

# INSTRUCTION MANUAL

## Surge protective device (SPD)

### Type LSK-NC Series

**OTOWA**  
OTOWA ELECTRIC CO.,LTD.

**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. This SPD does not withstand 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.

Table 1 External view and Basic circuit diagram

External view	Basic Circuit diagram (LSK-NCXXXXS)	Installation circuit						
		<table border="1"> <tr> <td>Uc:275V</td> <td>LSK-NC2720S</td> </tr> <tr> <td>Uc:320V</td> <td>LSK-NC3220S</td> </tr> <tr> <td>Uc:440V</td> <td>LSK-NC4420S</td> </tr> </table>	Uc:275V	LSK-NC2720S	Uc:320V	LSK-NC3220S	Uc:440V	LSK-NC4420S
Uc:275V	LSK-NC2720S							
Uc:320V	LSK-NC3220S							
Uc:440V	LSK-NC4420S							

※Uc : Maximum Continuous Operating Voltage (MCOV)

Rated current of Backup Fuse	
> 125A gL/gG	⇒ 125A gL/gG
≤ 125A gL/gG	⇒ Not necessary

## 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 If the SPD is used to protect critical equipment, install Backup Fuse at the rated current more than 125A on the electric input side of the SPD. (Ref. Table1)

③ If there are any requests from customer, please follow them.

b) The SPD may deteriorate, short circuit or in the worst case fail due to the electrical conditions and application environment — keep the following instructions to prevent this happening.

① Do not install the SPD on circuits where it is subjected to voltages above specified MCOV.

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 shapes.

③ Do not use the SPD in the circuits that are subjected to frequent current surges with a very short interval between them.

④ Do not expose the SPD to high temperature such as direct sunshine or install adjacent to hot object.

(Application temperature : -40°C to 70°C)

⑤ Do not expose the SPD to adverse environmental conditions such as rain, wind, steam, dust, and salty air.

⑥ Do not expose the SPD to acid, alkali, corrosion gas, solvent, oil, dust, and salt.

⑦ 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

a) The SPD must be isolated from the circuit by switching off the isolating switch on the electric input side of the SPD, or removing the Backup Fuse shown in Table 1, to provide protection from an electric shock.

b) When measuring an insulation resistance of the SPD or conducting voltage withstand test, disconnect the SPD main unit from the fixing base. (Ref: Fig.1)

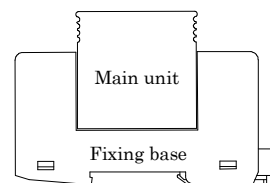


Fig.1 SPD main unit and fixing base

3) In the unlikely event of failure of the SPD or if there is an operation of isolating switch off or cut off the Backup Fuse:

a) Personnel without authorization to work on electrical circuitry — immediately contact the relevant authorized personnel but do NOT touch the SPD.

b) 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 removing the Backup Fuse shown in Table.1, to prevent an electric shock. For details of the inspection procedure, refer to "Regular maintenance" described in item 5. of this manual.

## 2. Installation method of the SPD

While installing the SPD, do the countermeasures against an electric shock.

1) The SPD should be installed on DIN rail only.

a) Installation method (Ref.Fig.2) :

After positioning the fixing base on DIN rail, push the fixing base into DIN rail until locking the slider on to the DIN rail.

b) Removing method (Ref.Fig.3) :

Pull the slider by using screw driver and pull off the fixing base from DIN rail.

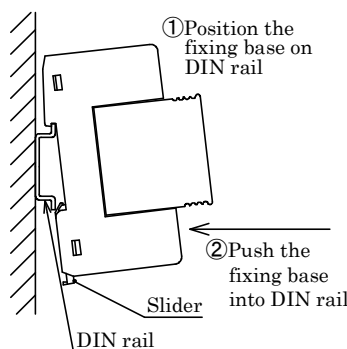


Fig.2 Installation on DIN rail

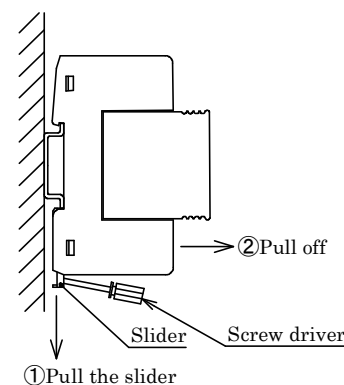


Fig.3 Removing from DIN rail

2) For connection of electric wires, use crimp terminals provided with an insulation cover. The wires should be securely connected to L and PE terminals of the SPD — torque for the terminal screw should be  $2.0 \sim 4.0 \text{ N} \cdot \text{m}$ . Minimum conductor size for the insulated wires used to connect the SPD should be  $1.5 \text{ mm}^2$  solid or flexible and maximum conductor size should be  $35 \text{ mm}^2$  stranded or  $25 \text{ mm}^2$  flexible. Keep the wires used for the connection as short as possible.

3) Installation and removing method of the SPD main unit (Ref : Fig.4, 5, 6, 7 )

a) When installing the SPD main unit, the concave of the SPD main unit (①part) should be fitted in the convex of the fixing base(②part). Push the SPD main unit down to the fixing base securely until the end. If the SPD main unit is not put in the fixing base until the end, the SPD may be no functioned normally.

b) When removing the SPD main unit from the fixing base, pull out with vertical direction (④part) while tilting the SPD main unit towards to the direction of arrow head ③, holding the both grab side of the SPD main unit.

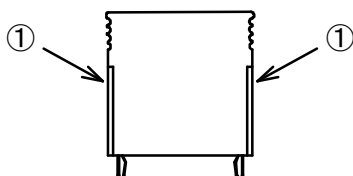


Fig.4 SPD main unit

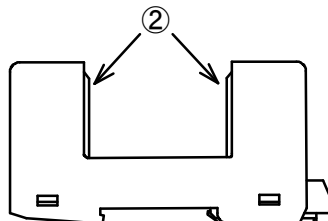


Fig.5 Fixing base

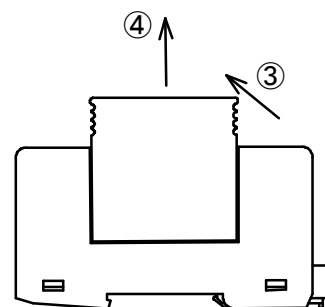
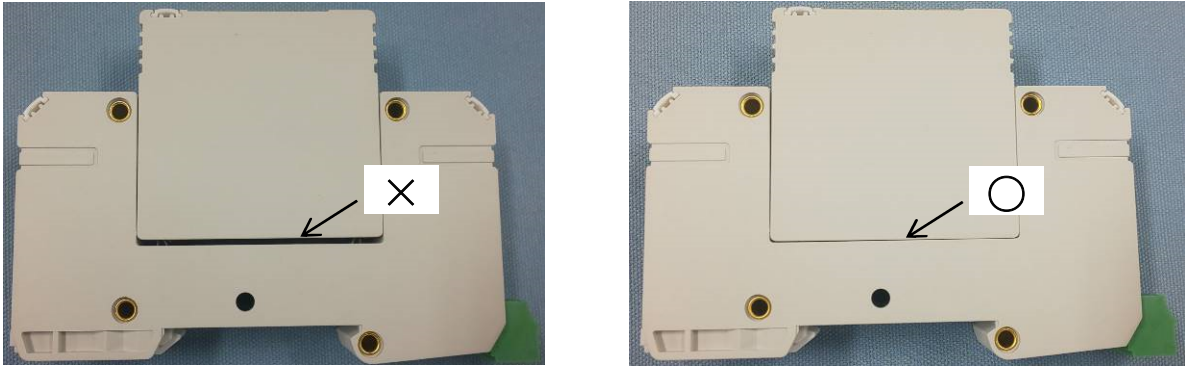


Fig.6 Removing method of SPD main unit



Push the SPD main unit down until the end not to space

Fig.7 Note of inserting condition of SPD main unit

**3. Replace of the SPD main unit**

The SPD main unit can be replaced when the SPD unlikely deteriorates.

(The status indicator on the SPD turns red and so on.)

When replacing the SPD main unit, please order the SPD main unit referred in Table 2.

For the method of removing and installing the SPD main unit, refer to “Installation method of the SPD” described in the item 2 of this manual.

Table 2 Type of SPD main unit (1 pcs)

Type of product	Type of SPD main unit (1 pcs)
LSK-NC2720S	LSK-2720M
LSK-NC3220S	LSK-3220M
LSK-NC4420S	LSK-4420M

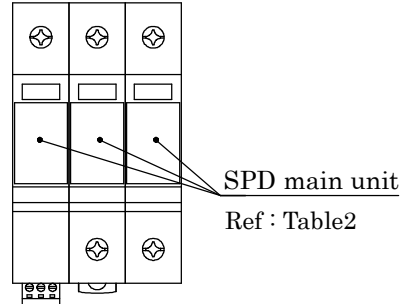


Fig.8 SPD main unit

**4. Remote signaling contact**

The SPD has a remote signaling contact as the changeover contact.

The SPD and terminal block of remote signaling contact are in a package separately. Insert this terminal block into the fixing base of the SPD. (Fig.9)



Fig.9-1 SPD and terminal block in a package

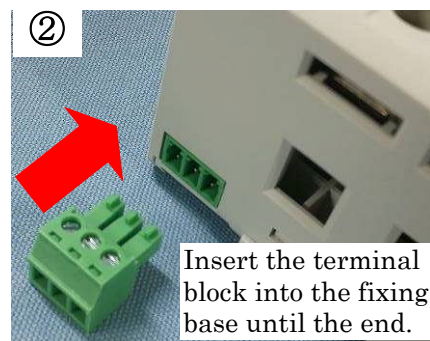


Fig.9-2 Insert the terminal block

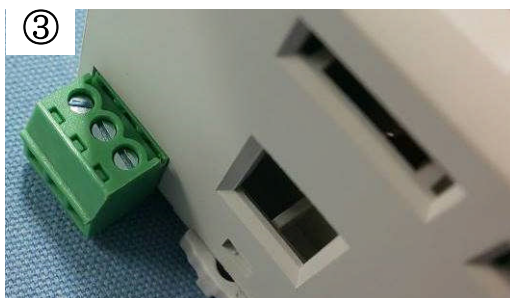


Fig.9-3 Connection of terminal block

1) The specification of switching capacity is shown in Table 3.

Table 3 Specifications of switching capacity

Switching capacity	[250VAC / 0.5A]	[250VDC / 0.1A]	[125VDC / 0.2A]	[75VDC / 0.5A]
Applied electric wire	1.5mm <sup>2</sup> solid / flexible (Max.)			

2) The connection of signal wires is shown in Fig.10.

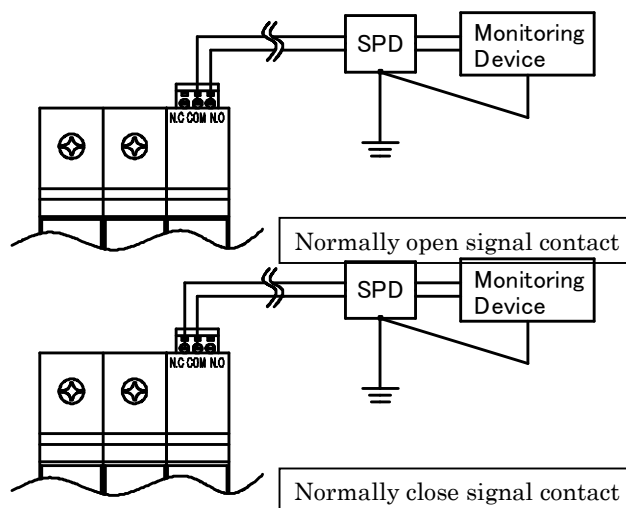


Fig.10 Connection of signal wires

- 3) When the monitoring device is far from SPDs, please install the SPD for protecting the monitoring device from induced lightning on the signal wires.
- 4) When connecting the signal wires to the signaling contact terminal, core wire of signal wire should not be out from the terminal.

## 5. Regular maintenance

- During the lightning season, and after lightning strikes, maintain the SPD as follows.
- When the maintenance, the SPD must be isolated from the circuit by switching off the isolating switch on the electric input side of the SPD, or removing the Backup Fuse shown in Table1, to prevent an electric shock.

- 1) If it is noted that the plastic housing has changed color or shape, replace the SPD.
- 2) If the status indicator on the SPD operates (Status indicator turns red), replace the SPD main unit.

Contact Us

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