



# Fixed-Mounted Circuit-Breaker Switchgear Type NXPLUS C up to 24 kV, Gas-Insulated

Medium-Voltage Switchgear

Catalog HA 35.41 · 2010

Answers for energy.

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Application  
Public power supply system

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Application  
Industry



**NXPLUS C switchgear**  
20 kV (example)



R-HA35-123.eps

Application  
Industry and offshore



R-HA35-107.eps

## Fixed-Mounted Circuit-Breaker Switchgear Type NXPLUS C up to 24 kV, Gas-Insulated

Medium-Voltage Switchgear

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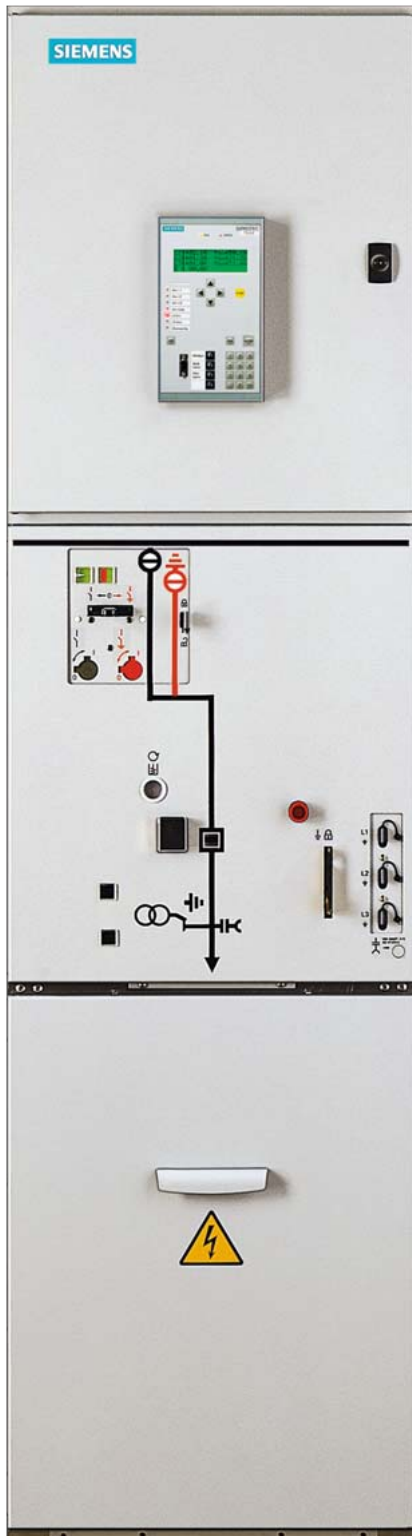
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The products and systems described in this catalog are manufactured and sold according to a certified quality and environmental management system (acc. to ISO 9001 and ISO 14001).  
(DQS Certificate Reg. No. DQS 003473 QM UM).  
The certificate is accepted in all IQNet countries.

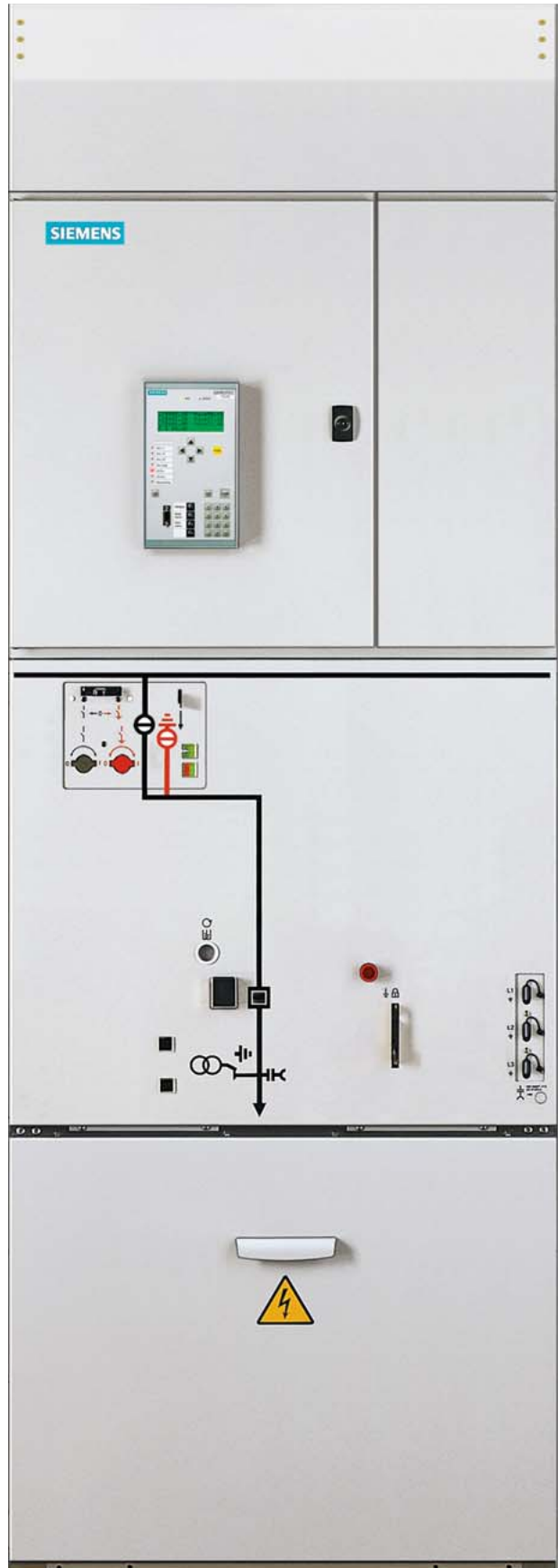
# Application

## Types



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Circuit-breaker panel 600 mm



R-HA35-125.eps

Circuit-breaker panel 900 mm

Fixed-mounted circuit-breaker switchgear NXPLUS C is a factory-assembled, type-tested, metal-enclosed, metal-clad, SF<sub>6</sub>-insulated switchgear 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.

### Electrical data (maximum values) and dimensions

Rated voltage	kV	7.2	12	15	17.5	24
Rated frequency	Hz	50/60	50/60	50/60	50/60	50/60
Rated short-duration power-frequency withstand voltage	kV	20 <sup>1)</sup>	28 <sup>2)</sup>	36	38	50
Rated lightning impulse withstand voltage	kV	60 <sup>1)</sup>	75 <sup>2)</sup>	95	95	125
Rated peak withstand current	kA	80	80	80	63	63
Rated short-circuit making current	kA	80	80	80	63	63
Rated short-time withstand current 3 s	kA	31.5	31.5	31.5	25	25
Rated short-circuit breaking current	kA	31.5	31.5	31.5	25	25
Rated normal current of the busbar	A	2500	2500	2500	2500	2500
Rated normal current of feeders	A	2500	2500	2500	2000	2000
Width	mm	600 <sup>3)</sup>	600 <sup>3)</sup>	600 <sup>3)</sup>	600 <sup>3)</sup>	600 <sup>3)</sup>
Depth						
– without pressure relief duct at the rear	mm	1100	1100	1100	1100	1100
– with pressure relief duct at the rear	mm	1225	1225	1225	1225	1225
Height						
– 600 mm panels		2250	2250	2250	2250	2250
– 900 mm panels		2550	2550	2550	2550	2550

1) 32 kV/60 kV according to some national requirements

2) 42 kV/75 kV according to some national requirements

3) 900 mm for rated normal feeder currents of 2000 A and 2500 A

# 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
  - Condensation
- Tight to ingress of foreign objects, such as:
  - Dust
  - Pollution
  - Small animals
  - Humidity
- Independent of the site altitude.

### Compact design

Thanks to the use of SF<sub>6</sub> 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 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 and replacement without SF<sub>6</sub> 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 operating conditions, the expected service life of the gas-insulated switchgear NXPLUS C is at least 35 years, probably 40 to 50 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:

- 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
- For three-position switch-disconnectors and earthing switches according to the endurance class defined in IEC 60265-1.

## 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 IP 65 for all high-voltage parts of the primary circuit, IP 3XD for the switchgear enclosure according to IEC 60529 and VDE 0470-1
- 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 and VDE 0671-1)
- Operating mechanisms of switching devices accessible outside the primary enclosure (switchgear vessel)
- Metal-coated, plug-in inductive voltage transformers mounted outside the SF<sub>6</sub> switchgear vessel
- Current transformers as ring-core current transformers mounted outside the SF<sub>6</sub> switchgear vessel
- Complete switchgear interlocking system with logical mechanical interlocks
- Welded switchgear vessels, sealed for life
- Minimum fire load
- Type and routine-tested
- Standardized, NC production processes
- Quality assurance in accordance with DIN EN ISO 9001
- More than 500,000 switchgear panels of Siemens in operation worldwide for many years
- Option: Aseismic design.

### Reliability

- Type and routine-tested
- Standardized, NC production processes
- 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<sub>6</sub>
- Three-position switch as busbar disconnecter and feeder earthing switch
- Make-proof earthing by means of the vacuum circuit-breaker
- Compact dimensions due to SF<sub>6</sub> 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
- Option: Cable connection access from rear (only circuit-breaker panel 1250 A)
- Installation and extension of existing switchgear at both ends without gas work and without modification of existing panels.

### Interlocks

- According to IEC 62271-200 and VDE 0671-200
- Logical mechanical interlocks prevent maloperation
- Three-position disconnecter can only be operated with circuit-breaker in OPEN position
- Circuit-breaker or contactor can only be operated with three-position switch in end position and operating lever removed
- Switch-disconnector, contactor, ring-main and metering panels are not interlocked due to their own switching capacity
- Three-position disconnecter interlocked against the circuit-breaker in circuit-breaker panels and in bus sectionalizers with one panel width
- Feeder locking device
- Locking device for three-position switch
- Cable compartment cover (access to HV HRC fuses) always interlocked against the three-position switch-disconnector in panels with HV HRC fuses (switch-disconnector panel, metering panel and contactor panel with fuses)
- Option: Cable compartment cover interlocked against the three-position switch (circuit-breaker panel, disconnecter panel, contactor panel without fuses, ring-main panel)
- Option: Electromagnetic interlocks
- Option: Actuating openings can be padlocked
- Option: "Feeder earthed" locking device.

### Modular design

- Panel replacement possible without SF<sub>6</sub> 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.

### Vacuum circuit-breaker

- Maintenance-free under normal ambient conditions according to IEC 62271-1 and VDE 0671-1
- No relubrication or readjustment
- Up to 10,000 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.

# 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	
	Rated short-duration power-frequency withstand voltage $U_d$ : – phase-to-phase, phase-to-earth, open contact gap – across the isolating distance	Rated lightning impulse withstand voltage $U_p$ : – phase-to-phase, phase-to-earth, open contact gap – across the isolating distance	kV	20 <sup>1)</sup>	28 <sup>2)</sup>	36	38	50	
			kV	23 <sup>1)</sup>	32 <sup>2)</sup>	39	45	60	
			kV	60 <sup>1)</sup>	75 <sup>2)</sup>	95	95	125	
				kV	70 <sup>1)</sup>	85 <sup>2)</sup>	110	110	145
	Rated frequency $f_r$		Hz	50/60	50/60	50/60	50/60	50/60	
	Rated normal current $I_r$ <sup>3)</sup> for the busbar		up to A	2500	2500	2500	2500	2500	
Rated filling level $p_{re}$ <sup>4)</sup>			150 kPa (absolute) at 20 °C						
Minimum functional level $p_{me}$ <sup>4)</sup>			130 kPa (absolute) at 20 °C						
Ambient air temperature			– 5 °C to +55 °C						

### Data of the switchgear panels

Circuit-breaker panel 630 A	Rated normal current $I_r$ <sup>3)</sup>	A	630	630	630	630	630		
	Rated short-time withstand current $I_k$	for switchgear with $t_k = 1$ s	up to kA	20	25	20	25	20	25
		for switchgear with $t_k = 3$ s	up to kA	20	–	20	–	20	–
	Rated peak withstand current $I_p$		up to kA	50	63	50	63	50	63
	Rated short-circuit making current $I_{ma}$		up to kA	50	63	50	63	50	63
	Rated short-circuit breaking current $I_{sc}$		up to kA	20	25	20	25	20	25
Electrical endurance of vacuum circuit-breakers	at rated normal current		10000 operating cycles						
	at rated short-circuit breaking current		50 breaking operations						
Circuit-breaker panel and bus sectionalizer, 1000 A <sup>5)</sup> , 1250 A <sup>6)</sup> , 2000 A, 2500 A	Rated normal current $I_r$ <sup>3)</sup>	A	1000	1000	1000	1000	1000		
	Rated short-time withstand current $I_k$	A 1250	1250	1250	1250	1250	1250		
		A 2000	2000	2000	2000	2000	2000		
		A 2500	2500	2500	–	–	–		
	for switchgear with $t_k = 1$ s	up to kA	31.5	31.5	31.5	25	25		
for switchgear with $t_k = 3$ s	up to kA	31.5	31.5	31.5	25	25			
Rated peak withstand current $I_p$		up to kA	80	80	80	63	63		
Rated short-circuit making current $I_{ma}$		up to kA	80	80	80	63	63		
Rated short-circuit breaking current $I_{sc}$		up to kA	31.5	31.5	31.5	25	25		
Electrical endurance of vacuum circuit-breakers	at rated normal current		10000 operating cycles						
	at rated short-circuit breaking current		50 breaking operations						
Disconnecting panel 1000 A <sup>5)</sup> , 1250 A, 2000 A, 2500 A	Rated normal current $I_r$ <sup>3)</sup>	A	1000	1000	1000	1000	1000		
	Rated short-time withstand current $I_k$	A 1250	1250	1250	1250	1250	1250		
		A 2000	2000	2000	2000	2000	2000		
		A 2500	2500	2500	–	–	–		
for switchgear with $t_k = 1$ s	up to kA	31.5	31.5	31.5	25	25			
for switchgear with $t_k = 3$ s	up to kA	31.5	31.5	31.5	25	25			
Rated peak withstand current $I_p$		up to kA	80	80	80	63	63		
Switch-disconnector panel (with HV HRC fuses)	Rated normal current $I_r$ <sup>3)</sup> for feeder <sup>7)</sup>	A	200	200	200	200	200		
	Rated short-time withstand current $I_k$	for switchgear with $t_k = 1$ s	up to kA	31.5	31.5	31.5	25	25	
		for switchgear with $t_k = 3$ s	up to kA	31.5	31.5	31.5	25	25	
	Rated peak withstand current $I_p$ <sup>7)</sup>		up to kA	80	80	80	63	63	
	Rated short-circuit making current $I_{ma}$ <sup>7)</sup>		up to kA	80	80	80	63	63	
Dimension "e" of HV HRC fuse-links	mm		292 <sup>8)</sup>	292 <sup>8)</sup>	442	442	442		
Ring-main panel (switch-disconnector panel without fuses)	Rated normal current $I_r$ <sup>3)</sup> for feeder	A	630	630	630	630	630		
	Rated short-time withstand current $I_k$	for switchgear with $t_k = 1$ s	up to kA	20	25	20	25	20	
		for switchgear with $t_k = 3$ s	up to kA	20	–	20	–	20	
	Rated peak withstand current $I_p$		up to kA	50	63	50	63	50	
Rated short-circuit making current $I_{ma}$		up to kA	50	63	50	63	50		
Vacuum contactor panel (with HV HRC fuses)	Rated normal current $I_r$ <sup>3)</sup> for feeder <sup>7)</sup>	A	450	450	450	450	450		
	Rated short-time withstand current $I_k$	for switchgear with $t_k = 1$ s	up to kA	31.5 <sup>9)</sup>	31.5 <sup>9)</sup>	31.5 <sup>9)</sup>	25 <sup>9)</sup>	25 <sup>9)</sup>	
		for switchgear with $t_k = 3$ s	up to kA	31.5 <sup>9)</sup>	31.5 <sup>9)</sup>	31.5 <sup>9)</sup>	25 <sup>9)</sup>	25 <sup>9)</sup>	
	Rated peak withstand current $I_p$ <sup>7)</sup>		up to kA	80	80	80	63	63	
	Rated short-circuit making current $I_{ma}$ <sup>7)</sup>		up to kA	80	80	80	63	63	
	Electrical endurance at rated normal current			100 000 or 500 000 operating cycles					
Dimension "e" of HV HRC fuse-links	mm		292 <sup>8)</sup>	442	442	442	442		
Metering panel (with HV HRC fuses)	Rated short-time withstand current $I_k$	for switchgear with $t_k = 1$ s	up to kA	31.5	31.5	31.5	25	25	
		for switchgear with $t_k = 3$ s	up to kA	31.5	31.5	31.5	25	25	
	Rated peak withstand current $I_p$ <sup>7)</sup>		up to kA	80	80	80	63	63	
	Dimension "e" of HV HRC fuse-links	mm		292 <sup>8)</sup>	292 <sup>8)</sup>	442	442	442	

## 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 – across the isolating distance	kV	20 <sup>1)</sup>	28 <sup>2)</sup>	36	38	50
			kV	23 <sup>1)</sup>	32 <sup>2)</sup>	39	45	60
			kV	60 <sup>1)</sup>	75 <sup>2)</sup>	95	95	125
		Rated lightning impulse withstand voltage $U_p$ : – phase-to-phase, phase-to-earth, open contact gap – across the isolating distance	kV	70 <sup>1)</sup>	85 <sup>2)</sup>	110	110	145
			kV	70 <sup>1)</sup>	85 <sup>2)</sup>	110	110	145
	Rated frequency $f_r$		Hz	50/60	50/60	50/60	50/60	50/60
Rated normal current $I_r$ <sup>3)</sup> for the busbar		up to A	2500	2500	2500	2500	2500	
Rated filling level $p_{re}$ <sup>4)</sup>			150 kPa (absolute) at 20 °C					→
Minimum functional level $p_{me}$ <sup>4)</sup>			130 kPa (absolute) at 20 °C					→
Ambient air temperature			– 5 °C to +55 °C					→

### Data of the switchgear panels

Circuit-breaker panel, bus coupler <sup>10)</sup> 1000 A	Rated normal current $I_r$ <sup>3)</sup>	A	1000	1000	1000	1000	1000	
	Rated short-time withstand current $I_k$	for switchgear with $t_k = 1$ s	up to kA	25	25	25	25	25
		for switchgear with $t_k = 3$ s	up to kA	25	25	25	25	25
	Rated peak withstand current $I_p$		up to kA	63	63	63	63	63
	Rated short-circuit making current $I_{ma}$		up to kA	63	63	63	63	63
	Rated short-circuit breaking current $I_{sc}$		up to kA	25	25	25	25	25
Electrical endurance of vacuum circuit-breakers	at rated normal current		10 000 operating cycles					→
	at rated short-circuit breaking current		50 breaking operations					→
Incoming sectionalizer 1250 A	Rated normal current $I_r$ <sup>3)</sup>	A	1250	1250	1250	1250	1250	
	Rated short-time withstand current $I_k$	for switchgear with $t_k = 1$ s	up to kA	25	25	25	25	25
		for switchgear with $t_k = 3$ s	up to kA	25	25	25	25	25
	Rated peak withstand current $I_p$		up to kA	63	63	63	63	63
	Rated short-circuit making current $I_{ma}$		up to kA	63	63	63	63	63
	Rated short-circuit breaking current $I_{sc}$		up to kA	25	25	25	25	25
Electrical endurance of vacuum circuit-breakers	at rated normal current		10 000 operating cycles					→
	at rated short-circuit breaking current		50 breaking operations					→
Further panel types	The above-mentioned panel types can on request be combined with panel types of the single-busbar range.							

### Footnotes for pages 8 and 9

- 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 normal currents apply to ambient air temperatures of max. 40 °C.  
The 24-hour mean value is max. 35 °C  
(according to IEC 62271-1 / VDE 0671-1)  
2500 A with natural ventilation
- 4) Pressure values for SF<sub>6</sub>-insulated switchgear vessels
- 5) Bus sectionalizer panel 1000 A and disconnecter panel 1000 A only possible with rated short-time withstand current  $I_k$  25 kA ( $t_k$  1 s and 3 s), rated peak withstand current  $I_p$  63 kA and rated short-circuit breaking current  $I_{sc}$  25 kA
- 6) Bus sectionalizer panel 1250 A in 2 panel widths only possible with rated short-time withstand current  $I_k$  25 kA ( $t_k$  1 s and 3 s), rated peak withstand current  $I_p$  63 kA and rated short-circuit breaking current  $I_{sc}$  25 kA
- 7) Depending on the HV HRC fuse-link, observe max. permissible let-through current  $I_D$  of the HV HRC fuse-links
- 8) Extension tube (150 mm long) required additionally
- 9) Applies to combination of vacuum contactor with HV HRC fuses: Vacuum contactor without HV HRC fuse reaches rated short-time withstand current  $I_k$  8 kA ( $t_k$  1 s) and rated peak withstand current  $I_p$  20 kA (applies to the complete switchgear)
- 10) Bus coupler 1250 A on request

# 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 opposite dimension drawings.

### Room height

- $\geq 2750$  mm  
NXPLUS C, all technical data, all types of arrangement
- $\geq 2400$  mm  
NXPLUS C, wall-standing arrangement with pressure relief duct, 25 kA 1 s and 3 s, busbar 1250 A, LV compartment 761 mm.

### Door dimensions

The door dimensions depend on the dimensions of the individual panels (see pages 12 to 20).

### Switchgear fixing

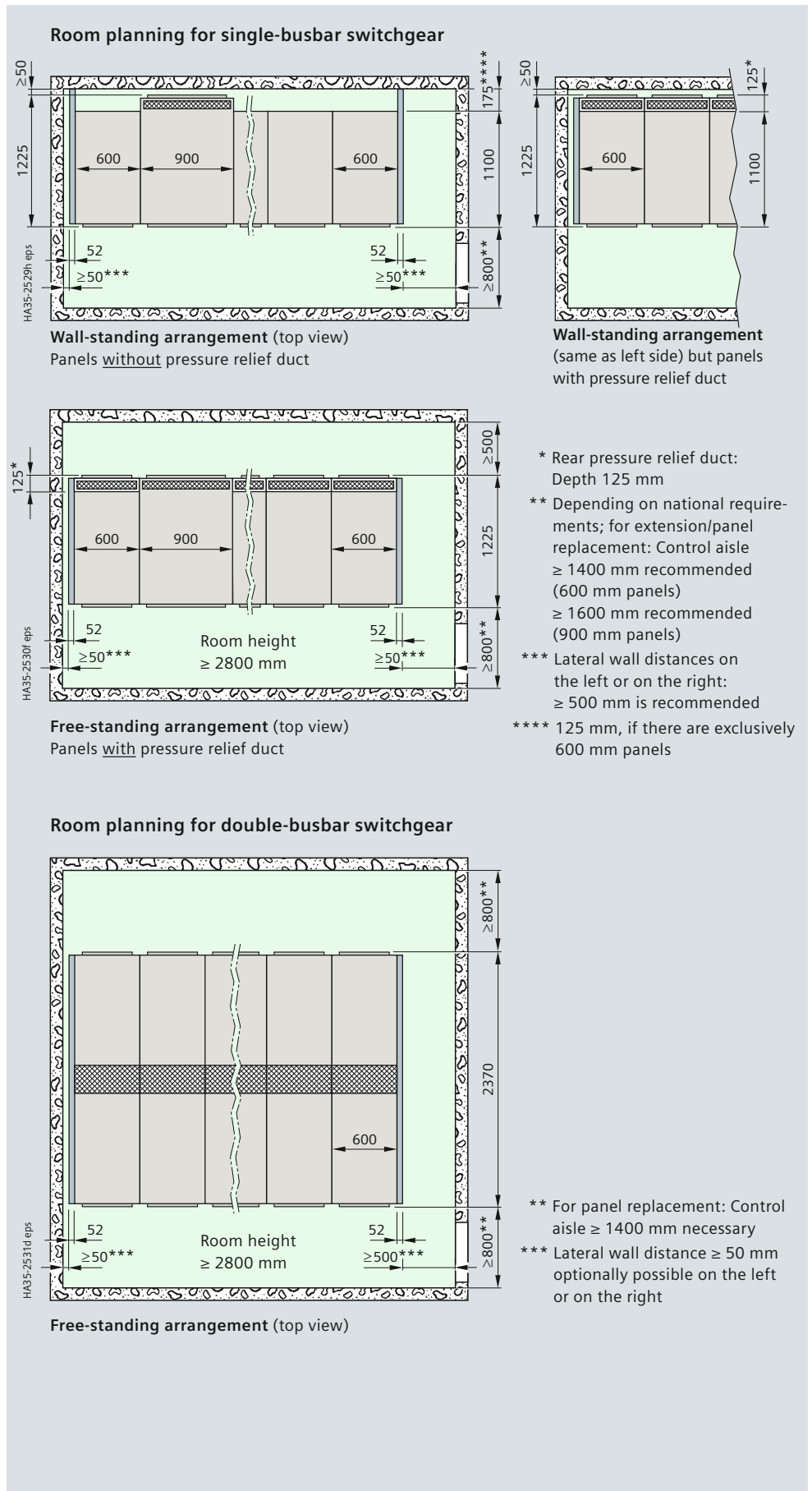
- For floor openings and fixing points of the switchgear, see pages 12 to 20
- Foundations:
  - Steel girder construction
  - Steel-reinforced concrete with foundation rails, welded or bolted on.

### Panel dimensions

See pages 12 to 20.

### Weights

- Single-busbar panels
- Panels for  $\leq 1250$  A: Approx. 800 kg
  - Panels for  $> 1250$  A: Approx. 1400 kg.
- Double-busbar panels
- Panels for  $\leq 1250$  A: Approx. 1600 kg.



### 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

Place of destination inside Germany or other European countries

- Means of transport: Rail and truck
- Type of packing:
  - Panels on pallets
  - Open packing with PE protective foil.

Place of destination overseas

- Means of transport: Ship
- Type of packing:
  - 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.

### Transport dimensions, transport weights <sup>1)</sup>

Panel widths mm	Transport dimensions Width × Height × Depth mm × mm × mm	Transport weight	
		with packing approx. kg	without packing approx. kg

#### Single-busbar switchgear transport inside Germany or to European countries

1 × 600	1100 × 2470 × 1450	900	800
1 × 900	1450 × 2470 × 1450	1500	1400
1 × 600 (top-rear cable connection)	1100 × 2470 × 2100	900	800

#### Transport to overseas

1 × 600	1130 × 2650 × 1450	900	800
1 × 900	1480 × 2650 × 1450	1500	1400
1 × 600 (top-rear cable connection)	1130 × 2650 × 2100	900	800

#### Double-busbar switchgear transport inside Germany or to European countries

1 × 600	1100 × 2470 × 1450	900	800
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#### Transport to overseas

1 × 600	1130 × 2650 × 1450	900	800
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### Classification of NXPLUS C switchgear according to IEC 62271-200

#### Design and construction

Partition class	PM (metallic partition)
Loss of service continuity category <sup>2)</sup> Panels with HV HRC fuses Panels without HV HRC fuses	LSC 2A LSC 2B
Accessibility to compartments (enclosure) Busbar compartment Switching device compartment Low-voltage compartment Cable compartment – without HV HRC fuses – with HV HRC fuses	Tool-based Non-accessible Tool-based  Tool-based Interlock-controlled and tool-based

#### Internal arc classification

Designation of the internal arc classification IAC	7.2 kV, 12 kV, 15 kV	17.5 kV, 24 kV
IAC class for: Wall-standing arrangement Free-standing arrangement	IAC A FL 31.5 kA, 1 s IAC A FLR 31.5 kA, 1 s	IAC A FL 25 kA, 1 s IAC A FLR 25 kA, 1 s
Type of accessibility A – F – L – R	Switchgear in closed electrical service location, access "for authorized personnel only" according to IEC 62271-200 Front Lateral Rear (for free-standing arrangement)	
Arc test current	25 kA, 31.5 kA	
Test duration	1 s	

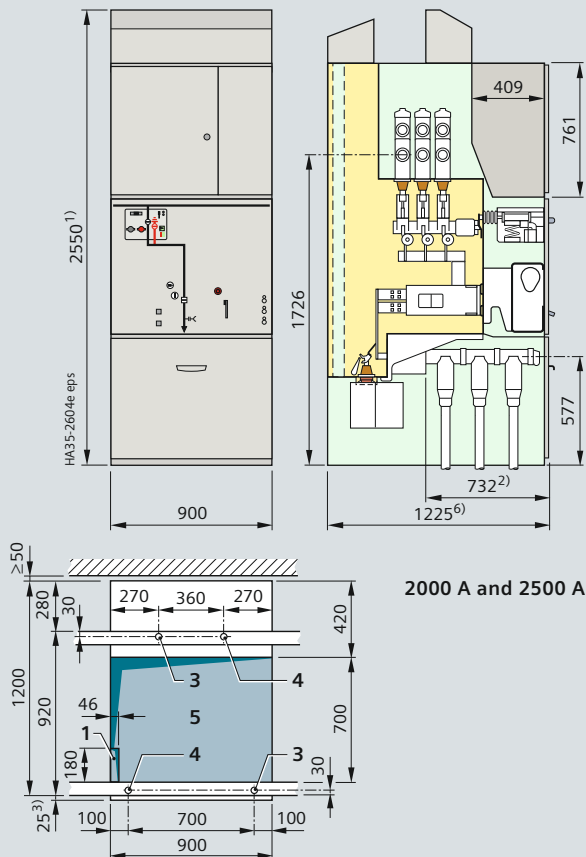
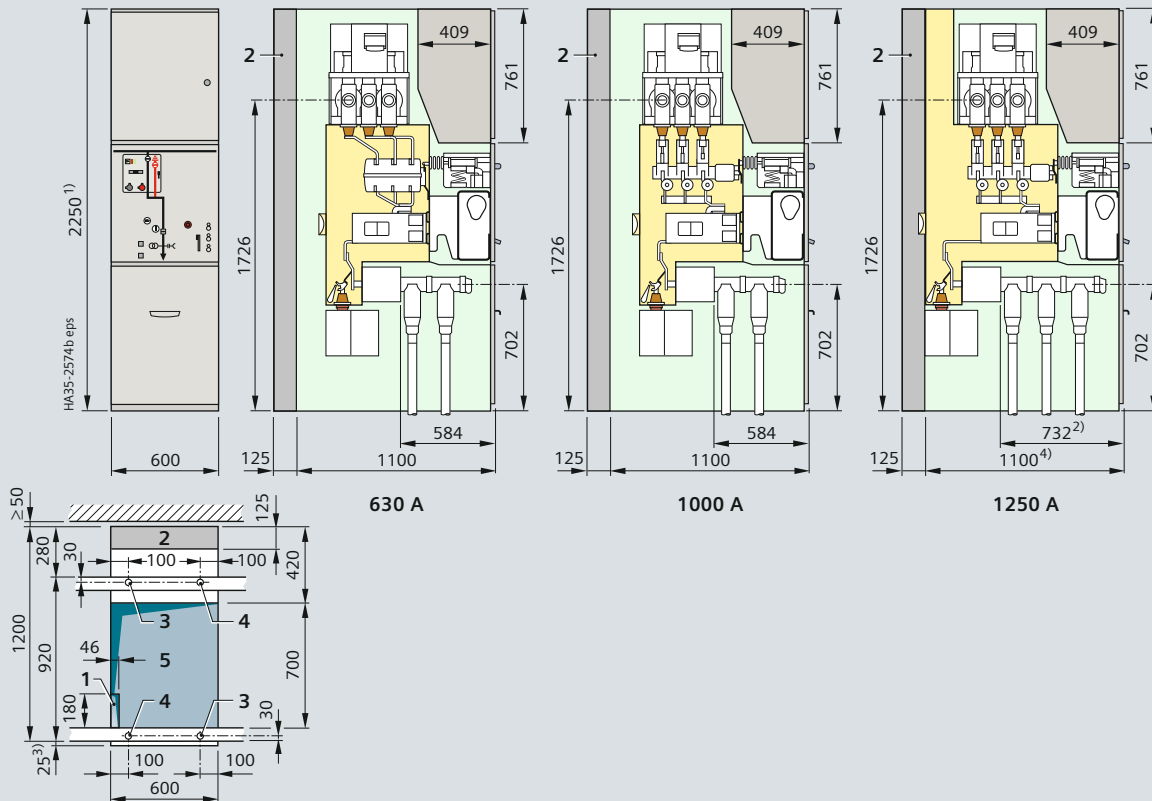
1) Average values depending on the degree to which panels are equipped

2) The loss of service continuity category is always referred to the complete switchgear, i.e. the panel with the lowest category determines the loss of service continuity category of the complete switchgear

# Dimensions

## Front views, sections, floor openings, fixing points for single-busbar switchgear

### Circuit-breaker panels



### Legend and footnotes for pages 12 and 13

- 1 Floor opening for control cables
- 2 Option: Pressure relief duct
- 3 Fixing hole for M8 / M10
- 4 Fixing hole for M8 / M10 (only for aseismic design)
- 5 Floor opening for high-voltage cables
- 6 Cable compartment / pressure relief duct

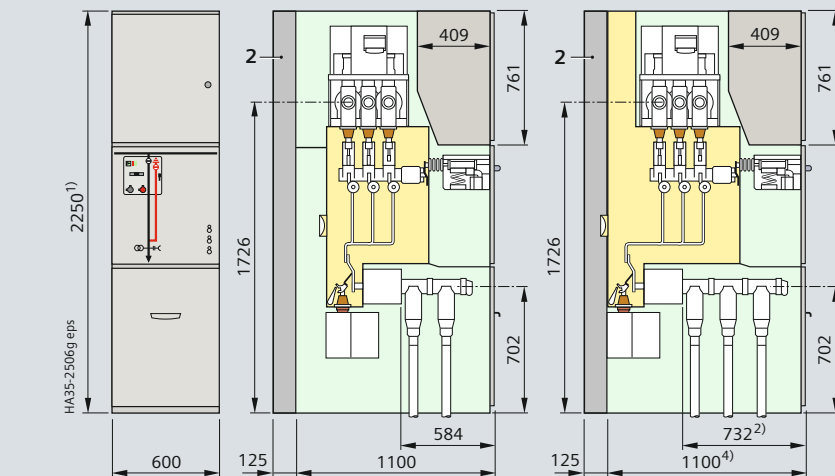
- 1) 2650 mm for higher low-voltage compartment
- 2) 752 mm for deeper cable compartment cover
- 3) 45 mm for deeper cable compartment cover
- 4) 1120 mm for deeper cable compartment cover
- 5) When only one cable is connected, the dimension is reduced by 275 mm
- 6) 1245 mm for deeper cable compartment cover



# Dimensions

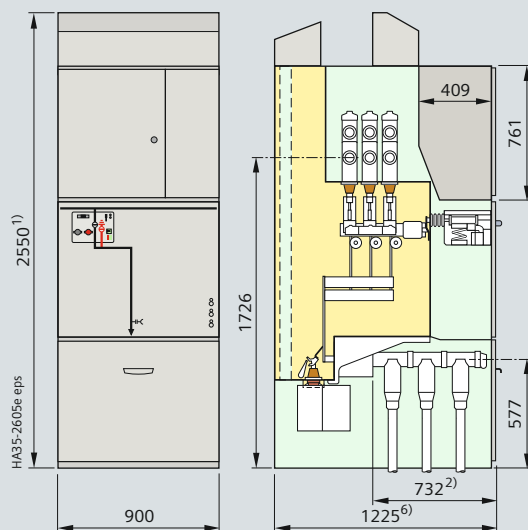
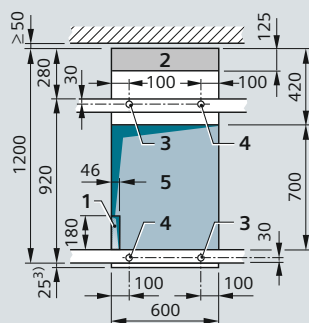
## Front views, sections, floor openings, fixing points for single-busbar switchgear

### Disconnecter panels

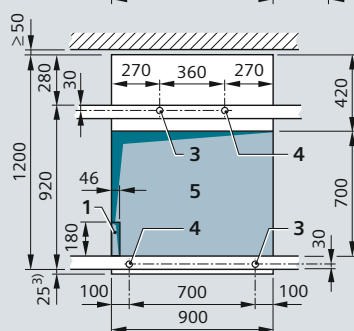


1000 A

1250 A



2000 A and 2500 A



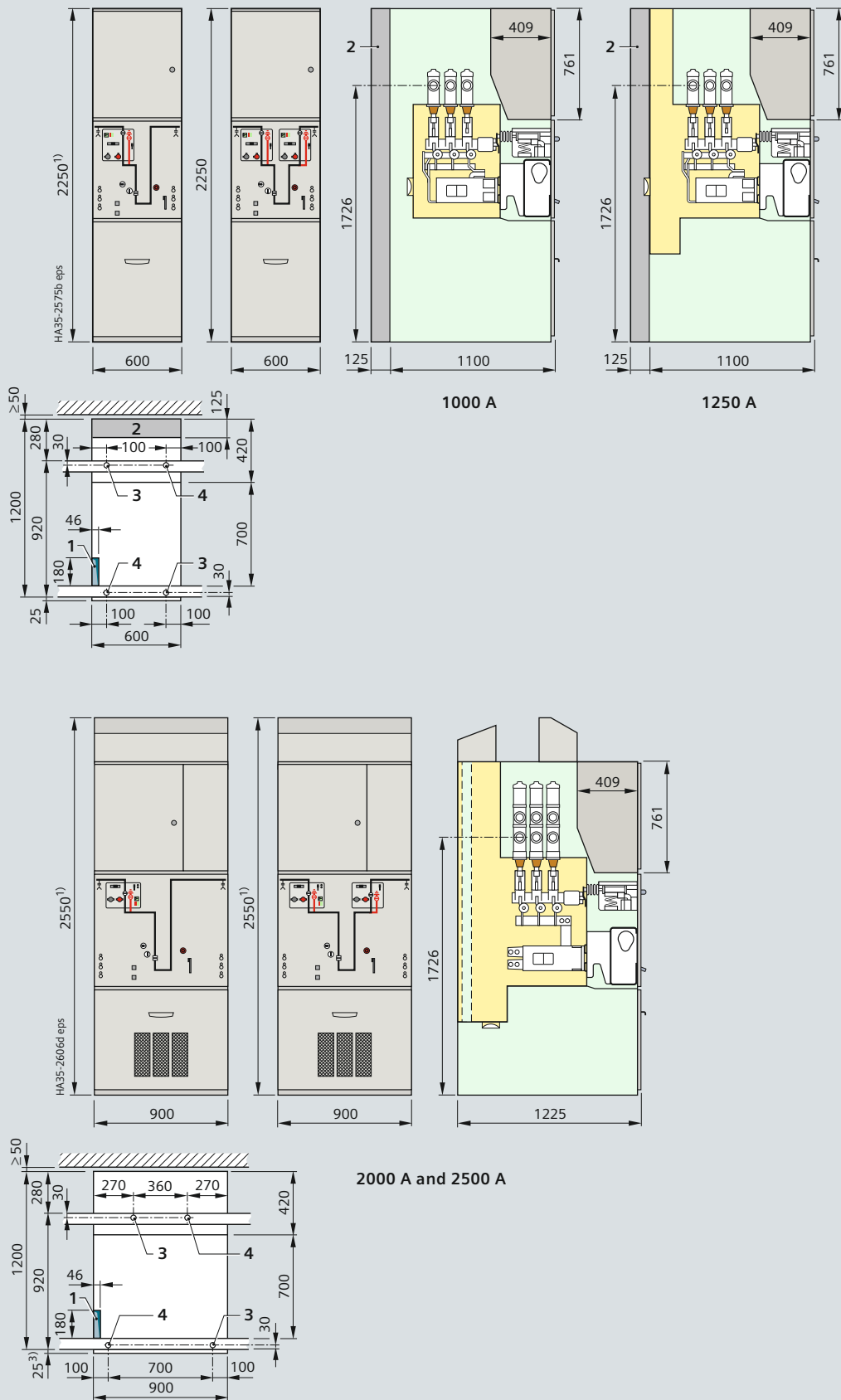
### Legend and footnotes for pages 14 and 15

- 1 Floor opening for control cables
- 2 Option: Pressure relief duct
- 3 Fixing hole for M8 / M10
- 4 Fixing hole for M8 / M10 (only for aseismic design)
- 5 Floor opening for high-voltage cables

- 1) 2650 mm for higher low-voltage compartment
- 2) 752 mm for deeper cable compartment cover
- 3) 45 mm for deeper cable compartment cover
- 4) 1120 mm for deeper cable compartment cover
- 6) 1245 mm for deeper cable compartment cover

## Front views, sections, floor openings, fixing points for single-busbar switchgear

Bus sectionalizers with one or two disconnectors (1 panel width)

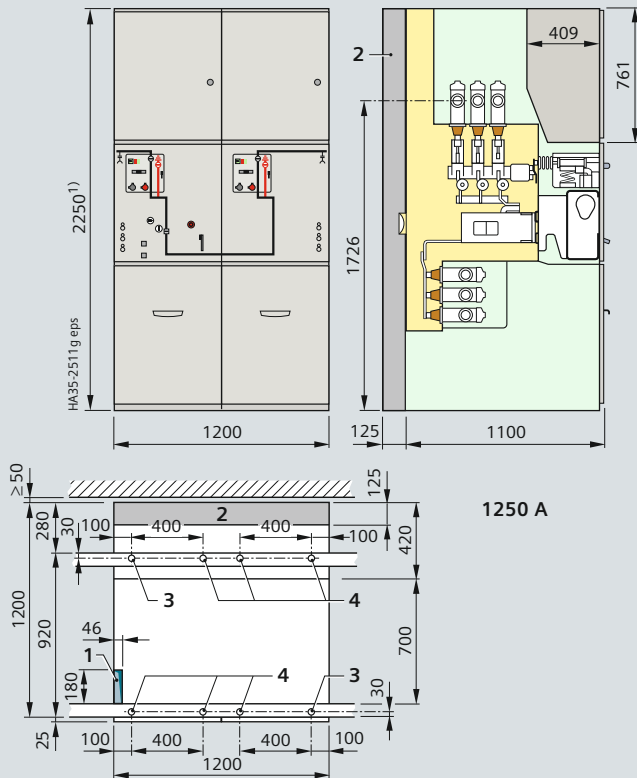


For legend and footnotes, see page 14

# Dimensions

## Front views, sections, floor openings, fixing points for single-busbar switchgear

Bus sectionalizers with disconnecter (2 panel widths)



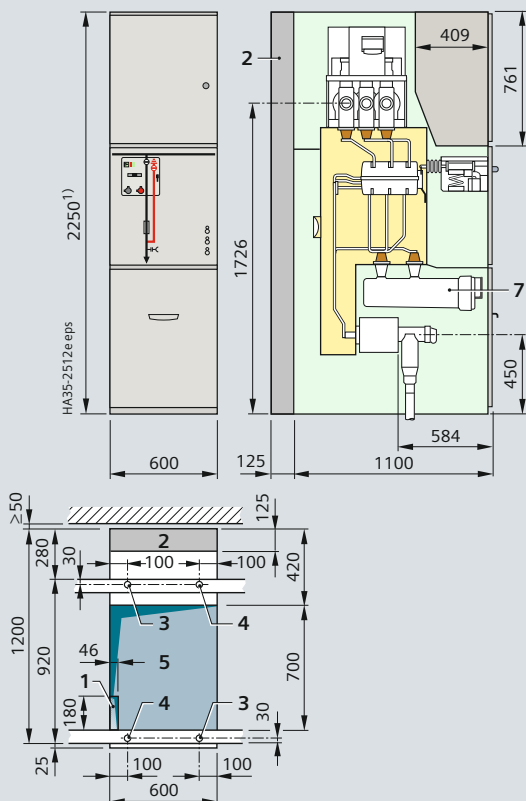
### Legend and footnotes for pages 16 and 17

- 1 Floor opening for control cables
- 2 Option: Pressure relief duct
- 3 Fixing hole for M8 / M10
- 4 Fixing hole for M8 / M10 (only for aseismic design)
- 5 Floor opening for high-voltage cables
- 7 Option: HV HRC fuses

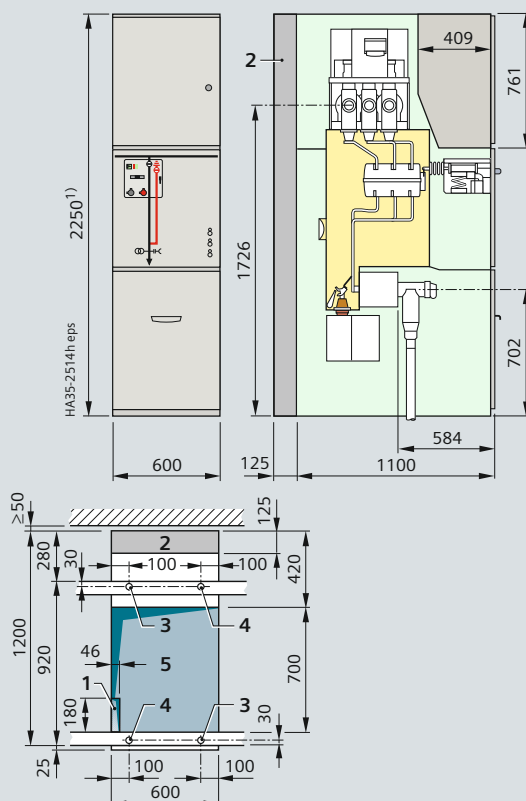
1) 2650 mm for higher low-voltage compartment

## Front views, sections, floor openings, fixing points for single-busbar switchgear

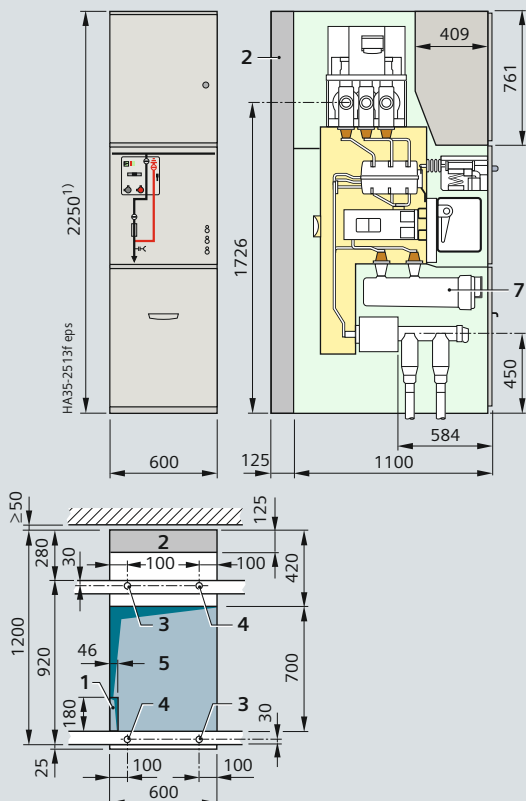
Switch-disconnector panel with HV HRC fuses



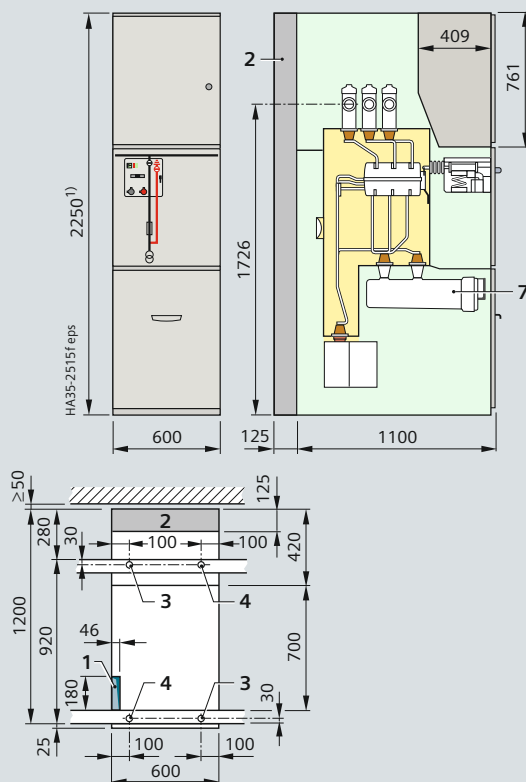
Ring-main panel  
(switch-disconnector panel without HV HRC fuses)



Vacuum contactor panel with HV HRC fuses



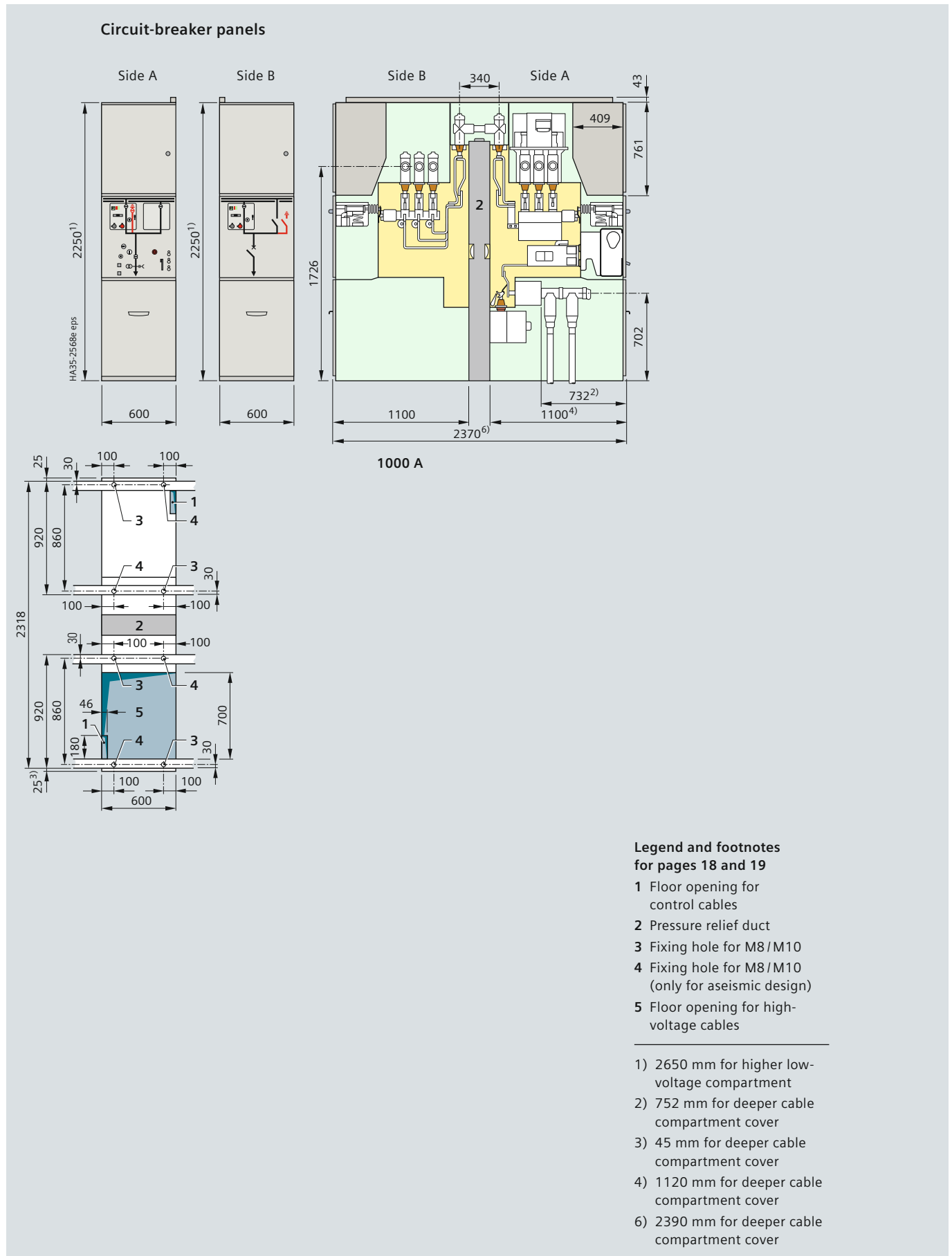
Metering panel with HV HRC fuses



For legend and footnotes, see page 16

# Dimensions

## Front views, sections, floor openings, fixing points for double-busbar switchgear



## Front views, sections, floor openings, fixing points for double-busbar switchgear

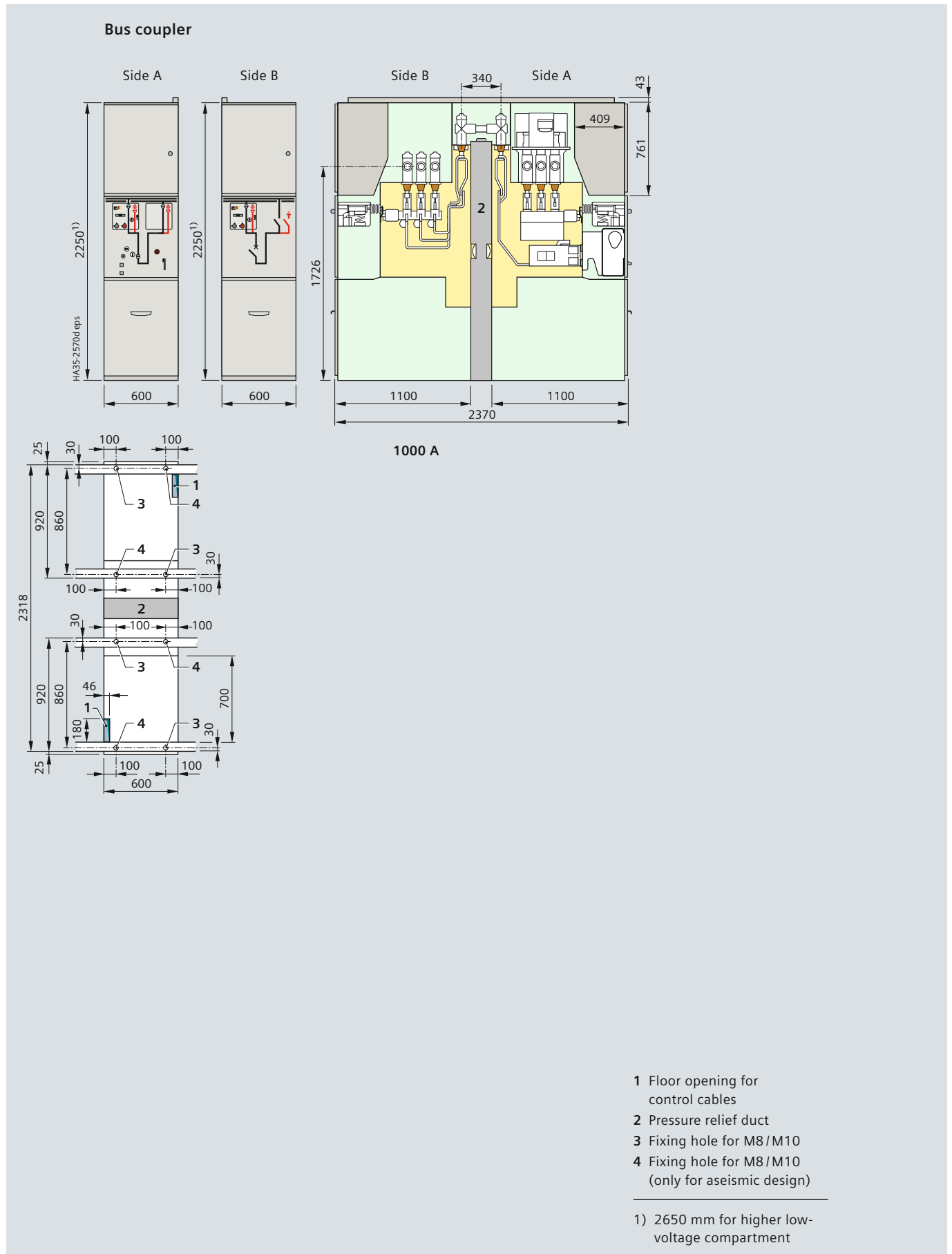
### Incoming sectionalizer



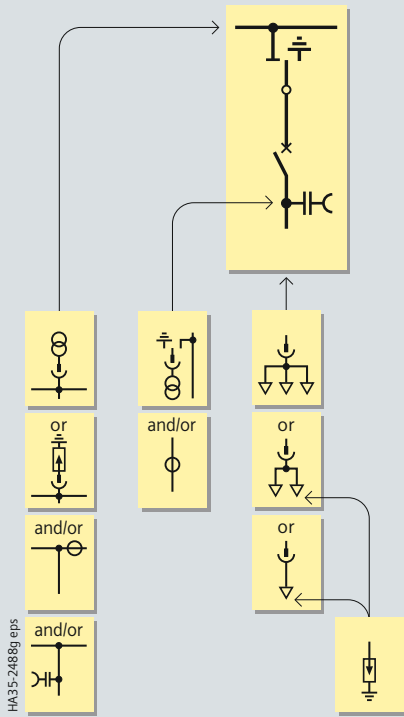
For legend and footnotes, see page 18

# Dimensions

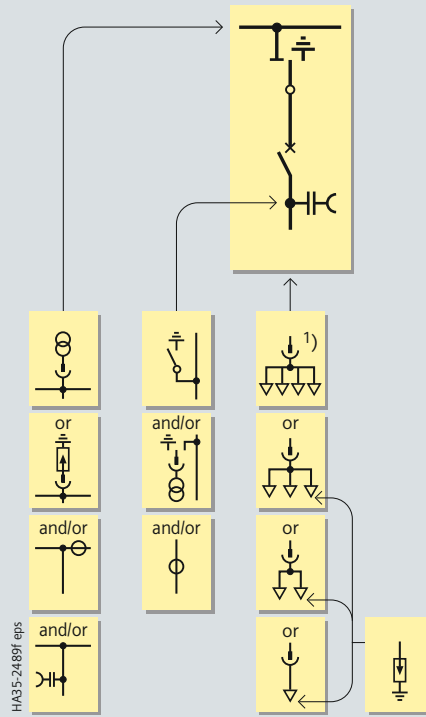
## Front views, sections, floor openings, fixing points for double-busbar switchgear



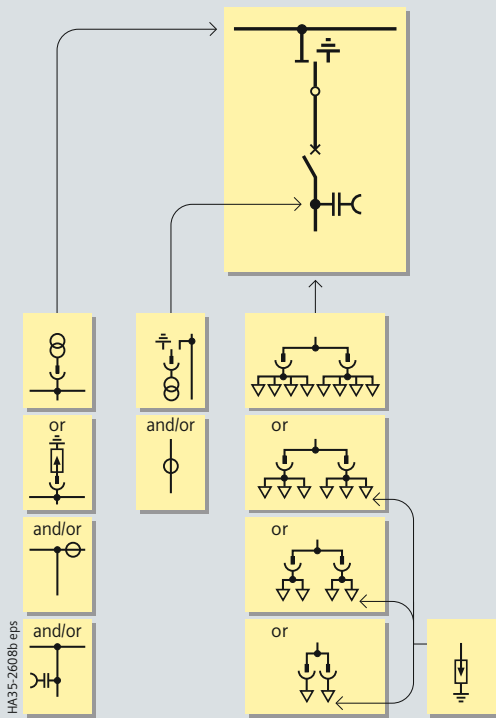
### Circuit-breaker panels



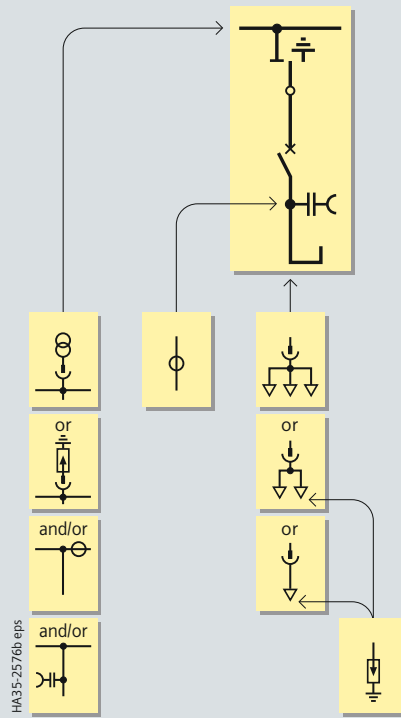
630 A



1000 A and 1250 A



2000 A and 2500 A



1250 A, top-rear cable connection



Three-position disconnector



Vacuum circuit-breaker



Plug-in voltage transformer



Disconnectable and plug-in voltage transformer



Current transformer



Capacitive voltage detecting system



Busbar earthing switch



Surge arrester or limiter



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

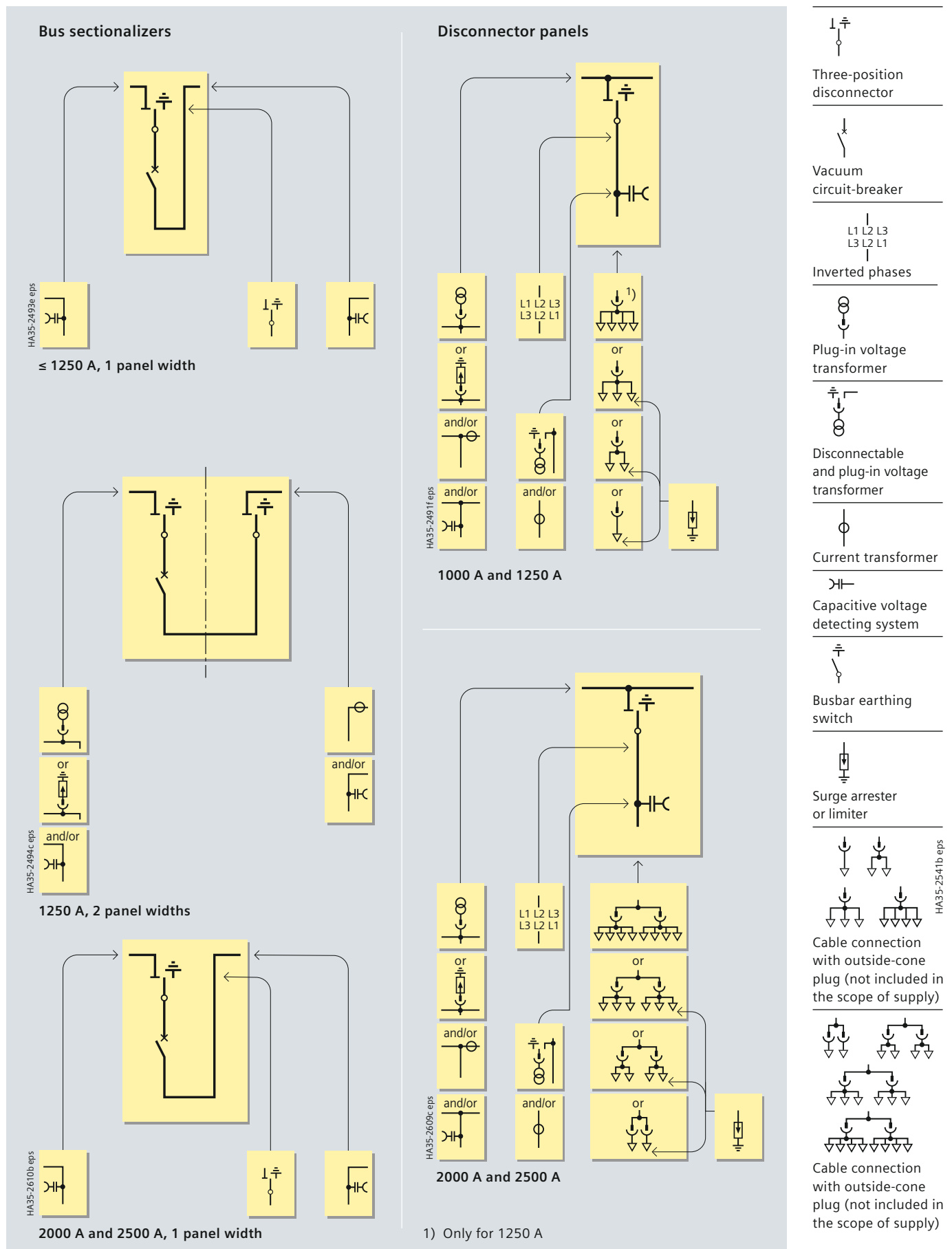


Cable connection with outside-cone plug (not included in the scope of supply)

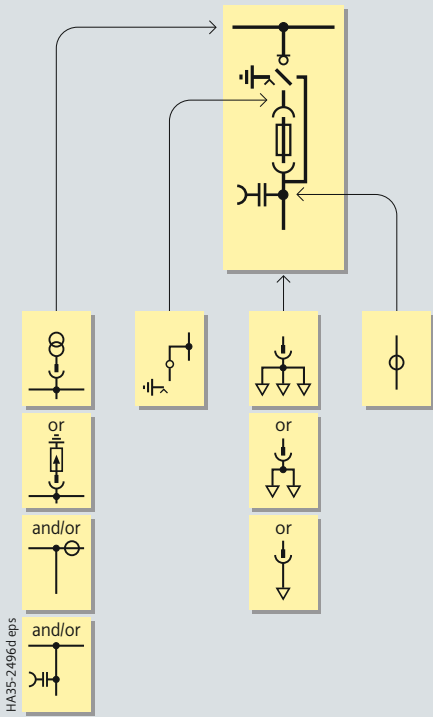
1) Only for 1250 A

# Product range

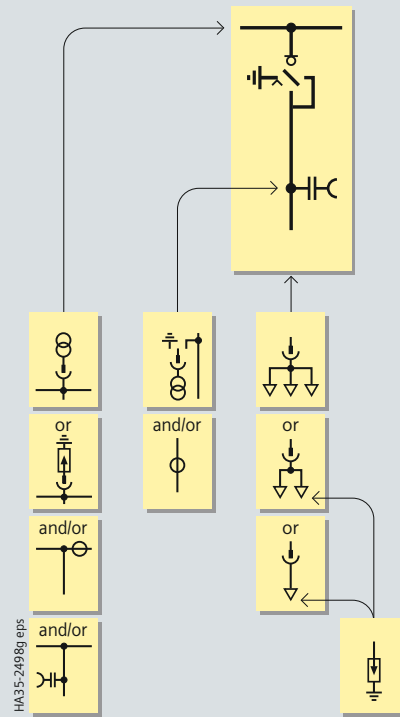
## Single-busbar panels



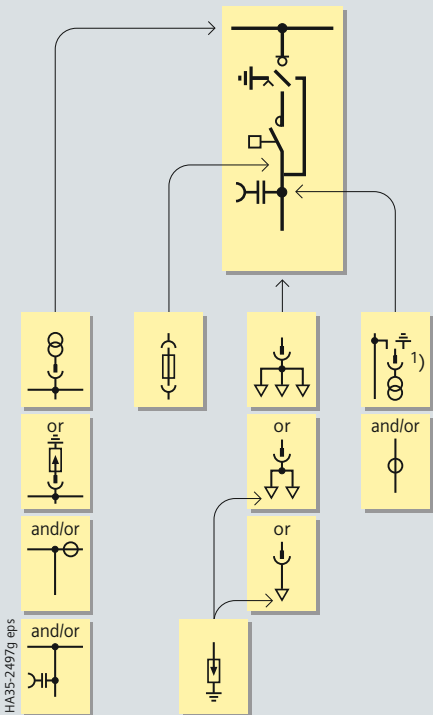
### Switch-disconnector panel



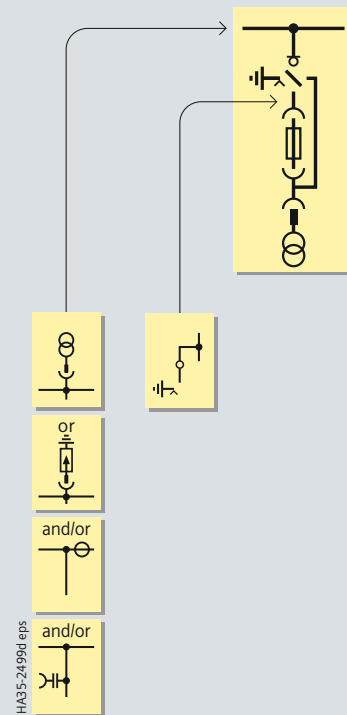
### Ring-main panel













### Vacuum contactor panel



### Metering panel



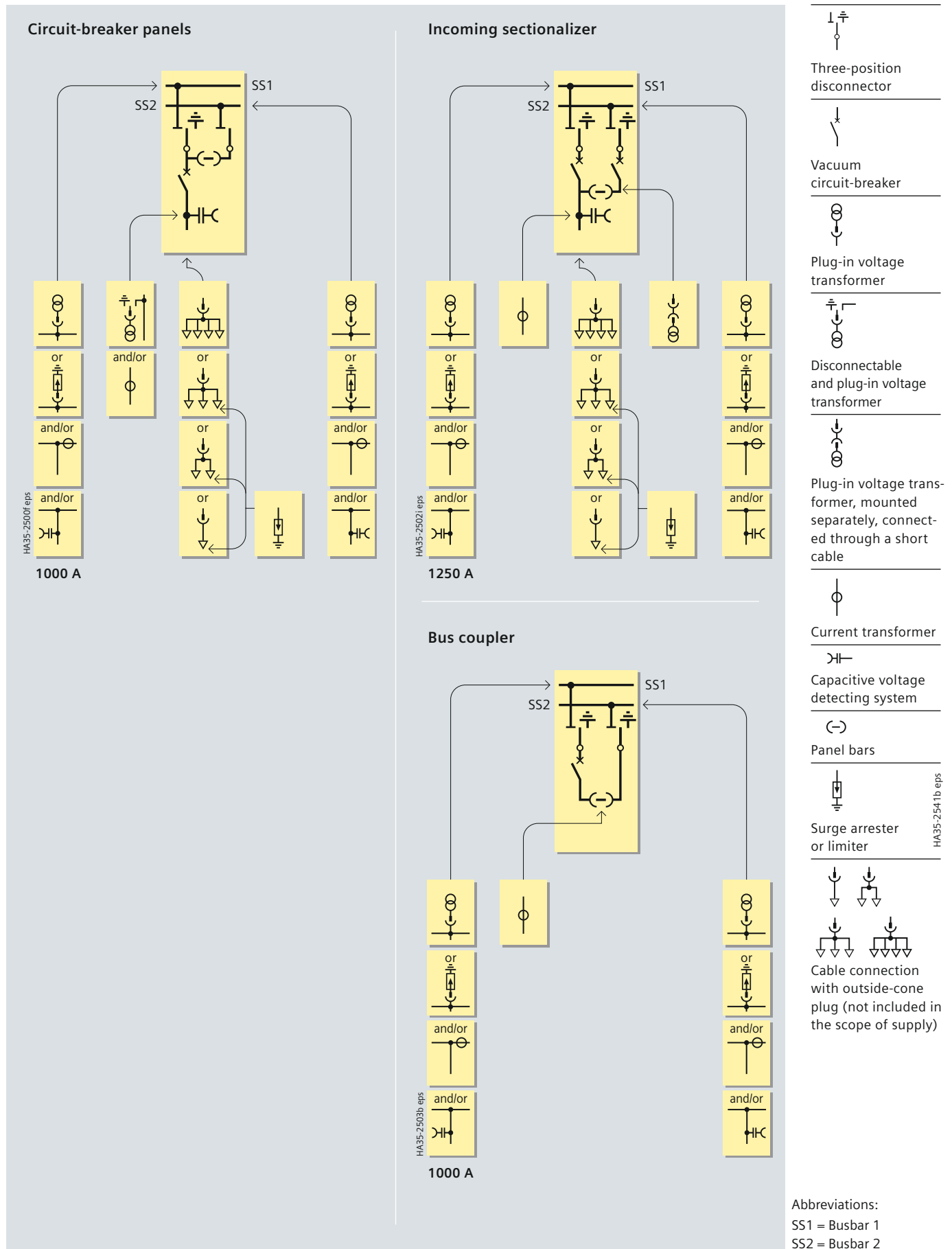
-  Three-position switch-disconnector
-  Vacuum contactor
-  HV HRC fuses
-  Plug-in voltage transformer
-  Disconnectable and plug-in voltage transformer
-  Current transformer
-  Capacitive voltage detecting system
-  2<sup>nd</sup> earthing switch for fuses
-  Surge arrester or limiter
-  Cable connection with outside-cone plug (not included in the scope of supply)

HA35-2541b eps

1) Only possible when vacuum contactor panel is designed without fuse

# Product range

## Double-busbar panels

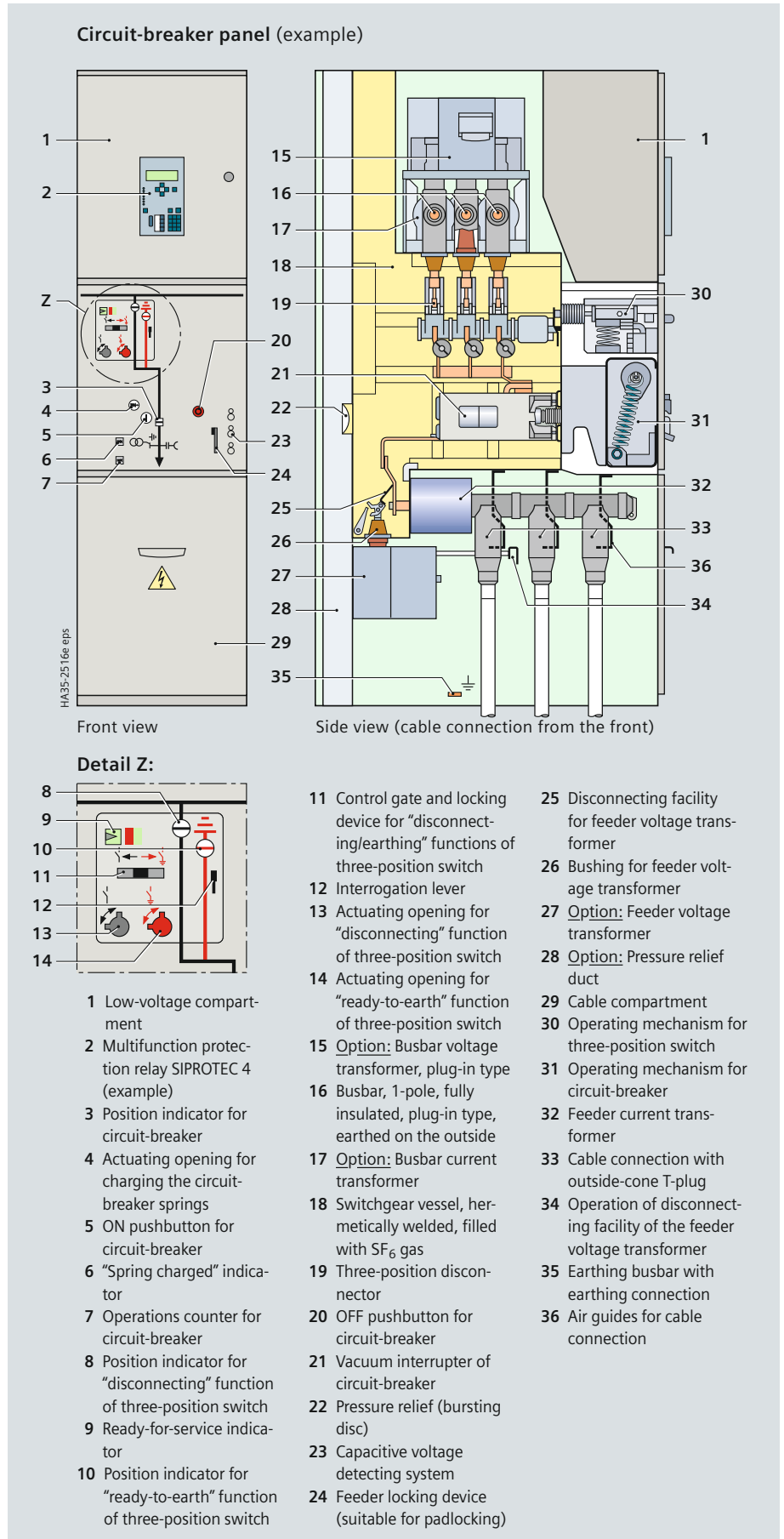


### Insulating system

- Switchgear vessel filled with SF<sub>6</sub> gas
- Features of SF<sub>6</sub> gas:
  - Non-toxic
  - Odorless and colorless
  - Non-inflammable
  - Chemically neutral
  - Heavier than air
  - Electronegative (high-quality insulator)
- Pressure of SF<sub>6</sub> gas in the switchgear vessel (absolute values at 20 °C):
  - Rated filling level: 150 kPa
  - Design pressure: 180 kPa
  - Design temperature of the SF<sub>6</sub> gas: 80 °C
- Operating pressure of bursting disc: ≥ 300 kPa
- Bursting pressure: ≥ 550 kPa
- Gas leakage rate: < 0.1 % per year.

### Panel design

- Factory-assembled, type-tested
- Metal-enclosed, metal-clad
- Hermetically tight, welded switchgear vessel made of stainless steel
- 1-pole, solid-insulated, screened busbars, plug-in type
- Maintenance-free
- Degree of protection
  - IP 65 for all high-voltage parts of the primary circuit
  - IP 3XD for the switchgear enclosure
- Vacuum circuit-breaker or vacuum contactor
- Three-position disconnector for disconnecting and earthing by means of the circuit-breaker
- Make-proof earthing by means of the vacuum circuit-breaker
- Three-position switch-disconnector
- Cable connection with outside-cone plug-in system according to DIN EN 50 181
- Wall-standing or free-standing arrangement
- Installation and possible later extension of existing panels without gas work
- Replacement of switchgear vessel without gas work
- Replacement of instrument transformers without gas work, as they are located outside the gas compartments
- Enclosure made of sendzimir-galvanized sheet steel, front cover, rear cover and end walls powder-coated in color "light basic" (SN 700)
- Low-voltage compartment removable, plug-in bus wires
- Lateral, metallic wiring ducts for control cables.



# Components

## Vacuum circuit-breaker

### Features

- According to IEC 62271-100 and VDE 0671-100 (for standards, see page 58)
- Application in hermetically welded switchgear vessel in conformity with the system
- Climate-independent vacuum interrupter poles in the SF<sub>6</sub>-filled switchgear vessel
- Maintenance-free for indoor installation according to IEC 62271-1 and VDE 0671-1
- Individual secondary equipment
- A metal bellows is used for gasketless separation of the SF<sub>6</sub> insulation and the operating mechanism (already used with success for over 2 million vacuum interrupters).

### Trip-free mechanism

The vacuum circuit-breaker is fitted with a trip-free mechanism according to IEC 62271 and VDE 0671.

### 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

- Located outside the switchgear vessel in the operating mechanism box and behind the control board
- Stored-energy spring mechanism for 10,000 operating cycles.

### Operating mechanism functions

#### Motor operating mechanism <sup>1)</sup> (M1 \*)

- 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 NXPLUS C
BREAKING	M2	IEC 62271-100	10,000 times mechanically without maintenance
	E2	IEC 62271-100	10,000 times rated normal current without maintenance 50 times short-circuit breaking current without maintenance
	C2	IEC 62271-100	Very low probability of restrikes

### Operating times

Closing time	Closing solenoid	< 75 ms
Opening time	1 <sup>st</sup> release	< 65 ms
	2 <sup>nd</sup> release	< 50 ms
Arcing time at 50 Hz		< 15 ms
Break time	1 <sup>st</sup> release	< 80 ms
	2 <sup>nd</sup> release	< 65 ms
Dead time		300 ms
Total charging time		< 15 s

Abbreviations for switching duties:

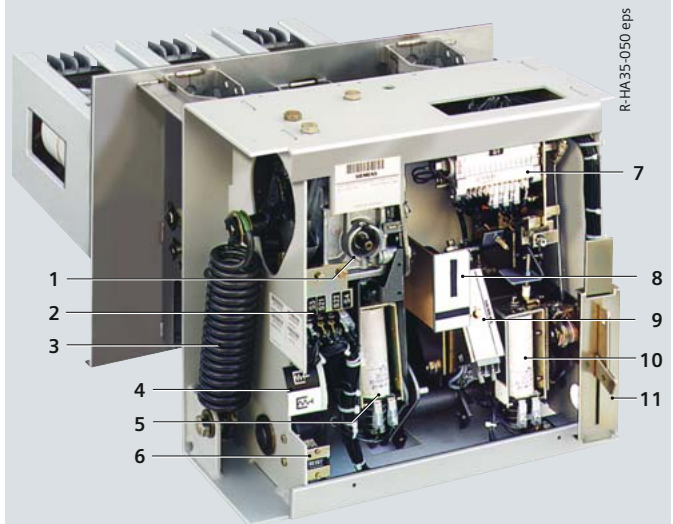
U = Synchronization and rapid load transfer (closing time ≤ 90 ms)

K = Auto-reclosing

1) Motor rating at 24 V to 240 V DC: 600 W  
100 V and 240 V AC: 750 VA

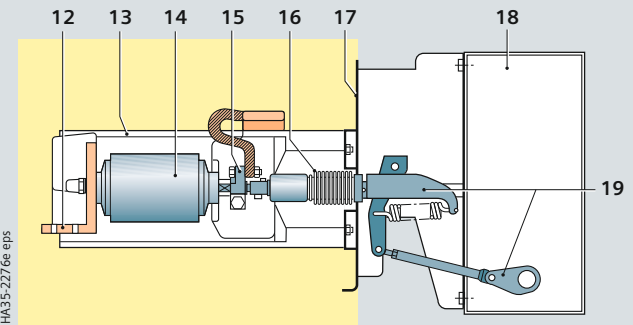
\* Item designation

### Vacuum circuit-breaker



Open on the side of the operating mechanism

- 1 Gear with motor (M1 \*)
- 2 Position switch (S4 \*)
- 3 Closing spring
- 4 "Closing spring charged" indication
- 5 Closing solenoid (Y9 \*)
- 6 Operations counter
- 7 Auxiliary switch 6 NO + 6 NC (S1 \*), option: 12 NO + 12 NC
- 8 CLOSED/OPEN position indicator for circuit-breaker
- 9 Option: 2<sup>nd</sup> release (Y2 \*)
- 10 1<sup>st</sup> release (Y1 \*)
- 11 Feeder locking device



Section through the vacuum circuit-breaker

- 12 Fixed terminal
- 13 Pole support
- 14 Vacuum interrupter
- 15 Moving terminal
- 16 Metal bellows
- 17 Switchgear vessel, SF<sub>6</sub>-insulated, with vacuum interrupter
- 18 Operating mechanism box (see figure above)
- 19 Operating kinematics

For further technical data and description of typical applications, please refer also to Catalog HG 11.05 "3AH5 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 variations, thus allowing even the highest requirements to be satisfied:

#### Closing solenoid

- Type 3AY15 10 (Y9 \*)
- For electrical closing.

#### Shunt releases

- Types:
  - Standard: 3AY15 10 (Y1 \*)
  - Option: 3AX11 01 (Y2 \*), with energy store
- Tripping by protection relay or electrical actuation.

#### C.t.-operated release

- Type 3AX11 02 (Y4 \*), 0.5 A
- Type 3AX11 04 (Y6 \*) for tripping pulse  $\geq 0.1$  Ws in conjunction with suitable protection systems
- Used if external auxiliary voltage is missing, tripping via protection relay.

#### Undervoltage release

- Type 3AX11 03 (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 (mechanical and electrical)

- 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 cut-out 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  $\geq 60$  V DC.

#### Auxiliary switch

- Type 3SV9 (S1 \*)
- Standard: 6 NO + 6 NC, free contacts thereof <sup>1)</sup> 3 NO + 4 NC
- Option: 12 NO + 12 NC, free contacts thereof <sup>1)</sup> 9 NO + 6 NC.

#### Position switch

- Type 3SE4 (S4 \*)
- For signaling "closing spring charged".

#### Mechanical interlock

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

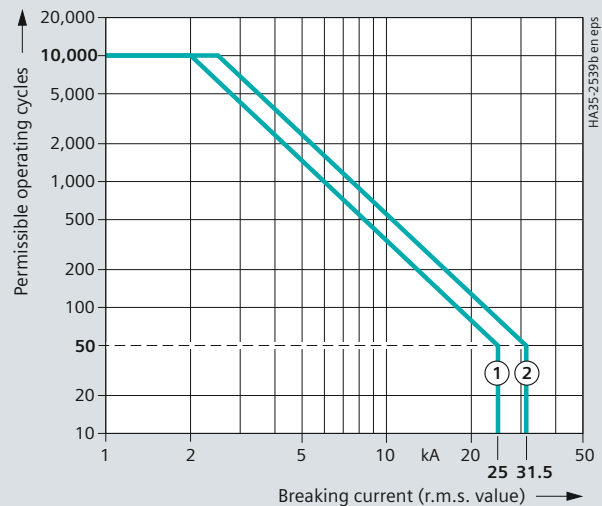
1) For utilization by the customer

\* Item designation

Abbreviations: NO = normally open contact

NC = normally closed contact

### Switching rate of the vacuum interrupter



#### Electrical data (curve 1)

Rated voltage 24 kV  
 Rated short-circuit breaking current  $\leq 25$  kA  
 Rated normal current  $\leq 2000$  A

#### Electrical data (curve 2)

Rated voltage 15 kV  
 Rated short-circuit breaking current  $\leq 31.5$  kA  
 Rated normal current  $\leq 2500$  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)  
 Multiple-shot reclosing: O-t-CO-t'-CO-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

### Possible release combinations

Release	Release combination				
	1	2	3	4	5
1 <sup>st</sup> shunt release type 3AY15 10	•	•	•	–	•
2 <sup>nd</sup> shunt release type 3AY11 01	–	•	–	–	–
C.t.-operated release type 3AX11 02, 0.5 A, or type 3AX11 04, 0.1 Ws	–	–	•	•	–
Undervoltage release type 3AX11 03	–	–	–	–	•

1 unit of each release, a maximum of 2 releases can be combined only.

# Components

## Three-position switches

### Common features

- According to IEC 62271-102 and VDE 0671-102 (for standards, see page 58)
- Application in hermetically welded switchgear vessel in conformity with the system
- Climate-independent contacts in the SF<sub>6</sub>-filled switchgear vessel
- Maintenance-free for indoor installation according to IEC 62271-1 and VDE 0671-1
- Individual secondary equipment
- A metal bellows is used for gasketless separation of the SF<sub>6</sub> insulation and the operating mechanism (already used with success for over 2 million vacuum interrupters)
- A rotary bushing is used for separation of the SF<sub>6</sub> insulation and the operating mechanism (already used with success millions of times in medium-voltage and high-voltage switchgear)
- Compact design due to short contact gaps in SF<sub>6</sub> gas
- Operation via gas-tight welded-in metal bellows or rotary bushing at the front of the switchgear vessel
- Reliable mechanical switch position up to the operating front of the panel (in double-busbar switchgear, the position indication for side B is done on side A via electrical position indicators).

### Three-position disconnecter

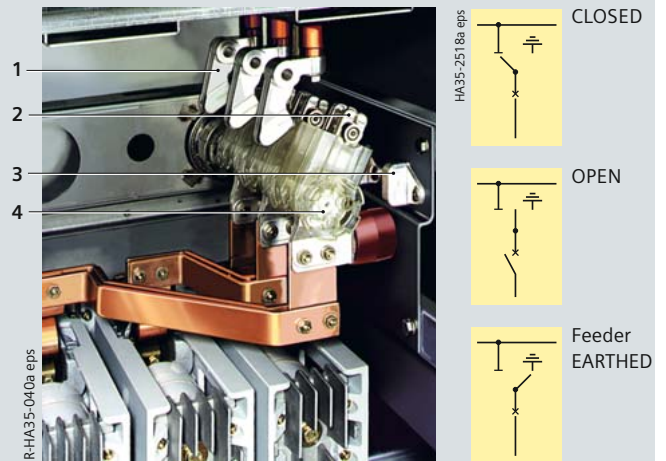
- Application in:
  - Circuit-breaker panel 1000 A to 2500 A (with interlock against the circuit-breaker)
  - Disconnecter panel 1000 A to 2500 A
  - Bus sectionalizer 1000 A to 2500 A
- 2000 mechanical operating cycles for CLOSED / OPEN / READY-TO-EARTH.

### Three-position switch-disconnector

- Application in:
  - Circuit-breaker panel 630 A (as disconnecter with interlock against the circuit-breaker)
  - Switch-disconnector panel
  - Ring-main panel
  - Contactor panel
  - Metering panel
- 2000<sup>1)</sup> mechanical operating cycles for CLOSED / OPEN / EARTHED
- Switching functions as general-purpose switch-disconnector according to:
  - IEC 60265-1
  - VDE 0670-301
  - IEC 62271-102
  - VDE 0671-102 (for standards, see page 58)
- Designed as a multi-chamber three-position switch with the functions:
  - Switch-disconnector and
  - Make-proof earthing switch.

1) For switch-disconnector panel:  
1000 mechanical operating cycles for  
CLOSED / OPEN / EARTHED

### Switch positions of the three-position switches

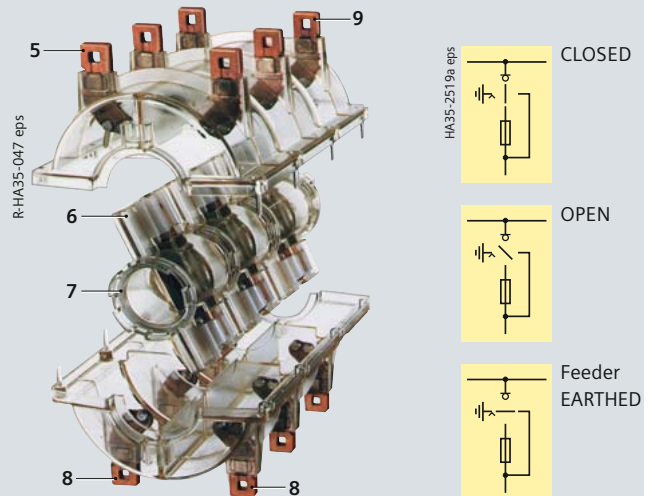


#### Three-position disconnecter

(in OPEN position)

with vacuum circuit-breaker arranged below (view into the switchgear vessel opened at the rear)

- 1 Fixed contact at the busbar
- 2 Swivel-mounted contact blade
- 3 Fixed contact for "feeder EARTHED"
- 4 Operating shaft



#### Three-position switch-disconnector

(exploded view)

- 5 Fixed contacts to earth
- 6 Rotary contact blade
- 7 Operating shaft
- 8 Fixed contact to the feeder
- 9 Fixed contact to the busbar

### 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 control gate is in neutral position again
- Switchgear interlocking system also possible with electro-mechanical interlocks if switchgear is equipped with motor operating mechanisms (mechanical interlocking for manual operation remains).

### Switch positions

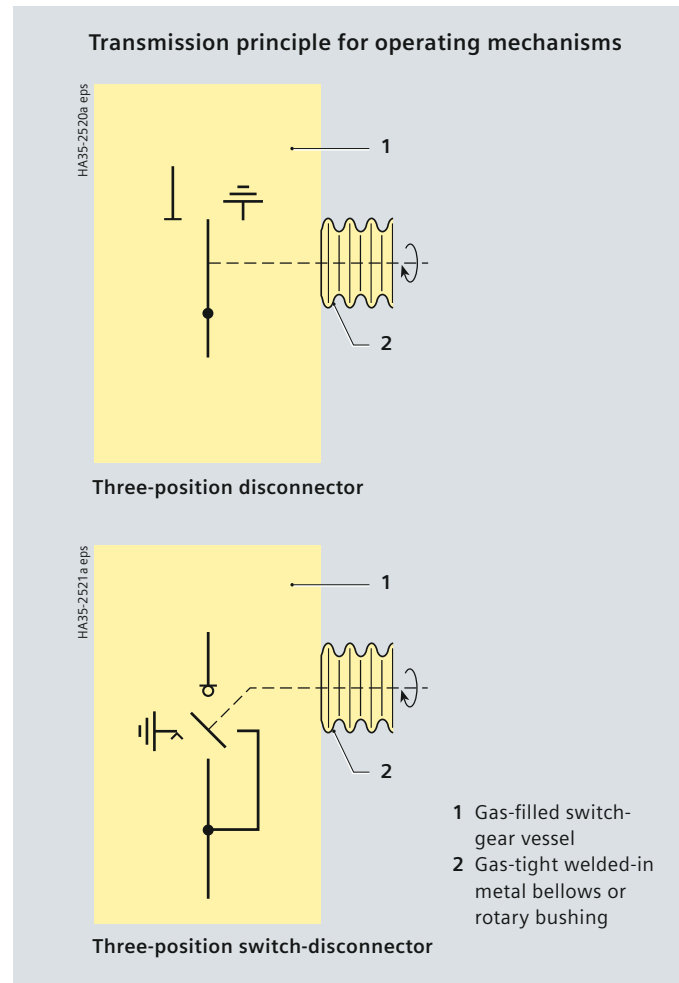
- "CLOSED", "OPEN", "EARTHED" or "READY-TO-EARTH"
- In circuit-breaker panels, earthing and short-circuiting the cable connection is completed by closing the vacuum circuit-breaker.

### Operating mechanism

- Spring-operated mechanism, used in:
  - Circuit-breaker panels 630 A to 1250 A
  - Bus sectionalizers 1000 A, 1250 A
  - Disconnecter panels 1000 A, 1250 A
  - Vacuum contactor panel
  - Metering panel
  - Ring-main panel
- Slow motion mechanism, used in:
  - Circuit-breaker panels 2000 A, 2500 A
  - Bus sectionalizers 2000 A, 2500 A
  - Disconnecter panels 2000 A, 2500 A
- Spring-operated / stored-energy mechanism, used in:
  - Switch-disconnector panel
- Spring-operated and spring-operated / stored-energy and slow motion mechanism actuated via operating lever at the operating front of the panel
- Separate operating shafts for the DISCONNECTING and EARTHING or READY-TO-EARTH functions
- Option: Motor operating mechanism for the DISCONNECTING and EARTHING or READY-TO-EARTH functions
- Spring-operated/stored-energy mechanism for the switch-disconnector function with fuses: Opening spring precharged (after closing)
- Maintenance-free due to non-rusting design of parts subjected to mechanical stress
- Bearings which require no lubrication.

### Transmission principle for operating mechanisms

- Transmission of operating power from outside into the gas-filled switchgear vessel by means of a metal bellows or a rotary bushing
- Gas-tight
- Maintenance-free.



### Endurance class of three-position disconnecter

Function	Class	Standard	Property of NXPLUS C
DISCONNECTING	M1	IEC 62271-102	2000 times mechanically without maintenance
READY-TO-EARTH			1000 times mechanically without maintenance
EARTHING	E2 <sup>1)</sup>	IEC 62271-102	50 times rated short-circuit making current $I_{ma}$ without maintenance

### Endurance class of three-position switch-disconnector

Function	Class	Standard	Property of NXPLUS C
DISCONNECTING	M1 <sup>2)</sup>	IEC 62271-102	2000 times mechanically without maintenance
LOAD BREAKING	M1	IEC 60265-1	1000 times mechanically without maintenance
	E3	IEC 60265-1	100 times rated mainly active load breaking current $I_1$ without maintenance 5 times rated short-circuit making current $I_{ma}$ without maintenance
EARTHING	E2	IEC 62271-102	5 times rated short-circuit making current $I_{ma}$ without maintenance

1) By closing the circuit-breaker

2) For switch-disconnector panel: M0 1000 times mechanically without maintenance

# Components

## HV HRC fuse assembly

### Features

- Application in:
  - Switch-disconnector panel
  - Contactor panel
  - Metering panel
- HV HRC fuse-links according to DIN 43 625 (main dimensions) with striker in "medium" version according to IEC 60282/ VDE 0670-4
- As short-circuit protection before transformers in the switch-disconnector panel
- As short-circuit protection before motors in the contactor panel
- As short-circuit protection before voltage transformers in the metering panel
- With selectivity (depending on correct selection) to upstream and downstream connected equipment
- 1-pole insulated
- Requirements according to IEC 62271-105 and VDE 067-105 fulfilled by combination of HV HRC fuses with the three-position switch-disconnector
- Climate-independent and maintenance-free, with fuse boxes made of cast resin
- Fuse assembly connected to the three-position switch-disconnector via welded-in bushings and connecting bars
- Arrangement of fuse assembly below the switchgear vessel
- Fuses can only be replaced if feeder is earthed
- Option: "Fuse tripped" indication for remote electrical indication with 1 normally open contact.

### Mode of operation

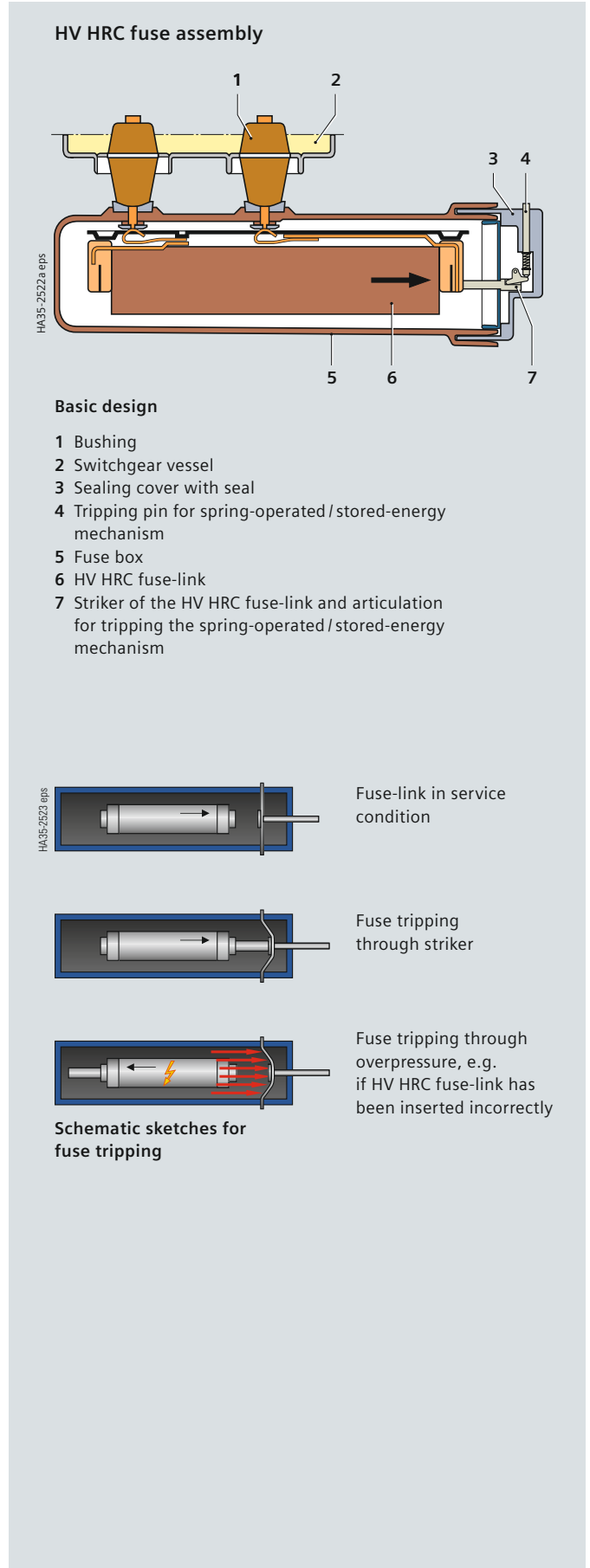
In the event that an HV HRC fuse-link has tripped, the switch is tripped via an articulation which is integrated into the cover of the fuse box (see figure).

In the event that the fuse tripping fails, e.g. if the fuse has been inserted incorrectly, the fuse box is protected by thermal protection. The overpressure generated by overheating trips the switch via the diaphragm in the cover of the fuse box and via an articulation. This breaks the current before the fuse box incurs irreparable damage.

This thermal protection works independently of the type and design of the HV HRC fuse used. Like the fuse itself, it is maintenance-free and independent of any outside climatic effects. Furthermore, the SIBA HV HRC fuses release the striker depending on the temperature and trip the three-position switch-disconnector as early as in the fuse overload range. Impermissible heating of the fuse box can be avoided in this way.

### Replacement of HV HRC fuse-links

- The transformer feeder has to be isolated and earthed.
- Subsequent manual replacement of the HV HRC fuse-link after removing the cable compartment cover.



## Allocation of three-position switch-disconnector with HV HRC fuses, transformer ratings

The table shows the recommended HV HRC fuse-links make SIBA (electrical data valid for ambient air temperatures of up to 40 °C) for fuse protection of transformers.

### Recommendation

The three-position switch-disconnector in the transformer feeder (transformer switch) was combined with HV HRC fuse-links and tested in accordance with IEC 62271-105. Higher transformer ratings on request.

### Standards

- HV HRC fuse-links with striker in "medium" version according to
- IEC 60282
  - VDE 0670-4 and 402
  - DIN 43 625 main dimensions.

Note: The exact selection of the SIBA fuse to be used is given in the NXPLUS C operating and installation instructions.

Dimension "e" = 292 mm with extension tube SIBA 3400601

Transformer				HV HRC fuse			
Operating voltage $U$ kV	Rated power $S_N$ kVA	Relative impedance voltage $u_k$ %	Rated current $I_1$ A	Rated normal current of fuse $I_{fuse}$ A	Operating voltage $U_{fuse}$ kV	Dimension "e" mm	Order No. Make SIBA
3.3 to 3.6	20	4	3.5	6.3	3 to 7.2	292	30 098 13.6,3
				10	3 to 7.2	292	30 098 13.10
	30	4	5.25	10	3 to 7.2	292	30 098 13.10
				16	3 to 7.2	292	30 098 13.16
	50	4	8.75	16	3 to 7.2	292	30 098 13.16
				20	3 to 7.2	292	30 098 13.20
	75	4	13.1	20	3 to 7.2	292	30 098 13.20
				25	3 to 7.2	292	30 098 13.25
	100	4	17.5	31.5	3 to 7.2	292	30 098 13.31,5
				40	3 to 7.2	292	30 098 13.40
	125	4	21.9	31.5	3 to 7.2	292	30 098 13.31,5
40				3 to 7.2	292	30 098 13.40	
160	4	28	40	3 to 7.2	292	30 098 13.40	
			50	3 to 7.2	292	30 098 13.50	
200	4	35	50	3 to 7.2	292	30 098 13.50	
			63	3 to 7.2	292	30 099 13.63	
250	4	43.7	63	3 to 7.2	292	30 099 13.63	
			80	3 to 7.2	292	30 099 13.80	
315	4	55.1	80	3 to 7.2	292	30 099 13.80	
			100	3 to 7.2	292	30 099 13.100	
400	4	70	100	3 to 7.2	292	30 099 13.100	
4 to 4.8	20	4	2.9	6.3	3 to 7.2	292	30 098 13.6,3
				10	3 to 7.2	292	30 098 13.10
	30	4	4.4	10	3 to 7.2	292	30 098 13.10
				16	3 to 7.2	292	30 098 13.16
	50	4	7.3	16	3 to 7.2	292	30 098 13.16
				20	3 to 7.2	292	30 098 13.20
	75	4	11	16	3 to 7.2	292	30 098 13.16
				20	3 to 7.2	292	30 098 13.20
	100	4	14.5	20	3 to 7.2	292	30 098 13.20
				25	3 to 7.2	292	30 098 13.25
	125	4	18.1	25	3 to 7.2	292	30 098 13.25
				31.5	3 to 7.2	292	30 098 13.31,5
	160	4	23.1	31.5	3 to 7.2	292	30 098 13.31,5
				40	3 to 7.2	292	30 098 13.40
200	4	28.7	40	3 to 7.2	292	30 098 13.40	
			50	3 to 7.2	292	30 098 13.50	
250	4	36.1	50	3 to 7.2	292	30 098 13.50	
			63	3 to 7.2	292	30 099 13.63	
315	4	45.5	63	3 to 7.2	292	30 099 13.63	
			80	3 to 7.2	292	30 099 13.80	
400	4	57.8	80	3 to 7.2	292	30 099 13.80	
			100	3 to 7.2	292	30 099 13.100	
500	4	72.2	100	3 to 7.2	292	30 099 13.100	
5 to 5.5	20	4	2.3	6.3	3 to 7.2	292	30 098 13.6,3
				10	3 to 7.2	292	30 098 13.10
	30	4	3.4	6.3	3 to 7.2	292	30 098 13.6,3
				10	3 to 7.2	292	30 098 13.10
	50	4	5.7	10	3 to 7.2	292	30 098 13.10
				16	3 to 7.2	292	30 098 13.16
	75	4	8.6	16	3 to 7.2	292	30 098 13.16
20				3 to 7.2	292	30 098 13.20	
100	4	11.5	16	3 to 7.2	292	30 098 13.16	
			20	3 to 7.2	292	30 098 13.20	
125	4	14.4	20	3 to 7.2	292	30 098 13.20	
			25	3 to 7.2	292	30 098 13.25	

(continued on next page)

# Components

## Allocation of three-position switch-disconnector with HV HRC fuses, transformer ratings

Transformer				HV HRC fuse			
Operating voltage $U$ kV	Rated power $S_N$ kVA	Relative impedance voltage $u_k$ %	Rated current $I_1$ A	Rated normal current of fuse $I_{fuse}$ A	Operating voltage $U_{fuse}$ kV	Dimension "e" mm	Order No. Make SIBA
5 to 5.5	160	4	18.4	31.5	3 to 7.2	292	30 098 13.31,5
				40	3 to 7.2	292	30 098 13.40
	200	4	23	40	3 to 7.2	292	30 098 13.40
				50	3 to 7.2	292	30 098 13.50
	250	4	28.8	40	3 to 7.2	292	30 098 13.40
				50	3 to 7.2	292	30 098 13.50
	315	4	36.3	50	3 to 7.2	292	30 098 13.50
63				3 to 7.2	292	30 099 13.63	
400	4	46.1	63	3 to 7.2	292	30 099 13.63	
			80	3 to 7.2	292	30 099 13.80	
500	4	57.7	80	3 to 7.2	292	30 099 13.80	
			100	3 to 7.2	292	30 099 13.100	
630	4	72.74	63	3 to 7.2	292	30 099 13.100	
6 to 7.2	20	4	1.9	6.3	6 to 12	292	30 004 13.6,3
				6.3	3 to 7.2	292	30 098 13.6,3
				6.3	6 to 12	442	30 101 13.6,3
	30	4	2.8	6.3	6 to 12	292	30 004 13.6,3
				6.3	3 to 7.2	292	30 098 13.6,3
				6.3	6 to 12	442	30 101 13.6,3
	50	4	4.8	10	3 to 7.2	292	30 098 13.10
				10	6 to 12	292	30 004 13.10
				10	6 to 12	442	30 101 13.10
				16	3 to 7.2	292	30 098 13.16
				16	6 to 12	292	30 004 13.16
				16	6 to 12	442	30 101 13.16
	75	4	7.2	16	3 to 7.2	292	30 098 13.16
				16	6 to 12	292	30 004 13.16
				16	6 to 12	442	30 101 13.16
	100	4	9.6	16	3 to 7.2	292	30 098 13.16
				16	6 to 12	292	30 004 13.16
				16	6 to 12	442	30 101 13.16
				20	3 to 7.2	292	30 098 13.20
				20	6 to 12	292	30 004 13.20
				20	6 to 12	442	30 101 13.20
	125	4	12	20	3 to 7.2	292	30 098 13.20
				20	6 to 12	292	30 004 13.20
				20	6 to 12	442	30 101 13.20
				25	3 to 7.2	292	30 098 13.25
				25	6 to 12	292	30 004 13.25
				25	6 to 12	442	30 101 13.25
	160	4	15.4	31.5	3 to 7.2	292	30 098 13.31,5
				31.5	6 to 12	292	30 004 13.31,5
				31.5	6 to 12	442	30 101 13.31,5
	200	4	19.2	31.5	3 to 7.2	292	30 098 13.31,5
				31.5	6 to 12	292	30 004 13.31,5
31.5				6 to 12	442	30 101 13.31,5	
40				3 to 7.2	292	30 098 13.40	
40				6 to 12	292	30 004 13.40	
40				6 to 12	442	30 101 13.40	
250	4	24	40	3 to 7.2	292	30 098 13.40	
			40	6 to 12	292	30 004 13.40	
			40	6 to 12	442	30 101 13.40	
			50	3 to 7.2	292	30 098 13.50	
			50	6 to 12	292	30 004 13.50	
			50	6 to 12	442	30 101 13.50	
315	4	30.3	50	3 to 7.2	292	30 098 13.50	
			50	6 to 12	292	30 004 13.50	
			50	6 to 12	442	30 101 13.50	
			63	6 to 12	292	30 012 43.63	
400	4	38.4	63	3 to 7.2	292	30 099 13.63	
			63	6 to 12	292	30 012 13.63	
			63	6 to 12	442	30 102 13.63	
			63	6 to 12	292	30 012 43.63	
			80	6 to 12	292	30 012 43.80	
			80	6 to 12	442	30 102 43.80	

(continued on next page)

## Allocation of three-position switch-disconnector with HV HRC fuses, transformer ratings

Transformer				HV HRC fuse			
Operating voltage $U$ kV	Rated power $S_N$ kVA	Relative impedance voltage $u_k$ %	Rated current $I_1$ A	Rated normal current of fuse $I_{fuse}$ A	Operating voltage $U_{fuse}$ kV	Dimension "e" mm	Order No. Make SIBA
6 to 7.2	500	4	48	80	6 to 12	292	30 012 43.80
				80	6 to 12	442	30 102 43.80
				80	3 to 7.2	292	30 099 13.80
				80	6 to 12	292	30 012 13.80
				80	6 to 12	442	30 102 13.80
				100	6 to 12	292	30 012 43.100
	630	4	61	100	6 to 12	292	30 099 13.100
				100	6 to 12	292	30 012 13.100
				100	6 to 12	442	30 102 13.100
				100	6 to 12	292	30 012 43.100
				100	6 to 12	442	30 102 43.100
				125	6 to 12	292	30 020 43.125
125	6 to 12	442	30 103 43.125				
800	5 to 6	77	125	6 to 12	442	30 103 43.125	
7.6 to 8.4	20	4	1.5	6.3	6 to 12	292	30 004 13.6,3
				6.3	6 to 12	442	30 101 13.6,3
	30	4	2.27	5	6 to 12	292	30 004 13.5
				6.3	6 to 12	292	30 004 13.6,3
				6.3	6 to 12	442	30 101 13.6,3
	50	4	3.7	10	6 to 12	292	30 004 13.10
				10	6 to 12	442	30 101 13.10
	75	4	5.7	16	6 to 12	292	30 004 13.16
				16	6 to 12	442	30 101 13.16
	100	4	7.6	16	6 to 12	292	30 004 13.16
				16	6 to 12	442	30 101 13.16
	125	4	9.5	20	6 to 12	292	30 004 13.20
				20	6 to 12	442	30 101 13.20
	160	4	12.1	31.5	6 to 12	292	30 004 13.31,5
				31.5	6 to 12	442	30 101 13.31,5
	200	4	15.2	31.5	6 to 12	292	30 004 13.31,5
31.5				6 to 12	442	30 101 13.31,5	
250	4	19	40	6 to 12	292	30 004 13.40	
			40	6 to 12	442	30 101 13.40	
315	4	23.9	50	6 to 12	292	30 004 13.50	
			50	6 to 12	442	30 101 13.50	
400	4	30.3	63	6 to 12	292	30 012 13.63	
			63	6 to 12	442	30 102 13.63	
500	4	37.9	80	6 to 12	292	30 012 43.80	
			80	6 to 12	442	30 102 43.80	
630	4	47.8	100	6 to 12	292	30 012 43.100	
			100	6 to 12	442	30 102 43.100	
8.9	20	4	1.3	6.3	6 to 12	292	30 004 13.6,3
				6.3	6 to 12	442	30 101 13.6,3
	30	4	2	5	6 to 12	292	30 004 13.5
				6.3	6 to 12	292	30 004 13.6,3
				6.3	6 to 12	442	30 101 13.6,3
	50	4	3.3	10	6 to 12	292	30 004 13.10
				10	6 to 12	442	30 101 13.10
	75	4	4.9	16	6 to 12	292	30 004 13.16
				16	6 to 12	442	30 101 13.16
	100	4	6.5	16	6 to 12	292	30 004 13.16
				16	6 to 12	442	30 101 13.16
	125	4	8.1	20	6 to 12	292	30 004 13.20
				20	6 to 12	442	30 101 13.20
	160	4	10.4	25	6 to 12	292	30 004 13.25
25				6 to 12	442	30 101 13.25	
200	4	13	31.5	6 to 12	292	30 004 13.31,5	
			31.5	6 to 12	442	30 101 13.31,5	
250	4	16.2	40	6 to 12	292	30 004 13.40	
			40	6 to 12	442	30 101 13.40	
315	4	20.5	50	6 to 12	292	30 004 13.50	
			50	6 to 12	442	30 101 13.50	

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# Components

## Allocation of three-position switch-disconnector with HV HRC fuses, transformer ratings

Transformer				HV HRC fuse			
Operating voltage $U$ kV	Rated power $S_N$ kVA	Relative impedance voltage $u_k$ %	Rated current $I_1$ A	Rated normal current of fuse $I_{fuse}$ A	Operating voltage $U_{fuse}$ kV	Dimension "e" mm	Order No. Make SIBA
8.9	400	4	26	63 63	6 to 12 6 to 12	292 442	30 012 13.63 30 102 13.63
	500	4	32.5	80 80	6 to 12 6 to 12	292 442	30 012 43.80 30 102 43.80
	630	4	41	100 100	6 to 12 6 to 12	292 442	30 012 43.100 30 102 43.100
10 to 12	20	4	1.15	4	6 to 12	292	30 004 13.4
	30	4	1.7	6.3	6 to 12	442	30 101 13.6,3
	50	4	2.9	10	6 to 12	292	30 004 13.10
				10	6 to 12	442	30 101 13.10
				10	10 to 17.5	292	30 255 13.10
				10	10 to 17.5	442	30 231 13.10
				10	10 to 24	442	30 006 13.10
	75	4	4.3	10	6 to 12	292	30 004 13.10
				10	6 to 12	442	30 101 13.10
				10	10 to 17.5	292	30 255 13.10
				10	10 to 17.5	442	30 231 13.10
				10	10 to 24	442	30 006 13.10
	100	4	5.8	16	6 to 12	292	30 004 13.16
				16	6 to 12	442	30 101 13.16
				16	10 to 17.5	292	30 255 13.16
				16	10 to 17.5	442	30 231 13.16
				16	10 to 24	442	30 006 13.16
	125	4	7.2	16	6 to 12	292	30 004 13.16
				16	6 to 12	442	30 101 13.16
				16	10 to 17.5	292	30 255 13.16
16				10 to 17.5	442	30 231 13.16	
16				10 to 24	442	30 006 13.16	
160	4	9.3	20	6 to 12	292	30 004 13.20	
			20	6 to 12	442	30 101 13.20	
			20	10 to 17.5	292	30 221 13.20	
			20	10 to 17.5	442	30 231 13.20	
			20	10 to 24	442	30 006 13.20	
200	4	11.5	25	6 to 12	292	30 004 13.25	
			25	6 to 12	442	30 101 13.25	
			25	10 to 17.5	292	30 221 13.25	
			25	10 to 17.5	442	30 231 13.25	
			25	10 to 24	442	30 006 13.25	
250	4	14.5	25	6 to 12	292	30 004 13.25	
			25	6 to 12	442	30 101 13.25	
			25	10 to 17.5	292	30 221 13.25	
			25	10 to 17.5	442	30 231 13.25	
			25	10 to 24	442	30 006 13.25	
			31.5	6 to 12	292	30 004 13.31,5	
			31.5	6 to 12	442	30 101 13.31,5	
			31.5	10 to 17.5	292	30 221 13.31,5	
			31.5	10 to 17.5	442	30 231 13.31,5	
			31.5	10 to 24	442	30 006 13.31,5	
315	4	18.3	31.5	6 to 12	292	30 004 13.31,5	
			31.5	6 to 12	442	30 101 13.31,5	
			31.5	10 to 17.5	292	30 221 13.31,5	
			31.5	10 to 17.5	442	30 231 13.31,5	
			31.5	10 to 24	442	30 006 13.31,5	
			40	6 to 12	292	30 004 13.40	
			40	6 to 12	442	30 101 13.40	
			40	10 to 17.5	292	30 221 13.40	
			40	10 to 17.5	442	30 231 13.40	
			40	10 to 24	442	30 006 13.40	
400	4	23.1	40	6 to 12	292	30 004 13.40	
			40	6 to 12	442	30 101 13.40	
			40	10 to 17.5	292	30 221 13.40	
			40	10 to 17.5	442	30 231 13.40	
			40	10 to 24	442	30 006 13.40	
			50	6 to 12	292	30 004 13.50	
			50	6 to 12	442	30 101 13.50	
			50	10 to 17.5	292	30 221 13.50	
			50	10 to 17.5	442	30 232 13.50	
			50	10 to 24	442	30 014 13.50	

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## Allocation of three-position switch-disconnector with HV HRC fuses, transformer ratings

Transformer				HV HRC fuse			
Operating voltage $U$ kV	Rated power $S_N$ kVA	Relative impedance voltage $u_k$ %	Rated current $I_1$ A	Rated normal current of fuse $I_{fuse}$ A	Operating voltage $U_{fuse}$ kV	Dimension "e" mm	Order No. Make SIBA
10 to 12	500	4	29	50	6 to 12	292	30 004 13.50
				50	6 to 12	442	30 101 13.50
				50	10 to 17.5	292	30 221 13.50
				50	10 to 17.5	442	30 232 13.50
				50	10 to 24	442	30 014 13.50
				63	6 to 12	292	30 012 43.63
				63	10 to 24	442	30 014 43.63
	630	4	36.4	63	6 to 12	292	30 012 13.63
				63	6 to 12	442	30 102 13.63
				63	10 to 17.5	442	30 232 13.63
				63	6 to 12	292	30 012 43.63
				63	10 to 24	442	30 014 43.63
				80	6 to 12	292	30 012 43.80
				80	6 to 12	442	30 102 43.80
	80	10 to 24	442	30 014 43.80			
	800	5 to 6	46.2	63	6 to 12	292	30 012 13.63
				63	6 to 12	442	30 102 13.63
				80	6 to 12	292	30 012 43.80
				80	6 to 12	442	30 102 43.80
	1000	5 to 6	58	100	6 to 12	292	30 012 43.100
100				6 to 12	442	30 102 43.100	
100				10 to 24	442	30 022 43.100	
1250	5 to 6	72	125	6 to 12	292	30 020 43.125	
			125	6 to 12	442	30 103 43.125	
12.4 to 13.4	20	4	0.94	4	10 to 24	442	30 006 13.4
	30	4	1.4	6.3	10 to 24	442	30 006 13.6,3
				6.3	10 to 24	442	30 231 13.6,3
	50	4	2.4	10	10 to 17.5	442	30 231 13.10
				10	10 to 24	442	30 006 13.10
	75	4	3.5	10	10 to 17.5	442	30 231 13.10
				10	10 to 24	442	30 006 13.10
	100	4	4.7	16	10 to 17.5	442	30 231 13.16
				16	10 to 24	442	30 006 13.16
	125	4	5.9	16	10 to 17.5	442	30 231 13.16
				16	10 to 24	442	30 006 13.16
	160	4	7.5	16	10 to 17.5	442	30 231 13.16
				16	10 to 24	442	30 006 13.16
	200	4	9.4	20	10 to 17.5	442	30 231 13.20
				20	10 to 24	442	30 006 13.20
	250	4	11.7	25	10 to 17.5	442	30 231 13.25
				31.5	10 to 17.5	442	30 231 13.31,5
25				10 to 24	442	30 006 13.25	
31.5				10 to 24	442	30 006 13.31,5	
315	4	14.7	31.5	10 to 17.5	442	30 231 13.31,5	
			31.5	10 to 24	442	30 006 13.31,5	
400	4	18.7	40	10 to 17.5	442	30 231 13.40	
			40	10 to 24	442	30 006 13.40	
500	4	23.3	50	10 to 17.5	442	30 232 13.50	
			50	10 to 24	442	30 014 13.50	
630	4	29.4	63	10 to 17.5	442	30 232 13.63	
			63	10 to 24	442	30 014 13.63	
800	5 to 6	37.3	80	10 to 24	442	30 014 43.80	
13.8	20	4	0.8	3.15	10 to 24	442	30 006 13.3,15
	30	4	1.25	4	10 to 24	442	30 006 13.4
				4	10 to 24	442	30 006 13.4
	50	4	2.1	6.3	10 to 17.5	442	30 231 13.6,3
				6.3	10 to 24	442	30 006 13.6,3
	75	4	3.2	6.3	10 to 17.5	442	30 231 13.6,3
				10	10 to 17.5	442	30 231 13.10
				10	10 to 24	442	30 006 13.10
	100	4	4.2	10	10 to 17.5	442	30 231 13.10
				16	10 to 17.5	442	30 231 13.16
16				10 to 24	442	30 006 13.16	
125	4	5.3	10	10 to 17.5	442	30 231 13.10	
			16	10 to 17.5	442	30 231 13.16	
			16	10 to 24	442	30 006 13.16	

(continued on next page)

# Components

## Allocation of three-position switch-disconnector with HV HRC fuses, transformer ratings

Transformer				HV HRC fuse			
Operating voltage $U$ kV	Rated power $S_N$ kVA	Relative impedance voltage $u_k$ %	Rated current $I_1$ A	Rated normal current of fuse $I_{fuse}$ A	Operating voltage $U_{fuse}$ kV	Dimension "e" mm	Order No. Make SIBA
13.8	160	4	6.7	16	10 to 17.5	442	30 231 13.16
	200	4	8.4	16	10 to 17.5	442	30 231 13.16
				20	10 to 17.5	442	30 231 13.20
				20	10 to 24	442	30 006 13.20
	250	4	10.5	20	10 to 17.5	442	30 231 13.20
				25	10 to 17.5	442	30 231 13.25
				25	10 to 24	442	30 006 13.25
	315	4	13.2	25	10 to 17.5	442	30 231 13.25
				31.5	10 to 17.5	442	30 231 13.31,5
				31.5	10 to 24	442	30 006 13.31,5
	400	4	16.8	31.5	10 to 17.5	442	30 231 13.31,5
			31.5	10 to 24	442	30 006 13.31,5	
500	4	21	40	10 to 17.5	442	30 231 13.40	
			40	10 to 24	442	30 006 13.40	
630	4	26.4	50	10 to 17.5	442	30 232 13.50	
			50	10 to 24	442	30 014 13.50	
800	5 to 6	33.5	63	10 to 17.5	442	30 232 13.63	
			63	10 to 24	442	30 014 13.63	
			63	10 to 24	442	30 014 43.63	
1000	5 to 6	41.9	80	10 to 24	442	30 014 43.80	
1250	5 to 6	52.3	100	10 to 24	442	30 022 43.100	
14.4	20	4	0.8	3.15	10 to 24	442	30 006 13.3,15
	30	4	1.2	3.15	10 to 24	442	30 006 13.3,15
	50	4	2	6.3	10 to 17.5	442	30 231 13.6,3
				6.3	10 to 24	442	30 006 13.6,3
	75	4	3	6.3	10 to 17.5	442	30 231 13.6,3
				6.3	10 to 24	442	30 006 13.6,3
	100	4	4	10	10 to 17.5	442	30 231 13.10
				16	10 to 17.5	442	30 231 13.16
				16	10 to 24	442	30 006 13.16
	125	4	5	10	10 to 17.5	442	30 231 13.10
				16	10 to 17.5	442	30 231 13.16
				16	10 to 24	442	30 006 13.16
	160	4	6.5	16	10 to 17.5	442	30 231 13.16
				16	10 to 24	442	30 006 13.16
	200	4	8	16	10 to 17.5	442	30 231 13.16
				16	10 to 24	442	30 006 13.16
				20	10 to 17.5	442	30 231 13.20
20				10 to 24	442	30 006 13.20	
250	4	10	20	10 to 17.5	442	30 231 13.20	
			20	10 to 24	442	30 006 13.20	
			25	10 to 17.5	442	30 231 13.25	
			25	10 to 24	442	30 006 13.25	
315	4	12.6	20	10 to 17.5	442	30 231 13.20	
			20	10 to 24	442	30 006 13.20	
			25	10 to 17.5	442	30 231 13.25	
			25	10 to 24	442	30 006 13.25	
400	4	16.1	31.5	10 to 17.5	442	30 231 13.31,5	
			31.5	10 to 24	442	30 006 13.31,5	
500	4	20.1	40	10 to 17.5	442	30 231 13.40	
			40	10 to 24	442	30 006 13.40	
630	4	25.3	50	10 to 17.5	442	30 232 13.50	
			50	10 to 24	442	30 014 13.50	
800	5 to 6	32.1	63	10 to 24	442	30 014 43.63	
1000	5 to 6	40.1	80	10 to 24	442	30 014 43.80	
1250	5 to 6	50.2	100	10 to 24	442	30 022 43.100	
15 to 17.5	20	4	0.77	3.15	10 to 24	442	30 006 13.3,15
	30	4	1.15	3.15	10 to 24	442	30 006 13.3,15
	50	4	1.9	6.3	10 to 17.5	442	30 231 13.6,3
				6.3	10 to 24	442	30 006 13.6,3
	75	4	2.9	6.3	10 to 17.5	442	30 231 13.6,3
	100	4	3.9	10	10 to 17.5	442	30 231 13.10
	125	4	4.8	16	10 to 17.5	442	30 231 13.16
				16	10 to 24	442	30 006 13.16
	160	4	6.2	16	10 to 17.5	442	30 231 13.16
	200	4	7.7	20	10 to 17.5	442	30 231 13.20
				20	10 to 24	442	30 006 13.20

(continued on next page)

## Allocation of three-position switch-disconnector with HV HRC fuses, transformer ratings

Transformer				HV HRC fuse				
Operating voltage $U$ kV	Rated power $S_N$ kVA	Relative impedance voltage $u_k$ %	Rated current $I_1$ A	Rated normal current of fuse $I_{fuse}$ A	Operating voltage $U_{fuse}$ kV	Dimension "e" mm	Order No. Make SIBA	
15 to 17.5	250	4	9.7	25 25	10 to 17.5 10 to 24	442 442	30 231 13.25 30 006 13.25	
	315	4	12.2	31.5 31.5	10 to 17.5 10 to 24	442 442	30 231 13.31,5 30 006 13.31,5	
	400	4	15.5	31.5 31.5	10 to 17.5 10 to 24	442 442	30 231 13.31,5 30 006 13.31,5	
	500	4	19.3	31.5 31.5 40 40	10 to 17.5 10 to 24 10 to 17.5 10 to 24	442 442 442 442	30 231 13.31,5 30 006 13.31,5 30 231 13.40 30 006 13.40	
	630	4	24.3	40 40 50 50 63	10 to 17.5 10 to 24 10 to 17.5 10 to 24 10 to 24	442 442 442 442 442	30 231 13.40 30 006 13.40 30 232 13.50 30 014 13.50 30 014 43.63	
	800	5 to 6	30.9	63	10 to 24	442	30 014 43.63	
	1000	5 to 6	38.5	63 80	10 to 24 10 to 24	442 442	30 014 43.63 30 014 43.80	
	1250	5 to 6	48.2	100	10 to 24	442	30 022 43.100	
	18 to 19	20	4	0.64	3.15	10 to 24	442	30 006 13.3,15
		30	4	0.96	3.15	10 to 24	442	30 006 13.3,15
50		4	1.6	6.3	10 to 24	442	30 006 13.6,3	
75		4	2.4	6.3	10 to 24	442	30 006 13.6,3	
100		4	3.2	10	10 to 24	442	30 006 13.10	
125		4	4	10	10 to 24	442	30 006 13.10	
160		4	5.1	16	10 to 24	442	30 006 13.16	
200		4	6.4	16	10 to 24	442	30 006 13.16	
250		4	8.1	20	10 to 24	442	30 006 13.20	
315		4	10.1	25	10 to 24	442	30 006 13.25	
400		4	12.9	31.5	10 to 24	442	30 006 13.31,5	
500		4	16.1	31.5 40	10 to 24 10 to 24	442 442	30 006 13.31,5 30 006 13.40	
630		4	20.2	40 50 63	10 to 24 10 to 24 10 to 24	442 442 442	30 006 13.40 30 006 13.50 30 014 43.63	
800		4 to 5	25.7	50 63	10 to 24 10 to 24	442 442	30 014 13.50 30 014 43.63	
1000		5 to 6	32.1	63	10 to 24	442	30 014 43.63	
1250	5 to 6	40.1	80	10 to 24	442	30 014 43.80		
20 to 23	20	4	0.57	3.15	10 to 24	442	30 006 13.3,15	
	30	4	0.86	3.15	10 to 24	442	30 006 13.3,15	
	50	4	1.5	6.3	10 to 24	442	30 006 13.6,3	
	75	4	2.2	6.3	10 to 24	442	30 006 13.6,3	
	100	4	2.9	6.3	10 to 24	442	30 006 13.6,3	
	125	4	3.6	10	10 to 24	442	30 006 13.10	
	160	4	4.7	10	10 to 24	442	30 006 13.10	
	200	4	5.8	16	10 to 24	442	30 006 13.16	
	250	4	7.3	16	10 to 24	442	30 006 13.16	
	315	4	9.2	16 20	10 to 24 10 to 24	442 442	30 006 13.16 30 006 13.20	
	400	4	11.6	20 25	10 to 24 10 to 24	442 442	30 006 13.20 30 006 13.25	
	500	4	14.5	25 31.5	10 to 24 10 to 24	442 442	30 006 13.25 30 006 13.31,5	
	630	4	18.2	31.5 40	10 to 24 10 to 24	442 442	30 006 13.31,5 30 006 13.40	
	800	5 to 6	23.1	31.5	10 to 24	442	30 006 13.31,5	
	1000	5 to 6	29	50	10 to 24	442	30 014 13.50	
	1250	5 to 6	36	50 63	10 to 24 10 to 24	442 442	30 014 13.50 30 014 43.63	
	1600	5 to 6	46.5	80 100	10 to 24 10 to 24	442 442	30 014 43.80 30 022 43.100	
	2000	5 to 6	57.8	100	10 to 24	442	30 022 43.100	

# Components

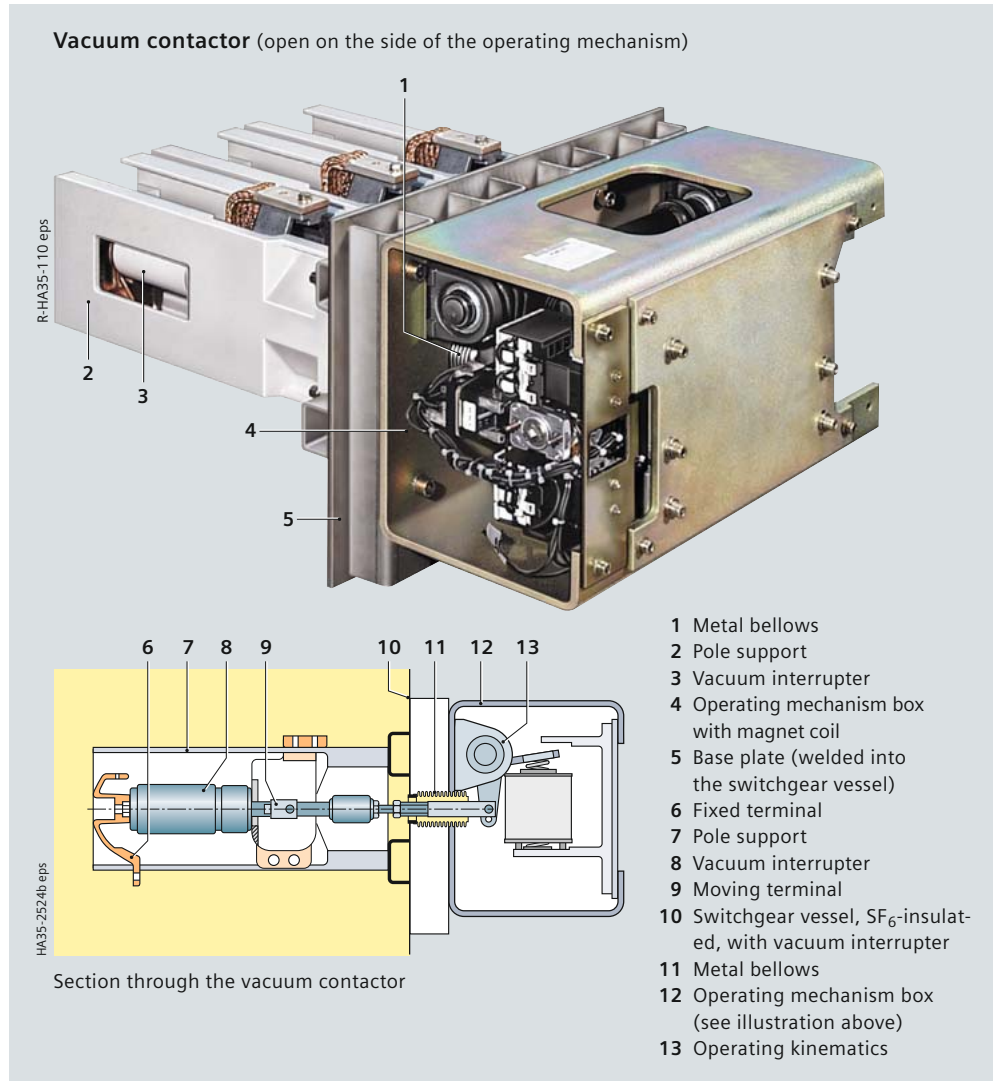
## Vacuum contactor, motor protection

### Features

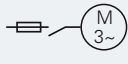
- According to IEC 60470 and VDE 0670-501 (for standards, see page 58)
- Application in hermetically welded switchgear vessel in conformity with the system
- Climate-independent vacuum interrupter poles in the SF<sub>6</sub>-filled switchgear vessel
- Maintenance-free for indoor installation according to IEC 62271-1 and VDE 0671-1
- Individual secondary equipment
- A metal bellows is used for gasketless separation of the SF<sub>6</sub> insulation and the operating mechanism (already used with success for over 2 million vacuum interrupters)
- Magnet coil for operation located outside the switchgear vessel
- 100,000 or 500,000 operating cycles at rated normal current.

### Short-circuit and overload protection in connection with motors

In circuits subjected to short-circuit currents, HV HRC fuse-links protect switching devices without short-circuit breaking capacity (e.g. vacuum contactors). The instant when the motor starts represents the maximum stress for the HV HRC fuse-links (starting currents, starting time and starting frequency). Motor starting must neither operate nor pre-damage the fuses.



### Motor protection table (see also note on page 31)

 Number of starts per hour	Maximum permissible motor starting current in A at rated normal current of HV HRC fuse										
	40 A	50 A	63 A	80 A	100 A	125 A	160 A	200 A	224 A	250 A	
HV motors with starting times up to 5 s	3.3 to 7.2 kV	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	>7.2 to 12 kV	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
	>12 to 23 kV	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
HV motors with starting times up to 15 s	2	95	115	135	160	210	415	560	765	860	960
	4	85	105	120	145	190	370	500	705	840	960
	8	75	95	110	130	170	340	455	640	760	960
	16	70	85	95	115	150	300	405	575	680	925
	32	63	75	85	105	140	270	370	520	615	840
HV motors with starting times up to 30 s	2	90	105	120	145	190	335	445	625	730	960
	4	80	95	110	130	170	300	400	560	655	890
	8	70	85	100	120	155	270	360	510	595	805
	16	65	75	90	105	140	240	325	455	535	720
	32	60	70	80	95	125	220	290	410	485	655

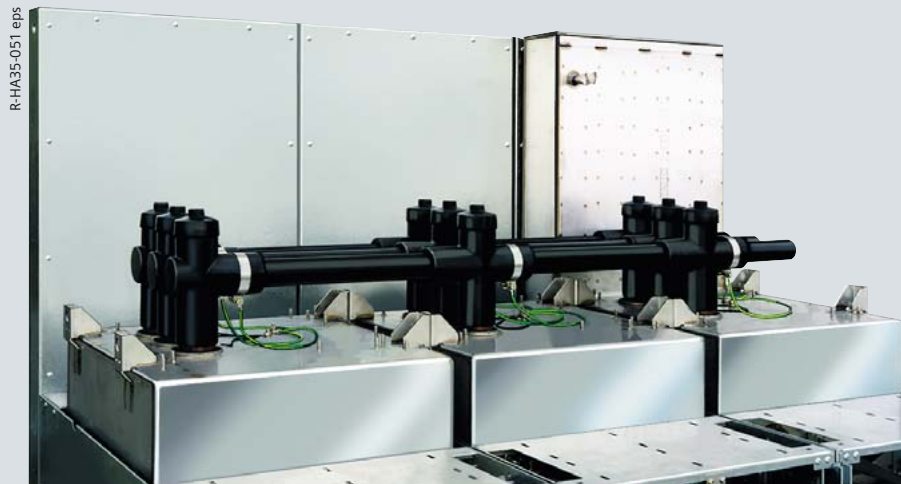
### Features

- 1-pole, plug-in and bolted design
- Consisting of round-bar copper, insulated by means of silicone rubber
- Busbar joints with cross and end adapters, insulated by means of silicone rubber
- Field control by means of electrically conductive layers on the silicone-rubber insulation (both inside and outside)
- Touchable as the external layers are earthed with the switchgear vessel
- Insensitive to pollution and condensation
- Safe-to-touch due to metal cover
- Switchgear extension or panel replacement is possible without SF<sub>6</sub> gas work.

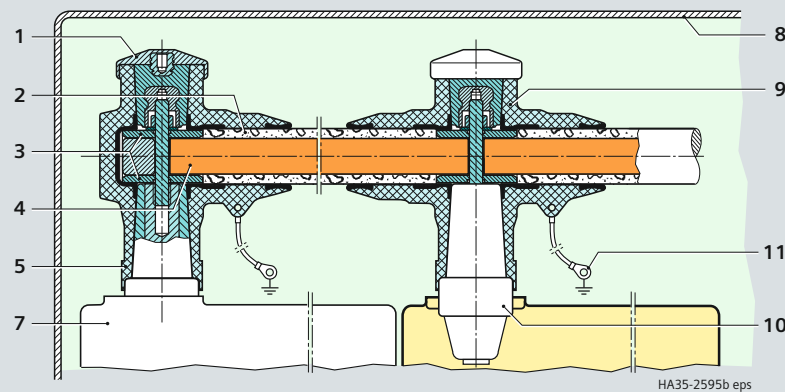
### Possible components

- Current transformers
- Voltage transformers
- Surge arresters
- Cables with
  - straight plug or
  - T-plug
- Fully-insulated bars (e.g. make Duresca).

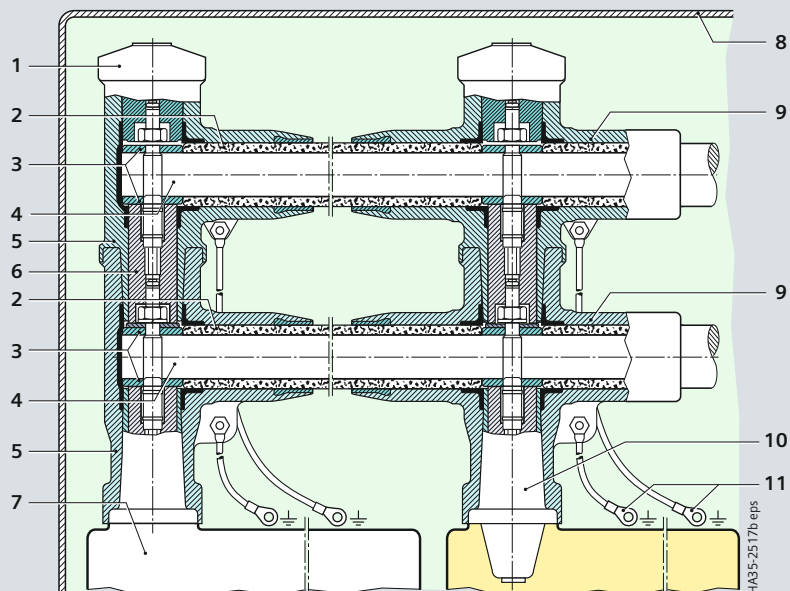
Busbars (example)



Busbars 1250 A, plug-in type, fully insulated  
(as front view of three panels, without low-voltage compartments)



Section of 1250 A busbar (basic design)  
Panel width 600 mm



Section of 1600 A, 2000 A or 2500 A busbar (basic design)  
Panel width 600 mm

### Legend

- 1 Cap
- 2 Busbar insulation made of silicone rubber
- 3 Clamps
- 4 Busbar (round-bar copper)
- 5 End adapter or coupling end adapter
- 6 Connection bolt
- 7 Switchgear vessel
- 8 Metal cover of busbars
- 9 Cross adapter or coupling cross adapter
- 10 Bushing
- 11 Earthing connection

# Components

## Current transformers

### Features

- According to IEC 60044-1 and VDE 0414-1
- Designed as ring-core current transformers, 1-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.

### Installation

- Arranged outside the primary enclosure (switchgear vessel).

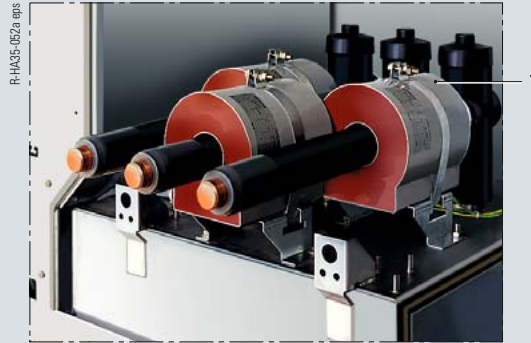
### Mounting locations

- At the busbar (1)
- At the panel connection (2)
- Around the cable (3).

### Current transformer types

- Busbar current transformer (1):
  - Inside  $\varnothing$  of transformer 56 mm /  $\leq$  1250 A and 55 x 355 mm /  $>$  1250 A
  - Usable height max. 160 mm at  $\leq$  1250 A max. 130 mm at  $>$  1250 A
- Feeder current transformer (2):
  - Inside  $\varnothing$  of transformer 106 mm /  $\leq$  1250 A and 100 x 200 mm /  $>$  1250 A
  - Max. usable height 205 mm
- Cable-type current transformer (3) for shielded cables:
  - Inside  $\varnothing$  of transformer 55 mm
  - Max. usable height 170 mm
- Zero-sequence current transformer (4) underneath the panels (included in the scope of supply); on-site installation.

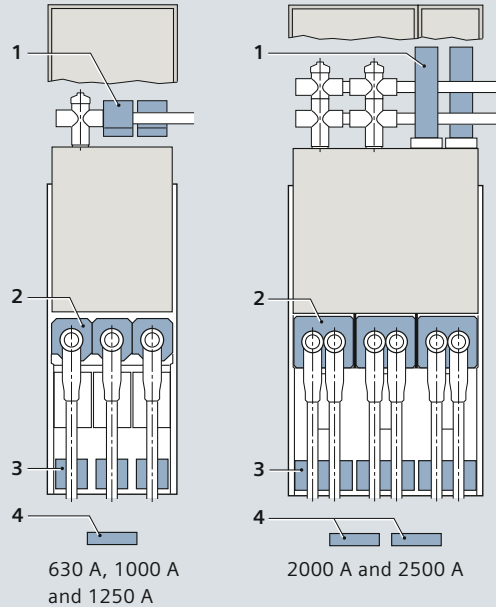
### Current transformers



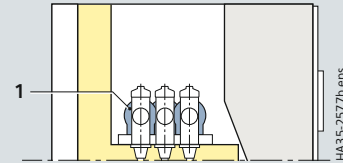
### Busbar current transformers

Example 1250 A

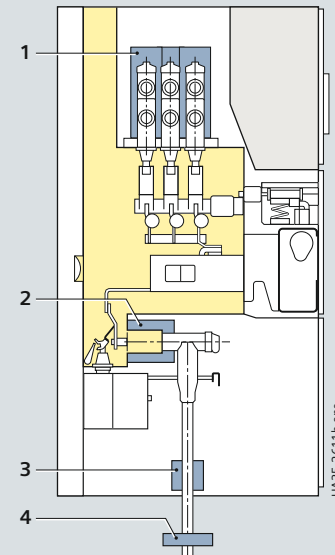
Front views:



Side views:



Panel with busbar  
1250 A



Panel with busbar  
2500 A

### Current transformer installation (basic scheme)

### Electrical data

Designation	Type 4MC
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 x rated current (primary)
Rated thermal short-time current, max. 3 s	max. 31.5 kA
Rated current	dynamic primary unlimited 40 A to 2500 A secondary 1 A and 5 A

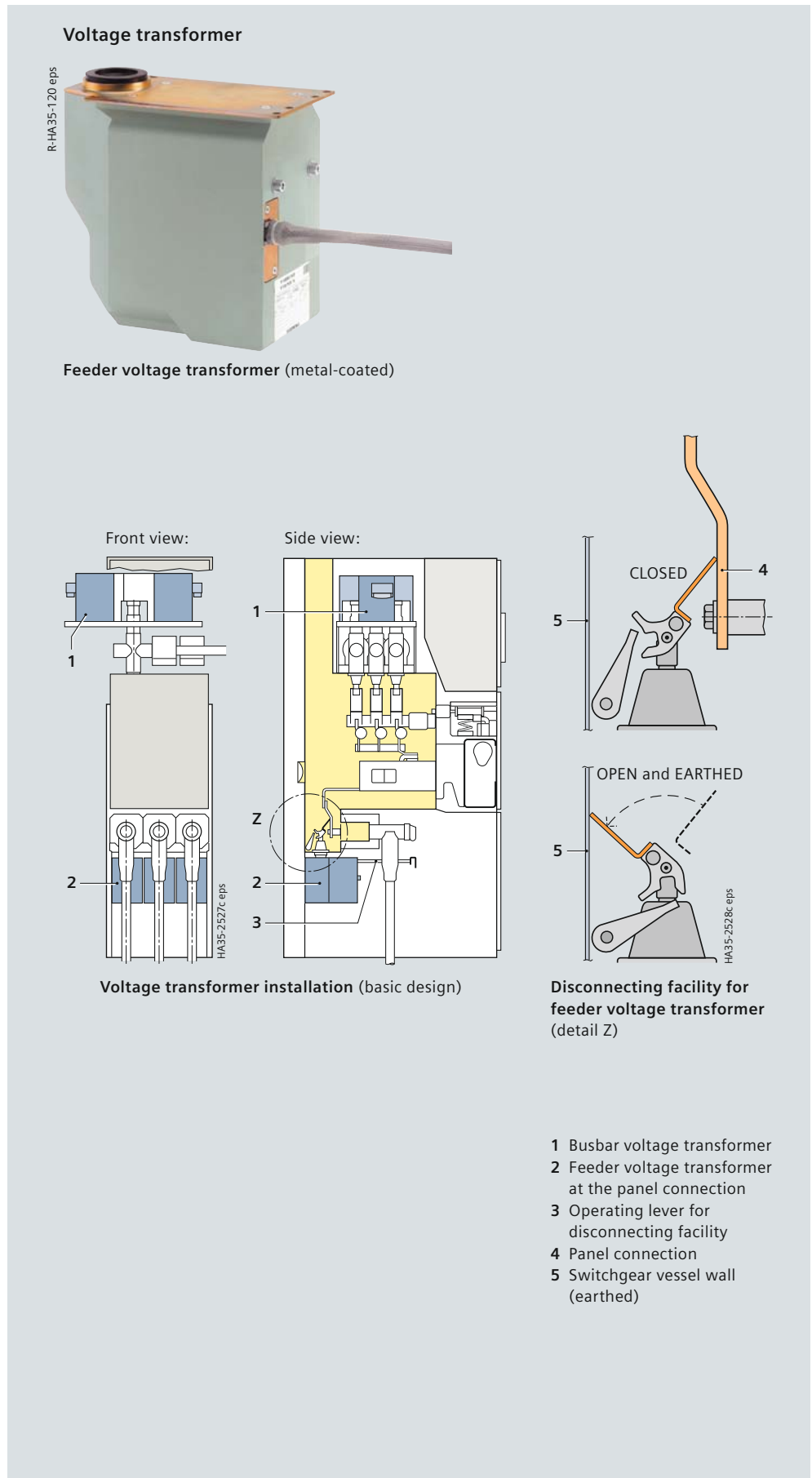
Designation	Type 4MC
Multiratio (secondary)	200 A – 100 A to 2500 A – 1250 A
Core data according to rated primary current:	max. 3 cores
Measuring core	Rating Class 2.5 VA to 30 VA Overcurrent factor 0.2 to 1
Protection core	Rating Class FS 5, FS 10 Overcurrent factor 5 P or 10 P
Permissible ambient air temperature	10 to 30
Insulation class	max. 60 °C E

### Features

- According to IEC 60044-2 and VDE 0414-2
- 1-pole, plug-in design
- Connection system with plug-in contact
- Inductive type
- Safe-to-touch due to metal cover
- Certifiable
- Climate-independent
- Secondary connection by means of plugs inside the panel
- Cast-resin insulated
- Arranged outside the primary enclosure (switchgear vessel)
- Mounting locations:
  - At the busbar
  - At the panel connection.

### Voltage transformer types

- Busbar voltage transformer 4MT2:
  - Pluggable in the cross adapters of the busbar  $\leq 1250$  A using additional adapters ( $> 1250$  A on request)
  - No separate metering panel required
  - Suitable for 80 % of the rated short-duration power-frequency withstand voltage at rated frequency
  - Repeat test at 80 % of the rated short-duration power-frequency withstand voltage possible with mounted voltage transformer (also valid for higher insulation ratings according to GOST and GB standards)
- Feeder voltage transformer 4MT3 at the panel connection:
  - Switchable through an SF<sub>6</sub>-insulated disconnecting facility in the switchgear vessel
  - Positions: "CLOSED" and "Transformer bushing EARTHED"
  - Operation of the disconnecting facility from outside through a metal bellows welded in the switchgear vessel
  - Voltage testing of switchgear and cables possible with mounted and earthed voltage transformer
- Feeder voltage transformer 4MU2 at the panel connection of the incoming sectionalizer (side B)
  - Connection to bushing with short, flexible cable.



# Components

## Voltage transformers

### Electrical data

#### Primary data

For types 4MT3, 4MT2 and 4MU2

For operating voltages from 3.3 kV to 23 kV, rated voltage factor  $U_n/8h = 1.9$ ;  $U_n/\text{continuous} = 1.2$

Rated voltage kV	Rated short-duration power-frequency withstand voltage kV	Rated lightning impulse withstand voltage kV	Standard	Operating voltage kV
3.6	10	20	IEC	$3.3/\sqrt{3}$
7.2	20	60	IEC	$3.6/\sqrt{3}$ ; $4.8/\sqrt{3}$ ; $5.0/\sqrt{3}$ ; $6.0/\sqrt{3}$ ; $6.3/\sqrt{3}$ ; $6.6/\sqrt{3}$
			GOST	$6.0/\sqrt{3}$ ; $6.3/\sqrt{3}$ ; $6.6/\sqrt{3}$
12	28	75	IEC	$7.2/\sqrt{3}$ ; $10/\sqrt{3}$ ; $11/\sqrt{3}$
			GOST	$10/\sqrt{3}$ ; $11/\sqrt{3}$
			GB	$10/\sqrt{3}$ ; $11/\sqrt{3}$
17.5	38	95	IEC	$13.2/\sqrt{3}$ ; $13.8/\sqrt{3}$ ; $15/\sqrt{3}$
24	50	125	IEC	$17.5/\sqrt{3}$ ; $20/\sqrt{3}$ ; $23/\sqrt{3}$

### Secondary data

For type	Operating voltage V	Auxiliary winding V	Thermal limit current (measuring winding) A	Rated long- time current 8 h A	Rating at accuracy class			
					0.2 VA	0.5 VA	1 VA	3 VA
4MT3 4MU2	$100/\sqrt{3}$ ; $110/\sqrt{3}$ ; $120/\sqrt{3}$	100/3; 110/3; 120/3	6	4	IEC			
					10, 15, 20, 25, 30	10, 15, 20, 25, 30, 45, 50, 60, 75, 90	10, 15, 20, 25, 30, 45, 50, 60, 75, 90, 100, 120, 150, 180	10, 15, 20, 25, 30, 45, 50, 60, 75, 90, 100, 120, 150, 180
					GOST 32/60 kV			
					10, 15, 20, 25, 30	10, 15, 20, 25, 30, 45, 50, 60, 75, 90	10, 15, 20, 25, 30, 45, 50, 60, 75, 90, 100, 120, 150, 180	10, 15, 20, 25, 30, 45, 50, 60, 75, 90, 100, 120, 150, 180
4MT2	$100/\sqrt{3}$ ; $110/\sqrt{3}$ ; $120/\sqrt{3}$	100/3; 110/3; 120/3	8	6	IEC			
					5, 10, 15, 20, 25	10, 15, 20, 25, 30, 45	10, 15, 20, 25, 30, 45, 50, 60, 75	10, 15, 20, 25, 30, 45, 50, 60, 75
					GOST 32/60 kV			
					5	10, 15	10, 15, 20, 25, 30	10, 15, 20, 25, 30
GOST 42/75 kV, GB 42/75 kV								
5, 10	10, 15, 20, 25, 30	10, 15, 20, 25, 30, 45, 50, 60	10, 15, 20, 25, 30, 45, 50, 60	10, 15, 20, 25, 30, 45, 50, 60				

GOST : Russian standard

GB : Chinese standard

### Features

- Bushings with outside cone
- With bolted contact (M16) as interface type "C" according to EN 50 180/EN 50 181
- For cable connection heights, see table on the right
- Max. connection depth: 584 mm or 732 mm with standard cable compartment cover, 752 mm with deep cable compartment cover
- With cable bracket, e.g. type C40 according to DIN EN 50 024
- 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 630 mm<sup>2</sup>
- Larger cross-sections on request
- Cable routing downwards, cable connection from the front
- Option: Cable routing upwards to the rear, cable connection from the rear (only for circuit-breaker panel 1250 A)
- For rated normal currents up to 2500 A
- Cable plugs and cable sealing ends are not included in the scope of supply.

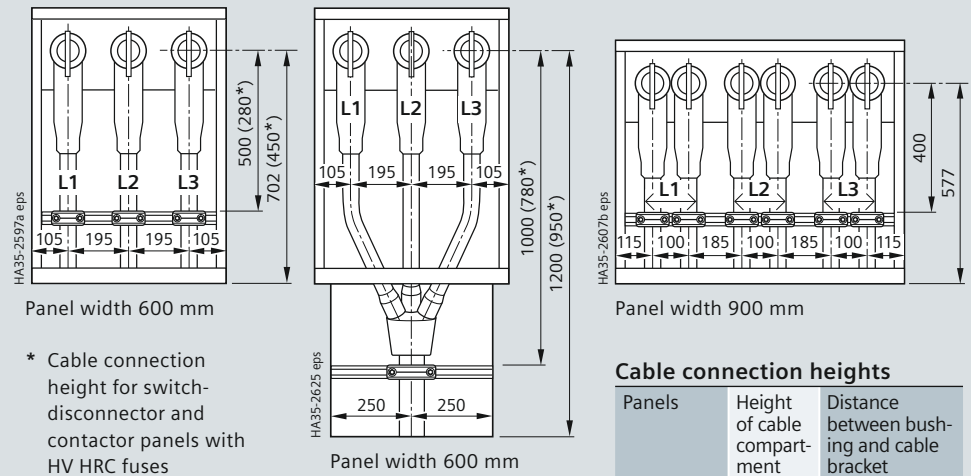
### Surge arresters

- 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.

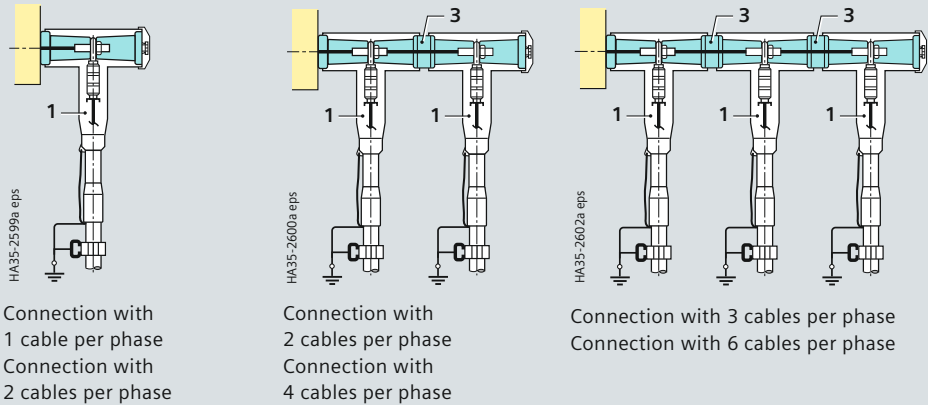
### Cable compartment



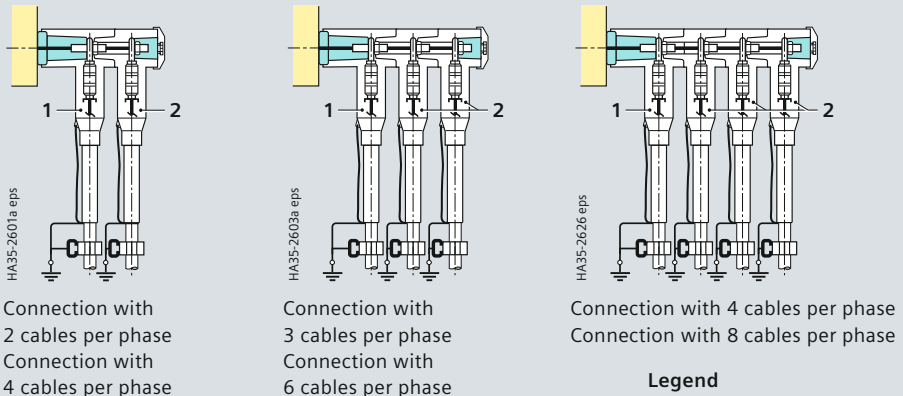
\* Cable connection height for switch-disconnector and contactor panels with HV HRC fuses

### Connectable cables

#### Cable T-plug with coupling insert



#### Cable T-plug with coupling T-plug



#### Legend

- 1 Cable T-plug
- 2 Coupling T-plug
- 3 Screw-type coupling insert

# Components

## Installation possibilities for cable connections and surge arresters, single-core PE and XLPE-insulated

Number of cables per panel and phase	Make	Conductor cross-section <sup>1)</sup> mm <sup>2</sup>	Cable T-plugs	Coupling inserts/ coupling plugs	Surge arresters with coupling inserts		According to standard
			bolted 12 kV 24 kV	bolted 12 kV 24 kV	Arresters	Coupling inserts	

- Circuit-breaker panel 630 A, 1000 A • Switch-disconnector panel 630 A • Disconnector panel 1000 A • Ring-main panel 630 A
- Contactor panel • Circuit-breaker panel with top-rear cable connection 1250 A <sup>2)</sup>

1	Euromold	35 to 300	1× 400TB/G 1× K400TB/G 1× K400TB/G-CSxxx	– – –	400PB-5(10)-SA-xxx	– – –	IEC, GOST, GB/DL IEC GOST, GB/DL	
		35 to 300	1× 430TB-630A 1× K430TB-630A 1× K430TB-630A-CSxxx	– – –	300SA-5(10)SA	– – –	IEC, GOST, GB/DL IEC GOST, GB/DL	
		400 to 630	1× 440TB/G 1× K440TB/G 1× K440TB/G-CSxxx	– – –	400PB-5(10)-SA-xxx	– – –	IEC, GOST, GB/DL IEC GOST, GB/DL	
	Südkabel	50 to 300 25 to 240	1× SET 12 1× SET 24	– –	MUT 23	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		400 to 500 300 to 500	1× SEHDT 13 1× SEHDT 23	– –	MUT 23	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
	nkt cables	25 to 300 25 to 500 25 to 300	1× CB 12-630 1× CB 17.5-630 1× CB 24-630	– – –	CSA 12-x CSA 17.5-x CSA 24-x	– – –	IEC GOST, GB/DL IEC, GOST, GB/DL	
		400 to 630	1× CB 36-630(1250) 1× CB 36-630(1250)	– –	CSA 12-x CSA 24-x	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
	Tyco Electronics Raychem	25 to 300	1× RSTI-L56xx 1× RSTI-L56xx	– –	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	– –	IEC IEC	
		25 to 300	1× RSTI-L56xx-CEE01 1× RSTI-L56xx-CEE01	– –	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	– –	GOST GOST	
		25 to 300	1× RSTI-58xx 1× RSTI-58xx	– –	RSTI-CC-58SAxxxx	– –	IEC IEC	
		25 to 300	1× RSTI-58xx-CEE01 1× RSTI-58xx-CEE01	– –	RSTI-CC-58SAxxxx	– –	GOST GOST	
		400 to 630	1× RSTI-36Lxx 1× RSTI-56Lxx	– –	RSTI-L56SAxxxx RSTI-66SAxxxx	RSTI-66CP-M16 RSTI-66CP-M16	IEC IEC	
		400 to 630	1× RSTI-36Lxx-CEE01 1× RSTI-56Lxx-CEE01	– –	RSTI-L56SAxxxx RSTI-66SAxxxx	RSTI-66CP-M16 RSTI-66CP-M16	GOST GOST	
	3M	50 to 240 25 to 240	1× 93-EE 705-6 1× 93-EE 705-6	– –	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		300 to 400	1× 93-EE 715-6 1× 93-EE 715-6	– –	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
	2	Euromold	35 to 300	2× 400TB/G 2× K400TB/G 2× K400TB/G-CSxxx	1× 400CP 1× K400CP 1× K400CP	– – –	– – –	IEC, GOST, GB/DL IEC GOST, GB/DL
			35 to 300	1× 430TB-630A 1× K430TB-630A 1× K430TB-630A-CSxxx	1× 300PB-630A 1× K300PB-630A 1× K300PB-630A-CSxxx	300SA-5(10)SA – –	– – –	IEC, GOST, GB/DL IEC GOST, GB/DL
			400 to 630	2× 440TB/G 2× K440TB/G 2× K440TB/G-CSxxx	1× 440CP 1× K440CP 1× K440CP	– – –	– – –	IEC, GOST, GB/DL IEC GOST, GB/DL
		Südkabel	50 to 300 25 to 240	1× SET 12 1× SET 24	1× SEHDK 13.1 1× SEHDK 23.1	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL
			50 to 300 25 to 240	2× SET 12 2× SET 24	1× KU 23.2 1× KU 23.2	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL
400 to 500 300 to 500			2× SEHDT 13 2× SEHDT 23	1× KU 23 1× KU 23	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
nkt cables		25 to 300 25 to 500 25 to 300	1× CB 12-630 1× CB 17.5-630 1× CB 24-630	1× CC 12-630 1× CC 17.5-630 1× CC 24-630	CSA 12-x CSA 17.5-x CSA 24-x	– – –	IEC GOST, GB/DL IEC, GOST, GB/DL	
		25 to 300	2× CB 12-630 2× CB 24-630	1× CP 630-C 1× CP 630-C	CSA 12-x CSA 24-x	– –	IEC IEC, GOST, GB/DL	
		400 to 630	1× CB 36-630(1250) 1× CB 36-630(1250)	1× CC 36-630(1250) 1× CC 36-630(1250)	CSA 12-x CSA 24-x	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		400 to 630	2× CB 36-630(1250) 2× CB 36-630(1250)	1× CP 630-M16 1× CP 630-M16	CSA 12-x CSA 24-x	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
Tyco Electronics Raychem		25 to 300	1× RSTI-L56xx 1× RSTI-L56xx	1× RSTI-CC-L56xx 1× RSTI-CC-L56xx	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	– –	IEC IEC	
		25 to 300	1× RSTI-L56xx-CEE01 1× RSTI-L56xx-CEE01	1× RSTI-CC-L56xx-CEE01 1× RSTI-CC-L56xx-CEE01	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	– –	GOST GOST	
		25 to 300	1× RSTI-58xx 1× RSTI-58xx	1× RSTI-CC-58xx 1× RSTI-CC-58xx	RSTI-CC-58SAxxxx	– –	IEC IEC	

1) Observe the actual short-circuit and current carrying capacity of the cables and sealing ends

2) At a normal current of more than 1150 A, cable sealing ends with tin-plated, nickel-plated or silver-plated cable lugs are required

## Installation possibilities for cable connections and surge arresters, single-core PE and XLPE-insulated

Number of cables per panel and phase	Make	Conductor cross-section 1) mm <sup>2</sup>	Cable T-plugs	Coupling inserts/ coupling plugs	Surge arresters with coupling inserts		According to standard
			bolted 12 kV 24 kV	bolted 12 kV 24 kV	Arresters	Coupling inserts	

- Circuit-breaker panel 630 A, 1000 A • Switch-disconnector panel 630 A • Disconnector panel 1000 A • Ring-main panel 630 A
- Contactor panel • Circuit-breaker panel with top-rear cable connection 1250 A 2)

2	Tyco Electronics Raychem	25 to 300	1× RSTI-58xx-CEE01 1× RSTI-58xx-CEE01	1× RSTI-CC-58xx-CEE01 1× RSTI-CC-58xx-CEE01	RSTI-CC-58SAxxxx –	– –	GOST GOST	
		400 to 630	2× RSTI-36Lxx 2× RSTI-56Lxx	1× RSTI-66CP-M16 1× RSTI-66CP-M16	– –	– –	IEC IEC	
		400 to 630	2× RSTI-36Lxx-CEE01 2× RSTI-56Lxx-CEE01	1× RSTI-66CP-M16 1× RSTI-66CP-M16	– –	– –	GOST GOST	
	3M	50 to 240 25 to 240	2× 93-EE 705-6 2× 93-EE 705-6	1× KU 23.2 1× KU 23.2	– –	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL
		240 150 to 240	1× 93-EE 705-6 1× 93-EE 705-6	1× 93-EE 718-6 1× 93-EE 718-6	– –	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL
		300 to 400	2× 93-EE 715-6 2× 93-EE 715-6	1× KU 23.2 1× KU 23.2	– –	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL
	3	Euromold	35 to 300	1× 430TB-630A 1× K430TB-630A 1× K430TB-630A-CSxxx	2× 300PB-630A 2× K300PB-630A 2× K300PB-630A-CSxxx	– – –	– – –	IEC, GOST, GB/DL IEC GOST, GB/DL
			nkt cables	25 to 300 25 to 500 25 to 300	1× CB 12-630 1× CB 17.5-630 1× CB 24-630	2× CC 12-630 2× CC 17.5-630 2× CC 24-630	– – –	– – –
400 to 630				1× CB 36-630(1250) 1× CB 36-630(1250)	2× CC 36-630(1250) 2× CC 36-630(1250)	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL
Tyco Electronics Raychem		25 to 300		1× RSTI-L56xx 1× RSTI-L56xx	2× RSTI-CC-L56xx 2× RSTI-CC-L56xx	– –	– –	IEC IEC
		25 to 300	1× RSTI-L56xx-CEE01 1× RSTI-L56xx-CEE01	2× RSTI-CC-L56xx-CEE01 2× RSTI-CC-L56xx-CEE01	– –	– –	GOST GOST	
		25 to 300	1× RSTI-58xx 1× RSTI-58xx	2× RSTI-CC-58xx 2× RSTI-CC-58xx	– –	– –	IEC IEC	
		25 to 300	1× RSTI-58xx-CEE01 1× RSTI-58xx-CEE01	2× RSTI-CC-58xx-CEE01 2× RSTI-CC-58xx-CEE01	– –	– –	GOST GOST	

- Circuit-breaker panel 1250 A 2) • Disconnector panel 1250 A 2) • DBB circuit-breaker panel 1000 A • DBB incoming sectionalizer 2)

1	Euromold	35 to 300	1× 400TB/G 1× K400TB/G	– –	400PB-5(10)-SA-xxx –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL		
		35 to 300	1× 430TB-630A 1× K430TB-630A	– –	300SA-5(10)SA –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL		
		400 to 630	1× 440TB/G 1× K440TB/G	– –	400PB-5(10)-SA-xxx –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL		
	Südkabel	50 to 300 25 to 240	1× SET 12 1× SET 24	– –	MUT 23 –	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		400 to 500 300 to 500	1× SEHDT 13 1× SEHDT 23	– –	MUT 23 –	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		nkt cables	25 to 300 25 to 500 25 to 300	1× CB 12-630 1× CB 17.5-630 1× CB 24-630	– – –	CSA 12-x CSA 17.5-x CSA 24-x	– – –	– – –	IEC GOST, GB/DL IEC, GOST, GB/DL
	400 to 630		1× CB 36-630(1250) 1× CB 36-630(1250)	– –	CSA 12-x CSA 24-x	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
	Tyco Electronics Raychem		25 to 300	1× RSTI-L56xx 1× RSTI-L56xx	– –	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	– –	– –	IEC IEC
			25 to 300	1× RSTI-L56xx-CEE01 1× RSTI-L56xx-CEE01	– –	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	– –	– –	GOST GOST
		25 to 300	1× RSTI-58xx 1× RSTI-58xx	– –	RSTI-CC-58SAxxxx –	– –	– –	IEC IEC	
		25 to 300	1× RSTI-58xx-CEE01 1× RSTI-58xx-CEE01	– –	RSTI-CC-58SAxxxx –	– –	– –	GOST GOST	
	3M	400 to 630	1× RSTI-36Lxx 1× RSTI-56Lxx	– –	RSTI-L56SAxxxx RSTI-66SAxxxx	RSTI-66CP-M16 RSTI-66CP-M16	– –	IEC IEC	
		400 to 630	1× RSTI-36Lxx-CEE01 1× RSTI-56Lxx-CEE01	– –	RSTI-L56SAxxxx RSTI-66SAxxxx	RSTI-66CP-M16 RSTI-66CP-M16	– –	GOST GOST	
		50 to 240 25 to 240	1× 93-EE 705-6 1× 93-EE 705-6	– –	– –	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		300 to 400	1× 93-EE 715-6 1× 93-EE 715-6	– –	– –	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
	2	Euromold	35 to 300	2× 400TB/G 2× K400TB/G	1× 400CP 1× K400CP	400PB-5(10)-SA-xxx –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	

1) Observe the actual short-circuit and current carrying capacity of the cables and sealing ends

2) At a normal current of more than 1150 A, cable sealing ends with tin-plated, nickel-plated or silver-plated cable lugs are required

# Components

## Installation possibilities for cable connections and surge arresters, single-core PE and XLPE-insulated

Number of cables per panel and phase	Make	Conductor cross-section 1) mm <sup>2</sup>	Cable T-plugs	Coupling inserts/ coupling plugs	Surge arresters with coupling inserts Arresters	Coupling inserts	According to standard
			bolted 12 kV 24 kV	bolted 12 kV 24 kV		additionally	GOST for Russia & GUS GB/DL for China

• Circuit-breaker panel 1250 A 2) • Disconnector panel 1250 A 2) • DBB circuit-breaker panel 1000 A • DBB incoming sectionalizer 2)

2	Euromold	35 to 300	1× 430TB-630A 1× K430TB-630A	1× 300PB-630A 1× K300PB-630A	300SA-5(10)SA	–	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		400 to 630	2× 440TB/G 2× K440TB/G	1× 440CP 1× K440CP	400PB-5(10)-SA-xxx	–	IEC, GOST, GB/DL IEC, GOST, GB/DL	
	Südkabel	50 to 300 25 to 240	1× SET 12 1× SET 24	1× SEHDK 13.1 1× SEHDK 23.1	MUT 23	–	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		50 to 300 25 to 240	2× SET 12 2× SET 24	1× KU 23.2 1× KU 23.2	MUT 23	–	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		400 to 500 300 to 500	2× SEHDT 13 2× SEHDT 23	1× KU 23 1× KU 23	MUT 23	–	IEC, GOST, GB/DL IEC, GOST, GB/DL	
	nkt cables	25 to 300 25 to 500 25 to 300	1× CB 12-630 1× CB 17.5-630 1× CB 24-630	1× CC 12-630 1× CC 17.5-630 1× CC 24-630	CSA 12-x CSA 17.5-x CSA 24-x	–	IEC GOST, GB/DL IEC, GOST, GB/DL	
		25 to 300	2× CB 12-630 2× CB 24-630	1× CP 630-C 1× CP 630-C	CSA 12-x CSA 24-x	–	IEC IEC, GOST, GB/DL	
		400 to 630	1× CB 36-630(1250) 1× CB 36-630(1250)	1× CC 36-630(1250) 1× CC 36-630(1250)	CSA 12-x CSA 24-x	–	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		400 to 630	2× CB 36-630(1250) 2× CB 36-630(1250)	1× CP 630-M16 1× CP 630-M16	CSA 12-x CSA 24-x	–	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		Tyco Electronics Raychem	25 to 300	1× RSTI-L56xx 1× RSTI-L56xx	1× RSTI-CC-L56xx 1× RSTI-CC-L56xx	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	–	IEC IEC
			25 to 300	1× RSTI-L56xx-CEE01 1× RSTI-L56xx-CEE01	1× RSTI-CC-L56xx-CEE01 1× RSTI-CC-L56xx-CEE01	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	–	GOST GOST
	25 to 300		1× RSTI-58xx 1× RSTI-58xx	1× RSTI-CC-58xx 1× RSTI-CC-58xx	RSTI-CC-58SAxxxx	–	IEC IEC	
	25 to 300		1× RSTI-58xx-CEE01 1× RSTI-58xx-CEE01	1× RSTI-CC-58xx-CEE01 1× RSTI-CC-58xx-CEE01	RSTI-CC-58SAxxxx	–	GOST GOST	
	400 to 630		2× RSTI-36Lxx 2× RSTI-56Lxx	1× RSTI-66CP-M16 1× RSTI-66CP-M16	RSTI-L56SAxxxx RSTI-66SAxxxx	RSTI-66CP-M16 RSTI-66CP-M16	IEC IEC	
	400 to 630		2× RSTI-36Lxx-CEE01 2× RSTI-56Lxx-CEE01	1× RSTI-66CP-M16 1× RSTI-66CP-M16	RSTI-L56SAxxxx RSTI-66SAxxxx	RSTI-66CP-M16 RSTI-66CP-M16	GOST GOST	
	3M	50 to 240 25 to 240	2× 93-EE 705-6 2× 93-EE 705-6	1× KU 23.2 1× KU 23.2	–	–	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		240 150 to 240	1× 93-EE 705-6 1× 93-EE 705-6	1× 93-EE 718-6 1× 93-EE 718-6	–	–	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		300 to 400	2× 93-EE 715-6 2× 93-EE 715-6	1× KU 23.2 1× KU 23.2	–	–	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		3	Euromold	35 to 300 3) 35 to 300 400 to 630 3)	3× 400TB/G 3× K400TB/G 1× 430TB-630A 1× K430TB-630A 3× 440TB/G 3× K440TB/G	2× 400CP 2× K400CP 2× 300PB-630A 2× K300PB-630A 2× 440CP 2× K440CP	– – 300SA-5(10)SA – – –	– – – – – –
	nkt cables	25 to 300 25 to 500 25 to 300	1× CB 12-630 1× CB 17.5-630 1× CB 24-630	2× CC 12-630 2× CC 17.5-630 2× CC 24-630	CSA 12-x CSA 17.5-x CSA 24-x	–	IEC GOST, GB/DL IEC, GOST, GB/DL	
		400 to 630	1× CB 36-630(1250) 1× CB 36-630(1250)	2× CC 36-630(1250) 2× CC 36-630(1250)	CSA 12-x CSA 24-x	–	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		Tyco Electronics Raychem	25 to 300	1× RSTI-L56xx 1× RSTI-L56xx	2× RSTI-CC-L56xx 2× RSTI-CC-L56xx	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	–	IEC IEC
			25 to 300	1× RSTI-L56xx-CEE01 1× RSTI-L56xx-CEE01	2× RSTI-CC-L56xx-CEE01 2× RSTI-CC-L56xx-CEE01	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	–	GOST GOST
			25 to 300	1× RSTI-58xx 1× RSTI-58xx	2× RSTI-CC-58xx 2× RSTI-CC-58xx	RSTI-CC-58SAxxxx	–	IEC IEC
25 to 300			1× RSTI-58xx-CEE01 1× RSTI-58xx-CEE01	2× RSTI-CC-58xx-CEE01 2× RSTI-CC-58xx-CEE01	RSTI-CC-58SAxxxx	–	GOST GOST	
400 to 630	3× RSTI-36Lxx 3× RSTI-56Lxx		2× RSTI-66CP-M16 2× RSTI-66CP-M16	–	–	IEC IEC		
400 to 630	3× RSTI-36Lxx-CEE01 3× RSTI-56Lxx-CEE01		2× RSTI-66CP-M16 2× RSTI-66CP-M16	–	–	GOST GOST		
4	Euromold	35 to 300	1× 430TB-630A 1× K430TB-630A	3× 300PB-630A 3× K300PB-630A	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	

1) Observe the actual short-circuit and current carrying capacity of the cables and sealing ends

2) At a normal current of more than 1150 A, cable sealing ends with tin-plated, nickel-plated or silver-plated cable lugs are required

3) Only possible with deep cable compartment cover

# Components

## Installation possibilities for cable connections and surge arresters, single-core PE and XLPE-insulated

Number of cables per panel and phase	Make	Conductor cross-section <sup>1)</sup> mm <sup>2</sup>	Cable T-plugs	Coupling inserts/ coupling plugs	Surge arresters with coupling inserts		According to standard	
			bolted 12 kV 24 kV	bolted 12 kV 24 kV	Arresters	Coupling inserts		
• Circuit-breaker panel 1250 A <sup>2)</sup> • Disconnector panel 1250 A <sup>2)</sup> • DBB circuit-breaker panel 1000 A • DBB incoming sectionalizer <sup>2)</sup>								
4	Tyco Electronics Raychem	25 to 300	1x RSTI-58xx 1x RSTI-58xx	3x RSTI-CC-58xx 3x RSTI-CC-58xx	– –	– –	IEC IEC	
		25 to 300	1x RSTI-58xx-CEE1 1x RSTI-58xx-CEE1	3x RSTI-CC-58xx-CEE1 3x RSTI-CC-58xx-CEE1	– –	– –	GOST GOST	
• Circuit-breaker and disconnector panel 2000 A, 2500 A								
2	Euromold	35 to 300	2x 400TB/G 2x K400TB/G	– –	400PB-5(10)-SA-xxx –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		35 to 300	2x 430TB-630A 2x K430TB-630A	– –	300SA-5(10)SA	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		400 to 630	2x 440TB/G 2x K440TB/G	– –	400PB-5(10)-SA-xxx	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
	Südkabel	50 to 300 25 to 240	2x SET 12 2x SET 24	– –	MUT 23	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		400 to 500 300 to 500	2x SEHDT 13 2x SEHDT 23	– –	MUT 23	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		nkt cables	25 to 300 25 to 500 25 to 300	2x CB 12-630 2x CB 17.5-630 2x CB 24-630	– – –	CSA 12-x CSA 17.5-x CSA 24-x	– – –	IEC GOST, GB/DL IEC, GOST, GB/DL
	Tyco Electronics Raychem	400 to 630	2x CB 36-630(1250) 2x CB 36-630(1250)	– –	CSA 12-x CSA 24-x	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		25 to 300	2x RSTI-L56xx 2x RSTI-L56xx	– –	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	– –	IEC IEC	
		25 to 300	2x RSTI-L56xx-CEE01 2x RSTI-L56xx-CEE01	– –	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	– –	GOST GOST	
		25 to 300	2x RSTI-58xx 2x RSTI-58xx	– –	RSTI-CC-58SAxxxx	– –	IEC IEC	
		25 to 300	2x RSTI-58xx-CEE01 2x RSTI-58xx-CEE01	– –	RSTI-CC-58SAxxxx	– –	GOST GOST	
		400 to 630 400 to 630	2x RSTI-36Lxx 2x RSTI-56Lxx 2x RSTI-36Lxx-CEE01 2x RSTI-56Lxx-CEE01	– – – –	RSTI-L56SAxxxx RSTI-66SAxxxx RSTI-L56SAxxxx RSTI-66SAxxxx	RSTI-66CP-M16 RSTI-66CP-M16 RSTI-66CP-M16 RSTI-66CP-M16	IEC IEC GOST GOST	
	3M	50 to 240 25 to 240	2x 93-EE 705-6 2x 93-EE 705-6	– –	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		300 to 400	2x 93-EE 715-6 2x 93-EE 715-6	– –	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		4	Euromold	35 to 300	4x 400TB/G 4x K400TB/G	2x 400CP 2x K400CP	400PB-5(10)-SA-xxx	–
	Südkabel	35 to 300	2x 430TB-630A 2x K430TB-630A	2x 300PB-630A 2x K300PB-630A	300SA-5(10)SA	–	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		400 to 630	4x 440TB/G 4x K440TB/G	2x 440CP 2x K440CP	400PB-5(10)-SA-xxx	–	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		50 to 300 25 to 240	2x SET 12 2x SET 24	2x SEHDK 13.1 2x SEHDK 23.1	MUT 23	–	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		50 to 300 25 to 240	4x SET 12 4x SET 24	2x KU 23.2 2x KU 23.2	MUT 23	–	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		400 to 500 300 to 500	4x SEHDT 13 4x SEHDT 23	2x KU 23 2x KU 23	MUT 23	–	IEC, GOST, GB/DL IEC, GOST, GB/DL	
nkt cables		25 to 300 25 to 500 25 to 300	2x CB 12-630 2x CB 17.5-630 2x CB 24-630	2x CC 12-630 2x CC 12-630 2x CC 24-630	CSA 12-x CSA 17.5-x CSA 24-x	– – –	IEC GOST, GB/DL IEC, GOST, GB/DL	
		25 to 300	4x CB 12-630 4x CB 24-630	2x CP 630-C 2x CP 630-C	CSA 12-x CSA 24-x	– –	IEC IEC, GOST, GB/DL	
		400 to 630	2x CB 36-630(1250) 2x CB 36-630(1250)	2x CC 36-630(1250) 2x CC 36-630(1250)	CSA 12-x CSA 24-x	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		400 to 630	4x CB 36-630(1250) 4x CB 36-630(1250)	2x CP 630-M16 2x CP 630-M16	CSA 12-x CSA 24-x	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
Tyco Electronics Raychem		25 to 300	2x RSTI-L56xx 2x RSTI-L56xx	2x RSTI-CC-L56xx 2x RSTI-CC-L56xx	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	IEC IEC	
	25 to 300	2x RSTI-L56xx-CEE01 2x RSTI-L56xx-CEE01	2x RSTI-CC-L56xx-CEE01 2x RSTI-CC-L56xx-CEE01	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	GOST GOST		

1) Observe the actual short-circuit and current carrying capacity of the cables and sealing ends

2) At a normal current of more than 1150 A, cable sealing ends with tin-plated, nickel-plated or silver-plated cable lugs are required

# Components

## Installation possibilities for cable connections and surge arresters, single-core PE and XLPE-insulated

Number of cables per panel and phase	Make	Conductor cross-section <sup>1)</sup> mm <sup>2</sup>	Cable T-plugs	Coupling inserts / coupling plugs	Surge arresters with coupling inserts	According to standard
			bolted 12 kV 24 kV	bolted 12 kV 24 kV	Arresters	Coupling inserts

• Circuit-breaker and disconnector panel 2000 A, 2500 A

4	Tyco Electronics Raychem	25 to 300	2x RSTI-58xx 2x RSTI-58xx	2x RSTI-CC-58xx 2x RSTI-CC-58xx	RSTI-CC-58SAxxxx	RSTI-CC-58SAxxxx	IEC IEC	
		25 to 300	2x RSTI-58xx-CEE01 2x RSTI-58xx-CEE01	2x RSTI-CC-58xx-CEE01 2x RSTI-CC-58xx-CEE01	RSTI-CC-58SAxxxx	– –	GOST GOST	
		400 to 630	4x RSTI-36Lxx 4x RSTI-56Lxx	2x RSTI-66CP-M16 2x RSTI-66CP-M16	RSTI-L56SAxxxx RSTI-66SAxxxx	RSTI-66CP-M16 RSTI-66CP-M16	IEC IEC	
		400 to 630	4x RSTI-36Lxx-CEE01 4x RSTI-56Lxx-CEE01	2x RSTI-66CP-M16 2x RSTI-66CP-M16	RSTI-L56SAxxxx RSTI-66SAxxxx	RSTI-66CP-M16 RSTI-66CP-M16	GOST GOST	
	3M	50 to 240	4x 93-EE 705-6 4x 93-EE 705-6	2x KU 23.2 2x KU 23.2	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		240	2x 93-EE 705-6	2x 93-EE 718-6	–	–	IEC, GOST, GB/DL	
		150 to 240	2x 93-EE 705-6	2x 93-EE 718-6	–	–	IEC, GOST, GB/DL	
	6	Euromold	35 to 300 <sup>3)</sup>	6x 400TB/G 6x K400TB/G	4x 400CP 4x K400CP	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL
			35 to 300	2x 430TB-630A 2x K430TB-630A	4x 300PB-630A 4x K300PB-630A	300SA-5(10)SA –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL
			400 to 630 <sup>3)</sup>	6x 440TB/G 6x K440TB/G	4x 440CP 4x K440CP	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL
nkt cables		25 to 300	2x CB 12-630	4x CC 12-630	CSA 12-x	–	IEC	
		25 to 500	2x CB 17.5-630	4x CC 12-630	CSA 17.5-x	–	GOST, GB/DL	
		25 to 300	2x CB 24-630	4x CC 24-630	CSA 24-x	–	IEC, GOST, GB/DL	
		400 to 630	2x CB 36-630(1250) 2x CB 36-630(1250)	4x CC 36-630(1250) 4x CC 36-630(1250)	CSA 12-x CSA 24-x	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
Tyco Electronics Raychem		25 to 300	2x RSTI-L56xx 2x RSTI-L56xx	4x RSTI-CC-L56xx 4x RSTI-CC-L56xx	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	– –	IEC IEC	
		25 to 300	2x RSTI-L56xx-CEE01 2x RSTI-L56xx-CEE01	4x RSTI-CC-L56xx-CEE01 4x RSTI-CC-L56xx-CEE01	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	– –	GOST GOST	
		25 to 300	2x RSTI-58xx 2x RSTI-58xx	4x RSTI-CC-58xx 4x RSTI-CC-58xx	RSTI-CC-58SAxxxx	–	IEC IEC	
	25 to 300	2x RSTI-58xx-CEE01 2x RSTI-58xx-CEE01	4x RSTI-CC-58xx-CEE01 4x RSTI-CC-58xx-CEE01	RSTI-CC-58SAxxxx	–	GOST GOST		
	400 to 630	6x RSTI-36Lxx 6x RSTI-56Lxx	4x RSTI-66CP-M16 4x RSTI-66CP-M16	– –	– –	IEC IEC		
	400 to 630	6x RSTI-36Lxx-CEE01 6x RSTI-56Lxx-CEE01	4x RSTI-66CP-M16 4x RSTI-66CP-M16	– –	– –	GOST GOST		
8	Euromold	35 to 300	2x 430TB-630A 2x K430TB-630A	6x 300PB-630A 6x K300PB-630A	– –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		25 to 300	2x RSTI-58xx 2x RSTI-58xx	6x RSTI-CC-58xx 6x RSTI-CC-58xx	– –	– –	IEC IEC	
	Tyco Electronics Raychem	25 to 300	2x RSTI-58xx-CEE1 2x RSTI-58xx-CEE1	6x RSTI-CC-58xx-CEE1 6x RSTI-CC-58xx-CEE1	– –	– –	GOST GOST	

1) Observe the actual short-circuit and current carrying capacity of the cables and sealing ends

3) Only possible with deep cable compartment cover

## Installation possibilities for cable connections and surge arresters, three-core PE and XLPE-insulated

Number of cables per panel and phase	Make	Conductor cross-section <sup>1)</sup> mm <sup>2</sup>	Cable T-plugs	Coupling inserts/ coupling plugs	Distribution kit for three-core cables	Surge arresters	According to standard	
			bolted 12 kV 24 kV	bolted 12 kV 24 kV				
1	Euromold	35 to 300	1x 400TB/G 1x K400TB/G 1x K400TB/G-CSxxx	– – –	1x distribution kit 1x distribution kit 1x distribution kit	400PB-5(10)-SA-xxx – –	IEC, GOST, GB/DL IEC GOST, GB/DL	
		35 to 300	1x 430TB-630A 1x K430TB-630A 1x K430TB-630A-CSxxx	– – –	1x distribution kit 1x distribution kit 1x distribution kit	300SA-5(10)SA – –	IEC, GOST, GB/DL IEC GOST, GB/DL	
	Südkabel	50 to 300 25 to 240	1x SET 12 1x SET 24	– –	1x distribution kit SAT 1x distribution kit SAT	MUT 23 –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
	nkt cables	25 to 300 25 to 500 25 to 300	1x CB 12-630 1x CB 17.5-630 1x CB 24-630	– – –	1x distribution kit ATS 1x distribution kit ATS 1x distribution kit ATS	CSA 12-x CSA 17.5-x CSA 24-x	IEC GOST, GB/DL IEC, GOST, GB/DL	
	Tyco Electronics Raychem	25 to 300	1x RSTI-L56xx 1x RSTI-L56xx	– –	1x distribution kit RSTI-TRF0x 1x distribution kit RSTI-TRF0x	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	IEC IEC	
		25 to 300	1x RSTI-L56xx-CEE01 1x RSTI-L56xx-CEE01	– –	1x distribution kit RSTI-TRF0x 1x distribution kit RSTI-TRF0x	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	GOST GOST	
		25 to 300	1x RSTI-58xx 1x RSTI-58xx	– –	1x distribution kit RSTI-TRF0x 1x distribution kit RSTI-TRF0x	RSTI-CC-58SAxxxx –	IEC IEC	
		25 to 300	1x RSTI-58xx-CEE01 1x RSTI-58xx-CEE01	– –	1x distribution kit RSTI-TRF0x 1x distribution kit RSTI-TRF0x	RSTI-CC-58SAxxxx –	GOST GOST	
	3M	50 to 240 25 to 240	1x 93-EE 705-6 1x 93-EE 705-6	– –	1x distribution kit 1x distribution kit	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		300 to 400	1x 93-EE 715-6 1x 93-EE 715-6	– –	1x distribution kit 1x distribution kit	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
	2	Euromold	35 to 300	2x 400TB/G 2x K400TB/G 2x K400TB/G-CSxxx	1x 400CP 1x K400CP 1x K400CP	2x distribution kit 2x distribution kit 2x distribution kit	– – –	IEC, GOST, GB/DL IEC GOST, GB/DL
			35 to 300	1x 430TB-630A 1x K430TB-630A 1x K430TB-630A-CSxxx	1x 300PB-630A 1x K300PB-630A 1x K300PB-630A-CSxxx	2x distribution kit 2x distribution kit 2x distribution kit	300SA-5(10)SA – –	IEC, GOST, GB/DL IEC GOST, GB/DL
		Südkabel	50 to 300 25 to 240	1x SET 12 1x SET 24	1x SEHDK 13.1 1x SEHDK 23.1	2x distribution kit SAT 2x distribution kit SAT	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL
			50 to 300 25 to 240	2x SET 12 2x SET 24	1x KU 23.2 1x KU 23.2	2x distribution kit SAT 2x distribution kit SAT	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL
nkt cables		25 to 300 25 to 500 25 to 300	1x CB 12-630 1x CB 17.5-630 1x CB 24-630	1x CC 12-630 1x CC 17.5-630 1x CC 24-630	2x distribution kit ATS 2x distribution kit ATS 2x distribution kit ATS	CSA 12-x CSA 17.5-x CSA 24-x	IEC GOST, GB/DL IEC, GOST, GB/DL	
		25 to 300	2x CB 12-630 2x CB 24-630	1x CP 630-C 1x CP 630-C	2x distribution kit ATS 2x distribution kit ATS	CSA 12-x CSA 24-x	IEC IEC, GOST, GB/DL	
Tyco Electronics Raychem		25 to 300	1x RSTI-L56xx 1x RSTI-L56xx	1x RSTI-CC-L56xx 1x RSTI-CC-L56xx	2x distribution kit RSTI-TRF0x 2x distribution kit RSTI-TRF0x	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	IEC IEC	
		25 to 300	1x RSTI-L56xx-CEE01 1x RSTI-L56xx-CEE01	1x RSTI-CC-L56xx-CEE01 1x RSTI-CC-L56xx-CEE01	2x distribution kit RSTI-TRF0x 2x distribution kit RSTI-TRF0x	RSTI-CC-L56SAxxxx RSTI-CC-66SAxxxx	GOST GOST	
		25 to 300	1x RSTI-58xx 1x RSTI-58xx	1x RSTI-CC-58xx 1x RSTI-CC-58xx	2x distribution kit RSTI-TRF0x 2x distribution kit RSTI-TRF0x	RSTI-CC-58SAxxxx –	IEC IEC	
		25 to 300	1x RSTI-58xx-CEE01 1x RSTI-58xx-CEE01	1x RSTI-CC-58xx-CEE01 1x RSTI-CC-58xx-CEE01	2x distribution kit RSTI-TRF0x 2x distribution kit RSTI-TRF0x	RSTI-CC-58SAxxxx –	GOST GOST	
3M		50 to 240 25 to 240	2x 93-EE 705-6 2x 93-EE 705-6	1x KU 23.2 1x KU 23.2	2x distribution kit 2x distribution kit	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		240 150 to 240	1x 93-EE 705-6 1x 93-EE 705-6	1x 93-EE 718-6 1x 93-EE 718-6	2x distribution kit 2x distribution kit	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		300 to 400	2x 93-EE 715-6 2x 93-EE 715-6	1x KU 23.2 1x KU 23.2	2x distribution kit 2x distribution kit	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
3		Euromold	35 to 300	1x 430TB-630A 1x K430TB-630A 1x K430TB-630A-CSxxx	2x 300PB-630A 2x K300PB-630A 2x K300PB-630A-CSxxx	3x distribution kit 3x distribution kit 3x distribution kit	– – –	IEC, GOST, GB/DL IEC GOST, GB/DL
	nkt cables		25 to 300 25 to 500 25 to 300	1x CB 12-630 1x CB 17.5-630 1x CB 24-630	2x CC 12-630 2x CC 17.5-630 2x CC 24-630	3x distribution kit ATS 3x distribution kit ATS 3x distribution kit ATS	– – –	IEC GOST, GB/DL IEC, GOST, GB/DL

- Circuit-breaker panel 630 A, 1000 A • Switch-disconnector panel 630 A • Disconnector panel 1000 A • Ring-main panel 630 A
- Contactor panel • Circuit-breaker panel 1250 A <sup>2)</sup> • Disconnector panel 1250 A <sup>2)</sup> • DBB circuit-breaker panel 1000 A
- DBB incoming sectionalizer <sup>2)</sup>

1) Observe the actual short-circuit and current carrying capacity of the cables and sealing ends

2) At a normal current of more than 1150 A, cable sealing ends with tin-plated, nickel-plated or silver-plated cable lugs are required

# Components

Installation possibilities for cable connections and surge arresters, three-core PE and XLPE-insulated, paper-insulated non-draining cables and paper-insulated mass-impregnated cables

Number of cables per panel and phase	Make	Conductor cross-section <sup>1)</sup> mm <sup>2</sup>	Cable T-plugs	Coupling inserts/ coupling plugs	Distribution kit for three-core cables	Surge arresters	According to standard
			bolted 12 kV 24 kV	bolted 12 kV 24 kV			GOST for Russia & GUS GB/DL for China

- Circuit-breaker panel 630 A, 1000 A • Switch-disconnector panel 630 A • Disconnector panel 1000 A • Ring-main panel 630 A
- Contactor panel • Circuit-breaker panel 1250 A <sup>2)</sup> • Disconnector panel 1250 A <sup>2)</sup> • DBB circuit-breaker panel 1000 A
- DBB incoming sectionalizer <sup>2)</sup>

3	Tyco Electronics Raychem	25 to 300	1× RSTI-L56xx 1× RSTI-L56xx	2× RSTI-CC-L56xx 2× RSTI-CC-L56xx	3x distribution kit RSTI-TRF0x 3x distribution kit RSTI-TRF0x	– –	IEC IEC
		25 to 300	1× RSTI-L56xx-CEE01 1× RSTI-L56xx-CEE01	2× RSTI-CC-L56xx-CEE01 2× RSTI-CC-L56xx-CEE01	3x distribution kit RSTI-TRF0x 3x distribution kit RSTI-TRF0x	– –	GOST GOST
		25 to 300	1× RSTI-58xx 1× RSTI-58xx	2× RSTI-CC-58xx 2× RSTI-CC-58xx	3x distribution kit RSTI-TRF0x 3x distribution kit RSTI-TRF0x	– –	IEC IEC
		25 to 300	1× RSTI-58xx-CEE01 1× RSTI-58xx-CEE01	2× RSTI-CC-58xx-CEE01 2× RSTI-CC-58xx-CEE01	3x distribution kit RSTI-TRF0x 3x distribution kit RSTI-TRF0x	– –	GOST GOST

## Paper-insulated non-draining cables

- Circuit-breaker panel 630 A, 1000 A • Switch-disconnector panel 630 A • Disconnector panel 1000 A • Ring-main panel 630 A
- Contactor panel • Circuit-breaker panel 1250 A <sup>2)</sup> • Disconnector panel 1250 A <sup>2)</sup> • DBB circuit-breaker panel 1000 A
- DBB incoming sectionalizer <sup>2)</sup>

1	Euromold	35 to 300	1× 400TB/G –	– –	1× distribution kit MIND –	400PB-5(10)-SA-xxx –	IEC, GOST, GB/DL	
		35 to 300	1× 430TB-630A –	– –	1× distribution kit MIND –	300SA-5(10)SA –	IEC, GOST, GB/DL	
	nkt cables	25 to 120	1× SÜEV10-120CU- xxxx-CB24 –	– –	– –	– –	CSA 12-x –	IEC, GOST, GB/DL
		150 to 240	1× SÜEV10-240CU- xxxx-CB24 –	– –	– –	– –	CSA 12-x –	IEC, GOST, GB/DL
2	Euromold	35 to 300	2× 400TB/G –	1× 400CP –	2× distribution kit MIND –	– –	IEC, GOST, GB/DL	
		35 to 300	1× 430TB-630A –	1× 300PB-630A –	2× distribution kit MIND –	– –	IEC, GOST, GB/DL	
	nkt cables	25 to 120	1× SÜEV10-120CU- xxxx-CB24 –	1× SÜEV10-120CU-xxxx- CC24 –	– –	– –	CSA 12-x –	IEC, GOST, GB/DL
		150 to 240	1× SÜEV10-240CU- xxxx-CB24 –	1× SÜEV10-240CU-xxxx- CC24 –	– –	– –	CSA 12-x –	IEC, GOST, GB/DL
3	Euromold	35 to 300 <sup>3)</sup>	3× 400TB/G –	2× 400CP –	3x distribution kit MIND –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	
		35 to 300	1× 430TB-630A –	2× 300PB-630A –	3x distribution kit MIND –	– –	IEC, GOST, GB/DL IEC, GOST, GB/DL	

## Paper-insulated mass-impregnated cables

- Circuit-breaker panel 630 A, 1000 A • Switch-disconnector panel 630 A • Disconnector panel 1000 A • Ring-main panel 630 A
- Contactor panel • Circuit-breaker panel 1250 A <sup>2)</sup> • Disconnector panel 1250 A <sup>2)</sup> • DBB circuit-breaker panel 1000 A
- DBB incoming sectionalizer <sup>2)</sup>

1	nkt cables	25 to 120	1× SÜEV10-120CU- xxxx-CB24 –	– –	– –	CSA 12-x –	IEC, GOST, GB/DL IEC, GOST, GB/DL
		150 to 240	1× SÜEV10-240CU- xxxx-CB24 –	– –	– –	CSA 12-x –	IEC, GOST, GB/DL IEC, GOST, GB/DL
2	nkt cables	25 to 120	1× SÜEV10-120CU- xxxx-CB24 –	1× SÜEV10-120CU-xxxx- CC24 –	– –	CSA 12-x –	IEC, GOST, GB/DL IEC, GOST, GB/DL
		150 to 240	1× SÜEV10-240CU- xxxx-CB24 –	1× SÜEV10-240CU-xxxx- CC24 –	– –	CSA 12-x –	IEC, GOST, GB/DL IEC, GOST, GB/DL

1) Observe the actual short-circuit and current carrying capacity of the cables and sealing ends

2) At a normal current of more than 1150 A, cable sealing ends with tin-plated, nickel-plated or silver-plated cable lugs are required

3) Only possible with deep cable compartment cover

## Panel connection (commercially available cable sealing ends)

Cable type	Cable sealing end			Comment
	Make	Type	Cross-section mm <sup>2</sup>	

### Thermoplastic-insulated cables ≤ 12 kV according to IEC 60502-2 and VDE 0276-620

Single-core cable, PE and XLPE-insulated N2YSY (Cu) and N2XSY (Cu) or NA2YSY (Al) and NA2XSY (Al)	<b>Euromold</b>	400TB/G 430TB-630A 440TB/G	35 to 300 35 to 300 400 to 630	EPDM with semi-conductive layer EPDM with semi-conductive layer EPDM with semi-conductive layer
	<b>nkt cables</b>	CB 12-630 CB 17.5-630 CB 36-630(1250)	25 to 300 25 to 500 400 to 630	Silicone with semi-conductive layer (optionally with metal housing) Silicone with semi-conductive layer Silicone with semi-conductive layer
	<b>Südkabel</b>	SET 12 SEHDT 13	50 to 300 400 to 500	Silicone with semi-conductive layer (optionally with metal housing) Silicone with semi-conductive layer (optionally with metal housing)
	<b>Tyco Electronics Raychem</b>	RSTI-L56xx RSTI-58xx RSTI-36Lxx	25 to 300 25 to 300 400 to 630	Silicone with semi-conductive layer, with capacitive measuring point Silicone with semi-conductive layer, with capacitive measuring point Silicone with semi-conductive layer, with capacitive measuring point
	<b>3M</b>	93-EE 705-6 93-EE 715-6	50 to 240 300 to 400	Silicone with semi-conductive layer (optionally with metal housing) Silicone with semi-conductive layer (optionally with metal housing)
Three-core cable PE and XLPE-insulated N2YSY (Cu) and N2XSY (Cu) or NA2YSY (Al) and NA2XSY (Al)	<b>Euromold</b>	400TB/G 430TB-630A	35 to 300 35 to 300	EPDM with semi-conductive layer, in combination with distribution kit EPDM with semi-conductive layer, in combination with distribution kit
	<b>nkt cables</b>	CB 12-630 CB 17.5-630	25 to 300 25 to 500	Silicone with semi-conductive layer (optionally with metal housing), in combination with distribution kit Silicone with semi-conductive layer, in combination with distribution kit
	<b>Südkabel</b>	SET 12 SEHDT 13	50 to 300 400 to 500	Silicone with semi-conductive layer (optionally with metal housing), in combination with distribution kit Silicone with semi-conductive layer (optionally with metal housing), in combination with distribution kit
	<b>Tyco Electronics Raychem</b>	RSTI-L56xx RSTI-58xx	25 to 300 25 to 300	Silicone with semi-conductive layer, with capacitive measuring point, in combination with distribution kit RSTI-TRFOx Silicone with semi-conductive layer, with capacitive measuring point, in combination with distribution kit RSTI-TRFOx
	<b>3M</b>	93-EE 705-6 93-EE 715-6	50 to 240 300 to 400	Silicone with semi-conductive layer (optionally with metal housing), in combination with distribution kit Silicone with semi-conductive layer (optionally with metal housing), in combination with distribution kit

### Thermoplastic-insulated cables 15/17.5/24 kV according to IEC 60502-2 and VDE 0276-620

Single-core cable, PE and XLPE-insulated N2YSY (Cu) and N2XSY (Cu) or NA2YSY (Al) and NA2XSY (Al)	<b>Euromold</b>	K400TB/G K430TB-630A K440TB/G	35 to 300 35 to 300 400 to 630	EPDM with semi-conductive layer EPDM with semi-conductive layer EPDM with semi-conductive layer
	<b>nkt cables</b>	CB 24-630 CB 36-630(1250)	25 to 300 400 to 630	Silicone with semi-conductive layer (optionally with metal housing) Silicone with semi-conductive layer
	<b>Südkabel</b>	SET 24 SEHDT 23	50 to 300 400 to 500	Silicone with semi-conductive layer (optionally with metal housing) Silicone with semi-conductive layer (optionally with metal housing)
	<b>Tyco Electronics Raychem</b>	RSTI-L56xx RSTI-58xx RSTI-56Lxx	25 to 300 25 to 300 400 to 630	Silicone with semi-conductive layer, with capacitive measuring point Silicone with semi-conductive layer, with capacitive measuring point Silicone with semi-conductive layer, with capacitive measuring point
	<b>3M</b>	93-EE 705-6 93-EE 715-6	25 to 240 300 to 400	Silicone with semi-conductive layer (optionally with metal housing) Silicone with semi-conductive layer (optionally with metal housing)
Three-core cable, PE and XLPE-insulated N2YSY (Cu) and N2XSY (Cu) or NA2YSY (Al) and NA2XSY (Al)	<b>Euromold</b>	K400TB/G K430TB-630A	35 to 300 35 to 300	EPDM with semi-conductive layer, in combination with distribution kit EPDM with semi-conductive layer, in combination with distribution kit
	<b>nkt cables</b>	CB 24-630	25 to 300	Silicone with semi-conductive layer (optionally with metal housing), in combination with distribution kit
	<b>Südkabel</b>	SET 24 SEHDT 23	50 to 300 400 to 500	Silicone with semi-conductive layer (optionally with metal housing), in combination with distribution kit Silicone with semi-conductive layer (optionally with metal housing), in combination with distribution kit
	<b>Tyco Electronics Raychem</b>	RSTI-L56xx RSTI-58xx	25 to 300 25 to 300	Silicone with semi-conductive layer, with capacitive measuring point, in combination with distribution kit RSTI-TRFOx Silicone with semi-conductive layer, with capacitive measuring point, in combination with distribution kit RSTI-TRFOx
	<b>3M</b>	93-EE 705-6 93-EE 715-6	25 to 240 300 to 400	Silicone with semi-conductive layer (optionally with metal housing), in combination with distribution kit Silicone with semi-conductive layer (optionally with metal housing), in combination with distribution kit

# Components

## Panel connection (commercially available cable sealing ends)

Cable type	Cable sealing end			Comment
	Make	Type	Cross-section mm <sup>2</sup>	
<b>Paper-insulated belted cables (non-draining cables) ≤ 12 kV according to IEC 60055 and VDE 0255</b>				
Three-core cable paper-insulated NKBA (Cu), NKBY (Cu), NKRA (Cu) and NKFA (Cu) or NAKBA (Al), NAKBY (Al), NAKRA (Al) and NAKFA (Al)	Euromold	400TB/G	35 to 300	EPDM with semi-conductive layer, in combination with distribution kit MIND EPDM with semi-conductive layer, in combination with distribution kit MIND
		430TB-630A	35 to 300	
	nkt cables	CB 24-630	25 to 240	Silicone with semi-conductive layer (optionally with metal housing), in combination with transition sealing end type SÜEV 10
<b>Paper-insulated belted cables (non-draining cables) ≤ 12 kV according to GOST 18410-73</b>				
Three-core cable paper-insulated ASB and ASBL	Euromold	400TB/G	35 to 300	EPDM with semi-conductive layer, in combination with distribution kit MIND EPDM with semi-conductive layer, in combination with distribution kit MIND
		430TB-630A	35 to 300	
	nkt cables	CB 24-630	25 to 240	Silicone with semi-conductive layer (optionally with metal housing), in combination with transition sealing end type SÜEV 10
<b>Paper-insulated belted cables (mass-impregnated cables) ≤ 12 kV according to IEC 60055 and VDE 0255</b>				
Three-core cable paper-insulated NKBA (Cu), NKBY (Cu), NKRA (Cu) and NKFA (Cu) or NAKBA (Al), NAKBY (Al), NAKRA (Al) and NAKFA (Al)	nkt cables	CB 24-630	25 to 240	Silicone with semi-conductive layer (optionally with metal housing), in combination with transition sealing end type SÜEV 10
<b>Paper-insulated belted cables (mass-impregnated cables) ≤ 12 kV according to GOST 18410-73</b>				
Three-core cable paper-insulated ASB and ASBL	nkt cables	CB 24-630	25 to 240	Silicone with semi-conductive layer (optionally with metal housing), in combination with transition sealing end type SÜEV 10

### Voltage detecting systems according to IEC 61243-5 or VDE 0682-415

- To verify safe isolation from supply
- LRM detecting systems
- with plug-in indicator
- with integrated indicator, type VOIS+, VOIS R+, WEGA, ZERO
- with integrated indicator, with integrated repeat test of the interface, with integrated function test, type CAPDIS-S1+, WEGA 1.2, and additionally with integrated signaling relays type CAPDIS-S2+, WEGA 2.2.

### Plug-in voltage indicator

- Verification of safe isolation from supply phase by phase
- Indicator suitable for continuous operation
- Measuring system and voltage indicator can be tested
- Voltage indicator flashes if high voltage is present.

### VOIS+, VOIS R+

- Integrated display, without auxiliary power
- With indication "A1" to "A3" (see legend)
- Maintenance-free, repeat test required
- With integrated 3-phase LRM test socket for phase comparison
- With integrated signaling relays (only VOIS R+).

### CAPDIS-Sx+

#### Common features

- Maintenance-free
- Integrated display, without auxiliary power
- Integrated repeat test of the interfaces (self-monitoring)
- With integrated function test (without auxiliary power) by pressing the "Display-Test" pushbutton
- With integrated 3-phase LRM test socket for phase comparison.

### CAPDIS-S1+

- Without auxiliary power
- With indication "A1" to "A5" (see legend)
- Without ready-for-service monitoring
- Without signaling relays (thus without auxiliary contacts).

### CAPDIS-S2+

- With indication "A0" to "A6" (see legend)
- Only by pressing the "Display-Test" pushbutton: "ERROR" indication (A6), e.g. in case of missing auxiliary voltage
- With ready-for-service monitoring (external auxiliary power required)
- With integrated signaling relay for signals (auxiliary power required)
- With signal-lead test.

### Indicators and detecting systems

R-HA40-103 eps



**Plug-in voltage indicator**  
per phase at the panel front

R-HA40-104 eps



**Integrated voltage indicator**  
VOIS+, VOIS R+

R-HA35-154 eps



R-HA35-155 eps



**Integrated voltage detecting system CAPDIS-S1+, -S2+**

### Symbols shown

	VOIS+, VOIS R+			CAPDIS-S1+			CAPDIS-S2+		
	L1	L2	L3	L1	L2	L3	L1	L2	L3
A0							000		
A1	⚡	⚡	⚡	⚡	⚡	⚡	⚡	⚡	⚡
A2									
A3	⚡	⚡		⚡	⚡		⚡	⚡	
A4				⚡	⚡	⚡	⚡	⚡	⚡
A5				000	000	000	000	000	000
A6							000	000	000 ERROR

HA35-2579a eps

A0 CAPDIS-S2+: Operating voltage not present

A1 Operating voltage present

A2 – Operating voltage not present

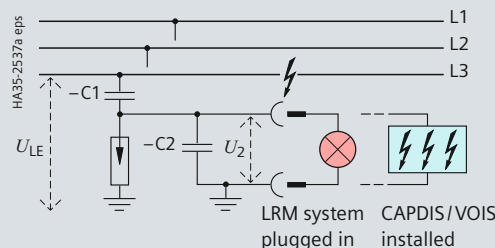
– For CAPDIS-S2+: Auxiliary power not present

A3 Failure in phase L1, operating voltage at L2 and L3 (for CAPDIS-Sx+ also earth-fault indication)

A4 Voltage (not operating voltage) present

A5 Indication "Display-Test" passed

A6 Indication "ERROR", e.g.: in case of missing auxiliary voltage



### Voltage indication

via capacitive voltage divider (principle)

– C1 Capacity integrated into bushing

– C2 Capacity of the connection leads and the voltage indicator to earth

$U_{LE} = U_N / \sqrt{3}$  during rated operation in the three-phase system

$U_2 = U_A =$  Voltage at the capacitive interface of the switchgear or at the voltage indicator

# Components

## Indicating and measuring equipment

### WEGA ZERO

- Voltage detecting system according to IEC 61958 or VDE 0670-502
- With indication "A1" to "A3" (see legend)
- Maintenance-free, repeat test required
- With integrated 3-phase test socket for phase comparison.



R-HA35-151.eps

Integrated voltage indicator  
WEGA ZERO

### WEGA 1.2

- Voltage detecting system according to IEC 61243-5 or VDE 0682-415
- With indication "A1" to "A5" (see legend)
- Maintenance-free
- Integrated repeat test of the interface (self-monitoring)
- With integrated function test (without auxiliary power) by pressing the "Display-Test" pushbutton
- With integrated 3-phase LRM test socket for phase comparison
- Without integrated signaling relay
- Without auxiliary power.



R-HA35-152.eps

Integrated voltage detecting system  
WEGA 1.2

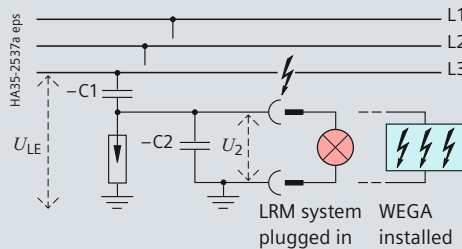
### WEGA 2.2

- Voltage detecting system according to IEC 61243-5 or VDE 0682-415
- With indication "A0" to "A6" (see legend)
- Maintenance-free
- Integrated repeat test of the interface (self-monitoring)
- With integrated function test (without auxiliary power) by pressing the "Display-Test" pushbutton
- With integrated 3-phase LRM test socket for phase comparison
- With integrated signaling relay
- Auxiliary power required
- With signal-lead test.



R-HA35-153.eps

Integrated voltage detecting system  
WEGA 2.2



Voltage indication  
via capacitive voltage divider (principle)

- C1 Capacity integrated into bushing
  - C2 Capacity of the connection leads and the voltage indicator to earth
- $U_{LE} = U_N / \sqrt{3}$  during rated operation in the three-phase system
- $U_2 = U_A =$  Voltage at the capacitive interface of the switchgear or at the voltage indicator

### Symbols shown

	WEGA ZERO			WEGA 1.2			WEGA 2.2		
	L1	L2	L3	L1	L2	L3	L1	L2	L3
A0									
A1	☀	☀	☀	⚡	⚡	⚡	⚡	⚡	⚡
A2	○	○	○						
A3	○	☀	☀		⚡	⚡		⚡	⚡
A4				⚡	⚡	⚡	⚡	⚡	⚡
A5				⚡	⚡	⚡	⚡	⚡	⚡
A6							⚡	⚡	⚡

R-HA35-144.eps

LC display gray: not illuminated  
LC display white: illuminated

- A0** For WEGA 2.2:  
Operating voltage not present, auxiliary power present, LCD illuminated
- A1** Operating voltage present  
For WEGA 2.2: Auxiliary power present, LCD illuminated
- A2** Operating voltage not present  
For WEGA 2.2: Auxiliary power not present, LCD not illuminated
- A3** Failure in phase L1, operating voltage at L2 and L3  
For WEGA 2.2: Auxiliary power present, LCD illuminated
- A4** Voltage present, current monitoring of coupling section below limit value  
For WEGA 2.2: Auxiliary power present, LCD illuminated
- A5** Indication "Display-Test" passed  
For WEGA 2.2: Auxiliary power present, LCD illuminated
- A6** For WEGA 2.2: LCD for missing auxiliary voltage is not illuminated

### Verification of correct terminal-phase connections

- Verification of correct terminal-phase connections possible by means of a phase comparison test unit (can be ordered separately)
- Safe-to-touch handling of the phase comparison test unit by inserting it into the capacitive taps (socket pairs) of the switch-gear.

### Phase comparison test units according to IEC 61243-5 or VDE 0682-415



Phase comparison test unit  
make Pfisterer, type EPV



Phase comparison test unit  
make Horstmann, type ORION 3.0  
as combined test unit for:

- Phase comparison
- Interface testing at the switchgear
- Voltage detection for LRM systems
- Integrated self-test
- Indication via LED and acoustic alarm



Phase comparison test unit  
make Kries, type CAP-Phase  
as combined test unit (HR and LRM) for:

- Voltage detection
- Repeat test
- Phase comparison
- Phase sequence test
- Self-test

The unit does not require a battery

# Components

## Indicating and measuring equipment

### Ready-for-service indicator

#### Features

- Self-monitoring; easy to read
- Independent of temperature and pressure variations
- Independent of the site altitude
- Only responds to changes in gas density
- **Option:** Alarm switch "1NO + 1NC" for remote electrical indication.

#### Mode of operation

For the ready-for-service indicator, a gas-tight measurement box is installed inside the switchgear vessel.

A coupling magnet, which is fitted to the bottom end of the measurement box, transmits its position to an outside armature through the non-magnetizable switchgear vessel. This armature moves the ready-for-service indicator of the switchgear.

While changes in the gas density during the loss of gas, which are decisive for the dielectric strength, are displayed, temperature-dependent changes in the gas pressure are not.

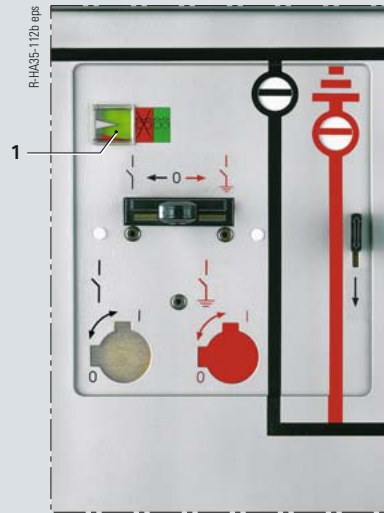
The gas in the measurement box has the same temperature as that in the switchgear.

The temperature effect is compensated via the same pressure change in both gas volumes.

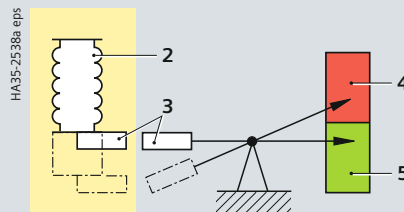
### Low-voltage compartment

- For accommodation of protection, control, measuring and metering equipment
- Partitioned safe-to-touch from the high-voltage part of the panel
- Low-voltage compartment can be removed, bus wires and control cables are plugged in
- **Option:** Higher low-voltage compartment (1161 mm instead of 761 mm) possible.

### Gas monitoring



Control board (detail) with red / green ready-for-service indicator



Stainless-steel vessel filled with SF<sub>6</sub> gas, relative pressure 50 kPa at 20 °C

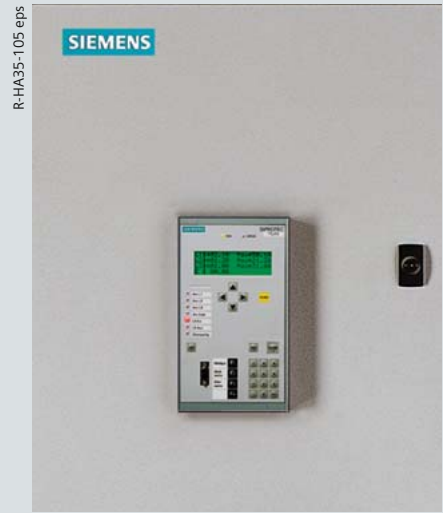
Ready-for-service indicator

#### Principle of operation

of gas monitoring with ready-for-service indicator

- 1 Ready-for-service indicator
- 2 Measurement box
- 3 Magnetic coupling
- 4 Red indication: not ready for service
- 5 Green indication: Ready for service

### Low-voltage compartment



Low-voltage compartment with multifunction protection relay SIPROTEC 4 7SJ61 (example)

For description of the SIPROTEC 4 multifunction protection relays, see page 57

The low-voltage compartment can accommodate all customary protection, control, measuring and monitoring equipment available on the market (e.g.):

### Multifunction protection relay SIPROTEC 4 7SJ600/7SJ602

- User-friendly operating program DIGSI 4 for configuration and analysis
- Communications and bus capability
- Functions: Protection, control, signaling, communication and measuring
- LC text display (2 lines) and keyboard for local operation, configuration and indication
- Four freely programmable LEDs for displaying any desired data
- Operation and fault indication memory
- Fault recorder
- Circuit-breaker control.

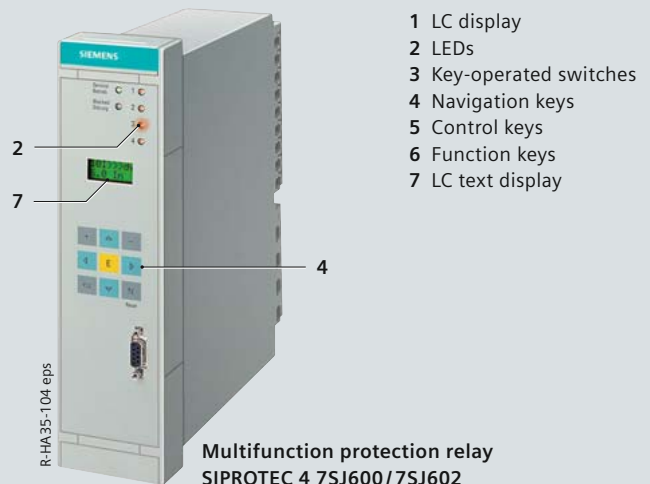
### Multifunction protection relay SIPROTEC 4 7SJ61/7SJ62

- For stand-alone or master operation
- Communications and bus capability
- Functions: Protection, control, signaling, communication and measuring
- LC text display (4 lines) for process and equipment data, as text, e.g. for
  - Measuring and metering values
  - Information on status of switchgear and switching device
  - Protection data
  - General indications
  - Alarms
- Four freely programmable function keys for frequently performed functions
- Seven freely programmable LEDs for displaying any desired data
- Keys for navigation in menus and for entering values
- Fault recorder.

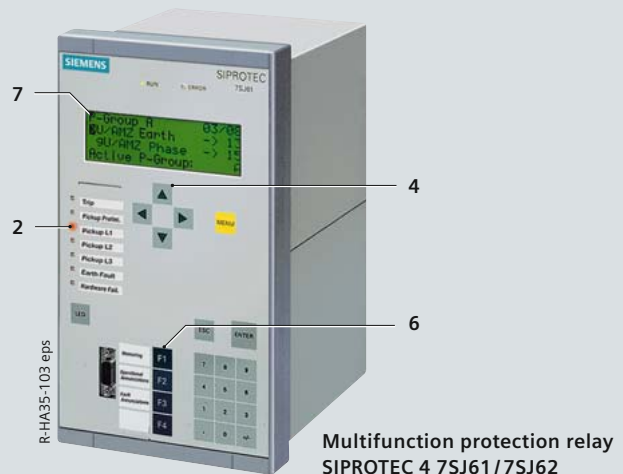
### Multifunction protection relay SIPROTEC 4 7SJ63

- For stand-alone or master operation
- Communications and bus capability
- Functions: Protection, control, signaling, communication and measuring
- LC display for process and equipment data in the form of a feeder control diagram and as text, e.g. for
  - Measuring and metering values
  - Information on status of switchgear and switching device
  - Protection data
  - General indications
  - Alarms
- Four freely programmable function keys for frequently performed functions
- Fourteen freely programmable LEDs for displaying any desired data
- Two key-operated switches to switch between “local and remote control” and “interlocked and non-interlocked operation”
- Keys for navigation in menus and for entering values
- Integrated motor control by special relays with enhanced performance
- Fault recorder.

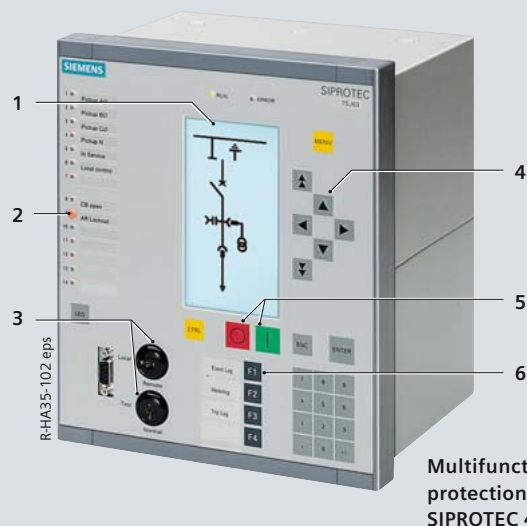
### Multifunction protection relays SIPROTEC 4



Multifunction protection relay SIPROTEC 4 7SJ600/7SJ602



Multifunction protection relay SIPROTEC 4 7SJ61/7SJ62



Multifunction protection relay SIPROTEC 4 7SJ63

# 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) and VDE 0101

- 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 VDE 0671-102 / EN 62 271-102.

### 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 / VDE 0671-1 (see table "Dielectric strength").
- The rated values are referred to sea level and to normal atmospheric conditions (1013 hPa, 20 °C, 11g/m<sup>3</sup> humidity according to IEC 60071 and VDE 0111).

The gas insulation at a relative gas pressure of 50 kPa permits switchgear installation at any desired altitude 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.

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).

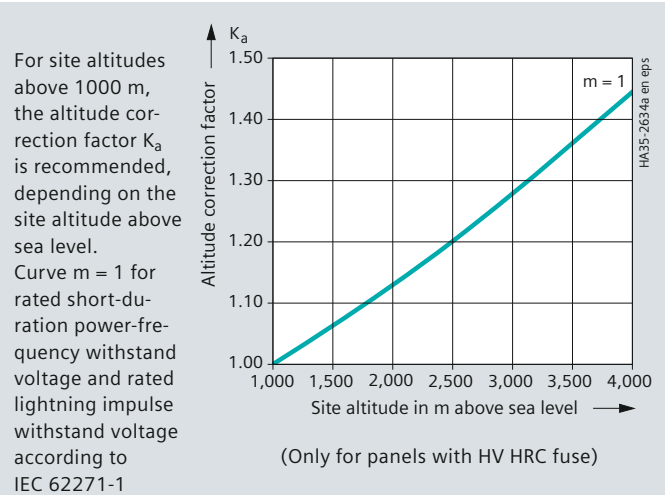
### Standards

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.

**Table – Dielectric strength**

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

### Altitude correction factor $K_a$



### 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 =  
 $95 \text{ kV} \cdot 1.28 = 122 \text{ kV}$

### Result:

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

### Overview of standards (May 2010)

		IEC standard	VDE standard	EN standard
Switchgear	NXPLUS C	IEC 62271-1	VDE 0671-1	EN 62 271-1
		IEC 62271-200	VDE 0671-200	EN 62 271-200
Devices	Circuit-breakers	IEC 62271-100	VDE 0671-100	EN 62 271-100
	Vacuum contactors	IEC 60470	VDE 0670-501	EN 60 470
	Disconnectors and earthing switches	IEC 62271-102	VDE 0671-102	EN 62 271-102
	Switch-disconnectors	IEC 60265-1	VDE 0670-301	EN 60 265-1
	Switch-disconnector / fuse combination	IEC 62271-105	VDE 0671-105	EN 62 271-105
	HV HRC fuses	IEC 60282	VDE 0670-4	EN 60 282
	Voltage detecting systems	IEC 61243-5	VDE 0682-415	EN 61 243-5
Degree of protection	IP code	IEC 60529	VDE 0470-1	EN 60 529
	IK code	IEC 62262	VDE 0470-100	EN 50 102
Insulation	–	IEC 60071	VDE 0111	EN 60 071
Instrument transformers	Current transformers	IEC 60044-1	VDE 0414-1	EN 60 044-1
	Voltage transformers	IEC 60044-2	VDE 0414-2	EN 60 044-2
Installation, erection	–	IEC 61936-1	VDE 0101	–

**Current carrying capacity**

- According to IEC 62271-200 or IEC 62271-1, VDE 0671-200 or VDE 0671-1, the rated normal 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 or VDE 0671-200
- 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<sub>6</sub> insulation of switching devices, the possibility of faults in SF<sub>6</sub>-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<sub>6</sub> insulation and the shorter arc length, i.e. approximately only 1/3 compared to air. The escaping gases are discharged upwards through a pressure relief duct (option).

**Aseismic capacity (option)**

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 60068-3-3 "Guidance – seismic test methods for equipment"
- IEC 60068-2-57 "Test Ff: Vibration – Time-history method"
- IEC 60068-2-59 "Test Fe: Vibration – Sine-beat method"
- IEEE 693-2005 "Recommended Practice for Seismic Design of Substations".

For installation on even and rigid concrete or steel structure (without considering building influences), the tested ground accelerations meet the following requirements:

- Uniform Building Code 1997 (UBC) – Zone 4
- California Building Code 1998 (CBC) – Zone 4
- IEEE 693-2005 – High required response spectrum (Figure A.1).

**Color of the panel front**

Siemens standard (SN) 47 030 G1, color no. 700/light basic (similar to RAL 7047/gray).

**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<sub>6</sub> 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 operating conditions as defined in the standard IEC 62271-1.

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.

**Protection against solid foreign objects, electric shock and water**

NXPLUS C switchgear fulfills according to the standards

IEC 62271-1	VDE 0671-1, EN 62 271-1
IEC 62271-200	VDE 0671-200, EN 62 271-200
IEC 60529	VDE 0470-1, EN 60 529
IEC 62262	VDE 0470-100, EN 50 102

the following degrees of protection:

Degree of protection IP	Type of protection
IP 65	for parts of the primary circuit under high voltage
IP 3XD	for switchgear enclosure
IP 31D	for switchgear enclosure (optional)
IP 32D	for switchgear enclosure (optional)
IP 34D	for switchgear enclosure (optional)
Degree of protection IK	Type of protection
IK 07	for switchgear enclosure

**Type approval**

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

- Lloyds Register of Shipping (LRS)
- Det Norske Veritas (DNV)
- Germanischer Lloyd (GL)
- Russian Maritime Register of Shipping (RMR)

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



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Siemens AG  
Energy Sector  
Freyeslebenstraße 1  
91058 Erlangen, Germany

Siemens AG  
Energy Sector  
Power Distribution Division  
Medium Voltage  
Postfach 3240  
91050 Erlangen, Germany  
[www.siemens.com/medium-voltage-switchgear](http://www.siemens.com/medium-voltage-switchgear)

For more information, please contact our  
Customer Support Center.  
Phone: +49 180/524 70 00  
Fax: +49 180/524 24 71  
(Charges depending on provider)  
E-mail: [support.energy@siemens.com](mailto:support.energy@siemens.com)

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