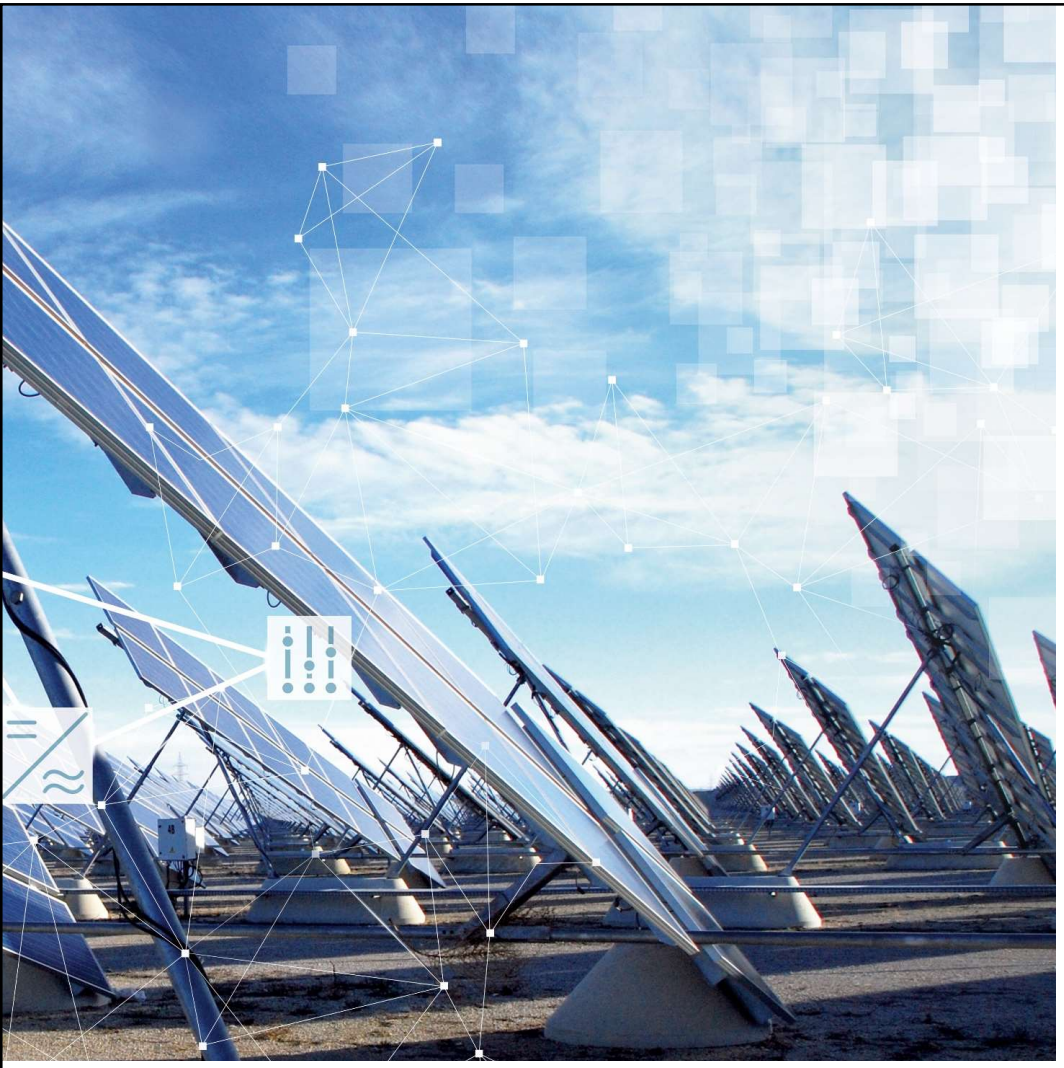


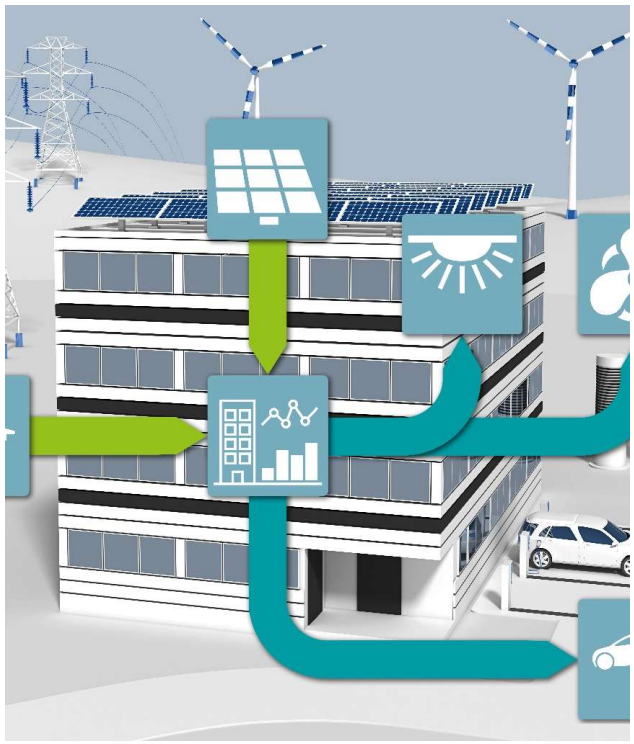
Solar power

Energía Solar

Antonio Gordillo / Marketing Automatización / 24 AGO 2021

PHOENIX CONTACT
INSPIRING INNOVATIONS

- Protection PV rooftop systems
- PV Park Management
- UPDATE magazine renewables
- Linkedin Phoenix Contact Solar Energy



PHOENIX CONTACT
INSPIRING INNOVATIONS

Solar power

Surge protection for photovoltaic rooftop systems

PHOENIX CONTACT
INSPIRING INNOVATIONS

Surge protection Solar

SPD for rooftop systems

- Surge protection for photovoltaic systems
- Directives for lightning and surge protection
- Selecting surge protection devices
- Application scenarios of lightning and surge protection
- Tailor-made portfolio
  - Surge protection for the DC side
  - Individual request
  - Surge protection for the AC side

PHOENIX CONTACT
INSPIRING INNOVATIONS

SPD´s for PV rooftop systems

PHOENIX CONTACT
INSPIRING INNOVATIONS

Industry solar power

Surge protection for photovoltaic systems

- Solar power is an essential source of renewable energy.
- Decreasing system costs mean that photovoltaic power generation systems are attractive.
- In order to provide optimum protection against overvoltages for the various system parts such as PV panels, inverters, and battery storage systems, surge protection must be used.

PHOENIX CONTACT
INSPIRING INNOVATIONS

Surge protection for photovoltaic rooftop systems

Directives for lightning and surge protection

HD 60364-7-712:2016

Harmonized standard developed by CENELEC on behalf of the European Commission. It describes how to plan and install PV systems.

DIN EN 61643-32

describes the selection criteria for DC and AC protective devices in photovoltaic systems. The contents of both standards have been incorporated into the national standards of many European countries.

PHOENIX CONTACT
INSPIRING INNOVATIONS

Surge protection for photovoltaic rooftop systems

Directives for lightning and surge protection

Country/ Region	Installation of PV systems	DC surge protection	AC surge protection
Europe	HD 60364-7-712	DIN EN 61643-32	
Germany	DIN VDE 0100-712	DIN EN 62305-3 Beiblatt 5	DIN VDE 0100-443
Switzerland	SN 411000 (NIN)	SN EN 62305 SN 411000 (NIN)	SN EN 62305-4 SN 411000 (NIN)
Austria	OVE-Richtlinie: R 6-2-1 OVE-Richtlinie: R 6-2-2 OVE-Richtlinie: R 6-3	ÖVE/ÖNORM EN 62305-3	OVE E 8101
Netherlands	NEN 1010:1015-712	NEN-EN 62305-3	NEN 1010:1015-440
Poland	PN-HD 60364-7-712	-	PN-HD 60364-4-443 PN-HD 60364-5-534
Belgium	AREI 2020	-	AREI 2020

PHOENIX CONTACT
INSPIRING INNOVATIONS

Surge protection for photovoltaic rooftop systems

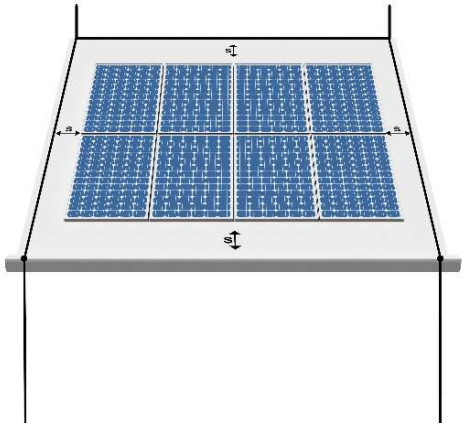
Selection surge protection devices

As per **DIN EN 61643-32**, a distinction is made between three application scenarios which determine the appropriate protection that should be selected:

Building without external lightning protection

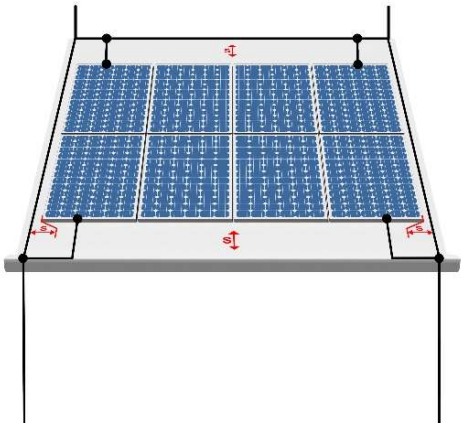
Building with external lightning protection

The separation distance “s” is maintained.



Building with external lightning protection

The separation distance “s” is not maintained.

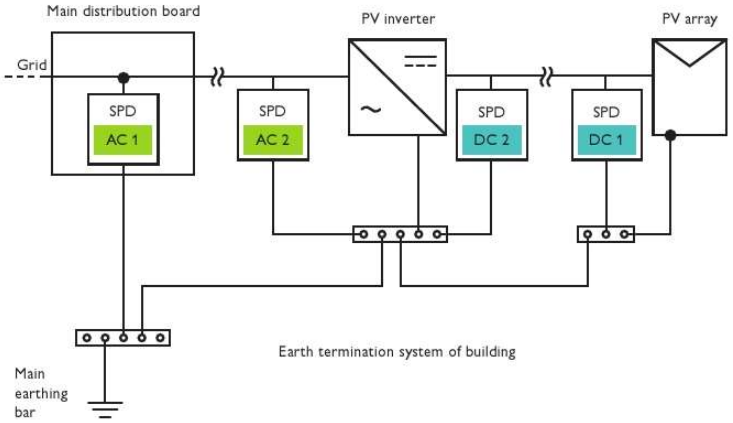


PHOENIX CONTACT
INSPIRING INNOVATIONS

Surge protection for photovoltaic rooftop systems

Building without external lightning protection

DC 1	**DC surge protection in the proximity of the PV panels**	**Type 2** A surge protective device is not required here if the cable length between “DC 1” and “DC 2” is less than 10 m.
DC 2	**DC surge protection in the proximity of the inverter**	**Type 2**
AC 1	**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 2	**AC surge protection in the main distribution**	**Type 2**

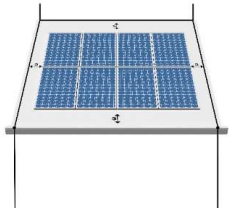


PHOENIX CONTACT
INSPIRING INNOVATIONS

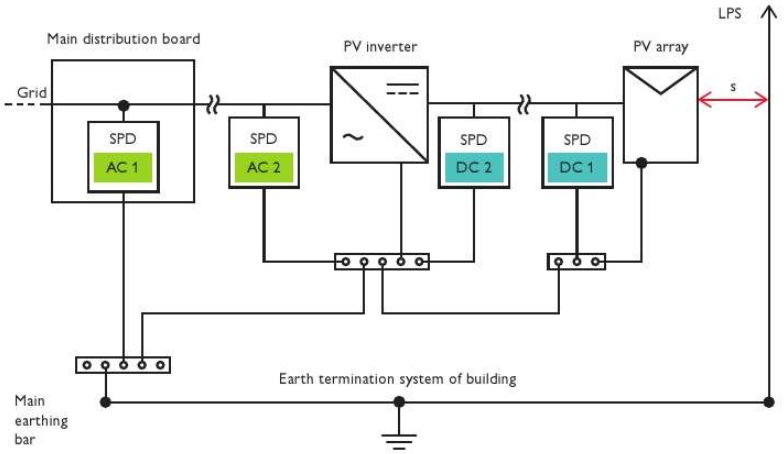
Surge protection for photovoltaic rooftop systems

Building with external lightning protection

The separation distance “s” is maintained.



DC 1	**DC surge protection in the proximity of the PV panels**	**Type 2** A surge protective device is not required here if the cable length between “DC 1” and “DC 2” is less than 10 m.
DC 2	**DC surge protection in the proximity of the inverter**	**Type 2**
AC 1	**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 2	**AC surge protection in the main distribution**	**Type 1**

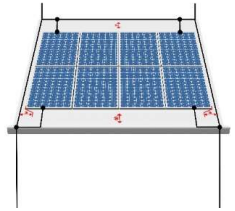


PHOENIX CONTACT
INSPIRING INNOVATIONS

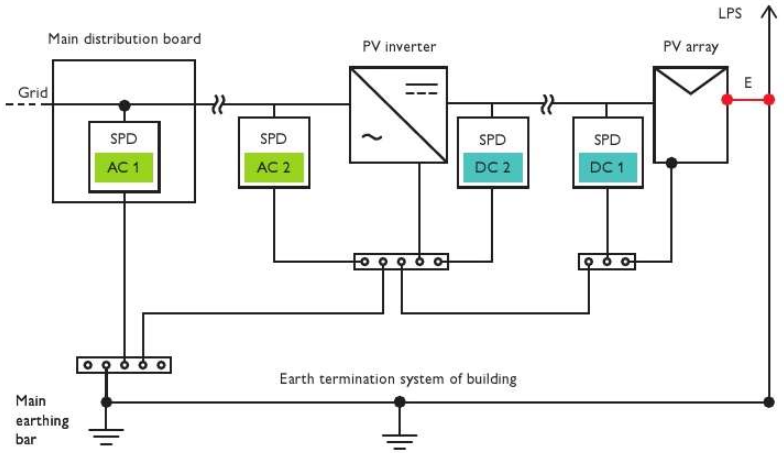
Surge protection for photovoltaic rooftop systems

Building with external lightning protection

The separation distance “s” is not maintained.



DC 1	**DC surge protection in the proximity of the PV panels**	**Type 1** A surge protective device is not required here if the cable length between “DC 1” and “DC 2” is less than 10 m.
DC 2	**DC surge protection in the proximity of the inverter**	**Type 1**
AC 1	**AC surge protection on the AC side of the inverter**	**Type 1** A surge protective device is not required here if the cable length between “AC 1” and “AC 2” is less than 10 m.
AC 2	**AC surge protection in the main distribution**	**Type 1**



PHOENIX CONTACT
INSPIRING INNOVATIONS

Surge protection for photovoltaic rooftop systems

Tailor-made portfolio

DC 1 | DC 2

Flexible and fast installation

With the string combiner boxes, our PV sets, all the necessary field connectors are always included as well.

DC 1 | DC 2

Safe connection technology

PV strings with ferrules can be wired without using tools by means of Push-in connection terminal blocks.

DC 1

Additional safety

Our PV sets with integrated fireman's switch enable the external disconnection of the PV panels from the rest of the system.

AC 1 | AC 2

Comprehensive portfolio

Whether a 3-conductor or 1-conductor system, and whatever the supply system configuration, we offer a broad portfolio for the protection of the AC side.

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TC

High data availability

As per DIN EN 61643-32, the telecommunications and data cables must be protected if the PV installation is equipped with surge protection.

PHOENIX CONTACT
INSPIRING INNOVATIONS

Surge protection for photovoltaic rooftop systems

Surge protection for the DC side

DC 1 DC 2

The whole product overview of our string combiner boxes with more than 60 variants you will find online! Visit our website at **phoenixcontact.com** and enter the following web code in the search field: **#2268**

Our PV sets

- Production in Germany
- Available from stock
- Worldwide shipping
- Corresponding accessories

PHOENIX CONTACT
INSPIRING INNOVATIONS

Surge protection for photovoltaic rooftop systems

Surge protection for the DC side

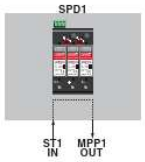
DC 1 | DC 2

Small selection from our portfolio

Complete product overview on website with **#2268**

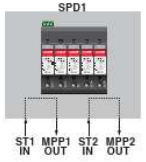
SOL-SC-1ST-0-DC-1MPPT-1001
Order No. 2404298

Technical data
- Surge protective device: type T1/T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 1
- Current per string: 40 A (I_{max})
- Number of outputs: 1
- Number of supported MPP trackers: 1
- Type of cable entry: SUNCLIX*
- Housing dimensions (W x H x D): 130 x 180 x 111 mm



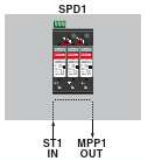
SOL-SC-1ST-0-DC-2MPPT-1000SE
Order No. 1101176

Technical data
- Surge protective device: type T1/T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 1 (per MPP tracker)
- Current per string: 40 A (I_{max})
- Number of outputs: 1 (per MPP tracker)
- Number of supported MPP trackers: 2
- Type of cable entry: cable gland
- Housing dimensions (W x H x D): 254 x 180 x 111 mm



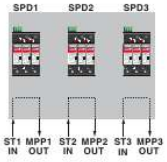
SOL-SC-1ST-0-DC-1MPPT-1000
Order No. 1182566

Technical data
- Surge protective device: type T1/T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 1
- Current per string: 40 A (I_{max})
- Number of outputs: 1
- Number of supported MPP trackers: 1
- Type of cable entry: cable gland
- Housing dimensions (W x H x D): 130 x 180 x 111 mm



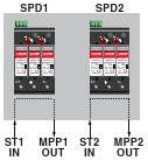
SOL-SC-1ST-0-DC-3MPPT-1001
Order No. 2404301

Technical data
- Surge protective device: type T1/T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 1 (per MPP tracker)
- Current per string: 40 A (I_{max})
- Number of outputs: 1 (per MPP tracker)
- Number of supported MPP trackers: 3
- Type of cable entry: SUNCLIX*
- Housing dimensions (W x H x D): 254 x 180 x 111 mm



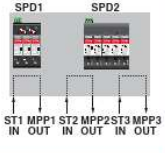
SOL-SC-1ST-0-DC-2MPPT-1001
Order No. 2404299

Technical data
- Surge protective device: type T1/T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 1 (per MPP tracker)
- Current per string: 40 A (I_{max})
- Number of outputs: 1 (per MPP tracker)
- Number of supported MPP trackers: 2
- Type of cable entry: SUNCLIX*
- Housing dimensions (W x H x D): 180 x 180 x 111 mm



SOL-SC-1ST-0-DC-3MPPT-1000SE
Order No. 1182571

Technical data
- Surge protective device: type T1/T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 1 (per MPP tracker)
- Current per string: 40 A (I_{max})
- Number of outputs: 1 (per MPP tracker)
- Number of supported MPP trackers: 3
- Type of cable entry: cable gland
- Housing dimensions (W x H x D): 361 x 254 x 111 mm



* SUNCLIX connectors included

PHOENIX CONTACT
INSPIRING INNOVATIONS

Surge protection for photovoltaic rooftop systems

Surge protection for the DC side

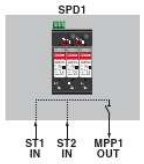
DC 1 | DC 2

Complete product overview on website with **#2268**

Small selection from our portfolio

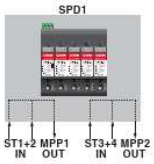
SOL-SC-2ST-0-DC-1MPPT-1101
Order No. 2404297

Technical data
- Surge protective device: type T1/T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 2
- Current per string: 16 A (I_{max})
- Number of outputs: 1
- Number of supported MPP trackers: 1
- Switching capacity: 32 A/1000 V DC
- Type of cable entry: SUNCLIX*
- Housing dimensions (W x H x D): 180 x 180 x 111 mm



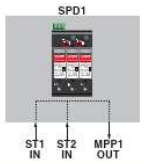
SOL-SC-2ST-0-DC-2MPPT-1001SE
Order No. 1016813

Technical data
- Surge protective device: type T1/T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 2 (per MPP tracker)
- Current per string: 20 A (I_{max})
- Number of outputs: 1 (per MPP tracker)
- Number of supported MPP trackers: 2
- Type of cable entry: SUNCLIX*
- Housing dimensions (W x H x D): 254 x 180 x 111 mm



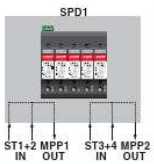
SOL-SC-2ST-0-DC-1MPPT-1000
Order No. 1016811

Technical data
- Surge protective device: type T1/T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 2
- Current per string: 20 A (I_{max})
- Number of outputs: 1
- Number of supported MPP trackers: 1
- Type of cable entry: cable gland
- Housing dimensions (W x H x D): 180 x 180 x 111 mm



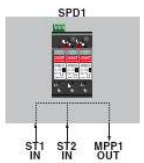
SOL-SC-2ST-0-DC-2MPPT-1000SE
Order No. 1016812

Technical data
- Surge protective device: type T1/T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 2 (per MPP tracker)
- Current per string: 20 A (I_{max})
- Number of outputs: 1 (per MPP tracker)
- Number of supported MPP trackers: 2
- Type of cable entry: cable gland
- Housing dimensions (W x H x D): 254 x 180 x 111 mm



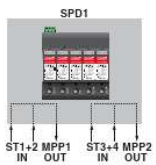
SOL-SC-2ST-0-DC-1MPPT-2000
Order No. 1055626

Technical data
- Surge protective device: type T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 2
- Current per string: 20 A (I_{max})
- Number of outputs: 1
- Number of supported MPP trackers: 1
- Type of cable entry: cable gland
- Housing dimensions (W x H x D): 180 x 180 x 111 mm



SOL-SC-2ST-0-DC-2MPPT-2000SE
Order No. 1055628

Technical data
- Surge protective device: type T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 2 (per MPP tracker)
- Current per string: 20 A (I_{max})
- Number of outputs: 1 (per MPP tracker)
- Number of supported MPP trackers: 2
- Type of cable entry: cable gland
- Housing dimensions (W x H x D): 254 x 180 x 111 mm



* SUNCLIX connectors included

PHOENIX CONTACT
INSPIRING INNOVATIONS

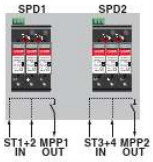
Surge protection for photovoltaic rooftop systems

Surge protection for the DC side

DC 1 | DC 2

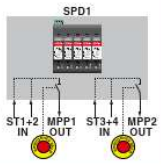
SOL-SC-2ST-0-DC-2MPPT-1101
Order No. 2404569

Technical data
- Surge protective device: type T1/T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 2 (per MPP tracker)
- Current per string: 20 A (I_{max})
- Number of outputs: 1 (per MPP tracker)
- Number of supported MPP trackers: 2
- Switching capacity: 32 A/1000 V DC (per MPP tracker)
- Switch disconnector type: rotary switch (lockable)
- Type of cable entry: SUNCLIX*
- Housing dimensions (W x H x D): 361 x 254 x 111 mm



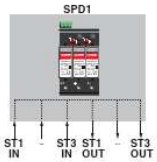
SOL-SC-2ST-0-DC-2MPPT-1300FS
Order No. 1137059

Technical data
- Surge protective device: type T1/T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 2 (per MPP tracker)
- Current per string: 20 A (I_{max})
- Number of outputs: 1 (per MPP tracker)
- Number of supported MPP trackers: 2
- Switching capacity: 50 A/1000 V DC (per MPP tracker)
- Type of cable entry: cable gland
- Housing dimensions (W x H x D): 400 x 400 x 200 mm



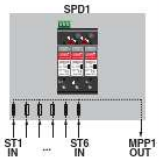
SOL-SC-3ST-0-DC-1MPPT-1001EQ
Order No. 1064363

Technical data
- Surge protective device: type T1/T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 3
- Current per string: 13.3 A (I_{max})
- Number of outputs: 3
- Number of supported MPP trackers: 1
- Type of cable entry: SUNCLIX*
- Housing dimensions (W x H x D): 180 x 180 x 111 mm



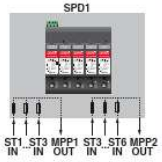
SOL-SC-6ST-0-DC-1MPPT-1010
Order No. 1113128

Technical data
- Surge protective device: type T1/T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 6
- Current per string: 10 A (I_{max})
- Number of outputs: 1
- Number of supported MPP trackers: 1
- String fuse: midget/10.3 x 38 (not included)
- Type of cable entry: cable gland
- Housing dimensions (W x H x D): 361 x 254 x 111 mm



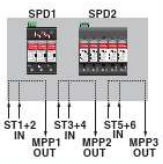
SOL-SC-3ST-0-DC-2MPPT-1011SE
Order No. 1042281

Technical data
- Surge protective device: type T1/T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 3 (per MPP tracker)
- Current per string: 12 A (I_{max})
- Number of outputs: 1 (per MPP tracker)
- Number of supported MPP trackers: 2
- String fuse: midget/10.3 x 38 (12 A included)
- Type of cable entry: SUNCLIX*
- Housing dimensions (W x H x D): 361 x 254 x 111 mm



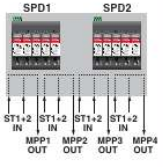
SOL-SC-2ST-0-DC-3MPPT-1000SE
Order No. 1053613

Technical data
- Surge protective device: type T1/T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 2 (per MPP tracker)
- Current per string: 20 A (I_{max})
- Number of outputs: 1 (per MPP tracker)
- Number of supported MPP trackers: 3
- Type of cable entry: cable gland
- Housing dimensions (W x H x D): 361 x 254 x 111 mm



SOL-SC-2ST-0-DC-4MPPT-1000SE
Order No. 1081867

Technical data
- Surge protective device: type T1/T2
- System voltage: 1000 V DC (U_{max})
- Number of string inputs: 2 (per MPP tracker)
- Current per string: 20 A (I_{max})
- Number of outputs: 1 (per MPP tracker)
- Number of supported MPP trackers: 4
- Type of cable entry: cable gland
- Housing dimensions (W x H x D): 361 x 254 x 111 mm



* SUNCLIX connectors included

Complete product overview on website with **#2268**

PHOENIX CONTACT
INSPIRING INNOVATIONS

Surge protection for photovoltaic rooftop systems

Request your individual string combiner box

Please provide us with the following information:

Inverter type

_____

Number of strings per MPP tracker

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ other:

Maximum string voltage
1000 V DC

Surge protection type

- ○ T2
- ○ T1/ T2

Cable entry system IN

- ○ Cable gland
- ○ SUNCLIX

Cable entry system OUT

- ○ Cable gland
- ○ SUNCLIX

DC switch disconnector

- ○ Fireman‘s switch
- ○ None
- ○ DC switch disconnector

Number of MPP trackers

- ○ 1
- ○ 2
- ○ 3
- ○ 4
- ○ 5

Maximum String current (A)

_____

Connection cross section IN (mm)

_____

Connection cross section OUT (mm)

_____

String fuse

- ○ +/-
- ○ +
- ○ Ohne

PHOENIX CONTACT
INSPIRING INNOVATIONS

Surge protection for photovoltaic rooftop systems

Weitere Informationen auf
Website unter **#0291**

Surge protection for the AC side

AC 1 | AC 2

Type 1/type 2 combined lightning current and surge arrester	**For 3-phase power supply networks**		**For 1-phase power supply networks**
When it comes to lightning discharge or direct lightning strikes, our type 1/type 2 combined lightning current and surge arresters provide the best protection for your installations.			
Type designation	FLT-SEC-P-T1-3S-350/25-FM	FLT-SEC-ZP-3S-255/7,5	FLT-SEC-P-T1-1S-350/25-FM
Order number	2905421	1074741	2905415
Type 2 surge protection device	**For 3-phase power supply networks**		**For 1-phase power supply networks**
Switching operations are far and away the most common cause of overvoltage. Type 2 surge protective devices provide effective protection against these dynamic disturbance variables.			
Type designation	VAL-SEC-T2-3S-350-FM		VAL-SEC-T2-1S-350-FM
Order number	2905340		2905333

PHOENIX CONTACT
INSPIRING INNOVATIONS

Surge protection for photovoltaic rooftop systems

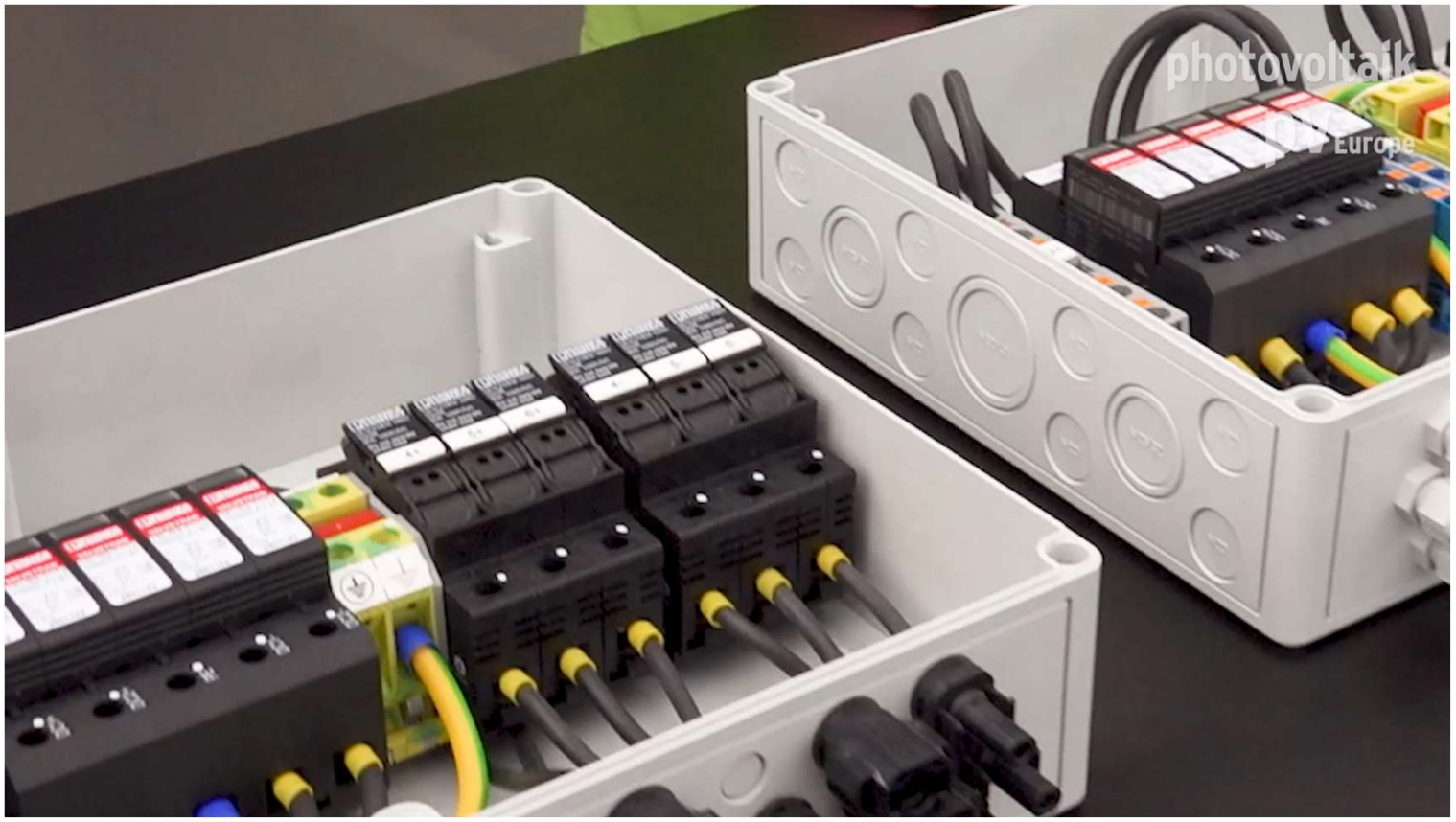
Surge protection for interfaces on the inverter

TC

	For digital signals	For RS-485 (2-wire)
All conventional inverters use an RS-485 data interface as well as digital inputs and outputs; these can be protected effectively against overvoltage.		
Type designation	2 x TTC-6P-2X1-F-M-24DC-PT-I	TTC-6P-3-HF-F-M-12DC-UT-I
Order number	2906794	2906786
	In accordance with Class EA ($CAT6_A$), for Gigabit Ethernet (up to 10 Gbps)	
Signal interfaces are particularly sensitive to overvoltage. You should therefore use our surge protection with components that are powerful and respond quickly.		
Type designation	DT-LAN-CAT.6+	
Order number	2881007	

More information
with web code **#0291**

PHOENIX CONTACT
INSPIRING INNOVATIONS

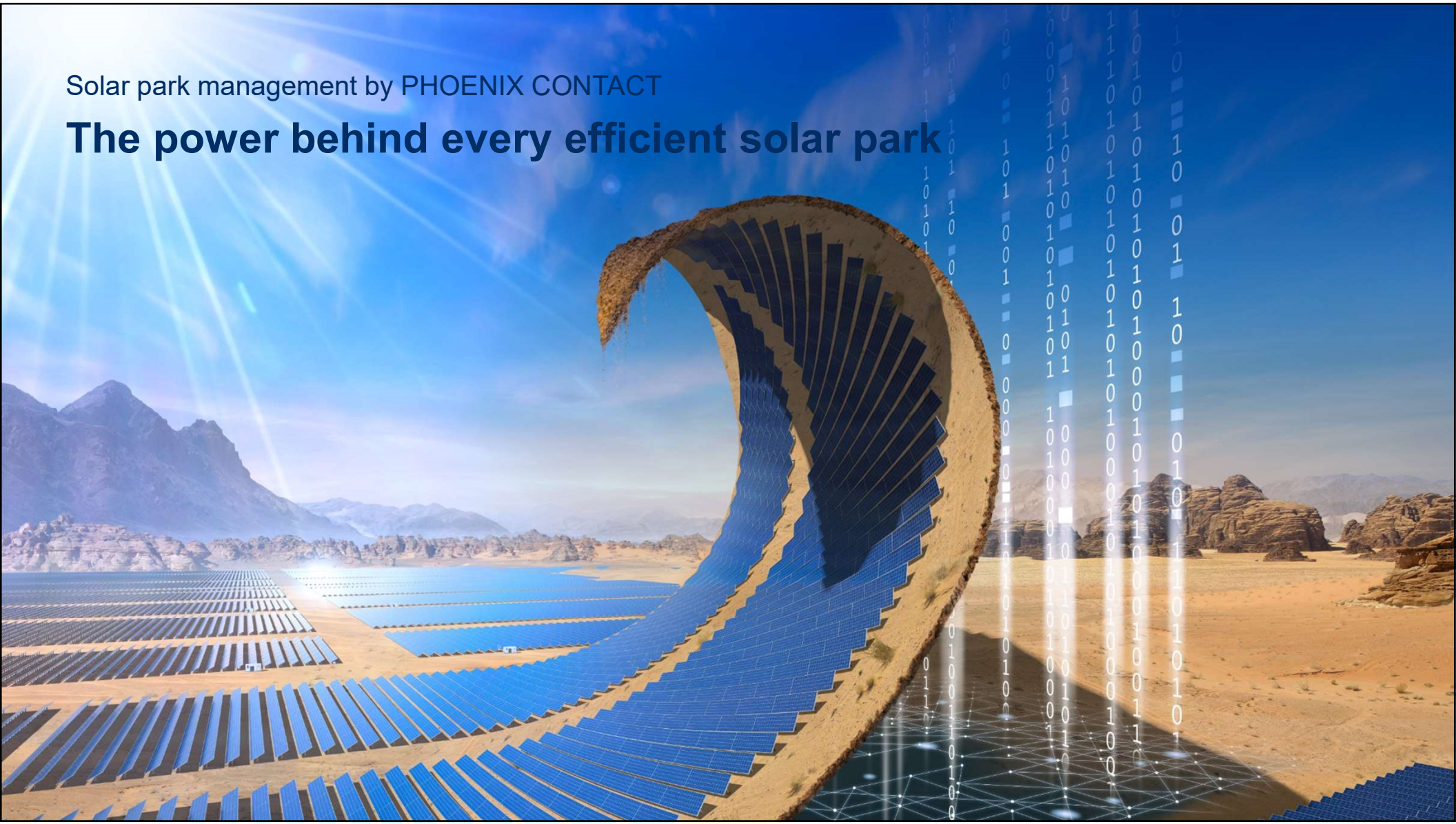


SCB Surge Protection on rooftop systems

PHOENIX CONTACT
INSPIRING INNOVATIONS

Solar park management by PHOENIX CONTACT

The power behind every efficient solar park



Solar park management by PHOENIX CONTACT

Strong solution partner behind every efficient solar park

From data acquisition at the field level all the way to feed-in control and visualization, we provide complete, seamless solutions for PV park management.

The combination of intelligent automation and comprehensive visualization tools enables you to continuously record and evaluate data from your solar park.

Our Integrated PV Park Management solution enables the extremely reliable and economic operation of PV systems.

Thanks to the open monitoring system, solar parks can be quickly and easily integrated and commissioned.

PHOENIX CONTACT
INSPIRING INNOVATIONS

The world’s first solar park management system based on industry standards

Integrated PV Park Management

Start up your new solar park

50 % faster

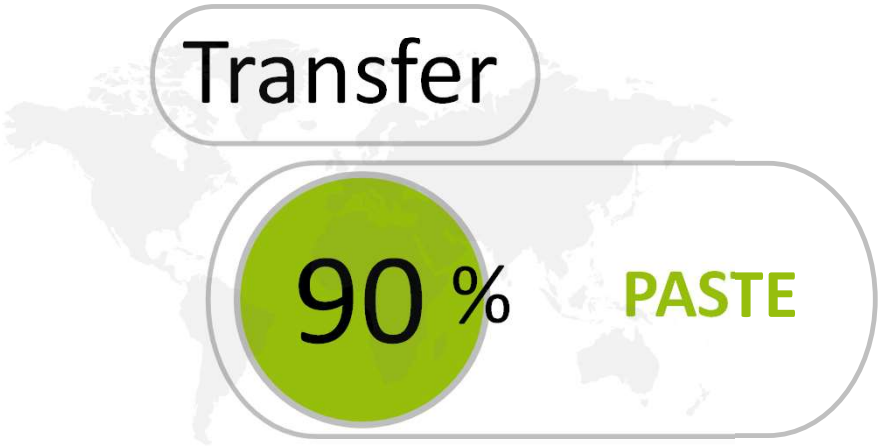
using

Plug and Play

PHOENIX CONTACT
INSPIRING INNOVATIONS

The world’s first solar park management system based on industry standards

Integrated PV Park Management



of existing planning

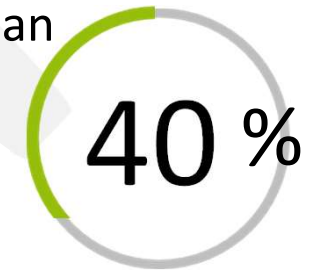
to new solar projects

PHOENIX CONTACT
INSPIRING INNOVATIONS

The world’s first solar park management system based on industry standards

Integrated PV Park Management

Reduce operation and maintenance costs more than



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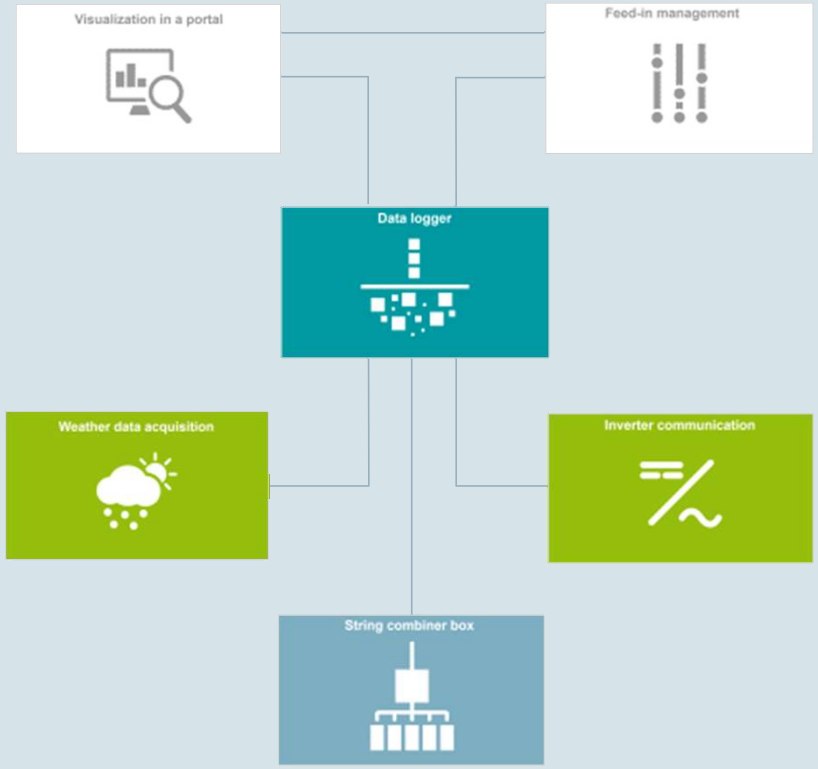
The world’s first solar park management system based on industry standards



Integrated PV Park Management

PHOENIX CONTACT

The world’s first solar park management system based on industry standards

Integrated PV Park Management

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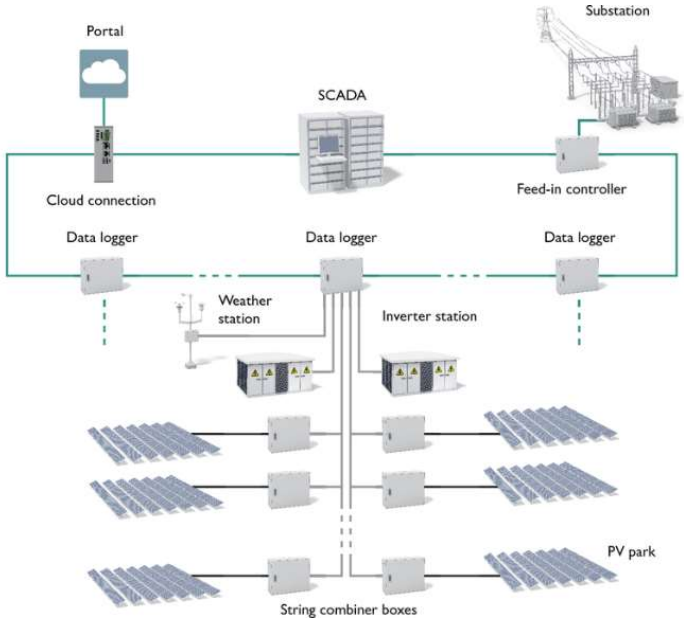


PHOENIX CONTACT
INSPIRING INNOVATIONS

Solutions for solar power

Strong solution partner behind every efficient solar park

Phoenix Contact, a global market leader headquartered in Germany, has been an expert provider of solutions and products in the solar power industry for many years.

Our group is synonymous with future-oriented components, systems, and solutions in the fields of electrical engineering, electronics, and automation.

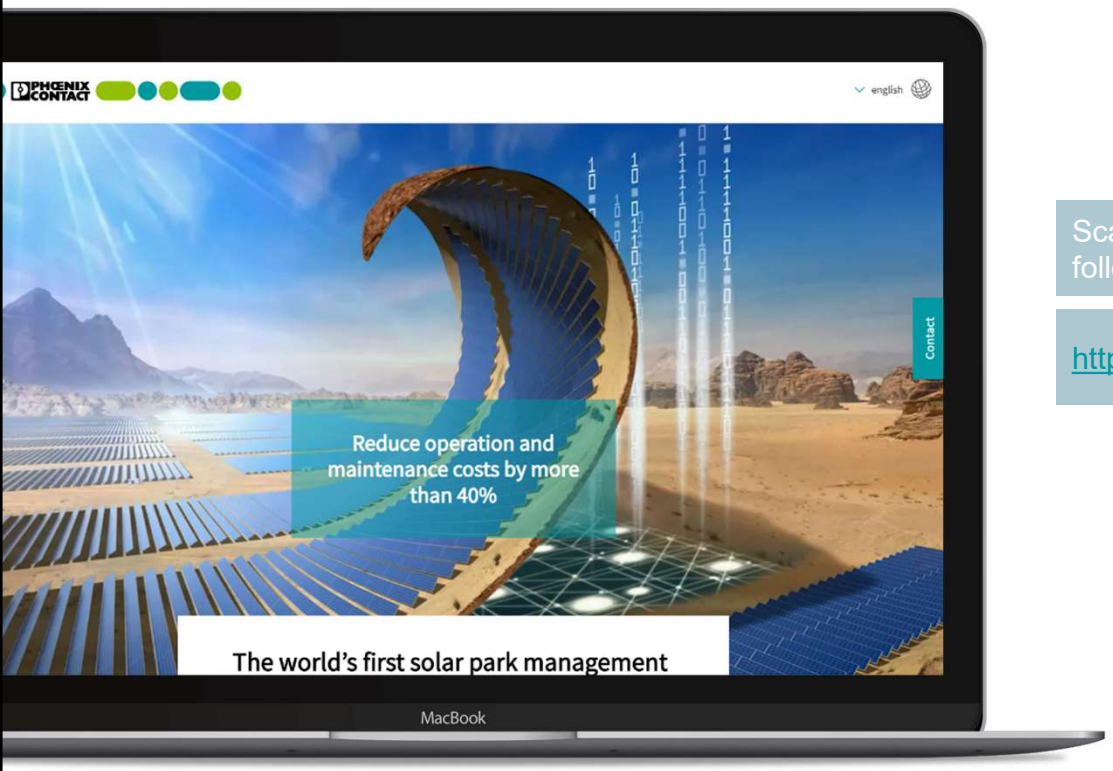
A global network across more than 100 countries and our more than 16,500 employees ensure close proximity to our customers, which we believe is particularly important..

From ground-mounted systems to rooftop systems all the way to hybrid energy systems, Phoenix Contact ensures the reliable operation of your photovoltaic park through the use of continuous plant data collection and an optimized feed-in management system.

PHOENIX CONTACT
INSPIRING INNOVATIONS

Integrated PV Park Management

Find more information about Integrated PV Park Management



Scan the QR code to go to the website, or use the following link:

https://phoe.co/solarparkmanagement

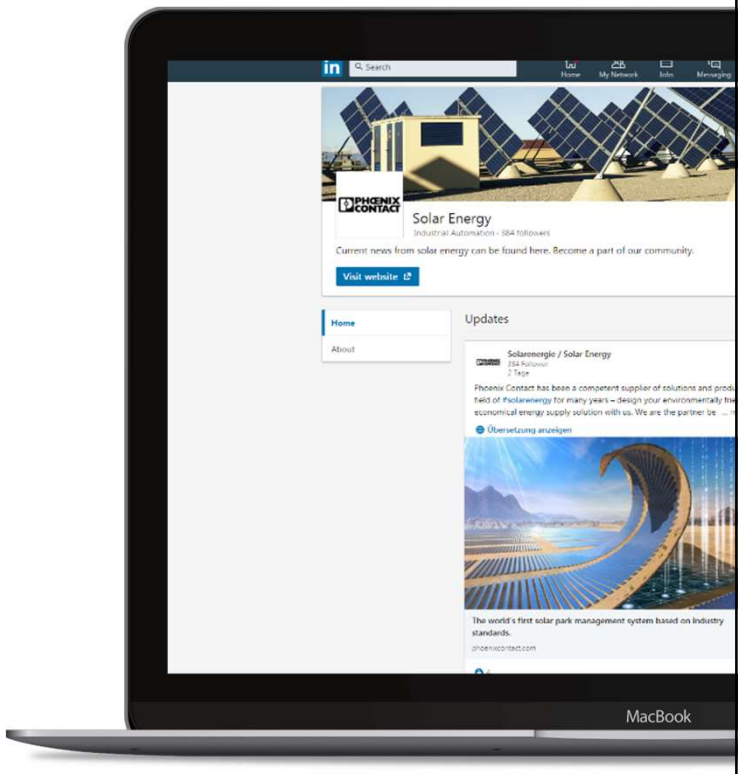
PHOENIX CONTACT
INSPIRING INNOVATIONS

Solutions for solar power

Follow our showcase page on LinkedIn

Scan the QR code to go to the website, or use the following link:

https://phoe.co/solarenergy-linkedin



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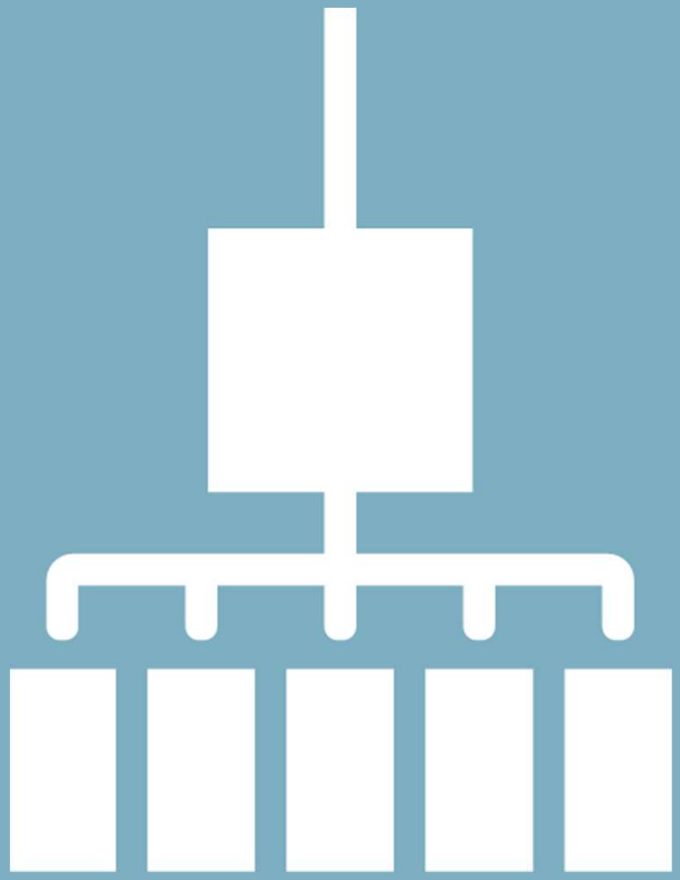
Thank you

PHOENIX CONTACT
INSPIRING INNOVATIONS

String combiner box



Integrated PV Park Management

String combiner box

Thanks to Hall-effect sensor technology, string currents can be easily and reliably monitored without interruption

Our string combiner boxes are self-powered thanks to the integrated DC/DC converter, which means they do not require a separate power supply

The string combiner boxes can be very flexibly used with different park topologies, depending on customer requirements

PHOENIX CONTACT
INSPIRING INNOVATIONS

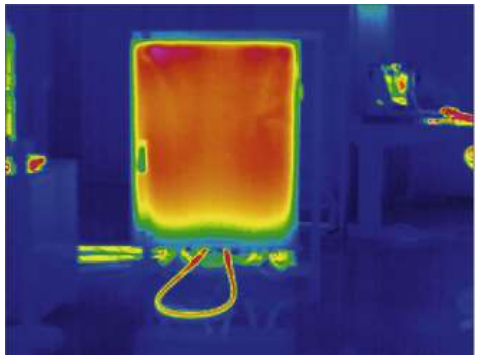
Integrated PV Park Management

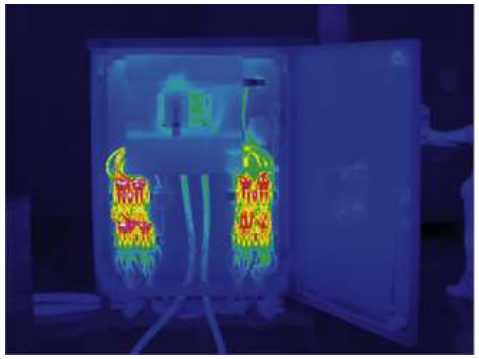
String combiner box

Space-saving installation through compact design

Current and voltage measurement up to 1500 V DC

Reliability and durability, thanks to a temperature-optimized design





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Integrated PV Park Management

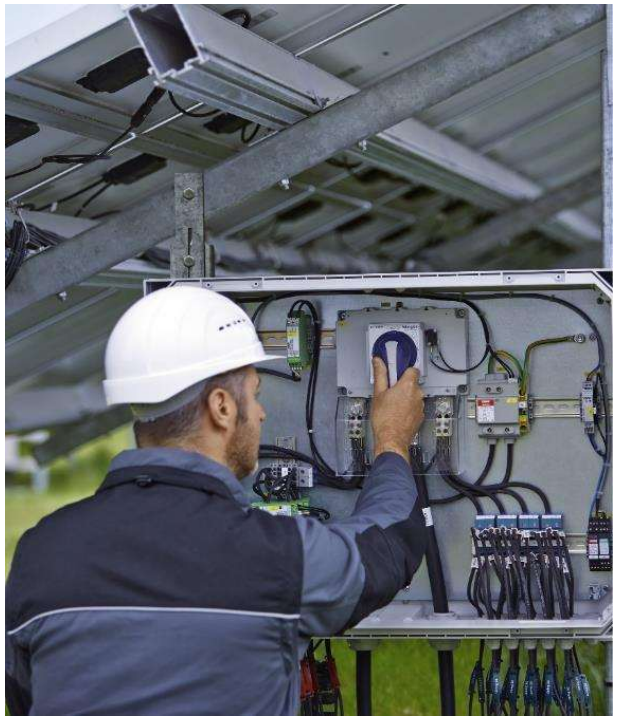
String monitoring

Maximizing power production

Minimizing operation and maintenance costs

Reliable detection of system errors

Fast and easy locating of failure points



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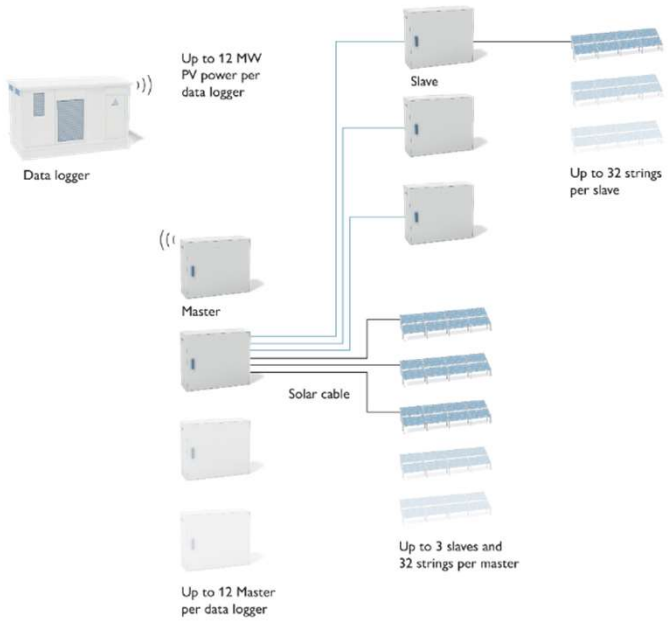
INSPIRING INNOVATIONS

Integrated PV Park Management

Master Slave Concept

Reduced cabling effort, thanks to wireless communication between the master and data logger

Low planning and startup costs, thanks to intelligent automation solution.



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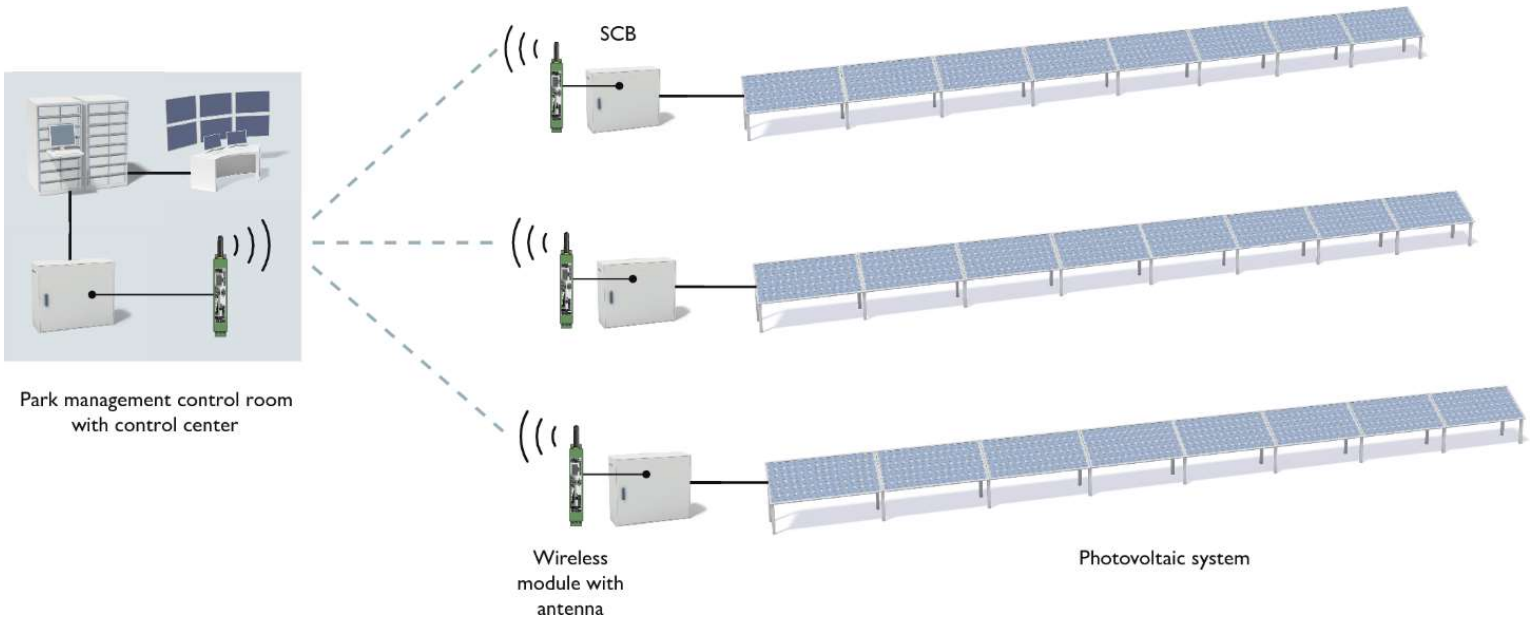
Wireless communication



PHOENIX CONTACT
INSPIRING INNOVATIONS

The world’s first solar park management system based on industry standards

Integrated PV Park Management

From the field level right through to the visualization of data in a portal, we have developed a scalable concept for the comprehensive operational management of the system portfolio.

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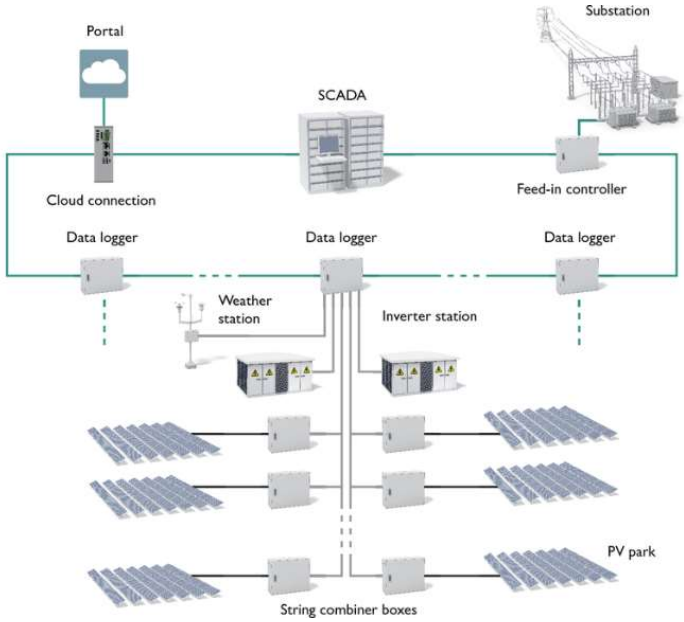


PHOENIX CONTACT
INSPIRING INNOVATIONS

Weather data acquisition

Integrated PV Park Management

Weather data acquisition

Easy installation

All sensors and accessories are available from the E-Shop

Reduced on-site cabling effort, as Modbus/RTU communication replaces the individual wiring of each analog sensor

Different communication interfaces can be configured with ease

PHOENIX CONTACT
INSPIRING INNOVATIONS

Integrated PV Park Management

Weather data acquisition

Easy integration

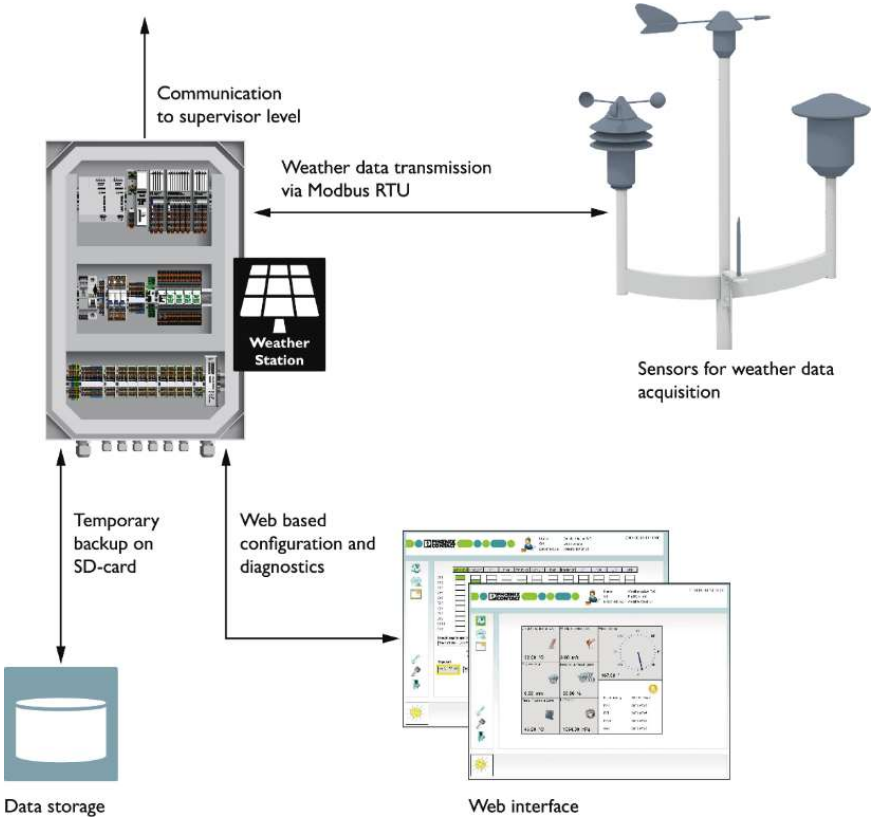
Complies with the IEC 61724-1 Class A standard for large-scale PV parks

Modular sensors with automatic detection of all sensors

PHOENIX CONTACT
INSPIRING INNOVATIONS

Integrated PV Park Management

Weather data acquisition



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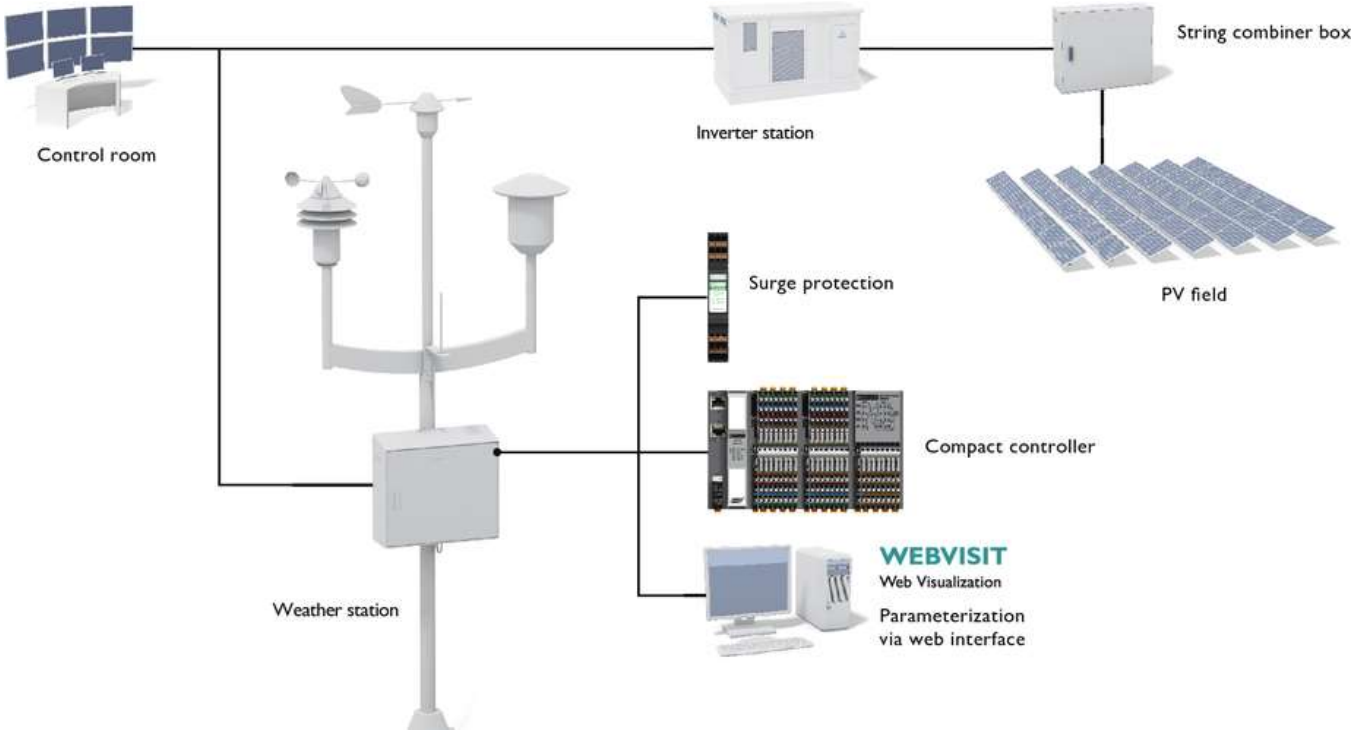
Integrated PV Park Management

Weather data acquisition



PHOENIX CONTACT
INSPIRING INNOVATIONS

Integrated PV Park Management

Product overview

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INSPIRING INNOVATIONS

The world’s first solar park management system based on industry standards

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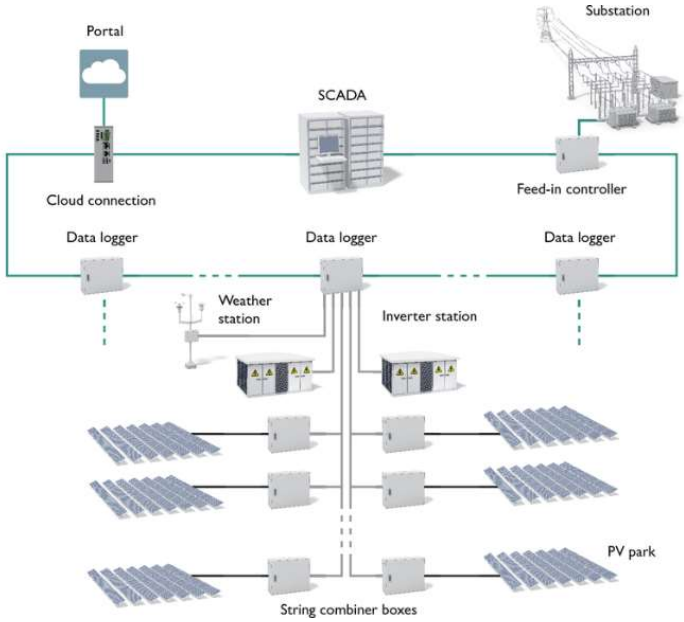

PHOENIX CONTACT
INSPIRING INNOVATIONS

Weather Station – Smart solution to measure environmental conditions

Integrated PV Park Management

APPLICATION CLUB

Data aquisition

Industry specific sensors

Network services

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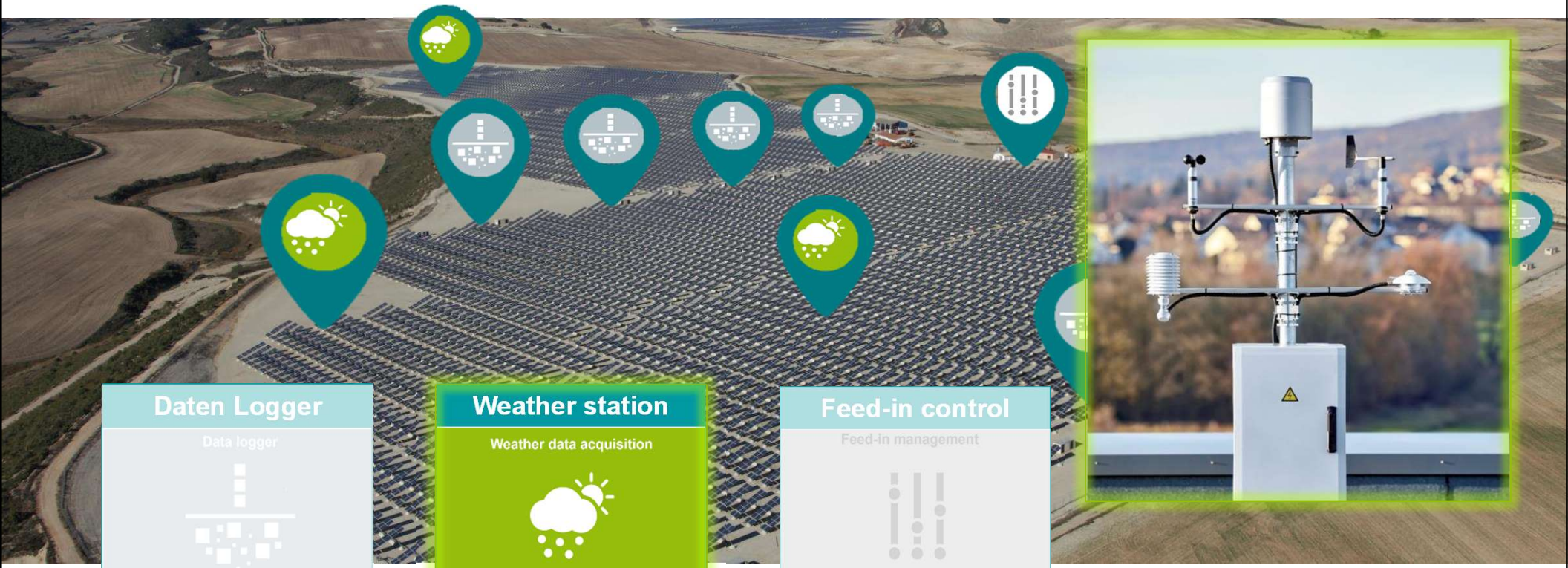
INSPIRING INNOVATIONS

Weather Station – Smart solution to measure environmental conditions

Integrated PV Park Management

APPLICATION CLUB



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INSPIRING INNOVATIONS

Weather Station – Smart solution to measure environmental conditions

Application possibilities in the solar industry

APPLICATION CLUB

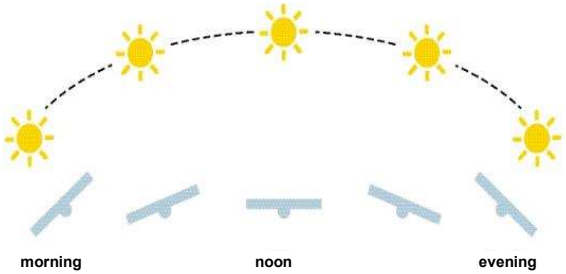
Efficiency calculation

The efficiency of the PV modules are temperature dependent and must be considered.

Performance optimization

Weather data are necessary as reference data to identify energy losses.

Sun position calculation



It is necessary to react to environmental conditions such as angle of irradiation, wind speed,...

PHOENIX CONTACT INSPIRING INNOVATIONS

Further application possibilities

Alarming

Fire Detection, Temperature measurement

Environmental data

Impact on the environment

Building Automation

Internal processes such as shading and cooling

Weather Station – Smart solution to measure environmental conditions

APPLICATION CLUB

Pain Points

- **Sensor wiring**
  - Often analog sensors with single cabling for every sensor
  - Sensors with a mixture different kind of connectors
  - Effort in assembling of connectors, like shielding
- **Effort to integrate the sensors in Automation system**
  - Every analog inputs need separate I/O’s
  - Parametrization/Setting on interfaces

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APPLICATION CLUB

VMM Solar Weather Station

– Smart environmental condition monitoring for every industry…

… a ready to sell and PLCnext based solution with control cabinet and a wide range of corresponding environment sensors

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INSPIRING INNOVATIONS

Weather Station – Smart solution to measure environmental conditions

Control Cabinet SOL-SC-WTH-STN

Function:

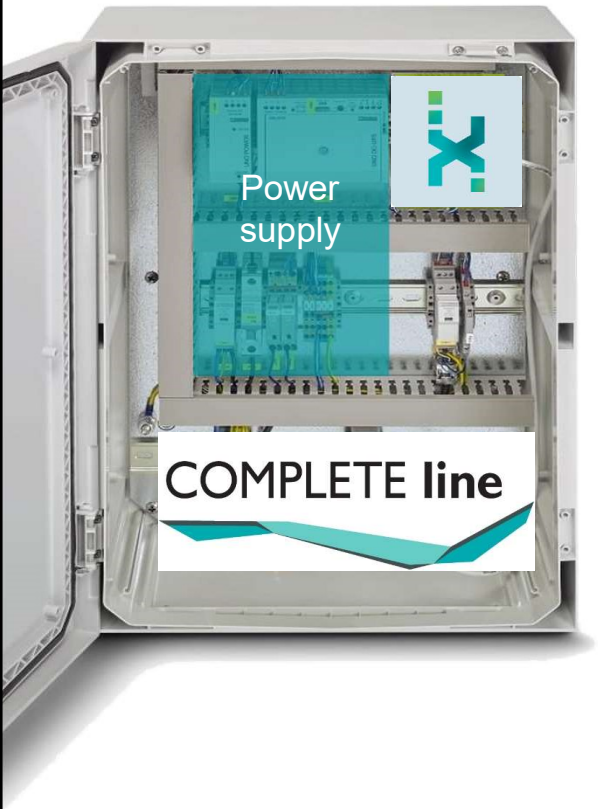
- Connection of field devices
- Data processing
- Temporary data storage
- Transfer of data to the higher-level data management system

Article Nr.: 1322110

Weather Station – Smart solution to measure environmental conditions

Control Cabinet SOL-SC-WTH-STN

APPLICATION CLUB



Hardware features

- IP 65 protection
- Ambient temperature operation – 25°C …52 °C
- Optional battery module
- Surge Voltage protection for Power Supply/ Sensor input
- PLCnext AXC F 1152 implemented

Software features

- Web interface HTML5
- Automatically search for connected sensors
- Preconfigured sensor from Phoenix Contact
- Supported third party sensors
- Providing data via Modbus / Profinet / OPC
- General configuration (Date and Time / station information / IP settings / alarm and event management)

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Weather Station – Smart solution to measure environmental conditions

Environment sensors

- Modbus RTU interface
- M12 connector
- Modular sensors comply with auto-detection mode
- Wide range of accessory like Y-adapters, preconfigured cables with M12 connectors, mounting traverse, …

1074975 - SOL-ES-PRO-WD

Modbus
wind direction sensor

1074976 - SOL-ES-PRO-WS

Modbus
wind speed sensor

1074983 - SOL-ES-PRO-MT

4-wire PT-100 with
Modbus converter

1074979 - SOL-ES-PRO-PYR

Modbus
secondary standard pyranometer

1074977 - SOL-ES-PRO-THP

Modbus Temperature, humidity, and
air pressure sensor

1074982 - SOL-ES-PRO-RC

Modbus
solar radiation sensor

1074978 - SOL-ES-PRO-RF

Modbus
precipitation sensor

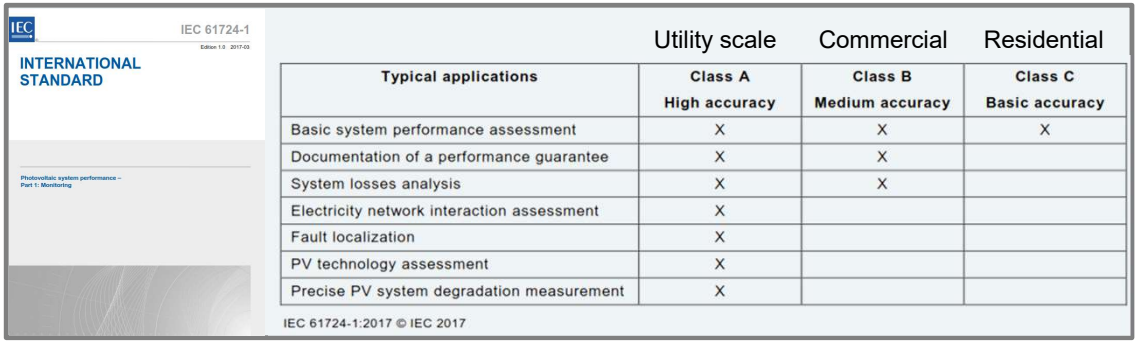
Soiling sensor

Compact weather station

Quality level of sensors

Sensors comply with the IEC 61724-1

Class A standard (highest accuracy) for large-scale PV systems

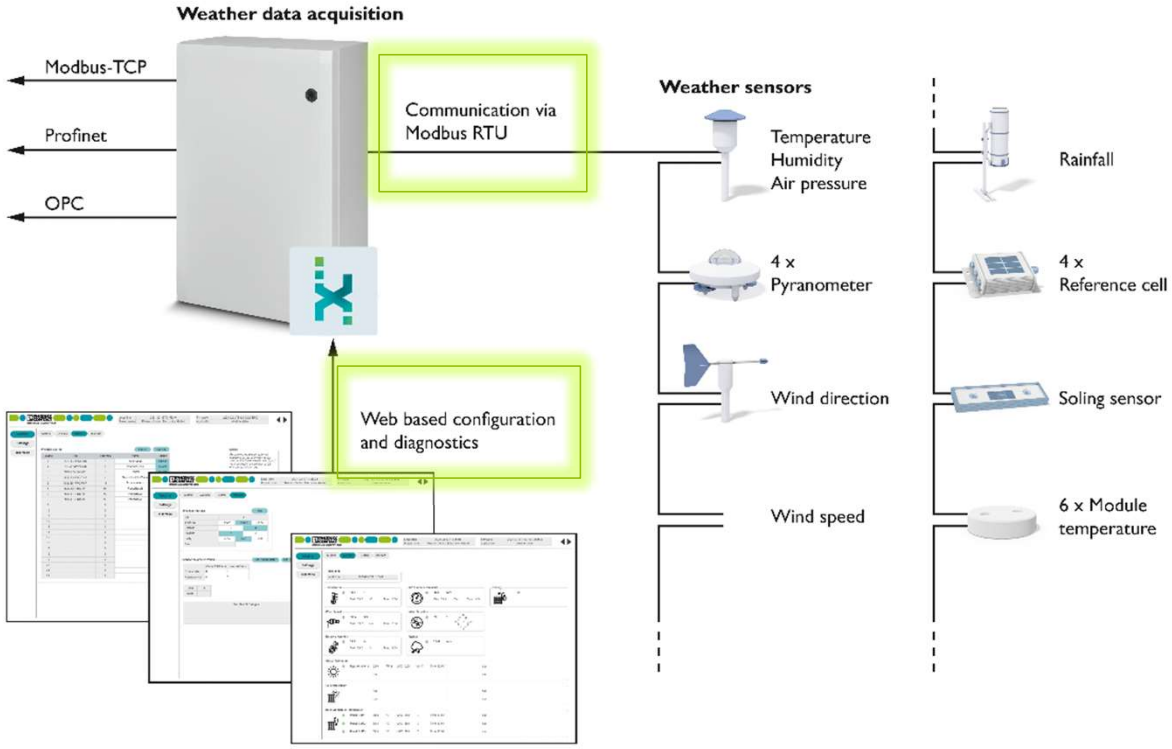


	Utility scale	Commercial	Residential
Typical applications	**Class A High accuracy**	**Class B Medium accuracy**	**Class C Basic accuracy**
Basic system performance assessment	X	X	X
Documentation of a performance guarantee	X	X	
System losses analysis	X	X	
Electricity network interaction assessment	X		
Fault localization	X		
PV technology assessment	X		
Precise PV system degradation measurement	X		

IEC 61724-1:2017 © IEC 2017

Weather Station – Smart solution to measure environmental conditions

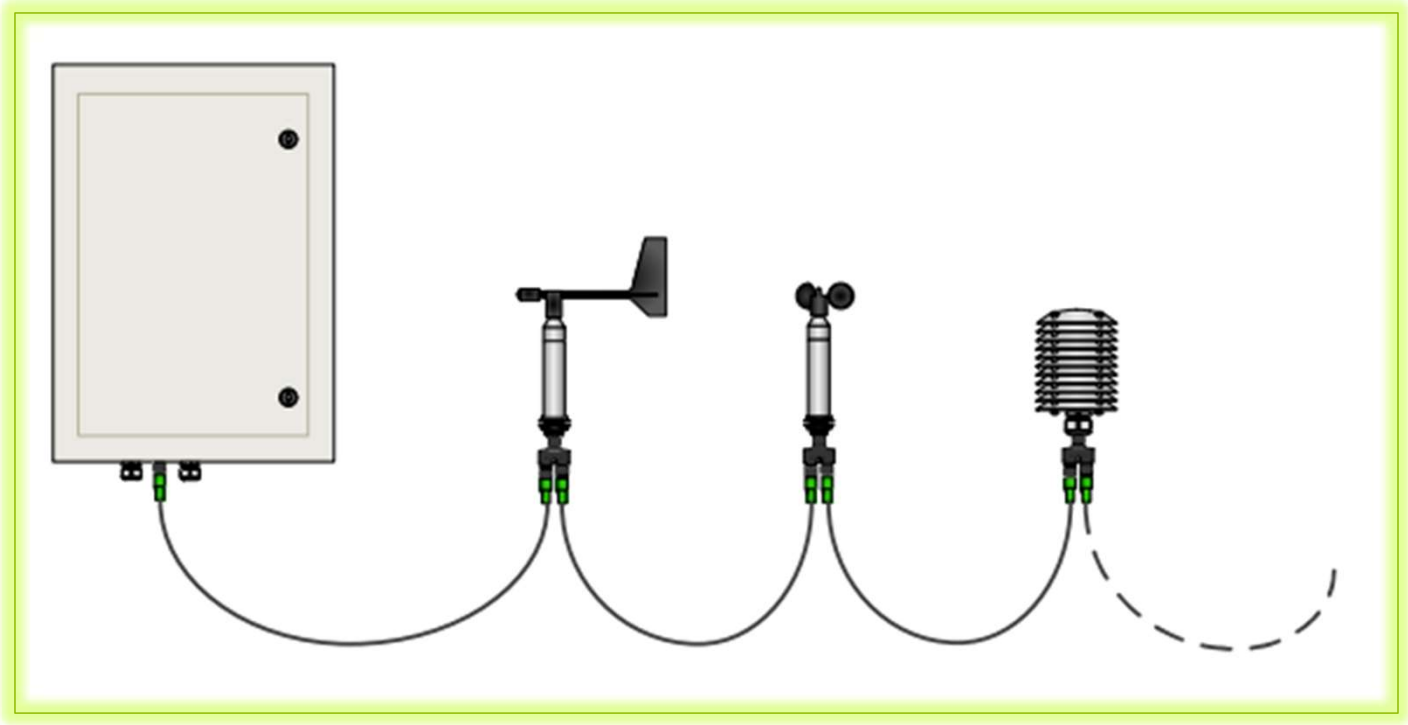
Topologie Weather data acquistion



Weather Station – Smart solution to measure environmental conditions

APPLICATION CLUB

Smart sensor cabling via daisy chain



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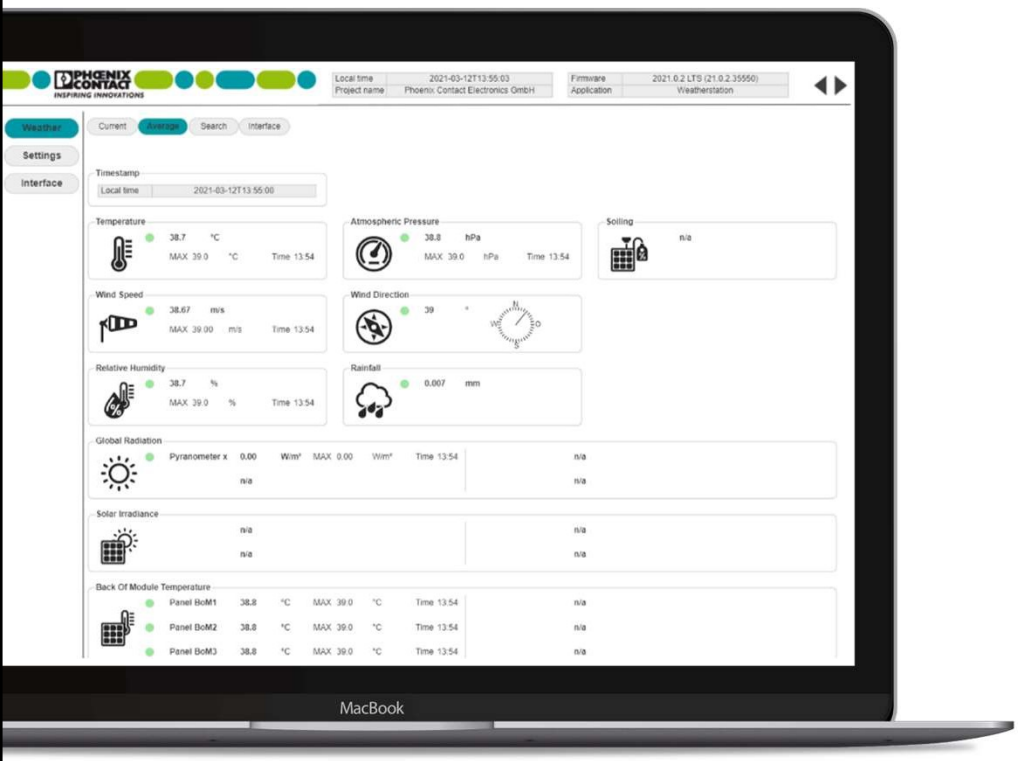
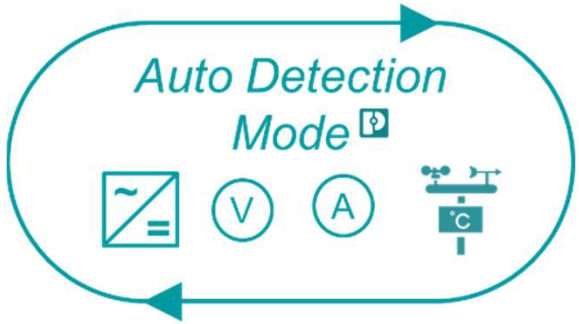
Weather Station – Smart solution to measure environmental conditions

Smart commissioning via Auto Detection Mode





- Web-based configuration
- System overview
- Automatic reading of the network

→ **Time saving during commissioning**

Weather Station – Smart solution to measure environmental conditions

Our reference clients

6 solar parks, total 208MW

Solar park 3,1MW

PV park with 22 tracker 770kW

Weather station and/or environment sensors from Phoenix Contact are already used Europe

Inverter communication

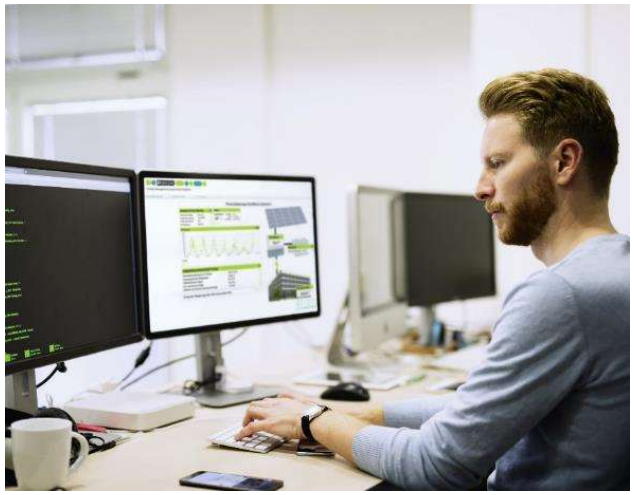
Integrated PV Park Management

Inverter communication

SOLARWORX contains software libraries for PC Worx, our engineering software, which are ideal for the implementation of photovoltaics projects

Among other things, these libraries include ready-made function blocks for communicating with all common types of inverters

To keep engineering times and costs for the startup of photovoltaic systems at a minimum, we continuously develop new drivers and function blocks for the connection of environmental sensors and for photovoltaic tracking systems.



Scan the QR code to go to the compatibility list!

PHOENIX CONTACT
INSPIRING INNOVATIONS

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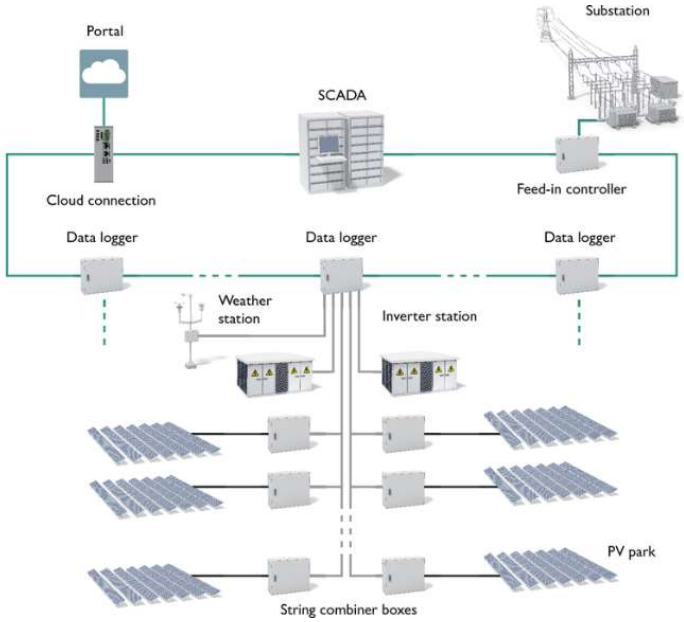
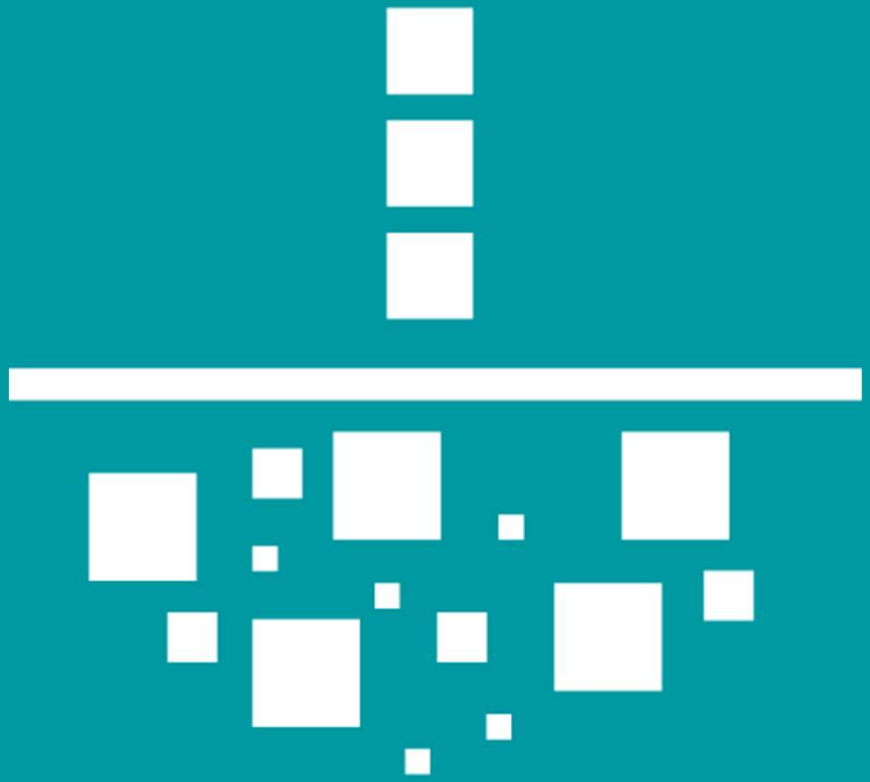


PHOENIX CONTACT
INSPIRING INNOVATIONS

Data logger



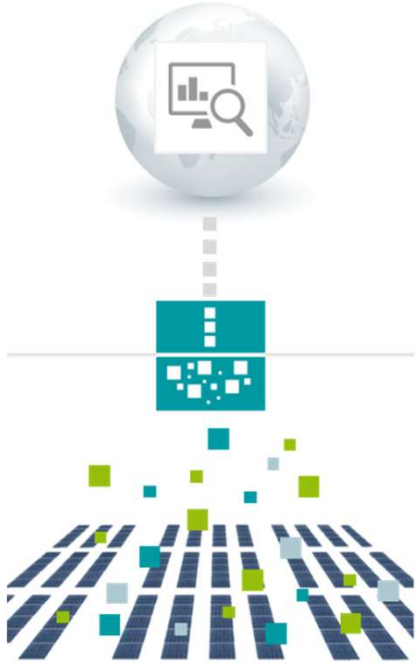
Integrated PV Park Management

Collecting data for the efficient operation of large-scale PV systems

Operating large photovoltaic systems requires continuous monitoring and control at the segment level

Our data logger assumes this function and records all relevant data about the ambient conditions and the inverter status

The data is transmitted to a higher-level data management system



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INSPIRING INNOVATIONS

Data logger

Auto Detection Mode

Significantly reduces the startup time

Less errors during configuration

Temporary data storage

Less faulty visualization and history data

Automatic data transmission when communication is reestablished

Integrated PV Park Management

Collect, process and transmit data

- Automatic detection mode of all park participants
- Avoidance of data gaps in visualization and history data thanks to temporary data storage
- Automatic data transfer to data management system
- Linking to different web portals through open interfaces possible

For further information on our switchgear and controlgear assembly for feed-in control, simply enter web code **#2437** in the search field on our website **phoenixcontact.com**

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INSPIRING INNOVATIONS

The world’s first solar park management system based on industry standards

Integrated PV Park Management

From the field level right through to the visualization of data in a portal, we have developed a scalable concept for the comprehensive operational management of the system portfolio.

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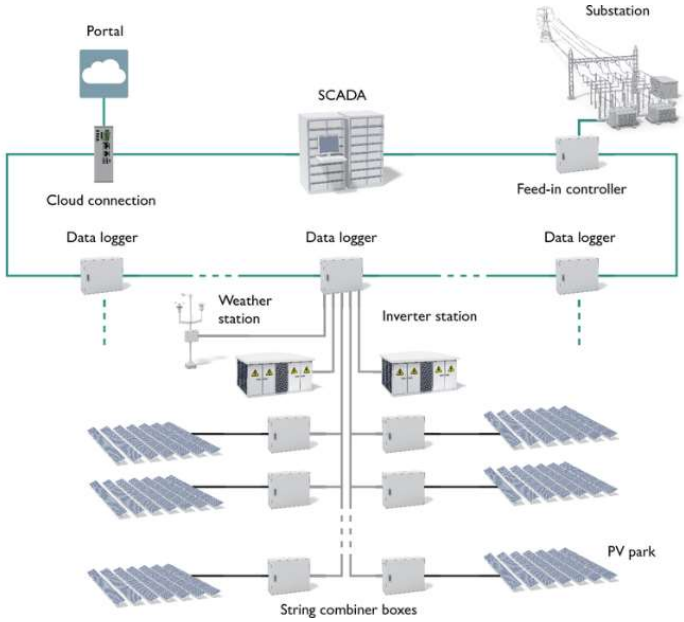
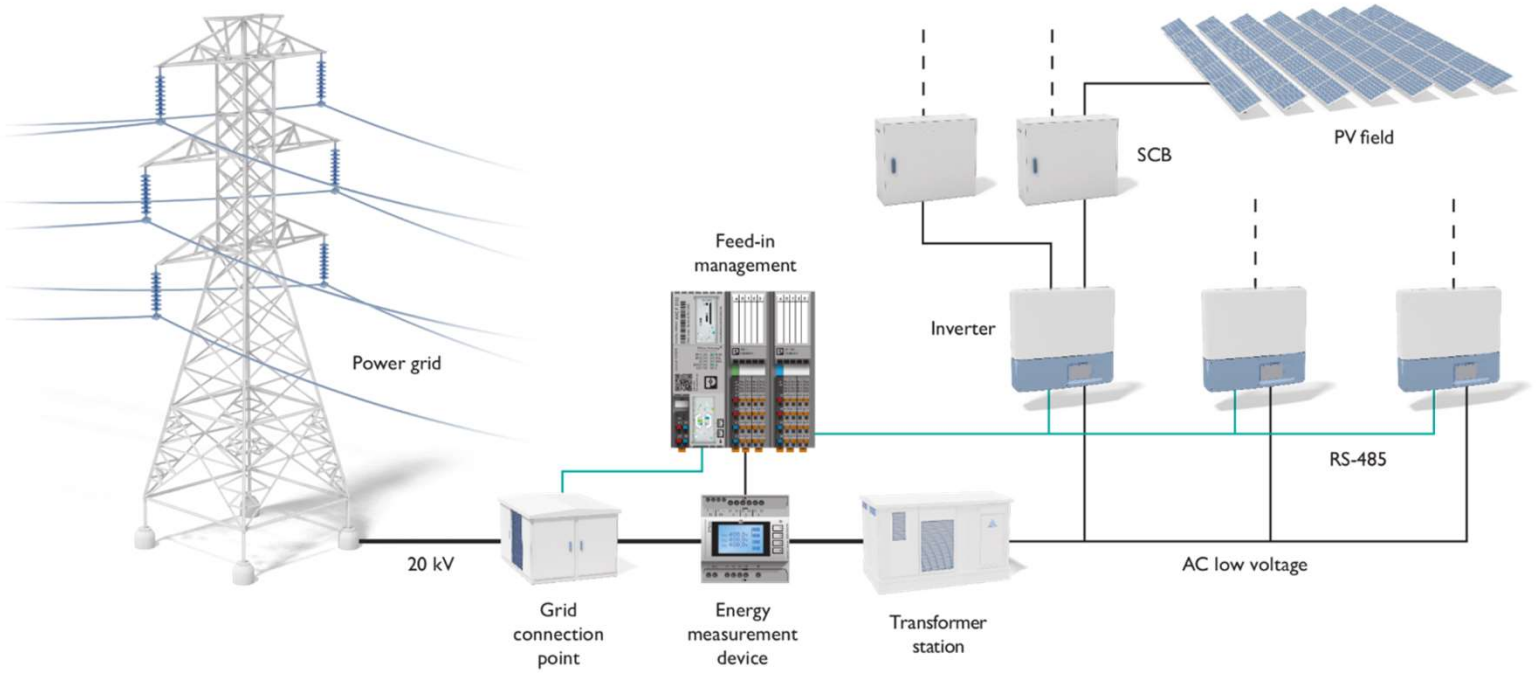


PHOENIX CONTACT
INSPIRING INNOVATIONS

Feed-in management

Integrated PV Park Management

Feed-in management



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Feed-in management

Certified feed-in control

Order designation: **SOL-SA-PCU-41XX**
Order No.: **1114234**

M.O.E. GmbH
Zertifizierungsstelle
Akkreditiert nach
DIN EN ISO/ IEC 17065: 2013

M.O.E. MOELLER OPERATING ENGINEERING
CERTIFICATION · MEASUREMENT · INSPECTION

Komponenten-zertifikat

Nr.: MOE 18-EZE-0014-04
Revision: 0.0

Hersteller / Typ	Phoenix Contact Electronics GmbH / SOL-SA-PCU-41XX
Komponententyp	EZA-Regler für Typ 1 und 2 EZA
Technische Daten	siehe Tabelle 2-1
VDE- Anwendungsrichtlinie	VDE-AR-N 4110:2018-11 VDE-AR-N 4120:2018-11
Zertifizierungsprogramm	FGW Technische Richtlinie Nr. 8 Rev. 9
Mitgeltende Normen / Richtlinien	FGW Technische Richtlinien Teil 3 Rev. 25 FGW Technische Richtlinien Teil 4 Rev. 9

Der oben genannte EZA-Regler erfüllt die Anforderungen der VDE-AR-N 4110:2018-11 und VDE-AR-N 4120:2018-11.

Die Hinweise gemäß Tabelle 4-2 sind zu beachten.

Der Hersteller hat die Zertifizierung des Qualitätsmanagementsystems seiner Fertigungsstätte nach ISO 9001 nachgewiesen.

Das Zertifikat beinhaltet folgende Angaben:

- Technische Daten des EZA-Reglers und die gültige Softwareversion;
- den schematischen Aufbau des EZA-Reglers;
- zusammengefasste Angaben zu den Eigenschaften des EZA-Reglers;

Das Zertifikat besteht aus 16 Seiten und folgendem Anhang:

- Anhang I: Evaluierungsbericht MOE-18-EZE-0014-03

Das Zertifikat ist gültig bis Datum (03.12.2024).

Itzehoe, 04.12.2019

04.12.2019 — **Jan-Martin Mohrdieck, M.Eng.**
Stellv. Leiter der Zertifizierungsstelle

04.12.2019 — **Mathias Morawe, M.Sc.**
Seniorexperte der Zertifizierungsstelle

M.O.E. GmbH Zertifizierungsstelle, Fraunhoferstraße 3, 25524 Itzehoe, info@moe-service.com

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Feed in Management Solution Certified VDE

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Feed-in Management

Contributing to grid stability

- Reliable system operation and simple grid connection by meeting all technical connection requirements
- Intelligent automation solutions ensure low engineering and operating costs
- Thanks to the pre-programmed software, you can quickly put power generation plants into operation
- Open interfaces enable customer-specific extensions

For further information on our switchgear and controlgear assembly for feed-in control, simply enter web code **#2438** in the search field on our website **phoenixcontact.com**

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Feed-in management

Application area VDE-AR-N 4110:2018-11

- To be used when connecting and operating customer systems (supply and generation systems, storage systems, mixing systems, as well as chargers for electric vehicles) to/on the public medium-voltage grid
  - Mains frequency: 50 Hz
  - Mains voltage: >1 kV to <60 kV
- To be used when the connection of the customer system is located in a customer's low-voltage grid, which is connected to the public medium-voltage grid via the mains transformer and the connecting cables
- These technical connection rules only fully apply for generation systems and storage systems from a maximum (installed) active power of ≥135 kW respectively.
- Run and certify generation systems with a maximum installed active power <135 kW independently of the connection to the public energy supply network in accordance with VDE-AR-N 4105:2018-11.

Feed-in management

Application area VDE-AR-N 4120:2018-11

- To be used when connecting and operating customer systems (supply and generation systems, storage systems, mixing systems, as well as chargers for electric vehicles) to/on the public high-voltage grid
  - Mains frequency: 50 Hz
  - Mains voltage: ≥60 kV to <150 kV
- To be used when the connection of the customer system is located in the customer's medium-voltage grid, which is connected to the public high-voltage grid via the mains transformer and the connecting cables.
- This does not apply if the connection of the customer system is located in the customer's high-voltage grid, which is connected to the public extra-high voltage grid via the grid transformer and the connecting cables. In this case, VDE-AR-N 4130:2018-11 will apply.

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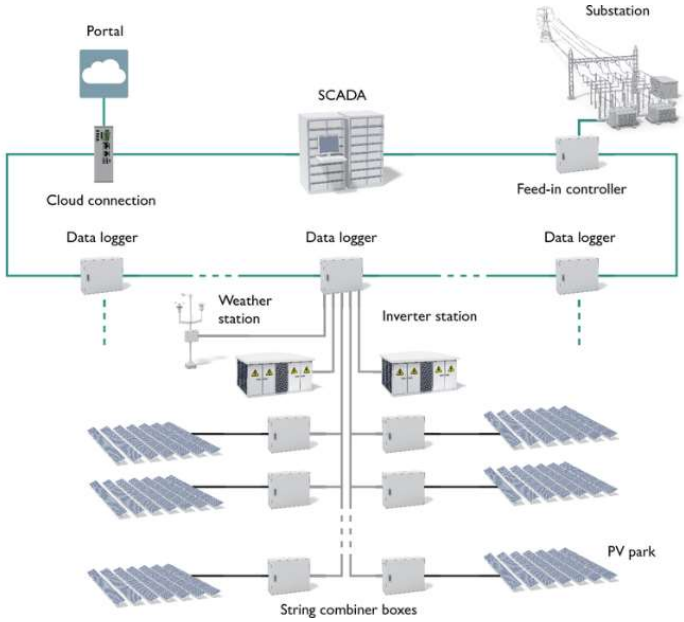

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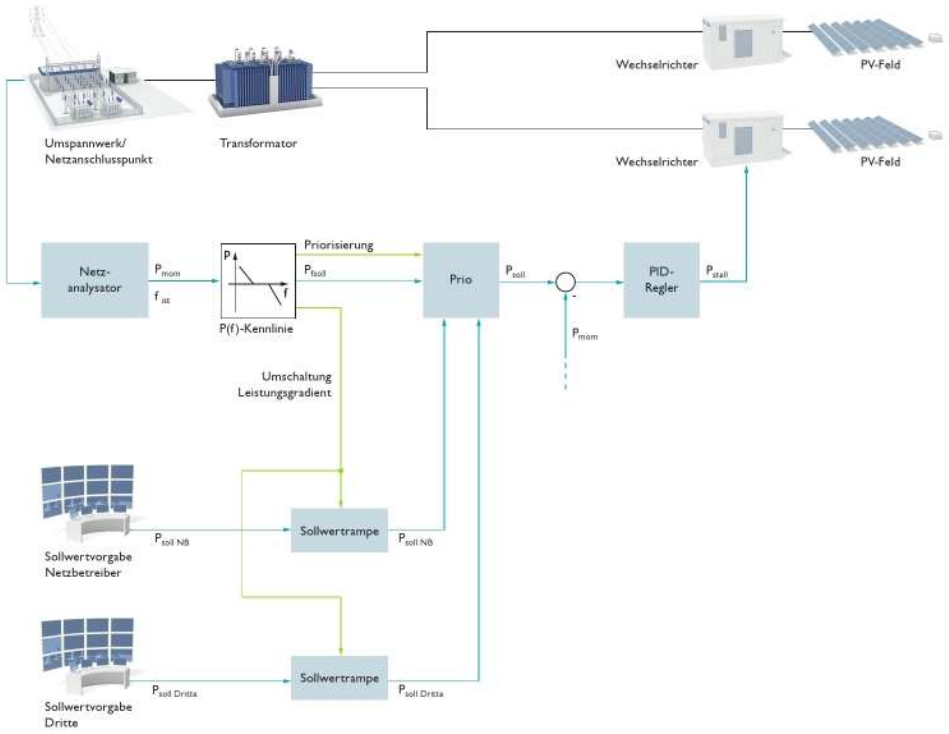
Feed-in management

Real Power 0 – 100 %

Aim of this procedure: The generation system regulates the real power in dependence of setpoint definitions of third parties and in consideration of supply continuity management.



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Feed-in management

Real Power/ Frequency

Aim of this procedure: The generation system regulates the real power at the network connection point in dependence of the current mains frequency of the primary distribution network.

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Feed-in management

Reactive Power/ Voltage

Aim of this procedure: At the network connection point, the generation system exchanges reactive power with the network in dependence of the current operating voltage of the primary distribution network.

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Feed-in management

Reactive Power/ Real Power

Aim: The generation system feeds reactive power (in Mvar) – predetermined by the network operator – into the network, independent of the real power supply.

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Visualization in a portal

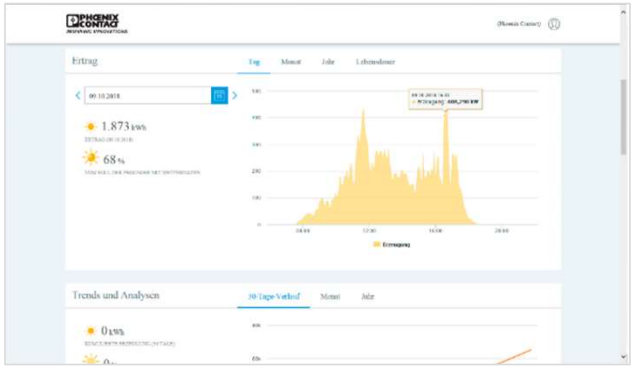
Integrated PV Park Management

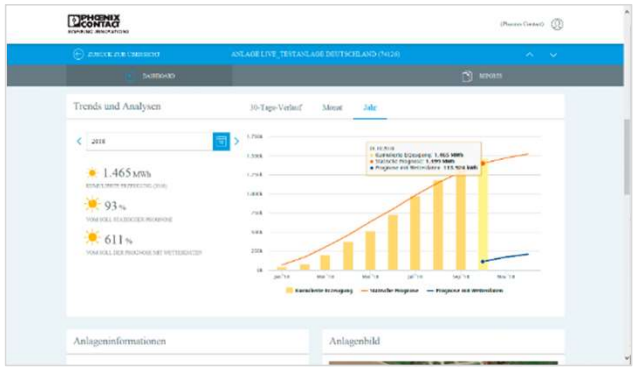
Portal connection

All assets at a glance, thanks to portal dashboard

An overview is provided of various PV systems, hosted in the highly secure data center

Optimum overview of production data, plus commercial reports





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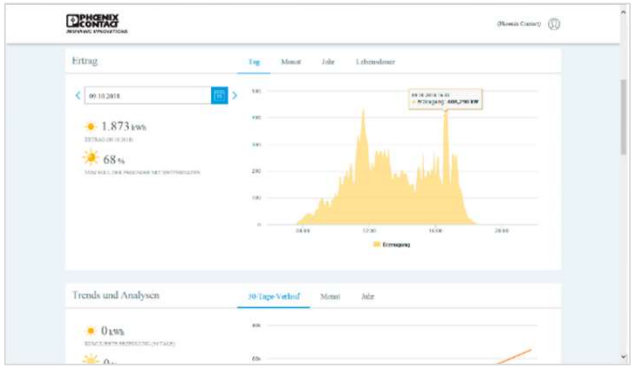
Integrated PV Park Management

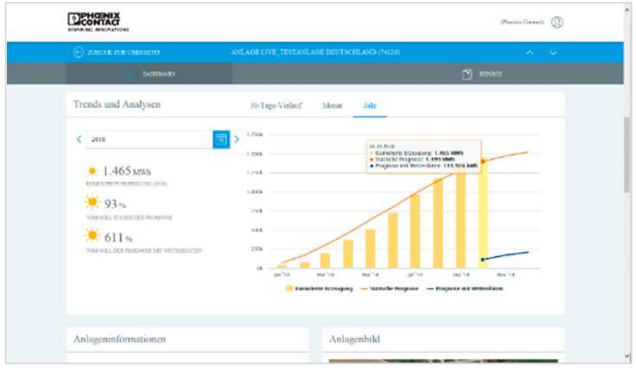
Portal connection

Easy startup by means of automatic detection of all park devices

Reduced maintenance costs, thanks to the automated failure algorithm

Available as an option: customer-specific dashboard for custom corporate identity





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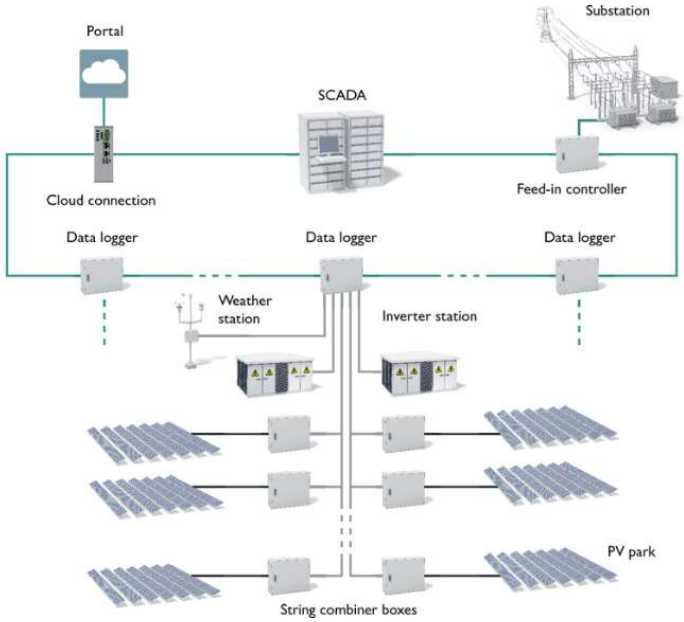

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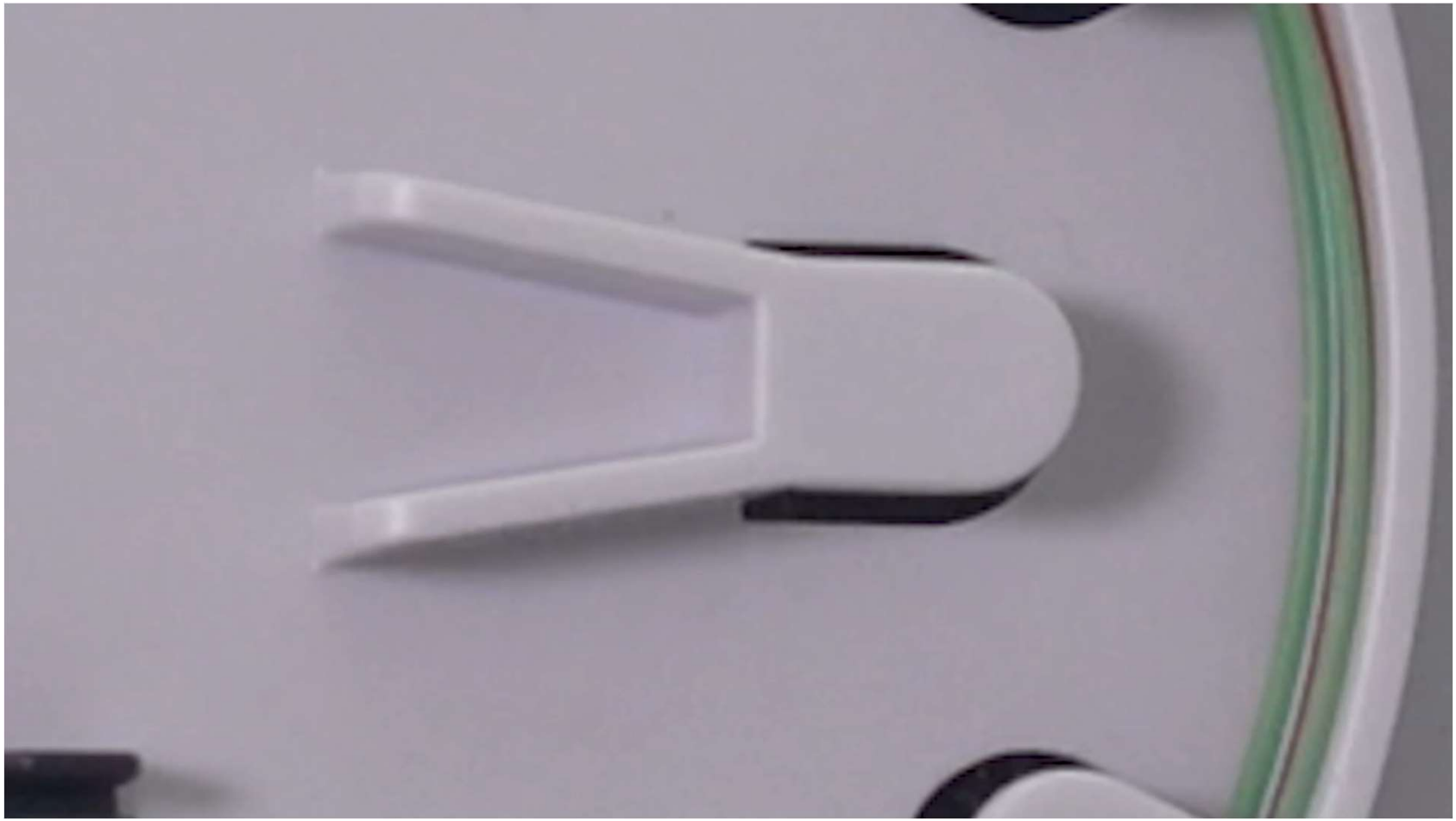

Video Surveillance for PV PARK Management

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Our services

Integrated PV Park Management

Our services

Concept creation

Model-based software development

Project support

Solutions for solar power

Strong solution partner behind every efficient solar park

Phoenix Contact, a global market leader headquartered in Germany, has been an expert provider of solutions and products in the solar power industry for many years.

Our group is synonymous with future-oriented components, systems, and solutions in the fields of electrical engineering, electronics, and automation.

A global network across more than 100 countries and our more than 16,500 employees ensure close proximity to our customers, which we believe is particularly important..

From ground-mounted systems to rooftop systems all the way to hybrid energy systems, Phoenix Contact ensures the reliable operation of your photovoltaic park through the use of continuous plant data collection and an optimized feed-in management system.

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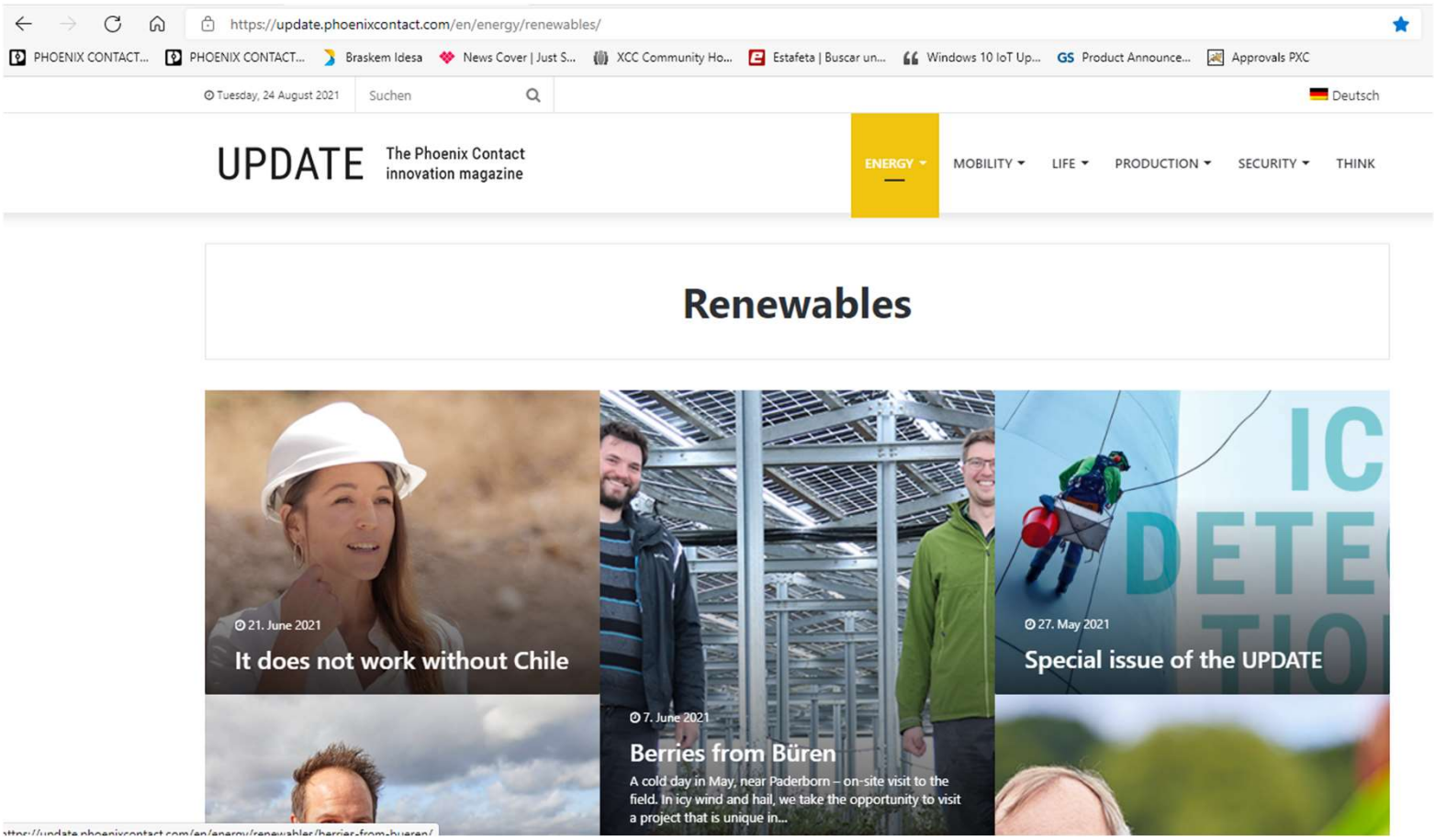

UPDATE Solar

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Guided Tour over the construction site of our latest Floating PV project Bomhofsplas

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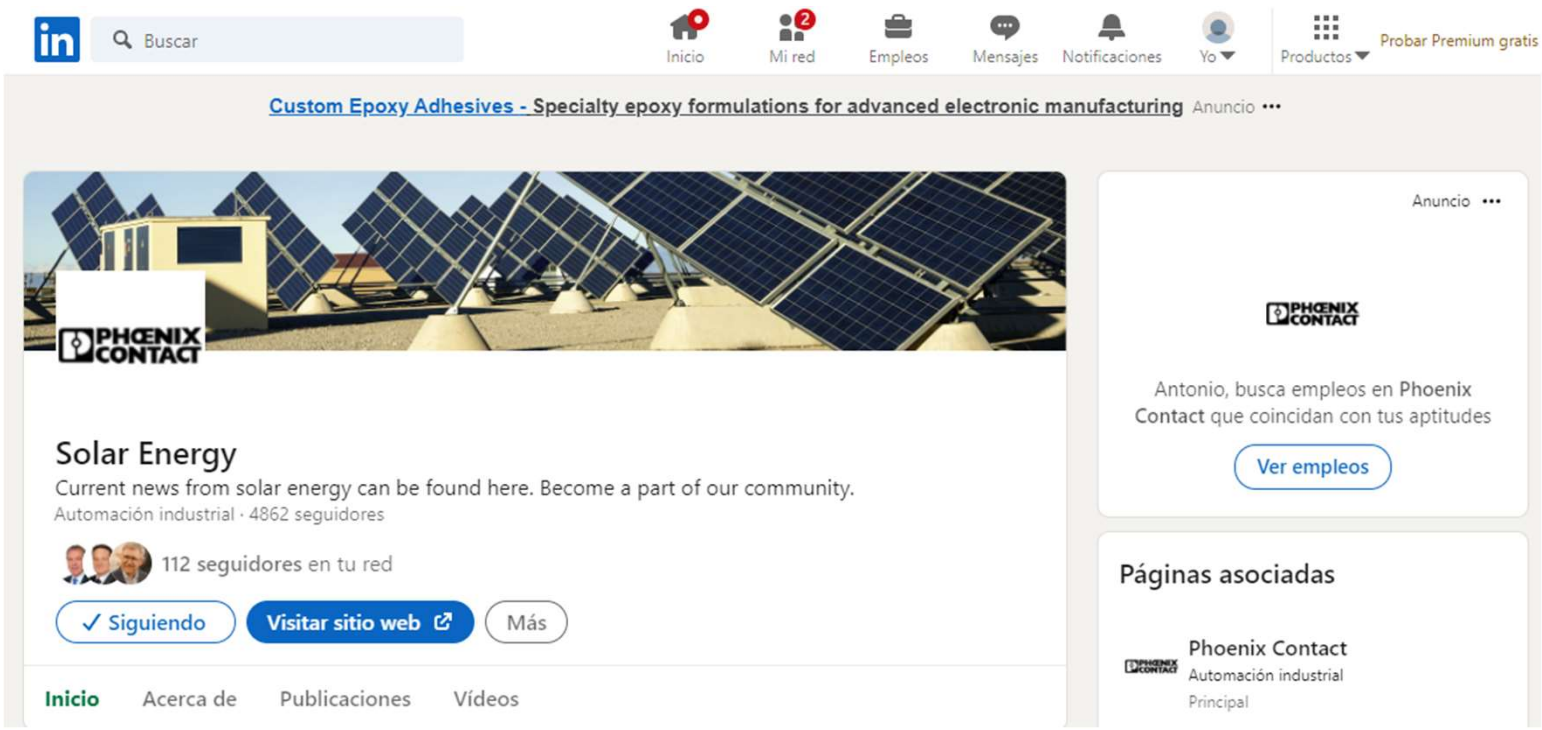
Linkedin



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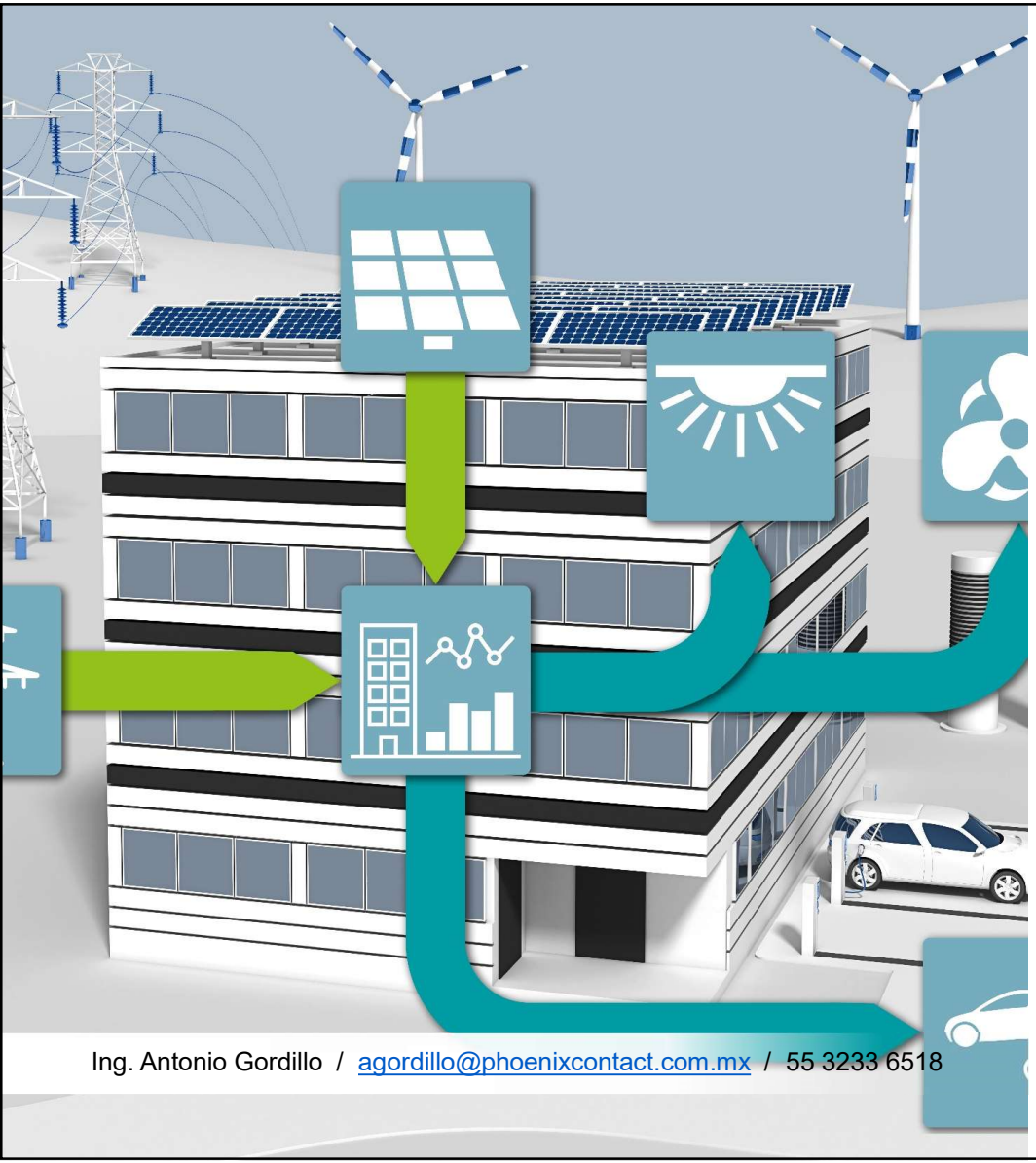

Danke

Gracias por su atención

Ing. Antonio Gordillo / agordillo@phoenixcontact.com.mx / 55 3233 6518

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