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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).

- If the input voltage is outside the rated range, the power supply may malfunction. Operate in accordance with 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

- The specified ripple noise are measured by the method introduced in Fig.1.1.
- Capacitors  $C_0$  and  $C_1$  should be hybrid electrolytic capacitors, ceramic capacitors, or other capacitors with good high frequency characteristics.

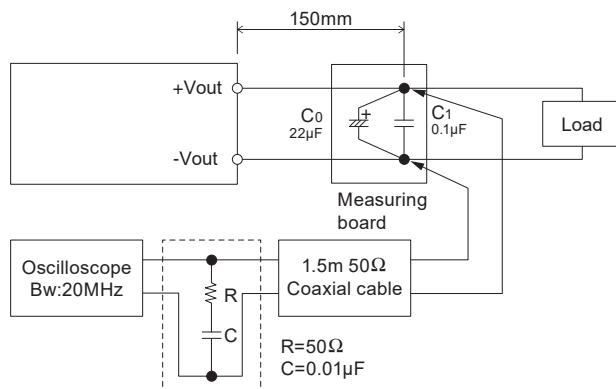
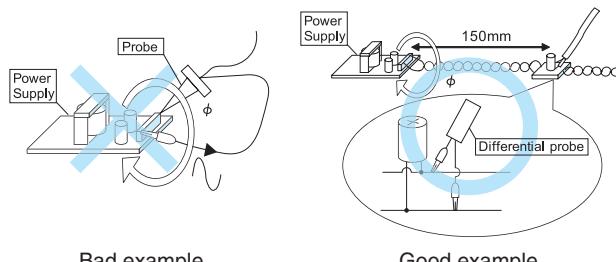


Fig.1.1 Measuring method of Ripple Noise

### Remarks :

When GND cable of probe with flux of magnetic force from power supply are crossing, ripple noise might not be measured correctly.

Please note the measuring environment.



Bad example

Good example

Fig.1.2. Example of measuring output ripple noise

## 1.6 Output Voltage Adjustment Range

- The output voltage can be adjusted within the specified range by turning the built-in potentiometer clockwise (up) or counterclockwise (down)
- Please operate the potentiometer slowly.

## 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, the switching power loss is reduced by burst operation, which will cause 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.

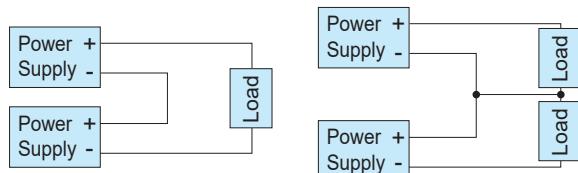


Fig.2.1 Examples of connecting in series operation

### 2.2 Parallel Operation

■ Redundant operation is possible by wiring as shown below.

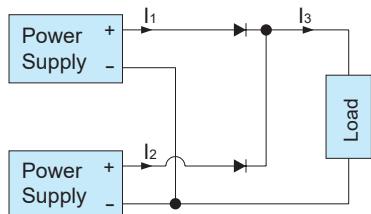


Fig.2.2 Example of redundancy operation

■ 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

■ Warranty

Table 3.1 Warranty

Cooling Method	Average ambient temperature	Warranty [years]	
		Load factor $Io \leq 75\%$	Load factor $75\% < Io \leq 100\%$
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.

## 5 Options and Others

### 5.1 Outline of Options

#### ●-C

With the -C option, the internal PCB has a conformal coating for anti-humidity.

#### ●-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.

### 5.2 Medical Isolation Grade

■ UMHA series meets 2MOPP

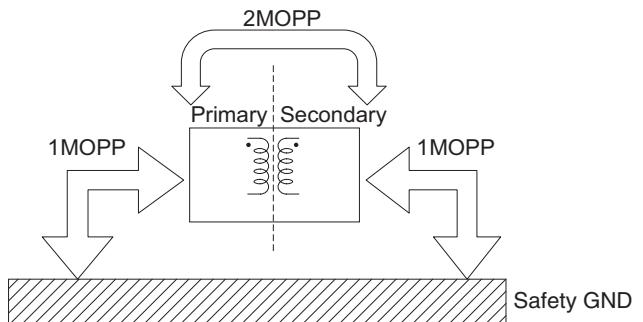


Fig.5.1 Medical Isolation Grade

### 5.3 Others

■ As the UMHA series is classified as a component power supply, it cannot be declared an applied part, and therefore cannot be declared CF rated. However, the UMHA Series has been evaluated for and meets the requirements related for use in CF applications.

■ 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.