

<b>LIGHTNING SURGE PROTECTOR FOR AC POWER SUPPLY (max. 3A; ultra-slim)</b>	MODEL <b>MD7AP</b>
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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:**

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**

- High discharge current capacity 10 kA (8 / 20 μs)
- Ultra-thin 7-mm-wide module can be mounted in high density
- Excellent protection employing multi-stage SPD circuits
- DIN rail mounting and grounding
- Power line monitor LED

**■ SPECIFICATIONS**

	LINE TO LINE		LINE TO EARTH
	MD7AP-100	MD7AP-200	
Max. continuous operating voltage (Uc)	140V AC	275V AC	275V AC
Voltage protection level (Up) @6kV (1.2 / 50 μs)	±550V	±850V	±850V
Leakage current @Uc	≤1mA	≤1mA	≤1mA
Response time	≤20 nsec.	≤20 nsec.	≤20 nsec.
Max. discharge current (Imax)	10kA (8 / 20 μs)		
Nominal current (IN)	3A		

## POINTS OF CAUTION

### ■ ENVIRONMENT

- Indoor use.
- When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.
- Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.
- Environmental temperature must be within  $-25$  to  $+85^{\circ}\text{C}$  ( $-13$  to  $+185^{\circ}\text{F}$ ) with relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.
- Altitude up to 2000 meters.
- This unit needs a DIN rail as earth grounding bar. Oxide film on the surface of an aluminium rail may lower the electric conductivity between this module and the ground. Use a steel or copper rail.

### ■ DIELECTRIC STRENGTH TESTING

- The surge protector starts discharging when 275V AC or greater voltage is applied between lines and earth. Remove the grounding wire before conducting a test. Be sure to return the wire after the test.

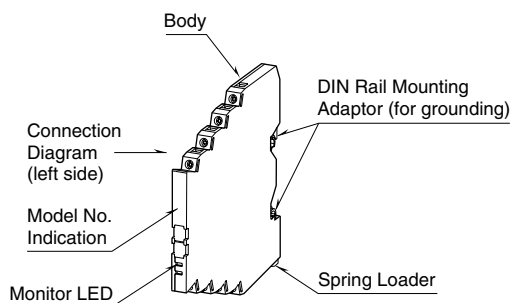
### ■ HIGH TEMPERATURE

- When the discharge element gradually degrades, its temperature rises due to an increased leakage current, until the safety fuses finally separate the element from the power line. However, a part of the module may already be too hot to touch safely by bare hands if the module is near the end of its life, or if the degradation occurs quickly due to lightning surges exceeding its capacity.
- It is recommended for safety to install the MD7AP inside a metal enclosure. Turn off the power supply line and confirm that the surface temperature is in the safe level before touching it for maintenance.
- The side surface temperature may become especially high. Observe at least 20 mm (0.8 inch) between the MD7AP and other devices in order to prevent the high temperature from affecting them.

### ■ AND ....

- We recommend that you keep spare surge protectors so that you can replace them when necessary.

## COMPONENT IDENTIFICATION

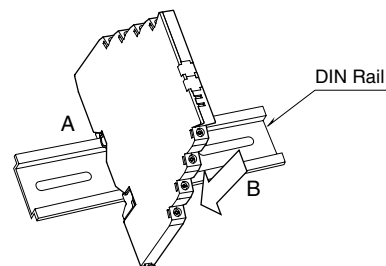


## INSTALLATION

Mount the unit on a DIN rail. Once installed, do not move it to another DIN rail.

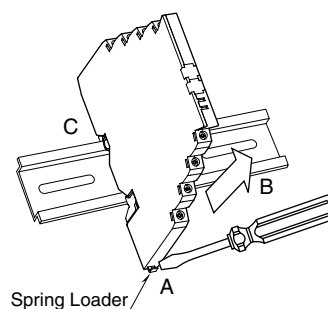
### ■ MOUNTING THE UNIT ON A DIN RAIL

- Hang the upper hook of the DIN rail mounting adaptor at the rear side of unit, on the DIN rail.
- Push in the lower in keeping pressing the unit to the DIN rail.
- DIN rails generally have slight individual variability in size. If you find it difficult to push in the lower part, go back to (A) and hang the upper part more deeply onto the rail and try (B) again.



### ■ REMOVING THE UNIT

- Push down the spring loader utilizing a minus screwdriver.
- Confirm that it is pulled enough down and pull out the lower part of the unit.
- Detach the upper part from the DIN rail.



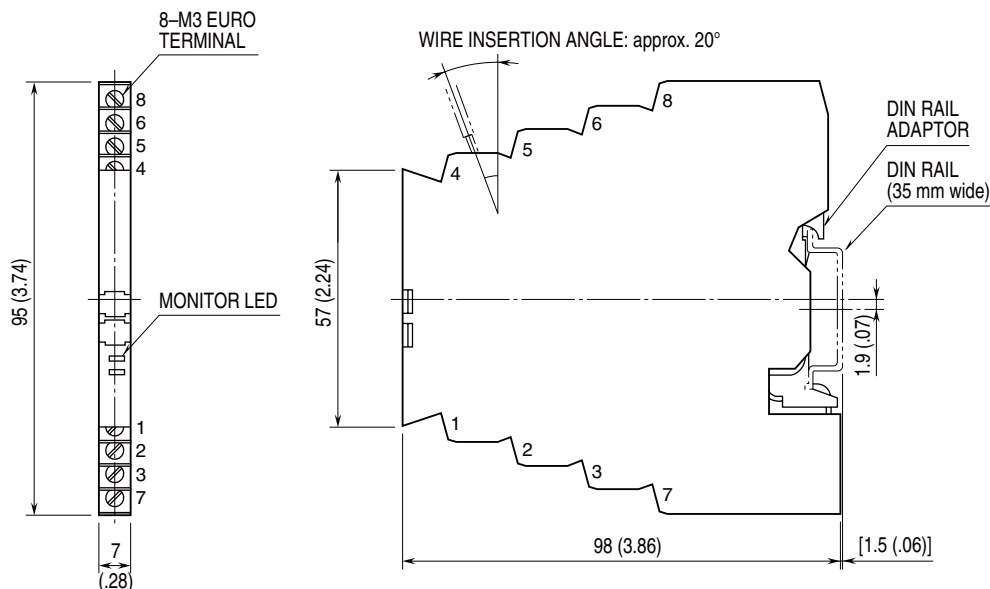
## TERMINAL CONNECTION

Connect the unit as in the diagram below.

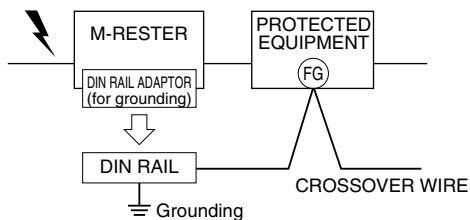
Be sure to ground the DIN rail on which the unit is mounted and cross-wire between the rail and FG terminal of the protected device as shown in Figure 1 in order to equalize the earth potential.

When the unit is connected with a device which has no FG terminal, ground the surge protector only.

### EXTERNAL DIMENSIONS unit: mm (inch)

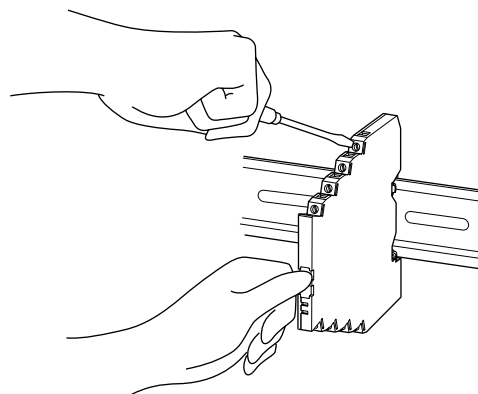


### Figure 1. GROUNDING



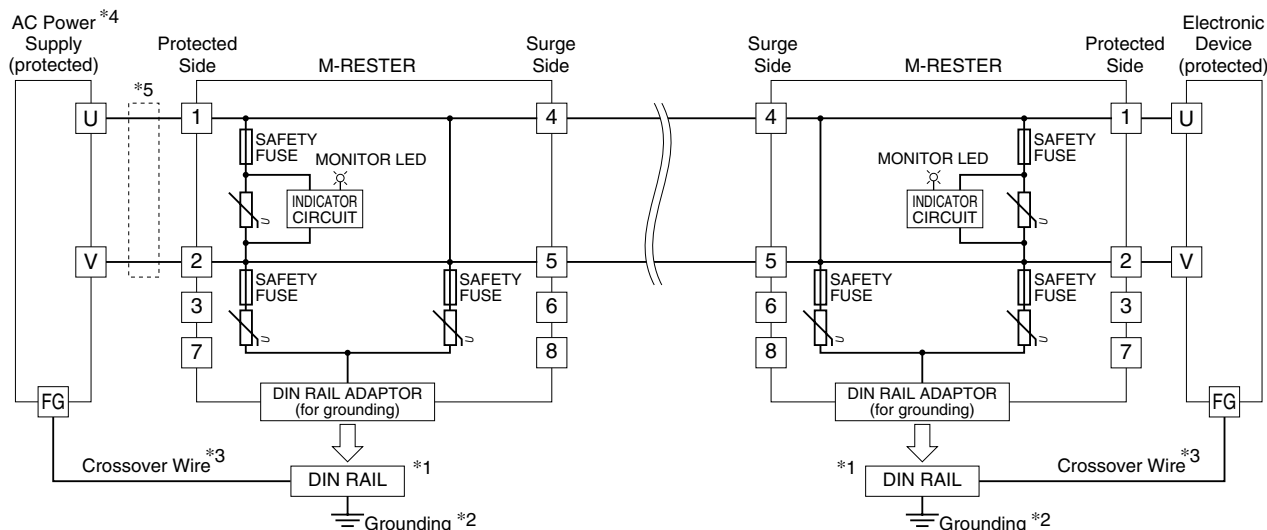
Cross-wire from the DIN rail to the metal housing of the protected device to equalize the ground potential.  
Ground only the surge protector when the protected device has no grounding terminal.

### CAUTION WHEN WIRING



Hold the module steady at the front when you tighten/loosen screw terminals.

## CONNECTION DIAGRAM



- \*1. Oxide film on the surface of an aluminium rail may lower the electric conductivity between this module and the ground. Use a steel or copper rail.
- \*2. Be sure to ground the DIN rail. Recommended grounding resistance  $\leq 100\Omega$
- \*3. Cross-wire between the DIN rail and the metal housing of the protected device to equalize the earth potential. Ground only the surge protector when the protected device has no ground terminal.
- \*4. Use an AC power source with the overload current protection function. (maximum output current 3A)
- \*5. Install a current limiting element (capacity 3) when the output current exceeds 3A.

## WIRING INSTRUCTIONS

### EURO TERMINAL

Torque: 0.3 N·m

Applicable wire size: 0.2 – 2.5 mm<sup>2</sup>

Stripped length: 8 mm

## 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 DIN rail is connected to the metal enclosure of protected device.
- 3) Make sure that the surge protector is securely attached to the DIN rail, and that the rail is grounded to earth.

### DISCHARGE ELEMENT

#### 1) Front monitor LED

Turn on the power supply and confirm that the LED turns on. If it is off despite that the power is supplied, replace the surge protector.

#### 2) Remove all wiring connected to the surge protector when you test the module.

#### 3) Check resistance across the following terminals on the high resistance range of multimeter and confirm no conduction.

Terminals (4) – (DIN rail), (5) – (DIN rail)

The tester should show 10 M $\Omega$  or greater.

#### 4) Confirm conduction across the same terminals with a 500 V DC 1000 M $\Omega$ insulation tester. The tester should show 20 M $\Omega$ or less.

Turn on the power supply with no load and measure current flowing into the surge protector. The tester should show 1 mA or less.

#### 5) If any of the above tests shows negative, replace the surge protector.