



# 3AH3 Vacuum Circuit-Breakers

Medium-Voltage Equipment  
Selection and Ordering Data

Catalog HG 11.03 · 2010

Answers for energy.

**SIEMENS**



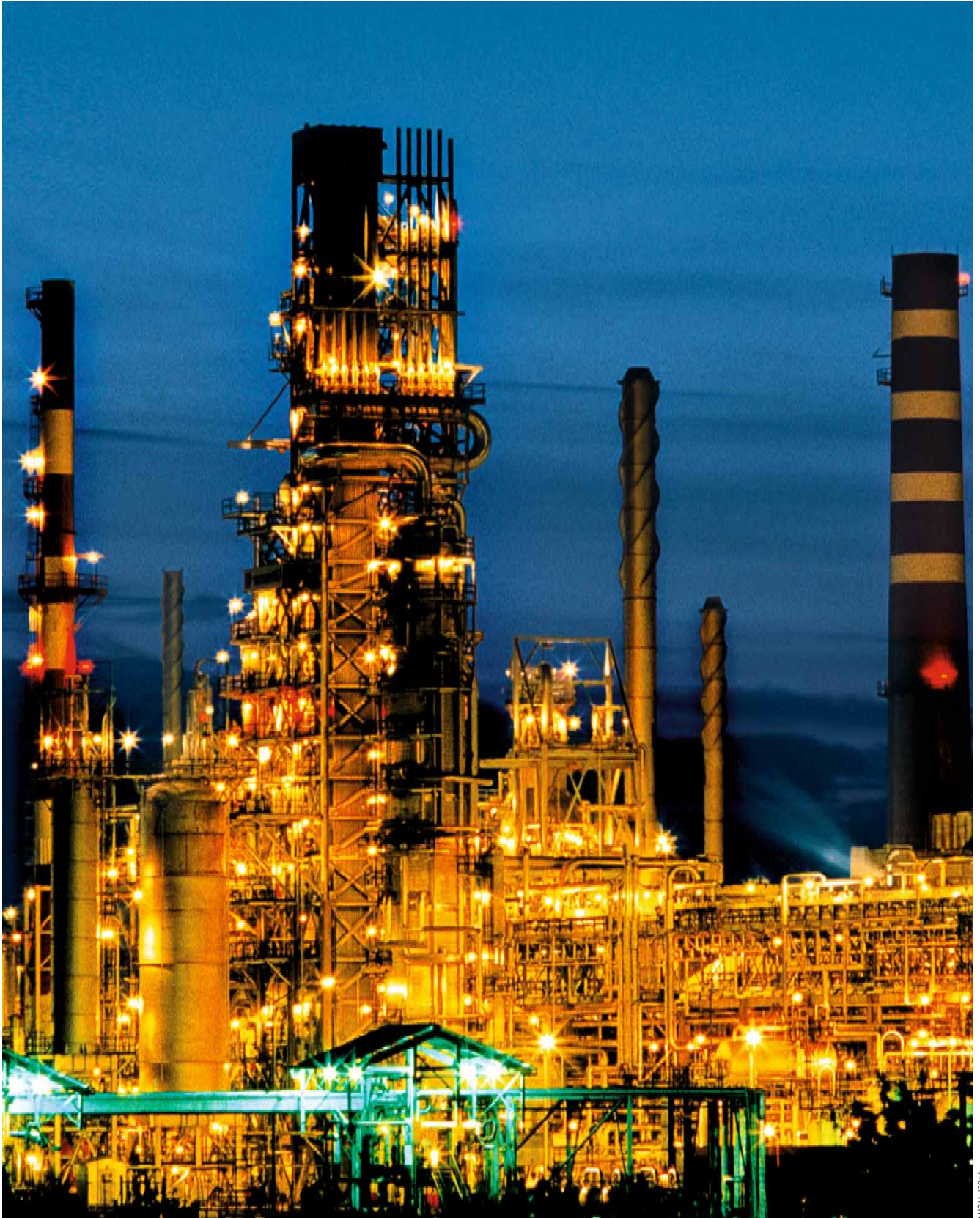
RHG11-172H

# 3AH3 Vacuum Circuit-Breakers

## Medium-Voltage Equipment Catalog HG 11.03 · 2010

Invalid: Catalog HG 11.03 · 2008

Contents	Page	
<b>Description</b>	<b>5</b>	<b>1</b>
General	6	
Construction and mode of operation, standards, maintenance-free design	7	
Ambient conditions, current carrying capacity and dielectric strength	9	
Product range overview and basic equipment	10	
<b>Equipment Selection</b>	<b>11</b>	<b>2</b>
Ordering data and configuration example	12	
Selection of basic types, circuit-breakers	13	
Selection of secondary equipment	17	
Selection of additional equipment	24	
Accessories and spare parts	25	
<b>Technical Data</b>	<b>27</b>	<b>3</b>
Electrical data, dimensions and weights	28	
Circuit diagrams	42	
Operating times, short-circuit protection of motors, consumption data of releases	44	
<b>Annex</b>	<b>45</b>	<b>4</b>
Inquiry form	46	
Configuration instructions	47	
Configuration aid	Foldout page	



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Industrial application: Refinery

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Contents	Page
<b>Description</b>	<b>5</b>
General	6
Construction and mode of operation:	
Switching medium	7
Pole assemblies	7
Operating mechanism box	7
Operating mechanism	7
Trip-free mechanism	7
Releases	8
Closing	8
Circuit-breaker tripping signal	8
Interlocking	8
Standards	8
Maintenance-free design	8
Ambient conditions	9
Current carrying capacity	9
Dielectric strength	9
Product range overview	10
Basic equipment	10



## 3AH3 vacuum circuit-breaker from 7.2 kV to 36 kV – The Powerful

1

Circuit-breakers must make and break all currents within the scope of their ratings: From small inductive and capacitive load currents up to high short-circuit currents,

controlling all fault conditions in the power system at the same time.

### 3AH3 – maintenance-free for high switching capacities



The 3AH3 vacuum circuit-breaker is maintenance-free throughout its entire service life. It is extremely powerful and controls up to 10,000 operating cycles. This circuit-breaker is used for high load currents up to 6300 A and high short-circuit currents up to 72 kA. It covers the common medium-voltage range from 7.2 kV to 36 kV.



Due to its high capacity, the circuit-breaker is especially suitable for generator operation and industrial applications. The high-current and generator circuit-breakers 3AH37 and 3AH38 meet the requirements of IEEE Std C37.013.

The vacuum circuit-breaker consists of the pole assemblies (1) and the operating mechanism box (2). The pole assemblies are fixed to the operating mechanism box via post insulators (3). The switching movement is transferred by means of operating rods (4) and levers.

### Switching medium

The vacuum switching technology, proven and fully developed for more than 30 years, serves as arc-quenching principle by using vacuum interrupters.

### Pole assemblies

The pole assemblies consist of the vacuum interrupters (6) and the interrupter supports. The vacuum interrupters are air-insulated and freely accessible. This makes it possible to clean the insulating parts easily in adverse ambient conditions. The vacuum interrupter is mounted rigidly to the upper interrupter support (5). The lower part of the interrupter is guided in the lower interrupter support (7), allowing axial movement. The braces absorb the external forces resulting from switching operations and the contact pressure.

### Operating mechanism box

The whole operating mechanism with releases, auxiliary switches, indicators and actuating devices is accommodated in the operating mechanism box. The extent of the secondary equipment depends on the case of application and offers a multiple variety of options in order to meet almost every requirement.

### Operating mechanism

The operating mechanism is a stored-energy mechanism. The closing spring is charged either electrically or manually. It latches tight at the end of the charging process and serves as an energy store. The force is transmitted from the operating mechanism to the pole assemblies via operating rods.

To close the breaker, the closing spring can be unlatched either mechanically by means of the local "ON" pushbutton or electrically by remote control. The closing spring charges the opening or contact pressure springs as the breaker closes. The now discharged closing spring will be charged again automatically by the mechanism motor or manually. Then the operating sequence OPEN-CLOSE-OPEN is stored in the springs. The charging state of the closing spring can be checked electrically by means of a position switch.

### Trip-free mechanism

3AH3 vacuum circuit-breakers have a trip-free mechanism according to IEC 62271-100. In the event of an opening command being given after a closing operation has been initiated, the moving contacts return to the open position and remain there even if the closing command is sustained. This means that the contacts of the vacuum circuit-breakers are momentarily in the closed position, which is permissible according to IEC 62271-100.



## Description

Construction and mode of operation, standards, maintenance-free design

1

### Releases

A release is a device which transfers electrical commands from an external source, such as a control room, to the latching mechanism of the vacuum circuit-breaker so that it can be opened or closed. Apart from the closing solenoid, the maximum possible equipment is one shunt release and two other releases. For release combinations, refer to page 17.

- The closing solenoid unlatches the charged closing spring of the vacuum circuit-breaker, closing it by electrical means. It is suitable for DC or AC voltage.
- Shunt releases are used for automatic tripping of vacuum circuit-breakers by suitable protection relays and for deliberate tripping by electrical means. They are intended for connection to an external power supply (DC or AC voltage) but, in special cases, may also be connected to a voltage transformer for manual operation.
- Current-transformer operated releases comprise a stored-energy mechanism, an unlatching mechanism and an electromagnetic system. They are used when there is no external source of auxiliary power (e.g. a battery). Tripping is effected by means of a protection relay (e.g. overcurrent-time protection) acting on the current-transformer operated release. When the tripping current is exceeded (= 90 % of the rated normal current of the c.t.-operated release), the latch of the energy store, and thus opening of the circuit-breaker, is released.
- Undervoltage releases comprise a stored-energy mechanism, an unlatching mechanism and an electromagnetic system which is permanently connected to the secondary or auxiliary voltage while the vacuum circuit-breaker is closed. If the voltage falls below a predetermined value, unlatching of the release is enabled and the circuit-breaker is opened via the stored-energy mechanism. The deliberate tripping of the undervoltage release generally takes place via an NC contact in the tripping circuit or via an NO contact by short-circuiting the magnet coil. With this type of tripping, the short-circuit current is limited by the built-in resistors. Undervoltage releases can also be connected to voltage transformers. When the operating voltage drops to impermissibly low levels, the circuit-breaker is tripped automatically.

For delayed tripping, the undervoltage release can be combined with energy stores.

### Closing

In the standard version, 3AH3 vacuum circuit-breakers can be remote-closed electrically. They can also be closed locally by mechanical unlatching of the closing spring via pushbutton.

Instead of this "manual mechanical closing", "manual electrical closing" is also available. In this version, the closing circuit of the circuit-breaker is controlled electrically by a pushbutton instead of the mechanical button. In this way, switchgear-related interlocks can also be considered for local operation in order to prevent involuntary closing.

If constant CLOSE and OPEN commands are present at the circuit-breaker at the same time, the 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 prevented.

### Circuit-breaker tripping signal

The NO contact makes brief contact while the vacuum circuit-breaker is opening, and this is often used to operate a hazard-warning system which, however, is only allowed to respond to automatic tripping of the circuit-breaker. Therefore, the signal from the NO contact must be interrupted when the circuit-breaker is being opened intentionally. This is accomplished under local control with the cut-out switch that is connected in series with the NO contact.

### Interlocking

#### Electrical interlocking

The circuit-breakers can be integrated in electromagnetic feeder or switchgear interlocks. In case of electrical interlocking, the disconnect or its operating mechanism is equipped with a magnetic lock-out mechanism. This mechanism is controlled by an auxiliary contact of the circuit-breaker, so that the disconnect can only be operated when the circuit-breaker is open. On the other hand, the circuit-breaker is also controlled by the disconnect or its operating mechanism, so that it can only be closed when the disconnect is in an end position. For this purpose, manual electrical closing must be provided in the circuit-breaker operating mechanism (see "Closing").

#### Mechanical interlocking

To interlock circuit-breaker trucks, withdrawable parts or disconnects according to the switch position, the circuit-breakers can be equipped with a mechanical interlocking. A sensor at the switchgear checks the position of the circuit-breaker and prevents the open circuit-breaker in a reliable way from being closed mechanically and electrically.

### Standards

3AH3 circuit-breakers conform to the following standards:

- IEC 62271-100 (former IEC 60056)
- IEC 62271-1 (former IEC 60694)
- VDE 0671 (former VDE 0670)
- IEEE Std C37.013 (only generator circuit-breaker)

All 3AH3 vacuum circuit-breakers fulfil the endurance classes E2, M2 and C2 according to IEC 62271-100.

### Maintenance-free design

The 3AH3 vacuum circuit-breakers are maintenance-free:

- Under normal ambient conditions according to IEC 62271-1 (former IEC 60694)
- Up to 10,000 operating cycles,
  - no relubrication, no readjustment required
  - and within their tolerances, the characteristics are independent of the switching rate or of standing times without switching operations.



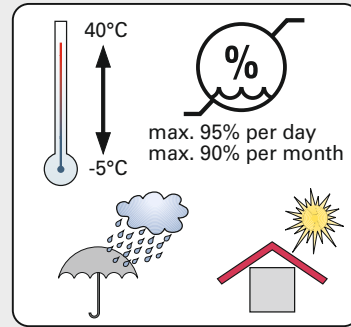
**Ambient conditions**

The vacuum circuit-breakers are designed for the normal operating conditions defined in IEC 62271-100.

Condensation can occasionally occur under the ambient conditions shown opposite. 3AH3 vacuum circuit-breakers are suitable for use in the following climatic classes according to IEC 60721, Part 3-3:

- Climatic ambient conditions: Class 3K4 <sup>1)</sup>
- Biological ambient conditions: Class 3B1
- Mechanical ambient conditions: Class 3M2
- Chemically-active substances: Class 3C2 <sup>2)</sup>
- Mechanically-active substances: Class 3S2 <sup>3)</sup>

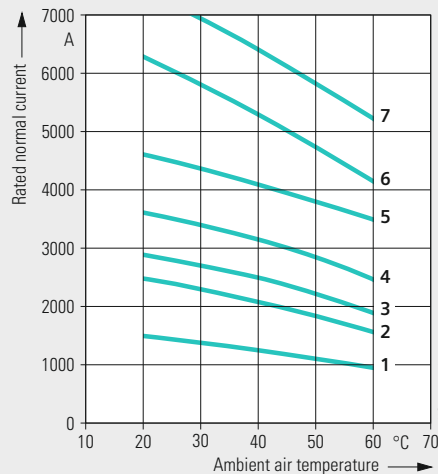
- 1) Low temperature limit: -5 °C
- 2) Without icing and wind-driven precipitation
- 3) Restriction: Clean insulation parts



**Current carrying capacity**

The rated normal currents specified in the opposite diagram have been defined according to IEC 62271-100 for an ambient air temperature of + 40 °C and apply to open switchgear. For enclosed switchgear the data of the switchgear manufacturer applies. At ambient air temperatures below + 40 °C, higher normal currents can be carried (see diagram):

- Characteristics curve 1 = Rated normal current 1250 A
- Characteristics curve 2 = Rated normal current 2000 A
- Characteristics curve 3 = Rated normal current 2500 A
- Characteristics curve 4 = Rated normal current 3150 A
- Characteristics curve 5 = Rated normal current 4000 A
- Characteristics curve 6 = Rated normal current 5000 A
- Characteristics curve 7 = Rated normal current 6300 A



**Dielectric strength**

The dielectric strength of air insulation decreases with increasing altitude due to low air density. According to IEC 62271-1, the values of the rated lightning impulse withstand voltage and the rated short-duration power-frequency withstand voltage specified in the chapter "Technical Data" apply to a site altitude of 1000 m above sea level. For an altitude above 1000 m, the insulation level must be corrected according to the opposite diagram.

The characteristic shown applies to both rated withstand voltages.

To select the devices, the following applies:

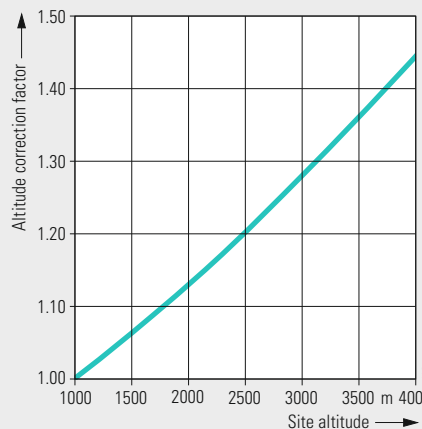
$$U \geq U_0 \times K_a$$

- U Rated withstand voltage under reference atmosphere
- U<sub>0</sub> Rated withstand voltage requested for the place of installation
- K<sub>a</sub> Altitude correction factor according to the opposite diagram

**Example**

For a requested rated lightning impulse withstand voltage of 75 kV at an altitude of 2500 m, an insulation level of 90 kV under reference atmosphere is required as a minimum:

$$90 \text{ kV} \geq 75 \text{ kV} \times 1.2$$



1

Product range overview

Rated voltage kV	Rated short-circuit breaking current kA	Rated normal current (A)															
		1250		2000		2500			3150			4000		5000		6300	
		Pole-centre distance (mm)															
		210	275	350	350	210	275	350	210	275	350	275	300	350	300	300	
7.2	50	■				■			■			■					
	63		■				■			■		■					
12	50	■				■			■			■					
	63		■				■			■		■					
15	50	■				■			■			■					
	63		■				■			■		■					
17.5	50	■				■			■		▲	■▲			▲	▲	
	63		■				■			■▲		■▲			▲	▲	
	72										▲		▲		▲	▲	
24	40						■										
	50										■	▲		■	▲	▲ <sup>2)</sup>	
	63											▲		▲	▲ <sup>2)</sup>	▲ <sup>2)</sup>	
	72											▲		▲	▲ <sup>2)</sup>	▲ <sup>2)</sup>	
36	31.5			■	■					■			■		■		
	40									■			■		■		
40.5 <sup>1)</sup>	31.5			■	■					■			■		■		
	40									■			■		■		

1) As 36 kV circuit-breaker with supplement Y09

2) Pole-centre distance 350 mm

■ 3AH3

▲ 3AH37/3AH38 high-current and generator circuit-breakers (according to IEEE Std C37.013)

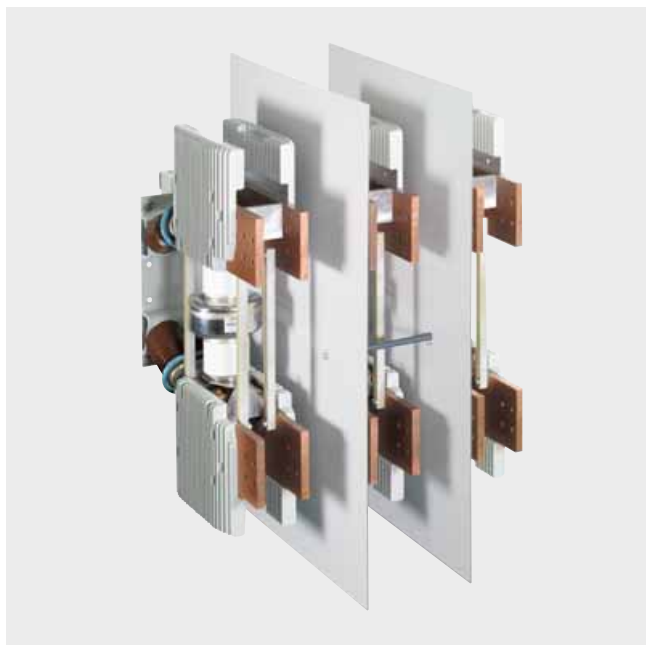
Basic equipment

Features	Minimum equipment	Alternative equipment	Remarks
Operating mechanism	Electrical operating mechanism (hand crank not included in the scope of supply)	Manual operating mechanism (hand crank included in the scope of supply)	Hand crank available as accessory
Closing	Closing solenoid and manual mechanical closing	Manual electrical closing	–
1 <sup>st</sup> release	Shunt release	None	–
2 <sup>nd</sup> release	Without	Shunt release, undervoltage release, c.t.-operated release	Max. 3 releases can be combined (for possible combinations, refer to page 17)
3 <sup>rd</sup> release	Without	Shunt release, undervoltage release, c.t.-operated release	Max. 3 releases can be combined (for possible combinations, refer to page 17)
Varistor circuit	Installed for ≥ 60 V DC	None	For limiting switching overvoltages due to inductive loads
Auxiliary switch	6 NO + 6 NC	12 NO + 12 NC	–
Plug connector	24-pole terminal strip	24-pole plug, 64-pole plug	–
Anti-pumping	Available	None	–
Circuit-breaker tripping signal	Available	None	–
Operating cycle counter	Available	None	–
"Spring charged" signal and indication	Available	None	–
Interlocking	Without	Mechanical interlocking	–



R-HG11-1944.eps

3AH3 vacuum circuit-breaker (4000 A)



R-HG11-2177.eps

3AH37 generator circuit-breaker

Contents Page

**Equipment Selection 11**

Ordering data and configuration example 12

Selection of basic types, circuit-breakers:

Voltage level 7.2 kV 13

Voltage level 12 kV 13

Voltage level 15 kV 14

Voltage level 17.5 kV 14

Voltage level 24 kV 15

Voltage level 36 kV 15

High-current and generator circuit-breakers according to IEEE C37.013:

Voltage level 17.5 kV 16

Voltage level 24 kV 16

Selection of secondary equipment:

Release combination 17

Operating voltage, closing solenoid 18

Operating voltage, 1<sup>st</sup> shunt release 19

Operating voltage, 2<sup>nd</sup> release 20

Operating voltage, 3<sup>rd</sup> release 21

Operating voltage of the operating mechanism 22

Auxiliary switch, secondary connection, interlocking 23

Languages and frequency 23

Selection of additional equipment 24

Accessories and spare parts 25







7.2 kV

50/60 Hz

Rated voltage	Rated lightning impulse withstand voltage	Rated short-duration power-frequency withstand voltage	Rated short-circuit breaking current at 36 % DC component	Rated short-circuit making current (at 50/60 Hz)	Pole-centre distance	Rated normal current	Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes
							Order No.:	3	A	H	3	■	■	■	-	■	■	■	■	■	■	■	■	■	■	■
7.2	60	20	50	125/130	210	1250		3	A	H	3	0	5	7	-	2										
						2500		3	A	H	3	0	5	7	-	6										
						3150		3	A	H	3	0	5	7	-	7										
					275	4000 <sup>1)</sup>		3	A	H	3	0	7	7	-	8										
			63	160/164	275	1250		3	A	H	3	0	7	8	-	2										
						2500		3	A	H	3	0	7	8	-	6										
						3150		3	A	H	3	0	7	8	-	7										
						4000 <sup>1)</sup>		3	A	H	3	0	7	8	-	8										

Special version (available for all 7.2 kV circuit-breakers)  
 $U_d = 32$  kV

- Z E 1 6

12 kV

50/60 Hz

$U_r$	$U_p$	$U_d$	$I_{sc}$	$I_{ma}$		$I_r$																				
kV	kV	kV	kA	kA	mm	A																				
12	75	28	50	125/130	210	1250		3	A	H	3	1	1	7	-	2										
						2500		3	A	H	3	1	1	7	-	6										
						3150		3	A	H	3	1	1	7	-	7										
					275	4000 <sup>1)</sup>		3	A	H	3	1	2	7	-	8										
			63	160/164	275	1250		3	A	H	3	1	2	8	-	2										
						2500		3	A	H	3	1	2	8	-	6										
						3150		3	A	H	3	1	2	8	-	7										
						4000 <sup>1)</sup>		3	A	H	3	1	2	8	-	8										

Special versions (available for all 12 kV circuit-breakers)  
 $U_d = 42$  kV

- Z E 1 3

$I_{sc} = 57.8$  kA  
 $I_{ma} = 145$  kA (for 3AH3 117- circuit-breaker)

- Z Y 0 3

1) Higher rated normal currents on request

Configuration example

3AH3 vacuum circuit-breaker  
Rated voltage  $U_r = 12$  kV, 50/60 Hz  
Rated lightning impulse withstand voltage  $U_p = 75$  kV  
Rated short-circuit breaking current  $I_{sc} = 50$  kA  
Pole-centre distance = 210 mm  
Rated normal current  $I_r = 1250$  A

3 A H 3

1 1 7 - 2

Example for Order No.:  
Order codes:

3	A	H	3	1	1	7	-	2	■	■	■	■	-	■	■	■	■	■	■	■	■	■	■	■	■	■
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---







**24 kV**

50/60 Hz

Rated voltage $U_r$ kV	Rated lightning impulse withstand voltage $U_p$ kV	Rated short-duration power-frequency withstand voltage $U_d$ kV	Rated short-circuit breaking current at 36 % DC component $I_{sc}$ kA	Rated short-circuit making current (at 50/60 Hz) $I_{ma}$ kA	Pole-centre distance mm	Rated normal current $I_r$ A	Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes							
							Order No.:	3	A	H	3	■	■	■	-	■	■	■	■	-	■	■	■	■	■	-	■	■	■	■	-	★	■
24	125	50	40	100/104	275	2500											See page 17																
	110	50	50	125/130	275	3150											See page 18																
	125	50	50	125/130	300	4000 <sup>1)</sup>											See page 19																

**36 kV**

50/60 Hz

$U_r$ kV	$U_p$ kV	$U_d$ kV	$I_{sc}$ kA	$I_{ma}$ kA	mm	$I_r$ A	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes														
36	170	70	31.5	80/82	350	1250	3	A	H	3	3	0	5	-	2																								
						2000	3	A	H	3	3	0	5	-	4																								
						2500	3	A	H	3	3	0	5	-	6																								
						3150	3	A	H	3	3	0	5	-	7																								
						4000 <sup>1)</sup>	3	A	H	3	3	0	5	-	8																								
						40	100/104	350	2500	3	A	H	3	3	0	6	-	6																					
						3150	3	A	H	3	3	0	6	-	7																								
						4000 <sup>1)</sup>	3	A	H	3	3	0	6	-	8																								
<b>Special versions</b> (available for all 36 kV circuit-breakers):																																							
$U_p = 185$ kV (only possible together)																																							
and $U_d = 85$ kV																																							
$U_p = 195$ kV (only possible together)																																							
and $U_d = 95$ kV																																							
$U_r = 40.5$ kV (only possible together)																																							
$U_p = 195$ kV																																							
$U_d = 95$ kV																																							

1) Higher rated normal currents on request

**Configuration example**

3AH3 vacuum circuit-breaker  
 Rated voltage  $U_r = 36$  kV, 50/60 Hz  
 Rated lightning impulse withstand voltage  $U_p = 170$  kV  
 Rated short-circuit breaking current  $I_{sc} = 40$  kA  
 Pole-centre distance = 350 mm  
 Rated normal current  $I_r = 2500$  A

Example for Order No.:	3	A	H	3	3	0	6	-	6	■	■	■	■	-	■	■	■	■	■	-	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Order codes:																																				



# Equipment Selection

Selection of basic types, high-current and generator circuit-breakers



2

## 17.5 kV

50/60 Hz/generator circuit-breaker acc. to IEEE Std C37.013

Position: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 Order codes

Rated voltage	Rated lightning impulse withstand voltage	Rated short-duration power-frequency withstand voltage	Rated short-circuit breaking current at 36 % DC component	Rated short-circuit making current (at 50/60 Hz)	Pole-centre distance	Rated normal current	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Order codes		
$U_r$	$U_p$	$U_d$	$I_{sc}$	$I_{ma}$		$I_r$	3	A	H	3	■	■	■	-	■	■	■	■	-	■	■	■	■	■	
kV	kV	kV	kA	kA	mm	A									See page 17	See page 18	See page 19	See page 20	See page 21	See page 22	See page 23	See page 23	-	★	
17.5	110	50	50	137	275	3150	3	A	H	3	8	1	7	-	7										
						4000	3	A	H	3	8	1	7	-	8										
					300	5000	3	A	H	3	7	1	2	-	4										
						6300 <sup>1)</sup>	3	A	H	3	7	1	2	-	5										
		63		173	275	3150	3	A	H	3	8	1	8	-	7										
						4000	3	A	H	3	8	1	8	-	8										
					300	5000	3	A	H	3	7	1	3	-	4										
						6300 <sup>1)</sup>	3	A	H	3	7	1	3	-	5										
		72		198	275	3150	3	A	H	3	8	1	9	-	7										G 1 A
						4000	3	A	H	3	8	1	9	-	8										G 1 A
					300	5000	3	A	H	3	7	1	4	-	4										
						6300 <sup>1)</sup>	3	A	H	3	7	1	4	-	5										

## 24 kV

50/60 Hz/generator circuit-breaker acc. to IEEE Std C37.013

$U_r$	$U_p$	$U_d$	$I_{sc}$	$I_{ma}$		$I_r$	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Order codes		
kV	kV	kV	kA	kA	mm	A																			
24	125	50	50	137	350	3150	3	A	H	3	7	2	2	-	2										
						4000	3	A	H	3	7	2	2	-	3										
						5000	3	A	H	3	7	2	2	-	4										
						6300 <sup>1)</sup>	3	A	H	3	7	2	2	-	5										
		63		173	350	3150	3	A	H	3	7	2	3	-	2										
						4000	3	A	H	3	7	2	3	-	3										
						5000	3	A	H	3	7	2	3	-	4										
						6300 <sup>1)</sup>	3	A	H	3	7	2	3	-	5										
		72		198	350	3150	3	A	H	3	7	2	4	-	2										
						4000	3	A	H	3	7	2	4	-	3										
						5000	3	A	H	3	7	2	4	-	4										
						6300 <sup>1)</sup>	3	A	H	3	7	2	4	-	5										

1) Higher rated normal currents on request

### Configuration example

3AH3 vacuum circuit-breaker

Rated voltage  $U_r = 24$  kV, 50/60 Hz

Rated lightning impulse withstand voltage  $U_p = 125$  kV

Rated short-circuit breaking current  $I_{sc} = 72$  kA

Pole-centre distance = 350 mm

Rated normal current  $I_r = 6300$  A

3 A H 3

7 2 4 - 5

Example for Order No.:

Order codes:

3	A	H	3	7	2	4	-	5	■	■	■	■	-	■	■	■	■	■	■	■	■	■	■	■	■
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---





9th position

Release combination

								Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes						
								Order No.:	3	A	H	3	■	■	■	-	■	■	■	■	■	■	■	-	■	■	■	■	-	★	■	■	■
Closing solenoid	1 <sup>st</sup> shunt release	2 <sup>nd</sup> shunt release	Undervoltage release	C.t.-operated release 0.5 A	C.t.-operated release 1.0 A	C.t.-operated release with tripping pulse $\approx 0.1$ Ws (10 $\Omega$ )	C.t.-operated release with tripping pulse $\approx 0.1$ Ws (20 $\Omega$ )												See page 18	See page 19	See page 20		See page 21	See page 22	See page 23	See page 23		See page 24					
■	■																	M															
■	■	■																N															
■	■	■																N								-	Z	F	1	5 <sup>1)</sup>			
■	■	■	■															T															
■	■	■		■														P															
■	■	■			■													P								-	Z	A	4	6			
■	■			■ <sup>2)</sup>														Q															
■	■		■															R															
■	■		■	■														S									-	Z	A	4	6		
■	■		■		■													U															
■	■			■														U									-	Z	A	4	6		
■	■					■												V															
■	■					■												V									-	Z	A	4	5		

- 1) With 3<sup>rd</sup> shunt release, voltage according to 13<sup>th</sup> position
- 2) Version with two c.t.-operated releases 0.5 A

Configuration example

3AH3 vacuum circuit-breaker  
 ( $U_r = 36$  kV, 50/60 Hz,  $U_p = 170$  kV,  $I_{sc} = 40$  kA,  $I_r = 2500$  A, pole-centre distance = 350 mm)  
 Closing solenoid, 1<sup>st</sup> shunt release, undervoltage release and c.t.-operated release with a rated normal current of 1 A

3 A H 3

3 0 6 - 6

S

- Z A 4 6

Example for Order No.:

3 A H 3 3 0 6 - 6 S ■ ■ ■ - ■ ■ ■ - Z

Order codes:

A 4 6



## Selection of secondary equipment



2

### 10<sup>th</sup> position

#### Operating voltage of the closing solenoid

		Position:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Order codes					
		Order No.:	3	A	H	3	■	■	■	-	■	■	■	■	-	■	■	■	■	-	*	■	■	■
Standard voltages	Special voltages												See page 19	See page 20	See page 21	See page 22	See page 23	See page 23	See page 24					
Mechanical closing at the circuit-breaker																								
24 V DC												B												
48 V DC												C												
60 V DC												D												
110 V DC												E												
220 V DC												F												
100 V AC 50/60 Hz <sup>1)</sup>												H												
110 V AC 50/60 Hz <sup>1)</sup>												J												
230 V AC 50/60 Hz <sup>1)</sup>												K												
	30 V DC											Z		With order code							K	1	A	
	32 V DC											Z		With order code								K	1	B
	120 V DC											Z		With order code								K	1	C
	125 V DC											Z		With order code								K	1	D
	127 V DC											Z		With order code								K	1	E
	240 V DC											Z		With order code								K	1	F
	120 V AC 50/60 Hz <sup>1)</sup>											Z		With order code								K	1	K
	125 V AC 50/60 Hz <sup>1)</sup>											Z		With order code								K	1	L
	240 V AC 50/60 Hz <sup>1)</sup>											Z		With order code								K	1	M
Manual electrical closing at the circuit-breaker																								
24 V DC												M												
48 V DC												N												
60 V DC												P												
110 V DC												Q												
220 V DC												R												
100 V AC 50/60 Hz <sup>1)</sup>												T												
110 V AC 50/60 Hz <sup>1)</sup>												U												
230 V AC 50/60 Hz <sup>1)</sup>												V												
	30 V DC											Z		With order code								K	2	A
	32 V DC											Z		With order code								K	2	B
	120 V DC											Z		With order code								K	2	C
	125 V DC											Z		With order code								K	2	D
	127 V DC											Z		With order code								K	2	E
	240 V DC											Z		With order code								K	2	F
	120 V AC 50/60 Hz <sup>1)</sup>											Z		With order code								K	2	K
	125 V AC 50/60 Hz <sup>1)</sup>											Z		With order code								K	2	L
	240 V AC 50/60 Hz <sup>1)</sup>											Z		With order code								K	2	M

1) The AC frequency 50 or 60 Hz is selected at the 16<sup>th</sup> position of the order number together with the language (see page 23)

### Configuration example

3AH3 vacuum circuit-breaker

( $U_r = 36$  kV, 50/60 Hz,  $U_p = 170$  kV,  $I_{sc} = 40$  kA,  $I_r = 2500$  A, pole-centre distance = 350 mm)

Manual electrical closing at the circuit-breaker, operating voltage of the closing solenoid 32 V DC

3 A H 3

3 0 6 - 6 S

Z

K 2 B

Example for Order No.:

3 A H 3 3 0 6 - 6 S Z ■ ■ - ■ ■ ■ - Z

Order codes:

A 4 6 + K 2 B



11<sup>th</sup> position

Operating voltage of the 1<sup>st</sup> shunt release

		Position:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Order codes					
		Order No.:	3	A	H	3	■	■	■	-	■	■	■	■	-	■	■	■	-	*	■	■	■	
Standard voltages	Special voltages													See page 20		See page 21	See page 22	See page 23	See page 23	See page 24				
24 V DC													1											
48 V DC													2											
60 V DC													3											
110 V DC													4											
220 V DC													5											
100 V AC	50/60 Hz <sup>1)</sup>												6											
110 V AC	50/60 Hz <sup>1)</sup>												7											
230 V AC	50/60 Hz <sup>1)</sup>												8											
	30 V DC												9		With order code							L 1 A		
	32 V DC												9		With order code							L 1 B		
	120 V DC												9		With order code							L 1 C		
	125 V DC												9		With order code							L 1 D		
	127 V DC												9		With order code							L 1 E		
	240 V DC												9		With order code							L 1 F		
	120 V AC	50/60 Hz <sup>1)</sup>											9		With order code							L 1 K		
	125 V AC	50/60 Hz <sup>1)</sup>											9		With order code							L 1 L		
	240 V AC	50/60 Hz <sup>1)</sup>											9		With order code							L 1 M		

1) The AC frequency 50 or 60 Hz is selected at the 16<sup>th</sup> position of the order number together with the language (see page 23)



Configuration example

3AH3 vacuum circuit-breaker

( $U_t = 36$  kV, 50/60 Hz,  $U_p = 170$  kV,  $I_{sc} = 40$  kA,  $I_t = 2500$  A, pole-centre distance = 350 mm)

Operating voltage of the 1<sup>st</sup> shunt release 48 V DC

3 A H 3

3 0 6 - 6 S Z

2

Example for Order No.:

Order codes:

3 A H 3 3 0 6 - 6 S Z 2 ■ - ■ ■ ■ - Z







## Selection of secondary equipment



### 14<sup>th</sup> position

#### Operating voltage of the operating mechanism

		Position:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Order codes			
		Order No.:	3	A	H	3	■	■	■	-	■	■	■	■	■	■	■	■	■	■ ■ ■		
Standard voltages	Special voltages																See page 23	See page 23	See page 24			
Manual operating mechanism (hand crank included in the scope of supply)																				A		
24 V DC																				B		
48 V DC																				C		
60 V DC																				D		
110 V DC																				E		
220 V DC																				F		
100 V AC 50/60 Hz <sup>1)</sup>																				H		
110 V AC 50/60 Hz <sup>1)</sup>																				J		
230 V AC 50/60 Hz <sup>1)</sup>																				K		
	30 V DC																			Z	With order code	P 1 A
	32 V DC																			Z	With order code	P 1 B
	120 V DC																			Z	With order code	P 1 C
	125 V DC																			Z	With order code	P 1 D
	127 V DC																			Z	With order code	P 1 E
	240 V DC																			Z	With order code	P 1 F
	120 V AC 50/60 Hz <sup>1)</sup>																			Z	With order code	P 1 K
	125 V AC 50/60 Hz <sup>1)</sup>																			Z	With order code	P 1 L
	240 V AC 50/60 Hz <sup>1)</sup>																			Z	With order code	P 1 M

1) The AC frequency 50 or 60 Hz is selected at the 16<sup>th</sup> position of the order number together with the language (see page 23)

2

#### Configuration example

3AH3 vacuum circuit-breaker

( $U_t = 36$  kV, 50/60 Hz,  $U_p = 170$  kV,  $I_{sc} = 40$  kA,  $I_t = 2500$  A, pole-centre distance = 350 mm)

Operating voltage of the operating mechanism 230 V AC, 50 Hz

3 A H 3

3 0 6 - 6 S Z 2 9 - 0

K

Example for Order No.:

3 A H 3 3 0 6 - 6 S Z 2 9 - 0 K ■ ■ - Z

Order codes:

A 4 6 + K 2 B + M 1 B



## Selection of additional equipment



### Additional equipment

Options	Position:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Order codes				
	Order No.:	3	A	H	3														-	*		
Wiring cables, halogen-free and flame-retardant																		-	Z	A	1	0
Condensation protection, heating for 230 V AC, 50 W																		-	Z	A	3	0
Silicone-free design																		-	Z	A	3	1
Vacuum circuit-breaker for horizontal installation																		-	Z	A	7	0
Additional rating plate, loose delivery																		-	Z	B	0	0
Primary conductor bars silver-plated for external connections and internal interconnection on both sides (standard for 4000 A circuit-breakers and type 3AH381)																		-	Z	D	1	0
Routine test certificate enclosed																		-	Z	F	2	0
Rated operating sequence O - 0.3 s - CO - 15 s - CO (only possible up to 31.5 kA)																		-	Z	F	2	8
Hand crank (also for motor operating mechanism) for manual charging of the closing spring																		-	Z	F	3	0
Circuit-breaker can also be used for 4500 A (applicable to circuit-breaker types 3AH3077-8, 3AH3078-8, 3AH3127-8, 3AH3128-8, 3AH3177-8, 3AH3178-8, 3AH3227-8, 3AH3228-8, 3AH3818-8, 3AH3819-8)																		-	Z	Y	0	4
Further, non-listed special versions (only after consultation with the order processing department at the Switchgear Factory Berlin). Information additionally in clear text.																		-	Z	Y	9	9

2

### Configuration example

3AH3 vacuum circuit-breaker  
 Rated voltage  $U_r = 36 \text{ kV (50/60 Hz)}$   
 Rated lightning impulse withstand voltage  $U_p = 170 \text{ kV}$   
 Rated short-circuit breaking current  $I_{sc} = 40 \text{ kA}$   
 Pole-centre distance = **350 mm**  
 Rated normal current  $I_r = 2500 \text{ A}$   
 Closing solenoid, 1<sup>st</sup> shunt release, undervoltage release and c.t.-operated release with a rated normal current of **1 A**  
 Manual electrical closing at the circuit-breaker, operating voltage of the closing solenoid **32 V DC**  
 Operating voltage of the 1<sup>st</sup> release **48 V DC**  
 2<sup>nd</sup> release as undervoltage release with operating voltage **32 V DC**  
 3<sup>rd</sup> release as c.t.-operated release  
 Operating voltage of the operating mechanism **230 V AC, 50 Hz**  
 Auxiliary switch 6 NO + 6 NC, 64-pole plug and with mechanical interlocking  
 Auxiliary switch contacts and pins of the plug connector gold-plated  
 Frequency 50 Hz or DC, operating instructions and rating plate in English  
 Routine test certificate enclosed

3 A H 3

3 0 6 - 6

S

Z

2

9

-

0

K

B

2

-

Z

A

4

6

+

K

2

+

M

1

+

A

2

+

F

2

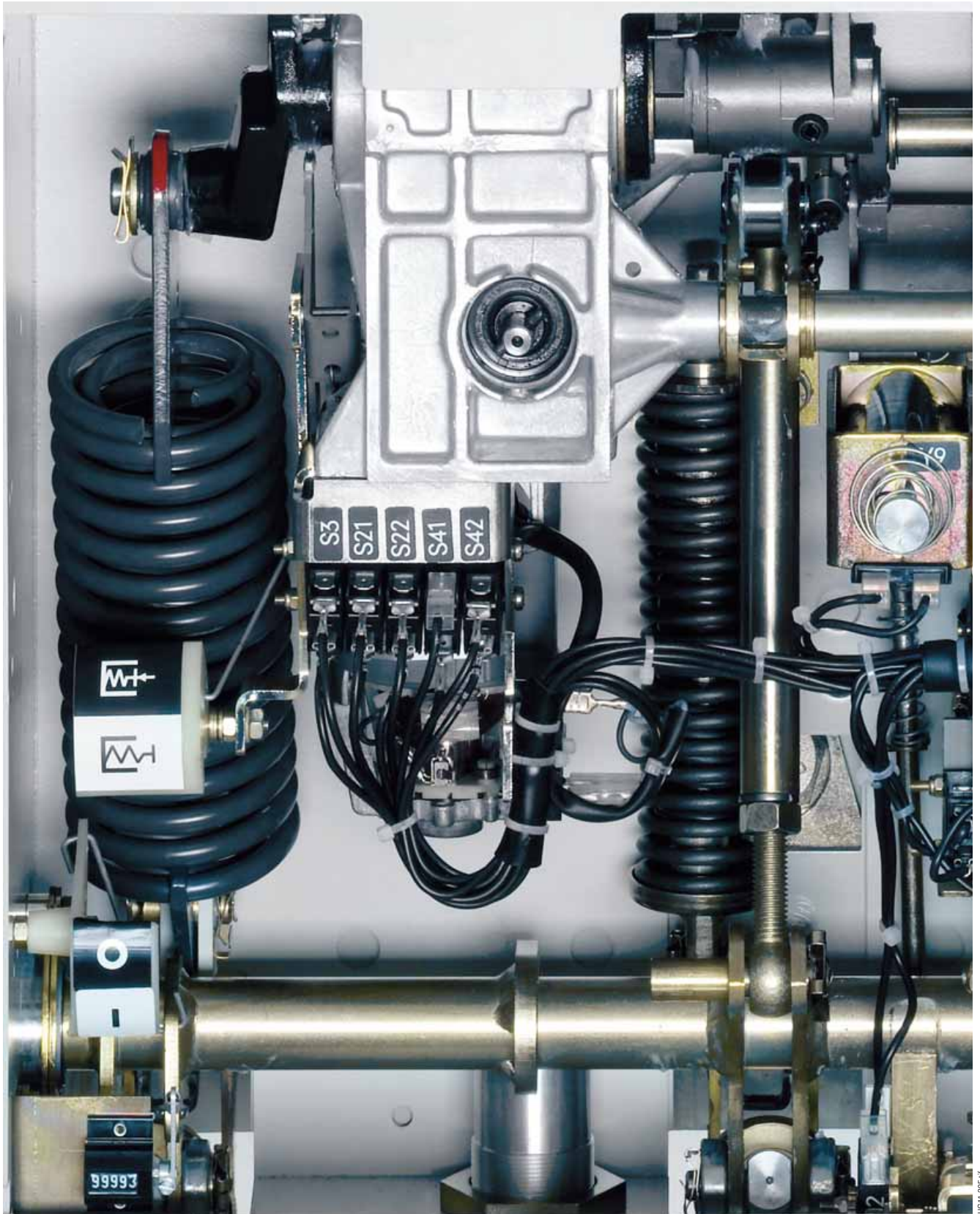
0

Example for Order No.:

Order codes:

3 A H 3 3 0 6 - 6 S Z 2 9 - 0 K B 2 - Z  
 A 4 6 + K 2 B + M 1 B + A 2 0 + F 2 0





RHG11-2051f





R-HG11-196.tif

Vacuum interrupter



R-HG11-197.tif

Post insulator and upper interrupter support

Contents Page

**Technical Data 27**

Electrical data, dimensions and weights:

Voltage level 7.2 kV	28
Voltage level 12 kV	28
Voltage level 15 kV	30
Voltage level 17.5 kV	32
Voltage level 24 kV	34
Voltage level 36 kV	36

Electrical data, dimensions and weights of high-current and generator circuit-breakers according to IEEE C37.013:

Voltage level 17.5 kV	38
Voltage level 24 kV	40

Circuit diagrams	42
Operating times	44
Short-circuit protection of motors	44
Consumption data of releases	44

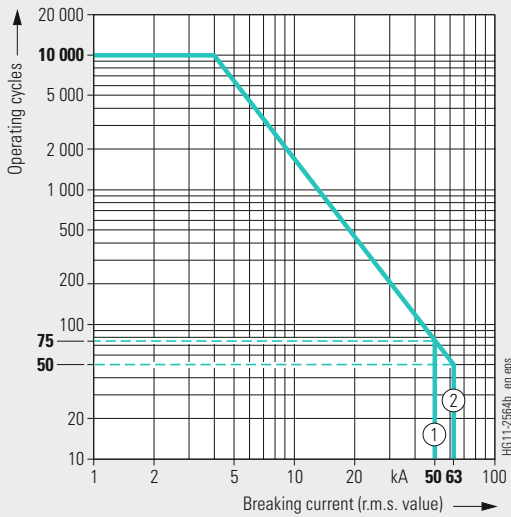


Order No.	7.2 kV 50/60 Hz		Rated normal current			Pole-centre distance			Rated operating sequence: O - 3 min - CO - 3 min - CO O - 0.3 s - CO - 3 min - CO O - 0.3 s - CO - 15 s - CO			Rated duration of short-circuit		Rated short-circuit breaking current		DC component in % of the rated short-circuit breaking current		Asymmetrical breaking current		Rated short-circuit making current (at 50/60 Hz)		Rated lightning impulse withstand voltage		Rated short-duration power-frequency withstand voltage		Voltage drop $\Delta U$ between connections (according to IEC 62271-1 at DC 100 A)		Minimum creepage distance, interrupter		Minimum creepage distance, phase-to-earth		Minimum clearance, phase-to-phase		Minimum clearance, phase-to-earth		Weights		Detailed dimension drawing (can be ordered)		Operating cycle diagram no. (see page 29)		Catalog dimension drawing no. (see page 29)	
	$I_r$ A	$I_n$ A	$I_{sc}$ kA	$I_{sc}^{(3)}$ kA	$I_{sc}^{(1)}$ kA	$t_k$ s	$I_{sc}$ kA	%	$I_{ma}$ kA	$U_p$ kV	$U_d$ kV	$\Delta U$ mV	mm	mm	mm	mm	mm	mm	kg																								
3AH3 057-2 ...	1250	210	■	△	△	3	50	36	56.1	125/130	60	20	1.8	160	230	80	130	180	S_325 00415	1	1																						
3AH3 057-6 ...	2500	210	■	△	△	3	50	36	56.1	125/130	60	20	1.8	160	230	80	130	180	S_325 00417	1	1																						
3AH3 057-7 ...	3150	210	■	△	△	3	50	36	56.1	125/130	60	20	1.8	160	230	80	130	180	S_325 00001	1	1																						
3AH3 077-8 ...	4000	275	■	△	△	3	50	36	56.1	125/130	60	20	1.4	160	170	71	130	308	S_325 00004	1	3																						
3AH3 078-2 ...	1250	275	■	△	△	3	63	36	70.7	160/164	60	20	1.8	160	170	71	130	196	S_325 00003	2	2																						
3AH3 078-6 ...	2500	275	■	△	△	3	63	36	70.7	160/164	60	20	1.8	160	170	71	130	196	S_325 00003	2	2																						
3AH3 078-7 ...	3150	275	■	△	△	3	63	36	70.7	160/164	60	20	1.8	160	170	71	130	196	S_325 00003	2	2																						
3AH3 078-8 ...	4000	275	■	△	△	3	63	36	70.7	160/164	60	20	1.4	160	170	71	130	308	S_325 00004	2	3																						

Order No.	12 kV 50/60 Hz		Rated normal current			Pole-centre distance			Rated operating sequence: O - 3 min - CO - 3 min - CO O - 0.3 s - CO - 3 min - CO O - 0.3 s - CO - 15 s - CO			Rated duration of short-circuit		Rated short-circuit breaking current		DC component in % of the rated short-circuit breaking current		Asymmetrical breaking current		Rated short-circuit making current (at 50/60 Hz)		Rated lightning impulse withstand voltage		Rated short-duration power-frequency withstand voltage		Voltage drop $\Delta U$ between connections (according to IEC 62271-1 at DC 100 A)		Minimum creepage distance, interrupter		Minimum creepage distance, phase-to-earth		Minimum clearance, phase-to-phase		Minimum clearance, phase-to-earth		Weights		Detailed dimension drawing (can be ordered)		Operating cycle diagram no. (see page 29)		Catalog dimension drawing no. (see page 29)	
	$I_r$ A	$I_n$ A	$I_{sc}$ kA	$I_{sc}^{(3)}$ kA	$I_{sc}^{(1)}$ kA	$t_k$ s	$I_{sc}$ kA	%	$I_{ma}$ kA	$U_p$ kV	$U_d$ kV	$\Delta U$ mV	mm	mm	mm	mm	mm	mm	kg																								
3AH3 117-2 ...	1250	210	■	△	△	3	50	36	56.1	125/130	75	28	1.8	160	230	80	130	180	S_325 00415	1	1																						
3AH3 117-6 ...	2500	210	■	△	△	3	50	36	56.1	125/130	75	28	1.8	160	230	80	130	180	S_325 00417	1	1																						
3AH3 117-7 ...	3150	210	■	△	△	3	50	36	56.1	125/130	75	28	1.8	160	230	80	130	180	S_325 00001	1	1																						
3AH3 127-8 ...	4000	275	■	△	△	3	50	36	56.1	125/130	75	28	1.4	160	170	71	130	308	S_325 00004	1	3																						
3AH3 128-2 ...	1250	275	■	△	△	3	63	36	70.7	160/164	75	28	1.8	160	170	71	130	196	S_325 00003	2	2																						
3AH3 128-6 ...	2500	275	■	△	△	3	63	36	70.7	160/164	75	28	1.8	160	170	71	130	196	S_325 00003	2	2																						
3AH3 128-7 ...	3150	275	■	△	△	3	63	36	70.7	160/164	75	28	1.8	160	170	71	130	196	S_325 00003	2	2																						
3AH3 128-8 ...	4000	275	■	△	△	3	63	36	70.7	160/164	75	28	1.4	160	170	71	130	308	S_325 00004	2	3																						

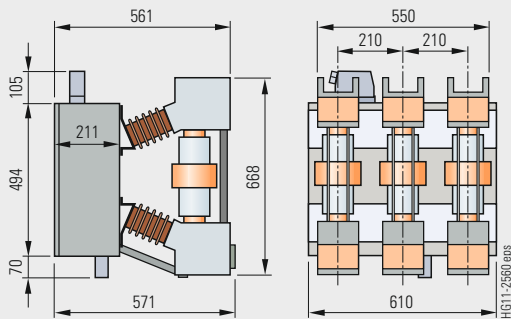
■ Standard information on the rating plate  
 △ Rated operating sequence possible up to  $I_{sc} = 31.5$  kA

**Operating cycle diagram for 7.2 kV and 12 kV**

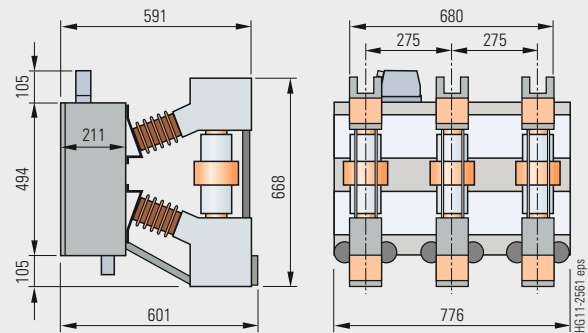


The permissible number of electrical operating cycles is shown as a function of the breaking current (r.m.s. value). All vacuum circuit-breakers fulfil the endurance classes E2, M2 and C2 according to IEC 62271-100. The curve shape beyond the parameters defined in IEC 62271-100 is based on average experience data. The number of operating cycles that can actually be reached can be different depending on the respective application.

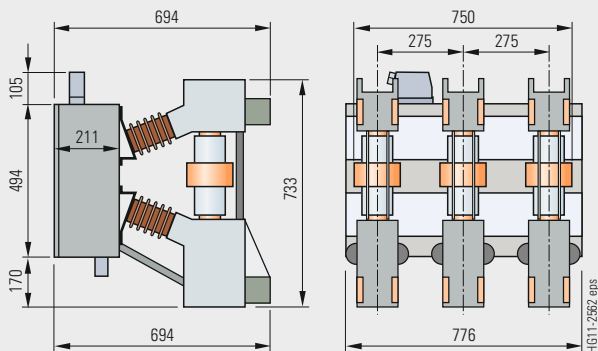
**Dimension drawings for 7.2 kV and 12 kV**



Dimension drawing 1



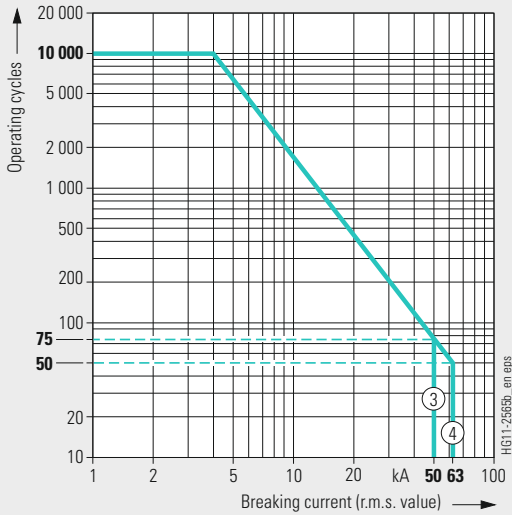
Dimension drawing 2



Dimension drawing 3

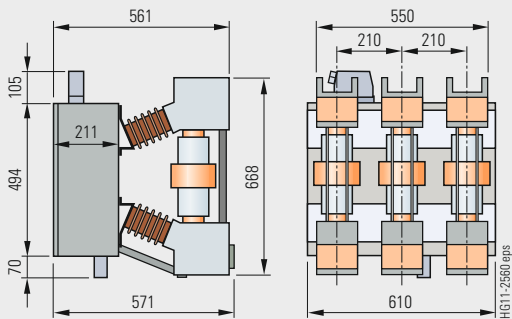


Operating cycle diagram for 15 kV

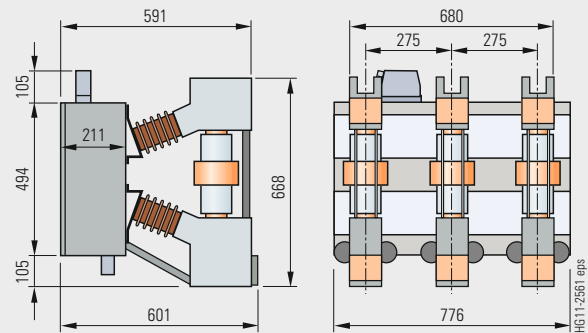


The permissible number of electrical operating cycles is shown as a function of the breaking current (r.m.s. value). All vacuum circuit-breakers fulfil the endurance classes E2, M2 and C2 according to IEC 62271-100. The curve shape beyond the parameters defined in IEC 62271-100 is based on average experience data. The number of operating cycles that can actually be reached can be different depending on the respective application.

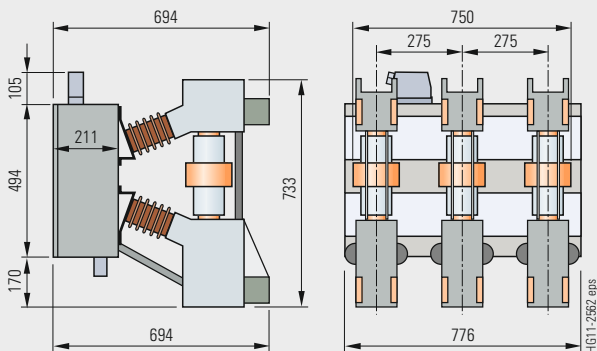
Dimension drawings for 15 kV



Dimension drawing 4



Dimension drawing 5

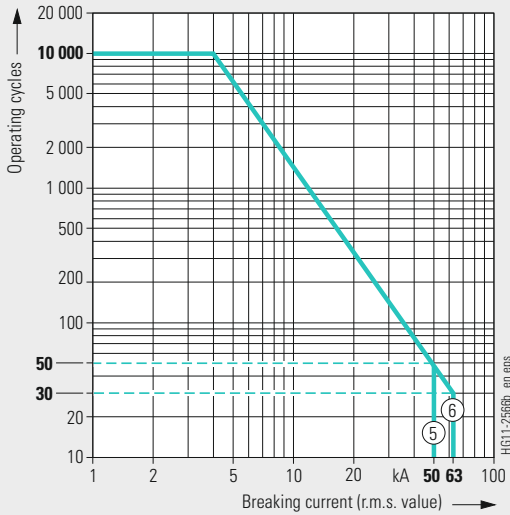


Dimension drawing 6



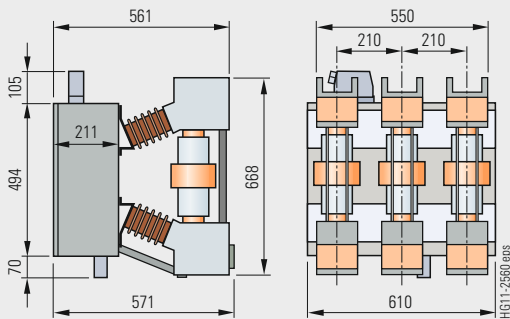


Operating cycle diagram for 17.5 kV

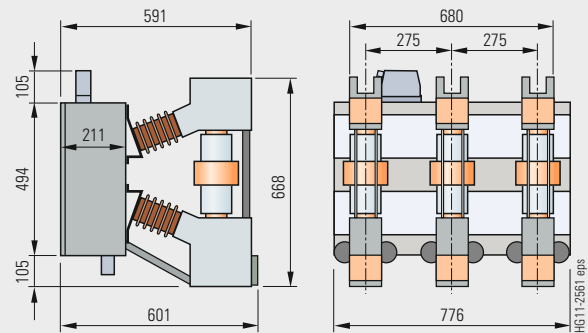


The permissible number of electrical operating cycles is shown as a function of the breaking current (r.m.s. value). All vacuum circuit-breakers fulfil the endurance classes E2, M2 and C2 according to IEC 62271-100. The curve shape beyond the parameters defined in IEC 62271-100 is based on average experience data. The number of operating cycles that can actually be reached can be different depending on the respective application.

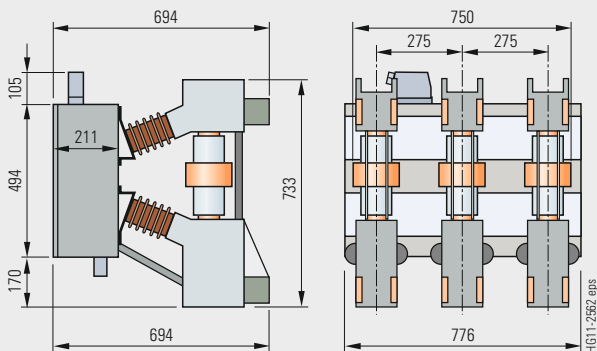
Dimension drawings for 17.5 kV



Dimension drawing 4



Dimension drawing 5

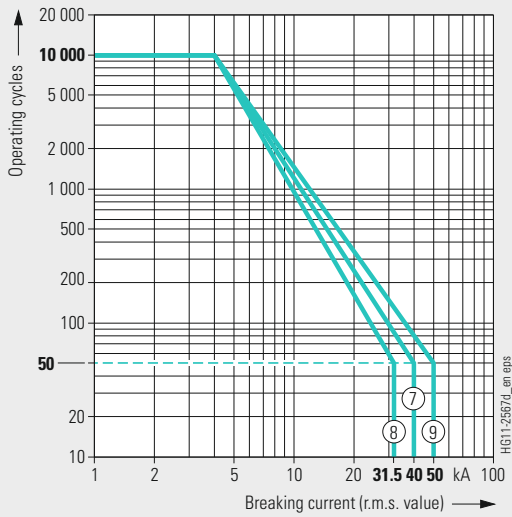


Dimension drawing 6



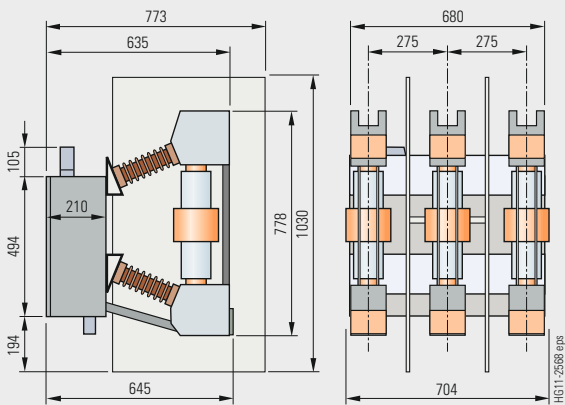


Operating cycle diagram for 24 kV

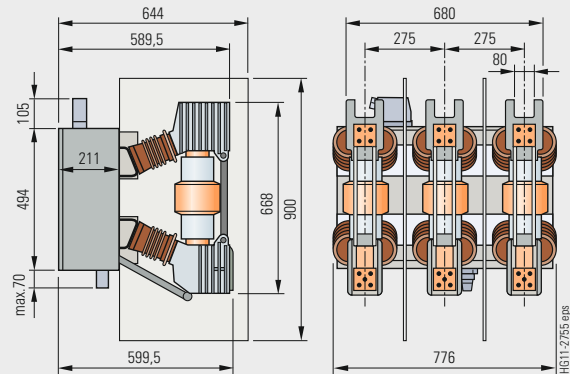


The permissible number of electrical operating cycles is shown as a function of the breaking current (r.m.s. value). All vacuum circuit-breakers fulfil the endurance classes E2, M2 and C2 according to IEC 62271-100. The curve shape beyond the parameters defined in IEC 62271-100 is based on average experience data. The number of operating cycles that can actually be reached can be different depending on the respective application.

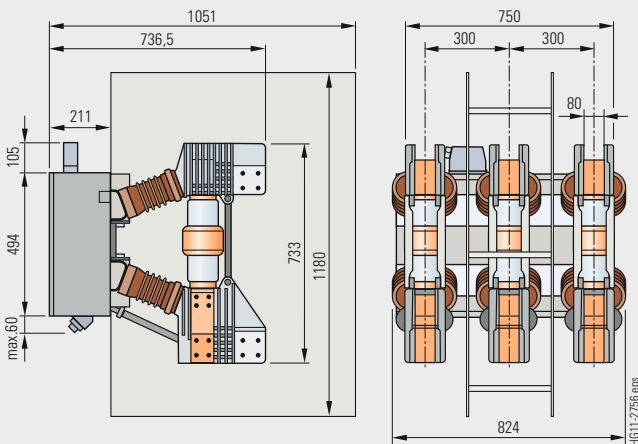
Dimension drawings for 24 kV



Dimension drawing 7



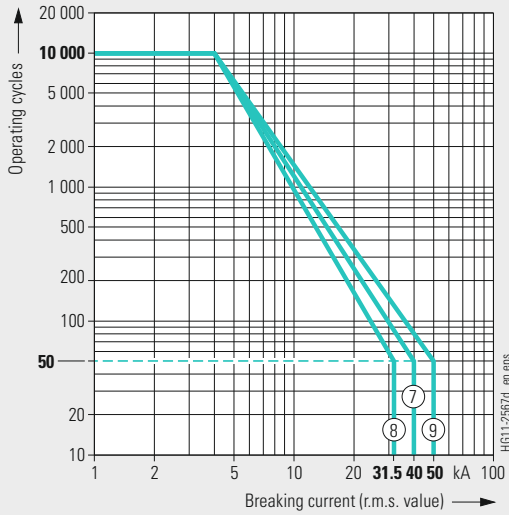
Dimension drawing 8



Dimension drawing 9

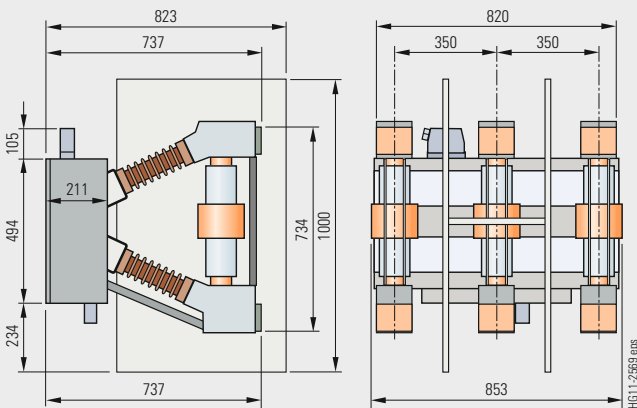


Operating cycle diagram for 36 kV

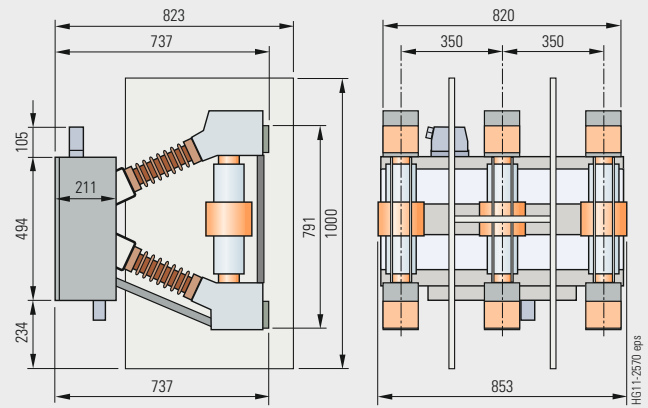


The permissible number of electrical operating cycles is shown as a function of the breaking current (r.m.s. value). All vacuum circuit-breakers fulfil the endurance classes E2, M2 and C2 according to IEC 62271-100. The curve shape beyond the parameters defined in IEC 62271-100 is based on average experience data. The number of operating cycles that can actually be reached can be different depending on the respective application.

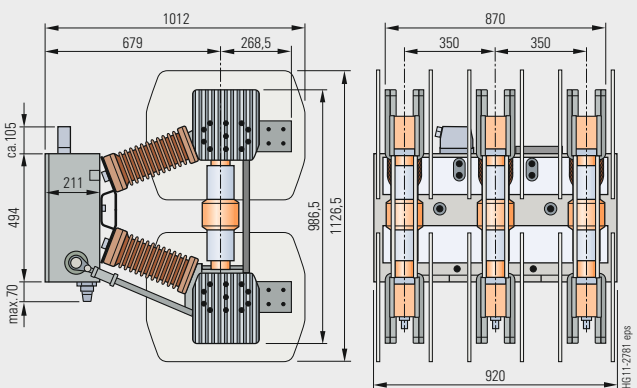
Dimension drawings for 36 kV



Dimension drawing 10



Dimension drawing 11



Dimension drawing 12



Electrical data, dimensions and weights of high-current and generator circuit-breakers

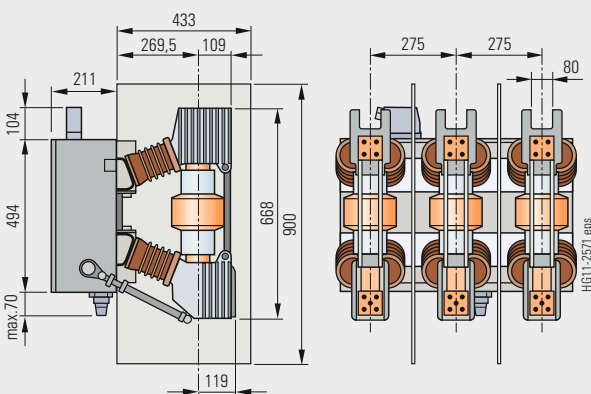
High-current and generator circuit-breakers according to IEEE C37.013 Order No.	Rated normal current	Pole-centre distance	Rated operating sequence: O - 3 min - CO - 3 min - CO		Rated duration of short-circuit	Rated short-circuit breaking current	DC component in % of the rated short-circuit breaking current	Asymmetrical breaking current	Rated short-circuit making current (at 50/60 Hz)	Rated lightning impulse withstand voltage	Rated short-duration power-frequency withstand voltage	Voltage drop $\Delta U$ between connections (according to IEC 62271-1 at DC 100 A)	Minimum creepage distance, interrupter	Minimum creepage distance, phase-to-earth	Minimum clearance, phase-to-phase	Minimum clearance, phase-to-earth	Weights	Detailed dimension drawing (can be ordered)	Catalog dimension drawing no. (see page 39)
	$I_r$	mm	O - 30 min - CO	CO - 30 min - CO															
3AH3 712-4 ...	5000	300	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	50	75	73	137	110	50	1.4	160	230	230	230	470	S_325 00587	14
3AH3 712-5 ...	6300	300	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	50	75	73	137	110	50	1.4	160	230	230	230	500	S_325 00587	14
3AH3 713-4 ...	5000	300	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	63	65	86	173	110	50	1.4	160	230	230	230	470	S_325 00588	15
3AH3 713-5 ...	6300	300	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	63	65	86	173	110	50	1.4	160	230	230	230	500	S_325 00588	15
3AH3 714-4 ...	5000	300	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	72	65	96	198	110	50	1.4	160	230	230	230	470	S_325 00589	15
3AH3 714-5 ...	6300	300	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	72	65	96	198	110	50	1.4	160	230	230	230	500	S_325 00589	15
3AH3 817-7 ...	3150	275	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	50	75	73	137	110	50	1.4	160	170	145	130	230	S_325 00592	13
3AH3 817-8 ...	4000	275	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	50	75	73	137	110	50	1.4	160	170	135	130	320	S_325 00593	14
3AH3 818-7 ...	3150	275	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	63	65	86	173	110	50	1.4	160	170	145	130	230	S_325 00019	16
3AH3 818-8 ...	4000	275	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	63	65	86	173	110	50	1.4	160	170	135	130	320	S_325 00030	14
3AH3 819-7 ...	3150	275	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	72	65	96	198	110	50	1.4	160	170	145	130	250	S_325 00019	16
3AH3 819-8 ...	4000	275	<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	72	65	96	198	110	50	1.4	160	170	135	130	320	S_325 00030	14

- Standard information on the rating plate
- Possible with order number suffix Z and order code F27

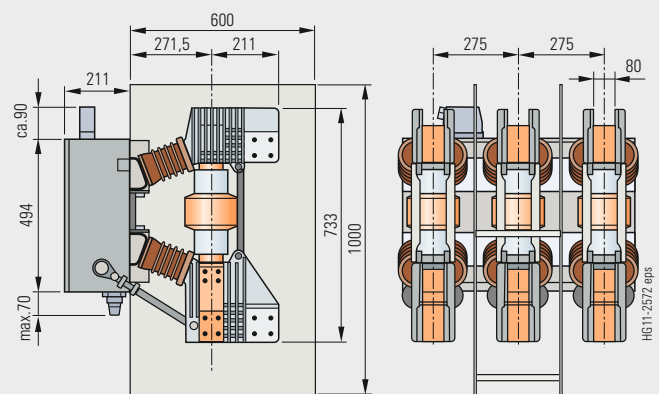
**Number of operating cycles**

The maximum permissible number of mechanical operating cycles is 10,000. Short-circuit breaking operations have been tested and proved under various conditions according to IEEE C37.013. As regards the electrical endurance, values ranging beyond this depend on the specific case of application.

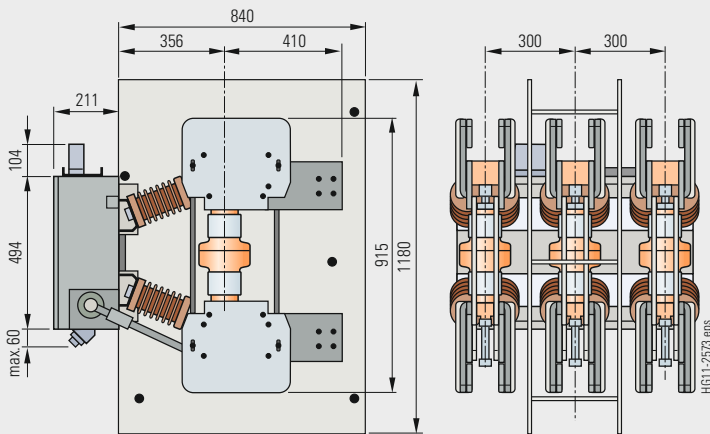
**Dimension drawings for high-current and generator circuit-breakers 17.5 kV**



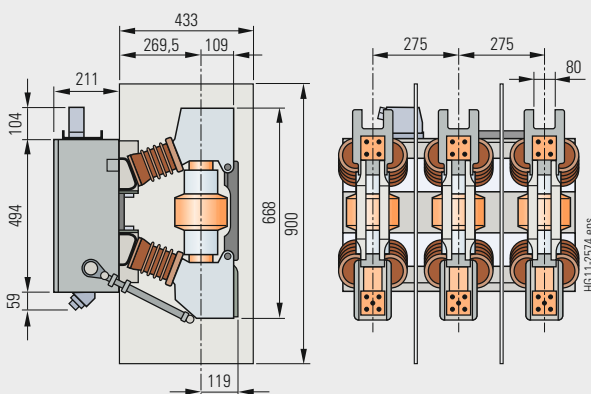
Dimension drawing 13



Dimension drawing 14



Dimension drawing 15



Dimension drawing 16

Electrical data, dimensions and weights of high-current and generator circuit-breakers

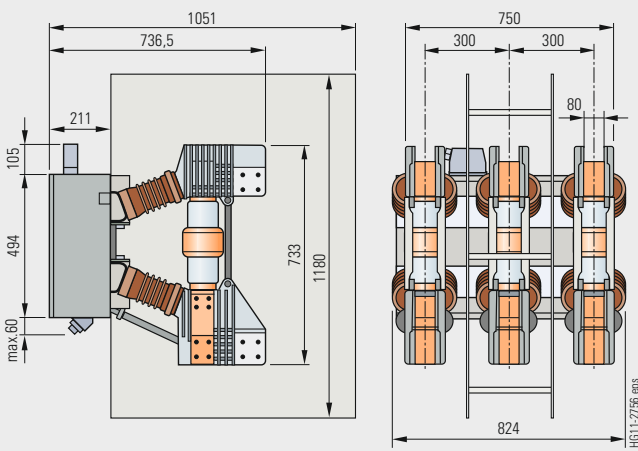
High-current and generator circuit-breakers according to IEC 62271-1-1 Order No.	24 kV 50/60 Hz		Rated normal current		Pole-centre distance		Rated operating sequence: O - 3 min - CO - 3 min - CO		O - 30 min - CO		Rated duration of short-circuit		Rated short-circuit breaking current		DC component in % of the rated short-circuit breaking current		Asymmetrical breaking current		Rated short-circuit making current (at 50/60 Hz)		Rated lightning impulse withstand voltage		Rated short-duration power-frequency withstand voltage		Voltage drop $\Delta U$ between connections (according to IEC 62271-1 at DC 100 A)		Minimum creepage distance, interrupter		Minimum creepage distance, phase-to-earth		Minimum clearance, phase-to-phase		Minimum clearance, phase-to-earth		Weights		Detailed dimension drawing (can be ordered)		Catalog dimension drawing no. (see page 41)	
	$I_r$	$I_{sc}$	$t_k$	$I_{sc}$	%	kA	kA	$I_{ma}$	$U_p$	$U_d$	mV	mm	mm	mm	mm	mm	kg																							
3AH3 722-2 ...	3150	300	□	■	3	50	75	73	137	125	50	1.6	160	220	538	170	350	S_325 00913	9																					
3AH3 722-3 ...	4000	300	□	■	3	50	75	73	137	125	50	1.6	160	220	538	170	350	S_325 00597	9																					
3AH3 722-4 ...	5000	300	□	■	3	50	75	73	137	125	50	1.6	160	207	293	170	470	S_325 00914	15																					
3AH3 722-5 ...	6300	300	□	■	3	50	75	73	137	125	50	1.6	160	207	293	170	500	S_325 00910	15																					
3AH3 723-2 ...	3150	300	□	■	3	63	65	86	173	125	50	1.6	160	220	538	170	350	S_325 00915	9																					
3AH3 723-3 ...	4000	300	□	■	3	63	65	86	173	125	50	1.6	160	220	538	170	350	S_325 00909	9																					
3AH3 723-4 ...	5000	300	□	■	3	63	65	86	173	125	50	1.6	160	207	293	170	470	S_325 00916	15																					
3AH3 723-5 ...	6300	300	□	■	3	63	65	86	173	125	50	1.6	160	207	293	170	500	S_325 00911	15																					
3AH3 724-2 ...	3150	300	□	■	3	72	65	96	198	125	50	1.6	160	220	538	170	350	S_325 00917	9																					
3AH3 724-3 ...	4000	300	□	■	3	72	65	96	198	125	50	1.6	160	220	538	170	350	S_325 00918	9																					
3AH3 724-4 ...	5000	300	□	■	3	72	65	96	198	125	50	1.6	160	207	293	170	470	S_325 00919	15																					
3AH3 724-5 ...	6300	300	□	■	3	72	65	96	198	125	50	1.6	160	207	293	170	500	S_325 00920	15																					

- Standard information on the rating plate
- Possible with order number suffix Z and order code F27

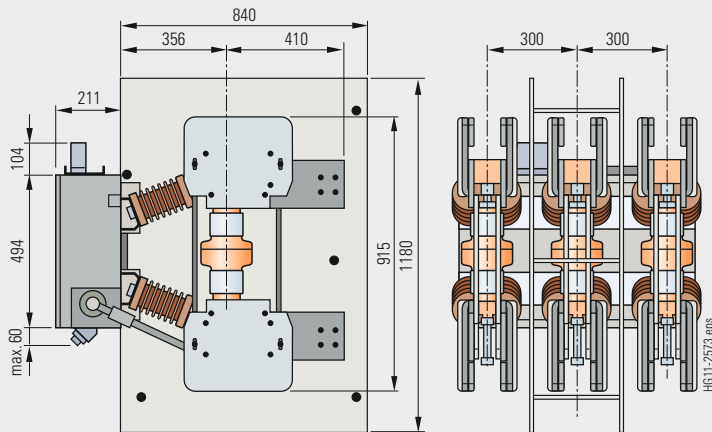
**Number of operating cycles**

The maximum permissible number of mechanical operating cycles is 10,000. Short-circuit breaking operations have been tested and proved under various conditions according to IEEE C37.013. As regards the electrical endurance, values ranging beyond this depend on the specific case of application.

**Dimension drawings for high-current and generator circuit-breakers 24 kV**



Dimension drawing 9

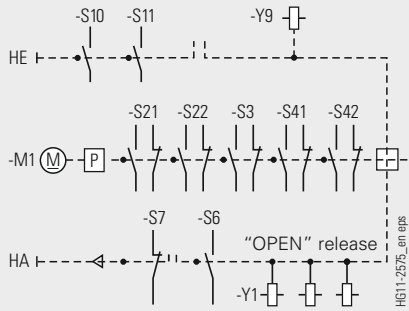


Dimension drawing 15

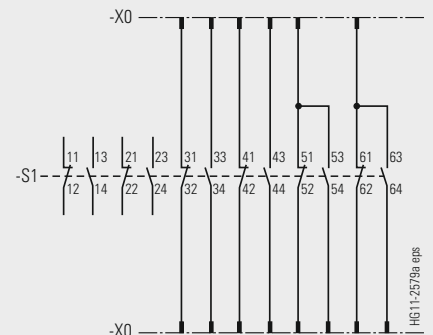


**Circuit diagrams**

The circuit diagrams shown here are examples from the manifold possibilities of circuit-breaker wiring.

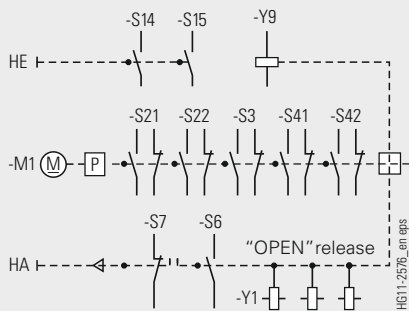


Manual closing – manual opening with auxiliary switch 6 NO + 6 NC

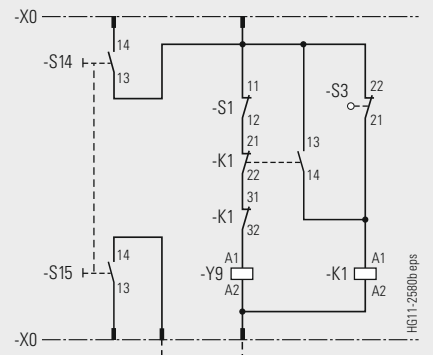


Contacts available for customer with basic circuit-breaker equipment and auxiliary switch 6 NO + 6 NC

**Additional equipment: Motor operating mechanism and auxiliary switch**

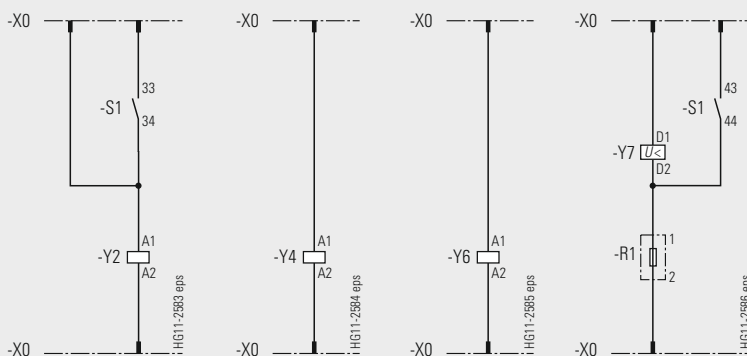


Motor operating mechanism with manual electrical closing



Manual electrical closing      Closing and anti-pumping

The available possible combinations are described in the chapter "Selection of secondary equipment".

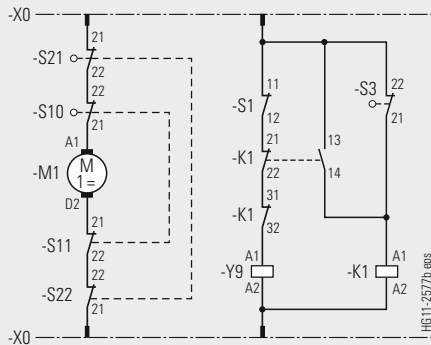


2<sup>nd</sup> shunt release      C.t.-operated release 0.5 A or 1 A      Low-energy c.t.-operated release 0.1 Ws      Undervoltage release

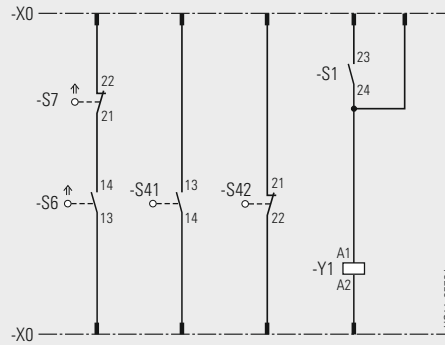
Legend see page 43

**Circuit diagrams (continued)**

The circuit diagrams shown here are examples from the manifold possibilities of circuit-breaker wiring.

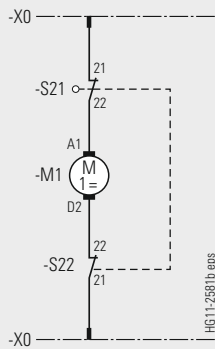


Motor operating mechanism with manual mechanical closing

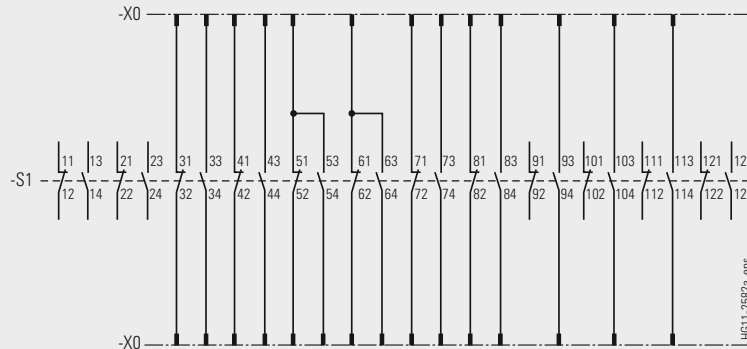


Circuit-breaker tripping signal      Signal "closing spring charged"      1<sup>st</sup> shunt release

**Additional equipment: Motor operating mechanism and auxiliary switch (continued)**



Motor operating mechanism



Contacts available for customer with basic circuit-breaker equipment  
Auxiliary switch -S1 (12 NO + 12 NC) instead of auxiliary switch 6 NO + 6 NC

**Legend (also for page 42)**

HA	Manual opening	S1	Auxiliary switch	S14,	Anti-pumping	X0	Lower part of plug/ terminal strip
HE	Manual closing	S3	Position switch (opens when closing spring is charged)	S15	Position switches	Y1	1 <sup>st</sup> shunt release
K1	Contactor (anti-pumping)	S6	Circuit-breaker tripping signal	S21,	Position switches (to de-energize the motor operating mechanism after charging)	Y2	2 <sup>nd</sup> shunt release
M1	Motor operating mechanism	S7	Cutout switch for circuit- breaker tripping signal	S22	Position switches (to indicate the charging state)	Y4	Current-transformer operated release
P	Energy store	S10,	Anti-pumping for manual closing	S41,	Position switches	Y6	Low-energy current- transformer operated release
R1	Resistance	S11		S42		Y7	Undervoltage release
						Y9	Closing solenoid

Operating times

Operating times at rated voltage of the secondary circuit	Equipment of circuit-breaker	Operating time of circuit-breaker
Closing time	–	< 75 ms <sup>1)</sup>
Opening time	1 <sup>st</sup> shunt release	< 60 ms <sup>1)</sup>
	2 <sup>nd</sup> and 3 <sup>rd</sup> release	< 55 ms
Arcing time	–	< 15 ms
Break time	1 <sup>st</sup> shunt release	< 80 ms
	2 <sup>nd</sup> and 3 <sup>rd</sup> release	< 60 ms
Dead time	–	300 ms
CLOSE/OPEN contact time	1 <sup>st</sup> shunt release	< 90 ms
	2 <sup>nd</sup> and 3 <sup>rd</sup> release	< 70 ms
Minimum command duration	Closing solenoid	45 ms
	1 <sup>st</sup> shunt release	40 ms
	2 <sup>nd</sup> and 3 <sup>rd</sup> release	20 ms
Pulse time for circuit-breaker tripping signal	1 <sup>st</sup> shunt release	> 15 ms
	2 <sup>nd</sup> and 3 <sup>rd</sup> release	> 10 ms
Charging time for electrical operation	–	< 15 s
Synchronism error between the poles	–	≤ 2 ms

1) Shorter operating times on request.

Short-circuit protection of motors (fuse protection of drive motors)

Rated voltage of the motor	Operating voltage		Power consumption of the motor		Smallest possible rated current <sup>2)</sup> of the m.c.b. (miniature circuit-breaker) with C-characteristic
	max. V	min. V	W (at DC)	VA (at AC)	
V					A
24 DC	26	20	500	–	16
48 DC	53	41	500	–	8
60 DC	66	51	500	–	6
110 DC	121	93	500	–	4
220 DC	242	187	500	–	2
110 AC	121	93	–	650	4
230 AC	244	187	–	650	2

2) The current inrush in the drive motor can be neglected due to its very short presence.

Consumption data of releases

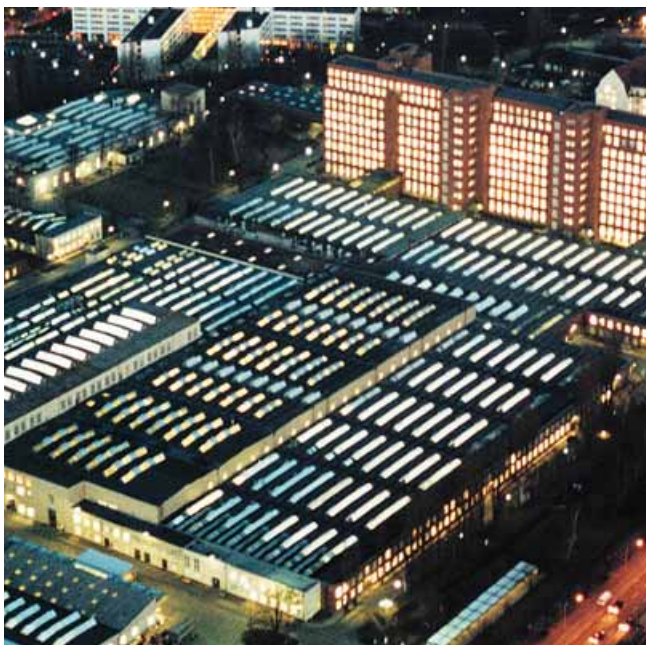
Release	Power consumption		Tripping ranges	
	Operation at		Tripping voltage at DC	Tripping voltage or tripping current at AC 50/60 Hz
	DC approx. W	AC 50/60 Hz approx. VA		
Closing solenoid 3AY15 10	140	140	85 to 110 % U	85 to 110 % U
1 <sup>st</sup> shunt release (without energy store) 3AY15 10	140	140	70 to 110 % U	85 to 110 % U
2 <sup>nd</sup> shunt release (with energy store) 3AY11 01	70	50	70 to 110 % U	85 to 110 % U
Undervoltage release 3AY11 03	20	20	35 to 0 % U	35 to 0 % U
Current-transformer operated release 3AX11 02 (rated normal current 0.5 or 1 A)	–	10 <sup>3)</sup>	–	90 to 110 % I <sub>a</sub>
Current-transformer operated release 3AX11 04 (tripping pulse ≥ 0.1 Ws)	–	–	–	–

3) Consumption at pickup current (90 % of the rated normal current) and open armature.



RH-G11-181.tif

Brandenburg Gate, Berlin, Germany



RH-G11-180.eps

Switchgear Factory in Berlin, Germany

Contents

Page

**Annex**

**45**

Inquiry form

46

Configuration instructions

47

Configuration aid

Foldout page

Please copy, fill in and return to your Siemens partner or you can use our prompted online configurator under [www.siemens.com/energy](http://www.siemens.com/energy)

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- 3AH3 circuit-breaker
- 3AH37/38 generator circuit-breaker

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**Technical Data**

	Other values			
Rated voltage	<input type="checkbox"/> 7.2 kV	<input type="checkbox"/> 12 kV	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 17.5 kV
	<input type="checkbox"/> 24 kV	<input type="checkbox"/> 36 kV	<input type="checkbox"/> 40.5 kV	<input type="checkbox"/> ___ kV
Rated lightning impulse withstand voltage	<input type="checkbox"/> 60 kV	<input type="checkbox"/> 75 kV	<input type="checkbox"/> 95 kV	<input type="checkbox"/> 110 kV
	<input type="checkbox"/> 125 kV	<input type="checkbox"/> 170 kV	<input type="checkbox"/> 195 kV	<input type="checkbox"/> ___ kV
Rated short-duration power-frequency withstand voltage	<input type="checkbox"/> 20 kV	<input type="checkbox"/> 32 kV	<input type="checkbox"/> 36 kV	<input type="checkbox"/> 38 kV
	<input type="checkbox"/> 50 kV	<input type="checkbox"/> 70 kV	<input type="checkbox"/> 95 kV	<input type="checkbox"/> ___ kV
Rated short-circuit breaking current	<input type="checkbox"/> 31.5 kA	<input type="checkbox"/> 40 kA	<input type="checkbox"/> 50 kA	
	<input type="checkbox"/> 63 kA	<input type="checkbox"/> 72 kA		<input type="checkbox"/> ___ kA
Rated normal current	<input type="checkbox"/> 1250 A	<input type="checkbox"/> 2000 A	<input type="checkbox"/> 2500 A	<input type="checkbox"/> 3150 A
	<input type="checkbox"/> 4000 A	<input type="checkbox"/> 5000 A	<input type="checkbox"/> 6300 A	<input type="checkbox"/> ___ A
Pole-centre distance	<input type="checkbox"/> 210 mm	<input type="checkbox"/> 275 mm	<input type="checkbox"/> 300 mm	<input type="checkbox"/> 350 mm

**Secondary equipment**

For possible combinations see pages 17 to 23

Circuit-breaker equipment	<input type="checkbox"/> Manual mechanical closing <input type="checkbox"/> Manual electrical closing <input type="checkbox"/> Manual operating mechanism			
Motor operating mechanism	<input type="checkbox"/> ___ V DC	<input type="checkbox"/> ___ V AC, ___ Hz		
Closing solenoid	<input type="checkbox"/> ___ V DC	<input type="checkbox"/> ___ V AC, ___ Hz		
1 <sup>st</sup> shunt release	<input type="checkbox"/> ___ V DC	<input type="checkbox"/> ___ V AC, ___ Hz		
2 <sup>nd</sup> shunt release	<input type="checkbox"/> ___ V DC	<input type="checkbox"/> ___ V AC, ___ Hz		
Current-transformer operated release	<input type="checkbox"/> 0.5 A	<input type="checkbox"/> 1 A	<input type="checkbox"/> ≥ 0.1 Ws (10 Ω)	<input type="checkbox"/> ≥ 0.1 Ws (20 Ω)
Undervoltage release	<input type="checkbox"/> ___ V DC		<input type="checkbox"/> ___ V AC, ___ Hz	
	<input type="checkbox"/> Without energy store		<input type="checkbox"/> With energy store	
Auxiliary switch	<input type="checkbox"/> 6 NO + 6 NC	<input type="checkbox"/> 12 NO + 12 NC		
Low-voltage connection	<input type="checkbox"/> 24-pole terminal strip	<input type="checkbox"/> 24-pole plug	<input type="checkbox"/> 64-pole plug	
<input type="checkbox"/> Mechanical interlocking				
Operating instructions	<input type="checkbox"/> English	<input type="checkbox"/> German	<input type="checkbox"/> French	<input type="checkbox"/> Spanish

**Application and other requirements**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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