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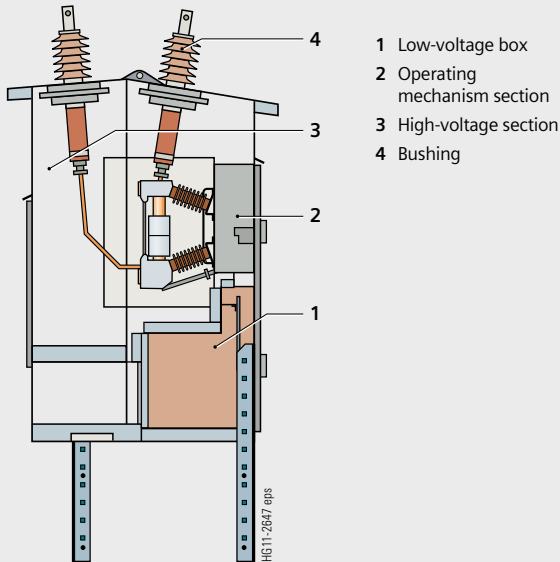
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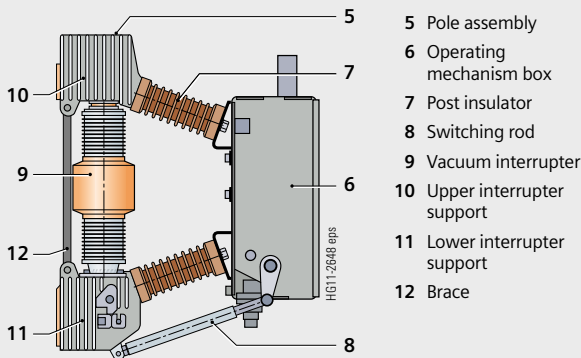
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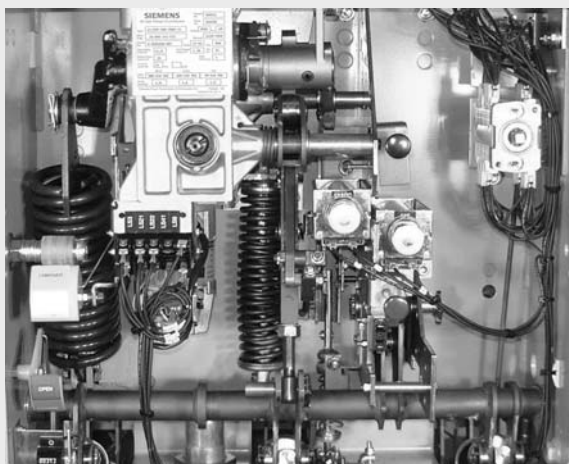


- 1 Low-voltage box
- 2 Operating mechanism section
- 3 High-voltage section
- 4 Bushing



- 5 Pole assembly
- 6 Operating mechanism box
- 7 Post insulator
- 8 Switching rod
- 9 Vacuum interrupter
- 10 Upper interrupter support
- 11 Lower interrupter support
- 12 Brace

Dead tank construction and pole assembly



View into the open operating mechanism box

Dead tank construction

SDV6 outdoor vacuum circuit-breakers consist of an earthed enclosure incorporating an indoor vacuum circuit-breaker, current transformers and a low-voltage section with protection device, controlling and heating.

The enclosure is divided into different sections which are segregated and protected from each other. These sections are accessible via separate doors. The low-voltage box (1) and the operating mechanism section (2) are located at the front side of the device. The high-voltage section (3) is accessible from the rear. Bushings (4) mounted on top of the device establish the connection to the high-voltage power system.

The low-voltage box contains the connections for remote operation as well as the power supply for the switching device and the protection equipment. The operating mechanism section covers the operating mechanism box of the indoor circuit-breaker with the control elements. The pole assemblies of the circuit-breaker are accessible through the high-voltage section.

Vacuum circuit-breaker

The vacuum circuit-breaker consists of the pole assemblies (5) and the operating mechanism box (6). The pole assemblies are fixed to the operating mechanism box via post insulators (7). The switching movement is transferred by means of operating rods (8) and levers.

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

The pole assembly consists of the vacuum interrupter (9) and the interrupter supports. The vacuum interrupters are air-insulated and freely accessible. The vacuum interrupter is rigidly fixed to the upper interrupter support (10). The lower part of the interrupter is guided in the lower interrupter support (11), allowing axial movement. The braces (12) absorb the external forces resulting from switching operations and the contact pressure.

Operating mechanism box

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

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Operating mechanism

Both for live-tank and dead-tank circuit-breakers, the operating mechanism is a stored-energy mechanism. The closing spring is charged either electrically or manually. It latches tight after completion of the charging process and serves as an energy store. The force is transferred from the operating mechanism to the pole assemblies via switching rods.

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

Releases

A release is a device which transfers electrical commands from an external source, such as a control room, to the latching mechanism of the vacuum circuit-breaker so that it can be opened or closed. The maximum possible equipment is one shunt release and two other releases. For release combinations, refer to page 16 or page 28.

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

Closing

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

Instead of this "manual mechanical closing", "manual electrical closing" is also available. In this version, the closing circuit of the circuit-breaker is controlled electrically by a pushbutton instead of the mechanical button.

If constant CLOSE and OPEN commands are present at the vacuum circuit-breaker at the same time, the vacuum circuit-breaker will return to the open position after closing. It remains in this position until a new CLOSE command is given. In this manner, continuous closing and opening (= "pumping") is prevented.

Standards

3AF0 and 3AG0 outdoor vacuum circuit-breakers conform to the following standards:

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

SDV6 outdoor vacuum circuit-breakers conform to the following standards:

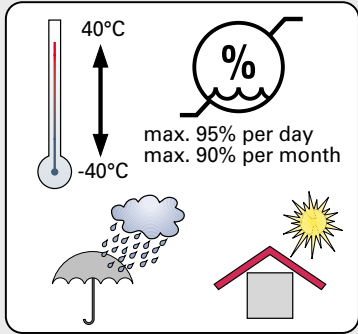
- ANSI C37.20
- IEEE C037.06
- ANSI Rain tested (C37.20.2 1999)
- UBC/CBC Seismic Zone 1 or 2
- UBC/CBC Seismic Zone 3 or 4

Furthermore, an outdoor vacuum circuit-breaker is available for IEC applications. It conforms to the following standards:

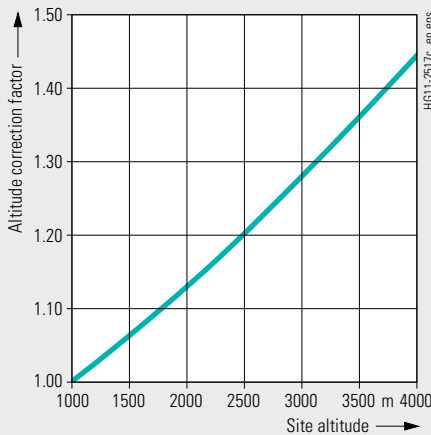
- NOM-J-211
- IEC 56
- IEC 137
- IEC 298
- ANSI C37.20.2
- ANSI C53.13

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Ambient conditions

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

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

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

- 1) Low temperature limit: -40 °C (on request)
- 2) Without icing and wind-driven precipitation
- 3) Restriction: Clean insulation parts

Dielectric strength

The dielectric strength of air insulation decreases with increasing altitude due to low air density. According to IEC 60694, the rated lightning impulse withstand voltage values specified in the chapter "Technical Data" apply to a site altitude of 1000 m above sea level. For an altitude above 1000 m, the insulation level must be corrected according to the opposite diagram.

The characteristic shown applies to the rated short-duration power-frequency withstand voltage and the rated lightning impulse withstand voltage.

To select the devices, the following applies:

$$U \geq U_0 \times K_a$$

- U Rated withstand voltage under standard reference atmosphere
- U_0 Rated lightning impulse withstand voltage requested for the place of installation
- K_a Altitude correction factor according to the opposite diagram

Example

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

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

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Product range overview

Rated voltage kV	Rated short-circuit breaking current kA	Rated normal current			
		1250 A	1600 A	2000 A	3000 A
12	25		■		
15.5	20	▲		▲	
	25	▲		▲	
	31.5	▲		▲	▲
	40	▲		▲	▲
17.5	25		○	○	
27.6	20	▲		▲	
	25	▲		▲	
36	25		●	●	
	31.5		●	●	
38	20	▲		▲	
	25	▲		▲	
	31.5	▲		▲	
	40	▲		▲	

■ 3AG0 ● 3AF01 ○ 3AF03 ▲ SDV6



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3AG0 outdoor vacuum circuit-breaker (live tank)



SDV6 outdoor vacuum circuit-breaker (dead tank)

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Voltage level 38 kV	20
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12 kV

50/60 Hz

Rated voltage	Rated lightning impulse withstand voltage	Rated short-duration power-frequency withstand voltage	Rated short-circuit breaking current at 36 % DC component	Rated short-circuit making current (at 50/60 Hz)	Rated normal current	Position:	Order No.:	Order codes
U_r	U_p	U_d	I_{sc}	I_{ma}	I_r	1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16		
12	75	28	25	63/65	2000		3 A G 0 1 4 4	

Special version:

$U_p = 95$ kV $U_d = 38$ kV (only possible together)

- Z V 1 0

17.5 kV

50/60 Hz

U_r	U_p	U_d	I_{sc}	I_{ma}	I_r	1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16	Order codes	
kV	kV	kV	kA	kA	A			
17.5	95	42	25	63/65	1600		3 A F 0 3 4 3	
					2000		3 A F 0 3 4 4	

36 kV

50/60 Hz

U_r	U_p	U_d	I_{sc}	I_{ma}	I_r	1 2 3 4 5 6 7 - 8 9 10 11 12 - 13 14 15 16	Order codes	
kV	kV	kV	kA	kA	A			
36	170	70	25	63/65	1600		3 A F 0 1 4 3	
					2000		3 A F 0 1 4 4	
			31.5	80/82	1600		3 A F 0 1 5 3	
					2000		3 A F 0 1 5 4	

Special versions (available for all 36 kV circuit-breakers):

$U_p = 200$ kV $U_d = 80$ kV (only possible together)

- Z V 1 0

$U_p = 200$ kV $U_d = 95$ kV (only possible together)

- Z V 1 3

Configuration example

3AF outdoor vacuum circuit-breaker

Rated voltage $U_r = 36$ kV

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

Rated normal current $I_r = 2000$ A

Special version $U_p = 200$ kV, $U_d = 95$ kV

3	A	F																	
				0	1	4	4												
																		-	Z
																		V	1
																		3	

Example for Order No.:
Order codes:

3	A	F	0	1	4	4	-												
V	1	3																	



Selection of secondary equipment, live tank



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8th position

Closing

Option	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Order codes			
Manual mechanical closing	3	A	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Manual electrical closing								3	4											

9th position

Operating voltage of the motor operating mechanism

Standard voltages	Special voltages	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Order codes		
Without										A										
24 V DC										B										
48 V DC										C										
60 V DC										D										
110 V DC										E										
220 V DC										F										
100 V AC 50/60 Hz ¹⁾										G										
110 V AC 50/60 Hz ¹⁾										H										
230 V AC 50/60 Hz ¹⁾										J										
	30 V DC									Z								J	1	A
	32 V DC									Z								J	1	B
	120 V DC									Z								J	1	C
	125 V DC									Z								J	1	D
	127 V DC									Z								J	1	E
	240 V DC									Z								J	1	F
	120 V AC 50/60 Hz ¹⁾									Z								J	1	K
	125 V AC 50/60 Hz ¹⁾									Z								J	1	L
	240 V AC 50/60 Hz ¹⁾									Z								J	1	M

1) The AC frequency 50 or 60 Hz is selected at the 15th and 16th position (see page 18)

10th position

Release combination

Closing solenoid	1 st shunt release	2 nd shunt release (Y2)	2 nd shunt release (Y3)	C.t.-operated release	Undervoltage release	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Order codes			
■	■																								
■	■	■																							
■	■			■																					
■	■	■			■																				
■	■		■		■																				
■	■																								

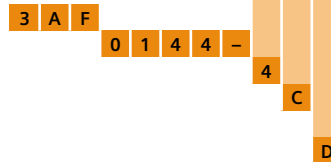
Configuration example

3AF outdoor vacuum circuit-breaker
($U_f = 36 \text{ kV}$, $I_{sc} = 25 \text{ kA}$, $I_f = 2000 \text{ A}$)

Manual electrical closing

Operating voltage of the motor operating mechanism 48 V DC

Release combination: Closing solenoid, 1st shunt release, c.t.-operated release



Example for Order No.:
Order codes:

3	A	F	0	1	4	4	-	4	C	D	■	■	-	■	■	■	■	-	Z			
V	1	3																				



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11th position

Operating voltage of the closing solenoid and 1st shunt release

		Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes					
		Order No.:	3	A	■	■	■	■	■	■	-	■	■	■	■	■	-	■	■	■	■	-	★	■	■	■
Standard voltages	Special voltages																									
24 V DC															1											
48 V DC															2											
60 V DC															3											
110 V DC															4											
220 V DC															5											
100 V AC 50/60 Hz ¹⁾															6											
110 V AC 50/60 Hz ¹⁾															7											
230 V AC 50/60 Hz ¹⁾															8											
	30 V DC														9										L 1 A	
	32 V DC														9										L 1 B	
	120 V DC														9										L 1 C	
	125 V DC														9										L 1 D	
	127 V DC														9										L 1 E	
	240 V DC														9										L 1 F	
	120 V AC 50/60 Hz ¹⁾														9										L 1 K	
	125 V AC 50/60 Hz ¹⁾														9										L 1 L	
	240 V AC 50/60 Hz ¹⁾														9										L 1 M	

12th position

Operating voltage of the 2nd release

Release as shunt release, c.t.-operated release or undervoltage release

		Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes					
		Order No.:	3	A	■	■	■	■	■	■	-	■	■	■	■	■	-	■	■	■	■	-	★	■	■	■
Standard voltages	Special voltages																									
Without or c.t.-operated release															0											
24 V DC															1											
48 V DC															2											
60 V DC															3											
110 V DC															4											
220 V DC															5											
100 V AC 50/60 Hz ¹⁾															6											
110 V AC 50/60 Hz ¹⁾															7											
230 V AC 50/60 Hz ¹⁾															8											
	30 V DC														9										M 1 A	
	32 V DC														9										M 1 B	
	120 V DC														9										M 1 C	
	125 V DC														9										M 1 D	
	127 V DC														9										M 1 E	
	240 V DC														9										M 1 F	
	120 V AC 50/60 Hz ¹⁾														9										M 1 K	
	125 V AC 50/60 Hz ¹⁾														9										M 1 L	
	240 V AC 50/60 Hz ¹⁾														9										M 1 M	

1) The AC frequency 50 or 60 Hz is selected at the 15th and 16th position (see page 18)

Configuration example

3AF outdoor vacuum circuit-breaker

($U_r = 36$ kV, $I_{sc} = 25$ kA, $I_r = 2000$ A)

Operating voltage of the closing solenoid and

1st shunt release 48 V DC

2nd release as c.t.-operated release

3 A F
0 1 4 4 - 4 C D
2
0

Example for Order No.:

Order codes:

3 A F 0 1 4 4 - 4 C D 2 0 - ■ ■ ■ ■ - Z



Selection of secondary equipment, live tank



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13th/14th position

Auxiliary switch, circuit-breaker tripping signal

				Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes					
				Order No.:	3	A	■	■	■	■	■	-	■	■	■	■	■	-	■	■	■	■	-	★	■	■	■	
Operations counter	Auxiliary switch 6 NO + 6 NC	Auxiliary switch 12 NO + 12 NC	Circuit-breaker tripping signal																				2	T				
■	■		■																				2	V				
■		■	■																				2	W				
■		■	■																				2	X				
																							See page 19					

15th/16th position

Frequency of operating voltages

Frequency																									
50 Hz or DC																				A	2				
60 Hz																				A	3				

2

Configuration example

3AF outdoor vacuum circuit-breaker

($U_f = 36 \text{ kV}$, $I_{sc} = 25 \text{ kA}$, $I_f = 2000 \text{ A}$)

With auxiliary switch 6 NO + 6 NC and circuit-breaker tripping signal

Frequency of operating voltages 50 Hz or DC

3	A	F																					
			0	1	4	4	-	4	C	D	2	0	-	2	T								
																						A	2
3	A	F	0	1	4	4	-	4	C	D	2	0	-	2	T	A	2	-	Z				
V	1	3																					

Example for Order No.:

Order codes:



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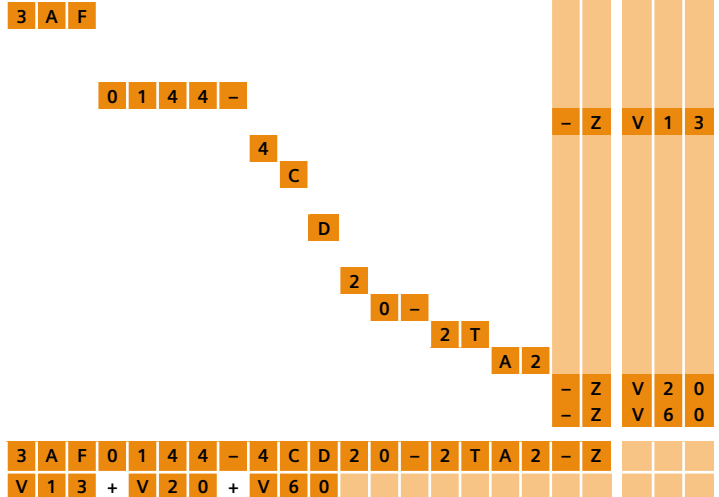
Additional equipment

Options	Available for			Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes						
	3AG01	3AF01	3AF03	Order No.:	3	A	■	■	■	■	■	-	■	■	■	■	■	-	■	■	■	■	-	★	■	■	■		
Insulator creepage distance 1300 mm			■																					-	Z	V	1	1	
Rated voltage 40.5 kV			■																						-	Z	V	1	2
Lockable operating mechanism box	■	■	■																						-	Z	V	2	0
Fixing for current transformer	■	■	■																						-	Z	V	3	0
Fixing for current and voltage transformers	■	■	■																						-	Z	V	3	1
Extension unit 600 mm			■																						-	Z	V	3	2
Main extension unit, extra height 600 mm			■																						-	Z	V	3	3
With current transformer mounting brackets with 2 ct- channels	■	■	■																						-	Z	V	3	5
With screening for the central pole assembly (bird screen)			■																						-	Z	V	4	0
Auxiliary switch 1 NO + 1 NC	■	■	■																						-	Z	V	5	0
Wiring 2.5 mm	■	■	■																						-	Z	V	5	1
Circuit-breaker application up to - 40 °C ambient air temperature	■	■	■																						-	Z	V	6	0
Gas-filled version with pressure indicator	■	■																							-	Z	V	8	2
DC 60 V coil as 1 st shunt release for DC 110 V operating voltage	■	■	■																						-	Z	V	8	3
With extension parts for circuit-breaker supporting structure			■																						-	Z	V	3	2



Configuration example

- 3AF outdoor vacuum circuit-breaker
- Rated voltage $U_r = 36 \text{ kV}$
- Rated short-circuit breaking current $I_{sc} = 25 \text{ kA}$
- Rated normal current $I_r = 2000 \text{ A}$
- Special version $U_p = 200 \text{ kV}$, $U_d = 95 \text{ kV}$
- Manual electrical closing
- Operating voltage of the motor operating mechanism **48 V DC**
- Release combination: Closing solenoid, 1st shunt release, c.t.-operated release
- Operating voltage of the closing solenoid and 1st shunt release **48 V DC**
- 2nd release as c.t.-operated release
- With auxiliary switch 6 NO + 6 NC and circuit-breaker tripping signal
- Frequency of operating voltages 50 Hz or DC
- Lockable operating mechanism box
- Circuit-breaker application up to - 40 °C ambient air temperature





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15.5 kV

50/60 Hz

Rated voltage U_r kV	Rated lightning impulse withstand voltage U_p kV	Rated short-duration power-frequency withstand voltage U_d kV	Rated short-circuit breaking current at 36 % DC component I_{sc} kA	Rated short-circuit making current (at 50/60 Hz) I_{ma} kA	Rated normal current I_r A	Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes
						Order No.:	S	D	V	6	■	■	■	-	■	■	■	■	■	■	■	■	■	■	■
15.5	110	50	20	52	1200 ¹⁾	S	D	V	6	0	3	2													
					2000	S	D	V	6	0	3	4													
			25	65	1200 ¹⁾	S	D	V	6	0	4	2													
					2000	S	D	V	6	0	4	4													
			31.5	82	1200 ¹⁾	S	D	V	6	0	5	2													
					2000	S	D	V	6	0	5	4													
			40	104	1200 ¹⁾	S	D	V	6	0	6	2													
					2000	S	D	V	6	0	6	4													
					3000	S	D	V	6	0	6	7													

1) 1250 A according to IEC standard

27.6 kV

50/60 Hz

U_r kV	U_p kV	U_d kV	I_{sc} kA	I_{ma} kA	I_r A	S	D	V	6	1	3	2													
27.6	150	60	20	52	1200 ¹⁾	S	D	V	6	1	3	2													
					2000	S	D	V	6	1	3	4													
			25	65	1200 ¹⁾	S	D	V	6	1	4	2													
		2000			S	D	V	6	1	4	4														

1) 1250 A according to IEC standard

38 kV

50/60 Hz

U_r kV	U_p kV	U_d kV	I_{sc} kA	I_{ma} kA	I_r A	S	D	V	6	2	3	2													
38	200	80	20	52	1200 ¹⁾	S	D	V	6	2	3	2													
					2000	S	D	V	6	2	3	4													
			25	65	1200 ¹⁾	S	D	V	6	2	4	2													
		2000			S	D	V	6	2	4	4														
			31.5	82	1200	S	D	V	6	2	5	2													
		1250 IEC			S	D	V	6	2	5	3														
					2000	S	D	V	6	2	5	4													
					2000 IEC	S	D	V	6	2	5	5													
			40	104	1200 ¹⁾	S	D	V	6	2	6	2													
		2000			S	D	V	6	2	6	4														

1) 1250 A according to IEC standard

Configuration example

Outdoor vacuum circuit-breaker, dead tank
Rated voltage $U_r = 38$ kV
Rated short-circuit breaking current $I_{sc} = 40$ kA
Rated normal current $I_r = 2000$ A

S	D	V	6																					
				2	6	4																		

Example for Order No.:
Order codes:

S	D	V	6	2	6	4	-	■	■	■	■	■	■	-	■	■	■	■	■	■	■	■	■	■	■
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---



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8 th position			Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes			
Release combination			Order No.:	S	D	V	6	■	■	■	-	■	■	■	■	■	-	■	■	■	■	■	■	■	■
Closing solenoid	1 st shunt release	2 nd shunt release																							

9 th position			Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes		
Operating voltage of the 1 st shunt release			Order No.:	S	D	V	6	■	■	■	-	■	■	■	■	■	-	■	■	■	■	■	■	■
Voltage																								
24 V DC													B											
48 V DC													C											
110 V DC													D											
125 V DC													E											
250 V DC													F											
120 V AC 50/60 Hz ¹⁾													J											
125 V AC 50/60 Hz ¹⁾													K											
240 V AC 50/60 Hz ¹⁾													L											

1) The frequency of the operating voltage was selected at the 14th position together with the language and the color (see page 23)

10 th position			Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes		
Operating voltage of the 2 nd shunt release			Order No.:	S	D	V	6	■	■	■	-	■	■	■	■	■	-	■	■	■	■	■	■	
Voltage																								
Without 2 nd shunt release (8 th position = 1)														A										
24 V DC													B											
48 V DC													C											
110 V DC													D											
125 V DC													E											
250 V DC													F											
120 V AC 50/60 Hz ¹⁾													J											
125 V AC 50/60 Hz ¹⁾													K											
240 V AC 50/60 Hz ¹⁾													L											

1) The frequency of the operating voltage was selected at the 14th position together with the language and the color (see page 23)

Configuration example

Outdoor vacuum circuit-breaker, dead tank
 ($U_r = 38 \text{ kV}$, $I_{sc} = 40 \text{ kA}$, $I_r = 2000 \text{ A}$)
 Release combination: Closing solenoid and 1st shunt release
 Operating voltage of the 1st shunt release **125 V AC**
 Without 2nd shunt release (8th position = 1)

S	D	V	6																					
				2	6	4	-																	
								1																
									K															
										A														
S	D	V	6	2	6	4	-	1	K	A														

Example for Order No.:
Order codes:

Selection of secondary equipment, dead tank



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2

11st position

Operating voltage of the closing solenoid

Position:	1	2	3	4	5	6	7	-	8	9	10	11	12	-	13	14	15	16	Order codes	
Order No.:	S	D	V	6	■	■	■	-	■	■	■	■	■	-	■	■	■	■	■	■ ■ ■ ■
Voltage																				
24 V DC												1								
48 V DC												2								
110 V DC												3								
125 V DC												4								
250 V DC												5								
120 V AC 50/60 Hz ¹⁾												6								
125 V AC 50/60 Hz ¹⁾												7								
240 V AC 50/60 Hz ¹⁾												8								

1) The frequency of the operating voltage was selected at the 14th position together with the language and the color (see page 23)

12nd position

Operating voltage of the motor operating mechanism

Voltage																	
24 V DC												1					
48 V DC												2					
110 V DC												3					
125 V DC												4					
250 V DC												5					
120 V AC 50/60 Hz ¹⁾												6					
125 V AC 50/60 Hz ¹⁾												7					
240 V AC 50/60 Hz ¹⁾												8					

1) The frequency of the operating voltage was selected at the 14th position together with the language and the color (see page 23)

13rd position

Auxiliary switch and control cable connection

Auxiliary switch 6 NO + 6 NC	Auxiliary switch 12 NO + 12 NC	Auxiliary switch 22 NO + 22 NC	64-pole plug connector	1	2	3
■			■			
	■		■			
		■	■			

Configuration example

Outdoor vacuum circuit-breaker, dead tank

($U_r = 38 \text{ kV}$, $I_{sc} = 40 \text{ kA}$, $I_r = 2000 \text{ A}$)

Operating voltage of the closing solenoid 125 V AC

Operating voltage of the motor operating mechanism 125 V AC

Auxiliary switch 6 NO + 6 NC and 64-pole plug connector

Example for Order No.:
Order codes:

S	D	V	6	2	6	4	-	1	K	A	7	7	-	1	■	■	■		
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--

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Retrofitting

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

Spare parts

When releases/solenoids are required as spare parts, the order number and the type of construction of the associated circuit-breaker type must also be specified.

Remark for orders

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

Accessories for the plug connector

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

For 24-pole plug connector

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

For 64-pole plug connector

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

Vacuum interrupters and other spare parts must only be replaced by instructed personnel.

2

Designation	Remarks	Operating voltage	Order No.
Lubricant			3AX11 33-3AY
Operating solenoid	Used as closing solenoid or 1 st shunt release	24 V DC 30 V DC 110 V DC 220 V DC	3AY15 10-3BY 3AY15 10-3MY 3AY15 10-3EY 3AY15 10-3FY
2nd shunt release	Without varistor, without rectifier Including varistor	24 – 32 V DC 48 – 60 V DC 110 – 127 V DC 220 – 240 V DC	3AX11 01-2BY 3AX11 01-2CY 3AX11 01-2EY 3AX11 01-2FY
	Including varistor and rectifier	230 – 240 V AC, 50 Hz	3AX11 01-2JY
Current-transformer operated release	For rated normal current 0.5 A, including varistor and rectifier		3AX11 02-2AY
Drive motor	(500 W)	110 V DC 220 V DC	3AY16 11-0EY 3AY16 11-0FY
	(700 W)	110 V DC 220 V DC	3AY15 11-1EY 3AY15 11-1FY
Rectifier component		100 – 250 V AC, 50 Hz	3AY15 25-1FY
Auxiliary switch (-S1)	5 NO + 5 NC 6 NO + 6 NC 11 NO + 11 NC 12 NO + 12 NC		3SV9221-2AY 3SV9273-2AY 3SV9222-2AY 3SV9274-2AY
Auxiliary contactor	2 NO + 2 NC 3TH30 22-0BB4 3TH30 22-0BC4 3TH30 22-0BF4 3TH30 22-0BM4	24 V DC 30 V DC 110 V DC 220 V DC	
Position switch	Type 3SE4206 (as spare part), without installation accessories Used for:	Nos.	
	– Electrical anti-pumping (-S3)	1	
	– Motor control (-S21, -S22)	2	
	– Closing spring charged (-S4)	1	

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Designation	Remarks	Operating voltage	Order No.
M.c.b.	5SX42 02-7	2 A, two-pole, 240 V AC, 50 Hz	2A 5SQ22107YA02
	5SX42 04-7	4 A, two-pole, 240 V AC, 50 Hz	4A 5SQ22107YA04
	5SX42 06-7	6 A, two-pole, 240 V AC, 50 Hz	6A 5SQ22107YA06
Heating		100 W, 240 V AC, 50 Hz	4394201101
Local-remote switch (S13)			4113488907
Handle	Hand crank to charge the spring		4112871002
Retaining elements	Set of lock washers		3AY15 50-0AY
Circuit-breaker control switch (S14)			4394570001

2

Data on the nameplate

"Leistungsschild
wird neu gezeichnet"

Note:

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

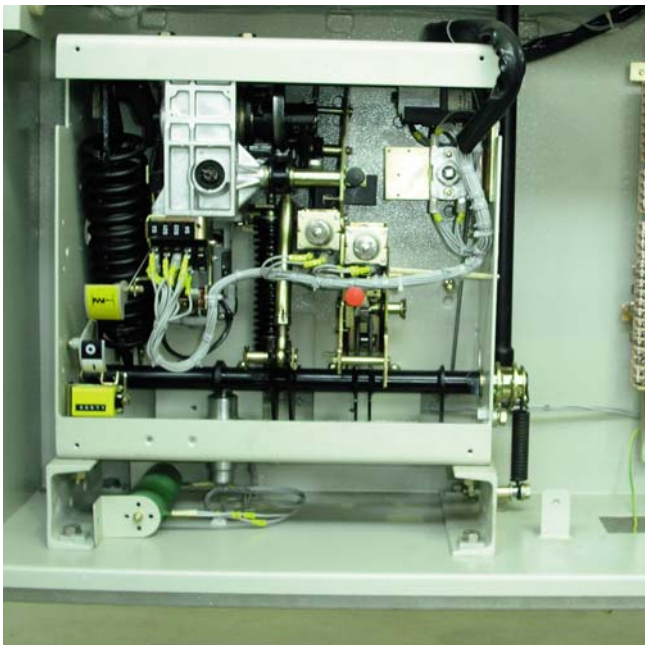
- **Type** designation
- **Serial No.**
- **Design code**
- **Year of manufacture**

DRAFT VERSION



R-HG11-XXX.tif

SDV6 outdoor vacuum circuit-breaker, porcelain bushings



R-HG11-XXX.tif

XXXXX

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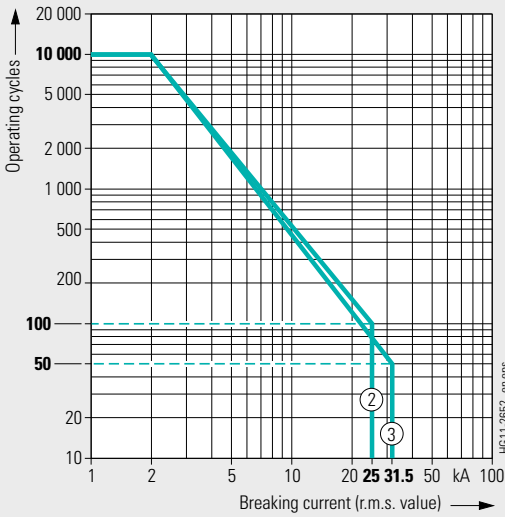
Order No.	12 kV 50/60 Hz		Rated operating sequence: O - 3 min - CO - 3 min - CO O - 0.3 s - CO - 3 min - CO O - 0.3 s - CO - 15 s - CO		Rated duration of short-circuit	Rated short-circuit breaking current	DC component in % of the rated short-circuit breaking current	Asymmetrical breaking current	Rated short-circuit making current (at 50/60 Hz)	Rated lightning impulse withstand voltage	Rated short-duration power-frequency withstand voltage	Voltage drop ΔU between connections	Minimum creepage distance, interrupter	Minimum creepage distance, phase-to-earth	Minimum clearance, phase-to-phase	Minimum clearance, phase-to-earth	Weights	Detailed dimension drawing (can be ordered)	Operating cycle diagram no. (see page 29)	Catalog dimension drawing no. (see page 29)	
	I_r	Pole-center distance	■	○	t_k	I_{sc}	%	kA	I_{ma}	U_p	U_d	mV	mm	mm	mm	mm	kg				
3AG0 144 ...	2000	555	■	○	3	25	36		63/65	75	28						450		1	1	
3																					
17.5 kV 50/60 Hz		I_r	Pole-center distance	Rated operating sequence: O - 3 min - CO - 3 min - CO O - 0.3 s - CO - 3 min - CO O - 0.3 s - CO - 15 s - CO		Rated duration of short-circuit	Rated short-circuit breaking current	DC component in % of the rated short-circuit breaking current	Asymmetrical breaking current	Rated short-circuit making current (at 50/60 Hz)	Rated lightning impulse withstand voltage	Rated short-duration power-frequency withstand voltage	Voltage drop ΔU between connections	Minimum creepage distance, interrupter	Minimum creepage distance, phase-to-earth	Minimum clearance, phase-to-phase	Minimum clearance, phase-to-earth	Weights	Detailed dimension drawing (can be ordered)	Operating cycle diagram no. (see page 29)	Catalog dimension drawing no. (see page 29)
		A	mm	■	○	t_k	I_{sc}	%	kA	I_{ma}	U_p	U_d	mV	mm	mm	mm	mm	kg			
3AF0 343 ...	1600	555	■	○	3	25	36		63/65	95	38							355		2	
3AF0 344 ...	2000	555	■	○	3	25	36		63/65	95	38							355		2	
36 kV 50/60 Hz		I_r	Pole-center distance	Rated operating sequence: O - 3 min - CO - 3 min - CO O - 0.3 s - CO - 3 min - CO O - 0.3 s - CO - 15 s - CO		Rated duration of short-circuit	Rated short-circuit breaking current	DC component in % of the rated short-circuit breaking current	Asymmetrical breaking current	Rated short-circuit making current (at 50/60 Hz)	Rated lightning impulse withstand voltage	Rated short-duration power-frequency withstand voltage	Voltage drop ΔU between connections	Minimum creepage distance, interrupter	Minimum creepage distance, phase-to-earth	Minimum clearance, phase-to-phase	Minimum clearance, phase-to-earth	Weights	Detailed dimension drawing (can be ordered)	Operating cycle diagram no. (see page 29)	Catalog dimension drawing no. (see page 29)
		A	mm	■	○	t_k	I_{sc}	%	kA	I_{ma}	U_p	U_d	mV	mm	mm	mm	mm	kg			
3AF0 143 ...	1600	725	■	○	3	25	36	27.4	63/65	170	70							850		2	
3AF0 144 ...	2000	725	■	○	3	25	36		63/65	170	70							850		2	
3AF0 153 ...	1600	725	■	○	4	31.5	36		80/82	170	70							855		3	
3AF0 154 ...	2000	725	■	○	4	31.5	36		80/82	170	70							850	1M 324 02001	3	

■ Standard according to IEC 62271-100 ○ Possible

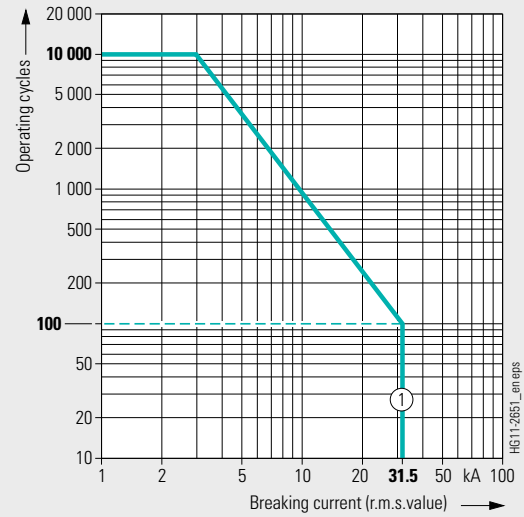
Fehlende Werte müssen noch ergänzt werden

DRAFT VERSION

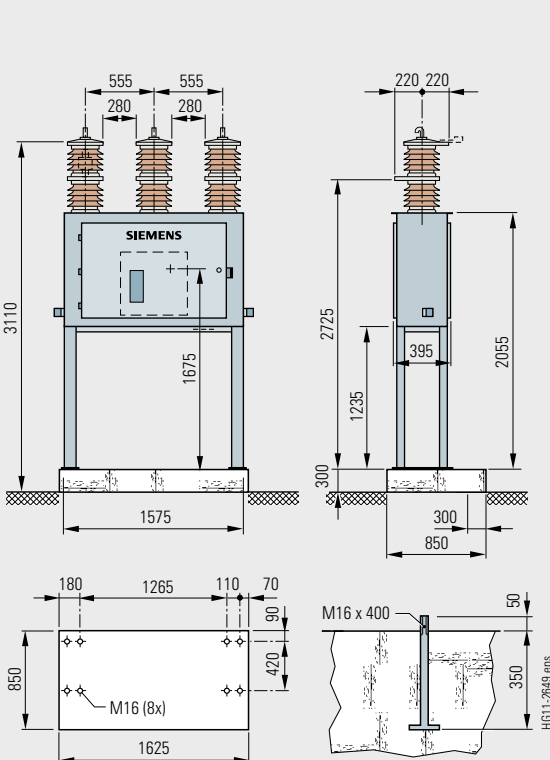
Operating cycle diagrams 3AF0/3AG0



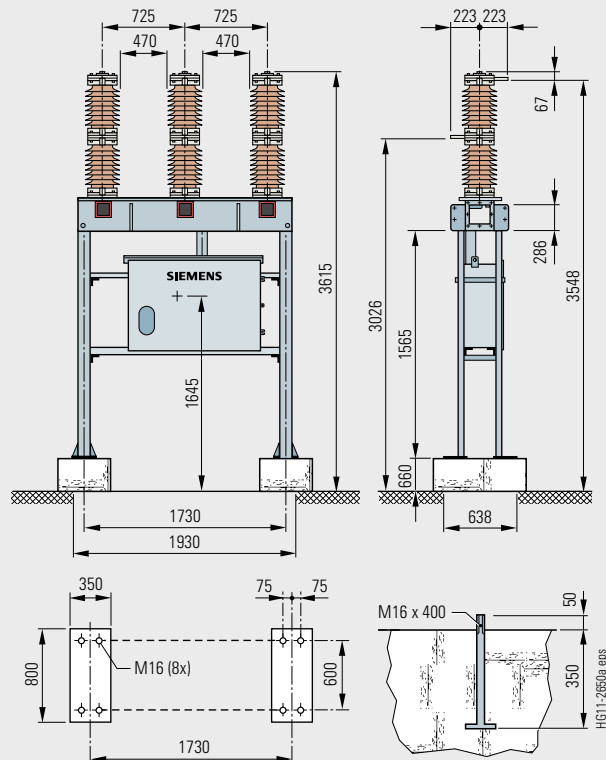
The permissible number of electrical operating cycles is shown as a function of the breaking current (r.m.s. value). All vacuum circuit-breakers fulfil the endurance classes E2, M2 and C2 according to IEC 62271-100. The curve shape beyond the parameters defined in IEC 62271-100 is based on average experience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



Dimension drawings 3AF0/3AG0



Dimension drawing 1



Dimension drawing 2



DRAFT VERSION

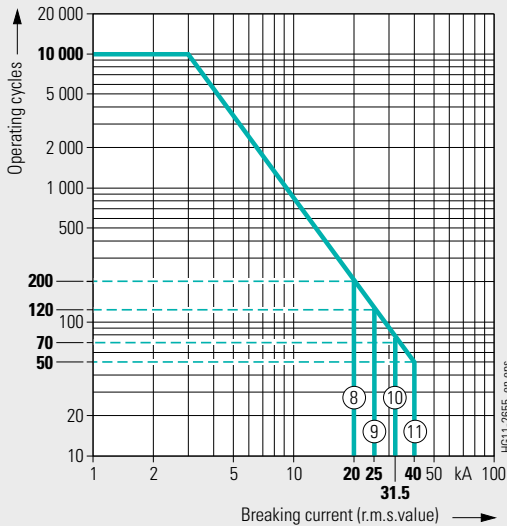
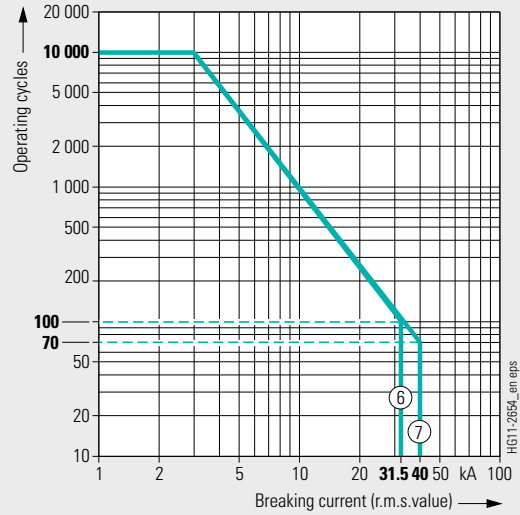
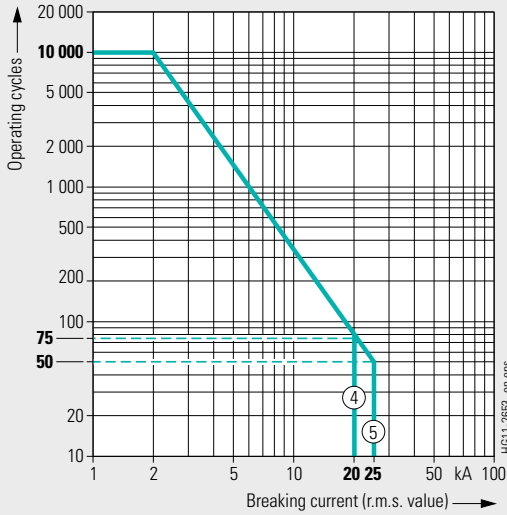
3

Order No.	15.5 kV 50/60 Hz		Rated normal current I_r A	Pole-center distance mm	Rated operating sequence: O - 3 min - CO - 3 min - CO	O - 15 s - CO	Rated duration of short-circuit t_k s	Rated short-circuit breaking current I_{sc} kA	DC component in % of the rated short-circuit breaking current %	Asymmetrical breaking current kA	Rated short-circuit making current (at 50/60 Hz) I_{ma} kA	Rated lightning impulse withstand voltage U_p kV	Rated short-duration power-frequency withstand voltage U_d kV	Voltage drop ΔU between connections mV	Minimum creepage distance, interrupter mm	Minimum creepage distance, phase-to-earth mm	Minimum clearance, phase-to-phase mm	Minimum clearance, phase-to-earth mm	Weights kg	Detailed dimension drawing (can be ordered)	Operating cycle diagram no. (see page 31)	Catalog dimension drawing no. (see page 31)
	SDV6032 ...	SDV6034 ...																				
	1200	330	■	○	3	20	48	31	52	110	50				600	330	255	1050		4	3.1	
	2000	330	■	○	3	20	48	31	52	110	50				600	330	255	1100		4	3.1	
	1200	330	■	○	3	25	48	39	65	110	50				600	330	255	1050		5	3.1	
	2000	330	■	○	3	25	48	39	65	110	50				600	330	255	1100		5	3.1	
	1200	330	■	○	3	31.5	48	49	82	110	50				600	330	255	1050		6	3.1	
	2000	330	■	○	3	31.5	48	49	82	110	50				600	330	255	1100		6	3.1	
	3000	401	■	○	3	31.5	48	49	82	110	50				600	400	255	1300		6	3.2	
	1200	330	■	○	3	40	48	62	104	110	50				600	330	255	1050		7	3.1	
	2000	330	■	○	3	40	48	62	104	110	50				600	330	255	1100		7	3.1	
	3000	401	■	○	3	40	48	62	104	110	50				600	400	255	1300		7	3.2	
fehlende Daten müssen ergänzt werden																						
27.6 kV 50/60 Hz		I_r A				t_k s	I_{sc} kA	%	kA	I_{ma} kA	U_p kV	U_d kV										
	SDV6132 ...	1200	401	■	○	3	20	48	31	52	150	60				620	400	255	1150		4	3.3
	SDV6134 ...	2000	401	■	○	3	20	48	31	52	150	60				620	400	255	1200		4	3.3
	SDV6142 ...	1200	401	■	○	3	25	48	39	65	150	60				620	400	255	1150		5	3.3
	SDV6144 ...	2000	401	■	○	3	25	48	39	65	150	60				620	400	255	1200		5	3.3
fehlende Daten müssen ergänzt werden																						
38 kV 50/60 Hz		I_r A				t_k s	I_{sc} kA	%	kA	I_{ma} kA	U_p kV	U_d kV										
	SDV6232 ...	1200	500	■	○	3	20	48	31	52	200	80				1040	500	480	1500		8	3.4
	SDV6234 ...	2000	500	■	○	3	20	48	31	52	200	80				1040	500	480	1550		8	3.4
	SDV6242 ...	1200	500	■	○	3	25	48	39	65	200	80				1040	500	480	1500		9	3.4
	SDV6244 ...	2000	500	■	○	3	25	48	39	65	200	80				1040	500	480	1550		9	3.4
	SDV6252 ...	1200	500	■	○	3	31.5	48	49	82	200	80				1040	500	480	1560		10	3.4
	SDV6254 ...	2000	500	■	○	3	31.5	48	49	82	200	80				1040	500	480	1610		10	3.4
	SDV6262 ...	1200	500	■	○	3	40	48	62	104	200	80				1040	500	480	1560		11	3.4
	SDV6264 ...	2000	500	■	○	3	40	48	62	104	200	80				1040	500	480	1610		11	3.4
fehlende Daten müssen ergänzt werden																						

■ Standard according to IEC 62271-100 ○ Possible

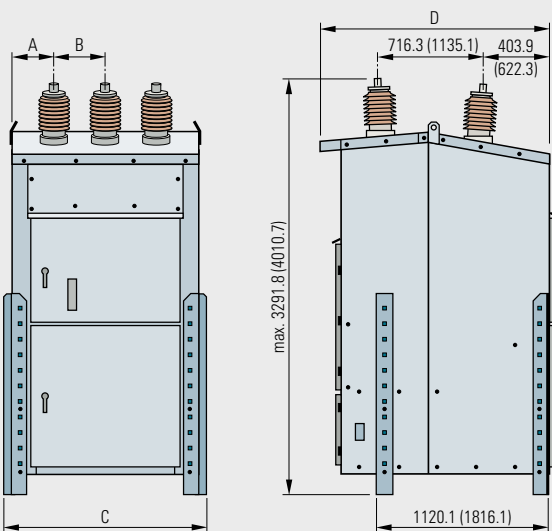
DRAFT VERSION

Operating cycle diagrams SDV6



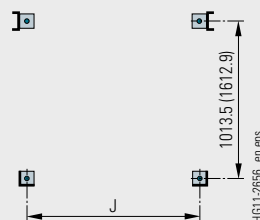
The permissible number of electrical operating cycles is shown as a function of the breaking current (r.m.s. value). All vacuum circuit-breakers fulfil the endurance classes E2, M2 and C2 according to IEC 62271-100. The curve shape beyond the parameters defined in IEC 62271-100 is based on average experience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

Dimension drawings SDV6



Dimension drawing no.	A	B	C	D	J
3.1	274.4	330.2	1295.40	58.5	1117.6
3.2	315.0	401.3	1506.2	1485.9	1328.4
3.3	315.0	401.3	1506.2	1485.9	1328.4
3.4	452.1	500.4	1910.1	1993.9	1706.9

Values in brackets for 38 kV



Operating times

Operating times at rated voltage of the secondary circuit	Equipment of circuit-breaker	Operating time of circuit-breaker	
		3AF0	3AG0
Closing time	–	≤ 75 ms	≤ 75 ms
Opening time	1 st shunt release	≤ 65 ms	≤ 65 ms
	2 nd shunt release	≤ 50 ms	≤ 50 ms
Arcing time	–	< 15 ms	< 15 ms
Break time	1 st shunt release	≤ 80 ms	≤ 80 ms
	2 nd shunt release	≤ 65 ms	≤ 65 ms
Dead time	–	300 ms	300 ms
CLOSE/OPEN contact time	1 st shunt release	≤ 90 ms	≤ 90 ms
	2 nd shunt release	≤ 90 ms	≤ 75 ms
Minimum command duration	Closing solenoid	40 ms	60 ms
	1 st shunt release	40 ms	60 ms
	Additional releases	20 ms	20 ms
Charging time for electrical operation	–	≤ 15 s	≤ 15 s
Synchronism error between the poles	–	≤ 2 ms	≤ 2 ms



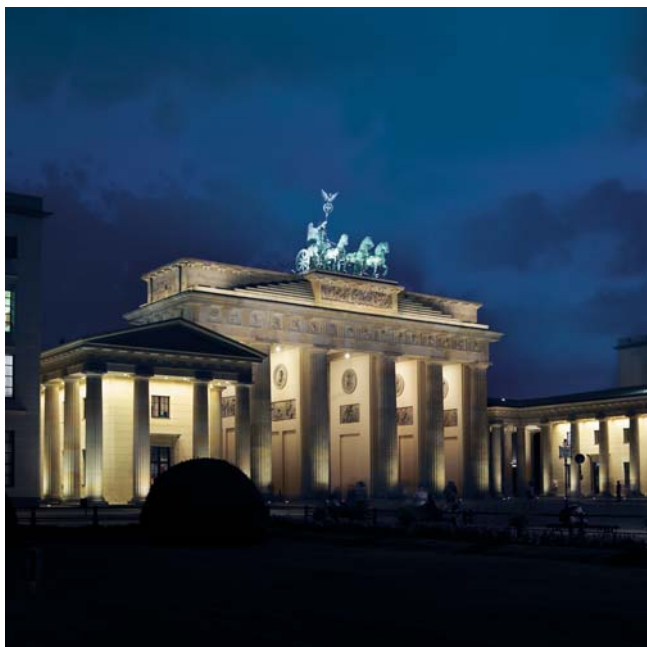
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Annex **33**

Inquiry form 34

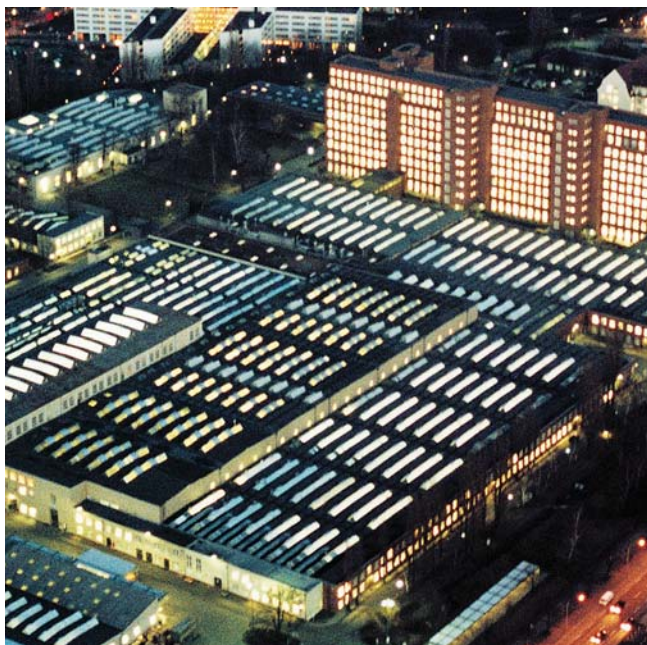
Configuration instructions 35

Configuration aid Foldout page



R-HG11-181.tif

Brandenburg Gate, Berlin, Germany



R-HG11-180.eps

Switchgear Factory in Berlin, Germany

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

DRAFT VERSION

Inquiry concerning

- Live tank
- Dead tank

Please

- Submit an offer
- Call us
- Visit us

Your address

Company

Dept.

Name

Street

Postal code/city

Phone

Fax

E-mail

Siemens AG

Dept.

Name

Street

Postal code/city

Fax

Technical data

				Other values
Rated voltage, live tank	<input type="checkbox"/> 12 kV	<input type="checkbox"/> 17.5 kV	<input type="checkbox"/> 36 kV	<input type="checkbox"/> ___ kV
Rated voltage, dead tank	<input type="checkbox"/> 15.5 kV	<input type="checkbox"/> 27.6 kV	<input type="checkbox"/> 38 kV	<input type="checkbox"/> ___ kV
Rated lightning impulse withstand voltage	<input type="checkbox"/> 75 kV	<input type="checkbox"/> 95 kV	<input type="checkbox"/> 110 kV	<input type="checkbox"/> ___ kV
	<input type="checkbox"/> 150 kV	<input type="checkbox"/> 170 kV	<input type="checkbox"/> 200 kV	
Rated short-duration power-frequency withstand voltage	<input type="checkbox"/> 28 kV	<input type="checkbox"/> 38 kV	<input type="checkbox"/> 42 kV	<input type="checkbox"/> ___ kV
	<input type="checkbox"/> 50 kV	<input type="checkbox"/> 60 kV	<input type="checkbox"/> 70 kV	
	<input type="checkbox"/> 80 kV	<input type="checkbox"/> 95 kV		
Rated short-circuit breaking current	<input type="checkbox"/> 20 kA	<input type="checkbox"/> 25 kA		<input type="checkbox"/> ___ kA
	<input type="checkbox"/> 31.5 kA	<input type="checkbox"/> 40 kA		
Rated normal current	<input type="checkbox"/> 1200 A	<input type="checkbox"/> 1250 A (IEC)	<input type="checkbox"/> 1600 A	<input type="checkbox"/> ___ A
	<input type="checkbox"/> 2000 A	<input type="checkbox"/> 3000 A		

Secondary equipment

Possible combinations

Motor operating mechanism ___ V DC ___ V AC, ___ Hz

Closing solenoid ___ V DC ___ V AC, ___ Hz

1st shunt release ___ V DC ___ V AC, ___ Hz

2nd shunt release ___ V DC ___ V AC, ___ Hz

Current-transformer operated release 0.5 A 1 A ≥ 0.1 Ws (10 Ω) ≥ 0.1 Ws (20 Ω)

Undervoltage release ___ V DC ___ V AC, ___ Hz

Without energy store With energy store

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

Low-voltage connection 24-pole terminal strip 24-pole plug 64-pole plug

Circuit-breaker tripping signal

Operating instructions in English Spanish

Application and other requirements

Please check off ___ Please fill in

