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# 1 Functions

## 1.1 Fuse

■ For the WMA series, AC (L) and AC (N) both have a fuse built in.

## 1.2 Input Voltage Range

- Power factor correction is not built-in.
- If the input voltage is outside the rated range, the power supply may malfunction operate in accordance with the specifications and/or start hunting or fail.
- If the input voltage changes suddenly, the output voltage may go outside the specifications. Consult us for more details.
- The power supply can work at the input voltage dip with the derating (Excluding WMA350H).

Table 1.1 SEMI F47-0706 Maximum output load factor

Voltage Dip	duration [ms]	WMA35F	WMA75F	WMA150H
200VAC→100VAC	200	100%	100%	90%
200VAC→140VAC	500	100%	100%	100%
200VAC→160VAC	1000	100%	100%	100%

### ● WMA35F WMA75F

■ The range is from 85VAC to 264VAC  
In cases that conform with safety standard, input voltage range is 100VAC to 240VAC (50/60Hz).

### ● WMA150H WMA350H

■ The rated input voltage range of the power supply is AC85-132V/AC170-264V (See SPECIFICATIONS for more details).  
■ To comply with the safety standards, use the power supply with the input voltage range of AC85-132V/AC170-264V (50/60Hz).

## 1.3 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.

## 1.4 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.

## 1.5 Overvoltage Protection

- Overvoltage protection is built-in.  
**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.

### ● WMA35F WMA75F WMA150H

■ If the overvoltage protection circuit is activated, shut down the input voltage, wait at least 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.

### ● WMA350H

■ The unit automatically recovers when the fault condition is removed.

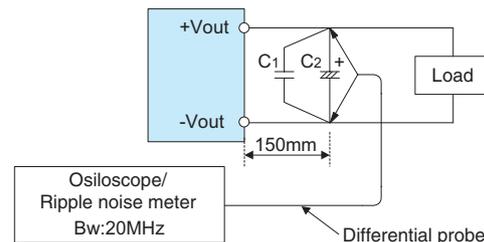
## 1.6 Thermal Protection

### ● WMA350H

- Thermal protection is built-in.  
Thermal protection will work under the following conditions and the power supply will shut down.  
① When the operating temperature and the output current greatly exceed the derating curve.  
② When the built-in cooling fan stops or the air flow from the fan is obstructed.  
If thermal protection works, switch off the input voltage and eliminate the conditions causing thermal protection to work. Allow enough time for the unit to cool off before switching on the input voltage again to recover the output voltage.

## 1.7 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.

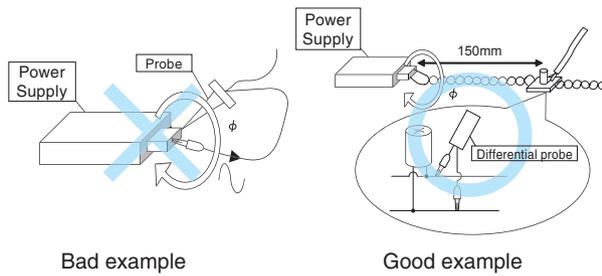


Fig.1.2 Example of measuring output ripple noise

### 1.8 Output Voltage Adjustment

- 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.

### 1.9 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.

### 1.10 Low Power Consumption

●WMA35F WMA75F WMA150H

- These 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 Parallel Operation

- Redundant operation is possible by wiring as shown below.

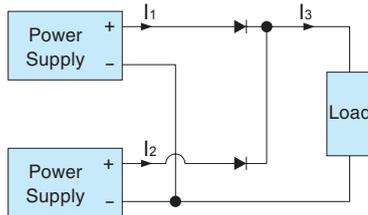


Fig.2.1 Example of redundancy operation

- 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.  
 $I_3 \leq$  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.

●WMA35F WMA75F WMA150H

Table 3.1 Expected lifetime (WMA35F WMA75F WMA150H)

Cooling Method	Average ambient temperature	Expected lifetime [years]	
		Load factor $I_o \leq 75\%$	Load factor $75\% < I_o \leq 100\%$
Convection	$T_a = 30^\circ\text{C}$ or less	5	5
	$T_a = 40^\circ\text{C}$	5	3

●WMA350H

Table 3.2 Expected lifetime (WMA350H)

Cooling Method	Average ambient temperature	Expected lifetime [years]	
		Load factor $I_o \leq 75\%$	Load factor $75\% < I_o \leq 100\%$
Forced air cooling (internal fan)	$T_a = 40^\circ\text{C}$ or less	5	5
	$T_a = 50^\circ\text{C}$	5	3

\* this lifetime includes a built-in fan lifetime

## 4 Ground

- When installing the power supply, make sure the FG terminal and the chassis are connected to the safety earth ground.

## 5 Options and Others

### 5.1 Outline of Options

- C
  - With the -C option, the internal PCB has a conformal coating for anti-humidity.
- G
  - With the -G option, the leakage current of the power supply is reduced.
  - The differences between the option -G models and the standard models are shown below.

Table 5.1 Low leakage current type (WMA35F WMA75F)

LEAKAGE CURRENT [mA]	0.10 max
CONDUCTED NOISE	Complies with CISPR32 (EN55032) class A

Table 5.2 Low leakage current type (WMA150H WMA350H)

LEAKAGE CURRENT [mA]	0.15 max
CONDUCTED NOISE	Complies with CISPR32 (EN55032) class A

### ●-J1

- Option -J1 units come with VH connectors (Mfr. J.S.T.) instead of terminal block.

Please contact us for details about external view.

### ●-J4

- Option -J4 units come with EP connectors (Mfr. Tyco Electronics) instead of terminal block.

Please contact us for details about external view.

### ●-T1

- Option -T1 models have horizontally positioned screws on a terminal block.
- Please contact us for details about appearance.

## 5.2 Medical Isolation Grade

■WMA series meets 2MOPP

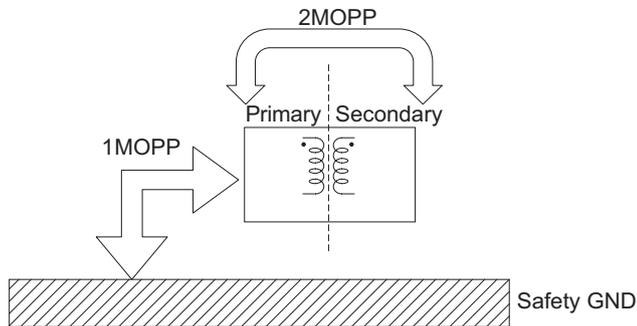


Fig.5.1 Medical Isolation Grade

## 5.3 Others

- Note that the case of the power supply remains hot for a while after it is turned off.
- 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.