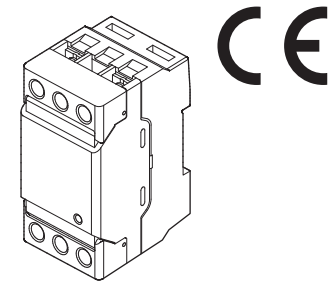


## Lightning Surge Protectors for Electronics Equipment M-RESTER

### 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.



### 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  $\mu$ 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:** 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<sup>2</sup>, 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:

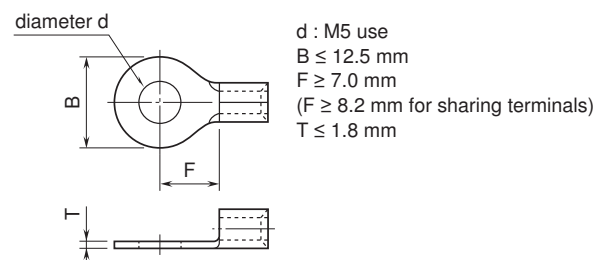
250 V AC @50 mA (resistive load)

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 voltage), and turns off during failure condition, power off and the thermal breaker operating.

#### • Applicable Solderless Terminal Size



#### 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

Line to line: 3.3 kV (@In)

Line to earth: 2.1 kV (@In)

**Maximum discharge current (Imax):** 20 kA (8/ 20  $\mu$ s)

**Nominal discharge current (In):** 10 kA (8/ 20  $\mu$ s)

**Response time:**

Line to line:  $\leq$  4 nsec.

Line to earth:  $\leq$  20 nsec.

**Leakage current:**  $\leq$  1 mA

**Insulation resistance:**  $\geq$  100 M $\Omega$  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:**

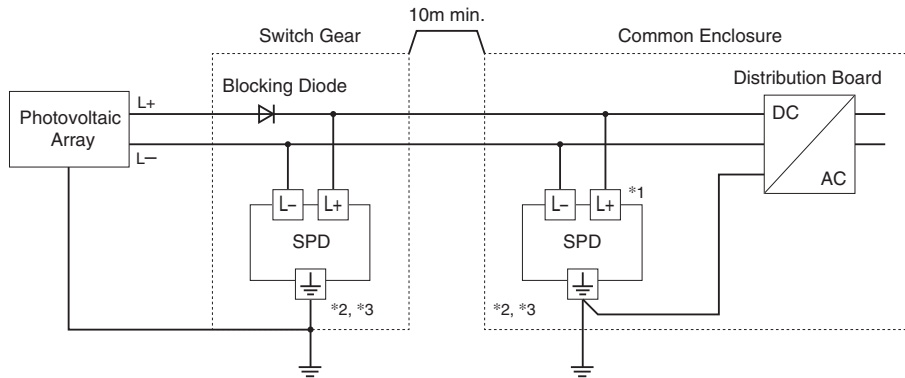
Low Voltage Directive

EN 61643-11

RoHS Directive

## 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.

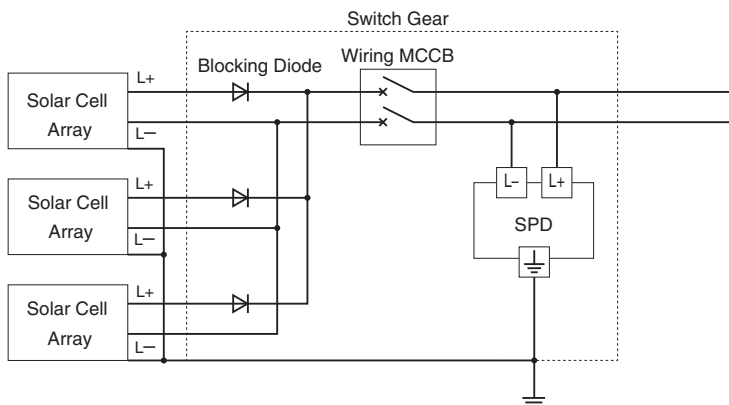
\*2. Cable length between the branch point and the earthing: 0.5 m or less recommended

\*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.

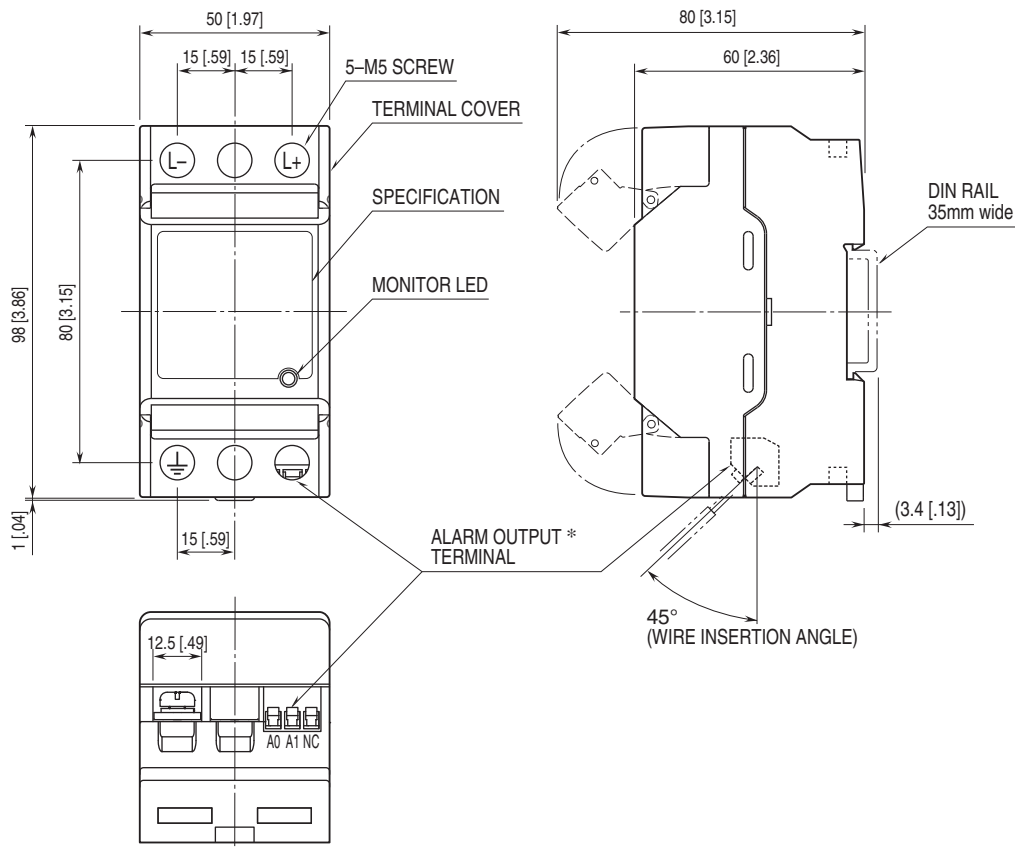
### ■ CIRCUIT BREAKER POSITION

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.

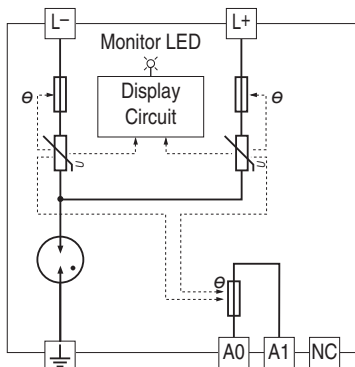


## EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



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

## SCHEMATIC CIRCUITRY



$\varnothing$ : Thermal breaker

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



Specifications are subject to change without notice.