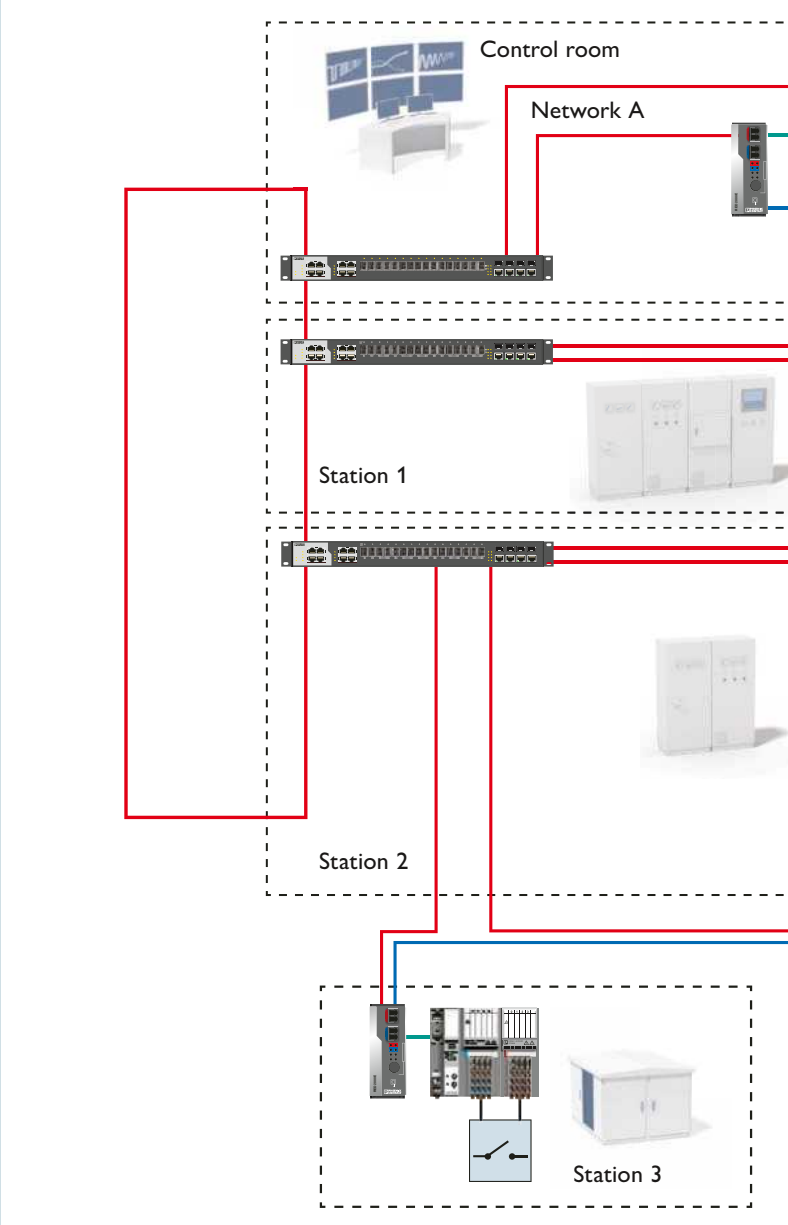
Products for IEC 61850

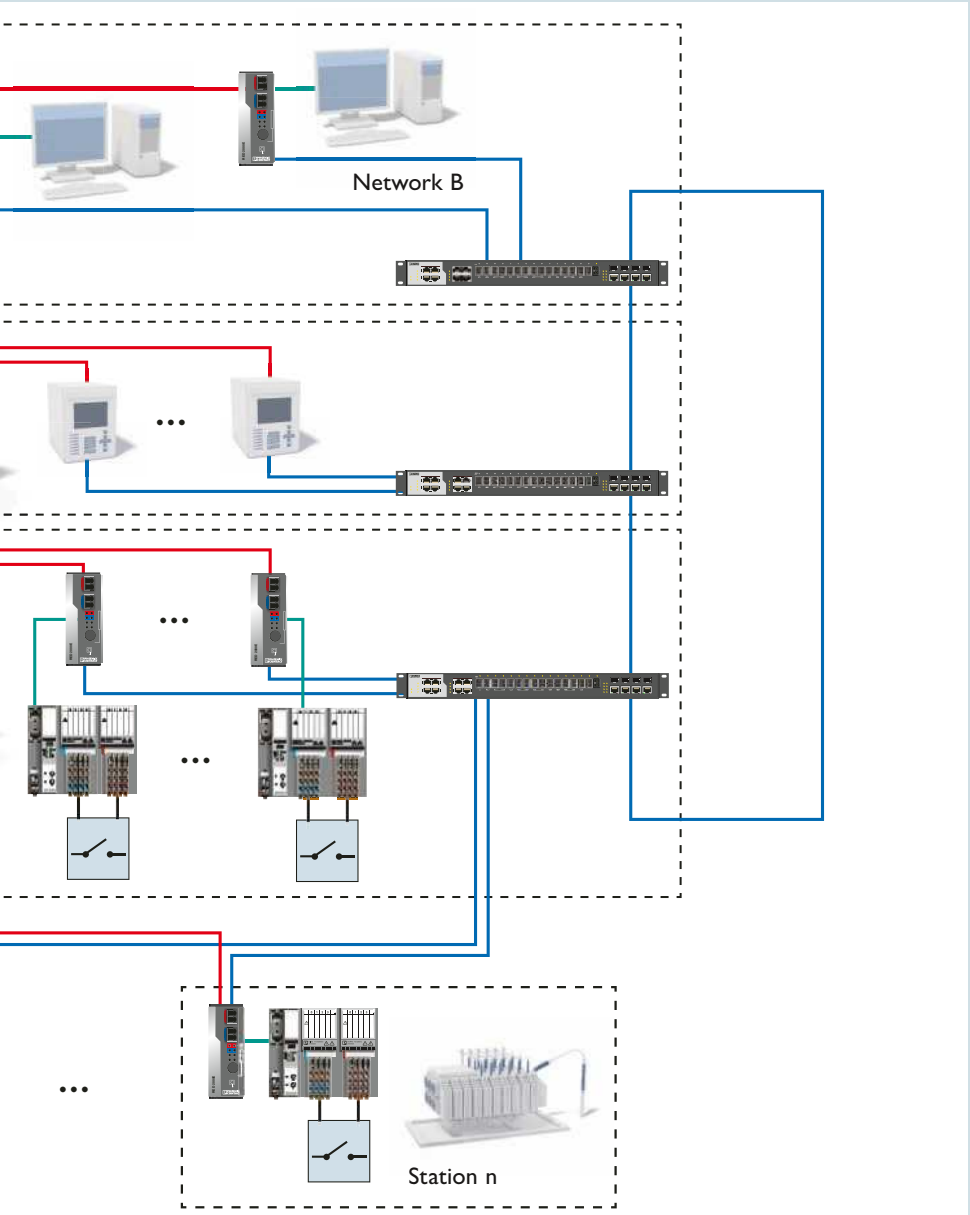
PHOENIX CONTACT
INSPIRING INNOVATIONS

IEC 61850
Future-proof energy networks

A reliable, sustainable energy supply poses new societal challenges. The energy needs will continue to grow disproportionately until 2030. Rising energy costs, scarce resources and CO_2 emissions are global factors. New energy concepts and system approaches, such as what is known as the Smart Grid, are needed to combat these challenges.

As a partner of the energy management industry for decades, Phoenix Contact offers you a wide range of high-performance products specially developed for these tasks.





High-availability networks

High availability and short reaction times are basic requirements for a stable energy supply. With switches, PRP redundancy modules and I/O modules from Phoenix Contact, you can easily implement high-availability network structures and fast, reliable IEC 61850 communication in your energy system.

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IEC 61850
Standardized communication

Until now, switchgears were based on a manufacturer-specific device technology with proprietary interfaces and protocols. This resulted in incompatible components and a strong dependency on products once they were installed.

Thanks to the IEC 61850 standard, communication and the engineering process are now being standardized worldwide. This means that users are no longer dependent on a single manufacturer, and the variety of interfaces is decreasing significantly. Ethernet technology is the basis for IEC 61850 communication.

IEC 61850 – Advantages at a glance

- Interoperability thanks to standardized communication and engineering processes
- Global use, a high acceptance rate and wide distribution
- Secure and future-proof investment due to clearly defined requirements for devices and communication
- Simplified system engineering through defined interfaces, an object-oriented data model and a uniform communication language
- Consistent communication from the process, field and station levels all the way to the power supply level

Ten parts for interoperability in the energy system

The IEC 61850 standard devised by the International Electrotechnical Commission is divided into ten parts. It describes the requirements for the devices and communication that are used in contactor systems and control systems for electric switchgears. The IEC 61850 primarily defines:

- General specifications for switchgears
- Information on functions and devices
- The exchange of information for protection
- The monitoring, control and measurement of the switchgears
- Communication interfaces
- An internationally uniform configuration language

Common understanding begins with uniform terms

Common understanding is an important basis for global communication. Therefore, the most important terms are defined uniformly in part 2 of IEC 61850. This includes the following:

SCADA	Supervisory Control and Data Acquisition
RTU	Remote Terminal Unit
IED	Intelligent Electronic Device
LN	Logical Node
GOOSE	Generic Object Oriented System Event

IEC 61850 at a glance

Even more robust during operation

The special ambient conditions in energy systems and the resulting requirements for devices are described in part 3 of IEC 61850. Devices that were developed in accordance with IEC 61850 meet these extreme requirements, particularly in the areas of climate, mechanical systems, EMC and power supply.

Less effort in system engineering

The object-oriented, hierarchically structured data model is the basis for simplified system engineering. Since predefined functional units are used, there is no need to document the systems extensively. The communication can simply be integrated into switchgears through the use of IEC 61850-capable I/O systems. The requirements for communication are described in part 5 of the standard.

Independent tests ensure interoperability

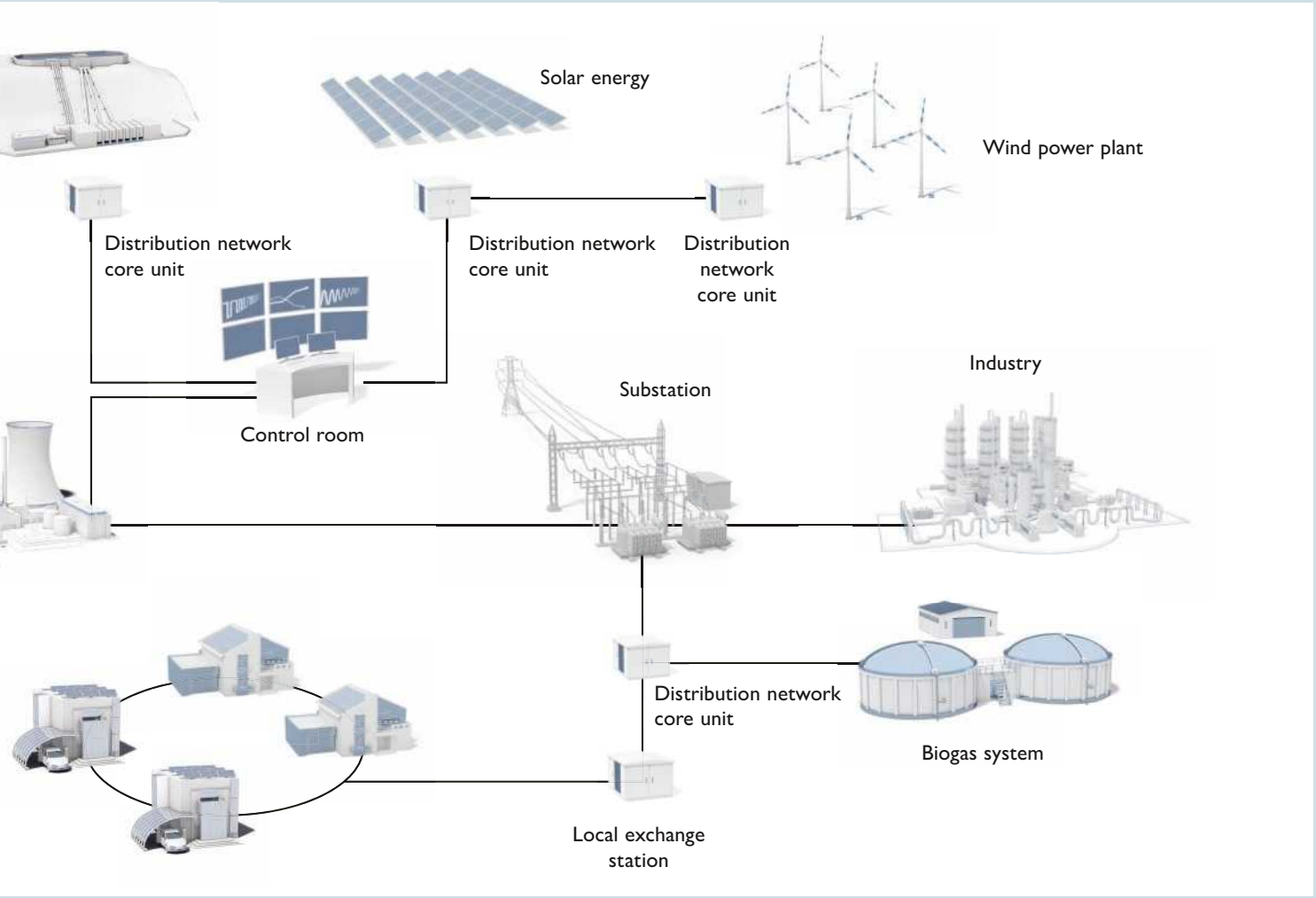
Independent testing institutes such as KEMA test the implementation of devices in accordance with IEC 61850 for:

- Product conformity
- Interoperability of the servers
- Consistent engineering

Smart Grid
Intelligent energy network

In addition to increasing energy demand, another challenge is that energy production is becoming increasingly decentralized. The volatility of renewable energy sources makes it difficult to ensure a stable energy supply. The Smart Grid solves this problem. Linking various applications enables multidirectional energy and communication streams that allow for a flexible reaction to ambient conditions. This requires special communication and network infrastructures customized to meet specific requirements.

Smart Grid: All applications are linked and continuously exchange data and information.



Products for IEC 61850

Robust Ethernet infrastructure

- Suitable for use under the harshest electromagnetic, electrostatic, and climatic ambient conditions
- 19" Managed Switches for the DIN rail
- Media converters for interference-proof connections via fiber optics
- Redundancy modules for high availability through parallel network redundancy

Easy with Axioline F I/O system

- KEMA-certified components for 100% interoperable communication
- Communication via MMS and the fast, event-controlled GOOSE protocol
- Easy configuration instead of programming
- Flexible for startups, expansions and retrofitting

Comprehensive accessories

- Marking
- Connectors
- Cable
- Splice boxes
- Power supplies
- Surge protection
- You can find additional accessories at www.phoenixcontact.com

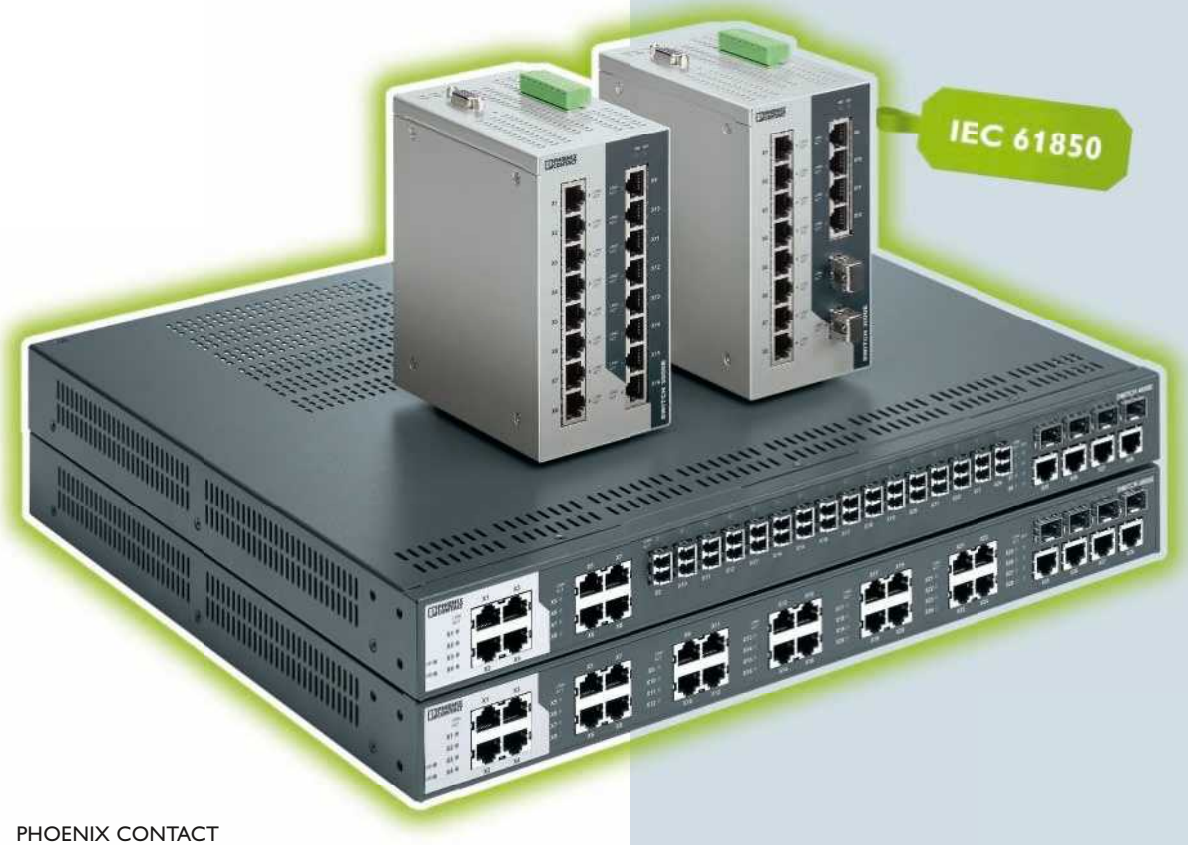
Industrial Ethernet
Switches

IEC 61850 places special requirements on network components. Depending on the area of use, extremely strict environmental requirements must be met. These requirements are specified under IEC 61850-3.

The switches meet these requirements and are optimized for communication in accordance with IEC 61850. You also benefit from comprehensive IT-compatible functions with respect to safety, redundancy and network management, and seamless integration into your IT network structures.

Your advantages

- Suitable for use under the harshest electromagnetic, electrostatic, and climatic ambient conditions in accordance with IEC 61850-3/IEEE 1613
- Reliable, error-free data transmission over long distances, thanks to fiber optic technology
- Fast redundancy mechanisms for high availability
- Features high port density and can be mounted side by side to minimize space required in the control cabinet



Switches product overview




Managed Switches for 19" control cabinets (without power supply)

FL SWITCH 4824E-4GC
Order No. 2891072
- 24 RJ45 ports and 4 Gigabit combo ports

FL SWITCH 4808E-16FX LC-4GC
Order No. 2891073
- 8 RJ45 ports, 16 LC multi mode ports, and 4 Gigabit combo ports

FL SWITCH 4808E-16FX SM LC-4GC
Order No. 2891074
- 8 RJ45 ports, 16 LC single mode ports, and 4 Gigabit combo ports

FL SWITCH 4808E-16FX-4GC
Order No. 2891079
- 8 RJ45 ports, 16 SC multi mode ports, and 4 Gigabit combo ports

FL SWITCH 4808E-16FX SM-4GC
Order No. 2891080
- 8 RJ45 ports, 16 SC single mode ports, and 4 Gigabit combo ports

FL SWITCH 4808E-16FX ST-4GC
Order No. 2891085
- 8 RJ45 ports, 16 ST multi mode ports, and 4 Gigabit combo ports

FL SWITCH 4808E-16FX SM ST-4GC
Order No. 2891086
- 8 RJ45 ports, 16 ST single mode ports, and 4 Gigabit combo ports

Switches and accessories product overview




Managed Switches

FL SWITCH 3016E
Order No. 2891066
- 16 RJ45 ports

FL SWITCH 3012E 2SFX
Order No. 2891067
- 12 RJ45 ports, 2 100 Mbps SFP ports

Unmanaged Switch

FL SWITCH 1008E
Order No. 2891065
- 8 RJ45 ports

Modular power supply for 19" switches

FL SWITCH 4800E-P1
Order No. 2891075
- Voltage range:
  36 V DC … 75 V DC

FL SWITCH 4800E-P5
Order No. 2891076
- Voltage range:
  88 V DC … 370 V DC
  90 V AC … 264 V AC

SFP modules

FL SFP FX Order No. 2891081	**Multi mode** 100 Mbps
FL SFP FX SM Order No. 2891082	**Single mode** 100 Mbps
FL SFP FX Order No. 2891754	**Multi mode** 1000 Mbps
FL SFP LX Order No. 2891767	**Single mode** 1000 Mbps
FL SFP LH Order No. 2989912	**Single mode** Long haul 1000 Mbps

Industrial Ethernet
Media converters and redundancy modules

In many energy systems, data must be transmitted over long distances. For reliable, interference-proof data transmission by means of fiber optic technology in your system, use a media converter with an LC connection and high electromagnetic compatibility (EMC).

Energy networks depend on particularly high failure protection. The PRP redundancy modules enable parallel network redundancy without switchover time in case of failure and ensure high availability for your network.

Your advantages

- Suitable for use under the harshest electromagnetic, electrostatic, and climatic ambient conditions in accordance with IEC 61850-3/IEEE 1613
- Data transmission via fiber optics for optimum performance and transmission security
- Integration of non-PRP-capable devices into parallel networks for maximum availability
- Simple communication setup without device configuration

Redundancy modules and media converters product overview

PRP redundancy module

FL RED 2003E PRP
Order No. 2701863

- 2 RJ45 ports as redundancy ports and 1 RJ45 port for a terminal device

PRP redundancy module

FL RED 2001E PRP 2LC
Order No. 2701864

- 2 LC multi mode ports as redundancy ports and 1 RJ45 port for a terminal device

Media converter

FL MC 2000E LC
Order No. 2891056

- 1 RJ45 port and 1 LC multi mode port

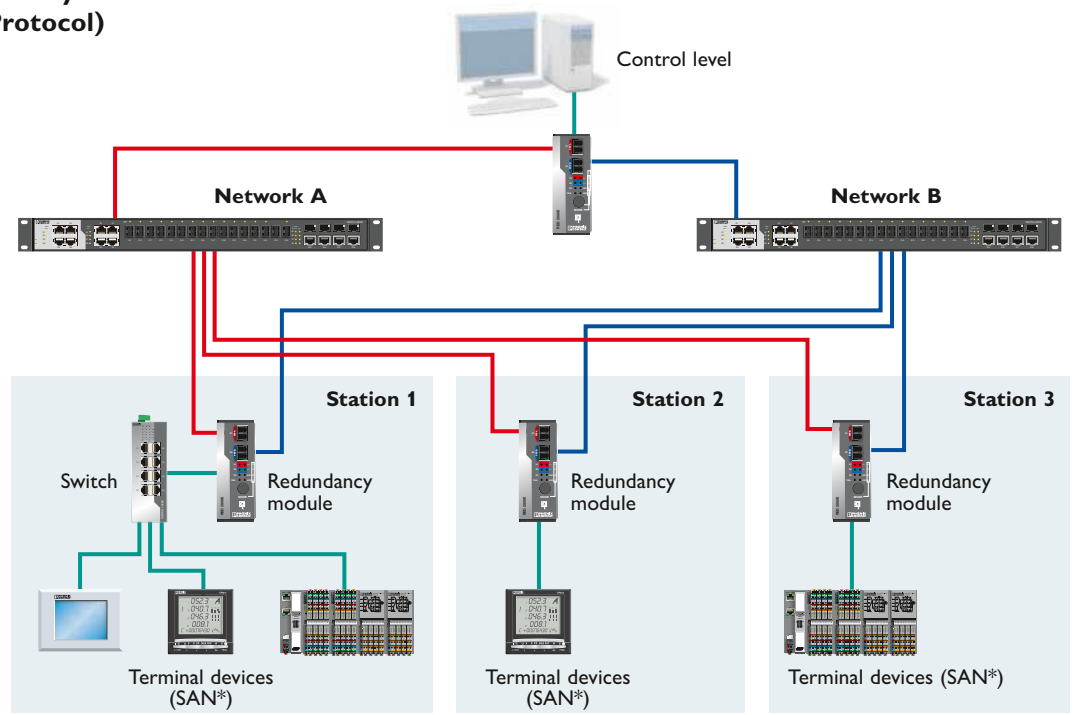
Media converter

FL MC 2000E SM40 LC
Order No. 2891156

- 1 RJ45 port and 1 LC single mode port

Parallel network redundancy with PRP (Parallel Redundancy Protocol)

PRP network redundancy is based on two independent, active paths between two devices. The transmitter uses two independent network interfaces that both send out the same data simultaneously. In this way, no packages are lost in case of a failure of the network or of individual network components.



*SAN = Single Attached Node

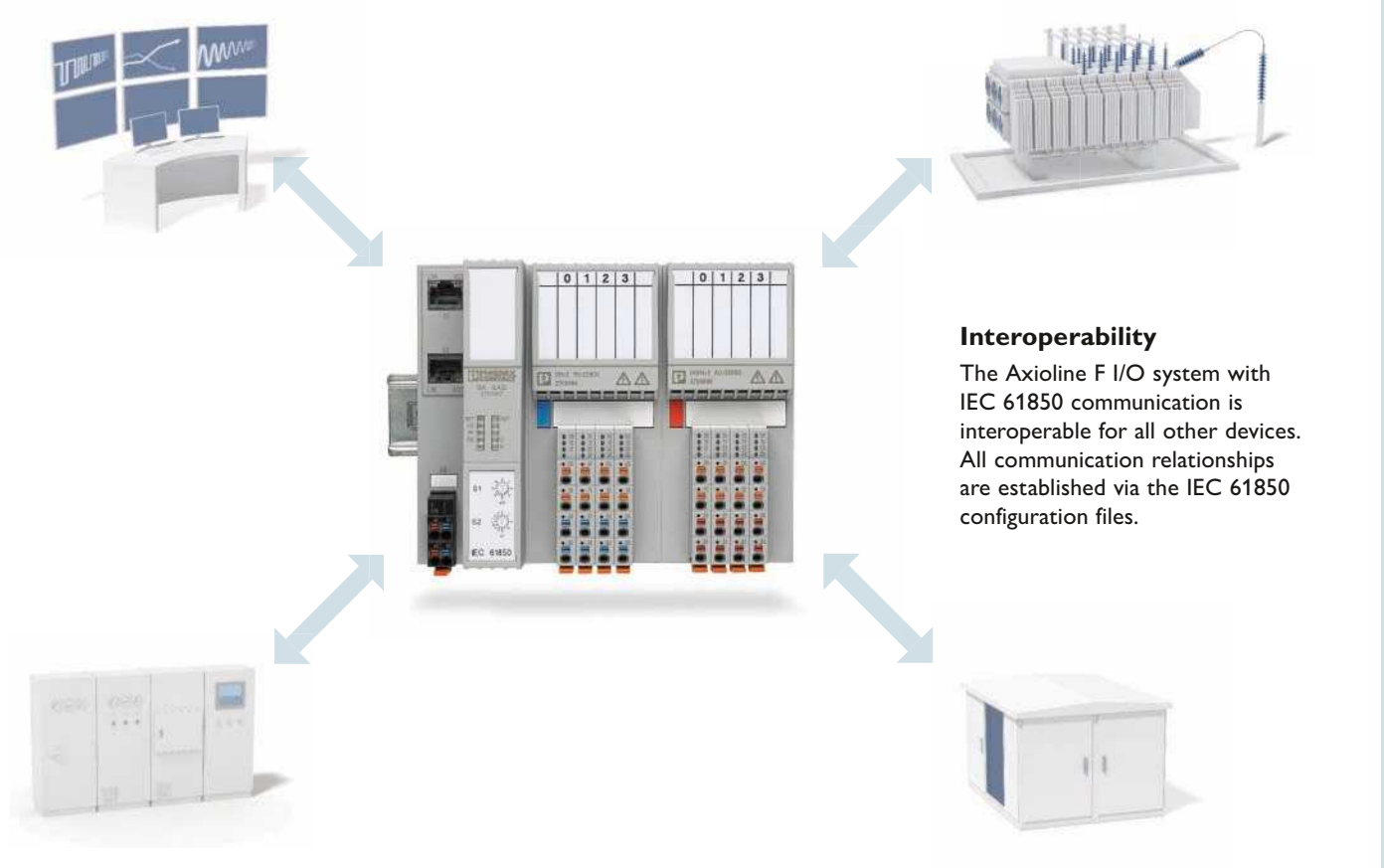
I/O system for the control cabinet
Axioline F

The IEC 61850 standard places special requirements on I/O systems: Depending on the area of use, they must transmit time-critical signals, meet extremely strict environmental requirements and support the interoperability required by the standard.

Exactly the right application for the Axioline F I/O system: fast, robust, easy.

Your advantages

- Extra-low and low voltage modules can be freely combined without insulation plates, allowing for more compact I/O stations
- Maximum flexibility and simplified project planning, startup and maintenance through interoperability of Axioline F
- Customized I/O number and easy retrofitting save on costs and increase flexibility

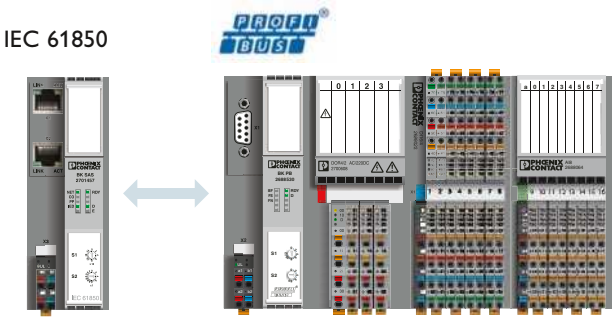


Interoperability

The Axioline F I/O system with IEC 61850 communication is interoperable for all other devices. All communication relationships are established via the IEC 61850 configuration files.

More flexibility with Axioline F

Benefit from the entire Axioline F product range und flexibly combine extra-low and low voltage modules. This also allows you to have an even more compact station setup because no insulation plates are needed.



A secure future with Axioline F

PROFIBUS is a communications protocol in the energy sector that continues to be widespread. For a quick change to IEC 61850, simply replace the bus coupler in the Axioline F system. If you use PROFIBUS today, then you are well equipped for a future switchover with Axioline F.

I/O system for the control cabinet
Axioline F

The particularly robust I/O system Axioline F is the perfect solution for applications in the energy sector. With the bus coupler for IEC 61850 and I/O modules for increased nominal voltage and corresponding electric strength, you can also use Axioline F for IEC 61850. Here, you benefit in particular from easy handling and the flexible station setup.

Your advantages

- Flexible and easy online access to the product through a web interface
- Time savings during startup without specific programming knowledge thanks to easy parameter configuration
- I/O station setup adapted to individual needs through a comprehensive Axioline F product range

Simple engineering

The web interface provides you with flexible online access to the product, and you save time during startup thanks to easy parameter configuration.

Axioline F for IEC 61850 product overview

Bus coupler

AXL F BK SAS
Order No. 2701457

- 2 Ethernet ports, RJ45
- Communication in accordance with IEC 61850-5, MMS and GOOSE
- Web interface for startup and diagnostics
- Time synchronization via SNTP
- Status and diagnostics indicators

Digital inputs

AXL F DI8/2 110/220DC 1F
Order No. 2700684

- 8 digital inputs, 2-conductor
- 110/220 V DC nominal voltage
- 5 kV impulse withstand voltage
- Developed in accordance with IEC 61850-3
- Status and diagnostics indicators

Digital outputs

AXL F DOR4/2 AC/220DC 1F
Order No. 2700608

- 4 relay outputs, 2-conductor
- Floating N/O contacts
- Nominal voltage up to 220 V DC or 230 V AC
- 5 kV impulse withstand voltage
- Developed in accordance with IEC 61850-3
- Status and diagnostics indicators

Axioline F I/O system product overview

Bus coupler

AXL F BK PB
Order No. 2688530

- PROFIBUS
- D-SUB connection
- Status and diagnostics indicators

AXL F BK PN
Order No. 2701815

- PROFINET
- 2 Ethernet ports, RJ45
- Status and diagnostics indicators

Digital signals

- Digital inputs and outputs
- 8 to 64 channels
- 1-, 2-, 3-, 4-conductor connection technology
- 35 mm or 54 mm overall width
- High-speed inputs
- 2 A outputs

Analog and temperature signals

- Analog inputs and outputs, current or voltage
- Temperature inputs, RTD or UTH
- 4 to 8 channels
- 2-, 3-, 4-conductor connection technology
- 35 mm or 54 mm overall width

Products for consistent solutions

Phoenix Contact offers you a unique selection of copper and fiber optic cabling. Use our wide range of designs, coding and pin assignments to implement your consistent solutions for secure data transmission.

Robust printers and a wide range of marking materials are available for all marking tasks in the energy sector. Using modern identification procedures such as RFID technology, you can even implement intelligent documentation management.

Your advantages

- Structure your projects even more efficiently with products from a single source
- Keep track of everything with special marking systems for the energy sector
- Benefit from years of expertise in connection technology and connectors during installation and data transmission
- Implement a reliable energy supply with industrial power supplies

You can find the complete product range on our website at www.phoenixcontact.com

Marking in the power station

The high-speed BLUEMARK CLED printer is the centerpiece of your marking system. With its special printing process, it meets the requirements in the power plant sector, meaning it can withstand high thermal, chemical and mechanical loads. Thanks to a wide range of marking materials and system accessories, you have the various marking tasks for the power plant covered.

Copper and fiber optic cabling

PLUSCON data is the connector range from Phoenix Contact for secure, reliable data transmission.

Benefit from innovative connection technologies and industry-standard design. The product range includes assembled cables, installation and field assembled connectors and special tool-free connector systems for fiber optic- and copper-based cabling.

Power supplies

Power supplies from the QUINT POWER series are the right choice for selective, cost-effective system protection. They activate circuit breakers quickly and magnetically using 6 times the nominal current. Preventive function monitoring ensures a high availability for your system. This function monitoring reports critical operating states before faults occur. Thanks to the adjustable voltage, all ranges from 5 V DC to 56 V DC are covered.

Marking

Printer

BLUEMARK CLED
Order No. 5147999

- Printer with LED-UV technology for printing plastic labels in the UniCard format
- Network capability via Ethernet
- Automatic material feed

Plastic labels white

Basic label
Order No. 0803039

- Additional colors available

RFID HF label
Order No. 0830954

RFID UHF label
Order No. 0830955

Adhesive RFID HF label
Order No. 0830956

Adhesive RFID UHF label
Order No. 0830957

Medium marking labels and mounting

Label holder
Order No. 0830958

Pop rivets
Order No. 0830959

Insert label, white
Order No. 0830960

Insert label, green RAL 6018
Order No. 0830961

- Additional colors available

Readers for RFID system

HF handheld
Order No. 5148010

UHF handheld
Order No. 5148011

RJ45 INDUSTRIAL

Straight cable outlet
Order No. 1406333

Cable outlet angled at the top
Order No. 1406339

Cable outlet angled at the bottom
Order No. 1406336

- Connector for assembly
- Up to 10 Gbps
- Suitable for applications with increased vibration
- 360° shielding
- One-piece design

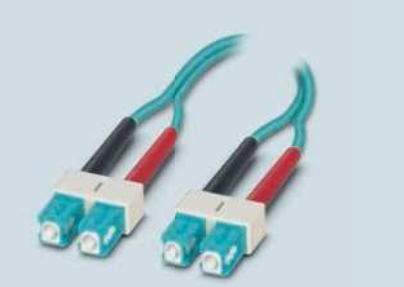
Push-pull ADVANCE

IP65/67 connector RJ45 CAT6$_A$
Order No. 1407890 straight cable outlet

IP65/67 connector RJ45 CAT6$_A$
Order No. 1408011 cable outlet at the bottom

IP65/67 connector SC-RJ GOF multi mode
Order No. 1407898 straight cable outlet

- Push-pull connector
- Version 14
- Housing made of die-cast zinc
- IP65/67 degree of protection



Patch cables

SC to SC, OM2, variable length
Order No. 1405697

SC to SC, OM3, variable length
Order No. 1405698

SC to SC, OM4, variable length
Order No. 1405699

- Assembled fiber optic cable
- Zip cord cable
- Fiber glass multi mode 50/125 µm
- Data rate to 10 Gbps up to 550 m (OM4)
- IP20 degree of protection for routing in cable ducts or control cabinets

Patch cables

LC to LC, OM2, variable length
Order No. 1405688

LC to LC, OM3, variable length
Order No. 1400621

LC to LC, OM4, variable length
Order No. 1405690

- Assembled fiber optic cable
- Zip cord cable
- Fiber glass multi mode 50/125 µm
- Data rate to 10 Gbps up to 550 m (OM4)
- IP20 degree of protection for routing in cable ducts or control cabinets

Tool set and connector for field assembly

Tool set
Order No. 1411049

LC duplex multi mode connector
Order No. 1411052

SC duplex single mode connector (APC)
Order No. 1412474

- Tool set for GOF assembly
- For field installation of LC and SC connectors
- No need to adhere and polish the connectors thanks to cleave technology

Power supplies

QUINT-PS/ 1AC/24DC/ 3.5
Order No. 2866747

- Input: single-phase
- Output: 24 V DC/3.5 A
- Nominal voltage (wide-range): 110 V DC … 220 V DC and 110 V AC … 230 V AC

QUINT-PS/ 1AC/24DC/ 5
Order No. 2866750

- Input: single-phase
- Output: 24 V DC/5 A
- Nominal voltage (wide-range): 110 V DC … 220 V DC and 110 V AC … 230 V AC

RJ45 module

RJ45 to RJ45 module
Order No. 1407995

Dummy frame
Order No. 1407988

- Consists of two housings, each with 6xRJ45
- Up to 10 Gbps
- Fully assembled with a multicable
- Variable length
- Unlockable from the front

Terminal outlets, IP65/IP67

IP65/67 terminal outlet, version 14
Order No. 1404281

IP65/67 terminal outlet, version 6
Order No. 1404278

SC-RJ IP65/67 terminal outlet, push-pull
Order No. 1404346

- 2 slots
- Control cabinet feed-through
- $CAT6_A$
- M12 8-pos., x-coded to RJ45 socket

Patch panel

RJ45 patch panel for the DIN rail mounting
Order No. 1658118

- IP20 degree of protection
- 1 slot
- With IDC fast connection
- For conductor cross sections from 0.2 mm^2 to 0.32 mm^2

19" frame

19" frame, black
Order No. 1409140

19" frame, gray
Order No. 1407986

- Empty frame
- For using 8 modules (each with 6x RJ45) with a total of 48 connections
- 1 rack unit

Marshalling panels

Marshalling panel with metal brackets, black
Order No. 1409284

Marshalling panel with metal brackets, gray
Order No. 1409283

Marshalling panel with plastic brackets
Order No. 1407994

- Marshalling distributor panel
- 19 inches
- 1 rack unit

Splice boxes

DIN rail splice box for 6x LC duplex
Order No. 1411901

DIN rail splice box for 6x SC duplex
Order No. 1411902

DIN rail splice box for 6x ST simplex
Order No. 1411903

- Two-part housing for securing on the DIN rail
- Integrated drawer for supporting excess fiber lengths (protection)
- Wire access possible by means of upper and lower screw connections (screw connections are optional)

Always up-to-date, always available to you. Here you'll find everything on our products, solutions and service:

phoenixcontact.com

Product range

- Cables and wires
- Connectors
- Controllers
- Electronics housing
- Electronic switchgear and motor control
- Fieldbus components and systems
- Functional safety
- HMIs and industrial PCs
- I/O systems
- Industrial communication technology
- Industrial Ethernet
- Installation and mounting material
- Lighting and signaling
- Marking and labeling
- Measurement and control technology
- Modular terminal blocks
- Monitoring
- PCB terminal blocks and PCB connectors
- Power supply units and UPS
- Protective devices
- Relay modules
- Sensor/actuator cabling
- Software
- Surge protection and interference filters
- System cabling for controllers
- Tools
- Wireless data communication

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