INSTRUCTION MANUAL

LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (20A)

MODEL **MAH**

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.

■ INSTALLATION / INSTRUCTION MANUAL

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

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 20 amps
- Usable for 3-phase/3-wire configuration
- Discharge current capacity 10000A
- Absorbs surges only without affecting instrumentation signal
- Indicator LED turns off with surge absorber anomaly
- Detaching the discharge elements from the power supply circuits when fuses are blown

■ SPECIFICATIONS

	BETWEEN LINES		LINE TO GND
	MAH-121, 123	MAH-221, 223	
Discharge volt. (p-p)	190V min.	380V min.	380V min.
Max. surge voltage*	350V max.	700V max.	700V max.
Leakage current	≤40mA @110V AC	≤40mA @220V AC	≤1mA @220V AC
Response time	≤0.1 µsec.		
Discharge current	10000A (8 / 20 µsec.)		
Max. load current	20A		
Voltage drop	≤1V (50/60 Hz)		

*The maximum voltage that could pass through M-RESTER. Protected equipment must be able to withstand this voltage for a very short time period.

POINTS OF CAUTION

■ ENVIRONMENT

- When heavy dust or metal particles are present in the atmosphere, install M-RESTER inside proper housing and ventilate it.
- Do not install the M-RESTER where it is subjected to continuous vibration. Do not apply physical impact to the M-RESTER.
- Environmental temperature must be within -5 to +55°C in order to ensure adequate life span and operation.

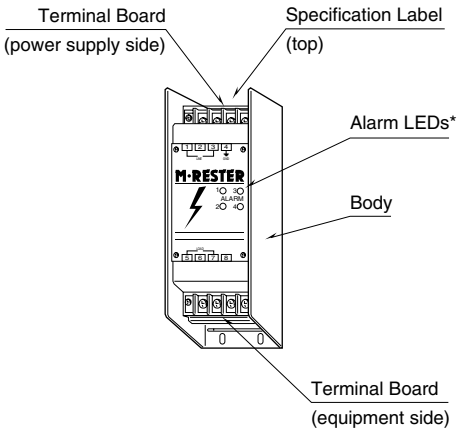
■ DIELECTRIC STRENGTH TEST

- The MAH starts discharging at 380V or more voltage applied across power supply terminals and metallic housing. DO NOT conduct a dielectric strength test with the MAH 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.

COMPONENT IDENTIFICATION



*Two LEDs for two-wire power line

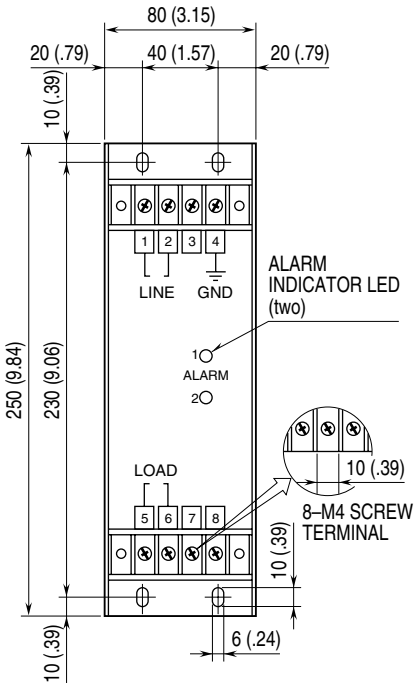
5-2-55, Minamitsumori, Nishinari-ku, Osaka 557-0063 JAPAN
Phone: +81(6)6659-8201 Fax: +81(6)6659-8510 E-mail: info@m-system.co.jp

INSTALLATION

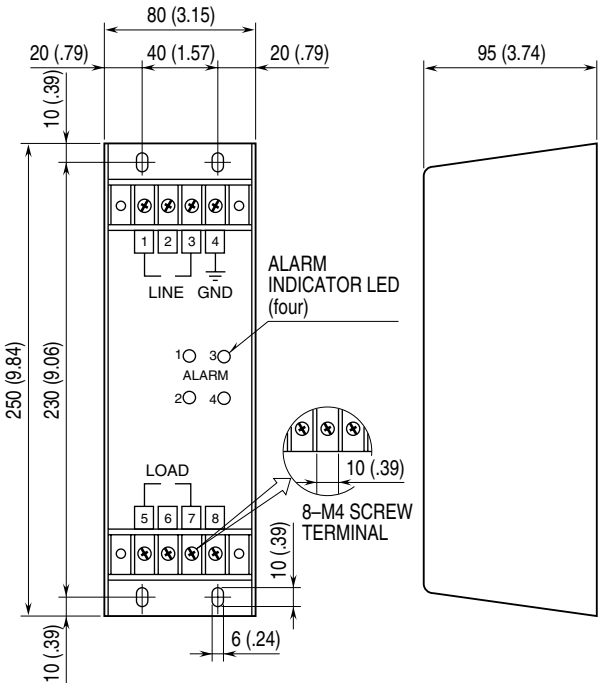
Refer to the drawings below.

■ **DIMENSIONS mm (inch)**

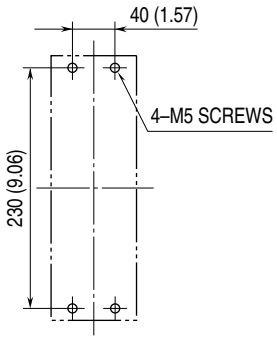
■ **2-WIRE**



■ **3-WIRE**



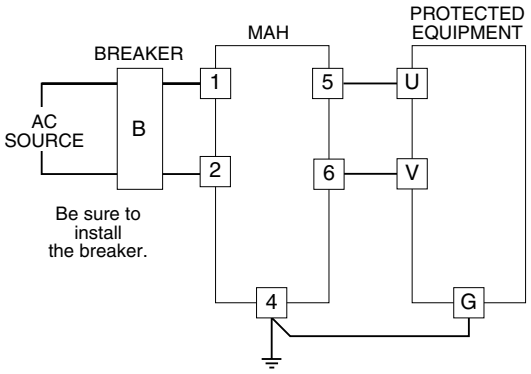
■ **MOUNTING REQUIREMENTS mm (inch)**



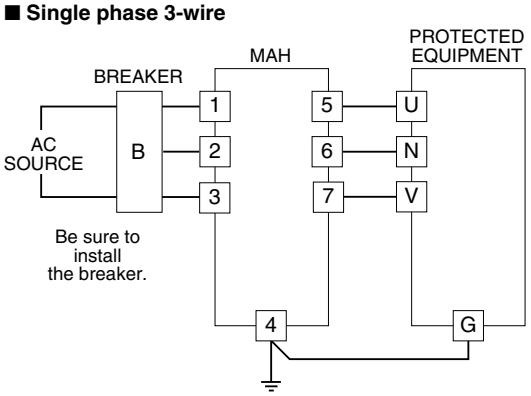
TERMINAL CONNECTION

Connect the unit as in the diagram below.
Be sure to cross-wire between the Ground terminal (4) and metallic housing of the protected equipment. (100Ω max.)

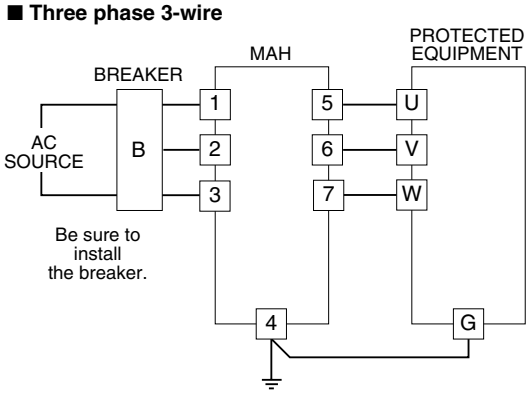
■ **Single phase 2-wire**



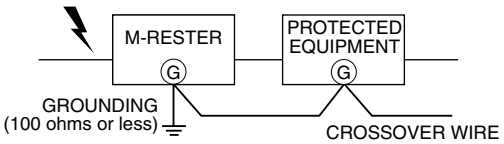
■ **Single phase 3-wire**



■ **Three phase 3-wire**



■ **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.

ALARM INDICATOR LED

The front LEDs turn ON when the power is supplied, and OFF in an abnormality.
When one or more LEDs are OFF, check the M-RESTER according to the checking procedure in the following section.
Before checking the M-RESTER, be sure to turn off the breaker at the power supply side of the M-RESTER for protecting from an electrical shock.

MAINTENANCE

Check M-RESTER periodically. Many cases of lightning are ignored, and even lightning at a far distance often causes inductive surges.
Even with the alarm indicator LEDs on the MAH unit, we recommend that you check your M-RESTER 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 (4) is connected to the metallic housing of protected equipment.
• Make sure that the Ground terminal (4) is grounded to earth.

ALARM INDICATOR LED

• Supply appropriate AC voltage through the M-RESTER and check the LEDs.
• When one or more LEDs are 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 (infinite standard).

MAH-121	Terminals (1) – (2), (1) – (4), (2) – (4)
MAH-221	Terminals (1) – (2), (1) – (4), (2) – (4)
MAH-123	Terminals (1) – (2), (2) – (3)
	(1) – (4), (2) – (4), (3) – (4)
MAH-223	Terminals (1) – (2), (2) – (3), (1) – (3)
	(1) – (4), (2) – (4), (3) – (4)

• Check that discharging occurs across the same terminals with a 500V DC megger. (Indicator of the megger reaches over-scale.)
• If any of the above tests shows negative, replace the M-RESTER.