

## LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (5 – 30A)

MODEL

**MH-205A**  
**MH-210A**  
**MH-230A**

### 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.....(1)

#### ■ 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 power requirements of medium capacities (5, 10 or 30 amps)
- Protecting electronic equipment from lightning surges that enter through substations and step-down transformers
- Discharge element failure triggers the fuse blown and alarm contact closed
- Also effective in rejecting switching transients generated by thyristors, circuit breakers, motor starters, etc.

#### ■ SPECIFICATIONS

	BETWEEN LINES	LINE TO GND
Discharge voltage (peak voltage)	410V min.	410V min.
Max. surge voltage*	410V max.	700V max.
Leakage current	≤ 1mA @300V DC	≤ 1mA @300V DC
Response time	≤ 0.1 μsec.	
Discharge current	10000A (8 / 20 μsec.)	
Maximum load current	5A (MH-205A)	
	10A (MH-210A)	
	30A (MH-230A)	
Voltage drop	2V or less at 50/60 Hz	
Rated line voltage	200V/220V/240V AC	

\* 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

#### ■ 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

- The M-RESTER starts discharging at 410V or more voltage applied across power supply terminals and metallic housing. DO NOT conduct a dielectric strength test with the M-RESTER connected to a power source.
- For confirming insulation of the unit, conduct the dielectric strength test WITH ALL WIRES REMOVED, or conduct an insulation resistance test (@250V DC).

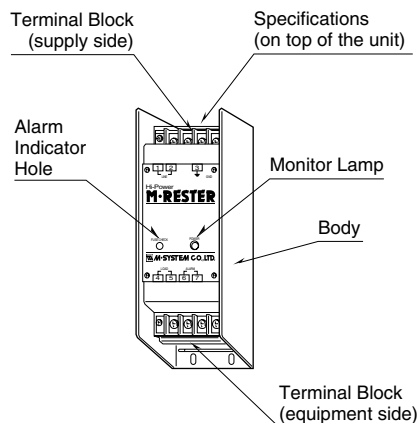
#### ■ RATED CURRENT

- Be sure that the rated current of protected equipment does not exceed the maximum load current specification of the M-RESTER.
- Be sure to install a breaker which matches the current rating at the power source side of the M-RESTER.

#### ■ 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.

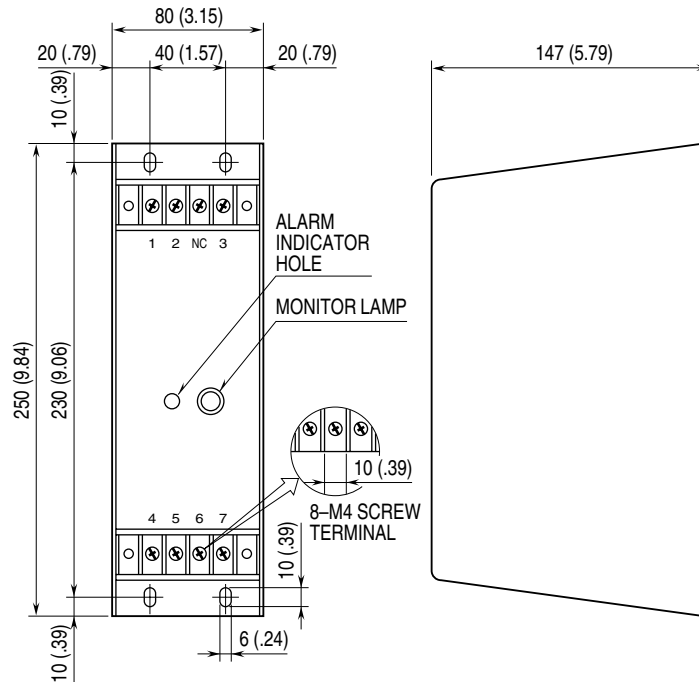
### COMPONENT IDENTIFICATION



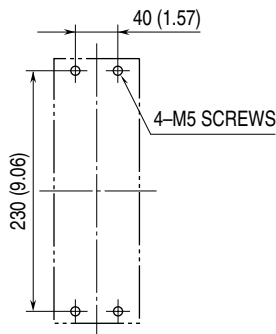
## INSTALLATION

Refer to the diagram below.

### EXTERNAL DIMENSIONS unit: mm (inch)



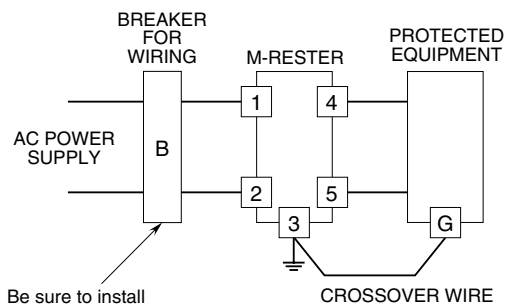
### MOUNTING REQUIREMENTS unit: mm (inch)



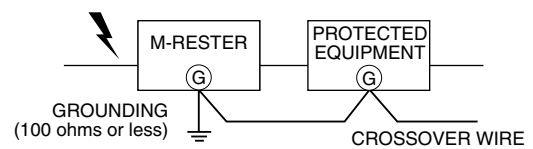
## TERMINAL CONNECTIONS

Connect the unit as in the diagram below.

Be sure to cross-wire between the Ground terminal (3) and metallic housing of the protected equipment. (100Ω max.)



### GROUNDING



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

## WIRING INSTRUCTIONS

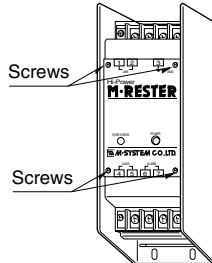
### ■ SCREW TERMINAL

Torque: 1.6 N·m

## REPLACING DISCHARGE ELEMENTS

The discharge elements and nameplate are constructed as one block.

- 1) Remove the four screws as shown in the figure to the right. (Separate the power supply for safety when replacing.)
- 2) Pull out slowly the whole block together with the nameplate.
- 3) Detach the connector between the main body and the discharge element block and plug it into new block.
- 4) Replace slowly the block back into the main body and fix it with the screws.



## 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

- Make sure that wiring is done as instructed in the connection diagram.
- Make sure that the Ground terminal (3) is connected to the metallic housing of protected equipment.
- Make sure that the Ground terminal (3) is grounded to earth.

### ALARM CONTACT AND INDICATOR

- M-RESTER is designed to protect the equipment even when subjected to a lightning surge exceeding its discharge current capacity to certain extent. However, in such a case, the insulation of its discharge element may fail. When it happens, a relay contact turns ON and the indicator on the front panel of M-RESTER turns white. Replace the discharge elements, according to the procedure described in the left.

### MONITOR LAMP

- Supply appropriate AC voltage through the M-RESTER and check the LEDs. When the red LED is off despite that power is supplied, replace the M-RESTER.

### DISCHARGE FUNCTION

Turn off the power supply and remove all wiring connected to M-RESTER before testing its discharge capability as follows:

- Check resistance across the following terminals on the high resistance range of multimeter and confirm no conduction (The meter will indicate the same value as it will show when these terminals are open).  
(For the MH-205A, MH-210A, the meter will show 1 MΩ or greater.)  
Terminals (1) – (2), (1) – (3), (2) – (3)
- Check that discharging occurs across the same terminals with a 500V DC/1000 MΩ megger (The megger will show 20 MΩ or less).
- If any of the above tests shows negative, replace the M-RESTER.