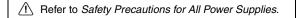
Switch Mode Power Supply

S82K (3/7.5/15/30/50/90/100-W Models)

CSM_S82K_DS_E_3_1

Ultimate DIN-rail-mounting Power Supply with a Power Range of 3 to 100 W

- EMI: EN 61204-3 class B
- Input: 85 to 264 VAC (except 90-W and 100-W models)
- · Safety standards: UL 60950-1/508, cUL: CSA C22.2 No. 14 (Class 2: Per No. 223), cUR: CSA No. 60950-1, EN50178 (= VDE 0160)
- Undervoltage alarm indication available for standard models.]
- RoHS-compliant





Model Number Structure

■ Model Number Legend

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

S82K -

1. Power Factor Correction

None: No

2. Power Ratings

003: 3 W 050: 50 W 007: 7.5 W 090: 90 W 015: 15 W 100: 100 W 030: 30 W

3. Output Voltage 05: +5 VDC

24: +24 VDC 12: +12 VDC 27: ±12 VDC 15: +15 VDC 28: ±15 VDC

Ordering Information

■ List of Models

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

Power ratings	Output voltage	Output current	Function Configuration			Models
			Output	Undervoltage alarm indicator/output	PFC	
3 W	5 V	0.6 A	Single output	Yes	No	S82K-00305
	12 V	0.25 A				S82K-00312
	15 V	0.2 A				S82K-00315
	24 V	0.13 A				S82K-00324
7.5 W	5 V	1.5 A				S82K-00705
	12 V	0.6 A				S82K-00712
	15 V	0.5 A				S82K-00715
	24 V	0.3 A				S82K-00724
	±12 V	0.3 A/0.2 A	Dual output			S82K-00727
	±15 V	0.2 A/0.2 A				S82K-00728
15 W	5 V	2.5 A	Single output	1		S82K-01505
	12 V	1.2 A				S82K-01512
	24 V	0.6 A				S82K-01524
30 W	5 V	5.0 A				S82K-03005 (See note 1.)
	12 V	2.5 A				S82K-03012
	24 V	1.3 A				S82K-03024
50 W	24 V	2.1 A				S82K-05024
90 W	24 V	3.75 A			No	S82K-09024
					Yes	S82K-P09024
100 W	24 V	4.2 A (See note 2.)			No	S82K-10024
					Yes	S82K-P10024

Note:1. The output capacity of the S82K-03005 is 25 W.

^{2.} The output current for S82K-P10024 during parallel operation is 3.78 A.

Specifications

■ Ratings/Characteristics

	P	ower ratings			S82K			
(See note 1.)		Single output		Dual output	Single output			
Item			3 W	7.5 W	7.5 W	15 W	30 W	
Efficiency (typical)		60% min. (Varies depending on specifications) 66% min. (Varies depending on specifications) 66% min. (Varies depending on specifications)						
Input	Voltage	AC	100 to 240 VAC (85 to 264 VA	AC)				
	(See note 2.)	DC	90 to 350 VDC Not possible					
	Frequency		50/60 Hz (47 to 450 Hz)					
	Current (See note 3.)	100-V input	0.15 A max.	0.25 A max.		0.45 A max.	0.9 A max.	
	<u> </u>	200-V input				0.25 A max.	0.6 A max.	
	Power Factor							
	Harmonic current emissions							
	Leakage current (See note 3.)	100-V input	0.5 mA max.					
	· ,	200-V input	1 mA max.	20)			Tos 4 (/ 11 / 10500)	
	Inrush current (See note 3.)	100-V input	15 A max. (for cold start at 25°C) 25 A max. (for cold start at 25°C)					
	<u> </u>	200-V input	30 A max. (for cold start at 25°C) 50 A max. (for cold start at 25°C)					
Out-	Noise filter Voltage Adjustme	ent Range	Yes ±10% (with V. ADJ) (See note	5.)	Not possible (See note 6.)		to 15% for S82K-03012/-03024)	
put (See note	Ripple (See note 3.)		2% (p-p) max.			(See note 5.)		
4.)	Input variation in		0.5% max. (at 85 to 264 VAC	input, 100% load)			·	
	Load variation in (rated input volta	fluence ge)	1.5% max. (0 to 100% load)		+V: 1.5% max. -V: 3% max. (0 to 100% load)	1.5% max. (0 to 100% load)		
	Temperature vari ence (See note 3		0.05%/°C max.					
	Startup time		100 ms max. (up to 90% of output voltage at rated input and output)					
	Hold time (See n	ote 3.)	20 ms min.					
Addi- tion- al func-	Overload protect (See note 7.)	ion	105% to 160% of rated load current (105% to 250% of rated load current for dual output models), gradual current/voltage drop, automatic reset (See note 8.) 105% to 160% of rated load current, gradual current increase, voltage drop intermitent operation, automatic reset					
tions	Overvoltage prot	ection	No				•	
	Undervoltage ala tion	rm indica-	Yes (color: red)					
	Undervoltage alarm output		No					
Parallel operation No								
Oth- er	h- Operating ambient tempera- ture		Refer to the derating curve in Engineering Data. (with no icing or condensation)					
	Storage temperature		-25 to 65°C (with no icing or condensation)					
	Operating ambient humidity		25% to 85% (Storage humidity: 25% to 90%)					
	Dielectric strength		3.0 kVAC for 1 min. (between 2.0 kVAC for 1 min. (between 1.0 kVAC for 1 min. (between	all inputs and PE terminals)				
		Detection current	10 mA			20 mA		
	Insulation resista	ince	100 MΩ min. (between all outputs and all inputs, PE terminals) at 500 VDC					
	Vibration resista	псе	10 to 55 Hz, 0.375-mm single amplitude for 2 h each in X, Y, and Z directions					
	Shock resistance		300 m/s², 3 times each in ±X, ±Y, ±Z directions					
	Output indicator		Yes (color: green)					
	ЕМІ	Conducted Emissions	Conforms to EN61204-3 EN5	5011 Class B and based on F	CC Class B			
		Radiated Emissions	Conforms to EN61204-3 EN5	5011 Class B				
	EMS		Conforms to EN61204-3 High severity levels					
	Approved stan- dards	UL cUL cUR EN/VDE	UL 508 (Listing; Class 2: Per UL1310), Class 2 (excluding Dual Output models), UL60950-1 CSA C22.2 No. 14 (Class 2: Per No. 223, excluding Dual output models) CSA No. 60950-1 ENS0178 (VDE0160) Based on VDE0160/P100					
	Weight		150 g max.			260 g max.	380 g max.	
					otection may operate at st			

Note:1. When a load is connected that has a built-in DC-DC converter, the overload protection may operate at startup and the power supply may not start. Refer to Overload Protection on page 8 for details.

2. Use with DC voltage input is beyond the conditions of approval or conformance to applicable safety standards. (DC input possible with 15 W max. Use the 7.5-W single-output models under the load of 90% max. if the voltage range is between 90 and 110 VDC.

Do not use the 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. There is no polarity.

3. Defined with a 100% load and the rated input voltage (100 or 200 VAC.)

4. The output specification is defined at the power supply output terminals.

5. If the output voltage adjuster (V. ADJ) is turned, the voltage will increase by more than +10% of the voltage adjustment range. (+15% for S82K-03012/-03024) When adjusting the output voltage, confirm the actual output voltage from the Power Supply and be sure that the load is not damaged.

6. The settings for the output voltage must be within the following range:

+V: ±1% of the rated value

-V: ±5% of the rated value

-V: ±5% of the rated value

7. Refer to Overload Protection on page 8 for details.

7. Refer to Overload Protection on page 8 for details.8. When using the 7.5-W single-output models within the input voltage range between 90 and 110 VDC, the protection function will operate at a current of 95% to 160% of the rated load current.

Power ratings		S82K S82K-P							
(See note 1.)		Single output							
		50 W	90 W	100 W	90 W	100 W			
Efficie	ncy (typical)		80% min. (Varies depending on	specifications)					
Input	Voltage	AC	100 to 240 VAC (85 to 264 VAC)	100 V (85 to 132 VAC)/200	V (170 to 264 VAC) Selectab	е			
	(See note 2.)	DC	Not possible						
	Frequency	•	50/60 Hz (47 to 450 Hz) 50/60 Hz (47 to 63 Hz)						
	Current	100-V input	1.3 A max.	2.5 A max.		•			
	(See note 3.) 200-V in		0.8 A max.	1.5 A max.					
	Power Factor	•		•		0.7 min. (at 200 VAC input,	at rated output), 100 V: unlimite		
	Harmonic current emissions			Conforms to EN6100-3-2 (200-V only)					
		100-V input	0.5 mA max.			•			
	(See note 3.)	200-V input	1 mA max.						
	Inrush current	100-V input	25 A max. (for cold start at 25°C)						
	(See note 3.)	200-V input	50 A max. (for cold start at 25°C)						
	Noise filter		Yes						
Out- put	Voltage Adjustme	ent Range	±10% (with V. ADJ) (-10% to 15	5% for S82K-05024) (See not	e 5.)	±10% (with V. ADJ) (See no	ote 5.)		
(See note	Ripple (See note	3.)	2% (p-p) max.						
4.)	Input variation in	fluence	0.5% max. (at 85 to 264 VAC input, 100% load) 0.5% max. (at 85 to 132 VAC input, 1700 to 264 VAC input, 100% load)						
	Load variation in (rated input volta	ge)	1.5% max. (0 to 100% load)						
	Temperature vari ence (See note 3.		0.05%/°C max.	Tara					
	Startup time		100 ms max. (up to 90% of output voltage at rated input and output)						
	Hold time (See no	•	20 ms min.						
Addi- tion- al func-	Overload protect (See note 6.)	ion	105% to 160% of rated load current, inverted L drop, automatic reset (See note 7.) current, gradual current increase, voltage drop intermitent operation, automatic reset						
tions	Overvoltage prot	ection	No						
	Undervoltage alarm indication Yes (color: red)								
	Undervoltage ala	rm output	No	Yes					
	Parallel operation		No		Yes (up to 2 units.)	No	Yes (up to 2 units.) (See note 8		
Oth- er	Operating ambier ture	nt tempera-	Refer to the derating curve in Engineering Data. (with no icing or condensation)						
	Storage temperat	ture	–25 to 65°C (with no icing or condensation)						
	Operating ambient humidity		25% to 85% (Storage humidity: 25% to 90%)						
	Dielectric strengt	th	3.0 kVAC for 1 min. (between al 2.0 kVAC for 1 min. (between al 1.0 kVAC for 1 min. (between al	I inputs and PE terminals)					
		Detection current	20 mA						
	Insulation resista	nce	100 $\mbox{M}\Omega$ min. (between all output						
	Vibration resistar		10 to 55 Hz, 0.375-mm single a	mplitude for 2 h each in X , Y ,	and Z directions				
	Shock resistance	•	00 m/s², 3 times each in ±X, ±Y, ±Z directions 150 m/s², 3 times each in ±X, ±Y, ±Z directions						
	Output indicator		Yes (color: green)						
	ЕМІ	Conducted Emissions	Conforms to EN61204-3 EN55011 Class B and based on FCC Class A on FCC Class B						
		Radiated Emissions	Conforms to EN61204-3 EN55011 Class B						
	EMS		Conforms to EN61204-3 High severity levels						
	Approved standards	UL cUL cUR	UL508 (Listing; Class 2: Per UL 9.), UL60950-1 CSA C22.2 No.14 (Class 2: Per CSA No. 60950-1	No. 223, excluding dual outp	, , ,	dual output models) (See n	er UL1310), Class 2 (excluding iote 9.), UL60950-1 : Per No. 223, excluding dual ou		
		EN/VDE	EN50178 (= VDE0160), EN609 Based on VDE0106/P100	,		EN50178 (= VDE0160), EN60950-1 (= VDE0805 Teil 1) Based on VDE0106/P100			
	Weight		400 g max.	600 g max.		1000g max.			

Note: 1. When a load is connected that has a built-in DC-DC converter, the overload protection may operate at startup and the power supply may not start. Refer to Overload Protection on page 8 for details.

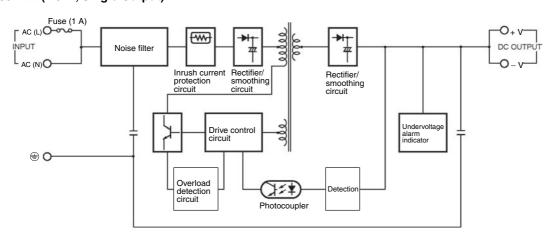
Use with DC voltage input is beyond the conditions of approval or conformance to applicable safety standards.
Do not use the Inverter output for the Power supply. Inverters with an output frequency of 50/60 Hz are available, but the rise in the internal temperature of the Power Supply may result in ignition or burning. There is no polarity.
 Defined with a 100% load and the rated input voltage (100 or 200 VAC.)

- 4. The output specification is defined at the power output terminals.
- 5. If the output voltage adjuster (V. ADJ) is turned, the voltage will increase by more than +10% of the voltage adjustment range. (+15% for S82K-03012/-03024) When adjusting the output voltage, confirm the actual output voltage from the Power Supply and be sure that the load is not damaged.
- Refer to Overload Protection on page 8 for details.
 When using the 90-W model at an ambient temperature of 25°C or less, the overload protection function will operate at 101% to 111% of the rated output current. When using the 90-W model at an ambient temperature exceeding 25°C, the overload protection function will operate at 92% to 111% of the rated output current.
- Parallel operation is set with the Parallel/Single Operation Selector.
- To meet Class-2 requirements with the 100-W, either a fuse or circuit breaker that is UL listed or CSA certified, and rated at 4.2 A max. should be wired in series with the load to be connected to the Power Supply. Only then can the Power Supply output be considered as meeting Class 2.

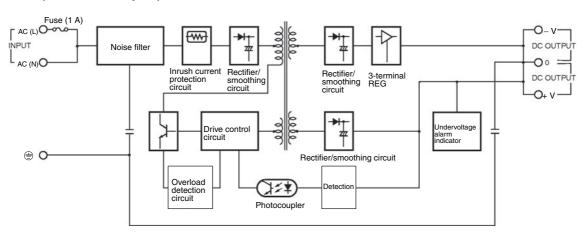
Connections

■ Block Diagrams

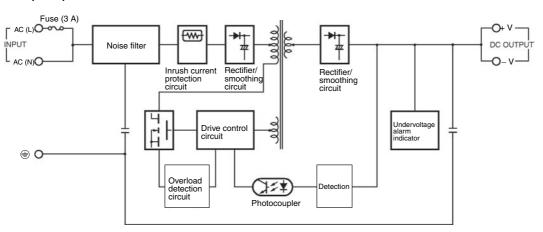
\$82K-003□□ (3 W) \$82K-007□□ (7.5 W, Single Output)



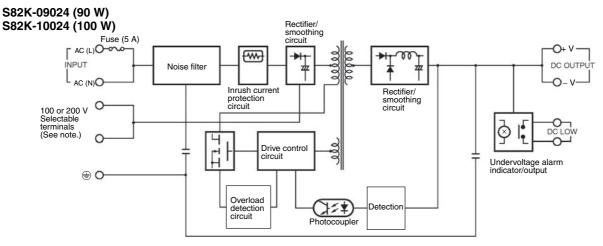
S82K-007□□ (7.5 W, Dual Outputs)



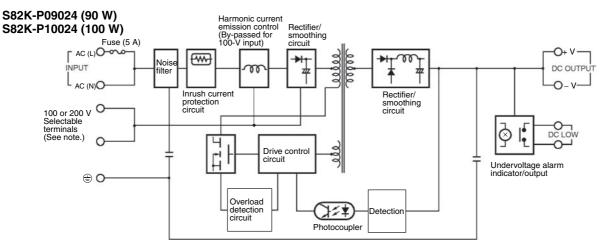
S82K-015 (15 W) S82K-030 (30 W) S82K-05024 (50 W)



4



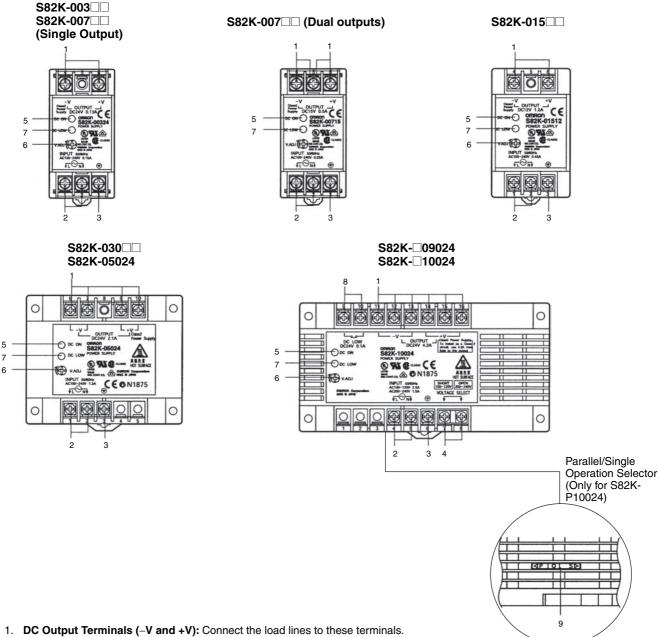
Note: Use the short bar to short-circuit terminals 7 and 8 to select 100 to 120 VAC and remove the short bar to select 200 to 240 VAC.



Note: Use the short bar to short-circuit terminals 7 and 8 to select 100 to 120 VAC and remove the short bar to select 200 to 240 VAC.

Construction and Nomenclature

■ Nomenclature



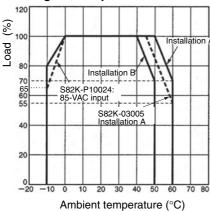
- AC Input Terminals (L and N): Connect the input lines to these terminals.
- 3. Protective Earthing Terminals (PE): Connect a ground line to these terminals.
- Input Voltage Selector Terminals (VOLTAGE SELECT): Selects a 100 V or 200 V input voltage.
- Output Indicator (DC ON: Green): Lights while a Direct Current (DC) output is ON.
- Output Voltage Adjuster(V.ADJ): Use to adjust the voltage.
- Undervoltage Alarm Indicator Terminal (DC LOW: Red): Lights when there is a drop in the output voltage.
- Undervoltage Alarm Output Terminals (DC LOW): S82K-□09024/-□10024 only.
- Parallel/Single Operation Selector: Set to "PARALLEL" for parallel operation.

Engineering Data

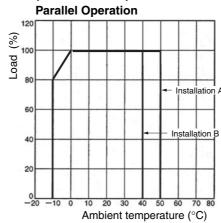
■ Derating Curve (A: Standard mounting, B: Face-up mounting)

3-/7.5-/15-/30-/50-/100-W Models

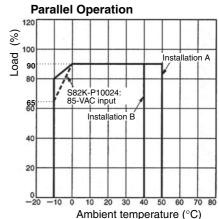
Single-Unit Operation



100-W Models without PFC (S82K-10024)

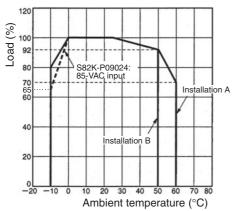


100-W Models with PFC (S82K-P10024)



Note: When using the 7.5-W single-output models within the input voltage range between 90 and 110 VDC, the load rate will become 90% or less.

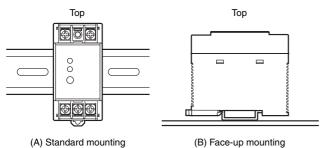
90-W Models Single-Unit Operation



Note: 1. The derating curve may vary depending on the installation conditions.

- 2. Multiple units cannot be installed in a configuration where they are lined up vertically.
- 3. Use the 7.5-W single-output models under the load of 90% max. if the voltage range is between 90 and 110 VDC.
- 4. The cold-start time will be longer when using S82K-P09024 or S82K-P10024 with an 85-VAC input.

■ Mounting

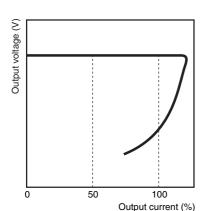


Note: Installations other than (A) and (B) are not possible.

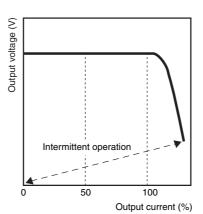
■ Overload Protection

The Power Supply is provided with an overload protection function that protects the Power Supply from possible damage by overcurrent. When the output current rises above 105% min. of the rated current, the protection function is triggered, automatically decreasing the output voltage. When the output current falls within the rated range, the overload protection function is automatically cleared.

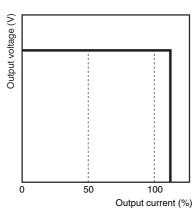
3-/7.5/15 W Models



30-/50 W Models



90-/100 W Models



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

Note: 1. When connecting a load that has a built-in DC-DC converter, the overload protection function may operate during startup, thus preventing the Power Supply from starting.

- 2. Internal parts may occasionally deteriorate or be damaged if a short-circuited or other overcurrent state continues during operation.
- 3. When using the 7.5-W single-output models at the input voltage range of 90 to 110 VDC, the overload protection function will operate at 95% to 160% of the rated output current.
- 4. When using the 90-W model at an ambient temperature of 25°C or less, the overload protection function will operate at 101% to 111% of the rated output current. When using the 90-W model at an ambient temperature exceeding 25°C, the overload protection function will operate at 92% to 111% of the rated output current.
- 5. When using the 100-W model with PFC in parallel operation, operation is limited to a load ratio of 90% to 100% of the rated output current at 4.2 A.

When Using ± Output Models

The +V output detects the total output power (+V output and -V output) to trigger the short-circuit protection against overcurrent. This protection varies depending on the -V output state. The -V output independently triggers the short-circuit protection.

■ Undervoltage Alarm Indicator and Output Function

If the output voltage at the output terminal drops to 75% to 90% of the rated voltage, the red indicator of the S82K will be lit. In the case of the S82K-\(\superscript{09024}\superscript{10024}\), a voltage drop alarm will be output via the relay available in the models.

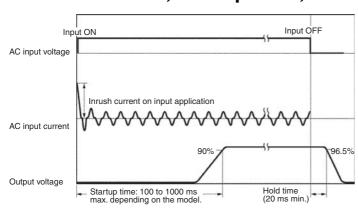
Note: This function detects the voltage at the output terminal of the Power Supply. To check the precise output voltage, measure the voltage at the terminal of the load.

	Indicator	Voltage	Operation of □09024/□10024's output (See note 2.)
Green lit:	▼ DC ON	If the voltage at the output terminal is more than 82% of the rated voltage and operation is normal, the green in-	
Red not lit:	O DC LOW	dicator will be lit and the red indicator will not be lit.	<u></u>
Green lit:	◯ DC ON (See note 1.)	If the voltage at the output terminal drops to below 82% of the rated voltage, the red indicator will be lit. (See	
Red lit:	▼ DC LOW	note 3.)	
Green not lit	:: O DC ON	If the voltage at the output terminal approaches 0 V, both the green and red indicators will not be lit.	
Red not lit:	O DC LOW	both the green and red indicators will not be it.	

Note: 1. The more the voltage at the output terminal drops, the darker both the green and red indicators will be.

- 2. The relay contacts have a capacity of 0.1 A at 24 VDC.
- 3. The red indicator will actually first light at a voltage between 75% and 90% of the rated voltage at output terminal.

■ Inrush Current, Startup Time, Hold Time



■ Reference Value

Item	Value	Definition
Reliability (MTBF)	•	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		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.

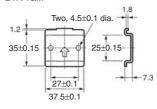
Dimensions

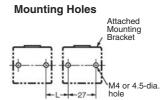
Note: All units are in millimeters unless otherwise indicated.

S82K-003□□ (3 W) S82K-007□□ (7.5 W)

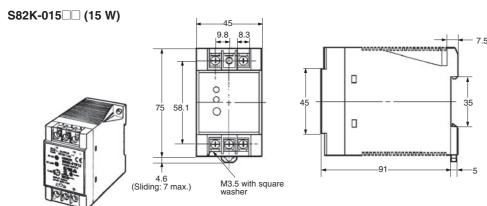
Mounting Brackets (Supplied)

Used when not mounting the Power Supply directly on the DIN rail.





Note: If more than one Power Supply is installed in a row, keep a distance of 20 mm min. (L = 20 mm min.) between each adjacent Power Supply.

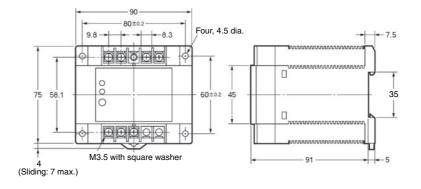


Mounting Holes Two, M4 or 4.5-dia. mounting holes

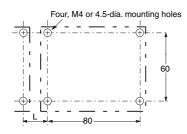
Note: If more than one Power Supply is installed in a row, keep a distance of 20 mm min. (L = 20 mm min.) between each adjacent Power Supply.

S82K-030□□ (30 W) S82K-05024 (50 W)

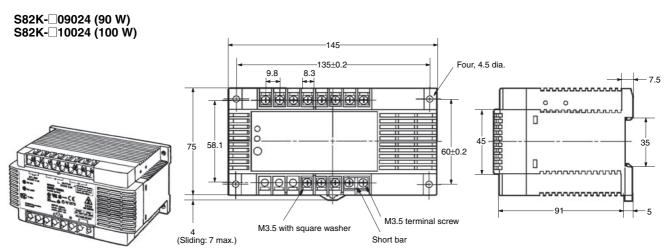




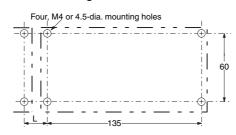
Mounting Holes



Note: If more than one Power Supply is installed in a row, keep a distance of 20 mm min. (L = 20 mm min.) between each adjacent Power Supply.



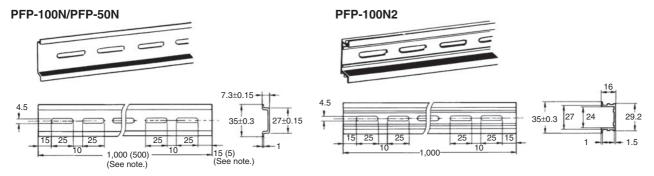
Mounting Holes



Note: If more than one Power Supply is installed in a row, keep a distance of 20 mm min. (L = 20 mm min.) between each adjacent Power Supply.

■ DIN Rail (Order Separately)

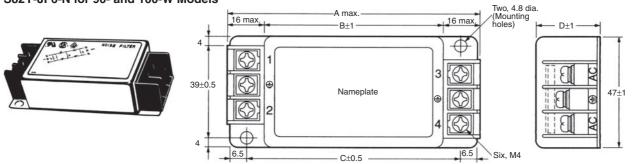
Mounting Rail (Material: Aluminum)



Note: The values shown in parentheses are for the PFP-50N.

■ Noise Filter (Order Separately)

S82Y-JF3-N for 3- to 50-W Models S82Y-JF6-N for 90- and 100-W Models



Safety Precautions

Refer to Safety Precautions for All Power Supplies.

∕!\ 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 of 0.98 N·m (M3.5).



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.

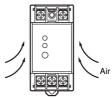


■ Precautions for Safe Use

Mounting

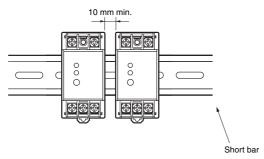
Take adequate measures to ensure proper heat dissipation to increase the long-term reliability of the product.

The Power Supply is designed to radiate heat by means of natural air-flow. Therefore, mount the Power Supply so that air flow takes place around the Power Supply.

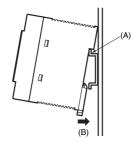


When mounting two or more Power Supplies side-by-side, allow at least 10 mm spacing between them, as shown in the following illustration.

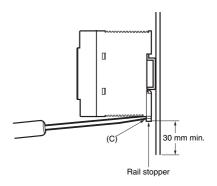
Forced air-cooling is recommended.



To mount the Power Supply on a DIN rail, hook portion (A) of the Power Supply to the rail and press the Power Supply toward direction (B).



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



Wiring

Do not apply more than 75-N force to the terminal block when tightening it.

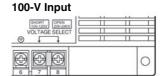
Ensure that input and output terminals are wired correctly.

Selection of 100 or 200 VAC Input Voltage

<u>(S82K-□09024/-□10024)</u>

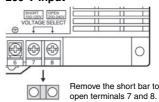
Select a 100-V or 200-V input by shorting or opening the input voltage selector terminals, as shown in the following diagram.

(The default setting is 200 V.)



Use the short bar to short-circuit terminals 7 and 8.

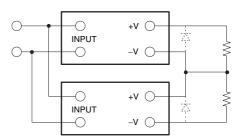
200-V Input



Generating Output Voltage (±)

An output of \pm can be generated by using two Power Supplies as shown below, because the Power Supply produces a floating output.

Correct

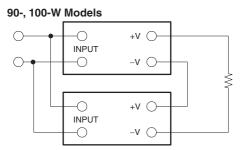


When connecting the Power Supplies in series with an operation amplifier, connect diodes to the output terminals as shown by the dotted lines in the figure. No diodes are required with S82K-□09024 and S82K-□10024.

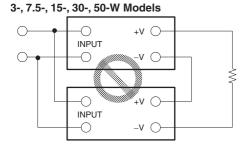
Series Operation

Two Power Supplies can be operated in series. Only 90-W/100-W models can be operated in series. Series operation, however, is not possible for the + outputs and – outputs of models with \pm outputs.

Correct



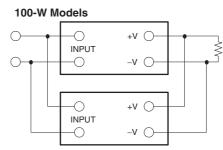
Incorrect



Parallel Operation

S82K 100-W models can be operated in parallel. Perform parallel operation with power supplies satisfying the same model.

Correct

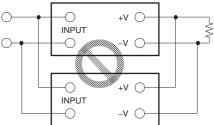


Note: When operating the S82K-P10024 in parallel operation, set the selector to "PARALLEL. In this case, the rated current per S82K-P10024 is 3.78 A.



Incorrect

3-, 7.5-, 15-, 30-, 50- and 90-W Models



Parallel Operation Precautions

The length and thickness of each wire connected to the load must be the same so that there is no difference in voltage drop value between the load and the output terminals of each Power Supply.

Adjust the output voltage of each Power Supply with output voltage adjuster (V. ADJ) so that there will be no difference in output voltage between each Power Supply.

Minimum Output Current (S82K-00727/S82K-00728)

The minimum output current of the S82K-00727 and S82K-00728 is restricted by the output voltage and control method.

Note: All the outputs of the S82K-00727 and S82K-00728 are controlled by the +V output. If the +V output current falls to more than 10% of the rated output, the -V output voltage may dron

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

In the interest of product improvement, specifications are subject to change without notice.

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- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

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PROGRAMMABLE PRODUCTS

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Disclaimers

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Product specifications and accessories may be changed at any time based on improvements and other reasons.

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