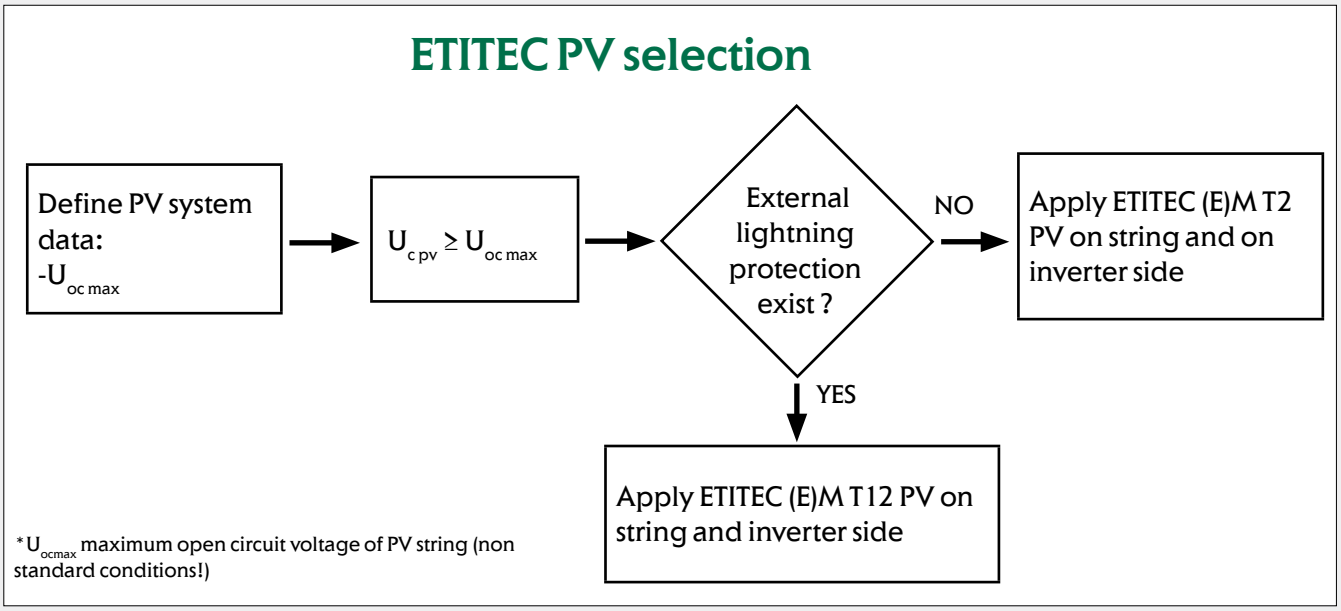
OVERVOLTAGE PROTECTION FOR PV SYSTEMS

ETITEC - Lightning and Surge Arresters

Overvoltage protection selection



ETITEC (E)M T12 PV ..... Y series of overvoltage surge protective devices has been developed to protect against direct and indirect discharges and is intended to protect photovoltaic systems.
The circuit topology consist of three varistors stages each protected by a thermal disconnection device.

Advantages:

- optical indication of faulty device (green ok, red false)
- remote signalisation (RC version only)
- DIN rail mounting (EN 60715)
- high discharge currents and high degree of protection
- MOV varistor is the protective element
- metal snapper, new way of mounting on DIN rail (easier, quicker)
- modular design
- RoHS compliant
- connection up to 35mm^2

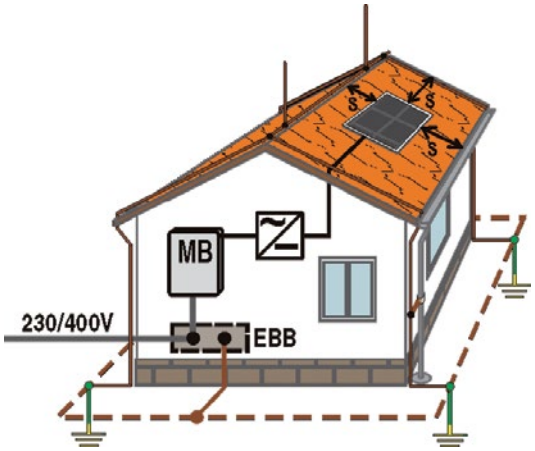
Suitable for green field installations (IEC/EN 61643-32)

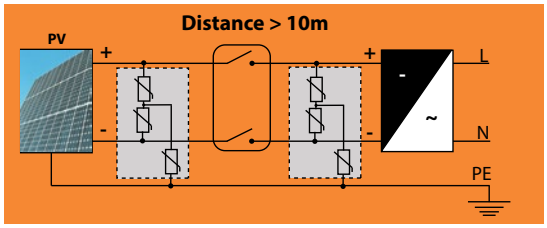
ETITEC M T12 PV
Location of Use: String box, Inverter
Mode of Protection:(+) - PE, (-) - PE, (+) - (-)
Surge Ratings: I_{Total} =up to 12.5 kA (10/350 µs) I_{Total} =up to 60 kA (8/20 µs)
EN Category: Type 1+2
Protective Elements: High Energy MOV
Housing: Pluggable Design
Compliance: IEC 61643-31:2018+A1:2014

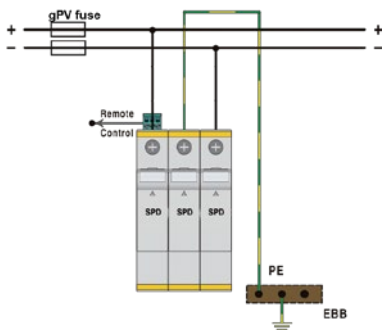
Suitable for roof installations (IEC/EN 61643-32)

ETITEC EM T12 PV
Location of Use: String box, Inverter
Mode of Protection:(+) - PE, (-) - PE, (+) - (-)
Surge Ratings: I_{Total} =up to 6.25 kA (10/350 µs)
I_{Total} =up to 65 kA (8/20 µs)
EN Category: Type 1, Type 2
Protective Elements: High Energy MOV
Housing: Pluggable Design
Compliance: IEC 61643-31:2018+A1:2014

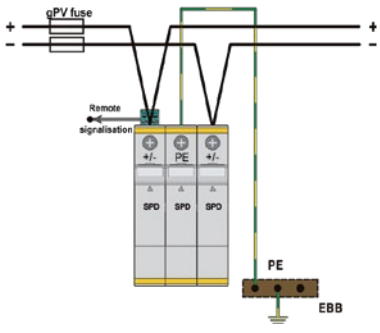
ETITEC (E)M T12 PV ..... Y for photovoltaic system on a building with External Lightning Protection







T connection



V connection

Note: If distance between string and inverter is less than 10 m, then you need only one ETITEC.

ETITEC M T12 PV

Type	Code No.	Max PV voltage U_{cpv} [V DC]	I_{scpv} [kA]	I_{total} (10/350) [kA]	I_{imp} [kA]	I_n [kA]	Weight [g]	Packaging [pcs]
ETITEC M T12 PV 1100/12,5 Y	002440511	1100	11	12,5	6,25	20	453	1/5
ETITEC M T12 PV 1100/12,5 Y RC	002440512	1100	11	12,5	6,25	20	462	1/5
ETITEC M T12 PV 1500/12,5 Y	002440513	1500	30	12,5	6,25	20	488	1/5
ETITEC M T12 PV 1500/12,5 Y RC	002440514	1500	30	12,5	6,25	20	497	1/5

*RC - remote contact for remote signalisation of bad module (to be replaced)

Spare (replacement) modules

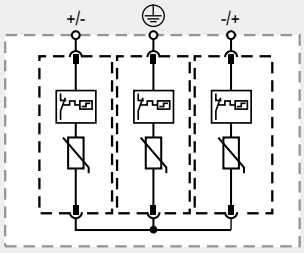
Type	Code No.	Compatible with	Weight [g]	Packaging [pcs]
MOD. M T12 PV 550/12,5	002440519	ETITEC M T12 PV 1100/12,5 Y (RC)	71	1/28
MOD. M T12 PV 550/6,25*	002440520	ETITEC M T12 PV 1100/12,5 Y (RC)	127	1/28
MOD. M T12 PV 750/10	002440521	ETITEC M T12 PV 1500/10 Y (RC)	87	1/28
MOD. M T12 PV 750/5*	002440522	ETITEC M T12 PV 1500/10 Y (RC)	130	1/28

*left or right module (Y connection)
Due to serial connection of modules (Y topology), U_{cpv} voltage of single module is 1/2 of total U_{cpv} between each pole

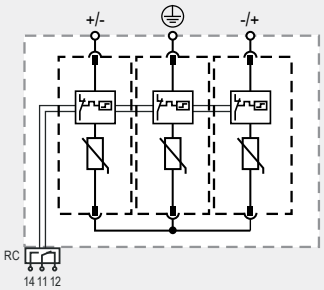
Technical data

Type	ETITEC M T12 PV 1100/12,5 Y	ETITEC M T12 PV 1500/12,5 Y
	T1,T2 / I,II / B,C	
Maximum Continuous Operating DC Voltage UCPV	1100 V	1500V
Nominal Discharge Current (8/20 µs) In	20 kA	20 kA
Total Discharge Current (8/20 µs) ITotal	50 kA	60 kA
Impulse Discharge Current (10/350)	6,25 kA	5 kA
Total Discharge Current (10/350 µs) ITotal	12,5 kA	10 kA
Specific Energy W/R	9,77 kJ/Ω	9,77 kJ/Ω
Charge	3,125 As	2,5 As
Voltage Protection Level Up	< 3,8 kV	< 4,5 kV
Response Time tA	< 25 ns	
Number of Ports	1	
Thermal Protection	✓	
Short-Circuit Current Rating SCCR ISCPV	11 kA	
Operating Temperature Range Ta	- 40°C ... +85°C	
Permissible Operating Humidity RH	5% - 95%	
Altitude (max)	4000 m	
Operating State / Fault Indication	Green Flag / Not Green Flag	
Conductor Cross Section (max)	35 mm2 (Solid, Stranded) / 25 mm2 (Flexible)	
Terminal Screw Torque Mmax	max. 4,5 Nm	
Mounting	35 mm DIN Rail, EN 60715	
Degree Of Protection	IP20	
Housing Material	Thermoplastic: Extinguishing Degree UL 94 V-0	
Size	3 modułes	
Remote contacts - type ...RC		
Contacts ratings	AC: 250V/1A; 125V/1A; DC: 48V/0,5A, 24V/0,5A, 12V/0,5A	
Terminal cross section	Max. 1,5 mm²	
Terminal Screw Torque Mmax	0,25 Nm	
Standards	IEC 61643-31:2018+A1:2014	

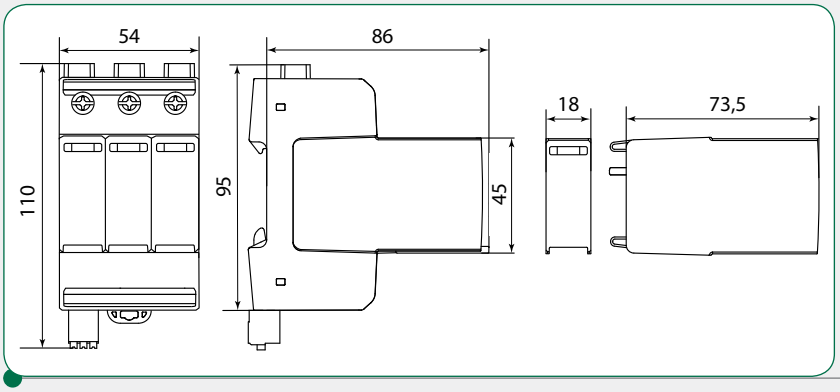
ETITEC M T12 PV 1500/12,5 Y



ETITEC M T12 PV .... Y



ETITEC M T12 PV .... Y RC



ETITEC EM T12 PV

Type	Code No.	Max PV voltage U_{cpv} [V DC]	I_{scpv} [kA]	I_{total} (10/350) [kA]	I_{imp} [kA]	I_n [kA]	Weight [g]	Packaging [pcs]
ETITEC EM T12 PV 1100/6,25 Y	002440580	1100	11	6,25	6,25	20	397	1/5
ETITEC EM T12 PV 1100/6,25 Y RC	002440581	1100	11	6,25	6,25	20	406	1/5
ETITEC EM T12 PV 1500/5 Y	002440582	1500	11	5	5	20	488	1/5
ETITEC EM T12 PV 1500/5 Y RC	002440583	1500	11	5	5	20	497	1/5

*RC - remote contact for remote signalisation of bad module (to be replaced)

Spare (replacement) modules

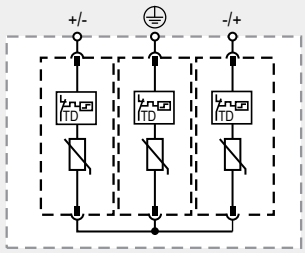
Type	Code No.	Compatible with	Weight [g]	Packaging [pcs]
MOD. EM T12 PV 550/6,25	002440584	ETITEC EM T12 PV 1100/6,25 Y (RC)	79	1/28
MOD. EM T12 PV 750/5	002440585	ETITEC EM T12 PV 1500/5 Y (RC)	87	1/28

Due to serial connection of modules (Y topology), U_{cpv} voltage of single module is 1/2 of total U_{cpv} between each pole

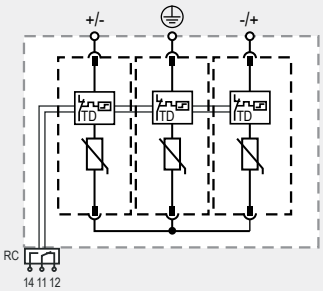
Technical data

Type	ETITEC EM T12 PV 1100/6,25 Y (RC)	ETITEC EM T12 PV 1500/5 Y (RC)
	T1,T2 / I,II / B,C/1CA	
Maximum Continuous Operating DC Voltage UCPV	1100 V	1500V
Nominal Discharge Current (8/20 µs) In	20 kA	20 kA
Total Discharge Current (8/20 µs) ITotal	65 kA	50 kA
Impulse Discharge Current (10/350)	6,25 kA	5 kA
Total Discharge Current (10/350 µs) ITotal	6,25 kA	5 kA
Specific Energy W/R	9,77 kJ/Ω	6,25 kJ/Ω
Charge	3,125 As	2,5 As
Maximum Discharge Current (8/20 µs) Imax	40 kA	30 kA
Voltage Protection Level Up	3,8 kV	5 kV
Response Time tA	< 25 ns	
Number of Ports	1	
Thermal Protection	✓	
Short-Circuit Current Rating SCCR ISCPV	11 kA	
Maximum Permitted DC Voltage Vpvdc	1100 V	1500 V
Voltage Protection Rating VPR	2500 V	4000 V
Nominal Discharge Current (8/20 µs) In In	20 kA	20 kA
Short-Circuit Current Rating SCCR ISCPV	50 kA	65 kA
Operating Temperature Range Ta	- 40°C ... +85°C	
Permissible Operating Humidity RH	5% - 95%	
Altitude (max)	4000 m	
Operating State / Fault Indication	Green Flag / Not Green Flag	
Conductor Cross Section (max)	35 mm² (Solid, Stranded) / 25 mm² (Flexible)	
Terminal Screw Torque Mmax	max. 4,5 Nm	
Mounting	35 mm DIN Rail, EN 60715	
Degree Of Protection	IP20	
Housing Material	Thermoplastic: Extinguishing Degree UL 94 V-0	
Size	3 modułes	
Remote contacts - type ...RC		
Contacts ratings	AC: 250V/1A; 125V/1A; DC: 48V/0,5A, 24V/0,5A, 12V/0,5A	
Terminal cross section	Max. 1,5 mm²	
Terminal Screw Torque Mmax	0,25 Nm	
Standards	IEC 61643-31:2018+A1:2014	

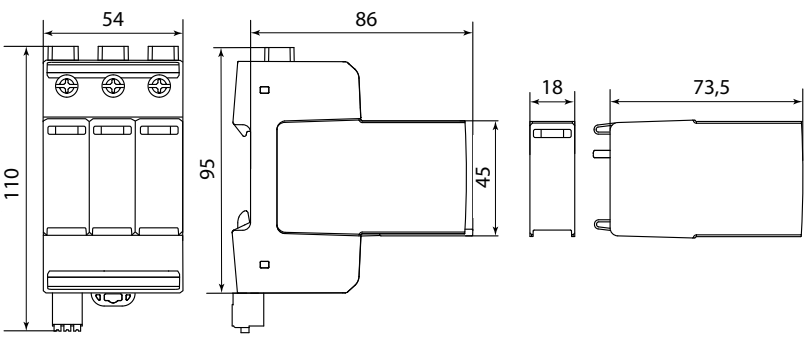
ETITEC EM T12 PV 1100/6,25 Y RC



ETITEC EM T12 PV .... Y



ETITEC EM T12 PV .... Y RC



NEW! acc. to IEC 61643-31:2018

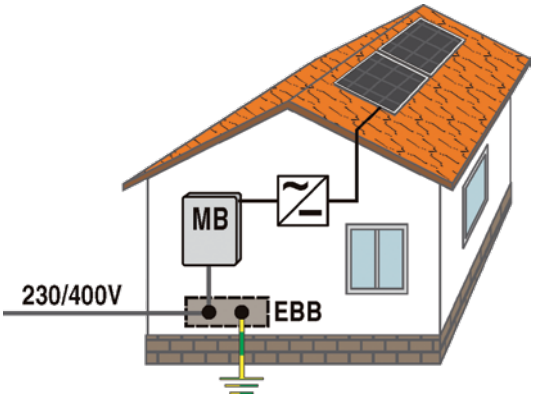
ETITEC (E)M T2 PV ..... Y series of overvoltage surge protective devices has been developed to protect against indirect discharges and is intended to protect photovoltaic systems.
The circuit topology consist of two (three) varistors stages each protected by a thermal disconnection device.

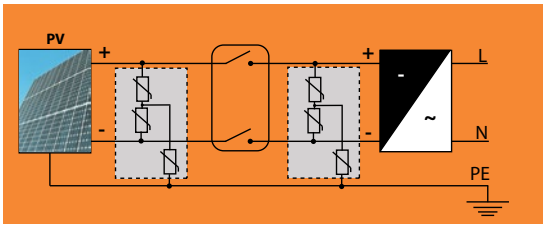
Location of Use: String box, Inverter
Mode of Protection:(+) - PE, (-) - PE, (+) - (-)
Surge Ratings: I_{Total} =up to 20 kA (8/20 µs)
I_{Total} =up to 50 kA (8/20 µs)
EN Category: Type 2
Protective Elements: High Energy MOV
Housing: Pluggable Design
Compliance: IEC 61643-31:2018+A1:2014

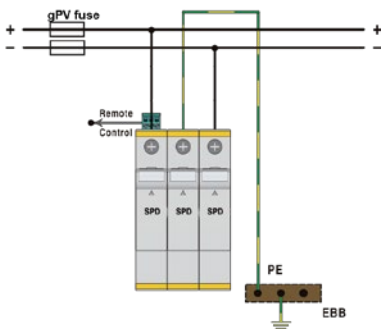
Advantages:

- optical indication of faulty device (green ok, red false)
- remote signalisation (RC version only)
- DIN rail mounting (EN 60715)
- high discharge currents and high degree of protection
- MOV varistor is the protective element
- metal snapper, new way of mounting on DINrail (easier, quicker)
- modular design
- IEC 61643-31:2018
- RoHS compliant
- connection up to 35mm2

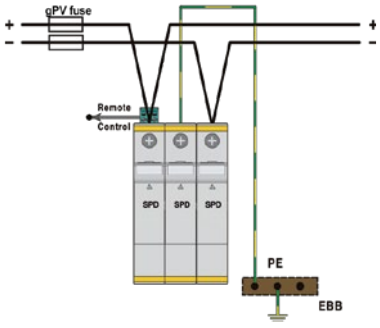
ETITEC (E)M T2 PV ..... Y for photovoltaic system on a building without External Lightning Protection







T connection



V connection

Note: If distance between string and inverter is less than 10 m, then you need only one ETITEC.

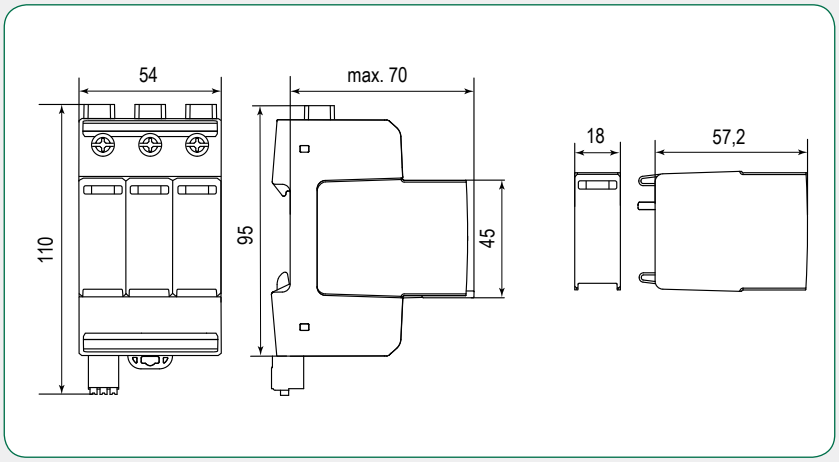
ETITEC M T2 PV						
Type	Code No.	Max PV voltage U_{cpv} [V DC]	I_{scpv} [kA]	I_n/I_{max} [kA]	Weight [g]	Packaging [pcs]
ETITEC M T2 PV 250/20 Y	002440732	250	6	20/50	294	1/5
ETITEC M T2 PV 250/20 Y RC	002440733	250	6	20/50	300	1/5
ETITEC M T2 PV 600/20 Y	002440735	600	6	20/50	347	1/5
ETITEC M T2 PV 600/20 Y RC	002440736	600	6	20/50	353	1/5
ETITEC M T2 PV 1100/20 Y	002440515	1100	11	20/40	396	1/5
ETITEC M T2 PV 1100/20 Y RC	002440516	1100	11	20/40	406	1/5
ETITEC M T2 PV 1500/20 Y	002440517	1500	11	20/30	444	1/5
ETITEC M T2 PV 1500/20 Y RC	002440518	1500	11	20/30	454	1/5

*RC - remote contact for remote signalisation of bad module (to be replaced)

ETITEC M T2 PV 1100/20 Y

Spare (replacement) modules				
Type	Code No.	Compatible with	Weight [g]	Packaging [pcs]
MOD. M T2 PV 125/20	002440734	ETITEC M T2 PV 250/20 Y (RC)	50	1/24
MOD. M T2 PV 300/20	002440737	ETITEC M T2 PV 600/20 Y (RC)	61	1/24
MOD. M T2 PV 550/20	002440523	ETITEC M T2 PV 1100/20 Y (RC)	0,071	1/28
MOD. M T2 PV 750/20	002440524	ETITEC M T2 PV 1500/20 Y (RC)	0,087	1/28

*Due to serial connection of modules (Y topology), Ucpv voltage of single module is 1/2 of total Ucpv between each pole

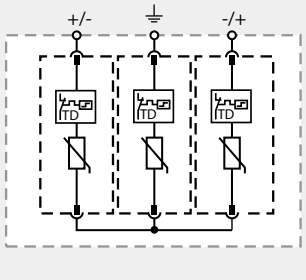


Difference between ETITEC M T2 PV and ETITEC EM T2 PV
ETITEC EM T2 PV is the economic version without module latching mechanism, easily distinguishable from ETITEC M T2 PV by the grey color of ETI logo on the device.

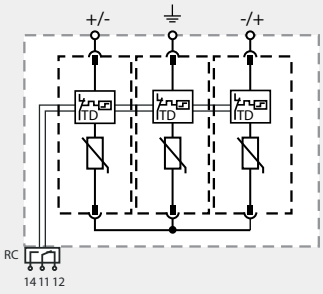
Technical data				
Type	ETITEC M T2 PV 250/20 Y	ETITEC M T2 PV 600/20 Y	ETITEC M T2 PV 1100/20 Y	ETITEC M T2 PV 1500/20 Y
	T2 / II / C			
Maximum Continuous Operating DC Voltage U_{CPV}	250 V	600 V	1100 V	1500V
Nominal Discharge Current (8/20 µs) I_n	20 kA			
Maximum Discharge Current (8/20 µs) I_{max}	50 kA		40 kA	30 kA
Total Discharge Current I_{total}	50 kA			40 kA
Voltage Protection Level U_p	1 kV	2 kV	< 3,8 kV	< 5 kV
Response Time t_A	< 25 ns			
Number of Ports	1			
Thermal Protection	✓			
Short-Circuit Current Rating SCCR I_{SCPV}	11 kA			
Operating Temperature Range T_a	- 40°C ... +85°C			
Permissible Operating Humidity RH	5% - 95%			
Altitude (max)	4000 m			
Operating State / Fault Indication	Green Flag / Not Green Flag			
Conductor Cross Section (max)	35 mm² (Solid, Stranded) / 25 mm² (Flexible)			
Terminal Screw Torque M_{max}	max. 4,5 Nm			
Mounting	35 mm DIN Rail, EN 60715			
Degree Of Protection	IP20			
Housing Material	Thermoplastic: Extinguishing Degree UL 94 V-0			
Size	3 modułes			
Remote contacts - type ...RC				
Contacts ratings	AC: 250V/1A; 125V/1A; DC: 48V/0,5A, 24V/0,5A, 12V/0,5A			
Terminal cross section	Max. 1,5 mm²			
Terminal Screw Torque M_{max}	0,25 Nm			
Standards	IEC 61643-31:2018+A1:2014			

Legend

+/-, -/+	Terminal for +/-, -/+ Conductor
⏚	Terminal for PE /G Conductor
RC	Remote Contacts Optional
TD	Thermal Disconnector

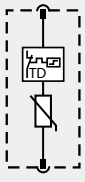


ETITEC M T2 PV .... Y

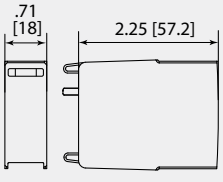


ETITEC M T2 PV .... Y RC

Plug Internal Configuration



Spare Plug



ETITEC EM T2 PV

Type	Code No.	Max PV voltage U_{cpv} [V DC]	I_{scpv} [kA]	I_n/I_{max} [kA]	Weight [g]	Packaging [pcs]
ETITEC EM T2 PV 1100/20 Y	002440623	1100	9	20/40	329	1/5
ETITEC EM T2 PV 1100/20 Y RC	002440624	1100	9	20/40	333	1/5
ETITEC EM T2 PV 1500/15 Y	002440625	1500	9	15/40	358	1/5
ETITEC EM T2 PV 1500/15 Y RC	002440626	1500	9	15/40	363	1/5

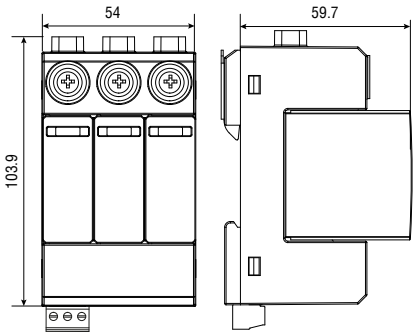
*RC - remote contact for remote signalisation of bad module (to be replaced)

Spare (replacement) modules

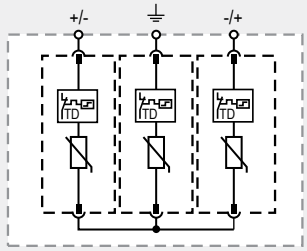
Type	Code No.	Compatible with	Weight [g]	Packaging [pcs]
MOD. EM T2 PV 550/20	002440627	ETITEC EM T2 PV 1100/20 Y (RC)	60	1/12
MOD. EM T2 PV 750/20	002440628	ETITEC EM T2 PV 1500/20 Y (RC)	71	1/12

Technical data

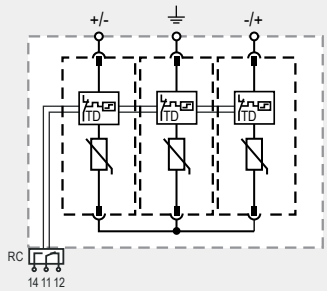
Type		ETITEC EM T2 PV 1100/20 Y	ETITEC EM T2 PV 1500/15 Y
		T2 / II / C	
Maximum Continuous Operating DC Voltage U_{CPV}		1100 V	1500V
Nominal Discharge Current (8/20 µs) I_n		20 kA	15 kA
Maximum Discharge Current (8/20 µs) I_{max}		40 kA	40 kA
Total Discharge Current I_{total}		40 kA	40 kA
Voltage Protection Level U_p	(+)-(-)	< 4,2 kV	< 4,8 kV
	(+)/(-)-PE	< 4,2 kV	< 4,8 kV
Response Time t_A		< 25 ns	
Thermal Protection		✓	
Number of Ports		1	
Short-Circuit Current Rating I_{SCPV}		9 kA	
Maximum Permitted DC Voltage V_{pvdc}		1000V	1500V
Voltage Protection Rating VPR		2500V	3000V
Short-Circuit Current Rating SCCR		50kA	65kA
Operating Temperature Range T_a		- 40°C ... +85°C	
Permissible Operating Humidity RH		5% - 95%	
Altitude (max)		2000 m	
Operating State / Fault Indication		Green Flag / Not Green Flag	
Conductor Cross Section (max)		35 mm² (Solid) / 25 mm² (Stranded)	
Terminal Screw Torque M_{max}		max. 4,5 Nm	
Mounting		35 mm DIN Rail, EN 60715	
Degree Of Protection		IP20	
Housing Material		Thermoplastic: Extinguishing Degree UL 94 V-0	
Size		3 modułes	
Remote contacts - type ...RC			
Contacts ratings		AC: 250V/1A; 120V/1A; DC: 48V/0,5A, 24V/0,5A, 12V/0,5A	
Terminal cross section		Max. 1,5 mm²	
Terminal Screw Torque M_{max}		0,25 Nm	
Standards		IEC 61643-31:2018+A1:2014	



ETITEC EM T2 PV 1500/15 Y



ETITEC EM T2 PV .... Y



ETITEC EM T2 PV .... Y RC

ETITEC V T2 690V (EN/IEC/VDE: T2/II/C)

ETITEC V series of overvoltage surge protective devices has been developed to protect the new generation PV network inverters with an output voltage of 800V (line voltage). The circuit topology consist of three (four) parallel-connected varistor modules. Each pole is equipped with a visual indication.

Advantages:

Type 2 AC Surge Protector
- I_n : 20 kA
- I_{max} : 40 kA
- Pluggable module for each phase
- Remote signaling option
- IEC 61643-11 and EN 61643-11 compliance
- UL1449 ed.4

ETITEC V T2						
Type	Code No.	I_n/I_{max} [kA]	U_c [V AC]	Network	Weight [g]	Packaging [pcs]
ETITEC V T2 690/20 3+0 RC	002442988	20/40	750	TNC	319	1/24
ETITEC V T2 690/20 4+0 RC	002442989	20/40	750	TNC-S	420	1/18

Designation:

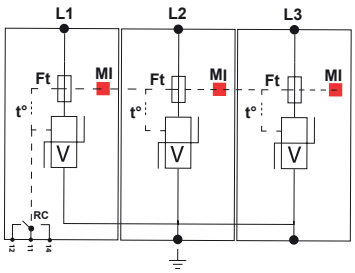
ETITEC V T2 xxx/20 p+c RC

xxx - voltage Uc (max. operating voltage AC), must be above the mains voltage
20 - 20kA (8/20us)
p - number of poles with varistors MOV
c - 0 varistors MOV at the NPE pole, 1 gas-discharge GDT (TT systems)
RC - Remote signaling contact

ETITEC V T2 690/20 3+0 RC

Technical data	
Type	**ETITEC V T2 690/20**
Class (IEC/EN/VDE)	II/T2/C
Network (TN)	690 V/1f
Max. AC operating voltage (AC) Uc	760 V
Temporary Over Voltage Characteristics (TOV) UT (AC)	1000 V/5s withstand
	1300V/120 min safe turn off
Residual current Ipe	< 1 mA
Follow current If	**none**
Nominal discharge current In (15 imp. x 8/20)	20 kA
Max. discharge current Imax (8/20)	40 kA
Protection level Up	3,5 kV
Admissible short-circuit current ISCCR	25 000A
Thermal disconnector	**internal**
Fuses	125 A gG
Installation ground fault breaker	Type «S» or delayed
Connection to Network	By screw terminals: 2,5-25 mm² / by bus
Disconnection indicator	1 mechanical indicator
Remote signaling of disconnection (RC)	✓
Mounting	Symmetrical rail 35 mm (EN60715)
Operating temperature	- 40°C ...+85°C
Protection rating	IP 20
Housing material	Thermoplastic UL94-V0
Standards	IEC 61643-11 / EN 61643-11

ETITEC V T2 690/20 3+0 RC



ETITEC V T2 690/20 4+0 RC