



# PS241/PS242 (24V Power Supply)

## First Step Guide    Second Edition

Thank you for purchasing our product.  
Make sure to read the Safety Guide and detailed Instruction Manual (CD) included with the product in addition to this First Step Guide to ensure correct use.  
This Instruction Manual is original.

**Warning :** Operation of this equipment requires detailed installation and operation instructions which are provided on the CD Manual included in the box this device was packaged in. It should be retained with this device at all times.  
A copy of the CD Manual can be requested by contacting your nearest IAI Sales Office listed at the back cover of the Instruction Manual or on the First Step Guide.

- Using or copying all or part of this Instruction Manual without permission is prohibited.
- The company names, names of products and trademarks of each company shown in the sentences are registered trademarks.

### Product Check

This product is comprised of the following parts if it is of standard configuration.  
If you find any fault in the contained model or any missing parts, contact us or our distributor.

#### 1. Parts (The option is excluded.)

No.	Part Name	Model	Remarks
1	24V Power Supply Main Unit	Refer to "2. How to read the model plate", "3. How to read the model No."	
Accessories			
2	First Step Guide (This Manual)		
3	Instruction Manual (CD)		
4	Safety Guide		

#### 2. How to read the model plate

Model	MODEL PS241
Serial No.	SERIAL No. 800061910    A1    MADE IN JAPAN

#### 3. How to read the model No.

**PS241**  
[Input Power]  
1: 100VAC  
2: 200VAC

#### 4. Instruction manuals related to this product, which are contained in the instruction manual (CD)

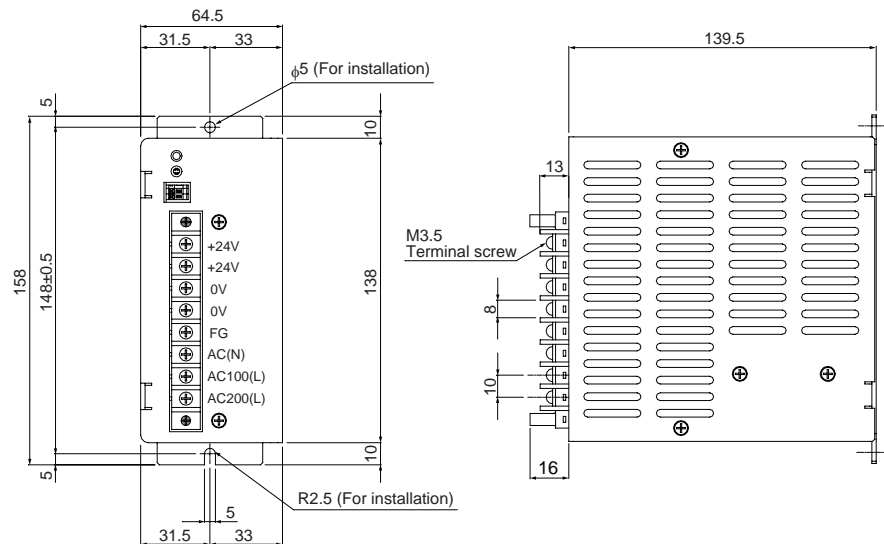
No.	Name	Manual No.
1	PS241 / PS242 24V Power Supply Instruction Manual	ME0129

### Basic Specifications

#### Specifications

Specification Item	100VAC Specification PS241	200VAC Specification PS242
Rated Voltage DC Output	24V±10% (fluctuates depending on duty)	
Rated DC Current Output	8.5A	
Peak Maximum DC Current Output	17A	
Rated Output Wattage	204W	
Efficiency	80%	
Rated Input Voltage (frequency)	100 to 115VAC (50/60Hz)	200 to 230VAC (50/60Hz)
Input Voltage Range	90 to 125VAC	180 to 250VAC
Input Current	3.5A (when total duty of 100VAC is applied)	1.8A (when total duty of 200VAC is applied)
Output Holding Time	20[msec] (Condition; ambient temp. 25°C, rated input and output)	
Protection Circuit	Over current protection, over voltage protection, over temperature protection, over load protection	
Parallel Operation	Applicable	
Operation Ambient Temp.	0 to 50°C (with derating)	
Operation Ambient Humidity	30 to 85%RH (non-condensing)	
Cooling Method	Natural air-cooling	
Voltage Durability	Output – input ... 2000VAC 1min. Input – housing ... 2000VAC 1min.	
Insulation Strength	Output – housing ... 100MΩ min. at 500VDC	
Circuit System	Line-commutated flyback converter	
Mass	Approx. 0.9kg	

### External Dimensions



### Installation Environment

Do not use this product in the following environment.

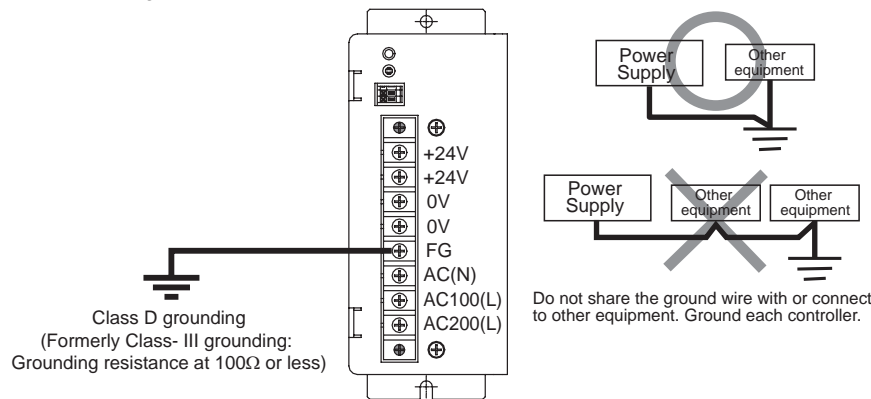
- Location where the surrounding air temperature exceeds the range of 0 to 40°C
- Location where condensation occurs due to abrupt temperature changes
- Relative humidity less than 10%RH or greater than 85%RH
- Location exposed to corrosive gases or combustible gases
- Location exposed to significant amount of dust, salt or iron powder
- Location subject to direct vibration or impact
- Location exposed to direct sunlight
- Location where the product may come in contact with water, oil or chemical droplets

When using the product in any of the locations specified below, provide a sufficient shield.

- Location subject to electrostatic noise
- Location where high electrical or magnetic field is present
- Location with the mains or power lines passing nearby

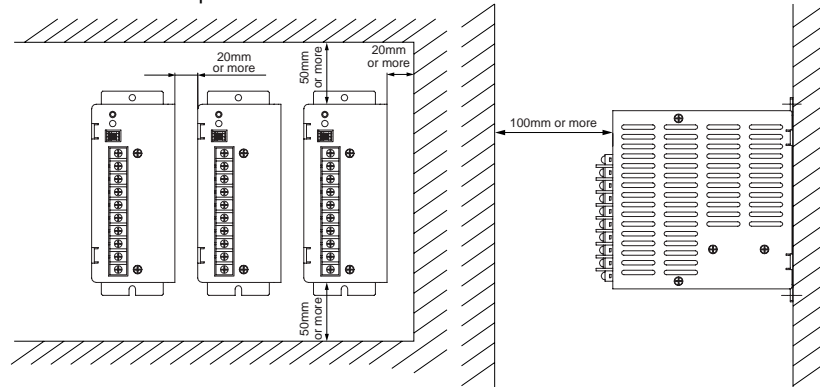
### Installation and Noise Elimination

#### 1. Grounding

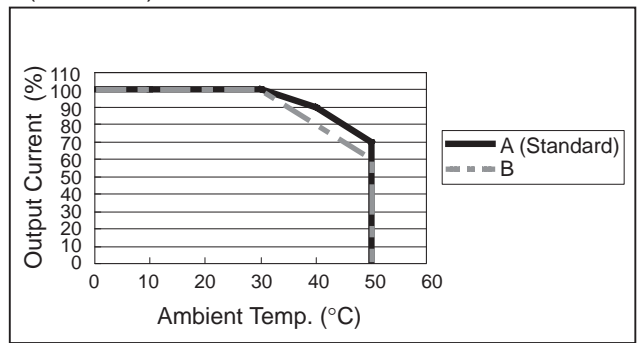
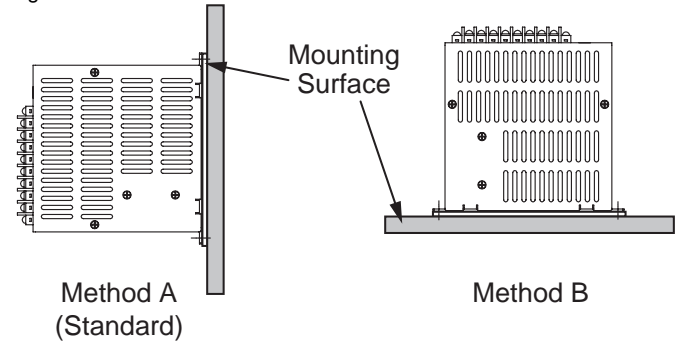


#### 2. Heatsink and Mounting Method

This is a natural air-cooling type power supply. Mount the unit on a wall to make it vertical as shown in the picture below.

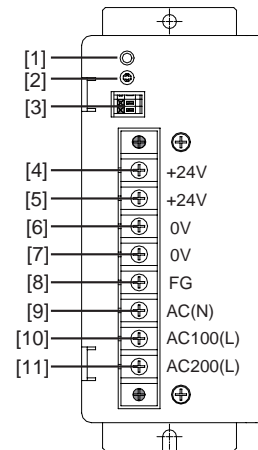


Both methods A (standard) & B below are available as a mounting method, however, the characteristics for the output current relevant to the temperature will differ for each way. Use within the range of its characteristics for each method.



**Warning:** The main housing of the product gets so hot that it sometimes gives you a burn as it works as a heat sink.  
Do not touch while the power is on, or even after the power is off until the heat calms down.

### Name and Function of Each Part



- RDY display (RDY)  
It is illuminated in normal operation.  
[Refer to "RDY Display (RDY), RDY Output Signal (RDYOUT)" for details.]
- Variable dial to set over load detection level  
For manufacturer's use only. Do not remove the seal.
- RDY output signal  
It turns on (electrically conducted) in normal operation.  
[Refer to "RDY Display (RDY), RDY Output Signal (RDYOUT)" for details.]
- [5] +24V output terminal  
\*(4) and (5) are connected internally.
- [6][7] 0V output terminal  
\*(6) and (7) are connected internally.
- Frame ground terminal  
It is the ground terminal that is connected to the power supply main housing.
- AC input terminal  
Input terminal common for 100VAC and 200VAC types.
- [10] AC input terminal (for 100VAC)  
Input terminal for 100VAC type.
- [11] AC input terminal (for 200VAC)  
Input terminal for 200VAC type.

**Caution:** Do not plug in for 200VAC type.

**Caution:** Do not plug in for 200VAC type.

(Note) Connect the power supply as follows;  
for 100VAC input specification, (9) and (10), and  
for 200VAC input specification, (9) and (11).  
They cannot be used in common for each specification.

## RDY Display (RDY) and RDY Output Signal (RDYOUT)

In a normal operation, RDY display should be illuminated and RDY output signal should be turned on (electrically conducted). If these RDY display light and RDY output signal are off, lighten the duty or add another power supply. Take note that there are also other considerable causes that the RDY display light and RDY output signal are off as listed below.

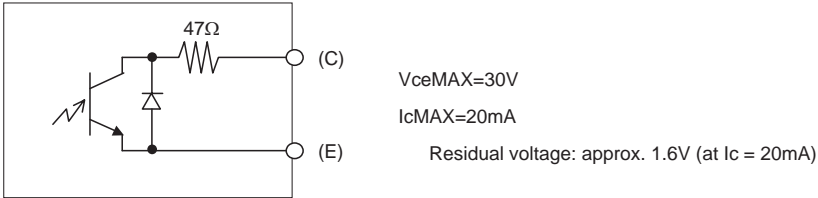
- Output is stopped due to the effect of the over temperature protection circuit, over voltage protection circuit, etc.
- Input power is off or low

Also, there will be a failure in normal operation when the over current protection is working.

RDY display and RDY output signal are linked to each other.

Power Status	RDY Output Signal	RDY Display
<ul style="list-style-type: none"><li>• In normal operation (when the duty ratio is lower than the setting value)</li></ul>	ON	Illuminating
<ul style="list-style-type: none"><li>• Duty ratio exceeds the setting value</li><li>• Output is stopped</li><li>• Power is not input or low</li><li>• Over current detection circuit is Working)</li></ul>	OFF	OFF

RDY output signal is insulated by a photocoupler and is the open-collector output system.



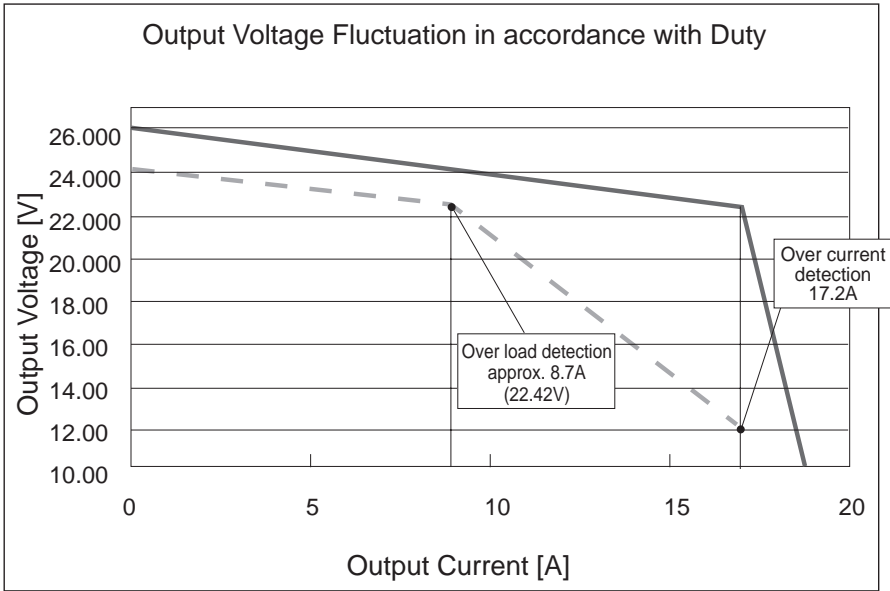
(Note): If connecting this terminal in series, consider the residual voltage.

## Output Voltage

This power supply is able to be used in a parallel operation, and the output voltage fluctuates within the range of 24V±10% even in a normal operation.

The voltage is set to around 25.8V at no duty. This voltage fluctuation does not influence the operation of IAI 24V controller at all.

This power supply changes the voltage within the area between the solid line and the broken line below in response to the load.



## Protective Functions

### (1) Over Current Protection Circuit

The voltage suddenly drops when the current more than the rated value is output (includes short circuit). Power output automatically recovers when the over current condition is cancelled.

There is a case that the over current protection circuit works due to the in-rush current caused by turning on multiple controllers at the same time.

Described above is concerned as the cause of the phenomenon of sudden voltage drop occurring when turning on each actuator controller, emergency stop being cancelled, and so on.

(What happens as the influence of the voltage drop is that it takes comparatively long time at the start-up of the controllers or canceling the emergency stop.)

In the case this is occurred, it is necessary to boost the controllers one by one, or add another power supply.

### (2) Over Voltage Protection Circuit

The over voltage protection circuit works when the output voltage rises abnormally high.

If the voltage continues to rise, it shuts down the output. To recover, shut down the input power first, leave it for approximately 2 minutes, and then input the power again.

When the over voltage protection works, internal devices may break. If output does not work properly even though trying to turn on the power several times, it may require a repair.

### (3) Over Temperature Protection Circuit

The over temperature protection circuit detects an abnormal rise of the ambient temperature and internal temperature (approx. 80°C), and shuts down the output.

To recover, shut down the input power first, leave it for a while till it cools down, and then input the power again. If the over temperature protection works often, lower the ambient temperature and the duty ratio.

### (4) Over Load Detection

When the over load detection circuit works, the output drops with accordance with the duty. Output will recover with a lower duty. It operates when the current of approximately 8.7A or more continues to flow.

## Parallel Operation

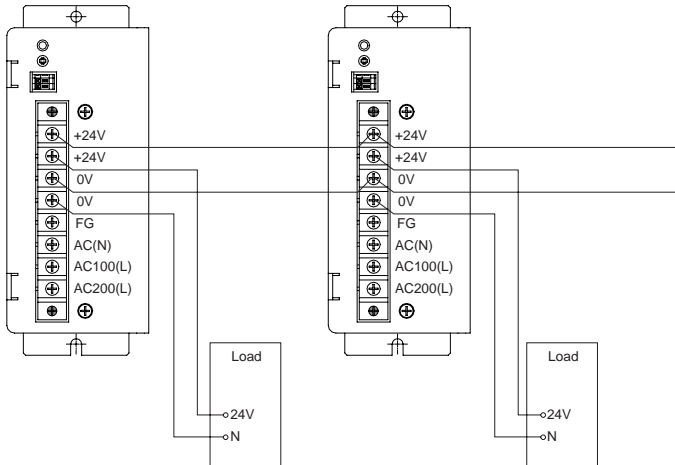
Parallel operation is available under the following conditions.

- Parallel operation is allowed up to 5 units. However, do not connect a power supply unit other than IAI 24V power supply to the parallel operation.
- 2 terminals for each of positive side and negative side as the output terminals are provided. Use one terminal for the parallel connection, and the other for the connection to the load.
- Turn on all the connected power supply units at the same time for the parallel operation. If the duty on one unit is too high, the over current detection circuit starts to work and may cause a failure in operation.
- Consider the connection of the power supplies to distribute the duty evenly to all the units so that a high duty is not applied on a single unit. Output voltage may drop with the in-rush current when the power is turned on.
- Select a cable which has AWG 18 (0.75sq) or more thickness for the load and transfer cables and the same thickness for all the cables considering the current. And, layout as short as possible.
- When connecting multiple units of power supply in parallel, the derating of output current is approximately 90%. Perform a parallel connection with confirming the current capacity.
  - 1 unit..... Rated 8.5A
  - 2 units..... Rated 15.3A (8.5A×2×0.9)
  - 3 units..... Rated 22.95A (8.5A×3×0.9)

\* When turning on the power with no load, there is a case that a power supply does not turn on the RDY display and RDY output signal. The power supply will operate in normal by connecting the load.

\* Series connection is not available.

- Separate the lines for the input power from the lines on the load side. Twist each bunch to improve the noise performance to the surrounding equipment.



Parallel Connection

## Simple Troubleshooting

Contents	Treatment
Voltage does not output	<ul style="list-style-type: none"><li>• Is the connected input voltage within the specification?</li><li>• Any short circuit or grounding fault on the output circuit?</li><li>• Time delay too short after over voltage or over temp protection activated.</li><li>• Did you turn on the power supply units at the same time for parallel operation?</li><li>• Did you check that the ambient temperature is not high?</li><li>• Is the load too big?</li></ul>
Output voltage is low.	<ul style="list-style-type: none"><li>• Is the load too big?</li></ul>
RDY display does not illuminate.	<ul style="list-style-type: none"><li>• Is the load too big?</li></ul>

**IAI**  
Quality and Innovation

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