

Pluggable Multi-pole Surge Protective Devices (SPDs) for Photovoltaic Systems (DC)

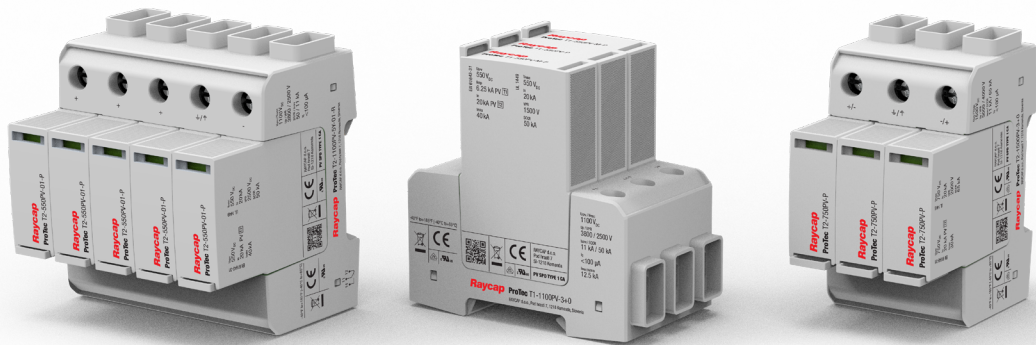


Lightning and Overvoltage Protection

ProTec T1-PV & ProTec T2-PV

Special features:

- Vibration and shock withstand capability
- Sensitive and reliable state-of-the-art disconnecter
- Short circuit current rating up to 30 kA
- Sensitive and reliable remote contact



ProTec T1 PV 5Y Series



ProTec T2 PV 5Y Series



ProTec T1 PV Series



ProTec T2 PV Series



More Product Information

IEC 61643-31:2018

EN 61643-31:2019

UL 1449 5th Edition



ProTec T1 PV and ProTec T2 PV solutions are high-performance, Type 1 and Type 2 pluggable surge protective devices designed to protect the DC power in photovoltaic systems. The products are ideal solutions for protecting String Combiner boxes and PV Inverters and are intended for use in both 1100VDC and 1500VDC systems.

All ProTec PV devices have low-height modules and a short circuit rating of 11 kA, except the ProTec T1-PV-S, which has an excellent short circuit rating of up to 30 kA.

RoHS
COMPLIANT



ProTec T1-1500PV-3+0-S(-R)**Type 1 • Type 2 • Open Type 1 PV SPD Listed**

Location of Use: String box, Inverter
 Mode of Protection: (+) - PE, (-) - PE, (+) - (-)
 EN/UL Category: Type 1, Type 2 /
 Open Type 1 PV SPD Listed
 Housing: Pluggable Design
 Compliance: EN 61643-31:2019
 UL 1449 5th Edition

**Technical Data****ProTec T1-xxxxPV-3+0-S(-R)****1500****EN Electrical**

Maximum Continuous Operating DC Voltage	U_{CPV}	1500 V
Nominal Discharge Current (8/20 μ s)	I_n	20 kA
Impulse Discharge Current (10/350 μ s)	I_{imp}	6.25 kA
Specific Energy	W/R	9.77 kJ/ Ω
Charge	Q	3.125 As
Total Discharge Current (10/350 μ s)	I_{Total}	12.5 kA
Total Discharge Current (8/20 μ s)	I_{Total}	60 kA
Maximum Discharge Current (8/20 μ s)	I_{max}	60 kA
Voltage Protection Level	(+) - PE, (-) - PE U_p	4500 V
	(+) - (-) U_p	4500 V
Response Time	t_A	< 25 ns
Overvoltage Category		III
Short-Circuit Current Rating	I_{SCP}	30 kA
Number of Ports		1

UL Electrical

Maximum Permitted DC Voltage	V_{pVdc}	1500 V
Voltage Protection Rating	(+) - G, (-) - G VPR	3000 V
	(+) - (-) VPR	3000 V
Nominal Discharge Current (8/20 μ s)	I_n	20 kA
Short-Circuit Current Rating	SCCR	100 kA

Additional Electrical Parameters (Tests performed within Raycap testing laboratory only)

Residual Voltage at 5 kA (8/20 μ s)	U_{res}	3400 V
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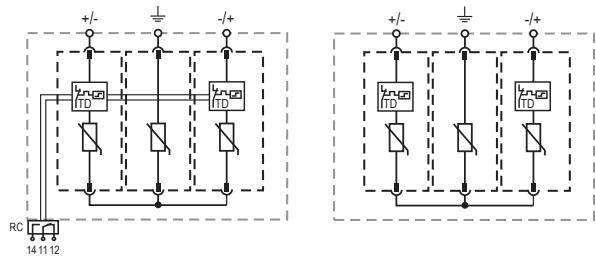
Mechanical & Environmental

Operating Temperature Range	T_a	-40 °F to +158 °F [185 °F per UL 1449] -40 °C to +70 °C [85 °C per UL 1449]
Permissible Operating Humidity	RH	5%...95%
Pollution Degree		2
Altitude (max)		13123 ft [4000 m]
Terminal Screw Torque	M_{max}	35 lbf-in per UL 1499 [4.5 Nm]
Conductor Cross Section (max)		6 AWG (Solid, Stranded) per UL 1449 35 mm ² (Solid, Stranded) / 25 mm ² (Flexible)
Mounting		35 mm DIN Rail, EN 60715
Degree Of Protection		IP 20 (built-in)
Housing Material		Thermoplastic: Extinguishing Degree UL 94 V-0
Thermal Protection		Yes
Operating State / Fault Indication		Green Flag / Not Green Flag
Remote Contacts (RC)		Optional
RC Switching Capacity		AC: 250V/1A, 125V/1A; DC: 48V/0.5A, 24V/0.5A, 12V/0.5A
RC Conductor Cross Section (max)		10 AWG (Solid, Stranded) per UL 1449 [1.5 mm ² (Solid)]
Overvoltage Category		III

Internal Configuration

Legend

- +/-, -/+ + or - Conductor Terminal
- ⏏ PE/G Conductor Terminal
- RC Remote Contacts Terminal (Optional)
- TD Thermal Disconnect

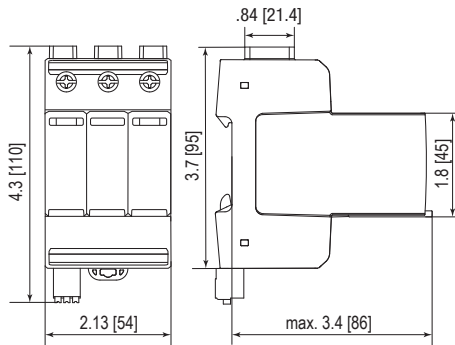


Order Information

Order Code	1500
ProTec T1-xxxxPV-3+0-S	59.0917
ProTec T1-xxxxPV-3+0-S-R (with remote contacts)	59.0916
ProTec T1-750PV-S-P (middle plug)	59.0919
ProTec T1-750PV-S-M-P (side plug)	59.0918

Dimensions & Packaging

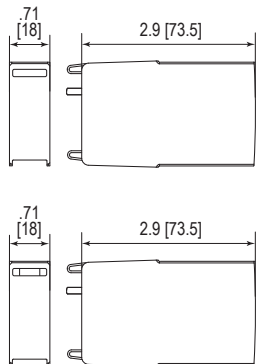
inches [mm]



Complete Unit

ProTec T1-xxxxPV-3+0-S	1500
Weight pounds [grams]	1.034 [469]
ProTec T1-xxxxPV-3+0-S-R	
Weight pounds [grams]	1.045 [474]
Single Unit DIN 43880 Dimension	3 TE / 2.13 [54 mm]
Packaging Dimensions (H x W x L)	4.3 x 4.5 x 13.8" [109 x 115 x 352 mm]
Standard Order Quantity	5 Units

Spare Plug



Single Unit

ProTec T1-xxxPV-S-P	750
Weight pounds [grams]	.282 [128]
ProTec T1-xxxPV-S-M-P	
Weight pounds [grams]	.196 [89]
Single Unit DIN 43880 Dimension	1 TE / .71" [18 mm]
Packaging Dimensions (H x W x L)	4.3 x 4.5 x 13.8" [109 x 115 x 352 mm]
Standard Order Quantity	28 Units

DATASHEET

Pluggable Multi-Pole SPD for Photovoltaic Systems

ProTec T1-PV 3+0

Type 1 • Type 2 • PV SPD Type 1CA



Location of Use: String box, Inverter
 Mode of Protection: (+)-PE, (-)-PE, (+)-(-)
 EN/UL Category: Type 1+2 / PV SPD Type 1CA
 Compliance: EN 61643-31:2019
 UL 1449 5th Edition



ProTec T1-xxxxPV-3+0(-R)

1100

EN Electrical

Maximum Continuous Operating Voltage (PV)	U_{CPV}	1100 V
Nominal Discharge Current (8/20 μ s)	I_n	20 kA
Impulse Discharge Current (10/350 μ s)	I_{imp}	6.25 kA
Specific Energy	W/R	9.77 kJ/ Ω
Charge	Q	3.125 As
Total Discharge Current (10/350 μ s)	I_{Total}	12.5 kA
Total Discharge Current (8/20 μ s)	I_{Total}	50 kA
Maximum Discharge Current (8/20 μ s)	I_{max}	40 kA
Voltage Protection Level	(+) - PE, (-) - PE U_p	3800 V
	(+) - (-) U_p	3800 V
Response Time	t_A	< 25 ns
Overvoltage Category		III
Short-Circuit Current Rating	I_{SCPV}	11 kA
Number of Ports		1

UL Electrical

Maximum Permitted DC Voltage	V_{pdc}	1100V
Voltage Protection Rating	(+) - G, (-) - G VPR	2500V
	(+) - (-) VPR	2500V
Nominal Discharge Current (8/20 μ s)	I_n	20 kA
Short-Circuit Current Rating	SCCR	50 kA

Additional Electrical Parameters (Tests performed within Raycap testing laboratory only)

Residual Voltage at 5 kA (8/20 μ s)	U_{res}	3200 V
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Mechanical & Environmental

Operating Temperature Range	T_a	-40 °F to +185 °F [-40 °C to +85 °C]
Permissible Operating Humidity	RH	5%...95%
Pollution Degree		2
Altitude (max)		13123 ft [4000m]
Terminal Screw Torque	M_{max}	40 lbf-in [4.5 Nm]
Conductor Cross Section (max)		2 AWG (Solid, Stranded) / 4 AWG (Flexible) 35 mm ² (Solid, Stranded) / 25 mm ² (Flexible)
Mounting		35 mm DIN Rail, EN 60715
Degree Of Protection		IP 20 (built-in)
Housing Material		Thermoplastic: Extinguishing Degree UL 94 V-0
Thermal Protection		Yes
Operating State / Fault Indication		Green Flag / Not Green Flag
Remote Contacts (RC)		Optional
RC Switching Capacity		AC: 250V/1A, 125V/1A; DC: 48V/0.5A, 24V/0.5A, 12V/0.5A
RC Conductor Cross Section (max)		16 AWG (Solid) / 1.5 mm ² (Solid)
Overvoltage Category		III

Raycap

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Internal Configuration

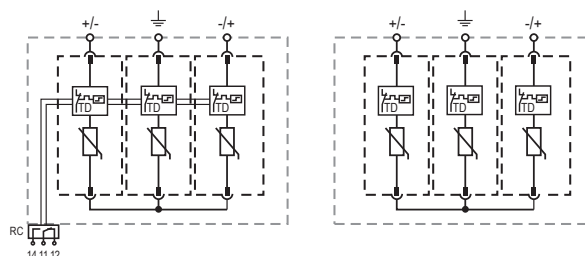
Legend

+/-, -/+ + or - Conductor Terminal

⏏ PE/G Conductor Terminal

RC Remote Contacts Terminal (Optional)

TD Thermal Disconnect

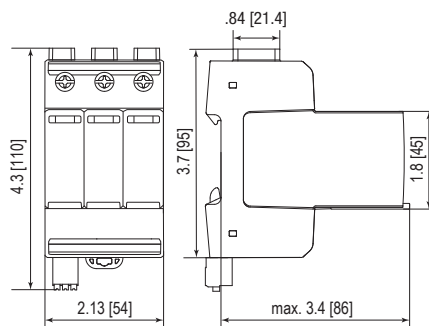


Order Information

Order Code	1100
ProTec T1-xxxxPV-3+0	59.0285
ProTec T1-xxxxPV-3+0-R (with remote contacts)	59.0286
ProTec T1-550PV-P (middle plug)	59.0283
ProTec T1-550PV-M-P (side plug)	59.0284

Dimensions & Packaging

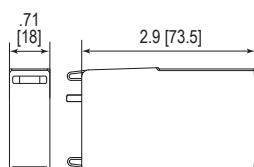
inches [mm]



Complete Unit

ProTec T1-xxxxPV-3+0	1100
Weight	pounds [grams]
	.968 [439]
ProTec T1-xxxxPV-3+0-R	
Weight	pounds [grams]
	.979 [444]
DIN 43880 Dimension	3 TE / 2.13" [54 mm]
Packaging Dimensions (H x W x L)	4.3 x 4.5 x 13.8" [109 x 115 x 352 mm]
Standard Order Quantity	5 Units

Spare Plug



Single Unit

ProTec T1-xxxPV-P	550
Weight	pounds [grams]
	.220 [100]
ProTec T1-xxxPV-M-P	
Weight	pounds [grams]
	.806 [366]
DIN 43880 Dimension	1 TE / .71" [18 mm]
Packaging Dimensions (H x W x L)	4.3 x 4.5 x 13.8" [109 x 115 x 352 mm]
Standard Order Quantity	28 Units

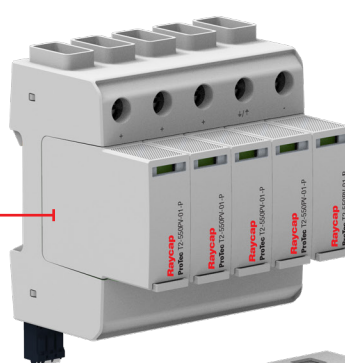
Complete Range of Protection Solutions for PV Systems

Lower Voltage SPDs for PV Systems



A wide portfolio of products in various shapes and lower voltages is also available on the QR code.

ProTec T1 & T2 5Y 1100V
Products feature different connection options and UL certifications.



ProTec T2 PV Series
Voltage ranges of 125V and 250V available in 1+0 and 2+0 configurations.



Multi-pole SPD
Available in standard and lower voltage (300V and 600V) format.

