

1	Functions	WMA-8
1.1	Fuse	WMA-8
1.2	Input Voltage Range	WMA-8
1.3	Inrush Current Limiting	WMA-8
1.4	Overcurrent Protection	WMA-8
1.5	Overvoltage Protection	WMA-8
1.6	Output Ripple Noise	WMA-8
1.7	Output Voltage Adjustment	WMA-8
1.8	Isolation	WMA-8
1.9	Low Power Consumption	WMA-8
2	Parallel Operation	WMA-9
3	Assembling and Installation Method	WMA-9
3.1	Installation Method	WMA-9
3.2	Derating	WMA-9
3.3	Expected Life and Warranty	WMA-10
4	Ground	WMA-10
5	Options and Others	WMA-10
5.1	Outline of Options	WMA-10
5.2	Medical Isolation Grade	WMA-10
5.3	Others	WMA-10

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

- 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).
- Power factor correction is not built-in.
- If the input voltage is outside the rated range, the power supply may not operate in accordance with the specifications and/or start hunting or fail.
- If the input voltage changes suddenly, the output voltage may go out of the specifications. Consult us for more details.

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 within a short period of time, 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.

●WMA150H

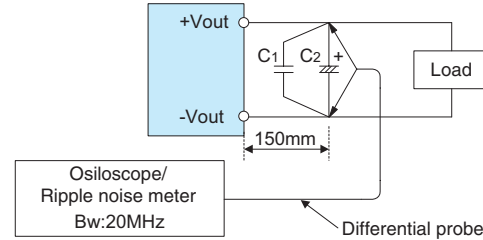
- If the overvoltage protection circuit is activated, shut down the input voltage, wait more than 3 minutes and turn on the AC input again to recover the output voltage. Recovery time varies depending on such factors as input voltage value at the time of the operation.

●WMA350H

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

1.6 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 μ F
C2 : Aluminum electrolytic capacitor 47 μ 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.

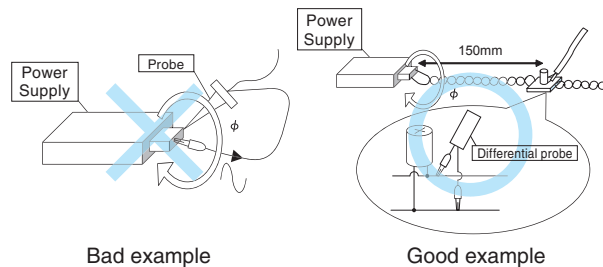


Fig.1.2 Example of measuring output ripple noise

1.7 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.

1.8 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.

1.9 Low Power Consumption

●WMA150H

- These power supplies are designed for low power consumption at no load.
- When the load factor is low (Io: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.

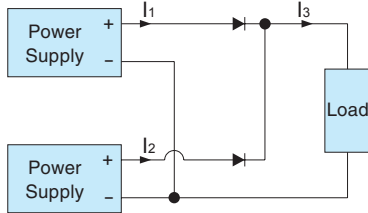


Fig.2.1 Example of redundancy operation

- 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.

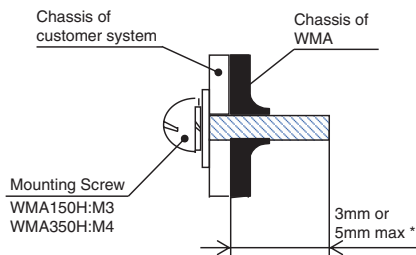
$$I_3 \leq \text{the rated current value}$$

- Parallel operation is not possible.

3 Assembling and Installation Method

3.1 Installation Method

- Do not insert a screw in which length is shown in the external view to keep enough insulation distance between the screw and internal components. See figure 3.1 for the detail.
- In order to withstand vibrations and impact, support which is shown in Figure 3.2 is necessary.



* The length of screws depend on the mounting method. refer to the external view for the detail.

Fig.3.1 Mounting screw

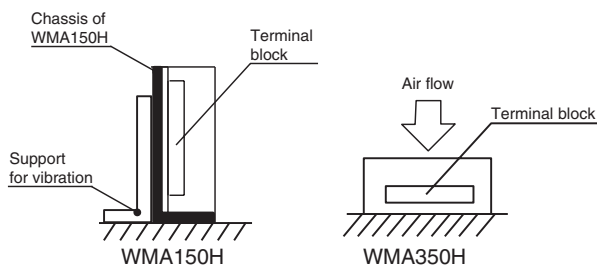


Fig.3.2 Installation method

- If you use two or more power supplies side by side, please keep a sufficient distance between them to allow enough air ventilation.
- Ambient temperature around each power supply should not exceed the temperature range shown in the derating curve.
- The unit has cooling fans. (WMA350H) Ensure that the inlet and outlet vents are not blocked.

3.2 Derating

- Input Voltage Derating Curve

The input voltage derating curve is shown in Fig. 3.3 and Fig. 3.4.

WMA150H

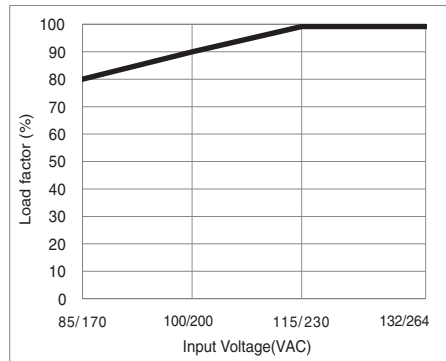


Fig.3.3 Input voltage derating curve (WMA150H)

WMA350H

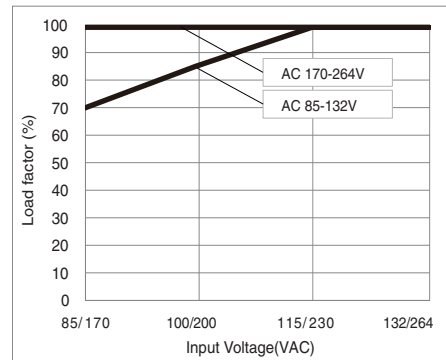


Fig.3.4 Input voltage derating curve (WMA350H)

- Ambient Temperature Derating Curve

The derating curves by the ambient temperature are shown in Fig. 3.5 and Fig.3.6.

*The specifications of ripple and ripple noise change in the shaded area.

WMA150H

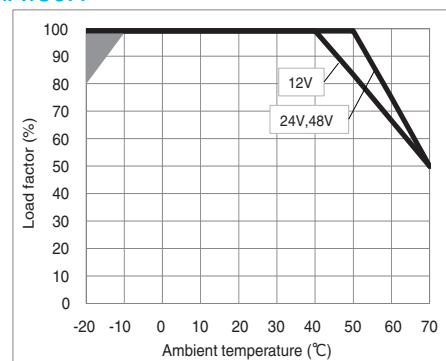


Fig. 3.5 Ambient temperature derating curve (WMA150H)

●WMA350H

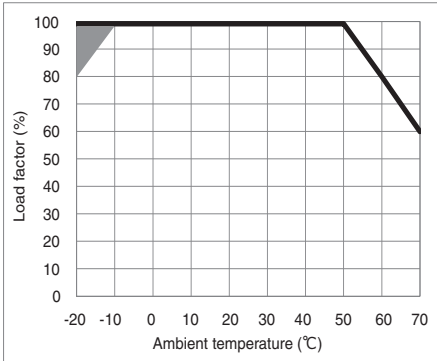


Fig. 3.6 Ambient temperature derating curve (WMA350H)

■The ambient temperature should be measured 5 to 10 cm away from the power supply so that it won't be influenced by the heat from the power supply. Please consult us for more details.

3.3 Expected Life Expectancy and Warranty

■Expected Life

The expected life of the power supply is shown below.

●WMA150H

Table 3.1 Expected lifetime (WMA150H)

Cooling Method	Average ambient temperature	Expected lifetime [years]	
		Load factor $I_o \leq 75\%$	Load factor $75\% < I_o \leq 100\%$
Convection	Ta = 30°C or less	5	5
	Ta = 40°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)	Ta = 40°C or less	5	5
	Ta = 50°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

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

●-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

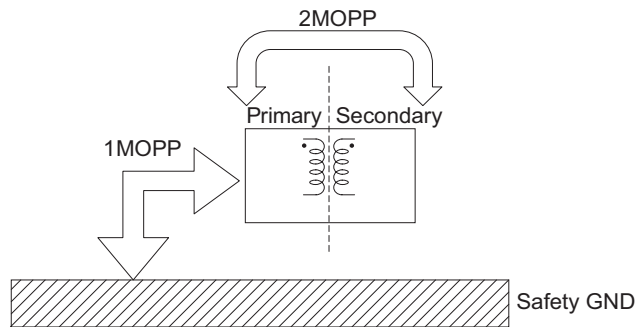


Fig.5.1 Medical Isolation Grade

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.

■If the built-in cooling fan in WMA350H stops, the built-in thermal protection may work and the output voltage may stop. Please check fan rotation periodically, to enhance the system reliability.