

LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE & PULSE USE (conduit mount, weather-proof)	MODEL	MD6x-24 MD6x-65
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BEFORE USE

Thank you for choosing M-System. Before use, please 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.....(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.

When using this product in potentially explosive atmosphere or hazardous (classified) location, you have to follow the safety procedure to install it. Please refer to “SAFE INSTALLATION MANUAL” for each type of certification.

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 4 – 20mA DC and pulse signal line including both 4-wire and 2-wire transmitters
- Direct mount in a wiring conduit of outdoor enclosures
- Absorbs surges only without affecting instrumentation signal

■ SPECIFICATIONS

	LINE TO LINE		LINE TO GROUND
	MD6x-24	MD6x-65	
Discharge voltage (peak voltage)	30V min.	70V min.	±160V min.
Max. surge voltage*1	40V max.	100V max.	±650V max.
Leakage current	≤ 5µA @30V DC	≤ 5µA @70V DC	≤ 5µA @±130V DC
Max. line voltage	30V DC	70V DC	----
Capacitance @1 kHz	≤ 2500pF	≤ 2500pF	≤ 100pF
Response time	≤ 4 nsec.	≤ 4 nsec.	≤ 20 nsec.
Discharge current capacity	10000A (8 / 20 µs)		
Max. load current	100mA		
Internal series resistance	Approx. 22 Ω including return		

*1. 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

■ GENERAL PRECAUTION

- Before you remove the unit or mount it, turn off the signal input and the power supply fed to the connected devices for safety.

■ ENVIRONMENT

- 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 -40 to +85°C (-40 to +185°F) in order to ensure adequate life span and operation.

■ INSULATION RESISTANCE TEST

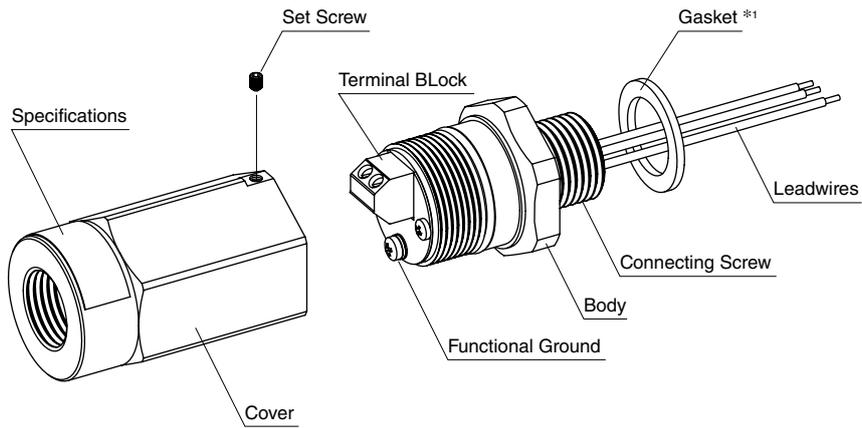
- Before conducting an insulation test, remove the unit from the protected signal line. Use an insulation tester of 125V DC at the maximum. If you use a higher-rated tester, the discharge elements will start discharging, which will be detected falsely as insulation failure.

■ AND

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

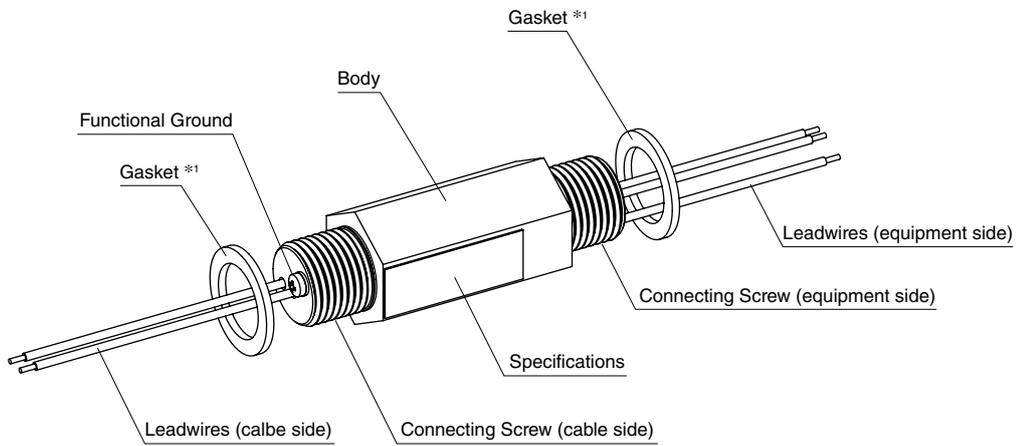
COMPONENT IDENTIFICATION

■ MD6T



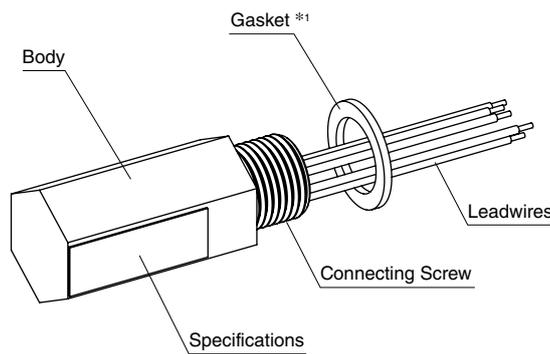
*1. Not provided with 1/2 NPT.

■ MD6N



*1. Not provided with 1/2 NPT.

■ MD6P

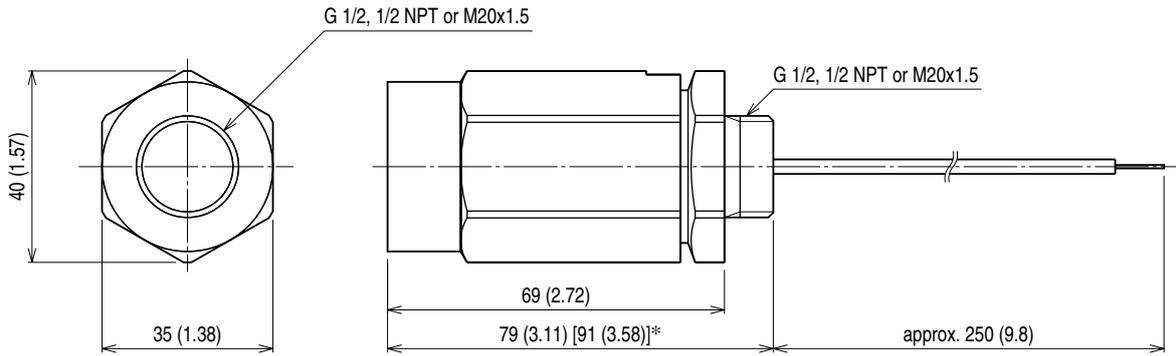


*1. Not provided with 1/2 NPT.

EXTERNAL DIMENSIONS unit: mm (inch)

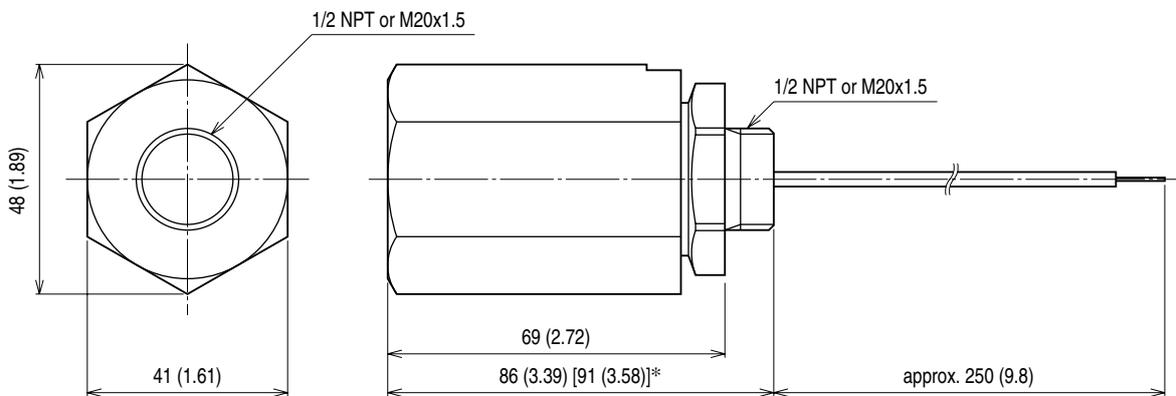
■ MD6T

■ WITHOUT SAFETY APPROVAL



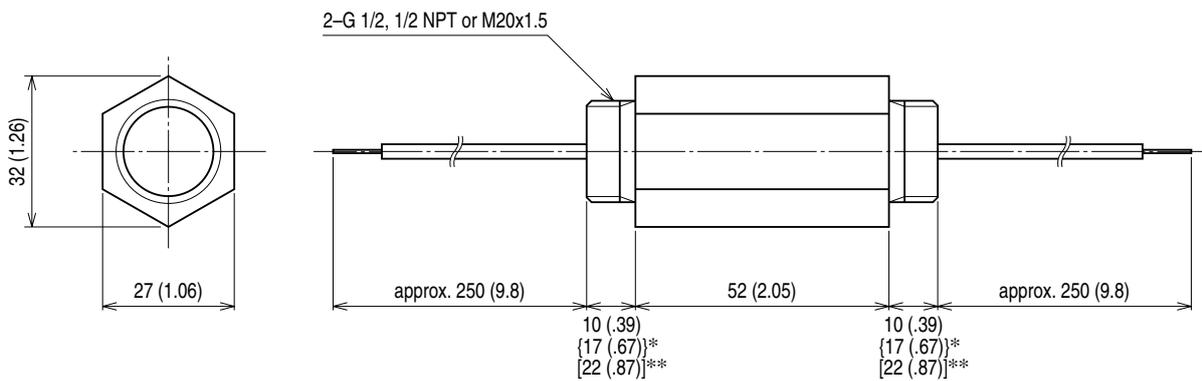
* [] for 1/2 NPT

■ WITH SAFETY APPROVAL



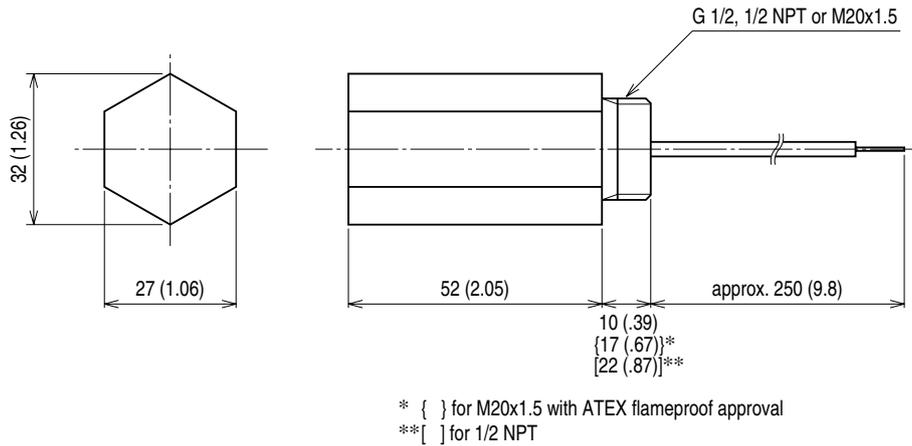
* [] for 1/2 NPT

■ MD6N



* [] for M20x1.5 with ATEX flameproof approval
 ** [] for 1/2 NPT

■ MD6P



INSTALLATION

- Confirm that the wiring conduit's thread size of the protected device matches the connecting screw's thread size of the unit.
- For 1/2 NPT thread, no gasket is provided with shipment. Apply adequate sealant or seal tape for preventing water entering through the connection.
- After wiring to the MD6T is complete and its cover is closed, be sure to tighten the set screw to ensure the sealing.

TERMINAL CONNECTION

- Connect the unit as in the diagram below.
- Connect the MD6x's green leadwire to the ground terminal inside the protected equipment enclosure. If the protected equipment has an outside ground terminal, connect between this terminal and the inside ground terminal. If the enclosure does not have an inside ground terminal, connect the green leadwire directly to the outside ground wire pulled inside the enclosure.
- Connect the yellow and blue wires to the signal terminals of the protected equipment.
- Ground the protected equipment enclosure. If the enclosure has an outside ground terminal, connect the ground wire to it. If it does not, pull the ground wire inside the enclosure and connect it to the inside ground terminal.
- Connect the signal lines to the MD6x.

■ MD6T

Connect the positive (+) line to the terminal 1, the negative (–) line to the terminal 2.

■ MD6N and MD6P

Connect the red leadwire to the positive (+) line, the black leadwire to the negative (–) line.

■ LEADWIRE DIAMETERS

Terminal block (MD6T): Leadwire diameter: 0.14 – 1.5 mm² for both stranded and solid wires;
or AWG26 – 16, stripped length 6 mm

Cable side (MD6N and MD6P): AWG20

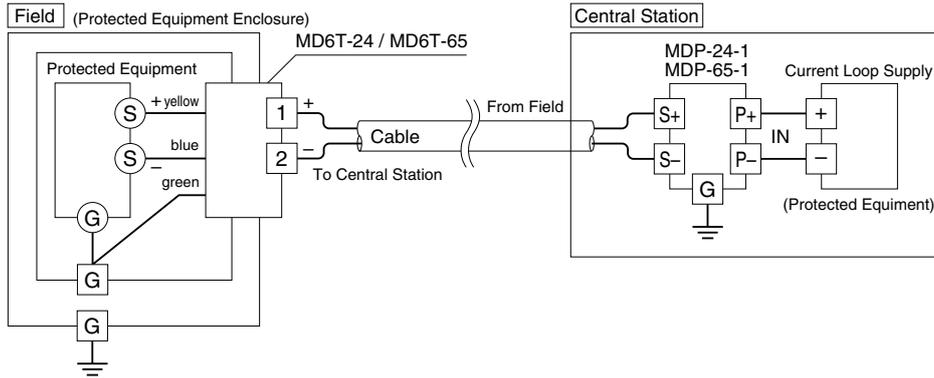
Grounding: AWG20

Protected equipment side: AWG22

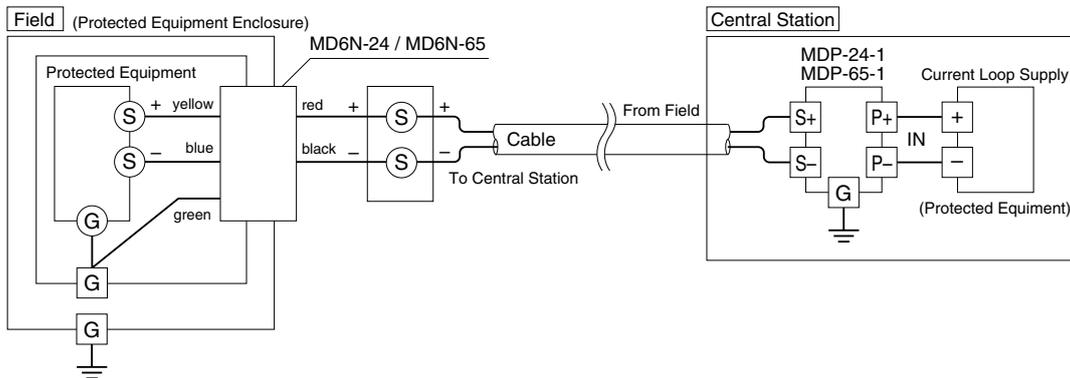
Note: The MD6T and the MD6N have a functional ground terminal, but DO NOT USE THIS TERMINAL FOR SURGE PROTECTION. It is used only when the protected device requires the functional grounding, e.g. for shield line ground to eliminate EM noise.

■ CONNECTION DIAGRAM

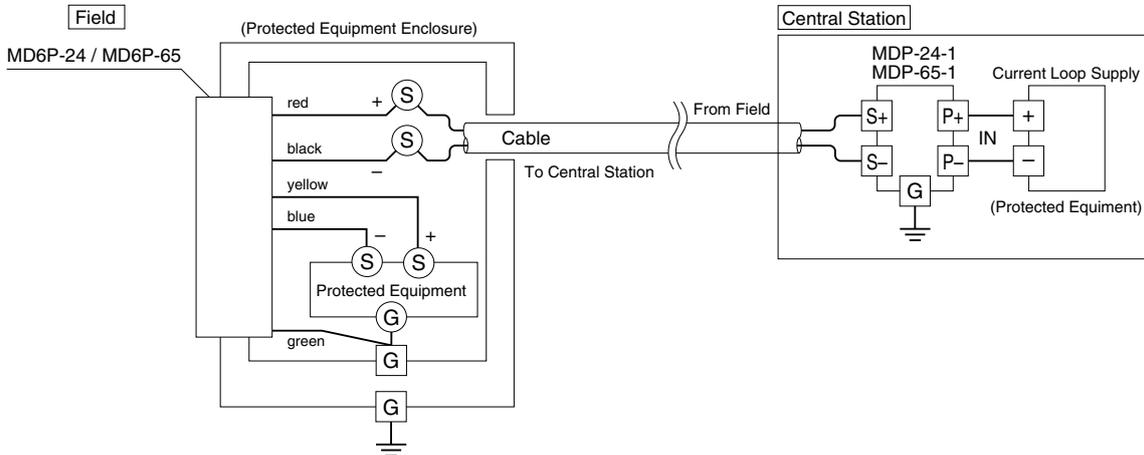
• MD6T Connection Diagram & Grounding



• MD6N Connection Diagram & Grounding



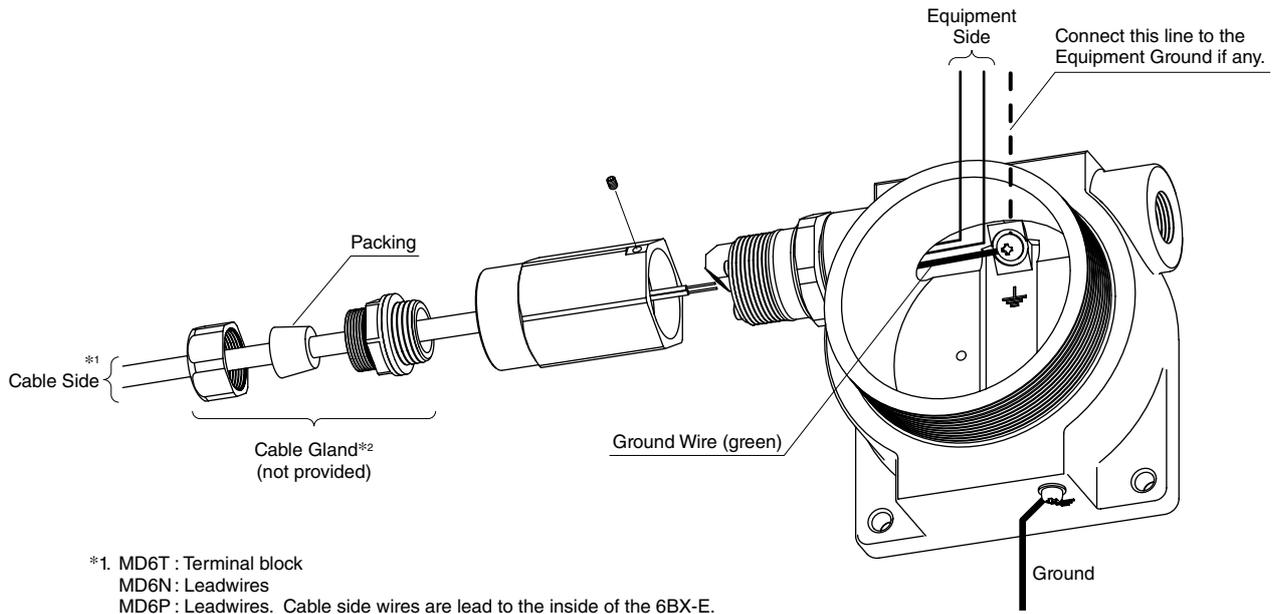
• MD6P Connection Diagram & Grounding



• Connecting The MD6x To Model 6BX-E Outdoor Enclosure

Connect the green leadwire to the ground terminal inside the enclosure to ground through the enclosure's outside ground terminal.

If the enclosure does not have an inside ground terminal, connect the green leadwire directly to the outside ground wire pulled inside the enclosure. Keep the ground wire as short as possible.



*1. MD6T : Terminal block
MD6N : Leadwires
MD6P : Leadwires. Cable side wires are lead to the inside of the 6BX-E.

*2. For wiring the MD6T, a cable gland is required. The packing of the cable gland must be separate from the body. Choose an appropriate one for the environment in which the surge protector is used.

CABLE GLAND (Model MD6T)

The packing of the cable gland must be separate from the body. Choose an appropriate one for the environment in which the surge protector is used.

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 wire is connected to the enclosure of the protected equipment.
- 3) Make sure that the ground wire is properly grounded to earth.

DISCHARGE ELEMENT

- 1) Remove all wiring connected to the surge protector when you test the module.
- 2) Check resistance across the following terminals on the high resistance range of multimeter and confirm no conduction. The tester should show 10 MΩ or greater.

• MD6T

Terminals (1) – (2), Terminal (1) – Green wire,
(2) – Green wire

• MD6N and MD6P

Red wire – Black wire, Red wire – Green wire,
Black wire – Green wire

When connecting the multimeter across Terminals (1) and (2), positive voltage must be applied to Terminal (1). Likewise, for Red and Black wires, positive voltage must be applied to the Red wire.

- 3) Confirm discharging across the same terminals with a 500V DC 1000 MΩ insulation tester. The tester should show 20 MΩ or less.
- 4) If any of the above tests shows negative, replace the surge protector.