



## 3AH5 Vacuum Circuit-Breakers

Medium-Voltage Equipment  
Selection and Ordering Data

Catalog HG 11.05 · 2010

Answers for energy.

**SIEMENS**



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# 3AH5 Vacuum Circuit-Breakers

## Medium-Voltage Equipment Catalog HG 11.05 · 2010

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Catalog HG 11.05 · 2008 (PDF version only)

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Industrial application: Refinery

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## 3AH5 standard circuit-breaker from 12 to 36 kV – The Economical

1

3AH5 vacuum circuit-breakers control all switching duties in medium-voltage systems. They are applicable for operation of e.g. overhead lines, cables, transformers, genera-

tors, capacitors, filter circuits, motors and reactors. Here, small short-circuit ratings in distribution systems face high breaking currents in industrial systems.

3AH5 – the universal circuit-breaker in the product range



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F-HG11-185.jpg

The 3AH5 vacuum circuit-breaker is a real all-round device in its field of application. With its compact dimensions, it fits in all customary switchgear types. The comprehensive variety of types with different normal currents and short-circuit cur-

rents as well as various pole-centre distances for voltage levels from 12 kV to 36 kV enables its universal application for all medium-voltage requirements.

The 3AH5 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.

### Pole assemblies

The pole assemblies consist of the vacuum interrupters (5) 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 rigidly fixed to the upper interrupter support (6). The lower part of the interrupter is guided in the lower interrupter support (7), allowing axial movement. The braces (8) 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

For circuit-breaker operation, both spring-operated and stored-energy mechanisms are available. With manual spring-operated mechanisms, the closing process takes place automatically after manual charging of the closing spring. The opening or contact springs are charged simultaneously during the closing operation, which means that a stored-energy mechanism is available for the opening operation.

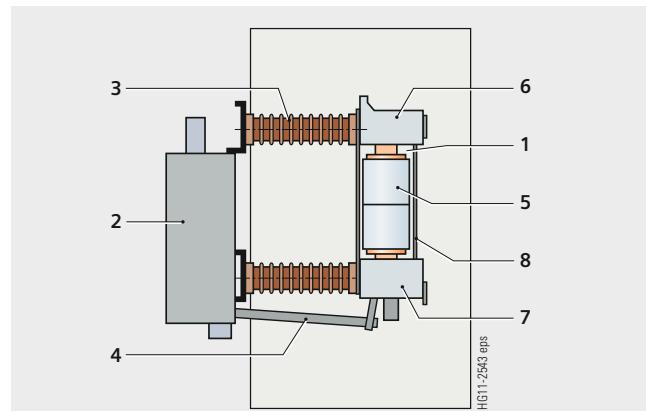
With motor or manual operating stored-energy mechanisms, the closing spring is either charged electrically or manually. It latches tight at the end of the charging process and serves as an energy store.

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.

### Trip-free mechanism

3AH5 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.

1



Circuit-breaker structure

- |                           |                             |
|---------------------------|-----------------------------|
| 1 Pole assembly           | 5 Vacuum interrupter        |
| 2 Operating mechanism box | 6 Upper interrupter support |
| 3 Post insulator          | 7 Lower interrupter support |
| 4 Operating rod           | 8 Brace                     |



Front view



Open operating mechanism box

**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 another release to be selected at will. 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 of the stored-energy mechanisms, 3AH5 vacuum circuit-breakers can be remote-closed electrically. They can also be closed locally by mechanical unlatching of the closing spring via pushbutton. With spring-operated mechanisms, closing obligatory takes place after the charging process.

An electrical closing lock-out prevents unpermissible closing of the circuit-breaker. The closing lock-out releases the operation of the circuit-breaker when auxiliary voltage is available, and blocks both local manual closing and remote electrical closing mechanically when there is no auxiliary voltage available.

The operating voltage of the electrical closing lock-out is the same as that of the closing solenoid. 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.

**Interlocking**Mechanical interlocking for stored-energy mechanisms

To interlock circuit-breaker trucks, withdrawable parts or disconnectors according to the switch position, the stored-energy mechanisms of 3AH5 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.

Electrical interlocking

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

**Standards**

3AH5 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 Part 100 and VDE 0670 Part 1000)

All 3AH5 vacuum circuit-breakers fulfil the endurance classes E2, M2 and C2 according to IEC 62271-100.

**Maintenance-free design**

The 3AH5 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. 3AH5 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 800 A

Characteristics curve 2 = Rated normal current 1250 A

Characteristics curve 3 = Rated normal current 2000 A

Characteristics curve 4 = Rated normal current 2500 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

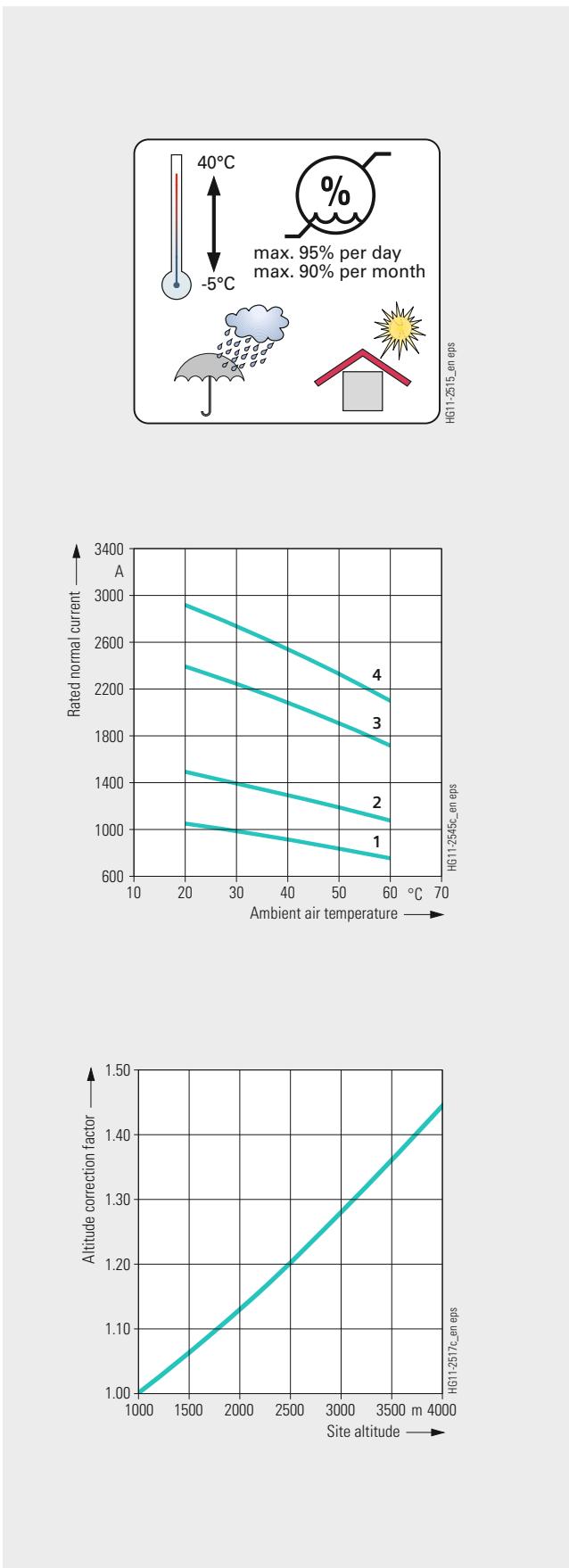
$U_0$  Rated withstand voltage requested for the place of installation

$K_a$  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:

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



## Description

Product range overview and basic equipment

3AH5 Vacuum Circuit-Breakers

1

### Product range overview

Rated voltage kV	Rated short- circuit breaking current kA	Rated normal current (A)											
		800				1250				2000			
Pole-centre distance (in mm)													
		160	210	275	160	210	275	350	210	275	350	210	275
12	13.1	■		■									
	16	■		■		■							
	20	■		■		■							
	25	■		■		■							
	31.5					■				■			
17.5	25	■		■		■							
	31.5					■				■			
24	16			■		■		■					
	20					■		■		■			
	25					■		■		■			
36	16						■		■				
	25						■		■		■		

■ Available design

### Basic equipment

In the basic version, the 3AH5 is equipped with a manual spring-operated mechanism. The following overview shows the alternatively selectable or additional equipment, as well as the possibility of designing the switching device with stored-energy mechanisms.

#### Equipment features for the different types of operating mechanisms

Type of operating mechanism	Closing solenoid	Electrical closing lock-out <sup>3)</sup>	1 <sup>st</sup> shunt release	2 <sup>nd</sup> release	Counter	Circuit-breaker tripping signal	Auxiliary switch 2 NO + 2 NC	Auxiliary switch 6 NO + 6 NC	Auxiliary switch 12 NO + 12 NC	Without terminal strip	24-pole terminal strip	24-pole plug connection	64-pole plug connection	Mechanical interlocking
Manual spring-operated mechanism <sup>1)</sup>	-	-	■	○	■	○	×	×	-	×	×	×	-	○
Manual operating stored-energy mechanism <sup>1)</sup>	○	○	■	○	■	○	×	×	-	×	×	×	-	○
Motor operating stored-energy mechanism <sup>2)</sup>	■	○	■	○	■	○	-	×	× <sup>4)</sup>	-	×	×	×	○

■ Basic equipment

✗ Optionally selectable basic equipment

○ Selectable additional equipment

- Not available

1) With manual operating mechanism, always with hand crank

2) With anti-pumping device

3) From pole-centre distance ≥ 210 mm

4) Only with 64-pole plug



3AH5 135-6 vacuum circuit-breaker



3AH5 204-1 vacuum circuit-breaker

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### Order number structure

The 3AH5 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.

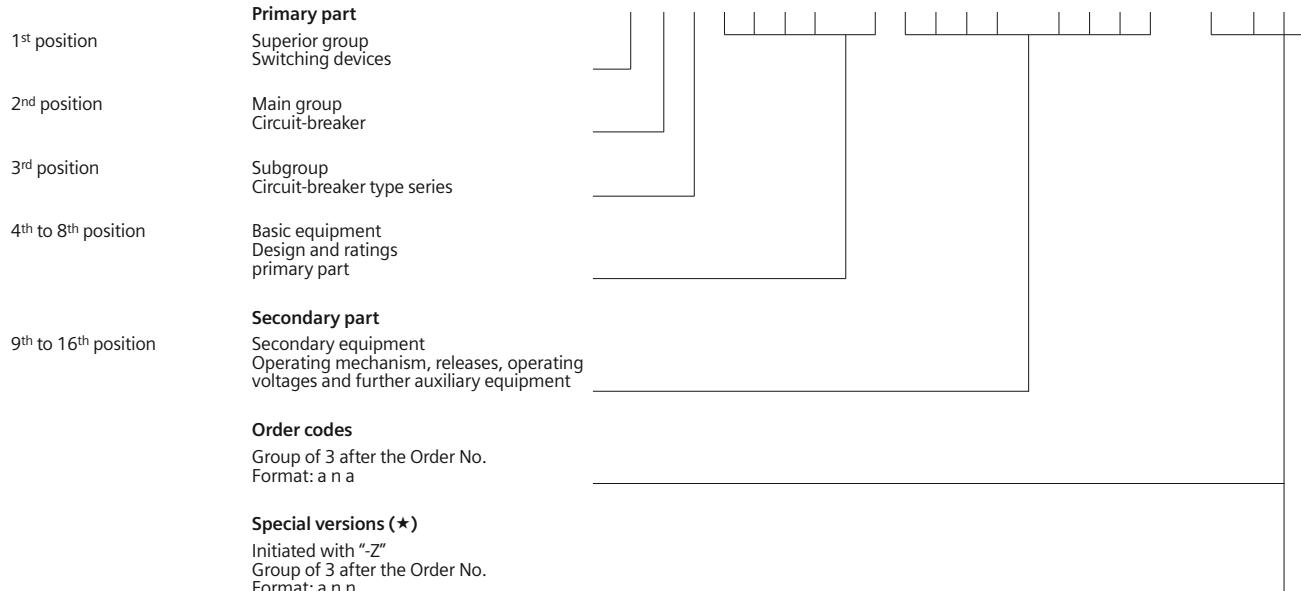
#### Order codes

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 20) 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.*

Example for Order No.:

Order codes:





12 kV

50/60 Hz

2

17.5 kV

50/60 Hz

$U_r$	$U_p$	$U_d$	$I_{sc}$	$I_{ma}$		$I_r$															
kV	kV	kV	kA	kA	mm	A															
17.5	95	38	25	63/65	160	800	3	A	H	5	2	0	4	-	1						
						1250	3	A	H	5	2	0	4	-	2						
					210	800	3	A	H	5	2	1	4	-	1						
						1250	3	A	H	5	2	1	4	-	2						
						2500	3	A	H	5	2	1	4	-	6						
			31.5	80/82	160	1250	3	A	H	5	2	0	5	-	2						
					210	1250	3	A	H	5	2	1	5	-	2						
						2000	3	A	H	5	2	1	5	-	4						
						2500	3	A	H	5	2	1	5	-	6						
Special version $U_r = 42$ kV (available for all 17.5 kV circuit-breakers)																	-	Z	E	1	3

**Special version**  $U_d = 42 \text{ kV}$  (available for all 17.5 kV circuit-breakers)

## Configuration example

## 3AH5 vacuum circuit-breaker

Rated voltage  $U_r = 17.5 \text{ kV}$

Rated short-circuit breaking current  $I_{sc} = 25 \text{ kA}$

Rated normal current  $I_r = 2500 \text{ A}$

Pole-centre distance = 210 mm

Special version  $U_d = 42$  kV

Example for Order No :

Order codes:

## Equipment Selection

## 3AH5 Vacuum Circuit-Breakers

## Selection of basic types, circuit-breakers



24 kV

50/60 Hz

36 kV

50/60 Hz

$U_r$	$U_p$	$U_d$	$I_{sc}$	$I_{ma}$		$I_r$														
kV	kV	kV	kA	kA	mm	A														
36	170	70	16	40/42	275	1250	3	A	H	5	3	2	2	-	2					
					350	1250	3	A	H	5	3	1	2	-	2					
			25	63/65	275	1250	3	A	H	5	3	2	4	-	2					
					350	1250	3	A	H	5	3	1	4	-	2					
						2000	3	A	H	5	3	1	4	-	4					

## Configuration example

#### 3AH5 vacuum circuit-breaker

Rated voltage  $U_r = 36 \text{ kV}$

Rated short-circuit breaking current  $I_{sc} = 25 \text{ kA}$

Rated short circuit breaking current

Rated normal current  $I_n = 2000 \text{ A}$

Pole-centre distance = 350 mm

Pole-centre distance = 350 mm

3 A H 5

3 1 4 - 4

**Example for Order No.:**

#### Order codes:

14 Siemens HG 11.05 · 2010



## 9<sup>th</sup> position

## Release combination

2

## Configuration example

## Configuration example

( $U_{\text{L}} = 36 \text{ kV}$ ,  $I_{\text{L}} = 25 \text{ kA}$ ,  $I_{\text{C}} = 2000 \text{ A}$ , pole-centre distance = 350 mm)

1<sup>st</sup> shunt release: c.t.-operated release

1st-shunt release; c.t.-operated release with a rated normal current of 1.0 A

# Equipment Selection

Selection of secondary equipment

3AH5 Vacuum Circuit-Breakers



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

### Operating voltage of the closing solenoid

	Position: Order No.:	1	2	3	4	5	6	7	-	8	9	10	11	-	13	14	15	16	-	★	Order codes
	Standard voltages	Special voltages																			
To be observed for selection!																					
• Manual spring-operat. mechan. generally without closing solenoid	(A)																				
• Man. operat. stored-energy mechan. option. with closing solenoid (A – Z)																					
• Motor op. stored-energy mech. generally with closing solenoid (B – Z)																					
Without closing solenoid														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	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			

## 11<sup>th</sup> position

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

	Standard voltages	Special voltages																			
	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 19)

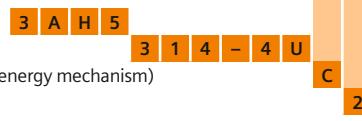
#### Configuration example

3AH5 vacuum circuit-breaker

( $U_r = 36 \text{ kV}$ ,  $I_{sc} = 25 \text{ kA}$ ,  $I_r = 2000 \text{ A}$ , pole-centre distance = 350 mm)

Operating voltage of the closing solenoid **48 V DC** (manual operating stored-energy mechanism)

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



Example for Order No.: 3 A H 5 3 1 4 - 4 U C 2 ■ - ■ ■ ■ ■ - Z  
Order codes: A 4 6



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

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

Operating voltage of the 2 <sup>nd</sup> release		Order No.:	Position:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Order codes
Standard voltages	Special voltages		3	A	H	5	–	–	–	–	–	–	–	–	–	–	–	–	★	
Without, or c.t.-operated release																See page 18	See page 18	See page 19	See page 19	See page 20
24 V DC																0	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 version</b>																				
To operate the 2 <sup>nd</sup> release as an undervoltage release on an energy store type AN1902- (for DC) or AN1901-2 (for AC), both made by 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.																				

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 19)

## Configuration example

#### **3AH5 vacuum circuit-breaker**

( $U_r = 36 \text{ kV}$ ,  $I_{cc} = 25 \text{ kA}$ ,  $I_r = 2000 \text{ A}$ , pole-centre distance = 350 mm)

2<sup>nd</sup> release as c.t.-operated release with a rated normal current of 1.0 A

Example for Order No.:  
Order codes:

3 A H 5  
3 1 4 - 4 U C 2

# Equipment Selection

Selection of secondary equipment

3AH5 Vacuum Circuit-Breakers



## 13<sup>th</sup> position

### Counter and circuit-breaker tripping signal

Attention! The selection of the counter and the circuit-breaker tripping signal depends on the selection of the secondary connection.						Position: Order No.:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes
Counter	Circuit-breaker tripping signal	Without terminal strip/plug	24-pole terminal strip/plug	64-pole plug	Definition 15 <sup>th</sup> position (see page 19)																				
■	○				A, B															1	■				
■ 1)			○ <sup>1)</sup>		E, F, G and H															1	■				
■	■	○			E, F, G and H														2	■					
■ 1)	■ 1)			○ <sup>1)</sup>	J, K, L and M														5	■					

■ Equipment to be selected      ○ Dependent equipment

1) Equipment only possible in combination with motor operating stored-energy mechanism

2

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

### Operating voltage of the operating mechanism/ type of operating mechanism

Type of operating mechanism / standard voltages	Special voltages																						
Manual operat. stored-energy mech. (hand crank incl. in the scope of supply)																							A
Manual spring-operated mechan. (hand crank incl. in the scope of supply)																							X
Motor operating stored-energy mechan. (selection of an operating voltage)																							B
24 V DC																							C
48 V DC																							D
60 V DC																							E
110 V DC																							F
220 V DC																							G
100 V AC 50/60 Hz <sup>2)</sup>																							H
110 V AC 50/60 Hz <sup>2)</sup>																							J
230 V AC 50/60 Hz <sup>2)</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>2)</sup>																							Z With order code P 1 K
125 V AC 50/60 Hz <sup>2)</sup>																							Z With order code P 1 L
240 V AC 50/60 Hz <sup>2)</sup>																							Z With order code P 1 M

2) 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 19)

## Configuration example

3AH5 vacuum circuit-breaker

( $U_t = 36 \text{ kV}$ ,  $I_{sc} = 25 \text{ kA}$ ,  $I_f = 2000 \text{ A}$ , pole-centre distance = 350 mm)

With counter and circuit-breaker tripping signal

Manual operating stored-energy mechanism

3 A H 5  
3 1 4 - 4 U C 2 0 - 2 A ■ ■ - Z  
A 4 6

Example for Order No.:  
Order codes:



## Equipment Selection

Selection of additional equipment

3AH5 Vacuum Circuit-Breakers



### Additional equipment

Position: Order No.:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes
	3	A	H	5	■	■	■	-	■	■	■	■	■	-	■	■	■	■	
Options																			
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
With electrical closing lock-out <sup>1)</sup>																		-	Z A 4 7
Additional rating plate, loose delivery																		-	Z B 0 0
Routine test certificate enclosed																		-	Z F 2 0
Hand crank (also with motor operating mechanism) for manual charging of the closing spring																		-	Z F 3 0
Further, non-listed special versions (only after consultation with the order processing department of the Switchgear Factory Berlin). Information additionally in clear text.																		-	Z Y 9 9

- 1) The operating voltage of the closing lock-out is the same as that of the closing solenoid. The closing lock-out is not available for manual spring-operated mechanisms or manual operating stored-energy mechanisms without closing solenoid (10<sup>th</sup> position: A) and generally not for 3AH512, 3AH513, 3AH514, 3AH520.

2

### Configuration example

3AH5 vacuum circuit-breaker

3 A H 5

Rated voltage  $U_r = 36 \text{ kV}$

3 1 4 - 4

Rated short-circuit breaking current  $I_{sc} = 25 \text{ kA}$

- Z A 4 6

Rated normal current  $I_r = 2000 \text{ A}$

U C 2 0 - 2

Pole-centre distance = 350 mm

- Z F 2 0

1<sup>st</sup> shunt release, c.t.-operated release with a rated normal current of 1.0 A

0 - 2 A H 2 - Z

Operating voltage of the closing solenoid 48 V DC

- Z F 2 0

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

2 A H 2 - Z

2<sup>nd</sup> release as c.t.-operated release with a rated normal current of 1.0 A

- Z F 2 0

With counter and breaker tripping signal

2 A H 2 - Z

Manual operating stored-energy mechanism

- Z F 2 0

Auxiliary switch 6 NO + 6 NC, 24-pole plug and mechanical interlocking

2 A H 2 - Z

Frequency DC, operating instructions and rating plate in English

- Z F 2 0

Routine test certificate enclosed

Example for Order No.:

3 A H 5 3 1 4 - 4 U C 2 0 - 2 A H 2 - Z

Order codes:

A 4 6 + F 2 0

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

#### Remark for orders

The order numbers 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 parts

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

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

**Vacuum interrupters 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 3AH5 vacuum circuit-breakers:

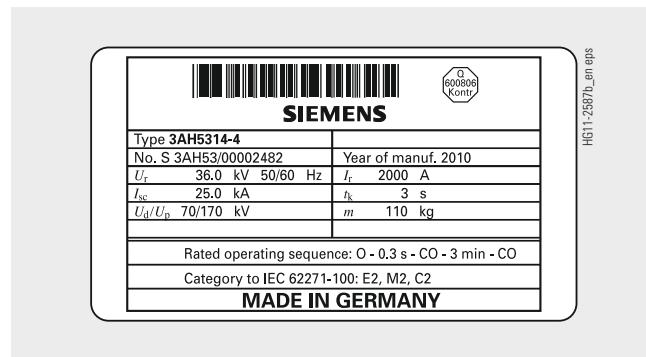
##### For 24-pole plug connector

- 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



2

#### Note:

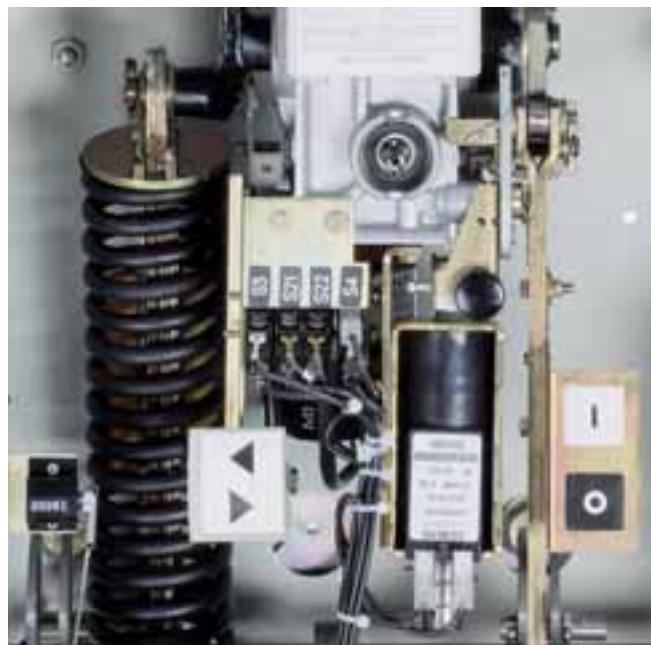
For any query regarding spare parts, subsequent deliveries, etc. the following three details are necessary:

- Type designation
- Serial No.
- Year of manufacture

Designation	Remarks	Order No.
Hand crank		3AX15 30-2B
Wire bundle	With 10 wires for auxiliary switch connection to	3AX11 34-2D
	– 64-pole plug connector	3AX11 34-2B
	– 24-pole plug connector	3AX11 34-2C
	– 24-pole terminal strip	
64-pole plug connector	Upper part of plug incl. sockets	3AX11 34-5A
	Lower part of plug incl. pins	3AX11 34-5B
	Complete plug connector	3AX11 34-6A
24-pole plug connector	Upper part of plug incl. socket insert	3AX11 34-5C
	Lower part of plug incl. pins	3AX11 34-5D
	Complete plug connector	3AX11 34-7A
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



R-HG11-2011eps



Motor operating mechanism with energy store and closing solenoid



Upper pole support with conductor bar connection

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## Technical Data

Electrical data, dimensions and weights

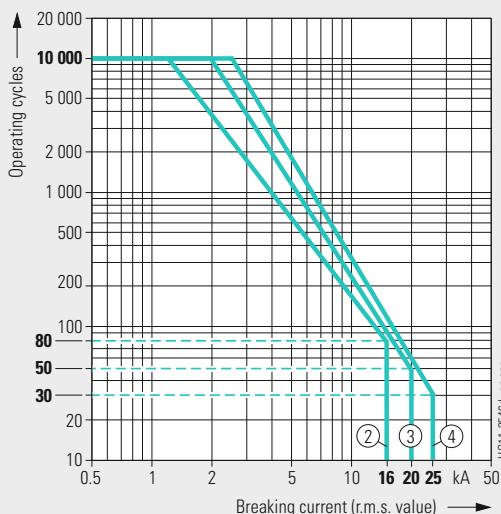
3AH5 Vacuum Circuit-Breakers

Order No.	Rated normal current		Pole-centre distance		Rated operating sequence:			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 (has to be ordered)			Operating cycle diagram no. (see page 25)			Catalog dimension drawing no. (see page 25)		
	$I_r$ A	mm							$t_k$ s	$I_{sc}$ kA	%	kA	$I_{ma}$ kA	$U_p$ kV	$U_d$ kV	mV	mm	mm	mm	mm	kg																															
3AH5 121-1 ...	800	160	□	■	○	3	13.1	36	14.7	33/ 34	75	28	6.0	90	135	88	95	35	S_441 00641	1	1.1																															
3AH5 122-1 ...	800	160	□	■	○	3	16	36	17.9	40/ 42	75	28	3.4	120	135	71	95	40	S_441 00643	2	1.3																															
3AH5 122-2 ...	1250	160	□	■	○	3	16	36	17.9	40/ 42	75	28	3.4	120	135	71	95	40	S_441 00643	2	1.3																															
3AH5 123-1 ...	800	160	□	■	○	3	20	36	22.4	50/ 52	75	28	3.4	120	135	71	95	40	S_441 00643	3	1.3																															
3AH5 123-2 ...	1250	160	□	■	○	3	20	36	22.4	50/ 52	75	28	3.4	120	135	71	95	40	S_441 00643	3	1.3																															
3AH5 125-2 ...	1250	160	□	■	○	3	31.5	36	35.4	80/ 82	75	28	3.0	129	135	60	95	40	S_441 00651	5	1.5																															
3AH5 131-1 ...	800	210	□	■	○	3	13.1	36	14.7	33/ 34	75	28	6.0	90	135	138	95	35	S_441 00642	1	1.2																															
3AH5 132-1 ...	800	210	□	■	○	3	16	36	17.9	40/ 42	75	28	3.4	120	135	121	95	40	S_441 00644	2	1.4																															
3AH5 132-2 ...	1250	210	□	■	○	3	16	36	17.9	40/ 42	75	28	3.4	120	135	121	95	40	S_441 00644	2	1.4																															
3AH5 133-1 ...	800	210	□	■	○	3	20	36	22.4	50/ 52	75	28	3.4	120	135	121	95	40	S_441 00644	3	1.4																															
3AH5 133-2 ...	1250	210	□	■	○	3	20	36	22.4	50/ 52	75	28	3.4	120	135	121	95	40	S_441 00644	3	1.4																															
3AH5 133-4 ...	2000	210	□	■	○	3	20	36	22.4	50/ 52	75	28	1.8	129	135	91	95	55	S_441 00646	3	1.6																															
3AH5 134-4 ...	2000	210	□	■	○	3	25	36	28	63/ 65	75	28	1.8	129	135	91	95	55	S_441 00646	4	1.6																															
3AH5 134-6 ...	2500	210	□	■	○	3	25	36	28	63/ 65	75	28	1.8	129	135	91	95	55	S_441 00646	4	1.6																															
3AH5 135-2 ...	1250	210	□	■	○	3	31.5	36	35.4	80/ 82	75	28	3.0	129	135	110	95	45	S_441 00645	5	1.7																															
3AH5 135-4 ...	2000	210	□	■	○	3	31.5	36	35.4	80/ 82	75	28	1.8	129	135	91	95	55	S_441 00646	5	1.6																															
3AH5 135-6 ...	2500	210	□	■	○	3	31.5	36	35.4	80/ 82	75	28	1.8	129	135	91	95	55	S_441 00646	5	1.6																															
3AH5 144-1 ...	800	160	□	■	○	3	25	36	28	63/ 65	75	28	3.8	90	135	75	95	40	S_441 01301	4	1.8																															
3AH5 144-2 ...	1250	160	□	■	○	3	25	36	28	63/ 65	75	28	3.8	90	135	75	95	40	S_441 01301	4	1.8																															
3AH5 154-1 ...	800	210	□	■	○	3	25	36	28	63/ 65	75	28	3.8	90	135	125	95	45	S_441 01302	4	1.9																															
3AH5 154-2 ...	1250	210	□	■	○	3	25	36	28	63/ 65	75	28	3.8	90	135	125	95	45	S_441 01302	4	1.9																															

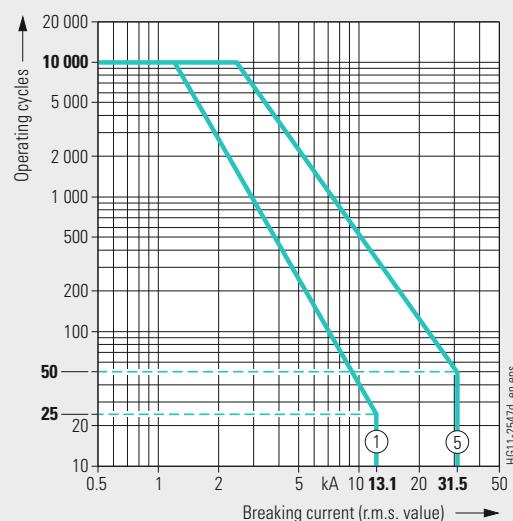
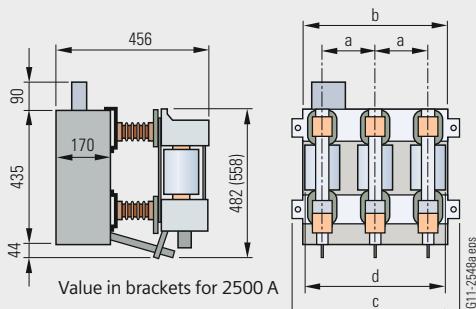
■ Standard information on the rating plate

□ Possible with order number suffix Z and order code F27, or standard for manual operating mechanism (14<sup>th</sup> position A or X)

○ Possible with order number suffix Z and order code F28

**Operating cycle diagrams for 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 drawing for 12 kV**


Dimension drawing	a mm	b mm	c mm	d mm
1.1	160	432	490	392
1.2	210	534	592	492
1.3	160	432	490	409
1.4	210	534	592	509
1.5	160	432	490	422
1.6	210	534	592	539
1.7	210	534	592	522
1.8	160	432	490	405
1.9	210	534	592	505

**a** = Pole-centre distance

**b** = Width of cross member

**c** = Width of cross member incl. lugs

**d** = Largest energized width

## Technical Data

Electrical data, dimensions and weights

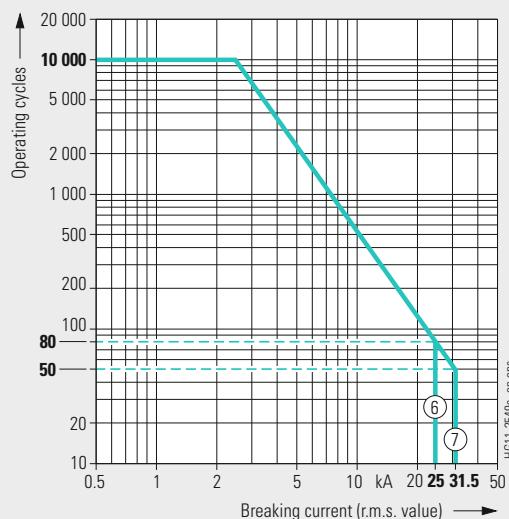
3AH5 Vacuum Circuit-Breakers

Order No.	Rated normal current		Pole-centre distance		Rated operating sequence:		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 (has to be ordered)		Operating cycle diagram no. (see page 27)		Catalog dimension drawing no. (see page 27)	
	$I_r$ A	mm					$t_k$ s	$I_{sc}$ kA	%	kA	$I_{ma}$ kA	$U_p$ kV	$U_d$ kV	mV	mm	mm	mm	mm	mm	kg																
3AH5 204-1...	800	160	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	3	25	36	28	63/ 65	95	38	3.4	129	170	176	130	40	S_441 00705	6	2.1															
3AH5 204-2...	1250	160	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	3	25	36	28	63/ 65	95	38	3.4	129	170	176	130	40	S_441 00705	6	2.1															
3AH5 205-2...	1250	160	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	3	31.5	36	35.4	80/ 82	95	38	2.7	129	170	140	130	40	S_441 00652	7	2.1															
3AH5 214-1...	800	210	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	3	25	36	28	63/ 65	95	38	3.4	129	170	108	130	45	S_441 00706	6	2.2															
3AH5 214-2...	1250	210	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	3	25	36	28	63/ 65	95	38	3.4	129	170	108	130	45	S_441 00706	6	2.2															
3AH5 214-6...	2500	210	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	3	25	36	28	63/ 65	95	38	1.6	129	170	163	130	55	S_441 00649	6	2.3															
3AH5 215-2...	1250	210	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	3	31.5	36	35.4	80/ 82	95	38	2.7	129	170	108	130	45	S_441 00648	7	2.2															
3AH5 215-4...	2000	210	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	3	31.5	36	35.4	80/ 82	95	38	1.6	129	170	163	130	55	S_441 00649	7	2.3															
3AH5 215-6...	2500	210	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="radio"/>	3	31.5	36	35.4	80/ 82	95	38	1.6	129	170	163	130	55	S_441 00649	7	2.3															

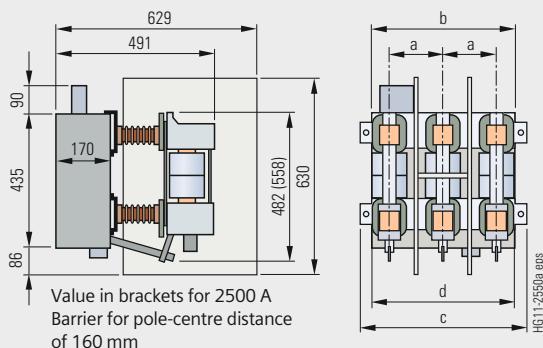
■ Standard information on the rating plate

□ Possible with order number suffix Z and order code F27, or standard for manual operating mechanism (14<sup>th</sup> position A or X)

○ Possible with order number suffix Z and order code F28

**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 drawing for 17.5 kV**


Dimension drawing	a mm	b mm	c mm	d mm
2.1	160	432	490	422
2.2	210	534	592	522
2.3	210	534	592	534

**a** = Pole-centre distance

**b** = Width of cross member

**c** = Width of cross member incl. lugs

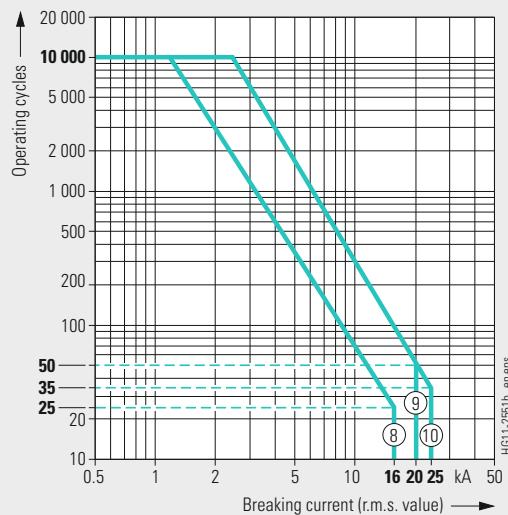
**d** = Largest energized width

Order No.	Rated normal current		Pole-centre distance		Rated operating sequence:			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 (has to be ordered)			Operating cycle diagram no. (see page 29)			Catalog dimension drawing no. (see page 29)		
	$I_r$ A	mm							$t_k$ s	$I_{sc}$ kA	%	kA	$I_{ma}$ kA	$U_p$ kV	$U_d$ kV	mV	mm	mm	mm	mm	kg																															
3AH5 272-1...	800	210	□	■	○	3	16	36	17.9	40/ 42	125	50	3.8	200	190	215	175	55	S_441 00660	8	3.1																															
3AH5 272-2...	1250	210	□	■	○	3	16	36	17.9	40/ 42	125	50	3.8	200	190	215	175	55	S_441 00660	8	3.1																															
3AH5 273-2...	1250	210	□	■	○	3	20	36	22.4	50/ 52	125	50	3.8	200	190	215	175	55	S_441 00662	9	3.2																															
3AH5 273-4...	2000	210	□	■	○	3	20	36	22.4	50/ 52	125	50	2.2	200	190	227	175	80	S_441 00663	9	3.3																															
3AH5 273-6...	2500	210	□	■	○	3	20	36	22.4	50/ 52	125	50	2.2	200	190	227	175	80	S_441 00663	9	3.3																															
3AH5 274-2...	1250	210	□	■	○	3	25	36	28	63/ 65	125	50	3.8	200	190	260	175	55	S_441 00662	10	3.2																															
3AH5 274-6...	2500	210	□	■	○	3	25	36	28	63/ 65	125	50	2.2	200	190	227	175	80	S_441 00663	10	3.3																															
3AH5 282-1...	800	275	□	■	○	3	16	36	17.9	40/ 42	125	50	3.8	200	190	180	175	55	S_441 00661	8	3.4																															
3AH5 282-2...	1250	275	□	■	○	3	16	36	17.9	40/ 42	125	50	3.8	200	190	180	175	55	S_441 00661	8	3.4																															
3AH5 283-2...	1250	275	□	■	○	3	20	36	22.4	50/ 52	125	50	3.8	200	190	165	175	55	S_441 00664	9	3.5																															
3AH5 283-4...	2000	275	□	■	○	3	20	36	22.4	50/ 52	125	50	2.2	200	190	135	175	80	S_441 00668	9	3.6																															
3AH5 283-6...	2500	275	□	■	○	3	20	36	22.4	50/ 52	125	50	2.2	200	190	135	175	80	S_441 00668	9	3.6																															
3AH5 284-2...	1250	275	□	■	○	3	25	36	28	63/ 65	125	50	3.8	200	190	165	175	55	S_441 00664	10	3.5																															
3AH5 284-6...	2500	275	□	■	○	3	25	36	28	63/ 65	125	50	2.2	200	190	135	175	80	S_441 00668	10	3.6																															

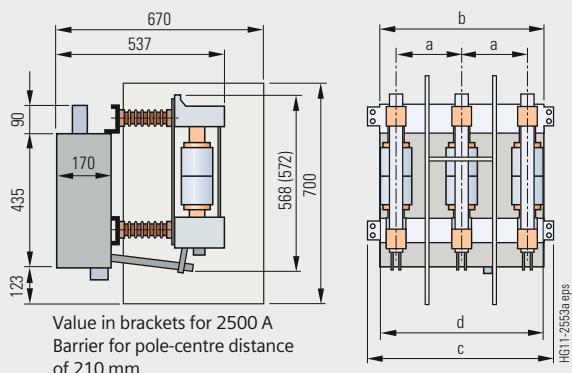
■ Standard information on the rating plate

□ Possible with order number suffix Z and order code F27, or standard for manual operating mechanism (14<sup>th</sup> position A or X)

○ Possible with order number suffix Z and order code F28

**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 drawing for 24 kV**


Dimension drawing	a mm	b mm	c mm	d mm
3.1	210	534	592	516
3.2	210	534	592	530
3.3	210	534	592	541
3.4	275	650	708	645
3.5	275	650	708	660
3.6	275	650	708	690

- a** = Pole-centre distance  
**b** = Width of cross member  
**c** = Width of cross member incl. lugs  
**d** = Largest energized width

## Technical Data

Electrical data, dimensions and weights

3AH5 Vacuum Circuit-Breakers

Order No.	Rated normal current		Pole-centre distance		Rated operating sequence:		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 (has to be ordered)		Operating cycle diagram no. (see below)		Catalog dimension drawing no. (see below)	
	I <sub>r</sub>	A	mm	mm	t <sub>k</sub>	s	I <sub>sc</sub>	kA	%	kA	I <sub>ma</sub>	kA	U <sub>p</sub>	kV	U <sub>d</sub>	kV	mV	mm	mm	mm	mm	mm	mm	kg	kg	kg	kg	kg	kg									
3AH5 312-2...	1250	350	□ ■ ○	3	16	36	28	40/ 42	170	70	3.0	240	310	256	300	85	S_441 00910	11	4.2																			
3AH5 314-2...	1250	350	□ ■ ○	3	25	36	28	63/ 65	170	70	3.0	240	310	256	300	85	S_441 00910	12	4.2																			
3AH5 314-4...	2000	350	□ ■ ○	3	25	36	28	63/ 65	170	70	2.5	240	310	256	300	110	S_441 00676	12	4.2																			
3AH5 322-2...	1250	275	□ ■ ○	3	16	36	28	40/ 42	170	70	3.0	240	310	256	300	75	S_441 00990	11	4.1																			
3AH5 324-2...	1250	275	□ ■ ○	3	25	36	28	63/ 65	170	70	3.0	240	310	256	300	75	S_441 00990	12	4.1																			

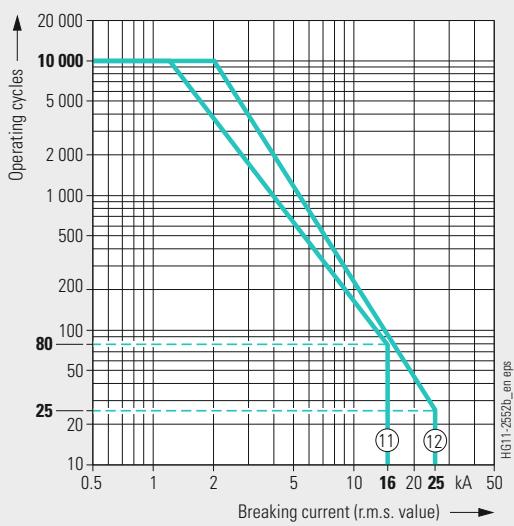
■ Standard information on the rating plate

□ Possible with order number suffix Z and order code F27, or standard for manual operating mechanism (14<sup>th</sup> position A or X)

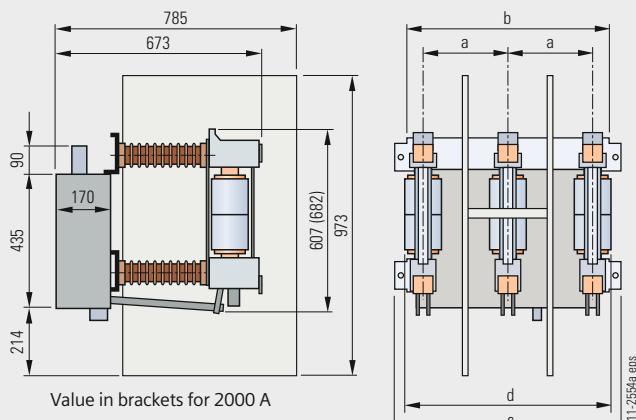
○ Possible with order number suffix Z and order code F28

3

### Operating cycle diagram and dimension drawing 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 drawing	a mm	b mm	c mm	d mm
4.1	275	650	708	668
4.2	350	810	868	818

a = Pole-centre distance

b = Width of cross member

c = Width of cross member incl. lugs

d = Largest energized width

## Operating times

Operating times at rated voltage of the secondary circuit	Equipment of circuit-breaker	Operating time of circuit-breaker
Closing time		< 65 ms <sup>1)</sup>
Opening time	1 <sup>st</sup> shunt release	< 55 ms <sup>1)</sup>
	2 <sup>nd</sup> release	< 45 ms
Arcing time		< 15 ms
Break time	1 <sup>st</sup> shunt release	< 70 ms
	2 <sup>nd</sup> release	< 60 ms
Dead time		300 ms
CLOSE/OPEN contact time	1 <sup>st</sup> shunt release	< 75 ms
	2 <sup>nd</sup> release	< 60 ms
Minimum command duration	Closing solenoid	45 ms
	1 <sup>st</sup> shunt release	40 ms
	2 <sup>nd</sup> release	20 ms
Pulse time for circuit-breaker tripping signal	1 <sup>st</sup> shunt release	> 15 ms
	2 <sup>nd</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
	V	max. V	min. V	W (at DC)	
24 DC	26		20	500	–
48 DC	53		41	500	–
60 DC	66		51	500	–
110 DC	121		93	500	–
220 DC	242		187	500	–
110 AC	121		93	–	650
230 AC	244		187	–	650

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

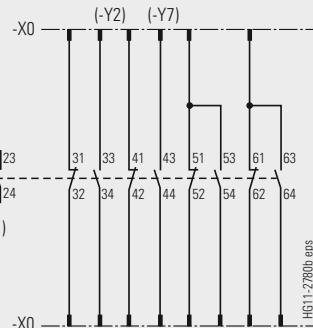
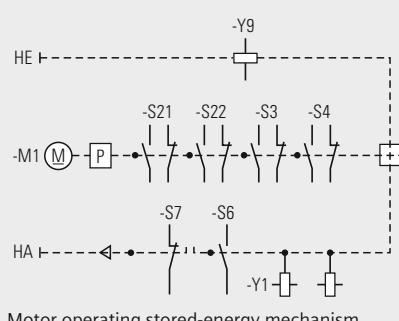
## Consumption data of releases

Release	Power consumption		Tripping ranges	
	Operation at			
	DC approx. W	AC 50/60 Hz approx. VA	Tripping voltage at DC	Tripping voltage or tripping current at AC 50/60 Hz
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 (without 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 % $I_a$
Current-transformer operated release 3AX11 04 (tripping pulse $\geq 0.1$ Ws)	–	–	–	–

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

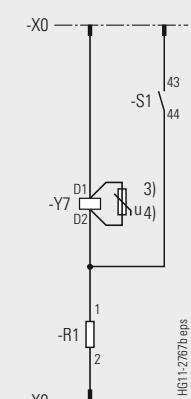
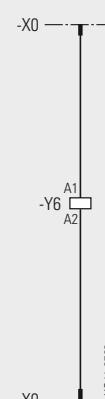
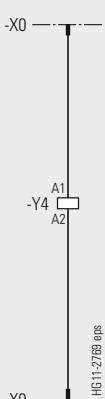
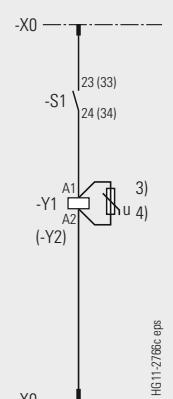
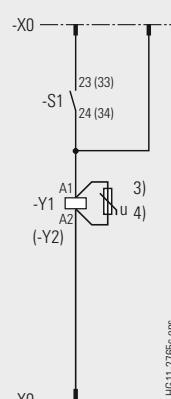
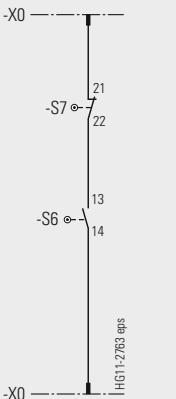
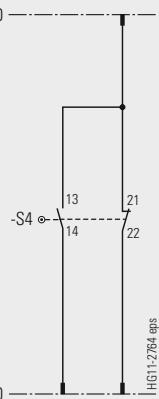
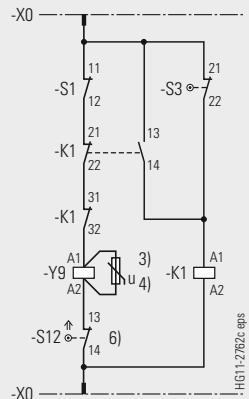
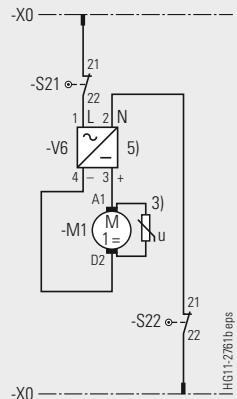
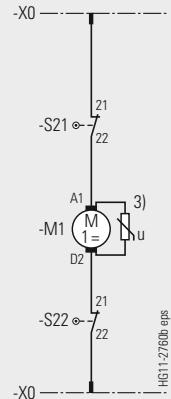
### Circuit diagrams

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



Motor operating stored-energy mechanism

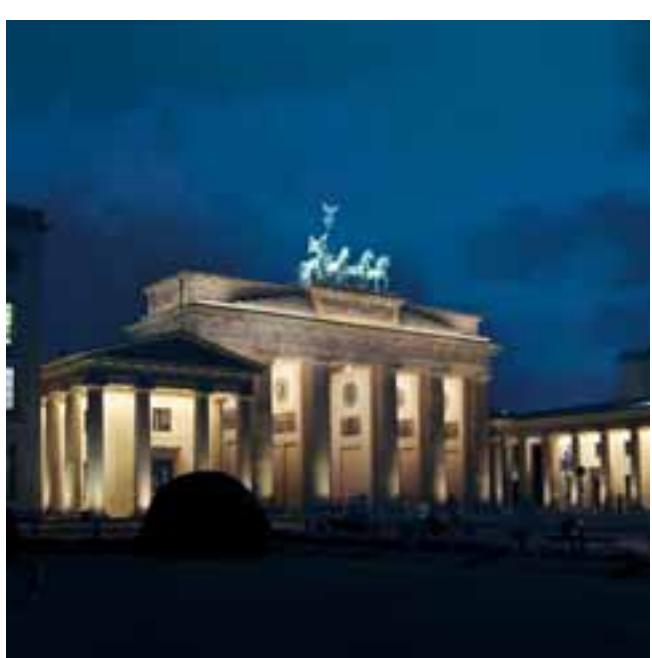
**The available possible combinations are described in the chapter "Selection of secondary equipment".**



- 1) Internally wired
- 2) Not wired
- 3) Integrated varistor for  $\geq 60$  V DC
- 4) Integrated varistor for  $\geq 100$  V AC/DC
- 5) Additional rectifier only required for AC
- 6) Only in connection with mechanical interlocking

### Legend

HA	Manual opening	S1	Auxiliary switch	S12	Mechanical interlocking	Y2	2nd shunt release
HE	Manual closing	S3	Position switch (opens when closing spring is charged)	S21,	Position switches	Y4	Current-transformer operated release
K1	Contactor (anti-pumping)	S4	Position switch (indicates the charging state)	S22	(to de-energize the motor operating mechanism after charging)	Y6	Low-energy current-transformer operated release
M1	Motor operating mechanism	S6	Circuit-breaker tripping signal	V6	Rectifier	Y7	Undervoltage release
P	Energy store	S7	Cutout switch for circuit-breaker tripping signal	X0	Lower part of plug	Y9	Closing solenoid
R1	Resistance			Y1	1st shunt release		



Brandenburg Gate, Berlin, Germany



Switchgear Factory in Berlin, Germany

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**Annex** **33**

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

3AH5 circuit-breaker

Please

- Submit an offer
- Call us
- Visit us

Your address

Company

Dept.

Name

Street

Postal code/city

Phone

Fax

E-mail

4

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"/> 17.5 kV <input type="checkbox"/> 36 kV	<input type="checkbox"/> ___ kV
Rated lightning impulse withstand voltage	<input type="checkbox"/> 75 kV <input type="checkbox"/> 125 kV	<input type="checkbox"/> 95 kV <input type="checkbox"/> 170 kV	<input type="checkbox"/> ___ kV
Rated short-duration power-frequency withstand voltage	<input type="checkbox"/> 28 kV <input type="checkbox"/> 50 kV	<input type="checkbox"/> 38 kV <input type="checkbox"/> 70 kV	<input type="checkbox"/> 42 kV <input type="checkbox"/> ___ kV
Rated short-circuit breaking current	<input type="checkbox"/> 13.1 kA <input type="checkbox"/> 25 kA	<input type="checkbox"/> 16 kA <input type="checkbox"/> 31.5 kA	<input type="checkbox"/> 20 kA <input type="checkbox"/> ___ kA
Rated normal current	<input type="checkbox"/> 800 A <input type="checkbox"/> 2000 A	<input type="checkbox"/> 1250 A <input type="checkbox"/> 2500 A	<input type="checkbox"/> ___ A
Pole-centre distance	<input type="checkbox"/> 160 mm	<input type="checkbox"/> 210 mm	<input type="checkbox"/> 275 mm <input type="checkbox"/> 350 mm

### Secondary equipment

For possible combinations see pages 15 to 19

Circuit-breaker equipment	<input type="checkbox"/> Manual spring-operated mechanism <input type="checkbox"/> Manual operating stored-energy mechanism <input type="checkbox"/> Motor operating stored-energy 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
Auxiliary switch	<input type="checkbox"/> 2 NO + 2 NC <input type="checkbox"/> 6 NO + 6 NC <input type="checkbox"/> 12 NO + 12 NC
Low-voltage connection	<input type="checkbox"/> without <input type="checkbox"/> 24-pole terminal strip <input type="checkbox"/> 24-pole plug <input type="checkbox"/> 64-pole plug
<input type="checkbox"/> Mechanical interlocking	
<input type="checkbox"/> Counter	
<input type="checkbox"/> Circuit-breaker tripping signal	
<input type="checkbox"/> Electrical closing lock-out	
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 3AH5 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 3AH5 vacuum circuit-breaker

## Instruction for configuration of the 3AH5 vacuum circuit-breaker

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

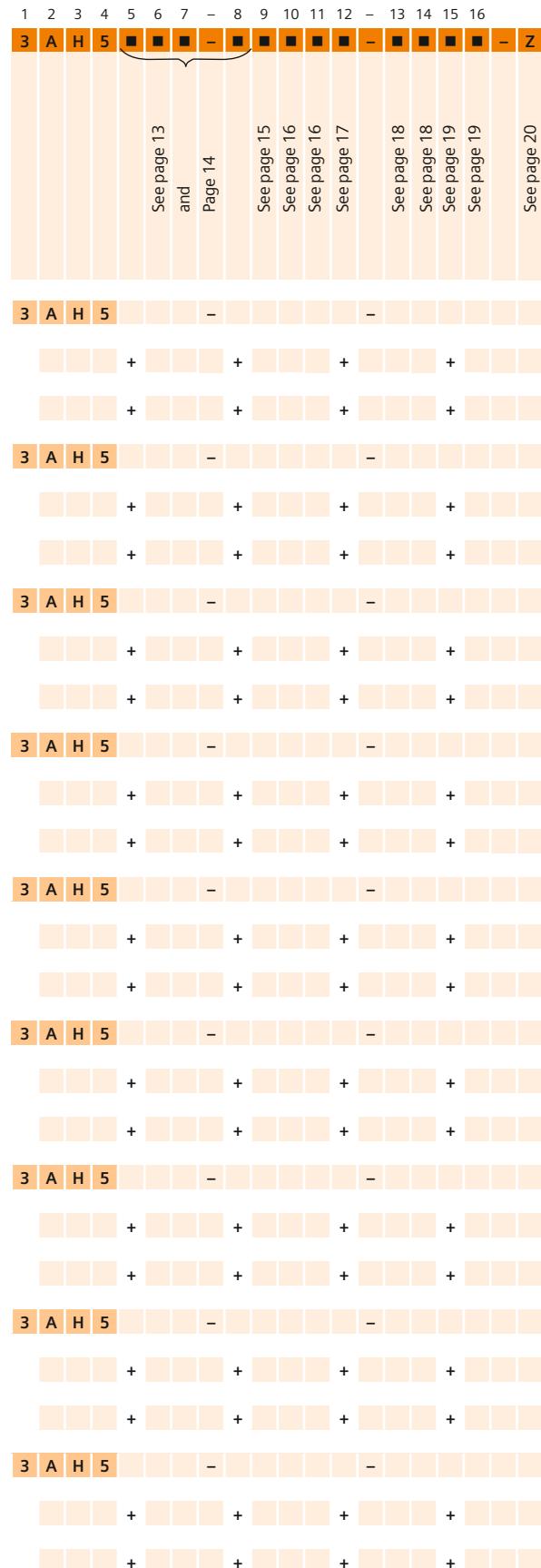
<u>Please specify the following ratings:</u>	<u>Possible options:</u>
Rated voltage ( $U_r$ )	$U_r$ : 12 kV, 17.5 kV, 24 kV, 36 kV
Rated lightning impulse withstand voltage ( $U_p$ )	$U_p$ : 75 kV, 95 kV, 125 kV, 170 kV
Rated short-duration power-frequency withstand voltage ( $U_d$ )	$U_d$ : 28 kV, 38 kV, 42 kV, 50 kV, 70 kV
Rated short-circuit breaking current ( $I_{sc}$ )	$I_{sc}$ : 13.1 kA, 16 kA, 20 kA, 25 kA, 31.5 kA 160 mm, 210 mm, 275 mm, 350 mm
Pole-centre distance	
Rated normal current ( $I_r$ )	$I_r$ : 800 A, 1250 A, 2000 A, 2500 A

These ratings define the positions 5 to 8 of the order number

2<sup>nd</sup> step: Definition of the secondary equipment (see pages 15 to 19)

<u>Please specify the following equipment features:</u>	<u>Possible options:</u>
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
Equipment with circuit-breaker tripping signal (position 13)	Equipment depends on the selection of the secondary connection
Type of operating mechanism and operating voltage of a motor, if available (position 14)	Manual spring-operated mechanism, manual operating stored-energy mechanism, motor operating stored-energy mechanism with operating voltages from 24 V DC to 240 V AC
Number of auxiliary contacts (position 15)	2 NO + 2 NC, 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, without 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 20)

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.



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Siemens AG  
Energy Sector  
Power Distribution Division  
Medium Voltage  
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13623 Berlin, Germany

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

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