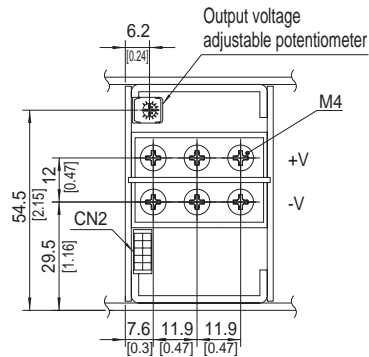
**2. Output module side view and connector pin assign**



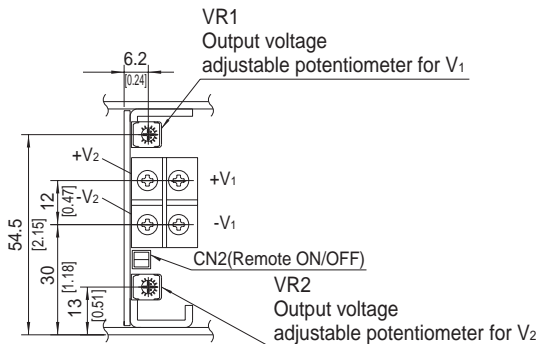
Module : A-K,L,M,N,P,R



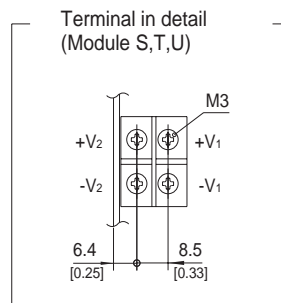
Module : Y,W,Z,9,Q,V



Module : 2A-2K



Module : S,T,U



※Tolerance : ±1 [±0.04]  
※Dimensions in mm, [ ] =inches

Output module and connector pin assign

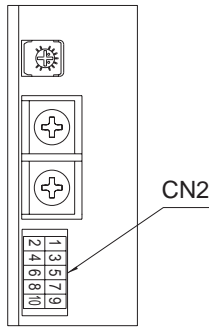
●CN2 connector pin assign except module S,T,U

Mating connector and terminal of CN2 in Output Module

Connector	Mating connector	Terminal	Mfr.
CN2	S10B-PHDSS	PHDR-10VS	Chain : SPHD-002T-P0.5
			Loose : BPHD-001T-P0.5 BPHD-002T-P0.5 *1
			J.S.T.

※ The housing for the remote sensing unused is mounted on CN2 of each output module (applying module : A - K, 2A - 2K).

\*1 Please consult J.S.T for a non-standard crimping tool.



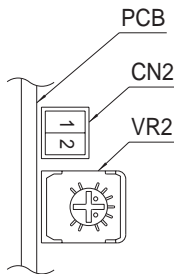
Pin connection and function of CN2 in Output Module

Pin No.	Function	
	Applying module : A - K, 2A - 2K	Applying module : L, M, N, P, R, Y, W, Z, 9, Q, V
1	RC+ : Remote ON/OFF +	RC+ : Remote ON/OFF +
2	RC- : Remote ON/OFF -	RC- : Remote ON/OFF -
3	N/C : N.C.	N/C : N.C.
4	N/C : N.C.	N/C : N.C.
5	LV+ : LV alarm	LV+ : LV alarm
6	LV- : LV alarm ground	LV- : LV alarm ground
7	+M : Self sensing terminal. (Do not wire for external connection.)	N/C : N.C.
8	+S : + Remote sensing	N/C : N.C.
9	-M : Self sensing terminal. (Do not wire for external connection.)	N/C : N.C.
10	-S : - Remote sensing	N/C : N.C.

●CN2 connector pin assign of module S,T,U

Mating connector and terminal of CN2 in Output Module

Connector	Mating connector	Terminal	Mfr.
CN2	S2B-PH-K-S	PHR-2	Chain: SPH-002T-P0.5S
			Loose: BPH-002T-P0.5S
			J.S.T.



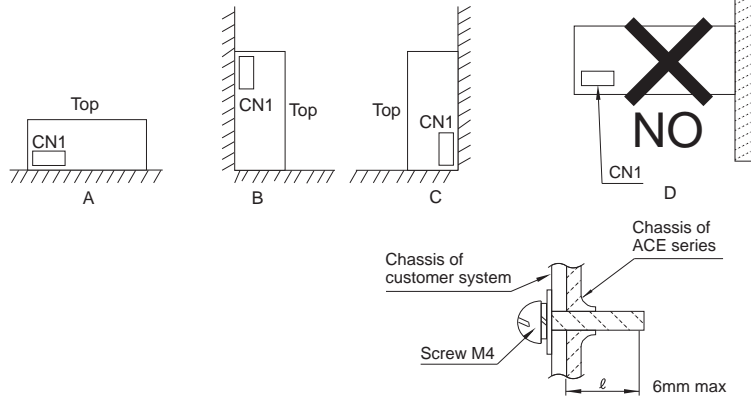
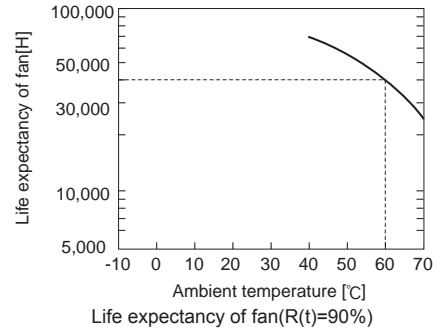
Pin connection and function of CN2 in Output Module

Pin No.	Function
1	Remote ON/OFF +
2	Remote ON/OFF -

Assembling and Installation Method

Installation method

- Fans for forced air cooling are built in.  
Ensure that the inlet (rear) and outlet (output terminal) vents are not blocked, to prevent disruption of the airflow.  
\*Option with reversed airflow (-F) is also available.
- If the unit is used in a dusty environment, an air filter should be used so the cooling efficiency of the fan is not reduced.
- If the fan stops, the thermal protection may be activated, shutting down the output. Life expectancy of the fan varies depending on usage conditions; therefore regular inspections of the fan are required for increased reliability. Should the fan become non-operational over the course of time, it can be replaced. Refer to the optional parts section of this catalog.
- When mounting the power supply with screws, it is recommended that this be done as shown in right figure. If other methods are used, be sure the weight of the power supply is taken into account.
- Avoid installation method 2 as shown in Fig. D, which can cause stress on the mounting holes.
- Maximum length of mounting screws is 6mm (Refer to right figure.).

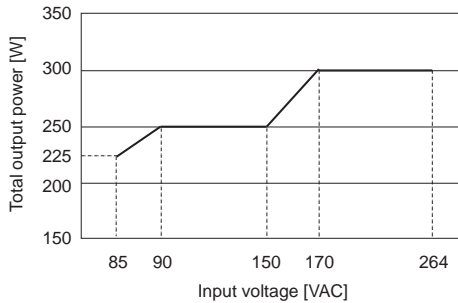


Derating

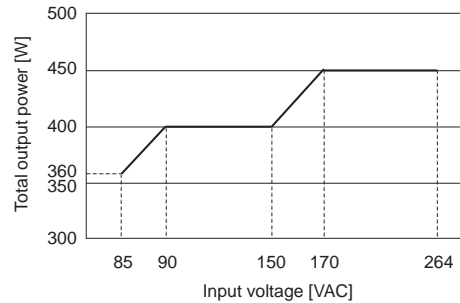
- The ACE series comprises power supplies consisting of a combination of output modules. Make sure each output module is used within specifications, and that the total output power of all modules is equal to, or less than the rated total output power.  
Refer to instruction manual 5 for Definition of load factor.

Derating curve for input voltage

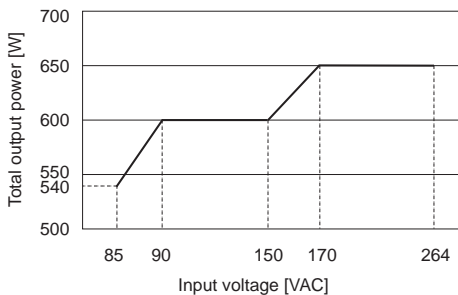
● ACE300F



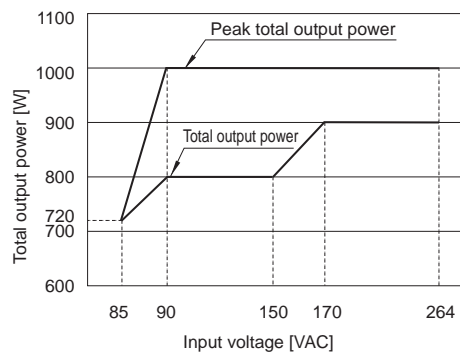
● ACE450F



● ACE650F



● ACE900F



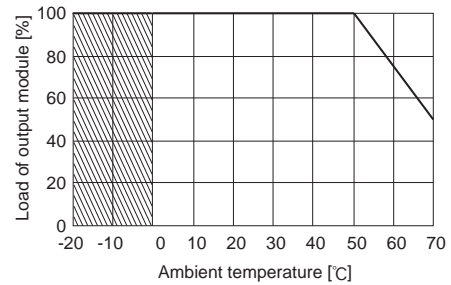
\*Refer to instruction manual 4 for Peak total output power.



Derating

Ambient temperature derating

- The derating curve for the ambient temperature (inlet temperature for cooling) of output modules is shown in right figure.
- Operation within the hatched area will result in different ripple and ripple noise specifications.



Instruction Manual

- ◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/ACE/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

ACE



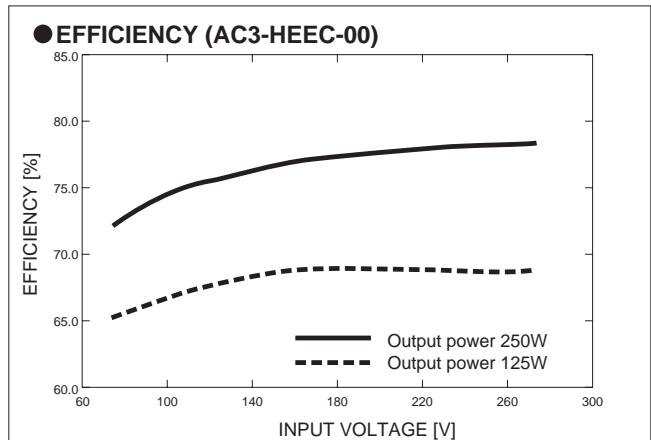
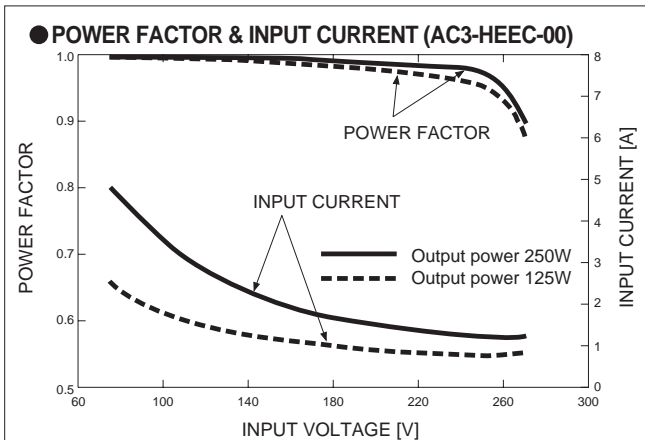
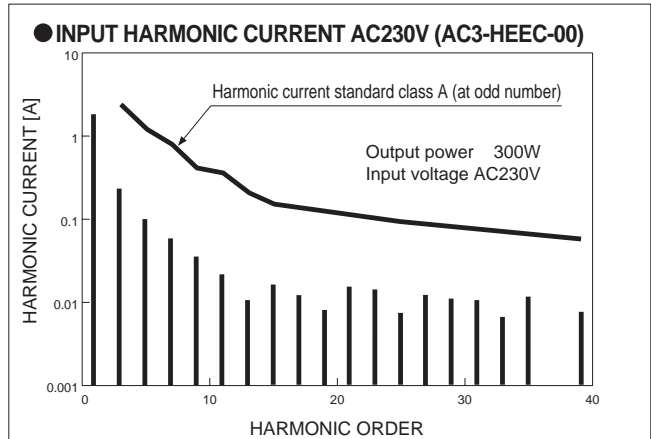
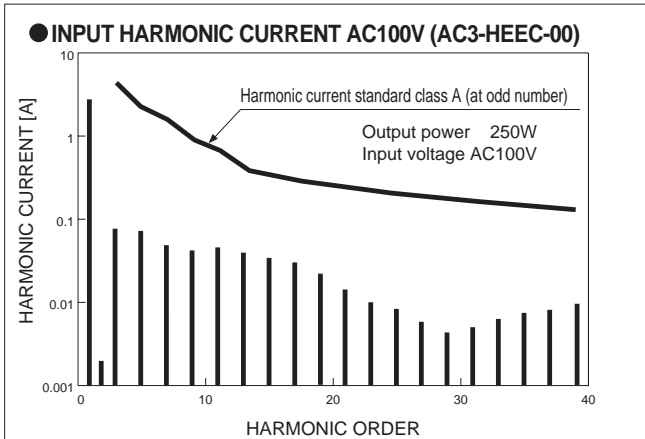
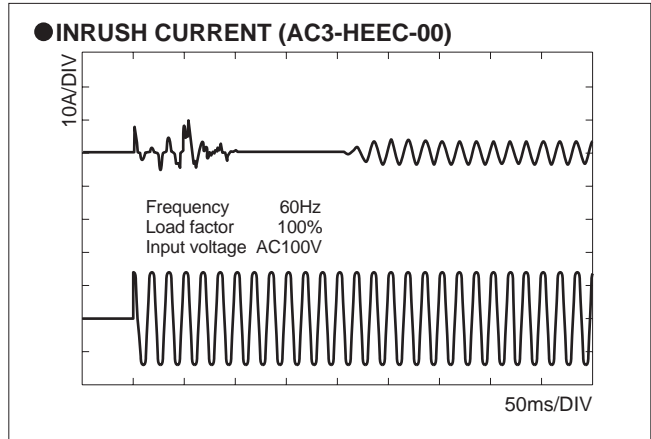
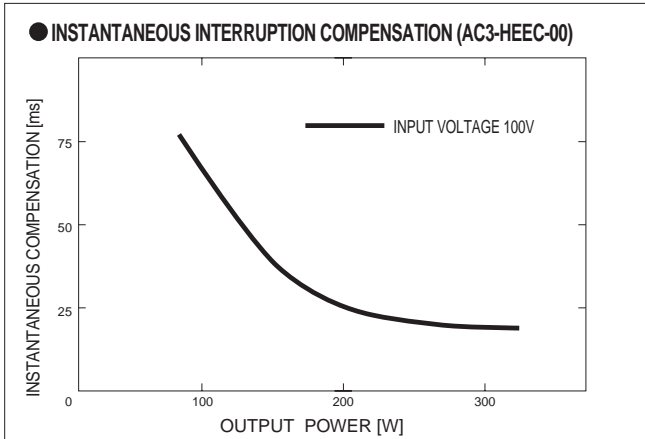
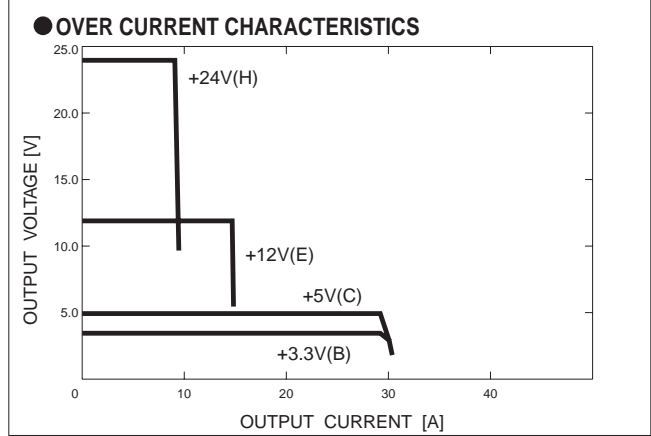
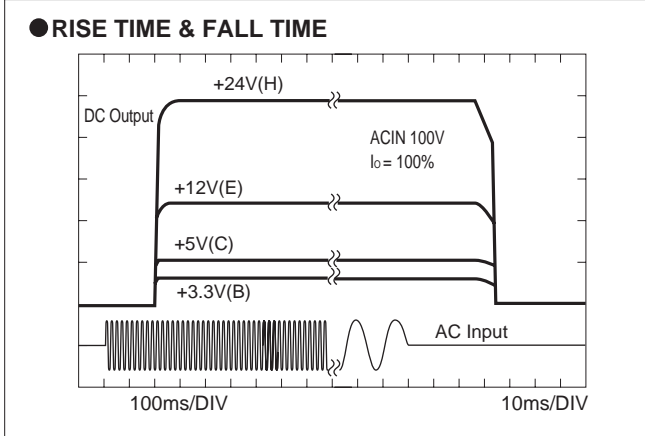
NOTICE



Basic Characteristics Data

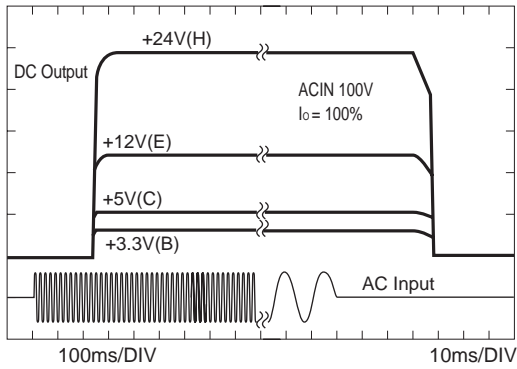
Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
Input module of ACE300F	Active filter	80	3.7*1	250V 8A	SCR	FR-4		Yes	No	No
Input module of ACE450F	Active filter	80	5.7*2	250V 10A	SCR	FR-4		Yes	No	No
Input module of ACE650F	Active filter	80	8.0*3	250V 15A	SCR	FR-4		Yes	No	No
Input module of ACE900F	Active filter	80	11*4	250V 20A	SCR	FR-4		Yes	No	No
Output module A-K	Forward converter	120	-	-	-	FR-4		Yes	Yes*5	Yes*7
Output module 2A-2K	Forward converter	120	-	-	-	FR-4		Yes	Yes*5	Yes*7
Output module L,M,N,P,R	Forward converter	120	-	-	-	FR-4		Yes	Yes*5	No
Output module Y,W,Z,9,Q,V	Forward converter	120	-	-	-	FR-4		Yes	Yes*6	No
Output module S,T,U	Forward converter	120	-	-	-	FR-4		Yes	Yes*6	No

- \*1 Input current is based on Model AC3-HHEC-00 outputs 250W at AC100V.
- \*2 Input current is based on Model AC4-HHECC-00 outputs 400W at AC100V.
- \*3 Input current is based on Model AC6-HHECC-00 outputs 600W at AC100V.
- \*4 Input current is based on Model AC9-HHECC-00 outputs 800W at AC100V.
- \*5 Series operation is possible with the same output modules.
- \*6 Series operation is possible, but series bar cannot be set by the series code.
- \*7 Parallel operation is possible with the same output voltage module.

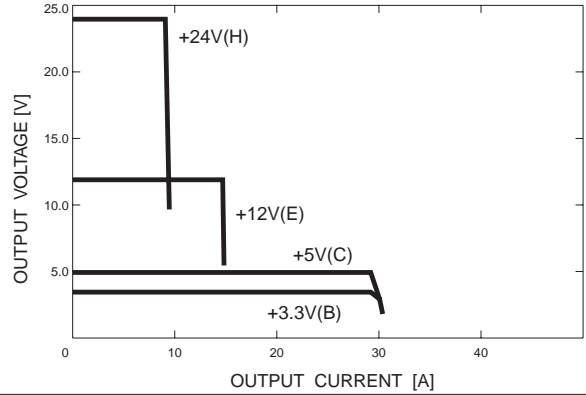


ACE

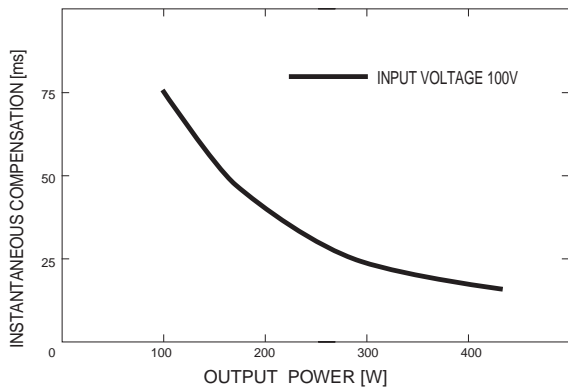
● RISE TIME & FALL TIME



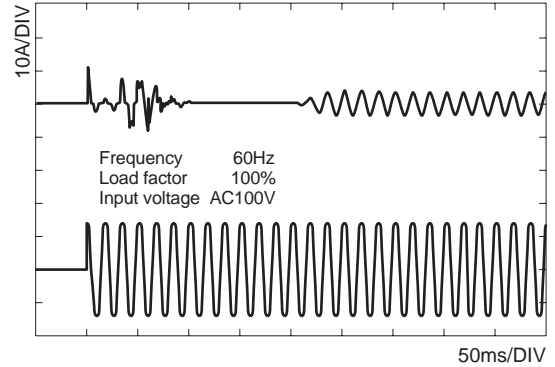
● OVER CURRENT CHARACTERISTICS



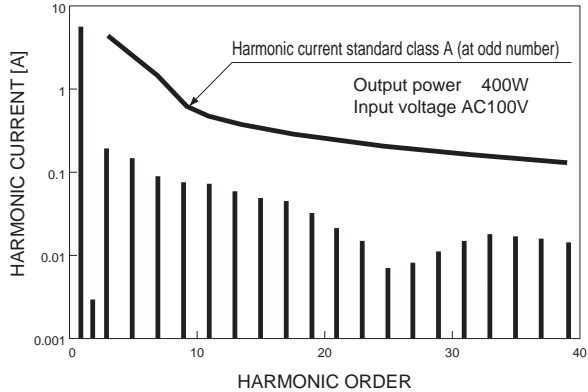
● INSTANTANEOUS INTERRUPTION COMPENSATION (AC4-HHECC-00)



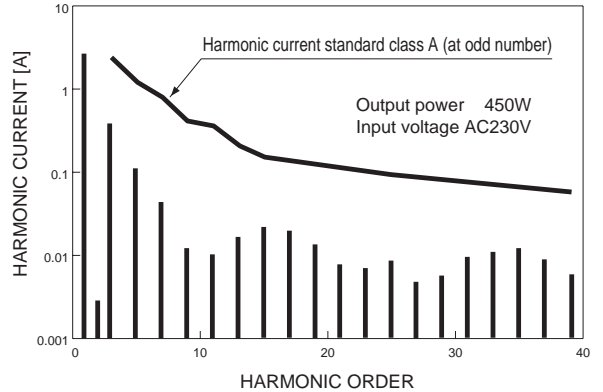
● INRUSH CURRENT (AC4-HHECC-00)



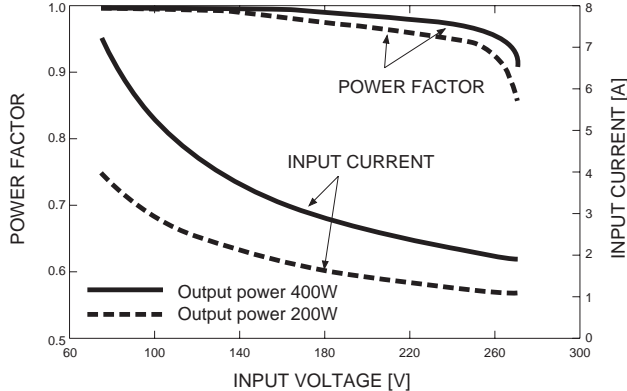
● INPUT HARMONIC CURRENT AC100V (AC4-HHECC-00)



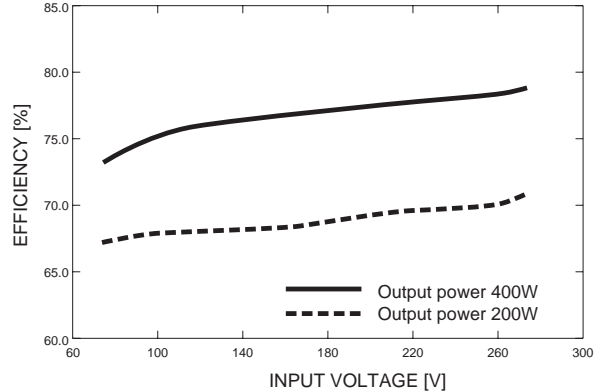
● INPUT HARMONIC CURRENT AC230V (AC4-HHECC-00)

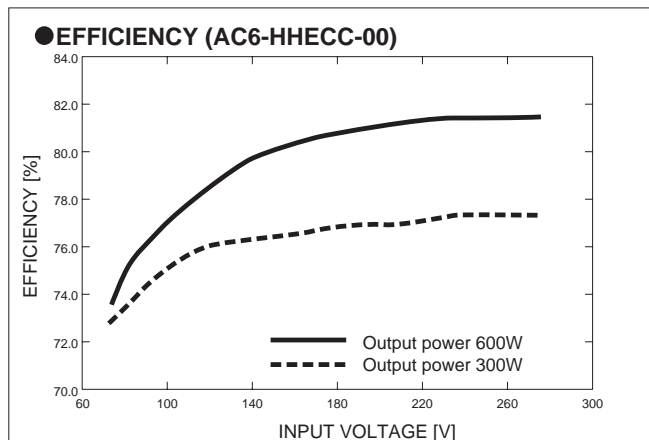
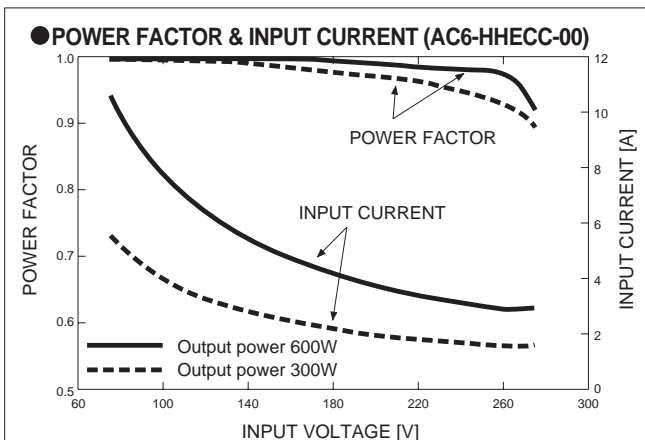
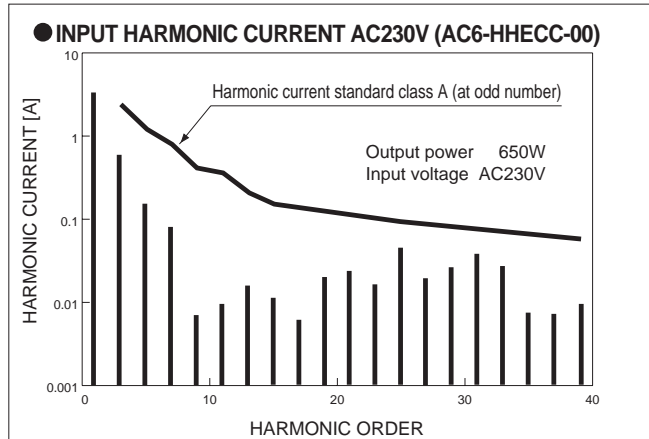
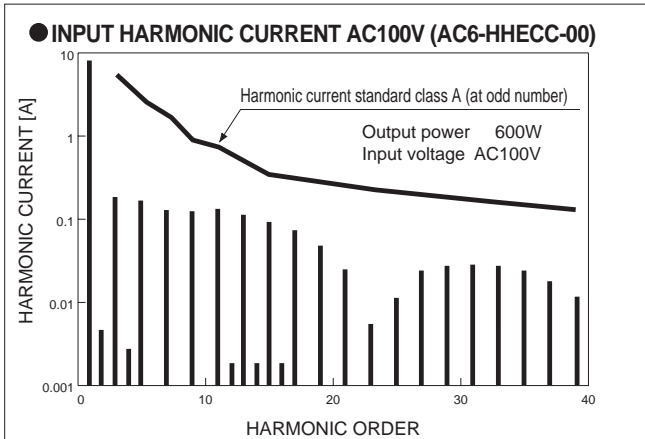
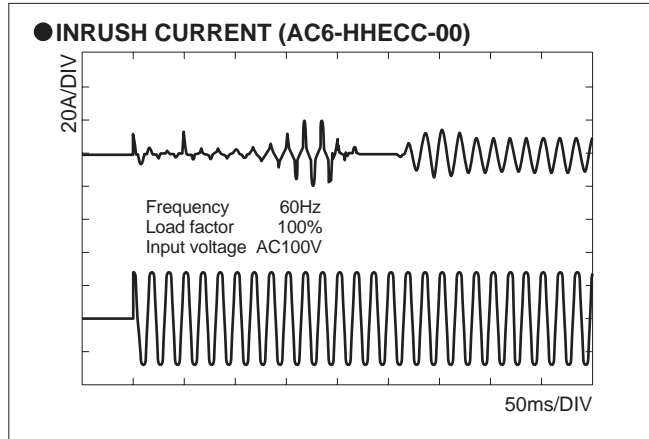
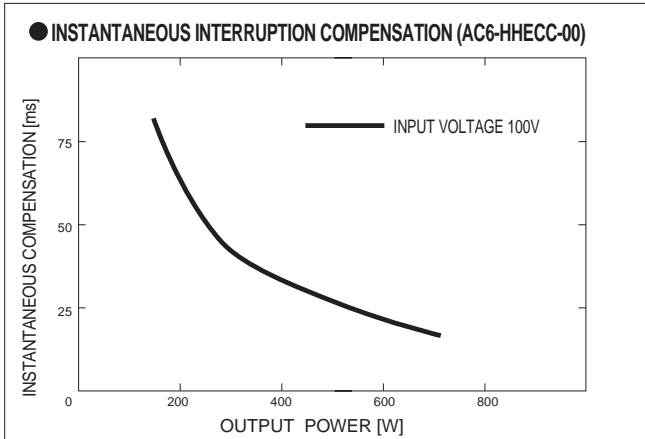
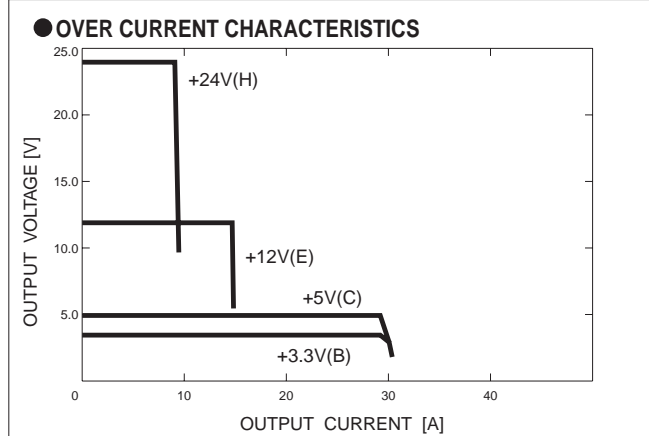
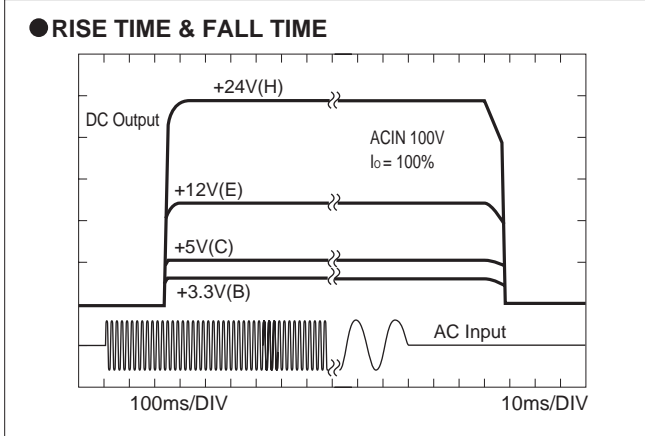


● POWER FACTOR & INPUT CURRENT (AC4-HHECC-00)

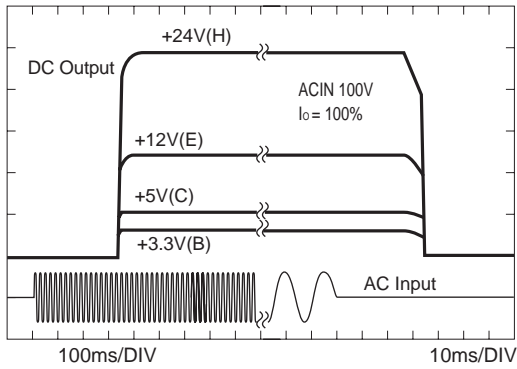


● EFFICIENCY (AC4-HHECC-00)

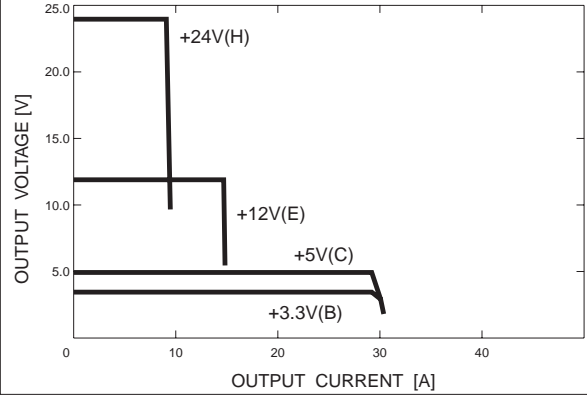




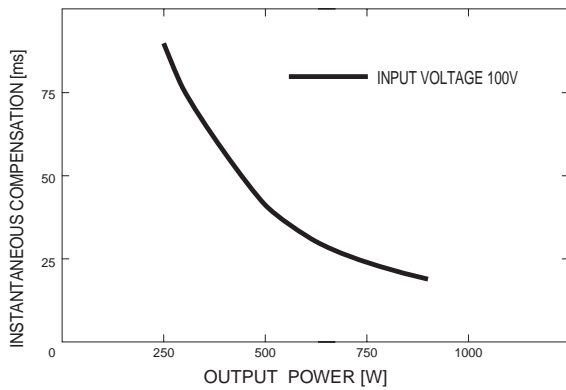
● RISE TIME & FALL TIME



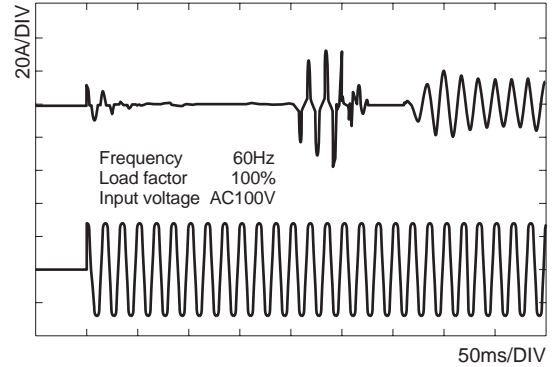
● OVER CURRENT CHARACTERISTICS



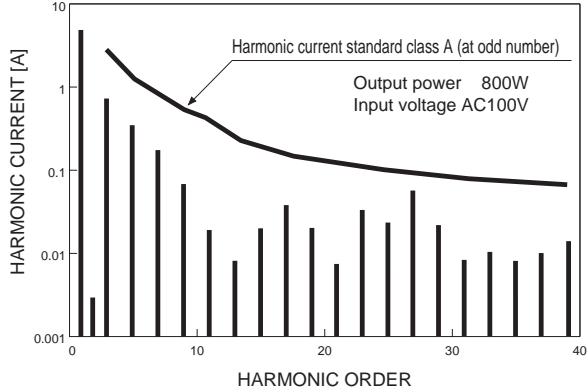
● INSTANTANEOUS INTERRUPTION COMPENSATION (AC9-HHEECC-00)



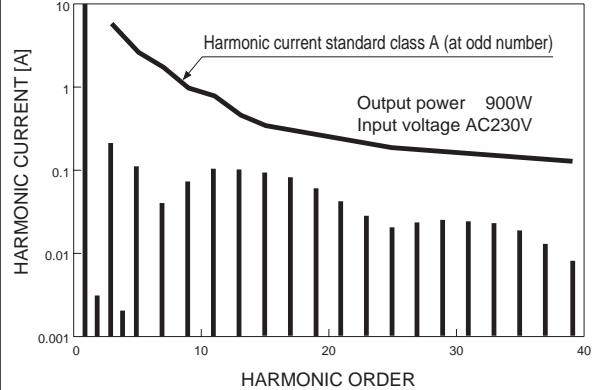
● INRUSH CURRENT (AC9-HHEECC-00)



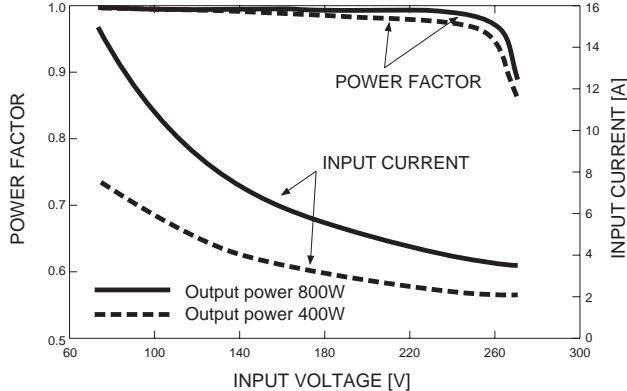
● INPUT HARMONIC CURRENT AC100V (AC9-HHEECC-00)



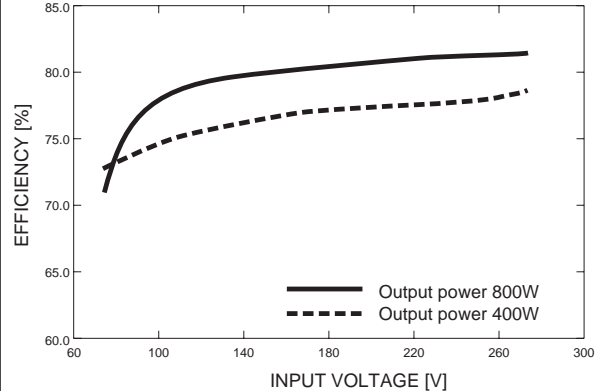
● INPUT HARMONIC CURRENT AC230V (AC9-HHEECC-00)



● POWER FACTOR & INPUT CURRENT (AC9-HHEECC-00)



● EFFICIENCY (AC9-HHEECC-00)







# KH-series



## Feature

For DIN (35mm) rail products  
 Wide operating ambient temperature range  
 I/O terminal has 2 types, Euro Style and Barrier Blocks Style  
 Built in overcurrent protection, overvoltage protection circuits

- KHEA30F/60F/90F, KHNA30F/60F/90F  
 Low power consumption at no load  
 Complies with SEMI F-47 (Derating is required)
- KHEA120F/240F/480F, KHNA120F/240F/480F  
 Built in remote ON/OFF  
 Built in signal output for confirming output voltage  
 Complies with SEMI F-47

## Safety agency approvals

UL60950-1, UL508, C-UL (CSA60950-1), EN60950-1,  
 ANSI/ISA12.12.01, ATEX  
 Complies with DEN-AN

## 5-year warranty (refer to Instruction Manual)

## CE marking

Low Voltage Directive  
 RoHS Directive

## EMI

Complies with FCC-B, CISPR22-B, EN55011-B, EN55022-B,  
 VCCI-B

## EMS Compliance : EN61204-3, EN61000-6-2

- EN61000-4-2
- EN61000-4-3
- EN61000-4-4
- EN61000-4-5
- EN61000-4-6
- EN61000-4-8
- EN61000-4-11

# KHEA/KHNA30F

KH
A
30
F
-□□
-□

①
②
③
④
⑤
⑥



Example recommended EMI/EMC filter  
NAC-04-472-D



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\*A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name  
KHE : Euro style I/O terminals  
KHN : Barrier blocks style I/O terminals
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Option  
C : with Coating

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	KHEA/KHNA30F-5	KHEA/KHNA30F-12	KHEA/KHNA30F-24
MAX OUTPUT WATTAGE[W]	25	27.6	31.2
DC OUTPUT	5V 5A	12V 2.3A	24V 1.3A

## SPECIFICATIONS

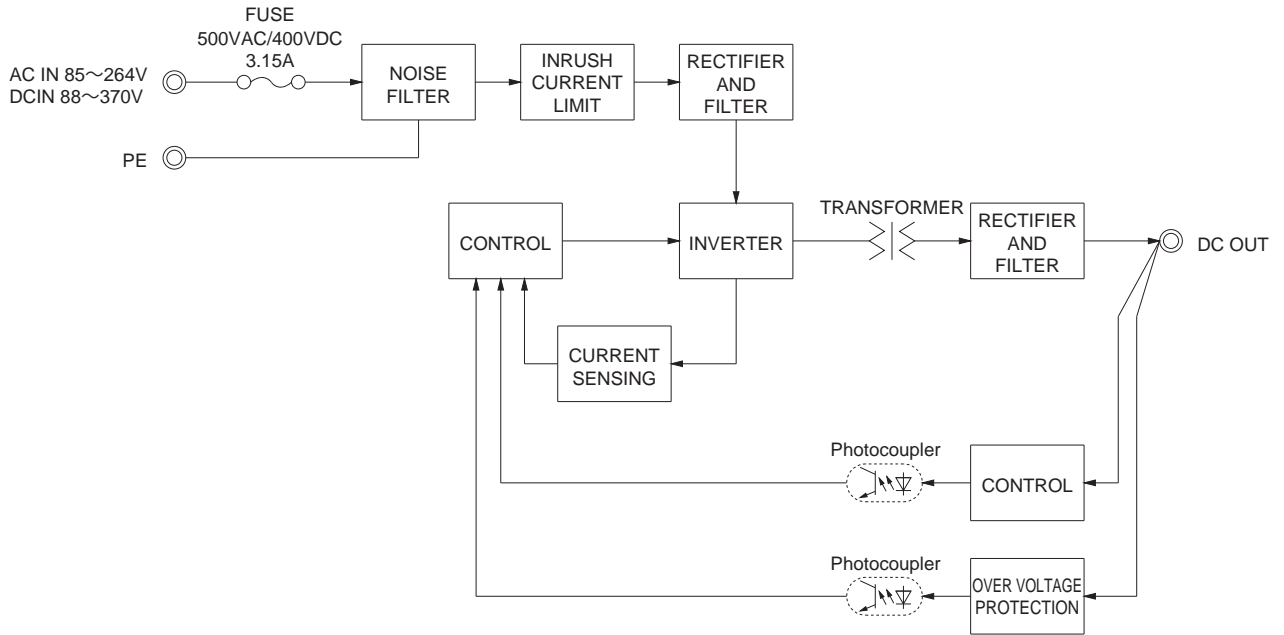
	MODEL	KHEA/KHNA30F-5	KHEA/KHNA30F-12	KHEA/KHNA30F-24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating") or DC88 - 370 *11			
	CURRENT[A]	ACIN 115V	0.45typ	0.50typ	0.55typ
		ACIN 230V	0.30typ	0.30typ	0.35typ
	FREQUENCY[Hz]	50 / 60 (45 - 440) or DC			
	EFFICIENCY[%]	ACIN 115V	84.0typ	87.0typ	88.5typ
		ACIN 230V	85.5typ	88.5typ	89.5typ
INRUSH CURRENT[A]	ACIN 115V	18typ (Io=100%) (at cold start Ta=25°C)			
	*1 ACIN 230V	35typ (Io=100%) (at cold start Ta=25°C)			
LEAKAGE CURRENT[ma]	0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)				
OUTPUT	VOLTAGE[V]	5	12	24	
	CURRENT[A]	5.0	2.3	1.3	
	PEAK CURRENT[A]	-	-	-	
	LINE REGULATION[mV] *2	20max	48max	96max	
	LOAD REGULATION[mV] *2	80max	100max	150max	
	RIPPLE[mVp-p] *3	0 to +70°C	150max	150max	150max
		-20 - 0°C	300max	300max	300max
		Io=0 - 30%	300max *4	300max *4	300max *4
	RIPPLE NOISE[mVp-p] *3	0 to +70°C	180max	180max	180max
		-20 - 0°C	360max	360max	360max
		Io=0 - 30%	360max *4	360max *4	360max *4
	TEMPERATURE REGULATION[mV]	0 to +70°C	50max	120max	240max
		-20 to +70°C	60max	150max	290max
	DRIFT[mV] *5	20max	48max	96max	
START-UP TIME[ms]	200typ (ACIN 115V, Io=100%)				
HOLD-UP TIME[ms]	20typ (ACIN 115V, Io=100%)				
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	4.50 to 5.50	10.80 to 13.20	22.50 to 28.50		
OUTPUT VOLTAGE SETTING[V]	5.00 to 5.15	12.00 to 12.48	24.00 to 24.96		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically *10			
	OVERVOLTAGE PROTECTION[V]	6.30 to 7.60	13.80 to 16.80	30.00 to 36.00	
	DC_OK LAMP	LED (Green)			
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	INPUT-PE	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	OUTPUT-PE	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)			
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-20 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Refer to "Derating")			
	STORAGE TEMP., HUMID. AND ALTITUDE	-30 to +85°C, 20 - 90%RH (Non condensing)			
	VIBRATION *8	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis (Packing state)			
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	AC input	UL60950-1, C-UL (CSA60950-1), EN60950-1, UL508 (NEC Class2 per UL1310), ANSI/ISA12.12.01, ATEX, Complies with DEN-AN *		
		DC input	UL60950-1, C-UL (CSA60950-1), EN60950-1		
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B			
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *6 (Not built-in to active filter) *9			
OTHERS	CASE SIZE *7	22.5 × 75 × 90mm (W × H × D) [0.89 × 2.95 × 3.54 inches]			
	WEIGHT	165g max			
	COOLING METHOD	Convection			

\*1 The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less)is excluded.  
 \*2 Please contact us about dynamic load and input response.  
 \*3 This is the value that measured on measuring board with capacitor of 22μF and 0.1μF at 150mm from output terminal.  
 Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103). Please refer to the instruction manual 1.7.  
 Ripple and ripple noise spec is change at Io=0 to 30% by burst operation.  
 \*4 In case of operating under 0°C ambient temperature, the value is two times of specification at 0 to 30% load factor.  
 \*5 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*6 Please contact us about another class.  
 \*7 Case size contains neither the umbo.  
 \*8 Only as standard mounting orientation (A). Refer to the "Assembling and Installation Method". If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.  
 \*9 When two or more units are operating it may not comply with the IEC61000-3-2.  
 \*10 If the overcurrent protection circuit operates continuously, the output voltage shut down. Refer to the instruction manual 1.3.  
 \*11 Under low DC input voltage below DC110V, the temperature derating -1°C/V or the output power derating -1%/V are required.  
 \* To meet the specifications. Do not operate over-loaded condition.  
 \* A sound may occur from power supply at light or peak loading.



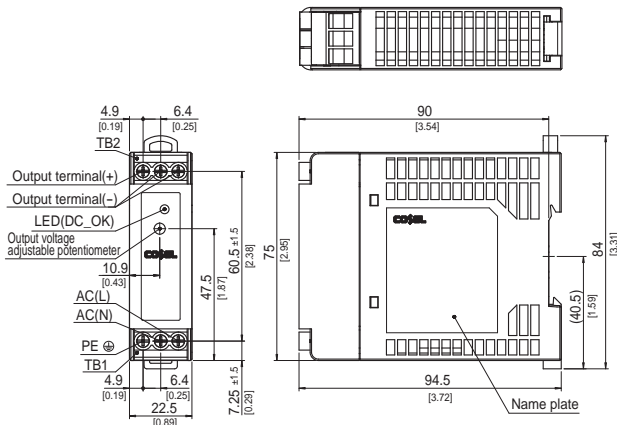
## Block diagram



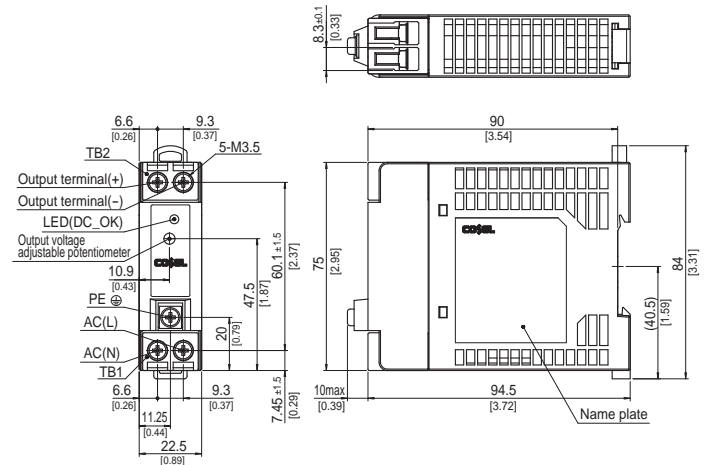
## External view

<KHEA30F(Euro Style I/O Terminals)>

<KHNA30F(Barrier Blocks Style I/O Terminals)>



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 165g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis · Case material : PBT
- ※ Din rail attachment material : PC/ABS
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1N · m max

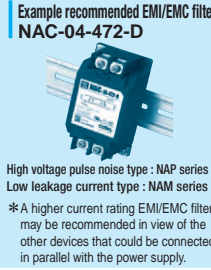


- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 165g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis · Case material : PBT
- ※ Din rail attachment material : PC/ABS
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1.1N · m max

# KHEA/KHNA60F

KH
A
60
F
-□□
-□

①
②
③
④
⑤
⑥



- ① Series name  
KHE : Euro style I/O terminals  
KHN : Barrier blocks style I/O terminals
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Option  
C : with Coating

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	KHEA/KHNA60F-12	KHEA/KHNA60F-24
MAX OUTPUT WATTAGE[W]	54	60
DC OUTPUT	12V 4.5A	24V 2.5A

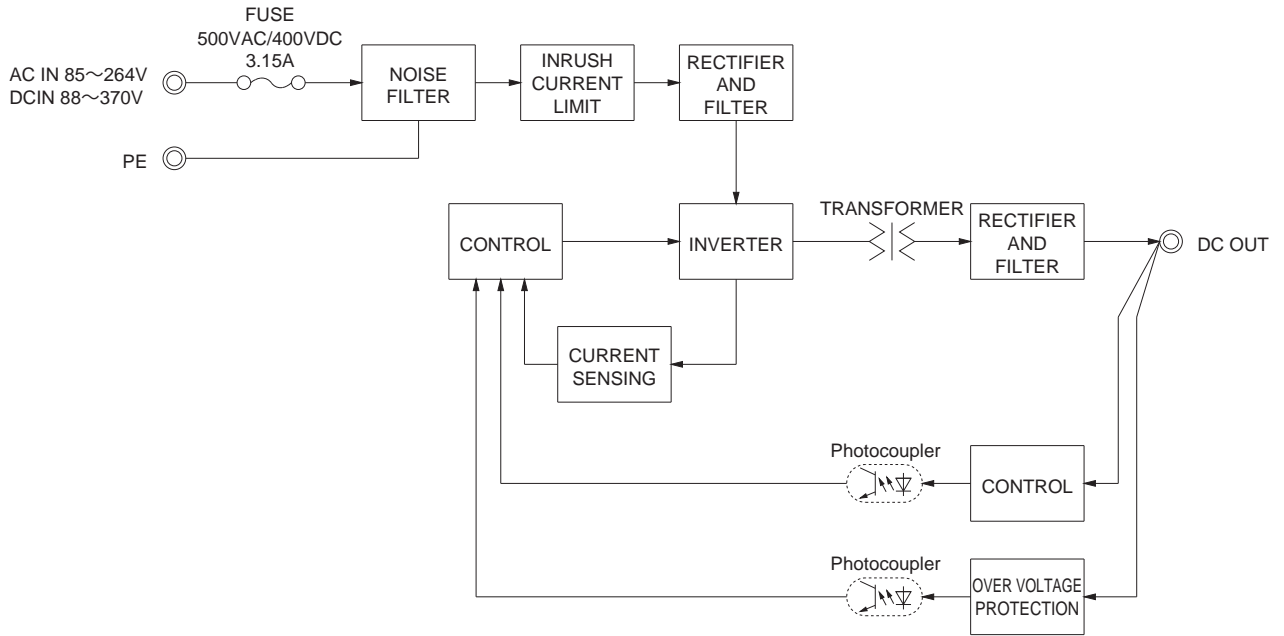
## SPECIFICATIONS

	MODEL	KHEA/KHNA60F-12	KHEA/KHNA60F-24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating") or DC88 - 370 *11		
	CURRENT[A]	ACIN 115V	1.00typ	1.10typ
		ACIN 230V	0.60typ	0.70typ
	FREQUENCY[Hz]	50 / 60 (45 - 440) or DC		
	EFFICIENCY[%]	ACIN 115V	87.0typ	89.0typ
		ACIN 230V	88.0typ	91.0typ
INRUSH CURRENT[A]	ACIN 115V	18typ (Io=100%) (at cold start Ta=25°C)		
	*1 ACIN 230V	35typ (Io=100%) (at cold start Ta=25°C)		
LEAKAGE CURRENT[ma]	0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)			
OUTPUT	VOLTAGE[V]	12	24	
	CURRENT[A]	4.5	2.5	
	PEAK CURRENT[A]	-	-	
	LINE REGULATION[mV] *2	48max	96max	
	LOAD REGULATION[mV] *2	100max	150max	
	RIPPLE[mVp-p] *3	0 to +70°C	200max	200max
		-20 - 0°C	300max	300max
		Io=0 - 30%	300max *4	300max *4
	RIPPLE NOISE[mVp-p] *3	0 to +70°C	260max	260max
		-20 - 0°C	360max	360max
		Io=0 - 30%	360max *4	360max *4
	TEMPERATURE REGULATION[mV]	0 to +70°C	120max	240max
		-20 to +70°C	150max	290max
	DRIFT[mV] *5	48max	96max	
START-UP TIME[ms]	200typ (ACIN 115V, Io=100%)			
HOLD-UP TIME[ms]	20typ (ACIN 115V, Io=100%)			
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	10.80 to 13.20	22.50 to 28.50		
OUTPUT VOLTAGE SETTING[V]	12.00 to 12.48	24.00 to 24.96		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically *10		
	OVERVOLTAGE PROTECTION[V]	13.80 to 16.80	30.00 to 36.00	
	DC_OK LAMP	LED (Green)		
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)		
	INPUT-PE	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)		
	OUTPUT-PE	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)		
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-20 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Refer to "Derating")		
	STORAGE TEMP., HUMID. AND ALTITUDE	-30 to +85°C, 20 - 90%RH (Non condensing)		
	VIBRATION *8	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)		
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis (Packing state)		
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	AC input	UL60950-1, C-UL (CSA60950-1), EN60950-1, UL508 (NEC Class2 per UL1310), ANSI/ISA12.12.01, ATEX, Complies with DEN-AN *	
		DC input	UL60950-1, C-UL (CSA60950-1), EN60950-1	
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B		
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *6 (Not built-in to active filter) *9		
OTHERS	CASE SIZE *7	32×90×90mm (W×H×D) [1.26×3.54×3.54 inches]		
	WEIGHT	270g max		
	COOLING METHOD	Convection		

\*1 The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less) is excluded.  
 \*2 Please contact us about dynamic load and input response.  
 \*3 This is the value that measured on measuring board with capacitor of 22μF and 0.1μF at 150mm from output terminal.  
 Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103). Please refer to the instruction manual 1.7.  
 Ripple and ripple noise spec is change at Io=0 to 30% by burst operation.  
 \*4 In case of operating under 0°C ambient temperature, the value is two times of specification at 0 to 30% load factor.  
 \*5 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*6 Please contact us about another class.  
 \*7 Case size contains neither the umbo.  
 \*8 Only as standard mounting orientation (A). Refer to the "Assembling and Installation Method". If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.  
 \*9 When two or more units are operating it may not comply with the IEC61000-3-2.  
 \*10 If the overcurrent protection circuit operates continuously, the output voltage shut down. Refer to the instruction manual 1.3.  
 \*11 Under low DC input voltage below DC110V, the temperature derating -1°C/V or the output power derating -1%/V are required.  
 \* To meet the specifications. Do not operate over-loaded condition.  
 \* A sound may occur from power supply at light or peak loading.

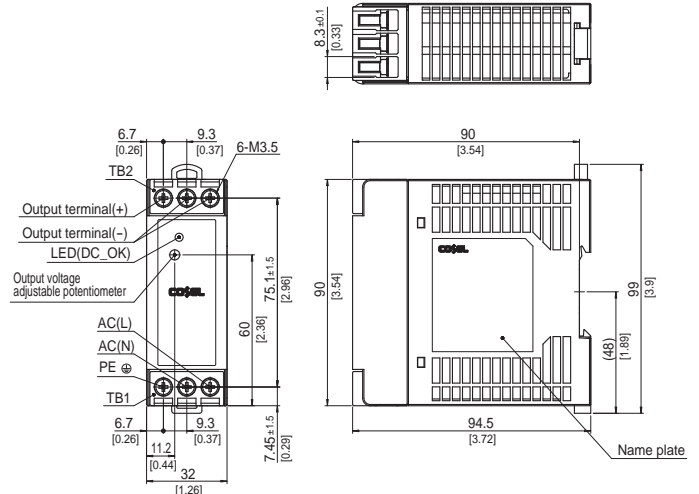
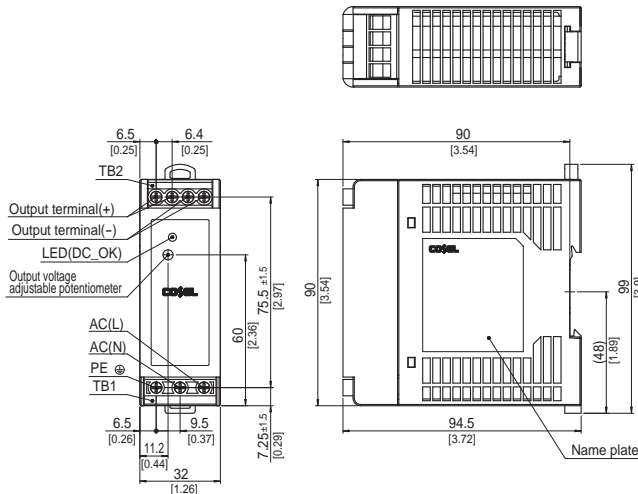
## Block diagram



## External view

<KHEA60F(Euro Style I/O Terminals)>

<KHNA60F(Barrier Blocks Style I/O Terminals)>



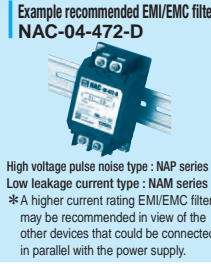
- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 270g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis · Case material : PBT
- ※ Din rail attachment material : PC/ABS
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1N · m max

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 270g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis · Case material : PBT
- ※ Din rail attachment material : PC/ABS
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1.1N · m max

# KHEA/KHNA90F

KH  A 90 F -   -

① ② ③ ④ ⑤ ⑥



- ① Series name  
KHE : Euro style I/O terminals  
KHN : Barrier blocks style I/O terminals
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Option  
C : with Coating  
E : NEC Class2 (24V)

\* Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	KHEA/KHNA90F-12	KHEA/KHNA90F-24
MAX OUTPUT WATTAGE[W]	81.6	91.2
DC OUTPUT	12V 6.8A	24V 3.8A

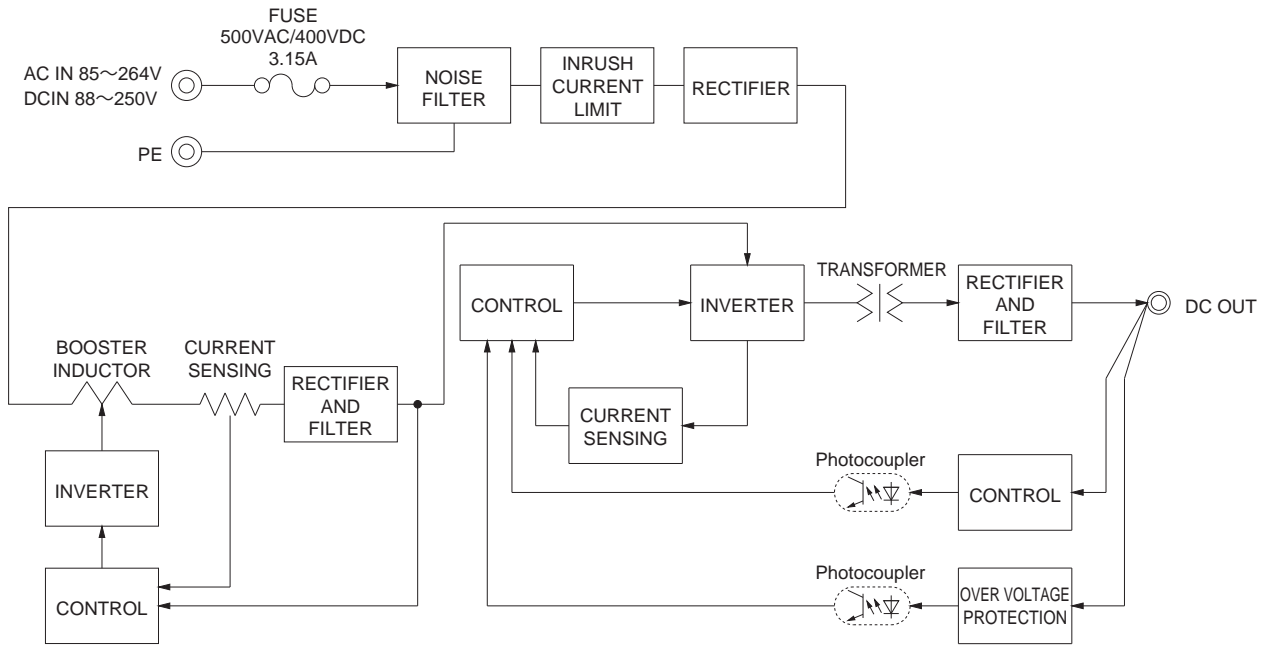
## SPECIFICATIONS

	MODEL	KHEA/KHNA90F-12	KHEA/KHNA90F-24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating") or DC88-250 *10		
	CURRENT[A]	ACIN 115V	0.85typ	0.95typ
		ACIN 230V	0.45typ	0.55typ
	FREQUENCY[Hz]	50 / 60 (45 - 66) or DC		
	EFFICIENCY[%]	ACIN 115V	87.0typ	89.0typ (88.0typ for option -E)
		ACIN 230V	88.0typ	91.0typ (89.5typ for option -E)
	POWER FACTOR (Io=100%)	ACIN 115V	0.98typ	
		ACIN 230V	0.86typ	
INRUSH CURRENT[A]	ACIN 115V	18typ (Io=100%) (at cold start Ta=25°C)		
	*1 ACIN 230V	35typ (Io=100%) (at cold start Ta=25°C)		
LEAKAGE CURRENT[ma]	0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)			
OUTPUT	VOLTAGE[V]	12	24	
	CURRENT[A]	6.8	3.8	
	PEAK CURRENT[A]	-		
	LINE REGULATION[mV] *2	48max	96max	
	LOAD REGULATION[mV] *2	100max	150max	
	RIPPLE[mVp-p] *3	0 to +70°C	200max	200max
		-20 - 0°C	300max	300max
		Io=0 - 30%	300max *4	300max *4
	RIPPLE NOISE[mVp-p] *3	0 to +70°C	260max	260max
		-20 - 0°C	360max	360max
		Io=0 - 30%	360max *4	360max *4
	TEMPERATURE REGULATION[mV]	0 to +70°C	120max	240max
		-20 to +70°C	150max	290max
	DRIFT[mV] *5	48max	96max	
	START-UP TIME[ms]	500typ (ACIN 115V, Io=100%)		
HOLD-UP TIME[ms]	20typ (ACIN 115V, Io=100%)			
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	10.80 to 13.20	22.50 to 28.50 (Fixed for option -E)		
OUTPUT VOLTAGE SETTING[V]	12.00 to 12.48	24.00 to 24.96 (24.00 to 24.50 for option -E)		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (101% for option -E), recovers automatically *9		
	OVERVOLTAGE PROTECTION[V]	13.80 to 16.80	30.00 to 36.00 (26.40 to 33.60 for option -E)	
	DC_OK LAMP	LED (Green)		
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)		
	INPUT-PE	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)		
	OUTPUT-PE	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)		
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-20 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Refer to "Derating")		
	STORAGE TEMP., HUMID. AND ALTITUDE	-30 to +85°C, 20 - 90%RH (Non condensing)		
	VIBRATION *8	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)		
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, X, Y and Z axis (Packing state)		
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	AC input	UL60950-1, C-UL (CSA60950-1), EN60950-1, UL508, NEC Class2 (24V output only option -E), ANSI/ISA12.12.01, ATEX, Complies with DEN-AN	
		DC input	UL60950-1, C-UL (CSA60950-1), EN60950-1	
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B		
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *6		
OTHERS	CASE SIZE *7	50×90×90mm (W×H×D) [1.97×3.54×3.54 inches]		
	WEIGHT	405g max		
	COOLING METHOD	Convection		

\*1 The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less)is excluded.  
 \*2 Please contact us about dynamic load and input response.  
 \*3 This is the value that measured on measuring board with capacitor of 22 μF and 0.1 μF at 150mm from output terminal.  
 Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103). Please refer to the instruction manual 1.7.  
 Ripple and ripple noise spec is change at Io=0 to 30% by burst operation.  
 \*4 In case of operating under 0°C ambient temperature, the value is two times of specification at 0 to 30% load factor.  
 \*5 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the

input voltage held constant at the rated input/output.  
 \*6 Please contact us about another class.  
 \*7 Case size contains neither the umbo.  
 \*8 Only as standard mounting orientation (A). Refer to the "Assembling and Installation Method". If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.  
 \*9 If the overcurrent protection circuit operates continuously, the output voltage shut down. Refer to the instruction manual 1.3.  
 \*10 Under low DC input voltage below DC110V, the temperature derating -1°C/V or the output power derating -1%/V are required.  
 \* To meet the specifications. Do not operate over-loaded condition.  
 \* A sound may occur from power supply at light or peak loading.

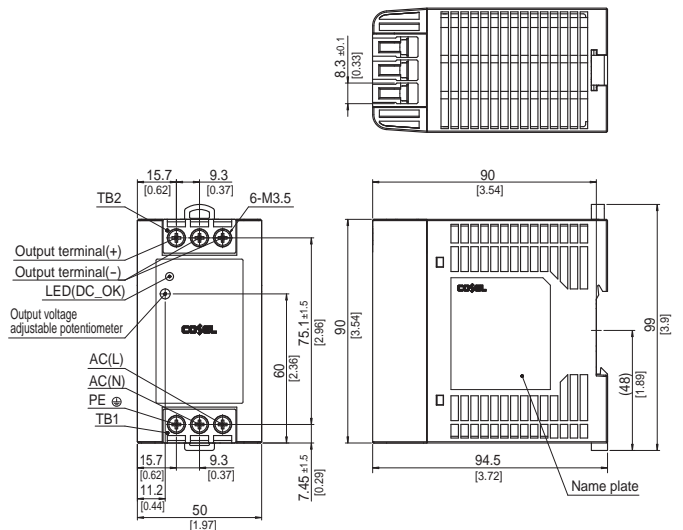
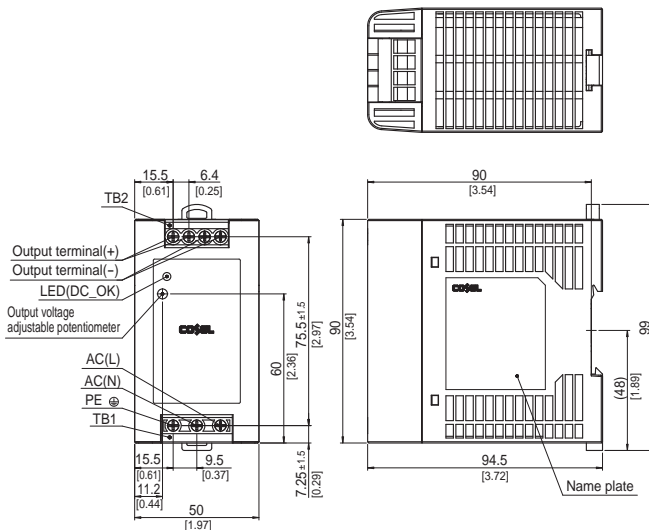
## Block diagram



## External view

<KHEA90F(Euro Style I/O Terminals)>

<KHNA90F(Barrier Blocks Style I/O Terminals)>



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 405g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis · Case material : PBT
- ※ Din rail attachment material : PC/ABS
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1N · m max

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 405g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis · Case material : PBT
- ※ Din rail attachment material : PC/ABS
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1.1N · m max

# KHEA/KHNA120F

KH  A -120 F -24 -

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-04-472-D



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name  
KHE : Euro style I/O terminals  
KHN : Barrier blocks style I/O terminals
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Option  
C : with Coating  
N2: Screw mounting

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	KHEA / KHNA120F-24
MAX OUTPUT WATTAGE[W]	120
DC OUTPUT	24V 5A (Peak 7.5A)

## SPECIFICATIONS

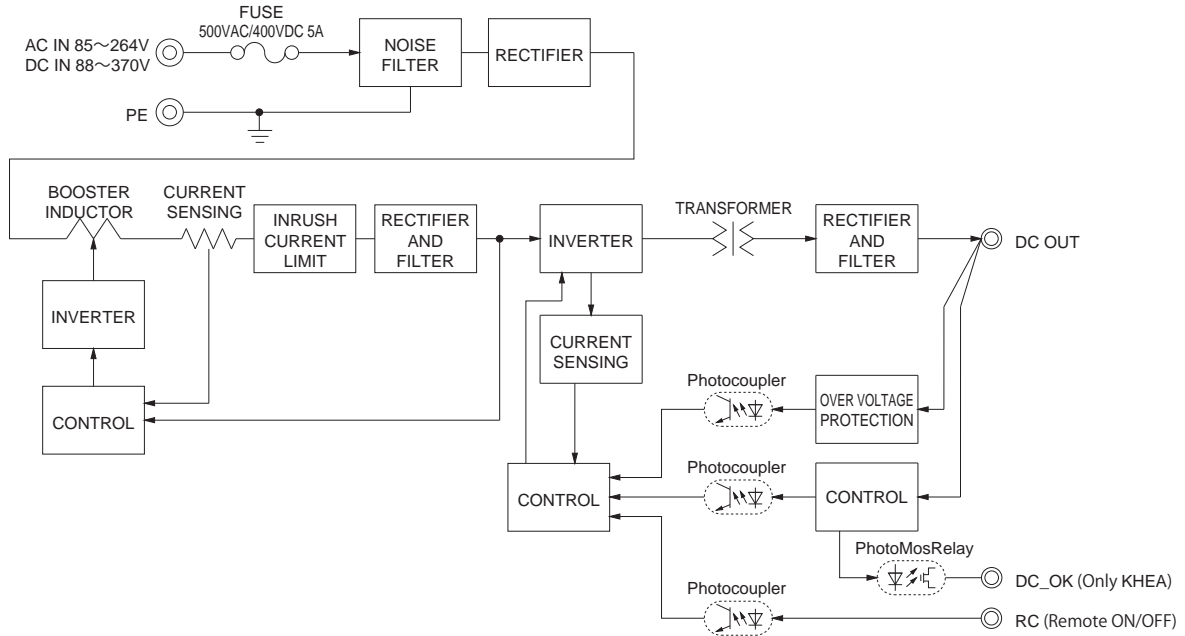
	MODEL	KHEA / KHNA120F-24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ or DC88 - 370 *10	
	CURRENT[A]	ACIN 115V	1.2typ
		ACIN 230V	0.6typ
	FREQUENCY[Hz]	50 / 60 (45 - 66) or DC	
	EFFICIENCY[%]	ACIN 115V	90typ
		ACIN 230V	92typ
	POWER FACTOR	ACIN 115V	0.98typ
		ACIN 230V	0.93typ
	INRUSH CURRENT[A]	ACIN 115V	15typ (at cold start Ta=25°C)
*1 ACIN 230V		30typ (at cold start Ta=25°C)	
LEAKAGE CURRENT[ma]	0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)		
OUTPUT	VOLTAGE[V]	24	
	CURRENT[A]	5	
	PEAK CURRENT[A]	*2 7.5	
	LINE REGULATION[mV]	*3 96max	
	LOAD REGULATION[mV]	*3 150max *4	
	RIPPLE[mVp-p]	0 to +70°C	120max
		*5 -25 - 0°C	240max
		Io=0 - 30%	240max *4
	RIPPLE NOISE[mVp-p]	0 to +70°C	150max
		*5 -25 - 0°C	300max
		Io=0 - 30%	300max *4
	TEMPERATURE REGULATION[mV]	0 to +70°C	240max *4
		-25 to +70°C	360max *4
	DRIFT[mV]	*6 96max	
START-UP TIME[ms]	750max (ACIN 115V, Io=100%)		
HOLD-UP TIME[ms]	20typ (ACIN 115V, Io=100%)		
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	22.5 to 28.5		
OUTPUT VOLTAGE SETTING[V]	24.0±1.0%		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 101% of peak current and recovers automatically	
	OVERVOLTAGE PROTECTION[V]	30.0 to 36.0	
	REMOTE ON/OFF (RC)	Provided	
	DC_OK LAMP	LED (Green)	
	ALARM LAMP	LED (Red)	
DC_OK CONTACT	Relay contact 30VDC 1A max, 30VAC 0.5A max (resistive load) (Only KHEA)		
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)	
	INPUT-PE	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)	
	OUTPUT-PE	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)	
	OUTPUT-RC, DC_OK	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)	
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-25 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Refer to "Derating")	
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 90%RH (Non condensing)	
	VIBRATION	*9 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)	
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis (Packing state)	
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	AC input UL60950-1, C-UL (CSA60950-1), EN60950-1, UL508, ANSI/ISA12.12.01, ATEX, GL, Complies with DEN-AN DC input UL60950-1, C-UL (CSA60950-1), EN60950-1	
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B	
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *7	
OTHERS	CASE SIZE	*8 37×124×117mm (W×H×D) [1.46×4.88×4.61 inches]	
	WEIGHT	580g max	
	COOLING METHOD	Convection	

- \*1 The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less)is excluded.
- \*2 Refer to 2, instruction manual.
- \*3 Please contact us about dynamic load and input response.
- \*4 The output voltage is below 23.5V, the value is equal to three times of the specification.
- \*5 This is the value that measured on measuring board with capacitor of 22 μF and 0.1 μF at 150mm from output terminal.

- Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103). Please refer to the instruction manual 1.7.
- \*6 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25 C, with the input voltage held constant at the rated input/output.
- \*7 Please contact us about another class.
- \*8 Case size contains neither the umbo.

- \*9 Only as standard mounting orientation (A). Refer to the "Assembling and Installation Method". If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.
- \*10 Under low DC input voltage below DC110V, the temperature derating -1C/V or the output power derating -1%/V are required.
- \* To meet the specifications. Do not operate over-loaded condition.
- \* A sound may occur from power supply at light or peak loading.

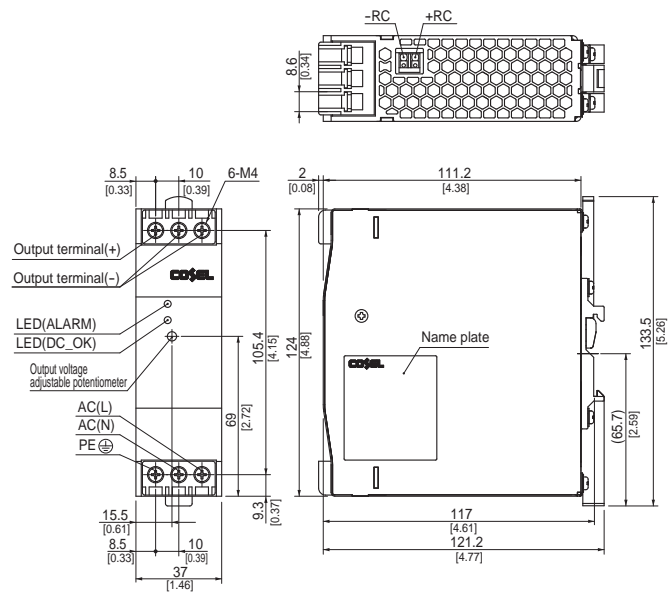
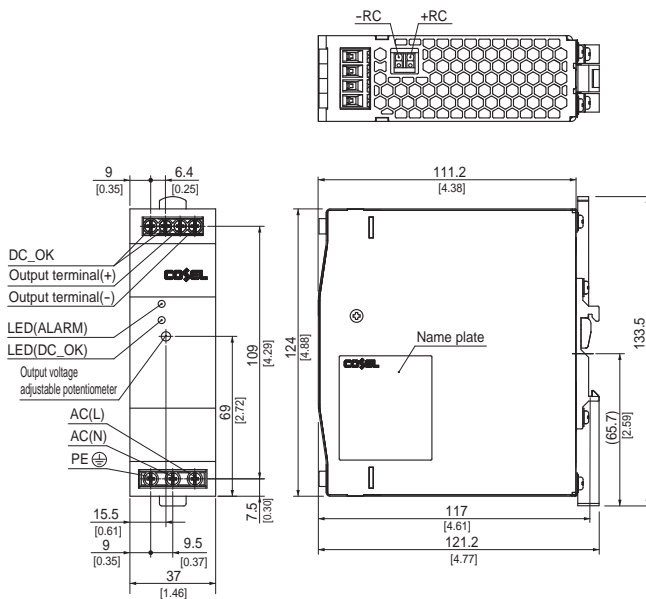
## Block diagram



## External view

<KHEA120F(Euro Style I/O Terminals)>

<KHNA120F(Barrier Blocks Style I/O Terminals)>



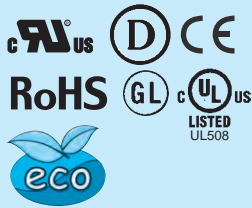
- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 580g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- ※ DIN rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1N · m max

- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 580g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- ※ DIN rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1.6N · m max

# KHEA/KHNA240F

KH  A -240 F -24 -

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472-D



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name  
KHE : Euro style I/O terminals  
KHN : Barrier blocks style I/O terminals
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Option  
C : with Coating  
N2: Screw mounting

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	KHEA / KHNA240F-24
MAX OUTPUT WATTAGE[W]	240
DC OUTPUT	24V 10A (Peak 15A)

## SPECIFICATIONS

	MODEL	KHEA / KHNA240F-24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ or DC88 - 370 *10	
	CURRENT[A]	ACIN 115V	2.3typ
		ACIN 230V	1.2typ
	FREQUENCY[Hz]	50 / 60 (45 - 66) or DC	
	EFFICIENCY[%]	ACIN 115V	92typ
		ACIN 230V	94typ
	POWER FACTOR	ACIN 115V	0.98typ
		ACIN 230V	0.93typ
INRUSH CURRENT[A]	ACIN 115V	20typ (more than 3 sec. to re-start)	
	*1 ACIN 230V	40typ (more than 3 sec. to re-start)	
LEAKAGE CURRENT[ma]	0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)		
OUTPUT	VOLTAGE[V]	24	
	CURRENT[A]	10	
	PEAK CURRENT[A]	*2 15	
	LINE REGULATION[mV]	*3 96max	
	LOAD REGULATION[mV]	*3 150max *4	
	RIPPLE[mVp-p]	0 to +70°C	120max
		*5 -25 - 0°C	240max
		Io=0 - 30%	240max *4
	RIPPLE NOISE[mVp-p]	0 to +70°C	150max
		*5 -25 - 0°C	300max
		Io=0 - 30%	300max *4
	TEMPERATURE REGULATION[mV]	0 to +70°C	240max *4
		*5 -25 to +70°C	360max *4
	DRIFT[mV]	*6 96max	
START-UP TIME[ms]	750max (ACIN 115V, Io=100%)		
HOLD-UP TIME[ms]	20typ (ACIN 115V, Io=100%)		
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	22.5 to 28.5		
OUTPUT VOLTAGE SETTING[V]	24.0 ± 1.0%		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 101% of peak current and recovers automatically	
	OVERVOLTAGE PROTECTION[V]	30.0 to 36.0	
	REMOTE ON/OFF (RC)	Provided	
	DC_OK LAMP	LED (Green)	
	ALARM LAMP	LED (Red)	
DC_OK CONTACT	Relay contact 30VDC 1A max, 30VAC 0.5A max (resistive load) (Only KHEA)		
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)	
	INPUT-PE	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)	
	OUTPUT-PE	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)	
	OUTPUT-RC, DC_OK	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)	
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-25 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Refer to "Derating")	
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 90%RH (Non condensing)	
	VIBRATION	*9 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)	
IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis (Packing state)		
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	AC input UL60950-1, C-UL (CSA60950-1), EN60950-1, UL508, ANSI/ISA12.12.01, ATEX, GL, Complies with DEN-AN DC input UL60950-1, C-UL (CSA60950-1), EN60950-1	
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B	
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *7	
OTHERS	CASE SIZE	*8 50 X 124 X 117mm (W X H X D) [1.97 X 4.88 X 4.61 inches]	
	WEIGHT	900g max	
	COOLING METHOD	Convection	

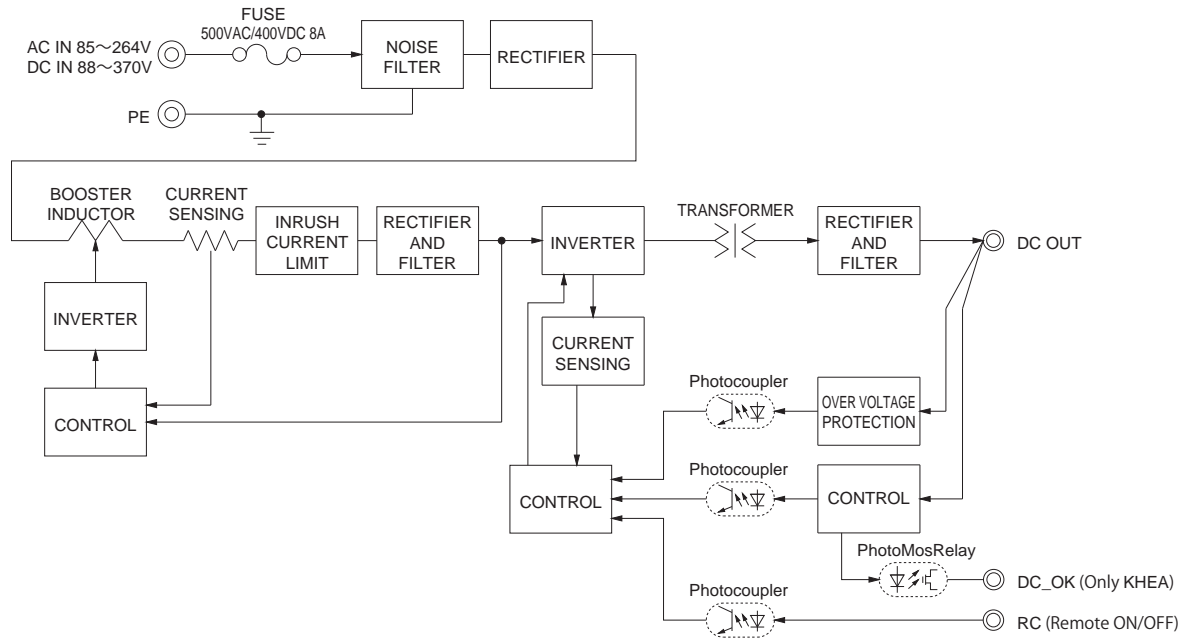


- \*1 The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less)is excluded.
- \*2 Refer to 2, instruction manual.
- \*3 Please contact us about dynamic load and input response.
- \*4 The output voltage is below 23.5V, the value is equal to three times of the specification.
- \*5 This is the value that measured on measuring board with capacitor of 22μF and 0.1μF at 150mm from output terminal.

- Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103). Please refer to the instruction manual 1.7.
- \*6 Drift is the change in DC output for a eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.
- \*7 Please contact us about another class.
- \*8 Case size contains neither the umbo.

- \*9 Only as standard mounting orientation (A). Refer to the "Assembling and Installation Method". If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.
- \*10 Under low DC input voltage below DC110V, the temperature derating -1°C/V or the output power derating -1%/V are required. To meet the specifications. Do not operate over-loaded condition.
- \* A sound may occur from power supply at light or peak loading.

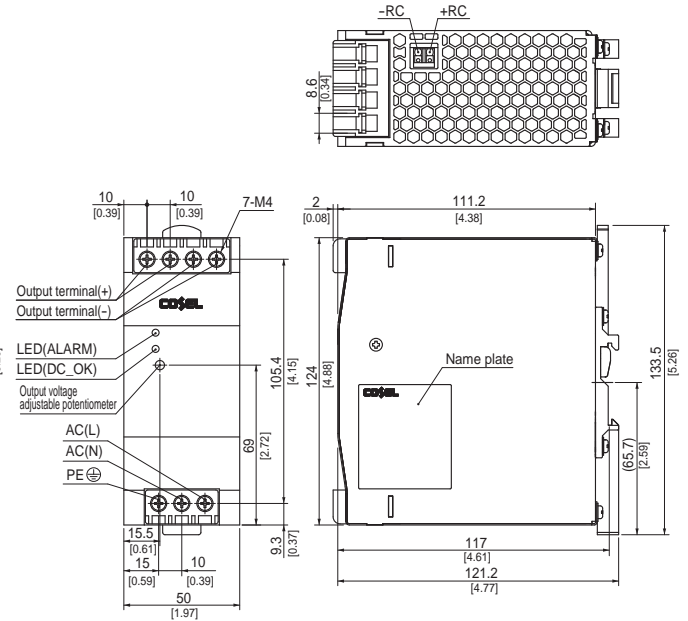
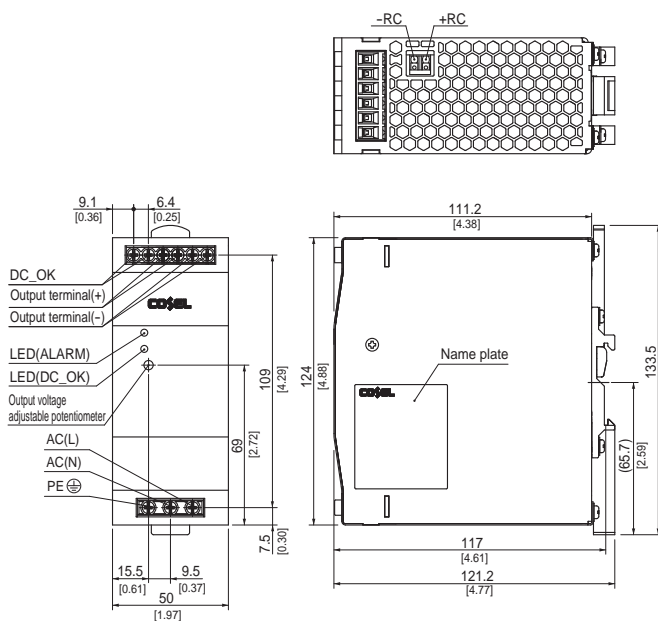
## Block diagram



## External view

<KHEA240F(Euro Style I/O Terminals)>

<KHNA240F(Barrier Blocks Style I/O Terminals)>



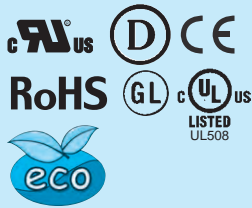
- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 900g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- ※ DIN rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1N · m max

- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 900g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- ※ DIN rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1.6N · m max

# KHEA/KHNA480F

KH  A 480 F -  -

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-10-472-D



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name  
KHE : Euro style I/O terminals  
KHN : Barrier blocks style I/O terminals
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Option  
C : with Coating  
N2: Screw mounting

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	KHEA / KHNA480F-24	KHEA / KHNA480F-48
MAX OUTPUT WATTAGE[W]	480	480
DC OUTPUT	24V 20A (Peak 30A)	48V 10A (Peak 15A)

## SPECIFICATIONS

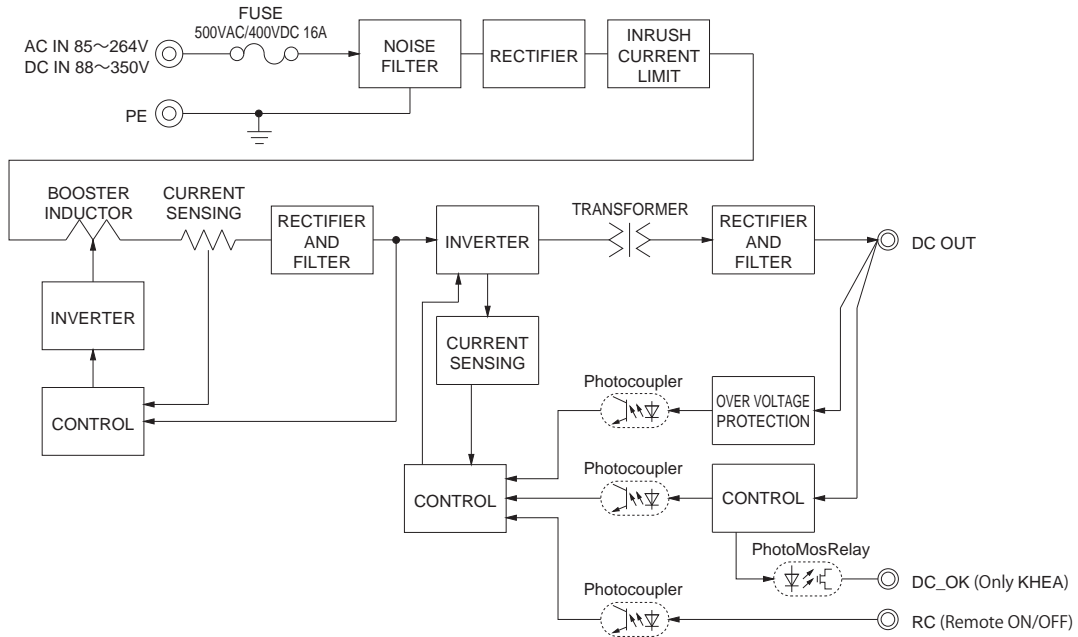
	MODEL	KHEA / KHNA480F-24	KHEA / KHNA480F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Output derating is required) or DC88 - 350 *10		
	CURRENT[A]	ACIN 115V	4.6typ	
		ACIN 230V	2.3typ	
	FREQUENCY[Hz]	50 / 60 (45 - 66) or DC		
	EFFICIENCY[%]	ACIN 115V	92typ	
		ACIN 230V	94typ	
	POWER FACTOR	ACIN 115V	0.98typ	
		ACIN 230V	0.93typ	
INRUSH CURRENT[A]	ACIN 115V	20typ (more than 3 sec. to re-start)		
	*1 ACIN 230V	40typ (more than 3 sec. to re-start)		
LEAKAGE CURRENT[ma]	0.75 / 1.5max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)			
OUTPUT	VOLTAGE[V]	24	48	
	CURRENT[A]	20	10	
	PEAK CURRENT[A]	*2 30	15	
	LINE REGULATION[mV]	*3 96max (Io=30-100%) *9	192max (Io=30-100%) *9	
	LOAD REGULATION[mV]	*3 150max (Io=30-100%) *9	300max (Io=30-100%) *9	
	RIPPLE[mVp-p]	0 to +70°C	120max	120max
		-25 - 0°C	240max	240max
		Io=0 - 30%	500max	750max
	RIPPLE NOISE[mVp-p]	0 to +70°C	150max	150max
		-25 - 0°C	300max	300max
		Io=0 - 30%	600max	750max
	TEMPERATURE REGULATION[mV]	0 to +70°C	240max	480max
		-25 to +70°C	360max	600max
	DRIFT[mV]	*5 96max	192max	
START-UP TIME[ms]	750max (ACIN 115V, Io=100%)			
HOLD-UP TIME[ms]	20typ (ACIN 115V, Io=100%)			
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	22.5 to 26.4	45.0 to 55.2		
OUTPUT VOLTAGE SETTING[V]	24.0±1.0%	48.0±1.0%		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 101% of peak current and recovers automatically		
	OVERVOLTAGE PROTECTION[V]	30.0 to 36.0	57.6 to 67.2	
	REMOTE ON/OFF (RC)	Provided		
	DC_OK LAMP	LED (Green)		
	ALARM LAMP	LED (Red)		
DC_OK CONTACT	Relay contact 30VDC 1A max, 30VAC 0.5A max (resistive load) (Only KHEA)			
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)		
	INPUT-PE	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)		
	OUTPUT-PE	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)		
	OUTPUT-RC, DC_OK	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)		
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-25 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Refer to "Derating")		
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 90%RH (Non condensing)		
	VIBRATION	*8 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)		
IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis (Packing state)			
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	AC input	UL60950-1, C-UL (CSA60950-1), EN60950-1, UL508, ANSI/ISA12.12.01, ATEX, GL (Only 24V), Complies with DEN-AN	
		DC input	UL60950-1, C-UL (CSA60950-1), EN60950-1	
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B		
HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *6			
OTHERS	CASE SIZE	*7 70×124×117mm (W×H×D) [2.76×4.88×4.61 inches]		
	WEIGHT	1,200g max		
	COOLING METHOD	Convection		

- \*1 The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less)is excluded.
- \*2 Refer to 3, instruction manual.
- \*3 Please contact us about dynamic load and input response.
- \*4 This is the value that measured on measuring board with capacitor of 22 μF and 0.1 μF at 150mm from output terminal.  
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).

- \*5 Please refer to the instruction manual 1.7.  
Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25 C, with the input voltage held constant at the rated input/output.
- \*6 Please contact us about another class.
- \*7 Case size contains neither the umbo.
- \*8 Only as standard mounting orientation (A). Refer to the "Assembling and Installation Method".

- If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.
- \*9 Burst operation at 30% load or less.
- \*10 Under low DC input voltage below DC110V, the temperature derating -1C/V or the output power derating -1%/V are required.
- \* To meet the specifications. Do not operate over-loaded condition.
- \* A sound may occur from power supply at light or peak loading.

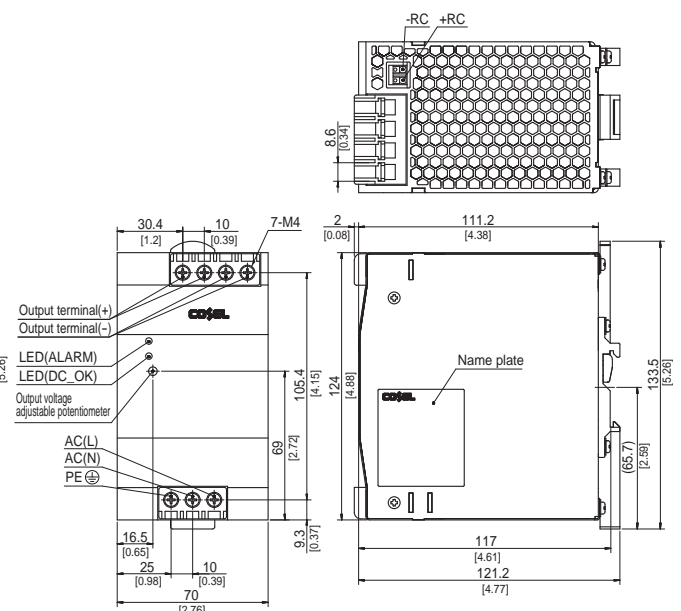
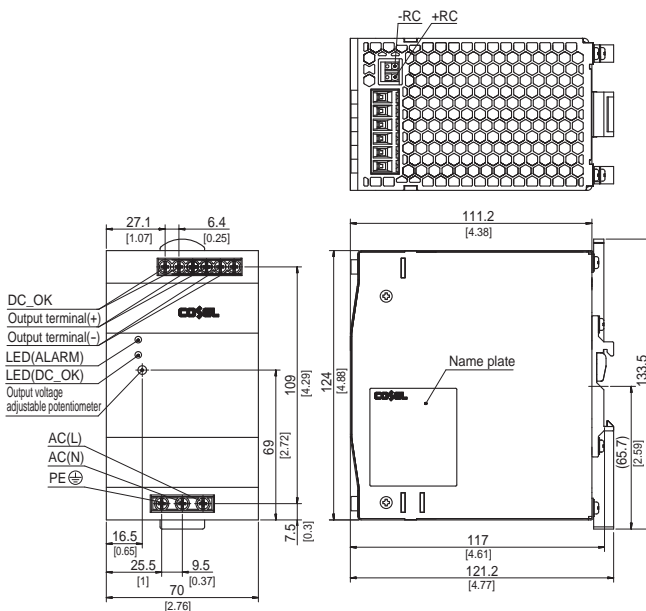
## Block diagram



## External view

<KHEA480F(Euro Style I/O Terminals)>

<KHNA480F(Barrier Blocks Style I/O Terminals)>

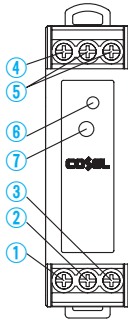


- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 1,200g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- ※ DIN rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1N · m max

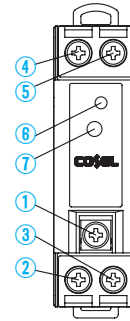
- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 1,200g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- ※ DIN rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1.6N · m max

**Terminal Blocks**

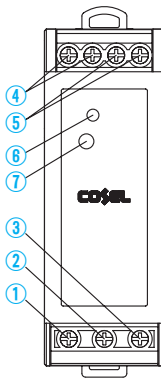
● **KHEA30F**



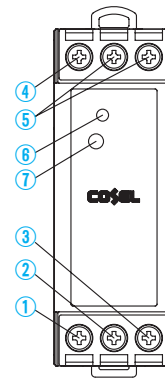
● **KHNA30F**



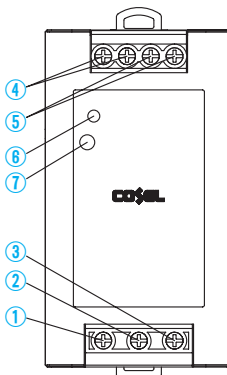
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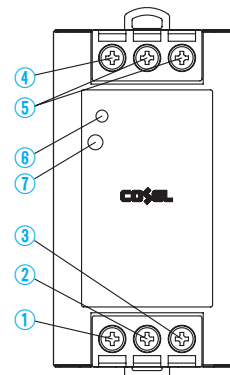
● **KHNA60F**



● **KHEA90F**



● **KHNA90F**

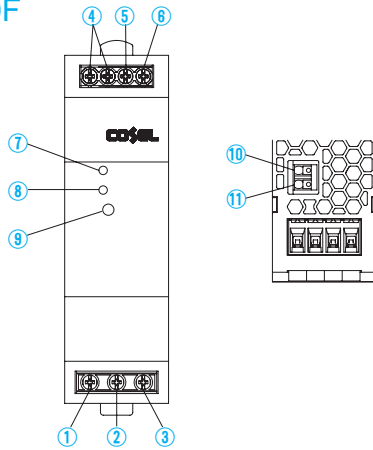


**KH**

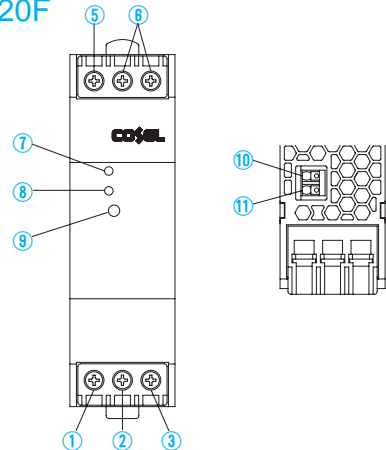
Terminal Number	Terminal Name	Function
①	PE	Protective earth Terminal
②	AC (N)	Input Terminals
③	AC (L)	
④	+VOUT	+Output Terminals
⑤	-VOUT	-Output Terminals
⑥	DC_OK	LED for output voltage confirmation
⑦	TRM	Adjustment of output voltage

## Terminal Blocks

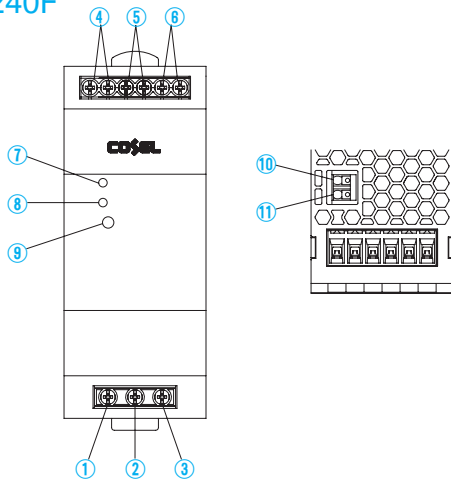
### ● KHEA120F



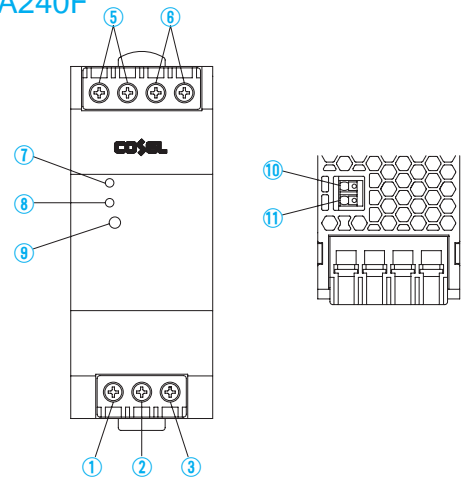
### ● KHNA120F



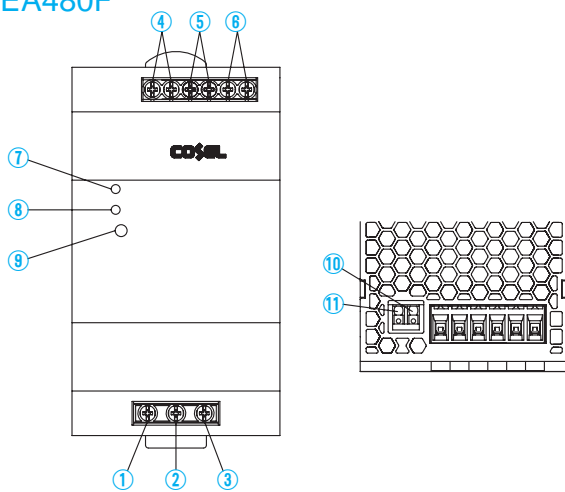
### ● KHEA240F



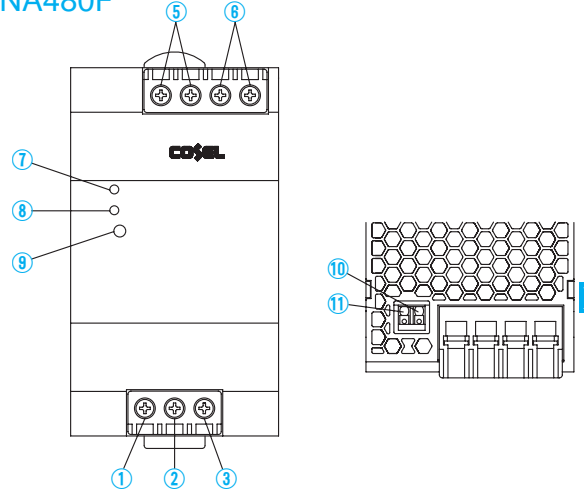
### ● KHNA240F



### ● KHEA480F



### ● KHNA480F



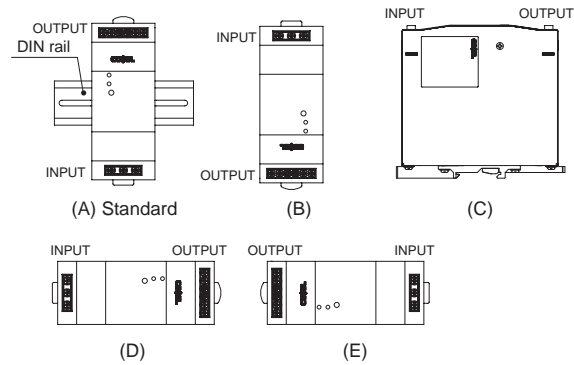
Terminal Number	Terminal Name	Function
①	PE	Protective earth Terminal
②	AC (N)	Input Terminals
③	AC (L)	
④	DC_OK	Output voltage confirmation(relay contact)
⑤	+VOUT	+Output Terminals
⑥	-VOUT	-Output Terminals

Terminal Number	Terminal Name	Function
⑦	ALARM	LED Alarm for lowered output voltage
⑧	DC_OK	LED for output voltage confirmation
⑨	TRM	Adjustment of output voltage
⑩	+RC	Remote ON/OFF Terminals
⑪	-RC	

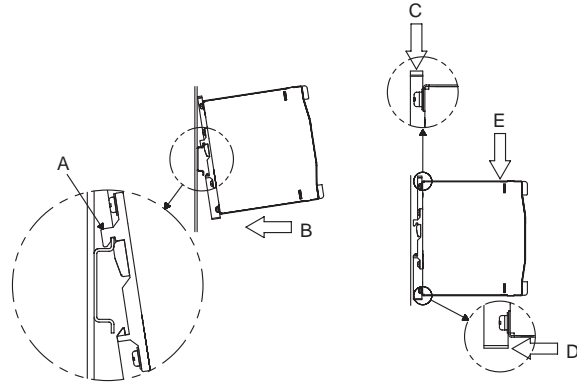
Assembling and Installation Method

Installation method

- About DIN-Rail Attachment available with DIN EN60715 TH 35 (35×7.5mm or 35×15mm) (Top hat shaped DIN rail)
- Below shows mounting orientation.  
If install other than standard mounting orientation (A), please fix the power supply for withstand the impact and vibration.



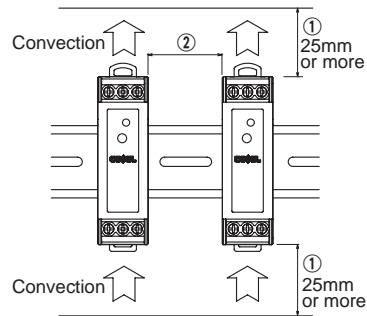
- When you mount a power supply on a DIN rail, have the area marked A catch one side of the rail and push the unit to the direction of B. To remove the power supply from the rail, either push down the area marked C or insert a tool such as driver to the area marked D and pull the unit apart from the rail. When you couldn't remove the unit easily, push down the area marked C while lightly pushing the unit to the direction of E.



- Shown below the notes about installation clearance of a unit.

● KHEA30F/60F/90F, KHNA30F/60F/90F

- ① Installation clearance at above and below the unit.  
Please have clearance of at least 25mm above and below the unit to avoid heat accumulation.
- ② Installation clearance at the side of the unit.  
Please have clearance of at least 5mm side the unit to insulating the internal components. However, refer to right figure, if adjacent device of the unit (including power supply) is a heat source.



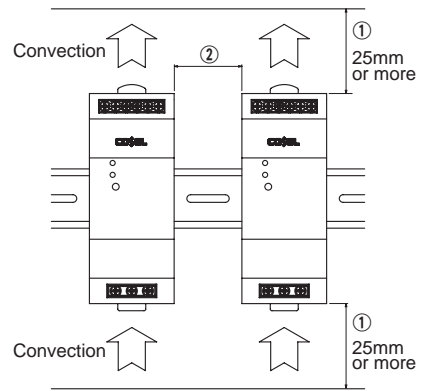
No.	Model	Adjacent device of the unit	
		Non-heat source	Heat source(*)
1	KHEA30F, KHNA30F	5mm or more	15mm or more
2	KHEA60F, KHNA60F	5mm or more	15mm or more
3	KHEA90F, KHNA90F	5mm or more	15mm or more

\*Reference value when same power units are adjacent.

### Assembling and Installation Method

#### ● KHEA120F/240F/480F, KHNA120F/240F/480F

- ① Installation clearance at above and below the unit.  
Please have clearance of at least 25mm above and below the unit to avoid heat accumulation.
- ② Installation clearance at the side of the unit.  
Please have clearance of at least 15mm side the unit to avoid interfering with heat radiation from housing. However, refer to right figure, if adjacent device of the unit (including power supply) is a heat source.



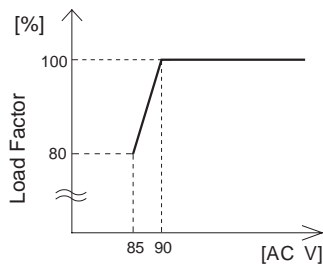
No.	Model	Adjacent device of the unit	
		Non-heat source	Heat source(*)
1	KHEA120F, KHNA120F	15mm or more	
2	KHEA240F, KHNA240F	15mm or more	
3	KHEA480F, KHNA480F	15mm or more	50mm or more

\* Reference value when same power units are adjacent.

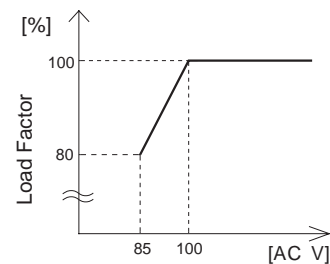
### Derating

#### Derating curve for input voltage

#### ● KHEA30F/60F/90F, KHNA30F/60F/90F



#### ● KHEA480F, KHNA480F



#### Ambient temperature derating

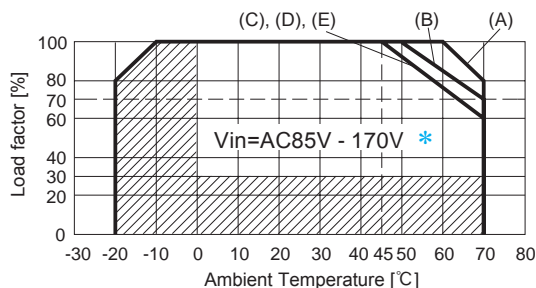
■ The operative ambient temperature as different by input voltage. Derating curve is shown below.

■ In the hatched area, the specification of Ripple, Ripple Noise is different from other area.

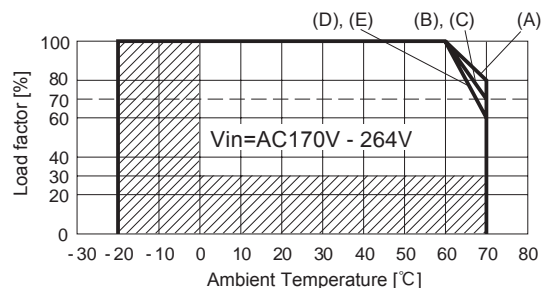
■ Derating Curve (Convection)

■ Refer to instruction manual 4 for Ambient temperature measurement point.

#### ● KHEA30F, KHNA30F

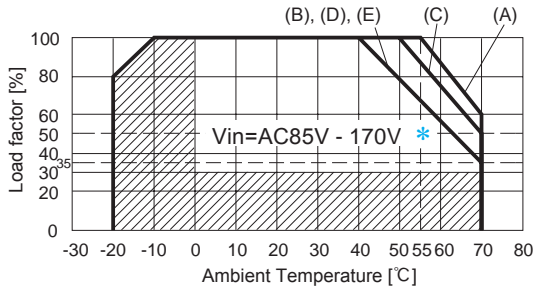


\* Derating curve depend on input voltage is required.

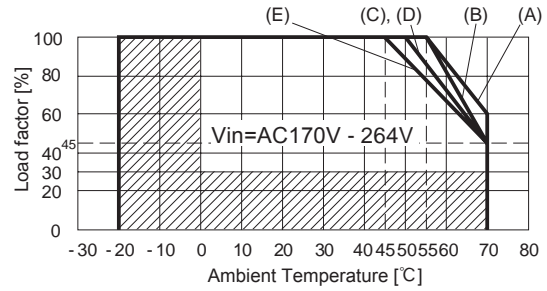


Derating

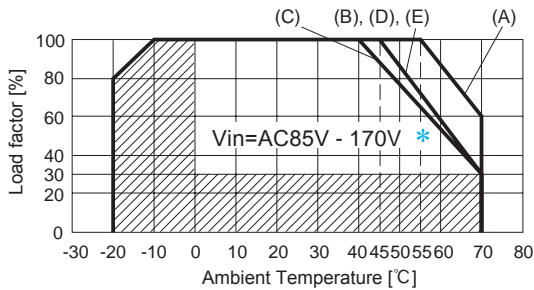
● KHEA60F, KHNA60F



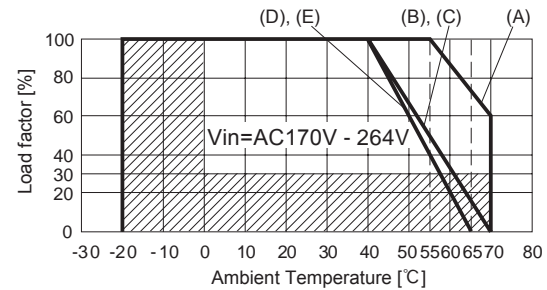
\* Derating curve depend on input voltage is required.



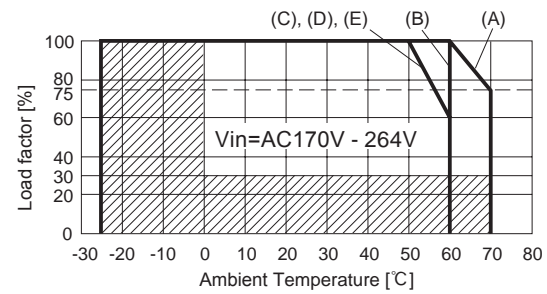
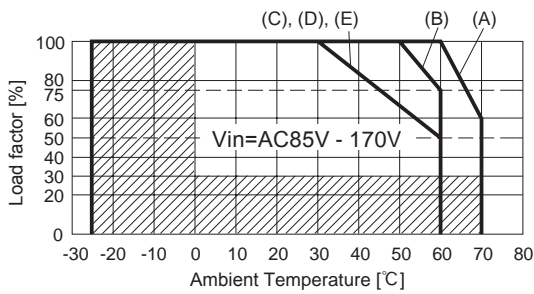
● KHEA90F, KHNA90F



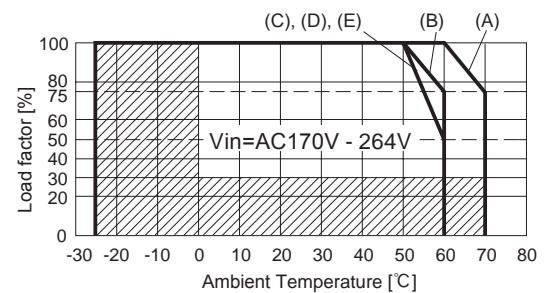
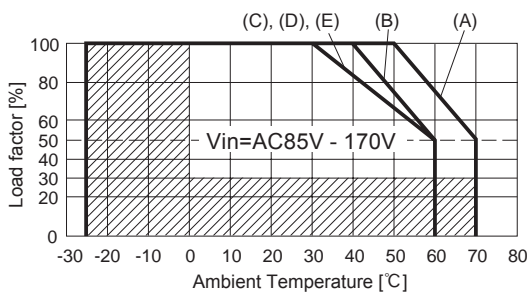
\* Derating curve depend on input voltage is required.



● KHEA120F, KHNA120F



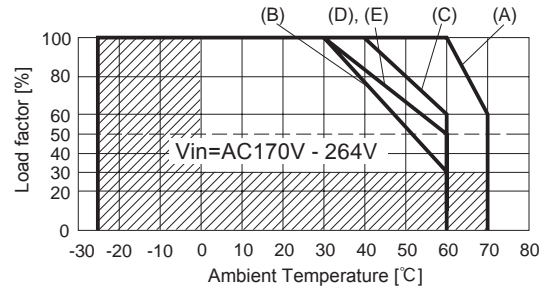
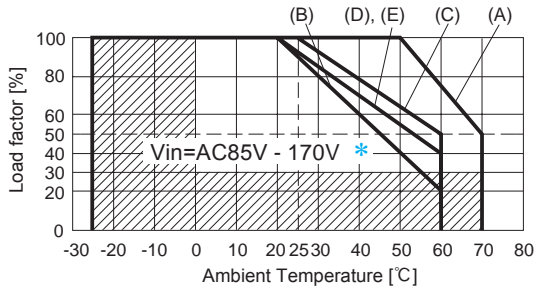
● KHEA240F, KHNA240F





Derating

● KHEA480F, KHNA480F

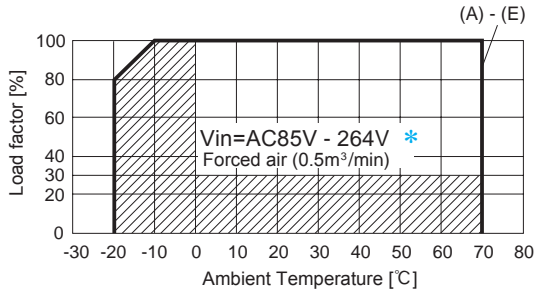


\* Derating curve depend on input voltage is required.

■ Derating Curve (Forced air)

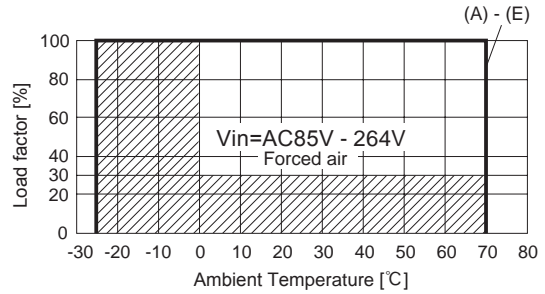
■ Use the temperature measurement point as shown in instruction manual 4. Please use at the temperature dose not exceed the values in instruction manual 4.

● KHEA30F/60F/90F, KHNA30F/60F/90F

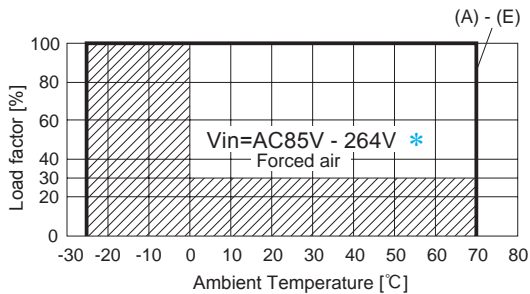


\* Derating curve depend on input voltage is required.

● KHEA120F/240F, KHNA120F/240F



● KHEA480F, KHNA480F



\* Derating curve depend on input voltage is required.

## Instruction Manual

◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual      <https://en.cosel.co.jp/product/powersupply/KH/>  
 Before using our product      <https://en.cosel.co.jp/technical/caution/index.html>

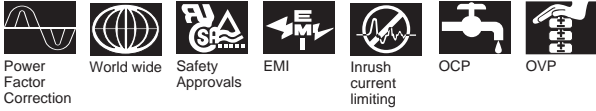


## Basic Characteristics Data

Model	Circuit method	Switching frequency *2 [kHz]	Input current [A] *1	Rated input fuse	Inrush current protection circuit	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
KHEA30F KHNA30F	Flyback converter	50 - 200	0.55	500VAC/400VDC 3.15A	Thermistor	FR-4		Yes	Yes	No
KHEA60F KHNA60F	Flyback converter	50 - 200	1.10	500VAC/400VDC 3.15A	Thermistor	FR-4		Yes	Yes	No
KHEA90F KHNA90F	Active filter Flyback converter	20 - 500 50 - 200	0.95	500VAC/400VDC 3.15A	Thermistor	FR-4		Yes	Yes	No
KHEA120F KHNA120F	Active filter LLC resonant converter	60 - 550 45 - 350	1.2	500VAC/400VDC 5A	Thermistor	FR-4		Yes	Yes	No
KHEA240F KHNA240F	Active filter LLC resonant converter	60 - 550 45 - 350	2.3	500VAC/400VDC 8A	SCR	FR-4		Yes	Yes	No
KHEA480F KHNA480F	Active filter LLC resonant converter	60 - 150 45 - 350	4.6	500VAC/400VDC 16A	Relay	FR-4		Yes	Yes	No

\*1 The value of input current is at ACIN 115V and 100%.

\*2 Burst operation at light loading, frequency is change by use condition.  
 Please contact us about detail.



# KL-series



## ■ Feature

For DIN (35mm) rail products  
Wide operating ambient temperature range  
I/O terminal has 2 types, Euro Style and Barrier Blocks Style  
Built in overcurrent protection, overvoltage protection circuits  
Complies with SEMI F-47 (refer to Instruction Manual 1.1)

## ■ Safety agency approvals

UL60950-1, UL508, C-UL (CSA60950-1), EN60950-1  
Complies with DEN-AN

## ■ 5-year warranty (refer to Instruction Manual)

## ■ CE marking

Low Voltage Directive  
RoHS Directive

## ■ EMI

Complies with FCC-B, CISPR22-B, EN55011-B, EN55022-B, VCCI-B

## ■ EMS Compliance : EN61204-3, EN61000-6-2

EN61000-4-2  
EN61000-4-3  
EN61000-4-4  
EN61000-4-5  
EN61000-4-6  
EN61000-4-8  
EN61000-4-11

# KLEA/KLNA120F

KL  A 120 F -   -

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-04-472-D



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\*A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name  
KLE : Euro Style I/O Terminals  
KLN : Barrier Blocks Style I/O Terminals
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Option  
C : with Coating  
N2 : Screw mounting

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	KLEA/KLNA120F-24	KLEA/KLNA120F-48
MAX OUTPUT WATTAGE[W]	120	120
DC OUTPUT	24V 5A	48V 2.5A

## SPECIFICATIONS

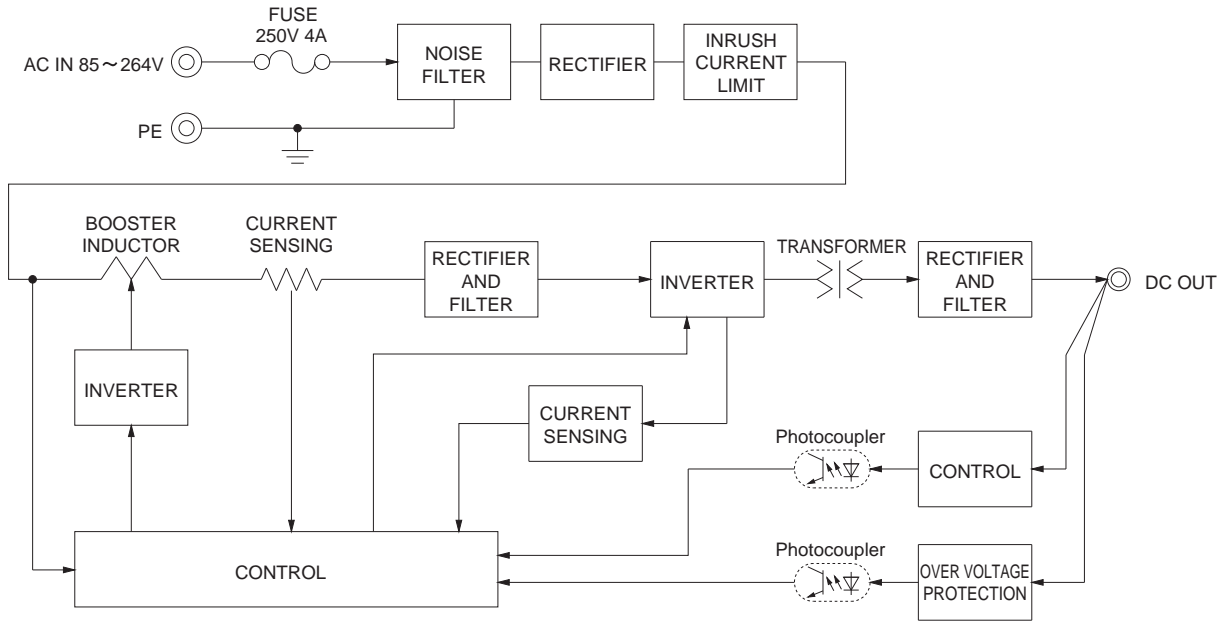
	MODEL	KLEA/KLNA120F-24	KLEA/KLNA120F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating") *9		
	CURRENT[A]	ACIN 115V	1.2typ	
		ACIN 230V	0.6typ	
	FREQUENCY[Hz]	50 / 60 (45 - 66)		
	EFFICIENCY[%]	ACIN 115V	86.5typ	
		ACIN 230V	88.0typ	
	POWER FACTOR	ACIN 115V	0.98typ	
ACIN 230V		0.90typ		
INRUSH CURRENT[A]	ACIN 115V	20typ (Io=100%)(at cold start Ta=25°C)		
	*1 ACIN 230V	40typ (Io=100%)(at cold start Ta=25°C)		
LEAKAGE CURRENT[ma]	0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)			
OUTPUT	VOLTAGE[V]	24	48	
	CURRENT[A]	5	2.5	
	LINE REGULATION[mV] *2	96max (Io=30-100%) *8	192max (Io=30-100%) *8	
	LOAD REGULATION[mV] *2	150max (Io=30-100%) *8	300max (Io=30-100%) *8	
	RIPPLE[mVp-p] *3	0 to +70°C	150max	150max
		-20 - 0°C	240max	240max
		Io=0 - 30%	500max	650max
	RIPPLE NOISE[mVp-p] *3	0 to +70°C	180max	180max
		-20 - 0°C	300max	300max
		Io=0 - 30%	500max	650max
	TEMPERATURE REGULATION[mV]	0 to +70°C	240max	480max
		-20 to +70°C	290max	600max
	DRIFT[mV] *4	96max	192max	
START-UP TIME[ms]	500typ (ACIN 115V, Io=100%)			
HOLD-UP TIME[ms]	20typ (ACIN 115V, Io=100%)			
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	21.60 to 26.40	43.20 to 52.80		
OUTPUT VOLTAGE SETTING[V]	24.00 to 24.96	48.00 to 49.92		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically		
	OVERVOLTAGE PROTECTION[V]	27.60 to 33.60	54.00 to 67.20	
	DC_OK LAMP	LED (Green)		
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)		
	INPUT-PE	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)		
	OUTPUT-PE	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)		
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-20 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Refer to "Derating")		
	STORAGE TEMP., HUMID. AND ALTITUDE	-30 to +85°C, 20 - 90%RH (Non condensing)		
	VIBRATION *7	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)		
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis (Packing state)		
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, UL508, Complies with DEN-AN		
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B		
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *5		
OTHERS	CASE SIZE *6	38 X 124 X 117mm (W X H X D) [1.5 X 4.88 X 4.61 inches]		
	WEIGHT	580g max		
	COOLING METHOD	Convection		

\*1 The value is primary surge. The current of input surge to a built-in EMI/EMC Filter (0.2ms or less) is excluded.  
\*2 Please contact us about dynamic load and input response.  
\*3 This is the value that measured on measuring board with capacitor of 22 μF and 0.1 μF at 150mm from output terminal.  
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).  
Please refer to the instruction manual 1.5.

\*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
\*5 Please contact us about another class.  
\*6 Case size contains neither the umbo.  
\*7 Only as standard mounting orientation (A). Refer to "Assembling and Installation Method".  
If install other than standard mounting orientation (A), please fix the power

supply for withstand the vibration and impact.  
\*8 Burst operation at 30% load or less.  
\*9 Please contact us about DC input voltage.  
\* To meet the specifications. Do not operate over-loaded condition.  
\* A sound may occur from power supply at light or peak loading.

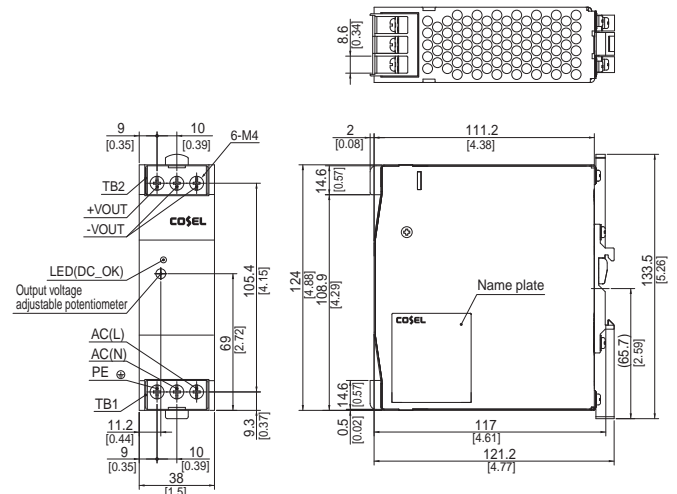
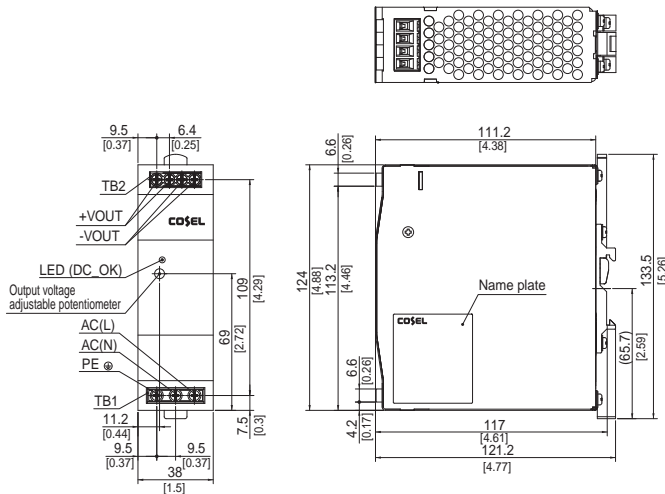
Block diagram



External view

<KLEA120F(Euro Style I/O Terminals)>

<KLNA120F(Barrier Blocks Style I/O Terminals)>



- ※ Tolerance :  $\pm 1.5$  [ $\pm 0.06$ ]
- ※ Weight : 580g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- ※ Din rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1N · m max

- ※ Tolerance :  $\pm 1.5$  [ $\pm 0.06$ ]
- ※ Weight : 580g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- ※ Din rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1.6N · m max

# KLEA/KLNA240F

KL  A 240 F -   -

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472-D



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\*A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name  
KLE : Euro Style I/O Terminals  
KLN : Barrier Blocks Style I/O Terminals
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Option  
C : with Coating  
N2: Screw mounting

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	KLEA/KLNA240F-24	KLEA/KLNA240F-48
MAX OUTPUT WATTAGE[W]	240	240
DC OUTPUT	24V 10A	48V 5A

## SPECIFICATIONS

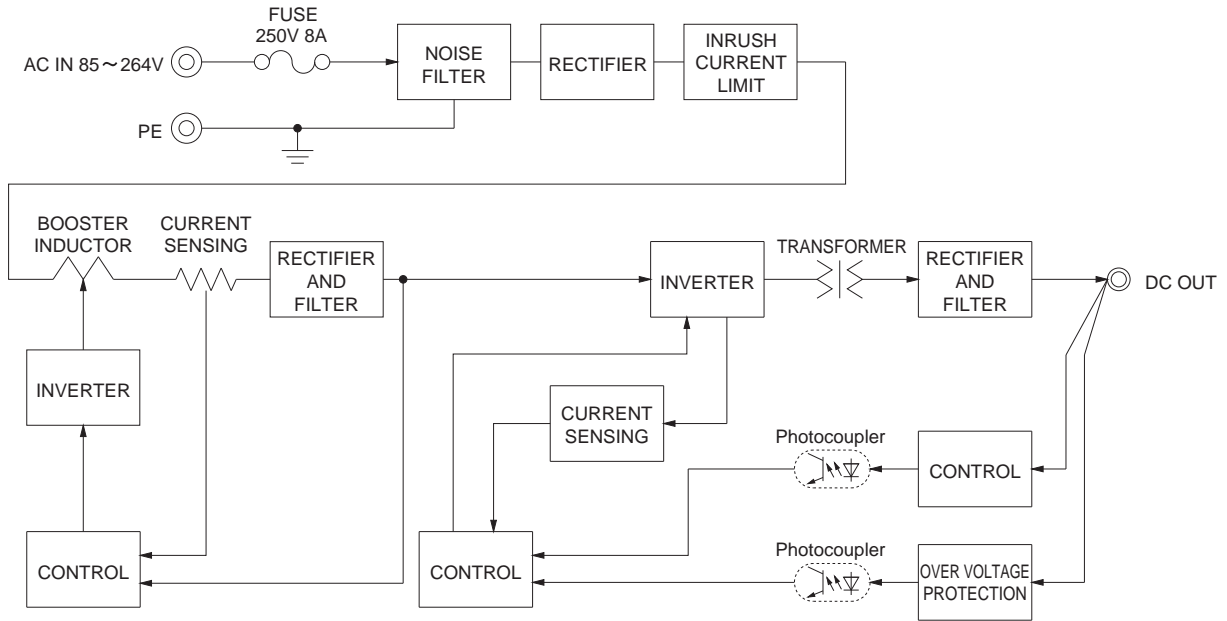
	MODEL	KLEA/KLNA240F-24	KLEA/KLNA240F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating") *8		
	CURRENT[A]	ACIN 115V	2.4typ	
		ACIN 230V	1.3typ	
	FREQUENCY[Hz]	50 / 60 (45 - 66)		
	EFFICIENCY[%]	ACIN 115V	88typ	
		ACIN 230V	90typ	
	POWER FACTOR	ACIN 115V	0.98typ	
		ACIN 230V	0.90typ	
INRUSH CURRENT[A]	ACIN 115V	20typ (Io=100%)(at cold start Ta=25°C)		
	ACIN 230V	40typ (Io=100%)(at cold start Ta=25°C)		
LEAKAGE CURRENT[ma]	0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)			
OUTPUT	VOLTAGE[V]	24	48	
	CURRENT[A]	10	5	
	LINE REGULATION[mV] *2	96max		
	LOAD REGULATION[mV] *2	150max		
	RIPPLE[mVp-p] *3	0 to +70°C	150max	150max
		-20 - 0°C	240max	240max
	RIPPLE NOISE[mVp-p] *3	0 to +70°C	180max	180max
		-20 - 0°C	300max	300max
	TEMPERATURE REGULATION[mV]	0 to +70°C	240max	480max
		-20 to +70°C	290max	600max
	DRIFT[mV] *4	96max		
	START-UP TIME[ms]	500typ (ACIN 115V, Io=100%)		
HOLD-UP TIME[ms]	20typ (ACIN 115V, Io=100%)			
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	21.60 to 26.40	43.20 to 52.80		
OUTPUT VOLTAGE SETTING[V]	24.00 to 24.96	48.00 to 49.92		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically		
	OVERVOLTAGE PROTECTION[V]	27.60 to 33.60	54.00 to 67.20	
	DC_OK LAMP	LED (Green)		
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)		
	INPUT-PE	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)		
	OUTPUT-PE	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)		
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-20 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Refer to "Derating")		
	STORAGE TEMP., HUMID. AND ALTITUDE	-30 to +85°C, 20 - 90%RH (Non condensing)		
	VIBRATION *7	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)		
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis (Packing state)		
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1), EN60950-1, UL508, Complies with DEN-AN		
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B		
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *5		
OTHERS	CASE SIZE *6	50 × 124 × 117mm (W × H × D) [1.97 × 4.88 × 4.61 inches]		
	WEIGHT	750g max		
	COOLING METHOD	Convection		

\*1 The value is primary surge. The current of input surge to a built-in EMI/EMC Filter (0.2ms or less) is excluded.  
\*2 Please contact us about dynamic load and input response.  
\*3 This is the value that measured on measuring board with capacitor of 22 μF and 0.1 μF at 150mm from output terminal.  
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).  
Please refer to the instruction manual 1.5.

\*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
\*5 Please contact us about another class.  
\*6 Case size contains neither the umbo.  
\*7 Only as standard mounting orientation (A). Refer to "Assembling and Installation Method".  
If install other than standard mounting orientation (A), please fix the power

supply for withstand the vibration and impact.  
\*8 Please contact us about DC input voltage.  
\* To meet the specifications. Do not operate over-loaded condition.  
\* A sound may occur from power supply at light or peak loading.

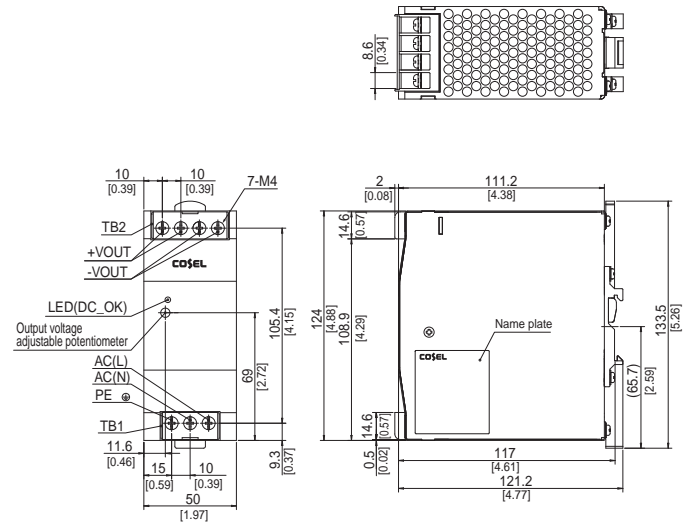
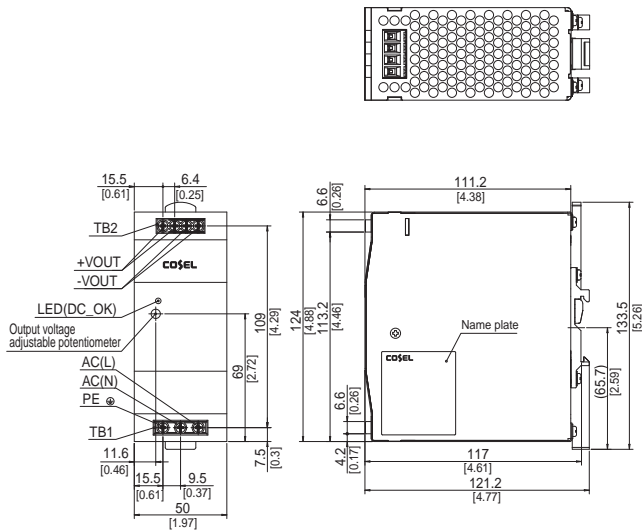
## Block diagram



## External view

<KLEA240F(Euro Style I/O Terminals)>

<KLNA240F(Barrier Blocks Style I/O Terminals)>

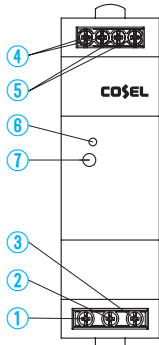


- ※ Tolerance :  $\pm 1.5$  [ $\pm 0.06$ ]
- ※ Weight : 750g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- ※ Din rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1N · m max

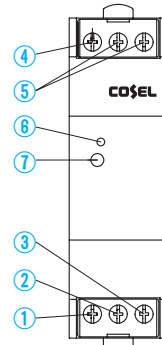
- ※ Tolerance :  $\pm 1.5$  [ $\pm 0.06$ ]
- ※ Weight : 750g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- ※ Din rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1.6N · m max

Terminal Blocks

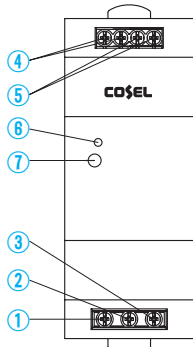
● KLEA120F



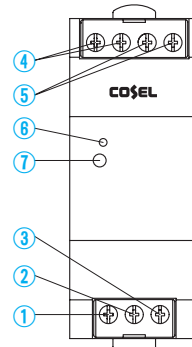
● KLNA120F



● KLEA240F



● KLNA240F



Terminal Number	Terminal Name	Function
①	PE	Protective earth Terminal
②	AC (N)	Input Terminals
③	AC (L)	
④	+VOUT	+Output Terminals
⑤	-VOUT	-Output Terminals
⑥	DC_OK	LED for output voltage confirmation
⑦	TRM	Adjustment of output voltage

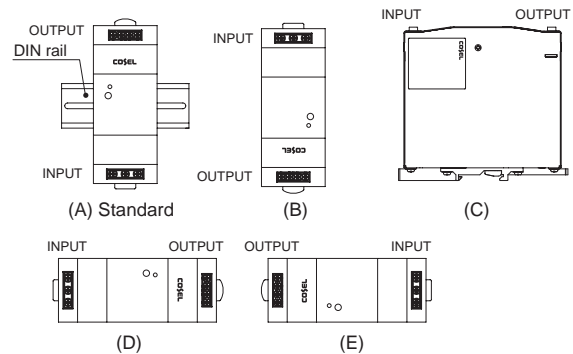
Assembling and Installation Method

Installation method

■ About DIN-Rail Attachment available with DIN EN60715 TH 35 (35×7.5mm or 35×15mm) (Top hat shaped DIN rail)

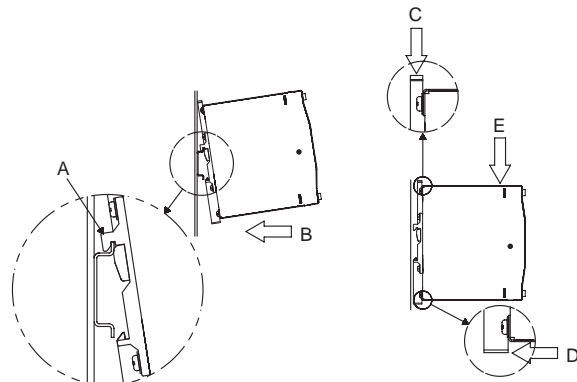
■ Below shows mounting orientation.

If install other than standard mounting orientation (A), please fix the power supply for withstand the impact and vibration.



■ When you mount a power supply on a DIN rail, have the area marked A catch one side of the rail and push the unit to the direction of B. To remove the power supply from the rail, either push down the area marked C or insert a tool such as driver to the area marked D and pull the unit apart from the rail.

When you couldn't remove the unit easily, push down the area marked C while lightly pushing the unit to the direction of E.

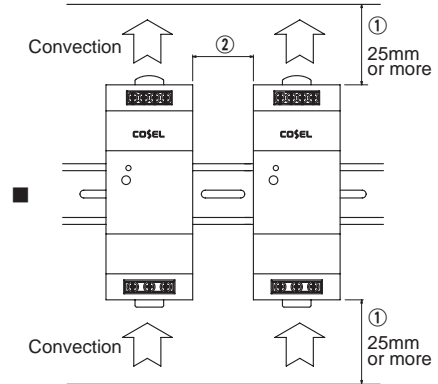




### Assembling and Installation Method

■ Shown below the notes about installation clearance of a unit.

- ① Installation clearance at above and below the unit.  
Please have clearance of at least 25mm above and below the unit to avoid heat accumulation.
- ② Installation clearance at the side of the unit.  
Please have clearance of at least 5mm side the unit to insulating the internal components. However, refer to right figure, if adjacent device of the unit (including power supply) is a heat source.

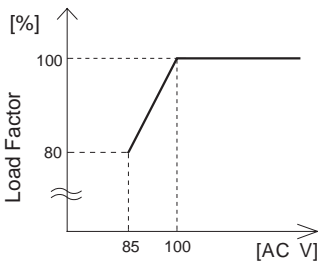


No.	Model	Adjacent device of the unit	
		Non-heat source	Heat source(*)
1	KLEA120F, KLNA120F	15mm or more	25mm or more
2	KLEA240F, KLNA240F	15mm or more	25mm or more

\* Reference value when same power units are adjacent.

### Derating

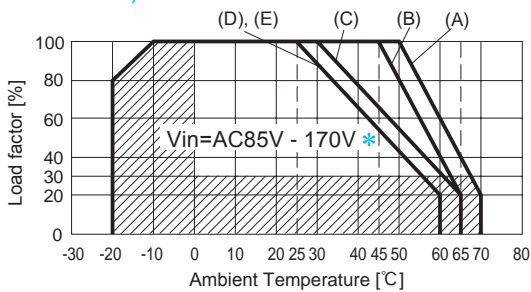
#### Derating curve for input voltage



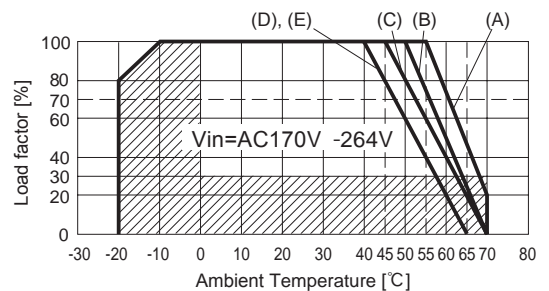
#### Ambient temperature derating

- The operative ambient temperature as different by input voltage. Derating curve is shown below.
- In the hatched area, the specification of Ripple, Ripple Noise is different from other area.
- Derating Curve (Convection)
- Refer to instruction manual 3 for Ambient temperature measurement point.

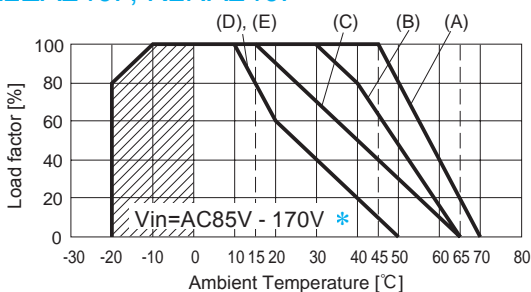
#### ● KLEA120F, KLNA120F



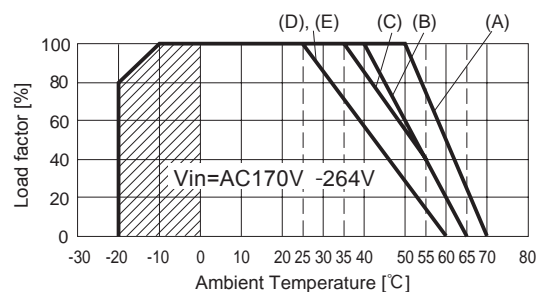
\* Derating curve depend on input voltage is required.



#### ● KLEA240F, KLNA240F



\* Derating curve depend on input voltage is required.

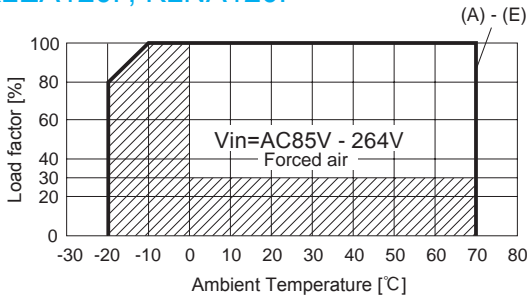


## Derating

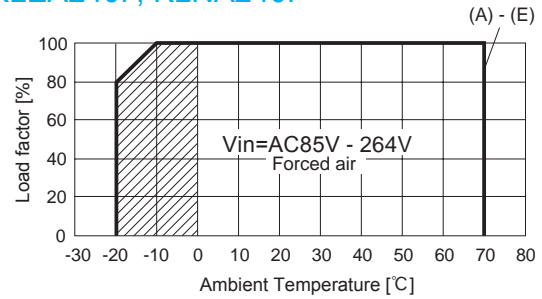
■ Derating Curve (Forced air)

■ Use the temperature measurement point as shown in instruction manual 3. Please use at the temperature dose not exceed the values in instruction manual 3.

### ● KLEA120F, KLNA120F



### ● KLEA240F, KLNA240F



## Instruction Manual

◆ It is necessary to read the “Instruction Manual” and “Before using our product” before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/KL/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

KL



NOTICE



## Basic Characteristics Data

Model	Circuit method	Switching frequency [KLz]	Input current [A] *1	Rated input fuse	Inrush current protection circuit	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
KLEA120F	Active filter	40 - 160	1.2	250V 4A	Thermistor	FR-4		Yes	Yes	No
KLNA120F	Flyback converter	20 - 150*2								
KLEA240F	Active filter	50 - 70	2.4	250V 8A	Thermistor	FR-4		Yes	Yes	No
KLNA240F	Forward converter	130								

\*1 The value of input current is at ACIN 115V and 100%.

\*2 Burst operation at light loading, frequency is change by use condition. Please contact us about detail.



# KR-series



KRE-20A

KRE-40A

## Feature

- Redundancy module
- For DIN (35mm) rail products
- Wide input voltage range
- Wide operating ambient temperature range
- Input voltage balance OK LED
- Input voltage OK LED and relay output

## Safety agency approvals

UL60950-1, UL508, C-UL (CSA60950-1), EN60950-1

## CE marking

Low Voltage Directive  
RoHS Directive

## EMI

Complies with FCC-B, CISPR22-B, EN55011-B, EN55022-B, VCCI-B

## EMS Compliance : EN61204-3, EN61000-6-2

EN61000-4-2  
EN61000-4-3  
EN61000-4-4  
EN61000-4-6

## 5-year warranty

# KRE -20A / -40A

KRE -□□A

①

②



① Series name  
KRE : Euro style I/O terminals  
② Output current

MODEL	KRE-20A	KRE-40A
DC OUTPUT CURRENT	20	40
DC PEAK OUTPUT CURRENT	30	60

## SPECIFICATIONS

	MODEL	KRE-20A	KRE-40A
INPUT	VOLTAGE[V]	DC10 ~ 60	DC10 ~ 30
	CURRENT[A]	10 (×2 Input)	20 (×2 Input)
	PEAK CURRENT[A]	15 (×2 Input)	30 (×2 Input)
	INPUT-OUTPUT POTENTIAL DIFFERENCE[V]	0.6typ (Ta=25°C ,Io=100%)	0.4typ (Ta=25°C ,Io=100%)
OUTPUT	CURRENT[A]	20	40
	PEAK CURRENT[A]	*1 30	60
FUNCTION	DC_OK LAMP	LED (Green)	
	Balance_OK LAMP	LED (Green)	
	DC_OK CONTACT	Relay contact 30VDC 0.5Amax , 30VAC 0.5Amax (resistive load)	
ISOLATION	INPUT-OUTPUT-Chassis	AC1,000V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)	
	INPUT-OUTPUT-DC_OK	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)	
	DC_OK-Chassis	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)	
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-25 to +70°C (Refer to "Derating"), 20 - 90%RH (Non condensing)	
	STORAGE TEMP.,HUMID.AND ALTITUDE	-25 to +85°C , 20 - 90%RH (Non condensing)	
	VIBRATION	*2 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)	
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis (Packing state)	
SAFETY	AGENCY APPROVALS	UL60950-1, C-UL (CSA60950-1) , EN60950-1 , UL508	
	CE MARKING	LVD	
OTHERS	CASE SIZE	*3 38×124×117mm (W×H×D) [1.5X4.88X4.61 inches]	
	WEIGHT	480g max	610gmax
	COOLING METHOD	Convection	

\*1 Refer to 2, instruction manual.

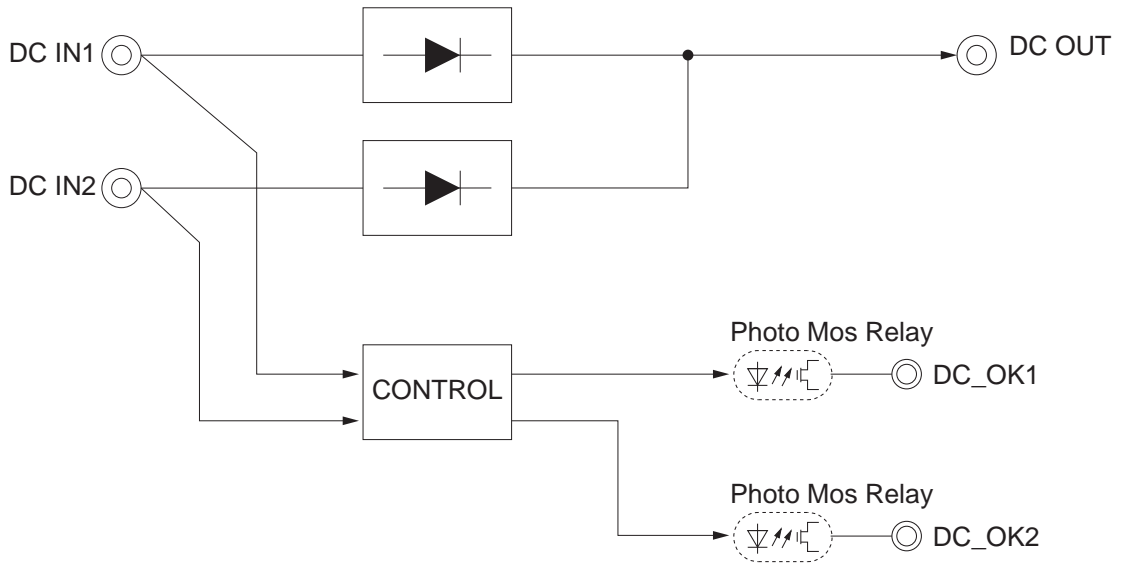
\*2 Only as standard mounting orientation (A). Refer to the "Assembling and Installation Method".

If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.

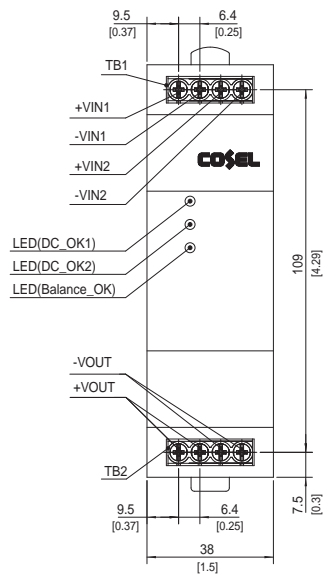
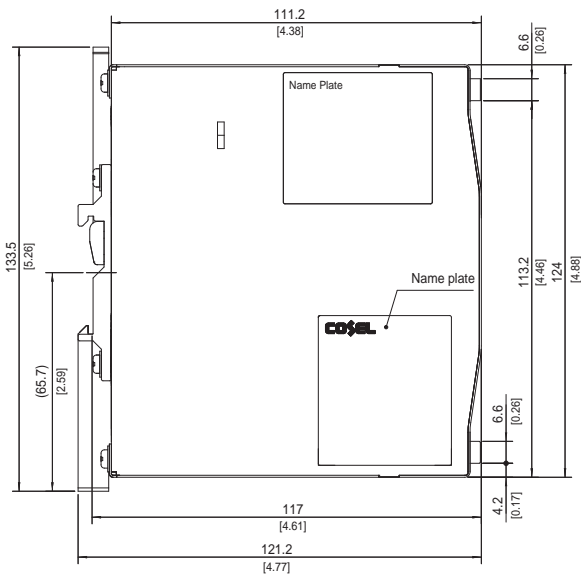
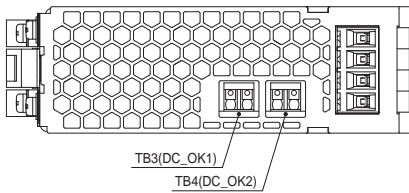
\*3 Case size contains neither the umbo.

\* To meet the specifications. Do not operate over-loaded condition.

Block diagram



External view

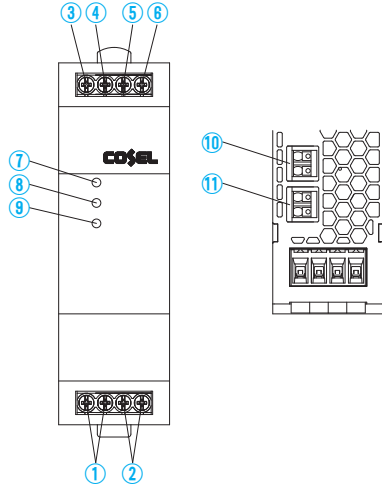


- ※ Tolerance : ±1.5 [±0.06]
- ※ Weight : KRE-20A 480g max  
KRE-40A 610g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- ※ DIN rail attachment material : Aluminum,  
Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1N · m max



Terminal Blocks

● KRE-20A/-40A



Terminal Number	Terminal Name	Function
①	+VOUT	+Output Terminals
②	-VOUT	-Output Terminals
③	+VIN1	+Input Terminals 1
④	-VIN1	-Input Terminals 1
⑤	+VIN2	+Input Terminals 2
⑥	-VIN2	-Input Terminals 2
⑦	DC_OK1	LED for input voltage 1 confirmation
⑧	DC_OK2	LED for input voltage 2 confirmation
⑨	Balance_OK	LED for input voltage balance confirmation
⑩	DC_OK1	Input voltage 1 confirmation (relay contact)
⑪	DC_OK2	Input voltage 2 confirmation (relay contact)

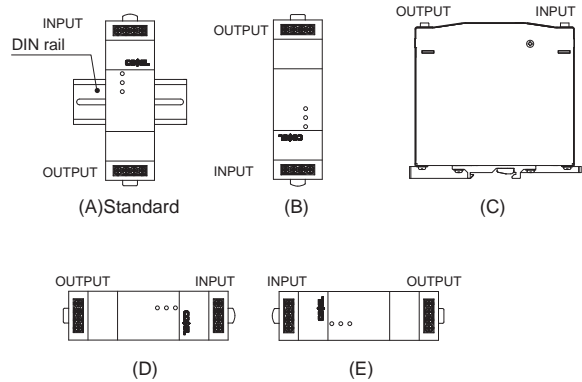
Assembling and Installation Method

Installation method

■ About DIN-Rail Attachment available with DIN EN60715 TH 35 (35×7.5mm or 35×15mm) (Top hat shaped DIN rail)

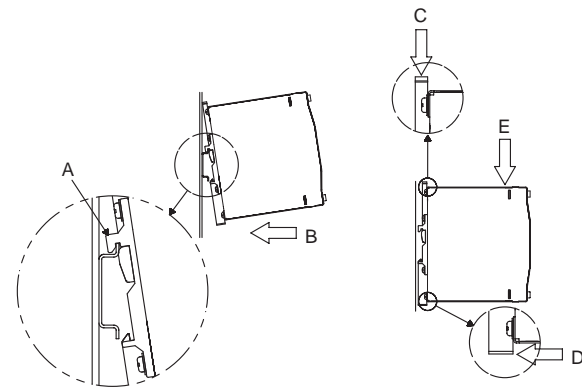
■ Below shows mounting orientation.

If install other than standard mounting orientation (A), please fix the power supply for withstand the impact and vibration.



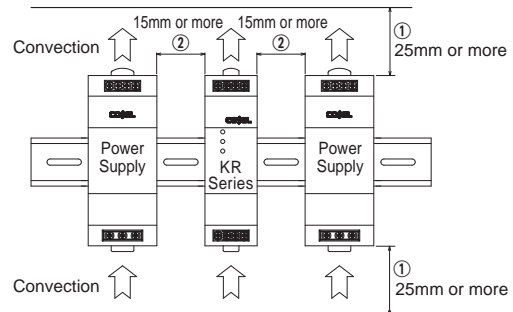
■ When you mount a power supply on a DIN rail, have the area marked A catch one side of the rail and push the unit to the direction of B. To remove the power supply from the rail, either push down the area marked C or insert a tool such as driver to the area marked D and pull the unit apart from the rail.

When you couldn't remove the unit easily, push down the area marked C while lightly pushing the unit to the direction of E.



■ Shown below the notes about installation clearance of a unit.

- ① Installation clearance at above and below the unit.  
Please have clearance of at least 25mm above and below the unit to avoid heat accumulation.
- ② Installation clearance at the side of the unit.  
Please have clearance of at least 15mm side the unit to avoid interfering with heat radiation from housing.

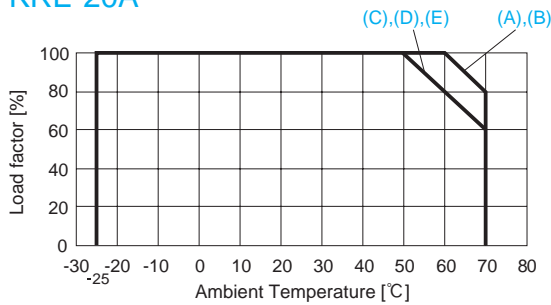


Derating

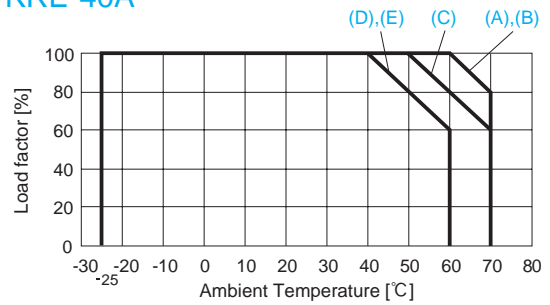
Ambient temperature derating

- The operative ambient temperature as different by input voltage. Derating curve is shown below.
- Derating Curve (Convection)
- Refer to instruction manual 3 for Ambient temperature measurement point.

● KRE-20A



● KRE-40A

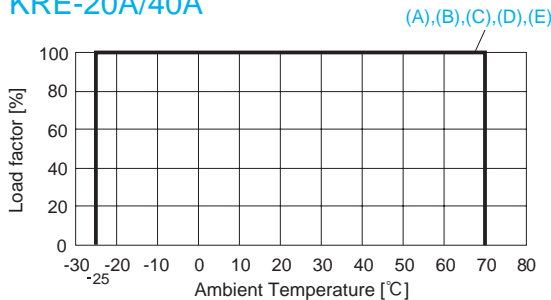


■ Derating Curve (Forced air)

\*UL508 (Listing) is excluded.

- Use the temperature measurement point as shown in instruction manual 3. Please use at the temperature dose not exceed the values in instruction manual 3.

● KRE-20A/40A



Instruction Manual

- ◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/KR/>

Before using our product <https://en.cosel.co.jp/technical/caution/index.html>



Basic Characteristics Data

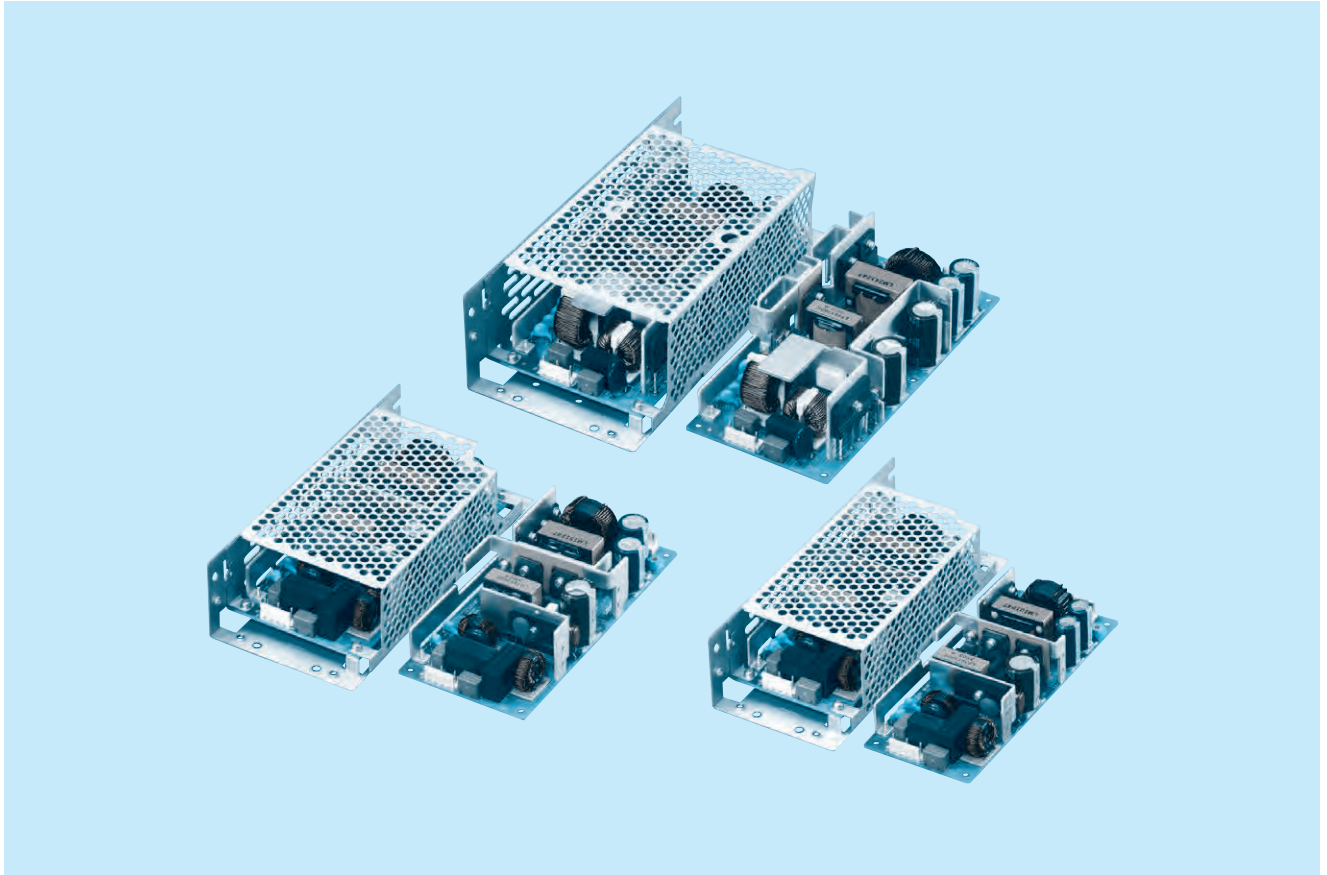
Model	Circuit method	PCB/Pattern		
		Material	Single sided	Double sided
KRE-20A	Diode	FR-4		Yes
KRE-40A	Diode	FR-4		Yes







# LMA-series



## Feature

- For medical electric equipment
- Internal dual fuses
- Low leakage current
- High power & peak power (option)
- Small and compact PCB construction
- Built-in inrush current, overcurrent and overvoltage protection circuits
- Harmonic attenuator (Complies with IEC61000-3-2 class A)
- Universal input (AC85-264V)
- Power factor correction

## Safety agency approvals

ANSI/AAMI ES60601, EN60601-1 3rd

## EMI

Complies with FCC-B, CISPR22-B, EN55011-B, EN55022-B, VCCI-B

## 5-year warranty

## CE marking

Low Voltage Directive  
RoHS Directive

## EMS Compliance

: EN61204-3, EN61000-6-2  
IEC60601-1-2 (2014), EN60601-1-2 (2015)

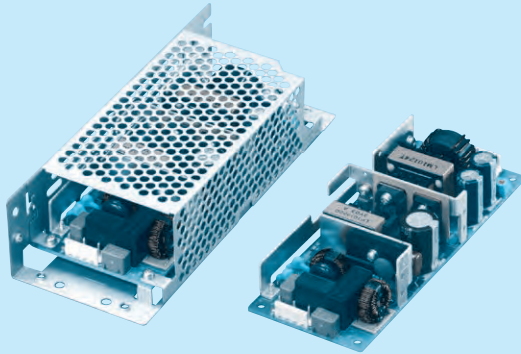
- EN61000-4-2
- EN61000-4-3
- EN61000-4-4
- EN61000-4-5
- EN61000-4-6
- EN61000-4-8
- EN61000-4-11

LMA

# LMA100F

LM A 100 F - □ - □

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAM-04-101



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*1
- C : with Coating
- G : Low leakage current
- H : with the function to be acceptable to output peak current
- J1 : VH(J.S.T.)connector type
- R : with Remote ON/OFF
- R2 : with Remote ON/OFF
- S : with Chassis
- SN : with Chassis & cover
- P : Setting in the overcurrent protection rating

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LMA100F-24-Y	LMA100F-24-HY
MAX OUTPUT WATTAGE[W]	103.2	103.2 (206.4) *2
DC OUTPUT	24V 4.3A	24V 4.3A (8.6A) *2

## SPECIFICATIONS

	MODEL	LMA100F-24-Y	LMA100F-24-HY	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating", Instruction Manual 1 and 3)		
	CURRENT[A]	ACIN 100V	1.4typ (Io=100%)	
		ACIN 200V	0.7typ (Io=100%)	
	FREQUENCY[Hz]	50 / 60 (47 - 63)		
	EFFICIENCY[%]	ACIN 100V	84.0typ (Io=100%)	
		ACIN 200V	86.0typ (Io=100%)	
	POWER FACTOR	ACIN 100V	0.99typ (Io=100%)	
INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) (At cold start) (Ta=25°C)		
	ACIN 200V	30typ (Io=100%) (At cold start) (Ta=25°C)		
LEAKAGE CURRENT[mA]	0.10 / 0.25max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60601-1)			
OUTPUT	VOLTAGE[V]	24		
	CURRENT[A]	4.3		
	LINE REGULATION[mV]	*7 96max		
	LOAD REGULATION[mV]	*7 150max		
	RIPPLE[mVp-p]	*3 0 to +50°C	120max	
		-10 - 0°C	160max	
	RIPPLE NOISE[mVp-p]*3	0 to +50°C	150max	
		-10 - 0°C	180max	
	TEMPERATURE REGULATION[mV]	0 to +50°C	240max	
		-10 to +50°C	290max	
	DRIFT[mV]	*4 96max		
	START-UP TIME[ms]	350typ (ACIN 100V, Io=100%)		
	HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)		
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	19.20 to 27.50			
OUTPUT VOLTAGE SETTING[V]	24.00 to 24.96			
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically		
	OVERVOLTAGE PROTECTION[V]	27.60 to 33.60		
	OPERATING INDICATION	Not provided		
	REMOTE SENSING	Not provided		
ISOLATION	REMOTE ON/OFF	Option (Required external power source.)		
	INPUT-OUTPUT-RC	*6 AC4,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 2MOOP		
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 1MOOP		
	OUTPUT-RC-FG	*6 AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)		
	OUTPUT-RC	*6 AC100V 1minute, Cutoff current = 25mA, DC100V 10MΩ min (At Room Temperature)		
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *5	-10 to +70°C, 20 - 90%RH (Non condensing), (Refer to "Derating", Instruction Manual 3) 3,000m (10,000feet) max		
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max		
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis		
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis		
	AGENCY APPROVALS (AT ONLY AC input)	ANSI/AAMI ES60601-1, EN60601-1 3rd, Complies with IEC60601-1-2 4th Ed.		
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B		
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *8		
OTHERS	CASE SIZE/WEIGHT	62 X 33 X 155mm [2.44 X 1.30 X 6.10 inches] (W X H X D) / 290g max (with chassis & cover : 470g max)		
	COOLING METHOD	Convection (Refer to "Derating", Instruction Manual 3) *5		

\*1 Specification is changed at option, refer to Instruction Manual.

\*2 Peak loading for 10sec. And Duty 40% max.

( ) means peak current. There is a possibility that an internal device is damaged when the specification is exceeded.

\*3 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal.  
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).

\*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*5 Derating is required.

\*6 Applicable when remote control (optional) is added.

\*7 Please contact us about dynamic load and input response.

\*8 Please contact us about another class.

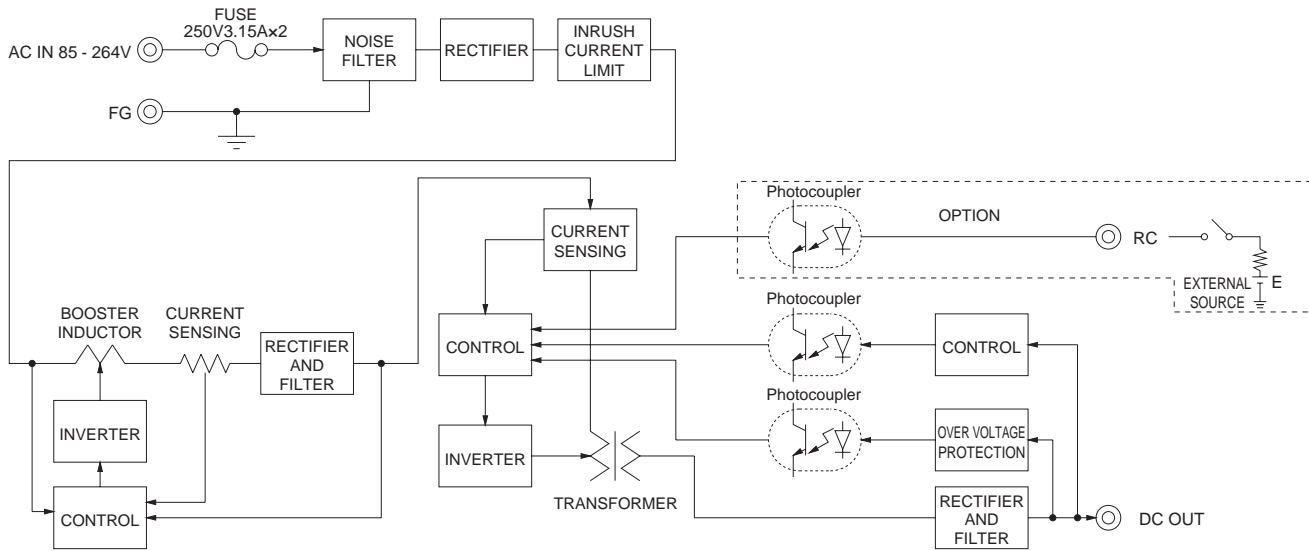
\* To meet the specifications. Do not operate over-loaded condition.

\* Parallel operation is not possible.

\* Derating is required when operated with chassis and cover.

\* Sound noise may be generated by power supply in case of pulse load.

Block diagram

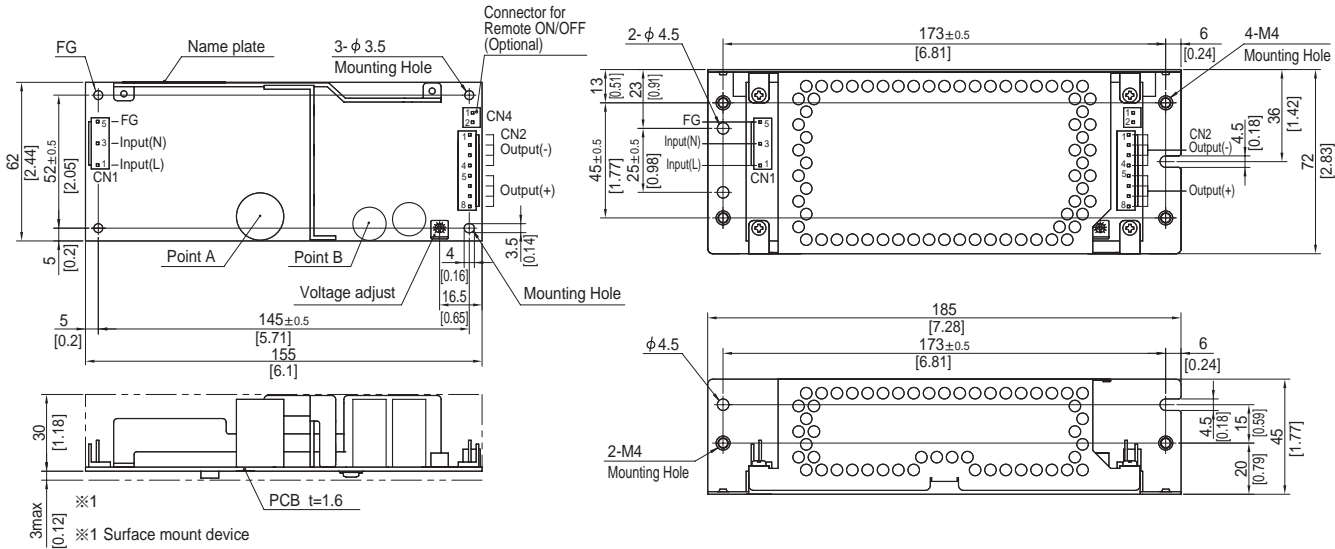


External view

※ External size of option is different from standard model.

Standard type

Chassis and cover type



- ※ 4 Mounting holes are existing.
- ※ The back side of P.C.B. of the power supply is assembled some SMDs.  
Be attention not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm length or more regarding insulation.  
And do not use press-fitting bush.
- ※ Point A, Point B are thermometry points.

I/O Connector	Mating connector	Terminal	
CN1	1-1123724-3	Chain	1123721-1
		Loose	1318912-1
		Chain	1123721-1
CN2	1-1123723-8	Loose	1318912-1

(Mfr:Tyco Electronics)

- ※ I/O Connector is Mfr. Tyco Electronics
- ※ Option:-J1:VH(J.S.T) connector type.

<PIN CONNECTION>

CN1		CN2	
Pin No.	Input	Pin No.	Output
1	AC(L)	1 to 4	-V
2		5 to 8	+V
3	AC(N)		
4			
5	FG		

※ Keep drawing current per pin below 5A for CN2.

- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 290g max (with chassis & cover : 470g max)
- ※ PCB material : CEM3
- ※ Optional chassis and cover material : Electric galvanizing steel board.
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque (Mounting hole of chassis) : 1.5N · m (16kgf · cm) max

Connector type

CN4 Option (Mfr:J.S.T)

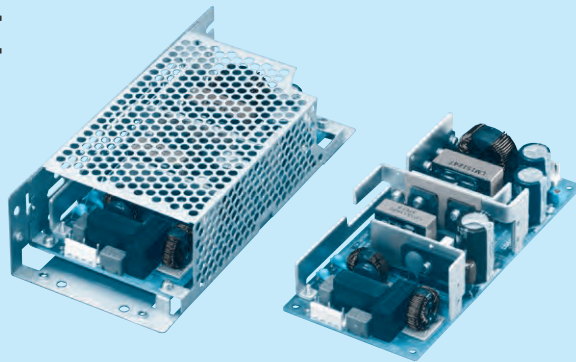
PIN No.	Contents
1	RC(+)
2	RC(-)

Barrier strip type

Model B2B-XH-A  
Mating Connector (Terminal)  
XHP-2  
( BXH-001T-P0.6  
or SXH-001T-P0.6 )

# LMA150F

LM A 150 F -□ -□  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**NAM-04-101**



High voltage pulse noise type : NAP series  
 Low leakage current type : NAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*1
- C : with Coating
- G : Low leakage current
- H : with the function to be acceptable to output peak current
- J1 : VH(J.S.T.)connector type
- R : with Remote ON/OFF
- R2 : with Remote ON/OFF
- S : with Chassis
- SN : with Chassis & cover
- P : Setting in the overcurrent protection rating

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
 \*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LMA150F-24-Y	LMA150F-24-HY
MAX OUTPUT WATTAGE[W]	151.2	151.2 (302.4) *2
DC OUTPUT	24V 6.3A	24V 6.3A (12.6A) *2

## SPECIFICATIONS

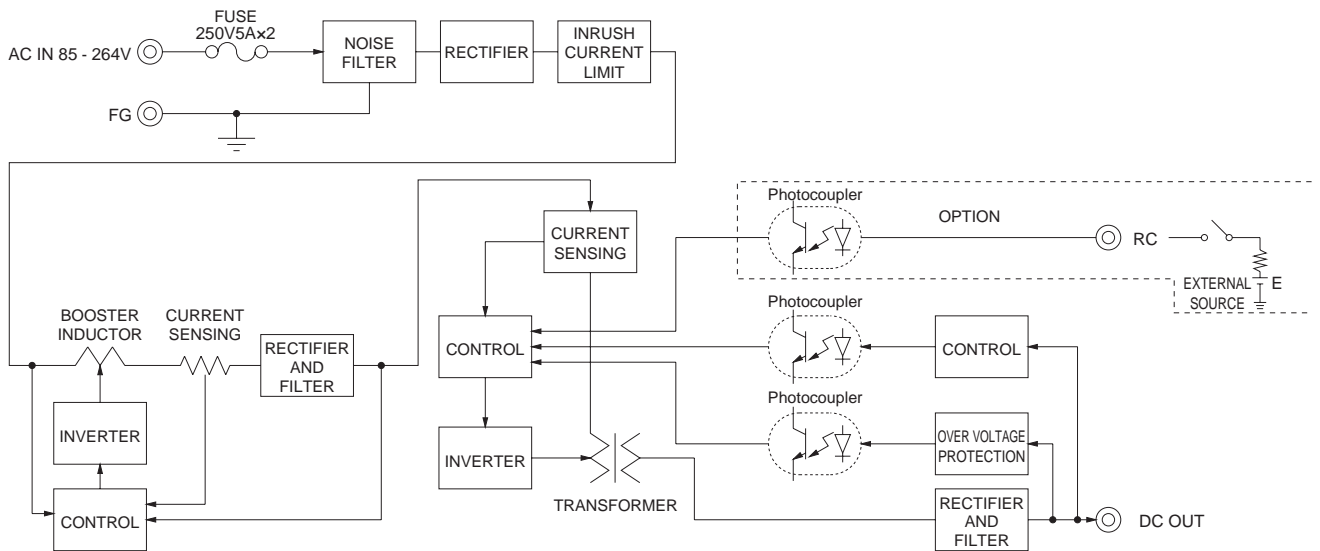
	MODEL	LMA150F-24-Y	LMA150F-24-HY	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating", Instruction Manual 1 and 3)		
	CURRENT[A]	ACIN 100V	2.0typ (Io=100%)	
		ACIN 200V	1.0typ (Io=100%)	
	FREQUENCY[Hz]	50 / 60 (47 - 63)		
	EFFICIENCY[%]	ACIN 100V	85.0typ (Io=100%)	
		ACIN 200V	87.0typ (Io=100%)	
	POWER FACTOR	ACIN 100V	0.99typ (Io=100%)	
INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) (At cold start) (Ta=25°C)		
	ACIN 200V	30typ (Io=100%) (At cold start) (Ta=25°C)		
LEAKAGE CURRENT[mA]	0.10 / 0.25max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60601-1)			
OUTPUT	VOLTAGE[V]	24		
	CURRENT[A]	6.3		
	LINE REGULATION[mV]	*7 96max		
	LOAD REGULATION[mV]	*7 150max		
	RIPPLE[mVp-p]	*3 0 to +50°C	120max	
		-10 - 0°C	160max	
	RIPPLE NOISE[mVp-p]*3	0 to +50°C	150max	
		-10 - 0°C	180max	
	TEMPERATURE REGULATION[mV]	0 to +50°C	240max	
		-10 to +50°C	290max	
	DRIFT[mV]	*4 96max		
	START-UP TIME[ms]	350typ (ACIN 100V, Io=100%)		
	HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)		
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	19.20 to 27.50			
OUTPUT VOLTAGE SETTING[V]	24.00 to 24.96			
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically		
	OVERVOLTAGE PROTECTION[V]	27.60 to 33.60		
	OPERATING INDICATION	Not provided		
	REMOTE SENSING	Not provided		
ISOLATION	REMOTE ON/OFF	Option (Required external power source.)		
	INPUT-OUTPUT-RC	*6 AC4,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 2MOOP		
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 1MOOP		
	OUTPUT-RC-FG	*6 AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)		
	OUTPUT-RC	*6 AC100V 1minute, Cutoff current = 25mA, DC100V 10MΩ min (At Room Temperature)		
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *5	-10 to +70°C, 20 - 90%RH (Non condensing), (Refer to "Derating", Instruction Manual 3) 3,000m (10,000feet) max		
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max		
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis		
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis		
	AGENCY APPROVALS (AT ONLY AC input)	ANSI/AAMI ES60601-1, EN60601-1 3rd, Complies with IEC60601-1-2 4th Ed.		
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B		
OTHERS	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *8		
	CASE SIZE/WEIGHT	75 X 36.5 X 160mm [2.95 X 1.44 X 6.30 inches] (W X H X D) / 370g max (with chassis & cover : 600g max)		
	COOLING METHOD	Convection (Refer to "Derating", Instruction Manual 3) *5		

\*1 Specification is changed at option, refer to Instruction Manual.  
 \*2 Peak loading for 10sec. And Duty 40% max.  
 ( ) means peak current. There is a possibility that an internal device is damaged when the specification is exceeded.  
 \*3 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal.  
 Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).

\*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*5 Derating is required.  
 \*6 Applicable when remote control (optional) is added.  
 \*7 Please contact us about dynamic load and input response.  
 \*8 Please contact us about another class.

\* To meet the specifications. Do not operate over-loaded condition.  
 \* Parallel operation is not possible.  
 \* Derating is required when operated with chassis and cover.  
 \* Sound noise may be generated by power supply in case of pulse load.

## Block diagram

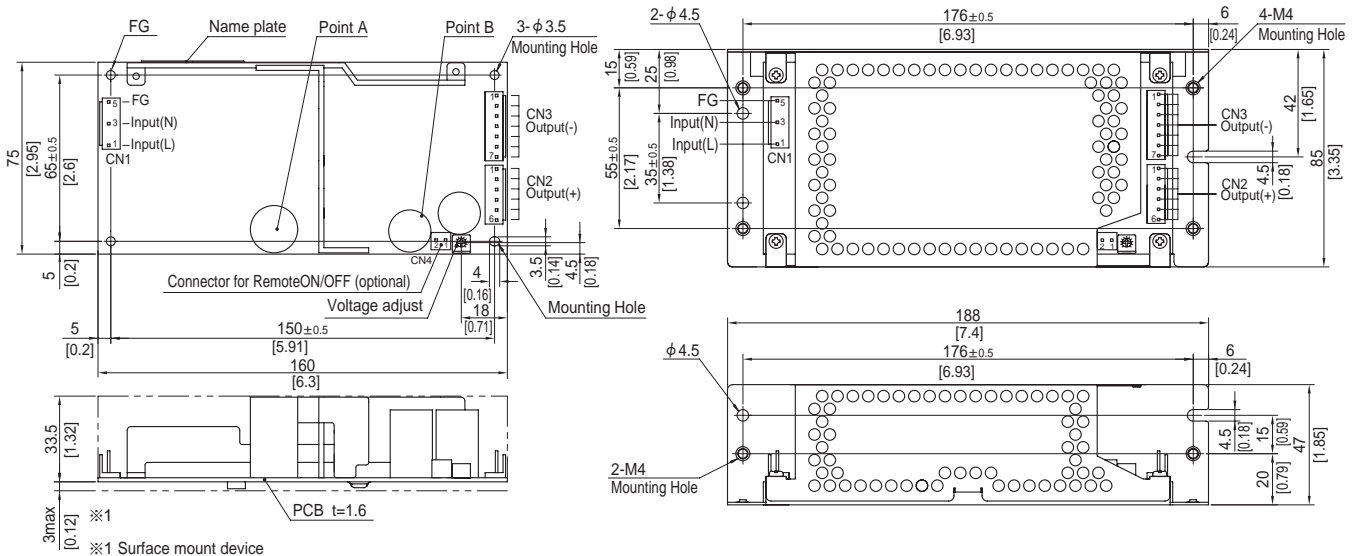


## External view

※ External size of option is different from standard model.

Standard type

Chassis and cover type



- ※ 1 Surface mount device
- ※ 4 Mounting holes are existing.
- ※ The back side of P.C.B. of the power supply is assembled some SMDs.  
Be attention not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm length or more regarding insulation.  
And do not use press-fitting bush.
- ※ Point A, Point B are thermometry points.

I/O Connector	Mating connector	Terminal
CN1	1-1123724-3	Chain 1123721-1
		Loose 1318912-1
CN2	1-1123723-6	Chain 1123721-1
		Loose 1318912-1
CN3	1-1123723-7	Chain 1123721-1
		Loose 1318912-1

(Mfr: Tyco Electronics)

- ※ I/O Connector is Mfr. Tyco Electronics
- ※ Option: -J1:VH(J.S.T) connector type.

### <PIN CONNECTION>

CN1		CN2		CN3	
Pin No.	Input	Pin No.	Output	Pin No.	Output
1	AC(L)	1 to 6	+V	1 to 7	-V
2					
3	AC(N)				
4					
5	FG				

※ Keep drawing current per pin below 5A for CN2, CN3.

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 370g max (with chassis & cover : 600g max)
- ※ PCB material : CEM3
- ※ Optional chassis and cover material : Electric galvanizing steel board.
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque (Mounting hole of chassis) :  $1.5N \cdot m$  (16kgf · cm) max

### Connector type

CN4 Option (Mfr: J.S.T)

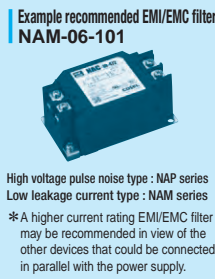
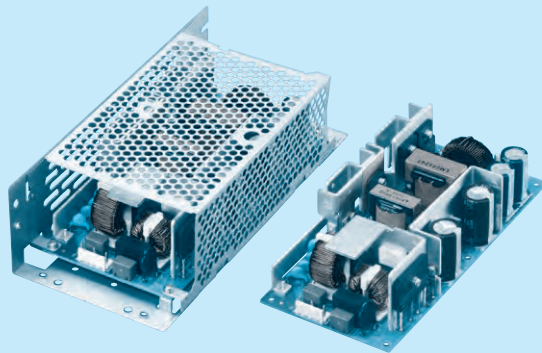
PIN No.	Contents
1	RC(+)
2	RC(-)

### Barrier strip type

Model B2B-XH-A  
Mating Connector (Terminal)  
XHP-2  
(BXH-001T-P0.6  
or SXH-001T-P0.6)

# LMA240F

LM A 240 F -□ -□  
 ① ② ③ ④ ⑤ ⑥



- ① Series name
  - ② Single output
  - ③ Output wattage
  - ④ Universal input
  - ⑤ Output voltage
  - ⑥ Optional \*1
- C : with Coating  
 G : Low leakage current  
 H : with the function to be acceptable to output peak current  
 J1 : VH(J.S.T.)connector type  
 R : with Remote ON/OFF  
 S : with Chassis  
 SN : with Chassis & cover  
 P : Setting in the overcurrent protection rating

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.  
 \*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	LMA240F-24-Y	LMA240F-24-HY
MAX OUTPUT WATTAGE[W]	300	300 (480) *2
DC OUTPUT	Convection	24V 10A
	Forced air	24V 12.5A
		24V 12.5A (20A) *2

## SPECIFICATIONS

	MODEL	LMA240F-24-Y	LMA240F-24-HY	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating", Instruction Manual 1 and 3)		
	CURRENT[A]	ACIN 100V	3.9typ (Io=100%)	
		ACIN 200V	1.8typ (Io=100%)	
	FREQUENCY[Hz]	50 / 60 (47 - 63)		
	EFFICIENCY[%]	ACIN 100V	86.0typ (Io=100%)	
		ACIN 200V	88.0typ (Io=100%)	
	POWER FACTOR	ACIN 100V	0.99typ (Io=100%)	
		ACIN 200V	0.95typ (Io=100%)	
	INRUSH CURRENT[A]	ACIN 100V	15 / 30typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 3 sec. to re-start)	
		ACIN 200V	30 / 30typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 3 sec. to re-start)	
LEAKAGE CURRENT[ma]	0.15 / 0.40max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60601-1)			
OUTPUT	VOLTAGE[V]	24	24	
	CURRENT[A]	Convection	10	10 (Peak 20) *2
		Forced air	12.5	12.5 (Peak 20) *2
	LINE REGULATION[mV] *7	96max		
	LOAD REGULATION[mV] *7	150max		
	RIPPLE[mVp-p] *3	0 to +50°C	120max	120max
		-10 - 0°C	160max	160max
	RIPPLE NOISE[mVp-p]*3	0 to +50°C	150max	150max
		-10 - 0°C	180max	180max
	TEMPERATURE REGULATION[mV]	0 to +50°C	240max	240max
		-10 to +50°C	290max	290max
	DRIFT[mV] *4	96max		
	START-UP TIME[ms]	350typ (ACIN 100V, Io=100%)		
	HOLD-UP TIME[ms] *9	20typ (ACIN 100V, Io=100%)		
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	19.20 to 27.50			
OUTPUT VOLTAGE SETTING[V]	24.00 to 24.96			
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating (works over 101% of peak current at option -H) and recovers automatically		
	OVERVOLTAGE PROTECTION[V]	27.60 to 33.60		
	OPERATING INDICATION	Not provided		
	REMOTE SENSING	Not provided		
ISOLATION	REMOTE ON/OFF	Option (Required external power source.)		
	INPUT-OUTPUT-RC *6	AC4,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 2MOOP		
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 1MOOP		
	OUTPUT-RC-FG *6	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)		
	OUTPUT-RC *6	AC100V 1minute, Cutoff current = 25mA, DC100V 10MΩ min (At Room Temperature)		
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE *5	-10 to +70°C, 20 - 90%RH (Non condensing), (Refer to "Derating", Instruction Manual 3) 3,000m (10,000feet) max		
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max		
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis		
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis		
	AGENCY APPROVALS (AT ONLY AC input)	ANSI/AAMI ES60601-1, EN60601-1 3rd, Complies with IEC60601-1-2 4th Ed.		
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B		
OTHERS	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *8		
	CASE SIZE/WEIGHT	84 X 46 X 180mm [3.31 X 1.81 X 7.09 inches] (W X H X D) / 540g max (with chassis & cover : 860g max)		
	COOLING METHOD	Convection / Forced air (Refer to "Derating", Instruction Manual 3) *5		

\*1 Specification is changed at option, refer to Instruction Manual.

\*2 Peak loading for 10sec. And Duty 40% max.  
 ( ) means peak current. There is a possibility that an internal device is damaged when the specification is exceeded.

\*3 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal.  
 Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent

to KEISOKU-GIKEN: RM103).

\*4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

\*5 Derating is required.

\*6 Applicable when remote control (optional) is added.

\*7 Please contact us about dynamic load and input response.

\*8 Please contact us about another class.

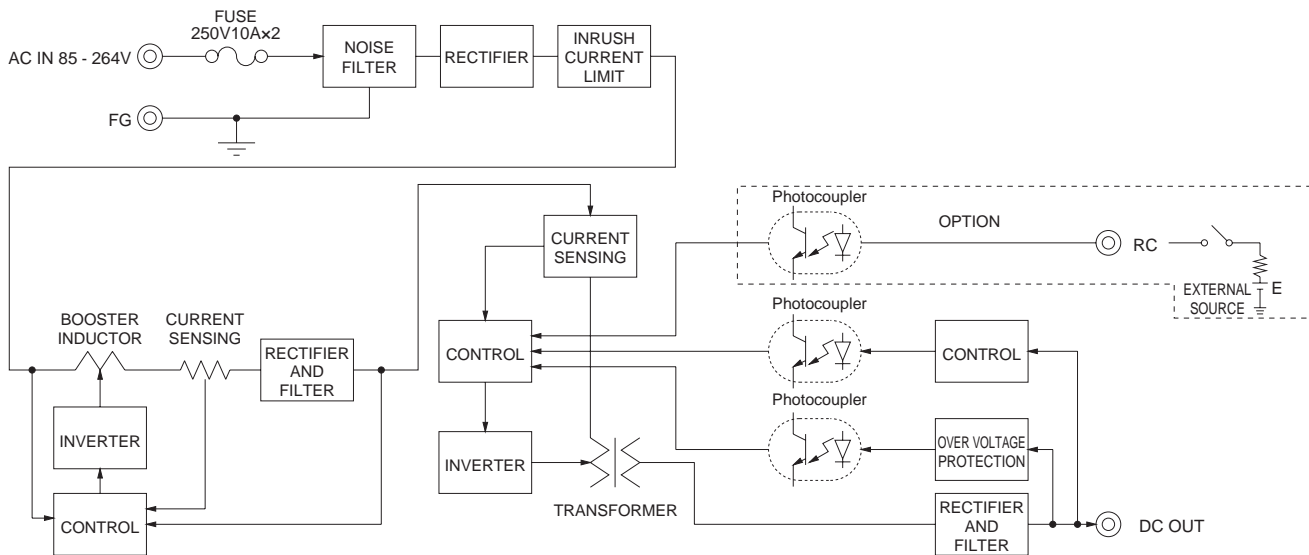
\* To meet the specifications. Do not operate over-loaded condition.

\* Parallel operation is not possible.

\* Derating is required when operated with chassis and cover.

\* Sound noise may be generated by power supply in case of pulse load.

Block diagram

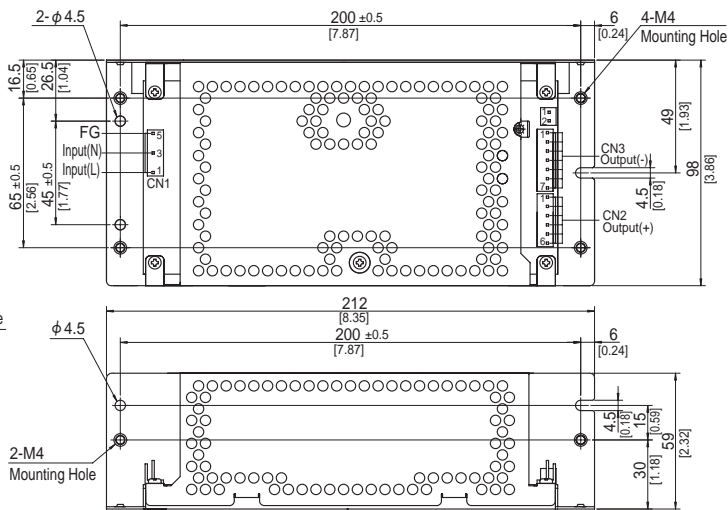
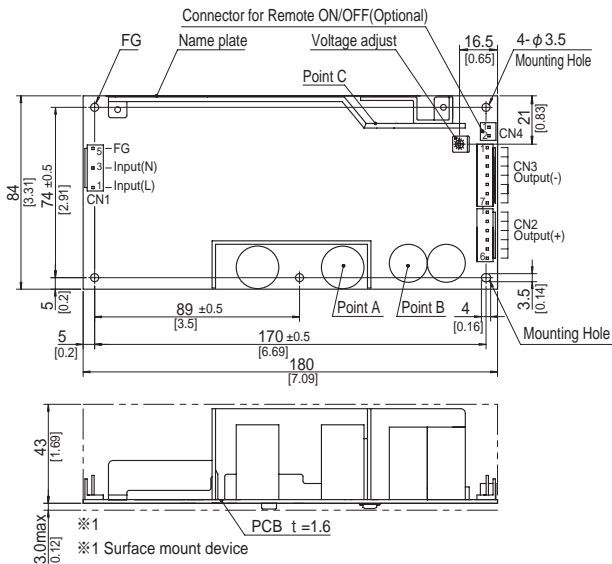


External view

※ External size of option is different from standard model.

Standard type

Chassis and cover type



- ※ 5 Mounting holes are existing.
- ※ The back side of P.C.B. of the power supply is assembled some SMDs.  
Be attention not to bump against the attached area by vibration.
- ※ Use the spacer of 8mm length or more regarding insulation.  
And do not use press-fitting bush.
- ※ Point A, Point B, Point C are thermometry points.

<PIN CONNECTION>

I/O Connector	Mating connector	Terminal
CN1	1-1123724-3	Chain 1123721-1
		Loose 1318912-1
CN2	1-1123723-6	Chain 1123721-1
		Loose 1318912-1
CN3	1-1123723-7	Chain 1123721-1
		Loose 1318912-1

(Mfr:Tyco Electronics)

CN1		CN2		CN3	
Pin No.	Input	Pin No.	Output	Pin No.	Output
1	AC(L)	1 to 6	+V	1 to 7	-V
2					
3	AC(N)				
4					
5	FG				

※ Keep drawing current per pin below 5A for CN2,CN3.

- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 540g max (with chassis & cover : 860g max)
- ※ PCB material : CEM3
- ※ Optional chassis and cover material : Electric galvanizing steel board.
- ※ Dimensions in mm, [ ] =inches
- ※ Mounting torque (Mounting hole of chassis) :1.5N · m (16kgf · cm) max

Connector type	
CN4 Option (Mfr:J.S.T)	
PIN No.	Contents
1	RC(+)
2	RC(-)

Barrier strip type  
Model B2B-XH-A  
Mating Connector (Terminal)  
XHP-2  
( BXH-001T-P0.6  
or SXH-001T-P0.6 )

- ※ I/O Connector is Mfr. Tyco Electronics
- ※ Option:-J1:VH(J.S.T) connector type.

Assembling and Installation Method

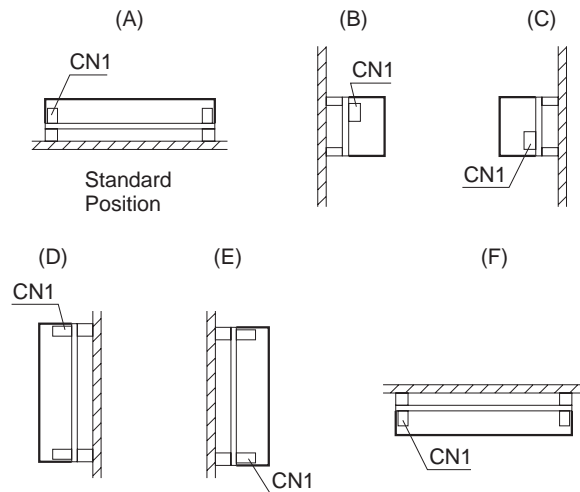
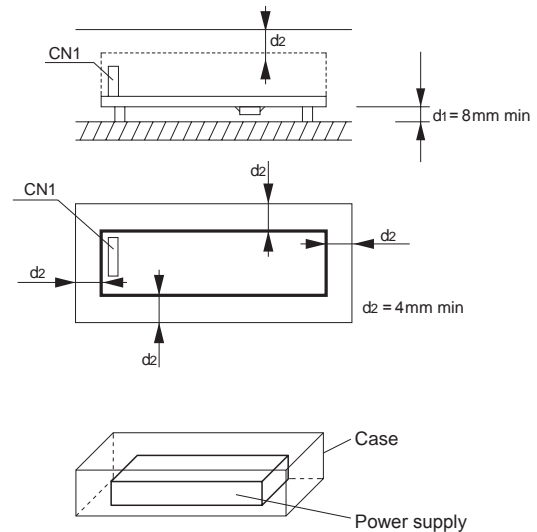
Installation method

■ This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, so handle the unit with care.

■ In case of metal chassis, keep the distance between d1 & d2 for to insulate between lead of component and metal chassis, use the spacer of 8mm or more between d1. If it is less than d1 & d2, insert the insulation sheet between power supply and metal chassis.

■ There is a possibility that it is not possible to cool enough when the power supply is used by the sealing up space as showing in right figure. Please use it after confirming the temperature of point A and point B of Instruction Manual 3.

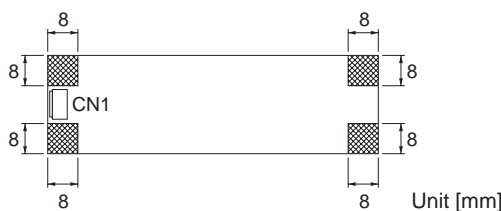
■ (F) mounting is not possible when unit is with case cover, but if need to operate unit by (F) positioning with case cover, temperature / load derating is necessary. For more details, please contact our sales or engineering departments.



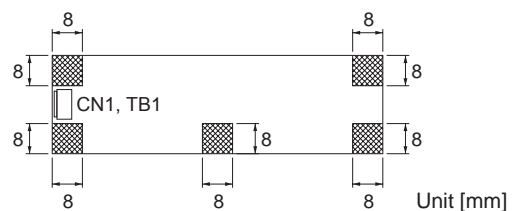
Mounting screw

■ The mounting screw should be M3. The hatched area shows the allowance of metal parts for mounting.

● LMA100F, LMA150F



● LMA240F

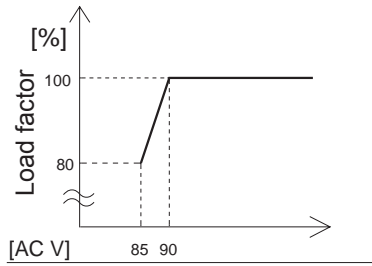


■ If metallic fittings are used on the component side of the board, ensure there is no contact with surface mounted components.  
 ■ This product uses SMD technology. Please avoid the PCB installation method which includes the twisting stress or the bending stress.  
 \* Recommendation to electrically connect FG to metal chassis for reducing noise.

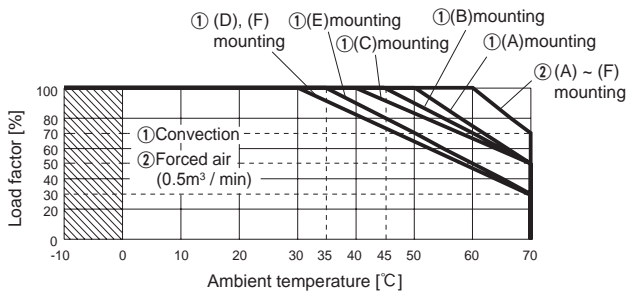


Derating

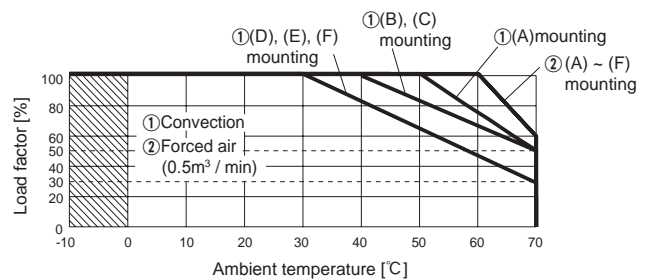
Derating curve for input voltage



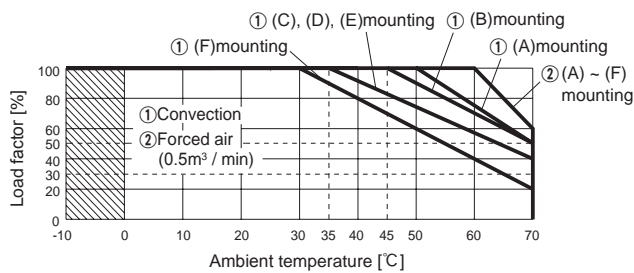
LMA100F Ambient temperature derating curve (Reference value)



LMA150F Ambient temperature derating curve (Reference value)



LMA240F Ambient temperature derating curve (Reference value)



Output voltage	Output power[W]	
	①Convection	②Forced air
24V	240.0	300.0

■ The operative ambient temperature is different by with / without chassis cover or mounting position.

Note: In the hatched area, the specification of Ripple, Ripple Noise is different from other area.

■ Make sure the temperature at point A and point B is less than the temperatures shown in Instruction Manual 3.

■ The ambient temperature should be measured 5 to 10 cm away from the power supply so that it won't be influenced by the heat from the power supply. Please consult us for more details.

## Instruction Manual

◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual      <https://en.cosel.co.jp/product/powersupply/LMA/>  
 Before using our product      <https://en.cosel.co.jp/technical/caution/index.html>

LMA



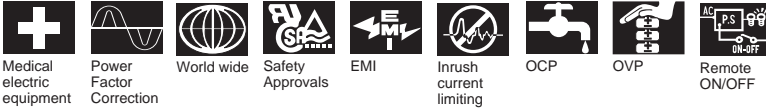
NOTICE



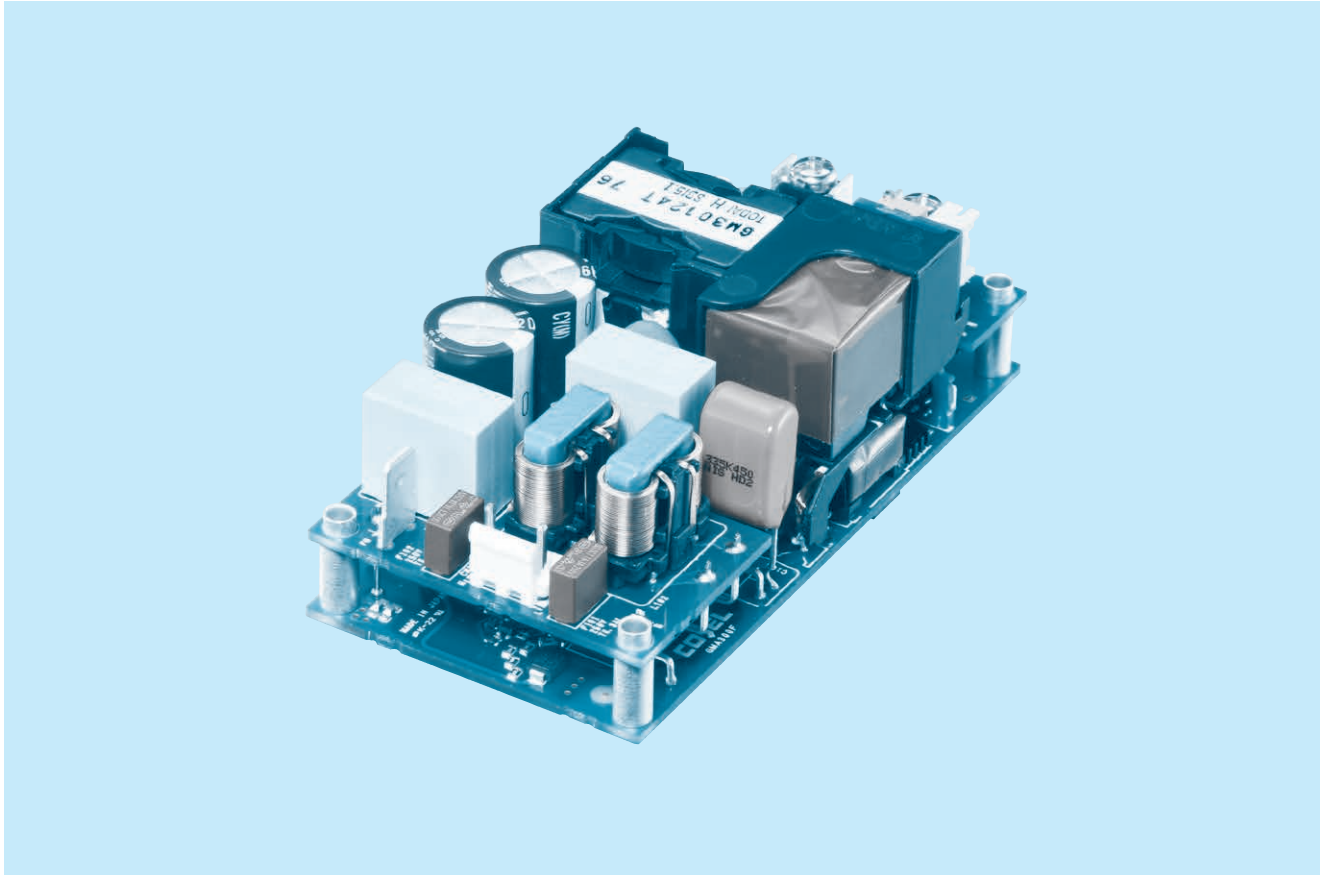
## Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current *1 [A]	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
					Material	Single sided	Double sided	Series operation	Parallel operation
LMA100F	Active filter	60	1.4	Thermistor	CEM-3		Yes	Yes	No
	Forward converter	130							
LMA150F	Active filter	60	2.0	Thermistor	CEM-3		Yes	Yes	No
	Forward converter	130							
LMA240F	Active filter	60	3.9	SCR	CEM-3		Yes	Yes	No
	Forward converter	130							

\*1 The value of input current is at ACIN 100V and rated load.



# GMA-series



## Feature

- Wattage 300Wmax
- For medical electric equipment (ANSI/AAMI ES60601-1, EN60601-1 3rd, IEC60601-1-2 4th Ed.)
- Suitable for BF application (Output-FG : 1MOPP, Input-Output : 2MOPP)
- 2"× 4" standard footprint
- With Remote ON/OFF (Optional)
- With AUX1 (12V 1A), AUX2 (5V 1A) (Optional)

## Safety agency approvals

- UL62368-1, ANSI/AAMI ES60601-1
- C-UL (CSA62368-1, CAN/CSA60601-1)
- EN62368-1, EN60601-1 3rd
- Complies with IEC60601-1-2 4th Ed.

## 5-year warranty (Refer to Instruction Manual)

## CE marking

- Low Voltage Directive
- RoHS Directive

## EMI

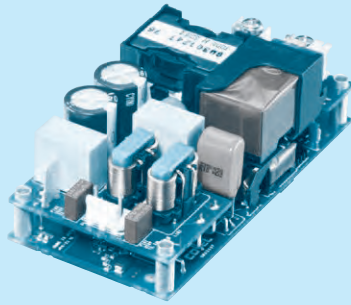
- Complies with FCC-B, CISPR11-B, CISPR32-B, EN55011-B, EN55032-B, VCCI-B

## EMS Compliance : EN61204-3, EN61000-6-2 IEC60601-1-2(2014), EN60601-1-2(2015)

- EN61000-4-2
- EN61000-4-3
- EN61000-4-4
- EN61000-4-5
- EN61000-4-6
- EN61000-4-8
- EN61000-4-11

# GMA300F

GM A 300 F -□□ -□  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
EAC-06-472



High voltage pulse noise type : EAP series  
 Low leakage current type : EAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*6
- C : with Coating
- J1 : Input connector  
VH (J.S.T.) connector type
- J3 : Horizontal input connector  
VH (J.S.T.) connector type
- R3 : with Subfeatures  
(5V1A AUX, 12V1A AUX, Remote ON/OFF)

Specification changes when options are added. Please refer to the instruction manual for more detail.

This power supply is manufactured using SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, please handle the unit with care.  
 \*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	GMA300F-12	GMA300F-24	GMA300F-48	GMA300F-56
MAX OUTPUT WATTAGE[W]	300	300	302.4	302.4
DC OUTPUT	12V 25A	24V 12.5A	48V 6.3A	56V 5.4A

## SPECIFICATIONS

	MODEL	GMA300F-12	GMA300F-24	GMA300F-48	GMA300F-56	
INPUT	VOLTAGE[V]	AC85 - 264 1φ (Output derating is required at AC85V - 115V. See "Derating")				
	CURRENT[A]	ACIN 115V	3.3typ			
		ACIN 230V	1.8typ			
	FREQUENCY[Hz]	50 / 60 (45 - 66)				
	EFFICIENCY[%]	ACIN 115V	90typ	91typ	91typ	91typ
		ACIN 230V	92typ	93typ	93typ	93typ
	POWER FACTOR (Io=100%)	ACIN 115V	0.95typ			
		ACIN 230V	0.90typ			
INRUSH CURRENT[A]	ACIN 115V	30typ (Io=100%) (At cold start, Ta=25°C)				
	ACIN 230V	60typ (Io=100%) (At cold start, Ta=25°C)				
LEAKAGE CURRENT[ma]	0.13 / 0.30max (ACIN 100/240V 60Hz, Io=100%, According to IEC60601-1)					
OUTPUT	VOLTAGE[V]	12	24	48	56	
	CURRENT[A]	25	12.5	6.3	5.4	
	LINE REGULATION[mV]	48max	96max	192max	192max	
	LOAD REGULATION[mV]	100max	150max	240max	240max	
	RIPPLE[mVp-p]	0 to +50°C	240max	240max	400max	400max
		-20 to 0°C	320max	320max	500max	500max
	RIPPLE NOISE[mVp-p]	0 to +50°C	300max	300max	500max	500max
		-20 to 0°C	360max	360max	580max	580max
	TEMPERATURE REGULATION[mV]	0 to +50°C	120max	240max	480max	480max
		-20 to +50°C	150max	290max	600max	600max
	DRIFT[mV]	48max	96max	192max	192max	
	START-UP TIME[ms]	400typ (ACIN 115V, Io=100%) *Start-up time is 900ms typ for less than 1minute of applying input again from turning off the input voltage.				
	HOLD-UP TIME[ms]	16typ (ACIN 115V, Io=85%) / 12typ (ACIN 115V, Io=100%)				
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	11.40 ~ 13.20		22.80 ~ 26.40		45.60 ~ 52.80
OUTPUT VOLTAGE SETTING[V]	12.00 ~ 12.48		24.00 ~ 24.96		48.00 ~ 49.92	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically				
	OVERVOLTAGE PROTECTION[V]	13.80 to 16.80	27.60 to 33.60	55.20 to 67.20	60.00 to 70.50	
	AUX1 (12V1A)	Optional				
	AUX2 (5V1A)	Optional				
ISOLATION	REMOTE ON/OFF	Optional				
	INPUT-OUTPUT · RC · AUX	*7 AC4,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 2MOPP				
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 1MOPP				
	OUTPUT · RC · AUX-FG	*7 AC1,500V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 1MOPP				
OUTPUT-RC · AUX	*7 AC100V 1minute, Cutoff current = 25mA, DC100V 10MΩ min (At Room Temperature)					
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-20 to +70°C, 20 - 90%RH (Non condensing), 5,000m (16,000feet) max *3 *8				
	STORAGE TEMP., HUMID. AND ALTITUDE	-30 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max				
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis				
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis				
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL62368-1, ANSI/AAMI ES60601-1, C-UL, EN62368-1, EN60601-1 3rd, Complies with IEC60601-1-2 4th Ed.				
	CONDUCTED NOISE	Complies with FCC Part15 classB, VCCI-B, CISPR32-B, EN55011-B, EN55032-B				
OTHERS	HARMONIC ATTENUATOR	*5 Complies with IEC61000-3-2 (class A)				
	CASE SIZE/WEIGHT	50.8×37×101.6mm [2.0×1.5×4.0 inches] (W×H×D) / 230g max				
	COOLING METHOD	Forced air (Requires external fan)				

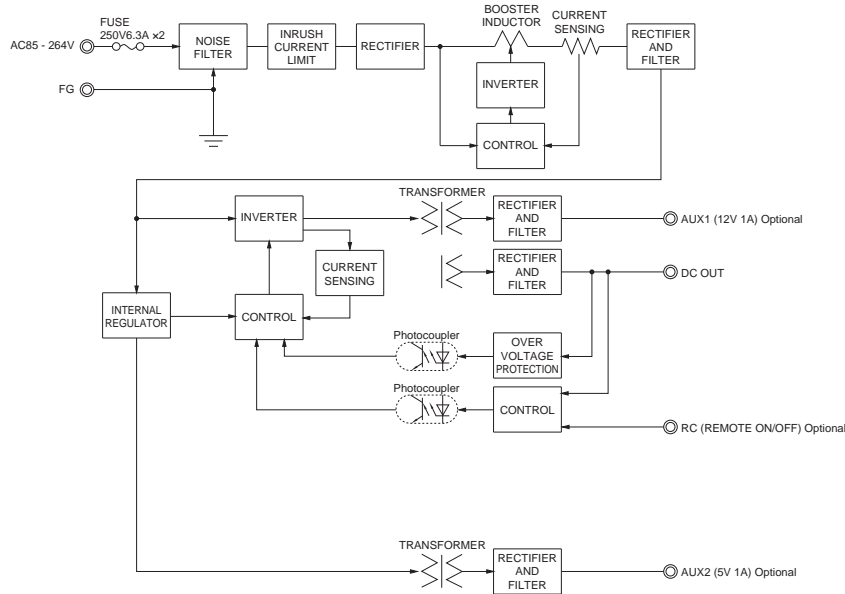
\*1 This is the value that measured on measuring board with capacitor of 22μF at 150mm from output terminal.  
 Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*3 Refer to "Derating"  
 \*4 Please contact us about dynamic load and input response.  
 \*5 Please contact us about another class.

\*6 Specification is changed at option, refer to Instruction Manual.  
 \*7 Applicable when AUX and remote control (optional) is added.  
 \*8 Please contact us about for more detail.  
 \* To meet the specifications. Do not operate over-loaded condition.  
 \* Parallel operation is not possible.  
 \* Sound noise may be generated by power supply in case of pulse load.  
 \* Substrate bottom has a Electric potential. Insulation is required.

## Features

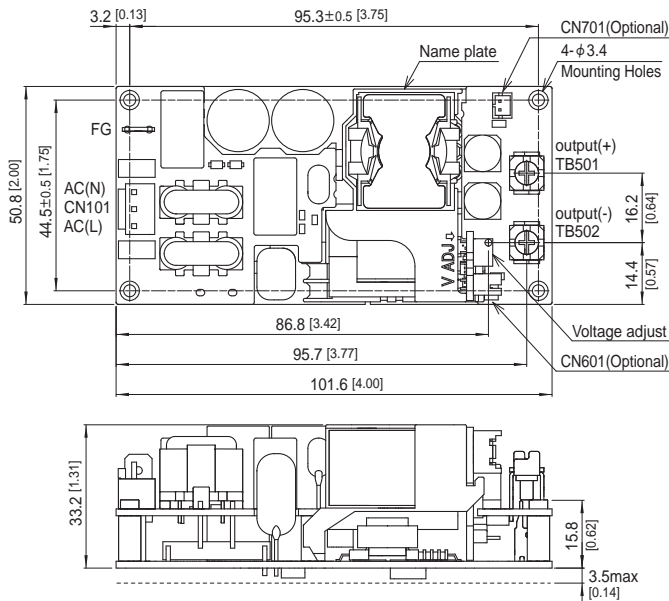
- High power density : 25.7W/inch<sup>3</sup>
- High efficiency : 93% typ (Input Voltage 230V, Output Voltage 24V)
- For medical electric equipment (ANSI/AAMI ES60601-1, EN60601-1 3rd, IEC60601-1-2 4th Ed.)
- Suitable for BF application (Output-FG : 1MOPP, Input-Output : 2MOPP)
- 2" × 4" standard footprint
- With Remote ON/OFF (Optional)
- With AUX1 (12V 1A), AUX2 (5V 1A) (Optional)

## Block diagram



## External view

\* External size of option J3 is different from standard model and refer to 6 Option and Others of instruction manual for details.



- \* Tolerance ±1 [±0.04]
- \* Weight : 230g max
- \* There is a total of four attachment holes.
- \* Dimensions in mm, [ ]=inches
- \* Screw tightening torque : (TB501, 502) : 1.25N · m max
- \* Mounting torque : 0.6N · m max
- \* Avoid contact between TB501 and 502 wiring with mounting parts.

	I/O Connector	Mating connector	Terminal	Mfr
Standard	CN101	1-1123724-2	1123721-1	Tyco Electronics
	CN101	1-1123722-3	1318912-1	
R3	CN601	B8B-PHDSS	PHDR-08VS	J.S.T.
	CN701	B2B-PH	PHR-2	
J1	CN101	B2P3-VH	VHR-3N	J.S.T.
J1R3	CN101	B2P3-VH	VHR-3N	
	CN601	B8B-PHDSS	PHDR-08VS	SPHD-002T-P0.5
CN701	B2B-PH	PHR-2	SPH-002T-P0.5S	

FG	Mating connector	Terminal	Mfr
250 (62409-1)	-	170603-2	Tyco Electronics

### <Pin Assignments>

#### <CN101>

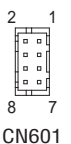
Pin No.	Input
1	AC(L)
2	
3	AC(N)

#### <CN601(Optional)>

Pin No.	Function
1	RC : REMOTE ON/OFF
2	RCG : REMOTE ON/OFF(GND)
3	N.C. : No connection
4	N.C. : No connection
5	N.C. : No connection
6	N.C. : No connection
7	AUX2 : AUX2 (5V 1A)
8	AUX2G : AUX2 (GND)

#### <CN701(Optional)>

Pin No.	Function
1	AUX1G : AUX1 (GND)
2	AUX1 : AUX1 (12V 1A)



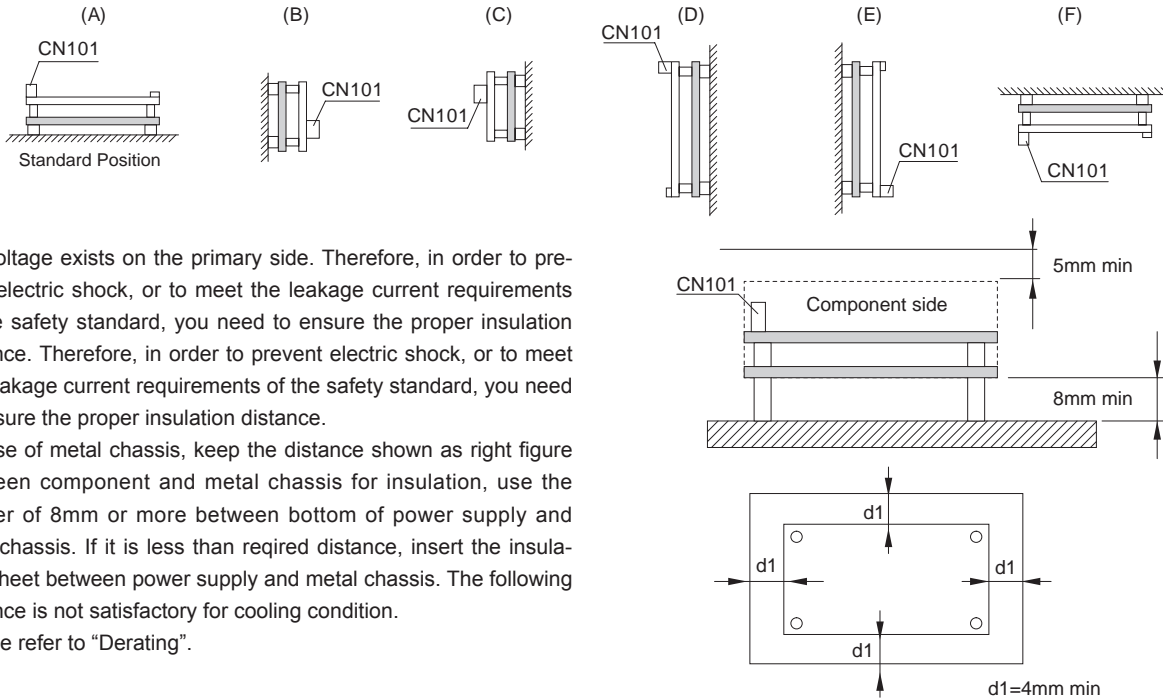
CN601



CN701

Assembling and Installation Method

■ Mounting method

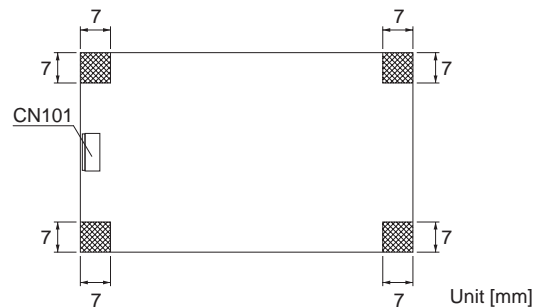


■ AC voltage exists on the primary side. Therefore, in order to prevent electric shock, or to meet the leakage current requirements of the safety standard, you need to ensure the proper insulation distance. Therefore, in order to prevent electric shock, or to meet the leakage current requirements of the safety standard, you need to ensure the proper insulation distance.

■ In case of metal chassis, keep the distance shown as right figure between component and metal chassis for insulation, use the spacer of 8mm or more between bottom of power supply and metal chassis. If it is less than required distance, insert the insulation sheet between power supply and metal chassis. The following distance is not satisfactory for cooling condition. Please refer to "Derating".

Mounting screw

- The mounting screw should be M3. The hatched area shows the allowance of metal parts for mounting.
- If metallic fittings are used on the component side of the board, ensure there is no contact with surface mounted components.
- This product uses SMD technology. Please avoid the PCB installation method which includes the twisting stress or the bending stress.

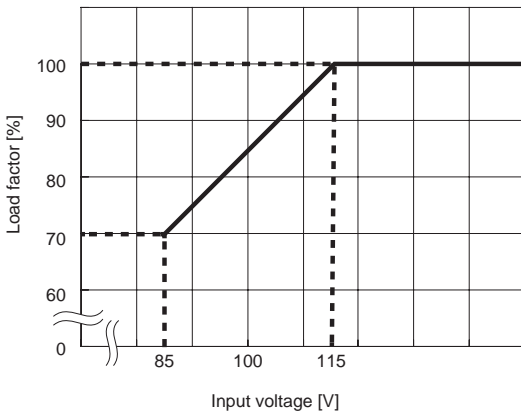


Derating

■ Cooling method

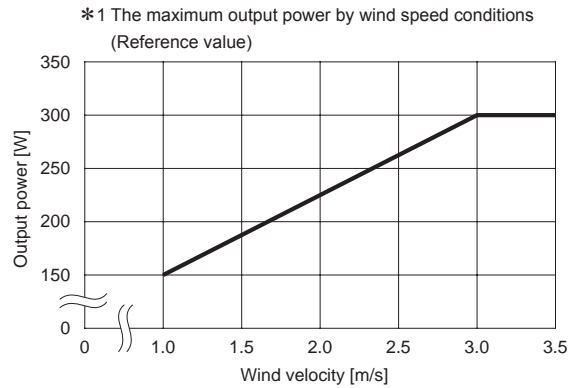
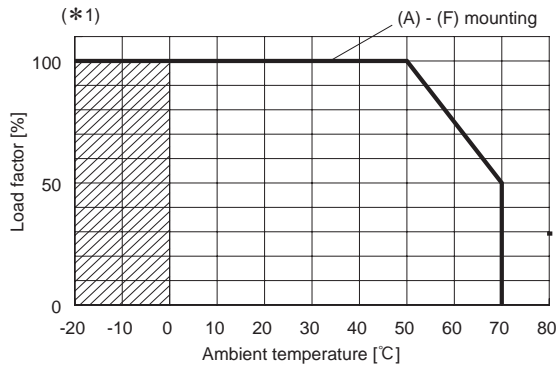
Conduction cooling are available. Please see instruction manual 3 for details. Please make sure the maximum component temperature rise given in instruction manual 3 is not exceeded.

● Derating curve for input voltage



Derating

● Ambient temperature derating curve at forced air (Reference value)



- Specifications for ripple and ripple noise changes in the shaded area.
- Please see instruction manual 3 for recommended cooling condition.

Instruction Manual

◆ It is necessary to read the “Instruction Manual” and “Before using our product” before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/GMA/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

GMA



NOTICE



Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current *1 [A]	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
					Material	Single sided	Double sided	Series operation	Parallel operation
GMA300F	Active filter	40 - 120	3.3	Thermistor	FR-4	-	Yes	Yes	No
	LLC resonant converters	90 - 180							

\*1 The value of input current is at ACIN 115V and rated load.

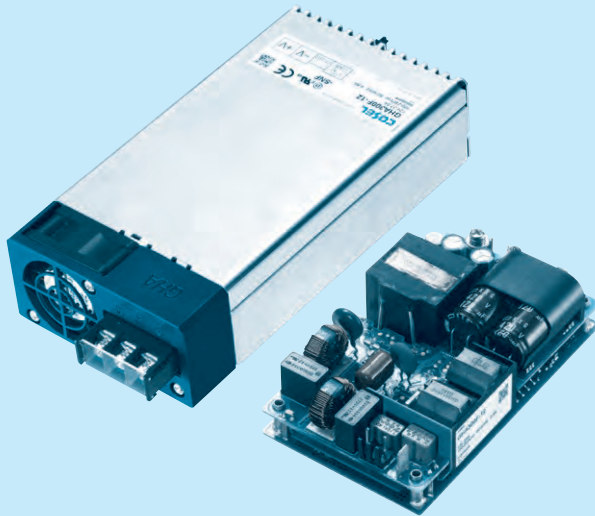




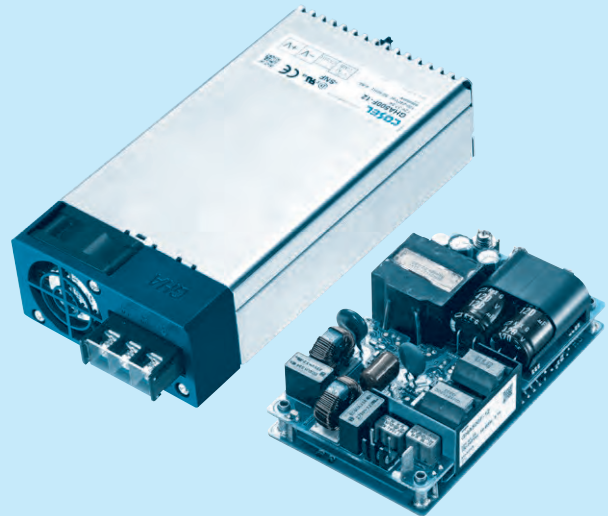


# GHA-series

GHA series is an innovative model that offers a wide variety of cooling methods (convection, forced air, and conduction cooling).



GHA300F / GHA300F-SNF



GHA500F / GHA500F-SNF

## Feature

- Wattage 500Wmax
- Conduction cooling (GHA500F)
- 3" X 5" standard footprint
- Less than 1U high
- ITE and Medical safety approvals
- Low leakage current
- With Remote (Option)
- With AUX1(12V), AUX2(5V) (Option)
- With FAN (GHA300F-SNF, GHA500F-SNF)

## Safety agency approvals

- UL60950-1, ANSI/AAMI ES60601-1
- C-UL (CSA60950-1, CAN/CSA60601-1)
- EN60950-1, EN60601-1 3rd
- Complies with DEN-AN

## 5-year warranty (Refer to Instruction Manual)

## CE marking

- Low Voltage Directive
- RoHS Directive

## EMI

- Complies with FCC-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B, VCCI-B

## EMS Compliance : EN61204-3, EN61000-6-2

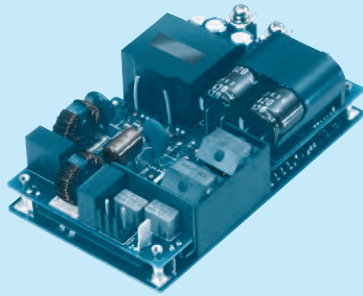
IEC60601-1-2 (2014), EN60601-1-2 (2015)

- EN61000-4-2
- EN61000-4-3
- EN61000-4-4
- EN61000-4-5
- EN61000-4-6
- EN61000-4-8
- EN61000-4-11

# GHA300F

**GH A 300 F** -□□ -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
EAC-10-472



High voltage pulse noise type : EAP series  
Low leakage current type : EAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
  - ② Single output
  - ③ Output wattage
  - ④ Universal input
  - ⑤ Output voltage
  - ⑥ Optional \*6
- T3 : mounting hole M3  
J1 : J.S.T.connector type  
J3 : Horizontal input connector  
J.S.T.connector type  
R3 : with Subfeatures (5VAUX,12VAUX,Remote, Power good)(Molex connector type)  
\*with friction locks,J2R3

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, please handle the unit with care  
\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

Specification is changed at option, refer to Instruction manual.

MODEL	GHA300F-12		GHA300F-24	GHA300F-48
MAX OUTPUT WATTAGE[W]	300		300	302.4
DC OUTPUT	Forced air Convection	at 50°C	12V 25A	24V 12.5A
		at 40°C	12V 8.4A	24V 4.2A
		at 50°C	12V 4.5A	24V 2.2A

## SPECIFICATIONS

	MODEL	GHA300F-12	GHA300F-24	GHA300F-48	
INPUT	VOLTAGE[V]	AC90 - 264 1 φ (output derating is required at AC90V -115V *3)			
	CURRENT[A]	ACIN 120V	3.3typ		
		ACIN 230V	1.8typ		
	FREQUENCY[Hz]	50 / 60 (47 - 63)			
	EFFICIENCY[%]	ACIN 120V	89typ	90typ	90typ
		ACIN 230V	91typ	92typ	92typ
	POWER FACTOR (Io=100%)	ACIN 120V	0.95typ		
		ACIN 230V	0.90typ		
INRUSH CURRENT[A]	ACIN 120V	20typ (Io=100%) (At cold start) (Ta=25°C)			
	ACIN 230V	40typ (Io=100%) (At cold start) (Ta=25°C)			
LEAKAGE CURRENT[ma]	0.125/0.250max (ACIN 120V/240V 60Hz,Io=100%, According to IEC60601-1)				
OUTPUT	VOLTAGE[V]	12	24	48	
	CURRENT[A]	Forced air	25.0	12.5	6.3
		Convection	4.5	2.2	1.1
	LINE REGULATION[mV] *4	48max	96max	192max	
	LOAD REGULATION[mV] *4	100max	150max	240max	
	RIPPLE[mVp-p] *1	0 to +50°C	240max	240max	300max
		-20 to 0°C	320max	320max	400max
	RIPPLE NOISE[mVp-p]*1	0 to +50°C	300max	300max	480max
		-20 to 0°C	360max	360max	500max
	TEMPERATURE REGULATION[mV]	0 to +50°C	120max	240max	480max
		-20 to +50°C	150max	290max	600max
	DRIFT[mV] *2	48max	96max	192max	
	START-UP TIME[ms]	500typ (ACIN 120V, Io=100%)			
	HOLD-UP TIME[ms]	16typ (ACIN 120V, Io=100%)			
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	10.80 to 13.20	21.60 to 26.40	43.20 to 52.80		
OUTPUT VOLTAGE SETTING[V]	12.00 to 12.48	24.00 to 24.96	48.00 to 49.92		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically			
	OVERVOLTAGE PROTECTION[V]	13.80 to 16.80	27.60 to 33.60	55.20 to 67.20	
	AUX1 (12V1A)	Optional			
	AUX2 (5V1A)	Optional			
	REMOTE ON/OFF	Optional			
	PowerGood	Optional			
ISOLATION	INPUT-OUTPUT · RC · AUX *7	AC4,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 2MOPP			
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 1MOPP			
	OUTPUT · RC · AUX-FG *7	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)			
	OUTPUT-RC · AUX *7	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)			
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTIUDE	-20 to +70°C, 20 - 90%RH (Non condensing), 3,000m (10,000feet) max *3			
	STORAGE TEMP.,HUMID.AND ALTIUDE	-30 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max			
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis			
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, ANSI/AAMI ES60601-1, C-UL(CSA60950-1, CAN/CSA60601-1), EN60950-1, EN60601-1 3rd, Complies with DEN-AN, IEC60601-1-2 4th Ed.			
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B			
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (class A) *5			
OTHERS	CASE SIZE/WEIGHT	76.2×35×127mm [3.0×1.4×5.0 inches] (W×H×D) / 400g max			
	COOLING METHOD	Convection, Forced air (Require external fan)			

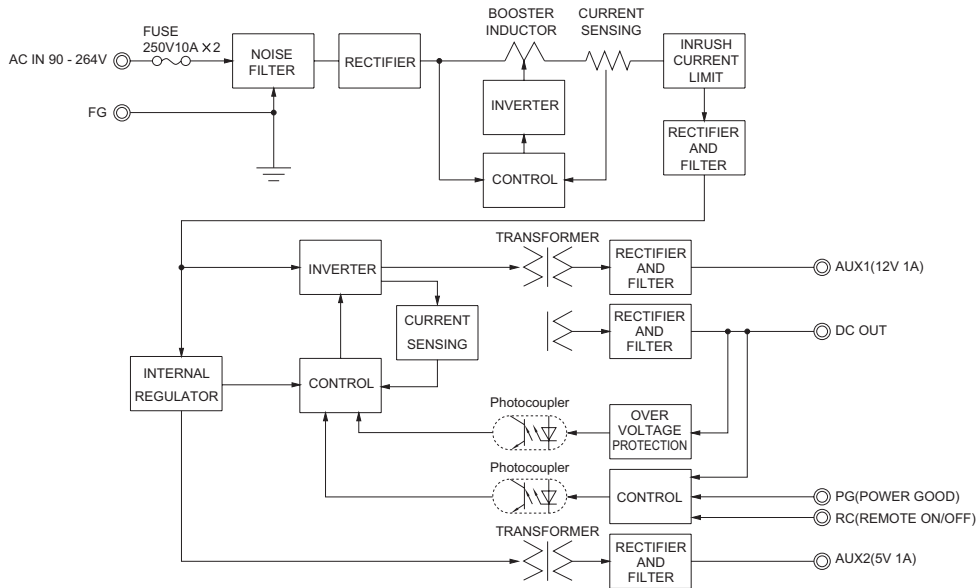
\*1 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal.  
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
\*3 Derating is required.  
\*4 Please contact us about dynamic load and input response.  
\*5 Please contact us about another class.

\*6 Specification is changed at option, refer to Instruction Manual  
\*7 Applicable when AUX and remote control (optional) is added.  
\* To meet the specifications. Do not operate over-loaded condition.  
\* Sound noise may be generated by power supply in case of pulse load.  
\* Parallel operation is not possible.  
\* Forced air cooling is required to output up to MAX OUTPUT WATTAGE.  
\* Bottom layer P.C.B has electric potential which is required isolation from FG by clearance or creepage as the safety design issue.

## Features

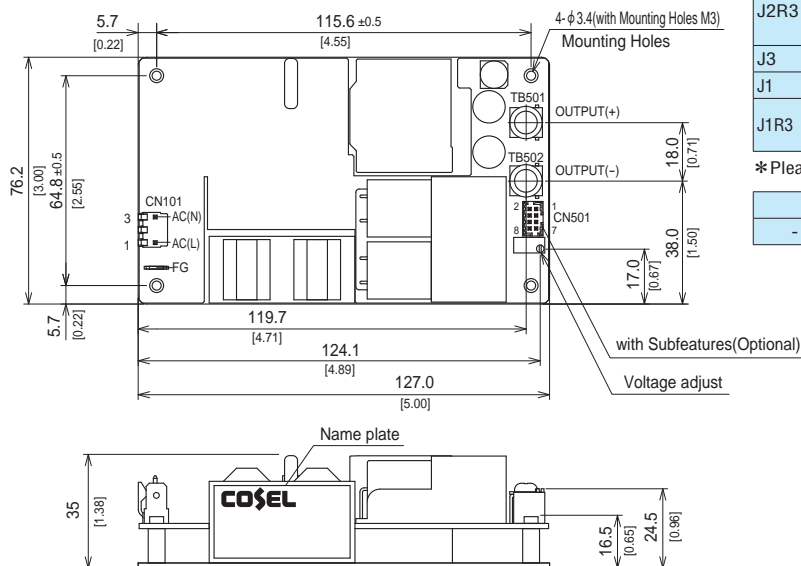
- High Power density: 14.3W/inch<sup>3</sup>
- 3" × 5" standard footprint
- Industrial and Medical safety approvals
- With Remote On/Off (Optional)
- No minimum load is required
- High efficiency 92% typ (Input Voltage 230V, Output Voltage 24V)
- Fits 1U applications
- Low leakage current
- With AUX1 (12V), AUX2 (5V) (Optional)

## Block diagram



## External view

\*External size of option J3 is different from standard model and refer to 6 Option and Others of instruction manual for details.



- ※ Tolerance  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 400g max
- ※ There is a total of four attachment holes.
- ※ This power supply requires mounting on metal standoffs 5mm in height. (Insulating sheet is required if you do not use a spacer).
- ※ Dimensions in mm, [ ]=inches
- ※ Screw tightening torque : (TB501, 502) : 1.5N · m max
- ※ Mounting torque : 0.6N · m max
- ※ Avoid contact between TB501 and 502 wiring with mounting parts.
- ※ Option : -J1 : (J.S.T) connector type. Refer to Instruction Manual 6.

		Connector	Mating connector	Terminal	Mfr
Standard	CN101	A-41671-A03A197-2	09-50-8031	08-50-0105 08-65-0114	Molex *
	CN501	087831-0820	51110-0851	50394-8051	
	CN501	087831-0841	51110-0860	50394-8051	
J2R3	CN101	A-41671-A03A197-2	09-50-8031	08-50-0105 08-65-0114	J.S.T.
J3	CN101	S2P3-VH			
J1	CN101	B2P3-VH	VHR-3N	SVH-21T-P1.1	J.S.T.
J1R3	CN501	B8B-PHDSS	PHDR-08VS	SPHD-002T-P0.5	

\*Please note the pin position No.1 is different from Molex.

FG	Mating connector	Terminal	Mfr
-	250 Series	-	Tyco Electronics

### <Pin Assignments>

#### <CN101>

Pin No.	Input
1	AC(L)
2	
3	AC(N)

#### <CN501(Optional)>

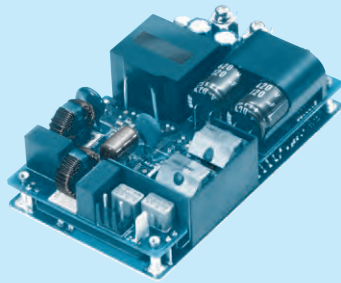
Pin No.	Function
1	AUX1 : AUX1 (12V1A)
2	AUX1G: AUX1 (GND)
3	RC : REMOTE ON/OFF
4	RCG : REMOTE ON/OFF (GND)
5	PG : Power good
6	PGG : Power good (GND)
7	AUX2 : AUX2 (5V1A)
8	AUX2G: AUX2 (GND)



CN501

# GHA500F

GH A 500 F -□□ -□  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter EAC-10-472



High voltage pulse noise type : EAP series  
 Low leakage current type : EAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
  - ② Single output
  - ③ Output wattage
  - ④ Universal input
  - ⑤ Output voltage
  - ⑥ Optional \*6
- T3 : mounting hole M3  
 J1 : J.S.T.connector type  
 J3 : Horizontal input connector J.S.T.connector type  
 R3 : with Subfeatures (5VAUX,12VAUX,Remote, Power good)(Molex connector type)  
 \*with friction locks,J2R3  
 P : Parallel Operation

This power supply is manufactured by SMD technology. The stress to P.C.B like twisting or bending causes the defect of the unit, please handle the unit with care  
 \*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

Specification is changed at option, refer to Instruction manual.

MODEL	GHA500F-12	GHA500F-15	GHA500F-24	GHA500F-30	GHA500F-48	GHA500F-56	
MAX OUTPUT WATTAGE[W]	500.4	501	504	501	504	504	
DC OUTPUT	Forced air	at 50°C	12V 41.7A	15V 33.4A	24V 21.0A	30V 16.7A	48V 10.5A
		at 40°C	12V 12.5A	15V 10.0A	24V 6.3A	30V 5.0A	48V 3.2A
	Convection	at 50°C	12V 9.2A	15V 7.4A	24V 4.6A	30V 3.7A	48V 2.3A
		at 0°C	12V 30.0A	15V 24.0A	24V 15.0A	30V 12.0A	48V 7.5A
conduction cooling	at 50°C	12V 16.7A	15V 13.4A	24V 8.4A	30V 6.7A	48V 4.2A	
	at 50°C	12V 16.7A	15V 13.4A	24V 8.4A	30V 6.7A	48V 4.2A	

## SPECIFICATIONS

MODEL	GHA500F-12	GHA500F-15	GHA500F-24	GHA500F-30	GHA500F-48	GHA500F-56	
VOLTAGE[V]	AC90 - 264 1 φ (output derating is required at AC90V -115V *3)						
CURRENT[A]	ACIN 120V	5.4typ					
	ACIN 230V	2.9typ					
FREQUENCY[Hz]	50 / 60 (47 - 63)						
EFFICIENCY[%]	ACIN 120V	88typ					
	ACIN 230V	90typ					
POWER FACTOR (lo=100%)	ACIN 120V	0.95typ					
	ACIN 230V	0.90typ					
INRUSH CURRENT[A]	ACIN 120V	20typ (lo=100%) (At cold start) (Ta=25°C)					
	ACIN 230V	40typ (lo=100%) (At cold start) (Ta=25°C)					
LEAKAGE CURRENT[mA]	0.125/0.250max (ACIN 120V/240V 60Hz,lo=100%, According to IEC60601-1)						
VOLTAGE[V]	12	15	24	30	48	56	
CURRENT[A]	Forced air	41.7	33.4	21.0	16.7	10.5	9.0
	Convection	9.2	7.4	4.6	3.7	2.3	1.9
	conduction cooling	16.7	13.4	8.4	6.7	4.2	3.6
LINE REGULATION[mV]	*4	48max	60max	96max	120max	192max	
LOAD REGULATION[mV]	*4	100max	120max	150max	180max	240max	
RIPPLE[mVp-p]	*1	0 to +50°C	240max	240max	240max	300max	300max
	-20 - 0°C	320max	320max	320max	400max	400max	500max
RIPPLE NOISE[mVp-p]*1	*1	0 to +50°C	300max	300max	300max	480max	480max
	-20 - 0°C	360max	360max	360max	500max	500max	580max
TEMPERATURE REGULATION[mV]	*1	0 to +50°C	120max	150max	240max	300max	480max
	-20 to +50°C	150max	180max	290max	360max	600max	600max
DRIFT[mV]	*2	48max	60max	96max	120max	192max	
START-UP TIME[ms]	500typ (ACIN 120V, lo=100%)						
HOLD-UP TIME[ms]	16typ (ACIN 120V, lo=100%)						
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	10.80 to 13.20	13.50 to 16.50	21.60 to 26.40	27.00 to 31.50	43.20 to 52.80	52.00 to 56.00	
OUTPUT VOLTAGE SETTING[V]	12.00 to 12.48	15.00 to 15.30	24.00 to 24.96	30.00 to 31.20	48.00 to 49.92	55.00 to 56.00	
OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically						
OVERVOLTAGE PROTECTION[V]	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	34.50 to 42.00	55.20 to 67.20	60.00 to 69.00	
AUX1 (12V1A)	Optional						
AUX2 (5V1A)	Optional						
REMOTE ON/OFF	Optional						
PowerGood	Optional						
INPUT-OUTPUT · RC · AUX	*7 AC4,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 2MOPP						
INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 1MOPP						
OUTPUT · RC · AUX-FG	*7 AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)						
OUTPUT-RC · AUX	*7 AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)						
OPERATING TEMP., HUMID. AND ALTITUDE	-20 to +80°C, 20 - 90%RH (Non condensing), 3,000m (10,000feet) max						
STORAGE TEMP., HUMID. AND ALTITUDE	-30 to +80°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max						
VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis						
IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis						
AGENCY APPROVALS	UL60950-1, ANSI/AAMI ES60601-1, C-UL(CSA60950-1, CAN/CSA60601-1), EN60950-1, EN60601-1 3rd, Complies with DEN-AN, IEC60601-1-2 4th Ed.						
CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B						
HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (class A) *5						
CASE SIZE/WEIGHT	76.2 X 35 X 127mm [3.0 X 1.4 X 5.0 inches] (W X H X D) / 420g max						
COOLING METHOD	Convection, Forced air (Require external fan), Conduction cooling						

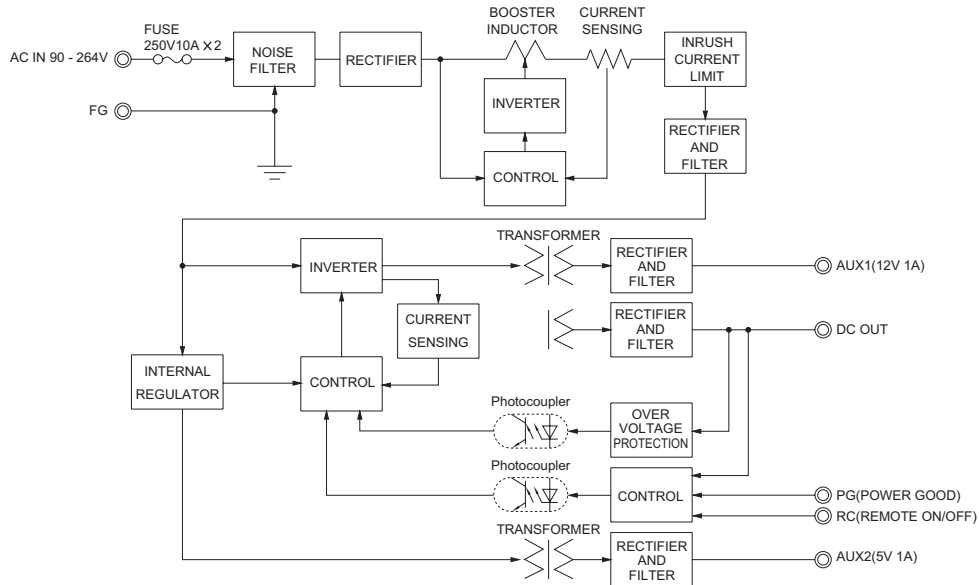
\*1 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal.  
 Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*3 Derating is required.  
 \*4 Please contact us about dynamic load and input response.

\*5 Please contact us about another class.  
 \*6 Specification is changed at option, refer to Instruction Manual.  
 \*7 Applicable when AUX and remote control (optional) is added.  
 \* To meet the specifications. Do not operate over-loaded condition.  
 \* Sound noise may be generated by power supply in case of pulse load.  
 \* Parallel operation is available with -P option. Refer to 5.1 on the instruction manual.  
 \* Forced air cooling is required to output up to MAX OUTPUT WATTAGE.

## Features

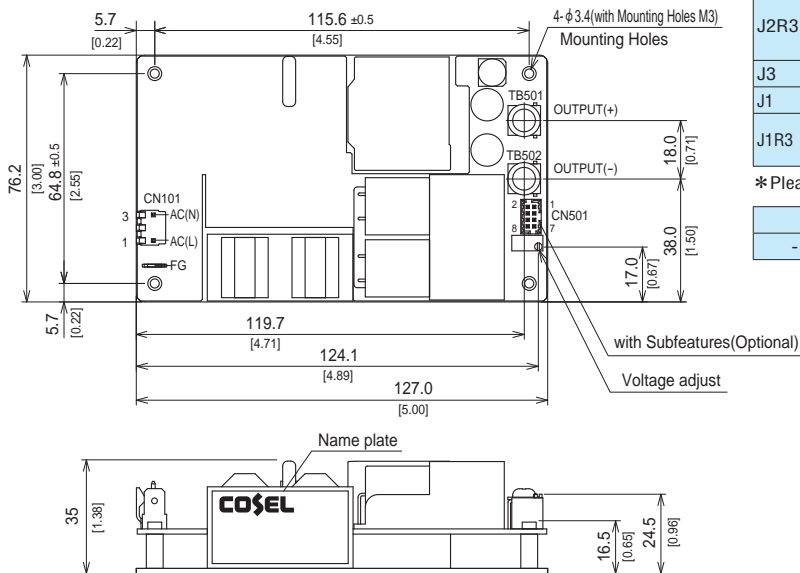
- Wattage 500W max
- High efficiency 92% typ (Input Voltage 230V, Output Voltage 24V)
- Conduction cooling
- Fits 1U applications
- Low leakage current
- With AUX1 (12V), AUX2 (5V) (Optional)
- High Power density: 24.1W/inch<sup>3</sup>
- 3" × 5" standard footprint
- Industrial and Medical safety approvals
- With Remote On/Off (Optional)
- No minimum load is required

## Block diagram



## External view

\* External size of option J3 is different from standard model and refer to 6 Option and Others of instruction manual for details.



- ※ Tolerance ±1 [±0.04]
- ※ Weight : 420g max
- ※ There is a total of four attachment holes.
- ※ Base Plate : Aluminum
- ※ Dimensions in mm, [ ]=inches
- ※ Screw tightening torque : (TB501, 502) : 1.5N · m max
- ※ Mounting torque : 0.6N · m max
- ※ Avoid contact between TB501 and 502 wiring with mounting parts.
- ※ Option : -J1 : (J.S.T) connector type. Refer to Instruction Manual 6.

Connector		Mating connector	Terminal	Mfr	
Standard	CN101	A-41671-A03A197-2	09-50-8031	08-50-0105 08-65-0114	Molex *
	CN501	087831-0820	51110-0851	50394-8051	
J2R3	CN101	A-41671-A03A197-2	09-50-8031	08-50-0105 08-65-0114	
	CN501	087831-0841	51110-0860	50394-8051	
J3	CN101	S2P3-VH			J.S.T.
J1	CN101	B2P3-VH	VHR-3N	SVH-21T-P1.1	
J1R3	CN501	B8B-PHDSS	PHDR-08VS	SPHD-002T-P0.5	

\* Please note the pin position No.1 is different from Molex.

FG	Mating connector	Terminal	Mfr
-	250 Series	-	170603-2 Tyco Electronics

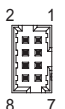
### <Pin Assignments>

#### <CN101>

Pin No.	Input
1	AC(L)
2	
3	AC(N)

#### <CN501 (Optional)>

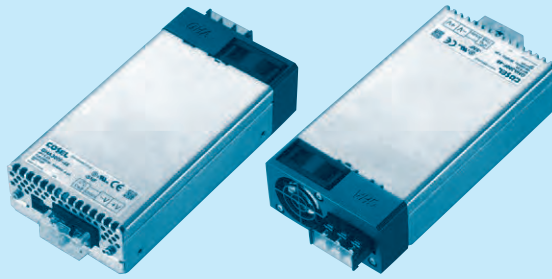
Pin No.	Function
1	AUX1 : AUX1 (12V1A)
2	AUX1G : AUX1 (GND)
3	RC : REMOTE ON/OFF
4	RCG : REMOTE ON/OFF (GND)
5	PG : Power good
6	PGG : Power good (GND)
7	AUX2 : AUX2 (5V1A)
8	AUX2G : AUX2 (GND)



CN501

# GHA300F-SNF

GH A 300 F -□□ -SNF□  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**EAC-10-472**



High voltage pulse noise type : EAP series  
 Low leakage current type : EAM series  
 \*A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
  - ② Single output
  - ③ Output wattage
  - ④ Universal input
  - ⑤ Output voltage
  - ⑥ Optional \*6
  - J1 : CN501  
 PHconnector type(J.S.T.)
  - J2 : CN501  
 Friction locks connector type (Molex)
- Refer to the instruction manual 6.1.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	GHA300F-12-SNF	GHA300F-24-SNF	GHA300F-48-SNF
MAX OUTPUT WATTAGE[W]	300	300	302.4
DC OUTPUT	Forced air +50°C 12V 25.0A	24V 12.5A	48V 6.3A

## SPECIFICATIONS

	MODEL	GHA300F-12-SNF	GHA300F-24-SNF	GHA300F-48-SNF	
INPUT	VOLTAGE[V]	AC90 - 264 1 φ (output derating is required at AC90V -115V *3)			
	CURRENT[A]	ACIN 120V	3.3typ		
		ACIN 230V	1.8typ		
	FREQUENCY[Hz]	50 / 60 (47 - 63)			
	EFFICIENCY[%]	ACIN 120V	88typ	89typ	89typ
		ACIN 230V	90typ	91typ	91typ
	POWER FACTOR (Io=100%)	ACIN 120V	0.95typ		
		ACIN 230V	0.90typ		
INRUSH CURRENT[A]	ACIN 120V	20typ (Io=100%) (At cold start) (Ta=25°C)			
	ACIN 230V	40typ (Io=100%) (At cold start) (Ta=25°C)			
LEAKAGE CURRENT[mA]	0.125/0.250max (ACIN 120V/240V 60Hz,Io=100%, According to IEC60601-1)				
OUTPUT	VOLTAGE[V]	12	24	48	
	CURRENT[A]	Forced air 25.0	12.5	6.3	
	LINE REGULATION[mV]	*4 48max	96max	192max	
	LOAD REGULATION[mV]	*4 100max	150max	240max	
	RIPPLE[mVp-p] *1	0 to +50°C	240max	240max	300max
		-20 - 0°C	320max	320max	400max
	RIPPLE NOISE[mVp-p]*1	0 to +50°C	300max	300max	480max
		-20 - 0°C	360max	360max	500max
	TEMPERATURE REGULATION[mV]	0 to +50°C	120max	240max	480max
		-20 to +50°C	150max	290max	600max
	DRIFT[mV]	*2 48max	96max	192max	
	START-UP TIME[ms]	500typ (ACIN 120V, Io=100%)			
	HOLD-UP TIME[ms]	16typ (ACIN 120V, Io=100%)			
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	10.80 to 13.20	21.60 to 26.40	43.20 to 52.80	
OUTPUT VOLTAGE SETTING[V]	12.00 to 12.48	24.00 to 24.96	48.00 to 49.92		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically *7			
	OVERVOLTAGE PROTECTION[V]	13.80 to 16.80	27.60 to 33.60	55.20 to 67.20	
	AUX1	10V 0.5A			
	AUX2	5V 1A			
	REMOTE ON/OFF	Possible, AUX2 is available			
PowerGood	Open collector				
ISOLATION	INPUT-OUTPUT · RC · AUX	AC4,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 2MOPP			
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 1MOPP			
	OUTPUT · RC · AUX-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)			
	OUTPUT-RC · AUX	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)			
ENVIRONMENT	OPERATING TEMP,HUMID.AND ALTITUDE	-20 to +70°C, 20 - 90%RH (Non condensing), 3,000m (10,000feet) max *3			
	STORAGE TEMP,HUMID.AND ALTITUDE	-30 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max			
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis			
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, ANSI/AAMI ES60601-1, C-UL(CSA60950-1, CAN/CSA60601-1), EN60950-1, EN60601-1 3rd, Complies with DEN-AN, IEC60601-1-2 4th Ed.			
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B			
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (class A) *5			
OTHERS	CASE SIZE/WEIGHT	85.2 X 41 X 165.3mm [3.35 X 1.61 X 6.5 inches] (W X H X D) / 620g max			
	COOLING METHOD	Forced air			

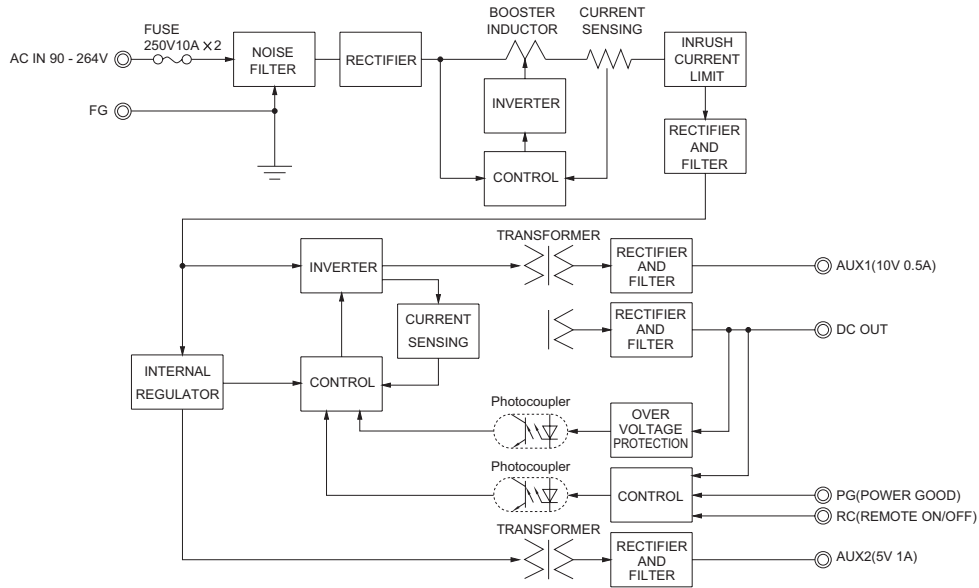
\*1 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal.  
 Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*3 Refer to "Derating".  
 \*4 Please contact us about dynamic load and input response.

\*5 Please contact us about another class.  
 \*6 Specification is changed at option, refer to Instruction Manual.  
 \*7 When output current more than rated, output will shut down after 5 seconds or more. Recycle input after 3 minutes to reset the protection.  
 \* To meet the specifications. Do not operate over-loaded condition.  
 \* Sound noise may be generated by power supply in case of pulse load.

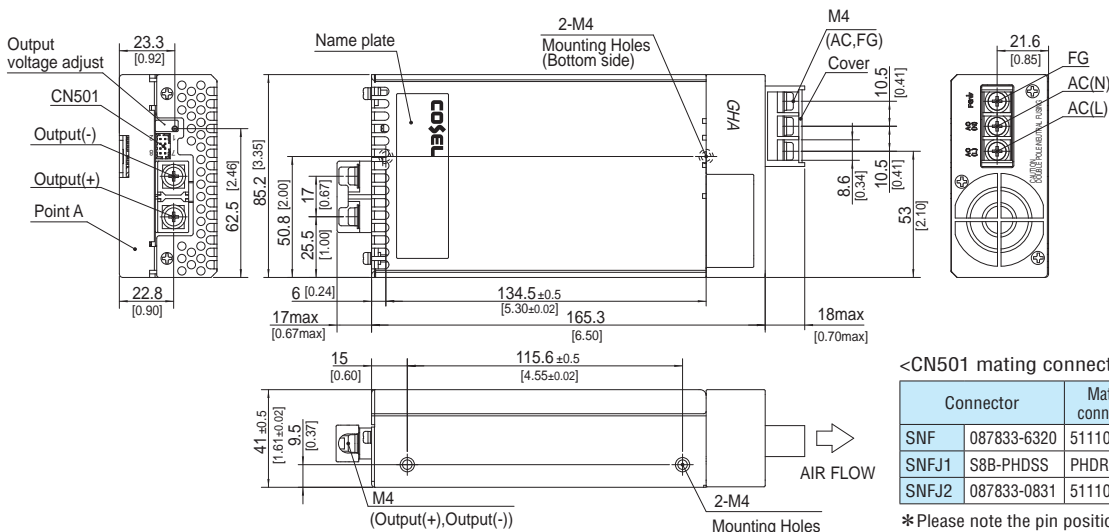
## Features

- Full packaged design united with GHA's features and additional robustness..
- High efficiency 91% typ (Input voltage 230V, Output voltage 24V)
- Optical for 1U applications
- Medical and Industrial safety approvals
- Low leakage current
- Conformal coating
- Single remote ON/OFF control for DC output, AUX1 and Fan.
- Isolated dual AUX (AUX1 10V 0.5A, AUX2 5V 1A)

## Block diagram



## External view



<CN501 mating connector and terminal>

Connector	Mating connector	Terminal	Mfr	
SNF	087833-6320	51110-0851	50394-8051	Molex *
SNFJ1	S8B-PHDSS	PHDR-08VS	SPHD-002T-P0.5	J.S.T.
SNFJ2	087833-0831	51110-0860	50394-8051	Molex *

\* Please note the pin position No.1 is different from Molex.

<CN501>

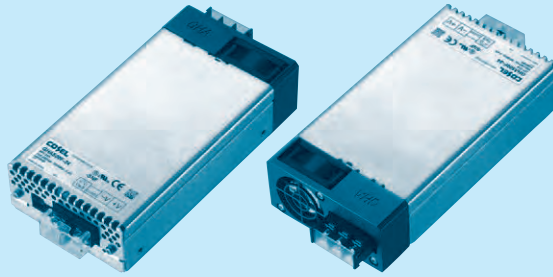
Pin No.	Function
1	AUX1 : AUX1 (10V0.5A)
2	AUX1G: AUX1 (GND)
3	RC : REMOTE ON/OFF
4	RCG : REMOTE ON/OFF (GND)
5	PG : Power good
6	PGG : Power good (GND)
7	AUX2 : AUX2 (5V1A)
8	AUX2G: AUX2 (GND)

- ※ Tolerance  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 620g max
- ※ Upper PCB Material/thickness : FR-4/1.6mm
- ※ Lower PCB Material/thickness : FR-4/1.6mm
- ※ Chassis Material/thickness : Aluminum/1.5mm
- ※ Cover Material/thickness : Aluminum/1.2mm
- ※ Fan cover Material : PBT
- ※ Mounting torque : 1.5N · m (14.7kgf · cm) max
- ※ Screw tightening torque M4 : 1.6N · m (16.9kgf · cm) max
- ※ Dimensions in mm, [ ]=inches



# GHA500F-SNF

GH A 500 F -□□ -SNF□  
 ① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
**EAC-10-472**



High voltage pulse noise type : EAP series  
 Low leakage current type : EAM series  
 \* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
  - ② Single output
  - ③ Output wattage
  - ④ Universal input
  - ⑤ Output voltage
  - ⑥ Optional \*6
- J1 : CN501  
 PHconnector type(J.S.T.)  
 J2 : CN501  
 Friction locks connector type (Molex)  
 P : Parallel Operation
- Refer to the instruction manual 6.1.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	GHA500F-12-SNF	GHA500F-15-SNF	GHA500F-24-SNF	GHA500F-30-SNF	GHA500F-48-SNF	GHA500F-56-SNF	
MAX OUTPUT WATTAGE[W]	450	501	504	501	504	504	
DC OUTPUT	Forced air +50°C	12V 37.5A	15V 33.4A	24V 21.0A	30V 16.7A	48V 10.5A	56V 9.0A

## SPECIFICATIONS

	MODEL	GHA500F-12-SNF	GHA500F-15-SNF	GHA500F-24-SNF	GHA500F-30-SNF	GHA500F-48-SNF	GHA500F-56-SNF					
INPUT	VOLTAGE[V]	AC90 - 264 1 φ (output derating is required at AC90V -115V *3)										
	CURRENT[A]	ACIN 120V	4.8typ	5.4typ								
		ACIN 230V	2.6typ	2.9typ								
	FREQUENCY[Hz]	50 / 60 (47 - 63)										
	EFFICIENCY[%]	ACIN 120V	87typ	89typ	89typ	89typ	89typ	89typ				
		ACIN 230V	89typ	91typ	91typ	91typ	91typ	91typ				
	POWER FACTOR (Io=100%)	ACIN 120V	0.95typ									
		ACIN 230V	0.90typ									
INRUSH CURRENT[A]	ACIN 120V	20typ (Io=100%) (At cold start) (Ta=25°C)										
	ACIN 230V	40typ (Io=100%) (At cold start) (Ta=25°C)										
LEAKAGE CURRENT[mA]	0.125/0.250max (ACIN 120V/240V 60Hz,Io=100%, According to IEC60601-1)											
OUTPUT	VOLTAGE[V]	12	15	24	30	48	56					
	CURRENT[A]	Forced air	37.5	33.4	21.0	16.7	10.5	9.0				
	LINE REGULATION[mV]	*4	48max	60max	96max	120max	192max	192max				
	LOAD REGULATION[mV]	*4	100max	120max	150max	180max	240max	240max				
	RIPPLE[mVp-p] *1	0 to +50°C	240max	240max	240max	300max	300max	400max				
		-20 - 0°C	320max	320max	320max	400max	400max	500max				
	RIPPLE NOISE[mVp-p]*1	0 to +50°C	300max	300max	300max	480max	480max	500max				
		-20 - 0°C	360max	360max	360max	500max	500max	580max				
	TEMPERATURE REGULATION[mV]	0 to +50°C	120max	150max	240max	300max	480max	480max				
		-20 to +50°C	150max	180max	290max	360max	600max	600max				
	DRIFT[mV]	*2	48max	60max	96max	120max	192max	192max				
	START-UP TIME[ms]	500typ (ACIN 120V, Io=100%)										
	HOLD-UP TIME[ms]	16typ (ACIN 120V, Io=100%)										
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	10.80 to 13.20		13.50 to 16.50		21.60 to 26.40		27.00 to 31.50		43.20 to 52.80		52.00 to 56.00	
OUTPUT VOLTAGE SETTING[V]	12.00 to 12.48		15.00 to 15.30		24.00 to 24.96		30.00 to 31.20		48.00 to 49.92		55.00 to 56.00	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically *7										
	OVERVOLTAGE PROTECTION[V]	13.80 to 16.80	17.25 to 21.00	27.60 to 33.60	34.50 to 42.00	55.20 to 67.20	60.00 to 69.00					
	AUX1	12V 0.5A										
	AUX2	5V 1A										
	REMOTE ON/OFF	Possible, AUX2 is available										
	PowerGood	Open collector										
ISOLATION	INPUT-OUTPUT · RC · AUX	AC4,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 2MOPP										
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature) 1MOPP										
	OUTPUT · RC · AUX-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)										
	OUTPUT-RC · AUX	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)										
ENVIRONMENT	OPERATING TEMP,HUMID.AND ALTITUDE	-20 to +70°C, 20 - 90%RH (Non condensing), 3,000m (10,000feet) max *3										
	STORAGE TEMP,HUMID.AND ALTITUDE	-30 to +80°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max										
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis										
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis										
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60950-1, ANSI/AAMI ES60601-1, C-UL(CSA60950-1, CAN/CSA60601-1), EN60950-1, EN60601-1 3rd, Complies with DEN-AN, IEC60601-1-2 4th Ed.										
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B										
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (class A) *5										
OTHERS	CASE SIZE/WEIGHT	85.2 X 41 X 165.3mm [3.35 X 1.61 X 6.5 inches] (W X H X D) / 660g max										
	COOLING METHOD	Forced air										

\*1 This is the value that measured on measuring board with capacitor of 22 μF at 150mm from output terminal.  
 Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.  
 \*3 Refer to "Derating".  
 \*4 Please contact us about dynamic load and input response.

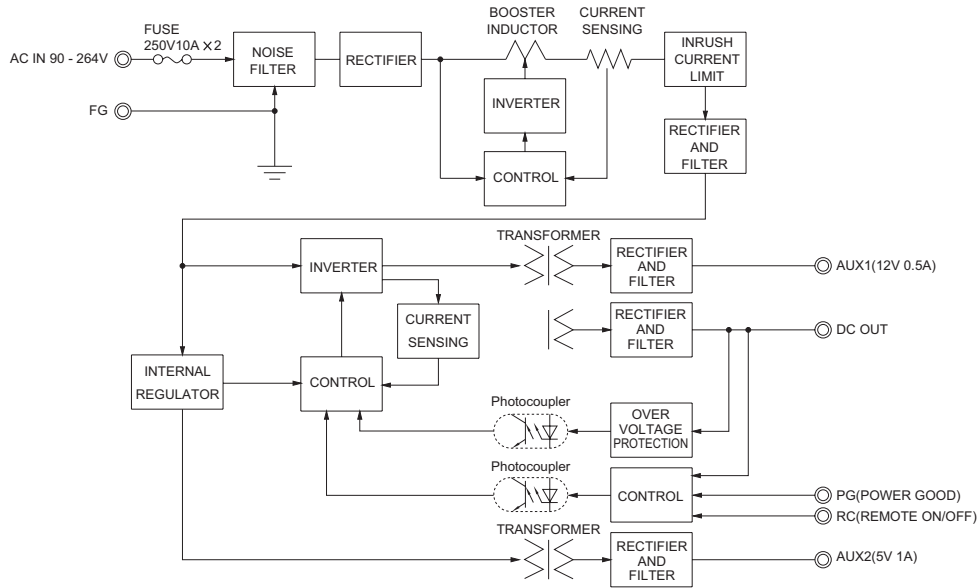
\*5 Please contact us about another class.  
 \*6 Specification is changed at option, refer to Instruction Manual.  
 \*7 When output current more than rated, output will shut down after 5 seconds or more. Recycle input after 3 minutes to reset the protection.  
 \* To meet the specifications. Do not operate over-loaded condition.  
 \* Sound noise may be generated by power supply in case of pulse load.  
 \* Parallel operation is available with -P option. Refer to 5.1on the instruction manual.



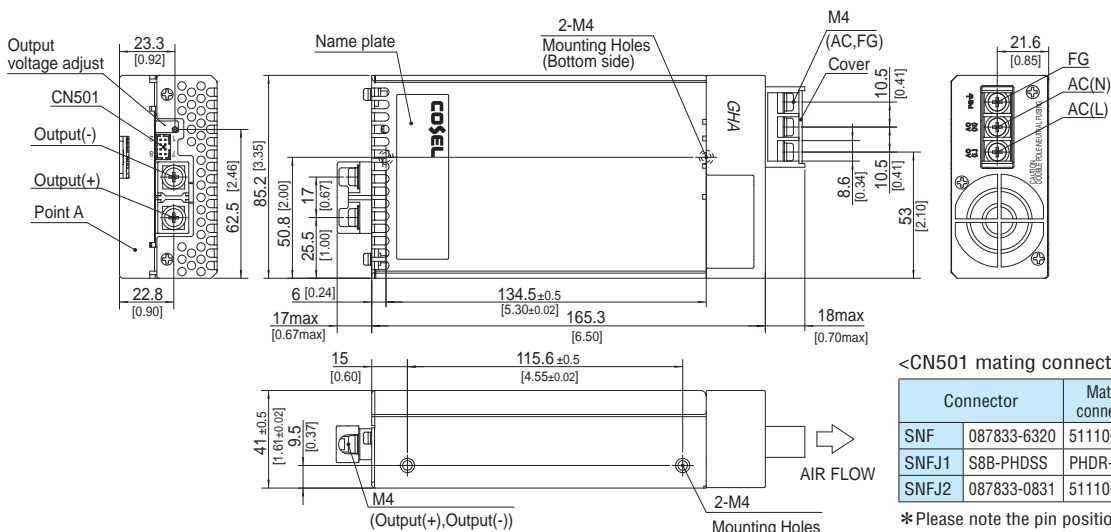
## Features

- Full packaged design united with GHA's features, and additional robustness..
- High efficiency 91% typ (Input voltage 230V,Output voltage 24V)
- 50% minimized size compares with previous products.
- Optical for 1U applications
- Medical and Industrial safety approvals
- Low leakage current
- Conformal coating
- Single remote ON/OFF control for DC output, AUX1 and Fan.
- Isolated dual AUX (AUX1 12V 0.5A, AUX2 5V 1A)

## Block diagram



## External view



<CN501 mating connector and terminal>

Connector	Mating connector	Terminal	Mfr	
SNF	087833-6320	51110-0851	50394-8051	Molex *
SNFJ1	S8B-PHDSS	PHDR-08VS	SPHD-002T-P0.5	J.S.T.
SNFJ2	087833-0831	51110-0860	50394-8051	Molex *

\* Please note the pin position No.1 is different from Molex.

<CN501>

Pin No.	Function
1	AUX1 : AUX1 (12V0.5A)
2	AUX1G: AUX1 (GND)
3	RC : REMOTE ON/OFF
4	RCG : REMOTE ON/OFF (GND)
5	PG : Power good
6	PGG : Power good (GND)
7	AUX2 : AUX2 (5V1A)
8	AUX2G: AUX2 (GND)

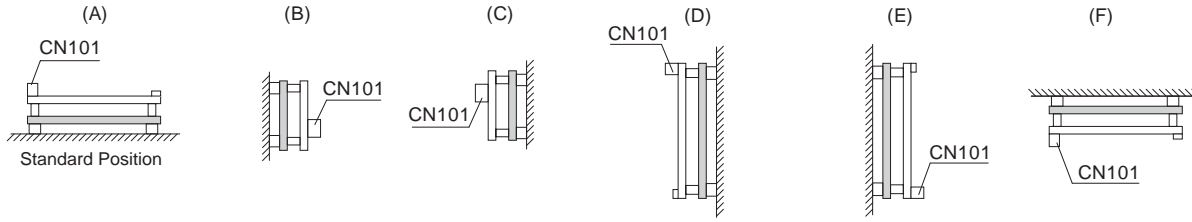
- ※ Tolerance  $\pm 1$  [±0.04]
- ※ Weight : 660g max
- ※ Upper PCB Material/thickness : FR-4/1.6mm
- ※ Lower PCB Material/thickness : AL/1.5mm
- ※ Chassis Material/thickness : Aluminum/1.5mm
- ※ Cover Material/thickness : Aluminum/1.2mm
- ※ Fan cover Material : PBT
- ※ Mounting torque : 1.5N · m (14.7kgf · cm) max
- ※ Screw tightening torque M4 : 1.6N · m (16.9kgf · cm) max
- ※ Dimensions in mm, [ ]=inches



Assembling and Installation Method

GHA300/500F

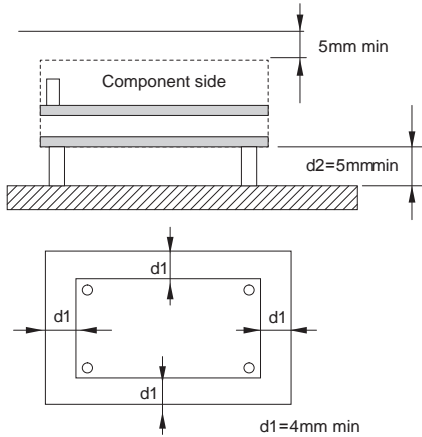
Mounting method



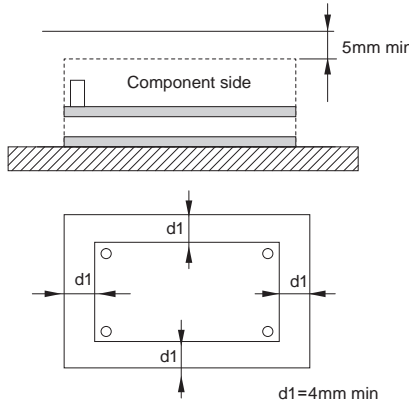
AC voltage exist on the primary side therefore. In order to prevent electric shock, or to meet the leakage current requirements of the safety standard, you need to ensure the proper insulation distance.

During use, keep the distance between  $d1$  &  $d2$  for to insulate between lead of component and metal chassis, use the spacer of 5mm or more between  $d2$ . If it is less than  $d1$  &  $d2$ , insert the insulation sheet between power supply and metal chassis.

GHA300F

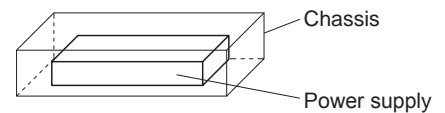


GHA500F



Remarks:

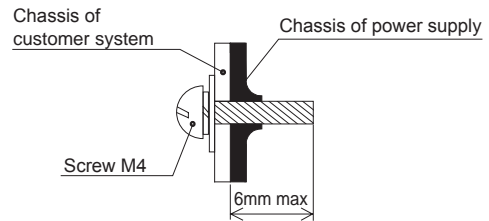
There is a possibility that it is not possible to cool enough when the power supply is used by the sealing up space as showing in right figure.



GHA300/500F-SNF

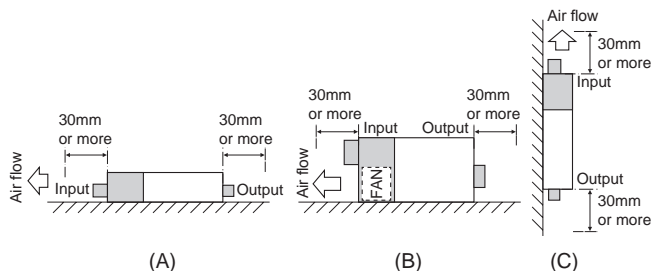
Mounting screw

Screw length into power supply should be shorter than 6mm due to keep safety isolation clearance from inside components in right figure. Please fix power supply surely by screws in consideration of the weight.



A cooling FAN is built-in. Please keep 30mm or more clearance both input and output side to make enough air ventilation. Do not block off cooling FAN's air flow for stable operation.

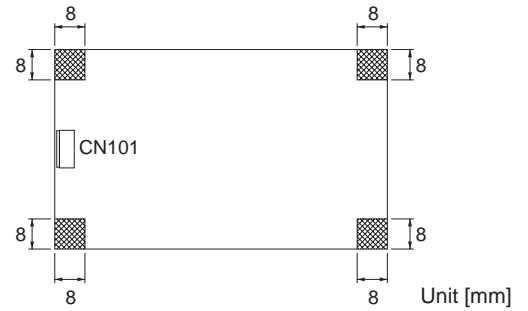
When power supply is used where dust exist, it may cause of FAN failure. It is recommended to install a air filter to the system air ventilation duct.



**Mounting screw**

● **GHA300/500F**

- The mounting screw should be M3. The hatched area shows the allowance of metal parts for mounting.
- If metallic fittings are used on the component side of the board, ensure there is no contact with surface mounted components.
- This product uses SMD technology.  
Please avoid the PCB installation method which includes the twisting stress or the bending stress.

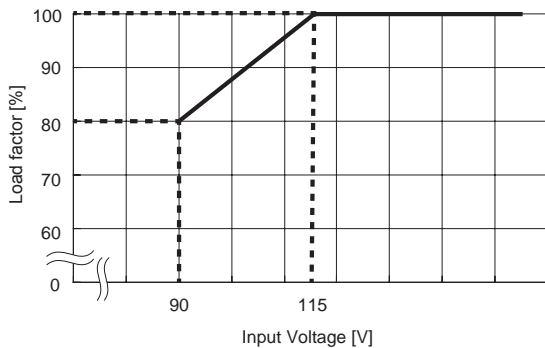


**Derating**

■ **Cooling method**

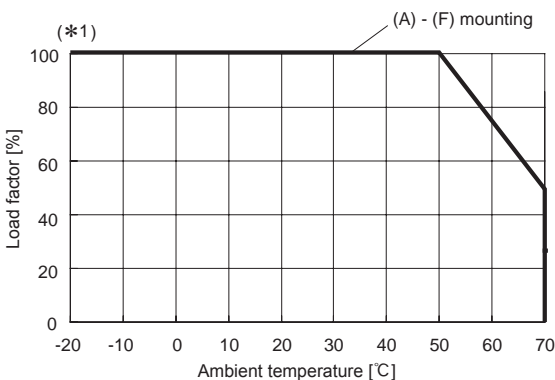
Conduction cooling, forced air and convection cooling are available for GHA500F. Both Forced air and convection cooling are available for GHA300F. Please see instruction manual 3 for details. Please make sure the maximum component temperature rise given in instruction manual 3 is not exceeded (Refer to instruction manual 6 for -SNF).

● **Derating curve for input voltage**



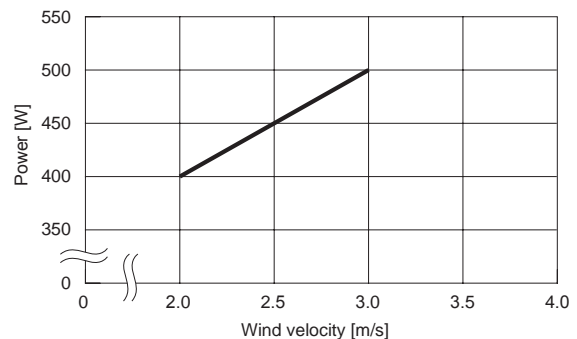
\* For maximum power in each cooling method, please apply.

● **GHA500F Ambient temperature derating curve at forced air (Reference value)**



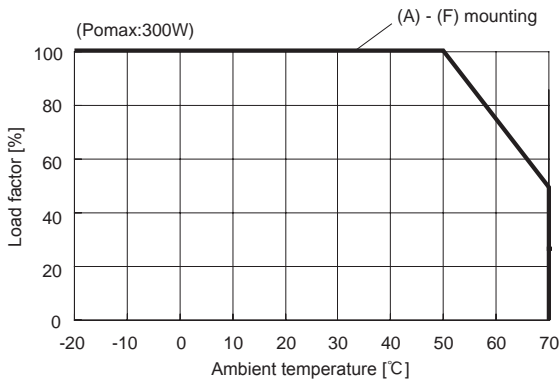
\* For the derating curves of other heat dissipation methods, see instruction manual 3.

\* 1 The maximum output power by wind speed conditions (Reference value)

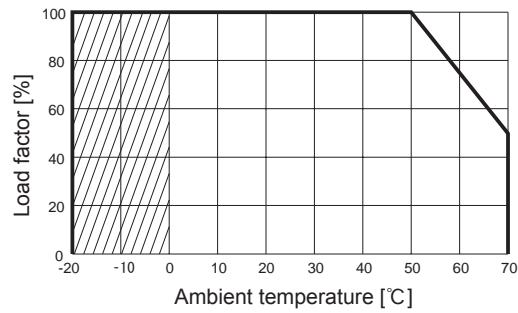


Derating

● GHA300F Ambient temperature derating curve at forced air (Reference value)



● GHA300/500F-SNF Ambient temperature derating curve (Reference value)



\*For the derating curves of other heat dissipation methods, see instruction manual 3.

Instruction Manual

◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/GHA/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

GHA



NOTICE

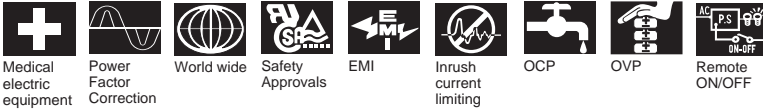


Basic Characteristics Data

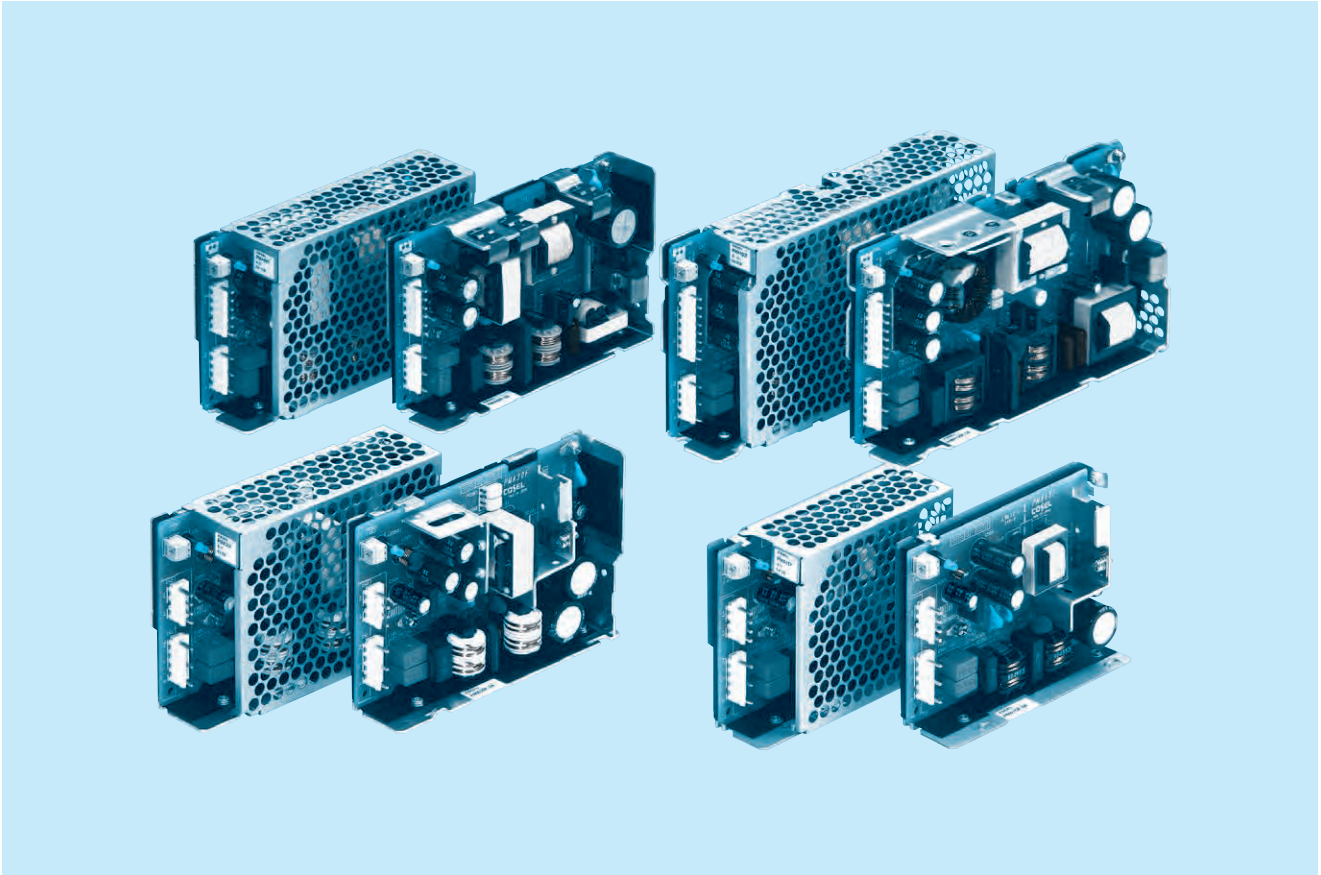
Model	Circuit method	Switching frequency [kHz]	Input current *1 [A]	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
					Material	Single sided	Double sided	Series operation	Parallel operation
GHA300F	boost chopper	60 - 220	3.3	Thermistor	FR-4		Yes	Yes	No
	LLC resonant converters	90 - 180							
GHA500F	boost chopper	60 - 220	5.4	Thermistor	Aluminum/FR-4	Yes	Yes	Yes	*2
	LLC resonant converters	90 - 180							
GHA300F-SNF	boost chopper	60 - 220	3.3	Thermistor	FR-4	Yes	Yes	Yes	No
	LLC resonant converters	90 - 180							
GHA500F-SNF	boost chopper	60 - 220	5.4	Thermistor	Aluminum/FR-4	Yes	Yes	Yes	*2
	LLC resonant converters	90 - 180							

\*1 The value of input current is at ACIN 120V and rated load.

\*2 Parallel operation is available with -P option. Refer to 6.1 on the instruction manual.



# PMA-series



## ■ Feature

- For medical electric equipment
- Internal dual fuses
- Harmonic attenuator (Complies with IEC61000-3-2)
- Universal input (AC85 - 264V)
- Efficiency increased with synchronous rectification technology (PMA60F, PMA100F)
- Variety of option

## ■ Safety agency approvals

UL60601-1, C-UL (CSA-C22.2 No.601.1), EN60601-1

## ■ EMI

FCC-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B, VCCI-B

## ■ 5-year warranty (refer to Instruction Manual)

## ■ CE marking

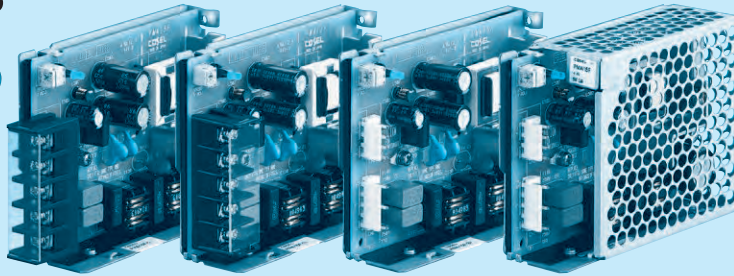
Low Voltage Directive  
RoHS Directive

## ■ EMS Compliance : EN61204-3, EN61000-6-2

- EN61000-4-2
- EN61000-4-3
- EN61000-4-4
- EN61000-4-5 (Common mode Level4, Differential mode Level2)
- EN61000-4-6
- EN61000-4-8
- EN61000-4-11

# PMA15F

① PM ② A ③ 15 ④ F ⑤ -□ ⑥ -□



Horizontal terminal block (option : -T1)    Vertical terminal block (option : -T)    Standard type    with Cover (option : -N)

Example recommended EMI/EMC filter  
**NAM-04-000**



Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5
- T : Vertical terminal block
- T1 : Horizontal terminal block
- N : with Cover
- J1 : VH(J.S.T.)connector type

Specification is changed at option, refer to Instruction Manual.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PMA15F-3R3	PMA15F-5	PMA15F-12	PMA15F-15	PMA15F-24
MAX OUTPUT WATTAGE[W]	9.9	15	15.6	15	16.8
DC OUTPUT	3.3V 3A	5V 3A	12V 1.3A	15V 1A	24V 0.7A

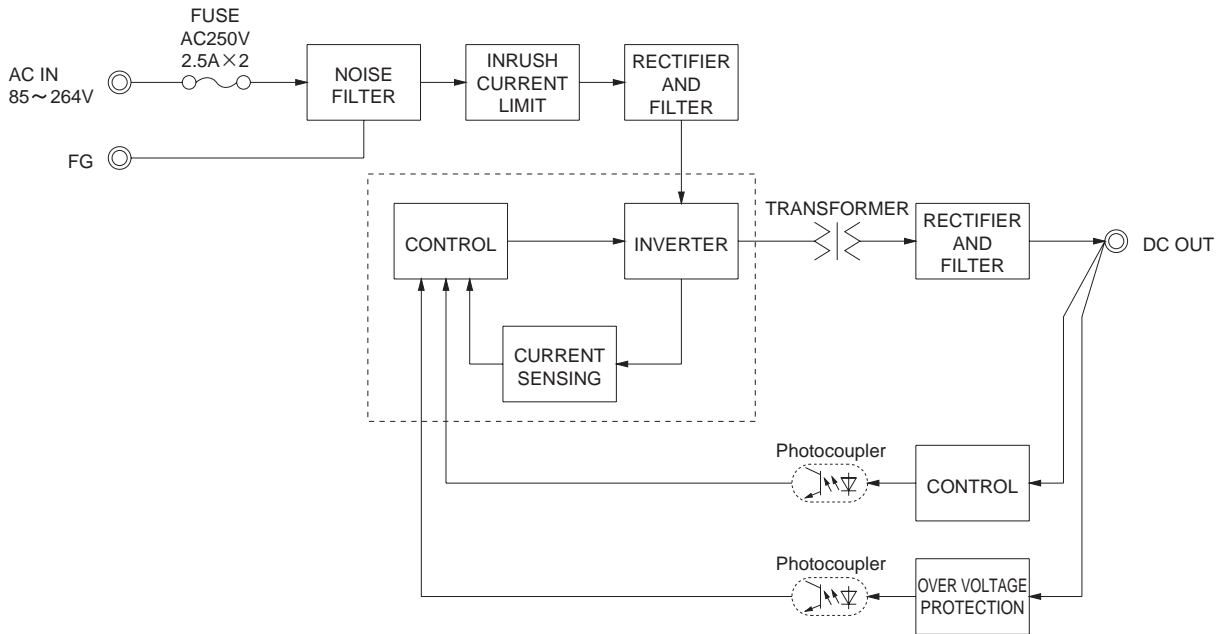
## SPECIFICATIONS

	MODEL	PMA15F-3R3	PMA15F-5	PMA15F-12	PMA15F-15	PMA15F-24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to the Instruction Manual 1.1 and "Derating") *3					
	CURRENT[A]	ACIN 100V	0.30typ (Io=100%)	0.40typ (Io=100%)			
		ACIN 200V	0.15typ (Io=100%)	0.20typ (Io=100%)			
	FREQUENCY[Hz]	50 / 60 (47 - 440)					
	EFFICIENCY[%]	ACIN 100V	66typ	70typ	74typ	76typ	76typ
		ACIN 200V	67typ	74typ	78typ	79typ	79typ
INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) (At cold start)					
	ACIN 200V	30typ (Io=100%) (At cold start)					
LEAKAGE CURRENT[mA]	0.05/0.10max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60601-1)						
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	
	CURRENT[A]	3.0	3.0	1.3	1.0	0.7	
	LINE REGULATION[mV]	20max	20max	48max	60max	96max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	150max	
	RIPPLE[mVp-p]	*1	0 to +50°C	80max	80max	120max	120max
			-10 - 0°C	140max	140max	160max	160max
	RIPPLE NOISE[mVp-p]	*1	0 to +50°C	120max	120max	150max	150max
			-10 - 0°C	160max	160max	180max	180max
	TEMPERATURE REGULATION[mV]	*1	0 to +50°C	50max	50max	120max	150max
			-10 to +50°C	60max	60max	150max	180max
	DRIFT[mV]	*2	20max	20max	48max	60max	96max
	START-UP TIME[ms]	200typ (ACIN 100V, Io=100%) *Start-up time is 700ms typ for less than 1minute of applying input again from turning off the input voltage.					
HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)						
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 to 3.60		4.50 to 5.50		10.00 to 13.20		
OUTPUT VOLTAGE SETTING[V]	3.30 to 3.40		5.00 to 5.15		12.00 to 12.48		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically					
	OVERVOLTAGE PROTECTION[V]	4.00 to 5.25	5.75 to 7.00	15.00 to 18.00	20.00 to 25.00	30.00 to 37.00	
	OPERATING INDICATION	LED (Green)					
	REMOTE ON/OFF	Not provided					
ISOLATION	INPUT-OUTPUT	AC4,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)					
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)					
	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)					
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +70°C, 20 - 90%RH (Non condensing), 3,000m (10,000 feet) max *3					
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000 feet) max					
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis					
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis					
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60601-1, C-UL (CSA-C22.2 No.601.1), EN60601-1					
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B					
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *6 (Not built-in to active filter *4)					
OTHERS	CASE SIZE/WEIGHT	31 X 78 X 103mm [1.22 X 3.07 X 4.06 inches] (W X H X D) / 230g max (with cover : 265g max)					
	COOLING METHOD	Convection					

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter (equivalent to KEISOKU-GIKEN: RM101).  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
\*3 Refer to "Derating".  
\*4 When two or more units are used, they may not comply with the harmonic attenuator. Please contact us for details.

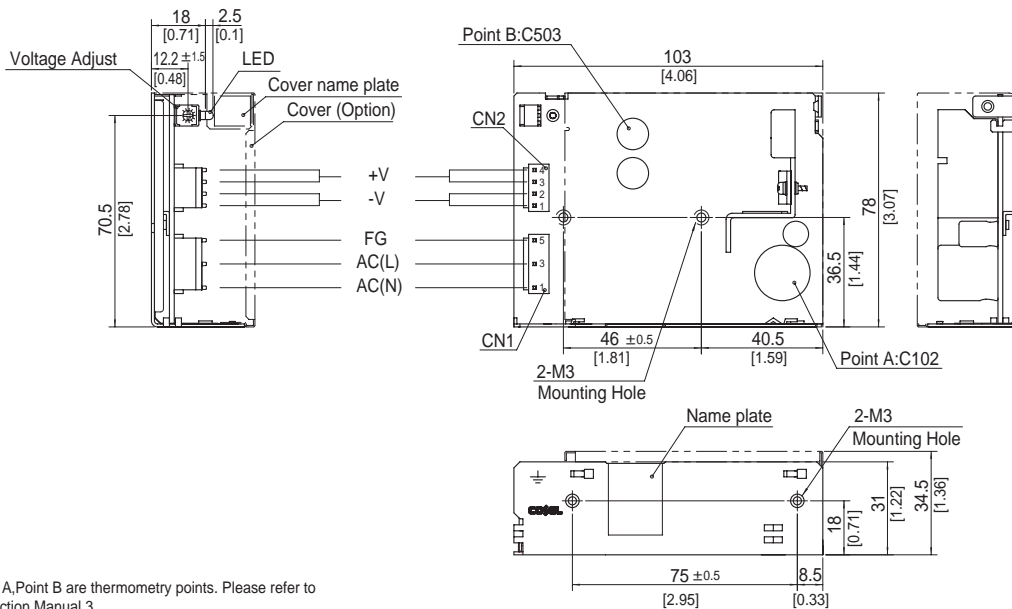
\*5 Please contact us about safety approvals for the model with option.  
\*6 Please contact us about another class.  
\* Parallel operation with other model is not possible.  
\* Derating is required when operated with cover.  
\* A sound may occur from power supply at peak loading.

Block diagram



External view

※ External size of option T and T1 is different from standard model and refer to 5 Option of instruction manual for details.



※ Point A, Point B are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating Connector	Terminal
CN1	1-1123722-5	Chain 1123721-1
		Loose 1318912-1
CN2	1-1123722-4	Chain 1123721-1
		Loose 1318912-1

(Mfr : Tyco Electronics AMP)

- ※ I/O Connector is Mfr. Tyco Electronics AMP
  - ※ Option : -J1 : (J.S.T) connector type
  - T : Vertical terminal block type
  - T1 : Horizontal terminal block type
- Refer to Instruction Manual 5.

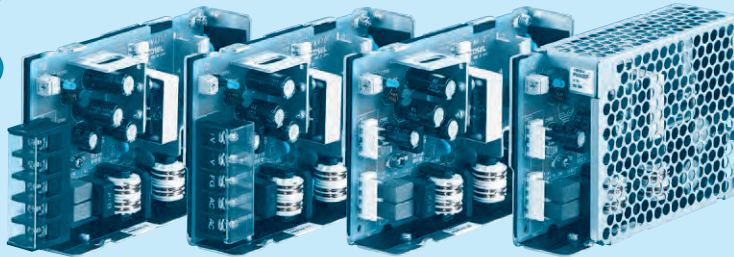
<PIN CONNECTION>

Pin No.	Input	Pin No.	Output
1	AC(N)	1, 2	-V
2		3, 4	+V
3	AC(L)		
4			
5	FG		

- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 230g max (with cover : 265g max)
- ※ PCB Material/thickness : CEM-3 / 1.6mm [0.06inches]
- ※ Chassis material : Electric galvanizing steel board
- ※ Keep drawing current per pin below 5A of CN2.
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque : 0.6N · m (6.3kgf · cm) max
- ※ Please connect safety ground to the unit in 2-M3 holes.

# PMA30F

① PM ② A ③ 30 ④ F ⑤ -□ ⑥ -□



Horizontal terminal block (option : -T1)    Vertical terminal block (option : -T)    Standard type    with Cover (option : -N)

Example recommended EMI/EMC filter  
**NAM-04-000**



Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5
- T : Vertical terminal block
- T1 : Horizontal terminal block
- N : with Cover
- J1 : VH(J.S.T.)connector type

Specification is changed at option, refer to Instruction Manual.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EML regulations.

MODEL	PMA30F-3R3	PMA30F-5	PMA30F-12	PMA30F-15	PMA30F-24
MAX OUTPUT WATTAGE[W]	19.8	30	30	30	31.2
DC OUTPUT	3.3V 6A	5V 6A	12V 2.5A	15V 2A	24V 1.3A

## SPECIFICATIONS

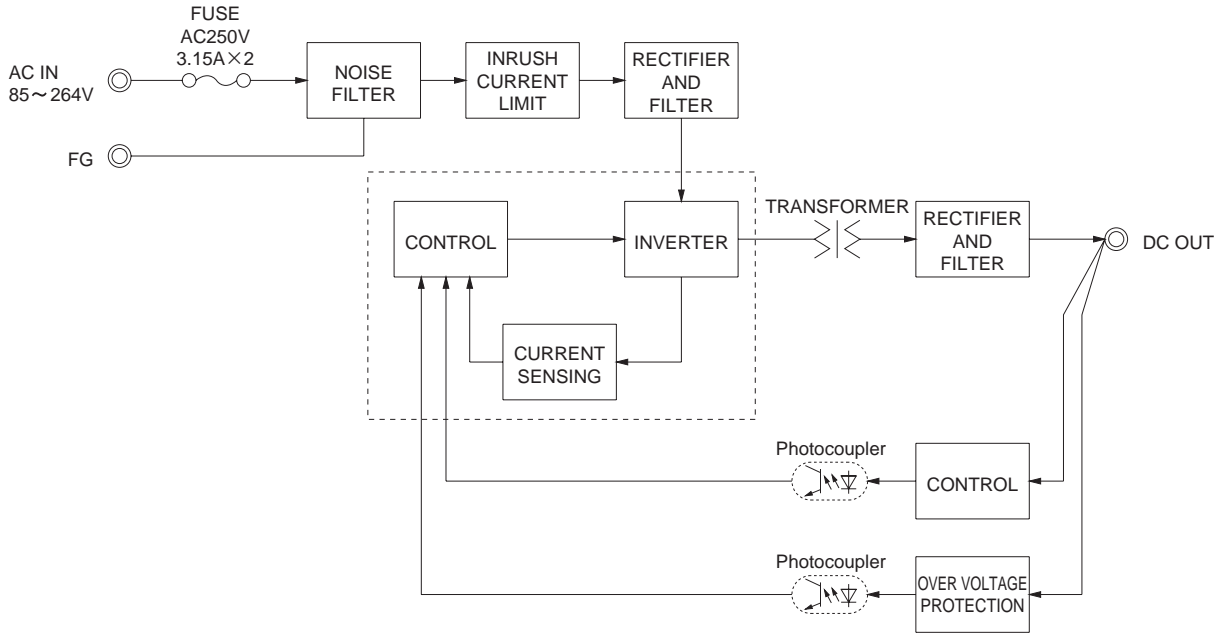
	MODEL	PMA30F-3R3	PMA30F-5	PMA30F-12	PMA30F-15	PMA30F-24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to the Instruction Manual 1.1 and "Derating") *3					
	CURRENT[A]	ACIN 100V	0.50typ (Io=100%)	0.70typ (Io=100%)			
		ACIN 200V	0.30typ (Io=100%)	0.40typ (Io=100%)			
	FREQUENCY[Hz]	50 / 60 (47 - 440)					
	EFFICIENCY[%]	ACIN 100V	67typ	71typ	76typ	77typ	
		ACIN 200V	69typ	74typ	78typ	80typ	
INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) (At cold start)					
	ACIN 200V	30typ (Io=100%) (At cold start)					
LEAKAGE CURRENT[mA]	0.05 / 0.10max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60601-1)						
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	
	CURRENT[A]	6.0	6.0	2.5	2.0	1.3	
	LINE REGULATION[mV]	20max	20max	48max	60max	96max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	150max	
	RIPPLE[mVp-p]	0 to +50°C	80max	80max	120max	120max	120max
		-10 - 0°C	140max	140max	160max	160max	160max
	RIPPLE NOISE[mVp-p]	0 to +50°C	120max	120max	150max	150max	150max
		-10 - 0°C	160max	160max	180max	180max	180max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	120max	150max	240max
		-10 to +50°C	60max	60max	150max	180max	290max
DRIFT[mV]	*2	20max	20max	48max	60max	96max	
START-UP TIME[ms]	200typ (ACIN 100V, Io=100%) *Start-up time is 700ms typ for less than 1minute of applying input again from turning off the input voltage.						
HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)						
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 to 3.60		4.50 to 5.50		10.00 to 13.20    13.20 to 18.00		
OUTPUT VOLTAGE SETTING[V]	3.30 to 3.40		5.00 to 5.15		12.00 to 12.48    15.00 to 15.60		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically					
	OVERVOLTAGE PROTECTION[V]	4.00 to 5.25	5.75 to 7.00	15.00 to 18.00	20.00 to 25.00	30.00 to 37.00	
	OPERATING INDICATION	LED (Green)					
	REMOTE ON/OFF	Not provided					
ISOLATION	INPUT-OUTPUT	AC4,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)					
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)					
	OUTPUT-FG	AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)					
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-10 to +70°C, 20 - 90%RH (Non condensing), 3,000m (10,000feet) max *3					
	STORAGE TEMP., HUMID. AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max					
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis					
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis					
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60601-1, C-UL (CSA-C22.2 No.601.1), EN60601-1					
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B					
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *6 (Not built-in to active filter *4)					
OTHERS	CASE SIZE/WEIGHT	31 X 82 X 120mm [1.22 X 3.23 X 4.72 inches] (W X H X D) / 240g max (with cover : 280g max)					
	COOLING METHOD	Convection					

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter (equivalent to KEISOKU-GIKEN: RM101).  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
\*3 Refer to "Derating".  
\*4 When two or more units are used, they may not comply with the harmonic attenuator. Please contact us for details.

\*5 Please contact us about safety approvals for the model with option.  
\*6 Please contact us about another class.  
\* Parallel operation with other model is not possible.  
\* Derating is required when operated with cover.  
\* A sound may occur from power supply at peak loading.

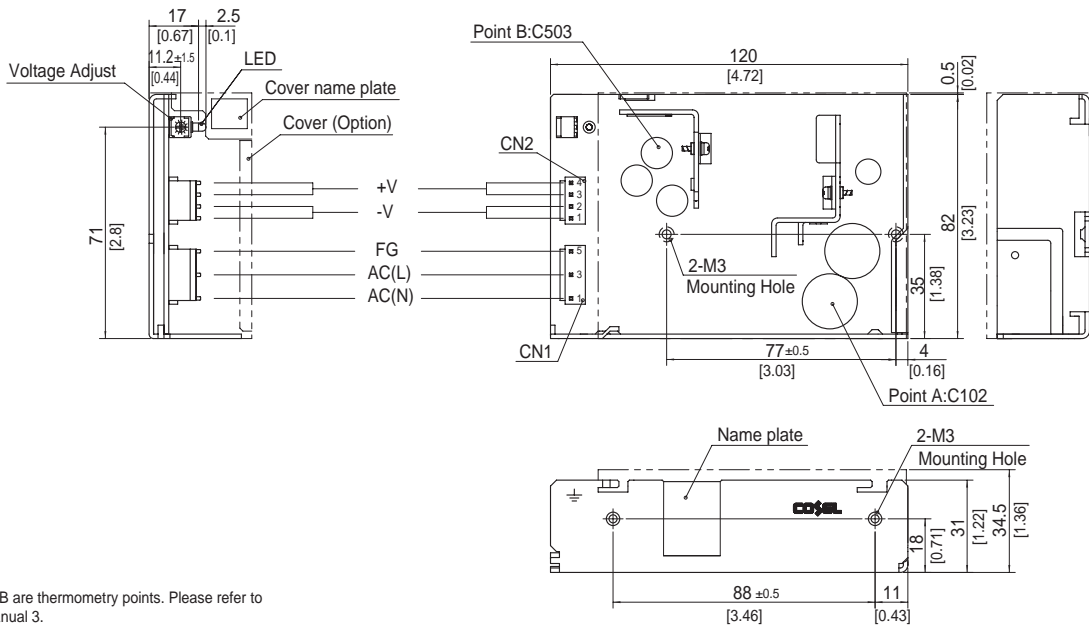


Block diagram



External view

※ External size of option T and T1 is different from standard model and refer to 5 Option of instruction manual for details.



※ Point A, Point B are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating Connector	Terminal
CN1	1-1123724-3	Chain 1123721-1
		Loose 1318912-1
CN2	1-1123723-4	Chain 1123721-1
		Loose 1318912-1

(Mfr: Tyco Electronics AMP)

※ I/O Connector is Mfr. Tyco Electronics AMP  
 ※ Option : -J1 : (J.S.T) connector type  
 -T : Vertical terminal block type  
 -T1 : Horizontal terminal block type  
 Refer to Instruction Manual 5.

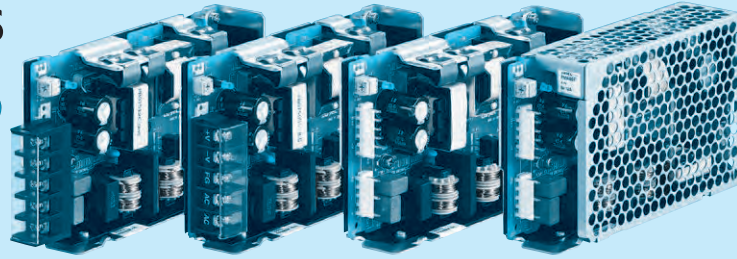
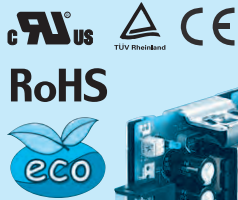
<PIN CONNECTION>

CN1		CN2	
Pin No.	Input	Pin No.	Output
1	AC(N)	1, 2	-V
2		3, 4	+V
3	AC(L)		
4			
5	FG		

※ Tolerance : ±1 [±0.04]  
 ※ Weight : 240g max (with cover : 280g max)  
 ※ PCB Material/thickness : CEM-3 / 1.6mm [0.06inches]  
 ※ Chassis material : Aluminum  
 ※ Keep drawing current per pin below 5A of CN2.  
 ※ Dimensions in mm, [ ] =inches  
 ※ Mounting torque : 0.49N · m (5kgf · cm) max  
 ※ Please connect safety ground to the unit in 2-M3 holes.

# PMA60F

① PM ② A ③ 60 ④ F ⑤ -□ ⑥ -□



Horizontal terminal block (option : -T1)    Vertical terminal block (option : -T)    Standard type    with Cover (option : -N)

Example recommended EMI/EMC filter  
**NAM-04-000**



Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5
- T : Vertical terminal block
- T1 : Horizontal terminal block
- N : with Cover
- J1 : VH(J.S.T.)connector type
- R : with Remote ON/OFF

Specification is changed at option, refer to Instruction Manual.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PMA60F-3R3	PMA60F-5	PMA60F-12	PMA60F-15	PMA60F-24
MAX OUTPUT WATTAGE[W]	39.6	60	60	60	60
DC OUTPUT	3.3V 12A	5V 12A	12V 5A	15V 4A	24V 2.5A

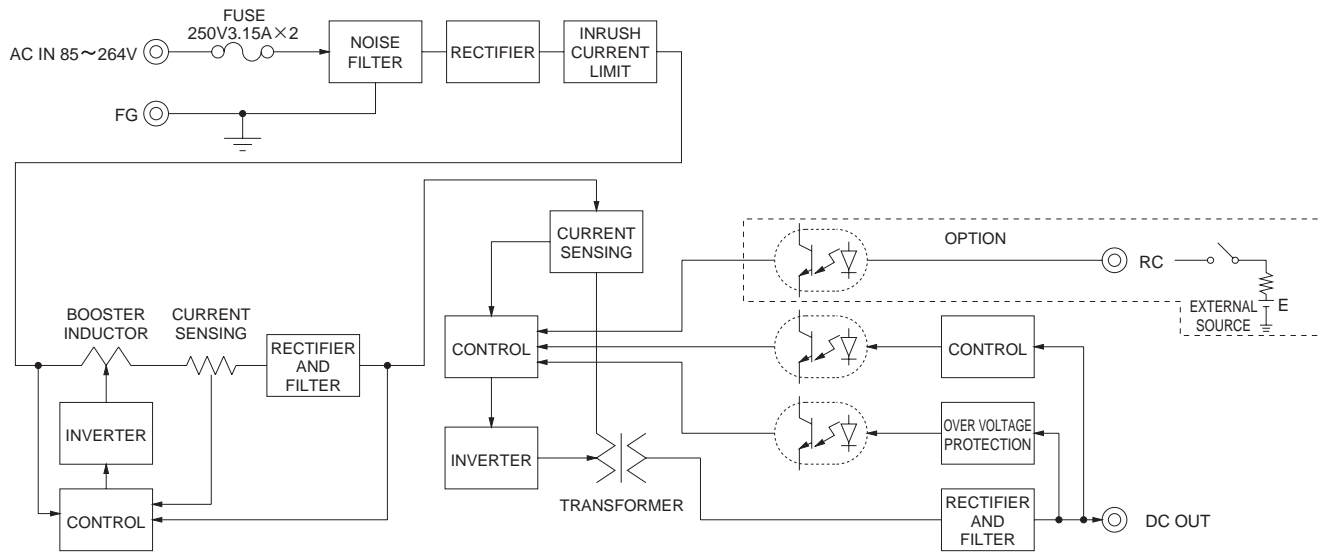
## SPECIFICATIONS

	MODEL	PMA60F-3R3	PMA60F-5	PMA60F-12	PMA60F-15	PMA60F-24	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to the Instruction Manual 1.1)					
	CURRENT[A]	ACIN 100V	0.7typ (Io=100%)	0.8typ (Io=100%)			
		ACIN 200V	0.4typ (Io=100%)	0.5typ (Io=100%)			
	FREQUENCY[Hz]	50 / 60 (47 - 63)					
	EFFICIENCY[%]	ACIN 100V	77typ	80typ	80typ	81typ	81typ
		ACIN 200V	78typ	83typ	82typ	83typ	83typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.98typ				
		ACIN 200V	0.85typ		0.90typ		
INRUSH CURRENT[A]	ACIN 100V	15typ (Io=100%) (At cold start)					
	ACIN 200V	30typ (Io=100%) (At cold start)					
LEAKAGE CURRENT[ma]	0.09 / 0.18max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60601-1)						
OUTPUT	VOLTAGE[V]	3.3	5	12	15	24	
	CURRENT[A]	12.0	12.0	5.0	4.0	2.5	
	LINE REGULATION[mV]	20max	20max	48max	60max	96max	
	LOAD REGULATION[mV]	40max	40max	100max	120max	150max	
	RIPPLE[mVp-p]	0 to +50°C	80max	80max	120max	120max	120max
		-10 - 0°C	140max	140max	160max	160max	160max
	RIPPLE NOISE[mVp-p]	0 to +50°C	120max	120max	150max	150max	150max
		-10 - 0°C	160max	160max	180max	180max	180max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	120max	150max	240max
		-10 to +50°C	60max	60max	150max	180max	290max
	DRIFT[mV]	20max	20max	48max	60max	96max	
	START-UP TIME[ms]	250typ (ACIN 100V, Io=100%)					
HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)						
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 to 3.60	4.50 to 5.50	10.00 to 13.20	13.20 to 18.00	19.20 to 27.00		
OUTPUT VOLTAGE SETTING[V]	3.30 to 3.40	5.00 to 5.15	12.00 to 12.48	15.00 to 15.60	24.00 to 24.96		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically					
	OVERVOLTAGE PROTECTION[V]	4.00 to 5.25	5.75 to 7.00	15.00 to 18.00	20.00 to 25.00	30.00 to 37.00	
	OPERATING INDICATION	LED (Green)					
	REMOTE ON/OFF	Optional (Required external power source)					
ISOLATION	INPUT-OUTPUT-RC	*3 AC4,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)					
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)					
	OUTPUT-RC-FG	*3 AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)					
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-10 to +70°C, 20 - 90%RH (Non condensing), 3,000m (10,000feet) max *4					
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max					
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis					
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis					
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60601-1, C-UL (CSA-C22.2 No.601.1), EN60601-1					
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B					
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 *6					
OTHERS	CASE SIZE/WEIGHT	32 X 82 X 135mm [1.26 X 3.23 X 5.31 inches] (W X H X D) / 350g max (with cover : 395g max)					
	COOLING METHOD	Convection					

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter (equivalent to KEISOKU-GIKEN: RM101).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \*3 Applicable when Remote ON/OFF (optional) is added. RC is insulated with input, output and FG.  
 \*4 Refer to "Derating".  
 \*5 Please contact us about safety approvals for the model with option.

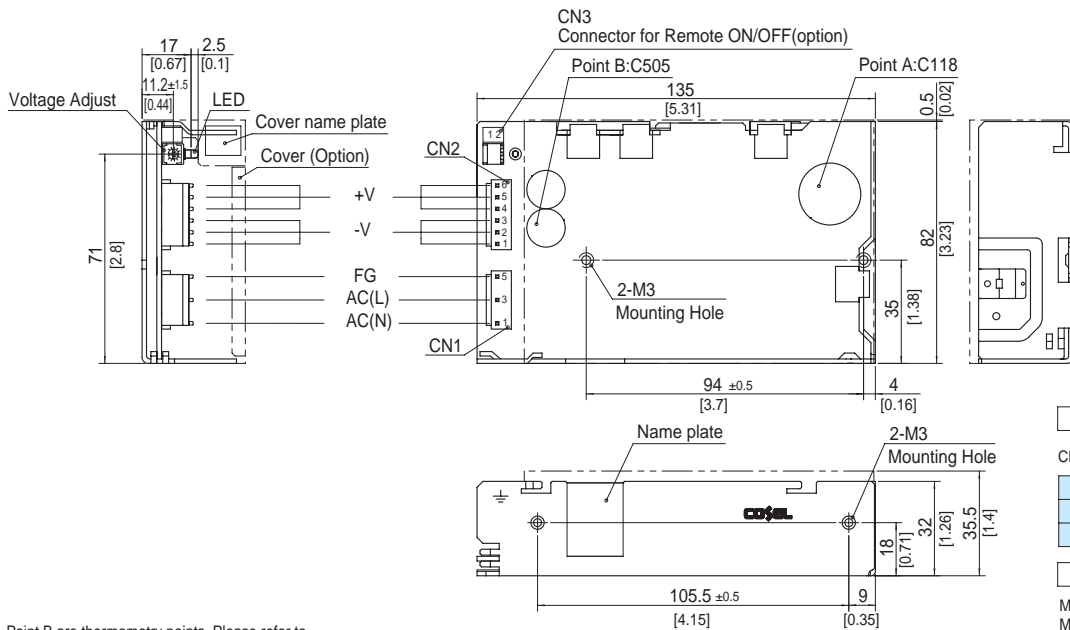
\*6 Please contact us about class C.  
 \* Parallel operation with other model is not possible.  
 \* Derating is required when operated with cover.  
 \* A sound may occur from power supply at peak loading.

Block diagram



External view

※ External size of option T and T1 is different from standard model and refer to 5 Option of instruction manual for details.



※ Point A, Point B are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating Connector	Terminal
CN1	1-1123724-3	Chain 1123721-1
		Loose 1318912-1
CN2	1-1123723-6	Chain 1123721-1
		Loose 1318912-1

(Mfr : Tyco Electronics AMP)

※ I/O Connector is Mfr. Tyco Electronics AMP  
 ※ Option : -J1 : (J.S.T) connector type  
 -T : Vertical terminal block type  
 -T1 : Horizontal terminal block type  
 Refer to Instruction Manual 5.

<PIN CONNECTION>

Pin No.	Input
1	AC(N)
2	
3	AC(L)
4	
5	FG

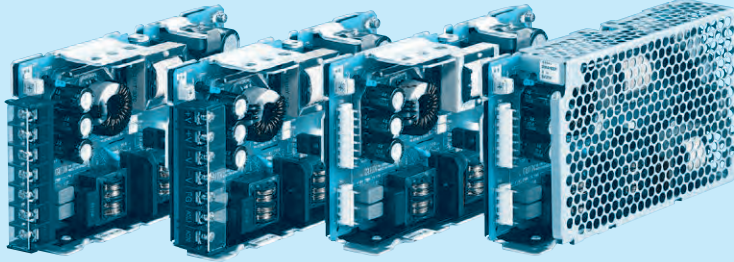
Pin No.	Output
1 - 3	-V
4 - 6	+V

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 350g max (with cover : 395g max)
- ※ PCB Material/thickness : CEM-3 / 1.6mm [0.06inches]
- ※ Chassis material : Aluminum
- ※ Keep drawing current per pin below 5A of CN2.
- ※ Dimensions in mm, [ ]=inches
- ※ Mounting torque : 0.49N · m (5kgf · cm) max
- ※ Please connect safety ground to the unit in 2-M3 holes.

Connector type	
CN3 Option (Mfr: J.S.T)	
PIN No.	Contents
1	RC(+)
2	RC(-)
Barrier strip type	
Model B2B-XH-A	
Mating Connector (Terminal)	
XHP-2	
(BXH-001T-P0.6 or SXH-001T-P0.6)	

# PMA100F

① PM ② A ③ 100 ④ F ⑤ -□ ⑥ -□



Horizontal terminal block (option : -T1)    Vertical terminal block (option : -T)    Standard type    with Cover (option : -N)

Example recommended EMI/EMC filter  
**NAM-06-000**



Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5
- T : Vertical terminal block
- T1: Horizontal terminal block
- N : with Cover
- J1 : VH(J.S.T.)connector type
- R : with Remote ON/OFF

Specification is changed at option, refer to Instruction Manual.

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	PMA100F-3R3	PMA100F-5	PMA100F-12	PMA100F-24	PMA100F-48
MAX OUTPUT WATTAGE[W]	66	100	102	108	100.8
DC OUTPUT	3.3V 20A	5V 20A	12V 8.5A	24V 4.5A	48V 2.1A

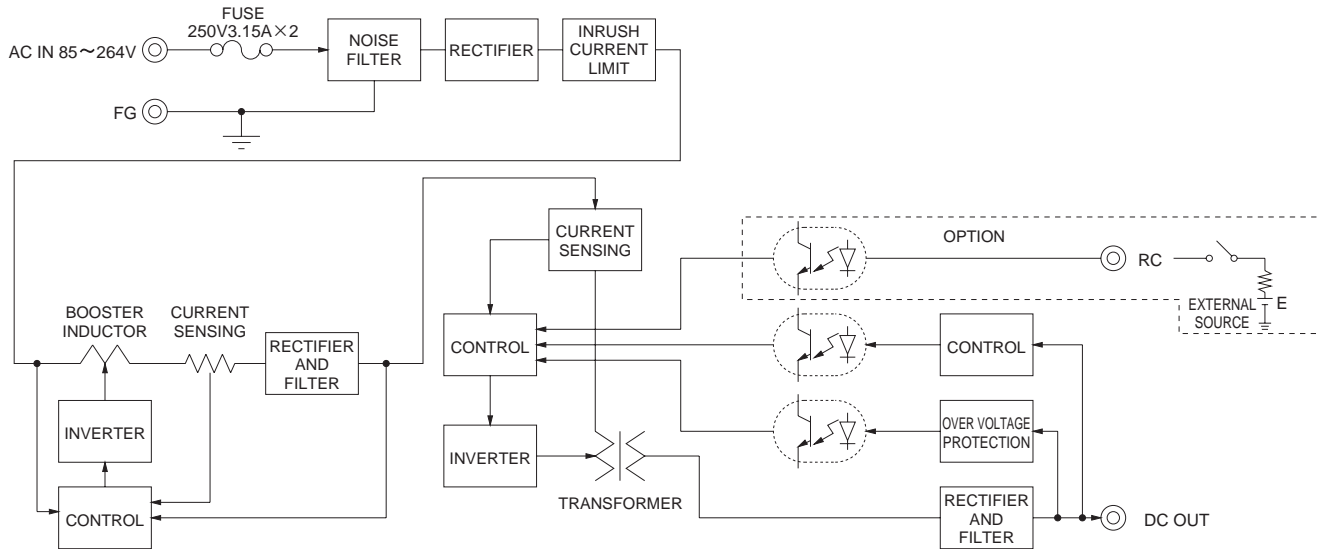
## SPECIFICATIONS

	MODEL	PMA100F-3R3	PMA100F-5	PMA100F-12	PMA100F-24	PMA100F-48	
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to the Instruction Manual 1.1)					
	CURRENT[A]	ACIN 100V	0.9typ (Io=100%)	1.3typ (Io=100%)			
		ACIN 200V	0.5typ (Io=100%)	0.7typ (Io=100%)			
	FREQUENCY[Hz]	50 / 60 (47 - 63)					
	EFFICIENCY[%]	ACIN 100V	77typ	81typ	82typ	84typ	84typ
		ACIN 200V	78typ	83typ	83typ	86typ	86typ
	POWER FACTOR (Io=100%)	ACIN 100V	0.98typ				
		ACIN 200V	0.85typ	0.90typ			
INRUSH CURRENT[A]	ACIN 100V	20typ (Io=100%) (At cold start)					
	ACIN 200V	40typ (Io=100%) (At cold start)					
LEAKAGE CURRENT[mA]	0.09 / 0.18max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60601-1)						
OUTPUT	VOLTAGE[V]	3.3	5	12	24	48	
	CURRENT[A]	20.0	20.0	8.5	4.5	2.1	
	LINE REGULATION[mV]	20max	20max	48max	96max	192max	
	LOAD REGULATION[mV]	40max	40max	100max	150max	240max	
	RIPPLE[mVp-p]	0 to +50°C	80max	80max	120max	150max	150max
		*1 -10 -0°C	140max	140max	160max	160max	200max
	RIPPLE NOISE[mVp-p]	0 to +50°C	120max	120max	150max	150max	250max
		*1 -10 -0°C	160max	160max	180max	180max	300max
	TEMPERATURE REGULATION[mV]	0 to +50°C	50max	50max	120max	240max	480max
		*1 -10 to +50°C	60max	60max	150max	290max	600max
	DRIFT[mV]	*2	20max	20max	48max	96max	192max
	START-UP TIME[ms]	250typ (ACIN 100V, Io=100%)					
	HOLD-UP TIME[ms]	20typ (ACIN 100V, Io=100%)					
OUTPUT VOLTAGE ADJUSTMENT RANGE[V]	2.85 to 3.60	4.50 to 5.50	10.00 to 13.20	19.20 to 27.00	39.00 to 53.00		
OUTPUT VOLTAGE SETTING[V]	3.30 to 3.40	5.00 to 5.15	12.00 to 12.48	24.00 to 24.96	48.00 to 49.92		
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically					
	OVERVOLTAGE PROTECTION[V]	4.00 to 5.25	5.75 to 7.00	15.00 to 18.00	30.00 to 37.00	58.00 to 65.00	
	OPERATING INDICATION	LED (Green)					
	REMOTE ON/OFF	Optional (Required external power source)					
ISOLATION	INPUT-OUTPUT-RC	*3 AC4,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)					
	INPUT-FG	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)					
	OUTPUT-RC-FG	*3 AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)					
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE	-10 to +70°C, 20 - 90%RH (Non condensing), 3,000m (10,000feet) max *4					
	STORAGE TEMP.,HUMID.AND ALTITUDE	-20 to +75°C, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max					
	VIBRATION	10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis					
	IMPACT	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis					
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	UL60601-1, C-UL (CSA-C22.2 No.601.1), EN60601-1					
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR11-B, CISPR22-B, EN55011-B, EN55022-B					
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 *6					
OTHERS	CASE SIZE/WEIGHT	34 X 93 X 168mm [1.34 X 3.66 X 6.61 inches] (W X H X D) / 560g max (with cover : 625g max)					
	COOLING METHOD	Convection					

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter (equivalent to KEISOKU-GIKEN: RM101).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \*3 Applicable when Remote ON/OFF (optional) is added. RC is insulated with input, output and FG.  
 \*4 Refer to "Derating".  
 \*5 Please contact us about safety approvals for the model with option.

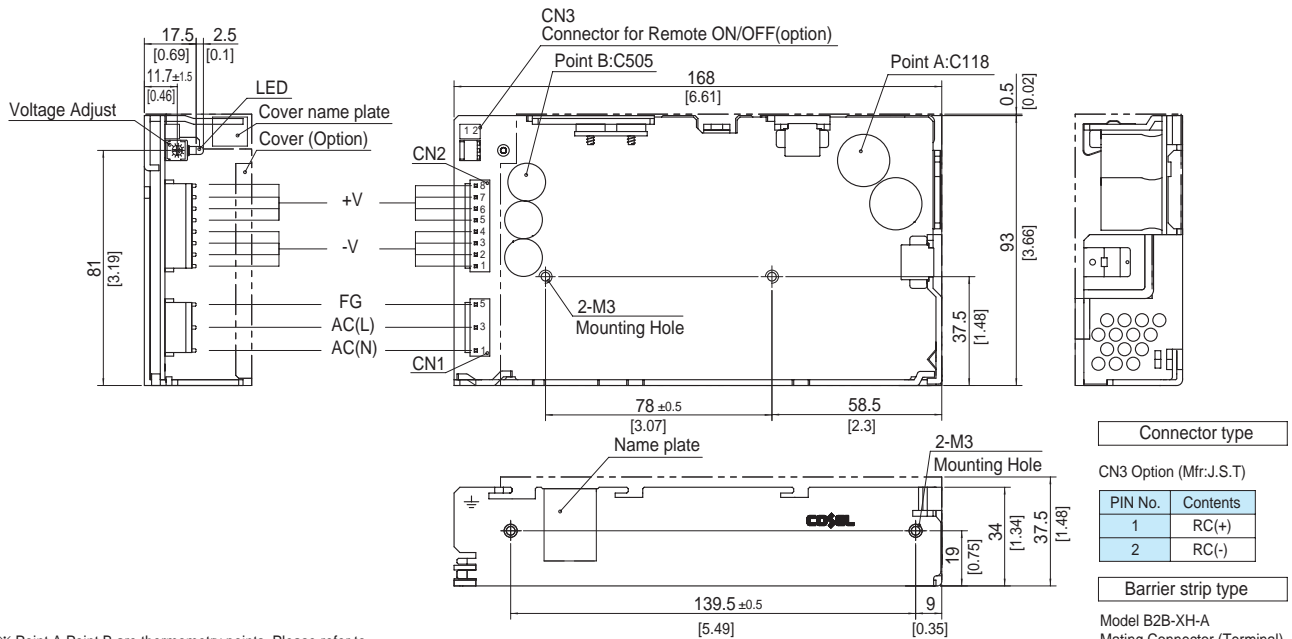
\*6 Please contact us about class C.  
 \* Parallel operation with other model is not possible.  
 \* Derating is required when operated with cover.  
 \* A sound may occur from power supply at peak loading.

## Block diagram



## External view

※ External size of option T and T1 is different from standard model and refer to 5 Option of instruction manual for details.



Connector type	
CN3 Option (Mfr:J.S.T)	
PIN No.	Contents
1	RC(+)
2	RC(-)

Barrier strip type	
Model B2B-XH-A	
Mating Connector (Terminal)	
XHP-2	
(BXH-001T-P0.6 or SXH-001T-P0.6)	

※ Point A, Point B are thermometry points. Please refer to Instruction Manual 3.

I/O Connector	Mating Connector	Terminal
CN1	1-1123724-3	Chain 1123721-1
		Loose 1318912-1
CN2	1-1123723-8	Chain 1123721-1
		Loose 1318912-1

(Mfr: Tyco Electronics AMP)

※ I/O Connector is Mfr. Tyco Electronics AMP  
 ※ Option: -J1 : (J.S.T) connector type  
 -T : Vertical terminal block type  
 -T1 : Horizontal terminal block type  
 Refer to Instruction Manual 5.

### <PIN CONNECTION>

Pin No.	Input
1	AC(N)
2	
3	AC(L)
4	
5	FG

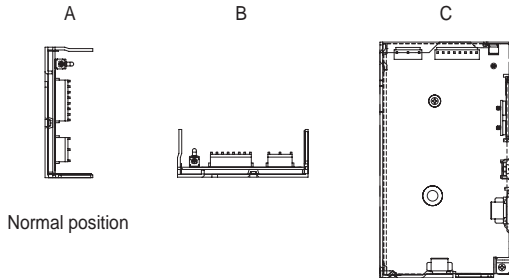
Pin No.	Output
1 - 4	-V
5 - 8	+V

※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]  
 ※ Weight : 560g max (with cover : 625g max)  
 ※ PCB Material/thickness : CEM-3 / 1.6mm [0.06inches]  
 ※ Chassis material : Aluminum  
 ※ Keep drawing current per pin below 5A of CN2.  
 ※ Dimensions in mm, [ ] =inches  
 ※ Mounting torque : 0.49N · m (5kgf · cm) max  
 ※ Please connect safety ground to the unit in 2-M3 holes.

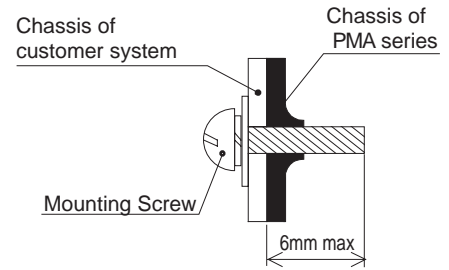
Assembling and Installation Method

Installation method

■ Do not insert a screw more than 6mm from the outside of a power supply to keep enough insulation distance between the screw and internal components.



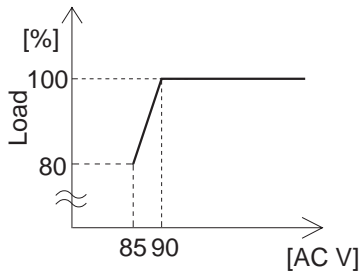
Normal position



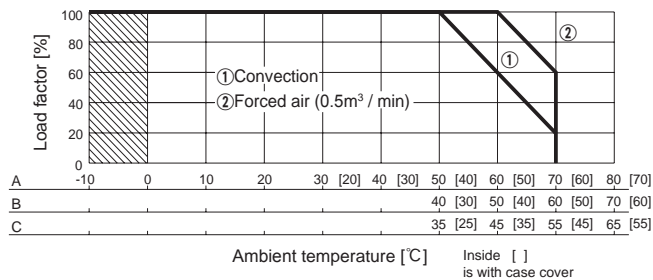
■ If you use two or more power supplies side by side, please keep a sufficient distance between them to allow enough air ventilation.  
 ■ Ambient temperature around each power supply should not exceed the temperature range shown in “Derating”.

Derating

● PMA15F,PMA30F Input voltage Derating Curve



● Ambient temperature Derating Curve (Reference value)



■ In the hatched area, the specification of Ripple, Ripple Noise is different from other area.  
 ■ The ambient temperature should be measured 5 to 10 cm away from the power supply so that it won't be influenced by the heat from the power supply. Please consult us for more details.  
 ■ Make sure the temperature at point A and point B is less than the temperatures shown in Instruction Manual 3.

Instruction Manual

◆ It is necessary to read the “Instruction Manual” and “Before using our product” before you use our product.

Instruction Manual <https://en.cosel.co.jp/product/powersupply/PMA/>  
 Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

PMA



NOTICE



## Basic Characteristics Data

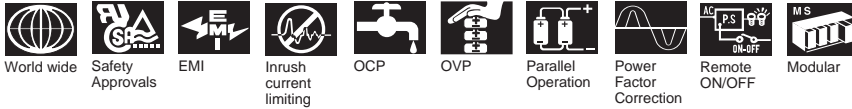
Model	Circuit method	Switching frequency [kHz]	Input current [A] *1	Inrush current protection	PCB/Pattern			Series/Parallel operation availability *2	
					Material	Single sided	Double sided	Series operation	Parallel operation
PMA15F	Flyback converter	100	0.4	Thermistor	CEM-3	Yes		Yes	No
PMA30F	Flyback converter	100	0.7	Thermistor	CEM-3	Yes		Yes	No
PMA60F	Active filter	60 - 550	0.8	Thermistor	CEM-3	Yes		Yes	No
	Forward converter	120							
PMA100F	Active filter	60 - 550	1.3	Thermistor	CEM-3	Yes		Yes	No
	Forward converter	120							

\*1 The value of input current is at ACIN 100V and rated load.

\*2 Refer to Instruction Manual 2.







# ACE-series (-H : Medical)



ACE-H option is a configurable type power supply for medical use. For more details, please refer to the specifications of ACE series.

## Feature

Flexible modular system architecture provides various output configuration  
 Harmonic attenuator (Complies with IEC61000-3-2)  
 Universal input (AC85 - 264V)  
 Remote ON/OFF control, alarm

## Safety agency approvals

UL60950-1, C-UL (CSA60950-1), EN60950-1, EN50178  
 Complies with DEN-AN  
 UL60601-1, C-UL (CSA601.1), EN60601-1 approvals (optional)

## EMI

Complies with FCC-B, CISPR22-B,  
 EN55022-B, VCCI-B

## 3-year warranty

## CE marking

Low Voltage Directive  
 RoHS Directive

## EMS Compliance

: EN61204-3, EN61000-6-2  
 IEC60601-1-2 (2014), EN60601-1-2 (2015)

EN61000-4-2  
 EN61000-4-3  
 EN61000-4-4  
 EN61000-4-5  
 EN61000-4-6  
 EN61000-4-8  
 EN61000-4-11

## Medical electrical equipment

- ACE-H option is a configurable type power supply for medical use. For more details, please refer to the specifications of ACE series.

### 1 Type

AC □ - □□□□□□ - □□ - H

When units that support use as medical electrical equipment and other options are combined, the end of the type name is as follows.

AC □ - □□□□□□ - □□ - H ○ △

\*○, △ :other options

Refer to instruction manual 5. for Option.

Example of use in conjunction with option -K model (reduced fan speed).

AC □ - □□□□□□ - □□ - HK

\*Options that cannot be used in conjunction with this are as follows:

C : coating

E : low leakage current

\*Option -H is a low leakage current specification product.

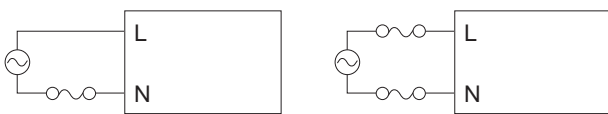
Refer to section 2 for details.

### 2 Specification

- Safety : UL60601-1 (CSA601.1), EN60601-1
- Isolation : 4,000 VAC input-output, RC, AUX 1min.  
cutoff current 10mA
- leakage current : 0.3mA max (100 VAC), 0.5mA max (230 VAC)  
\*0.1mA max. is also possible.
- conducted noise : complies with FCC-A, VCCI-A, CISPR22-A,  
EN55022-A
- Supported modules  
All modules except S, T, and U modules with "output module specification."Please note that there is no support for modules S, T, and U.
- Ripple noise  
Ripple noise is 1.5 times that of standard models.

### 3 Others

- If applying for medical equipment agency approval, use fuses or breakers that comply with applicable safety regulations on input terminals.



ACE-H  
 FUSE ACE300F 250 VAC8A ACE450F 250 VAC10A  
 ACE650F 250 VAC15A ACE900F 250 VAC20A

Fig.3.1 Connecting FUSE

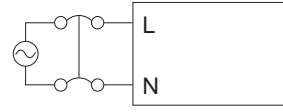
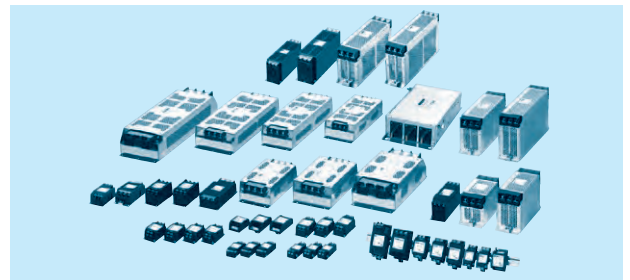


Fig. 3.2 Connecting circuit breaker

# EMI/EMC Filter



## Contents

■ Single phase type RoHS

	Rated voltage	Series	Rated current [A]							Released year	Main feature
			3	4	6	10	16	20	30		
1-stage	AC250V	EAC	●	—	●	●	●	●	●	'10	Small, attenuation (150kHz-1MHz), DIN rail installation (Optional)
	AC250V	EAM	●	—	●	●	●	●	●	'10	Small, Low leakage current, DIN rail installation (Optional)
	AC250V	EAP	●	—	●	●	●	●	●	'10	Small, High-voltage pulses attenuation, DIN rail installation (Optional)
	AC250V	ESC	●	—	●	●	●	—	—	'10	Small,attenuation(150kHz-1MHz), Screwless terminal type,DIN rail installation (Optional)
	AC250V	ESM	●	—	●	●	●	—	—	'10	Small,Low leakage current, Screwless terminal type,DIN rail installation (Optional)
	AC250V	ESP	●	—	●	●	●	—	—	'10	Small,High-voltage pulses attenuation, Screwless terminal type,DIN rail installation (Optional)
	AC250V	NAC	—	●	●	●	●	●	●	'05	General-purpose High-attenuation (150kHz-1MHz), DIN rail installation (Optional)
	AC250V	NAM	—	●	●	●	●	●	●	'05	Low leakage current, DIN rail installation (Optional)
	AC250V	NAH	—	—	●	●	●	●	●	'05	Ultra high-attenuation (10kHz-1MHz), DIN rail installation (Optional)
	AC250V	NAP	—	●	●	●	●	●	●	'05	High-voltage pulses high-attenuation, DIN rail installation (Optional)
2-stage	AC250V	NBH	—	—	●	●	●	●	●	'07	Ultra high-attenuation and broadband (10kHz-10MHz), DIN rail installation (Optional)
	AC250V	NBC	—	—	●	●	●	●	●	'07	High-attenuation (150kHz-1MHz), DIN rail installation (Optional)
	AC250V	NBM	—	—	●	●	●	●	●	'07	Low leakage current, Withstand voltage 4KVAC, DIN rail installation (Optional)

■ Three phase type RoHS [JAC (40, 50, 60A) : RoHS ]

	Rated voltage	Series	Rated current [A]																Released year	Main feature
			4	6	10	20	30	40	50	60	80	100	125	150	200	250	300	400		
1-stage	AC500V	JAC	—	●	●	●	●	—	—	—	—	—	—	—	—	—	—	—	'14	Compact and low profile General-purpose High-attenuation (150kHz-1MHz), Ultra high-attenuation (optional) DIN rail installation (Optional)
	AC500V	JAC	—	—	—	—	—	●	●	●	—	—	—	—	—	—	—	—	NEW '19	Compact and low profile General-purpose High-attenuation (150kHz-1MHz), Ultra high-attenuation (optional) Input voltage range 528VAC max
	AC500V	TAC	●	●	●	●	●	—	—	—	—	—	—	—	—	—	—	—	'05	General-purpose High-attenuation (150kHz-1MHz), DIN rail installation (Optional)
	AC500V	TAH	●	●	●	●	●	—	—	—	—	—	—	—	—	—	—	—	'05	Ultra high-attenuation (10kHz-1MHz), DIN rail installation (Optional)
	AC500V	TAC	—	—	—	—	—	—	●	●	●	—	●	—	—	—	—	—	'08	General-purpose High-attenuation (150kHz-1MHz), Input voltage range 528VAC max
	AC500V	TAH	—	—	—	—	—	—	●	●	●	—	●	—	—	—	—	—	'16	Ultra high-attenuation(10kHz-1MHz), Input voltage range 528VAC max
	AC500V	TAC	—	—	—	—	—	—	—	—	—	—	—	●	●	●	—	—	'09	General-purpose High-attenuation (150kHz-1MHz), Input voltage range 528VAC max
	AC500V	FTA	—	—	—	—	—	●	●	—	—	—	—	—	—	—	—	—	'13	General-purpose High-attenuation (150kHz-1MHz), For Europe high-attenuation, Ultra high-attenuation(Optional) With switch of line to ground capacitor (Optional)
	AC500V	FTA	—	—	—	—	—	—	●	●	●	—	●	—	—	—	—	—	'11	General-purpose High-attenuation (150kHz-1MHz), For Europe high-attenuation, Ultra high-attenuation(Optional)
2-stage	AC500V	TBC	—	—	—	—	—	●	●	●	—	●	—	—	—	—	—	—	'08	High-attenuation (150kHz-1MHz), Input voltage range 528VAC max
	AC500V	TBC	—	—	—	—	—	—	—	—	—	—	—	●	●	●	—	—	'09	High-attenuation (150kHz-1MHz), Input voltage range 528VAC max
	AC500V	FTB	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	'11	High-attenuation(150kHz-1MHz), Ultra high-attenuation(Optional)
	AC500V	FSB	—	—	●	●	●	—	—	—	—	—	—	—	—	—	—	—	'16	EMI/EMC Filter for motor drive system. Improve saturation resistance.
	AC500V	FSB	—	—	—	—	—	●	●	—	—	—	—	—	—	—	—	—	NEW '18	EMI/EMC Filter for motor drive system. Improve saturation resistance.
	AC500V	FSB	—	—	—	—	—	—	—	●	●	—	●	—	—	—	—	—	NEW '17	EMI/EMC Filter for motor drive system. Improve saturation resistance.
multi-stage	AC500V	TSC	—	—	—	—	—	—	—	—	—	—	—	—	—	—	●	●	'13	Ultra high attenuation for star connection with neutral earthing, Input voltage range 528VAC max

■ DC type RoHS

	Rated voltage	Series	Rated current [A]				Released year	Main feature
			1	3	6	10		
1-stage	DC±50V	SNA	●	●	●	—	'05	Ripple noise attenuation for switch mode power supplies (±Vin), DIN rail installation (Optional)
	DC50V	SNR	—	—	—	●	'07	Ripple noise attenuation for switch mode power supplies (+Vin), Peak load, DIN rail installation (Optional)

# EMI/EMC Filter Selection Guide by Type

## Three phase EMI/EMC Filter

		Rated current				
		4A	6A	10A	20A	30A
 <b>RoHS</b>	<b>JAC Series</b> 1-stage filter Compact and low profile General-purpose	<b>JAC Series</b> 6A to 30A 	<b>JAC Series</b> 6A to 30A 	<b>JAC Series</b> 6A to 30A 	<b>JAC Series</b> 6A to 30A 	<b>JAC Series</b> 6A to 30A 
		Push down type terminal block Selectable leakage current specification (30A or less)	<b>Option(-H)</b> Ultra high attenuation type	<b>Option(-U)</b> Improve differential mode attenuation (Three-phase 250V)	<b>DIN rail (Option)</b> <b>JAC Series</b> 6A to 30A	
	<b>TAC Series</b> <b>TAH Series</b> 1-stage filter Low-profile General-purpose	<b>TAC Series</b> 4A to 30A 	<b>TAC Series</b> 4A to 30A 	<b>TAH Series</b> 4A to 30A 	<b>TAH Series</b> 4A to 30A 	<b>TAH Series</b> 4A to 30A 
		Push down type terminal block Selectable leakage current specification (TAC/TAH Series for 30A or less)	<b>Option(-H)</b> Ultra high attenuation type	<b>Option(-U)</b> Improve differential mode attenuation (Three-phase 250V)	<b>DIN rail (Option)</b> <b>TAC Series</b> <b>TAH Series</b> 4A to 30A	
	<b>TBC Series</b> 2-stage filter High-attenuation	Selectable leakage current specification				
	<b>FTA Series</b> 1-stage filter <b>FTB Series</b> 2-stage filter <b>FSB Series</b> 2-stage filter Book type General-purpose High-attenuation Saturation resistance type	Selectable leakage current specification (Ultra high attenuation for EU)	<b>Option(-H)</b> Ultra high attenuation type	<b>Option(-G)</b> With switch of line to ground capacitor	<b>Option(-U)</b> Improve differential mode attenuation (Three-phase 250V)	80A 100A 125A 150A Standard 
Selectable leakage current specification			<b>Option(-L)</b> Ultra high attenuation for EU	<b>Option(-S)</b> Hexagon socket head cap screws option		
Push down type terminal block Selectable leakage current specification (30A or less)		<b>Option(-H)</b> Ultra high attenuation type	<b>Option(-U)</b> Improve differential mode attenuation (Three-phase 250V)	<b>FSB Series</b> 10A to 30A 	EMI/EMC Filter for motor drive system. Improve saturation resistance.	

## Single phase EMI/EMC Filter

		Rated current							
		3A	4A	6A	10A	16A	20A	30A	
 <b>RoHS</b>	<b>ES Series</b> 1-stage filter Screwless type Small size type Torque management unnecessary Selectable leakage current specification	<b>ESC Series</b> 3A to 16A 	<b>ESM Series</b> 3A to 16A 	<b>ESP Series</b> 3A to 16A 	<b>ESC Series</b> 3A to 16A 	<b>ESM Series</b> 3A to 16A 	<b>ESP Series</b> 3A to 16A 	<b>ES Series</b> 3A to 16A 	
		High attenuation for Low frequency band (150kHz to 1MHz) Low leakage current High-voltage pulses attenuation	<b>Option(-H)</b> Ultra high attenuation type	<b>Option(-U)</b> Improve differential mode attenuation (Three-phase 250V)	<b>DIN rail (Option)</b> <b>ES Series</b>				
	<b>EA Series</b> 1-stage filter Screw type Small size type Push down type terminal block Selectable leakage current specification	<b>EAC Series</b> 3A to 30A 	<b>EAM Series</b> 3A to 30A 	<b>EAP Series</b> 3A to 30A 	<b>EAC Series</b> 3A to 30A 	<b>EAM Series</b> 3A to 30A 	<b>EAP Series</b> 3A to 30A 	<b>EA Series</b> 3A to 30A 	
		High attenuation for Low frequency band (150kHz to 1MHz) Low leakage current High-voltage pulses attenuation	<b>Option(-H)</b> Ultra high attenuation type	<b>Option(-U)</b> Improve differential mode attenuation (Three-phase 250V)	<b>DIN rail (Option)</b> <b>EA Series</b>				
	<b>NA Series</b> 1-stage filter Screw type General-purpose Push down type terminal block Selectable leakage current specification	<b>NAC Series</b> 4A to 30A 	<b>NAM Series</b> 4A to 30A 	<b>NAP Series</b> 4A to 30A 	<b>NAH Series</b> 6A to 30A 	<b>NAC Series</b> 4A to 30A 	<b>NAM Series</b> 4A to 30A 	<b>NAP Series</b> 4A to 30A 	<b>NAH Series</b> 6A to 30A 
		High attenuation for Low frequency band (150kHz to 1MHz) Low leakage current High-voltage pulses high attenuation Ultra high attenuation for ultra low frequency band (10kHz to 1MHz)	<b>Option(-H)</b> Ultra high attenuation type	<b>Option(-U)</b> Improve differential mode attenuation (Three-phase 250V)	<b>DIN rail (Option)</b> <b>NA Series</b>				
<b>NB Series</b> 2-stage filter Screw type High-attenuation Push down type terminal block Selectable leakage current specification	<b>NBC Series</b> 6A to 30A 	<b>NBM Series</b> 6A to 30A 	<b>NBH Series</b> 6A to 30A 	<b>NBC Series</b> 6A to 30A 	<b>NBM Series</b> 6A to 30A 	<b>NBH Series</b> 6A to 30A 	<b>NB Series</b> 6A to 30A 		
	High attenuation for Low frequency band (150kHz to 1MHz) Low leakage current Withstand voltage 4kV Ultra high attenuation and broadband (10kHz to 10MHz)	<b>Option(-H)</b> Ultra high attenuation type	<b>Option(-U)</b> Improve differential mode attenuation (Three-phase 250V)	<b>DIN rail (Option)</b> <b>NB Series</b>					

## DC EMI/EMC Filter

		Rated current		
		1A 3A	6A	10A
 <b>RoHS</b>	<b>SNA Series</b> <b>SNR Series</b> 1-stage filter Ripple noise attenuation for switch mode power supplies	<b>SNA Series</b> 1A/3A 	<b>SNA Series</b> 6A 	<b>SNR Series</b> 10A 
		For ±V output power supply For ±V output power supply For +V output power supply (Peak load)	<b>DIN rail (Option)</b> <b>SNA Series</b> <b>SNR Series</b>	<b>Terminal block (Option)</b> <b>SNA (6A)</b> <b>SNR (10A)</b>

40A 50A 60A

80A 100A 125A

150A

200A 250A 300A

400A 600A



**JAC Series**

40A 50A 60A



NEW

High attenuation for Low frequency band (150kHz to 1MHz)

High attenuation for Low frequency band (150kHz to 1MHz)

**TAC Series** ※

**TAH Series**

50A 60A



**TAC Series** ※

**TAH Series**

80A 100A



**TAC Series** ※

**TAH Series**

150A



**TAC Series**

200A to 300A



Ultra high attenuation for ultra low frequency band (10kHz to 1MHz)

**Option(-U)**  
Improve differential mode attenuation (Three-phase 250V)  
**TAC/TAH Series for 50A or more**

※Same external dimensions as TAH series

**TBC Series**

50A 60A



**TBC Series**

80A 100A



**TBC Series**

150A



**TBC Series**

200A to 300A



Ultra high attenuation for Low frequency band (150kHz to 1MHz)



**TSC Series**



**TSC Series**

400A 600A



Ultra high attenuation for star connection with neutral earthing

High attenuation for Low frequency band (150kHz to 1MHz)

**FTA Series**

40A 50A 60A



**FTA Series**

80A 100A 125A



**FTA Series**

150A



Ultra high attenuation for Low frequency band (150kHz to 1MHz)

**FTB Series**

80A 100A



**FTB Series**

150A



EMI/EMC Filter for motor drive system. Improve saturation resistance.

**FSB Series**

40A 50A 60A



NEW

**FSB Series**

80A 100A



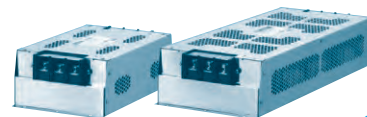
NEW

**FSB Series**

150A

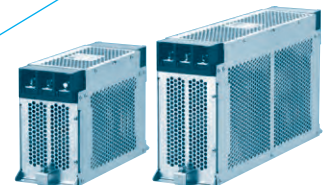


NEW

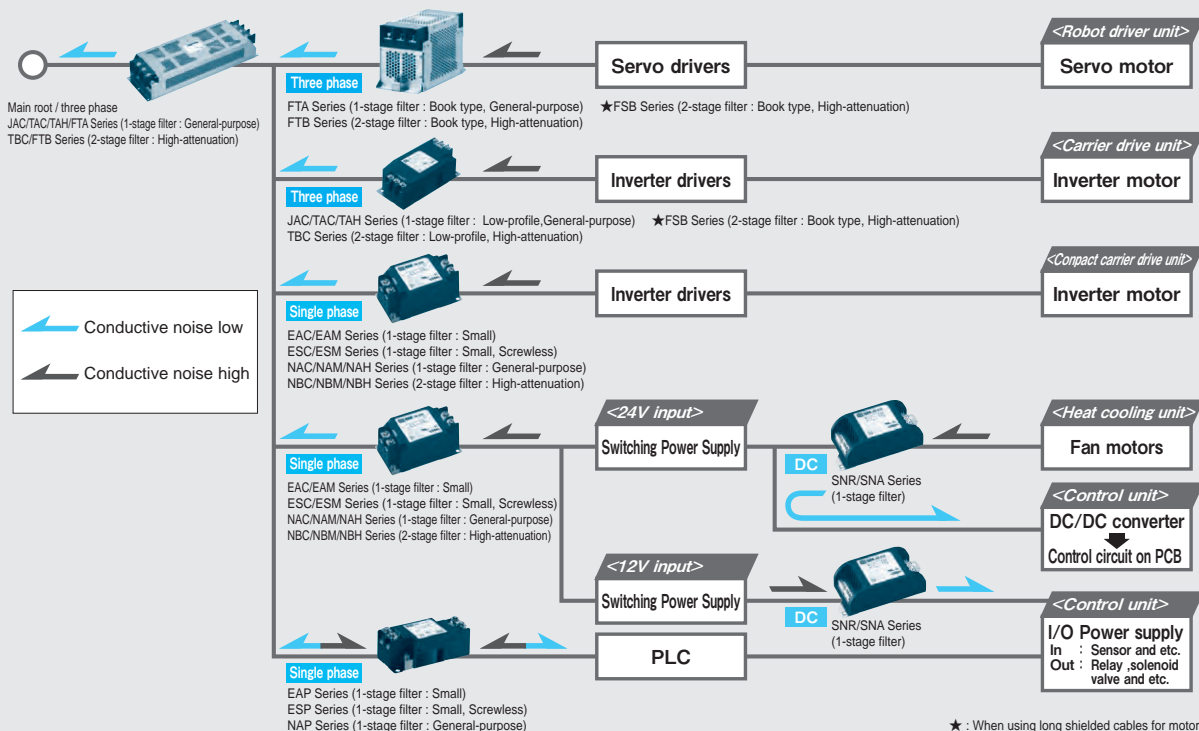


Low-profile

Book type



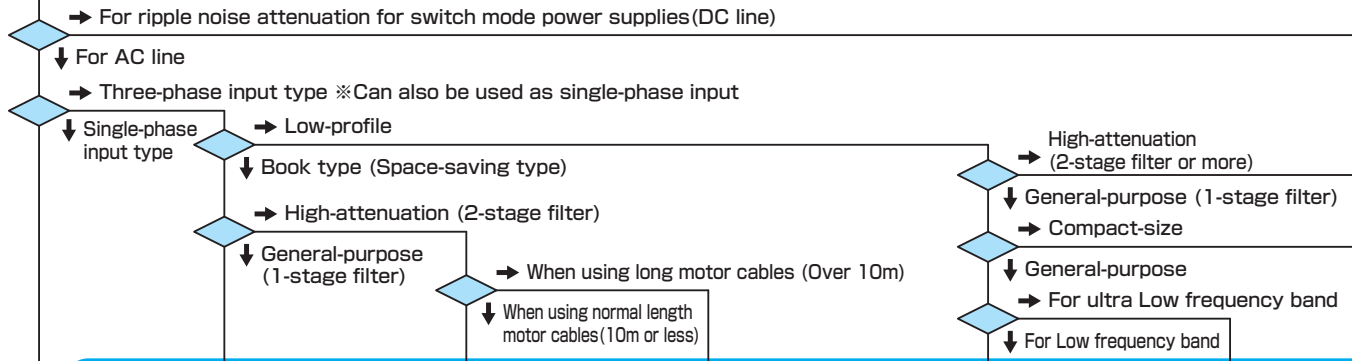
**Diagram of Sample application**




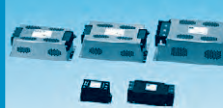



# EMI/EMC Filter Selection Guide by Function

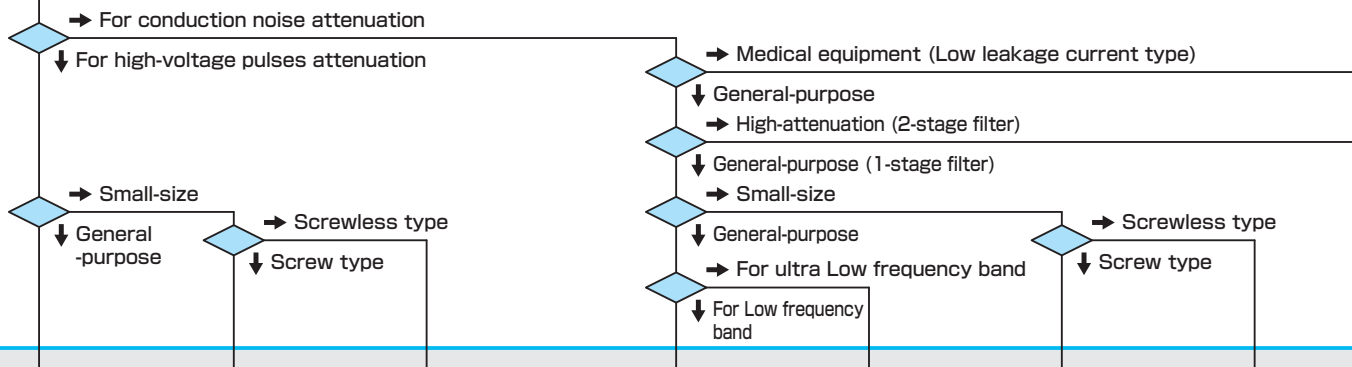
By using the flow chart below, you can easily select the model you need.








**START**



FTA series(1-stage filter)	FTB series(2-stage filter)	FSB series(2-stage filter)	TAC series(1-stage filter)	TAH series(1-stage filter)
				
(40-150A) EMI/EMC filters for anti-conducted emission of servomotor and device having inverter General-purpose from 150kHz to 1MHz	(80-150A) EMI/EMC filters for anti-conducted emission of servomotor and device having inverter High-attenuation from 150kHz to 1MHz	(10-150A) EMI/EMC filters for motor drive system Improve saturation resistance	(4-300A) EMI/EMC filters for anti-conducted emission of servomotor and device having inverter General-purpose from 150kHz to 1MHz	(4-150A) EMI/EMC filters for anti-conducted emission of servomotor and device having inverter General-purpose from 10kHz to 1MHz (Ultra low-frequency band)
■Option -H, -U, -G, -S(80-150A)	■Option -H, -L, -S	■Option -H, -U, -HU, -S(80-150A)	■Option -D(4-30A), -U(50-300A)	■Option -D(4-30A), -U(50-150A)
■Use:Robot with inverter or servomotor, Welding machine, Elevator, Medical equipment, etc	■Use:Robot with inverter or servomotor, Welding machine, Elevator, Medical equipment, etc	■Use:Robot with inverter or servomotor, Welding machine, Elevator, Medical equipment, etc	■Use:Robot with inverter or servomotor, Welding machine, Elevator, Medical equipment, etc	■Use:Robot with inverter or servomotor, Welding machine, Elevator, Medical equipment, etc

**Three-phase EMI/EMC filter**



NAP series(1-stage filter)	EAP series(1-stage filter)	ESP series(1-stage filter)	NAC series(1-stage filter)	NAH series(1-stage filter)(*)	EAC series(1-stage filter)	ESC series(1-stage filter)
						
(4-30A) EMI/EMC filters for anti-malfunction by external noise High-voltage pulses high-attenuation	(3-30A) EMI/EMC filters for anti-malfunction by external noise High-voltage pulses high-attenuation Small-size	(3-16A) EMI/EMC filters for anti-malfunction by external noise High-voltage pulses high-attenuation Small-size Screwless terminal type	(4-30A) EMI/EMC filters for anti-conducted emission General-purpose from 150kHz to 1MHz	(6-30A) EMI/EMC filters for anti-conducted emission General-purpose from 10kHz to 1MHz (Ultra low-frequency band)	(3-30A) EMI/EMC filters for anti-conducted emission General-purpose from 150kHz-1MHz Small-size	(3-16A) EMI/EMC filters for anti-conducted emission General-purpose from 150kHz-1MHz Small-size Screwless terminal type
■Option -D	■Option -D	■Option -D	■Option -D	■Option -D	■Option -D	■Option -D
■Use:PLC, industrial equipment with computer, etc	■Use:PLC, industrial equipment with computer, etc	■Use:PLC, industrial equipment with computer, etc	■Use:Using multiple switching power supplies, single phase inverter, etc	■Use:Using multiple switching power supplies, single phase inverter, robot with servo motor, medical equipment, etc	■Use:Using multiple switching power supplies, single phase inverter, etc	■Use:Using multiple switching power supplies, single phase inverter, etc

**Single-phase EMI/EMC filter**

■Option

- D : DIN rail installation type
- H : Ultra high attenuation type
- U : Improve differential mode attenuation (Rated voltage 250V)
- L : Ultra high attenuation type for EU






- G : With switch of line to ground capacitor
- S : Hexagon socket head cap screw (Standard type is Hexagon head screw)
- T : Terminal block type

→ Rated current 400A or more

↓ Rated current less than 400A

→ For +V output power supply (Peak load)

↓ For ±V output power supply  
※Can also be used for +V output power supply

JAC series(1-stage filter)	TBC series(2-stage filter)	TSC series(multi-stage filter)	SNA series(1-stage filter)	SNR series(1-stage filter)
				
(6-60A) EMI/EMC filters for anti-conducted emission of servomotor and device having inverter General-purpose from 150kHz to 1MHz Compact-size	(50-300A) EMI/EMC filters for anti-conducted emission of servomotor and device having inverter High-attenuation from 150kHz to 1MHz	(400, 600A) Ultra high-attenuation for star connection with neutral earthing	(1, 3, 6A) Ripple noise attenuation for switch mode power supplies (DC±50V)	(10A) Ripple noise attenuation for switch mode power supplies (DC+50V)
■Option -D(6-30A), -H, -U	■Option —	■Option ※1 —	■Option -D, -T(6A), -DT(6A)	■Option -D, -T, -DT
■Use:Robot with inverter or servomotor, Welding machine, Elevator, Medical equipment, etc	■Use:Robot with inverter or servomotor, Welding machine, Elevator, Medical equipment, etc	■Use:Robot with inverter or servomotor, Welding machine, Elevator, Medical equipment, etc	■Use:DC EMI/EMC filter for ±V output power supply of analog circuit (Operational amplifier etc.)	■Use:DC EMI/EMC filter for +V output power supply of analog circuit

### DC EMI/EMC filter

※1 Please contact us about low leakage current type (Change to low grounding capacitor)

→ For Broadband

↓ For Low frequency band

→ High-attenuation (2-stage filter)

↓ General-purpose (1-stage filter)

→ Small-size

↓ General-purpose

→ For ultra Low frequency band







↓ For Low frequency band

→ Screwless type

↓ Screw type

→ For Broadband

↓ For Low frequency band

NBC series(2-stage filter)	NBH series(2-stage filter) (◆)	NAM series(1-stage filter)	EAM series(1-stage filter)	ESM series(1-stage filter)	NBM series(2-stage filter)
					
(6-30A) EMI/EMC filters for anti-conducted emission High-attenuation from 150kHz to 1MHz	(6-30A) EMI/EMC filters for anti-conducted emission Ultra high-attenuation and broadband from 10kHz to 10MHz ※Including 4kV withstand voltage model(Medical equipment)	(4-30A) EMI/EMC filters for medical applications Low leakage current type General-purpose from 150kHz to 1MHz	(3-30A) EMI/EMC filters for medical applications Low leakage current type General-purpose from 150kHz to 1MHz Small-size	(3-16A) EMI/EMC filters for medical applications Low leakage current type General-purpose from 150kHz to 1MHz Small-size Screwless terminal type	(6-30A) EMI/EMC filters for medical applications Low leakage current type General-purpose from 150kHz to 1MHz with stand voltage 4kV
■Option -D	■Option -D	■Option -D	■Option -D	■Option -D	■Option -D
■Use:Using multiple switching power supplies, single phase inverter, etc	■Use:Using multiple switching power supplies, single phase inverter, robot with servo motor, medical equipment, etc	■Use:A case when using multiple switching power supplies, or for medical applications like endoscope, etc	■Use:A case when using multiple switching power supplies, or for medical applications like endoscope, etc	■Use:A case when using multiple switching power supplies, or for medical applications like endoscope, etc	■Use:A case when using multiple switching power supplies, or for medical applications like endoscope, etc





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# 1 Noise Basics

## 1 What Is Noise?

Noises refers to unwanted variations or fluctuations in voltage, current, signals, etc.

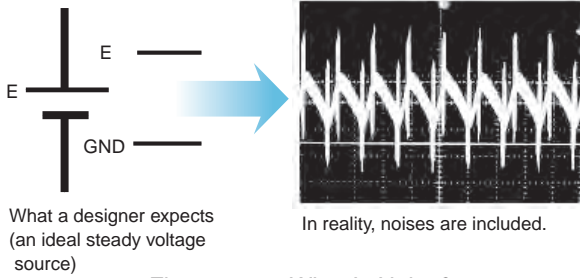


Figure 1.1.1 What Is Noise?

## 2 Noise Sources

Noise comes in two types: natural noise and manmade noise. While natural noises are generated by a lightning strike or static electricity, manmade noises are generated by familiar devices such as industrial equipment, fluorescent bulbs, or communication equipment.

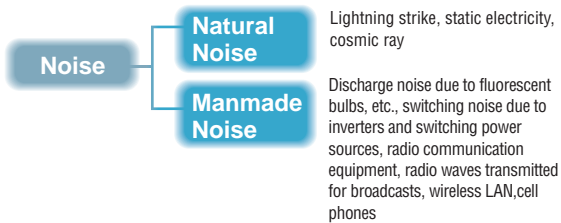


Figure 1.2.1 Noise Sources

Typical devices that generate noise are switching power sources and general-purpose inverters. Such devices include switching elements such as FETs and IGBTs, and are major noise sources due to high-frequency switching of those elements.

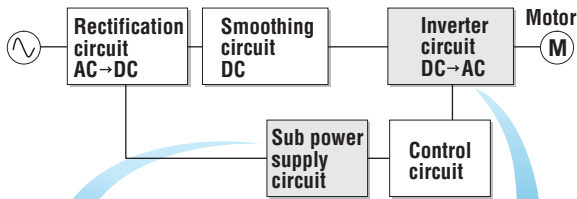


Figure 1.2.2 Inverter block diagram

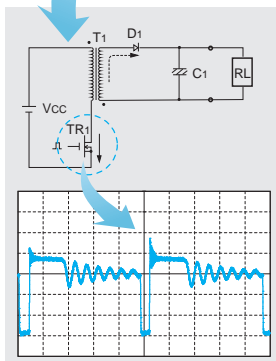


Figure 1.2.3 Sub power supply inverter operation waveform

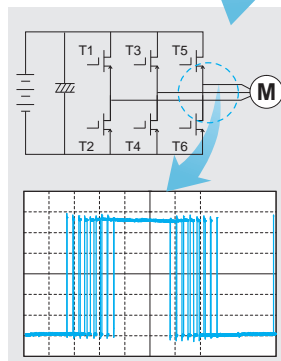


Figure 1.2.4 Inverter PWM output waveform

## 3 What Is EMC?

EMC stands for electromagnetic compatibility, and refers to the ability of electrical equipment to have both EMI and EMS at once; the former indicates the ability to suppress noise radiated from the equipment itself and the latter means the ability to endure noise from other equipment.

### What are EMC compliant products?

The EMC compliant products refer to those that meet standards required by EMI and EMS.

They provide various types of parts that can deal with noise from the viewpoint of EMI and/or EMS.

Our noise filters (hereinafter, "EMI filters") are parts that mainly deal with conducted interference in terms of EMI.

$$EMC = EMI + EMS$$

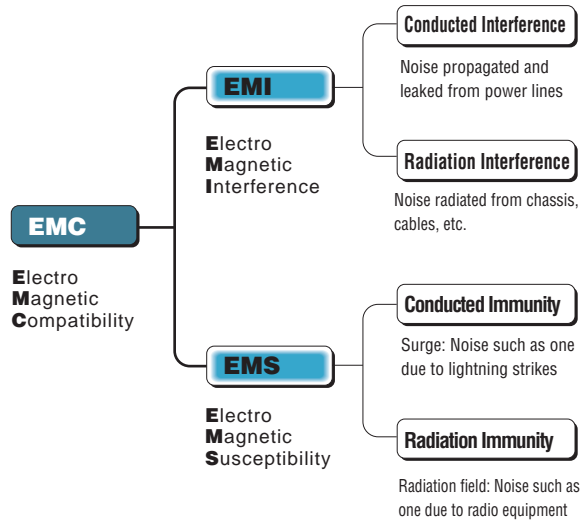


Figure 1.3.1 Concept of EMC

# 1 Noise Basics

## 4 Propagation Paths of Noise

### a. Conductive noise

Refers to noise that propagates through a power line or PCB tracing.

### b. Inductive noise

Refers to noise that is induced due to electromagnetic or electrostatic induction caused by a power line or a signal line of a peripheral device when it is placed near a line or pattern in which noise current flows and propagates through the line.

### c. Radiated noise

Noise radiated by an antenna (or a line be having as an antenna) that propagates to other devices through the air.

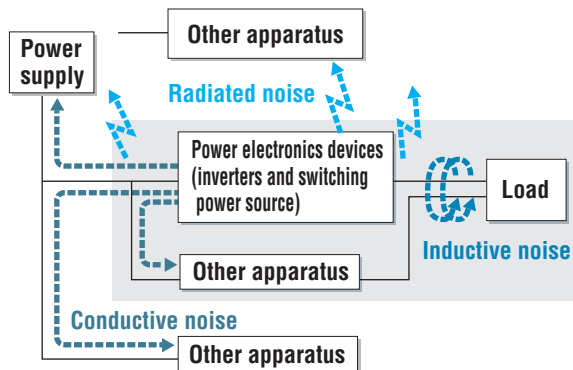


Figure 1.4.1 Propagation Paths of Noise

## 5 Basics of Noise Reduction

The propagation of noise consists of a noise source, an entity that is affected by the noise, and propagation path that connects both. To reduce noise:

- Reduce the noise level of a noise source
- Make it more difficult for noise to propagate
- Make equipment less vulnerable to noise

In addition to the above, designs must consider standards, quality and cost of noise reduction methods.



Figure 1.5.1 Overview of Noise Generation and Propagation Path

## 6 Types of Conductive Noise

Noise is divided into two types based on its generation mode: normal mode noise and common mode noise. Normal mode noise is also called differential mode noise, and refers to noise generated between power lines. Common mode noise refers to noise generated between a power line and ground line.

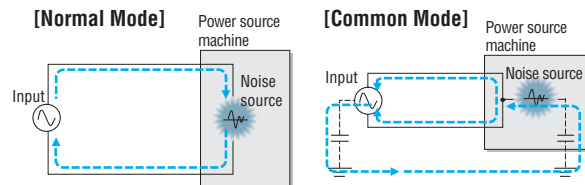
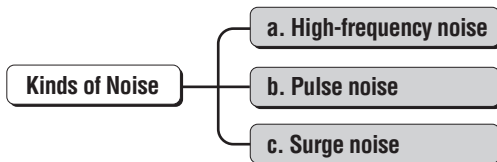


Figure 1.6.1 Noise Generation Paths (Example in which a noise source is within power equipment)

## 7 Types of and Countermeasures for Noise



### a. High-frequency noise

Also called EMI noise or power supply noise and refers to high-frequency components such as the clock frequency of a computer and switching frequency of power sources. As an antinoise measure, an EMI filter should be installed on the input side. An appropriate filter should be selected based on requirements such as attenuation, mechanical design and cost.

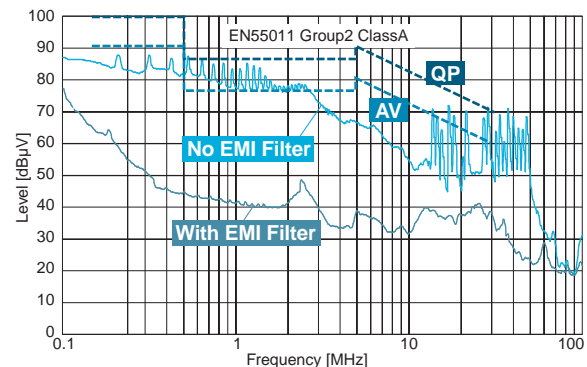
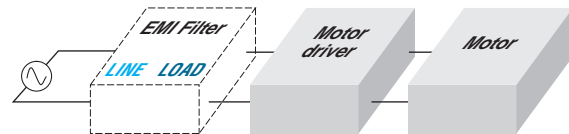


Figure 1.7.1 Example of Noise Reduction by an EMI Filter

# 1 Noise Basics

Output ripple noise from a switching power source is also a type of high-frequency noise. Ripple noise can be reduced with a DC filter designed for it.

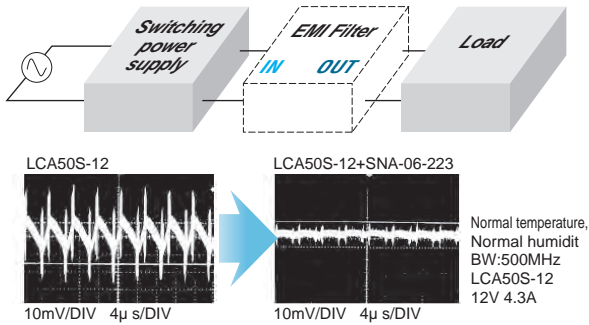


Figure 1.7.2 Example of Effectiveness of Ripple Noise Filter

## b. Pulse noise

This noise is generated when a relay or motor is driven. As peak voltage may reach as high as a few thousand volts, generic filters may not be able to sufficiently attenuate noise because its choke coil gets saturated. As an antinoise measure, one could select a filter that uses an amorphous core for its superior pulse attenuation characteristic.

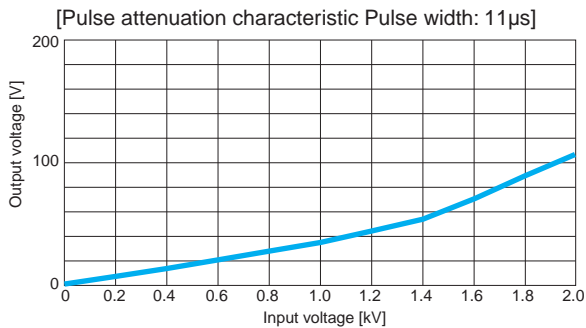
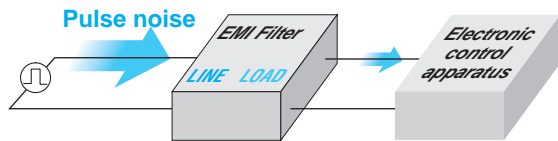


Figure 1.7.3 Example of Pulse Attenuation Characteristic(NAP-16-472)

## c. Surge noise

This noise occurs when a natural discharge (such as lightning) affects a power line. As the generated voltage reaches as extremely high as a few kilovolts or more, EMI filters cannot suppress surge noise. As an antinoise measure, one could use a part such as a varistor to control surge voltage between power lines or between a power line and ground. EMI filters can withstand approximately 2 kV between power lines and approximately 4 kV between a power line and ground (these values are not guaranteed). If surges are a concern, surge countermeasures should be selected and installed to handle the EMI filter's capabilities.

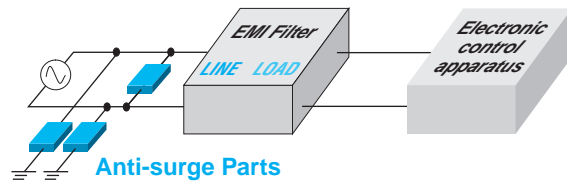


Figure 1.7.4 Proper Installation Location of surge Countermeasures

### 1 Rated Voltage

The rated voltage is the maximum line voltage (nominal value) allowable to be used.

As the rated voltages for some parts used within an EMI filter are high in reality, however, voltages higher than the rated voltage of the EMI filter may be used without causing any trouble.

In fact, the rated voltages of filter components are often higher, in which case the filter can handle actual voltages that exceed its ratings.

In the case of some EMI filters, the maximum operation voltages are defined by specifications for them, separately from rated voltages.

Note that using EMI filters at voltages lower than their rated voltages do not pose any problems. For example, an EMI filter with a rated voltage of AC 250 V can be used for power lines of AC 100V.

As for line frequency, EMI filters for AC power supply lines have been basically designed to be used with the commercial frequency (50 Hz/60 Hz).

Higher frequencies such as 400Hz can cause problems such as excessive capacitor heating.

Note that EMI filters for AC power lines can also be used for DC power supply lines.

### 2 Rated Current

The rated current is the maximum load current (nominal value) that can be continuously carried. If the ambient temperature is high, however, the load current needs to be derated.

Figure 2.2.1 shows an example of a derating characteristic.

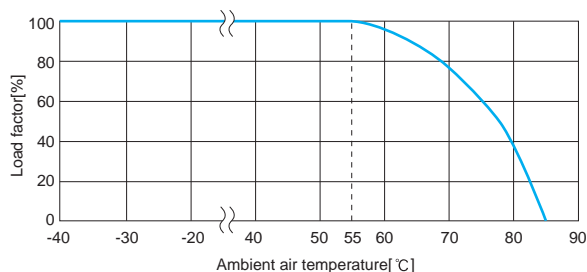


Figure 2.2.1 Derating Curve

This example indicates that when the maximum ambient temperature reaches 75, the EMI filter should be used with a load factor of approximately 60% (approximately 60% of the rated current) or lower.

Current higher than the rated current would be allowed to flow in EMI filters for a short period of time only. Inrush current (Up to 40A or 10 times the rated current, single shots with a length of a few milliseconds) from devices such as a general switching power source does not cause any problems, but relatively long and / or repetitive peak current draws can result in the average current exceeding the filter's rating.

### 3 Test Voltage (Withstand Voltage)

The test voltage is a voltage value that is applied at the time of withstand voltage test. The withstand voltage test is to verify that the part does not break when applying a high voltage in a short period of time between a terminal (line) and the mounting plate (ground) of an EMI filter.

In the case of EMI filters for AC power lines, the test voltage is generally AC 2000 V or AC 2500 V.

In withstand voltage tests, the high voltage applied between a line and ground, results in abnormally high leakage current flow. When carrying out a withstand voltage test in an acceptance inspection, please set the cutoff current of withstand voltage test equipment to an appropriate value (the cutoff current defined in the specifications for the EMI filter).

For some EMI filters that have ground capacitors with extremely large capacity, DC voltages may be used for test voltages because the leakage current becomes too high when AC voltages are applied.

### 4 Insulation Resistance (Isolation Resistance)

Insulation resistance is a resistance value when applying a specified DC voltage (normally 500 V) between isolated conductors such as a terminal (line) and the mounting plate (ground), and regarded as one indicator of degree of insulation.

The insulation resistance is found by measuring the very small current that flows in an insulating material such as a resin case and capacitor when DC voltage is applied.

### 5 Leakage Current

The leakage current is an electric current that flows from the ground terminal of an EMI filter when the filter is connected to an AC power line.

Generally, as one sets the capacitance of a ground capacitor to a higher value, the reduction effect on common mode noise will be heightened and at the same time, the leakage current will increase.

Care must be taken, because large leakage current could cause a circuit breaker to trip or electric shock to occur when the EMI filter is not properly grounded.

Current (I) that flows from each power line to ground is represented with the following expression; it forms the basis of leakage current calculation.

$$I = 2 \pi f C E$$

f : Power frequency  
 C : Capacitance between line and ground  
 E : Power supply voltage between line and ground

## 2 Selection of EMI Filters

### 6 DC Resistance

DC resistance is a resistance value between the input and output of an EMI filter (the sum of resistance values for both directions).

It is mostly accounted for with the coil resistances but also includes connections between the coils and terminals.

The voltage drop caused by an EMI filter is represented with the following expression:

$$\text{Voltage drop} = \text{DC resistance} \times \text{Load current}$$

Note that specifications for some products define voltage drops when rated current is carried, instead of resistance values.

### 7 Temperature/Humidity

#### a. Operating temperature

This is the range of ambient temperatures for which the product's usage is guaranteed.

If an ambient temperature is high, the load current needs to be derated.

#### b. Operating humidity

This is the range of ambient humidities for which the product's usage is guaranteed.

It assumes no condensation.

#### c. Storage temperature and humidity

The specified ranges of ambient temperatures and humidities that EMI filters in an unenergized state can be stored without deteriorating performance. No condensation is assumed for the storage humidity.

### 8 Circuitry

The following represents examples of EMI filter circuit structures.

#### a. Single-phase 1-stage filter

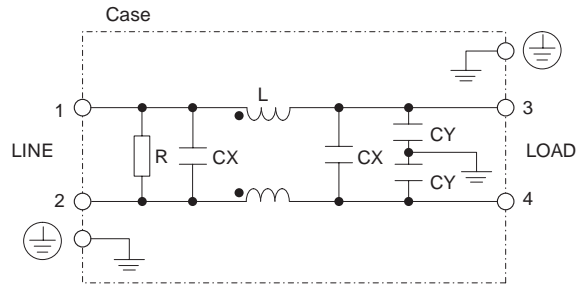


Figure 2.8.1 Circuit Structure Example of a Single-phase 1-stage EMI Filter

This figure shows a standard circuit structure for single-phase EMI filters.

L and CYs reduce the common mode noise; CXs and leakage inductance from L reduce the normal mode noise.

R indicates a discharge resistance for capacitors.

#### b. Single-phase 2-stage EMI filter

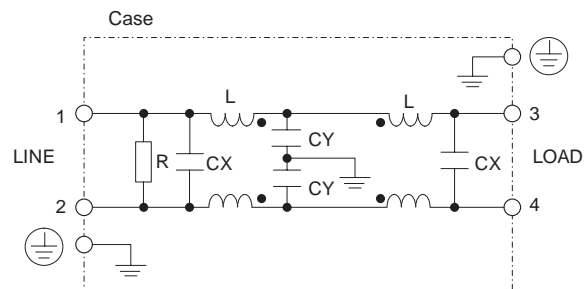


Figure 2.8.2 Circuit Structure Example of a Single-phase 2-stage EMI filter

The above figure represents a circuit structure example of placing choke coils in two stages to improve the attenuation characteristic.

The following graph shows an example comparison of attenuation characteristics for a 1-stage and 2-stage EMI filter.

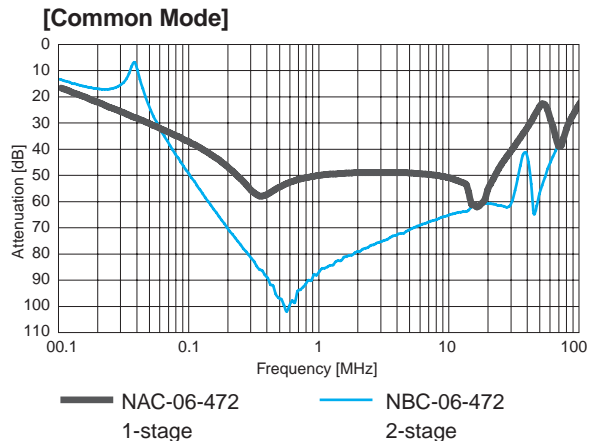


Figure 2.8.3 Example of Comparing Attenuation Characteristics between 1-stage and 2-stage EMI filters.

## 2 Selection of EMI Filters

### 9 Safety Standards

#### a. General description of safety standards

The international standards consist of IEC standards which concern the electrical fields, and ISO standards which concern the non-electrical fields.

#### IEC

(International Electrotechnical Commission)

Standardization organization for standards related to the electrical fields; its headquarters is located in Switzerland.

It releases technical standards for electricity based on the latest sciences and technologies, and each country develops its own specific safety standards based on the corresponding IEC standards.

#### CISPR

(Comite International Special des

Perturbations Radioelectriques

=International Special Committee

on Radio Interference)

One of IEC's special committees; it was established with the aim to integrate standards such as allowable values and measurement methods for interfering waves causing radio communication failures, and includes a standardization committee for EMC (Electro Magnetic Compatibility).

#### European Standard / EN Standard





(Europäische Norm=European Standard)

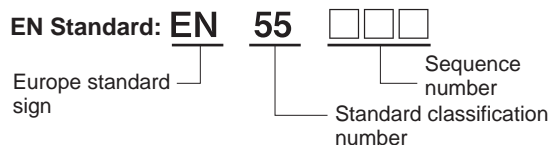
The EN Standard was created based on the IEC and CISPR standards, and consists of items almost similar to those in both standards.

A unique number is assigned to each standard.

(Example: IEC939 EN60939)

[An example of Certification Authorities in Europe based on EN Standard]

VDE	Germany	
TUV	Germany	
DEMKO	Denmark	
SEMKO	Sweden	



Standard classification number	Reference standards
EN50000 series	General European standards
EN55000 series	CISPR standards
EN60000 series	IEC standards

#### ENEC



(European Norm Electrical Certification)

The safety approval mark in Europe that enables products to smoothly be delivered among all the EU signatories, EFTA (European Free Trade Area), and East European countries.

Electronic products that are authorized to bear the ENEC mark do not need to be subjected to application procedures among the signatories. It provides a benefit of eliminating the need to obtain approval from each signatory to which they are distributed. The ENEC mark is intended to apply to products such as lighting equipment, transformers, information processing equipment, switches and EMI filters.

★EU signatories...Germany, UK, Italy, Denmark, and 24 other countries

★EFTA...Iceland, Norway, Switzerland, and Lichtenstein

★East European...Ukraine, Estonia, Belorussia, Moldova, Latvia, and Lithuania

#### North America

UL (Underwriters Laboratories Inc.)

A test organization established in 1894 by the Electrical Bureau of the National Board of Fire Underwriters. Since then, it has been performing compliance tests on various electric products.

CSA (Canadian Standard Association)

A non-profit standardization organization established in Canada in 1919. Each state law in Canada requires that electric equipment that needs to be connected to a public power source conforms to the CSA standards.

UL	USA	
CSA	Canada	

As the US and Canada have signed MRA (Mutual Recognition Agreement), mutual approval can be obtained. If UL verifies that a certain electric product conforms to the CSA standard, or to the UL and CAS standards, the product is authorized to bear the following approval marks:

CSA	
UL,CSA	

#### b. Safety standards for EMI filters

Different products may conform to different safety standards and bear different approval marks (for use in different countries). Check the approved safety standards when considering purchasing them.

IEC939	International standard	IEC
EN60939	EU	EN
UL1283	USA	UL
C22.2 No.8	Canada	CSA

#### c. CCC approval from China

EMI filters do not fall within the scope of CCC. (as of November 2011)

## 2 Selection of EMI Filters

### 10 Attenuation Characteristic (Static Characteristic)

Attenuation characteristic provides a rough indication of noise reduction effect. The graph is derived from plotting an attenuation characteristic when connecting a EMI filter to a specified measurement circuit with frequency on the horizontal axis and with attenuation on the vertical axis.

The measurement methods are shown in Figure 2.10.1 and Figure 2.10.2. The attenuation is given as the ratio of  $U_{01}$  to  $U_{02}$ , where  $U_{01}$  is output when EMI filters are not in the measured circuit and  $U_{02}$  is when an EMI filter is in the circuit, and normally expressed with the logarithm of that ratio in [dB].

$$\text{Attenuation} = 20\text{Log}_{10} (U_{01}/U_{02}) \text{ [dB]}$$

$U_{01}$ :Generated voltage when a EMI filter is not inserted [V]

$U_{02}$ :Generated voltage when a EMI filter is inserted [V]

\*An attenuation of 20 [dB] means that the noise level reduces to 1/10 of the one without an EMI filter. Similarly, 40 [dB] and 60 [dB] mean a 1/100 and 1/1000 reduction of the noise level, respectively.

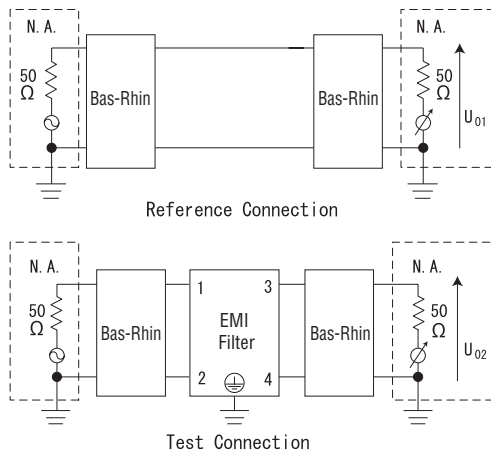


Figure 2.10.1 Attenuation Characteristic Measurement Method (Single-phase Normal Mode)

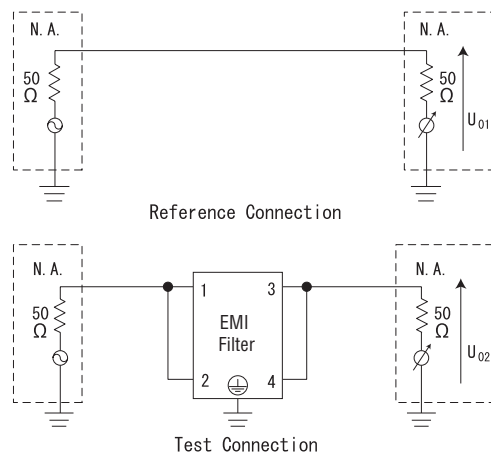


Figure 2.10.2 Attenuation Characteristic Measurement Method (Single-phase Common Mode)

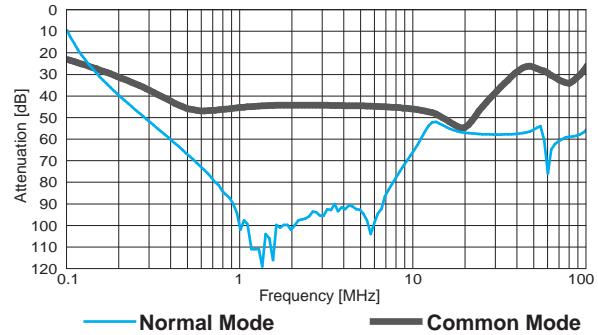


Figure 2.10.3 Example of Attenuation Characteristic (NAC-16-472)

The attenuation characteristic of EMI filters is affected by the input and output impedances of a measured circuit. This attenuation characteristic (static characteristic) is measured under the constant condition of input and output impedances of 50  $\Omega$  regardless of measurement frequencies. This enables the attenuation characteristics of different filters to be compared under the same conditions.

However, actual electronic devices have different power line impedances, and impedance itself has its own frequency characteristic and does not take a constant value.

For these reasons, the attenuation characteristics (static characteristics) that are specified in the catalogs for EMI filters do not necessarily coincide with those when they are attached to actual electronic devices.

One must also be careful that when connecting EMI filters in series, the static characteristic of the resultant series is not derived from simply adding the static characteristics [dB] of the individual filters.

### 11 Pulse Attenuation Characteristic

Figure 2.11.2 represents how much the EMI filter can attenuate pulse common mode noises, which may cause malfunctions of electronic equipment, connected to a power line. Figure 2.11.1 illustrates the measurement method.

When terminating the input and output of the EMI filter with 50  $\Omega$ , and applying a specified pulse waveform on the input, pulse voltages appearing on the output are measured and plotted with the horizontal axis representing input pulse voltage and with the vertical axis representing output pulse voltage.

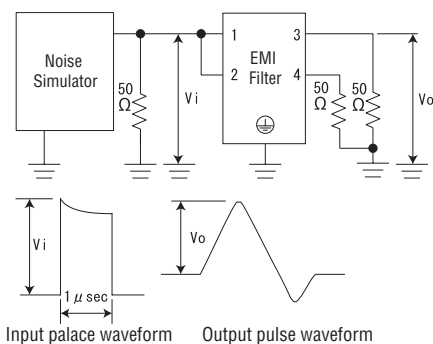


Figure 2.11.1 Measurement Method for Pulse Attenuation Characteristic (Single Phase)



## 2 Selection of EMI Filters

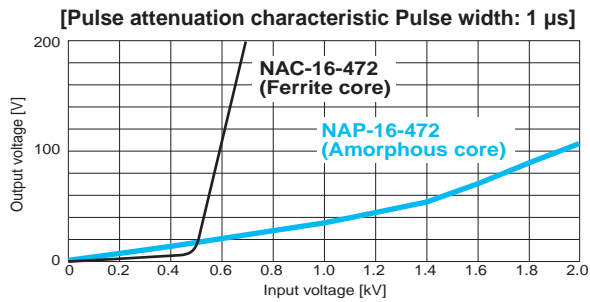


Figure 2.11.2 Example of Comparing Pulse Attenuation Characteristics

Figure 2.11.2 gives an example of comparing pulse attenuation characteristics for an EMI filter using a general ferrite core and one using an amorphous core.

The graph suggests that the amorphous core prevents the voltage of output pulses from increasing quickly in relation to rising input pulse voltage (a good pulse attenuation characteristic).

Beyond a given volt-time product the choke coil of an EMI filter will saturate, resulting in significantly reduced noise suppression. The volt-time product (V·T) that causes the core to reach magnetic saturation is found with the following calculation expression:

$$V \cdot T = \Delta B \cdot N \cdot Ae$$

**V** : Pulse voltage [V]  
**T** : Pulse width [sec]  
 $\Delta B$  : Change of core's magnetic flux density =  $B_m - B_r$  [T]  
**B<sub>m</sub>** : Saturation magnetic flux density  
**B<sub>r</sub>** : Residual magnetic flux density  
**N** : Number of turns in a coil [turns]  
**A<sub>e</sub>** : Effective cross section [m<sup>2</sup>]

According to the expression, an EMI filter using a core that has larger  $\Delta B$  (for example, an amorphous core) is less vulnerable to magnetic saturation, assuming that the numbers of turns and the sizes of cores are the same.

### 12 Ground Capacitor Codes

Many EMI filters can support various capacities of ground capacitors by specifying an appropriate code. The selectable ground capacitor codes depend on the types of EMI filters; the following table lists an example of ground capacitor codes and attenuation characteristics.

Table 2.12.1 Example of Ground Capacitor Codes (EAP series)

Code	Leak Current (input 125/250V 60Hz)	Line to ground capacitor (nominal value)
000	5 μA / 10 μA max	Not Provided
101	12.5 μA / 25 μA max	100pF
221	25 μA / 50 μA max	220pF
331	37.5 μA / 75 μA max	330pF
471	50 μA / 100 μA max	470pF
681	75.5 μA / 150 μA max	680pF
102	0.13 mA / 0.25 mA max	1000pF
222	0.25 mA / 0.5 mA max	2200pF
332	0.38 mA / 0.75 mA max	3300pF
472	0.5 mA / 1.0 mA max	4700pF

**EAP** -10 -472 -□  
 Model Name | Rated Current | Ground Capacitor Codes | Option

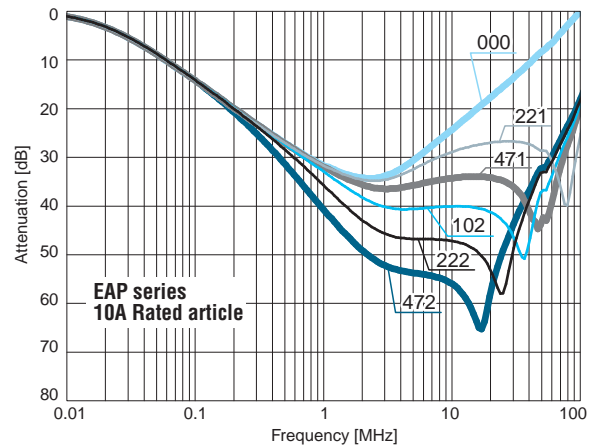


Figure 2.12.1 Example of Ground Capacitor Codes and Common Attenuation Characteristics

Generally, the larger capacity one sets a ground capacitor to, the better the common mode attenuation characteristic. But, the leakage current will also become larger, which means that there is a tradeoff.

The abundant selections of ground capacitor capacities make it possible for one to develop the best balance between attenuation characteristic and leakage current.

### 13 Options

Our EMI filters can be customized by specifying an option code.

As the types of set options depend on filter products, please refer to our catalog.

The following describes the outline of each option:

#### a. DIN rail installation type: D

This type of EMI filter can be installed to a DIN rail often used for control consoles, etc.

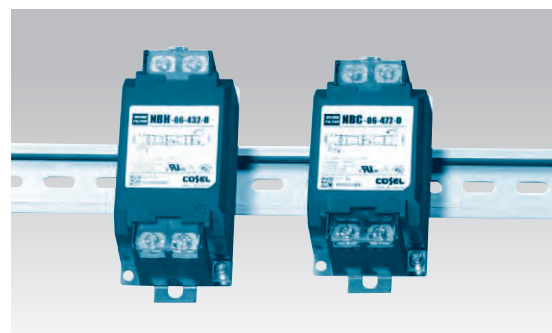


Figure 2.13.1 Examples of DIN Rail Installation Type EMI Filters

Note that as this type of EMI filter may not produce proper noise attenuation with grounding through a DIN rail, one must connect the ground to the protective earth terminal (PE) of the EMI filter. For EMI filters that have two protective earth terminals, it can connect the ground to either one only.

## 2 Selection of EMI Filters

### b. Terminal block type: T

These types of EMI filters use a terminal block as their interface (if the standard product uses a connector).

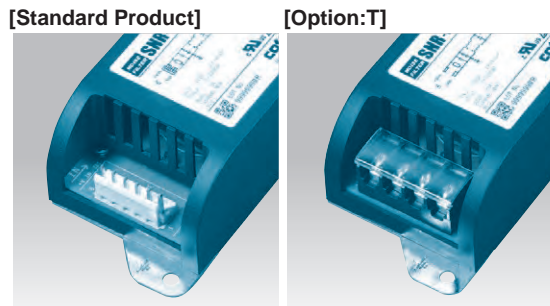


Figure 2.13.2 Comparison between Standard Product and T-option Product

### c. High permeability choke coil type (ultra low-frequency and ultra high attenuation): H

These types of EMI filters the choke coil core with a high permeability core. These types improve the common mode attenuation characteristic for low frequencies compared to their standard products.

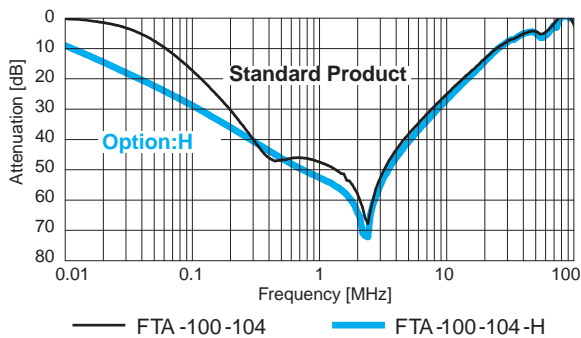


Figure 2.13.3 Example of Comparing Common Mode Attenuation Characteristics between Standard Product and H-option Product

### d. Hexagon socket head cap bolt type: S

These types of EMI filters have a hexagon socket head cap (Allen) bolt in their terminal block in instead of the standard bolt (cross recessed (Philips) hexagon head bolt). Customers can select the desired type of bolt for tools they are using.

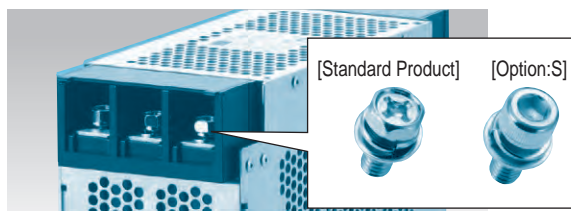


Figure 2.13.4 Comparison between Standard Product and S-option Product

### e. With switch of line to ground capacitor type : G

These types of Ultra high attenuation type for EU, With switch of line to ground capacitor.

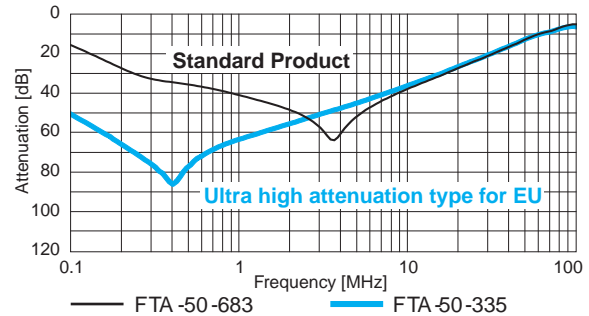


Figure 2.13.5 Example of Comparing Common Mode Attenuation Characteristics between Standard Product and Ultra high attenuation type for EU Product



Figure 2.13.6 With switch of line to ground capacitor type (Customers use when Test Voltage)

### f. Improve differential mode attenuation type : U

These types of change the rated voltage 250V.

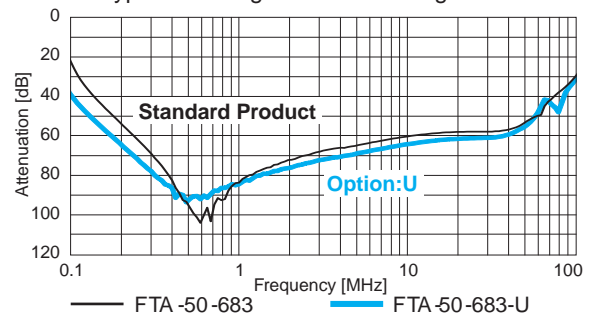


Figure 2.13.7 Example of Comparing differential Mode Attenuation Characteristics between Standard Product and U-option Product

### g. Ultra high attenuation type for EU : L

These types of Ultra high attenuation type for EU.

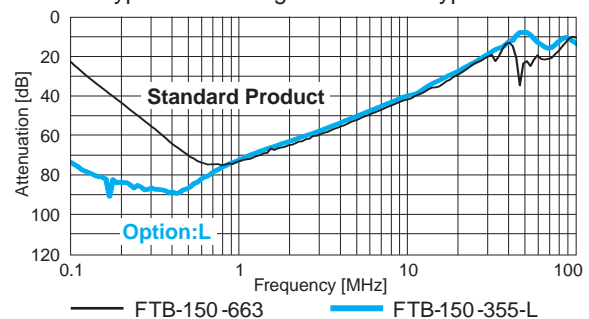


Figure 2.13.8 Example of Comparing Common Mode Attenuation Characteristics between Standard Product and L-option Product

Option code is possible combination. Please contact us for more information.

### 3 How to Use EMI Filters

#### 1 Ground Wiring

When wiring an EMI filter with a ground wire, use a wire as thick and short as possible. A long ground wire will deteriorate attenuation of high frequencies due to inductance in the wire.

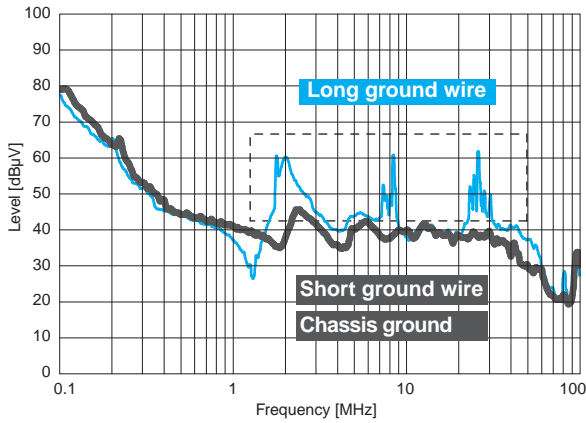


Figure 3.1.1 Example of Ground wiring Effed on Noise

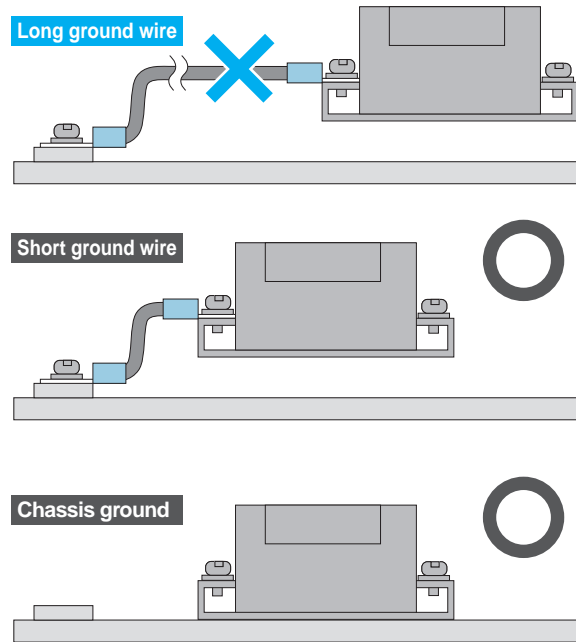


Figure 3.1.2 Proper grounding

If customers connect the metal chassis of their EMI filter, they can obtain an effect similar to a short ground wire.

#### 2 Input and Output Wiring

Separate input wires from output wires. If one binds input and output wires of EMI filters, or lays them close to each other, the filters may lose their proper attenuation effect because the high-frequency noise component may bypass them. Twisting input (and / or output) wires in pairs can reduce noise.

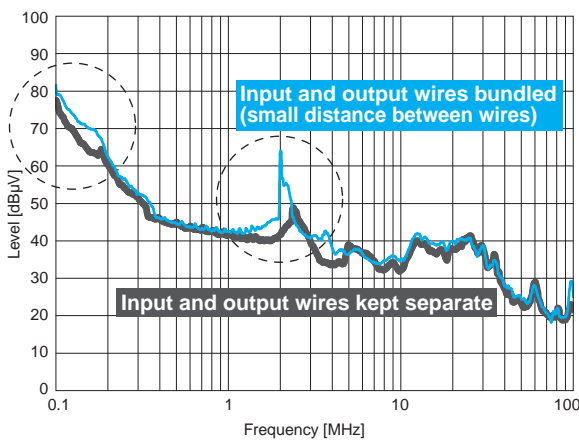


Figure 3.2.1 Example of Effect of wiring on Noise

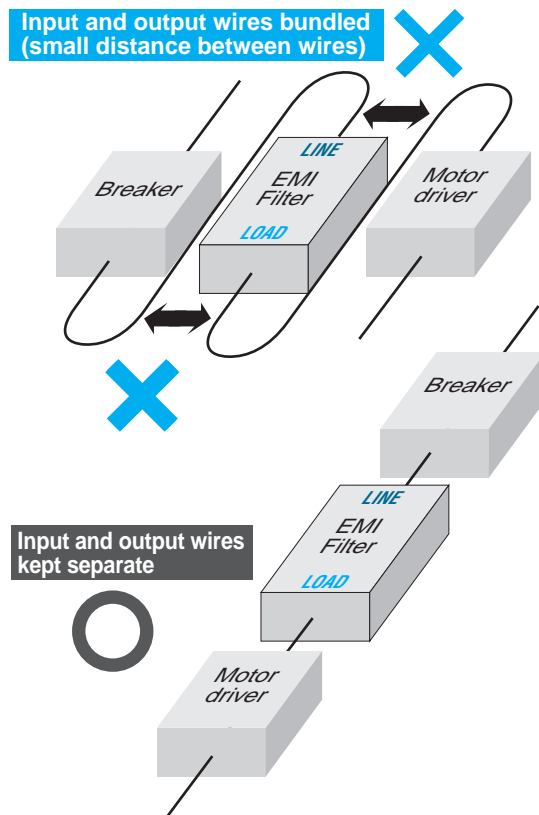


Figure 3.2.2 Input and output wires

# 4 Noise Reduction

## 1 Input and Output Impedance and Filter Circuit

The input/output impedances of a noise source and a load will have various optimal filter circuits. General EMI filters take a configuration of a low pass filter that combines L and C. If the expected attenuation effect can not be obtained, impedances of noise source and load may be the reasons.

Table 4.1.1 Combinations of I/O Impedances and Optimal Filters

		Output impedance ( $Z_o$ )	
		High	Low
Input impedance ( $Z_i$ )	High		
	Low		

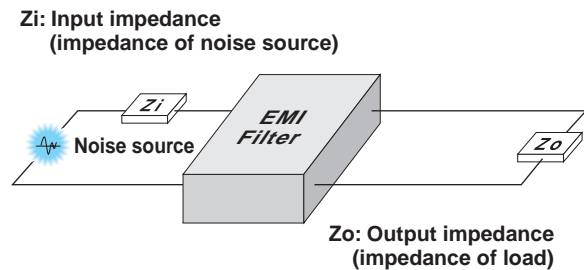


Figure 4.1.1 Input/output Impedances of an EMI Filter Circuit

## 2 EMI Filter Installation and Orientation

Generally, an EMI filter is placed in a way that the LINE terminal is connected to the input side, but it can also be used in a reverse configuration.

However, it may end up producing a different attenuation effect.

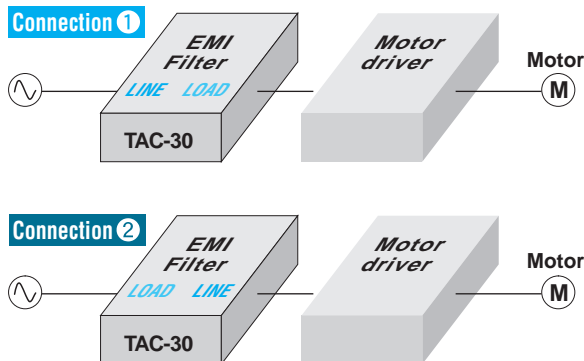


Figure 4.2.1 Direction in which an EMI Filter Is Attached and Connected

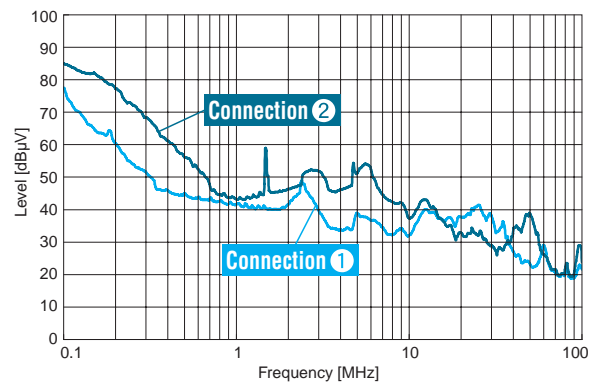


Figure 4.2.2 Example of Effect of Filter Orientation on Noise

If the internal circuit consists of a symmetric EMI filter (one of the NBC series or TBC series), the direction in which the filter is connected will not cause any difference in noise attenuation. But in the case of asymmetric ones, it may cause difference in the attenuation.

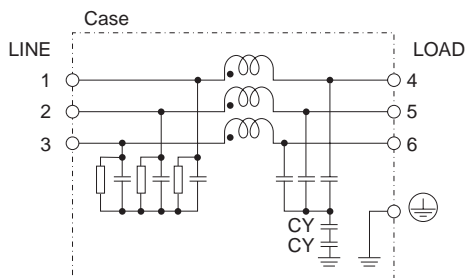


Figure 4.2.3 TAC Series Circuit Diagram (Circuit Is Asymmetric)

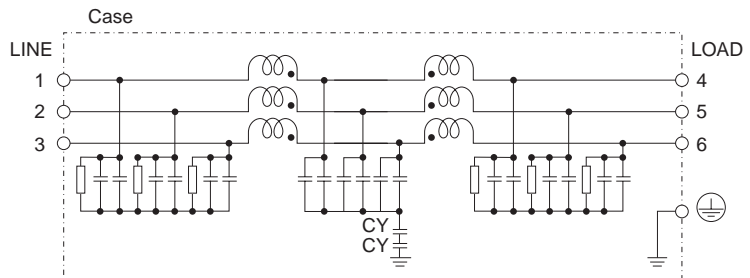


Figure 4.2.4 TBC Series Circuit Diagram (Circuit Is Symmetric)

CY: Line to ground capacitor  
: Mounting Plate

## 3 Combining Multiple EMI Filters

If one EMI filter cannot provide sufficient attenuation, the attenuation effect can be improved by connecting two filters in series. However, one must pay attention to the fact that it will result in combining the leakage current and voltage drop of two EMI filters.

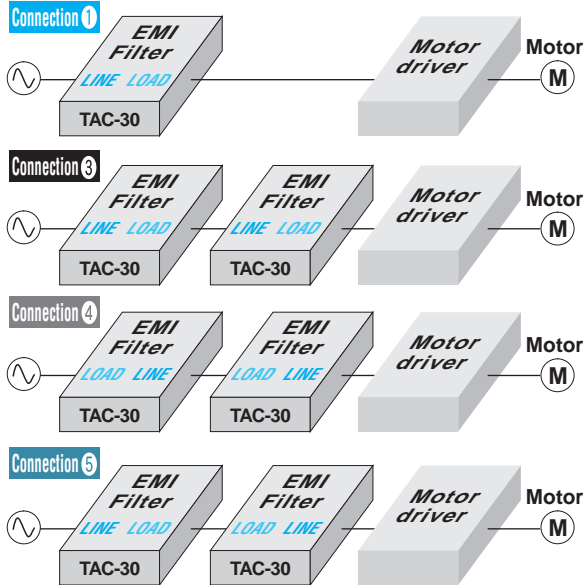


Figure 4.3.1 Example of EMI Filter Connection Directions

When connecting two EMI filters, the direction in which they are connected may also cause difference in the attenuation characteristic. Figure 4.3.3 shows the results of comparing the attenuation characteristics (static characteristics) due to different directions in which two EMI filters are connected.

Figure 4.3.4 shows the actual sample noise characteristics caused by the connection directions.

Unlike the static characteristic data, connection 4 does not improve the attenuation in this case. This phenomenon occurred because the input and output impedances of the EMI filters were different from the conditions of static characteristics.

When trying to optimize the way EMI filters are connected, one must evaluate by checking actual noise levels.

## 4 External Ferrite Core

If one EMI filter cannot provide sufficient attenuation, the effect can be improved by inserting an external core.

Whether a core is inserted on the LINE side or on the LOAD side of an EMI filter may cause difference in the attenuation characteristic.

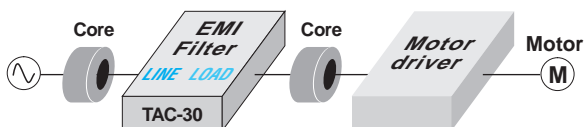


Figure 4.4.1 Example of Placing an External Core

When adding a core on the LINE side, one needs a core that can generate sufficiently large inductance for the choke coil within the EMI filter.

Just inserting on the LINE side a core whose performance is equal to or less than that of the internal choke coil does not contribute to reducing noise.

When inserting it on the LOAD side, it will produce a large attenuation effect because the circuit takes a configuration of a T-type EMI filter circuit.

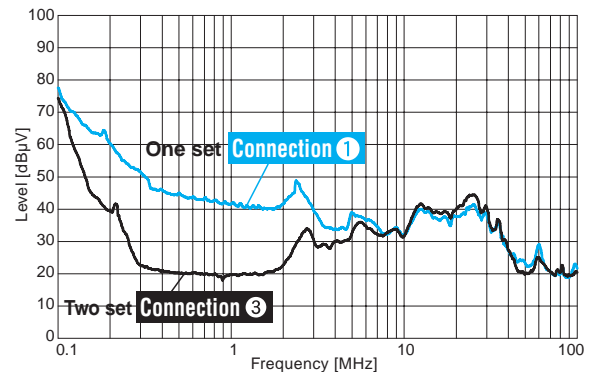


Figure 4.3.2 Example of Effect of Combining Multiple Filters

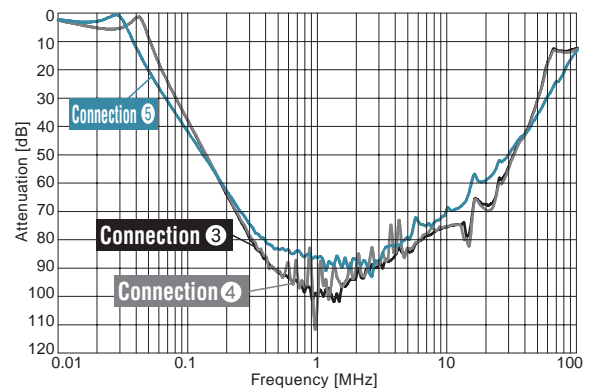


Figure 4.3.3 Comparing Static Characteristics of Different 2-filter configurations

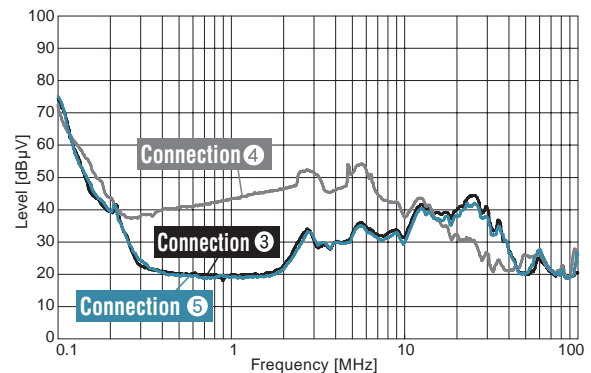


Figure 4.3.4 Comparing Effects of Different 2-filter Configurations

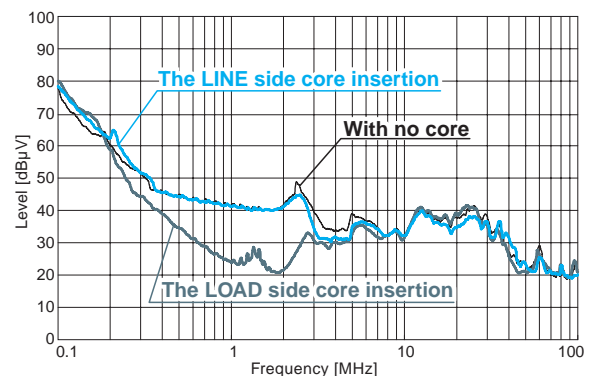


Figure 4.4.2 Example of Effect of Adding an External Ferrite Core

## 1 CE Marking

For machines and electric products to be sold in the EU area, manufacturers are required to bear a CE mark to prove they are in compliance with safety requirements, quality control, and ecocide prevention. To be allowed to do so, they must meet appropriate EC directives. The following describes the EC directives that are applied to general machinery products:

### a. Machinery directive

This directive covers products that are an assembly of parts and have a driving section (with the central focus on industrial equipment).

### b. EMC directive

This directive is intended to apply to electric parts which can be sources of radio disturbance or are affected by electromagnetic interference. It requires that two items, emission (EMI) and immunity (EMS), be met.

### c. Low voltage directive

This directive is intended to apply to products that operate with a rated voltage in the range of 50 to 1000 V AC or 75 to 1500 V DC.

As there are no appropriate EC directives (including the ones described above) which apply to EMI filters, EMI filter products cannot bear a CE mark.

However, EMI filters can obtain an ENEC mark, which has a similar effect on bypassing application procedures of its signatories.

## 2 Conducted Emission EN61000-6-4

The voltages of interfering waves propagated through a power cable from equipment to the outside are measured with LISN in an open site or anechoic chamber.

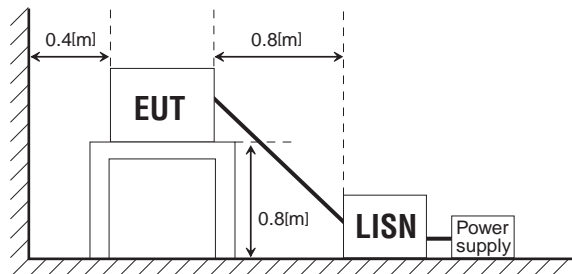


Figure 5.2.1 Example of Conducted Emissions Measurement Configuration

★ : Refer to the description in "Terminology related to EMC Test" in this document.

## 3 Radiated Emission EN61000-6-4

When operating equipment, the strength of electromagnetic waves is measured in a range of specified frequencies at a location 3 or 10 m away from the equipment

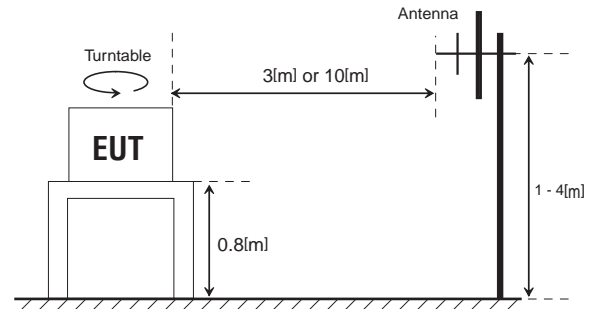


Figure 5.3.1 Example of Radiated Emission Measurement Configuration

## 4 Power Supply Harmonic Current EN61000-3-2

One analyzes the frequencies of input currents and checks the value of the harmonic current for each order.

## 5 Electrostatic Discharge EN61000-4-2

This test simulates effects of electrostatic discharge (malfunctions or destruction of semiconductor elements) and includes contact discharge and aerial discharge in its scope.

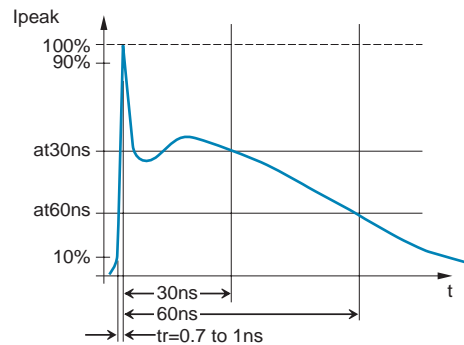


Figure 5.5.1 Discharge current waveform

Table 5.5.1 Application Level

Level	Specified voltage	First peak discharge current ( $\pm 10\%$ ) $I_p$	Rise time	Current value at 30 ns ( $\pm 30\%$ )	Current value at 60 ns ( $\pm 30\%$ )
1	2kV	7.5A	0.7 - 1ns	4A	2A
2	4kV	15A	0.7 - 1ns	8A	4A
3	6kV	22.5A	0.7 - 1ns	12A	6A
4	8kV	30A	0.7 - 1ns	16A	8A

## 6 Radio frequency electromagnetic field EN61000-4-3

This test checks immunities of equipment to effects of electromagnetic waves.

## 7 Fast Transient/Burst EN61000-4-4

This test checks immunities to burst waves by from injecting via cable pulses that resemble the results of a discharge.

## 8 Surge EN61000-4-5

This test checks immunities to surges by applying a specified surge waveform.

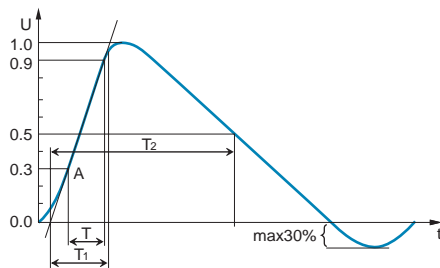


Figure 5.8.1 Example of a Surge Waveform in Voltage

Table 5.8.1 Level

Level	Open circuit test voltage±10% [kV]
1	0.5
2	1.0
3	2.0
4	4.0
X	special

## 9 Conducted Radio-frequency Interference EN61000-4-6

This test checks immunities to conducted disturbances when electromagnetic waves pass into equipment through a cable.

## 10 Power Frequency Magnetic Field EN61000-4-8

This test checks immunities to magnetic fields generated by power frequency currents flowing through an input line or a power wiring.

## 11 Voltage Dip/Momentary Power Interruption EN61000-4-11

These tests check if equipment functions normally after momentary voltage drop, or power failure that decreases voltage to 0.

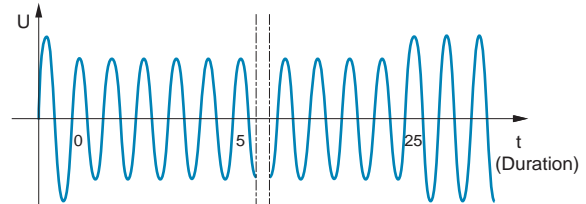


Figure 5.11.1 Example of a Waveform of Voltage Dips

## 12 Unit of Noise

Noise is represented with 1 [μV] as its reference in [dB]. It is assumed that 1 [μV] equals 0 [dBμV]. For example, 1 [V] is represented as follows:

$$20\text{Log}_{10} \frac{1}{1 \times 10^{-6}} = 120 \text{ [dB}\mu\text{V]}$$

$$\begin{aligned} 10 \text{ [V]} &\Rightarrow 140 \text{ [dB}\mu\text{V]} \\ 100 \text{ [V]} &\Rightarrow 160 \text{ [dB}\mu\text{V]} \\ 1000 \text{ [V]} &\Rightarrow 180 \text{ [dB}\mu\text{V]} \end{aligned}$$

## 13 Detection Method

### a. Peak detection (PK)

It detects the heights of peaks of an output waveform.

### b. Quasi-peak detection (QP)

It detects quasi-peaks through a circuit that has time constants at the time of charge and discharge. Quasi-peak detection value equals an intermediate value between peak and average ones.

This detection has high measurement results when noise has a long duration or occurs frequently.

### c. Average detection (AV)

It detects an average of values of an output waveform.

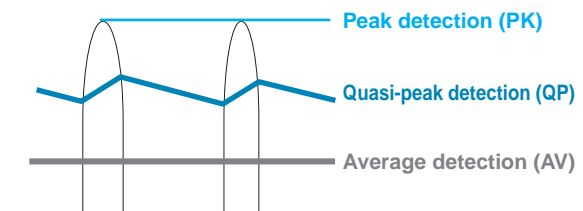


Figure 5.13.1 Relations between Detection Methods and Measurement Levels

14 Conducted and Radiated Emission Limits (Excerpt)

Test item	Standard	EN61000-6-3	EN61000-6-4	EN55011			EN55022		EN60601-1-2			EN50370-1	
	Classification	Common standard	Common standard	Group 1 ★			Standard for product groups		Standard for product groups			Standard for product groups	
	Product	-	-	ISM equipment ★			Information processing equipment (ITE equipment)		ISM equipment (medical equipment)			Machine tool	
				-	20 kVA or less	Exceeding 20 kVA			-	20 kVA or less	Exceeding 20 kVA	16A or less	Exceeding 16A
	Operating environment	Class B	Class A	Class B	Class A	Class B	Class A	Class B	Class A	Class B	Class A	Class A	

Level:Unit [dBµV]

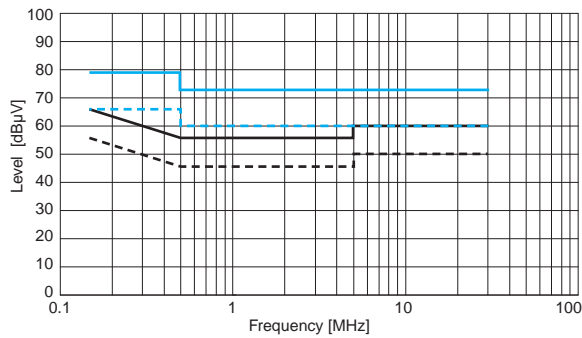
Conducted emission	Limit	QP	0.1 - 50.5MHz	66 - 56	79	66 - 56	79	100	66 - 56	79	66 - 56	79	100	79	100		
			0.5 - 5MHz	56	73	56	73	86	56	73	56	73	56	73	86	73	86
			5 - 30MHz	60	73	60	73	90 - 73	60	73	60	73	60	73	90 - 73	60	90 - 70
		AV	0.15 - 0.5MHz	56 - 46	66	56 - 46	66	90	56 - 46	66	56 - 46	66	56 - 46	66	90	66	90
			0.5 - 5MHz	46	60	46	60	76	46	60	46	60	46	60	76	60	76
			5 - 30MHz	50	60	50	60	80 - 60	50	60	50	60	50	60	80 - 60	60	80 - 60

Level:Unit [dBµV/m]

Radiated emission	Limit	10m Law	30 - 230MHz	30	40	30	40	50	30	40	30	40	50	40	50		
			230MHz - 1GHz	37	47	37	47	50	37	47	37	47	37	47	50	47	50
		30m Law	30 - 230MHz	-	30	-	-	-	-	-	-	-	-	-	-	-	-
			230MHz - 1GHz	-	37	-	-	-	-	-	-	-	-	-	-	-	-

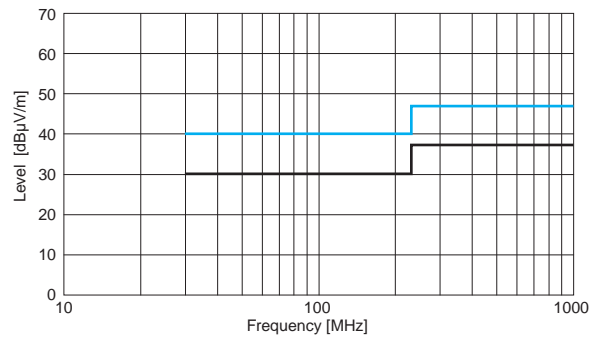
★ : Refer to the description in "Terminology related to EMC Test" in this document.

(As of November 2011)



— EN55011 ClassA QP (Group 1)  
 - - - EN55011 ClassA AV (Group 1)  
 — EN55011 ClassB QP (Group 1)  
 - - - EN55011 ClassB AV (Group 1)  
 (the above is also applied to EN55013, EN55014-1, EN55022, and EN60601-1)

Figure 5.14.1 Conducted Emission Limit Graph



— ClassB  
 — ClassA

Figure 5.14.2 Radiated Emission Limit Graph



### 15 Terminology related to EMC Test

#### ★ EUT

Stands for Equipment Under Test, and refers to equipment that will be tested or provided for a test.

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#### ★ Immunity test

Refers to a test to evaluate the durability of EUT against electromagnetic interference.

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#### ★ Emission test

Refers to a test to evaluate whether the strength of electromagnetic interference emitted from EUT exceeds a given limit.

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#### ★ Open site

Refers to an experimental facility installed outdoors to be used for activities such as EMC measurement.

---

#### ★ Anechoic chamber

Refers to a facility to be used to create an electromagnetically isolated environment; the interior surfaces of the chamber absorb radio frequency waves.

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#### ★ CISPR

One of IEC's special committees; it was established to integrate standards such as those for allowable values and measurement methods for interfering waves causing radio communication failures and includes a standardization committee for EMC (Electro Magnetic Compatibility).

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#### ★ Group 1 and Group 2 in EN55011

Group1 : Equipment for laboratories, healthcare, and sciences  
(Example: frequency counters, spectrum analyzers, switching power source, and measuring apparatus)

Group2 : Industrial induction heating equipment, induction heating equipment, industrial microwave heating equipment, household microwave ovens, medical equipment, spark erosion equipment, and spot welders.

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#### ★ ISM equipment

Stands for Industrial, Scientific and Medical radio-frequency equipment and refers to radio-frequency equipment for industry, science, and health care.


























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#### ★ LISN

Stands for Line Impedance Stabilization Network. It refers to equipment that sends noise components to a measurement device while monitoring impedances, looking at the power source from EUT. It is also called AMN (Artificial Mains Network).

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## 1 Source Voltages in the World

 People's Republic of China	Single phase 2 wire 220V	Three phase 4 wire 380V
 Taiwan	Single phase 2 wire 110V, 220V	Three phase 4 wire 380V
 India	Single phase 2 wire 230V, 240V	Three phase 4 wire 400V, 415V
 Indonesia	Single phase 2 wire 220V	Three phase 4 wire 380V
 Japan	Single phase 2 wire 100V, 200V	Three phase 3 wire 200V
 Korea	Single phase 2 wire 110V, 220V	Three phase 3 wire 200V Three phase 4 wire 380V
 Philippines	Single phase 2 wire 220V, 230V, 240V	Three phase 3 wire 480V
 Singapore	Single phase 2 wire 230V	Three phase 4 wire 400V
 Thailand	Single phase 2 wire 220V	Three phase 4 wire 380V
 Malaysia	Single phase 2 wire 240V	Three phase 4 wire 415V
 Egypt	Single phase 2 wire 220V	Three phase 4 wire 380V
 Saudi Arabia	Single phase 2 wire 127V, 220V	Three phase 4 wire 380V
 Australia	Single phase 2 wire 240V	Three phase 4 wire 415V
 New Zealand	Single phase 2 wire 230V, 240V	Three phase 4 wire 400V, 415V
 Austria	Single phase 2 wire 230V	Three phase 4 wire 400V
 France	Single phase 2 wire 230V	Three phase 4 wire 400V
 Germany	Single phase 2 wire 230V	Three phase 4 wire 400V
 UK	Single phase 2 wire 240V	Three phase 4 wire 415V
 Netherlands	Single phase 2 wire 230V	Three phase 4 wire 400V
 Italy	Single phase 2 wire 220V	Three phase 4 wire 380V
 Spain	Single phase 2 wire 127V, 220V	Three phase 4 wire 380V
 Switzerland	Single phase 2 wire 230V	Three phase 4 wire 400V
 Russia (former republics of the Soviet Union)	Single phase 2 wire 127V, 220V	Three phase 4 wire 380V
 USA	Single phase 2 wire 120V, 265V, 277V Single phase 3 wire 115/230V, 120/240V, 240/480V	Three phase 4 wire 208V, 460V, 480V
 Brazil	Single phase 2 wire 127V	Three phase 4 wire 220V



# EAC series

EAC -10 -472 -□

① ② ③ ④

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

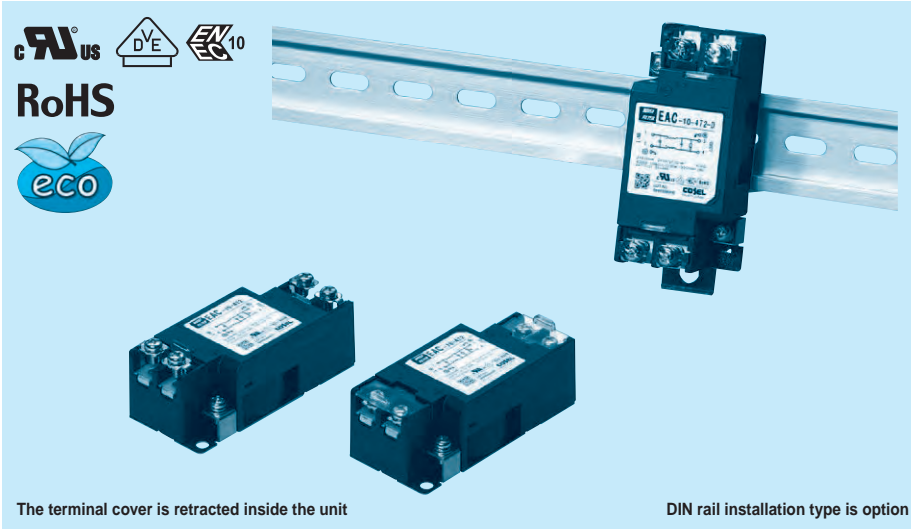
table 1.1 Line to ground capacitor code

Code	Leakage Current (Input 125/250V 60Hz)	Line to ground capacitor (nominal value)
681	75.5 $\mu$ A/150 $\mu$ A max	680pF
102	0.13mA/0.25mA max	1000pF
222	0.25mA/0.5 mA max	2200pF
332	0.38mA/0.75mA max	3300pF
472	0.5 mA/1.0 mA max	4700pF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

- ④ Options
- D: DIN rail installation type

\* The dimensions change when the option is set. Refer to External view.



The terminal cover is retracted inside the unit

DIN rail installation type is option

## Features of EAC series

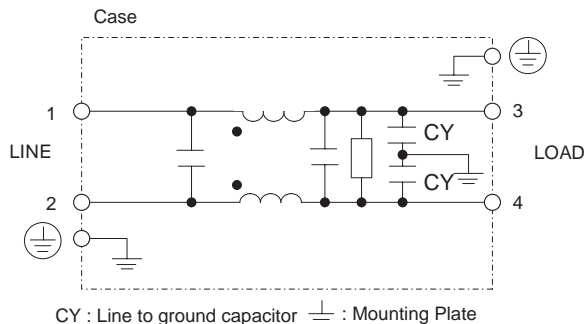
### Small, common mode EMI/EMC Filters in 150kHz to 1MHz(1-Stage filter)

- Single Phase 250 VAC
  - Small-size
  - Quick and easy push-down terminal
- Just connect the wires, push-down and tighten the screws with a screwdriver

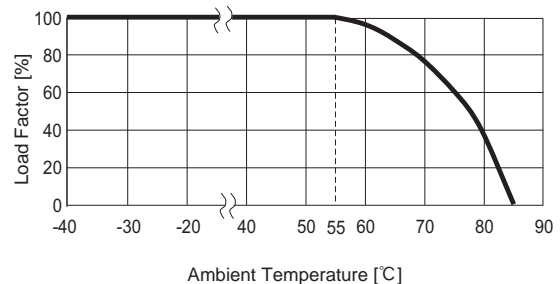
### Specifications

No.	Items	EAC-03-472	EAC-06-472	EAC-10-472	EAC-16-472	EAC-20-472	EAC-30-472
1	Rated Voltage[V]	AC 1 $\phi$ 250 / DC250					
2	Rated Current[A]	3	6	10	16	20	30
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 20mA), 1minute at room temperature and humidity					
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 500M $\Omega$ min at room temperature and humidity					
5	Leakage current 125/250V 60Hz	0.5mA/1.0mA max					
6	DC resistance	180m $\Omega$ max	110m $\Omega$ max	40m $\Omega$ max	20m $\Omega$ max	10m $\Omega$ max	6m $\Omega$ max
7	Safety agency approval temperatures	-25 to +85 $^{\circ}$ C (Refer to Derating Curve)					
8	Operating temperature	-40 to +85 $^{\circ}$ C (Refer to Derating Curve)					
9	Operating humidity	20 to 95%RH (Non condensing)					
10	Storage temperature/humidity	-40 to +85 $^{\circ}$ C/20 to 95%RH (Non condensing)					
11	Vibration	10 to 55Hz, 19.6m/s $^2$ (2G), 3min. Period, 1hour each X, Y and Z axis					
12	Impact	196.1m/s $^2$ (20G), 11ms Once each X, Y and Z axis					
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC (At only AC input)					
14	Case size (without projection) /Weight	39X30X85 mm [1.54X1.18X3.35 inches] (W X H X D) /170g max (Option : -D refer to external view)					

### Circuit Diagram



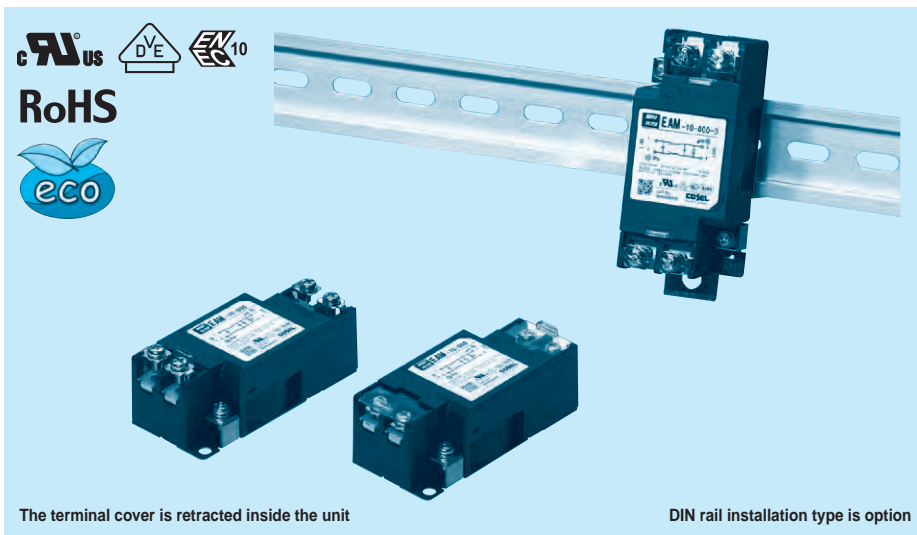
### Derating Curve



# EAM series

EAM -10 -000 -□

① ② ③ ④



The terminal cover is retracted inside the unit

DIN rail installation type is option

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table.1.1 Line to ground capacitor code

Code	Leakage Current (Input 125/250V 60Hz)	Line to ground capacitor (nominal value)
000	5 $\mu$ A / 10 $\mu$ A max	Not Provided
101	12.5 $\mu$ A / 25 $\mu$ A max	100pF
221	25 $\mu$ A / 50 $\mu$ A max	220pF
331	37.5 $\mu$ A / 75 $\mu$ A max	330pF
471	50 $\mu$ A / 100 $\mu$ A max	470pF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

- ④ Options
- D: DIN rail installation type

\* The dimensions change when the option is set. Refer to External view.

## Features of EAM series

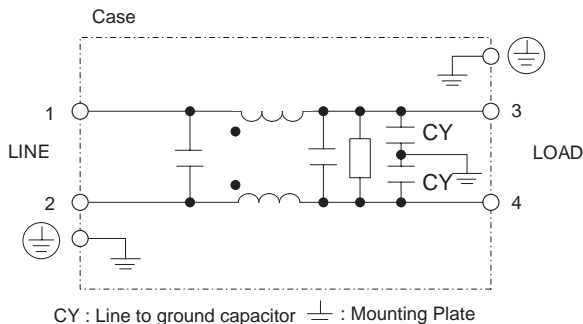
### Small, Low leakage current type (1-Stage filter)

- Single Phase 250 VAC
  - Small-size
  - Quick and easy push-down terminal
- Just connect the wires, push-down and tighten the screws with a screwdriver**

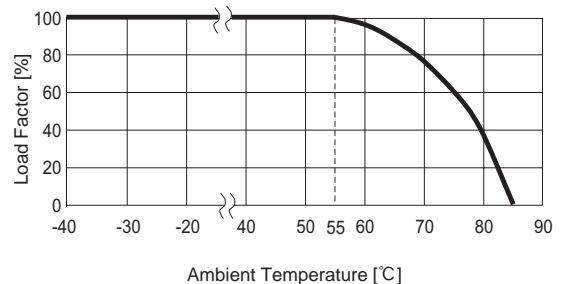
### Specifications

No.	Items	EAM-03-000	EAM-06-000	EAM-10-000	EAM-16-000	EAM-20-000	EAM-30-000
1	Rated Voltage[V]	AC 1 $\phi$ 250 / DC250					
2	Rated Current[A]	3	6	10	16	20	30
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 20mA), 1 minute at room temperature and humidity					
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 500M $\Omega$ min at room temperature and humidity					
5	Leakage current 125/250V 60Hz	5 $\mu$ A/10 $\mu$ A max					
6	DC resistance	180m $\Omega$ max	110m $\Omega$ max	40m $\Omega$ max	20m $\Omega$ max	10m $\Omega$ max	6m $\Omega$ max
7	Safety agency approval temperatures	-25 to +85 $^{\circ}$ C (Refer to Derating Curve)					
8	Operating temperature	-40 to +85 $^{\circ}$ C (Refer to Derating Curve)					
9	Operating humidity	20 to 95%RH (Non condensing)					
10	Storage temperature/humidity	-40 to +85 $^{\circ}$ C/20 to 95%RH (Non condensing)					
11	Vibration	10 to 55Hz, 19.6m/s $^2$ (2G), 3min. Period, 1hour each X, Y and Z axis					
12	Impact	196.1m/s $^2$ (20G), 11ms Once each X, Y and Z axis					
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC (At only AC input)					
14	Case size (without projection) /Weight	39X30X85 mm [1.54X1.18X3.35 inches] (W X H X D) /170g max (Option : -D refer to external view)					

### Circuit Diagram



### Derating Curve



# EAP series

EAP -10 -472 -□

① ② ③ ④

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

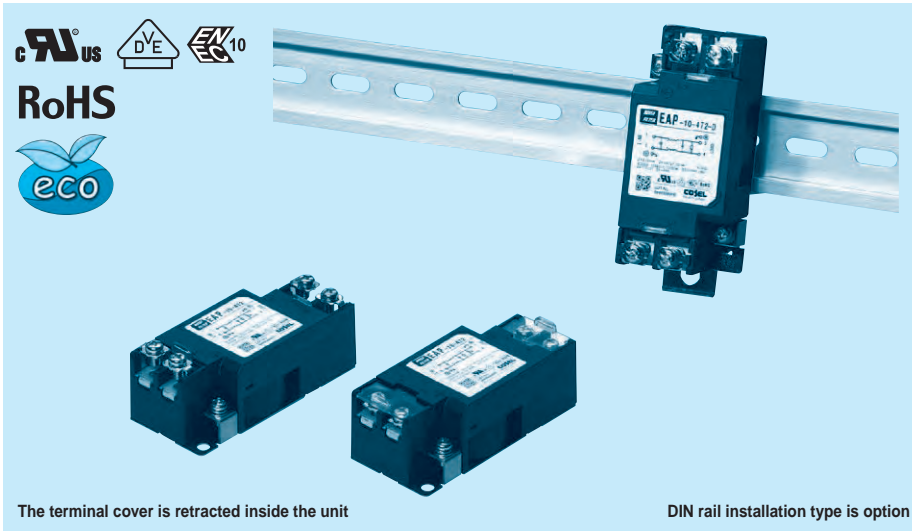
table 1.1 Line to ground capacitor code

Code	Leakage Current (Input 125/250V 60Hz)	Line to ground capacitor (nominal value)
000	5 $\mu$ A/ 10 $\mu$ A max	Not Provided
101	12.5 $\mu$ A/ 25 $\mu$ A max	100pF
221	25 $\mu$ A/ 50 $\mu$ A max	220pF
331	37.5 $\mu$ A/ 75 $\mu$ A max	330pF
471	50 $\mu$ A/100 $\mu$ A max	470pF
681	75.5 $\mu$ A/150 $\mu$ A max	680pF
102	0.13mA/0.25mA max	1000pF
222	0.25mA/0.5 mA max	2200pF
332	0.38mA/0.75mA max	3300pF
472	0.5 mA/1.0 mA max	4700pF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

- ④ Options
- D: DIN rail installation type

\* The dimensions change when the option is set. Refer to External view.



The terminal cover is retracted inside the unit

DIN rail installation type is option

## Features of EAP series

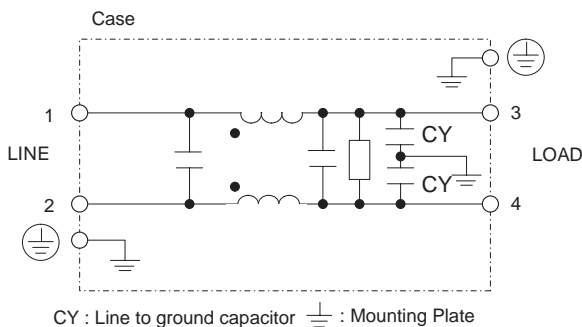
### Small, High-voltage pulses common mode EMI/EMC Filters (1-Stage filter)

- Single Phase 250 VAC
  - Small-size
  - Quick and easy push-down terminal
- Just connect the wires, push-down and tighten the screws with a screwdriver

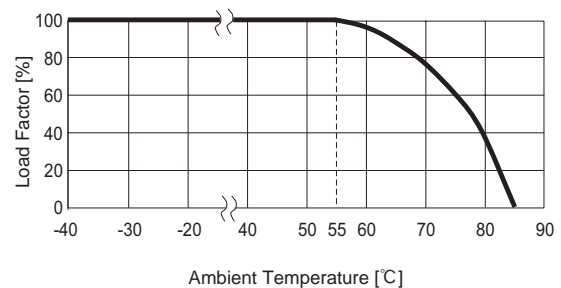
### Specifications

No.	Items	EAP-03-472	EAP-06-472	EAP-10-472	EAP-16-472	EAP-20-472	EAP-30-472
1	Rated Voltage[V]	AC 1 $\phi$ 250 / DC250					
2	Rated Current[A]	3	6	10	16	20	30
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 20mA), 1minute at room temperature and humidity					
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 500M $\Omega$ min at room temperature and humidity					
5	Leakage current 125/250V 60Hz	0.5mA/1.0mA max					
6	DC resistance	180m $\Omega$ max	110m $\Omega$ max	40m $\Omega$ max	20m $\Omega$ max	10m $\Omega$ max	6m $\Omega$ max
7	Safety agency approval temperatures	-25 to +85°C (Refer to Derating Curve)					
8	Operating temperature	-40 to +85°C (Refer to Derating Curve)					
9	Operating humidity	20 to 95%RH (Non condensing)					
10	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)					
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis					
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis					
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC (At only AC input)					
14	Case size (without projection) /Weight	39 X 30 X 85 mm [1.54 X 1.18 X 3.35 inches] (W X H X D) /170g max (Option : -D refer to external view)					

### Circuit Diagram



### Derating Curve

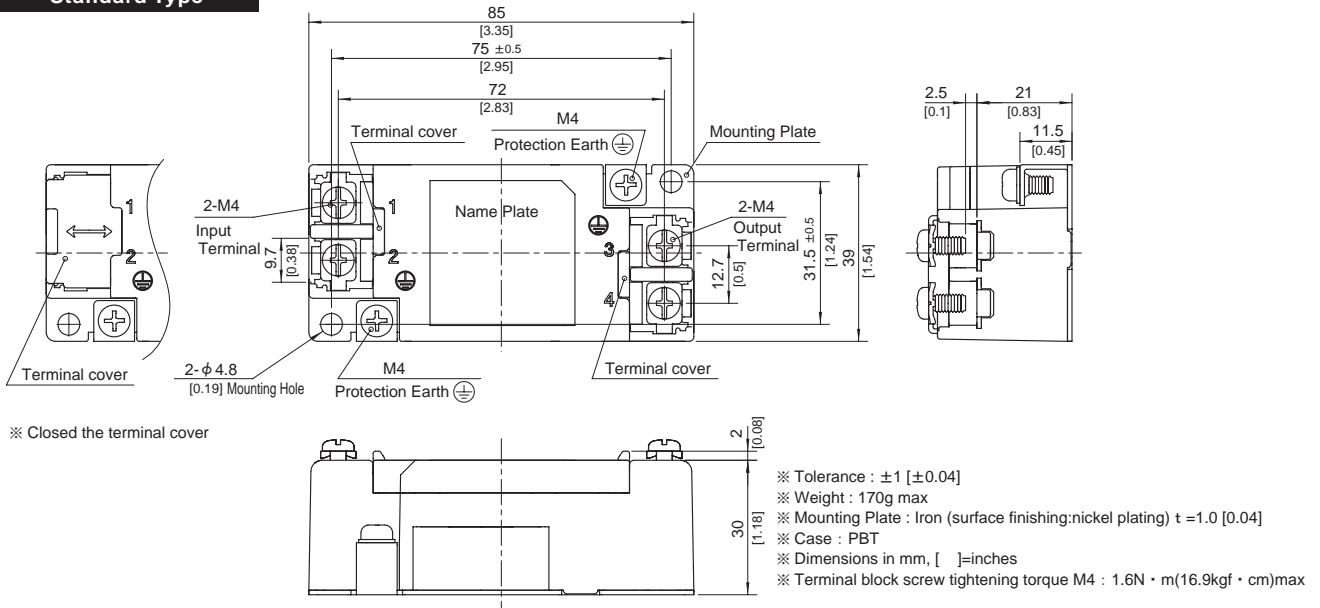


## External view

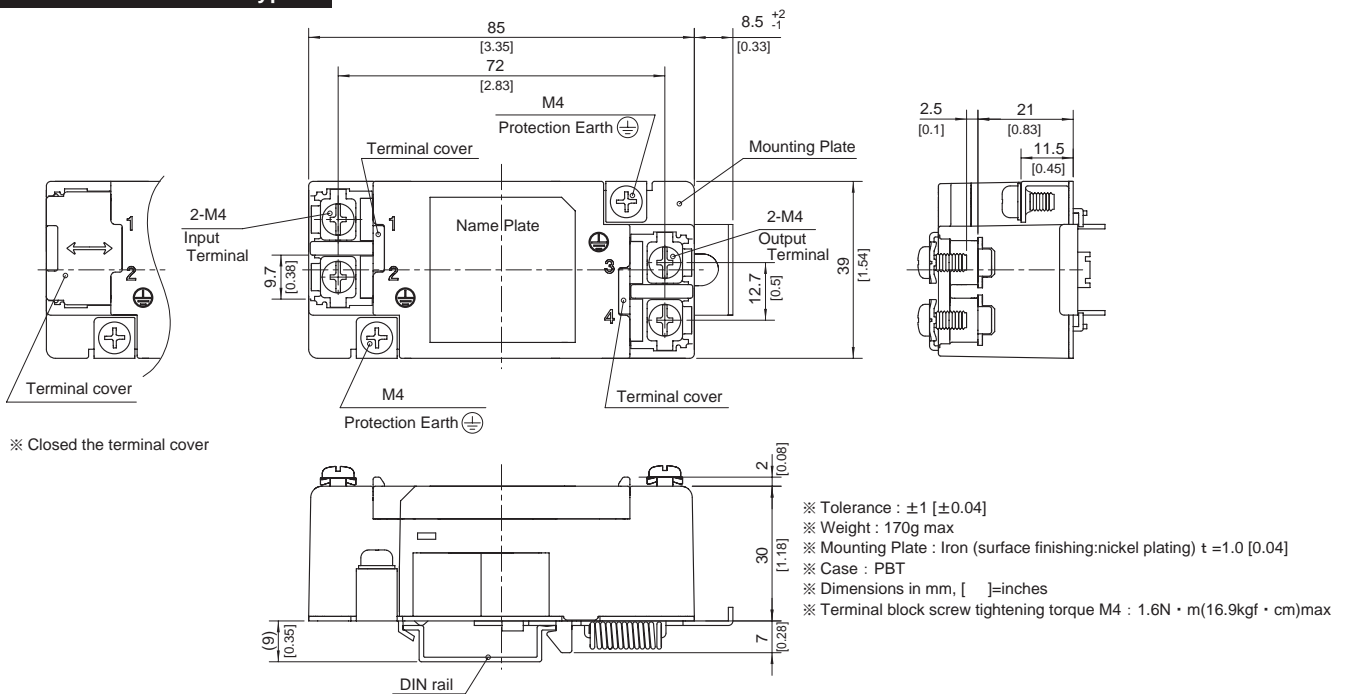
This product is shipped in the following condition, because it is equipped with push-down terminals.

- ① The terminal cover is retracted inside the unit.
- ② The screws for connecting the terminals are held in the up right position.

### Standard Type



### DIN rail installation Type

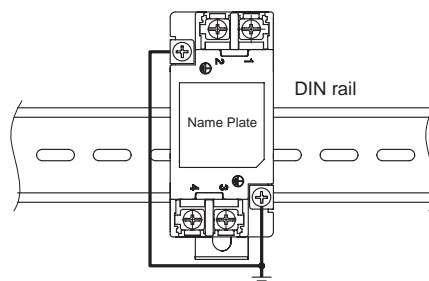


### ■ Note when installing the EMI/EMC Filter on a DIN rail.

When the EMI/EMC Filter is grounded through the DIN rail, the proper noise attenuation may not be achieved.

Be sure to connect the protection earth (PE) of the EMI/EMC Filter body to the earth.

It can connect the ground to either one only.



# ESC series

ESC -10 -472 -□

① ② ③ ④

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

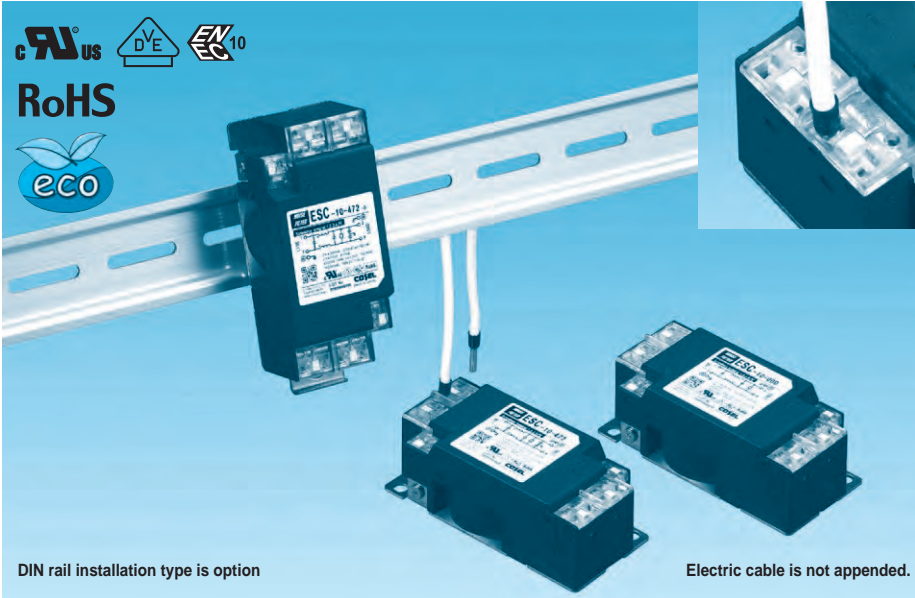
table 1.1 Line to ground capacitor code

Code	Leakage Current (Input 125/250V 60Hz)	Line to ground capacitor (nominal value)
681	75.5 $\mu$ A/150 $\mu$ A max	680pF
102	0.13mA/0.25mA max	1000pF
222	0.25mA/0.5 mA max	2200pF
332	0.38mA/0.75mA max	3300pF
472	0.5 mA/1.0 mA max	4700pF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

- ④ Options
- D: DIN rail installation type

\* The dimensions change when the option is set. Refer to External view.



## Features of ESC series

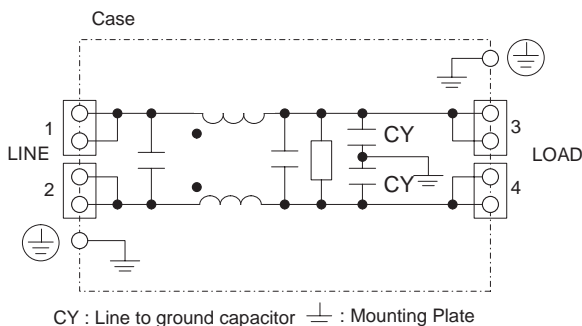
### Small, common mode EMI/EMC Filters in 150kHz to 1MHz(1-Stage filter)

- Small EMI/EMC Filters that change input-output terminal and protection earth terminal of EA series into screwless terminal type
- Single Phase 250VAC
- Torque management is unnecessary with screwless

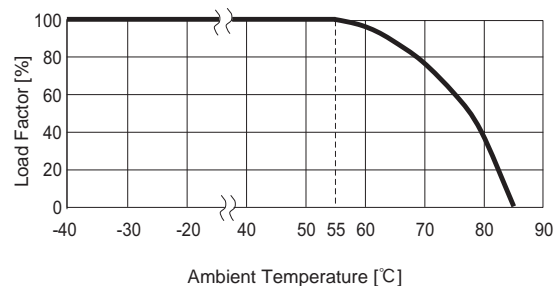
## Specifications

No.	Items	ESC-03-472	ESC-06-472	ESC-10-472	ESC-16-472
1	Rated Voltage[V]	AC 1 $\phi$ 250 / DC250			
2	Rated Current[A]	3	6	10	16
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 20mA), 1minute at room temperature and humidity			
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 500M $\Omega$ min at room temperature and humidity			
5	Leakage current 125/250V 60Hz	0.5mA/1.0mA max			
6	DC resistance	180m $\Omega$ max	110m $\Omega$ max	40m $\Omega$ max	20m $\Omega$ max
7	Safety agency approval temperatures	-25 to +85 $^{\circ}$ C (Refer to Derating Curve)			
8	Operating temperature	-40 to +85 $^{\circ}$ C (Refer to Derating Curve)			
9	Operating humidity	20 to 95%RH (Non condensing)			
10	Storage temperature/humidity	-40 to +85 $^{\circ}$ C/20 to 95%RH (Non condensing)			
11	Vibration	10 to 55Hz, 19.6m/s $^2$ (2G), 3min. Period, 1hour each X, Y and Z axis			
12	Impact	196.1m/s $^2$ (20G), 11ms Once each X, Y and Z axis			
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC (At only AC input)			
14	Case size (without projection) /Weight	39 X 30 X 85 mm [1.54 X 1.18 X 3.35 inches] (W X H X D) /170g max (Option : -D refer to external view)			

## Circuit Diagram



## Derating Curve

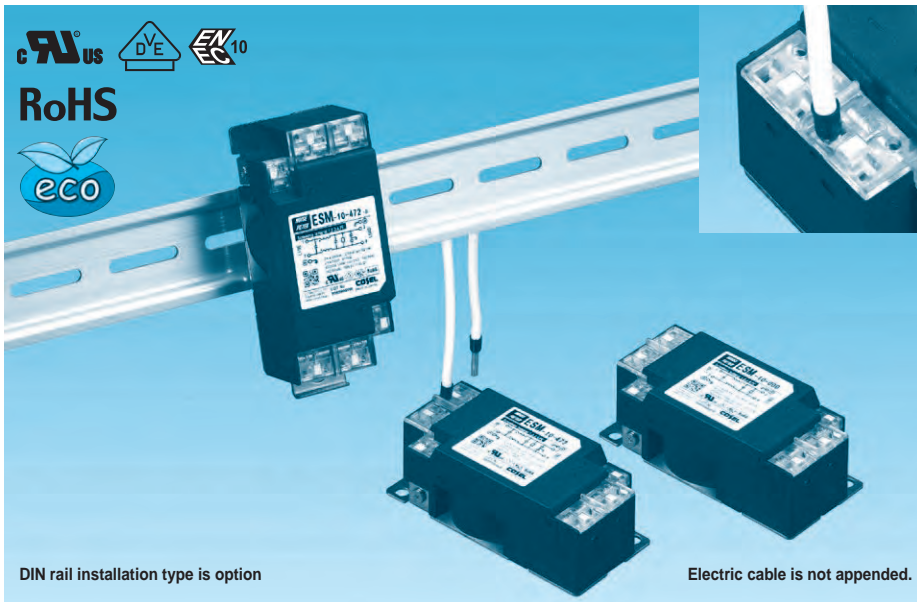




# ESM series

ESM -10 -000 -□

① ② ③ ④



DIN rail installation type is option

Electric cable is not appended.

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table 1.1 Line to ground capacitor code

Code	Leakage Current (Input 125/250V 60Hz)	Line to ground capacitor (nominal value)
000	5 $\mu$ A / 10 $\mu$ A max	Not Provided
101	12.5 $\mu$ A / 25 $\mu$ A max	100pF
221	25 $\mu$ A / 50 $\mu$ A max	220pF
331	37.5 $\mu$ A / 75 $\mu$ A max	330pF
471	50 $\mu$ A / 100 $\mu$ A max	470pF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

- ④ Options
- D: DIN rail installation type

\* The dimensions change when the option is set. Refer to External view.

## Features of ESM series

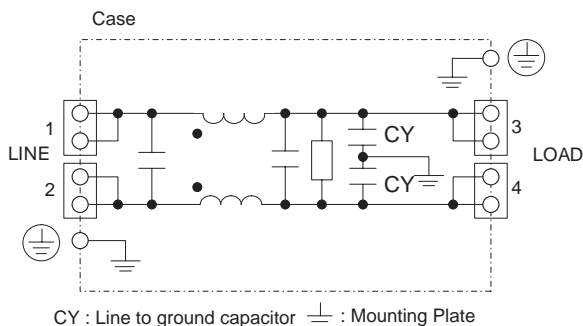
### Small, Low leakage current type (1-Stage filter)

- Small EMI/EMC Filters that change input-output terminal and protection earth terminal of EA series into screwless terminal type
- Single Phase 250VAC
- Torque management is unnecessary with screwless

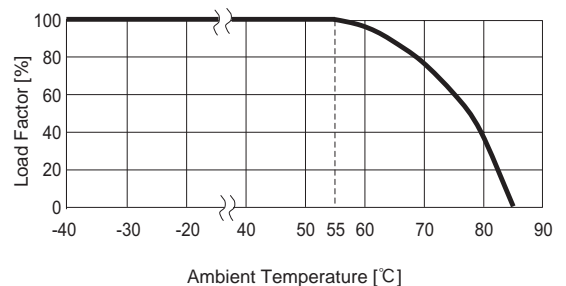
### Specifications

No.	Items	ESM-03-000	ESM-06-000	ESM-10-000	ESM-16-000
1	Rated Voltage[V]	AC 1 $\phi$ 250 / DC250			
2	Rated Current[A]	3	6	10	16
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 20mA), 1minute at room temperature and humidity			
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 500M $\Omega$ min at room temperature and humidity			
5	Leakage current 125/250V 60Hz	5 $\mu$ A/10 $\mu$ A max			
6	DC resistance	180m $\Omega$ max	110m $\Omega$ max	40m $\Omega$ max	20m $\Omega$ max
7	Safety agency approval temperatures	-25 to +85 $^{\circ}$ C (Refer to Derating Curve)			
8	Operating temperature	-40 to +85 $^{\circ}$ C (Refer to Derating Curve)			
9	Operating humidity	20 to 95%RH (Non condensing)			
10	Storage temperature/humidity	-40 to +85 $^{\circ}$ C/20 to 95%RH (Non condensing)			
11	Vibration	10 to 55Hz, 19.6m/s $^2$ (2G), 3min. Period, 1hour each X, Y and Z axis			
12	Impact	196.1m/s $^2$ (20G), 11ms Once each X, Y and Z axis			
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC (At only AC input)			
14	Case size (without projection) /Weight	39 X 30 X 85 mm [1.54 X 1.18 X 3.35 inches] (W X H X D) /170g max (Option : -D refer to external view)			

### Circuit Diagram



### Derating Curve



# ESP series

ESP -10 -472 -□

① ② ③ ④

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

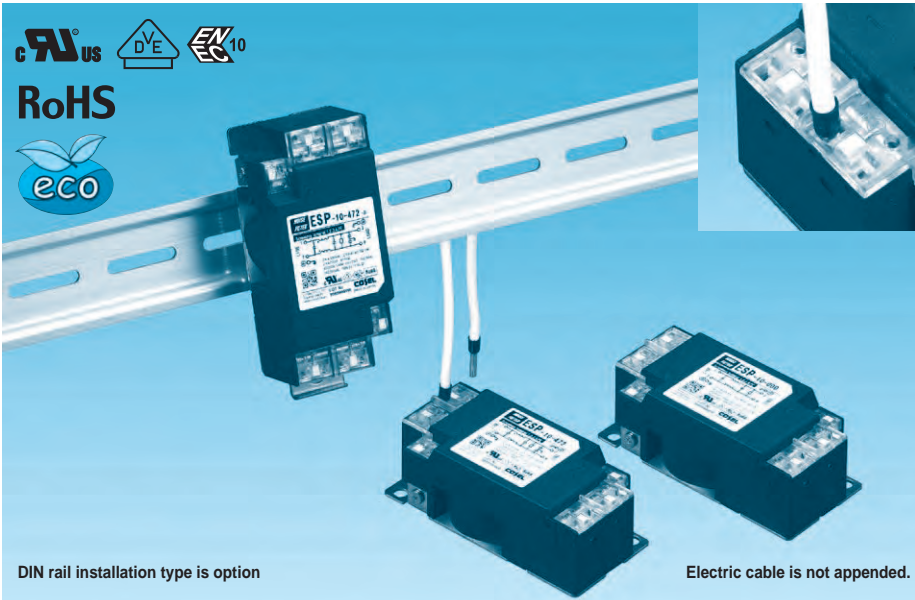
table.1.1 Line to ground capacitor code

Code	Leakage Current (Input 125/250V 60Hz)	Line to ground capacitor (nominal value)
000	5 $\mu$ A/ 10 $\mu$ A max	Not Provided
101	12.5 $\mu$ A/ 25 $\mu$ A max	100pF
221	25 $\mu$ A/ 50 $\mu$ A max	220pF
331	37.5 $\mu$ A/ 75 $\mu$ A max	330pF
471	50 $\mu$ A/100 $\mu$ A max	470pF
681	75.5 $\mu$ A/150 $\mu$ A max	680pF
102	0.13mA/0.25mA max	1000pF
222	0.25mA/0.5 mA max	2200pF
332	0.38mA/0.75mA max	3300pF
472	0.5 mA/1.0 mA max	4700pF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

- ④ Options
- D: DIN rail installation type

\* The dimensions change when the option is set. Refer to External view.



DIN rail installation type is option

Electric cable is not appended.

## Features of ESP series

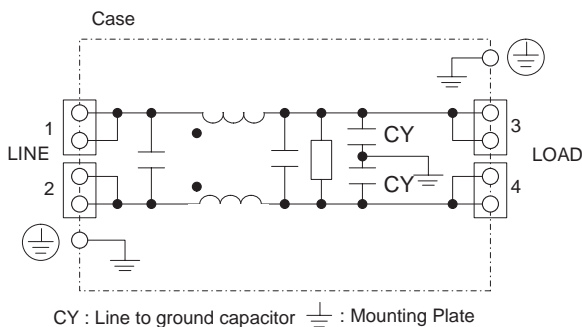
### Small, High-voltage pulses common mode EMI/EMC Filters (1-Stage filter)

- Small EMI/EMC Filters that change input-output terminal and protection earth terminal of EA series into screwless terminal type
- Single Phase 250VAC
- Torque management is unnecessary with screwless

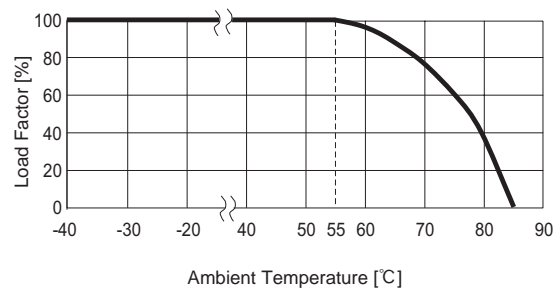
## Specifications

No.	Items	ESP-03-472	ESP-06-472	ESP-10-472	ESP-16-472
1	Rated Voltage[V]	AC 1 $\phi$ 250 / DC250			
2	Rated Current[A]	3	6	10	16
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 20mA), 1minute at room temperature and humidity			
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 500M $\Omega$ min at room temperature and humidity			
5	Leakage current 125/250V 60Hz	0.5mA/1.0mA max			
6	DC resistance	180m $\Omega$ max	110m $\Omega$ max	40m $\Omega$ max	20m $\Omega$ max
7	Safety agency approval temperatures	-25 to +85°C (Refer to Derating Curve)			
8	Operating temperature	-40 to +85°C (Refer to Derating Curve)			
9	Operating humidity	20 to 95%RH (Non condensing)			
10	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)			
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis			
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis			
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC (At only AC input)			
14	Case size (without projection) /Weight	39 X 30 X 85 mm [1.54 X 1.18 X 3.35 inches] (W X H X D) /170g max (Option : -D refer to external view)			

## Circuit Diagram

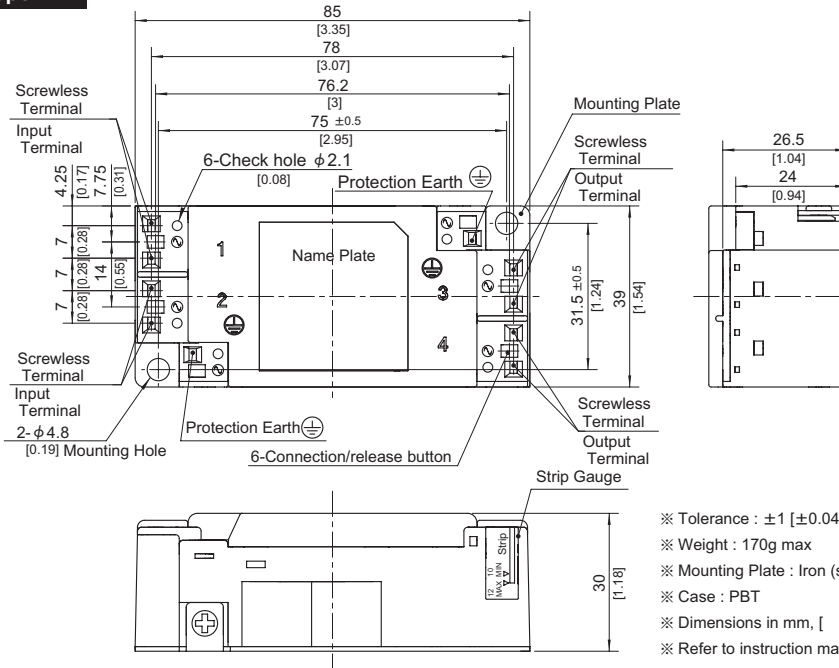


## Derating Curve



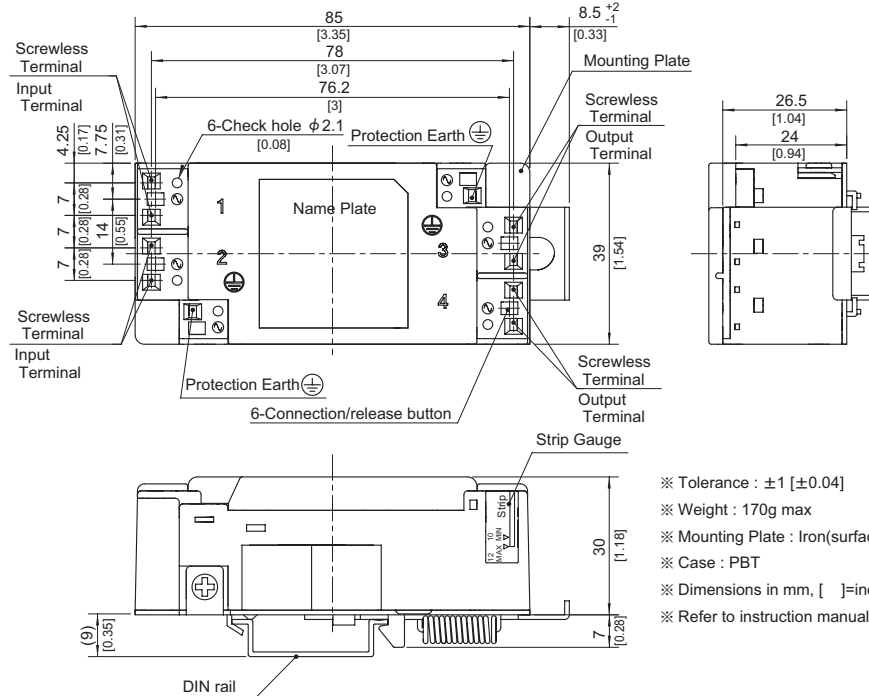
## External view

### Standard Type



- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 170g max
- ※ Mounting Plate : Iron (surface finishing:nickel plating) t=1.0 [0.04]
- ※ Case : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Refer to instruction manual for details.

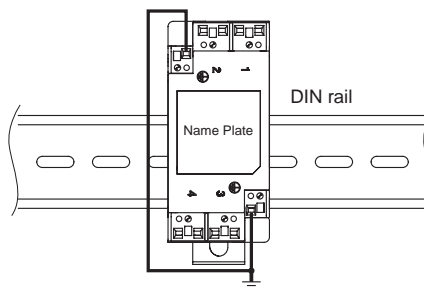
### DIN rail installation Type



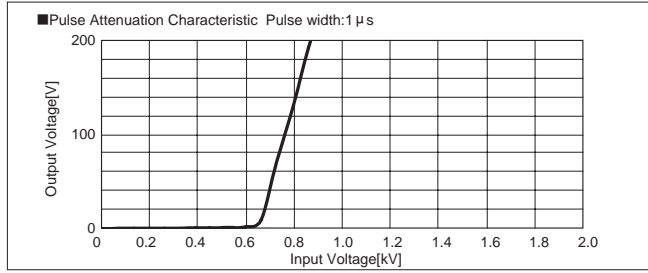
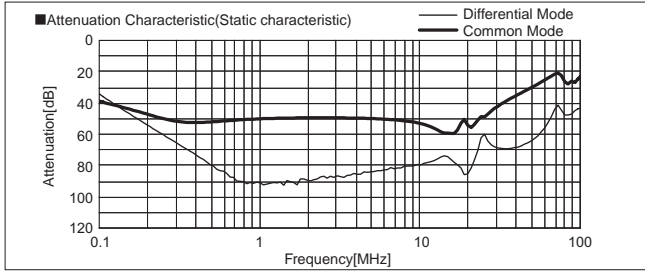
- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 170g max
- ※ Mounting Plate : Iron (surface finishing:nickel plating) t=1.0 [0.04]
- ※ Case : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Refer to instruction manual for details.

### ■Note when installing the EMI/EMC Filter on a DIN rail.

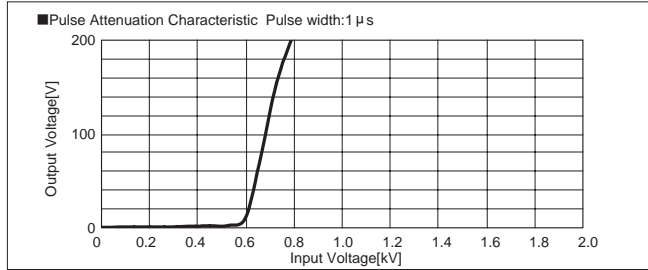
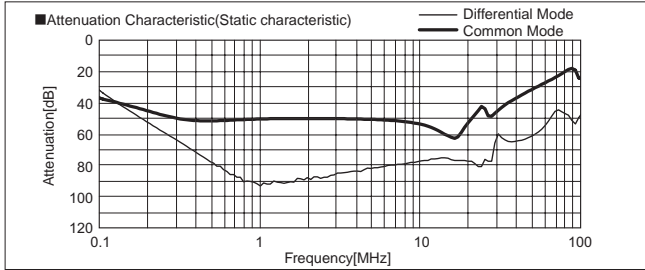
When the EMI/EMC Filter is grounded through the DIN rail, the proper noise attenuation may not be achieved.  
 Be sure to connect the protection earth (PE) of the EMI/EMC Filter body to the earth.  
 It can connect the ground to either one only.



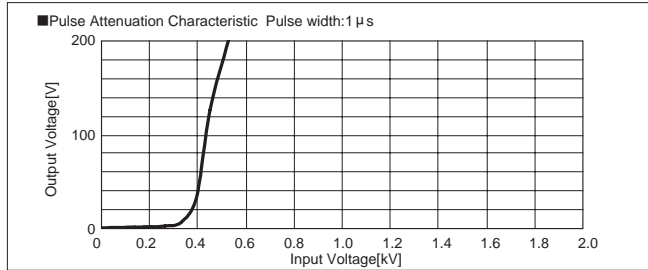
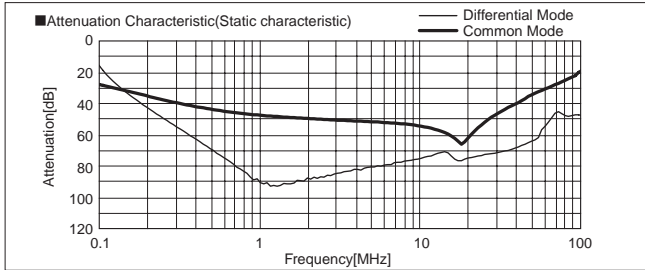
### EAC-03-472 / ESC-03-472



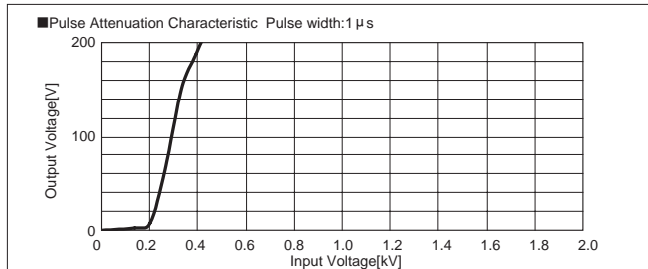
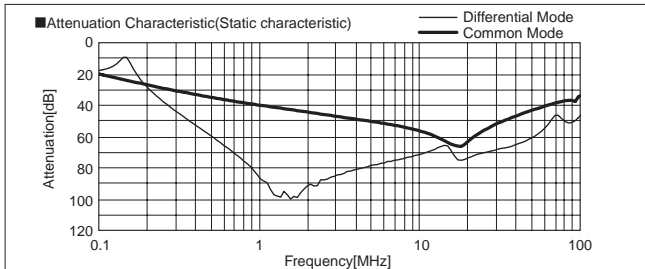
### EAC-06-472 / ESC-06-472



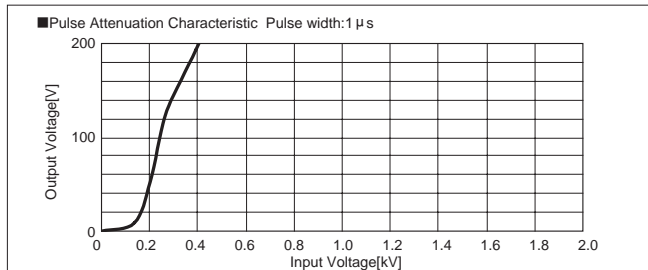
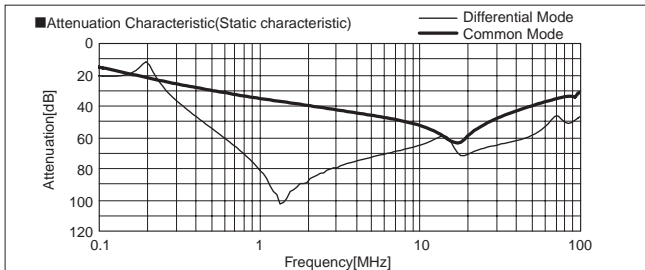
### EAC-10-472 / ESC-10-472



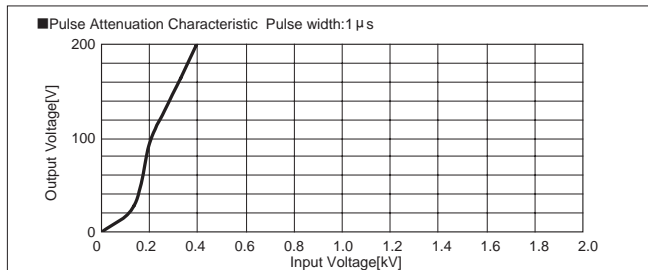
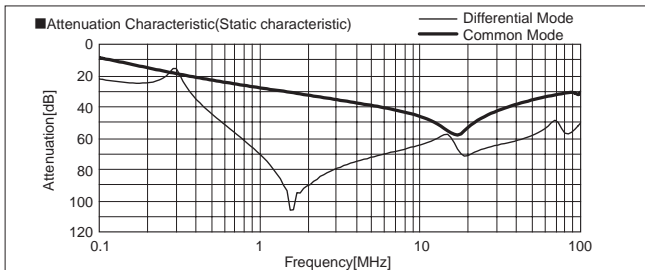
### EAC-16-472 / ESC-16-472



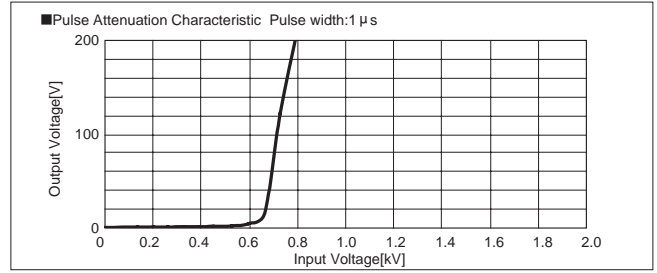
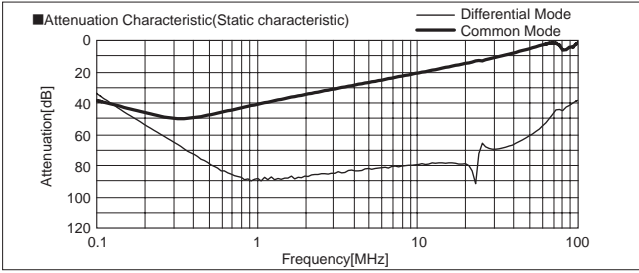
### EAC-20-472



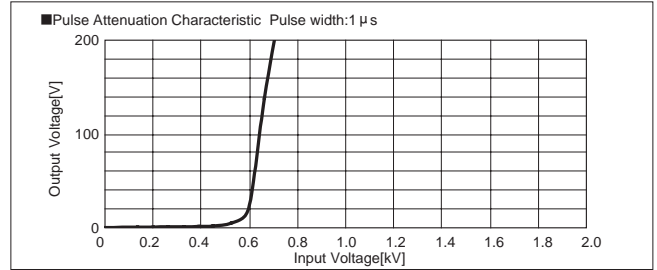
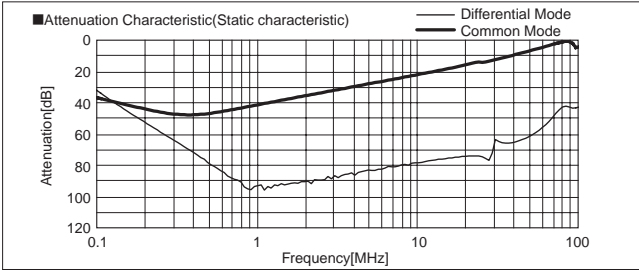
### EAC-30-472



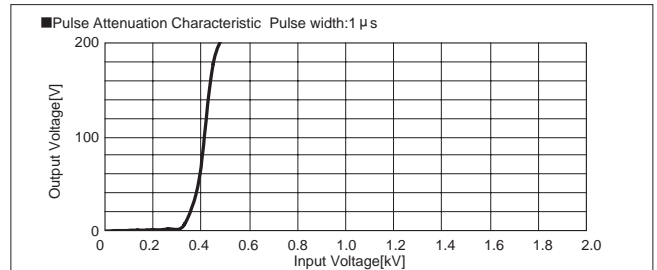
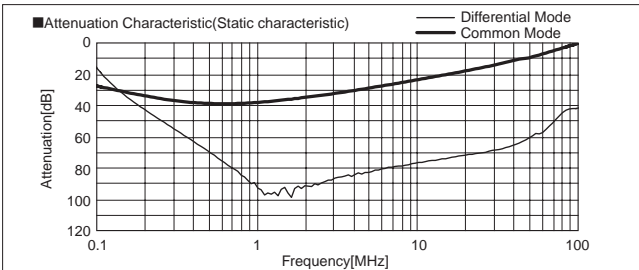
### EAM-03-000 / ESM-03-000



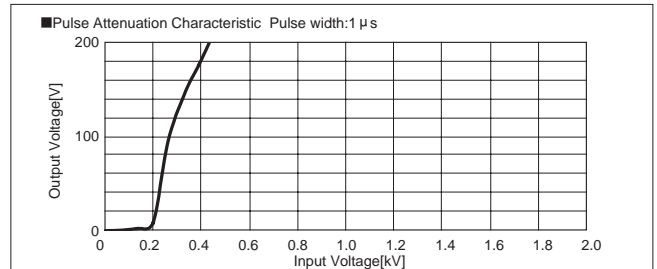
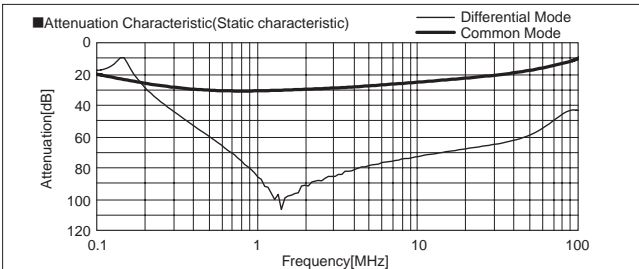
### EAM-06-000 / ESM-06-000



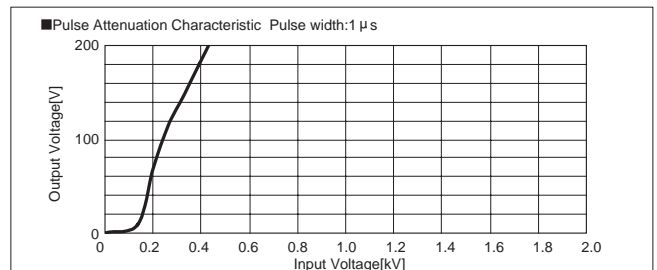
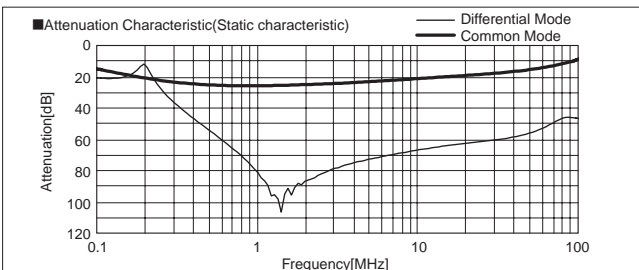
### EAM-10-000 / ESM-10-000



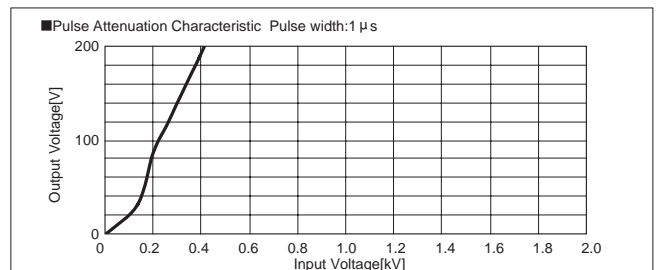
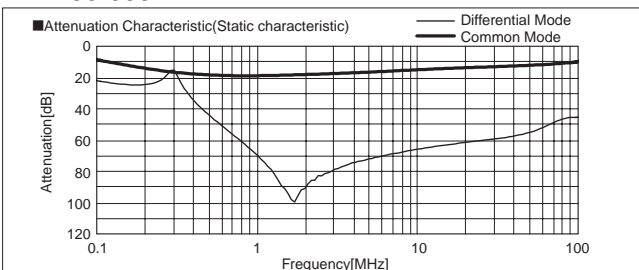
### EAM-16-000 / ESM-16-000



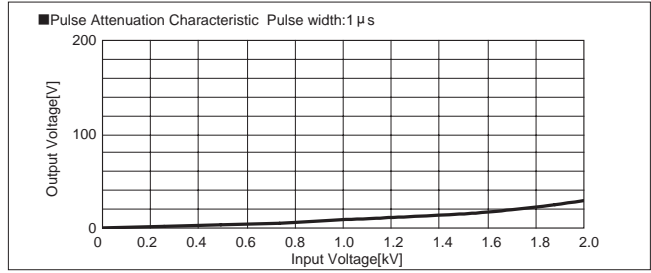
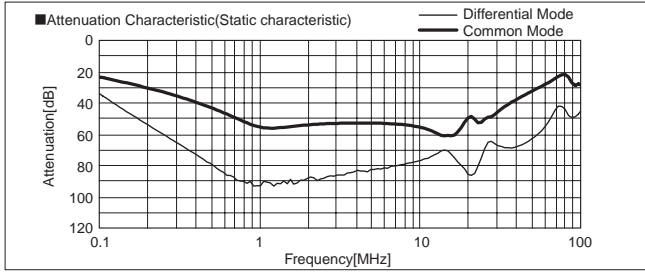
### EAM-20-000



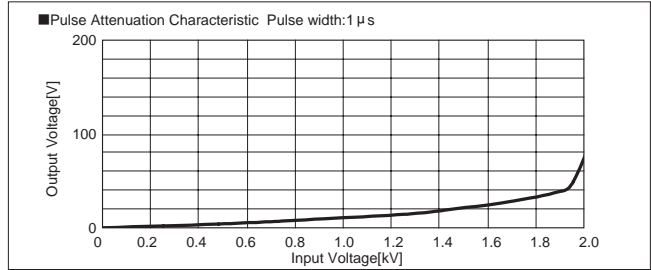
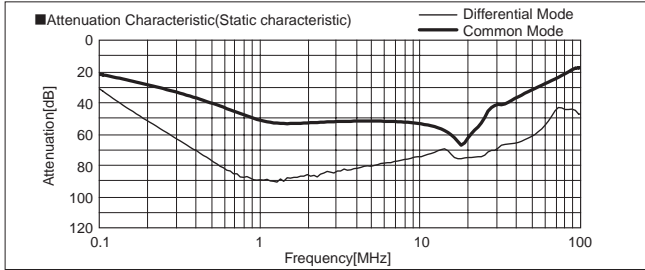
### EAM-30-000



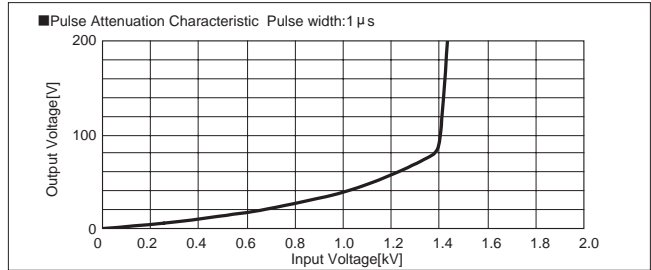
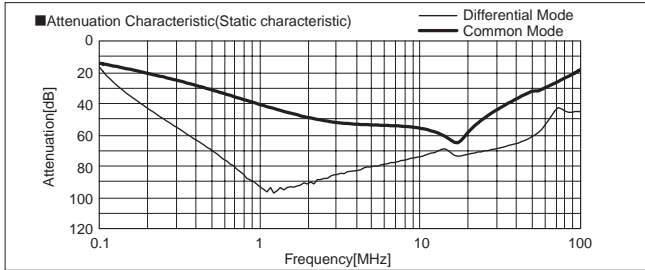
**EAP-03-472 / ESP-03-472**



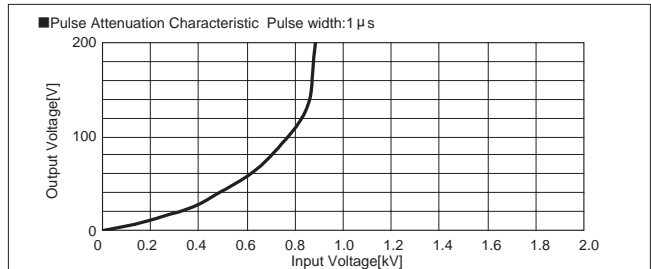
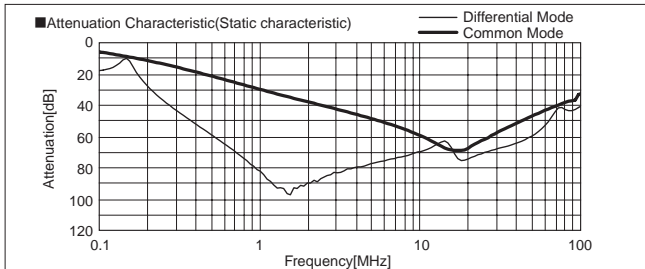
**EAP-06-472 / ESP-06-472**



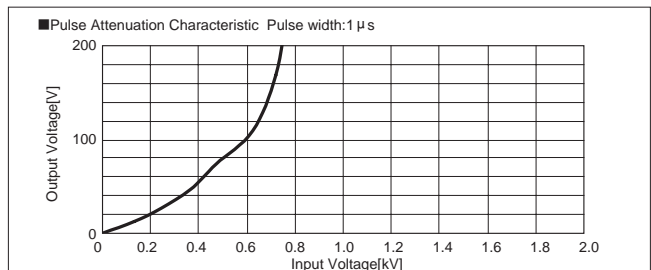
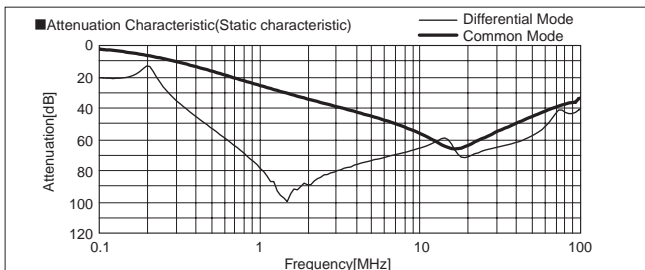
**EAP-10-472 / ESP-10-472**



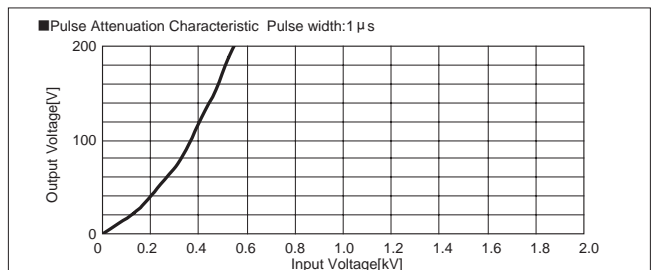
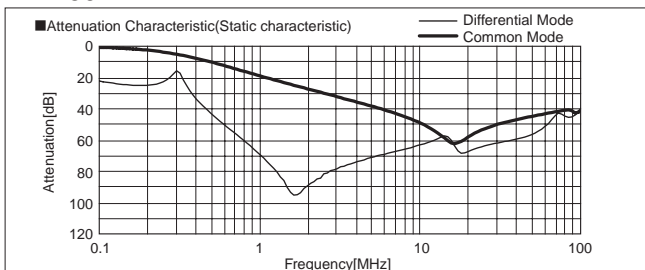
**EAP-16-472 / ESP-16-472**



**EAP-20-472**



**EAP-30-472**



# 1 Applicable Electric Cable

- Only use the electric cable that exists in the Table1.
- Use the cable that conductor material is copper. Do not use the cable that conductor material is iron or aluminum. Never use the one other than the electric cable.  
Ex. Steel wire, Stick made of resin, other wire
- Note that the current rating is different in each electric cable.
- Strip so as not to damage the conductor at stripping sheath.
- Strip specified length of cable sheath (Refer to Table1).  
Strip Length can be confirmed with a gauge of the body case. Refer to External view.
- Do not put solder on the conductor. It becomes impossible to connect cable.

Table.1 Applicable Wire

Solid wire	Diameter 0.5mm to 1.2mm (AWG.22 to AWG.16)
Stranded wire	0.3mm <sup>2</sup> to 1.25mm <sup>2</sup> (AWG.22 to AWG.16) Conductor diameter more than 0.18 mm
Sheath strip length	10mm to 12mm

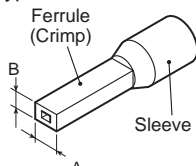
# 2 Applicable bar-type terminal

- The applicable bar-type terminal (Refer to Table 2) must be used, and after crimp, the size of bar-type terminal must be kept value of Table 3. Use the applicable terminal (Refer to Table 2) and keep the size of terminal, or you will not be able to connect cable. Contact us when the bar-type terminals other than the applicable bar-type terminal (Refer to Table 2) are used.
- Connect cable so as not to conceal the button with the sleeve of the cable when a round terminals other than the applicable terminal are used.

Table.2 Applicable bar-type terminal

Manufacturer	Size	model	Crimp tool
Phoenix Contact	AWG.22	AI0.34-12TQ	CRIMPFOX UD6-4
	AWG.20	AI0.5-10WH AI0.5-12WH	
	AWG.18	AI0.75-10GY AI0.75-12GY AI1-10RD AI1-12RD	
	AWG.16	AI1.5-10BK AI1.5-12BK	
Nichifu	AWG.22-16	TGN TC-1.25-11T TGV TC-1.25-11T	NH11 NH32 NH65

<Square type>



<Round type>

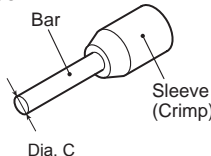
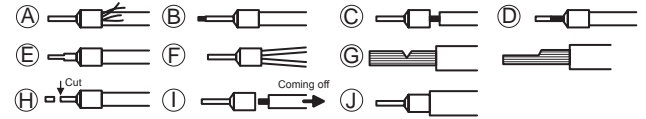


Table.3 Dimension of terminal at crimp  
[Dimensions in mm]

Part	Dimension
A	1.1 to 2.6
B	0.8 to 1.6
Dia. C	0.8 to 1.6

# 3 State of crimped bar-type terminal

● Bad condition



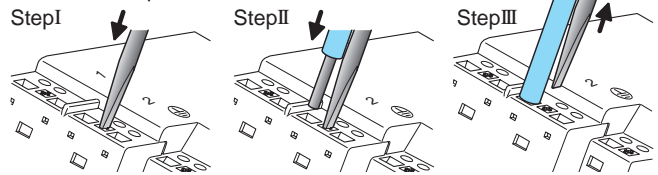
- Ⓐ The wire protrudes from the sleeve.
- Ⓑ The conductor extremely protrudes from the point of the bar-type terminal.
- Ⓒ The electric conductor is not inserted enough and the conductor has been exposed from the terminal.
- Ⓓ The sheath strip length doesn't suffice and the conductor is not enough inserted in the ferrules.
- Ⓔ Crimp is only the point of conductor.
- Ⓕ It crimps two electric cables.
- Ⓖ There is a damage or a disconnection part in the conductor.
- Ⓗ The point of the terminal is cut.
- Ⓘ It comes off the terminal when the cable is pulled.
- ⓵ The sheath of the cable protrudes from the sleeve.

# 4 Wiring Terminal Blocks (connecting/releasing)

- One electric cable one insertion hole. When two or more is connected, it causes trouble.
- Do connecting and releasing of the electric cable by using a flat-blade driver while pushing the connection/release button. Moreover, insert the conductor or the bar-type terminal to the end fully.
- When you connect the stranded cable, connect wires after lightly stranding wires.
- Confirm the electric cable is surely connected with the terminal after connecting.
- The check hole can be used for the check of wire connecting and insulation and for the operation monitor etc.

● Connecting : Stranded cable, Solid cable (Diameter 0.5 to 0.9)

- Step I Push the button with a flat-blade driver.
- Step II Insert the cable into the hole while pushing the button.
- Step III Release the flat-blade driver and cable connection is completion.



● Connecting : Solid wire (except diameter 0.5 to 0.9), bar type terminal

Insert the cable into the insertion hole.  
\* Insert it while pushing the button when it is not easy to insert it.

● Releasing : Stranded wire, Solid wire, bar type terminal

Pull out the electric cable while pushing the button with flat-blade driver.

\* Notice : Two insertion holes are released at the same time by pushing the button once. (Except PE terminal)

- Use the flat-blade driver that meets the size in Table 4.



Table.4 Dimension of flat-blade driver  
[Dimensions in mm]

Part	Dimension
D	1.0max
E	3.0max

# NAC series

NAC -10 -472 -□

① ② ③ ④

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

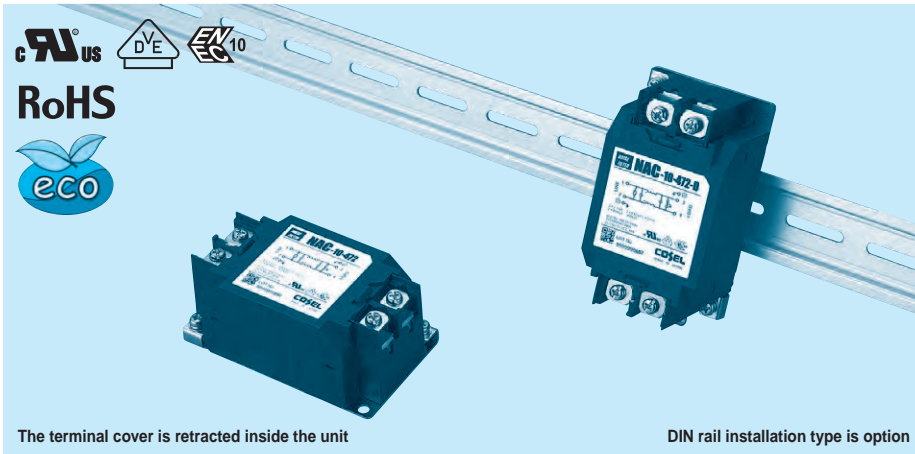
table 1.1 Line to ground capacitor code

Code	Leakage Current (Input 125/250V 60Hz)	Line to ground capacitor (nominal value)
681	75.5 μA / 150 μA max	680pF
102	0.13mA / 0.25mA max	1000pF
222	0.25mA / 0.5 mA max	2200pF
332	0.38mA / 0.75mA max	3300pF
472	0.5 mA / 1.0 mA max	4700pF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

- ④ Options
- D: DIN rail installation type

\* The dimensions change when the option is set. Refer to External view.



The terminal cover is retracted inside the unit

DIN rail installation type is option

## Features of NAC series

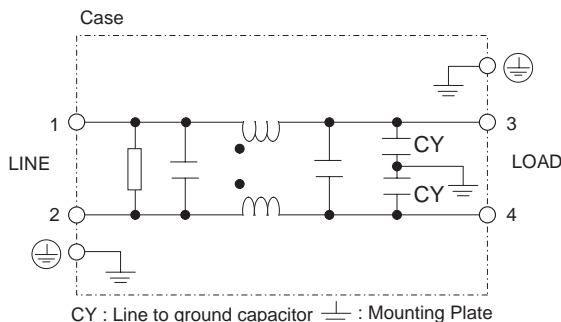
### High-attenuation type of common mode noise from 150kHz to 1MHz

- Single Phase 250 VAC
- Push down type terminal block

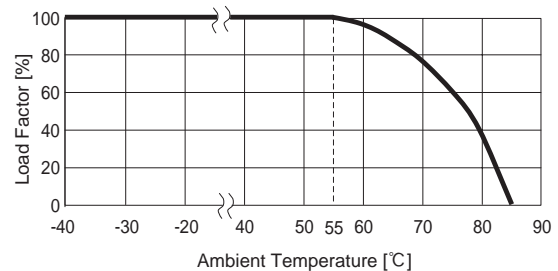
## Specifications

No.	Items	NAC-04-472	NAC-06-472	NAC-10-472	NAC-16-472	NAC-20-472	NAC-30-472
1	Rated Voltage[V]	AC 1 φ 250 / DC250					
2	Rated Current[A]	4	6	10	16	20	30
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 20mA), 1minute at room temperature and humidity					
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100MΩ min at room temperature and humidity					
5	Leakage current 125/250V 60Hz	0.5mA/1.0mA max					
6	Voltage drop	1.0V max					
7	Safety agency approval temperatures	-25 to +85°C (Refer to Derating Curve)					
8	Operating temperature	-40 to +85°C (Refer to Derating Curve)					
9	Operating humidity	20 to 95%RH (Non condensing)					
10	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)					
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis					
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis					
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC (At only AC input)					
14	Case size (without projection) /Weight	53 X 41 X 92 mm [2.09 X 1.61 X 3.62 inches] (W X H X D) /300g max (Option : -D refer to external view)					

## Circuit Diagram



## Derating Curve

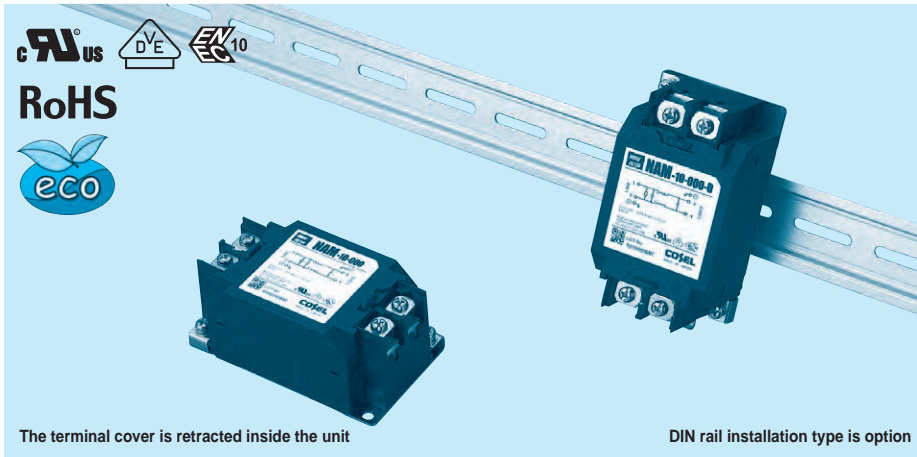




# NAM series

NAM -10 -000 -□

① ② ③ ④



- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table.1.1 Line to ground capacitor code

Code	Leakage Current (Input 125/250V 60Hz)	Line to ground capacitor (nominal value)
000	5 $\mu$ A / 10 $\mu$ A max	Not Provided
101	12.5 $\mu$ A / 25 $\mu$ A max	100pF
221	25 $\mu$ A / 50 $\mu$ A max	220pF
331	37.5 $\mu$ A / 75 $\mu$ A max	330pF
471	50 $\mu$ A / 100 $\mu$ A max	470pF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

- ④ Options
- D: DIN rail installation type

\* The dimensions change when the option is set. Refer to External view.

## Features of NAM series

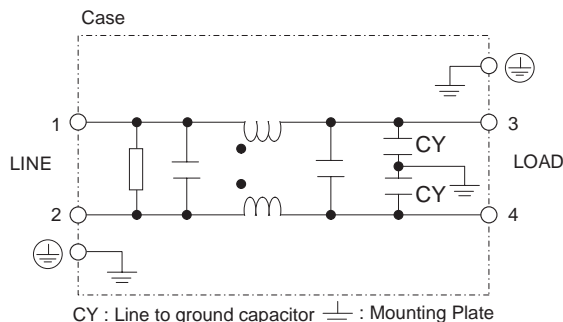
### Low leakage current type

- Single Phase 250 VAC
- Push down type terminal block

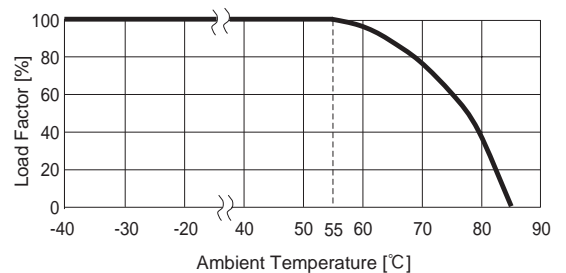
### Specifications

No.	Items	NAM-04-000	NAM-06-000	NAM-10-000	NAM-16-000	NAM-20-000	NAM-30-000
1	Rated Voltage[V]	AC 1 $\phi$ 250 / DC250					
2	Rated Current[A]	4	6	10	16	20	30
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 20mA), 1minute at room temperature and humidity					
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100M $\Omega$ min at room temperature and humidity					
5	Leakage current 125/250V 60Hz	5 $\mu$ A/10 $\mu$ A max					
6	Voltage drop	1.0V max					
7	Safety agency approval temperatures	-25 to +85 $^{\circ}$ C (Refer to Derating Curve)					
8	Operating temperature	-40 to +85 $^{\circ}$ C (Refer to Derating Curve)					
9	Operating humidity	20 to 95%RH (Non condensing)					
10	Storage temperature/humidity	-40 to +85 $^{\circ}$ C/20 to 95%RH (Non condensing)					
11	Vibration	10 to 55Hz, 19.6m/s $^2$ (2G), 3min. Period, 1hour each X, Y and Z axis					
12	Impact	196.1m/s $^2$ (20G), 11ms Once each X, Y and Z axis					
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC (At only AC input)					
14	Case size (without projection) /Weight	53X41X92 mm [2.09X1.61X3.62 inches] (W X H X D) /300g max (Option : -D refer to external view)					

### Circuit Diagram



### Derating Curve



# NAH series

NAH -10 -472 -□

① ② ③ ④

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

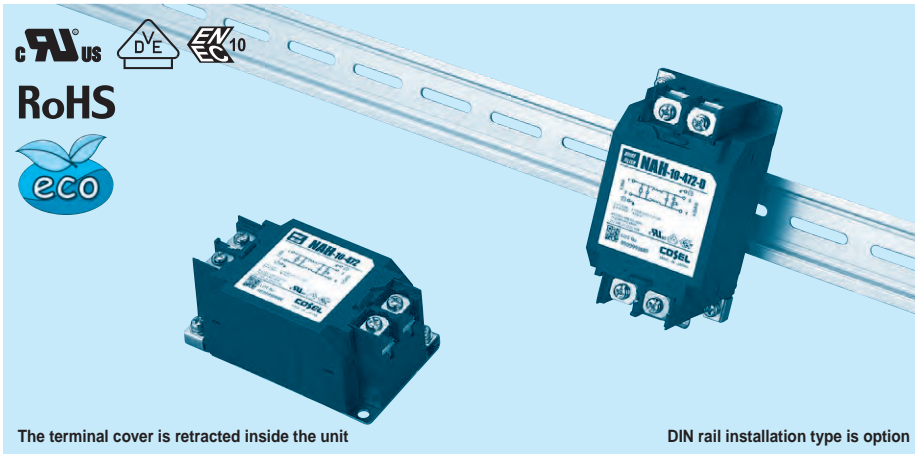
table 1.1 Line to ground capacitor code

Code	Leakage Current (Input 125/250V 60Hz)	Line to ground capacitor (nominal value)
000	5 $\mu$ A/ 10 $\mu$ A max	Not Provided
101	12.5 $\mu$ A/ 25 $\mu$ A max	100pF
221	25 $\mu$ A/ 50 $\mu$ A max	220pF
331	37.5 $\mu$ A/ 75 $\mu$ A max	330pF
471	50 $\mu$ A/100 $\mu$ A max	470pF
681	75.5 $\mu$ A/150 $\mu$ A max	680pF
102	0.13mA/0.25mA max	1000pF
222	0.25mA/0.5 mA max	2200pF
332	0.38mA/0.75mA max	3300pF
472	0.5 mA/1.0 mA max	4700pF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

- ④ Options
- D: DIN rail installation type

\* The dimensions change when the option is set. Refer to External view.



The terminal cover is retracted inside the unit

DIN rail installation type is option

## Features of NAH series

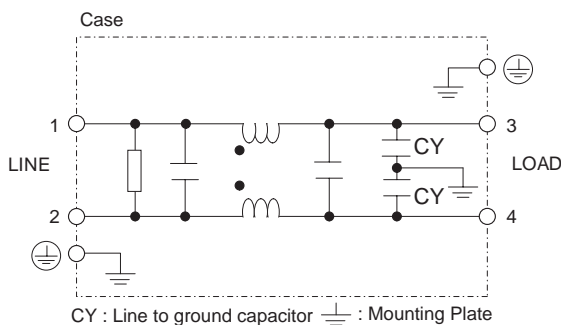
### Ultra high-attenuation type of common mode noise from 10kHz to 1MHz

- Single Phase 250 VAC
- Push down type terminal block

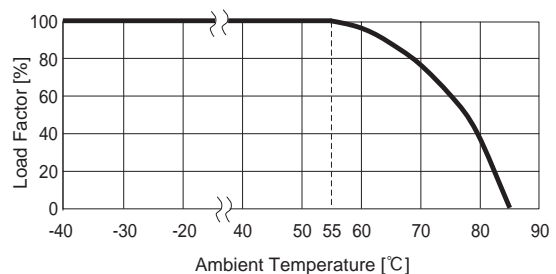
## Specifications

No.	Items	NAH-06-472	NAH-10-472	NAH-16-472	NAH-20-472	NAH-30-472
1	Rated Voltage[V]	AC 1 $\phi$ 250 / DC250				
2	Rated Current[A]	6	10	16	20	30
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 20mA), 1minute at room temperature and humidity				
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100M $\Omega$ min at room temperature and humidity				
5	Leakage current 125/250V 60Hz	0.5mA/1.0mA max				
6	Voltage drop	1.0V max				
7	Safety agency approval temperatures	-25 to +85°C (Refer to Derating Curve)				
8	Operating temperature	-40 to +85°C (Refer to Derating Curve)				
9	Operating humidity	20 to 95%RH (Non condensing)				
10	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)				
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis				
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis				
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC (At only AC input)				
14	Case size (without projection) /Weight	53 X 41 X 92 mm [2.09 X 1.61 X 3.62 inches] (W X H X D) /300g max (Option : -D refer to external view)				

## Circuit Diagram



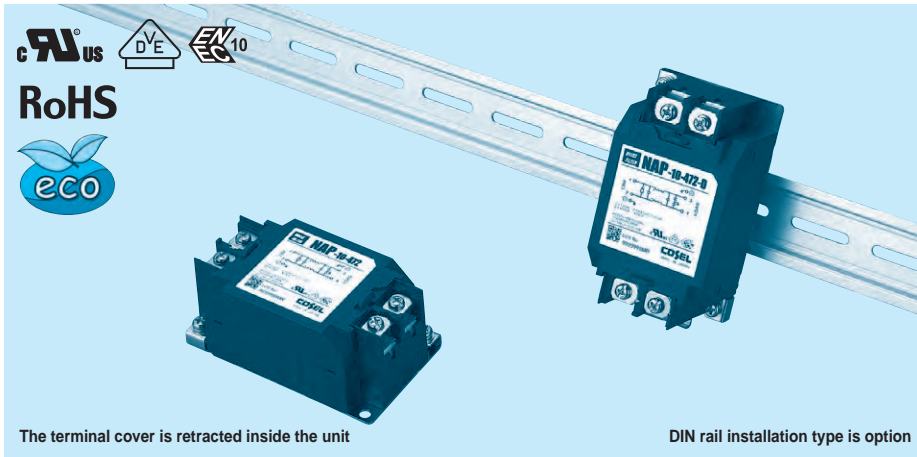
## Derating Curve



# NAP series

NAP -10 -472 -□

① ② ③ ④



The terminal cover is retracted inside the unit

DIN rail installation type is option

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table 1.1 Line to ground capacitor code

Code	Leakage Current (Input 125/250V 60Hz)	Line to ground capacitor (nominal value)
000	5 $\mu$ A/ 10 $\mu$ A max	Not Provided
101	12.5 $\mu$ A/ 25 $\mu$ A max	100pF
221	25 $\mu$ A/ 50 $\mu$ A max	220pF
331	37.5 $\mu$ A/ 75 $\mu$ A max	330pF
471	50 $\mu$ A/100 $\mu$ A max	470pF
681	75.5 $\mu$ A/150 $\mu$ A max	680pF
102	0.13mA/0.25mA max	1000pF
222	0.25mA/0.5 mA max	2200pF
332	0.38mA/0.75mA max	3300pF
472	0.5 mA/1.0 mA max	4700pF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

- ④ Options
- D: DIN rail installation type

\* The dimensions change when the option is set. Refer to External view.

## Features of NAP series

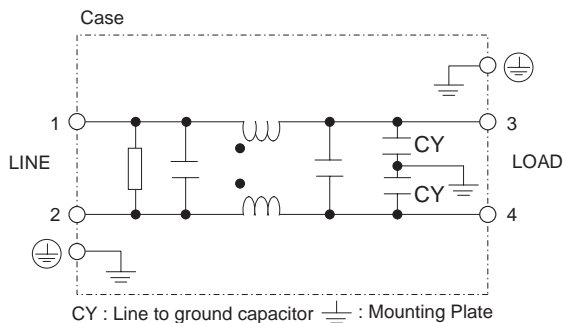
### High-voltage pulses high-attenuation type

- Single Phase 250 VAC
- Push down type terminal block

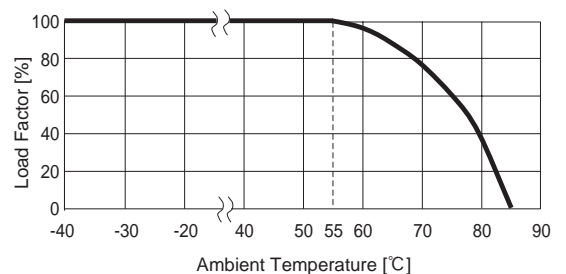
### Specifications

No.	Items	NAP-04-472	NAP-06-472	NAP-10-472	NAP-16-472	NAP-20-472	NAP-30-472
1	Rated Voltage[V]	AC 1 $\phi$ 250 / DC250					
2	Rated Current[A]	4	6	10	16	20	30
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 20mA), 1minute at room temperature and humidity					
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100M $\Omega$ min at room temperature and humidity					
5	Leakage current 125/250V 60Hz	0.5mA/1.0mA max					
6	Voltage drop	1.0V max					
7	Safety agency approval temperatures	-25 to +85 $^{\circ}$ C (Refer to Derating Curve)					
8	Operating temperature	-40 to +85 $^{\circ}$ C (Refer to Derating Curve)					
9	Operating humidity	20 to 95%RH (Non condensing)					
10	Storage temperature/humidity	-40 to +85 $^{\circ}$ C/20 to 95%RH (Non condensing)					
11	Vibration	10 to 55Hz, 19.6m/s $^2$ (2G), 3min. Period, 1hour each X, Y and Z axis					
12	Impact	196.1m/s $^2$ (20G), 11ms Once each X, Y and Z axis					
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC (At only AC input)					
14	Case size (without projection) /Weight	53X41 X92 mm [2.09 X 1.61 X 3.62 inches] (W X H X D) /300g max (Option : -D refer to external view)					

### Circuit Diagram



### Derating Curve

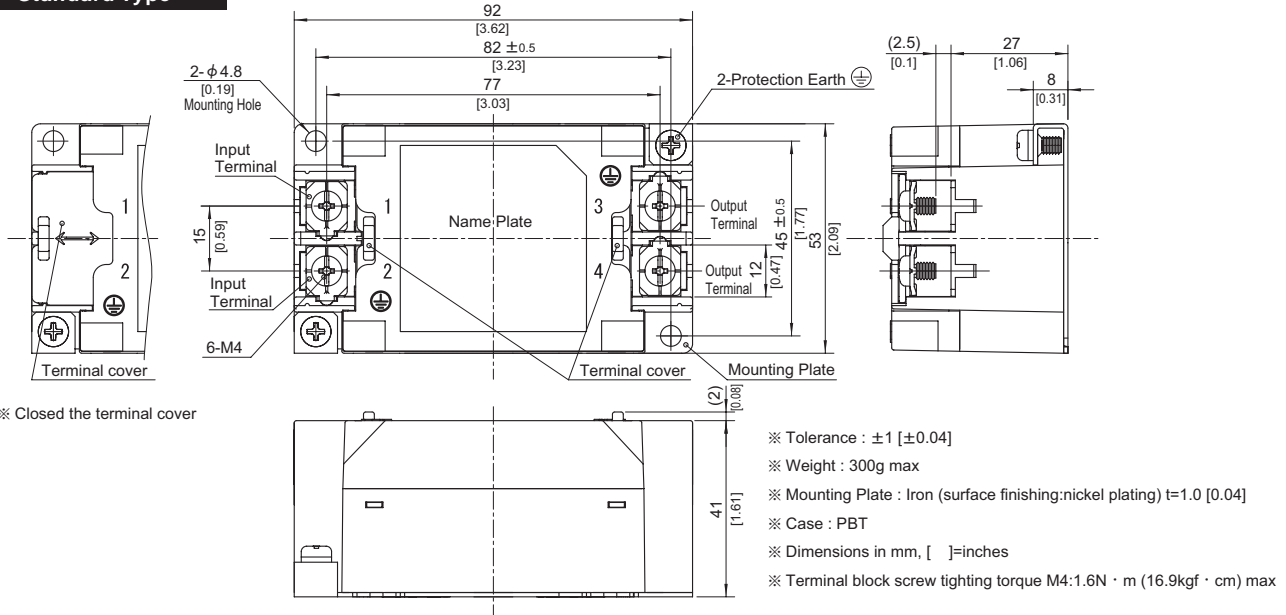


## External view

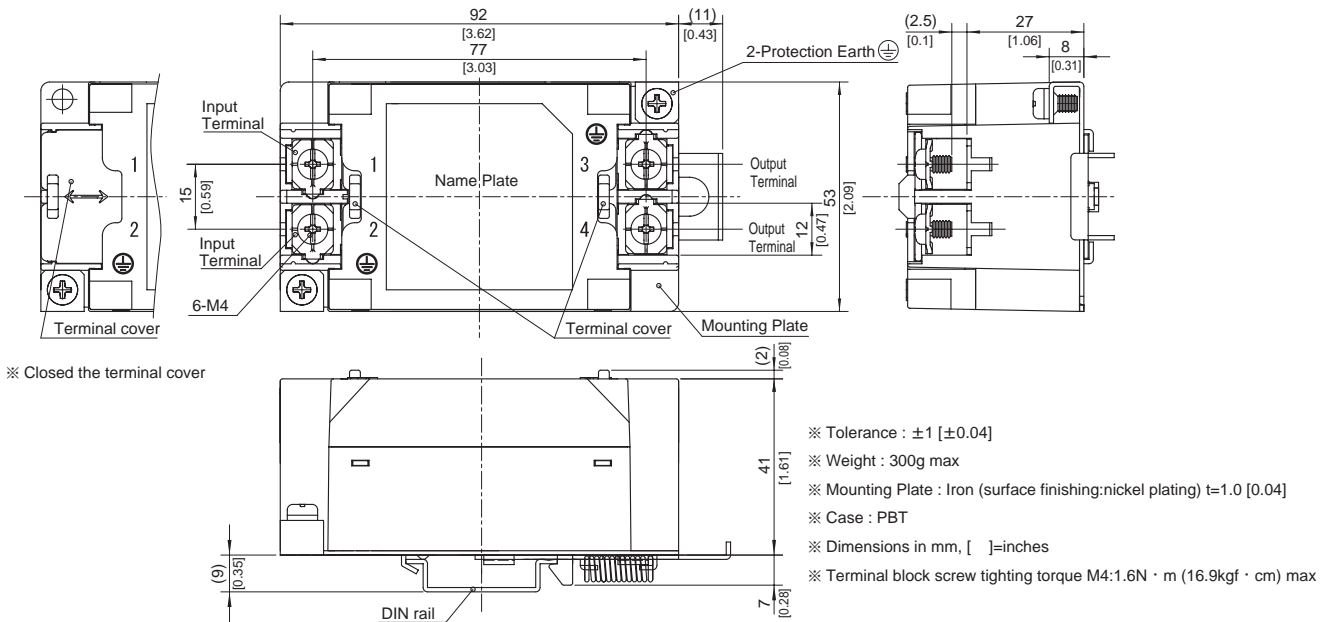
As this product is adopted push-down type terminal block, this appearance is as follows.

- ① The terminal cover is retracted inside the unit.
- ② The screws for connecting the terminals are held in the up right position.

### Standard Type



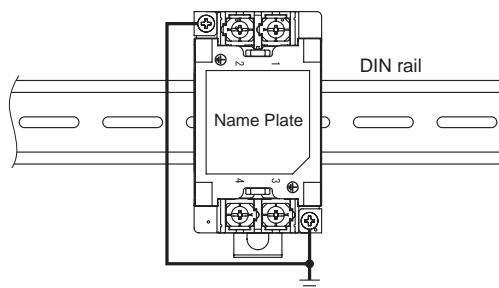
### DIN rail installation Type



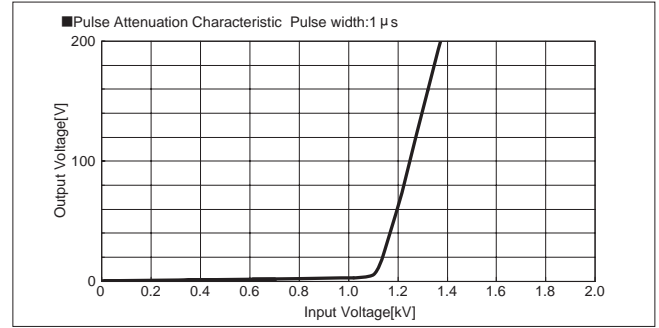
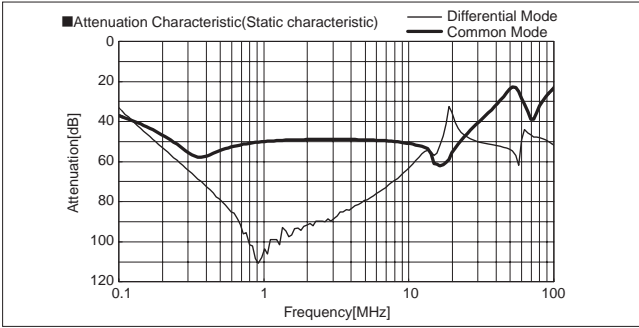
### ■Note when installing the EMI/EMC Filter on a DIN rail.

When the EMI/EMC Filter is grounded through the DIN rail, the proper noise attenuation may not be achieved.

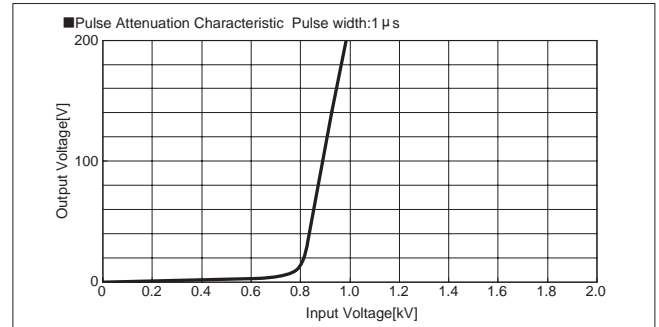
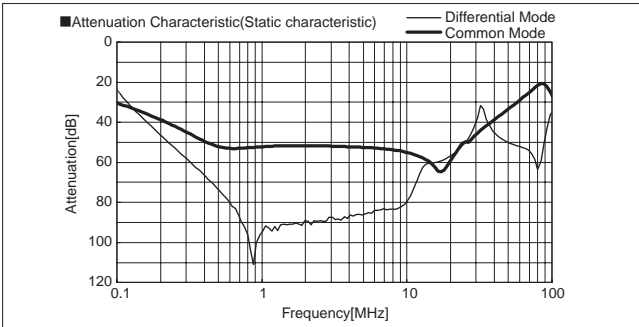
Be sure to connect the protection earth (PE) of the EMI/EMC Filter body to the earth. It can connect the ground to either one only.



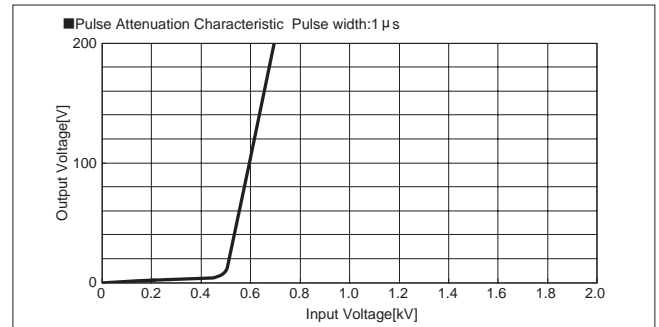
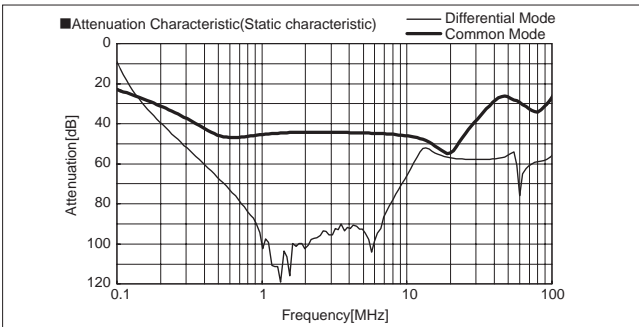
NAC-06-472



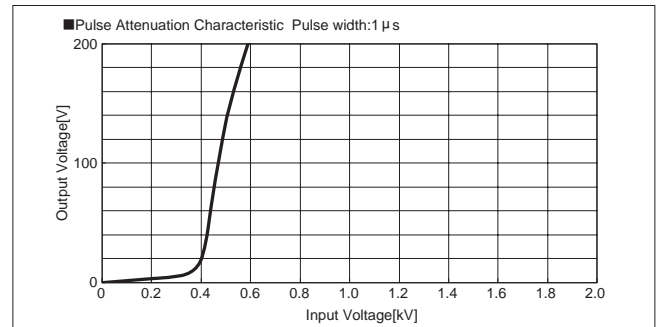
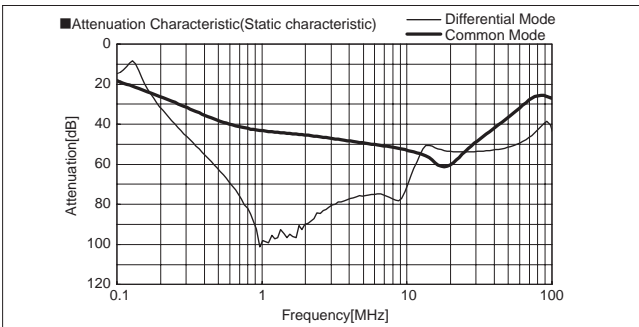
NAC-10-472



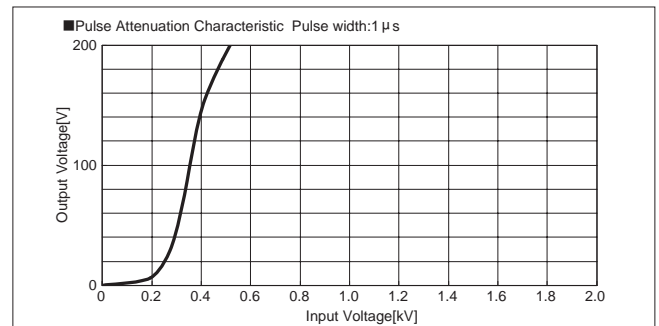
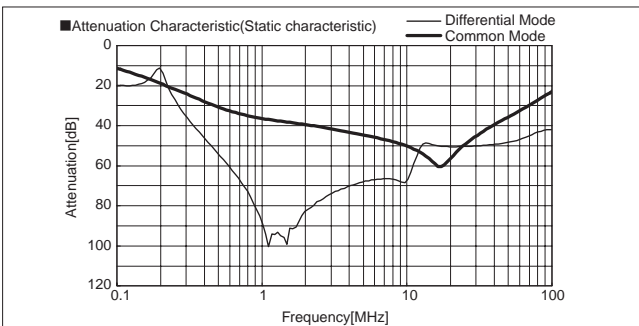
NAC-16-472



NAC-20-472

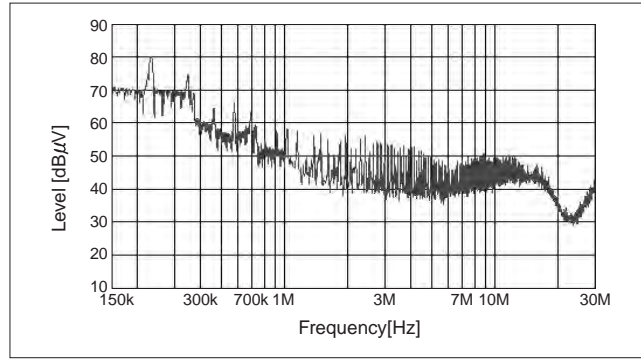


NAC-30-472

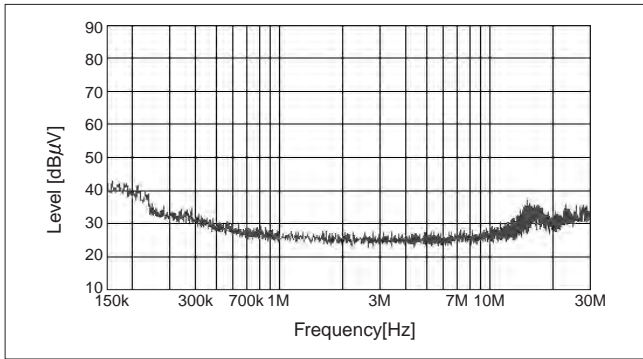


■Characteristic example of conductive noise reduction.

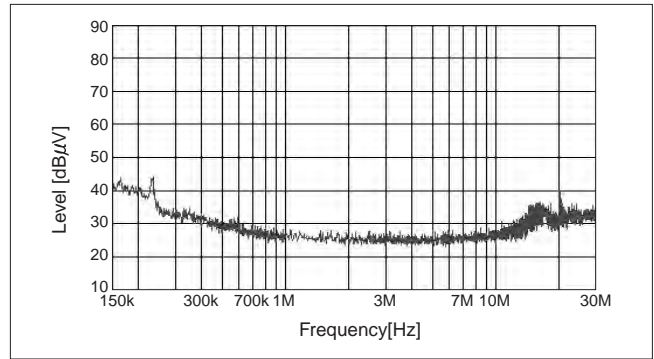
Reference data (PBA150F-5-G : Low leakage current type)



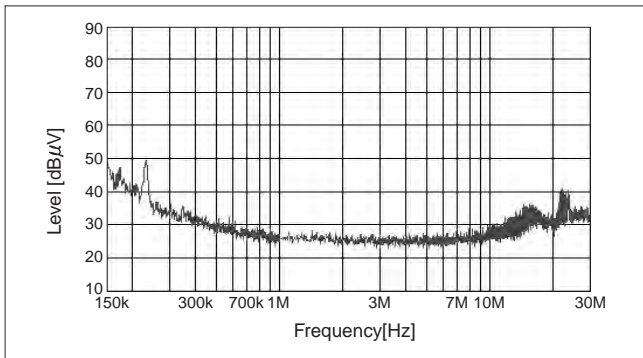
**NAC-06-472+PBA150F-5-G**



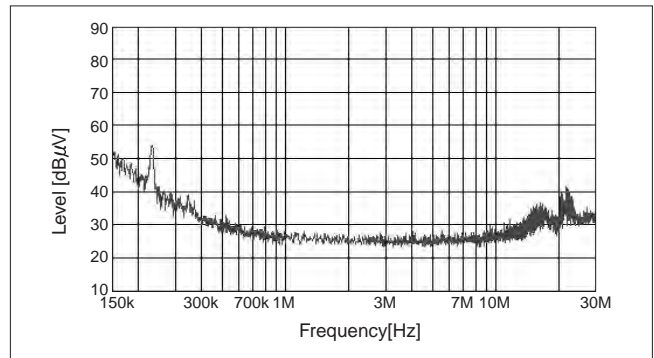
**NAC-10-472+PBA150F-5-G**



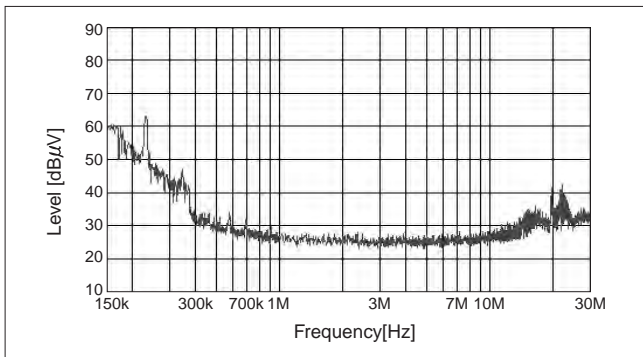
**NAC-16-472+PBA150F-5-G**



**NAC-20-472+PBA150F-5-G**

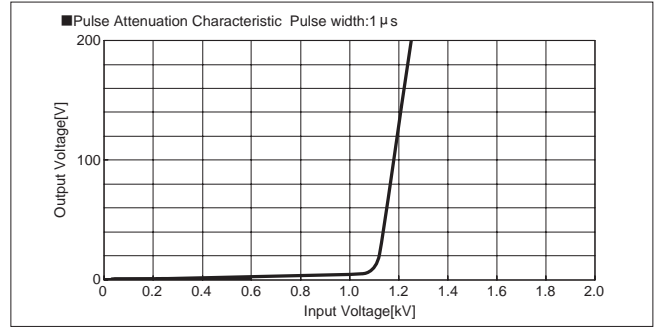
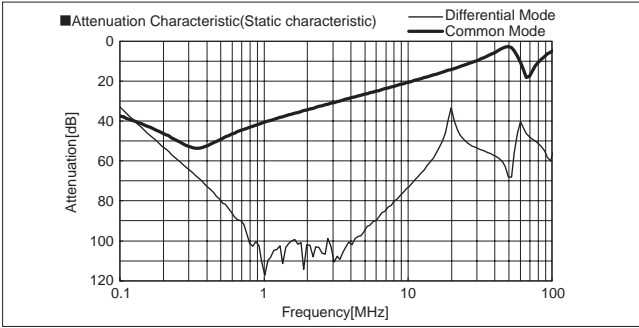


**NAC-30-472+PBA150F-5-G**

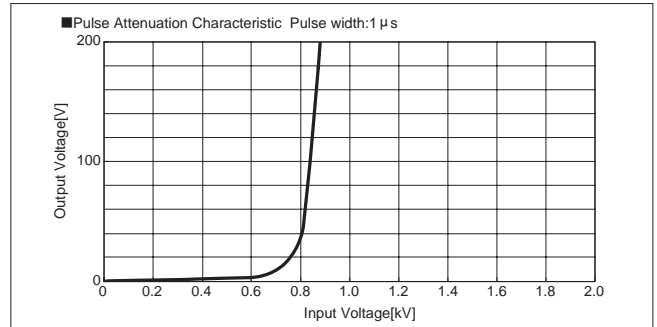
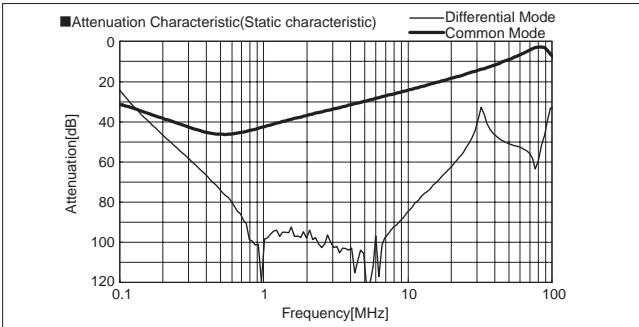


Condition : 230 VAC, Io=100%

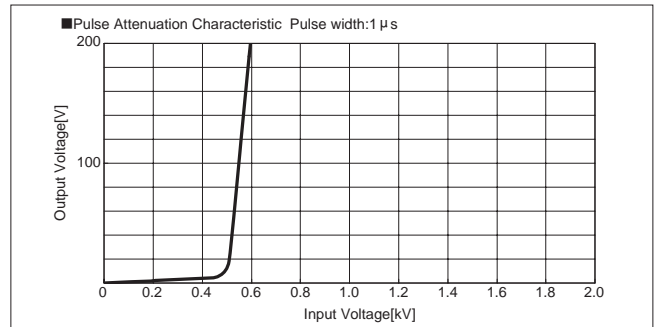
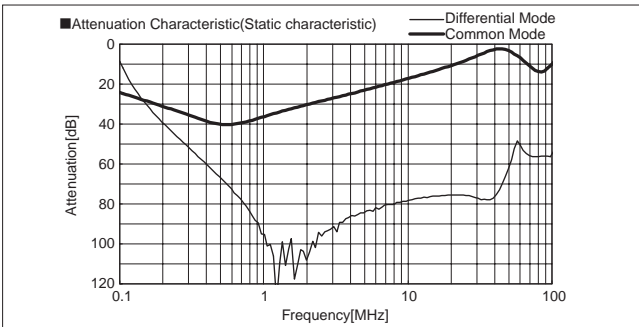
NAM-06-000



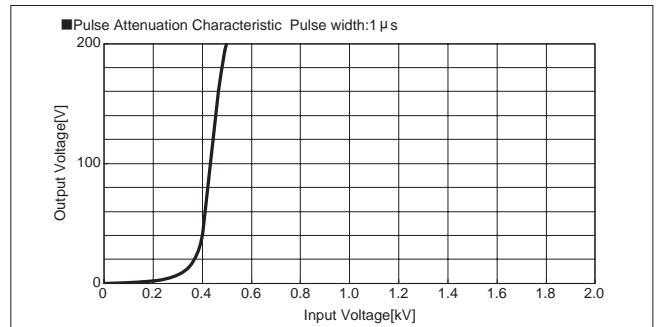
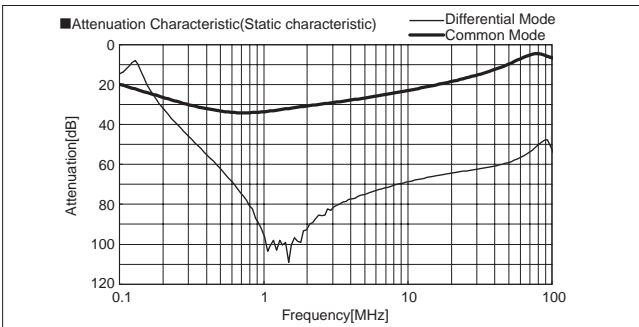
NAM-10-000



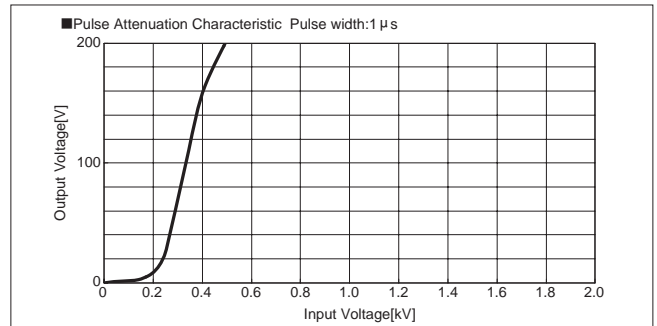
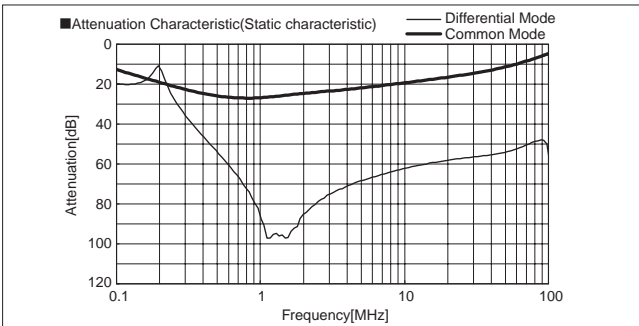
NAM-16-000



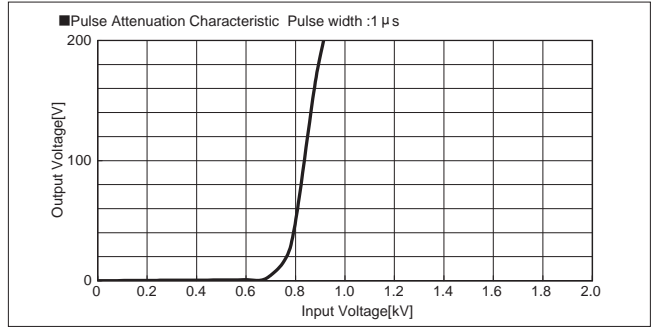
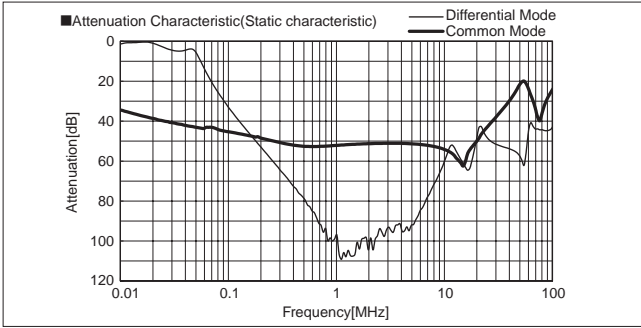
NAM-20-000



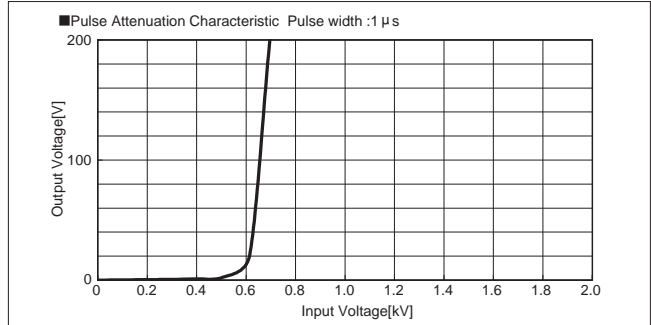
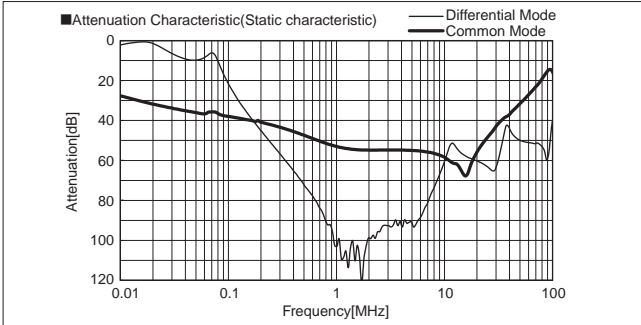
NAM-30-000



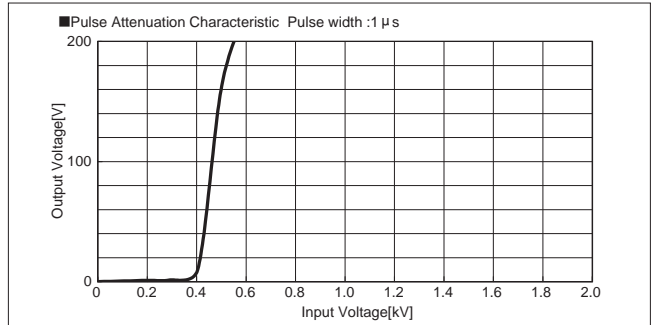
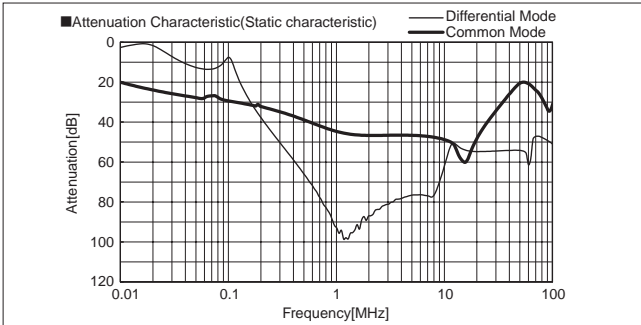
**NAH-06-472**



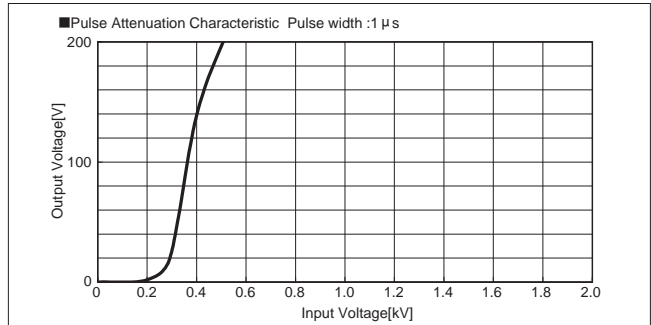
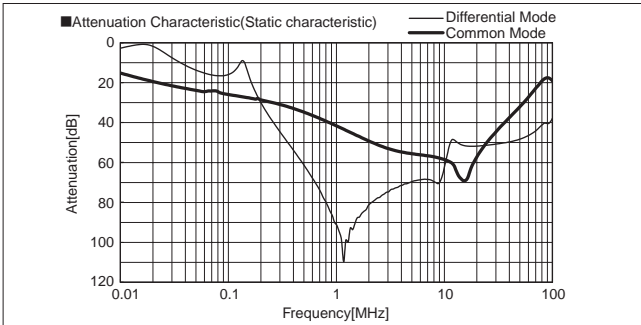
**NAH-10-472**



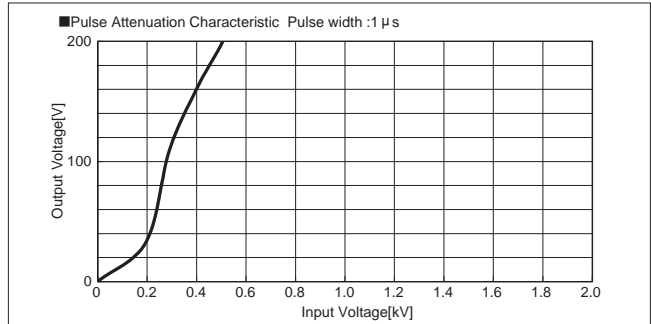
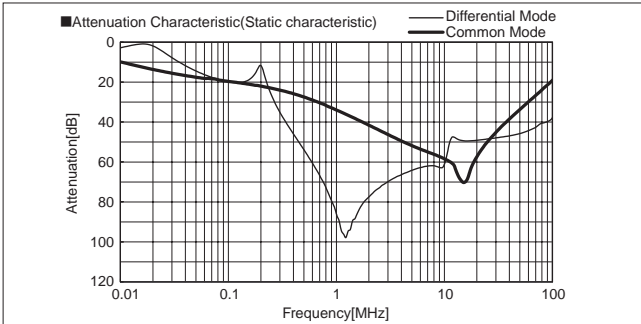
**NAH-16-472**



**NAH-20-472**

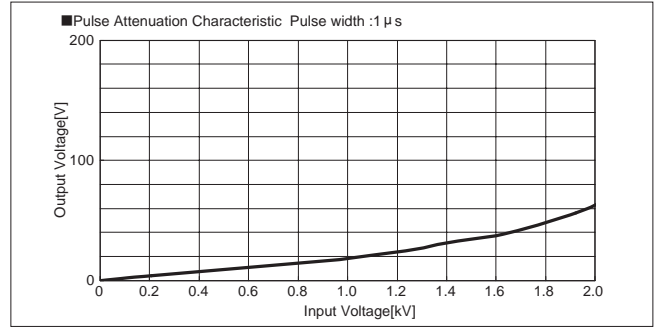
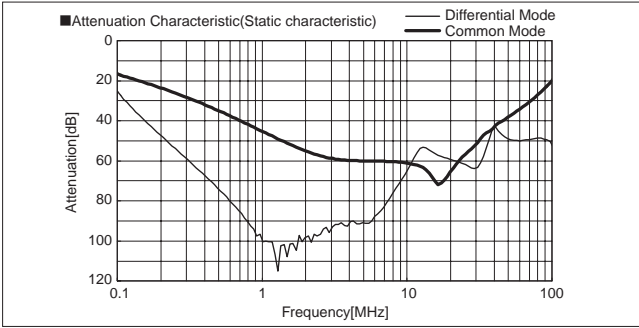


**NAH-30-472**

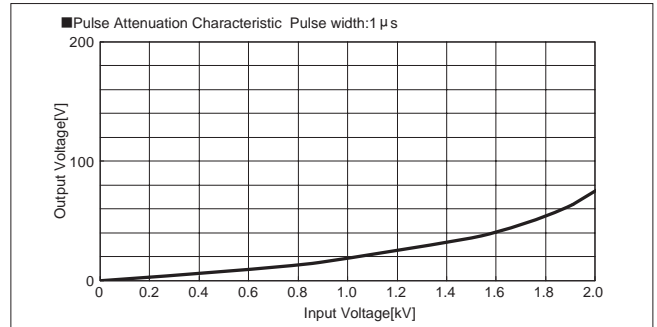
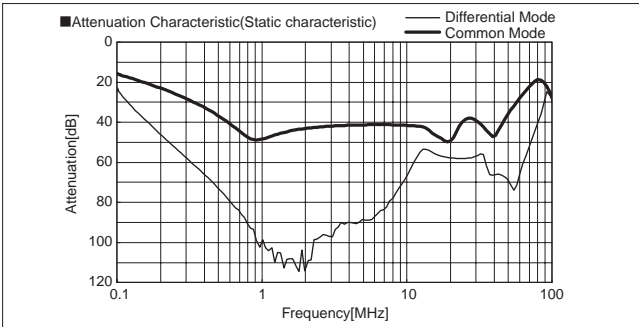




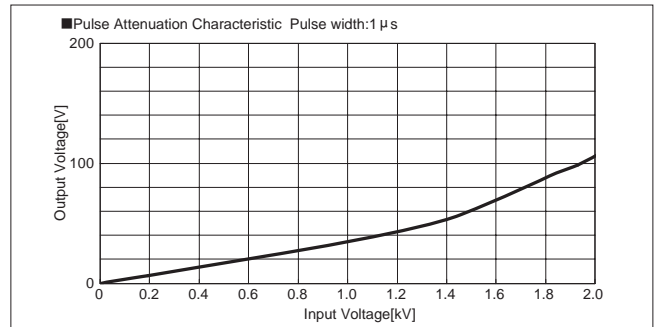
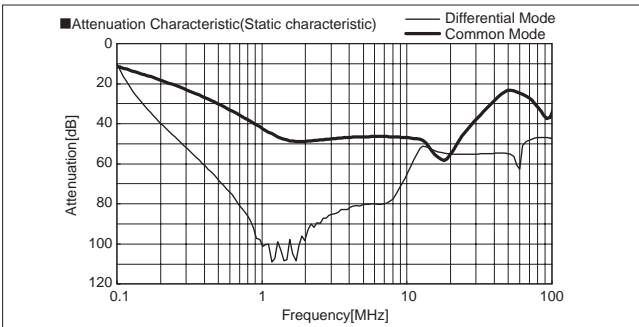
NAP-06-472



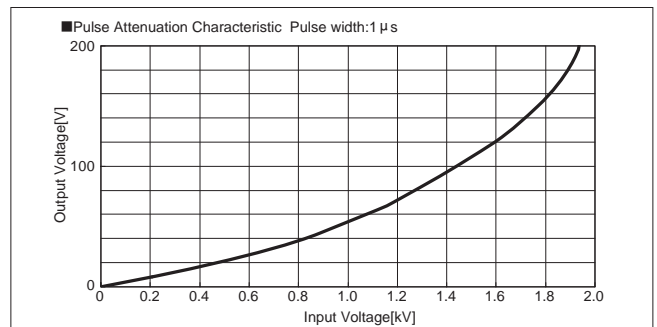
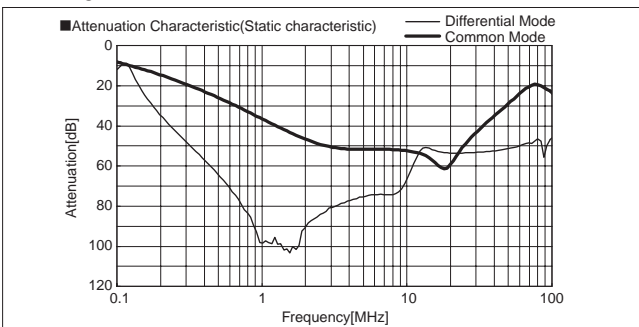
NAP-10-472



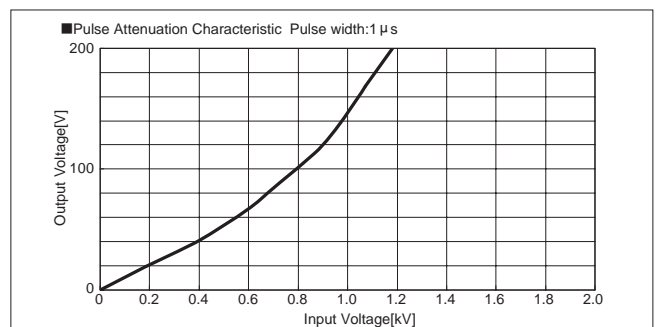
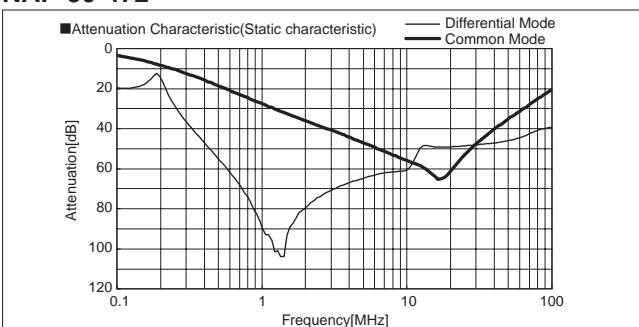
NAP-16-472



NAP-20-472



NAP-30-472



# NBH series

NBH -10 -432 -□

① ② ③ ④

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

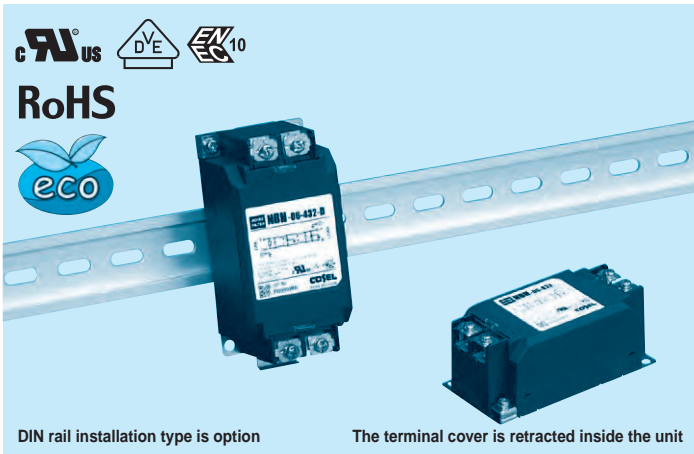
table 1.1 Line to ground capacitor code

Code	Leakage Current (Input 125/250V 60Hz)	Line to ground capacitor (nominal value)		Test voltage (Terminal- Mounting Plate)
		CY1	CY2	
000	5 $\mu$ A/ 10 $\mu$ A max	Not Provided	Not Provided	4,000VAC
101	12.5 $\mu$ A/ 25 $\mu$ A max	100pF	Not Provided	
221	25 $\mu$ A/ 50 $\mu$ A max	220pF	Not Provided	
331	37.5 $\mu$ A/ 75 $\mu$ A max	330pF	Not Provided	
471	50 $\mu$ A/100 $\mu$ A max	470pF	Not Provided	
681	75.5 $\mu$ A/150 $\mu$ A max	680pF	Not Provided	2,500VAC
102	0.13mA/0.25mA max	1000pF	Not Provided	
202	0.25mA/0.5 mA max	1000pF	1000pF	
322	0.38mA/0.75mA max	2200pF	1000pF	
432	0.5 mA/1.0 mA max	3300pF	1000pF	

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

- ④ Options
- D: DIN rail installation type

\* The dimensions change when the option is set. Refer to External view.



## Features of NBH series

### Ultra high-attenuation type of common mode noise from 10kHz to 10MHz (2-stage filter)

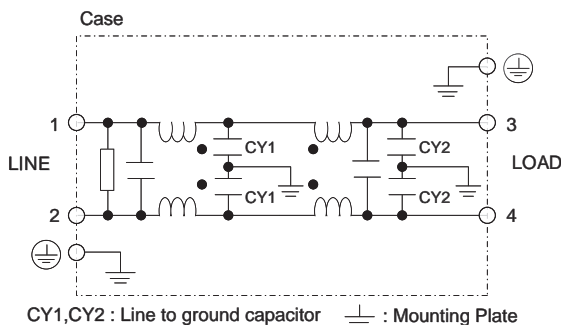
- Single Phase 250 VAC
- Withstand voltage 4,000 VAC (Line to ground capacitor code -000 to -471)
- Push down type terminal block

### Specifications

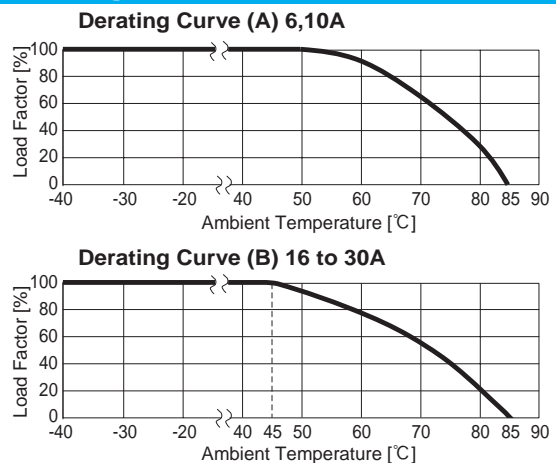
No.	Items	NBH-06-432	NBH-10-432	NBH-16-432	NBH-20-432	NBH-30-432
1	Rated Voltage[V]	AC 1 $\phi$ 250 / DC250				
2	Rated Current[A]	6	10	16	20	30
3	Test Voltage (Terminal-Mounting Plate) *1	2,500 VAC (Cutoff Current = 20mA), 1minute at room temperature and humidity				
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100M $\Omega$ min at room temperature and humidity				
5	Leakage current 125/250V 60Hz	0.5mA/1.0mA max				
6	Voltage drop	1.0V max				
7	Safety agency approval temperatures	-25 to +85 $^{\circ}$ C (Refer to Derating Curve A)		-25 to +85 $^{\circ}$ C (Refer to Derating Curve B)		
8	Operating temperature	-40 to +85 $^{\circ}$ C (Refer to Derating Curve A)		-40 to +85 $^{\circ}$ C (Refer to Derating Curve B)		
9	Operating humidity	20 to 95%RH (Non condensing)				
10	Storage temperature/humidity	-40 to +85 $^{\circ}$ C/20 to 95%RH (Non condensing)				
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis				
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis				
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC (At only AC input)				
14	Case size (without projection) /Weight	53 X 43 X 104 mm [2.09 X 1.69 X 4.09 inches] (W X H X D) /320g max (Option : -D refer to external view)				

\*1 When the line to ground capacitor code is different, the test voltage characteristic is different. (See table 1.1)

### Circuit Diagram



### Derating Curve

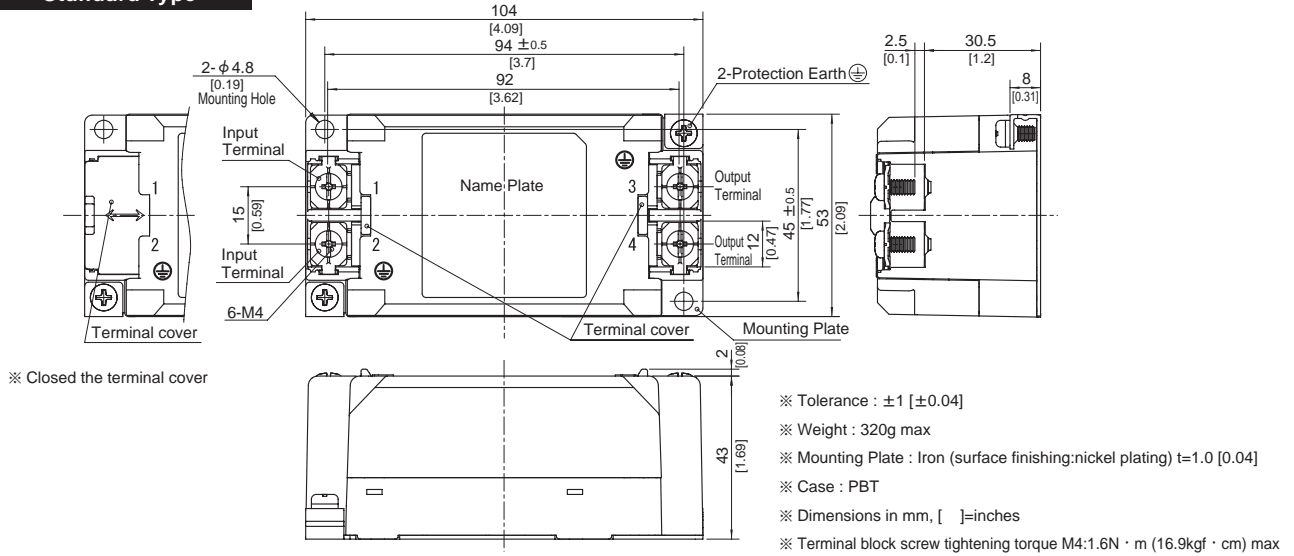


External view

As this product is adopted push-down type terminal block, this appearance is as follows.

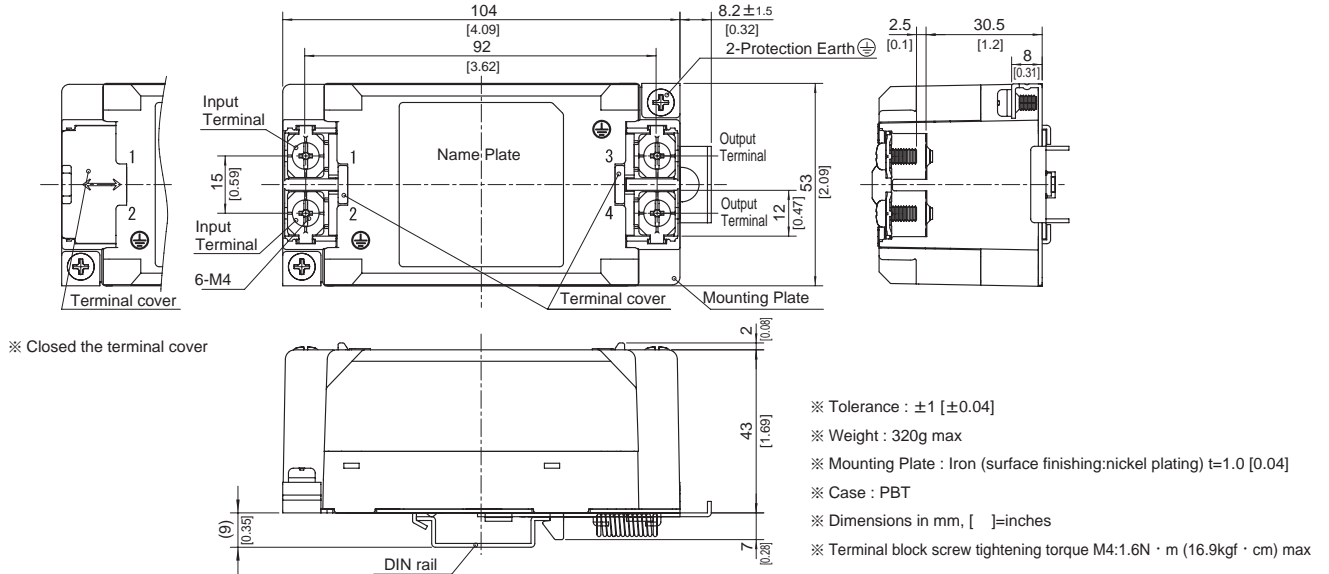
- ① The terminal cover is retracted inside the unit.
- ② The screws for connecting the terminals are held in the up right position.

Standard Type



※ Closed the terminal cover

DIN rail installation Type

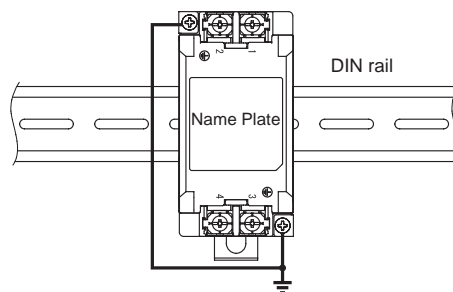


※ Closed the terminal cover

■ Note when installing the EMI/EMC Filter on a DIN rail.

When the EMI/EMC Filter is grounded through the DIN rail, the proper noise attenuation may not be achieved.

Be sure to connect the protection earth (PE) of the EMI/EMC Filter body to the earth. It can connect the ground to either one only.



# NBC series

NBC -10 -472 -□

① ② ③ ④

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

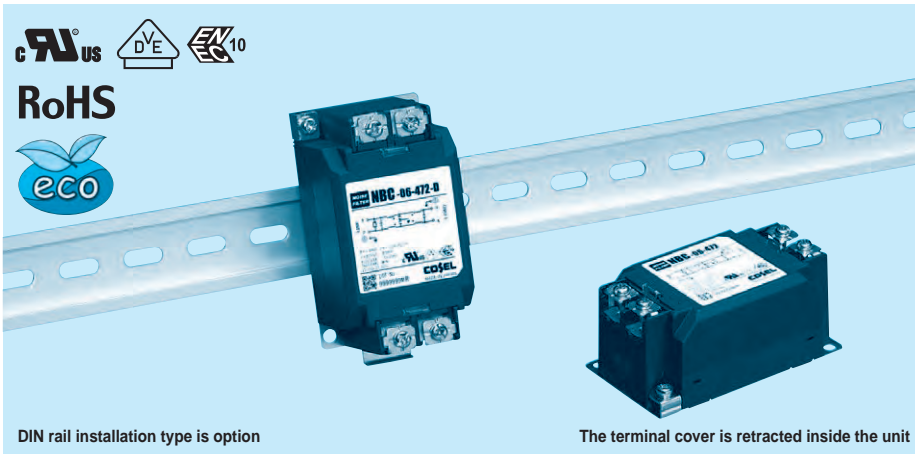
table 1.1 Line to ground capacitor code

Code	Leakage Current (Input 125/250V 60Hz)	Line to ground capacitor (nominal value)
681	75.5 μA / 150 μA max	680pF
102	0.13mA / 0.25mA max	1000pF
222	0.25mA / 0.5 mA max	2200pF
332	0.38mA / 0.75mA max	3300pF
472	0.5 mA / 1.0 mA max	4700pF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

- ④ Options
- D: DIN rail installation type

\* The dimensions change when the option is set. Refer to External view.



## Features of NBC series

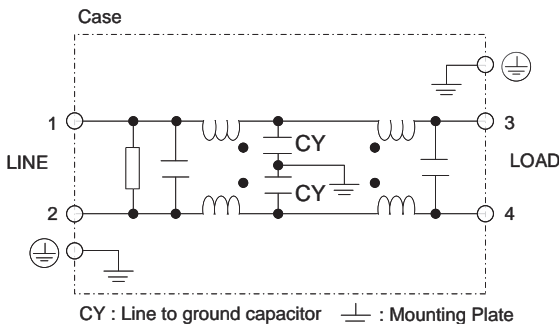
### High-attenuation type of common mode noise from 150kHz to 1MHz (2-stage filter)

- Single Phase 250 VAC
- Push down type terminal block

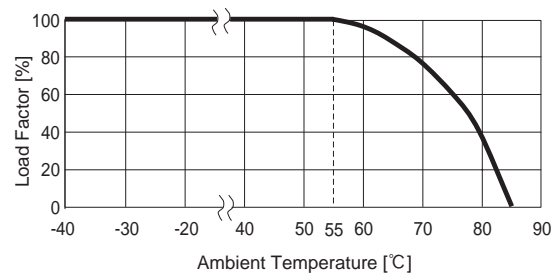
## Specifications

No.	Items	NBC-06-472	NBC-10-472	NBC-16-472	NBC-20-472	NBC-30-472
1	Rated Voltage[V]	AC 1 φ 250 / DC250				
2	Rated Current[A]	6	10	16	20	30
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 20mA), 1minute at room temperature and humidity				
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100MΩ min at room temperature and humidity				
5	Leakage current 125/250V 60Hz	0.5mA/1.0mA max				
6	Voltage drop	1.0V max				
7	Safety agency approval temperatures	-25 to +85°C (Refer to Derating Curve)				
8	Operating temperature	-40 to +85°C (Refer to Derating Curve)				
9	Operating humidity	20 to 95%RH (Non condensing)				
10	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)				
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis				
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis				
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC (At only AC input)				
14	Case size (without projection) /Weight	53 X 41 X 92 mm [2.09 X 1.61 X 3.62 inches] (W X H X D) /270g max (Option : -D refer to external view)				

## Circuit Diagram



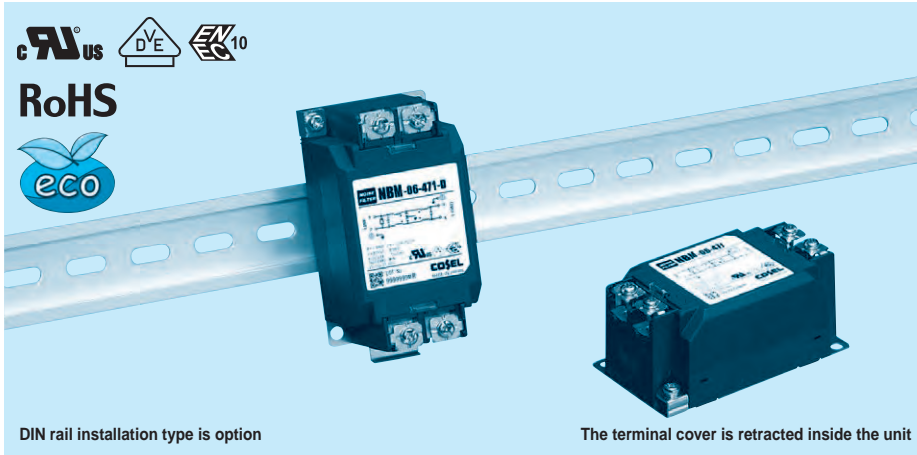
## Derating Curve



# NBM series

NBM -10 -471 -□

① ② ③ ④



DIN rail installation type is option

The terminal cover is retracted inside the unit

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table 1.1 Line to ground capacitor code

Code	Leakage Current (Input 125/250V 60Hz)	Line to ground capacitor (nominal value)
000	5 $\mu$ A / 10 $\mu$ A max	Not Provided
101	12.5 $\mu$ A / 25 $\mu$ A max	100pF
221	25 $\mu$ A / 50 $\mu$ A max	220pF
331	37.5 $\mu$ A / 75 $\mu$ A max	330pF
471	50 $\mu$ A / 100 $\mu$ A max	470pF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

- ④ Options
- D: DIN rail installation type

\* The dimensions change when the option is set. Refer to External view.

## Features of NBM series

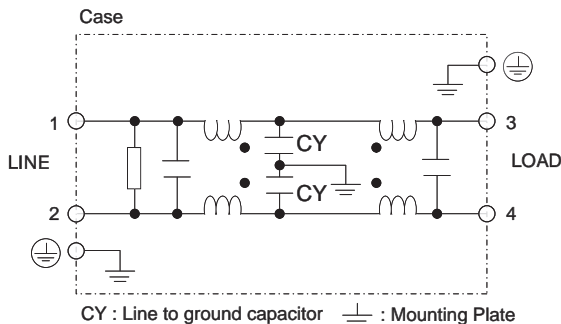
### Low leakage current type, Withstand voltage 4,000VAC (2-stage filter)

- Single Phase 250 VAC
- Push down type terminal block

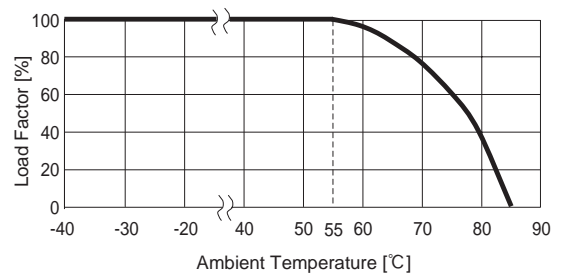
## Specifications

No.	Items	NBM-06-471	NBM-10-471	NBM-16-471	NBM-20-471	NBM-30-471
1	Rated Voltage[V]	AC 1 $\phi$ 250 / DC250				
2	Rated Current[A]	6	10	16	20	30
3	Test Voltage (Terminal-Mounting Plate)	4,000 VAC (Cutoff Current = 20mA), 1minute at room temperature and humidity				
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100M $\Omega$ min at room temperature and humidity				
5	Leakage current 125/250V 60Hz	50 $\mu$ A/100 $\mu$ A max				
6	Voltage drop	1.0V max				
7	Safety agency approval temperatures	-25 to +85 $^{\circ}$ C (Refer to Derating Curve)				
8	Operating temperature	-40 to +85 $^{\circ}$ C (Refer to Derating Curve)				
9	Operating humidity	20 to 95%RH (Non condensing)				
10	Storage temperature/humidity	-40 to +85 $^{\circ}$ C/20 to 95%RH (Non condensing)				
11	Vibration	10 to 55Hz, 19.6m/s $^2$ (2G), 3min. Period, 1hour each X, Y and Z axis				
12	Impact	196.1m/s $^2$ (20G), 11ms Once each X, Y and Z axis				
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC (At only AC input)				
14	Case size (without projection) /Weight	53 x 41 x 92 mm [2.09 x 1.61 x 3.62 inches] (W x H x D) /270g max (Option : -D refer to external view)				

## Circuit Diagram



## Derating Curve

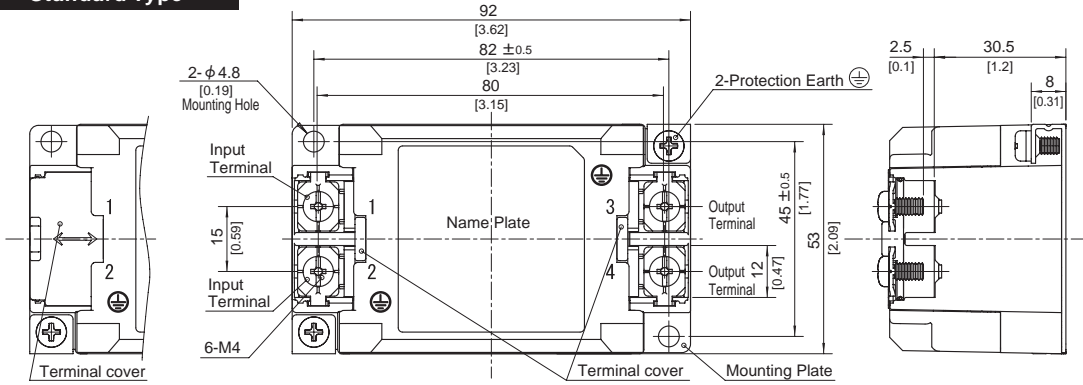


**External view**

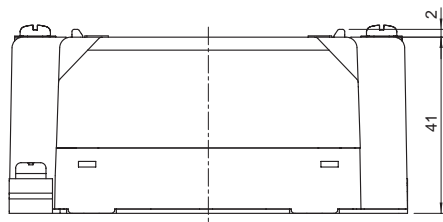
As this product is adopted push-down type terminal block, this appearance is as follows.

- ① The terminal cover is retracted inside the unit.
- ② The screws for connecting the terminals are held in the up right position.

**Standard Type**

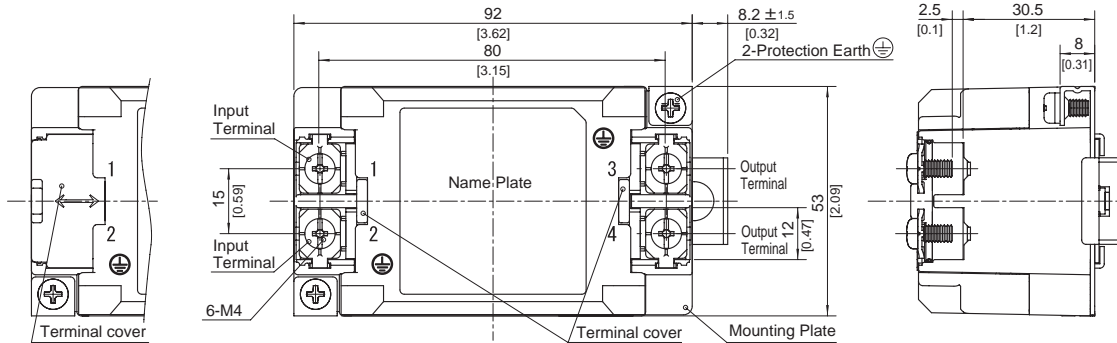


※ Closed the terminal cover

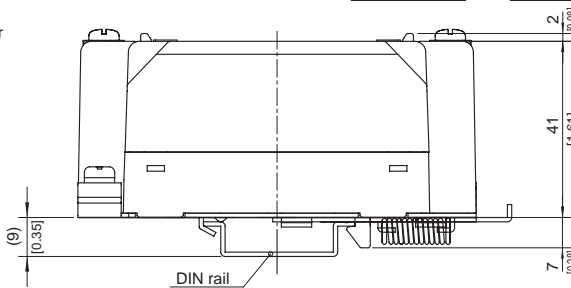


- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 270g max
- ※ Mounting Plate : Iron (surface finishing:nickel plating) t=1.0 [0.04]
- ※ Case : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M4:1.6N · m (16.9kgf · cm) max

**DIN rail installation Type**



※ Closed the terminal cover

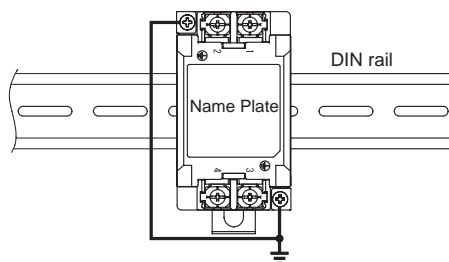


- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 270g max
- ※ Mounting Plate : Iron (surface finishing:nickel plating) t=1.0 [0.04]
- ※ Case : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M4:1.6N · m (16.9kgf · cm) max

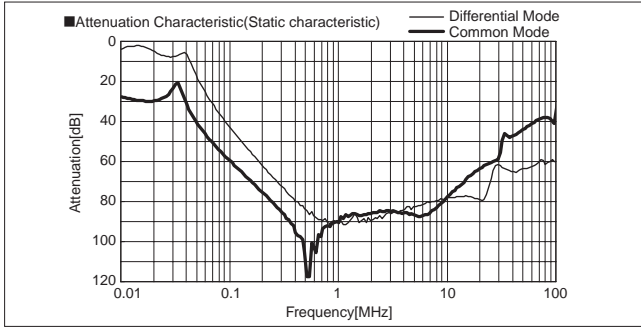
**■Note when installing the EMI/EMC Filter on a DIN rail.**

When the EMI/EMC Filter is grounded through the DIN rail, the proper noise attenuation may not be achieved.

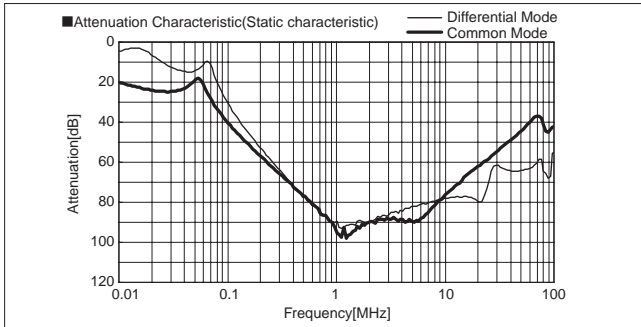
Be sure to connect the protection earth (PE) of the EMI/EMC Filter body to the earth. It can connect the ground to either one only.



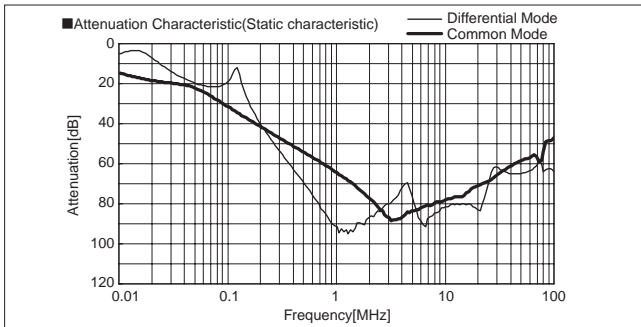
**NBH-06-432**



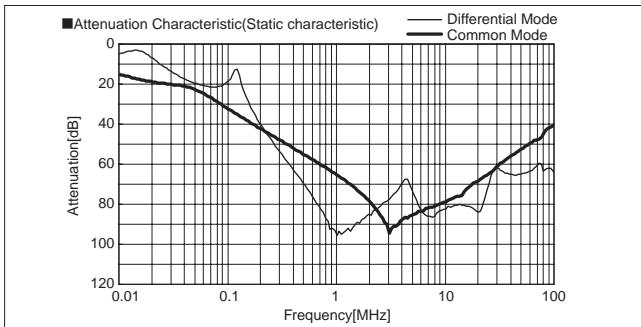
**NBH-10-432**



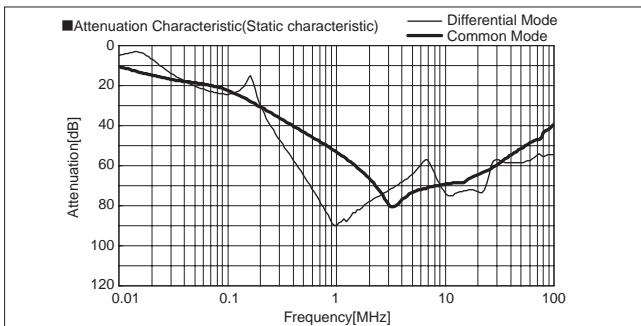
**NBH-16-432**



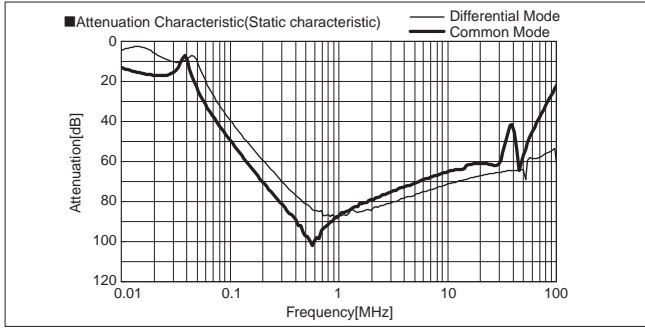
**NBH-20-432**



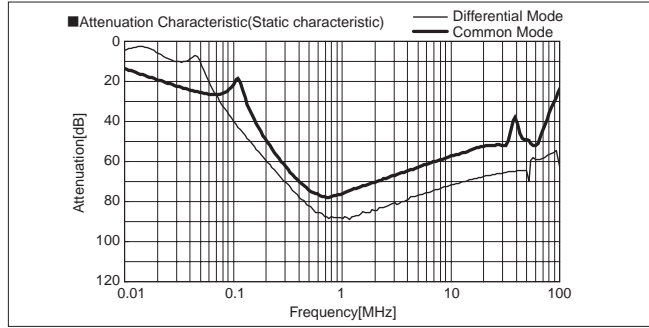
**NBH-30-432**



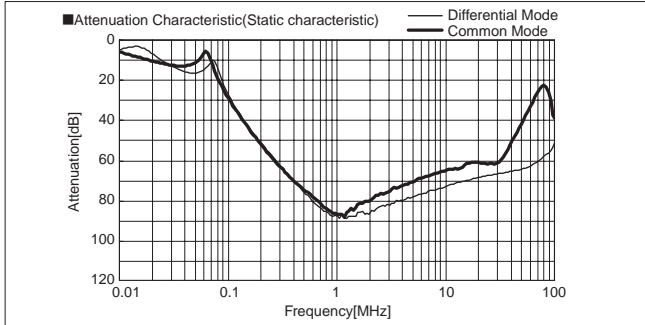
**NBC-06-472**



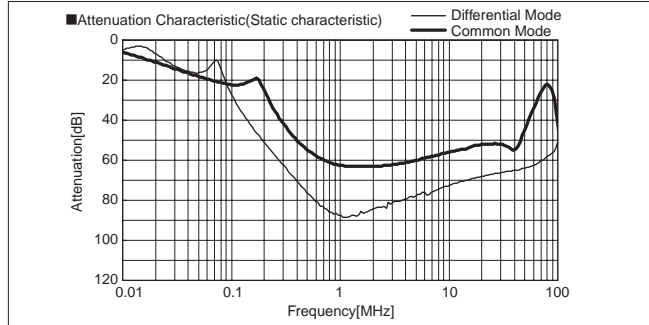
**NBM-06-471**



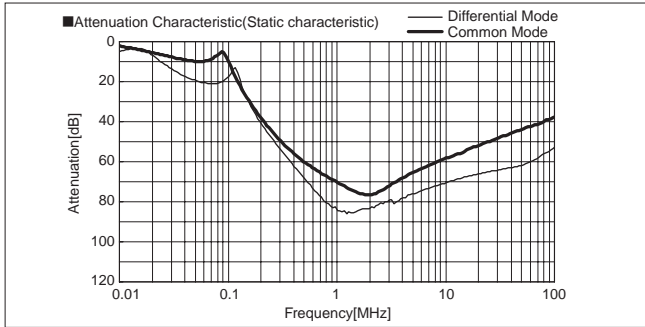
**NBC-10-472**



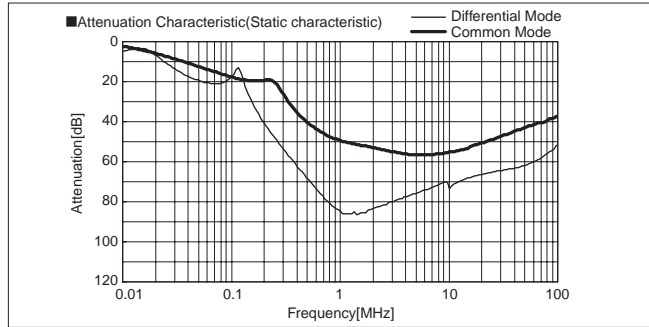
**NBM-10-471**



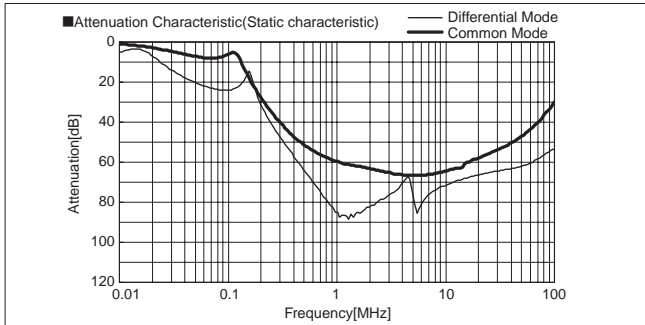
**NBC-16-472**



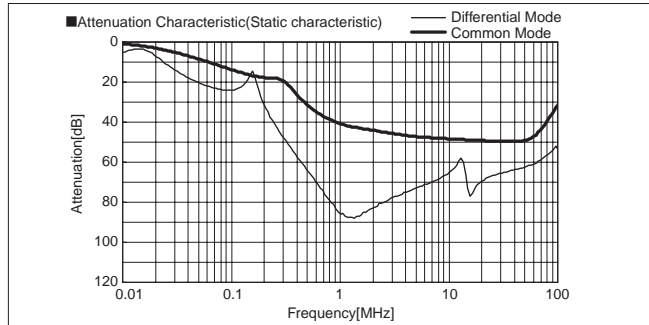
**NBM-16-471**



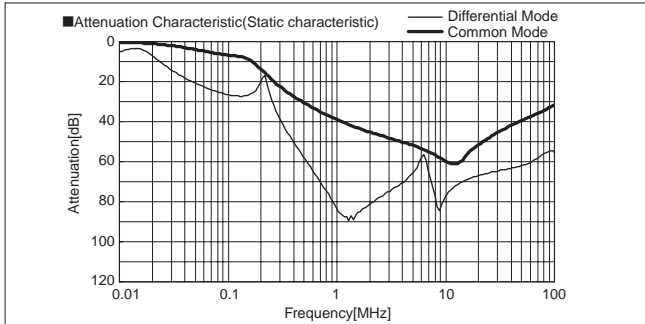
**NBC-20-472**



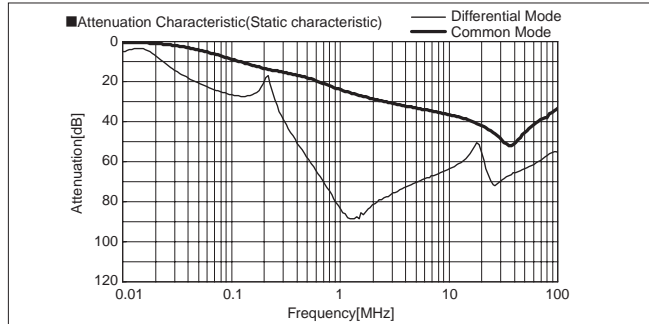
**NBM-20-471**



**NBC-30-472**



**NBM-30-471**







# JAC series(6-30A)

JAC -30 -683 -□

① ② ③ ④

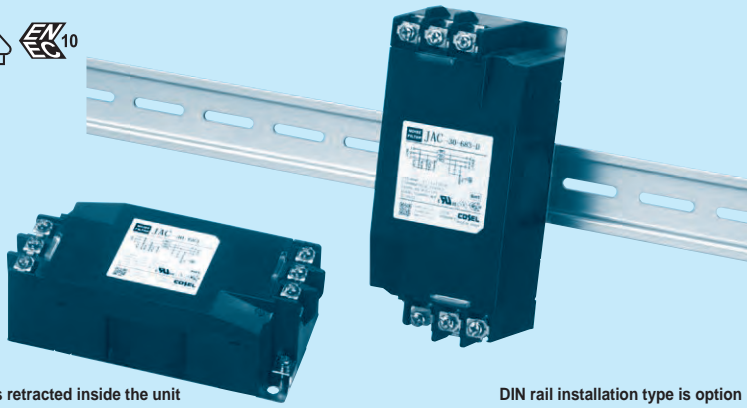
- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table 1.1 Line to ground capacitor code

Code	Leakage Current (Input 250/500V 60Hz) (Only "224" is 250/400V 60Hz)	Line to ground capacitor (nominal value)
103	0.5mA / 1.0mA max	10,000pF
223	1.0mA / 2.0mA max	22,000pF
683	2.5mA / 5.0mA max	68,000pF
224	15mA / 24mA max	220,000pF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

- ④ Option
- D: DIN rail installation type
- \* The dimensions change when the option is set. Refer to External view.
- H: Ultra high-attenuation type
- "103", "223", "683" is applied.
- U: Improve differential mode attenuation (Rated voltage 250V)



The terminal cover is retracted inside the unit

DIN rail installation type is option

## Features of JAC series

### Compact and low profile, common mode EMI/EMC filters in 150kHz to 1MHz (1-stage filter)

- Three Phase 500 VAC
- Push down type terminal block
- Selectable leakage current value, Ultra high-attenuation type "224" for EU (Y type with neutral earth system)

## Specifications

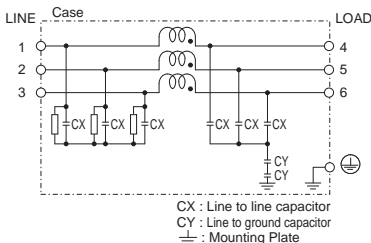
No.	Items	JAC-06-683	JAC-10-683	JAC-20-683	JAC-30-683
1	Rated Voltage[V]	AC Three Phase 500 (voltage range:528 max) 50/60Hz *1 *2			
2	Rated Current[A]	6	10	20	30
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 100mA), 1minute at room temperature and humidity *3			
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100MΩ min at room temperature and humidity *4			
5	Leakage current 250/500V 60Hz	2.5mA/5.0mA max			
6	DC resistance	100mΩ max	45mΩ max	15mΩ max	8mΩ max
7	Safety agency approval temperatures	-25 to +85°C (Refer to Derating Curve)			
8	Operating temperature	-40 to +85°C (Refer to Derating Curve)			
9	Operating humidity	20 to 95%RH (Non condensing)			
10	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)			
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis			
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis			
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC			
14	Case size (without projection)	63 X 44 X 132 mm (W X H X D) (Option: -D refer to external view)			
15	Weight	[2.48 X 1.73 X 5.20 inches] (W X H X D) 440g max			

- \*1 Capacitor code "224" : Three Phase Δ-connection 400 (440 max), Y-connection 500 (528 max).
- \*2 "JAC-□□□□□□□□□□-U" : Three Phase 250 (275 max).
- \*3 Capacitor code "224" : 2,800VDC (Cutoff Current = 10mA), 1 minute at room temperature and humidity.
- \*4 Capacitor code "224" : Isolation resistance specification is deleted.

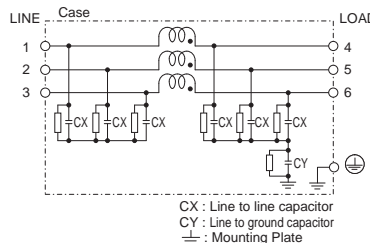
## Circuit Diagram

## Derating Curve

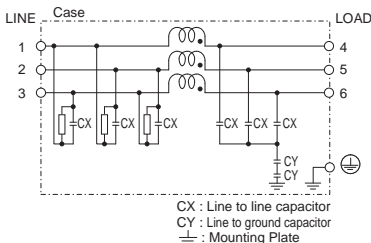
(1) Line to ground capacitor code : 103, 223, 683



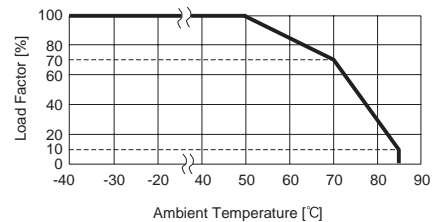
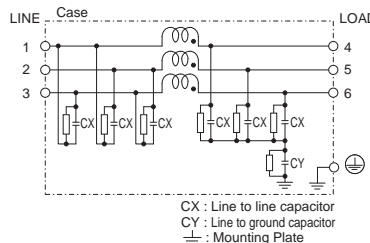
(2) Line to ground capacitor code : 224



(3) Line to ground capacitor code : 103, 223, 683  
Option : U



(4) Line to ground capacitor code : 224  
Option : U

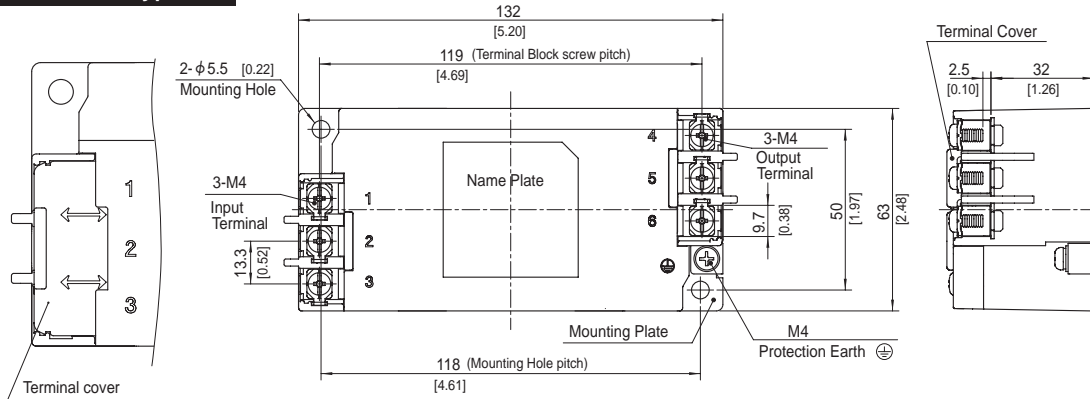


## External view

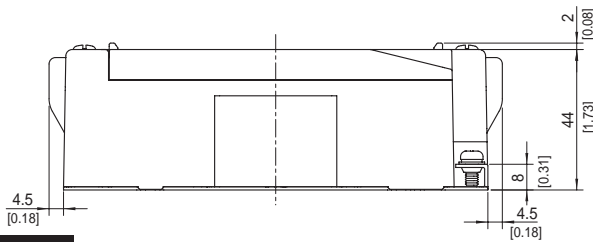
As this product is adopted push-down type terminal block, this appearance is as follows.

- ① The terminal cover is retracted inside the unit.
- ② The screws for connecting the terminals are held in the up right position.

### Standard Type

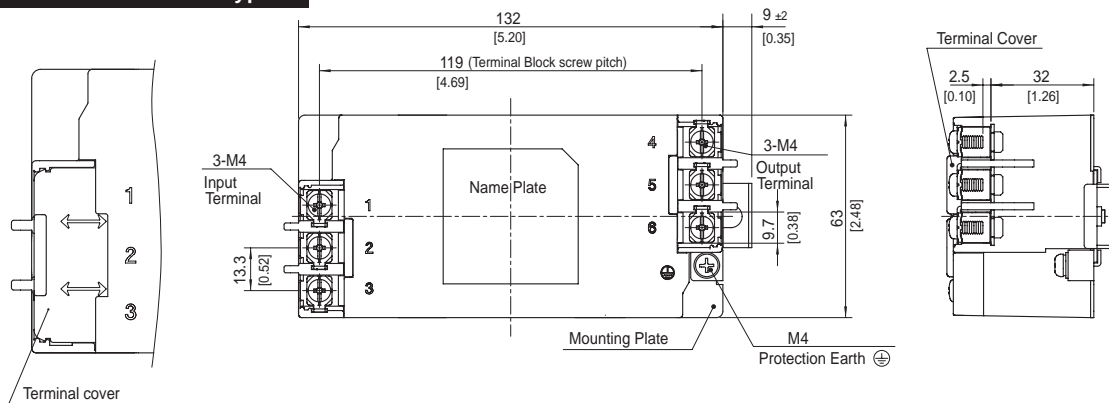


※ Close the terminal cover

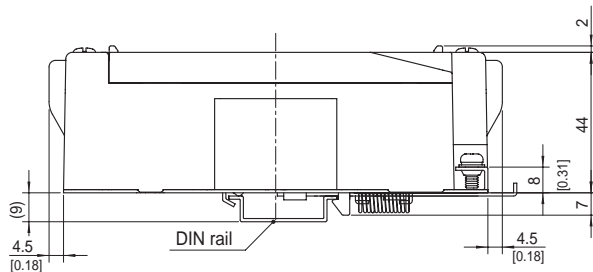


- ※ Tolerance :  $\pm 1[\pm 0.04]$
- ※ Weight : 440g max
- ※ Mounting Plate : Iron(surface finishing : nickel plating)  $t=1.0[0.04]$
- ※ Case : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M4 : 1.6N · m(16.9kgf · cm)max

### DIN rail installation Type



※ Close the terminal cover

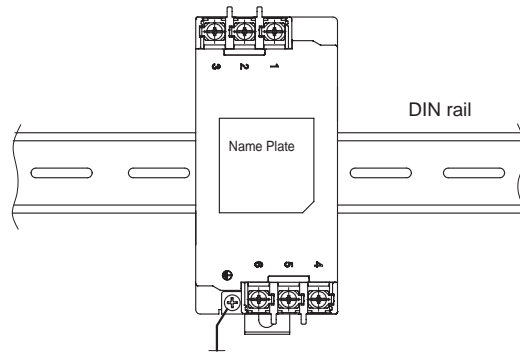


- ※ Tolerance :  $\pm 1[\pm 0.04]$
- ※ Weight : 440g max
- ※ Mounting Plate : Iron(surface finishing : nickel plating)  $t=1.0[0.04]$
- ※ Case : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M4 : 1.6N · m(16.9kgf · cm)max

### ■ Note when installing the EMI/ EMC Filter on a DIN rail.

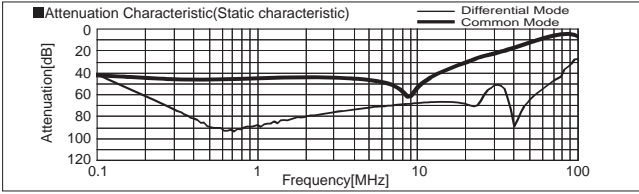
When the EMI/EMC Filter is grounded through the DIN rail, the proper noise attenuation may not be achieved.

Be sure to connect the protection earth (PE) of the EMI/EMC Filter body to the earth.

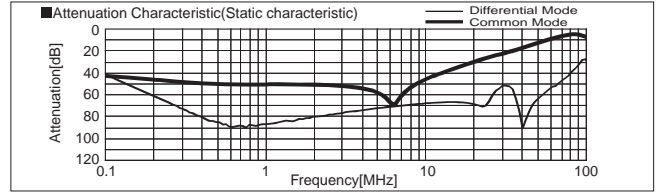




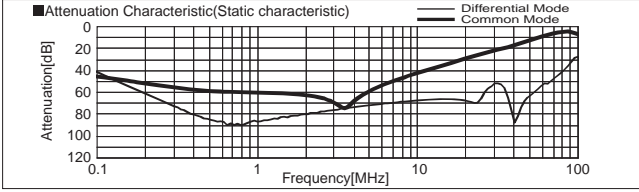
**JAC-06-103-H**



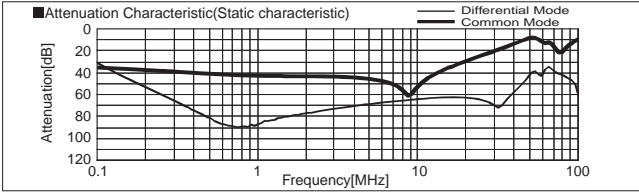
**JAC-06-223-H**



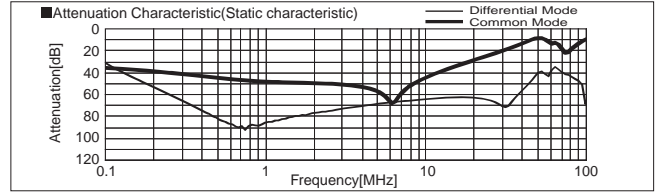
**JAC-06-683-H**



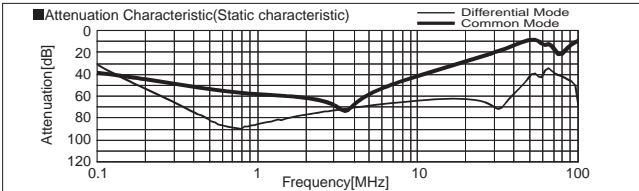
**JAC-10-103-H**



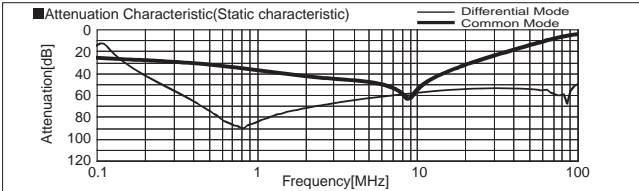
**JAC-10-223-H**



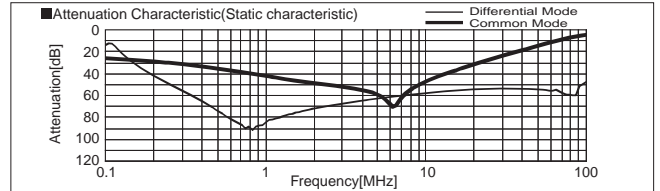
**JAC-10-683-H**



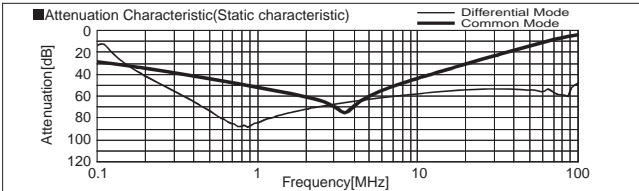
**JAC-20-103-H**



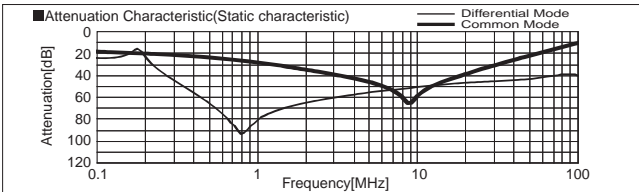
**JAC-20-223-H**



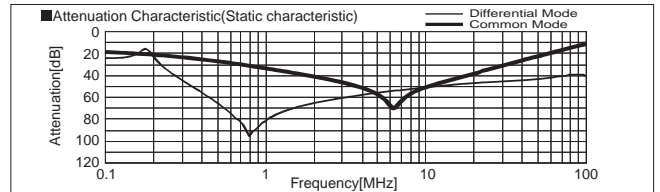
**JAC-20-683-H**



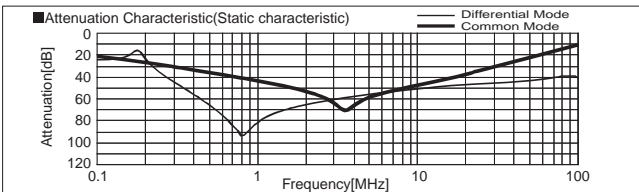
**JAC-30-103-H**



**JAC-30-223-H**



**JAC-30-683-H**







# JAC series(40,50,60A)

JAC -50 -683 -□

① ② ③ ④



- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table 1.1 Line to ground capacitor code

Code	Leakage Current *1	Line to ground capacitor (nominal value)
	Upper row : Δ-connection Lower row : Y-connection	
103	0.5mA / 1.0mA max 0.05mA / 0.1mA max	0.01μF
223	1.0mA / 2.0mA max 0.1mA / 0.2mA max	0.022μF
683	2.5mA / 5.0mA max 0.35mA / 0.7mA max	0.068μF
224	15mA / 24mA max 2.0mA / 4.0mA max	0.22μF
155	80mA / 125mA max 9.0mA / 18mA max	1.5μF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

\*1 Input 250/500V 60Hz  
(Δ-connection of "224", "155" is 250/400V 60Hz)

- ④ Option
- H: Ultra high-attenuation type  
"103", "223", "683" is applied.
- U: Improve differential mode attenuation  
(Rated voltage 250V)

## Features of JAC series

### Compact and low profile, common mode EMI/EMC filters in 150kHz to 1MHz (1-stage filter)

- Three phase rated voltage 500 VAC (voltage range : 528V max)
- Selectable leakage current value, Ultra high-attenuation type "224", "155" for EU (Y type with neutral earth system)

### Specifications

No.	Items	JAC-40-683	JAC-50-683	JAC-60-683
1	Rated Voltage[V]	AC Three Phase 500 (voltage range: 528 max) 50/60Hz *2 *3		
2	Rated Current[A]	40	50	60
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 100mA), 1minute at room temperature and humidity *4		
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100MΩ min at room temperature and humidity *5		
5	Leakage current 250/500V 60Hz	2.5mA/5.0mA max		
6	DC resistance	7.0mΩ max	5.0mΩ max	3.5mΩ max
7	Safety agency approval temperatures	-40 to +85°C (Refer to Derating Curve)		
8	Operating temperature	-40 to +85°C (Refer to Derating Curve)		
9	Operating humidity	20 to 95%RH (Non condensing)		
10	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)		
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis		
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis		
13	Safety agency approvals	UL60939, CSA C22.2 No.8 (C-UL), EN60939 (DEMKO), ENEC		
14	Case size (without projection)	65 X 54 X 153 mm (W X H X D) [2.56 X 2.13 X 6.02 inches] (W X H X D)		
15	Weight	800g max		

\*2 Capacitor code "224" and "155" : Three Phase Δ-connection 400 (440 max), Y-connection 500 (528 max).

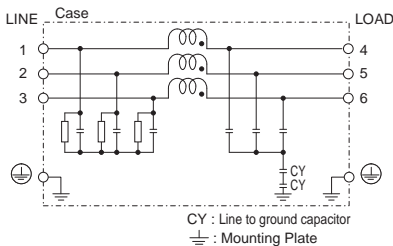
\*3 "JAC-□□□□□□□□-U" : Three Phase 250 (275 max).

\*4 Capacitor code "224" and "155" : 2,800VDC (Cutoff Current = 10mA), 1 minute at room temperature and humidity.

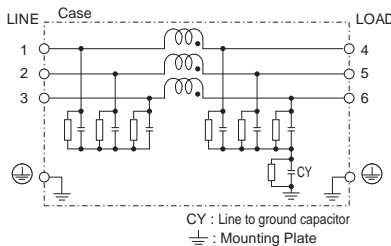
\*5 Capacitor code "224" and "155" : Isolation resistance specification is deleted.

### Circuit Diagram

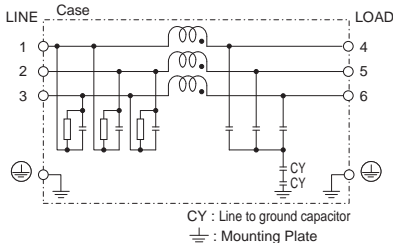
(1) Line to ground capacitor code : 103, 223, 683



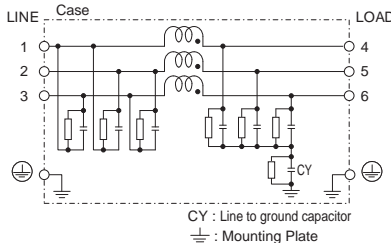
(2) Line to ground capacitor code : 224, 155



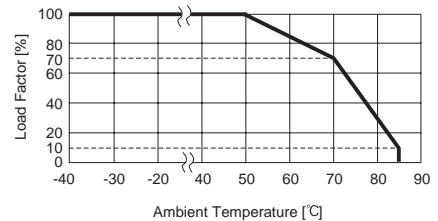
(3) Line to ground capacitor code : 103, 223, 683  
Option : U



(4) Line to ground capacitor code : 224, 155  
Option : U



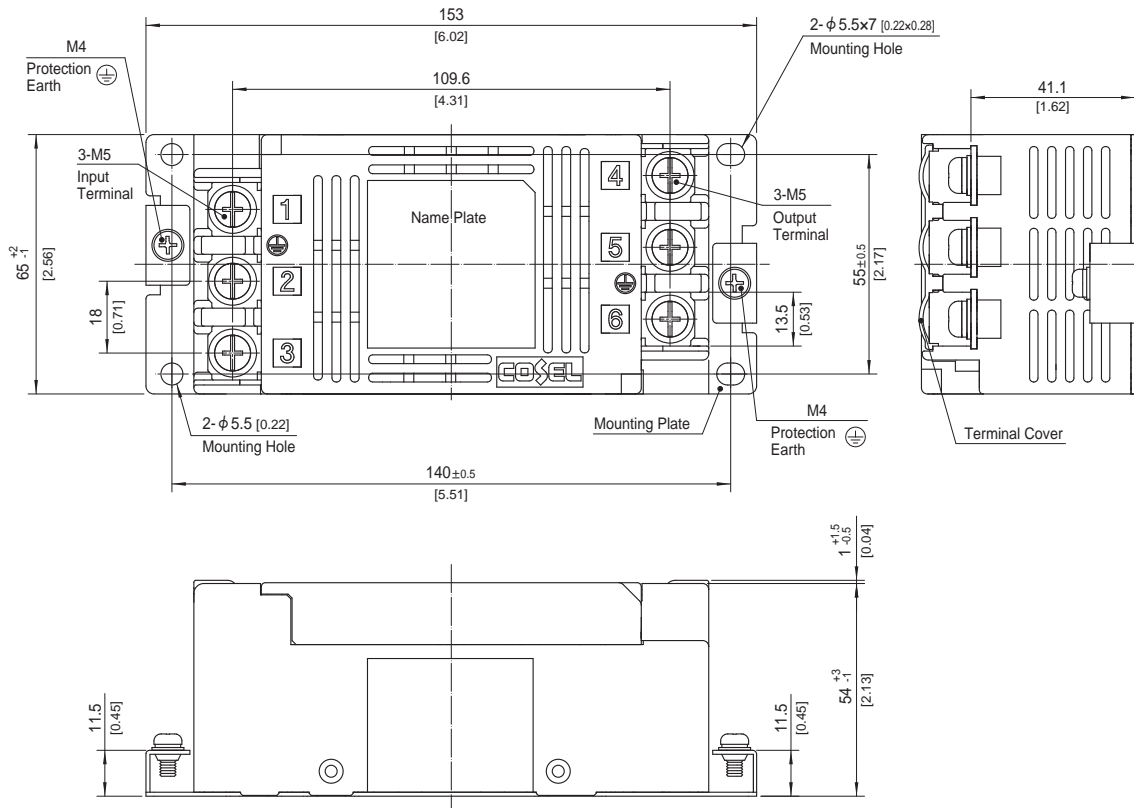
### Derating Curve



\* Keep free ventilation holes for cooling.



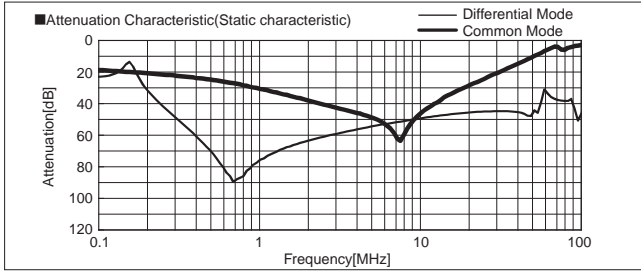
## External view



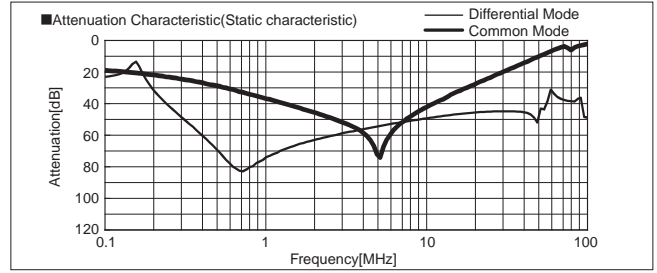
- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 800g max
- ※ Mounting Plate : Hot-dip Galvanized Steel board  $t=1.0$  [0.04]
- ※ Case Material : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M5 :  $3.0\text{N} \cdot \text{m}$  (30.7kgf · cm) max
- ※ Protection Earth (PE) screw tightening torque M4 :  $1.6\text{N} \cdot \text{m}$  (16.9kgf · cm) max
- ※ Can not be mounted upside-down. (mounted the top surface)
- ※ Keep free ventilation holes for cooling.
- ※ Can be mounted using the 2 corner mounting holes.



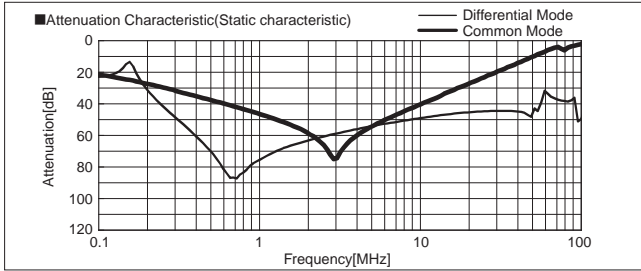
**JAC-40-103-H**



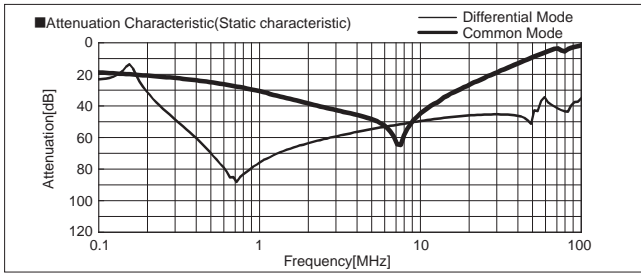
**JAC-40-223-H**



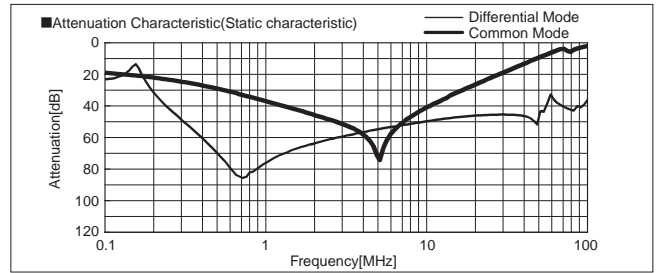
**JAC-40-683-H**



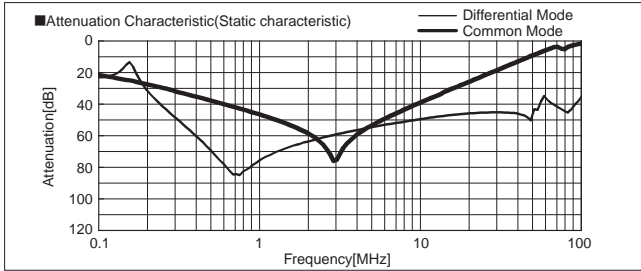
**JAC-50-103-H**



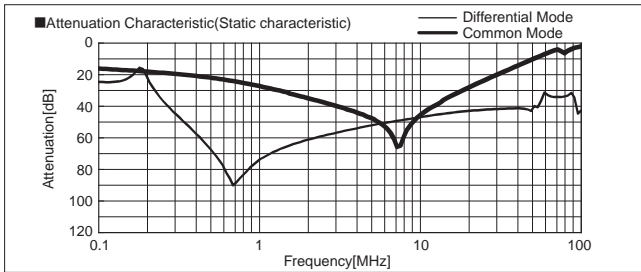
**JAC-50-223-H**



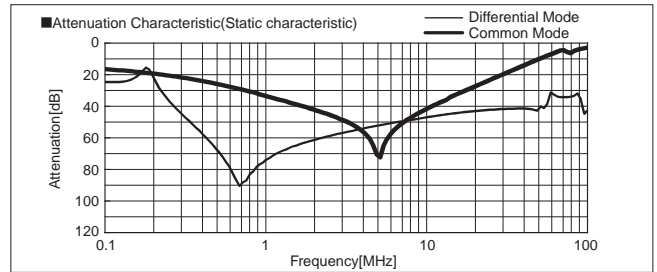
**JAC-50-683-H**



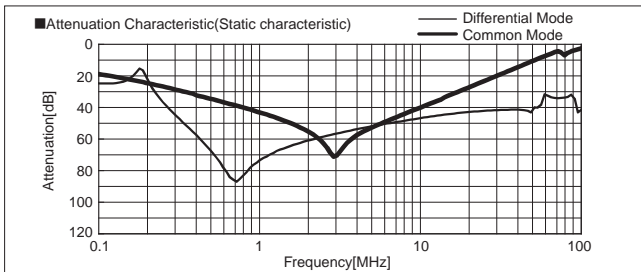
**JAC-60-103-H**



**JAC-60-223-H**



**JAC-60-683-H**







# TAC series(4-30A)

TAC -10 -683 -□

① ② ③ ④

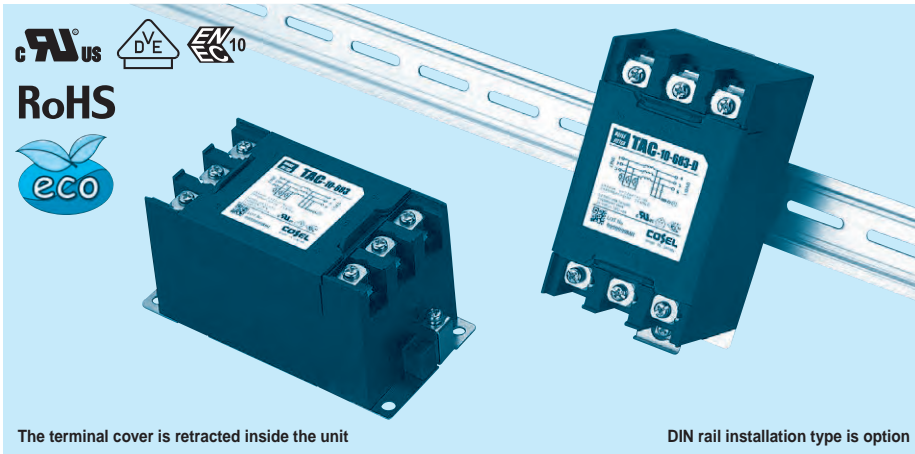
- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table 1.1 Line to ground capacitor code

Code	Leakage Current (Input 250/500V 60Hz)	Line to ground capacitor (nominal value)
103	0.5mA/1.0mA max	10000pF
223	1.0mA/2.0mA max	22000pF
683	2.5mA/5.0mA max	68000pF

- ④ Options
- D: DIN rail installation type

\* The dimensions change when the option is set. Refer to External view.



## Features of TAC series

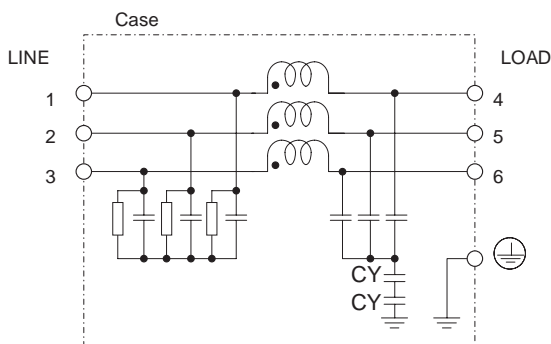
### High-attenuation type of common mode noise from 150kHz to 1MHz (1-stage filter)

- Three phase rated voltage 500 VAC (voltage range: 528V max)
- Selectable leakage current value
- Push down type terminal block

## Specifications

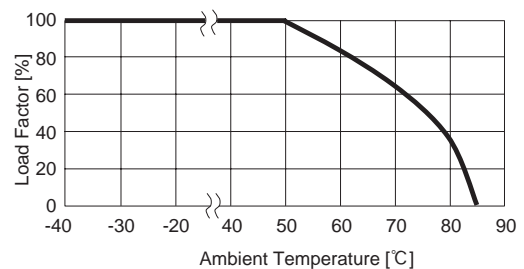
No.	Items	TAC-04-683	TAC-06-683	TAC-10-683	TAC-20-683	TAC-30-683
1	Rated Voltage[V]	AC Three Phase 500 (voltage range: 528 max) 50/60Hz				
2	Rated Current[A]	4	6	10	20	30
3	Test Voltage (Terminal-Mounting Plate)	2,000 VAC (Cutoff Current = 100mA), 1minute at room temperature and humidity				
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100MΩ min at room temperature and humidity				
5	Leakage current 250/500V 60Hz	2.5mA/5.0mA max				
6	Voltage drop	1.5V max			1.0V max	
7	Safety agency approval temperatures	-25 to +85°C (Refer to Derating Curve)				
8	Operating temperature	-40 to +85°C (Refer to Derating Curve)				
9	Operating humidity	20 to 95%RH (Non condensing)				
10	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)				
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis				
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis				
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC				
14	Case size (without projection) /Weight	63 X 64 X 128 mm [2.48 X 2.52 X 5.04 inches] (W X H X D) /620g max (Option : -D refer to external view)				

## Circuit Diagram



CY : Line to ground capacitor : Mounting Plate

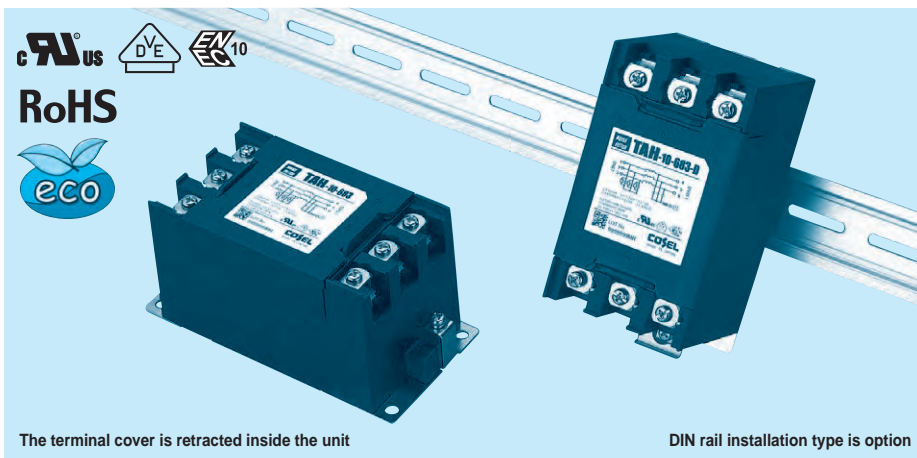
## Derating Curve



# TAH series(4-30A)

TAH -10 -683 -□

① ② ③ ④



The terminal cover is retracted inside the unit

DIN rail installation type is option

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table1.1 Line to ground capacitor code

Code	Leakage Current (Input 250/500V 60Hz)	Line to ground capacitor (nominal value)
103	0.5mA/1.0mA max	10000pF
223	1.0mA/2.0mA max	22000pF
683	2.5mA/5.0mA max	68000pF

- ④ Options
- D : DIN rail installation type

\* The dimensions change when the option is set. Refer to External view.

## Features of TAH series

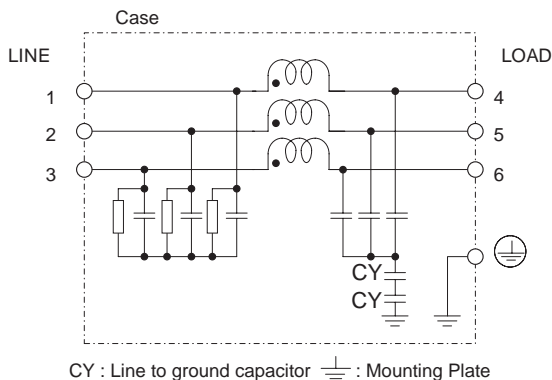
### Ultra high-attenuation type of common mode noise from 10kHz to 1MHz (1-stage filter)

- Three phase rated voltage 500 VAC (voltage range:528V max)
- Selectable leakage current value
- Push down type terminal block

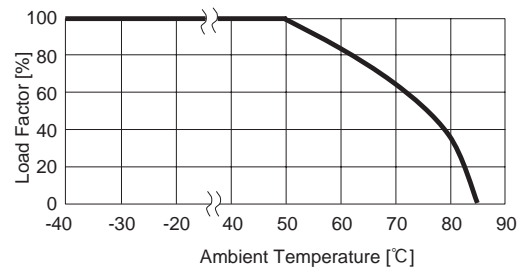
## Specifications

No.	Items	TAH-04-683	TAH-06-683	TAH-10-683	TAH-20-683	TAH-30-683
1	Rated Voltage[V]	AC Three Phase 500 (voltage range:528 max) 50/60Hz				
2	Rated Current[A]	4	6	10	20	30
3	Test Voltage (Terminal-Mounting Plate)	2,000 VAC (Cutoff Current = 100mA), 1minute at room temperature and humidity				
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100MΩ min at room temperature and humidity				
5	Leakage current 250/500V 60Hz	2.5mA/5.0mA max				
6	Voltage drop	1.5V max		1.0V max		
7	Safety agency approval temperatures	-25 to +85°C (Refer to Derating Curve)				
8	Operating temperature	-40 to +85°C (Refer to Derating Curve)				
9	Operating humidity	20 to 95%RH (Non condensing)				
10	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)				
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis				
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis				
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL) , DIN EN60939 VDE0565 Teil3-1, ENEC				
14	Case size (without projection) /Weight	63 X 64 X 128 mm [2.48 X 2.52 X 5.04 inches] (W X H X D) /620g max (Option : -D refer to external view)				

## Circuit Diagram



## Derating Curve

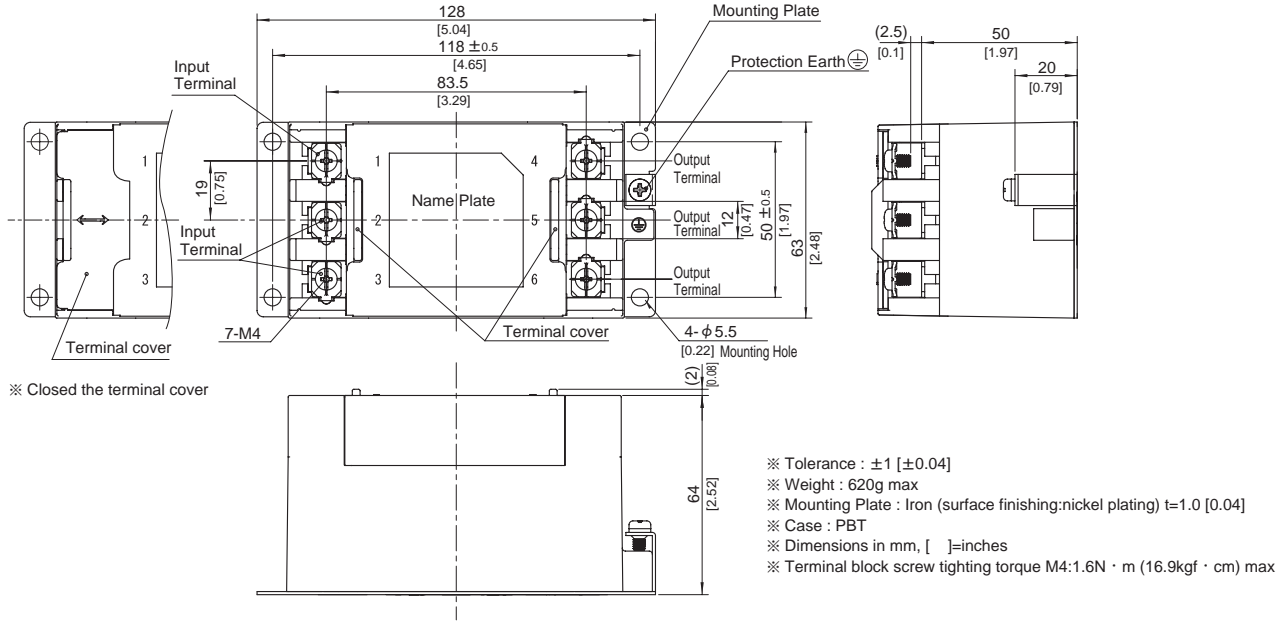


## External view

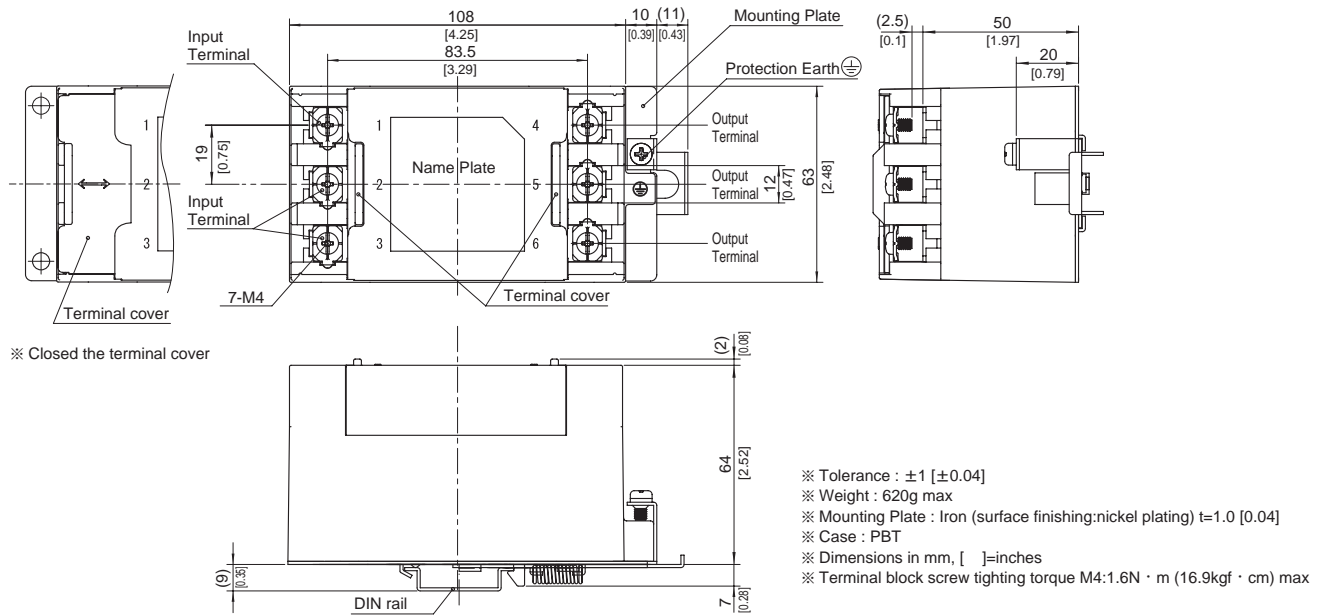
As this product is adopted push-down type terminal block, this appearance is as follows.

- ① The terminal cover is retracted inside the unit.
- ② The screws for connecting the terminals are held in the up right position.

### Standard Type



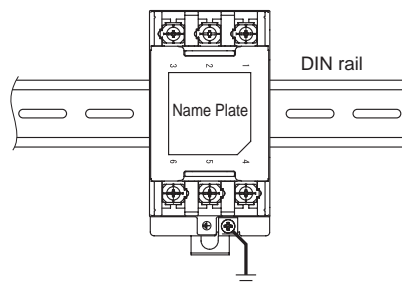
### DIN rail installation Type



### ■Note when installing the EMI/EMC Filter on a DIN rail.

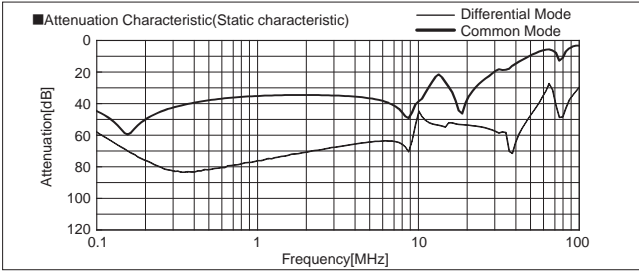
When the EMI/EMC Filter is grounded through the DIN rail, the proper noise attenuation may not be achieved.

Be sure to connect the protection earth (PE) of the EMI/EMC Filter body to the earth.

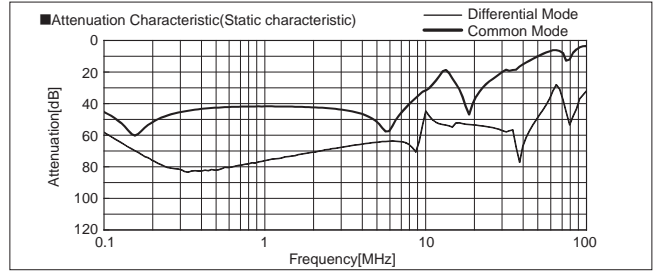




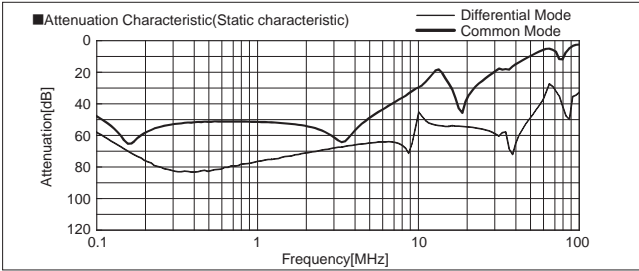
**TAC-04-103**



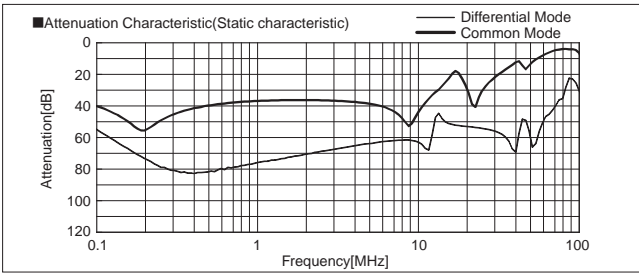
**TAC-04-223**



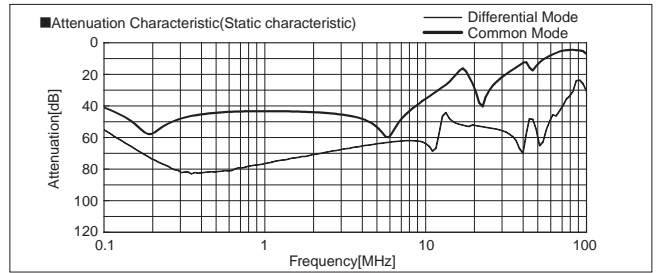
**TAC-04-683**



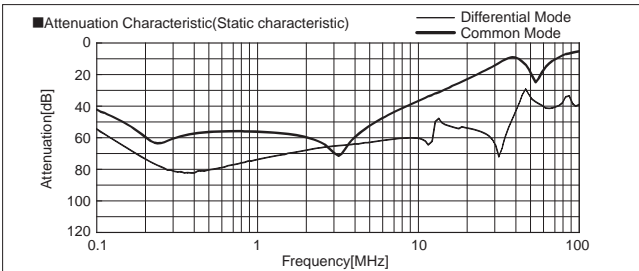
**TAC-06-103**



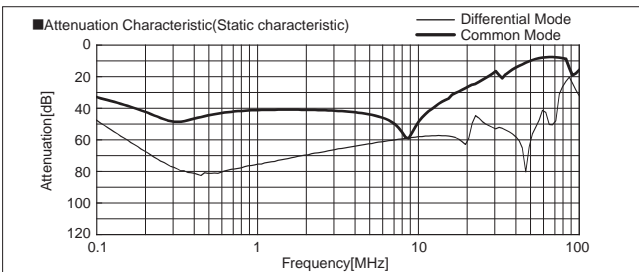
**TAC-06-223**



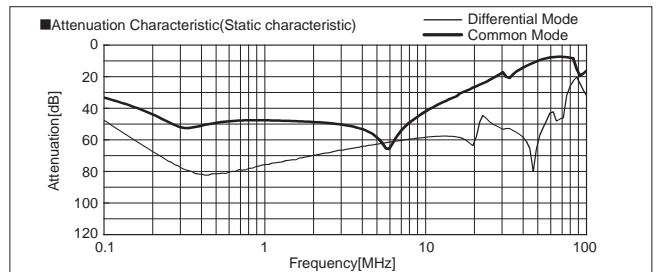
**TAC-06-683**



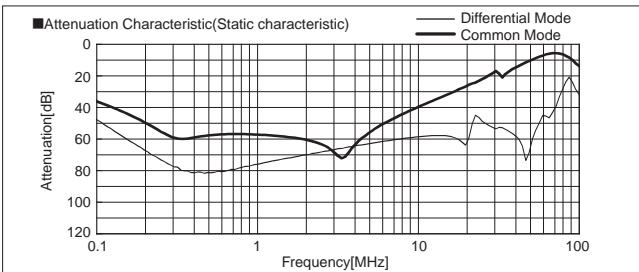
**TAC-10-103**



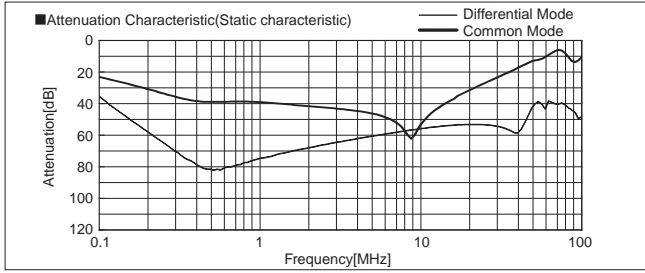
**TAC-10-223**



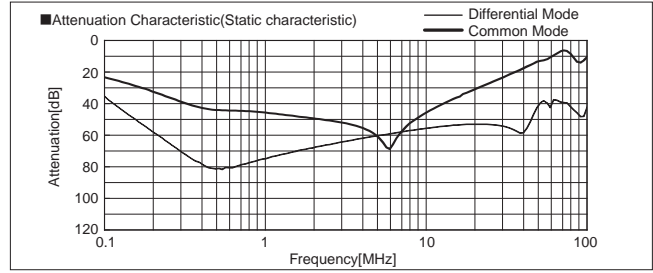
**TAC-10-683**



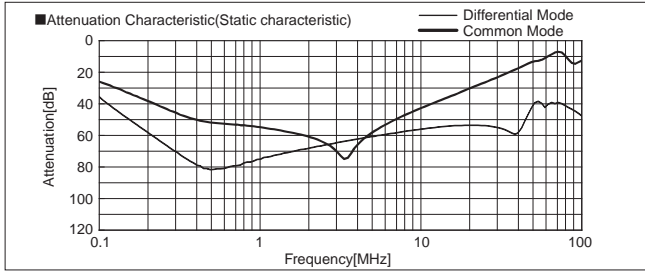
**TAC-20-103**



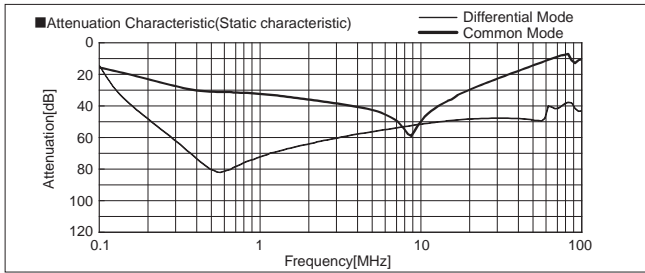
**TAC-20-223**



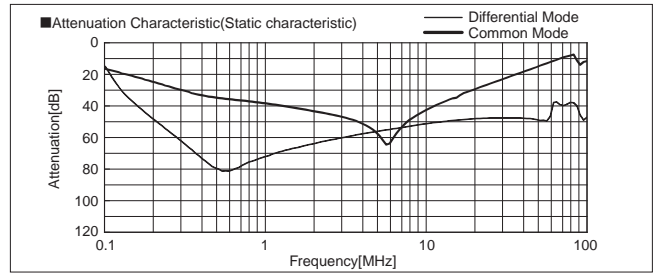
**TAC-20-683**



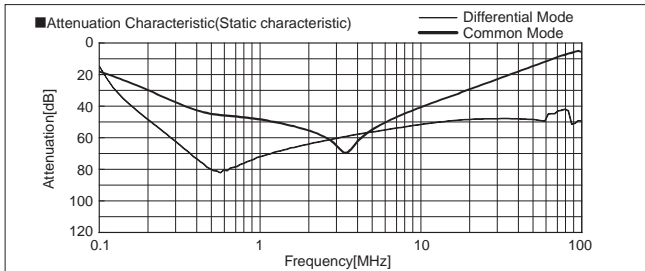
**TAC-30-103**



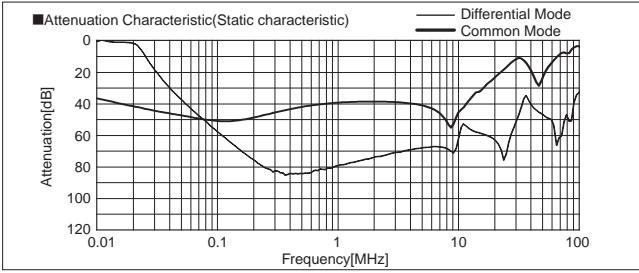
**TAC-30-223**



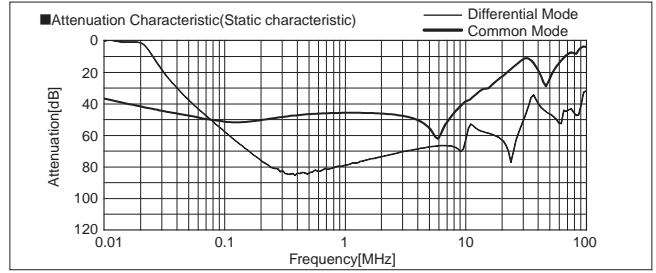
**TAC-30-683**



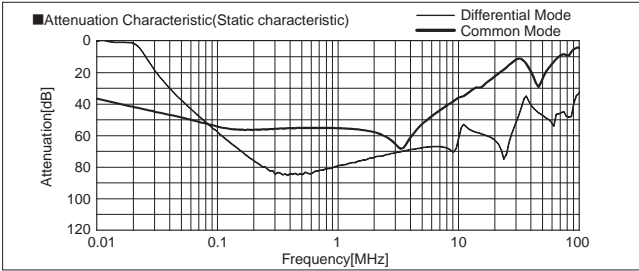
**TAH-04-103**



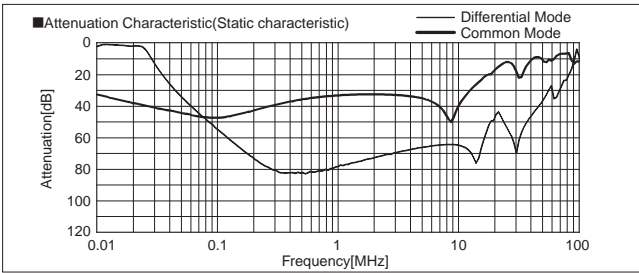
**TAH-04-223**



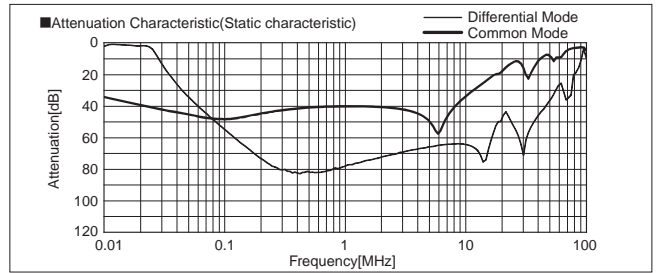
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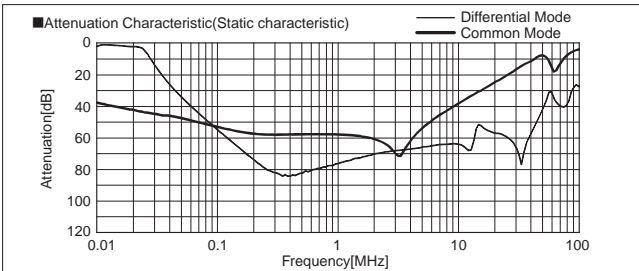
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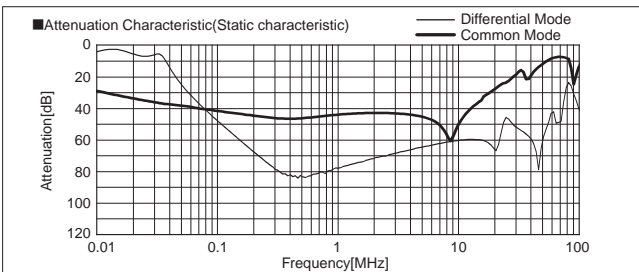
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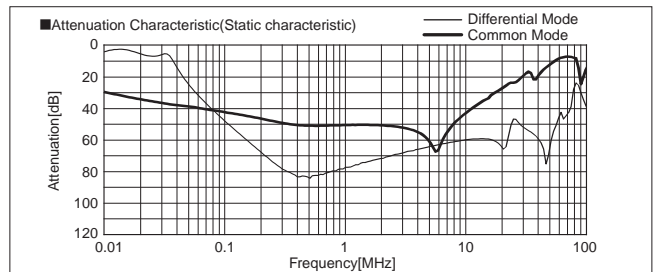
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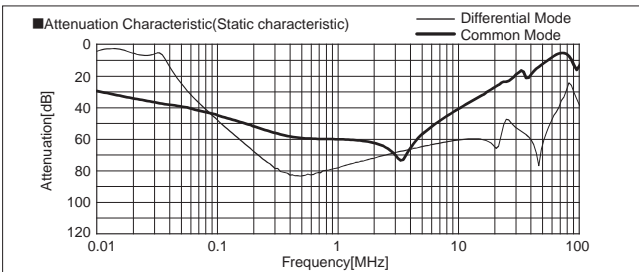
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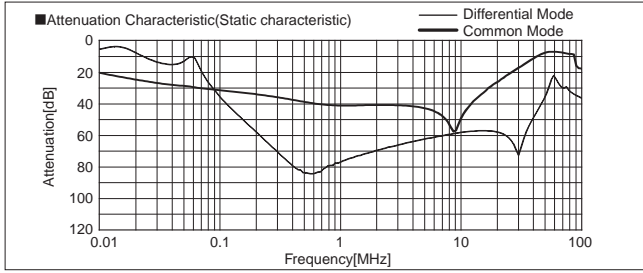
**TAH-10-223**



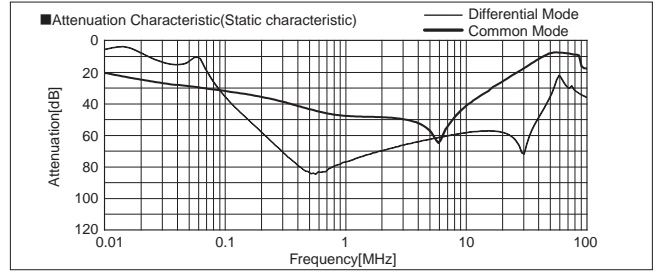
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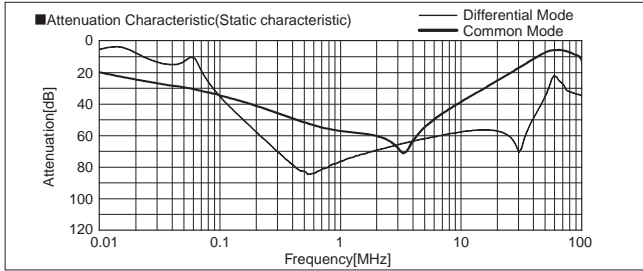
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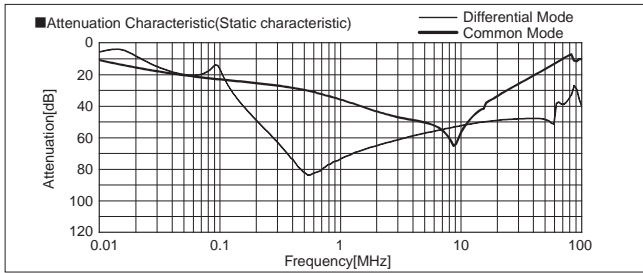
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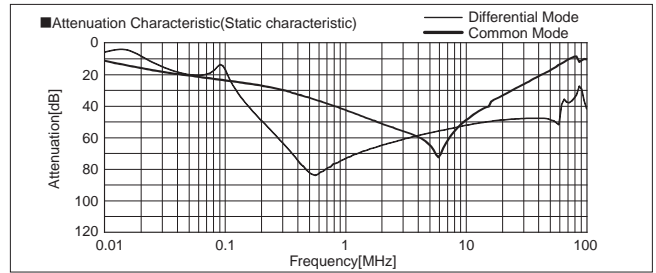
**TAH-20-683**



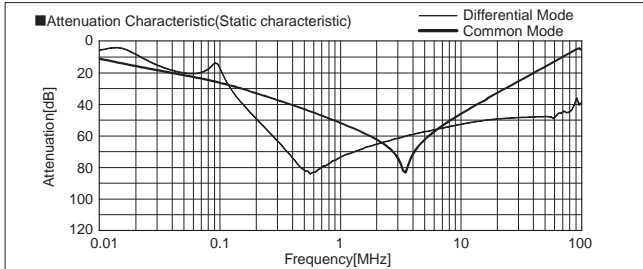
**TAH-30-103**



**TAH-30-223**



**TAH-30-683**



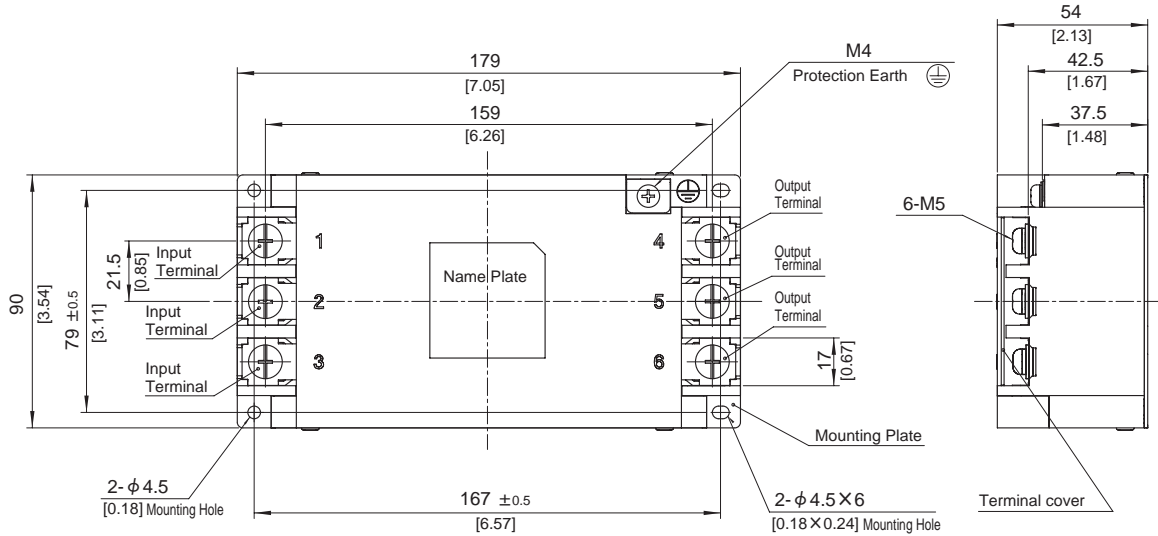






**External view**

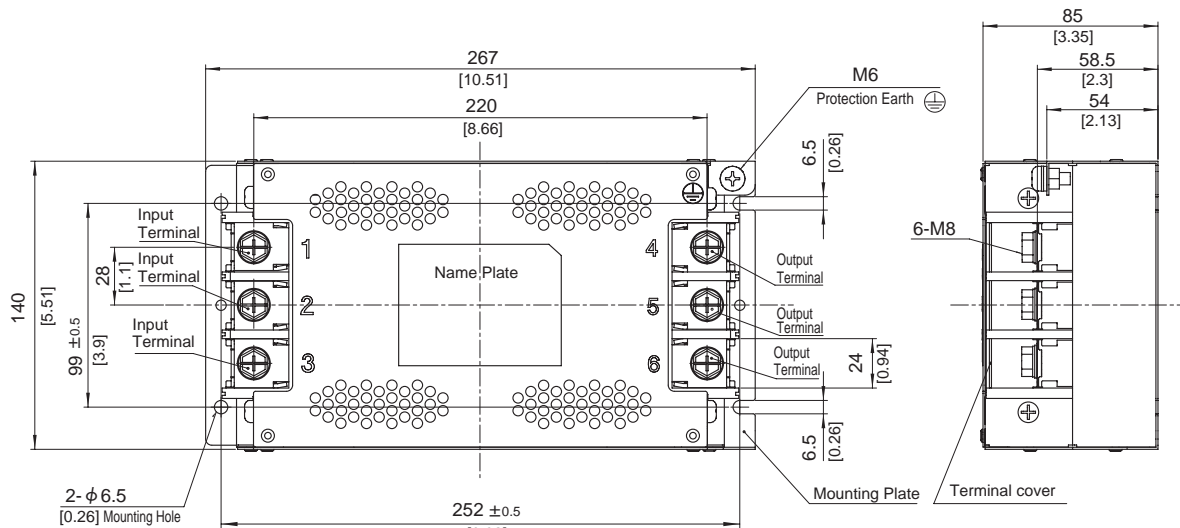
**TAC-50-□□□ / TAC-60-□□□**  
**TAH-50-□□□ / TAH-60-□□□**



※ Can not be mounted upside-down.  
(mounted the top surface)

※ Tolerance : ±1 [±0.04]  
 ※ Weight : 1.4kg max  
 ※ Mounting Plate : Iron (surface finishing:nickel plating) t=1.2 [0.05]  
 ※ Case : PBT  
 ※ Dimensions in mm, [ ]=inches  
 ※ Terminal block screw tightening torque M5:3.0N · m (30.7kgf · cm) max  
 ※ Protection Earth screw tightening torque M4:1.6N · m (16.9kgf · cm) max

**TAC-80-□□□ / TAC-100-□□□**  
**TAH-80-□□□ / TAH-100-□□□**



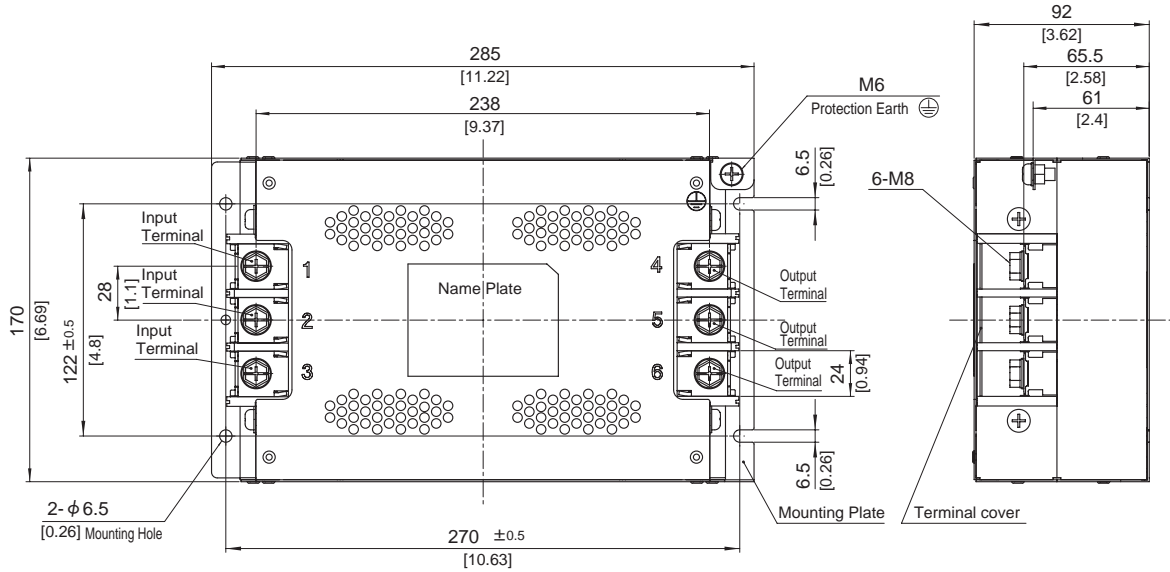
※ Can not be mounted upside-down.  
(mounted the top surface)

※ Tolerance : ±1 [±0.04]  
 ※ Weight : 3.8kg max  
 ※ Chassis Material : Stainless steel t=1.0 [0.04]  
 ※ Dimensions in mm, [ ]=inches  
 ※ Terminal block screw tightening torque M8:9.2N · m (93.9kgf · cm) max  
 ※ Protection Earth screw tightening torque M6:5.8N · m (59.2kgf · cm) max



## External view

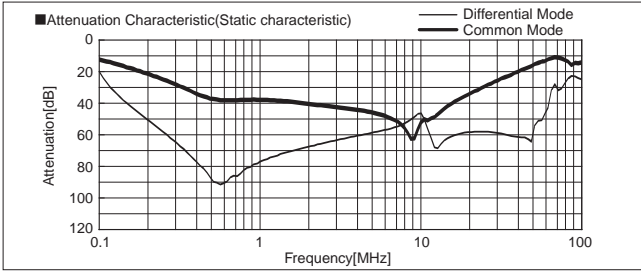
TAC-150-□□□  
TAH-150-□□□



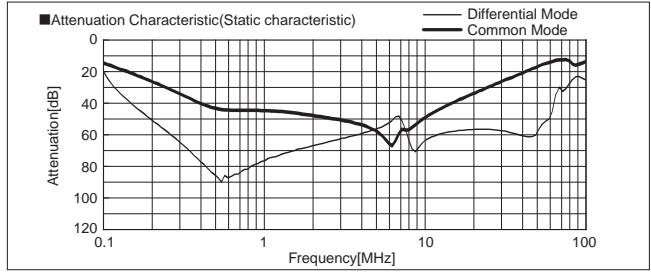
※ Can not be mounted upside-down.  
(mounted the top surface)

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 4.8kg max
- ※ Chassis Material : Stainless steel t=1.0 [0.04]
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M8:9.2N · m (93.9kgf · cm) max
- ※ Protection Earth screw tightening torque M6:5.8N · m (59.2kgf · cm) max

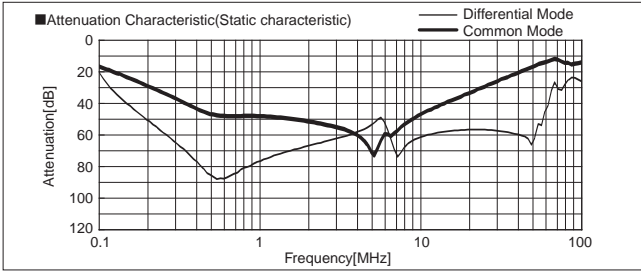
**TAC-50-103**



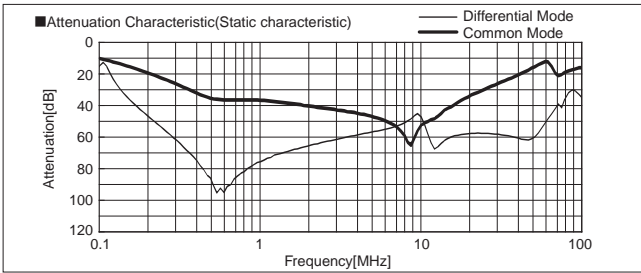
**TAC-50-223**



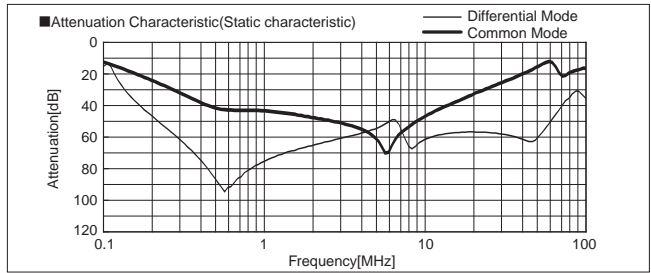
**TAC-50-333**



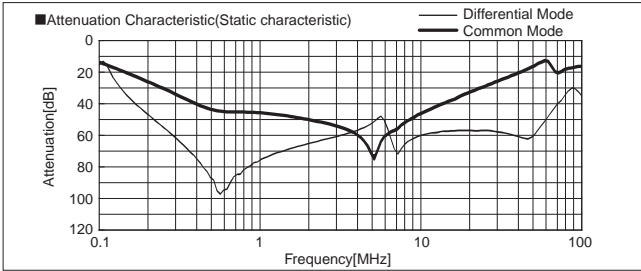
**TAC-60-103**



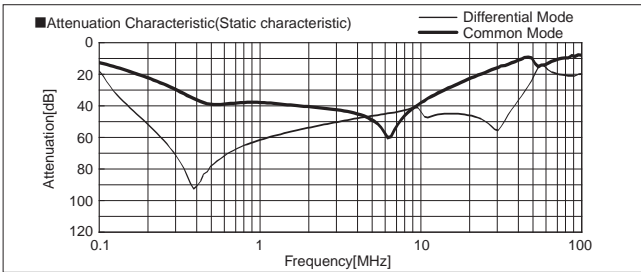
**TAC-60-223**



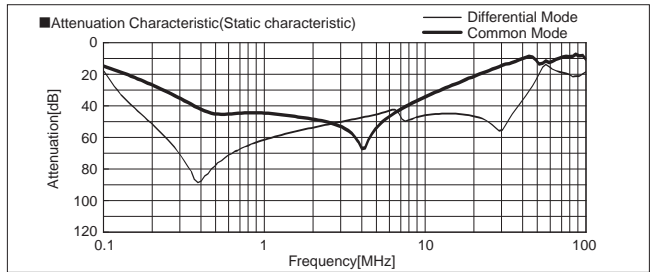
**TAC-60-333**



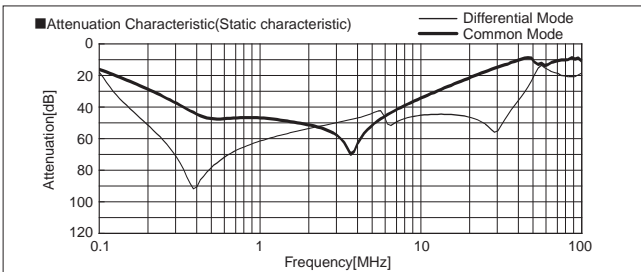
**TAC-80-103**



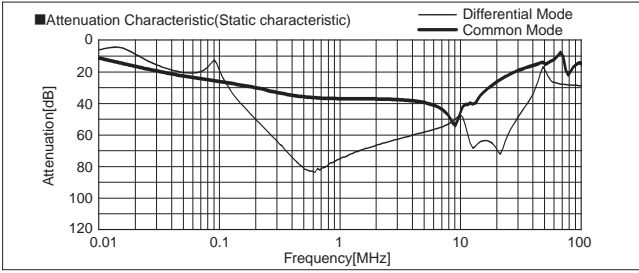
**TAC-80-223**



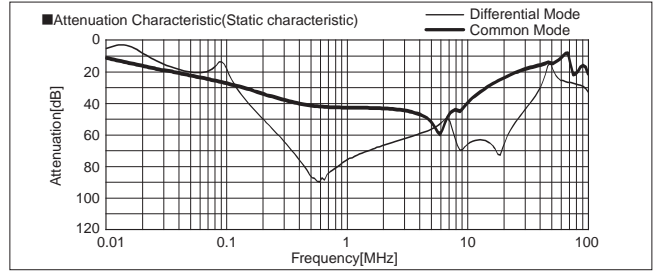
**TAC-80-333**



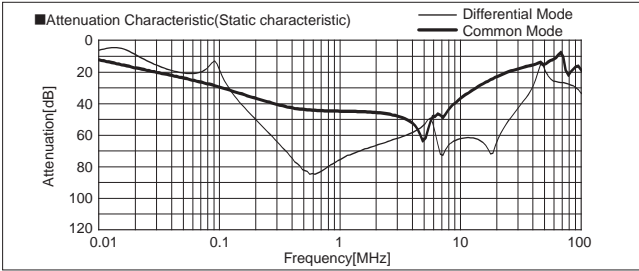
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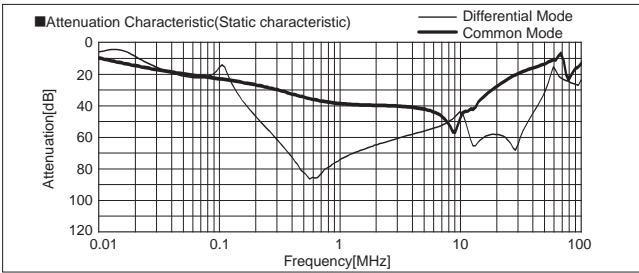
**TAH-50-223**



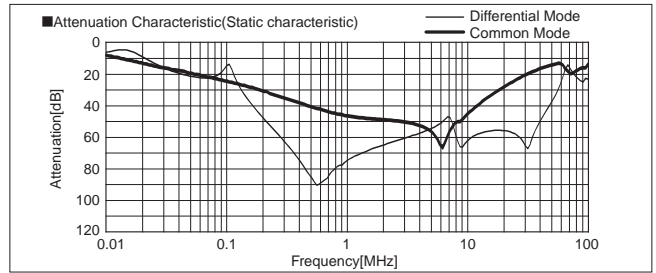
**TAH-50-333**



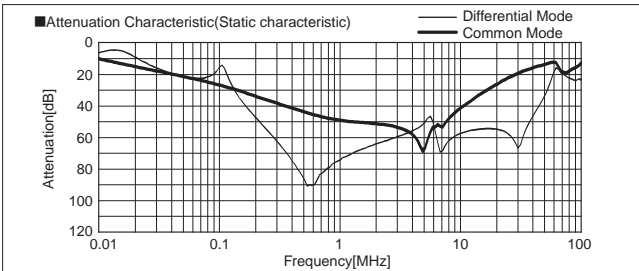
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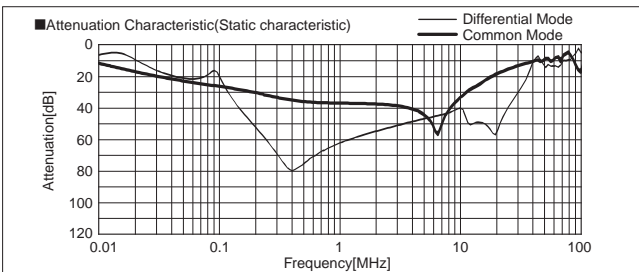
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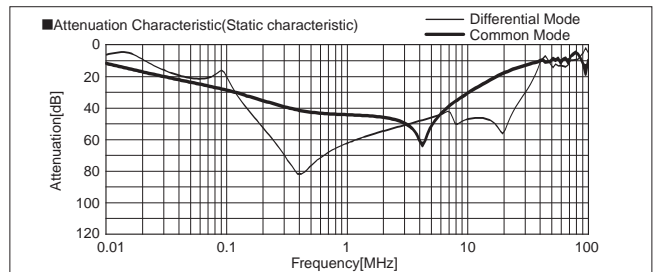
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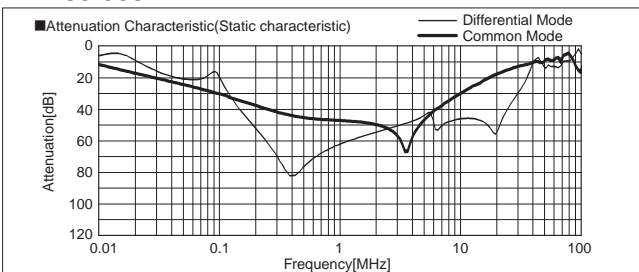
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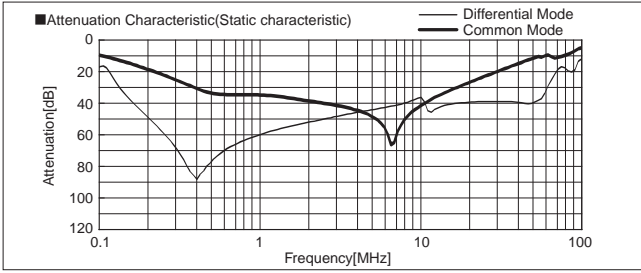
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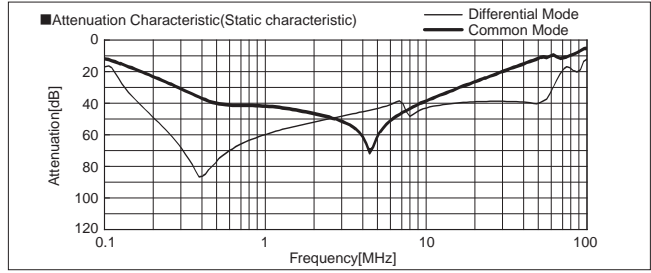
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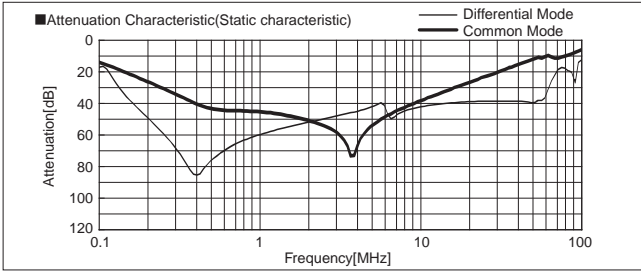
**TAC-100-103**



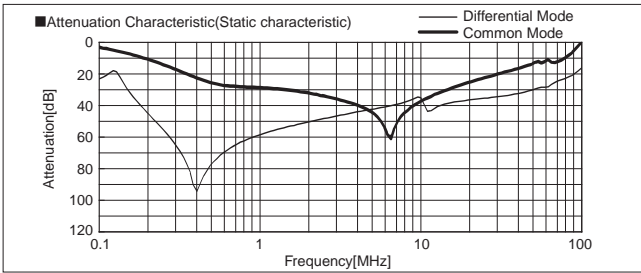
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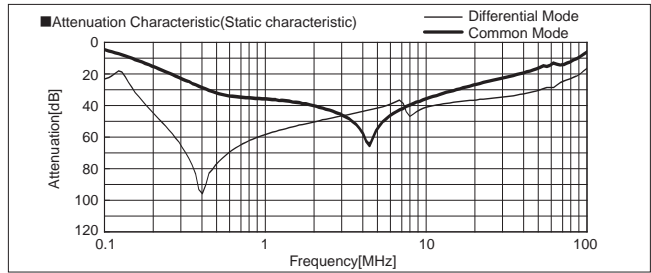
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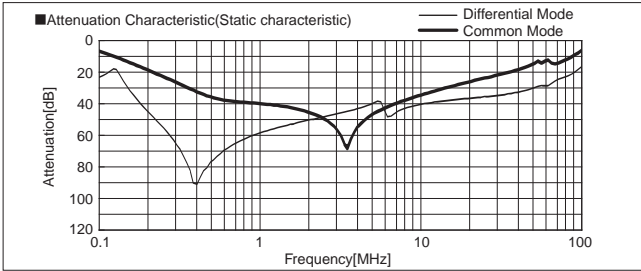
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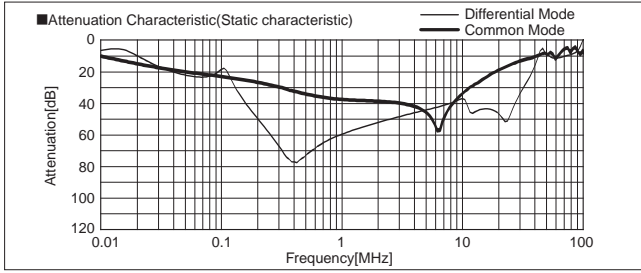
**TAC-150-223**



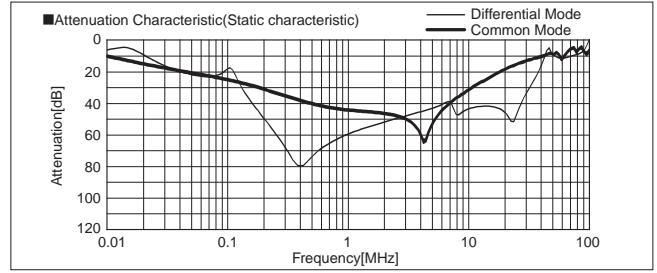
**TAC-150-333**



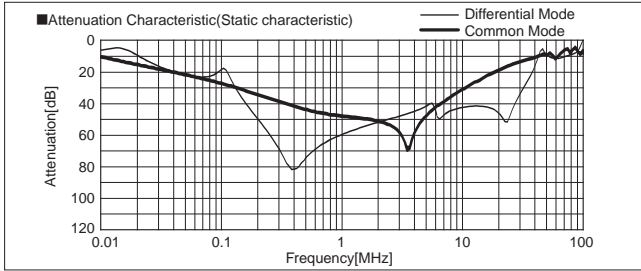
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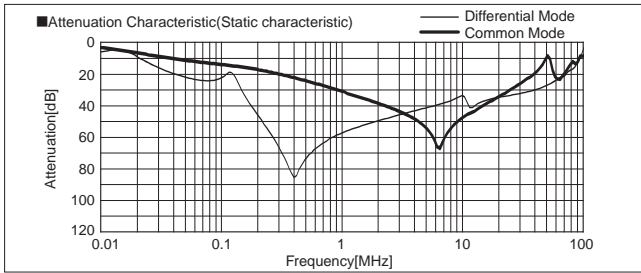
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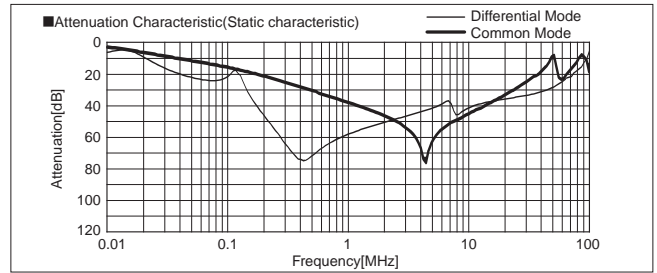
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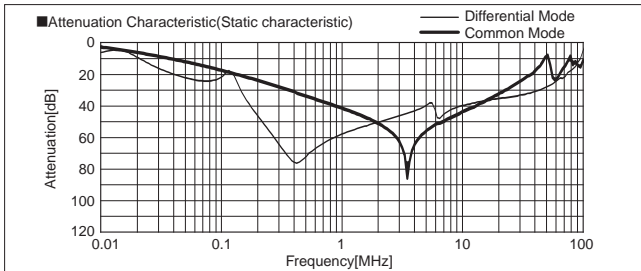
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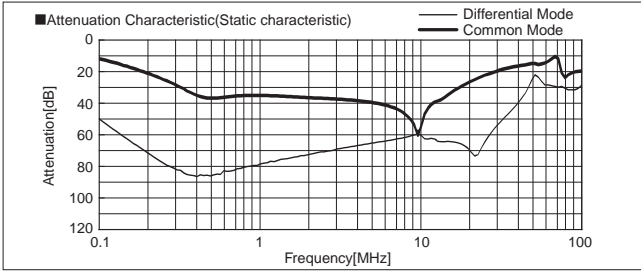
**TAH-150-223**



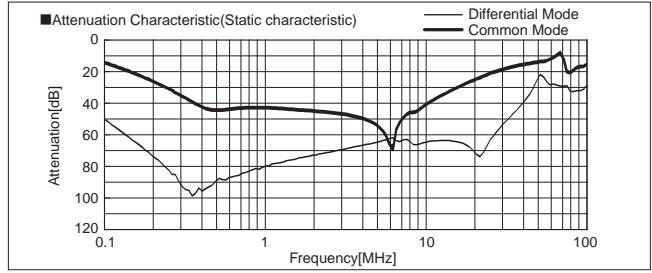
**TAH-150-333**



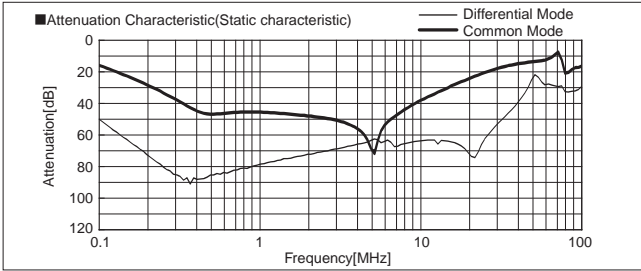
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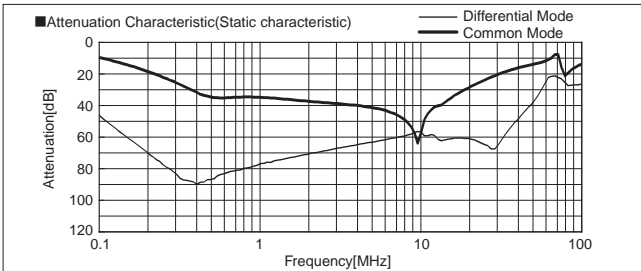
**TAC-50-223-U**



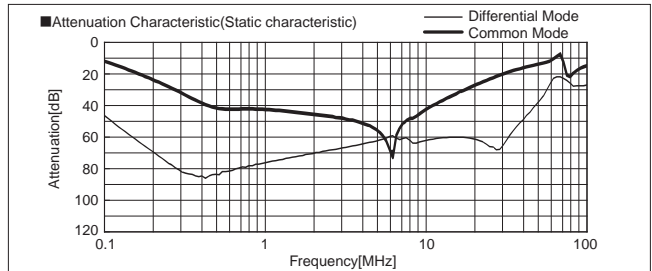
**TAC-50-333-U**



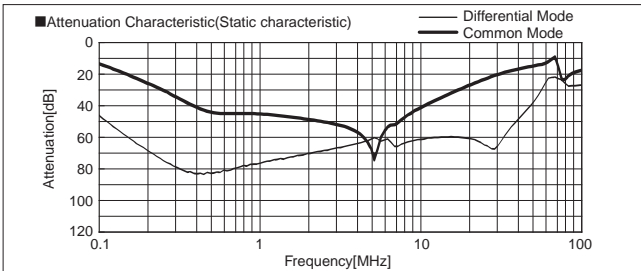
**TAC-60-103-U**



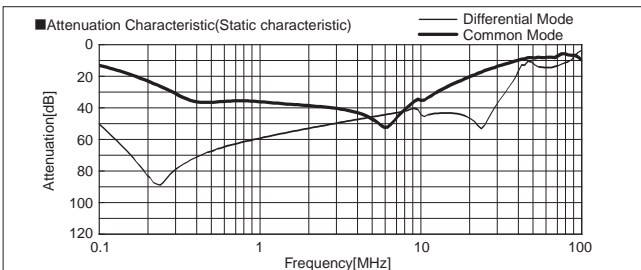
**TAC-60-223-U**



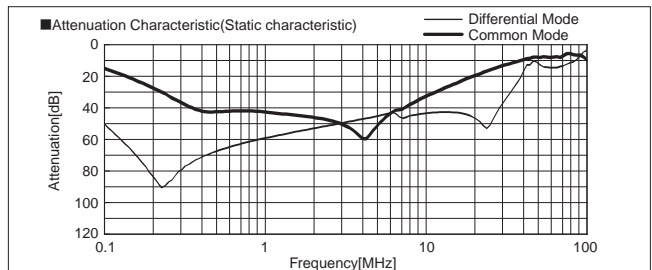
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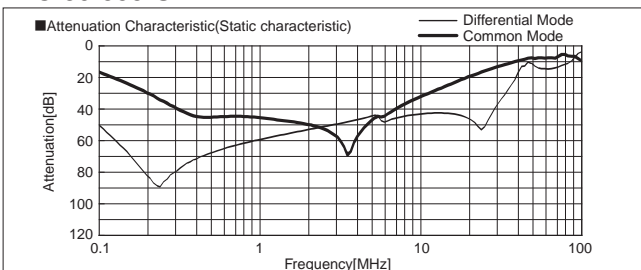
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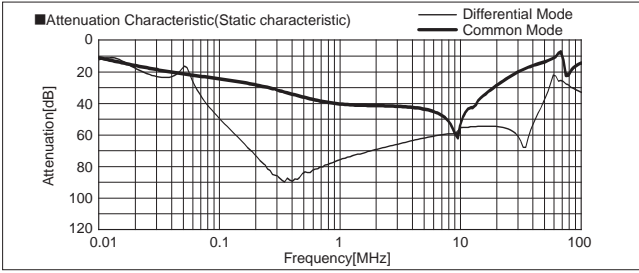
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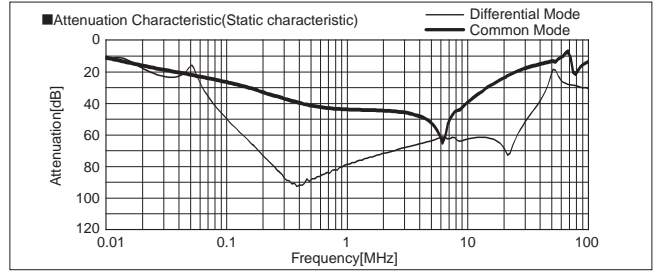
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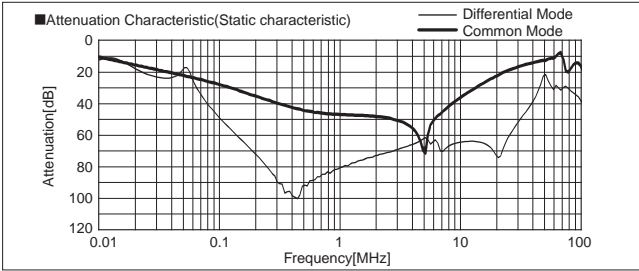
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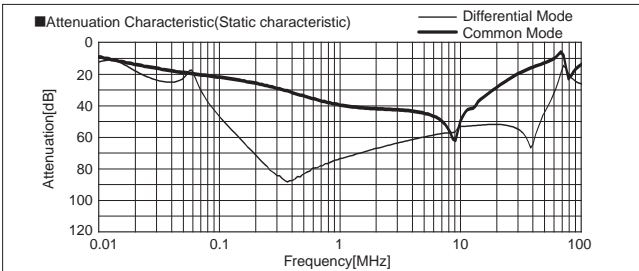
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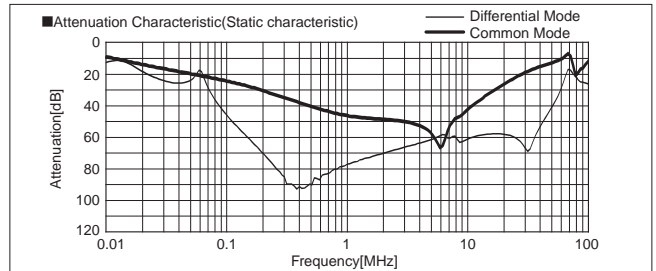
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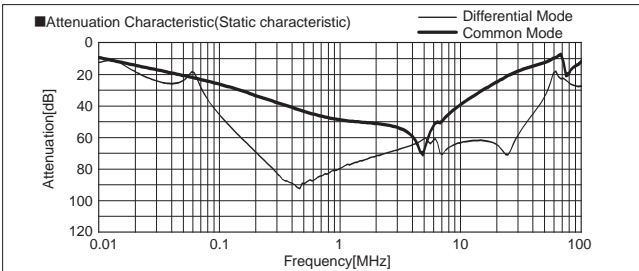
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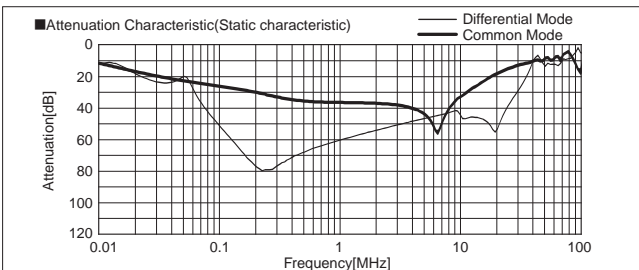
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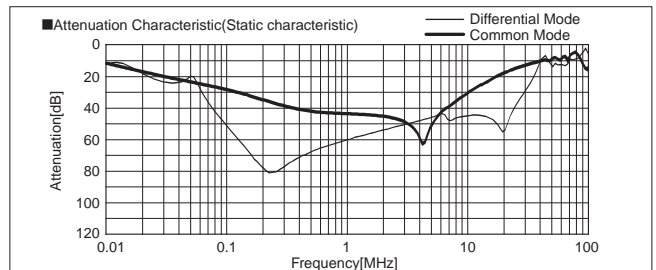
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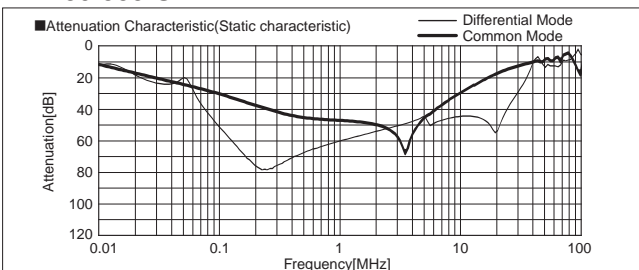
**TAH-80-103-U**



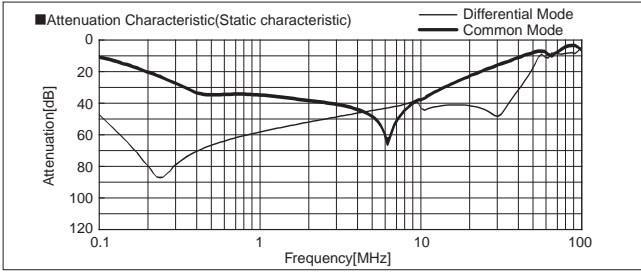
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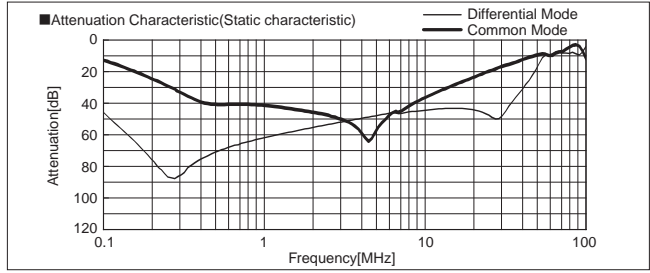
**TAH-80-333-U**



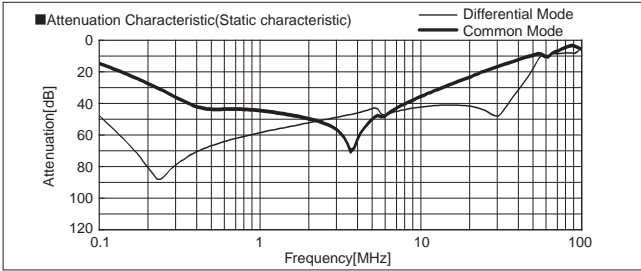
**TAC-100-103-U**



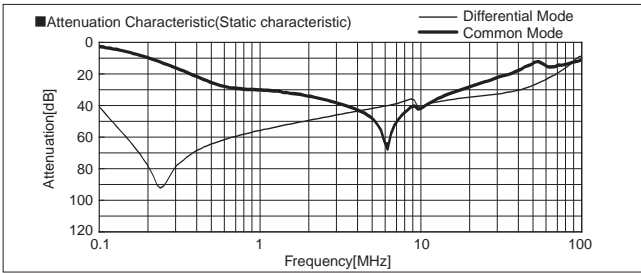
**TAC-100-223-U**



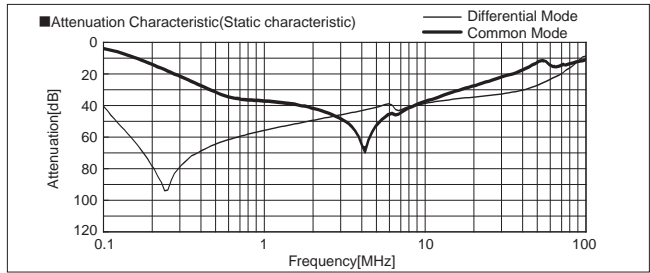
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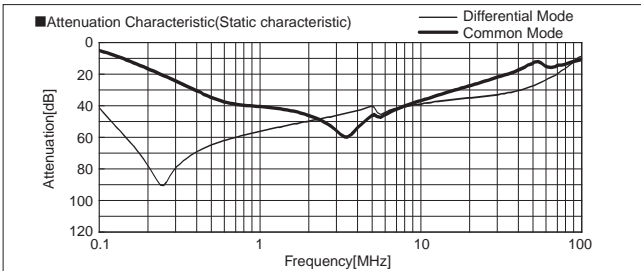
**TAC-150-103-U**



**TAC-150-223-U**

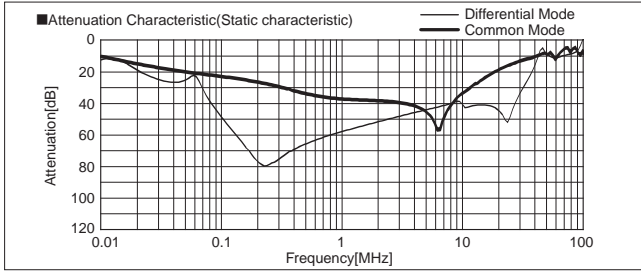


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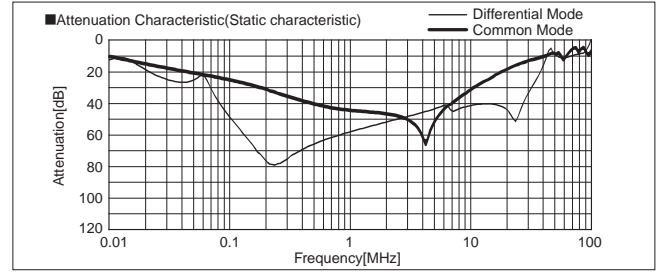




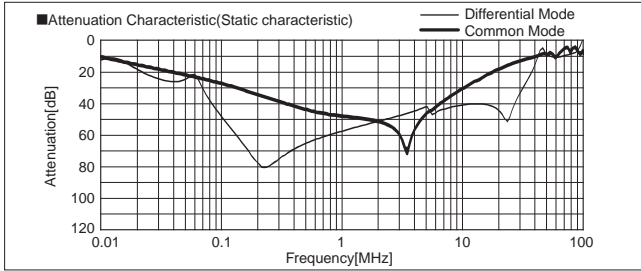
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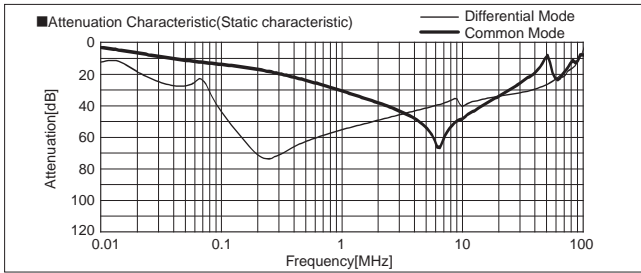
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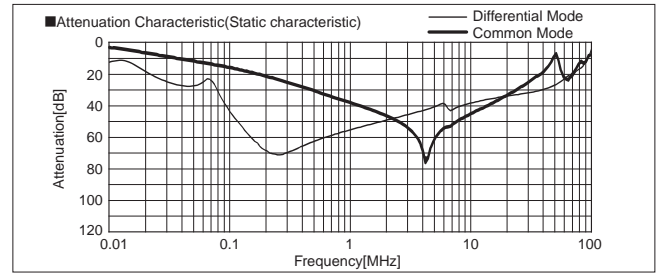
**TAH-100-333-U**



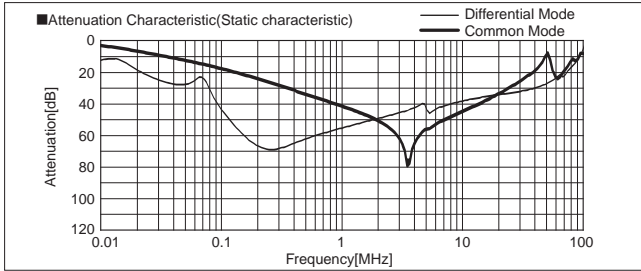
**TAH-150-103-U**



**TAH-150-223-U**

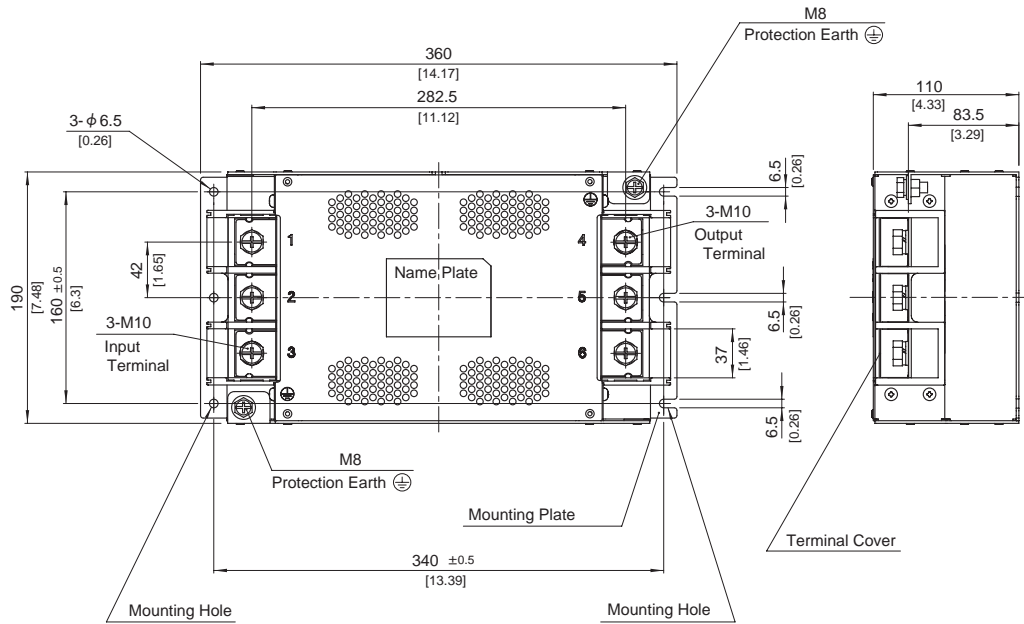


**TAH-150-333-U**





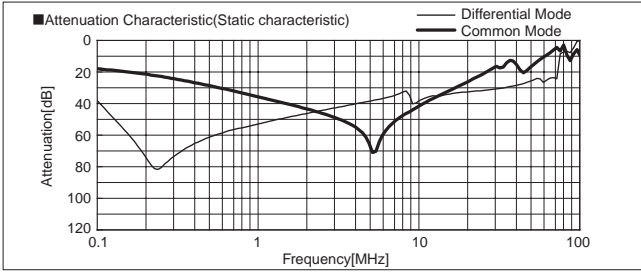
## External view



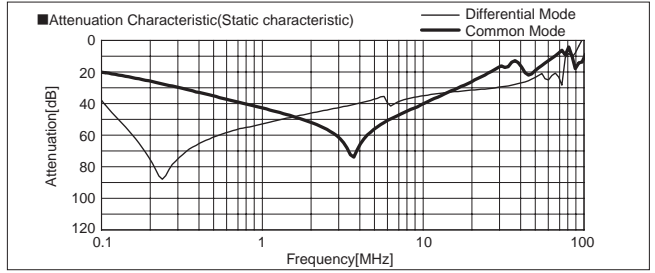
※ Can not be mounted upside-down.  
(mounted the top surface)

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 8.0kg max
- ※ Mounting Plate : Stainless steel  $t=2.0$  [0.08]
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M10 : 14.2N · m (144.9kgf · cm) max
- ※ Protection Earth screw tightening torque M8 : 9.2N · m (93.9kgf · cm) max

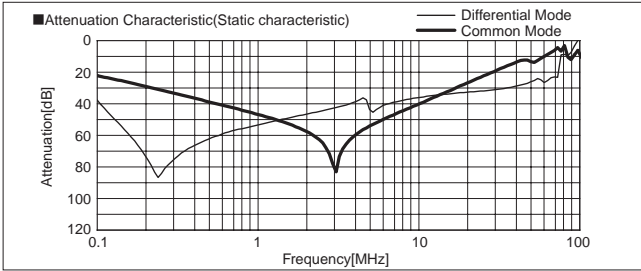
**TAC-200-103**



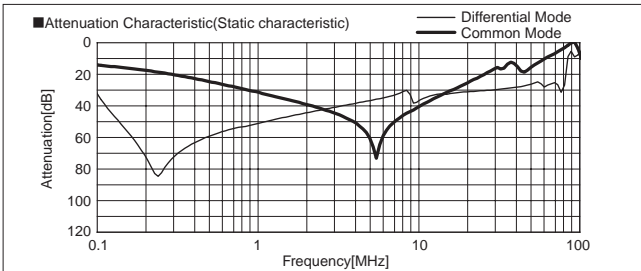
**TAC-200-223**



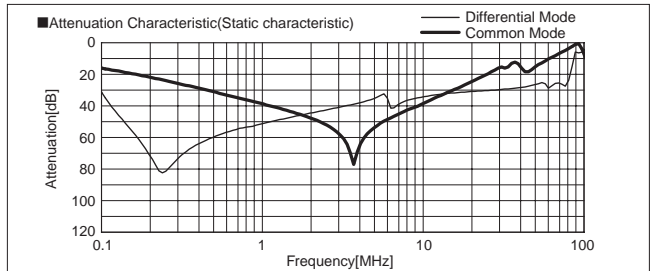
**TAC-200-333**



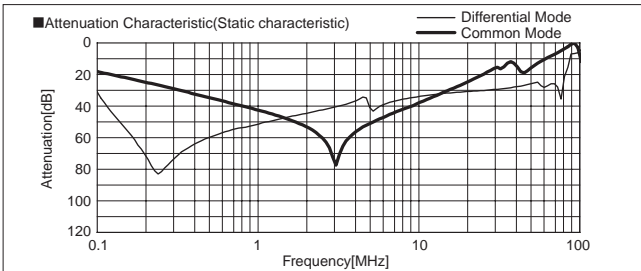
**TAC-250-103**



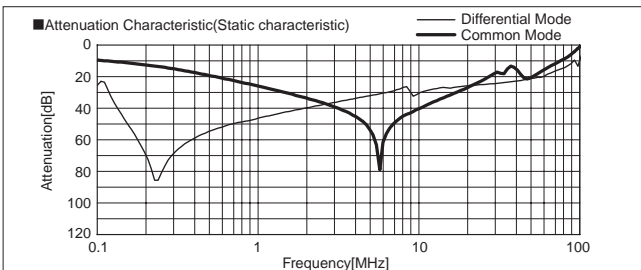
**TAC-250-223**



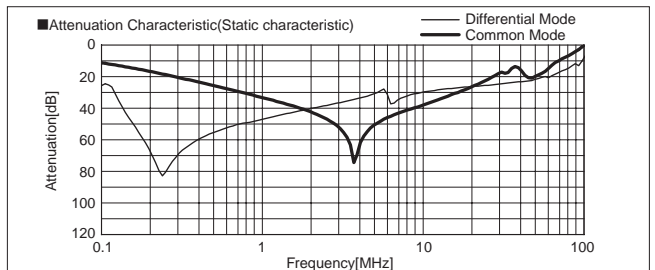
**TAC-250-333**



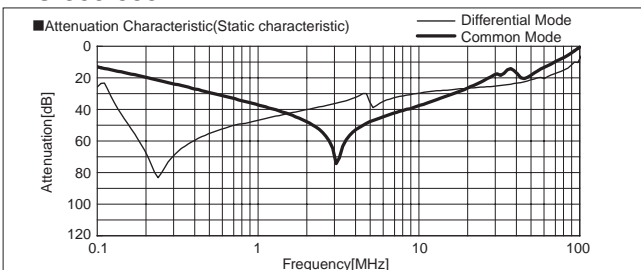
**TAC-300-103**



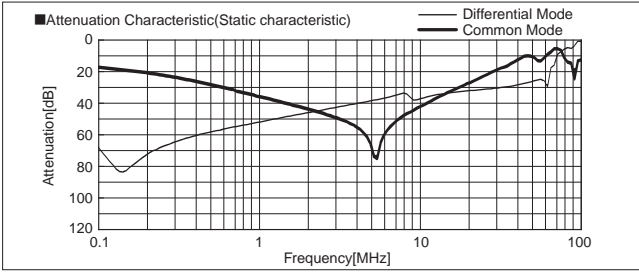
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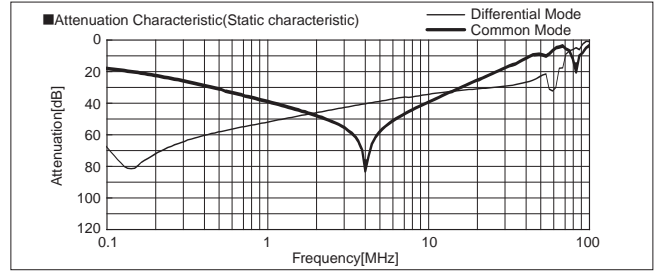
**TAC-300-333**



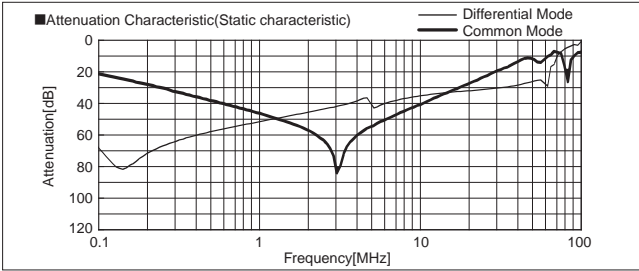
**TAC-200-103-U**



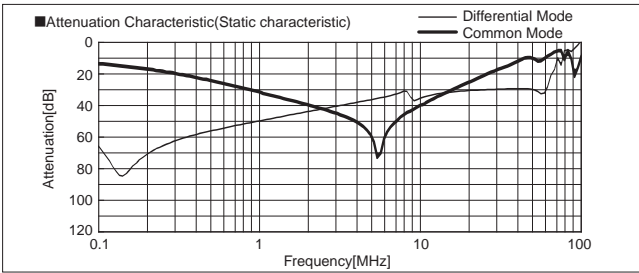
**TAC-200-223-U**



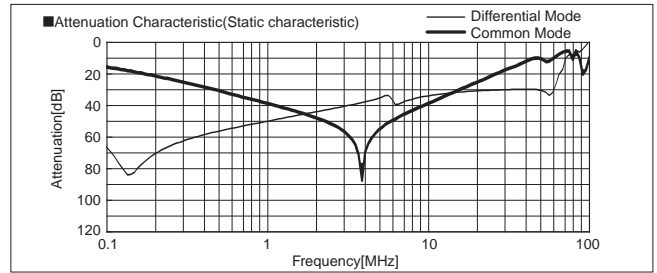
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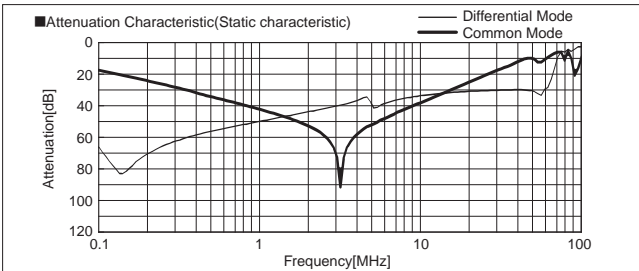
**TAC-250-103-U**



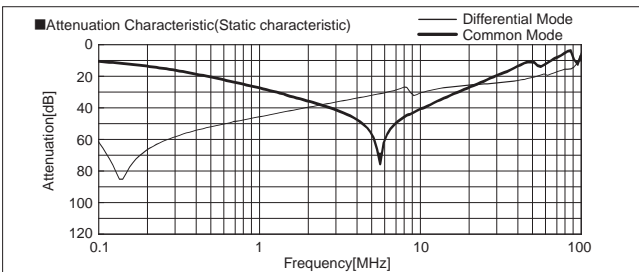
**TAC-250-223-U**



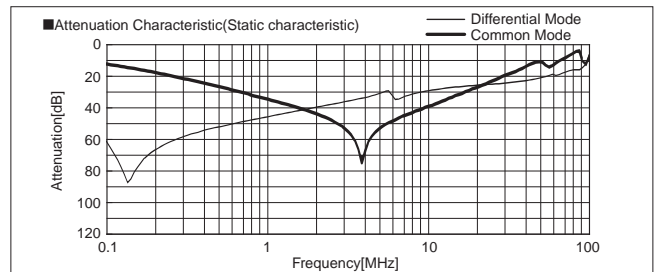
**TAC-250-333-U**



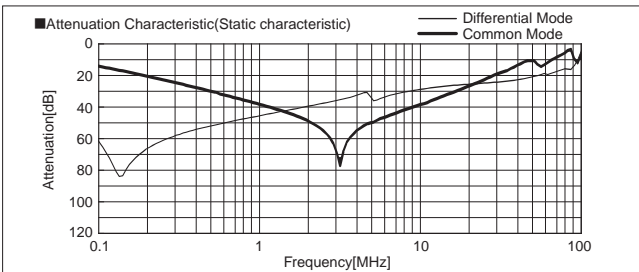
**TAC-300-103-U**



**TAC-300-223-U**



**TAC-300-333-U**



# FTA series(40,50,60A)

FTA -50 -683 -□

① ② ③ ④

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table 1.1 Line to ground capacitor code

Code	Leakage Current (Input 250/500V 60Hz) (335 Only 250/400V 60Hz)	Line to ground capacitor (nominal value)
223	1.0mA/2.0mA max	22,000pF
683	2.5mA/5.0mA max	68,000pF
104	3.5mA/7.0mA max	100,000pF
335	160mA/250mA max	3.3μF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

- ④ Option
- H: Ultra high attenuation type "335" is not applied.
- U: Improve differential mode attenuation (Rated voltage 250V)
- G: With switch of line to ground capacitor Only "335" is applied.
- \* Leakage current 160mA/250mA max when the switch state is ON (switched to "I"). 10μA/16μA max when the switch state is OFF (switched to "O").



## Features of FTA series

### Book type (Space-saving type)

- 1-stage filter General-purpose High-attenuation (150kHz - 1MHz)
- Selectable leakage current value, Ultra high attenuation type "335" for EU(Wye type with neutral earth system), With switch of line to ground capacitor "-G"

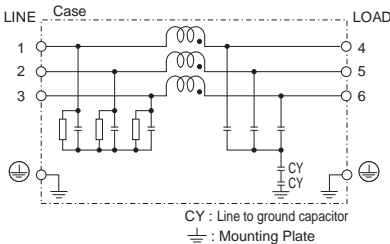
### Specifications

No.	Items	FTA-40-683	FTA-50-683	FTA-60-683
1	Rated Voltage[V]	AC Three Phase 500 (voltage range:528 max) 50/60Hz *1 *2		
2	Rated Current[A]	40	50	60
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 100mA), 1minute at room temperature and humidity *3		
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100MΩ min at room temperature and humidity *4		
5	Leakage current 250/500V 60Hz	2.5mA/5.0mA max		
6	DC resistance	8.5mΩ max	6mΩ max	4.5mΩ max
7	Safety agency approval temperatures	-25 to +85°C (Refer to Derating Curve)		
8	Operating temperature	-40 to +85°C (Refer to Derating Curve)		
9	Operating humidity	20 to 95%RH (Non condensing)		
10	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)		
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis		
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis		
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL) , DIN EN60939 VDE0565 Teil3-1, ENEC		
14	Case size (without projection)	65 X 84 X 153 mm (W X H X D) (Option: -G refer to external view) [2.56 X 3.31 X 6.02 inches] (W X H X D)		
15	Weight	1.2kg max		

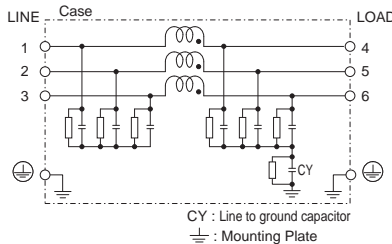
- \*1 Only capacitor code "335", Three Phase Δ-connection : 400 (440 max), Wye-connection : 500 (528 max)
- \*2 Only "FTA-□□□□□□-U", Three Phase 250 (275 max)
- \*3 Only capacitor code "335", 2,800VDC (Cutoff Current = 10mA), 1minute at room temperature and humidity.
- \*4 Only capacitor code "335", Isolation resistance specification is deleted.

## Circuit Diagram

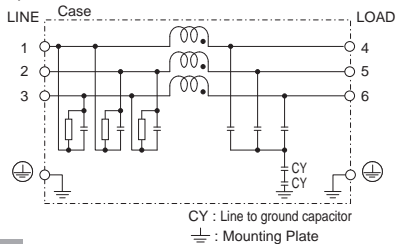
(1) Line to ground capacitor code : 223, 683, 104



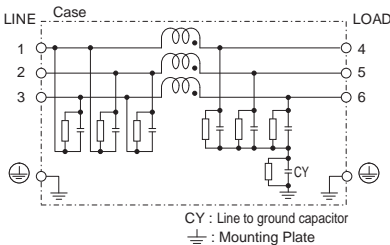
(2) Line to ground capacitor code : 335



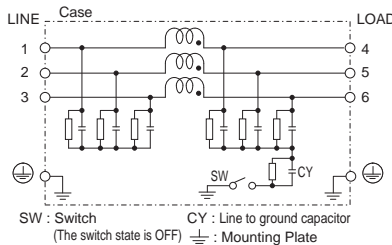
(3) Line to ground capacitor code : 223, 683, 104  
Option : U



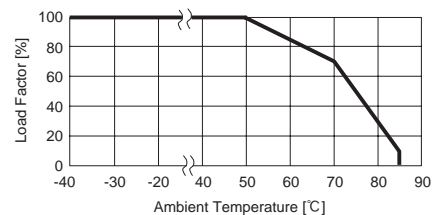
(4) FTA-□□□-335-U



(5) FTA-□□□-335-G

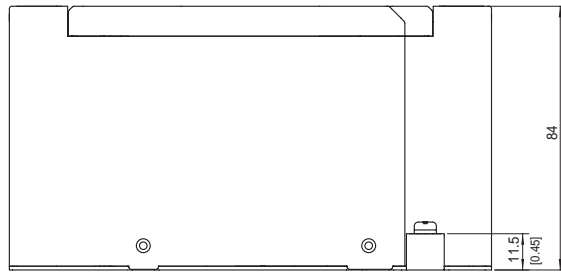
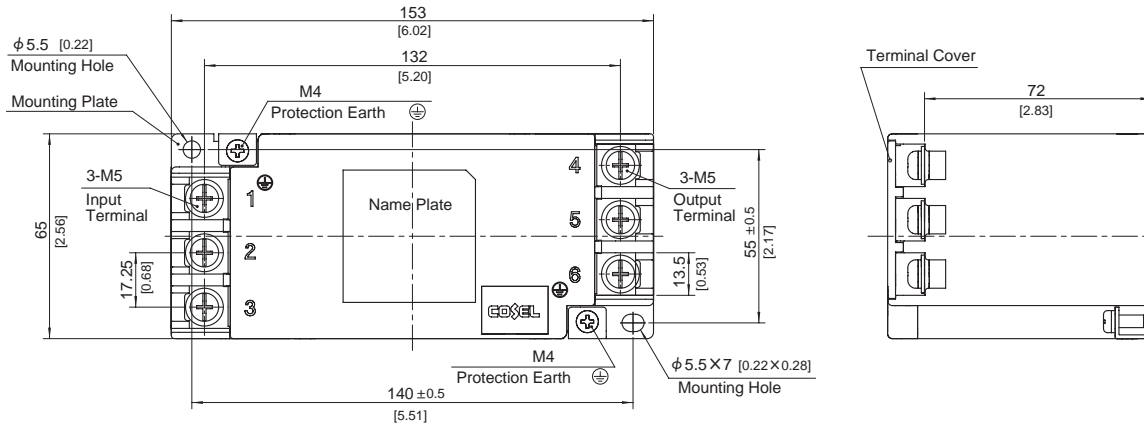


## Derating Curve



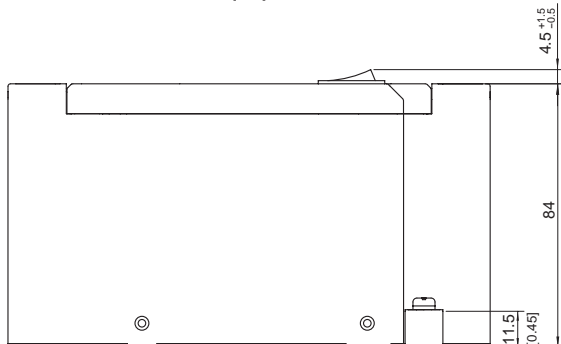
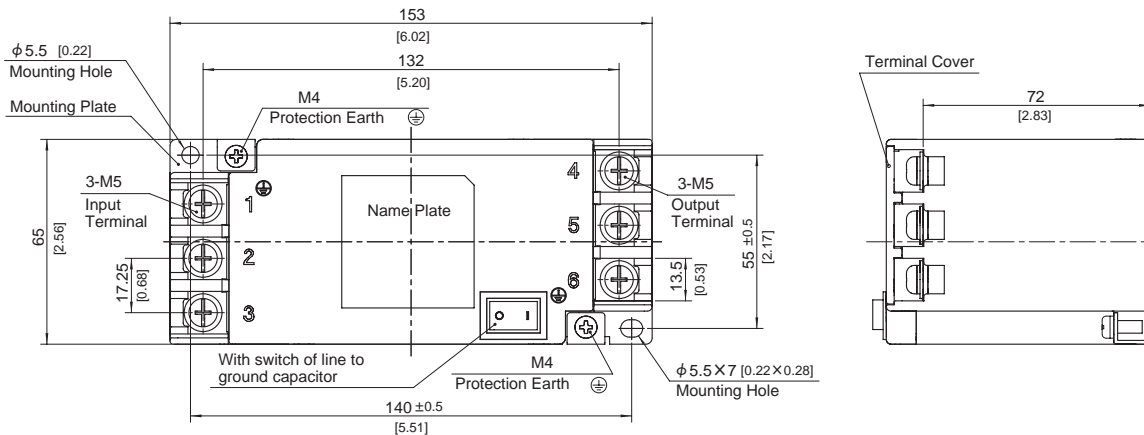
## External view

### Standard Type



- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 1.2kg max
- ※ Mounting Plate : Iron (surface finishing : nickel plating) t=1.2 [0.05]
- ※ Case : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M5 : 3.0N · m (30.7kgf · cm)max
- ※ Protection Earth (PE) screw tightening torque M4 : 1.6N · m (16.9kgf · cm)max
- ※ Can not be mounted upside-down (mounted the top surface)

### With switch of line to ground capacitor ON/OFF



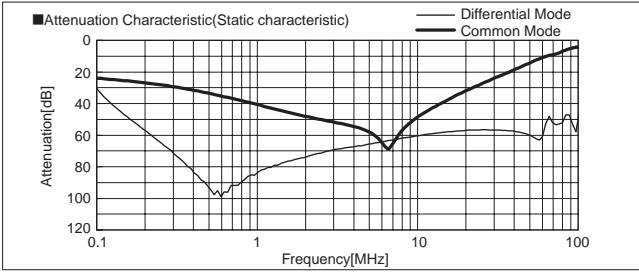
- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 1.2kg max
- ※ Mounting Plate : Iron (surface finishing : nickel plating) t=1.2 [0.05]
- ※ Case : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M5 : 3.0N · m (30.7kgf · cm)max
- ※ Protection Earth (PE) screw tightening torque M4 : 1.6N · m (16.9kgf · cm)max
- ※ Can not be mounted upside-down (mounted the top surface)
- ※ The switch state is OFF at shipping
- ※ Switch status ON : "I", OFF : "O"

※ HIGH LEAKAGE CURRENT  
first connect to earth

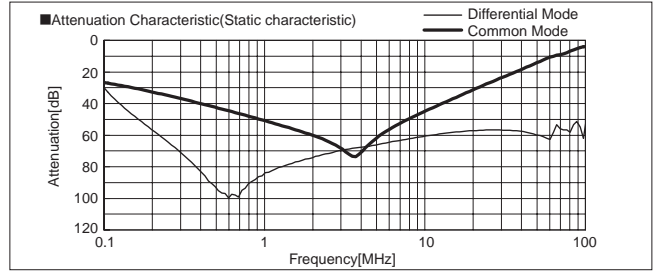




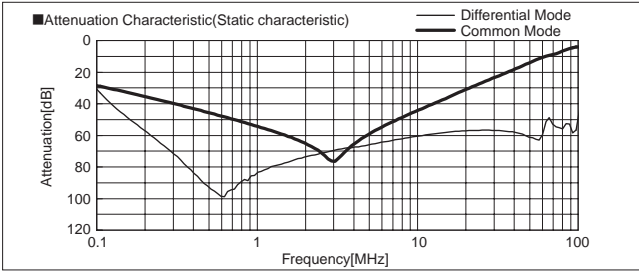
**FTA-40-223-H**



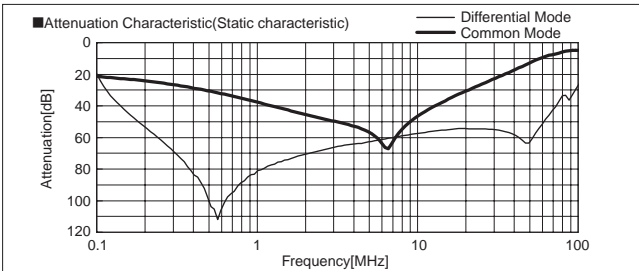
**FTA-40-683-H**



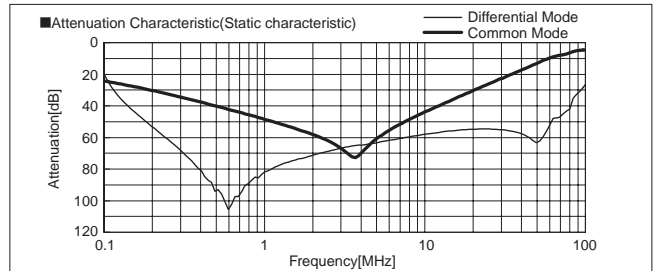
**FTA-40-104-H**



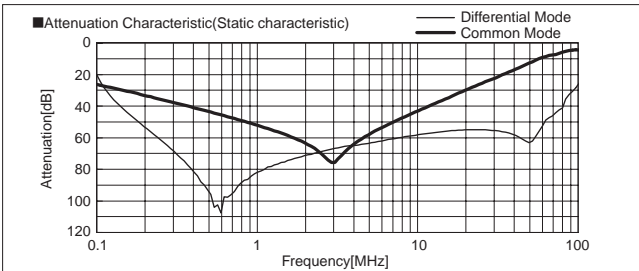
**FTA-50-223-H**



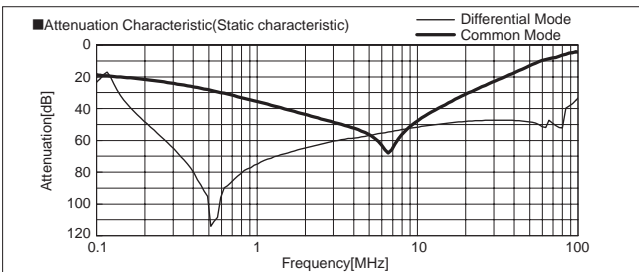
**FTA-50-683-H**



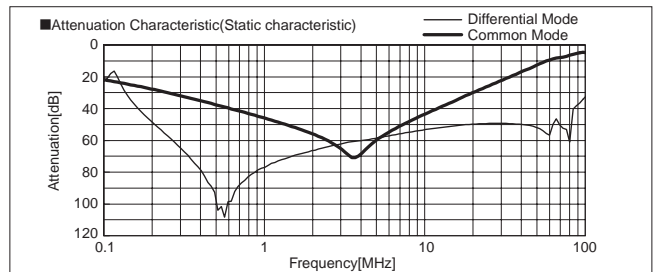
**FTA-50-104-H**



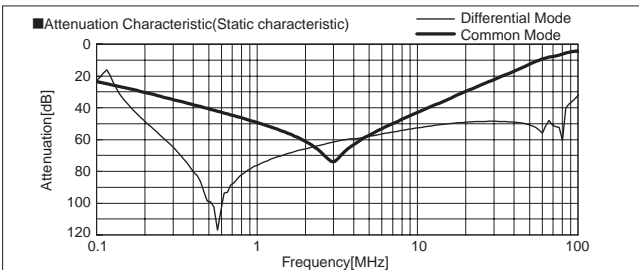
**FTA-60-223-H**



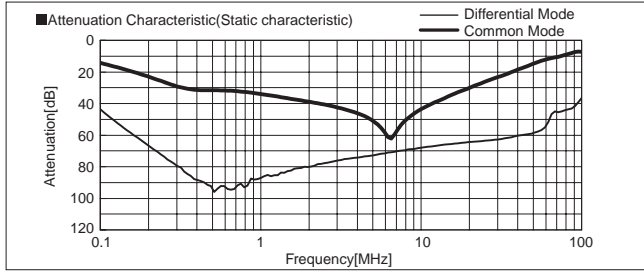
**FTA-60-683-H**



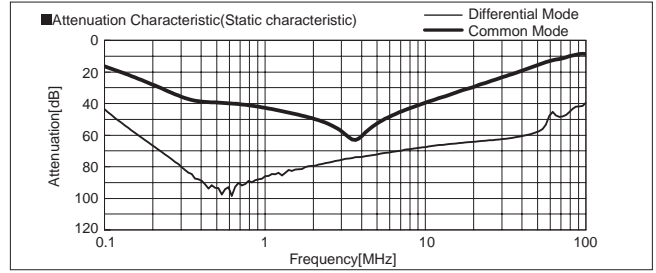
**FTA-60-104-H**



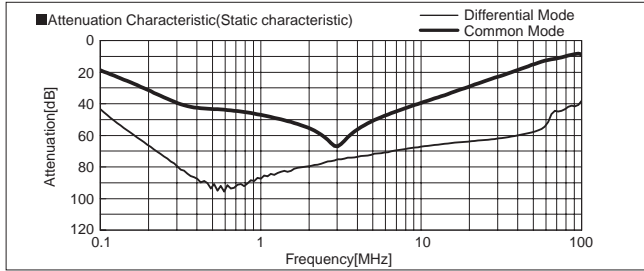
**FTA-40-223-U**



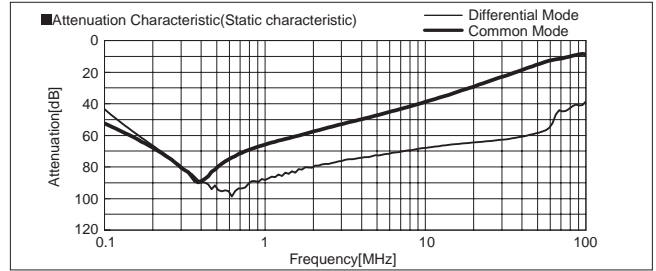
**FTA-40-683-U**



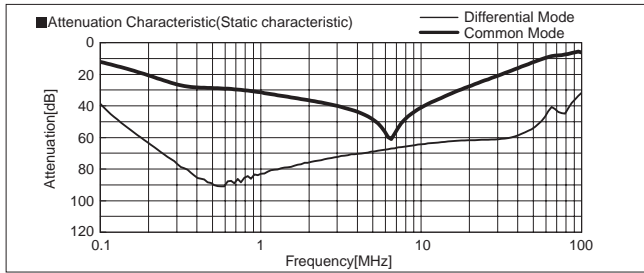
**FTA-40-104-U**



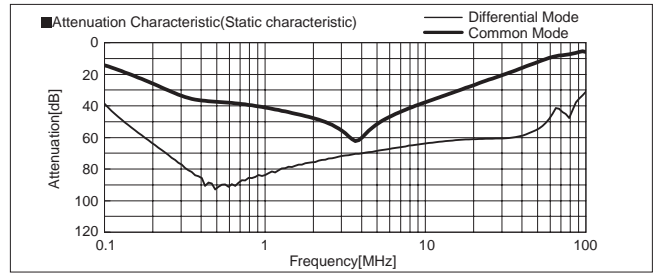
**FTA-40-335-U**



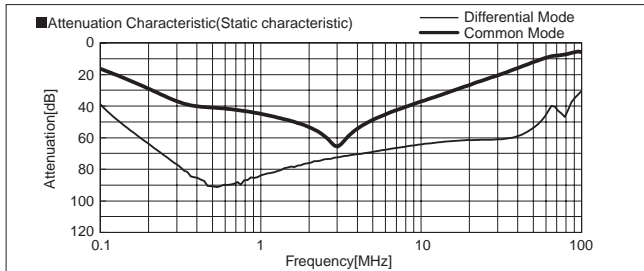
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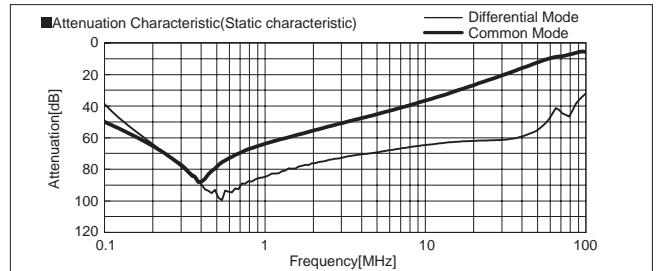
**FTA-50-683-U**



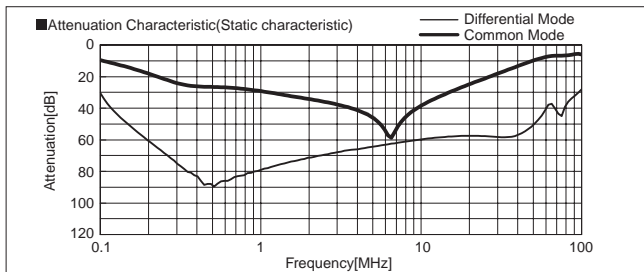
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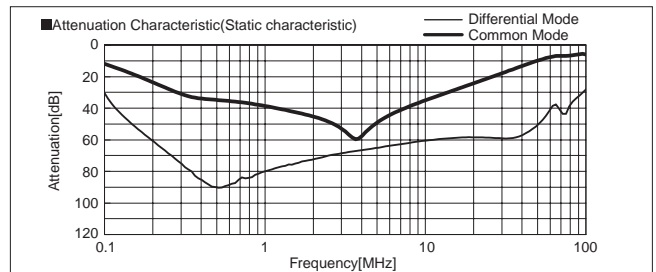
**FTA-50-335-U**



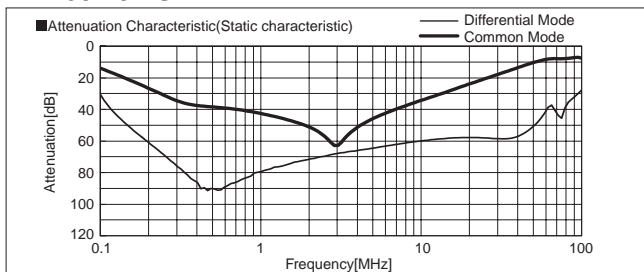
**FTA-60-223-U**



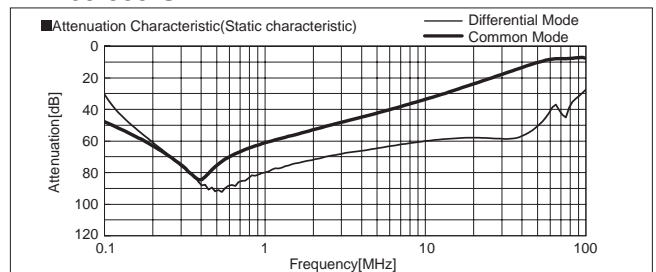
**FTA-60-683-U**



**FTA-60-104-U**



**FTA-60-335-U**

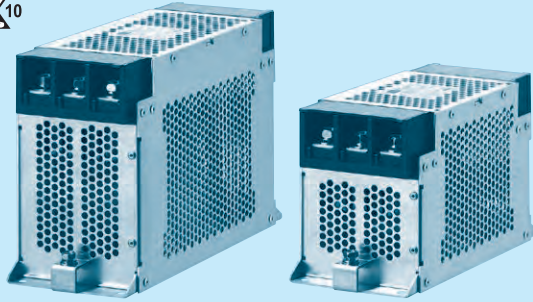




# FTA series(80,100,125,150A)

FTA -80 -683 -□

① ② ③ ④



- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

Code	Leakage Current (Input 250/500V 60Hz) (155,335 only 250/400V 60Hz)	Line to ground capacitor (nominal value)
223	1.0mA/2.0mA max	22,000pF
683	2.5mA/5.0mA max	68,000pF
104	3.5mA/7.0mA max	100,000pF
155	160mA/250mA max	1.5μF
335	320mA/500mA max	3.3μF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

- ④ Option
- H: Ultra high attenuation type  
"155", "335" is not applied.
- S: Hexagon socket head cap screw  
(Standard type is Hexagon head screw)
- U: Improve differential mode attenuation  
(Rated voltage 250V)
- G: With switch of line to ground capacitor  
Only "155", "335" is applied.
- \* "155" is Leakage current 160mA/250mA max when the switch state is ON (switched to "I").  
50μA/80μA max when the switch state is OFF (switched to "O").
- \* "335" is Leakage current 320mA/500mA max when the switch state is ON (switched to "I").  
50μA/80μA max when the switch state is OFF (switched to "O").

## Features of FTA series

### Book type (Space-saving type)

- 1-stage filter General-purpose High-attenuation (150kHz - 1MHz)
- Selectable leakage current value, Ultra high attenuation type "155", "335" for EU  
(Wye type with neutral earth system), With switch of line to ground capacitor "-G"

## Specifications

No.	Items	FTA-80-683	FTA-100-683	FTA-125-683	FTA-150-683
1	Rated Voltage[V]	AC Three phase 500 (voltage range:528 max) 50/60Hz *1 *2			
2	Rated Current[A]	80	100	125	150
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 100mA), 1minute at room temperature and humidity *3			
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100MΩ min at room temperature and humidity *4			
5	Leakage current 250/500V 60Hz	2.5mA/5.0mA max			
6	DC resistance	5mΩ max	4mΩ max	3mΩ max	3mΩ max
7	Safety agency approval temperatures	-25 to +85°C (Refer to Derating Curve)			
8	Operating temperature	-40 to +85°C (Refer to Derating Curve)			
9	Operating humidity	20 to 95%RH (Non condensing)			
10	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)			
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis			
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis			
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC			
14	Case size (without projection)	100 X 130 X 210 mm (W X H X D) (Option: -G refer to external view) [3.94 X 5.12 X 8.27 inches]			100 X 170 X 260 mm (W X H X D) (Option: -G refer to external view) [3.94 X 6.69 X 10.24 inches]
15	Weight	3.1kg max			4.2kg max

\*1 Only capacitor code and option "155", "335", Three Phase Δ-connection:400 (440 max), Wye-connection:500(528 max)

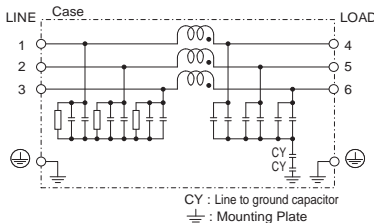
\*2 Only option "U", Three Phase 250(275 max)

\*3 Only capacitor code and option "155", "335", 2,800VDC (Cutoff Current = 10mA), 1minute at room temperature and humidity.

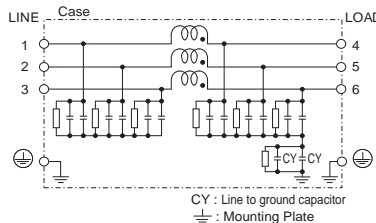
\*4 Only capacitor code and option "155", "335", Isolation resistance specification is deleted.

## Circuit Diagram

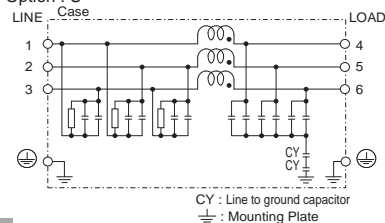
(1) Line to ground capacitor code : 223, 683, 104



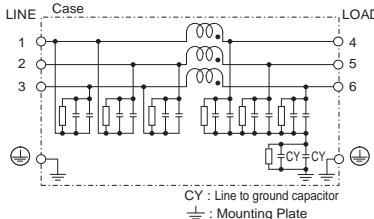
(2) Line to ground capacitor code : 155, 335



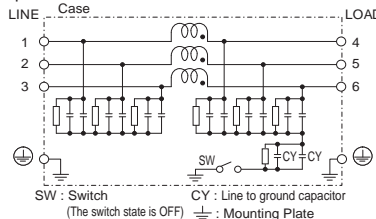
(3) Line to ground capacitor code : 223, 683, 104  
Option : U



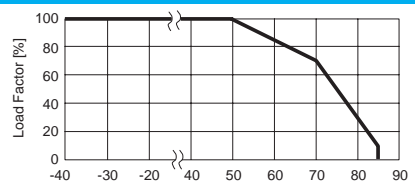
(4) Line to ground capacitor code : 155, 335  
Option : U



(5) Line to ground capacitor code : 155, 335  
Option : G

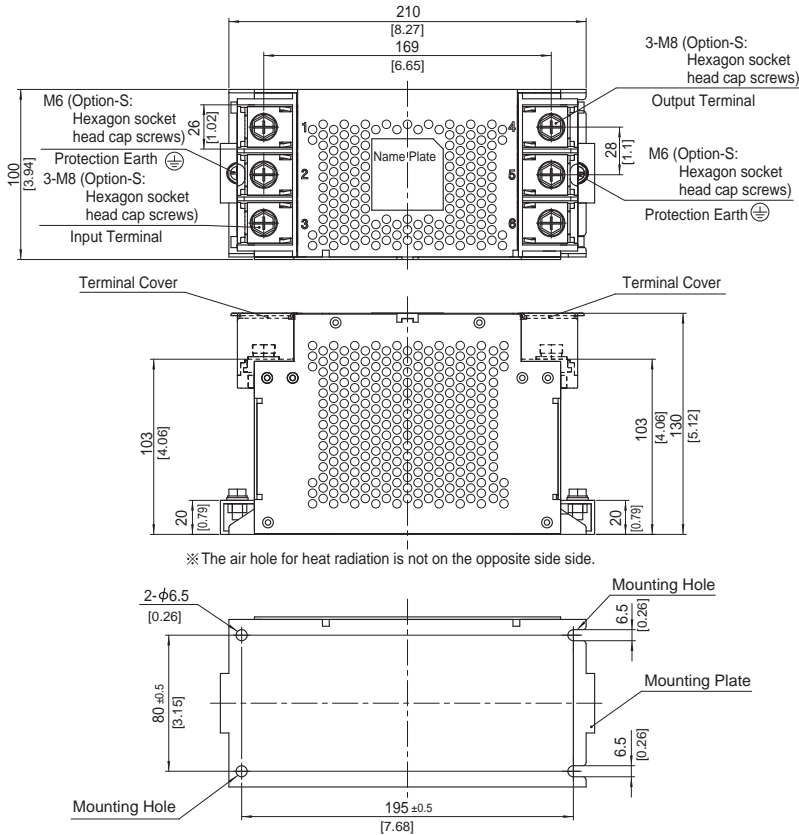


## Derating Curve



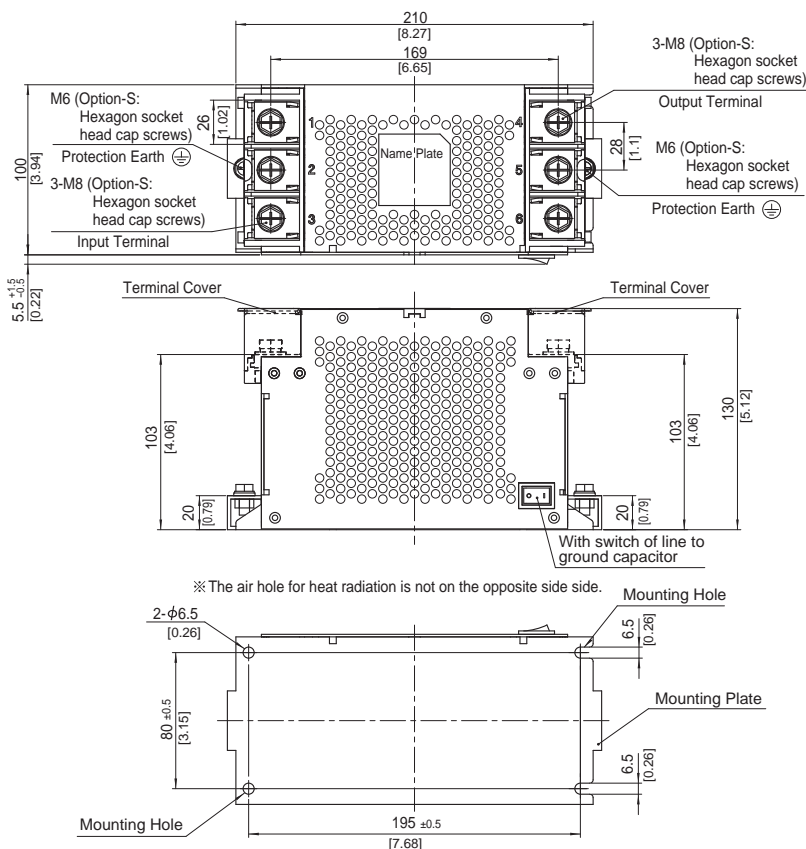
## External view

### FTA-80 / FTA-100 / FTA-125



- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 3.1kg max
- ※ Mounting Plate : Aluminum t=2.0 [0.08]
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque  
M8 : 9.2N · m(93.9kgf · cm)max
- ※ Protection Earth (PE) screw tightening torque  
M6 : 5.8N · m(59.2kgf · cm)max
- ※ Can not be mounted upside-down  
(mounted the top surface)
- ※ Keep free ventilation holes for cooling

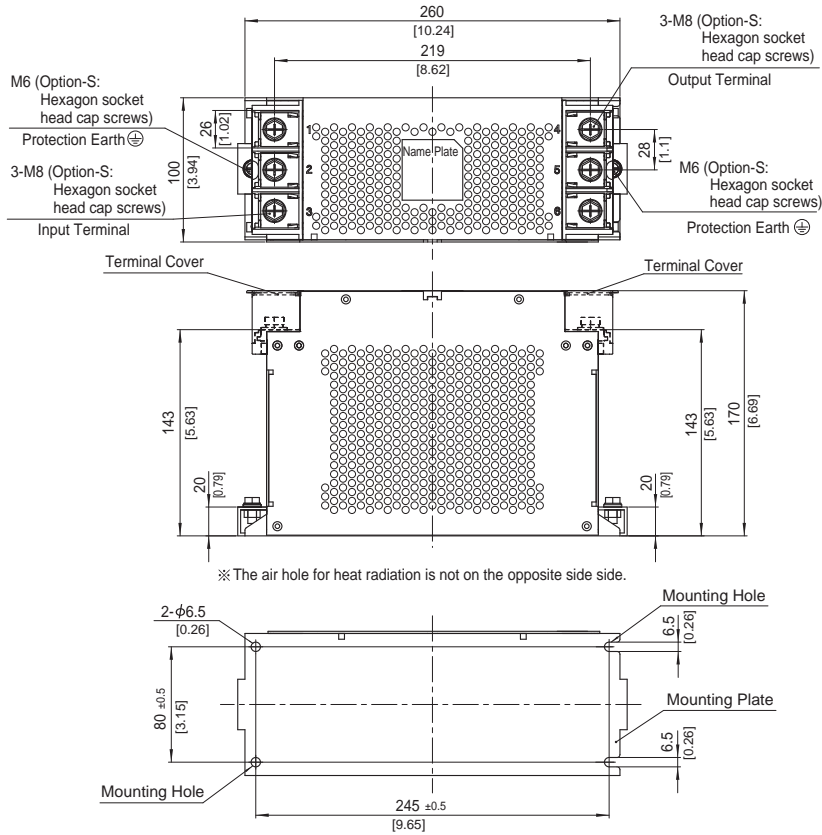
### FTA-80 / FTA-100 / FTA-125 with switch of line to ground capacitor ON/OFF



- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 3.1kg max
- ※ Mounting Plate : Aluminum t=2.0 [0.08]
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque  
M8 : 9.2N · m(93.9kgf · cm)max
- ※ Protection Earth (PE) screw tightening torque  
M6 : 5.8N · m(59.2kgf · cm)max
- ※ Can not be mounted upside-down  
(mounted the top surface)
- ※ Keep free ventilation holes for cooling
- ※ The switch state is OFF at shipping
- ※ Switch status ON : "I", OFF : "O"
- ※ HIGH LEAKAGE CURRENT  
first connect to earth

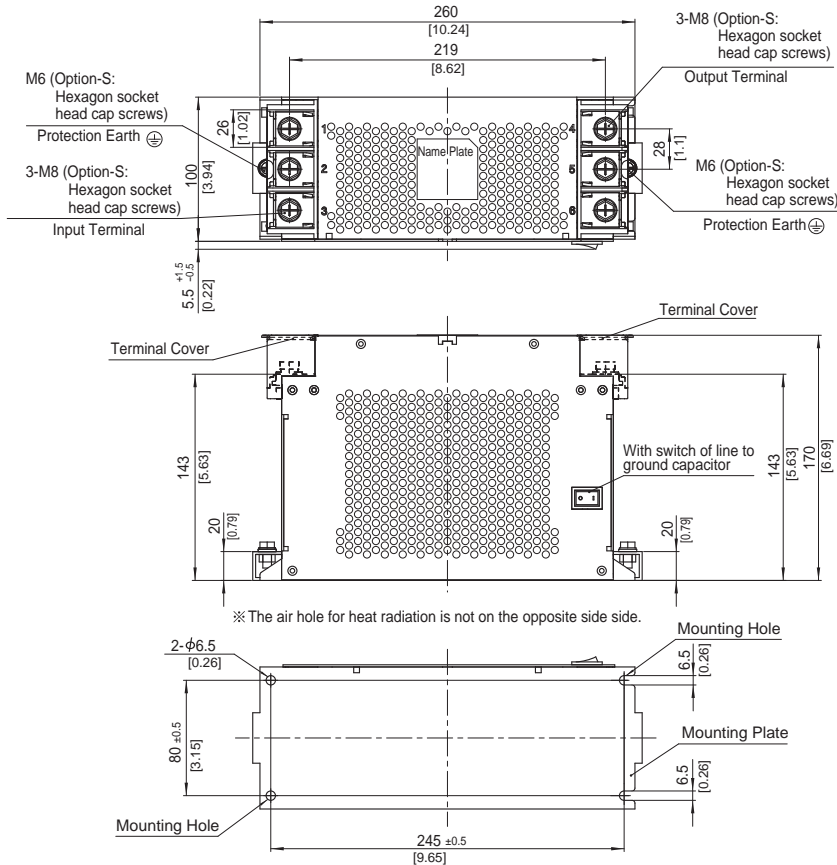
## External view

### FTA-150



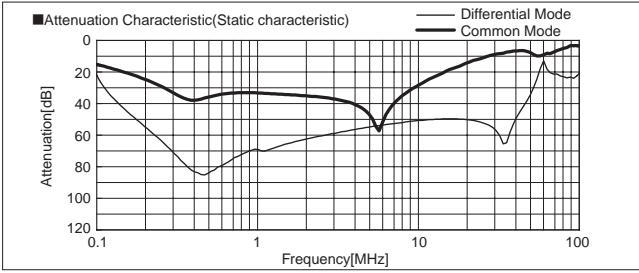
- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 4.2kg max
- ※ Mounting Plate : Aluminum  $t=2.0$  [0.08]
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque  
M8 :  $9.2N \cdot m$  (93.9kgf  $\cdot$  cm)max
- ※ Protection Earth (PE) screw tightening torque  
M6 :  $5.8N \cdot m$  (59.2kgf  $\cdot$  cm)max
- ※ Can not be mounted upside-down (mounted the top surface)
- ※ Keep free ventilation holes for cooling

### FTA-150 with switch of line to ground capacitor ON/OFF

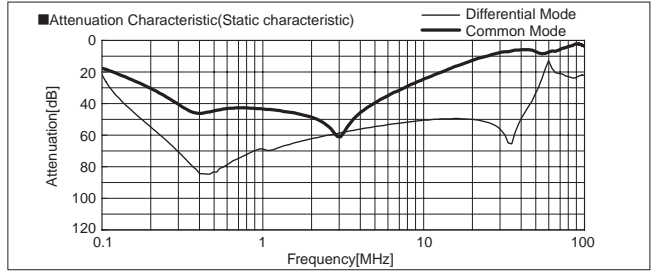


- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 4.2kg max
- ※ Mounting Plate : Aluminum  $t=2.0$  [0.08]
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque  
M8 :  $9.2N \cdot m$  (93.9kgf  $\cdot$  cm)max
- ※ Protection Earth (PE) screw tightening torque  
M6 :  $5.8N \cdot m$  (59.2kgf  $\cdot$  cm)max
- ※ Can not be mounted upside-down (mounted the top surface)
- ※ Keep free ventilation holes for cooling
- ※ The switch state is OFF at shipping
- ※ Switch status ON : " | ", OFF : " O "
- ※ HIGH LEAKAGE CURRENT first connect to earth

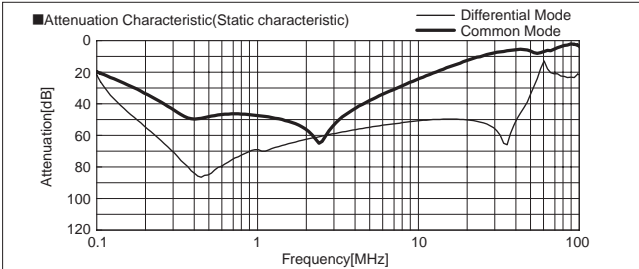
**FTA-80-223**



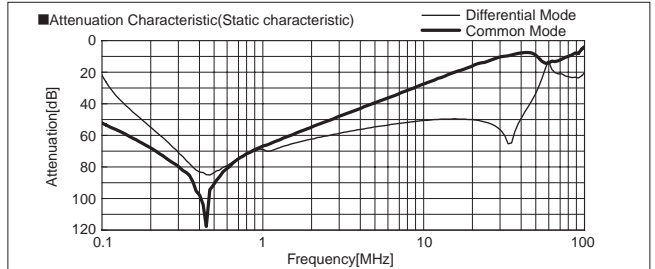
**FTA-80-683**



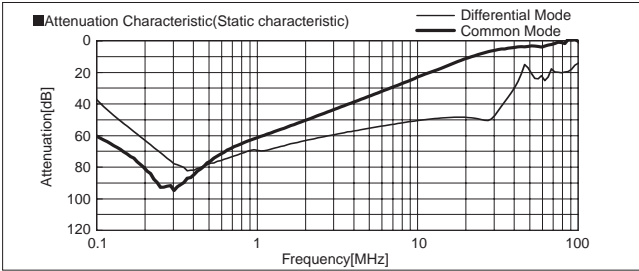
**FTA-80-104**



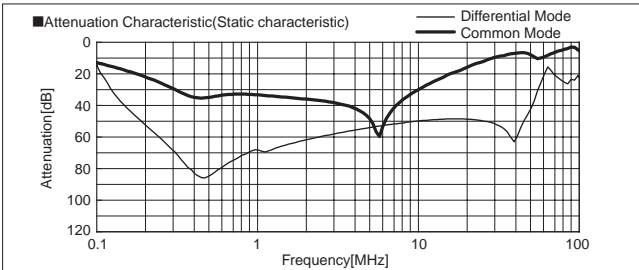
**FTA-80-155**



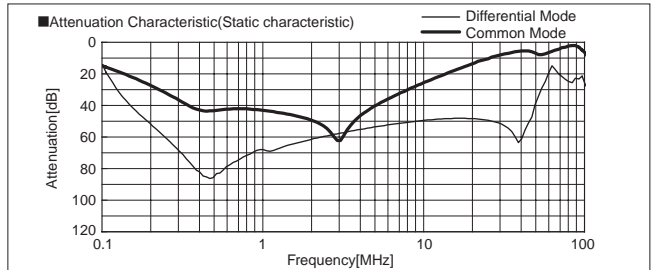
**FTA-80-335**



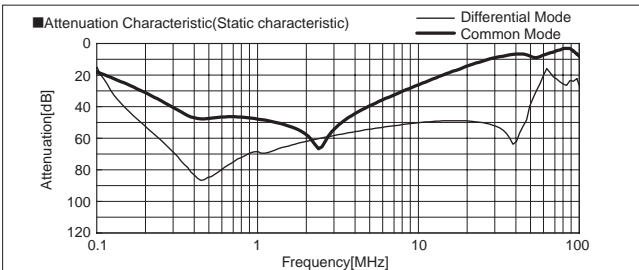
**FTA-100-223**



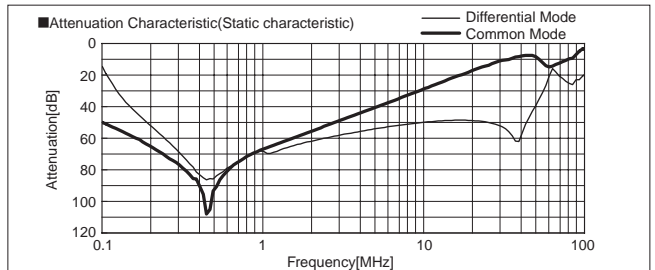
**FTA-100-683**



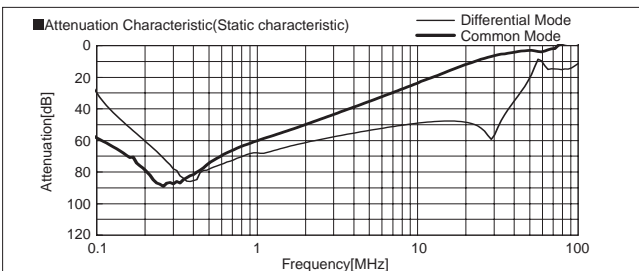
**FTA-100-104**



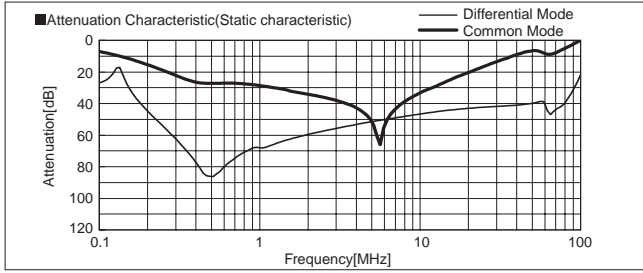
**FTA-100-155**



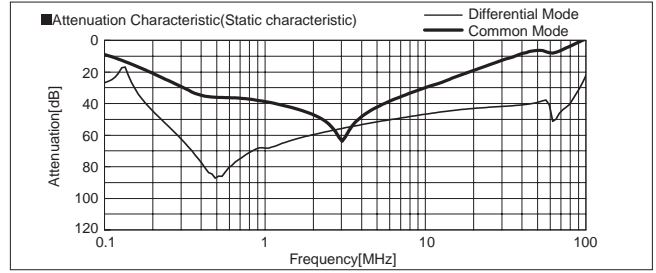
**FTA-100-335**



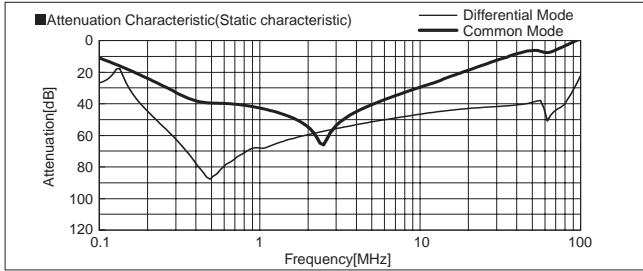
**FTA-125-223**



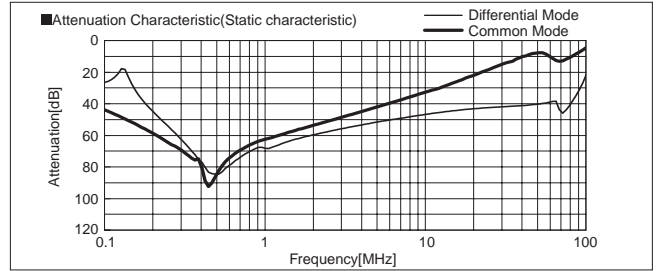
**FTA-125-683**



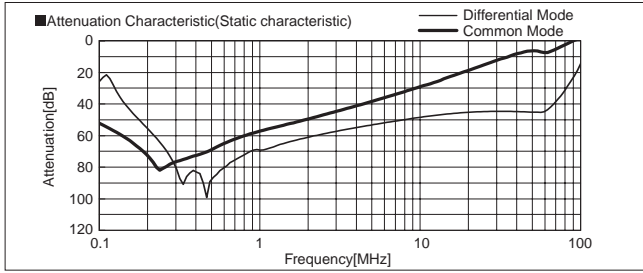
**FTA-125-104**



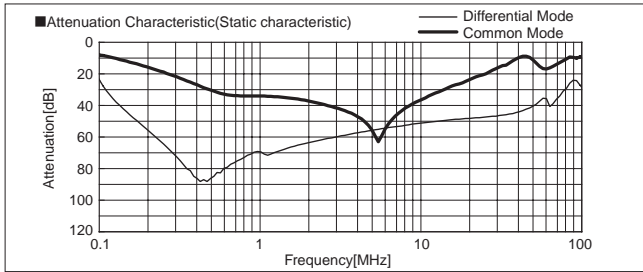
**FTA-125-155**



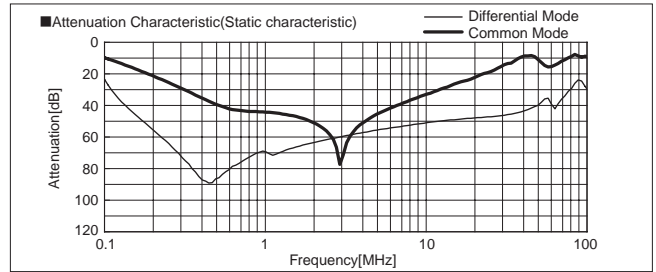
**FTA-125-335**



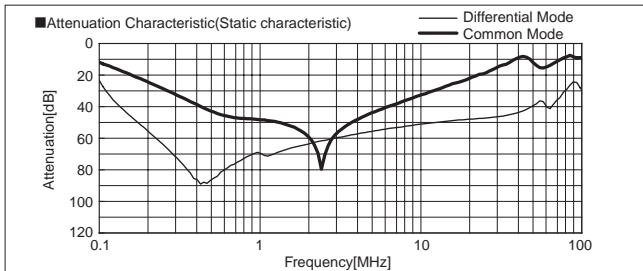
**FTA-150-223**



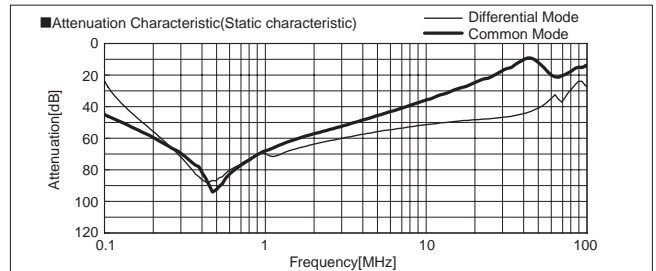
**FTA-150-683**



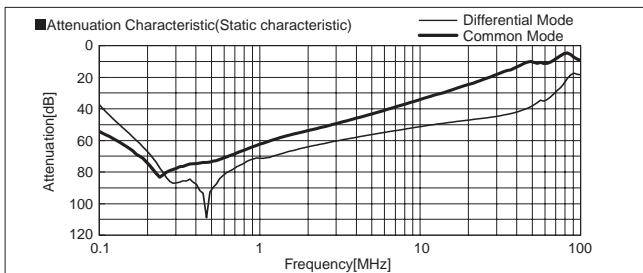
**FTA-150-104**



**FTA-150-155**

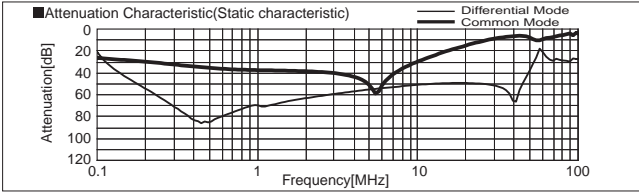


**FTA-150-335**

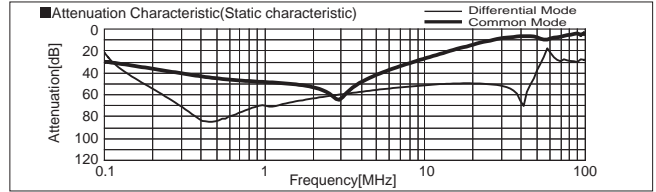




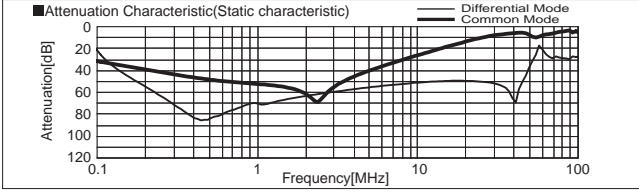
**FTA-80-223-H**



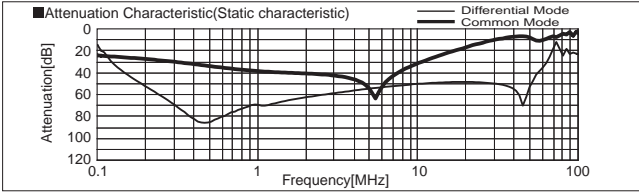
**FTA-80-683-H**



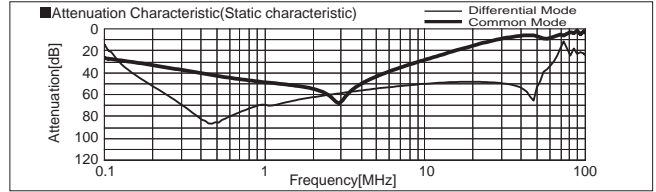
**FTA-80-104-H**



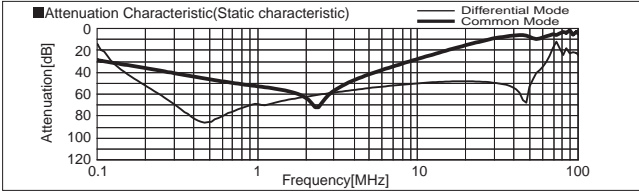
**FTA-100-223-H**



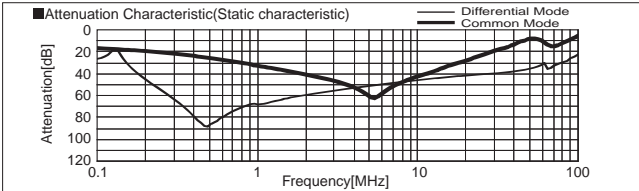
**FTA-100-683-H**



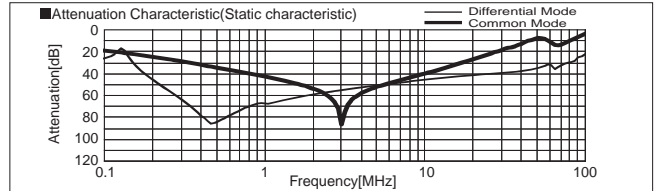
**FTA-100-104-H**



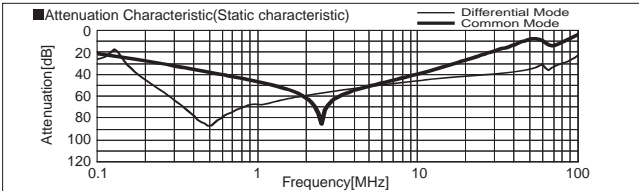
**FTA-125-223-H**



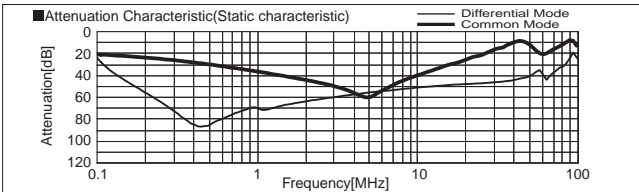
**FTA-125-683-H**



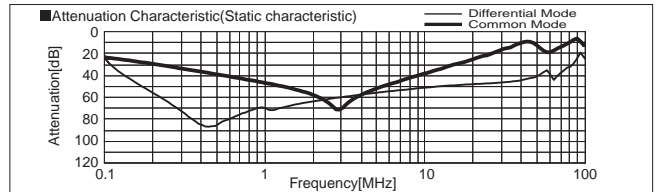
**FTA-125-104-H**



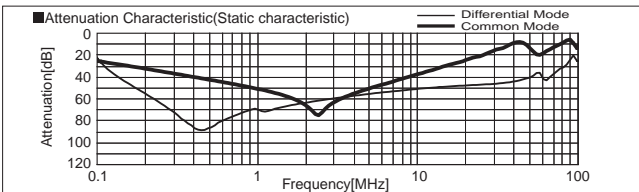
**FTA-150-223-H**



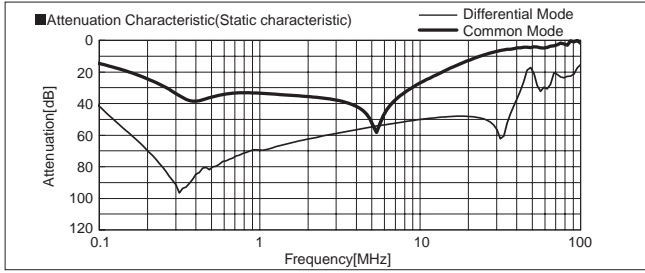
**FTA-150-683-H**



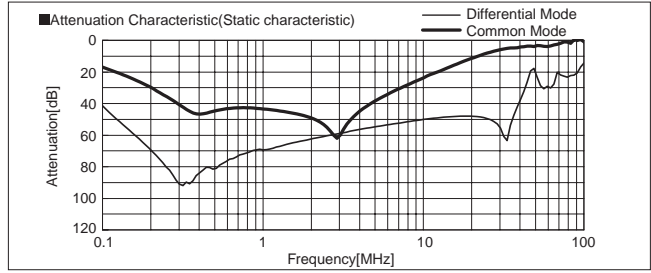
**FTA-150-104-H**



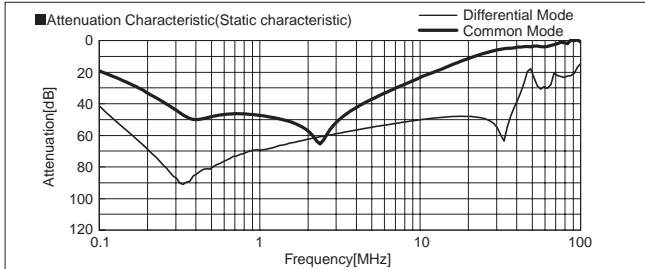
**FTA-80-223-U**



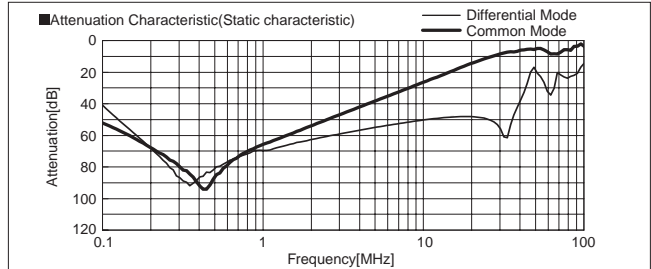
**FTA-80-683-U**



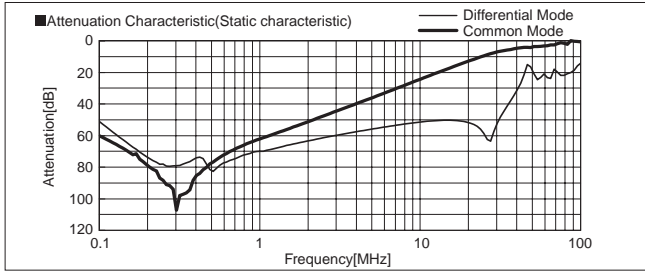
**FTA-80-104-U**



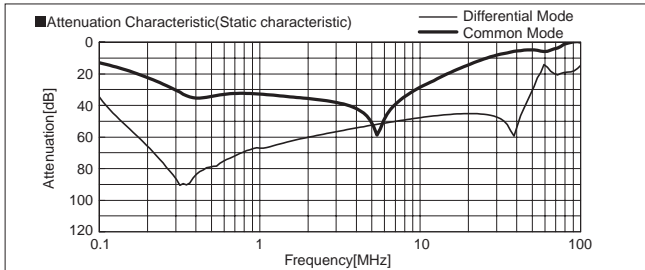
**FTA-80-155-U**



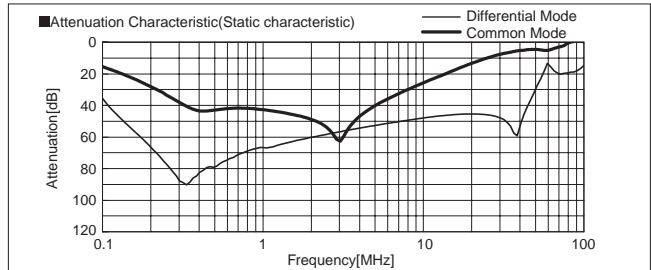
**FTA-80-335-U**



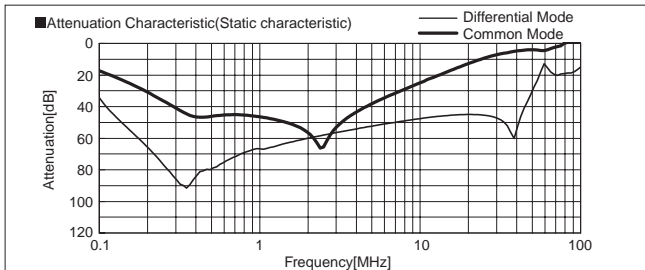
**FTA-100-223-U**



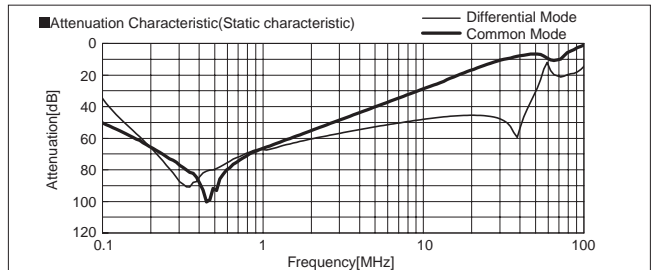
**FTA-100-683-U**



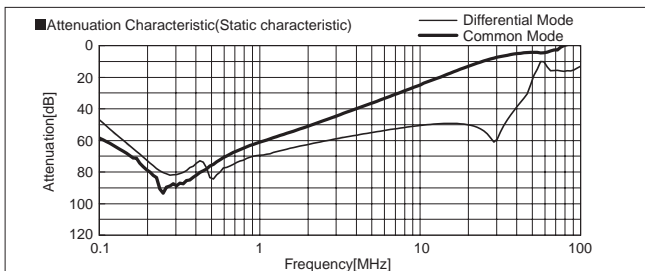
**FTA-100-104-U**



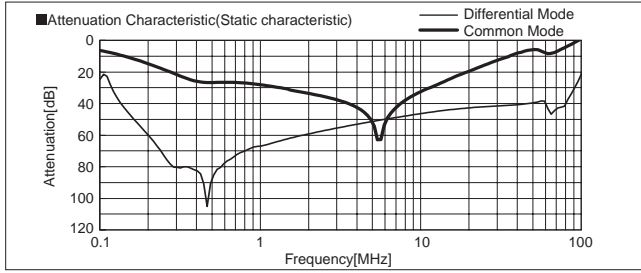
**FTA-100-155-U**



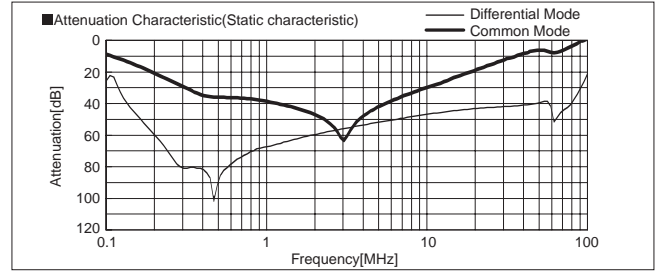
**FTA-100-335-U**



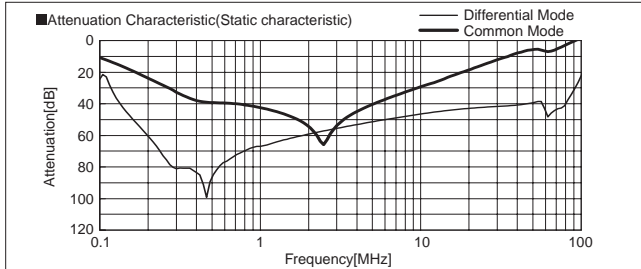
**FTA-125-223-U**



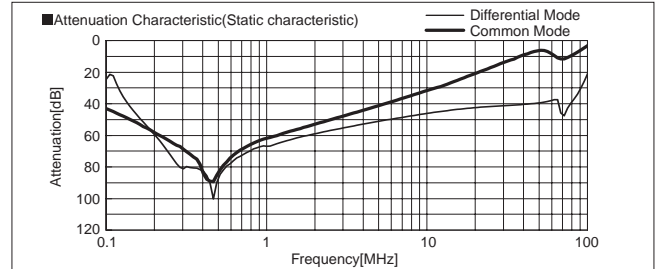
**FTA-125-683-U**



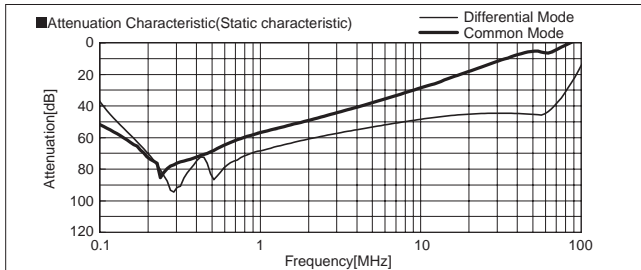
**FTA-125-104-U**



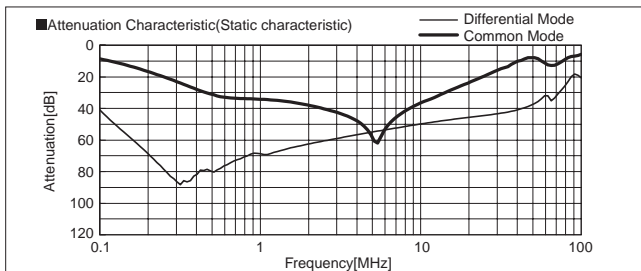
**FTA-125-155-U**



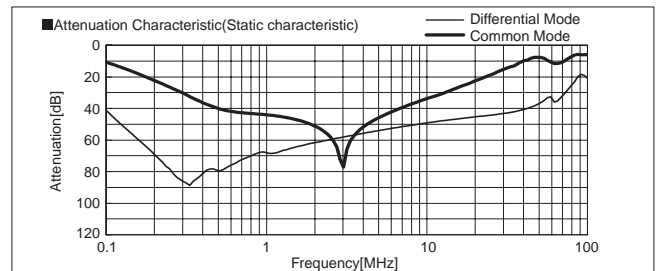
**FTA-125-335-U**



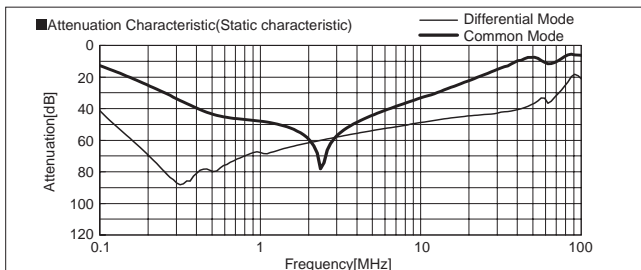
**FTA-150-223-U**



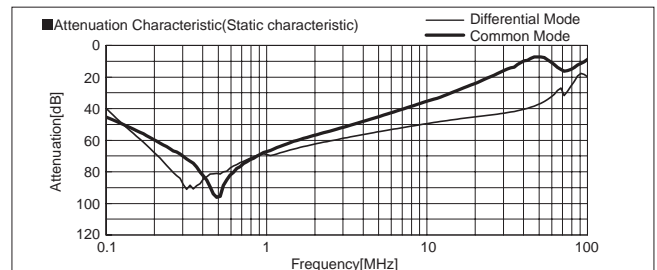
**FTA-150-683-U**



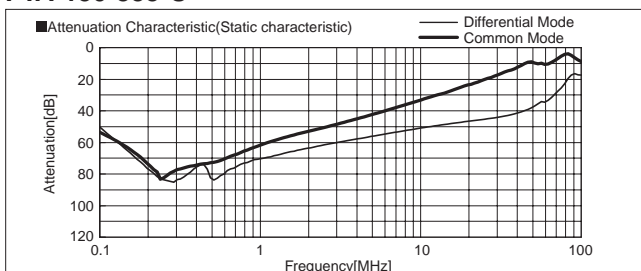
**FTA-150-104-U**



**FTA-150-155-U**



**FTA-150-335-U**



# TBC series(50,60,80,100,150A)

TBC -50 -683

① ② ③

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table 1.1 Line to ground capacitor code

Code	Leakage Current (Input 250/500V 60Hz)	Line to ground capacitor (nominal value)
223	1.0mA/2.0mA max	22,000pF
683	2.5mA/5.0mA max	68,000pF
104	3.5mA/7.0mA max	100,000pF

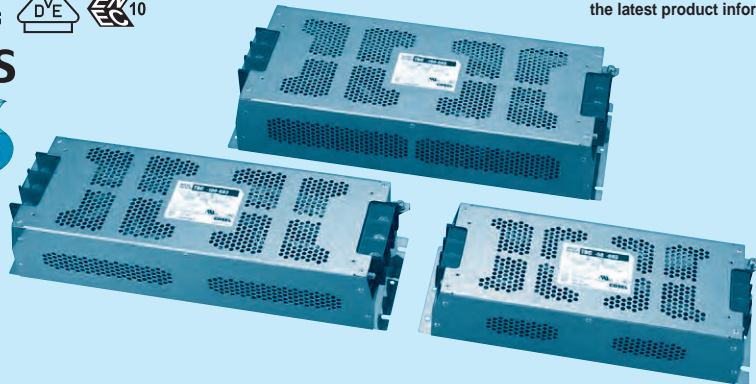
\* When the line to ground capacitor code is different, the attenuation characteristic is different.



RoHS



\*Link to [www.cosel.co.jp/en](http://www.cosel.co.jp/en) for the latest product information.



## Features of TBC series

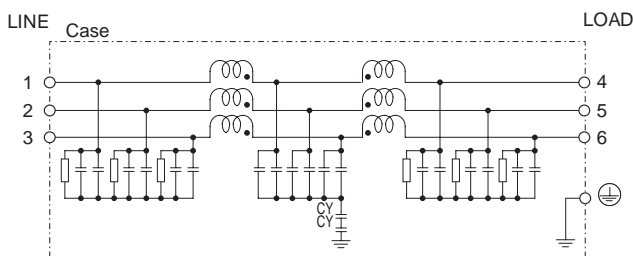
### High-attenuation type of common mode noise from 150kHz to 1MHz (2-stage filter)

- Three phase rated voltage 500 VAC (voltage range:528V max)
- Selectable leakage current value

## Specifications

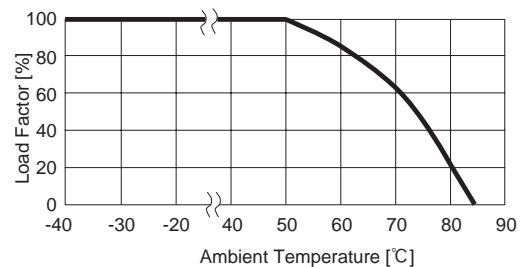
No.	Items	TBC-50-683	TBC-60-683	TBC-80-683	TBC-100-683	TBC-150-683
1	Rated Voltage[V]	AC Three Phase 500 (voltage range:528 max) 50/60Hz				
2	Rated Current[A]	50	60	80	100	150
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 100mA), 1minute at room temperature and humidity				
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100MΩ min at room temperature and humidity				
5	Leakage current 250/500V 60Hz	2.5mA/5.0mA max				
6	DC resistance	14mΩ max	10mΩ max	10mΩ max	8mΩ max	6mΩ max
7	Safety agency approval temperatures	-25 to +85°C (Refer to Derating Curve)				
8	Operating temperature	-40 to +85°C (Refer to Derating Curve)				
9	Operating humidity	20 to 95%RH (Non condensing)				
10	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)				
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis				
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis				
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC				
14	Case size (without projection)	140×80×374 mm (W×H×D)		150×92×456 mm (W×H×D)		190×92×482 mm (W×H×D)
		[5.51×3.15×14.72 inches]		[5.91×3.62×17.95 inches]		[7.48×3.62×18.98 inches]
15	Weight	4.3kg max		7.7kg max		9.6kg max

## Circuit Diagram



CY : Line to ground capacitor  $\perp$  : Mounting Plate

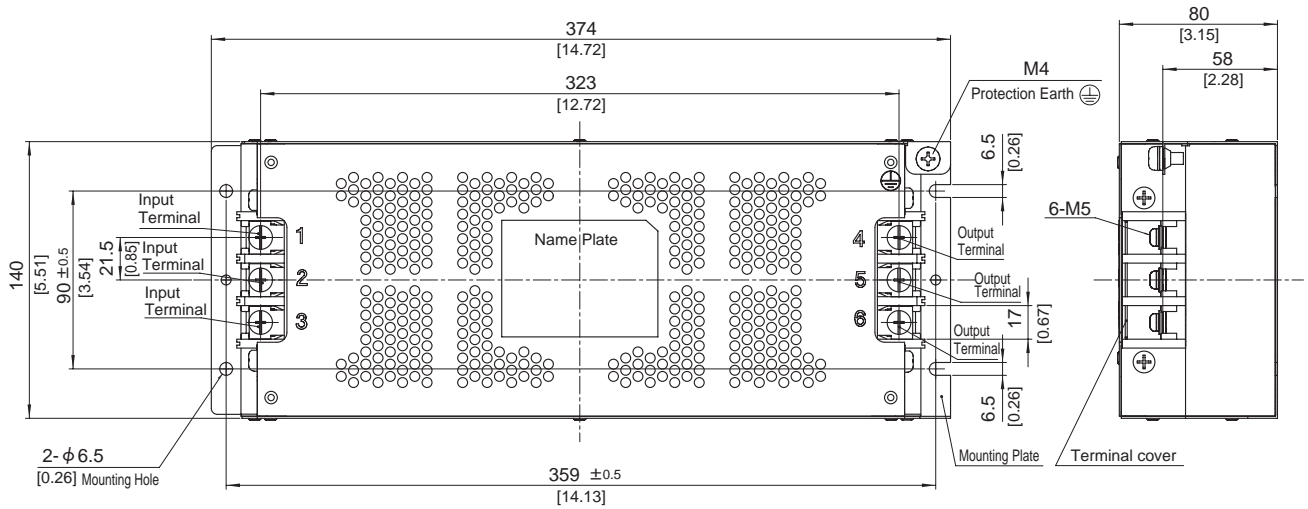
## Derating Curve



\* Keep free ventilation holes for cooling.

## External view

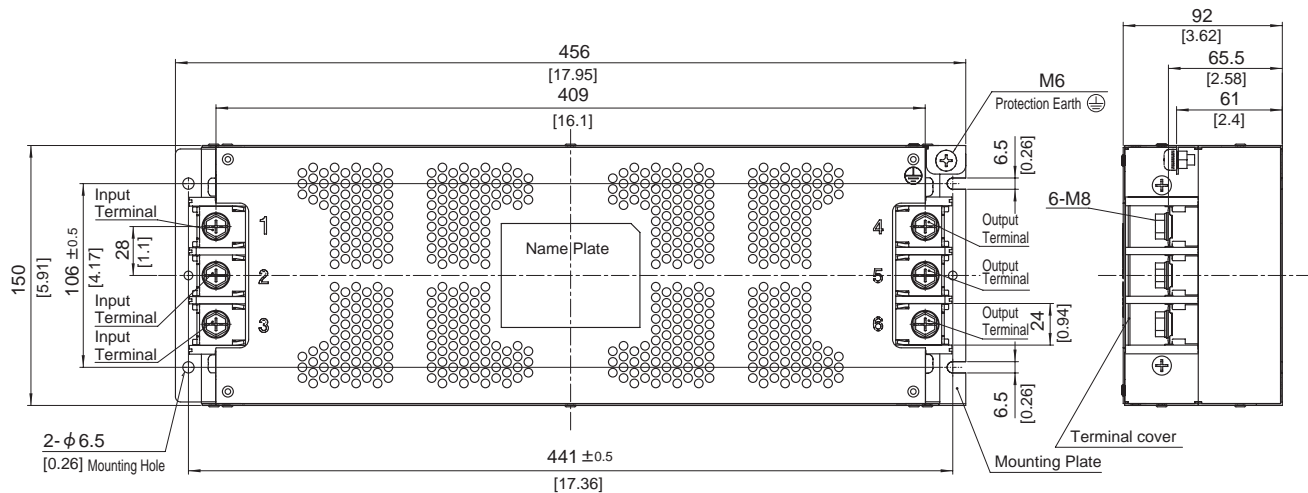
TBC-50-□□□ / TBC-60-□□□



※ Can not be mounted upside-down.  
(mounted the top surface)

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 4.3kg max
- ※ Chassis Material : Stainless steel  $t=1.0$  [0.04]
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M5:3.0N · m (30.7kgf · cm) max
- ※ Protection Earth screw tightening torque M4:1.6N · m (16.9kgf · cm) max

TBC-80-□□□ / TBC-100-□□□

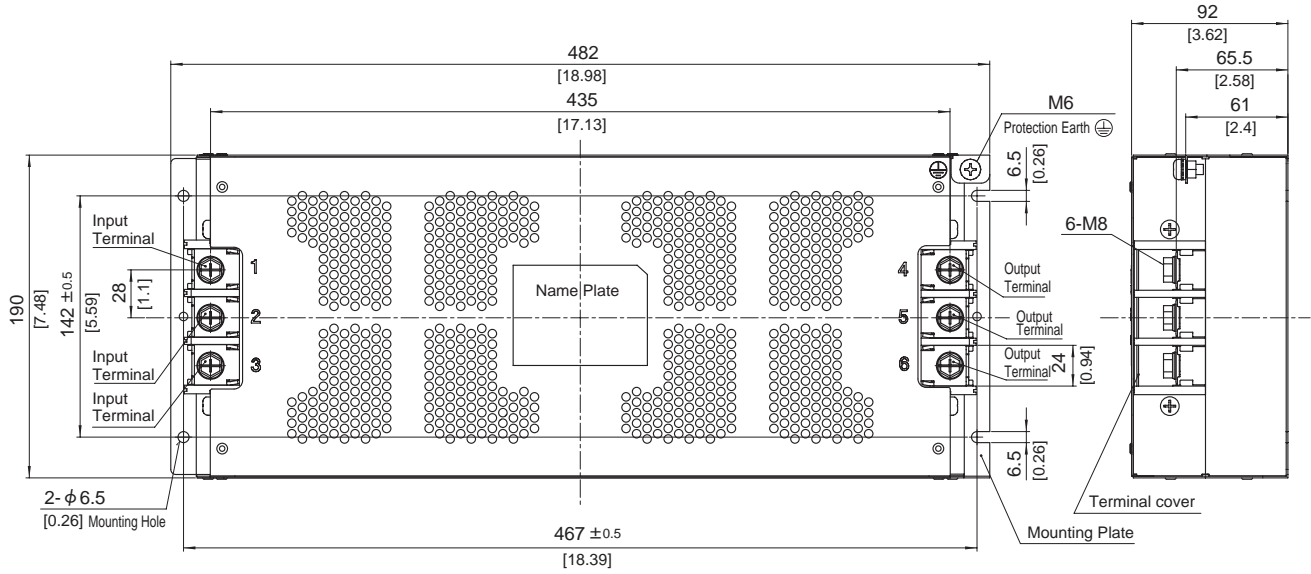


※ Can not be mounted upside-down.  
(mounted the top surface)

- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 7.7kg max
- ※ Chassis Material : Stainless steel  $t=1.0$  [0.04]
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M8:9.2N · m (93.9kgf · cm) max
- ※ Protection Earth screw tightening torque M6:5.8N · m (59.2kgf · cm) max

**External view**

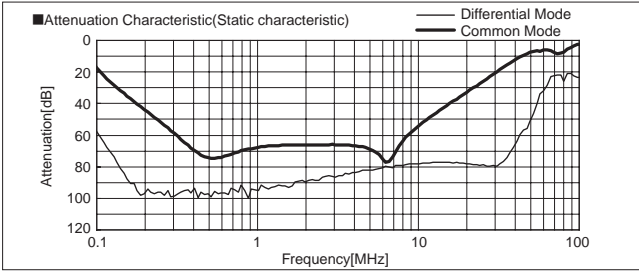
TBC-150-□□□



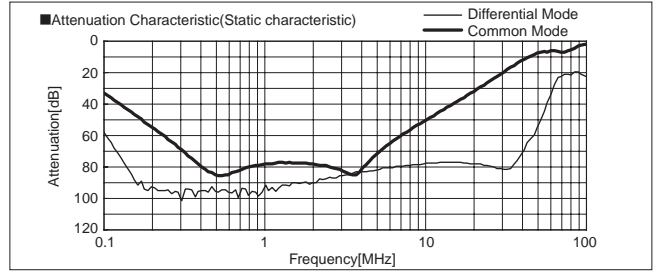
※ Can not be mounted upside-down.  
(mounted the top surface)

- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 9.6kg max
- ※ Chassis Material : Stainless steel t=1.0 [0.04]
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M8:9.2N · m (93.9kgf · cm) max
- ※ Protection Earth screw tightening torque M6:5.8N · m (59.2kgf · cm) max

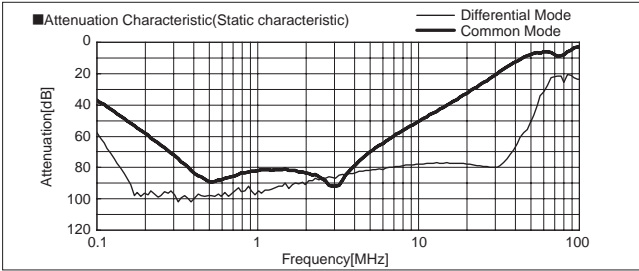
**TBC-50-223**



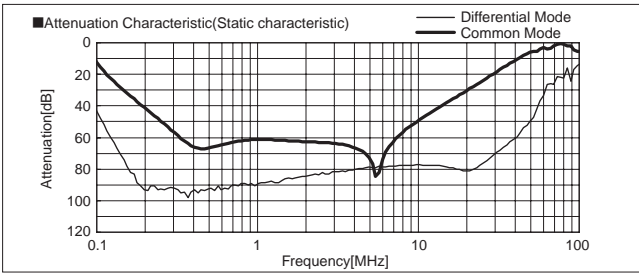
**TBC-50-683**



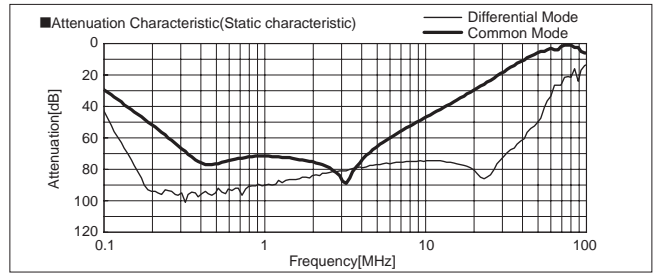
**TBC-50-104**



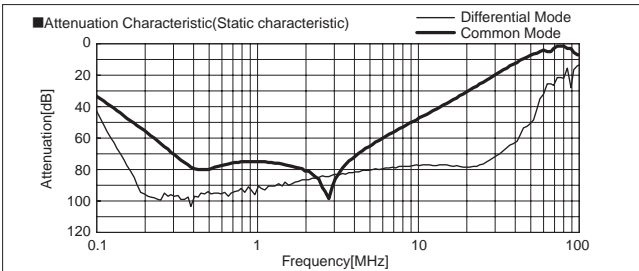
**TBC-100-223**



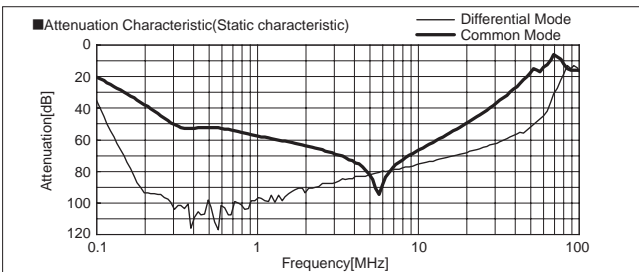
**TBC-100-683**



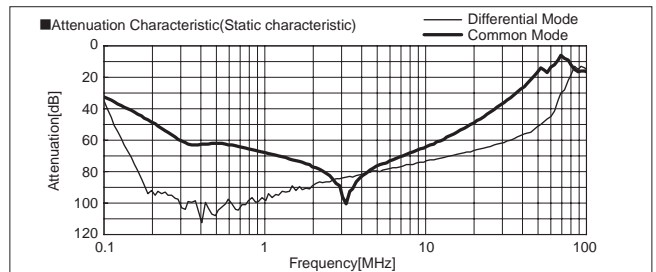
**TBC-100-104**



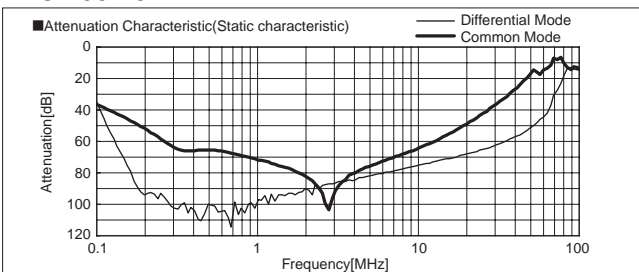
**TBC-150-223**



**TBC-150-683**

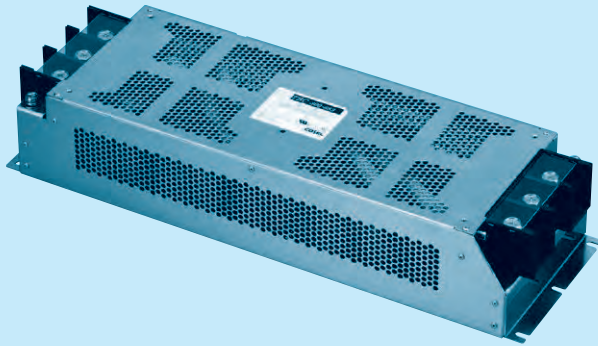


**TBC-150-104**



# TBC series(200,250,300A)

TBC -200 -683



- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table 1.1 Line to ground capacitor code

Code	Leakage Current (Input 250/500V 60Hz)	Line to ground capacitor (nominal value)
223	1.0mA/2.0mA max	22,000pF
683	2.5mA/5.0mA max	68,000pF
104	3.5mA/7.0mA max	100,000pF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

## Features of TBC series

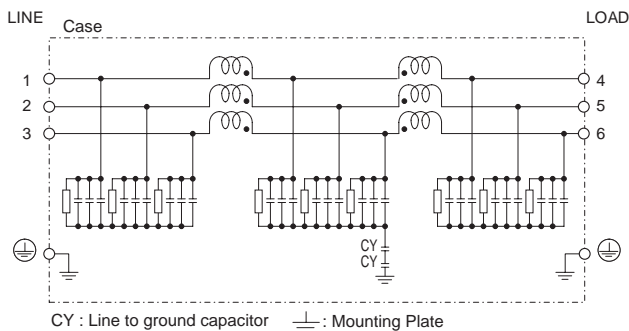
### High-attenuation type of common mode noise from 150kHz to 1MHz (2-stage filter)

- Three phase rated voltage 500 VAC (voltage range:528V max)
- Selectable leakage current value

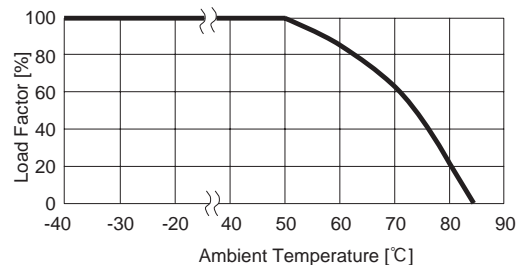
## Specifications

No.	Items	TBC-200-683	TBC-250-683	TBC-300-683
1	Rated Voltage[V]	AC Three Phase 500 (voltage range:528 max) 50/60Hz		
2	Rated Current[A]	200	250	300
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 100mA), 1minute at room temperature and humidity		
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100MΩ min at room temperature and humidity		
5	Leakage current 250/500V 60Hz	2.5mA/5.0mA max		
6	DC resistance	4mΩ max	3mΩ max	2mΩ max
7	Safety agency approval temperatures	-25 to +85°C (Refer to Derating Curve)		
8	Operating temperature	-40 to +85°C (Refer to Derating Curve)		
9	Operating humidity	20 to 95%RH (Non condensing)		
10	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)		
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis		
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis		
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL) , DIN EN60939 VDE0565 Teil3-1, ENEC		
14	Case size (without projection)	190 X 110 X 580 mm [7.48 X 4.33 X 22.83 inches] (W X H X D)		
15	Weight	13.0kg max		

## Circuit Diagram



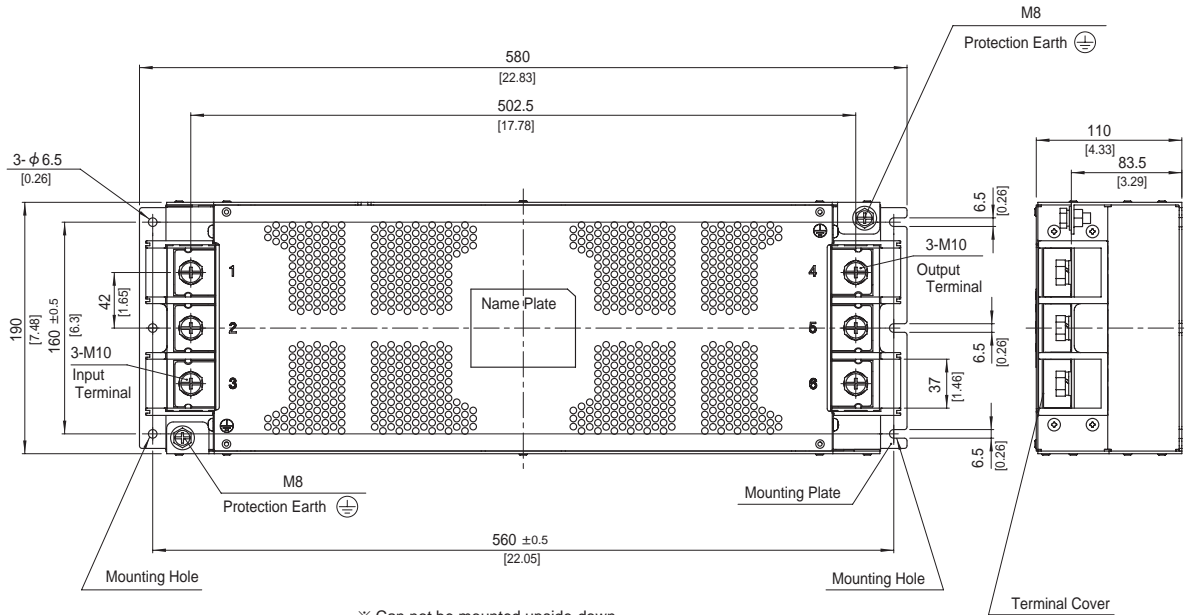
## Derating Curve



\* Keep free ventilation holes for cooling.



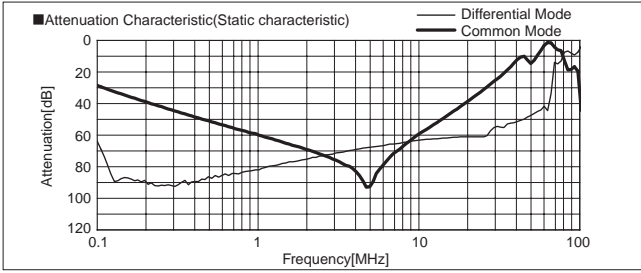
## External view



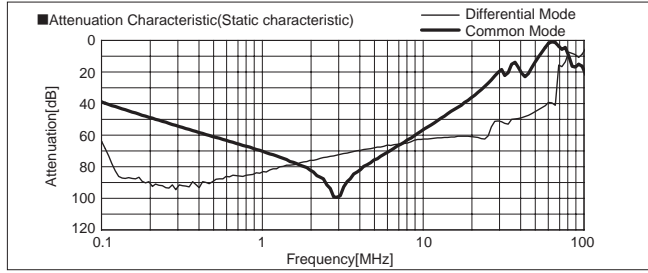
※ Can not be mounted upside-down.  
(mounted the top surface)

- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 13.0kg max
- ※ Mounting Plate : Stainless steel t=2.0 [0.08]
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M10 : 14.2N · m (144.9kgf · cm) max
- ※ Protection Earth screw tightening torque M8 : 9.2N · m (93.9kgf · cm) max

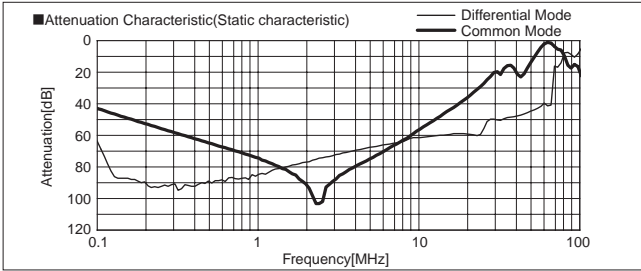
**TBC-200-223**



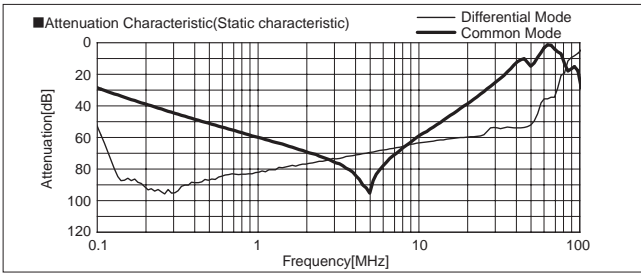
**TBC-200-683**



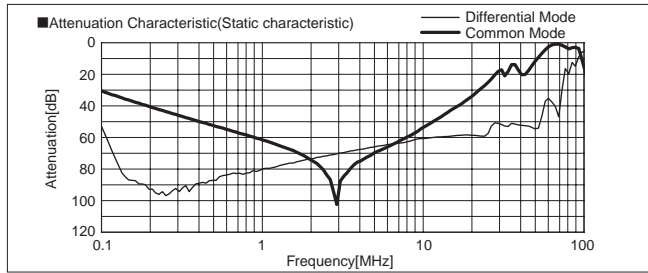
**TBC-200-104**



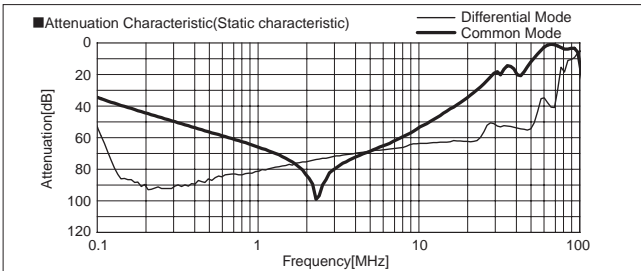
**TBC-250-223**



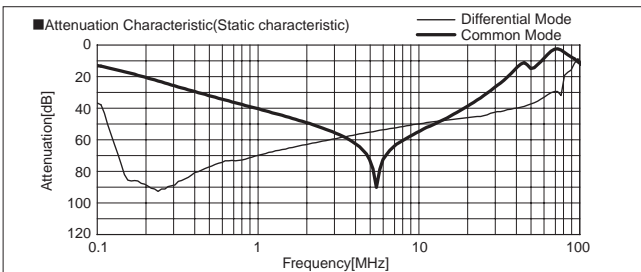
**TBC-250-683**



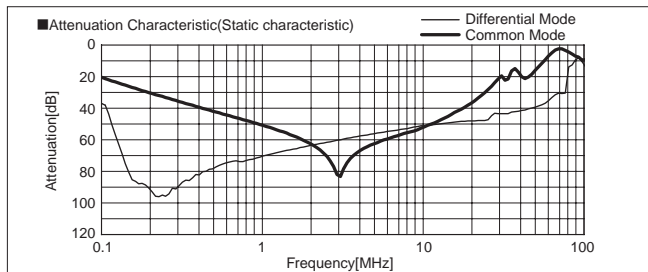
**TBC-250-104**



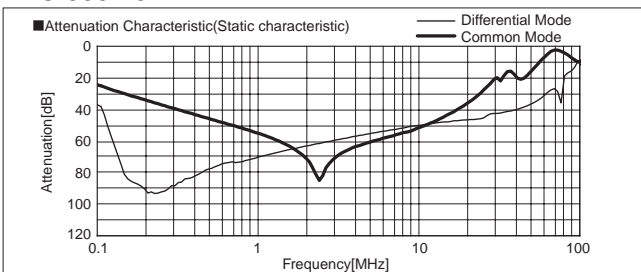
**TBC-300-223**



**TBC-300-683**



**TBC-300-104**





# FTB series(80,100,150A)

FTB -80 -663 -□

① ② ③ ④



## Features of FTB series

### Book type (Space-saving type)

- 2-stage filter High-attenuation (150kHz - 1MHz)
- Selectable leakage current value, Ultra high-attenuation type "-355-L" for EU (Y type with neutral earth system)

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table 1.1 Line to ground capacitor code

Code	Leakage Current *2 Upper row : Δ-connection Lower row : Y-connection	Line to ground capacitor CY1 (nominal value)	Line to ground capacitor CY2 (nominal value)
203	1.0mA/2.0mA max 0.1mA/0.2mA max	10,000pF	10,000pF
663	2.5mA/5.0mA max 0.35mA/0.7mA max	33,000pF	33,000pF
324	12mA/24mA max 1.5mA/3.0mA max	220,000pF	100,000pF
355 *1	330mA/515mA max 40mA/80mA max	220,000pF	3,300,000pF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

\*1 "355" is applied only to "L" type.

\*2 Input 250/500V 60Hz  
(Only Δ-connection of "355" is 250/400V 60Hz)

- ④ Option
- H: Ultra high-attenuation type  
"355" is not applied
- S: Hexagon socket head cap screw  
(Standard type is Hexagon head screw)
- L: Ultra high-attenuation type for EU

## Specifications

No.	Items	FTB-80-663	FTB-100-663	FTB-150-663
1	Rated Voltage[V]	AC Three Phase 500 (voltage range: 528 max) 50/60Hz *3		
2	Rated Current[A]	80	100	150
3	Test Voltage (Terminal-Mounting Plate)	2,500 VAC (Cutoff Current = 100mA), 1minute at room temperature and humidity *4		
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100MΩ min at room temperature and humidity *5		
5	Leakage current 250/500V 60Hz	2.5mA/5.0mA max		
6	DC resistance	10mΩ max	8mΩ max	6mΩ max
7	Safety agency approval temperatures	-25 to +85°C (Refer to Derating Curve)		
8	Operating temperature	-40 to +85°C (Refer to Derating Curve)		
9	Operating humidity	20 to 95%RH (Non condensing)		
10	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)		
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis		
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis		
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil3-1, ENEC		
14	Case size (without projection)	100 X 170 X 350 mm (W X H X D) [3.94 X 6.69 X 13.78 inches]	100 X 210 X 400 mm (W X H X D) [3.94 X 8.27 X 15.75 inches]	
15	Weight	5.3kg max		7.8kg max

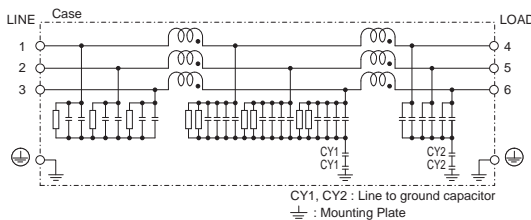
\*3 Only capacitor code "355", Three Phase Δ-connection : 400 (440 max), Y-connection : 500 (528 max)

\*4 Only capacitor code "324","355" 2,800 VDC (Cutoff Current = 10mA), 1minute at room temperature and humidity.

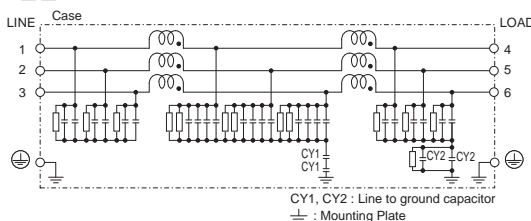
\*5 Only capacitor code "355", Isolation resistance specification is deleted.

## Circuit Diagram

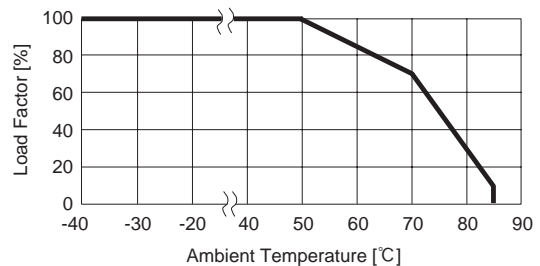
(1) Line to ground capacitor code : 203, 663, 324



(2) FTB-□-355-L



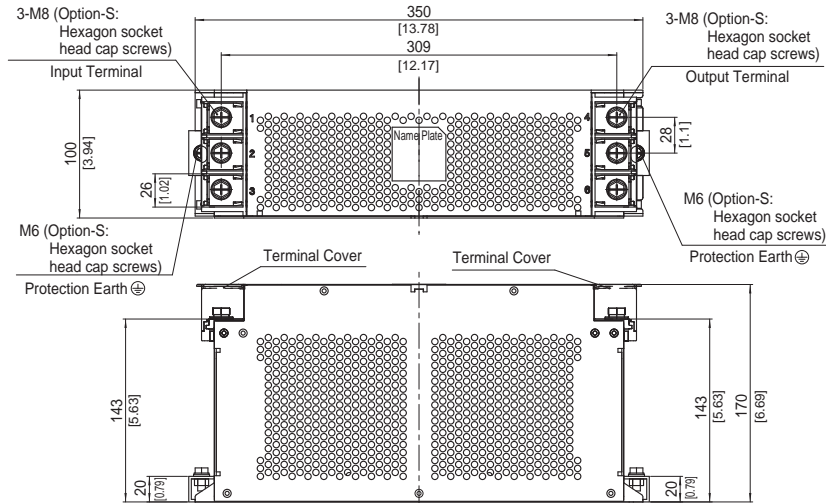
## Derating Curve



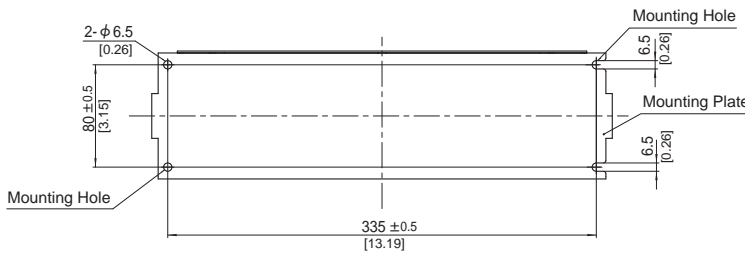
\* Keep free ventilation holes for cooling.

## External view

### FTB-80-□□□ / FTB-100-□□□

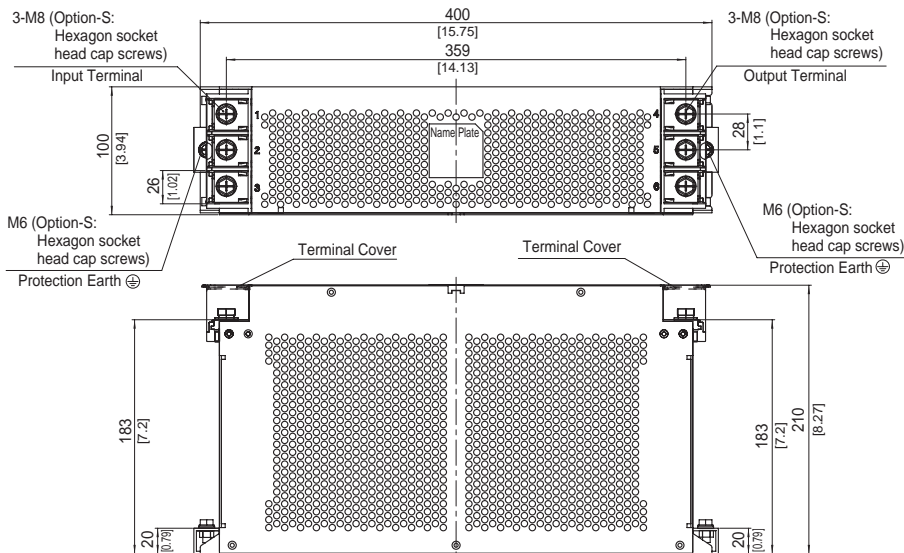


※ The air hole for heat radiation is not on the opposite side side.

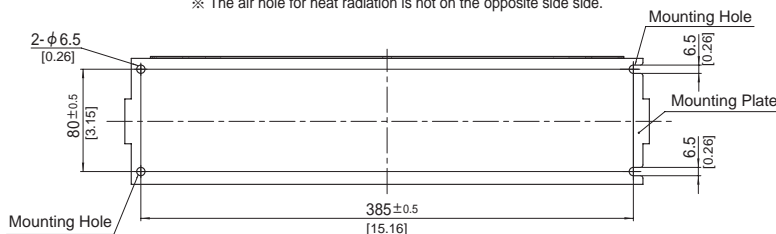


- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 5.3kg max
- ※ Mounting Plate : Aluminum  $t=2.0$  [0.08]
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque  
M8 : 9.2N · m(93.9kgf · cm)max
- ※ Protection Earth (PE) screw tightening torque  
M6 : 5.8N · m(59.2kgf · cm)max
- ※ Can not be mounted upside-down  
(mounted the top surface)
- ※ Keep free ventilation holes for cooling

### FTB-150-□□□

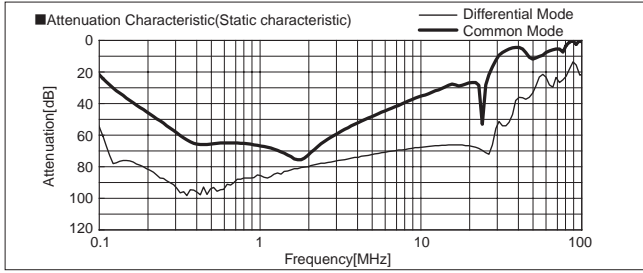


※ The air hole for heat radiation is not on the opposite side side.

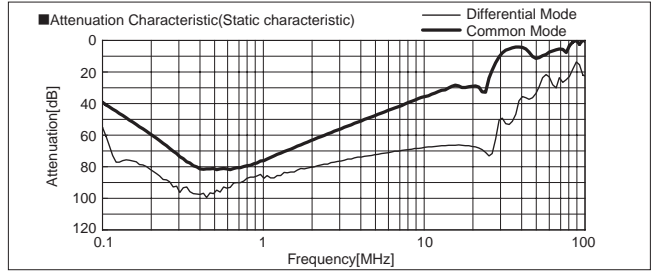


- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 7.8kg max
- ※ Mounting Plate : Aluminum  $t=2.0$  [0.08]
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque  
M8 : 9.2N · m(93.9kgf · cm)max
- ※ Protection Earth (PE) screw tightening torque  
M6 : 5.8N · m(59.2kgf · cm)max
- ※ Can not be mounted upside-down  
(mounted the top surface)
- ※ Keep free ventilation holes for cooling

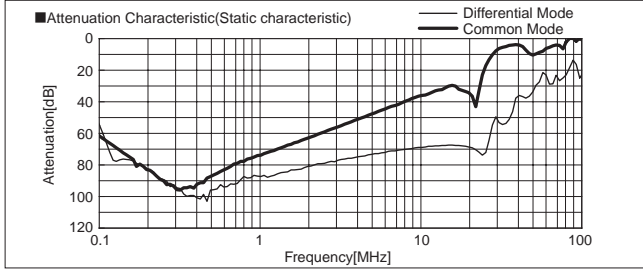
**FTB-80-203**



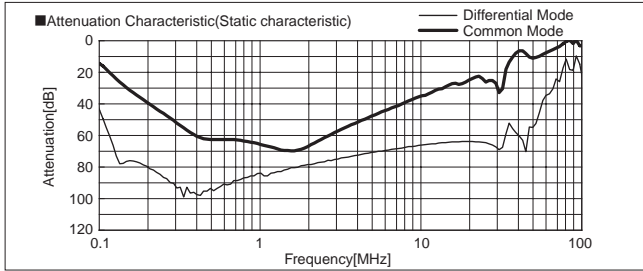
**FTB-80-663**



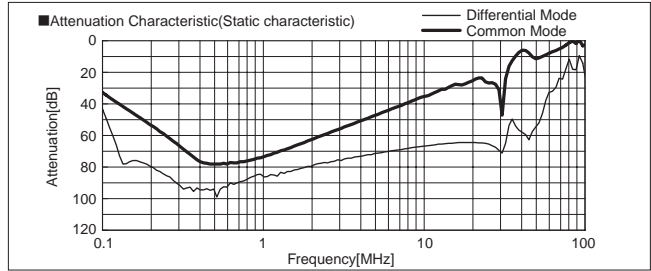
**FTB-80-324**



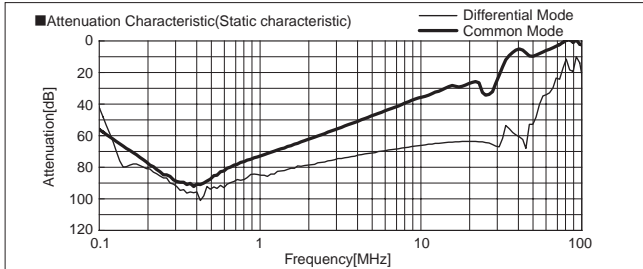
**FTB-100-203**



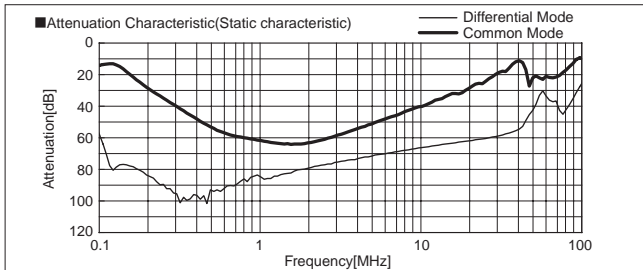
**FTB-100-663**



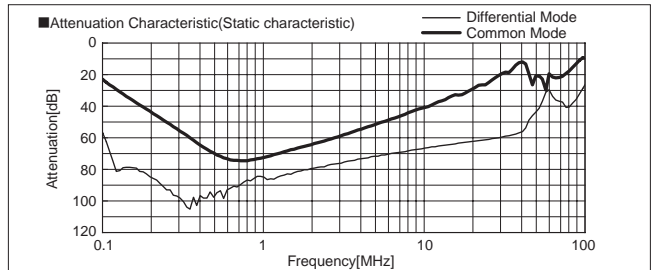
**FTB-100-324**



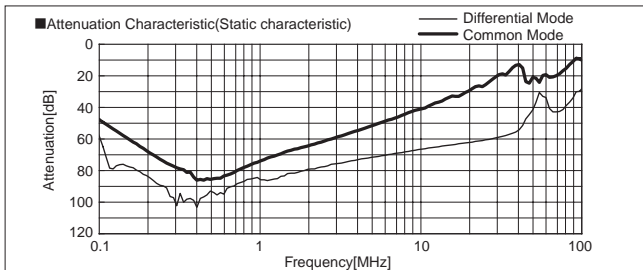
**FTB-150-203**



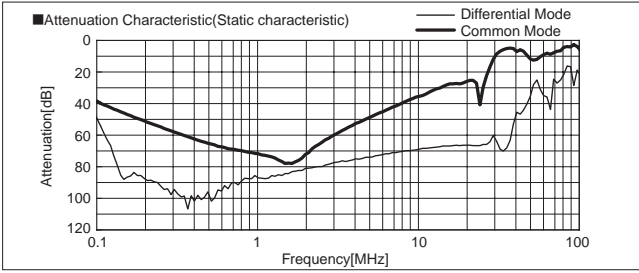
**FTB-150-663**



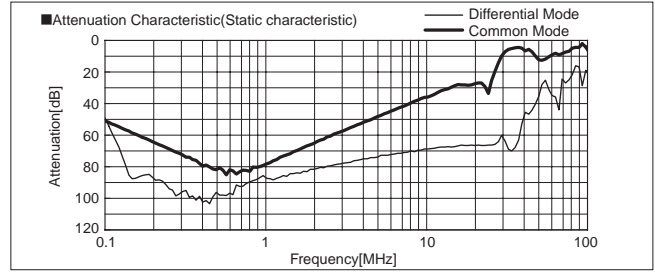
**FTB-150-324**



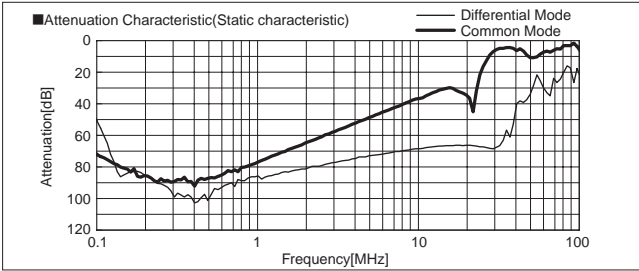
**FTB-80-203-H**



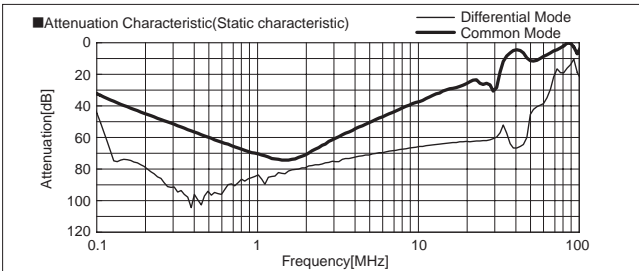
**FTB-80-663-H**



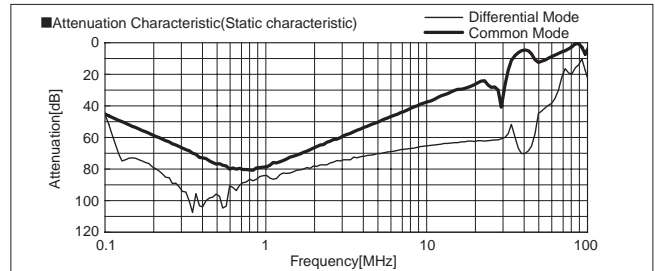
**FTB-80-324-H**



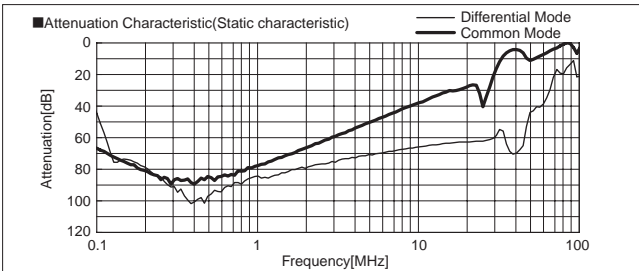
**FTB-100-203-H**



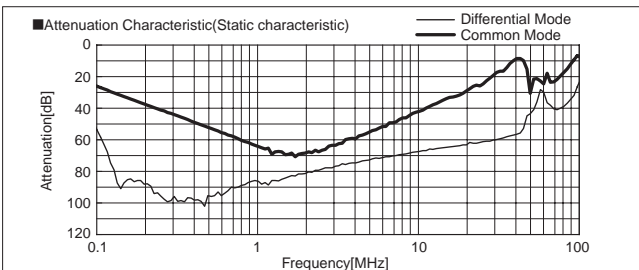
**FTB-100-663-H**



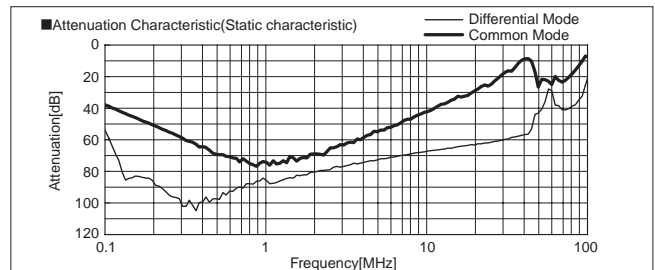
**FTB-100-324-H**



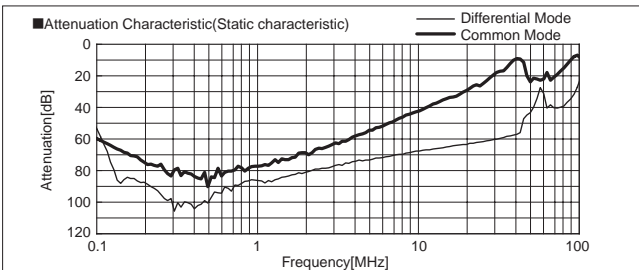
**FTB-150-203-H**



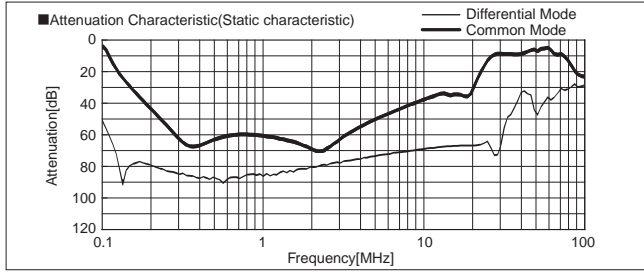
**FTB-150-663-H**



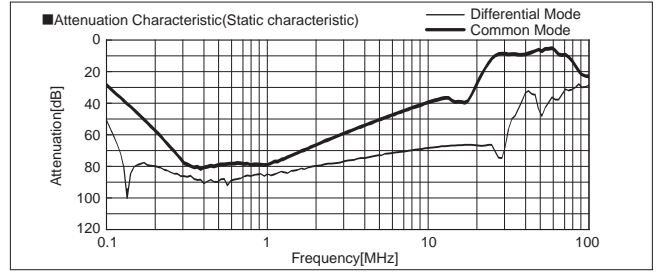
**FTB-150-324-H**



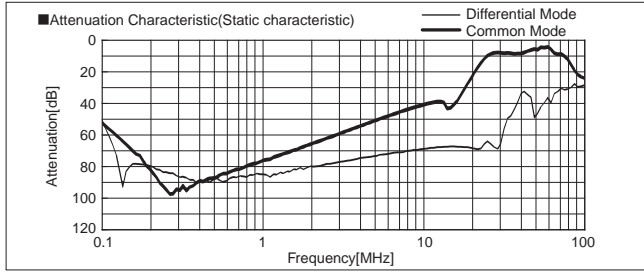
**FTB-80-203-L**



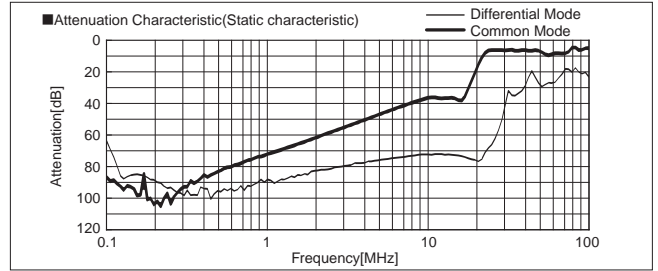
**FTB-80-663-L**



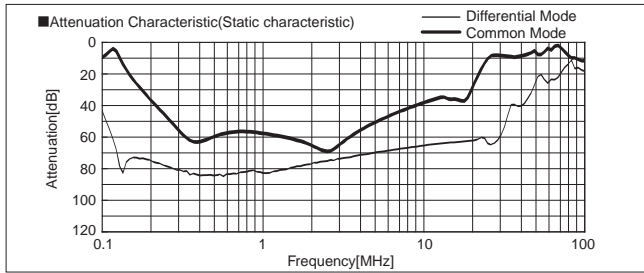
**FTB-80-324-L**



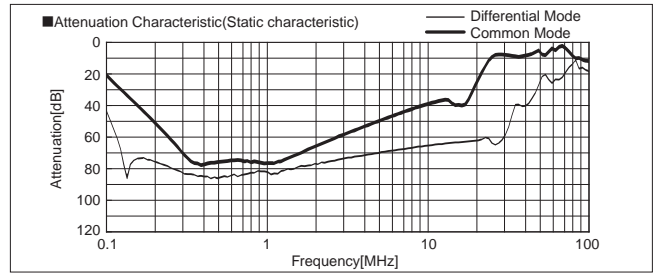
**FTB-80-355-L**



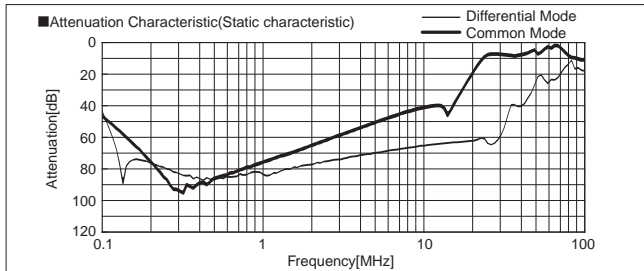
**FTB-100-203-L**



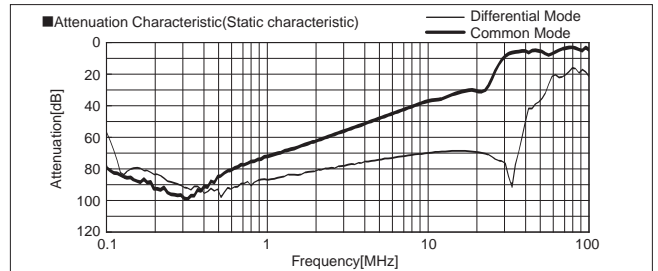
**FTB-100-663-L**



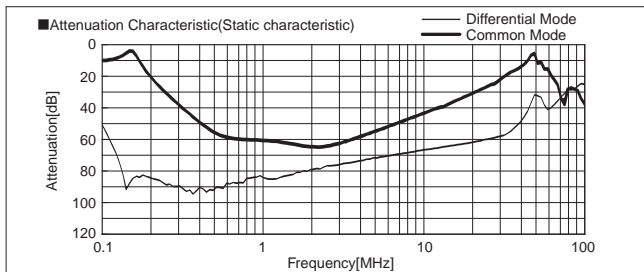
**FTB-100-324-L**



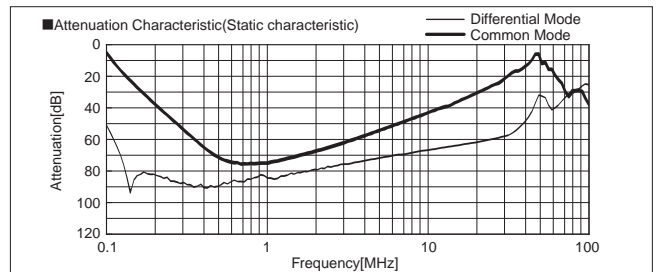
**FTB-100-355-L**



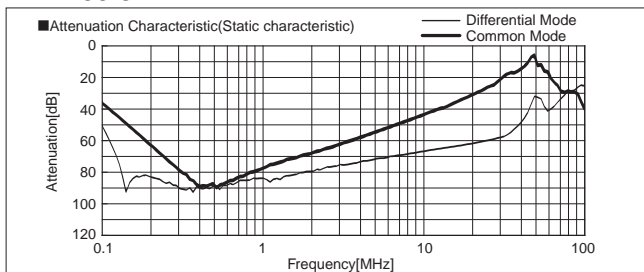
**FTB-150-203-L**



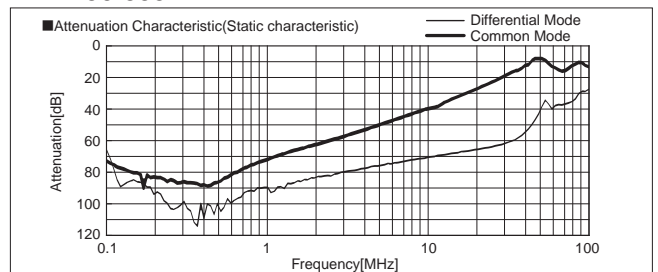
**FTB-150-663-L**



**FTB-150-324-L**



**FTB-150-355-L**







# FSB series(10,20,30A)

FSB -30 -324 -□

① ② ③ ④



The terminal cover is retracted inside the unit

## Features of FSB series

### EMI/EMC Filter for motor drive system (AC servo)

- Improve saturation resistance (There is such as performance improvement type “-254-HU”)
- Book type (Space-saving type)
- Quick and easy push-down terminal  
Just connect the wires, push-down and tighten the screws with a screwdriver

### Specifications

No.	Items	FSB-10-324	FSB-20-324	FSB-30-324
1	Rated Voltage[V]	AC Three Phase 500 (voltage range:528 max) 50/60Hz *3 *4		
2	Rated Current[A]	10	20	30
3	Test Voltage (Terminal-Mounting Plate)	2,800 VDC (Cutoff Current = 10mA), 1minute at room temperature and humidity *5		
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100MΩ min at room temperature and humidity *6		
5	Leakage current 250/500V 60Hz	12mA/24mA max		
6	DC resistance	100mΩ max	38mΩ max	20mΩ max
7	Safety agency approval temperatures	-25 to +85°C (Refer to Derating Curve)		
8	Operating temperature	-40 to +85°C (Refer to Derating Curve)		
9	Operating humidity	20 to 95%RH (Non condensing)		
10	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)		
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis		
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis		
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil 3-1, ENEC		
14	Case size (without projection)	66 X 100 X 240 mm (W X H X D) [2.60 X 3.94 X 9.45 inches] (W X H X D)		
15	Weight	1.8kg max		

\*3 Only capacitor code “355”, Three Phase Δ-connection : 400 (440 max), Y-connection : 500 (528 max)  
 \*4 Only “FSB-□□□□□□□□-U”, Three Phase 250 (275 max)  
 \*5 Only capacitor code “203”, “573”, “693”, “104”, 2,500VAC (Cutoff Current = 100mA), 1minute at room temperature and humidity.  
 \*6 Only capacitor code “335”, “355”, Isolation resistance specification is deleted.

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

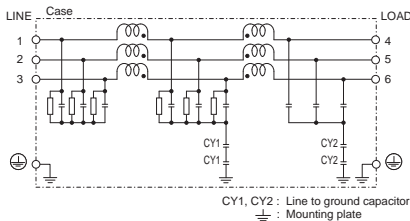
table1.1 Line to ground capacitor code

Code	Leakage Current *1 Upper row : Δ-connection Lower row : Y-connection	Line to ground capacitor CY1 (nominal value)	Line to ground capacitor CY2 (nominal value)
203	1.0mA/2.0mA max 0.1mA/0.2mA max	0.01μF	0.01μF
573 *2	2.5mA max/Not applicable 0.35mA max/Not applicable	0.01μF	0.047μF
693	2.5mA/5.0mA max 0.35mA/0.7mA max	0.022μF	0.047μF
104	3.5mA/7.0mA max 0.5mA/1.0mA max	0.033μF	0.068μF
254 *2	12mA max/Not applicable 1.5mA max/Not applicable	0.033μF	0.22μF
324	12mA/24mA max 1.5mA/3.0mA max	0.1μF	0.22μF
335 *2	160mA max/Not applicable 20mA max/Not applicable	0.033μF	3.3μF
355	180mA/270mA max 25mA/50mA max	0.22μF	3.3μF

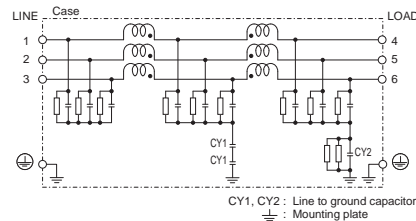
- \* When the line to ground capacitor code is different, the attenuation characteristic is different.
- \*1 Input 250/500V 60Hz (Only Δ-connection of “355” is 250/400V 60Hz)
- \*2 Only “U” type is applied.
- ④ Option  
 H : Ultra high-attenuation type  
 U : Improve differential mode attenuation (Rated voltage 250V)  
 Only “573”, “254”, “335” is applied.

### Circuit Diagram

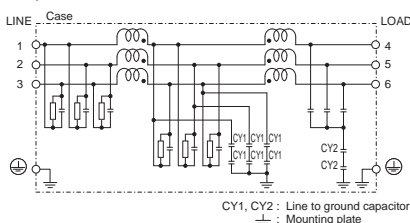
(1) Line to ground capacitor code : 203, 693, 104, 324



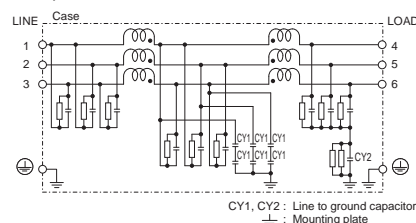
(2) Line to ground capacitor code : 355



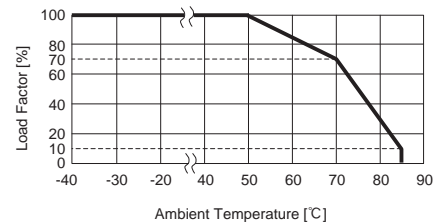
(3) Line to ground capacitor code : 573, 254  
Option : U



(4) Line to ground capacitor code : 335  
Option : U



### Derating Curve

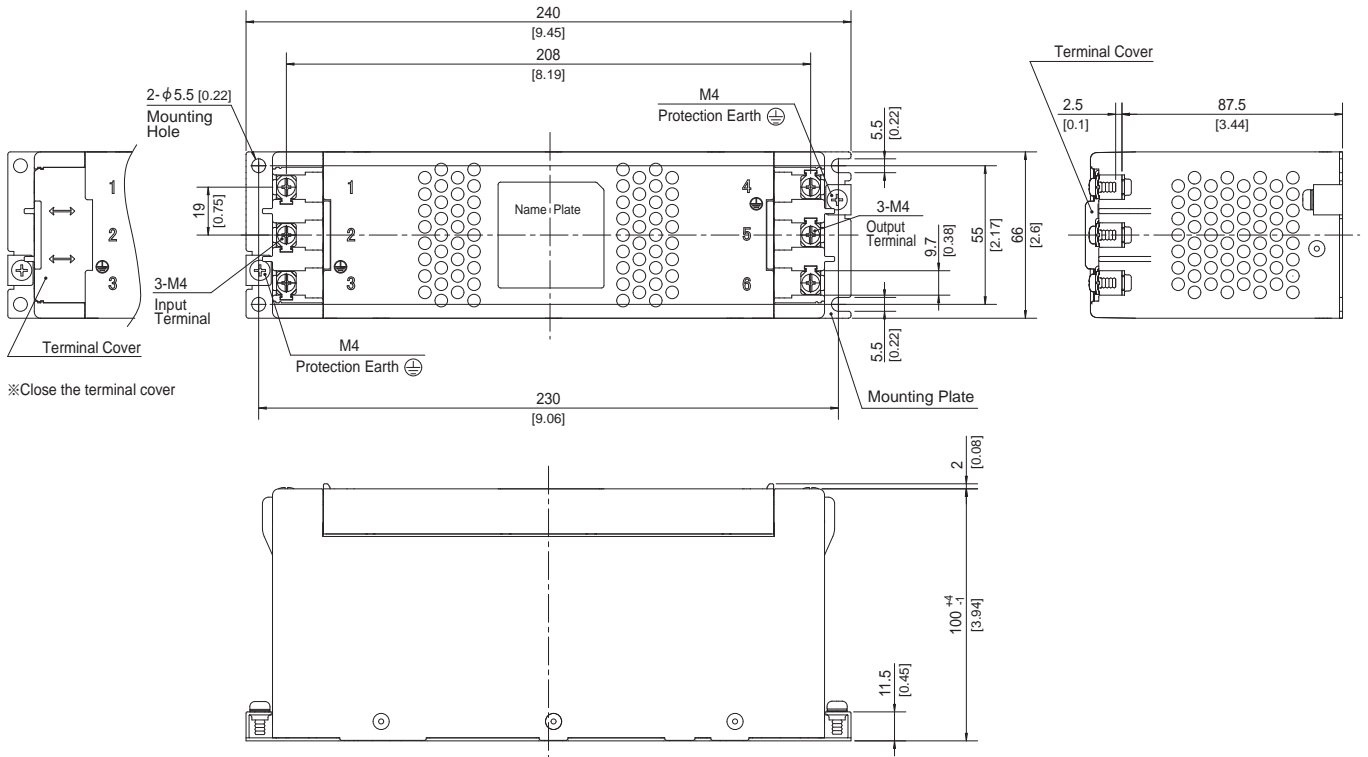


\* Keep free ventilation holes for cooling.

## External view

As this product is adopted push-down type terminal block, this appearance is as follows.

- ① The terminal cover is retracted inside the unit.
- ② The screws for connecting the terminals are held in the up right position.

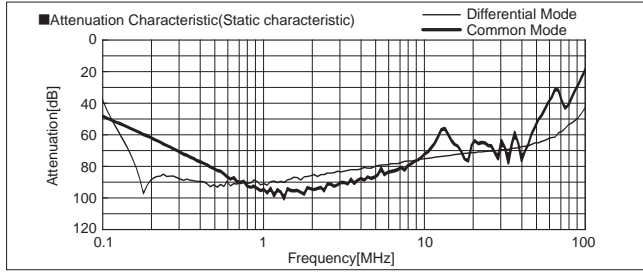


※Close the terminal cover

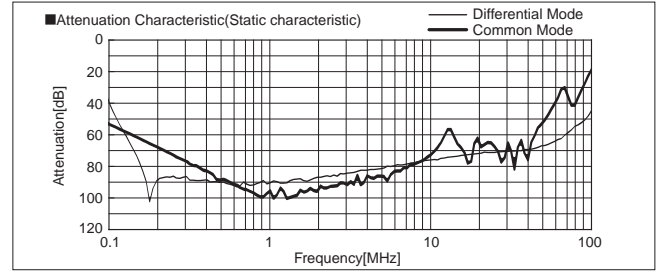
- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 1.8kg max
- ※ Mounting Plate : Hot-dip Galvanized Steel board  $t=1.2$  [0.05]
- ※ Case : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M4 :  $1.6N \cdot m$  (16.9kgf·cm)max
- ※ Can not be mounted upside-down (mounted the top surface)
- ※ Keep free ventilation holes for cooling



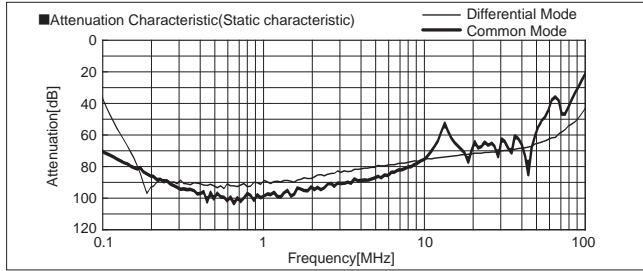
**FSB-10-693-H**



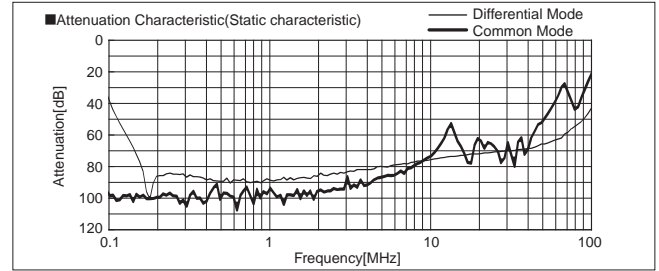
**FSB-10-104-H**



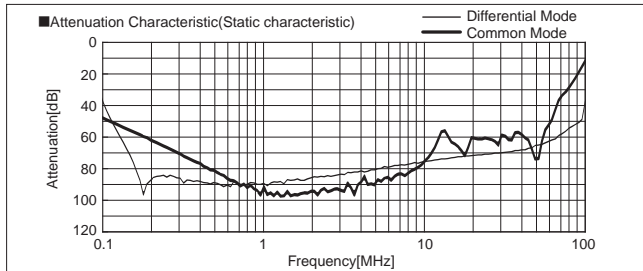
**FSB-10-324-H**



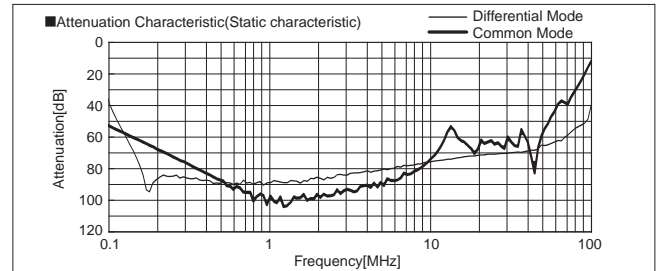
**FSB-10-355-H**



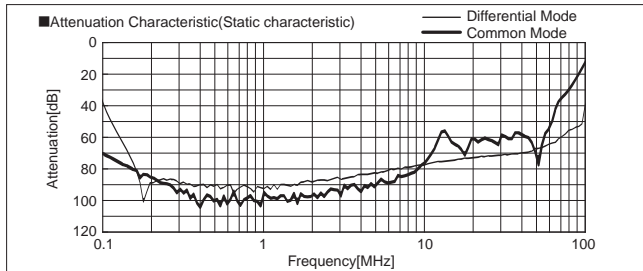
**FSB-20-693-H**



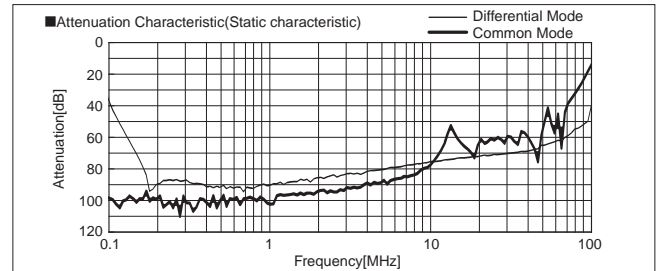
**FSB-20-104-H**



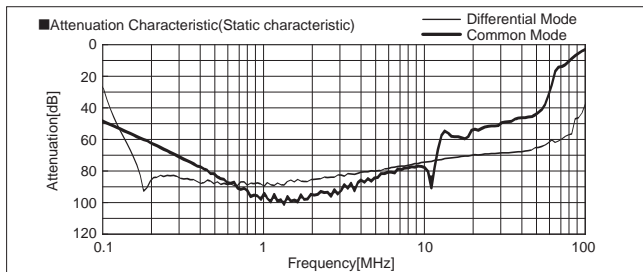
**FSB-20-324-H**



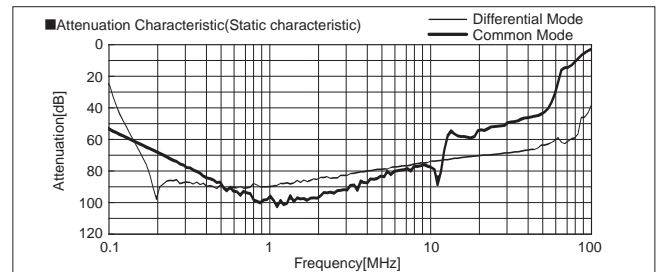
**FSB-20-355-H**



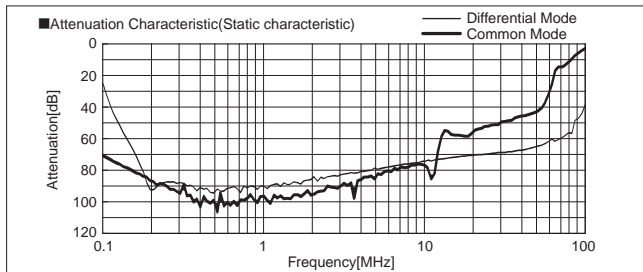
**FSB-30-693-H**



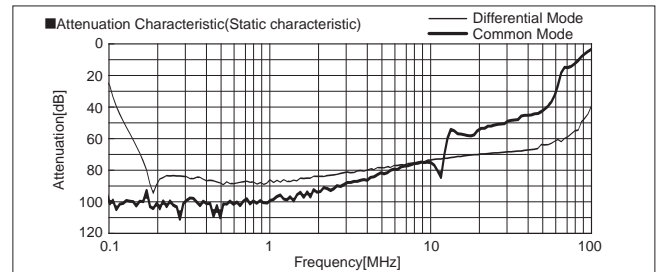
**FSB-30-104-H**



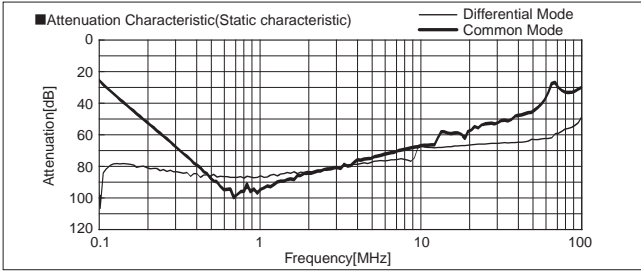
**FSB-30-324-H**



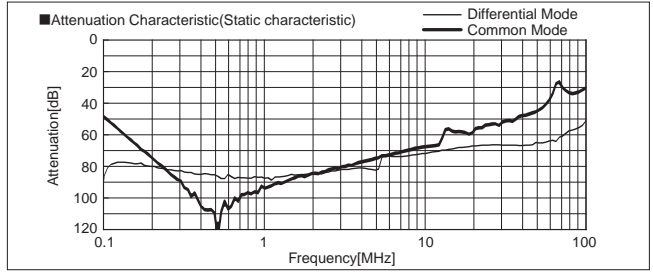
**FSB-30-355-H**



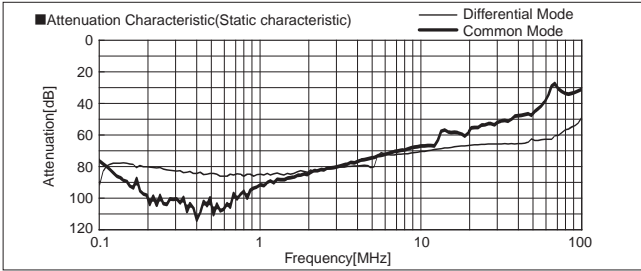
**FSB-10-573-U**



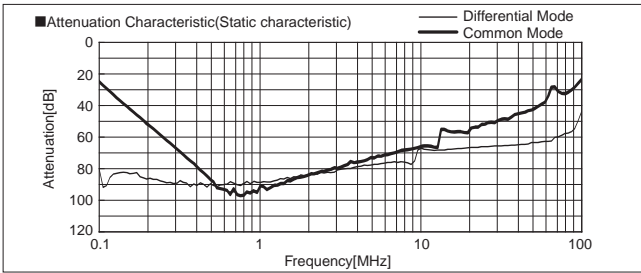
**FSB-10-254-U**



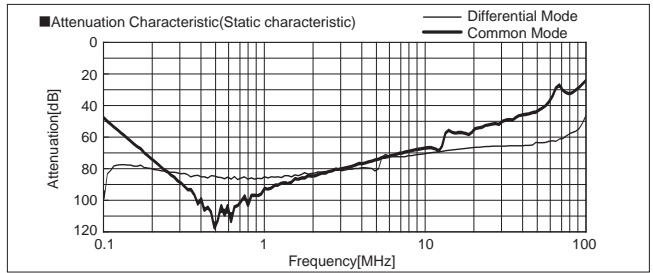
**FSB-10-335-U**



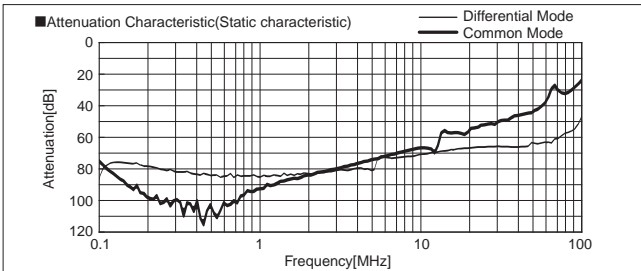
**FSB-20-573-U**



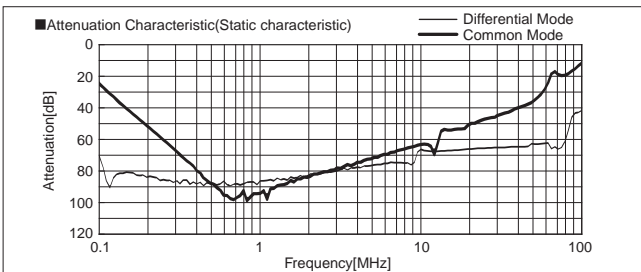
**FSB-20-254-U**



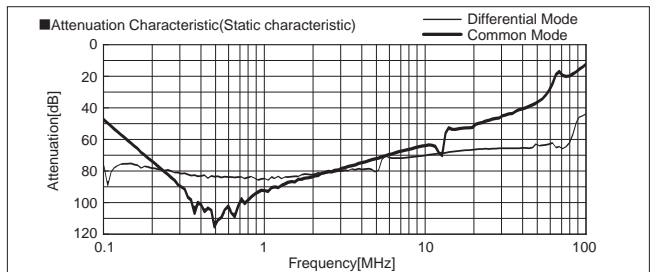
**FSB-20-335-U**



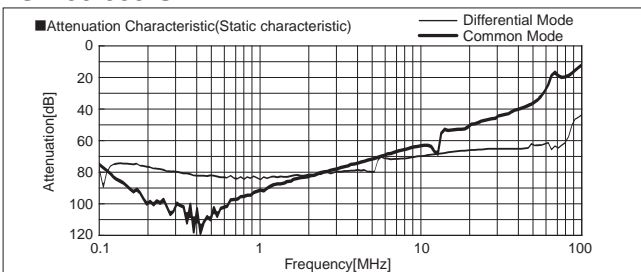
**FSB-30-573-U**



**FSB-30-254-U**



**FSB-30-335-U**





# FSB series(40,50,60A)

FSB -60 -324 -□

① ② ③ ④



- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table 1.1 Line to ground capacitor code

Code	Leakage Current *1 Upper row : Δ-connection Lower row : Y-connection	Line to ground capacitor CY1 (nominal value)	Line to ground capacitor CY2 (nominal value)
203	1.0mA/2.0mA max 0.1mA/0.2mA max	0.01 μF	0.01 μF
693	2.5mA/5.0mA max 0.35mA/0.7mA max	0.022 μF	0.047 μF
104	3.5mA/7.0mA max 0.5mA/1.0mA max	0.033 μF	0.068 μF
324	12mA/24mA max 1.5mA/3.0mA max	0.1 μF	0.22 μF
355	180mA/270mA max 25mA/50mA max	0.22 μF	3.3 μF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

\*1 Input 250/500V 60Hz (Only Δ-connection of "355" is 250/400V 60Hz)

- ④ Option
- H : Ultra high-attenuation type  
"355" is not applied.
- U : Improve differential mode attenuation  
(Rated voltage 250V)

## Features of FSB series

### EMI/EMC Filter for motor drive system (AC servo)

- Improve saturation resistance (There is such as performance improvement type "-324-HU")
- Book type (Space-saving type)

## Specifications

No.	Items	FSB-40-324	FSB-50-324	FSB-60-324
1	Rated Voltage[V]	AC Three Phase 500 (voltage range:528 max) 50/60Hz *2 *3		
2	Rated Current[A]	40	50	60
3	Test Voltage (Terminal-Mounting Plate)	2,800 VDC (Cutoff Current = 10mA), 1minute at room temperature and humidity *4		
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100MΩ min at room temperature and humidity *5		
5	Leakage current 250/500V 60Hz	12mA/24mA max		
6	DC resistance	17mΩ max	14mΩ max	10mΩ max
7	Safety agency approval temperatures	-25 to +85°C (Refer to Derating Curve)		
8	Operating temperature	-40 to +85°C (Refer to Derating Curve)		
9	Operating humidity	20 to 95%RH (Non condensing)		
10	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)		
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis		
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis		
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil 3-1, ENEC		
14	Case size (without projection)	90 X 125 X 290 mm (W X H X D) [3.54 X 4.92 X 11.42 inches] (W X H X D)		
15	Weight	3.3kg max		

\*2 Only capacitor code "355", Three Phase Δ-connection : 400 (440 max), Y-connection : 500 (528 max)

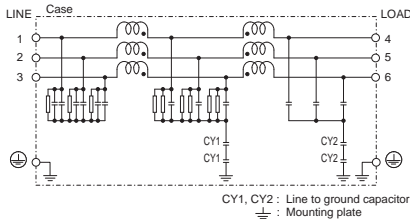
\*3 Only "FSB-□□□□□□-U", Three Phase 250 (275 max)

\*4 Only capacitor code "203", "693", "104", 2,500VAC (Cutoff Current = 100mA), 1minute at room temperature and humidity.

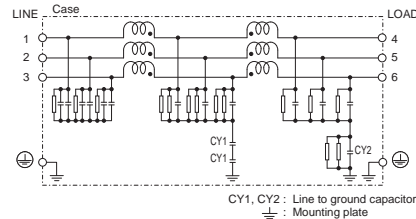
\*5 Only capacitor code "355", Isolation resistance specification is deleted.

## Circuit Diagram

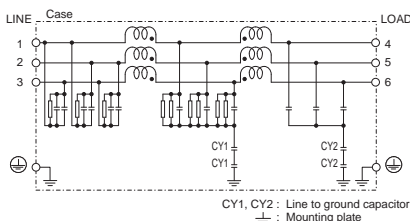
(1) Line to ground capacitor code : 203, 693, 104, 324



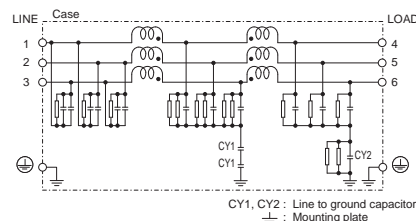
(2) Line to ground capacitor code : 355



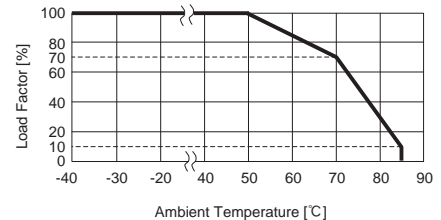
(3) Line to ground capacitor code : 203, 693, 104, 324  
Option : U



(4) Line to ground capacitor code : 355  
Option : U



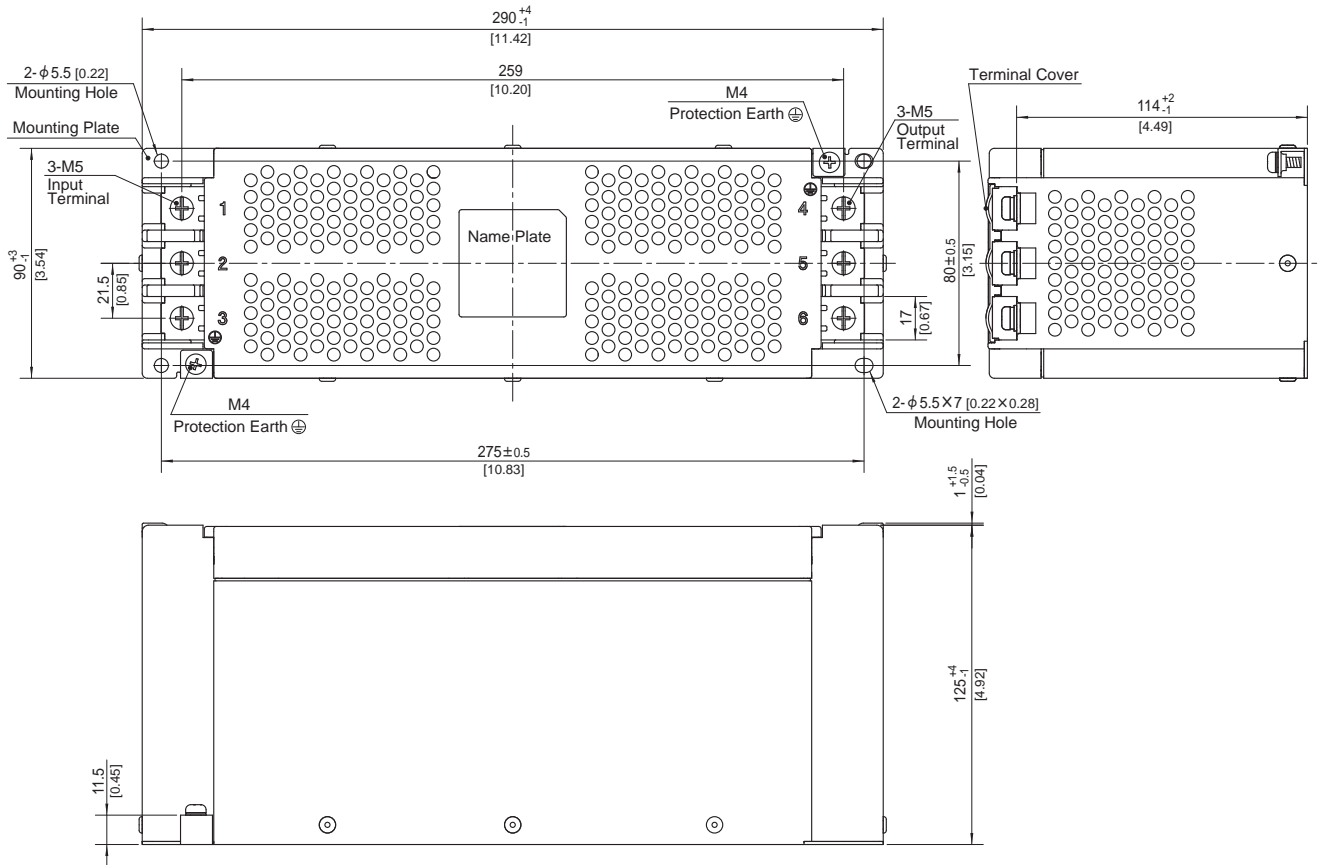
## Derating Curve



\* Keep free ventilation holes for cooling.

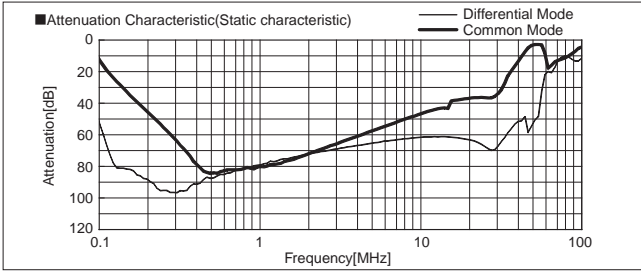


## External view

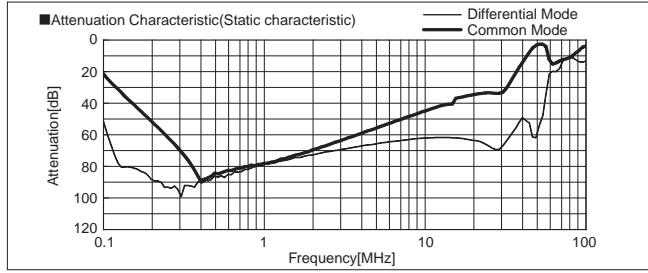


- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 3.3kg max
- ※ Mounting Plate : Hot-dip Galvanized Steel board  $t=1.2$  [0.05]
- ※ Case Material : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M5 :  $3.0\text{N} \cdot \text{m}$  (30.7kgf $\cdot$ cm)max
- ※ Protection Earth(PE) screw tightening torque M4 :  $1.6\text{N} \cdot \text{m}$  (16.9kgf $\cdot$ cm)max
- ※ Can not be mounted upside-down(mounted the top surface)
- ※ Keep free ventilation holes for cooling

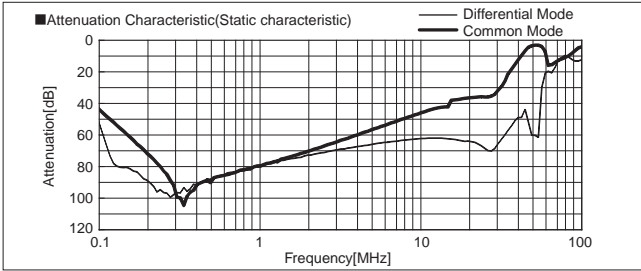
**FSB-40-693**



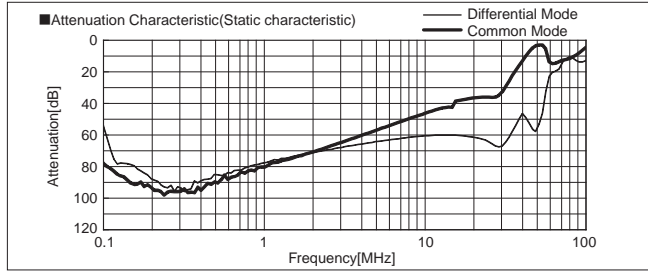
**FSB-40-104**



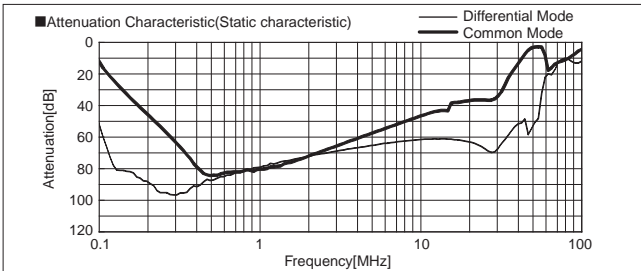
**FSB-40-324**



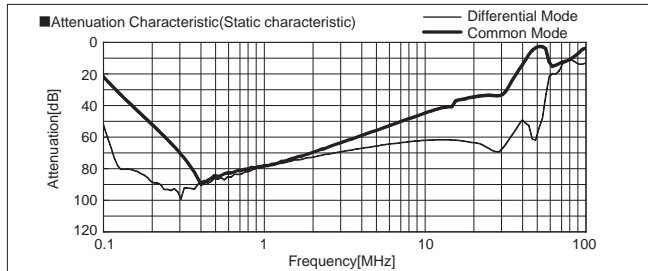
**FSB-40-355**



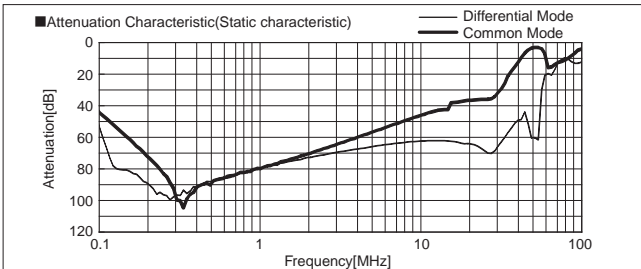
**FSB-50-693**



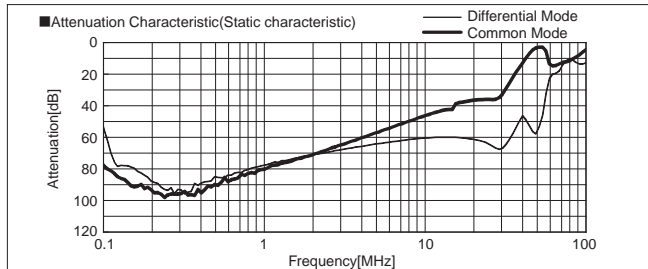
**FSB-50-104**



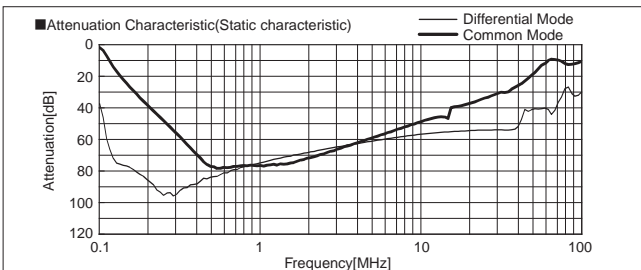
**FSB-50-324**



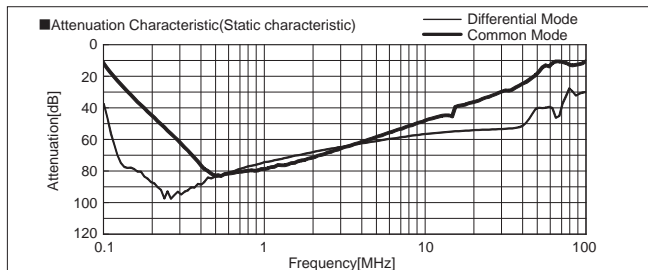
**FSB-50-355**



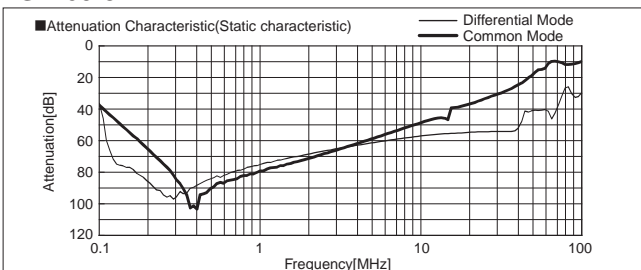
**FSB-60-693**



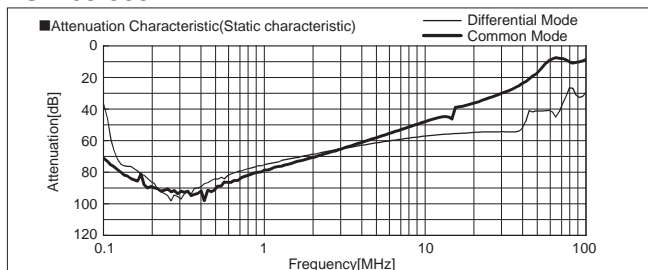
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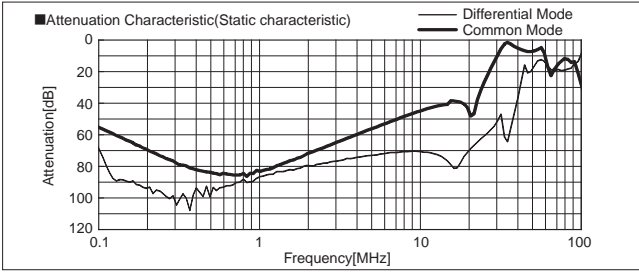
**FSB-60-324**



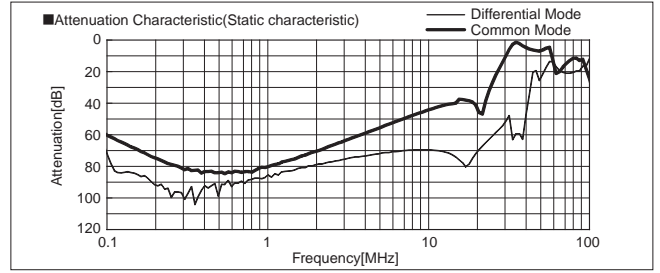
**FSB-60-355**



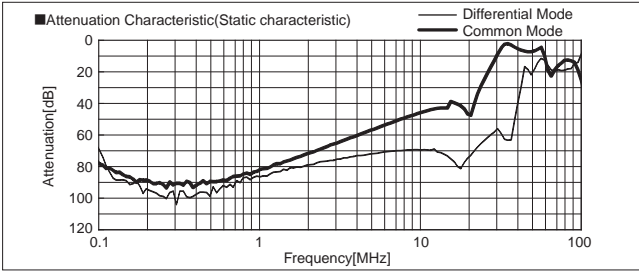
**FSB-40-693-H**



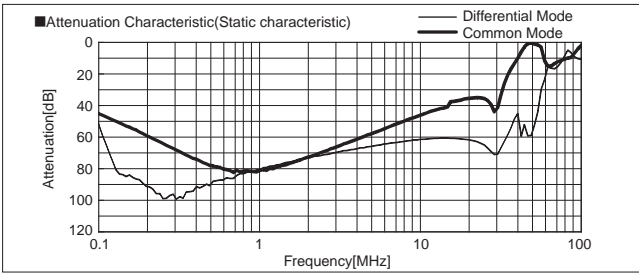
**FSB-40-104-H**



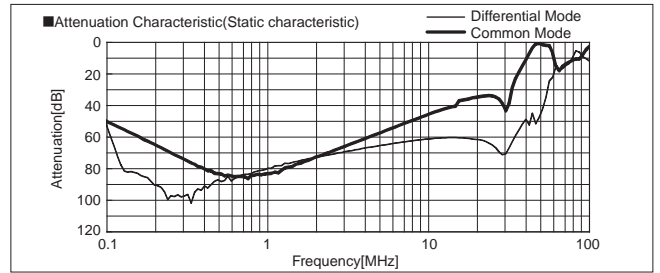
**FSB-40-324-H**



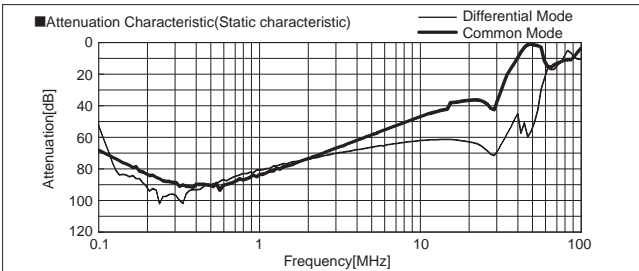
**FSB-50-693-H**



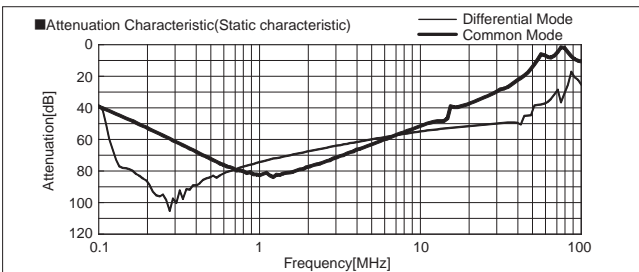
**FSB-50-104-H**



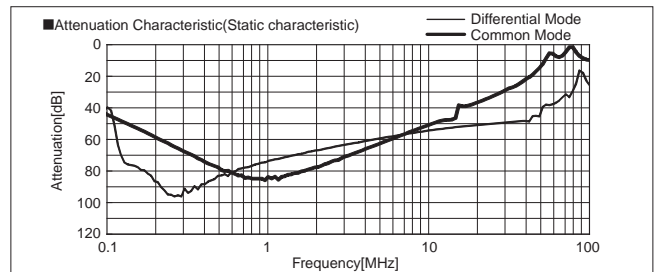
**FSB-50-324-H**



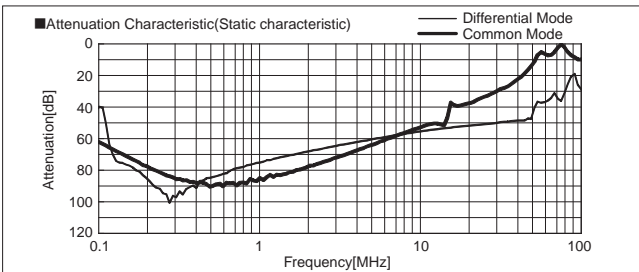
**FSB-60-693-H**



**FSB-60-104-H**



**FSB-60-324-H**



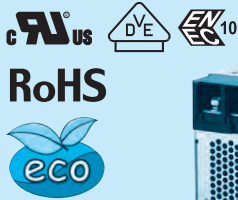




# FSB series(80,100,150A)

FSB -150 -324 -□

① ② ③ ④



## Features of FSB series

### EMI/EMC Filter for motor drive system (AC servo)

- Improve saturation resistance (There is such as performance improvement type “-324-HU”)
- Book type (Space-saving type)

- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table 1.1 Line to ground capacitor code

Code	Leakage Current *1 Upper row : Δ-connection Lower row : Y-connection	Line to ground capacitor CY1 (nominal value)	Line to ground capacitor CY2 (nominal value)
203	1.0mA/2.0mA max 0.1mA/0.2mA max	0.01 μF	0.01 μF
693	2.5mA/5.0mA max 0.35mA/0.7mA max	0.022 μF	0.047 μF
104	3.5mA/7.0mA max 0.5mA/1.0mA max	0.033 μF	0.068 μF
324	12mA/24mA max 1.5mA/3.0mA max	0.1 μF	0.22 μF
355	330mA/515mA max 40mA/80mA max	0.22 μF	3.3 μF

\* When the line to ground capacitor code is different, the attenuation characteristic is different.

\*1 Input 250/500V 60Hz (Only Δ-connection of “355” is 250/400V 60Hz)

④ Option

- H : Ultra high-attenuation type  
“355” is not applied.
- S : Hexagon socket head cap screw  
(Standard type is Hexagon head screw)
- U : Improve differential mode attenuation  
(Rated voltage 250V)

## Specifications

No.	Items	FSB-80-324	FSB-100-324	FSB-150-324
1	Rated Voltage[V]	AC Three Phase 500 (voltage range:528 max) 50/60Hz *2 *3		
2	Rated Current[A]	80	100	150
3	Test Voltage (Terminal-Mounting Plate)	2,800 VDC (Cutoff Current = 10mA), 1minute at room temperature and humidity *4		
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 100MΩ min at room temperature and humidity *5		
5	Leakage current 250/500V 60Hz	12mA/24mA max		
6	DC resistance	10mΩ max	8mΩ max	6mΩ max
7	Safety agency approval temperatures	-25 to +85°C (Refer to Derating Curve)		
8	Operating temperature	-40 to +85°C (Refer to Derating Curve)		
9	Operating humidity	20 to 95%RH (Non condensing)		
10	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)		
11	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis		
12	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis		
13	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL), DIN EN60939 VDE0565 Teil 3-1, ENEC		
14	Case size (without projection)	100 X 170 X 350 mm (W X H X D)		100 X 210 X 400 mm (W X H X D)
		[3.94 X 6.69 X 13.78 inches] (W X H X D)		[3.94 X 8.27 X 15.75 inches] (W X H X D)
15	Weight	6.3kg max		

\*2 Only capacitor code “355”, Three Phase Δ-connection : 400 (440 max), Y-connection : 500 (528 max)

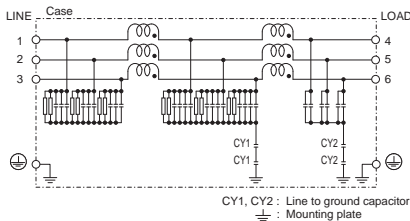
\*3 Only “FSB-□□□□□□□□-U”, Three Phase 250 (275 max)

\*4 Only capacitor code “203”, “693”, “104”, 2,500VAC (Cutoff Current = 100mA), 1minute at room temperature and humidity.

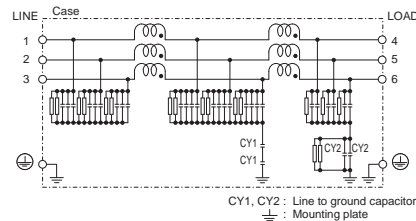
\*5 Only capacitor code “355”, Isolation resistance specification is deleted.

## Circuit Diagram

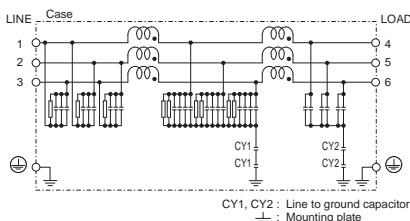
(1) Line to ground capacitor code : 203, 693, 104, 324



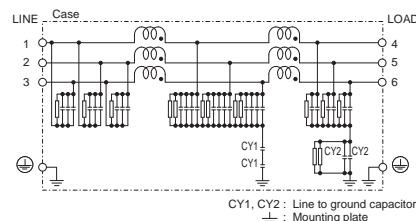
(2) Line to ground capacitor code : 355



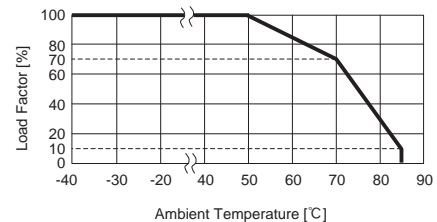
(3) Line to ground capacitor code : 203, 693, 104, 324  
Option : U



(4) Line to ground capacitor code : 355  
Option : U



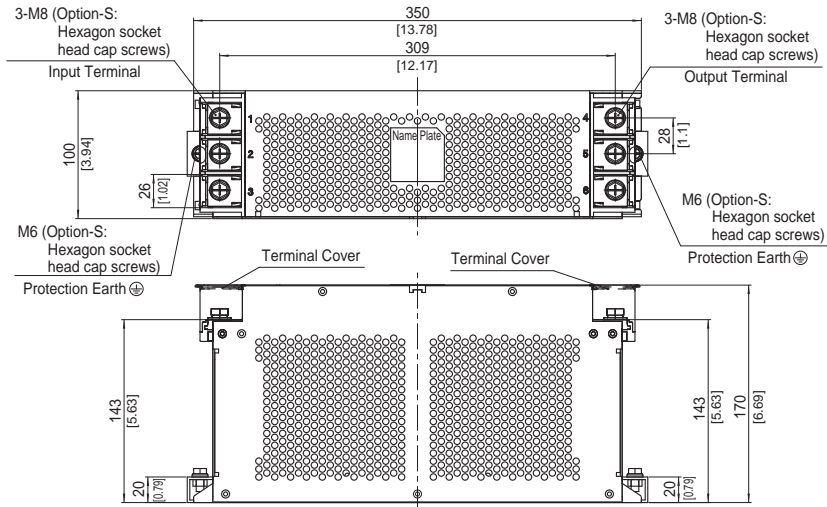
## Derating Curve



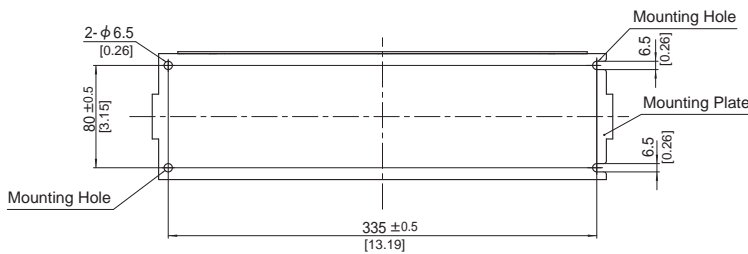
\* Keep free ventilation holes for cooling.

## External view

### FSB-80 / FSB-100

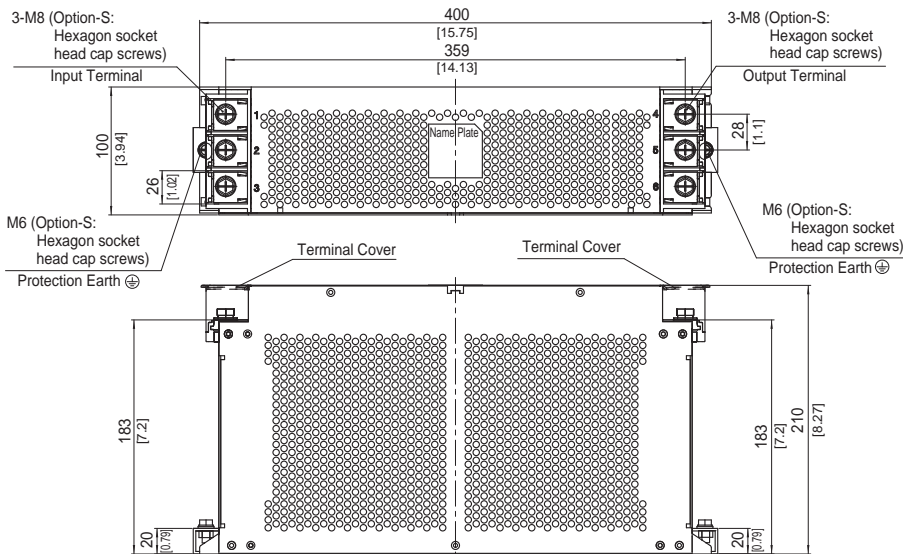


※ The air hole for heat radiation is not on the opposite side side.

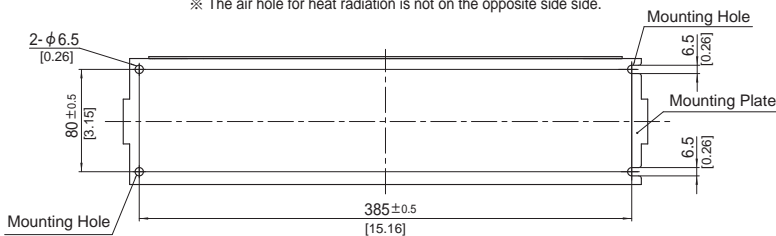


- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 6.3kg max
- ※ Mounting Plate : Aluminum  $t=2.0$  [0.08]
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque  
M8 :  $9.2N \cdot m$  (93.9kgf · cm)max
- ※ Protection Earth (PE) screw tightening torque  
M6 :  $5.8N \cdot m$  (59.2kgf · cm)max
- ※ Can not be mounted upside-down (mounted the top surface)
- ※ Keep free ventilation holes for cooling

### FSB-150

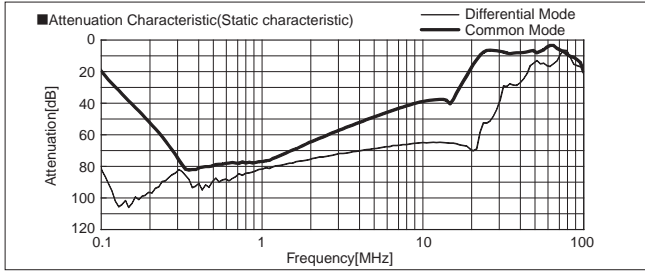


※ The air hole for heat radiation is not on the opposite side side.

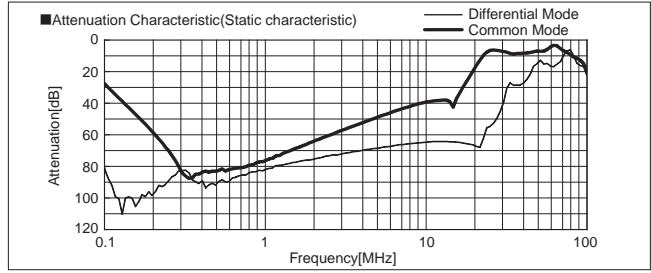


- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 8.8kg max
- ※ Mounting Plate : Aluminum  $t=2.0$  [0.08]
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque  
M8 :  $9.2N \cdot m$  (93.9kgf · cm)max
- ※ Protection Earth (PE) screw tightening torque  
M6 :  $5.8N \cdot m$  (59.2kgf · cm)max
- ※ Can not be mounted upside-down (mounted the top surface)
- ※ Keep free ventilation holes for cooling

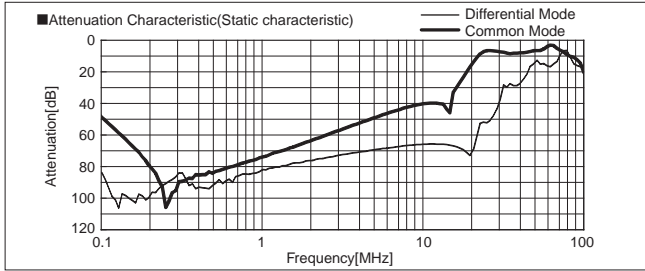
**FSB-80-693**



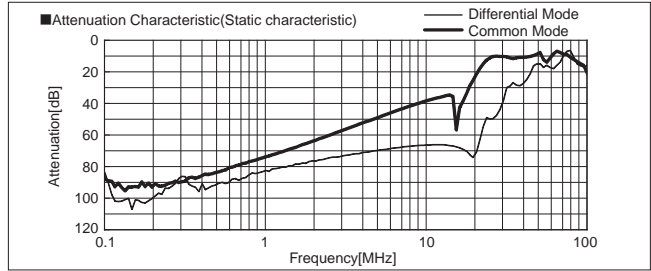
**FSB-80-104**



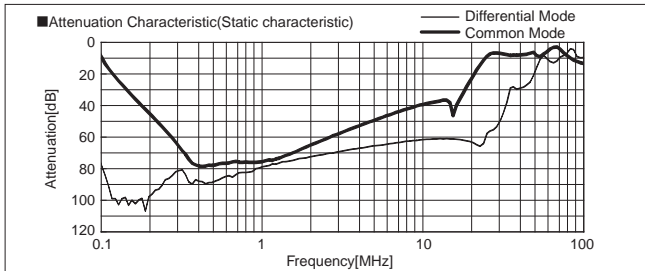
**FSB-80-324**



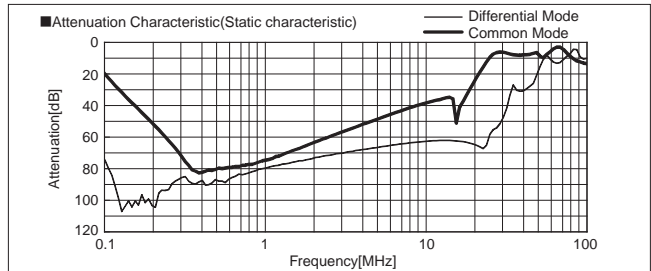
**FSB-80-355**



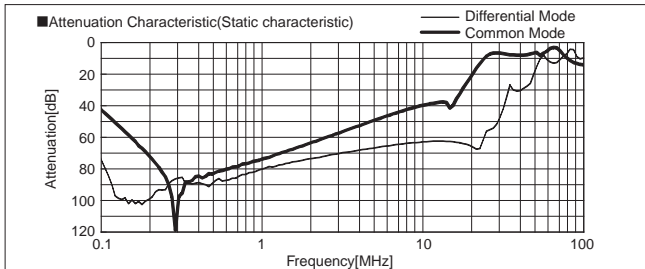
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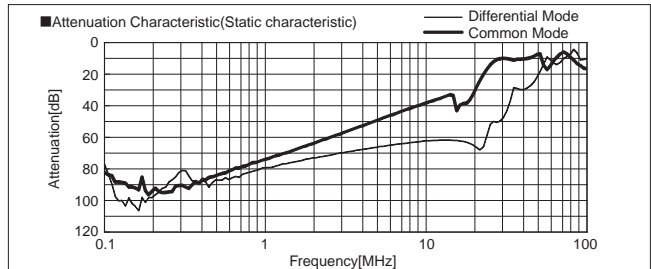
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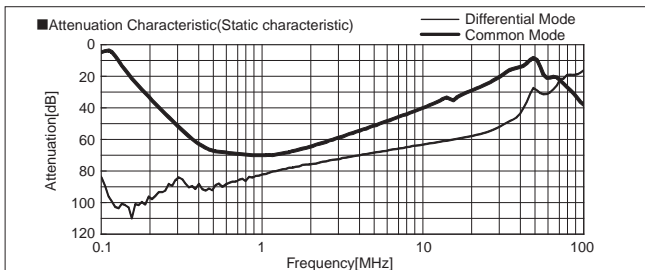
**FSB-100-324**



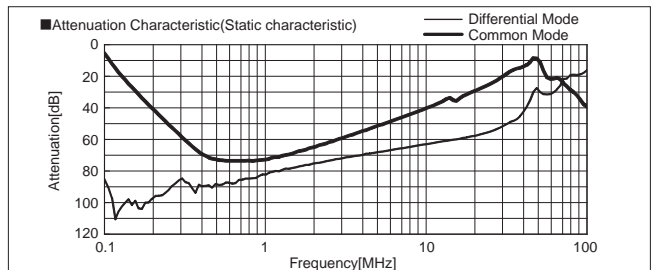
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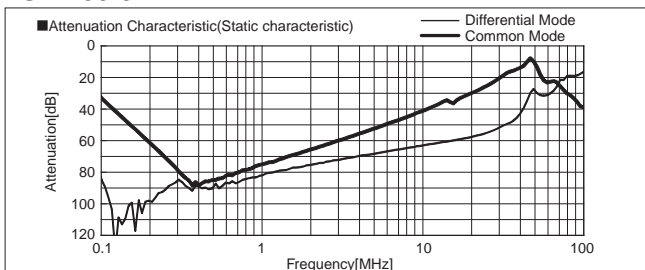
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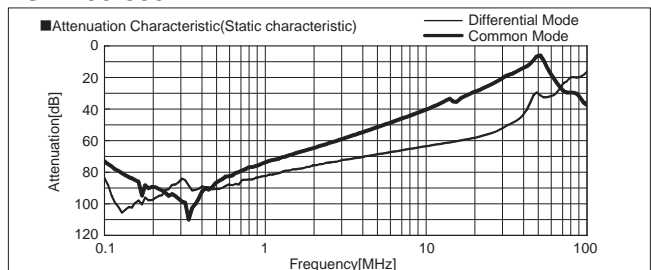
**FSB-150-104**



**FSB-150-324**

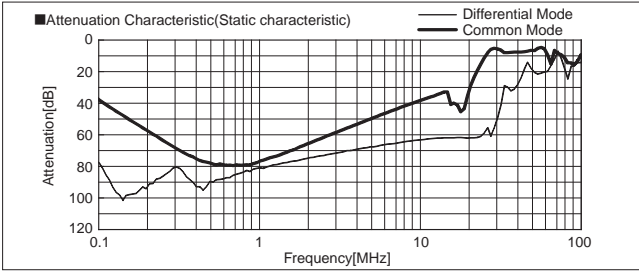


**FSB-150-355**

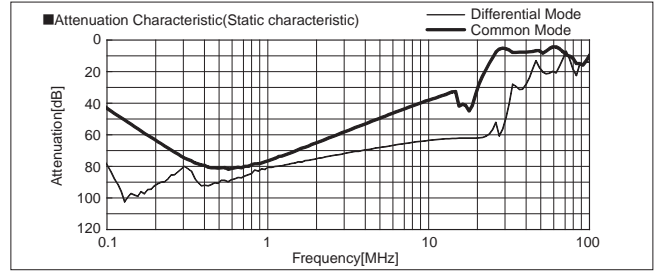




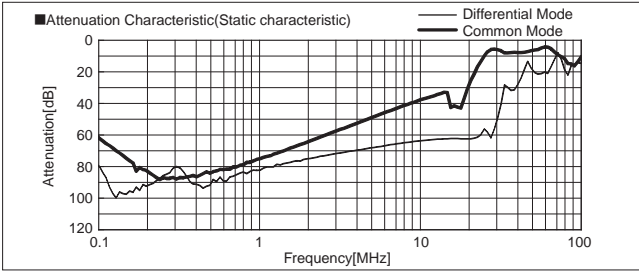
**FSB-80-693-H**



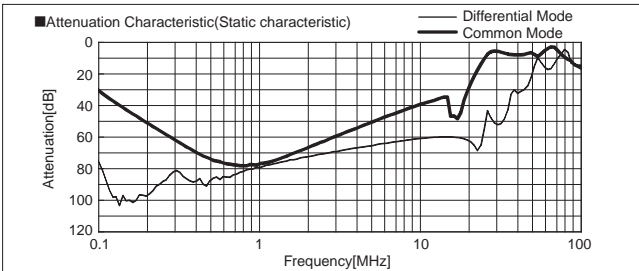
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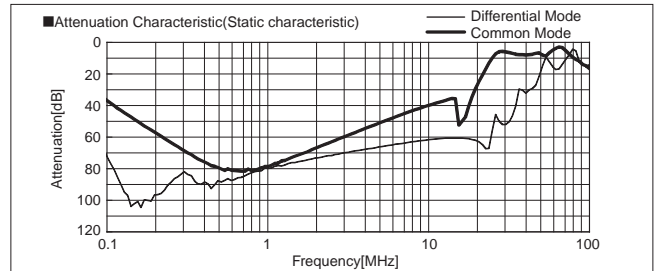
**FSB-80-324-H**



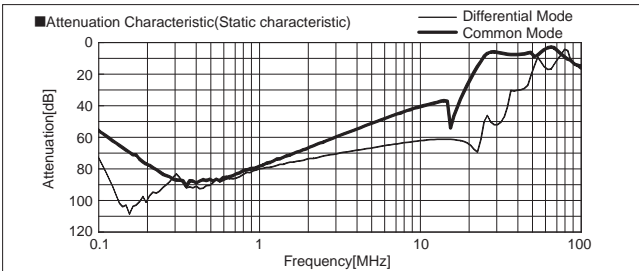
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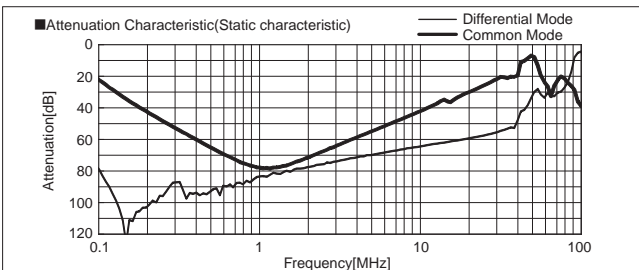
**FSB-100-104-H**



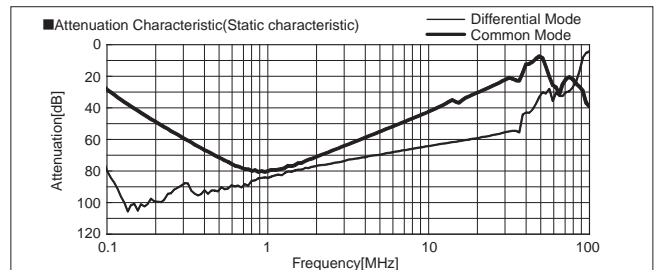
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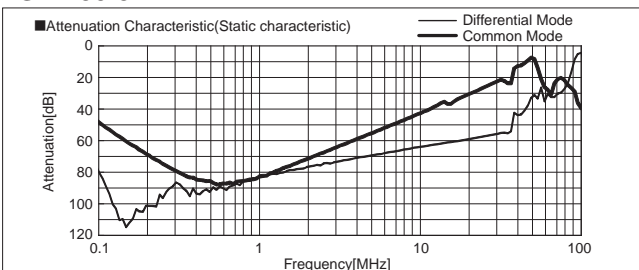
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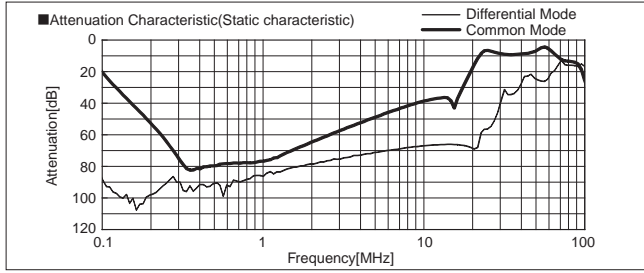
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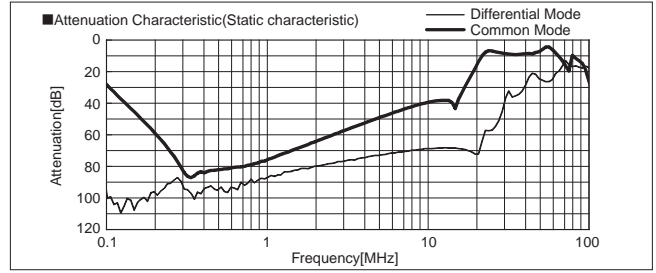
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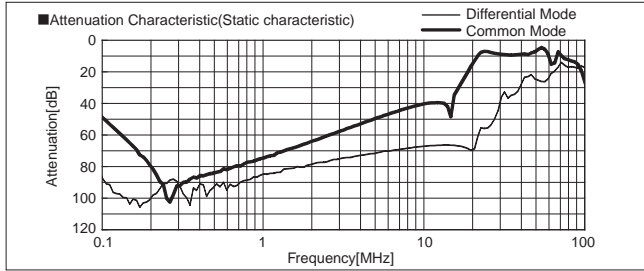
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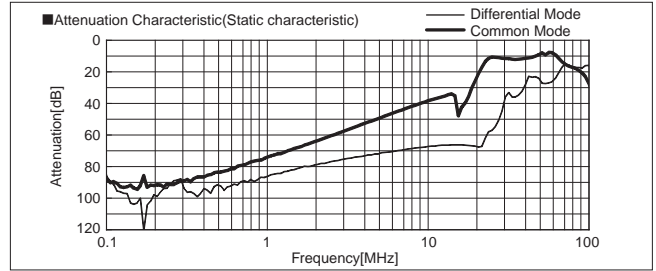
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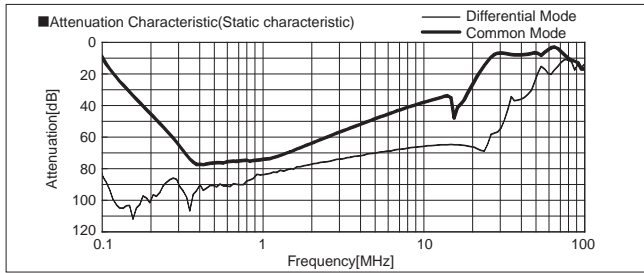
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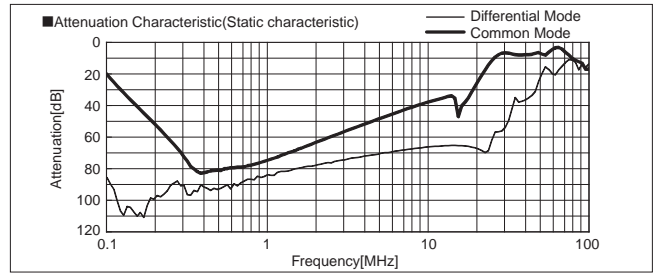
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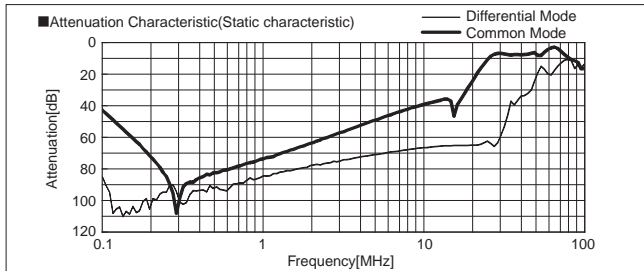
**FSB-100-693-U**



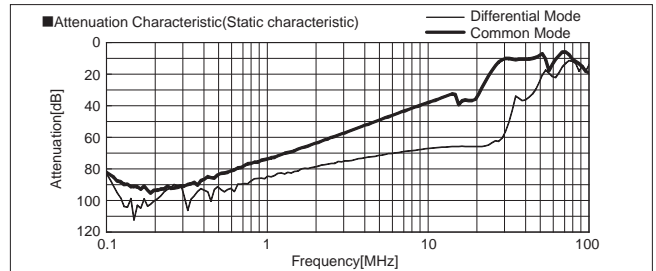
**FSB-100-104-U**



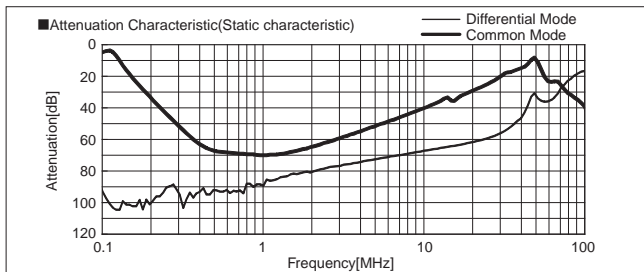
**FSB-100-324-U**



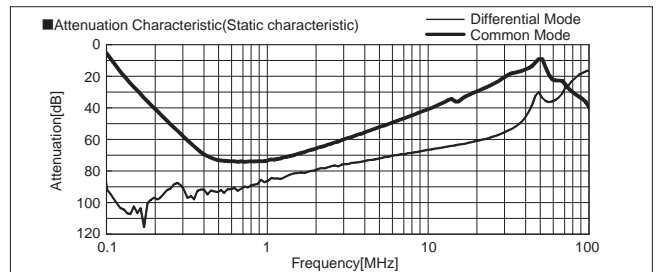
**FSB-100-355-U**



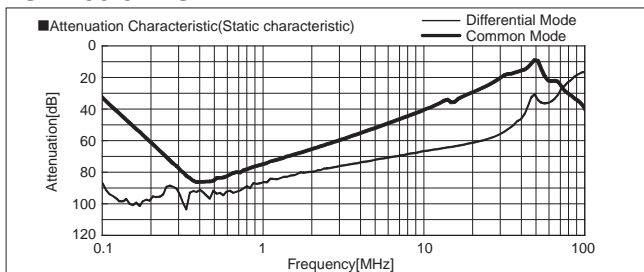
**FSB-150-693-U**



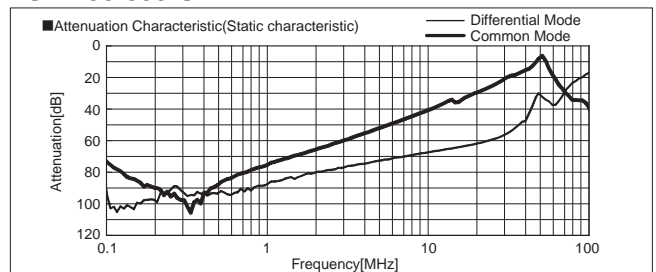
**FSB-150-104-U**



**FSB-150-324-U**



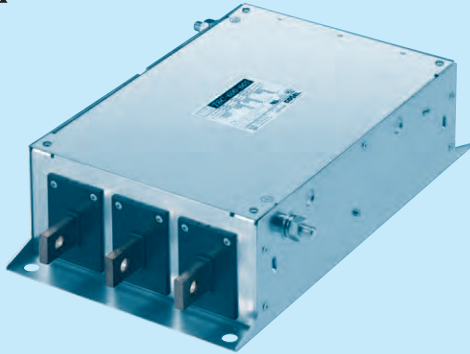
**FSB-150-355-U**





# TSC series(400,600A)

TSC -600 -665



- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1

table1.1 Line to ground capacitor code

Code	Leakage Current *1	Line to ground capacitor (nominal value)		
	Upper row : Δ-connection Lower row : Y-connection	CY1	CY2	CY3
665	220mA/350mA max 20mA/40mA max	2.2μF	2.2μF	2.2μF

\* Please contact us about low leakage current type (Change to low grounding capacitor) and further high-attenuation type (Change to high permeability choke coil).

\*1 Δ-connection : Input 250/400V 60Hz  
Y-connection : Input 250/500V 60Hz

## Features of TSC series

### Ultra high-attenuation for star connection with neutral earthing

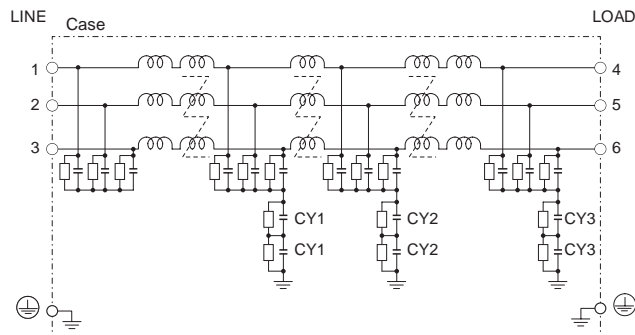
- Input and output terminals : Busbar type
- Ideal for Solar Photovoltaic system , Large Manufacturing facility

## Specifications

No.	Items	TSC-400-665	TSC-600-665
1	Rated Voltage[V]	AC Three Phase Y-connection 500 (voltage range:528 max) 50/60Hz *2	
2	Rated Current[A]	400	600
3	Test Voltage (Terminal-Mounting Plate)	3,600 VDC (Cutoff Current = 10mA), 1minute at room temperature and humidity	
4	Leakage current 250/500V 60Hz	20mA/40mA max (Y-connection)	
5	DC resistance	0.27mΩ max	0.2mΩ max
6	Safety agency approval temperatures	-25 to +85°C (Refer to Derating Curve)	
7	Operating temperature	-40 to +85°C (Refer to Derating Curve)	
8	Operating humidity	20 to 95%RH (Non condensing)	
9	Storage temperature/humidity	-40 to +85°C/20 to 95%RH (Non condensing)	
10	Vibration	10 to 55Hz, 9.8m/s <sup>2</sup> (1G), 3min. Period, 1hour each X, Y and Z axis	
11	Impact	98.1m/s <sup>2</sup> (10G), 11ms Once each X, Y and Z axis	
12	Safety agency approvals	UL1283, CSA C22.2 No.8 (C-UL) , DIN EN60939 VDE0565 Teil3-1, ENEC	
13	Case size (without projection)	210 X 100 X 360 mm [8.27 X 3.94 X 14.17 inches] (W X H X D)	
14	Weight	9.5kg max	10.0kg max

\*2 Three Phase Δ-connection:400 (440 max)

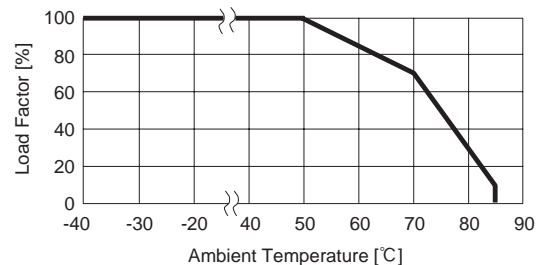
## Circuit Diagram



CY1, CY2, CY3 : Line to ground capacitor

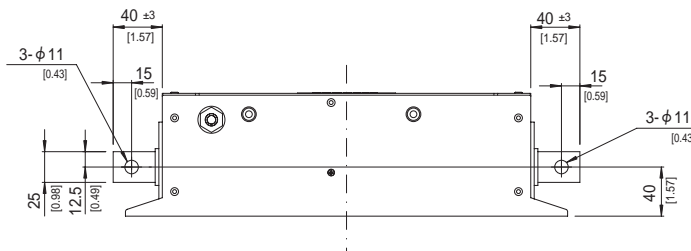
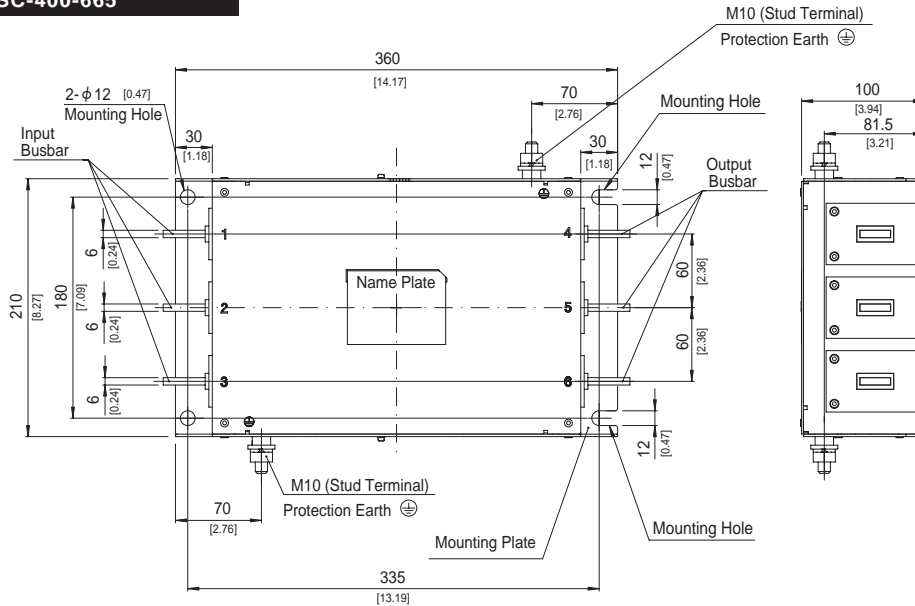
⊥ : Mounting Plate

## Derating Curve



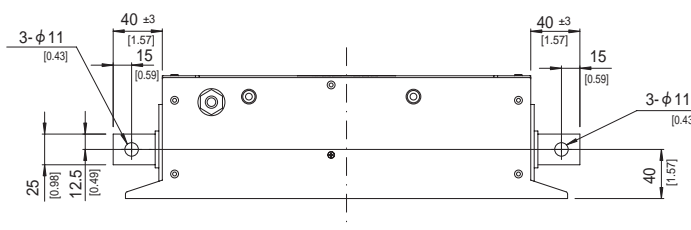
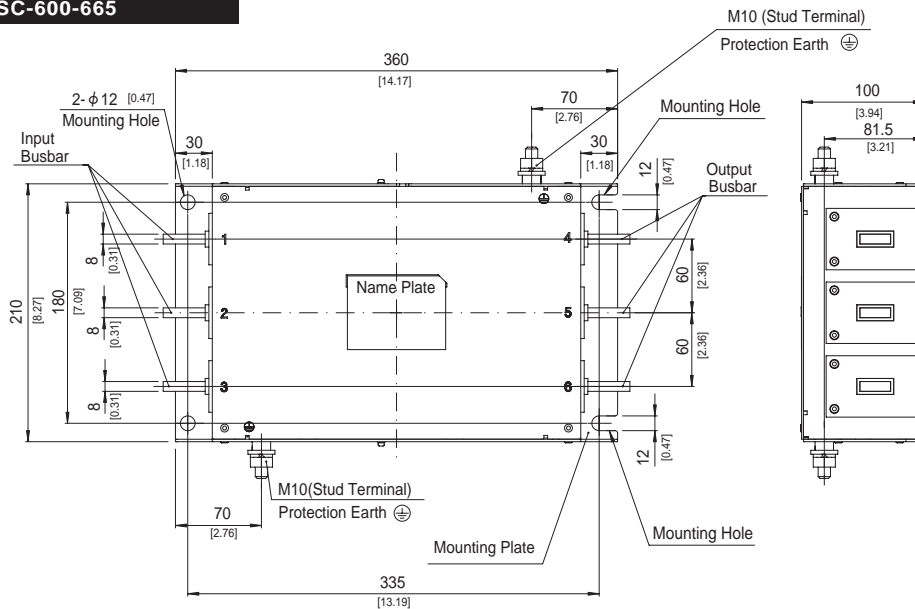
## External view

### TSC-400-665



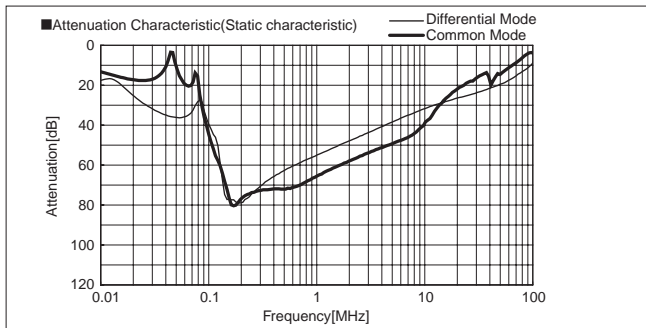
- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 9.5kg max
- ※ Mounting Plate : Alumin  $t=2.0$  [0.08]
- ※ Busbar : Copper (Unplated)  $t=6.0$  [0.24]
- ※ Dimensions in mm, [ ]=inches
- ※ Protection Earth (PE) screw tightening torque  
M10 : 14.2N · m (144.9kgf · cm)max
- ※ Can not be mounted upside-down  
(mounted the top surface)

### TSC-600-665

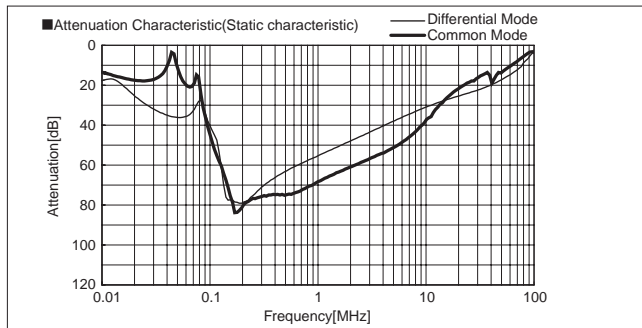


- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 10.0kg max
- ※ Mounting Plate : Alumin  $t=2.0$  [0.08]
- ※ Busbar : Copper (Unplated)  $t=8.0$  [0.31]
- ※ Dimensions in mm, [ ]=inches
- ※ Protection Earth (PE) screw tightening torque  
M10 : 14.2N · m (144.9kgf · cm)max
- ※ Can not be mounted upside-down  
(mounted the top surface)

**TSC-400-665**



**TSC-600-665**



## 1 Busbar Applicable connect

- When wiring an M10 terminal to the busbar, the external dimension of the crimp terminal is critical in maintaining isolation distance between insulating resin, chassis, and mounting screws. We therefore recommend that you use terminals of the dimensions shown in table 1.1.

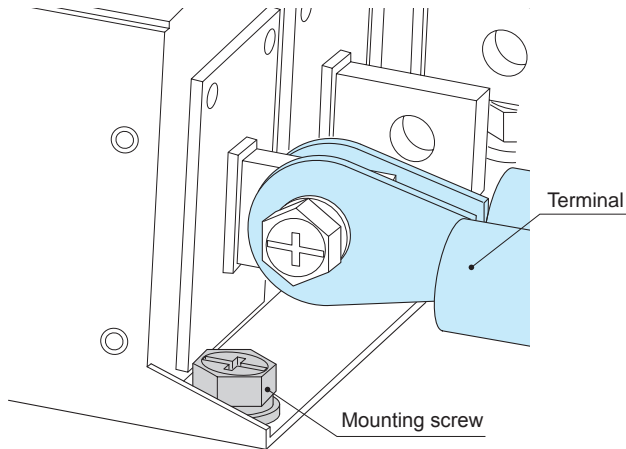


Fig.1.1 Busbar connection

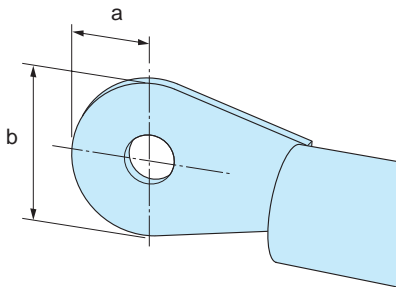


Fig.1.2 Terminals dimension

table.1.1 Selected conditions terminals dimension

Model Name	"a"Allowable dimension	"b"Allowable dimension
TSC series	19.5mm max	38.5mm max

## 2 Notes on wiring and storage

### ■ Notes on wiring

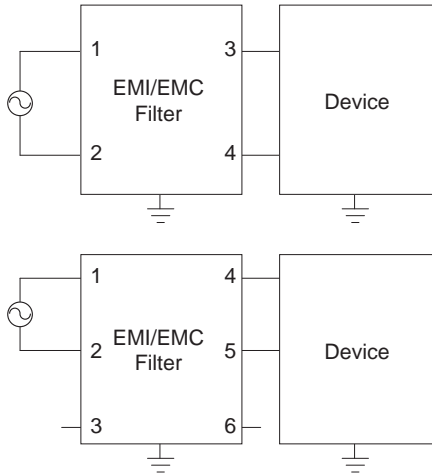
Since the (copper) busbar has not been surface treated, surface oxidation may form a resistive layer between the contacts. We therefore recommend abrasion of all mating surfaces before, and wearing gloves during, all wiring work. Please be careful not to leave fingerprints.

### ■ Notes on storage

Please avoid storage in environments where copper corrosion is concerned. Storage under a normal temperature and humidity environment is recommended.

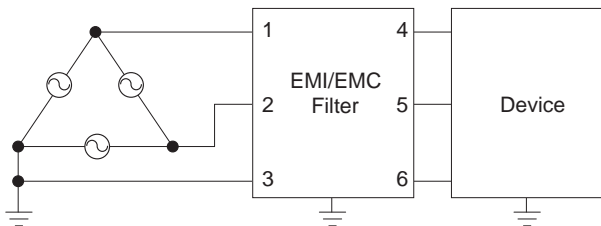
## 1 Method of connecting EMI/EMC Filter

### (1) Single Phase

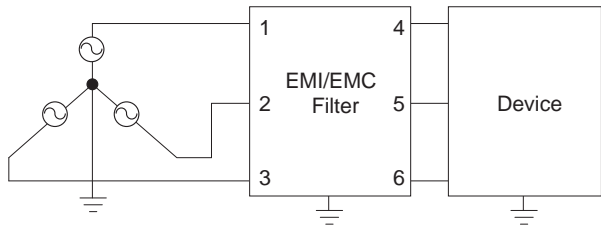


※Three phase EMI/EMC filter is also available as a single phase input type.

### (2) Three phase (Delta-connection)



### (3) Three phase (Star-connection)



[Reference] Example of calculating input current calculation

Input voltage 400 [V]  
 Input capacity of the equipment 4000 [VA]

$$\text{Input current} = \frac{4000 \text{ [VA]}}{400 \text{ [V]} \times \sqrt{3}} = 5.8 \text{ [A]}$$

## 2 Caution when connecting EMI/EMC Filter

Please note the excessive temperature increase of EMI/EMC filter.  
 Please contact us if judgement is difficult.

### (1) Input voltage and frequency

Please use within the rated voltage (or maximum voltage) of each model.

Input frequency specification for AC input EMI/EMC filter is considered as commercial frequency (50/60Hz).

It should not be used under the following conditions.

- 1) Distorted input voltage waveform.  
 (Triangle wave, square wave etc.)
- 2) High input frequency (ex: 400Hz)

### (2) Input current

Please use within the rated current of each model.

EMI/EMC filters have short term peak current capability. Therefore, it can flow ~40A or ten times of rated current, non-repeated, within a few ms such as inrush current of power supply etc.

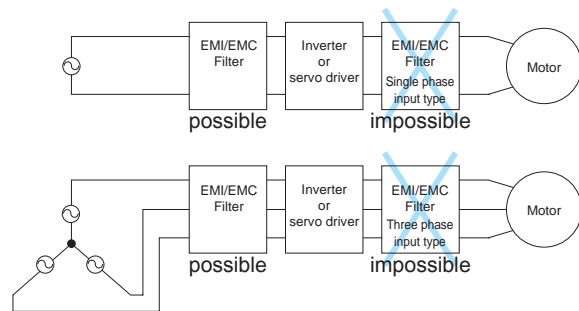
However, it should not be used under the following conditions.

- 1) Long duration peak current.
- 2) Peak current or high-frequency current is continuously flowing.

### (3) Connection to a general-purpose inverter (servo driver)

Please connect EMI/EMC filter to input side of inverter driver (servo driver).

It should not be used between the inverter (servo driver) and the motor.





## 3 Safety Considerations

- To apply for safety standard approval using this EMI/EMC Filter, the following conditions must be met.
- The unit must be used as a component of an end-use equipment.
- Protection earth terminal (PE) must be connected to safety ground of end-use equipment.

# SNA series (1A,3A)

SNA -03 -223 -□

① ② ③ ④

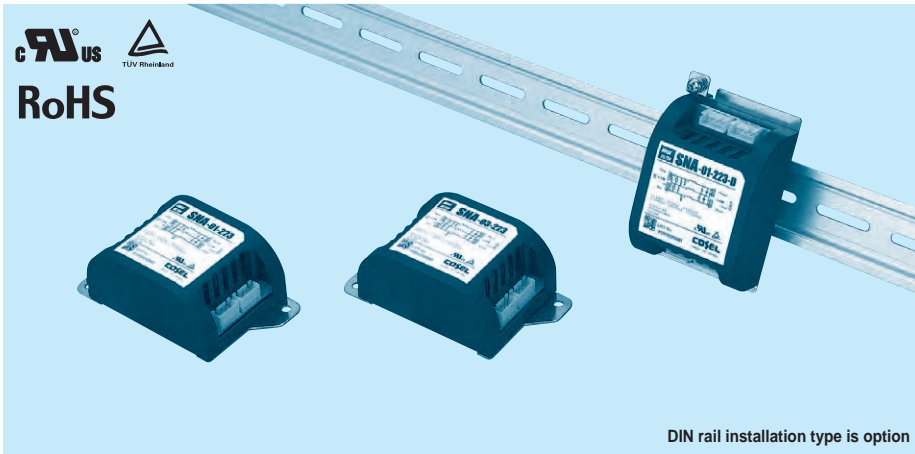
- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table 1.1 Line to ground capacitor code

Code	Line to ground capacitor (nominal value)
000	Not Provided
223	22000pF

- ④ Options
- D: DIN rail installation type

\* The dimensions change when the option is set. Refer to External view.



DIN rail installation type is option

RoHS

## Features of SNA series (1A and 3A)

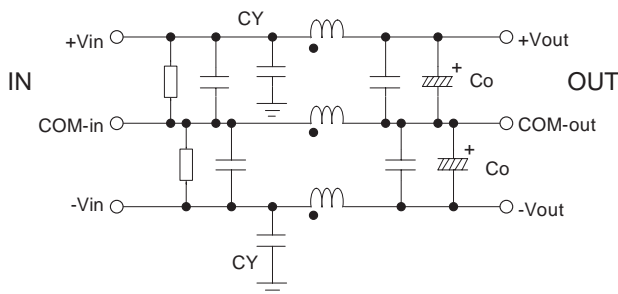
### Ripple noise attenuation type for switch mode power supplies(DC)

- ±50 VDC
- Best filter for switch mode power supplies of analog circuits (ex. power supply filter for an operational amplifier)

### Specifications

No.	Items	SNA-01-223	SNA-03-223
		Interface: Connector	
1	Rated Voltage DC[V]	±50 (+Vin - COM-in, -Vin - COM-in)	
2	Rated Current DC[A]	1	3
3	Test Voltage (Terminal-Mounting Plate)	500 VAC (Cutoff Current = 100mA), 1minute at room temperature and humidity	
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 50MΩ min at room temperature and humidity	
5	DC resistance	190mΩ max	90mΩ max
6	Operating temperature	-40 to +71°C (Refer to Derating Curve)	
7	Operating humidity	20 to 95%RH (Non condensing)	
8	Storage temperature/humidity	-40 to +75°C/20 to 95%RH (Non condensing)	
9	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis	
10	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis	
11	Safety agency approvals	UL60950-1, C-UL (CSA60950-1), EN60950-1	
12	Case size (without projection) /Weight	52 X 35 X 93 mm [2.05 X 1.38 X 3.66 inches] (W X H X D) /130g max (Option : -D refer to external view)	

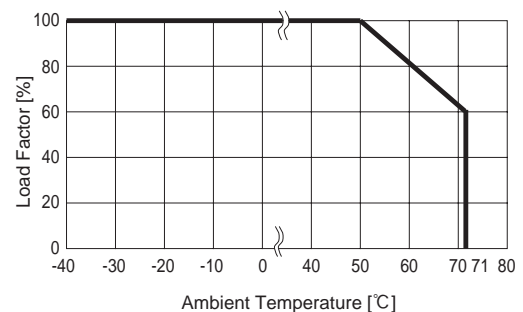
### Circuit Diagram



CY : Line to ground capacitor Co : Electrolytic capacitor : Mounting Plate

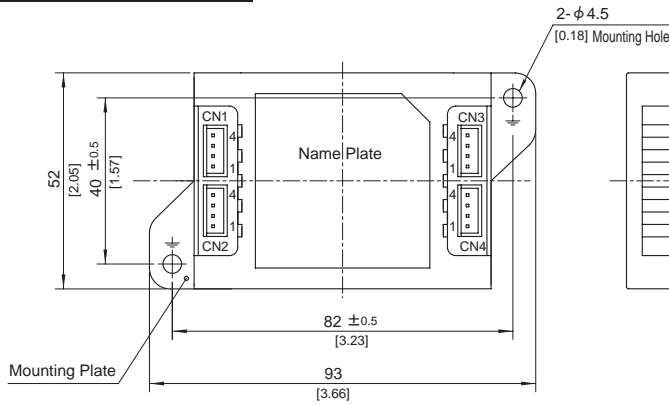
■ Expected life : 10 years

### Derating Curve



## External view

### Standard Type



CN1	
Pin No.	Function
1,2	COM-in
3,4	+Vin

CN3	
Pin No.	Function
1,2	COM-out
3,4	+Vout

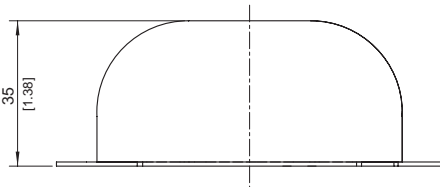
CN2	
Pin No.	Function
1,2	-Vin
3,4	COM-in

CN4	
Pin No.	Function
1,2	-Vout
3,4	COM-out

I/O Connector	Mating connector	Terminal
CN1-CN4	B4B-XH-AM	XHP-4
		Reel: SXH-001T-P0.6
		Bulk: BXH-001T-P0.6

(Mfr.: J.S.T)

Option harness : Refer to Instruction Manual 4



※ Tolerance : ±1 [±0.04]

※ Weight : 130g max

※ PCB Material /thickness : CEM3 /1.6mm [0.06 inches]

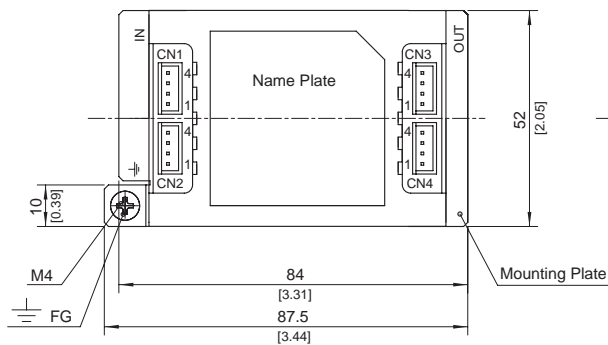
※ Mounting plate : Iron (surface finishing : nickel plating) t=1.0 [0.04]

※ Case : PBT

※ Dimensions in mm, [ ]=inches

※ Keeping drawing current per pin below 2A for CN1 to CN4

### DIN rail installation Type



CN1	
Pin No.	Function
1,2	COM-in
3,4	+Vin

CN3	
Pin No.	Function
1,2	COM-out
3,4	+Vout

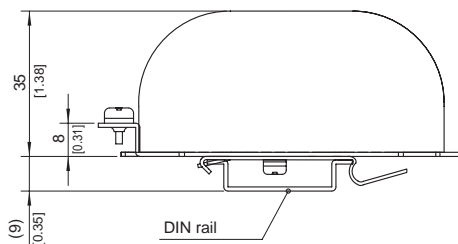
CN2	
Pin No.	Function
1,2	-Vin
3,4	COM-in

CN4	
Pin No.	Function
1,2	-Vout
3,4	COM-out

I/O Connector	Mating connector	Terminal
CN1-CN4	B4B-XH-AM	XHP-4
		Reel: SXH-001T-P0.6
		Bulk: BXH-001T-P0.6

(Mfr.: J.S.T)

Option harness : Refer to Instruction Manual 4



※ Tolerance : ±1 [±0.04]

※ Weight : 140g max

※ PCB Material /thickness : CEM3 /1.6mm [0.06 inches]

※ Mounting plate : Iron (surface finishing : nickel plating) t=1.0 [0.04]

※ Case : PBT

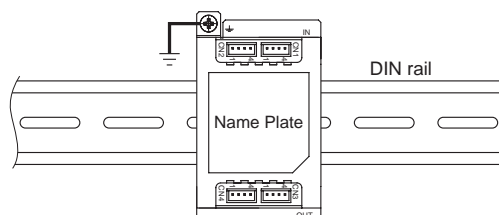
※ Dimensions in mm, [ ]=inches

※ Keeping drawing current per pin below 2A for CN1 to CN4

### ■Note when installing the EMI/EMC Filter on a DIN rail.

When the EMI/EMC Filter is grounded through the DIN rail, the proper noise attenuation may not be achieved.

Be sure to connect the FG terminal of the EMI/EMC Filter body to the earth.



# SNA series (6A)

SNA -06 -223 -□

① ② ③ ④

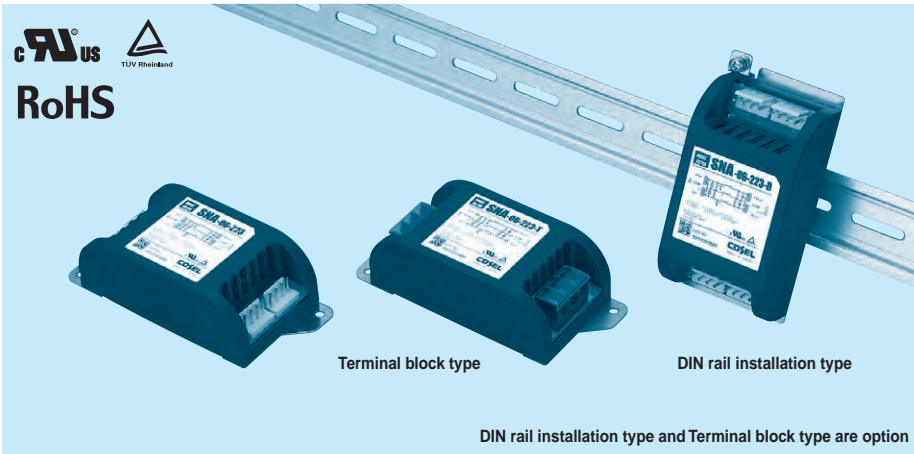
- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table 1.1 Line to ground capacitor code

Code	Line to ground capacitor (nominal value)
000	Not Provided
223	22000pF

- ④ Options
- D :DIN rail installation type
- T :Terminal block type
- DT :Terminal block and DIN rail type

\* The dimensions change when the option is set. Refer to External view.



RoHS

## Features of SNA series (6A)

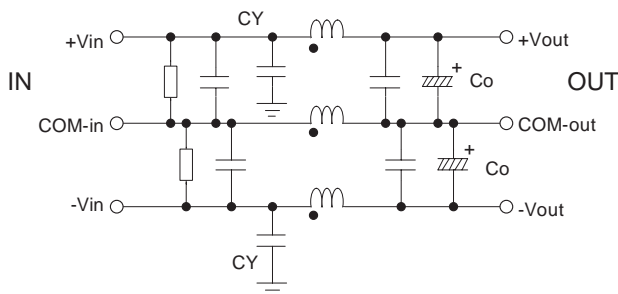
### Ripple noise attenuation type for switch mode power supplies(DC)

- ±50 VDC
- Best filter for switch mode power supplies of analog circuits (ex. power supply filter for an operational amplifier)

### Specifications

No.	Items	SNA-06-223
		Interface:Connector
1	Rated Voltage DC[V]	±50 (+Vin - COM-in, -Vin - COM-in)
2	Rated Current DC[A]	6
3	Test Voltage (Terminal-Mounting Plate)	500 VAC (Cutoff Current = 100mA), 1minute at room temperature and humidity
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 50MΩ min at room temperature and humidity
5	DC resistance	50mΩ max
6	Operating temperature	-40 to +71°C (Refer to Derating Curve)
7	Operating humidity	20 to 95%RH (Non condensing)
8	Storage temperature/humidity	-40 to +75°C/20 to 95%RH (Non condensing)
9	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis
10	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis
11	Safety agency approvals	UL60950-1, C-UL (CSA60950-1), EN60950-1
12	Case size (without projection) /Weight	52 X 35 X 117 mm [2.05 X 1.38 X 4.61 inches] (W X H X D) /150g max (Option : -D, -T, -DT refer to external view)

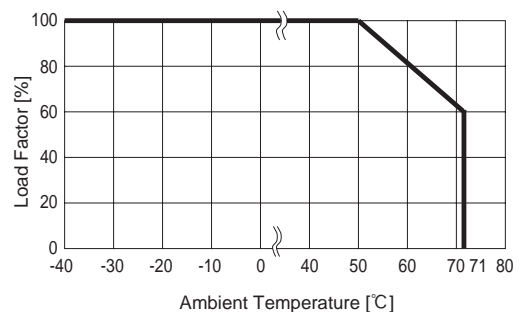
### Circuit Diagram



CY : Line to ground capacitor Co : Electrolytic capacitor : Mounting Plate

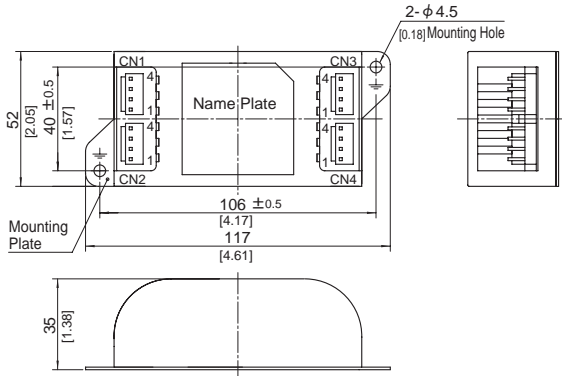
■ Expected life : 10 years

### Derating Curve



## External view

### Standard Type



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 150g max
- ※ PCB Material /thickness : CEM3 /1.6mm [0.06 inches]
- ※ Mounting plate : Iron (surface finishing : nickel plating)  $t=1.0$  [0.04]
- ※ Case : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Keeping drawing current per pin below 5A for CN1 to CN4

CN1		CN3	
Pin No.	Function	Pin No.	Function
1,2	COM-in	1,2	COM-out
3,4	+Vin	3,4	+Vout

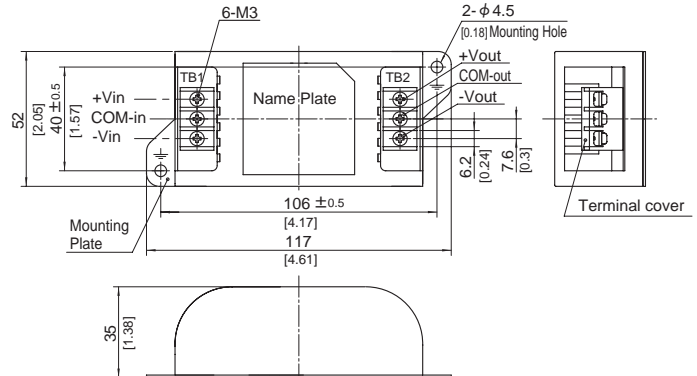
CN2		CN4	
Pin No.	Function	Pin No.	Function
1,2	-Vin	1,2	-Vout
3,4	COM-in	3,4	COM-out

I/O Connector	Mating connector	Terminal
CN1-CN4	B4P-VH VHR-4N	Reel:SVH-21T-P1.1 Bulk:BVH-21T-P1.1

(Mfr:J.S.T)

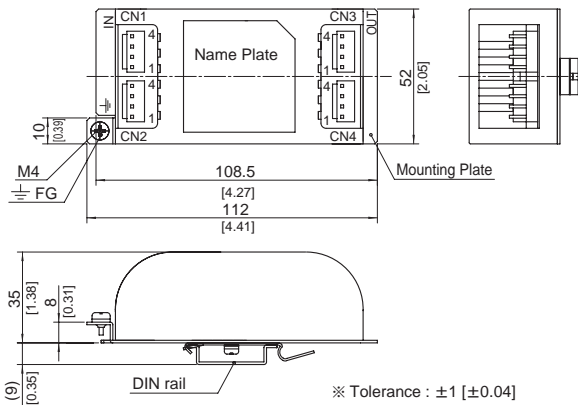
Option harness : Refer to Instruction Manual 4

### Terminal block Type



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 160g max
- ※ PCB Material /thickness : CEM3 /1.6mm [0.06 inches]
- ※ Mounting plate : Iron (surface finishing : nickel plating)  $t=1.0$  [0.04]
- ※ Case : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M3:0.8N · m (8.5kgf · cm) max

### DIN rail installation Type



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 160g max
- ※ PCB Material /thickness : CEM3 / 1.6mm [0.06 inches]
- ※ Mounting plate : Iron (surface finishing : nickel plating)  $t=1.0$  [0.04]
- ※ Case : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Keeping drawing current per pin below 5A for CN1 to CN4

CN1		CN3	
Pin No.	Function	Pin No.	Function
1,2	COM-in	1,2	COM-out
3,4	+Vin	3,4	+Vout

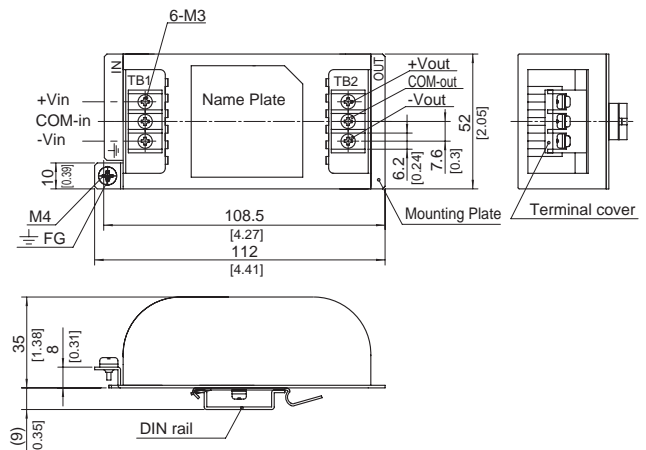
CN2		CN4	
Pin No.	Function	Pin No.	Function
1,2	-Vin	1,2	-Vout
3,4	COM-in	3,4	COM-out

I/O Connector	Mating connector	Terminal
CN1-CN4	B4P-VH VHR-4N	Reel:SVH-21T-P1.1 Bulk:BVH-21T-P1.1

(Mfr:J.S.T)

Option harness : Refer to Instruction Manual 4

### Terminal block type+DIN rail installation Type

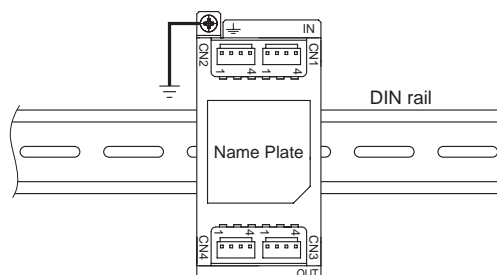


- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 170g max
- ※ PCB Material /thickness : CEM3 /1.6mm [0.06 inches]
- ※ Mounting plate : Iron (surface finishing : nickel plating)  $t=1.0$  [0.04]
- ※ Case : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M3:0.8N · m (8.5kgf · cm) max

## Note when installing the EMI/EMC Filter on a DIN rail.

When the EMI/EMC Filter is grounded through the DIN rail, the proper noise attenuation may not be achieved.

Be sure to connect the FG terminal of the EMI/EMC Filter body to the earth.



# SNR series (10A)

SNR -10 -223 -□

① ② ③ ④

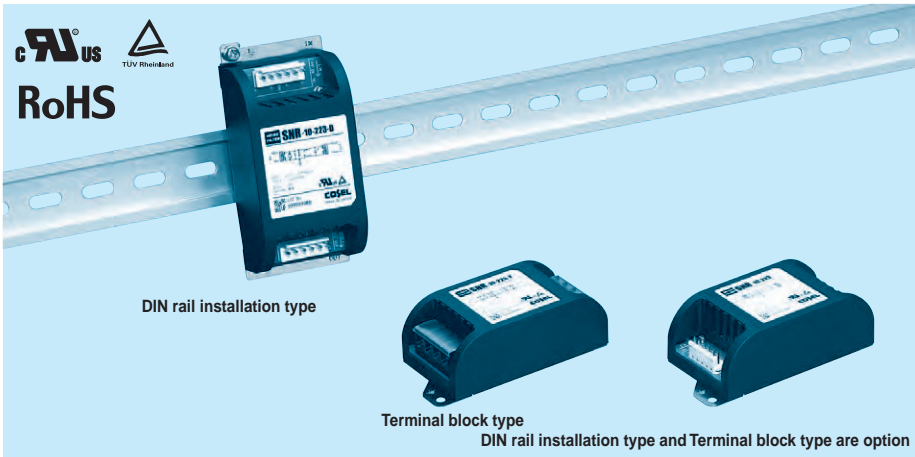
- ① Model Name
- ② Rated Current
- ③ Line to ground capacitor code: See table 1.1.

table 1.1 Line to ground capacitor code

Code	Line to ground capacitor (nominal value)
000	Not Provided
223	22000pF

- ④ Options
- D :DIN rail installation type
- T :Terminal block type
- DT :Terminal block and DIN rail type

\* The dimensions change when the option is set. Refer to External view.



## Features of SNR series (10A)

### Ripple noise attenuation type for switch mode power supplies(DC)

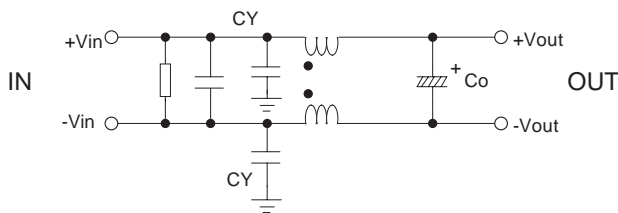
- 50 VDC
- Best filter for switch mode power supplies of analog circuits

### Specifications

No.	Items	SNR-10-223
		Interface:Connector
1	Rated Voltage DC[V]	50
2	Rated Current DC[A]	*1 10 (Peak 20)
3	Test Voltage (Terminal-Mounting Plate)	500 VAC (Cutoff Current = 100mA), 1minute at room temperature and humidity
4	Isolation Resistance (Terminal-Mounting Plate)	500 VDC 50MΩ min at room temperature and humidity
5	DC resistance	20mΩ max
6	Operating temperature	-40 to +71°C (Refer to Derating Curve)
7	Operating humidity	20 to 95%RH (Non condensing)
8	Storage temperature/humidity	-40 to +75°C/20 to 95%RH (Non condensing)
9	Vibration	10 to 55Hz, 19.6m/s <sup>2</sup> (2G), 3min. Period, 1hour each X, Y and Z axis
10	Impact	196.1m/s <sup>2</sup> (20G), 11ms Once each X, Y and Z axis
11	Safety agency approvals	UL60950-1, C-UL (CSA60950-1), EN60950-1
12	Case size (without projection) /Weight	52 X 35 X 117 mm [2.05 X 1.38 X 4.61 inches] (WXHXD) /140g max (Option : -D, -T, -DT refer to external view)

\*1 Peak current for 10 sec. And Duty 35% max, refer to Instruction Manual 5. In detail.

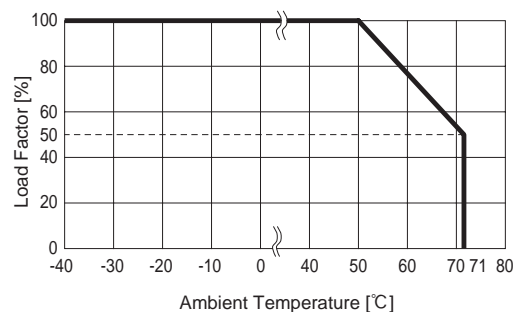
### Circuit Diagram



CY : Line to ground capacitor Co : Electrolytic capacitor : Mounting Plate

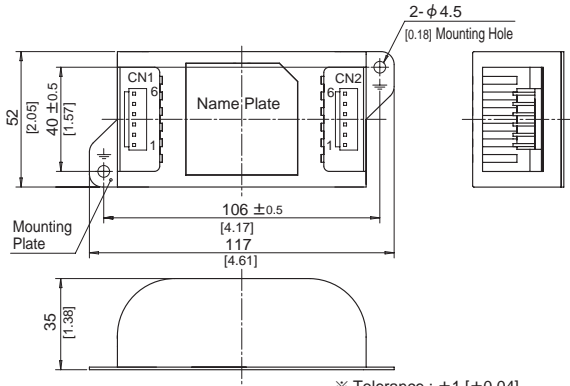
■ Expected life : 10 years

### Derating Curve



## External view

### Standard Type



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 140g max
- ※ PCB Material /thickness : CEM3 /1.6mm [0.06 inches]
- ※ Mounting plate : Iron (surface finishing : nickel plating)  $t=1.0$  [0.04]
- ※ Case : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Keeping drawing current per pin below 5A (7A at peak current) for CN1 to CN2

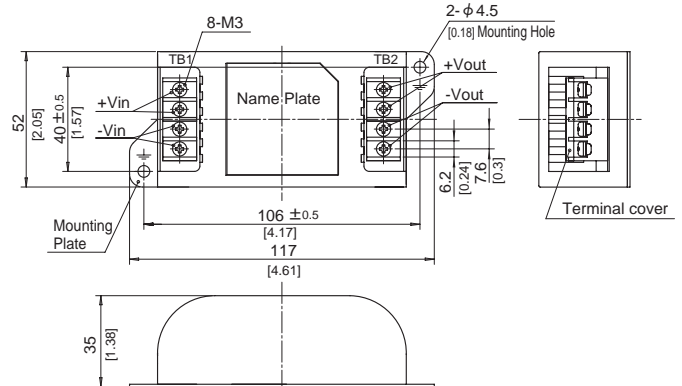
CN1		CN2	
Pin No.	Function	Pin No.	Function
1,2,3	-Vin	1,2,3	-Vout
4,5,6	+Vin	4,5,6	+Vout

I/O Connector	Mating connector	Terminal
CN1,CN2	B6P-VH	VHR-6N
		Reel:SVH-21T-P1.1
		Bulk:BVH-21T-P1.1

(Mfr:J.S.T)

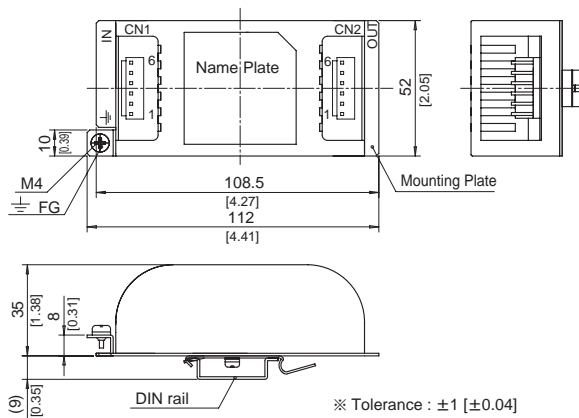
Option harness : Refer to Instruction Manual 4

### Terminal block Type



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 150g max
- ※ PCB Material /thickness : CEM3 /1.6mm [0.06 inches]
- ※ Mounting plate : Iron (surface finishing : nickel plating)  $t=1.0$  [0.04]
- ※ Case : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M3:0.8N · m (8.5kgf · cm) max
- ※ Keeping drawing current per pin below 8A (10A at peak current) for TB1 to TB2

### DIN rail installation Type



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 150g max
- ※ PCB Material /thickness : CEM3 / 1.6mm [0.06 inches]
- ※ Mounting plate : Iron (surface finishing : nickel plating)  $t=1.0$  [0.04]
- ※ Case : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Keeping drawing current per pin below 5A (7A at peak current) for CN1 to CN2

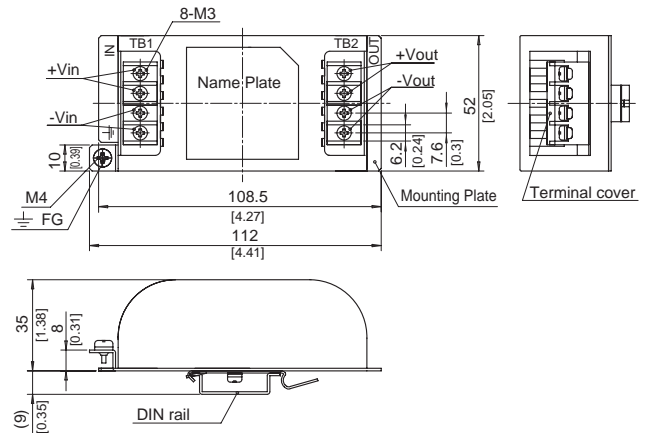
CN1		CN2	
Pin No.	Function	Pin No.	Function
1,2,3	-Vin	1,2,3	-Vout
4,5,6	+Vin	4,5,6	+Vout

I/O Connector	Mating connector	Terminal
CN1,CN2	B6P-VH	VHR-6N
		Reel:SVH-21T-P1.1
		Bulk:BVH-21T-P1.1

(Mfr:J.S.T)

Option harness : Refer to Instruction Manual 4

### Terminal block type+DIN rail installation Type

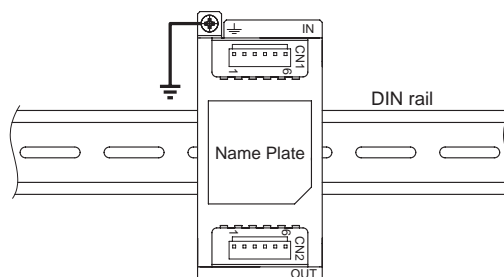


- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 160g max
- ※ PCB Material /thickness : CEM3 /1.6mm [0.06 inches]
- ※ Mounting plate : Iron (surface finishing : nickel plating)  $t=1.0$  [0.04]
- ※ Case : PBT
- ※ Dimensions in mm, [ ]=inches
- ※ Terminal block screw tightening torque M3:0.8N · m (8.5kgf · cm) max
- ※ Keeping drawing current per pin below 8A (10A at peak current) for TB1 to TB2

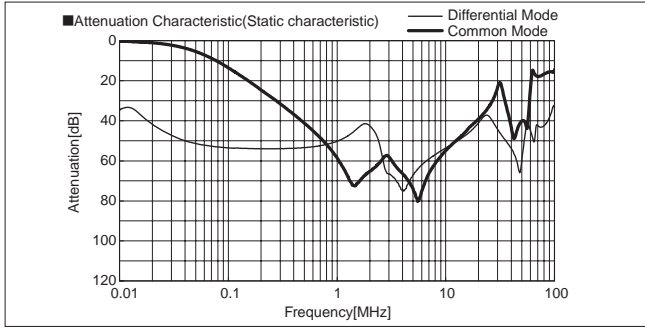
## ■Note when installing the EM/EMC Filter on a DIN rail.

When the EM/EMC Filter is grounded through the DIN rail, the proper noise attenuation may not be achieved.

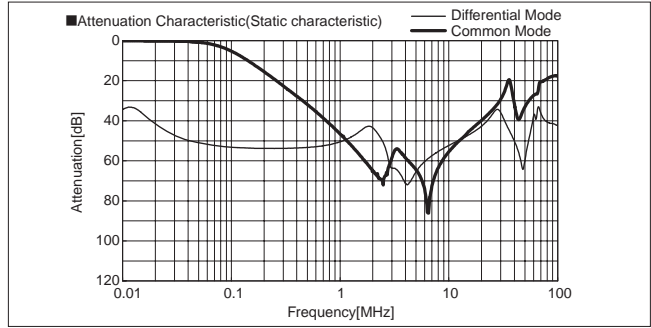
Be sure to connect the FG terminal of the EM/EMC Filter body to the earth.



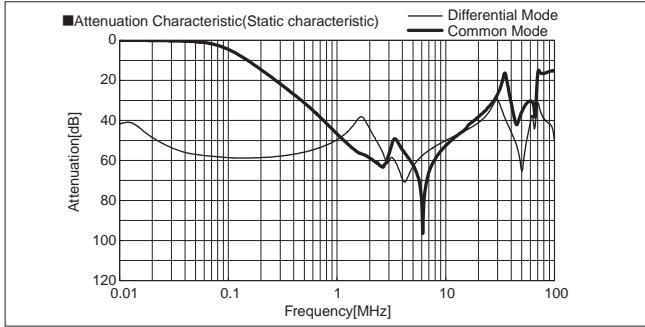
SNA-01-223



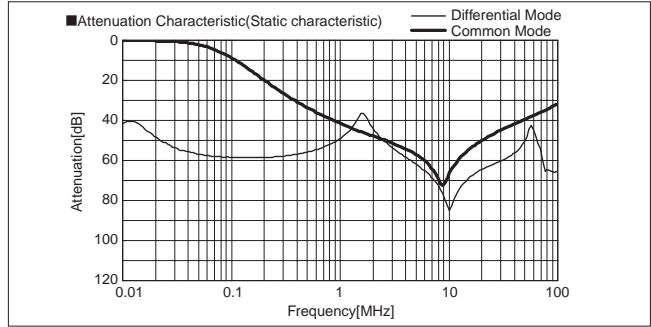
SNA-03-223



SNA-06-223



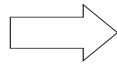
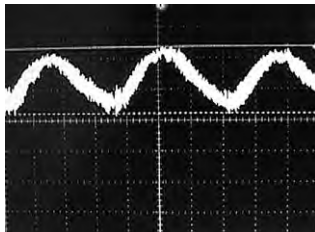
SNR-10-223



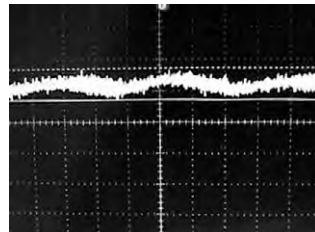
※ This product only reduces ripple noise of the switch mode power supply. It cannot be used effectively to reduce ripple noise at line frequency.

Example of attenuation output noise.

LCA10S-12

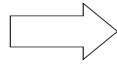
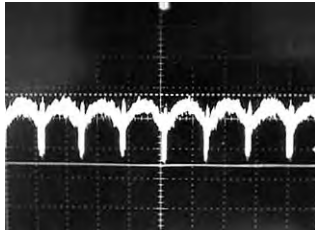


LCA10S-12+SNA-01-223

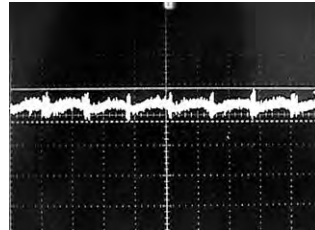


(Room temp, Room Humi)  
BW:500MHz  
LCA10S-12  
12V 0.9A

LCA30S-12

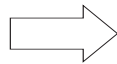
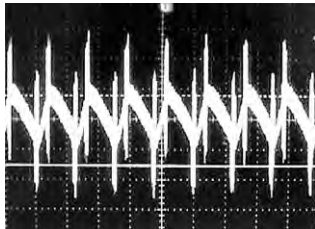


LCA30S-12+SNA-03-223

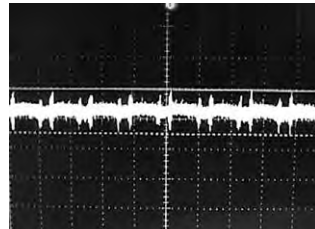


(Room temp, Room Humi)  
BW:500MHz  
LCA30S-12  
12V 2.5A

LCA50S-12

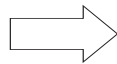


LCA50S-12+SNA-06-223

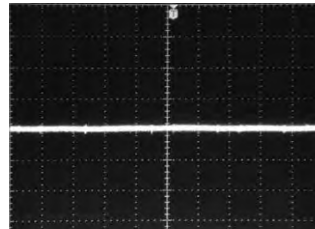


(Room temp, Room Humi)  
BW:500MHz  
LCA50S-12  
12V 4.3A

LEP240F-24



LEP240F-24+SNR-10-223



(Room temp, Room Humi)  
BW:500MHz  
LEP240F-24  
24V 10A

※ Measured by differential probe (KEISOKU-GIKEN:DP-100).

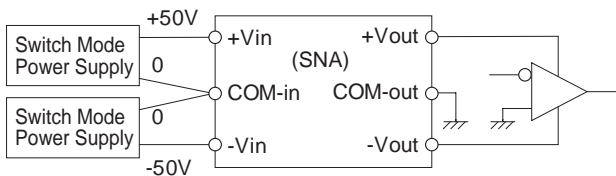


# 1 Wiring to Input/Output terminals

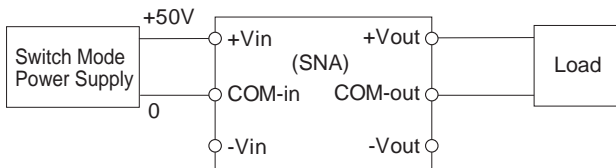
■ This filter uses polarized components (electrolytic capacitor), The filter will break if reverse voltage is applied to the input/output terminals. Please exercise caution when wiring.

# 2 Application examples

■ Power supply for an operational amplifier.



■ Single output power supply.



# 3 Safety Considerations

■ To apply for safety standard approval using this EMI/EMC Filter, the following conditions must be met.

- The unit must be used as a component of an end-use equipment.
- The unit must be used in the secondary circuit that is insulated from the primary circuit through double or reinforced insulation.
- The mounting plate (FG) must be connected to safety ground of end-use equipment.

# 4 Optional Parts

■ The harness for Input/Output of EMI/EMC Filter is available.

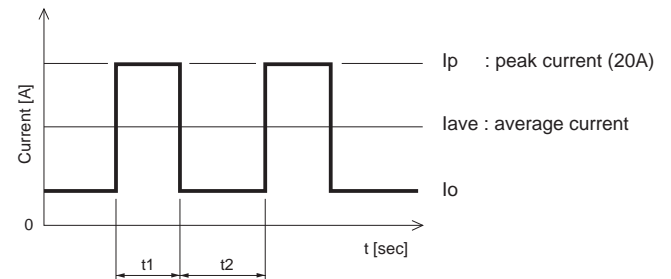
Model	Harness model
SNA-01	H-OU-8
SNA-03	H-OU-8
SNA-06	H-OU-9
SNR-10	H-OU-18

※ The same harness model applies to both input and output.

※ Sold in units of 1 piece.

# 5 Peak current (SNR)

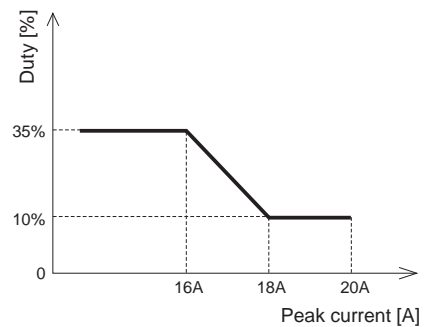
■ Peak current is possible to draw as below.



$$t1 \leq 10 \text{ [sec]}, I_{ave} = \frac{I_p \cdot t1 + I_o \cdot t2}{t1 + t2} \leq \text{rated current}$$

$$\frac{t1}{t1 + t2} \leq \text{Duty}$$

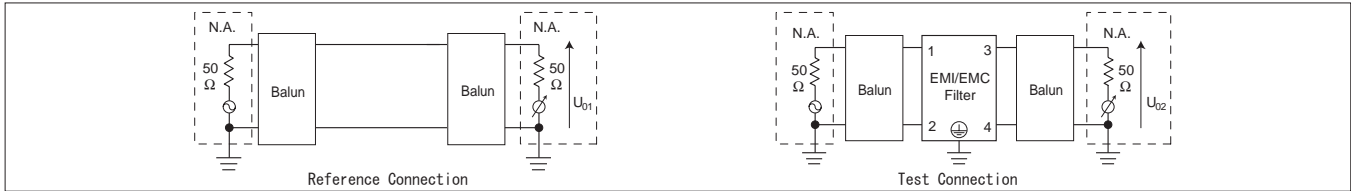
Duty is depended on peak current, refer to below chart.



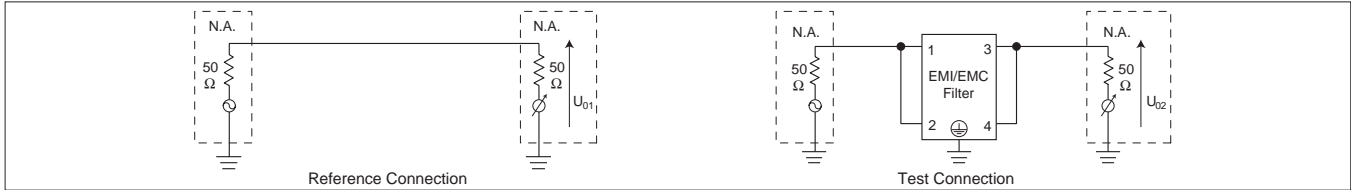
### (1) Attenuation Characteristic(Static characteristic)

※ Attenuation=  $20\log(U_{b1}/U_{b2})$ (dB)  
 $U_{b1}$ : Voltage in state without filters  
 $U_{b2}$ : Voltage in state which added filters  
 ※ N.A.: Network analyzer

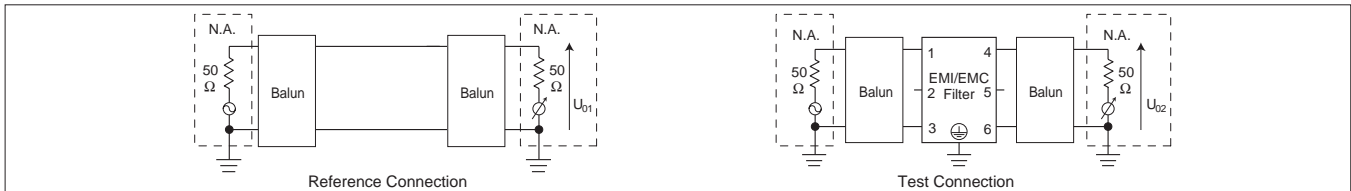
■ Object product : Single phase input type (Differential mode)



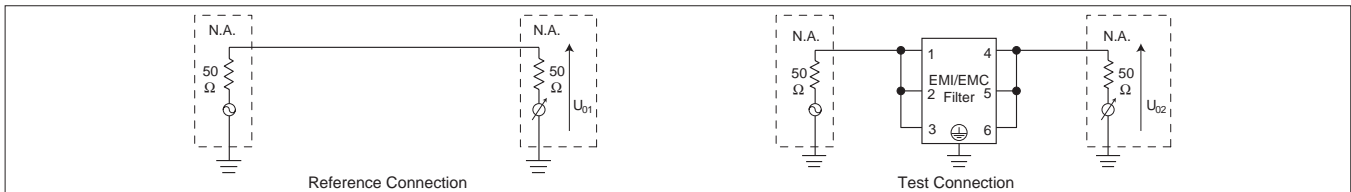
■ Object product : Single phase input type (Common mode)



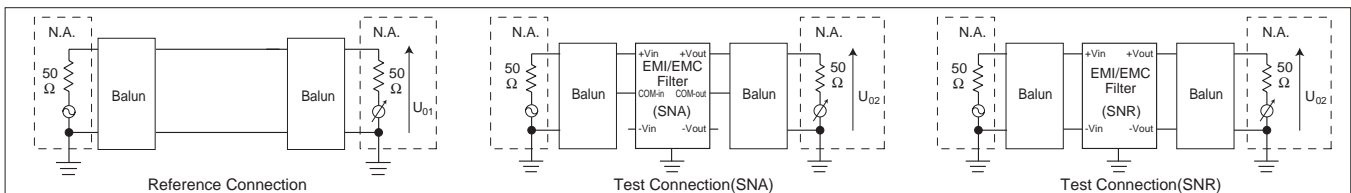
■ Object product : Three phase input type (Differential mode)



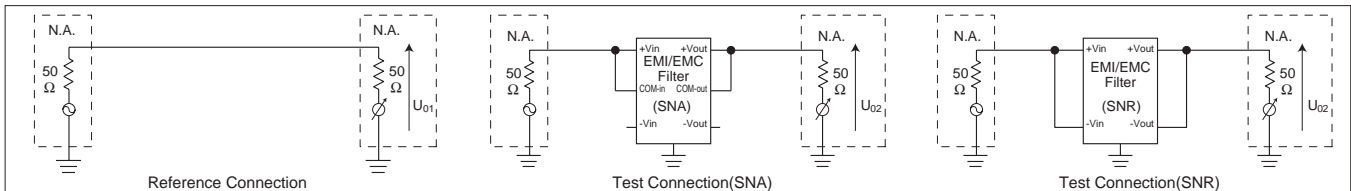
■ Object product : Three phase input type (Common mode)



■ Object product : DC input type (Differential mode)



■ Object product : DC input type (Common mode)



### (2) Pulse Attenuation Characteristic







□ Head Office

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