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| SPECIFICATION | | Specification No. | T-230450C11~C16 | | | |
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| Product Name | ZP-H2-H1 | Enactment Date | Apr. 08, 2026 | Revision Date | | |
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1.General

This product is an SPD designed to protect terminal devices from abnormal voltages such as lightning surges induced in RS-422 or RS-485 signals, and is particularly suited to protecting devices with low line-to-line and line-to-ground withstand voltages. This product consists of an SPD plug and a jack. The SPD plug has a deterioration indication function, and the presence or absence of deterioration can be checked using a dedicated tester (ZPT1).

2.Service Condition

- 2.1 Install Location : Indoor
- 2.2 Ambient Temperature : -40°C~70°C
- 2.3 Relative Humidity : ≤96% (non-condensing)
- 2.4 Storage Temperature : -40°C~70°C
- 2.5 Storage Humidity : ≤96% (non-condensing)
- 2.6 Altitude : ≤2000m

3.Structure

3.1 Appearance, Structure, and Dimensions

Table.1

| Jack type | Model Number | Appearance |
|---------------------|--------------|-------------|
| Screwless Terminals | ZP-H2-H1 | T-230450A11 |
| Screw Terminals | ZP-H2-H1JKN | T-230450A12 |

Mounting method: This SPD is standard for mounting on a DIN rail (35 mm wide).

Structure: This SPD has a structure that does not cause signal breakdown (including uninterruptible breakdown) even if the SPD plug is detached.

3.2 Marking

The following items are indicated. For details, refer to the external drawing T-230450A11,A12.

- Plug: (1) Product name (2) Manufacturer's name (3) Date of manufacture
(4) Maximum continuous voltage U_c (5) UL Mark and UL characteristics
(6) Two-dimensional code (Installation Instruction)

- Jack: (1) Product name (2) Manufacturer's name (3) Date of manufacture (4) Terminal indication

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3.3 Circuit Configuration

The circuit configuration of this SPD is shown in the figure below.

This SPD is directional. Incorrect connection may damage the SPD.

Connections should be made as shown in Figure 1 below.

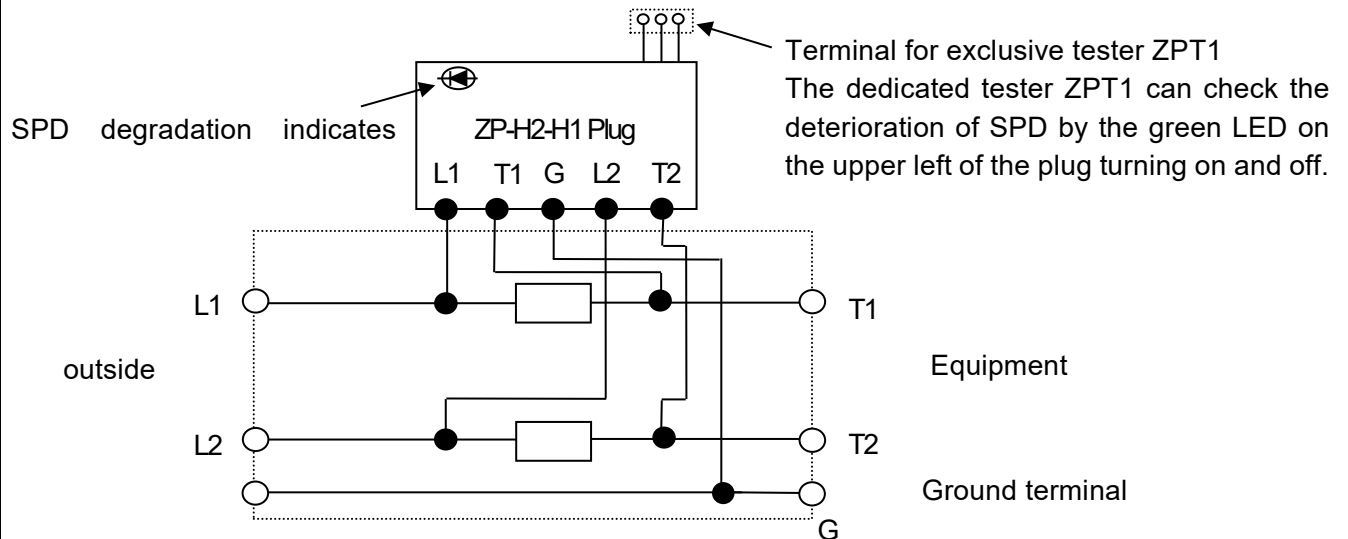


Figure 1: ZP-H2-H1 Circuit Configuration

4. Applicable Standards

The applicable standards of this product are shown in Table.2.

Table.2

| Item | Standard |
|----------------------|--------------------------|
| Applicable Standards | UL497B (File No.E140906) |

| | | | | | |
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5.Characteristics

5.1 Electrical and Protective Performance

SPD characteristics shown in Table.3.

Table.3

| Item | Measuring conditions | Characteristics |
|--|-------------------------------------|------------------------|
| | 1. Maximum continuous voltage U_c | |
| 2. Rated current | - | DC100mA |
| 3. Series resistance | DC100mA | $5\Omega \pm 10\%$ |
| 4. Insertion loss | DC~25MHz | $\leq 1.0\text{dB}$ |
| 5. Voltage protection level U_p | 1.2/50 μs 10kV | 50V |
| 6. Nominal discharge current I_n | 8/20 μs | 5kA |
| 7. Maximum discharge current I_{max} | 8/20 μs | 10kA(5kA×2) |
| | 10/350 μs | 2kA(1kA×2) |
| 8. Impulse durability | 8/20 μs 5kA | 10 times (Category C2) |
| | 10/350 μs 2.5kA | 2 times (Category D1) |
| 9. Rated Breakdown Voltage | 100V/s | L-L:6-20 V |
| | | L-E:6-20 V |
| 10. AC durability | 50Hz 0.5A 1s | 5 times |
| 11. Overload failure mode | - | Mode 1 |
| 12. Fault indicator | Inspection by special tester (ZPT1) | Normal:LED lighting |
| | | Fault:LED off |

Note 1) Temperature and humidity at the time of performance measurement are based on IEC 160-1963 (normal condition of test place): standard condition temperature $20 \pm 15^\circ\text{C}$ and standard condition humidity $65 \pm 20\%$.

Note 2) Each item is tested in accordance with IEC 61643-21.

Note 3) Excluding resistance after trip operation

5.2 Determining when to replace this product

This product has a mechanism to disconnect the lightning protection device from the relevant line when an excessive abnormal current flows in.

By connecting the terminal of the dedicated tester ZPT1 to the terminal for the dedicated tester ZPT1 on the plug, the green LED will light up if it is normal. LED lights up when it is normal, and turns off when it is deteriorated.

If the green LED does not light up when inspected with the dedicated tester ZPT1, the plug part must be replaced.

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6.Connection conditions

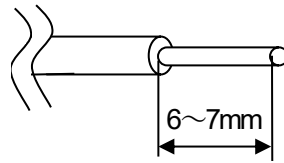
The cables that can be connected to the terminals mounted on this SPD are as follows.

6.1 Screwless terminals

Both stranded and single wires

AWG28~13(cross section:0.8~2.5mm²)

The recommended terminal treatment for cables to be connected to this SPD is as follows.



6.2 Screw terminals

Stranded wire

AWG24~14(cross section:0.2~2.63mm²)

Insulated crimp terminals compatible with M4, such as 0.3-4, 1.25-4, and 2-4

Tightening torque: 0.75N · m (7.6kgf · cm)

7.Inspection Condition

Electrical performance, visual and dimensional inspections are shown in Table 4.

Table.4

| Item | Inspection type | | How to check for Characteristics |
|--|--------------------|--------------------|---------------------------------------|
| | Process inspection | Product inspection | |
| 1. Maximum continuous voltage U_C | - | Type | According to Table.3 |
| 2. Rated current | - | Type | |
| 3. Series resistance | Sampling | Sampling | |
| 4. Insertion loss | - | Type | |
| 5. Voltage protection level U_P | - | Type | |
| 6. Nominal discharge current I_n | - | Type | |
| 7. Maximum discharge current I_{max} | - | Type | |
| 8. Impulse durability | - | Type | |
| 9. Rated Breakdown Voltage | - | Type | |
| 10. AC durability | - | Type | |
| 11. Overload failure mode | - | Type | |
| 12. LED lighting confirmation | Sampling | Sampling | |
| 13. Low temperature test | - | Type | |
| 14. High temperature test | - | Type | |
| 15. Temperature cycle test | - | Type | |
| 16. Vibration test | - | Type | |
| 17. Appearance/Structure | Sampling | Sampling | According to T-230450A11, T-230450A12 |
| 18. Dimensions | Sampling | Sampling | |

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Note 1) In principle, sampling inspections shall be performed as a single sampling and sampling inspection in accordance with ISO2859 (Counting and sampling inspection procedures and sampling table), with AQL=2.5 based on the special inspection level S-3.

Note 2) Formal inspections are conducted on at least one unit for the first lot of a new production or when important materials or manufacturing methods are changed.

However, items whose performance can be confirmed with the same type of product may be omitted.

8.Environmental Test

The environmental performance of this SPD is shown in Table 5.

After each test, the series resistance, and voltage protection level performance shall be satisfied.

Table.5

| Item | Test Condition | Test Time |
|---------------------------|--|-------------|
| 1. Low temperature test | Ta=-40±3°C | 1000h |
| 2. High temperature test | Ta=+70±2°C | 1000h |
| 3. Temperature cycle test | | 30 cycles |
| 4. Vibration test | JIS E 3014 Class 2, Class A Vibration frequency: 40 (Hz) Acceleration double amplitude: 19.6 m/s ² (2G) | 15min/3axis |

9.Packing and Marking of Wrapping Box

We package in cardboard boxes in units of 10 pieces. The cardboard box will be labeled with the product name, manufacturer's name, and quantity.

10. Quality Assurance Period and Content of Assurance

The warranty period for this product is generally one year (*) from the date of delivery. Failures that occur during this time will be repaired free of charge or replaced only with non-defective ones if the cause is clearly judged to be our responsibility. The warranty does not cover any damage or damage to the device caused by lightning. The cost of replacement is not covered by the warranty.

This product is shipped after strict in-house inspection. However, please contact the dealer or each branch office of purchase for any trouble caused by a malfunction or accident during transportation.

Purchased items are not covered by our warranty but are covered by the manufacturer's warranty.

*If you wish to extend the warranty, we will discuss the warranty separately.

However, the warranty does not apply in the following cases:

- (1) If the product arises from use that is contrary to the conditions or precautions stated in the specifications or instruction manual, etc.

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- (2) The effect of lightning strikes beyond product specifications, fire, earthquake, typhoon, eruption, flood, tsunami, salt damage, snow damage, freeze, abnormal temperature, abnormal vibration, Cases caused by other natural disasters.
- (3) When caused by changes in geology or topography,
- (4) Cases resulting from external factors such as fire, explosion, collision, corrosive gas, or contact with flying objects.
- (5) Cases arising from acts of a third party.
- (6) If the product is modified irrespective of our company, or improper handling such as moving, transporting or dropping the installation site, cases arising from secondary construction.
- (7) Cases caused by damage or improper construction of foundation or mounting pole. (outside our construction scope)
- (8) The failure or failure of the equipment connected to this product.
- (9) If it occurs without performing inspection and action for maintenance items recommended by us.

11.Environmental correspondence

This product is applicable to EU RoHS Directive(*) for regulated substances (10 substances: lead, mercury, cadmium, hexavalent chromium, PBB, PBDE, DEHP, BBP, DBP, DIBP), and does not include controlled substances that exceed regulatory limits.

* European Parliament and Council Directive 2011/65/EU , (EU)2015/863