Photovoltaics

Solutions for Photovoltaic Utility Scale Systems

Operate large-scale PV systems more efficiently

Weidmüller

Solutions for your PV value chain

Weidmüller is a solution provider for connectivity cabinets and communication infrastructure

Tested & proven
Our PV boxes are designed and tested to withstand extreme climate fluctuations. See for yourself in our video straight from our lab.

Our offering

Connection & Combination
Connection & Combination of PV strings from field or array

Protection
Protection against surges and touching

Monitoring
Monitoring of string perfomance and component status

Your benefits at a glance

Standard models available in stock
Standard soltions with only 4 weeks of delivery time

5 years warranty
We increase the warranty period due to the high quality of our combiner boxes

Spare parts on stock
Easy supply for O&M companies

Easy commisioning & maintenance
Products designed to reduce installation time and cost as well as future maintenance

Logistic savings
Global production locations allow cost- and time-optimised production and supply

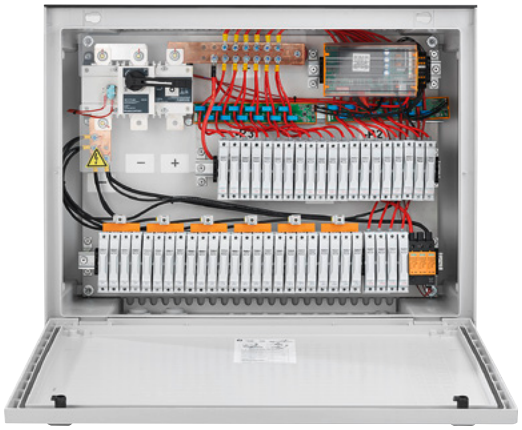
Online selection tool
Online tool to choose the best model for each application

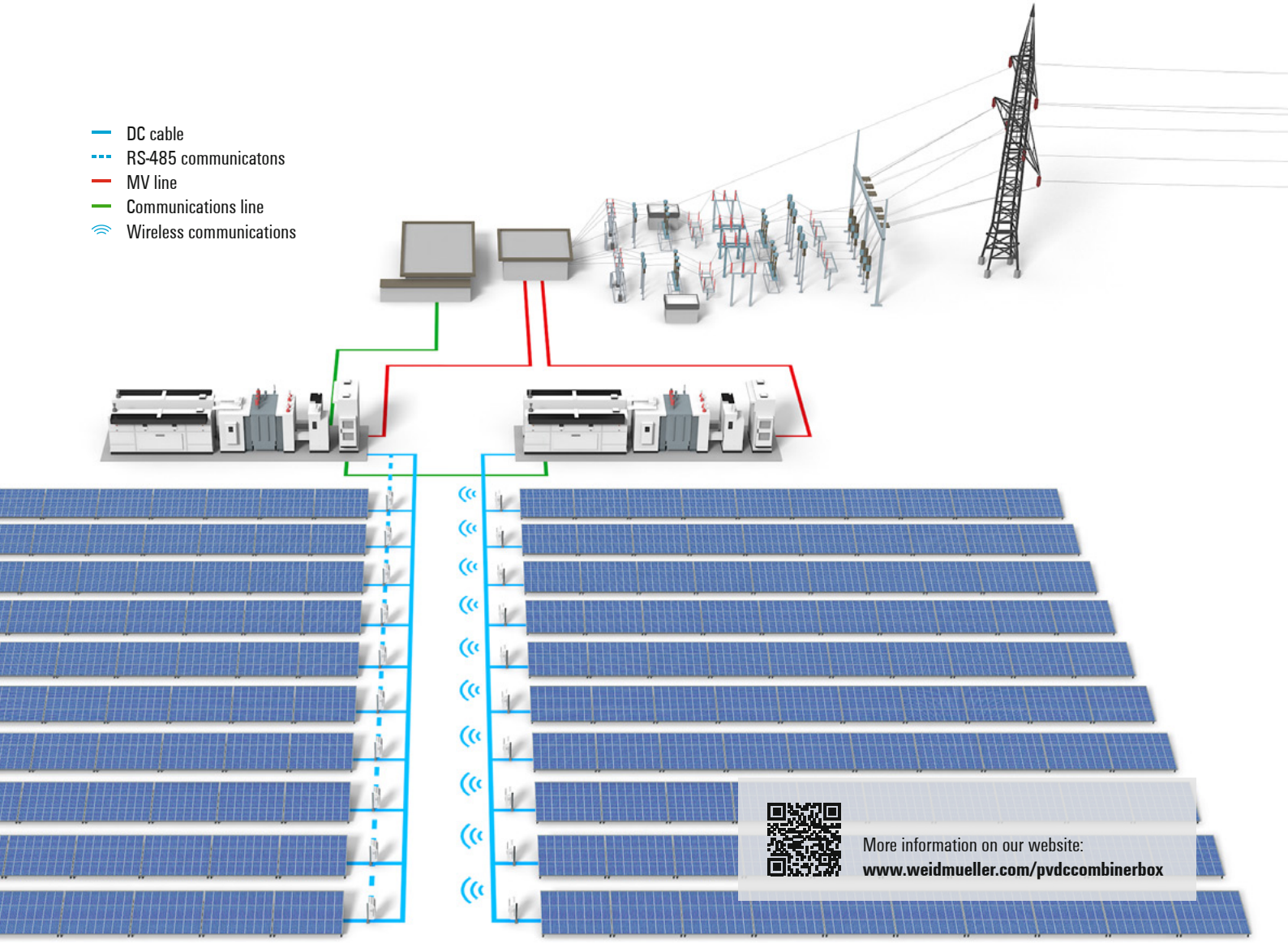
1.1 PV DC Combiner Boxes
Central Inverter Concept

Bundle, protect and combine PV strings efficiently

Our DC combiner boxes offer users the possibility to integrate short-circuit and overvoltage protection, as well string monitoring solutions (I,V, T and SPD and switch isolator status), for PV systems using central inverters with PV panels in trackers and fix tilt systems.

Weidmüller offers a trackrecord of DC combiner boxes higher than 250.000 units sold in all climate regions of the planet for more than 15 years.The experience and expertise in the DC engineering is used to provide high-end solutions covering the CAPEX and OPEX needs of the customer. Models equipped with string monitoring provide additional performance with voltage, current and temperature mesurement as well as SPD health and DC switch status. This helps to improve PR of plants and optimises the ROI.





More information on our website:
www.weidmueller.com/pvdccombinerbox

Product highlights

- **Optimised design –** By using advanced simulation 3D softwares, the product variants have been designed and tested to operate at the maximum mechanical and thermal effiency in the most compact housing size.
- **All technical data available online with 1-click –** Weidmüller offers web tools to support on the selection of the best model for your application. Technical data and certifications are available in the Weidmüller online catalogue.
- **Cost-optimised variants –** With the new product line cost optimised models with special accessories were designed which cover the most common applications in PV power plants.
- **Longer lifetime –** DC engineering expertise implemented in designs to allow longer lifetime and higher performance under extreme climatic conditions.
- **Better LCOE and ROI –** Product trackrecord, bankability and reputation of our solutions simplify product due diligences, insurance contracts and even to increase value of the asset in case it is sold in the future.

Technical data: PV DC Combiner Boxes

Main application features	
Inputs	from 8 to 32
Outputs	1-2
Operating ambient temperature	-20°C up to 50°C
DC earthing system	Floating, negative grounded or positive grounded
Installation location	Protected outdoors
Altitude above the sea level	up to 2000m (standard) higher altitude on demand
Main electrical features	
Rated DC voltage	from 1000 V DC up to 1500 V DC
Rated DC current per input	up to 48 Amps
Maximum fuse size	up 32 Amps for 10x85 mm up 75 Amps for 22x58 mm
Portection against overcurrent	gPV fuses according to IEC 60269-6
Fuses	On both poles or on one pole
Switch disconnector	Yes
Switch disconnector rating	up to 500 A (other options on demand)
Enclosure	
Enclosure material	GFRP (Glass Fiber Reinforced Polyester)
Enclosure shape	Portrait or Landscape
Enclosure fixing system	Wall mounted, pedestal or piling fixation
Degree of protection	IP65
Form factor	Cabinet with hinged door
Polycarbonate protection plate	Yes (optional)
Surge protections	
Surge protection device	Type I+II or Type II
Auxiliary contacts	Yes (optional)
Surge protection on RS-485 ports	Yes (optional)
String monitoring	
String monitoring device	Yes (optional)
Main monitored parameters	Voltage, current, temperature, SPD status, switch isolator status and auxiliary alarms
Voltage measurement	from 200 V DC up to 1500 V DC
Current measurement	up to 50 A per string/input
Communication port	RS-485 or wireless (LoRAWAN)
Protocol	Modbus/RTU
Power supply for string monitoring device	DC/DC converter (self powered string monitoring)
Others	
Input connectors	WM4 C PV connectors or cable glands (other options on demand)
Standards	
Standards	IEC 61439-1/2 ED3 / EN614391/2:2021

1.2 PV Floating DC Combiner Boxes
Floating Solar Installations

Collect, protect and monitor DC strings in extreme environments

The lack of land requires the development of new locations for PV systems. In this case, water surfaces are particularly suitable because of the low shading and the cooling effect of the water. However, the ambient conditions place high demands on the generator connection boxes.

Our PV DC Floating Combiner Boxes are designed for use in floating PV systems on freshwater surfaces and equipped with central inverters. They comply with IEC-61439 (ed. 3) and withstand high humidity, corrosive atmosphere and exposure to sunlight. We offer a wide range of plug & play variants from 8 to 24 inputs – with comprehensive protection and suitable covering solutions.and DC switch status. This helps to improve PR of plants and optimises the ROI.

Product highlights

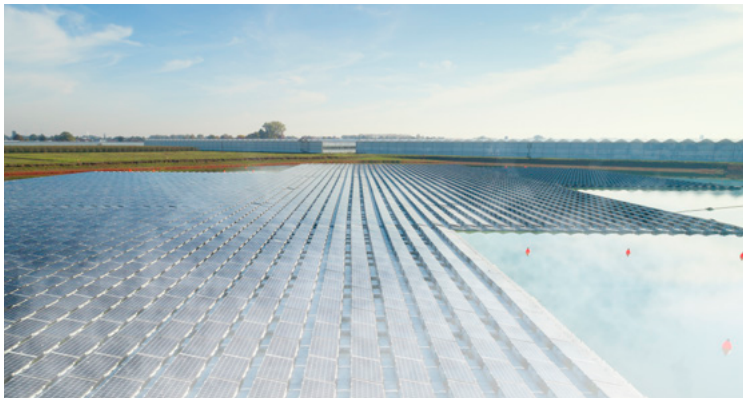
- **Absorbing aluminum alloy sunshade –** The specially developed aluminum 5457 (with magnesium) sunshade absorbs incident solar radiation and heat. Its surface finishing increases the reflection index and efficiently deflects the incident radiation. This reduces the temperature inside the combiner box very effectively.
- **Reliable sealing function –** The aluminum cover is fixed to the enclosure door with stainless steel blind rivets. The rivets are located outside the area of the door seal, so that the sealing function according to IP65 is reliably guaranteed at all times.
- **Ensured ventilation –** An air gap between the door housing and the aluminum alloy cover ensures constant air convection. In this way, the combiner box and its components are reliably cooled.
- **Optimum watertightness –** Multivia cable glands ensure optimum watertightness. They reduce the number of mechanical parts and make the entire construction more robust.

More information on our website:
www.weidmueller.com/pvfloating

Ensured quality
Watch our video and see how our PV Floating DC Combiner Boxes are manufactured.

Easy connection - low maintenance

Due to the pre-assembled Aluminium cover, our combiner boxes do not require any additional preparation work during installation. The innovative PV connection makes the entire solution plug-and-play.Our combiner boxes are made of GFRP and therefore do not need to be repainted regularly. A decisive advantage over metal housings.



Suitable for high humidity
PV-DC floating combiner boxes are specially designed for Severity Class B environments according to IEC 61439 (ed. 3). Therefore, they are suitable for operation in extremely humid and corrosive environments.

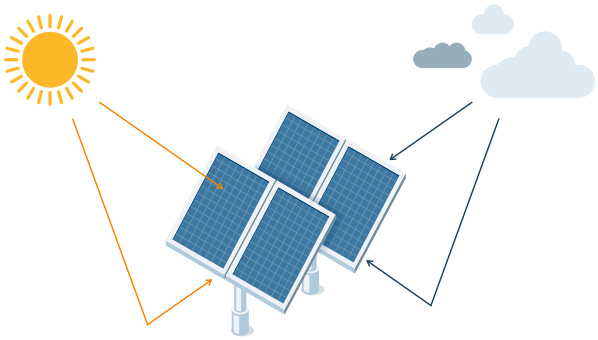
Suitable for direct sunlight
PV-DC floating combiner boxes can be operated in direct sunlight without the need to install an additional sunshield. The pre-mounted aluminum cover improves the performance of the system.

Suitable for PV systems in freshwater
The PV DC Floating Combiner Boxes can be operated in floating PV systems on freshwater surfaces. They have been extensively tested and are certified for long-term operation under these specific environmental conditions.

1.3 PV DC Combiner Boxes for High Power Panels
Central Inverter Concept & High voltages

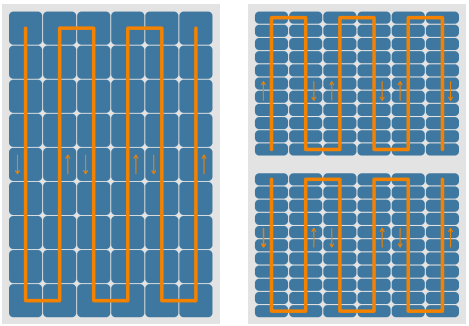
Compact and durable solutions for bifacial half-cell modules

Bifacial solar panels have solar cells on both the front and the back of the panel. This allows the solar energy to be collected on the back of the panel and increases the energy yield of the solar energy system. Our four new PV-DC combination boxes for bifacial half-cell modules allow a higher current consumption due to the fuse holders used.



Space optimized and higher reliability

Increasing the power of PV panels (mono and bifacial) with half-cut cells leads to a rise of current in the strings. The need for higher rated fuses is then mandatory and requires a new approach to system design. Our new designs of PV DC high current combiner boxes offer easy adaptation and time saving for new developments.



Product highlights

- **Standard options in stock ready to order –** A wide range of solutions, available for immediate order from stock to fit into the installation concepts with all common PV module brands. Variants: With 6 and 8 inputs, with fuse protection in (+/-) poles and with gPV fuses from of 22x58 mm format and a rated current per fuse between 30 Amps up to 75 Amps.
- **Overvoltage protections –** With several configurations, Weidmüller offers the VPU surge protection series for 1500 V DC systems with up to 11 kA Isc and Type I+II or Type II variants.
- **Optimised design –** Through the use of advanced 3D simulation software, the product variants have been designed and tested to operate with maximum mechanical and thermal efficiency in the most compact enclosure possible.
- **Special Fuse protection –** Weidmüller fuses (WSFL) and fuse holders (WSFH) have been specially developed for this new architecture. Rated currents of 35 to 75 Amps per input enable the connection of single and double strings.

Ordering data for DC Combiner Boxes

PV DC Combiner Boxes

Type	Inputs	Fuse protection	Rated voltage	Max Isc per input	String monitoring	Type of enclosure	Enclosure size	Qty.	Order No.
PV 216S0F4CXXV000TXPX15LWW	16	One Pole	1500Vdc	16A	No	Landscape	536 x 747 x 300 mm	1	**8000078885**
PV 216S0F3CXXV000TAPX15LWW	16	Both Poles	1500Vdc	14A	Integrated Monitoring System	Landscape	636 x 847 x 300 mm	1	**8000093503**
PV 216S0F3CXXV000TXPX15PWW	16	Both Poles	1500Vdc	14A	No	Portrait	747 x 536 x 300 mm	1	**8000078118**
PV 216S0F3CXXV000TXPX15LJP	16	Both Poles	1500Vdc	14A	No	Landscape	636 x 847 x 300 mm	1	**8000097600**
PV 220S0F4CXXV000TXPX15PWW	20	One Pole	1500Vdc	14A	No	Portrait	747 x 536 x 300 mm	1	**8000078883**
PV 220S0F4CXXV000TAPX15PWW	20	One Pole	1500Vdc	18A	Integrated Monitoring System	Portrait	847 x 635 x 300 mm	1	**8000093501**
PV 220S0F3CXXV000TXPX15LJP	20	Both Poles	1500Vdc	14A	No	Landscape	636 x 847 x 300 mm	1	**8000097601**
PV 220S0F0C25V000TA1PA15LIT	20	Both Poles	1500Vdc	14A	Integrated Monitoring System	Landscape	636 x 847 x 300 mm	1	**8000105513**
PV 224S0F3CXXV000TXPX15LWW	24	Both Poles	1500Vdc	14A	No	Landscape	636 x 847 x 300 mm	1	**8000078884**
PV 224S0F3CXXV000TXPX15PWW	24	Both Poles	1500Vdc	14A	No	Portrait	847 x 636 x 300 mm	1	**8000078882**
PV 224S0F3CXXV000TAPX15PWW	24	Both Poles	1500Vdc	13A	Integrated Monitoring System	Portrait	847 x 636 x 300 mm	1	**8000093500**
PV 224S0F3CXXV000TAPX15LWW	24	Both Poles	1500Vdc	14A	Integrated Monitoring System	Landscape	636 x 847 x 300 mm	1	**8000093502**
PV 224S0F4CXXV000TXPX15PWW	24	One Pole	1500Vdc	14A	No	Portrait	847 x 636 x 300 mm	1	**8000068263**
PV 232S0F4CXXV003TXPX15PWW	32	One Pole	1500Vdc	10A	No	Portrait	847 x 636 x 300 mm	1	**8000060710**

PV Floating DC Combiner Boxes

Type	Inputs	Fuse protection	Rated voltage	String monitoring	Type of enclosure	Enclosure size	Qty.	Order No.
PV 216S0F3CXXV003T7P015PFJP	16	Both Poles	1500Vdc	Integrated Monitoring System	Portrait	847 x 636 x 300 mm	1	**8000057079**
PV 216S0F3CXXV003TXPX15PFJP	16	Both Poles	1500Vdc	No	Portrait	847 x 636 x 300 mm	1	**8000057080**
PV 218S0F0C15V003TXPX15PFWW	18	Both Poles	1500Vdc	No	Portrait	847 x 636 x 300 mm	1	**8000057083**
PV 220S0F3CXXV003TXPX15PFJP	20	Both Poles	1500Vdc	No	Portrait	847 x 636 x 300 mm	1	**8000057081**
PV 224S0F1C15V003TXPX15PFWW	24	One Pole	1500Vdc	No	Portrait	847 x 636 x 300 mm	1	**8000057088**
PV 224S0F1C15V003T7P015PFWW	24	One Pole	1500Vdc	Integrated Monitoring System	Portrait	847 x 636 x 300 mm	1	**8000057085**
PV 224S0F3CXXV003TXPX15PFJP	24	Both Poles	1500Vdc	No	Portrait	847 x 636 x 300 mm	1	**8000057077**

PV DC Combiner Boxes for High Power Panels

Type	Inputs	Rated voltage	Max Isc per input	String monitoring	Enclosure size	Qty.	Order No.
DC Combiner Box	6	1500Vdc	22A	No	636 x 847 x 300 mm	1	**8000081269**
DC Combiner Box	8	1500Vdc	21A	No	747 x 536 x 300 mm	1	**8000081271**
DC Combiner Box	8	1500Vdc	32A	No	636 x 847 x 300 mm	1	**8000081272**
DC Combiner Box	6	1500Vdc	25A	Integrated Monitoring System	636 x 847 x 300 mm	1	**8000101211**
DC Combiner Box	8	1500Vdc	25A	Integrated Monitoring System	636 x 847 x 300 mm	1	**8000101212**
DC Combiner Box	10	1500Vdc	25A	Integrated Monitoring System	636 x 847 x 300 mm	1	**8000101213**
DC Combiner Box	12	1500Vdc	25A	Integrated Monitoring System	1056 x 852 x 350 mm	1	**8000101214**
DC Combiner Box	10	1500Vdc	48A	Integrated Monitoring System	1056 x 852 x 350 mm	1	**8000101215**

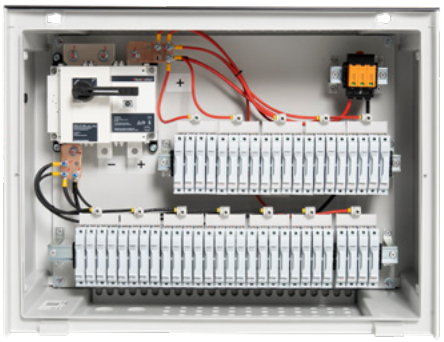
PV DC Combiner Boxes Enclosure Accessories

Type	Type of Accessory	Enclosure Brand	Material	Type of enclosure	Enclosure size	Qty.	Order No.
PK FIXATION KIT NSYPLM108	Mounting kit for 2 poles	Schneider Electric	Steel-235 HDG	Portrait	1056 x 852 x 350 mm	1	**8000045007**
PK FIXATION KIT NSYPLM75	Mounting kit for 1 or 2 poles	Schneider Electric	Steel-235 HDG	Portrait	747 x 536 x 300 mm	1	**8000045005**
PK FIXATION KIT NSYPLM86	Mounting kit for 1 or 2 poles	Schneider Electric	Steel-235 HDG	Portrait	847 x 636 x 300 mm	1	**8000045006**
PK FIXATION KIT ARIA75	Mounting kit for 1 or 2 poles	ABB	Steel-235 HDG	Portrait	747 x 536 x 300 mm	1	**8000045008**
PK FIXATION KIT ARIA86	Mounting kit for 1 or 2 poles	ABB	Steel-235 HDG	Portrait	847 x 636 x 300 mm	1	**8000045011**
PK FIXATION KIT ARIA108	Mounting kit for 2 poles	ABB	Steel-235 HDG	Portrait	1056 x 852 x 350 mm	1	**8000045013**
SUNLIGHT COVER ARIA86 ALU	Cover for floating PV DC CB	ABB	AL-5754	Portrait	847 x 636 x 300 mm	1	**4000004177**
SUNLIGHT COVER SCH86 ALU	Cover for floating PV DC CB	Schneider Electric	AL-5754	Portrait	847 x 636 x 300 mm	1	**4000004848**
SUNLIGHT COVER SCH108 ALU	Cover for floating PV DC CB	Schneider Electric / ABB	AL-5754	Portrait	1056 x 852 x 350 mm	1	**4000004854**
METAL SUNCANOPY GALVANIZED ABB/SCH75	Canopy for ground-mounted PV DC CB	Schneider Electric / ABB	Steel-275 HDG	Portrait	747 x 536 x3 00 mm	1	**4000004772**
METAL SUNCANOPY GALVANIZED ABB/SCH86 V2	Canopy for ground-mounted PV DC CB	Schneider Electric / ABB	Steel-275 HDG	Portrait	847 x 636 x 300 mm	1	**4000004024**
METAL SUNCANOPY GALVANIZED ABB/SCH108 (**)	Canopy for ground-mounted PV DC CB	Schneider Electric / ABB	Steel-275 HDG	Portrait	1056 x 852 x 350 mm	1	**4000004771**

1.4 PV DC Combiner Boxes variants for 1 MPPT inverters
String Inverter Concepts with 1 MPPT

Efficient and optimized solution for 1 MPPT string inverters

1 MPPT solar string inverters are being rapidly adopted as an efficient solution for large rooftop or utility scale project. Under constant and even sunlight conditions 1 MPPT string inverters perform as efficiently as multi MPPT inverters. PV DC Combiner boxes for 1 MPPT inverters provide a compact solution to combine, protect and monitor all strings providing power to inverter DC side.



Reduced number of MPPT's

Under the competitive landscape of the PV Solar industry new string inverter solutions have appeared. Single MPPT's string inverters provide a robust and reliable solution with reduced electronic components and complexity needed for multiple MPPT inverters. Our new PV DC Combiner boxes, allow different inverter manufacturers to introduce a complete solution with an optimized design with Weidmueller's quality standards.

Inverter Brands

KACO new energy. Fronius Ingeteam SMA SUNGROW

Product highlights

- **Standard options in stock ready to order –** A wide range of solutions, available for immediate order from stock to fit into the installation concepts with 1 MPPT string inverter. Variants: With from 7 to 20 inputs, with fuse
- **Solutions for 1000Vdc and 1500Vdc**
- **Overvoltage protection –** With several configurations, Weidmüller offers the VPU surge protection series for 1500 V DC systems with up to 11 kA Isc and Type I+II or Type II variants.
- **Optimized design –** Through the use of advanced 3D simulation software, the product variants have been designed and tested to operate with maximum mechanical and thermal efficiency in the most compact enclosure possible.
- **Special Fuse protection –** Weidmüller fuses (WSFL) and fuse holders (WSFH) have been specially developed for this new architecture.

Ordering data for DC Combiner Boxes variants for 1 MPPT inverters

PV DC Combiner Boxes for Kaco/Sungrow/Ingeteam (1500Vdc)

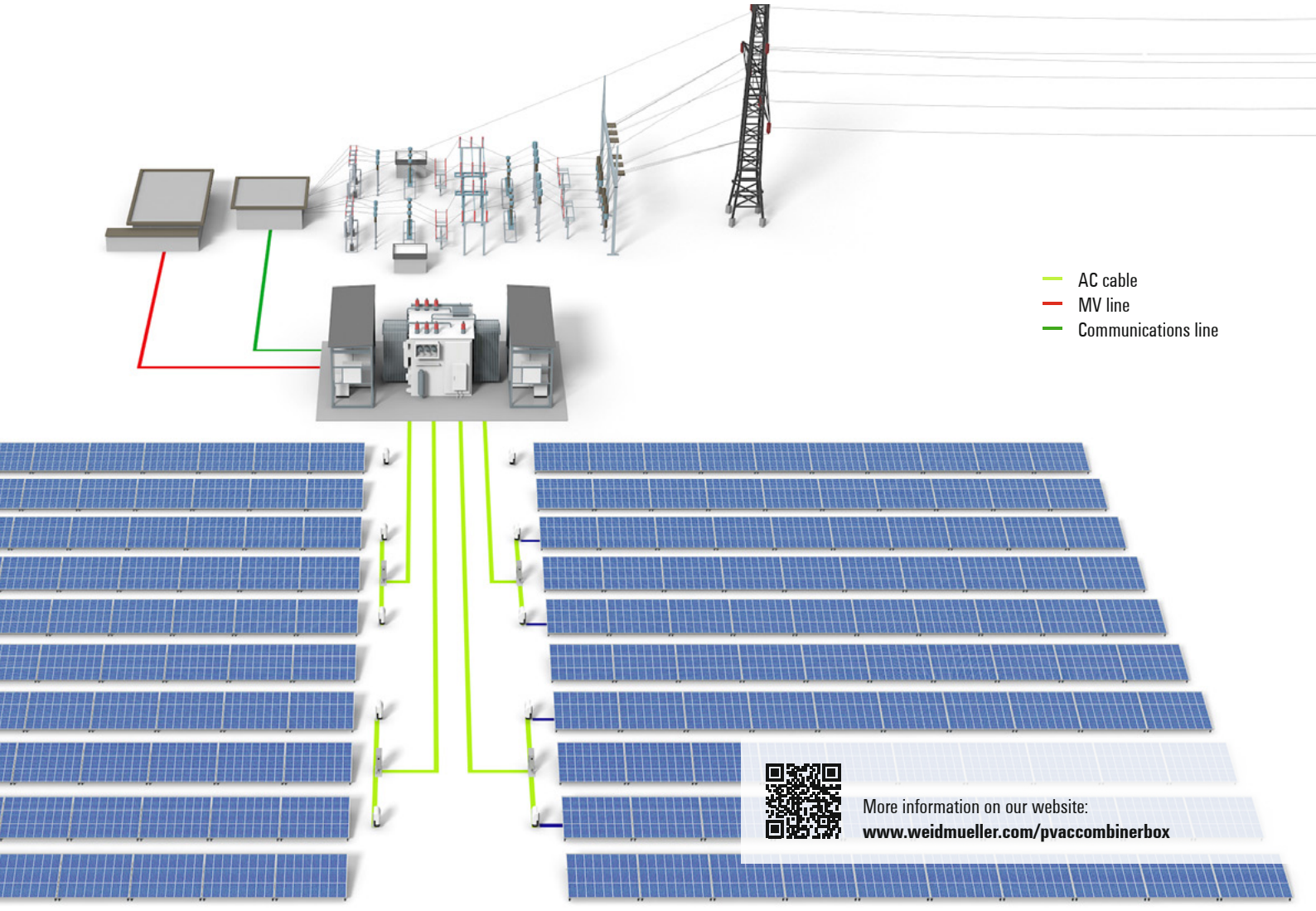
Type	Inputs	Fuse Protection	Max Fuse Rate	Isc	Fuse included	String monitoring	Type of enclosure	Enclosure size	Max oper. temp	Qty.	Order No.
PV 212S0F3CXXV100TXPX15LWW	12	Both Poles	30A	19A	No	No	Landscape	636 x 847 x 300 mm	45°C	1	**8000096019**
PV 212S0F3CXXV100T9P015LWW	12	Both Poles	30A	19A	No	Yes	Landscape	636 x 847 x 300 mm	45°C	1	**8000096020**
PV 215S0F3CXXV100TXPX15LWW	15	Both Poles	30A	19A	No	No	Landscape	636 x 847 x 300 mm	45°C	1	**8000096023**
PV 215S0F3CXXV100T9P015LWW	15	Both Poles	30A	19A	No	Yes	Landscape	636 x 847 x 300 mm	45°C	1	**8000096024**
PV 216S0F3CXXV100TXPX15LWW	16	Both Poles	25A	14A	No	No	Landscape	636 x 847 x 300 mm	45°C	1	**8000096025**
PV 216S0F3CXXV100T9P015LWW	16	Both Poles	25A	14A	No	Yes	Landscape	636 x 847 x 300 mm	45°C	1	**8000096026**
PV 220S0F3CXXV100TXPX15LWW	20	Both Poles	25A	14A	No	No	Landscape	636 x 847 x 300 mm	45°C	1	**8000096027**
PV 220S0F3CXXV100T9P015LWW	20	Both Poles	25A	14A	No	Yes	Landscape	636 x 847 x 300 mm	45°C	1	**8000096028**

1.5 PV AC Combiner Boxes
String Inverter Concept

Bundle and protect PV string inverters in utility-scale systems reliably and economically

For solar installations in the PV industry, reliability and availability are paramount. In systems with string inverters, our AC combiner boxes provide optimal short-circuit and overvoltage protection. Furthermore, each string inverter can be easily isolated from the system to do maintenance tasks.

The new PV AC Combiner boxes have been designed for PV systems with string inverters in trackers or fix tilt systems.The product portfolio is suitable for inverters from 60 kW up to 200 kW and support voltages of 400 V, 690 V or 800 V AC. The combiner boxes allow to collect from 2 up to 6 string inverters in one single cabinet. They withstand ambient temperatures from -20 up to +50°C to operate in hardest climate conditions, fulfilling the highest market standards as per IEC 61439-2 ed 3.0:2020.



More information on our website:
www.weidmueller.com/pvaccombinerbox

Product highlights

- **Optimised design –** By using advanced simulation 3D softwares, the product variants have been designed and tested to operate at the maximum mechanical and thermal effiency in the most compact housing size.
- **Technical data available online with 1-click –** We offer web tools to support the selection of the best model for the application. Technical data and certifications are available in the Weidmüller online catalogue.
- **Very resistant to short-circuits –** Designed to operate in solar power plants with high requirements of short cuircuit current.

Technical data: PV AC Combiner Boxes

Application data	
Installation location	Protected outdoors
Altitude above the sea level	up to 2000m (standard) higher altitude on demand
Operating ambient temperature	-20°C up to 50°C
Electrical characteristics	
Rated voltage	400V AC - 690 V AC - 800 V AC
Number of inputs (inverters)	from 2 up to 6
Rated current per Input (Inc)	85A up to 200A
Rated frequency (Hz)	50Hz
Short circuit strenght	120kA
Fuse link factir form	NH-00 / NH-01
Fuse link rating	85A up to 250A
Number of outputs	1
Protection class	Class II
Overvoltage protection	Type II or Type I+II
Earthing system	TN-S / TN-C
Enclosure	
Enclosure material	Glass Fiber Reinforced Polyester
Enclosure IP rating	IP65
Enclosure fixing system	Wall mounted or pedestal
Form factor	Cabinet with hinged door
Polycarbonate protection cover	Yes
Inputs	
Input cable	4x70mm^2 or 4x95mm^2
Input cable gland	M50
Outputs	
Output cable	1 x 240mm^2
Output cable gland	M40
Others	
Main switch disconnector	Yes (optional)
Standards	
Compliant standards	IEC 61439-2 ED 3

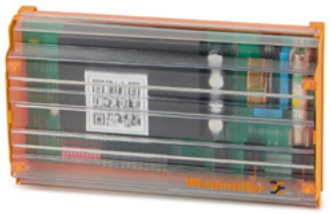
Ordering data: PV AC Combiner Boxes

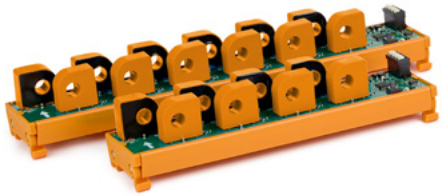
Type	Inputs	Outputs	Rated voltage	Fuse-link rated current	Monitoring	Type of enclosure	Enclosure size	Qty.	Order No.
PV 40601S2V1C0A1ES	6	1	400 Vac	100A	No	Landscape	850 x 1000 x 350 mm	1	**8000069105**
PV 40301S2V1C2A1ES	3	1	400 Vac	160A	No	Portrait	1000 x 800 x 300 mm	1	**8000069106**
PV 40401S2V1C1A1ES	4	1	400 Vac	125A	No	Portrait	1000 x 800 x 300 mm	1	**8000069107**
PV 40401S2V3C0A0ES	4	1	690 Vac	100A	No	Portrait	800 x 600 x 300 mm	1	**8000069108**
PV 40201S2V3C1A0ES	2	1	690 Vac	125A	No	Portrait	800 x 600 x 300 mm	1	**8000069109**
PV 40201S2V4C0A0ES	2	1	800 Vac	100A	No	Portrait	800 x 600 x 300 mm	1	**8000069110**
PV 40201S2V4C2A0ES	2	1	800 Vac	160A	No	Portrait	800 x 600 x 300 mm	1	**8000069111**

2.1 PV String Monitoring System
Monitoring solutions

Modular PV string monitoring system for up to 32 strings

In ground-mounted photovoltaic systems, the electrical parameters of the PV strings must be constantly monitored. This is the only way owners and operators can maintain the performance and yield of their systems in the long term. The new PV String Monitoring System is integrated into the DC combiner boxes of plants with central inverters. It is designed to monitor the current and voltage of the individual strings as well as the current SPD and breaker status in the combiner box. Due to its modular design, the system can monitor up to 32 strings and measure up to 50 A per string. It is powered by plant current, can communicate wirelessly, and has low heat emission.





Compact and powerful
It can monitor up to 32 strings and measure up to 50 A per string.

Wireless communication capability
The system can transmit data either via RS-485 cable or wirelessly to the SCADA system.

Modular design
It allows monitoring of up to 3-string inputs as well as high-power and bifacial solar panels.

Product highlights

- PV String Monitoring System (SMS) allows to control & monitor major string paremeter which enhances solar production of a solar plant
- Monitoring of major combiner box variables (string curent & voltage, switch & SPD status, temperature,...)
- Monitor up to 32 strings (single double or triple)
- String current monitoring up to 50 A for new high power and bifacil solar panels
- Voltage string monitoring up to 1500 V (also suitable for 1000 V PV solar systems)
- Hall effect sensor monitoring with low power/heat dissipation which ensures the long term perfomance of the PV DC Combiner Box components
- 99% measurment accuracy for all variable monitored
- RS-485 communication (wireless LoRaWAN® optional for entire PV DC combiner boxes solutions offers only)

Technical data: PV String Monitoring System

Application data	
Installation location	Protected outdoors
Altitude above the sea level	up to 2000m (standard) higher altitude on demand
Operating ambient temperature	-20°C up to 70°C
Electrical characteristics	
Operating voltage	1000V DC to 1500V DC
Voltage supply	from 200V up to 1500V
Number of inputs	from 8 up to 32
Available modules	8 channels and 12 channels
Current measurement range	from 0A up to 50A
Measurement accuracy	1%
Power supply	integrated DC/DC converter
Measurement technology	Hall effect sensors
Number of digital inputs	2
Communications	
Communication technology	RS-485 or wireless (LoRaWAN®)
Communication protocol	Modbus RTU / LoRaWAN®
Surge protection communication port	Yes
Overcurrent protection	Yes
BaudRate	19200 bps (default)
Modbus timeout	1 second
Measurement variables	Voltage, current, temperature, SPD status, switch isolator status and auxiliary alarms
Standards	
Standards	EN 61326-1:2013 EN 62311:2020 EN 62109-1:2010

Ordering data: PV String Monitoring System

Type	Type of unit	Operating voltage	Communication type	Number of monitored channels	Max current/ channel	Measurement technology	Number of digital inputs	Qty.	Order No.
SOLAR SMS MASTER	Master - main board	<1500 V DC	RS-485 / Modbus RTU	Controls up to 32 channels	-	N/A	2	1	**4000002958**
SOLAR SMS SLAVE 8IN25A	Slave - current sensor board	-	RS-485 / Modbus RTU	8 inputs	25A	Hall effect	-	1	**4000002959**
SOLAR SMS SLAVE 12IN25A	Slave - current sensor board	-	RS-485 / Modbus RTU	12 inputs	25A	Hall effect	-	1	**4000002961**
SOLAR SMS SLAVE 8IN50A	Slave - current sensor board	-	RS-485 / Modbus RTU	8 inputs	50A	Hall effect	-	1	**4000003982**
SOLAR SMS SLAVE 12IN50A	Slave - current sensor board	-	RS-485 / Modbus RTU	12 inputs	50A	Hall effect	-	1	**4000003983**

2.2 PV Communication Boxes
Plant Communication

Connecting photovoltaic power plants through reliable and safe industrial communications

We combine extensive experience with photovoltaic projects and industrial communication to create a complete portfolio of PV communication cabinets for PV power plants.

Our portfolio offers certified and ready-to-use cabinets for PV power plants that meet the specific environmental, electrical and data transmission requirements according to customer specifications. Weidmüller can customise the communication infrastructure requirements of the PV power plant, enabling perfect data collection for the plant owner, ultimately improving the long-term investment.

Product highlights

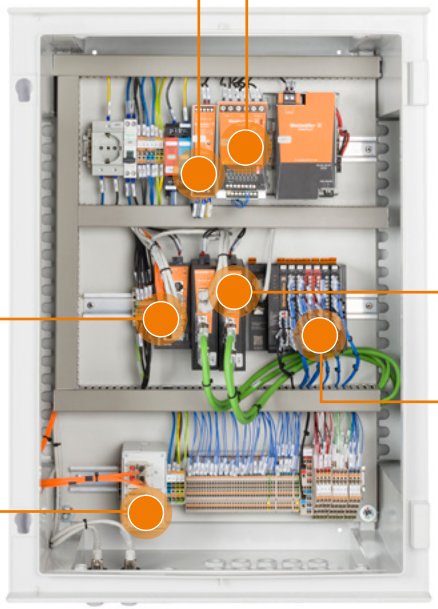
- Safe function due to optimal protection
- Maximum availability due to integrated energy backup
- Highly reliable industry standard with built-in communication protocols
- High cost-effectiveness through modular designs based on standard references
- TCP/RS cards for RS485 field buses
- IP certification for outdoor or indoor use

Power supply
24 VDC @ 3 ADC

Battery & UPS
Battery 24 VDC @ 3.4 Ah
UPS 24 VDC @ 20A/10A

RJ-45 Switch & Fibre-optic Converter
IE managed switch 6x RJ-45 ports
2x SC Multi-mode ports

2 x Serial / Ethernet converter
Serial / Ethernet converter
2x RJ45
2x DB9 for RS-485



Fibre-optic patch panel box
6x SC Multi-mode fibre-optic ports

U-Control with multiple I/O
U-Control controller
16x Digital inputs
4x Analogue inputs
8 GB data storage

Other designs on request
Simply contact us and describe the application and the requirements for the PV Communication Box. We will then provide you with a custom-fit design and quote:
www.weidmueller.com/pvcommunicationbox

2.3 PV Weather Boxes
Plant Communication

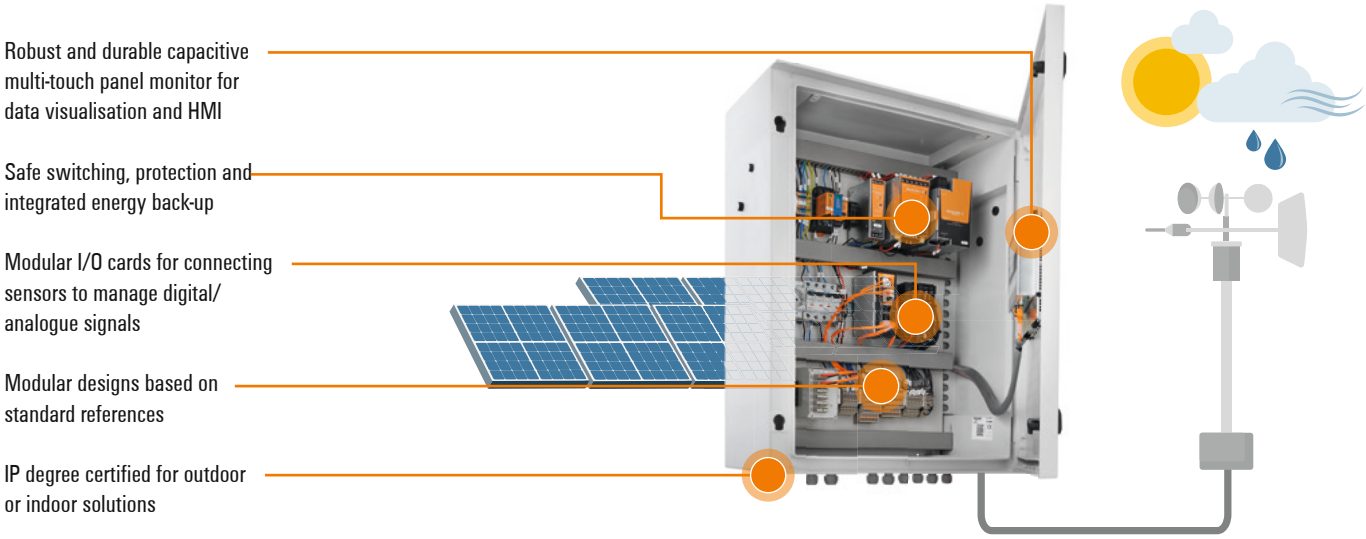
Increase your energy production, monitor your system output

PV systems should deliver optimum performance. In order to use as many plant resources as possible for energy generation, regular monitoring of weather parameters is crucial.

Our PV Weather Boxes provide reliable information on all important weather parameters. Values such as temperature, irradiance, wind speed and direction, precipitation, relative humidity, and much more can be permanently recorded. The certified housings are equipped with regard to customer-specific requirements such as environmental conditions, electrics, and data transmission. They are ready for immediate use, extremely robust, and protected against all weather influences.

Product highlights

- Reliable function due to optimal protection
- Maximum availability due to integrated power backup
- High cost-effectiveness through modular designs based on standard references
- IP certification for outdoor or indoor use
- Connection of the required weather sensors (not included in the scope of delivery) via modular I/O cards



Suitable for the most well-know brands of weather sensors
The Weidmüller PV Weather Boxes are suitable for all well known weather sensors on the market e.g.use, extremely robust, and protected against all weather influences.

Hukseflux Thermal Sensors · KIPP & ZONEN · EKO · EVEN SENSOR SOLUTIONS

Ordering data: PV Weather Boxes

Type	Type of control device	Type of IE device	UPS control unit	Type of SPD	Qty.	Order No.
PV WUCI05T1U2D1A1WXRXWW	- UC20-WL2000-IOT - 10.1" capacitive multitouch-panel	- IE network managed switch 6x RJ45 2x SC multi-mode - Remote I/O 16-CH digital input - Remote I/O 4-CH analog input signals - Remote I/O communication 1-CH RS-485	- CP DC UPS 24V 20A/10A - DURA ECO LA-BAT 24V 3.4AH	AC SPD	1	**8000094420**
PV WUCI05TXU2D1A1WXRXWW	- UC20-WL2000-IOT	- IE network managed switch 6x RJ45 2x SC multi-mode - Remote I/O 16-CH digital input - Remote I/O 4-CH analog input signals - Remote I/O communication 1-CH RS-485	- CP DC UPS 24V 20A/10A - DURA ECO LA-BAT 24V 3.4AH	AC SPD	1	**8000094711**

3.0 PV Components for an effective running system
Plant Equipment

PV Connectors

PV-Stick with PUSH IN connection

No crimping tool, no lost time, no extra effort - the unique PV-Stick uses tried-and-tested PUSH IN technology. The fastest, easiest and safest way to wire up photovoltaic plants - literally in no time.

WM4 C with crimp connection

Outstanding quality and ease of handling due to modern crimp connection.
The WM4 C is suitable for automated assembly as well as for manual installation in the field.

PV Stick - Photovoltaic connector

Type	Rated voltage (IEC) Rated current	Connection cross-section min. / max.	Continuous operating temperature min. / max.	Qty.	Order No.
Female socket					
PV-STICK+ VPE10	1500 V DC / 30 A	4 / 6 mm²	-40°C...+ 85°C	10	**1303450000**
PV-STICK+ VPE50	1500 V DC / 30 A	4 / 6 mm²	-40°C...+ 85°C	50	**1303460000**
PV-STICK+ VPE200	1500 V DC / 30 A	4 / 6 mm²	-40°C...+ 85°C	200	**1303470000**
Pin					
PV-STICK- VPE10	1500 V DC / 30 A	4 / 6 mm²	-40°C...+ 85°C	10	**1303490000**
PV-STICK- VPE50	1500 V DC / 30 A	4 / 6 mm²	-40°C...+ 85°C	50	**1303500000**
PV-STICK- VPE200	1500 V DC / 30 A	4 / 6 mm²	-40°C...+ 85°C	200	**1303510000**
PV-Stick set					
PV-STICK SET	1500 V DC / 30 A	4 / 6 mm²	-40°C...+ 85°C	1	**1422030000**

WM 4 C - Box-connector

Type	Rated voltage / current	Conductor cross-section	Connection	Qty.	Order No.
Male housing					
SFGH BOX WM4 C BT	1100 V DC (IEC) / 35 A	4 / 6 mm²	M 12 housing cable gland	100	**1530640000**
Socket housing with M12 cable gland					
BUGH BOX WM4 C BT	1100 V DC (IEC) / 35 A	4 / 6 mm²	M 12 housing cable gland	100	**1530630000**
Accessories					
BUKO WM4 C BT	Female contact	4 and 6 mm² cables	Loose goods for crimping tools	100	**1530670000**
BUKO WM4 C RL	Female contact	4 and 6 mm² cables	Reel packaged goods for automated crimping	1500	**1530770000**
SFKO WM4 C BT	Male contact	4 and 6 mm² cables	Loose goods for crimping tools	100	**1530680000**
SFKO WM4 C RL	Male contact	4 and 6 mm² cables	Reel packaged goods for automated crimping	1500	**1530780000**

PV Tools

Reliable photovoltaic installation tools

When installing a photovoltaic system, the installer is dependent on reliable and smooth-running tools. Weidmüller offers a range of professional tools for this purpose.

Stripping tools

Type	Cutting	Stripping	Qty.	Order No.
MULTI-STRIPAX PV	2.5, 4.0 and 6 mm²	2.5, 4.0 and 6 mm²	1	**1190490000**

Cutting tools

Type	Crimping	Description	Qty.	Order No.
CTF PV WM4	1.5 – 6 mm²	Crimping tool for Weidmüller photovoltaic connector WM4 and plugs with the same design	1	**1222870000**

Multitool

Type	Description	Qty.	Order No.
MULTITOOL PV SET	Combines the following applications: Fasten PV Stick, check cable diameter for PV Stick, mount smart lock for PV Stick, open cover of PV Next, replace SPD cartridge inside PV Next Boxes, operate PUSH IN connection, open electrical cabinet	1	**2771530000**

PV Fuses

gPV cylindrical fuse cartridges

The gPV cylindrical fuse cartridges are designed to provide compact, safe and economical protection of photovoltaic modules. They provide protection against both overload and short circuit.

gPV fuse cartridges silver-plated contacts for PV applications

Type	Voltage / Current	Switching capacity	Qty.	Order No.
Fuse 1500V GPV - 10x85				
FUSE WSFL 10X85 15A 1K5V GPV	1500 V DC / 15 A	50 kA	1	**4000002597**
FUSE WSFL 10X85 16A 1K5V GPV	1500 V DC / 16 A	50 kA	1	**4000002609**
FUSE WSFL 10X85 20A 1K5V GPV	1500 V DC / 20 A	50 kA	1	**4000002610**
FUSE WSFL 10X85 25A 1K5V GPV	1500 V DC / 25 A	50 kA	1	**4000002611**
FUSE WSFL 10X85 30A 1K5V GPV	1500 V DC / 30 A	50 kA	1	**4000005431**
FUSE WSFL 10X85 32A 1K5V GPV	1500 V DC / 32 A	50 kA	1	**4000002612**
Fuse 1500V GPV - 22x58				
FUSE WSFL 22X58 30A 1k5V GPV	1500 V DC / 30 A	30 kA	1	**2873880000**
FUSE WSFL 22X58 35A 1k5V GPV	1500 V DC / 35 A	30 kA	1	**2865970000**
FUSE WSFL 22X58 40A 1k5V GPV	1500 V DC / 40 A	30 kA	1	**4000003732**
FUSE WSFL 22X58 50A 1k5V GPV	1500 V DC / 50 A	30 kA	1	**4000003733**
FUSE WSFL 22X58 65A 1k5V GPV	1500 V DC / 65 A	30 kA	1	**4000003734**
FUSE WSFL 22X58 70A 1k5V GPV	1500 V DC / 70 A	30 kA	1	**2873890000**
FUSE WSFL 22X58 75A 1k5V GPV	1500 V DC / 75 A	30 kA	1	**2870900000**

Fuseholder

Type	Voltage / Current	Form factor	Qty.	Order No.
FUSEHOLDER WSFH 10X85 1K5V	1500 V DC / 32 A	10 x 85 mm	10	**4000002613**
FUSEHOLDER WSFH 22X58 1K5V	1500 V DC / 80 A	22 x 58 mm	6	**4000003740**

Lightning and Surge Protection

VARITECTOR PU PV for more safety

PV systems are directly exposed to environmental influences because they are always installed in exposed locations. Therefore the probability of lightning strikes and resulting overvoltage is high. The components of unprotected PV systems are again and again considerably damaged.

VPU I+II / VPU II - lighting and surge protection for PV systems

Type	Rated voltage / discharge current	Version	Network	Qty.	Order No.
Requirements class: Type I+II					
VPU PV I+II 3 1000	1000 V / 40 kA	without remote signalling contact	2 horizontal pitches	1	**2530610000**
VPU PV I+II 3 R 1000	1000 V / 40 kA	with remote signalling contact	2 horizontal pitches	1	**2530620000**
VPU PV I+II 3 1500	1500 V / 30 kA	without remote signalling contact	3 horizontal pitches	1	**2530580000**
VPU PV I+II 3 R 1500	1500 V / 30 kA	with remote signalling contact	3 horizontal pitches	1	**2530590000**
Requirements class: Type II					
VPU II 2 PV 600V DC	600 V / 40 kA	without remote signalling contact	2 horizontal pitches	1	**1351340000**
VPU II 2 R PV 600V DC	600 V / 40 kA	with remote signalling contact	2 horizontal pitches	1	**1351370000**
VPU PV II 3 1000	1100 V / 40 kA	without remote signalling contact	3 horizontal pitches	1	**2530550000**
VPU PV II 3 R 1000	1100 V / 40 kA	with remote signalling contact	3 horizontal pitches	1	**2530180000**
VPU PV II 3 1500	1500 V / 30 kA	without remote signalling contact	3 horizontal pitches	1	**2530640000**
VPU PV II 3 R 1500	1500 V / 30 kA	with remote signalling contact	3 horizontal pitches	1	**2530650000**

VPU AC I - lightning protection for PV systems

Type	Continuous current / lightning impulse current (I_{imp})	Version	Network	Qty.	Order No.
Type I arrester - 275 V AC / 25 kA - S-line					
VPU AC I 3+1 275/25 LCF S 2PE	275 V AC / 25 kA	without remote signalling contact, leakage current free	TN-C-S, TN-S, TT	1	**2726760000**
VPU AC I 3+1 R 275/25 LCF S 2PE	275 V AC / 25 kA	with remote signalling contact, leakage current free	TN-C-S, TN-S, TT	1	**2726770000**

VPU AC II - surge protection for PV systems

Type	Continuous current / discharge current (I_{max})	Version	Network	Qty.	Order No.
Type II arrester - 300 V AC / 50 kA					
VPU AC II 3+1 300/50	300 V AC / 50 kA	without remote signalling contact	TN-C-S, TN-S, TT	1	**2591080000**
VPU AC II 3+1 R 300/50	300 V AC / 50 kA	with remote signalling contact	TN-C-S, TN-S, TT	1	**2591090000**

4.0 Tested quality

Standard tests and services guaranteeing a long service life

Trust in approved quality

Our laboratory is accredited according to international standards. It operates independently and is recognised by institutions, registration services, and other institutions and authorities. As a member of the CTDP program, Weidmüller is regularly audited by UL, especially about test methods, quality management and documentation.

All combiner boxes are tested according to IEC-61439-ed-2 and are constructed on the basis of the test results as well as assembled for the specific application. This ensures that each of the requirements of the target application is fully met.

Your benefits at a glance

- 5 years warranty
- Laboratory testing
- Comissioning Services
- On-Site Inspection

Tested & proven
Our PV boxes are designed and tested to withstand extreme climate fluctuations. See for yourself in our video straight from our lab.

5.0 Proven competence
Reference projects around the globe

The best proof of the quality of our solutions is their worldwide use. More than 250,000 of our photovoltaic combiner boxes are installed in over 100 countries worldwide. They connect 120 million photovoltaic modules. Our reference project database provides an overview.

Floating dynamic solar park
Dynamic solar islands

- Location: Andijk, Netherlands
- Performance: 22 MWp
- Start-up: 2021
- Solution: 21 PV Floating DC Combiner Boxes

Suria Sungai Petani
PV Utility Park

- Location: Kuala Muda, Malaysia
- Performance: 116 MW
- Start-up: 2021
- Solution: 437 DC Combiner Boxes

Droogfontein
PV Utility Park

- Location: South Africa
- Performance: 80 MWp
- Start-up: 2019
- Solution: 450 Combiner Boxes

Sol do Sertão
PV Utility Park

- Location: Oliveira dos Brejinhos, Brazil
- Performance: 474 MWp
- Start-up: 2021
- Solution: 2,318 DC Combiner Boxes

Discover more reference projects on our website:
www.weidmueller.com/pv-references

Weidmüller – Your partner in Smart Industrial Connectivity

As experienced experts we support our customers and partners around the world with products, solutions and services in the industrial environment of power, signal and data. We are at home in their industries and markets and know the technological challenges of tomorrow. We are therefore continuously developing innovative, sustainable and useful solutions for their individual needs. Together we set standards in Industrial Connectivity.

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