Solartec

PV photovoltaic electrical components and combiner boxes

Gave

Solartec

Company

Gave Electro is a prestigious manufacturer of electrical equipment with extensive experience in industrial and energy management applications.

The company applies its considerable technical expertise to switchgear and low-voltage control and protection, with notable advances in recent years in direct current applications related to renewable energies and especially photovoltaic power generation.

As specialists, we provide support to clients around the world, offering customised solutions and working with them throughout the various stages of their projects.

Load break switch-disconnectors for photovoltaic applications

"New technologies that tackle the challenges posed by renewable energies"

Renewable energies have seen the emergence of new direct current electrical equipment needs. These needs are reflected in the development of new regulations in both power generation installations and energy products.

The latest edition of switchgear **standard 60947-3** dated 2020 included new categories and product requirements that were especially dedicated to photovoltaic generation installations.

The latest legislation updates product requirements considering new installation needs and taking into account the latest technical developments impact into industry capabilities.

Product overview

PV modular switches

MPV51
Single 1000 V circuit
From 25 to 40A

MPV53
Twin 1000 V – 25A circuits

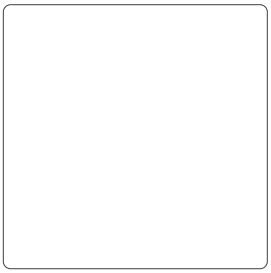
PV load break switches 1000 V

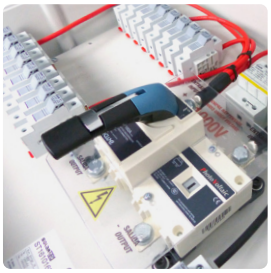
55PV series
Two-pole body
From 100 to 315A

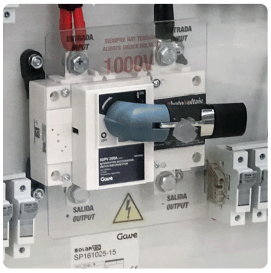
55PV series
Four sizes
From 400 to 2000A

PV load break switches 1500V

55HPV series
Single size
From 160 to 400A







Innovation

The challenge of breaking high voltage currents without zero crossing has led to the development of new electromechanical concepts that use the very latest techniques and materials.

Safety

Operator safety is guaranteed through full compliance with the regulation's demanding requirements regarding insulation and resistance.

Modular PV switch-disconnectors

"The MPV series guarantees the on load breaking and disconnection of PV circuits in a modular device"

Functions

MPV switch-disconnectors are modular devices that allow low-voltage photovoltaic circuits to be safely opened and closed under load.

Maximum circuit safety is guaranteed with the device in the disconnection position.

According to standards:

- IEC 60947-3
- UNE HD 60364-7-712

Characteristics

- Assembly on DIN rail or back plate mounting
- Modular device in terms of width and height which can be mounted into modular panels with a 45-mm frontal opening
- Quick operation mechanism with self-cleaning contacts
- Switch body manufactured in high-performance materials that are resistant to temperature changes. Level of protection: IP20
- Outdoor operation

Modular

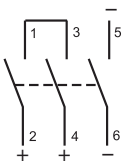
The modular device can be perfectly mounted into residential and commercial installations that use modular housings. The especially compact size of the switches allows combiner boxes to be set up in limited spaces, with the option to wire in a switch operating two independent circuits within the same housing.

Technical data

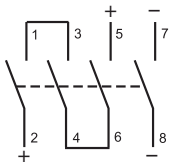
Reference		MPV512100	MPV514100	MPV532100
Description		Switch disconnector		
Rated insulation voltage	Ui	1000 V	1000V	1000V
Rated impulse voltage	Uimp	8 kV	8 kV	8 kV
Rated short-time withstand current	Icw (1 sec)	500 A	500 A	500 A
Rated operating current	Ie (DC21B)	25 A	40 A	2 x 25 A
Connection screws		M4	M4	M4
Terminal tightening torque		1,2 Nm	1,2 Nm	1,2 Nm
Maximum cable cross-section	rigid	10 mm^2	10 mm^2	10 mm^2
	flexible	6 mm^2	6 mm^2	6 mm^2

Electrical scheme

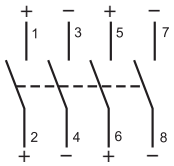
MPV5121



MPV5141

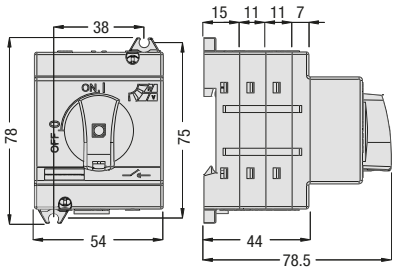


MPV5321

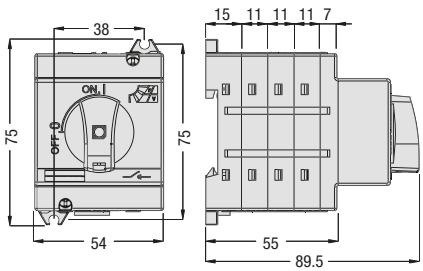


Dimensions (mm)

MPV512100



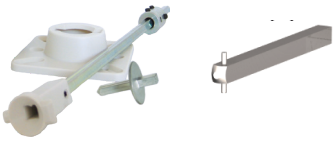
MPV514100 / MPV532100



Accessory references

Handles

Reference	Description
AK1200523	Padlockable external operation handle
AK2000553	Non-lockable external handle



Prolonged shaft

Reference	Description
AK1740003	Clutch with 200 mm prolonged shaft, interlock and mounting plate for external MPV514100 operation

PV load break switches from 100 to 2000A

The 55PV (1000 V) and 55HPV (1500 V) series of switch-disconnectors are designed to offer maximum levels of safety in photovoltaic applications, covering a wide range of power levels from 100A to 2000A. This cutting-edge technology ensures excellent results in really compact sizes.

Functions

Switch-disconnectors on photovoltaic circuits play a critical role in ensuring circuit insulation on systems characterised by their high voltage.

Switches are designed to withstand the constant temperature changes to which photovoltaic installations are exposed without this affecting their rupturing capacity. Long-term insulation is guaranteed, even where there are preent other external elements (dust, condensation, etc.) that increase the risk of electrical failure.

According to standards

- IEC 60947-3

General characteristics

- Wide range of power ratings (from 100A to 2000A) in four different sizes
- Two-pole 1000V model up to 315A. Quick installation and lower power loose heating
- 2P+ and 1P- 1500V models
- Extra-fast breaking technology
- Positive break indication
- Excellent thermal and dynamic withstand
- Large insulation distances (> 50 mm)
- High resistance to damp heat
- Can be accessorised with auxiliary contacts for control circuits

Applications

Disconnection and isolation of solar power generation circuits on the roofs of industrial buildings, solar trackers and photovoltaic power plants.

Design

The housing has been designed with increased leakage distances (>50mm) on the live parts to guarantee long-term safety against electrical risk. A particular circuit -breaking technology for elevated operating voltages allows quick arc supression. The high-performance materials which offer great thermal stability and excellent dielectric properties guarantee a long working life for the equipment.

Technical data

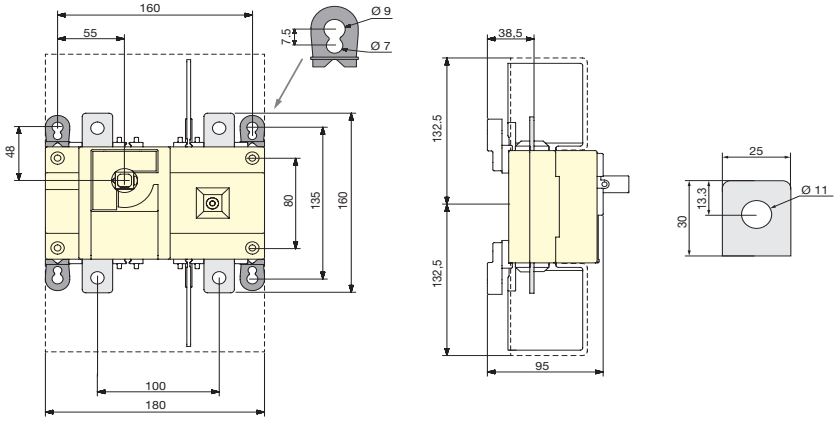
Reference		Size – B4 (2 P)			
		55PV2010	55PV2016	55PV2025	55PV2031
Rated current	Ie (A)	100	160	250	315
Insulation voltage	Ui (V)	1500	1500	1500	1500
Impulse voltage	Uimp (kV)	12	12	12	12
Rated service voltage	Ue (V)	1000	1000	1000	1000
Operational current DC21B -1000VDC	A	100	160	250	315
Rated short-time withstand current 0.3 seconds	(kA ef)	10	10	10	10
Rated short-time withstand current 1 second	(kA ef)	5	5	5	5
Power dissipation per pole @40ºC	W/P	0.8	2	4.7	8
Maximum copper cable cross section	mm^2	35	70	120	185
Maximum copper busbar width	mm	32	32	32	32

Reference		Size – B4 (4 P)		Size – B5 (4 P)		Size – B6 (4 P)	Size – B7 (4 P)
		55PV4040	55PV4050	55PV4063	55PV4080	55PV4120	55PV4200
Rated current	Ie (A)	400	500	630	800	1250	2000
Number of pole(s) in series per circuit		2P+ ; 2P-	2P+ ; 2P-	2P+ ; 2P-	2P+ ; 2P-	2P+ ; 2P-	2P+ ; 2P-
Insulation voltage	Ui (V)	1500	1500	1500	1500	1500	1500
Impulse voltage	Uimp (kV)	12	12	12	12	12	12
Rated operational voltage	Ue (V)	1000	1000	1000	1000	1000	1000
Operational current DC21B -1000VDC	A	400	500	630	800	1250	2000
Rated short-time withstand current 0.3 seconds	(kA ef)	10	10	10	10	10	10
Rated short-time withstand current 1 second	(kA ef)	5	5	5	5	5	5
Power dissipation per pole @40ºC	W/P	20	30	40	70	-	-
Maximum copper cable cross section	mm^2	240	2x 150	2x 185	2x 240	2x 240	-
Maximum copper busbar width	mm	32	32	40	50	63	100

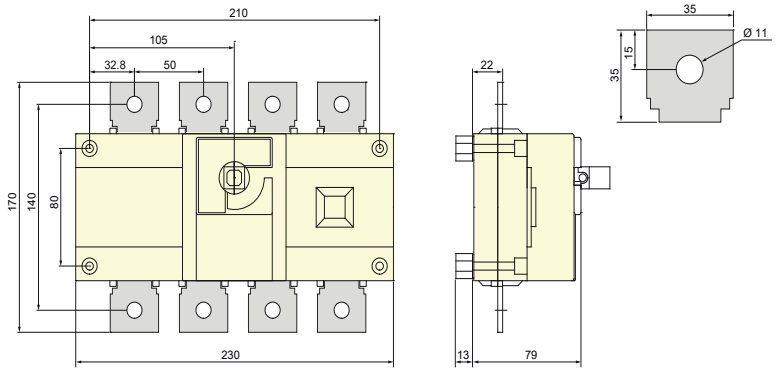
Reference		Size - B4T (3 P)			
		55HPV3016	55HPV3025	55HPV3031	55HPV3040
Rated current	Ie (A)	160	250	315	400
Number of pole(s) in series per circuit		2P+ ; 1P-	2P+ ; 1P-	2P+ ; 1P-	2P+ ; 1P-
Insulation voltage	Ui (V)	1500	1500	1500	1500
Impulse voltage	Uimp (kV)	12	12	12	12
Rated operational voltage	Ue (V)	1500	1500	1500	1500
Operational current DC21B -1000VDC	A	160	250	315	400
Rated short-time withstand current 0.3 seconds	(kA ef)	10	10	10	10
Rated short-time withstand current 1 second	(kA ef)	5	5	5	5
Power dissipation per pole @40ºC	W/P	2.5	5	9.5	15
Maximum copper cable cross section	mm^2	70	120	185	240
Maximum copper busbar width	mm	32	32	32	32

Dimensions 1000V DC (mm)

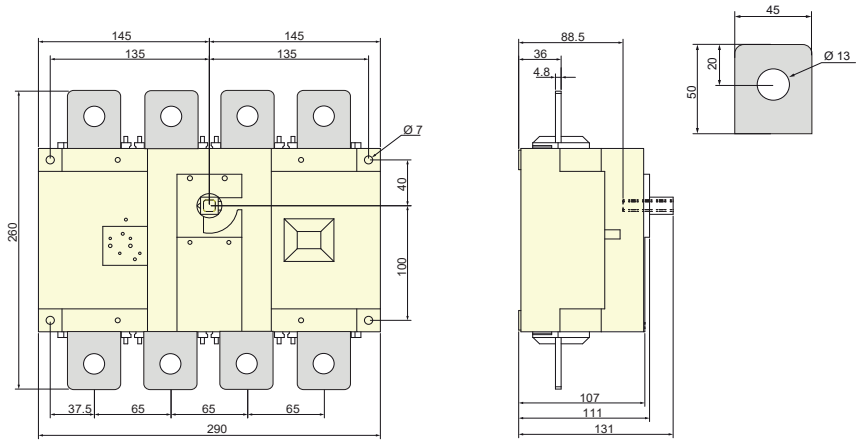
Size B4 – 2 Poles



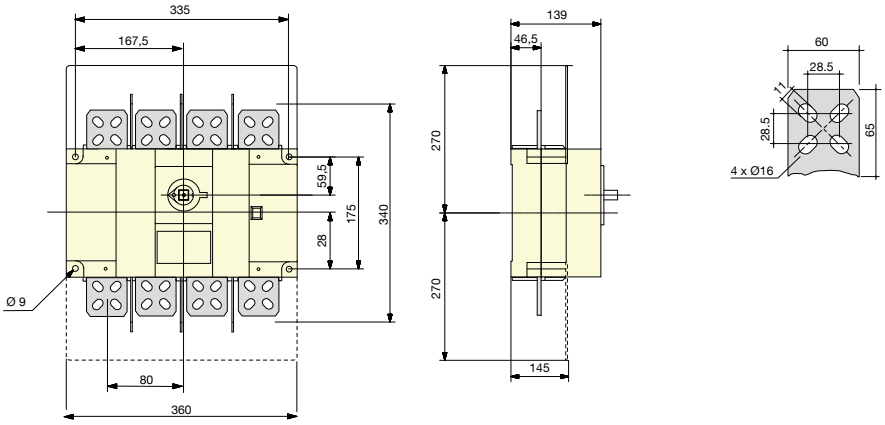
Size B4 – 4 Poles



Size B5



Size B6



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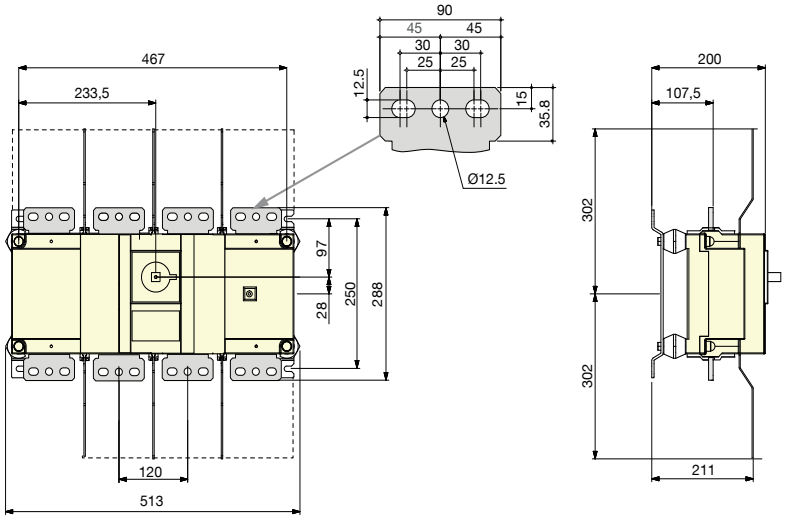
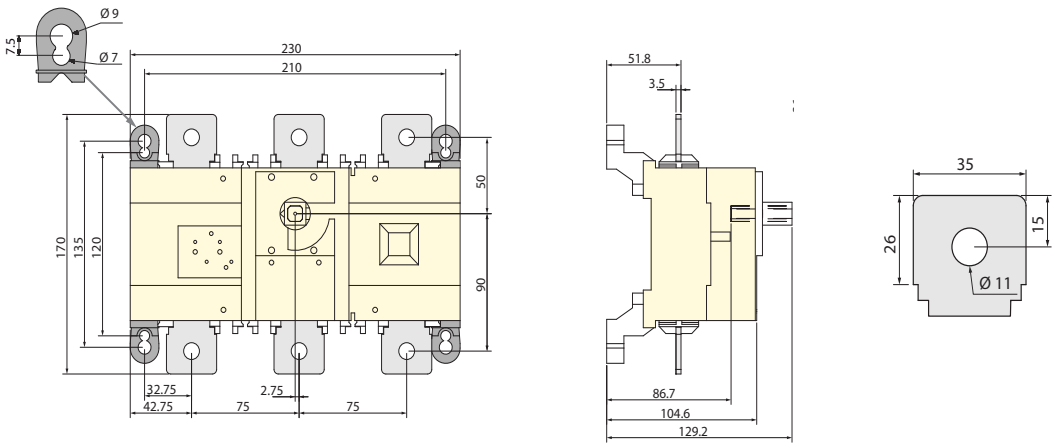


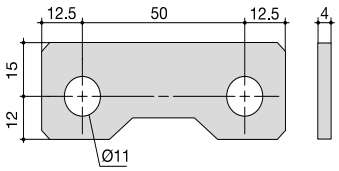
Dimensions 1500V DC

Size B4T – 3 Poles

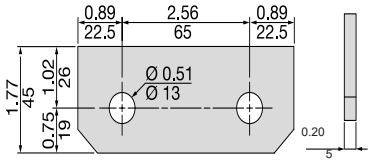


Dimensions (mm)

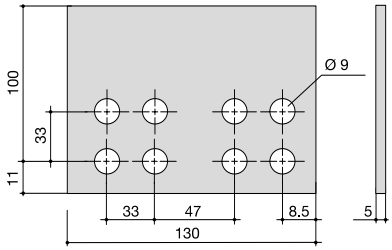
S04P0500



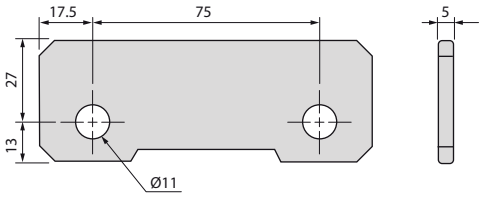
S04P0800



S04P1100



S04P0026



Accessories

						
Switch	**Direct handle**	**External handle**	**Prolonged shaft**	**Bridging bars**	**Auxiliary contact**	**Protection screens**
100A / B4 2P	J1 handle S11J1	S2 handle S13S2	200 mm S081**020** 320 mm S081**032** 500 mm S081**050**	-	1st NO/NC contact 2699 **0031** 2nd NO/NC contact 2699 **0032**	S063B4
160A / B4 2P						
250A / B4 2P						
315A / B4 2P						
400A / B4 4P				S04P0500		S064B4
500A / B4 4P						
630A / B5 4P				S04P0800		S064B
800A / B5 4P			200 mm S081**520** 320 mm S081**532** 400 mm S081**540**			
1250A /B6 4P	J4 handle S11J4	S4 handle S13S4		S04P1100		S064B6
2000A / B7 4P				S04P1200		S064B7
160A /B4T 3P	J2 handle S11J2	S2 handle S13S2	200 mm S081**020** 320 mm S081**032**	S04P0026		S063B5
250A /B4T 3P						
315A /B4T 3P						
400A /B4T 3P						

Accessory references

Bridging bars

Reference	Size	Current	Bridges	Description
S04P0500	B4	400 - 500A	1	B4 4 mm-thick bridging bars
S04P0026	B4T	400A (1500V)	1	B5 5mm-thick bridging bars
S04P0800	B5	630 - 800A	2	B5 5mm-thick bridging bars
S04P1100	B6	800 - 1250A	1	B6 5mm-thick bridging bars
S04P1200	B7	2000A	1	B7 8mm-thick bridging bars

Operation handles

Reference	Size	Type	Description
S11J1	B4 – B5	J1	Mounting with frontal screw Padlockable
S11J2	B4T	J2	
S11J4	B6 – B7	J4	
S13S2	B4 – B5	S2	Mounting from outside or inside the panel. Material highly resistant to UV rays and aggressive environments. Padlockable handle.
S13S4	B6 – B7	S4	

Prolonged shafts

Reference	Size	Length	Handle	Description
S081020	B4 – B5	200 mm	S2	Interlocking tip in Zamak material of high robustness Shafts surface chemically treated against corrosion Several standard lengths
S081032		320 mm		
S081050		500 mm		
S081520	B6 – B7	200 mm	S4	
S081532		320 mm		
S081540		400 mm		

Protection screens

Reference	Size	Poles	Installation	Description
S063B4	B4	2P	Upper or lower	Easy to install Transparent plastic material that allows inspection of connections Top or bottom installation
S064B4		4P		
S064B4	B4T	3P		
S063B5	B5	3P		
S064B5	B5	4P		
S064B6	B6	4P		
S064B7	B7	4P		

Surge protective devices

"A complete modular range offering full protection for all installation types"

The range of PST modular surge protectors is designed to respond the protection needs on low voltage power supply networks. These surges are mainly the result of lightning strikes, although they can also be caused by industrial switching.

The electrical design is based on high energy varistors that are equippet with internal thermal disconnectors and might also be combined with gas discharge tubes.
Usual configurations will offer proection in common an differentials modes.

According to standards

- IEC 61643-31
- EN 50539-11
- IEC 61643-11

Product overview

For photovoltaic installations

1000V DC

Class I
PST41PV
Monobloc with remote signalling

Class I + II
PST31APV
Pluggable version

Class II
PSTxxPV
Pluggable version

1500V DC

Class I + II
PST32PV
Pluggable version

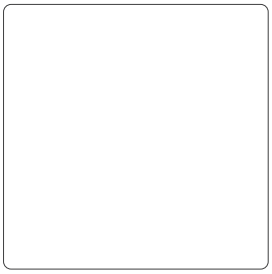
AC Voltage

Class I+II
PSTxxx-xxx
Pluggable

Class II
PSTCxxx
Pluggable
Compacts size

For stand-alone photovoltaic installations

Class II
PST140-xxD
Pluggable



Application principle

PST protectors are based on the use of zinc oxide varisotrs (MOV) which offer the best compromise between a fast response time (< 25 ns) and high drainage capacity – the key parameters to be taken into account when ensuring efficient protection. Sure protectios is optimised when this system is used in combination with gas discharge tubes.

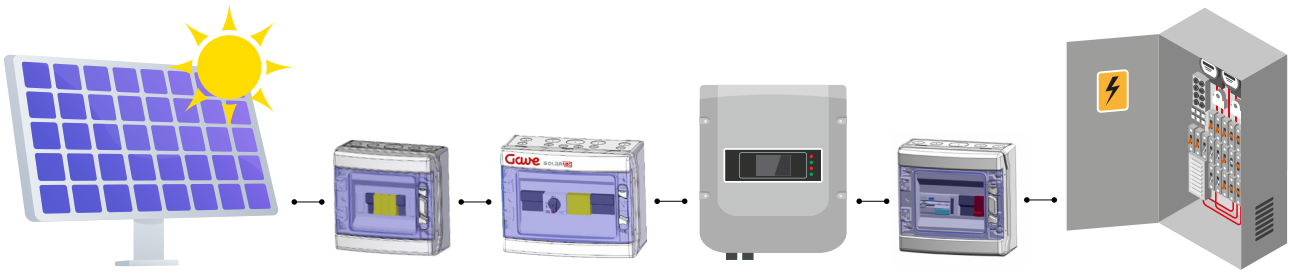
PV installation protection

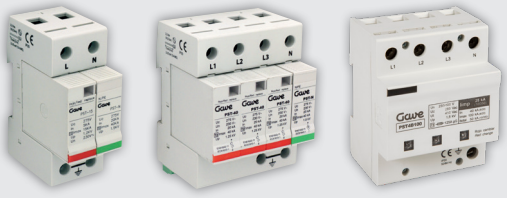
Selection and coordination of surge protectors

The standard IEC 61643-32 sets forth the criteria for selecting, coordinating and installing temporary overvoltage surge protectors at photovoltaic power facilities. These installation instructions cover the DC side of the facility and the AC side between inverter and mains board. Arrangements depend on the installation's location (building or field), cable lengths and the presence of lightning rods at the installation.

In order to ensure optimum safety at an installation, we need to draw up a protection coordination diagram, with "Primary" protection on the side of the inverter being protected and "Secondary" protection near the generation modules. This association is required when the distance between the generation modules and the inverter combiner box is longer than 10 meters.

A lightning rod system at the installation requires a Class I protector at both sides of the inverter. Protectors on the AC side of the installation should be placed at least 10 meters from the inverter and have an associated disconnector element. The total cable length between the connection point to the line and the earthing





AC surge protectors

Select the device for AC-side protection at your installation

DOWNLOAD CATALOG

Types of protection

There are three types of overvoltage surge protectors. Their classification mainly depends on outdoor conditions and the location of the protection within the installation.

- ### Type I
  These devices are designed for use at installations where there is a significant risk of lightning strikes, for example where there is a lightning rod or where the power generation is located on the field. Regulations state that protection of this type should be subject to Class I testing, with 10/350 µs current impulses that simulate the current generated by a direct lightning strike. As a result, this protection needs to be very powerful in order to be able to discharge such a large amount of energy.

- ### Type II
  These are installed on the inverter side or near the generation modules, at sites where the risk of a direct lightning strike is deemed to be negligible. Type II protection covers the whole installation. This type of protection is subject to Class II 8/20 µs current impulse testing.

- ### Type III
  For very sensitive equipment, a second level of protection is recommended. These are Type III protectors. Type III protection is tested using a hybrid 1.2/50 µs – 8/20 µs waveform (Class III testing) and is mainly used at communication circuits.

Protection parameters

Protection is defined by a series of electrical parameters that help you to select the product most suited to your needs.

→ **Ucpv** Maximum continuous operating voltage
Applicable continuous operating voltage, which should be greater than the maximum PV voltage (Uocstc).

→ **Iscpv** Short-circuit current
The SPD must safely withstand (failsafe disconnection) a end-of-life test. The value should be greater than the maximum PV line current (Iscstc).

→ **In** Nominal discharge current
This is the level that a Type II surge protector can withstand repeatedly without destruction (15 8/20 µs current impulses).

→ **Iimp** Impulse current
Applicable to Type I surge protectors, corresponding to the maximum protection resistance (10/350 µs waveform) at one pole or two poles together (Itotal).

→ **Up** Protection level
Maximum residual voltage at the protector output subject to a discharge current equivalent to its nominal discharge current (In). This should be lower than the impulse voltage strength of the installation equipment.

DC protection for 1000 V DC installations

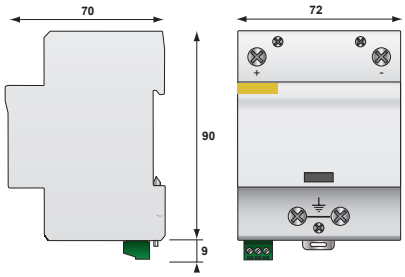
Class I

Due to the very high discharge capacity, it is advisable to only use this type of protection where there is maximum risk of a direct lightning strike.

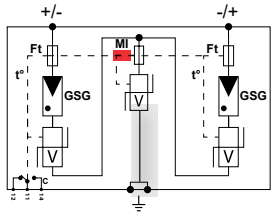
Technical data

		PST41PV
Maximum continuous voltage	Ucpv	1200 V DC
Nominal discharge current – 15 8/20 µs waveform pulses	In	20 kA
Maximum discharge current	Imax	40 kA
Maximum lightning current per pole – One 10/350 µs waveform pulse	Iimp	12.5 kA
Voltage protection level (a In)	Up	2.8 kV

Dimensions (mm)



Connection scheme



GSG: Gas-filled spark gap
V: High energy MOV
Mi: Disconnection indicator

Ft: Thermal fuse
t°: Thermal disconnection system
C: Remote contact

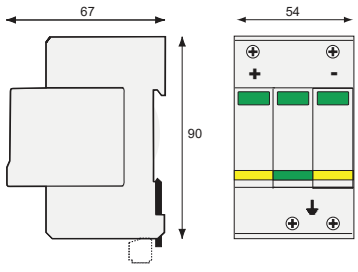
Class I + II

In areas with high electrical storm activity or the presence of lightning rods nearby, the use of type I+II protection is recommended.

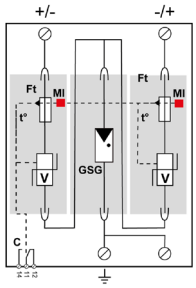
Technical data

		PST31APV
Maximum continuous voltage	Ucpv	1200 V DC
Nominal discharge current – 15 8/20 µs waveform pulses	In	15 kA
Maximum discharge current	Imax	40 kA
Maximum lightning current per pole – One 10/350 µs waveform pulse	Iimp	6.25 kA
Voltage protection level (a In)	Up	4.6 kV

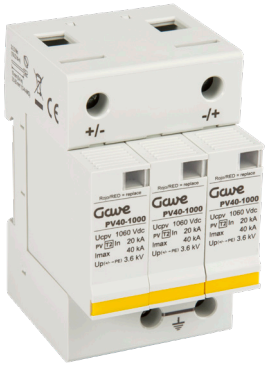
Dimensions (mm)



Connection scheme



GSG: Gas-filled spark gap
V: High energy MOV
Mi: Disconnection indicator
Ft: Thermal fuse
t°: Thermal disconnection system
C: Remote contact



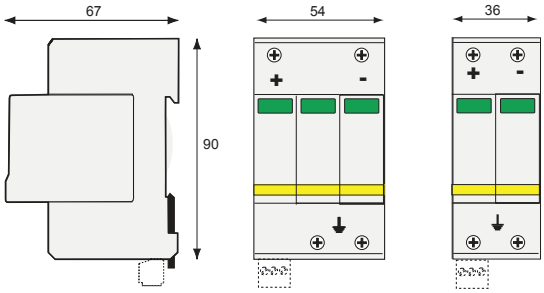
Class II

Class II protection is designed to safeguard photovoltaic power networks against temporary overvoltage due to atmospheric discharges. Products are installed in parallel on the networks to be protected, offering protection between the pole and the earth on common mode and between the two poles in differential mode.
The electrical layout combines varistors with internal thermal disconnection system and its associated window indicators.

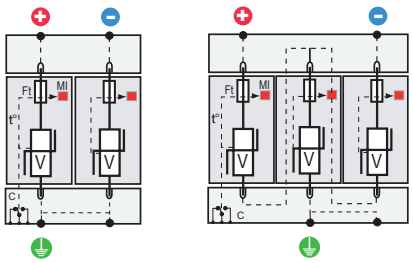
Technical data

		PST25PV	PST25PVT	PST31PV	PST31PVT
		530 V DC	**530 V DC**	**1060 V DC**	**1060 V DC**
Maximum continuous voltage	Ucpv				
Nominal discharge current – 15 8/20 µs waveform pulses	In	20 kA	20 kA	20 kA	20 kA
Maximum discharge current	Imax	40 kA	40 kA	40 kA	40 kA
Voltage protection level (a In)	Up	1.8 kV	1.8 kV	3.6 kV	3.6 kV
Remote signalling		-	Yes	-	Yes

Dimensions (mm)



Connection scheme



V: High energy MOV
Ft:Thermal fuse
t°: Thermal disconnection system

DC protection for 1500 V DC installations

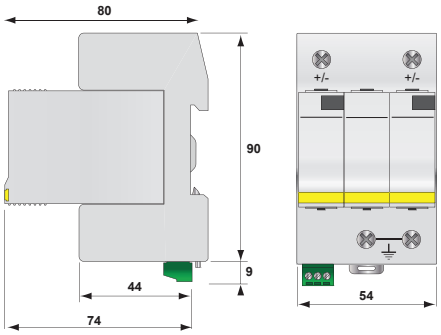
Class I + II

In 1500 V systems, a balance has to be found between a high discharge capacity and a limitation on the level of overvoltage to the equipment to be protected. The use of high capacity varistors ensures Class I + II protection based on plug-in modules with Up levels of protection that are compatible with 1500V inverters.

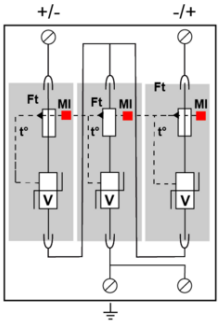
Technical data

		PST32PV	PST32PVT
Maximum continuous voltage	Ucpv	**1500 V DC**	**1500 V DC**
Nominal discharge current – 15 8/20 µs waveform pulses	In	15 kA	15 kA
Maximum discharge current	Imax	40 kA	40 kA
Maximum impulse current	Iimp	6.25 kA	6.25 kA
Voltage protection level (a In)	Up	5.3 kV	5.3 kV
Remote signalling		-	Yes

Dimensions (mm)



Connection scheme



GSG: Gas-filled spark gap
V: High energy MOV
Ft: Fusible térmico
t°: Thermal disconnection system

DC protection for stand-alone installations

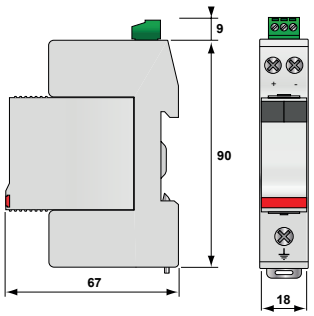
Class II

Class II devices to protect regulators and battery chargers against temporary overvoltage which may affect stand-alone solar power installations.
Battery regulators and battery chargers have low withstand voltage levels. It is essential to select an appropriate protector, with an Up protection level that is compatible with the regulator/battery charger's maximum voltage. An inappropriate selection might lead to overvoltage surges reaching the regulator and causing irreparable damage.

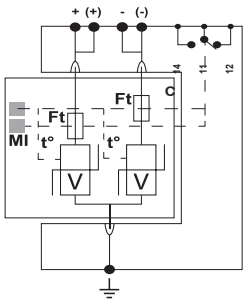
Technical data

		PST140-75D	PST140-110D	PST140-220D
Maximum continuous voltage	Ucpv	**100 V DC**	**150 V DC**	**275 V DC**
Nominal discharge current–15 8/20 µs waveform pulses	In	20 kA	20 kA	20 kA
Maximum discharge current	Imax	40 kA	40 kA	40 kA
Voltage protection level (a In)	Up	390 V	500 V	900 V
Reference with remote signalling		PST140-75DT	PST140-110DT	PST140-220DT

Dimensions (mm)



Connection scheme



V: High energy MOV
Mi: Disconnection indicator
Ft: Thermal fuse
t°: Thermal disconnection system
C: Remote contact

Protection for AC installations

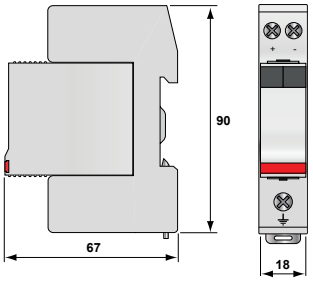
Class II

Compact transient overvoltage protector for power surges caused by a short voltage spike, 230 V AC 50 Hz I+N power, varistor technology combined with gas discharge tube.

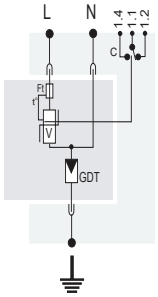
Technical data

		PSTC40
Maximum continuous voltage	Ucpv	**255 V AC**
Nominal discharge current – 15 8/20 µs waveform pulses	In	20 kA
Maximum discharge current	Imax	40 kA
Voltage protection level (a In)	Up	1.25 / 1.5 kV

Dimensions (mm)



Connection scheme



V: High energy MOV
Ft: Thermal fuse
t°: Thermal disconnection system
C: Remote contact
GDT: Gas discharge tube

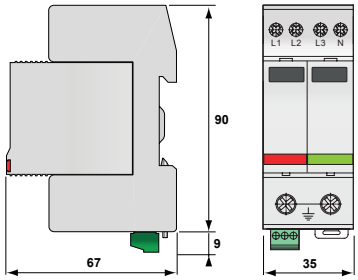
Class II

Compact transient overvoltage protector for power surges caused by a short voltage spike, class 2. 400 V AC 50 Hz III+N power, varistor technology combined with gas discharge tube.

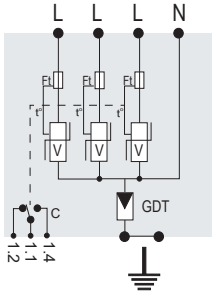
Technical data

		PSTC440
Maximum continuous voltage	Ucpv	**255 V AC**
Nominal discharge current – 15 8/20 µs waveform pulses	In	20 kA
Maximum discharge current	Imax	40 kA
Voltage protection level (a In)	Up	1.25 / 1.5 kV
Reference with remote signalling		PSTC440T

Dimensions (mm)



Connection scheme



V: High energy MOV
Ft: Thermal fuse
t°: Thermal disconnection system
C: Remote contact
GDT: Gas discharge tube

Protection for AC installations

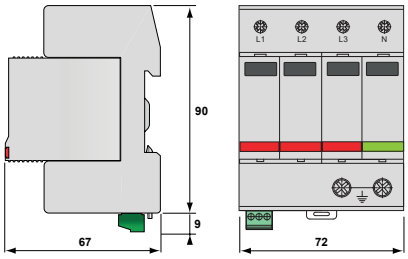
Class I+II

In areas with high electrical storm activity or the presence of lightning rods nearby, the use of type I+II protection is recommended.

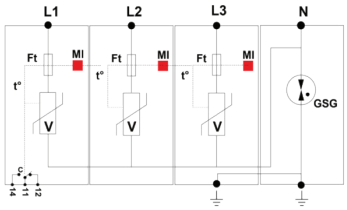
Technical data

		PST4A50
Maximum continuous voltage	Uc	440 V AC
Nominal discharge current – 15 8/20 µs waveform pulses	In	20 kA
Maximum discharge current	Imax	50 kA
Maximum lightning current per pole – One 10/350 µs waveform pulse	Iimp	12.5 kA
Voltage protection level (a In)	Up	1.7 kV

Dimensions (mm)



Connection scheme



GSG: Gas-filled spark gap
V: High energy MOV
Mi: Disconnection indicator

Ft: Thermal fuse
t°: Thermal disconnection system
C: Remote contact

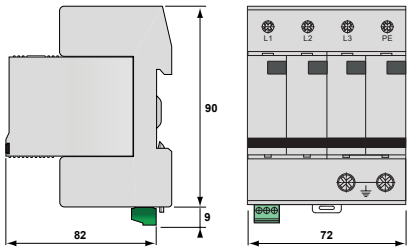
Class I + II

Designed to provide type I + II protection for generation installations that operate with up to 800V AC with no neutral connection.

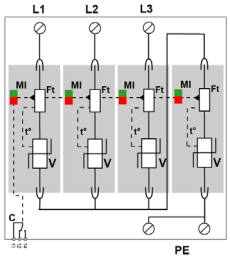
Technical data

		PST440-800
Maximum continuous voltage	Uc	800 V AC
Nominal discharge current – 15 8/20 µs waveform pulses	In	20 kA
Maximum discharge current	Imax	50 kA
Maximum lightning current per pole – One 10/350 µs waveform pulse	Iimp	12.5 kA
Voltage protection level (a In)	Up	3.4 kV

Dimensions (mm)



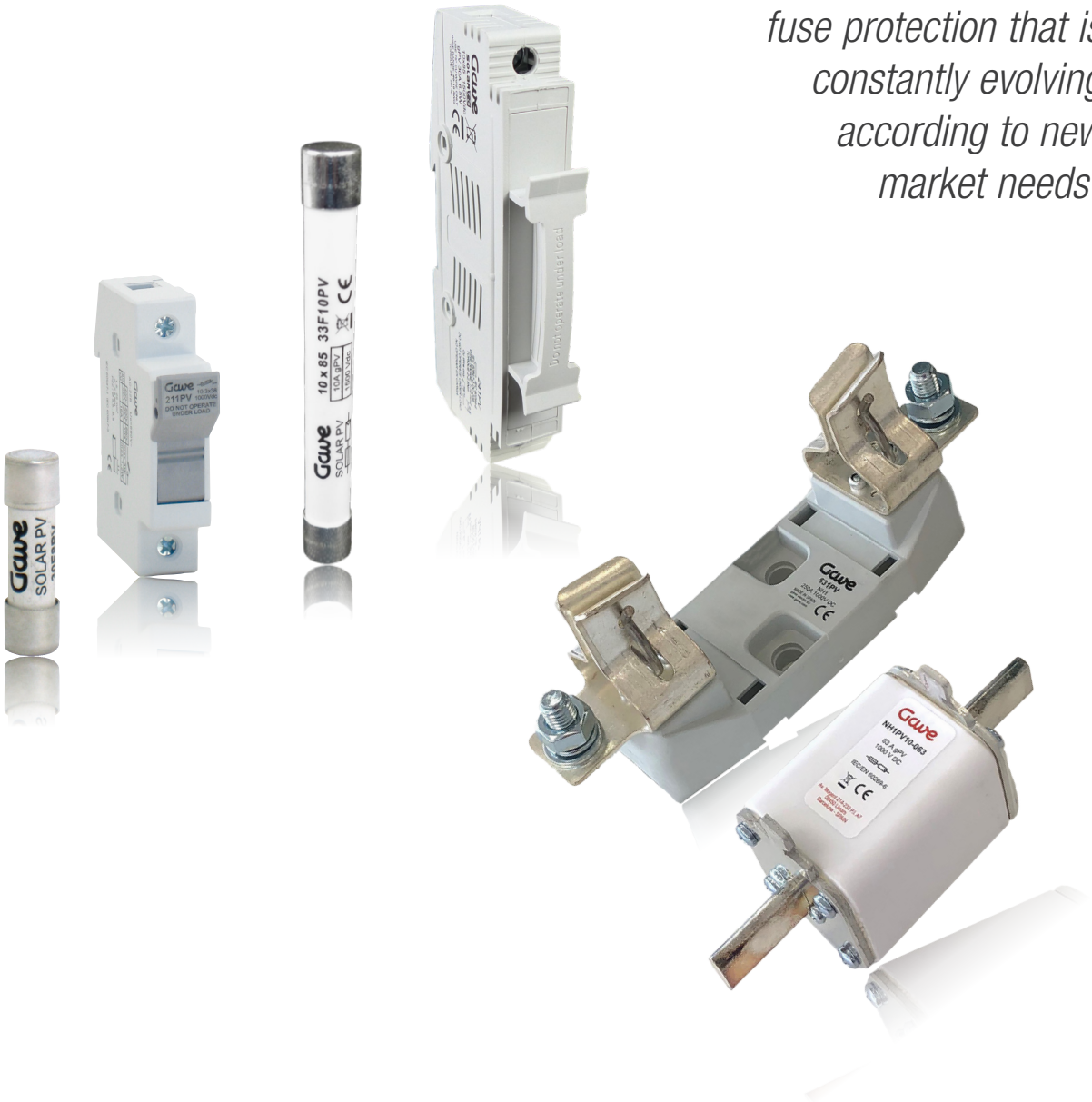
Connection scheme



V: High energy MOV
Mi: Disconnection indicator
Ft: Thermal fuse
t°: Thermal disconnection system
C: Remote contact

Fuse protection

"A complete range of fuse protection that is constantly evolving according to new market needs"



The rapid advances made in renewable energies and especially in photovoltaic power generation have created new protection requirements, both in terms of conversion equipment and in the electrical installation itself.

Fuse protection has proved to be the best available technology due to its high level of selectivity and aging resistance. These new needs are covered by the standard IEC 60269-6 which outlines the specific requirements for fuses used in photovoltaic protection, especially the creation of a new gPV characteristic and the new temperature cycle withstand testing.

Product overview

gPV cylindrical fuses

Size 0 – 10x38
Size 1 – 14x51
1000V DC

Size 10x85
1500V DC

Cylindrical fuse holders

Size 0 – 10x38
Size 1 – 14x51
1000V DC

Size 10x85
1500V DC

NH – gPV fuses

Sizes 1, 2 and 3
Up to 500 A
1000V DC

Sizes 1XL, 2XL and 3L – up to 315 A
1500V DC

Fuse holder bases NH type

Sizes 1, 2 and 3
1000V DC

Size
1XL, 2XL and 3L
1500V DC

Functions

Safely and reliably interrupt the low overcurrents that are characteristic of photovoltaic installations especially with the difficulty of elevated voltages. Disconnect the strings under no load condition.

Technology

Composite materials which can withstand the severe temperature changes with minimal dimensional alterations. Alloys that are suitable for operations within the narrow range of action.

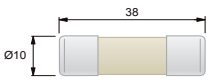
1000V DC gPV cylindrical fuses

30FxxPV and 31FxxPV fuses are designed to protect against the limited overloads typical of photovoltaic installations and safeguard the modules against reverse currents. The protection will operate at 1.35 x In, ensuring optimum installation protection.

Technical data

Reference	Nominal current (A)	Energy integrals I2t (A2s)		Power dissipation (W)		Packaging
		Pre-Arcing	Total at 1000 V	0.8 In	In	
30F2PV	2	1.2	3.4	0.6	1	10
30F6PV	6	30	90	1.1	1.8	10
30F8PV	8	3	32	1.2	2.1	10
30F10PV	10	7	70	1.3	2.3	10
30F12PV	12	12	120	1.5	2.7	10
30F15PV	15	22	220	1.7	2.9	10
30F20PV	20	34	240	2.1	3.5	10
31F25PV	25	65	943	2.7	5.1	10
31F32PV	32	120	1740	3.3	6.2	10

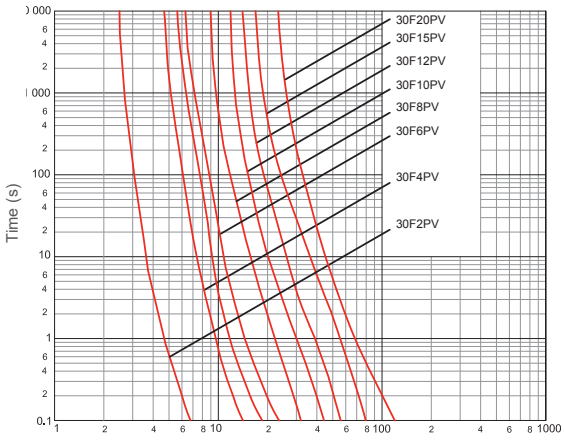
Dimensions (mm)



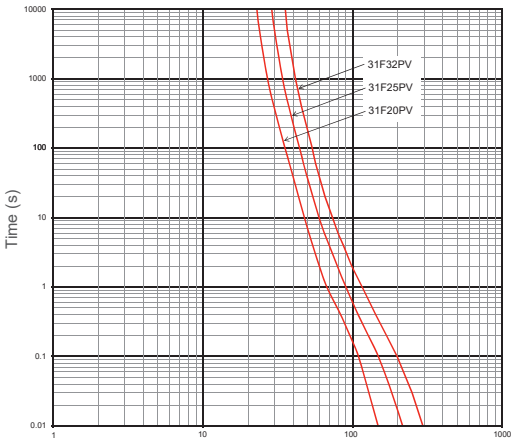
30FxxPV

31FxxPV

Time-current characteristics



DC current, time constant < 1ms (A)



DC current, time constant < 1ms (A)

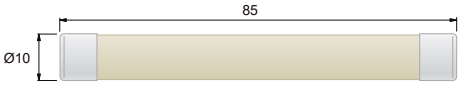
1500V DC gPV cylindrical fuses

The development of photovoltaic systems has evolved toward power plants that operate voltages above of 1000 V. Thanks to the 33F range of fuses, it is now possible to protect installations at voltages up to 1500 V. The 10x85 cylindrical fuse employs special ceramics that are able to resist thermal cycles and internal pressure. The fuse element uses high-purity silver to avoid aging problems and guarantee operation.

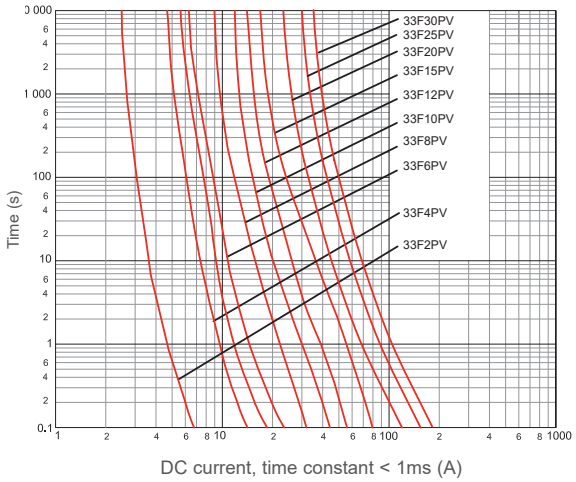
Technical data

Reference	Nominal current (A)	Power dissipation (W)		Packaging
		0.7 In	In	
33F2PV	2	1,70	3,20	10
33F4PV	4	1,69	3,19	10
33F6PV	6	1,73	3,25	10
33F8PV	8	1,79	3,36	10
33F10PV	10	1,99	3,74	10
33F12PV	12	2,28	4,29	10
33F15PV	15	2,63	4,95	10
33F20PV	20	3	5,65	10
33F25PV	25	4,35	7,9	10
33F30PV	30	4,68	8,5	10

Dimensions (mm)



Time-current characteristics



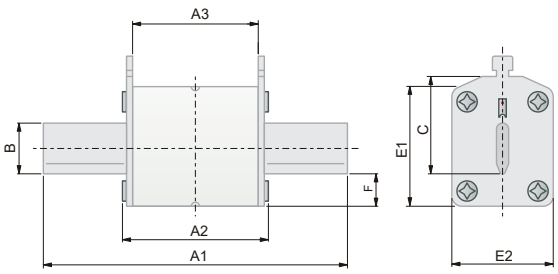
1000V DC NH gPV fuses

In solar field installations with centralised power inverters where the current to be protected is high we are going to use level 2 combiner boxes. This protection is provided through size 1, 2 and 3 NH fuses for voltages up to 1000 V. The use of special ceramics capable of withstanding thermal cycles and high internal pressure are essential in order to guarantee the safety of the unit. The high purity level of the element ensures the accuracy required to act on the light overcurrents that are typical of photovoltaic installations.

Technical data

Reference	Size	Nominal current (A)	Power dissipation (W)		Packaging
			0.7 In	In	
NH1PV10-063	1	63	4.4	10.3	3
NH1PV10-080	1	80	5.2	12.4	3
NH1PV10-100	1	100	5.9	14	3
NH1PV10-125	1	125	6.3	14.7	3
NH1PV10-160	1	160	8.7	22.1	3
NH1PV10-200	1	200	10.1	23.6	3
NH2PV10-200	2	200	10.2	25.3	3
NH2PV10-250	2	250	12.3	30.5	3
NH3PV10-315	3	315	17.8	44.1	3
NH3PV10-400	3	400	20.2	50.4	3

Dimensions (mm)



Size	A1	A2	A3	B	C	E1	E2	F
1	134	70	62	20	40	51.5	44	13.5
2	150	70	62	25	48	60.5	54	14.5
3	150	70	62	32	60	74	70	17

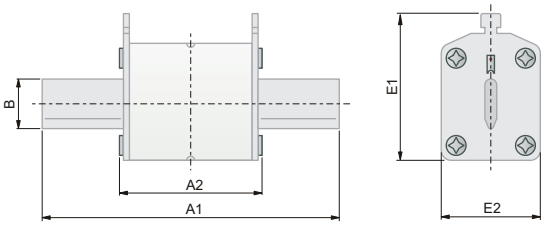
1500V DC NH gPV fuses

Centralised inverters for solar farms can work at voltages of up to 1500 V with high current levels. Standard IEC 60269-6 has defined L- and XL-size NH fuses in order to overcome application challenges by increasing the distance between the contact blades. Internal pressure resistance and the special ceramics able to endure thermal cycles are essential to guaranteeing the safety of the installation. The high purity level of the element provides the accuracy required to act on the light overcurrents that are typical of photovoltaic installations.

Technical data

Reference	Size	Nominal current (A)	Power dissipation (W)		Packaging
			0.7 In	In	
NH1XLPV15-100	1XL	100	11	24	1
NH1XLPV15-125	1XL	125	12	27	1
NH1XLPV15-200	1XL	200	15	37	1
NH2XLPV15-250	2XL	250	23	53	1
NH3LPV15-315	3L	315	23	58	1
NH3LPV15-350	3L	350	26	64	1
NH3LPV15-400	3L	400	28	71	1

Dimensions (mm)



Size	A1	A2	B	E1	E2
1XL	187	125	20	65	51
2XL	205	125	32	72	60
3L	205	125	32	89	75

PV cylindrical fuse holders

Photovoltaic installation fuse holders have to withstand working conditions under a wide range of temperatures and seasonal variation. The use of high-performance plastic materials offers such characteristics.

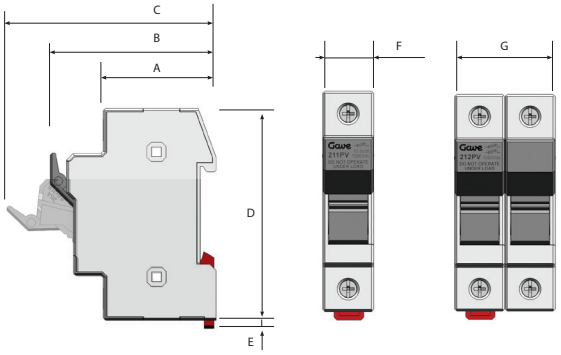
1000 V DC

Size 0 and 1 modular cylindrical fuse holders can operate at voltages of up to 1000 V DC.

Technical data

Reference	Poles	Size	Maximum current In (A)	Packaging
211PV	1	0 (10x38)	20	12
212PV	2	0 (10x38)	20	6
221PV	1	1 (14x51)	32	6

Dimensions (mm)



	211PV	212PV	221PV
A	42	42	52
B	62	62	73
C	80	80	99
D	78,5	78,5	108
E	3	3	4
F	17,5	17,5	27
G	35	35	-

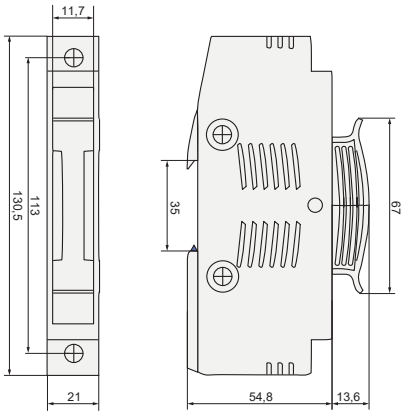
1500 V DC

241PV fuse holder bases are designed with ventilation areas to optimise heat dissipation. They carry 10x85-size fuses that can operate at voltages of up to 1500 V.

Technical data

Reference	Poles	Maximum current In (A)	Pack.
241PV	1	30	6

Dimensions (mm)



NH PV fuse bases

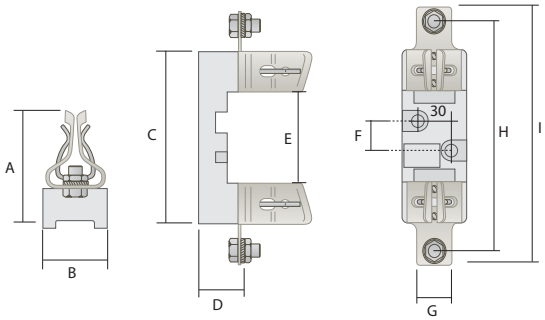
NH-type blade fuse bases are available in sizes 1, 2 and 3 for voltages up to 1000 V and 1XL, 2XL and 3L for voltages up to 1500 V. The high quality of the plastics and ceramics used guarantee insulation.

1000 V DC

Technical data

Reference	Poles	Size	Maximum current In (A)	Packaging
531PV	1	1	250 A	3
541PV10	1	2	400 A	3
551PV10	1	3	500 A	3

Dimensions (mm)



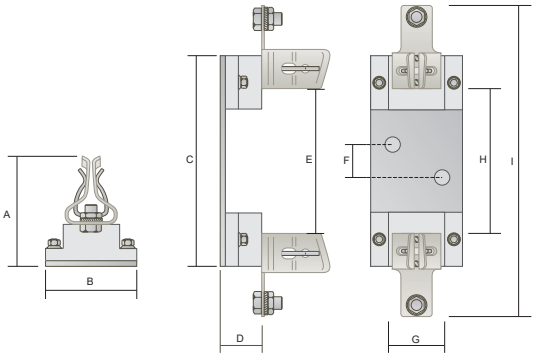
	531PV	541PV10	551PV10
A	87	98	100
B	55	55	75
C	150	150	150
D	35	35	35
E	82	78	78
F	25	25	25
G	27	30	45
H	175	205	205
I	197	227	223

1500 V DC

Technical data

Reference	Poles	Size	Maximum current In (A)	Packaging
531XLPV	1	1XL	200 A	1
541XLPV	1	2XL	250 A	1
551LPV	1	3L	315 A	1

Dimensions (mm)



	531	541 XLPV	551 LPV
A	105	105	105
B	85	85	85
C	203	220	220
D	38	38	38
E	128	145	145
F	31	31	31
G	45	45	45
H	253	270	270
I	270	287	287

PV modular combiner boxes

"A solution designed for residential and commercial installations"

The range of SOLARTEC PV modular connection boxes has been designed for maximum ease of use by both the installer and the user of self-consumption installations.

Functions

The photovoltaic connection boxes perform the connection and protection functions of the photovoltaic arrays and sub-arrays in the different parts of the photovoltaic installation.

These boxes can break and disconnect electrical circuits in order to isolate the inverter inputs. They are located on the DC side or the AC side of the installation They fully comply with specific standards guaranteeing personal safety.

Product overview

STM Series – PV modular combiner boxes

STM Series
1 MPPT
From 1 to 6 strings

STM Series
2 to 6 MPPT
From 1 to 3 strings

STM Series
Batteries

AC protection boxes

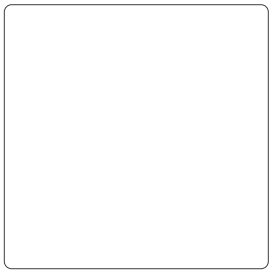
ACM Series
Single-phase boxes, with or without automatic reclosing

ACT Series
Three-phase boxes, with or without automatic reclosing

PV protection boxes

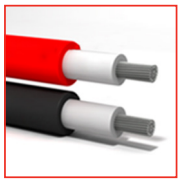
STM Series
1 to 6 MPPT with or without MC4 connectors

They typically feature protection against power surges, short circuits and overvoltages of atmospheric origin.
The standard HD 60364-7-712:2017 details requirements for special installations - Phtovoltaic (PV) systems.



Photovoltaic DC combiner boxes

General characteristics

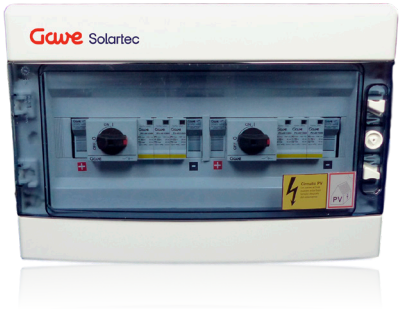


Wiring
Flexible PV cable with double insulation (EN50618)

Fuse protection
Positive and negative poles protected against overcurrents by gPV fuses

Surge protectors
Class II or I+II surge protector. Phase connection on top and earth connection on bottom. Module end of life visual indication

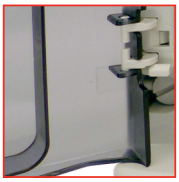
Switch disconnector
Rotary knife switchdisconnector with quick operation sytstem to break loads with voltages up to 1000 V



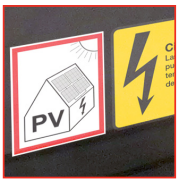
Enclosure
RAL7035 gray polycarbonate, suitable for outdoor use with increased impact resistance (IK08)

Enclosure safety
Class II double insulation, compliant with **IEC 61439-1** standard

Transparent PC window with UV protection
180º opening reversible window. Smoked color allows inspection of the interior and PST status



Safety identification
Adhesive signs indicating compliance with Section 514 personal safety regulation requirements



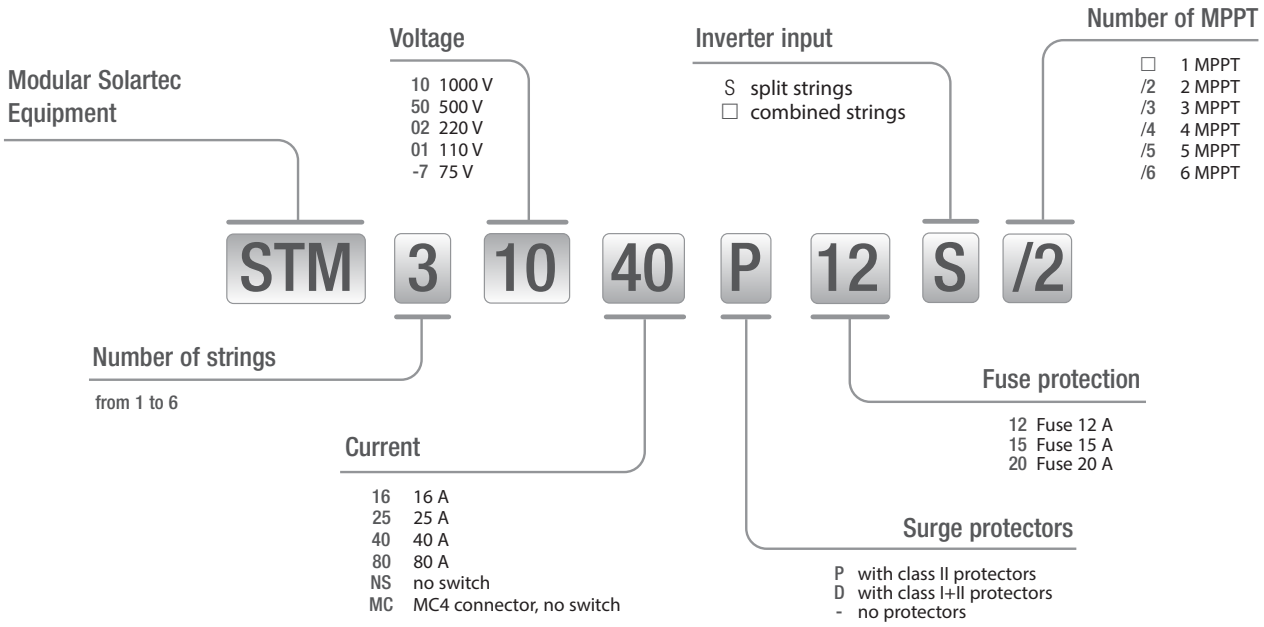
Accessibility
Access to connections requires the use of a tool that complies with Section 526 of the standard

IP65-level protection
Window features sealing gasket guaranteeing full protection

MODULAR SWITCH-DISCONNECTORS

- Specific direct current disconnection
- Materials highly resistant to the extreme environmental conditions that characterise PV applications

Reference system



Modular combiner boxes 1000 V DC range

1 MPPT
1 to 6 strings

2 to 6 MPPT
Combined outputs per MPPT

Multiple MPPT
With 2 inverter inputs per MPPT

1 MPPT stand-alone/ hybrid systems
1 to 6 strings

415 VAC

AC PROTECTION BOXES

Single-phase AC modular combiner boxes

Three-phase AC modular combiner boxes

PROTECTION BOXES

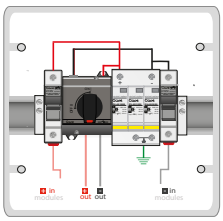
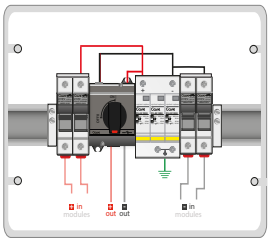
2 to 4 MPPT
1 string

1 to 4 MPPT + MC4 connectors
For quick connection

Multiple MPPT
With two or three inverter inputs per MPPT

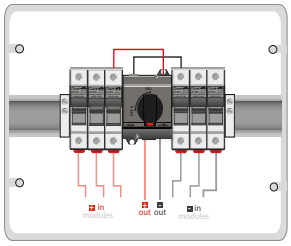
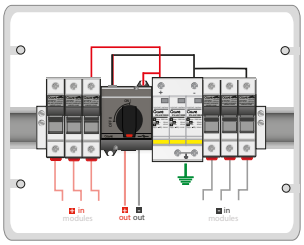
PV DC combiner boxes

Connection boxes for 1 MPPT inverters

				
Reference	STM11025P12	STM11025D12	STM21040P12	STM21040D12
	STM11025P15	STM11025D15	STM21040P15	STM21040D15
	STM11025P20	STM11025D20	STM21040P20	STM21040D20
Connection diagram				
Number of strings per tracker	1		2	
Number of MPPT trackers	1		1	
Maximum voltage (max. Uoc)	1000 V		1000 V	
PV current rating (Isc max)	25 A		40 A	
Fuse protection	Yes – gPV curve		Yes – gPV curve	
Surge protection	Class II - PST31PV	Class I+II - PST31APV	Class II - PST31PV	Class I+II - PST31APV
Maximum continuous voltage (Ucpv)	1060 VDC	1200 VDC	1060 VDC	1200 VDC
Nominal discharge current (In)	20 kA	15 kA	20 kA	15 kA
Maximum impulse current (Imp)	-	6.25 kA	-	6.25 kA
Maximum discharge current (Imax)	40 kA	40 kA	40 kA	40 kA
Protection level at In (Up)	3.6 kV	4.6 kV	3.6 kV	4.6 kV

Enclosure

Insulation (IEC/EN 61140)	Class II	Class II
Protection level (IEC/EN 60529)	IP65	IP65
Mechanical impact protection (IEC/EN 62262)	IK08	IK08
UV resistance (ISO 4892-2)	Yes	Yes
Dimensions mm (height x width x depth)	231 x 238 x 118	246 x 310 x 148
Box and cover material	PC	PC
Glow wire resistance	750ºC	750ºC

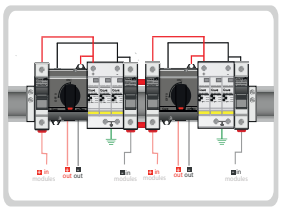
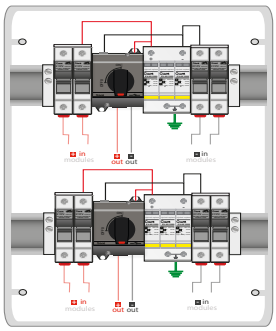
	
STM31040-12	**STM31040P12**
STM31040-15	**STM31040P15**
STM31040-20	**STM31040P20**
	
3	3
1	1
1000 V	1000 V
40 A	40 A
Yes – gPV curve	Yes – gPV curve
No	Class II - PST31PV
-	1060 V DC
-	20 kA
-	40 kA
-	3.6 kV

Class II	Class II
IP65	IP65
IK08	IK08
Yes	Yes
246 x 310 x 148	246 x 310 x 148
PC	PC
750 ºC	750 ºC

PV DC combiner boxes

Combiner boxes for multiple MPPT inverters

Inverter disconnection is essential in order to ensure optimum installation performance. On installations with shades or where there are string orientation problems, the use of inverters with multiple MPPT trackers is advisable.

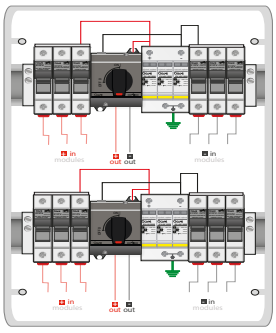
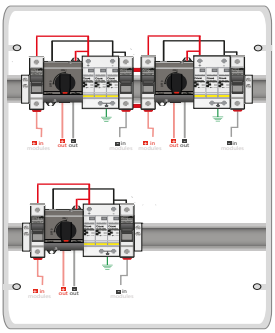
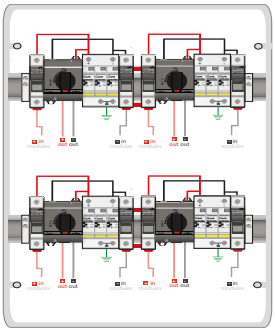
				
Reference	STM11025P12/2	STM11025D12/2	STM21040P12/2	STM21040D12/2
	STM11025P15/2	STM11025D15/2	STM21040P15/2	STM21040D15/2
	STM11025P20/2	STM11025D20/2	STM21040P20/2	STM21040D20/2
Connection diagram				
Number of strings per tracker	1		2	
Number of MPPT trackers	2		2	
Maximum voltage (max. Uoc)	1000 V		1000 V	
PV current rating (Isc max)	2 x 25 A		2 x 40 A	
Fuse protection	Yes – gPV curve		Yes – gPV curve	
Surge protection	Class II - PST31PV	Class I+II - PST31APV	Class II - PST31PV	Class I+II - PST31APV
Maximum continuous voltage (Ucpv)	1060 VDC	1200 VDC	1060 VDC	1200 VDC
Nominal discharge current (In)	20 kA	15 kA	20 kA	15 kA
Maximum impulse current (Imp)	-	6.25 kA	-	6.25 kA
Maximum discharge current (Imax)	40 kA	40 kA	40 kA	40 kA
Protection level at In (Up)	3.6 kV	4.6 kV	3.6 kV	4.6 kV

Enclosure

Insulation (IEC/EN 61140)	Class II	Class II
Protection level (IEC/EN 60529)	IP65	IP65
Mechanical impact protection (IEC/EN 62262)	IK08	IK08
UV resistance (ISO 4892-2)	Yes	Yes
Dimensions mm (height x width x depth)	286 x 418 x 148	436 x 310 x 148
Box and cover material	PC	PC
Glow wire resistance	750ºC	750ºC

Maintenance safety

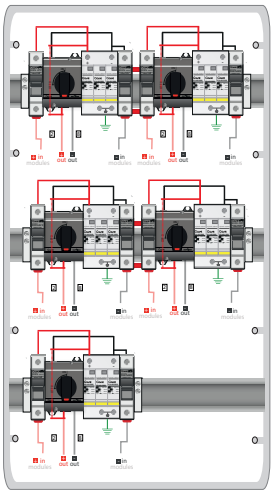
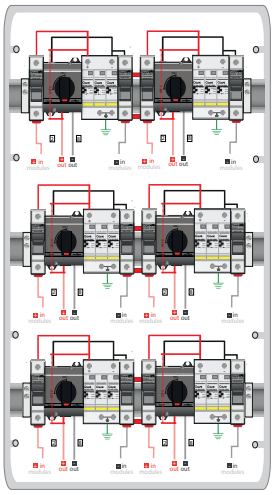
The switching and disconnection devices guarantee maintenance operation in safety conditions without the need to fully stop solar generation.

					
STM31040P12/2	**STM31040D12/2**	**STM11025P12/3**	**STM11025D12/3**	**STM11025P12/4**	**STM11025D12/4**
STM31040P15/2	**STM31040D15/2**	**STM11025P15/3**	**STM11025D15/3**	**STM11025P15/4**	**STM11025D15/4**
STM31040P20/2	**STM31040D20/2**	**STM11025P20/3**	**STM11025D20/3**	**STM11025P20/4**	**STM11025D20/4**
					
3		1		1	
2		3		4	
1000 V		1000 V		1000 V	
2 x 40 A		3 x 25 A		4 x 25 A	
Yes – gPV curve		Yes – gPV curve		Yes – gPV curve	
Class II - PST31PV	Class I+II - PST31APV	Class II - PST31PV	Class I+II - PST31APV	Class II - PST31PV	Class I+II - PST31APV
1060 VDC	1200 VDC	1060 VDC	1200 VDC	1060 VDC	1200 VDC
20 kA	15 kA	20 kA	15 kA	20 kA	15 kA
-	6.25 kA	-	6.25 kA	-	6.25 kA
40 kA	40 kA	40 kA	40 kA	40 kA	40 kA
3.6 kV	4.6 kV	3.6 kV	4.6 kV	3.6 kV	4.6 kV

Class II	Class II	Class II
IP65	IP65	IP65
IK08	IK08	IK08
Yes	Yes	Yes
436 x 310 x 148	436 x 418 x 148	436 x 418 x 148
PC	PC	PC
750ºC	750ºC	750ºC

PV DC combiner boxes

Combiner boxes for multiple MPPT inverters

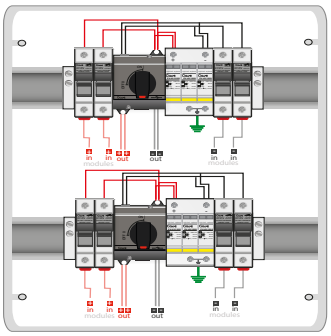
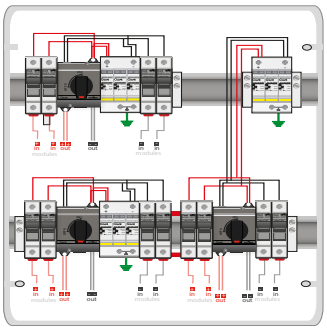
		
Reference	**STM11025P12/5** **STM11025P15/5** **STM11025P20/5**	**STM11025P12/6** **STM11025P15/6** **STM11025P20/6**
Connection diagram		
Number of strings per tracker	1	1
Number of MPPT trackers	5	6
Maximum voltage (max. Uoc)	1000 V	1000 V
PV current rating (Isc max)	5 x 25 A	6 x 25 A
Fuse protection	Yes – gPV curve	Yes – gPV curve
Surge protection	Class II - PST31PV	Class II - PST31PV
Maximum continuous voltage (Ucpv)	1060 V DC	1060 V DC
Nominal discharge current (In)	20 kA	20 kA
Maximum discharge current (Imax)	40 kA	40 kA
Protection level at In (Up)	3.6 kV	3.6 kV

Enclosure

Insulation (IEC/EN 61140)	Class II	Class II
Protection level (IEC/EN 60529)	IP65	IP65
Mechanical impact protection (IEC/EN 62262)	IK08	IK08
UV resistance (ISO 4892-2)	YES	YES
Dimensions mm (height x width x depth)	586 x 418 x 148	586 x 418 x 148
Box and cover material	PC	PC
Glow wire resistance	750 °C	750 °C

Combiner boxes for inverters with two circuits per MPPT

Ensuring protection and maintenance operations on multi-MPPT inverters with two input strings per MPPT can be achieved by using connection boxes with independent string inputs and outputs. It is indicated in the reference by the letter S that precedes the MPPT number.

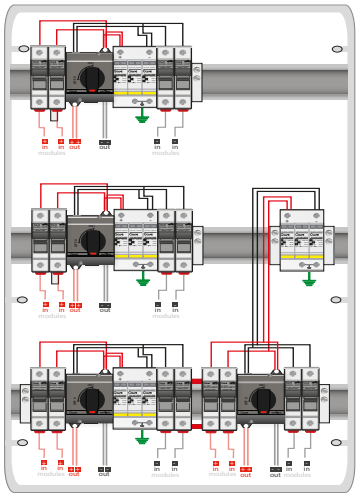
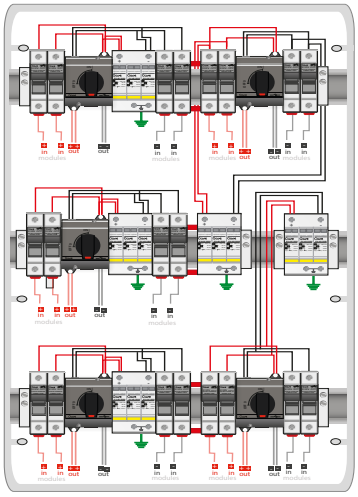
		
Reference	STM21025P12S/2 STM21025P15S/2 STM21025P20S/2	STM21025P12S/3 STM21025P15S/3 STM21025P20S/3
Connection diagram		
Number of strings per tracker	2	2
Number of MPPT trackers	2	3
Maximum voltage (max. Uoc)	1000 V	1000 V
PV current rating (Isc max)	2 x 25 A/2	3 x 25 A/ 2
Fuse protection	Yes – gPV curve	Yes – gPV curve
Surge protection	Class II - PST31PV	Class II - PST31PV
Maximum continuous voltage (Ucpv)	1060 V DC	1060 V DC
Nominal discharge current (In)	20 kA	20 kA
Maximum discharge current (Imax)	40 kA	40 kA
Protection level at In (Up)	3.6 kV	3.6 kV

Enclosure

Insulation (IEC/EN 61140)	Class II	Class II
Protection level (IEC/EN 60529)	IP65	IP65
Mechanical impact protection (IEC/EN 62262)	IK08	IK08
UV resistance (ISO 4892-2)	YES	YES
Dimensions mm (height x width x depth)	436 x 310 x 148	436 x 418 x 148
Box and cover material	PC	PC
Glow wire resistance	750 ºC	750 ºC

PV DC combiner boxes

Combiner boxes for inverters with two circuits per MPPT

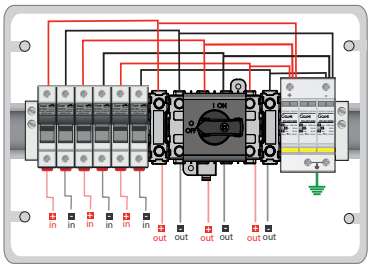
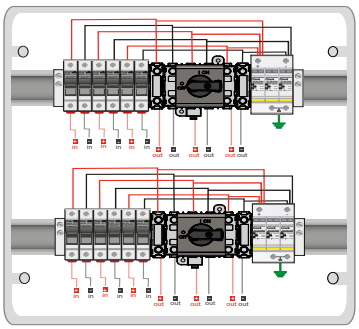
		
Reference	STM21025P12S/4 STM21025P15S/4 STM21025P20S/4	STM21025P12S/5 STM21025P15S/5 STM21025P20S/5
Connection diagram		
Number of strings per tracker	2	2
Number of MPPT trackers	4	5
Maximum voltage (max. Uoc)	1000 V	1000 V
PV current rating (Isc max)	4 x 25 A/ 2	5 x 25 A/ 2
Fuse protection	Yes – gPV curve	Yes – gPV curve
Surge protection	Class II - PST31PV	Class II - PST31PV
Maximum continuous voltage (Ucpv)	1060 V DC	1060 V DC
Nominal discharge current (In)	20 kA	20 kA
Maximum discharge current (Imax)	40 kA	40 kA
Protection level at In (Up)	3.6 kV	3.6 kV

Enclosure

Insulation (IEC/EN 61140)	Class II	Class II
Protection level (IEC/EN 60529)	IP65	IP65
Mechanical impact protection (IEC/EN 62262)	IK08	IK08
UV resistance (ISO 4892-2)	Yes	Yes
Dimensions mm (height x width x depth)	586 x 418 x 148	586 x 418 x 148
Box and cover material	PC	PC
Glow wire resistance	750 ºC	750 ºC

Combiner boxes for inverters with three circuits per MPPT

Ensuring protection and maintenance operations on multi-MPPT inverters with three input strings per MPPT can be achieved by using connection boxes with independent string inputs and outputs. It is indicated in the reference by the letter S that precedes the MPPT number.

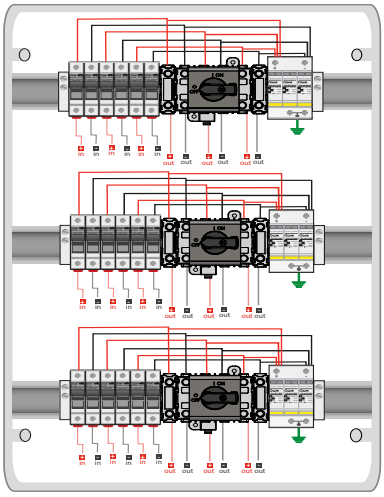
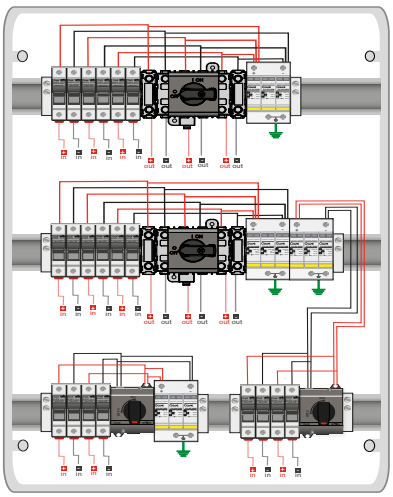
		
Reference	**STM31016P12S** **STM31016P15S** **STM31016P20S**	**STM31016P12S/2** **STM31016P15S/2** **STM31016P20S/2**
Connection diagram		
Number of strings per tracker	3	3
Number of MPPT trackers	1	2
Maximum voltage (max. Uoc)	1000 V	1000 V
PV current rating (Isc max)	16A/3 1000V - 25A/3 800V	2 x16A/3 1000V - 25A/3 800V
Fuse protection	Yes – gPV curve	Yes – gPV curve
Surge protection	Class II - PST31PV	Class II - PST31PV
Maximum continuous voltage (Ucpv)	1060 VDC	1060 VDC
Nominal discharge current (In)	20 kA	20 kA
Maximum discharge current (Imax)	40 kA	40 kA
Protection level at In (Up)	3.6 kV	3.6 kV

Enclosure

Insulation (IEC/EN 61140)	Class II	Class II
Protection level (IEC/EN 60529)	IP65	IP65
Mechanical impact protection (IEC/EN 62262)	IK08	IK08
UV resistance (ISO 4892-2)	Yes	Yes
Dimensions mm (height x width x depth)	436 x 310 x 148	436 x 418 x 148
Box and cover material	PC	PC
Glow wire resistance	750ºC	750ºC

PV DC combiner boxes

Combiner boxes for inverters with three circuits per MPPT

		
Reference	STM31016P12S/3 STM31016P15S/3 STM31016P20S/3	STP01298
Connection diagram		
Number of strings per tracker	3	3+3+2+2
Number of MPPT trackers	3	4
Maximum voltage (max. Uoc)	1000 V	1000 V
PV current rating (Isc max)	3 x 16A/3 1000V - 25A/3 800V	2 x 16A/3 + 2 x 25A/2
Fuse protection	Yes – gPV curve	Yes – gPV curve
Surge protection	Class II - PST31PV	Class II - PST31PV
Maximum continuous voltage (Ucpv)	1060 VDC	1060 VDC
Nominal discharge current (In)	20 kA	20 kA
Maximum discharge current (Imax)	40 kA	40 kA
Protection level at In (Up)	3.6 kV	3.6 kV

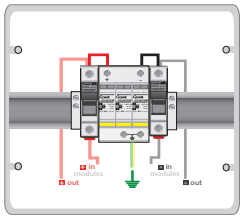
Enclosure

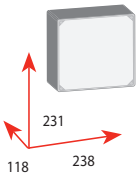
Insulation (IEC/EN 61140)	Class II	Class II
Protection level (IEC/EN 60529)	IP65	IP65
Mechanical impact protection (IEC/EN 62262)	IK08	IK08
UV resistance (ISO 4892-2)	Yes	Yes
Dimensions mm (height x width x depth)	586 x 418 x 148	586 x 418 x 148
Box and cover material	PC	PC
Glow wire resistance	750ºC	750ºC

Protection boxes

At installations where there are load break devices which isolate the generation from the inverter, it may be necessary to install protection boxes. Additional SPD is also required when the distance between the inverter SPD protection and the solar modules is greater than 10 meters (based on HD60364-7-712 §534.104).

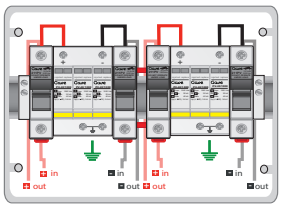
1 MPPT protection box

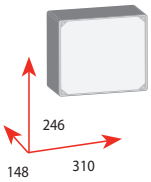




dimensions mm	fuse (A)	protector	Reference
	12 A	PST31PV	STM110NSP12
	15 A	PST31PV	STM110NSP15
	20A	PST31PV	STM110NSP20
		Ucpv 1060 VDC In 20 kA Imax 40kA Up 3.6 kV	

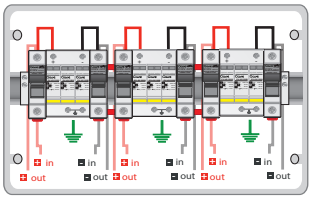
2 MPPT protection box

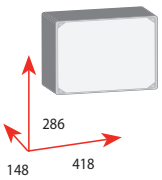




dimensions mm	fuse (A)	protector	Reference
	12 A	2xPST31PV	STM110NSP12/2
	15 A	2xPST31PV	STM110NSP15/2
	20A	2xPST31PV	STM110NSP20/2
		Ucpv 1060 VDC In 20 kA Imax 40kA Up 3.6 kV	

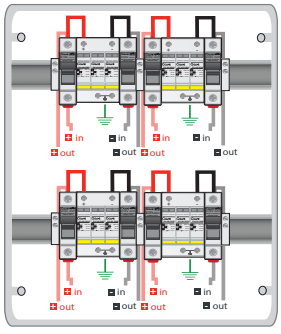
3 MPPT protection box

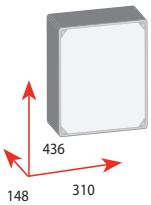




dimensions mm	fuse (A)	protector	Reference
	12 A	3xPST31PV	STM110NSP12/3
	15 A	3xPST31PV	STM110NSP15/3
	20A	3xPST31PV	STM110NSP20/3
		Ucpv 1060 VDC In 20 kA Imax 40kA Up 3.6 kV	

4 MPPT protection box





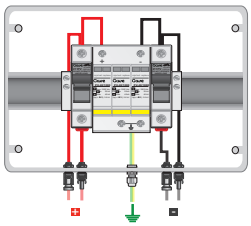
dimensions mm	fuse (A)	protector	Reference
	12 A	4xPST31PV	STM110NSP12/4
	15 A	4xPST31PV	STM110NSP15/4
	20A	4xPST31PV	STM110NSP20/4
		Ucpv 1060 VDC In 20 kA Imax 40kA Up 3.6 kV	

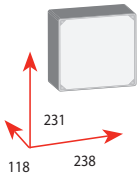
Protection boxes

Quick-connect protection box MC4

At installations where protection boxes are required, either at the inverter level or at the modules level, we can arrange for a fast and safe connection by using protection boxes with built-in MC4 connectors.

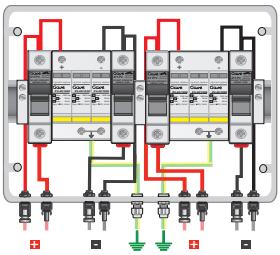
Quick-connect protection box for 1 MPPT

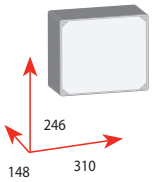




dimensions mm	fuse (A)	protector	Reference
	12 A	PST31PV	STM110MCP12
	15 A	PST31PV	STM110MCP15
	20 A	PST31PV	STM110MCP20
		Ucpv 1060 V DC In 20 kA Imax 40 kA Up 3.6 kV	

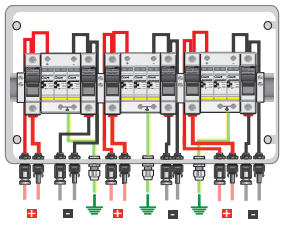
Quick-connect protection box for 2 MPPT

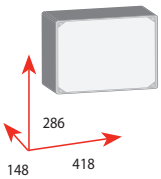




dimensions mm	fuse (A)	protector	Reference
	12 A	2xPST31PV	STM110MCP12/2
	15 A	2xPST31PV	STM110MCP15/2
	20 A	2xPST31PV	STM110MCP20/2
		Ucpv 1060 V DC In 20 kA Imax 40 kA Up 3.6 kV	

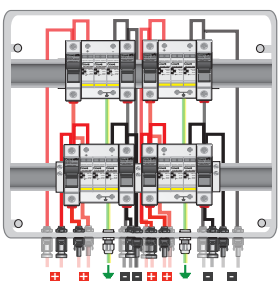
Quick-connect protection box for 3 MPPT

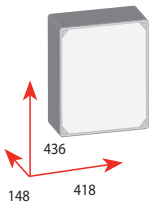




dimensions mm	fuse (A)	protector	Reference
	12 A	3xPST31PV	STM110MCP12/3
	15 A	3xPST31PV	STM110MCP15/3
	20 A	3xPST31PV	STM110MCP20/3
		Ucpv 1060 V DC In 20 kA Imax 40 kA Up 3.6 kV	

Quick-connect protection box for 4 MPPT



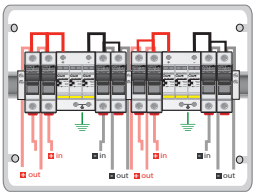
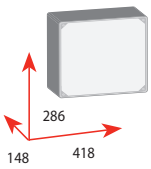
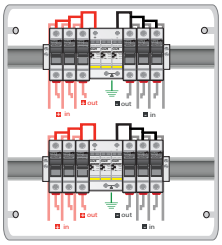
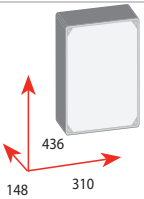


dimensions mm	fuse (A)	protector	Reference
	12 A	4xPST31PV	STM110MCP12/4
	15 A	4xPST31PV	STM110MCP15/4
	20 A	4xPST31PV	STM110MCP20/4
		Ucpv 1060 V DC In 20 kA Imax 40 kA Up 3.6 kV	

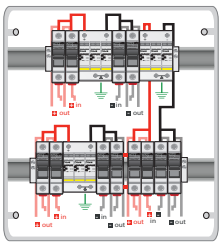
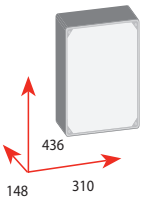
Protection boxes for multiple MPPT inverters with several inputs

At installations where there are protection boxes associated with inverters featuring multiple input strings for each MPPT we shall use 25P..S/ connection boxes (see pages 38-42) or NSP..S/ protection boxes If switch is not required.

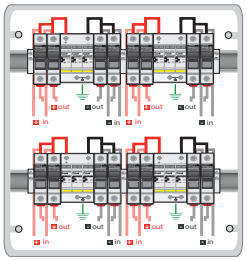
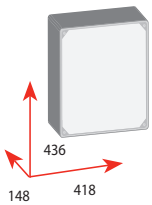
Protection box with several inputs for MPPT – Nr. MPPT 2

		dimensions mm	fuse (A)	protector	Reference
			12 A 15 A 20 A	2xPST31PV 2xPST31PV 2xPST31PV Ucpv 1060 V DC In 20 kA Imax 40 kA Up 3.6 kV	STM210NSP12S/2 STM210NSP15S/2 STM210NSP20S/2
			12 A 15 A 20 A	2xPST31PV 2xPST31PV 2xPST31PV Ucpv 1060 V DC In 20 kA Imax 40 kA Up 3.6 kV	STM310NSP12S/2 STM310NSP15S/2 STM310NSP20S/2

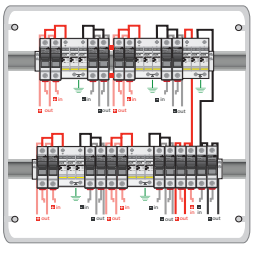
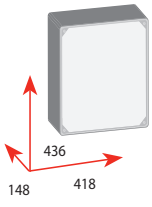
Protection box with several inputs for MPPT – Nr. MPPT 3

		dimensions mm	fuse (A)	protector	Reference
			12 A 15 A 20 A	3xPST31PV 3xPST31PV 3xPST31PV Ucpv 1060 V DC In 20 kA Imax 40 kA Up 3.6 kV	STM210NSP12S/3 STM210NSP15S/3 STM210NSP20S/3

Protection box with several inputs for MPPT – Nr. MPPT 4

		dimensions mm	fuse (A)	protector	Reference
			12 A 15 A 20 A	4xPST31PV 4xPST31PV 4xPST31PV Ucpv 1060 V DC In 20 kA Imax 40 kA Up 3.6 kV	STM210NSP12S/4 STM210NSP15S/4 STM210NSP20S/4

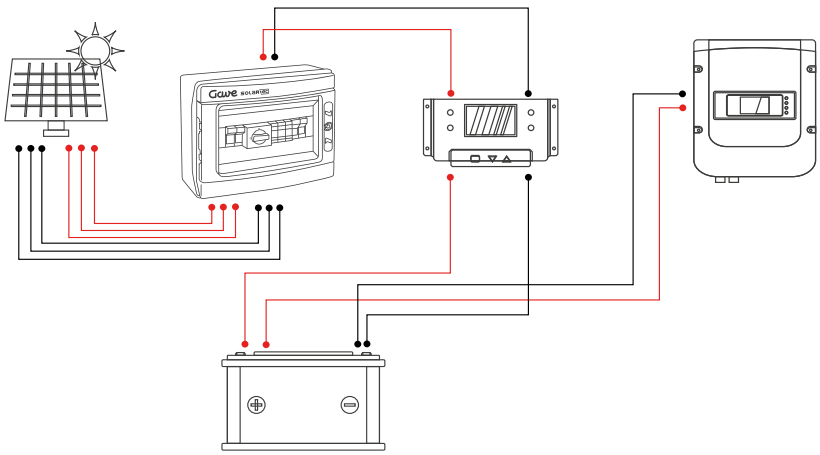
Protection box with several inputs for MPPT – Nr. MPPT 5

		dimensions mm	fuse (A)	protector	Reference
			12 A 15 A 20 A	5xPST31PV 5xPST31PV 5xPST31PV Ucpv 1060 V DC In 20 kA Imax 40 kA Up 3.6 kV	STM210NSP12S/5 STM210NSP15S/5 STM210NSP20S/5

Battery installations

"Connection box for stand-alone or hybrid systems"

Off-grid or hybrid photovoltaic generation systems are based on the use of **batteries** to accumulate energy. These systems work at very low voltages that are compatible with various battery types (12/24/48 V). In order to achieve high power capacity with low voltages we install multiple strings in parallel and need to use equipment with high nominal currents.

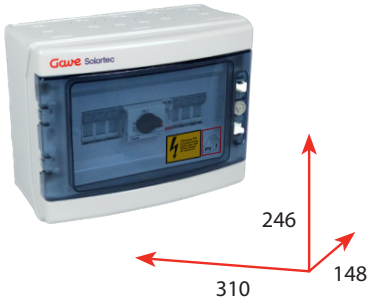


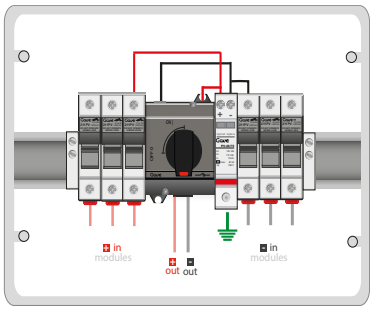
Overvoltage protection

Charge controllers and **chargers/inverters** work at very low voltages and are extremely sensitive to any temporary power surges. A connection box with an **Up** protection level that is compatible with the regulator/battery charger's maximum voltage is essential.

An inappropriate selection of the associated protector might mean that overvoltage surges reach the controller, causing irreparable damage.

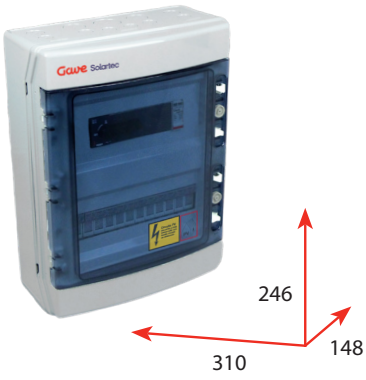
Connection boxes for battery systems up to 3 strings – Un 75-220 V

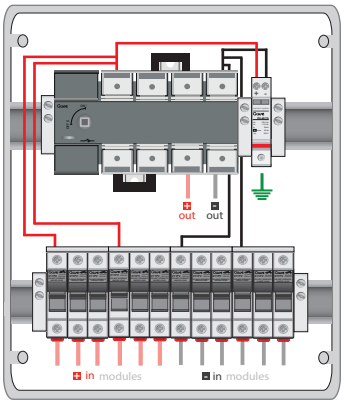




	fuse (A)	protector	Ucpv	In	Imax	Up	Reference
	12 A	PST140-75D	100 V DC	20 kA	40 kA	390 V	STM3-740P12
	15 A	PST140-75D	100 V DC	20 kA	40 kA	390 V	STM3-740P15
	12 A	PST140-110D	150 V DC	20 kA	40 kA	500 V	STM30140P12
	15 A	PST140-110D	150 V DC	20 kA	40 kA	500 V	STM30140P15
	12 A	PST140-220D	275 V DC	20 kA	40 kA	900 V	STM30240P12
	15 A	PST140-220D	275 V DC	20 kA	40 kA	900 V	STM30240P15

Connection boxes for battery systems up to 6 strings – Un 75-220 V





	fuse (A)	protector	Ucpv	In	Imax	Up	Reference
	12 A	PST140-75D	100 V DC	20 kA	40 kA	390 V	STM6-780P12
	15 A	PST140-75D	100 V DC	20 kA	40 kA	390 V	STM6-780P15
	12 A	PST140-110D	150 V DC	20 kA	40 kA	500 V	STM60180P12
	15 A	PST140-110D	150 V DC	20 kA	40 kA	500 V	STM60180P15
	12 A	PST140-220D	275 V DC	20 kA	40 kA	900 V	STM60280P12
	15 A	PST140-220D	275 V DC	20 kA	40 kA	900 V	STM60280P15

AC protection boxes

«AC protection box with MCB and RCD devices»

The inverter is a power incoming source for the electrical distribution at residential and commercial installations, therefore standarised protection for incoming power sources must be implemented. This ensures a consistent and safe integration of the inverter's output with the existing electrical infrastructure.

According to standards

- EN 61439-1/-2
- EN 61008-1
- EN 60898-1
- EN 61643-11

General characteristics

Surge protectors
Compact Class II overvoltage protectors (EN 61643- 11). Module end of life visual indication

Fuse protection
The fastest short-circuit protection for SPD end-of-life condition

MCB
C curve protection 6kA breaking capacity in compliance with EN 60898-1

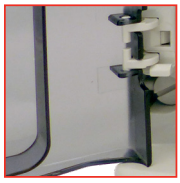
Enclosure
RAL7035 gray polycarbonate providing IP65 protection, suitable for outdoor use with high impact resistance (IK08)

Enclosure safety
Class II double insulation, compliant with **61439-1**

Automatic reclosing RCCB
Combinations using residual current circuit breakers with automatic relocsing device ARD according to EN 63024:2019

Residual current circuit breaker
Type A – suitable for alternating currents with direct current components.
Complies with EN 61008-1. Status and fault indicator. Protects against untimely tripping

Transparent PC window with UV protection
180º opening reversible window. Smoked color allows inspection of the interior and PST status

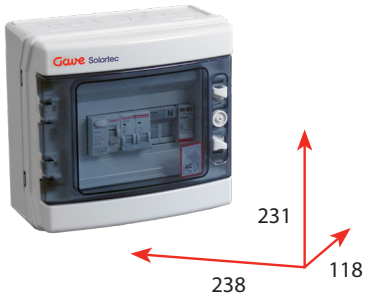


AC protection boxes

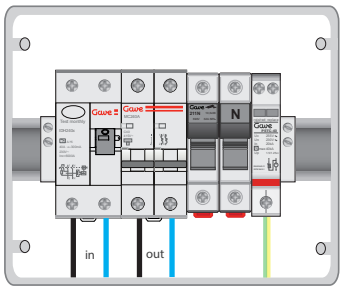
AC protection enclosures are placed at the output of the inverter and intended to safeguard both people and property facilities. The **ACM series** caters to single-phase inverters, while the **ACT series** is designed for three-phase models. Each model comes equipped with type A RCCB and MCB protection, alongside a surge protection device associated with end-of-life fuse protection.

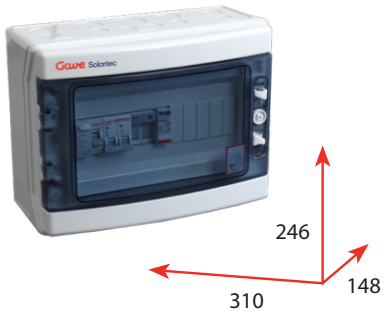
The standard **SDA model** is available, as well as the **EDA model** which provides extra room for later installation of additional components (5 modules in single-phase boxes and 10 modules in three-phase boxes).

AC boxes for single-phase inverter output

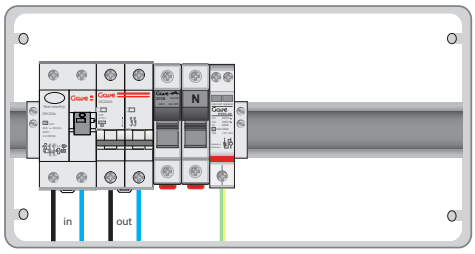


Current (A)	Reference
10	ACM10SDA
16	ACM16SDA
20	ACM20SDA
25	ACM25SDA
32	ACM32SDA
40	ACM40SDA
50	ACM50SDA
63	ACM63SDA



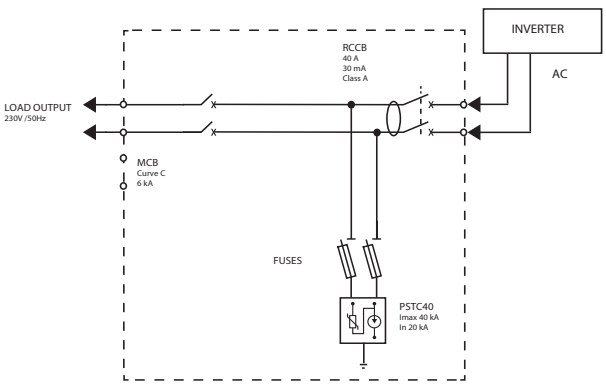


Current (A)	Reference
10	ACM10EDA
16	ACM16EDA
20	ACM20EDA
25	ACM25EDA
32	ACM32EDA
40	ACM40EDA
50	ACM50EDA
63	ACM63EDA



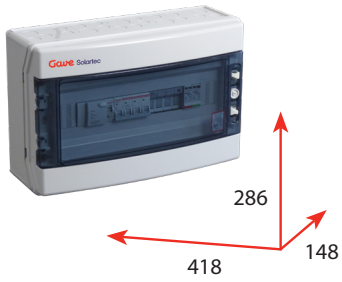
* EDA - 5 additional space modules

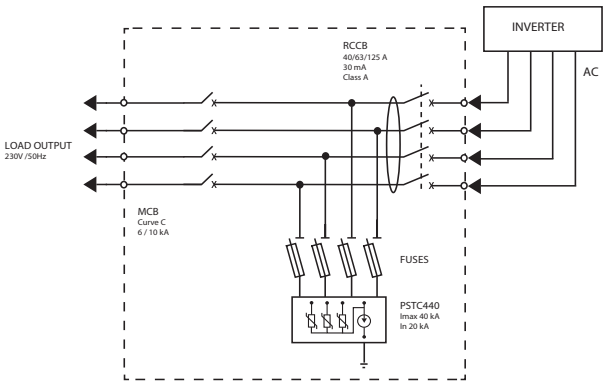
Characteristics	Values
Network type	230V~ 50Hz
RCCB type	A
Technical characteristics	2P 40-63A/30mA
MCB	10/16/20/25/32/ 40/50/63 A
Technical characteristics	C 6kA
Class II surge protection	PSTC40
Nominal discharge current (In) / Max (Imax)	20 kA / 40 kA
Protection level at In (Up)	1.5 kV
SPD protected	gG fuse



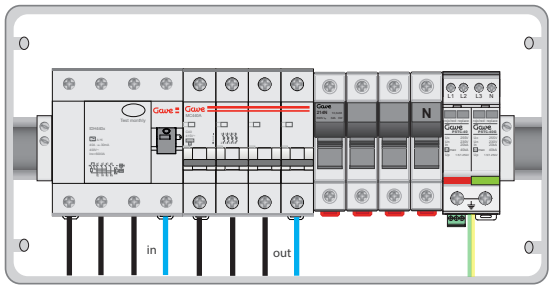
AC protection boxes

AC boxes for three-phase inverter output





Design for current 06 to 63 A

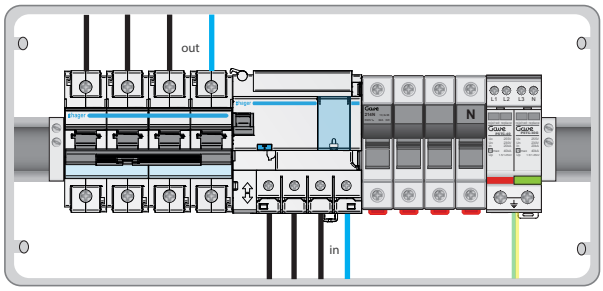


Current (A)	Reference	
06	ACT06SDA	
10	ACT10SDA	
16	ACT16SDA	
20	ACT20SDA	
25	ACT25SDA	
32	ACT32SDA	
40	ACT40SDA	ACT40SDA/300 *
50	ACT50SDA	ACT50SDA/300 *
63	ACT63SDA	ACT63SDA/300 *

Characteristics	Values
Network type	400V~ 50Hz
RCCB type	A
Technical characteristics	4P 40-63A/30mA
MCB	06/10/16/20/25/ 32/40/50/63 A
Technical characteristics	C 6kA
Class II surge protection	PSTC440
Nominal discharge current (In) / Max (Imax)	20 kA / 40kA
Protection level at In (Up)	1.5 kV
SPD protected	gG fuse

* 300 ma RCCB

Design for current 80 to 125 A

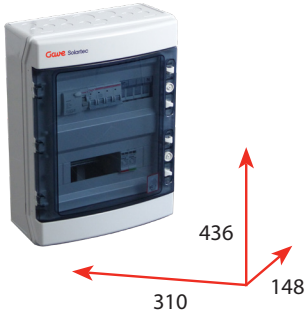


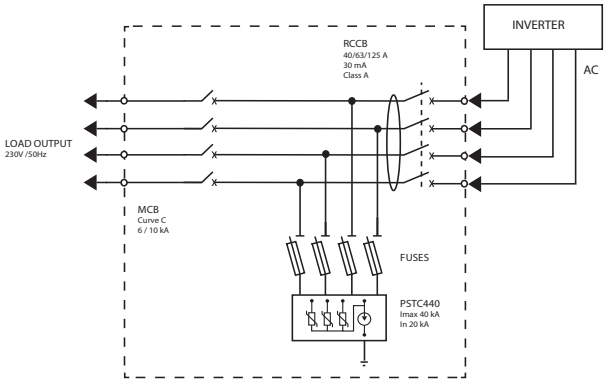
Current (A)	Reference	
80	ACT80SDA	ACT80SDA/300 *
100	ACT100SDA	ACT100SDA/300 *
125	ACT125SDA	ACT125SDA/300 *

Characteristics	Values
Network type	400V~ 50Hz
RCCB type	A
Technical characteristics	4P 125A 30mA
MCB	80/100/125 A
Technical characteristics	C 10kA
Class II surge protection	PSTC440
Nominal discharge current (In) / Max (Imax)	20 kA / 40kA
Protection level at In (Up)	1.5 kV
SPD protected	gG fuse

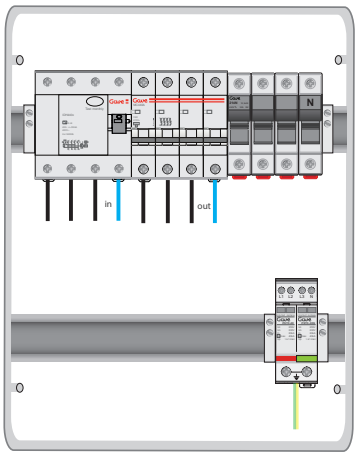
* 300 ma RCCB

AC boxes for three-phase inverter output with additional space





Design for current 06 - 63 A



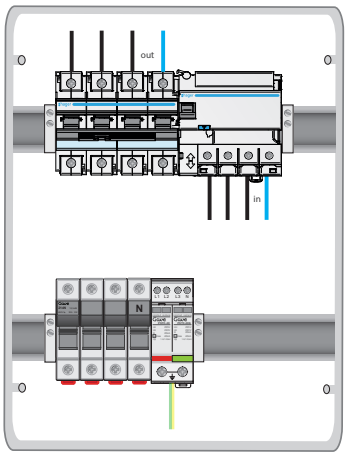
Intensidad (A)	Reference
06	ACT06EDA
10	ACT10EDA
16	ACT16EDA
20	ACT20EDA
25	ACT25EDA
32	ACT32EDA

Current (A)	Reference
40	ACT40EDA
50	ACT50EDA
63	ACT63EDA
40	ACT40EDA/300*
50	ACT50EDA/300*
63	ACT63EDA/300*

Characteristics	Values
Network type	400V~ 50Hz
RCCB type	A
Technical characteristics	4P 40-63A/30mA
MCB	06/10/16/20/25/ 32/40/50/63 A
Technical characteristics	C 6kA
Class II surge protection	PSTC440
Nominal discharge current (In) / Max (Imax)	20 kA / 40kA
Protection level at In (Up)	1.5 kV
SPD protected	gG fuse

* 300 ma RCCB

Design for current 80 - 125 A



Current (A)	Reference	
80	ACT80EDA	ACT80EDA/300 *
100	ACT100EDA	ACT100EDA/300 *
125	ACT125EDA	ACT125EDA/300 *

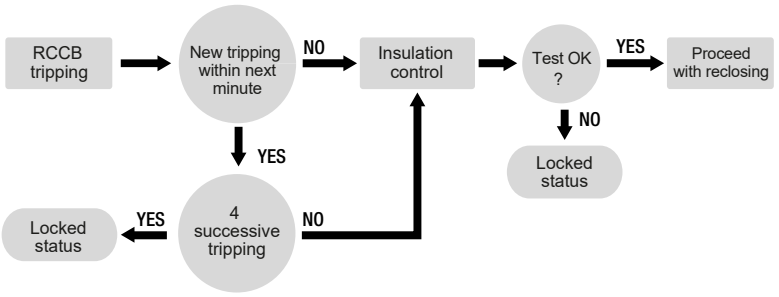
Characteristics	Values
Network type	400V~ 50Hz
RCCB type	A
Technical characteristics	4P 125A 30mA
MCB	80/100/125 A
Technical characteristics	C 10kA
Class II surge protection	PSTC440
Nominal discharge current (In) / Max (Imax)	20 kA / 40kA
Protection level at In (Up)	1.5 kV
SPD protected	gG fuse

* 300 ma RCCB

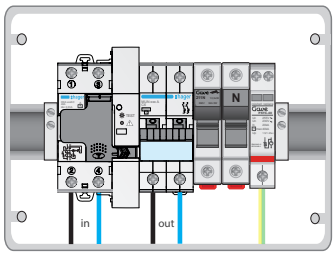
AC protection boxes with automatic reclosing

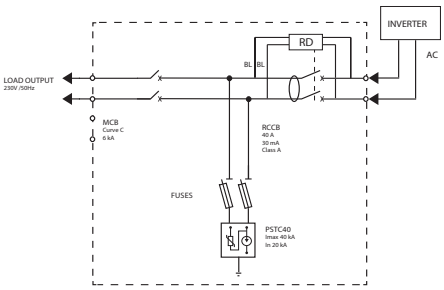
«Safety protection with minimised power interruption»

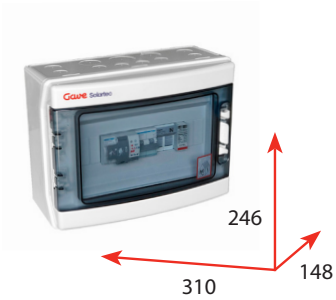
The untimely tripping in photovoltaics generation installations are at the origin of potential production losses, when a human presence that can reset the installation is not available. To avoid this situation, we advise the use of residual current circuit breaker with automatic reclosing device.



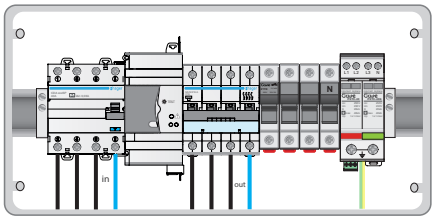
ACM design with reclosing

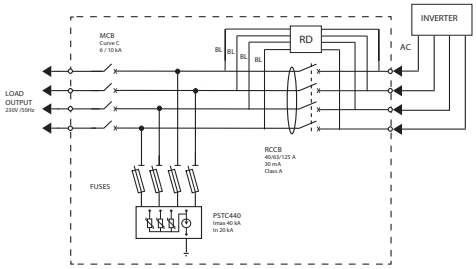


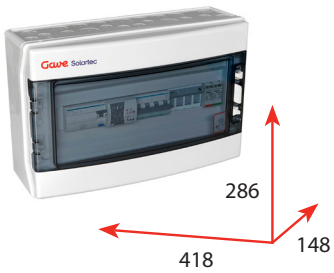




ACT design with reclosing







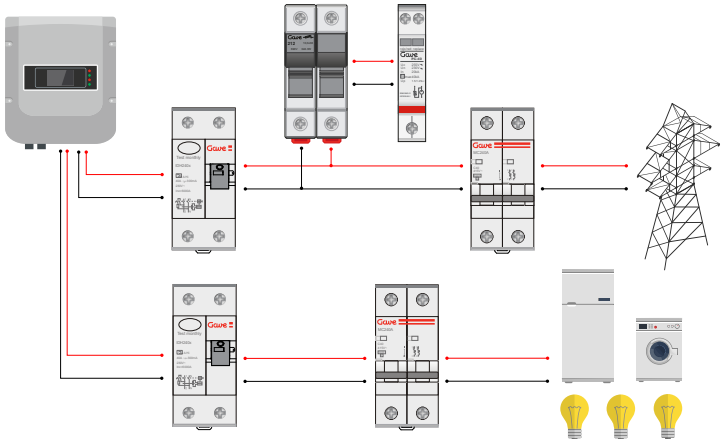
Characteristics	ACM	ACT
Network type	230V~ 50Hz	230V~ 50Hz
RCCB type	A	A
Technical characteristics	2P 40A/30mA	4P 40A/30mA
MCB	10/16/20/ 25/32/40 A	06/10/16/20/ 25/32/40 A
Technical characteristics	C 6kA	C 6kA
Class II surge protection	PSTC40	PSTC440
Nominal discharge current (In) / Max (Imax)	20 kA / 40kA	20 kA / 40kA
Protection level at In (Up)	1.5 kV	1.5 kV
SPD protected	gG fuse	gG fuse

Current (A)	Ref. ACM	Ref. ACM
6		ACT06RDA
10	ACM10RDA	ACT10RDA
16	ACM16RDA	ACT16RDA
20	ACM20RDA	ACT20RDA
25	ACM25RDA	ACT25RDA
32	ACM32RDA	ACT32RDA
40	ACM40RDA	ACT40RDA

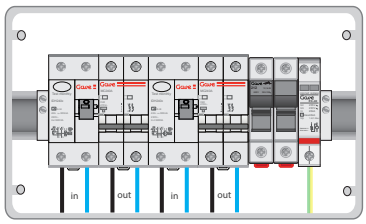
AC protection boxes for hybrid inverter

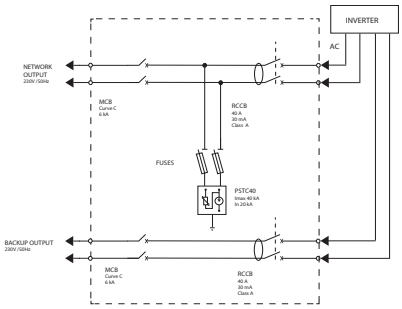
«Protect your equipment in all output circuits»

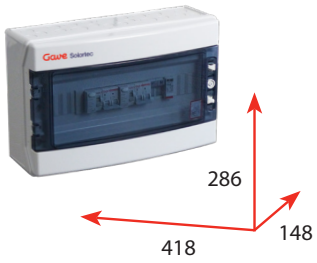
Hybrid inverters maximise the use of the energy generated by the self-consumption installation. They usually have several operating modes that allow hierarchical discrimination of behavior, managing surpluses to the battery or network, and automatically guaranteeing the availability of energy for backup loads when there is an absence of power grid. These installations require dedicated AC boxes that protect the different output circuits.



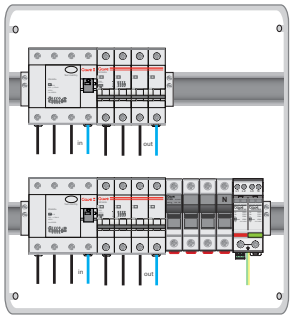
ACM design for hybrid

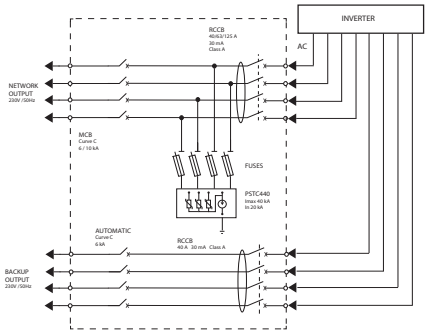


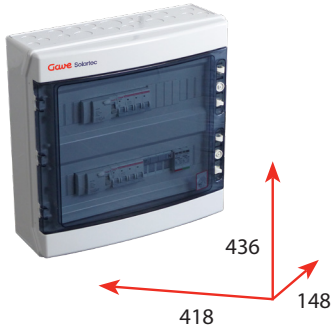




ACT design for hybrid







Characteristics	ACM	ACT
Network type	230V~ 50Hz	230V~ 50Hz
RCCB type	A	A
Technical characteristics	2P 40A/30mA	4P 40A/30mA
MCB	10/16/20/25/32/40 A	10/16/20/25/32/40 A
Technical characteristics	C 6kA	C 6kA
Class II surge protection	PSTC40	PSTC440
Nominal discharge current (In) / Max (Imax)	20 kA / 40kA	20 kA / 40kA
Protection level at In (Up)	1.5 kV	1.5 kV
SPD protected	gG fuse	gG fuse

Current (A)	Ref. ACM	Ref. ACT
10	ACM10H	ACT10H
16	ACM16H	ACT16H
20	ACM20H	ACT20H
25	ACM25H	ACT25H
32	ACM32H	ACT32H
40	ACM40H	ACT40H

Switchover unit for self-consumption facilities

"Reliable grid connection-disconnection with safe circuits isolation"

Wide range of Backup Box systems for hybrid inverters with backup batteries, the selected loads are powered both in connected mode and when disconnected from the grid.

Main functions

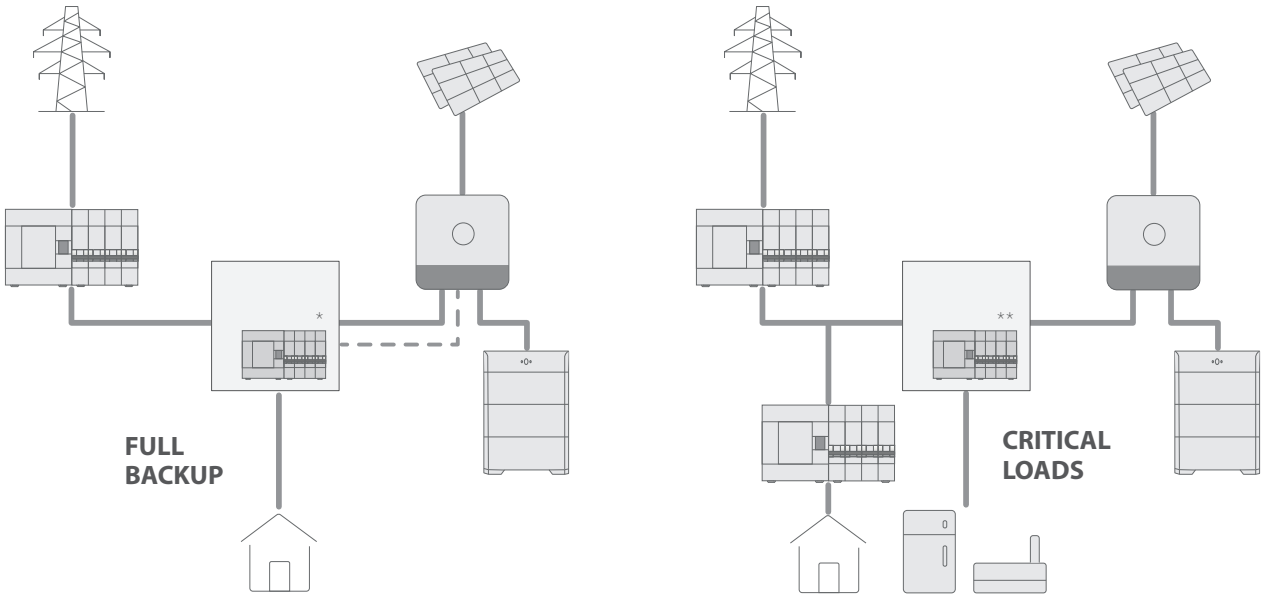
- The box receives energy from the grid and the inverter
- Loads are supplied by the box
- Guaranteed, safe status switching

Motorised switch

The changeover switch technology ensures the electrical connection is secure. Electrical block design allows contact closing in one mechanical position avoiding unintended connections with built-in interlock system. Automatic operation is complemented with the capability of manual operation.

BACKUP FOR FRONIUS INVERTER

Backup switching system for **Fronius GEN24 Plus inverters** (Primo and Symo up to 10 kW). The unit is operated through commands from the inverter itself, which controls the operation and switching status at all times. The Full Backup version allows for the entire installation to be supplied thanks to the integrated Fronius Smart Meter.



For Fronius GEN24 Plus inverter

* Full backup system. Includes an integrated 63 A Smart Meter and load output protection.

grid	dimensions mm	current	poles	Reference
230 Vac single-phase	400x400x150	25 A	2P	ACBM25FN
		40 A	2P	ACBM40FN
		63 A	2P	ACBM63FN
400 Vac three-phase	500x500x150	25 A	4P	ACBT25FN
		40 A	4P	ACBT40FN
		63 A	4P	ACBT63FN

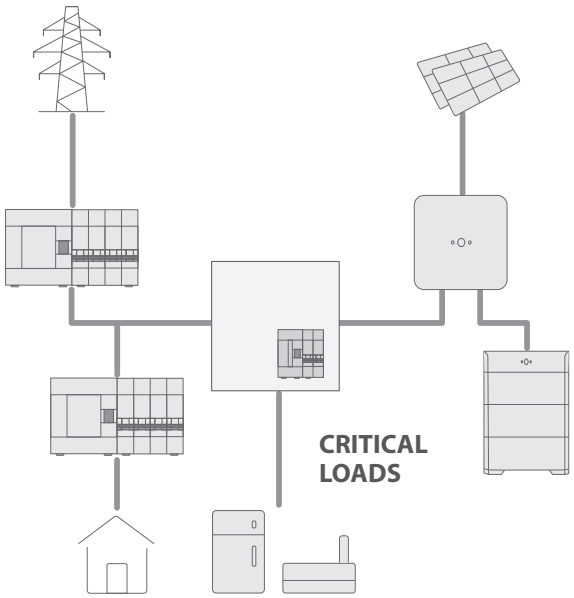
For critical loads with Fronius GEN24 Plus inverter

** Switching order from inverter. Includes priority load output protection.

grid	dimensions mm	current	poles	Reference
230 Vac single-phase	400x400x150	25 A	2P	ACBM25CCFN
		40 A	2P	ACBM40CCFN
		63 A	2P	ACBM63CCFN
400 Vac three-phase	500x500x150	25 A	4P	ACBT25CCFN
		40 A	4P	ACBT40CCFN
		63 A	4P	ACBT63CCFN

BACKUP FOR HUAWEI INVERTER

The backup system controls connection between the sources for **SUN2000 KTL L1 and M1 inverters** at all times. The control relay constantly analyses grid status, disconnecting the grid when it is not available and instructing the inverter to prioritise critical loads supply.



For Huawei SUN2000 KTL (L1 & M1) inverter

Includes priority load output protection.

grid	dimensions mm	current	poles	Reference
230 Vac single-phase	400x400x150	40 A	2P	ACBM40HWB0
400 Vac three-phase	400x400x150	40 A	4P	ACBT40HWB1

BACKUP FOR CRITICAL LOADS

Autonomous switching system for solar inverters. Thanks to its control and supervision relay, this solution effectively manages connection to and disconnection from the electrical grid based on whether it is available and supplies loads from **hybrid inverters.**

For critical loads

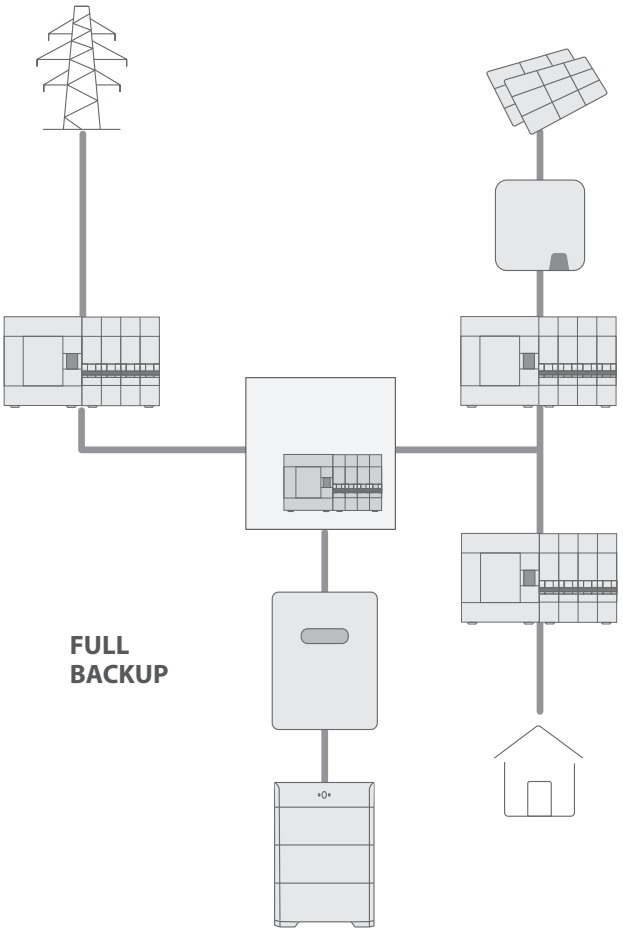
Includes phase presence relay, status contact, and priority load output protection.

grid	dimensions mm	current	poles	Reference
230 Vac single-phase	400x400x150	25 A	2P	ACBM25CC
		40 A	2P	ACBM40CC
		63 A	2P	ACBM63CC
400 Vac three-phase	500x500x150	25 A	4P	ACBT25CC
		40 A	4P	ACBT40CC
		63 A	4P	ACBT63CC

BACKUP FOR SMA INVERTER

The various backup schemes for **SMA Sunny Island inverters** require different solutions. The backup systems make it possible to disconnect from the grid and supply the installation with solar power based on orders from the inverter itself.

The versions for three-phase grids allow supply from one phase, the three phases combined, or the three phases separately.



For SMA Sunny Island inverter

Full backup system. Space reserved inside for installing Sunny Home Manager. Includes protection for inputs from the inverter.

grid	Number of inverters	current	poles	Reference
230 Vac single-phase	1	25 A	2P	ACBM25SM
	1	40 A	2P	ACBM40SM
	1	63 A	2P	ACBM63SM
400 Vac three-phase	1 (1 phase)	25 A	4P	ACBT25SM1
	1 (1 phase)	40 A	4P	ACBT40SM1
	1 (1 phase)	63 A	4P	ACBT63SM1
	1 (3-phase coupling)	25 A	4P	ACBT25SM1C
	1 (3-phase coupling)	40 A	4P	ACBT40SM1C
	1 (3-phase coupling)	63 A	4P	ACBT63SM1C
	3 (3 phases)	25 A	4P	ACBT25SM3
	3 (3 phases)	40 A	4P	ACBT40SM3
	3 (3 phases)	63 A	4P	ACBT63SM3

DC and AC combiner boxes for multiple MPPT inverters

"Efficient integration for commercial and industrial applications"

Photovoltaic systems are transforming the way commercial and industrial buidlings manage energy by reducing operational expenses and contribuiting to sustainability goals.

Rooftops and similar installations typically use inverters with a large number of MPPTs to optimise production despite the different architectural constrains that might exist. These inverters are normally designed with 3 phase outputs which are ideal for commercial and industrial buildings.

Product overview

PV DC generator combiner boxes

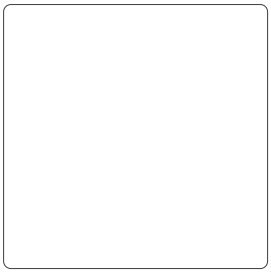
SLP series
up to 1000 V
5 to 7 MPPTs

SLA series
up to 1500 V
8 to 12 MPPTs

PV AC generator combiner boxes

ACA series
Single inverter

ACA series
Multiple inverter combination



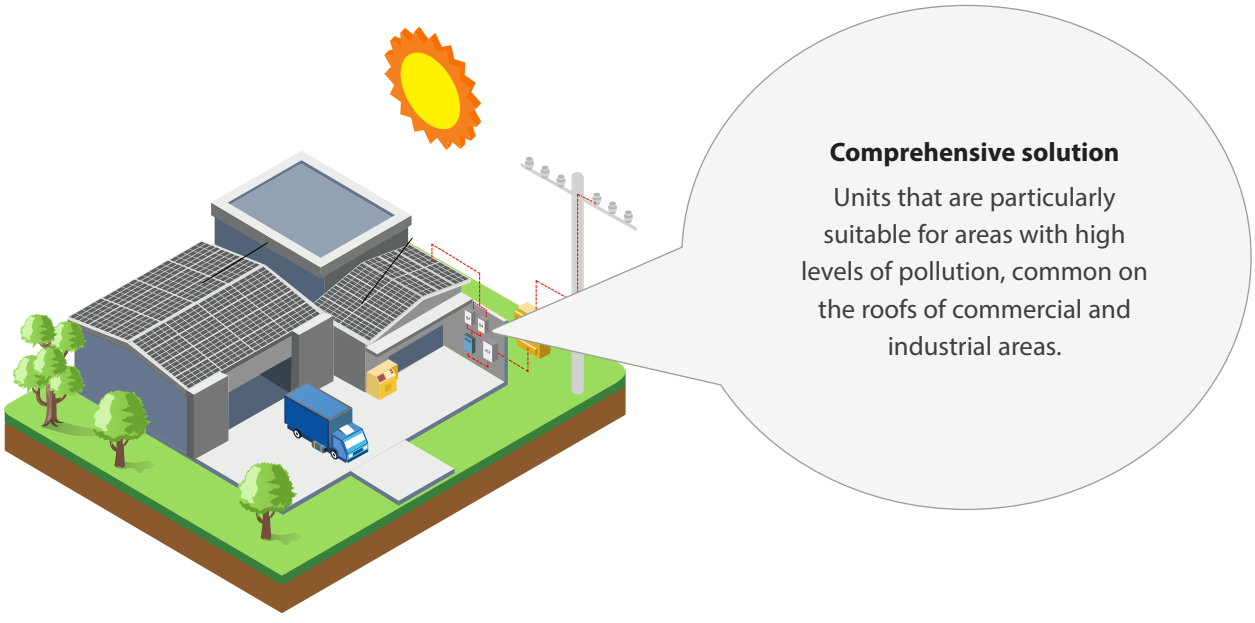
The ranges SLP, SLA and ACA ranges of combiner boxes have been designed to offer dedicated solutions to these installations by providing simple wiring process with reduced installation costs while integrating reliable components that guarantee the safety of the installation.

SLP combiner boxes

"Compact units for industrial applications"

The SLP series is engineered for protecting and managing string in inverters with multiple MPPTs inputs.

Its design features a see-through cover, enabling swift inspection of components without the need to open the box. Ideally suited for installations in limited spaces that require confined solutions. Available in 1000 and 1500 Vdc, accommodating either one or two input strings for each MPPT.

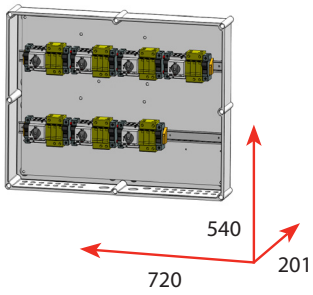


Comprehensive solution

Units that are particularly suitable for areas with high levels of pollution, common on the roofs of commercial and industrial areas.

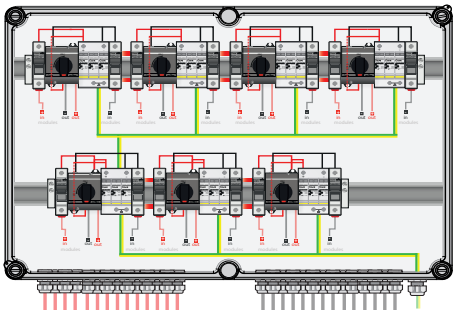
SLP COMBINER BOXES

Inverters 1 string per MPPT, 1000V

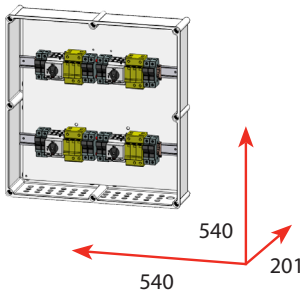


Characteristics

MPPT	str.	fuse prot.	SPD	Reference
5	1	15A	PST31PV	SLP11025P15/5
6	1	15A	PST31PV	SLP11025P15/6
7	1	15A	PST31PV	SLP11025P15/7
5	1	20A	PST31PV	SLP11025P20/5
6	1	20A	PST31PV	SLP11025P20/6
7	1	20A	PST31PV	SLP11025P20/7

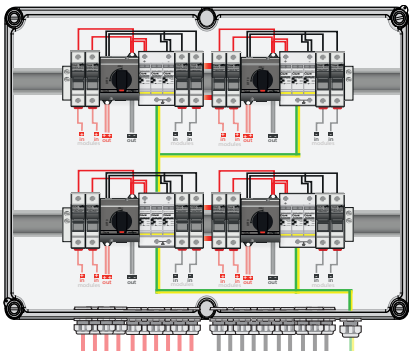


Inverters 2 string per MPPT, 1000V

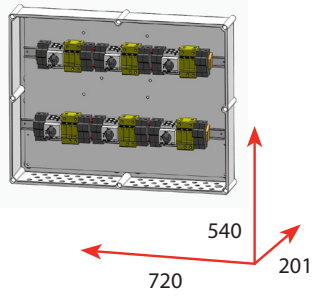


Characteristics

MPPT	str.	fuse prot.	SPD	Reference
4	2	15A	PST31PV	SLP21025P15S/4
4	2	20A	PST31PV	SLP21025P20S/4

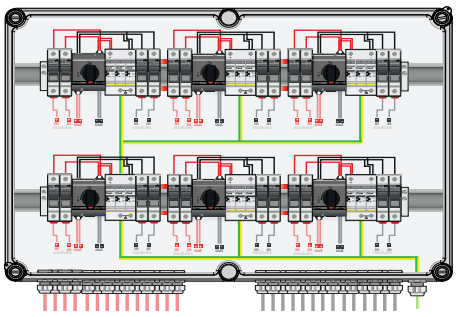


Inverters 2 string per MPPT, 1000V



Characteristics

MPPT	str.	fuse prot.	SPD	Reference
5	2	15A	PST31PV	SLP21025P15S/5
6	2	15A	PST31PV	SLP21025P15S/6
5	2	20A	PST31PV	SLP21025P20S/5
6	2	20A	PST31PV	SLP21025P20S/6



SLA combiner cabinets

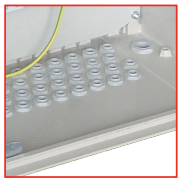
"Versatility and space optimisation"

This range of combiner cabinets is aimed at the string protection and and switching on inverters with multiple MPPTs inputs. The SLA line admits a large number of MPPTs in a single unit which reverts in cost reduction and space saving. Its great versatility means it can adapt to the specific needs of a large range of industrial inverters. Available in 1000 and 1500 Vdc with 1 or 2 input strings per MPPT.

General characteristics

IP66

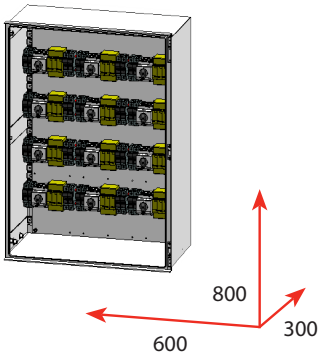
Materials
Glass reinforced polyester enclosure and cover



Machining
Inputs and outputs adapted to the cable sections and number of connections

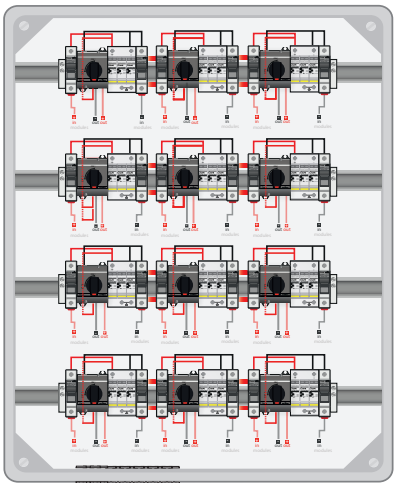
Individual test
QR code link to unit individual test

Inverters 1 string per MPPT, 1000V - Vertical layout

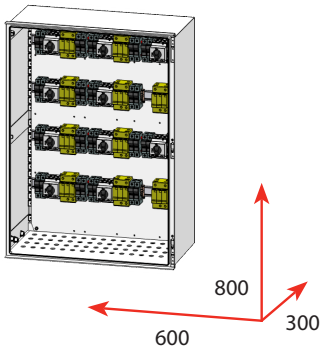


Characteristics

MPPT	str.	fuse prot.	SPD	Reference
8	1	15A	PST31PV	SLA11025P15/8
9	1	15A	PST31PV	SLA11025P15/9
10	1	15A	PST31PV	SLA11025P15/10
11	1	20A	PST31PV	SLA11025P15/11
12	1	20A	PST31PV	SLA11025P15/12
8	1	20A	PST31PV	SLA11025P20/8
9	1	20A	PST31PV	SLA11025P20/9
10	1	20A	PST31PV	SLA11025P20/10
11	1	20A	PST31PV	SLA11025P20/11
12	1	20A	PST31PV	SLA11025P20/12

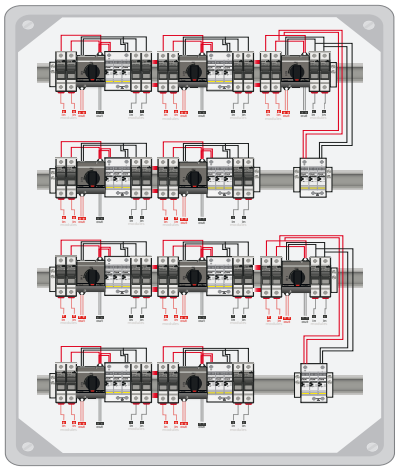


Inverters 2 string per MPPT, 1000V - Vertical layout

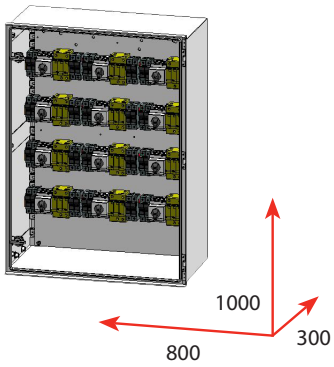


Characteristics

MPPT	str.	fuse prot.	SPD	Reference
8	2	15A	PST31PV	SLA21025P15S/8
9	2	15A	PST31PV	SLA21025P15S/9
10	2	15A	PST31PV	SLA21025P15S/10
8	2	20A	PST31PV	SLA21025P20S/8
9	2	20A	PST31PV	SLA21025P20S/9
10	2	20A	PST31PV	SLA21025P20S/10

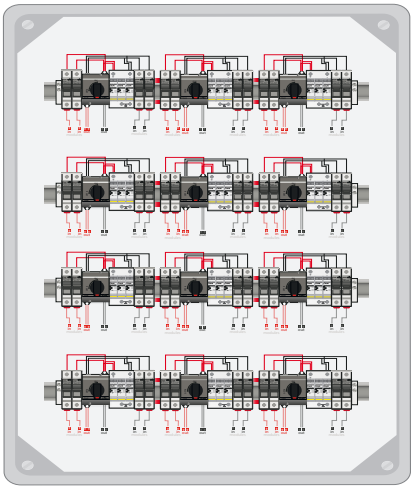


Inverters 2 string per MPPT, 1000V - Vertical layout

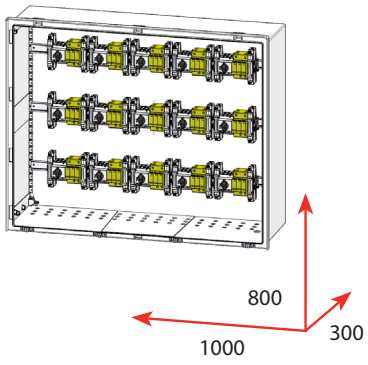


Characteristics

MPPT	str.	fuse prot.	SPD	Reference
11	2	15A	PST31PV	SLA21025P15S/11
12	2	15A	PST31PV	SLA21025P15S/12
11	2	20A	PST31PV	SLA21025P20S/11
12	2	20A	PST31PV	SLA21025P20S/12

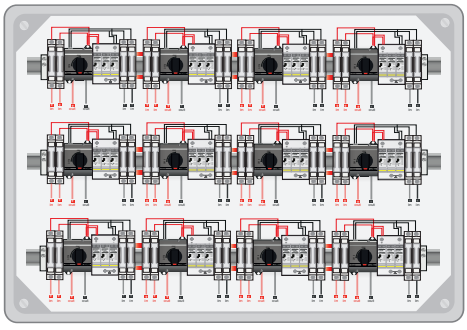


Inverters 2 string per MPPT, 1000V - Horizontal layout



Characteristics

MPPT	str.	fuse prot.	SPD	Reference
11	2	15A	PST31PV	SLA2H025P15S/11
12	2	15A	PST31PV	SLA2H025P15S/12
11	2	20A	PST31PV	SLA2H025P20S/11
12	2	20A	PST31PV	SLA2H025P20S/12



AC combiner cabinets

Combiner cabinets to protect alternating current generation delivered by inverters in photovoltaic installations. The versatility of the ACA line allows multiple inverters to be combined and reduces the number of connections, including short-circuit, surge, ground fault, and transient overvoltage protection.

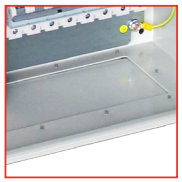
General characteristics

Line
Multiple combinations based on current rating, combined or individual residual current device, and breaking capacity

Materials
Metal enclosure for outdoor use
RAL7035

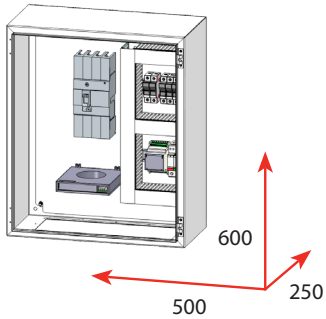
IK10
IP66

Individual test
Individual test QR code



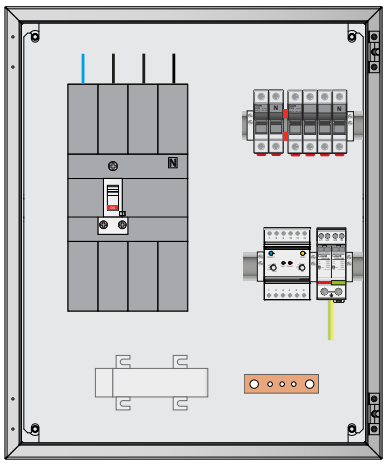
Lower cover
Removable blank cover plate to facilitate cable routing

AC Single input box in metal enclosure

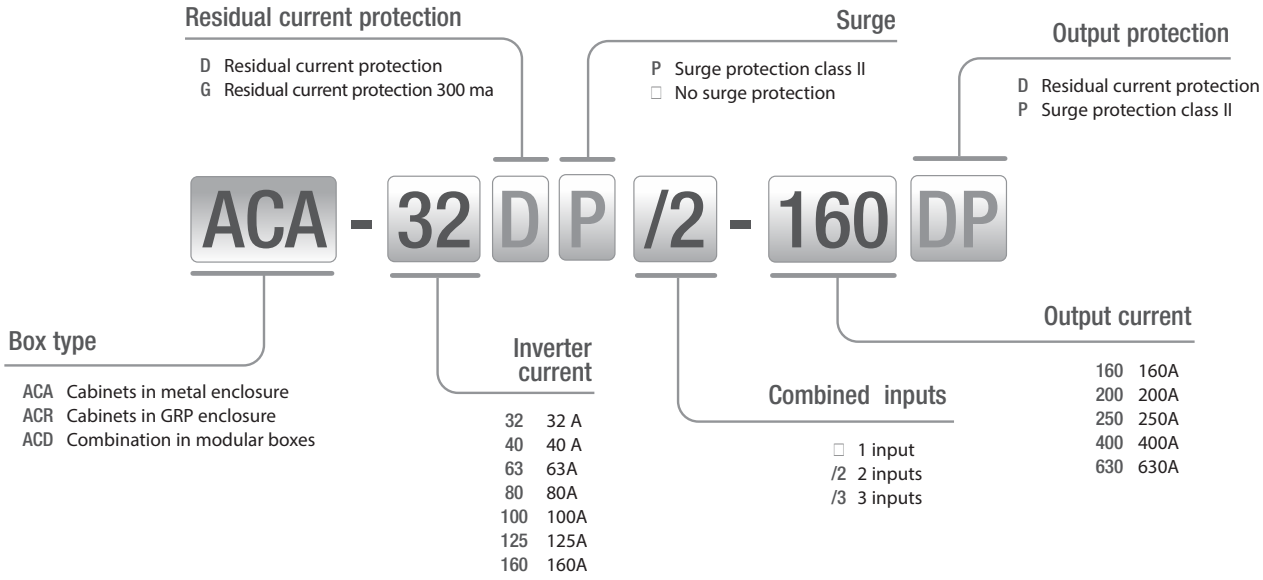


Characteristics

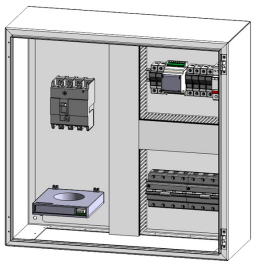
Current	Residual current protection	SPD	Reference
160A	Relay	PSTC440	ACA-160DP
200A	Relay	PSTC440	ACA-200DP
250A	Relay	PSTC440	ACA-250DP

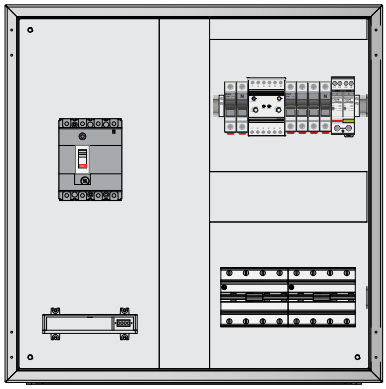


Reference system



AC Multiple input box in metal enclosure

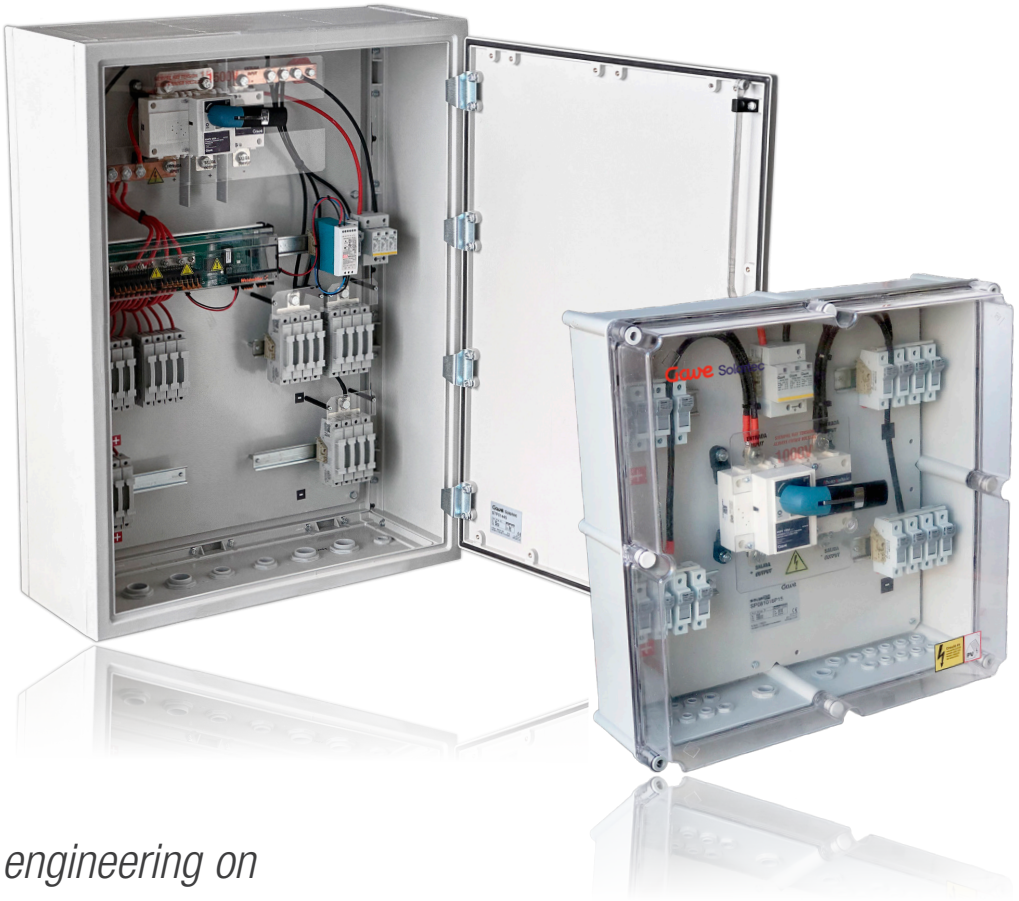




Characteristics

Input		Output				
Current	Residual current protection	Current	Residual current protection	SPD	Dimensions	Reference
63		160A	Relay	PSTC440	600x600x250	ACA-63/2-160DP
80		160A	Relay	PSTC440		ACA-80/2-160DP
100		200A	Relay	PSTC440		ACA-100/2-200DP
160		400	Relay	PSTC440	800x800x250	ACA-160/2-400DP
200		400	Relay	PSTC440		ACA-200/2-400DP
250		630	Relay	PSTC440		ACA-250/2-630DP
80	Integrated	160		PSTC440	600x800x250	ACA-80D/2-160P
100	Integrated	200		PSTC440		ACA-100D/2-200P
160	Relay	400		PSTC440		ACA-160D/2-400P
200	Relay	400		PSTC440		ACA-200D/2-400P
250	Relay	630		PSTC440		ACA-250D/2-630P
160	Relay	400		PSTC440	800x1000x300	ACA-160D/2S400P
200	Relay	400		PSTC440		ACA-200D/2S400P
250	Relay	630		PSTC440		ACA-250D/2S630P

PV combiner boxes



«Solution engineering on installations with central inverters»

Installations on the roof of large commercial-industrial buildings and solar generation plants use central inverters that are capable of converting large amounts of power. The technology employed by these systems has developed significantly with inverters that have increased the string concentration and are able to operate at voltages up to 1500 V.

Functions

Photovoltaic combiner boxes connect and protect the direct current part of the generation before reaching the inverter. These boxes disconnect electrical circuits in order to isolate the inverter

Product overview

DC PV generator combiner boxes

SP Series
up to 1000 V
From 7 to 16 strings

SP Series
up to 1500 V
From 8 to 10 strings

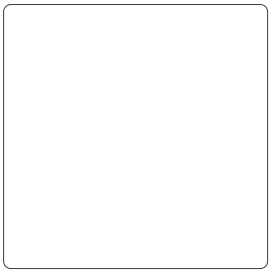
DC PV generator connection cabinets

SA Series
up to 1000 V
From 16 to 30 strings

SA Series
up to 1500 V
From 8 to 28 strings

SM Series
up to 1000 V
From 8 to 32 strings

SM Series
up to 1500 V
From 8 to 32 strings



input on the direct current side. They fully comply with all regulations guaranteeing personal safety. They also feature protection against power surges, short circuits and overvoltages of atmospheric origin.

DC PV generator combiner boxes

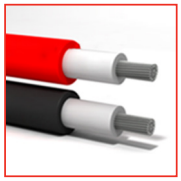
"DC combiner boxes for commercial and industrial facilities"

The Solartec SP range of combiner boxes is specifically designed to be used on the roof of commercial and industrial buildings on installations with centralised inverters. These products stand out for their **ease of installation** and high level of **electrical safety**.

The lightweight nature of polyester housings simplifies their transportation and assembly on building rooftops. We should also highlight the separations between fuse holders that increase isolation distances, improving electrical safety and simplifying connection wiring. This set-up is especially suitable given the high levels of pollution on commercial and industrial building roofs.
The transparent polycarbonate covers ensure fast and efficient installation inspection.

"Light, easily transportable and installable housings designed to guarantee maximum electrical safety"

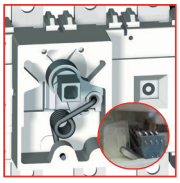
General characteristics



Wiring
Flexible PV cable with double insulation (EN50618)

Fuse protection
Positive and negative poles protected against overcurrents by gPV fuses

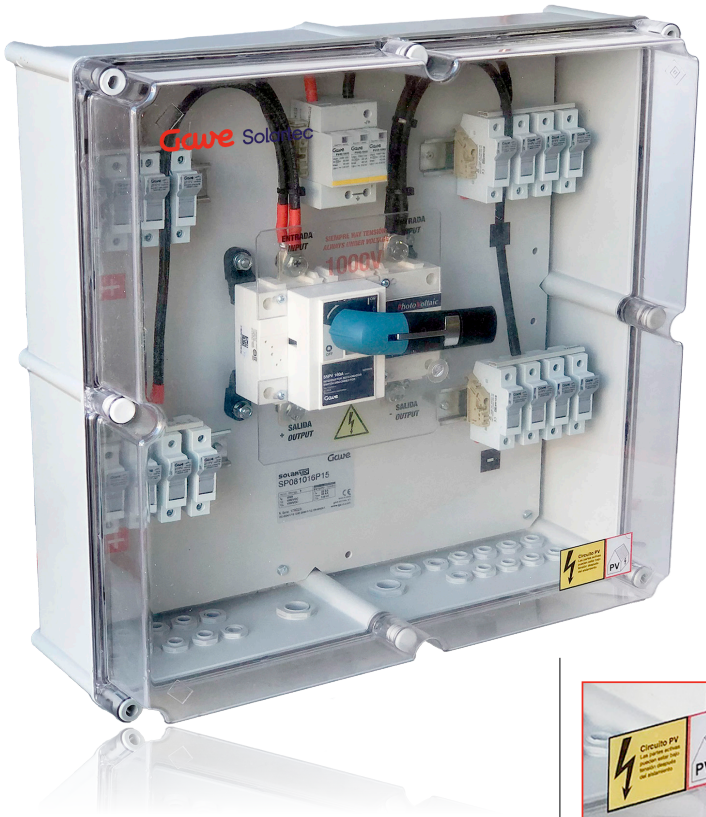
Surge protectors
Phase connection on top and earth connection on bottom. Module end of life visual indication



PV switches
Switch disconnector with extra-fast breaking technology that allows for a smaller switch as well as reducing heat dissipation

Materials
Polyester housings reinforced with RAL7035 gray fiberglass. Self-extinguishing.
Cover in transparent polycarbonate

Enclosure safety
Class II double insulation, compliant with **IEC 61439-1** standard



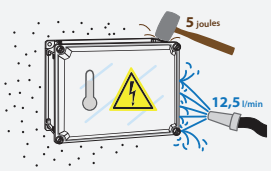
Protection screen
This screen prevents direct contact with permanently live parts during maintenance operations

Connection
Supplied with input/output and earth cable glands

Safety signs
Adhesive signs indicating compliance with Section 514 personal safety regulation requirements

High level of protection and resistance

High IK09 (IEC 62262) impact resistance with IP66 (IEC 60529) standard protection.



Heating

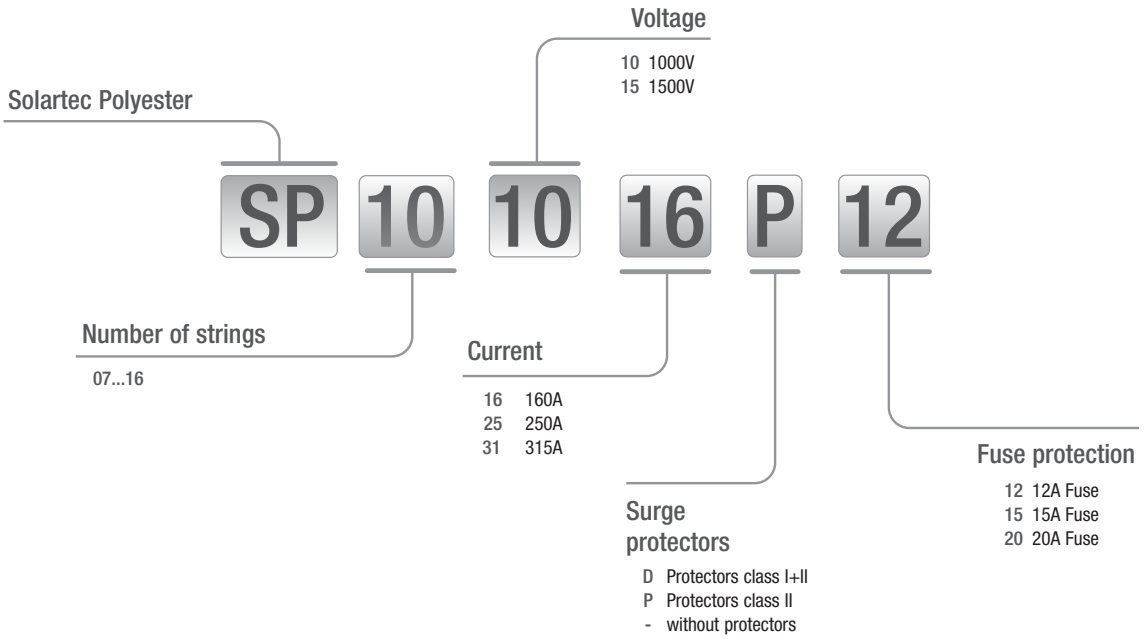
The low-dissipation switch and heat dissipation channels between the fuse holders prevent hot areas, allowing the installation to operate in ambient temperatures of up to 50 ºC without the need for heat correction.

Safety

The significant isolation distances (the separation between fuse holders on switches) and the use of materials with high dielectric properties ensure safety, even after the installation has been in operation for a number of years.

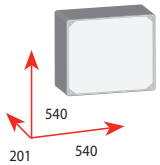
DC PV generator combiner boxes

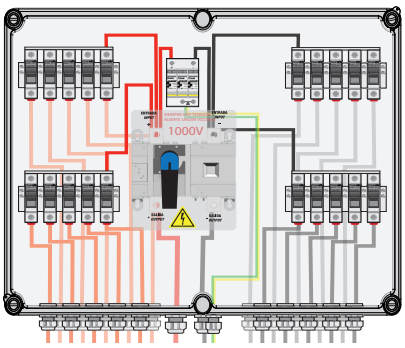
Reference system



1 MPPT from 7 to 10 strings, 1000 V

dimensions (mm)



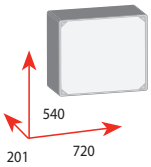


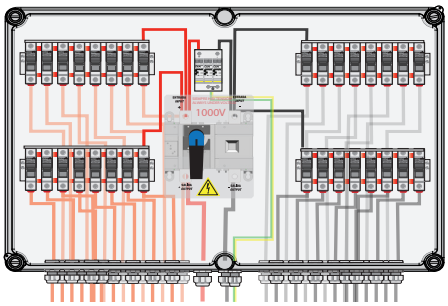
Characteristics

MPPT	strings	fuse	switch disconnector	SPD	Reference
1	7	15A	160 A	PST31PV	SP071016P15
1	7	15A	160 A	PST31APV	SP071016D15
1	7	20A	160 A	PST31PV	SP071016P20
1	7	20A	160 A	PST31APV	SP071016D20
1	8	15A	160 A	PST31PV	SP081016P15
1	8	15A	160 A	PST31APV	SP081016D15
1	8	20A	160 A	PST31PV	SP081016P20
1	8	20A	160 A	PST31APV	SP081016D20
1	9	15A	160 A	PST31PV	SP091016P15
1	9	15A	160 A	PST31APV	SP091016D15
1	9	20A	250 A	PST31PV	SP091025P20
1	9	20A	250 A	PST31APV	SP091025D20
1	10	15A	160 A	PST31PV	SP101016P15
1	10	15A	160 A	PST31APV	SP101016D15
1	10	20A	250 A	PST31PV	SP101025P20
1	10	20A	250 A	PST31APV	SP101025D20

1 MPPT from 11 to 16 strings, 1000 V

dimensions (mm)

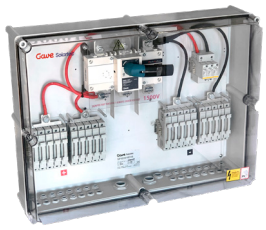




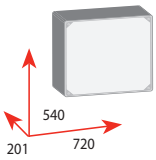
Characteristics

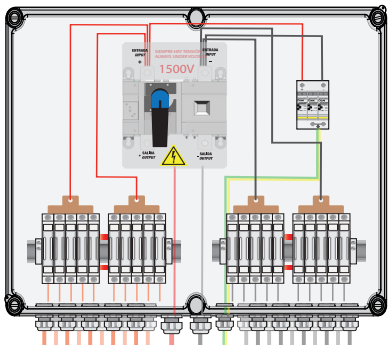
MPPT	strings	fuse	switch disconnector	SPD	Reference
1	11	15A	250 A	PST31PV	SP111025P15
1	11	15A	250 A	PST31APV	SP111025D15
1	11	20A	250 A	PST31PV	SP111025P20
1	11	20A	250 A	PST31APV	SP111025D20
1	12	15A	250 A	PST31PV	SP121025P15
1	12	15A	250 A	PST31APV	SP121025D15
1	12	20A	250 A	PST31PV	SP121025P20
1	12	20A	250 A	PST31APV	SP121025D20
1	13	15A	250 A	PST31PV	SP131025P15
1	13	15A	250 A	PST31APV	SP131025D15
1	13	20A	315 A	PST31PV	SP131031P20
1	13	20A	315 A	PST31APV	SP131031D20
1	14	15A	250 A	PST31PV	SP141025P15
1	14	15A	250 A	PST31APV	SP141025D15
1	14	20A	315 A	PST31PV	SP141031P20
1	14	20A	315 A	PST31APV	SP141031D20
1	15	15A	250 A	PST31PV	SP151025P15
1	15	15A	250 A	PST31APV	SP151025D15
1	15	20A	315 A	PST31PV	SP151031P20
1	15	20A	315 A	PST31APV	SP151031D20
1	16	15A	250 A	PST31PV	SP161025P15
1	16	15A	250 A	PST31APV	SP161025D15
1	16	20A	315 A	PST31PV	SP161031P20
1	16	20A	315 A	PST31APV	SP161031D20

1 MPPT from 8 to 10 strings, 1500 V



dimensions (mm)





Characteristics

MPPT	strings	fuse	switch disconnector	SPD	Reference
1	8	15A	160 A	PST32PV	SP081516D15
1	8	20A	160 A	PST32PV	SP081516D20
1	9	15A	160 A	PST32PV	SP091516D15
1	9	20A	250 A	PST32PV	SP091525D20
1	10	15A	160 A	PST32PV	SP101516D15
1	10	15A	250 A	PST32PV	SP101525D20

1000 V and 1500 V PV combiner cabinet for solar power plants

"DC combiner boxes for large-scale solar power plants"

The choice of supplier for combiner cabinets is an important one for an EPC department that has to maximise returns for the investor company on power generation projects.

The Gave Electro engineering team has developed a range of products that feature Capex and Opex criteria to optimise the return on investment.

The SA and SM ranges of photovoltaic connection cabinets are aimed at large power generation plants and are designed with special attention to the long life cycles at such facilities which require very high weathering resistance. The design also facilitates installation, start-up and maintenance operations.

SA Series

Fiberglass-reinforced polyester cabinets that ensure great impact strength and resistance to harsh weather conditions. Designs using especially robust equip-ment that can operate at voltages up to 1500V.

Individual verification of all cabinets.

SM Series

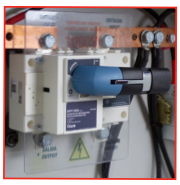
Based on the SA series with monitoring options.

"Designed to optimise return on investment at facilities with long life cycles"

General characteristics

Protective screen
Protects against direct contact with live parts

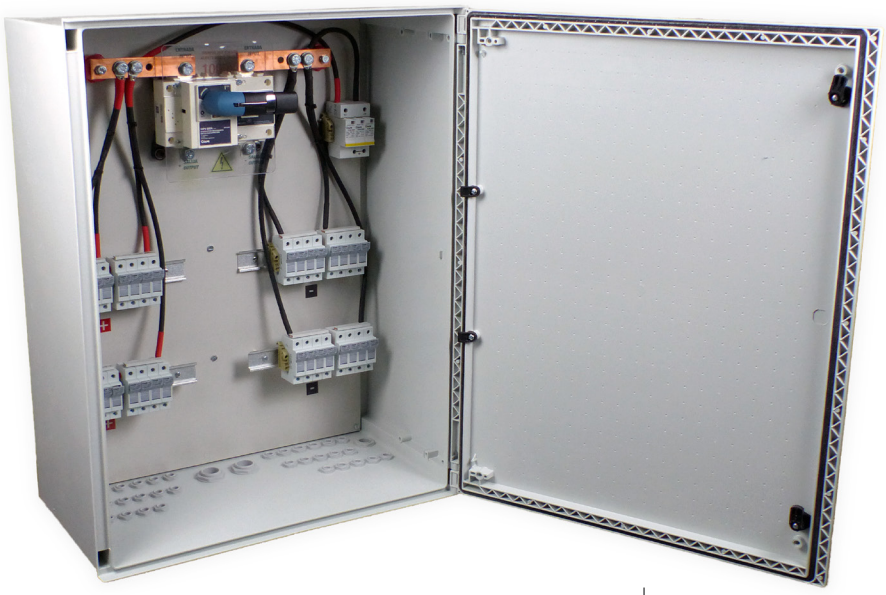
Busbar collection
Copper bar for string set connection, optimising thermal performance



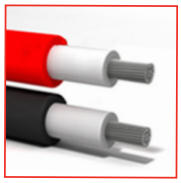
Padlockable handle
Ergonomic direct-operation handle with lock for maintenance operations

PV switches
Switch disconnector with extra-fast breaking technology that allows a smaller switch as well as reducing heat dissipation

Surge protectors
Class II overvoltage protectors – 1000V Class I+II – 1500V (EN 61643-31). Phase connection on top and earth connection on bottom. Module end of life visual indication



Wiring
Flexible PV cable with double insulation (EN50618)



Safety signs
Protects against direct contact with live parts

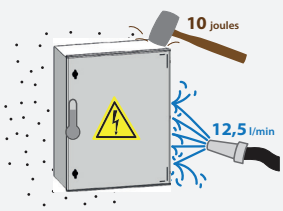
Materials
Corrosion-resistant polyester housings reinforced with RAL7035 gray fiberglass. Nonhygroscopic material, suitable for outdoor use

Enclosure safety
Class II double insulation, compliant with **IEC 61439-1** standard

Connection
Supplied with input/ output and earth cable glands

Door
DIN 3 mm double bar closing system. Interior hinges that ensure very wide opening

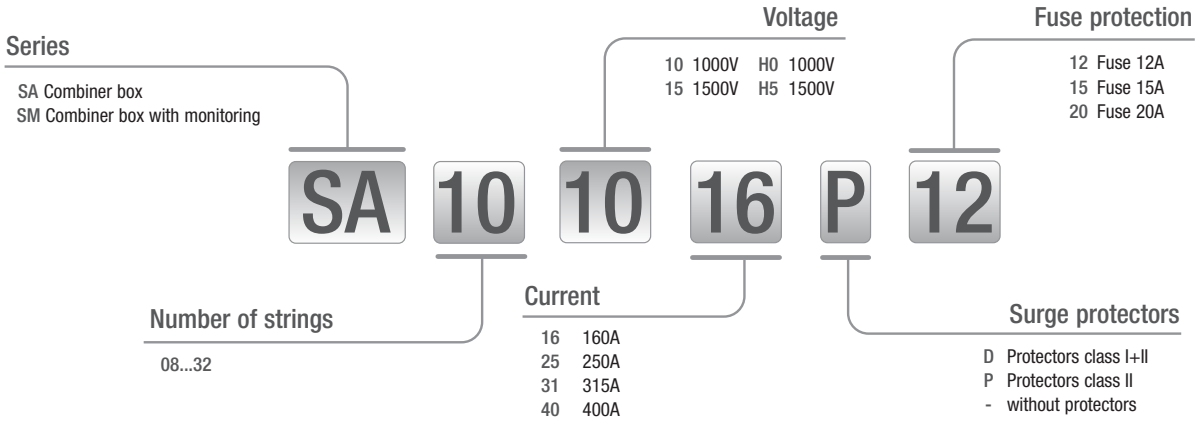
High level of protection and resistance
High IK10 (IEC 62262) impact resistance with IP66 (IEC 60529) standard protection.



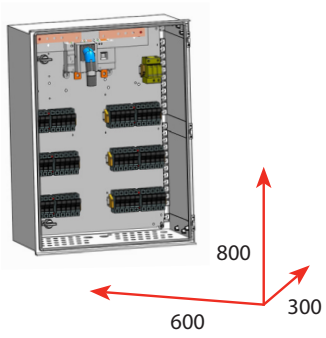
Aluminum cable set-ups
Solar power plants require long lengths of cabling which can lead to voltage drop problems with a subsequent production fall-off. In many cases, it may be advisable to optimise production through the use of aluminum cables which have a greater cross-section. There are a number of ways in which SA boxes and cabinets can be adapted to such needs.

1000 V and 1500 V PV combiner cabinet for solar power plants

Reference system

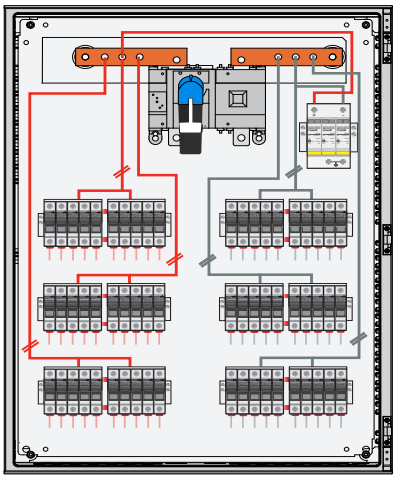


1000 V combiner boxes from 16 to 30 strings

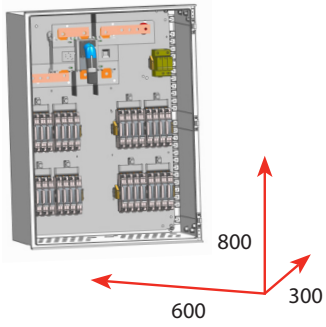


Characteristics

strings	fuse	switch disconnector	SPD	Reference
16	15A	250A	PST31PV	SA161025P15
20	15A	315A	PST31PV	SA201031P15
24	15A	315A	PST31PV	SA241031P15
28	15A	400A	PST31PV	SA281040P15
30	15A	400A	PST31PV	SA301040P15

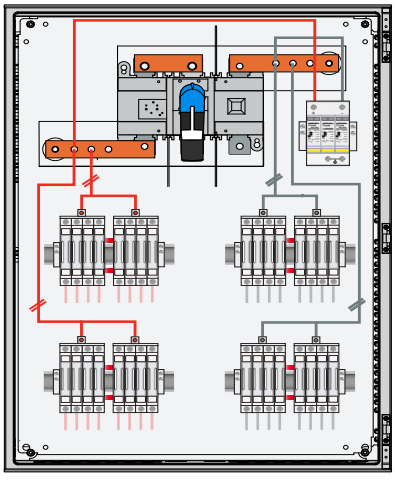


1500 V combiner boxes from 8 to 16 strings

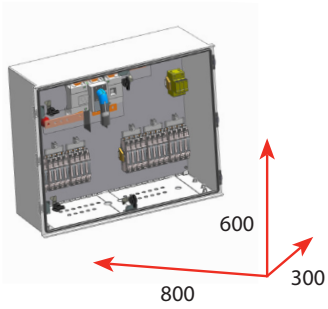


Characteristics

strings	fuse	switch disconnector	SPD	Reference
8	15A	160A	PST32PV	SA081516D15
12	15A	250A	PST32PV	SA121525D15
16	15A	250A	PST32PV	SA161525D15

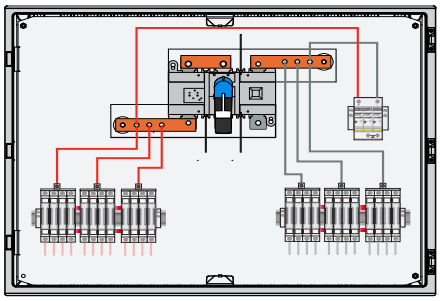


1500 V combiner boxes from 8 to 12 strings - horizontal layout

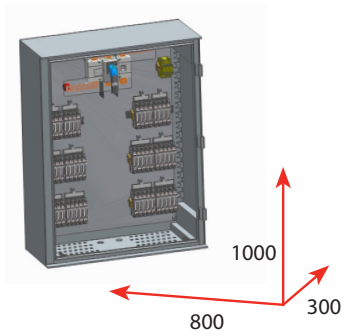


Characteristics

strings	fuse	switch disconnector	SPD	Reference
8	15A	160A	PST32PV	SA08H516D15
12	15A	250A	PST32PV	SA12H525D15

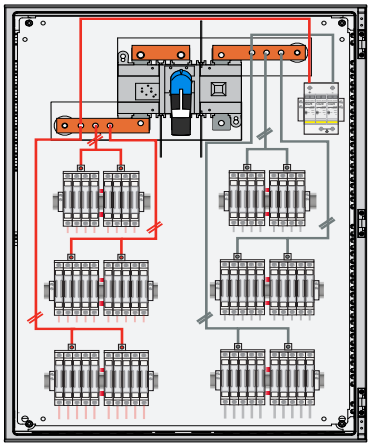


1500 V combiner from with 20 to 28 strings

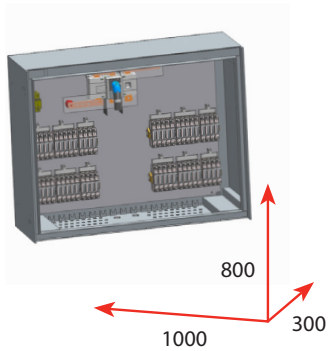


Characteristics

strings	fuse	switch disconnector	SPD	Reference
20	15A	315A	PST32PV	SA201531D15
24	15A	400A	PST32PV	SA241540D15
28	15A	400A	PST32PV	SA281540D15

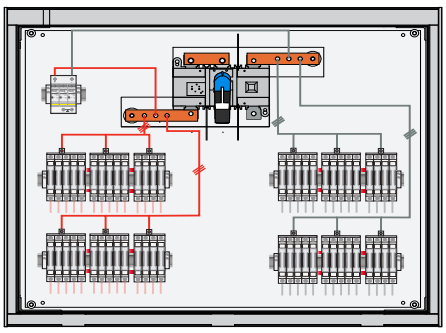


1500 V combiner boxes from 16 to 28 strings - horizontal layout



Characteristics

strings	fuse	switch disconnector	SPD	Reference
16	15A	250A	PST32PV	SA16H525D15
20	15A	315A	PST32PV	SA20H531D15
24	15A	400A	PST32PV	SA24H540D15
28	15A	400A	PST32PV	SA28H540D15



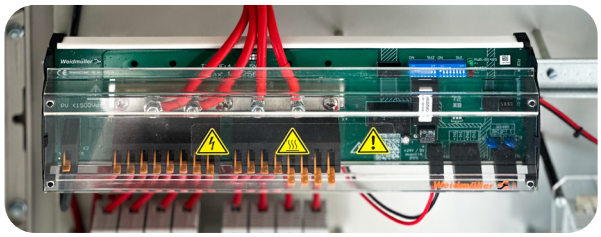
1000 V and 1500 V PV combiner cabinet with monitoring for solar power plants

«Monitoring of the installation to ensure optimum return on investment»

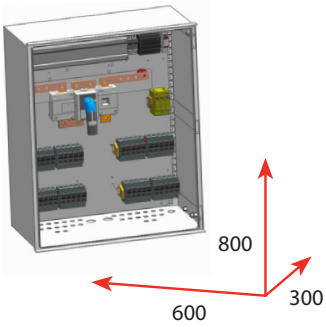
The range of SM cabinets comprise a complete offer of combiner cabinets integrating protection and monitoring elements into the same enclosure. Design capabilities of the technical team include development of customised solutions that are easily scalable at a production level.

Monitoring

The rapid detection of the elements that negatively affect the performance of the installation allows action at the point closest to the failure to minimise the associated opportunity costs. The electronics measurements are based on high precision shunt sensors and has been designed to reliably operate in demanding conditions (-25ºC to +70ºC and high humidity). The board has built-in led indicators for a quick signalling system status indication, it also includes several signal inputs for continuous monitoring of other devices (disconnectors, overvoltage protectors,..). Communication is done through Modbus RTU-RS485 of very easy integration in SCADA systems.

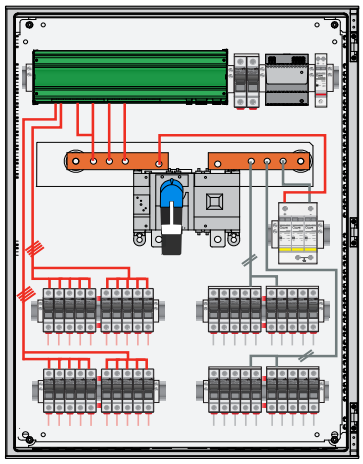


1000 V combiner boxes from 8 to 16 strings with monitoring

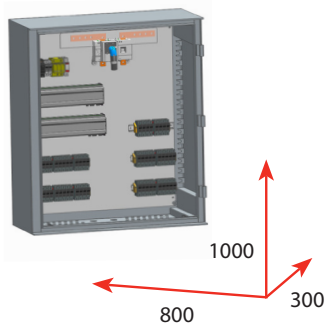


Characteristics

strings	fuse	switch disconnector	SPD	Reference
8	15A	160A	PST31PV	SM081016P15
12	15A	250A	PST31PV	SM121025P15
16	15A	250A	PST31PV	SM161025P15

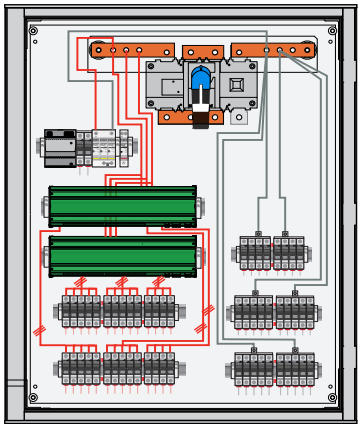


1000 V combiner boxes from 20 to 32 strings

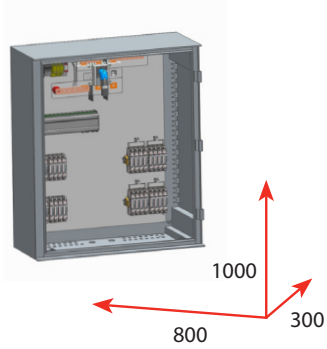


Characteristics

strings	fuse	switch disconnector	SPD	Reference
20	15A	315A	PST31PV	SM201031P15
24	15A	400A	PST31PV	SM241040P15
28	15A	400A	PST31PV	SM281040P15
32	15A	400A	PST31PV	SM321040P15

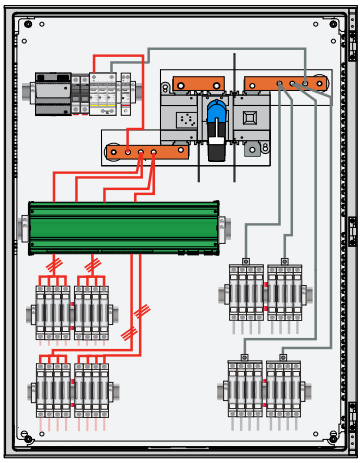


1500 V combiner boxes from 8 to 16 strings

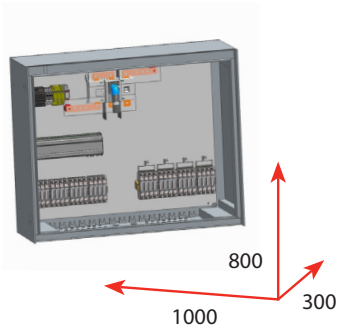


Characteristics

strings	fuse	switch disconnector	SPD	Reference
8	15A	160A	PST32PV	SM081516D15
12	15A	250A	PST32PV	SM121525D15
16	15A	250A	PST32PV	SM161525D15

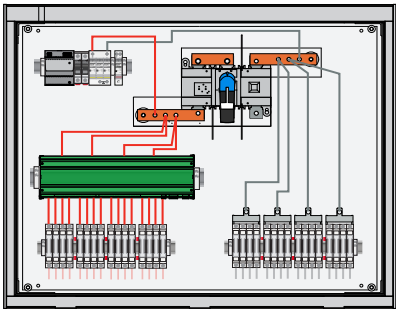


1500 V combiner boxes from 8 to 16 strings - horizontal layout

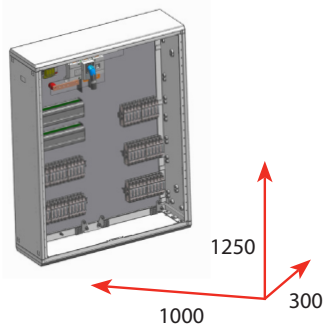


Characteristics

strings	fuse	switch disconnector	SPD	Reference
8	15A	160A	PST32PV	SM08H516D15
12	15A	250A	PST32PV	SM12H525D15
16	15A	250A	PST32PV	SM16H525D15

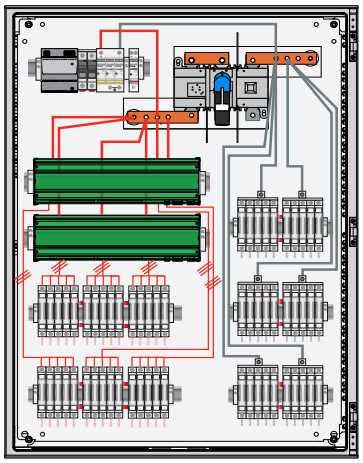


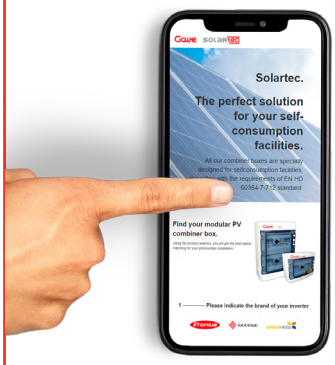
1500 V combiner boxes from 20 to 32 strings



Characteristics

strings	fuse	switch disconnector	SPD	Reference
20	15A	315A	PST32PV	SM201531D15
24	15A	400A	PST32PV	SM241540D15
28	15A	400A	PST32PV	SM281540D15
32	15A	400A	PST32PV	SM321540D15





The essential tool to find your PV combiner box quickly and easily

In just 3 easy steps:

1. Choose your inverter brand
2. Select the model
3. Find the reference for your DC and AC box that is compatible with your installation

It's that simple! As well as finding the reference, you will also be able to view the product, check the main characteristics and download the technical datasheet to ensure that you have the most complete and detailed information possible.

VIEW SELECTOR

Contact

For further information, email
solartec@gave.com

Video

Find out how modular PV combiner boxes work

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