

**LIGHTNING SURGE PROTECTOR FOR
RS-485 / RS-422 (full-duplex)**

MODEL **MDW5-4R**

BEFORE USE

Thank you for choosing M-System. Before use, check the contents of package you received as outlined below. If you have any problems or questions on the product, please contact M-System's Sales Office or representatives.

■ PACKAGE INCLUDES:

Lightning surge protector (1)

■ MODEL NO.

Check that model No. described on specification label is exactly what you ordered.

■ INSTALLATION / INSTRUCTION MANUAL

This manual describes necessary points of caution when you use this product, including 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 RS-485 or RS-422 transmission line

■ SPECIFICATIONS

	BETWEEN LINES	LINE TO SG	TO GROUND
Discharge voltage	±5V min. 6-7, 8-9	5V min. 6/7/8/9-10	±140V min. each line-G
Max. surge voltage*	±25V max. 1-2, 3-4	25V max. 1/2/3/4-5	±600V max. each line-G
Leakage current	≤0.2mA @±5V 6-7, 8-9	≤0.2mA @5V 6/7/8/9-10	≤10µA @±140V each line-G
Response time	≤4 nsec.	≤4 nsec.	≤20 nsec.
Capacitance (approx.)	500 pF @100 kHz	500 pF @100 kHz	100 pF @100 kHz
Discharge current	10kA (8 / 20 µsec.)		
Max. load current	100mA		
Internal series resist.	approx. 4.0Ω including return		
Max. line voltage	±5V		
Input attenuation	-0.5 dB max. @DC...2.0 MHz, Z ₀ = 110Ω		
Transmission speed	≤1.5 Mbps recommended		

*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 an enclosure with proper ventilation.
- 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 (23 to 131°F) and relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.

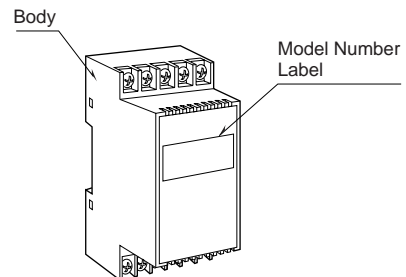
■ DIELECTRIC STRENGTH TESTING

- The unit will start discharging when 140V or greater voltage is applied between lines and ground. DO NOT perform dielectric strength tests with wires connected to the unit.

■ AND

- We recommend that you keep spare M-RESTERs so that you can replace them when necessary.
- Lightning surge can enter not only through signal lines but also through power supply lines. We recommend that you also use the Lightning Surge Protector for Power Lines for adequate protection.

COMPONENT IDENTIFICATION

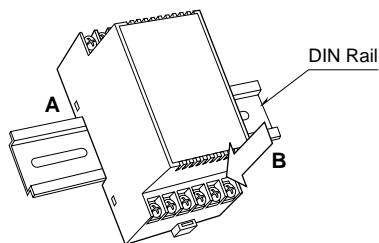


INSTALLATION

Set the unit so that its mounting adapter is at the bottom.

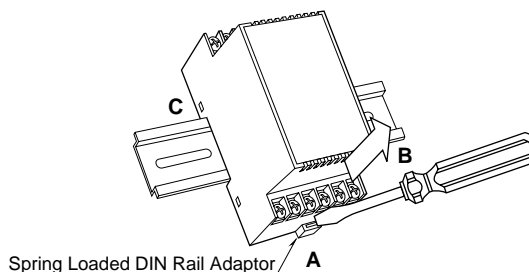
■ MOUNTING THE UNIT ON A DIN RAIL

- A) Hang the upper hook at the rear side of unit on the DIN rail.
- B) Push in the lower in keeping pressing the unit to the DIN rail.



■ REMOVING THE UNIT

- A) Push down the DIN rail adaptor utilizing a minus screwdriver.
- B) Pull out the lower part of the unit.
- C) Detach the upper part from the DIN rail.



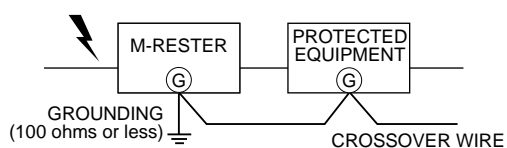
TERMINAL CONNECTIONS

Connect the unit as in the diagram below.

Be sure to cross-wire between the Ground terminal (11) and that of the protected equipment as shown below.

When the M-RESTER is connected with a device which has no Ground terminal such like M-System's (See figure below), ground the M-RESTER Ground terminal (11) only.

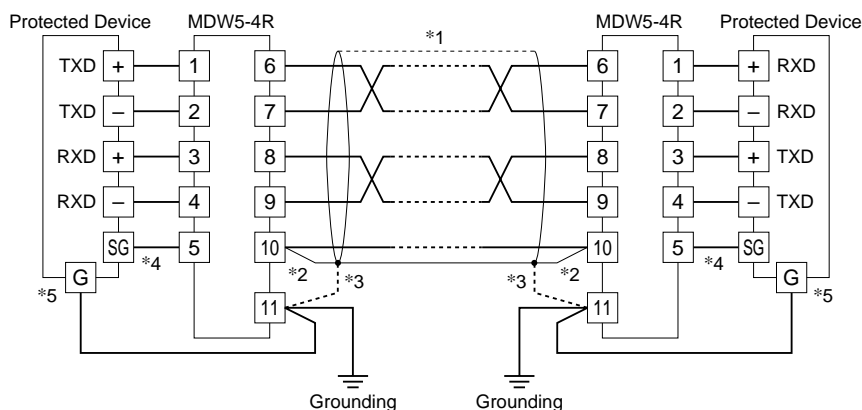
■ GROUNDING



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.

■ CONNECTION DIAGRAM



*1. Connect Terminals [6] - [7] and [8] - [9] when using a 4-core cable.

*2. This wiring is Not needed for a cable without shield.

*3. Cross wire to Terminal [11] when grounding the shield wire (if necessary).

*4. Leave Terminal [5] when the protected device has no [SG] (Signal Ground) terminal.

*5. Cross wire to the protected device's [G] terminal with Terminal [11] of the surge protector.
Ground only the surge protector if the protected device has no [G] terminal.

MAINTENANCE

Check M-RESTER periodically. Many cases of lightning are ignored, and even lightning at a far distance often causes inductive surges.

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 (11) is connected to the metallic housing of protected device.
- Make sure that the Ground terminal (11) is grounded to earth.

DISCHARGE ELEMENT

Remove all wiring connected to M-RESTER when you test the head element module.

- Check resistance across the following terminals on the high resistance range of multimeter (measuring current $\leq 0.25\mu\text{A}$) and confirm no conduction.

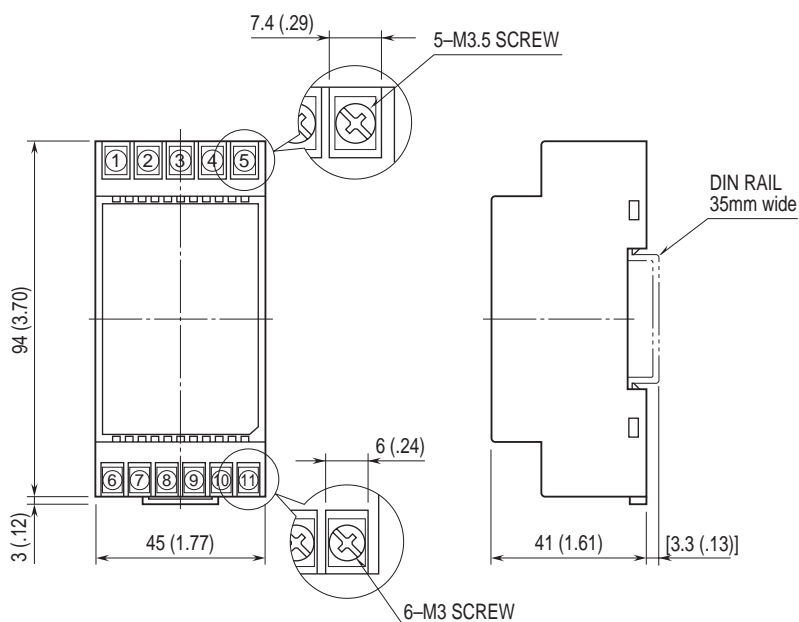
Terminals (6) – (7), (8) – (9), (6) – (10), (7) – (10), (8) – (10), (9) – (10), (10) – (11)

The tester should show $10\text{M}\Omega$ or more at (10) – (11), $1\text{M}\Omega$ or more at other terminals. When measuring across (6) – (10), (7) – (10), (8) – (10) and (9) – (10), connect the tester's probe so that the positive voltage is applied to (6), (7), (8), (9) respectively.

- Confirm conduction across the same terminals with a 500V DC $1000\text{M}\Omega$ insulation tester in the same manner as with the tester. The tester should show $20\text{M}\Omega$ or less.

- If any of the above tests shows negative, replace the M-RESTER.

EXTERNAL DIMENSIONS mm (inch)



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

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.

M-System Co., Ltd., 5-2-55, Minamitsumori, Nishinari-ku, Osaka 557-0063 JAPAN, Phone: (06) 6659-8201, Fax: (06) 6659-8510, E-mail: info@m-system.co.jp