Photovoltaic installation for rooftop systems made easy

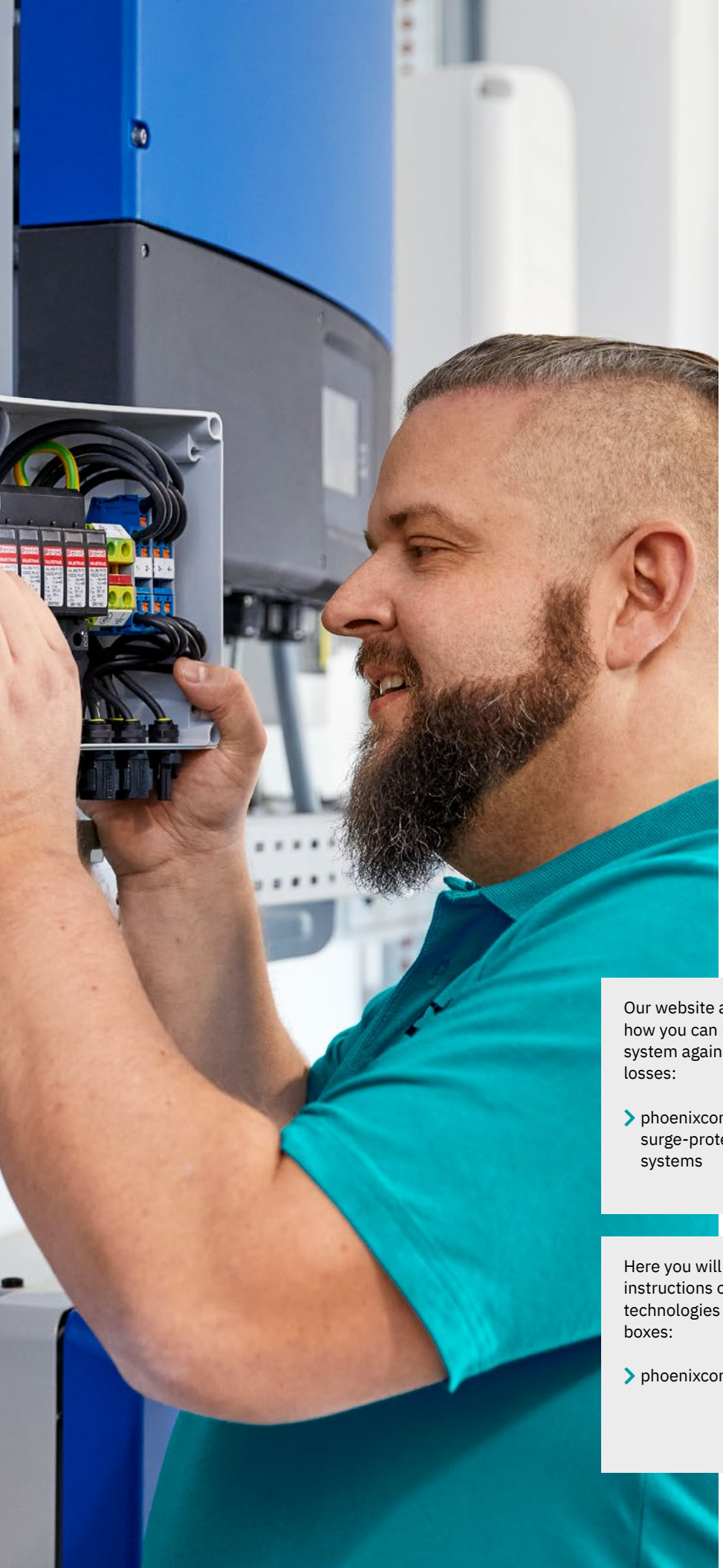
Standards, selection guides,
and products for electricians

PHOENIX CONTACT

Surge protection for photovoltaic systems

In the midst of the energy transition, decentralized photovoltaic systems are becoming increasingly important. Whether large ground-mounted systems or smaller rooftop installations, surge protection measures are necessary in order to reliably and permanently protect photovoltaic systems and ensure system availability. Due to their conductor loops and installation locations, these systems are at risk from surge voltages caused by lightning strikes.

Our string combiner boxes and surge protective devices not only ensure a long service life for your photovoltaic system, but also keep the payback time as short as possible.



Contents

Our website also includes information on how you can reliably protect your solar system against surge voltages and yield losses:

› phoenixcontact.com/surge-protection-for-pv-rooftop-systems

Here you will find assistance and instructions on mounting and connection technologies for our string combiner boxes:

› phoenixcontact.com/videos-scb

Directives and standards for lightning and surge protection for photovoltaic rooftop systems

When planning and installing new photovoltaic systems in Germany, it is important to comply with certain requirements. This applies not only to the systems themselves, but also to the surge protection of the corresponding system parts.

DIN VDE 0100-712 describes how to plan and install photovoltaic systems in Germany. In order to optimally protect the systems against the effects of surge voltages, it is also important to ensure that the correct type of surge protection is used.

On the alternating current side (AC side), surge protection is required in accordance with DIN VDE 0100-443.

If the protection of the inverter is to be ensured, protection is also required on the direct current side (DC side) in accordance with DIN EN 62305-3 Supplement 5.

AC side:
Protective measures in the main distribution

DIN VDE 0100-443 and DIN VDE 0100-534 specify whether and, if necessary, which surge protection measures must be provided on the AC side of the photovoltaic power supply system.

DC side:
Protection of the photovoltaic power supply system

If it proves necessary to protect the inverter, DIN EN 62305-3 Supplement 5 stipulates that surge protective devices must primarily be installed in the proximity of the PV panels (DC 1). Additional protective measures may be necessary in the proximity of the inverter in the case of long cable lengths (> 10 m, DC 2).

If signal and communication circuits are present in the photovoltaic system in question, these should also be equipped with surge protective devices.

› For the appropriate products for MCR and data lines, see page 23.

Do you have further questions about the normative principles or are you about to embark on a project and need advice?

Then contact our experts for surge protection quickly and easily via WhatsApp.

- Use the number +49 5235 343654
- Scan the QR code

DIN VDE 0100-712

It describes how to plan and install photovoltaic systems in Germany.

DIN VDE 0100-443 and DIN VDE 0100-534

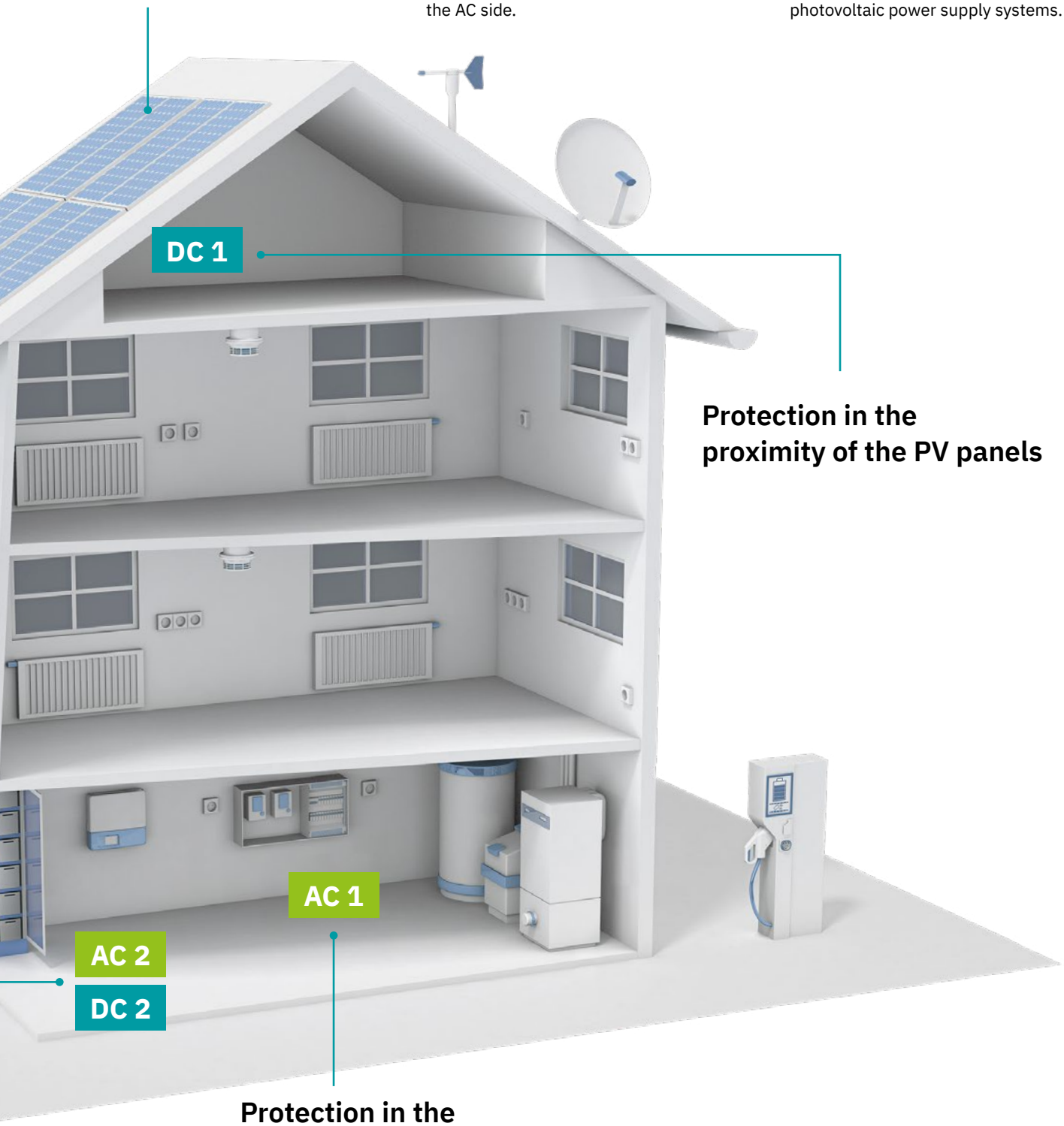
AC side

They specify when and which surge protection measures are required on the AC side.

DIN EN 62305-3 Supp. 5 (VDE 0185-305-3 Bbl 5)

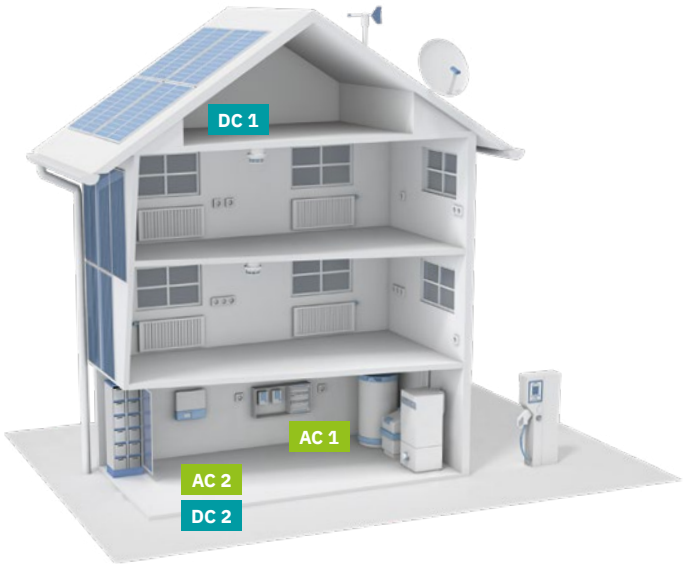
DC side

Supplement 5 deals specifically with lightning and surge protection for photovoltaic power supply systems.

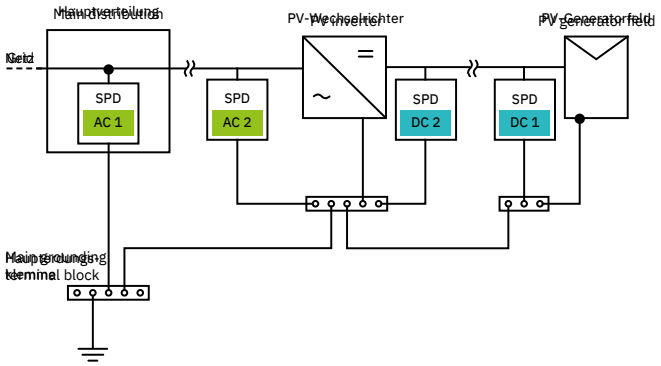


Find the right surge protection type

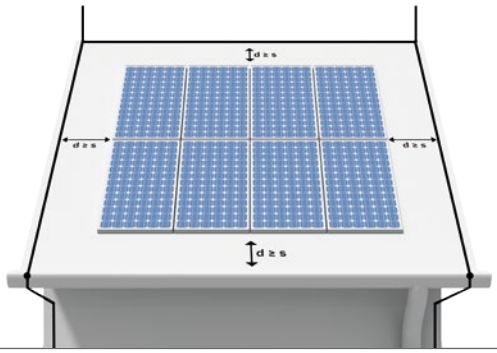
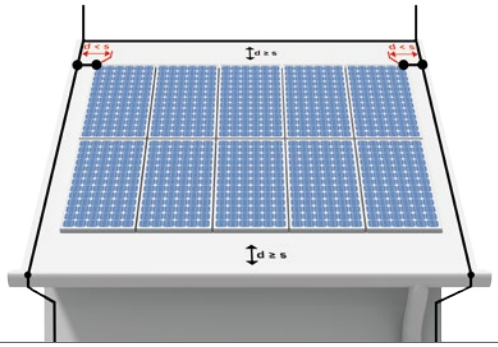
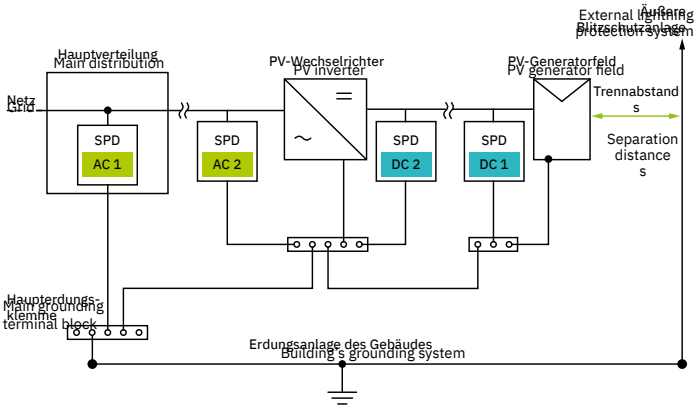
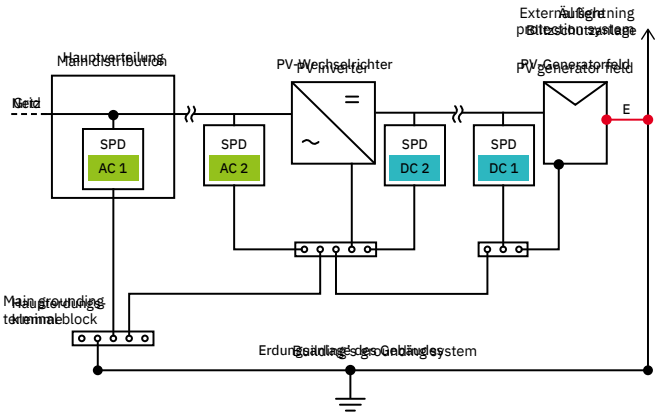
Which type of surge protection is appropriate depends on the conditions at your planned photovoltaic system. There are three scenarios that each require different types of surge protection.



1. Photovoltaic rooftop system without external lightning protection



DC 1	**DC surge protection in the proximity of the PV panels**	**Type 2** Define the installation location of the SPD[1)] so that the device is installed as close as possible to the PV generator field, often directly after the entrance to the physical structure.
DC 2	**DC surge protection in the proximity of the inverter**	**Type 2** Surge protection is not required here if the cable length between “DC 1” and the inverter to be protected is less than 10 m.
AC 2	**AC surge protection on the AC side of the inverter**	**Type 2** A surge protective device is not required here if the cable length between “AC 1” and “AC 2” is less than 10 m.
AC 1	**AC surge protection in the main distribution**	**Type 2**

Photovoltaic rooftop system with external lightning protection	
2. Separation distance “s” is maintained	**3. Separation distance “s” is not maintained**
	
The distance “d” is greater than or equal to the separation distance “s” at every point in accordance with DIN EN 62305-3 Supplement 5 (VDE 0185-305-3 Bbl 5).	The distance “d” is less than the required separation distance “s” at at least one point.
	
Type 2 Define the installation location of the SPD[1] so that the device is installed as close as possible to the PV generator field, often directly after the entrance to the physical structure.	**Type 1** Define the installation location of the SPD[1] so that the device is installed as close as possible to the PV generator field, often directly after the entrance to the physical structure.
Type 2 Surge protection is not required here if the cable length between “DC 1” and the inverter to be protected is less than 10 m.	**Type 1**
Type 2 A surge protective device is not required here if the cable length between “AC 1” and “AC 2” is less than 10 m.	**Type 1**
Type 1	**Type 1**

[1] The surge protective device (SPD) contains at least one non-linear component and is intended to limit surge voltages and divert pulse currents.

Find the right string combiner box

To determine the right string combiner box for your application, there are two options available in our online selection guide. If the inverter type is known, a preselection is already displayed after answering just three questions, which you can further refine using filters. If the inverter type is not known, simply use the filters directly to find the optimum solution for your application.

You can access our online selection guide via the link or by scanning the QR code.

› phoenixcontact.com/string-combiner-boxes

Is the inverter type known?

Yes

No

Which inverter will be used in your project?

Huawei | SMA | Sungrow | SolarEdge | Fronius | ...

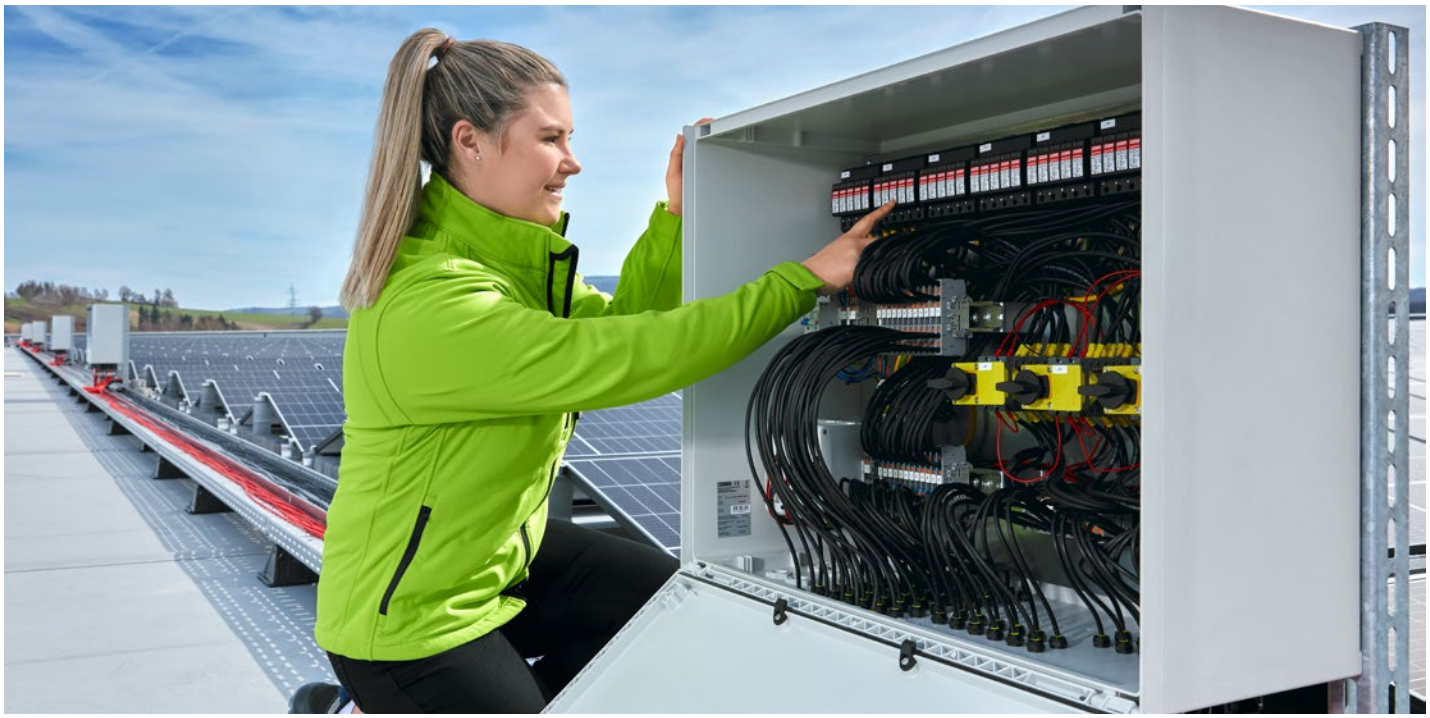
Which inverter type will be used in your project?

1-phase (hybrid) | 3-phase | ...

Which inverter model will be used in your project?

Model A | Model B | Model C | Model D | Model E | ...

Preselection



Refine using filters

- Type of cable entry
- Connection technology
- ...

Use the filters directly

- Number of MPP trackers
- Number of strings per MPP tracker
- ...

Optimum solution

String combiner box
SOL-SC-1ST-0-DC-2MPPT-2001
Item no. 2403337

- MPP voltage: 1,000 V DC
- Number of strings: 1
- Number of supported MPP trackers: 2
- Surge protection: T2

Choosing the right connection technology for string combiner boxes influences the efficiency, safety, durability, and ease of maintenance of the system. Three options are available here:

1. SUNCLIX PV connector
2. MC4-Evo 2 PV connector
3. Cable gland with Push-in Technology

› More information on photovoltaic connection technology: phoenixcontact.com/pv-connectors

Standard string combiner boxes

String combiner boxes need to be used in order to provide optimum protection for photovoltaic systems against surge voltages caused by lightning strikes, for example. Our ready-to-install string combiner boxes can be connected immediately, and are reliable system solutions that protect the inverter directly upstream of the DC and AC voltage inputs.

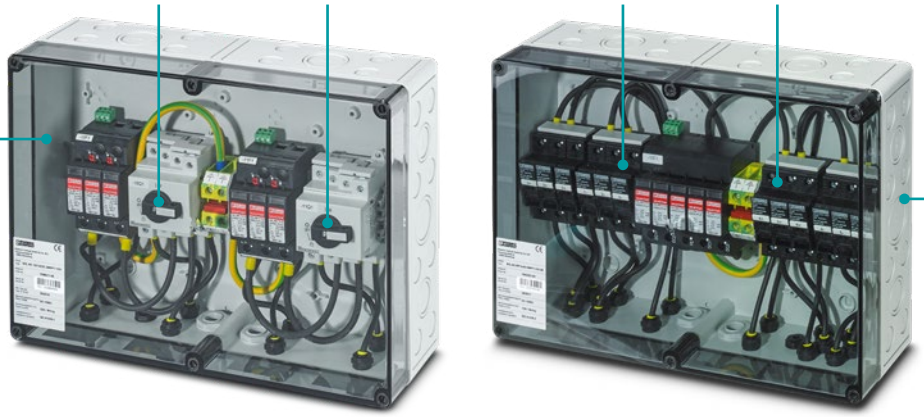
All string combiner boxes with SUNCLIX connection technology come with the necessary field connectors included as standard.

Your advantages

- Optimum protection provided by dust- and jet-water-proof housing (IP65)
- Fast installation and startup with preassembled string combiner boxes
- Pluggable components and application-specific connection technology enable easy maintenance
- High-performance components for specific application requirements
- Standard-compliant switchgear and controlgear assembly in accordance with DIN EN 61439
- Two protective grounding terminal points: One for the protective conductor of the installed surge protective device and, if necessary, one for functional grounding and the lightning protection equipotential bonding of the photovoltaic system

Basic functions

Additional functions (examples)



String combiner boxes with SUNCLIX connectors

With SUNCLIX connectors							
MPP tracker	**Strings per MPP tracker**	**Outputs per MPP tracker**	**Current per string**	**Arrester**	**Size**	**Designation**	**Item no.**
1	1	1	40 A	T1 / T2	1	SOL-SC-1ST-0-DC-1MPPT-1001	2404298
	1	1	40 A	T2	1	SOL-SC-1ST-0-DC-1MPPT-2001	2403338
	2	1	20 A	T1 / T2	2	SOL-SC-2ST-0-DC-1MPPT-1001	1056073
	3	1	13 A	T1 / T2	2	SOL-SC-3ST-0-DC-1MPPT-1001	2404765
	3	3	13 A	T1 / T2	2	SOL-SC-3ST-0-DC-1MPPT-1001EQ	1064363
	4	1	10 A	T1 / T2	2	SOL-SC-4ST-0-DC-1MPPT-1001	2404296
2	1	1	40 A	T1 / T2	2	SOL-SC-1ST-0-DC-2MPPT-1001	2404299
	1	1	40 A	T2	2	SOL-SC-1ST-0-DC-2MPPT-2001	2403337
	2	1	20 A	T1 / T2	3	SOL-SC-2ST-0-DC-2MPPT-1001SE	1016813
	2	2	20 A	T1 / T2	3	SOL-SC-2ST-0-DC-2MPPT-1001EQ	1117754
	3	1	13 A	T1 / T2	3	SOL-SC-3ST-0-DC-2MPPT-1001SE	1153124
3	1	1	40 A	T1 / T2	3	SOL-SC-1ST-0-DC-3MPPT-1001	2404301
	1	1	40 A	T2	3	SOL-SC-1ST-0-DC-3MPPT-2001	2403336
	2	1	20 A	T1 / T2	4	SOL-SC-2ST-0-DC-3MPPT-1001SE	1478915
4	1	1	40 A	T1 / T2	4	SOL-SC-1ST-0-DC-4MPPT-1001SE	1029990
	2	1	20 A	T1 / T2	4	SOL-SC-2ST-0-DC-4MPPT-1001SE	1103205
6	1	1	40 A	T1 / T2	4	SOL-SC-1ST-0-DC-6MPPT-1001SE	1022360
10	2	1	20 A	T1 / T2	7	SOL-SC-2ST-0-DC-10MPPT-1001SE	1253218
12	2	1	20 A	T1 / T2	7	SOL-SC-2ST-0-DC-12MPPT-1001SE	1251937
With SUNCLIX connectors and switch disconnectors							
1	2	1	16 A	T1 / T2	2	SOL-SC-2ST-0-DC-1MPPT-1101	2404297
2	1	1	32 A	T1 / T2	4	SOL-SC-1ST-0-DC-2MPPT-1101	1056071
	2	1	16 A	T1 / T2	4	SOL-SC-2ST-0-DC-2MPPT-1101	2404569
With SUNCLIX connectors and fuses							
1	4	1	10 A	T1 / T2	3	SOL-SC-4ST-0-DC-1MPPT-1011	2403335
2	3	1	13 A	T1 / T2	4	SOL-SC-3ST-0-DC-2MPPT-1011SE	1042281

Housing size 1
130 x 180 x 111 mm (W x H x D)

Housing size 2
180 x 180 x 111 mm (W x H x D)

Housing size 3
254 x 180 x 111 mm (W x H x D)

Housing size 4
361 x 254 x 111 mm (W x H x D)

… With cable gland and Push-in connection

With cable gland and Push-in connection							
MPP tracker	**Strings per MPP tracker**	**Outputs per MPP tracker**	**Current per string**	**Arrester**	**Size**	**Designation**	**Item no.**
1	1	1	40 A	T1 / T2	1	SOL-SC-1ST-0-DC-1MPPT-1000	1182566
	1	1	40 A	T2	1	SOL-SC-1ST-0-DC-1MPPT-2000	1105827
	2	1	20 A	T1 / T2	2	SOL-SC-2ST-0-DC-1MPPT-1000	1016811
	2	1	20 A	T2	2	SOL-SC-2ST-0-DC-1MPPT-2000	1055626
	4	1	10 A	T2	2	SOL-SC-4ST-0-DC-1MPPT-2000	2403334
2	1	1	40 A	T1 / T2	3	SOL-SC-1ST-0-DC-2MPPT-1000SE	1101176
	1	1	40 A	T2	3	SOL-SC-1ST-0-DC-2MPPT-2000SE	1105828
	2	1	20 A	T1 / T2	3	SOL-SC-2ST-0-DC-2MPPT-1000SE	1016812
	2	1	20 A	T2	3	SOL-SC-2ST-0-DC-2MPPT-2000SE	1055628
	3	1	13 A	T1 / T2	4	SOL-SC-3ST-0-DC-2MPPT-1000EQ	1356077
3	1	1	40 A	T1 / T2	4	SOL-SC-1ST-0-DC-3MPPT-1000SE	1182571
	2	1	20 A	T1 / T2	4	SOL-SC-2ST-0-DC-3MPPT-1000SE	1053613
	2	1	20 A	T2	4	SOL-SC-2ST-0-DC-3MPPT-2000SE	1055629
	3	1	13 A	T1 / T2	5	SOL-SC-3ST-0-DC-3MPPT-1000EQ	1356079
4	1	1	40 A	T1 / T2	4	SOL-SC-1ST-0-DC-4MPPT-1000SE	2404842
	2	1	20 A	T1 / T2	4	SOL-SC-2ST-0-DC-4MPPT-1000SE	1081867
	2	1	20 A	T2	5	SOL-SC-2ST-0-DC-4MPPT-2005SE	1197150
	2	2	20 A	T1 / T2	5	SOL-SC-2ST-0-DC-4MPPT-1000EQSE	1491583
6	1	1	40 A	T1 / T2	4	SOL-SC-1ST-0-DC-6MPPT-1000SE	2404843
	2	2	20 A	T1 / T2	6	SOL-SC-2ST-0-DC-6MPPT-1000EQSE	1318523
10	2	2	20 A	T1 / T2	7	SOL-SC-2ST-0-DC-10MPPT-1000EQS	1318524
12	2	2	20 A	T1 / T2	7	SOL-SC-2ST-0-DC-12MPPT-1000EQS	1491828
With cable gland and Push-in connection and switch disconnectors							
1	2	1	16 A	T1 / T2	2	SOL-SC-2ST-0-DC-1MPPT-1100	1283679
2	2	1	16 A	T1 / T2	4	SOL-SC-2ST-0-DC-2MPPT-1100SE	1283682
4	1	1	32 A	T1 / T2	4	SOL-SC-1ST-0-DC-4MPPT-1100SEC	1455739
With cable gland and Push-in connection and fuses							
1	6	1	10 A	T1 / T2	4	SOL-SC-6ST-0-DC-1MPPT-1010	1113128

Housing size 5
508 x 180 x 111 mm (W x H x D)

Housing size 6
400 x 400 x 200 mm (W x H x D)

Housing size 7
600 x 400 x 230 mm (W x H x D)

Product list for special applications

String combiner boxes with SUNCLIX connectors and switch disconnectors							
String entry on the top of the housing. DC output on the bottom of the housing							
MPP tracker	**Strings per MPP tracker**	**Outputs per MPP tracker**	**Current per string**	**Arrester**	**Size**	**Designation**	**Item no.**
2	2	1	16 A	T1 / T2	4	SOL-SC-2ST-0-DC-2MPPT-1101UD	1140111
3	2	1	16 A	T1 / T2	4	SOL-SC-2ST-0-DC-3MPPT-1101UD	1140960

String combiner boxes with cable gland and Push-in connection							
Versions with extended connection cross-section range in the DC output (max. 16 mm²)							
1	2	1	20 A	T2	3	SOL-SC-2ST-0-DC-1MPPT-2005	1197141
2	2	1	20 A	T2	3	SOL-SC-2ST-0-DC-2MPPT-2005SE	1197145
3	2	1	20 A	T2	4	SOL-SC-2ST-0-DC-3MPPT-2005SE	1197147
Adapted to SolarEdge inverters with extended connection cross-section (max. 16 mm²) and increased maximum current of 75 A.							
1	3	3	25 A	T1 / T2	3	SOL-SC-3ST-0-DC-1MPPT-1005EQ	1197151
Version with extended connection cross-section (input strings max. 16 mm², DC output max. 35 mm²) and increased maximum current of 75 A. Connection of copper or aluminum conductors in the DC output.							
1	3	1	25 A	T1 / T2	4	SOL-SC-3ST-0-DC-1MPPT-1005AL	1216523

String combiner box with cable gland and Push-in connection and switch disconnectors							
Version with extended connection cross-section range in the DC output (max. 16 mm²)							
1	2	1	16 A	T2	3	SOL-SC-2ST-0-DC-1MPPT-2105	1428529

Housing size 3

254 x 180 x 111 mm (W x H x D)

Housing size 4

361 x 254 x 111 mm (W x H x D)

String combiner boxes with MC4-Evo 2 connectors							
MPP tracker	**Strings per MPP tracker**	**Outputs per MPP tracker**	**Current per string**	**Arrester**	**Size**	**Designation**	**Item no.**
1	1	1	40 A	T1 / T2	1	SOL-SC-1ST-0-DC-1MPPT-1006	1834560
	1	1	40 A	T2	1	SOL-SC-1ST-0-DC-1MPPT-2006	1834561
2	1	1	40 A	T1 / T2	2	SOL-SC-1ST-0-DC-2MPPT-1006	1834564
	1	1	40 A	T2	2	SOL-SC-1ST-0-DC-2MPPT-2006	1834565
	2	1	20 A	T1 / T2	3	SOL-SC-2ST-0-DC-2MPPT-1006SE	1834566
3	1	1	40 A	T1 / T2	3	SOL-SC-1ST-0-DC-3MPPT-1006	1834567
4	1	1	40 A	T1 / T2	4	SOL-SC-1ST-0-DC-4MPPT-1006SE	1834573

For more detailed information as well as many other versions, visit our e-shop.

› phoenixcontact.com/string-combiner-boxes

For help and instructions on our products, visit our YouTube channel.

› phoenixcontact.com/videos-scb

Contact

We will be happy to assist you in selecting the right string combiner box for your photovoltaic system:

› pm-combinations@phoenixcontact.com

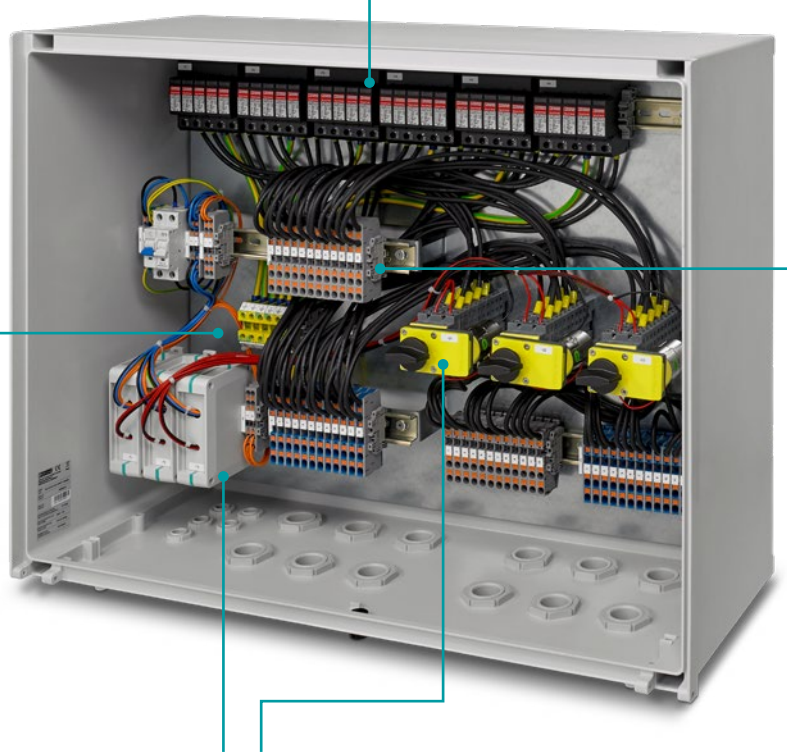
String combiner boxes with fire department switch disconnector

Although no general regulation exists, fire protection organizations and insurers are increasingly recommending the use of fire department switch disconnectors. In the event of a fire, they allow the DC cables to be disconnected automatically directly at the PV panels. Switching off the mains voltage ensures that there is no voltage, which provides for safe firefighting without the need for additional measures. The motorization of the switch disconnector means that it is automatically restarted when the mains voltage is switched on. This is ideal for low-maintenance systems.

Your advantages

- Automatic load disconnection near the PV panels
- Motorized restart after mains failure or accidental shutdown
- Integrated surge protection ensures high system availability
- Support in complying with the VDE-AR-E 2100-712 application guide
- Standard-compliant design in accordance with DIN EN 61439

Functions



String combiner boxes with fire department switch disconnector

With SUNCLIX connectors and fire department switch disconnectors							
MPP tracker	**Strings per MPP tracker**	**Outputs per MPP tracker**	**Current per string**	**Arrester**	**Size**	**Designation**	**Item no.**
1	2	1	20 A	T1 / T2	4	SOL-SC-2ST-0-DC-1MPPT-1301	1809692
2	2	1	20 A	T1 / T2	4	SOL-SC-2ST-0-DC-2MPPT-1301SE	1809693

With cable gland and Push-in connection and fire department switch disconnector							
MPP tracker	**Strings per MPP tracker**	**Outputs per MPP tracker**	**Current per string**	**Arrester**	**Size**	**Designation**	**Item no.**
1	2	2	20 A	T1 / T2	4	SOL-SC-2ST-0-DC-1MPPT-1300EQ	1809684
2	2	2	20 A	T1 / T2	4	SOL-SC-2ST-0-DC-2MPPT-1300EQSE	1809690
4	2	2	20 A	T1 / T2	6	SOL-SC-2ST-0-DC-4MPPT-1300EQSE	1639245
12	2	2	20 A	T1 / T2	7	SOL-SC-2ST-0-DC-12MPPT-1300EQS	1460946

Housing size 4
361 x 254 x 111 mm (W x H x D)

Housing size 6
400 x 400 x 200 mm (W x H x D)

Housing size 7
600 x 400 x 230 mm (W x H x D)

For more detailed information as well as many other versions, visit our e-shop.

› phoenixcontact.com/string-combiner-boxes

Our video tutorial shows you how to connect a string combiner box with fire department switch disconnector and what you need to bear in mind.

› phoenixcontact.com/video-scb-fdsd

Contact

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› pm-combinations@phoenixcontact.com

Installation accessories

Accessories for surge protection for the DC side			
			
	S PV connector	**L PV connector**	**Y distributor for collecting two strings**
	Plug-in compatible		
Description	Tool-free fast-connection technology	Reduction of cable losses	Greater flexibility in field cabling
Cable connection	2.5 mm² ... 6 mm²	6 mm² ... 16 mm²	–
Type Item no.	PV-C3F-S 2,5-6 (+) 1386381	PV-C4F-S 6-16 (+) 1284634	PV-ED6/Y-120(2+/1-) 1030649
Type Item no.	PV-C3M-S 2,5-6 (-) 1386384	PV-C4M-S 6-16 (-) 1284632	PV-ED6/Y-120(1+/2-) 1030650

		
	PV protective cap	**MC4 adapter**
Description	IP67 protection for unused SUNCLIX connectors	MC4 to SUNCLIX
	Self-sealing	Up to 35 A
Type Item no.	PV-C PROTECTION CAP 1785430	PV-AS-MC4/6-150MN-SET1 1079531

		
	Replacement plug[1)]	**Replacement plug[1)]**
Description	Replacement for faulty surge protection plugs	Replacement for faulty surge protection plugs
	Type 2 or type 1/2	Type 2 or type 1/2
Type Item no.	VAL-MS 1000DC-PV-ST 2800624	VAL-SPP-T2-1000DC-PV-P 1466779
Type Item no.	VAL-MS-T1/T2 1000DC-PV-ST 2801162	VAL-SPP-T1-1000DC-PV-P 1466781

[1)] *To find the appropriate replacement plug, go to the product page at: phoenixcontact.com*

Weather protection canopies

Accessories for the string combiner box		
		
	Weather protection canopy	
Housing size	4 (361 x 254 x 111 mm)	3 (254 x 180 x 111 mm)
Description	Canopy to protect the string combiner box (SCB) from environmental influences when installed outdoors, made of stainless steel, with M8 grounding bolt on the back, incl. mounting material for SCB and grounding cable.	
Type Item no.	SOL-WR-3625-AISI304 1579291	SOL-WR-2518-AISI304 1579290

		
	Weather protection canopy	
Housing size	2 (180 x 180 x 111 mm)	1 (130 x 180 x 111 mm)
Description	Canopy to protect the string combiner box (SCB) from environmental influences when installed outdoors, made of stainless steel, with M8 grounding bolt on the back, incl. mounting material for SCB and grounding cable.	
Type Item no.	SOL-WR-1818-AISI304 1579286	SOL-WR-1813-AISI304 1579283

For further information on the various housing sizes, see page 12.

The weather protection canopy protects the string combiner box from precipitation and direct sunlight. Our video shows you how to mount the canopies.

› phoenixcontact.com/video-scb-weather-protection-canopy

Additional surge protection

Surge protection for the AC side (suitable for 3-phase TN-S or TT systems)

AC 1

Web code: #0291






Type of building	With lightning protection, with / without overhead line		Without lightning protection, with overhead line		Without lightning protection, without overhead line	
Description	Combined lightning current and surge arrester for the feed point of the low-voltage electrical installation. Installation downstream of the service panel (FLT-MB-T1) or in the grid-side wiring space of the meter panel (FLT-SEC-ZP2). In the case of overhead lines, the additional installation of an FLT-MB-T1 at the roof pole connection is recommended.		Combined lightning current and surge arrester for the feed point of the low-voltage electrical installation. Installation in the grid-side wiring space of the meter panel (FLT-SEC-ZP2). The additional installation of an FLT-MB-T1 on the roof pole connection is recommended.		Surge protection for the feed point of the low-voltage electrical installation. Installation in the system-side wiring space of the meter panel (VAL) or in the grid-side wiring space (FLT-SEC-ZP2).	
Type	FLT-MB-T1-264/ 12.5-3+1-UT-R [1) 2)]	FLT-SEC-ZP2-3S-255/12.5 [2) 3)]	FLT-MB-T1-264/ 12.5-3+1-UT-R [1)]	FLT-SEC-ZP2-3S-255/7.5 [3)]	VAL-SEC-T2-3S-350/40-FM [1)]	FLT-SEC-ZP2-3S-255/7.5 [3)]
Item no.	1380667	1168943	1380667	1168940	2909635	1168940

Surge protection for the AC side (suitable for 1- and 3-phase TN-S or TT systems)

AC 2

Web code: #0291




Type of building	With lightning protection, separation distance “s” maintained, or without lightning protection		With lightning protection, separation distance “s” not maintained	
Description	Additional surge protection in the immediate proximity of the inverter. Required if the distance to the surge protective device (SPD) at the feed point of the system is more than 10 m.		Additional combined lightning current and surge arrester in the immediate proximity of the inverter. Always required if the separation distance has not been maintained, regardless of the distance to the surge protective device (SPD) at the feed point of the system.	
Inverter type	1-phase	3-phase	1-phase	3-phase
Type	VAL-SPP-T2-275-1+1-UT-R [1)]	VAL-SPP-T2-275-3+1-UT-R [1)]	FLT-MB-T1-264/ 12.5-1+1-UT-R [1) 2)]	FLT-MB-T1-264/ 12.5-3+1-UT-R [1) 2)]
Item no.	1466212	1466214	1380657	1380667

[1)] With remote indication contact. Also available without remote indication contact.
[2)] Can only be used for lightning protection level III/IV. FLT-MB-T1 is also available for lightning protection level I/II.
[3)] The remote signaling module shown is not supplied as standard and is available as an option under item no. 1168947.

Surge protection for MCR signals at the inverter		
TC Web code: #0291		
Signal type	**Digital signals (two single-core wires, 24 V DC, with common reference potential)**	**Analog signals (one double wire, 0/4 ... 20 mA, 0 ... 10 V)**
Description	Pluggable surge protection for digital signals. Protection of two single-core wires with common, non-grounded reference potential. With integrated overload protection and mechanical status indicator. Remote signaling with optional additional modules is possible.	Pluggable surge protection for an analog signal. Protects one double wire. With integrated overload protection and mechanical status indicator. Remote signaling with optional additional modules is possible.
Type	TTC-6P-2X1-F-24DC-PT-I	TTC-6P-1X2-24DC-PT-I
Item no.	1065320	2906815

Surge protection for MCR signals at the inverter		
TC Web code: #0291		
Signal type	**RS-485 (2-wire)**	**Ethernet in acc. with Class EA / CAT6$_A$ (up to 10 Gbps incl. PoE++)**
Description	Pluggable surge protection for an RS-485 interface (2-wire). With integrated overload protection and mechanical status indicator. Remote signaling with optional additional modules is possible.	Surge protection for an Ethernet interface. Intermediate plug with RJ45 connection on both sides. Can be snapped onto a DIN rail. Grounding is then performed directly via the metal housing.
Type	TTC-6P-3-HF-F-M-12DC-UT-I	DT-LAN-CAT.6+
Item no.	2906786	2881007

Contact our experts

Via email

We will be happy to assist you in selecting the right string combiner box for your photovoltaic system:

› Email: pm-combinations@phoenixcontact.com

Find your local distributor

› phoenixcontact.com/
find-a-distributor

Via WhatsApp

Contact our experts with any questions regarding surge protection:

› Use the number
+49 5235 343654

› Scan the QR code

Our tutorials on YouTube

Watch our videos for help and instructions on our string combiner boxes.

› phoenixcontact.com/videos-scb

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