

Cirprotec

Specialists in **Lightning** and **Surge**
Protection for **Photovoltaic Systems**



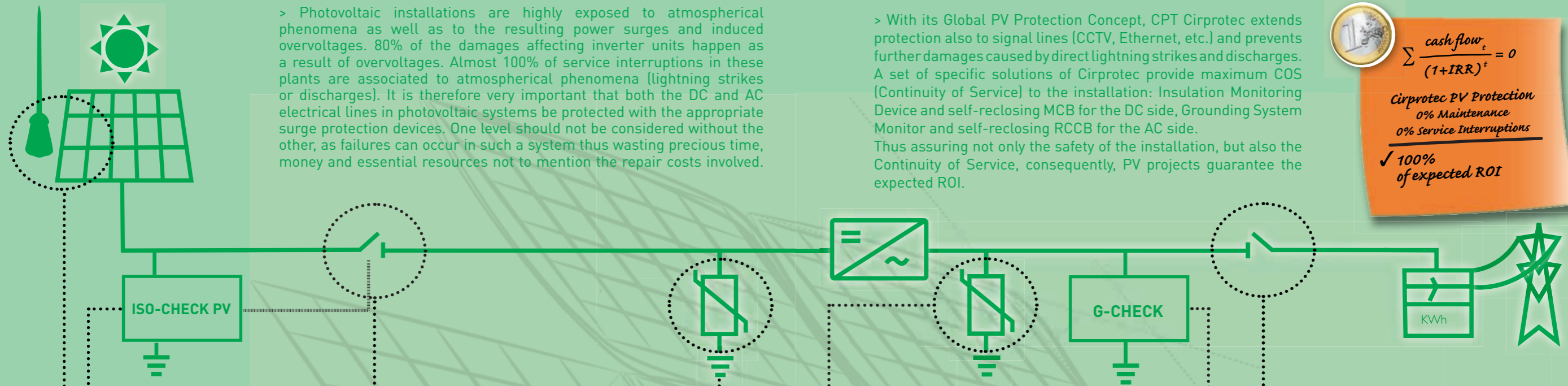
Includes new plug-in SPD range and insulation monitoring device

> Photovoltaic installations are highly exposed to atmospherical phenomena as well as to the resulting power surges and induced overvoltages. 80% of the damages affecting inverter units happen as a result of overvoltages. Almost 100% of service interruptions in these plants are associated to atmospherical phenomena (lightning strikes or discharges). It is therefore very important that both the DC and AC electrical lines in photovoltaic systems be protected with the appropriate surge protection devices. One level should not be considered without the other, as failures can occur in such a system thus wasting precious time, money and essential resources not to mention the repair costs involved.

> With its Global PV Protection Concept, CPT Cirprotec extends protection also to signal lines (CCTV, Ethernet, etc.) and prevents further damages caused by direct lightning strikes and discharges. A set of specific solutions of Cirprotec provide maximum COS (Continuity of Service) to the installation: Insulation Monitoring Device and self-reclosing MCB for the DC side, Grounding System Monitor and self-reclosing RCCB for the AC side. Thus assuring not only the safety of the installation, but also the Continuity of Service, consequently, PV projects guarantee the expected ROI.

$$\sum \frac{\text{cash flow}_t}{(1+IRR)^t} = 0$$

Cirprotec PV Protection
0% Maintenance
0% Service Interruptions
✓ 100% of expected ROI



Category	Product	Key Features	Image	Notes
DC: IMD, MCB AC: RCCB, Grounding	ISO-CHECK PV	Insulation Monitoring Device • 6 modules • Up to 1000 Vdc.		New
	MCB-DC-R	DC self-reclosing MCB for PV (main switch & string). • 5 or 4,5 DIN modules • Up to 63 A and 1000 Vdc. • Optional self-reclosing in 600 Vdc.		Self-reclosing
SPD Class I+II	NIMBUS ESE	Lightning rod with Early Streamer Emission. • Standards: NFC 17-102. • Radius > 100 m.		
	PSC3 PHOTOVOLTAIC	Class I+II Lightning Arrester • Uoc max: 600/1000 Vdc • Iimp (10/350 μs): 12,5 kA • Imax (8/20 μs): 65 kA • Up ≤ 2,6 kV / 3,6 kV • 3 DIN modules, plug-in. • For highly exposed installations and/or equipped with Lightning Protection System.		
SPD Class II	CS23 PHOTOVOLTAIC	Class II Surge Protector • Uoc max: 600/1000 Vdc. • Imax (8/20 μs): 40 kA • Up ≤ 2,6 kV / 3,8 kV • 2 DIN modules only. • Monobloc.		"Y" solution in only 2 modules
	PSM3 PHOTOVOLTAIC	Class II Surge Protector • Uoc max: 600/1000 Vdc. • Imax (10/350 μs): 12,5 kA • Up ≤ 2,6 kV / 3,6 kV • 3 DIN modules, pluggable surge modules. • Tested according to prEN 50539-11. • Back-up fuse not required in PV installations where rated current < 80 A.		prEN 50539-11 New
	CS	Class II Surge Protector • Uc: 275 / 440 V • Imax (8/20 μs): 40 kA • Up (L-N) ≤ 1,3 kV • Up (N-PE) ≤ 1,5 kV (TT) • 2 or 4 DIN modules, 1-phase and 3-phase, monobloc.		CS4P, CS2P
	PSM	Class II Surge Protector • Uc: 275 / 440 V • Imax (8/20 μs): 40 kA • Up (L-N) ≤ 1,3 kV • Up (N-PE) ≤ 1,5 kV (TT) • Pluggable surge modules. • 2 or 4 DIN modules, 1-phase and 3-phase.		PSM4, PSM2
Service Continuity	G-CHECK	Grounding System Monitor • Continuous monitoring of the status of the grounding connection. • Checking of the earth loop resistance • Alarm threshold: 0-100 Ohms (user defined) • Alarm output		New
	R-CHECK	Self-reclosing Earth Leakage relay RCCB • Insulation test which keeps the system from reconnecting if leakage persists. • 4 or 8 modules, 1-phase and 3-phase. • Idn: 30 - 300 mA • In: 40 A • Un: 230/400 V 50-60 Hz		Self-reclosing
Lightning Protection	PSC	Class I+II Lightning Arrester • Uc: 275/440 V • Iimp (10/350 μs): 12,5 kA • Imax (8/20 μs): 65 kA • Up (L-N) ≤ 1,3 kV • Up (N-PE) ≤ 1,5 kV (TT) • 4 DIN modules, 1-phase and 3-phase, plug-in. • For highly exposed installations and/or equipped with Lightning Protection System.		PSC4, PSC2

Surge protectors for each side of the PV installation



DC Protection



Range	CS23 PHOTOVOLTAIC		PSM3 PHOTOVOLTAIC		PSC3 PHOTOVOLTAIC	
Model	CS23-40/600	CS23-40/1000	PSM3-40/600 PV	PSM3-40/1000 PV	PSC3-12,5/600 PV	PSC3-12,5/1000 PV
Code w/out signalling	77707360	77707362	77707850	77707852	77738370	77738375
Code with signalling	77707361	77707363	77707851	77707853	77738371	77738376
Un (Uoc max)	600 Vdc	1000 Vdc	600 Vdc	1000 Vdc	600 Vdc	1000 Vdc
I _{max} (8/20 μs)	40 kA		40 kA		65 kA	
I _{imp} (10/350 μs)	-		-		12,5 kA	
I _n	20 kA		20 kA		20 kA	
IEC 61643-11	Class II		Class II		Class I+II	
Up	≤ 2,6 kV	≤ 3,8 kV	≤ 2,6 kV	≤ 4 kV	≤ 2,6 kV	≤ 3,6 kV
t _a	< 25 ns		< 25 ns			
I _{scwpv}	-		100 A		-	
Back-up fuse	10 A		80 A*		10 A	
Format	Monobloc		Plug-in			

All products are specific for DC applications.

* Back-up fuse not required in PV installations where rated current < 80 A.

AC Protection

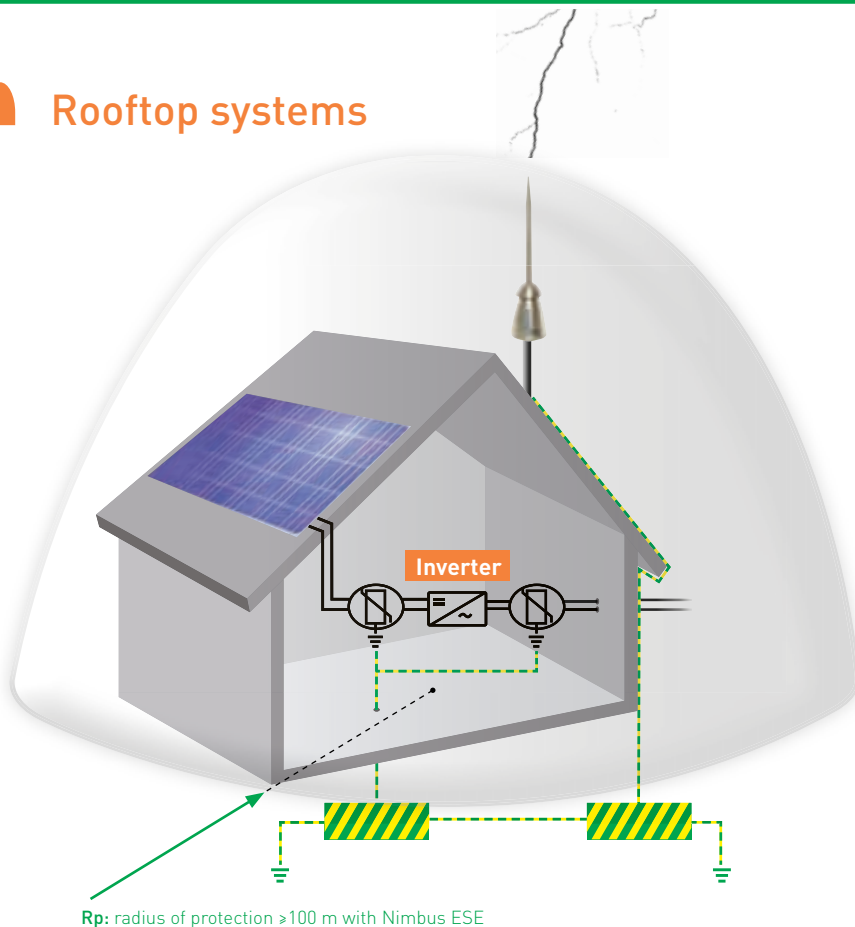


Range	CS4P	CS2P	PSM4	PSM2	PSC4	PSC2
Model	CS4P-40/400	CS2P-40/230	PSM4-40/400 TNS	PSM2-40/230 TNS	PSC4-12,5/400 TNS	PSC2-12,5/230
Code w/out signalling	77705458	77705248	77707956	77707906	77738455	77738255
Code with signalling	77705459	77705249	77707957	77707907	77738456	77738256
Poles	4P	2P	4P	2P	4P	2P
Network	TNC-S, TNS					
Uc 50/60 Hz	275 / 400 V	275 V	275 V		275 V	
I _{max} (8/20µs)	40 kA	40 kA	40 kA		65 kA	
I _{imp} (10/350 µs)	-	-	-	-	12,5 kA	
I _n	15 kA	15 kA	20 kA			
U _p	≤ 1,3 kV	≤ 1,3 kV	≤ 1,3 kV			
t _a	< 25 ns		< 25 ns			
I _{cc}	25 kA	25 kA	25 kA		25 kA	
IEC 61643-11	Class II		Class II		Class I+II	
Format	Monobloc		Plug-in			

All DC & AC protectors have visual status indication. Each product is available also with IR (Remote Indication), ie, remote signalling of the status of protection, IP = 20.

Lightning and Surge Protection: rooftop and large-scale systems

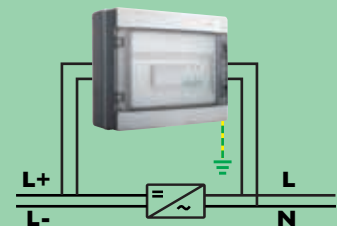
Rooftop systems



Rp: radius of protection ≥ 100 m with Nimbus ESE

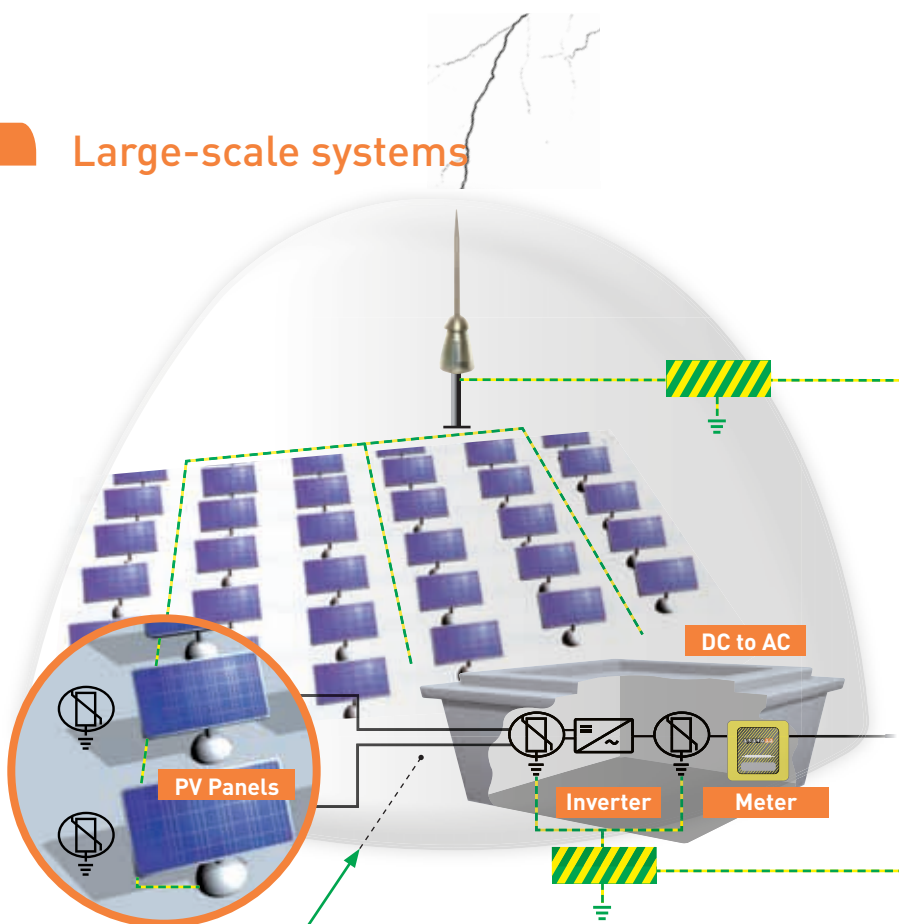
DC/AC Protection Roof Kit for microgeneration

This is a box for combined protection of DC&AC sides of the Inverter with Class II surge protectors. It's a Plug&Play solution for application in microgeneration and cogeneration PV systems, especially in the residential and tertiary sectors. **Custom projects only.**



The radius of protection of the **Nimbus ESE lightning rod** covers the PV panels and all electrical and electronic equipment of the PV installation. As opposite to passive Franklin LPS, PV panel performance is not affected by shadowing elements. Nimbus is the best solution to protect PV installations against direct lightning impacts in a most cost efficient way. The protection is calculated according to the NFC 17-102 standard.

Large-scale systems



Rp: Radius of protection ≥ 100 m with Nimbus ESE

Signal lines in photovoltaic installations and, to a very particular extent, communication and data management interfaces of the inverter, require the appropriate overvoltage protection for each protocol: RS-232, RS-485, CCTV, Ethernet, ADSL, ISDN, etc. This is especially true when the cable runs are long, potentially, the degree of exposure to induced overvoltages increases significantly.

When **cable runs exceed a 20 m distance**, a complete protection is only achieved with the installation of additional surge protectors in the correct position. String combiner units are an example of highly exposed devices. Installing a surge protector as close to them as possible allows to better manage residual voltages (left upstream by the surge protectors at the inverter) as well as induction phenomena.

 = SPD (Surge Protective Device)

Insulation & Grounding System monitors, self-reclosing MCB & RCCB, signal line SPD, ESE lightning rod

Insulation monitoring device (DC)

Model	ISO-CHECK PV 600	ISO-CHECK PV 1000
Code	77706704	77706703
Us	230 V	230 V
Uoc	1000 Vdc	600 Vdc
Ran	30...80 Ω	30...80 Ω
Modules	6	6



Grounding system monitor (AC)

Model	G-CHECK 120 V	G-CHECK 230 V
Code	77706550	77706500
Us	120 V	230 V
Modules	2	2
Alarma threshold	0-100 Ω	0-100 Ω
Alarm signal	Remote	Remote



Self-reclosing PV MCB (DC)



Model	MCB-DC-1000		MCB-DC-600	
Code	550870	550879	550850	550859
Protection	String	Inverter	String	Inverter
Uoc	1000 Vdc		600 Vdc	
In	10 A	63 A	10 A	63 A
Un	880Vdc		550 Vdc	
Modules	4+1/2		5	
Reclosure	Manual		Automatic (optional)	
Remote Signal	Yes			

B curve. DC21B class. Available with C curve for 440 Vdc models.

Self-reclosing RCCB (AC)



Model	R-CHECK 2-40-30	R-CHECK 4-40-300-T
Code	554411	554322
Phases	P+N	3P+N
Poles	2	4
Un	230/400 Vac 50-60Hz	
In	40 A	
Idn	30 mA	300 mA
Modules	4	8
Class	A IEC 1008.1	
Reclosure	Timed sequence & insulation test	Timed sequence

Self reclosure

Signal line SPDs



Model	Protocol 232	RF	Tel. Lines
Model	DB9 12V9HS	CT 10 CCTV	DIN-ADSL
Code	77820145	77801670	77840115
Uc	16 V	60 V	180 V
Up	<25 V (L-GND) <500 V (L-PE)	<0,6 kV	<0,2 kV
In	0,5 kA	10 kA	5 kA
Imax	0,5 kA	20 kA	10 kA
Wires	7+GND	BNC Connect	2

ESE lightning rods

Model	CPT-1	CPT-2	CPT-3
Code	77901100	77901200	77901300
Level I	42 m	58 m	79 m
Level II	51 m	70 m	86 m
Level III	57 m	75 m	97 m
Level IV	65 m	84 m	107 m

Level of protection acc. to product standard NFC 17-102.



CPT

CIRPROTEC, S.L.

Lepant, 49 - 08223 Terrassa (BARCELONA) - SPAIN

Tel. (+34) 93 733 16 84 Fax. (+34) 93 733 27 64

export@cirprotec.com