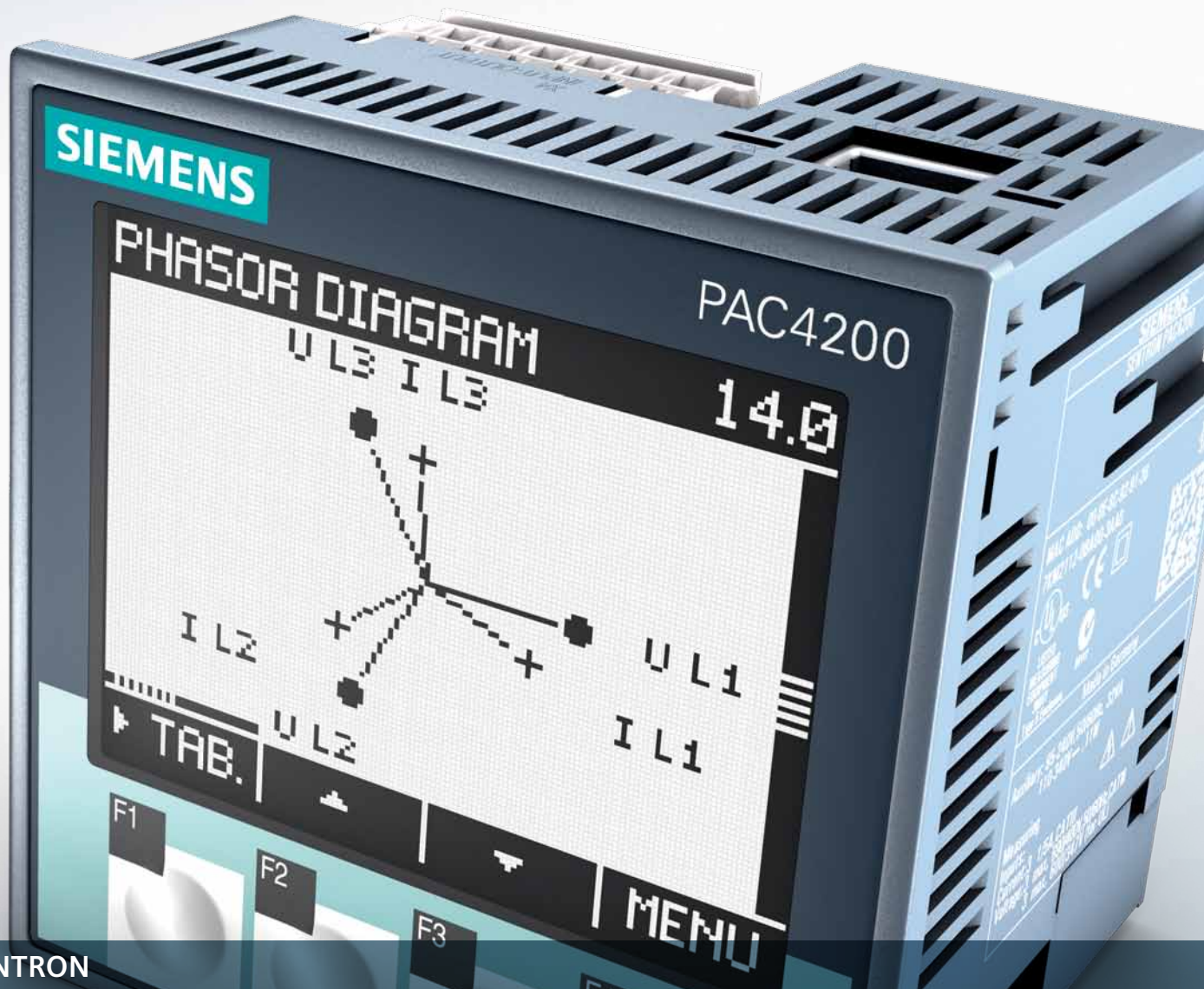


SIEMENS



SENTRON

Components for low-voltage power distribution

Protection, switching, measuring and monitoring devices

Answers for infrastructure.



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Reliability in power distribution

With SENTRON protection, switching, measuring and monitoring devices you have your power supply safely under control. Our coordinated product portfolio meets all the requirements for low-voltage power distribution.



Managing energy intelligently

People need electrical energy. Whether lighting systems, household appliances or machinery, a reliable power supply is the basis for comfort and progress. But what's behind all this? A challenging set of demands are placed on low-voltage power distribution, be it in industrial applications, in infrastructure or in buildings.

Smart grids and a full range of integrated, communication-capable components ensure safety, functionality and minimum power consumption. Protection devices provide maximum safety for people and assets, switching devices control energy flows, and measuring and monitoring devices provide status information on the electrical system. These products give you the basis you need for a safe and cost-efficient power supply.

Safety and flexibility

Outstanding technology - approved since years

Protecting, switching, measuring and monitoring are the basic functions of low-voltage power distribution.

In this segment and in many others, the name Siemens has been synonymous with innovation and outstanding technology for the past 160 years.

Customers around the world know that they can rely on our extensive product and system portfolio.

Keeping the power supply under control

The SENTRON product portfolio contains a broad selection of perfectly coordinated components along with a wide range of accessories. The spectrum includes SENTRON protection, switching, measuring and monitoring devices.

Whether in industry, infrastructure or buildings, these products deliver maximum flexibility, ease of use and safety for low-voltage power distribution.

Totally Integrated Power for complete, integrated solutions

The low-voltage power distribution product portfolio plays a key role in the Totally Integrated Power™ concept.

Communication-capable switches and modules can link the products and

systems to building or industrial automation systems. They report how much energy is being used where and notify the control level system about risks and critical states. The operator thus profits from higher system availability and can identify potential long-term reductions in power consumption and costs.

Excellent support

As a competent and reliable partner we offer you comprehensive support – from initial information, planning, configuration and ordering through to commissioning, operation and technical support. We know the requirements to be met in your area of work and day-to-day business. Based on this, we give you flexible and high quality support, which allows you to concentrate fully on your customers and their needs.

Highlights

- Safe, reliable power distribution based on a coordinated set of protection, switching, measuring and monitoring devices from a single source
- Communication-capable products and systems support integration into building and industrial automation systems
- Modular design maximizes configuration and operational flexibility
- Comprehensive support – from planning to operation

Read the QR code with your QR code reader.



Whether in industrial applications, infrastructure or buildings – our integrated portfolio of SENTRON protection, switching, measuring and monitoring devices offers safe, cost-efficient and flexible options for low-voltage power distribution.

Keeping the power supply under control

Highlights

- Perfectly coordinated components
- IEC/EN and UL standard compliant products for worldwide use
- A comprehensive protection concept for low-voltage power distribution in industrial applications, infrastructure and buildings

Coordinated components for low-voltage power distribution

Siemens is the only supplier worldwide which offers a comprehensive protection concept with perfectly coordinated components for maximum system availability, flexibility and efficiency: the product range includes protection devices such as circuit breakers, miniature circuit breakers, residual current protective devices, fuse systems and overvoltage protection devices, as well as switching devices, switch disconnectors, measuring and monitoring devices.

High application flexibility

Whether in industrial applications, infrastructure or buildings, you are sure to find the product you are looking for in the SENTRON family. The components are perfectly matched. The modular design facilitates fast, simple configuration and installation of the low-voltage power distribution. Maintenance or upgrades are exceptionally easy with the SENTRON portfolio and the extensive range of modular accessories.

Uniform labeling with the simplest of means

All products from the SENTRON portfolio can be identified with adhesive labels – and all at the same level in the case of modular installation devices.

Safe and economical configuration and engineering

With the professional SIMARIS planning tools and ALPHA SELECT configuration software we are supplying you with highly useful tools which will support you in your project. These software tools facilitate fast, safe and economical planning, configuration and deployment of power distribution boards and electrical networks.

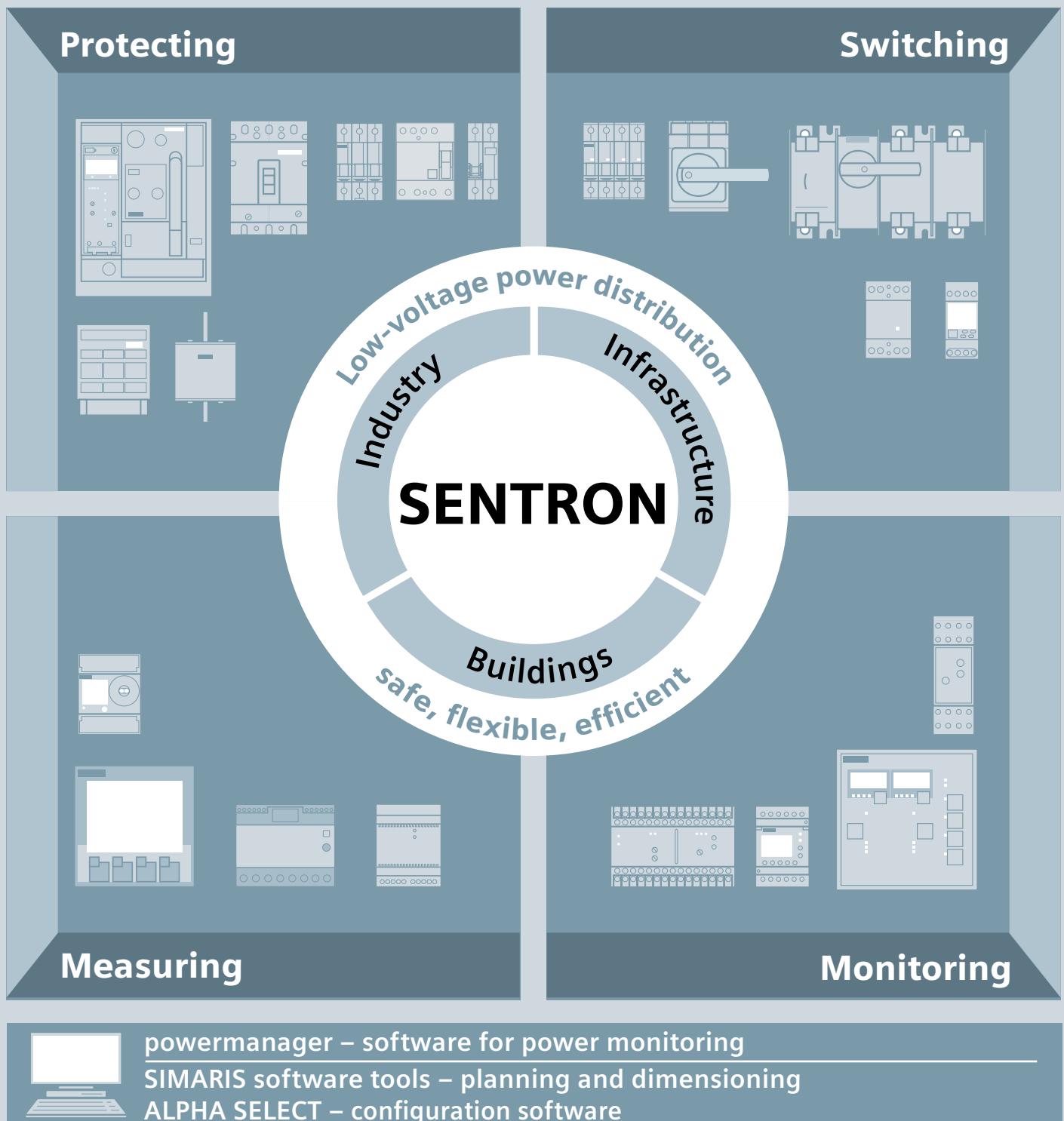
Worldwide use

Many of the products comply with IEC/EN and UL standards and can be used worldwide. This facilitates the export of electrical systems.

Whether in industrial applications, infrastructure or buildings – a reliable power supply is essential to keep operations running smoothly.



SENTRON protection, switching, measuring and monitoring devices



Protection, switching and communicating

In many applications, 3WL/3VL circuit breakers provide protection and switching functionality for motors, generators, transformers, capacitors, busbars and cables.



Cost-efficient power distribution

3WL air circuit breakers and 3VL molded-case circuit breakers provide vital switching and protection functionality in the power distribution of industrial applications, infrastructure and buildings. These devices also communicate with higher-level control systems over standardized bus systems such as PROFIBUS, ETHERNET and Modbus,

creating transparency in the power distribution. They provide users with key information on energy flows, faults and risks, providing the basis for a sustained reduction in operating costs and increasing plant availability.

3WL air circuit breakers

3WL air circuit breakers are designed to meet increasingly demanding expectations worldwide. They are used as incoming-feeder, distribution, coupler, and outgoing-feeder circuit breakers. They are easy to handle and provide integrated communication capability. In combination with an electronic control system, they provide a comprehensive window on what is happening in the grid.

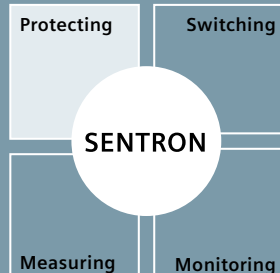
Sizes and accessories

With only three sizes and an extensive amount of accessories, the 3WL air circuit breaker covers the power range from 630 A to 6,300 A. All versions feature the same basic design and share the same complete range of standard accessories.

3WL air circuit breakers



| | 3WL11 | 3WL12 | 3WL13 | 3WL12 |
|---|--------------------------------------|--|---|--|
| | | for AC up to 6,300 A | | for DC up to 4,000 A |
| Rated current I_n [A] | 630, 800, 1,000, 1,250, 1,600, 2,000 | 800, 1,000, 1,250, 1,600, 2,000, 2,500, 3,200, 4,000 | 4,000, 5,000, 6,300 | 1,000, 2,000, 4,000 |
| Size | I | II | III | II |
| Rated ultimate short-circuit breaking capacity [kA] | 55 / 66 / 85 at 415 V / 500 V AC | 66 / 80 / 100 at 415 V / 500 V AC | 100/150 (3-pole) 100/130 (4-pole) at 415 V / 500 V AC | 35 / 30 / 25 / 20 at 20 / 300 / 600 / 1,000 V DC |



Communication-capable 3WL/3VL circuit breakers from the SENTRON portfolio feature a modular design. Information used for diagnostics, troubleshooting, maintenance or cost center management can be forwarded to a central control room.

3VL molded-case circuit breakers

Compact dimensions and excellent communication capabilities are the outstanding features of the 3VL molded-case circuit breakers. The space-saving circuit breakers are rated between 16 A and 1,600 A, and they are ideal for a number of different applications: for system and motor protection, for starter combinations or as switch disconnectors depending on requirements.

Sizes and accessories

3VL molded-case circuit breakers can be equipped with thermal-magnetic (16 A to 630 A) or solid-state overcurrent release (63 A to 1,600 A). The product portfolio is completed by two series of internal accessories.

Highlights

- Communication capability provides connectivity to higher-level management systems
- Extensive range of accessories for the 3WL air circuit breakers for great versatility
- Compact dimensions of the 3VL molded-case circuit breakers

3VL molded-case circuit breakers



| | 3VL1 | 3VL2 | 3VL3 | 3VL4 |
|--|-------------|-------------|---------------|---------------|
| Rated current I_n [A] at 50 °C ambient temperature | 16 ... 160 | 26 ... 160 | 80 ... 250 | 125 ... 400 |
| | 3VL5 | 3VL6 | 3VL7 | 3VL8 |
| Rated current I_n [A] at 50 °C ambient temperature | 250 ... 630 | 320 ... 800 | 400 ... 1,250 | 640 ... 1,600 |

Broad protection concept

Fuse systems from the SENTRON portfolio ensure high system availability 24 hours a day.



Fuse systems for all applications

Fuses and protective switching devices support intelligent concepts for protection and safe switching in low-voltage power distribution. Fuses reliably shut down circuits when a short circuit or overload condition occurs, providing maximum protection for humans, systems, devices and electrical lines.

The following systems are available:

- LV HRC fuse systems
- DIAZED and NEOZED fuse systems
- Class CC fuse system and cylindrical fuse systems
- SITOR semiconductor fuses

SITOR semiconductor fuses

These fuses effectively protect power semi-conductors from the effects of short circuits, preventing damage to expensive devices and equipment such as converters, which have fuses at the input and in the intermediate DC circuit, as well as UPS systems and soft starters for motors. A number of different designs are available.

3KL/3KM switch disconnectors with fuses

Used as main or EMERGENCY-STOP switches, the 3KL/3KM switch disconnectors provide maximum safety, because the double contact break and isolating distance ensure that no voltage is applied to the fuse in the OFF position.

3NJ62 in-line switch disconnectors with fuses

These in-line switch disconnectors feature an integrated double-break switching mechanism. They are ideal for applications with multiple cable outlets which run in a very confined space. The devices feature intelligent plug-in design for safe and easy installation.

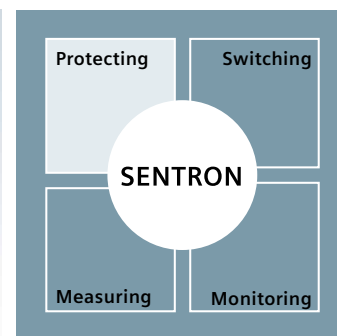
5SG7 MINIZED switch disconnectors, D02

5SG7 MINIZED switch disconnectors with fuses rated up to 63 A are primarily used in switchgear and controlgear assemblies. They can also be used in households upstream from the meter in accordance with TAB 2007 guidelines.

Fast mounting and efficient power distribution with 8US busbar system rated at up to 630 A:

- 1 Busbar supports
- 2 Device adapters for motor feeder with SIRIUS components
- 3 Standard mounting rail adapters
- 4 3NP1 fuse switch disconnectors
- 5 DIAZED bus-mounting bases
- 6 Infeed modules
- 7 Terminals





The fuses and safety switching devices are well matched and ensure reliable disconnection in addition to their protection functions.

3NP1 fuse switch disconnectors

The fuses are clearly visible through the large inspection window. The clearly visible isolating distance facilitates safe and easy maintenance. Additional functions such as electromechanical or electronic fuse monitoring and grid monitoring functions maximize system availability.

3NJ4 in-line fuse switch disconnectors

These compact in-line devices can accommodate multiple connections in a confined space. They are designed for the occasional manual switching and isolation of load feeders and power distributions in industry applications and infrastructure.













5SG7 MINIZED fuse switch disconnectors, D01

Due to their compact design of only 18 mm per pole, 5SG7 MINIZED fuse switch disconnectors, D01 are used primarily in controlgear applications.

Highlights

- Effective short-circuit and overload protection enhances operational reliability and system availability
- A comprehensive protection system portfolio which contains the right product for any application
- SITOR semiconductor fuses safeguard high-value equipment and subsystems

Symbols for switch-fuse devices based on IEC 60947-3

| Device | Switch on/off | Disconnect | Switch on/off and disconnect |
|---|--|--|--|
|  | Load switch  | Disconnectors  | Switch disconnectors  |
|  | Load switch with fuse  | Disconnectors with fuses  | Switch disconnectors with fuses  |
|  | Fuse-switch  | Fuse disconnectors  | Fuse switch disconnectors  |

Reliability and safety

The comprehensive range of residual current operated circuit breakers and miniature circuit breakers is used in all buildings, industrial applications and infrastructure around the world.



Overload and short-circuit protection

Miniature circuit breakers offer protection against damage caused by overload and short circuits. The products feature convenient installation and connection technology, standard accessories and integrated design. A complete range of miniature circuit breakers is available.

- For standard applications:
5SL to 6 kA from 0.3 to 63 A
- For quick installation:
5SJ6 ...-KS with plug-in terminal
up to 6 kA from 10 to 20 A
- For small installation space:
5SY6 0, 1+N in 1 MW up to 6 kA
from 2 to 40 A
- For very high requirements:
5SY to 25 kA from 0.3 to 80 A, 5SP
from 80 to 125 A, also for universal
current applications
- For worldwide use,
certified to UL 489 and IEC:
5SJ4 ...-HG from 0.3 to 63 A

Effective residual current protection

Residual current protective devices are used for the protection of people and assets, fire protection and to provide additional protection in case of direct contact. They protect human life and prevent fires started by electrical ignition. In addition to RCCBs, combination RCBOs and RC units are also available. RCBOs and RC units in combination with miniature circuit breakers combine personal, fire and overload protection in a single device.

The right version for every residual current

RCCBs type A can be tripped by a fault which is detected in AC sine wave current as well as in a pulsating DC current. They are used in most cases. RCCBs type F were developed specially to protect against electric shock when using electric loads with frequency converters in single-phase AC networks. Current-sensitive RCCBs type B/type B+ also react to faults in smoothed DC which can occur with power semiconductors.

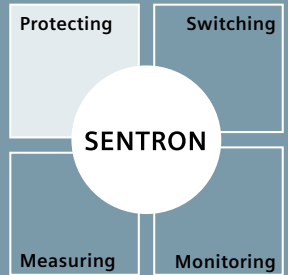
Versions that suit every requirement

The super-resistant version **[K]** prevents unwanted power cuts by briefly delaying the tripping action of the RCCB, thereby avoiding unnecessary downtimes. The selective version **[S]** features time-delayed tripping and a sliding scale of tripping times and rated residual currents to selectively shut down separate parts of a system. The patented SIGRES RCCB has built-in condensation protection to ensure maximum safety and durability even under harsh conditions such as gas or moisture in the ambient air.

Simple configuration of applications thanks to multiple combination options

- 1 5SM2 RC unit for personal protection and prevention of electrically ignited blazes
- 2 5SY 4-pole miniature circuit breakers
- 3 5ST3 remote operating mechanism for remote switching of the MCB
- 4 5ST3 undervoltage releases protect downstream loads in the circuit against risks from undervoltage
- 5 5ST3 auxiliary switches and 5ST3 fault signal contacts for signaling switching state or protective tripping





Miniature circuit breakers protect against overload and short circuits; overvoltage protection devices protect against lightning strikes. AFD units and residual current protective devices are used for the protection of people and assets.

Advanced preventative protection against fire

5SM6 AFD units for advanced preventative protection against fire are used in combination with a 5SY MCB or a 5SU1 RCBO. They provide reliable protection against hazardous arcing faults, thus closing a safety gap which has existed up to now. All poles of the fused circuit are disconnected from the network in the event of a fault. People and property are now reliably protected against possible injury and damage from fire caused by overload, short circuits or arcing faults.

Multi-level lightning protection

Lightning arresters type 1 provide protection against overvoltage and high power surges that may be triggered by a direct or indirect lightning strike. Surge arresters type 2 are used after lightning arresters type 1 to protect against transient overvoltage. Surge arresters type 3 are used downstream of surge arresters type 2 in sub-distribution boards near the loads to protect those loads.

Highlights

- Comprehensive portfolio of residual current operated circuit breakers and miniature circuit breakers
- Protection against hazardous arcing faults with advanced preventative protection against fire
- Multi-level lightning and overvoltage protection

Proper functioning of the different types of residual current protective devices

| Type Current waveform | AC | A | F | B | B+ | Type Tripping current |
|--------------------------|----|---|---|---|----|---|
| | ■ | ■ | ■ | ■ | ■ | 0.5 ... 1.0 $I_{\Delta n}$ |
| | | ■ | ■ | ■ | ■ | 0.35 ... 1.4 $I_{\Delta n}$ |
| | | ■ | ■ | ■ | ■ | Start angle 90°: 0.25 ... 1.4 $I_{\Delta n}$ Start angle 135°: 0.11 ... 1.4 $I_{\Delta n}$ |
| | | ■ | ■ | ■ | ■ | max. 1.4 $I_{\Delta n}$ + 6 mA |
| | | | ■ | ■ | ■ | 0.5 to 1.4 $I_{\Delta n}$ |
| | | | | ■ | ■ | 0.5 ... 2.0 $I_{\Delta n}$ |

Switching functions for safety and comfort

Safe switching of loads and control events to ensure smooth production



Easy manual switching

Manual switching devices can be reliably used in electrical systems and loads that are switched on and off manually. The product range includes switch disconnectors, On/Off switches, control switches and pushbuttons.

Manifold switching functions

5TE8 control switches handle a variety of tasks used as two-way switches, group switches and control switches. Two-way switches are used in control cabinets and distribution boards for switching small loads on/off or switching them over. Group switches with center position permit the positions open/stop/closed,

for example to control anti-clockwise rotation - OFF - clockwise rotation. Control switches have in addition an integral control lamp for the ON position. 5TE8 ON/OFF switches are used to switch lighting, motors and other electrical devices. 5TE4 switches are used primarily in control systems, e.g. to switch on seal-in circuits or as pushbuttons with maintained-contact function for manual use.

Safe isolation from the grid

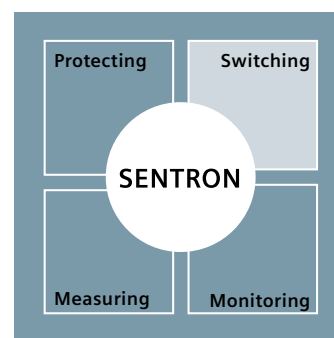
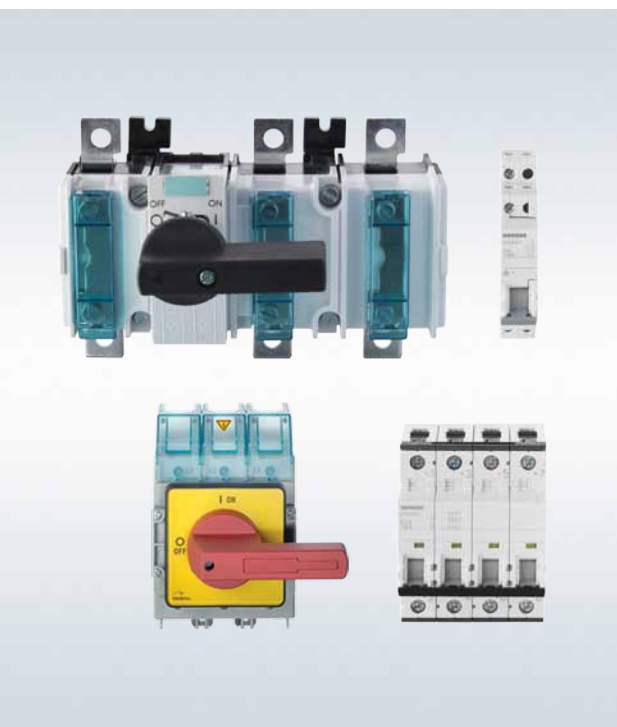
3KA/3KE switch disconnectors can be used for fuseless isolation in any low-voltage grid. They function as main control, EMERGENCY-STOP or transfer switches. Available in three or four pole versions, they can be used for disconnecting or switching under load. After disconnection, 3LD main and EMERGENCY-STOP switches can be used to safely isolate electrical systems or to switch induction motors or air-conditioning systems up to 132 kW as well as solar systems.

Safe switching of solar modules

DIN VDE 0100-712 specifies the use of special 5TE2 DC isolators for isolating solar modules in photovoltaic systems. With a high rated voltage of up to 1,000 V DC, 5TE2 DC switch disconnectors are the ideal solution for this application.

A selection of products from the manual switching portfolio

| | Rated operational current [A] | Design/version | Contact type |
|--|---|---|--|
| 5TE4 pushbuttons | 20 | Pushbuttons, control pushbuttons, double pushbuttons with maintained-contact function or momentary-contact function | 1 NO/1 NC, 1 NO+1 NC, 1 NO+1 NO, 1 NO, 2 NO, 3 NO+N, 4 NC, 1 NO/1 N, 2 CO, 2 NC, 1 NO/1 NC |
| 5TE8 control switches | 20 | Two-way switches, group switches with intermediate position and control switch | 1 NO/1 NC, 2 NO/2 NC, 3 NO/3 NC, 1 CO, 2 CO |
| 5TE ON/OFF switches | 16, 25, 32, 36, 63, 80, 100, 125, 160, 200, 250, 630, 1,000 | Gray handle, red handle | 1 NO, 2 NO, 3 NO, 3 NO+N, 4 NO, 3 NO+N+AS |
| 5TE1 switch disconnectors | 100, 125, 160, 200 | Transparent enclosure, gray knob Yellow enclosure, red knob | 2 NO, 3 NO, 4 NO, 3 NO+N |
| 3LD, 5TE, 3KA/3KE switch disconnectors | 16 ... 1,000 | Front and floor mounting, standard rail mounting, molded plastic enclosure | 2-pole ... 6-pole |



Manual and electrical switching devices are used for the on-demand control of systems and loads in many different applications.

Remote switching

Electrical switching devices such as remote control switches, switching relays or Insta contactors are used where systems and loads are controlled by means of electrical signals. 5TT4 remote control switches trip in the event of current inrushes, i.e. pulses, and then electro-mechanically save the switching position, even in the event of a power failure. 5TT4 switching relays are used as contact multipliers for switching large loads with low control circuit power. 5TT5 Insta contactors are suitable for switching heating, lighting and motors. In industry, they are being used to an increasing extent to switch motors in applications such as heat pumps or HVAC.

Time switching

Time switches are used in a huge variety of applications including dryers on production lines, exterior lighting on office buildings, and residential heating systems. They ensure maximum comfort and safety and reduce power consumption. The extensive product portfolio ranges from 7LF mechanical and digital time switches and 5TT industrial timers to 7LF timers for buildings. They are also used to switch staircase lighting, ventilation systems and circulation pumps.

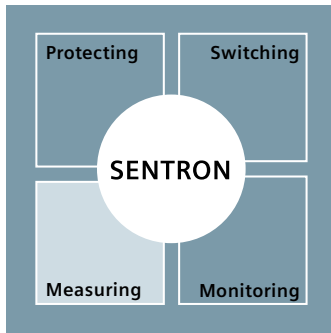
Highlights

- Extensive portfolio of electrical and manual switching products
- DIN VDE 0100-712 compliant DC isolators for solar modules
- Timers provide enhanced safety and comfort and reduce energy consumption

A selection of products from the electrical switching portfolio

| | Version | Contact type | Rated control voltage [V] |
|-------------------------------------|---|---|----------------------------------|
| 5TT4 remote control switches | AC, AC central, AC series, AC shutters/blinds, AC group, DC | 1 NO, 2 NO, 3 NO, 4 NO, 1 NO + 1 NC | AC: 8 ... 230 DC: 12 ... 110 |
| 5TT4 switching relays | AC, DC | 1 NO, 2 NO, 3 NO, 4 NO, 1 NO + 1 NC, 1 CO, 2 CO | AC: 8 ... 230, DC: -- |
| 7LF timers | Digital, analog | 1 ... 4 NO, 1 CO | 110 ... 240 |
| | Rated operational current [A] | Contact type | Rated operating voltage [V] |
| 5TT5 Insta contactor | AC: 20 ... 63 DC: 24 ... 63 | AC: 4 NO, 3 NO + 1 NC, 2 NO + 2 NC, 4 NC DC: 2 NO, 1 NO + 1 NC, 1 NC, 4 NO, 3 NO + 1 NC, 2 NC + 2 NC, 4 NC | AC: 24 ... 230 DC: 24 ... 220 |

Greater transparency through energy flow tracking



Highlights

- Vital information about energy flows, consumption and system status
- Communication with higher-level automation and power monitoring systems
- TÜV-tested; standard-compliant according to DIN EN 16001 / ISO 50001

Informed to detail

Measuring devices deliver reliable electricity consumption and system status information. With their measured values they provide the basis for efficient power monitoring. Whether for industrial applications, infrastructure or buildings, the 7KT/7KM PAC measuring devices collect the power values for the infeed, outgoing feeders or individual loads. In addition, they provide important data for assessing the system state and power quality. The communication-capable devices can be very easily integrated into automation and power monitoring systems to process the acquired data. Communication with higher-level power management systems takes place via PROFIBUS DP, PROFINET, Modbus RTU, Modbus TCP, M-Bus and KNX.

All-purpose devices for worldwide use

Thanks to their wide range of functions, the measuring devices can be used everywhere where electrical energy is distributed and used. Built-in digital inputs and outputs make it simple to adapt the devices to the particular application. Plug-in modules can be added at a later time to provide extra inputs/outputs and bus interfaces. A comprehensive range of monitoring functions provides early warning of



The right measuring device to meet every requirement.

malfunction or overload conditions. With international approvals and nine language versions the devices are perfectly suitable for worldwide use. IP65 protection for front-panel mounting as a standard feature allows them to be used even in harsh environments.

| Excerpt from the measuring device portfolio | | 7KT PAC1500 | 7KM PAC3100 | 7KM PAC3200 | 7KM PAC4200 |
|---|--|--|-------------|-------------|--------------|
| Technical data | Compliant with EN 50470-1, -3, versions: - calibrated (MID), direct connection (up to 125 A), transformer connection (5 A) | ■ | | | |
| | Basic measured values (>30) e.g. V, I, P, Q, W, f, ... | | ■ | ■ | ■ |
| | Extended range of measured values (>50) e.g. THD, asymmetry | | | ■ | ■ |
| | Basic power quality (>200) e.g. phase angle, single harmonic up to order 31 | | | | ■ |
| | Load profile record with time stamp, min./max. | | | | ■ |
| Inputs/Outputs | DI | | ■ 2 | ■ 1 | ■ 2 □ plus 8 |
| | DO | | ■ 2 | ■ 1 | ■ 2 □ plus 4 |
| | Pulse inputs for counters | | | ■ 1 | ■ 2 □ plus 8 |
| | Pulse outputs | ■ 2 (Q, W) | ■ 2 | ■ 1 | ■ 2 □ plus 4 |
| | | ■ available as standard □ optionally available | | | |

Everything in view with monitoring devices



Monitoring devices for uninterruptible power supply.

Everything under control

You are in firm control of your power supply systems twenty-four-seven. Intelligent monitoring devices increase system availability.

Detection of faults in good time

High plant availability and low downtimes help keep costs low. Residual current monitors help detect and remedy faults before the plant is shut down.

They check for residual currents and issue a warning when the predefined threshold is exceeded, making a vital contribution to operational reliability.

High operational reliability

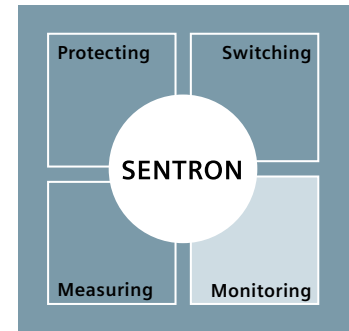
The 3KC ATC5300 transfer control device increases the reliability of the power supply through automatic or manual switching between two power supply systems. It is deployed wherever a power failure would have serious consequences, e.g. in the power supply to industrial processes with transfer switching at non-critical times or in distributed power networks with UPS.

Uninterruptible power supply

Hospitals and medical centers have a lot of medical equipment which in many cases performs life-critical functions. In group 2 areas (e.g. intensive care units or operating rooms), 7LQ3 switchover devices monitor the IT network and provide switchover functionality for two redundant supply lines to ensure a continuous supply of power.

Equipment and system protection

Overvoltages and undervoltages can seriously impair the functionality of systems and equipment. 5TT3 voltage relays reliably detect malfunctions in the power supply, helping to protect against possible subsequent damage.



Highlights

- Monitoring equipment increases system availability
- Switchover devices ensure power supply continuity in medical premises
- UPS for reliable protection against power failure

A selection of products from the monitoring device portfolio

| | |
|----------------------------------|---|
| Transfer switches | 3KC ATC5300 transfer control device |
| Monitoring of electrical values | Residual current monitors, voltage relays, current relays, priority switches, fuse monitors, phase and phase sequence monitors, insulation monitors, monitoring of medical premises |
| Monitoring of plants and devices | Fault signaling units, EMERGENCY-STOP modules, level relays, line circuit relays, dusk switches, temperature controllers, p.f. controllers, thermistor motor protection relays |

Portfolio for professional power monitoring

With our comprehensive power monitoring portfolio you create transparency in your power distribution.

Always completely in the know due to intelligent measurement methods

The 7KT/7KM PAC measuring devices detect and document energy values of infeeds, outgoing feeders or individual loads in a precise and reliable manner. They also provide important measured values that can be used to analyze the status of the system and the power quality. To further process the measured data, the devices, due to their versatile communication capability, can easily be integrated into higher-ranking automation and energy management systems.

Switching and protection devices with communication capability

The 3WL air circuit breakers and the 3VL molded-case circuit breakers are used for reliable low-voltage power distribution. They are far more than just switching and protection devices: Via standardized bus systems they provide measured values and important information for diagnostics, fault detection, maintenance and power monitoring, and thus offer new possibilities with regard to the implementation of profitable and highly available low-voltage power distribution.

Easy integration of other components into the power monitoring system

Other switching, protection or measuring devices can be integrated into the power monitoring system, either via an own communication interface or their S0 interface. This way, for example, consumption values of non-electrical energy carriers such as gas or water, and the switching state of devices without communication capability can be analyzed in the power monitoring system.

powermanager software

The powermanager software for power monitoring can be used for infrastructure, industrial applications and buildings. Already with the standard package with functions for the gathering, analyzing and monitoring of various measured values, it is easy to set up a power monitoring system. Other customer-specific requirements can be met with option packages. With powermanager, you keep all your options open and, thanks to a flexible licensing concept, you can expand the project with additional functions or devices at any time without losing any data.

The powermanager software brings clarity to power distribution.



The 7KT/7KM PAC measuring devices bring transparency to energy flows and system states.



Communication-capable circuit breakers provide early warning of faults.





Compatible hardware and software components enable efficient power monitoring that meets all requirements in buildings, infrastructure and industry – from standard solutions to customized applications.

TÜV conformity certificate for measuring devices and powermanager

DIN EN 16001 and ISO 50001 are power saving standards which define compulsory criteria for sustainable energy management in companies. With our 7KT/7KM PAC measuring devices and the powermanager power monitoring software we are the world's first supplier of products for supporting a company's energy management system, which have been tested by TÜV Rheinland in compliance with the two standards.

- TÜV-tested power monitoring software and measuring devices
- Standard-compliant according to DIN EN 16001 / ISO 50001



Optimization of energy efficiency for sustainable environmental protection

The concrete implementation of DIN EN 16001 and ISO 50001 requires a sustainable and professional energy management system which enables the software-assisted recording of energy flows in detail in all production plants, followed by analysis and evaluation of the energy consumption. The aim is to help companies build up systems and processes for the sustainable optimization of energy efficiency and thus for the reduction of energy costs. The TÜV-tested 7KT/7KM PAC measuring devices and the powermanager power monitoring software offer the optimum technical basis for energy management in compliance with the standards, thereby helping to reduce CO₂ emissions and preserve the environment.

Highlights

- Complete portfolio of hardware and software components for every application
- Integration of various measuring devices for recording non-electrical energy carriers
- TÜV-tested components for supporting a company's energy management system

Systematic approach to power distribution

Highlights

- Comprehensive portfolio for low-voltage switchboards, distribution boards and small distribution boards
- Compliance with standards for added safety
- Numerous software tools and comprehensive support for planning and installation of power distribution systems

For all requirements

A comprehensive range of high-performance components enables switchboards and distribution boards to meet any need.

SIVACON S8 power distribution board – safe, flexible and cost-efficient

The SIVACON S8 power distribution board sets new standards in power distribution or as a motor control center (MCC) for industrial applications or infrastructure. The power distribution board system rated up to 7,000 A for easy and integrated power distribution ensures maximum safety for human beings and plants through design verification by verification tests in accordance with IEC 61439-2. The optimized power distribution board design offers great versatility.

ALPHA distribution boards – integrated platform structure

Whether small, wall- or floor-mounted, ALPHA distribution boards are all based on a proven system. They comply with all safety regulations and offer reliable quality. The integrated platform structure gives them great versatility for use in industrial applications, infrastructure and buildings. In addition, a range of sub-distribution products is available.

Reliable power distribution dimensioning

A tender process takes place prior to contract award for public or other large buildings. Siemens provides a set of defined specification texts. The software SIMARIS design runs calculations and performs dimensioning for the electrical distribution network based on the structure that has been defined and entry of technical data in accordance with recognized rules of technology and applicable standards.

Definition of necessary devices and comparison of tripping characteristics

Based on the equipment and the distribution boards needed, the software SIMARIS project determines the system space requirements and helps you define the budget. You generate the technical specifications for the entire project with a single click of the mouse.

SIMARIS provides tripping characteristic curves as well as let-through current and let-through energy characteristics.

Completely coordinated components for low-voltage power distribution and electrical installation technology

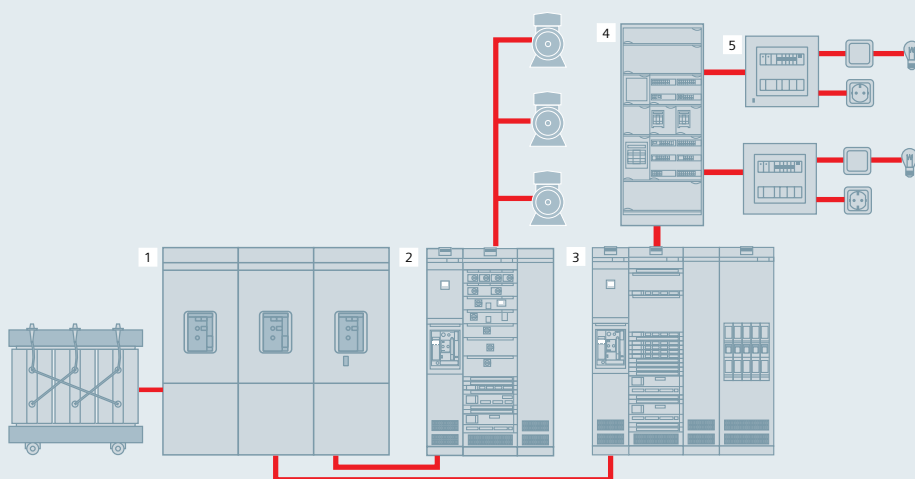


SENTRON protection devices

In industrial application as well as in the infrastructure energy must be distributed safely. Our intelligent products and systems for low-voltage power distribution meet every requirement for safety, flexibility and efficiency.

Power distribution in industrial applications and infrastructure

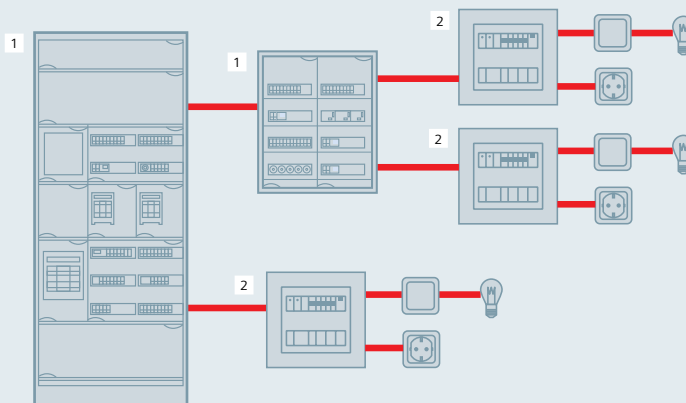
- | | |
|---|-------------------------------------|
| 1 | Main low-voltage power distribution |
| 2 | Motor Control Center (MCC) |
| 3 | Switchboard |
| 4 | Distribution board |
| 5 | Small distribution board |



In modern buildings a multitude of uses, optimized design and flexibility of mounting and installation are called for. Our complete portfolio leaves nothing to be desired.

Power distribution in buildings

- | | |
|---|---------------------------|
| 1 | Distribution boards |
| 2 | Small distribution boards |



Planning, configuration and ordering of distribution boards

The free configuration software ALPHA SELECT makes distribution board configuration faster and easier than ever before. The software program covers the complete product portfolio of the

electrical installation technology and accompanies you step-by-step through the entire project, from planning to installation. Configuration errors are virtually impossible thanks to collision tests and configuration rules saved in the program.



SENTRON switching devices



SENTRON measuring devices



SENTRON monitoring devices

Answers for single- and multi-family homes

A broad portfolio of personal, fire, lightning and overvoltage protection products makes the entire house a safer place to live.



Protecting people and assets

A comprehensive protection concept keeps people and property safe in apartment buildings. Siemens components give homeowners all the protection they need, and they comply with all current standards.

Line protection is a must

In the event of a short circuit or overload, the miniature circuit breaker cuts off power to the affected circuit. They can be found installed in every house.

Effective residual current protection

Residual current protective devices prevent accidents caused by direct or indirect contact with electrical voltage and offer additional protection against fires started by electrical ignition. Electrical outlet circuits should have 30 mA residual current protection. Upstream residual current circuit breakers are provided for other circuits, for example lighting. Distributed protection, which shuts off only the affected circuit when a fault occurs, increases the overall availability of the electrical system.

Protection against arcing faults

AFD units for advanced preventative protection against fire reliably detect hazardous arcing faults, thereby protecting human lives, buildings and irreplaceable assets. All poles of the fused circuit are disconnected from the network in the event of a fault.

Overvoltage protection is worth the investment

Lightning strikes or overvoltage can cause serious damage to electrical equipment and systems. Even minor voltage peaks in the power lines can have grave consequences. Multi-level overvoltage protection prevents damage to the electrical installation and terminal equipment.

In residential buildings people and their assets have to be protected.



Electrical and time switching

Timers are simple and effective tools for saving energy. They can be used in a variety of ways, for example to switch lighting, ventilation and heating on and off in response to load conditions. The room remains comfortable and energy consumption decreases significantly. Remote control switches enable users to turn off the lights from multiple pushbuttons.

Charging unit for electric vehicles

Standard IEC 61851 defines the requirements for the installation and operation of electrical vehicle charging stations. Tried-and-tested, high-quality SENTRON protection, switching, measuring and monitoring devices deliver maximum safety when installing a charging unit.

Highlights

- Protection against electric shock by means of residual current protective devices in accordance with DIN VDE 0100-410
- Electrical and time switching for efficient use of energy
- High-quality components for safe charging station installation

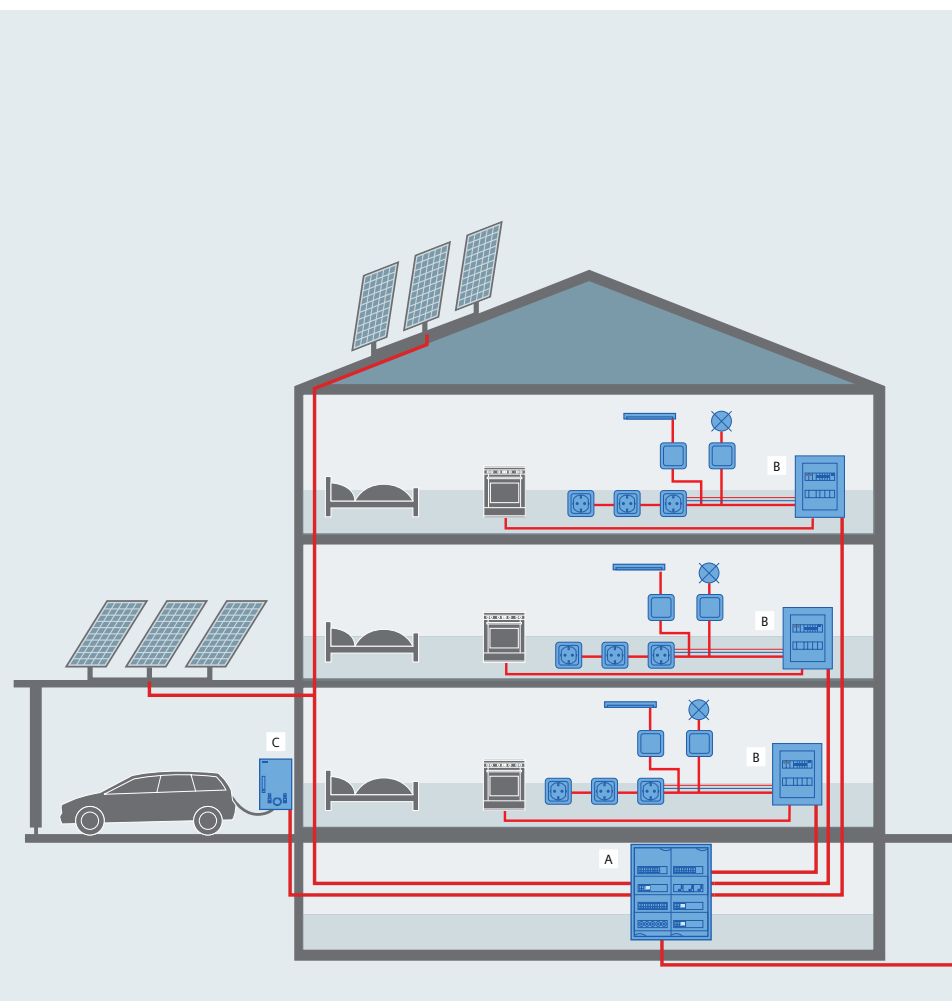
Personal safety is the top priority in residential buildings. Complete protection is provided for equipment which is attached to mains power.

Applications

| | | |
|---|---------------------------|-------------|
| A | Distribution board: | 1 2 3 5 7 |
| B | Small distribution board: | 1 3 4 6 7 8 |
| C | Charging unit: | 1 2 6 |

Components used

| | |
|---|--|
| 1 | Miniature circuit breakers for the protection of the individual lines |
| 2 | RCCBs type B for the protection against a DC current |
| 3 | RCBOs for personal, property and fire protection |
| 4 | AFD units for protection against hazardous arcing faults |
| 5 | Type 1 and Type 2 overvoltage protection |
| 6 | Type 2 and Type 3 overvoltage protection provides fine protection for sensitive equipment |
| 7 | Time switches, e.g. for lighting in the cellar, hall and staircase in order to reduce energy consumption |
| 8 | Remote control switches, e.g. for lighting in staircase or hall |



Answers for flexible building usage

Both in the office and on the production floor, SENTRON components protect people and ensure system availability even in change-of-use situations.



Personal safety in the office

Many mid-tier companies have both office and production areas. As a result, the power distribution system has to meet very different needs. RCCBs protect electrical outlet circuits in office areas. The use of AFD units in combination

with RCBOs is recommended to provide combined personal, fire and system protection.

Smooth production operations

Every production unit should have its own power distribution subsystem to ensure a reliable supply of power to the machines on the production floor. Each machine also has its own control cabinet which contains for example frequency converters and the controllers. If required, switch disconnectors with LV HRC fuse systems cut off power to individual machines. Type B and Type B+ universal current sensitive RCCBs ensure a high level of personal safety. They are unaffected by capacitive leakage current from devices such as frequency converters and provide guaranteed protection against the effects of residual current. Measuring devices capture both active and reactive energy data with a high degree of precision. The data is acquired via a LAN coupler with an RS485 expansion module and forwarded over an Ethernet link for analysis on an office PC.

SENTRON protection, switching, measuring and monitoring devices keep production running smoothly and ensure high system availability.



Efficient system protection

Fuse switch disconnectors are installed for occasional manual switching/isolating of for example machines, sub-distribution boards and cables. Providing "load switching" and "disconnect" functions, they are able to switch on, control and switch off the specified rated current. They can also handle a specific short-circuit current over a certain period of time.

Safe photovoltaic systems

Due to the current source characteristics of solar modules, disconnecting DC power in PV systems presents greater difficulties compared to normal home installations. DIN VDE 0100-712 specifies the use of special switch disconnectors for isolating solar modules in photovoltaic systems. The compact 5TE2 switch disconnector rated at 1000 V DC meets the requirements of this standard.

Highlights

- Flexible, safe and scalable power distribution systems for mid-tier companies
- Coordinated portfolio to keep things running without a hitch
- Protection of your investment thanks to durable, high-quality products

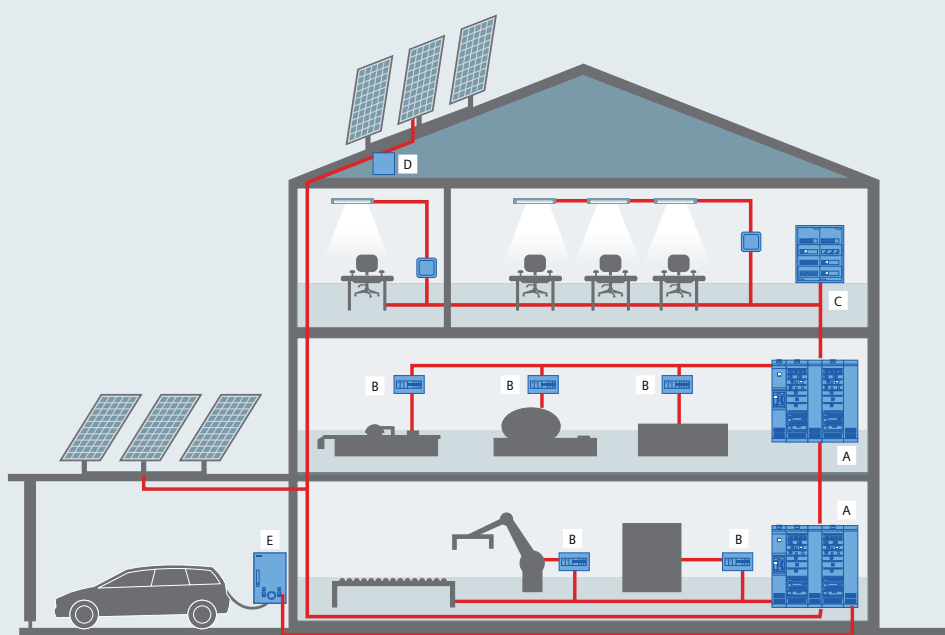
Personal protection similar to residential buildings is standard in office environments. On the production floor, safe machine operation and minimization of downtime are also priorities.

Applications

| | | |
|---|------------------------------------|------------|
| A | Switchboard: | 1 2 7 9 10 |
| B | Control cabinet: | 1 2 5 7 |
| C | Distribution board: | 2 4 6 9 10 |
| D | Molded-plastic distribution board: | 3 8 9 11 |
| E | Charging unit: | 2 5 9 10 |

Components used

| | |
|----|--------------------------------|
| 1 | Molded-case circuit breakers |
| 2 | MCBs |
| 3 | MCBs, universal current |
| 4 | RCCBs type A or type F |
| 5 | RCCBs type B |
| 6 | AFD units |
| 7 | Fuse switch disconnectors |
| 8 | Photovoltaic fuses |
| 9 | Overvoltage protection devices |
| 10 | Measuring devices |
| 11 | DC isolators |



Answers for the manufacturing industry

A broad range of products covers a whole range of requirements. IEC and UL approvals facilitate export.



System availability and safety

Production is expected to run continuously without interruption. Therefore, power distribution in the manufacturing industry has to avoid power cuts and guarantee high system availability. Intelligent products monitor system status and power loads and communicate them with standardized bus systems such as PROFIBUS, PROFINET or Modbus to higher-level management systems.

High current switching

Soft starters are deployed to avoid peak loads caused by motor startup current. Devices with high switching capacity are used for line protection. Good up-front planning of the power distribution system regarding selectivity ensures that only the nearest protective device activates when a fault occurs rather than bringing down all of the motors.

Monitoring the system status

7KM PAC measuring devices, protection and switching devices communicate over standardized bus systems with higher levels in the system hierarchy. Sensor data such as motor temperature can also be transmitted to these devices providing system transparency. RCDs are also installed, which detect residual currents long before the protective device activates.

Enhanced functionality

A wide selection of auxiliary components, such as remote control switches and fault signal contacts, is available for industrial applications, and they support integration into control systems.

High system availability in industrial applications avoids downtime and the associated high costs.



Efficient planning

SIMARIS design simplifies planning and dimensioning of the electrical power supply. The software tool performs the grid calculations, selects the appropriate products and generates a suitable, safe and economical solution to meet the needs of the application. The tool also quickly calculates short-circuit current, load flow, voltage drop and energy balance.

Easy system documentation

The My Documentation Manager tool enables users to efficiently generate reliable system documentation by putting together customized manuals:

www.siemens.com/lowvoltage/mydocumentationmanager

Highlights

- Reliable monitoring of system status and network load
- Communication-capable products ensure perfect coordination between all components
- My Documentation Manager – the ideal tool for simple, reliable system documentation

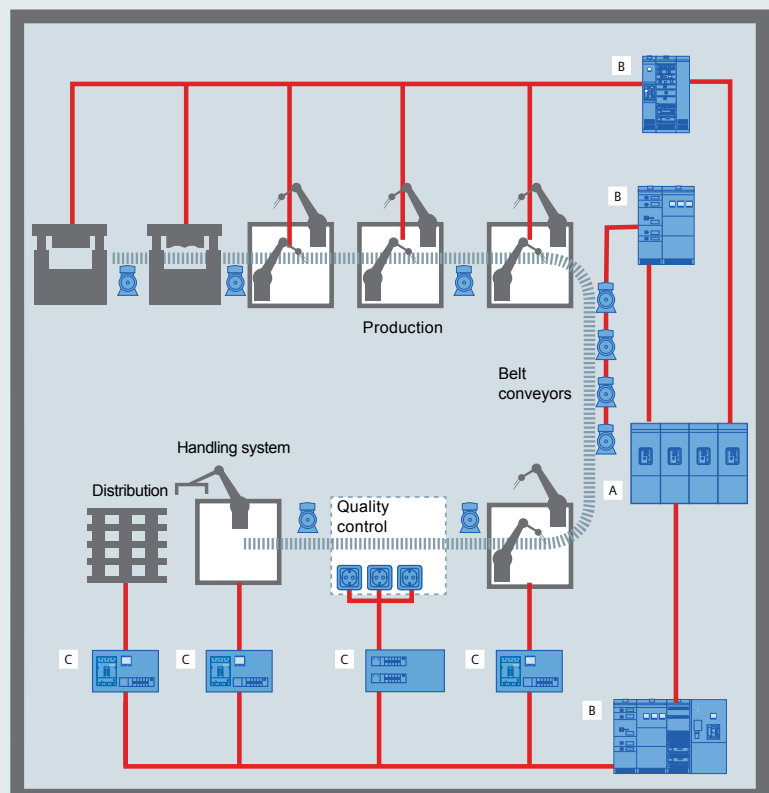
Selective protection of the individual components is essential to maintain high system availability. International approvals facilitate the export of machinery and systems.

Applications

| | | |
|---|--------------------------------------|-------------|
| A | Low-voltage main power distribution: | 1 2 3 6 7 |
| B | Switchboard (MCC): | 2 3 4 5 6 7 |
| C | Control cabinet: | 1 3 5 6 7 |

Components used

| | |
|---|--|
| 1 | Switch disconnectors with high switching capacity and auxiliary components |
| 2 | Air circuit breakers |
| 3 | Molded-case circuit breakers |
| 4 | Fuse switch disconnectors to protect machinery |
| 5 | Cylindrical fuses |
| 6 | Measuring devices for monitoring and as basis for power monitoring |
| 7 | Busbar systems |



Answers for non-residential buildings

Software tools provide assistance during planning, configuration and deployment of power distribution systems.



Planning ahead

A coordinated set of products and integrated systems creates synergies and supports high-performance concepts. These concepts contain various types of systems: power distribution, building

management, HVAC, lighting and sun protection control, fire protection systems, access control, intrusion systems, safety systems and video surveillance. Energy sources such as PV systems and charging stations for electric vehicles are also included in the concept. Effective protection of persons, assets, hardware and software in the building are other important aspects of the overall concept.

Specification texts and configuration-relevant CAx files

The range of specification text blocks includes power distribution products and systems and technical building equipment, including such things as lift and lighting systems and uninterruptible power supplies. Project-relevant CAx files (commercial and technical product data) are also available.

Planning and design of the power distribution for infrastructure applications have to satisfy stringent safety, flexibility and cost criteria.



Data acquisition and analysis

Communication-capable products can be integrated into higher-level systems such as the Desigo building management system. The 3WL air circuit breaker sends data over Modbus RTU, PROFIBUS or ETHERNET. Data analysis can provide early fault warning, avoid peak loads and help maintain a constant load on the grid.

Integration of smart grids

Power for the electricity grid is normally supplied from a central generation station, but the current trend is towards distributed generation. PV systems, wind turbines and biogas systems can feed the gained electrical power directly into the low-voltage grid. Smart grids which automatically manage and control the loads match power infeed with the load. Smart grids incorporate loads such as heat pumps, hot water tanks, freezers and electric car batteries into the grid management.

Highlights

- Tailored overall concepts for public and non-residential buildings
- Power monitoring minimizes energy consumption and reduces cost
- Software tools and specification texts simplify the planning process

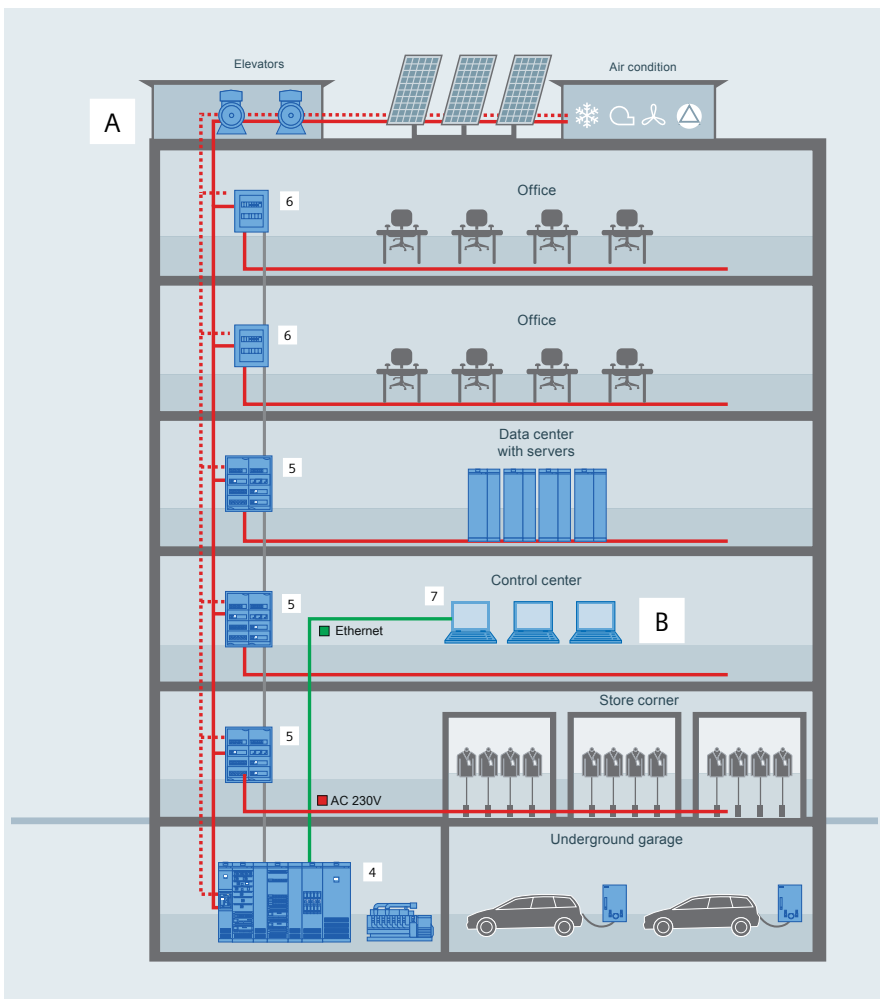
A meticulous planning, implementation and ongoing operating phase is needed for every infrastructure project. A selection of software tools and comprehensive support are available for all three levels.

Applications

| | | | | | |
|---|-------------------------|---|---|---|---|
| A | Configuration/planning: | 1 | 2 | 3 | |
| B | Power monitoring: | 4 | 5 | 6 | 7 |

Components used

| | |
|---|---|
| 1 | SIMARIS design |
| 2 | SIMARIS project |
| 3 | SIMARIS curves |
| 4 | Central energy supply switchboard with air circuit breaker |
| 5 | Distribution board with measuring devices for accurate allocation of power consumption to the individual cost centers |
| 6 | Small distribution board with measuring devices |
| 7 | The powermanager power monitoring software supports user-friendly graphic analysis of power consumption displayed on load curves as well as generation of statements and cost reports |



Answers for industrial estates and business parks

A suitable version of a broad spectrum of products can be supplied to meet a wide range of requirements.



High system availability

The electricity supply at industrial estates and business parks has to meet a number of challenges. Production lines, office buildings and logistics centers have to

run without interruption at all times. High system availability increases the efficiency of the production process and enhances business competitiveness.

Planning flexibility

In many cases, buildings at an industrial estate are leased, so change of use is a frequent occurrence. Machinery is installed in a different place, and production buildings are converted into office space or vice versa. The power distribution system has to have the flexibility to accommodate these changes. Busbar trunking systems ensure safe, reliable distribution of power and facilitate change of use. Circuit breakers or miniature circuit breakers with a higher switching capacity ensure safety and flexibility. Intelligent software tools such as the SIMARIS family and ALPHA SELECT support reliable, flexible and economical dimensioning of electrical power distribution systems.

Flexibility and performance: key characteristics of the power distribution of an industrial estate.



To intelligently manage energy flows, it is essential to have an insight into them. Communication-capable low-voltage power distribution components such as circuit breakers and measuring devices provide measured values and data which can be processed, monitored and archived using the powermanager power monitoring software. The received data can be displayed individually in user-friendly visualizations to provide transparency in your energy flows. This information permits considerable savings.

Smart grids include the networked communication and control of energy sources and loads. The goal is to ensure continuity of the energy supply based on efficient, reliable system operation. Our products ensure effective communication between power sources and loads in smart grids. Power is fed in from PV systems and wind turbines. Intelligent energy and building management systems make efficient use of the energy on the load side.

- Flexibility in the power distribution through anticipatory planning and highly versatile products
- Communication-capable components provide transparency in the energy flows
- Safe, cost-effective dimensioning of electrical grids using the SIMARIS software tools

Applications

Components used

| | |
|---|--|
| 1 | Switch disconnectors with high switching capacity and auxiliary components |
| 2 | Air circuit breakers |
| 3 | Molded-case circuit breakers |
| 4 | Switch disconnectors to protect machinery |
| 5 | Cylindrical fuses |
| 6 | Measuring devices for monitoring and as basis for power monitoring |
| 7 | Busbar systems |
| 8 | Monitoring devices |



Answers for the safe power supply of tomorrow

Whether for wind power, photovoltaics or electromobility: our integrated portfolio offers high-quality and standard-compliant products for the implementation of sustainable power concepts.

Ready for the future

In view of the limited resources of fossil fuels, the use of renewable energy sources is becoming increasingly important. Alongside wind turbines, photovoltaic systems are a key area of interest. Both the ecological and economic aspects of these systems are of great importance.

As a global leading supplier of first-class, standard compliant products and systems for low-voltage power distribution we contribute to a responsible and sustainable use of electrical energy.

With our consistent portfolio enabling power supply and distribution, personal, fire and line protection as well as power monitoring, we support sustainable energy concepts in the areas of wind energy, photovoltaics, electromobility and smart buildings, infrastructures and industry.


Wind power plants face demanding ambient conditions

The power output of a wind power plant can change with the wind strength and direction quickly and unexpectedly. The components used in the nacelle are also subjected to mechanical stresses and climatic effects around the clock – especially low-frequency vibrations and temperature changes between -25 °C and +50 °C. Current-carrying components are also subjected to thermal stress by the frequent on/off switching of the wind power plant.

To reliably maintain the functional capability and availability of the protection equipment under these circumstances, components must be used which have a safe range that is matched to the requirements of the wind power plant. Our protection, switching and measuring devices with optional communication modules which support the monitoring of the plant and the adherence to the service intervals provide an ideal solution.



SENTRON components for sustainable energy concepts (excerpt)

| Wind power applications | Photovoltaic applications | Electromobility |
|---|--|---|
|  |  |  |
| <p>3WL/3VL circuit breakers protect against short circuit and overload; 7KT/7KM measuring devices monitor energy flows.</p> | <p>Cylindrical fuses and LV HRC fuses ensure the safe operation of photovoltaic systems.</p> | <p>The WB100A charging unit is equipped with tried-and-tested SENTRON protection, switching and monitoring devices.</p> |

Standard-compliant components for PV systems

PV systems play an important role in CO₂ reduction and also make good business sense, not least in view of the feed-in tariffs guaranteed by local laws (e.g. German Renewable Energy Sources Act – EEG). The construction and operation of photovoltaic systems is now integrated in the standards DIN VDE 0100-712, DIN VDE 0126 and IEC 60269-1, -6. Siemens offers a high-quality, standard-compliant product range for the operation of PV systems, which guarantees a high level of operational safety and a long-term stability of yield.

Whether for lightning strikes, overloads or simply maintenance work – the comprehensive and coordinated range of SENTRON protection, switching, measuring and monitoring devices offers you all the components you need for the safe construction and operation of photovoltaic systems – from DC over-voltage protection to universal current sensitive RCCBs – from a single source.

Sustainable technologies for the electromobility of tomorrow

Electromobility places special demands on the power grid and the electricity supply companies, but also on personal and fire protection at the charging point. Our comprehensive product portfolio offers components and specific integrated solutions for all requirements in the charging infrastructure. Our tried-and-tested SENTRON protection, switching and monitoring devices provide a maximum of safety during the charging operation. Matching components for the charging power, ambient conditions and point of installation are required from the low-voltage power distribution range. Our offering includes predefined integrated solutions compliant with IEC 61851, which can be scaled in their functionality and performance class.

Highlights

- Comprehensive portfolio of protection, switching, measuring and monitoring devices for the implementation of sustainable energy concepts
- Components coordinated with the special requirements of PV and wind power plants
- Safe system operation thanks to standard-compliant products

Standards – the ticket to the world

Highlights

- Complete portfolio of IEC-compliant products
- Development of innovative products and systems according to customer requirements
- Worldwide application of a large number of SENTRON components according to IEC/EN and UL standards

For use around the world

The components in the SENTRON portfolio can be used worldwide without any problems as they comply with numerous applicable standards and are widely certified.

Standards bodies

Two organizations, the International Electrical Commission (IEC) and the American National Standards Institute (ANSI) in North America, issue standards which govern the use of electrical power and appliances. UL regulations (published by Underwriters Laboratories®) apply in areas which are under the influence of ANSI.

IEC standards, published in Europe as European standards (EN), are used in other regions.

UL (Underwriters Laboratories Inc.®)

The UL listed or UL recognized marking on products which have been designed in compliance with IEC standards confirms that the products may be used in accordance with UL guidelines. This is of particular importance to European exporters of electrical switchboards and equipment for machines who export to the USA, as their products will only be accepted if they meet the relevant UL standards.

As an international supplier, our products can be used world-wide thanks to numerous certifications.



Any questions? One click – well-informed

LV Explorer – Discover Low Voltage in 3D

Portfolio

LV Explorer

Discover Low Voltage in 3D

Switchboards

Busbar Trunking Systems

Distribution Boards

Terminal Blocks

Protection Devices

Control Devices and Switch Disconnectors

Busbar Systems

Measuring Devices and Energy Monitoring

Monitoring Devices

Topics

News

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Always at your disposal: our extensive support

| Information | Planning/Orders | Operation/Service | Training |
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