

PS3L — Metal Frame Switching Power Supplies



Key features of the PS3L series include:

- Metal Frame
- Slim Style
- Wide Power Range: 10W-300W
- Universal Input:
10W-30W:85-264V AC/105-370V DC
50W-300W:85-264V AC/105-350V DC
- Screw Terminals, IP20 (fingersafe)
- Power Factor Correction
EN61000-3-2
EN61000-3-3 (50W to 300W models)
- Overcurrent/Overvoltage protection
- Voltage + 10% adjustment
- DIN rail or Panel Surface Mount
- Approvals:
CE marked
UL 508 listed
UL 1950 recognized
EN50178 compliant
EMC Directives
EN50081-2
EN61000-6-2
LVD
EN60950:2000



Part Numbers

Part Number	Item	Watts	Rated Voltage	Rated Current
PS3L-A05AFF		10	5V DC	2A
PS3L-A12AFF			12V DC	0.9A
PS3L-A24AFF			24V DC	0.5A
PS3L-B05AFF		15	5V DC	3A
PS3L-B12AFF			12V DC	1.4A
PS3L-B24AFF			24V DC	0.7A
PS3L-C05AFF		30	5V DC	6A
PS3L-C12AFF			12V DC	2.5A
PS3L-C24AFF			24V DC	1.3A
PS3L-D12AFF		50	12V DC	4.3A
PS3L-D24AFF			24V DC	2.2A
PS3L-E12AFF		100	12V DC	8.5A
PS3L-E24AFF			24V DC	4.5A
PS3L-F12AFF		150	12V DC	13A
PS3L-F24AFF			24V DC	6.5A
PS3L-G24AFF		300	24V DC	12.5A

Specifications

Type		PS3L-A (10W)	PS3L-B (15W)	PS3L-C (30W)	PS3L-D (50W)	PS3L-E (100W)	PS3L-F (150W)	PS3L-G24 (300W)	
Input	Input Voltage (Single-phase two-wire)	100 to 240V AC (Voltage range: 85 to 264V AC/105 to 370V DC)			100 to 240V AC (Voltage range: 85 to 264V AC/105 to 350V DC)				
	Frequency (AC input only)	47 to 63 Hz							
	Input Current (Typical)	100V	0.25A	0.37A	0.68A	0.68A	1.4A	2.0A	3.8A
		200V	0.16A	0.23A	0.45A	0.34A	0.65A	0.95A	2.0A
	Inrush Current (Cold start)	100V	20A max.	20A max.	20A max.	30A max.	30A max.	30A max.	30A max.
		200V	40A max.	40A max.	40A max.	60A max.	60A max.	60A max.	60A max.
	Leakage Current	0.75 mA max. (60Hz; UL, CSA, VDE)							
Power Factor (Typical)	—				0.99 (100V AC input, rated output), 0.95 (200V AC, rated output)				
Efficiency (Typical)	5V DC: 70%	5V DC: 73%	5V DC: 75%	—	—	—	—	—	
	12V DC: 74%	12V DC: 75%	12V DC: 77%	12V DC: 76%	12V DC: 78%	12V DC: 80%	—	—	
	24V DC: 78%	24V DC: 78%	24V DC: 79%	24V DC: 79%	24V DC: 81%	24V DC: 83%	24V DC: 81%	—	
Output	Rated Voltage/Current	5V/2A 12V/0.9A 24V/0.5A	5V/3A 12V/1.4A 24V/0.7A	5V/6A 12V/2.5A 24V/1.3A	— 12V/4.3A 24V/2.2A	— 12V/8.5A 24V/4.5A	— 12V/13A 24V/6.5A	— — 24V/12.5A	
	Adjustable Voltage Range	±10% (V.ADJ control on front)							
	Output Holding Time	20 msec minimum (at the rated input and output)							
	Start Time	200 msec maximum (at the rated input and output)				500 msec maximum (at the rated input and output)			
	Rise Time	100 msec maximum (at the rated input and output)				200 msec maximum (at the rated input and output)			
	Regulation	Input Fluctuation	5V: 20 mV maximum, 12V: 48 mV maximum, 24V: 96 mV maximum						
		Load Fluctuation	5V: 40 mV maximum, 12V: 100 mV maximum, 24V: 150 mV maximum						
		Temperature Change (-10 to +50°C)	5V	50 mV maximum		5V: 60 mV maximum		—	
			12V	120 mV maximum		12V: 150 mV maximum		—	
	Ripple Voltage	-10 to 0°C	5V: 160 mV maximum, 12V/24V: 180 mV maximum (Note 1)						200 mV maximum (Note 1)
0 to +50°C		5V: 120 mV maximum, 12V/24V: 150 mV maximum (Note 1)						—	
Supplementary Functions	Overcurrent Protection	105% (Typical), Automatic reset (Note 2)							
	Overvoltage Protection	120% min. (Note 3)	Output off at 120%, reset when input voltage is restored. (Note 4)						
	Operation Indicator	Provided (Green LED)							
Dielectric Strength	Between input and output terminals:3,000V AC, 1 minute Between input terminal and housing:2,000V AC, 1 minute Between output terminal and housing:500V AC, 1 minute								
Insulation Resistance	Between input and output terminals:100MΩ minimum (500V DC megger) Between input terminal and housing:100MΩ minimum (500V DC megger)								
Operating Temperature (Note 5)	-10 to +70°C					-10 to +60°C		-10 to +65°C	
Storage Temperature	-30 to +75°C								
Operating Humidity	20 to 90% RH (no condensation, no freezing)								
Vibration Resistance	10 to 55 Hz, 20 m/s ² constant, sweep cycle 1 minute, 2 hours each in 3 axes								
Shock Resistance	200 m/s ² , 11 ms, 1 shock each in 3 axes								
Dimensions H X W X D (mm)	97 × 35 × 86	97 × 35 × 86	96 × 35 × 114.5	97 × 37 × 147.5	97 × 54 × 200	97 × 62 × 200	158 × 63 × 230		
Weight (Approx.)	240g	250g	340g	350g	630g	730g	1550g		
Terminal Screw	M4 slotted-Phillips head screw (screw terminal type)								

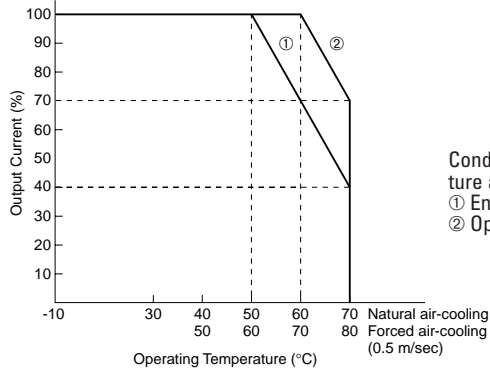


1. Including noise. Measured at the terminal block according to EIAJ.
2. Protection against short-circuit and overcurrent of 30 seconds maximum. Overload for 30 seconds or longer may damage the internal elements.
3. Zener limiter method
4. Turn the input off and after one minute, turn the input on again.
5. Refer to the derating characteristics. No freezing. The maximum temperature is the temperature at 100% output current (natural air-cooling) in the derating characteristics.

Characteristics

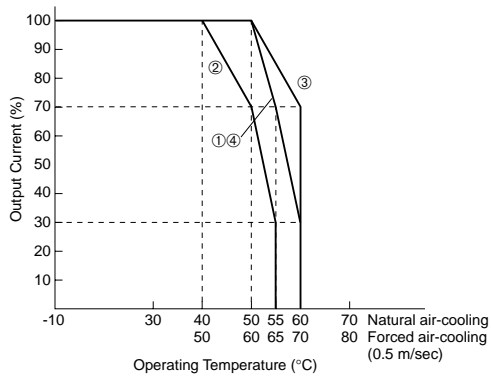
Operating Temperature vs. Output Current Characteristics (Derating Curves)

PS3L-A/B/C/D

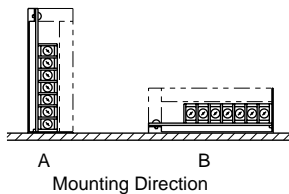


Conditions: At rated input/output (operating temperature is the temperature around the power supply)
 ① Enclosed (Mounting Directions A and B)
 ② Open frame (Mounting Directions A and B)

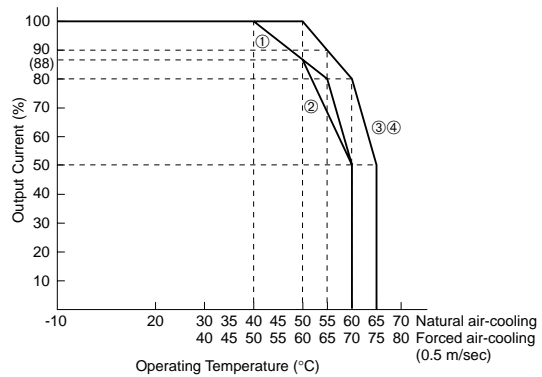
PS3L-E/F



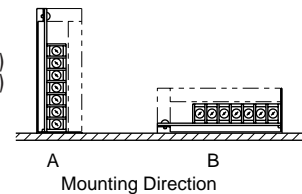
Conditions: At rated input/output (operating temperature is the temperature around the power supply)
 ① Enclosed (Mounting Direction A)
 ② Enclosed (Mounting Direction B)
 ③ Open frame (Mounting Direction A)
 ④ Open frame (Mounting Direction B)



PS3L-G24

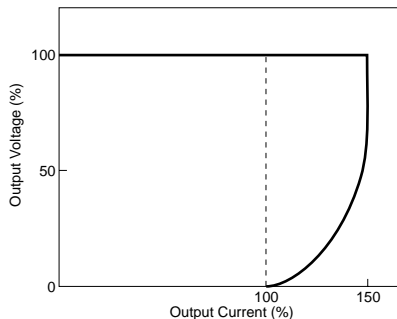


Conditions: At rated input/output (operating temperature is the temperature around the power supply)
 ① Enclosed (Mounting Direction A)
 ② Enclosed (Mounting Direction B)
 ③ Open frame (Mounting Direction A)
 ④ Open frame (Mounting Direction B)

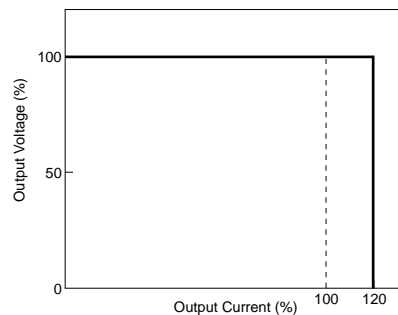


Overcurrent Protection Characteristics

PS3L-A/B

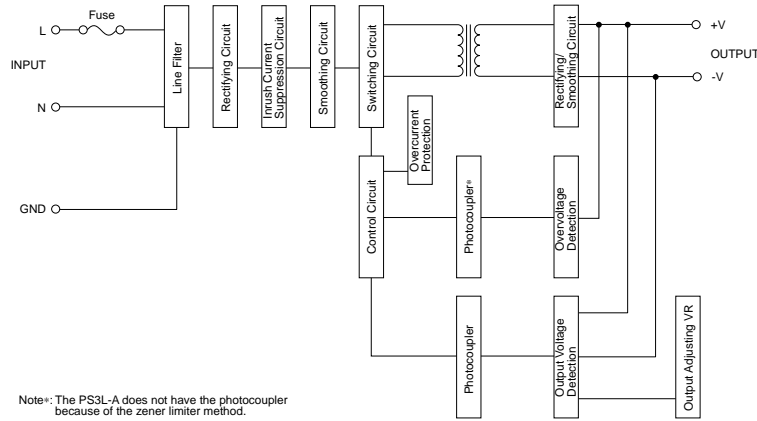


PS3L-C/D/E/F/G

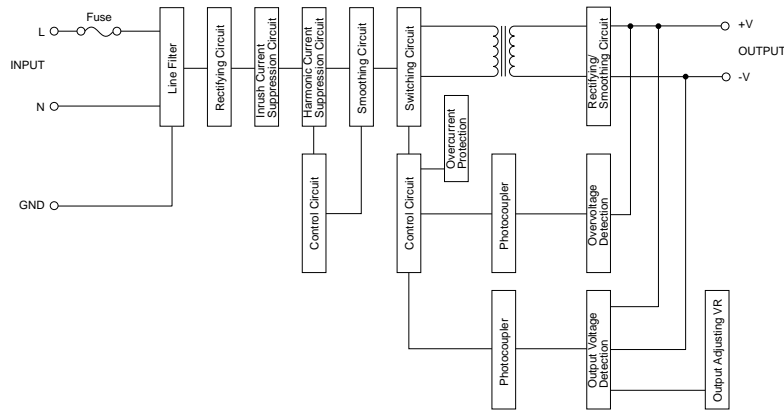


Internal Schematic Diagrams

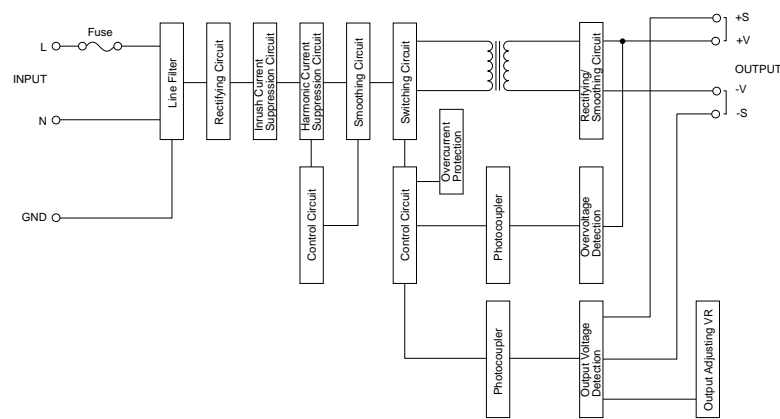
PS3L-A/B/C



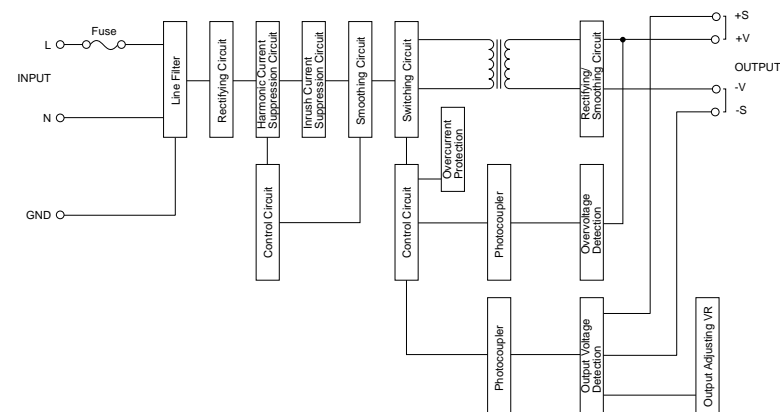
PS3L-D



PS3L-E/F

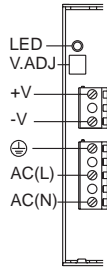


PS3L-G

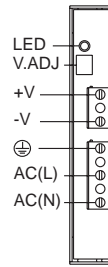


Terminal Markings

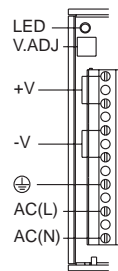
PS3L-A/B



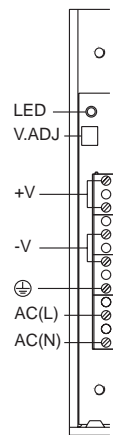
PS3L-C/D



PS3L-E/F



PS3L-G



Marking	Name	Description
V.ADJ	Output Voltage Adjustment	Allows adjustment within $\pm 10\%$. Turning clockwise increases the output voltage.
LED	Operation Indicator (Green)	Lights on when the output voltage is on.
+V -V	DC Output Terminals	+V: Positive output terminal -V: Negative output terminal
⊕	Ground Terminal	Grounding the terminal reduces high-frequency currents caused by switching.
AC	Input Terminal	Accepts a wide range of voltage and frequency. Polarity is irrelevant when using a DC input.

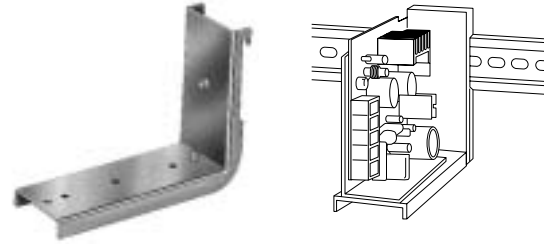
Accessories

Mounting Bracket (Optional)

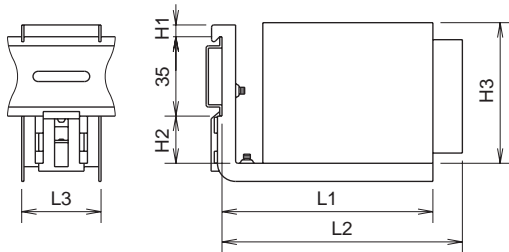
Model	Mounting Plate	L-shaped Bracket (1)	L-shaped Bracket (2)	Dimensions
PS3L-A/B	PS9Z-3E1B	PS9Z-3E2B	PS9Z-3E3B	See page L-19
PS3L-C	PS9Z-3E1C	PS9Z-3E2C	PS9Z-3E3C	
PS3L-D	PS9Z-3E1D	PS9Z-3E2D	PS9Z-3E3D	
PS3L-E	PS9Z-3L1F	PS9Z-3E2E	PS9Z-3E3E	
PS3L-F	PS9Z-3L1F	PS9Z-3E2F	PS9Z-3E3F	
PS3L-G	PS9Z-3L1G	—	—	

DIN-Rail Mounting Bracket (Optional)

Model	Part Number
PS3L-A	PS9Z-3E4C
PS3L-B	
PS3L-C	
PS3L-D	PS9Z-3E4D
PS3L-E	PS9Z-3E4F
PS3L-F	



DIN-rail mounting brackets are ordered separately from switching power supplies.

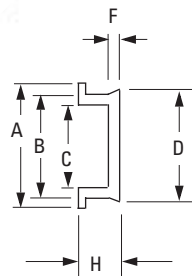
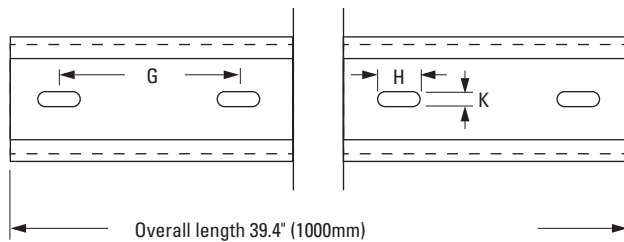


Part Number	Model	L1 (mm)	L2 (mm)	L3 (mm)	H1 (mm)	H2 (mm)	H3 (mm)
PS9Z-3E4C	PS3L-A	134	117	35	5.2	20.8	97
	PS3L-B						
	PS3L-C		156	35			
PS9Z-3E4D	PS3L-D	186	178.8	39.5	5.2	20.8	97
PS9Z-3E4F	PS3L-E	216.8	230.8	65	11.2	20	97
	PS3L-F						

Power Supplies

DIN Rail (Optional)

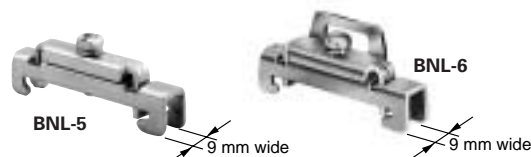
Part Number	Length	Material
BAA1000	1000 mm	Aluminum
BNDN1000	1000 mm	Aluminum



	Length in Inches (mm)
A	1.4" (35mm)
B	1.14" (29mm)
C	0.78" (23mm)
D	1.2" (31mm)
E	0.41" (10.5mm)
F	0.11" (3mm)
G	2" (51mm)
H	0.47" (12mm)
K	0.16" (4mm)

End Clip (Optional)

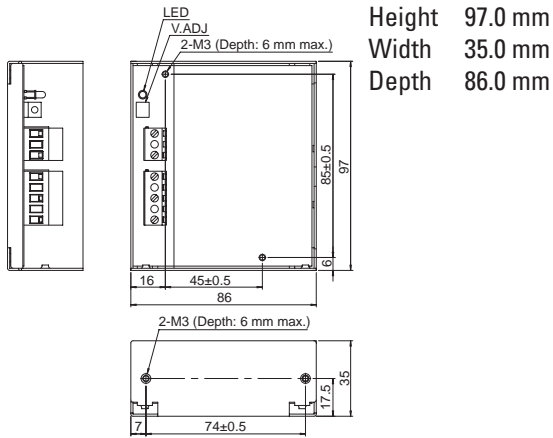
Item	Package No.
DIN Rail End Clip	BNL-5
	BNL-6



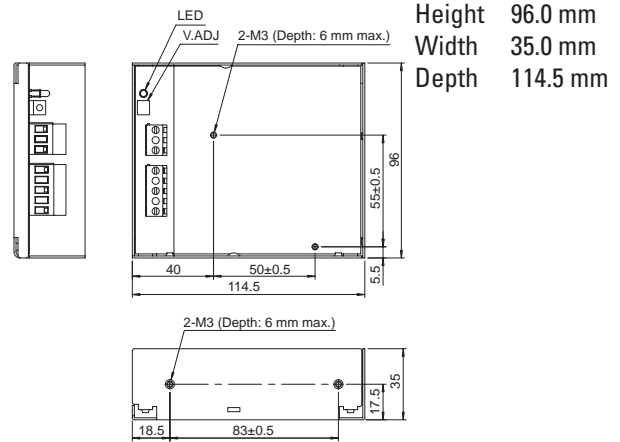
Installed on a DIN rail, the mounting clips prevent power supplies from sliding sideways.

Dimensions (tolerance: ±1 mm)

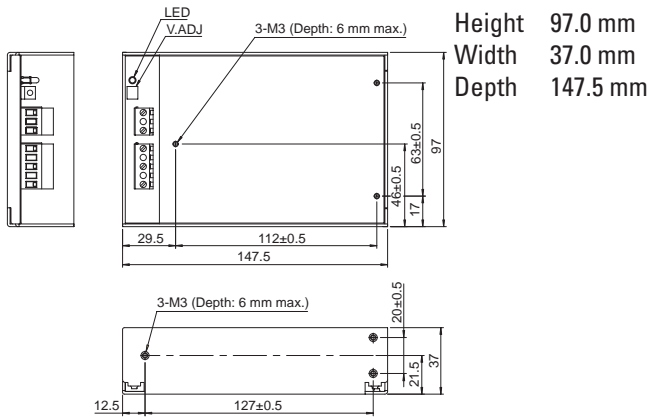
PS3L-A/B (10/15W)



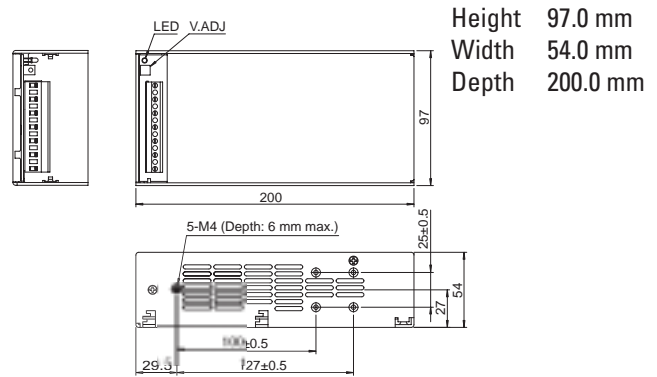
PS3L-C (30W)



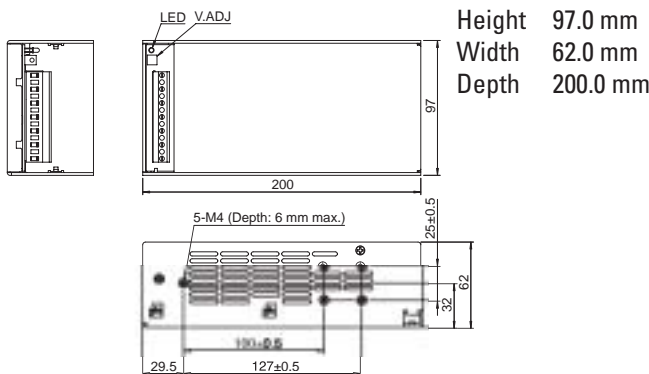
PS3L-D (50W)



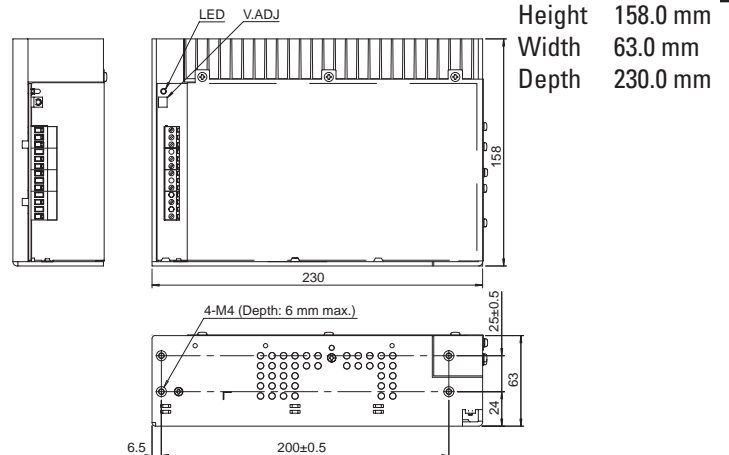
PS3L-E (100W)



PS3L-F (150W)



PS3L-G (300W)



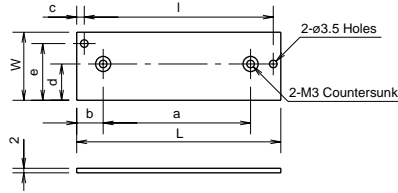
Make sure that the mounting screws do not penetrate into the power supply unit for 6 mm or more.

All dimensions in mm.

Mounting Bracket Dimensions (PS9Z-3E1/PS9Z-3E2/PS9Z-3E3/PS9Z-3L)

Mounting Plate

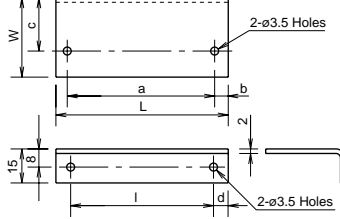
PS9Z-3E1B/3E1C
(For 10W/15W/30W Types)



Part Number	Dimensions (mm)							
	W	L	l	a	b	c	d	e
PS9Z-3E1B	35	101	94	74	14.5	3.5	17.5	30
PS9Z-3E1C	33	138.5	128.5	83	32	5	17.5	26

L-shaped Bracket (1)

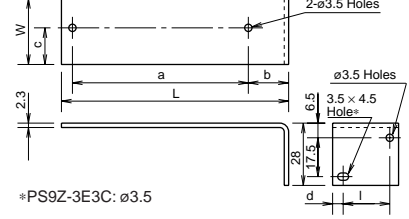
PS9Z-3E2B/3E2C
(For 10W/15W/30W Types)



Part Number	Dimensions (mm)						
	W	L	l	a	b	c	d
PS9Z-3E2B	36	95.5	80.5	74	9.5	18.5	7.5
PS9Z-3E2C	38	118.5	104	83	15	20.5	7.5

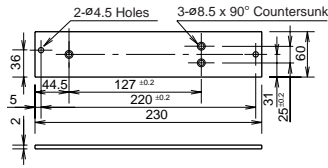
L-shaped Bracket (2)

PS9Z-3E3B/3E3C
(For 10W/15W/30W Types)

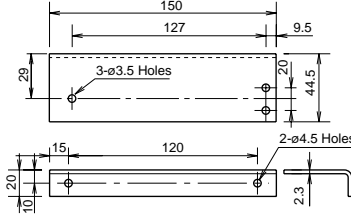


Part Number	Dimensions (mm)						
	W	L	l	a	b	c	d
PS9Z-3E3B	31	103	22.5	74	18	13.5	4.5
PS9Z-3E3C	33	126	25	83	21	15.5	4

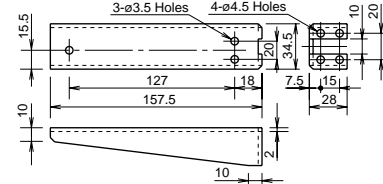
PS9Z-3E1D
(For 50W Type)



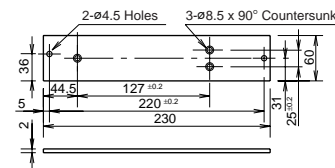
PS9Z-3E2D
(For 50W Type)



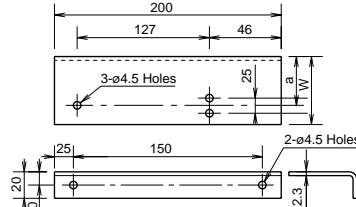
PS9Z-3E3D
(For 50W Type)



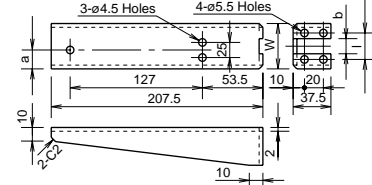
PS9Z-3L1F
(For 100W/150W Types)



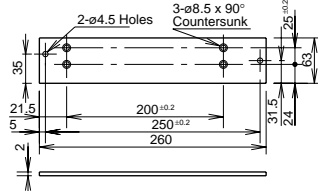
PS9Z-3E2E/3E2F
(For 100W/150W Types)



PS9Z-3E3E/3E3F
(For 100W/150W Types)



PS9Z-3L1G
(For 300W Type)

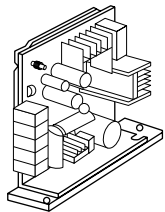


Part Number	Dimensions (mm)	
	W	a
PS9Z-3E2E	59	34.5
PS9Z-3E2F	70	40

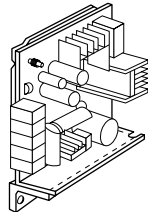
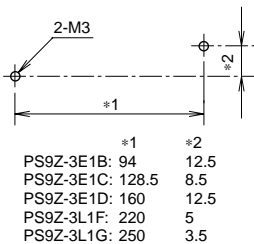
Part Number	Dimensions (mm)			
	W	l	a	b
PS9Z-3E3E	54	32.5	27	12.5
PS9Z-3E3F	65	40	32.5	20

Power Supplies

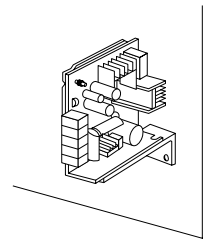
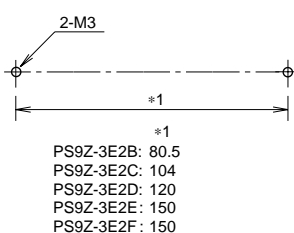
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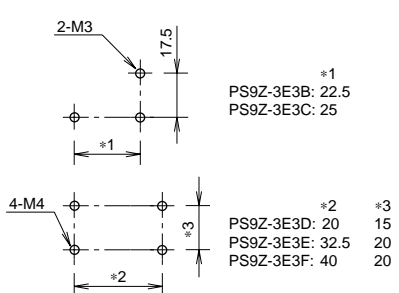
Mounting Hole Layout



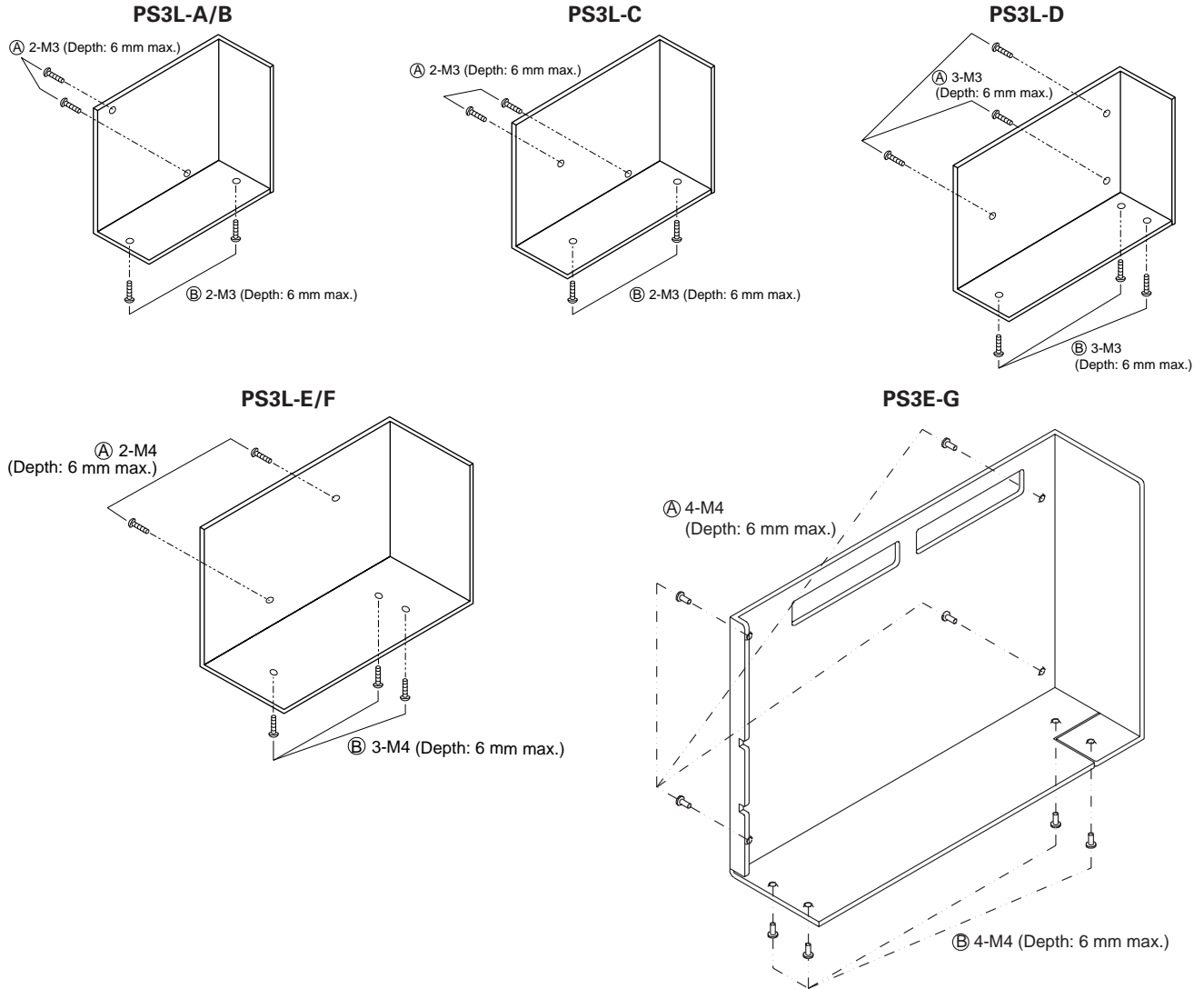
Mounting Hole Layout



Mounting Hole Layout



Installation



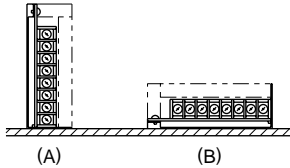
The figures above show the frames only. PC board and parts are omitted for illustration purposes.

Installation	Mounting Hole Layout				
	PS3L-A/B	PS3L-C	PS3L-D	PS3L-E/F	PS3L-G
A Side Mounting (screw from the back)					
B Side Mounting (screw from the back)					

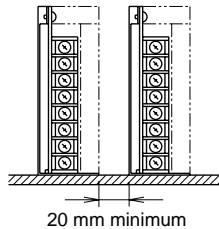
Instructions

Notes for Installation

- PS3L switching power supplies can be installed in either (A) or (B) directions as shown below. For PS3L-E/F/G types, the operating temperature vs. output current characteristics vary with the mounting direction. See the derating curves on page L-15.



- Mount the switching power supply on a metallic surface that provides adequate heat dissipation. Be sure to prevent heat built-up around the power supplies.
- Maintain 20 mm clearance between the power supplies.



- Use mounting screws of a proper length so that screws do not penetrate into the housing of the switching power supply 6 mm or more.
- Mounting screws cannot be fastened on a PC board. Be sure to fasten the screws on the chassis side.

Overcurrent Protection

The output voltage drops automatically when an overcurrent flows due to an overload or short circuit. Normal voltage is automatically restored when the load returns to normal conditions.

Overvoltage Protection (PS3L-A)

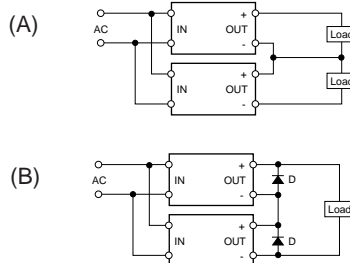
The PS3L-A uses a Zener diode for overvoltage protection. In case overvoltage damages the zener diode, contact IDEC for repair. Do not apply an external overvoltage to the output terminal.

(PS3L-B/C/D/E/F/G)

The output is turned off by overvoltage protection when an overvoltage is applied. When the output voltage has dropped due to an overvoltage (120% or more), turn the input off, and after one minute, turn the input on again.

Series Operation

The following series operations are allowed.



For the series operation (B), insert Schottky diodes D as shown in the figure. Select a Schottky diode in consideration of the rated current.

Notes for Operation

- Output interruption may indicate blown fuses. Contact IDEC.
- The internal fuse inside the power supply is for AC input. When using with DC input, install an external fuse for DC input. To avoid blown fuses, select fuses in consideration of the rated current of internal fuses.

Rated Current of Internal Fuses

Type No.	Rated Current of Fuse
PS3L-A	2A
PS3L-B	
PS3L-C	3.15A
PS3L-D	2A
PS3L-E	4A
PS3L-F	
PS3L-G	6.3A

- Avoid overload and short-circuit for a long period of time, otherwise the internal elements may be damaged.

4. Not suitable for parallel operation.

- DC input operation is not subject to safety standards.

Insulation/Dielectric Test

When conducting an insulation/dielectric test, short-circuit the input (between AC) and output (between + and -). Do not apply or interrupt the voltage suddenly, otherwise the surge voltage may be generated and the power supply may be damaged.

L

Adjustment of Output Voltage

The output voltage can be adjusted within $\pm 10\%$ of the rated output voltage by using the V.ADJ control on the front. Turning the V.ADJ clockwise increases the output voltage. When using a higher output voltage, reduce the output current to make sure that the output capacity is within the rating. Note that overvoltage protection may work when increasing the output voltage.

Safety Precautions

- Do not use switching power supplies with electric equipment whose malfunction or inadvertent operation may damage the human body or life directly.
- Make sure that the input voltage and output current do not exceed the ratings. If the input voltage and output current exceed the ratings, electric shock, fire, or malfunction may occur.
- Do not disassemble, repair, or modify the power supplies, otherwise the high voltage internal part may cause electric shock, fire, or malfunction.
- Do not touch the switching power supplies while input voltage is applied, otherwise electric shock may occur.
- Provide the final product with protection against malfunction or damage that may be caused by the malfunction of switching power supplies.
- Operating temperatures should not exceed the ratings. Be sure to note the derating characteristics. If the operating temperature exceeds the ratings, electric shock, fire, or malfunction may occur.
- Blown fuses indicate that the internal circuits are damaged. Contact IDEC for repair. Do not just replace the fuse and reoperate, otherwise electric shock, fire, or malfunction may occur.
- Do not use the switching power supplies to charge rechargeable batteries.