



SION **Vacuum** Circuit-Breakers

Medium-Voltage Equipment
Selection and Ordering Data

Catalog HG 11.02 · 2005

SIEMENS



Circuit-breaker for fixed installation



Circuit-breaker with drawout element and contact arms with contact system

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Features of 3AE vacuum circuit-breakers

Standard circuit-breakers

7.2 to 24 kV

- For fixed installation
- As drawout systems
- With mounting accessories
 - Drawout element
 - Contact arms, contact systems
 - Fixed contacts, bushings

Slide-in module

7.2 to 24 kV

- Standard circuit-breaker with
 - Drawout element, contact arms, contact systems, fixed contacts, bushings

Mounted in

- Cartridge with shutters

SION Vacuum Circuit-Breakers Description

Construction and mode of operation

General

The compact SION vacuum circuit-breaker controls all switching duties in medium-voltage distribution systems and is suitable for installation in all customary air-insulated medium-voltage switchgear types.

The comprehensive installation accessories enable easy integration in the panel and form – maximally equipped as a slide-in module – almost the complete circuit-breaker compartment.

Switching medium

The vacuum switching technology of the vacuum interrupters, which has been proven for 30 years, serves as arc-quenching principle.

Pole assemblies

The pole assemblies consist of – Vacuum interrupters – Pole shells.

The vacuum interrupters are air-insulated and freely accessible. The pole assemblies are fixed on the mounting plate of the operating mechanism and supported by means of the pole shell.

The vacuum interrupter (3) is mounted rigidly to the upper interrupter support. The lower part of the interrupter is guided in the lower interrupter support, allowing axial movement. The pole shell (4) absorbs the external forces arising from switching operations and the contact pressure.

Operating mechanism

The whole operating mechanism is mounted on its mounting plate, including the motor, releases, indicators and actuating devices.

Stored-energy operating mechanism

The operating mechanism is a stored-energy spring mechanism. The force is transmitted from the operating mechanism to the pole assemblies via operating levers. 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 "ON" pushbutton or electrically by remote control. The closing spring charges the contact-pressure / opening springs as the breaker closes.

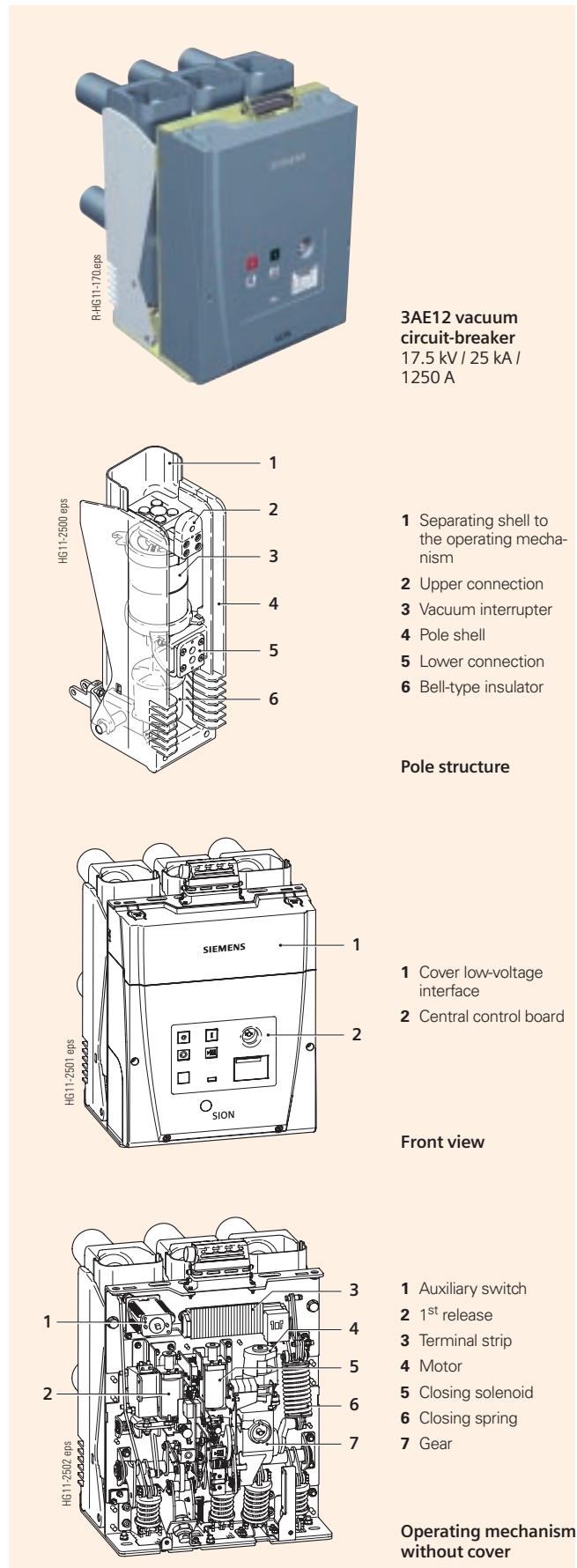
The now discharged closing spring will be charged again automatically by the mechanism motor.

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 as well as auto-reclosing.

Trip-free mechanism

In the event of an opening command being given after a closing operation has been initiated, the moving contacts return to the open position and remain there even if the closing command is sustained. This means that the contacts of the vacuum circuit-breakers are momentarily in the closed position.



3AE12 vacuum circuit-breaker
17.5 kV / 25 kA / 1250 A

- 1 Separating shell to the operating mechanism
- 2 Upper connection
- 3 Vacuum interrupter
- 4 Pole shell
- 5 Lower connection
- 6 Bell-type insulator

Pole structure

- 1 Cover low-voltage interface
- 2 Central control board

Front view

- 1 Auxiliary switch
- 2 1st release
- 3 Terminal strip
- 4 Motor
- 5 Closing solenoid
- 6 Closing spring
- 7 Gear

Operating mechanism without cover

Construction and mode of operation

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 mechanism motors (see table)

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

Motor short-circuit protection

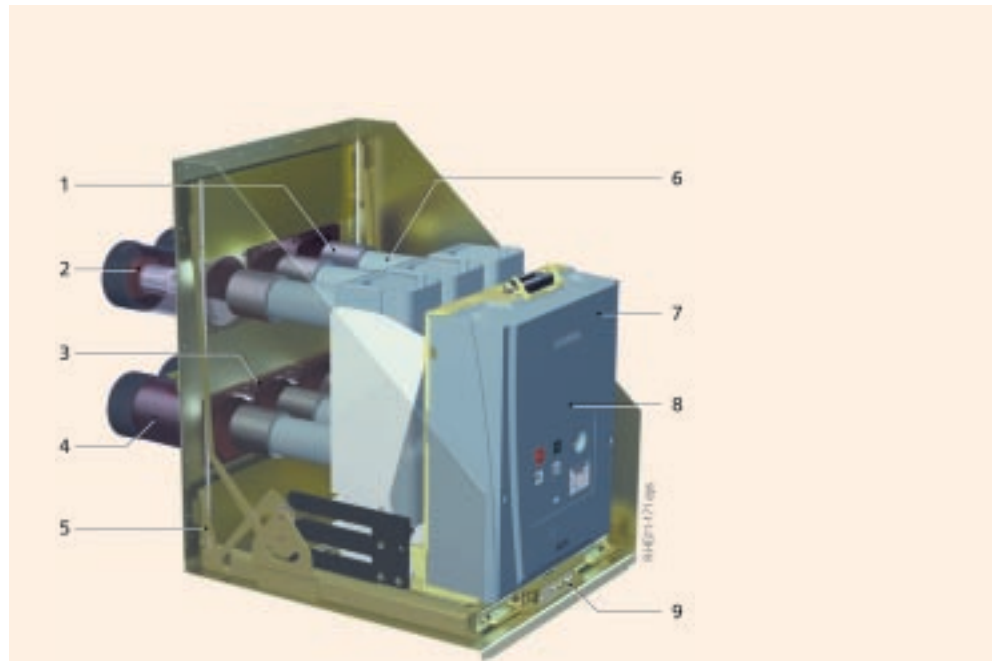
Rated voltage of the motor V	Operating voltage		Power consumption of the motor		Smallest possible rated current of the m.c.b. with C-characteristic A
	max. V	min. V	W at DC	VA at AC	
DC 24 48 60 110 220	26	20	350	–	8
	53	41	350	–	6
	66	51	350	–	4
	121	93	350	–	2
	242	187	350	–	1.6
AC 110 230	121	93	–	400	2
	244	187	–	400	1.6

Slide-in module

Besides the circuit-breaker installation equipment available for standard circuit-breakers by means of the packages for the drawout element, contact arms, fixed contacts and bushings, it is also possible to supply a complete slide-in module.

The slide-in module contains all necessary components for the circuit-breaker compartment of a panel. It consists of the circuit-breaker on a drawout element with contact arms, mounted in a cartridge with side and rear walls, equipped with bushings, fixed contacts, shutters and shutter mechanism. The surfaces of the side and rear walls form the tested connection compartment.

The vacuum circuit-breaker on the drawout element is racked into the cartridge with the associated handle by the rotary movement of the spindle. The shutter mechanism is controlled by lateral gates, and the shutters are opened for contacting. Signals for the service and disconnected positions are transmitted to the module connector at the low-voltage interface of the vacuum circuit-breaker via the position switches of the drawout element.



Slide-in module

- 1 Contact system
- 2 Fixed contact
- 3 Shutter
- 4 Bushing
- 5 Cartridge
- 6 Contact arm
- 7 Low-voltage interface
- 8 Vacuum circuit-breaker
- 9 Drawout element

Secondary equipment

The scope of the 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. For availability and combination possibilities, see Sections 2 and 3.

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 releases are designed for short-time duty up to 1 minute and are reset internally.

3AY15 10 closing solenoid

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 vacuum circuit-breakers by suitable protection relays and for deliberate tripping by electrical means.

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

Two different types of shunt releases are available:

- In case of the 1st shunt release 3AY15 10, 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 shunt release 3AX11 01 is fitted if more than one shunt release is required.

With this design, the electrical opening command is boosted by means of a solenoid armature unlatching an 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.

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 vacuum circuit-breaker is closed.

If the voltage falls below a pre-determined value, unlatching of the release is enabled and the circuit-breaker is opened via the stored-energy mechanism.

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

The transformer current ensures that the protection system is supplied with energy, and fills an energy store, the charge of which is available as a tripping pulse ≥ 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 protection system or protection 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:

- 7SJ45 protection system
- or similar protection systems

Release equipment

The maximum equipment are 2 freely selected releases. For release combinations refer to pages 2/11 and 3/8.

Releases

	Power consumption		Operating ranges	
	DC operation approx. W	50/60 Hz AC approx. VA	Tripping voltage (DC)	Tripping voltage / current (50/60 Hz AC)
Closing solenoid 3AY15 10	140	140	85 to 110 % U	85 to 110 % U
1st shunt release 3AY15 10 (without stored-energy mechanism)	140	140	70 to 110 % U	85 to 110 % U
2nd shunt release 3AX11 01 (with stored-energy mechanism)	70	50	70 to 110 % U	85 to 110 % U
Undervoltage release 3AY11 03	20	20	35 to 0 % U	35 to 0 % U
Current transformer-operated release 3AX11 02 (rated current 0.5 A or 1 A)	–	10 *	–	90 to 110 % I_a
Current transformer-operated release 3AX11 04 (tripping pulse ≥ 0.1 Ws)	–	–	–	–

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

Secondary equipment

Electrical local closing

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

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.

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.

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.

Integrated varistor modules

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. To prevent this, the motor, closing solenoid, releases are equipped with integrated varistor modules at operating voltages ≥ 60 up to 250 V DC. This limits overvoltages to approximately 500 V.

Low-voltage interface

The separate cover enables easy access to the low-voltage interface. All possible customer-side control and signalling connections are concentrated here:

- Auxiliary switch
- Terminal strip
- Plug connection
- Anti-pumping relay
- Module plug of the drawout element.

3SV9 auxiliary switch

Versions available are

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

Please refer to pages 2/10 and 3/7 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 acc. to VDE 0110
Continuous current	10 A
Making current	50 A
Breaking capacity at 220 V DC, T = 20 ms	2 A

Secondary connections (for control circuit)

Versions:

- 64-pole plug connector, make Amphenol with crimping connections. A crimping tool is necessary to connect the wiring in the lower plug part.
- 24-pole plug connector, make Amphenol, with screw connections in the upper plug part and with crimping connections in the lower plug part.
- 27-pole terminal strip, control cables are routed out by the customer through the cable gland.
- Additional module plug for versions with drawout element for position indication of the drawout element.

Please refer to pages 2/12 and 3/9 for types 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 (see page 1/11) 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.

Interlocking

Mechanical interlocking

At the interface of the mechanical interlocking of the vacuum circuit-breaker, sensors on the switchgear side can check the switching status and prevent the associated disconnecter from being closed while the vacuum circuit-breaker is closed. The system also prevents the vacuum circuit-breaker from being closed while the associated disconnecter is in a faulty position.

Vacuum circuit-breakers mounted on drawout elements are mechanically interlocked, with the result that the handle for racking the drawout element can only be inserted in the "OPEN" position. The lock of the drawout element can only be released in the disconnected position by operating the pushing handles.

If the vacuum circuit-breaker on the drawout element is in an intermediate position (neither in the service nor in the disconnected position), operation is not possible due to the mechanical interlocking.

Electrical interlocking

The auxiliary and signalling contacts which show the switch position of the vacuum circuit-breaker or the position of the drawout element can be integrated in the switchgear interlocking concept in order to exclude unpermissible switching sequences.

SION Vacuum Circuit-Breakers Description

Available SION vacuum circuit-breakers

Supply program, technical data

- For fixed installation
- As drawout systems

- With installation accessories
 - Drawout element
 - Contact arms
 - Contact systems
 - Fixed contacts
 - Bushings

Rated voltage U_r at rated frequency f	Rated lightning impulse withstand voltage U_{lp}	Rated short-duration power frequency withstand voltage U_p	Rated short-circuit power frequency withstand voltage U_{sc}	Rated insulation level	Available SION vacuum circuit-breakers															
					Rated short-circuit breaking current I_{sc}	Asymmetrical breaking current k	Rated short-circuit making current I_{ma}	Rated normal current I_n	with pole-center distance in mm				Width across flats * in mm							
									150	160	210	275	205	275	310	310				
kV	kV	kV	kA	s	kA	kA	A													
7.2 kV 50/60 Hz	60	20	16	3	17.9	40	800	•	•	•										
							1250	•	•	•										
							20	•	•	•										
							25	•	•	•										
							2000	–	–	–										
31.5	3	35.4	80	800	•	•	•													
				1250	•	•	•													
				2000	–	–	–													
				2500	–	–	–													
				40	•	•	•													
12 kV 50/60 Hz	75	28	16	3	17.9	40	800	•	•	•										
							1250	•	•	•										
							20	•	•	•										
							25	•	•	•										
							2000	–	–	–										
31.5	3	35.4	80	800	•	•	•													
				1250	•	•	•													
				2000	–	–	–													
				2500	–	–	–													
				40	•	•	•													

• Possible
– Not possible

* Width across flats: Distance between the upper and lower main terminals

Available SION vacuum circuit-breakers

Supply program, technical data

- For fixed installation
- As drawout systems

- With installation accessories
 - Drawout element
 - Contact arms
 - Contact systems
 - Fixed contacts
 - Bushings

Rated voltage U_r at rated frequency f		Rated lightning impulse withstand voltage U_{lp}		Rated short-duration power frequency withstand voltage U_d		Rated short-circuit breaking current I_{sc}		Asymmetrical breaking current k		Rated short-circuit making current I_m		Available SION vacuum circuit-breakers																																																																												
												Rated insulation level		with pole-center distance in mm																																																																										
												Rated normal current I_n		150				160				210				275																																																														
		Width across flats * in mm																																																																																						
kV		kV		kA		s		kA		kA		A																																																																												
17.5 kV 50/60 Hz	95	38	12.5	3	14.9	31.3	800	1250	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																																																																	
																								16	3	17.9	40	800	1250	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																																											
																																														25	3	28.0	63	800	1250	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•																					
																																																																				31.5	3	35.4	80	800	1250	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
24 kV 50/60 Hz	125	50	12.5	3	14.9	31.3	800	1250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•																																																																	
																								16	3	17.9	40	800	1250	2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•																																											
																																														20	3	22.4	50	800	1250	2000	2500	-	-	-	-	-	-	-	-	-	-	-	-	•																						
																																																																			25	3	28.0	63	800	1250	2000	2500	-	-	-	-	-	-	-	-	-	-	-	-	•	

• Possible
– Not possible

* Width across flats: Distance between the upper and lower main terminals

SION Vacuum Circuit-Breakers Description

Available SION slide-in modules

Supply program, technical data

– Standard circuit-breakers
mounted in a cartridge
with accessories

Rated voltage U_i at rated frequency f_i	Rated lightning impulse withstand voltage U_p	Rated short-duration power- frequency withstand voltage U_d	Rated short-circuit breaking current I_{sc}	Rated short-circuit breaking current I_k	Asymmetrical breaking current	Rated short-circuit making current I_{ma}	Rated normal current I_n	Available SION slide-in modules								
								with pole-center distance in mm								
								Width across flats * in mm								
								150		210		275				
								275	310	275	310	310				
	kV	kV	kA	s	kA	kA	A									
7.2 kV 50/60 Hz	60	20	16	3	17.9	40	800	•	•	•	•	–				
							1250	•	•	•	•	–				
							20	3	22.4	50	800	•	•	•	•	–
							1250	•	•	•	•	–				
							25	3	28.0	63	800	•	•	•	•	–
1250	•	•	•	•	–											
2000	–	–	–	–	–	–	–	–	–	–						
2500	–	–	–	–	–	–	–	–	–	–						
31.5	3	35.4	80	800	•	•	•	•	•	–						
1250	•	•	•	•	–	–	–	–	–	–						
2000	–	–	–	–	–	–	–	–	–	–						
2500	–	–	–	–	–	–	–	–	–	–						
40	3	44.9	100	1250	–	–	–	–	•	–						
2000	–	–	–	–	–	–	–	–	•	–						
2500	–	–	–	–	–	–	–	–	•	–						
3150	–	–	–	–	–	–	–	–	•	–						
12 kV 50/60 Hz	75	28	16	3	17.9	40	800	•	•	•	•	–				
							1250	•	•	•	•	–				
							20	3	22.4	50	800	•	•	•	•	–
							1250	•	•	•	•	–				
							25	3	28.0	63	800	•	•	•	•	–
1250	•	•	•	•	–											
2000	–	–	–	–	–	–	–	–	–							
2500	–	–	–	–	–	–	–	–	–	–						
31.5	3	35.4	80	800	•	•	•	•	•	–						
1250	•	•	•	•	–	–	–	–	–	–						
2000	–	–	–	–	–	–	–	–	–	–						
2500	–	–	–	–	–	–	–	–	–	–						
40	3	44.9	100	1250	–	–	–	–	•	–						
2000	–	–	–	–	–	–	–	–	•	–						
2500	–	–	–	–	–	–	–	–	•	–						
3150	–	–	–	–	–	–	–	–	•	–						

• Possible
– Not possible

* Width across flats: Distance between the upper and lower main terminals

Available SION slide-in modules

Supply program, technical data

– Standard circuit-breakers
mounted in a cartridge
with accessories

Rated voltage U_i at rated frequency f_i	Rated lightning impulse withstand voltage U_p	Rated short-duration power- frequency withstand voltage U_d	Rated short-circuit breaking current I_{sc}	Asymmetrical breaking current I_k	Rated short-circuit making current I_{ma}	Rated normal current I_n	Available SION slide-in modules									
							with pole-center distance in mm									
							150		210		275					
							Width across flats * in mm									
							275		310		275		310			
kV	kV	kA	s	kA	kA	A										
17.5 kV 50/60 Hz	95	38	12.5	3	14.9	31.3	800	•	•	•	•	–	–			
							1250	•	•	•	•	–				
							16	3	17.9	40	800	•	•	•	•	–
							1250	•	•	•	•	–				
							25	3	28.0	63	800	•	•	•	•	–
1250	•	•	•	•	–											
2000	–	–	–	–	–	–										
2500	–	–	–	–	–	–										
17.5 kV 50/60 Hz	95	38	31.5	3	35.4	80	800	•	•	•	•	–				
							1250	•	•	•	•	–				
							2000	–	–	–	–	–				
							2500	–	–	–	–	–				
							40	3	44.9	100	1250	–	–	–	•	–
2000	–	–	–	–	–	–										
2500	–	–	–	–	–	–										
3150	–	–	–	–	–	–										
24 kV 50/60 Hz	125	50	12.5	3	14.9	31.3	800	–	–	–	•	–				
							1250	–	–	–	•	–				
							16	3	17.9	40	800	–	–	–	•	•
							1250	–	–	–	–	•	–	•		
							2000	–	–	–	–	–	–	•	•	
24 kV 50/60 Hz	125	50	20	3	22.4	50	800	–	–	–	•	•				
							1250	–	–	–	•	–				
							2000	–	–	–	•	–				
							2500	–	–	–	•	–				
							25	3	28.0	63	800	–	–	–	•	•
1250	–	–	–	–	•	–	•									
2000	–	–	–	–	•	–	•									
2500	–	–	–	–	•	–	•									

• Possible
– Not possible

* Width across flats: Distance between the upper and lower main terminals

Operating times

Operating times at rated voltage of secondary circuit

Vacuum circuit-breaker equipment	Operating time
Closing time	– < 75 ms
Opening time	1 st shunt release < 65 ms
	2 nd release < 50 ms
Arcing time	– < 15 ms
Break time	1 st shunt release < 80 ms
	2 nd release < 65 ms
Dead time	– 300 ms
CLOSE/OPEN time	1 st shunt release < 75 ms
	2 nd release < 60 ms
Minimum command duration	Closing solenoid 45 ms
	1 st shunt release 40 ms
	2 nd release 20 ms
Pulse time for breaker tripping signal	1 st shunt release > 15 ms
	2 nd release > 10 ms
Spring-charging time for electrical operation	– < 10 s
Synchronous operation error between the poles	– 2 ms

Technical data

Standards

The vacuum circuit-breakers conform to the following standards:

- IEC 60 694
- IEC 62 271-100

The slide-in modules have been tested according to

- IEC 62 271-200 regarding
 - Dielectric strength
 - Temperature rise
 - Switching capacity.

Circuit-breaker class according to IEC 62 271-100, E2, M2, C2

Current-carrying capacity

The rated normal currents specified in Fig. a have been defined in IEC 62 271-100 for an ambient temperature of 40 °C and apply to open switchgear.

For enclosed switchgear the data of the switchgear manufacturer applies.

At ambient temperatures of < 40 °C, higher normal currents can be carried (see Fig. a).

Insulating capacity (see Fig. b)

The rated values of the insulating capacity are referred to sea level. The decreasing insulating capacity must be taken into account for site altitudes above 1000 m.

The characteristic $m = 1$ applies to the rated short-duration power-frequency withstand voltage and the rated lightning impulse withstand voltage. The correction factor K_a must be considered for site altitudes > 1000 m according to the characteristics.

To select the devices, the following applies:

Withstand voltage to be selected $1) \geq$ requested withstand voltage $2) \times K_a$.

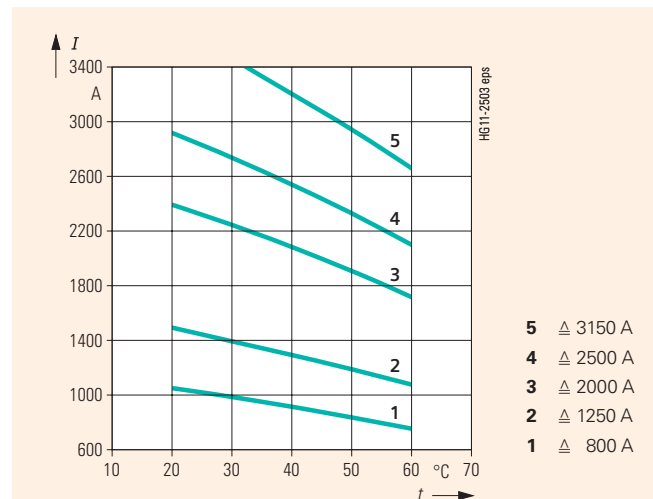


Fig. a
Rated normal currents

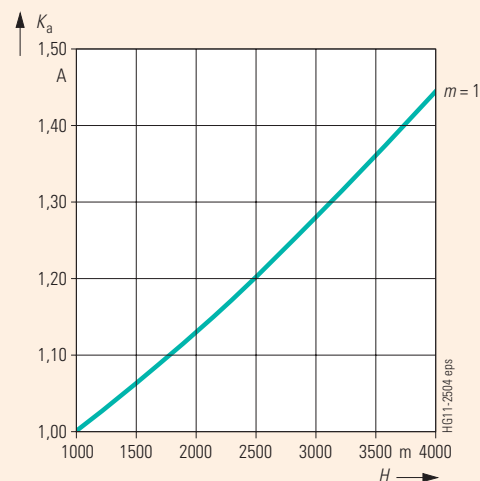


Fig. b
Altitude correction factor K_a

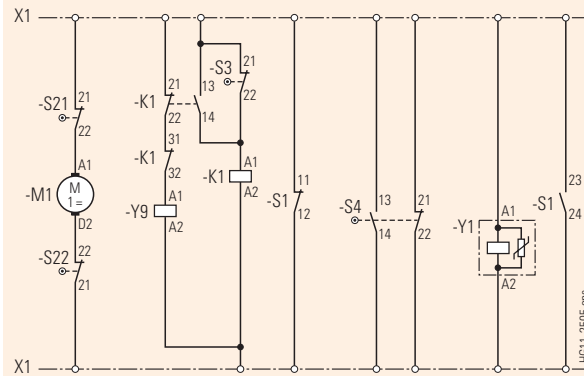
- 1) Rated lightning impulse withstand voltage
Rated short-duration power-frequency withstand voltage
- 2) Lightning impulse withstand voltage
Short-duration power-frequency withstand voltage

Schematic diagrams (not binding – examples only)

Legend

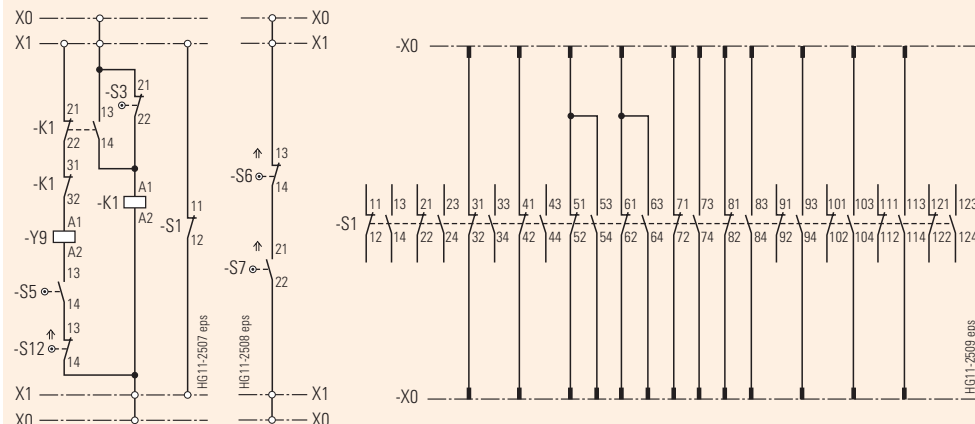
- K1 Contactor (anti-pumping)
- M1 Motor-operated mechanism
- R1 Resistor
- S1 Auxiliary switch
- S12 Mechanical interlocking
- S21, Position switches
- S22 (switch off motor-operated mechanism after spring charging)
- S3 Position switch (anti-pumping)
- S4 Position switch (opens when closing spring is charged)
- S5 Electrical closing lock-out
- S6 Breaker tripping signal
- S7 Cut-out switch for breaker tripping signal
- X0 24-pole or 64-pole plug connector
- X1 27-pole terminal strip
- Y1 1st shunt release
- Y2 2nd shunt release
- Y4 Current transformer-operated release (rated current of 0.5 A or 1 A)
- Y6 Current transformer-operated release (tripping pulse ≥ 0.1 Ws)
- Y7 Undervoltage release
- Y9 Closing solenoid

Basic equipment



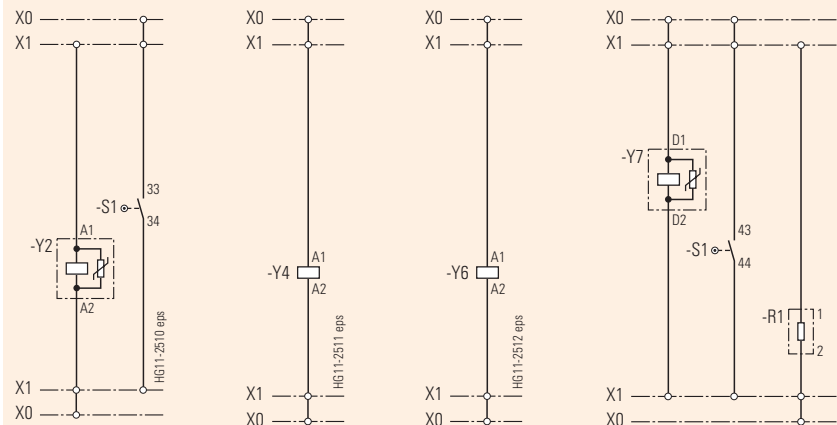
Motor-operated mechanism Closing and anti-pumping for motor-operated stored-energy mechanism "Closing spring charged" signal 1st shunt release Auxiliary switch

Additional equipment



Closing and anti-pumping for motor-operated stored-energy mechanism Breaker tripping signal Auxiliary switch

Additional equipment, releases (for combination possibilities, refer to "Secondary equipment", catalog Sections 2 and 3)



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

SION Vacuum Circuit-Breakers Description

Order No. structure

General data

The vacuum circuit-breakers consist of a primary and a secondary part. The relevant data make up the 16-digit Order No.

The primary part contains the principal electrical data of the breaker poles.

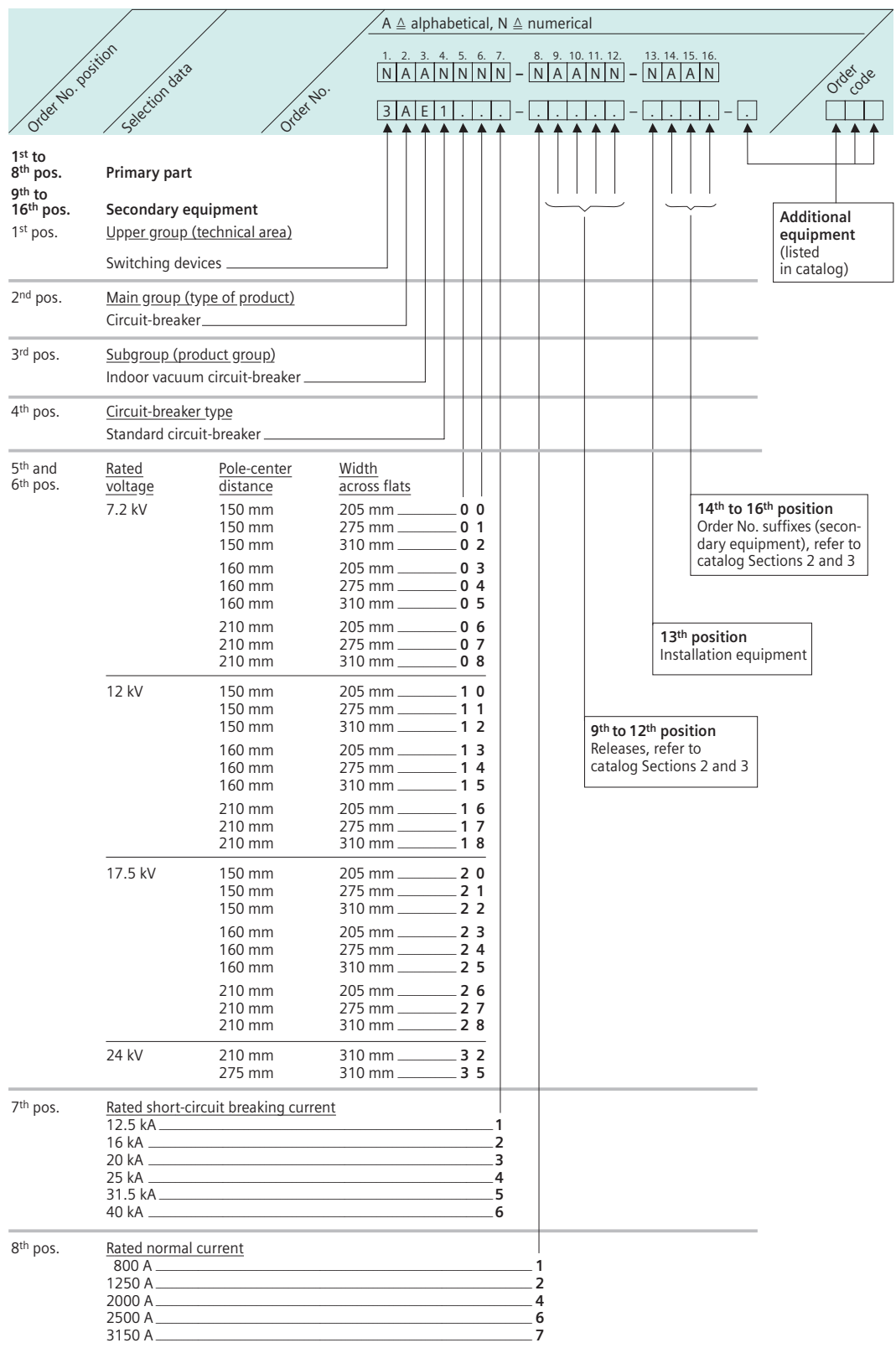
The secondary part covers the auxiliary devices which are necessary for operating and controlling the vacuum circuit-breaker.

Additional equipment

One item of additional equipment is covered by one order code. When an order is placed, this should be stated together with the Order No.

Several types of additional equipment can be ordered at the same time, i.e. several order codes can be added to the Order No. in succession and in any sequence.

In the case of further additional equipment which cannot be ordered by means of the order codes, please contact PTD MCS OM in Berlin, Germany.



Order codes for the Order No.

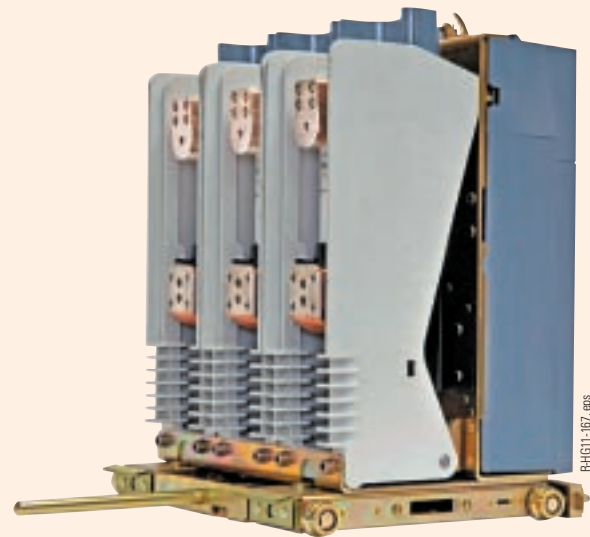
Additional equipment Overview (for your information only)

Additional equipment	Order code
Halogen-free and flame-retardant wiring cables	A10
Auxiliary switch contacts 12 NO + 12 NC and pins of 64-pole plug connector gold-plated	A21
Condensation protection, heating for 230 V AC, 50 W	A30
Silicone-free design	A31
Electrical closing lock-out	A47
Additional rating plate, provided separately	B00
Separating shell to contact arm side (standard version)	D90
Separating shell to contact arm side (short version)	D91
Rated short-duration power-frequency withstand voltage $U_d = 42$ kV instead of 28 kV (at $U_r = 12$ kV), extended creepage distances	E13
Routine test certificate (enclosed with delivery)	F20
Routine test certificate (with stamp and signature)	F21
Routine test certificate (to orderer)	F23
Hand crank for vacuum circuit-breaker (for manual charging of the closing spring)	F30
Handle for drawout element (for racking the vacuum circuit-breaker on the drawout element)	F32
Handle for earthing switch (for operating the earthing switch on the slide-in module)	F34
Key-operated interlocking (RONIS lock at the vacuum circuit-breaker)	J60

7.2 to 24 kV, 50/60 Hz



Circuit-breaker with drawout element
(operating mechanism side)



Circuit-breaker with drawout element
(primary connection)

Catalog Section 2	Page
Features	2/1
Ordering data, examples for ordering	2/2
Selection and ordering data for	
– 7.2 kV	2/3 and 2/4
– 12 kV	2/5 and 2/6
– 17.5 kV	2/7 and 2/8
– 24 kV	2/9
Secondary equipment	
– Selection	2/10
– Order No. suffixes	2/11 and 2/12
Accessories and spare parts	2/13 and 2/14

Features of standard circuit-breakers

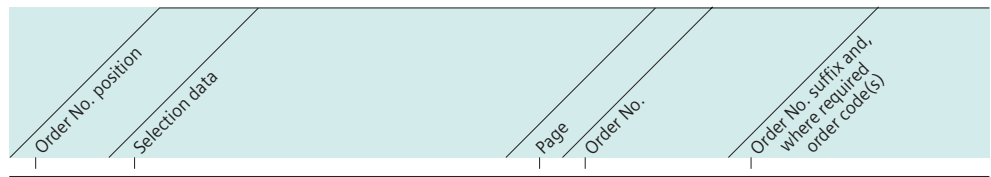
- Rated voltages 7.2 to 24 kV
- Maintenance-free up to 10,000 operating cycles, higher breaker service life possible
- Rated short-circuit breaking currents up to 40 kA (r.m.s. value)
- DC component 36 %, higher values on request
- Values of transient recovery voltage acc. to IEC 62 271-100, other values on request
- Upright installation
- Installation accessories – packages
 - Drawout element
 - Contact arms, contact systems
 - Fixed contacts, bushings
- Suitable for switching, for example:
 - Overhead lines and cables
 - Transformers
 - Generators
 - Capacitors
 - Filter circuits
 - Motors
 - Reactors

Ordering data, examples for ordering

Ordering data

The 3AE standard circuit-breakers are determined by a 16-digit Order No. According to the equipment fitted to the standard circuit-breakers, this Order No. must be suffixed by one or more order codes.

- For selection and ordering data of the primary equipment with additional equipment see pages 2/3 to 2/9.
- For associated Order No. suffixes (secondary equipment) see pages 2/11 and 2/12.



1st example for ordering

1 st to 8 th position	<u>3AE standard circuit-breaker:</u> – Rated voltage U_f 12 kV – Rated short-circuit breaking current I_{sc} 31.5 kA – Rated lightning impulse withstand volt. U_p 75 kV – Pole-center distance 160 mm – Width across flats 275 mm – Rated normal current I_f 1250 A	2/3	3 A E 1 1 4 5 - 2	...
9 th position	Closing solenoid, 1 st shunt release and undervoltage release	2/11	F	...
10 th position	Closing solenoid operating voltage 230 V AC	2/11	K	...
11 th position	1 st shunt release operating voltage 110 V DC	2/11	4	...
12 th position	2 nd release (undervoltage) operating voltage 220 V DC	2/11	5	...
13 th position	Without installation equipment	2/12	0	...
14 th position	Operating mechanism voltage 230 V AC	2/12	K	...
15 th position	Without mechanical interlocking, auxiliary switch 12 NO + 12 NC, 64-pole plug connector, without breaker tripping signal	2/12	Q	...
16 th position	Frequency of operating voltage 50 Hz, rating plate and operating instructions in German	2/12	0	...
When ordering, state:		Order No.	3 A E 1 1 4 5 - 2 F K 4 5 - 0 K Q 0	

2nd example for ordering

	<u>Standard circuit-breaker as in 1st example,</u> but		3 A E 1 1 4 5 - 2 F K . . . K . 0	...
11 th position	1 st shunt release operating voltage as special voltage 125 V DC	2/11	9	L 1 D
12 th position	2 nd release (undervoltage) operating voltage as special voltage 240 V DC	2/11	9	M 1 F
13 th position	on drawout element with contact arms and contact systems	2/12	2	
15 th position	<i>requires version with mechanical interlocking</i> with mechanical interlocking, auxiliary switch 12 NO + 12 NC, 64-pole plug connector, without breaker tripping signal	2/12	P	
	<u>Additional equipment</u> Handle for drawout element	2/12		F 3 2
When ordering, state:		Order No.	3 A E 1 1 4 5 - 2 F K 9 9 - 2 K P 0 - Z	
		Order codes	L 1 D + M 1 F + F 3 2	

Selection and ordering data

7.2 kV, 50/60 Hz

Rated voltage U_r 7.2 kV, 50/60 Hz
 Rated lightning impulse withstand voltage U_p 60 kV
 Rated short-duration power-frequency withstand voltage U_d 20 kV
 DC component DC = 36 % of the rated short-circuit breaking current

Values of the transient recovery voltage
 – According to IEC 62 271-100
 – Voltage (TRV) 12.3 kV peak value
 – Rate-of-rise (RRRV) 0.24 kV/ μ s

Rated short-circuit breaking current I_{sc}		Rated operating sequence: O - 0.35 - CO - 15s - CO - 15s - CO O - 0.35 - CO - 3min - CO - CO O - 3min - CO - 3min - CO		Asymmetrical breaking current		Rated short-circuit making current I_{max} 50/60Hz		Pole-center distance		Width across flats		Rated normal current I_r		Order No.	Order code (see page 2/12)	Weight	Voltage drop ΔU between connections ¹⁾	Minimum creepage distance:	Vacuum interrupter	Phase to earth	Minimum clearance:	Phase to phase	Phase to earth	Dimension drawing No.								
kA		kA	kA	mm	mm	A									approx. kg	mV	mm	mm	mm	mm	mm	mm										
16	• • •	17.9	40	210	310	800	3AE1 082-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90	2.1	129	140	160	75	3M442	02024001													
					310	1250	3AE1 082-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90	2.1	129	140	160	75	3M442	02024001														
					275	800	3AE1 072-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90	2.1	129	140	165	75	3M442	02023001														
					275	1250	3AE1 072-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90	2.1	129	140	165	75	3M442	02023001														
					205	800	3AE1 062-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90	2.1	129	140	165	75	3M442	02022001														
					205	1250	3AE1 062-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90	2.1	129	140	165	75	3M442	02022001														
					160	310	800	3AE1 052-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	110	75	3M442	02018001													
						310	1250	3AE1 052-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	110	75	3M442	02018001													
						275	800	3AE1 042-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	115	75	3M442	02017001													
						275	1250	3AE1 042-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	115	75	3M442	02017001													
						205	800	3AE1 032-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	115	75	3M442	02016001													
						205	1250	3AE1 032-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	115	75	3M442	02016001													
				150	• • •	22.4	50	210	310	800	3AE1 022-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	100	75	3M442	02012001									
									310	1250	3AE1 022-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	100	75	3M442	02012001										
									275	800	3AE1 012-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	105	75	3M442	02011001										
									275	1250	3AE1 012-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	105	75	3M442	02011001										
									205	800	3AE1 002-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	105	75	3M442	02010001										
									205	1250	3AE1 002-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	105	75	3M442	02010001										
								160	310	800	3AE1 083-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90	2.1	129	140	160	75	3M442	02024001										
									310	1250	3AE1 083-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90	2.1	129	140	160	75	3M442	02024001										
									275	800	3AE1 073-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90	2.1	129	140	165	75	3M442	02023001										
									275	1250	3AE1 073-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90	2.1	129	140	165	75	3M442	02023001										
									205	800	3AE1 063-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90	2.1	129	140	165	75	3M442	02022001										
									205	1250	3AE1 063-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90	2.1	129	140	165	75	3M442	02022001										
150	• • •	22.4	50	160	310	800	3AE1 053-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	110	75	3M442	02018001													
					310	1250	3AE1 053-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	110	75	3M442	02018001														
					275	800	3AE1 043-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	115	75	3M442	02017001														
					275	1250	3AE1 043-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	115	75	3M442	02017001														
					205	800	3AE1 033-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	115	75	3M442	02016001														
					205	1250	3AE1 033-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	115	75	3M442	02016001														
150	• • •	22.4	50	150	310	800	3AE1 023-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	100	75	3M442	02012001													
					310	1250	3AE1 023-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	100	75	3M442	02012001														
					275	800	3AE1 013-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	105	75	3M442	02011001														
					275	1250	3AE1 013-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	105	75	3M442	02011001														
					205	800	3AE1 003-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	105	75	3M442	02010001														
					205	1250	3AE1 003-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80	2.1	129	140	105	75	3M442	02010001														

• Possible

1) According to IEC 60 694 with 100 A DC

Selection and ordering data

7.2 kV, 50/60 Hz

Rated voltage U_r **7.2 kV, 50/60 Hz**
 Rated lightning impulse withstand voltage U_p **60 kV**
 Rated short-duration power-frequency withstand voltage U_d **20 kV**
 DC component **DC = 36 %** of the rated short-circuit breaking current

Values of the transient recovery voltage
 – According to IEC 62 271-100
 – Voltage (TRV) 12.3 kV peak value
 – Rate-of-rise (RRRV) 0.24 kV/ μ s

Rated short-circuit breaking current I_{sc}		Rated operating sequence: O - 0.35 - CO - 15s - CO - 15s - CO O - 0.35 - CO - 3min - CO - 3min - CO		Asymmetrical breaking current		Rated short-circuit making current I_{ma} 50/60 Hz		Pole-center distance		Width across flats		Rated normal current I_r		Order No.	Order code (see pages 2/11 and 2/12)	Weight	Voltage drop ΔU between connections ¹⁾	Minimum creepage distance: Vacuum interrupter Phase to earth	Minimum clearance: Phase to phase Phase to earth	Dimension drawing No.									
kA		kA	kA	mm	mm	A						approx. kg	mV	mm	mm	mm	mm												
25	• • •	28	63	210	310	800	3AE1 084-1....-....	□ □ □ □	90	2.1	129	140	160	75	3M442	02024001													
					310	1250	3AE1 084-2....-....	□ □ □ □	90	2.1	129	140	160	75	3M442	02024001													
					310	2000	3AE1 084-4....-....	□ □ □ □	110	1.5	129	265	130	130	3M442	02028001													
					275	800	3AE1 074-1....-....	□ □ □ □	90	2.1	129	140	165	75	3M442	02023001													
					275	1250	3AE1 074-2....-....	□ □ □ □	90	2.1	129	140	165	75	3M442	02023001													
					205	800	3AE1 064-1....-....	□ □ □ □	90	2.1	129	140	165	75	3M442	02022001													
					205	1250	3AE1 064-2....-....	□ □ □ □	90	2.1	129	140	165	75	3M442	02022001													
					160	310	800	3AE1 054-1....-....	□ □ □ □	80	2.1	129	140	110	75	3M442	02018001												
						310	1250	3AE1 054-2....-....	□ □ □ □	80	2.1	129	140	110	75	3M442	02018001												
						275	800	3AE1 044-1....-....	□ □ □ □	80	2.1	129	140	115	75	3M442	02017001												
						275	1250	3AE1 044-2....-....	□ □ □ □	80	2.1	129	140	115	75	3M442	02017001												
						205	800	3AE1 034-1....-....	□ □ □ □	80	2.1	129	140	115	75	3M442	02016001												
						205	1250	3AE1 034-2....-....	□ □ □ □	80	2.1	129	140	115	75	3M442	02016001												
					150	310	800	3AE1 024-1....-....	□ □ □ □	80	2.1	129	140	100	75	3M442	02012001												
						310	1250	3AE1 024-2....-....	□ □ □ □	80	2.1	129	140	100	75	3M442	02012001												
						275	800	3AE1 014-1....-....	□ □ □ □	80	2.1	129	140	105	75	3M442	02011001												
						275	1250	3AE1 014-2....-....	□ □ □ □	80	2.1	129	140	105	75	3M442	02011001												
						205	800	3AE1 004-1....-....	□ □ □ □	80	2.1	129	140	105	75	3M442	02010001												
						205	1250	3AE1 004-2....-....	□ □ □ □	80	2.1	129	140	105	75	3M442	02010001												
					31.5	• • •	35.4	80	210	310	800	3AE1 085-1....-....	□ □ □ □	90	2.1	129	140	160	75	3M442	02024001								
										310	1250	3AE1 085-2....-....	□ □ □ □	90	2.1	129	140	160	75	3M442	02024001								
										310	2000	3AE1 085-4....-....	□ □ □ □	110	1.5	129	265	130	130	3M442	02028001								
										310	2500	3AE1 085-6....-....	□ □ □ □	110	1.5	129	265	130	130	3M442	02028001								
										275	800	3AE1 075-1....-....	□ □ □ □	90	2.1	129	140	165	75	3M442	02023001								
275	1250	3AE1 075-2....-....	□ □ □ □	90						2.1	129	140	165	75	3M442	02023001													
205	800	3AE1 065-1....-....	□ □ □ □	90						2.1	129	140	165	75	3M442	02022001													
205	1250	3AE1 065-2....-....	□ □ □ □	90						2.1	129	140	165	75	3M442	02022001													
160	310	800	3AE1 055-1....-....	□ □ □ □						80	2.1	129	140	110	75	3M442	02018001												
	310	1250	3AE1 055-2....-....	□ □ □ □						80	2.1	129	140	110	75	3M442	02018001												
	275	800	3AE1 045-1....-....	□ □ □ □						80	2.1	129	140	115	75	3M442	02017001												
	275	1250	3AE1 045-2....-....	□ □ □ □						80	2.1	129	140	115	75	3M442	02017001												
	205	800	3AE1 035-1....-....	□ □ □ □						80	2.1	129	140	115	75	3M442	02016001												
	205	1250	3AE1 035-2....-....	□ □ □ □						80	2.1	129	140	115	75	3M442	02016001												
150	310	800	3AE1 025-1....-....	□ □ □ □						80	2.1	129	140	100	75	3M442	02012001												
	310	1250	3AE1 025-2....-....	□ □ □ □						80	2.1	129	140	100	75	3M442	02012001												
	275	800	3AE1 015-1....-....	□ □ □ □						80	2.1	129	140	105	75	3M442	02011001												
	275	1250	3AE1 015-2....-....	□ □ □ □						80	2.1	129	140	105	75	3M442	02011001												
	205	800	3AE1 005-1....-....	□ □ □ □						80	2.1	129	140	105	75	3M442	02010001												
	205	1250	3AE1 005-2....-....	□ □ □ □						80	2.1	129	140	105	75	3M442	02010001												
40 ²⁾	• • •	44.9	100	210						310	1250	3AE1 086-2....-....	□ □ □ □												3M442	02070001			
										310	2000	3AE1 086-4....-....	□ □ □ □														3M442	02071001	
										310	2500	3AE1 086-6....-....	□ □ □ □															3M442	02071001
										310	3150	3AE1 086-7....-....	□ □ □ □															3M442	02072001

• Possible

1) According to IEC 60 694 with 100 A DC
 2) Available as of mid 2006

Selection and ordering data

12 kV, 50/60 Hz

Rated voltage U_r 12 kV, 50/60 Hz

Rated lightning impulse withstand voltage U_p 75 kV

Rated short-duration power-frequency withstand voltage U_d 28 kV (42 kV see under additional equipment)

DC component DC = 36 % of the rated short-circuit breaking current

Values of the transient recovery voltage

– According to IEC 62 271-100

– Voltage (TRV) 20.6 kV peak value

– Rate-of-rise (RRRV) 0.34 kV/ μ s

Rated short-circuit breaking current I_{sc}		Rated operating sequence: O - 0.35 - CO - 15s - CO - 15s - CO O - 0.35 - CO - 3min - CO - 3min - CO		Asymmetrical breaking current		Rated short-circuit making current I_{ma} 50/60 Hz		Order No.	Order code (see page 2/12)	Weight	Voltage drop ΔU between connections 1)	Minimum creepage distance:	Vacuum interrupter	Phase to earth	Minimum clearance:	Phase to phase	Phase to earth	Dimension drawing No.	
kA		kA	kA	mm	mm	A													
16	• • •	17.9	40	210	310	800	3AE1 182-1....-....- □ □ □ □	90	2.1	129	140	160	75	3M442	02024001				
					310	1250	3AE1 182-2....-....- □ □ □ □	90	2.1	129	140	160	75	3M442	02024001				
					275	800	3AE1 172-1....-....- □ □ □ □	90	2.1	129	140	165	75	3M442	02023001				
					275	1250	3AE1 172-2....-....- □ □ □ □	90	2.1	129	140	165	75	3M442	02023001				
					205	800	3AE1 162-1....-....- □ □ □ □	90	2.1	129	140	165	75	3M442	02022001				
					205	1250	3AE1 162-2....-....- □ □ □ □	90	2.1	129	140	165	75	3M442	02022001				
					160	310	800	3AE1 152-1....-....- □ □ □ □	80	2.1	129	140	110	75	3M442	02018001			
						310	1250	3AE1 152-2....-....- □ □ □ □	80	2.1	129	140	110	75	3M442	02018001			
						275	800	3AE1 142-1....-....- □ □ □ □	80	2.1	129	140	115	75	3M442	02017001			
						275	1250	3AE1 142-2....-....- □ □ □ □	80	2.1	129	140	115	75	3M442	02017001			
						205	800	3AE1 132-1....-....- □ □ □ □	80	2.1	129	140	115	75	3M442	02016001			
						205	1250	3AE1 132-2....-....- □ □ □ □	80	2.1	129	140	115	75	3M442	02016001			
				150	310	800	3AE1 122-1....-....- □ □ □ □	80	2.1	129	140	100	75	3M442	02012001				
					310	1250	3AE1 122-2....-....- □ □ □ □	80	2.1	129	140	100	75	3M442	02012001				
					275	800	3AE1 112-1....-....- □ □ □ □	80	2.1	129	140	105	75	3M442	02011001				
					275	1250	3AE1 112-2....-....- □ □ □ □	80	2.1	129	140	105	75	3M442	02011001				
					205	800	3AE1 102-1....-....- □ □ □ □	80	2.1	129	140	105	75	3M442	02010001				
					205	1250	3AE1 102-2....-....- □ □ □ □	80	2.1	129	140	105	75	3M442	02010001				
				20	• • •	22.4	50	210	310	800	3AE1 183-1....-....- □ □ □ □	90	2.1	129	140	160	75	3M442	02024001
									310	1250	3AE1 183-2....-....- □ □ □ □	90	2.1	129	140	160	75	3M442	02024001
									275	800	3AE1 173-1....-....- □ □ □ □	90	2.1	129	140	165	75	3M442	02023001
									275	1250	3AE1 173-2....-....- □ □ □ □	90	2.1	129	140	165	75	3M442	02023001
									205	800	3AE1 163-1....-....- □ □ □ □	90	2.1	129	140	165	75	3M442	02022001
									205	1250	3AE1 163-2....-....- □ □ □ □	90	2.1	129	140	165	75	3M442	02022001
160	310	800	3AE1 153-1....-....- □ □ □ □						80	2.1	129	140	110	75	3M442	02018001			
	310	1250	3AE1 153-2....-....- □ □ □ □						80	2.1	129	140	110	75	3M442	02018001			
	275	800	3AE1 143-1....-....- □ □ □ □						80	2.1	129	140	115	75	3M442	02017001			
	275	1250	3AE1 143-2....-....- □ □ □ □						80	2.1	129	140	115	75	3M442	02017001			
	205	800	3AE1 133-1....-....- □ □ □ □						80	2.1	129	140	115	75	3M442	02016001			
	205	1250	3AE1 133-2....-....- □ □ □ □						80	2.1	129	140	115	75	3M442	02016001			
150	310	800	3AE1 123-1....-....- □ □ □ □					80	2.1	129	140	100	75	3M442	02012001				
	310	1250	3AE1 123-2....-....- □ □ □ □					80	2.1	129	140	100	75	3M442	02012001				
	275	800	3AE1 113-1....-....- □ □ □ □					80	2.1	129	140	105	75	3M442	02011001				
	275	1250	3AE1 113-2....-....- □ □ □ □					80	2.1	129	140	105	75	3M442	02011001				
	205	800	3AE1 103-1....-....- □ □ □ □					80	2.1	129	140	105	75	3M442	02010001				
	205	1250	3AE1 103-2....-....- □ □ □ □					80	2.1	129	140	105	75	3M442	02010001				

• Possible

1) According to IEC 60 694 with 100 A DC

Selection and ordering data

12 kV, 50/60 Hz

Rated voltage U_r 12 kV, 50/60 Hz

Rated lightning impulse withstand voltage U_p 75 kV

Rated short-duration power-frequency withstand voltage U_d 28 kV (42 kV see under additional equipment)

DC component DC = 36 % of the rated short-circuit breaking current

Values of the transient recovery voltage

– According to IEC 62 271-100

– Voltage (TRV) 20.6 kV peak value

– Rate-of-rise (RRRV) 0.34 kV/μs

Rated short-circuit breaking current I_{sc}		Rated operating sequence: O - 0.35 - CO - 15s - CO - 15s - CO O - 3min - CO - 3min - CO		Asymmetrical breaking current		Rated short-circuit making current I_{ma} 50/60 Hz		Pole-center distance		Width across flats		Rated normal current I_r		Order No.	Order code (see page 2/12)	Weight	Voltage drop ΔU between connections 1)	Minimum creepage distance:	Vacuum interrupter	Phase to earth	Minimum clearance:	Phase to phase	Phase to earth	Dimension drawing No.
kA		kA	kA	mm	mm	A			mm	mm	mm	mm	mm		approx. kg	mV	mm	mm	mm	mm	mm	mm		
25	• • •	28	63	210	310	800	3AE1 184-1....-....- □ □ □ □	90	2.1	129	140	160	75	3M442 02024001										
					310	1250	3AE1 184-2....-....- □ □ □ □	90	2.1	129	140	160	75	3M442 02024001										
					310	2000	3AE1 184-4....-....- □ □ □ □	110	1.5	129	265	130	130	3M442 02028001										
					310	2500	3AE1 184-6....-....- □ □ □ □	110	1.5	129	265	130	130	3M442 02028001										
					275	800	3AE1 174-1....-....- □ □ □ □	90	2.1	129	140	165	75	3M442 02023001										
					275	1250	3AE1 174-2....-....- □ □ □ □	90	2.1	129	140	165	75	3M442 02023001										
					205	800	3AE1 164-1....-....- □ □ □ □	90	2.1	129	140	165	75	3M442 02022001										
					205	1250	3AE1 164-2....-....- □ □ □ □	90	2.1	129	140	165	75	3M442 02022001										
					160	310	800	3AE1 154-1....-....- □ □ □ □	80	2.1	129	140	110	75	3M442 02018001									
						310	1250	3AE1 154-2....-....- □ □ □ □	80	2.1	129	140	110	75	3M442 02018001									
						275	800	3AE1 144-1....-....- □ □ □ □	80	2.1	129	140	115	75	3M442 02017001									
						275	1250	3AE1 144-2....-....- □ □ □ □	80	2.1	129	140	115	75	3M442 02017001									
				205		800	3AE1 134-1....-....- □ □ □ □	80	2.1	129	140	115	75	3M442 02016001										
				205		1250	3AE1 134-2....-....- □ □ □ □	80	2.1	129	140	115	75	3M442 02016001										
				150	310	800	3AE1 124-1....-....- □ □ □ □	80	2.1	129	140	100	75	3M442 02012001										
					310	1250	3AE1 124-2....-....- □ □ □ □	80	2.1	129	140	100	75	3M442 02012001										
					275	800	3AE1 114-1....-....- □ □ □ □	80	2.1	129	140	105	75	3M442 02011001										
					275	1250	3AE1 114-2....-....- □ □ □ □	80	2.1	129	140	105	75	3M442 02011001										
					205	800	3AE1 104-1....-....- □ □ □ □	80	2.1	129	140	105	75	3M442 02010001										
					205	1250	3AE1 104-2....-....- □ □ □ □	80	2.1	129	140	105	75	3M442 02010001										
					31.5	• • •	35.4	80	210	310	800	3AE1 185-1....-....- □ □ □ □	90	2.1	129	140	160	75	3M442 02024001					
										310	1250	3AE1 185-2....-....- □ □ □ □	90	2.1	129	140	160	75	3M442 02024001					
				310						2000	3AE1 185-4....-....- □ □ □ □	110	1.5	129	265	130	130	3M442 02028001						
				310						2500	3AE1 185-6....-....- □ □ □ □	110	1.5	129	265	130	130	3M442 02028001						
275	800	3AE1 175-1....-....- □ □ □ □	90	2.1						129	140	165	75	3M442 02023001										
275	1250	3AE1 175-2....-....- □ □ □ □	90	2.1						129	140	165	75	3M442 02023001										
205	800	3AE1 165-1....-....- □ □ □ □	90	2.1						129	140	165	75	3M442 02022001										
205	1250	3AE1 165-2....-....- □ □ □ □	90	2.1						129	140	165	75	3M442 02022001										
160	310	800	3AE1 155-1....-....- □ □ □ □	80						2.1	129	140	110	75	3M442 02018001									
	310	1250	3AE1 155-2....-....- □ □ □ □	80						2.1	129	140	110	75	3M442 02018001									
	275	800	3AE1 145-1....-....- □ □ □ □	80						2.1	129	140	115	75	3M442 02017001									
	275	1250	3AE1 145-2....-....- □ □ □ □	80						2.1	129	140	115	75	3M442 02017001									
	205	800	3AE1 135-1....-....- □ □ □ □	80	2.1	129	140	115	75	3M442 02016001														
	205	1250	3AE1 135-2....-....- □ □ □ □	80	2.1	129	140	115	75	3M442 02016001														
150	310	800	3AE1 125-1....-....- □ □ □ □	80	2.1	129	140	100	75	3M442 02012001														
	310	1250	3AE1 125-2....-....- □ □ □ □	80	2.1	129	140	100	75	3M442 02012001														
	275	800	3AE1 115-1....-....- □ □ □ □	80	2.1	129	140	105	75	3M442 02011001														
	275	1250	3AE1 115-2....-....- □ □ □ □	80	2.1	129	140	105	75	3M442 02011001														
	205	800	3AE1 105-1....-....- □ □ □ □	80	2.1	129	140	105	75	3M442 02010001														
	205	1250	3AE1 105-2....-....- □ □ □ □	80	2.1	129	140	105	75	3M442 02010001														
	40 ²⁾	• • •	44.9	100	210	310	1250	3AE1 186-2....-....- □ □ □ □							3M442 02070001									
						310	2000	3AE1 186-4....-....- □ □ □ □								3M442 02071001								
310						2500	3AE1 186-6....-....- □ □ □ □								3M442 02071001									
310						3150	3AE1 186-7....-....- □ □ □ □								3M442 02072001									

• Possible

1) According to IEC 60 694 with 100 A DC

2) Available as of mid 2006

Selection and ordering data

17.5 kV, 50/60 Hz

Rated voltage U_r 17.5 kV, 50/60 Hz
 Rated lightning impulse withstand voltage U_p 95 kV
 Rated short-duration power-frequency withstand voltage U_d 38 kV
 DC component DC = 36 % of the rated short-circuit breaking current

Values of the transient recovery voltage
 – According to IEC 62 271-100
 – Voltage (TRV) 30 kV peak value
 – Rate-of-rise (RRRV) 0.42 kV/ μ s

Rated short-circuit breaking current I_{sc}		Rated operating sequence: O - 0.35 - CO - 15s - CO - 15s - CO O - 0.35 - CO - 3min - CO - 3min - CO		Asymmetrical breaking current		Rated short-circuit making current I_{ma} 50/60 Hz		Order No.	Order code (see page 2/12)	Weight	Voltage drop ΔU between connections 1)	Minimum creepage distance: Vacuum interrupter	Phase to earth	Minimum clearance: Phase to phase	Phase to earth	Dimension drawing No.			
kA		kA	kA	mm	mm	A													
12.5	• • •	14.9	31.3	210	310	800	3AE1 281-1....-....- □ □ □ □	90	2.1	129	275	160	150	3M442	02027001				
					310	1250	3AE1 281-2....-....- □ □ □ □	90	2.1	129	275	160	150	3M442	02027001				
					275	800	3AE1 271-1....-....- □ □ □ □	90	2.1	129	275	165	150	3M442	02026001				
					275	1250	3AE1 271-2....-....- □ □ □ □	90	2.1	129	275	165	150	3M442	02026001				
					205	800	3AE1 261-1....-....- □ □ □ □	90	2.1	129	275	165	150	3M442	02025001				
					205	1250	3AE1 261-2....-....- □ □ □ □	90	2.1	129	275	165	150	3M442	02025001				
					160	310	800	3AE1 251-1....-....- □ □ □ □	80	2.1	129	275	200	150	3M442	02021001			
						310	1250	3AE1 251-2....-....- □ □ □ □	80	2.1	129	275	200	150	3M442	02021001			
						275	800	3AE1 241-1....-....- □ □ □ □	80	2.1	129	275	224	150	3M442	02020001			
						275	1250	3AE1 241-2....-....- □ □ □ □	80	2.1	129	275	224	150	3M442	02020001			
						205	800	3AE1 231-1....-....- □ □ □ □	80	2.1	129	275	247	150	3M442	02019001			
						205	1250	3AE1 231-2....-....- □ □ □ □	80	2.1	129	275	247	150	3M442	02019001			
				150	310	800	3AE1 221-1....-....- □ □ □ □	80	2.1	129	275	190	150	3M442	02015001				
					310	1250	3AE1 221-2....-....- □ □ □ □	80	2.1	129	275	190	150	3M442	02015001				
					275	800	3AE1 211-1....-....- □ □ □ □	80	2.1	129	275	214	150	3M442	02014001				
					275	1250	3AE1 211-2....-....- □ □ □ □	80	2.1	129	275	214	150	3M442	02014001				
					205	800	3AE1 201-1....-....- □ □ □ □	80	2.1	129	275	237	150	3M442	02013001				
					205	1250	3AE1 201-2....-....- □ □ □ □	80	2.1	129	275	237	150	3M442	02013001				
				16	• • •	17.9	40	210	310	800	3AE1 282-1....-....- □ □ □ □	90	2.1	129	275	160	150	3M442	02027001
									310	1250	3AE1 282-2....-....- □ □ □ □	90	2.1	129	275	160	150	3M442	02027001
									275	800	3AE1 272-1....-....- □ □ □ □	90	2.1	129	275	165	150	3M442	02026001
									275	1250	3AE1 272-2....-....- □ □ □ □	90	2.1	129	275	165	150	3M442	02026001
									205	800	3AE1 262-1....-....- □ □ □ □	90	2.1	129	275	165	150	3M442	02025001
									205	1250	3AE1 262-2....-....- □ □ □ □	90	2.1	129	275	165	150	3M442	02025001
160	310	800	3AE1 252-1....-....- □ □ □ □						80	2.1	129	275	200	150	3M442	02021001			
	310	1250	3AE1 252-2....-....- □ □ □ □						80	2.1	129	275	200	150	3M442	02021001			
	275	800	3AE1 242-1....-....- □ □ □ □						80	2.1	129	275	224	150	3M442	02020001			
	275	1250	3AE1 242-2....-....- □ □ □ □						80	2.1	129	275	224	150	3M442	02020001			
	205	800	3AE1 232-1....-....- □ □ □ □						80	2.1	129	275	247	150	3M442	02019001			
	205	1250	3AE1 232-2....-....- □ □ □ □						80	2.1	129	275	247	150	3M442	02019001			
150	310	800	3AE1 222-1....-....- □ □ □ □					80	2.1	129	275	190	150	3M442	02015001				
	310	1250	3AE1 222-2....-....- □ □ □ □					80	2.1	129	275	190	150	3M442	02015001				
	275	800	3AE1 212-1....-....- □ □ □ □					80	2.1	129	275	214	150	3M442	02014001				
	275	1250	3AE1 212-2....-....- □ □ □ □					80	2.1	129	275	214	150	3M442	02014001				
	205	800	3AE1 202-1....-....- □ □ □ □					80	2.1	129	275	237	150	3M442	02013001				
	205	1250	3AE1 202-2....-....- □ □ □ □					80	2.1	129	275	237	150	3M442	02013001				

• Possible

1) According to IEC 60 694 with 100 A DC

Selection and ordering data

17.5 kV, 50/60 Hz

Rated voltage U_r 17.5 kV, 50/60 Hz
 Rated lightning impulse withstand voltage U_p 95 kV
 Rated short-duration power-frequency withstand voltage U_d 38 kV
 DC component DC = 36 % of the rated short-circuit breaking current

Values of the transient recovery voltage
 – According to IEC 62 271-100
 – Voltage (TRV) 30 kV peak value
 – Rate-of-rise (RRRV) 0.42 kV/ μ s

Rated short-circuit breaking current I_{sc}		Rated operating sequence: O - 0.35 - CO - 15s - CO - 15s - CO O - 0.35 - CO - 3min - CO - 3min - CO		Asymmetrical breaking current		Rated short-circuit making current I_{ma} 50/60 Hz		Order No.	Order code (see page 2/12)	Weight	Voltage drop ΔU between connections 1)	Minimum creepage distance: Vacuum interrupter	Phase to earth	Minimum clearance: Phase to phase	Phase to earth	Dimension drawing No.				
kA		kA	kA	mm	mm	A														
25	• • •	28	63	210	310	800	3AE1 284-1....-....- □ □ □ □	90	2.1	129	275	160	150	3M442	02027001					
					310	1250	3AE1 284-2....-....- □ □ □ □	90	2.1	129	275	160	150	3M442	02027001					
					310	2000	3AE1 284-4....-....- □ □ □ □	110	1.5	129	265	130	130	3M442	02029001					
					310	2500	3AE1 284-6....-....- □ □ □ □	110	1.5	129	265	130	130	3M442	02029001					
					275	800	3AE1 274-1....-....- □ □ □ □	90	2.1	129	275	165	150	3M442	02026001					
					275	1250	3AE1 274-2....-....- □ □ □ □	90	2.1	129	275	165	150	3M442	02026001					
					205	800	3AE1 264-1....-....- □ □ □ □	90	2.1	129	275	165	150	3M442	02025001					
					205	1250	3AE1 264-2....-....- □ □ □ □	90	2.1	129	275	165	150	3M442	02025001					
					160	310	800	3AE1 254-1....-....- □ □ □ □	80	2.1	129	275	200	150	3M442	02021001				
						310	1250	3AE1 254-2....-....- □ □ □ □	80	2.1	129	275	200	150	3M442	02021001				
						275	800	3AE1 244-1....-....- □ □ □ □	80	2.1	129	275	224	150	3M442	02020001				
						275	1250	3AE1 244-2....-....- □ □ □ □	80	2.1	129	275	224	150	3M442	02020001				
				205		800	3AE1 234-1....-....- □ □ □ □	80	2.1	129	275	247	150	3M442	02019001					
				205		1250	3AE1 234-2....-....- □ □ □ □	80	2.1	129	275	247	150	3M442	02019001					
				150	310	800	3AE1 224-1....-....- □ □ □ □	80	2.1	129	275	190	150	3M442	02015001					
					310	1250	3AE1 224-2....-....- □ □ □ □	80	2.1	129	275	190	150	3M442	02015001					
					275	800	3AE1 214-1....-....- □ □ □ □	80	2.1	129	275	214	150	3M442	02014001					
					275	1250	3AE1 214-2....-....- □ □ □ □	80	2.1	129	275	214	150	3M442	02014001					
					205	800	3AE1 204-1....-....- □ □ □ □	80	2.1	129	275	237	150	3M442	02013001					
					205	1250	3AE1 204-2....-....- □ □ □ □	80	2.1	129	275	237	150	3M442	02013001					
					31.5	• • •	35.4	80	210	310	800	3AE1 285-1....-....- □ □ □ □	90	2.1	129	275	160	150	3M442	02027001
										310	1250	3AE1 285-2....-....- □ □ □ □	90	2.1	129	275	160	150	3M442	02027001
				310						2000	3AE1 285-4....-....- □ □ □ □	110	1.5	129	265	130	130	3M442	02029001	
				310						2500	3AE1 285-6....-....- □ □ □ □	110	1.5	129	265	130	130	3M442	02029001	
275	800	3AE1 275-1....-....- □ □ □ □	90	2.1						129	275	165	150	3M442	02026001					
275	1250	3AE1 275-2....-....- □ □ □ □	90	2.1						129	275	165	150	3M442	02026001					
205	800	3AE1 265-1....-....- □ □ □ □	90	2.1						129	275	165	150	3M442	02025001					
205	1250	3AE1 265-2....-....- □ □ □ □	90	2.1						129	275	165	150	3M442	02025001					
160	310	800	3AE1 255-1....-....- □ □ □ □	80						2.1	129	275	200	150	3M442	02021001				
	310	1250	3AE1 255-2....-....- □ □ □ □	80						2.1	129	275	200	150	3M442	02021001				
	275	800	3AE1 245-1....-....- □ □ □ □	80						2.1	129	275	224	150	3M442	02020001				
	275	1250	3AE1 245-2....-....- □ □ □ □	80						2.1	129	275	224	150	3M442	02020001				
	205	800	3AE1 235-1....-....- □ □ □ □	80	2.1	129	275	247	150	3M442	02019001									
	205	1250	3AE1 235-2....-....- □ □ □ □	80	2.1	129	275	247	150	3M442	02019001									
150	310	800	3AE1 225-1....-....- □ □ □ □	80	2.1	129	275	190	150	3M442	02015001									
	310	1250	3AE1 225-2....-....- □ □ □ □	80	2.1	129	275	190	150	3M442	02015001									
	275	800	3AE1 215-1....-....- □ □ □ □	80	2.1	129	275	214	150	3M442	02014001									
	275	1250	3AE1 215-2....-....- □ □ □ □	80	2.1	129	275	214	150	3M442	02014001									
	205	800	3AE1 205-1....-....- □ □ □ □	80	2.1	129	275	237	150	3M442	02013001									
	205	1250	3AE1 205-2....-....- □ □ □ □	80	2.1	129	275	237	150	3M442	02013001									
	40 ²⁾	• • •	44.9	100	210	310	1250	3AE1 286-2....-....- □ □ □ □							3M442	02070001				
						310	2000	3AE1 286-4....-....- □ □ □ □									3M442	02071001		
310						2500	3AE1 286-6....-....- □ □ □ □									3M442	02071001			
310						3150	3AE1 286-7....-....- □ □ □ □									3M442	02072001			

• Possible

1) According to IEC 60 694 with 100 A DC
 2) Available as of mid 2006

Selection and ordering data

24 kV, 50/60 Hz

Rated voltage U_r 24 kV, 50/60 Hz
 Rated lightning impulse withstand voltage U_p 125 kV
 Rated short-duration power-frequency withstand voltage U_d 50 kV
 DC component DC = 36 % of the rated short-circuit breaking current

Values of the transient recovery voltage
 – According to IEC 62 271-100
 – Voltage (TRV) 41 kV peak value
 – Rate-of-rise (RRRV) 0.47 kV/ μ s

Rated short-circuit breaking current I_{sc}	Rated operating sequence: O - 0.35 - CO - 15s - CO - 15s - CO O - 0.35 - CO - 3min - CO - 3min - CO	Asymmetrical breaking current	Rated short-circuit making current I_{ma} 50/60 Hz	Pole-center distance	Width across flats	Rated normal current I_r	Order No.	Order code (see page 2/12)	Weight	Voltage drop ΔU between connections 1)	Minimum creepage distance:	Vacuum interrupter	Phase to earth	Minimum clearance:	Phase to phase	Phase to earth	Dimension drawing No.
kA		kA	kA	mm	mm	A			approx. kg	mV	mm	mm	mm	mm	mm		
12.5	• • •	14.9	31.3	210	310	800	3AE1 321-1....-....-	□ □ □ □	120	2.6	200	350	200	210	3M442	02050001	
				310	310	1250	3AE1 321-2....-....-	□ □ □ □	120	2.6	200	350	200	210	3M442	02050001	
16	• • •	17.9	40	210	310	800	3AE1 322-1....-....-	□ □ □ □	120	2.6	200	350	200	210	3M442	02050001	
				310	310	1250	3AE1 322-2....-....-	□ □ □ □	120	2.6	200	350	200	210	3M442	02050001	
				310	310	2000	3AE1 322-4....-....-	□ □ □ □	140	2.0	200	340	200	205	3M442	02051001	
20	• • •	22.4	50	210	310	800	3AE1 323-1....-....-	□ □ □ □	120	2.6	200	350	200	210	3M442	02050001	
				310	310	1250	3AE1 323-2....-....-	□ □ □ □	120	2.6	200	350	200	210	3M442	02050001	
				310	310	2000	3AE1 323-4....-....-	□ □ □ □	140	2.0	200	340	200	205	3M442	02051001	
25	• • •	28	63	210	310	800	3AE1 324-1....-....-	□ □ □ □	120	2.6	200	350	200	210	3M442	02050001	
				310	310	1250	3AE1 324-2....-....-	□ □ □ □	120	2.6	200	350	200	210	3M442	02050001	
				310	310	2000	3AE1 324-4....-....-	□ □ □ □	140	2.0	200	340	200	205	3M442	02051001	
275				275	310	800	3AE1 352-1....-....-	□ □ □ □	130	2.6	200	350	265	210	3M442	02052001	
				310	310	1250	3AE1 352-2....-....-	□ □ □ □	130	2.6	200	350	265	210	3M442	02052001	
				310	310	2000	3AE1 352-4....-....-	□ □ □ □	150	2.0	200	340	265	205	3M442	02053001	
310				310	310	800	3AE1 353-1....-....-	□ □ □ □	130	2.6	200	350	265	210	3M442	02052001	
				310	310	1250	3AE1 353-2....-....-	□ □ □ □	130	2.6	200	350	265	210	3M442	02052001	
				310	310	2000	3AE1 353-4....-....-	□ □ □ □	150	2.0	200	340	265	205	3M442	02053001	
310				310	310	2500	3AE1 353-6....-....-	□ □ □ □	150	2.0	200	340	265	205	3M442	02053001	
				275	310	800	3AE1 354-1....-....-	□ □ □ □	130	2.6	200	350	265	210	3M442	02052001	
				310	310	1250	3AE1 354-2....-....-	□ □ □ □	130	2.6	200	350	265	210	3M442	02052001	
310				310	310	2000	3AE1 354-4....-....-	□ □ □ □	150	2.0	200	340	265	205	3M442	02053001	
				310	310	2500	3AE1 354-6....-....-	□ □ □ □	150	2.0	200	340	265	205	3M442	02053001	

• Possible

1) According to IEC 60 694 with 100 A DC

Secondary equipment

Basic equipment, additional equipment

Basic equipment	Additional equipment	Remarks
● Electrical operating mechanism	–	Can also be operated manually (hand crank required as accessory)
● Closing solenoid 3AY15 10	–	–
<u>1st release</u> ● 1 st shunt release 3AY15 10	<u>2nd release:</u> ○ 2 nd shunt release 3AX11 01 ○ Current transformer-operated release 3AX11 02 for 0.5 A or 1 A ○ Current transformer-operated release 3AX11 04 for tripping pulse ≥ 0.1 Ws, 20 Ω ○ Undervoltage release 3AX11 03	Max. 2 releases can be combined (refer to table below for combination possibilities and to order number suffixes on page 2/11) The current transformer-operated release for a tripping pulse ≥ 0.1 Ws is used in connection with the protection relay 7SJ45
● Auxiliary switch 6 NO + 6 NC with terminal strip	○ Auxiliary switch 12 NO + 12 NC ○ 24-pole plug connector ¹⁾ ○ 64-pole plug connector ○ Option: Auxiliary switch contacts and 64-pole plug connector gold-plated	For free contacts to be used by the customer see table below Scope of delivery of the plug connector: lower and upper plug parts with crimp sockets
● Anti-pumping	–	Electrical and mechanical
● Operating cycle counter	–	–
● Position switches (1 NO + 1 NC)	–	For "Closing spring charged" signal
–	○ Breaker tripping signal	–
–	○ Mechanical interlocking	–
–	○ Module plug	State position indicator for the drawout element
–	○ Halogen-free and flame-retardant wiring cables	Additional equipment see page 2/12
–	○ Silicone-free design	Additional equipment see page 2/12
–	○ Hand crank for manual charging of the closing spring	Additional equipment see page 2/12
–	○ Condensation protection for 230 V AC, 50 W	Additional equipment see page 2/12
–	○ Electrical closing lock-out	Prevents unauthorized closing of the circuit-breaker
–	○ Key-operated interlocking	RONIS lock incl. 2 keys
–	○ Handle for drawout element	–

Combination possibilities of the releases

Release	Mounting location	
	1	2
1 st shunt release	•	–
1 st release (shunt release, undervoltage release or current transformer-operated release)	•	•
2 nd release (shunt release, undervoltage release or current transformer-operated release)	•	•

• possible – not possible

Auxiliary switch contacts which can be used by the customer

		Free contacts to be used by the customer			
		Available on lower plug part or terminal strip		Available on auxiliary switch	
		With basic equipment	With maximum equipment	With basic equipment	With maximum equipment
6 NO + 6 NC	terminal strip	11	5	4 NO + 4 NC	3 NO + 3 NC
	24-pole plug connector ¹⁾	11	6	4 NO + 4 NC	3 NO + 3 NC
12 NO + 12 NC	terminal strip	11	5	10 NO + 10 NC	9 NO + 9 NC
	64-pole plug connector	24	11	10 NO + 10 NC	9 NO + 9 NC

1) 24-pole plug connector available only for fixed-installation version

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

Accessories and spare parts

Installation parts

When releases / solenoids are being retrofitted, the Order Nos. of the installation parts must also be stated. With other types of additional equipment, the required installation parts are included in the delivery.

Spare parts

When releases / solenoids are required as spare parts, the Order No. and design of the associated standard circuit-breaker must be stated.

Ordering note

The order numbers are applicable to standard circuit-breakers of current manufacture. When installation or spare parts are being ordered for an existing standard circuit-breaker, always quote the serial No. of the breaker in order to be certain of obtaining the correct items.

Accessories for the plug connector

Included in the scope of delivery for the standard circuit-breaker's basic version:

24-pole

- Lower plug part
- Crimp sockets acc. to number of contacts
- Upper plug part with screw contacts (no crimp sockets necessary)

64-pole

- Lower plug part
- Upper plug part
- Crimp sockets acc. to number of contacts

Designation	Remarks	Operating voltage	Order No.		
Handles	Hand crank for circuit-breaker		3AX15 30 – 2B		
	Handle for drawout element		3AX14 30 – 2C		
Lubricant	180 g of Klüber-Isoflex Topas L32		3AX11 33 – 3H		
	1 kg of Klüber-Isoflex Topas L32		3AX11 33 – 3E		
	1 kg of Molykote Grease		3AX11 33 – 2L		
Operating solenoid	Used as closing solenoid or 1 st shunt release	24 V DC	3AY15 10 – 5B		
		30 to 32 V DC	3AY15 10 – 5M		
		48 V DC	3AY15 10 – 5C		
		60 V DC	3AY15 10 – 5D		
		100 to 124 V DC	3AY15 10 – 5E		
		125 to 144 V DC	3AY15 10 – 5N		
		220 to 250 V DC	3AY15 10 – 5F		
		100 to 125 V AC, 50/60 Hz	3AY15 10 – 6E		
		230 to 240 V AC, 50/60 Hz	3AY15 10 – 6F		
		2nd shunt release		24 to 32 V DC	3AX11 01 – 2B
48 to 60 V DC	3AX11 01 – 2C				
110 to 127 V DC	3AX11 01 – 2E				
220 to 240 V DC	3AX11 01 – 2F				
100 to 125 V AC, 50 Hz	3AX11 01 – 2G				
230 to 240 V AC, 50 Hz	3AX11 01 – 2J				
100 to 125 V AC, 60 Hz	3AX11 01 – 3G				
230 to 240 V AC, 60 Hz	3AX11 01 – 3J				
Installation parts				3AX14 11 – 2A	
Current transformer-operated release	For rated normal current 0.5 For rated normal current 1 A For tripping pulse ≥ 0.1 Ws, 20 Ω for protection relay 7SJ45				3AX11 02 – 2A
			3AX11 02 – 2B		
			3AX11 04 – 2B		
Installation parts			3AX14 11 – 2A		
Undervoltage release		24 V DC	3AX11 03 – 2B		
		30 to 32 V DC	3AX11 03 – 2L		
		48 V DC	3AX11 03 – 2C		
		60 V DC	3AX11 03 – 2D		
		110 V DC	3AX11 03 – 2E		
		120 to 127 V DC	3AX11 03 – 2N		
		220 V DC	3AX11 03 – 2F		
		240 V DC	3AX11 03 – 2P		
		100 V AC, 50 Hz	3AX11 03 – 2G		
		110 to 125 V AC, 50 Hz	3AX11 03 – 2H		
		230 V AC, 50 Hz	3AX11 03 – 2J		
		240 V AC, 50 Hz	3AX11 03 – 2M		
		100 V AC, 60 Hz	3AX11 03 – 3G		
		110 to 125 V AC, 60 Hz	3AX11 03 – 3H		
		230 V AC, 60 Hz	3AX11 03 – 3J		
		240 V AC, 60 Hz	3AX11 03 – 3M		
Installation parts			3AX14 11 – 2A		
Drive motor		24/30/32 V DC	3AY17 11 – 2B		
		48 V DC	3AY17 11 – 2C		
		60 V DC	3AY17 11 – 2D		
		100/110/125 V AC/DC	3AY17 11 – 2E		
		220 V DC / 230 V AC	3AY17 11 – 2F		
		Installation parts			
Auxiliary contactor type 3RH 1122 for anti-pumping		24 V DC	SWB: 55656		
		30 to 32 V DC	SWB: 55658		
		48 V DC	SWB: 55659		
		60 V DC	SWB: 55660		
		110 V DC	SWB: 55661		
		120 to 127 V DC	SWB: 55662		
		220 V DC	SWB: 55663		
		240 to 250 V DC	SWB: 55665		
		110 V AC 50/60 Hz	SWB: 55666		
		120 V AC 50/60 Hz	SWB: 55667		
		125 V AC 50/60 Hz	SWB: 55668		
		230 V AC 50/60 Hz	SWB: 55669		
		240 V AC 50/60 Hz	SWB: 55670		
		Position switch	Type 3SE4 without installation accessories Used for:		SWB: 46677
- Electrical anti-pumping (-S3)	Nos. 1				
- Electrical interlocking (-S12)	1				
- Motor control (-S21, -S22)	2				
- Closing spring charged (-S4)	1				
- Breaker tripping signal (-S6, -S7)	2				
- Electrical closing lock-out (-S5)	1				
- Drawout element (-S1.0 to -S1.9)	10				

Accessories and spare parts (continued)

Designation	Remarks	Operating voltage	Order No.
Auxiliary switch (-S1)	6 NO + 6 NC 12 NO + 12 NC		3SV92 73 – 2AA0 3SV92 74 – 2AA0
Mechanical interlocking			3AX14 20 – 2A
Key-operated interlocking			3AX14 37 – 2A
Module plug	State position indicator of drawout element		3AX14 60 – 2A
Accessories for plug connector (for conductor cross-section 1.5 mm ²)			
Crimp pins (for lower plug part) (make Amphenol)	24-pole 64-pole		3AX11 34 – 3A 3AX11 34 – 4B
Crimp sockets (for upper plug part) (make Amphenol)	64-pole		3AX11 34 – 4C
Crimping tool (make Amphenol)	For notching the crimp pins and crimp sockets		3AX11 34 – 4D
Disassembly tool (make Amphenol)			3AX11 34 – 4G
Electrical closing lock-out		24 V DC 48 V DC 60 V DC 110 to 127 V DC 220 to 240 V DC 100 V AC, 50/60 Hz 110 to 125 V AC, 50/60 Hz 220 to 240 V AC, 50/60 Hz	3AX16 05 – 5B 3AX16 05 – 5C 3AX16 05 – 5D 3AX16 05 – 5E 3AX16 05 – 5F 3AX16 05 – 5G 3AX16 05 – 5H 3AX16 05 – 5J 3AX14 15 – 2A
Installation parts			
Bushings		7.2 to 17.5 kV 24 kV	3AX14 51 – 2A 3AX14 51 – 2B
Separating shell towards contact arm side	for additional screening with narrow mounting conditions	7.2 to 17.5 kV (standard version) 24 kV (standard version) 7.2 to 17.5 kV (short version) 24 kV (short version)	3AX14 38 – 2A 3AX14 38 – 2B 3AX14 38 – 3A 3AX14 38 – 3B
Contact system		800 to 3150 A	3AX14 42 – 2A

7.2 to 24 kV, 50/60 Hz



RH-GT1-168 eps

Slide-in module (disconnected position)



RH-GT1-168 eps

Slide-in module (service position)

Catalog Section 3	Page
Features	3/1
Ordering data, examples for ordering	3/2
Selection and ordering data for	
– 7.2 kV	3/3
– 12 kV	3/4
– 17.5 kV	3/5
– 24 kV	3/6
Secondary equipment	
– Selection	3/7
– Order No. suffixes	3/8 and 3/9
Accessories and spare parts	3/10 and 3/11

Features of slide-in modules

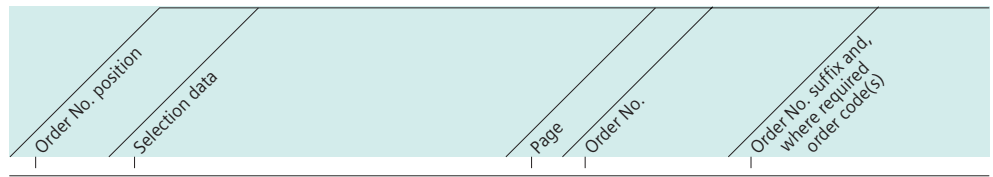
- Rated voltages 7.2 to 24 kV
- Maintenance-free up to 10,000 operating cycles, higher breaker service life possible
- Rated short-circuit breaking currents up to 40 kA (r.m.s. value)
- DC component 36 %, higher values on request
- Values of transient recovery voltage acc. to IEC 62 271-100, other values on request
- Complete module for realization of the circuit-breaker compartment of a panel
 - With cartridge
 - Shutters
 - Interlocking interfaces
 - Option: Earthing switch
- Suitable for switching, for example:
 - Overhead lines and cables
 - Transformers
 - Generators
 - Capacitors
 - Filter circuits
 - Motors
 - Reactors

Ordering data, examples for ordering

Ordering data

The 3AE slide-in modules are determined by a 16-digit Order No. According to the equipment fitted to the module, this Order No. must be suffixed by one or more order codes.

- For selection and ordering data of the primary equipment with additional equipment see pages 3/3 to 3/6
- For associated Order No. suffixes (secondary equipment) see pages 3/8 and 3/9.



1st example for ordering

1 st to 8 th position	3AE slide-in module: – Rated voltage U_r 12 kV – Rated short-circuit breaking current I_{sc} 31.5 kA – Rated lightning impulse withstand voltage U_p 75 kV – Pole-center distance 210 mm – Width across flats 275 mm – Rated normal current I_r 1250 A	3/3	3 A E 1 1 7 5 - 2
9 th position	Closing solenoid, 1 st shunt release and undervoltage release	3/8		F
10 th position	Closing solenoid operating voltage 230 V AC	3/8		K
11 th position	1 st shunt release operating voltage 110 V DC	3/8		4
12 th position	2 nd release (undervoltage) operating voltage 220 V DC	3/8		5
13 th position	As slide-in module with cartridge, contact arms, fixed contacts, bushings, shutters	3/9		5
14 th position	Operating mechanism voltage 230 V AC	3/9		K
15 th position	With mechanical interlocking, auxiliary switch 12 NO + 12 NC, 64-pole plug connector, with breaker tripping signal	3/9		N
16 th position	Frequency of operating voltage 50 Hz, rating plate and operating instructions in German	3/9		0
Additional equipment				
	Handle for drawout element	3/9		F 3 2
When ordering state:		Order No.	3 A E 1 1 7 5 - 2 F K 4 5 - 5 K N 0 - Z	
		Order code	F 3 2	

Selection and ordering data

7.2 kV, 50/60 Hz

Rated voltage U_r 7.2 kV, 50/60 Hz
 Rated lightning impulse withstand voltage U_p 60 kV
 Rated short-duration power-frequency withstand voltage U_d 20 kV
 DC component DC = 36 % of the rated short-circuit breaking current

Values of the transient recovery voltage
 – According to IEC 62 271-100
 – Voltage (TRV) 12.3 kV peak value
 – Rate-of-rise (RRRV) 0.24 kV/ μ s

Rated short-circuit breaking current I_{sc}		Rated operating sequence: O - 0.3s - CO - 15s - CO - 15s - CO - 15s - CO - 3min - CO - 3min - CO		Asymmetrical breaking current		Rated short-circuit making current I_{ma} 50/60 Hz		Order No.	Order code (see page 319)	Weight	Voltage drop ΔU between connections 1)	Minimum creepage distance:	Vacuum interrupter	Phase to earth	Minimum clearance:	Phase to phase	Phase to earth	Dimension drawing No.																																																																																					
kA		kA	kA	mm	mm	A																																																																																																	
16	• • •	17.9	40	210	310	800	3AE1 082-1....-....	□ □ □ □	approx. kg	130	2.1	129	140	160	75	3M442	02024001																																																																																						
					310	1250	3AE1 082-2....-....	□ □ □ □										130	2.1	129	140	160	75	3M442	02024001																																																																														
					275	800	3AE1 072-1....-....	□ □ □ □																		130	2.1	129	140	165	75	3M442	02023001																																																																						
					275	1250	3AE1 072-2....-....	□ □ □ □																										130	2.1	129	140	165	75	3M442	02023001																																																														
					150	310	800	3AE1 022-1....-....																																		□ □ □ □	120	2.1	129	140	100	75	3M442	02012001																																																					
					310	1250	3AE1 022-2....-....	□ □ □ □																																		120									2.1	129	140	100	75	3M442	02012001																																														
					275	800	3AE1 012-1....-....	□ □ □ □																																																		120	2.1	129	140	105	75	3M442	02011001																																						
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					20	• • •	22.4	50																																																																		210	310	800	3AE1 083-1....-....	□ □ □ □	130	2.1	129	140	160	75	3M442	02024001																	
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					150	310	800	3AE1 024-1....-....																																																																									□ □ □ □	120	2.1	129	140	100	75	3M442	02012001														
					310	1250	3AE1 024-2....-....	□ □ □ □																																																																									120									2.1	129	140	100	75	3M442	02012001							
					275	800	3AE1 014-1....-....	□ □ □ □																																																																																									120	2.1	129	140	105	75	3M442
					275	1250	3AE1 014-2....-....	□ □ □ □	120	2.1	129	140	105	75	3M442	02011001																																																																																							
				31.5	• • •	35.4	80	210									310	800	3AE1 085-1....-....	□ □ □ □	130	2.1	129																																																																																
																	310	1250	3AE1 085-2....-....	□ □ □ □				130	2.1	129	140	160	75	3M442	02024001																																																																								
																	310	2000	3AE1 085-4....-....	□ □ □ □												150	1.5	129	265	130	130	3M442	02028001																																																																
310	2500	3AE1 085-6....-....	□ □ □ □														150	1.5	129	265																				130						130	3M442	02028001																																																							
275	800	3AE1 075-1....-....	□ □ □ □																																										130				2.1	129	140	165	75	3M442	02023001																																																
275	1250	3AE1 075-2....-....	□ □ □ □																																																					130	2.1	129	140	165	75	3M442	02023001																																								
150	310	800	3AE1 025-1....-....																																																													□ □ □ □	120	2.1	129	140	100	75	3M442	02012001																															
310	1250	3AE1 025-2....-....	□ □ □ □																																						120	2.1	129	140																				100									75	3M442	02012001																												
275	800	3AE1 015-1....-....	□ □ □ □																																																																									120	2.1	129	140	105		75	3M442	02011001																			
275	1250	3AE1 015-2....-....	□ □ □ □																																																																														120				2.1	129	140	105	75	3M442	02011001												
40 ²⁾	• • •	44.9	100																																																																																									210	310	1250	3AE1 086-2....-....	□ □ □ □							
									310	2000	3AE1 086-4....-....	□ □ □ □																																																																																											
				310	2500	3AE1 086-6....-....	□ □ □ □																																																																																																
				310	3150	3AE1 086-7....-....	□ □ □ □																																																																																																

• Possible

1) According to IEC 60 694 with 100 A DC
 2) Available as of mid 2006

Selection and ordering data

12 kV, 50/60 Hz

Rated voltage U_r 12 kV, 50/60 Hz

Rated lightning impulse withstand voltage U_p 75 kV

Rated short-duration power-frequency withstand voltage U_d 28 kV (42 kV see under additional equipment)

DC component DC = 36 % of the rated short-circuit breaking current

Values of the transient recovery voltage

– According to IEC 62 271-100

– Voltage (TRV) 20.6 kV peak value

– Rate-of-rise (RRRV) 0.34 kV/ μ s

Rated short-circuit breaking current I_{sc}		Rated operating sequence: O - 0.35 - CO - 15s - CO - 15s - CO - 3min - CO - 3min - CO		Asymmetrical breaking current		Rated short-circuit making current I_{ma} 50/60 Hz		Order No.	Order code (see page 319)	Weight	Voltage drop ΔU between connections 1)	Minimum creepage distance: Vacuum interrupter	Phase to earth	Minimum clearance: Phase to phase	Phase to earth	Dimension drawing No.					
kA		kA	kA	mm	mm	A															
16	• • •	17.9	40	210	310	800	3AE1 182-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	140	160	75	3M442 02024001					
					310	1250	3AE1 182-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	140	160	75	3M442 02024001					
					275	800	3AE1 172-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	140	165	75	3M442 02023001					
					275	1250	3AE1 172-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	140	165	75	3M442 02023001					
					150	310	800	3AE1 122-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	140	100	75	3M442 02012001				
					310	1250	3AE1 122-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	140	100	75	3M442 02012001					
					275	800	3AE1 112-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	140	105	75	3M442 02011001					
					275	1250	3AE1 112-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	140	105	75	3M442 02011001					
					20	• • •	22.4	50	210	310	800	3AE1 183-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	140	160	75	3M442 02024001
					310					1250	3AE1 183-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	140	160	75	3M442 02024001	
					275					800	3AE1 173-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	140	165	75	3M442 02023001	
					275					1250	3AE1 173-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	140	165	75	3M442 02023001	
150	310	800	3AE1 123-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>					120	2.1	129	140	100	75	3M442 02012001					
310	1250	3AE1 123-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	120					2.1	129	140	100	75	3M442 02012001						
275	800	3AE1 113-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	120					2.1	129	140	105	75	3M442 02011001						
275	1250	3AE1 113-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	120					2.1	129	140	105	75	3M442 02011001						
25	• • •	28	63	210	310					800	3AE1 184-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	140	160	75	3M442 02024001	
310					1250					3AE1 184-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	140	160	75	3M442 02024001		
310					2000					3AE1 184-4....-....-	<input type="checkbox"/>	<input type="checkbox"/>	150	1.5	129	265	130	130	3M442 02028001		
310					2500					3AE1 184-6....-....-	<input type="checkbox"/>	<input type="checkbox"/>	150	1.5	129	265	130	130	3M442 02028001		
275					800	3AE1 174-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	140	165	75	3M442 02023001						
275					1250	3AE1 174-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	140	165	75	3M442 02023001						
150					310	800	3AE1 124-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	140	100	75	3M442 02012001					
310					1250	3AE1 124-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	140	100	75	3M442 02012001						
275					800	3AE1 114-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	140	105	75	3M442 02011001						
275					1250	3AE1 114-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	140	105	75	3M442 02011001						
31.5					• • •	35.4	80	210	310	800	3AE1 185-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	140	160	75	3M442 02024001	
310									1250	3AE1 185-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	140	160	75	3M442 02024001		
310	2000	3AE1 185-4....-....-	<input type="checkbox"/>	<input type="checkbox"/>					150	1.5	129	265	130	130	3M442 02028001						
310	2500	3AE1 185-6....-....-	<input type="checkbox"/>	<input type="checkbox"/>					150	1.5	129	265	130	130	3M442 02028001						
275	800	3AE1 175-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>					130	2.1	129	140	165	75	3M442 02023001						
275	1250	3AE1 175-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>					130	2.1	129	140	165	75	3M442 02023001						
150	310	800	3AE1 125-1....-....-	<input type="checkbox"/>					<input type="checkbox"/>	120	2.1	129	140	100	75	3M442 02012001					
310	1250	3AE1 125-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>					120	2.1	129	140	100	75	3M442 02012001						
275	800	3AE1 115-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>					120	2.1	129	140	105	75	3M442 02011001						
275	1250	3AE1 115-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>					120	2.1	129	140	105	75	3M442 02011001						
40 ²⁾	• • •	44.9	100	210					310	1250	3AE1 186-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>							3M442 02070001	
310									2000	3AE1 186-4....-....-	<input type="checkbox"/>	<input type="checkbox"/>									
310					2500	3AE1 186-6....-....-	<input type="checkbox"/>	<input type="checkbox"/>										3M442 02071001			
310					3150	3AE1 186-7....-....-	<input type="checkbox"/>	<input type="checkbox"/>										3M442 02072001			

• Possible

1) According to IEC 60 694 with 100 A DC

2) Available as of mid 2006

Selection and ordering data

17.5 kV, 50/60 Hz

Rated voltage U_r 17.5 kV, 50/60 Hz
 Rated lightning impulse withstand voltage U_p 95 kV
 Rated short-duration power-frequency withstand voltage U_d 38 kV
 DC component DC = 36 % of the rated short-circuit breaking current

Values of the transient recovery voltage
 – According to IEC 62 271-100
 – Voltage (TRV) 30 kV peak value
 – Rate-of-rise (RRRV) 0.42 kV/ μ s

Rated short-circuit breaking current I_{sc}		Rated operating sequence: O - 0.35 - CO - 15s - CO - 15s - CO - 15s - CO O - 0.35 - CO - 3min - CO - 3min - CO		Asymmetrical breaking current		Rated short-circuit making current I_{ma} 50/60 Hz		Pole-center distance		Width across flats		Rated normal current I_r		Order No.	Order code (see page 319)	Weight	Voltage drop ΔU between connections ¹⁾	Minimum creepage distance:	Vacuum interrupter	Phase to earth	Minimum clearance:	Phase to phase	Phase to earth	Dimension drawing No.					
kA		kA	kA	mm	mm	A						approx. kg	mV	mm	mm	mm	mm	mm	mm	mm	mm	mm							
12.5	• • •	14.9	31.3	210	310	800	3AE1 281-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	275	160	150	3M442	02027001										
					310	1250	3AE1 281-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	275	160	150	3M442	02027001										
					275	800	3AE1 271-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	275	165	150	3M442	02026001										
					275	1250	3AE1 271-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	275	165	150	3M442	02026001										
					150	310	800	3AE1 221-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	275	190	150	3M442	02015001									
						310	1250	3AE1 221-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	275	190	150	3M442	02015001									
						275	800	3AE1 211-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	275	214	150	3M442	02014001									
						275	1250	3AE1 211-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	275	214	150	3M442	02014001									
					16	• • •	17.9	40	210	310	800	3AE1 282-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	275	160	150	3M442	02027001					
										310	1250	3AE1 282-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	275	160	150	3M442	02027001					
										275	800	3AE1 272-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	275	165	150	3M442	02026001					
										275	1250	3AE1 272-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	275	165	150	3M442	02026001					
150	310	800	3AE1 222-1....-....-	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	275	190	150	3M442	02015001									
	310	1250	3AE1 222-2....-....-	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	275	190	150	3M442	02015001									
	275	800	3AE1 212-1....-....-	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	275	214	150	3M442	02014001									
	275	1250	3AE1 212-2....-....-	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	275	214	150	3M442	02014001									
25	• • •	28	63	210						310	800	3AE1 284-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	275	160	150	3M442	02027001					
										310	1250	3AE1 284-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	275	160	150	3M442	02027001					
										310	2000	3AE1 284-4....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	150	1.5	129	265	130	130	3M442	02029001					
										310	2500	3AE1 284-6....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	150	1.5	129	265	130	130	3M442	02029001					
					275	800	3AE1 274-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	275	165	150	3M442	02026001										
					275	1250	3AE1 274-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	275	165	150	3M442	02026001										
					150	310	800	3AE1 224-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	275	190	150	3M442	02015001									
						310	1250	3AE1 224-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	275	190	150	3M442	02015001									
						275	800	3AE1 214-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	275	214	150	3M442	02014001									
						275	1250	3AE1 214-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	275	214	150	3M442	02014001									
					31.5	• • •	35.4	80	210	310	800	3AE1 285-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	275	160	150	3M442	02027001					
										310	1250	3AE1 285-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	275	160	150	3M442	02027001					
310	2000	3AE1 285-4....-....-	<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	150	1.5	129	265	130	130	3M442	02029001										
310	2500	3AE1 285-6....-....-	<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	150	1.5	129	265	130	130	3M442	02029001										
275	800	3AE1 275-1....-....-	<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	275	165	150	3M442	02026001										
275	1250	3AE1 275-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	130	2.1	129	275	165	150	3M442	02026001										
150	310	800	3AE1 225-1....-....-	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	275	190	150	3M442	02015001									
	310	1250	3AE1 225-2....-....-	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	275	190	150	3M442	02015001									
	275	800	3AE1 215-1....-....-	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	275	214	150	3M442	02014001									
	275	1250	3AE1 215-2....-....-	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120	2.1	129	275	214	150	3M442	02014001									
40 ²⁾	• • •	44.9	100	210						310	1250	3AE1 286-2....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>												3M442 02070001	
										310	2000	3AE1 286-4....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>													
					310	2500	3AE1 286-6....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>															3M442 02071001			
					310	3150	3AE1 286-7....-....-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>															3M442 02072001			

• Possible

1) According to IEC 60 694 with 100 A DC
 2) Available as of mid 2006

Selection and ordering data

24 kV, 50/60 Hz

Rated voltage U_r **24 kV, 50/60 Hz**
 Rated lightning impulse withstand voltage U_p **125 kV**
 Rated short-duration power-frequency withstand voltage U_d **50 kV**
 DC component **DC = 36 %** of the rated short-circuit breaking current

Values of the transient recovery voltage
 – According to IEC 62 271-100
 – Voltage (TRV) 41 kV peak value
 – Rate-of-rise (RRRV) 0.47 kV/ μ s

Rated short-circuit breaking current I_{sc}		Rated operating sequence: O - 0.3s - CO - 15s - CO - 15s - CO - 3min - CO - 3min - CO		Asymmetrical breaking current		Rated short-circuit making current I_{ma} 50/60 Hz		Order No.	Order code (see page 319)	Weight	Voltage drop ΔU between connections ¹⁾		Minimum creepage distance:		Vacuum interrupter		Phase to earth		Minimum clearance:		Phase to phase		Dimension drawing No.																					
kA		kA	kA	mm	mm	A					approx. kg	mV	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		mm	mm																			
12.5	• • •	14.9	31.3	210	310	800	3AE1 321-1....-....-	□ □ □ □	160	2.6	200	350	200	210	3M442	02050001	310	310	800	3AE1 321-2....-....-	□ □ □ □	160	2.6	200	350	200	210	3M442	02050001															
						1250	3AE1 322-1....-....-	□ □ □ □																						160	2.6	200	350	200	210	3M442	02050001							
16	• • •	17.9	40	210	310	800	3AE1 322-2....-....-	□ □ □ □	160	2.6	200	350	200	210	3M442	02050001	310	310	1250	3AE1 322-3....-....-	□ □ □ □	160	2.6	200	350	200	210	3M442	02050001															
						2000	3AE1 322-4....-....-	□ □ □ □											180	2.0	200									340	200	205	3M442	02051001										
						275	310	800											3AE1 352-1....-....-	□ □ □ □	180									2.6	200	350	265	210	3M442	02052001								
								1250											3AE1 352-2....-....-	□ □ □ □																	180	2.6	200	350	265	210	3M442	02052001
								2000											3AE1 352-4....-....-	□ □ □ □																	200	2.0	200	340	265	205	3M442	02053001
						20	• • •	22.4											50	210	310									800	3AE1 323-1....-....-	□ □ □ □	160	2.6	200	350	200	210	3M442	02050001	310	310	1250	3AE1 323-2....-....-
2000	3AE1 323-3....-....-	□ □ □ □	180	2.0	200				340	200	205	3M442	02051001																															
310	2000	3AE1 323-4....-....-												□ □ □ □	180	2.0	200	340				200	205	3M442	02051001																			
310	2500	3AE1 323-6....-....-	□ □ □ □	180	2.0				200	340	200	205	3M442	02051001																														
275	310	800	3AE1 353-1....-....-												□ □ □ □	180	2.6	200				350	265	210	3M442	02052001																		
		1250	3AE1 353-2....-....-	□ □ □ □	180				2.6	200	350	265	210	3M442	02052001																													
		2000	3AE1 353-4....-....-	□ □ □ □		200	2.0	200											340	265	205						3M442	02053001																
310	2500	3AE1 353-6....-....-	□ □ □ □	200	2.0				200	340	265	205	3M442	02053001																														
25	• • •	28	63			210	310	800							3AE1 324-1....-....-	□ □ □ □	160	2.6	200	350	200	210	3M442	02050001	310	310	1250	3AE1 324-2....-....-	□ □ □ □	160	2.6	200	350	200	210	3M442	02050001							
				2000	3AE1 324-3....-....-			□ □ □ □	180	2.0	200	340	200	205	3M442	02051001																												
				310	2000			3AE1 324-4....-....-																			□ □ □ □	180	2.0									200	340	200	205	3M442	02051001	
				310	2500			3AE1 324-6....-....-	□ □ □ □	180	2.0	200	340	200	205	3M442											02051001																	
				275	310			800	3AE1 354-1....-....-																			□ □ □ □	180									2.6	200	350	265	210	3M442	02052001
								1250	3AE1 354-2....-....-	□ □ □ □	180	2.6	200	350	265	210											3M442	02052001																
2000	3AE1 354-4....-....-	□ □ □ □	200			2.0	200	340	265	205							3M442	02053001																										
310	2500	3AE1 354-6....-....-		□ □ □ □	200						2.0	200	340	265	205	3M442			02053001																									

• Possible

1) According to IEC 60 694 with 100 A DC

Secondary equipment

Basic equipment, additional equipment

Basic equipment		Additional equipment	Remarks
● Electrical operating mechanism	–		Can also be operated manually (hand crank required as accessory)
● Closing solenoid 3AY15 10	–		–
<u>1st release</u>		<u>2nd release:</u>	Max. 2 releases can be combined (refer to table below for combination possibilities and to order number suffixes on page 3/8)
● 1 st shunt release 3AY15 10		○ 2 nd shunt release 3AX11 01	The current transformer-operated release for a tripping pulse ≥ 0.1 Ws is used in connection with the protection relay 7SJ45
		○ Current transformer-operated release 3AX11 02 for 0.5 A or 1 A	
		○ Current transformer-operated release 3AX11 04 for tripping pulse ≥ 0.1 Ws, 20 Ω	
		○ Undervoltage release 3AX11 03	
● Auxiliary switch 6 NO + 6 NC with terminal strip		○ Auxiliary switch 12 NO + 12 NC	For free contacts to be used by the customer see table below
		○ 64-pole plug connector	Scope of delivery of the plug connector: lower and upper plug parts with crimp sockets
		○ Option: Auxiliary switch contacts and 64-pole plug connector gold-plated	
● Anti-pumping	–		Electrical and mechanical
● Operating cycle counter	–		–
● Position switches (1 NO + 1 NC)	–		For "Closing spring charged" signal
● Mechanical interlocking	–		–
● Module plug	–		State position indicator of the drawout element
–		○ Breaker tripping signal	–
–		○ Halogen-free and flame-retardant wiring cables	Additional equipment see page 3/9
–		○ Silicone-free design	Additional equipment see page 3/9
–		○ Hand crank for manual charging of the closing spring	Additional equipment see page 3/9
–		○ Condensation protection for 230 V AC, 50 W	Additional equipment see page 3/9
–		○ Electrical closing lock-out	Prevents the unauthorized closing of the circuit-breaker
–		○ Key-operated interlocking	RONIS lock incl. 2 keys
–		○ Handle for drawout element	–
–		○ Earthing switch	–
–		○ Handle for earthing switch	–

Combination possibilities of the releases

Release	Mounting location	
	1	2
1 st shunt release	•	–
1 st release (shunt release, undervoltage release or current transformer-operated release)	•	•
2 nd release (shunt release, undervoltage release or current transformer-operated release)	•	•

• possible – not possible

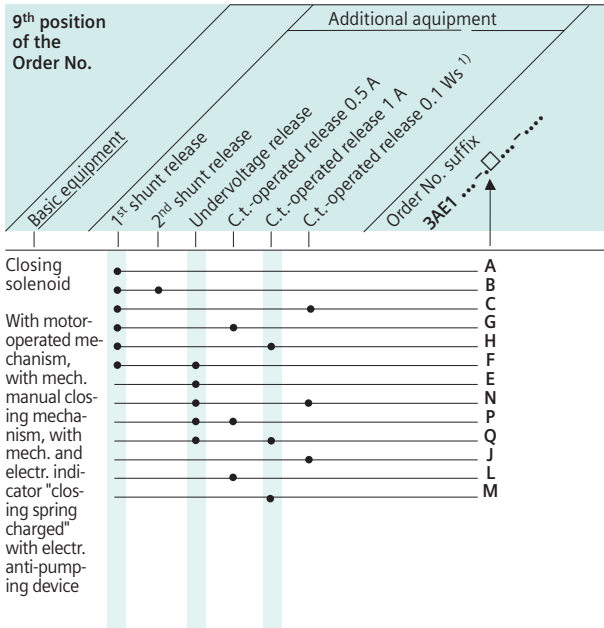
Auxiliary switch contacts which can be used by the customer

Auxiliary switch contacts		Free contacts to be used by the customer			
	With plug connector or terminal strip	Available on lower plug part or terminal strip		Available on auxiliary switch	
		With basic equipment	With maximum equipment	With basic equipment	With maximum equipment
6 NO + 6 NC	terminal strip	11	5	4 NO + 4 NC	3 NO + 3 NC
	terminal strip	11	5	10 NO + 10 NC	9 NO + 9 NC
12 NO + 12 NC	64-pole plug connector	24	11	10 NO + 10 NC	9 NO + 9 NC

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

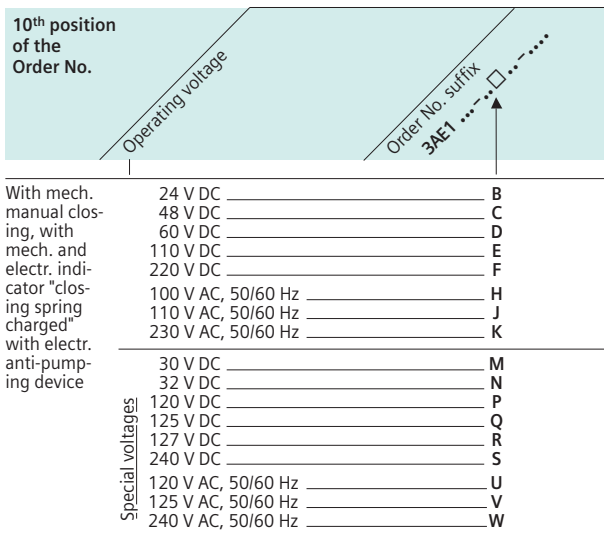
Order No. suffixes (secondary equipment)

Release combinations

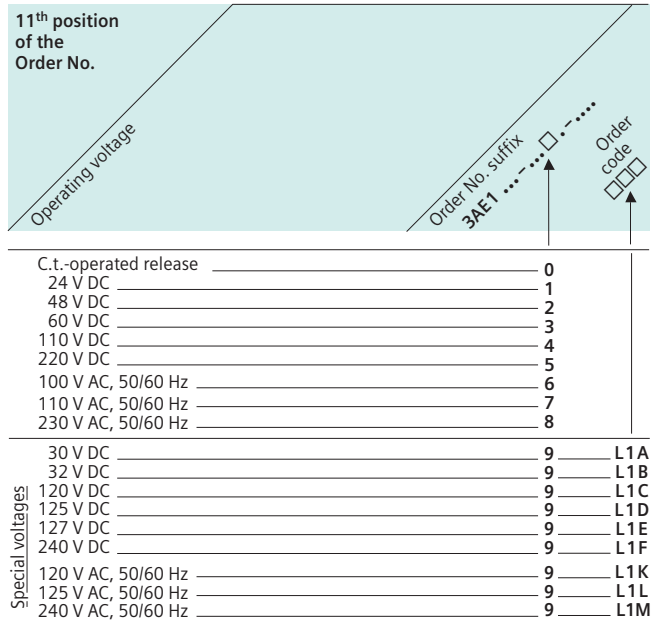


1) Low-energy c.t.-operated release
0.1 Ws, 20 Ω for protection relay 7SJ45

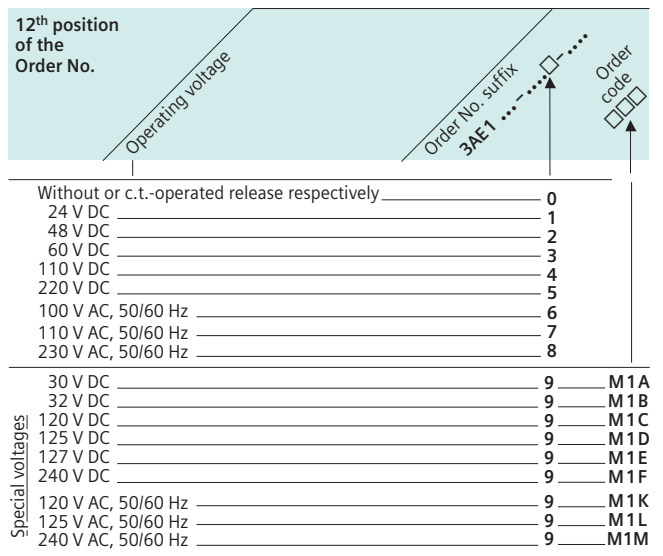
Operating voltage of the closing solenoid



Operating voltage of the 1st shunt release



Operating voltage of the 2nd release



Order No. suffixes (secondary equipment)

Equipment of the slide-in module



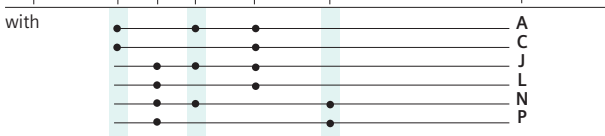
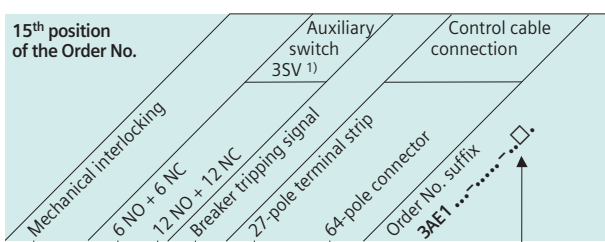
- On cartridge, with drawout element, contact arms, contact system, fixed contacts, bushings and shutters 5
- On cartridge, with drawout element, contact arms, contact system, fixed contacts, bushings, shutters and earthing switch 6
- Drawings of the complete equipment of the slide-in module in the formats DWG, DXF, IGS, PDF. Scope of delivery includes fixed-installation version of the circuit-breaker 8

Operating voltage of motor-operated mechanism



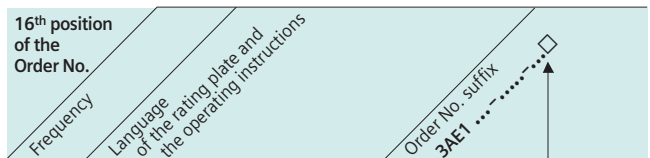
Motor-operated mechanism	24 V DC	B
	48 V DC	C
	60 V DC	D
	110 V DC	E
	220 V DC	F
With mechanical manual closing, with mech. and electr. indicator	100 V AC, 50/60 Hz	H
	110 V AC, 50/60 Hz	J
	230 V AC, 50/60 Hz	K
Special voltages	30 V DC	M
	32 V DC	N
	120 V DC	P
	125 V DC	Q
	127 V DC	R
	240 V DC	S
	120 V AC, 50/60 Hz	U
	125 V AC, 50/60 Hz	V
	240 V AC, 50/60 Hz	W

Mechanical interlocking, breaker tripping signal, auxiliary switch, control cable connection



1) Free auxiliary switch levels available with:
1 release 4 NO + 4 NC resp. 10 NO + 10 NC
2 releases 3 NO + 3 NC resp. 9 NO + 9 NC

Frequency of the operating voltage, language



50 Hz	German	0
60 Hz	German	1
50 Hz	English	2
60 Hz	English	3
50 Hz	French	4
60 Hz	French	5
50 Hz	Spanish	6
60 Hz	Spanish	7

Additional equipment



- Wiring cables, halogen-free and flame-retardant A 10
- Auxiliary switch contacts 12 NO + 12 NC and pins of the 64-pole plug-in connector gold-plated A 21
- Condensation protection, heating for 230 V AC, 50 W A 30
- Silicone-free design A 31
- Electrical closing lock-out A 47
- Additional rating plate, provided separately B 00
- Rated short-duration power-frequency withstand voltage $U_d = 42$ kV instead of 28 kV (with $U_r = 12$ kV), extended creepage distances E 13
- Routine test certificate (enclosed with delivery) F 20
- Routine test certificate (with stamp and signature) F 21
- Routine test certificate (to orderer) F 23
- Hand crank for vacuum circuit-breaker (for manual charging of the closing spring) F 30
- Handle for drawout element (for racking the vacuum circuit-breaker on the drawout element) F 32
- Handle for earthing switch (for operating the earthing switch at the module) F 34
- Key-operated interlocking (RONIS lock at the vacuum circuit-breaker) J 60

Accessories and spare parts

Installation parts

When releases / solenoids are being retrofitted, the Order Nos. of the installation parts must also be stated. With other types of additional equipment, the required installation parts are included in the delivery.

Spare parts

When releases / solenoids are required as spare parts, the Order No. and design of the associated standard circuit-breaker must be stated.

Ordering note

The order numbers are applicable to standard circuit-breakers of current manufacture. When installation or spare parts are being ordered for an existing standard circuit-breaker, always quote the serial No. of the breaker in order to be certain of obtaining the correct items.

Accessories for the plug connector

Included in the scope of delivery for the standard circuit-breaker's basic version:

24-pole

- Lower plug part
- Crimp sockets acc. to number of contacts
- Upper plug part with screw contacts (no crimp sockets necessary)

64-pole

- Lower plug part
- Upper plug part
- Crimp sockets acc. to number of contacts

Designation	Remarks	Operating voltage	Order No.	
Handles	Hand crank for circuit-breaker		3AX15 30 – 2B	
	Handle for drawout element		3AX14 30 – 2C	
	Handle for earthing switch		3AX14 30 – 2D	
Lubricant	180 g of Klüber-Isoflex Topas L32		3AX11 33 – 3H	
	1 kg of Klüber-Isoflex Topas L32		3AX11 33 – 3E	
	1 kg of Molykote Grease		3AX11 33 – 2L	
Operating solenoid	Used as closing solenoid or 1 st shunt release	24 V DC	3AY15 10 – 5B	
		30 to 32 V DC	3AY15 10 – 5M	
		48 V DC	3AY15 10 – 5C	
		60 V DC	3AY15 10 – 5D	
		100 to 124 V DC	3AY15 10 – 5E	
		125 to 144 V DC	3AY15 10 – 5N	
		220 to 250 V DC	3AY15 10 – 5F	
		100 to 125 V AC 50/60 Hz	3AY15 10 – 6E	
		230 to 240 V AC 50/60 Hz	3AY15 10 – 6F	
		2nd shunt release		24 to 32 V DC
48 to 60 V DC	3AX11 01 – 2C			
110 to 127 V DC	3AX11 01 – 2E			
220 to 240 V DC	3AX11 01 – 2F			
100 to 125 V AC, 50 Hz	3AX11 01 – 2G			
230 to 240 V AC, 50 Hz	3AX11 01 – 2J			
100 to 125 V AC, 60 Hz 230 to 240 V AC, 60 Hz	3AX11 01 – 3G 3AX11 01 – 3J			
Installation parts				
Current transformer-operated release	For rated normal current 0.5 For rated normal current 1 A For tripping pulse ≥ 0.1 Ws, 20 Ω for protection relay 7SJ45		3AX11 02 – 2A	
			3AX11 02 – 2B	
			3AX11 04 – 2B	
Installation parts				
Undervoltage release		24 V DC	3AX11 03 – 2B	
		30 to 32 V DC	3AX11 03 – 2L	
		48 V DC	3AX11 03 – 2C	
		60 V DC	3AX11 03 – 2D	
		110 V DC	3AX11 03 – 2E	
		120 to 127 V DC	3AX11 03 – 2N	
		220 V DC	3AX11 03 – 2F	
		240 V DC	3AX11 03 – 2P	
		100 V AC, 50 Hz	3AX11 03 – 2G	
		110 to 125 V AC, 50 Hz	3AX11 03 – 2H	
230 V AC, 50 Hz	3AX11 03 – 2J			
240 V AC, 50 Hz	3AX11 03 – 2M			
100 V AC, 60 Hz	3AX11 03 – 3G			
110 to 125 V AC, 60 Hz	3AX11 03 – 3H			
230 V AC, 60 Hz	3AX11 03 – 3J			
240 V AC, 60 Hz	3AX11 03 – 3M			
Installation parts				
Drive motor		24/30/32 V DC	3AY17 11 – 2B	
		48 V DC	3AY17 11 – 2C	
		60 V DC	3AY17 11 – 2D	
		100/110/125 V DC/AC	3AY17 11 – 2E	
		220 V DC / 230 V AC	3AY17 11 – 2F	
Auxiliary contactor type 3RH 1122 for anti-pumping		24 V DC	SWB: 55656	
		30 to 32 V DC	SWB: 55658	
		48 V DC	SWB: 55659	
		60 V DC	SWB: 55660	
		110 V DC	SWB: 55661	
		120 to 127 V DC	SWB: 55662	
		220 V DC	SWB: 55663	
		240 to 250 V DC	SWB: 55665	
		110 V AC 50/60 Hz	SWB: 55666	
		120 V AC 50/60 Hz	SWB: 55667	
		125 V AC 50/60 Hz	SWB: 55668	
		230 V AC 50/60 Hz	SWB: 55669	
		240 V AC 50/60 Hz	SWB: 55670	
		Position switch	Type 3SE4 without installation accessories Used for:	Nos.
- Electrical anti-pumping (-S3)	1			
- Electrical interlocking (-S12)	1			
- Motor control (-S21, -S22)	2			
- Closing spring charged (-S4)	1			
- Breaker tripping signal (-S6, -S7)	2			
- Electrical closing lock-out (-S5)	1			
- Drawout element (-S1.0 to -S1.9)	10			

Accessories and spare parts (continued)

Designation	Remarks	Operating voltage	Order No.
Auxiliary switch (-S1)	6 NO + 6 NC 12 NO + 12 NC		3SV92 73 - 2AA0 3SV92 74 - 2AA0
Mechanical interlocking			3AX14 20 - 2A
Key-operated interlocking			3AX14 37 - 2A
Module connector	State position indicator of drawout element		3AX14 60 - 2A
Accessories for plug connector (for conductor cross-section 1.5 mm ²)			
Crimp pins (for lower plug part) (make Amphenol)	24-pole 64-pole		3AX11 34 - 3A 3AX11 34 - 4B
Crimp sockets (for upper plug part) (make Amphenol)	64-pole		3AX11 34 - 4C
Crimping tool (make Amphenol)	For notching the crimp pins and crimp sockets		3AX11 34 - 4D
Disassembly tool (make Amphenol)			3AX11 34 - 4G
Electrical closing lock-out		24 V DC 48 V DC 60 V DC 110 to 127 V DC 220 to 240 V DC 100 V AC, 50/60 Hz 110 to 125 V AC, 50/60 Hz 220 to 240 V AC, 50/60 Hz	3AX16 05 - 5B 3AX16 05 - 5C 3AX16 05 - 5D 3AX16 05 - 5E 3AX16 05 - 5F 3AX16 05 - 5G 3AX16 05 - 5H 3AX16 05 - 5J
Installation parts			3AX14 15 - 2A
Bushings		7.2 to 17.5 kV 24 kV	3AX14 51 - 2A 3AX14 51 - 2B
Gate for cartridge		Standard version Short version	3AX14 52 - 2A 3AX14 52 - 2B
Contact system		800 to 3150 A	3AX14 42 - 2A

Notes

If not stated otherwise on the individual pages of this catalog, we reserve the right to include modifications, especially regarding the stated values, dimensions and weights.

Drawings are not binding.

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If not stated otherwise, all dimensions in this catalog are given in mm.

The information in this document contains general descriptions of the technical options available, which do not always have to be present in individual cases. The required features should therefore be specified in each individual case at the time of closing the contract.

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