

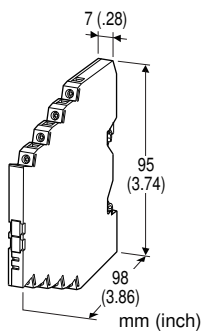
## Lightning Surge Protectors for Electronics Equipment M-RESTER

### LIGHTNING SURGE PROTECTOR FOR STANDARD SIGNAL LINE

(ultra-slim)

#### Functions & Features

- High discharge current capacity 20 kA (8 / 20 $\mu$ s), 1 kA (10 / 350  $\mu$ s)
- Ultra-thin 7-mm-wide module can be mounted in high density
- Excellent protection employing multi-stage SPD circuits
- DIN rail mounting and grounding
- Shield terminal provided
- CE marking



**MODEL: MD7ST-[1][2][3][4]**

#### ORDERING INFORMATION

- Code number: MD7ST-[1][2][3][4]
- Specify a code from below for each [1] through [4]. (e.g. MD7ST-24FF00)
- For the safety approval code 2, specify the product's destination country using Ordering Information Sheet (No. ESU-8057).

#### [1] NOMINAL VOLTAGE

- 24: 24 V DC
- 60: 60 V DC

#### [2] SHIELD TERMINAL (line / earth)

- FF: Floating / Floating
- FG: Floating / Grounding
- GF: Grounding / Floating
- GG: Grounding / Grounding

#### [3] LOOP DISCONNECT FUSE

- 0: Without
- 1: With (CENELEC/ATEX approval Not selectable)

#### [4] SAFETY APPROVAL

- 0: None
- 2: CENELEC intrinsic safety (ATEX)

#### RELATED PRODUCTS

- Loop disconnect fuse (model: MD7F)

#### GENERAL SPECIFICATIONS

- Construction:** Slim-sized front terminal structure
- Degree of protection:** IP20
- Connection:** Euro terminal block (torque 0.3 N·m)
- Applicable wire size:** 0.2 - 2.5 mm<sup>2</sup>
- Grounding:** DIN Rail
- Housing material:** Flame-resistant resin (black)
- Loop disconnect fuse:** Current rating 250 mA (Separates the protected device from the power source when the former fails in the shortcircuit mode.)

#### INSTALLATION

- Operating temperature:** -25 to +85°C (-13 to +185°F) (See Safety Parameters for use in a hazardous location.)
- Operating humidity:** 30 to 90 %RH (non-condensing)
- Mounting:** DIN Rail (TH35-7.5, 1-mm-thick)
- 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.
- Weight:** 70 g (2.5 oz)

## PERFORMANCE

MODEL NO.	NOMINAL VOLTAGE SHLD TERMINAL	MD7ST-24				MD7ST-60			
		FF	FG	GF	GG	FF	FG	GF	GG
Max. continuous operating voltage (Uc)	Line to Line	30V				70V			
	Line to Earth	±160V		30V		±160V		70V	
	Line to SHLD	±160V		30V		±160V		70V	
	SHLD to Earth	±160V	short	±160V	short	±160V	short	±160V	short
Voltage protection level (Up) @4kV (1.2 / 50 µs)	Line to Line	60V				115V			
	Line to Earth	±800V		±60V		±800V		±115V	
	Line to SHLD	±1200V	±800V	±60V		±1200V	±800V	±115V	
	SHLD to Earth	±800V	short	±800V	short	±800V	short	±800V	short
Leakage current @Uc	Line to Line	≤5µA				≤5µA			
	Other sections	≤5µA				≤5µA			
Response time	Line to Line	≤4 nsec.				≤4 nsec.			
	Other sections	≤20 nsec.				≤20 nsec.			
Max. discharge current (Imax)	20kA (8 / 20 µs), 1.0kA (10 / 350 µs)								
Nominal current (In)	250mA								
Internal series resistance	Without fuse	4.7Ω ±10% per line				10Ω ±10% per line			
	With fuse	7.5Ω ±10% per line				12.5Ω ±10% per line			

## STANDARDS & APPROVALS

### CE conformity:

ATEX Directive (94/9/EC)  
 Ex ia EN 60079-11: 2007  
 Category 1G EN 60079-26: 2007  
 EMC Directive (2004/108/EC)  
 EMI EN 61000-6-4: 2007  
 EMS EN 61000-6-2: 2005

### Safety approval:

CENELEC: Intrinsic safety (ATEX)  
 Ⓢ II 1G, Ex ia IIC; T4 and T5  
 EN 60079-0: 2006  
 EN 60079-11: 2007  
 EN 60079-26: 2007

Surge protection: IEC 61643-21: 2000  
 (Categories C1, C2, D1)

## SAFETY PARAMETERS

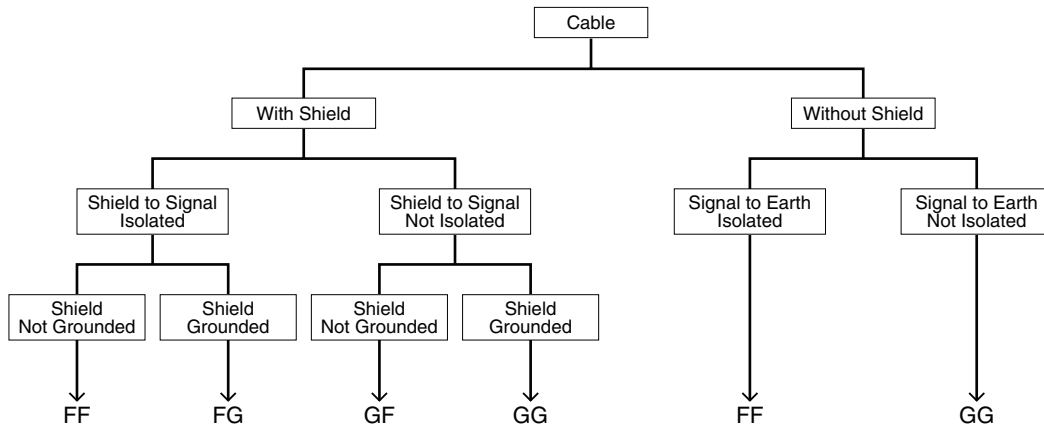
### ■ CENELEC / ATEX IS DATA

	MD7ST-24	MD7ST-60	
Ui (Vmax)	32V	60V	
Ii (Imax)	any	any	
Ci	10 nF	5 nF	
Li	0 µH	0 µH	
Pi	Temp. Class	Range	Parameter
	T4	-25 to +40°C	1.3W
		-25 to +60°C	1.2W
		-25 to +80°C	1.0W
T5	-25 to +40°C	1.0W	

## DESCRIPTIONS

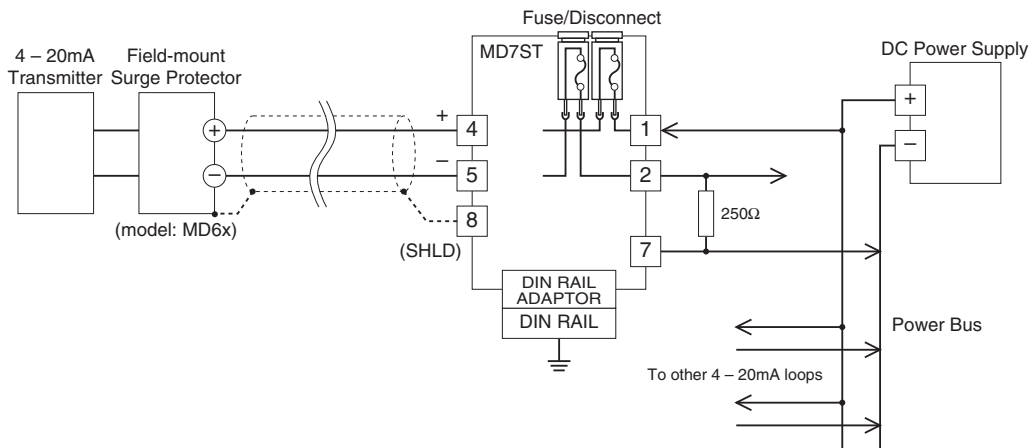
### ■ SELECTING SHIELD TERMINAL TYPE

- The surge protector has a dedicated shield terminal effective for easy shield wiring and surge protection.
- Review the shield method (grounding, non-grounding, connecting to SG, etc.) required by the protected device or system.
- There is no electrical effect to the shield by installing the surge protector, but an appropriate shield terminal type must be selected to suit user applications.
- Refer to the flow chart below to choose.

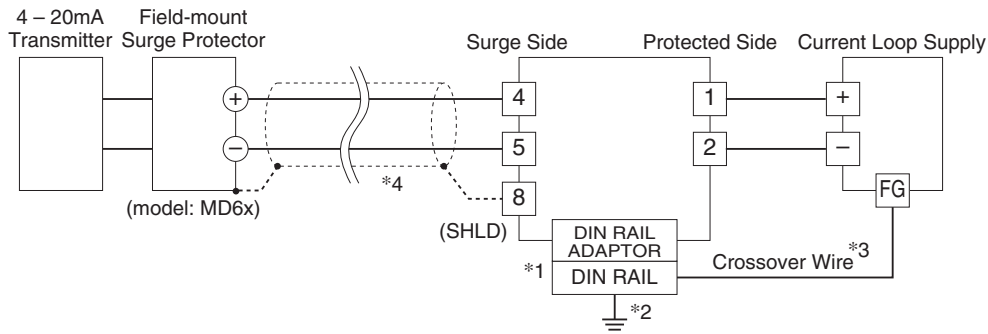


### ■ SELECTING LOOP DISCONNECT FUSE

- Specify 'Loop disconnect fuse' type when multiple transmitters are connected to single power bus.
- Loop disconnect fuse is used to separate a transmitter loop from the power bus when it fails in the shortcircuit mode.

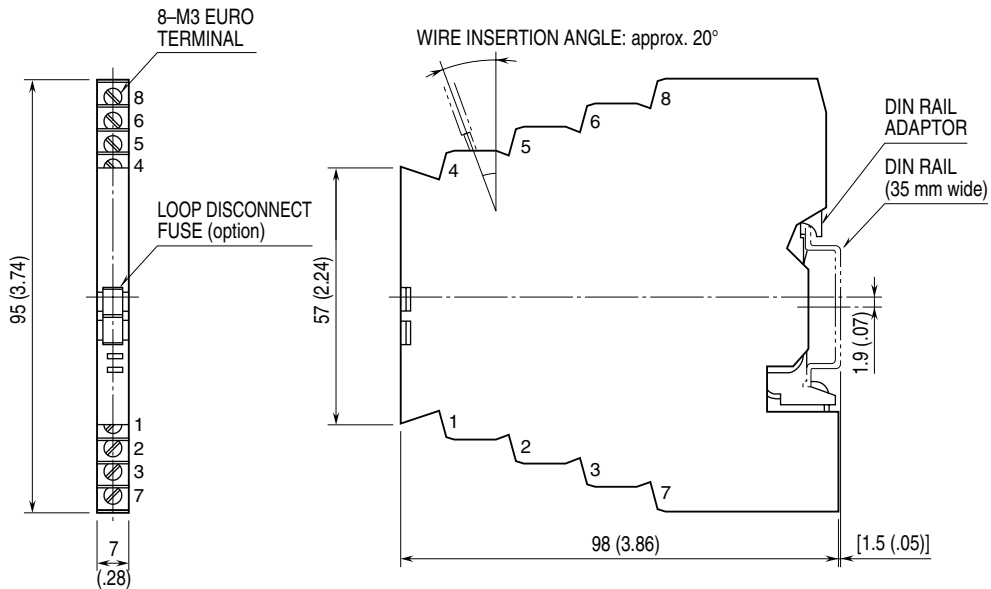


## CONNECTION EXAMPLES



- \*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. Shield wiring method is an example. Proceed according to the system requirements.

## EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



## SCHEMATIC CIRCUITRY

SHIELD TERMINAL	MODEL NO.	SCHEMATIC CIRCUITRY	APPLICATIONS
<ul style="list-style-type: none"> <li>Line to SHLD: Floating</li> <li>Earth to SHLD: Floating</li> </ul>	<ul style="list-style-type: none"> <li>MD7ST-xFF0x (No fuse option)</li> <li>MD7ST-xFF1x (Fuse option)</li> </ul>		<ul style="list-style-type: none"> <li>Standard type</li> <li>To protect a device having isolation between Signal and Earth.</li> <li>When SHLD should be floating against the earth. (single-end grounding)</li> </ul>
<ul style="list-style-type: none"> <li>Line to SHLD: Floating</li> <li>Earth to SHLD: Grounding</li> </ul>	<ul style="list-style-type: none"> <li>MD7ST-xFG0x (No fuse option)</li> <li>MD7ST-xFG1x (Fuse option)</li> </ul>		<ul style="list-style-type: none"> <li>To protect a device having isolation between Signal and Earth.</li> <li>When SHLD should be grounded. (single- or both-end grounding)</li> </ul>
<ul style="list-style-type: none"> <li>Line to SHLD: Grounding</li> <li>Earth to SHLD: Floating</li> </ul>	<ul style="list-style-type: none"> <li>MD7ST-xGF0x (No fuse option)</li> <li>MD7ST-xGF1x (Fuse option)</li> </ul>		<ul style="list-style-type: none"> <li>To protect a device having isolation between Signal and Earth.</li> <li>When SHLD wire should be connected to SG terminal of the protected device. (SHLD is not grounded to the earth.)</li> </ul>
<ul style="list-style-type: none"> <li>Line to SHLD: Grounding</li> <li>Earth to SHLD: Grounding</li> </ul>	<ul style="list-style-type: none"> <li>MD7ST-xGG0x (No fuse option)</li> <li>MD7ST-xGG1x (Fuse option)</li> </ul>		<ul style="list-style-type: none"> <li>To protect a device which does not have a good dielectric strength between Signal and Earth.</li> </ul>

Sections enclosed with broken line may differ depending upon the models; without Fuse/Disconnect option, fuse circuit is shorted.



Specifications are subject to change without notice.