# Lightning Surge Protectors for Electronics Equipment M-RESTER

SURGE PROTECTOR FOR PHOTOVOLTAIC SYSTEM
(750V DC,1000V DC USE)

Functions & Features
• Surge protection for photovoltaic array and power conditioner.
• High discharge current capacity 20 kA
• 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.
• Breakdown of the surge protector remotely detected with the alarm output
• Photovoltaic system's resistance to earth is measurable without removing the SPD due to spark gap employed between line and earth.

CE
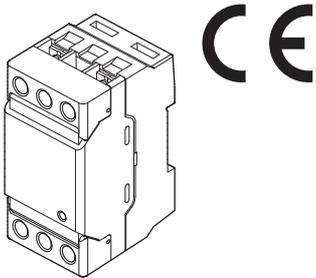
MODEL: MATPH–[1]M[2]

ORDERING INFORMATION
• Code number: MATPH-[1]M[2]
Specify a code from below for each of [1] and [2].
  (e.g.MATPH-1000MA)

[1] OPERATIONAL VOLTAGE
750: 750 V DC
1000: 1000 V DC

MAXIMUM DISCHARGE CURRENT
M: 20kA (8/20 µsec.)

[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: One-port combination type 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 mm^2, stripped length 8 mm
Screw terminal
  Line: Nickel-plated steel
  Alarm output: Tin-plated copper alloy
Housing material: Flame-resistant resin (black)
**Alarm output**: Trips when the thermal breaker operates. (N.C. contact)
Rated load:
250 V AC @50 mA (resistive load)
24 V DC @50 mA (resistive load)
Safety function: Thermal breaker incorporated
Monitor LED: Green LED turns on during normal conditions (100 V DC to operational votage), and turns off during failure condition, power off and the thermal breaker operating.

• **Applicable Solderless Terminal Size**

diameter d

d : M5 use
B ≤ 12.5 mm
F ≥ 7.0 mm
(F ≥ 8.2 mm for sharing terminals)
T ≤ 1.8 mm
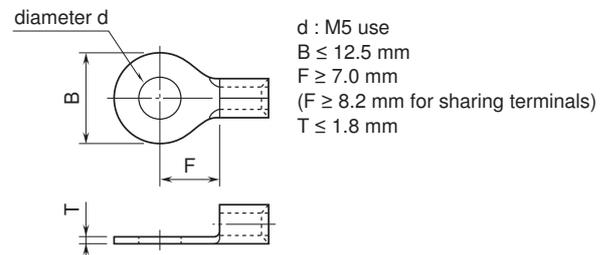
INSTALLATION
Operating temperature: -25 to +80°C (-13 to +176°F)
Operating humidity: 30 to 90 %RH (non-condensing)
Mounting: DIN Rail
Weight: 200 g (0.44 lb)

PERFORMANCE
Max. continuous operating voltage (Uc, Line to line):
 750 V DC for MATPH-750
 1000 V DC for MATPH-1000
Discharge voltage (Line to earth): 500 V DC
Voltage protection level (Up):
• MATPH-750
 Line to line: 2.5 kV (@In)
 Line to earth: 1.8 kV (@In)
• MATPH-1000

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Line to line: 3.3 kV (@In)
Line to earth: 2.1 kV (@In)
Maximum discharge current (Imax): 20 kA (8/ 20 μs)
Nominal discharge current (In): 10 kA (8/ 20 μs)
Response time:
Line to line: ≤ 4 nsec.
Line to earth: ≤ 20 nsec.
Leakage current: ≤ 1 mA
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 61643-1 Class II
EN 61643-11 Class II

STANDARDS & APPROVALS

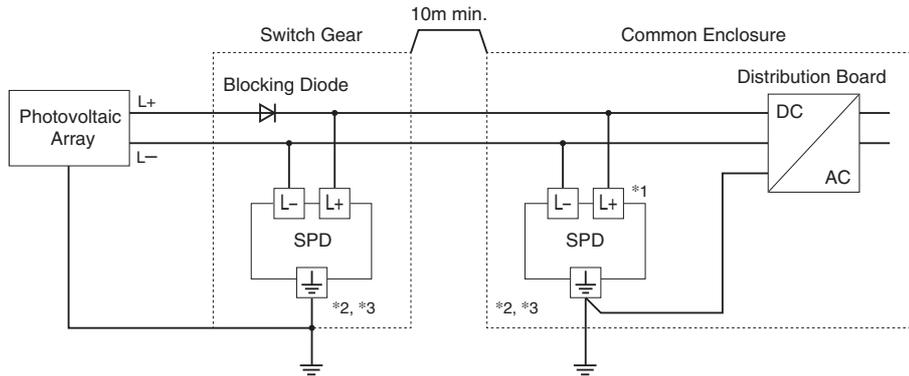**Refer to the manuals to comply with the standards.**
EU conformity:
Low Voltage Directive
EN 61643-11
RoHS Directive

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CONNECTION EXAMPLES

■ CONNECTION DIAGRAM

*1. When the wiring distance is longer than 10 m between the power conditioner and the surge protector in the switch gear, install near the power conditioner.
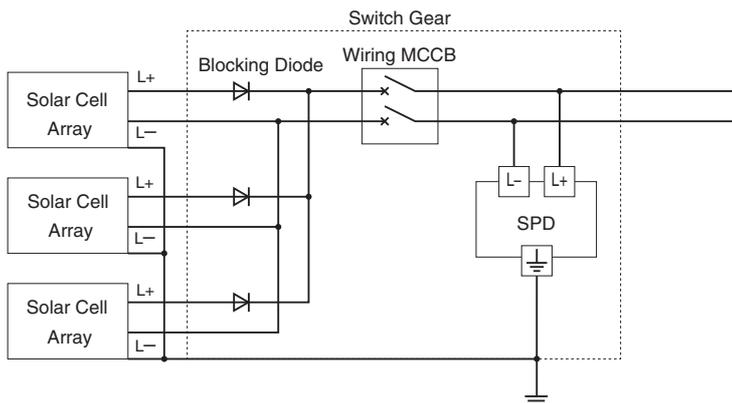
*2. Cable length between the branch point and the earthing: 0.5 m or less recommended

*3. When the solar panel manufacturer requires earthing at negative line of DC side, do NOT use the earth terminal of the SPD but use the L- terminal. If also, earthing at positive line is necessary, earth the L+ terminal.
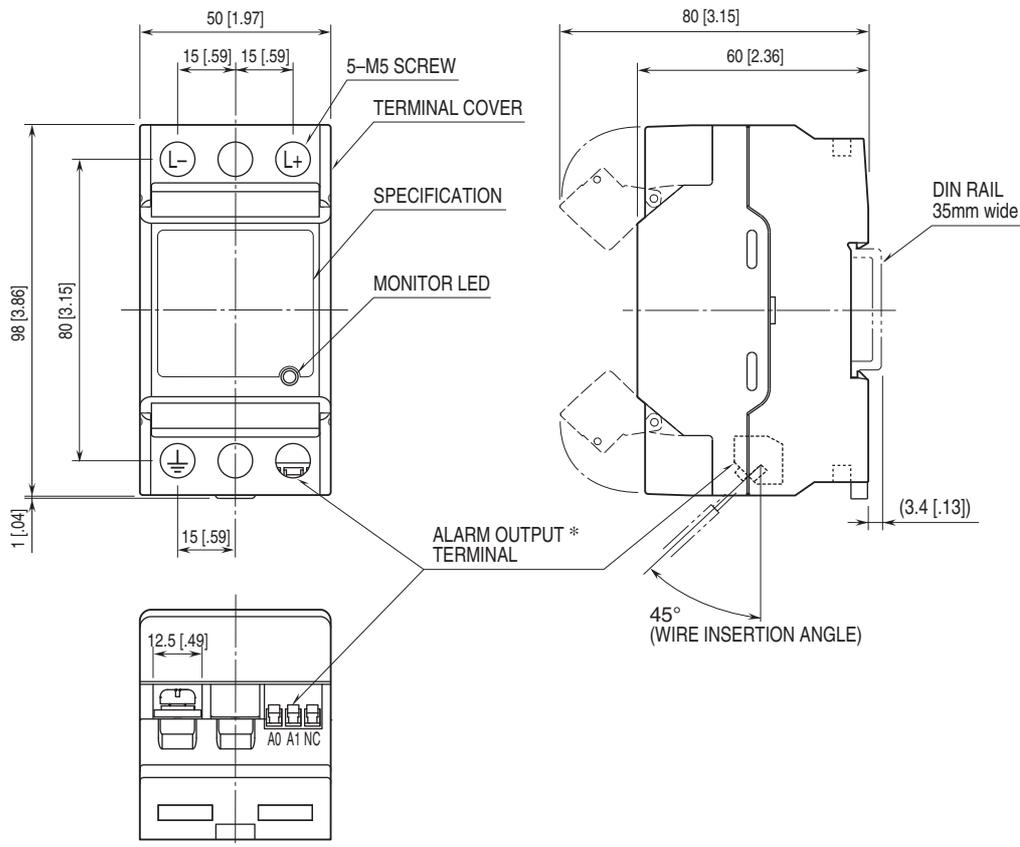
■ CIRCUIT BREAKER POSITION

If you want to use circuit breaker as SPD maintenance switch, insert a wiring MCCB for DC on SPD power side (diagram below).

Even when the output current of solar cell array is low, use 20 AT or more for wiring MCCB.
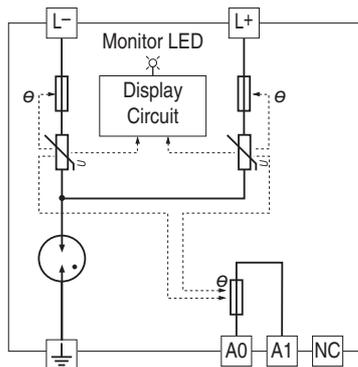
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EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS   unit: mm [inch]

50 [1.97]
15 [.59] 15 [.59]
5–M5 SCREW
TERMINAL COVER
L– L+
SPECIFICATION
MONITOR LED
98 [3.86]
80 [3.15]
1 [.04]
15 [.59]
ALARM OUTPUT *
TERMINAL

80 [3.15]
60 [2.36]
DIN RAIL
35mm wide
(3.4 [.13])
45°
(WIRE INSERTION ANGLE)

12.5 [.49]
A0 A1 NC

* Only for 'Alarm output' code 'A.'

SCHEMATIC CIRCUITRY

L– L+
Monitor LED
Display Circuit
θ   θ
θ
A0 A1 NC

θ: Thermal breaker
Note: Terminals A0 & A1 are available for 'Alarm output' code 'A.'

⚠ Specifications are subject to change without notice.