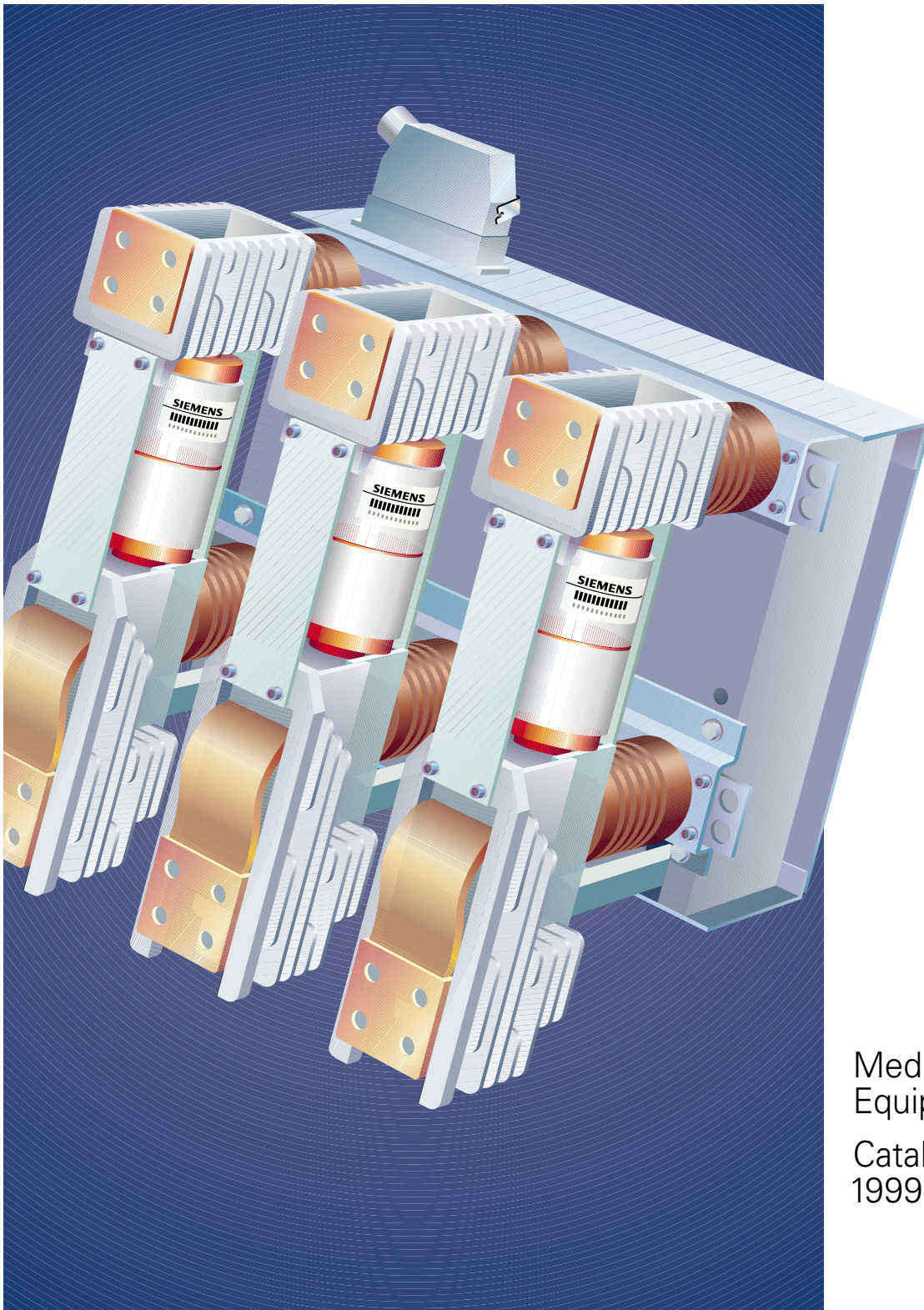
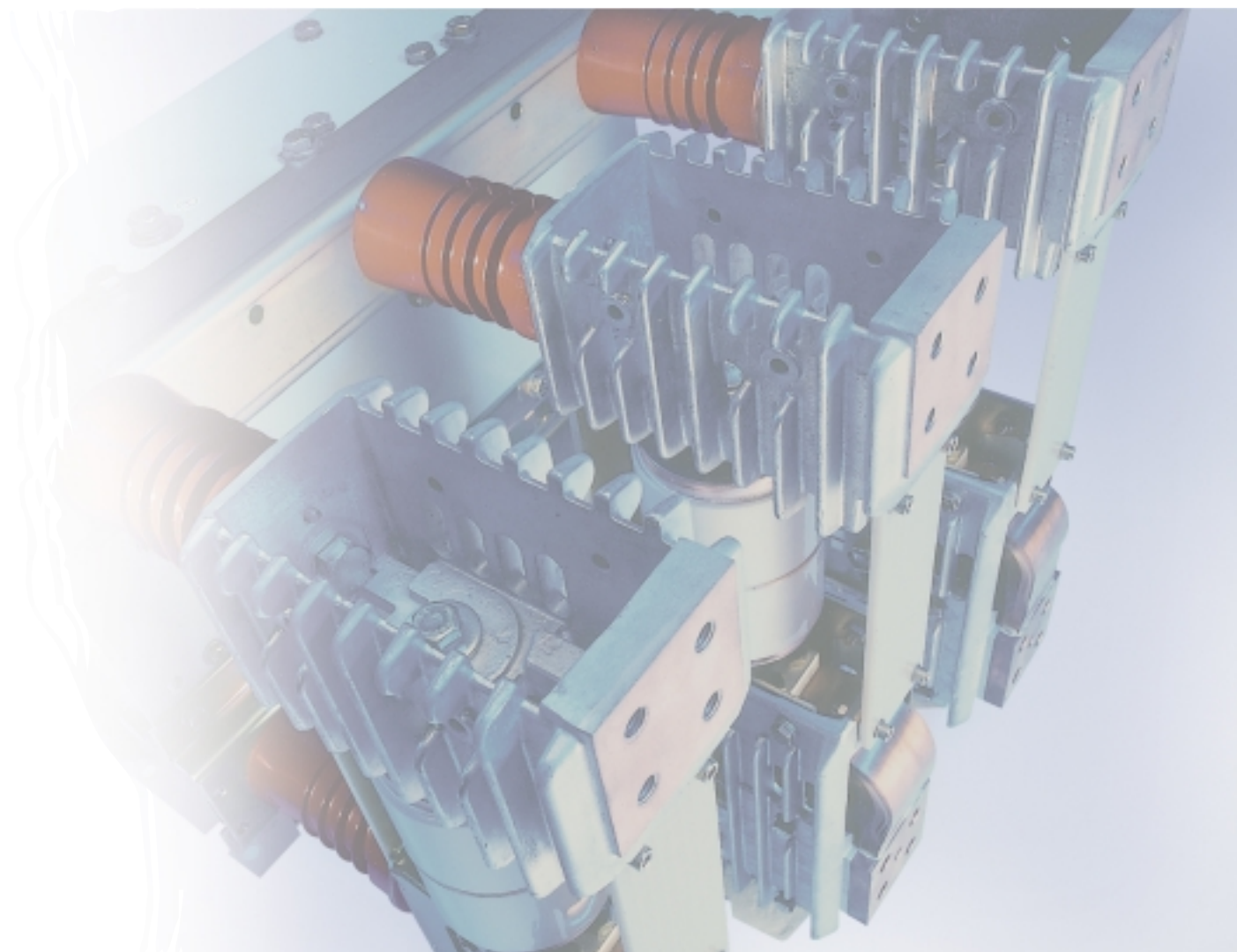


# SIEMENS

## 3AH Vacuum Circuit-Breakers



Medium-Voltage  
Equipment  
Catalog HG 11.11  
1999



Siemens  
8BJ50 medium-voltage  
withdrawable switchgear  
with 3AH vacuum circuit-breaker  
on central truck



Airport Munich

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### Features of the 3AH Vacuum Circuit-Breakers

#### Quality standard

The 3AH vacuum circuit-breakers are subjected to a routine inspection exceeding the requirements laid down in the standards:

- Current measured value acquisition – such as, for example, operating speed and contact travel – during the run-in phase in comparison with the values of the long-term tests

#### Additional features

- Stable measured values with narrow tolerance limits
- Low power loss
- Uniform long-term thermal stability

#### Freedom from maintenance

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

- Under normal ambient conditions in accordance with IEC 60 694 and VDE 0670 Part 1000
- Up to 10,000 operating cycles
  - No relubrication
  - No readjustment
  - Nominal performance remains within tolerance even at very high operating frequencies or after long periods of idleness
- Advantages of vacuum technology:
  - Vacuum-tight for life
  - Soldered seal
  - Small number of mechanical parts

#### Environmental compatibility

The 3AH vacuum circuit-breakers are environmental-friendly:

- As far as material selection and manufacturing methods are concerned
- Environmentally neutral in operation and during switching operations
- Easy to dispose of at the end of their service life

## 3AH Vacuum Circuit-Breakers



Medium-Voltage Equipment  
Catalog HG 11.11 · 1999

Supersedes: Catalog HG 11.11 · 1997

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# 3AH Vacuum Circuit-Breakers Description

## Applications

- Universal installation in all standard medium-voltage equipment
- Suitable for use as 1-pole or multi-pole medium-voltage circuit-breaker for all switching duties in indoor switchgear
- For switching all resistive, inductive and capacitive currents
- For switching generators
- For switching contact lines (1-pole traction circuit-breakers)

## Switching duties

The switching duty of the vacuum circuit-breaker depends on its type of operating mechanism:

- Stored-energy operating mechanism
  - for synchronization and rapid load transfer (U)
  - for auto-reclosing (K)
- Snap-action operating mechanism (snap-action CLOSED, stored-energy OPEN)
  - for normal closing and opening.

*Abbreviations  
for switching duties  
and cases of application:*

U = Synchronization and rapid load transfer (closing time  $\leq 90$  ms)

K = Auto-reclosing

O = Opening

C = Closing

CO = Closing with subsequent opening in the breaker's shortest close-open time

$t, t'$  = Dead time

## Cases of application

### Synchronization

The closing times (for switching duties U and K) are so short that, at the instant the contacts touch, the systems being paralleled are still sufficiently in synchronism.

### Rapid load transfer

(Transfer of loads from one source of supply to another without interruption of service)

The vacuum circuit-breakers (for switching duties U and K) have the very short closing and opening times which are required for this purpose.

Tests conforming to the relevant standards have been carried out on the vacuum circuit-breakers for switching duty U. They included tests using the sequence O-t-CO-t'-CO ( $t, t' 3$  min) with full rated short-circuit breaking current.

### Auto-reclosing

Used in overhead line systems to eliminate transient faults or short-circuits, such as those caused by thunderstorms, lightning or animals.

The vacuum circuit-breakers for switching duty K have such short dead times between opening and closing, even at full short-circuit current, that the interruption in the supply has no appreciable effect on the load.

If auto-reclosing is unsuccessful, the affected circuit is completely disconnected.

According to VDE 0670 a vacuum circuit-breaker designed for auto-reclosing must be able to perform the test sequence O-t-CO-t'-CO ( $t 0.3$  s;  $t' 3$  min); in the case of unsuccessful auto-reclosing, only the sequence O-t-CO ( $t 0.3$  s) is required.

### Auto-reclosing in contact line systems

When, after auto-reclosing, a contact line system is tested with test resistors to ensure that no short-circuits are present, the sequence O-t-CO ( $t 15$  s) is required.

### Multiple auto-reclosing

The vacuum circuit-breakers are also suitable for multiple auto-reclosing. This is employed primarily in English-speaking countries under the designa-

tion "Reclosing", for example, the following sequence: O-t-CO-t'-CO-t'-CO ( $t 0.3$  s,  $t' 15$  s).

### Switching of transformers

Due to the special type of contact material used, the chopping current of vacuum circuit-breakers is only 2 to 3 A, which means that no dangerous overvoltages arise when unloaded transformers are disconnected.

### Interruption of short-circuit currents

(with very high initial rates-of-rise for the transient recovery voltage)

When interrupting short-circuit currents arising from faults immediately behind a transformer, generator or current-limiting reactor on the load side, firstly it is possible for the full short-circuit current to develop and, secondly, the initial rate-of-rise of the transient recovery voltage may be considerably higher than the values specified according to IEC 60056 and VDE 0670. Initial rates-of-rise of up to 10 kV/ $\mu$ s may occur, or even higher values when interrupting short-circuits on the load side of reactors. The vacuum circuit-breakers are also designed for these types of stresses.

### Switching of capacitors

Vacuum circuit-breakers are primarily designed for switching operations in capacitive circuits. They are able to disconnect capacitor banks of the highest ratings without restriking and, therefore, without overvoltages.

The interruption of capacitive currents has been tested up to 600 A for rated voltages up to 12 kV, up to 300 A for rated voltages up to 24 kV and up to 200 A for rated voltages up to 36 kV. These values depend on the test facility used.

Operating experience has shown that as a guiding value capacitive currents up to 70 % of the breaker rated normal current can generally be handled.

When capacitors are connected in parallel, currents which have the same level as short-circuit currents can occur which, due to their high rate-of-rise, may cause damage to the system components.

Making currents up to 10 kA (peak value) are permissible; higher values on request.

### Switching of overhead lines and cables

When unloaded overhead lines and cables are being disconnected, the relatively low capacitive currents are interrupted without restriking and, therefore, without overvoltage.

### Switching of motors

If small high-voltage motors are disconnected during start-up, switching overvoltages may occur. This affects high-voltage motors with a starting current of up to 600 A.

The level of these overvoltages can be reduced to safe values by means of special surge limiters.

Overvoltage protection is not required for motors with individual p.f. correction.

### Switching of generators

If generators with a short-circuit current  $\leq 600$  A are switched, switching overvoltages may occur.

In such a case, surge limiters or surge arresters should be used.

### Switching of filter circuits

When interrupting filter circuits or disconnecting reactor-connected capacitor banks, loading of the vacuum circuit-breaker by recovery voltage is greater than with pure capacitors.

The reason for this is that the reactor and the capacitor are connected in series.

This has to be taken into account when selecting the vacuum circuit-breaker with respect to rated voltage.

### Switching of arc furnaces

Up to 100 operating cycles per day are required, for which the 3AH2 and 3AH4 vacuum circuit-breakers are particularly suitable.

As a result of the characteristics of the load circuit, the currents can be asymmetrical and distorted.

In order to prevent any resonance in the furnace transformers, an individually adapted suppressor circuit is necessary.

## Versions

### Standard circuit-breakers

#### Type 3AH1

- Up to 10,000 operating cycles
- Up to 24 kV

#### Type 3AH3

- Rated short-circuit breaking currents of up to 63 kA
- Rated normal currents of up to 4000 A
- Up to 10,000 operating cycles
- Up to 36 kV

### Frequent-operation circuit-breakers

#### Type 3AH2

- Up to 60,000 mechanical operating cycles
- Up to 24 kV

#### Type 3AH4

- For very high numbers of operating cycles, up to 120,000 mechanical operating cycles
- 24 kV and 36 kV

### Economy circuit-breakers

#### Type 3AH5

- For small switching capacities
- Individual secondary equipment
- Up to 10,000 operating cycles
- 12 kV to 36 kV

### High-current circuit-breakers

#### Type 3AH3 83

According to ANSI C37.013

- Rated short-circuit breaking currents of up to 63 kA
- Rated normal currents of up to 12,000 A
- Up to 10,000 operating cycles
- 17.5 kV

According to IEC 60 056

- Rated short-circuit breaking currents of up to 80 kA
- Rated normal currents of up to 12,000 A
- Up to 10,000 operating cycles
- 17.5 kV

### Traction circuit-breakers, 1-pole

#### Type 3AH4 7

- Rated short-circuit breaking currents of up to 50 kA
- Rated normal currents of up to 2500 A
- Up to 60,000 operating cycles
- 17.5 kV, 16<sup>2</sup>/<sub>3</sub> Hz
- 27.5 kV, 50/60 Hz

### Special circuit-breakers

- 1-pole to 3-pole
- Rated short-circuit breaking currents of up to 80 kA
- Rated normal currents of up to 4000 A
- Up to 10,000 operating cycles
- 7.2 kV to 36 kV

## Fields of application

Case of application*	Number of operating cycles	Rated voltage/ rated short-circuit breaking current	Vacuum circuit-breaker type	Catalog page
<b>Cables and overhead power lines</b>	≤ 10,000	≤ 17.5 kV / ≤ 40 kA 24 kV / ≤ 25 kA	→ 3AH1	2/2 – 2/9 2/10, 2/11
		≤ 17.5 kV / > 40 kA 24 kV / 40 kA 36 kV / ≤ 40 kA	→ 3AH3	2/2 – 2/9 2/10, 2/11 2/12, 2/13
		12 kV / ≤ 25 kA 17.5 kV / 25 kA 24 kV / 16 kA 36 kV / 16 kA	→ 3AH5	4/2, 4/3 4/4, 4/5 4/6, 4/7 4/8, 4/9
<b>Transformers</b>	≤ 10,000	≤ 17.5 kV / ≤ 40 kA 24 kV / ≤ 25 kA	→ 3AH1	2/2 – 2/9 2/10, 2/11
		≤ 17.5 kV / ≤ 63 kA 24 kV / 40 kA 36 kV / ≤ 40 kA	→ 3AH3	2/2 – 2/9 2/10, 2/11 2/12, 2/13
		17.5 kV / 50 to 80 kA	→ 3AH3 83	5/2, 5/3
<b>Generators</b>	≤ 10,000	≤ 17.5 kV / ≤ 40 kA 24 kV / ≤ 25 kA	→ 3AH1	2/2 – 2/9 2/10, 2/11
		≤ 17.5 kV / ≤ 63 kA 24 kV / 40 kA 36 kV / ≤ 40 kA	→ 3AH3	2/2 – 2/9 2/10, 2/11 2/12, 2/13
		17.5 kV / 50 to 80 kA	→ 3AH3 83	5/2, 5/3
<b>Capacitors</b>	≤ 10,000	≤ 17.5 kV / ≤ 40 kA 24 kV / ≤ 25 kA	→ 3AH1	2/2 – 2/9 2/10, 2/11
		≤ 17.5 kV / 50 and 63 kA 24 kV / 40 kA 36 kV / ≤ 40 kA	→ 3AH3	2/2 – 2/9 2/10, 2/11 2/12, 2/13
		12 kV / ≤ 25 kA 17.5 kV / 25 kA 24 kV / 16 kA 36 kV / 16 kA	→ 3AH5	4/2, 4/3 4/4, 4/5 4/6, 4/7 4/8, 4/9
<b>Filter circuits</b>	≤ 10,000	≤ 17.5 kV / ≤ 40 kA 24 kV / ≤ 25 kA	→ 3AH1	2/2 – 2/9 2/10, 2/11
		≤ 17.5 kV / 50 and 63 kA 24 kV / 40 kA 36 kV / ≤ 40 kA	→ 3AH3	2/2 – 2/9 2/10, 2/11 2/12, 2/13
		12 kV / ≤ 25 kA 17.5 kV / 25 kA 24 kV / 16 kA 36 kV / 16 kA	→ 3AH5	4/2, 4/3 4/4, 4/5 4/6, 4/7 4/8, 4/9
Filter circuits cause an increase in voltage at the series-connected switchgear.	> 10,000	≤ 17.5 kV / ≤ 40 kA 24 kV / 25 kA	→ 3AH2	3/2 – 3/9 3/10, 3/11
		24 kV / 40 kA 36 kV / ≤ 40 kA	→ 3AH4	3/10, 3/11 3/12, 3/13
<b>Motors</b>	≤ 10,000	≤ 15 kV / ≤ 40 kA	→ 3AH1	2/2 – 2/7
		≤ 15 kV / 50 and 63 kA	→ 3AH3	2/2 – 2/7
		≤ 12 kV / ≤ 25 kA	→ 3AH5	4/2, 4/3
	> 10,000	≤ 15 kV / ≤ 40 kA	→ 3AH2	3/2 – 3/7
<b>Reactors</b>	≤ 10,000	≤ 17.5 kV / ≤ 40 kA 24 kV / ≤ 25 kA	→ 3AH1	2/2 – 2/9 2/10, 2/11
		≤ 17.5 kV / 50 and 63 kA 24 kV / 40 kA 36 kV / ≤ 40 kA	→ 3AH3	2/2 – 2/9 2/10, 2/11 2/12, 2/13
		≤ 17.5 kV / ≤ 40 kA 24 kV / 25 kA	→ 3AH2	3/2 – 3/9 3/10, 3/11
	> 10,000	24 kV / 40 kA 36 kV / ≤ 40 kA	→ 3AH4	3/10, 3/11 3/12, 3/13
<b>Arc furnaces</b>	≤ 60,000	≤ 17.5 kV / ≤ 40 kA 24 kV / 25 kA	→ 3AH2	3/2 – 3/9 3/10, 3/11
	≤ 120,000	24 kV / 40 kA 36 kV / ≤ 40 kA	→ 3AH4	3/10, 3/11 3/12, 3/13
<b>Traction 16<sup>2</sup>/<sub>3</sub> Hz</b>	≤ 60,000	17.5 kV / ≤ 31.5 kA	→ 3AH4 7	6/2, 6/3
	≤ 10,000	17.5 kV / 40 and 50 kA	→ 3AH4 7	6/2, 6/3
<b>Traction 50/60 Hz</b>	≤ 60,000	27.5 kV / ≤ 31.5 kA	→ 3AH4 7	6/4, 6/5
<b>Special applications</b>	→ On req.	→ On request	→ On req.	7/2

\* Please pay attention to the notes "Cases of application" on page 1/2.

# 3AH Vacuum Circuit-Breakers Description

**Technical specifications** - for details regarding service life, please refer to catalog sections 2 to 6

## Electrical data and supply program

Circuit-breaker types	Rated short-circuit breaking current <sup>1)</sup> $I_{sc}$	Rated short-circuit making current $I_{ma}$	Rated normal current	Rated voltage and rated frequency								
				7.2 kV 50/60 Hz	12 kV 50/60 Hz	15 kV 50/60 Hz	17.5 kV 50/60 Hz	17.5 kV 16 <sup>2</sup> / <sub>3</sub> Hz	24 kV 50/60 Hz	27.5 kV 50/60 Hz	36 kV 50/60 Hz	
<b>3AH1/3AH3 standard circuit-breakers</b>	13.1 kA	32.8 kA	800 A	—	3AH5	—	—	—	—	—	—	
	16 kA	40 kA	800 to 1250 A	—	3AH5	—	—	—	3AH1	—	—	
	20 kA	50 kA	800 to 1250 A	—	—	—	—	—	—	3AH5	—	3AH5
				—	3AH5	—	—	—	—	—	—	
	25 kA	63 kA	800 to 2500 A	—	—	—	—	—	—	3AH1	—	—
				—	3AH5	—	3AH5	—	—	—	—	
	31.5 kA	80 kA	1250 to 2500 A <sup>2)</sup>	3AH1	3AH1	3AH1	3AH1	—	—	—	—	3AH3
				3AH2	3AH2	3AH2	3AH2	—	—	—	—	3AH4
	40 kA	100 kA	1250 to 3150 A	3AH1	3AH1	3AH1	3AH1	—	—	—	—	—
				3AH2	3AH2	3AH2	3AH2	—	—	—	—	—
50 kA	125 kA	1250 to 3150 A	—	—	—	—	—	—	3AH3	—	3AH3	
			—	—	—	—	—	—	3AH4	—	3AH4	
63 kA	160 kA	1250 to 4000 A	3AH3	3AH3	3AH3	3AH3	—	—	—	—		
<b>3AH3 83 high-current circuit-breakers</b>	50 kA	125 kA	8000 and 12000 A	—	—	—	3AH3 83	—	—	—	—	
	63 kA	160 kA	8000 and 12000 A	—	—	—	3AH3 83	—	—	—	—	
	80 kA	225 kA	8000 and 12000 A	—	—	—	3AH3 83	—	—	—	—	
<b>3AH4 7 traction circuit-breakers, 1-pole</b>	25 kA	63 kA	1250 to 2000 A	—	—	—	—	—	—	3AH4 7	—	
			2000 A	—	—	—	—	3AH4 7	—	—	—	
	31.5 kA	80 kA	2000 A	—	—	—	—	3AH4 7	—	—	—	
			2000 to 2500 A	—	—	—	—	—	—	3AH4 7	—	
	40 kA	100 kA	2500 A	—	—	—	—	3AH4 7	—	—	—	
50 kA	125 kA	2500 A	—	—	—	—	3AH4 7	—	—	—		
<b>Special circuit-breakers</b>				On request								

## Operating times

Operating times at rated voltage of secondary circuit	Vacuum circuit-breaker equipment		Vacuum circuit-breaker operating time						
			3AH1	3AH2	3AH3	3AH4	3AH5	3AH3 83	3AH4 7
Closing time	—	ms	<75 <sup>3)</sup>	<75 <sup>3)</sup>	<80 <sup>3)</sup>	<80 <sup>3)</sup>	<75 <sup>3)</sup> 5)	<80 <sup>3)</sup>	<80 <sup>3)</sup>
Opening time	1st shunt release	ms	<65 <sup>3)</sup>	<65 <sup>3)</sup>	<65 <sup>3)</sup>	<65 <sup>3)</sup>	<65 <sup>3)</sup>	<65 <sup>3)</sup>	<65 <sup>3)</sup>
	2nd and 3rd releases	ms	<50	<50	<45	<45	<50	<45	<45
Opening time	Instantaneous release	ms	—	—	—	—	—	—	15
Arcing time	—	ms	<15	<15	<15	<15	<15	<15	<15 <sup>4)</sup>
Break time	1st shunt release	ms	<80	<80	<80	<80	<80	<80	<80
	2nd and 3rd releases	ms	<65	<65	<60	<60	<65	<60	<60
Dead time	—	ms	300	300	300	300	300	300	300
CLOSE/OPEN time	1st shunt release	ms	<80	<80	<90	<90	<75	<90	<90
	2nd and 3rd releases	ms	<65	<65	<70	<70	<60	<70	<70
Minimum command duration	Closing solenoid	ms	45	45	45	45	45	45	45
	1st shunt release	ms	40	40	40	40	40	40	40
	2nd and 3rd releases	ms	20	20	20	20	20	20	20
Pulse time for breaker tripping signal	1st shunt release	ms	>15	>15	>15	>15	>15	>15	>15
	2nd and 3rd releases	ms	>10	>10	>10	>10	>10	>10	>10
Spring-charging time for electrical operation	—	s	<15	<15	<15	<15	<10	<15	<15
Synchronous operation error between the poles	—	ms	2	2	2	2	2	2	—

1) DC component 36% (higher values on request).

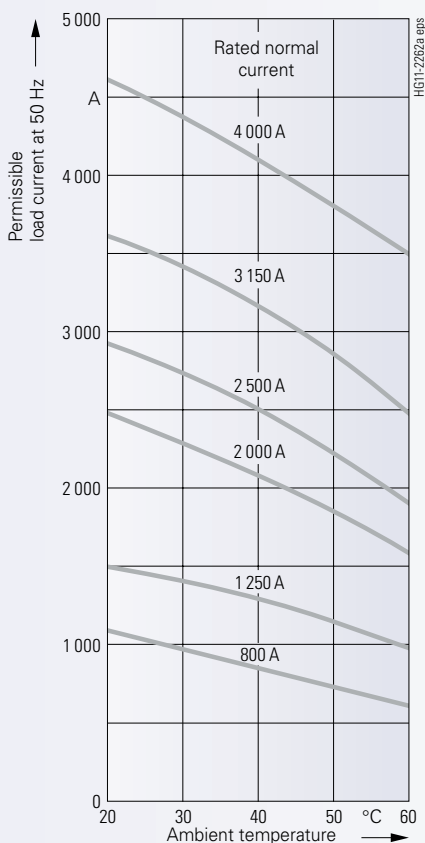
2) 3150 A for rated voltage 17.5 kV.

3) Shorter operating times on request.

4) Arcing time < 33 ms at rated frequency of 16<sup>2</sup>/<sub>3</sub> Hz.

5) With stored-energy mechanism.

## Current-carrying capacity



The values of rated normal current listed above were defined in accordance with the requirements of IEC 60694 and VDE 0670, Part 1000 at an ambient temperature of 40 °C and apply for open-type switchgear.

In the case of enclosed-type switchgear, the information of the switchgear manufacturer are applicable.

In the event of ambient temperatures < 40 °C, higher normal currents may be carried (see diagram).

## Construction and mode of operation

### Arc-quenching system

As the contacts are galvanically separated, the current that is to be interrupted initiates a metal-vapour arc discharge. Current continues flowing through the metal-vapour plasma until the next current zero. The arc extinguishes at approximately current zero. The metal vapour loses its conductivity within a few microseconds, which very quickly re-establishes the dielectric strength of the contact gap.

A certain minimum current is needed in order to maintain the metal-vapour arc discharge. The arc will be chopped before the natural current zero, if the current falls below this value.

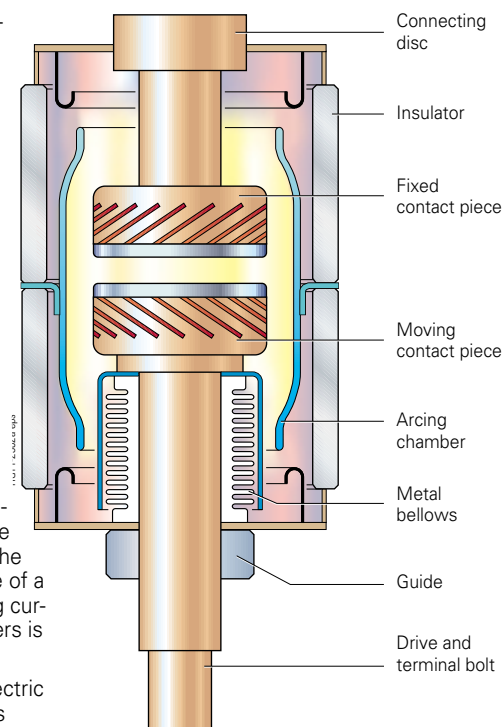
In order to prevent impermissible overvoltages when performing switching operations in inductive circuits, the chopping current must be limited to the lowest possible value. Due to the use of a special contact material, the chopping current in the 3AH vacuum circuit-breakers is only 2 A to 3 A.

Due to the rapid recovery of the dielectric strength of the contact gap, the arc is safely quenched even in cases where contact separation occurs immediately before a current zero. Consequently, the arcing time of the last poles to clear is no more than 15 ms.

The shapes and sizes of the contacts vary according to the breaking current and the dimensions of the interrupters:

- In the case of the radial magnetic field contact, the arc burns diffusely while the current is up to approximately 10 kA (instantaneous). At higher current values the arc is contracted, so local overheating of the contact pieces must be avoided. An additional radial magnetic field produces a force which causes the arc to run around the arcing rings of the contact pieces. This allows the contact erosion that occurs at the root of the arc to be distributed over the whole circumference of the rings.
- In the case of the axial magnetic field contact, the axial field causes the arc to remain diffuse, even at high current values. This means that the stress on the disc-shaped contact surfaces is uniform and any local melting is avoided.

With AC circuit-breakers the actual task of the arc-quenching system is to deionize the contact gap immediately after current zero.



Vacuum interrupter example

In the case of all the conventional methods of arc-quenching this means that the arc is being cooled even before the minimum quenching gap and the subsequent current zero are reached. As a result, the arc power is unintentionally increased to a considerable degree.

With the vacuum circuit-breaker, on the other hand, the arc is not cooled. The metal-vapour plasma has a high conductivity which results in an extremely low arc voltage with values from only 20 to 200 V.

For this reason, and due to the short arcing times, the amount of energy conversion in the contact gap is very low. This relatively low stress level means that the quenching system is maintenance-free.

Due to the very low pressures of less than  $10^{-9}$  bar in the interrupter under steady-state conditions, contact gaps of only 6 to 20 mm are required to achieve a high dielectric strength.



# 3AH Vacuum Circuit-Breakers Description

## Construction and mode of operation

### Pole assemblies, mechanisms

The pole assemblies consist of

- Vacuum interrupters
- 2 interrupter supports

The vacuum interrupters are freely accessible, therefore enabling the insulating parts to be easily cleaned in the case of difficult ambient conditions (fouling).

The pole assemblies are mounted on the housing of the operating mechanism by means of post insulators.

The vacuum interrupter (4) is mounted rigidly to the upper interrupter support (1). The lower part of the interrupter is inserted in the lower interrupter support (7). The struts (3 and 13) absorb the external forces arising from switching operations and contact pressure.

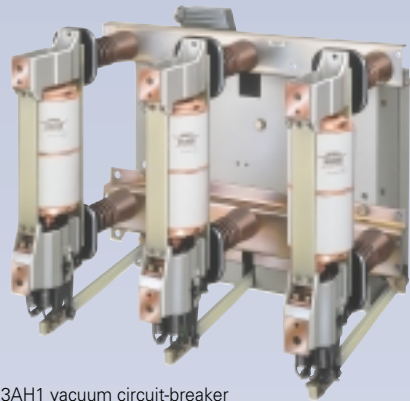
3 versions of pole assemblies are available which differ in function according to the method by which the operating rods are attached to the interrupters (see mechanism versions shown opposite).

### Legend

- 1 Upper interrupter support
- 2 Upper terminal
- 3 Outer strut
- 4 Vacuum interrupter
- 5 Drive bolt of the vacuum interrupter
- 6 Flexible connector
- 7 Lower interrupter support
- 8 Lower terminal
- 9 Opening and contact-pressure spring
- 10 Contact-pressure spring
- 11 Bracket
- 12 Upper post insulator
- 13 Inner strut
- 14 Lower post insulator
- 15 Lever
- 16 Operating rod

1) 3AH4 7 traction circuit-breakers with 2 interrupter units per pole have a slightly different operating mechanism.

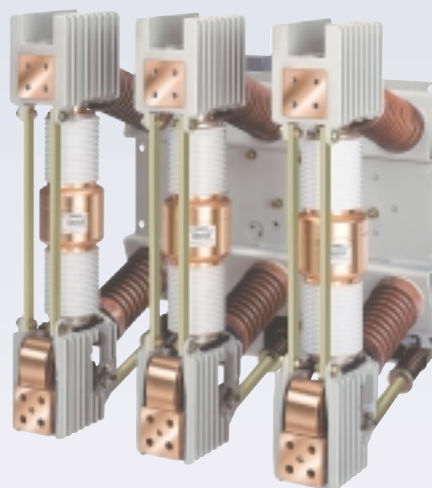
### Vacuum circuit-breakers (examples)



3AH1 vacuum circuit-breaker  
24 kV / 25 kA / 1250 A

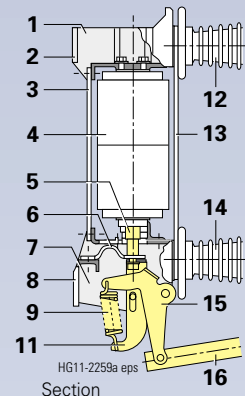


3AH2 vacuum circuit-breaker  
24 kV / 25 kA / 2500 A

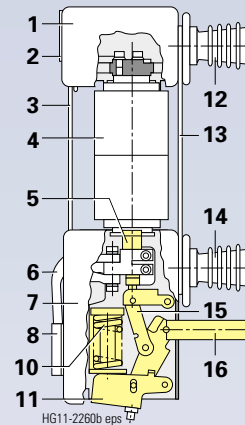


3AH4 vacuum circuit-breaker  
24 kV / 40 kA / 2500 A  
(partitions not shown)

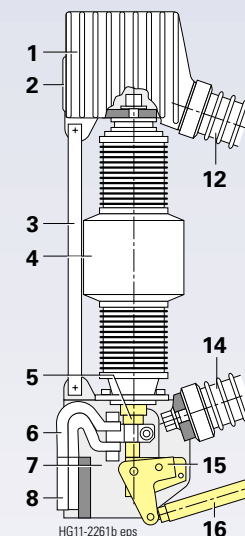
### Mechanism versions



Section through the pole assembly; mechanism version 1



Section through the pole assembly; mechanism version 2



Section through the pole assembly; mechanism version 3

### Rated values and operating motion

#### for 3AH1 and 3AH5

12 kV with pole-centre distance 160 mm  
31.5 kA / 1250 A

up to 17.5 kV  
25 kA / 1250 A

24 kV  
25 kA / 1250 A

36 kV  
16 kA / 1250 A

The operating motion results from the operating rod (16), lever (15) and opening and contact-pressure spring (9) to the bracket (11) attached to the drive bolt (5).

#### for 3AH1 and 3AH2

up to 17.5 kV  
25 kA /  $\geq 2000$  A  
 $\geq 31.5$  kA /  $\geq 1250$  A

24 kV  
20 kA /  $\geq 1250$  A  
25 kA /  $\geq 1250$  A

The operating motion results from the operating rod (16) and lever (15) to the drive bolt (5).

The contact-pressure spring (10) acts on the drive bolt (5) through the bracket (11) and lever (15).

#### for 3AH3 and 3AH4 <sup>1)</sup>

up to 17.5 kV  
 $\geq 50$  kA

24 kV  
40 kA

36 kV  
 $\geq 31.5$  kA

The operating motion results from the operating rod (16) and lever (15) to the drive bolt (5).

## Construction and mode of operation

### Operating mechanisms

The whole operating mechanism is contained in a single housing, including the releases, auxiliary switches, indicators and actuating devices.

### Stored-energy operating mechanism

The operating drive is usually a stored-energy mechanism. The mechanism operates the pole assemblies through rods. The closing spring can be charged either electrically or manually. It latches in when charging is complete. The closing spring acts as the stored-energy mechanism.

To close the breaker, the closing spring can be unlatched either mechanically by means of the local "CLOSE" pushbutton or electrically by remote control. The closing spring charges the contact-pressure/opening springs as the breaker closes.

The now discharged closing spring will be charged again automatically by the mechanism motor – if this exists.

The breaker is now capable of performing the OPEN – CLOSE – OPEN switching sequence that is required for an unsuccessful auto-reclosing operation.

All stored-energy mechanisms perform the switching duties of synchronizing and rapid load transfer (U) as well as auto-reclosing (K).

### Snap-action operating mechanism

On the snap-action operating mechanism, closing inevitably follows charging of the closing spring.

During closing operation, the opening and contact-pressure springs are charged at the same time, therefore a stored-energy mechanism is available for opening.

Opening can be initiated on all vacuum circuit-breakers by various releases or locally by the OPEN pushbutton.

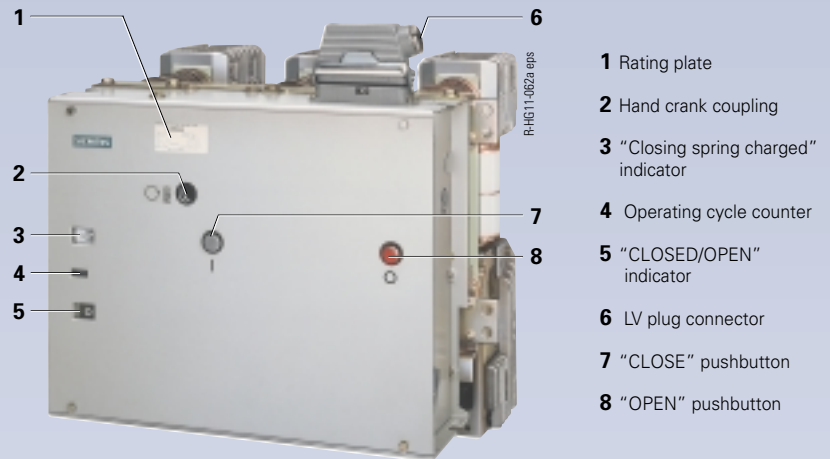
If there is a failure of power to the motor, the spring can always be recharged manually.

### Trip-free mechanism

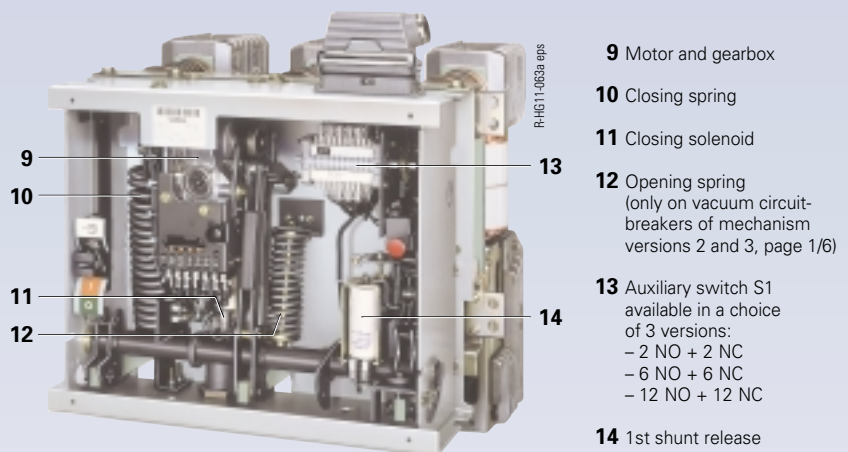
The 3AH vacuum circuit-breakers are equipped with a trip-free mechanism according to IEC 60 056 and VDE 0670.

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 vacuum circuit-breakers are momentarily in the closed position under these circumstances, which is permitted according to IEC 60 056 and VDE 0670.

### Control, display and operating elements (example)



3AH1 vacuum circuit-breaker  
12 kV / 31.5 kA / 2000 A  
Front side with control and display elements



3AH1 vacuum circuit-breaker  
12 kV / 31.5 kA / 2000 A  
Front side open with interior view of mechanism housing

Abbreviations:

NO = normally-open  
NC = normally-closed

## Power consumption and rated currents

### Motor short-circuit protection

Rated voltage of operating mechanism V	Operating voltage V		Power consumption of the motor W VA		Smallest possible rated current of the m.c.b. with C-characteristic A
	max. V	min. V	W	VA	

#### For 3AH1, 3AH2, 3AH5 vacuum circuit-breakers

DC 24	26	20	350	–	8
48	53	41	350	–	6
60	66	51	350	–	4
110	121	93	350	–	2
220	242	187	350	–	1.6
AC 110	121	93	–	400	2
230	244	187	–	400	1.6

#### For 3AH3, 3AH3 83, 3AH4, 3AH4 7 vacuum circuit-breakers

DC 24	26	20	500	–	16
48	53	41	500	–	8
60	66	51	500	–	6
110	121	93	500	–	3
220	242	187	500	–	1.6
AC 110	121	93	–	650	3
230	244	187	–	650	1.6

### Motors of operating mechanism

The motors operate in short-time duty and therefore the voltage and power consumption do not have to be in conformance with the data of the rating plate.

#### Protection of the motors

See table above.

The inrush current in the motor can be neglected since it is of very brief duration.

## Secondary equipment

The scope of the 3AH vacuum circuit-breaker secondary equipment depends on the particular application and offers a variety of possible variations which satisfy nearly every requirement. In the following, all secondary modules are described. The availability and combination possibilities are stated for the relevant breaker type series (see catalog sections 2 to 6).

### Releases

A release is a device which transfers commands from an external source, such as a control room, to the latching mechanism of the circuit-breaker so that it can be opened or closed. The various types of releases available are described in detail below. The VDE designations for the devices are also given (in brackets) when they differ from the terms used in this catalog.

The releases are designed for short-time duty up to 1 minute. In the case of 3AH1 to 3AH4 vacuum circuit-breakers they are reset internally and in the case of 3AH5 vacuum circuit-breakers the pulse time has to be limited externally.

#### 3AY15 10 closing solenoid

Available for DC or AC operation.

The closing solenoid unlatches the charged closing spring of the vacuum circuit-breaker, closing it by electrical means.

#### Shunt releases

Shunt releases are used for automatic tripping of circuit-breakers by suitable protective relays and for deliberate tripping by electrical means.

They are intended for connection to an external power supply (AC or DC) but, in special cases, may also be connected to a voltage transformer for manual operation.

Two different types of shunt releases are available:

- The 1st shunt release 3AY15 10 is normally included in the basic equipment of the vacuum circuit-breaker (except of 3AH5 vacuum circuit-breaker). With this design, the electric tripping pulse is fed to the "OPEN" latching mechanism by means of a direct-acting solenoid armature in order to open the circuit-breaker.

- The 3AX11 01 shunt release is fitted if more than one shunt release is required (2nd or 3rd release). In the case of the 3AH5 vacuum circuit-breakers a maximum of 2 shunt releases is possible.

With this design, the electrical opening command is boosted by means of a solenoid armature unlatching a stored-energy mechanism before being fed to the "OPEN" latching mechanism in order to open the breaker. Shorter opening times are possible with this release than with the 3AY15 10 type.

Refer to the selection and ordering data in catalog sections 2 to 6 for the relevant types of vacuum circuit-breakers concerning the maximum possible number of releases that can be fitted.

## Secondary equipment

### Releases

Order No. of releases	Power consumption		Operating ranges	
	DC operation	AC operation 50/60 Hz	Tripping voltage (DC)	Tripping voltage/current (AC 50/60 Hz)
	approx. W	approx. VA		

### Closing solenoid

3AY15 10	140	140	85 to 110% $U$	85 to 110% $U$
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### 1st shunt release (without stored-energy mechanism)

3AY15 10	140	140	70 to 110% $U$	85 to 110% $U$
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### 2nd shunt release (with stored-energy mechanism)

3AX11 01	70	50	70 to 110% $U$	85 to 110% $U$
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### Undervoltage release

3AY11 03	20	20	35 to 0% $U$	35 to 0% $U$
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### Current transformer-operated release (rated current 0.5 A or 1 A)

3AX11 02	–	10 *	–	90 to 110% $I_a$
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### Current transformer-operated release (tripping pulse $\geq 0.1$ Ws)

3AX11 04	–	–	–	–
----------	---	---	---	---

### 3AX11 03 undervoltage release

An undervoltage release comprises a stored-energy mechanism, an unlatching mechanism and an electromagnetic system which is permanently energized while the 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.

Manual tripping of the undervoltage release is generally performed with an NC contact in the tripping circuit but may also be performed with an NO contact by short-circuiting the solenoid coil. With this type of release, the short-circuit current is limited by the built-in resistors (see page 1/13 for typical circuitry).

Undervoltage releases can also be connected to voltage transformers. If the operating voltage drops to an impermissibly low level, the vacuum circuit-breaker will be tripped automatically.

Unsuccessful attempts at closing when the solenoid coil of the undervoltage release is not energized can be prevented in the following ways:

- By normally fitting electrical local closing in conjunction with the undervoltage release and additionally
- By connecting the undervoltage release, operated through an NO contact and closing solenoid, to the same operating voltage.

### Undervoltage release with delay

For delayed tripping, the undervoltage release can be combined with stored-energy mechanisms:

- Type AN 1901 (for AC), settable delay times: 1 s – 1.8 s – 2.5 s
- Type AN 1902 (for DC), settable delay times: 0.5 s – 0.9 s – 1.5 s

These stored-energy mechanisms can either be order together with the vacuum circuit-breaker, or can be purchased separately from Bender 1):

### Current transformer-operated release

comprises

- A stored-energy mechanism
- An unlatching mechanism
- An electromagnetic system

It is used when there is no external source of auxiliary power (e.g. a battery). Tripping is effected by means of a protective relay (e.g. overcurrent-time protection) acting on the current transformer-operated release.

The following current transformer-operated releases are used:

- 3AX11 02 current transformer-operated release with a rated current of 0.5 A or 1 A which requires auxiliary transformers (e.g. type 4AM5 – see catalog sheet LSA 2.2.6 "Auxiliary current transformers for differential relays for overhead lines, cables and transformers") in addition to the main current transformers.

The stored-energy mechanism is unlatched when the tripping current is exceeded (90 % of the rated current of the current transformer-operated release), thus causing

the vacuum circuit-breaker to be opened.

- 3AX11 04 current transformer-operated release, low-energy version for a tripping pulse of min. 0.1 Ws.

The transformer current ensures that the protective system is supplied with energy, and fills an energy store, the charge of which is available as a tripping pulse  $\geq 0.1$  Ws at the time of tripping. This pulse is switched by the command contact and is capable of activating the current transformer-operated release.

The 3AX11 04 current transformer-operated release is always used in conjunction with a protective system or protective relay that takes its supply and release energy for the vacuum circuit-breaker from its own current transformer and is thus not dependent on external auxiliary voltages:

- 7SJ41 protective system
- protective relay make SEG 2), type WIP 1
- or similar protective systems.

### 3AX6 01. instantaneous release

- For traction circuit-breakers
- For 1-pole special circuit-breakers
- Extremely short opening times
- DC operation only
- For special switching duties with extremely short opening times, vacuum circuit-breakers can be equipped with a 3AX6 01. instantaneous release, which requires an electrical energy store.
- A 3AX15 50-0 capacitor release is additionally required for operating the instantaneous release. This capacitor release is not part of the scope of supply and must be ordered separately. The rated voltage of the capacitor release must be chosen to suit the operating voltage of the instantaneous release.

#### Ordering addresses:

1) Dipl.-Ing.  
W. Bender GmbH & Co. KG  
Postfach 11 61  
D-35301 Grünberg  
Germany

2) Schaltanlagen – Elektronik  
Geräte GmbH & Co. KG  
Krefelder Weg 47  
D-47906 Kempen  
Germany

\* Consumption with operating current (90% of the rated current) and open-circuit armature.

# 3AH Vacuum Circuit-Breakers Description

## Secondary equipment

### Electrical local closing

In the standard version, the 3AH1 to 3AH4 vacuum circuit-breakers can be remote-closed electrically. In addition, they can be mechanically closed locally by direct unlatching of the closing spring.

However, "electrical local closing" is also available instead of the mechanical mechanism.

In this version the closing circuit of the vacuum circuit-breaker is triggered electrically by means of a pushbutton.

This arrangement allows interlocking conditions arising from the system to be accepted in the "local" mode so that the vacuum circuit-breaker cannot close accidentally. For example, the vacuum circuit-breaker can be interlocked through the auxiliary contact of a disconnector (see "Interlocking" and the schematic diagrams on page 1/12).

Vacuum circuit-breakers with electrical local closing cannot be closed mechanically.

### Anti-pumping

(mechanical and electrical)

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, continual closing and opening (= "pumping") is prevented.

### Breaker tripping signal

The NO contact S6 makes brief contact while the 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 S7 that is connected in series with the NO contact (see typical circuit on page 1/13).

### Position switch for signalling "Closing spring charged"

The charging status of the closing spring in the vacuum circuit-breaker can be interrogated electrically by means of the position switch.

### Varistor module

When inductive loads are being disconnected in DC circuits it is possible for switching overvoltages to be produced which might pose a risk to solid-state devices. This risk can be eliminated by connecting varistors across the inductances of the vacuum circuit-breaker (motor, closing solenoid, releases).

A suitable varistor module for operating voltages  $\geq 60$  V to 250 V DC is fitted when ordering; it limits overvoltages to approximately 500 V.

### Secondary connections (for control circuit)

Versions:

- 64-pole plug connector (e.g. type Han 64 D of Harting make) with crimping connections<sup>1)</sup> (a Harting crimping tool<sup>1)</sup> is necessary to connect the wiring in the lower plug part)
- 24-pole plug connector (e.g. type Han 24 E of Harting make) with screw connections in the upper plug part and with crimping connections<sup>1)</sup> in the lower plug part
- Prefabricated cables can be ordered for wiring up the lower plug part (64-pole or 24-pole)
- 24-pole terminal strip

Please refer to "Secondary equipment" in catalog sections 2 to 6 for availability of secondary connections.

The upper plug part and sleeve of the connector are supplied loose. No tools are required for plugging and unplugging the upper and lower plug parts.

The schematic diagrams show the factory assignment of the secondary connections. All Siemens circuit-breakers have the same assignment of terminals if they have the same secondary connections, with the result that it is easy to replace any breakers. Other terminal assignment on request.

### 3SV9 auxiliary switch

The following versions are available:

- 2 NO + 2 NC
- 6 NO + 6 NC
- 12 NO + 12 NC

Please refer to "Secondary equipment" in catalog sections 2 to 6 for availability and contacts of the auxiliary switch which can be used by the customer.

Rated insulation voltage	250 V AC/DC
Insulation	Class C to VDE 0110
Continuous current	10 A
Making current	50 A
Breaking capacity at 220 V DC, T = 20 ms	2 A

### Interlocking

#### Mechanical interlocking

Sensing devices on the system side check the status of the vacuum circuit-breaker and prevent it from closing if the associated disconnector is not in a position to allow safe operation.

The system also prevents the disconnector from being operated while the vacuum circuit-breaker is closed.

Similarly, the mechanical interlocking system can also be used for interlocking breaker trucks or withdrawable circuit-breaker units.

#### Electrical interlocking

Vacuum circuit-breakers can be incorporated in electromagnetic interlocking schemes for feeders and substations. With electrical interlocking, a magnetic lockout mechanism is fitted to the disconnector or its operating mechanism. The lockout is operated through an auxiliary contact of the vacuum circuit-breaker so that the disconnector can only be operated when the vacuum circuit-breaker is open.

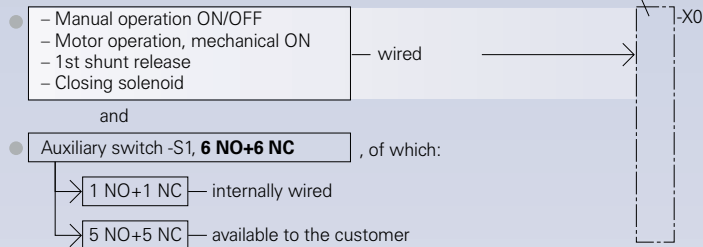
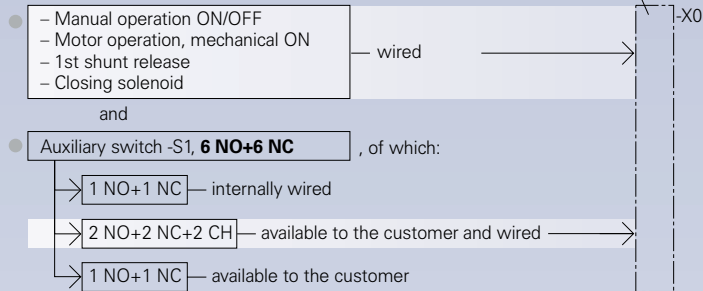
The vacuum circuit-breaker is, on the other hand, controlled by the disconnector or its operating mechanism so that it may only be closed when the disconnector is at its end positions. For this purpose, the operating mechanism of the vacuum circuit-breaker must be fitted with the electrical local closing system (see "Electrical local closing").

1) Can be ordered from your Siemens Partner or from Harting, Steckverbinder und Systemtechnik GmbH & Co. KG Postfach 2451 D-32381 Minden Germany

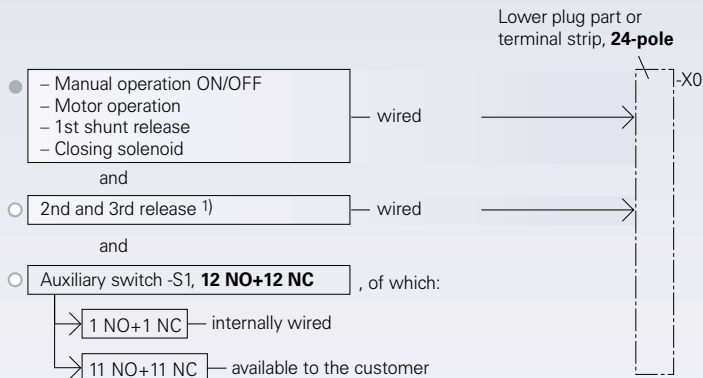
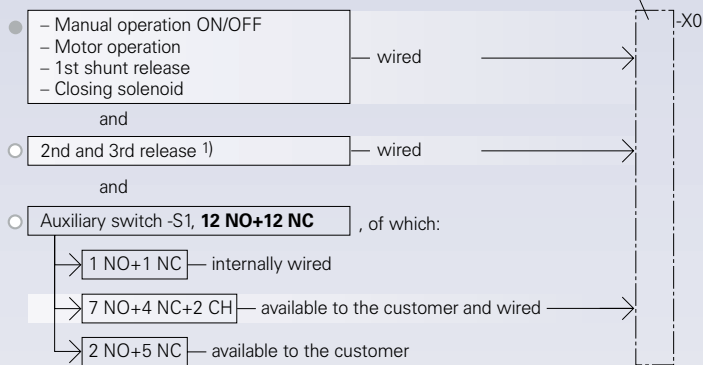
## Secondary equipment · Wiring overview

### 3AH ...vacuum circuit-breakers (without 3AH5)

#### ● Basic equipment



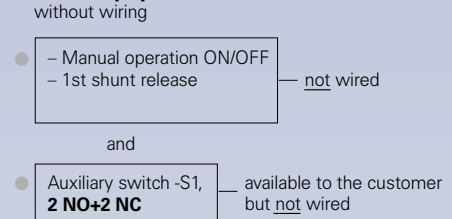
#### ● Basic and ○ additional equipment



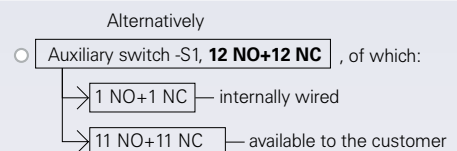
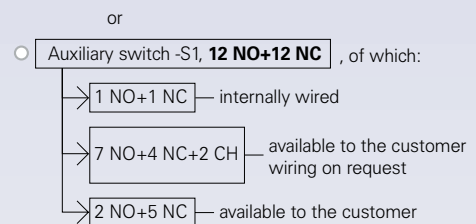
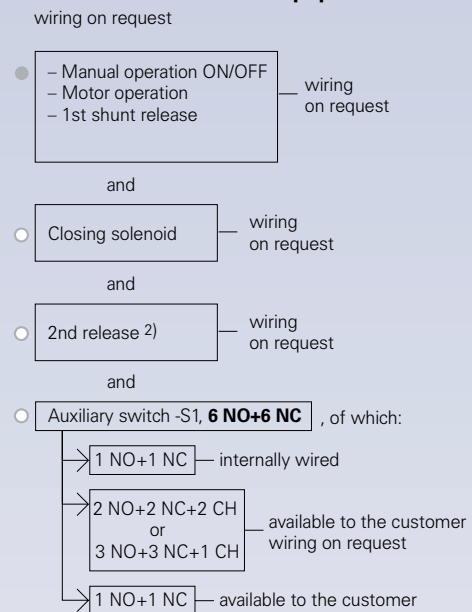
1) In the case of more than one release, the number of auxiliary switch contacts available to the customer and given in the schematic diagrams is binding.

### 3AH5 vacuum circuit-breaker

#### ● Basic equipment



#### ● Basic and ○ additional equipment



Wiring of the equipment (auxiliary switch, motor-operated mechanism and release) possible with

- Plug connector, 64-pole or
- Plug connector, 24-pole or
- Terminal strip, 24-pole

2) In the case of more than one release, the number of auxiliary switch contacts available to the customer and given in the schematic diagrams is binding.

Abbreviations:

NO = normally-open, NC = normally-closed, CH = changeover contact (NO/NC)

Schematic diagrams for 3AH ... vacuum circuit-breakers (without 3AH5) · Not binding – examples only

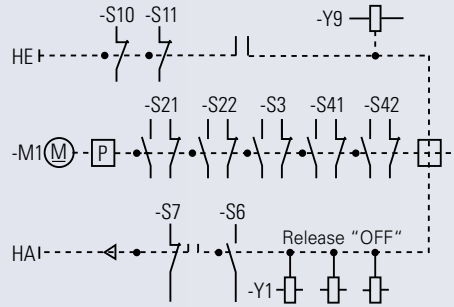
## Basic equipment

### Legend

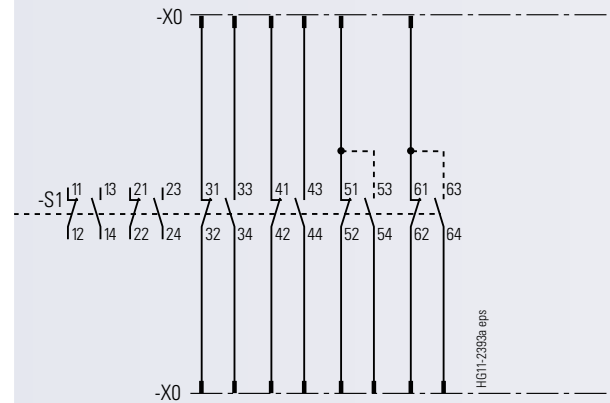
- A1 3AX15 50-0 capacitor release
- HA Manual tripping
- HE Manual closing
- K1 Contactor (anti-pumping)
- M1 Motor-operated mechanism
- P Stored-energy mechanism
- R1 Resistor
- S1 Auxiliary switch
- S10, S11 Mechanical anti-pumping
- S14, S15 Electrical local closing
- S21, S22 Position switches (switch off motor-operated mechanism after spring charging)
- S3 Position switch (opens when closing spring charged)
- S41, S42 Position switches (signal charging state)
- S6 Breaker tripping signal
- S7 Cut-out switch for breaker tripping signal
- V1, V2 Varistor modules\*
- X0 24-pole or 64-pole plug connector, or 24-pole terminal strip
- Y1 1st shunt release
- Y2 2nd shunt release
- Y2 Instantaneous release (for 3AH4 7 traction circuit-breakers only)
- Y4 Current transformer-operated release (rated current of 0.5 A or 1 A)
- Y6 Current transformer-operated release (tripping pulse  $\geq 0.1$  Ws)
- Y7 Undervoltage release
- Y9 Closing solenoid

\* Option:  
Varistor circuitry  
for  $\geq 60$  V DC (on request)

### Manual closing · Manual tripping



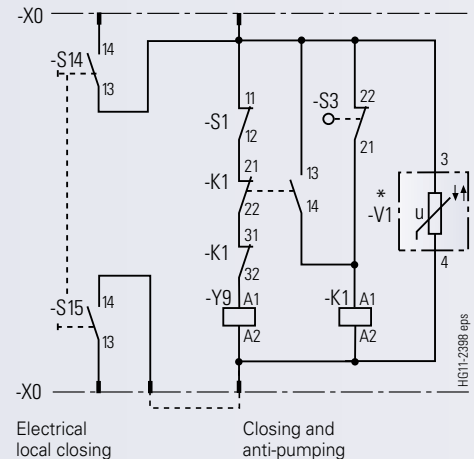
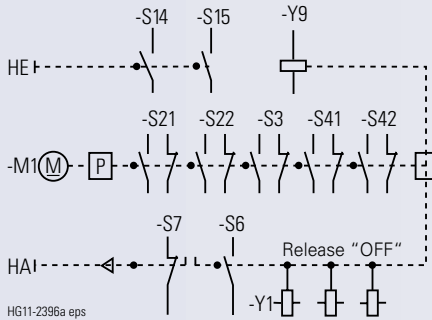
### Auxiliary switch -S1 (6 NO + 6 NC)



5 NO + 5 NC contacts available to the customer (see also page 1/11)

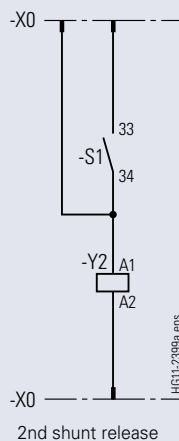
## Additional equipment, motor-operated mechanism and auxiliary switch

### Motor-operated mechanism with electrical local closing

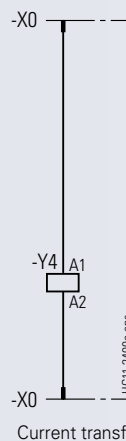


## Additional equipment, releases (for combination possibilities, refer to "Secondary equipment", catalog sections 2 to 6)

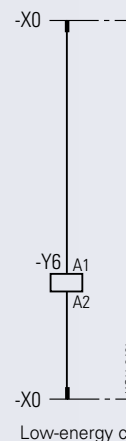
### Releases



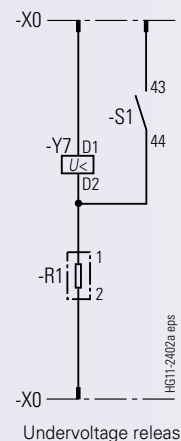
2nd shunt release



Current transformer-operated release, 0.5 A or 1 A



Low-energy current transformer-operated release 0.1 Ws

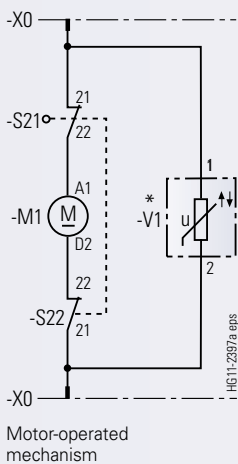
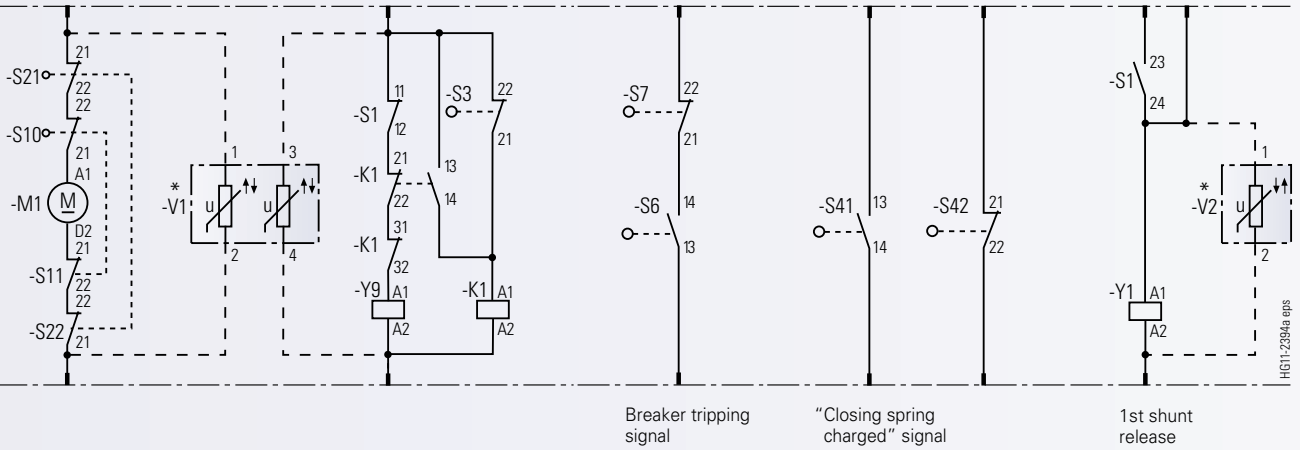


Undervoltage release

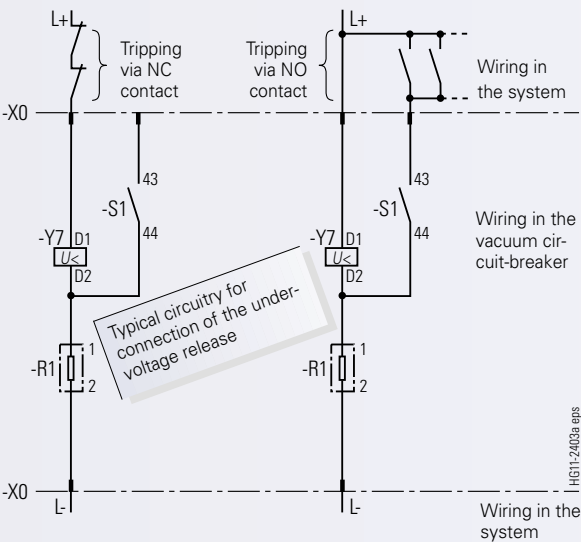
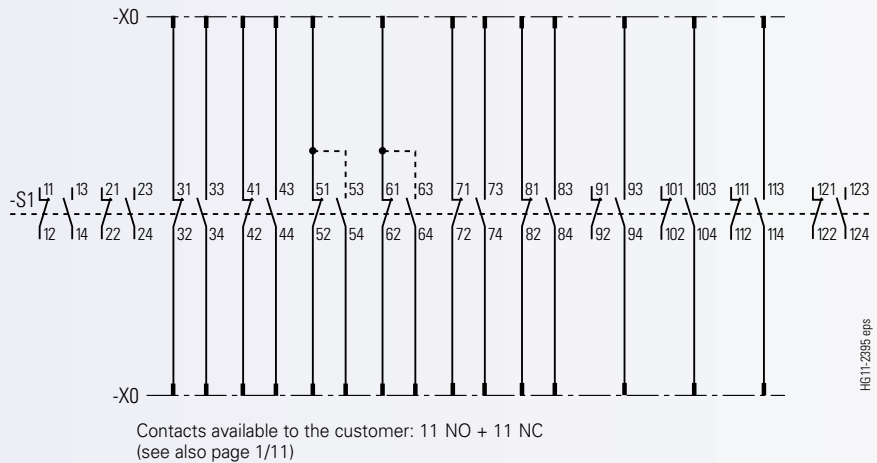
### Abbreviations:

NO = normally-open  
NC = normally-closed

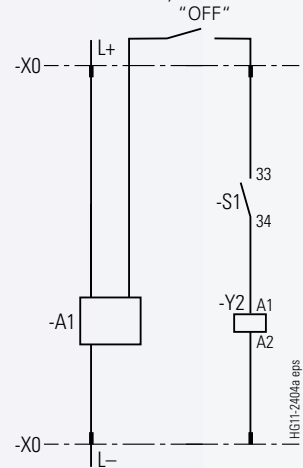
**Motor-operated mechanism with mechanical closing**



**Auxiliary switch -S1 (12 NO + 12 NC), instead of the auxiliary switch with 6 NO + 6 NC**



**Instantaneous release, for 3AH4 7 traction circuit-breakers only**





# 3AH Vacuum Circuit-Breakers Description

Schematic diagrams for 3AH5 vacuum circuit-breakers · Not binding – examples only

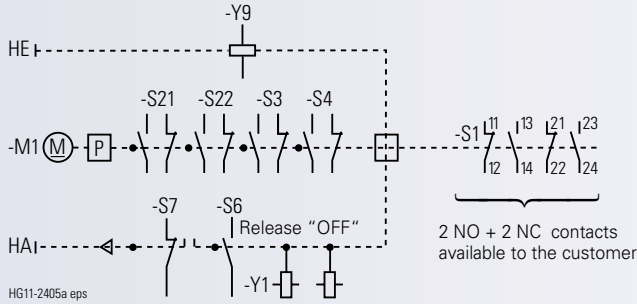
## Basic equipment

### Legend

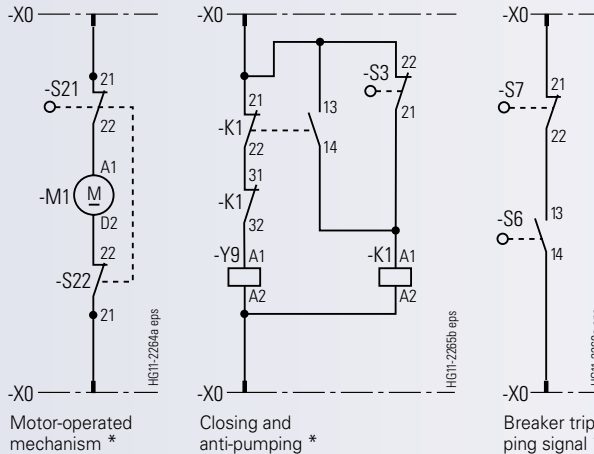
- HA Manual tripping
- HE Manual closing
- K1 Contactor (anti-pumping)
- M1 Motor-operated mechanism
- P Stored-energy mechanism
- R1 Resistor
- S1 Auxiliary switch
- S21, S22 Position switches (switch off motor-operated mechanism after spring charging)
- S3 Position switch (opens when closing spring charged)
- S4 Position switch (signal charging state)
- S6 Breaker tripping signal
- S7 Cut-out switch for breaker tripping signal
- X0 Lower plug part
- Y1 1st shunt release
- Y6 Low-energy current transformer-operated release
- Y7 Undervoltage release
- Y9 Closing solenoid

### Manual closing · Manual tripping

without wiring



## Additional equipment

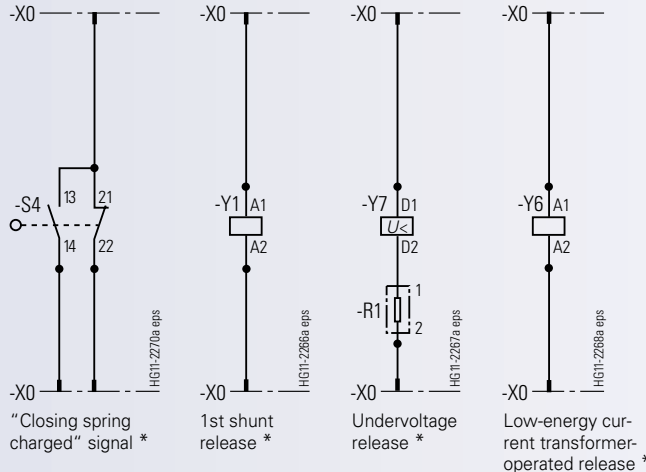


### Auxiliary switch

6 NO + 6 NC or 12 NO + 12 NC (instead of 2 NO + 2 NC in the basic equipment). Most of these contacts are available to the customer and – on request – can in some cases be wired to a plug connector or terminal strip (see page 1/11).

### Wiring of the secondary equipment

- The secondary equipment is wired only in cases where the terminal strip or plug connector is included in the order.
- Wiring to choice of
  - 64-pole plug connector or
  - 24-pole plug connector or
  - 24-pole terminal strip
- Releases, with wiring to choice of
  - Plug connector or
  - Terminal strip



### Abbreviations:

NO = normally-open  
NC = normally-closed

\* Only when explicitly ordered:  
For combination possibilities, refer to "Secondary equipment" in catalog section 4.

## Standards

### Standards

The vacuum circuit-breakers conform to the following standards:

- IEC 60 056
- IEC 60 694
- BS 5311
- VDE 0670
- ANSI C37.013  
(only 3AH3 83 high-current circuit-breakers up to 63 kA)

### Tests

For the development and type-testing of high-performance switchgear which meet the applicable standards, Siemens has its own accredited testing facilities for:

- High-power electrical testing
- Testing of:
  - Mechanical operation
  - Reliability
  - Insulating capacity
  - Temperature rise
  - Climatic withstand capability.

Extensive series of tests are carried out for the type-tests specified in the relevant standards in order to achieve reliable results.

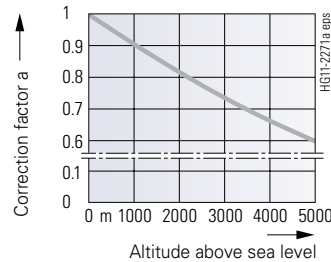
If a customer wishes tests to be carried out by an independent organization, the testing facilities of the following company are also available:

PEHLA  
Gesellschaft für  
elektrische Hochleistungs-  
prüfungen  
Theodor-Stern-Kai 1  
D-60596 Frankfurt/Main  
Germany

The tests encompass switching capacity, current-carrying capacity and, where applicable, insulating capacity. The fees for these tests are charged by PEHLA according to their current price schedule.

### Insulating capacity

The specified values are referred to sea level. When installed at altitudes above 1000 m, an allowance must be made for the resulting decrease in insulating capacity (see correction factor  $a$  in the diagram below).



The following expression thus applies for the selection of the devices and equipment:

$$\frac{\text{Rated lightning impulse withstand voltage to be selected } ^1)}{\text{Required rated lightning impulse withstand voltage } ^1)} \geq 1.1 \cdot a$$

If, however, the actual insulating capacity must be determined at the installation site – the withstand voltage – the reduction of the insulating capacity from that for an altitude of 0 m (sea level) must be calculated as follows:

$$\text{Withstand voltage } ^2) = \text{rated lightning impulse withstand voltage } ^1) \text{ of the selected device.}$$

#### Definitions:

Rated lightning impulse withstand voltage or rated short-time power frequency voltage <sup>1)</sup> = target value according to VDE, IEC, etc. referred to sea level.

Lightning impulse withstand voltage or power frequency withstand voltage <sup>2)</sup> = actual value at the respective height.

The vacuum circuit-breakers for 15 kV rated voltage meet the requirements of the American standard ANSI C 37 with respect to their insulating capacity.

- 1) Rated lightning impulse withstand voltage  
Rated short-time power frequency voltage
- 2) Lightning impulse withstand voltage  
Power frequency withstand voltage

### Ambient conditions

3AH vacuum circuit-breakers are designed for the normal operating conditions laid down in standards IEC 60 694 and VDE 0670.

#### Ambient temperature

- Highest value: +40 °C
- Highest value of 24-hour mean: +35 °C
- Lowest value: –5 °C

#### Relative humidity (average values measured):

- Over 24 hours: max. 95%
- Over 1 month: max. 90%

Under these conditions, condensation may sometimes arise.

The ambient air is not heavily polluted with dust, smoke, corrosive or flammable gases, vapours or salt.

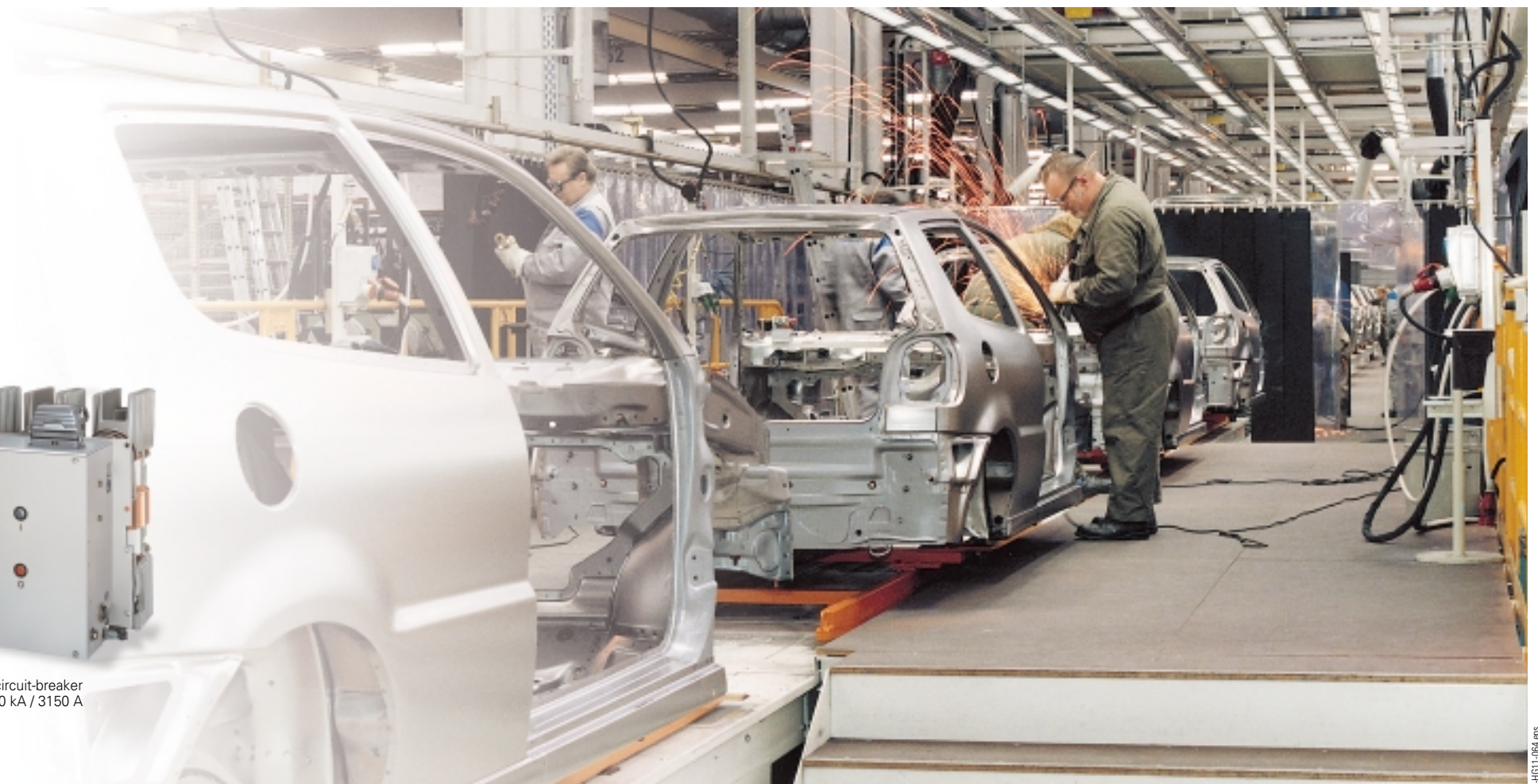
7.2 to 36 kV



e. g. 3AH1 standard circuit-breaker  
12kV / 31.5 kA / 2000 A



e. g. 3AH3 standard circuit-breaker  
12 kV / 50 kA / 3150 A



Vehicle production (photo Volkswagen Factory, Wolfsburg)

**Catalog section 2** Page

- Rated data
- Selection and ordering data
- Electrical and mechanical service life
- Dimensions and weights
- Secondary equipment

For rated voltages	
- 7.2 kV	2/2-2/3
- 12 kV	2/4-2/5
- 15 kV	2/6-2/7
- 17.5 kV	2/8-2/9
- 24 kV	2/10-2/11
- 36 kV	2/12-2/13

Enquiry form A/2

**Features of standard circuit-breakers**

- Rated voltages 7.2 to 36 kV
- Maintenance-free up to 10,000 operating cycles
- Mechanical breaker service life 10,000 operating cycles
- Rated short-circuit breaking currents up to 63 kA (r.m.s. value), up to 50 operating cycles
- DC component 36%, higher values on request
- Suitable for use in conjunction with, for example:
  - Overhead lines and cables
  - Transformers
  - Generators
  - Capacitors
  - Filter circuits
  - Motors
  - Reactors



**3AH1 055-4**  
31.5 kA / 2000 A

**7.2 kV**

Rated voltage 7.2 kV  
 Rated lightning impulse withstand voltage 60 kV  
 Rated short-time power frequency withstand voltage 20 kV  
 Rated short-circuit duration 3 s  
 Rated short-circuit breaking current  $I_{sc}$  and rated short-circuit making current  $I_{ma}$  see table

2

## Selection and ordering data for rated voltage 7.2 kV

$I_{sc}$ kA	$I_{ma}$ kA	Pole-centre distance mm	Please add Order No. suffix	Order No. suffix at rated normal current						Remarks
				800 A	1250 A	2000 A	2500 A	3150 A	4000 A	
Load char. No. 1 1										
20	50	210	3AH1 053-□ ← 1 — 2							• • • —
Load char. No. 2 2 2 4										
25	63	210	3AH1 054-□ ← 1 — 2 — 4 — 6							• • • —
Load char. No. 3 3 5										
31.5	80	210	3AH1 055-□ ← 2 — 4 — 6							• • • —
Load char. No. 6 6 6 6										
40	100	210	3AH1 056-□ ← 2 — 4 — 6 — 7							○ • $I_{sc}$ up to 44 kA, $I_{ma}$ up to 110 kA
Load char. No. 7 7 7										
50	125	210	3AH3 057-□ ← 2 — 6 — 7							○ • —
Load char. No. 8 8 8 8										
63 (can be used up to 72 kA)	160	275	3AH3 078-□ ← 2 — 6 — 7 — 8							○ • $I_{ma}$ up to 181 kA

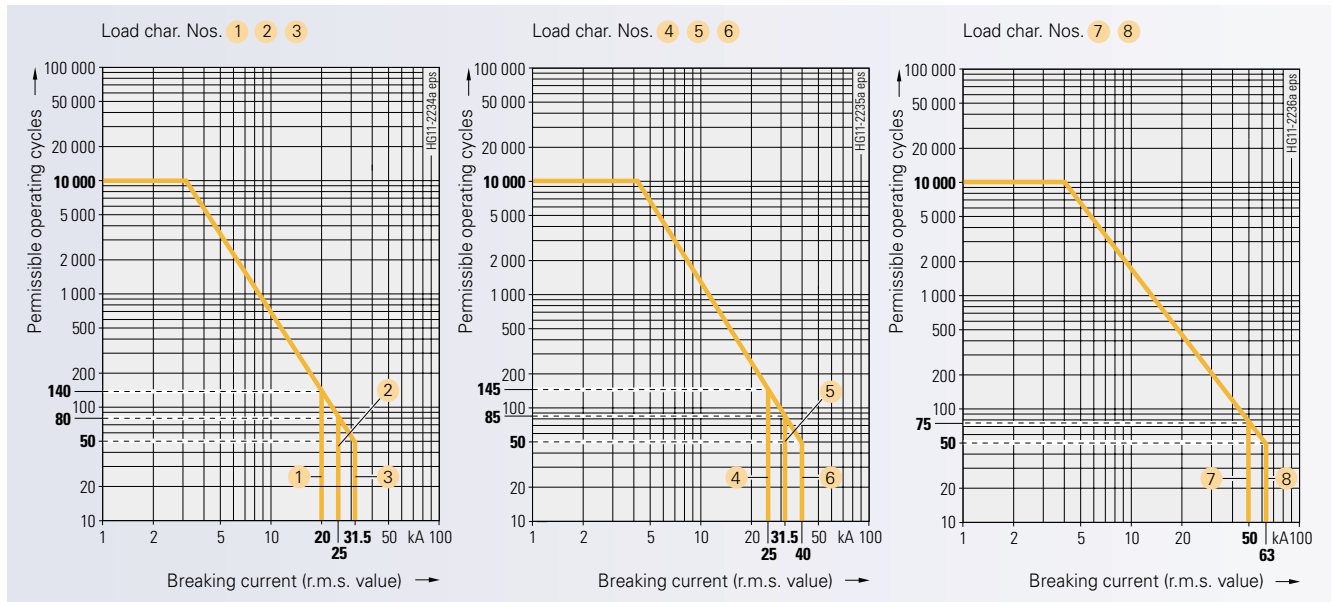
Rated operating sequences

- - 0.3s - CO - 15s - CO - 15s - CO - 15s - CO
- - 0.3s - CO - 3min - CO
- - 3min - CO - 3min - CO

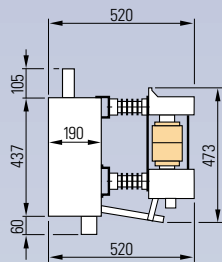
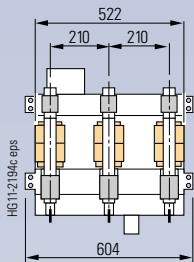
Enquiry form  
see page A/2

• Possible ○  $I_{sc}$  up to 31.5 kA possible

## Electrical service life (load char. Nos. 1 to 8) · Mechanical breaker service life 10,000 operating cycles

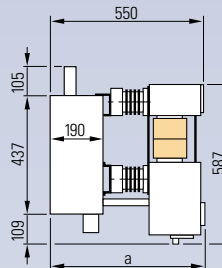
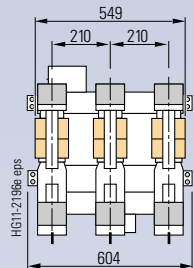


## Dimensions and weights



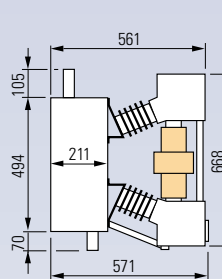
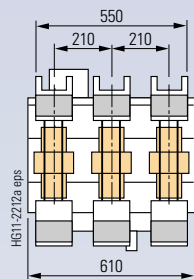
### Pole-centre distance 210 mm

- 20 kA / up to 1250 A
  - 25 kA / up to 1250 A
- Weight approx. 75 kg

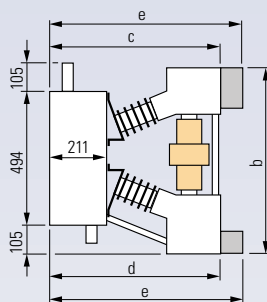
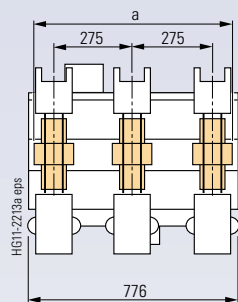


- 25 kA / 2000 A, 2500 A
  - 31.5 kA / 1250 A, 2000 A, 2500 A
  - 40 kA / 1250 A, 2000 A, 2500 A, 3150 A
- Weight 110 to 130 kg

Dimension a in mm	
1250/2000 A	550 mm
2500/3150 A	565 mm



- 50 kA / up to 3150 A
- Weight approx. 180 kg



### Pole-centre distance 275 mm

- 63 kA
- Weight up to 3150 A approx. 196 kg  
Weight at 4000 A approx. 308 kg

Dimensions in mm		
	To 3150 A mm	4000 A mm
a	680	750
b	668	733
c	591	–
d	601	–
e	–	694

## Secondary equipment

7.2 kV

For a description of the secondary equipment, refer to pages 1/8 to 1/13.

Equipment	Remarks
<ul style="list-style-type: none"> <li>● <b>Basic equipment</b></li> <li>○ Additional equipment</li> </ul>	
<ul style="list-style-type: none"> <li>● <b>Electrical operating mechanism</b></li> </ul>	<ul style="list-style-type: none"> <li>– Can also be manually controlled</li> <li>– <u>Option</u>: with manual control</li> </ul>
<ul style="list-style-type: none"> <li>● <b>Closing solenoid</b> type 3AY1510</li> </ul>	–
<ul style="list-style-type: none"> <li>● <b>1st shunt release</b> type 3AY1510</li> </ul>	– Refer to table below for release combinations
<ul style="list-style-type: none"> <li>○ 2nd shunt release type 3AX1101</li> </ul>	– Max. 3 releases can be combined
<ul style="list-style-type: none"> <li>○ Current transformer-operated release 0.5 A/1 A, type 3AX1102</li> </ul>	– A current transformer-operated release for a tripping pulse of $\geq 0.1$ Ws is used in connection with the 7SJ41 protective system or with the protective relay made by SEG
<ul style="list-style-type: none"> <li>○ Current transformer-operated release 0.1 Ws, type 3AX1104</li> </ul>	
<ul style="list-style-type: none"> <li>○ Undervoltage release type 3AX1103</li> </ul>	
<ul style="list-style-type: none"> <li>● <b>Auxiliary switch 6 NO + 6 NC</b></li> <li>○ Auxiliary switch 12 NO + 12 NC*</li> </ul>	<ul style="list-style-type: none"> <li>– Refer to page 1/11 concerning contacts available for customer use</li> <li>– <u>On request</u>: More than 12 NO + 12 NC</li> <li>– <u>Option</u>: Gold-plated auxiliary switch contacts</li> </ul>
<ul style="list-style-type: none"> <li>● <b>Terminal strip 24-pole or plug connector</b> 64-pole or 24-pole</li> </ul>	<ul style="list-style-type: none"> <li>– Electrical equipment – such as motor, release – wired to terminal strip or plug connector</li> <li>– <u>Option</u>: Gold-plated plug connector contacts</li> </ul>
<ul style="list-style-type: none"> <li>● <b>Anti-pumping</b> mechanical and electrical</li> </ul>	–
<ul style="list-style-type: none"> <li>● <b>Breaker tripping signal</b></li> </ul>	–
<ul style="list-style-type: none"> <li>● <b>Operating cycle counter</b></li> </ul>	–
<ul style="list-style-type: none"> <li>● <b>Position switches</b> (2 pieces) for signalling “Closing spring charged”</li> </ul>	–
<ul style="list-style-type: none"> <li>○ Electrical local closing</li> </ul>	In place of mechanical local closing
<ul style="list-style-type: none"> <li>○ Mechanical interlocking</li> </ul>	–
<ul style="list-style-type: none"> <li>○ Varistor circuitry</li> </ul>	In the secondary circuit, for $\geq 60$ V DC
<ul style="list-style-type: none"> <li>○ Halogen-free and flame-retardant wiring cables</li> </ul>	–
<ul style="list-style-type: none"> <li>○ Condensation protection</li> </ul>	For 230 V AC
<ul style="list-style-type: none"> <li>○ Silver-plated or tinned primary current paths</li> </ul>	External terminals and internal connections on both sides
<ul style="list-style-type: none"> <li>○ Hand crank</li> </ul>	For manual charging of the closing spring
<ul style="list-style-type: none"> <li>○ Silicone-free design</li> </ul>	–

2

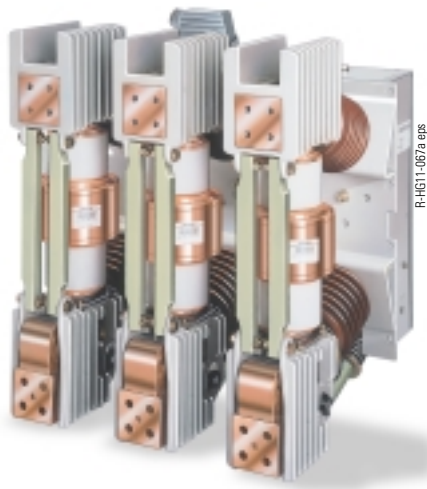
### 3 combination possibilities of the releases

Release	Release combinations		
	1	2	3
1st shunt release	•	•	•
2nd release	–	•	•
3rd release	–	–	•

The 2nd and 3rd releases can be shunt releases, undervoltage releases or current transformer-operated releases as desired (0.5 A, 1 A or 0.1 Ws).

- 1 piece per release. A maximum of 3 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 6 NO + 6 NC).  
Abbreviations: NO = normally-open, NC = normally-closed



**3AH3 117-7**  
50 kA / 3150 A

**12 kV**

Rated voltage 12 kV  
 Rated lightning impulse withstand voltage 75 kV  
 Rated short-time power frequency withstand voltage 28 kV\*  
 Rated short-circuit duration 3 s  
 Rated short-circuit breaking current  $I_{sc}$  and rated short-circuit making current  $I_{ma}$  see table

\* Up to 42 kV on request

2

### Selection and ordering data for rated voltage 12 kV

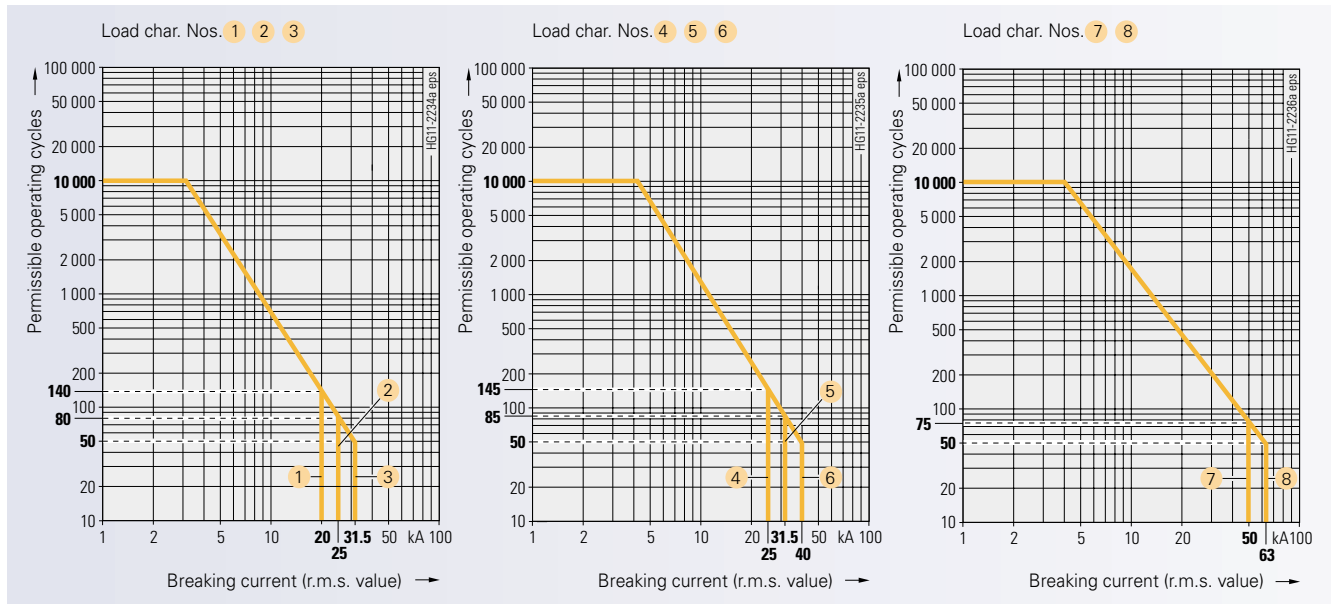
$I_{sc}$ kA	$I_{ma}$ kA	Pole-centre distance mm	Please add Order No. suffix	Order No. suffix at rated normal current						Rated operating sequences	Remarks
				800 A	1250 A	2000 A	2500 A	3150 A	4000 A		
				Load char. No. <b>1</b> <b>1</b>							
20	50	210	<b>3AH1 113</b> -□ ← 1 — 2								• • • —
				Load char. No. <b>2</b> <b>2</b> <b>2</b> <b>4</b>							
25	63	160	<b>3AH1 104</b> -□ ← 1 — 2								• • • —
	63	210	<b>3AH1 114</b> -□ ← 1 — 2 — 4 — 6								• • • —
				Load char. No. <b>3</b> <b>3</b> <b>3</b> <b>5</b>							
31.5	80	160	<b>3AH1 105</b> -□ ← 1 — 2								• • • —
	80	210	<b>3AH1 115</b> -□ ← 2 — 4 — 6								• • • —
				Load char. No. <b>6</b> <b>6</b> <b>6</b> <b>6</b>							
40	100	210	<b>3AH1 116</b> -□ ← 2 — 4 — 6 — 7								○ • $I_{sc}$ up to 44 kA, $I_{ma}$ up to 110 kA
				Load char. No. <b>7</b> <b>7</b> <b>7</b>							
50	125	210	<b>3AH3 117</b> -□ ← 2 — 6 — 7								○ • $I_{sc}$ up to 57.8 kA, $I_{ma}$ up to 145 kA
				Load char. No. <b>8</b> <b>8</b> <b>8</b> <b>8</b>							
63	160	275	<b>3AH3 128</b> -□ ← 2 — 6 — 7 — 8								○ • —

Enquiry form see page A/2

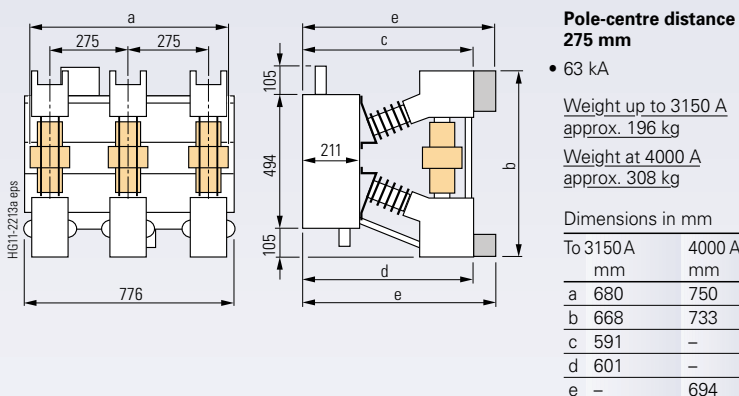
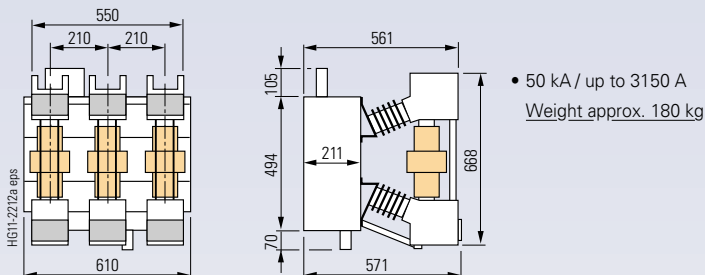
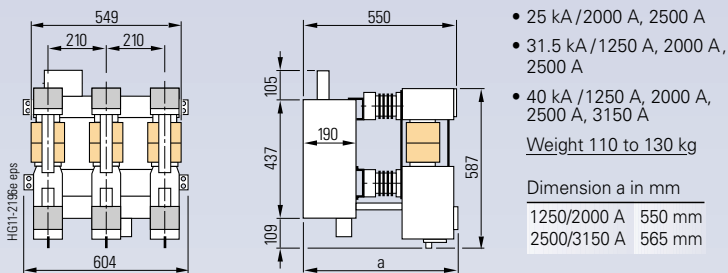
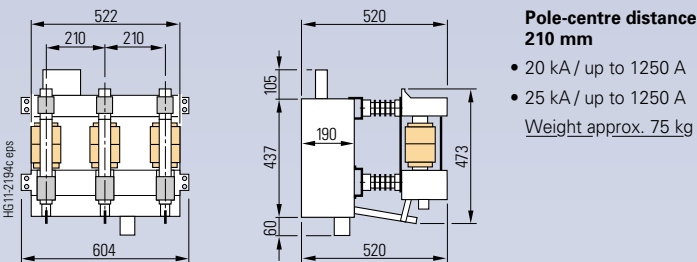
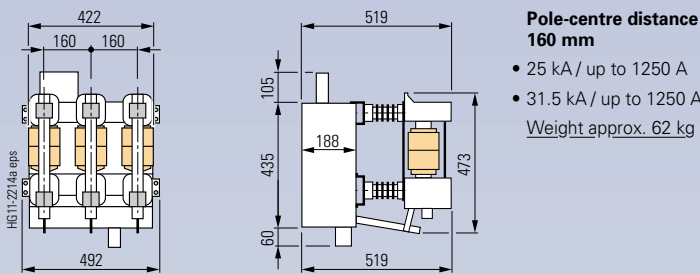
Rated operating sequences  
 O - 0.3s - CO - 15s - CO - 15s - CO - 15s - CO  
 O - 0.3s - CO - 3min - CO  
 O - 3min - CO - 3min - CO

• Possible ○  $I_{sc}$  up to 31.5 kA possible

### Electrical service life (load char. Nos. 1 to 8) · Mechanical breaker service life 10,000 operating cycles



## Dimensions and weights



## Secondary equipment

12 kV

For a description of the secondary equipment, refer to pages 1/8 to 1/13.

Basic equipment	Remarks
Additional equipment	
<b>Electrical operating mechanism</b>	- Can also be manually controlled - <u>Option</u> : with manual control
<b>Closing solenoid</b> type 3AY1510	-
<b>1st shunt release</b> type 3AY1510	- Refer to table below for release combinations
2nd shunt release type 3AX1101	- Max. 3 releases can be combined
Current transformer-operated release 0.5 A / 1 A, type 3AX1102	- A current transformer-operated release for a tripping pulse of $\geq 0.1$ Ws is used in connection with the 7SJ41 protective system or with the protective relay made by SEG
Current transformer-operated release 0.1 Ws, type 3AX1104	
Undervoltage release type 3AX1103	
<b>Auxiliary switch 6 NO + 6 NC</b>	- Refer to page 1/11 concerning contacts available for customer use
Auxiliary switch 12 NO + 12 NC*	- <u>On request</u> : More than 12 NO + 12 NC - <u>Option</u> : Gold-plated auxiliary switch contacts
<b>Terminal strip 24-pole or plug connector</b> 64-pole or 24-pole	- Electrical equipment - such as motor, release - wired to terminal strip or plug connector - <u>Option</u> : Gold-plated plug connector contacts
<b>Anti-pumping</b> mechanical and electrical	-
<b>Breaker tripping signal</b>	-
<b>Operating cycle counter</b>	-
<b>Position switches</b> (2 pieces) for signalling "Closing spring charged"	-
Electrical local closing	In place of mechanical local closing
Mechanical interlocking	-
Varistor circuitry	In the secondary circuit, for $\geq 60$ V DC
Halogen-free and flame-retardant wiring cables	-
Condensation protection	For 230 V AC
Silver-plated or tinned primary current paths	External terminals and internal connections on both sides
Hand crank	For manual charging of the closing spring
Silicone-free design	-

2

## 3 combination possibilities of the releases

Release	Release combinations		
	1	2	3
1st shunt release	•	•	•
2nd release	-	•	•
3rd release	-	-	•

The 2nd and 3rd releases can be shunt releases, undervoltage releases or current transformer-operated releases as desired (0.5 A, 1 A or 0.1 Ws).

- 1 piece per release. A maximum of 3 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 6 NO + 6 NC).  
Abbreviations: NO = normally-open, NC = normally-closed



**3AH1 166-6**  
40 kA / 2500 A

R-HG11-07/4a eps

## 15 kV

Rated voltage 15 kV  
 Rated lightning impulse withstand voltage 95 kV  
 Rated short-time power frequency withstand voltage 36 kV\*  
 Rated short-circuit duration 3 s  
 Rated short-circuit breaking current  $I_{sc}$  and rated short-circuit making current  $I_{ma}$  see table

\* Up to 42 kV on request

# 2

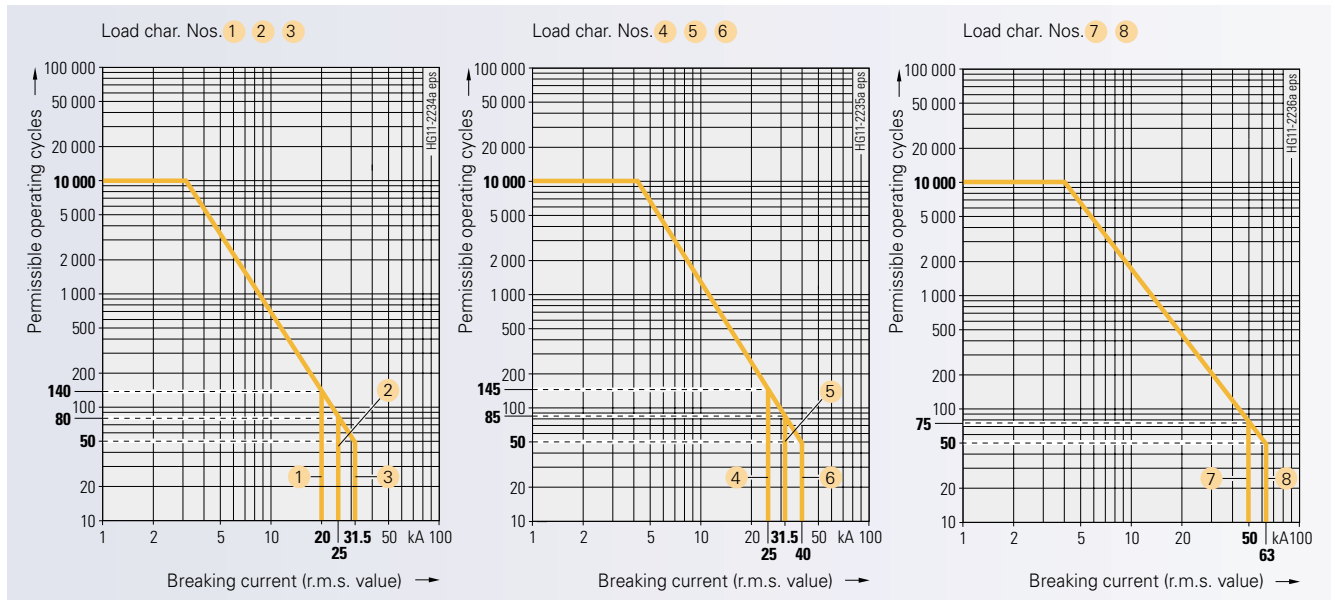
### Selection and ordering data for rated voltage 15 kV

$I_{sc}$ kA	$I_{ma}$ kA	Pole-centre distance mm	Please add Order No. suffix	Order No. suffix at rated normal current						Rated operating sequences	Remarks
				800 A	1250 A	2000 A	2500 A	3150 A	4000 A		
				Load char. No. <b>1</b> <b>1</b>						O - 0.3s - CO - 15s - CO - 15s - CO	
20	50	210	<b>3AH1 163</b> -□ ←	<b>1</b>	<b>2</b>						
				Load char. No. <b>2</b> <b>2</b> <b>2</b> <b>4</b>						O - 0.3s - CO - 3min - CO	
25	63	160	<b>3AH1 154</b> -□ ←	<b>1</b>	<b>2</b>						
	63	210	<b>3AH1 164</b> -□ ←	<b>1</b>	<b>2</b>	<b>4</b>	<b>6</b>				
				Load char. No. <b>3</b> <b>3</b> <b>5</b>						O - 3min - CO - 3min - CO	
31.5	80	210	<b>3AH1 165</b> -□ ←		<b>2</b>	<b>4</b>	<b>6</b>				
				Load char. No. <b>6</b> <b>6</b> <b>6</b> <b>6</b>							
40	100	210	<b>3AH1 166</b> -□ ←		<b>2</b>	<b>4</b>	<b>6</b>	<b>7</b>			
				Load char. No. <b>7</b> <b>7</b> <b>7</b>							
50	125	210	<b>3AH3 167</b> -□ ←		<b>2</b>		<b>6</b>	<b>7</b>			
				Load char. No. <b>8</b> <b>8</b> <b>8</b> <b>8</b>							
63	160	275	<b>3AH3 178</b> -□ ←		<b>2</b>		<b>6</b>	<b>7</b>	<b>8</b>		

Enquiry form see page A/2

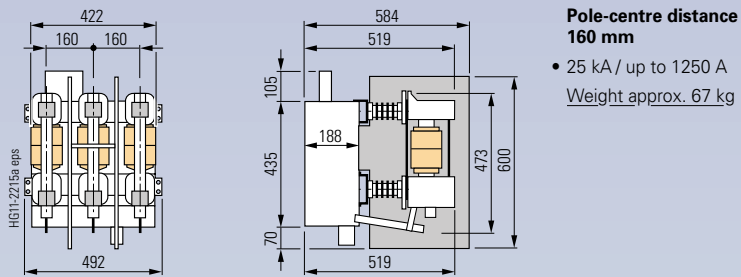
• Possible ○  $I_{sc}$  up to 31.5 kA possible

### Electrical service life (load char. Nos. 1 to 8) · Mechanical breaker service life 10,000 operating cycles



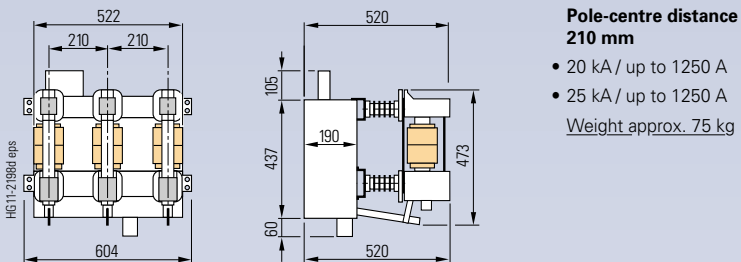


## Dimensions and weights



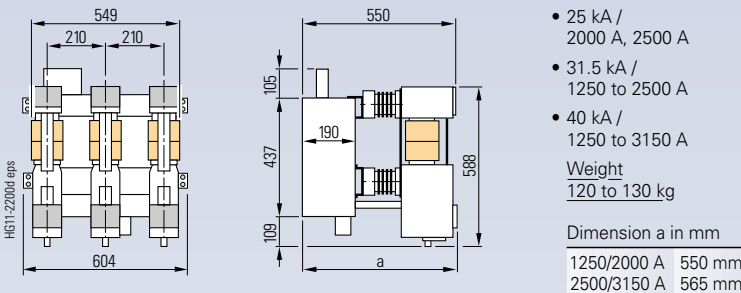
**Pole-centre distance 160 mm**

- 25 kA / up to 1250 A
- Weight approx. 67 kg



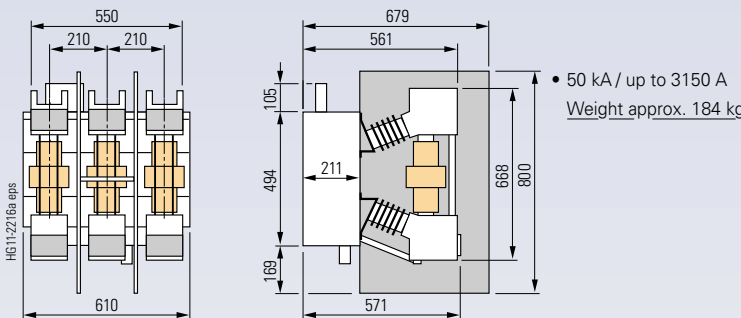
**Pole-centre distance 210 mm**

- 20 kA / up to 1250 A
- 25 kA / up to 1250 A
- Weight approx. 75 kg

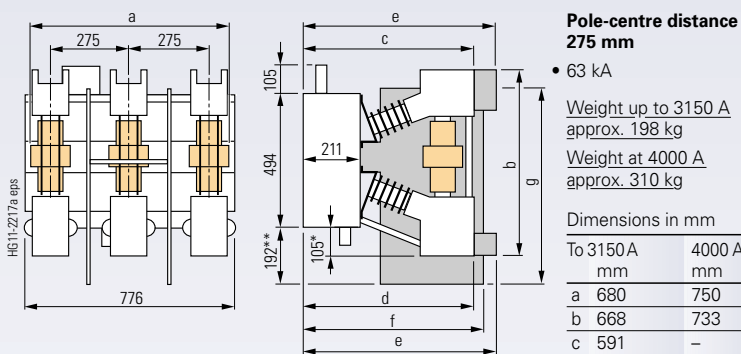


- 25 kA / 2000 A, 2500 A
- 31.5 kA / 1250 to 2500 A
- 40 kA / 1250 to 3150 A
- Weight 120 to 130 kg

Dimension a in mm	
1250/2000 A	550 mm
2500/3150 A	565 mm



- 50 kA / up to 3150 A
- Weight approx. 184 kg



**Pole-centre distance 275 mm**

- 63 kA
- Weight up to 3150 A approx. 198 kg
- Weight at 4000 A approx. 310 kg

Dimensions in mm	
To 3150 A	4000 A
a	680 / 750
b	668 / 733
c	591 / -
d	601 / -
e	- / 694
f	- / 623
g	- / 697

\* Lowest breaker size up to 3150 A  
\*\* Lowest breaker size for 4000 A

## Secondary equipment

15 kV

For a description of the secondary equipment, refer to pages 1/8 to 1/13.

Equipment	Remarks
<ul style="list-style-type: none"> <li>● <b>Basic equipment</b></li> <li>○ Additional equipment</li> </ul>	
<ul style="list-style-type: none"> <li>● <b>Electrical operating mechanism</b></li> </ul>	<ul style="list-style-type: none"> <li>- Can also be manually controlled</li> <li>- <u>Option</u>: with manual control</li> </ul>
<ul style="list-style-type: none"> <li>● <b>Closing solenoid</b> type 3AY1510</li> </ul>	
<ul style="list-style-type: none"> <li>● <b>1st shunt release</b> type 3AY1510</li> </ul>	- Refer to table below for release combinations
<ul style="list-style-type: none"> <li>○ 2nd shunt release type 3AX1101</li> </ul>	- Max. 3 releases can be combined
<ul style="list-style-type: none"> <li>○ Current transformer-operated release 0.5 A/1 A, type 3AX1102</li> </ul>	- A current transformer-operated release for a tripping pulse of $\geq 0.1$ Ws is used in connection with the 7SJ41 protective system or with the protective relay made by SEG
<ul style="list-style-type: none"> <li>○ Current transformer-operated release 0.1 Ws, type 3AX1104</li> </ul>	
<ul style="list-style-type: none"> <li>○ Undervoltage release type 3AX1103</li> </ul>	
<ul style="list-style-type: none"> <li>● <b>Auxiliary switch 6 NO + 6 NC</b></li> <li>○ Auxiliary switch 12 NO + 12 NC*</li> </ul>	<ul style="list-style-type: none"> <li>- Refer to page 1/11 concerning contacts available for customer use</li> <li>- <u>On request</u>: More than 12 NO + 12 NC</li> <li>- <u>Option</u>: Gold-plated auxiliary switch contacts</li> </ul>
<ul style="list-style-type: none"> <li>● <b>Terminal strip 24-pole or plug connector</b> 64-pole or 24-pole</li> </ul>	<ul style="list-style-type: none"> <li>- Electrical equipment - such as motor, release - wired to terminal strip or plug connector</li> <li>- <u>Option</u>: Gold-plated plug connector contacts</li> </ul>
<ul style="list-style-type: none"> <li>● <b>Anti-pumping</b> mechanical and electrical</li> </ul>	
<ul style="list-style-type: none"> <li>● <b>Breaker tripping signal</b></li> </ul>	
<ul style="list-style-type: none"> <li>● <b>Operating cycle counter</b></li> </ul>	
<ul style="list-style-type: none"> <li>● <b>Position switches</b> (2 pieces) for signalling "Closing spring charged"</li> </ul>	
<ul style="list-style-type: none"> <li>○ Electrical local closing</li> </ul>	In place of mechanical local closing
<ul style="list-style-type: none"> <li>○ Mechanical interlocking</li> </ul>	
<ul style="list-style-type: none"> <li>○ Varistor circuitry</li> </ul>	In the secondary circuit, for $\geq 60$ V DC
<ul style="list-style-type: none"> <li>○ Halogen-free and flame-retardant wiring cables</li> </ul>	
<ul style="list-style-type: none"> <li>○ Condensation protection</li> </ul>	For 230 V AC
<ul style="list-style-type: none"> <li>○ Silver-plated or tinned primary current paths</li> </ul>	External terminals and internal connections on both sides
<ul style="list-style-type: none"> <li>○ Hand crank</li> </ul>	For manual charging of the closing spring
<ul style="list-style-type: none"> <li>○ Silicone-free design</li> </ul>	

2

## 3 combination possibilities of the releases

Release	Release combinations		
	1	2	3
1st shunt release	•	•	•
2nd release	-	•	•
3rd release	-	-	•

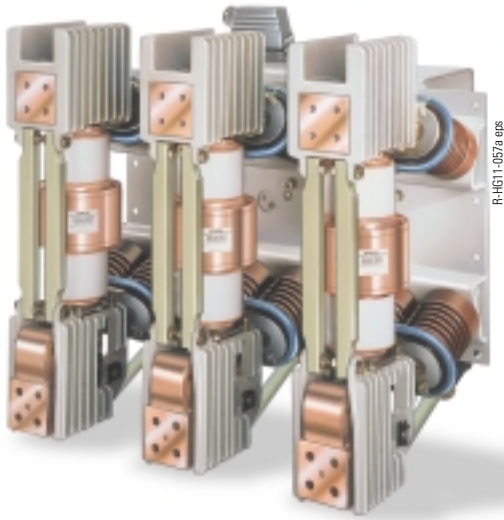
The 2nd and 3rd releases can be shunt releases, undervoltage releases or current transformer-operated releases as desired (0.5 A, 1 A or 0.1 Ws).

- 1 piece per release. A maximum of 3 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 6 NO + 6 NC).  
Abbreviations: NO = normally-open, NC = normally-closed

17.5 kV

**3AH3 228-7**  
63 kA / 3150 A  
(Partitions not shown)



Rated voltage 17.5 kV  
Rated lightning impulse withstand voltage 95 kV  
Rated short-time power frequency withstand voltage 38 kV\*  
Rated short-circuit duration 3 s  
Rated short-circuit breaking current  $I_{sc}$  and rated short-circuit making current  $I_{ma}$  see table

\* Up to 42 kV on request

Rated operating sequences

- O - 0.3s - CO - 15s - CO - 15s - CO - 15s - CO
- O - 0.3s - CO - 3min - CO
- O - 3min - CO - 3min - CO

2

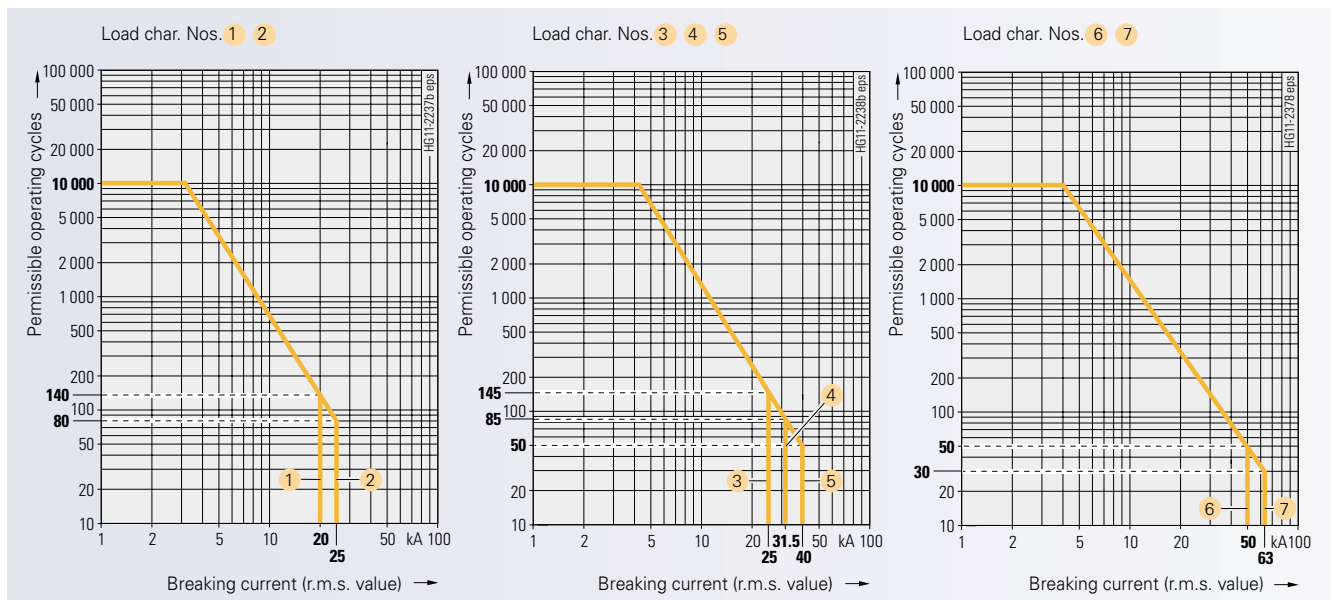
## Selection and ordering data for rated voltage 17.5 kV

$I_{sc}$ kA	$I_{ma}$ kA	Pole-centre distance mm	Please add Order No. suffix	Order No. suffix at rated normal current						Remarks
				800 A	1250 A	2000 A	2500 A	3150 A	4000 A	
Load char. No. 1 1										
20	50	210	<b>3AH1 213</b> -□ ← 1 — 2							• • • —
Load char. No. 2 2 2 3										
25	63	160	<b>3AH1 204</b> -□ ← 1 — 2							• • • —
	63	210	<b>3AH1 214</b> -□ ← 2 — 4 — 6							• • • —
Load char. No. 4 4 4 4										
31.5	80	210	<b>3AH1 215</b> -□ ← 2 — 4 — 6 — 7							• • • —
Load char. No. 5 5 5 5										
40	100	210	<b>3AH1 216</b> -□ ← 2 — 4 — 6 — 7							○ • $I_{ma}$ up to 110 kA
Load char. No. 6 6 6										
50	125	210	<b>3AH3 217</b> -□ ← 2 — 6 — 7							○ • —
Load char. No. 7 7 7 7										
63	160	275	<b>3AH3 228</b> -□ ← 2 — 6 — 7 — 8							○ • —
	160	275	<b>3AH3 818</b> -□ ← 2 — 7 — 8							• Standard: ANSI C37.013

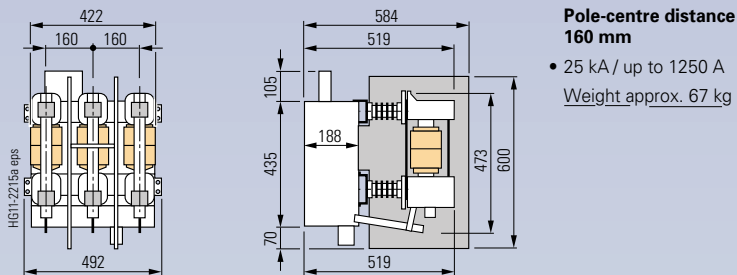
Enquiry form see page A/2

• Possible ○  $I_{sc}$  up to 31.5 kA possible

## Electrical service life (load char. Nos. 1 to 7) · Mechanical breaker service life 10,000 operating cycles

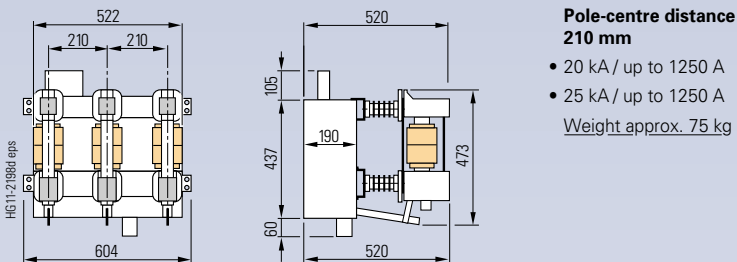


## Dimensions and weights



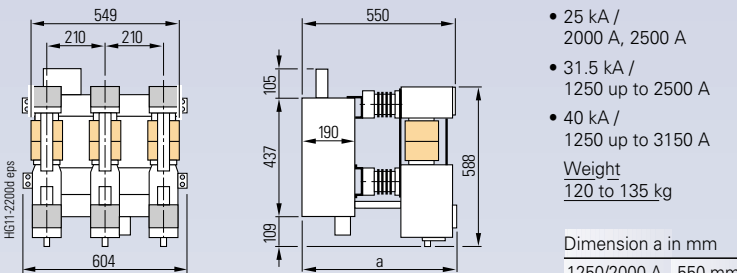
**Pole-centre distance 160 mm**

- 25 kA / up to 1250 A
- Weight approx. 67 kg



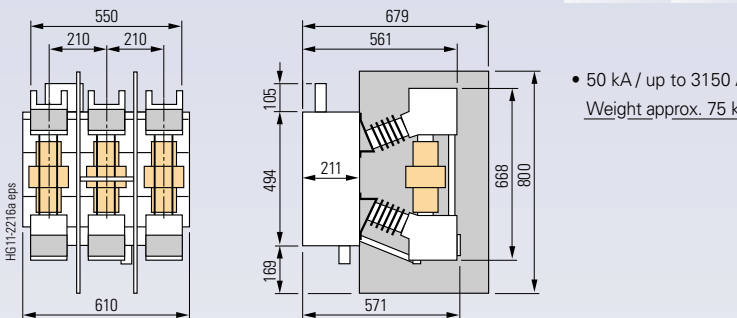
**Pole-centre distance 210 mm**

- 20 kA / up to 1250 A
- 25 kA / up to 1250 A
- Weight approx. 75 kg

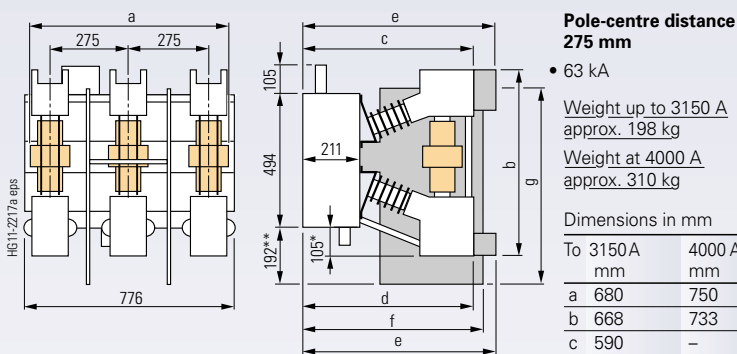


- 25 kA / 2000 A, 2500 A
- 31.5 kA / 1250 up to 2500 A
- 40 kA / 1250 up to 3150 A
- Weight 120 to 135 kg

Dimension a in mm	
1250/2000 A	550 mm
2500/3150 A	565 mm



- 50 kA / up to 3150 A
- Weight approx. 75 kg



**Pole-centre distance 275 mm**

- 63 kA
- Weight up to 3150 A approx. 198 kg
- Weight at 4000 A approx. 310 kg

Dimensions in mm	
To 3150 A	4000 A
mm	mm
a	680 / 750
b	668 / 733
c	590 / -
d	600 / -
e	- / 694
f	- / 623
g	- / 697

\* Lowest breaker size up to 3150 A  
\*\* Lowest breaker size for 4000 A

## Secondary equipment

**17.5 kV**

For a description of the secondary equipment, refer to pages 1/8 to 1/13.

Basic equipment	Remarks
Additional equipment	
<b>Electrical operating mechanism</b>	- Can also be manually controlled - <u>Option</u> : with manual control
<b>Closing solenoid</b> type 3AY1510	-
<b>1st shunt release</b> type 3AY1510	- Refer to table below for release combinations
<b>2nd shunt release</b> type 3AX1101	- Max. 3 releases can be combined
<b>Current transformer-operated release 0.5 A/1 A</b> , type 3AX1102	- A current transformer-operated release for a tripping pulse of $\geq 0.1$ Ws is used in connection with the 7SJ41 protective system or with the protective relay made by SEG
<b>Current transformer-operated release 0.1 Ws</b> , type 3AX1104	
<b>Undervoltage release</b> type 3AX1103	
<b>Auxiliary switch 6 NO + 6 NC</b>	- Refer to page 1/11 concerning contacts available for customer use
<b>Auxiliary switch 12 NO + 12 NC*</b>	- <u>On request</u> : More than 12 NO + 12 NC - <u>Option</u> : Gold-plated auxiliary switch contacts
<b>Terminal strip 24-pole or plug connector</b> 64-pole or 24-pole	- Electrical equipment - such as motor, release - wired to terminal strip or plug connector - <u>Option</u> : Gold-plated plug connector contacts
<b>Anti-pumping</b> mechanical and electrical	-
<b>Breaker tripping signal</b>	-
<b>Operating cycle counter</b>	-
<b>Position switches (2 pieces)</b> for signalling "Closing spring charged"	-
<b>Electrical local closing</b>	In place of mechanical local closing
<b>Mechanical interlocking</b>	-
<b>Varistor circuitry</b>	In the secondary circuit, for $\geq 60$ V DC
<b>Halogen-free and flame-retardant wiring cables</b>	-
<b>Condensation protection</b>	For 230 V AC
<b>Silver-plated or tinned primary current paths</b>	External terminals and internal connections on both sides
<b>Hand crank</b>	For manual charging of the closing spring
<b>Silicone-free design</b>	-

2

## 3 combination possibilities of the releases

Release	Release combinations		
	1	2	3
1st shunt release	•	•	•
2nd release	-	•	•
3rd release	-	-	•

The 2nd and 3rd releases can be shunt releases, undervoltage releases or current transformer-operated releases as desired (0.5 A, 1 A or 0.1 Ws).

- 1 piece per release. A maximum of 3 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 6 NO + 6 NC).  
Abbreviations: NO = normally-open, NC = normally-closed

**3AH1 284-2**  
25 kA / 1250 A



**24 kV**

Rated voltage 24 kV  
Rated lightning impulse withstand voltage 125 kV  
Rated short-time power frequency withstand voltage 50 kV  
Rated short-circuit duration 3 s  
Rated short-circuit breaking current  $I_{sc}$  and rated short-circuit making current  $I_{ma}$  see table

**2**

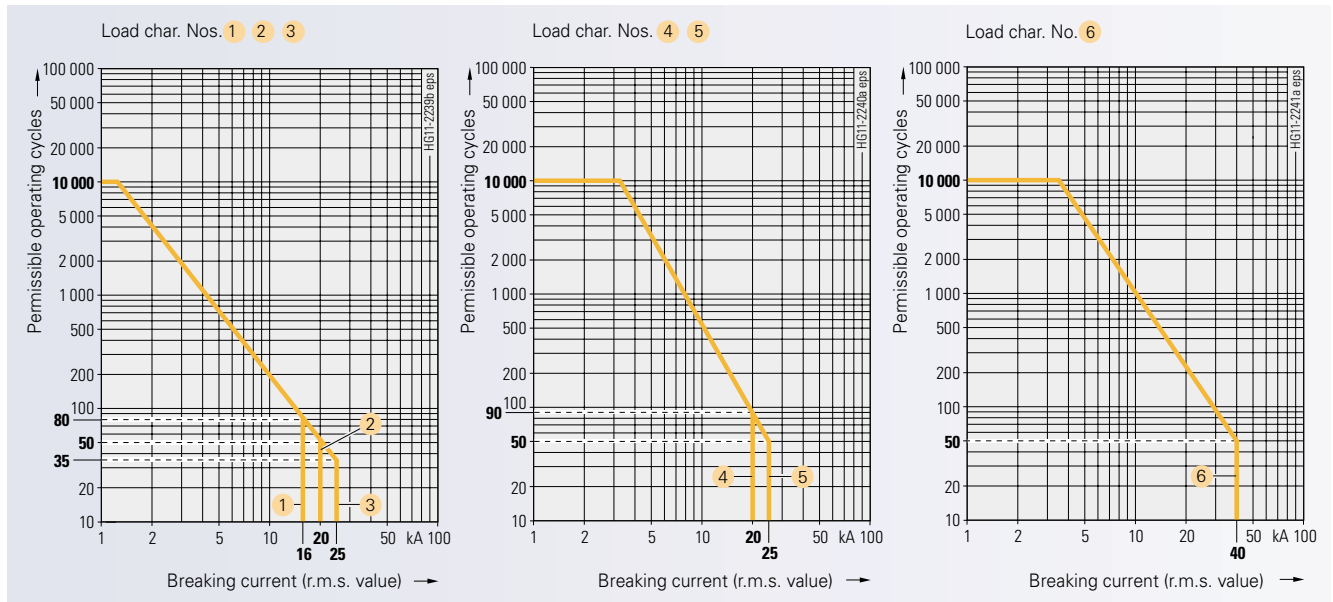
### Selection and ordering data for rated voltage 24 kV

$I_{sc}$ kA	$I_{ma}$ kA	Pole-centre distance mm	Please add Order No. suffix	Order No. suffix at rated normal current					Rated operating sequences				Remarks	
				800 A	1250 A	1250 A	2000 A	2500 A	O - 0.3s - CO - 15s - CO - 15s - CO	O - 0.3s - CO - 3min - CO	O - 3min - CO - 3min - CO			
				Load char. No. <b>1</b> <b>1</b>										
16	40	210	<b>3AH1 252</b> -□ ← 1 — 2	1	2				•	•	•	—		
	40	275	<b>3AH1 262</b> -□ ← 1 — 2	1	2				•	•	•	—		
				Load char. No. <b>2</b> <b>2</b> <b>4</b> <b>4</b> <b>4</b>										
20	50	210	<b>3AH1 273</b> -□ ← 1 — 2	1	2				•	•	•	—		
	50		<b>3AH1 253</b> -□ ←		2	4	6		•	•	•	—		
	50	275	<b>3AH1 283</b> -□ ← 1 — 2	1	2				•	•	•	—		
	50		<b>3AH1 263</b> -□ ←		2	4	6		•	•	•	—		
				Load char. No. <b>3</b> <b>3</b> <b>5</b> <b>5</b> <b>5</b>										
25	63	210	<b>3AH1 274</b> -□ ← 1 — 2	1	2				•	•	•	3AH1 274: up to 35 x $I_{sc}$		
	63		<b>3AH1 254</b> -□ ←		2	4	6		•	•	•	—		
	63	275	<b>3AH1 284</b> -□ ← 1 — 2	1	2				•	•	•	3AH1 284: up to 35 x $I_{sc}$		
	63		<b>3AH1 264</b> -□ ←		2	4	6		•	•	•	—		
				Load char. No. <b>6</b>										
40	100	275	<b>3AH3 266</b> -□ ←				6		○	•	—			

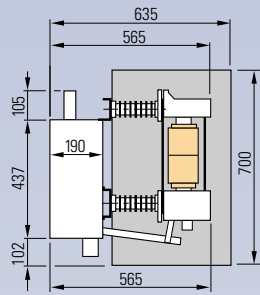
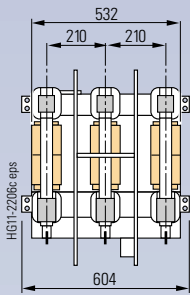
Enquiry form  
see page A/2

• Possible ○  $I_{sc}$  up to 31.5 kA possible

### Electrical service life (load char. Nos. 1 to 6) · Mechanical breaker service life 10,000 operating cycles

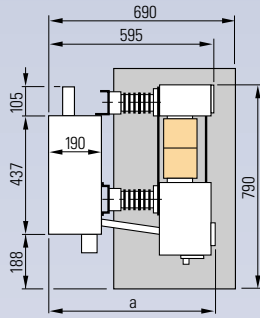
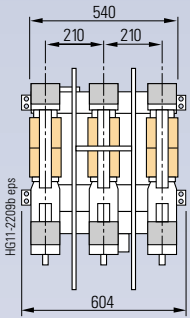


## Dimensions and weights



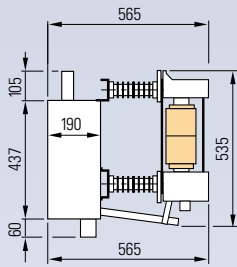
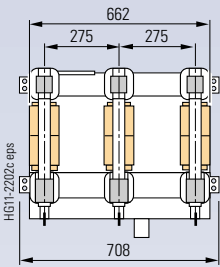
### Pole-centre distance 210 mm

- 16 kA / up to 1250 A
  - 20 kA / up to 1250 A (only for type 3AH1 27.-.)
  - 25 kA / up to 1250 A (only for type 3AH1 27.-.)
- Weight approx. 85 kg



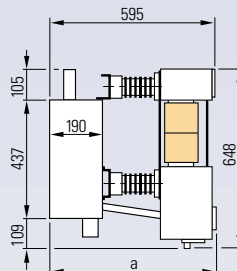
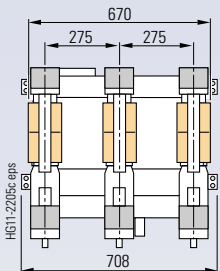
- 20 kA (for type 3AH1 253.-.)
  - 25 kA (for type 3AH1 254.-.)
- Weight  
120 kg to 130 kg

Dimension a in mm	
1250/2000 A	595 mm
2500 A	610 mm



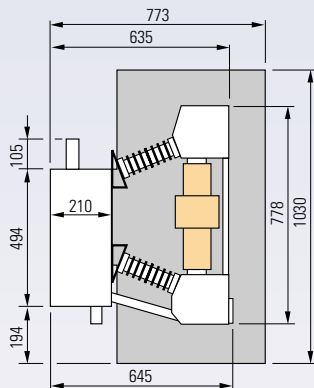
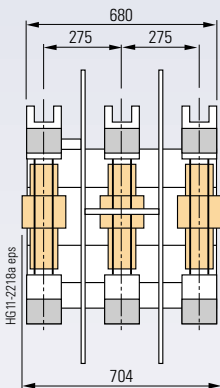
### Pole-centre distance 275 mm

- 16 kA / up to 1250 A
  - 20 kA / up to 1250 A (only for type 3AH1 28.-.)
  - 25 kA / up to 1250 A (only for type 3AH1 28.-.)
- Weight  
120 kg to 130 kg



- 20 kA (for type 3AH1 263.-.)
  - 25 kA (for type 3AH1 264.-.)
- Weight  
120 kg to 130 kg

Dimensions a in mm	
1250/2000 A	595 mm
2500 A	610 mm



- 40 kA / 2500 A
- Weight  
approx. 168 kg

## Secondary equipment

# 24 kV

For a description of the secondary equipment, refer to pages 1/8 to 1/13.

Equipment	Remarks
<ul style="list-style-type: none"> <li>● <b>Basic equipment</b></li> <li>○ Additional equipment</li> </ul>	
<ul style="list-style-type: none"> <li>● <b>Electrical operating mechanism</b></li> </ul>	<ul style="list-style-type: none"> <li>- Can also be manually controlled</li> <li>- <u>Option</u>: with manual control</li> </ul>
<ul style="list-style-type: none"> <li>● <b>Closing solenoid</b> type 3AY1510</li> </ul>	
<ul style="list-style-type: none"> <li>● <b>1st shunt release</b> type 3AY1510</li> </ul>	- Refer to table below for release combinations
<ul style="list-style-type: none"> <li>○ 2nd shunt release type 3AX1101</li> </ul>	- Max. 3 releases can be combined
<ul style="list-style-type: none"> <li>○ Current transformer-operated release 0.5 A/1 A, type 3AX1102</li> </ul>	- A current transformer-operated release for a tripping pulse of $\geq 0.1$ Ws is used in connection with the 7SJ41 protective system or with the protective relay made by SEG
<ul style="list-style-type: none"> <li>○ Current transformer-operated release 0.1 Ws, type 3AX1104</li> </ul>	
<ul style="list-style-type: none"> <li>○ Undervoltage release type 3AX1103</li> </ul>	
<ul style="list-style-type: none"> <li>● <b>Auxiliary switch 6 NO + 6 NC</b></li> <li>○ Auxiliary switch 12 NO + 12 NC*</li> </ul>	<ul style="list-style-type: none"> <li>- Refer to page 1/11 concerning contacts available for customer use</li> <li>- <u>On request</u>: More than 12 NO + 12 NC</li> <li>- <u>Option</u>: Gold-plated auxiliary switch contacts</li> </ul>
<ul style="list-style-type: none"> <li>● <b>Terminal strip 24-pole or plug connector</b> 64-pole or 24-pole</li> </ul>	<ul style="list-style-type: none"> <li>- Electrical equipment – such as motor, release – wired to terminal strip or plug connector</li> <li>- <u>Option</u>: Gold-plated plug connector contacts</li> </ul>
<ul style="list-style-type: none"> <li>● <b>Anti-pumping</b> mechanical and electrical</li> </ul>	
<ul style="list-style-type: none"> <li>● <b>Breaker tripping signal</b></li> </ul>	
<ul style="list-style-type: none"> <li>● <b>Operating cycle counter</b></li> </ul>	
<ul style="list-style-type: none"> <li>● <b>Position switches</b> (2 pieces) for signalling "Closing spring charged"</li> </ul>	
<ul style="list-style-type: none"> <li>○ Electrical local closing</li> </ul>	In place of mechanical local closing
<ul style="list-style-type: none"> <li>○ Mechanical interlocking</li> </ul>	
<ul style="list-style-type: none"> <li>○ Varistor circuitry</li> </ul>	In the secondary circuit, for $\geq 60$ V DC
<ul style="list-style-type: none"> <li>○ Halogen-free and flame-retardant wiring cables</li> </ul>	
<ul style="list-style-type: none"> <li>○ Condensation protection</li> </ul>	For 230 V AC
<ul style="list-style-type: none"> <li>○ Silver-plated or tinned primary current paths</li> </ul>	External terminals and internal connections on both sides
<ul style="list-style-type: none"> <li>○ Hand crank</li> </ul>	For manual charging of the closing spring
<ul style="list-style-type: none"> <li>○ Silicone-free design</li> </ul>	

### 3 combination possibilities of the releases

Release	Release combinations		
	1	2	3
1st shunt release	•	•	•
2nd release	-	•	•
3rd release	-	-	•

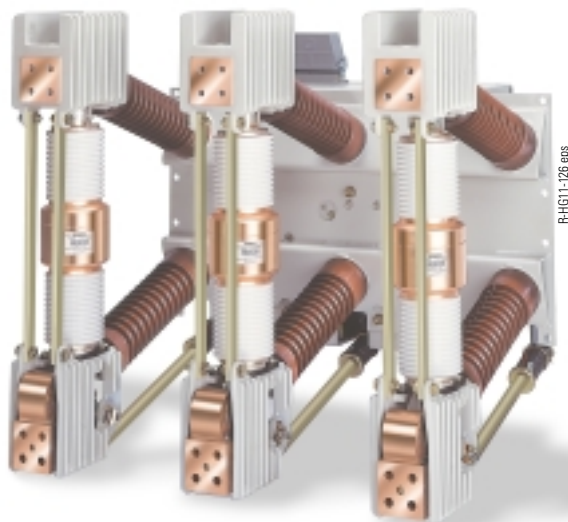
The 2nd and 3rd releases can be shunt releases, undervoltage releases or current transformer-operated releases as desired (0.5 A, 1 A or 0.1 Ws).

- 1 piece per release. A maximum of 3 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 6 NO + 6 NC).  
Abbreviations: NO = normally-open, NC = normally-closed

## 36 kV

**3AH3 305-6**  
31.5 kA / 2500 A  
(Partitions  
not shown)



Rated voltage 36 kV\*  
Rated lightning impulse withstand voltage 170 kV\*\*  
Rated short-time power frequency  
withstand voltage 70 kV\*\*\*  
Rated short-circuit duration 3 s  
Rated short-circuit breaking current  $I_{sc}$  and  
rated short-circuit making current  $I_{ma}$   
see table

\* Up to 40.5 kV on request  
\*\* Up to 185 kV on request  
\*\*\* Up to 85 kV on request

Rated operating sequences

O - 0.3s - CO - 15s - CO - 15s - CO - 15s - CO  
O - 0.3s - CO - 3min - CO  
O - 3min - CO - 3min - CO

# 2

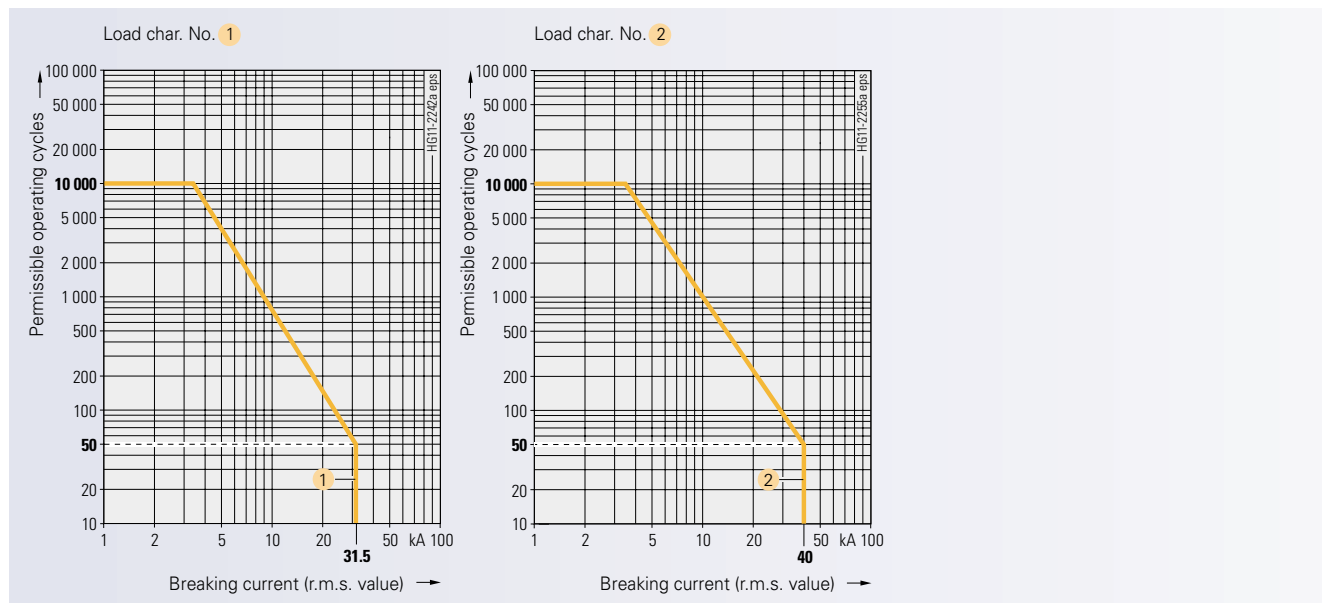
### Selection and ordering data for rated voltage 36 kV

$I_{sc}$ kA	$I_{ma}$ kA	Pole- centre distance mm	Please add Order No. suffix	Order No. suffix at rated normal current			Remarks
				1250 A	2000 A	2500 A	
				Load char. No. <b>1</b> <b>1</b>			
31.5	80	350	<b>3AH3 305-</b> □ ← <b>2</b> — <b>4</b> — <b>6</b>	•	•	•	—
				Load char. No. <b>2</b>			
40	100	350	<b>3AH3 306-</b> □ ← <b>6</b>		○	•	—

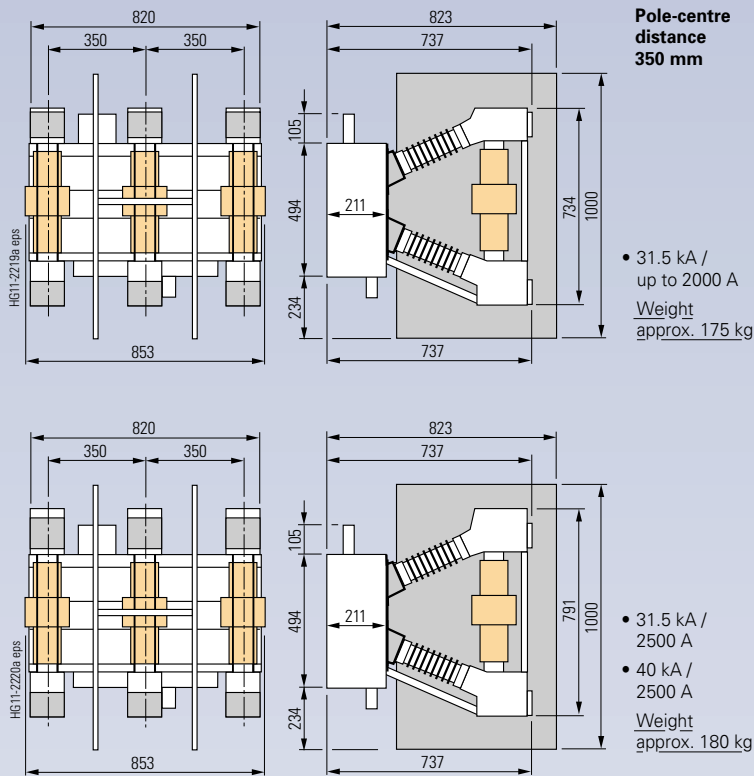
Enquiry form  
see page A/2

• Possible ○  $I_{sc}$  up to 31.5 kA possible

**Electrical service life (load char. Nos. 1 and 2)** · Mechanical breaker service life 10,000 operating cycles



## Dimensions and weights



## Secondary equipment

**36 kV**

For a description of the secondary equipment, refer to pages 1/8 to 1/13.

Basic equipment	Remarks
<ul style="list-style-type: none"> <li>○ Additional equipment</li> </ul>	
<ul style="list-style-type: none"> <li>● <b>Electrical operating mechanism</b></li> </ul>	<ul style="list-style-type: none"> <li>- Can also be manually controlled</li> <li>- <u>Option</u>: with manual control</li> </ul>
<ul style="list-style-type: none"> <li>● <b>Closing solenoid</b> type 3AY1510</li> </ul>	—
<ul style="list-style-type: none"> <li>● <b>1st shunt release</b> type 3AY1510</li> </ul>	<ul style="list-style-type: none"> <li>- Refer to table below for release combinations</li> </ul>
<ul style="list-style-type: none"> <li>○ 2nd shunt release type 3AX1101</li> </ul>	<ul style="list-style-type: none"> <li>- Max. 3 releases can be combined</li> </ul>
<ul style="list-style-type: none"> <li>○ Current transformer-operated release 0.5 A/1 A, type 3AX1102</li> </ul>	<ul style="list-style-type: none"> <li>- A current transformer-operated release for a tripping pulse of <math>\geq 0.1</math> Ws is used in connection with the 7SJ41 protective system or with the protective relay made by SEG</li> </ul>
<ul style="list-style-type: none"> <li>○ Current transformer-operated release 0.1 Ws, type 3AX1104</li> </ul>	
<ul style="list-style-type: none"> <li>○ Undervoltage release type 3AX1103</li> </ul>	
<ul style="list-style-type: none"> <li>● <b>Auxiliary switch 6 NO + 6 NC</b></li> </ul>	<ul style="list-style-type: none"> <li>- Refer to page 1/11 concerning contacts available for customer use</li> </ul>
<ul style="list-style-type: none"> <li>○ Auxiliary switch 12 NO + 12 NC*</li> </ul>	<ul style="list-style-type: none"> <li>- <u>On request</u>: More than 12 NO + 12 NC</li> <li>- <u>Option</u>: Gold-plated auxiliary switch contacts</li> </ul>
<ul style="list-style-type: none"> <li>● <b>Terminal strip 24-pole or plug connector 64-pole or 24-pole</b></li> </ul>	<ul style="list-style-type: none"> <li>- Electrical equipment – such as motor, release – wired to terminal strip or plug connector</li> <li>- <u>Option</u>: Gold-plated plug connector contacts</li> </ul>
<ul style="list-style-type: none"> <li>● <b>Anti-pumping</b> mechanical and electrical</li> </ul>	—
<ul style="list-style-type: none"> <li>● <b>Breaker tripping signal</b></li> </ul>	—
<ul style="list-style-type: none"> <li>● <b>Operating cycle counter</b></li> </ul>	—
<ul style="list-style-type: none"> <li>● <b>Position switches</b> (2 pieces) for signalling “Closing spring charged”</li> </ul>	—
<ul style="list-style-type: none"> <li>○ Electrical local closing</li> </ul>	In place of mechanical local closing
<ul style="list-style-type: none"> <li>○ Mechanical interlocking</li> </ul>	—
<ul style="list-style-type: none"> <li>○ Varistor circuitry</li> </ul>	In the secondary circuit, for $\geq 60$ V DC
<ul style="list-style-type: none"> <li>○ Halogen-free and flame-retardant wiring cables</li> </ul>	—
<ul style="list-style-type: none"> <li>○ Condensation protection</li> </ul>	For 230 V AC
<ul style="list-style-type: none"> <li>○ Silver-plated or tinned primary current paths</li> </ul>	External terminals and internal connections on both sides
<ul style="list-style-type: none"> <li>○ Hand crank</li> </ul>	For manual charging of the closing spring
<ul style="list-style-type: none"> <li>○ Silicone-free design</li> </ul>	—

2

### 3 combination possibilities of the releases

Release	Release combinations		
	1	2	3
1st shunt release	•	•	•
2nd release	-	•	•
3rd release	-	-	•

The 2nd and 3rd releases can be shunt releases, undervoltage releases or current transformer-operated releases as desired (0.5 A, 1 A or 0.1 Ws).

- 1 piece per release. A maximum of 3 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 6 NO + 6 NC).  
Abbreviations: NO = normally-open, NC = normally-closed

7.2 to 36 kV



RHG11-071 eps

e. g. 3AH2 frequent-operation circuit-breaker  
24 kV / 25 kA / 2500 A



RHG11-127 eps

e. g. 3AH4 frequent-operation circuit-breaker  
24 kV / 40 kA / 2500 A  
(partitions not shown)



Arc furnace of a steelworks

RHG11-070 eps

**Catalog section 3** Page

- Rated data
- Selection and ordering data
- Electrical and mechanical service life
- Dimensions and weights
- Secondary equipment

For rated voltages

- 7.2 kV	3/2-3/3
- 12 kV	3/4-3/5
- 15 kV	3/6-3/7
- 17.5 kV	3/8-3/9
- 24 kV	3/10-3/11
- 36 kV	3/12-3/13

Enquiry form A/2

**Features of frequent-operation circuit-breakers**

- Rated voltages 7.2 to 36 kV
- Maintenance-free up to 10,000 operating cycles
- Mechanical breaker service life
  - for 3AH2 frequent-operation circuit-breakers, 60,000 operating cycles
  - for 3AH4 frequent-operation circuit-breakers, 120,000 operating cycles
- Rated short-circuit breaking currents up to 40 kA (r.m.s. value), minimum 50 operating cycles
- DC component 36%, higher values on request
- Switching capacity at a rated normal current of up to 2500 A, 30,000 operating cycles
- Suitable for use in conjunction with, for example:
  - Capacitors
  - Filter circuits
  - Motors
  - Reactors (individual protection circuitry required)
  - Especially suitable for operating arc furnaces (individual protection circuitry also required)





**3AH2 056-6**  
40 kA / 2500 A

## 7.2 kV

Rated voltage 7.2 kV  
 Rated lightning impulse withstand voltage 60 kV  
 Rated short-time power frequency withstand voltage 20 kV  
 Rated short-circuit duration 3 s  
 Rated short-circuit breaking current  $I_{sc}$  and rated short-circuit making current  $I_{ma}$  see table

### Selection and ordering data for rated voltage 7.2 kV

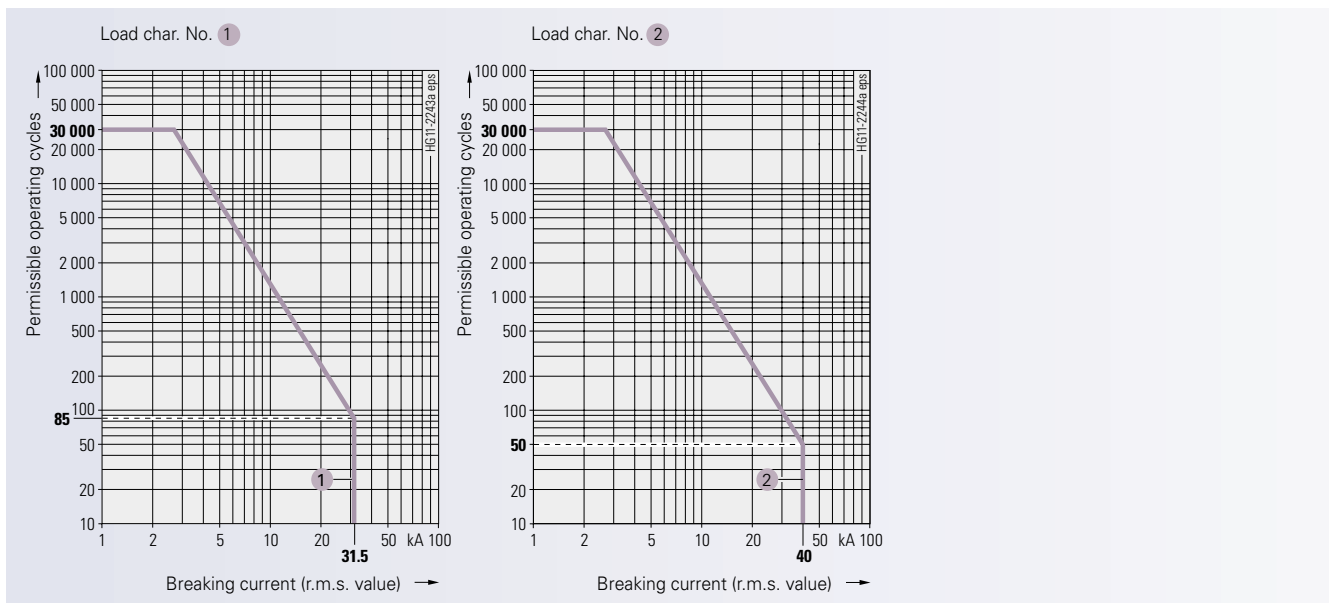
$I_{sc}$ kA	$I_{ma}$ kA	Pole-centre distance mm	Please add Order No. suffix	Order No. suffix at rated normal current				Remarks
				1250 A	2000 A	2500 A	3150 A	
				Load char. No. <b>1</b> <b>1</b> <b>1</b>				
31.5	80	210	<b>3AH2 055-□</b> ←	<b>2</b>	<b>4</b>	<b>6</b>		•   •   •   —
				Load char. No. <b>2</b> <b>2</b> <b>2</b> <b>2</b>				
40	100	210	<b>3AH2 056-□</b> ←	<b>2</b>	<b>4</b>	<b>6</b>	<b>7</b>	○   • $I_{sc}$ up to 44 kA, $I_{ma}$ up to 110 kA

Rated operating sequences  
 O - 0.3s - CO - 15s - CO - 15s - CO - 15s - CO  
 O - 0.3s - CO - 3min - CO  
 O - 3min - CO - 3min - CO

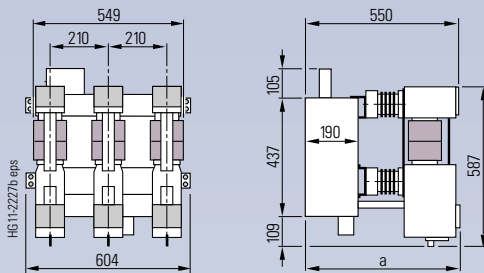
Enquiry form  
see page A/2

• Possible   ○  $I_{sc}$  up to 31.5 kA possible

**Electrical service life (load char. Nos. 1 and 2) · Mechanical breaker service life 60,000 operating cycles**



## Dimensions and weights



### Pole-centre distance 210 mm

- 31.5 kA / 1250 A, 2000 A, 2500 A
- 40 kA / 1250 A, 2000 A, 2500 A, 3150 A

Weight approx. 130 kg

Dimension a in mm

1250/2000 A	550 mm
2500/3150 A	565 mm

## Secondary equipment

# 7.2 kV

For a description of the secondary equipment, refer to pages 1/8 to 1/13.

Basic equipment	Remarks
○ Additional equipment	
● <b>Electrical operating mechanism</b>	– Can also be manually controlled – <u>Option</u> : with manual control
● <b>Closing solenoid</b> type 3AY1510	–
● <b>1st shunt release</b> type 3AY1510	– Refer to table below for release combinations
○ 2nd shunt release type 3AX1101	– Max. 3 releases can be combined
○ Current transformer-operated release 0.5 A/1 A, type 3AX1102	– A current transformer-operated release for a tripping pulse of $\geq 0.1$ Ws is used in connection with the 7SJ41 protective system or with the protective relay made by SEG
○ Current transformer-operated release 0.1 Ws, type 3AX1104	
○ Undervoltage release type 3AX1103	
● <b>Auxiliary switch 6 NO + 6 NC</b>	– Refer to page 1/11 concerning contacts available for customer use
○ Auxiliary switch 12 NO + 12 NC*	– <u>On request</u> : More than 12 NO + 12 NC – <u>Option</u> : Gold-plated auxiliary switch contacts
● <b>Terminal strip 24-pole or plug connector 64-pole or 24-pole</b>	– Electrical equipment – such as motor, release – wired to terminal strip or plug connector – <u>Option</u> : Gold-plated plug connector contacts
● <b>Anti-pumping</b> mechanical and electrical	–
● <b>Breaker tripping signal</b>	–
● <b>Operating cycle counter</b>	–
● <b>Position switches</b> (2 pieces) for signalling “Closing spring charged”	–
○ Electrical local closing	In place of mechanical local closing
○ Mechanical interlocking	–
○ Varistor circuitry	In the secondary circuit, for $\geq 60$ V DC
○ Halogen-free and flame-retardant wiring cables	–
○ Condensation protection	For 230 V AC
○ Silver-plated or tinned primary current paths	External terminals and internal connections on both sides
○ Hand crank	For manual charging of the closing spring
○ Silicone-free design	–

### 3 combination possibilities of the releases

Release	Release combinations		
	1	2	3
1st shunt release	•	•	•
2nd release	–	•	•
3rd release	–	–	•

The 2nd and 3rd releases can be shunt releases, undervoltage releases or current transformer-operated releases as desired (0.5 A, 1 A or 0.1 Ws).

- 1 piece per release. A maximum of 3 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 6 NO + 6 NC).  
Abbreviations: NO = normally-open, NC = normally-closed



## 12 kV

**3AH2 116-6**  
40 kA / 2500 A

Rated voltage 12 kV  
 Rated lightning impulse withstand voltage 75 kV  
 Rated short-time power frequency withstand voltage 28 kV\*  
 Rated short-circuit duration 3 s  
 Rated short-circuit breaking current  $I_{sc}$  and rated short-circuit making current  $I_{ma}$  see table

\* Up to 42 kV on request

### Selection and ordering data for rated voltage 12 kV

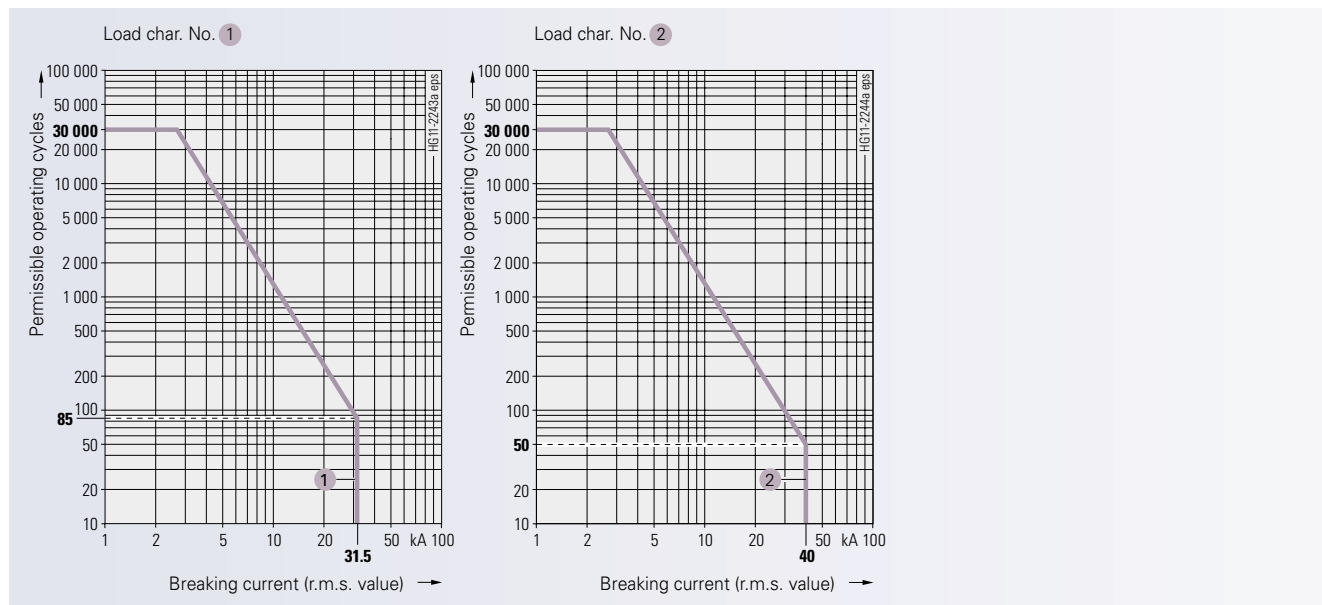
$I_{sc}$ kA	$I_{ma}$ kA	Pole-centre distance mm	Please add Order No. suffix	Order No. suffix at rated normal current				Remarks
				1250 A	2000 A	2500 A	3150 A	
				Load char. No. <b>1</b> <b>1</b> <b>1</b>				
31.5	80	210	<b>3AH2 115-□</b> ←	<b>2</b>	<b>4</b>	<b>6</b>		• • • —
				Load char. No. <b>2</b> <b>2</b> <b>2</b> <b>2</b>				
40	100	210	<b>3AH2 116-□</b> ←	<b>2</b>	<b>4</b>	<b>6</b>	<b>7</b>	○ • $I_{sc}$ up to 44 kA, $I_{ma}$ up to 110 kA

Rated operating sequences  
 O - 0.3s - CO - 15s - CO - 15s - CO - 15s - CO  
 O - 0.3s - CO - 3min - CO  
 O - 3min - CO - 3min - CO

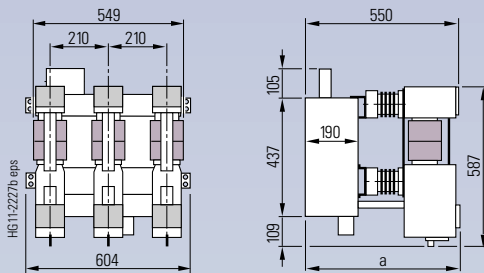
Enquiry form see page A/2

• Possible ○  $I_{sc}$  up to 31.5 kA possible

**Electrical service life (load char. Nos. 1 and 2) · Mechanical breaker service life 60,000 operating cycles**



## Dimensions and weights



### Pole-centre distance 210 mm

- 31.5 kA / 1250 A, 2000 A, 2500 A
- 40 kA / 1250 A, 2000 A, 2500 A, 3150 A

Weight approx. 130 kg

Dimension a in mm

1250/2000 A	550 mm
2500/3150 A	565 mm

## Secondary equipment

# 12 kV

For a description of the secondary equipment, refer to pages 1/8 to 1/13.

Basic equipment	Remarks
○ Additional equipment	
● <b>Electrical operating mechanism</b>	– Can also be manually controlled – <u>Option</u> : with manual control
● <b>Closing solenoid</b> type 3AY1510	–
● <b>1st shunt release</b> type 3AY1510	– Refer to table below for release combinations
○ 2nd shunt release type 3AX1101	– Max. 3 releases can be combined
○ Current transformer-operated release 0.5 A/1 A, type 3AX1102	– A current transformer-operated release for a tripping pulse of $\geq 0.1$ Ws is used in connection with the 7SJ41 protective system or with the protective relay made by SEG
○ Current transformer-operated release 0.1 Ws, type 3AX1104	
○ Undervoltage release type 3AX1103	
● <b>Auxiliary switch 6 NO + 6 NC</b>	– Refer to page 1/11 concerning contacts available for customer use
○ Auxiliary switch 12 NO + 12 NC*	– <u>On request</u> : More than 12 NO + 12 NC – <u>Option</u> : Gold-plated auxiliary switch contacts
● <b>Terminal strip 24-pole or plug connector 64-pole or 24-pole</b>	– Electrical equipment – such as motor, release – wired to terminal strip or plug connector – <u>Option</u> : Gold-plated plug connector contacts
● <b>Anti-pumping</b> mechanical and electrical	–
● <b>Breaker tripping signal</b>	–
● <b>Operating cycle counter</b>	–
● <b>Position switches</b> (2 pieces) for signalling “Closing spring charged”	–
○ Electrical local closing	In place of mechanical local closing
○ Mechanical interlocking	–
○ Varistor circuitry	In the secondary circuit, for $\geq 60$ V DC
○ Halogen-free and flame-retardant wiring cables	–
○ Condensation protection	For 230 V AC
○ Silver-plated or tinned primary current paths	External terminals and internal connections on both sides
○ Hand crank	For manual charging of the closing spring
○ Silicone-free design	–

# 3

### 3 combination possibilities of the releases

Release	Release combinations		
	1	2	3
1st shunt release	•	•	•
2nd release	–	•	•
3rd release	–	–	•

The 2nd and 3rd releases can be shunt releases, undervoltage releases or current transformer-operated releases as desired (0.5 A, 1 A or 0.1 Ws).

- 1 piece per release. A maximum of 3 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 6 NO + 6 NC).  
Abbreviations: NO = normally-open, NC = normally-closed



**3AH2 166-6**  
40 kA / 2500 A

**15 kV**

Rated voltage 15 kV  
 Rated lightning impulse withstand voltage 95 kV  
 Rated short-time power frequency withstand voltage 36 kV\*  
 Rated short-circuit duration 3 s  
 Rated short-circuit breaking current  $I_{sc}$  and rated short-circuit making current  $I_{ma}$  see table

\* Up to 42 kV on request

Rated operating sequences

- - 0.3s - CO - 15s - CO - 15s - CO - 15s - CO
- - 0.3s - CO - 3min - CO
- - 3min - CO - 3min - CO

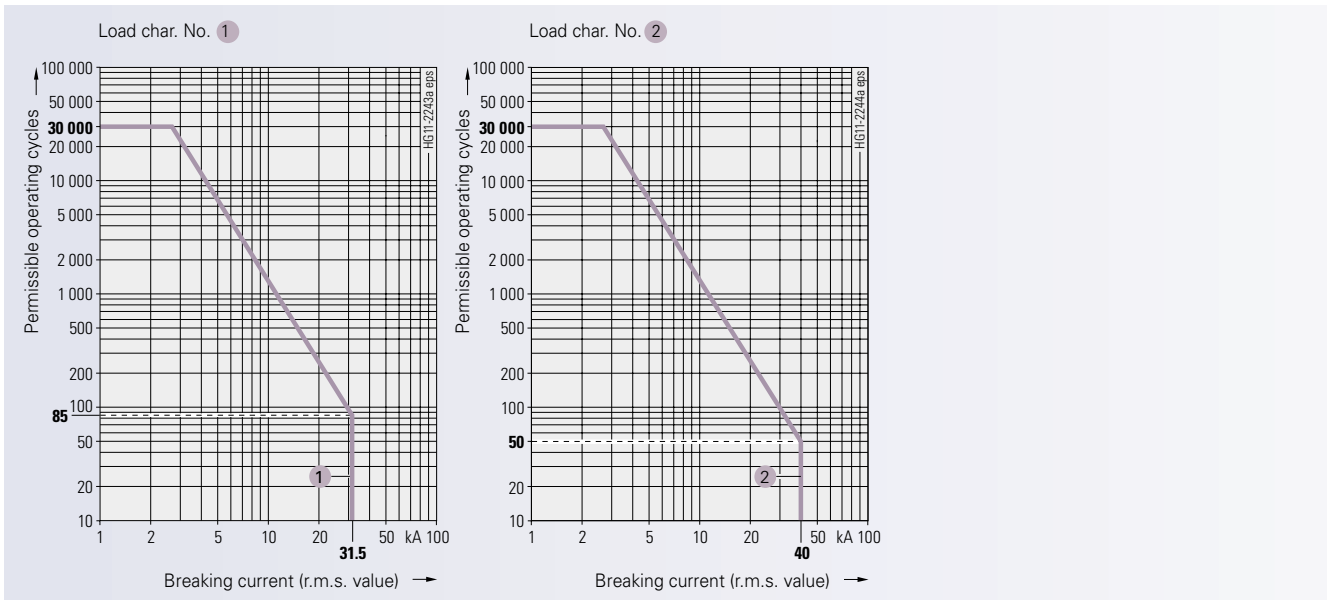
### Selection and ordering data for rated voltage 15 kV

$I_{sc}$ kA	$I_{ma}$ kA	Pole-centre distance mm	Please add Order No. suffix	Order No. suffix at rated normal current				Remarks
				1250 A	2000 A	2500 A	3150 A	
				Load char. No. <b>1</b> <b>1</b> <b>1</b>				
31.5	80	210	<b>3AH2 165-□</b> ←	<b>2</b>	<b>4</b>	<b>6</b>		• • • —
				Load char. No. <b>2</b> <b>2</b> <b>2</b> <b>2</b>				
40	100	210	<b>3AH2 166-□</b> ←	<b>2</b>	<b>4</b>	<b>6</b>	<b>7</b>	○ • $I_{ma}$ up to 110 kA

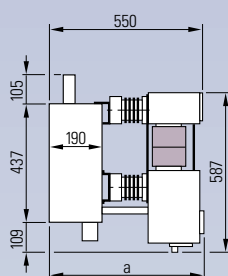
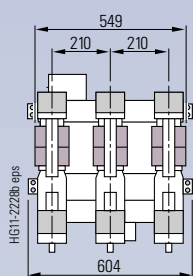
Enquiry form  
see page A/2

• Possible ○  $I_{sc}$  up to 31.5 kA possible

**Electrical service life (load char. Nos. 1 and 2)** · Mechanical breaker service life 60,000 operating cycles



## Dimensions and weights



### Pole-centre distance 210 mm

- 31.5 kA / 1250 A, 2000 A, 2500 A
  - 40 kA / 1250 A, 2000 A, 2500 A, 3150 A
- Weight approx. 135 kg

Dimension a in mm	
1250/2000 A	550 mm
2500/3150 A	565 mm

## Secondary equipment

15 kV

For a description of the secondary equipment, refer to pages 1/8 to 1/13.

Basic equipment	Remarks
○ Additional equipment	
● <b>Electrical operating mechanism</b>	– Can also be manually controlled – <u>Option</u> : with manual control
● <b>Closing solenoid</b> type 3AY1510	–
● <b>1st shunt release</b> type 3AY1510	– Refer to table below for release combinations
○ 2nd shunt release type 3AX1101	– Max. 3 releases can be combined
○ Current transformer-operated release 0.5 A/1 A, type 3AX1102	– A current transformer-operated release for a tripping pulse of $\geq 0.1$ Ws is used in connection with the 7SJ41 protective system or with the protective relay made by SEG
○ Current transformer-operated release 0.1 Ws, type 3AX1104	
○ Undervoltage release type 3AX1103	
● <b>Auxiliary switch 6 NO + 6 NC</b>	– Refer to page 1/11 concerning contacts available for customer use
○ Auxiliary switch 12 NO + 12 NC*	– <u>On request</u> : More than 12 NO + 12 NC – <u>Option</u> : Gold-plated auxiliary switch contacts
● <b>Terminal strip 24-pole or plug connector 64-pole or 24-pole</b>	– Electrical equipment – such as motor, release – wired to terminal strip or plug connector – <u>Option</u> : Gold-plated plug connector contacts
● <b>Anti-pumping</b> mechanical and electrical	–
● <b>Breaker tripping signal</b>	–
● <b>Operating cycle counter</b>	–
● <b>Position switches</b> (2 pieces) for signalling “Closing spring charged”	–
○ Electrical local closing	In place of mechanical local closing
○ Mechanical interlocking	–
○ Varistor circuitry	In the secondary circuit, for $\geq 60$ V DC
○ Halogen-free and flame-retardant wiring cables	–
○ Condensation protection	For 230 V AC
○ Silver-plated or tinned primary current paths	External terminals and internal connections on both sides
○ Hand crank	For manual charging of the closing spring
○ Silicone-free design	–

### 3 combination possibilities of the releases

Release	Release combinations		
	1	2	3
1st shunt release	•	•	•
2nd release	–	•	•
3rd release	–	–	•

The 2nd and 3rd releases can be shunt releases, undervoltage releases or current transformer-operated releases as desired (0.5 A, 1 A or 0.1 Ws).

- 1 piece per release. A maximum of 3 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 6 NO + 6 NC).  
Abbreviations: NO = normally-open, NC = normally-closed



## 17.5 kV

**3AH2 215-6**  
31.5 kA / 2500 A

Rated voltage 17.5 kV  
 Rated lightning impulse withstand voltage 95 kV  
 Rated short-time power frequency withstand voltage 38 kV\*  
 Rated short-circuit duration 3 s  
 Rated short-circuit breaking current  $I_{sc}$  and rated short-circuit making current  $I_{ma}$  see table

\* Up to 42 kV on request

### Selection and ordering data for rated voltage 17.5 kV

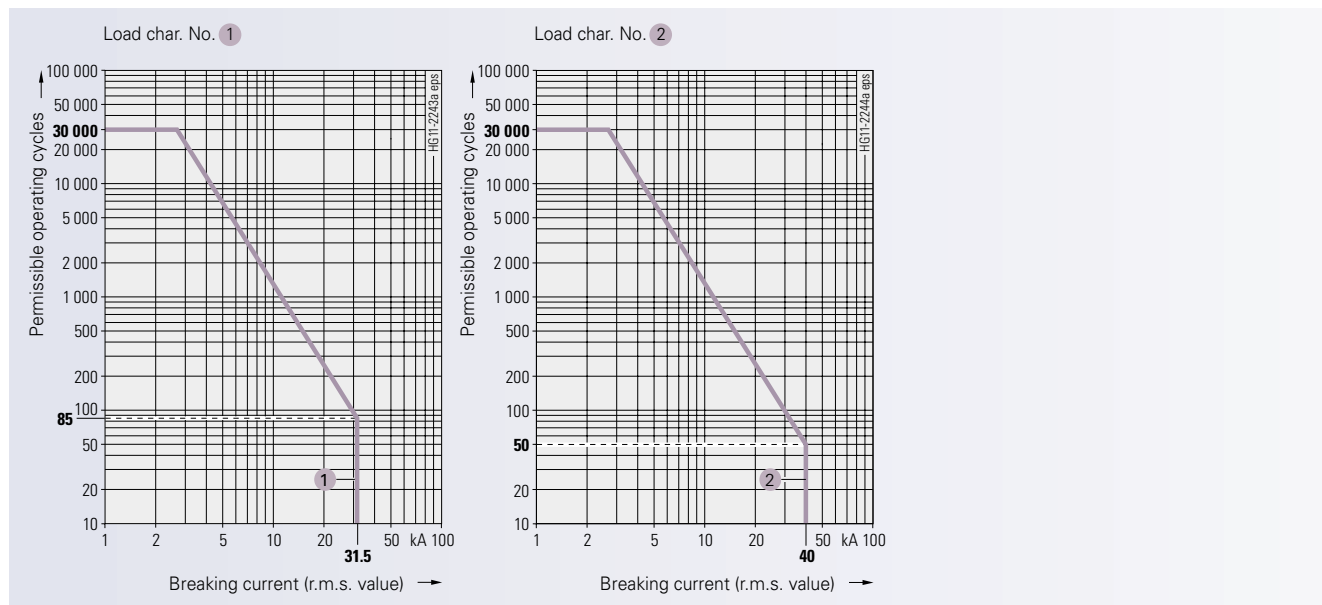
Rated operating sequences  
 O - 0.3s - CO - 15s - CO - 15s - CO - 15s - CO  
 O - 0.3s - CO - 3min - CO  
 O - 3min - CO - 3min - CO

$I_{sc}$ kA	$I_{ma}$ kA	Pole-centre distance mm	Please add Order No. suffix	Order No. suffix at rated normal current				Remarks
				1250 A	2000 A	2500 A	3150 A	
				Load char. No. <b>1</b> <b>1</b> <b>1</b> <b>1</b>				
31.5	80	210	<b>3AH2 215-</b> □ ← 2	4	6	7	• • • —	
				Load char. No. <b>2</b> <b>2</b> <b>2</b> <b>2</b>				
40	100	210	<b>3AH2 216-</b> □ ← 2	4	6	7	○ • $I_{ma}$ up to 110 kA	

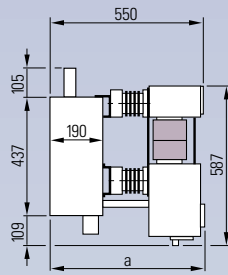
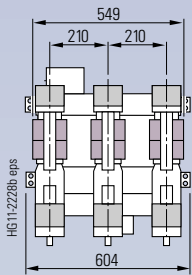
Enquiry form  
see page A/2

• Possible ○  $I_{sc}$  up to 31.5 kA possible

**Electrical service life (load char. Nos. 1 and 2)** · Mechanical breaker service life 60,000 operating cycles



## Dimensions and weights



### Pole-centre distance 210 mm

- 31.5 kA /  
1250 A, 2000 A,  
2500 A, 3150 A
- 40 kA /  
1250 A, 2000 A,  
2500 A, 3150 A

Weight approx. 135 kg

Dimension a in mm

1250/2000 A	550 mm
2500/3150 A	565 mm

## Secondary equipment

# 17.5 kV

For a description of the secondary equipment, refer to pages 1/8 to 1/13.

Basic equipment	Remarks
○ Additional equipment	
● <b>Electrical operating mechanism</b>	– Can also be manually controlled – <u>Option</u> : with manual control
● <b>Closing solenoid</b> type 3AY1510	–
● <b>1st shunt release</b> type 3AY1510	– Refer to table below for release combinations
○ 2nd shunt release type 3AX1101	– Max. 3 releases can be combined
○ Current transformer-operated release 0.5 A/1 A, type 3AX1102	– A current transformer-operated release for a tripping pulse of $\geq 0.1$ Ws is used in connection with the 7SJ41 protective system or with the protective relay made by SEG
○ Current transformer-operated release 0.1 Ws, type 3AX1104	
○ Undervoltage release type 3AX1103	
● <b>Auxiliary switch 6 NO + 6 NC</b>	– Refer to page 1/11 concerning contacts available for customer use
○ Auxiliary switch 12 NO + 12 NC*	– <u>On request</u> : More than 12 NO + 12 NC – <u>Option</u> : Gold-plated auxiliary switch contacts
● <b>Terminal strip 24-pole or plug connector 64-pole or 24-pole</b>	– Electrical equipment – such as motor, release – wired to terminal strip or plug connector – <u>Option</u> : Gold-plated plug connector contacts
● <b>Anti-pumping</b> mechanical and electrical	–
● <b>Breaker tripping signal</b>	–
● <b>Operating cycle counter</b>	–
● <b>Position switches</b> (2 pieces) for signalling “Closing spring charged”	–
○ Electrical local closing	In place of mechanical local closing
○ Mechanical interlocking	–
○ Varistor circuitry	In the secondary circuit, for $\geq 60$ V DC
○ Halogen-free and flame-retardant wiring cables	–
○ Condensation protection	For 230 V AC
○ Silver-plated or tinned primary current paths	External terminals and internal connections on both sides
○ Hand crank	For manual charging of the closing spring
○ Silicone-free design	–

### 3 combination possibilities of the releases

Release	Release combinations		
	1	2	3
1st shunt release	•	•	•
2nd release	–	•	•
3rd release	–	–	•

The 2nd and 3rd releases can be shunt releases, undervoltage releases or current transformer-operated releases as desired (0.5 A, 1 A or 0.1 Ws).

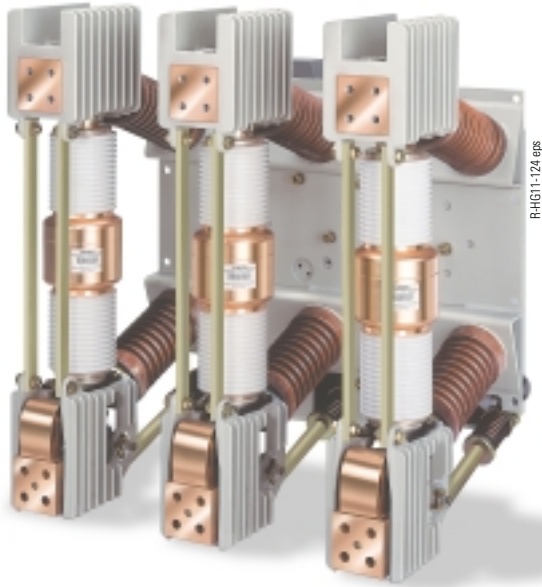
- 1 piece per release. A maximum of 3 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 6 NO + 6 NC).  
Abbreviations: NO = normally-open, NC = normally-closed



## 24 kV

**3AH4 266-6**  
40 kA / 2500 A  
(Partitions  
not shown)



Rated voltage 24 kV  
Rated lightning impulse withstand voltage 125 kV  
Rated short-time power frequency  
withstand voltage 50 kV  
Rated short-circuit duration 3 s  
Rated short-circuit breaking current  $I_{sc}$  and  
rated short-circuit making current  $I_{ma}$   
see table

### 3

#### Selection and ordering data for rated voltage 24 kV

$I_{sc}$ kA	$I_{ma}$ kA	Pole- centre distance mm	Please add Order No. suffix	Order No. suffix at rated normal current			Remarks
				1250 A	2000 A	2500 A	
				Load char. No. ① ① ①			
25	63	210	3AH2 254-□ ←	2	4	6	• • • —
	63	275	3AH2 264-□ ←	2	4	6	• • • —
				Load char. No. ②			
40	100	275	3AH4 266-□ ←			6	○ • —

Rated operating sequences

O - 0.3s - CO - 15s - CO - 15s - CO - 15s - CO  
O - 0.3s - CO - 3min - CO  
O - 3min - CO - 3min - CO

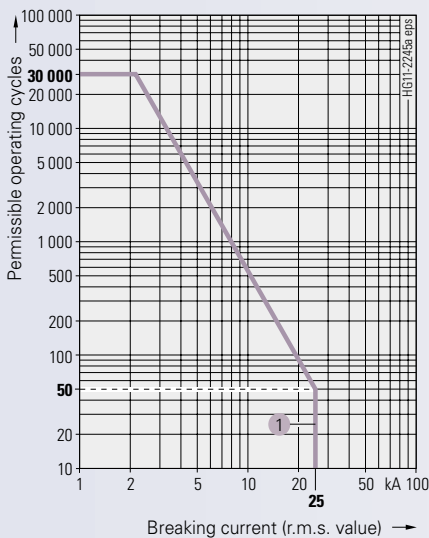
Enquiry form  
see page A/2

• Possible ○  $I_{sc}$  up to 31.5 kA possible

#### Electrical service life (load char. Nos. ① and ②)

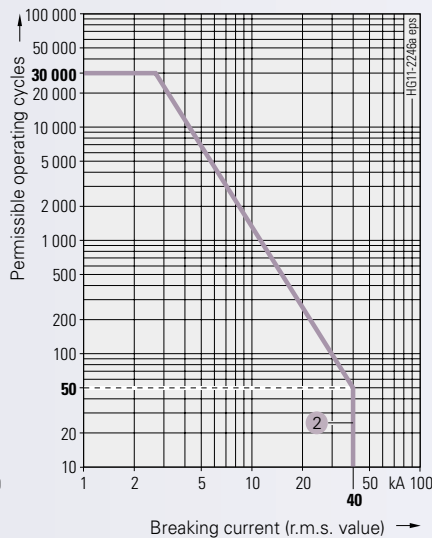
Mechanical breaker service life  
60,000 operating cycles

Load char. No. ①

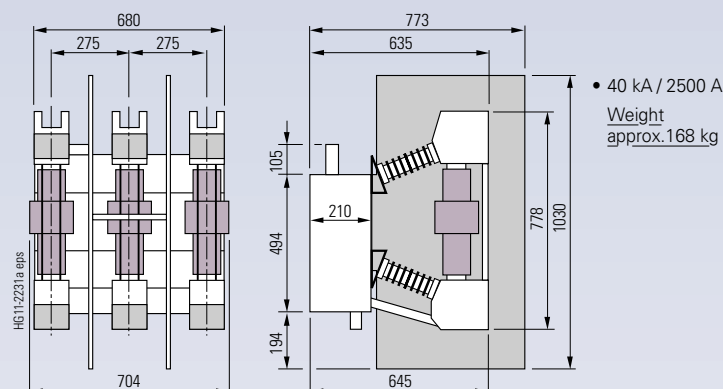
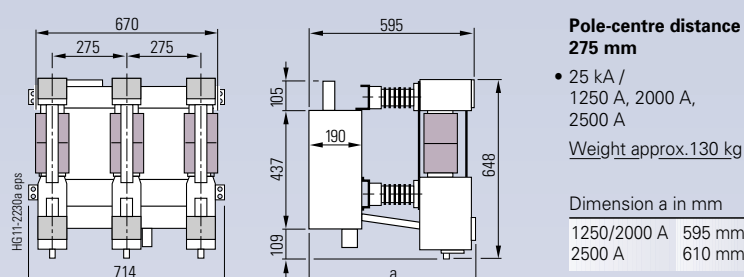
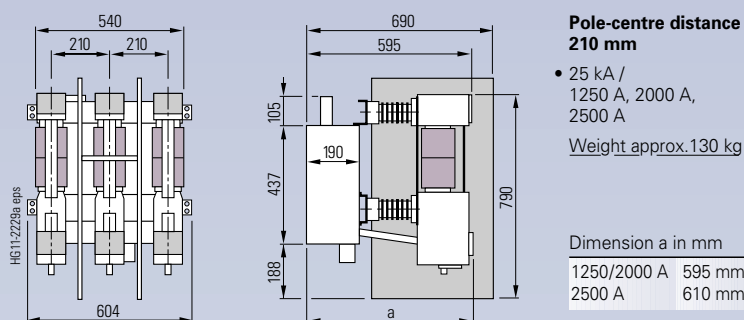


Mechanical breaker service life  
120,000 operating cycles

Load char. No. ②



## Dimensions and weights



## Secondary equipment

24 kV

For a description of the secondary equipment, refer to pages 1/8 to 1/13.

Basic equipment	Remarks
○ Additional equipment	
● <b>Electrical operating mechanism</b>	– Can also be manually controlled – <u>Option</u> : with manual control
● <b>Closing solenoid</b> type 3AY15 10	–
● <b>1st shunt release</b> type 3AY15 10	– Refer to table below for release combinations
○ 2nd shunt release type 3AX11 01	– Max. 3 releases can be combined
○ Current transformer-operated release 0.5 A/1 A, type 3AX11 02	– A current transformer-operated release for a tripping pulse of $\geq 0.1$ Ws is used in connection with the 7SJ41 protective system or with the protective relay made by SEG
○ Current transformer-operated release 0.1 Ws, type 3AX11 04	
○ Undervoltage release type 3AX11 03	
● <b>Auxiliary switch 6 NO + 6 NC</b>	– Refer to page 1/11 concerning contacts available for customer use
○ Auxiliary switch 12 NO + 12 NC*	– <u>On request</u> : More than 12 NO + 12 NC – <u>Option</u> : Gold-plated auxiliary switch contacts
● <b>Terminal strip 24-pole or plug connector</b> 64-pole or 24-pole	– Electrical equipment – such as motor, release – wired to terminal strip or plug connector – <u>Option</u> : Gold-plated plug connector contacts
● <b>Anti-pumping</b> mechanical and electrical	–
● <b>Breaker tripping signal</b>	–
● <b>Operating cycle counter</b>	–
● <b>Position switches</b> (2 pieces) for signalling “Closing spring charged”	–
○ Electrical local closing	In place of mechanical local closing
○ Mechanical interlocking	–
○ Varistor circuitry	In the secondary circuit, for $\geq 60$ V DC
○ Halogen-free and flame-retardant wiring cables	–
○ Condensation protection	For 230 V AC
○ Silver-plated or tinned primary current paths	External terminals and internal connections on both sides
○ Hand crank	For manual charging of the closing spring
○ Silicone-free design	–

3

## 3 combination possibilities of the releases

Release	Release combinations		
	1	2	3
1st shunt release	•	•	•
2nd release	–	•	•
3rd release	–	–	•

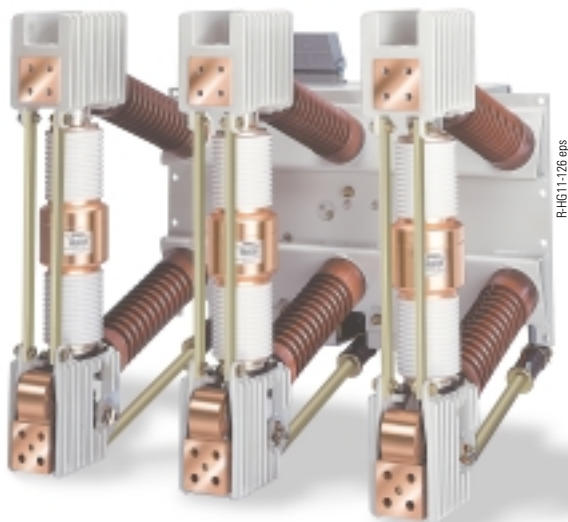
The 2nd and 3rd releases can be shunt releases, undervoltage releases or current transformer-operated releases as desired (0.5 A, 1 A or 0.1 Ws).

- 1 piece per release. A maximum of 3 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 6 NO + 6 NC).  
Abbreviations: NO = normally-open, NC = normally-closed

## 36 kV

**3AH4 305-6**  
31.5 kA / 2500 A  
(Partitions  
not shown)



Rated voltage 36 kV  
Rated lightning impulse withstand voltage 170 kV\*  
Rated short-time power frequency  
withstand voltage 70 kV\*\*  
Rated short-circuit duration 3 s  
Rated short-circuit breaking current  $I_{sc}$  and  
rated short-circuit making current  $I_{ma}$   
see table

\* Up to 185 kV on request  
\*\* Up to 85 kV on request

Rated operating sequences

O - 0.3s - CO - 15s - CO - 15s - CO - 15s - CO  
O - 0.3s - CO - 3min - CO  
O - 3min - CO - 3min - CO

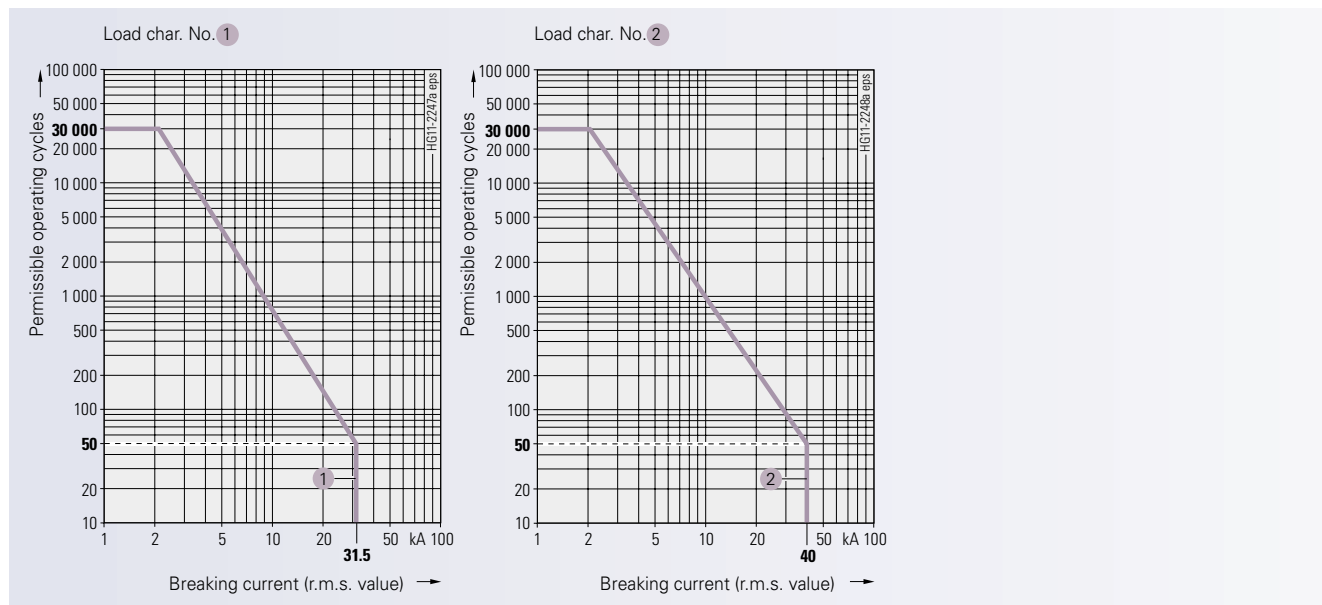
### Selection and ordering data for rated voltage 36 kV

$I_{sc}$ kA	$I_{ma}$ kA	Pole- centre distance mm	Please add Order No. suffix	Order No. suffix at rated normal current			Remarks
				1250 A	2000 A	2500 A	
				Load char. No. <b>1</b> <b>1</b> <b>1</b>			
31.5	80	350	<b>3AH4 305-□</b> ←	<b>2</b>	<b>4</b>	<b>6</b>	•    •    •    —
				Load char. No. <b>2</b>			
40	100	350	<b>3AH4 306-□</b> ←			<b>6</b>	○    •    —

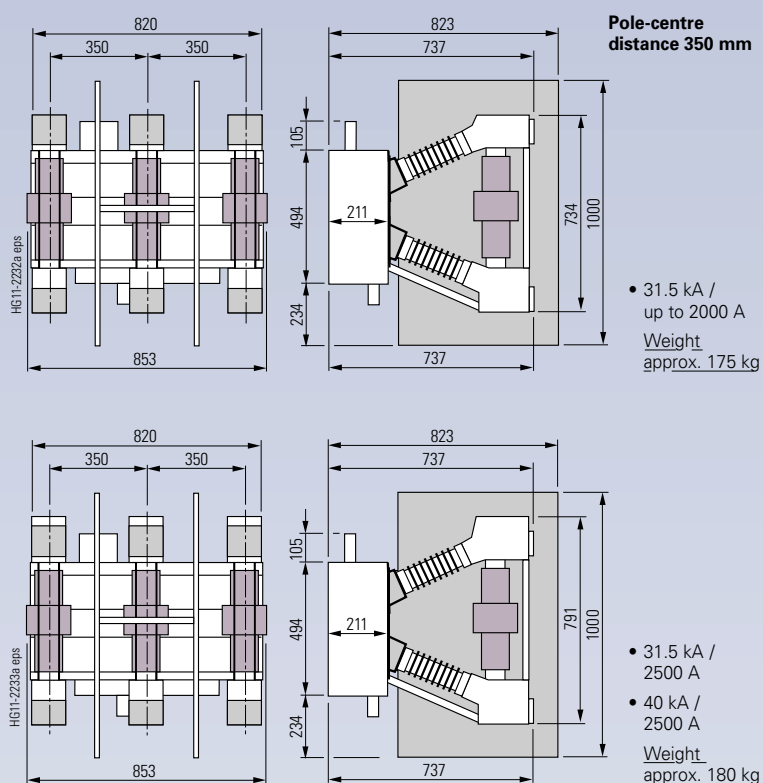
Enquiry form  
see page A/2

• Possible ○  $I_{sc}$  up to 31.5 kA possible

**Electrical service life (load char. Nos. 1 and 2) · Mechanical breaker service life 120,000 operating cycles**



## Dimensions and weight



## Secondary equipment

**36 kV**

For a description of the secondary equipment, refer to pages 1/8 to 1/13.

Basic equipment	Remarks
<ul style="list-style-type: none"> <li>○ Additional equipment</li> </ul>	
<ul style="list-style-type: none"> <li>● <b>Electrical operating mechanism</b></li> </ul>	<ul style="list-style-type: none"> <li>- Can also be manually controlled</li> <li>- <u>Option</u>: with manual control</li> </ul>
<ul style="list-style-type: none"> <li>● <b>Closing solenoid</b> type 3AY1510</li> </ul>	—
<ul style="list-style-type: none"> <li>● <b>1st shunt release</b> type 3AY1510</li> </ul>	<ul style="list-style-type: none"> <li>- Refer to table below for release combinations</li> </ul>
<ul style="list-style-type: none"> <li>○ 2nd shunt release type 3AX1101</li> </ul>	<ul style="list-style-type: none"> <li>- Max. 3 releases can be combined</li> </ul>
<ul style="list-style-type: none"> <li>○ Current transformer-operated release 0.5 A/1 A, type 3AX1102</li> </ul>	<ul style="list-style-type: none"> <li>- A current transformer-operated release for a tripping pulse of <math>\geq 0.1</math> Ws is used in connection with the 7SJ41 protective system or with the protective relay made by SEG</li> </ul>
<ul style="list-style-type: none"> <li>○ Current transformer-operated release 0.1 Ws, type 3AX1104</li> </ul>	
<ul style="list-style-type: none"> <li>○ Undervoltage release type 3AX1103</li> </ul>	
<ul style="list-style-type: none"> <li>● <b>Auxiliary switch 6 NO + 6 NC</b></li> </ul>	<ul style="list-style-type: none"> <li>- Refer to page 1/11 concerning contacts available for customer use</li> </ul>
<ul style="list-style-type: none"> <li>○ Auxiliary switch 12 NO + 12 NC*</li> </ul>	<ul style="list-style-type: none"> <li>- <u>On request</u>: More than 12 NO + 12 NC</li> <li>- <u>Option</u>: Gold-plated auxiliary switch contacts</li> </ul>
<ul style="list-style-type: none"> <li>● <b>Terminal strip 24-pole or plug connector 64-pole or 24-pole</b></li> </ul>	<ul style="list-style-type: none"> <li>- Electrical equipment – such as motor, release – wired to terminal strip or plug connector</li> <li>- <u>Option</u>: Gold-plated plug connector contacts</li> </ul>
<ul style="list-style-type: none"> <li>● <b>Anti-pumping</b> mechanical and electrical</li> </ul>	—
<ul style="list-style-type: none"> <li>● <b>Breaker tripping signal</b></li> </ul>	—
<ul style="list-style-type: none"> <li>● <b>Operating cycle counter</b></li> </ul>	—
<ul style="list-style-type: none"> <li>● <b>Position switches</b> (2 pieces) for signalling “Closing spring charged”</li> </ul>	—
<ul style="list-style-type: none"> <li>○ Electrical local closing</li> </ul>	In place of mechanical local closing
<ul style="list-style-type: none"> <li>○ Mechanical interlocking</li> </ul>	—
<ul style="list-style-type: none"> <li>○ Varistor circuitry</li> </ul>	In the secondary circuit, for $\geq 60$ V DC
<ul style="list-style-type: none"> <li>○ Halogen-free and flame-retardant wiring cables</li> </ul>	—
<ul style="list-style-type: none"> <li>○ Condensation protection</li> </ul>	For 230 V AC
<ul style="list-style-type: none"> <li>○ Silver-plated or tinned primary current paths</li> </ul>	External terminals and internal connections on both sides
<ul style="list-style-type: none"> <li>○ Hand crank</li> </ul>	For manual charging of the closing spring
<ul style="list-style-type: none"> <li>○ Silicone-free design</li> </ul>	—

### 3 combination possibilities of the releases

Release	Release combinations		
	1	2	3
1st shunt release	•	•	•
2nd release	-	•	•
3rd release	-	-	•

The 2nd and 3rd releases can be shunt releases, undervoltage releases or current transformer-operated releases as desired (0.5 A, 1 A or 0.1 Ws).

- 1 piece per release. A maximum of 3 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 6 NO + 6 NC).  
Abbreviations: NO = normally-open, NC = normally-closed

12 to 36 kV



e. g. 3AH5 economy circuit-breaker  
12 kV / 20 kA / 1250 A

Transformer station (Rheingau Elektrizitätswerke GmbH)

**Catalog section 4** Page

- Rated data
- Selection and ordering data
- Electrical and mechanical service life
- Dimensions and weights
- Secondary equipment

For rated voltages

- 12 kV 4/4-4/3
- 17.5 kV 4/4-4/5
- 24 kV 4/6-4/7
- 36 kV 4/8-4/9

Enquiry form A/3

**Features of economy circuit-breakers**

- Rated voltages 12 to 36 kV
- Maintenance-free up to 10,000 operating cycles
- Mechanical breaker service life 10,000 operating cycles
- Rated short-circuit breaking currents up to 25 kA (r.m.s. value), minimum 25 operating cycles
- DC component 36 %, higher values on request
- User configurable secondary equipment
- Optimum replacement for breakers of conventional design, e. g. low-oil breakers and dead-tank oil circuit-breakers
- Suitable for use in conjunction with, for example:
  - Overhead lines and cables
  - Transformers
  - Capacitors
  - Filter circuits
  - Motors

## 12 kV

**3AH5 103-2**  
20 kA / 1250 A



Rated voltage 12 kV  
 Rated lightning impulse withstand voltage 75 kV  
 Rated short-time power frequency withstand voltage 28 kV\*  
 Rated short-circuit duration 3 s  
 Rated short-circuit breaking current  $I_{sc}$  and rated short-circuit making current  $I_{ma}$  see table

\* Up to 42 kV on request  
 (in case of vacuum circuit-breakers for  $I_{sc} = 20$  kA and 25 kA)

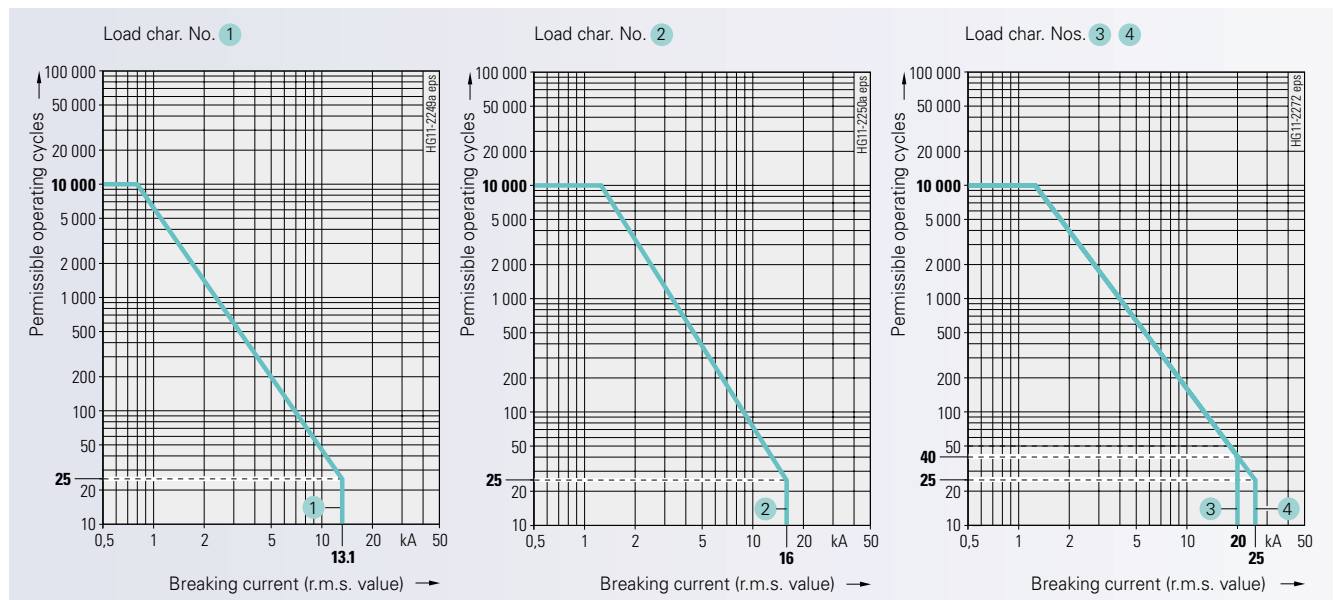
### Selection and ordering data for rated voltage 12 kV

$I_{sc}$ kA	$I_{ma}$ kA	Pole-centre distance mm	Please add Order No. suffix	Order No. suffix at rated normal current 800 A    1250 A	Rated operating sequences 1) O - 0.3s - CO - 15s - CO - 15s - CO - 15s - CO O - 0.3s - CO - 3min - CO O - 3min - CO - 3min - CO	Remarks
Load char. No. 1						
13.1	32.8	160	<b>3AH5 101</b> -□ ← 1	1	•	•
	32.8	210	<b>3AH5 111</b> -□ ← 1	1	•	•
Load char. No. 2						
16	40	160	<b>3AH5 102</b> -□ ← 1	2	•	•
	40	210	<b>3AH5 112</b> -□ ← 1	2	•	•
Load char. No. 3						
20	50	160	<b>3AH5 103</b> -□ ← 1	2	•	•
	50	210	<b>3AH5 113</b> -□ ← 1	2	•	•
Load char. No. 4						
25	63	160	<b>3AH5 104</b> -□ ← 1	2	•	•
	63	210	<b>3AH5 114</b> -□ ← 1	2	•	•

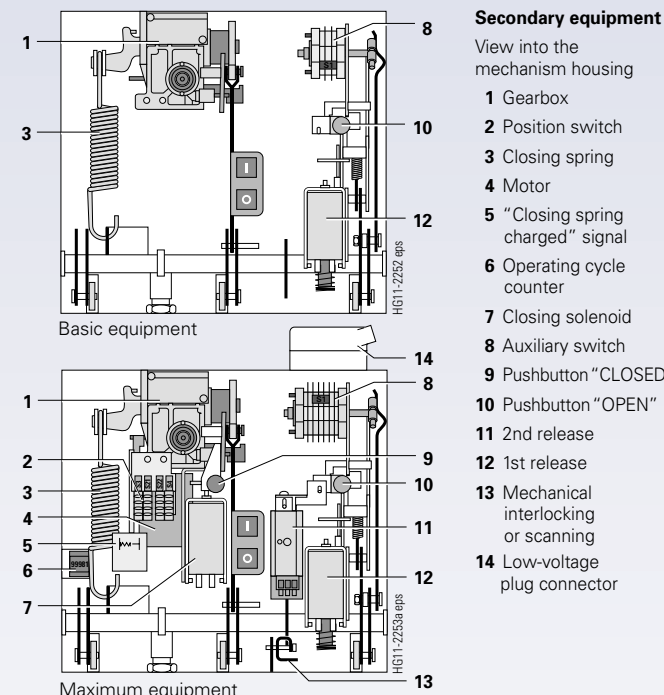
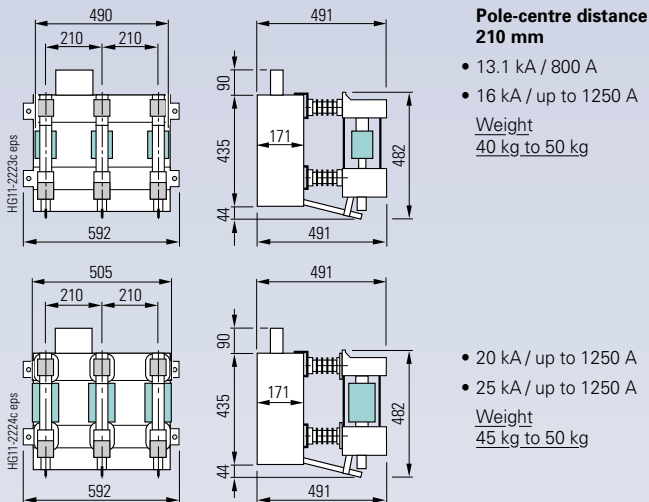
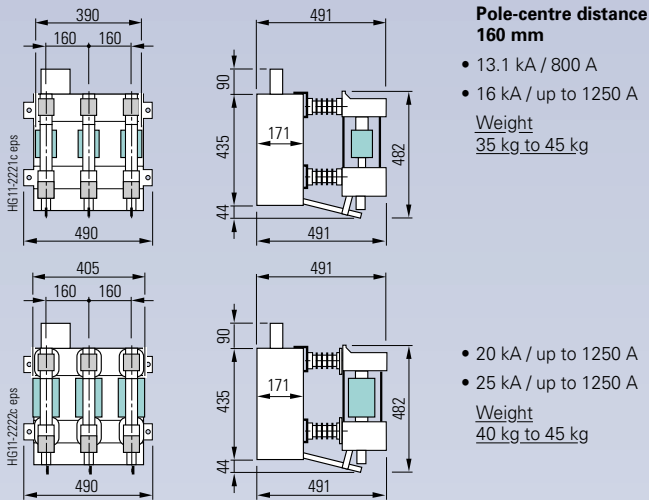
Enquiry form  
see page A/3

1) Motor stored-energy mechanism required • Possible

### Electrical service life (load char. Nos. 1 to 4) · Mechanical breaker service life 10,000 operating cycles



## Dimensions and weight



## Secondary equipment

12 kV

For a description of the secondary equipment, refer to pages 1/8 to 1/11 and 1/14.

The basic version of the 3AH5 vacuum circuit-breaker is supplied unwired.

Basic equipment	Remarks
<ul style="list-style-type: none"> <li>Additional equipment</li> </ul>	
<ul style="list-style-type: none"> <li>Manual snap-action operating mechanism</li> </ul>	With manual mechanism always with hand crank
<ul style="list-style-type: none"> <li>Manual stored-energy mechanism</li> </ul>	
<ul style="list-style-type: none"> <li>Motor stored-energy mechanism</li> </ul>	Always with closing solenoid and anti-pumping
<ul style="list-style-type: none"> <li>Closing solenoid 3AY1510</li> </ul>	Including "Spring charged" signal
<ul style="list-style-type: none"> <li>1st shunt release type 3AY1510</li> </ul>	- Refer to table below for release combinations
<ul style="list-style-type: none"> <li>2nd shunt release type 3AX1101</li> </ul>	- Only a maximum of 2 releases can be combined
<ul style="list-style-type: none"> <li>Current transformer-operated release 0.5 A/1 A, type 3AX1102</li> </ul>	- A current transformer-operated release for a tripping pulse of $\geq 0.1$ Ws is used in connection with the 7SJ41 protective system or with the protective relay made by SEG
<ul style="list-style-type: none"> <li>Current transformer-operated release 0.1 Ws, type 3AX1104</li> </ul>	
<ul style="list-style-type: none"> <li>Undervoltage release type 3AX1103</li> </ul>	
<ul style="list-style-type: none"> <li>Auxiliary switch 2 NO+2 NC, unwired</li> </ul>	- Free contacts available for customer use
<ul style="list-style-type: none"> <li>Auxiliary switch 6 NO+6 NC,* unwired</li> </ul>	- Option: Auxiliary switch contacts wired to plug connector
<ul style="list-style-type: none"> <li>Auxiliary switch 12 NO+12 NC,* unwired</li> </ul>	- Option: Gold-plated auxiliary switch contacts
	- Option: 12 NO + 12 NC available only with 64-pole plug connector
<ul style="list-style-type: none"> <li>Terminal strip 24-pole or plug connector 64-pole or 24-pole</li> </ul>	- Only in connection with auxiliary switches 6 NO+6 NC and 12 NO+12 NC
	- Option: Electrical equipment—such as motor, release—wired to terminal strip or plug connector
	- Option: Gold-plated plug connector contacts
<ul style="list-style-type: none"> <li>Breaker tripping signal</li> </ul>	—
<ul style="list-style-type: none"> <li>Operating cycle counter</li> </ul>	—
<ul style="list-style-type: none"> <li>Mechanical interlocking</li> </ul>	In the case of manual snap-action mechanism, mechanical scanning of the circuit-breaker positions
<ul style="list-style-type: none"> <li>Varistor circuitry</li> </ul>	In the secondary circuit, for $\geq 60$ V DC
<ul style="list-style-type: none"> <li>Halogen-free and flame-retardant wiring cables</li> </ul>	—
<ul style="list-style-type: none"> <li>Condensation protection</li> </ul>	For 230 V AC
<ul style="list-style-type: none"> <li>Silver-plated or tinned primary current paths</li> </ul>	External terminals and internal connections on both sides
<ul style="list-style-type: none"> <li>Hand crank</li> </ul>	For manual charging of the closing spring
<ul style="list-style-type: none"> <li>Silicone-free design</li> </ul>	—

## 8 combination possibilities of the releases

Release	Release combinations							
	1	2	3	4	5	6	7	8
1st shunt release type 3AY1510	•	•	-	-	-	•	•	•
2nd shunt release type 3AX1101	-	•	-	-	-	-	-	-
Current trans- type 3AX1102; 0.5 A or former-operated type 3AX1102; 1 A or release type 3AX1104; 0.1 Ws	-	-	•	•	-	•	•	-
Undervoltage release type 3AX1103	-	-	-	-	•	-	-	•

• 1 piece per release. A maximum of 2 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 2 NO + 2 NC).

Abbreviations: NO = normally-open, NC = normally-closed



**3AH5 204-1**  
25 kA / 800 A  
(Partitions  
not shown)

R-HG11-078a eps

## 17.5 kV

Rated voltage 17.5 kV  
 Rated lightning impulse withstand voltage 95 kV  
 Rated short-time power frequency  
 withstand voltage 38 kV\*  
 Rated short-circuit duration 3 s  
 Rated short-circuit breaking current  $I_{sc}$  and  
 rated short-circuit making current  $I_{ma}$   
 see table

\* Up to 42 kV on request

### Selection and ordering data for rated voltage 17.5 kV

Rated operating sequences 1)

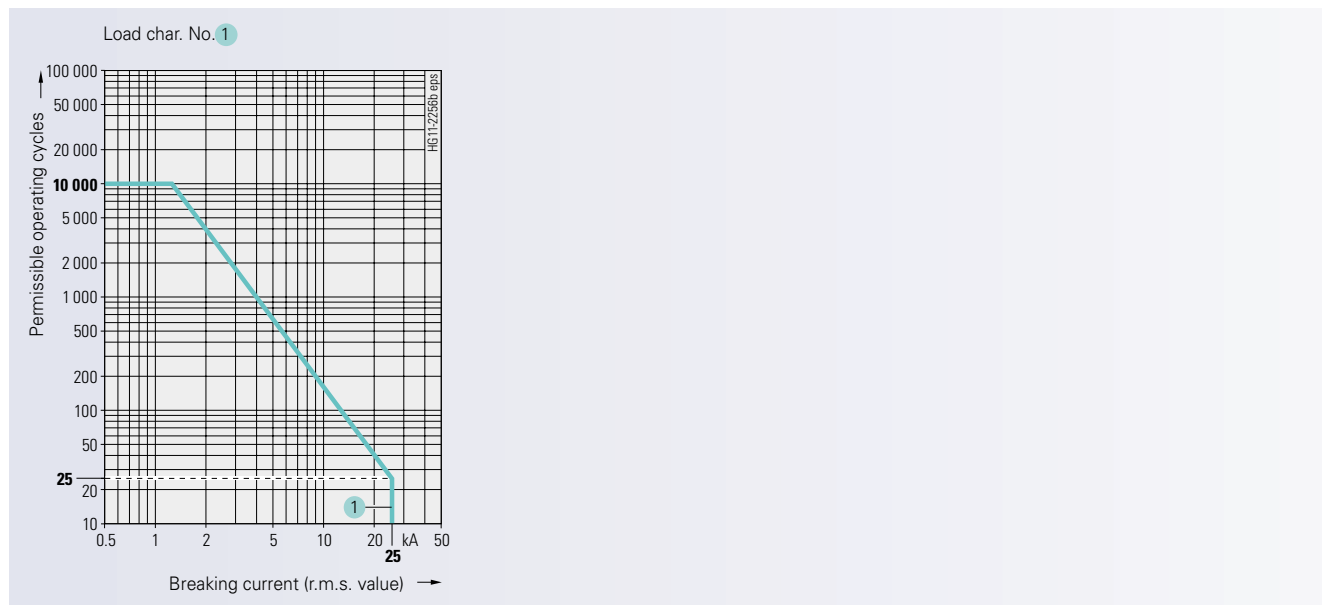
- O - 0.3s - CO - 15s - CO - 15s - CO - 15s - CO
- O - 0.3s - CO - 3min - CO
- O - 3min - CO - 3min - CO

$I_{sc}$ kA	$I_{ma}$ kA	Pole- centre distance mm	Please add Order No. suffix	Order No. suffix		Remarks
				at rated normal current		
				800 A	1250 A	
				Load char. No. <b>1</b> <b>1</b>		
25	63	160	<b>3AH5 204-</b> □ ← 1	1	2	•
	63	210	<b>3AH5 214-</b> □ ← 1	1	2	•

Enquiry form  
see page A/3

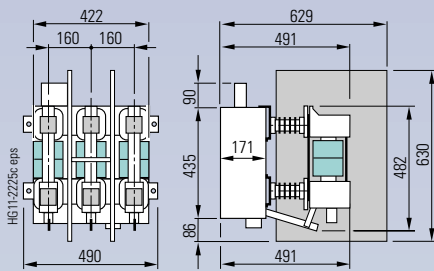
1) Motor stored-energy mechanism required • Possible

**Electrical service life (load char. No. 1)** - Mechanical breaker service life 10,000 operating cycles



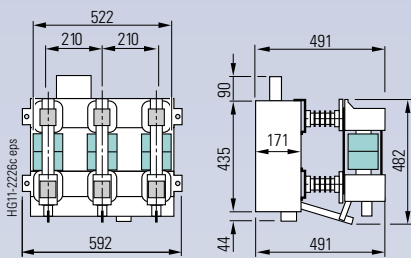


## Dimensions and weight



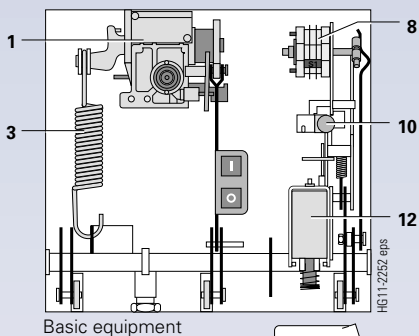
### Pole-centre distance 160 mm

- 25 kA / up to 1250 A
- Weight 40 kg to 45 kg

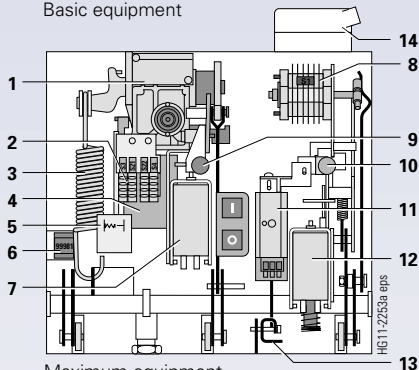


### Pole-centre distance 210 mm

- 25 kA / up to 1250 A
- Weight 45 kg to 50 kg



Basic equipment



Maximum equipment

## Secondary equipment

View into the mechanism housing

- 1 Gearbox
- 2 Position switch
- 3 Closing spring
- 4 Motor
- 5 "Closing spring charged" signal
- 6 Operating cycle counter
- 7 Closing solenoid
- 8 Auxiliary switch
- 9 Pushbutton "CLOSED"
- 10 Pushbutton "OPEN"
- 11 2nd release
- 12 1st release
- 13 Mechanical interlocking or scanning
- 14 Low-voltage plug connector

## Secondary equipment

# 17.5 kV

For a description of the secondary equipment, refer to pages 1/8 to 1/11 and 1/14.

The basic version of the 3AH5 vacuum circuit-breaker is supplied unwired.

Basic equipment	Remarks
<ul style="list-style-type: none"> <li>Additional equipment</li> </ul>	
<ul style="list-style-type: none"> <li>Manual snap-action operating mechanism</li> </ul>	With manual mechanism always with hand crank
<ul style="list-style-type: none"> <li>Manual stored-energy mechanism</li> </ul>	
<ul style="list-style-type: none"> <li>Motor stored-energy mechanism</li> </ul>	Always with closing solenoid and anti-pumping
<ul style="list-style-type: none"> <li>Closing solenoid 3AY1510</li> </ul>	Including "Spring charged" signal
<ul style="list-style-type: none"> <li>1st shunt release type 3AY1510</li> </ul>	- Refer to table below for release combinations
<ul style="list-style-type: none"> <li>2nd shunt release type 3AX1101</li> </ul>	- Only a maximum of 2 releases can be combined
<ul style="list-style-type: none"> <li>Current transformer-operated release 0.5 A/1 A, type 3AX1102</li> </ul>	- A current transformer-operated release for a tripping pulse of $\geq 0.1$ Ws is used in connection with the 7SJ41 protective system or with the protective relay made by SEG
<ul style="list-style-type: none"> <li>Current transformer-operated release 0.1 Ws, type 3AX1104</li> </ul>	
<ul style="list-style-type: none"> <li>Undervoltage release type 3AX1103</li> </ul>	
<ul style="list-style-type: none"> <li>Auxiliary switch 2 NO+2 NC, unwired</li> </ul>	- Free contacts available for customer use
<ul style="list-style-type: none"> <li>Auxiliary switch 6 NO+6 NC,* unwired</li> </ul>	- Option: Auxiliary switch contacts wired to plug connector
<ul style="list-style-type: none"> <li>Auxiliary switch 12 NO+12 NC,* unwired</li> </ul>	- Option: Gold-plated auxiliary switch contacts - Option: 12 NO + 12 NC available only with 64-pole plug connector
<ul style="list-style-type: none"> <li>Terminal strip 24-pole or plug connector 64-pole or 24-pole</li> </ul>	- Only in connection with auxiliary switches 6 NO+ 6 NC and 12 NO+12 NC - Option: Electrical equipment—such as motor, release—wired to terminal strip or plug connector - Option: Gold-plated plug connector contacts
<ul style="list-style-type: none"> <li>Breaker tripping signal</li> </ul>	—
<ul style="list-style-type: none"> <li>Operating cycle counter</li> </ul>	—
<ul style="list-style-type: none"> <li>Mechanical interlocking</li> </ul>	In the case of manual snap-action mechanism, mechanical scanning of the circuit-breaker positions
<ul style="list-style-type: none"> <li>Varistor circuitry</li> </ul>	In the secondary circuit, for $\geq 60$ V DC
<ul style="list-style-type: none"> <li>Halogen-free and flame-retardant wiring cables</li> </ul>	—
<ul style="list-style-type: none"> <li>Condensation protection</li> </ul>	For 230 V AC
<ul style="list-style-type: none"> <li>Silver-plated or tinned primary current paths</li> </ul>	External terminals and internal connections on both sides
<ul style="list-style-type: none"> <li>Hand crank</li> </ul>	For manual charging of the closing spring
<ul style="list-style-type: none"> <li>Silicone-free design</li> </ul>	—

## 8 combination possibilities of the releases

Release	Release combinations							
	1	2	3	4	5	6	7	8
1st shunt release type 3AY1510	•	•	-	-	-	•	•	•
2nd shunt release type 3AX1101	-	•	-	-	-	-	-	-
Current trans- type 3AX1102; 0.5 A or former-operated type 3AX1102; 1 A or release type 3AX1104; 0.1 Ws	-	-	•	•	-	•	•	-
Undervoltage release type 3AX1103	-	-	-	-	•	-	-	•

- 1 piece per release. A maximum of 2 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 2 NO + 2 NC).

Abbreviations: NO = normally-open, NC = normally-closed

## 24 kV

**3AH5 252-1**  
16 kA / 800 A  
(Partitions not shown)



Rated voltage 24 kV  
Rated lightning impulse withstand voltage 125 kV  
Rated short-time power frequency withstand voltage 50 kV  
Rated short-circuit duration 3 s  
Rated short-circuit breaking current  $I_{sc}$  and rated short-circuit making current  $I_{ma}$  see table

### Selection and ordering data for rated voltage 24 kV

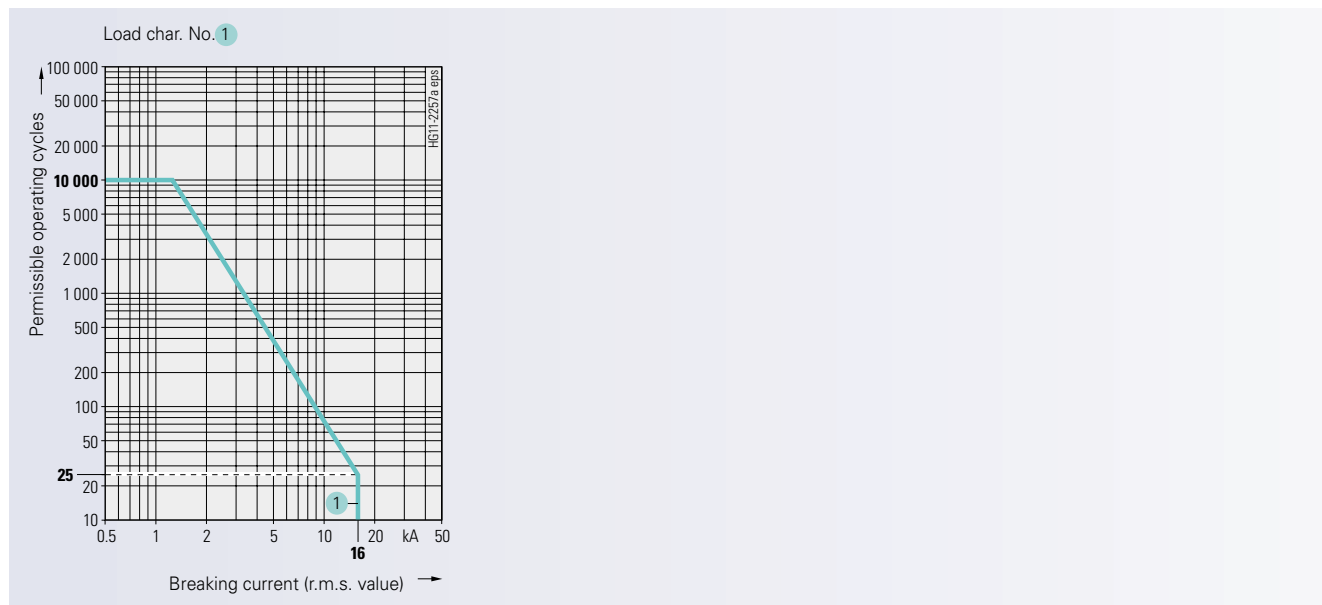
Rated operating sequences <sup>1)</sup>

- O - 0.3s - CO - 15s - CO - 15s - CO - 15s - CO
- O - 0.3s - CO - 3min - CO
- O - 3min - CO - 3min - CO

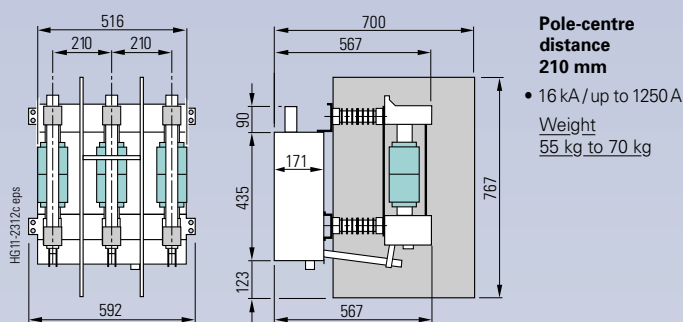
$I_{sc}$ kA	$I_{ma}$ kA	Pole-centre distance mm	Please add Order No. suffix	Order No. suffix at rated normal current 800 A    1250 A	Remarks
					Enquiry form see page A/3
			Load char. No. <b>1</b> <b>1</b>		
16	40	210	<b>3AH5 252-</b> □ ← <b>1</b>	<b>2</b>	•    •    •    —
	40	275	<b>3AH5 262-</b> □ ← <b>1</b>	<b>2</b>	•    •    •    —

<sup>1)</sup> Motor stored-energy mechanism required    • Possible

**Electrical service life (load char. No. 1)** · Mechanical breaker service life 10,000 operating cycles

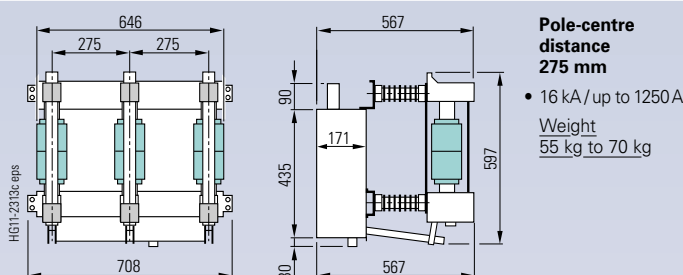


## Dimensions and weight



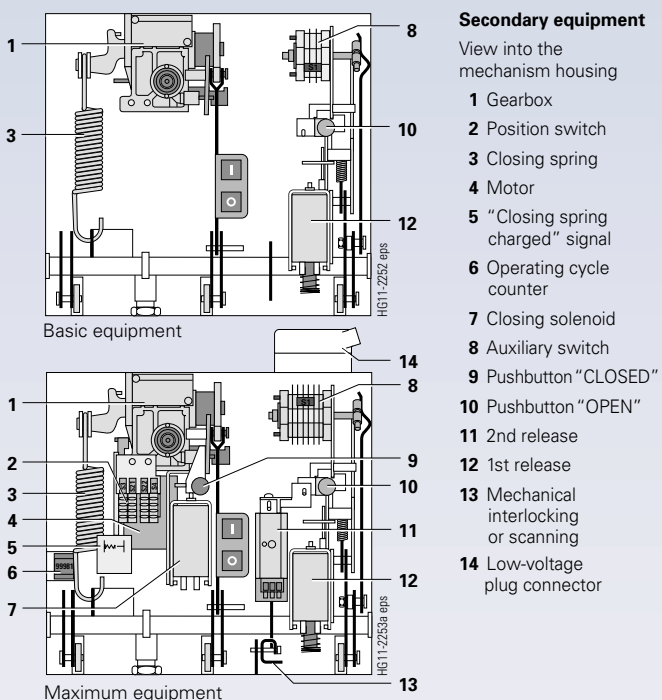
**Pole-centre distance**  
**210 mm**

- 16 kA / up to 1250 A
- Weight  
55 kg to 70 kg



**Pole-centre distance**  
**275 mm**

- 16 kA / up to 1250 A
- Weight  
55 kg to 70 kg



## Secondary equipment

View into the mechanism housing

- 1 Gearbox
- 2 Position switch
- 3 Closing spring
- 4 Motor
- 5 "Closing spring charged" signal
- 6 Operating cycle counter
- 7 Closing solenoid
- 8 Auxiliary switch
- 9 Pushbutton "CLOSED"
- 10 Pushbutton "OPEN"
- 11 2nd release
- 12 1st release
- 13 Mechanical interlocking or scanning
- 14 Low-voltage plug connector

## Secondary equipment

# 24 kV

For a description of the secondary equipment, refer to pages 1/8 to 1/11 and 1/14.

The basic version of the 3AH5 vacuum circuit-breaker is supplied unwired.

Basic equipment	Remarks
<ul style="list-style-type: none"> <li>Additional equipment</li> </ul>	
<ul style="list-style-type: none"> <li>Manual snap-action operating mechanism</li> </ul>	With manual mechanism always with hand crank
<ul style="list-style-type: none"> <li>Manual stored-energy mechanism</li> </ul>	
<ul style="list-style-type: none"> <li>Motor stored-energy mechanism</li> </ul>	Always with closing solenoid and anti-pumping
<ul style="list-style-type: none"> <li>Closing solenoid 3AY1510</li> </ul>	Including "Spring charged" signal
<ul style="list-style-type: none"> <li>1st shunt release type 3AY1510</li> </ul>	- Refer to table below for release combinations
<ul style="list-style-type: none"> <li>2nd shunt release type 3AX1101</li> </ul>	- Only a maximum of 2 releases can be combined
<ul style="list-style-type: none"> <li>Current transformer-operated release 0.5 A/1 A, type 3AX1102</li> </ul>	- A current transformer-operated release for a tripping pulse of $\geq 0.1$ Ws is used in connection with the 7SJ41 protective system or with the protective relay made by SEG
<ul style="list-style-type: none"> <li>Current transformer-operated release 0.1 Ws, type 3AX1104</li> </ul>	
<ul style="list-style-type: none"> <li>Undervoltage release type 3AX1103</li> </ul>	
<ul style="list-style-type: none"> <li>Auxiliary switch 2 NO+2 NC, unwired</li> </ul>	- Free contacts available for customer use
<ul style="list-style-type: none"> <li>Auxiliary switch 6 NO+6 NC,* unwired</li> </ul>	- Option: Auxiliary switch contacts wired to plug connector
<ul style="list-style-type: none"> <li>Auxiliary switch 12 NO+12 NC,* unwired</li> </ul>	- Option: Gold-plated auxiliary switch contacts
	- Option: 12 NO + 12 NC available only with 64-pole plug connector
<ul style="list-style-type: none"> <li>Terminal strip 24-pole or plug connector 64-pole or 24-pole</li> </ul>	- Only in connection with auxiliary switches 6 NO+ 6 NC and 12 NO+12 NC
	- Option: Electrical equipment – such as motor, release – wired to terminal strip or plug connector
	- Option: Gold-plated plug connector contacts
<ul style="list-style-type: none"> <li>Breaker tripping signal</li> </ul>	—
<ul style="list-style-type: none"> <li>Operating cycle counter</li> </ul>	—
<ul style="list-style-type: none"> <li>Mechanical interlocking</li> </ul>	In the case of manual snap-action mechanism, mechanical scanning of the circuit-breaker positions
<ul style="list-style-type: none"> <li>Varistor circuitry</li> </ul>	In the secondary circuit, for $\geq 60$ V DC
<ul style="list-style-type: none"> <li>Halogen-free and flame-retardant wiring cables</li> </ul>	—
<ul style="list-style-type: none"> <li>Condensation protection</li> </ul>	For 230 V AC
<ul style="list-style-type: none"> <li>Silver-plated or tinned primary current paths</li> </ul>	External terminals and internal connections on both sides
<ul style="list-style-type: none"> <li>Hand crank</li> </ul>	For manual charging of the closing spring
<ul style="list-style-type: none"> <li>Silicone-free design</li> </ul>	—

## 8 combination possibilities of the releases

Release	Release combinations							
	1	2	3	4	5	6	7	8
1st shunt release type 3AY1510	•	•	-	-	-	•	•	•
2nd shunt release type 3AX1101	-	•	-	-	-	-	-	-
Current trans- type 3AX1102; 0.5 A or former-operated type 3AX1102; 1 A or release type 3AX1104; 0.1 Ws	-	-	•	•	-	•	•	-
Undervoltage release type 3AX1103	-	-	-	-	•	-	-	•

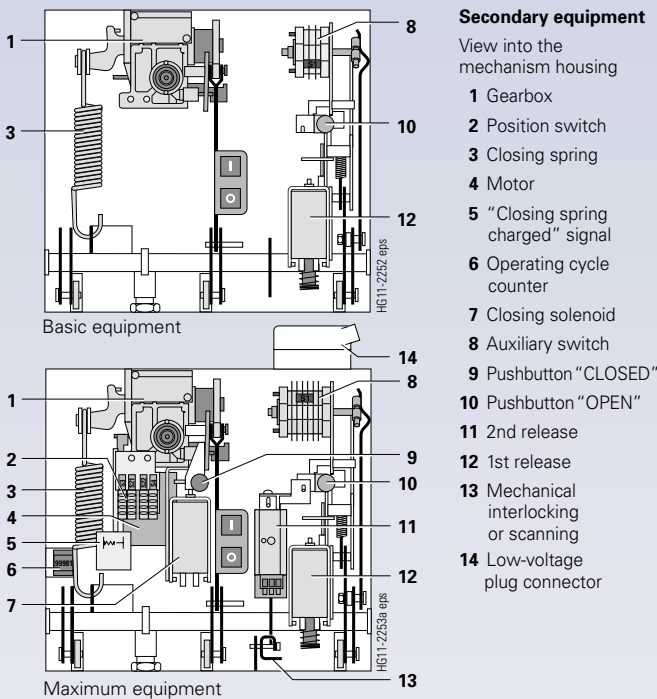
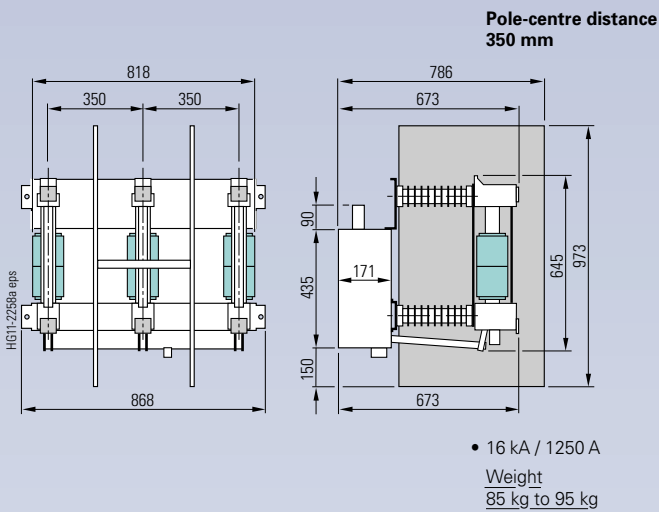
- 1 piece per release. A maximum of 2 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 2 NO + 2 NC).

Abbreviations: NO = normally-open, NC = normally-closed



### Dimensions and weight



### Secondary equipment

For a description of the secondary equipment, refer to pages 1/8 to 1/11 and 1/14.

The basic version of the 3AH5 vacuum circuit-breaker is supplied unwired.

Basic equipment	Remarks
<ul style="list-style-type: none"> <li>Additional equipment</li> </ul>	
<ul style="list-style-type: none"> <li>Manual snap-action operating mechanism</li> </ul>	With manual mechanism always with hand crank
<ul style="list-style-type: none"> <li>Manual stored-energy mechanism</li> </ul>	
<ul style="list-style-type: none"> <li>Motor stored-energy mechanism</li> </ul>	Always with closing solenoid and anti-pumping
<ul style="list-style-type: none"> <li>Closing solenoid 3AY1510</li> </ul>	Including "Spring charged" signal
<ul style="list-style-type: none"> <li>1st shunt release type 3AY1510</li> </ul>	- Refer to table below for release combinations
<ul style="list-style-type: none"> <li>2nd shunt release type 3AX1101</li> </ul>	- Only a maximum of 2 releases can be combined
<ul style="list-style-type: none"> <li>Current transformer-operated release 0.5 A/1 A, type 3AX1102</li> </ul>	- A current transformer-operated release for a tripping pulse of $\geq 0.1$ Ws is used in connection with the 7SJ41 protective system or with the protective relay made by SEG
<ul style="list-style-type: none"> <li>Current transformer-operated release 0.1 Ws, type 3AX1104</li> </ul>	
<ul style="list-style-type: none"> <li>Undervoltage release type 3AX1103</li> </ul>	
<ul style="list-style-type: none"> <li>Auxiliary switch 2 NO+2 NC, unwired</li> </ul>	- Free contacts available for customer use
<ul style="list-style-type: none"> <li>Auxiliary switch 6 NO+6 NC,* unwired</li> </ul>	- Option: Auxiliary switch contacts wired to plug connector
<ul style="list-style-type: none"> <li>Auxiliary switch 12 NO+12 NC,* unwired</li> </ul>	- Option: Gold-plated auxiliary switch contacts - Option: 12 NO + 12 NC available only with 64-pole plug connector
<ul style="list-style-type: none"> <li>Terminal strip 24-pole or plug connector 64-pole or 24-pole</li> </ul>	- Only in connection with auxiliary switches 6 NO+ 6 NC and 12 NO+12 NC - Option: Electrical equipment—such as motor, release—wired to terminal strip or plug connector - Option: Gold-plated plug connector contacts
<ul style="list-style-type: none"> <li>Breaker tripping signal</li> </ul>	—
<ul style="list-style-type: none"> <li>Operating cycle counter</li> </ul>	—
<ul style="list-style-type: none"> <li>Mechanical interlocking</li> </ul>	In the case of manual snap-action mechanism, mechanical scanning of the circuit-breaker positions
<ul style="list-style-type: none"> <li>Varistor circuitry</li> </ul>	In the secondary circuit, for $\geq 60$ V DC
<ul style="list-style-type: none"> <li>Halogen-free and flame-retardant wiring cables</li> </ul>	—
<ul style="list-style-type: none"> <li>Condensation protection</li> </ul>	For 230 V AC
<ul style="list-style-type: none"> <li>Silver-plated or tinned primary current paths</li> </ul>	External terminals and internal connections on both sides
<ul style="list-style-type: none"> <li>Hand crank</li> </ul>	For manual charging of the closing spring
<ul style="list-style-type: none"> <li>Silicone-free design</li> </ul>	—

### 8 combination possibilities of the releases

Release	Release combinations							
	1	2	3	4	5	6	7	8
1st shunt release type 3AY1510	•	•	-	-	-	•	•	•
2nd shunt release type 3AX1101	-	•	-	-	-	-	-	-
Current trans- type 3AX1102; 0.5 A or former-operated type 3AX1102; 1 A or release type 3AX1104; 0.1 Ws	-	-	•	•	-	•	•	-
Undervoltage release type 3AX1103	-	-	-	-	•	-	-	•

• 1 piece per release. A maximum of 2 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 2 NO + 2 NC).  
Abbreviations: NO = normally-open, NC = normally-closed

17.5 kV



e. g. 3AH3 83 high-current circuit-breaker  
17.5 kV / 63 kA / 8000 A



Xingó Hydroelectric power plant, Brazil

**Catalog section 5** Page

- Rated data
- Selection and ordering data
- Electrical and mechanical service life
- Dimensions and weights
- Secondary equipment

For rated voltage  
- 17.5 kV 5/2-5/3

Enquiry form A/2

**Features of high-current circuit-breakers**

- Rated voltage 17.5 kV
- Maintenance-free up to 10,000 operating cycles
- Mechanical breaker service life 10,000 operating cycles
- Consisting of 3 individual vacuum circuit-breakers, i. e. 1 vacuum circuit-breaker is used for each phase
- Rated normal currents up to 12,000 A
- Suitable for use in conjunction with generators

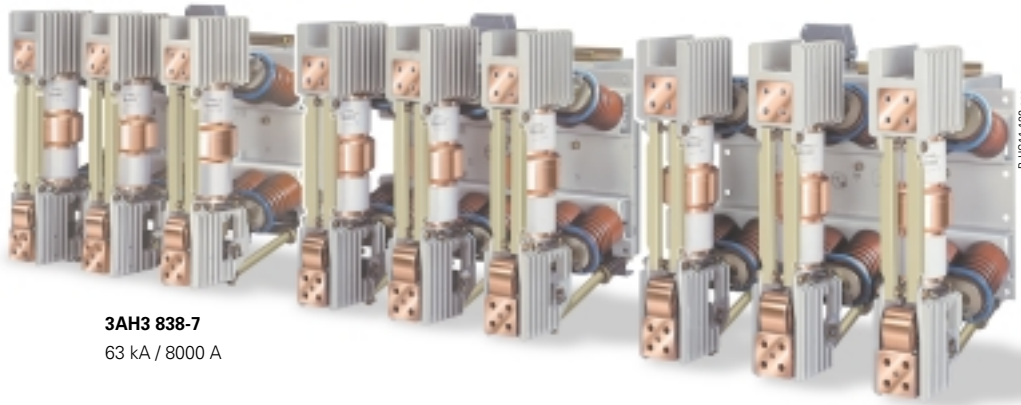
According to ANSI C37.013

- Rated short-circuit breaking currents of 50 kA and 63 kA
- DC component 50%, higher values on request

According to IEC 60056

- Rated short-circuit breaking current 80 kA
- DC component 50%, higher values on request

**17.5 kV**



**3AH3 838-7**  
63 kA / 8000 A

- Rated
- voltage 17.5 kV
  - lightning impulse withstand voltage 95 kV
  - short-time power frequency withstand voltage 38 kV\*
  - short-circuit duration 3 s
  - short-circuit breaking current  $I_{sc}$  and short-circuit making current  $I_{ma}$  see table

\* Up to 42 kV on request

### Selection and ordering data for rated voltage 17.5 kV

Rated operating sequence

O - 3min - CO - 3min - CO

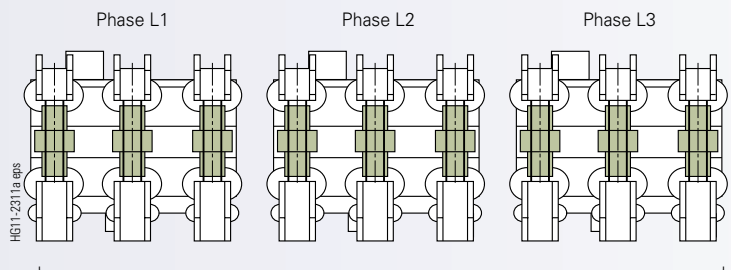
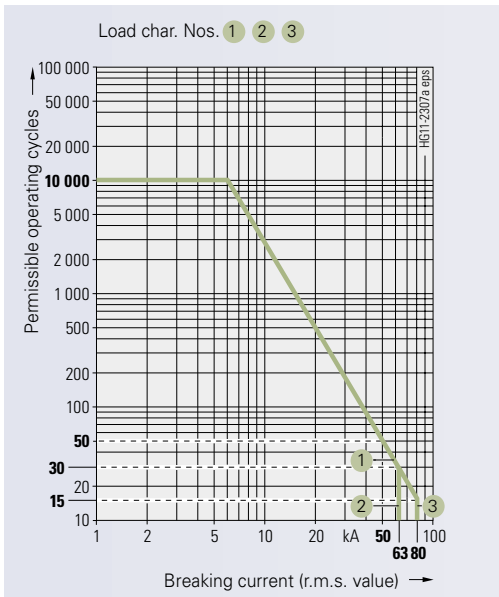
$I_{sc}$ kA	$I_{ma}$ kA	Pole-centre distance mm	Please add Order No. suffix	Order No. suffix at rated normal current 8000 A    12 000 A	No. of poles per phase	Remarks
Load char. No. <b>1</b> <b>1</b>						
50	125	210	<b>3AH3 837</b> -□ ← <b>7</b>	<b>8</b>	3	• • Standard: ANSI C37.013 Standard: ANSI C37.013
	125	275	<b>3AH3 837</b> -□ ← <b>8</b>		3	
Load char. No. <b>2</b> <b>2</b>						
63	160	275	<b>3AH3 838</b> -□ ← <b>7</b>	<b>8</b>	3	• Standard: ANSI C37.013
			<b>3AH3 838</b> -□ ← <b>8</b>		3	
Load char. No. <b>3</b> <b>3</b>						
80	225	275	<b>3AH3 830</b> -□ ← <b>7</b>	<b>8</b>	3	• Standard: IEC 60056

Enquiry form  
see page A/2

• Possible

5

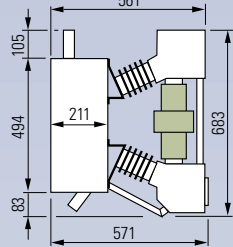
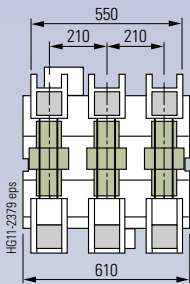
### Electrical service life (load char. Nos. 1 to 3) · Mechanical breaker service life 10,000 operating cycles



High-current circuit-breaker, consisting of 3 individual vacuum circuit-breakers with 3 poles per phase.

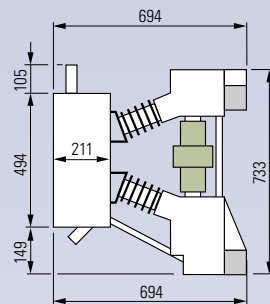
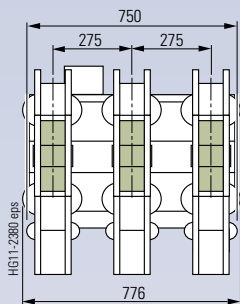
For dimensions for 1 phase, refer to page 5/3.

## Dimensions and weights



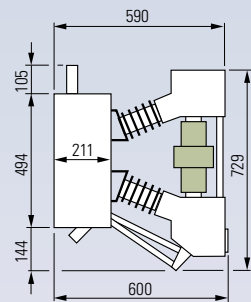
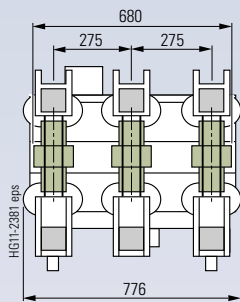
### Pole-centre distance 210 mm

- 50 kA / 8000 A
- Weight of the 3 vacuum circuit-breakers approx. 552 kg

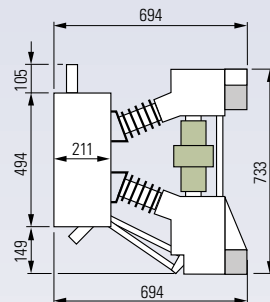
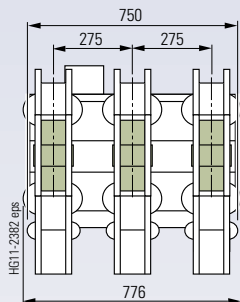


### Pole-centre distance 275 mm

- 50 kA / 12 000 A
- Weight of the 3 vacuum circuit-breakers approx. 930 kg



- 63 kA / 8000 A
- 80 kA / 8000 A
- Weight of the 3 vacuum circuit-breakers approx. 594 kg



- 63 kA / 12 000 A
- 80 kA / 12 000 A
- Weight of the 3 vacuum circuit-breakers approx. 930 kg

Dimension drawings,  
all for 1 phase only.

## Secondary equipment

# 17.5 kV

For a description of the secondary equipment, refer to pages 1/8 to 1/13.

Basic equipment	Remarks
○ Additional equipment	
● <b>Electrical operating mechanism</b>	- Can also be manually controlled - <u>Option</u> : with manual control
● <b>Closing solenoid</b> type 3AY15 10	-
● <b>1st shunt release</b> type 3AY15 10	- Refer to table below for release combinations
○ 2nd shunt release type 3AX11 01	- Max. 3 releases can be combined
○ Current transformer-operated release 0.5 A/1 A, type 3AX11 02	- A current transformer-operated release for a tripping pulse of $\geq 0.1$ Ws is used in connection with the 7SJ41 protective system or with the protective relay made by SEG
○ Current transformer-operated release 0.1 Ws, type 3AX11 04	
○ Undervoltage release type 3AX11 03	
● <b>Auxiliary switch 6 NO + 6 NC</b>	- Refer to page 1/11 concerning contacts available for customer use
○ Auxiliary switch 12 NO + 12 NC *	- <u>On request</u> : More than 12 NO + 12 NC - <u>Option</u> : Gold-plated auxiliary switch contacts
● <b>Terminal strip 24-pole or plug connector</b> 64-pole or 24-pole	- Electrical equipment - such as motor, release - wired to terminal strip or plug connector - <u>Option</u> : Gold-plated plug connector contacts
● <b>Anti-pumping</b> mechanical and electrical	-
● <b>Breaker tripping signal</b>	-
● <b>Operating cycle counter</b>	-
● <b>Position switches</b> (2 pieces) for signalling "Closing spring charged"	-
○ Electrical local closing	In place of mechanical local closing
○ Mechanical interlocking	-
○ Varistor circuitry	In the secondary circuit, for $\geq 60$ V DC
○ Halogen-free and flame-retardant wiring cables	-
○ Condensation protection	For 230 V AC
○ Silver-plated or tinned primary current paths	External terminals and internal connections on both sides
○ Hand crank	For manual charging of the closing spring
○ Silicone-free design	-

### 3 combination possibilities of the releases

Release	Release combinations		
	1	2	3
1st shunt release	•	•	•
2nd release	-	•	•
3rd release	-	-	•

The 2nd and 3rd releases can be shunt releases, undervoltage releases or current transformer-operated releases as desired (0.5 A, 1 A or 0.1 Ws).

- 1 piece per release. A maximum of 3 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 6 NO + 6 NC).  
Abbreviations: NO = normally-open, NC = normally-closed



17.5 kV, 16<sup>2</sup>/<sub>3</sub> Hz and 27.5 kV, 50/60 Hz



e. g.  
1-pole traction circuit-breaker  
27.5 kV, 50/60 Hz /  
25 kA / 2000 A



e. g.  
1-pole traction circuit-breaker  
17.5 kV, 16<sup>2</sup>/<sub>3</sub> Hz /  
50 kA / 2500 A



Körle substation, 110 / 15 kV, 16<sup>2</sup>/<sub>3</sub> Hz (traction power supply) with ICE power unit

**Catalog section 6** Page

- Rated data
- Selection and ordering data
- Electrical and mechanical service life
- Dimensions and weights
- Secondary equipment

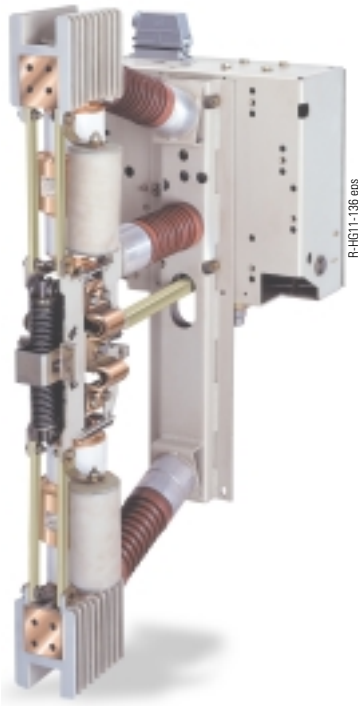
For rated voltages

- 17.5 kV, 16<sup>2</sup>/<sub>3</sub> Hz 6/2-6/3
- 27.5 kV, 50/60 Hz 6/4-6/5

Enquiry form A/4

**Features of 1-pole traction circuit-breakers**

- Rated voltages 17.5 kV, 16<sup>2</sup>/<sub>3</sub> Hz and 27.5 kV, 50/60 Hz
- Maintenance-free up to 10,000 operating cycles
- Mechanical breaker service life up to 60,000 operating cycles
- Rated short-circuit breaking currents up to 50 kA
- DC component 36%, higher values on request
- Rated lightning impulse withstand voltages 125 kV to 250 kV
- Suitable for use in conjunction with, for example
  - Traction power supply installations
  - Contact line sections
  - Primary power supply (main circuit-breaker function) of locomotives and motor cars



**3AH4 757-6**  
50 kA / 2500 A

## 17.5 kV, 16 2/3 Hz

Rated voltage 17.5 kV, 16 2/3 Hz  
 Rated lightning impulse withstand voltage 125 kV  
 Rated short-time power frequency withstand voltage 50 kV  
 Rated short-circuit duration 3 s  
 Rated short-circuit breaking current  $I_{sc}$  and rated short-circuit making current  $I_{ma}$  see table

### Selection and ordering data for rated voltage 17.5 kV, 16 2/3 Hz

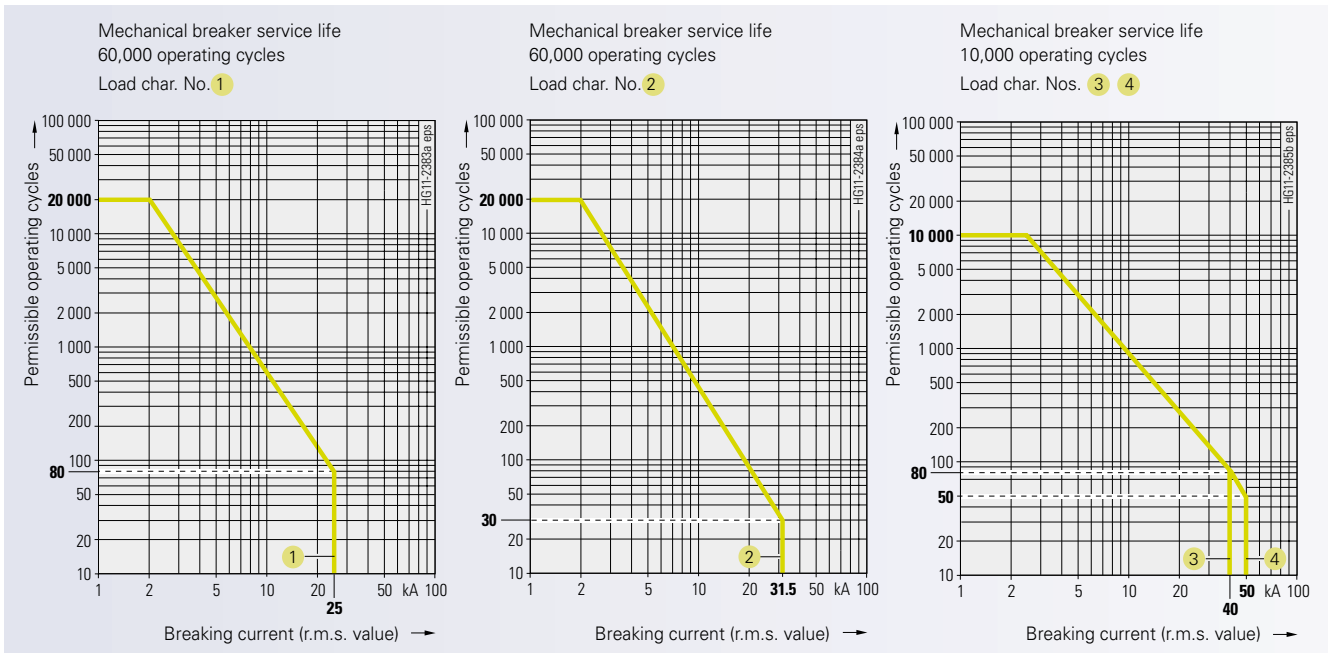
$I_{sc}$ kA	$I_{ma}$ kA	Please add Order No. suffix	Order No. suffix at rated normal current 2000 A    2500 A	Rated operating sequences		Remarks
		Load char. No. <b>1</b>			O - 3min - CO - 3min - CO	
25	63	<b>3AH4 754</b> -□ ← <b>4</b>		•	•	—
		Load char. No. <b>2</b>			O - 15s - CO	
31.5	80	<b>3AH4 755</b> -□ ← <b>4</b>		•	•	—
		Load char. No. <b>3</b>				
40	100	<b>3AH4 756</b> -□ ← <b>6</b>		•	•	—
		Load char. No. <b>4</b>				
50	125	<b>3AH4 757</b> -□ ← <b>6</b>		•	•	—

Enquiry form  
see page A/4

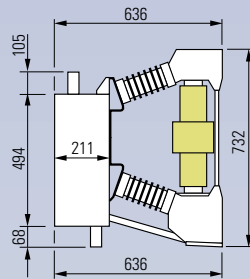
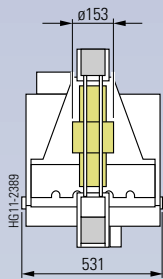
• Possible

## 6

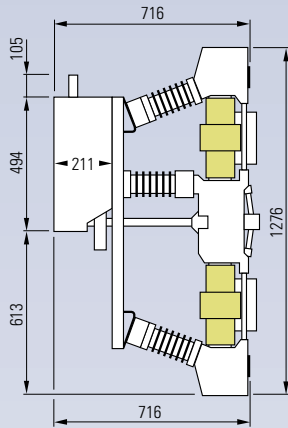
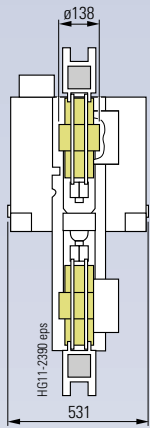
### Electrical service life (load char. Nos. 1 to 4)



## Dimensions and weights



- 25 kA / 2000 A
  - 31.5 kA / 2000 A
- Weight  
approx. 90 kg



- 40 kA / 2500 A
  - 50 kA / 2500 A
- Weight  
approx. 138 kg

## Secondary equipment

17.5 kV, 16 2/3 Hz

For a description of the secondary equipment, refer to pages 1/8 to 1/13.

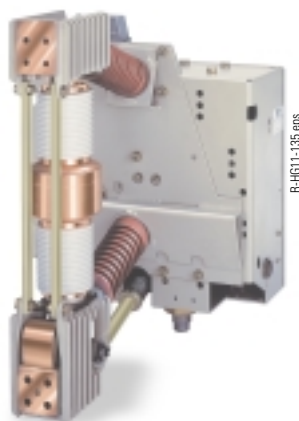
Basic equipment	Remarks
Additional equipment	
<b>Electrical operating mechanism</b>	Can also be controlled manually
<b>Closing solenoid</b> type 3AY1510	—
<b>1st shunt release</b> type 3AY1510	– Refer to table below for release combinations
<b>2nd shunt release</b> type 3AX1101	– Max. 3 releases can be combined
<b>Instantaneous release</b> type 3AX60 1.	– A capacitor release type 3AX1550-0 is necessary in connection with the instantaneous release
<b>Undervoltage release</b> type 3AX1103	
<b>Auxiliary switch 6 NO + 6 NC</b>	– Refer to page 1/11 concerning contacts available for customer use
<b>Auxiliary switch 12 NO + 12 NC *</b>	– <u>On request:</u> More than 12 NO + 12 NC – <u>Option:</u> Gold-plated auxiliary switch contacts
<b>Terminal strip 24-pole or plug connector</b> 64-pole or 24-pole	– Electrical equipment – such as motor, release – wired to terminal strip or plug connector – <u>Option:</u> Gold-plated plug connector contacts
<b>Anti-pumping</b> mechanical and electrical	—
<b>Breaker tripping signal</b>	—
<b>Operating cycle counter</b>	—
<b>Position switches (2 pieces)</b> for signalling “Closing spring charged”	—
<b>Electrical local closing</b>	In place of mechanical local closing
<b>Mechanical interlocking</b>	—
<b>Varistor circuitry</b>	In the secondary circuit, for ≥ 60 V DC
<b>Halogen-free and flame-retardant wiring cables</b>	—
<b>Condensation protection</b>	For 230 V AC
<b>Silver-plated or tinned primary current paths</b>	External terminals and internal connections on both sides
<b>Hand crank</b>	For manual charging of the closing spring
<b>Silicone-free design</b>	—

### 4 combination possibilities of the releases

Release	Release combinations			
	1	2	3	4
1st shunt release type 3AY1510	•	•	•	•
2nd shunt release type 3AX1101	•	–	•	–
Instantaneous release type 3AX60 1.	–	•	–	–
Undervoltage release type 3AX1103	•	–	–	•

- 1 piece per release. A maximum of 3 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 6 NO +6 NC).  
Abbreviations: NO = normally-open, NC = normally-closed



**3AH4 784-4**  
25 kA / 2000 A

## 27.5 kV, 50/60 Hz

Rated voltage 27.5 kV, 50/60 Hz  
 Rated lightning impulse withstand voltage  $U_p$  and  
 rated short-time power frequency  
 withstand voltage  $U_d$   
 see table  
 Rated short-circuit duration 3 s  
 Rated short-circuit breaking current  $I_{SC}$  and  
 rated short-circuit making current  $I_{ma}$   
 see table

### Selection and ordering data for rated voltage 27.5 kV, 50/60 Hz

Rated operating sequences

O - 0.3s - CO - 3min - CO

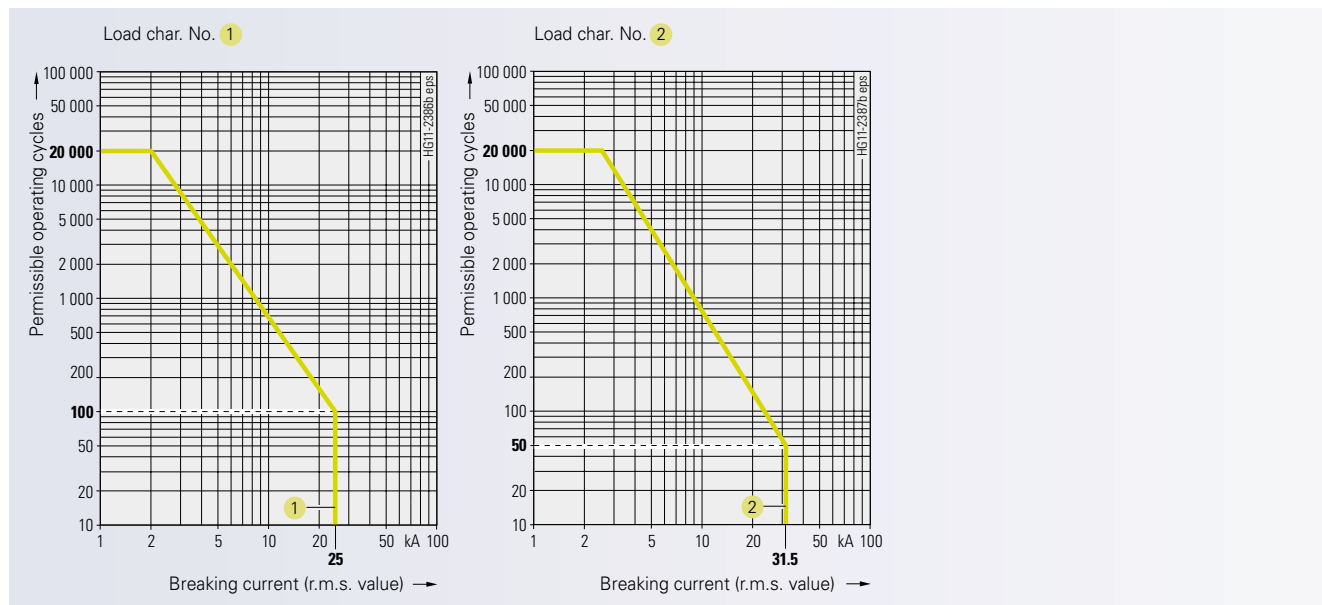
$U_p$	$U_d$	$I_{SC}$	$I_{ma}$	Please add Order No. suffix	Order No. suffix at rated normal current 1250 A   2000 A   2500 A	Rated operating sequences	Remarks
kV	kV	kA	kA				
170	70	25	63	<b>3AH4 784</b> -□ ← 2 — 4	1   1	•	—
		31.5	80	<b>3AH4 785</b> -□ ← 6	2		
250	105	25	63	<b>3AH4 794</b> -□ ← 2 — 4	1   1	•	—
		31.5	80		2		

Enquiry form  
see page A/4

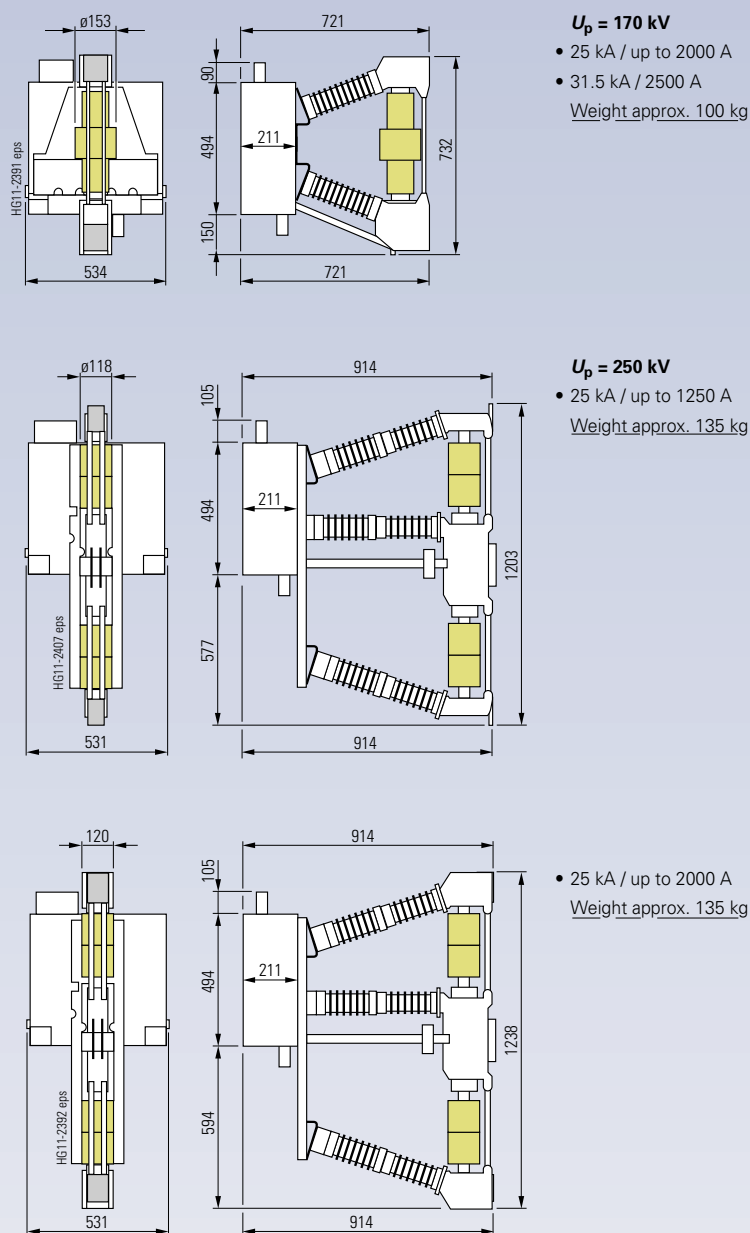
• Possible

6

**Electrical service life (load char. Nos. 1 and 2)** · Mechanical breaker service life 60,000 operating cycles



## Dimensions and weights



## Secondary equipment

**27.5 kV, 50/60 Hz**

For a description of the secondary equipment, refer to pages 1/8 to 1/13.

Basic equipment	Remarks
<ul style="list-style-type: none"> <li>Additional equipment</li> </ul>	
<ul style="list-style-type: none"> <li><b>Electrical operating mechanism</b></li> </ul>	Can also be controlled manually
<ul style="list-style-type: none"> <li><b>Closing solenoid</b> type 3AY1510</li> </ul>	—
<ul style="list-style-type: none"> <li><b>1st shunt release</b> type 3AY1510</li> </ul>	– Refer to table below for release combinations
<ul style="list-style-type: none"> <li>2nd shunt release type 3AX1101</li> </ul>	– Max. 3 releases can be combined
<ul style="list-style-type: none"> <li>Undervoltage release type 3AX1103</li> </ul>	
<ul style="list-style-type: none"> <li><b>Auxiliary switch 6 NO + 6 NC</b></li> </ul>	– Refer to page 1/11 concerning contacts available for customer use
<ul style="list-style-type: none"> <li>Auxiliary switch 12 NO + 12 NC *</li> </ul>	<ul style="list-style-type: none"> <li>– <u>On request:</u> More than 12 NO + 12 NC</li> <li>– <u>Option:</u> Gold-plated auxiliary switch contacts</li> </ul>
<ul style="list-style-type: none"> <li><b>Terminal strip 24-pole or plug connector</b> 64-pole or 24-pole</li> </ul>	<ul style="list-style-type: none"> <li>– Electrical equipment – such as motor, release – wired to terminal strip or plug connector</li> <li>– <u>Option:</u> Gold-plated plug connector contacts</li> </ul>
<ul style="list-style-type: none"> <li><b>Anti-pumping</b> mechanical and electrical</li> </ul>	—
<ul style="list-style-type: none"> <li><b>Breaker tripping signal</b></li> </ul>	—
<ul style="list-style-type: none"> <li><b>Operating cycle counter</b></li> </ul>	—
<ul style="list-style-type: none"> <li><b>Position switches (2 pieces)</b> for signalling “Closing spring charged”</li> </ul>	—
<ul style="list-style-type: none"> <li>Electrical local closing</li> </ul>	In place of mechanical local closing
<ul style="list-style-type: none"> <li>Mechanical interlocking</li> </ul>	—
<ul style="list-style-type: none"> <li>Varistor circuitry</li> </ul>	In the secondary circuit, for $\geq 60$ V DC
<ul style="list-style-type: none"> <li>Halogen-free and flame-retardant wiring cables</li> </ul>	—
<ul style="list-style-type: none"> <li>Condensation protection</li> </ul>	For 230 V AC
<ul style="list-style-type: none"> <li>Silver-plated or tinned primary current paths</li> </ul>	External terminals and internal connections on both sides
<ul style="list-style-type: none"> <li>Hand crank</li> </ul>	For manual charging of the closing spring
<ul style="list-style-type: none"> <li>Silicone-free design</li> </ul>	—

### 3 combination possibilities of the releases

Release	Release combinations		
	1	2	3
1st shunt release type 3AY1510	•	•	•
2nd shunt release type 3AX1101	•	–	•
Undervoltage release type 3AX1103	•	•	–

- 1 piece per release. A maximum of 3 releases can be combined.

\* Exchanged for the basic equipment (auxiliary switch 6 NO + 6 NC).  
Abbreviations: NO = normally-open, NC = normally-closed

7.2 to 36 kV



RHG11-130 eps

e. g.  
special circuit-breaker, 2-pole  
24 kV / 25 kA / 800 A



RHG11-131 eps

e. g.  
explosion-protected circuit-breaker  
12 kV / 23.6 kA / 630 A



Mobile selective-cut road driving machine for underground mining type WAW 300 (photo Westfalia Lünen)

RHG11-129 eps

**Features of special circuit-breakers**

Special circuit-breakers

- Rated voltages 7.2 to 36 kV
- Maintenance-free up to 10,000 operating cycles
- Mechanical breaker service life 10,000 operating cycles
- Rated short-circuit breaking currents up to 63 kA (r.m.s. value), min. 50 operating cycles
- DC component 36 %, higher values on request

Explosion-protected circuit-breakers

- Rated voltages 7.2 and 12 kV
- Maintenance-free up to 10,000 operating cycles
- Mechanical breaker service life 10,000 operating cycles
- Rated short-circuit breaking currents up to 23.6 kA (r.m.s. value)

**Catalog section 7** Page

- Rated data
- Service life
- Secondary equipment
- Ambient influences
- Standards

For

- Special circuit-breakers 1, 2 and 3-pole 7/2
- Explosion-protected circuit-breakers 7/3

Enquiry form A/5

We turn your requirements into reality. Just drop us a line. Also see our enquiry form in the Appendix, page A/5

# Special Circuit-Breakers, 1, 2 and 3-Pole

– On request –

## 2-pole special circuit-breaker

24 kV /  
25 kA / 800 A  
Pole-centre distance  
550 mm



7.2 to 36 kV

1 and 2-pole special circuit-breakers can be derived from 3AH1 to 3AH4 3-pole vacuum circuit-breakers.

## Requirements

- Vibration stability and seismic withstand capability in accordance with the guidelines of "Germanischer Lloyd" and "Lloyd's Register of Shipping", e. g. for
  - Power plants
  - Shipbuilding
- Climatic withstand capability

We turn your requirements into reality. Just drop us a line. Also see our enquiry form in the Appendix, page A/5

## Selection data

Rated voltages $U_r$	7.2 to 36 kV
Rated frequencies $f_r$	16 <sup>2</sup> / <sub>3</sub> or 50/60 Hz
Rated lightning impulse withstand voltages $U_p$	60 to 250 kV
Rated short-time power frequency withstand voltages $U_d$	20 to 105 kV
Rated short-circuit duration $t_k$	up to 4 s
Rated normal current $I_r$	800 to 4000 A
Rated short-circuit breaking currents $I_{sc}$	16 to 80 kA
Rated short-circuit making currents $I_{ma}$	50 to 225 kA
Rated operating sequences	O - 0.3s - CO - 15s - CO - 15s - CO - 15s - CO O - 0.3s - CO - 3min - CO O - 3min - CO - 3min - CO
Pole-centre distances of 2-pole special circuit-breakers	320 to 700 mm

**Secondary equipment** · For description refer to pages 1/8 to 1/13

### ● Basic equipment

- Additional equipment

### ● Electrical operating mechanism

- Closing solenoid, type 3AY1510
- 1st shunt release, type 3AY1510
- 2nd shunt release, type 3AX1101
- Current transformer-operated release, type 3AX1102, for 0.5 A or 1 A
- Current transformer-operated release, type 3AX1104, for tripping pulse  $\geq 0.1$  Ws
- Undervoltage release, type 3AX1103
- Instantaneous release, type 3AX60 1.

### ● Auxiliary switch 6 NO + 6 NC

- Auxiliary switch 12 NO + 12 NC <sup>1)</sup>

### ● Terminal strip, 24-pole or plug connector, 64-pole or 24-pole

### ● Anti-pumping, mechanical and electrical

### ● Breaker tripping signal

### ● Operating cycle counter

### ● Position switches (2 pieces) for "Closing spring charged" signal

- Electrical local closing
- Mechanical interlocking
- Varistor circuitry
- Silicone-free design

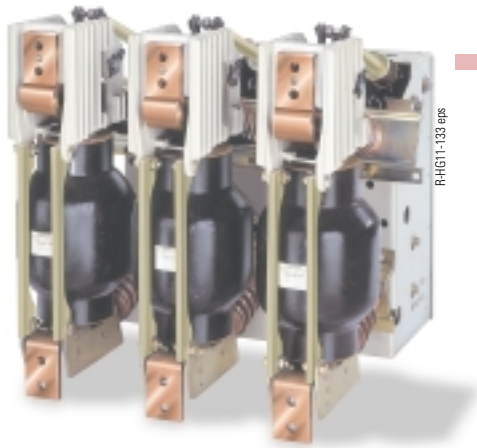
<sup>1)</sup> Exchanged for the basic equipment (auxiliary switch 6 NO + 6 NC).

Abbreviations: NO = normally-open, NC = normally-closed

7.2 and 12 kV

## Explosion-protected circuit-breaker

12 kV /  
23.6 kA / 630 A



### Requirements

- Explosion protection, e. g. for
  - Mining installations
  - Chemical plants
- Firedamp protection

Firedamp protection involves special design measures as compared with normal industrial equipment:

- Vacuum interrupters with cast-resin-impregnated glass-fibre coating and with the same distances between poles, degree of protection EEx d I
- Auxiliary switch, fitted in the lower section of the operating mechanism box (actuated by a linkage from the operating shaft), degree of protection EEx d I
- Lift motor with degree of protection EEx d I
- Secondary release and closing solenoid, degree of protection EEx e I
- Limit switch (Sch)d, degree of protection EEx d I
- Line-up terminals with degree of protection EEx e I

We turn your requirements into reality. Just drop us a line. Also see our enquiry form in the Appendix, page A/5

### Selection data

Rated voltages $U_r$	7.2 and 12 kV
Rated frequencies $f_r$	50/60 Hz
Rated lightning impulse withstand voltages $U_p$	75 kV
Rated short-time power frequency withstand voltages $U_d$	28 kV
Rated short-circuit duration $t_k$	3 s
Rated normal current $I_r$	630 A
Rated short-circuit breaking current $I_{sc}^*$	23.6 kA
Rated short-circuit making current $I_{ma}$	75 kA
Rated operating sequences O - 3min - CO - 3min - CO	possible
Pole-centre distance	210 mm

**Secondary equipment** · For description refer to pages 1/8 to 1/13

- **Basic equipment**
- **Electrical operating mechanism**
- **Closing solenoid**
- **1st shunt release**
- **Undervoltage release**
- **Auxiliary switch 4 NO + 4 NC**
- **Terminal strip** as line-up terminal 22+6-pole
- **Operating cycle counter**

\* Reduced 90% value certified by the BVS.

Abbreviations: NO = normally-open, NC = normally-closed





3AH vacuum circuit-breaker  
assembly line

Berlin switchgear factory of Siemens AG

Catalog section A	Page
Enquiry forms for	
– 3AH1/3AH3 standard circuit-breakers	A/2
– 3AH2/3AH4 frequent-operation circuit-breakers	A/2
– 3AH3 83 high-current circuit-breakers	A/2
– 3AH5 economy circuit-breakers	A/3
– 3AH4 7, 1-pole traction circuit-breakers	A/4
– Special circuit-breakers	A/5
Catalog index	A/6–A/8
Conditions of sale and delivery	A/10

#### Medium-Voltage Equipment and Components Subdivision

- Production shops at the Berlin switchgear factory for
  - Vacuum circuit-breakers
  - Vacuum contactors
- About 400 employees
- Facilities:
  - Development
  - Design
  - Type testing
  - Accredited test bays
  - Parts manufacture
  - Surface treatment
  - Several assembly lines
  - Routine testing and dispatch
  - Training and information centre
  - Quality management and environmental protection management



Enquiry concerning

**Economy  
circuit-breaker type 3AH5**

requesting

- Offer  
 Phone call  
 Visit

### Your address

Company

Department

Name

Street

Postcode/town

Tel.

FAX

### Siemens AG

Department

Name

Street

Postcode/town

FAX

### Technical specifications

Other values

Rated voltage	<input type="checkbox"/> 12 kV	<input type="checkbox"/> 17.5 kV	<input type="checkbox"/> 24 kV	<input type="checkbox"/> 36 kV	<input type="checkbox"/> .....kV
Rated lightning impulse withstand voltage	<input type="checkbox"/> 75 kV	<input type="checkbox"/> 95 kV	<input type="checkbox"/> 125 kV		<input type="checkbox"/> .....kV
Rated short-time power frequency withstand voltage	<input type="checkbox"/> 28 kV	<input type="checkbox"/> 38 kV	<input type="checkbox"/> 42 kV		<input type="checkbox"/> .....kV
	<input type="checkbox"/> 50 kV	<input type="checkbox"/> 70 kV			
Rated short-circuit breaking current	<input type="checkbox"/> 13.1 kA	<input type="checkbox"/> 16 kA	<input type="checkbox"/> 20 kA		<input type="checkbox"/> .....kA
	<input type="checkbox"/> 25 kA				
Rated normal current	<input type="checkbox"/> 800 A	<input type="checkbox"/> 1250 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

Refer to pages 4/3 to 4/9 for combination possibilities

Wiring	<input type="checkbox"/> without	<input type="checkbox"/> with
<input type="checkbox"/> Snap-action operating mechanism, manual operating mechanism		
<input type="checkbox"/> Stored-energy mechanism	<input type="checkbox"/> as manual operating mechanism	
	<input type="checkbox"/> as motor-operated mechanism	
	<input type="checkbox"/> DC ..... V	<input type="checkbox"/> AC ..... V, ..... Hz
<input type="checkbox"/> Closing solenoid	<input type="checkbox"/> DC ..... V	<input type="checkbox"/> AC ..... V, ..... Hz
<input type="checkbox"/> 1st shunt release	<input type="checkbox"/> DC ..... V	<input type="checkbox"/> AC ..... V, ..... Hz
<input type="checkbox"/> 2nd shunt release	<input type="checkbox"/> DC ..... V	<input type="checkbox"/> AC ..... V, ..... Hz
<input type="checkbox"/> Current transf.-operated release	<input type="checkbox"/> 0.5 A	<input type="checkbox"/> 1 A
	<input type="checkbox"/> Tripping pulse min. 0.1 Ws	
<input type="checkbox"/> Undervoltage release	<input type="checkbox"/> DC ..... V	<input type="checkbox"/> AC ..... V, ..... 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"/> Plug connector or	
	<input type="checkbox"/> 64-pole	
	<input type="checkbox"/> 24-pole	
<input type="checkbox"/> without	<input type="checkbox"/> with	
<input type="checkbox"/> Mechanical interlocking	<input type="checkbox"/> Operating cycle counter	
<input type="checkbox"/> Varistor circuitry at ≥ 60 V DC	<input type="checkbox"/> Breaker tripping signal	
Language of operating instructions	<input type="checkbox"/> German	<input type="checkbox"/> English
	<input type="checkbox"/> French	<input type="checkbox"/> Spanish

### Field of application and other requirements

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Please copy this form, fill it in and send it to your Siemens partner.

Please mark with a cross. ..... Please fill in.

Enquiry concerning

**Traction circuit-breaker, 1-pole, type 3AH4 7**

requesting

- Offer
- Phone call
- Visit

**Your address**

Company \_\_\_\_\_

Department \_\_\_\_\_

Name \_\_\_\_\_

Street \_\_\_\_\_

Postcode/town \_\_\_\_\_

Tel. \_\_\_\_\_

FAX \_\_\_\_\_

**Siemens AG**

Department \_\_\_\_\_

Name \_\_\_\_\_

Street \_\_\_\_\_

Postcode/town \_\_\_\_\_

FAX \_\_\_\_\_

**Technical specifications**

				Other values	
Rated voltage	<input type="checkbox"/> 17.5 kV, 2/3 Hz	<input type="checkbox"/> 27.5 kV	<input type="checkbox"/> t.....kV		
Rated lightning impulse withstand voltage	<input type="checkbox"/> 125 kV	<input type="checkbox"/> 170 kV	<input type="checkbox"/> 250 kV	<input type="checkbox"/> t.....kV	
Rated short-time power frequency withstand voltage	<input type="checkbox"/> 50 kV	<input type="checkbox"/> 70 kV	<input type="checkbox"/> 105 kV	<input type="checkbox"/> t.....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"/> 50 kA	<input type="checkbox"/> t.....kA
Rated normal current	<input type="checkbox"/> 1250 A	<input type="checkbox"/> 2000 A	<input type="checkbox"/> 2500 A	<input type="checkbox"/> t.....A	

**Secondary equipment**

Refer to pages 6/3 and 6/5 for combination possibilities

Motor-operated mechanism  DC t..... V  AC t..... V, t..... Hz

Closing solenoid  DC t..... V  AC t..... V, t..... Hz

1st shunt release  DC t..... V  AC t..... V, t..... Hz

2nd shunt release  DC t..... V  AC t..... V, t..... Hz

Instantaneous release  DC t..... V

Undervoltage release  DC t..... V  AC t..... V, t..... Hz

Auxiliary switch  6 NO + 6 NC  12 NO + 12 NC

Low-voltage connection  Plug connector or  Terminal strip, 24-pole  
 64-pole  
 24-pole

Electrical local closing

Mechanical interlocking

Varistor circuitry at ≥ 60 V DC

Language of operating instructions  German  English  Others t.....

**Field of application and other requirements**

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Please mark with a cross. t..... Please fill in.

Please copy this form, fill it in and send it to your Siemens partner.

A

Enquiry concerning

**Special circuit-breakers**  
for special applications

requesting

- Offer  
 Phone call  
 Visit

### Your address

Company

Department

Name

Street

Postcode/town

Tel.

FAX

### Siemens AG

Department

Name

Street

Postcode/town

FAX

### Technical specifications

Other values

Rated voltage	<input type="checkbox"/> 7.2 kV	<input type="checkbox"/> 12 kV	<input type="checkbox"/> 15 kV	<input type="checkbox"/> 17.5 kV	<input type="checkbox"/> ..... kV
	<input type="checkbox"/> 24 kV	<input type="checkbox"/> 27.5 kV	<input type="checkbox"/> 36 kV		
Rated lightning impulse withstand voltage	<input type="checkbox"/> 60 kV	<input type="checkbox"/> 75 kV	<input type="checkbox"/> 95 kV	<input type="checkbox"/> 125 kV	<input type="checkbox"/> ..... kV
	<input type="checkbox"/> 170 kV	<input type="checkbox"/> 250 kV			
Rated short-time power frequency withstand voltage	<input type="checkbox"/> 20 kV	<input type="checkbox"/> 28 kV	<input type="checkbox"/> 36 kV	<input type="checkbox"/> 38 kV	<input type="checkbox"/> ..... kV
	<input type="checkbox"/> 50 kV	<input type="checkbox"/> 70 kV	<input type="checkbox"/> 105 kV		
Rated short-circuit breaking current	<input type="checkbox"/> 16 kA	<input type="checkbox"/> 20 kA	<input type="checkbox"/> 25 kA	<input type="checkbox"/> 31.5 kA	<input type="checkbox"/> ..... kA
	<input type="checkbox"/> 40 kA	<input type="checkbox"/> 50 kA	<input type="checkbox"/> 63 kA	<input type="checkbox"/> 80 kA	
Rated normal current	<input type="checkbox"/> 800 A	<input type="checkbox"/> 1250 A	<input type="checkbox"/> 1600 A	<input type="checkbox"/> 2000 A	<input type="checkbox"/> ..... A
	<input type="checkbox"/> 2500 A	<input type="checkbox"/> 3150 A	<input type="checkbox"/> 4000 A		
Number of poles	<input type="checkbox"/> 1-pole	<input type="checkbox"/> 2-pole	<input type="checkbox"/> 3-pole		
Pole-centre distance 3-pole	<input type="checkbox"/> 160 mm	<input type="checkbox"/> 210 mm	<input type="checkbox"/> 275 mm	<input type="checkbox"/> 350 mm	
2-pole	<input type="checkbox"/> 320 mm	<input type="checkbox"/> 420 mm	<input type="checkbox"/> 550 mm	<input type="checkbox"/> 700 mm	

### Secondary equipment

Motor-operated mechanism	<input type="checkbox"/> DC ..... V	<input type="checkbox"/> AC ..... V, ..... Hz
Closing solenoid	<input type="checkbox"/> DC ..... V	<input type="checkbox"/> AC ..... V, ..... Hz
1st shunt release	<input type="checkbox"/> DC ..... V	<input type="checkbox"/> AC ..... V, ..... Hz
<input type="checkbox"/> 2nd shunt release	<input type="checkbox"/> DC ..... V	<input type="checkbox"/> AC ..... V, ..... Hz
<input type="checkbox"/> Current transf.-operated release	<input type="checkbox"/> 0.5 A	<input type="checkbox"/> 1 A
	<input type="checkbox"/> Tripping pulse min. 0.1 Ws	
<input type="checkbox"/> Instantaneous release	<input type="checkbox"/> DC ..... V	
<input type="checkbox"/> Undervoltage release	<input type="checkbox"/> DC ..... V	<input type="checkbox"/> AC ..... V, ..... Hz
Auxiliary switch	<input type="checkbox"/> 6 NO + 6 NC	<input type="checkbox"/> 12 NO + 12 NC
Low-voltage connection	<input type="checkbox"/> Plug connector or	<input type="checkbox"/> Terminal strip, 24-pole
	<input type="checkbox"/> 64-pole	
	<input type="checkbox"/> 24-pole	
<input type="checkbox"/> Electrical local closing		
<input type="checkbox"/> Mechanical interlocking		
<input type="checkbox"/> Varistor circuitry at $\geq 60$ V DC		
Language of operating instructions	<input type="checkbox"/> German	<input type="checkbox"/> English
	<input type="checkbox"/> French	<input type="checkbox"/> Spanish

### Field of applications and other requirements

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Please copy this form, fill it in and send it to your Siemens partner.

Please mark with a cross. ..... Please fill in.

**A**

Power Transmission and Distribution Group

**Catalog Index** (Please contact your Siemens Representative)

Designation	Title	Order No.
High Voltage	<b>High-Voltage Equipment (Above 52 kV)</b>	
HG 21.4	Surge Counting Devices for Surge Arresters	E50001-K1521-A401-A1-7600
	<b>Medium-Voltage Equipment (High-Voltage Equipment up to 52 kV)</b>	
HG 11.11	3AH Vacuum Circuit-Breakers	E50001-K1511-A111-A4-7600
HG 11.15	3AY2 Components up to 36 kV for 3AH Vacuum Circuit-Breakers	E50001-K1511-A151-A1-7600
HG 11.21	3TL Vacuum Contactors	E50001-K1511-A211-A1-7600
HG 11.31	Disconnectors and Earthing Switches	E50001-K1511-A311-A1-7600
HG 11.51	NXACT Vacuum Circuit-Breaker Modules	E50001-K1511-A511-A1-7600
HG 12	Vacuum Switches, Switch-Disconnectors, HV HRC Fuse	E50001-K1512-A101-A4-7600
HG 13	Switchgear Interlock Units, Control Valves, Compressed Air Systems	E86010-K1513-A101-A1-7600
HG 21	Overvoltage Protection	E50001-K1521-A101-A1-7600
HG 21.2.5	3EH2 Surge Arresters	E50001-K1521-A251-A3-7600
HG 21.2.7	2EE2 Special-Purpose Surge Arresters for the Protection of Motors, Generators and Furnace Transformers	E50001-K1521-A271-A3-7600
HG 22	Insulators of Cast Resin (Excerpt)	E50001-K1522-A111-A1-7600
HG 24	Current and Voltage Transformers	E50001-K1524-A101-A2-7600
HG 25	Air-Cored Reactors, High-Voltage Capacitors	E86010-K1525-A101-A4-7600
Medium-Voltage Switchgear	<b>Medium-Voltage Switchgear (High-Voltage Indoor Distribution Switchgear)</b>	
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HA 25.21	Type 8BK20 Switchgear up to 24 kV with Withdrawable Circuit-Breakers (Metal-Clad)	E50001-K1425-A311-A6-7600
HA 25.31	Type 8BK40 Switchgear up to 17.5 kV/63 kA with Withdrawable Circuit-Breakers	E50001-K1425-A411-A2-7600
HA 25.41	Generator Circuit-Breaker Units up to 17.5 kV/80kA, Type 8BK41	E50001-K1425-A511-A1-7600
HA 25.61	Type 8BJ50 Switchgear up to 24 kV with Withdrawable Circuit-Breakers*	E50001-K1425-A711-A2-7600
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HA 26.1	36/38 kV Switchgear with Withdrawable Vacuum Circuit-Breakers, Type 8BK20	Siemens Den Haag, Dept. CMS DMS E50001-K1427-A111-A2-7600
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HA 45.11	Fixed-Mounted Ring-Main Units up to 24 kV, SF <sub>6</sub> -Insulated, Type 8DJ10	E50001-K1445-A111-A6-7600
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HA 51.1	Type 8FB1 Compact Transformer Substations up to 24 kV	E50001-K1451-A111-A2-7600
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