

Breaker size SPD Instruction manual

OTOWA
OTOWA ELECTRIC CO.,LTD.

Model : LT-44T2HT,
LT-44T2HTS (with deterioration contact output terminal)

Please read the instructions before installing the product, as this instruction manual explains how to use the SPD effectively and safely.

The SPD conforms to the induced lightning current test specified in class II of IEC61643-11 : 2011. (When conforming to the standard IEC61643-11, a specified external disconnector is required.) This SPD does not with stand direct lightning surges that exceed the value described in the specification, and it may not protect the equipment connected. Please confirm the detailed specification, size, etc. using the brochure or data sheet.

1. Safety instruction

1) Instruction for use

- a) It is exceptionally difficult to predict the energy involved with lightning since it is a natural phenomenon. In the event of a direct lightning strike exceeding the specification or if there are multiple induced lightning currents in a short period of time, the SPD may deteriorate, short circuit and in the worst case fail. To prevent these problems from occurring and protect other equipment, follow instruction ① or ② below.

① The SPD should be installed in a grounded metal enclosure.

(Ex : metal distribution board)

② Install the SPD as shown in Figure 1 and install the external disconnector (fuse) to the primary side of the SPD.

b) Electrical condition for circuit

- ① Do not install the SPD on circuits where it is subjected to voltages above specified **Uc. (LT-44T2HT/44T2HTS=AC440V)**
- ② Do not use the SPD above the peak value of MCOV ($U_c \times \sqrt{2} V$), if DC or AC voltage has incomplete wave shape.
- ③ Do not use the SPD in the circuits that are subjected to frequent current surges with a very short interval between them.

c) Service environmental condition

- ① Do not expose the SPD to high temperature such as direct sunshine or install adjacent to hot object.
(Application temperature : $-20^{\circ}\text{C} \sim +50^{\circ}\text{C}$)
- ② Do not expose the SPD to adverse environmental conditions such as rain, wind, steam, dust, and salty air
- ③ Do not expose the SPD to acid, alkali, corrosion gas, solvent, oil, dust, and salt.
- ④ Handle the SPD carefully to prevent mechanical shock (e.g. drop) or vibration, as this may cause cracking of its plastic housing.

2) Instruction for regular maintenance (Electric shock attention)

When the maintenance of the SPD, please open the main switch or external separator attached to the primary side of the SPD.

3) In the unlikely event of failure of the SPD or if there is operation of the MCCB or ELB:

(1) Personnel without authorization to work on electrical circuitry

- Immediately contact the relevant authorized personnel but do NOT touch the SPD.

(2) Authorized person

- During inspection of the SPD, it must be isolated from the circuit by switching off the isolating switch on the electric input side of the SPD, or switching off the MCCB, ELB or disconnector to prevent an electric shock. For details of the inspection procedure, refer to "Regular maintenance" described in item 3. of this manual.

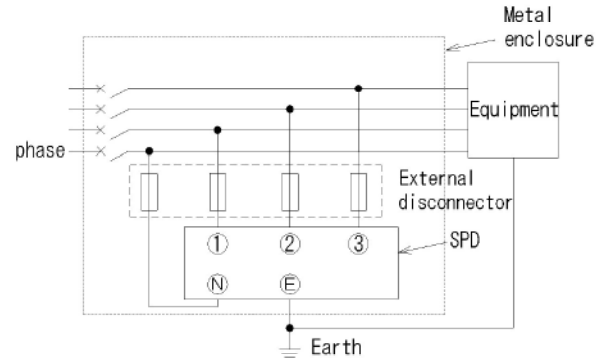


Fig.1 Installation method for SPD

2. Installation method of the SPD

Install the SPD and connect electric wires to the SPD by only authorized person.

1) Installation method

The SPD should be installed by any methods as shown in Fig.2 to Fig.5.

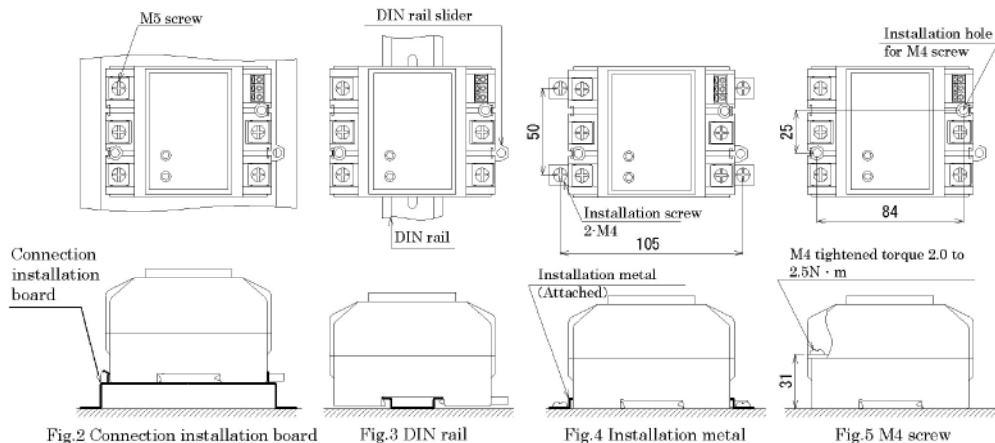


Fig.2 Connection installation board

Fig.3 DIN rail

Fig.4 Installation metal

Fig.5 M4 screw

See the back page

2) Connection of electric wire

- (1) Use an crimp-type terminal or copper bar connected to the connection terminal (M5screw) of the SPD.
- (2) Tighten the connection terminal (M5 screw) with the torque of 2.0 to 2.5N·m.
- (3) Conductor size for the insulated wires used to connect the SPD should be 5.5sq. to 14sq, or copper bar should be used to connect it. Keep the wires used for the connection as short as possible.
- (4) Do not expose the conductive part of electric wires by using a crimp terminal with an insulation cover to ensure the degree of protection provided by the enclosure (IP20). If the crimp terminal has no insulation cover, an insulation tube should be covered to the crimp terminal. When using a copper bar, also do not expose the conductive part of it by using an insulation tube.
- (5) Ground of the SPD should be connected to the ground terminal in the distribution board. Connect the equipment ground wire to the ground terminal in the distribution board. When it is not possible to connect to the distribution board grounding terminal, it should be grounded with one point after connecting distribution board grounding wire and equipment's grounding wire. Otherwise there is a possibility that the device can't be protected.

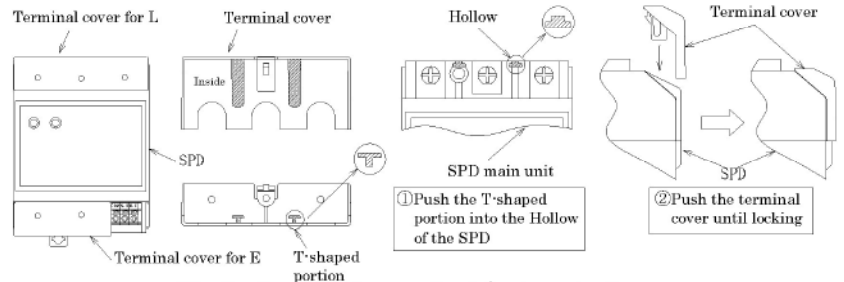


Fig.6 Installation method for terminal cover

3) Installing and removing method of terminal cover

- (1) After connecting an electric wire to the SPD, the terminal cover should be installed on the SPD (for L and E side) not to remove it easily. The terminal cover for L side should be installed to the line terminal, and the terminal cover for E side should be installed to the earth terminal. Installing method for both terminal covers is same.
- (2) When the terminal cover is removed, use a tool. After pushing the terminal cover up, remove it by hand. Removing method for both terminal covers is same.

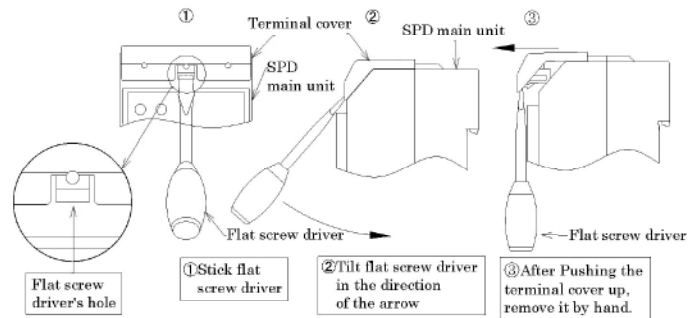


Fig.7 Removing method for terminal cover

4) Deterioration contact output terminal (LT-44T2HTS is only applied.)

- (1) Specification
 - ①Contact output : Normally open (a type) and Normally close (b type) (c type)
 - ②Maximum operating voltage / current : 250VAC / 1.5A, 110VDC / 0.2A
 - ③Application wire : Stranded AWG19 to 16 (about 0.75mm² to 1.25mm²)
Rigid φ0.4mm to φ1.2mm

(2) Using method

When using the deterioration contact output terminal, connect the signal line to the deterioration contact output terminal. Fig.8 shows circuit diagram.

Contact type	Terminal number
a type (Normally OFF, Deteriorated ON)	COM—N.O
b type (Normally ON, Deteriorated OFF)	COM—N.C

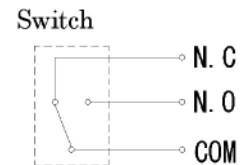


Fig.8 Circuit diagram

- (3) When connecting signal line to the deterioration contact output terminal, install the SPD as shown in below table on adjacent the monitoring device to protect it against lightning surge. (Ref: Fig.9)

Contact circuit voltage	Applied SPD
AC100V	LT-121
AC200V	LT-122
DC12V	SL-GV12J
DC24V	SL-GV24J
DC48V	SL-GV48J
DC100V	LT-121

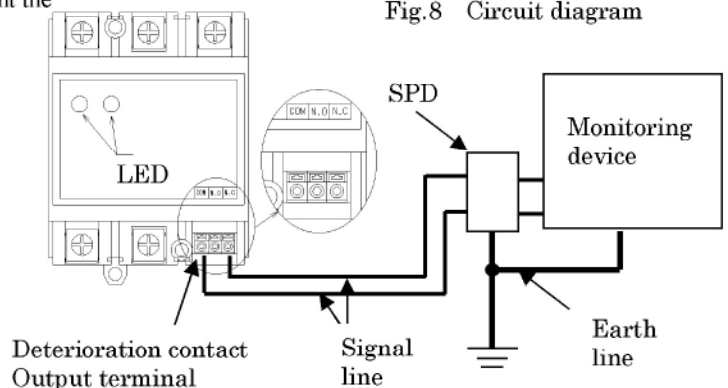


Fig.9 Installation method of the SPD (Connection example, b type : LT-44T2HTS is only applied)

3. Usual maintenance

Follow below instruction when maintenance. (Ref: 1.Safety instruction 2.Instruction for regular maintenance)

<Method of judging SPD and External disconnector>(Pass or Fail)

Please replace the SPD and fuse when it is in the following state. (If the fuse holder also has abnormality such as deformation, please replace the fuse holder together)

○ Appearance check

When the LED of SPD is off

- Check the following states and if it does not seem to satisfy the specification, please replace the SPD body and fuse because of both or one of SPD and fuse is deteriorated.

1) Confirmation of conduction of fuse

Remove the fuse from the fuse holder and check the conduction of the fuse. If there is no conduction please replace the fuse.

2) SPD Insulation resistance measurement (L to L)

When the insulation resistance between ①②③ on each terminal (between ①and②, ②and③, ①and③) is less than $10M\Omega$ by 500V and more than $10M\Omega$ by 1000V insulation tester, replace the SPD immediately.

○ SPD Insulation resistance measurement (L to PE)

When the insulation resistance between ①②③ on each terminal and PE terminal is less than $10M\Omega$ by 500V insulation tester, replace the SPD immediately.

○ Other

- When ELB operates many times, SPD may become deteriorated. Replace the SPD and confirm the ELB doesn't operate. (After replacing the SPD, please check that the breaker is not working)
- If the SPD case is discolored or deformed, please replace the SPD.

4. Company

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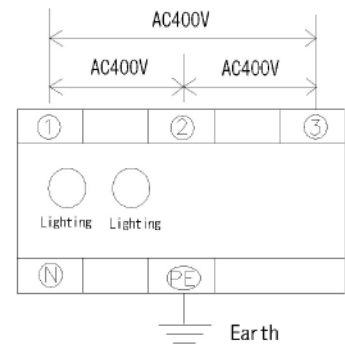


Fig.10 Lighting of the LED lamp while applying electric power