



UT-S101 & UT-S201
Control Signal Surge Protector
RS-485

User Manual

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1. General

UT-S101 lightning surge protector is designed by reference to the standard IEC61643-21:2000/GB/T18802.21. With the development of the national economy in China, there is increasing development in the Internet era and rapid progress in the development of Internet technology. However, it is inevitable that we cannot ignore problems arising in the development, and the issue of safety problem should be considered above all else. In our daily life, damage to electronic equipment caused by lightning is the most serious and potential threats from static electricity can be seen everywhere. In order to create a safer environment for extensive users, the need for improving equipment reliability is becoming greater and greater.

2. Product Features

This product is applicable for use not only in either protection of such equipment as industrial control internet, RS-485 interfaces, special lines, automatic control and instrument lines, data cables, telephone equipment, and facsimile machines, but also in the protection of sensors and secondary instruments in the electric current loop so as to protect the equipment from damage caused by induced overvoltage, switching overvoltage, and electrostatic discharge. This product has such advantages as multi-level protection, large discharge current capacity, low limiting voltage, fast response, and high transmission rate.

3. Operating Environment

Temperature: $-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$;

Relative humidity: 5% ~ 95%;

Barometric pressure: 70 kPa ~ 106 kPa

4. Operating Principle

The lightning surge protector is connected in serial at the front end of the equipment to be protected. When the transmission line is under impact from induced thunder or other transient overvoltage, the surge current is discharged through the protecting circuit of the protector to the ground. The output voltage clamp is within permissible voltage range to ensure safety in the equipment operation.

5. Specifications

Model	UT-S101	UT-S201
Rated operating voltage (U_n)	5 V	5 V
Max. DC operating voltage (U_c)	6 V	6 V
Max. AC operating voltage (U_c)	4.2 V	4.2 V
Nominal operating current (IL)	0.12 A	0.12 A
Nominal discharge current (8/20 us) (I_n)	3 KA	5 KA
Maximum discharge current (I_n)	5 KA	10 KA



Limiting voltage (Upl)	≤11 V	≤11 V
Series impedance characteristic of wire (Ro)	10 Ohm	10 Ohm
Wire-to-wire capacitance (Cll)	≤80 pF	≤80 pF
Wire-to-earth capacitance (Cpe)	≤140 pF	≤140 pF
Response time (ta)	<1 ns	<1 ns
Range of operating temperature	-40°C ~ 85°C	-40°C ~ 85°C
Testing standard	IEC61000-4-5	IEC61000-4-5
Testing level	X	X
Insulation resistance	>1 MΩ	>1 MΩ
Insertion loss (dB)	≤0.5 dB	≤0.5 dB
Enclosure protection class	IP30	IP30
Overall dimension	25 x 25 x 82	25 x 25 x 82
Enclosure material	Shielded metallic aluminum	Shielded metallic aluminum
Type of wiring	Connection terminal (RS-485)	Connection terminal (RS-485)
Anti-static level	Class 4	Class 4
Transmission rate (bps)	10 M	10 M

6. Installation, Use and Maintenance

6.1 Installation

6.1.1 Prior to connection of the protector to the system, check whether ground resistance of the grounding grid meets specification requirements.

6.1.2 Connect the protector to the front end of the equipment to be protected. A reliable connection must be established.

6.1.3 Connect the ground lead of protector to the ground bus, keeping the distance as short as possible.

6.2 Precautions

6.2.1 There are marks of input (IN) and output (OUT) on the protector. The output end shall be connected to the equipment to be protected. Do not connect equipment incorrectly, or else it may result in damage to the equipment or failure in protection for the equipment.

6.2.2 In case of increased loss due to poor connection at the plug, socket, or otherwise, re-connect the plug/socket or replace the protector.

6.2.3 To avoid damage which could affect normal operation, the user is not allowed to randomly dismantle fasteners at each position of the protector.

6.3 Protector Inspection

6.3.1 Use an avometer to check (at the level of $\Omega \times 1$) whether resistance between input core wire and output core wire of the protector is about 10 Ω . If it is an open circuit, then it is abnormal and the protector shall be replaced.