

Surge protection Device

TP10-320PN

1. Scope

TP10-320PN low-voltage surge protector is applicable for the surge protection of lighting power supplies, such as outdoor street lamps, landscape lights, traffic signals and so on . It is used to suppress and discharge the overcurrent and overvoltage generated by induction lightning or lowvoltage distribution systems, and protect electrical equipment from damage. This product is suitable for 110V-277V AC power supply system, using differential mode protection, the use of soft wire and external circuit Parallel connection.

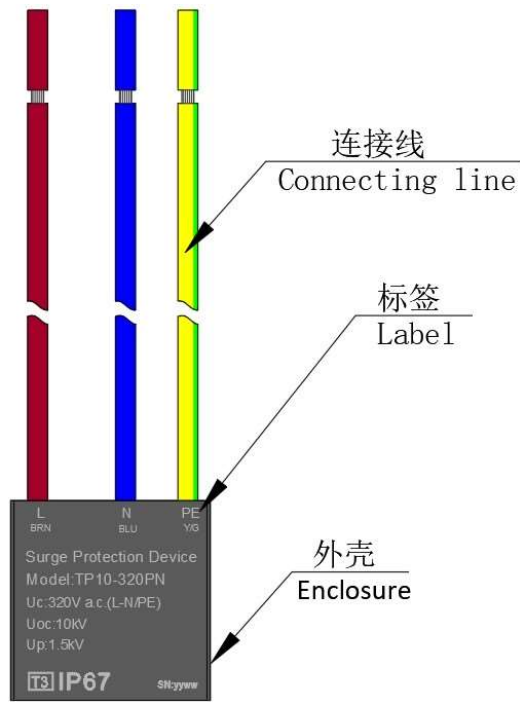
2. Glossary

- 2.1 Surge
A transient wave of current, potential or power in an electric circuit. For the purposes of this standard, surges do not include temporary over voltages (TOV) consisting of an increase in the power frequency voltage for several cycles.
- 2.2 Surge Protective Device (SPD)
A device composed of at least one non-linear component and intended for limiting surge voltages on equipment by diverting or limiting surge current and is capable of repeating these functions as specified.
- 2.3 Status Indicator
Device that indicates the operational status of an SPD, or a part of an SPD.
- 2.4 1.2/50 μ s Voltage Wave
Voltage surge with a virtual front time of 1.2 μ s and a time to half-value of 50 μ s delivered across an open circuit.
- 2.5 8/20 μ s Current Wave
Current surge with a virtual front time of 8 μ s and a time to half-value of 20 μ s delivered into a short circuit.
- 2.6 Nominal System Voltage
A nominal value assigned to designate a system of a given voltage class in accordance with ANSI C84.1, Table 1.
- 2.7 Maximum Continuous Operating Voltage (MCOV)
Maximum r.m.s. voltage, which may be continuously applied to the SPD's mode of protection.
- 2.8 Measured Limiting Voltage (MLV)
Highest value of voltage that is measured across the terminals of the SPD during the application of impulses of specified wave shape and amplitude.
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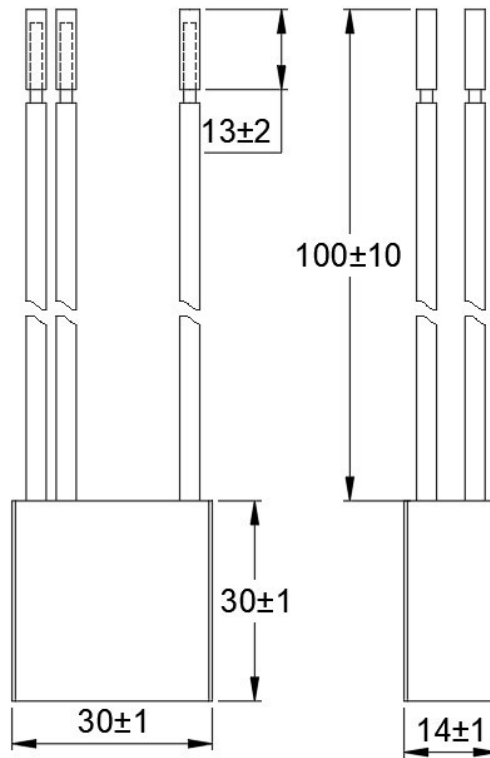
- 2.9 Voltage Protection Level (U_p)
Maximum voltage to be expected at the SPD terminals due to an impulse stress with defined voltage steepness and an impulse stress with a discharge current with given amplitude and wave shape.
- 2.10 Reference Test Voltage (U_{REF})
The r.m.s. value of voltage used for testing which depends on the mode of protection of the SPD, the nominal system voltage, the system configuration and the voltage regulation within the system.
- 2.11 Nominal Discharge Current (I_n)
Peak value of the current, selected by the manufacturer, through the SPD having a current wave shape of 8/20 μ s where the SPD remains functional after 15 surges.
- 2.12 Maximum Discharge Current (I_{max})
Crest value of a current through the SPD having an 8/20 μ s wave shape and magnitude according to the manufacturers specification. I_{max} is equal to or greater than I_n .
- 2.13 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.
- 2.14 Thermal Stability
SPD is thermally stable if, after heating up during the operating duty test, its temperature decreases with time while energized at specified maximum continuous operating voltage and at specified ambient temperature conditions.
- 2.15 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.
- 2.16 Open Circuit Voltage (U_{oc})
Open circuit voltage of the combination wave generator at the point of connection of the device under test.

3. Structure and Dimensions

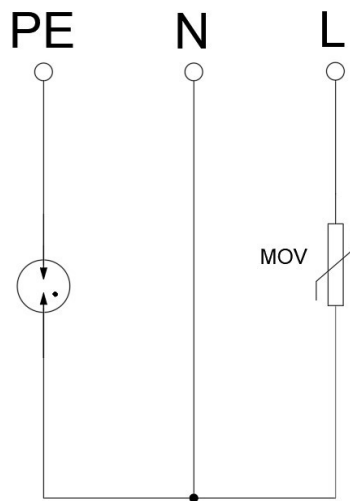
- 3.1 Structure
Product Structure: The design type of this product is voltage-limited, black shell, and black epoxy potting glue. It uses power cord and external circuit Parallel connection.
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3.2 Product Dimensions (mm)



3.3 Circuit Diagram



4. Environment

Environment	Order No.	Order
RoHS	2015/863/EU	Meet the RoHS

5. Specifications

Technical Feature	Technical Parameters	Reference Standards
Operational Temperature Range	(-40 -85)°C	GB/T 10193 IEC 61051
Storage Temperature and Humidity Range (24 hours)	(-40-100)°C ≤95%RH	IEC 60068-2-1 IEC 60068-2-2
Max. continuous operating voltage (U _c)	320Vac (L-N/PE)	
Open Circuit Voltage (U _{oc})	10kV	IEC61643-11 IEC61000-4-5
Voltage Protection Level (U _p)	1.5kV	IEC61643-11

Degrees of Protection Provided by Enclosure	IP67	IEC60529
Altitude	-500m to 2000m	IEC61643-11
Housing Material	IP67	IEC60529

6. Inspection Method & Standards

6.1 General Test Items

No.	Items	Inspection Tools	Inspection Requirement	Reference Standards
1	Appearance	Visual check	The case without perforation and fins, the mark is clear.	Enterprise Standard
2	Dimension	vernier caliper	Use the Vernier caliper to measure the product size, and the size range please reference to the table 3.3.	Enterprise Standard

6.2 Voltage Protect Rating Test

Reference Standard: IEC61643.11-2011 Section 8.3.3.3

Test Method:

To perform this test a combination wave generator is used.

- 1)The interval between the individual impulses shall be long enough for the sample to cool down to ambient temperature.
- 2)The voltage of the combination wave generator is set to provide an open-circuit voltage of 0,1; 0,2; 0,5; 1,0 times the U_{oc} as declared by the manufacturer for the SPD.
- 3)With these generator settings four surges will be applied to the SPD at each amplitude: two with positive and two with negative polarity.
- 4)An oscillographic record shall be made of the current delivered by the generator into the SPD and the voltage at the output port of the SPD for each impulse.
- 5)The value for determining the measured limiting voltage and U_{max} is the maximum voltage recorded during this test.

Pass criteria:

During the test, there was no evidence of breakdown or flashover on the voltage and current waveforms and visual inspection of the samples.

For the second type test, the limiting voltage of the test sample is the maximum value of U_{max} (8/20 μ s) and U_{max} (wavefront discharge voltage); for the third type test, the limiting voltage of the test sample is U_{max} (mixed wave). The limit voltage value of the above test is less than or equal to the marked voltage protection level.

6.3 Nominal Discharge Current Test

Reference Standard: IEC61643.11-2011 Section 8.3.4.3

Test Method:

- 1) Apply an impulse current of 8/20 positive polarity to the test samples L-N 15 times, and divide them into 3 groups with 5 impulses in each group. Each shock is synchronized with the power frequency, the synchronization angle increases step by step at intervals of $30^{\circ} \pm 5^{\circ}$, and the current waveform is recorded for each shock. Apply U_c at the same time as each impact, The interval between two shocks is 50-60s.
- 2) The interval between two groups is 30min-35min.
- 3) Impact 15 shocks, keep U_c for no less than 15 minutes.

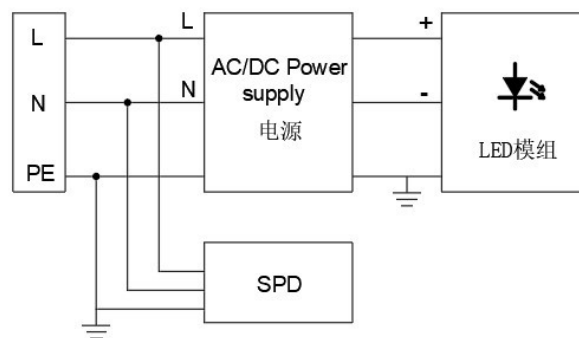
Pass Criteria:

- 1) Thermal stability shall be achieved. The SPD is considered to be thermally stable if the crest of the resistive component of the current flowing into the SPD or the power dissipation shows either a decreasing tendency or does not increase during 15 min of U_c voltage application immediately after the application of U_c . If the test itself is performed with the SPD energized at U_c , then U_c either remains applied for these 15 min without interruption or is reapplied within less than 30 s.
- 2) Voltage and current records and visual inspection shall show no indication of puncture or flashover.
- 3) No visible damage shall occur during the test.
- 4) Values for measured limiting voltage after the test shall be below or equal to U_p .
- 5) No excessive leakage currents shall occur after the test; The SPD shall be connected as for normal use according to the manufacturer's instructions to a power supply at the reference test voltage (U_{REF}). The current that flows through each terminal is measured. Its resistive component (measured at the crest of the sine wave) shall not exceed a value of 1 mA, or the current shall not have changed by more than 20 % compared to the initial value determined at the beginning of the relevant test sequence.
- 6) External disconnectors as specified by the manufacturer shall not operate during the test and shall be in working order after the test.
- 7) Internal disconnectors as specified by the manufacturer shall not operate during the test and shall be in working order after the test.
- 8) There shall be no explosion or other hazard to either personnel or the facility.

7. Safety Precautions

- 7.1 Read and understand all instructions before installation.
 - 7.2 The voltage continuously applied to the product should not exceed its maximum continuous working voltage U_c .
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- 7.3 Avoiding to destroy enclosure, solvent such as acetone is forbidden for cleaning products when assembly.
- 7.4 Avoiding making mechanical damage on products, improper operation such as knocking when assembly is not allowed.
- 7.5 If you do not obey the instructions, the electric system or associated equipment may be breakdown.
- 7.6 Installation location: Indoors/Outdoors.
- 7.7 Fluctuation range of system voltage shall be less than 10%.
- 7.8 The SPD should be replaced immediately when it has the problem of aging failure which would cause the thermal protection device disconnect and the work indicator lights turn off.
- 7.9 Mounting Method
It employs the Parallel connection of the protected device and power cord.



8. Marks and Package

8.1 Marking on Product

L BRN	N BLU	PE Y/G
Surge Protection Device		
Model:TP10-320PN		
Uc:320V a.c.(L-N/PE)		
Uoc:10kV		
Up:1.5kV		
T3 IP67		SN:yyww

8.2 包装 Packaging

包装方式与要求 Packaging Method and Requirement		
	内盒 Inner Box	外箱 Carton
包装尺寸(mm) Dimensions	390*260*28	397*267*285
数量 (PCS) Quantity	16	160
净重(kg) Net Weight	0.334	3.34
毛重(kg) Gross Weight	0.414	4.5
备注: Remark:		

9. Storage Conditions and Effective Date

- a) Recommend Long-term Storage Condition: Storage Temperature: (-10 - 40) °C, Storage Humidity ≤75%RH.
- b) Do not store the products in the environment that with corrosive gas or under direct sunlight.
- c) Storage Period: 2 years.