



# 3AH4 Vacuum Circuit-Breakers

Medium-Voltage Equipment  
Selection and Ordering Data

Catalog HG 11.04 · August 2010

Answers for energy.

**SIEMENS**



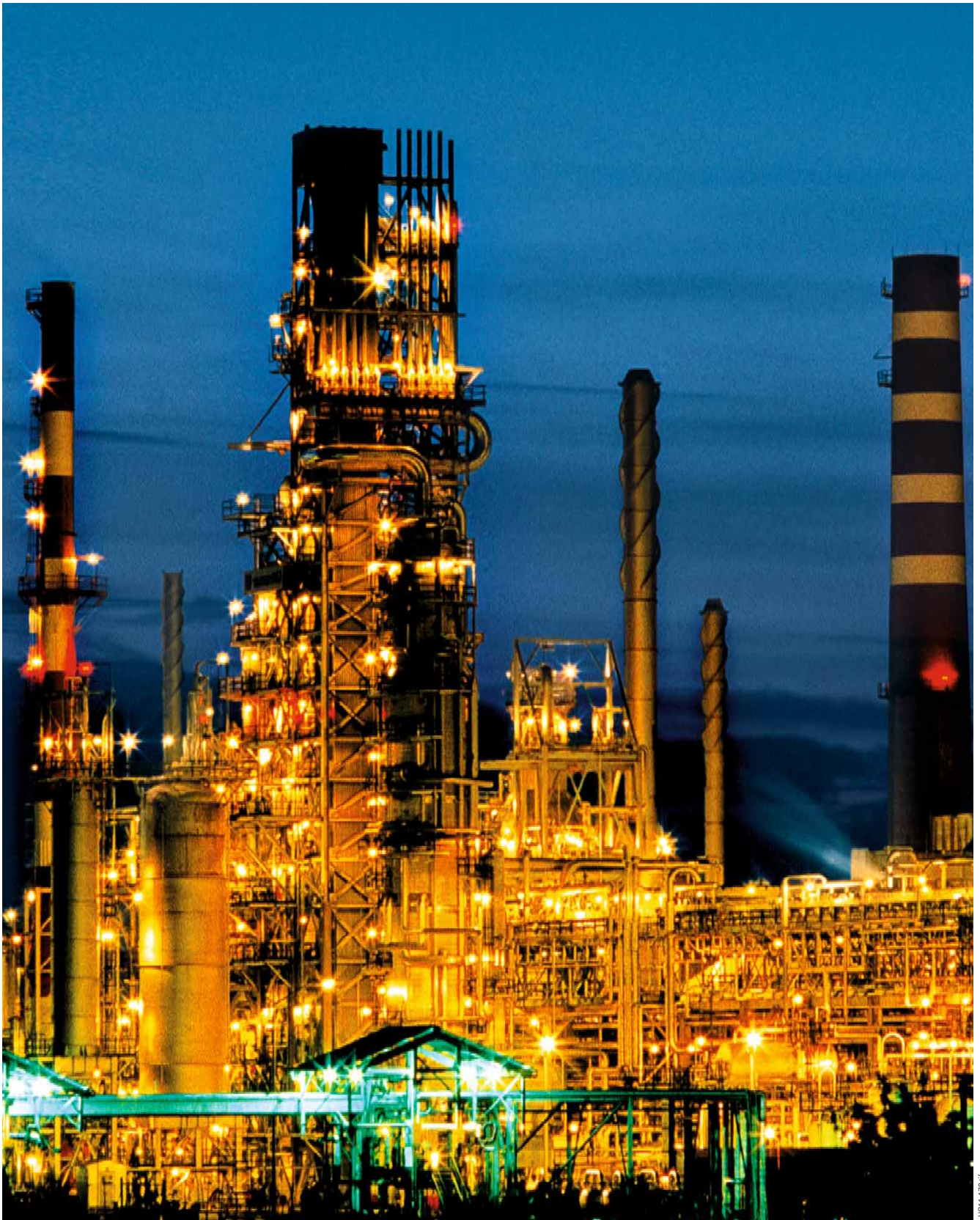
RH611-172HF

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RHG11-173HF





Industrial application: Refinery

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## 3AH4 frequent-operation circuit-breaker from 7.2 to 36 kV – The Persistent

1

Certain applications, especially in the industry, need high and up to very high numbers of operating cycles.

For example, operation of arc furnaces requires more than 100 operating cycles a day.

3AH4 – the circuit-breaker for a maximum number of operating cycles



The vacuum circuit-breaker type 3AH4 up to 36 kV is designed for extremely high numbers of operating cycles: It controls 60,000 / 120,000 operating cycles.

Minimum maintenance work, such as greasing of operating mechanisms after 10,000 operating cycles and replacement of vacuum interrupters after 30,000 operating cycles, preserves the reliability of these circuit-breakers throughout their entire service life – despite high mechanical stress.

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.

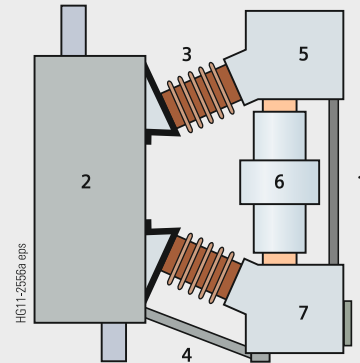
### Operating mechanism

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

3AH4 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.



Circuit-breaker structure

- 1 Pole assembly
- 2 Operating mechanism box
- 3 Post insulator
- 4 Operating rod
- 5 Upper interrupter support
- 6 Vacuum interrupter
- 7 Lower interrupter support



Front view



Open operating mechanism box

## Description

Construction and mode of operation, standards

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 15.

- 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, 3AH4 vacuum circuit-breakers can be remote-closed electrically. They can also be closed locally by mechanical unlatching of the closing spring via push-button. 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 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 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 vacuum circuit-breakers can be integrated in electromagnetic feeder or switchgear interlocks. In case of electrical interlocking, the disconnecter 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 disconnecter can only be operated when the circuit-breaker is open. On the other hand, the circuit-breaker is also controlled by the disconnecter or its operating mechanism, so that it can only be closed when the disconnecter 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 disconnectors 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

3AH4 vacuum circuit-breakers conform to the following standards:

- IEC 62271-100 (former IEC 60056)
- IEC 62271-1 (former IEC 60694)
- VDE 0671 (former VDE 0670)

All 3AH4 vacuum circuit-breakers fulfil the endurance classes E2 and C2 according to IEC 62271-100 and surpass the endurance class M2 six / twelve times (60,000 / 120,000 operating cycles).



**Maintenance**

The 3AH4 vacuum circuit-breakers are maintenance-free up to 10,000 operating cycles under normal ambient conditions according to IEC 62271-1 (former IEC 60694):

- Relubrication after 10,000 operating cycles
- Replacement of vacuum interruptors after 30,000 operating cycles.

**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. 3AH4 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** (see diagram)

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:

- 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

**Dielectric strength**

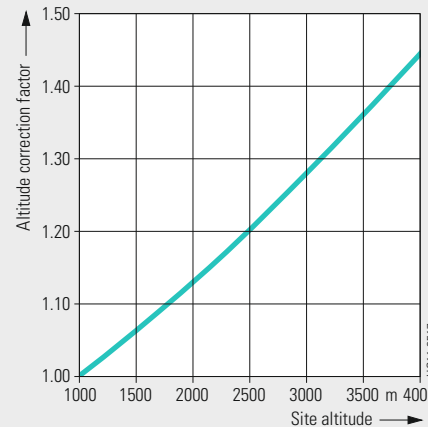
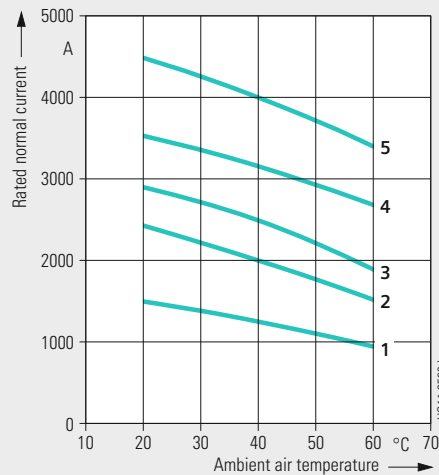
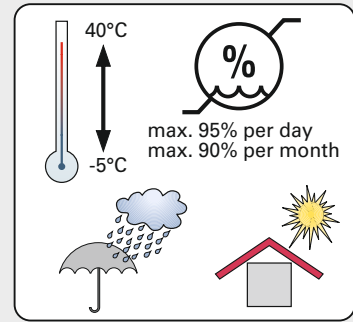
The dielectric strength of air insulation decreases with increasing altitude due to low air density. According to IEC 62271-1, the values of the rated lightning impulse withstand voltage and the rated short-duration power-frequency withstand voltage specified in the chapter "Technical Data" apply to 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
- $U_0$  Rated withstand voltage requested for the place of installation
- $K_a$  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
		Pole-centre distance (mm)											
		210	275	350	210	275	350	210	275	350	210	350	350
12	31.5	□			□								
	40	□			□			□				□	
15	31.5	□			□								
	40	□ *			□							□	
24	25	□	□		□	□							
	40									■			
36	31.5			■			■					■	■
	40										■		■
		* 1600 A											

■ Available design 120,000 operating cycles      □ Available design 30,000 / 60,000 operating cycles

Basic equipment

Features	Minimum equipment	Alternative equipment	Remarks
Operating mechanism	Electrical operating mechanism	None	Also for manual operation; 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 15)
3 <sup>rd</sup> release	Without	Undervoltage release, c.t.-operated release	Max. 3 releases can be combined (for possible combinations, refer to page 15)
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	–



3AH4 vacuum circuit-breaker

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**Order number structure**

The 3AH4 vacuum circuit-breakers consist of a primary and a secondary part. The relevant data make up the 16-digit order number. The primary part covers the main electrical data of the circuit-breaker poles. The secondary part covers the auxiliary devices which are necessary for operating and controlling the vacuum circuit-breaker.

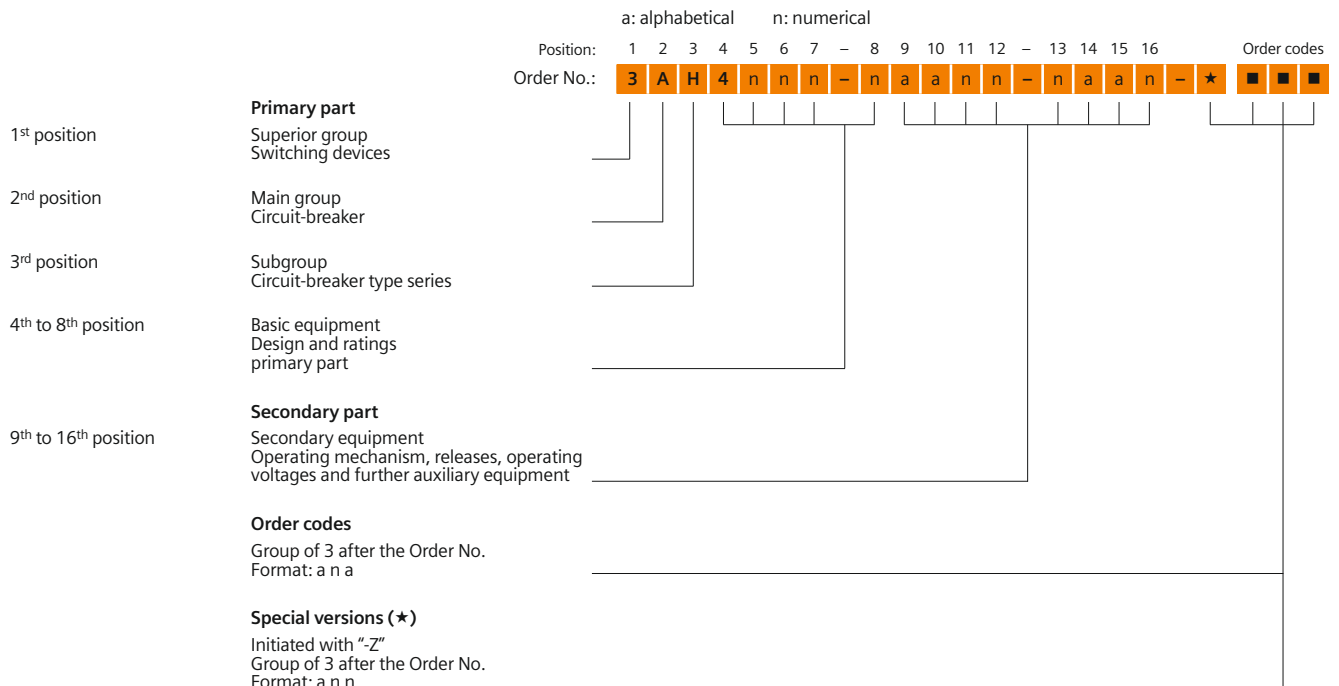
Order codes

Individual equipment versions, marked with **9** or **Z** in the 9<sup>th</sup> to 16<sup>th</sup> position, are explained more in detail by a 3-digit order code. Several order codes can be added to the order number in succession and in any sequence.

Special versions (★)

In case of special versions, “-Z” is added to the order number and a descriptive order code follows. If several special versions are required, the suffix “-Z” is listed only once. If a requested special version is not in the catalog and can therefore not be ordered via order code, it has to be identified with **Y 9 9** after consultation. The agreement hereto is made directly between your responsible sales partner and the order processing department in the Switchgear Factory Berlin.

2



**Configuration example**

In order to simplify the selection of the correct order number for the requested circuit-breaker type, you will find a configuration example on each page of the chapter “Equipment Selection”. For the selection of the secondary part, always the last example of the primary part was taken over and continued, so that at the end of the equipment selection (page 22) a completely configured circuit-breaker results as an example.

*On the foldout page we offer a configuring aid. Here you can fill in the order number you have determined for your circuit-breaker.*









## 24 kV

50/60 Hz, 30,000/60,000* / 120,000 operating cycles							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	Order No.:	3	A	H	4	■	■	■	-	■	■	■	■	■	-	■	■	■	■	■	■	■		
$U_r$	$U_p$	$U_d$	$I_{sc}$	$I_{ma}$		$I_r$																								
kV	kV	kV	kA	kA	mm	A																								
24	125	50	25	100/104	210	1250		3	A	H	4	■	■	■	-	■	■	■	■	■	■	■	■	■	■	■	■			
						2500		3	A	H	4	2	5	4	-	4	See page 15	See page 16	See page 17	See page 18		See page 19	See page 20	See page 21	See page 22		See page 22			
						275	1250	3	A	H	4	2	6	4	-	2	30,000 operating cycles with order code										M	3	0	
						2000	1250	3	A	H	4	2	6	4	-	4	30,000 operating cycles with order code										M	3	0	
						40	275	2500	3	A	H	4	2	6	6	-	6	120,000 operating cycles												

\* As of 2011: 60,000 operating cycles with order code M60

## 36 kV

50/60 Hz, 120,000 operating cycles							Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes							
$U_r$	$U_p$	$U_d$	$I_{sc}$	$I_{ma}$		$I_r$	Order No.:	3	A	H	4	■	■	■	-	■	■	■	■	■	-	■	■	■	■	■	■	■					
kV	kV	kV	kA	kA	mm	A																											
36	170	70	31.5	80/82	350	1250		3	A	H	4	3	0	5	-	2																	
						2000		3	A	H	4	3	0	5	-	4																	
						2500		3	A	H	4	3	0	5	-	6																	
						3150		3	A	H	4	3	0	5	-	7																	
						4000		3	A	H	4	3	0	5	-	8																	
		40		100/104	350	2500		3	A	H	4	3	0	6	-	6																	
						3150		3	A	H	4	3	0	6	-	7																	
						4000		3	A	H	4	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																																	

### Configuration example

3AH4 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  
 Increase of rated lightning impulse withstand voltage  $U_p = 195$  kV  
 and rated short-duration power-frequency withstand voltage  $U_d = 95$  kV

Example for Order No.: 3 A H 4 3 0 6 - 6 ■ ■ ■ ■ - ■ ■ ■ ■ - Z  
 Order codes: E 2 4 + E 2 5



9th position

Release combinatioid

								Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes					
								Order No.:	3	A	H	■	■	■	■	-	■	■		See page 16	See page 17	See page 18	-	See page 19	See page 20	See page 21	See page 22	-	*	■	■	■
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 $\geq 0.1$ Ws (10 $\Omega$ )	C.t.-operated release with tripping pulse $\geq 0.1$ Ws (20 $\Omega$ )																									
■	■																													M		
■	■	■																												N		
■	■	■	■																											T		
■	■	■		■																										P		
■	■	■																												P		
■	■		■																											- Z		
■	■		■																											A 4 6		
■	■		■																											R		
■	■		■																											S		
■	■		■																											S		
■	■		■																											- Z		
■	■		■																											A 4 6		
■	■		■																											U		
■	■		■																											U		
■	■		■																											- Z		
■	■		■																											A 4 6		
■	■		■																											V		
■	■		■																											V		
																														- Z		
																														A 4 5		



Configuration example

3AH4 vacuum circuit-breaker

( $U_r = 36$  kV, 50/60 Hz,  $U_p = 195$  kV,  $I_{sc} = 40$  kA,  $I_r = 2500$  A, pole-centre distance = 350 mm)

Closing solenoid, 1<sup>st</sup> shunt release, 2<sup>nd</sup> shunt release and c.t.-operated release with a rated normal current of 0.5 A

3 A H 4

3 0 6 - 6

P

Example for Order No.:

3 A H 4 3 0 6 - 6 P ■ ■ ■ - ■ ■ ■ ■ - Z

Order codes:

E 2 4 + E 2 5

## Selection of secondary equipment



### 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	4	■	■	■	-	■	■	■	■	-	■	■	■	■	-	*	■	■	■
Standard voltages	Special voltages												See page 17	See page 18	See page 19	See page 20	See page 21	See page 22						
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 22)

### Configuration example

3AH4 vacuum circuit-breaker

( $U_r = 36$  kV, 50/60 Hz,  $U_p = 195$  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 30 V DC

3 A H 4

3 0 6 - 6 P

Z

K 2 A

Example for Order No.:

Order codes:

3 A H 4 3 0 6 - 6 P Z ■ ■ - ■ ■ ■ ■ - Z  
E 2 4 + E 2 5 + K 2 A





**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	4	■	■	■	-	■	■	■	■	-	■	■	■	-	★	■	■	■
Standard voltages	Special voltages													See page 18		See page 19	See page 20	See page 21	See page 22				
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 22)



**Configuration example**

3AH4 vacuum circuit-breaker

( $U_r = 36$  kV, 50/60 Hz,  $U_p = 195$  kV,  $I_{sc} = 40$  kA,  $I_r = 2500$  A, pole-centre distance = 350 mm)

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

3 A H 4

3 0 6 - 6 P Z

2

Example for Order No.:

3 A H 4 3 0 6 - 6 P Z 2 ■ - ■ ■ ■ - Z

Order codes:

E 2 4 + E 2 5 + K 2 A

## Selection of secondary equipment



### 12<sup>th</sup> position

#### Operating voltage of the 2<sup>nd</sup> release

#### Shunt release, undervoltage release or c.t.-operated 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	4	■	■	■	-	■	■	■	■	-	■	■	■	■	-	★	■	■	■		
																See page 19	See page 20	See page 21	See page 22							
Standard voltages		Special voltages																								
Without or c.t.-operated release														0												
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							M	1	A		
		32 V DC												9	With order code								M	1	B	
		120 V DC												9	With order code								M	1	C	
		125 V DC												9	With order code									M	1	D
		127 V DC												9	With order code									M	1	E
		240 V DC												9	With order code									M	1	F
		120 V AC 50/60 Hz <sup>1)</sup>												9	With order code									M	1	K
		125 V AC 50/60 Hz <sup>1)</sup>												9	With order code									M	1	L
		240 V AC 50/60 Hz <sup>1)</sup>												9	With order code									M	1	M
<b>Special versions</b>																										
To operate the 2 <sup>nd</sup> release as an undervoltage release on an energy store type AN 1902- (for DC) or AN 1901-2 (for AC), both make Bender, the operating voltage must be defined – and whether the energy store will be provided by the customer or included in the scope of supply.																										
		Energy store																								
		Type																								
		In the scope of supply																								
60 V DC		AN 1902-												9	With order code									M	2	D
110 V DC		AN 1902-												9	With order code									M	2	E
220 V DC		AN 1902-												9	With order code									M	2	F
100/110/230 V AC		AN 1901-2												9	With order code									M	2	G
60 V DC		AN 1902-												9	With order code									M	3	D
110 V DC		AN 1902-												9	With order code									M	3	E
220 V DC		AN 1902-												9	With order code									M	3	F
100/110/230 V AC		AN 1901-2												9	With order code									M	3	G

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 22)

### Configuration example

3AH4 vacuum circuit-breaker

( $U_i = 36$  kV,  $50/60$  Hz,  $U_p = 195$  kV,  $I_{sc} = 40$  kA,  $I_r = 2500$  A, pole-centre distance = 350 mm)

2<sup>nd</sup> release as undervoltage release with operating voltage 32 V DC

3 A H 4

3 0 6 - 6 P Z 2

9

M 1 B

Example for Order No.:

3 A H 4 3 0 6 - 6 P Z 2 9 - ■ ■ ■ ■ - Z

Order codes:

E 2 4 + E 2 5 + K 2 A + M 1 B



**13<sup>th</sup> position**

**Operating voltage of the 3<sup>rd</sup> release**

**Undervoltage release or c.t.-operated 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	4	■	■	■	-	■	■	■	■	-	■	■	■	■	■
Standard voltages	Special voltages																			
Without or c.t.-operated release																				
24 V DC																				
48 V DC																				
60 V DC																				
110 V DC																				
220 V DC																				
100 V AC 50/60 Hz <sup>1)</sup>																				
110 V AC 50/60 Hz <sup>1)</sup>																				
230 V AC 50/60 Hz <sup>1)</sup>																				
	30 V DC																			
	32 V DC																			
	120 V DC																			
	125 V DC																			
	127 V DC																			
	240 V DC																			
	120 V AC 50/60 Hz <sup>1)</sup>																			
	125 V AC 50/60 Hz <sup>1)</sup>																			
	240 V AC 50/60 Hz <sup>1)</sup>																			
<b>Special versions</b>																				
To operate the 3 <sup>rd</sup> release as an undervoltage release on an energy store type AN 1902- (for DC) or AN 1901-2 (for AC), both make Bender, the operating voltage must be defined – and whether the energy store will be provided by the customer or included in the scope of supply.																				
	Energy store																			
	Type	In the scope of supply																		
60 V DC	AN 1902-	no																		
110 V DC	AN 1902-	no																		
220 V DC	AN 1902-	no																		
100/110/230 V AC	AN 1901-2	no																		
60 V DC	AN 1902-	yes																		
110 V DC	AN 1902-	yes																		
220 V DC	AN 1902-	yes																		
100/110/230 V AC	AN 1901-2	yes																		

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 22)

**Configuration example**

3AH4 vacuum circuit-breaker  
( $U_i = 36 \text{ kV}$ ,  $50/60 \text{ Hz}$ ,  $U_p = 195 \text{ kV}$ ,  $I_{sc} = 40 \text{ kA}$ ,  $I_r = 2500 \text{ A}$ , pole-centre distance = 350 mm)  
3<sup>rd</sup> release as c.t.-operated release

3 A H 4

3 0 6 - 6 P Z 2 9 - 0

Example for Order No.: 3 A H 4 3 0 6 - 6 P Z 2 9 - 0 ■ ■ ■ - Z  
Order codes: E 2 4 + E 2 5 + K 2 A + M 1 B



2

### 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	4	■	■	■	-	■	■	■	■	■	■	■	■	■	■	■		
Standard voltages	Special voltages																						
24 V DC																							
48 V DC																							
60 V DC																							
110 V DC																							
220 V DC																							
100 V AC	50/60 Hz <sup>1)</sup>																						
110 V AC	50/60 Hz <sup>1)</sup>																						
230 V AC	50/60 Hz <sup>1)</sup>																						
	30 V DC																						
	32 V DC																						
	120 V DC																						
	125 V DC																						
	127 V DC																						
	240 V DC																						
	120 V AC	50/60 Hz <sup>1)</sup>																					
	125 V AC	50/60 Hz <sup>1)</sup>																					
	240 V AC	50/60 Hz <sup>1)</sup>																					

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 22)

#### Configuration example

3AH4 vacuum circuit-breaker

( $U_t = 36$  kV, 50/60 Hz,  $U_p = 195$  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 4

3 0 6 - 6 P Z 2 9 - 0

K

Example for Order No.:

3 A H 4 3 0 6 - 6 P Z 2 9 - 0 K ■ ■ - Z  
 Order codes: E 2 4 + E 2 5 + K 2 A + M 1 B





**15th position**

**Auxiliary switch, secondary connection, interlocking**

	Position:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Order codes				
	Order No.:	3	A	H	4	■	■	■	-	■	■	■	■	-	■	■	■	■				
Mechanical interlocking																	See page 22					
Auxiliary switch 6 NO + 6 NC		■															See page 22					
Auxiliary switch 12 NO + 12 NC				■																		
64-pole plug <sup>1)</sup>					■																	
24-pole plug <sup>2)</sup>						■																
24-pole terminal strip <sup>2)</sup>							■															
																		A				
																			E			
																				G		
																				C		
																				M		
																				B		
																				F		
																				H		
																				D		
																				N		
<b>Special version</b>																						
Auxiliary switch 12 NO + 12 NC and 24-pole plug (E or F)																		-	Z	A 2 6		
<b>Special versions</b> gold-plated contacts and pins																						
Auxiliary switch 6 NO + 6 NC and 24-pole terminal strip (G or H)																			-	Z	A 1 7	
Auxiliary switch 12 NO + 12 NC and 24-pole terminal strip (M or N)																				-	Z	A 1 8
Auxiliary switch 6 NO + 6 NC and 64-pole plug (A or B)																				-	Z	A 2 0
Auxiliary switch 12 NO + 12 NC and 64-pole plug (C or D)																				-	Z	A 2 1

- 1) Depending on the equipment, some connections of the 64-pole plug connector remain free. These can be connected to free auxiliary switch contacts by the customer. Prefabricated wires are available as accessories.
- 2) Auxiliary switch contacts are not wired to the plug/terminal strip and must therefore be connected directly.

**Configuration example**

3AH4 vacuum circuit-breaker

( $U_r = 36 \text{ kV}$ ,  $50/60 \text{ Hz}$ ,  $U_p = 195 \text{ kV}$ ,  $I_{sc} = 40 \text{ kA}$ ,  $I_r = 2500 \text{ A}$ , pole-centre distance = **350 mm**)

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

Auxiliary switch 12 NO + 12 NC, 64-pole plug, without mechanical interlocking

3 A H 4

3 0 6 - 6 P Z 2 9 - 0

K

C

Example for Order No.:

3 A H 4 3 0 6 - 6 P Z 2 9 - 0 K C ■ - Z

Order codes:

E 2 4 + E 2 5 + K 2 A + M 1 B

**2**

Selection of secondary equipment/Additional equipment



16th position

AC frequency of operating voltages

Languages of operating instructions and rating plate

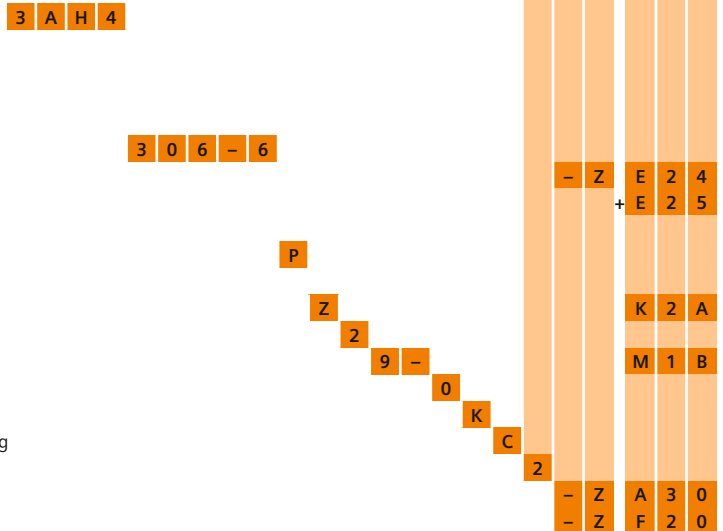
		Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes						
		Order No.:	3	A	H	4					-													*			
Language selection		German																									
		English																									
		French																									
		Spanish																									
Frequency selection		DC																									
		50 Hz																									
		50 Hz and DC																									
		60 Hz																									
		60 Hz and DC																									
Other languages on request																											
Special versions																											
Additional information on the rating plate (only after consultation with the order processing department of the Switchgear Factory Berlin). Information in clear text.																											

Additional equipment

		Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes						
Options																											
Wiring cables, halogen-free and flame-retardant																											
Condensation protection, heating for 230 V AC, 50 W																											
Silicone-free design																											
Additional rating plate, loose delivery																											
Primary conductor bars silver-plated for external connections and internal interconnection on both sides																											
Routine test certificate enclosed																											
Hand crank (also for motor operating mechanism) for manual charging of the closing spring																											
Further, non-listed special versions (only after consultation with the order processing department of the Switchgear Factory Berlin). Information additionally in clear text.																											

Configuration example

- 3AH4 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  $I_r = 2500 \text{ A}$
- Increase of rated lightning impulse withstand voltage  $U_p = 195 \text{ kV}$  and rated short-duration power-frequency withstand voltage  $U_d = 95 \text{ kV}$
- Closing solenoid, 1st shunt release, 2nd shunt release and c.t.-operated release with a rated normal current of 0.5 A
- Manual electrical closing at the circuit-breaker, operating voltage of the closing solenoid 30 V DC
- Operating voltage of the 1st release 48 V DC
- 2nd release as undervoltage release with operating voltage 32 V DC
- 3rd release as c.t.-operated release
- Operating voltage of the operating mechanism 230 V AC, 50 Hz
- Auxiliary switch 12 NO + 12 NC, 64-pole plug, without mechanical interlocking
- Frequency 50 Hz or DC, operating instructions and rating plate in English
- Condensation protection, heating for 230 V AC, 50 W
- Routine test certificate enclosed



Example for Order No.: 3 A H 4 3 0 6 - 6 P Z 2 9 - 0 K C 2 - Z E 2 4 + E 2 5 + K 2 A + M 1 B + A 3 0 + F 2 0  
 Order codes: E 2 4 + E 2 5 + K 2 A + M 1 B + A 3 0 + F 2 0



On request, we will be pleased to send you an overview of accessories and spare parts, as well as the spare pole assemblies available. Please consider the following information for your purchase order.

#### Remark for orders

The order numbers in the spare part overview are applicable to vacuum circuit-breakers of current manufacture. When mounting parts or spare parts are being ordered for an existing vacuum circuit-breaker, always quote the type designation, serial number and the year of manufacture of the circuit-breaker to be sure to get the correct delivery.

#### Retrofitting

When releases/solenoids are retrofitted, the order numbers of the mounting parts must also be specified. For other additional equipment, the required mounting parts are included in the delivery.

#### Spare pole assemblies

As spare parts, the vacuum interrupters are always supplied as a complete pole including post insulator.

To select the correct pole assemblies, please specify the type designation, serial number and year of manufacture of the circuit-breaker. All data is given on the rating plate.

**Vacuum pole assemblies and other spare parts must only be replaced by instructed personnel.**

#### Accessories for the plug connector

Included in the scope of supply of the basic equipment for 3AH4 vacuum circuit-breakers:

##### For 24-pole plug connector

- Lower part of plug
- Crimp sockets according to number of contacts
- Upper part of plug with screwed contacts (no crimp sockets required)

##### For 64-pole plug connector

- Lower part of plug
- Upper part of plug
- Crimp sockets according to number of contacts

#### Data on the rating plate

SIEMENS	
Type 3AH4306-6	
No. S 3AH4/00002325	Year of manuf. 2010
$U_r$ 36.0 kV 50/60 Hz	$I_r$ 2500 A
$I_{sc}$ 40.0 kA	$t_k$ 3 s
$U_d/U_n$ 70/170 kV	$m$ 180 kg
Rated operating sequence: 0 - 3 min - CO - 3 min - CO	
Category to IEC 62271-100: E2, M2, C2	
<b>MADE IN GERMANY</b>	

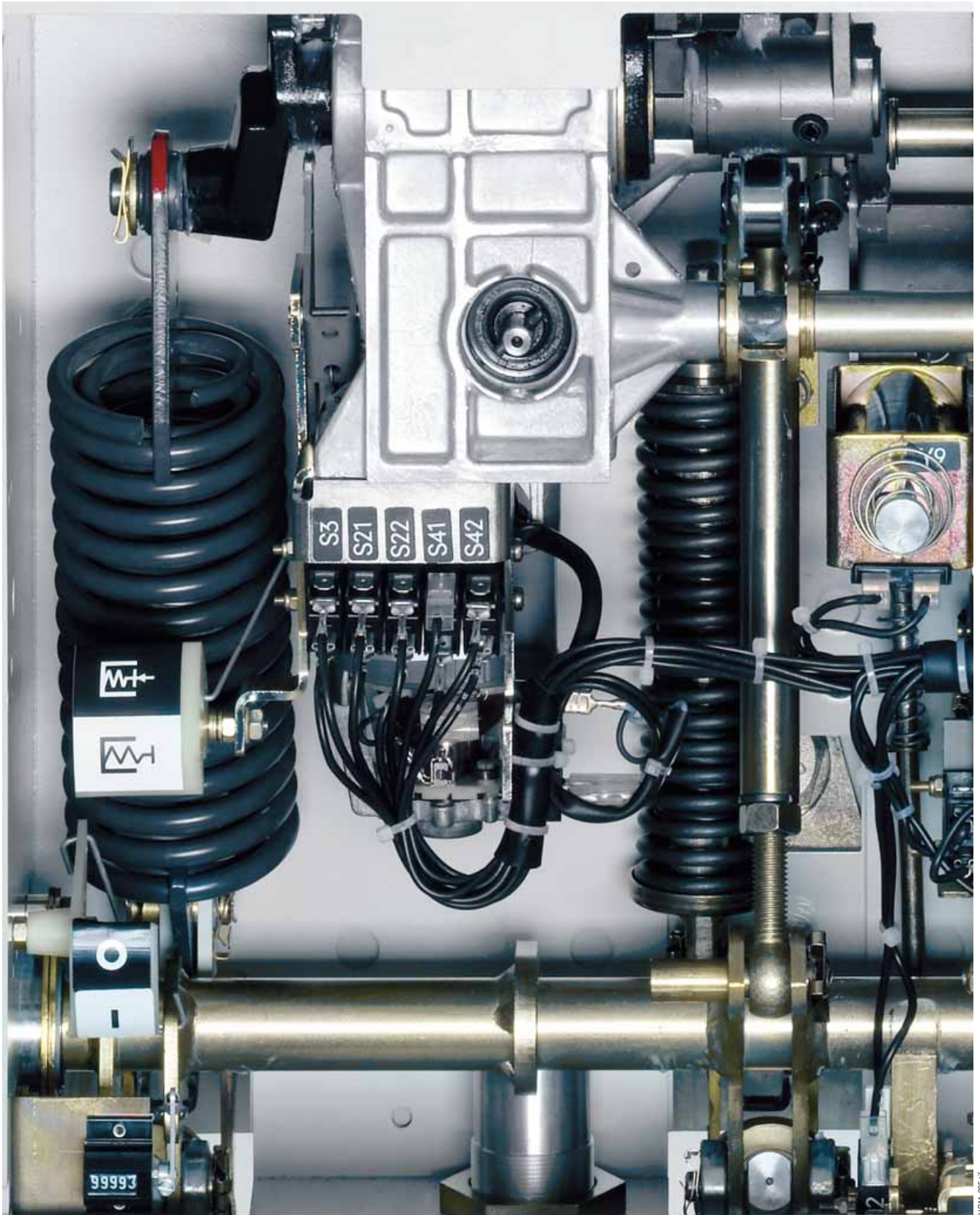
HG11-2594L\_en apps

#### Note:

For any query regarding spare parts, subsequent deliveries, etc. the following three details are necessary:

- Type designation
- Serial No.
- Year of manufacture

Designation	Remarks	Order No.
Hand crank		3AX15 30-2B
Lubricant	(for special application conditions) 180 g Klüber-Isoflex Topas L32N	3AX11 33-3H
	1 kg Klüber-Isoflex Topas L32N	3AX11 33-3E
	1 kg Shell Tellus oil 32 (special oil)	3AX11 33-2D
Wire bundle	With 10 wires for connection of auxiliary switch to	
	– 64-pole plug connector	3AX11 34-2D
	– 24-pole plug connector	3AX11 34-2B
	– 24-pole terminal strip	3AX11 34-2C
Accessories for plug connector	(for wire cross-section 1.5 mm <sup>2</sup> )	
	Crimp pins for lower part of plug 24-pole	3AX11 34-3A
	64-pole	3AX11 34-4B
	Crimp sockets for upper part of plug 64-pole	3AX11 34-4C
	Crimping pliers	3AX11 34-4D
	Disassembly tool	3AX11 34-4G

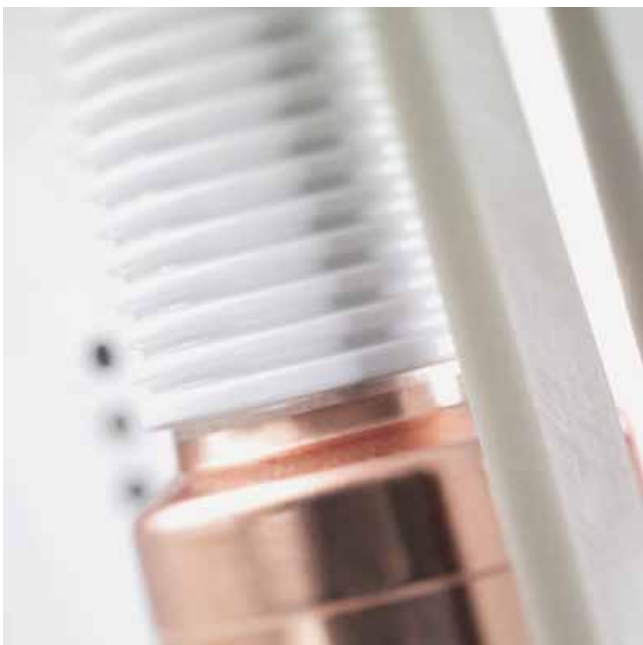


RH611-2051ff



R-HG11-199.eps

Power connection 3AH4



R-HG11-198.tif

Vacuum interrupter with ribs

## Contents

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Electrical data, dimensions and weights:

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Short-circuit protection of motors 32

Consumption data of releases 32



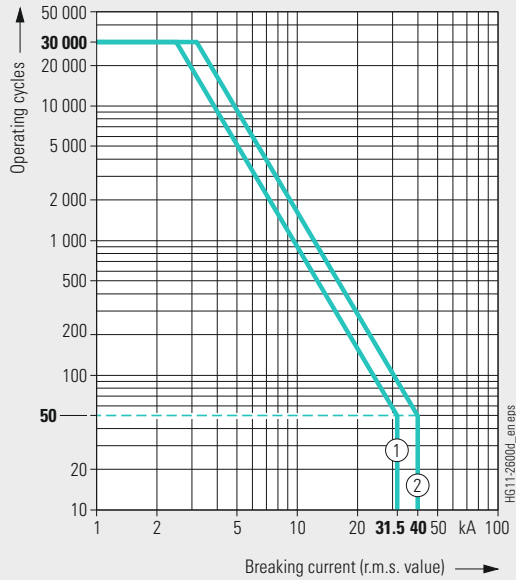
Order No.	12 kV 50/60 Hz		Rated normal current			Pole-centre distance			Rated operating sequence: O - 3 min - CO - 3 min - CO O - 0.3 s - CO - 3 min - CO O - 0.3 s - CO - 15 s - CO			Rated duration of short-circuit			Rated short-circuit breaking current			DC component in % of the rated short-circuit 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 27)			Catalog dimension drawing no. (see page 27)		
	$I_r$ A	mm	$I_r$	mm	mm	$t_k$ s	$I_{sc}$ kA	%	kA	$I_{ma}$ kA	$U_b$ kV	$U_d$ kV	mV	mm	mm	mm	mm	mm	mm	kg	S_325 00900	1	3																																				
3AH4 115-2 ...	1250	210	□	■	○	3	31.5	36	35.4	80/82	75	28	2.5	130	160	130	130	113	S_325 00900	1	3																																						
3AH4 115-4 ...	2000	210	□	■	○	3	31.5	36	35.4	80/82	75	28	2.5	130	165	90	130	129	S_325 00901	1	1																																						
3AH4 116-2 ...	1250	210	■	△	△	3	40	36	44.9	100/104	75	28	2.5	140	195	90	120	135	S_325 00902	2	2																																						
3AH4 116-3 ...	1600	210	■	△	△	3	40	36	44.9	100/104	75	28	2.5	140	195	90	120	135	S_325 00902	2	2																																						
3AH4 116-4 ...	2000	210	■	△	△	3	40	36	44.9	100/104	75	28	2.5	140	195	90	120	135	S_325 00903	2	2																																						
3AH4 116-6 ...	2500	210	■	△	△	3	40	36	44.9	100/104	75	28	2.0	140	195	90	120	135	S_325 00904	2	2																																						
3AH4 116-7 ...	3150	210	■	△	△	3	40	36	44.9	100/104	75	28	2.0	140	195	90	120	135	S_325 00904	2	2																																						

3

Order No.	15 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 27)			Catalog dimension drawing no. (see page 27)		
	$I_r$ A	mm	$I_r$	mm	mm	$t_k$ s	$I_{sc}$ kA	%	kA	$I_{ma}$ kA	$U_b$ kV	$U_d$ kV	mV	mm	mm	mm	mm	mm	kg	S_325 00900	1	3																																					
3AH4 165-2 ...	1250	210	□	■	○	3	31.5	36	35.4	80/82	95	36	2.5	130	160	243	130	117	S_325 00900	1	3																																						
3AH4 165-4 ...	2000	210	□	■	○	3	31.5	36	35.4	80/82	95	36	2.5	130	165	150	130	130	S_325 00901	1	1																																						
3AH4 166-2 ...	1250	210	■	△	△	3	40	36	44.9	100/104	95	36	2.5	146	195	150	120	142	S_325 00902	2	3																																						
3AH4 166-3 ...	1600	210	■	△	△	3	40	36	44.9	100/104	95	36	2.5	146	195	150	120	142	S_325 00902	2	2																																						
3AH4 166-4 ...	2000	210	■	△	△	3	40	36	44.9	100/104	95	36	2.5	146	195	195	120	142	S_325 00903	2	2																																						
3AH4 166-6 ...	2500	210	■	△	△	3	40	36	44.9	100/104	95	36	2.0	146	195	195	120	142	S_325 00904	2	2																																						
3AH4 166-7 ...	3150	210	■	△	△	3	40	36	44.9	100/104	95	36	2.0	146	195	195	120	142	S_325 00904	2	2																																						

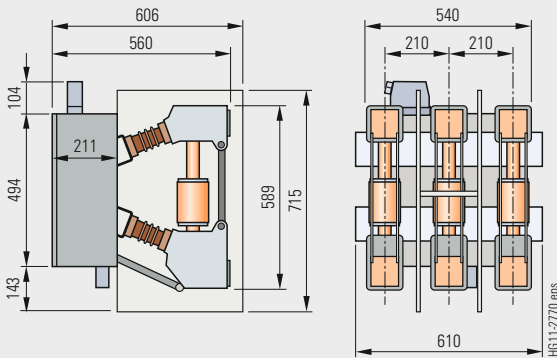
- Standard information on the rating plate
- Possible with order number suffix Z and order code F27
- Possible with order number suffix Z and order code F28
- △ Rated operating sequence possible up to  $I_{sc} = 31.5$  kA

Operating cycle diagram for 12/15 kV

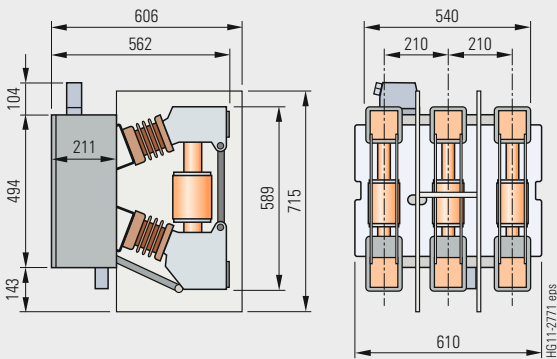


The permissible number of electrical operating cycles is shown as a function of the breaking current (r.m.s. value). All vacuum circuit-breakers fulfil the endurance classes E2, M2 and C2 according to IEC 62271-100. The curve shape beyond the parameters defined in IEC 62271-100 is based on average experience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

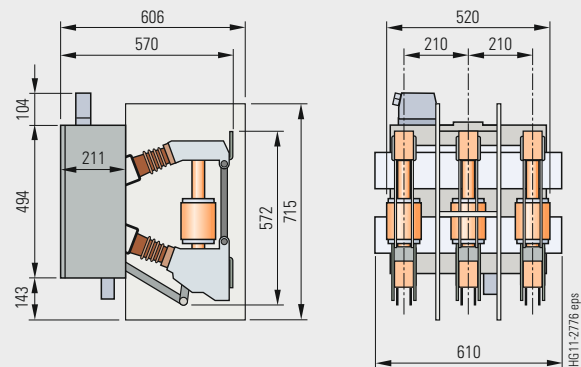
Dimension drawings for 12/15 kV



Dimension drawing 1



Dimension drawing 2



Dimension drawing 3

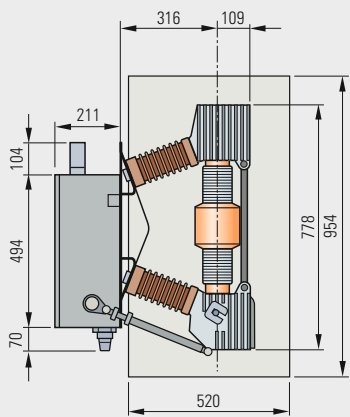


Order No.	24 kV 50/60 Hz																				
	Rated normal current	Pole-centre distance	Rated operating sequence: O - 3 min - CO - 3 min - CO O - 0.3 s - CO - 3 min - CO O - 0.3 s - CO - 15 s - CO			Rated duration of short-circuit	Rated short-circuit breaking current	DC component in % of the rated short-circuit 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 28 and 29)
	$I_r$	mm	$t_k$	$I_{sc}$	%	kA	$I_{ma}$	$U_p$	$U_d$	mV	mm	mm	mm	mm	kg						
3AH4 254-2 ...	1250	210	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	25	36	28	63/65	125	50	2.5	200	230	310	175	112	S_325 00905	3	8
3AH4 254-4 ...	2500	210	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	25	36	28	63/65	125	50	2.5	200	230	320	150	131	S_325 00906	3	6
3AH4 264-2 ...	1250	275	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	25	36	28	63/65	125	50	2.5	200	230	348	170	112	S_325 00907	3	9
3AH4 264-4 ...	2000	275	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	25	36	28	63/65	125	50	2.5	200	230	265	150	133	S_325 00908	3	7
3AH4 266-6 ...	2500	275	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	40	36	44.9	100/104	125	50	2.0	360	226	188	210	135	S_325 00007	5	4

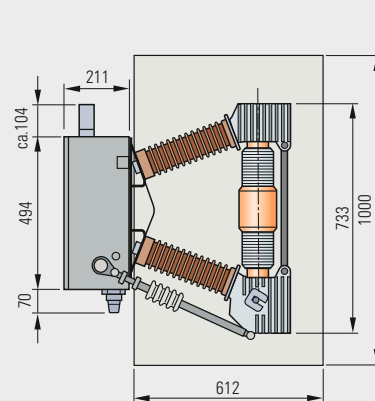
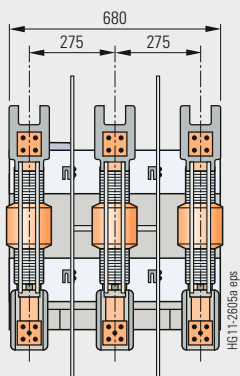
Order No.	36 kV 50/60 Hz																				
	$I_r$	mm	$t_k$	$I_{sc}$	%	kA	$I_{ma}$	$U_p$	$U_d$	mV	mm	mm	mm	mm	kg						
	A	mm	s	kA	%	kA	kA	kV	kV	mV	mm	mm	mm	mm	kg						
3AH4 305-2 ...	1250	350	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	31.5	36	35.4	80/82	170	70	2.3	360	330	314	260	170	S_325 00008	4	5
3AH4 305-4 ...	2000	350	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	31.5	36	35.4	80/82	170	70	2.3	360	330	314	260	175	S_325 00008	4	5
3AH4 305-6 ...	2500	350	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	31.5	36	35.4	80/82	170	70	2.3	360	330	314	260	175	S_325 00009	4	5
3AH4 305-7 ...	3150	350	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	31.5	36	35.4	80/82	170	70	1.9	366	430	309	270	350	S_325 00011	4	10
3AH4 305-8 ...	4000	350	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	31.5	36	35.4	80/82	170	70	1.9	366	430	309	270	350	S_325 00011	4	10
3AH4 306-6 ...	2500	350	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	40	36	44.9	100/104	170	70	2.3	360	330	314	260	175	S_325 00009	5	5
3AH4 306-7 ...	3150	350	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	40	36	44.9	100/104	170	70	1.9	366	430	309	270	350	S_325 00059	5	10
3AH4 306-8 ...	4000	350	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3	40	36	44.9	100/104	170	70	1.9	366	430	309	270	350	S_325 00059	5	10

- Standard information on the rating plate
- Possible with order number suffix Z and order code F27
- Possible with order number suffix Z and order code F28

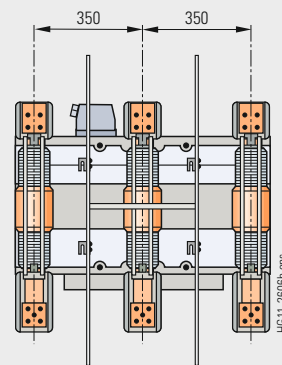
Dimension drawings for 24/36 kV



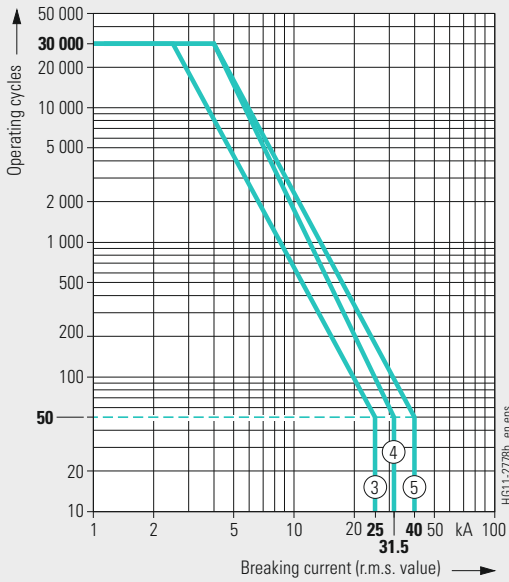
Dimension drawing 4



Dimension drawing 5

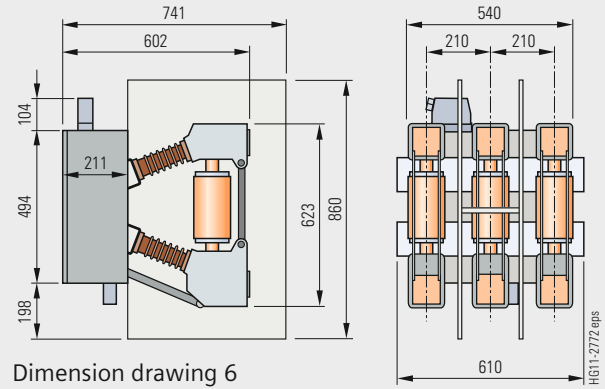


Operating cycle diagram for 24/36 kV

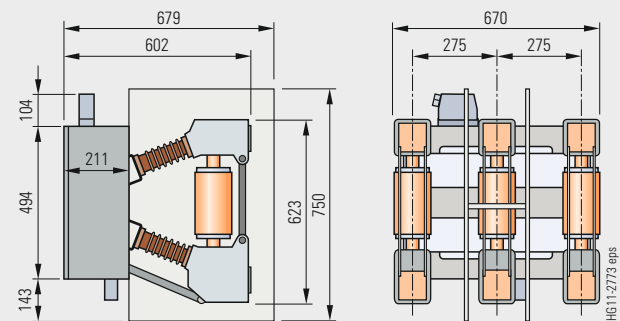


The permissible number of electrical operating cycles is shown as a function of the breaking current (r.m.s. value). All vacuum circuit-breakers fulfil the endurance classes E2, M2 and C2 according to IEC 62271-100. The curve shape beyond the parameters defined in IEC 62271-100 is based on average experience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

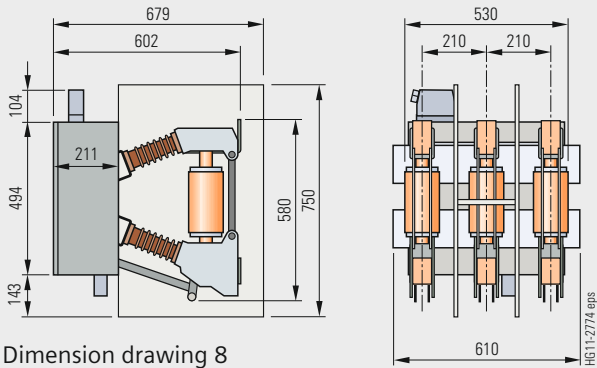
Dimension drawings for 24/36 kV



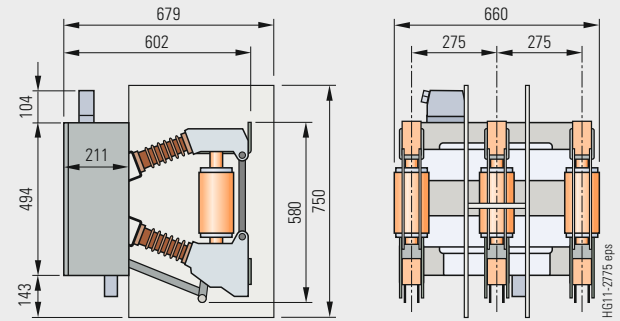
Dimension drawing 6



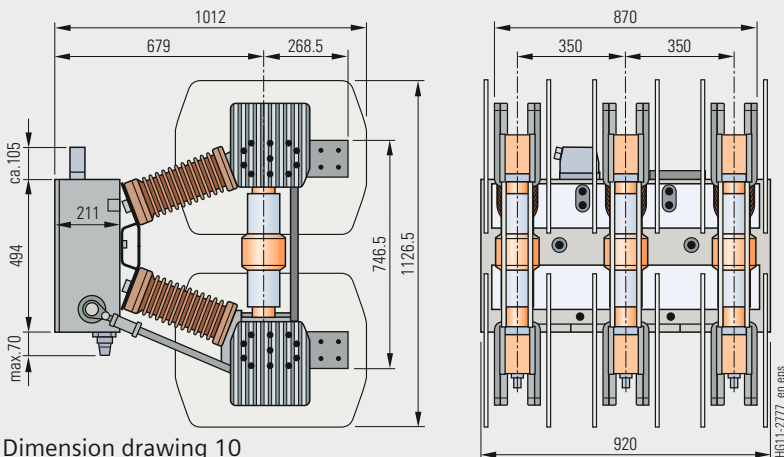
Dimension drawing 7



Dimension drawing 8



Dimension drawing 9

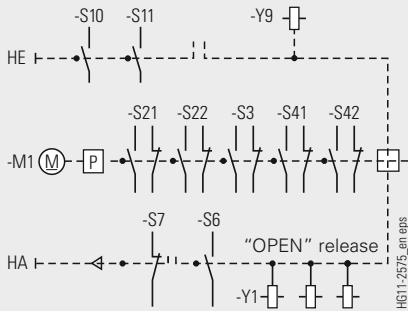


Dimension drawing 10

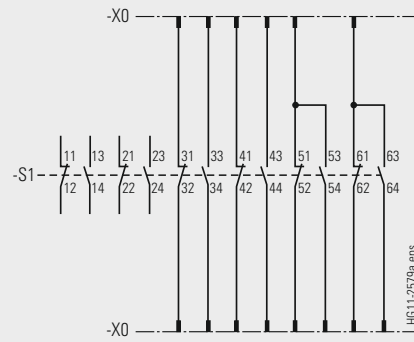


### Circuit diagrams

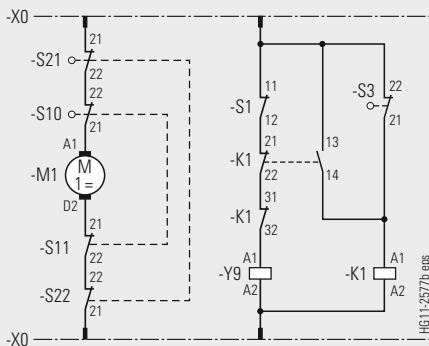
The circuit diagrams shown here are examples from the manifold possibilities of circuit-breaker wiring.



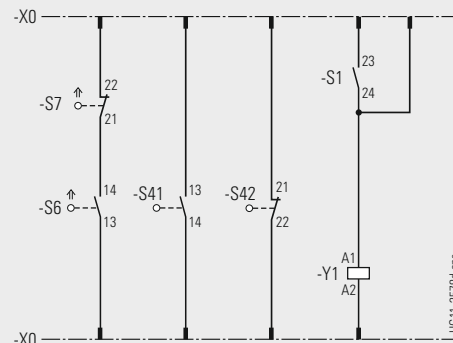
Manual closing – manual opening with auxiliary switch 6 NO + 6 NC



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



Motor operating mechanism with manual mechanical closing



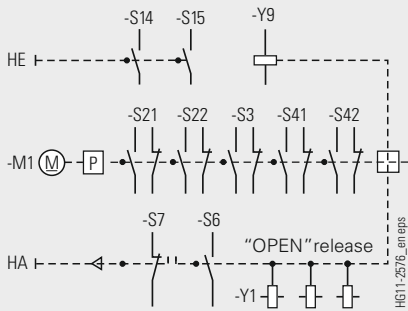
Circuit-breaker tripping signal      Signal "closing spring charged"      1st shunt release

3

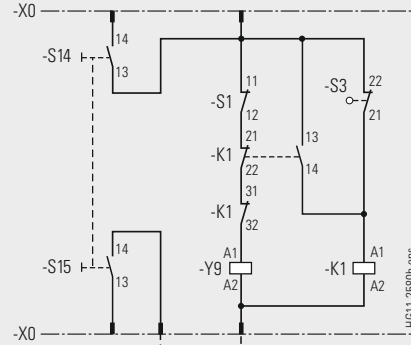
### Legend (also for page 31)

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

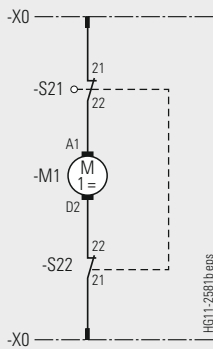
**Additional equipment: Motor operating mechanism and auxiliary switch**



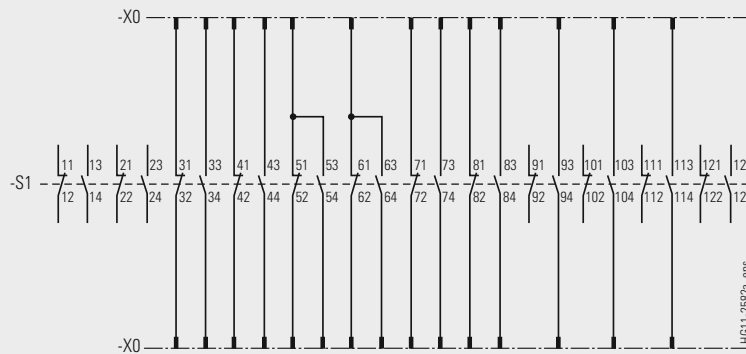
Motor operating mechanism with manual electrical closing



Manual electrical closing  
Closing and anti-pumping

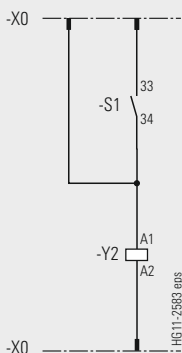


Motor operating mechanism

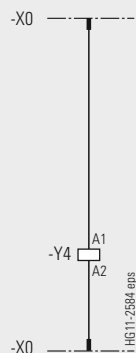


Contacts available for customer with basic circuit-breaker equipment  
Auxiliary switch -S1 (12 NO + 12 NC) instead of auxiliary switch 6 NO + 6 NC

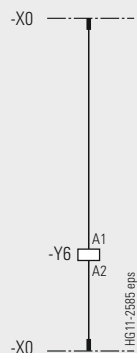
The available possible combinations are described in the chapter "Selection of secondary equipment".



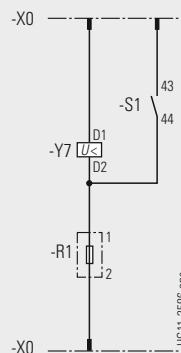
2<sup>nd</sup> shunt release



C.t.-operated release 0.5 A or 1 A



Low-energy c.t.-operated release 0.1 Ws



Undervoltage release

Legend see page 30

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

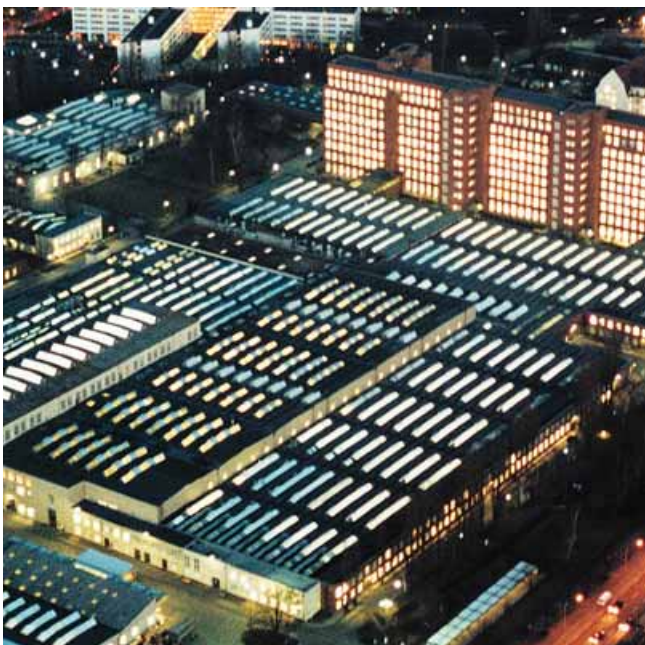
Release	Power consumption		Tripping ranges	
	Operation at		Tripping voltage at DC	Tripping voltage or tripping current at AC 50/60 Hz
	DC approx. W	AC 50/60 Hz approx. VA		
Closing solenoid 3AY15 10	140	140	85 to 110 % U	85 to 110 % U
1 <sup>st</sup> shunt release (without energy store) 3AY15 10	140	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 A 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.



R-HG11-181.tif

Brandenburg Gate, Berlin, Germany



R-HG11-180.eps

Switchgear Factory in Berlin, Germany

Contents	Page
<b>Annex</b>	<b>33</b>
Inquiry form	34
Configuration instructions	35
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)

**Inquiry concerning**

3AH4 circuit-breaker

**Please**

- Submit an offer
- Call us
- Visit us

**Your address**

\_\_\_\_\_  
Company

\_\_\_\_\_  
Dept.

\_\_\_\_\_  
Name

\_\_\_\_\_  
Street

\_\_\_\_\_  
Postal code/city

\_\_\_\_\_  
Phone

\_\_\_\_\_  
Fax

\_\_\_\_\_  
E-mail

**Siemens AG**

\_\_\_\_\_  
Dept.

\_\_\_\_\_  
Name

\_\_\_\_\_  
Street

\_\_\_\_\_  
Postal code/city

\_\_\_\_\_  
Fax

**Technical Data**

	Other values			
Rated voltage	<input type="checkbox"/> 12 kV <input type="checkbox"/> 24 kV	<input type="checkbox"/> 15 kV <input type="checkbox"/> 36 kV	<input type="checkbox"/> ___ kV	
Rated lightning impulse withstand voltage	<input type="checkbox"/> 125 kV <input type="checkbox"/> 195 kV	<input type="checkbox"/> 170 kV <input type="checkbox"/> 185 kV	<input type="checkbox"/> ___ kV	
Rated short-duration power-frequency withstand voltage	<input type="checkbox"/> 50 kV <input type="checkbox"/> 95 kV	<input type="checkbox"/> 70 kV	<input type="checkbox"/> 85 kV	<input type="checkbox"/> ___ kV
Rated short-circuit breaking current	<input type="checkbox"/> 25 kA	<input type="checkbox"/> 31.5 kA	<input type="checkbox"/> 40 kA	<input type="checkbox"/> ___ kA
Rated normal current	<input type="checkbox"/> 1250 A <input type="checkbox"/> 3150 A	<input type="checkbox"/> 2000 A <input type="checkbox"/> 4000 A	<input type="checkbox"/> 2500 A	<input type="checkbox"/> ___ A
Pole-centre distance	<input type="checkbox"/> 210 mm	<input type="checkbox"/> 275 mm	<input type="checkbox"/> 350 mm	

**Secondary equipment**

For possible combinations see pages 15 to 22

Circuit-breaker equipment	<input type="checkbox"/> Manual mechanical closing			
	<input type="checkbox"/> Manual electrical closing			
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**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Please check off                      \_\_\_ Please fill in





**You prefer to configure your 3AH4 vacuum circuit-breaker on your own?**  
Please follow the steps for configuration and enter the order number in the configuration aid.  
Alternatively you can also use our prompted online configurator under [www.siemens.com/energy](http://www.siemens.com/energy)

For configuration of your  
3AH4 vacuum circuit-breaker

### Instruction for configuration of the 3AH4 vacuum circuit-breaker

#### 1<sup>st</sup> step: Definition of the primary part (see page 13 and 14)

Please specify the following ratings:	Possible options:
Rated voltage ( $U_r$ )	$U_r$ : 24 kV to 36 kV
Rated lightning impulse withstand voltage ( $U_p$ )	$U_p$ : 125 kV to 195 kV
Rated short-duration power-frequency withstand voltage ( $U_d$ )	$U_d$ : 50 kV to 95 kV
Rated short-circuit breaking current ( $I_{sc}$ )	$I_{sc}$ : 31.5 kA to 40 kA
Rated normal current ( $I_r$ )	$I_r$ : 1250 A to 3150 A
Pole-centre distance	275 mm to 350 mm

These ratings define the positions 4 to 8 of the order number.

#### 2<sup>nd</sup> step: Definition of the secondary equipment (see pages 15 to 22)

Please specify the following equipment features:	Possible options:
Release combination (position 9)	Shunt release, current-transformer operated release and undervoltage release
Closing solenoid (position 10)	Operating voltages from 24 V DC to 240 V AC
Operating voltage of the releases (positions 11/12)	Operating voltages from 24 V DC to 240 V AC
Type of local closing (position 10)	Mechanical closing, manual electrical closing
Operating voltage of the motor (position 14)	Motor operating stored-energy mechanism with operating voltages from 24 V DC to 240 V AC
Number of auxiliary contacts (position 15)	6 NO + 6 NC, 12 NO + 12 NC
Design of the secondary connection (position 15)	24-pole terminal strip, 24-pole plug connector, 64-pole plug connector
Language of the documentation (position 16)	English, German, French, Spanish, other languages on request
Frequency of the operating voltage of the secondary equipment at AC (position 16)	50 Hz/60 Hz

These equipment features define the positions 9 to 16 of the order number.

#### 3<sup>rd</sup> step: Do you have any further requirements concerning the equipment? (Please refer to page 22)

Should you still need more options than the possible special equipment like halogen-free and flame-retardant or silicone-free version, condensation protection or an additional rating plate, etc., please contact your responsible sales partner.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
3	A	H	4												Z
3	A	H	4												
3	A	H	4												
3	A	H	4												
3	A	H	4												
3	A	H	4												
3	A	H	4												
3	A	H	4												



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Power Distribution Division  
Medium Voltage  
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13623 Berlin, Germany

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Customer Support Center.  
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Fax: +49 180 524 24 71  
(Charges depending on provider)  
E-mail: support.energy@siemens.com

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