

Specific systems protection

ESP Photovoltaic (PV) Series



Combined Type 1 and 2 tested protector (BS EN 61643-31 and BS EN 50539-11) for a Photovoltaic PV solar panel system that is on a building where a structural Lightning Protection System (LPS) is employed, for equipotential bonding. For use at boundaries up to LPZ 0 to protect against flashover (on the DC side of the DC-AC inverter) through to LPZ 2 to protect the PV system from damage.



Features & benefits

- Enhanced protection (to IEC/BS EN 62305) offering low let-through voltage further minimizing the risk of flashover creating dangerous sparking or electric shock
- Repeated protection in lightning intense environments
- The varistor based design eliminates the high follow current (I_f) associated with spark gap based surge protection
- Pluggable module design (with anti-vibration locking clip) allows for simple replacement at end-of-life
- Compact, space saving design
- Indicator shows when the protector requires replacement
- Remote signal contact, with fast fit screw-less push terminals, can indicate the SPDs status through interfacing with a building management system

Application

Use on the DC side of the DC-AC inverter for protection against partial direct or indirect lightning strikes. ESP Type 1 AC mains protectors (e.g. ESP 415T1/25/TNS) are further required at the AC side of the DC-AC inverter.

Installation

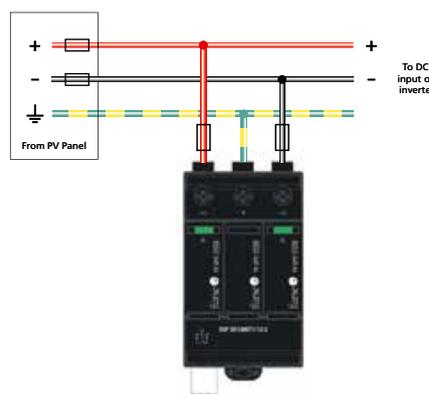
The SPD should be installed in the main distribution board with connecting leads of minimal length. The SPD should be installed in parallel to the DC supply of the DC-AC inverter via a suitable overcurrent protection device (e.g. gPV fuse) and is suitable for attachment to a 35 mm top hat DIN rail.

Accessories

Metallic enclosure:
MBX D4
ABB order code:
7TCA085400R0649

Weatherproof enclosure:
WBX D4
ABB order code:
7TCA085410R0032

SPD replacement modules:
ESP DC550T1/6.25/M
(end modules for 1100V SPD)
7TCA085460R0416
ESP DC550T1/6.25E/M
(central module for 1100V SPD)
7TCA085460R0417
ESP DC750T1/6.25/M
(end modules for 1500V SPD)
7TCA085460R0418
ESP DC750T1/6.25E/M
(central module for 1500V SPD)
7TCA085460R0419



IMPORTANT: The primary purpose of lightning current or equipotential bonding mains Type 1 Surge Protective Devices (SPDs) is to prevent dangerous sparking caused by flashover to protect against the loss of human life. In order to protect electronic equipment and ensure the continual operation of systems, transient overvoltage mains Type 2 and 3 SPDs such as the ESP M1 or ESP D1 Series are further required, typically installed at downstream sub-distribution boards feeding sensitive equipment. IEC/BS EN 62305 refers to the correct application of mains Type 1, 2 and 3 SPDs as a coordinated set. For further information, please refer to the Furse Guide to BS EN 62305 Protection against Lightning.

ESP PV Series - Technical specification

Electrical specification	ESP DC1100T1/12.5	ESP DC1500T1/12.5
ABB order code	7TCA085460R0406	7TCA085460R0413
Maximum DC voltage (RMS/DC), U_{CPV}	1100 V	1500 V
Short circuit current rating, I_{SCPV}	11 kA	30 kA
Leakage current (to earth)	< 1 mA	
Volt free contact: ⁽³⁾	Push terminal	
– current rating	1 A	
– nominal voltage (RMS)	250 V	
Back up fuse	If the I_{SCMAX} rating delivered by the PV array is greater than I_{SCPV} rating of the SPD then external fusing must be fitted. ABB Furse always recommends the use of external PV fusing in all installations as it is good electrical practice. The following fuse guidance from IEC 60364-7-712 applies: - Use gPV fuses in accordance with IEC 60269-6 - The rated operating voltage U_e shall be greater or equal to U_{OCMAX} of the PV array. To determine a suitable value for the gPV fuse, the following guidance is offered: - Determine I_{SCMAX} that can be delivered by the PV array at that point in the installation - Divide this value by 10 (equivalent to low irradiation value), divide this by 1.25 - Install gPV fuse value closest to this calculated value. - Example: if $I_{SCMAX} = 3000A$, then a suitable fuse would be 240A gPV	
Transient specification	ESP DC1100T1/12.5	ESP DC1500T1/12.5
Type 1 (BS EN/EN), Class I (IEC)		
Nominal discharge current 8/20 μs (per mode) I_n	20 kA	
Let-through voltage U_p at I_n ⁽¹⁾	< 3.8 kV	< 4.5 kV
Impulse discharge current 10/350 μs I_{imp} (per mode) ⁽²⁾	6.25 kA	
Total discharge current 10/350 μs I_{total} (total to earth) ⁽²⁾	12.5 kA	
Type 2 (BS EN/EN), Class II (IEC)		
Nominal discharge current 8/20 μs (per mode) I_n	20 kA	
Let-through voltage U_p at I_n ⁽¹⁾	< 3.8 kV	< 4.5 kV
Maximum discharge current I_{max} (per mode) ⁽²⁾	40 kA	60 kA
Mechanical specification	ESP DC1100T1/12.5	ESP DC1500T1/12.5
Temperature range	-40 to +80 °C	
Connection type	Screw terminal - maximum torque 4.5 Nm	
Conductor size (stranded)	35 mm ²	
Earth connection	Screw terminal	
Volt free contact	Push-fit connection with conductor up to 1.5 mm ² (solid)	
Degree of protection (IEC 60529)	IP20	
Case Material	Thermoplastic UL-94 V-0	
Mounting	Indoor, 35 mm top hat DIN rail	
Weight – Unit	0.41 kg	0.47 kg
– Packaged	0.42 kg	0.48 kg
Dimensions to DIN 43880 - H x D x W: ⁽³⁾	95 mm x 92 mm x 54.5 mm (3TE)	

- (1) The maximum transient voltage let-through of the protector throughout the test, per mode
 (2) The electrical system, external to the unit, may constrain the actual current rating achieved in a particular installation
 (3) The remote signal contact (removable) adds 15 mm to height

