Photovoltaics

Solutions for Photovoltaic Utility Scale Systems

Operate large-scale PV systems more efficiently

Weidmüller

Solutions for Your PV Value Chain

Weidmuller is a solutions provider for connectivity cabinets and communication infrastructure

Tested & proven
Our PV boxes are designed and tested to withstand extreme climate fluctuations. Visit the link in the QR code to see for yourself.

Our offering

Connection & combination
Connection and combination of PV strings from field or array

Protection
Protection against surges and touching

Monitoring
Monitoring of string performance and component status

Your benefits at a glance

Standard models available in stock
Tailor-made solutions with only 12 weeks of delivery time

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

Spare parts in stock
Easy supply for O&M companies

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

Logistics savings
Global production locations allow cost- and time-optimized production and supply

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

1.1 PV DC Combiner Box with String Monitoring

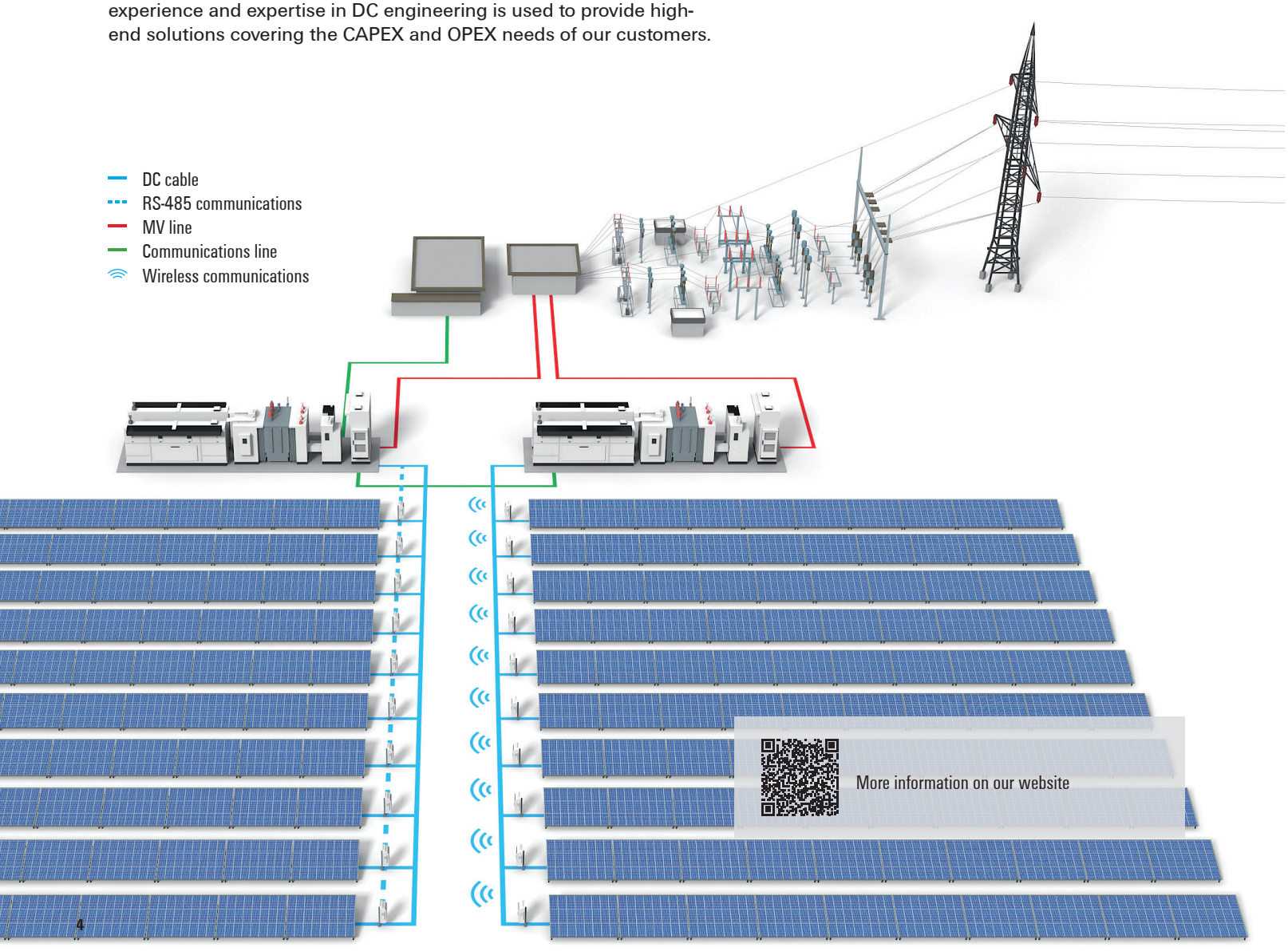
Real time information about your assets

Bundle, protect and monitor PV strings efficiently

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

With our real-time monitoring at the string level, we can immediately and precisely identify failures such as blown fuses, damaged PV connectors, degraded solar panels and other issues. These problems are common in solar farms and are often difficult to identify.
In the best-case scenario, they reduce energy production and the profitability of the business. In the worst-case, if some of these issues persist undetected for a long time, they can create hot spots that may start fires and lead to catastrophic results.

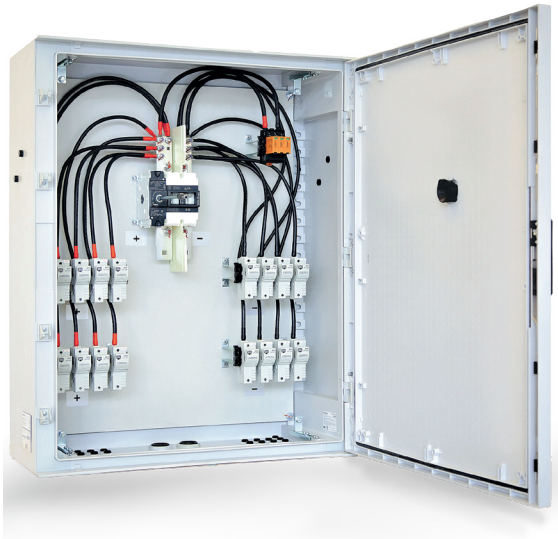
Weidmuller PV DC Combiner Boxes offer a track record of more than 320,000 units sold in all climate regions for the last 15+ years. Our experience and expertise in DC engineering is used to provide high-end solutions covering the CAPEX and OPEX needs of our customers.



More information on our website

1.2 PV DC Combiner Boxes without Monitoring

Options for high input current or high number of inputs



Standard and customized options tailored to your needs

A wide range of solutions fit into installation concepts with mono and bifacial PV panels, connected as single strings or arrays.

It is possible because Weidmuller offers DC combiner boxes with variants from 6 to 32 inputs, with fuse protection in both poles or only one of them. The gPV fuses can be selected from 10 to 75 amps and the switch disconnect can reach up to 500 amps.

Space optimized: reliability with high lifetime

DC combiner boxes must have a lifespan of over 10 years, which can only can be ensured through detailed design, careful selection of components and accurate construction processes.

Here you can see some of the details which makes Weidmuller's solution the most reliable DC combiner box in the market:

- **Horizontal orientation of fuses:** facilitates a more homogeneous temperature distribution which reduces blown fuses caused by hot spots.
- **Optimal enclosure size:** The distance between components ensures better heating distribution and passive cooling, allowing operation with external ambient temperatures of up to 122° F.
- **Double electrical isolation:** Fiberglass reinforced polyester enclosures with UV protection and no exposed metal components offers double isolation for unparalleled user safety.
- **Reduced internal metal parts:** Fiberglass mounting plate and full protection plate in front of the components reduces the risk of arc-fault.

Overvoltage protection

Weidmuller offers VPU series surge protection, with several configurations, for 1500 Vdc systems with SPD Type I+II or Type II.

More information on our website

Product highlights

- **Optimized design —** By using advanced simulation 3D software, the product variants have been designed and tested to operate at the maximum mechanical and thermal efficiency in the most compact enclosure size.
- **Cost-optimized variants —** The new product line and associated special accessories were designed to cover the most common PV power plant applications in a cost-effective manner.
- **Longer lifetime —** DC engineering expertise is implemented in designs to allow longer lifetime and higher performance under extreme climatic conditions.
- **Better LCOE and ROI —** Our proven track record, reliability and the reputation of our solutions simplify the product vetting process as well as insurance contracts, in addition to ensuring maximum asset resale value.

Technical data: PV DC Combiner Boxes

Main application features	
Inputs	from 6 to 32
Outputs	1
Operating ambient temperature	-40ºC up to 50ºC
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	up to 1500Vdc
Rated DC current per input	up to 48 amps
Maximum fuse size	up 32 amps for 10x85 mm up 75 amps for 22x65 mm
Protection against overcurrent	gPV fuses according to IEC 60269-6, ANSI/UL 248-19
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 - NEMA 4X
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)
Option with string current monitoring = number of monitored inputs up to 16	
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 25 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	MC4 C PV connectors or cable glands (other options on demand)
Standards	
Standards and approvals	UL 1741, 3rd Edition, 2021-08 / CSA C22.2 NO 290.19

Ordering Data for PV DC Combiner Boxes

PV DC Combiner Boxes with monitoring

Type	Inputs	Fuse protection	Fuse value	Rated voltage	Enclosure orientation	Enclosure size	Qty.	Order no.
PV 216S0F0C32V100T7P015PUS	16 strings	Both poles	32 amp	1500Vdc	Portrait	1056 x 852 x 350 mm	1	**8000089216**
PV 216S0F0C30V100T7P015PUS	16 strings	Both poles	30 amp	1500Vdc	Portrait	1056 x 852 x 350 mm	1	**8000142605**
Note: Other variants available on request.								

PV DC Combiner Boxes without monitoring

Type	Inputs	Fuse protection	Fuse value	Rated voltage	Enclosure orientation	Enclosure size	Qty.	Order no.
PV 232S0F0C20V100TXPX15PUS	32 strings	Both poles	20 amp	1500Vdc	Portrait	1056 x 852 x 350 mm	1	**8000089220**
PV 214S0F0C30V000TXPX15PUS	14 strings	Both poles	30 amp	1500Vdc	Portrait	847 x 636 x 300 mm	1	**8000125023**
PV 212S0F0C30V000TXPX15PUS	12 strings	Both poles	30 amp	1500Vdc	Portrait	847 x 636 x 300 mm	1	**8000132434**
PV 210S0F0C30V000TXPX15PUS	10 strings	Both poles	30 amp	1500Vdc	Portrait	747 x 536 x 300 mm	1	**8000132433**
PV 208S0F0C75V100TXPX15PUS	8 arrays	Both poles	75 amp	1500Vdc	Portrait	1056 x 852 x 350 mm	1	**8000089171**
PV 206S0F0C20V000TXPX15PUS	6 strings	Both poles	20 amp	1500Vdc	Portrait	747 x 536 x 300 mm	1	**8000142869**
PV 211S0F1C25V000TXPX15PUS	11 strings	Only on positive	25 Amp	1500Vdc	Portrait	747 x 536 x 300 mm	1	**8000146521**
PV 212S0F1C25V002TXPX15PUS	12 strings	Only on positive	25 Amp	1500Vdc	Portrait	747 x 536 x 300 mm	1	**8000151454**
PV 215S0F1C30V000TXPX15PUS	15 strings	Only on positive	30 Amp	1500Vdc	Portrait	847 x 636 x 300 mm	1	**8000150020**
Note: Other variants available on request.								

2.1 PV Communication Boxes
SCADA system interface

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. Weidmuller can customize the communication infrastructure requirements of the PV power plant, enabling perfect data collection for the plant owner, ultimately improving the long-term investment.

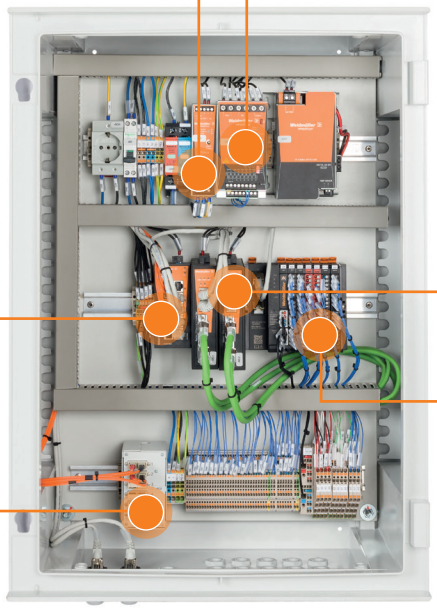
Product highlights

- 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

RJ45 switch & fiber-optic converter
IE managed switch 6x RJ45 ports
2x SC multi-mode ports

Fiber-optic patch panel box
6x SC Multi-mode fiber-optic ports



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

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

u-control with multiple I/O
u-control controller
16 x digital inputs
4 x analog 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.

2.2 PV Weather Boxes
Plant communication

Increase your energy production, monitor your system output

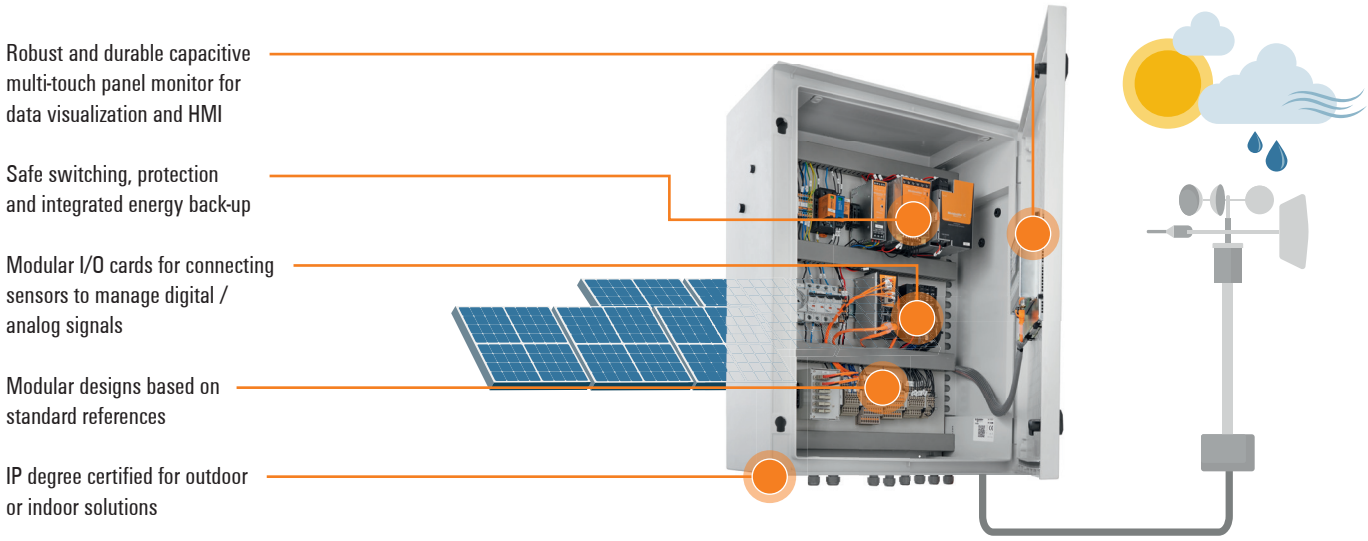
PV systems should deliver optimum performance. In order to use as many plant resources as possible for energy generation, regular monitoring of weather parameters is crucial.

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 enclosures are equipped according 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 conditions.

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-known brands of weather sensors
The Weidmuller PV Weather Boxes are compatible with all well-known weather sensors on the market, boast extremely robust usage and are protected against all weather influences.

Hukseflux Thermal Sensors
KIPP & ZONEN
EKO
SEVEN SENSOR SOLUTIONS

3.0 PV Components for an Effective Running System
Plant equipment

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.

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. VARITECTOR PV surge protection helps to extend the service life of photovoltaic systems — which minimizes financial risks and ensures the long-term profitability of a PV system. This is crucial for reliable energy production.

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 signaling contact	2 horizontal pitches	1	**2530610000**
VPU PV I+II 3 R 1000	1000 V / 40 kA	With remote signaling contact	2 horizontal pitches	1	**2530620000**
VPU PV I+II 3 1500	1500 V / 30 kA	Without remote signaling contact	3 horizontal pitches	1	**2530580000**
VPU PV I+II 3 R 1500	1500 V / 30 kA	With remote signaling contact	3 horizontal pitches	1	**2530590000**
Requirements class: Type II					
VPU PV II 3 1000	1100 V / 40 kA	Without remote signaling contact	3 horizontal pitches	1	**2530550000**
VPU PV II 3 R 1000	1100 V / 40 kA	With remote signaling contact	3 horizontal pitches	1	**2530180000**
VPU PV II 3 1500	1500 V / 30 kA	Without remote signaling contact	3 horizontal pitches	1	**2530640000**
VPU PV II 3 R 1500	1500 V / 30 kA	With remote signaling contact	3 horizontal pitches	1	**2530650000**

VPU AC II - surge protection for PV systems

Description	Type	Version	Rated voltage UL	Grid recommendation	Order no.
VPU AC II US 2 R 120/50	II	With remote	120 V	Two phase system	**2730480000**
VPU AC II US 3 R 120/50	II	With remote	120 V	Three phase system	**2730520000**
VPU AC II US 3 R 277/50	II	With remote	277 V	Three phase system	**2730590000**
VPU AC II US 3 R 400/50	II	With remote	400 V	Three phase system	**2730730000**

4.0 Quality Tested

Standard tests and services guarantee a long service life

Trust in approved quality

Our laboratory is accredited according to international standards. It operates independently and is recognized by institutions, registration services and other authorities. As a member of the CTDP program, Weidmuller 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-year warranty
- Laboratory testing
- Commissioning services
- On-site inspection

5.0 Proven Competence

Reference projects around the globe

The best proof of the quality of our solutions is in their worldwide use. More than 320,000 of our photovoltaic combiner boxes are installed in over 100 countries worldwide. They connect 120 million photovoltaic modules.

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

Weidmuller – 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 Smart Industrial Connectivity.

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