Catalog
HA 35.41 · 2024

MEDIUM-VOLTAGE SWITCHGEAR

Fixed-Mounted Circuit-Breaker Switchgear **Type NXPLUS C up to 36 kV**, Gas-Insulated

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Applications

Typical uses

Application: Public power supply system and offshore

NXPLUS C switchgear 20 kV (example Data Center Germany)

Application: Industry and offshore

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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).

Applications

Types

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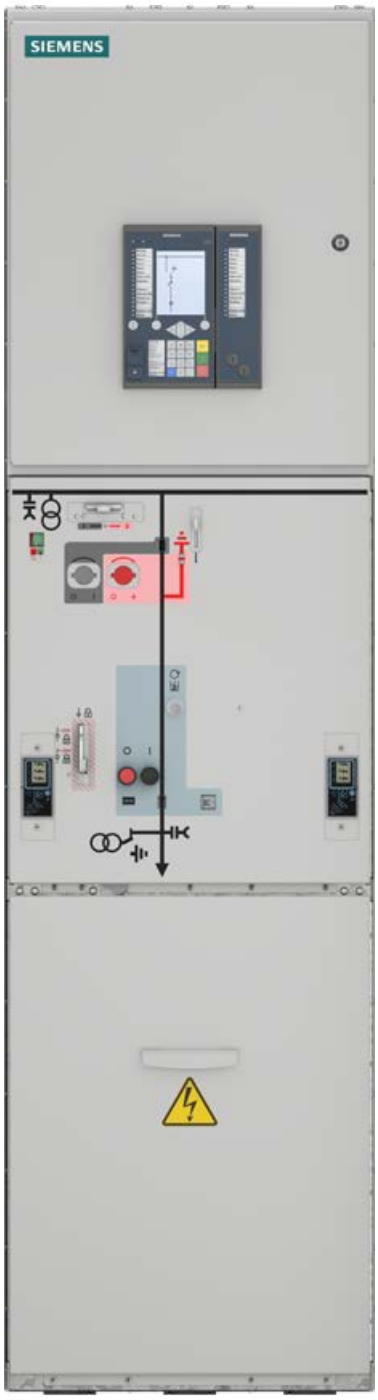
Circuit-breaker panel 450 mm



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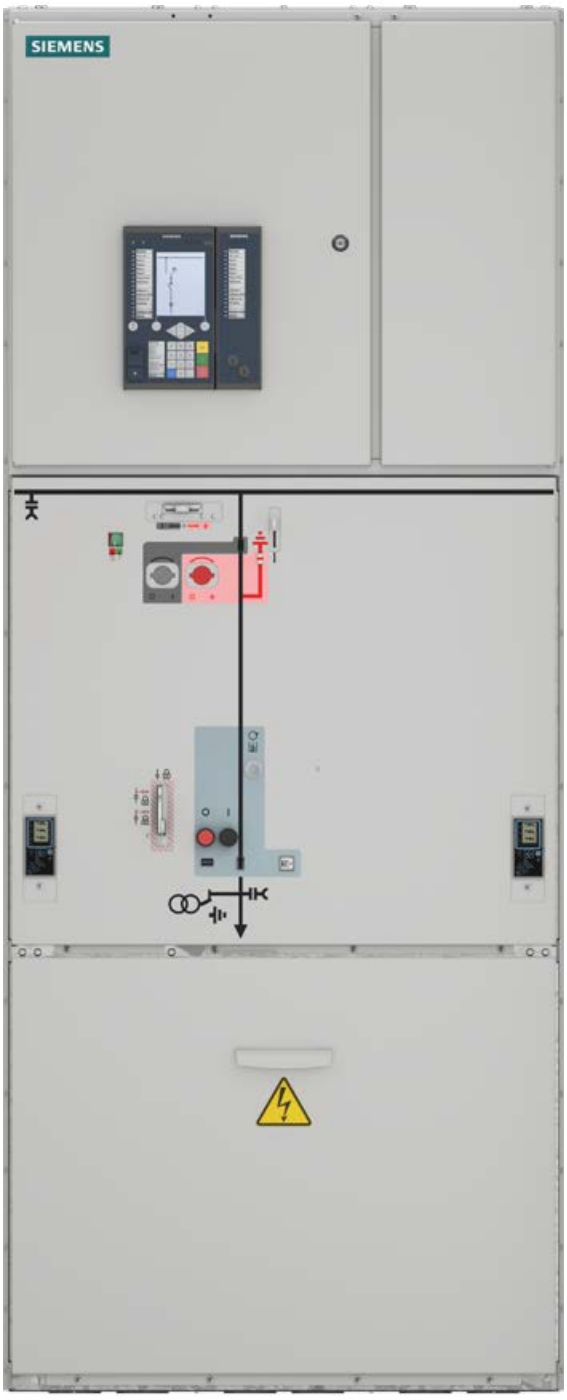
Circuit-breaker panel 600 mm



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Circuit-breaker panel 900 mm

Typical uses

Fixed-mounted circuit-breaker switchgear NXPLUS C is a factory-assembled, type-tested, metal-enclosed, SF_6-insulated switchgear with metallic partitions [3] for single-busbar and double-busbar applications for indoor installation.

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.

Ratings

Electrical data (maximum values) and dimensions								
Rated voltage	kV	**7.2**	**12**	**15**	**17.5**	**24**	**36**	**38**
Rated frequency	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Rated short-duration power-frequency withstand voltage	kV	20 [1]	28 [2]	36	38	50	70	70
Rated lightning impulse voltage	kV	60 [1]	75 [2]	95	95	125	170	150
Rated peak withstand current	kA	80/82	80/82	80/82	80/82	63/65	63/65	63/65
Rated short-circuit making current	kA	80/82	80/82	80/82	80/82	63/65	63/65	63/65
Rated short-time withstand current 3 s	kA	31.5	31.5	31.5	31.5	25	25	25
Rated short-circuit breaking current	kA	31.5	31.5	31.5	31.5	25	25	25
Rated continuous current of the busbar	A	2500	2500	2500	2500	2500	2500	2500
Rated continuous current of the feeders	A	2500	2500	2500	2500	2500	1250	1250
Width	mm mm mm mm	300 [4] 450 600 900	300 [4] 450 600 900	300 [4] 450 600 900	300 [4] 450 600 900	300 [4] 450 600 900	300 [4] – 600 900	300 [4] – 600 900
Depth	mm	1225	1225	1225	1225	1225	1225	1225
Height	mm	2250	2250	2250	2250	2250	2250	2250

1) 32 kV/60 kV according to some national requirements
2) 42 kV/75 kV according to some national requirements
3) Corresponds to "metal-clad" according to former standard IEC 60298
4) Only dummy panel

Type approval

NXPLUS C switchgear has been type-approved by the following classification societies:

- DNV GL
- American Bureau of Shipping (ABS)

The switchgear is therefore also approved for application on ships and platforms.

National approval by Intertek

The corresponding national approvals for the USA and Canada (approval number: 5022522) are available at Intertek. Thus, the NXPLUS C switchgear fulfills the main requirements of the US-American IEEE Standard and the Canadian CSA Standard.

Requirements

Features

Environmental independence
Hermetically tight, welded switchgear vessels made of stainless steel as well as single-pole solid insulation make the parts of the primary circuit under high voltage of NXPLUS C switchgear
- Insensitive to certain aggressive ambient conditions, such as saline air, air humidity, dust and condensation
- Tight to ingress of foreign objects, such as dust, pollution, small animals, humidity
- Independent of the site altitude.

This high degree of environmental independence cannot be achieved for the air-insulated metering panel due to the partial air insulation (block-type current transformers, block-type voltage transformers with connecting bars).

Compact design
Thanks to the use of SF_6 insulation, compact dimensions are possible. Thus:
- Existing switchgear rooms and substation rooms can be used effectively
- New constructions cost little
- Costly city-area space is saved.

Maintenance-free design
Switchgear vessels 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)
- Installation, operation, extension, replacement without SF_6 gas work
- Reduced operating costs
- Cost-efficient investment
- No maintenance cycles.

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 service conditions, the expected service life of gas-insulated switchgear NXPLUS C is at least 40 years, taking the tightness of the hermetically welded switchgear vessel into account. The service life is limited by the maximum number of operating cycles of the switching devices installed.

Safety

Personal safety
- Safe-to-touch and hermetically sealed primary enclosure
- Cable terminations, busbars and voltage transformers are surrounded by earthed layers
- 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
- Operating mechanisms and auxiliary switches safely accessible outside the primary enclosure (switchgear vessel)
- Due to the system design, 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 logical mechanical interlocks and tested switchgear enclosure
- Panels tested for resistance to internal faults up to 31.5 kA
- Logical mechanical interlocks prevent maloperation
- Make-proof earthing by means of the vacuum circuit-breaker.

Security of operation
- Hermetically sealed primary enclosure independent of environmental effects (pollution, humidity and small animals)
- Maintenance-free in an indoor environment (IEC 62271-1)
- Operating mechanisms of switching devices accessible outside the primary enclosure (switchgear vessel)
- Metal-coated and plug-in inductive voltage transformers mounted outside the SF_6 switchgear vessel
- Current transformers as ring-core current transformers mounted outside the SF_6 switchgear vessel
- Complete switchgear interlocking system with logical mechanical interlocks
- Welded switchgear vessels, sealed for life
- Minimum fire load
- Type- and routine-tested
- Standardized and manufactured using numerically controlled machines
- Quality assurance in accordance with DIN EN ISO 9001
- More than 500,000 switchgear panels of Siemens in operation worldwide for many years.

Reliability
- Type- and routine-tested
- Standardized and manufactured using numerically controlled machines
- Quality assurance in accordance with DIN EN ISO 9001
- More than 500,000 switchgear panels of Siemens in operation worldwide for many years.

General
- 3-pole enclosure of the primary part consisting of a switchgear vessel made of stainless steel
- Insulating gas SF_6 (fluorinated greenhouse gas)
- Three-position switch as busbar disconnector and feeder earthing switch
- Make-proof earthing by means of the vacuum circuit-breaker
- Compact dimensions due to SF_6 insulation
- Hermetically tight, welded switchgear vessel made of stainless steel
- 1-pole, solid-insulated, screened busbars, plug-in type
- Cable connection with outside-cone plug-in system, or for connection of solid-insulated bars
- Wall-standing or free-standing arrangement
- Cable connection access from front
- Low-voltage door hinge on the left or right
- Installation and extension of existing switchgear at both ends without gas work and without modification of existing panels
- Option: Flexible pressure relief duct systems.

Interlocks
- According to IEC 62271-200
- Logical mechanical interlocks prevent maloperation
- Interlocking of three-position disconnector
  - If the DISCONNECTING function is in CLOSED position, the READY-TO-EARTH function cannot be selected
  - If the READY-TO-EARTH function is in CLOSED position, the DISCONNECTING function cannot be selected
- Interlocking of three-position switch-disconnector
  - If the LOAD BREAKING function is in CLOSED position, the EARTHING function cannot be selected
  - If the EARTHING function is in CLOSED position, the LOAD BREAKING function cannot be selected
- 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
- Locking device for “feeder earthed”
- Locking device for three-position disconnector
  The following interlocks can be fulfilled by placing the padlock accordingly:
  - Padlock on the left: Three-position disconnector DISCONNECTING function cannot be operated, three-position disconnector READY-TO-EARTH function can be operated
  - Padlock in the center: Control gate blocked, no switching operations possible
  - Padlock on the right: Three-position disconnector DISCONNECTING function can be operated, three-position disconnector READY-TO-EARTH function cannot be operated
  - Fuse compartment can only be closed if the fuse box is completely closed
- De-earthing lockout when the fuse cover is removed
- Option: Cable compartment cover interlocked against three-position disconnector (circuit-breaker panel)
- Option: Transformer compartment interlocked against three-position switch-disconnector (auxiliary transformer panel)
- Option: Closing lockout for mechanical CLOSING of the circuit-breaker
- Option: Closing lockout for three-position disconnector DISCONNECTING function when the cable compartment cover / instrument transformer compartment cover is removed (circuit-breaker panel, air-insulated metering panel)
- Option: Electromagnetic interlocks (-Y1, -Y5, -Y8E, -Y16, -Y32)
- Option: Mechanical pushbuttons of the circuit-breaker can be padlocked
- Option: Locking device for “feeder”.

Modular design
- Panel replacement possible without SF_6 gas work
- Low-voltage compartment removable, plug-in bus wires.

Instrument transformers
- Current transformers not subjected to dielectric stress
- Easy replacement of current transformers designed as ring-core transformers
- Metal-coated, plug-in and disconnectable voltage transformers
- Block-type current transformers and block-type voltage transformers in the air-insulated metering panel, also possible as customer supply (block-type current transformers are dielectrically stressed).

Sensors
- Current sensor as inductive current transformer in combination with precision shunt (voltage signal)
- Voltage sensor as resistor divider
- In combination with secondary devices such as
  - SICAM FCM
  - 7SJ81.

Auxiliary transformer
- Three-phase and single-phase dry-type transformer
- Power 40 kVA or 10 kVA
- Connection symbol Dyn1, Dyn5 or Li0
- According to Ecodesign Directive
- No. 548/2014 of the EU.

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

Secondary systems
- Customary 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.

Standards (see page 44)

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 40 years. 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.

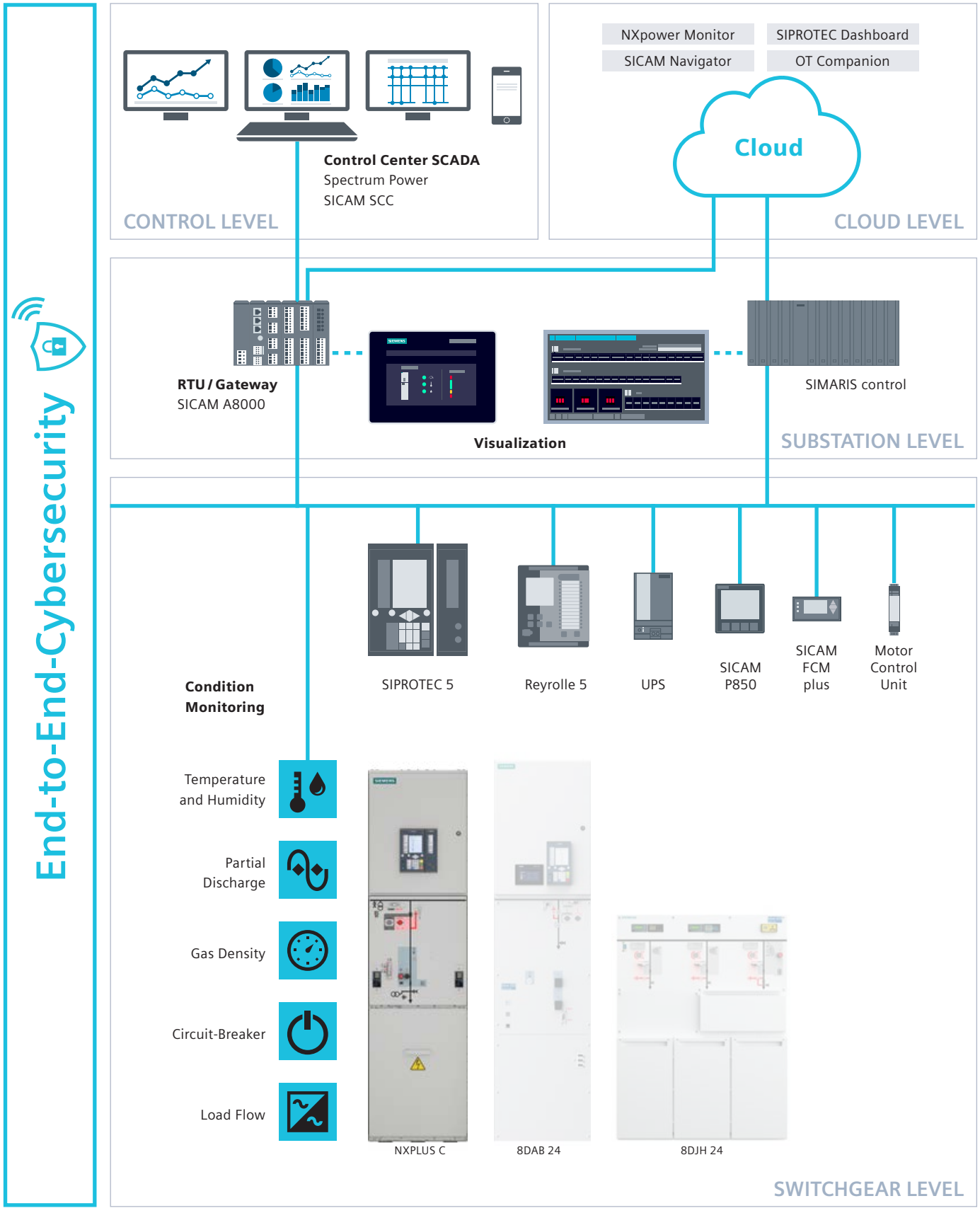
Digital gas density monitoring
For perfect operation of a gas-insulated switchgear, the correct gas density inside the switchgear vessel is crucial. To maintain the full scope of functions of the switchgear, immediate action is required if the gas density falls below the necessary values.

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
Load flow monitoring provides the basis for the relation between the electrical utilization and other defined and monitored status values. Knowing the actual utilization, for example, it is possible to determine how the temperature characteristic will develop with increasing electrical utilization, and if this leads to a possible recommended action.

Digitalization, condition monitoring

Digitalization solutions from a single source



Technical data

Electrical data, filling pressure, temperature for single-busbar switchgear

Common electrical data, filling pressure and temperature									
Rated insulation level	Rated voltage U_r	kV	**7.2**	**12**	**15**	**17.5**	**24**	**36**	**38**
	Rated short-duration power-frequency withstand voltage U_d								
	– phase-to-phase, phase-to-earth, open contact gap	kV	20 [1]	28 [2]	36	38	50	70	70
	– across the isolating distance	kV	23 [1]	32 [2]	40	45	60	80	77
	Rated lightning impulse withstand voltage U_p								
	– phase-to-phase, phase-to-earth, open contact gap	kV	60 [1]	75 [2]	95	95	125	170	150
	– across the isolating distance	kV	70 [1]	85 [2]	110	110	145	195	165
Rated frequency f_r		Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Rated continuous current [3] I_r	for the busbar	up to A	2500	2500	2500	2500	2500	2500	2500
Rated filling level (absolute) p_{re}	for gas-insulated switchgear vessels	kPa	150	150	150	150	150	150	150
Minimum functional level (absolute) p_{me}	for gas-insulated switchgear vessels	kPa	130	130	130	130	130	130	130
Gas leakage rate		%	< 0.1 per year →						
Ambient air temperature		°C	–5 to +55 [6] →						

Data of the switchgear panels									
Circuit-breaker panel 630 A, 800 A									
Rated continuous current I_r	at an ambient air temperature of 40 °C	A	630	630	630	630	630	630	630
		A	800	800	800	800	800	800	800
Rated short-time withstand current I_k	for switchgear with t_k = 1 s	kA	20|25	20|25	20|25	20|25	20|25	20|25	20|25
	for switchgear with t_k = 3 s	kA	20|25	20|25	20|25	20|25	20|25	20|25	20|25
Rated peak withstand current I_p	50 Hz	kA	50|63	50|63	50|63	50|63	50|63	50|63	50|63
	60 Hz	kA	52|65	52|65	52|65	52|65	52|65	52|65	52|65
Rated short-circuit making current I_{ma}	50 Hz	kA	50|63	50|63	50|63	50|63	50|63	50|63	50|63
	60 Hz	kA	52|65	52|65	52|65	52|65	52|65	52|65	52|65
Rated short-circuit breaking current I_{sc}		kA	20|25	20|25	20|25	20|25	20|25	20|25	20|25
Electrical endurance of vacuum circuit-breakers	at rated continuous current		10,000 operating cycles →						
	at rated short-circuit breaking current		50 breaking operations →						
Endurance classes according to IEC 62271-100			M2, E2, C2, S2 →						
Endurance classes according to IEC 62271-102	DISCONNECTING		M1	M1	M1	M1	M1	M1	M1
	EARTHING		M0, E0	M0, E0	M0, E0	M0, E0	M0, E0	M0, E0	M0, E0

The EARTHING function with endurance class E2 is reached by closing the circuit-breaker in combination with the earthing switch (endurance class E0).

Circuit-breaker panel [5] and bus sectionalizer 1000 A [5], 1250 A [5], 1600 A, 2000 A, 2500 A									
Rated continuous current [3] I_r	at an ambient air temperature of 40 °C	A	1000	1000	1000	1000	1000	1000	1000
		A	1250	1250	1250	1250	1250	1250	1250
		A	1600	1600	1600	1600	1600	–	–
		A	2000	2000	2000	2000	2000	–	–
		A	2500	2500	2500	2500	2500	–	–
Rated short-time withstand current I_k	for switchgear with t_k = 1 s	kA	20|25|31.5	20|25|31.5	20|25|31.5	20|25|31.5	20|25	20|25	20|25
	for switchgear with t_k = 3 s	kA	20|25|31.5	20|25|31.5	20|25|31.5	20|25|31.5	20|25	20|25	20|25
Rated peak withstand current I_p	50 Hz	kA	50|63|80	50|63|80	50|63|80	50|63|80	50|63	50|63	50|63
	60 Hz	kA	52|65|82	52|65|82	52|65|82	52|65|82	52|65	52|65	52|65
Rated short-circuit making current I_{ma}	50 Hz	kA	50|63|80	50|63|80	50|63|80	50|63|80	50|63	50|63	50|63
	60 Hz	kA	52|65|82	52|65|82	52|65|82	52|65|82	52|65	52|65	52|65
Rated short-circuit breaking current I_{sc}		kA	20|25|31.5	20|25|31.5	20|25|31.5	20|25|31.5	20|25	20|25	20|25
Electrical endurance of vacuum circuit-breakers	at rated continuous current		10,000 operating cycles →						
			30,000 [5] operating cycles →					–	–
	at rated short-circuit breaking current		50 breaking operations →						
Endurance classes according to IEC 62271-100			M2, E2, C2, S2 →						
Endurance classes according to IEC 62271-102	DISCONNECTING		M1	M1	M1	M1	M1	M1	M1
	EARTHING		M0, E0	M0, E0	M0, E0	M0, E0	M0, E0	M0, E0	M0, E0

The EARTHING function with endurance class E2 is reached by closing the circuit-breaker in combination with the earthing switch (endurance class E0).

For footnotes, see page 12

Data of the switchgear panels (continued)

Disconnector panel 630 A, 800 A, 1000 A, 1250 A, 1600 A, 2000 A, 2500 A									
Rated voltage *Ur*		kV	**7.2**	**12**	**15**	**17.5**	**24**	**36**	**38**
Rated continuous current [3] I_r	at an ambient air temperature of 40 °C	A	630	630	630	630	630	630	630
		A	800	800	800	800	800	800	800
		A	1000	1000	1000	1000	1000	1000	1000
		A	1250	1250	1250	1250	1250	1250	1250
		A	1600	1600	1600	1600	1600	–	–
		A	2000	2000	2000	2000	2000	–	–
		A	2500	2500	2500	2500	2500	–	–
Rated short-time withstand current I_k	for switchgear with t_k = 1 s	kA	20|25|31.5	20|25|31.5	20|25|31.5	20|25|31.5	20|25	20|25	20|25
	for switchgear with t_k = 3 s	kA	20|25|31.5	20|25|31.5	20|25|31.5	20|25|31.5	20|25	20|25	20|25
Rated peak withstand current I_p	50 Hz	kA	50|63|80	50|63|80	50|63|80	50|63|80	50|63	50|63	50|63
	60 Hz	kA	52|65|82	52|65|82	52|65|82	52|65|82	52|65	52|65	52|65
Endurance classes according to IEC 62271-102	DISCONNECTING		M1	M1	M1	M1	M1	M1	M1
	EARTHING		M0, E0	M0, E0	M0, E0	M0, E0	M0, E0	M0, E0	M0, E0
Three-position switch-disconnector/fuse combination Auxiliary transformer panel (with HV HRC fuses)									
Rated continuous current [3] [4] I_{load}	at an ambient air temperature of 40 °C	A	200	200	200	200	200	–	–
Rated short-time withstand current I_k	for switchgear with t_k = 1 s	kA	20|25|31.5	20|25|31.5	20|25|31.5	20|25|31.5	20|25	–	–
	for switchgear with t_k = 3 s	kA	20|25|31.5	20|25|31.5	20|25|31.5	20|25|31.5	20|25	–	–
Rated peak withstand current [4] I_p	50 Hz	kA	50|63|80	50|63|80	50|63|80	50|63|80	50|63	–	–
	60 Hz	kA	52|65|82	52|65|82	52|65|82	52|65|82	52|65	–	–
Rated short-circuit making current [4] I_{ma}	50 Hz	kA	50|63|80	50|63|80	50|63|80	50|63|80	50|63	–	–
	60 Hz	kA	52|65|82	52|65|82	52|65|82	52|65|82	52|65	–	–
Rated transfer current $TDI_{transfer}$		A	1500	1500	1300	1300	1300	–	–
Rated take-over current TDI_{to}		A	1500	1500	1300	1300	1300	–	–
Dimension "e" of HV HRC fuse-links		mm	292	292	442	442	442	–	–
		mm	442	442					
Endurance class according to IEC 62271-103			M1	M1	M1	M1	M1	–	–
Metering panel, gas-insulated (with HV HRC fuses)									
Rated continuous current [3] I_r	at an ambient air temperature of 40 °C	A	–	–	–	–	–	–	–
Rated short-time withstand current I_k	for switchgear with t_k = 1 s	kA	20|25|31.5	20|25|31.5	20|25|31.5	20|25|31.5	20|25	–	–
	for switchgear with t_k = 3 s	kA	20|25|31.5	20|25|31.5	20|25|31.5	20|25|31.5	20|25	–	–
Rated peak withstand current I_p	50 Hz	kA	50|63|80	50|63|80	50|63|80	50|63|80	50|63	–	–
	60 Hz	kA	52|65|82	52|65|82	52|65|82	52|65|82	52|65	–	–
Dimension "e" of HV HRC fuse-links		mm	292	292	442	442	442	–	–
		mm	442	442					
Endurance class according to IEC 62271-102	DISCONNECTING		M0	M0	M0	M0	M0	–	–
	EARTHING		M0, E2	M0, E2	M0, E2	M0, E2	M0, E2	–	–
Metering panel, air-insulated									
Rated continuous current [3] I_r	at an ambient air temperature of 40 °C	A	1250 [8]	1250 [8]	1250 [8]	1250 [8]	1250 [8]	–	–
Rated short-time withstand current I_k	for switchgear with t_k = 1 s	kA	20|25	20|25	20|25	20|25	20|25	–	–
	for switchgear with t_k = 3 s	kA	20|25	20|25	20|25	20|25	20|25	–	–
Rated peak withstand current I_p	50 Hz	kA	50|63	50|63	50|63	50|63	50|63	–	–
	60 Hz	kA	52|65	52|65	52|65	52|65	52|65	–	–
Endurance classes according to IEC 62271-102	DISCONNECTING		M1	M1	M1	M1	M1	–	–
	EARTHING		M0, E0	M0, E0	M0, E0	M0, E0	M0, E0	–	–

For footnotes, see page 12

Technical data

Electrical data, filling pressure, temperature for single-busbar switchgear

Data of the switchgear panels (continued)									
Ring-main panel									
Rated voltage *Ur*		kV	**7.2**	**12**	**15**	**17.5**	**24**	**36**	**38**
Rated continuous current [3] I_{load}	at an ambient air temperature of 40 °C	A	630	630	630	630	630	–	–
Rated short-time withstand current I_k	for switchgear with t_k = 1 s	kA	20|25	20|25	20|25	20|25	20|–	–	–
	for switchgear with t_k = 3 s	kA	20|–	20|–	20|–	20|–	20|–	–	–
Rated peak withstand current I_p	50 Hz	kA	50|63	50|63	50|63	50|63	50|–	–	–
	60 Hz	kA	52|65	52|65	52|65	52|65	52|–	–	–
Rated short-circuit making current I_{ma}	50 Hz	kA	50|63	50|63	50|63	50|63	50|–	–	–
	60 Hz	kA	52|65	52|65	52|65	52|65	52|–	–	–
Endurance class according to IEC 62271-103			M1, E3	M1, E3	M1, E3	M1, E3	M1, E3	–	–
Vacuum contactor panel with HV HRC fuses									
Rated continuous current [3] [4] I_r	at an ambient air temperature of 40 °C	A	450	450	450	450	450	–	–
Rated short-time withstand current I_k	for switchgear with t_k = 1 s	kA	20|25|31.5	20|25|31.5	20|25|31.5	20|25|31.5	20|25	–	–
	for switchgear with t_k = 3 s	kA	20|25|31.5	20|25|31.5	20|25|31.5	20|25|31.5	20|25	–	–
Rated peak withstand current [4] I_p	50 Hz	kA	50|63|80	50|63|80	50|63|80	50|63|80	50|63	–	–
	60 Hz	kA	52|65|82	52|65|82	52|65|82	52|65|82	52|65	–	–
Rated short-circuit making current [4] I_{ma}	50 Hz	kA	50|63|80	50|63|80	50|63|80	50|63|80	50|63	–	–
	60 Hz	kA	52|65|82	52|65|82	52|65|82	52|65|82	52|65	–	–
Dimension "e" of HV HRC fuse-links		mm mm	292 442	292 442	442	442	442	–	–
Electrical endurance of the vacuum contactor panel with HV HRC fuses			100,000 or 500,000 operating cycles →					–	–
Endurance class according to IEC 62271-102	DISCONNECTING		M0	M0	M0	M0	M0	–	–
	EARTHING		M0, E2	M0, E2	M0, E2	M0, E2	M0, E2	–	–

Footnotes for pages 10 bis 13

1) Higher values of the rated short-duration power-frequency withstand voltage available with:
   – 32 kV for phase-to-phase, phase-to-earth and open contact gap, as well as
   – 37 kV across the isolating distance
   Higher values of the rated lightning impulse withstand voltage:
   – 60 kV for phase-to-phase, phase-to-earth and open contact gap, as well as
   – 70 kV across the isolating distance
2) Higher values of the rated short-duration power-frequency withstand voltage available with:
   – 42 kV for phase-to-phase, phase-to-earth and open contact gap, as well as
   – 48 kV across the isolating distance
   Higher values of the rated lightning impulse withstand voltage:
   – 95 kV for phase-to-phase, phase-to-earth and open contact gap, as well as
   – 110 kV across the isolating distance
3) The rated continuous currents apply to ambient air temperatures of max. 40 °C.
   The 24-hour mean value is max. 35 °C (according to IEC 62271-1)
   2500 A with natural ventilation
4) Depending on the HV HRC fuse-link, observe max. permissible let-through current I_D of the HV HRC fuse-links
5) For circuit-breaker panel 1000 A and 1250 A up to 17.5 kV, up to 31.5 kA, and 24 kV up to 25 kA, the following operating cycles are optionally available:
   – 5000 operating cycles for DISCONNECTING function
   – 5000 operating cycles for READY-TO-EARTH function
   – 30,000 operating cycles for circuit-breaker
   – 10,000 operating cycles for DISCONNECTING function
   – 10,000 operating cycles for READY-TO-EARTH function
   – 30,000 operating cycles for circuit-breaker
6) Optional ambient air temperature –25 °C to +55 °C (secondary devices (e.g. protection devices, meters, measuring transducers, etc.) must be suitable for the given ambient air temperature)
7) Without mechanical closing latch: 500,000
   With mechanical closing latch: 100,000
   Max. 60 operating cycles per hour
8) 1095 A for version with three-position disconnector

Technical data

Electrical data, filling pressure, temperature for double-busbar switchgear

Common electrical data, filling pressure and temperature							
Rated insulation level	Rated voltage U_r	kV	7.2	12	15	17.5	24
	Rated short-duration power-frequency withstand voltage U_d						
	– phase-to-phase, phase-to-earth, open contact gap	kV	20 [1]	28 [2]	36	38	50
	– across the isolating distance	kV	23 [1]	32 [2]	40	45	60
	Rated lightning impulse withstand voltage U_p						
	– phase-to-phase, phase-to-earth, open contact gap	kV	60 [1]	75 [2]	95	95	125
	– across the isolating distance	kV	70 [1]	85 [2]	110	110	145
Rated frequency f_r		Hz	50/60	50/60	50/60	50/60	50/60
Rated continuous current [3] I_r	for the busbar	up to A	2500	2500	2500	2500	2500
Rated filling level p_{re}	for gas-insulated switchgear vessels	kPa	150	150	150	150	150
Minimum functional level p_{me}	for gas-insulated switchgear vessels	kPa	130	130	130	130	130
Gas leakage rate		%	< 0.1 per year →				
Ambient air temperature		°C	–5 to +55 [6] →				

Data of the switchgear panels							
Circuit-breaker panel 1000 A							
Rated continuous current [3] I_r	at an ambient air temperature of 40 °C	A	1000	1000	1000	1000	1000
Rated short-time withstand current I_k	for switchgear with t_k = 1 s	kA	20 | 25	20 | 25	20 | 25	20 | 25	20 | 25
	for switchgear with t_k = 3 s	kA	20 | 25	20 | 25	20 | 25	20 | 25	20 | 25
Rated peak withstand current I_p	50 Hz	kA	50 | 63	50 | 63	50 | 63	50 | 63	50 | 63
	60 Hz	kA	52 | 65	52 | 65	52 | 65	52 | 65	52 | 65
Rated short-circuit making current I_{ma}	50 Hz	kA	50 | 63	50 | 63	50 | 63	50 | 63	50 | 63
	60 Hz	kA	52 | 65	52 | 65	52 | 65	52 | 65	52 | 65
Rated short-circuit breaking current I_{sc}		kA	20 | 25	20 | 25	20 | 25	20 | 25	20 | 25
Electrical endurance of vacuum circuit-breakers	at rated continuous current		10,000 operating cycles →				
	at rated short-circuit breaking current		50 breaking operations →				
Endurance classes according to IEC 62271-100			M2, E2, C2, S2	M2, E2, C2, S2	M2, E2, C2, S2	M2, E2, C2, S2	M2, E2, C2, S2
Endurance classes according to IEC 62271-102	DISCONNECTING		M1	M1	M1	M1	M1
	EARTHING		M0, E0	M0, E0	M0, E0	M0, E0	M0, E0

The EARTHING function with endurance class E2 is reached by closing the circuit-breaker in combination with the earthing switch (endurance class E0).

Incoming sectionalizer and bus coupler 1000 A, 1250 A							
Rated continuous current [3] I_r	at an ambient air temperature of 40 °C	A A	1000 1250	1000 1250	1000 1250	1000 1250	1000 1250
Rated short-time withstand current I_k	for switchgear with t_k = 1 s	kA	20 | 25	20 | 25	20 | 25	20 | 25	20 | 25
	for switchgear with t_k = 3 s	kA	20 | 25	20 | 25	20 | 25	20 | 25	20 | 25
Rated peak withstand current I_p	50 Hz	kA	50 | 63	50 | 63	50 | 63	50 | 63	50 | 63
	60 Hz	kA	52 | 65	52 | 65	52 | 65	52 | 65	52 | 65
Rated short-circuit making current I_{ma}	50 Hz	kA	50 | 63	50 | 63	50 | 63	50 | 63	50 | 63
	60 Hz	kA	52 | 65	52 | 65	52 | 65	52 | 65	52 | 65
Rated short-circuit breaking current I_{sc}		kA	20 | 25	20 | 25	20 | 25	20 | 25	20 | 25
Electrical endurance of vacuum circuit-breakers	at rated continuous current		10,000 operating cycles →				
	at rated short-circuit breaking current		50 breaking operations →				
Endurance classes according to IEC 62271-100			M2, E2, C2, S2	M2, E2, C2, S2	M2, E2, C2, S2	M2, E2, C2, S2	M2, E2, C2, S2
Endurance classes according to IEC 62271-102	DISCONNECTING		M1	M1	M1	M1	M1
	EARTHING		M0, E0	M0, E0	M0, E0	M0, E0	M0, E0

The EARTHING function with endurance class E2 is reached by closing the circuit-breaker in combination with the earthing switch (endurance class E0).

For footnotes, see page 12

Technical data

Room planning

Switchgear installation

- For single-busbar applications:
  - Wall-standing arrangement or
  - Free-standing arrangement
  - Face-to-face arrangement accordingly
- For double-busbar applications:
  - Back-to-back arrangement (free-standing arrangement).

Room dimensions

See dimension drawings below.

Room height

- ≥ 2750 mm
  NXPLUS C, all technical data, all types of arrangement, with / without horizontal pressure relief duct
- ≥ 2400 mm
  NXPLUS C, wall-standing and free-standing arrangement with rear / central pressure relief duct, low-voltage compartment 761 mm, without horizontal pressure relief duct.

Door dimensions

Recommended as a minimum for the door dimensions:
Door height: ≥ 2500 mm
Door width: ≥ 900 mm (for panel widths of 600 mm)
≥ 1200 mm (for panel widths of 900 mm).

Switchgear fixing

- For floor openings and fixing points of the switchgear, see pages 18 bis 30
- Foundations:
  - Steel girder construction
  - Steel-reinforced concrete with foundation rails, welded or bolted on.

Panel dimensions

See pages 18 bis 30.

Weights

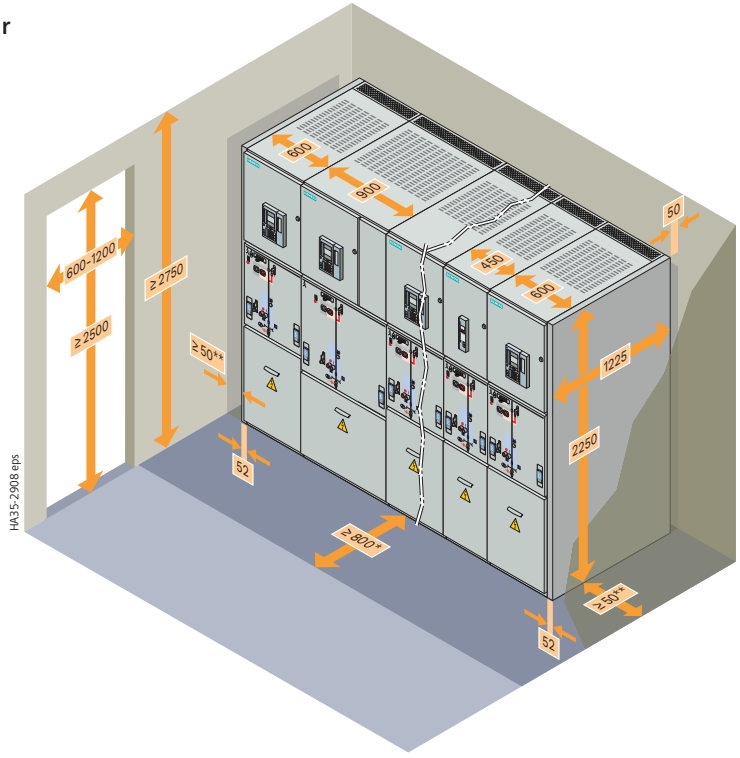
Single-busbar panels
- Panels for ≤ 1250 A: Approx. 800 kg
- Panels for > 1250 A: Approx. 1400 kg.

Double-busbar panels
- Panels for ≤ 1250 A: Approx. 1600 kg.

Switchgear installation

Wall-standing arrangement for single-busbar switchgear

All panels with cable connection at the front and pressure relief duct at the rear



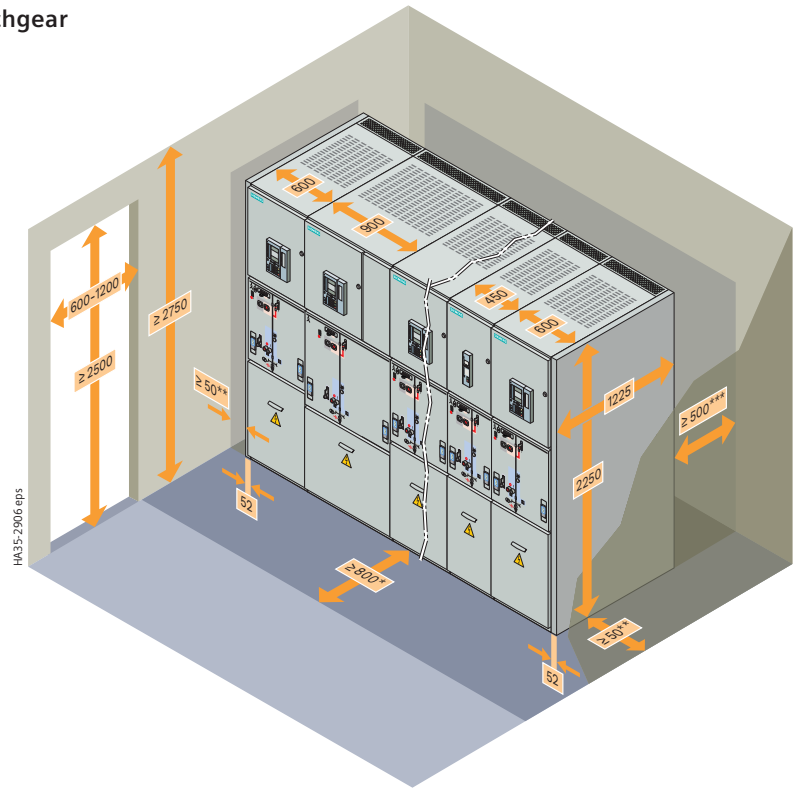
* Control aisle depending on national specifications;
for extension / panel replacement:
≥ 1400 mm recommended (450 mm, 600 mm panels)
≥ 1600 mm recommended (900 mm panels)

** Lateral wall distances on the left or on the right;
for installation and maintenance (according to IEC 61936-1):
≥ 500 mm recommendable
≥ 500 mm required for auxiliary transformer panels with lateral cable connection as end panels

Switchgear installation

Free-standing arrangement for single-busbar switchgear

All panels with cable connection at the front and pressure relief duct at the rear



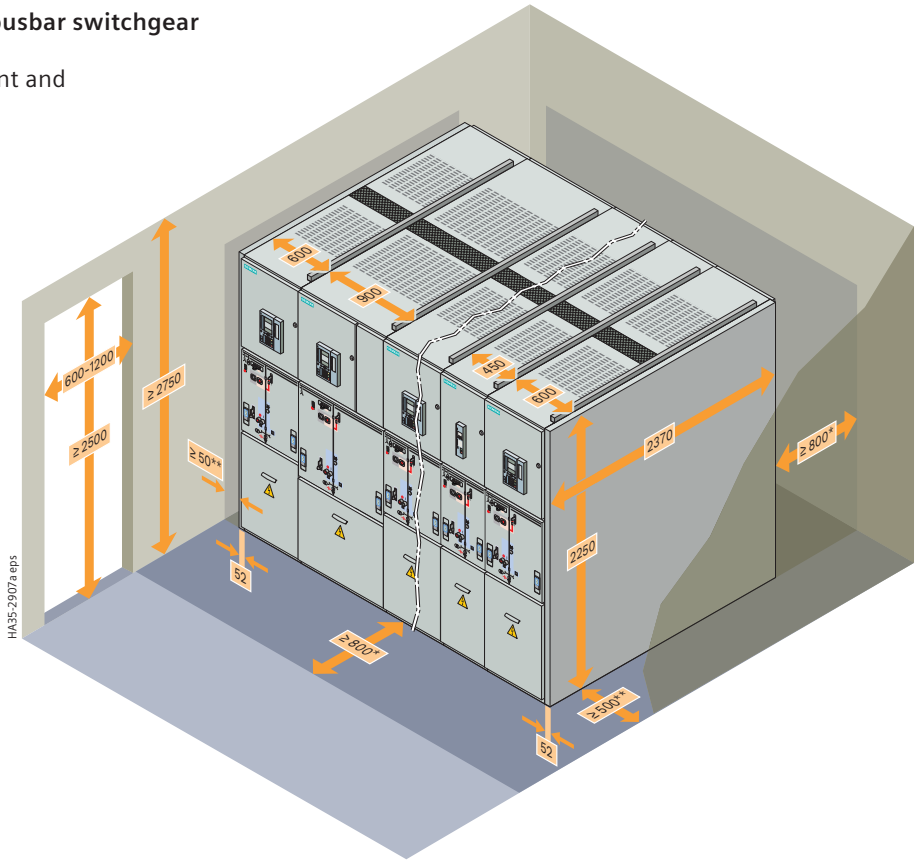
* Control aisle depending on national specifications;
for extension/panel replacement:
≥ 1400 mm recommended (450 mm, 600 mm panels)
≥ 1600 mm recommended (900 mm panels)

** Lateral wall distances on the left or on the right;
for installation and maintenance (according to IEC 61936-1):
≥ 500 mm recommendable
≥ 500 mm required for auxiliary transformer panels with lateral cable connection as end panels

*** ≥ 500 mm aisle for installation and maintenance (according to IEC 61936-1)
≥ 800 mm aisle for operation (according to IEC 62271-200)

Free-standing arrangement for double-busbar switchgear

All panels with cable connection at the front and central pressure relief duct



* Control aisle depending on national specifications;
for extension/panel replacement:
≥ 1400 mm recommended (450 mm, 600 mm panels)
≥ 1600 mm recommended (900 mm panels)

** Lateral wall distance ≥ 50 mm optionally possible on the left or on the right:
≥ 500 mm for installation and maintenance (according to IEC 61936-1)
≥ 800 mm for operation (according to IEC 62271-200)
≥ 800 mm for panel replacement (450 mm, 600 mm panels)
≥ 1100 mm for panel replacement (900 mm panels)

Technical data

Shipping data

Transport

NXPLUS C switchgear is delivered in form of individual panels. Please observe the following:

- Transport facilities on site
- Transport dimensions and transport weights
- Size of door openings in building.

In case of double-busbar panels the A and B sides are supplied separately.

Packing

Means of transport: Rail and truck

– Panels on pallets
– Open packing with PE protective foil.

Means of transport: Ship and airplane

– Panels on pallets
– In closed crates (cardboard) with sealed upper and lower PE protective foil
– With desiccant bags
– With sealed wooden base
– Max. storage time: 6 months.

Dimensions, weights

Transport	Panel spacing	Transport dimensions			Transport weight	
	mm	Width mm	Height mm	Depth mm	With packing kg	Without packing kg
Single busbar						
Truck or rail	1 × 450	1100	2460	1450	800	700
	1 × 600	1100	2460	1450	900	800
	1 × 900	1100	2460	1450	1500	1400
	1 × 450 (cable connection from rear)	1100	2460	2100	800	700
	1 × 600 (cable connection from rear)	1100	2460	2100	900	800
	1 × 900 (cable connection from rear)	1100	2460	2100	1500	1400
	Auxiliary power transformer	800	1200	1200	575	500
Ship or airplane	1 × 450	1130	2550	1450	800	700
	1 × 600	1130	2550	1450	900	800
	1 × 900	1130	2550	1450	1500	1400
	1 × 450 (cable connection from rear)	1130	2550	2100	800	700
	1 × 600 (cable connection from rear)	1130	2550	2100	900	800
	1 × 900 (cable connection from rear)	1130	2550	2100	1500	1400
	Auxiliary power transformer	800	1200	1200	575	500
Double busbar						
Truck or rail	1 × 450	1100	2460	1450	800	700
	1 × 600	1100	2460	1450	900	800
	1 × 900	1100	2460	1450	1500	1400
	Auxiliary power transformer	800	1200	1200	500	425
Ship or airplane	1 × 450	1130	2550	1450	800	700
	1 × 600	1130	2550	1450	900	800
	1 × 900	1130	2550	1450	1500	1400
	Auxiliary power transformer	800	1200	1200	575	500

Classification of NXPLUS C switchgear according to IEC 62271-200

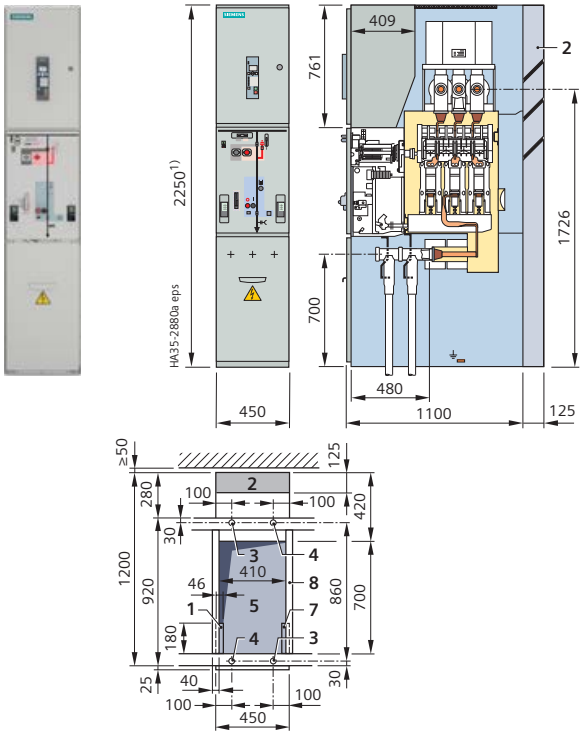
Design and construction			
Partition class		PM (metal partition) [1]	
Loss of service continuity category			
Single-busbar panels with connection compartment	Circuit-breaker panel	LSC 2	
	Disconnector panel		
	Switch-disconnector panel with HV HRC fuses		
	Ring-main panel		
	Vacuum contactor panel with HV HRC fuses		
Double-busbar panels with connection compartment	Circuit-breaker panel	LSC 2A	
	Incoming sectionalizer		
Panels without connection compartment	Bus sectionalizer, single-panel	No LSC assigned, as no connection compartment available [5]. Note: The single-panel bus sectionalizer (incl. both busbar sections) can remain in operation if the lower compartment is opened.	
	Bus sectionalizer, two-panel	No LSC assigned, as no connection compartment available [5]. Note: If the longitudinal panel interconnection is earthed, both busbar sections can remain in operation if the compartment of the longitudinal panel interconnection is opened.	
	Bus coupler	No LSC assigned, as connection compartment available [5]. Note: The bus coupler can remain in operation if the lower compartment is opened.	
	Auxiliary transformer panel	No LSC assigned, as connection compartment available [5]. Note: The busbar of the switchgear can remain in operation if the transformer compartment is opened.	
	Auxiliary transformer panel with lateral cable connection	No LSC assigned, as this panel does not contain a busbar [5]. Note: The busbar of the adjacent panels (switchgear) can remain in operation if the lateral cable compartment is opened.	
	Metering panel	No LSC assigned, as no connection compartment available [5]. Note: The busbar of the switchgear can remain in operation if the voltage transformer compartment is opened.	
	Air-insulated metering panel without three-position disconnector	No LSC assigned, as no connection compartment available [5]. Note: The busbar (both busbar sections) of the switchgear must be earthed if the voltage transformer compartment is opened.	
	Air-insulated metering panel with three-position disconnector	No LSC assigned, as no connection compartment available [5]. Note: If the block-type instrument transformer set is earthed, both busbar sections can remain in operation if the voltage transformer compartment is opened.	
	Dummy panel	No LSC assigned, as no connection compartment available [5].	
Accessibility to compartments (enclosure)			
Busbar compartment		Tool-based	
Switching-device compartment		Non-accessible	
Instrument transformer compartment / transformer compartment		Tool-based	
Fuse compartment		Interlock-controlled and tool-based	
Low-voltage compartment		Tool-based	
Cable compartment		Tool-based	
Internal arc classification			
Designation of the internal arc classification IAC		**7.2 kV, 12 kV, 15 kV, 17.5 kV**	**24 kV, 36 kV, 38 kV**
IAC class	for wall-standing arrangement	IAC A FL 31.5 kA, 1 s [2) 3)]	IAC A FL 25 kA, 1 s [2) 3)]
	for free-standing arrangement	IAC A FLR 31.5 kA, 1 s [2) 3)]	IAC A FLR 25 kA, 1 s [2) 3)]
Accessibility type 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)	
Arc test current I_a		31.5 kA	25 kA
Test duration		1 s	1 s
Test arrangement		According to IEC 62271-200 Annex A: Minimum wall distance 800 mm (for accessible sides)	

1) Corresponds to “metal-clad” according to former standard IEC 60298
2) Switch-disconnector panel with HV HRC fuses: connection compartment fuse-protected; vacuum contactor panel with HV HRC fuses: connection compartment fuse-protected; metering panel: voltage transformer compartment fuse-protected; auxiliary transformer panel: transformer compartment fuse-protected
3) Valid for normal operating conditions, not for normal use. [4)]
4) Normal operating conditions: At least one part of the panel is live, and all doors and covers are closed and locked.
Normal use: Use of the switchgear as described in the operating instructions.
5) According to standard IEC 62271-200

Panel dimensions

Circuit-breaker panel, single busbar

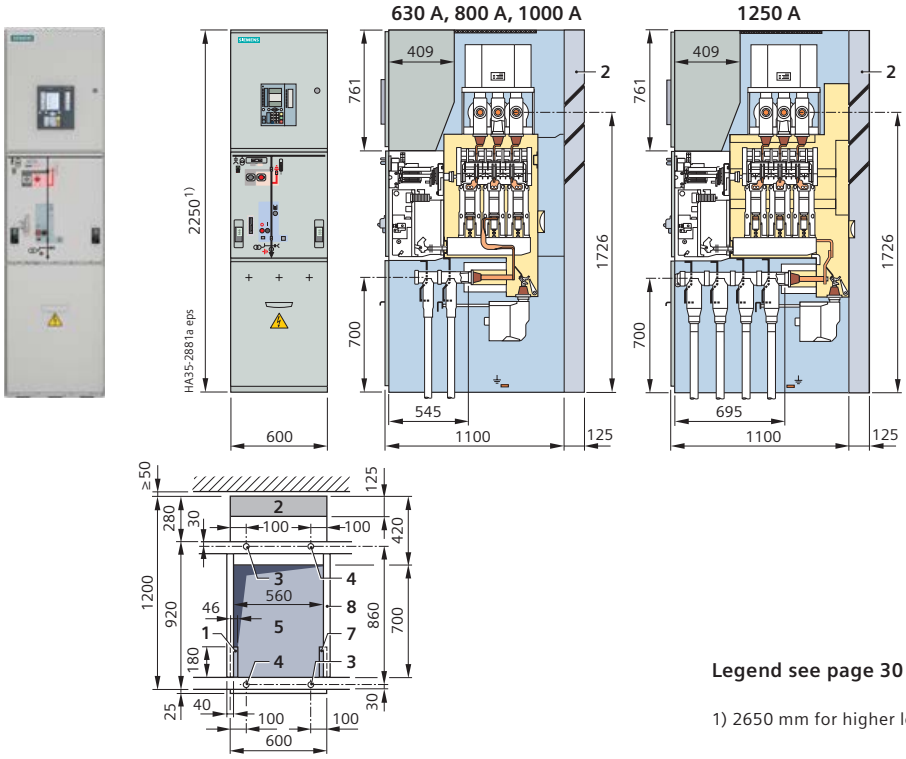
24 kV — Circuit-breaker panel 630 A, 800 A — 450 mm



Legend see page 30

1) 2650 mm for higher low-voltage compartment

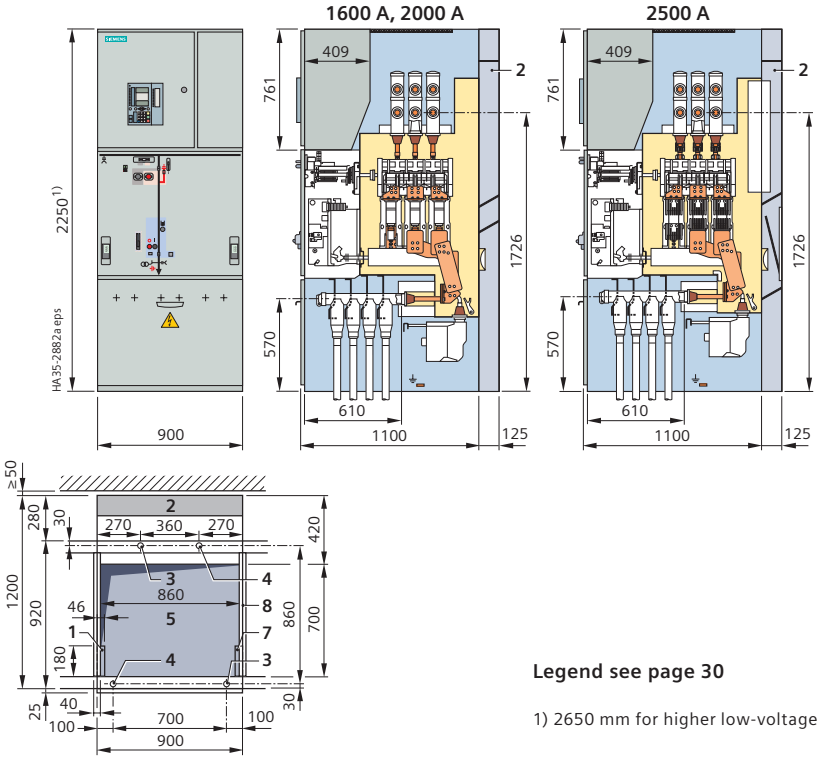
24 kV — Circuit-breaker panel 630 A, 800 A, 1000 A, 1250 A — 600 mm



Legend see page 30

1) 2650 mm for higher low-voltage compartment

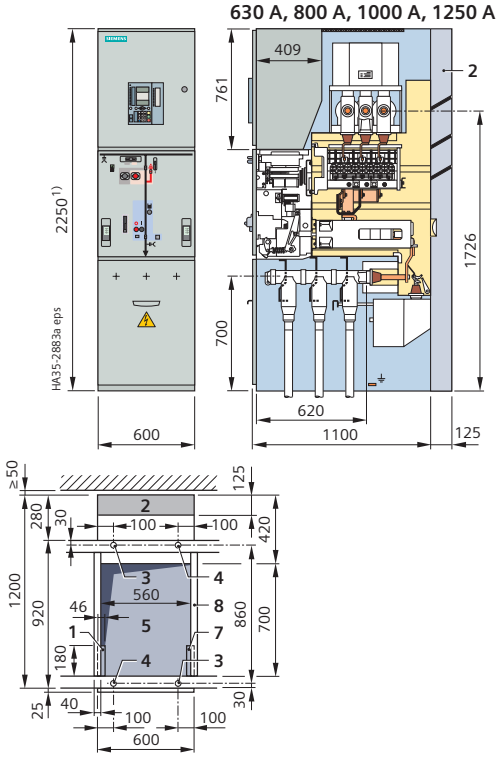
24 kV — Circuit-breaker panel 1600 A, 2000 A, 2500 A — 900 mm



Legend see page 30

1) 2650 mm for higher low-voltage compartment

36 kV — Circuit-breaker panel 630 A, 800 A, 1000 A, 1250 A — 600 mm



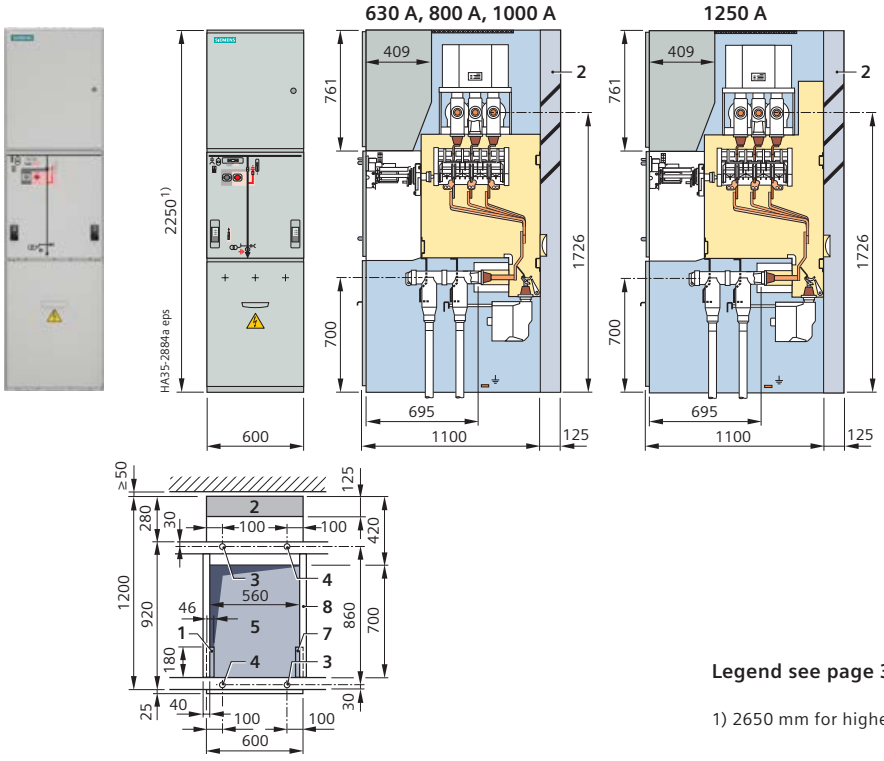
Legend see page 30

1) 2650 mm for higher low-voltage compartment

Panel dimensions

Disconnector panel, single busbar

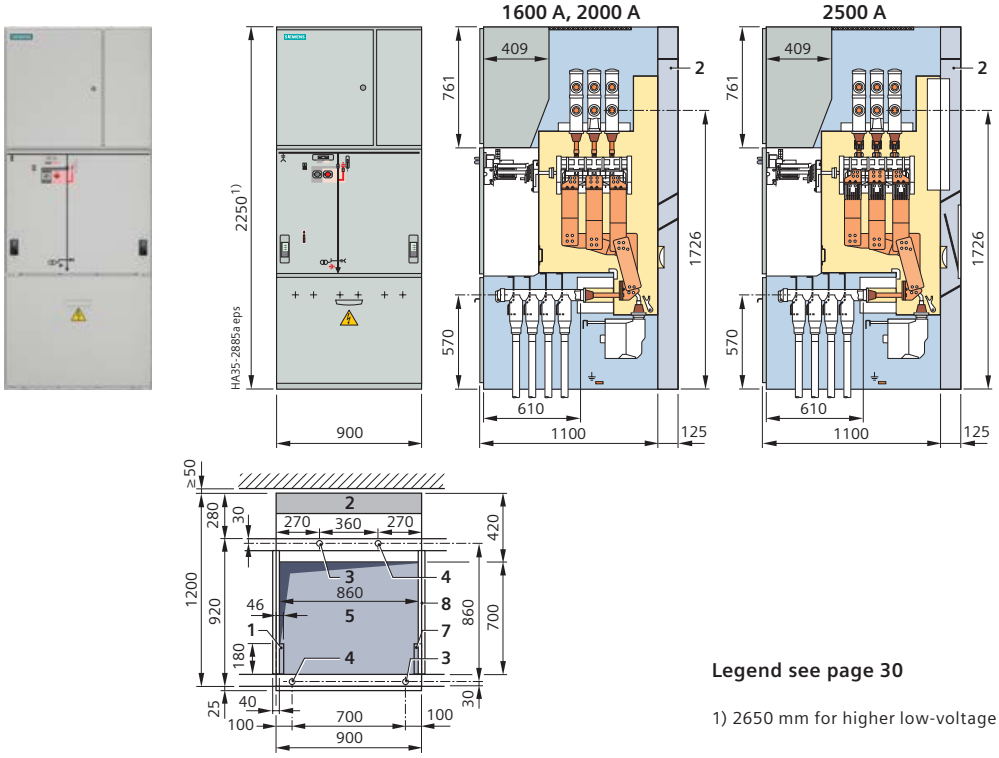
24 kV — Disconnector panel 630 A, 800 A, 1000 A, 1250 A — 600 mm



Legend see page 30

1) 2650 mm for higher low-voltage compartment

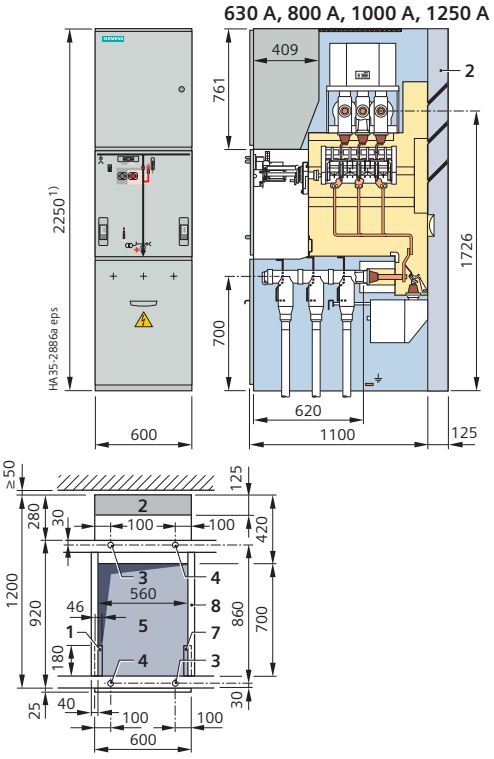
24 kV — Disconnector panel 1600 A, 2000 A, 2500 A — 900 mm



Legend see page 30

1) 2650 mm for higher low-voltage compartment

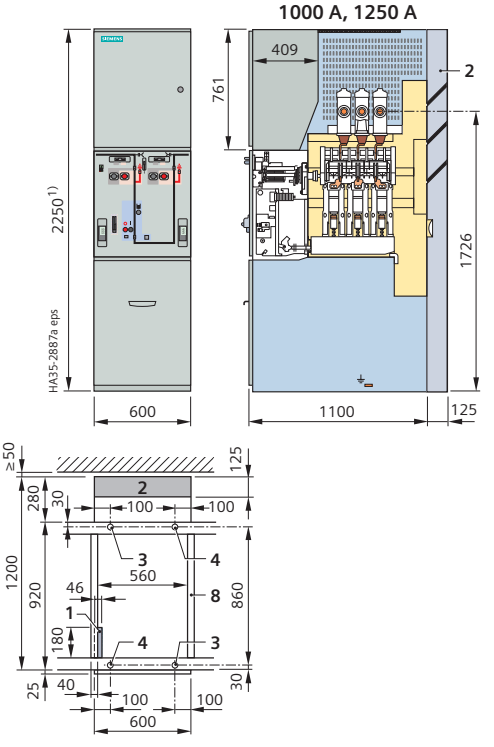
36 kV Disconnector panel 630 A, 800 A, 1000 A, 1250 A — 600 mm



Legend see page 30

1) 2650 mm for higher low-voltage compartment

24 kV Bus sectionalizer 1000 A, 1250 A — 600 mm



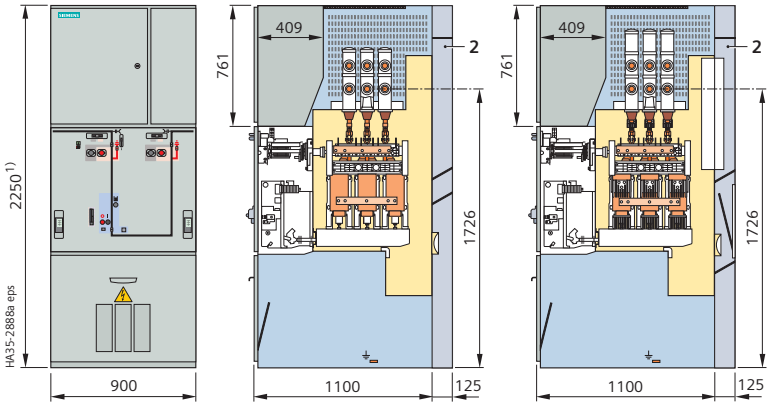
Legend see page 30

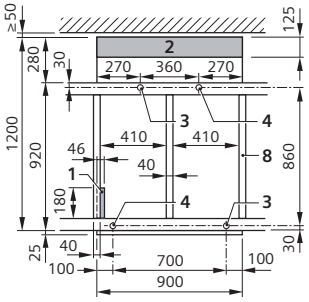
1) 2650 mm for higher low-voltage compartment

Panel dimensions

Bus sectionalizer, single busbar

24 kV — Bus sectionalizer 1600 A, 2000 A, 2500 A — 900 mm

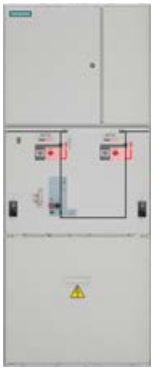


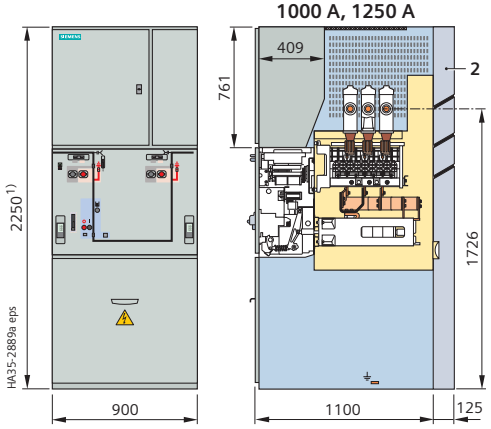


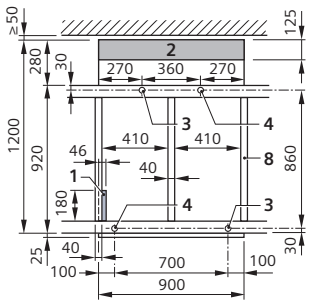
Legend see page 30

1) 2650 mm for higher low-voltage compartment

36 kV — Bus sectionalizer 1000 A, 1250 A — 900 mm



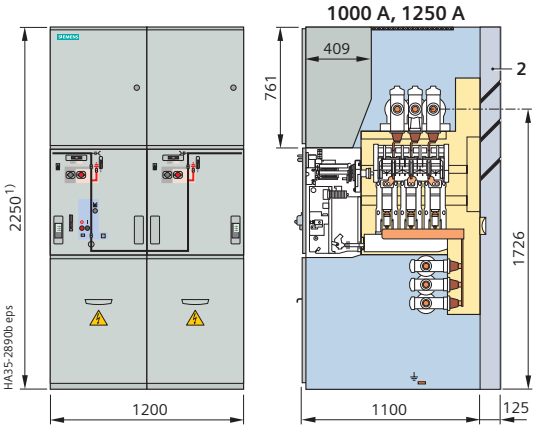


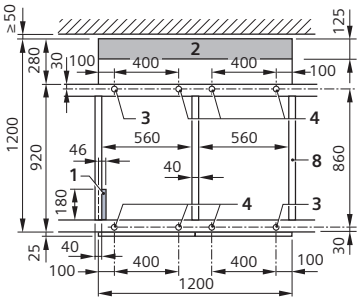


Legend see page 30

1) 2650 mm for higher low-voltage compartment

24 kV Bus sectionalizer 1000 A, 1250 A — 2 × 600 mm

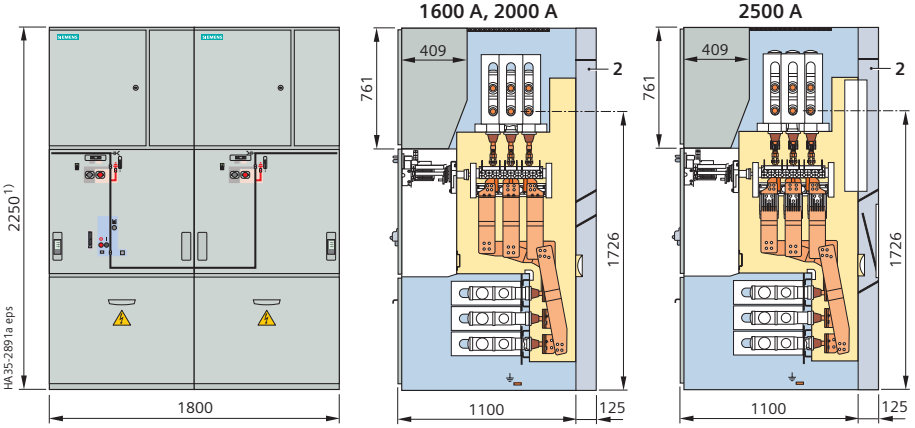


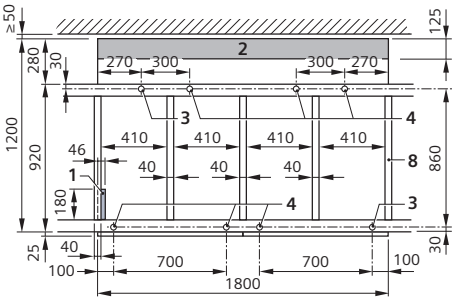


Legend see page 30

1) 2650 mm for higher low-voltage compartment

24 kV Bus sectionalizer 1600 A, 2000 A, 2500 A — 2 × 900 mm





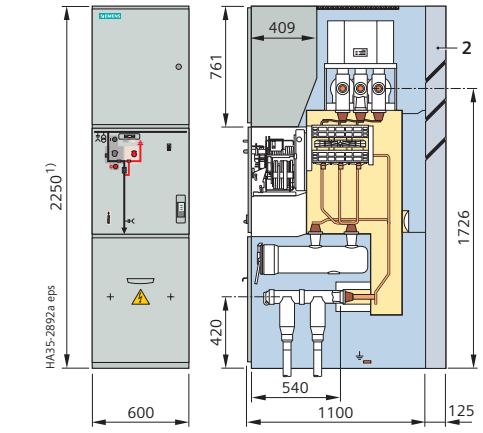
Legend see page 30

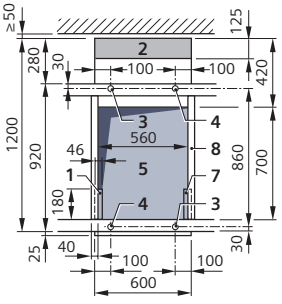
1) 2650 mm for higher low-voltage compartment

Panel dimensions

Switch-disconnector panel, auxiliary transformer panel, single busbar

24 kV Switch-disconnector panel with HV HRC fuses 200 A — 600 mm

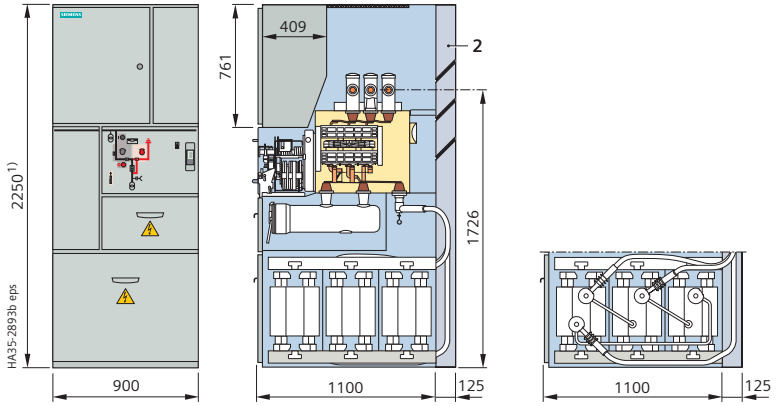


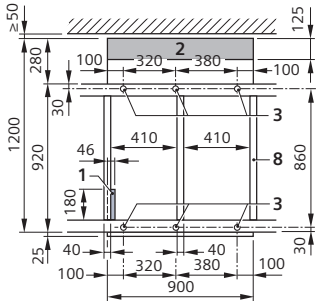


Legend see page 30

1) 2650 mm for higher low-voltage compartment

24 kV Auxiliary transformer panel — 900 mm





Legend see page 30

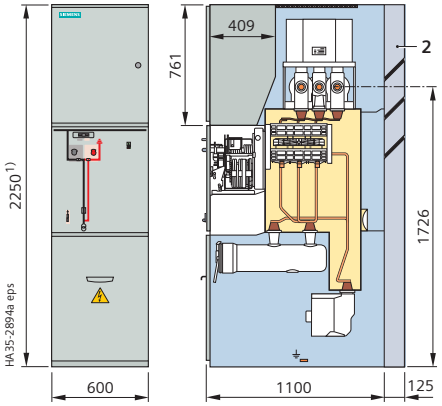
1) 2650 mm for higher low-voltage compartment

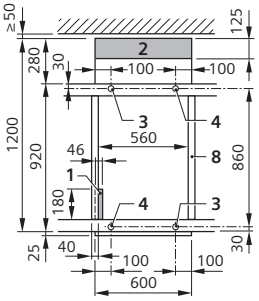
24 kV Auxiliary transformer panel with lateral cable connection 900 mm

Legend see page 30

1) 2650 mm for higher low-voltage compartment

24 kV Metering panel 600 mm





Legend see page 30

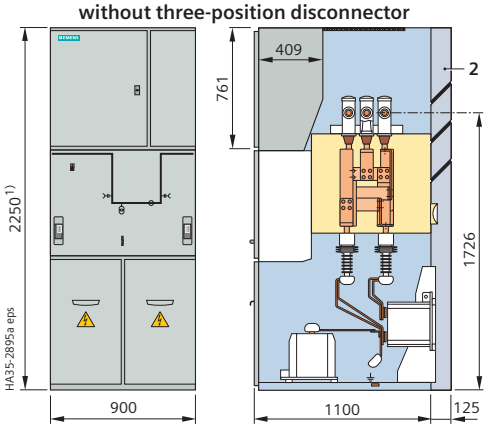
1) 2650 mm for higher low-voltage compartment

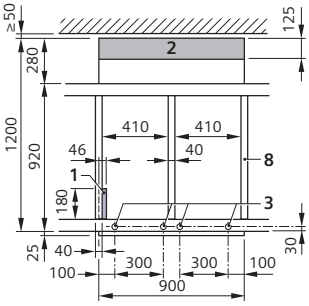
Panel dimensions

Metering panel, ring-main panel, single busbar

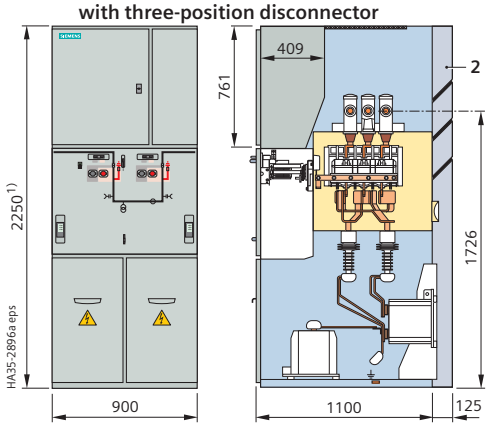
24 kV — Air-insulated metering panel without / with three-position disconnector — 900 mm

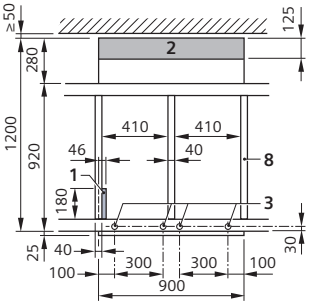
without three-position disconnector





with three-position disconnector

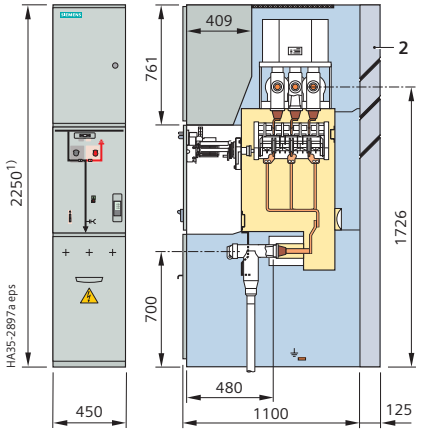


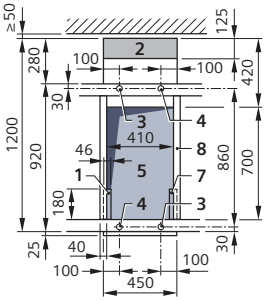


Legend see page 30

1) 2650 mm for higher low-voltage compartment

24 kV — Ring-main panel 630 A — 450 mm



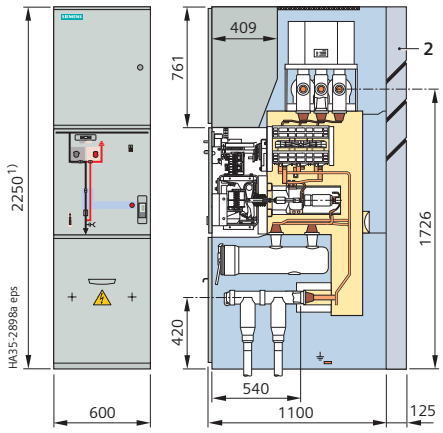


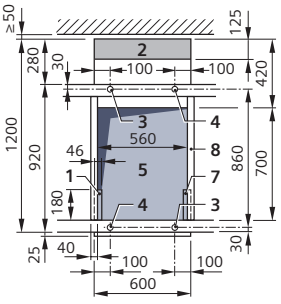
Legend see page 30

1) 2650 mm for higher low-voltage compartment

24 kV Vacuum contactor panel — 600 mm

with HV HRC fuses



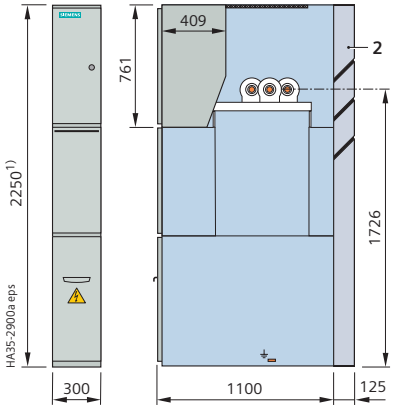


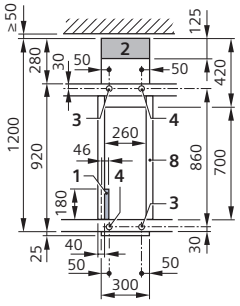
Legend see page 30

1) 2650 mm for higher low-voltage compartment

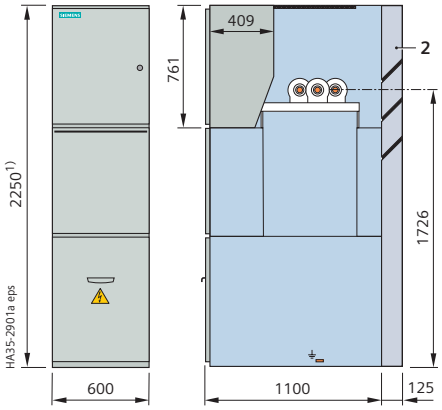
24 kV 36 kV Dummy panels — 300 mm, 600 mm

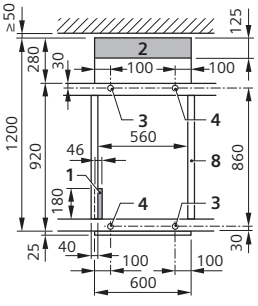
300 mm





600 mm





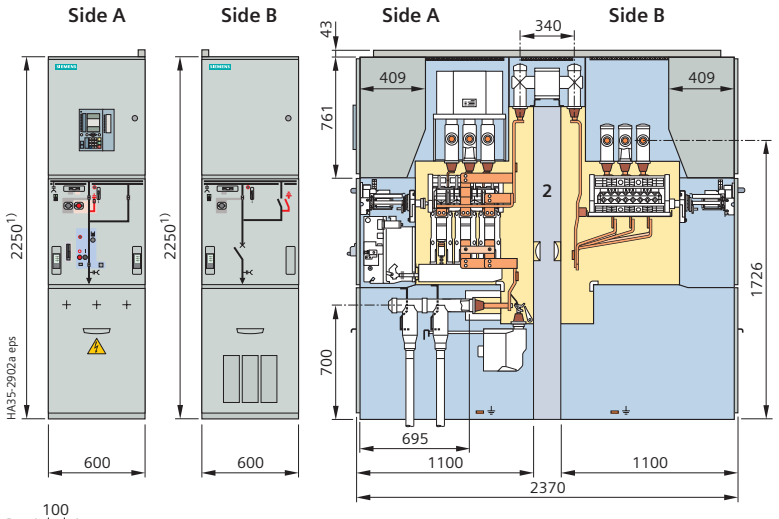
Legend see page 30

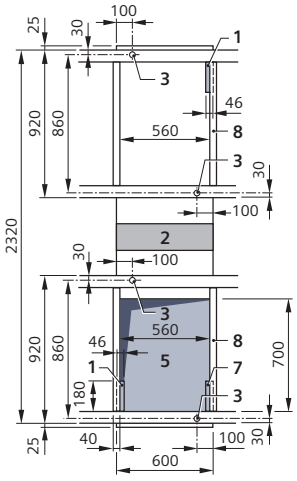
1) 2650 mm for higher low-voltage compartment

Panel dimensions

Circuit-breaker panel, double busbar

24 kV | **Circuit-breaker panel 1000 A** | **600 mm**

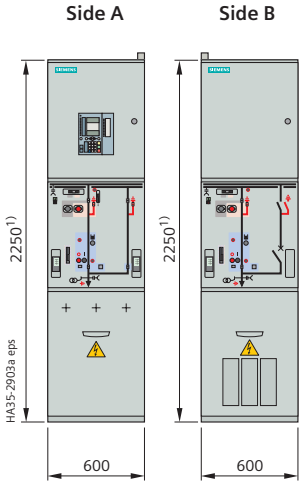


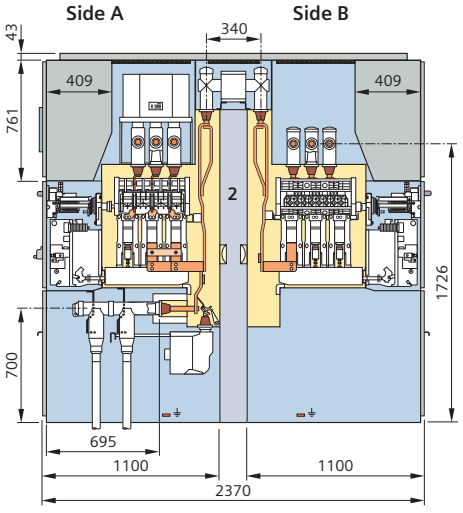


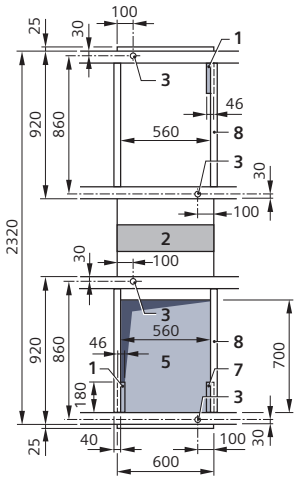
Legend see page 30

1) 2650 mm for higher low-voltage compartment

24 kV **Incoming sectionalizer 1000 A, 1250 A** **600 mm**







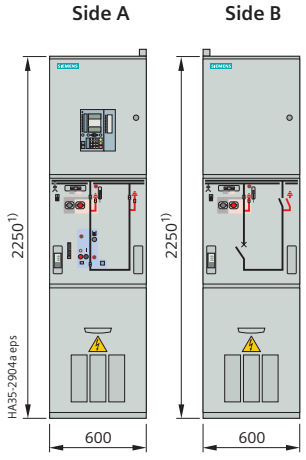
Legend see page 30

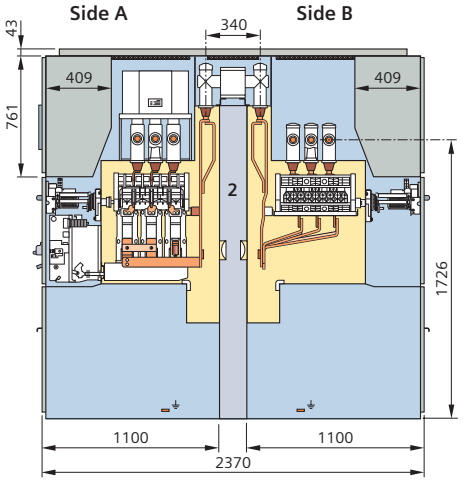
1) 2650 mm for higher low-voltage compartment

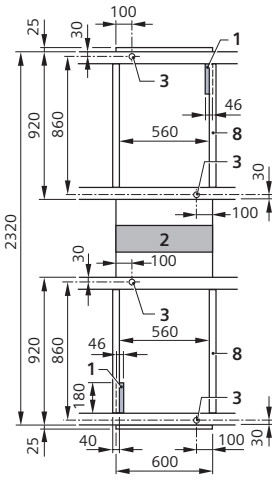
Panel dimensions

Bus coupler, double busbar

24 kV | **Bus coupler 1000 A, 1250 A** | **600 mm**







1) 2650 mm for higher low-voltage compartment

Legend for pages 18 to 30:

1 Left-side floor opening for control cables

2 Pressure relief duct

3 Fixing hole for M8 / M10

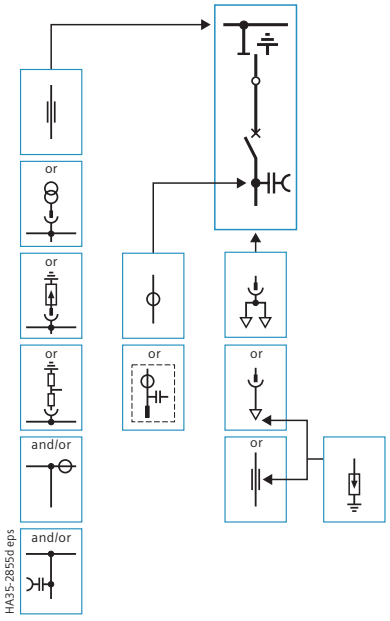
4 Fixing hole for M8 / M10 (only for resistance against shock, vibration, earthquakes)

5 Floor opening for high-voltage cables

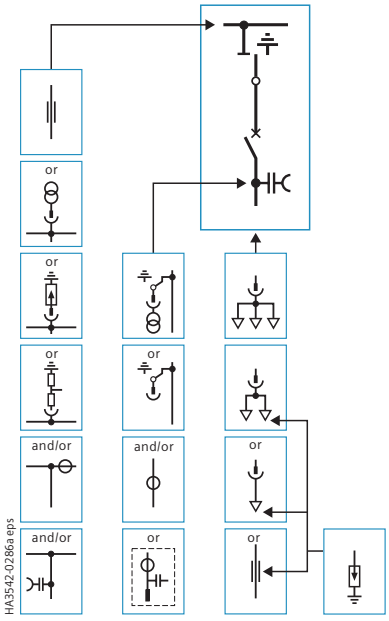
7 Right-side floor opening for control cables (only required for zero-sequence current transformers in the cable basement)

8 Cross member (necessary for panel replacement)

24 kV Circuit-breaker panels 630 A, 800 A

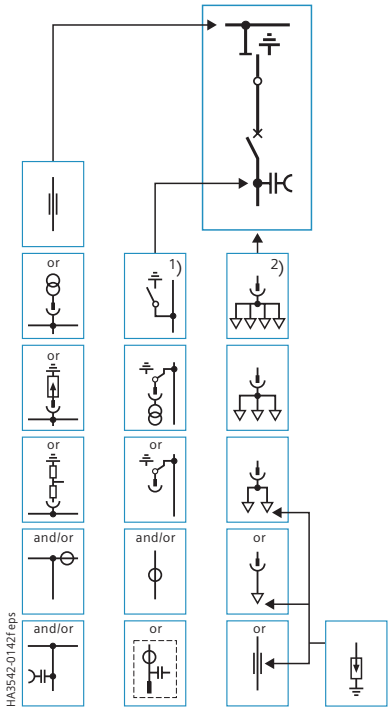


450 mm



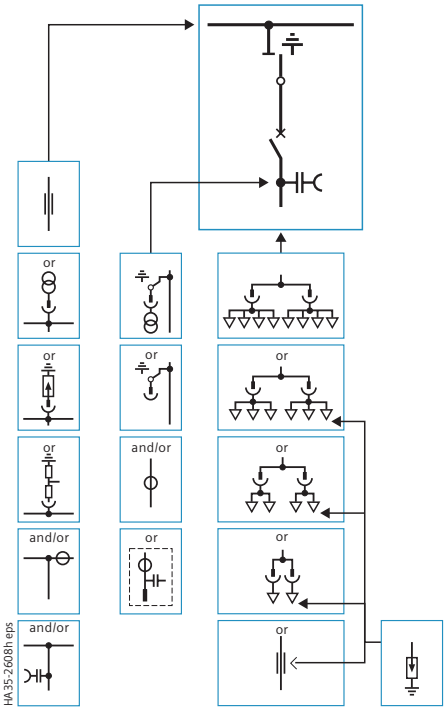
600 mm

24 kV Circuit-breaker panels 1000 A, 1250 A, 1600 A, 2000 A, 2500 A



1) Only for version with 10,000 operating cycles
2) Only for 1250 A

600 mm



900 mm


Three-position disconnector

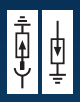

Vacuum circuit-breaker


Current transformer

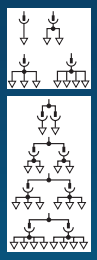

Capacitive voltage detecting system


Solid-insulated bar


Plug-in voltage transformer


Surge arrester or limiter


Plug-in voltage transformer with earthing device


Cable connection with outside-cone plug (not included in the scope of supply)


Busbar earthing switch


Prepared for installation of plug-in voltage transformers


Voltage sensor (resistor divider)

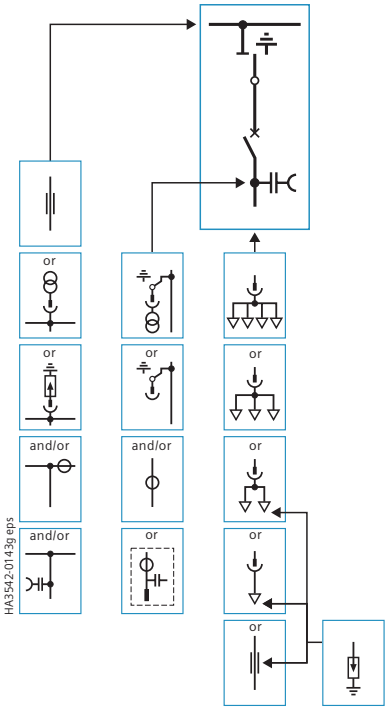

SIBushing

Product range

Single-busbar panels

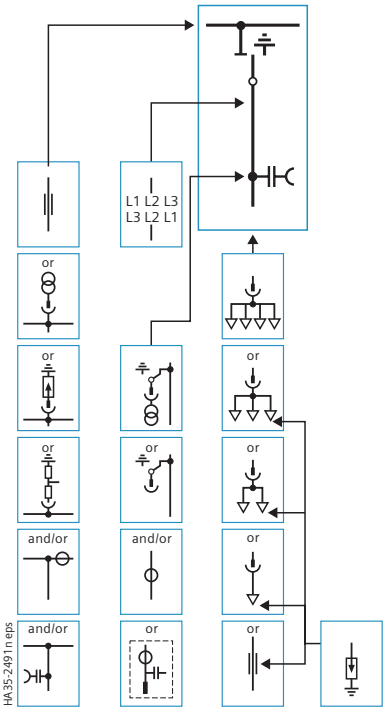
- Three-position disconnector
- Vacuum circuit-breaker
- Current transformer
- Capacitive voltage detecting system
- Solid-insulated bar
- Plug-in voltage transformer
- Surge arrester or limiter
- Plug-in voltage transformer with earthing device
- Cable connection with outside-cone plug (not included in the scope of supply)
- Inverted phases (L1 L2 L3 / L3 L2 L1)
- Prepared for installation of plug-in voltage transformers
- Voltage sensor (resistor divider)
- SIBushing

36 kV — Circuit-breaker panels 630 A, 800 A, 1000 A, 1250 A

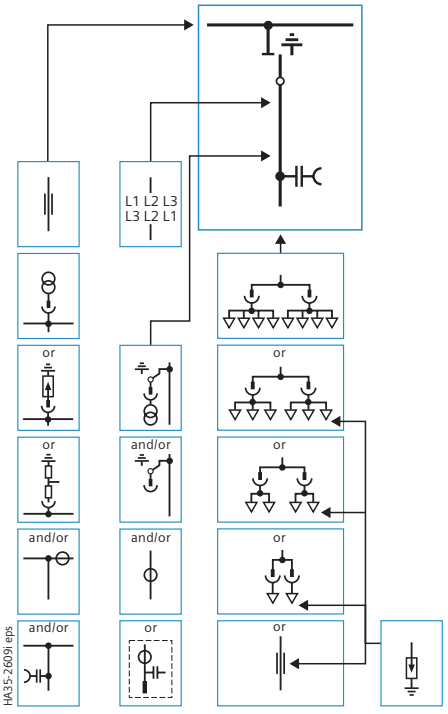


600 mm

24 kV — Disconnector panels 630 A, 800 A, 1000 A, 1250 A, 1600 A, 2000 A, 2500 A

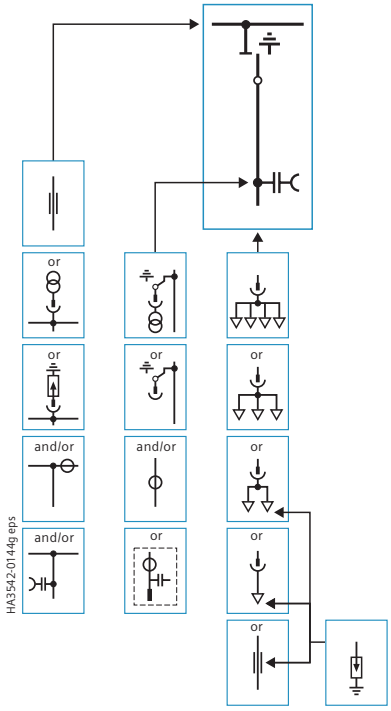


600 mm



900 mm

36 kV Disconnector panels 630 A, 800 A, 1000 A, 1250 A



600 mm

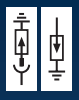

Three-position disconnector


Current transformer

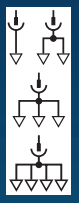

Capacitive voltage detecting system


Solid-insulated bar


Plug-in voltage trans-former


Surge arrester or limiter


Plug-in voltage transformer with earthing device


Cable connection with outside-cone plug (not included in the scope of supply)


Prepared for installation of plug-in voltage transformers

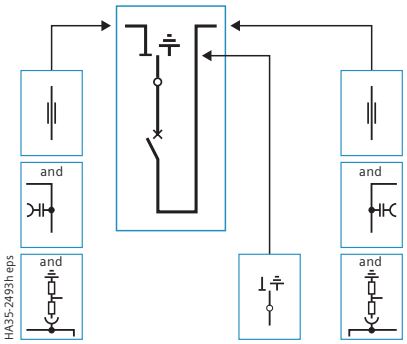

SIBushing

Product range

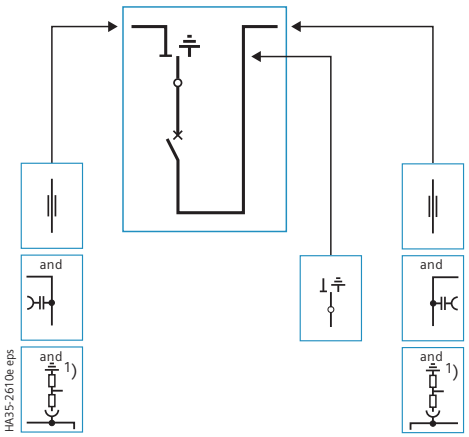
Single-busbar panels

- Three-position disconnector
- Vacuum circuit-breaker
- Current transformer
- Capacitive voltage detecting system
- Solid-insulated bar
- Plug-in voltage transformer
- Surge arrester or limiter
- Longitudinal panel interconnection
- Voltage sensor (resistor divider)

24 kV — Bus sectionalizers 1000 A, 1250 A, 1600 A, 2000 A, 2500 A



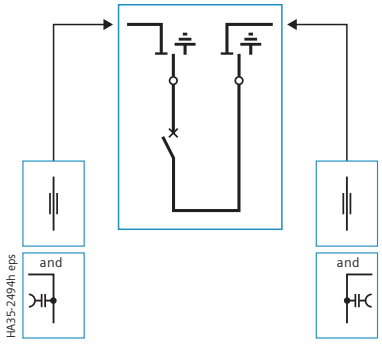
600 mm



900 mm

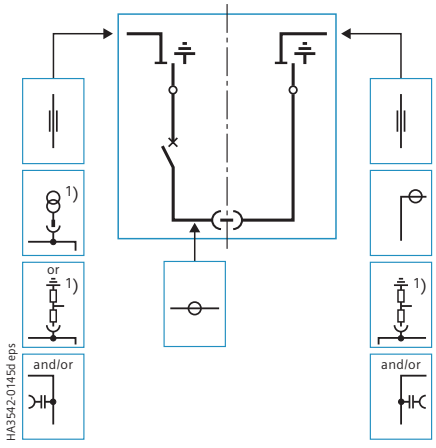
1) Not for LK 2500 A

36 kV — Bus sectionalizers 1000 A, 1250 A



900 mm

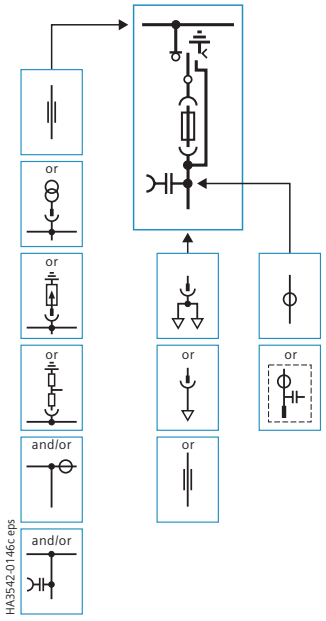
24 kV — Bus sectionalizers, two-panel design, 1000 A, 1250 A, 1600 A, 2000 A, 2500 A



2 × 600 mm, 2 × 900 mm

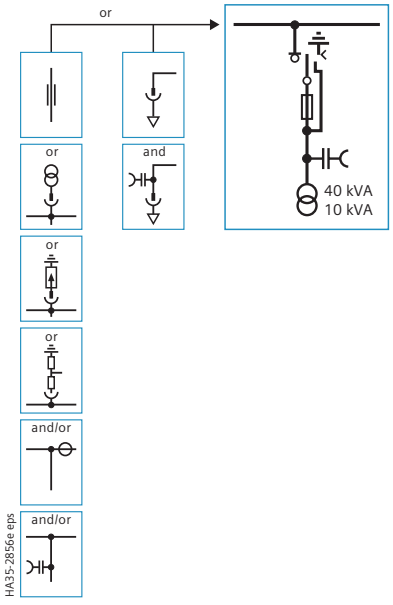
1) Not for LK 2500 A

24 kV Switch-disconnector panel with HV HRC fuses 200 A

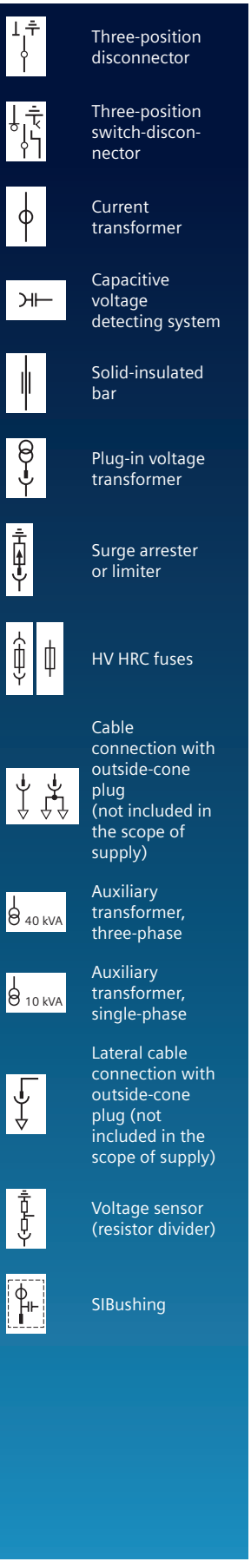


600 mm

24 kV Auxiliary transformer panel



900 mm



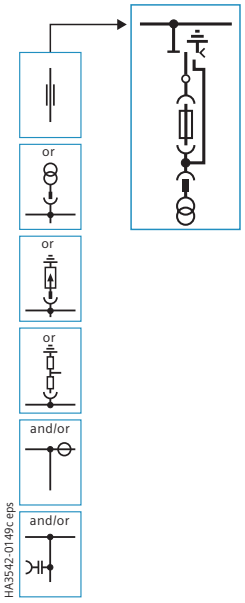
Product range

Single-busbar panels

- Three-position disconnector with make-proof earthing switch
- Current transformer
- Capacitive voltage detecting system
- Solid-insulated bar
- Plug-in voltage transformer
- Surge arrester or limiter
- HV HRC fuses
- Three-position disconnector
- Voltage transformer
- Phase fixed point (spherical connection bolt)
- Voltage sensor (resistor divider)

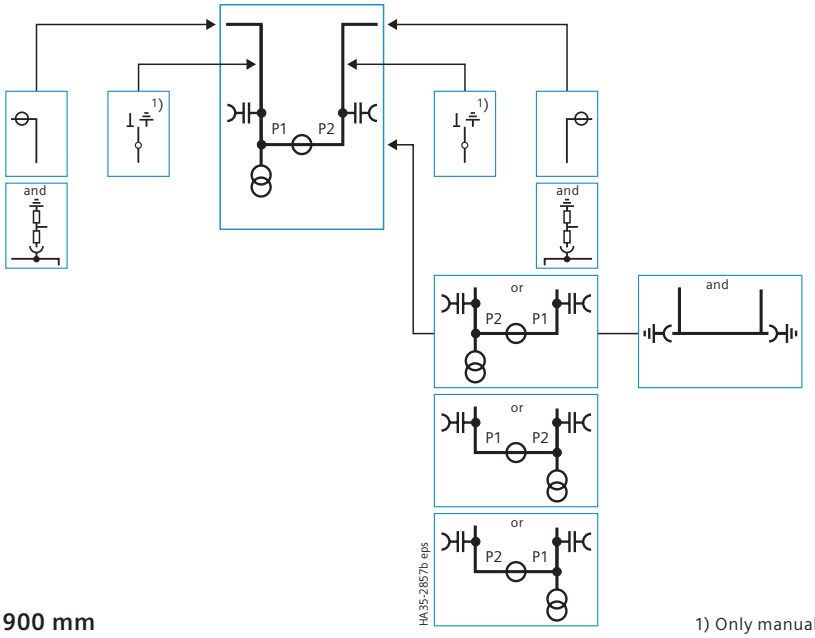
P1 and P2 are terminal designations of the current transformer

24 kV Metering panel



600 mm

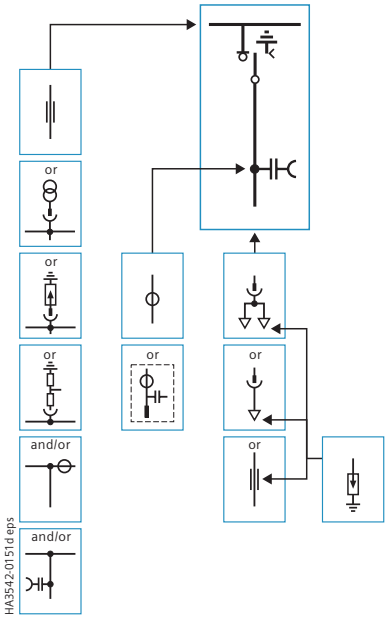
24 kV Air-insulated metering panel without / with three-position disconnector



900 mm

1) Only manual operating mechanism

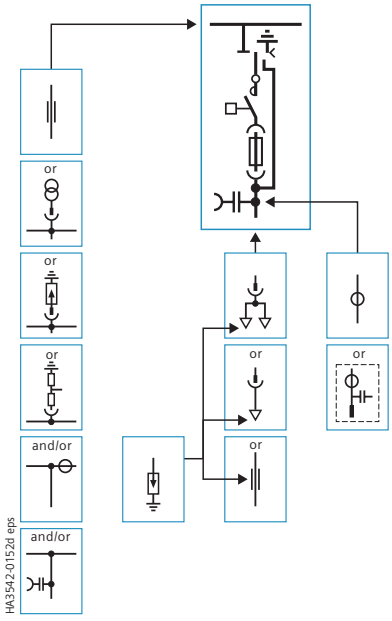
24 kV Ring-main panel 630 A



450 mm

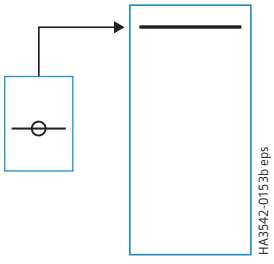
24 kV Vacuum contactor panel

with HV HRC fuses



600 mm

24 kV 36 kV Dummy panel



300 mm, 600 mm

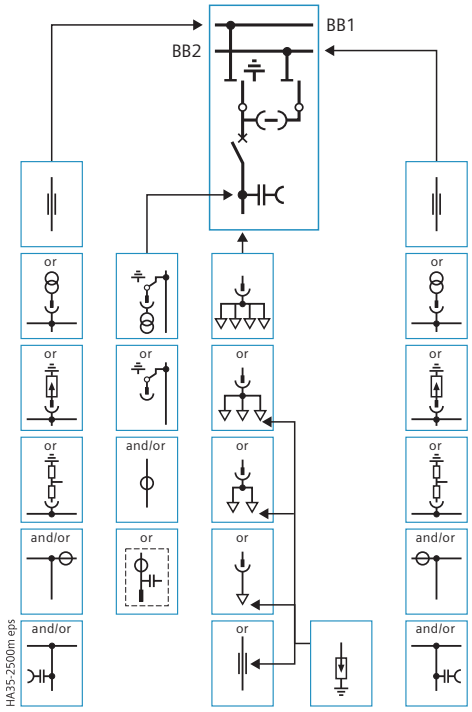
- Three-position switch-disconnector
- Current transformer
- Capacitive voltage detecting system
- Solid-insulated bar
- Plug-in voltage transformer
- Surge arrester or limiter
- Cable connection with outside-cone plug (not included in the scope of supply)
- Three-position disconnector with make-proof earthing switch
- HV HRC fuses
- Vacuum contactor
- Voltage sensor (resistor divider)
- SIBushing

Product range

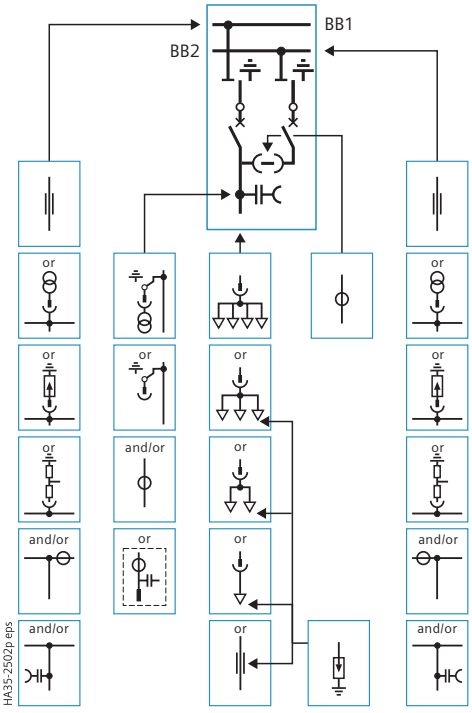
Double-busbar panels

- Three-position disconnector
- Vacuum circuit-breaker
- Current transformer
- Capacitive voltage detecting system
- Solid-insulated bar
- Plug-in voltage transformer
- Surge arrester or limiter
- Cable connection with outside-cone plug (not included in the scope of supply)
- Transverse panel interconnection
- Plug-in voltage transformer with earthing device
- Prepared for installation of plug-in voltage transformers
- Voltage sensor (resistor divider)
- SIBushing

24 kV Circuit-breaker panel

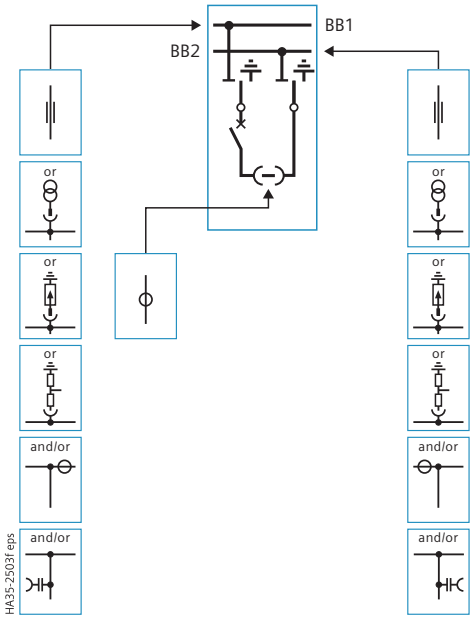


24 kV Incoming sectionalizer



Abbreviations:
BB1 = Busbar 1
BB2 = Busbar 2

24 kV Bus coupler



Abbreviations:
BB1 = Busbar 1
BB2 = Busbar 2

- Three-position disconnector
- Vacuum circuit-breaker
- Current transformer
- Capacitive voltage detecting system
- Solid-insulated bar
- Plug-in voltage transformer
- Surge arrester or limiter
- Transverse panel interconnection
- Voltage sensor (resistor divider)

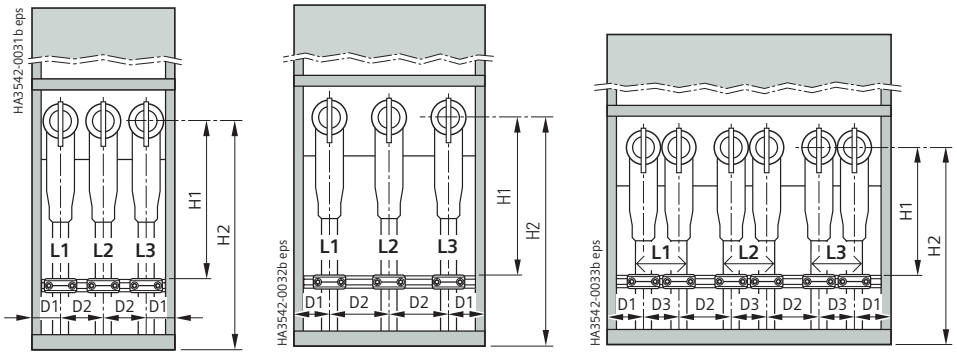
Components
Panel connection

Features
- Bushings with outside cone
- With bolted contact (M16) as interface type C according to EN 50181
- For cable connection heights, see table on the right
- Max. connection depth: See side views on pages 18 to 30
- With cable bracket type C40 according to DIN EN 60715
- Option: Access to the cable compartment only if the feeder has been isolated and earthed
- For thermoplastic-insulated cables
- For shielded cable T-plugs or cable elbow plugs with bolted contact
- For connection cross-sections up to 1200 mm²
- Larger cross-sections on request
- Cable routing downwards, cable connection from the front
- For rated continuous currents up to 2500 A
- Cable T-plugs are not included in the scope of supply.

Surge arresters
- Pluggable on cable T-plug
- 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.

Surge limiters
- Pluggable on cable T-plug
- Surge limiters recommended when motors with starting currents < 600 A are connected.

Cable compartment



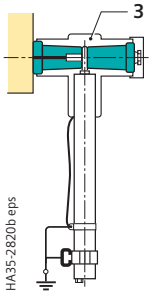
Panel width 450 mm | Panel width 600 mm | Panel width 900 mm

Cable connection heights

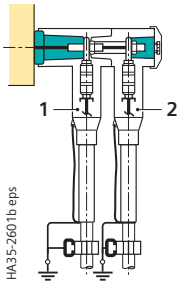
Panels	Height of cable compartment (H2) mm	Distance between bushing and cable bracket (H1) mm	Distances cable – cable cable – separation wall D1 mm	D2 mm	D3 mm
450 mm	700	500	90	135	–
600 mm	700	500	112	188	–
900 mm	570	430	115	185	100
Switch-disconnector panel and vacuum contactor panel with HV HRC fuses	420	250	–	–	–

Connectable cables
Cable T-plug with coupling insert
a) Panel width 450 mm
b) Panel width 600 mm
c) Panel width 900 mm

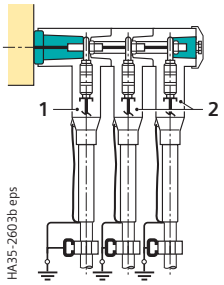
Solid-insulated bar



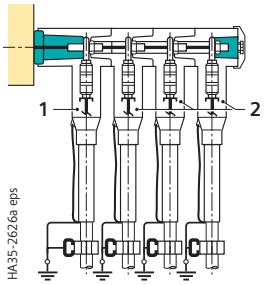
Cable T-plug with coupling T-plug



a) Connection with 2 cables per phase
b) Connection with 2 cables per phase
c) Connection with 4 cables per phase



b) Connection with 3 cables per phase
c) Connection with 6 cables per phase



b) Connection with 4 cables per phase
c) Connection with 8 cables per phase

Legend
1 Cable T-plug
2 Coupling T-plug
3 End adapter

Permissible cable types

Cable type	Cable sealing end			Remark
	Make	Type	Cross-section mm²	
Thermoplastic-insulated cables ≤ 12 kV according to IEC 60502-2				
Single-core cable, PE and XLPE-insulated N2YSY (Cu) and N2XSY (Cu) or NA2YSY (Al) and NA2XSY (Al)	Nexans Euromold	480TB/G	35 to 300	EPDM with semi-conductive layer
		484TB/G	50 to 630	EPDM with semi-conductive layer
		489TB/G	800 to 1200	EPDM with semi-conductive layer
	NKT	CB 24-630	25 to 300	Silicone with semi-conductive layer (optionally with metal housing)
		CB 24-1250/2	95 to 500	Silicone with semi-conductive layer
		CB 36-630	35 to 400	Silicone with semi-conductive layer
		CB 36-630(1250)	240 to 800	Silicone with semi-conductive layer
		CB 42-1250/3	95 to 1000	Silicone with semi-conductive layer
		CSE-A 12630	25 to 630	EPDM with semi-conductive layer
	TE connectivity	RSTI-58xx	25 to 300	Silicone with semi-conductive layer, with capacitive measuring point
		RSTI-395x	400 to 1000	Silicone with semi-conductive layer, with capacitive measuring point
		ELBC-58xx	25 to 300	EPDM with semi-conductive layer
	Cellpack	CTS 630A 24 kV	50 to 400	EPDM with semi-conductive layer
		CTS 1250A 24 kV	500 to 630	EPDM with semi-conductive layer
	Südkabel	SET 12	40 to 300	Silicone with semi-conductive layer
		SAT 12	185 to 630	Silicone with semi-conductive layer
Three-core cable PE and XLPE-insulated N2YSY (Cu) and N2XSY (Cu) or NA2YSY (Al) and NA2XSY (Al)	Nexans Euromold	480TB/G	35 to 300	EPDM with semi-conductive layer, in combination with distribution kit
	NKT	CB 24-630	25 to 300	Silicone with semi-conductive layer (optionally with metal housing), in combination with distribution kit
		CB 24-1250-2	185 to 500	Silicone with semi-conductive layer, in combination with distribution kit
	TE connectivity	RSTI-58xx	25 to 300	Silicone with semi-conductive layer, with capacitive measuring point,in combination with distribution kit RSTI-TRF0x
		ELBC-810	25 to 500	EPDM with semi-conductive layer, in combination with distribution kit
Thermoplastic-insulated cables 15/17.5/24 kV according to IEC 60502-2				
Single-core cable, PE and XLPE-insulated N2YSY (Cu) and N2XSY (Cu) or NA2YSY (Al) and NA2XSY (Al)	Nexans Euromold	K480TB/G	35 to 300	EPDM with semi-conductive layer
		K484TB/G	50 to 630	EPDM with semi-conductive layer
		K489TB/G	800 to 1200	EPDM with semi-conductive layer
	NKT	CB 24-630	25 to 300	Silicone with semi-conductive layer (optionally with metal housing)
		CB 24-1250/2	35 to 500	Silicone with semi-conductive layer
		CB 36-630	35 to 400	Silicone with semi-conductive layer
		CB 36-630(1250)	240 to 800	Silicone with semi-conductive layer
		CB 42-1250-3	630 to 1000	Silicone with semi-conductive layer
		CSE-A 24630	25 to 630	EPDM with semi-conductive layer
	TE connectivity	RSTI-58xx	25 to 300	Silicone with semi-conductive layer, with capacitive measuring point
		RSTI-595x	400 to 1000	Silicone with semi-conductive layer, with capacitive measuring point
		ELBC-58xx	35 to 300	EPDM with semi-conductive layer
	Cellpack	CTS 630A 24 kV	25 to 400	EPDM with semi-conductive layer
		CTS 1250A 24 kV	400 to 630	EPDM with semi-conductive layer
	Südkabel	SET 24	25 to 240	Silicone with semi-conductive layer
		SAT 24	95 to 630	Silicone with semi-conductive layer
Three-core cable PE and XLPE-insulated N2YSY (Cu) and N2XSY (Cu) or NA2YSY (Al) and NA2XSY (Al)	Nexans Euromold	K480TB/G	35 to 300	EPDM with semi-conductive layer, in combination with distribution kit
	NKT	CB 24-630	25 to 300	Silicone with semi-conductive layer (optionally with metal housing), in combination with distribution kit
		CB 24-1250-2	35 to 500	Silicone with semi-conductive layer, in combination with distribution kit
	TE connectivity	RSTI-58xx	25 to 300	Silicone with semi-conductive layer, with capacitive measuring point,in combination with distribution kit RSTI-TRF0x
		ELBC-824	35 to 400	EPDM with semi-conductive layer, in combination with distribution kit

Components
Panel connection

Permissible cable types

Cable type	Cable sealing end			Remark
	Make	Type	Cross-section mm²	
Thermoplastic-insulated cables 36 kV according to IEC 60502-2				
Single-core cable, PE and XLPE-insulated N2YSY (Cu) and N2XSY (Cu) or NA2YSY (Al) and NA2XSY (Al)	Nexans Euromold	M480TB/G	35 to 300	EPDM with semi-conductive layer
		M484TB/G	50 to 630	EPDM with semi-conductive layer
		M489TB/G	800 to 1200	EPDM with semi-conductive layer
	NKT	CB 36-630	35 to 300	Silicone with semi-conductive layer (optionally with metal housing)
		CB 36-630(1250)	240 to 630	Silicone with semi-conductive layer
		CB 42-1250/3	95 to 1000	Silicone with semi-conductive layer
		CSE-A 36630	50 to 630	EPDM with semi-conductive layer
	TE connectivity	RSTI-68xx	35 to 300	Silicone with semi-conductive layer, with capacitive measuring point
		RSTI-695x	400 to 1000	Silicone with semi-conductive layer, with capacitive measuring point
	Cellpack	CTS 630A 36 kV	35 to 400	EPDM with semi-conductive layer
		CTS 1250A 36 kV	400 to 630	EPDM with semi-conductive layer
	Südkabel	SET 36	70 to 300	Silicone with semi-conductive layer
		SAT 12	185 to 630	Silicone with semi-conductive layer
		SAT 24	95 to 1000	Silicone with semi-conductive layer
		SAT 36	400 to 500	Silicone with semi-conductive layer
Three-core cable PE and XLPE-insulated N2YSY (Cu) and N2XSY (Cu) or NA2YSY (Al) and NA2XSY (Al)	Nexans Euromold	M480TB/G	35 to 300	EPDM with semi-conductive layer, in combination with distribution kit
	NKT	CB 36-630	35 to 300	Silicone with semi-conductive layer (optionally with metal housing), in combination with distribution kit
		CB 36-630(1250)	240 to 630	Silicone with semi-conductive layer, in combination with distribution kit
	TE connectivity	RSTI-68xx	35 to 300	Silicone with semi-conductive layer, with capacitive measuring point,in combination with distribution kit RSTI-TRF0x

Commercially available bar systems

Bar type	Bar connection				Remark
	Make	Type	Conductor material	Max. rated current	
Solid-insulated bar	MGC Moser Glaser	Duresca DE	Copper	1250 A / 2500 A	Outer sheath made of polyamide (polyamide tube)
		Duresca DG	Copper	1250 A / 2500 A	Outer sheath made of CrNi steel or aluminum (metal sheath)
	Preissinger	ISOBUS MB	Copper	1250 A / 2500 A	Outer sheath made of epoxy resin (with heat shrinkable tube, if required)
	Ritz	SIS	Copper	1250 A / 2500 A	Outer sheath made of epoxy resin (with heat shrinkable tube, if required)

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 and EN 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 (see Technical data).

The rated values are referred to sea level and to normal atmospheric conditions (1013 hPa, 20 °C, 11 g/m³ humidity according to IEC 60071).

The gas insulation at a relative gas pressure of 50 kPa permits switchgear installation at an altitude of up to 4000 m above sea level without the dielectric strength being adversely affected. This also applies to the cable connection when plug-in sealing ends are used.

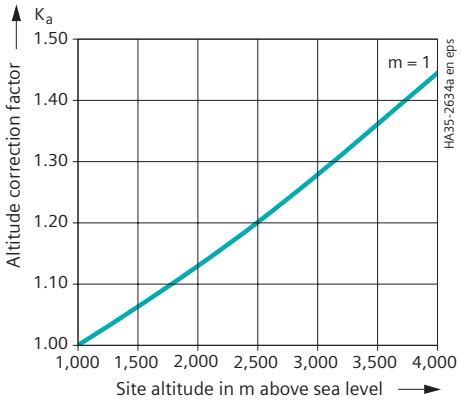
A decrease (reduction) of the dielectric strength with increasing site altitude must only be considered for panels with HV HRC fuses or for the air-insulated metering panel.

For site altitudes above 1000 m, a higher insulation level must be selected. It results from the multiplication of the rated insulation level for 0 to 1000 m with the altitude correction factor K_a (see illustration and example).

Table – Dielectric strength

Rated voltage (r.m.s. value)	kV	7.2	12	15	17.5	24	36	38
Rated short-duration power-frequency withstand voltage (r.m.s. value)								
– Between phases and to earth	kV	20	28	35	38	50	70	70
– Across isolating distances	kV	23	32	39	45	60	80	77
Rated lightning impulse withstand voltage (peak value)								
– Between phases and to earth	kV	60	75	95	95	125	170	150
– Across isolating distances	kV	70	85	105	110	145	195	165

Altitude correction factor K_a



(Only for panels with HV HRC fuse)

For site altitudes above 1000 m, the altitude correction factor K_a is recommended, depending on the site altitude above sea level.
Curve m = 1 for rated short-duration power-frequency withstand voltage and rated lightning impulse withstand voltage according to IEC 62271-1

Example:
3000 m site altitude above sea level (K_a = 1.28),
17.5 kV switchgear rated voltage,
95 kV rated lightning impulse withstand voltage

Rated lightning impulse withstand voltage to be selected =
95 kV × 1.28 = 122 kV

Result:
According to the above table, switchgear for a rated voltage of 24 kV with a rated lightning impulse withstand voltage of 125 kV is to be selected.

Standards

Standards, specifications, guidelines

Standards

NXPLUS C 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
	Vacuum contactors	62271-106	High-voltage switchgear and controlgear: Alternating current contactors, contactor-based controllers and motor-starters
	Disconnectors and earthing switches	62271-102	High-voltage switchgear and controlgear: Alternating current disconnectors and earthing switches
	Switch-disconnectors	62271-103	High-voltage switchgear and controlgear: Switches for rated voltages above 1 kV up to and including 52 kV
	Switch-disconnector/fuse combination	62271-105	High-voltage switchgear and controlgear: Alternating current switch-fuse combinations for rated voltages above 1 kV up to and including 52 kV
Voltage detecting systems		62271-213	Voltage detecting and indicating system (VDIS)
		62271-215	Phase comparator used with VDIS
HV HRC fuses		60282	High-voltage fuses: Current-limiting fuses
Surge arresters		60099	Surge arresters
Degree of protection		60529	Degrees of protection provided by enclosures (IP code)
		62262	Degree 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	Specifications for the re-use of sulphur hexafluoride (SF_6) and its mixtures in electrical equipment
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

Operation of electrical installations
- 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
- Definition of criteria:
– 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 of external components and the SF_6 insulation of switching devices, the possibility of faults in SF_6-insulated switchgear is improbable and a mere fraction of that typical of earlier 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 or the three-position switch-disconnector.

In the unlikely event of a fault within the switchgear vessel, the energy conversion in the case of an internal arc fault is minor thanks to the SF_6 insulation and the shorter arc length, approximately only 1/3 of the converted energy of an arc in air insulation. The escaping gases are discharged upwards through a pressure relief duct.

Aseismic capacity (option)
The NXPLUS C switchgear can be upgraded for regions at risk from earthquakes.

For upgrading, earthquake qualification testing has been carried out in accordance with the following standards:
- IEC/TS 62271-210 "Seismic qualification for metal enclosed and solid-insulation enclosed switchgear and controlgear assemblies for rated voltages above 1 kV and up to and including 52 kV"
- IEC 60068-2-57 "Test Ff: Vibration – Time-history method"

The tested ground accelerations conform to the following required response spectrums:
- IEC/TS 62271-210 – Severity level 2, (ZPA) = 1 g (Figure 2)
- IEEE 693-2018 – High performance level required response spectrum, 1.0 g (Figure A.1).

For operation in regions at risk from earthquakes, the operator must ensure compliance with the national directives and legal stipulations.

The test verifications are valid for switchgear installations on even and rigid concrete or steel structure (possible building influences, such as superelevation factors, are not considered).

The operator must ensure compliance with application-specific seismic requirements.

Shock, vibration (option)
NXPLUS C switchgear can be upgraded to withstand stress caused by shock and vibration. For upgrading, shock and vibration tests have been carried out in accordance with the following standards
- ETSI EN 300 019-2-2; T2.3 Public Transportation
- IEC 60068-2-6, Environmental Testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)
- IEC 60068-2-64, Environmental Testing – Part 2-64: Tests – Test Fh: Vibration, broad-band, random and guidance (noise spectrum according to DNV).

Color of the panel front
RAL 7035 Light grey.

Standards

Standards, specifications, guidelines

Climate and environmental influences

The parts of the primary circuit of NXPLUS C switchgear under high voltage are completely enclosed and insensitive to climatic influences.

- All medium-voltage devices (except for HV HRC fuses) are installed in a gas-tight, welded stainless-steel switchgear vessel which is filled with SF_6 gas
- Live parts outside the switchgear vessel are provided with single-pole enclosure
- At no point can creepage currents flow from high-voltage potentials to earth
- 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.

The NXPLUS C switchgear is suitable for application in indoor installations under normal service conditions as defined in the standard IEC 62271-1.

- Temperature: –5 °C to +55 °C; –25 °C to +55 °C [1] (option)
- Relative air humidity: Mean value over 24 hours [1]: ≤ 98 %; Mean value over 1 month: ≤ 90 %
- Condensation: Occasionally; Frequently (degree of protection min. IP31D, with anti-condensation heater in the low-voltage part [2])
- Site altitude: 4000 m; For panels with HV HRC fuses: Altitude correction factor to be considered (see page 43)

Furthermore, the high-voltage part of the NXPLUS C switchgear can be used in environmental conditions of the climatic category 3C2 according to the standard IEC 60721-3-3.

NXPLUS C has been subjected to a climatic test according to IEC 60932, Level 2, and is suitable for service conditions according to “Design Class 2”. This test also meets the requirements of IEC 62271-304 for “Design Class 2”.

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).

Protection against solid foreign objects, electric shock and water

NXPLUS C switchgear fulfills according to the standards

IEC 62271-1	EN 62271-1
IEC 62271-200	EN 62271-200
IEC 60529	EN 60529
IEC 62262	EN 50102

the following degrees of protection:

Degree of protection IP	Type of protection
IP65	for parts of the primary circuit under high voltage
IP3XD	for switchgear enclosure
IP31D	for switchgear enclosure (optional)
IP32D	for switchgear enclosure (optional)
IP34D	for switchgear enclosure (optional)
IP4X	for switchgear enclosure (optional)
IP54	for switchgear enclosure (optional)

Degree of protection IK	Type of protection
IK07	for switchgear enclosure

For secondary devices in the low-voltage door, the stipulations of the IP degree of protection apply according to the definitions for the switchgear enclosure.

1) Secondary devices (e.g. protection devices, meters, measuring transducers, etc.) must be suitable for the given service conditions
2) Heater in the low-voltage compartment and operating mechanism box of the circuit-breaker

Notes

Smart Infrastructure combines the real and digital worlds across energy systems, buildings and industries, enhancing the way people live and work and significantly improving efficiency and sustainability.

We work together with customers and partners to create an ecosystem that both intuitively responds to the needs of people and helps customers achieve their business goals.

It helps our customers to thrive, communities to progress and supports sustainable development to protect our planet for the next generation.

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