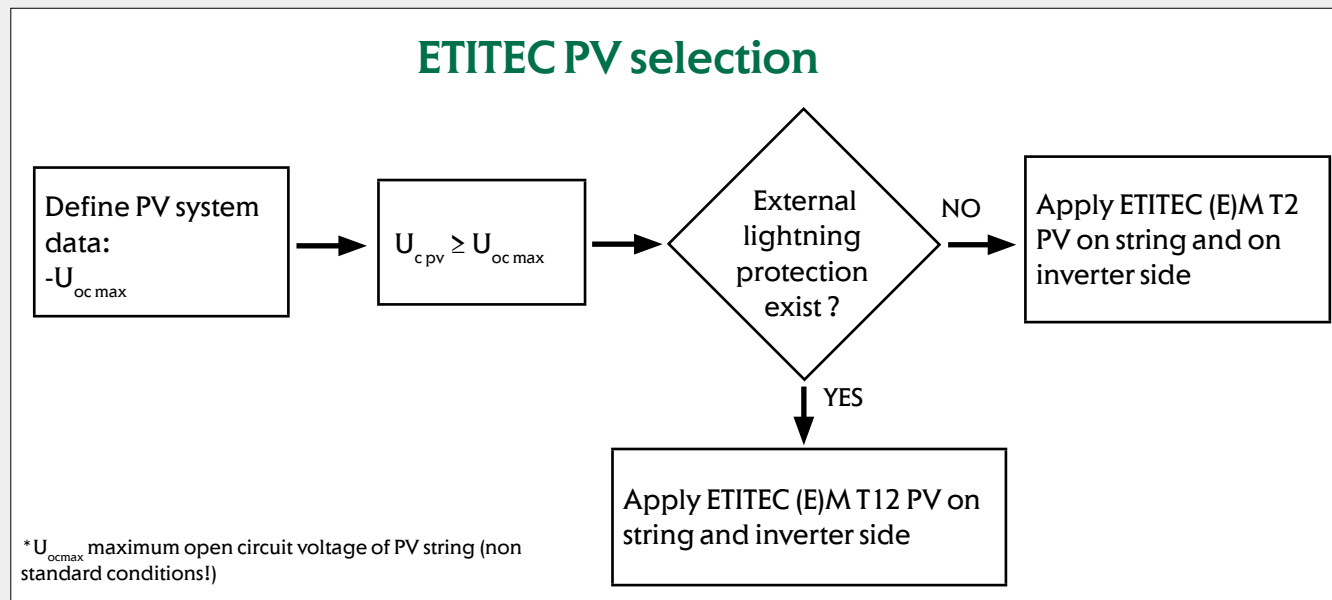


OVERVOLTAGE PROTECTION FOR PV SYSTEMS



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 35mm²

ETITEC M T12 PV

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

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

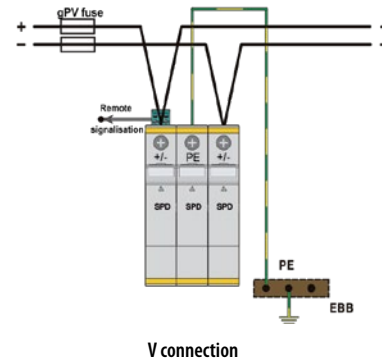
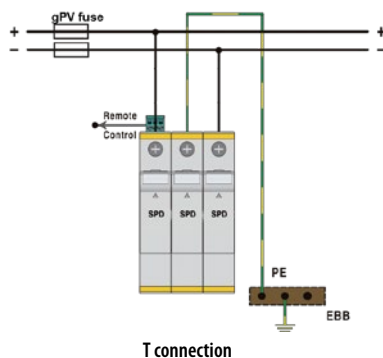
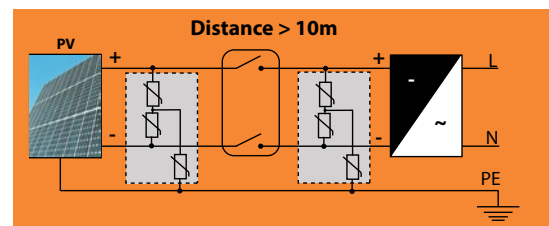
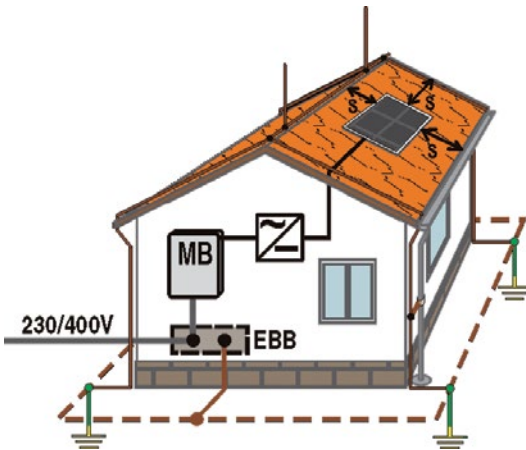
ETITEC EM T12 PV

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

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

Overvoltage protection

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



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. MT12 PV 550/12,5 | 002440519 | ETITEC M T12 PV 1100/12,5 Y (RC) | 71 | 1/28 |
| MOD. MT12 PV 550/6,25* | 002440520 | ETITEC M T12 PV 1100/12,5 Y (RC) | 127 | 1/28 |
| MOD. MT12 PV 750/10 | 002440521 | ETITEC M T12 PV 1500/10 Y (RC) | 87 | 1/28 |
| MOD. MT12 PV 750/5* | 002440522 | ETITEC M T12 PV 1500/10 Y (RC) | 130 | 1/28 |

*left or right module (Y connection)

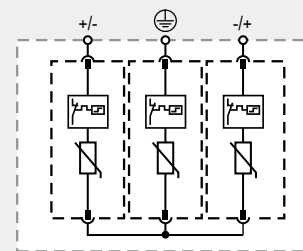
Due to serial connection of modules (Y topology), U_{cpv} voltage of single module is 1/2 of total U_{cpv} between each pole

Technical data

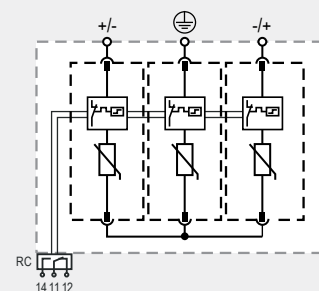
| Type | ETITEC M T12 PV 1100/12,5 Y | ETITEC M T12 PV 1500/12,5 Y |
|---|--|-----------------------------|
| | T1,T2 / I,II / B,C | |
| Maximum Continuous Operating DC Voltage UCPV | 1100 V | 1500V |
| Nominal Discharge Current (8/20 μ s) In | 20 kA | 20 kA |
| Total Discharge Current (8/20 μ s) ITotal | 50 kA | 60 kA |
| Impulse Discharge Current (10/350) | 6,25 kA | 5 kA |
| Total Discharge Current (10/350 μ s) 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 mm ² (Solid, Stranded) / 25 mm ² (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 modules | |
| 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 mm ² | |
| Terminal Screw Torque Mmax | 0,25 Nm | |
| Standards | IEC 61643-31:2018+A1:2014 | |



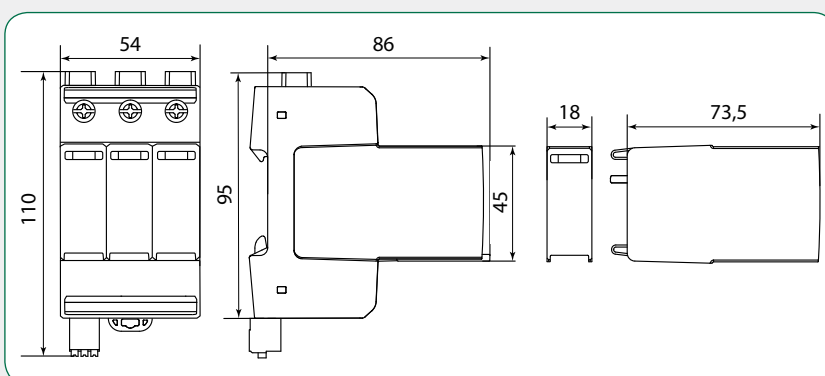
ETITEC M T12 PV 1500/12,5 Y



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 |

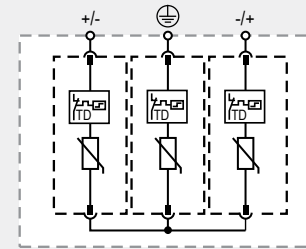
Due to serial connection of modules (Y topology), U_{cpv} voltage of single module is 1/2 of total U_{cpv} between each pole

Technical data

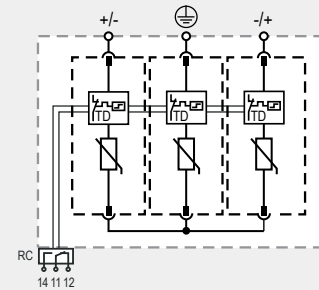
| Type | ETITEC EM T12 PV 1100/6,25 Y (RC) | ETITEC EM T12 PV 1500/5 Y (RC) |
|---|--|--------------------------------|
| | T1,T2 / I,I / B,C/1CA | |
| Maximum Continuous Operating DC Voltage UCPV | 1100 V | 1500V |
| Nominal Discharge Current (8/20 μ s) In | 20 kA | 20 kA |
| Total Discharge Current (8/20 μ s) ITotal | 65 kA | 50 kA |
| Impulse Discharge Current (10/350) | 6,25 kA | 5 kA |
| Total Discharge Current (10/350 μ s) 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 μ s) 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 Vpvc | 1100 V | 1500 V |
| Voltage Protection Rating VPR | 2500 V | 4000 V |
| Nominal Discharge Current (8/20 μ s) 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 mm ² (Solid, Stranded) / 25 mm ² (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 modules | |
| 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 mm ² | |
| Terminal Screw Torque Mmax | 0,25 Nm | |
| Standards | IEC 61643-31:2018+A1:2014 | |



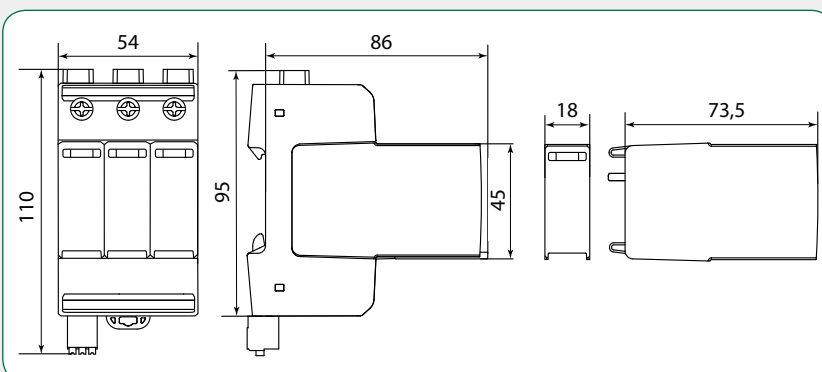
ETITEC EM T12 PV 1100/6,25 Y RC



ETITEC EM T12 PV ... Y



ETITEC EM T12 PV ... Y RC

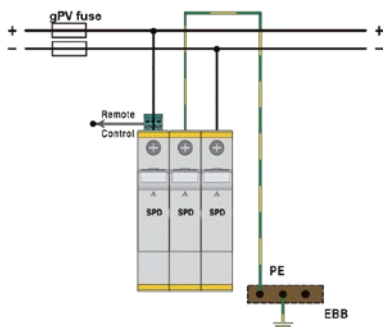
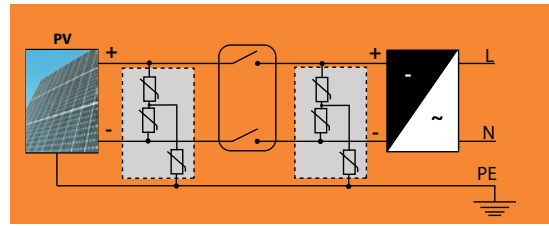
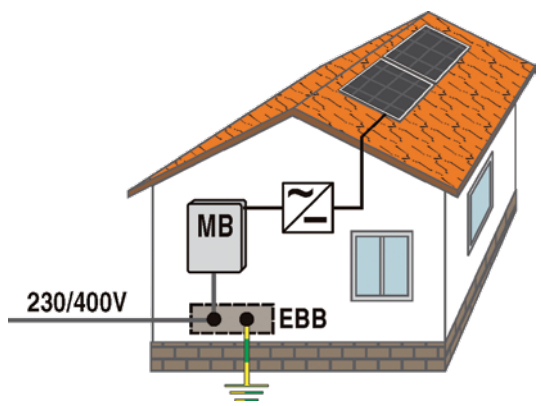


ETITEC (E)M T2 PV Y series of overvoltage surge protective devices has been developed to protect against indirect discharges and is intended to protect photovoltaic systems. The circuit topology consist of two (three) varistors stages each protected by a thermal disconnection device.

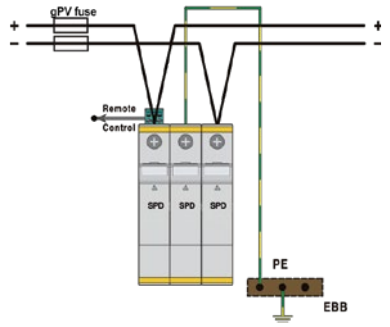
Location of Use: String box, Inverter
 Mode of Protection:(+) - PE, (-) - PE, (+) - (-)
 Surge Ratings: I_{Total} =up to 20 kA (8/20 μ s)
 I_{Total} =up to 50 kA (8/20 μ s)
 EN Category: Type 2
 Protective Elements: High Energy MOV
 Housing: Pluggable Design
 Compliance: IEC 61643-31:2018+A1:2014

- 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] | $I_{t1}/I_{t2\ max}$ [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 |

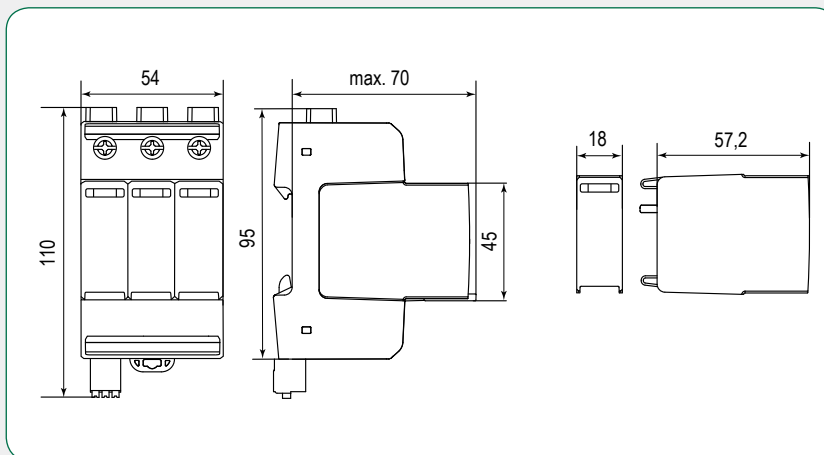


ETITEC M T2 PV 1100/20 Y

*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 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), U_{cpv} voltage of single module is 1/2 of total U_{cpv} between each pole



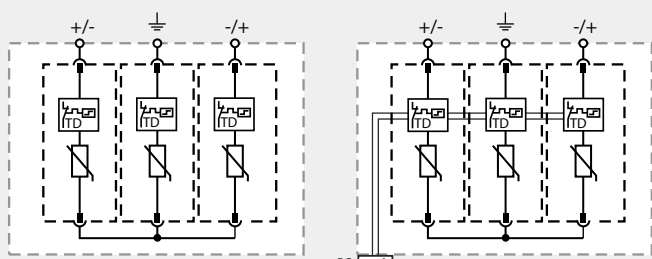


Difference between ETITEC M T2 PV and ETITEC EM T2 PV
 ETITEC EM T2 PV is the economic version without module latching mechanism, easily distinguishable from ETITEC M T2 PV by the grey color of ETI logo on the device.

Overvoltage protection

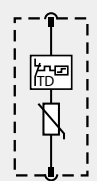
| Technical data | | | | |
|--|--|-------------------------|--------------------------|--------------------------|
| Type | ETITEC M T2 PV 250/20 Y | ETITEC M T2 PV 600/20 Y | ETITEC M T2 PV 1100/20 Y | ETITEC M T2 PV 1500/20 Y |
| | T2 / II / C | | | |
| Maximum Continuous Operating DC Voltage U_{CPV} | 250 V | 600 V | 1100 V | 1500V |
| Nominal Discharge Current (8/20 μ s) I_n | 20 kA | | | |
| Maximum Discharge Current (8/20 μ s) 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 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 mm ² (Solid, Stranded) / 25 mm ² (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 modules | | | |
| 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 mm ² | | | |
| 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 Disconnecter

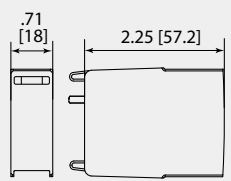


ETITEC M T2 PV ... Y ETITEC M T2 PV ... Y RC

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

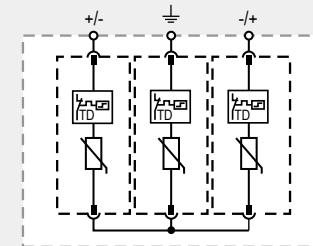
| Type | Code No. | Compatible with | Weight [g] | Packaging [pcs] |
|----------------------|-----------|--------------------------------|---------------|--------------------|
| MOD. EM T2 PV 550/20 | 002440627 | ETITEC EM T2 PV 1100/20 Y (RC) | 60 | 1/12 |
| MOD. EM T2 PV 750/20 | 002440628 | ETITEC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

Technical data

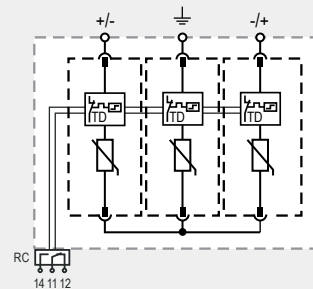
| Type | ETITEC EM T2 PV 1100/20 Y | | ETITEC EM T2 PV 1500/15 Y | |
|--|--|----------|---------------------------|--|
| | T2 / II / C | | | |
| Maximum Continuous Operating DC Voltage U_{CPV} | 1100 V | | 1500V | |
| Nominal Discharge Current (8/20 μ s) I_n | 20 kA | | 15 kA | |
| Maximum Discharge Current (8/20 μ s) 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_x | < 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_o | - 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 mm ² (Solid) / 25 mm ² (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 modules | | | |
| 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 mm ² | | | |
| Terminal Screw Torque M_{max} | 0,25 Nm | | | |
| Standards | IEC 61643-31:2018+A1:2014 | | | |



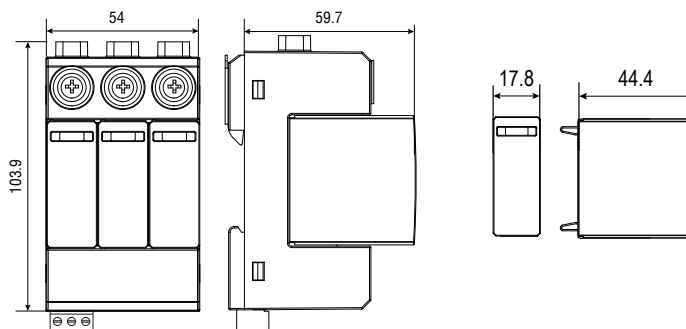
ETITEC EM T2 PV 1500/15 Y



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_{nmax} [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 U_c (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 | ETITECV T2 690/20 |
| Class (IEC/EN/VDE) | II/T2/C |
| Network (TN) | 690 V/1f |
| Max. AC operating voltage (AC) U _c | 760 V |
| Temporary Over Voltage Characteristics (TOV) U _r (AC) | 1000 V/5s withstand |
| | 1300V/120 min safe turn off |
| Residual current I _{pe} | < 1 mA |
| Follow current I _f | none |
| Nominal discharge current I _n (15 imp. x 8/20) | 20 kA |
| Max. discharge current I _{max} (8/20) | 40 kA |
| Protection level U _p | 3,5 kV |
| Admissible short-circuit current I _{scCR} | 25 000A |
| Thermal disconnecter | internal |
| Fuses | 125 A gG |
| Installation ground fault breaker | Type «S» or delayed |
| Connection to Network | By screw terminals: 2,5-25 mm ² / 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 |

Overvoltage protection

