

SPD

Surge Protective Device

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.

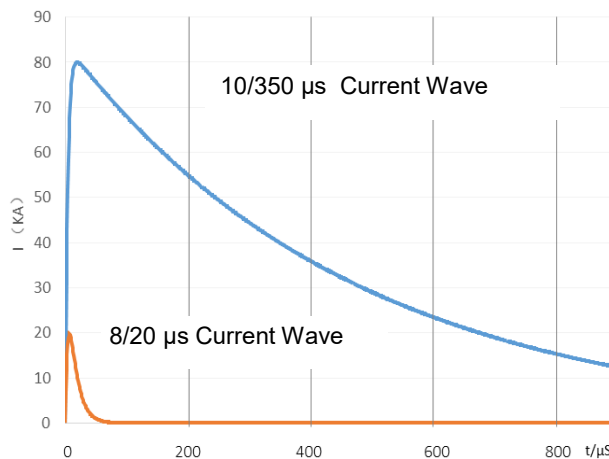
Surge Voltage Caused by Lightning

Electrical and electronic system are subject to damage from a lightning electromagnetic impulse (LEMP). Therefore SPM 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.

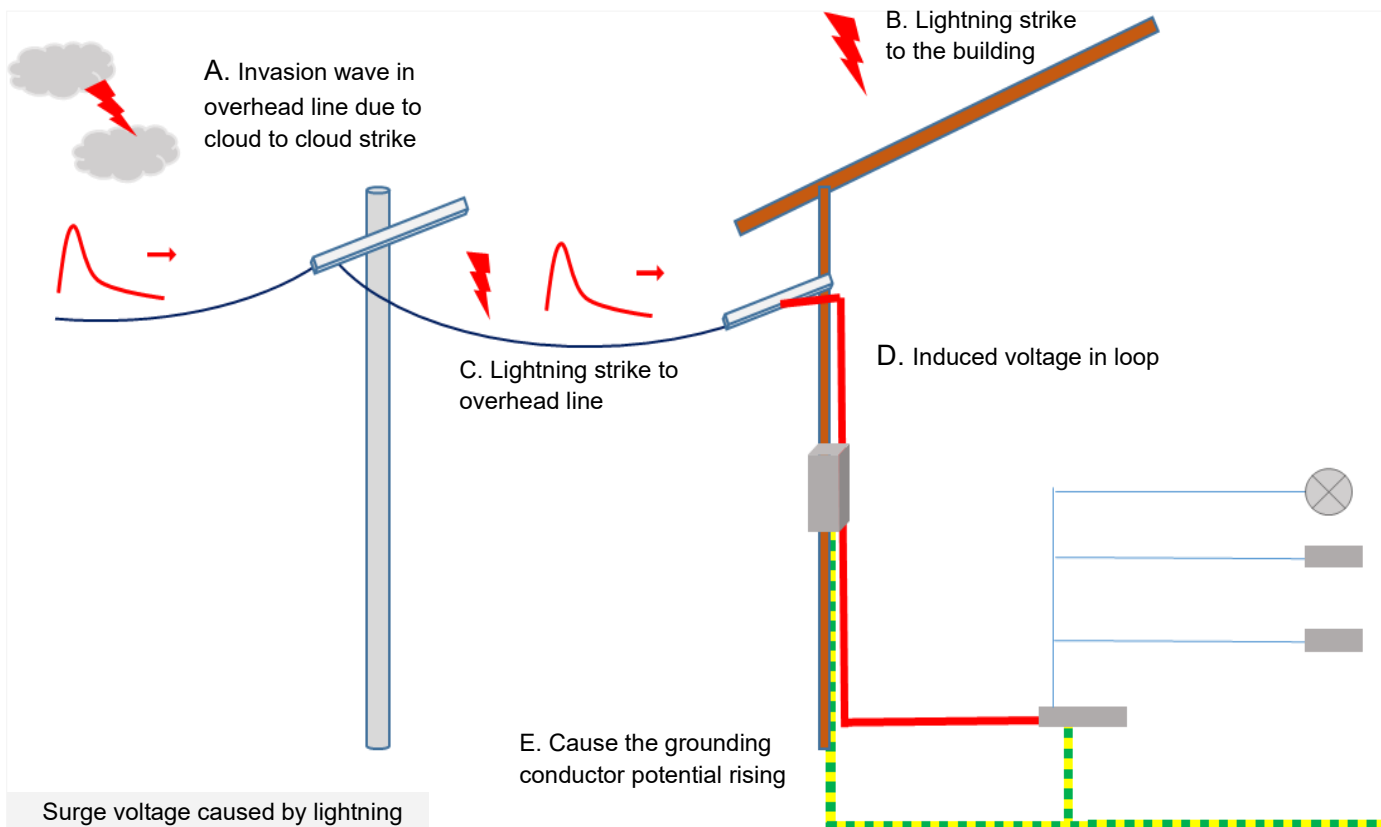
Damage Due to Lighting

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 lighting current effects, including sparking;
- D3: failure of internal systems due to LEMP



Standard lightning test wave



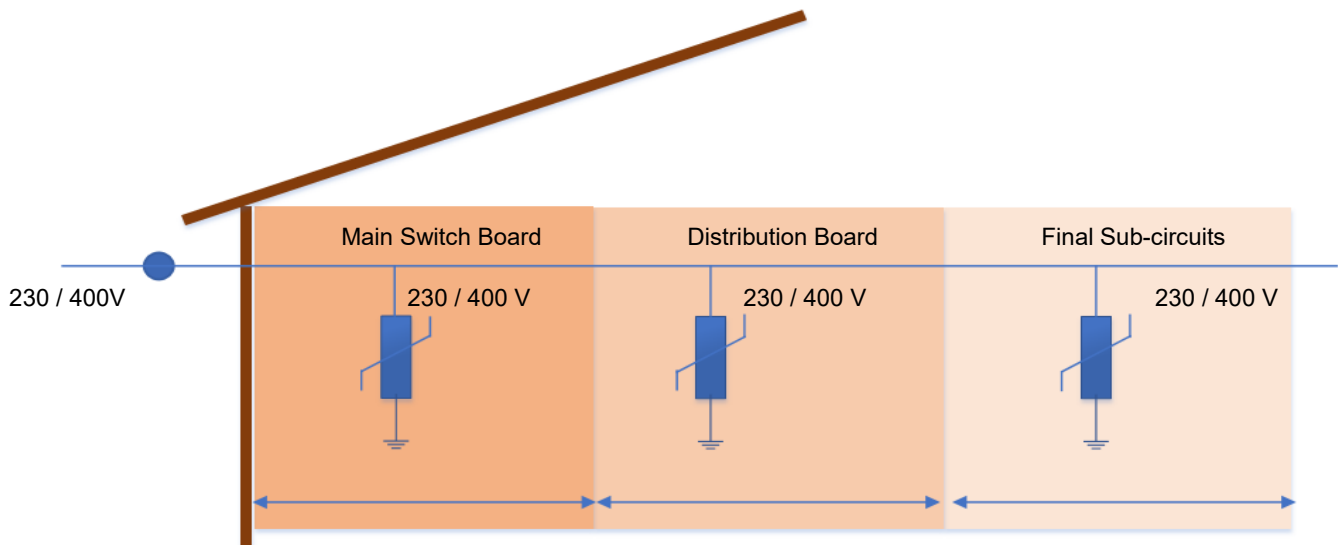
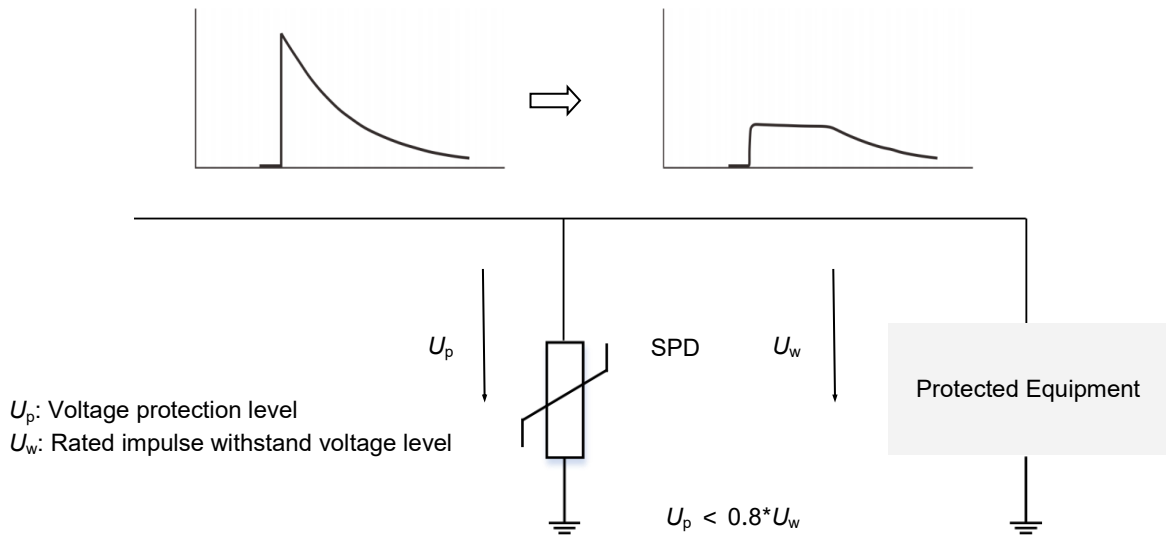
Surge voltage caused by lightning

SPD

Surge Protective Device

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.

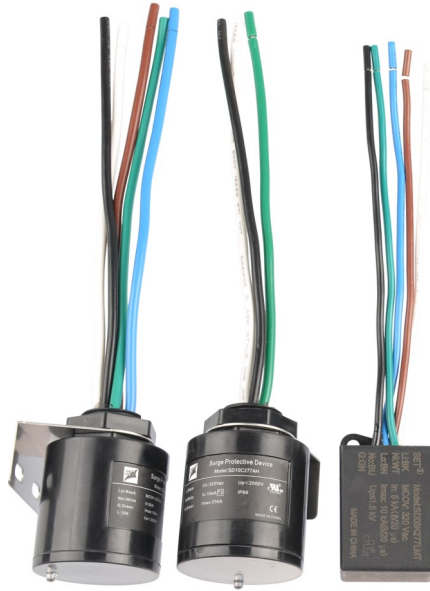


Overvoltage Category	IV	III	II	I
U_w (kV) Impulse Withstand Voltage	6	4	2.5	1.5
Lightning Protection Zone LPZ	LPZ1	LPZ2	LPZn	
SPD Type	Class I or Class II	Class II	Class II or Class III	

SPD

Surge Protective Device

LED Surge Protective Device



Description

As LEDs are more susceptible to surges, the impact of the surge will cause the partial or complete failure of the LED module or driver. To ensure the service life and reliability and to avoid unnecessary maintenance, a well-conceived and effective surge protection for LED street lightings should be adopted.

SETsafe | SETfuse LED Surge Protective Devices (SPDs) are specifically designed for outdoor lighting. The products facilitate surge immunity compliant with IEEE C62.41.2 Location Category C high exposure and protect LED street lighting from lightning surge damage. With built-in thermal protection, the products could fail safely when suffering sustained overvoltage or its internal varistor degradation. The products with small size, could be easily mounted in narrow space.

Features

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

Applications

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

Glossary

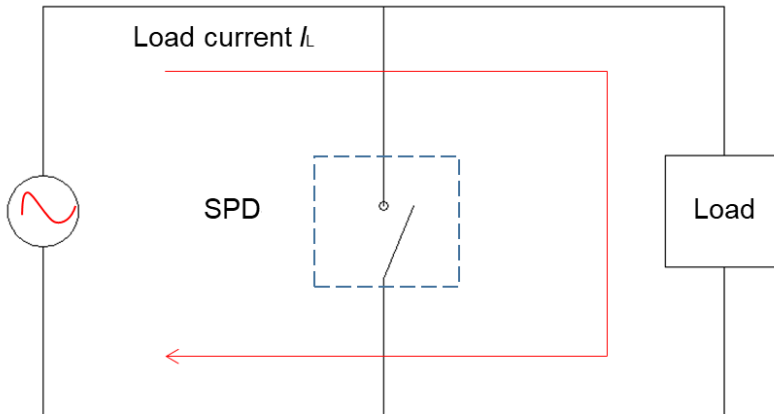
Item	Description
U_p	<p>Voltage Protection Level Maximum voltage to be expected at the SPD terminals due to an impulse stress with defined voltage steepness and an impulse stress with a discharge current with given amplitude and waveshape. — (IEC 61643-11)</p>
8/20 μ s	<p>8/20 Current Impulse Current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

SPD

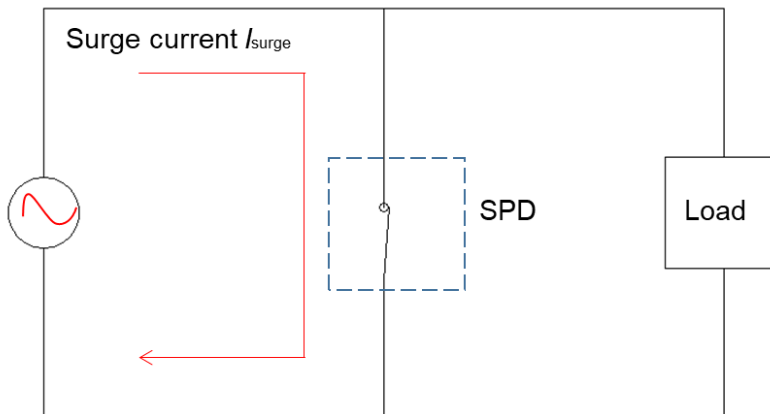
Surge Protective Device

Operation Principle

SPD is equivalent to open circuit when the circuit without surge (Impedance > 100 MΩ).



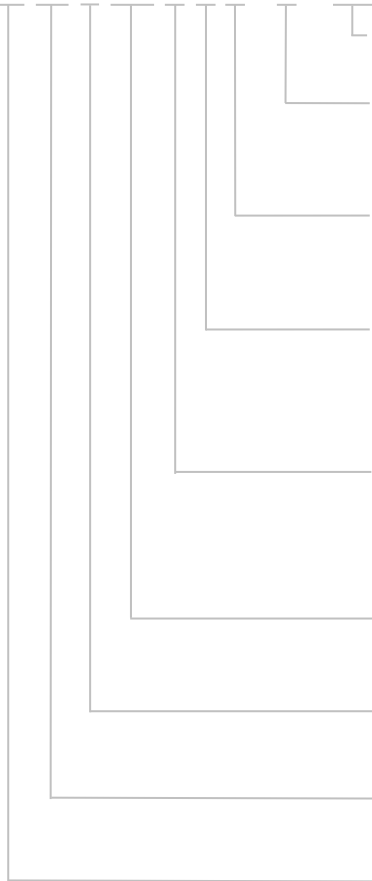
When a surge invades the circuit, the SPD circuit mutates to a low impedance, releasing the surge current into the ground.



SPD
Surge Protective Device

Part Numbering System

SD 05 K 277 L M T - D - 001









- Other Options**
- Protection Mode**
Default: All-mode
D: Differential Mode
- Wire Connection**
Default: One-port
T: Two-port
- Surge Capacity**
H: High
M: Medium
- Circuit Characteristic**
A: With GDT and Failure Indicator
G: With GDT
L: With Failure Indicator
N: Without GDT or Failure Indicator
- Nominal System Voltage**
120 V, 277 V, 347 V, 480 V
- Design Sequence**
- Nominal Discharge Current**
05: 5 kA, 10: 10 kA
- Product Category**

SPD

SPD

Agency Information

Agency Information		Standards	NO.	Category
	UL	UL 1449 4th Edition	E322662	VZCA2
	cUL	CSA C22.2 NO.269, CSA ECN 516	E322662	VZCA8
	TUV	IEC/EN 61643-11, IEC/EN 61643-31	See the different models for details	
	CE	IEC/EN 61643-11, IEC/EN 61643-31	See the different models for details	
	CB	IEC/EN 61643-11	See the different models for details	
	CQC	GB/T 18802.1-2011	See the different models for details	

SPD

Surge Protective Device



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.

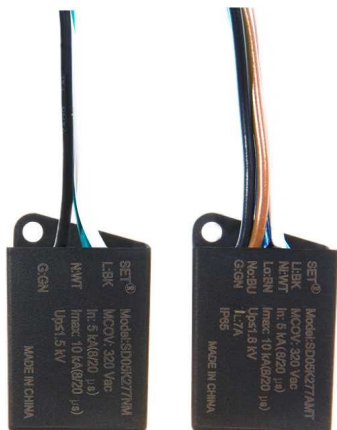
SPD

Surge Protective Device

SPD for Outdoor Lights



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



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

Agency Approvals

Agency	Standards	No.
	UL1449	E322662
	EN 61643-11	R50434690
	EN 61643-11	AN 50473469
Environment	RoHS 2.0 & REACH	Compliant

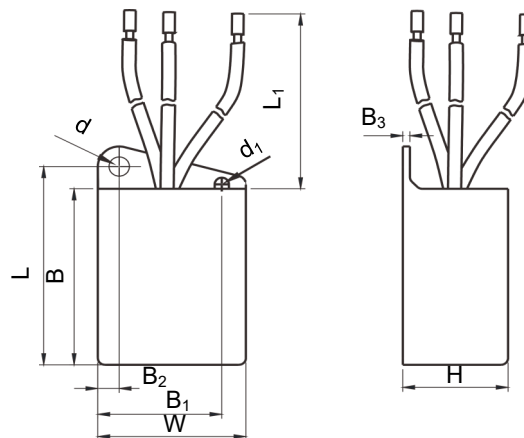
Packaging Information

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

Description

SD05K series is specifically designed for outdoor lighting. The products facilitate surge immunity compliant with IEEE C62.41.2 Location Category C high exposure and protect LED street lighting from lightning surge damage. With built-in thermal protection, SD05K series could fail safely when suffering sustained overvoltage or its internal varistor degradation. SD05K series with small size, could be easily mounted in narrow space.

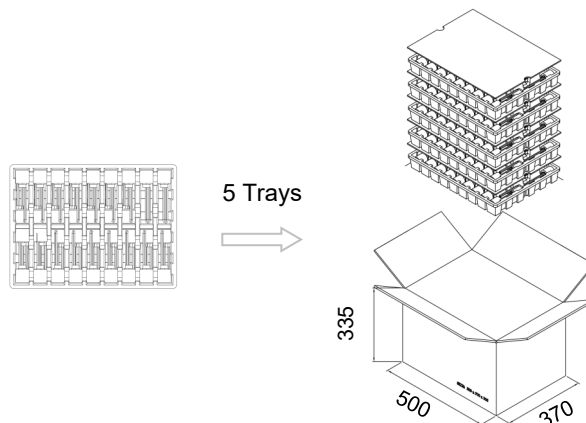
Dimensions (mm)



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

Note:

The wire length “L₁” can be customized as required.



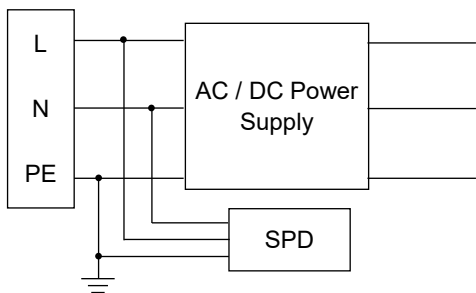
- Unit: mm
- Please contact us if you have special packaging requirement.

SPD

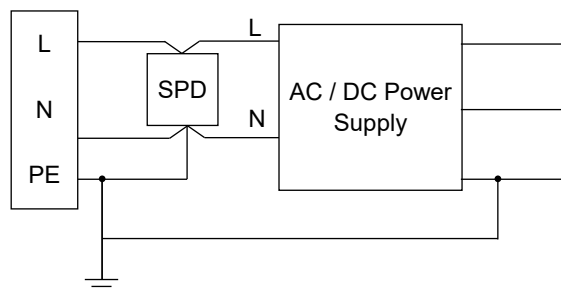
Surge Protective Device

SD05K Series

Wiring Diagram



Parallel Connection (One-port)

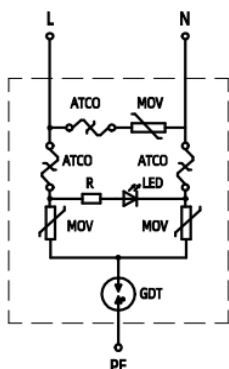


"Kelvin" Connection (Two-port)

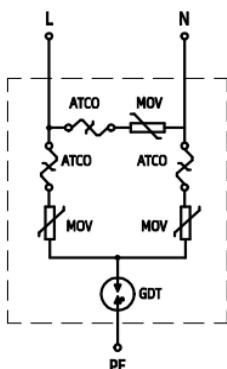
Notes:

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

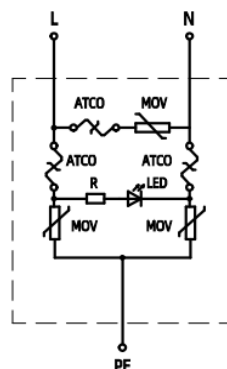
Schematics



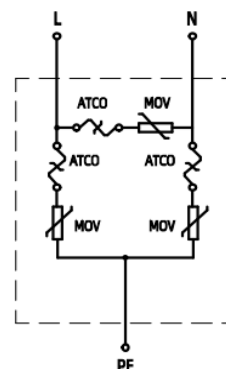
SD05KxxxAM Series
FIGURE SD05K-1



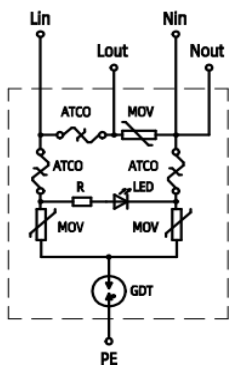
SD05KxxxGM Series
FIGURE SD05K-2



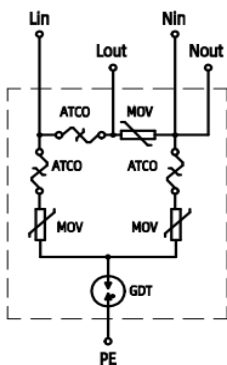
SD05KxxxLM Series
FIGURE SD05K-3



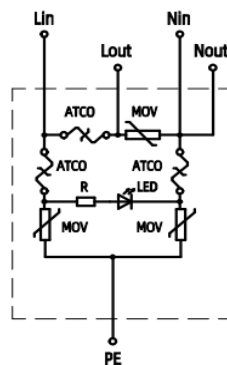
SD05KxxxNM Series
FIGURE SD05K-4



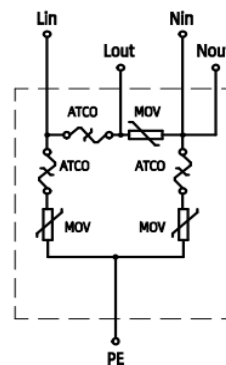
SD05KxxxAMT Series
FIGURE SD05K-5



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.

Specifications

Model	Max. Continuous Operating Voltage	Nominal Discharge Current (8/20 μs)	Max. Discharge Current (8/20 μs)	Voltage Protection Level	Rated Current ^a	Response Time	External Overcurrent Protection ^b	Schematic	Agency Approvals		
	U_c	I_n	I_{max}	U_p	I_r						
	(VAC)	(kA)	(kA)	(V)	(A)				UL, cUL	TUV	CE
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.