

Switch Mode Power Supply

S8VK-C (60/120/240/480-W Models)

Cost-effective Single Phase Power Supply
Universal input and Safety standards
for worldwide applications
Space-saving Compact Design

- Universal input for worldwide applications:
100 to 240 VAC (85 to 264 VAC)
- DC input can be available: 90 to 350 VDC
- Operation temperature range: -25 to 60 °C
- Compact Dimension for small space
- Flexible installation by special mounting brackets
- Safety standards:
UL508/60950-1, CSA C22.2 No.107.1/60950-1
EN50178 (=VDE0160), EN60950-1 (=VDE0805)
- EMS: Conform to EN61204-3
EMI: EN55011 Class A



⚠ Refer to *Safety Precautions for All Power Supplies* and *Safety Precautions* on page 11.

Model Number Structure

Model Number Legend

Note: Not all combinations are possible. Refer to *List of Models* in *Ordering Information*, below.

S8VK-C **24**
1 2

1. Power Ratings

060: 60 W
120: 120 W
240: 240 W
480: 480 W

2. Output voltage

24: 24 V

Ordering Information

Note: For details on normal stock models, contact your nearest OMRON representative.

Power ratings	Input voltage	Output Voltage	Output current	Model number
60 W	Single phase 100 to 240 VAC 90 to 350 VDC	24 V	2.5 A	S8VK-C06024
120 W		24 V	5 A	S8VK-C12024
240 W		24 V	10 A	S8VK-C24024
480 W		24 V	20 A	S8VK-C48024

Specifications

Ratings, Characteristics, and Functions

Power ratings			60 W	120 W	240 W	480 W
Output voltage			24 V	24 V	24 V	24 V
Efficiency (Typical)			88%	89%	89%	92%
Input	Voltage *1	230 VAC input	100 to 240 VAC, 90 to 350 VDC (allowable range: 85 to 264 VAC) *6			
	Frequency *1		50/60 Hz (47 to 450 Hz)			
	Current (Typical)	115 VAC input	1.0 A	2.0 A	2.5 A	4.8 A
		230 VAC input	0.7 A	1.4 A	1.3 A	2.4 A
	Power factor (Typical)	230 VAC input	0.44	0.45	0.92	0.97
	Harmonic current emissions		--- Conforms to EN61000-3-2			
	Leakage current (Typical)	115 VAC input	0.19 mA	0.19 mA	0.24 mA	0.26 mA
		230 VAC input	0.34 mA	0.36 mA	0.54 mA	0.65 mA
	Inrush current (Typical) *2	115 VAC input	16 A			
Output		230 VAC input	32 A			
	Voltage adjustment range *3		-10% to 15% (with V.ADJ) (guaranteed)			
	Ripple at 20 MHz (Typical) *4	230 VAC input	70 mV	120 mV	70 mV	130 mV
	Input variation influence		0.5% max. (at 85 to 264 VAC input, 100% load)			
	Load variation Influence (Rated Input voltage)		1.5% max., at 0% to 100% load			
	Temperature variation influence		0.05%/°C max.			
	Start up time (Typical) *2	115 VAC input	530 ms	720 ms	790 ms	770 ms
		230 VAC input	410 ms	510 ms	750 ms	670 ms
	Hold time (Typical) *2	115 VAC input	24 ms	27 ms	34 ms	21 ms
		230 VAC input	117 ms	128 ms	36 ms	22 ms
Additional functions	Overload protection *2		105% to 160% of rated load current			
	Overvoltage protection *2		Yes *5			
	Parallel operation		No			
	Series operation		Possible for up to two Power Supplies (with external diode)			
Others	Ambient operating temperature		-25 to 60°C (Refer to Engineering Data)			
	Storage temperature		-25 to 65°C			
	Ambient operating humidity		20% to 90% (Storage humidity: 10% to 95%)			
	Dielectric strength (detection current: 20 mA)		3.0 kVAC for 1 min. (between all inputs and outputs)			
			2.0 kVAC for 1 min. (between all inputs and PE terminal)			
			1.0 kVAC for 1 min. (between all outputs and PE terminal)			
	Insulation resistance		100 MΩ min. (between all outputs and all inputs/ PE terminals) at 500 VDC			
	Vibration resistance		10 to 55 Hz, 0.375-mm single amplitude for 2 h each in X, Y, and Z directions			
			10 to 150 Hz, 0.35-mm single amplitude (5 G max for 60W, 120W, 240 W, 3 G max for 480 W) for 80 min. each in X, Y, and Z directions			
	Shock resistance		150 m/s ² , 3 times each in ±X, ±Y, and ±Z directions			
	Output indicator		Yes (color: green), lighting from 80% to 90% or more of rated voltage			
	EMI	Conducted Emission	Conforms to EN61204-3 EN55011 Class A and based on FCC Class A			
		Radiated Emission	Conforms to EN61204-3 EN55011 Class A			
	EMS		Conforms to EN61204-3 high severity levels			
	Approved Standards		UL Listed: UL508 (Listing)			
			UL UR: UL60950-1 (Recognition)			
			cUL: CSA C22.2 No.107.1 cUR: CSA C22.2 No.60950-1 EN/VDE: EN50178 (=VDE0160), EN60950-1 (=VDE0805)			
	Fulfilled Standards		SELV (EN60950-1/EN50178/UL60950-1) EN50274 for Terminal parts			
	Degree of protection		IP20 by EN / IEC60529			
	SEMI		F47-0706 (200 to 240 VAC)			
	Weight		260 g	580 g	940 g	1,550 g

*1. Do not use an inverter output for the Power Supply. Inverters with an output frequency of 50/60 Hz are available, but the rise in the internal temperature of the Power Supply may result in ignition or burning.

*2. For a cold start at 25°C. Refer to *Engineering Data* on page 5 for details.

*3. If the output voltage adjuster (V. ADJ) is turned, the voltage will increase by more than +15% of the voltage adjustment range. When adjusting the output voltage, confirm the actual output voltage from the Power Supply and be sure that the load is not damaged.

*4. A characteristic when the ambient operating temperature is between -25 to 60°C.

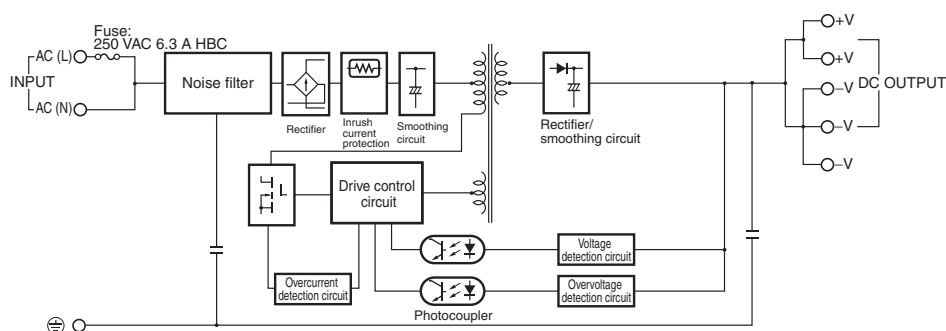
*5. To reset the protection, turn OFF the input power for three minutes or longer and then turn it back ON.

*6. 90 to 350 VDC's UL standards are scheduled to obtain certification in June, 2013.

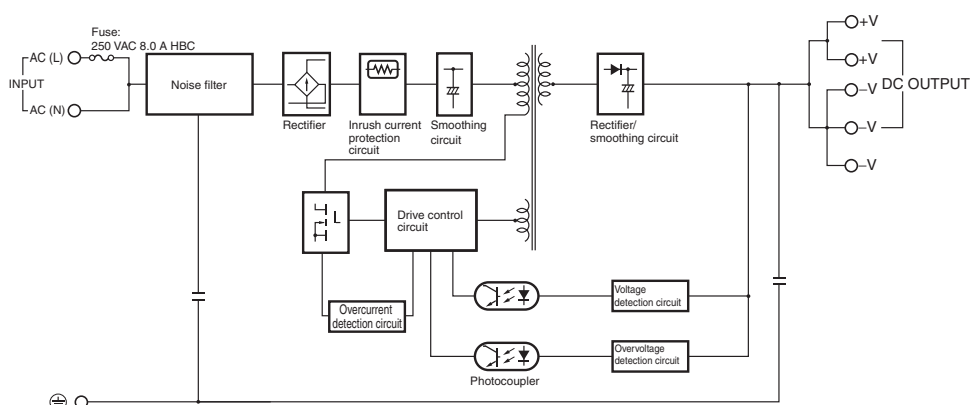
Connections

Block Diagrams

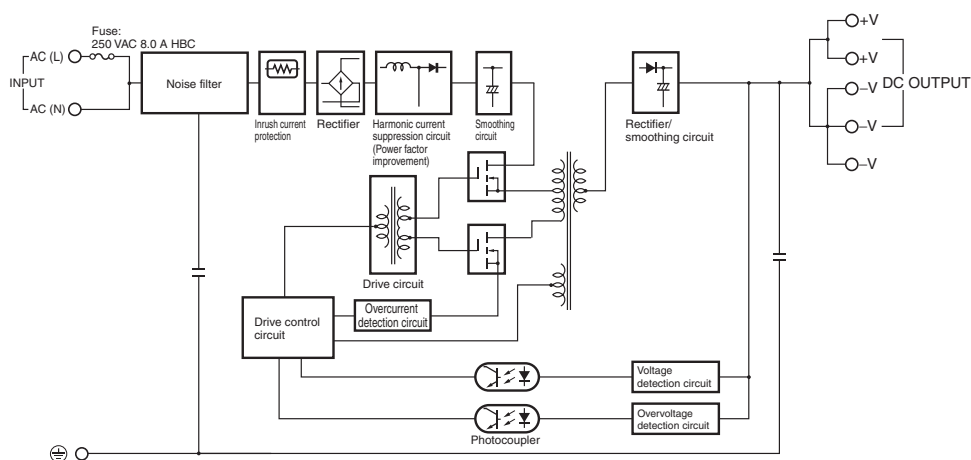
S8VK-C06024 (60W)



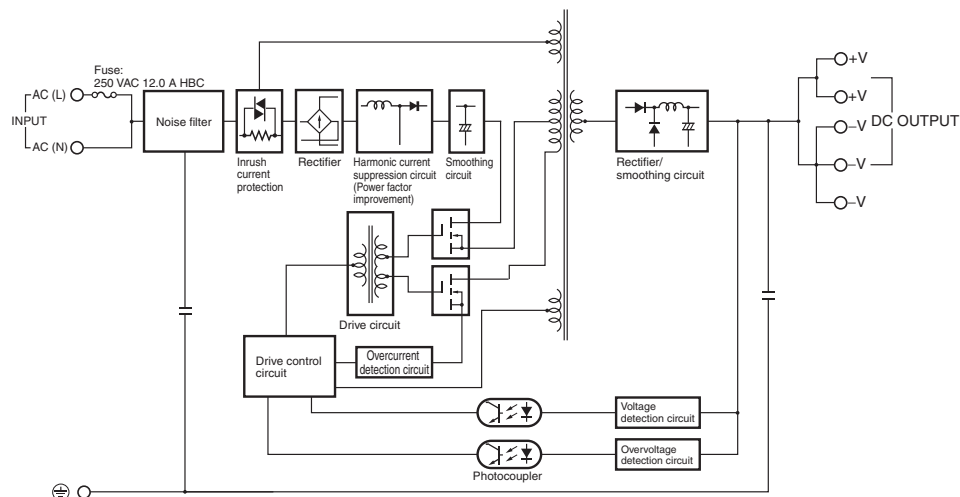
S8VK-C12024 (120W)



S8VK-C24024 (240W)



S8VK-C48024 (480W)



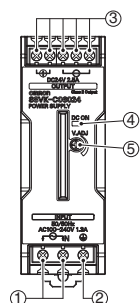
S8VK-C

Construction and Nomenclature

Nomenclature

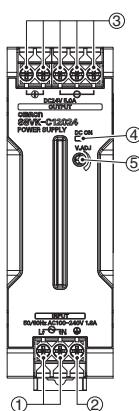
60-W Models

S8VK-C06024



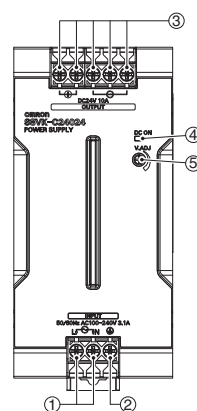
120-W Models

S8VK-C12024



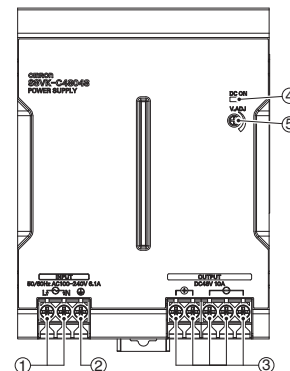
240-W Models

S8VK-C24024



480-W Models

S8VK-C48024



No.	Name	Function
1	Input terminals (L), (N)	Connect the input lines to these terminals. *1
2	Protective Earth terminal (PE)	Connect the ground line to this terminal. *2
3	DC Output terminals (–V), (+V)	Connect the load lines to these terminals.
4	Output indicator (DC ON: Green)	Lights while a direct current (DC) output is ON.
5	Output voltage adjuster (V.ADJ)	Use to adjust the voltage.

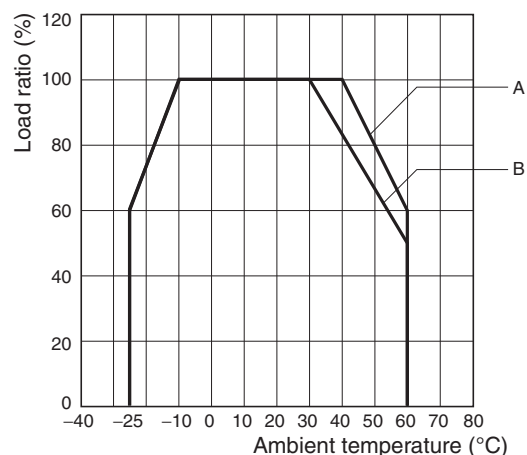
*1. The fuse is located on the (L) side. It is not user-replaceable. For a DC input, connect the positive voltage to the L terminal.

*2. This is the protective earth terminal specified in the safety standards. Always ground this terminal.

Engineering Data

Derating Curve

60, 120, 240, 480 W

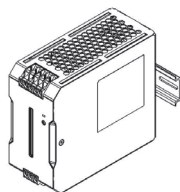


Note: 1. At less than 90 VAC, the derating is 2.5%/V
 2. For a DC power input, reduce the load given in the above derating curve by multiplying the following coefficients.
 S8VK-C06024/S8VK-C12024: 0.8
 S8VK-C24024/S8VK-C48024: 0.7

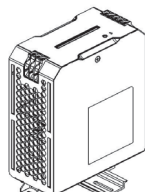
- A. Standard mounting
40°C and over: the derating is 2.0%/°C
- B. Face-up mounting
30°C and over: the derating is 1.67%/°C

Mounting

(A) Standard (Vertical) mounting



(B) Face-up mounting

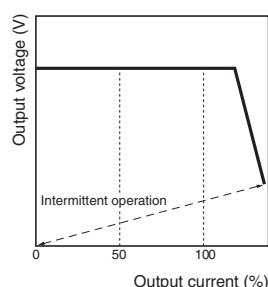


Overload Protection

The load and the power supply are automatically protected from overcurrent damage by this function.

Overload protection is activated if the output current rises above 105% of the rated current.

When the output current returns within the rated range overload protection is automatically cleared.

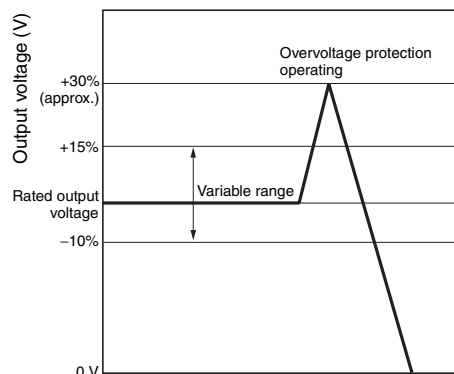


The values shown in the above diagrams are for reference only.

- Note:**
1. Internal parts may occasionally deteriorate or be damaged if a short-circuited or overcurrent state continues during operation.
 2. Internal parts may possibly deteriorate or be damaged if the Power Supply is used for applications with frequent inrush current or overloading at the load end. Do not use the Power Supply for such applications.

Overvoltage Protection

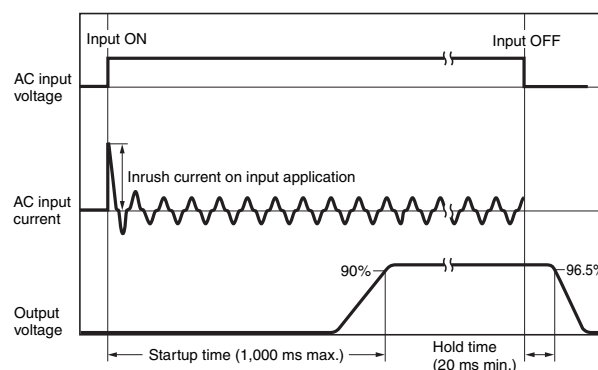
Consider the possibility of an overvoltage and design the system so that the load will not be subjected to an excessive voltage even if the feedback circuit in the Power Supply fails. If an excessive voltage that is approximately 130% of the rated voltage or more is output, the output voltage is shut OFF. Reset the input power by turning it OFF for at least three minutes and then turning it back ON again.



The values shown in the above diagram is for reference only.

Note: Do not turn ON the power again until the cause of the overvoltage has been removed.

Inrush Current, Startup Time, Output Hold Time

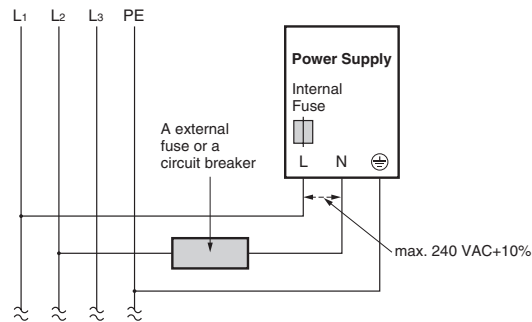


Note: Twice the input current or above will flow during the parallel operation or redundant system. Therefore, check the fusing characteristics of fuses and operating characteristics of breakers making sure that the external fuses will not burn out and the circuit breakers will not be activated by the inrush current.

Two phases application for Single phase models
For All Single phase Models, S8VK-C

Basically OMRON single phase power supply can be used on two-phases of a 3-phase-system when some of conditions satisfy like below.

- 1. The supplying voltage is below the maximum rated input.
OMRON Power supply allows the input voltage equivalent or less than 240 VAC+10%.
Please confirm the input voltage between two lines if the input voltage satisfies this condition before connecting.
- 2. The external protector is needed on N input line to secure a safety.
N line has no protection of a fuse internally.
An appropriate fuse or circuit breaker should be connected on N input line like the following.



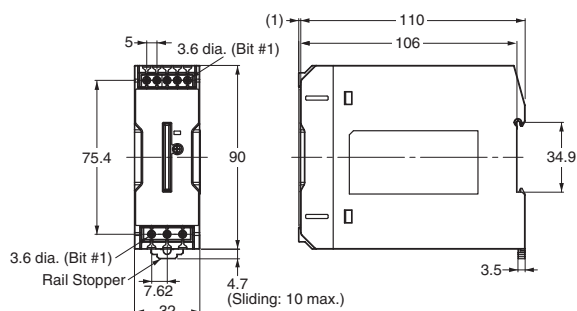
Reference Value

	Value
Reliability (MTBF)	Single phase model 60 W: 630,000 hrs 120 W: 490,000 hrs 240 W: 270,000 hrs 480 W: 190,000 hrs
Definition	MTBF stands for Mean Time Between Failures, which is calculated according to the probability of accidental device failures, and indicates reliability of devices. Therefore, it does not necessarily represent a life of the product.
Life expectancy	10 yrs. Min.
Definition	The life expectancy indicates average operating hours under the ambient temperature of 40°C and a load rate of 50%. Normally this is determined by the life expectancy of the built-in aluminum electrolytic capacitor.

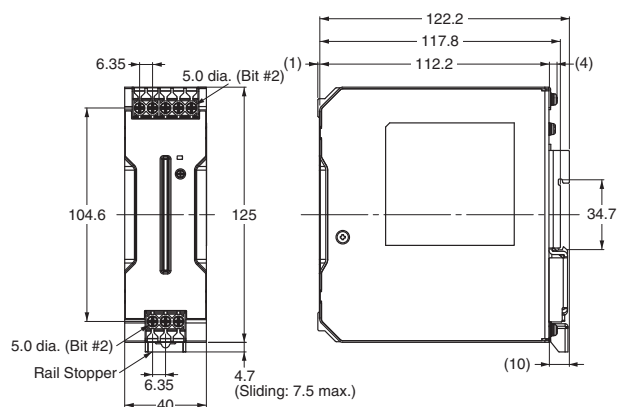
Dimensions

(Unit: mm)

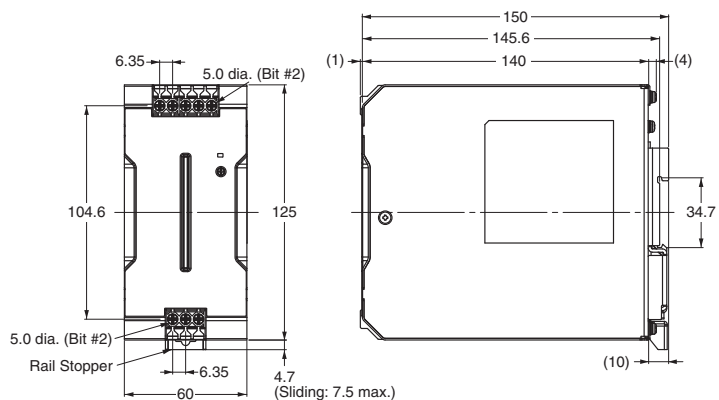
S8VK-C06024 (60 W)



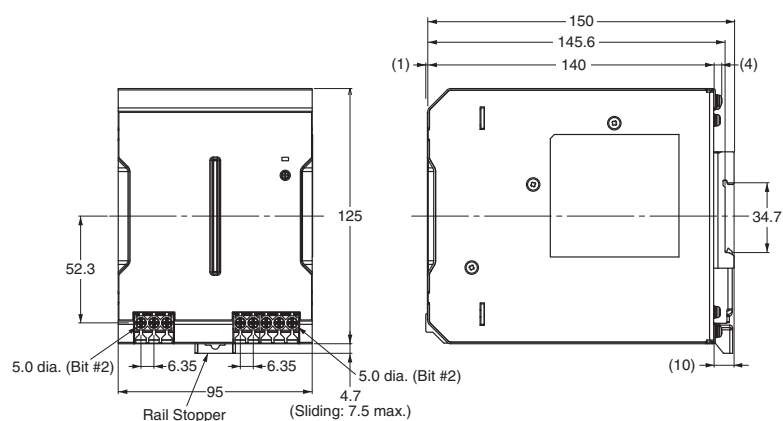
S8VK-C12024 (120 W)



S8VK-C24024 (240 W)



S8VK-C48024 (480 W)



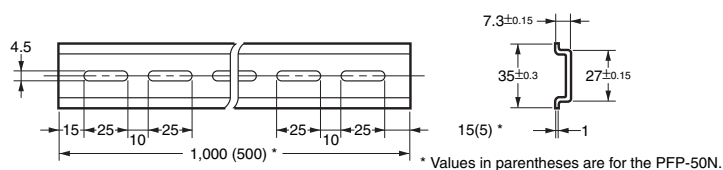
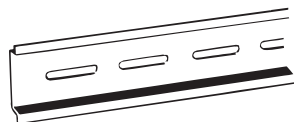
DIN Rail (Order Separately)

Note: All units are in millimeters unless otherwise indicated.

Mounting Rail (Material: Aluminum)

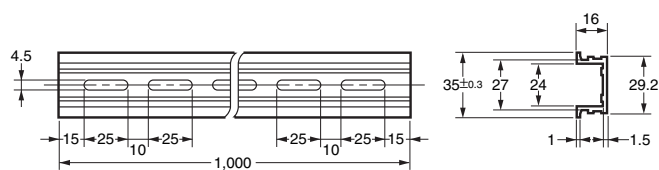
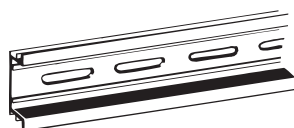
PFP-100N

PFP-50N



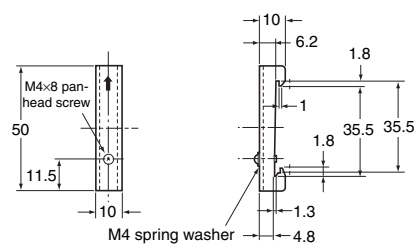
Mounting Rail (Material: Aluminum)

PFP-100N2



End Plate

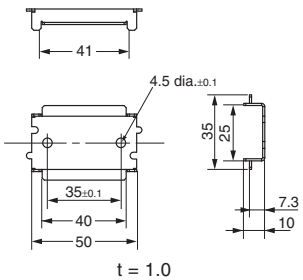
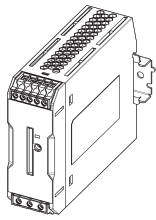
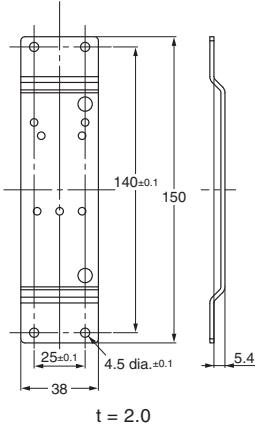
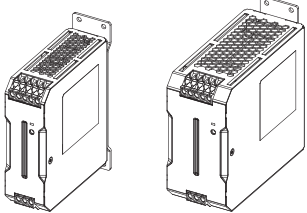
PFP-M



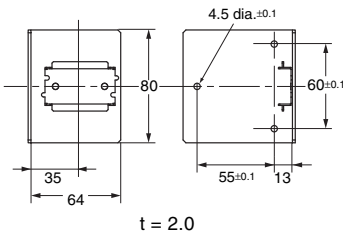
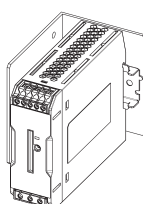
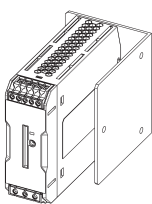
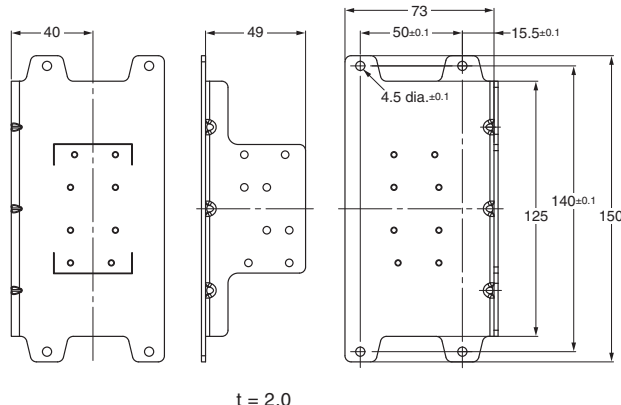
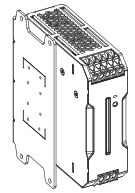
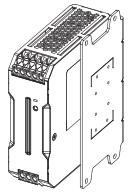
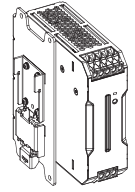
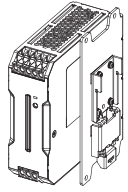
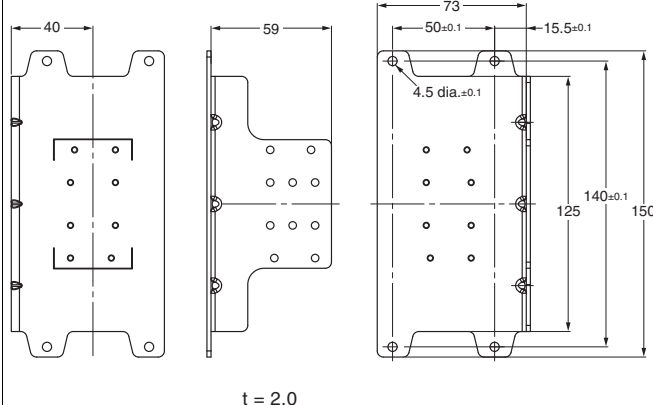
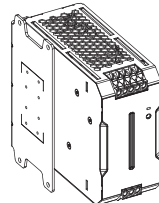
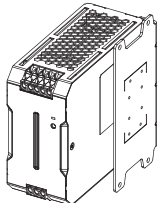
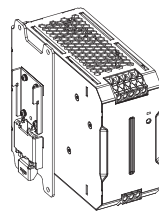
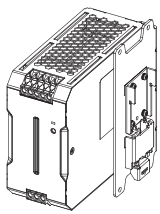
Note: If there is a possibility that the Unit will be subject to vibration or shock, use a steel DIN Rail. Otherwise, metallic filings may result from aluminum abrasion.

Mounting Brackets

Name	Model
Front-mounting bracket (for 60 W models)	S82Y-VS10F
Front-mounting bracket (for 120, 240 and 480 W models)	S82Y-VK10F
Side-mounting bracket (for 60 W models)	S82Y-VS10S
Side-mounting bracket (for 120 W models)	S82Y-VK10S
Side-mounting bracket (for 240 W models)	S82Y-VK20S

Type	Model	Dimensions	Appearance
Front-mounting bracket (For 60 W models)	S82Y-VS10F	 t = 1.0	
Front-mounting bracket (for 120, 240 and 480 W models)	S82Y-VK10F	 t = 2.0	(For 120 W types) (For 240 W types) 

S8VK-C

Type	Model	Dimensions	Appearance
Side-mounting bracket (For 60 W models)	S82Y-VS10S	 t = 2.0	Left-side mounting Right-side mounting  
Side-mounting bracket (For 120 W models)	S82Y-VK10S	 t = 2.0	Left-side mounting Right-side mounting    
Side-mounting bracket (For 240 W models)	S82Y-VK20S	 t = 2.0	Left-side mounting Right-side mounting    

Safety Precautions

Warning Indications

 CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.
Precautions for Safe Use	Supplementary comments on what to do or avoid doing, to use the product safely.
Precautions for Correct Use	Supplementary comments on what to do or avoid doing, to prevent failure to operate, malfunction or undesirable effect on product performance.

Meaning of Product Safety Symbols

	Used to warn of the risk of electric shock under specific conditions.
	Used to warn of the risk of minor injury caused by high temperatures.
	Used for general mandatory action precautions for which there is no specified symbol.
	Use to indicate prohibition when there is a risk of minor injury from electrical shock or other source if the product is disassembled.

CAUTION

Minor electric shock, fire, or Product failure may occasionally occur. Do not disassemble, modify, or repair the Product or touch the interior of the Product.



Minor burns may occasionally occur. Do not touch the Product while power is being supplied or immediately after power is turned OFF.



Fire may occasionally occur. Tighten terminal screws to the specified torque (0.5 to 0.6 N·m).



Minor injury due to electric shock may occasionally occur. Do not touch the terminals while power is being supplied. Always close the terminal cover after wiring.



Minor electric shock, fire, or Product failure may occasionally occur. Do not allow any pieces of metal or conductors or any clippings or cuttings resulting from installation work to enter the Product.



Precautions for Safe Use

Wiring

- Connect the ground completely. A protective earthing terminal stipulated in safety standards is used. Electric shock or malfunction may occur if the ground is not connected completely.
- Minor fire may possibly occur. Ensure that input and output terminals are wired correctly.
- Do not apply more than 75-N force to the terminal block when tightening it.
- Be sure to remove the sheet covering the Product for machining before power-ON so that it does not interfere with heat dissipation.
- Use the following material for the wires to be connected to the S8VK-C to prevent smoking or ignition caused by abnormal loads.

Terminals and Wiring

Model	INPUT		OUTPUT		PE	
	American Wire Gauge	Solid Wire /Stranded Wire	American Wire Gauge	Solid Wire /Stranded Wire	American Wire Gauge	Solid Wire /Stranded Wire
S8VK-C06024	AWG22 to 12	0.35 to 4 mm ² /0.35 to 2.5 mm ²	AWG20 to 12	0.5 to 4 mm ² /0.5 to 2.5 mm ²	AWG14 or thicker	2.5 mm ² or thicker /2.5 mm ² or thicker
S8VK-C12024	AWG22 to 10	0.35 to 6 mm ² /0.35 to 4 mm ²	AWG18 to 10	0.75 to 6 mm ² /0.75 to 4 mm ²		
S8VK-C24024	AWG20 to 10	0.5 to 6 mm ² /0.5 to 4 mm ²	AWG14 to 10	2.5 to 6 mm ² /2.5 to 4 mm ²		
S8VK-C48024	AWG16 to 10	1.5 to 6 mm ² /1.5 to 4 mm ²	AWG12 to 10	4 to 6 mm ² /4 mm ²		

- Strip I/O wires for 8 mm when using a screwless terminal block.

Note: The rated current for output terminals is 10 A per terminal.

Be sure to use multiple terminals simultaneously for current that exceeds the terminal rating.

When applying a current of 10 A or more, use at least two terminals each for the positive and negative wires.

Installation Environment

- Do not use the Power Supply in locations subject to shocks or vibrations. In particular, install the Power Supply as far away as possible from contactors or other devices that are a vibration source.
- Install the Power Supply well away from any sources of strong, high-frequency noise and surge.

Operating Life

- The life of a Power Supply is determined by the life of the electrolytic capacitors used inside. Here, Arrhenius Law applies, i.e., the life will be cut in half for each rise of 10°C or the life will be doubled for each drop of 10°C. The life of the Power Supply can thus be increased by reducing its internal temperature.

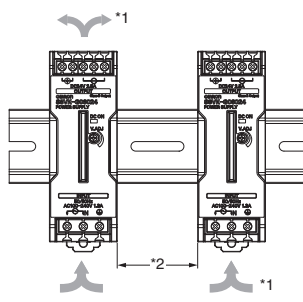
Ambient Operating and Storage Environments

- Store the Power Supply at a temperature of -25 to 65°C and a humidity of 10% to 95%.
- Do not use the Power Supply in areas outside the derating curve otherwise, internal parts may occasionally deteriorate or be damaged.
- Use the Power Supply at a humidity of 20% to 90%.
- Do not use the Power Supply in locations subject to direct sunlight.
- Do not use locations where liquids, foreign matter, or corrosive gases may enter the interior of Products.

Precautions for Correct Use

Mounting

- Take adequate measures to ensure proper heat dissipation to increase the long-term reliability of the Product. Be sure to allow convection in the atmosphere around devices when mounting. Do not use in locations where the ambient temperature exceeds the range of the derating curve.
- When cutting out holes for mounting, make sure that cuttings do not enter the interior of the Products.



- *1. Convection of air
*2. 20 mm min.

- Improper mounting will interfere with heat dissipation and may occasionally result in deterioration or damage of internal parts. Use the Product within the derating curve for the mounting direction that is used.
- Use a mounting bracket when the Product is mounted facing horizontally.
- Heat dissipation will be adversely affected. When the Product is mounted facing horizontally, always place the side with the label facing upward.
- Operate the Power Supply within a range that is 5°C less than the values in the derating curve in *Engineering Data* on page 4 if the Power Supply is used with an installation spacing of 10 mm min. (20 mm max.) on the left and right.

Overcurrent Protection

- Internal parts may possibly deteriorate or be damaged if a short-circuited or overcurrent state continues during operation.
- Internal parts may possibly deteriorate or be damaged if the Power Supply is used for applications with frequent inrush current or overloading at the load end. Do not use the Power Supply for such applications.
- The DC ON indicator (green) flashes if the overload protection function operates.

Charging a Battery

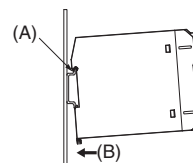
If you connect a battery as the load, install overcurrent control and overvoltage protection circuits.

Output Voltage Adjuster (V.ADJ)

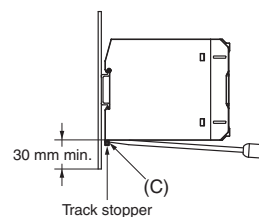
- The output voltage adjuster (V.ADJ) may possibly be damaged if it is turned with unnecessary force. Do not turn the adjuster with excessive force.
- After completing output voltage adjustment, be sure that the output capacity or output current does not exceed the rated output capacity or rated output current.

DIN Rail Mounting

To mount the Block on a DIN Rail, hook portion (A) of the Block onto the rail and press the Block in direction (B).

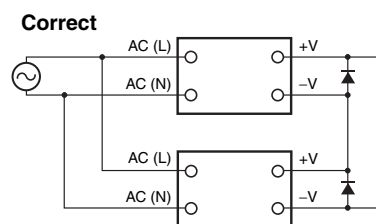


To dismount the Block, pull down portion (C) with a flat-blade screwdriver and pull out the Block.



Series Operation

Two power supplies can be connected in series.



Note: 1. The diode is connected as shown in the figure. If the load is short-circuited, a reverse voltage will be generated inside the Power Supply. If this occurs the Power Supply may possibly deteriorate or be damaged. Always connect a diode as shown in the figure. Select a diode having the following ratings.

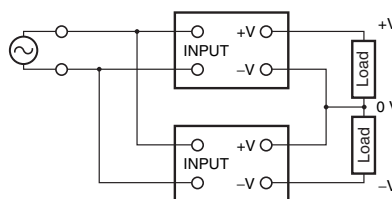
Type	Schottky Barrier diode
Dielectric strength (V_{RRM})	Twice the rated output voltage or above
Forward current (I_F)	Twice the rated output current or above

2. Although Products having different specifications can be connected in series, the current flowing through the load must not exceed the smaller rated output current.

Making Positive/Negative Outputs

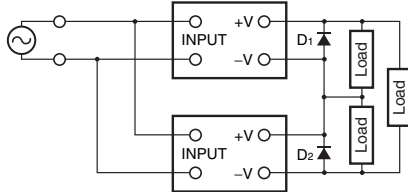
- The outputs are floating outputs (i.e., the primary circuits and secondary circuits are separated). You can therefore make positive and negative outputs by using two Power Supplies. You can make positive and negative outputs with any of the models.

If positive and negative outputs are used, connect Power Supplies of the same model as in the following figure. (Combinations with different output capacities or output voltages can be made. However, use the lower of the two maximum rated output currents as the current to the loads.)



- Depending on the model, internal circuits may be damaged due to startup failure when the power is turned ON if loads such as a servomotor or operational amplifier may operate in series. Therefore, connect bypass diodes (D1, D2) as shown in the following figure.

If the list of models that support series connection of outputs says that an external diode is not required, an external diode is also not required for positive/negative outputs.



- Use the following information as a guide to the diode type, dielectric strength, and current.

- Type: Schottky barrier diode
- Dielectric strength (V_{RRM}): Twice the rated Power Supply output voltage or higher
- Forward current (I_F): Twice the rated Power Supply output current or higher

Backup Operation

Backup operation can be performed with S8VK-R. Refer to the S8VK-R Datasheet for detail.

In Case There Is No Output Voltage

The possible cause for no output voltage may be that the overcurrent or overvoltage protection has operated. The internal protection may operate if a large amount of surge voltage such as a lightening surge occurs while turning ON the power supply.

In case there is no output voltage, please check the following points before contacting us:

- Checking overload protected status:
Check whether the load is in overload status or is short-circuited.
Remove wires to load when checking.
- Checking overvoltage or internal protection:
Turn the power supply OFF once, and leave it OFF for at least 3 minutes. Then turn it ON again to see if this clears the condition.

Audible Noise at Power ON (240-W, and 480-W Models)

A harmonic current suppression circuit is built into the Power Supply. This circuit can create noise when the input is turned ON, but it will last only until the internal circuits stabilize and does not indicate any problem in the Product.

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