Solar power

Solutions for photovoltaics

PHOENIX CONTACT
INSPIRING INNOVATIONS

Passionate about your industry
Customized comprehensive solutions

Phoenix Contact, a global market leader in the field of electrical engineering, electronics, and automation, is your reliable partner in the solar industry. To ensure the efficiency of your systems in the long term, our experts use their many years of technical expertise and passion to focus on the challenges you face. Excellent products which are intelligently combined to form innovative systems are at the heart of our solutions. Extended with industry-specific features, we develop solutions which are rounded out by engineering, servicing, and training services.

"We are constantly working to further develop our industry standard-based solutions for an environmentally conscious and cost-effective power supply."

Global Industry Management – Phoenix Contact

Contents

For further information on solar power, simply scan the QR code.

Solutions for sustainable energy

A global society in which renewable and affordable electrical energy is available in sufficient quantities: This is the All Electric Society – the scientifically based vision of the future of a carbon-neutral and sustainably developing world. The way to achieve this is through the comprehensive electrification, networking, and automation of all relevant areas of life and work. Phoenix Contact is empowering its customers through numerous products, solutions, and application examples to actively shape this transformation towards a sustainable industrial society.

Energy-efficient buildings

A photovoltaic system on the roof or integrated in the facade, a combined heat and power plant in the cellar, charging stations in front of the door: sector coupling has already become reality in modern buildings. In order to be able to operate them as an overall system in an automated manner and as energy-efficiently as possible, a wide variety of data, whether from systems or sensors, must be ready for universal use. The open IoT framework of the Emalytics building management system from Phoenix Contact makes this possible.

Reliable networked systems

The increasing electrification, networking, and automation of sectors goes hand in hand with a growing dependency on reliable power supply solutions. For reliable supply and sector coupling, we provide solutions with surge protection, uninterruptible power supplies, redundancy modules, and compatible device circuit breakers for all applications.

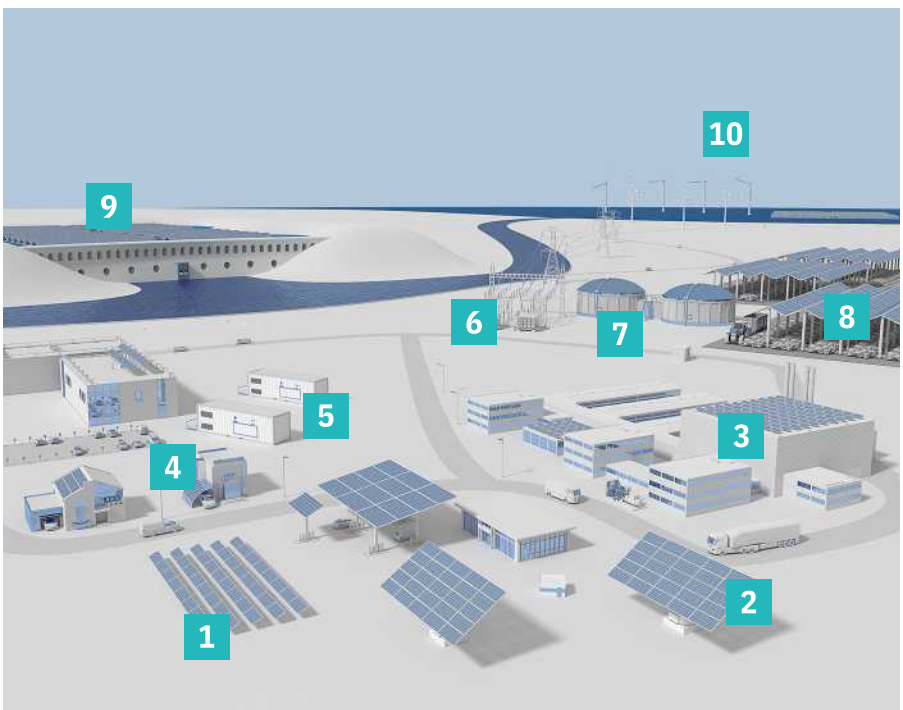
Lowering the hurdles of the energy revolution

Distributed photovoltaic systems contribute significantly to a reliable power supply in the All Electric Society. Certified feed-in controllers from Phoenix Contact enable fast and unbureaucratic grid connection of new systems – without having to wait a long time for the certificate of grid conformity. In this way, they not only simplify the path to the energy revolution – they actually accelerate the process.

The energy landscape of tomorrow

The All Electric Society replaces fossil fuels with renewable sources of energy, such as photovoltaics and wind power. To ensure the safe operation and controlled power feed-in of distributed power generation plants, we provide you with solutions based on industry standards for the following:

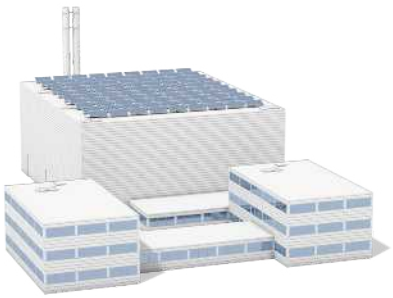
1. Ground-mounted PV systems
2. PV tracking
3. PV rooftop systems
4. E-mobility
5. Energy storage
6. Power transmission and distribution
7. Biogas plants
8. Agrivoltaics
9. Floating PV
10. Wind power



Sector coupling is the key to a sustainable power supply.

Ground-mounted systems

From a suitable, comprehensive cabling solution to intelligent park management, Phoenix Contact offers all the components for the efficient operation of your ground-mounted photovoltaic system.



Rooftop systems

Rooftop photovoltaic systems are susceptible to damage from lightning strikes. Thanks to our product portfolio of ready-to-install string combiner boxes for rooftop systems, we offer long-term protection.

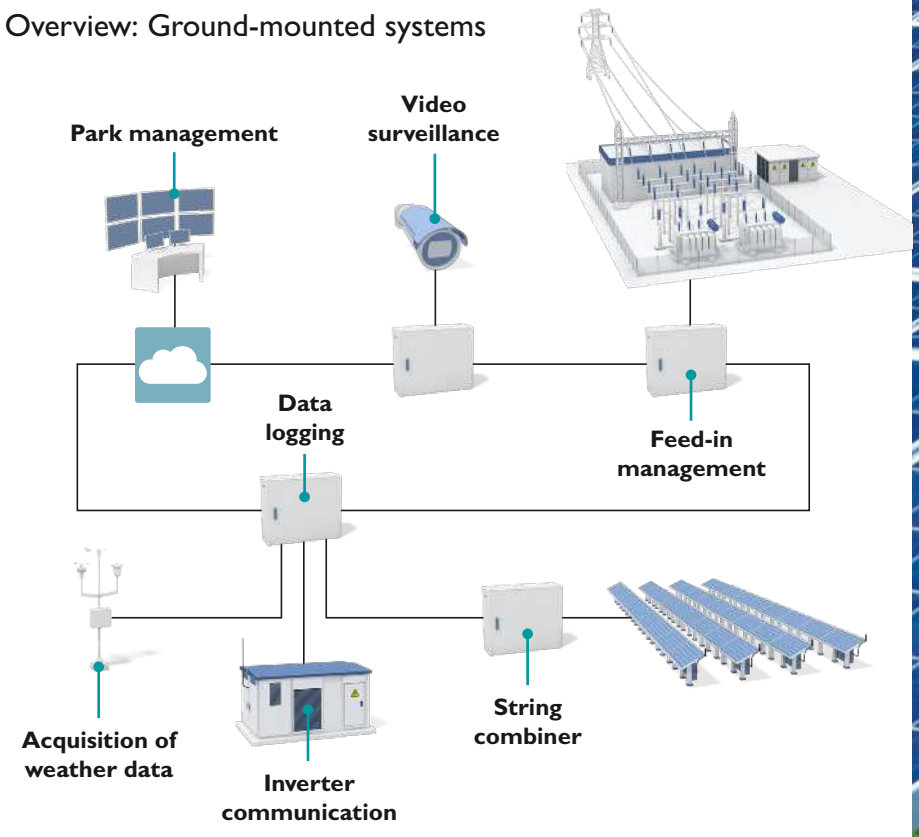
Hybrid energy systems

The combination of different power generation plants plays an important role in the expansion of renewable energy. It ensures the sustainable supply of cities and industrial buildings.

Solutions for ground-mounted systems

Photovoltaics makes a major contribution to meeting our continually rising energy requirements. Interest in building increasingly larger and more powerful ground-mounted photovoltaic systems is on the rise worldwide. Networking, monitoring, and communication are indispensable in this regard, particularly in relation to consistent network quality and maintenance in line with requirements. At the same time, in the case of larger systems, the focus is on quick and easy connection technology. Discover the advantages of Phoenix Contact solutions for yourself.

Overview: Ground-mounted systems



Solutions for ground-mounted systems

Park management

Optimal operational management and maintenance are crucial for ensuring the profitability of your systems. Our solutions for park management enable the extremely reliable and economical operation of PV systems. From the field level to the visualization of data in a portal, we have developed a scalable, seamless concept for the comprehensive operational management of the system portfolio. Thanks to this open system, solar parks can be quickly and easily integrated and commissioned.

Your advantages

- ☑ Transfer 90% of your existing planning to new solar projects
- ☑ Achieve time savings of 50% when commissioning your solar park with Plug and Play
- ☑ Reduce operating and maintenance costs by more than 40%

Comprehensive project support

We enable application-oriented analysis and consultation for the smooth implementation of your photovoltaic projects. Thanks to coordinated system solutions, we provide you with a turnkey automation and visualization portfolio that is already proven in the field. We thus achieve a high level of reusability and scalability, tailored to your needs.

Model-based software development

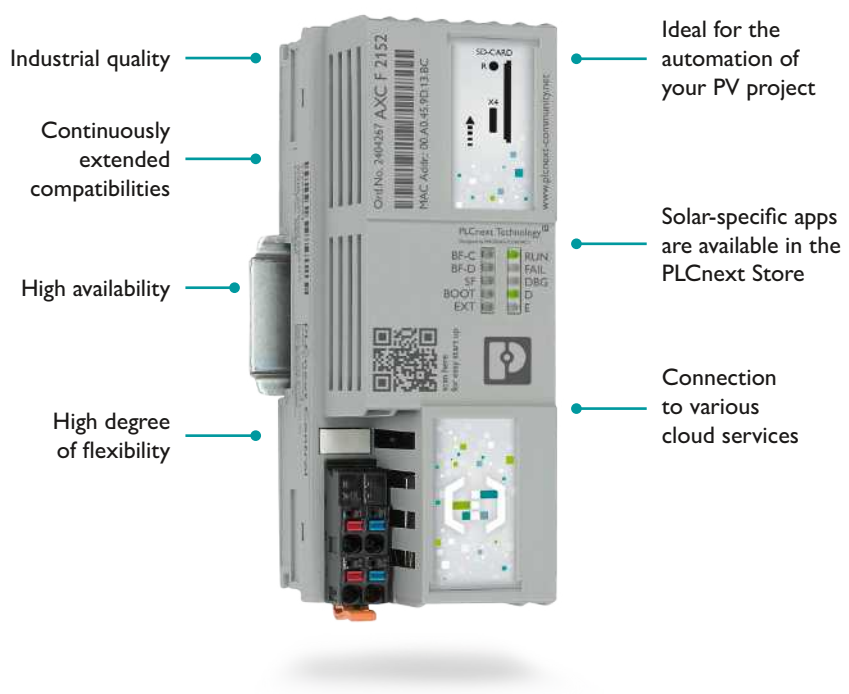
With the help of Matlab Simulink, the software for your park management will be developed based on models. International grid codes can be integrated easily and the engineering costs can be kept down. Moreover, model-based software development also enables structured implementation and minimizes risks during the planning phase. This ensures that your projects can be implemented efficiently.

Flexible portal connection

To avoid data gaps in monitoring and reporting, data is automatically stored locally in the event that the Internet connection between the photovoltaic system and the portal is interrupted. Open system interfaces enable connection to existing portals.

The platform for comprehensive photovoltaic park management

PLCnext Technology forms the basis of the open control platform from Phoenix Contact. The solution makes it possible to provide a coordinated portfolio for photovoltaic systems. The integration of open-source software, apps, and future technologies also enables quick and reliable engineering as well as easy adaptation to the individual requirements of the operator. You can implement new IoT-based business models through direct connection to cloud-based services and databases.



PLCnext Technology

Designed by Phoenix Contact

Solutions for ground-mounted systems

Feed-in management

Distributed power generation plants need to play their part in ensuring high grid stability. The system yield, storage, and self-consumption are regulated and monitored. When it comes to meeting the energy needs in the near future, the major tasks include linking various energy sources, using types of storage, and shifting loads to meet the peak generation. The accelerated expansion of renewable energy is creating considerable challenges for grid and system operators, electricity marketers, and consumers alike.

Your advantages

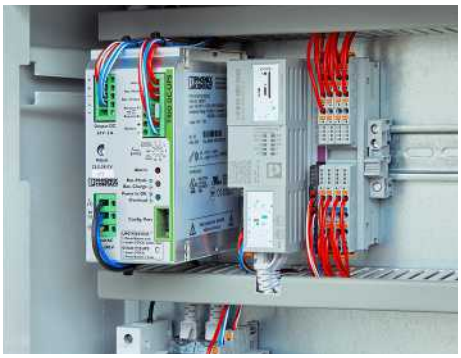
- ☑ Certified in several European countries
- ☑ Simple grid connection due to compliance with all technical connection requirements worldwide
- ☑ Low engineering and operating costs with intelligent automation solutions
- ☑ Rapid commissioning with preprogrammed software
- ☑ Open interfaces enable customer-specific extensions

Open control technology

With the Power Control Unit (PCU) from Phoenix Contact, you can implement reliable feed-in management. We offer freely programmable interfaces and function blocks and constantly work towards meeting the requirements for comprehensive energy management systems.

Flexible connection of power generation plants

Multi-instancing of the PCU makes it possible to control different power generation plants independently and simultaneously at one grid connection point, for example, a combination of a photovoltaic system and a CHP plant.



Certified solution

Phoenix Contact is one of the first manufacturers to have certified its PCU for the German market. Since then, this certificate in accordance with VDE-AR-N 4110/20 has been applied successfully in Germany for systems above 135 kW. The strong growth in the solar market has spread to all of Europe. Phoenix Contact is also aiming for PCU certification for countries where a certified solution is possible.

Programmed functions

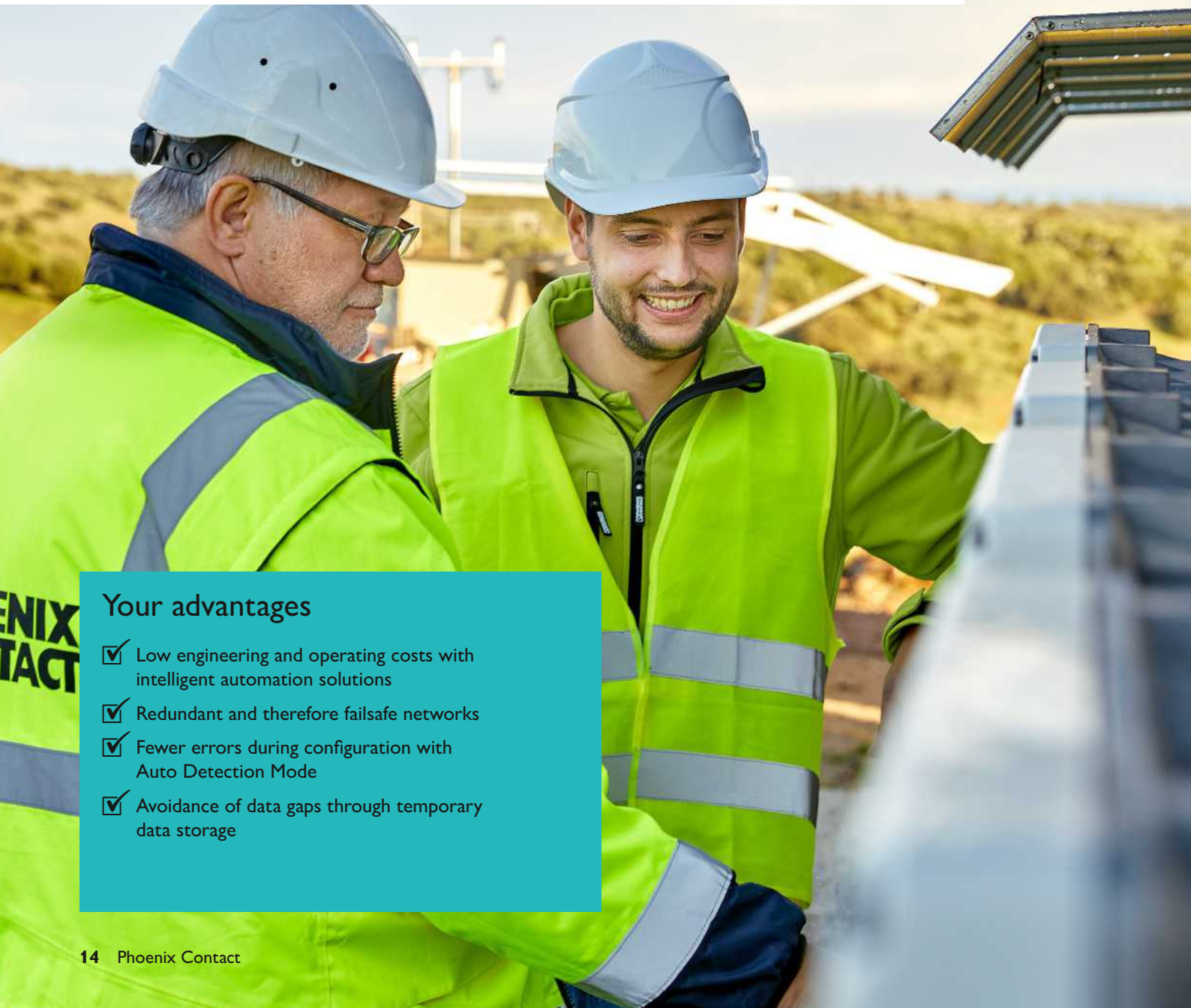
Our PCU can be customized specifically to your application. The interfaces to the grid operators, power providers, direct sellers, and energy measuring devices are connected by the user on the basis of the specific project. In addition, we offer a wide variety of controller functions for controlling all kinds of distributed power generation plants.

Grid operator	Control functions	Power generation unit
IEC 60870-5-104	P(f) characteristic curve	Wind power
IEC 60870-5-101	Q with voltage limitation	Biogas CHP plant
4 ... 20 mA	**Q(U) characteristic curve**	**Photovoltaics**
Ripple control receiver	Q(P) characteristic curve	Battery storage
Data point lists	$\cos(\varphi)_{soll\ NB}$ / $Q_{soll\ NB}$ cos(φ)	Generation of hydrogen

Solutions for ground-mounted systems

Data logging

Operating large photovoltaic systems requires continuous monitoring and control at segment level. A 10 MW solar system comprises approximately 2,500 strings for every 20 solar panels. It consists of a variety of string combiner boxes, inverters, and additional monitoring components such as reference sensors, weather stations, or energy measuring devices. Countless amounts of measurement data are acquired and processed further, inverters are controlled, and the system status is transmitted to a higher-level data management system. These tasks are performed by our data logger.



Your advantages

- ☑ Low engineering and operating costs with intelligent automation solutions
- ☑ Redundant and therefore failsafe networks
- ☑ Fewer errors during configuration with Auto Detection Mode
- ☑ Avoidance of data gaps through temporary data storage

Data acquisition and collection

To ensure effective system monitoring in large photovoltaic systems, the currents of individual strings are monitored. Our data logger records all the relevant data regarding the ambient conditions and the status of the inverter. This data can be transmitted to a higher-level portal.

Temporary data storage

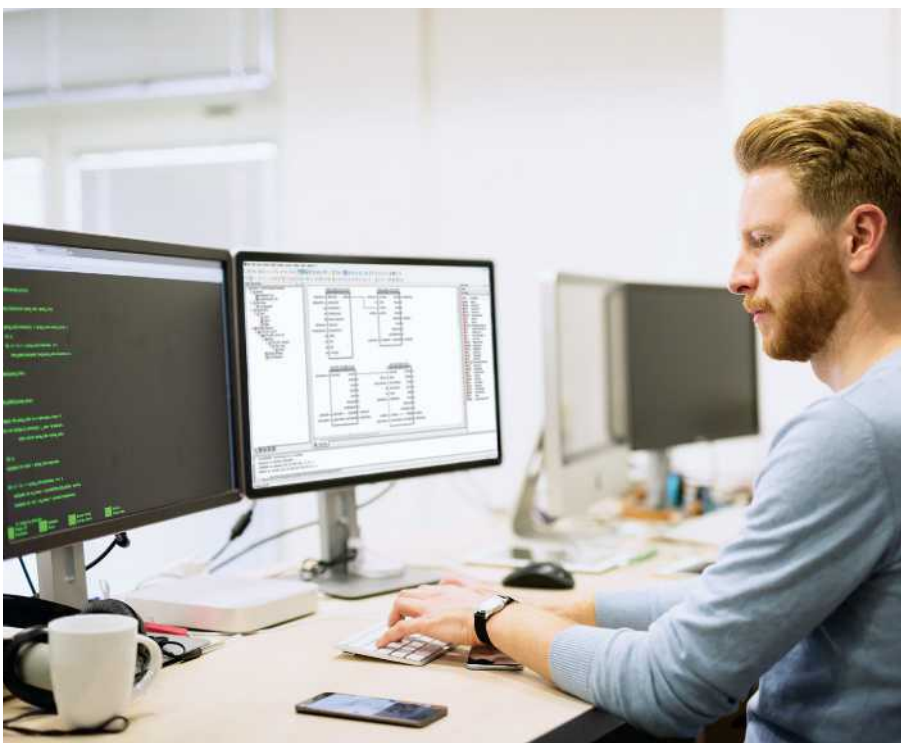
Temporary data storage ensures seamless visualization and history data. Automatic data transfer after communication to the data management system has been restored is also ensured.

Automatic system detection

The data loggers use automatic detection mode, making it extremely easy to connect all of the systems in the PV park using Plug and Play. This reduces the commissioning time significantly, as there is no configuration required.

Compatibility with all common inverters

Solarworx contains software libraries for our engineering software solutions, PC Worx and PLCnext Engineer, which are specifically designed for the implementation of photovoltaic projects. Among other things, these libraries include ready-to-use driver blocks for communication with all common inverter models. To keep the engineering outlay for commissioning photovoltaic systems to a minimum, we are constantly developing new drivers and function blocks. For example, they are used for connecting environmental sensors and for using solar trackers.



Software for all engineering tasks in PV parks

Solutions for ground-mounted systems

Acquisition of weather data

Operators of photovoltaic systems want to be kept informed of the energy efficiency and reliability of their ground-mounted system at all times. One possible measurement of this is the performance ratio, which indicates the ratio of the actual system yield to the yield that is theoretically possible. Weather stations measure important data around the clock. This data is then included in the calculation of the performance ratio.

Your advantages

- ☑ Minimal configuration effort with simple Plug and Play connection for weather sensors
- ☑ All sensors meet the requirements of IEC 61724-1 for Class A systems
- ☑ Flexibility due to the individual selection of sensors
- ☑ Quick integration possible without prior programming knowledge

Acquisition of weather data

The environmental sensors of the weather station are directly connected to our control system via Modbus. The preconfigured sensors are immediately available to transmit weather data. Thanks to our extensive portfolio of sensors, we can provide you with weather stations that are tailored to your needs.

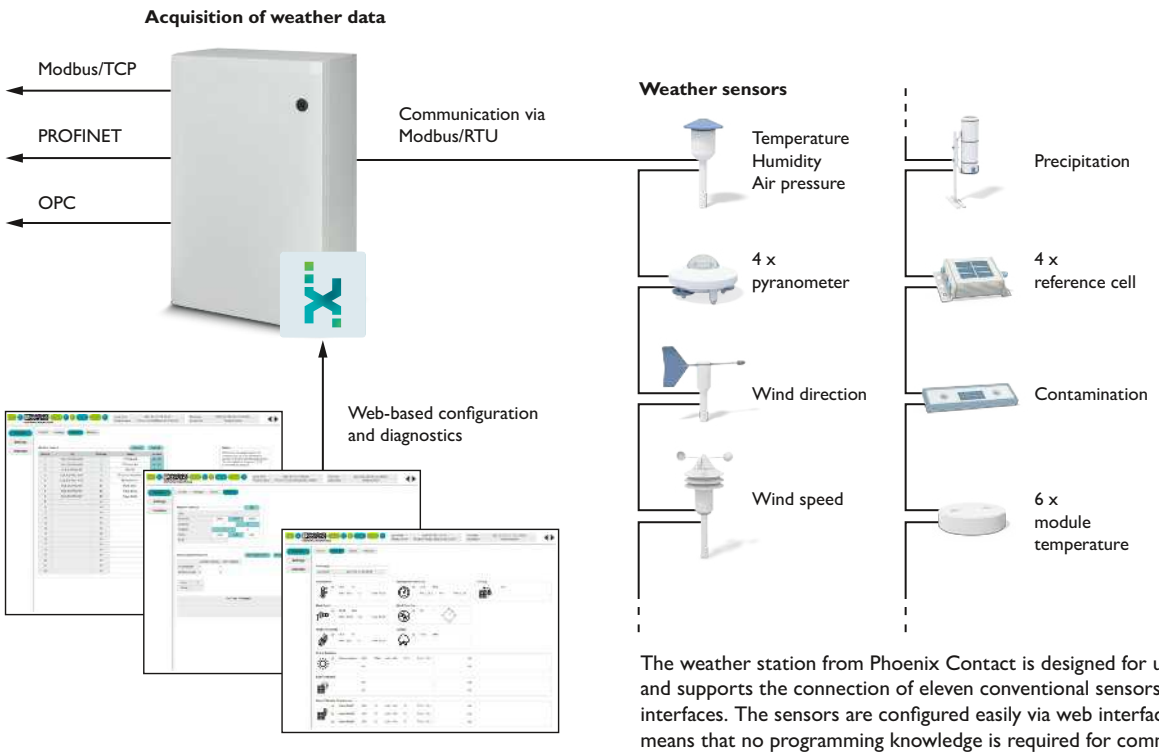
Connection of sensors

Instead of wiring each sensor individually, our M12 connections with Y distributors make it exceedingly simple to connect them in series. This greatly reduces the amount of wiring required on site while also making it easier to integrate the sensors into the overall system.

Performance at a glance

To determine the performance of a PV system, irradiance sensors are mounted horizontally as well as at module level. The performance ratio indicates when the actual solar yield deviates from the expected yield. System operators can thus promptly intervene and secure their revenue in the long term.

Intelligent solution for measuring environmental data



The weather station from Phoenix Contact is designed for universal use and supports the connection of eleven conventional sensors via standard interfaces. The sensors are configured easily via web interface. This means that no programming knowledge is required for commissioning the weather station.

Solutions for ground-mounted systems

String combiner

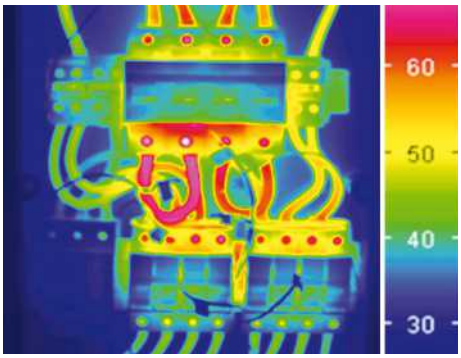
Planners and installers are faced with the challenge of achieving maximum availability and performance for photovoltaic systems in regions with varying climatic conditions. The important factors here are collecting and distributing string currents, protecting the individual modules against damage from lightning and surge voltages, and monitoring the performance of the system.

Your advantages

- ☑ Application-oriented analysis and consultation
- ☑ Standardized tests in an accredited laboratory
- ☑ Reliability and durability, thanks to a temperature-optimized design
- ☑ Protective devices meet EN 50539-11 and UL 1449 3rd
- ☑ KEMA-certified

Consultation and development

During preliminary development clarification, we work closely with our customers in order to meet the desired requirements in the best way possible. The development process is designed to be target-oriented and efficient. Following completion of preliminary clarification, the design phase of our string combiner boxes gets underway.



Checking and testing

The prototypes undergo electrical and mechanical testing in our own test laboratories. Temperature, climate, and vibration tests ensure that the solutions work flawlessly in the intended environments. A temperature test, for example, enables hotspots to be detected. The results are used to define the optimal layout of components. This eliminates failure due to thermal overload.

Customer-specific solutions

Based on the specified requirements, we provide customized control cabinet solutions for the string combiner of photovoltaic systems. Variations in the number of strings, the monitoring function, the disconnection of the strings, and protection against surge voltages can be implemented flexibly.

We meet your individual requirements

Monitoring string currents and voltages
Using Hall sensors, the current measuring module determines the parameters of your photovoltaic systems on a contact-free basis and forwards them to the communication module.
With the voltage measuring module, you can measure DC voltages up to 1,500 V.

Connection and protection
Fuse terminal blocks are ideal for protecting individual strings against reverse currents.

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

Protection against surge voltages
Significantly increase the availability of your system with lightning current arresters and surge protective devices from Phoenix Contact.

String combiner: Data communication in PV parks

Wireless string monitoring

Trusted Wireless technology was specifically developed for industrial use. Due to high-frequency switching operations in PV systems, interference commonly occurs on communication cables. This means that interference-free monitoring of PV systems cannot always be ensured. Wireless communication in the 2.4 GHz band is immune to electromagnetic interference and is therefore ideal for use in PV systems. Using wireless modules, serial RS-485 cables can be easily and flexibly replaced with a secure, interference-free wireless connection.

Your advantages

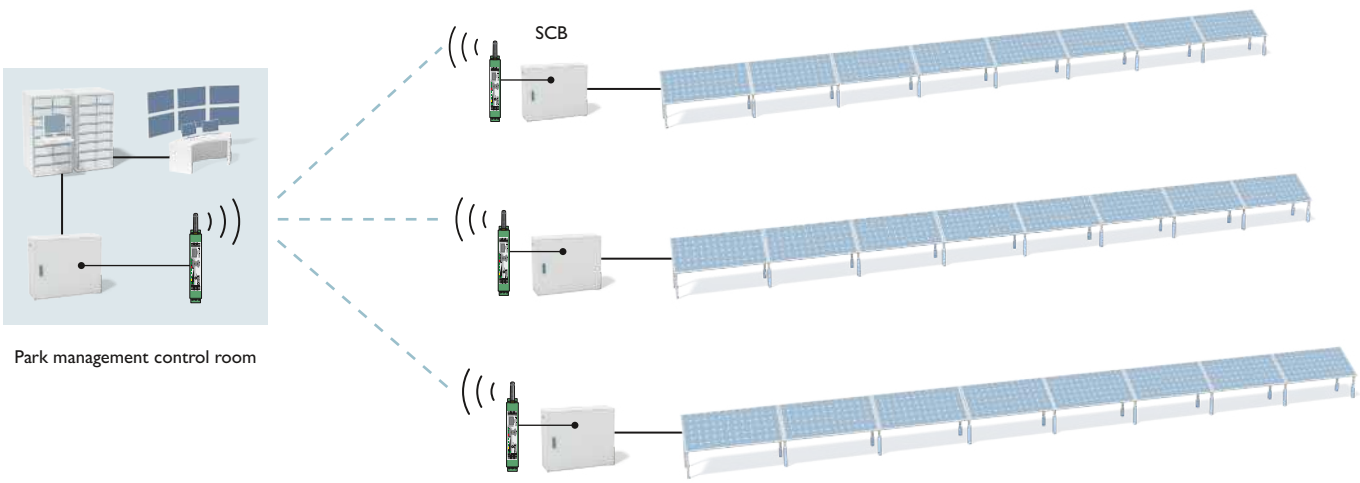
- Reduced installation and maintenance costs
- Flexible networking
- Reliable and interference-free communication
- Intuitive startup, thanks to user-friendly software wizard

Technical data	
Interface	RS-485 (0.3 to 115.2 Kbps)
Adjustable wireless data rate	16 to 250 Kbps
Supply voltage	19.2 to 30.5 V DC
Point-to-point range	Up to 500 m
Network devices	Max. 250
Frequency band	2.4 GHz
Antenna connection	RSMA (female)
Approval	CE, UL, FCC, ISC, ANATEL, IFT, KC, WPC, RCM

Wireless networking of serial interfaces

Data from string combiner boxes (SCBs) is output via serial RS-485 interfaces and transmitted wirelessly to the central park management system.

Our proven wireless technology enables reliable, interference-free communication over a distance of up to 500 m with up to 250 SCBs. Since our wireless system allows mesh networks to be set up, the devices can communicate with each other via repeater and server stations.



Special application examples

Floating PV application

Due to their location at sea or on inland bodies of water, floating PV systems place very particular requirements on the SCBs. Intended specifically for these areas of application, Phoenix Contact provides salt-water resistant SCBs with special strain relief for the solar cables in the event of strong swells. To keep the cabling effort as low as possible, the use of wireless modules in floating PV parks is highly recommended.

Retrofitting solutions

Our wireless technology is the ideal solution when existing PV systems are overhauled or a monitoring system is subsequently installed.

There is no need for any of the major excavation work involved in laying new cables, which keeps the costs for the subsequent work manageable.

Solutions for ground-mounted systems

Video surveillance

With the rapid growth of photovoltaics, the number of incidents at systems is also on the increase. The focus is not just on solar panels, connecting cables and even inverters are increasingly being targeted. It is often smaller solar parks that fall victim to these activities, as they are located out of the way and are not always adequately protected against vandalism and theft. It is therefore recommended that the system boundaries and entry points are monitored. This will prevent unauthorized entry to PV parks.

Your advantages

- ☑ Cost savings with the compact all-in-one device
- ☑ Significant time savings with adapter for wall and mast mounting and minimal wiring effort
- ☑ Advanced PoE management
- ☑ Simple startup and configuration
- ☑ Alert in the event of sabotage

Secure network solutions

Phoenix Contact offers scalable network solutions that can be flexibly adapted to your video surveillance system. We analyze your video surveillance network from a holistic perspective. As specialists in all products and services required to connect cameras to video servers, we offer industrial solutions that ensure that no footage is lost. Your video surveillance system is only as secure as the network that connects all of the components.

Power over Ethernet

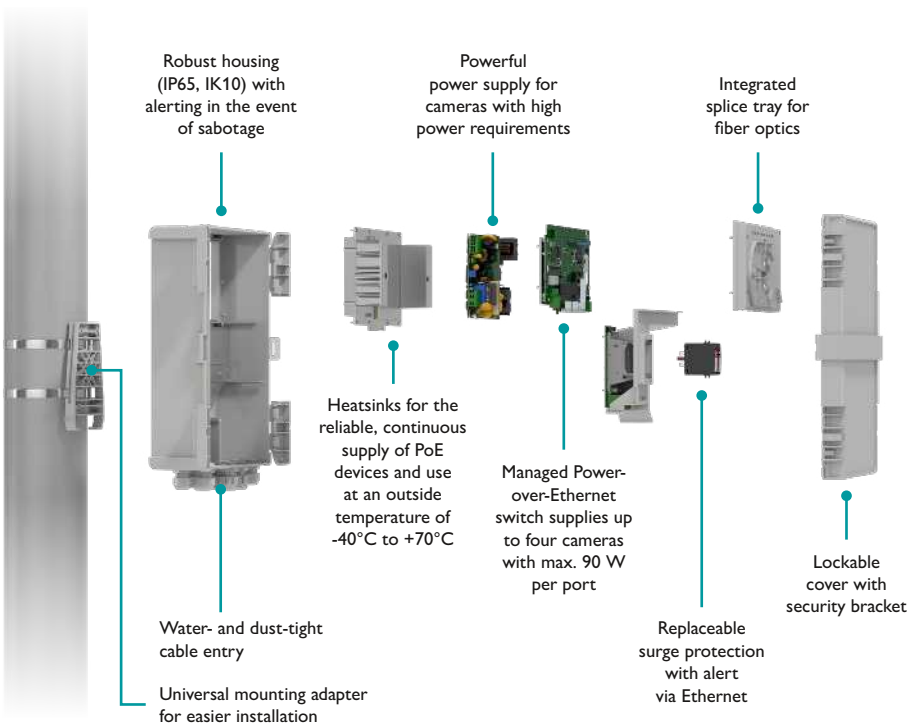
Eliminate the need for a separate power supply when installing devices in difficult to access or remote system parts. With industrial Power over Ethernet (PoE) devices from Phoenix Contact, power supply and data transfer are combined in the same Ethernet cable. Now, this means you can utilize the advantages of PoE technology reliably in critical applications as well.

High-speed Ethernet up to 1 km

Gigabit Ethernet extenders transmit broadband Ethernet up to 1 km, which is much further than the maximum standard Ethernet distance of 100 m. The robust transmission takes place over 2-wire cables or coaxial cables, via which the extenders and the connected end devices are additionally supplied with power. This means they are particularly well suited for retrofits of analog to digital video surveillance in PV parks.

Smart Camera Box: The all-in-one device for video surveillance

The Smart Camera Box is an outdoor PoE switch with integrated power supply, surge protection, splice tray for fiber optics, and a DIN rail for additional accessories. Featuring up to four Gigabit Power over Ethernet ports and two uplink ports, it is the ideal all-in-one device for a large number of applications in PV systems, such as video surveillance, LED lighting, WLAN access point, and other network applications.



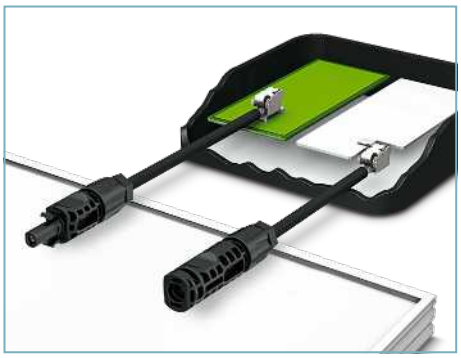
Solutions for ground-mounted systems

Connection technology

From the photovoltaic panel and the string combiner box to the inverter – Phoenix Contact offers numerous cabling solutions that are perfectly tailored to the requirements of ground-mounted photovoltaic systems. These were designed with durability and quick and easy installation in mind. The DC connectors that can be assembled in the field can be mounted in just a few seconds without special tools. The high-quality components also contribute to high system availability, even in extreme weather conditions.

Your advantages

- ☑ Variety and flexibility with various conductor cross-sections from 2.5 to 16 mm²
- ☑ UV-, temperature-, and weather-resistant design
- ☑ Future-oriented for voltages of up to 1,500 V
- ☑ Innovative spring connection for durable and reliable connections without special tools



Connection of PV panels

SUNCLIX connectors support automated processing. Silver-plated contacts ensure lower contact resistance values during long-term use. The new connectors with crimp connection are designed for currents up to 40 A (TÜV)/50 A (UL) and voltages up to 1,500 V (TÜV/UL).

Connecting and cabling

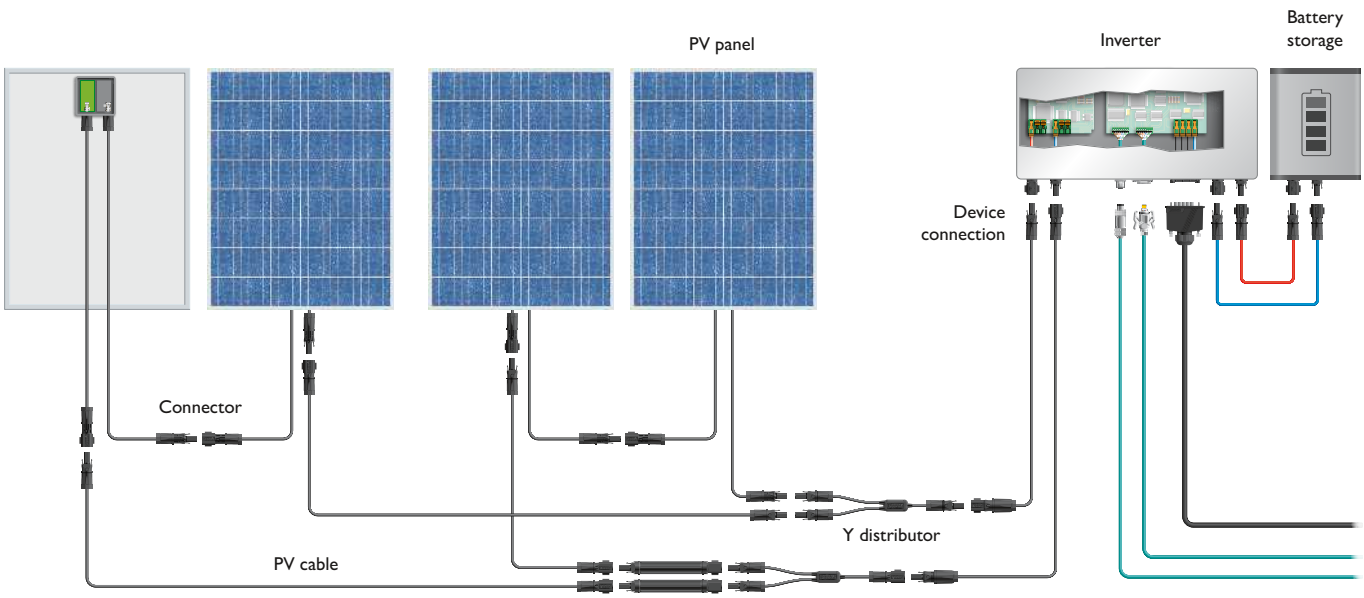
The innovative spring connection of the DC connectors allows you to reliably and safely connect cables ranging from 2.5 to 16 mm² without using special tools. This enables very quick and easy on-site assembly.

Distribution and protection

Our Y distributors and string fuses provide even greater flexibility in photovoltaic cabling. Route adjacent strings to the terminal point easily and inexpensively with just one string cable. Protect your devices with external string fuses and thus benefit from the advantages of thermal management and the small device size.

Consistent connection technology from the photovoltaic panel right through to feed-in

Connectors and cables facilitate fixed or flexible installation. They are suitable for a temperature range from -40°C to +85°C. Certification in accordance with current standards enables international use.

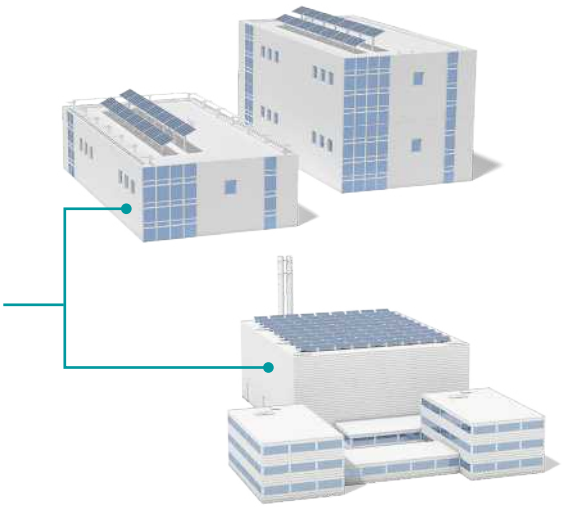


Solutions for rooftop systems

Large, slightly slanted roof surfaces provide great conditions for the profitable deployment of photovoltaic systems. As a result of declining panel prices and increasing energy costs, photovoltaic systems on private, commercial, and public buildings are becoming increasingly attractive, even without government subsidies. Phoenix Contact offers a wide range of products to monitor the installations and provide permanent protection against all manner of lightning currents and surge voltages.

Overview: Rooftop systems

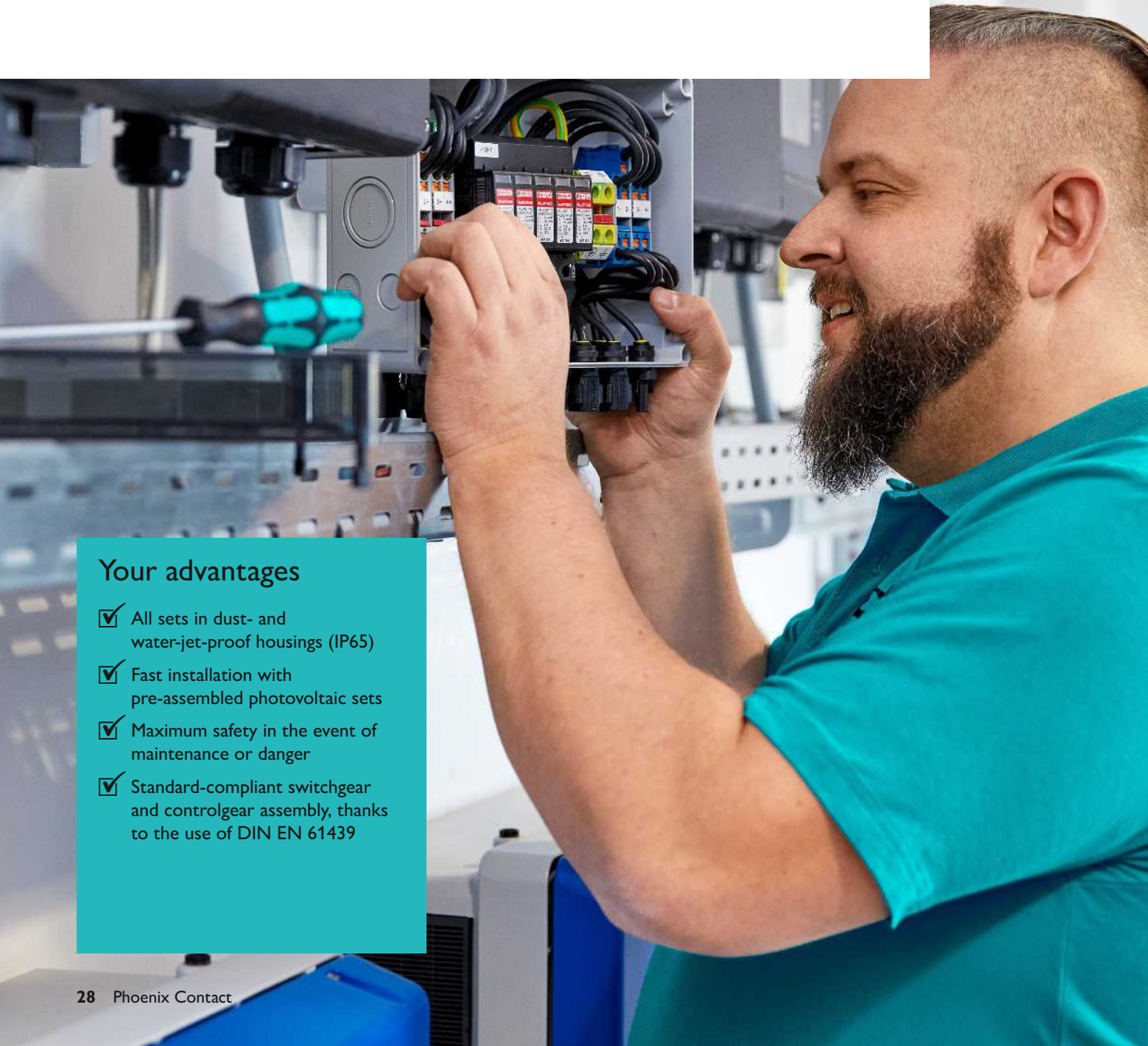
Monitoring and protection
Reliably protect photovoltaic rooftop systems of any kind against surge voltages and disconnect them if required.



Solutions for rooftop systems

Modular protection concept

String combiner boxes need to be used in order to provide optimum protection for the various parts of rooftop systems against lightning strikes and surge voltages. Phoenix Contact offers an extensive portfolio of various ready-to-install, directly connectable string combiner boxes for your rooftop systems.



Your advantages

- ☑ All sets in dust- and water-jet-proof housings (IP65)
- ☑ Fast installation with pre-assembled photovoltaic sets
- ☑ Maximum safety in the event of maintenance or danger
- ☑ Standard-compliant switchgear and controlgear assembly, thanks to the use of DIN EN 61439

Protection against surge voltages

With its pre-assembled PV sets, Phoenix Contact offers reliable system solutions that protect the inverter directly upstream of the DC and AC voltage inputs. Surge voltage couplings are discharged directly to the ground potential. Due to our coordinated scope of supply, new versions can be made available very quickly.

Connection

To connect the PV strings, the string combiner boxes are equipped with either our SUNCLIX panel feed-throughs or with cable glands on Push-in terminal blocks. SUNCLIX connectors from Phoenix Contact and Push-in terminal blocks combine the advantages of easy installation with reliable and maintenance-free connection.

Disconnection and isolation

We offer a fire department emergency shutdown or switch disconnector as well as surge protection in a single device. An emergency switching off switch can be used to disconnect the photovoltaic system remotely, thus providing maximum possible safety in the event of maintenance or danger.

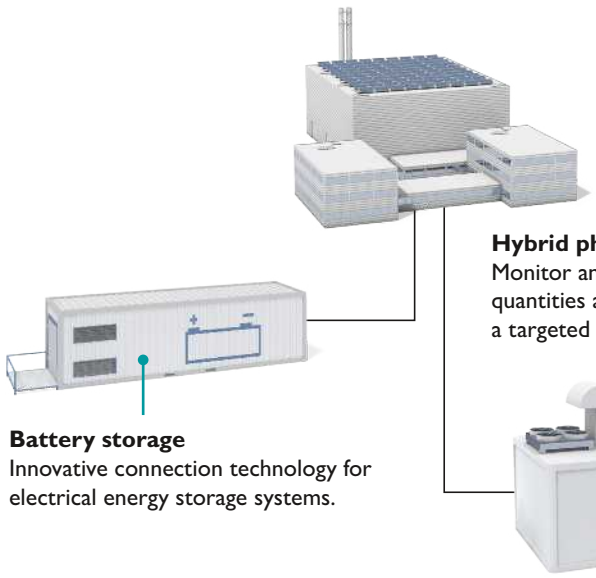
Tailor-made portfolio

When it comes to determining the appropriate protective circuit, the type of inverter plays a crucial role in the surge protection for photovoltaic systems. Phoenix Contact offers a wide range of surge protective devices for the AC side as well as a large variety of string combiner boxes for many types of inverter.

Solutions for hybrid energy systems

Around 1.2 billion people worldwide have no access to electricity. As a result, diesel generators are used in many locations to produce the necessary, independent source of energy. However, the price of the fuel for diesel generators is constantly rising. The use of hybrid photovoltaic systems not only reduces this financial burden, it also lowers CO_2 emissions in a sustainable manner. In rural regions without a local power grid, hybrid photovoltaic systems are a cost-effective and environmentally-friendly alternative for generating electricity far from corresponding grids.

Overview: Hybrid energy systems



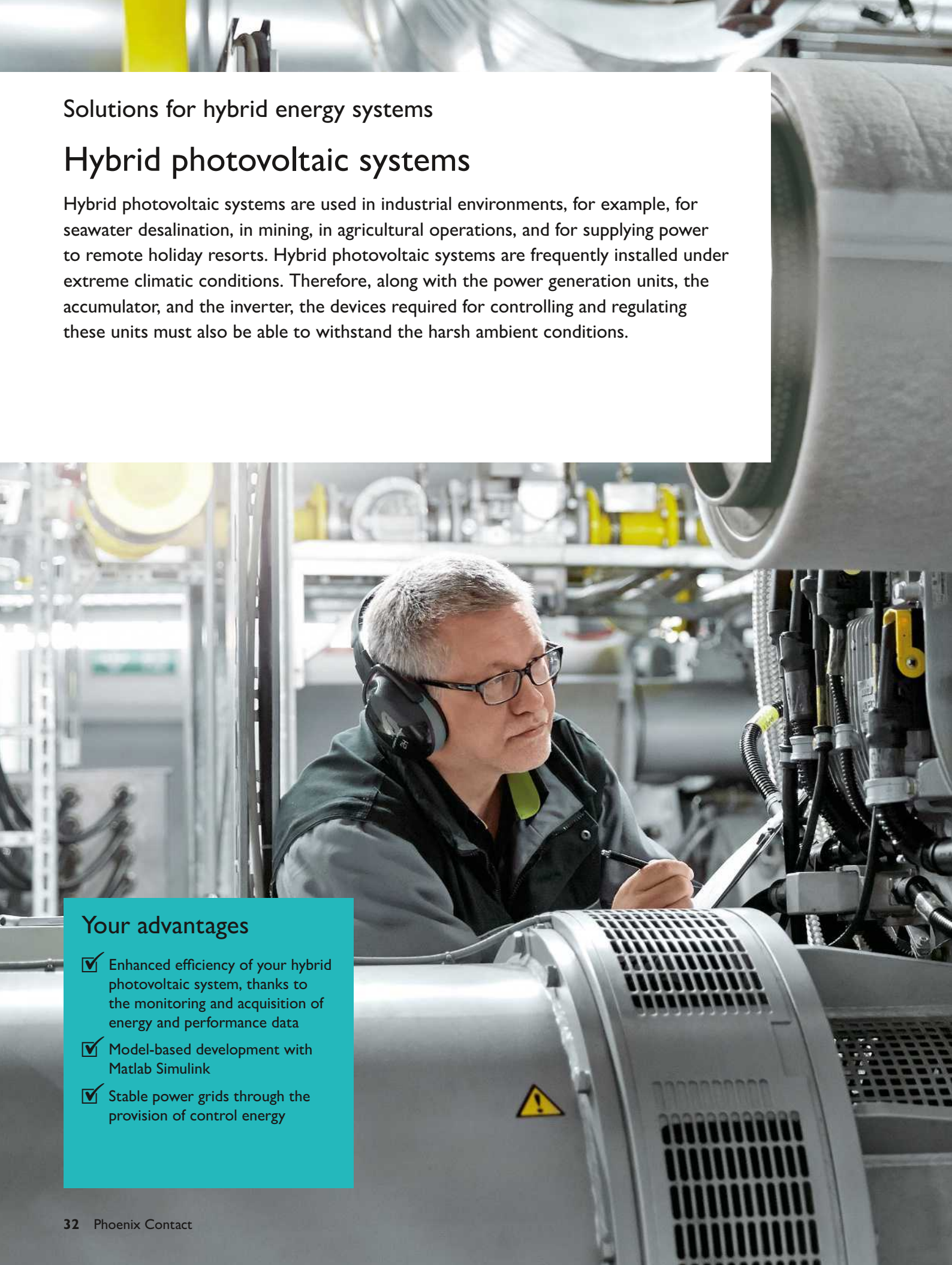
Hybrid photovoltaic systems
Monitor and regulate energy quantities and provide them in a targeted manner.

Battery storage
Innovative connection technology for electrical energy storage systems.

Solutions for hybrid energy systems

Hybrid photovoltaic systems

Hybrid photovoltaic systems are used in industrial environments, for example, for seawater desalination, in mining, in agricultural operations, and for supplying power to remote holiday resorts. Hybrid photovoltaic systems are frequently installed under extreme climatic conditions. Therefore, along with the power generation units, the accumulator, and the inverter, the devices required for controlling and regulating these units must also be able to withstand the harsh ambient conditions.

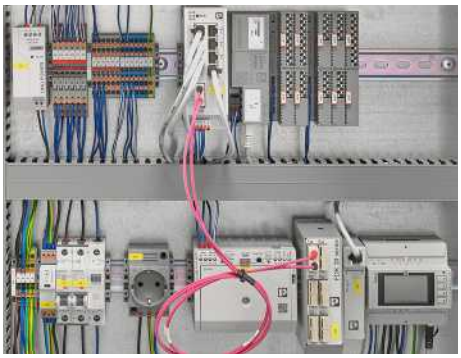


Your advantages

- ☑ Enhanced efficiency of your hybrid photovoltaic system, thanks to the monitoring and acquisition of energy and performance data
- ☑ Model-based development with Matlab Simulink
- ☑ Stable power grids through the provision of control energy

Measuring energy

The power measurement terminal for the tried-and-tested Axioline F I/O system records all voltages, currents, and power generated by the hybrid photovoltaic systems. This means that you can obtain industry-proven automation and energy measurement components from a single source. The power measurement terminal enables the analysis of alternating current values. Instantaneous values are recorded and then evaluated.



Managing loads

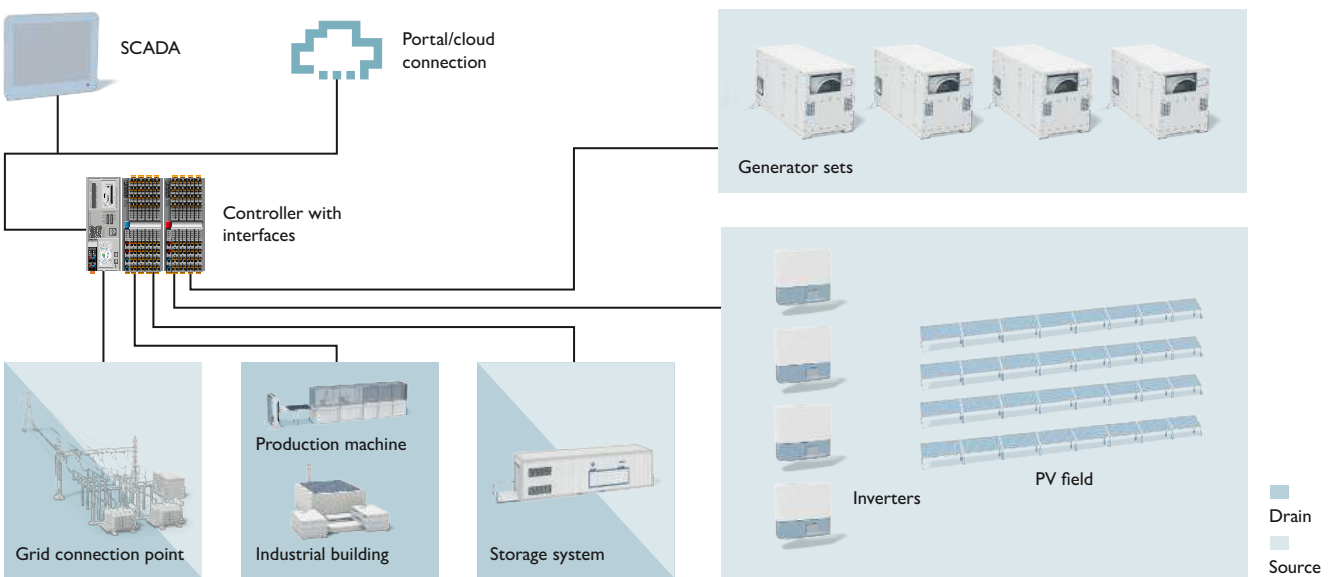
The small-scale controllers from Phoenix Contact can be used to control and monitor hybrid photovoltaic systems and achieve efficient energy management. If the load progression is known, the load management system will be developed based on models by Matlab Simulink and tested in the simulation environment. This reduces the engineering effort involved.

Providing control energy

Feeding in heavily fluctuating renewable energy puts power grids through increasingly severe load tests. Since limiting the maximum power output in photovoltaic systems is not economical, operating reserve buffers are used more and more frequently. Our modular control system assumes the central management function for providing control energy.

Power supply even in remote regions

To ensure the reliable operation of hybrid photovoltaic systems, all of the system components must be optimally coordinated. A Phoenix Contact small-scale controller can be used to control and regulate the entire application. It works like an energy manager and ensures that the energy quantities required by the consumer are available at the right place and at the right time.



Solutions for hybrid energy systems

Battery storage systems

Residential storage, industrial storage, and utility-scale storage are the links for sector coupling. They compensate fluctuations in renewable energy, thus guaranteeing a stable power supply. For a huge range of applications, energy storage devices must operate safely, reliably, and efficiently. Resilient and durable electrical connection technology is necessary to satisfy these requirements. Phoenix Contact provides you with internationally certified connection technology designed to meet the high demands of energy storage systems.

Your advantages

- ☑ Unrivalled portfolio of PCB connections, connectors, and electronics housings that demonstrate our strong innovation power
- ☑ Solutions for signal, data, and power transmission from a single source
- ☑ Comprehensive options for customization right through to developing new customer-specific products
- ☑ Specialists with know-how: our experts have extensive knowledge of technology and applications
- ☑ Reliable partner with 100 years of experience in delivering high product quality and professional services

Connection technology for the cabling of battery storage systems

The battery-pole connectors from the BPC series allow flexible and reliable front cabling for currents up to 350 A and voltages up to 1,500 V.

The BBC busbar connection system provides a convenient system cabling solution – it is blind-mating, touch-proof, and scalable up to 200 A at 1,500 V.

Coded DC connectors were developed for energy storage applications up to 1,500 V/40 A. With proven spring connection technology, tool-free field assembly is possible.

Structure of an energy storage system

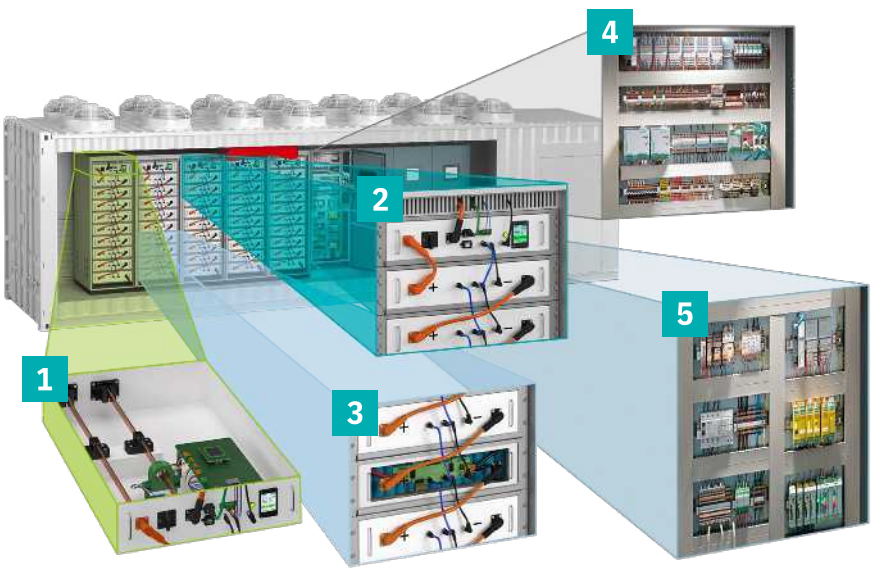
1. Control unit
At rack level, the Control Unit controls the individual battery modules. It is used to organize the charging and discharging processes of the battery modules and ensure their safe operating state. To do this, it monitors currents and voltages and the temperatures inside the modules.

2. Cabling
All components, modules, and organization levels within an energy storage system are electrically interconnected. This is either done directly or using pre-assembled cabling solutions for data, signals, and power as well as based on busbars.

3. Battery module
Battery modules are the core element of the energy storage system. They contain battery cells in which the electrical charge is stored as chemical energy. Each battery module features cell balancing, which ensures that all the battery cells maintain an equal state of charge. Sensors monitor the temperature.

4. System control
At the top organizational level of an energy storage system, the system control coordinates all the processes within the system. This ensures that both the Control Units of the enclosed racks and the auxiliary units are addressed. In addition, the system control handles the external communication.

5. System monitoring
For reasons of safety and efficiency, processes and states are monitored with a high degree of accuracy on all levels of an energy storage system. This begins with measuring the temperatures inside the battery modules and continues all the way to monitoring external influencing factors.



Service and support: The path to protected power generation plants

Design of a 360° cybersecurity concept

Complete package

We will accompany you through the entire process, from identifying critical areas that may be targeted to devising a security concept, including optional system certification. 360° security means that, in addition to the various technologies, we also include processes and people in the risk analysis, as there are also potential targets behind the firewall. Our certified reference architecture provides you with an easy and cost-effective entry point.

Basic security workshop

Starter package (1.5 days)

Based on your security objectives, we work with you to develop your individual strategy from the security requirements to an effective security concept. The result is a basic security concept with approximately 40 pages of recommended actions.

Basic security

Individual package

Achieve a basic level of protection with transparency regarding the security status of your networks. We will then work together to create an action plan for minimum security standards and we will accompany your right through to its implementation.

Additional security services

Individual packages

- Secure remote maintenance concept
- Protection of machines
- Secure network strategy
- Implementing an anomaly detection system

Seminar portfolio

Also available in-house at your premises

- Industrial cybersecurity – IEC 62443
- Security for production or machine manufacturers
- Basic principles of cybersecurity – TÜV Rheinland cybersecurity training program

Your advantages

- ☑ Transparency regarding the security status of your automation system
- ☑ Critical areas that may be targeted are comprehensively protected by 360° cybersecurity
- ☑ Certified industrial security experts and processes (IEC 62443)
- ☑ Through our participation in committees, we are already aware of the requirements of tomorrow
- ☑ Easy and cost-effective entry point with a certified reference architecture

Open communication with customers and partners

Customer-specific solutions

Concept creation
Phoenix Contact will work together with you to create a tailored management concept for your solar park. Our experts and system partners are familiar with the regional conditions and the specific challenges of the industry. Comprehensive planning based on your requirements is a fundamental element of our portfolio.

Project support
Phoenix Contact provides you with support and advice during planning, development, procurement, and implementation, as well as in the maintenance of your photovoltaic park. Our experts are there for you – from minor adjustments to developing new products and solutions. Our service team will work together with you, taking your needs and requirements into account to ensure that your solar park management project runs as smoothly as possible.

Global network
Phoenix Contact supports you worldwide with professional service and support for all aspects of products, services, and solutions. Depending on the requirements, we ensure the fast replacement of products or support you in the event of problems by patching into your system. In the event of an emergency, we can also provide you with replacement parts outside of office hours.

Your Energy Solution Partner wherever you are

Phoenix Contact works with selected partners from all over the world that have extensive expertise in our products and systems. This ensures that our solutions for renewable energy are optimally adapted to meet individual customer requirements worldwide.

Get comprehensive advice from our Energy Solution Partners.

Find your Energy Solution Partner here

Inspiring industrial solutions with excellent products

Phoenix Contact offers innovative products and solutions for all aspects of photovoltaic power generation. These solutions are based on a wide range of industrially-tested connection and automation technology. When combined in an intelligent way, these products become systems for a variety of functions such as control, remote monitoring, or measured value acquisition.
Inspiring industrial solutions are created as a result of our industry expertise, many years of experience, and consideration of special requirements.

Phoenix Contact

Excellent products

Photovoltaic connectors

From connection technology for photovoltaic panels through DC connectors for field cabling to device connection for signals, data, and power.

Power supplies

With the DC/DC converters from the UNO POWER family, the control cabinet is supplied directly from the photovoltaic system. This saves installation costs and increases the efficiency of the system.

DC monitoring

The monitoring system provides reliable information regarding the performance of your photovoltaic system. This means faults can be quickly localized and rectified.

Controllers

Modular small-scale controllers for automating everything from ground-mounted photovoltaic systems to autonomous power supply systems.

Surge protection

You can now obtain lightning current and surge protection for photovoltaic systems with new protective devices that are designed for a generator voltage of up to 1,500 V DC.

AC monitoring

Network-capable energy measuring devices and the new Axioline F series power measurement module record and monitor the electrical parameters of photovoltaic systems on the AC side.

Wireless modules

The wireless system for wireless communication in PV systems transmits I/O signals or serial data and is therefore very versatile.

Software

Software is the key to efficient automation. Phoenix Contact offers software from configuration to system operation.

For further information on our products and solutions for solar power, simply scan the QR code.

To ensure that you are always kept up to date, we share news and useful information about renewable energy on our LinkedIn focus page. Become a part of the community.

Open communication with customers and partners worldwide

Phoenix Contact is a global market leader based in Germany. We are known for producing future-oriented products and solutions for the electrification, networking, and automation of all sectors of the economy and infrastructure. With a global network reaching across more than 100 countries with over 20,000 employees, we maintain close relationships with our customers, something we believe is essential for our common success.

Our wide range of innovative products makes it easy for our customers to implement the latest technology in a variety of applications and industries. This especially applies to the target markets of energy, infrastructure, industry, and mobility.

You can find your local partner at

phoenixcontact.com

MNR 5200593/2022-15-07/09

VMM03-22.001.L3

INSPIRING INNOVATIONS