

Lightning Surge Protectors for Electronics Equipment M-RESTER

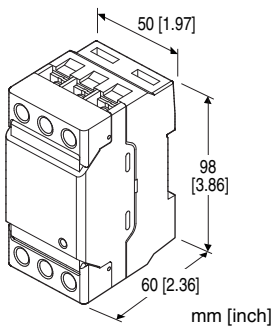
LIGHTNING SURGE PROTECTOR FOR THREE-PHASE POWER SUPPLY

Functions & Features

- Connected in parallel between the power and earth lines regardless of load current
- Applicable to single phase 2/3-wire and three-phase 3/4-wire system
- High discharge current capacity 20 kA or 40 kA (8/20 μ s)
- Degraded head element is automatically separated from the power lines by the incorporated thermal breaker, and the LED lamp (turns off) and the relay contact alerts the failure status.
- Complies with IEC 61643-11 Class II

Typical Applications

- Low-voltage distribution board
- Combination with installation for large load current



MODEL: MAT3-240[1]M[2]

ORDERING INFORMATION

- Code number: MAT3-240[1]M[2]
- Specify a code from below for each of [1] and [2]. (e.g. MAT3-2403MY)

OPERATIONAL VOLTAGE

240: 240 V AC

[1] POWER SYSTEM

- 3: Single-phase 2/3-wire, Three-phase 3-wire
- 4: Single-phase 2/3-wire, Three-phase 3/4-wire

MAXIMUM DISCHARGE CURRENT

M: 20kA (8/20 μ sec.)

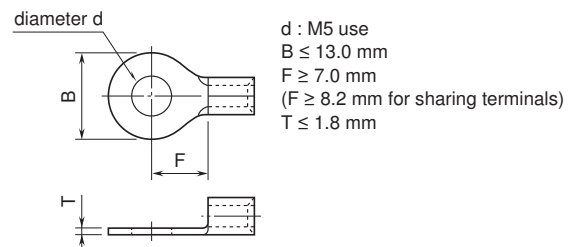
[2] ALARM OUTPUT

- A: With
- Y: Without

GENERAL SPECIFICATIONS

- Construction:** Standalone; terminal access at the front
- Degree of protection:** IP20 (If the solderless terminals are covered with insulation tubes.)
- Surge protection type:** Voltage limiting type one-port SPD
- Connection**
 - Line:** M5 screw terminal (torque: 2.5 N·m)
 - Alarm output:** Tension clamp
- Applicable wire size**
 - Line:** See the drawing below.
 - Alarm output:** 0.13 to 1.5 mm², stripped length 8 mm
- Screw terminal**
 - Line:** Nickel-plated steel
 - Alarm output:** Tin-plated copper alloy
- Housing material:** Flame-resistant resin (black)
- Alarm output:** SPDT relay contact trips when the thermal breaker operates.
- OUTPUT TERMINAL A1 - C**
 - Normal: Open
 - Failure or power off: Close
- OUTPUT TERMINAL A2 - C**
 - Normal: Close
 - Failure or power off: Open
- Rated load:**
 - 250 V AC @1 A (resistive load)
 - 24 V DC @1 A (resistive load)
- Safety function:** Thermal breaker incorporated
- Monitor LED:** Green LED turns on during normal condition and turns off during failure condition, power off or the thermal breaker operating.

• Applicable Solderless Terminal Size



INSTALLATION

- Operating temperature:** -5 to +55°C (23 to 131°F)
- Operating humidity:** 5 to 95 %RH (non-condensing)
- Mounting:** DIN Rail
- Weight:** 300 g (0.66 lb)

PERFORMANCE

Response time: ≤ 3 nanoseconds (≤ 20 nanoseconds for N to PE)

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

Dielectric strength: 2000 V AC @1 minute (line to alarm output)

Surge protection: IEC 61643-11 Class II
EN 61643-11 Class II

MODEL	MAX. CONTINUOUS OPERATING VOLTAGE (Uc)	DISCHARGE VOLTAGE (Vmin)	VOLTAGE PROTECTION LEVEL (Up)	OPERATIONAL VOLTAGE RANGE *1 (50 / 60Hz)
MAT3-240	Between lines: 240 V AC N to PE: 320 V AC	Between lines: 400V N to PE: 680V	1500	1-phase/2-wire, 3-phase/3-wire: 90 – 240V AC 1-phase/3-wire: 90 / 180 – 120 / 240V AC 3-phase/4-wire: 170 – 240V AC

MODEL	MAX. LEAKAGE CURRENT @Uc			
	ALARM OUTPUT	WITH	WITHOUT	
MAT3-240	Line to Line	1 to 2	28mA *2	6mA *3
		Other sections	2mA	2mA
	N to PE	10μA	10μA	

*1. MAT3 is operational as an SPD despite the voltage less than the minimum. However, the functions of the monitor LED and the alarm output are not guaranteed.

*2. Approx. 12mA @100V AC

*3. Approx. 3mA @100V AC

MODEL	MAX. DISCHARGE CURRENT (Imax)	NOMINAL DISCHARGE CURRENT (In)
MAT3-240xMx	20kA (8/20μsec)	10kA (8/20μsec)

STANDARDS & APPROVALS

EU conformity:

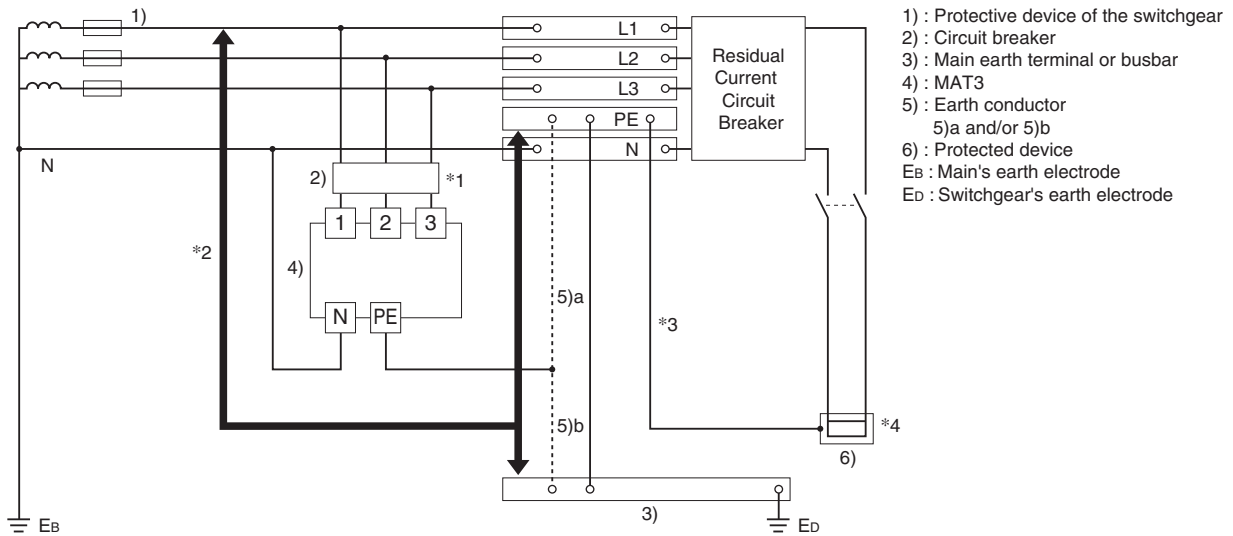
Low Voltage Directive

EN 61643-11

RoHS Directive

CONNECTION EXAMPLES

■ INSTALLATION EXAMPLES: Three-phase 4-wire connection



- *1. The circuit breaker or the fuse as disconnectors must be installed.
 Molded-case circuit breaker (MCCB) or residual current circuit breaker with overcurrent protection (RCD) can be used.
 The rated interrupting capacity of the circuit breaker must be greater than the highest amount of current that could be available in the circuit.
 Install MCCB (rated current 20 – 30A) that has element for each phase.
 Or RCD with protection from nuisance tripping against transit voltages type or time-delay overcurrent protection type is recommended.
 Recommended sensitivity current rating: 30mA
- *2. Cable length between the branch point and the earthing: 0.5 meters or less recommended
- *3. The protected device's metal enclosure must be cross-wired to the earth terminal of the MAT3. If the protected device has no earth terminal, earth only the MAT3.
- *4. In order to protect an electronic circuit such as measuring equipment or communication equipment, we recommend to use surge protectors which have serial impedance incorporated such as our models MAX, MMA, MAH.

■ CONNECTION EXAMPLES BY POWER SYSTEMS

Abnormal voltages appearing in case of a light load or a fault earth loop must be within the maximum continuous operational voltage when selecting the MAT3 models.

POWER SYSTEM	Single-phase/2-wire		Three phase/3-wire (delta connection)	
CONNECTION				
EXAMPLE	Power System (example)	SPD1	Power System (example)	SPD1
	Single-phase/2-wire 110V AC	MAT3-240xMx	Three-phase/3-wire 220V AC	MAT3-240xMx
	Single-phase/2-wire 220V AC	MAT3-240xMx		
POWER SYSTEM	Single-phase/2-wire (three-phase delta connection earthed in the middle of phases) Single-phase/3-wire		Three-phase/4-wire (star connection)	
CONNECTION				
EXAMPLE	Power System (example)	SPD1	Power System (example)	SPD1
	Single-phase/2-wire 110V AC	MAT3-240xMx	Three-phase/4-wire 220V AC	MAT3-2404Mx
	Single-phase/3-wire 220/110V AC	MAT3-240xMx		

*1. For TT system, in order to ensure safe failure mode at TOV due to earth fault on high-voltage systems, connect between terminal 2 and N of the MAT3.

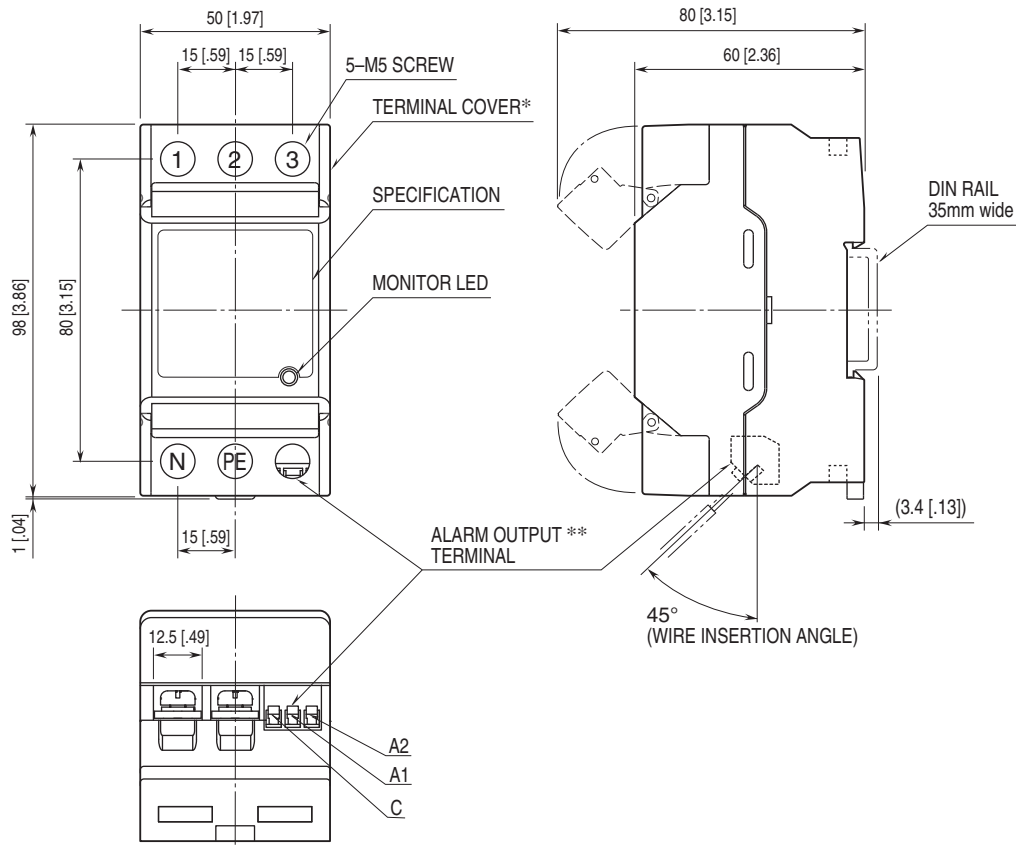
*2. For TT system, in order to ensure safe failure mode at TOV due to earth fault on high-voltage systems, install a four-pole (three-pole plus neutral) circuit breaker.

*3. For single-phase/2-wire system, connect lines to terminal 1 and 2 of the MAT3. For single-phase/3-wire system, connect the neutral line to terminal 2 of the MAT3.

■ ALARM OUTPUT

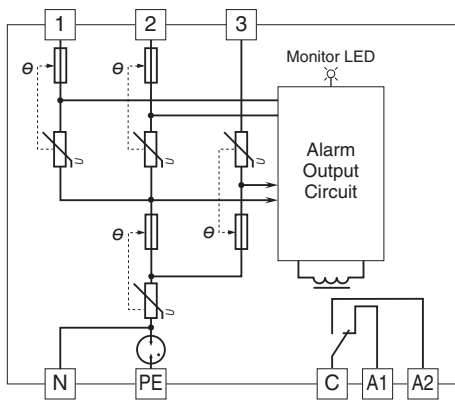
When the alarm output is to be transmitted remotely via outdoor cables, a surge protector for the signal line is required.

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



* Open/close type.
 ** Only for 'Alarm output' code 'A.'

SCHEMATIC CIRCUITRY



theta: Thermal breaker
 Note: Terminals C, A1 & A2 are available for 'Alarm output' code 'A.'
 The schematic shows the relay contact status of a thermal trip or power off.



Specifications are subject to change without notice.