

LIGHTNING SURGE PROTECTOR FOR POWER SUPPLY USE (DC power use; life monitor)	MODEL MDHA
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BEFORE USE

Thank you for choosing M-System. Before use, check the 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)

■ MODEL NO.

Check that model No. described on the specification label is 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 DC power supplies up to 5 amps
- Life monitor function helps you to decide when you should replace the M-RESTER; reduces maintenance and prevents downtime
- LED display and alarm contact output indicate the degradation and life span of the surge protection circuits
- No power supply interruption even when the unit is degraded or at the end of its life

■ SPECIFICATIONS

	BETWEEN LINES		LINE TO GND
	MDHA-12	MDHA-24	
Discharge voltage (peak voltage)	±15V min.	±30V min.	±160V min.
Max. surge voltage (Up)*	±80V max.	±120V max.	±700V max.
Leakage current	≤40mA @13.2V DC	≤40mA @26.4V DC	≤0.1mA @160V DC
Response time	≤4 nsec.	≤4 nsec.	≤20 nsec.
Discharge current	10000A (8 / 20 μsec.)		
Max. load current	5A		
Internal series resist.	≤0.2Ω including return		

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

Insulation resistance: ≥100MΩ with 500V DC
(line or ground to alarm output)

Dielectric strength: 1500V AC @1 minute
(line or ground to alarm output)

POINTS OF CAUTION

■ POWER INPUT RATING

- Operational voltage range
MDHA-12: 10.8 – 13.2V DC (Uc)
MDHA-24: 21.6 – 26.4V DC (Uc)

■ UNPLUGGING THE UNIT

- Before you remove the unit from its base socket or mount it, turn off the power supply and the signal for safety.

■ ENVIRONMENT

- Indoor use
- When heavy dust or metal particles are present in the air, install the unit inside proper housing and ventilate it.
- Do not install the unit where it is subjected to continuous vibration. Do not apply physical impact to the unit.
- 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.

■ WIRING

- Remove the wiring to the ground terminals (2 or 7) before conducting an insulation test. Otherwise the element will start discharging at discharge voltage, which will be judged as insulation failure. Be sure to secure the wiring after the testing is complete. Incomplete wiring can actually cause lightning intrusion.

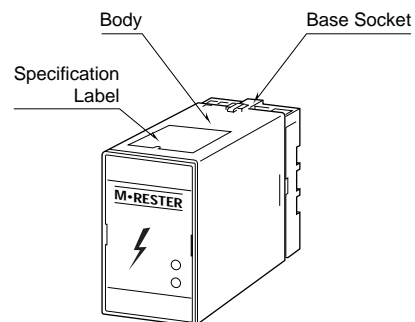
■ RATED CURRENT

- Be sure that the total current rating of the protected equipment does not exceed the maximum load current capacity of the MDHA. Install a breaker at the supply side.

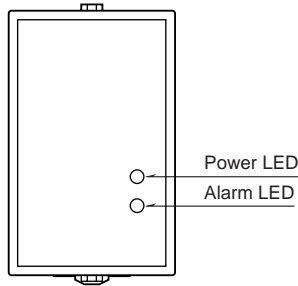
■ AND

- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying surge counter backup function described in the data sheet.

COMPONENT IDENTIFICATION



■ FRONT PANEL CONFIGURATION



POWER LED (green)

The green LED turns on while the power is supplied; turns off when the power supply line has failed or when the MDHA has been judged 'end of life.' The alarm contact is turned on when the LED is off. (It may not be on if the power supply line is not completely in failure.)

ALM LED

The tricolor LED turns off, then on in green, amber, and red according to the unit status.

- 1) Remains OFF when the power supply is first turned on.
- 2) Green: The unit has received one or more surges. (The LED does not turn on when the power is not supplied.)
- 3) Amber: Replacement is recommended.
- 4) Red: The life span has ended. Replace the unit immediately. The alarm contact is turned on in this state. (The red light may be momentarily ON when the power is removed, regardless of the life status.)

LIFE STATUS TABLE

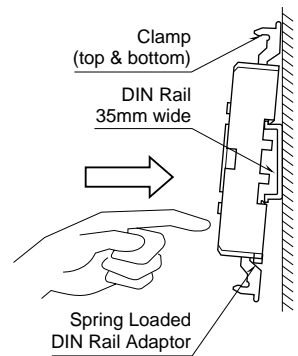
POWER LED	ALARM LED	ALARM CONTACT	STATUS	REPLACEMENT
ON	OFF	OFF	Normal (no surge)	No Need
	Green		Normal (multiple hits)	
	Amber		Near End	Without Delay
	Red		End (degraded)	Now
OFF	----	----	Power supply removed or End (degraded)	Now if the power supply is normal.

INSTALLATION

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

■ **DIN RAIL MOUNTING**

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



■ **WALL MOUNTING**

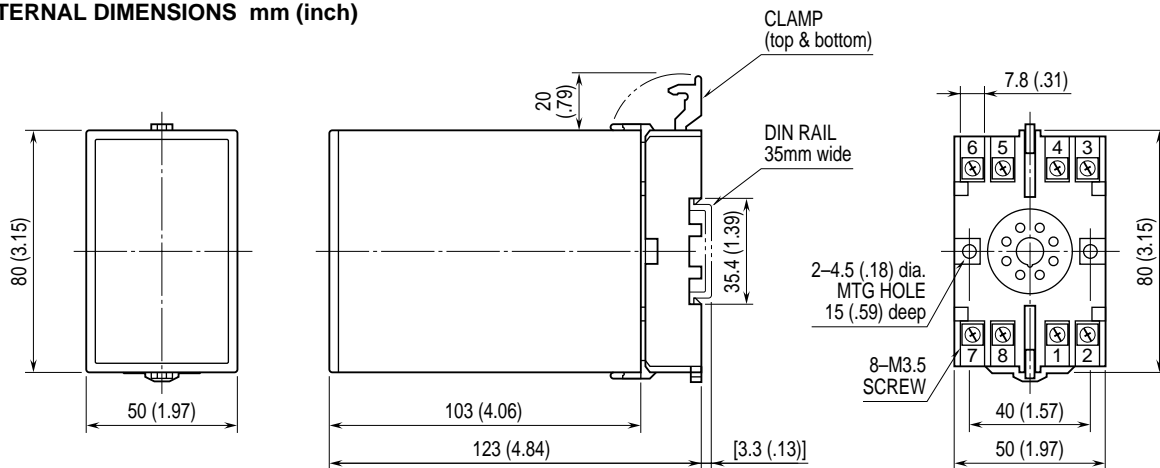
Refer to the drawings below.

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

TERMINAL CONNECTIONS

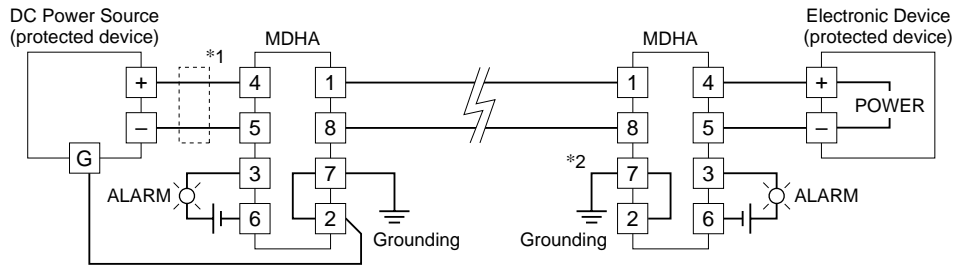
Connect the unit as in the diagram below or refer to the connection diagram label on the side of the unit. Be sure to make cross-wiring between the ground terminal (2 or 7) and the metallic housing of the protected device to ground (100Ω max.).

■ **EXTERNAL DIMENSIONS mm (inch)**



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

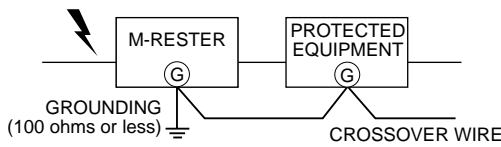
■ CONNECTION DIAGRAM



*1. Be sure to install a circuit breaker.

*2. If the protected device has no G terminal, ground only the MDHA's ground terminal.

■ 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.

MAINTENANCE

While the ALARM LED is green, regular inspections are recommended.

When it is turned to amber, replacement of the unit is recommended.

When it is turned to and remain red, replace the unit immediately.

CAUTION

Before replacing the unit, be sure to turn off the power supply for safety. Other factors such like an alarm system connected to the line should also be considered.

The life monitoring circuit remain alive due to the internal backup power even when the external power supply is removed. The LED is turned off in that case. The backup power is normally effective for approximately one week depending upon environmental conditions.

M-SYSTEM WARRANTY

M-System warrants such new M-System M-Rester which it manufactures to be free from defects in materials and workmanship during the 12-month period following the date that such M-Rester was originally purchased if such M-Rester has been used under normal operating conditions and properly maintained, M-System's sole liability, and purchaser's exclusive remedies, under this warranty are, at M-System's option, the repair, replacement or refund of the purchase price of any M-System M-Rester which is defective under the terms of this warranty. To submit a claim under this warranty, the purchaser must return, at its expense, the defective M-System M-Rester to the below address together with a copy of its original sales invoice.

THIS IS THE ONLY WARRANTY APPLICABLE TO M-SYSTEM M-RESTER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. M-SYSTEM SHALL HAVE NO LIABILITY FOR CONSEQUENTIAL, INCIDENTAL OR SPECIAL DAMAGES OF ANY KIND WHATSOEVER.

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