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# 1 Functions

## 1.1 Input Voltage Range

- The range is from 85VAC to 264VAC  
In cases that conform with safety standard, input voltage range is 100VAC to 240VAC (50/60Hz).
- Power factor correction is not built-in.
- If the input voltage is outside the rated range, the power supply may malfunction. Operate in accordance within in the specifications.
- If the input voltage changes suddenly, the output voltage may go outside the specifications. Consult us for more details.

## 1.2 Inrush Current Limiting

- Inrush current protection is built-in.
- If you need to use a switch on the input side, select one that can withstand an input inrush current.
- Thermistor is used in the inrush current limiting circuit. When you turn the power supply on and off repeatedly, have enough intervals for the power supply to cool down before being turned on again.

## 1.3 Overcurrent Protection

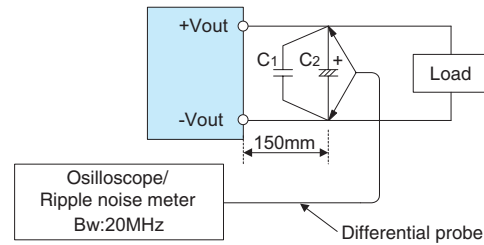
- Overcurrent protection is built-in. It works at more than 105% of the rated output current. The power supply recovers automatically when the overcurrent condition is removed. Do not use the power supply under a short-circuit or overcurrent condition.
- Hiccup Operation Mode  
When overcurrent protection works and the output voltage drops, the output voltage goes into Hiccup mode so that the average output current can decrease.

## 1.4 Overvoltage Protection

- An overvoltage protection circuit is built-in. If the overvoltage protection circuit is activated, shut down the input voltage, wait more than 3 minutes and turn on the AC input again to recover the output voltage. Recovery time varies depending on such factors as input voltage value at the time of the operation.
- Remarks :** Please avoid applying a voltage exceeding the rated voltage to an output terminal. Doing so may cause a power supply to malfunction or fail. If you cannot avoid doing so, for example, if you need to operate a motor, etc., please install an external diode on the output terminal to protect the unit.

## 1.5 Output Ripple Noise

- Output ripple noise may be influenced by the measuring environment.  
The measuring method shown in Fig. 1.1 is recommended.



C1 : Film capacitor 0.1  $\mu$ F  
C2 : Aluminum electrolytic capacitor 47  $\mu$ F

Fig.1.1 Measuring method of Ripple Noise

**Remarks :** When measuring output ripple noise with an oscilloscope, do not let the oscilloscope's GND cable cross the magnetic flux from the power supply. Otherwise there may be electrical potential generated on the GND cable and the measuring result may not be accurate.

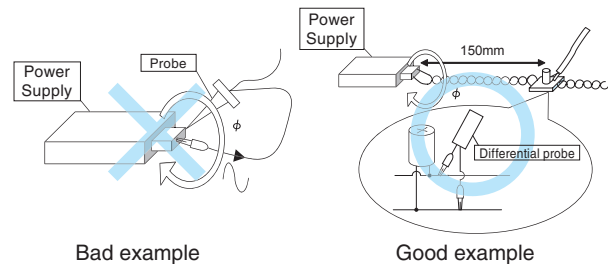


Fig.1.2 Example of measuring output ripple noise

## 1.6 Output voltage adjustment range

- Adjustment of output voltage is possible by using option “-Y”.  
Please refer to instruction manual 5.1.

## 1.7 Isolation

- For a receiving inspection, such as Hi-Pot test, gradually increase (decrease) the voltage for the start (shut down). Avoid using Hi-Pot tester with the timer because it may generate voltage a few times higher than the applied voltage, at ON/OFF of a timer.

## 1.8 Low Power Consumption

- The power supplies are designed for low power consumption at no load.
- When the load factor is low ( $I_o$ :0-20%typ), the switching power loss is reduced by burst operation, which will cause ripple and ripple noise to go beyond the specifications.
- Ripple noise during burst operation will change depending on the input voltage and the output current. Consult us for advice on how to reduce ripple noise.
- When there is a need to measure the stand-by power consumption, measure it by using the average mode of the tester. The measuring environment may influence the result. Consult us for more details.

## 2 Series Operation and Parallel Operation

### 2.1 Series Operation

■ The power supplies can be used in series connection. The output current in series operation must be lower than the rated current of the power supply with the lowest rated current among the power supplies connected in series. Make sure no current exceeding the rated current flows into a power supply.

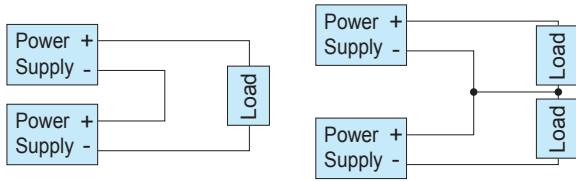


Fig.2.1 Examples of connecting in series operation

### 2.2 Parallel Operation

■ Redundant operation is possible by wiring as shown below.

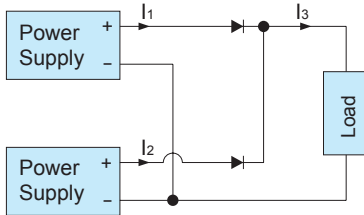


Fig.2.2 Example of redundancy operation

■ Even a slight difference in output voltage can affect the balance between the values of  $I_1$  and  $I_2$ .

Make sure the value of  $I_3$  does not exceed the rated output current of the power supply.

$$I_3 \leq \text{the rated current value}$$

■ Parallel operation is not possible.

## 3 Life Expectancy and Warranty

### ■ Expected Life

The expected life of the power supply is shown below.

Table 3.1 Expected lifetime

Cooling Method	Average ambient temperature	Expected lifetime [years]	
		Load factor $l_o \leq 75\%$	Load factor $75\% < l_o \leq 100\%$
Convection	Ta = 30°C or less	5	5
	Ta = 40°C	5	3

## 4 Ground

■ When installing the power supply with your unit, ensure that the input mounting hole FG is connected to safety ground of the unit. Except for -E option.

## 5 Options and Others

### 5.1 Outline of Options

● -E

• The -E option is for IEC Class II equipment.

● -T

• The -T Option has changed the I/O interface from the connector to the terminal block Type.

• Please contact us for details about appearance.

● -Y

• The -Y option allows for the output voltage adjustment and output voltage setting by the built-in potentiometer.

Table 5.1 Output voltage adjustment range and output voltage setting

Output voltage	Output voltage adjustment range [V]	Output voltage setting [V]
5V	4.5 to 5.5	5.00 to 5.15
7.5V	6.75 to 8.25	7.50 to 7.80
12V	10.8 to 13.2	12.00 to 12.48
15V	13.5 to 16.5	15.00 to 15.60
24V	21.6 to 26.4	24.00 to 24.96
36V	32.4 to 39.6	36.00 to 37.44
48V	43.2 to 52.8	48.00 to 49.92

### 5.2 Medical Isolation Grade

■ UMA series meets 2MOPP

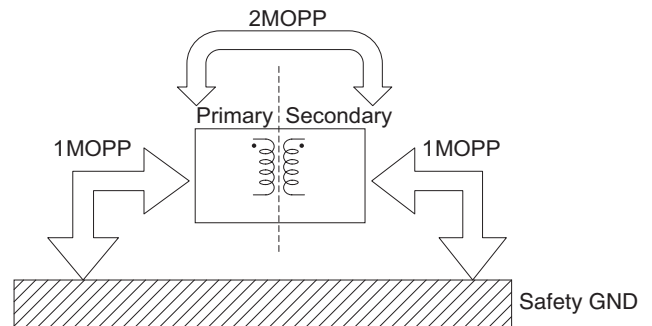


Fig.5.1 Medical Isolation Grade

### 5.3 Others

- If large capacitors are connected to the output terminals (load side), the output voltage may stop or become unstable. Consult us for advice.
- If the power supply is turned off at no load, the output voltage remains for a few minutes as the power supply is designed for low internal power consumption. Be careful of electrical shock at the time of maintenance.
- This power supply is manufactured by SMD technology. The stress to PCB like twisting or bending causes the defect of the unit, so handle the unit with care.
  - Please tighten screws in all mounting holes.
  - Install it so that PCB may become parallel to the clamp face.
  - Avoid dripping unit.