Catalog
HA 35.11 · 2025

MEDIUM-VOLTAGE SWITCHGEAR

Switchgear **Types 8DA10 and 8DB10 up to 40.5 kV,** Gas-Insulated

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Application

Typical uses

Typical uses (examples):

Public power supply system

Industry

Typical uses (examples):

Offshore

Traction power supply

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Types 8DA10 and 8DB10 up to 40.5 kV,
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Contents

The products and systems described in this catalog are manufactured and sold according to a certified management system (acc. to ISO 9001, ISO 14001 and BS OHSAS 18001).

Application

Versions

8DA10 and 8DB10 – SF_6 version

Example: Version with mechanical gas pressure manometers for feeders and busbar

Option: Version with digital gas pressure monitoring for feeders and busbar

R-HA3511-023.psd

R-HA3511-024.psd

Single busbar type 8DA10 and double busbar type 8DB10

Medium-voltage switchgear 8DA/B is indoor, factory-assembled, type-tested, single-pole metal-enclosed, gas-insulated switchgear, for single-busbar and double-busbar applications, as well as for traction power supply systems.

It is used in transformer and switching substations, e.g., in:

- Power supply companies
- Power stations
- Cement industry
- Automobile industry
- Iron and steel works
- Rolling mills
- Mining industry
- Textile, paper and food industries
- Chemical industry
- Petroleum industry
- Pipeline installations
- Offshore installations
- Electrochemical plants
- Petrochemical plants
- Shipbuilding industry
- Diesel power plants
- Emergency power supply installations
- Lignite open-cast mines
- Traction power supply systems.

Electrical data (maximum values) according to IEC

Single-busbar and double-busbar switchgear					
Rated voltage	kV	**12**	**24**	**36**	**40.5**
Rated frequency	Hz	50 / 60	50 / 60	50 / 60	50 / 60
Rated short-duration power-frequency withstand voltage	kV	28 [1]	50 [1]	70 [1]	85 [1]
Rated lightning impulse withstand voltage	kV	75	125	170	185 [1]
Rated peak withstand current	up to kA	100 / 104	100 / 104	100 / 104	100 / 104
Rated short-circuit making current	up to kA	100 / 104	100 / 104	100 / 104	100 / 104
Rated short-time withstand current 3 s	up to kA	40	40	40	40
Rated short-circuit breaking current	up to kA	40	40	40	40
Rated continuous current of the busbar	up to A	5000	5000	5000	5000
Rated continuous current of feeders	up to A	3150 [2]	3150 [2]	3150 [2]	3150 [2]

Electrical data (maximum values) according to IEEE

Single-busbar and double-busbar switchgear						
Rated voltage	kV	**4.76**	**8.25**	**15**	**27**	**38**
Rated frequency	Hz	60	60	60	60	60
Rated short-duration power-frequency withstand voltage	kV	19	36	36	50	70
Rated lightning impulse withstand voltage	kV	60	95	95	125	150
Rated peak withstand current	up to kA	104	104	104	104	104
Rated short-circuit making current	up to kA	104	104	104	104	104
Rated short-time withstand current 3 s	up to kA	40	40	40	40	40
Rated short-circuit breaking current	up to kA	40	40	40	40	40
Rated continuous current of the busbar	up to A	5000	5000	5000	5000	5000
Rated continuous current of feeders	up to A	3000 [2]	3000 [2]	3000 [2]	3000 [2]	3000 [2]

Electrical data (maximum values)

Single-pole and double-pole traction power supply switchgear			
Rated voltage	kV	**17.25**	**27.5**
Rated frequency	Hz	16.7	50/60
Rated short-duration power-frequency withstand voltage	kV	50	95
Rated lightning impulse withstand voltage	kV	125	200
Rated peak withstand current	up to kA	80	80
Rated short-circuit making current	up to kA	80	80
Rated short-time withstand current 3 s	up to kA	31.5	31.5
Rated short-circuit breaking current	up to kA	31.5	31.5
Rated continuous current of the busbar	up to A	3150	3150
Rated continuous current of feeders	up to A	2500	2500

1) Higher values on request
2) With forced ventilation

Requirements

Features

Protection against environmental influences

The single-pole enclosed high-voltage part of the switchgear is suitable for applications under aggressive ambient conditions, such as:

- Saline air
- Air humidity
- Dust
- Condensation.

It is tight to ingress of foreign objects, such as:

- Dust
- Pollution
- Small animals.

The application is independent of the site altitude.

Compact design

Thanks to the use of gas insulation, compact dimensions are possible.
Thus:

- Existing switchgear rooms can be used effectively
- New constructions cost little
- Costly city-area space is saved.

Maintenance-free design

Switchgear housings designed as sealed pressure systems, maintenance-free switching devices and enclosed cable plugs ensure:

- Maximum supply reliability
- Personnel safety
- Sealed-for-life design according to IEC 62271-200 (sealed pressure system)
- Reduced operating costs
- Cost-efficient investment.

Innovation

The use of digital secondary systems and combined protection and control devices ensures:

- Clear integration in process control systems
- Flexible and highly simplified adaptation to new system conditions and thus to cost-efficient operation.

Service life

Under normal operating conditions, the expected service life of gas-insulated switchgear 8DA/B is at least 35 years, probably 40 to 50 years, taking the tightness of the enclosed high-voltage part into account. The service life is limited by the maximum number of operating cycles of the switching devices installed:

- For circuit-breakers, according to the endurance class defined in IEC 62271-100
- For three-position disconnectors and earthing switches, according to the endurance class defined in IEC 62271-102.

Personal safety

- Safe-to-touch and hermetically sealed primary enclosure
- All high-voltage parts including the cable terminations, busbars and voltage transformers are metal-enclosed
- Capacitive voltage detecting system to verify safe isolation from supply
- Operation is only possible with closed switchgear enclosure
- Standard degree of protection IP65 for all high-voltage parts of the primary circuit, IP3XD for the switchgear enclosure according to IEC 60529
- High resistance to internal arcs by single-pole enclosure of the primary circuit
- Panels tested for resistance to internal faults up to 40 kA
- Logical mechanical interlocks prevent maloperation
- Make-proof earthing by means of the vacuum circuit-breaker.

Security of operation

- Hermetically sealed primary enclosure protects against environmental effects (pollution, humidity and small animals)
- Maintenance-free in an indoor environment according to IEC 62271-1
- Two-phase and three-phase short-circuits between the primary conductors are excluded by the single-pole primary enclosure
- In isolated or compensated systems, low-current earth-fault currents are self-extinguishing
- Operating mechanisms of switching devices accessible outside the primary enclosure (switchgear housings)
- Metal-enclosed, plug-in inductive voltage transformers mounted outside the primary enclosure
- Ring-core current transformers, mounted outside the primary enclosure, not subjected to dielectric stress
- Complete switchgear interlocking system with logical mechanical interlocks
- Bolted switchgear housings sealed for life
- Minimum fire load
- Option: Aseismic design.

Reliability

- Type and routine-tested
- Standardized, NC production processes
- Quality assurance in accordance with DIN EN ISO 9001, DIN EN ISO 14001 and BS OHSAS 18001
- More than 190,000 8DA/B switchgear panels of Siemens in operation worldwide.

General
- Single-pole enclosure of the primary part by modular switchgear housings made of corrosion-resistant aluminum alloy
- Insulating gas SF_6 up to 40.5 kV
- Three-position disconnector as busbar disconnector and feeder earthing switch
- Make-proof earthing by means of the vacuum circuit-breaker
- Compact dimensions due to gas insulation
- Single-pole metal-enclosed, gas-insulated busbars
- Cable connection with inside-cone plug-in system, or for connection of gas-insulated and solid-insulated bars
- Wall-standing or free-standing arrangement
- Installation and extension of existing switchgear at both ends without modification of existing panels.

Interlocks
- According to IEC 62271-200
- Three-position disconnector can only be operated with circuit-breaker in OPEN position
- Circuit-breaker can only be operated with three-position disconnector in end position and operating lever removed.

Modular design
- Replacement of the panel connection housings or the circuit-breaker possible without interrupting busbar operation
- Low-voltage compartment removable, plug-in bus wires.

Instrument transformers
- Current transformers not subjected to dielectric stress
- Metal-enclosed, plug-in and disconnectable voltage transformers.

Vacuum circuit-breaker
- Maintenance-free under normal ambient conditions according to IEC 62271-1
- No relubrication or readjustment
- Vacuum interrupters sealed for life
- Up to 10,000 operating cycles
- Option: Up to 30,000 operating cycles.

Secondary systems
- Protection, measuring and control equipment
- Option: Numerical multifunction protection relay with integrated protection, control, communication, operating and monitoring functions
- Can be integrated in process control systems.

Digitalization, condition monitoring

Siemens Xcelerator, available monitoring functionalities

Siemens Xcelerator

Siemens Xcelerator is an open digital business platform that enables customers to accelerate their digital transformation more easily, quickly, and at scale.

Addressing key challenges in the energy sector and beyond

Maintaining grid stability – Increasing energy demands often clash with fluctuating generation. Balancing both is crucial for tomorrow's grid stability.

Our smart energy solutions simplify management, align OT and IT, and ensure a resilient, scalable, and adaptable grid.

Maximizing cyber and asset security – Power grids can be a target for cyberattacks, which may cause power outages and unpredictable results.

Our solutions incorporate security measures to remove vulnerabilities in IT components, control devices, as well as transformer substation and switchgear systems.

Reducing expenditures – Our solutions enhance competitiveness through optimized CAPEX and OPEX with asset optimization, digital planning, simulation, and flexible financing options

Integrating distributed energy resources (DERs) – DERs are at the heart of a clean and resilient energy future. Nevertheless, a greater system flexibility is needed to consistently balance supply and demand.

Our solution offering covers the entire spectrum: from consulting through technical applications and services to tailored financing and business models.

Available monitoring functionalities for gas-insulated switchgear

Condition monitoring

Condition monitoring serves to continuously improve the resilience, reliability, and availability of maintenance-free, gas-insulated medium-voltage switchgear with an expected service life of 35 years and more. These values are based on the design and empirical data for switchgear assemblies, as well as on the intended use of the switchgear under normal service conditions according to IEC 62271-1.
To protect the investment (CAPEX) and reduce operational expenditures (OPEX), the extension of switchgear functions with a condition monitoring system is the appropriate way for early indication of irregularities at the switchgear and its peripheral components. This is the premise for condition-based inspection.

Temperature monitoring of the cable connections

Temperature monitoring of the cable connections ensures that the maximum permissible thermal service conditions of the gas-insulated switchgear and the cable connection set are not exceeded during operation. With the help of an intelligent correlation between the ambient air temperature, the cable connection temperature, and the switchgear utilization, anomalies can already be detected and indicated before the limit temperature is reached, based also on low-load scenarios.

Temperature and humidity monitoring of the environment (dew-point monitoring)

Ongoing condensation would lead to corrosion at the switchgear, and reduce its service life. Specific countermeasures after strong humidity at the switchgear assembly, as well as the prevention of further condensation, can remedy the situation.

Partial discharge monitoring

Partial discharges arise if the electrical insulation is damaged or insufficient. Partial discharge monitoring offers a pre-alarming in case of a possibly insufficient electrical insulation. In most cases, partial discharges are a long-term effect of thermal overstressing or of defective or incorrectly installed peripheral components.

Digital gas density monitoring

For perfect operation of a gas-insulated switchgear, the correct gas density inside the switchgear vessel is crucial. To maintain the full scope of functions of the switchgear, immediate action is required if the gas density falls below the necessary values.

Circuit-breaker monitoring

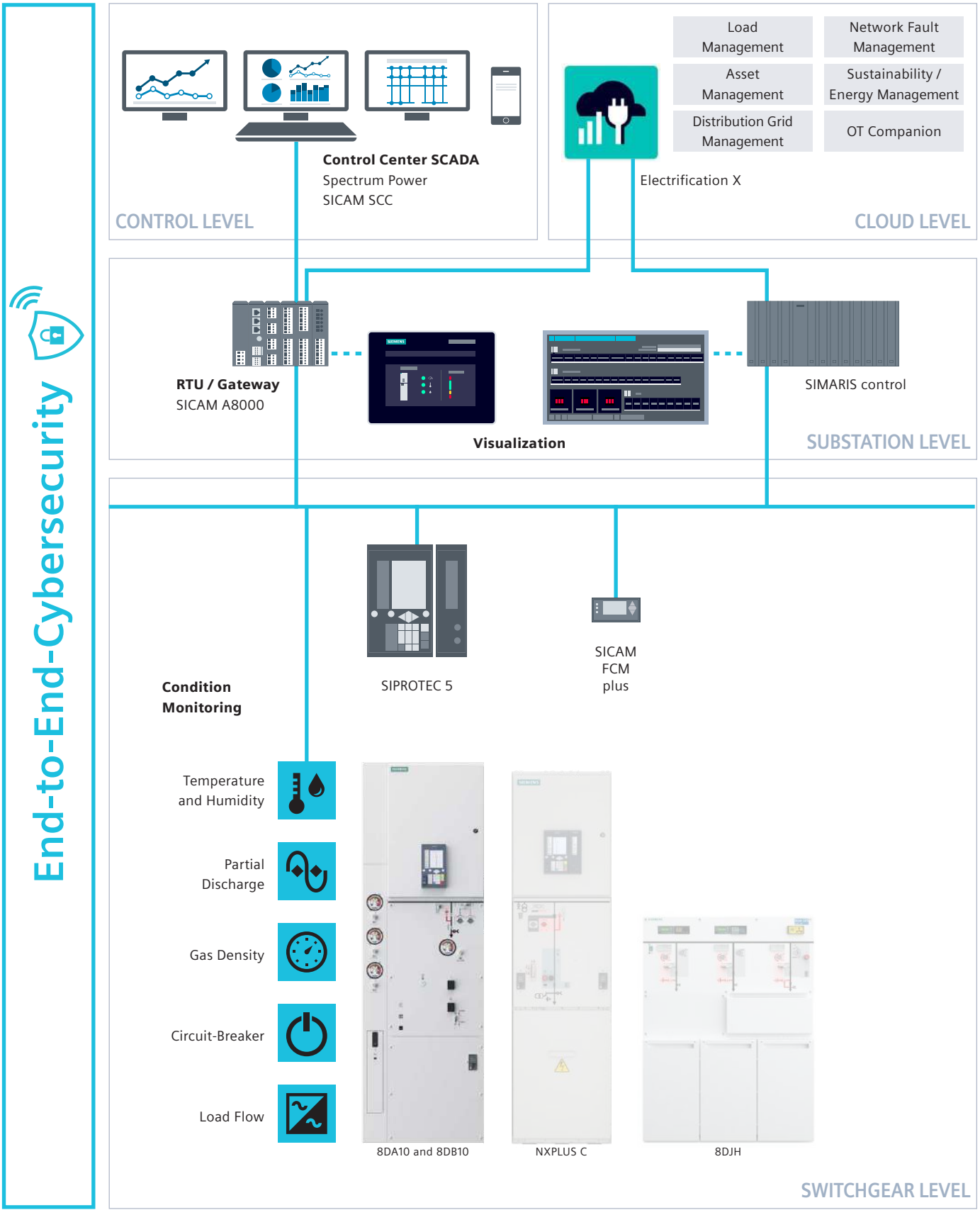
Continuous monitoring of circuit-breaker functions enables an evaluation of the actual health status of the circuit-breaker, based on both mechanical and electrical parameters. The evaluation of performed mechanical and electrical switching operations, as well as the monitoring of other components, allows to indicate at an early stage if servicing work is necessary, or if a suitable replacement switchgear should be procured.

Load flow monitoring

An increasing number of distributed energy resources and the growing share of e-mobility lead to ever more volatile load flows in the distribution grids. Capturing this data is an important element for identifying hotspots in the grid, and it offers planning security for the operator.

Digitalization, condition monitoring

Digitalization solutions from a single source



Sustainability

Our contribution to a sustainable and cleaner planet
At Siemens, sustainability is not just a commitment, but a core strategy deeply ingrained in our operations. Our DEGREE framework, representing **Decarbonization, Ethics, Governance, Resource Efficiency, Equity, and Employability**, guides our journey towards a sustainable future. It constitutes a 360-degree approach for all stakeholders – our customers, our suppliers, our investors, our people, the societies we serve, and our planet.

Siemens aims to limit global warming to 1.5 degrees Celsius and takes action across its operations, targeting various ESG (Environmental, Social, and Governance) topics. We further contribute to decarbonization by helping our customers reduce emissions, and aim to lower our own operational emissions significantly by 2030. Additionally, we promote resource efficiency through recycling and a circular economy, incorporating sustainable design criteria into our products and increasing the use of secondary materials. Siemens focuses on sustainable materials, energy sources, and product service life optimization to minimize resource consumption and waste. Ultimately, we strive to create a better future by achieving sustainability goals and minimizing environmental impacts.

Siemens gas-insulated switchgear (GIS) systems have played a key role over the last 40 years for a reliable and safe power distribution. Thanks to state-of-the-art manufacturing processes and a reliable switchgear design, the insulating gas remains in closed circuits throughout the entire production and operating phase of the switchgear, with extremely low leakage rates and minimal emissions of CO_2 equivalents throughout the entire life cycle. In addition, our switchgear has numerous advantages that have a positive impact on the ecological footprint of the users.

Space efficiency: Siemens GIS offer very compact solutions that save valuable space and additionally decrease the environmental impact of electrical infrastructure installations.

Material efficiency: Our GIS products are designed to have a very low CO_2 footprint. A prime example is SIBushing, a non-conventional instrument transformer that reduces the use of raw materials, energy consumption, and landfill waste.

Energy efficiency: An optimized main current path with a low ohmic resistance reduces the power loss during operation of the switchgear considerably, and thus increases the energy efficiency.

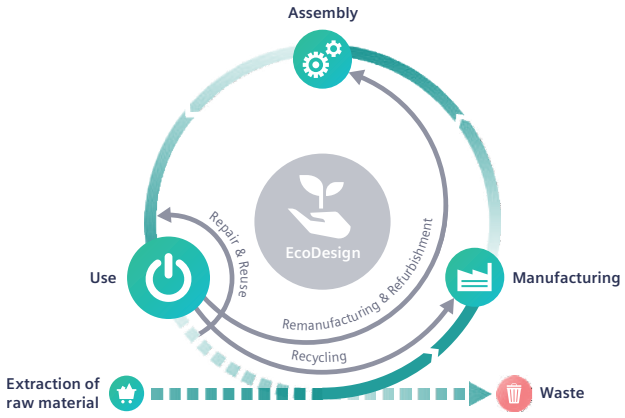
Long service life: With the right material selection and an innovative design, GIS have an expected service life of at least 35 years, thus extending the re-investment cycle and further diminishing the CO_2 footprint.

Maintenance-free design: No additional maintenance is necessary for our gas-insulated switchgear. The CO_2 footprint can be reduced further by avoiding site visits during the operational phase of the switchgear.

Sustainable services: The CO_2 footprint can be diminished thanks to services from predictive maintenance to condition monitoring, remote FAT, CO_2 monitoring via NXpower monitor, the Totally Integrated Power planning tools, and paperless documentation.

The complete life cycle that counts

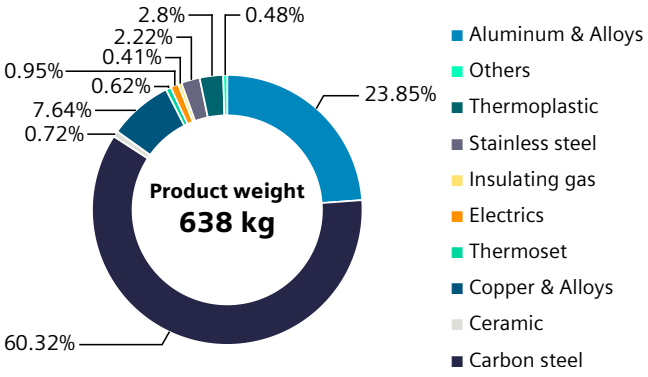
In view of the global climate crisis and the necessity to reduce carbon emissions and preserve natural resources, Siemens aims to decrease the environmental footprint of its own business operations as well as that of its customers and supply chains. With internationally standardized approaches, we provide transparency regarding the environmental impacts of our products, systems, solutions, and services.



The Siemens Environmental Product Declaration (EPD) adheres to ISO 14021 standards for environmental labels and declarations.
It is based on a comprehensive Life Cycle Assessment (LCA) study conducted in accordance with ISO 14040/44, incorporating Product Category Rules (PCR) specified in EN 50693 for electronic and electrotechnical products and systems.

Product	8DA10 for the primary distribution level
Technical data	U_r = 40.5 kV, I_k = 40 kA, I_r = 3150 A
Product description	8DA10 is a gas-insulated, single-pole, metal-enclosed circuit-breaker switchgear with SF_6 insulation for primary distribution grids, and available as circuit-breaker, bus sectionalizer and disconnector panels
Functional Unit	Reference 8DA10 – circuit-breaker panel for 1250 A – primary part, type-tested according to IEC 62271-200. Maintenance-free, operating 24 h, 365 days/a with a considered service life of 40 years

Material composition



Resource efficiency

The end-of-life phase of an 8DA10 was modeled with the LCA tool Green Digital Twin (GDT) (Database: One Siemens LCA Database based on MLC CUP 2023.2, formerly GaBi) by first dismantling the equipment, followed by a shredding, sorting, and material separation process, resulting in

- An overall product recyclability of up to 91 % mainly thanks to high metal content
- An energy recoverability of up to 3 % from plastic materials
- A minimum disposal rate of 6 %

The exact final values depend on the used recycling processes.

Use of environmentally safe materials

At Siemens, we are committed to the development and production of environmentally friendly and sustainably produced equipment. This includes avoiding hazardous substances in our products without compromising their benefits for our customers. Please visit the following website* to learn more about how we comply with product-related environmental regulations like RoHS, REACh and others.

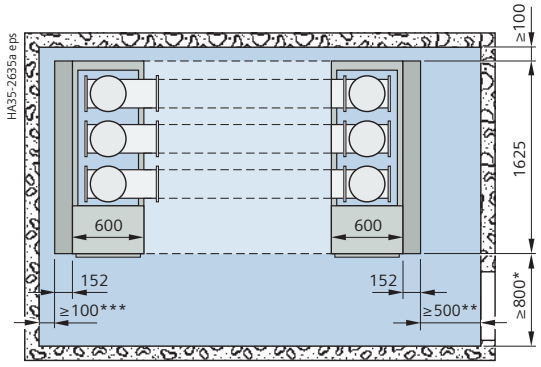
* https://www.siemens.com/global/en/products/energy/ecotransparency/ecotransparency-downloads.html

Room planning

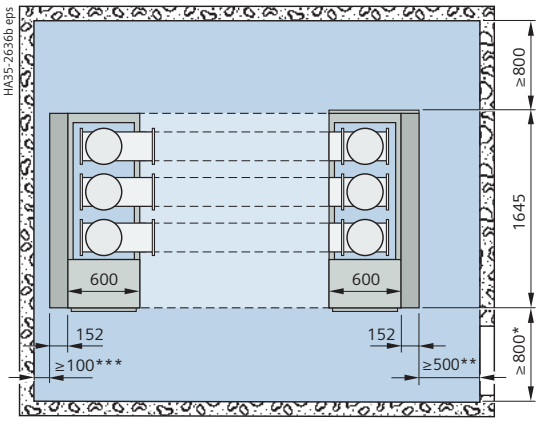
Single-busbar switchgear and double-busbar switchgear

Room planning for single-busbar switchgear 8DA10

Wall-standing arrangement (top view)

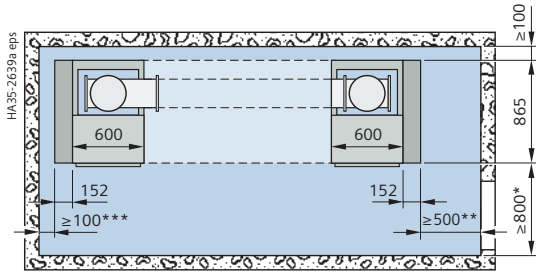


Free-standing arrangement (top view)

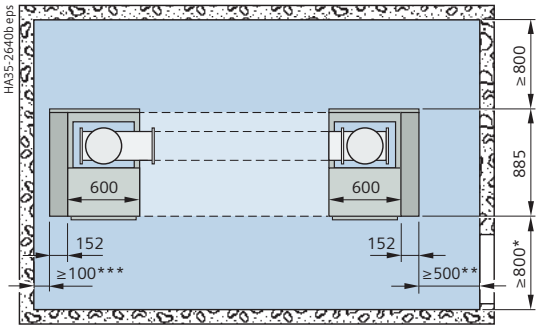


Room planning for traction power supply switchgear 8DA11

Wall-standing arrangement (top view)

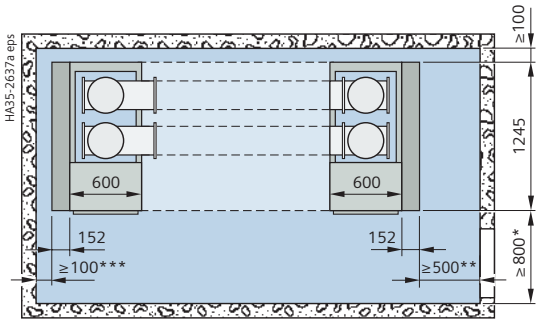


Free-standing arrangement (top view)

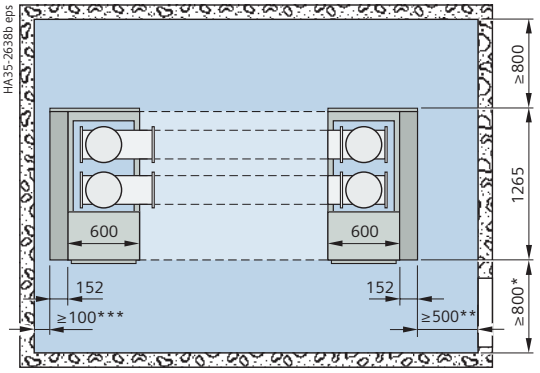


Room planning for traction power supply switchgear 8DA12

Wall-standing arrangement (top view)



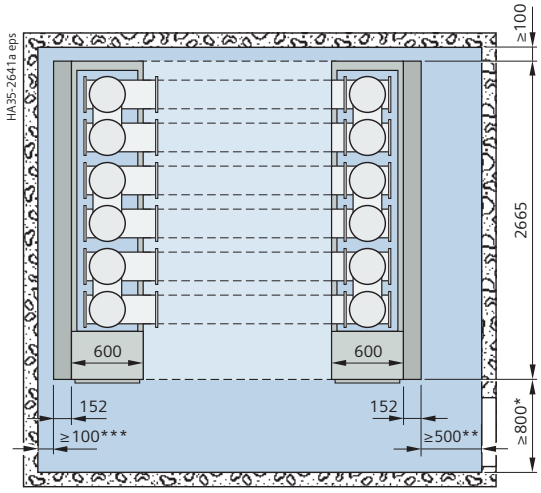
Free-standing arrangement (top view)



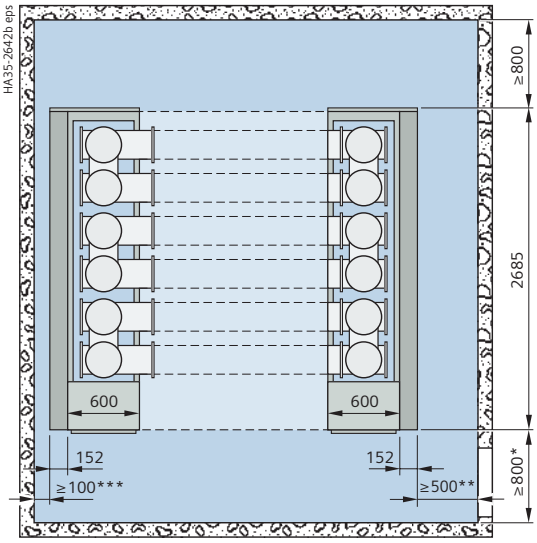
*) Depending on national requirements
**) Lateral wall distance ≥ 500 mm
optionally required on the left or on the right
***) Lateral minimum wall distance
≥ 100 mm optionally possible on the left or on the right

Room planning double-busbar switchgear 8DB10

Wall-standing arrangement (top view)



Free-standing arrangement (top view)



Switchgear installation

- Wall-standing arrangement without rear wall (IAC AFL)
- Free-standing arrangement without rear wall (IAC AFL)
- Free-standing arrangement with rear wall (IAC AFLR).

Room dimensions

See dimension drawings above.
Room height: ≥ switchgear height + 200 mm.
If there are any busbar components, the minimum room height may have to be higher.
For switchable busbar components in 8DB10, free-standing arrangement is required.

Door dimensions

The door dimensions depend on the dimensions of the individual panels (see pages 19 to 23).

Switchgear fixing

- For floor openings and fixing points of the switchgear, see pages 19 to 23
- Foundations:
  - Steel girder construction
  - Steel-reinforced concrete with foundation rails, welded or bolted on.

Panel dimensions

See pages 19 to 23.

*) Depending on national requirements
**) Lateral wall distance ≥ 500 mm optionally required on the left or on the right
***) Lateral minimum wall distance ≥ 100 mm optionally possible on the left or on the right

Room planning
Transport and packing

Transport and packing

Transport
Single-busbar switchgear 8DA10 and traction power supply switchgear 8DA11/12 is delivered in transport units comprising up to four panels. Double-busbar switchgear 8DB10 is delivered in transport units comprising up to three panels.
Please observe the following:
- Transport facilities on site
- Transport dimensions and transport weights
- Size of door openings in building.

Packing

Means of transport: Truck
- Panels on pallets
- Open packing with PE protective foil.

Means of transport: Seafreight or airfreight
- Panels on pallets
- In closed crates with sealed upper and lower PE protective foil
- With desiccant bags
- With sealed wooden base
- Max. storage time: 6 months.

Long-time packing
- Panels on pallets
- In closed crates with sealed, aluminum-coated PE protective foil
- With desiccant bags
- With sealed wooden base
- Max. storage time: 12 months.

Dimensions, weights

Transport	Panel spacing	Transport dimensions			Transport weight [1]	
		Width	Height	Depth	with packing	without packing
	mm	mm	mm	mm	kg	kg
Single-busbar switchgear 8DA10						
Truck	1 × 600	1370	2550	1888	850	750
	2 × 600	1764	2550	1870	1700	1500
	3 × 600	2400	2550	1870	2550	2250
	4 × 600	2964	2550	1870	3400	3000
Seafreight or airfreight	1 × 600	1388	2700	1888	850	750
	2 × 600	1764	2700	1888	1700	1500
	3 × 600	2400	2700	1888	2550	2250
	4 × 600	2964	2700	1888	3400	3000
Double-busbar switchgear 8DB10						
Truck	1 × 600	1370	2550	3124	1300	1200
	2 × 600	1870	2550	3124	2600	2400
	3 × 600	2416	2550	3124	3900	3600
Seafreight or airfreight	1 × 600	1388	2850	3124	1300	1200
	2 × 600	1888	2850	3124	2600	2400
	3 × 600	2440	2850	3124	3900	3600
Traction power supply switchgear 8DA11/12						
Truck	1 × 600	1370	2550	1888	600	500
	2 × 600	1764	2550	1870	1200	1000
	3 × 600	2400	2550	1870	1800	1500
	4 × 600	2964	2550	1870	2400	2000
Seafreight or airfreight	1 × 600	1388	2700	1888	600	500
	2 × 600	1764	2700	1888	1200	1000
	3 × 600	2400	2700	1888	1800	1500
	4 × 600	2964	2700	1888	2400	2000

1) Average values based on standard subframe with LV compartment 850 mm depending on the degree to which panels are equipped

Classification of single-busbar switchgear and double-busbar switchgear according to IEC 62271-200

Design and construction	
Partition class	PM
Loss of service continuity category	
– Single-busbar switchgear	LSC2
– Double-busbar switchgear	LSC2A
Internal arc classification	
Wall-standing arrangement	IAC AFL 40 kA, 1 s
Free-standing arrangement	IAC AFLR 40 kA, 1 s
Type of accessibility A	Switchgear in closed electrical service location, access “for authorized personnel only” according to IEC 62271-200
– F	Front
– L	Lateral
– R	Rear (for free-standing arrangement)
Rated short-time withstand current	40 kA
Rated duration of short-circuit	1 s

Classification of single-busbar switchgear and double-busbar switchgear according to IEEE Std C37.20.7™-2017

Internal arc classification	
Wall-standing arrangement	Type 1B 40 kA, 0.5 s
Free-standing arrangement	Type 2B 40 kA, 0.5 s
Type of accessibility	
– Type 1B	Front
– Type 2B	Front, lateral, rear (for free-standing arrangement)
Rated short-time withstand current	40 kA
Rated duration of short-circuit	0.5 s

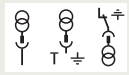
Product range

Single-busbar switchgear 8DA10

Three-position disconnector

Vacuum circuit-breaker

Plug-in voltage transformer (directly plugged or with cable connection)



Voltage transformer without or with disconnecting function

Current transformer

Capacitive voltage detecting system

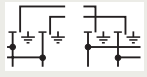
Busbar – earthing switch

Busbar connection with or without three-position disconnector

Surge arrester

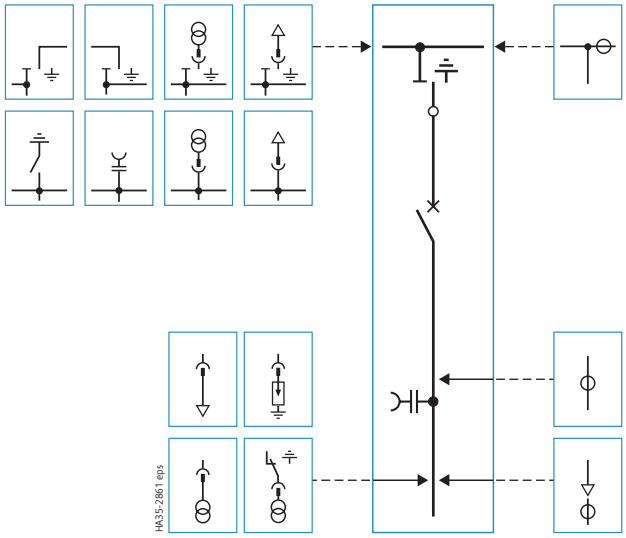
Panel connection with inside-cone plug or bar connection

Zero-sequence current transformer

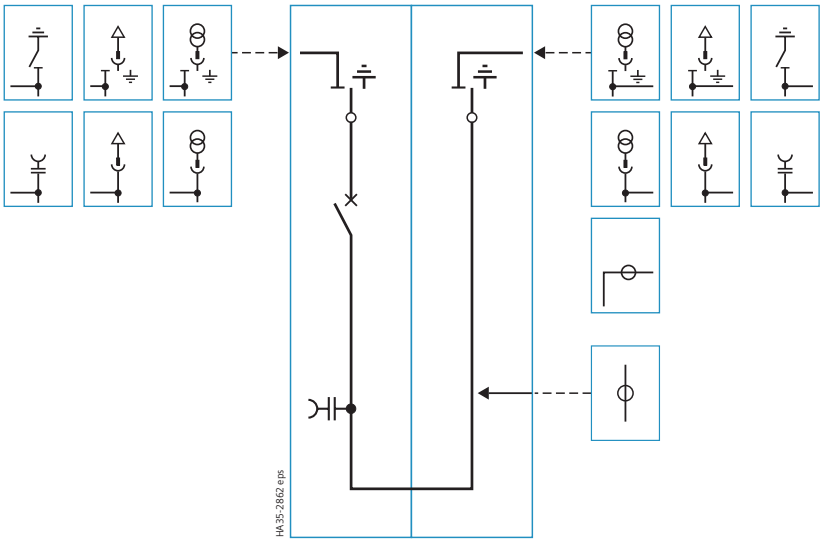


Top-mounted bus sectionalizer

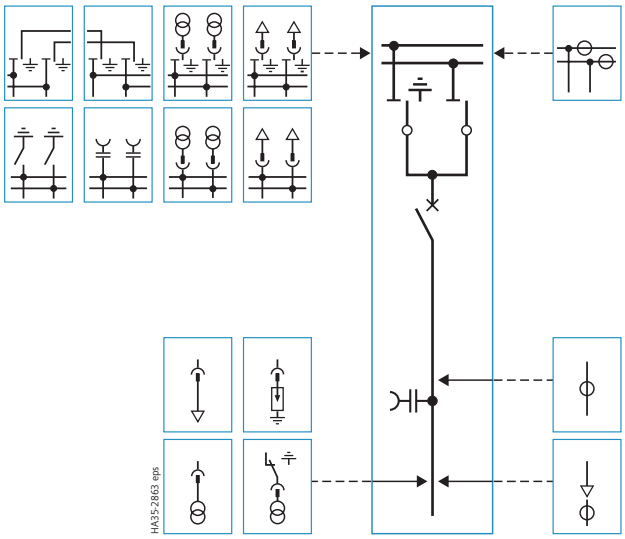
Circuit-breaker panel



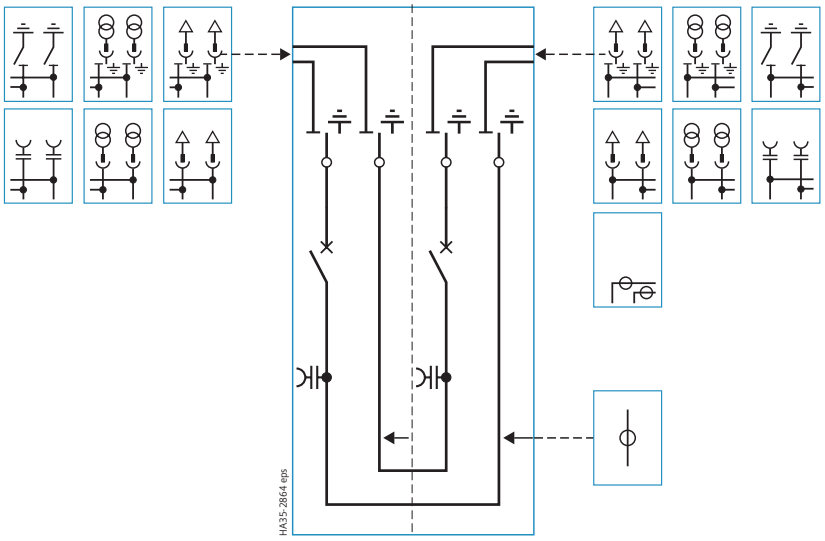
Bus sectionalizer



Circuit-breaker panel



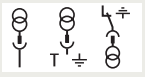
Bus sectionalizer



Three-position disconnector

Vacuum circuit-breaker

Plug-in voltage transformer (directly plugged or with cable connection)



Voltage transformer without or with disconnecting function

Current transformer

Capacitive voltage detecting system

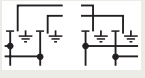
Busbar
– earthing switch

Busbar connection with or without three-position disconnector

Surge arrester

Panel connection with inside-cone plug or bar connection

Zero-sequence current transformer



Top-mounted bus sectionalizer

Product range

Double-busbar switchgear 8DB10

Three-position disconnector

Vacuum circuit-breaker

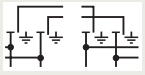
Voltage transformer without or with disconnecting function

Current transformer

Capacitive voltage detecting system

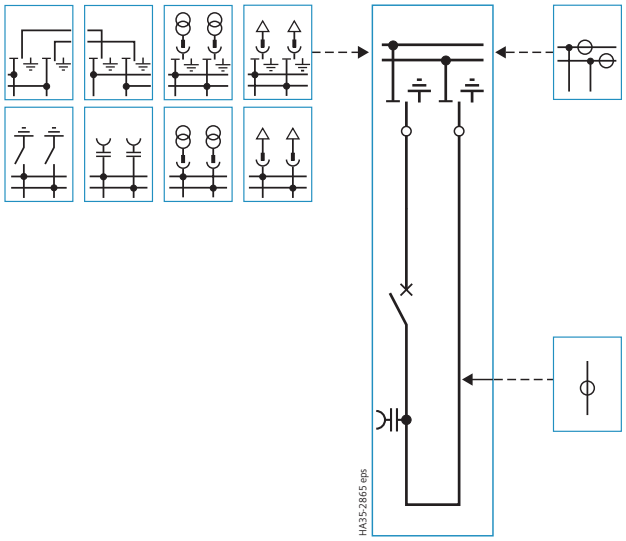
Busbar – earthing switch

Busbar connection with or without three-position disconnector

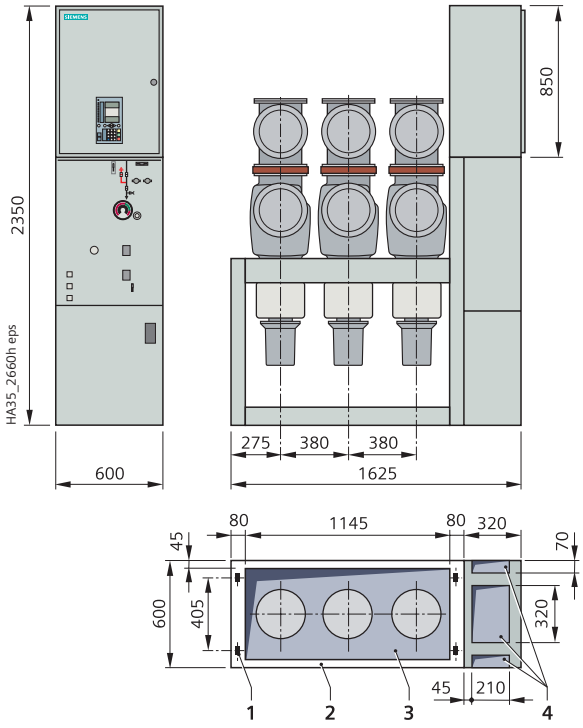


Top-mounted bus sectionalizer

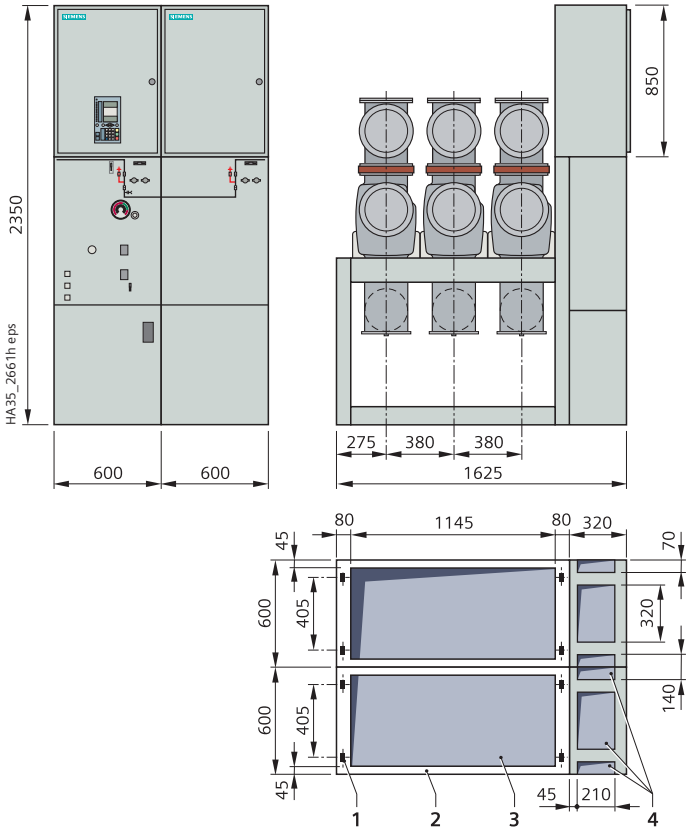
Bus coupler



Circuit-breaker panel up to 3150 A



Bus sectionalizer up to 3150 A



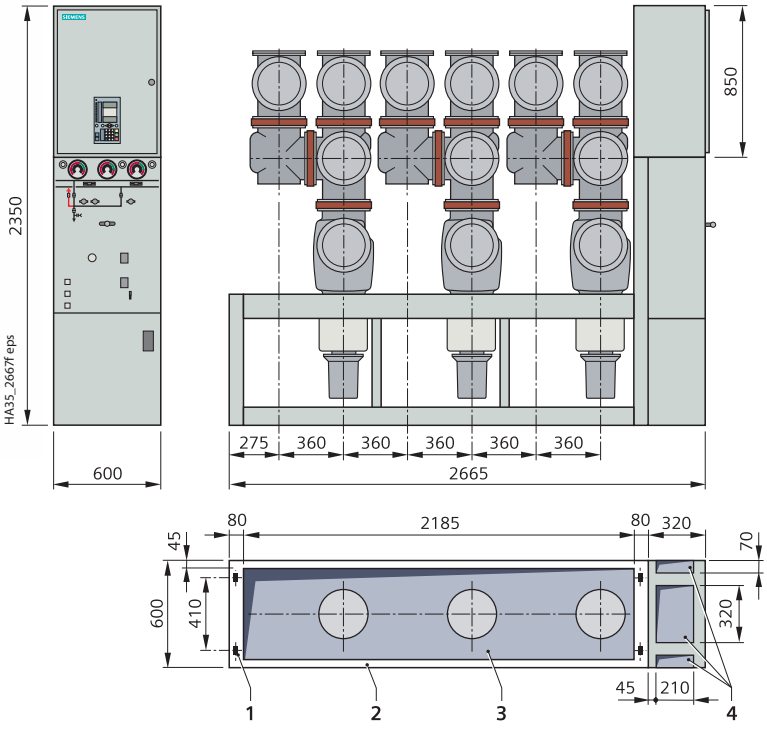
Legend and footnotes:

1 Fixing hole for 26 mm × 45 mm
2 Base frame
3 Floor opening for high-voltage cables
4 Area for floor openings for control cables

Dimensions

Typicals, double-busbar switchgear (examples)

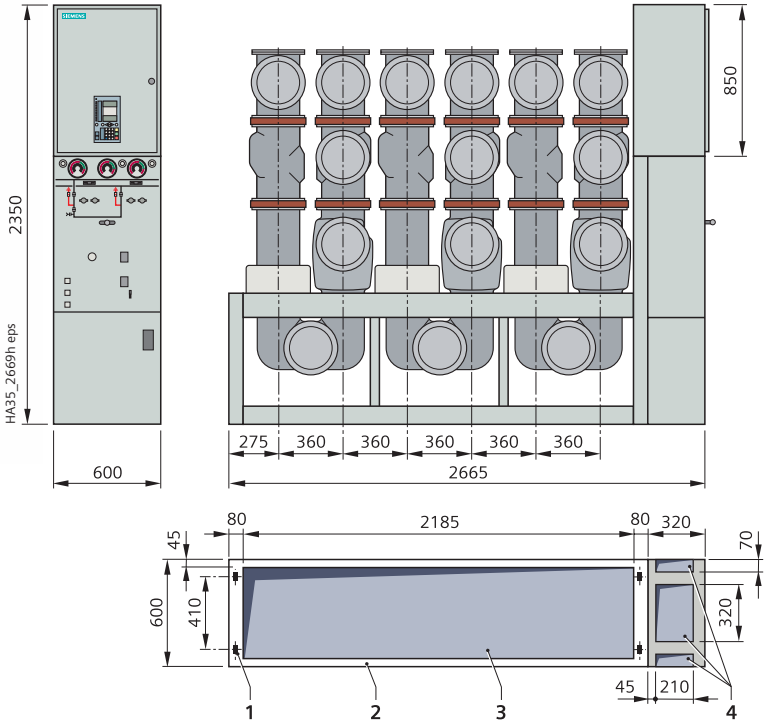
Circuit-breaker panel up to 3150 A



Legend and footnotes:

1 Fixing hole for 26 mm × 45 mm
2 Base frame
3 Floor opening for high-voltage cables
4 Area for floor openings for control cables

Bus coupler up to 3150 A



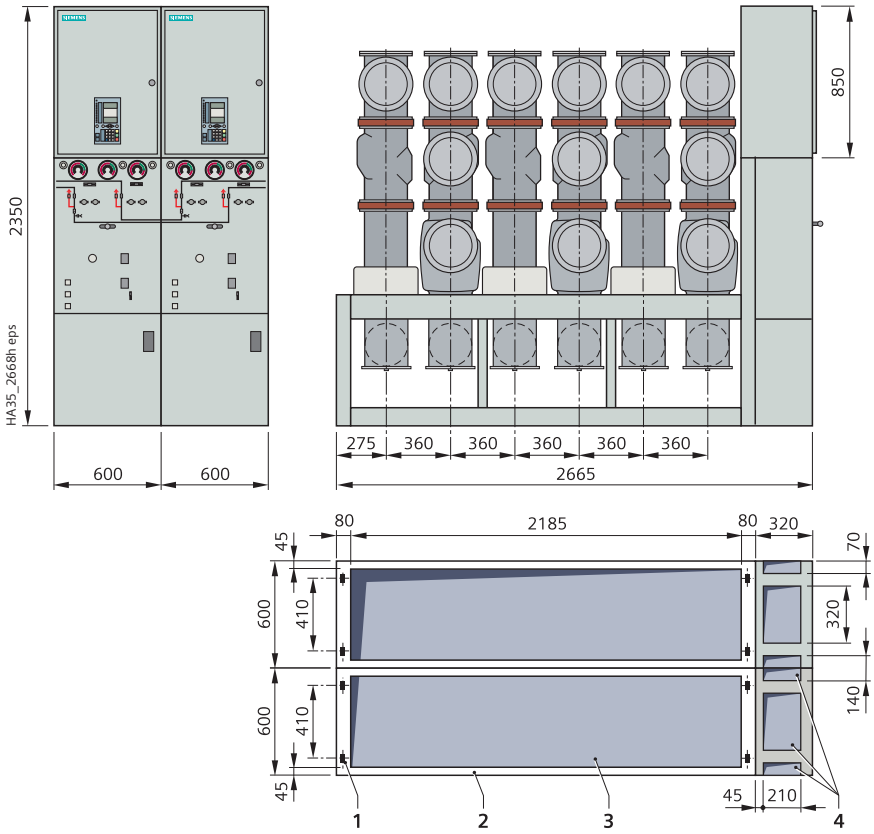
Legend and footnotes:

1 Fixing hole for
26 mm × 45 mm
2 Base frame
3 Floor opening for
high-voltage cables
4 Area for floor openings for control cables

Dimensions

Typicals, double-busbar switchgear (examples)

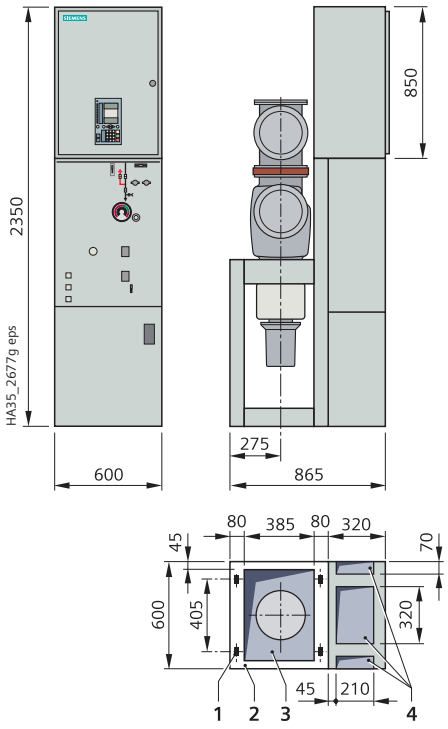
Bus sectionalizer up to 3150 A (busbar system 1 and 2)



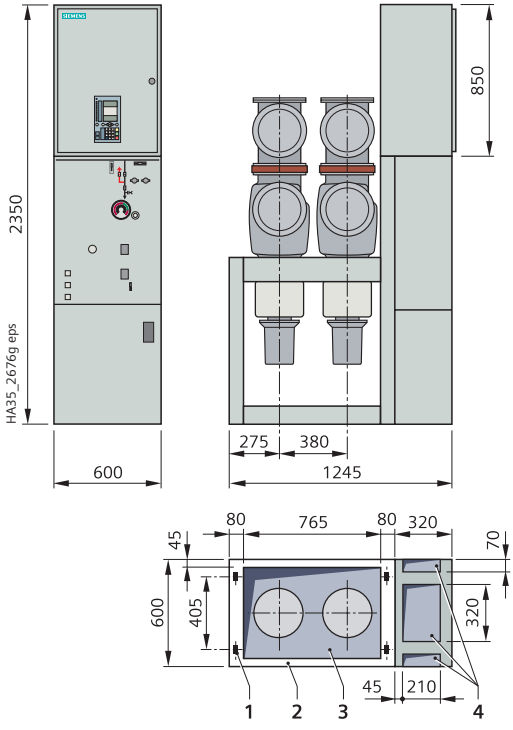
Legend and footnotes:

1 Fixing hole for
26 mm × 45 mm
2 Base frame
3 Floor opening for
high-voltage cables
4 Area for floor openings for control cables

Single-pole circuit-breaker panel up to 2500 A



Double-pole circuit-breaker panel up to 2500 A



Legend and footnotes:

1 Fixing hole for 26 mm × 45 mm
2 Base frame
3 Floor opening for high-voltage cables
4 Area for floor openings for control cables

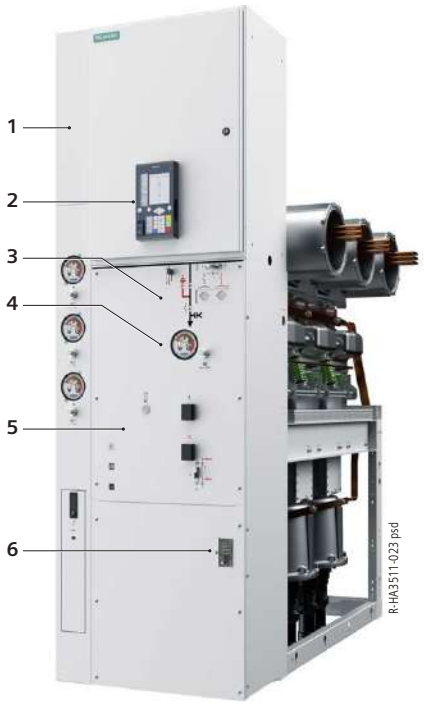
Design

Panel design, single-busbar switchgear (example)

Panel design

- Factory-assembled, type-tested
- Single-pole metal enclosure
- Hermetically bolted switchgear housings made of corrosion-resistant aluminum alloy
- Switchpanel poles arranged one behind the other
- Maintenance-free under normal operating conditions according to IEC 62271-1
- Degree of protection
  - IP65 for all high-voltage parts of the primary circuit
  - IP3XD for the switchgear enclosure [1)]
- Vacuum circuit-breaker
- Three-position disconnector for disconnecting and earthing
- Make-proof earthing by means of the vacuum circuit-breaker
- Cable connection with inside-cone plug-in system according to EN 50181
- Wall-standing or free-standing arrangement
- Instrument transformers located outside the gas compartments
- Low-voltage compartment removable, plug-in bus wires
- Standardized production processes and certified quality and environmental management system according to ISO 9001, ISO 14001 and BS OHSAS 18001.

Panel design (example)

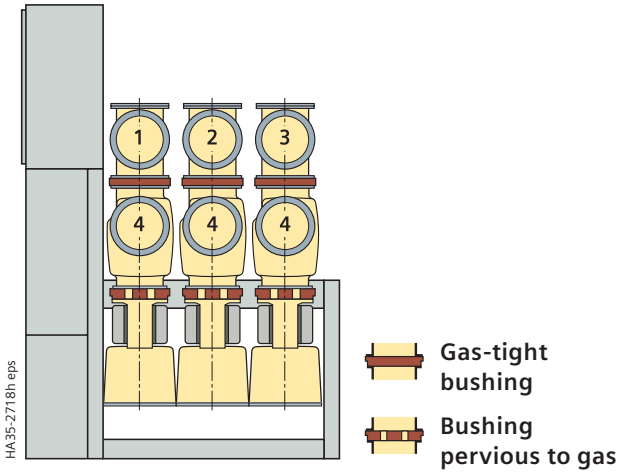


Panel for single-busbar switchgear

Legend for pages 24 and 25:

1 Low-voltage compartment
2 Electronic control board, e.g. multifunction protection
3 Operating mechanism and interlock for three-position disconnector, as well as mechanical position indicators for three-position disconnector and circuit-breaker
4 Manometer for gas monitoring of feeder gas compartments
5 Circuit-breaker operating mechanism
6 Voltage detecting system

Arrangement of gas compartments



Single-busbar panel

Legend for 8DA10:

1 Busbar L1 (manometer B11 *)
2 Busbar L2 (manometer B12 *)
3 Busbar L3 (manometer B13 *)
4 Circuit-breaker L1, L2, L3 (manometer B0 *)

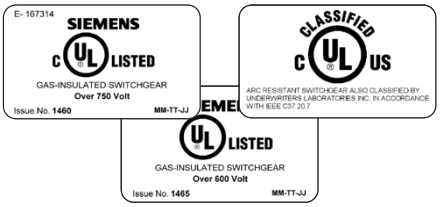
ANSI-design:

Camera system

- Camera system for visual monitoring of the switch positions of the disconnectors and earthing switches.

UL certification

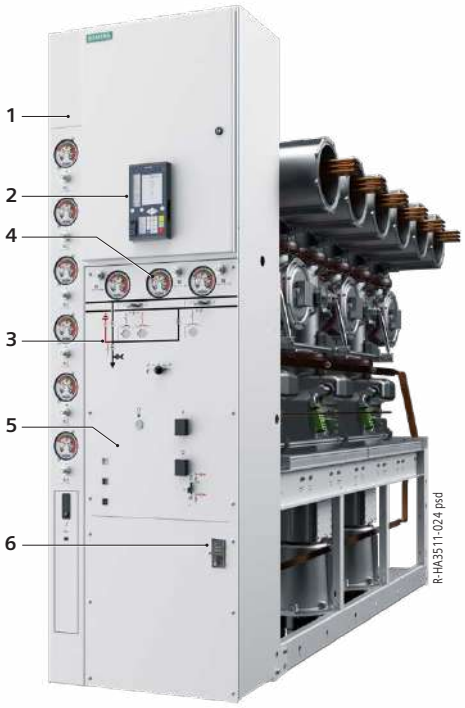
- For 8DA10 and 8DB10 ANSI design options there is a UL or cUL certificate available.



1) Other switchgear enclosure versions on request

* Item designation

Panel design (example)



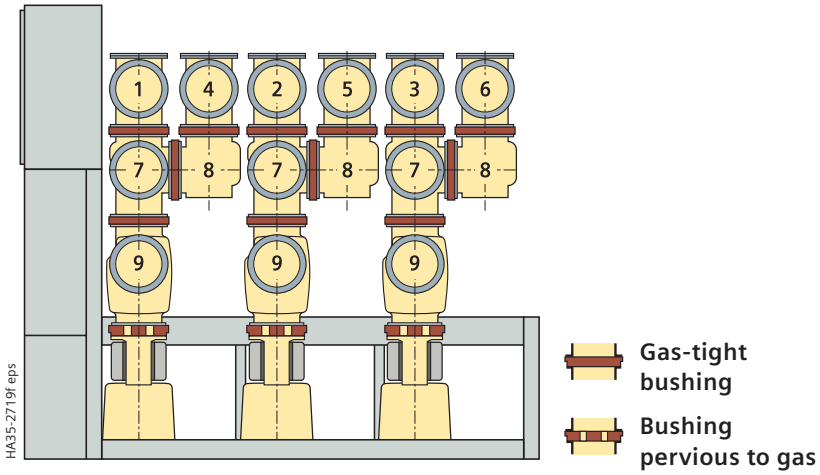
Panel for double-busbar switchgear

Legend see page 24.

Insulating system

- Switchgear housing filled with gas
- Insulating gases according to IEC 62271-4:
  - Insulating gas SF_6 up to 40.5 kV (Global Warming Potential GWP = 24,300 according to IPCC AR6 7SM, 2021)
- Pressure of the gases in the switchgear housing dependent on the electrical ratings (relative pressure at 20 °C):
  - Rated functional level (relative): 70 kPa / 120 kPa
  - Gas leakage rate: < 0.1 % per year.

Arrangement of gas compartments



Double-busbar panel

Gas compartment scheme

- Sealed pressure system according to IEC 62271-1
- No refilling required throughout the entire service life
- Gas compartments distributed to several areas
- Simple, visual check of the gas pressure on the switchgear front
- Indication of the gas pressure without auxiliary voltage supply
- Gas filling equipment with non-return valve arranged at the switchgear front beside the associated gas pressure manometer.

Legend for 8DB10:

1 Busbar system 1, L1 (manometer B11 *)
2 Busbar system 1, L2 (manometer B12 *)
3 Busbar system 1, L3 (manometer B13 *)
4 Busbar system 2, L1 (manometer B21 *)
5 Busbar system 2, L2 (manometer B22 *)
6 Busbar system 2, L3 (manometer B23 *)
7 Three-position disconnector, busbar system 1, L1, L2, L3 (manometer B1 *)
8 Disconnector, busbar system 2, L1, L2, L3 (manometer B2 *)
9 Circuit-breaker L1, L2, L3 (manometer B0 *)

* Item designation

Components

Vacuum circuit-breaker

Features

- Vacuum circuit-breaker according to IEC 62271-100
- Application in hermetically bolted switchgear housings in conformity with the system
- Vacuum interrupter in gas-filled switchgear housing
- Individual secondary equipment
- A metal bellows is used for gasketless separation between the gas insulation and the vacuum.

Trip-free mechanism

The vacuum circuit-breaker is fitted with a trip-free mechanism according to IEC 62271-100.

Switching duties and operating mechanisms

The switching duties of the vacuum circuit-breaker are dependent, among other factors, on its type of operating mechanism.

Motor operating mechanism

- Motor-operating stored-energy mechanism
  - For auto-reclosing (K)
  - For synchronization and rapid load transfer (U).

Further operating mechanism features

- Operating mechanism located outside the switchgear enclosure
- Installation behind the control board
- Stored-energy spring mechanism for 10,000 operating cycles
- Optional: Stored-energy spring mechanism for 30,000 operating cycles.

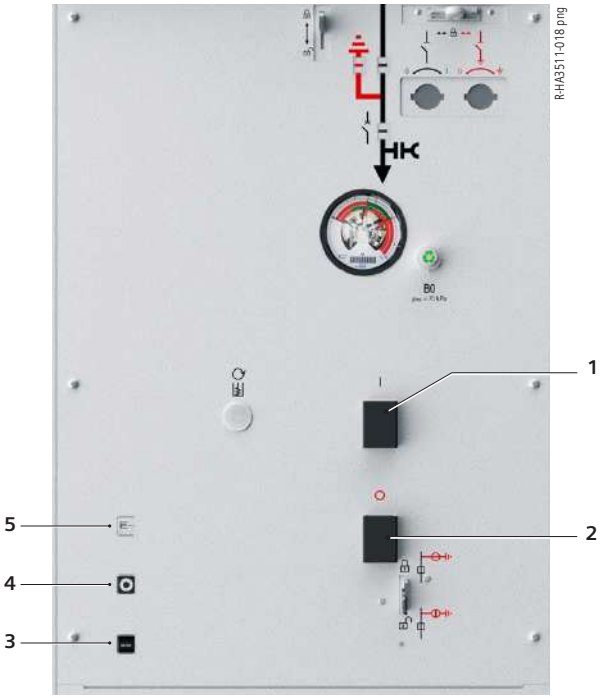
Operating mechanism functions

Motor operating mechanism

In the case of motor operating mechanism, the closing spring is charged by means of a motor and latched in the charged position (“spring charged” indication is visible). Closing is effected either by means of an ON pushbutton or a closing solenoid. The closing spring is recharged automatically (for auto-reclosing).

Endurance class of circuit-breaker

Function	Class	Standard	Property of 8DA/B
BREAKING	M2	IEC 62271-100	10,000 times mechanically without maintenance
	E2	IEC 62271-100	10,000 times rated continuous current without maintenance 50 times short-circuit breaking current without maintenance
	C2	IEC 62271-100	Very low probability of restrikes



Circuit-breaker operating mechanism 3AH49 for single-busbar switchgear, double-busbar switchgear and traction power supply switchgear

1 ON pushbutton
2 OFF pushbutton
3 Operations counter
4 Position indicator for circuit-breaker
5 “Closing spring charged” indicator at the operating mechanism

Operating times

Closing time		Closing solenoid	< 95 ms
Opening time		1st shunt release	< 65 ms
		2nd shunt release	< 65 ms
		Undervoltage release	< 65 ms
Arcing time	at 50 Hz		< 15 ms
	at 60 Hz		< 12 ms
Break time	at 50 Hz	1st shunt release	< 80 ms
		2nd shunt release	< 80 ms
		Undervoltage release	< 80 ms
Dead time			300 ms
Total charging time			< 15 s

For further technical data and description of typical applications, please refer also to Catalog HG 11.04 “3AH4 Vacuum Circuit-Breakers”

Secondary equipment
The scope of the secondary equipment of the vacuum circuit-breaker depends on the type of application and offers a wide range of possible variations, allowing almost every requirement to be satisfied.

Closing solenoid
- Type 3AY1410
- For electrical closing.

Shunt releases
- Type 3AY1410 (Y1*, Y2*, Y3*)
- Type 3AX1101 (Y2*)
- Tripping by protection relay or electrical actuation.

Undervoltage release
- Type 3AX1103 (Y7*)
- Comprising:
  - Energy store and unlatching mechanism
  - Electromagnetic system, which is permanently connected to voltage while the vacuum circuit-breaker is closed; tripping is initiated when this voltage drops
- Connection to voltage transformers possible.

Anti-pumping
- Function: If constant CLOSE and OPEN commands are present at the vacuum circuit-breaker at the same time, the vacuum circuit-breaker will return to the open position after closing. It remains in this position until a new CLOSE command is given. In this manner, continuous closing and opening (= pumping) is avoided.

Circuit-breaker tripping signal
- For electrical signaling (as pulse > 10 ms), e.g. to remote control systems, in the case of automatic tripping (e.g. protection)
- Via limit switch (S6*) and cutout switch (S7*).

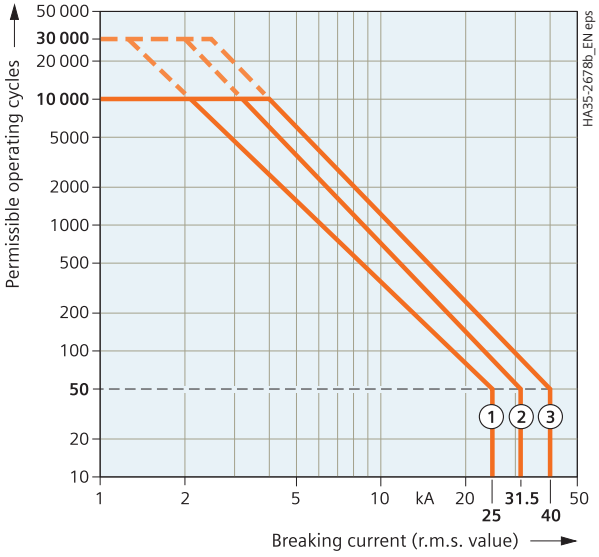
Varistor module
- To limit overvoltages to approx. 500 V for protection devices (when inductive components are mounted in the vacuum circuit-breaker)
- For auxiliary voltages ≥ 60 V DC.

Auxiliary switch
- Type 3SV9 (S1*)
- Standard: 12 NO + 12 NC
- Option: 22 NO + 22 NC.

Position switch
- Type 3SE4 (S4*)
- For signaling “closing spring charged”.

Mechanical interlock
- Mechanical interlocking to the three-position disconnector
- During operation of the three-position disconnector, the vacuum circuit-breaker cannot be operated.

Operating cycle diagram



Examples

Electrical data (curve 1)
Rated short-circuit breaking current 25 kA
Rated continuous current 1250 A

Electrical data (curve 2)
Rated short-circuit breaking current 31.5 kA
Rated continuous current 2000 A

Electrical data (curve 3)
Rated short-circuit breaking current 40 kA
Rated continuous current 2500 A

Rated operating sequences

Rapid load transfer (U):	O–t–CO–t'–CO (t = 0.3 s, t' = 3 min)
Auto-reclosing (K):	O–t–CO–t'–CO (t = 0.3 s, t' = 3 min)
Auto-reclosing (K):	O–t–CO–t'–CO (t = 0.3 s, t' = 15 s)

O = OPEN operation
CO = CLOSE operation with subsequent OPEN operation at the shortest internal close-open time of the vacuum circuit-breaker

Combination possibilities closing solenoid and releases

Closing solenoid and releases	Type	1	2	3	4	5
Closing solenoid	3AY1410	•	•	•	•	•
1st shunt release	3AY1410	•	•	•	•	•
2nd shunt release	3AY1410	–	•	•	–	–
	3AX1101	–	–	–	–	•
3rd shunt release	3AY1410	–	–	•	–	–
Undervoltage release	3AX1103	–	–	–	•	•

Abbreviations: NO = normally open contact, NC= normally closed contact

* Item designation

Components

Three-position disconnector

Features

- Rated continuous currents up to 3150 A
- 2000 operating cycles for the disconnector *
- 1000 operating cycles for the earthing switch *
- Operating shaft and contact blades with common center of rotation and reliable switch position up to the operating front of the panel
- Gas-tight bushings separate the busbar and circuit-breaker housings
- Maintenance-free under normal operating conditions according to IEC 62271-1.

Switch positions

- CLOSED, OPEN, EARTHED or READY-TO-EARTH
- CLOSED: Contact blades connected with the busbar: Main circuit closed between busbar and circuit-breaker
- OPEN: Main circuit open between busbar and circuit-breaker: Test voltages for isolating distances are withstood
- READY-TO-EARTH: Contact blades connected with the earthing contact
- EARTHED: Feeder earthed and short-circuited by closing the circuit-breaker.

Operating mechanism

- Only permissible operations possible due to logical mechanical interlocks
- Mechanically coupled position indicator
- Separate operating shafts for the “DISCONNECTING”, “EARTHING” and “READY-TO-EARTH” functions
- With manual operating mechanism
- Option: With motor operating mechanism
- Same sense of rotation for the switching operations of the “CLOSE” or “OPEN” functions.

Endurance class of three-position disconnector

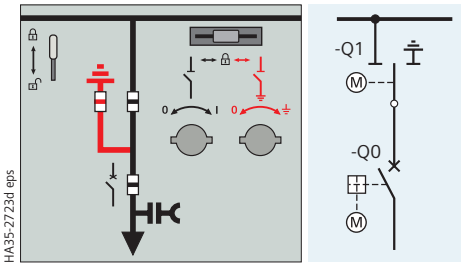
Function	Class	Standard	Property of 8DA/B
DISCONNECTING	M1	IEC 62271-102	2000 times mechanically without maintenance
READY-TO-EARTH			1000 times mechanically without maintenance
EARTHING	E2 [1)]	IEC 62271-102	50 times rated short-circuit making current I_{ma} without maintenance

Endurance class of make-proof earthing switch

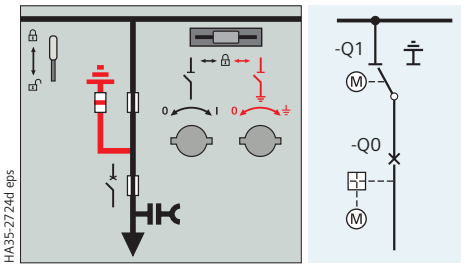
Function	Class	Standard	Property of 8DA/B
EARTHING	E1	IEC 62271-102	1000 times mechanically without maintenance
			2 times rated short-circuit making current I_{ma} without maintenance

Position indicators, single-busbar switchgear

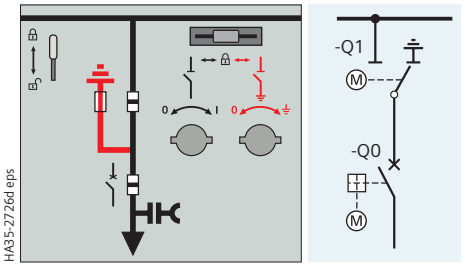
for three-position disconnector
and vacuum circuit-breaker



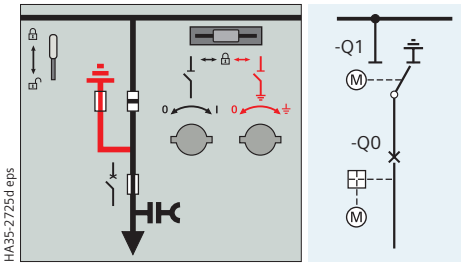
Feeder OPEN



Feeder CLOSED



Feeder READY-TO-EARTH



Feeder EARTHED

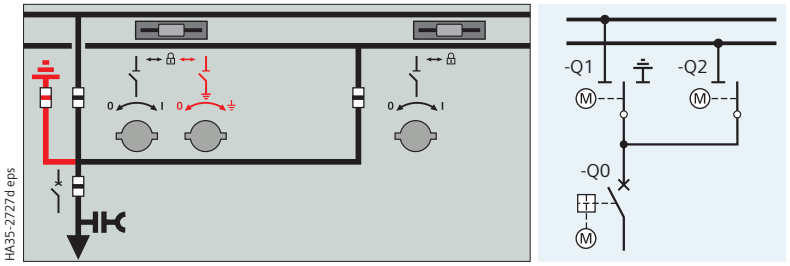
1) By closing the circuit-breaker

* Higher operating cycles on request

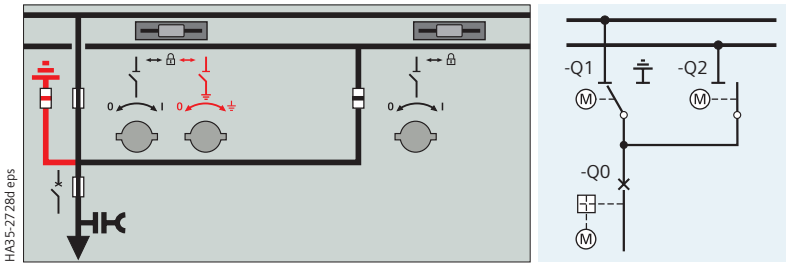
Interlocks

- Selection of permissible switching operations by means of a control gate with mechanically interlocked vacuum circuit-breaker
- Corresponding operating shafts are not released at the operating front until they have been pre-selected with the control gate
- Operating lever cannot be removed until switching operation has been completed
- Circuit-breaker cannot be closed until the control gate is in neutral position again
- Option: Switchgear interlocking system with electromechanical interlocks (mechanical interlocking for manual operation remains).

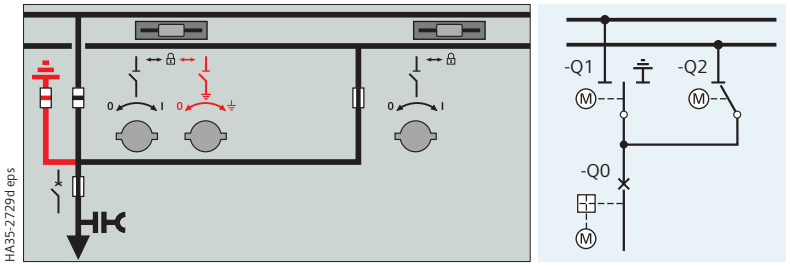
Position indicators, double-busbar switchgear
for three-position disconnector
and vacuum circuit-breaker



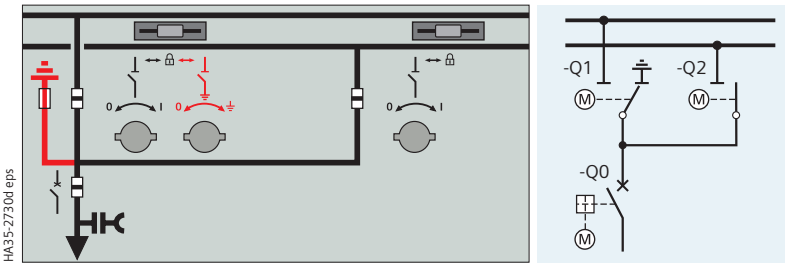
Feeder OPEN



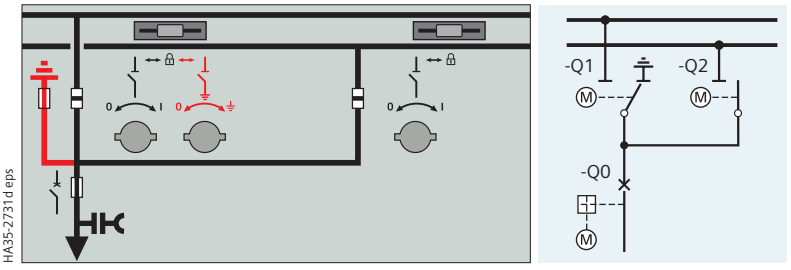
Feeder busbar system 1 CLOSED



Feeder busbar system 2 CLOSED



Feeder READY-TO-EARTH



Feeder EARTHED

Components

Current transformers

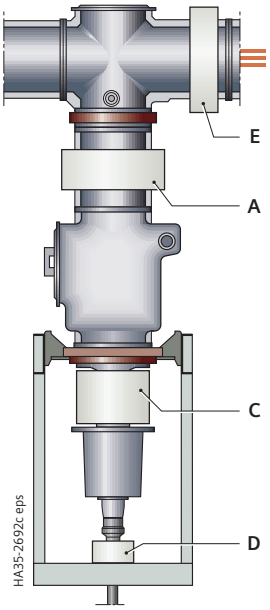
Features

- According to IEC 61869-2
- Designed as ring-core current transformers, single-pole
- Free of dielectrically stressed cast-resin parts (due to design)
- Insulation class E
- Inductive type
- Certifiable
- Climate-independent
- Secondary connection by means of a terminal strip in the low-voltage compartment of the panel
- Cast-resin insulated.

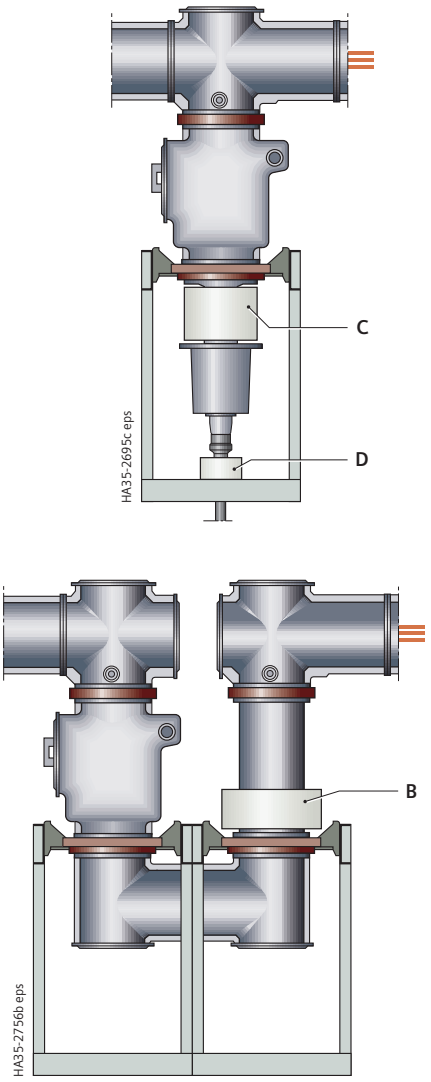
Installation

- Arranged outside the primary enclosure (switchgear housing).

Current transformers



B Current transformer in bus sectionalizer and bus coupler (type 4MC4_40)
C Feeder current transformer (type 4MC4_90)
D Feeder current transformer (type 4MC4_10)
E Busbar current transformer (type 4MC4_40)
Option:
A Feeder current transformer between circuit-breaker and three-position disconnector at the busbar (type 4MC4_90)

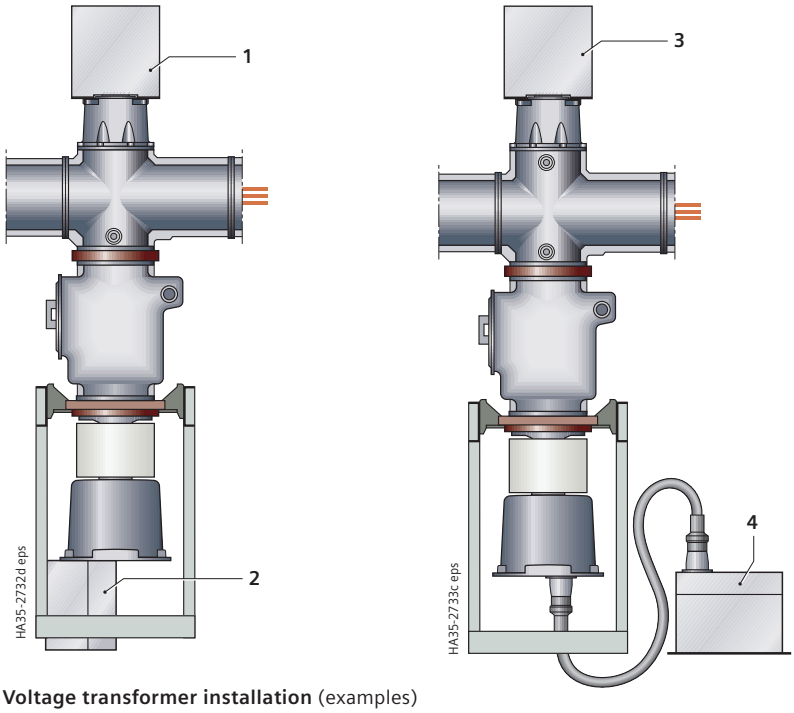


Current transformer installation (examples)

Electrical data* for		Type 4MC4
Operating voltage		max. 0.8 kV
Rated short-duration power-frequency withstand voltage (winding test)		3 kV
Rated frequency		50 / 60 Hz
Rated continuous thermal current		max. 1.2 × rated current (primary)
Rated thermal short-time current, max. 3 s		max. 40 kA
Rated current	dynamic	unlimited
	primary	40 A to 3150 A
	secondary	1 A and 5 A
Multiratio (secondary)		200 A – 100 A up to 3150 A – 1575 A
Core data according to rated primary current		max. 3 cores
Measuring core	Rating	2.5 VA to 30 VA
	Class	0.2 to 1
	Overcurrent factor	FS 5, FS 10
Protection core	Rating	2.5 VA to 30 VA
	Class	5 P or 10 P
	Overcurrent factor	10 to 30
Permissible ambient air temperature		max. 60 °C
Insulation class		E

* Further electrical data on request

Voltage transformers



Voltage transformer installation (examples)

1 Busbar voltage transformer 4MU4 / 4MT3
2 Feeder voltage transformer 4MT3 / 4MT7 (connection at panel connection housing); feeder voltage transformer with disconnecting function (option)
3 Busbar voltage transformer 4MU4 with three-position disconnector (option)
4 Feeder voltage transformer 4MU3 (connection via flexible cable with plug size S2 at the panel connection housing, and metal-enclosed voltage transformer)

Electrical data for		**4MT3**	**4MU4**	**4MT7**	**4MU3**
Rated voltage	up to kV	24.0	40.5	40.5	40.5
Rated short-duration power-frequency withstand voltage	up to kV	65	95	95	95
Rated lightning impulse withstand voltage	up to kV	125	200	200	200
Rated voltage factor		U_n / 8h = 1.9 U_n / continuous = 1.2	U_n / 8h = 1.9 U_n / continuous = 1.2	U_n / 8h = 1.9 U_n / continuous = 1.2	U_n / 8h = 1.9 U_n / continuous = 1.2
Standard		IEC GOST GB	IEC GOST GB	IEC GOST GB	IEC GOST GB

Features
- According to IEC 61869-3
- Single-pole, plug-in design
- Connection system with plug-in contact according to EN 50181
- Inductive type
- Safe-to-touch due to metal enclosure
- Certifiable
- Climate-independent
- Secondary connection by means of plugs in the low-voltage compartment of the panel
- Cast-resin insulated.

Installation
- Arranged outside the primary enclosure (switchgear housing).

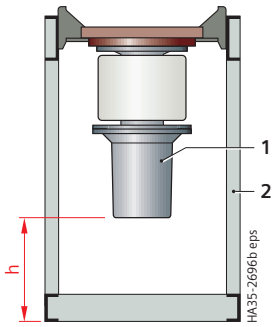
Mounting locations
- On the busbar
- At the panel connection housing.

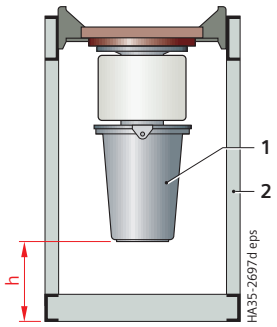
Voltage transformer types
- Busbar voltage transformers 4MT3 and 4MU4
  - Pluggable on the busbar with plug-in system according to EN 50181
  - No separate metering panel required
  - Option: Three-position disconnector for busbar voltage transformer CLOSED – OPEN – EARTHED
  - Option 4MU4: Repeat test at 80 % of the rated short-duration power-frequency withstand voltage possible with mounted voltage transformer.
- Feeder voltage transformers 4MT3/4MT7 and 4MU3
  - Pluggable at the feeder with plug-in system according to EN 50181
  - Connection of 4MT3/4MT7 directly at the panel connection housing
  - Connection of 4MU3 via flexible cable with plug size S2 at the panel connection housing, and metal-enclosed voltage transformer.

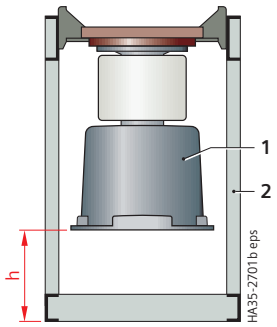
Components

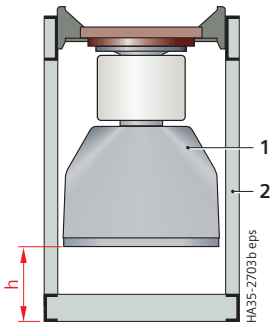
Panel connection

Panel connection 8DA/B for cable plugs and bar systems









Version 1	Version 2	Version 3				Version 4		
S2	S3	S2	S3	4MT7, 4MT3	SR* up to 2500 A	S2	S3	SR* up to 3150 A
1	1	1	1			4		
		2				5		
		3				6		
			2				4	
			3			1	3	
		1	2			1	4	
		2	1			2	2	
		1		4MT3, 4MT7		2	3	
		2		4MT3, 4MT7		3	1	
			1	4MT3, 4MT7		3	2	
			2	4MT3, 4MT7		4	1	
		1	1	4MT3, 4MT7		1		1
				4MT7	1	2		1
		1			1		1	1
							2	1
						1	1	1
								1

Panel connection height h [mm]

1. Single-busbar switchgear, traction power supply switchgear
2. Double-busbar switchgear
3. Switchgear versions with higher subframe

1.	320	240	275	240.5	222	219
2.	120	40	75	40.5	22	19
3.	540	460	495	460.5	442	439

Legend:

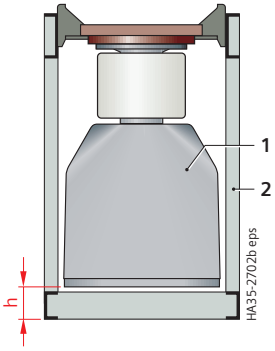
1 Panel connection housing
2 Subframe
h Connection height of panel connection versions

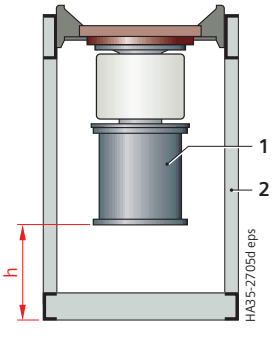
Features

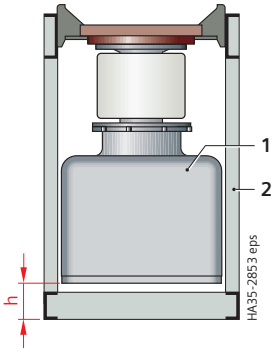
- Inside-cone plug-in system for plug sizes 2, 3 and 4 according to EN 50181
- Connection of several cables with different plug sizes possible per phase
- Connection of solid-insulated or gas-insulated bar possible
- Connection of 4MT7 voltage transformer plugged in at the panel connection housing version 3
- Connection of 4MU3 voltage transformer via plug size 2 at the panel connection housing
- For rated continuous currents up to 3150 A.

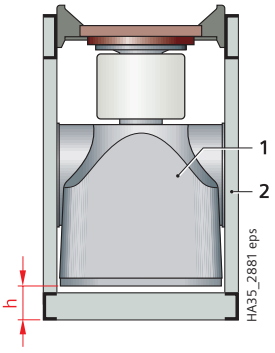
* Solid-insulated bar connection

Panel connection 8DA/B for cable plugs and bar systems









Version 5			Version 6	Version 7				Version 8**		
S2	S3	S4	SR* up to 2500 A	S2	S3	4MT7, 4MU3, switchable	Test socket, switchable	S2	S3	4MU3
		1	1	1		4MT7		1	4	4MU3
1		1		2		4MT7		2	4	
2		1			1	4MT7			5	
	1	1			2	4MT7			5	4MU3
	2	1		1	1	4MT7		1	5	
1	1	1		3		4MU3			6	
		2		4		4MU3				
					3	4MU3				
				2	1	4MU3				
				1	2	4MU3				
				2	2	4MU3				
				1	3	4MU3				
				1		4MU3	1			
				2		4MU3	1			
				3		4MU3	1			
					1	4MU3	1			
					2	4MU3	1			
				1	1	4MU3	1			
				1	2	4MU3	1			

Panel connection height h [mm]

1. Single-busbar switchgear, traction power supply switchgear
2. Double-busbar switchgear
3. Switchgear versions with higher subframe

1.	92	240	105	94
2.	108	40	–	–
3.	312	460	325	314

Surge arresters

- Pluggable via inside-cone plug-in system size 2 or 3
- Surge arresters recommended
  - – if, at the same time, the cable system is directly connected to the overhead line
  - – the protection zone of the surge arrester at the end tower of the overhead line does not cover the switchgear.

* Solid-insulated bar connection
** Only for single-busbar version

Components

Panel connection (commercially available cable plugs and bar connections)

Busbar and panel connection (commercially available cable plugs)

Cable type	Cable sealing end					Remark
	Make	Type	Size	Diameter across cable insulation mm	Conductor cross-section RM (RE) mm²	
Thermoplastic-insulated cables ≤ 12 kV according to IEC 60502-2						
Single-core cable or three-core cable, PE and XLPE-insulated, N2YSY (Cu) and N2XSY (Cu) or NA2YSY (Al) and NA2XSY (Al)	NKT	CPI 2	2	12.7–44.0	25–300 (400)	Insulation material silicone rubber, without metal housing, installation without special tools
		CPI 3	3	21.2–51.0	185–630 (800)	
		CPI 3 XL	3	34.0–57.8	185–630 (1000)	
	Pfisterer	CONNEX	2	13.5–44.0	25–400	Insulation material silicone rubber, with metal housing
		CONNEX	3	15.5–55.0	35–800	
		CONNEX	4	33.0–78.5	95–1600	
	Südkabel	SEIK 14	2	13.0–40.6	25–300	Insulation material silicone rubber, with metal housing
		SEIK 15	3	19.3–50.6	120–630	
	TE Connectivity	RPIT-321x	2	19.5–36.0	95–300	Insulation material silicone rubber, with metal housing
		RPIT-331x	3	26.0–50.0	240-1000	
Thermoplastic-insulated cables ≤ 24 kV according to IEC 60502-2						
Single-core cable or three-core cable, PE and XLPE-insulated, N2YSY (Cu) and N2XSY (Cu) or NA2YSY (Al) and NA2XSY (Al)	NKT	CPI 2	2	17.0–40.0	25–300 (400)	Insulation material silicone rubber, without metal housing, installation without special tools
		CPI 3	3	21.2–45.6	95–630 (800)	
		CPI 3 XL	3	34.0–57.8	400–800 (1000)	
	Pfisterer	CONNEX	2	13.5–44.0	25–400	Insulation material silicone rubber, with metal housing
		CONNEX	3	15.5–55.0	35–800	
		CONNEX	4	33.0–78.5	95–1600	
	Südkabel	SEIK 24	2	13.0–40.6	25–300	Insulation material silicone rubber, with metal housing
		SEIK 25	3	19.3–50.6	50–630	
	TE Connectivity	RPIT-521x	2	19.5–36.0	50–300	Insulation material silicone rubber, with metal housing
		RPIT-531x	3	26.0–50.0	150-1000	
Thermoplastic-insulated cables ≤ 40.5 kV according to IEC 60502-2						
Single-core cable or three-core cable, PE and XLPE-insulated, N2YSY (Cu) and N2XSY (Cu) or NA2YSY (Al) and NA2XSY (Al)	NKT	CPI 2	2	17.0–40.0	25–300 (400)	Insulation material silicone rubber, without metal housing, installation without special tools
		CPI 3	3	21.2–51.0	50–630 (800)	
		CPI 3 XL	3	34.0–57.8	400–800 (1000)	
	Pfisterer	CONNEX	2	13.5–44.0	25–400	Insulation material silicone rubber, with metal housing
		CONNEX	3	15.5–55.0	35–800	
		CONNEX	4	33.0–78.5	95–1600	
	Südkabel	SEIK 24	2	13.0–40.6	35–300	Insulation material silicone rubber, with metal housing
		SEIK 25	3	19.3–50.6	50–630	
	TE Connectivity	RPIT-621x	2	19.5–36.0	50–185	Insulation material silicone rubber, with metal housing
		RPIT-631x	3	26.0–50.0	70-1000	

Busbar and panel connection (commercially available bar systems)

Bar type	Bar connection				Remark
	Make	Type	Conductor material	Max. rated current [1]	
Solid-insulated bar	Ritz	SIS	Copper, aluminum	3150 A	Outer sheath made of epoxy resin (with heat shrinkable tube, if required)
	MGC Moser Glaser	Duresca DE	Copper, aluminum	2500 A	Outer sheath made of polyamide (polyamide tube)
		Duresca DG	Copper, aluminum	2500 A	Outer sheath made of CrNi steel or aluminum (metal sheath)
	Tefelen Preissinger	ISOBUS MR	Copper, aluminum	2500 A	Outer sheath made of epoxy resin (with heat shrinkable tube, if required)

Busbar and panel connection (commercially available dummy plugs)

Accessories	Dummy plug				Remark
	Make	Type	Size	Rated voltage	
Inside-cone plug-in system according to EN 50181	NKT	FPI 2	2	40.5 kV	Insulation material silicone rubber, with metal housing
		FPI 3	3	40.5 kV	
	Pfisterer Blindstecker		2	40.5 kV	Insulation material silicone rubber, with metal housing
			3	40.5 kV	
			4	40.5 kV	
	Südkabel	ISIK 15/25/35	2	12 / 24 / 40.5 kV	Insulation material silicone rubber, with metal housing
		ISIK 15/25/35	3	12 / 24 / 40.5 kV	
	TE Connectivity	RPIC-2	2	40.5 kV	Insulation material silicone rubber, with metal housing
		RPIC-3	3	40.5 kV	

1) Higher values on request

Standards

Standards, specifications, guidelines

Type of service location

The switchgear can be used as indoor installation according to IEC 61936 (Power installations exceeding 1 kV AC)

- Outside lockable electrical service locations at places which are not accessible to the public. Enclosures of switchgear can only be removed with tools
- In lockable electrical service locations. A lockable electrical service location is a place outdoors or indoors that is reserved exclusively for housing electrical equipment and which is kept under lock and key. Access is restricted to authorized personnel and persons who have been properly instructed in electrical engineering. Untrained or unskilled persons may only enter under the supervision of authorized personnel or properly instructed persons.

Terms

"Make-proof earthing switches" are earthing switches with short-circuit making capacity according to IEC 62271-102.

Dielectric strength

- The dielectric strength is verified by testing the switchgear with rated values of short-duration power-frequency withstand voltage and lightning impulse withstand voltage according to IEC 62271-1.
- The rated values are referred to sea level and to normal atmospheric conditions (1013 hPa, 20 °C, 11g/m³ humidity according to IEC 60071).

The gas insulation permits switchgear installation at any desired altitude above sea level without the dielectric strength being adversely affected.

Standards

8DA/B switchgear complies with the relevant standards and specifications applicable at the time of type tests.
In accordance with the harmonization agreement reached by the countries of the European Union, their national specifications conform to the IEC standard.

Standards

		IEC standard / EN standard	Title
Switchgear		62271-1	High-voltage switchgear and controlgear: Common specifications for alternating current switchgear and controlgear
		62271-200	High-voltage switchgear and controlgear: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV
Switching devices	Circuit-breakers	62271-100	High-voltage switchgear and controlgear: Alternating-current circuit-breakers
	Disconnectors and earthing switches	62271-102	High-voltage switchgear and controlgear: Alternating current disconnectors and earthing switches
Voltage detecting systems		62271-213	Voltage detecting and indicating system (VDIS)
		62271-215	Phase comparator used with VDIS
Surge arresters		60099	Surge arresters
Degree of protection		60529	Degrees of protection provided by enclosures (IP code)
		62262	Degrees of protection provided by enclosures (IK code)
Insulation		60071	Insulation co-ordination
Instrument transformers		61869-1	Instrument transformers
		61869-2	Current transformers
		61869-3	Voltage transformers
		61869-6	Low-power instrument transformers
		61869-10	Low-power passive current transformers
		61869-11	Low-power passive voltage transformers
SF_6		60376	Specification of technical grade sulphur hexafluoride (SF_6) and complementary gases for use in electrical equipment
		60480	
		62271-4	High-voltage switchgear and controlgear – Handling procedures for gases for insulation and/or switching
Installation		61936-1	Power installations exceeding 1 kV a.c.
Environmental conditions		60721-3-3	Classification of environmental conditions
Operation		EN 50110	Operation of electrical installations

Current carrying capacity
- According to IEC 62271-200 or IEC 62271-1, the rated continuous current refers to the following ambient air temperatures
  - Maximum of 24-hour mean + 35 °C
  - Maximum + 40 °C
- The current carrying capacity of the panels and busbars depends on the ambient air temperature outside the enclosure.

Internal arc classifications
- Protection of operating personnel by means of tests for verifying the internal arc classification
- Internal arcing tests must be performed in accordance with IEC 62271-200 and IEEE Std C37.20.7™-2007
- Definition of criteria according to IEC:
  - Criterion 1: Correctly secured doors and covers do not open, limited deformations are accepted
  - Criterion 2: No fragmentation of the enclosure, no projection of small parts above 60 g
  - Criterion 3: No holes in accessible sides up to a height of 2 m
  - Criterion 4: No ignition of indicators due to hot gases
  - Criterion 5: The enclosure remains connected to its earthing point.

Resistance to internal faults
Due to the single-pole enclosure and the gas insulation of the switchgear and the switching devices, the possibility of faults in 8DA/B switchgear is a mere fraction of that typical of other switchgear types:
- There are no effects due to external influences, such as
  - Pollution layers
  - Humidity
  - Small animals and foreign objects
- Maloperation is practically excluded due to logical arrangement of operating elements
- Short-circuit-proof feeder earthing by means of the circuit-breaker.

In the unlikely event of a fault within the switchgear housing, the energy conversion in the case of an internal arc fault is minor thanks to the gas insulation and the shorter length of the arc, approximately only ⅓ of the converted energy of an arc in air insulation.

Resistance to short circuits and earth faults
Two-phase and three-phase short circuits between the primary conductors are excluded by the single-pole primary enclosure.

Seismic withstand capability (optional)
8DA/B switchgear can be upgraded for regions at risk from earthquakes.
Detailed information on earthquake qualification and testing on request.

Color of the panel front
RAL 7035 Light grey.

Climate and environmental influences
8DA/B switchgear is completely enclosed and insensitive to climatic influences.
- All medium-voltage devices are installed in gas-tight and bolted switchgear housings made of corrosion-resistant aluminum alloy and filled with insulating gas
- Live parts are provided with single-pole enclosure
- Operating mechanism parts which are functionally important are made of corrosion-resistant materials
- Bearings in the operating mechanism are designed as dry-type bearings and do not require lubrication.

Recycling
The switchgear can be recycled in ecological manner in compliance with existing legislation. Auxiliary devices such as short-circuit indicators have to be recycled as electronic scrap. Batteries have to be recycled professionally. Insulating gas SF_6 has to be evacuated professionally as a reusable material and recycled (SF_6 must not be released into the environment).

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Medium-Voltage Switchgear

Status 05/2025

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