SIEMENS

Totally Integrated Power – SIVACON S8

Safe, flexible and cost-efficient power distribution

SIVACON S8 low-voltage switchboard

www.siemens.com/sivacon-S8

Contents

Totally Integrated Power (TIP) – We bring power to the point.

Our software and hardware products, systems and solutions for all voltage levels make power supply efficient, reliable and safe – in infrastructure, cities, buildings and industrial plants.

Our portfolio can be linked to industrial and building automation and is completed by comprehensive support throughout the entire lifecycle.

SIVACON S8, part of the TIP portfolio, sets new standards as a power distribution board or Motor Control Center (MCC) for industrial applications or in the infrastructure. The switchboard system for the simple and consistent distribution of power guarantees a high level of personal and plant safety and, due to its optimal design, offers a wide range of possible uses. Thanks to the modular design, the switchboard can be optimally adapted to every requirement when designing the complete system. Combining a high level of safety with a modern design, the switchboard provides an efficient solution.

Reliable power for industry and infrastructure –
with our consistent portfolio

SIVACON S8 –
Safe and intelligent power distribution

Tested safety
SIVACON S8 stands for safety at a high level. The low-voltage switchboard is a design verified power switchgear and controlgear assembly; the design is verified by tests according to IEC 61439-2. Its physical properties have been verified at the testing laboratory for both operation and failure situations. Personal safety is furthermore ensured by verification of the test under conditions of arcing in accordance with IEC/TR 61641.

Flexible solutions
SIVACON S8 offers intelligent solutions which can be adapted to match your requirements. Different mounting designs can be combined in one cubicle with ease. The flexible modules allow for the simple exchange or addition of functional units. The SIVACON S8 modules undergo a continuous innovation process, thereby ensuring the technical progress for the overall system.

Your benefit

- Safety for people and plant by means of design verification with tests according to IEC 61439-2
- Personal and plant safety in case of arcing by means of tests according to IEC/TR 61641
- High flexibility due to innovative modular design

SIVACON S8 –
System overview

Cubicle design

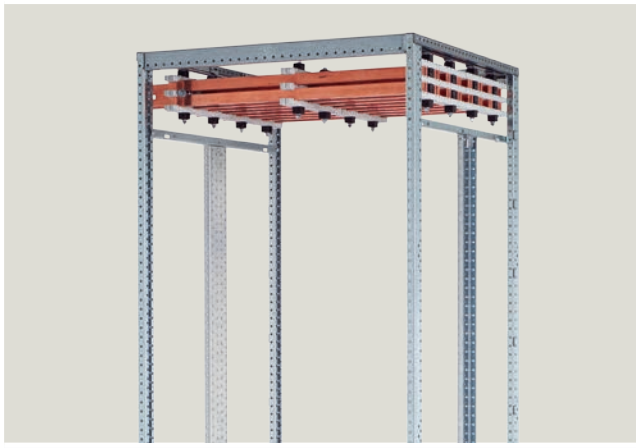
	Circuit-breaker design	Universal mounting design	Fixed-mounted design
Mounting design	• Fixed-mounted design • Withdrawable design	• Withdrawable design • Fixed-mounted design with compartment doors • Plug-in design	• Fixed-mounted design with front covers
Functions	• Incoming feeder • Outgoing feeder • Bus coupler	• Cable feeders • Motor feeders (MCC)	• Cable feeders
Rated values	• Up to 6,300 A	• Up to 630 A • Up to 250 kW	• Up to 630 A
Type of connection	Front or rear	Front or rear	Front
Cubicle width (mm)	400, 600, 800, 1,000, 1,400	600, 1,000, 1,200	1,000, 1,200
Internal separation	Form 1, 2b, 3a, 4b, 4 type 7 (BS)	Form 3b, 4a, 4b, 4 type 7 (BS)	Form 1, 2b, 3b, 4a, 4b
Busbar position	Top, rear	Top, rear	Top, rear

	In-line design, plug-in	In-line design, fixed-mounted	Reactive power compensation
	• Plug-in design	• Fixed-mounted design	• Fixed-mounted design
	• Cable feeders	• Cable feeders	• Central compensation of reactive power
	• Up to 630 A	• Up to 630 A	• Unchoked up to 600 kvar • Choked up to 500 kvar
	Front	Front	Front
	1,000, 1,200	600, 800, 1,000	800
	Form 3b, 4b	Form 1, 2b	Form 1, 2b
	Top, rear	Rear	Without, top, rear

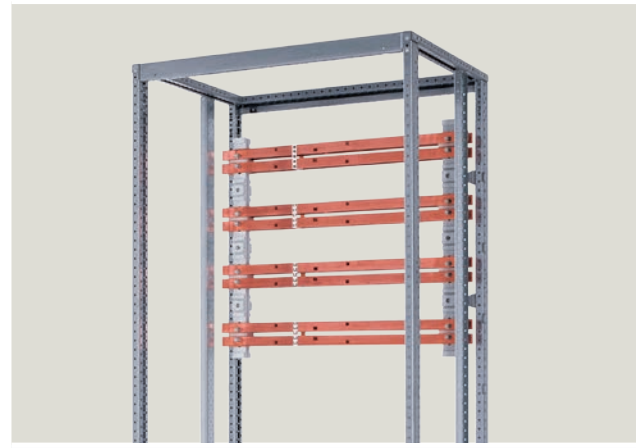
Features

Design side wall

Standardised labeling system
for cubicles and feeders



Variable busbar positions, at the top up to 6,300 A



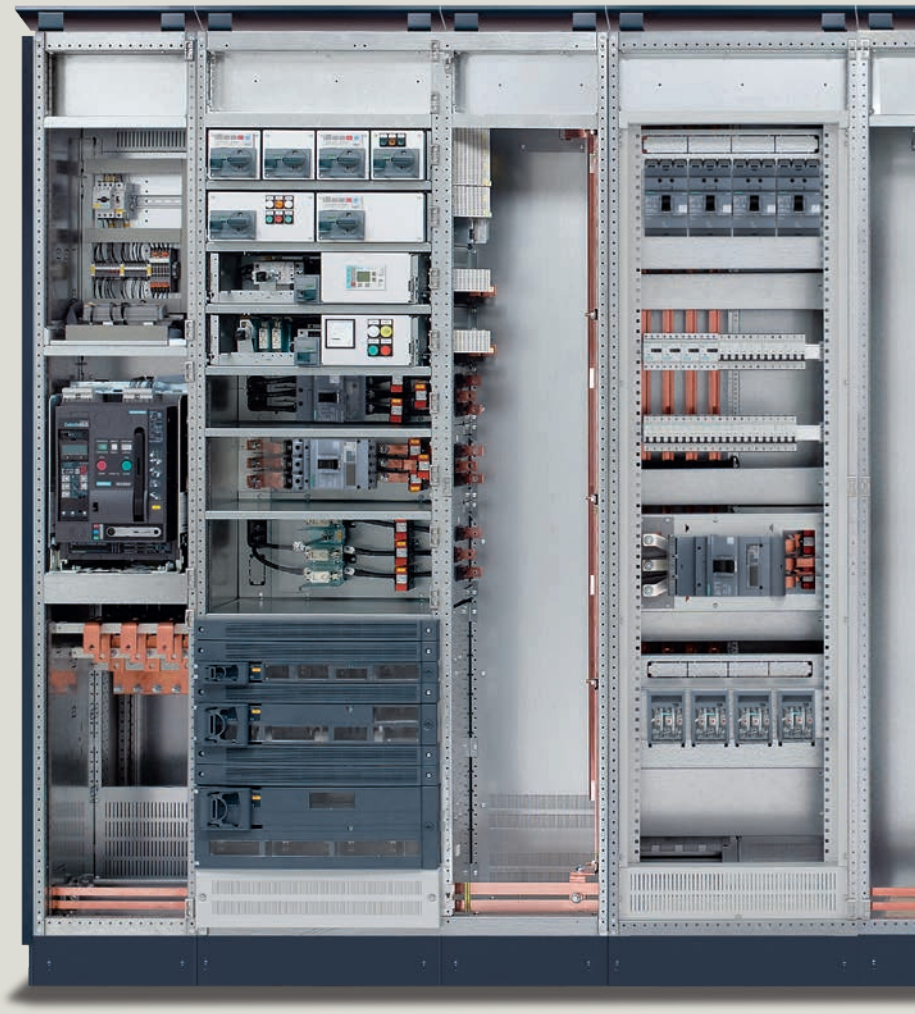
Variable busbar positions, at the rear up to 7,000 A
(top and/or bottom)

Locking system
for simple or central locking

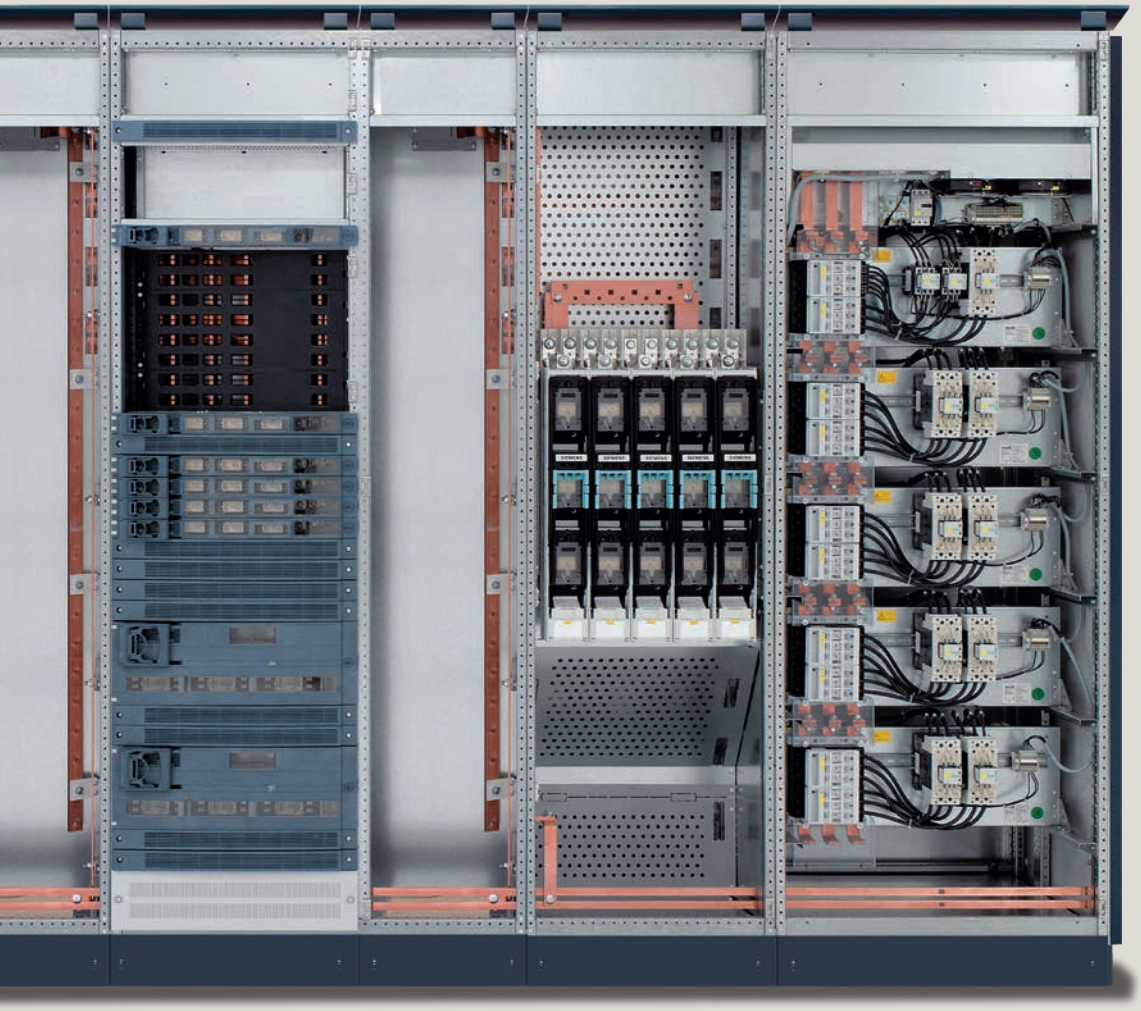
Lockable rotary handle system

SIVACON S8 –
System overview

Cubicle design

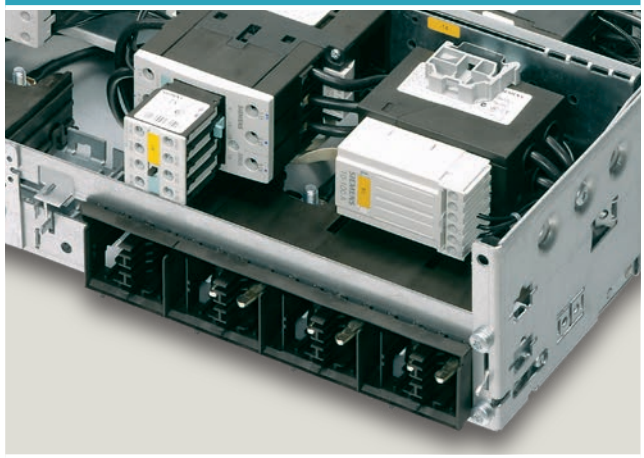


	Circuit-breaker design	Universal mounting design	Fixed-mounted design
Mounting design	• Fixed-mounted design • Withdrawable design	• Withdrawable design • Fixed-mounted design with compartment doors • Plug-in design	• Fixed-mounted design with front covers
Functions	• Incoming feeder • Outgoing feeder • Bus coupler	• Cable feeders • Motor feeders (MCC)	• Cable feeders
Rated values	• Up to 6,300 A	• Up to 630 A • Up to 250 kW	• Up to 630 A
Type of connection	Front or rear	Front or rear	Front
Cubicle width (mm)	400, 600, 800, 1,000, 1,400	600, 1,000, 1,200	1,000, 1,200
Internal separation	Form 1, 2b, 3a, 4b, 4 type 7 (BS)	Form 3b, 4a, 4b, 4 type 7 (BS)	Form 1, 2b, 3b, 4a, 4b
Busbar position	Top, rear	Top, rear	Top, rear

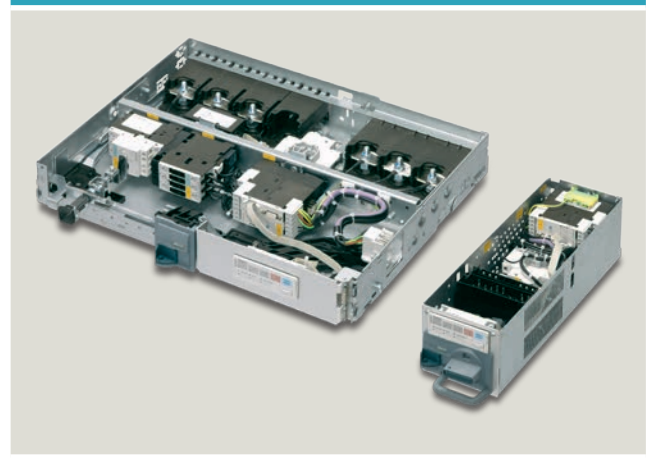


	In-line design, plug-in	In-line design, fixed-mounted	Reactive power compensation
	• Plug-in design	• Fixed-mounted design	• Fixed-mounted design
	• Cable feeders	• Cable feeders	• Central compensation of reactive power
	• Up to 630 A	• Up to 630 A	• Unchoked up to 600 kvar • Choked up to 500 kvar
	Front	Front	Front
	1,000, 1,200	600, 800, 1,000	800
	Form 3b, 4b	Form 1, 2b	Form 1, 2b
	Top, rear	Rear	Without, top, rear

Features

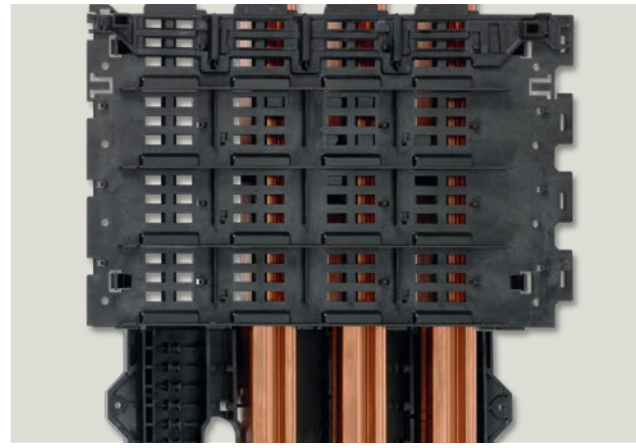


Patented low-wear withdrawable unit
contact system for long service life



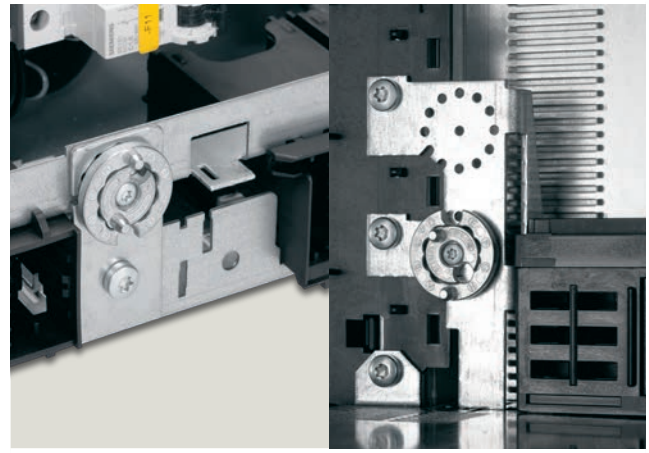
Normal withdrawable units up to 630 A
and small withdrawable units up to 63 A

Shutter with double-action for normal and small
withdrawable units for a high level of personal safety



Arc-resistant distribution busbar embedding
for a high level of personal and plant safety

Lockable disconnected position for safe
commissioning and maintenance



Coding of withdrawable units with 96 (optionally up to 9,216)
versions for clear assignment

Frame, enclosure and busbars

Flexible framework for high stability, corrosion protection and safe earthing

Variable busbar positions (rear or top)

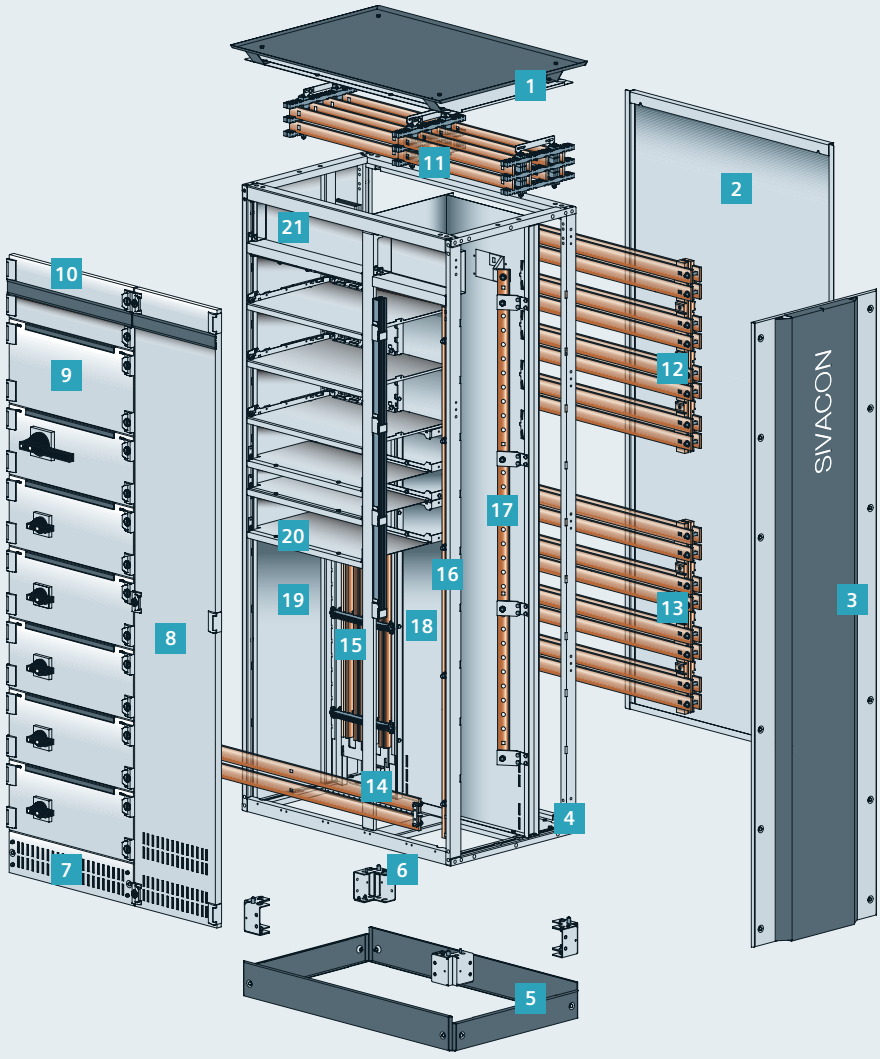
Your benefit

- Personal safety thanks to the patented door locking system
- Arrangement of busbar positions suitable for the application
- High level of flexibility thanks to variable busbar systems

The SIVACON S8 switchboard offers a perfect combination of a cost-efficient structure and high quality. The target is clear: a perfect equipment for all of your demands – versatile, safe, user-friendly, and easy to operate. The intelligent design of SIVACON S8 is our answer to these requirements.

Technical data	
Frame	
Door opening angle	125°, 180° with stand-alone installation
Frame height (without base)	2,000, 2,200 mm
Base height (optional)	100, 200 mm
Degree of protection	In accordance with IEC 60529: IP30, IP31, IP40, IP41, IP43, IP54
Main busbars	
Rated currents	Up to 7,000 A
Rated peak withstand current (I_{pk})	Up to 330 kA
Rated short-time withstand current (I_{cw})	Up to 150 kA

Cubicle in universal mounting design



Enclosure

1 Roof plate
2 Rear wall
3 Design side wall
4 Frame
5 Base cover
6 Base
7 Base compartment cover, ventilated
8 Cubicle door, ventilated
9 Compartment door
10 Head room door

Busbars

11 Main busbar (L1 ... L3, N) – top
12 Main busbar (L1 ... L3, N) – rear top
13 Main busbar (L1 ... L3, N) – rear bottom
14 Main busbar (PE) – bottom
15 Distribution busbar (L1 ... L3, N) – device compartment
16 Distribution busbar (PE) – cable compartment
17 Distribution busbar (N) – cable compartment

Internal separation

18 Device compartment/ busbar compartment
19 Cubicle to cubicle
20 Compartment to compartment
21 Cross-wiring compartment

Locking system for simple or central locking

Safety with functionality

The frame and all of the bearing components of the cubicle are made from stable, screw-fastened sheet steel profiles. Circumferential rows of holes allow for individual expansion.

The patented door locking system with universal door hinge allows for the hinge side to be changed with ease. The doors are available with either simple or central locking, and can be fitted with various locking systems such as door locks or rotary handle system. The roof plates feature pressure relief for additional safety. Cubicle-to-cubicle separation is provided as standard. The surfaces of frame components, rear walls and floor plates are sendzimir-galvanised. Doors, side walls and covers are powder-coated or painted.

Systematic flexibility

The well thought-out design of the switchboard allows it to be integrated perfectly into a modern room concept. The cubicles, either single- or double-fronted, can be installed with a common main busbar system (MBB system), or back-to-back with separate MBB systems.

Whether your need is for simple systems or extensive networks with transversal or longitudinal couplers, SIVACON S8 offers you all the flexibility you need.

The busbars can be positioned at either the top or the rear and, if required, two busbar systems can also be integrated in one switchboard. The busbar connections are maintenance-free. The transport joints are easily accessible from the front or the top.

Circuit-breaker design

Compact cubicles with circuit-breaker design

3WL air circuit breaker in withdrawable or fixed-mounted design

Where more current is needed, e.g. in incoming feeder cubicles or outgoing feeder cubicles for high-power consumer loads, the circuit-breaker design offers a powerful, compact solution.

Technical data	
Mounting design	Fixed-mounted design, withdrawable design
Functions	Incoming feeder, outgoing feeder, transversal or longitudinal coupler
Nominal current I_n of the circuit breaker	Up to 6,300 A
Type of connection	Front or rear
Cubicle width (mm)	400, 600, 800, 1,000, 1,400
Internal separation	Form 1, 2b, 3a, 4b, 4 type 7 (BS)
Busbar position	Top, rear top and/or rear bottom

Your benefit

- Safety by connected, test and disconnected position with the door closed
- Optimum cubicle width for every circuit-breaker size
- Ideal space conditions for cable connection, for every size
- Design verified connection to SIVACON 8PS busbar trunking systems

Inspection of the 3WL air circuit breaker is possible at any time without removal.

Cooling system with fans underneath the 3WL circuit breaker

User-friendly with safety

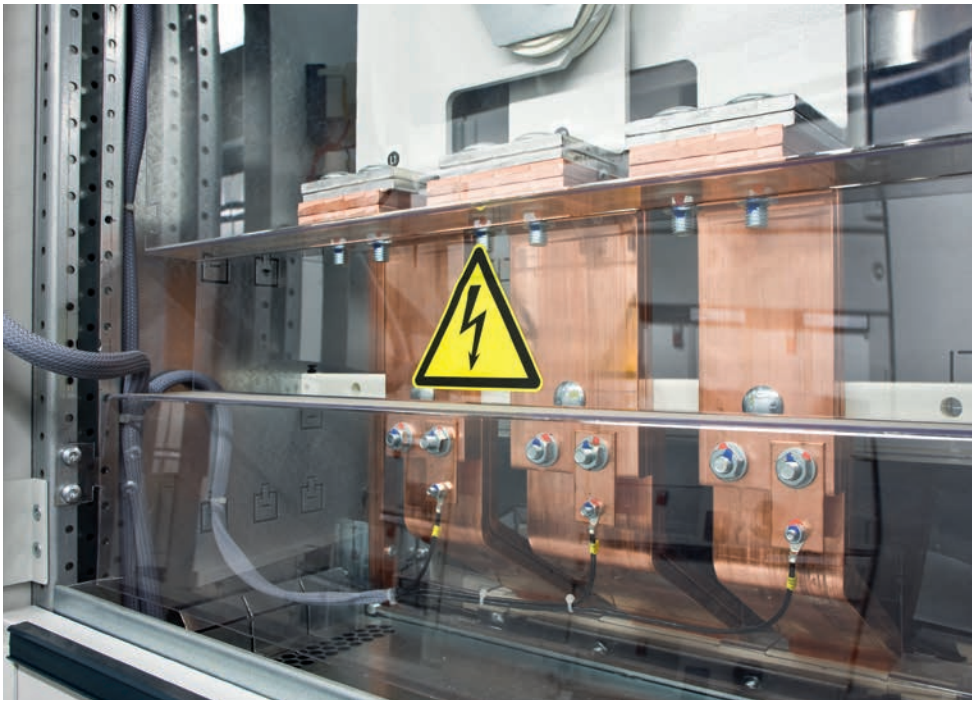
The cubicles for 3W./3V. circuit breakers cater for personal safety and long-term operational reliability. The incoming feeder, outgoing feeder and coupling cubicles in circuit-breaker design are fitted with 3W. air circuit breakers in withdrawable or fixed-mounted design or, alternatively, with 3V. molded case circuit breakers.

Since there are generally many consumer loads downstream from these cubicles, the personal safety and operational reliability of these are of particular importance. SIVACON S8, with its components of the circuit-breaker design, meets all these requirements in compact and safe manner.

Moving to the connected, test or disconnected position with the 3W. air circuit breaker takes place with the door closed. Design verification by tests in accordance with IEC 61439-2 also guarantees a high level of safety for all sizes.

Cost-efficient solutions

As a compact version with a cubicle width of just 400 mm, the cubicle with 3W. air circuit breaker is perfectly suitable for current ratings up to 2,000 A. For a cost-efficient installation, the circuit-breaker cubicle with a width of 600 mm offers enough space for up to three circuit breakers. In this version, the connection is made at the rear.



Continuous power supply by means of design verified connection to SIVACON 8PS busbar trunking systems

SIVACON S8 offers high plant safety and uninterrupted power supply for all requirements in functional buildings.

Cubicles in circuit-breaker design can be equipped with forced cooling. The use of fans considerably reduces the circuit-breaker derating caused by operational power loss. Cubicle properties such as degree of protection or a high form of internal separation are not restricted thereby.

Flexible for individual requirements

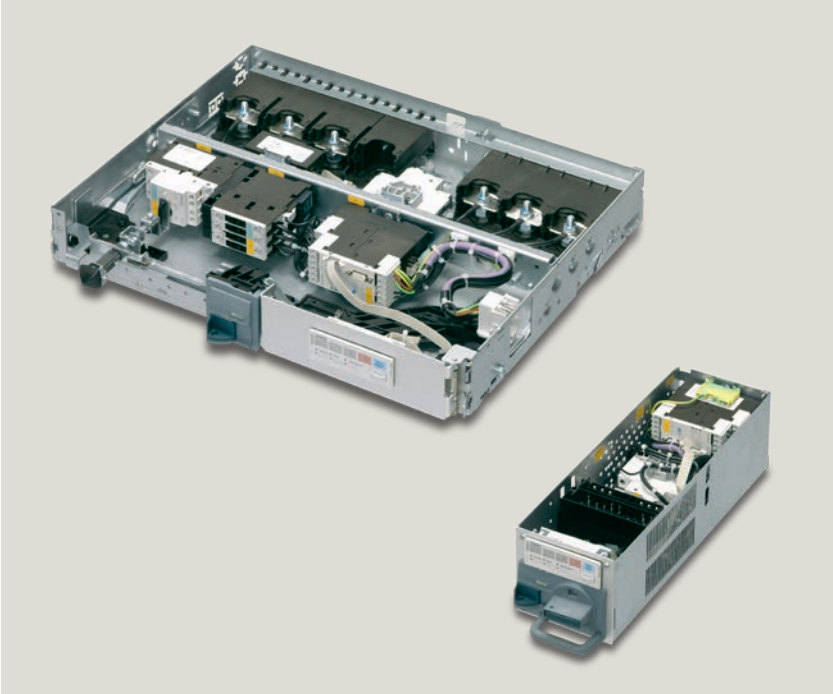
The cubicles consist of separate functional compartments. In the cable or busbar connection compartment, the circuit-breaker design offers optimal connection conditions for every size.

There, cables or SIVACON 8PS busbar trunking systems can be connected with design verification. The busbar trunking system connection units, specially developed for SIVACON S8, are an integral component of the cubicles in circuit-breaker design.

The auxiliary device compartment offers ideal space conditions for the switching devices provided for control and monitoring. They are arranged on an auxiliary device holder which can be separated from the power section. Depending on the position of the cable or busbar connection compartment, the auxiliary device holder can be installed at the top or bottom.

Universal mounting design

Withdrawable design, fixed-mounted design with compartment doors, and switch disconnectors with fuses can be combined.



The withdrawable design offers sizes of withdrawable units adjusted to the power – with small withdrawable units for high packing densities.

Your benefit

- High level of flexibility and efficiency by functional assemblies which can be combined as required in space-optimised modular design
- Personal safety, even in the event of a fault, thanks to closed front doors in all withdrawable unit positions (connected, test, disconnected positions)
- Long service life thanks to patented low-wear contact system

If there is little space available, the universal mounting design offers a safe, flexible and cost-efficient solution. It allows to combine different mounting designs – withdrawable, fixed-mounted with compartment doors, plug-in – in one cubicle. As a version in withdrawable design it is the ideal solution for Motor Control Centers in industrial plants, where quick adjustments of the power supply system are always required.

Technical data	
Mounting design	Withdrawable design, fixed-mounted design with compartment doors, plug-in design
Functions	Cable feeders up to 630 A Motor feeders up to 250 kW (at 400 V)
Type of connection	Front and rear
Cubicle width (mm)	600, 1,000, 1,200
Internal separation	Form 3b, 4a, 4b, 4 type 7 (BS)
Busbar position	Top, rear top and/or rear bottom

Wide cable connection duct for easy installation

The universal mounting design with forced ventilation enables the installation of withdrawable units for devices with extremely high power loss, such as frequency converters.

Flexible and space-saving

The functional assemblies can be combined at will, allowing for a space-saving installation of your switchboard. The 400 mm or 600 mm wide cable compartment on the right side of the cubicle offers cable brackets for fastening the cables. In universal mounting design, the cables can also be connected at the rear, which makes the lateral cable compartment unnecessary, thus reducing the cubicle width to 600 mm. The vertical distribution busbars are arranged at the rear left in the cubicle. The profile busbar or flat copper design allows for tap-offs in the smallest of grids. Cables, wires or busbars can also be connected without any need for drilling or punching – optimal flexibility for later extensions.

Extended mounting options

Cubicles in universal mounting design can be provided with forced ventilation to enable the installation of devices with extremely high power loss in withdrawable design. The heat is dissipated by fans via a separate air duct. The fans are sized so that heat removal of the withdrawable unit is ensured even if one of the fans fails.

Communication

Communication via PROFIBUS DP, PROFINET or Modbus offers all the benefits of extensive control functions and analysis options.

Fixed-mounted design with 3VA circuit breaker

Plug-in design with 3NJ62 switch-disconnectors with fuses

Fixed-mounted design – modular and cost-efficient

The fixed-mounted switching devices are installed on modular device holders. These can be equipped with circuit breakers or switch disconnectors with fuses.

Cable connection is made directly at the device or, in cases of higher requirements, at special connection terminals in the cable compartment. For individual equipping, the system offers freely assignable device holders.

Plug-in design – flexible modifications

3NJ62 or SASILplus (JEAN MÜLLER) switch disconnectors with fuses can be installed in the bottom 600 mm of the device compartment. They are equipped with a plug-in contact on the supply/line side. This means that the switch disconnector can be replaced or modified without de-energising the cubicle.

Simple and safe operation of the withdrawable units behind closed doors

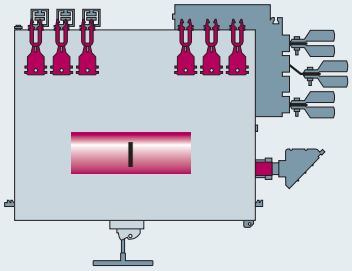
The mechanical coding of the withdrawable unit prevents any confusion of withdrawable units of the same size.

Withdrawable design – ergonomic and compact

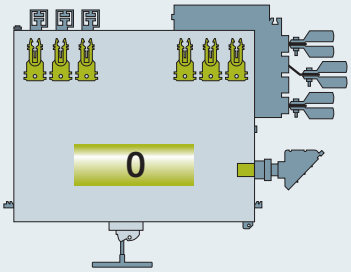
When requirements are frequently changing, e.g. modifications in motor rating or the connection of new consumer loads, the withdrawable design offers the flexibility needed. Withdrawable units can be modified or retrofitted with ease, and without de-energising the cubicle.

Regardless of whether small or normal withdrawable units are used, the size is optimally adapted to the required power rating, thus allowing to reduce the size of the switchboard to a minimum. The compact small withdrawable units are particularly useful here.

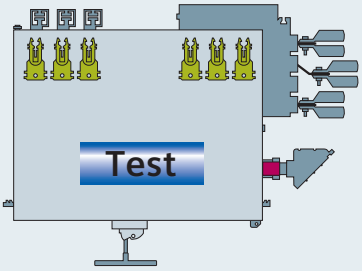
With small withdrawable unit sizes of 1/4 (up to four withdrawable units per compartment) and 1/2 (up to two withdrawable units per compartment), as well as with normal withdrawable units with heights starting from 100 mm, very high packing densities can be achieved, with up to 48 withdrawable units per cubicle for space-optimised installation.



In the connected position, both power and control contacts are closed.



Withdrawable units in disconnected position have maximum isolating distances on the incoming, outgoing and control sides.



The test position allows for no-load testing of the withdrawable units.

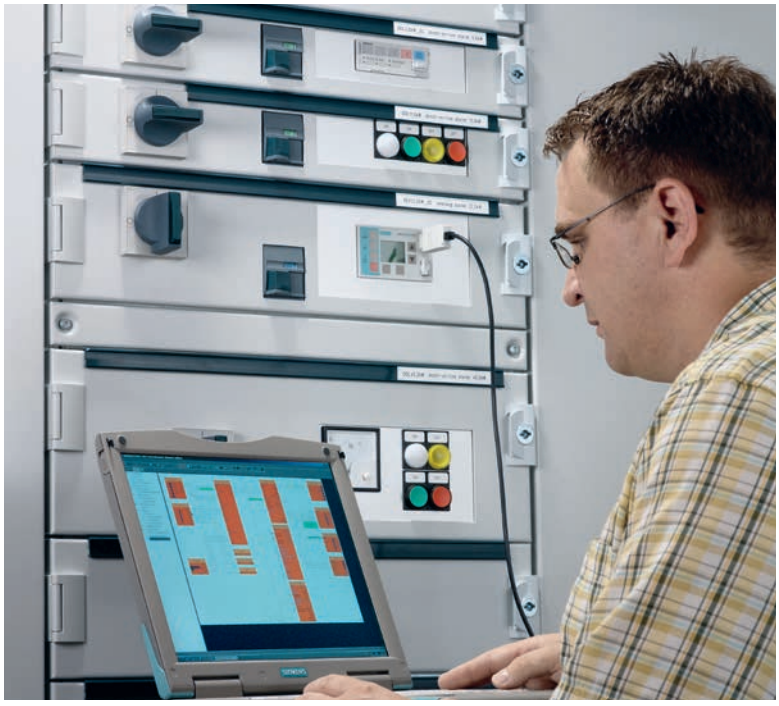
Moving to the withdrawable unit positions behind closed door

Safe operation of the withdrawable units

Withdrawable units of all sizes are equipped with integrated operating error protection and a uniform, clear indication of the withdrawable unit positions. Moving to the test, disconnected or connected position takes place with the door closed and without eliminating the degree of protection.

In addition to the main switch, the disconnected position of the withdrawable units can also be locked for additional safety. A coding of the withdrawable unit prevents any confusion of withdrawable units of the same size.

The patented withdrawable unit contact system has been conceived to be user-friendly and particularly wear-resistant. In order to protect against damage, in the disconnected position all parts of the withdrawable units are located within the contours of the withdrawable units. The withdrawable unit compartments have isolating distances on the incoming and outgoing sides. No connection work is required inside the withdrawable unit compartments.



Integrated full motor protection, including communication for intelligent linking to the control level

High level of availability of the Motor Control Center even in a harsh industrial environment

Motor management and control device SIMOCODE pro

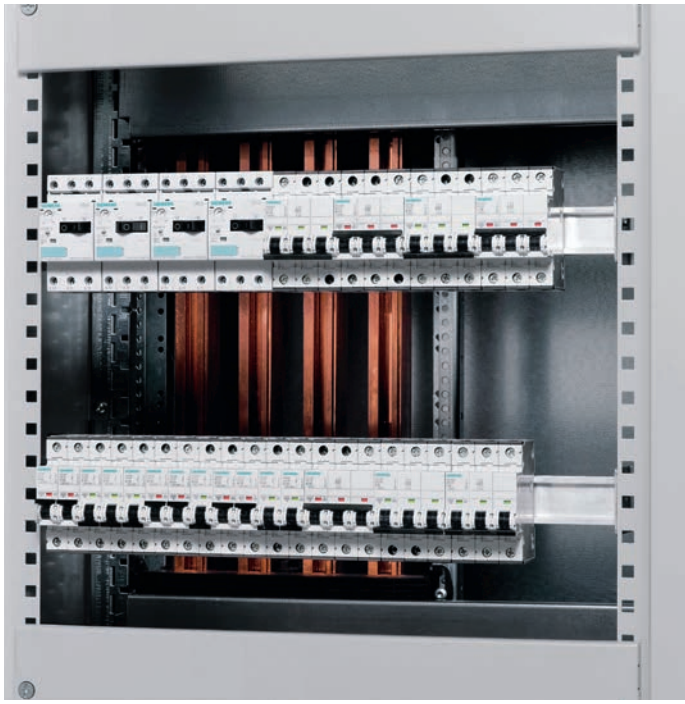
SIMOCODE pro is a flexible, modular motor management system for motors with constant speed in the low-voltage range. It optimises the link between control system and motor feeder, increases plant availability and offers at the same time considerable savings during construction, commissioning, operation and maintenance of a plant.

SIMOCODE pro, which is installed in the low-voltage switchboard, is the intelligent link between higher-level automation system and motor feeder, and combines:

- multi-functional electronic full motor protection, independent of the automation system,
- safe shutdown of motors,
- integrated control functions,
- detailed operation, service and diagnosis data,
- open communication via PROFIBUS, PROFINET or Modbus,
- automatic parameter assignment to the motor feeder thanks to fixed installation of the SIMOCODE pro initialization module in the withdrawable unit compartment.

Fixed-mounted design with front covers

The front covers in the fixed-mounted design cubicle are easy to install and guarantee a uniform front level



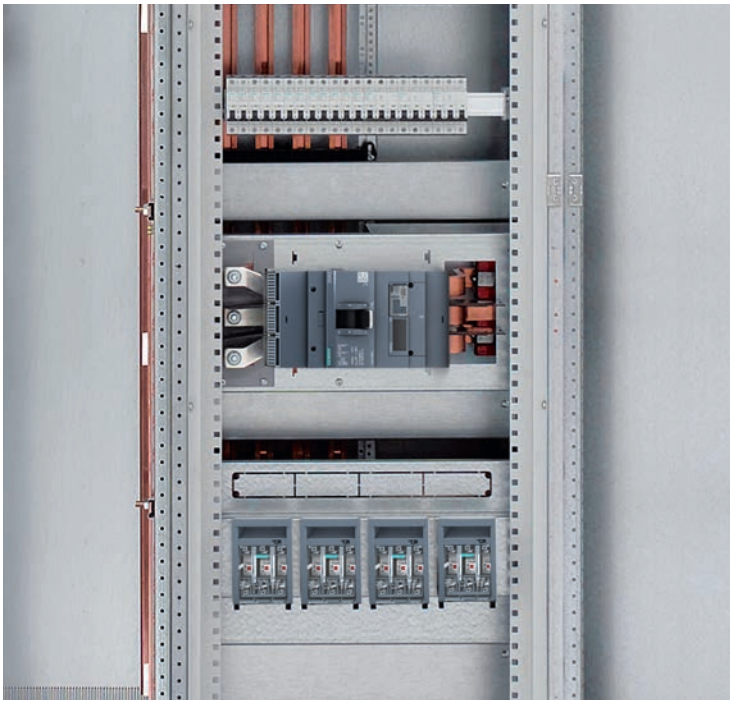
The multi-profile busbar allows for easy mounting of modular installation devices

Your benefit

- Cost-efficient arrangement of devices as single or multiple feeders
- More safety thanks to design verified standard modules
- High level of flexibility through the combination of high-rating outgoing feeders and modular installation devices

If the replacement of components under operating conditions is not required, or if short downtimes are acceptable, then the fixed-mounted design with front covers offers a safe and cost-efficient solution.

Technical data	
Mounting design	Fixed-mounted design with front covers
Functions	Cable feeders up to 630 A
Type of connection	Front
Cubicle width (mm)	1,000, 1,200
Internal separation	Form 1, 2b, 3b, 4a, 4b
Busbar position	Top, rear top and/or rear bottom



Installation of fuse switch disconnectors, circuit breakers, or modular installation devices

Where an exchange of components under operating conditions is not required, the fixed-mounted design with front covers is a safe and cost-efficient solution.

Safe and cost-efficient

Individual functional assemblies can be combined in modular design as desired, therefore offering you all the flexibility that you need.

Additive modules enable functional compartments to be subdivided as required (up to form 4b). The cables are routed at the right side of the cubicle in a cable compartment with a choice of width of either 400 mm or 600 mm. Cable brackets are provided here for fastening the cables.

Flexible and space-saving

The vertical distribution busbars are arranged at the rear left in the cubicle. The profile busbar or flat copper design allows for tap-offs in the smallest of grids. Connections to the distribution busbars by means of cables, wires or busbars are also possible without any need for drilling or punching. This guarantees maximum flexibility, even for later extensions.

Multifunctional modules

The switching devices are installed on modular device holders of graduated depth. These can be equipped with circuit breakers, fuse switch disconnectors, or modular installation devices. They are attached to the device holder and directly connected to the distribution busbar. The cable connection is made directly at the device or, in cases of higher requirements, at special connection terminals. Thanks to the cover, simple operation is possible directly at the device. The cubicle can be optionally closed with a glass door.

In-line design, plug-in

The cubicle for 3NJ62 switch disconnectors with fuses is suitable for up to 35 outgoing feeders.

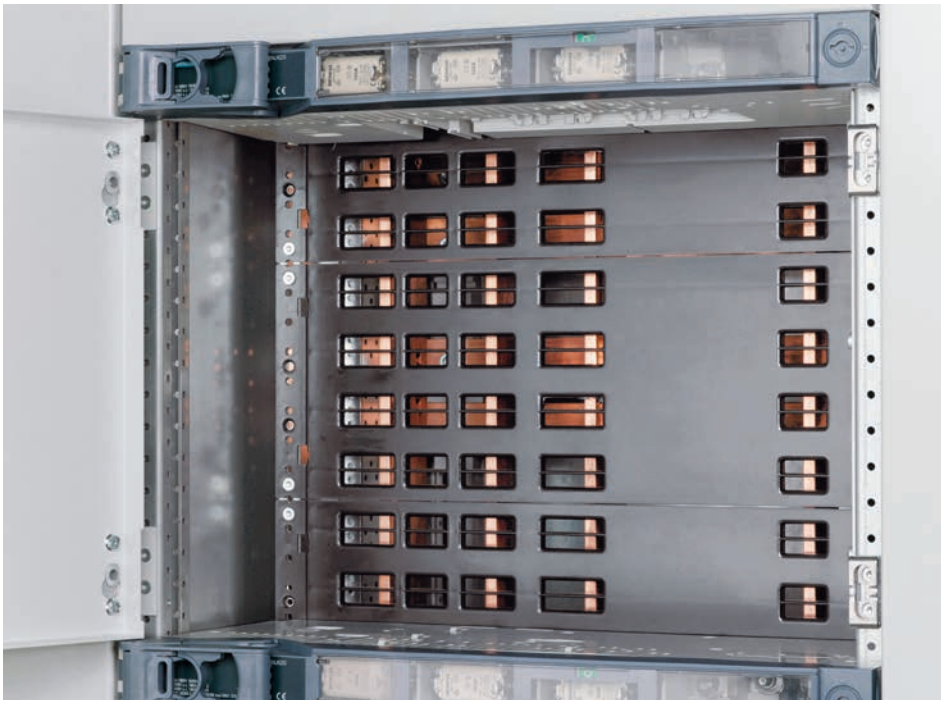
3NJ62 switch disconnectors with fuses feature single or double breaking as standard.

Your benefit

- High level of plant availability thanks to modification or replacement under operating conditions
- Simple and cost-efficient mounting due to plug-in contact on the supply/line side
- High packing density with up to 35 feeders per cubicle

In-line switching devices with a plug-in contact on the supply/line side offer a cost-efficient alternative to the withdrawable design and, thanks to their modular design, allow for quick and easy modification or replacement under operating conditions.

Technical data	
Mounting design	Plug-in design
Functions	Cable feeders up to 630 A
Type of connection	Front
Cubicle width (mm)	1,000, 1,200
Internal separation	Form 3b, 4b
Busbar position	Top, rear top and/or rear bottom



Plug-in busbar system, with test finger safety cover

The in-line design is particularly well-suited for applications with numerous cable feeders in a very confined space.

Variable with plug-in design

The 3NJ62 in-line switch disconnectors with fuses are suitable for cable feeders up to 630 A.

Alternatively, SASILplus (JEAN MÜLLER) switch disconnectors with fuses can be used. With up to 35 feeders per cubicle, the switching devices achieve a high packing density.

The cables are routed vertically at the right side of the cubicle in a cable compartment with a choice of width of either 400 mm or 600 mm. Cable brackets are provided here for fastening the cables.

Safe and flexible

The distribution busbar system is arranged at the rear of the in-line design cubicle. It offers test finger safety (IP20B) to live parts. The tap-off openings are arranged in a 50 mm modular grid. This guarantees maximum flexibility, even for later extensions.

Compact with high functionality

The cable is connected directly at the device. The device forms the front closure. The plug-in in-line switch disconnectors are operated directly at the device. Up to three required current transformers can be installed in the in-line device within its contours. Auxiliary switches and measuring devices can be integrated in the in-line switch disconnector. Device compartments are available for individual equipping.

In-line design, fixed-mounted

With the fixed-mounted 3NJ4 fuse switch disconnectors, it is possible to install up to 18 feeders per cubicle.

With a wide range of connection options, the compact devices can be optimally fitted, even where space is limited.

Your benefit

- Space-saving thanks to the compact design with up to 18 feeders per cubicle
- Consequent, cost-efficient installation
- Optional installation of freely assignable device holders or ALPHA small distribution board for modular installation devices

If the replacement of components under operating conditions is not required, or if short downtimes are acceptable, then fixed-mounted in-line fuse switch disconnectors offer a safe and cost-efficient solution.

Technical data	
Mounting design	Fixed-mounted design
Functions	Cable feeders up to 630 A
Type of connection	Front
Cubicle width (mm)	600, 800, 1,000
Internal separation	Form 1, 2b
Busbar position	Rear top, and/or rear bottom

3NJ4 in-line fuse switch disconnectors with cable compartment for connection from the bottom

In office complexes, space-saving and cost-effective switchboard installation is requested.

Compact and safe

The cubicles for cable feeders in the fixed-mounted design up to 630 A are equipped with vertically installed 3NJ4 fuse switch disconnectors.

Thanks to their compact design they allow for optimal and cost-efficient applications in infrastructure.

Depending on the cubicle width, several switch disconnectors of size 00 to 3 can be installed. A mounting plate can be provided in the cubicle for the installation of additional auxiliary devices. Alternatively, an ALPHA small distribution board can be installed.

Cost-efficient and adaptable

As a distribution busbar system, various cross-sections are available which are arranged horizontally at the rear inside the cubicle.

The protective conductor, PEN or neutral conductor bars are installed separately from the phase conductors in the cable compartment, either at the top or the bottom of the cubicle, depending on the connection.

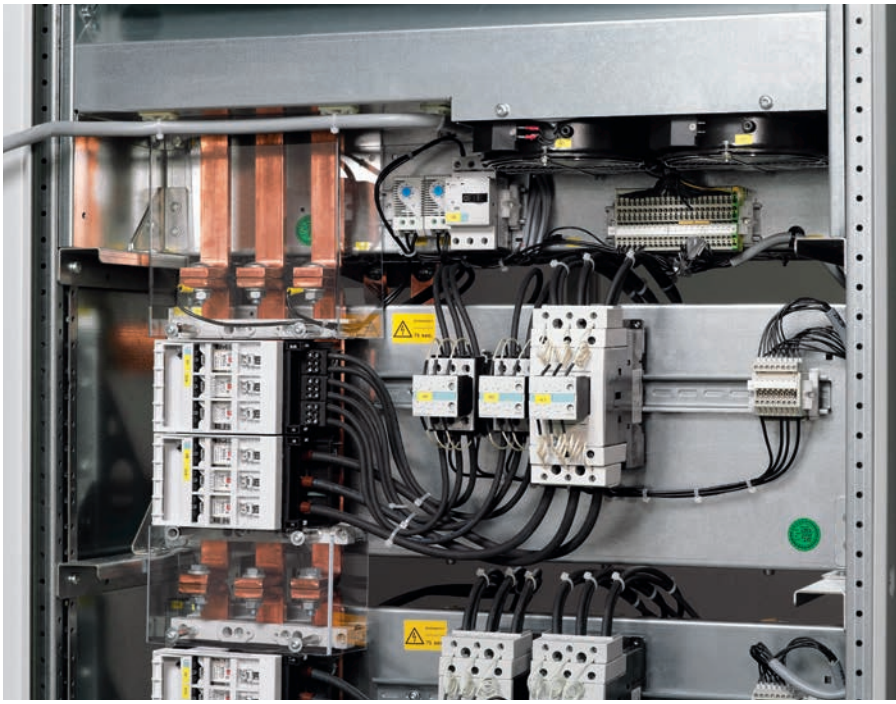
Flexible design

The switch disconnectors are fixed-mounted on the horizontal distribution busbar system. The cable is connected directly at the device. The cables can be routed into the cubicle from the top or the bottom.

A cubicle-height door provides the front closure. This door can be optionally fitted with a cutout area, which allows to operate the switching devices when the door is closed. Operation takes place directly at the device. The switch disconnectors can be fitted with up to three current transformers to enable feeder-related measurements.

Reactive power compensation

Cubicle for the central reactive power compensation



The capacitor assemblies can be used in choked or unchoked condition.

Your benefit

- More cost-efficient thanks to lower energy costs
- Efficient network dimensioning thanks to low reactive power
- Design verified integration directly to the switchboard or as a separate cubicle

Cubicles for the central reactive power compensation relieve transformers as well as cables and reduce transmission losses. In this way, reactive power compensation cubicles enable an economic power supply with efficient network dimensioning.

Technical data	
Mounting design	Fixed-mounted design
Functions	Central compensation of reactive power
Capacitor power	Unchoked up to 600 kvar, choked up to 500 kvar
Degree of choking	Without, 5.67 %, 7 %, 14 %
Type of connection	Front
Cubicle width (mm)	800
Internal separation	Form 1, 2b
Busbar position	Without, top, rear top and/or rear bottom

Reactive power compensation cubicle for cost-efficient power supply

Reactive power is caused by inductive consumer loads such as motors.

Cost-efficient overall system

In a network, reactive power is caused by inductive, linear consumer loads such as motors, transformers or reactors, as well as by inductive, non-linear consumer loads such as converters, welding apparatus, arc furnaces or UPS systems. Depending on the consumer load structure, the reactive power compensation is equipped with choked or unchoked capacitor assemblies. The controller assembly has an electronic reactive power controller for door installation. The multifunction display is used to set the desired target cos phi from 0.8 ind to 0.8 cap. Network parameters such as U, I, f, cos phi, P, S, Q and harmonics are displayed.

The capacitor assembly (up to 200 kvar) with MKK capacitors has a fuse switch-disconnector, capacitor contactors, discharge devices and filter reactors. The switch-disconnector assembly can optionally be used for the central safety isolation of the integrated capacitor assemblies.

Flexible design

The reactive power compensation cubicle can be integrated into the switchboard directly and with design verification. In this case, additional protection measures and cable connections between the switchboard and the reactive power compensation are not required when these are installed separately. The entire height of the device compartment is available for the installation of the controller, capacitor or group-switch assemblies. The device compartment is closed by means of a cubicle-height door with ventilation openings.

SIVACON S8 – standard-compliant, design verified low-voltage switchboard

SIVACON S8: Safe power supply with design verification

Your benefit

- Safety for people and plant thanks to design verification with tests according to IEC 61439-2
- Quality assurance through design verifications and routine verifications
- Systematic tests always carried out with devices

Low-voltage switchboards or, in accordance with the standard, power switchgear and controlgear assemblies are developed, manufactured and tested following the specifications of IEC 61439-2.

Requirement of the IEC 61439-2 standard

In order to provide evidence that the switchboard is fit for purpose, this standard requires two main forms of verification – design verifications and routine verifications. Design verifications are tests carried out during the development process and are the responsibility of the original manufacturer (developer). Routine verifications must be performed by the manufacturer of the power switchgear and controlgear assembly on every manufactured switchboard prior to delivery.

Design verification with tests

The SIVACON S8 low-voltage switchboard offers safety for people and plant by means of the design verification with tests according to IEC 61439-2.

The physical properties are dimensioned and verified at the testing laboratory for both operation and failure situations. Design verifications as well as routine verifications are a decisive part of quality assurance, and the prerequisite for CE marking according to the EC guidelines and laws.

Design verifications			
The design verifications can be provided by way of three different methods. If there is more than one method available for a specific verification, these methods are considered equivalent, and the selection of the method is under the responsibility of the original manufacturer.			
	Verification by testing	**Verification by calculation**	**Verification by design rules**
1. Strength of materials and parts	✔	—	—
2. Degree of protection provided by enclosures	✔	—	✔
3. Clearances and creepage distances	✔	✔	✔
4. Protection against electric shock and integrity of protective circuits	✔	✔[1]	✔[1]
5. Incorporation of switching devices and components	—	—	✔
6. Internal electrical circuits and connections	—	—	✔
7. Terminals for external conductors	—	—	✔
8. Dielectric properties	✔	—	✔[2]
9. Temperature rise limits	✔	Up to 1,600 A	Up to 630 A[3]
10. Short-circuit withstand strength	✔	Conditional[3]	Conditional[3]
11. Electromagnetic compatibility (EMC)	✔	—	✔
12. Mechanical operation	✔	—	—

1 Effectiveness of the assembly in case of external faults
2 Impulse withstand voltage only
3 Comparison with an already tested design

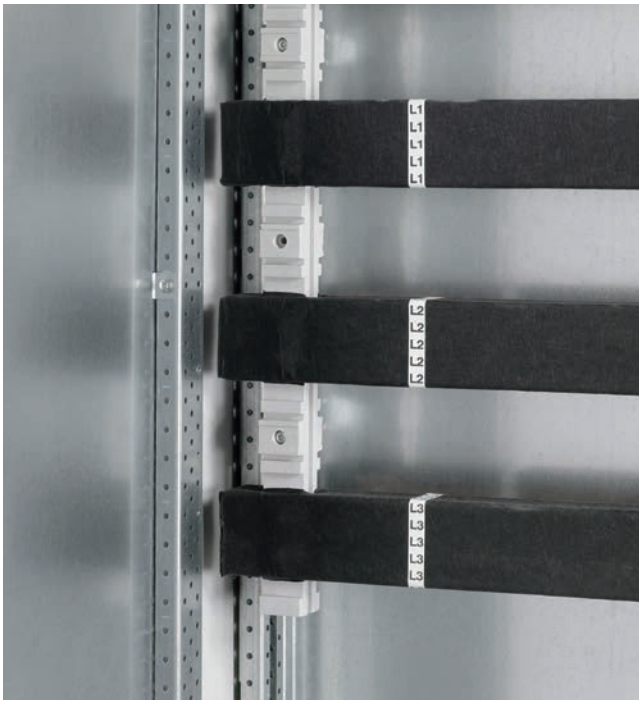
Verification of temperature rise

One of the most important verifications is the compliance with the temperature-rise limits. This verifies that the switchboard is fit for purpose when the temperature rises due to operational power loss. In view of the ever increasing rated currents, together with higher requirements relating to the degree of protection and internal separation, this is one of the greatest challenges for the switchboard.

Although the standard allows the verification by calculation for rated currents up to 1,600 A, for SIVACON S8 this verification is always performed by testing. Clear rules governing the selection of the test specimens (worst-case test) ensure that the entire product range is systematically covered, including the devices.

Safety as an integral part – arc resistance

The arc barrier restricts the effects to one cubicle in case of arcing.



Insulated main busbars prevent the occurrence of arcing.

Your benefit

- Personal safety by testing the switchboard under conditions of arcing
- Plant safety by limiting the effects of internal arcing faults inside the switchboard
- Reliability thanks to extensive systematic check

Besides the reliability of power supply, a high level of personal protection plays a central part.

Protection for people and plant

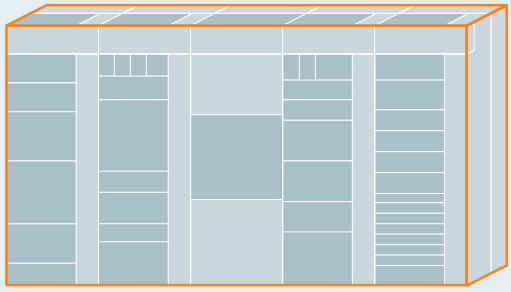
An arc is one of the most dangerous faults, associated with the most serious consequences which can occur inside a switchboard, and it can also damage adjacent feeders, cubicles or the entire switchboard. Arcing can be caused by incorrect dimensioning and reductions in insulation due to pollution, etc., but it can also be the result of handling errors.

The effects, resulting from high pressure and extremely high temperatures, can have fatal consequences for the operator, the switchboard and even the building. Testing of low-voltage switchboards under conditions of arcing is a special test in accordance with IEC/TR 61641. SIVACON S8 offers the verification of personal safety by testing under conditions of arcing. Furthermore, SIVACON S8 has passed the more severe test according to AS/NZS 3439.1 (Australian/New Zealand standard).

Arc protection levels

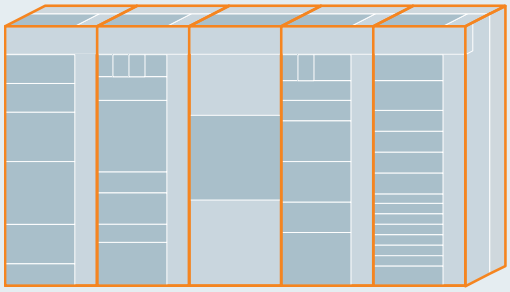
For SIVACON S8 with requirements concerning the arc resistance, Siemens has developed a level concept.
The arc protection levels describe the limitation of the effects of an arc on the entire switchboard or parts thereof.

Level 1



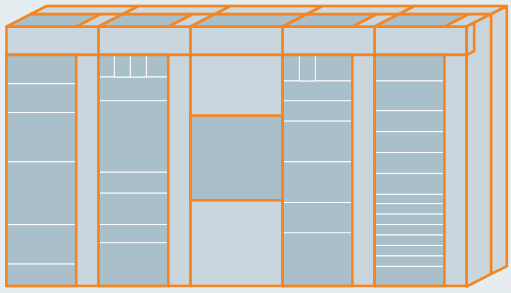
Personal safety without extensive limitation of the arcing fault effects inside the switchboard.

Level 2



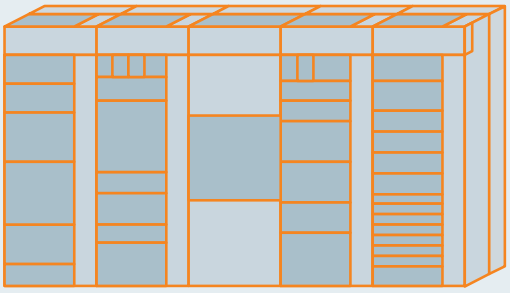
Personal safety with limitation of the arcing fault effects to one cubicle or double-front unit.

Level 3



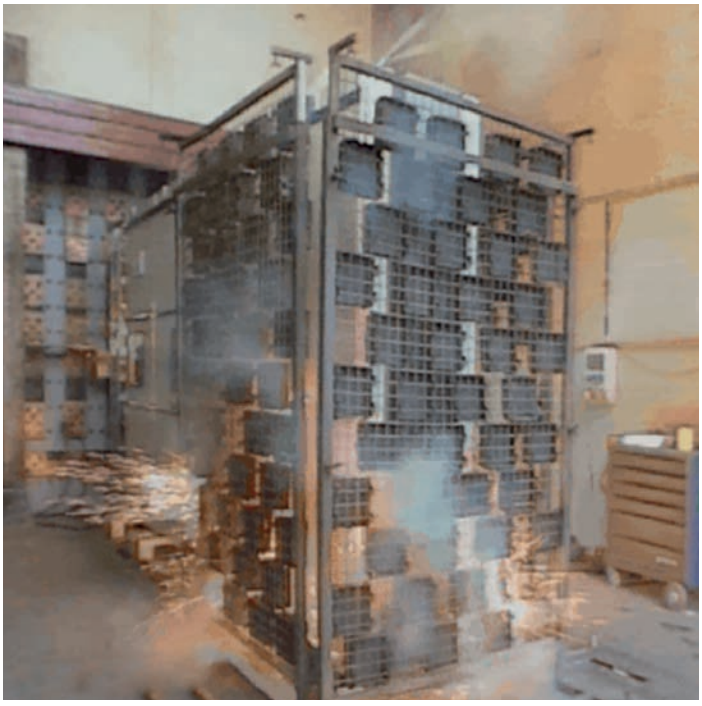
Personal safety with limitation of the arcing fault effects to the main busbar compartment, to the device compartment, or to the cable compartment in one cubicle or double-front unit.

Level 4



Personal safety with limitation of the arcing fault effects to the place of origin.

Arc resistance measures are an integral part of SIVACON S8.



Tests under conditions of arcing in accordance with IEC/TR 61641

Safety as the primary objective

Preventive protection measures such as the high-quality insulation of live parts (e.g. busbars), standardised and simple operation, integrated operating error protection and reliable switchboard dimensions prevent arcing, and thus personal injuries.

Moreover, reactive protective measures limit the effects of an arc. They include: arc-resistant hinge and locking systems, safe operation of withdrawable units or circuit breakers behind a closed door, and protective measures on ventilation openings at the front, arc barriers, or an arc detection system combined with the rapid disconnection of arcs. The functionality of the measures described has been proven by numerous, comprehensive arcing tests under “worst-case” conditions, performed on a wide variety of cubicle types and functional units.

The solution for high seismic requirements and vibrations

Safe power supply even under high seismic requirements

Increased mechanical stress on the high seas

SIVACON S8 switchboards offer a safe solution even for regions at risk from earthquakes, or areas of application with high mechanical stress, e.g. due to large (ship) drives.

Earthquake upgrade

In the earthquake-tested version, SIVACON S8 is available for seismic requirements. During the test, the functionality and stability after and during the earthquake are checked.

The results of the the seismic tests are divided into three categories:
1: Functionality during the earthquake
2: Functionality after the earthquake
3: Stability

Certifications for application on ships and offshore platforms

The conditions of application on the high seas are a special challenge for switchboards: Besides the saline atmosphere with a high air humidity, this is particularly due to enhanced mechanical stress. SIVACON S8 switchboards are perfectly set to meet these challenges. For application on ships and offshore platforms, SIVACON S8 was given the necessary certifications from renowned international classification societies under hand and seal.

Your benefit

- Safety for people and plant by means of tests according to IEC 61439-2
- Safe power supply with earthquake-tested version for seismic requirements
- Certifications for application on ships and offshore platforms

Connection to energy management, control or automation systems with SIVACON S8

Innovative devices of the SENTRON family for recording and supplying consumption data and electrical parameters

Communication-capable measuring devices 7KT PAC

Your benefit

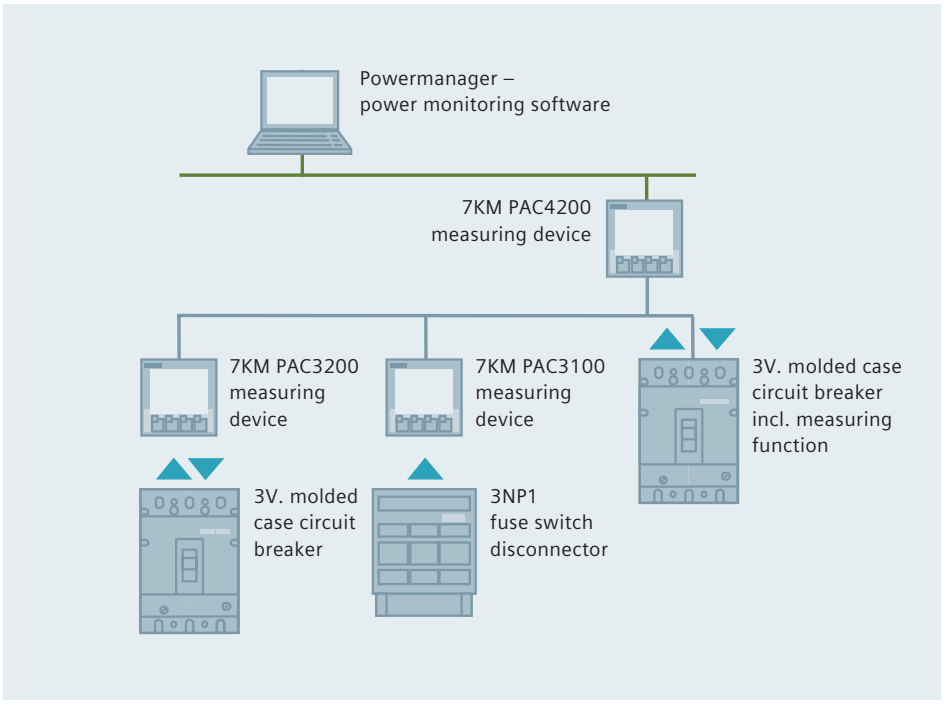
- Simple integration of the communication-capable measuring devices and circuit breakers
- Identification of saving potentials thanks to transparency of power flows
- Reliable recording and display of consumption data
- Improved plant availability through continuous monitoring

Switchboards must operate cost-efficiently. Consequently, downtimes must be avoided, and their utilization must be constantly optimised. The ISO 50001 standard supports companies with a specific process description when an operational energy management system is introduced. A standard-based energy management optimises the use of energy and increases the energy efficiency constantly.

Consistently well informed

Anybody who wants to reduce energy costs on a long-term basis, firstly requires a clear overview of power consumption and power flows. The 7KT/7KM PAC measuring devices, 3W./3V. circuit breakers, or intelligent motor management systems such as SIMOCODE pro, which are integrated in the switchboard, can help you to achieve this.

They record precise and reliable measurements of the energy values for electrical feeders or individual consumer loads. In addition to this, the devices provide you – via standardised bus systems – with important measured values for the assessment of the switchboard state and the network quality.



The basis of energy management is transparency: Integrated solution for smart power distribution

Simple evaluation of data

For the further processing of measured data, the devices can be very easily integrated into higher-level automation and energy management systems, thanks to the wide variety of communication options they offer. The communication-capable measuring devices and circuit breakers therefore provide the ideal basis for cost-efficient power monitoring with the SIVACON S8 switchboard.

The PC-based power monitoring software powermanager from Siemens analyses and documents the data from measuring devices and circuit breakers, and produces load profile curves and trend analyses, extending to the visualisation of switching states.

Application examples

Cost-efficient low-voltage power distribution for the oil & gas industry

Requirement

- Safety for people and plant
- Reliable power supply
- Minimisation of failure risk
- Customer-specific, flexible and extendable solutions

Solution

The modular SIVACON S8 with design verified connection to SIVACON 8PS busbar trunking systems could be easily adapted to the customer requirements. The cubicles in universal mounting design are perfectly suitable for Motor Control Centers. The withdrawable design combines a high level of personal and operating safety with flexibility for changing requirements. Communication-capable devices establish the link to higher-level automation and energy management systems.

Added value / result

- Safety for people and plant by means of design verification acc. to IEC 61439-2
- Personal and plant safety in case of arcing thanks to consistent testing
- Certification by renowned classification societies for offshore applications, and earthquake-tested version available
- Cost-efficient, flexible and modularly extendable switchboard
- Consistent, reliable power distribution with links to automation and energy management

Smart low-voltage power distribution for data centers

Requirement

- High level of safety for people
- Uninterrupted power supply with minimum failure risk
- High reliability of supply for the information and communication technology (ICT) as well as for infrastructure systems such as cooling, air conditioning and fire monitoring
- High level of cost-efficiency

Solution

A SIVACON S8 low-voltage switchboard as a double-fronted switchboard, connected through SIVACON 8PS busbar trunking systems with standard connection components in order to reduce the frequency and effects of faults to a minimum.

The universal mounting design allows to combine various mounting designs in one cubicle as a cost-efficient solution for different requirements.

Added value / result

- Safety for people and plant by means of design verification acc. to IEC 61439-2
- Personal and plant safety in case of arcing thanks to consistent testing
- Cost-efficient, flexible and modularly extendable switchboard with space-optimised installation
- Consistent, reliable power distribution with links to energy management systems

Safe and compact low-voltage power distribution for high-rise buildings, functional buildings and infrastructure

Requirement

- High level of safety for people
- Reliable power supply
- High level of cost-efficiency
- Minimum maintenance requirements

Solution

A SIVACON S8 low-voltage switchboard with design verified connection to SIVACON 8PS busbar trunking systems ensures safe power transmission from the transformer to the main distribution board and up to the floor distribution boards.

The cubicles in fixed-mounted and in-line design are efficient and economic; the link to the energy management system is established through communication-capable devices.

Added value / result

- Safety for people and plant by means of design verification acc. to IEC 61439-2
- Personal and plant safety in case of arcing thanks to consistent testing
- Earthquake-tested version available
- Cost-efficient, space-saving switchboard with variable busbar position and combination of different mounting designs
- Compact and modular construction with high level of flexibility and extensibility
- Consitent and reliable power distribution

Cost-efficient low-voltage power distribution for chemical plants

Requirement

- Safety for people and plant
- Reliable and flexible power supply
- Minimisation of failure risk
- Customer-specific, flexible and extendable solutions

Solution

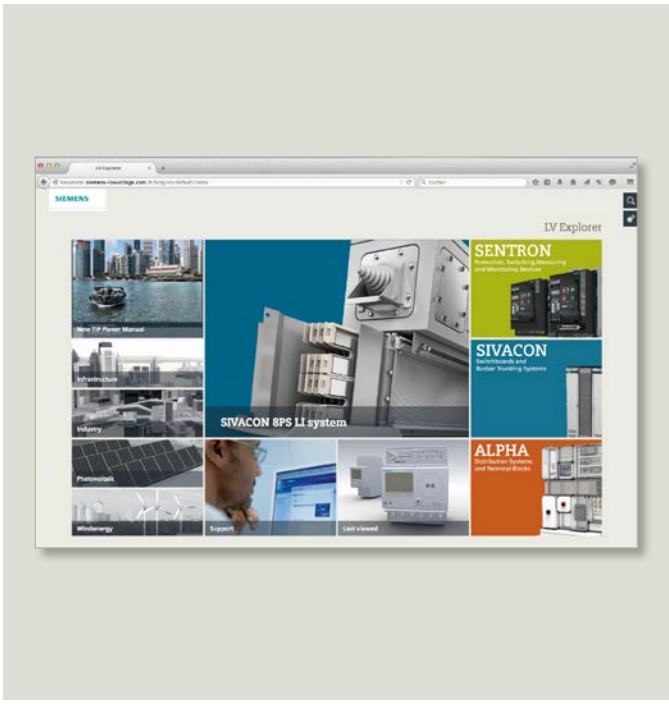
SIVACON S8 with design verified connection to SIVACON 8PS busbar trunking systems transports the power from the transformer through the main distribution board to the production facilities and factory buildings around the clock in flexible, reliable and safe manner.

Thanks to the withdrawable units, MCC cubicles in universal mounting design are safe for people and operation, and flexible due to e.g. quick adjustment to changed motor ratings or additional consumer loads without any disconnection. SIMOCODE pro, among others, provides for the intelligent link between the automation system and the motor feeder.

Added value / result

- Safety for people and plant by means of design verification acc. to IEC 61439-2
- Personal and plant safety in case of arcing thanks to consistent testing
- Earthquake-tested version available
- Cost-efficient, flexible and modularly extendable switchboard
- Consistent, reliable power distribution with links to automation and energy management

Support



SIVACON S8 on the Internet: **www.siemens.com/sivacon-S8**

Time optimisation by Siemens as a competent partner at your side

SIVACON S8 low-voltage switchboards on the Internet

Our website offers you a broad range of promotional and technical information as well as helpful tools for our SIVACON S8 low-voltage switchboards.

www.siemens.com/sivacon-S8

LV Explorer – the Discovery of Low Voltage in 3D

Get comprehensive and specific information about our products with the help of 3D animations, trailers and technical information.

www.siemens.com/lowvoltage/lv-explorer

Tender specification texts

We offer a comprehensive range of specification texts to support you:

www.siemens.com/specifications

Reliable local support

Our local experts are there for you around the world, helping you to develop solutions for your energy supply, and providing you with specific expertise on project management and financial services for your projects. Important aspects of safety, logistics, and environmental protection are considered.

SIMARIS planning tools: **www.siemens.com/simaris**

Especially for planning and conception of electrical power distribution systems, Siemens supports electrical planning engineers in many countries. Technical experts – from the TIP Consultant Support – will provide you with professional consulting, software tools, specification texts, and planning manuals.

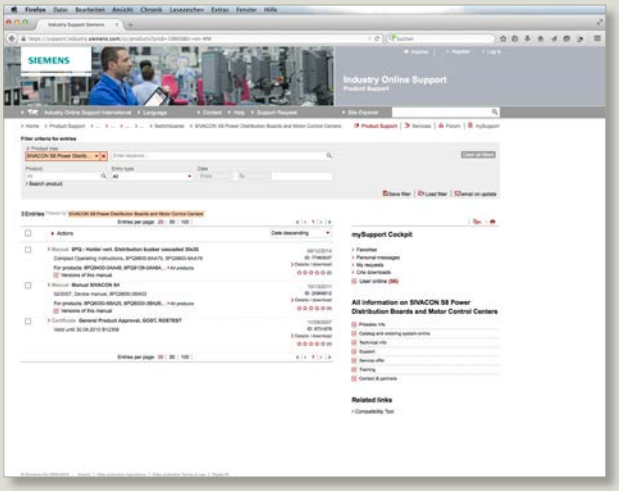
Efficient planning support with the SIMARIS software tools

Planning electric power distribution for industrial plants, infrastructure and buildings is becoming more and more complex. To help electrical planning engineers to work faster and better under existing conditions, the innovative SIMARIS software tools effectively support the planning process.

SIMARIS design

For network calculations and dimensioning, SIMARIS design offers a secure solution from the broad product portfolio of power distribution, according to recognised rules and standards (VDE, IEC) and specific requirements. The specific components that are required are selected automatically on the basis of the given project structure and the basic data collected.

For advanced users, the SIMARIS design professional version provides additional functions: Display and dimensioning of networks with parallel network operation, automatic selectivity evaluation, export of the created project for further processing in SIMARIS project, as well as the creation of active and passive emergency power supply systems.



Technical documentation on the Internet: **www.siemens.com/lowvoltage/product-support**

SIMARIS project

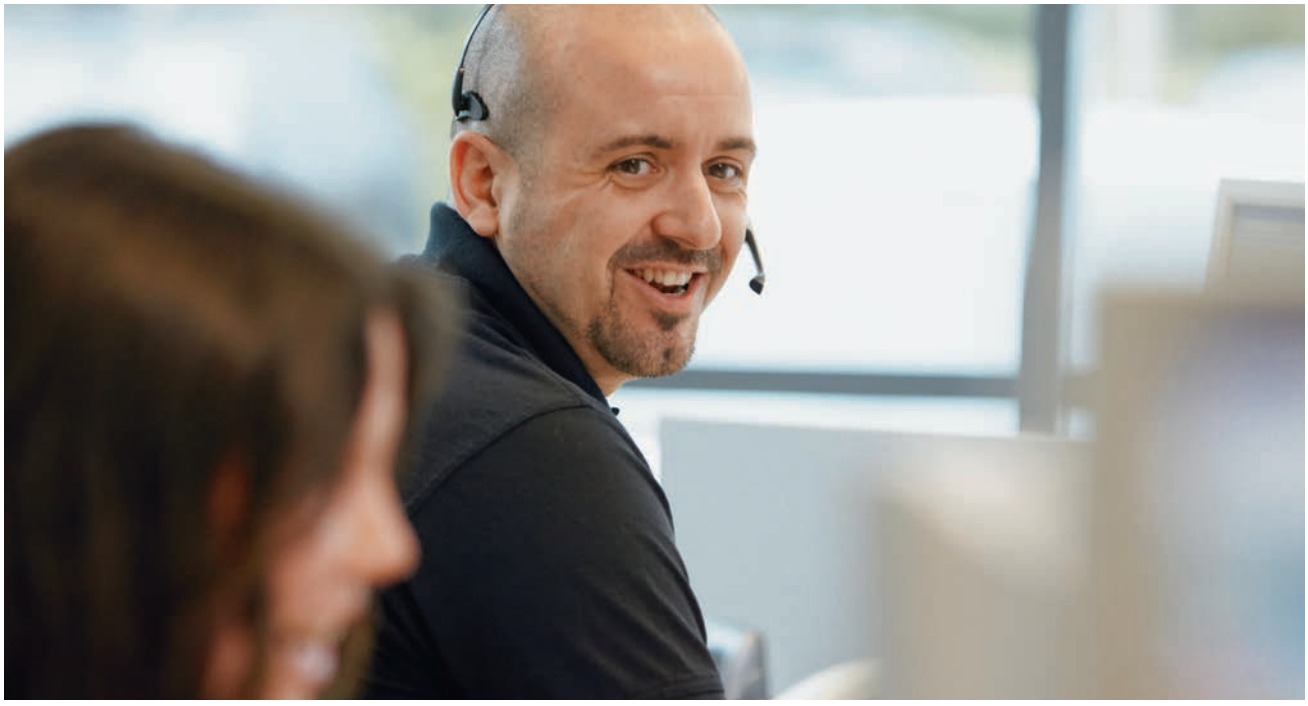
The software tool SIMARIS project enables you to create project documents quickly, easily and clearly to fit the space and budget requirements of your complete power distribution system. Based on the switchboards and devices determined, you can also create a list of specifications in GAEB D81 or RTF format – in German, English or Italian – at the click of a button, since the relevant specification texts are stored for all the components, configured automatically, and compiled in a project-specific manner.

www.siemens.com/simaris

Technical documentation on the Internet

You will find an overview of the technical documentation available for the SIVACON S8 low-voltage switchboard, such as the planning manual "SIVACON S8 – Technical Planning Information" on our website (updated daily) at:

www.siemens.com/lowvoltage/product-support



Training offer: **www.siemens.com/lowvoltage/training**

Build on a sound basis

Our courses offer you solid foundations for your business success. Expert lecturers provide you with the necessary theoretical and practical information relating to our SIVACON S8 low-voltage switchboards. Training is dynamic and easy-to-understand, and includes multimedia teaching equipment as well as many practical examples. For details of our current range of courses, please visit our website at:

www.siemens.com/lowvoltage/training

Support

For more information, please contact our **Customer Support Center**.

Tel.: +49 (0) 180 524 70 00
Fax: +49 (0) 180 524 24 71
(Charges depending on provider)

E-mail: support.energy@siemens.com

Technical data

Standards and approvals		
Standards and prescriptions	Power switchgear and controlgear assembly (design verification)	IEC 61439-2
	Testing under conditions of arcing due to internal fault	IEC/TR 61641
	Induced vibrations	IEC 60068-3-3 IEC 60068-2-6 IEC 60068-2-57 IEC 60980 KTA 2201.4 Uniform Building Code (UBC), Edition 1997 Vol. 2, Ch. 19, Div. IV
	Protection against electric shock	EN 50274
Approvals and certifications	Europe Russia, Belarus, Kazakhstan China	CE Marking and EC Declaration of Conformity EAC (Eurasian Conformity) CCC
	Det Norske Veritas Lloyds Register of Shipping	DNV GL Type Approval Certificate LR Type Approval Certificate
	Shell Conformity	"DEP Shell"

Technical data		
Rated operational voltage (U_e)	Main circuit	Up to 690 V (rated frequency f_n 50 Hz)
Clearances and creepage distances	Rated impulse withstand voltage (U_{imp})	8 kV
	Rated insulation voltage (U_i)	1,000 V
	Degree of pollution	3
Main busbars, horizontal	Rated current	Up to 7,010 A
	Rated peak withstand current (I_{pk})	Up to 330 kA
	Rated short-time withstand current (I_{cw})	Up to 150 kA, 1 s
Rated currents of devices	Circuit breakers	Up to 6,300 A
	Cable feeders	Up to 630 A
	Motor feeders	Up to 250 kW
Internal separation	IEC 61439-2	Form 1 to form 4
	BS EN 61439-2	Up to form 4 type 7
IP degree of protection	In accordance with IEC 60529	Ventilated up to IP43 Non-ventilated IP54
Mechanical strength	IEC 62262	Up to IK10
Dimensions	Height (without base)	2,000, 2,200 mm
	Height of base (optional)	100, 200 mm
	Cubicle width	200, 350, 400, 600, 800, 850, 1,000, 1,200, 1,400 mm
	Depth (single front)	500, 600, 800, 1,000, 1,200 mm
Installation conditions	Indoor installation, ambient air temperature in the 24-h mean	+ 35°C (-5°C to + 40°C)

Project checklist – Part 1

Customer							
Author							
Project			Telephone				
Factory ref. no.			Fax				
Delivery date			Date				
Standards and prescriptions							
☒ IEC 61439-1/2 / EN 61439-1/2 VDE 0660 Part 600-1/2	IEC/TR 61641, arc resistance ☐ Level 1, personal safety ☐ Level 3, limitation to functional compartment			☐ Level 2, limitation to one cubicle ☐ Level 4, limitation to the place of origin			
	☐ Insulated main busbar		☐ Arc barrier		☐ Arc detection system		
Environmental conditions							
Operating conditions	☐ Standard (interior climate 3K4)		☐ Special		☐ Corrosive gases (e.g. H_2S)		
Ambient air temperature (24-h mean)	☐ 20 °C	☐ 25 °C	☐ 30 °C	☐ 35 °C	☐ 40 °C	☐ 45 °C	☐ 50 °C
Site altitude above sea level	☐ ≤ 2,000 m		☐ Others:			m	
Adverse operating conditions	☐ None		☐ Earthquake-proof		☐ Ship/Offshore		
	☐ Others:						
Layout and installation							
Type of installation	☐ Single-fronted		☐ Back-to-back		☐ Double-fronted		
Connection inside the cubicle	☐ Front		☐ Rear				
Restriction of total length	☐ Without		☐ Yes			mm	
Max. net length per transport unit	☐ 2,400 mm		☐ Others			mm	
Cable/busbar entry							
Incoming feeder cubicles	☐ From bottom		☐ From top				
Outgoing feeder cubicles	☐ From bottom		☐ From top				
Degree of protection							
Ventilated cubicle	☐ IP30	☐ IP31	☐ IP40	☐ IP41	☐ IP43		
Non-ventilated cubicle						☐ IP54	
Towards the cable floor	☐ IP00	☐ IP30	☐ IP40	☐ IP54			
	☐ At the factory		☐ At the building site				

Project checklist – Part 2

Project						
Network data / infeed data						
Grid type	☐ TN-C	☐ TN-S	☐ TN-C-S	☐ IT	☐ TT	
Transformer rated power S_r	kVA		Rated impedance voltage U_z			%
Rated operational voltage U_e	V		Frequency f			Hz
Rated short-time withstand current I_{cw}	kA		Short-circuit withstand current I_k at DC			kA
Design of external connection	☐ L1, L2, L3, PEN		☐ L1, L2, L3, PE + N ☐ ZEP (PEN + PE)		☐ Others:	
	☐ 3-pole switchable		☐ 4-pole switchable			
Horizontal busbar system						
Position	☐ Top		☐ Rear (top)		☐ Rear (bottom)	
Rated current I_n	A		A		A	
CU treatment	☐ Bright		☐ Silver-plated		☐ Tin-plated	
Design L1, L2, L3 + ...	☐ PEN	☐ PE	☐ N	☐ PEN, N = 50 %	☐ PEN, N = 100 %	
	☐ Others:					
Vertical busbar system / Distribution busbars						
CU treatment	☐ Bright	☐ Silver-plated	☐ Tin-plated			
Design L1, L2, L3 + ...	☐ PEN	☐ PE	☐ N	☐ PEN, N = 50 %	☐ PEN, N = 100 %	
Internal separation						
Circuit-breaker design	☐ Form 1	☐ Form 2b	☐ Form 3a		☐ Form 4b	☐ Form 4 type 7
Universal mounting design				☐ Form 3b	☐ Form 4a	☐ Form 4b	☐ Form 4 type 7
Fixed-mounted design	☐ Form 1	☐ Form 2b		☐ Form 3b	☐ Form 4a	☐ Form 4b	
In-line design, plug-in				☐ Form 3b		☐ Form 4b	
In-line design, fixed-mounted	☐ Form 1	☐ Form 2b					
Reactive power compensation	☐ Form 1	☐ Form 2b					
Notes						

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