



INSTRUCTION SHEET

Switching Power Supply PS6R Series

Confirm that the delivered product is what you have ordered. Read this instruction sheet to make sure of correct operation. Make sure that the instruction sheet is kept by the end user.

SAFETY NOTE

These devices are open-type devices that are to be installed in a tool only accessible enclosure suitable for the environment. This equipment is suitable for use in Class I, division 2, Groups A, B, C and D OR Non-hazardous locations only. **WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN REMOVED OR THE AREA IS KNOWN TO BE NON HAZARDOUS.** **WARNING - EXPLOSION HAZARD - SUBSTITUTION OF ANY COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.** **WARNING - EXPOSURE TO SOME CHEMICALS MAY DEGRADE THE SEALING PROPERTIES OF MATERIALS USED IN THE RELAYS CONTAINED IN THIS DEVICE.** **AVERTISSEMENT - RISQUE D'EXPLOSION. AVANT DE DECONNECTER L'EQUIPEMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DESIGNÉ NON DANGEREUX.** **AVERTISSEMENT - RISQUE D'EXPLOSION. LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATÉRIEL INACCEPTABLE POUR LES EMBLEMENTS DE CLASSE I, DIVISION 2.** **AVERTISSEMENT - L'EXPOSITION DES RELAIS UTILISÉS DANS CET APPAREIL À DES PRODUITS CHIMIQUES RISQUE D'AFFECTER LEURS PROPRIÉTÉS D'ÉTANCHÉITÉ.**

In this operation instruction sheet, safety precautions are categorized in order of importance to Warning and Caution. The PS6R switching power supplies are designed for installation in a cabinet. This product cannot be used outside of equipment. Embed this product inside an appropriate enclosure before using the product.

WARNING

- Warning notices are used to emphasize that improper operation may cause severe personal injury or death.
- Do not use the switching power supply on control equipment in aircraft, trains, and atomic equipment where malfunction of the switching power supply may cause severe personal injury or threaten human life. These switching power supplies are designed for use on general electronic equipment such as communication equipment, instrumentation equipment, and industrial control equipment.
- Make sure that the operating conditions satisfy the values described in the catalog. Confirm the specification values before designing the equipment to use the switching power supply and before supplying power. Contact IDEC if you have any question.
- Do not modify or repair the switching power supply. Modification or repairing of the switching power supply by users may cause electrical shocks, damage, fire, malfunction, and other heavy accidents.
- Do not install the switching power supply where a human body may come into contact while power is supplied to the switching power supply. Do not touch the switching power supply during operation or immediately after turning off because some parts are heated and at a high voltage, causing burns or electrical shocks.
- Do not connect the output terminals or output lead wires together. Fire or damage may result.
- Include a protection in the equipment using the switching power supply in consideration of malfunction or damage of the load in case the switching power supply should fail. If the switching power supply should fail, a very high voltage drop may occur at the output terminals.
- Turn power off before wiring the switching power supply. Make sure of correct wiring. Incorrect wiring may cause electrical shocks or damage.
- For IT power distribution systems, make sure to install an external fuse into (N) AC input terminal for protect the N line.

CAUTION

- Caution notices are used where inattention might cause personal injury or damage to equipment.
- Make sure of the correct input voltage. Incorrect input voltage may cause blown fuses, fuming, or fire. Make sure of correct polarity of input and output terminals before supplying power to the switching power supply.
- In case of use IT power distribution systems, use PS6R together with appropriate appliances which have function to monitor earth fault.
- Do not touch any part inside the switching power supply. Prevent foreign objects from entering into the housing of the switching power supply. If the internal parts are touched by hand or foreign objects such as a paper clip or screw entering into the housing, accidents or damage may occur.
- Observe the temperature derating. The operating temperature is the temperature around the switching power supply. Use the switching power supply within the temperature derating curve. Otherwise, the internal temperature will rise and damage may be caused.
- For DC input, make sure to install an external fuse.
- Do not turn the output voltage adjustment beyond the limits. Otherwise, the switching power supply may be deteriorated and damage may be caused.
- When damage or malfunction should occur during operation, immediately turn power off and stop the switching power supply. Contact IDEC.
- Do not use or store the switching power supply in environments subjected to a large amount of vibrations or shocks. Otherwise, damage may be caused.
- When transporting equipment in which this product is embedded, enact sufficient measures to ensure that the product is fixed in place. Failing to do so may cause the equipment to be damaged or deformed.
- Do not install the switching power supply in environments exposed to direct sunlight, iron particles, oil splashes, chemicals, and hydrogen sulfide. Do not use the switching power supply in humid places such as basements or greenhouses or in low-temperature places such as in freezers or in front of cooler outlet.

1 Safety Standard Conditions

Applicable standards: UL508(UL Listing), ANSI/ISA 12.12.01(UL Listing), CSA C22.2 No.107.1(c-UL Listing), CSA C22.2 No.213(c-UL Listing), EN60950-1, EN50178

EMC : EN61204-3 ClassB (*1)
Marine standards : ABS, DNV-GL(Legacy GL) (*1), (*2)

*1 When using the Power Supply Unit (PS6R-F24, -G24) in combination with the Accessory Unit (PS9Z-6RM3, -6RM4, -6RM6), wrap each Accessory Unit output wire once around a ferrite core (KITAGAWA INDUSTRIES CO., LTD. : RFC-13MA).
*2 For mounting, make sure to use mounting bracket PS9Z-6RF2. When using the Power Supply Unit PS6R-J24, Noise Filter (SHAFFNER GROUP : FN2070-10-06) should be connected to the input terminal.

2 Type No. Guide

Power Supply Unit		Accessory Unit (DC-DC Converter Unit)	
PS6R-□24	Output Voltage Code 24 : 24V	PS9Z-6RM□	Output Voltage Code 1 : +5V
	Output Wattage Code F : 120W		2 : +12V
	G : 240W		3 : ±5V
	J : 480W		4 : ±15V
			5 : +5V/+12V
			6 : ±12V

3 Conditions

Operating temperature: -10 to +70°C
(without freezing, output derating and certified temperatures, see "6. Output Derating")
Note) Refer to "6. Output Derating" for authorized operating temperature by each standard.
Storage temperature: -25 to +75°C (without freezing)
Operating/storage humidity: 20 to 90% RH (without condensation)
Altitude: Up to 2000m above sea level
For use in Pollution degree 2 environment.

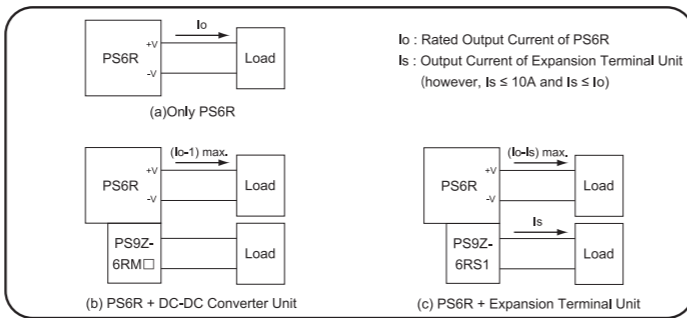
4 Rating

Use the switching power supply with the output wattage within the values shown below.
Leakage current: 1.0mA max

Type No.	Input Voltage V AC	Input Current A	Input Frequency Hz	Output Voltage V DC	Output Current Max. A	Output Wattage Max. W
PS6R-F24	100 - 240	1.4	50/60	21.6 - 26.4	5.0	120
PS6R-G24	100 - 240	2.7	50/60	21.6 - 26.4	10.0	240
PS6R-J24	100 - 240	5.5 - 2.2	50/60	21.6 - 26.4	20.0	480

●Accessory Unit
Use the Accessory Unit with the output wattage within the values shown below.
When the DC-DC Converter Unit (PS9Z-6RM□) is in use, reduce the output current from the PS6R by 1A [see Fig.1(b)].
When the Expansion Terminal Unit (PS9Z-6RS1) is in use, ensure that the total output current and total output power of the PS6R and the Expansion Terminal Unit do not exceed the rated output current and rated output power of the PS6R [see Fig.1(c)].

Type No.	Input Voltage V AC	Input Current A	Input Frequency Hz	Output Voltage V DC	Output Current Max. A	Output Wattage Max. W
PS9Z-6RM1				5	2.0	10
PS9Z-6RM2				12	1.0	12
PS9Z-6RM3				5	1.0	10
PS9Z-6RM4				-5	1.0	10
PS9Z-6RM5				15	0.4	12
PS9Z-6RM6				-15	0.4	12
PS9Z-6RM5				5	1.0	11
PS9Z-6RM6				12	0.5	12
PS9Z-6RS1				-12	0.5	12
PS9Z-6RS1				24	10.0	-



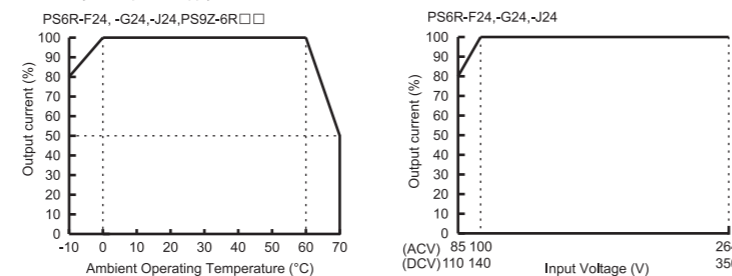
5 Allowable Input Range

Use the switching power supply within the input voltage range shown below. (Not compliant with safety standards) For DC input, make sure to install an external fuse.

- Power Supply Unit
 - 85 to 264VAC / 110 to 350VDC
 - (However, derating is necessary when the voltage is between 85 and 100VAC and between 110 and 140VDC. For details, see "6. Output Derating.")
- Accessory Unit
 - Connect these to the Power Supply Unit (PS6R). The accessory units cannot be used as standalone units.

6 Output Derating

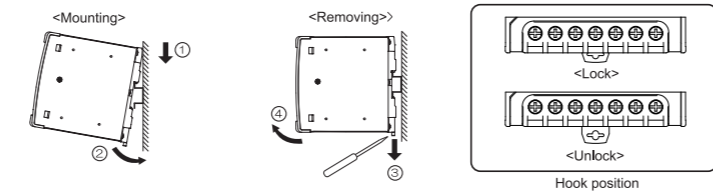
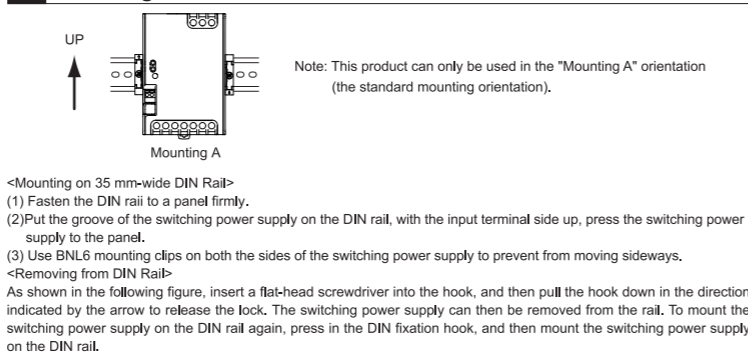
- Derating according to the ambient operating temperature
The ambient operating temperature is the temperature in the vicinity of the power supply.
- Derating according to the input voltage (Ta = 25°C)



Note: In order to comply with UL508, ANSI/ISA 12.12.01, CSA C22.2 No.107.1, CSA C22.2 No.213, EN60950-1, EN50178 standards, the ambient operating temperature is as below.

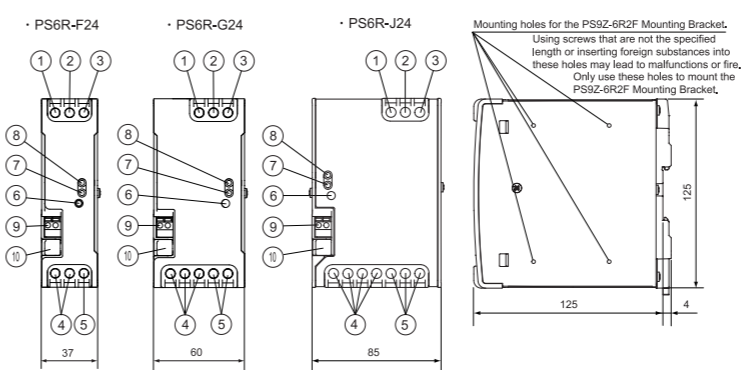
Type No.	Ambient Operating Temperature (°C)	
	UL508, ANS/ISA 12.12.01, CSA C22.2 No.107.1, CSA C22.2 No.213	EN60950-1, EN50178
PS6R-F24,-G24	60	60
PS6R-J24	55	60
PS9Z-6RM□□	60	60

7 Mounting

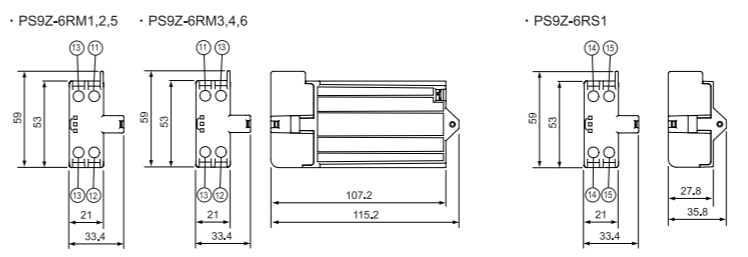


8 Terminal Marking and Description

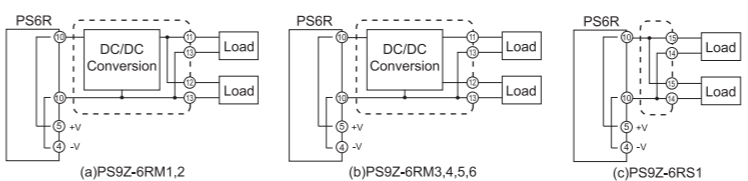
- Power Supply Unit
 - ①(L) AC Input Terminal
 - ②(N) AC Input Terminal
 - ③(⊕) Ground Terminal (Protective earthing terminal)
 - ④(-V) DC Output Terminal
 - ⑤(+V) DC Output Terminal
 - ⑥(VR.ADJ) Output Voltage Adjustment
 - ⑦(DC ON) Operation Indicator
 - ⑧(DC LOW) Output Low Indicator
- ⑨DC OK Output (The contact is turned on when the power supply starts operating and is turned off when the output voltage drops.)
- ⑩Accessory Unit Connection Terminal (When using an accessory unit, remove the cap and insert the accessory unit into this terminal.)



- Accessory Unit (DC-DC Converter Unit)
 - ⑪DC Output Terminal
 - ⑫DC Output Terminal
 - ⑬DC Output Terminal
- Accessory Unit (Expansion Terminal Unit = PS9Z-6RS1)
 - ⑭(-V) DC Output Terminal
 - ⑮(+V) DC Output Terminal



- Terminals ⑪ and ⑫ of the PS9Z-6RM1 and PS9Z-6RM2 DC-DC Converter Units are connected internally. Ensure that the total output current of ⑪ and ⑫ does not exceed the rated output current of each DC-DC Converter Unit.
- Terminal ④ of the PS6R and terminal ⑬ of the DC-DC Converter Unit are connected internally.
- Terminal ④ of the PS6R and terminal ⑭ of the Expansion Terminal Unit as well as terminal ⑤ of the PS6R and terminal ⑮ of the Expansion Terminal Unit are connected internally.
- For models that have multi outputs, there is a difference in the times required for the outputs to start, so be sure to test the operation with the actual equipment before putting the switching power supply into use.

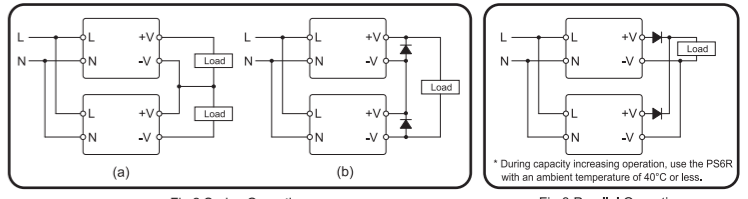


9 Power Supply Installation

- Make sure of sufficient convection in consideration of heat radiation. Do not block the opening of the switching power supply.
- Keep at least 20mm clearance around the switching power supply, except for the opening.
- When the derating is in question, provide forced air-cooling.
- Connect ground terminal to a proper ground completely.
- Use minimum 60 C wire, copper wire only.
- In addition, refer to the wire type given Table.1 to select a wire type and a number of wires. (Comply with UL508, CSA C22.2 No.107.1 use the wire type given Table.1.)
- Terminal tightening torque 0.8 N·m.
- Adjusting the Output Voltage
The output voltage can be adjusted within ±10% of the rated output voltage using the VR.ADJ (output voltage adjustment). Note that the overvoltage protection may work when the output voltage is raised.
- Overcurrent Protection
When an overcurrent flows due to an overload, the output voltage drops. When the load is reduced to a normal level, the normal output voltage is restored. Note that an overload or short-circuit condition continuing for an extended period of time will deteriorate or damage internal elements.
- Overvoltage Protection
(PS6R) The PS6R uses a manual reset method after power shutdown. To recover from output voltage drop due to an overvoltage, turn off the AC input, and turn on the AC input after approximately 1 minute.
(PS9Z-6RM□) An output voltage drop caused by overvoltage occurring will damage the internal components. If this occurs, contact IDEC.
- Insulation Resistance and Dielectric Strength Tests
When making these tests, connect the AC input terminals together and the output + and - terminals together. Rapid application and interruption of the test voltage will generate a surge voltage, which may damage the switching power supply. When an accessory unit is in use, short the accessory unit output to the PS6R output (+ and -).
- Series Operation
Two PS6R switching power supplies can be connected in series. [See Fig.2] When connecting the switching power supplies in series shown in Fig.2(b), insert a Schottky diode in the output line of each switching power supply. DC-DC Converter Units cannot be operated in series. Select a Schottky diode that has a reverse voltage that is greater than or equal to the output voltage of the power supply and that has a current that matches the used rated current.
- Parallel Operation
The PS6R Power Supply Unit supports both backup operation and capacity increasing operation. DC-DC Converter Units cannot be operated in parallel. When the PS6R is being used in capacity increasing operation, pay attention to the following notes.
(1) Use the PS6R at an ambient temperature of 40°C or less.
(2) During parallel operation, direct connections cannot be made to the output. Connect diodes to the output side of each power supply [see Fig.3].
(3) Match the voltage of the output terminals of each power supply. Make the voltage difference between power supplies 30mV or less.
(4) Use load wires that have the same conducting wire diameter and wire length.
(5) Only set the output voltage high enough to make up for the falling part of the forward voltage (VF) of the diodes.
(6) Apply input at the same time.
(7) Select a diode that has reverse voltages that are greater than or equal to the output voltage of the power supply and that has currents that are greater than or equal to three times the output current of the power supply. Use an appropriate heat sink in consideration of the heat generated by the diodes.

Table.1

Type No.	Terminal	Wire Size, AWG and No. of wire	Wire Type	Torque, N·m(Nm)
PS6R-F24 PS6R-G24	Input	18 - 14 AWG, 1wire	Cu, unprepared, solid/stranded	7.0(0.8)
	Output	18 - 14AWG, 1wire, (18AWG - 7A, 16AWG - 10A, 14AWG - 15A)	Cu, unprepared, solid/stranded	7.0(0.8)
PS6R-J24	DC OK output	22 - 14AWG, 1wire (Stripped wire length: 6 to 7mm)	Cu, unprepared, solid/stranded	-
	Input	18 - 14AWG, 1wire	Cu, unprepared, solid/stranded	7.0(0.8)
	Output	18 - 14AWG, 2wires use the same wire size for each terminal (18AWG - 7A, 16AWG - 10A, 14AWG - 15A)	Cu, solid/stranded, used with Listed pressure terminal connectors, such as ring or fork types, on the end of the conductor before attachment to the wiring terminals at the terminal block	7.0(0.8)
PS9Z-6RM□	DC OK output	22 - 14AWG, 1wire (Stripped wire length: 6 to 7mm)	Cu, unprepared, solid/stranded	-
	Output	18 - 14AWG, 1wire, (18AWG - 7A, 16 AWG - 10A, 14AWG - 15A)	Cu, unprepared, solid/stranded	7.0(0.8)



10 Using an Accessory Unit

- See the following figures when an accessory unit is in use.
- Remove the cap from the PS6R. (After the cap is removed, store it in a safe place.)
 - Insert the accessory unit into the accessory unit connection terminal of the PS6R.
 - Use the fixation screw to firmly fix the accessory in place in the PS6R. Recommended tightening torque: 0.5 to 0.6N·m
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11 Using a Mounting Bracket

- See the following figures when a Mounting Bracket (option) is being attached to the PS6R. If it can be assumed that the equipment in which this power supply is embedded will be subject to large vibrations or shocks, we recommend that the equipment be attached to a DIN rail or that the PS9Z-6RF2 be used.
- <PS9Z-6R1F>
① Push in the clamp of PS6R to the LOCK position. Insert A part of the Mounting Bracket into position B on the bottom of the switching power supply housing.
- <PS9Z-6R2F>
Use the included fixation screws (M3 × 6, Flat Head Screw) to attach the Mounting Bracket to the PS6R by inserting screws into the four screw holes. Recommended tightening torque: 0.5 to 0.6N·m
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