

LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY (2A)	MODEL	MA-100 MA-200
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BEFORE USE

Thank you for choosing M-System. Before use, please check contents of the package you received as outlined below. If you have any problems or questions with the product, please contact M-System's Sales Office or representatives.

■ PACKAGE INCLUDES:

Lightning surge protector (body + base socket).....(1)
Fuse (spare parts)(2)

■ MODEL NO.

Confirm Model No. marking on the product to be exactly what you ordered.

■ INSTRUCTION MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection and basic maintenance procedures.

LIMITATION APPLICABLE TO M-RESTER
The M-RESTER will protect electronics equipment from damage caused by lightning by absorbing most of the surge voltages.
However, M-RESTER may not be effective against certain extremely high voltages caused by a direct or almost direct hit by lightning.
M-RESTER must be installed according to this installation / instruction manual.

GENERAL

■ FUNCTION & FEATURES

- Designed specifically for AC power supplies up to 2 amps
- No degradation of normal (50/60 Hz) line frequency
- Power indicator lamp provided

■ SPECIFICATIONS

	BETWEEN LINES		LINE TO GND
	MA-100	MA-200	
Discharge voltage (peak voltage)	190V min.	410V min.	410V min.
Max. surge voltage* (peak voltage)	350V max.	700V max.	700V max.
Leakage current	≤ 1mA @150V DC	≤ 1mA @300V DC	≤ 1mA @300V DC
Rated line voltage	100V AC 110V AC 120V AC	200V AC 220V AC 240V AC	----
Response time	≤ 0.1 μsec.		
Discharge current	1000A (8 / 20 μsec.)		
Max. load current	2A		
Voltage drop	≤ 2V (50/60 Hz)		

* The maximum voltage that could pass through the surge protector. Protected equipment must be able to withstand this voltage for a very short time period.

POINTS OF CAUTION

■ CONFORMITY WITH EU DIRECTIVES

- This equipment is suitable for use in Pollution Degree 2 and Installation Category II (transient voltage 2500V for MA-200 and 1500V for MA-100) environments.
- Altitude up to 2000 meters.
- The equipment must be mounted inside a panel.
- The equipment must be installed such that appropriate clearance and creepage distances are maintained to conform to CE requirements. Failure to observe these requirements may invalidate the CE conformance.
- The actual installation environments such as panel configurations, connected devices, connected wires, may affect the protection level of this unit when it is integrated in a panel system. The user may have to review the CE requirements in regard to the whole system and employ additional protective measures to ensure the CE conformity.

■ ENVIRONMENT

- Indoor use.
- When heavy dust or metal particles are present in the air, install the surge protector inside proper housing with sufficient ventilation.
- Do not install the surge protector where it is subjected to continuous vibration. Do not subject the unit to physical impact.
- Environmental temperature must be within -5 to +55°C (23 to 131°F) with relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.

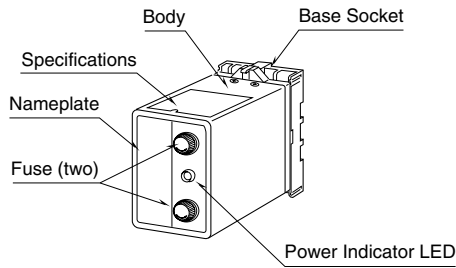
■ DIELECTRIC STRENGTH TEST

- Unplug the body from the base socket before conducting a dielectric strength test. If the test is performed with the body, the surge protector will start discharging at the described discharge voltage, resulting as insulation failure. Be sure to plug the body back into the socket and secure it with the clamps after the testing is complete.

■ AND

- We recommend that you keep spare surge protectors so that you can replace them when necessary.
- Lightning surge can enter not only through power supply lines but also through signal lines. We recommend that you also use the surge protectors for signal line for sufficient protection.

COMPONENT IDENTIFICATION

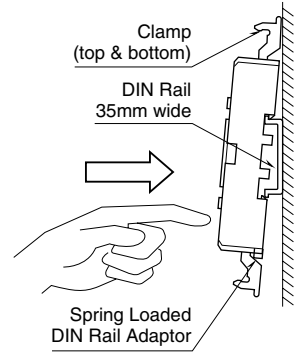


INSTALLATION

Detach the yellow clamps located at the top and bottom of the unit for separate the body from the base socket.

■ DIN RAIL MOUNTING

Set the base socket so that its DIN rail adaptor is at the bottom. Position the upper hook on the DIN rail and push in the lower. When removing the socket, push down the DIN rail adaptor utilizing a minus screwdriver and pull.



■ WALL MOUNTING

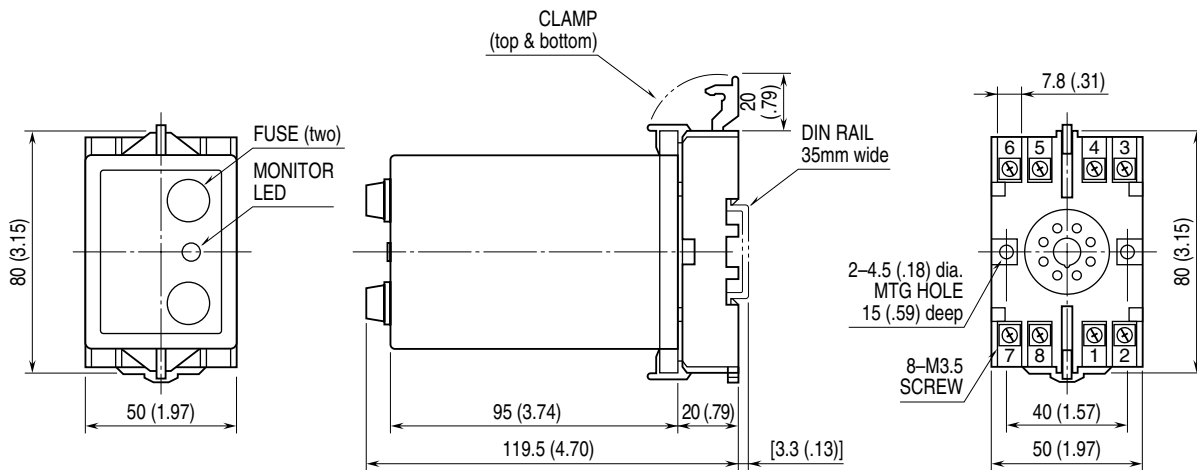
Refer to "EXTERNAL DIMENSIONS."

Shape and size of the base socket are slightly different with various socket types.

TERMINAL CONNECTION

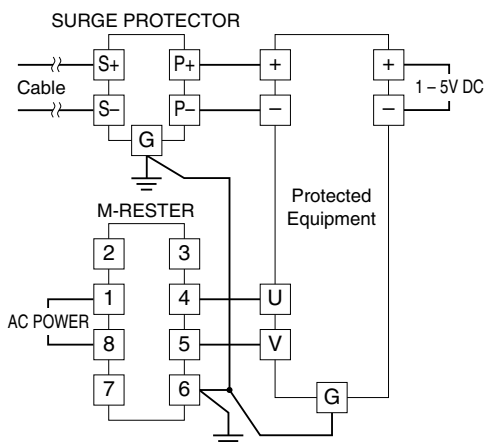
Connect the unit as in the diagram below or refer to the connection diagram on the front of the unit. Be sure to cross-wire between the Ground terminal (2, 3, 6 or 7) and the metallic housing of the protected equipment. (100 Ω max.)

■ EXTERNAL DIMENSIONS unit: mm (inch)



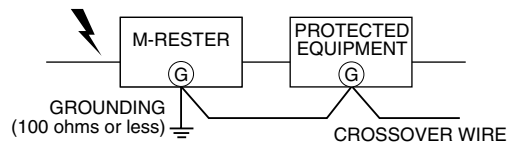
• When mounting, no extra space is needed between units.

■ CONNECTION DIAGRAM



Ground one of the terminals 2, 3, 6 and 7.

■ GROUNDING



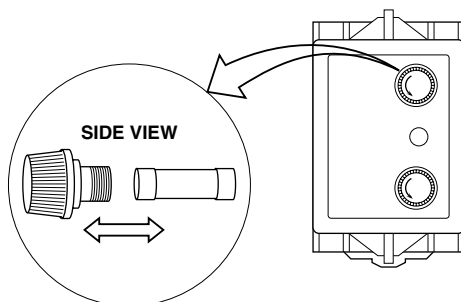
A crossover wire between M-RESTER ground and the ground or metallic housing of the equipment is required for protection. If the protected equipment has no ground terminal, ground the M-RESTER only.

SURGE ABSORBER ELEMENT

When strong lightning surges exceeding the discharge current capacity of the surge protector enter the power supply cables, it protects the devices to some extent, but its discharge element may fail. The fuse will be blown at the same time.

Before replacing the fuse, be sure to turn off the power supply. Turn the fuse holder counterclockwise to extract the fuse and replace it with a new one. (Refer to the figure below.)

If it recovers to normal after replacing the fuse, you can continue to use this surge protector. However, if the fuse is blown again soon after that, it is possible that the surge protector has failed because of excessive load current. In such a case, stop using it until a complete testing is done. Follow the checking procedure explained in the "MAINTENANCE" section in this manual.



In order to remove the fuse, turn it counterclockwise and pull it out of its holder.

Use a proper type of fuse which meets M-RESTER model and its power supply voltage.

	PARTS NO.	MODEL NO.	RATING
MA-100 use	200002	FGMB	125V, 2A
MA-200 use	200979	FGMB	250V, 2A

MAINTENANCE

Check surge protectors periodically. Many cases of lightning are ignored, and even lightning at a far distance often causes inductive surges.

We recommend that you check your surge protector about twice a year, before and after the rainy season. Check whenever you experience a strong lightning occurrence.

Checking procedure is explained in the following:

■ CHECKING WIRING

- 1) Make sure that wiring is done as instructed in the connection diagram.
- 2) Make sure that the Ground terminal (2, 3, 6 or 7) is connected to the metallic housing of protected device.
- 3) Make sure that the Ground terminal (2, 3, 6 or 7) is grounded to earth.

DISCHARGE FUNCTION

Remove all the wires connected to the surge protector and test its discharge capability as follows:

• MA-100

- 1) Apply 150V DC across the terminals (1) – (8), and measure leakage current. ($\leq 1\text{mA}$ standard)
Check also that the power indicator LED is ON.
- 2) Then apply 250V DC and check that the discharging occurs. ($\geq 2\text{mA}$ standard)

• MA-200

- 1) Apply 300V DC across the terminals (1) – (8), and measure leakage current. ($\leq 1\text{mA}$ standard)
Check also that the power indicator LED is ON.
- 2) Then apply 500V DC and check that the discharging occurs. ($\geq 2\text{mA}$ standard)

• MA-100, MA-200

- 1) Apply 300V DC across the following terminals and measure leakage current. ($\leq 1\text{mA}$ standard)
Terminals (1) – (2), (8) – (2)
- 2) Then apply 500V DC and check that the discharging occurs. ($\geq 2\text{mA}$ standard)
- 3) If a DC power source is not available, check resistance across the following terminals ($\geq 10\text{M}\Omega$ standard).
Terminals (1) – (8), (1) – (2), (8) – (2)
- 4) Check that discharging occurs across the same terminals with a 500V DC/1000 M Ω insulation tester. ($\leq 20\text{M}\Omega$ standard)

If any of the above tests shows negative, replace the whole surge protector unit.