

# SPD

Surge Protective Device

SD05K Serie



## Description

Surge Protection Device (SPD) is a transient surge suppression device consisting of varistor (MOV), Gas Discharge Tube (GDT) and thermal fuse (ATCO). When a high-amplitude transient surge occurs in the circuit, SPD suddenly changes to low impedance, clamping the voltage to a safe level and discharging the surge current.

SETsafe | SETfuse SD05K series is specially designed for outdoor lighting. Surge level complies with IEEE C62.41.2 Location category C high exposure level requirements to protect LED lights from damage by surges. SD05K series built-in Thermal protection, which can safely fail when suffering sustained overvoltage or internal varistor degradation.

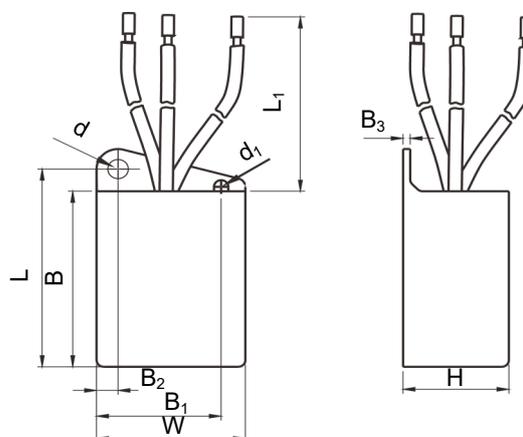
## Features

- Sealed Enclosure, IP66
- Differential and Common Mode Protections
- One-port or Two-port Surge Protective Device (SPD)
- Thermal Protection and Failure Indication
- Small Size

## Applications

- Outdoor Street Lighting
- Parking Lighting
- Highway Lighting
- Landscape Lighting
- Traffic and Signal Lighting

## Dimensions (mm)



L	L <sub>1</sub>	W	H
44.5 ± 1.0	150.0 ± 5.0	31.0 ± 1.0	22.0 ± 1.0
d	d <sub>1</sub>	B	B <sub>1</sub>
4.3 ± 0.5	3.0 ± 0.5	39.5 ± 1.0	26.0 ± 1.0
B <sub>2</sub>	B <sub>3</sub>		
4.5 ± 0.5	1.5 ± 0.2		

Note:

The wire length "L<sub>1</sub>" can be customized as required.

## Agency Approvals

Agency Information		Standards	NO.	Category
	UL	UL 1449	E322662	Type 4CA
	CUL	CSA C22.2 NO.269, CSA ECN 516	E322662	Type 4CA
	TUV	IEC/EN 61643-11, IEC/EN 61643-31	R 50441567	Class II
	CE	IEC/EN 61643-11, IEC/EN 61643-31	AN 50426133001	Class II
<b>Environment</b>	NA	RoHS 2.0 & REACH	Compliant	

### Specifications

Model	Max. Continuous Operating Voltage	Nominal Discharge Current (8/20 μs)	Max. Discharge Current (8/20 μs)	Voltage Protection Level	Rated Current <sup>a</sup>	Response Time	External Overcurrent Protection <sup>b</sup>	Schematic	Agency Approvals			
	$U_c$	$I_n$	$I_{max}$	$U_p$	$I_r$							
	(VAC)	(kA)	(kA)	(V)	(A)				(ns)	(A)	FIGURE	UL
SD05K120AM	150	5	10	1000	-	<100	10	SD05K-1	○	○	○	○
SD05K277AM	320	5	10	1800	-	<100	10	SD05K-1	●	●	●	●
SD05K347AM	420	5	10	2200	-	<100	10	SD05K-1	○	○	○	○
SD05K120GM	150	5	10	1000	-	<100	10	SD05K-2	○	○	○	○
SD05K277GM	320	5	10	1800	-	<100	10	SD05K-2	○	○	○	○
SD05K347GM	420	5	10	2200	-	<100	10	SD05K-2	○	○	○	○
SD05K120LM	150	5	10	800	-	<25	10	SD05K-3	○	○	○	○
SD05K277LM	320	5	10	1500	-	<25	10	SD05K-3	●	●	●	●
SD05K347LM	420	5	10	2000	-	<25	10	SD05K-3	○	○	○	○
SD05K120NM	150	5	10	800	-	<25	10	SD05K-4	○	○	○	○
SD05K277NM	320	5	10	1500	-	<25	10	SD05K-4	○	○	○	○
SD05K347NM	420	5	10	2000	-	<25	10	SD05K-4	○	○	○	○
SD05K120AMT	150	5	10	1000	7	<100	10	SD05K-5	○	○	○	○
SD05K277AMT	320	5	10	1800	7	<100	10	SD05K-5	●	●	●	●
SD05K347AMT	420	5	10	2200	7	<100	10	SD05K-5	○	○	○	○
SD05K120GMT	150	5	10	1000	7	<100	10	SD05K-6	○	○	○	○
SD05K277GMT	320	5	10	1800	7	<100	10	SD05K-6	○	○	○	○
SD05K347GMT	420	5	10	2200	7	<100	10	SD05K-6	○	○	○	○
SD05K120LMT	150	5	10	800	7	<25	10	SD05K-7	○	○	○	○
SD05K277LMT	320	5	10	1500	7	<25	10	SD05K-7	●	●	●	●
SD05K347LMT	420	5	10	2000	7	<25	10	SD05K-7	○	○	○	○
SD05K120NMT	150	5	10	800	7	<25	10	SD05K-8	○	○	○	○
SD05K277NMT	320	5	10	1500	7	<25	10	SD05K-8	○	○	○	○
SD05K347NMT	420	5	10	2000	7	<25	10	SD05K-8	○	○	○	○

Notes:

a: Rated Current of the Thermal Fuse.

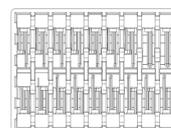
b: Recommended External Circuit Breaker Model: C 10 A, Curve C.

"●" indicates that the product has been certified, and "○" indicates that the product has not been certified.

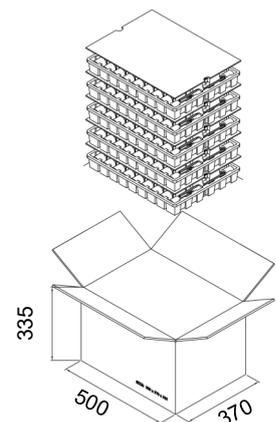
### Packaging Information

- Unit: mm
- Please contact us if you have special packaging requirement.

Item	Tray	Carton
Dimensions (mm)	470 × 350 × 57	500 × 370 × 335
Quantity (PCS)	72	360



5 Trays

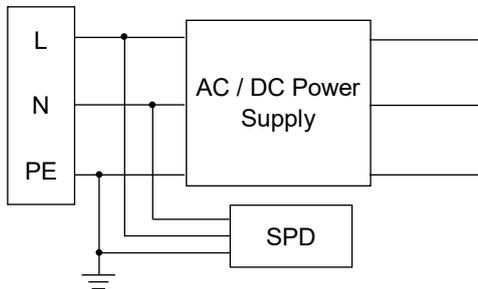


# SPD

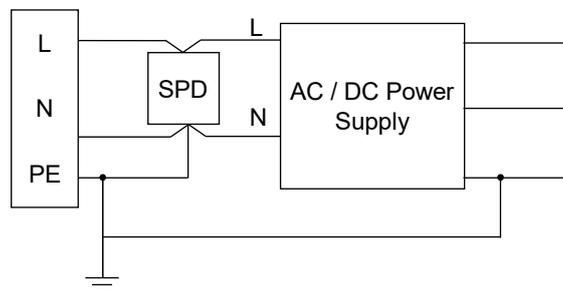
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## Wiring Diagram



Parallel Connection (One-port)

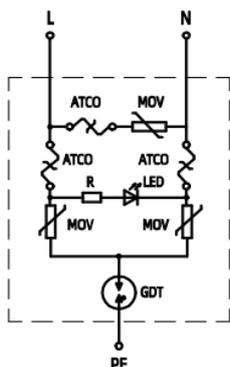


"Kelvin" Connection (Two-port)

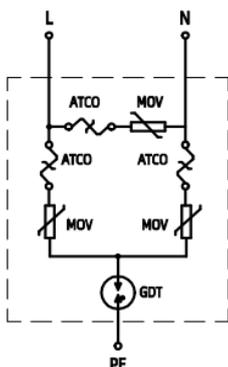
Notes:

- Internal thermal protection.
- Two-port "Kelvin" connection SPD can reduce the effect of inductance and achieve optimum overvoltage protection.

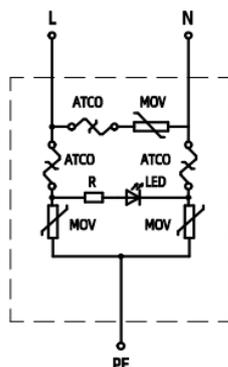
## Schematics



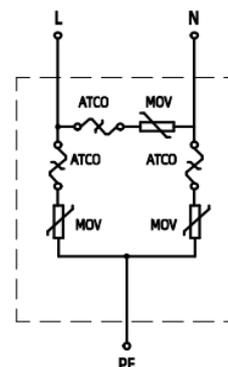
SD05KxxxAM Series  
FIGURE SD05K-1



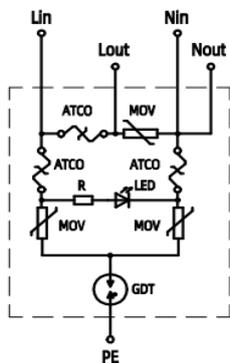
SD05KxxxGM Series  
FIGURE SD05K-2



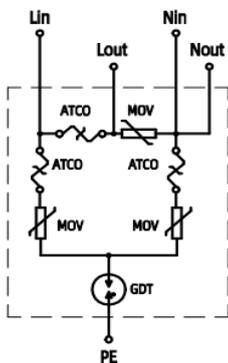
SD05KxxxLM Series  
FIGURE SD05K-3



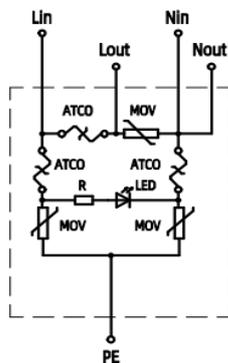
SD05KxxxNM Series  
FIGURE SD05K-4



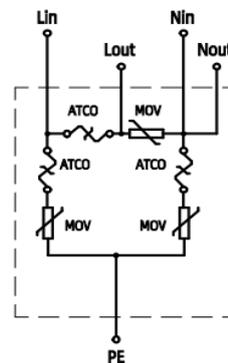
SD05KxxxAMT Series  
FIGURE SD05K-5



SD05KxxxGMT Series  
FIGURE SD05K-6



SD05KxxxLMT Series  
FIGURE SD05K-7

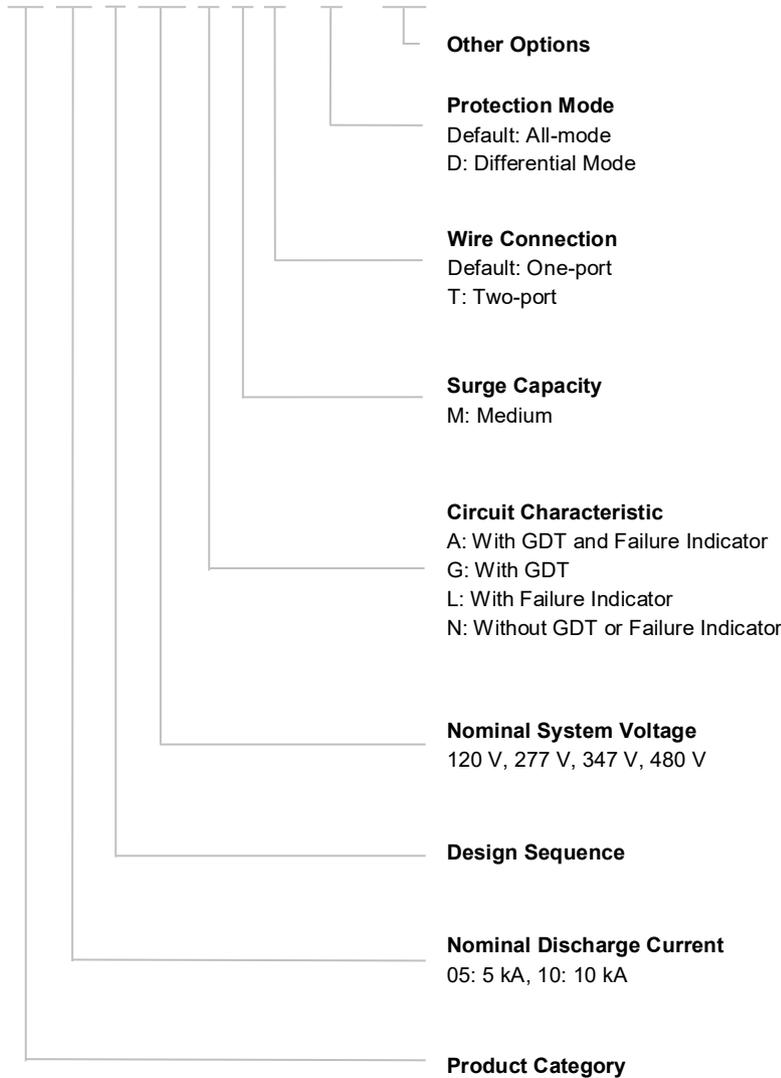


SD05KxxxNMT Series  
FIGURE SD05K-8

Note: The wire color can be customized according to relevant standards and customer requirements.

### Part Numbering System

SD 05 K 277 L M T - D - 001



Reminder:

Part numbering system in the datasheet is only for selecting correct parameter and product features. Before placing order, please contact us for specifications and use the part number and product code in the specifications to place order to ensure the part is correct. Product code is the unique identification.

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## Overvoltage

Electricity is an essential part of modern human production and life. But power facilities are threatened by internal and external overvoltages. Power system overvoltage mainly includes:

**Transient overvoltage of atmospheric origin:** Lightning strikes instantly generate high energy, generating surge currents up to hundreds of kA, and lightning wave can invade along power lines, causing damage to power facilities and electrical equipment

**Transient overvoltage due to switching:** Switching operations of a power utility may cause overvoltage.

**Temporary overvoltage:** A long duration (second level) temporary overvoltage (asymmetric ground fault) or harmonious overvoltage.

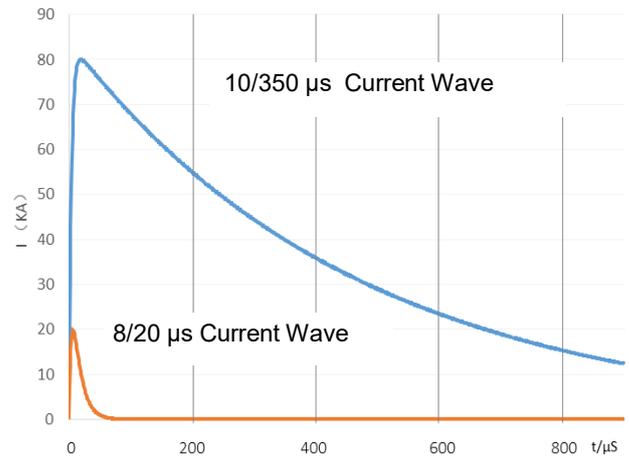
## Surge Voltage Caused by Lightning

Electrical and electronic system are subject to damage from a lightning electromagnetic impulse (LEMP). Therefore SPD need to be provided avoid failure of internal system. LEMP may caused by direct, near and far lightning strikes. According to the relevant research, lightning strikes within a certain distance may cause dangerous overvoltage on the cable, endangering the equipment connected to it.

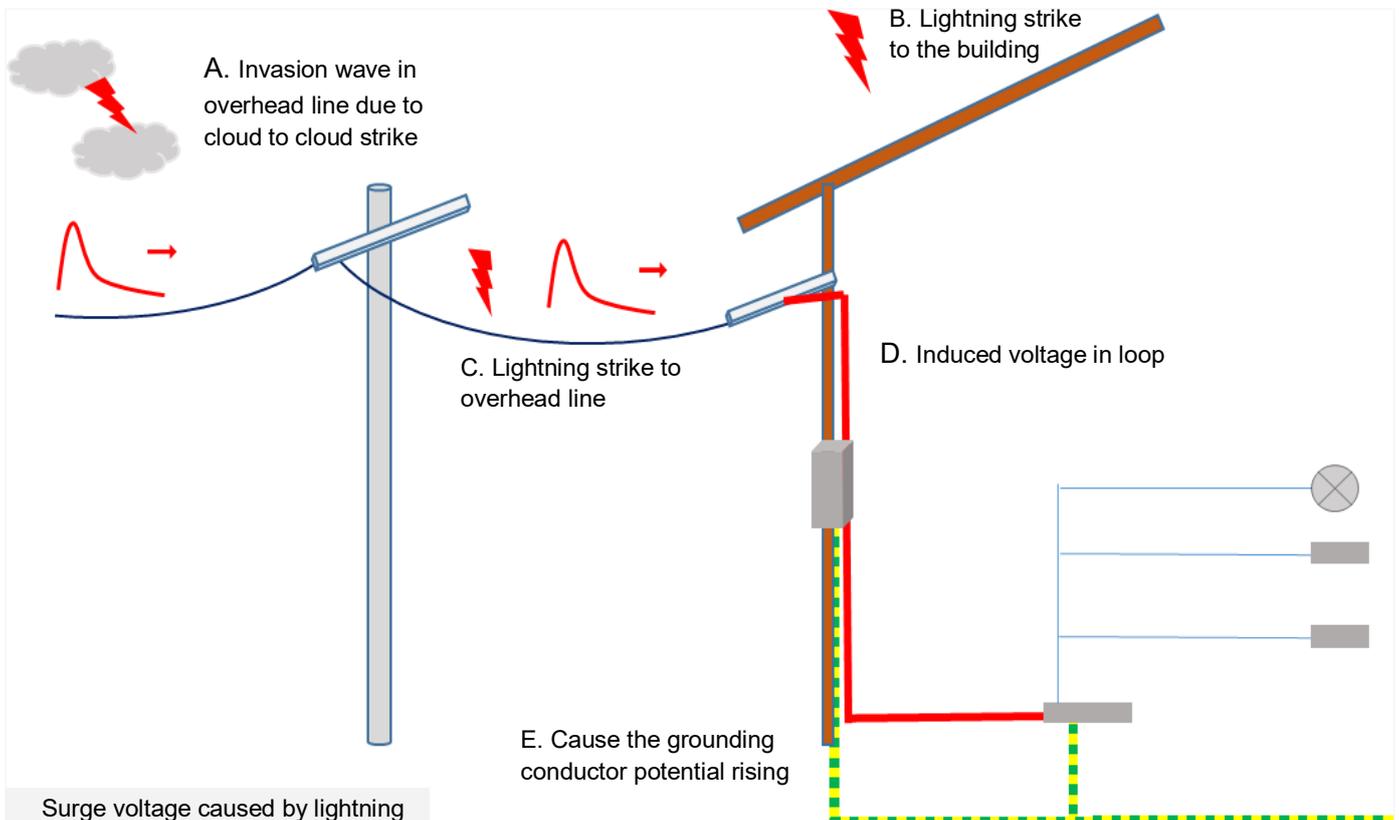
## Damage Due to Lighting

The lighting can cause three basic type of damage:

- D1: injury to living beings by electric shock;
- D2: physical damage (fire, explosion, mechanical destruction, chemical release) due to lightning current effects, including sparking;
- D3: failure of internal systems due to LEMP



Standard lightning test wave



Surge voltage caused by lightning

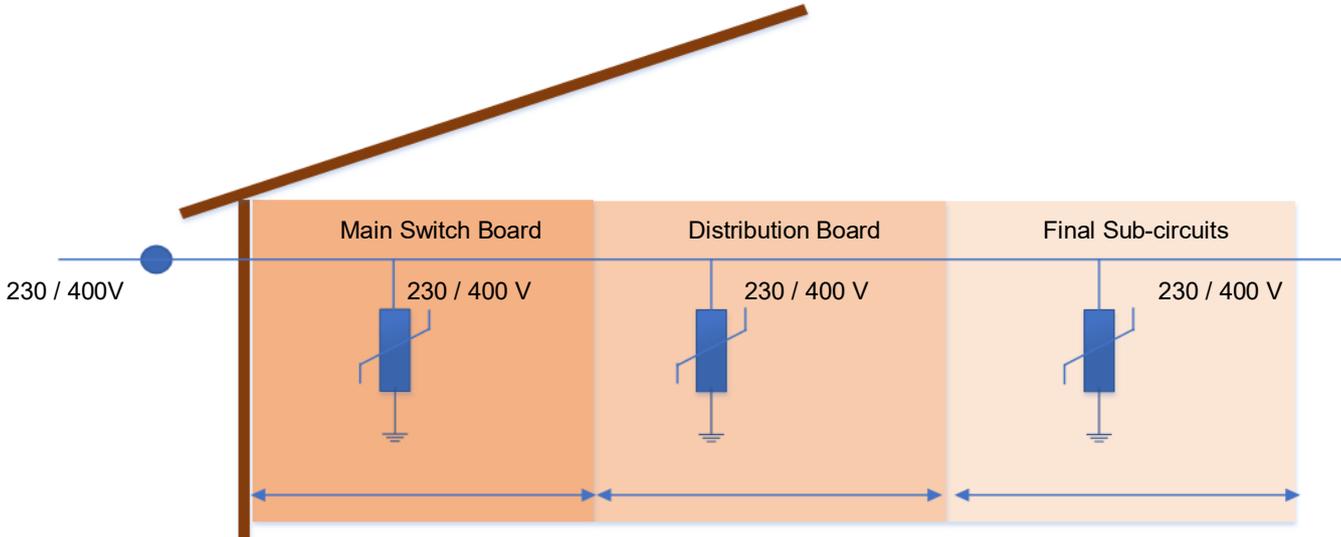
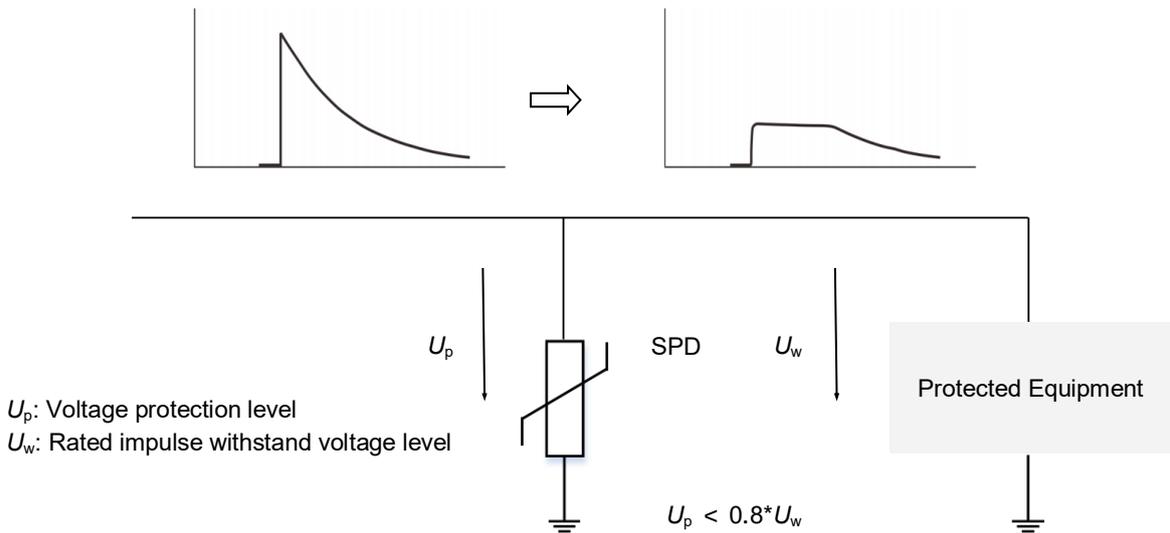
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Impulse Withstand Voltage and Surge Protection

As the primary equipment of internal lightning-proof, SPD needs to be able to withstand surge stress and provides the level of voltage protection required for the equipment. This involves the selection and coordination of SPD in different locations to form a complete protection system.



Overvoltage Category	IV	III	II	I
$U_w$ (kV) Impulse Withstand Voltage	6	4	2.5	1.5
Lightning Protection Zone LPZ	LPZ1	LPZ2	LPZn	
SPD Type	Class I or Class II	Class II	Class II or Class III	

## Glossary

Item	Description
$U_p$	<p><b>Voltage Protection Level</b></p> <p>Maximum voltage to be expected at the SPD terminals due to an impulse stress with defined voltage steepness and an impulse stress with a discharge current with given amplitude and waveshape.</p> <p>— (IEC 61643-11)</p>
8/20 $\mu$ s	<p><b>8/20 Current Impulse</b></p> <p>Current impulse with a nominal virtual front time of 8 <math>\mu</math>s and a nominal time to half-value of 20 <math>\mu</math>s.</p> <p>— (IEC 61643-11)</p>
1.2/50 $\mu$ s	<p><b>1.2/50 Voltage Impulse</b></p> <p>Voltage impulse with a nominal virtual front time of 1.2 <math>\mu</math>s and a nominal time to half-value of 50 <math>\mu</math>s.</p> <p>— (IEC 61643-11)</p>
$U_c$	<p><b>Maximum Continuous Operating Voltage</b></p> <p>Maximum r.m.s. voltage, which may be continuously applied to the SPD's mode of protection.</p> <p>— (IEC 61643-11)</p>
$I_n$	<p><b>Nominal Discharge Current</b></p> <p>Crest value of the current through the SPD having a current waveshape of 8/20.</p> <p>— (IEC 61643-11)</p>
$I_{imp}$	<p><b>Impulse Discharge Current for Class I Test</b></p> <p>Crest value of a discharge current through the SPD with specified charge transfer Q and specified energy W/R in the specified time.</p> <p>— (IEC 61643-11)</p>
$I_{max}$	<p><b>Maximum Discharge Current</b></p> <p>Crest value of a current through the SPD having an 8/20 waveshape and magnitude according to the manufacturers specification. <math>I_{max}</math> is equal to or greater than <math>I_n</math>.</p> <p>— (IEC 61643-11)</p>
<b>Modes of Protection</b>	<p><b>Modes of Protection</b></p> <p>An intended current path, between terminals that contains protective components, e.g. line-to-line, line-to-earth, line-to-neutral, neutral-to-earth.</p> <p>— (IEC 61643-11)</p>
<b>IP</b>	<p><b>Degrees of Protection Provided by Enclosure (IP Code)</b></p> <p>Classification preceded by the symbol IP indicating the extent of protection provided by an enclosure against access to hazardous parts, against ingress of solid foreign objects and possibly harmful ingress of water.</p>



# ATTENTION

## Usage

1. Frequency range is from 47 Hz to 63 Hz.
2. The voltage applied continuously to the SPD must not exceed its maximum continuous operating voltage  $U_c$ .
3. When atmosphere press is from 80 kPa to 106 kPa, the related altitude shall be from 2000 m to - 500 m.
4. Do not touch the product body or wires directly when power is on, to avoid electric shock.

## Replacement

As SPD is a non-repairable product, for safety sake, please use the same type of SPD for replacement.

## Storage

Do not store SPD at high temperature, high humidity or corrosive gas environment, to avoid oxidation of the wires. Use them up within 2 years after receiving the goods.

## Installation

1. Installation and startup may only be carried out by qualified personnel. The relevant country-specific regulations must be observed.
2. Check the device for external damage before installation. If the device is defective, it must not be used.
3. Pay attention to risk of electric shock. Please cutoff all electrical power before installation or service.
4. Lay the output cables to the surge protective devices (SPDs) as short as possible, without loops.
5. Do not apply mechanical stress to the SPD body during or after the installation.

## Maintenance

1. Check SPD status according to instructions before and after the thunderstorm season each year.
2. If the indicator of "failure state" appears, the SPD is damaged. Replace the SPD with same type.
3. Ensure electrical connections and mountings are correct before energizing the circuit.
4. SPD's quality is well controlled and strictly inspected before delivery. If non-functional ones are found during operation, please contact us early enough.