

DRIESCHER - Indoor Vacuum Circuit-Breaker

- Rated voltage
12 kV up to 38,5 kV
- Rated current
630 A up to 2500 A



V12-

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DRIESCHER - Indoor Vacuum Circuit-Breaker



Category for capacitive current breaking **C2**
Category for mechanical switching cycles **M2**

Rated voltage	12 kV				24 kV *			36 kV **		38,5 kV
	20 kA	25 kA	31,5 kA	40 kA	20 kA	25 kA	31,5 kA	20 kA	31,5 kA	20 kA
Rated current										
630 A	●	●			●	●		●		●
1250 A	●	●			●	●		●		●
1600 A			●				●			
2000 A							●			
2500 A				●			●		●	

* this type with rated voltage 24 kV, was tested with a test voltage of 25 kV (On/Off test).

** this type with rated voltage 36kV, was tested with a test voltage of 38,5 kV (On/Off test).

DRIESCHER - Indoor Vacuum Circuit-Breaker

according to EN 62271-100

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General

The new DRIESCHER vacuum circuit-breaker is a technological development of the well-proven vacuum circuit-breaker series 746.

These three-pole indoor circuit-breakers are designed for rated voltages of 12 kV up to 38,5 kV and

rated currents of 630 A up to 2500 A.

All specified circuit-breakers are delivered for front panel installation.

Operating conditions

The breakers are designed for normal operating conditions in compliance with EN 62271-1, class „minus 5 indoors“. A reliable operation is still guaranteed at minus temperatures of -15° .

The maximum ambient temperature is 40°C ; the mean value over 24 hours is max. 35°C . The values on insulation strength are - corresponding to DIN VDE 0671 Part 1 - related to sea level.

For installations at altitudes of up to 1000 m any

reduction in insulation caused by the reduced insulating property of the air is insignificant and can be ignored. For installation at altitudes > 1000 m it is necessary to correct the values given for the rated power-frequency withstand voltage and the rated impulse withstand voltage (e.g. the insulating property of the clearance at an altitude of 2000 m above sea level is reduced by the factor 0,8).

Maintenance

These new DRIESCHER circuit-breakers boast extremely low-maintenance. We recommend an visual inspection and occasional cleaning of the insulating

parts. It is only necessary to lubricate the operating mechanism.

Design and principle of operation of the vacuum circuit-breaker

The new DRIESCHER vacuum circuit-breaker is a technical further development of our well-proven vacuum circuit-breaker series 746.

This vacuum circuit-breaker is made up of the following five (refer also to page 5) sub-assemblies which are coordinated with maximum precision:

Via **operating mechanism** ① the coil-spring energy storage mechanism is manually or electrically charged. Should the supply voltage fail, the coil-spring energy storage mechanism can be charged via the operating shaft using a crank.

Feature:

- *an overload blocking in the operating mechanism prevents any overloading of the energy storage mechanism.*

The coil-spring energy storage mechanism ② comprises three coil springs and an end position damping. This stores the energy (display), precisely controls the energy transmission and permits constant operating speeds.

Feature:

- *The energy is stored for 3 switching operations*
- *The adjusted end position damping permits an optimal switching operation. The mechanism is therefore extremely low in wear, low in maintenance, and has a long service life.*

Via **the switching module** ③ it is possible to operate the circuit-breaker manually by pressing the push-buttons or it can be operated electrically (release mechanism). The motor of the operating mechanism immediately recharges the coil-spring energy storage mechanism after operation. In addition to the release mechanisms the switching module also includes the locking mechanisms.

Feature:

- *The last possible switching operation is always and OFF switching operation*
- *For further electrical operations a second OFF release can be installed*

The electrical components ④ with their displays (operations counter, switch position) operate the circuit-breaker depending on the wiring diagram (e.g. auto reclosing). The 70-pin female connector (11) is positioned on the top of the breaker frame.

The male connector (10) is part of the delivery or part of the corresponding panel.

The operating shaft ⑤ assembled in the breaker frame transmits the operating energy via insulating bars (8) to the vacuum interrupters.

Advantage of the breaker frame:

- *compact design possible*
- *very lightweight and stable*

The high quality vacuum tubes are housed in moulded parts of Duroplast insulating material (9).

The **current** in the breaker pole flows from the upper terminal (1) to the fixed contact (2) of the vacuum tube.

The laminated contact ribbon (4) is screwed to the moving contact (3) of the vacuum tube. The spring (5) provides the required contact pressure and compensates the permissible contact burn (M) during the entire service life. The burn of the contacts in the vacuum tube can be monitored using the "M" mark. This can be carried out without necessitating dismantling. The pressure welded end of the contact ribbon forms the lower pole contact surface (7) which is supported by the contact arm (6).

Advantage:

- *the vacuum tubes are protected against extreme ambient conditions and damage*
- *the entire pole can be removed as one piece*

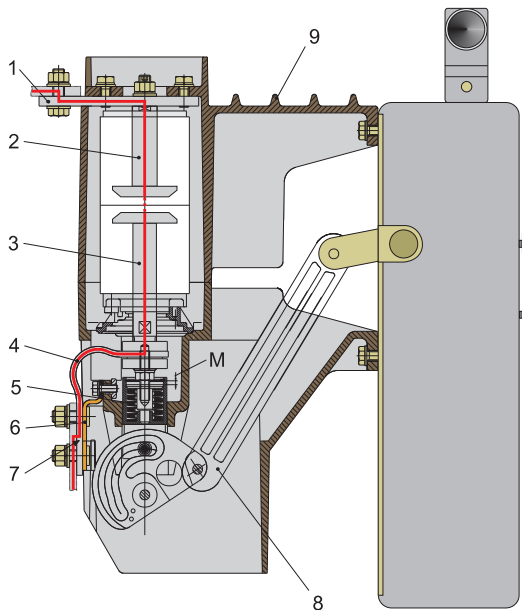
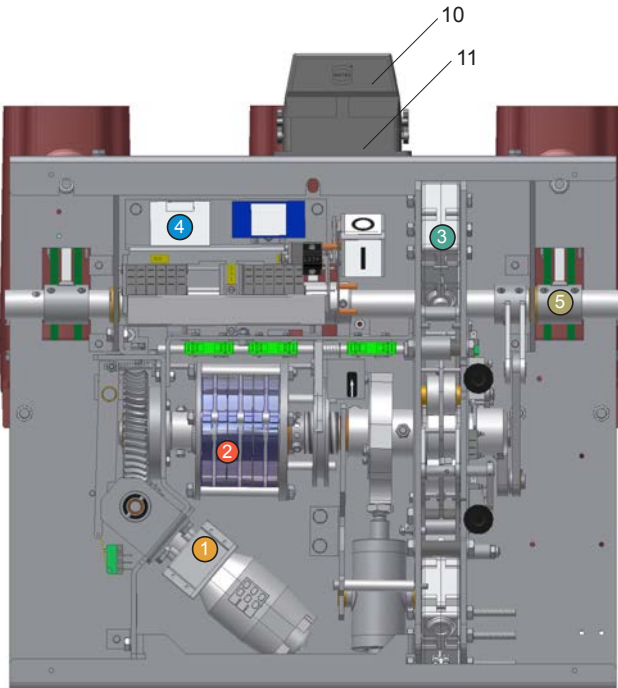
Summary:

The sub-assemblies and their optimal arrangement have made it possible to provide an extremely compact design.

This circuit-breaker is therefore extremely flexible in its application and meets all customer requirements to the full.

This new, optimised mechanical design also permits a minimum amount of maintenance and guarantees an extremely long service life.

Schematic diagram of assembly design and operating principle



Basic equipment:

- Push-button for ON and OFF switching on site
- Display of breaker position ON/OFF
- Display of charging condition of coil-spring energy storage mechanism
- Operations counter

Possible equipment:

- Electric motor
- Pump suppresser
- Auxiliary switch for motor, controls and locking mechanisms
- Additional releases (refer to page 7)

- Very high mechanical service life through optimised power transmission of precision-coordinated subassemblies with end position damping
- Flexible application through compact design
- Shorter delivery times
- Fast retrofitting possible (e.g. motor operating mechanism, auto reclosing ARC)
- Exceptionally high service life
- Minimum amount of maintenance
- Previous models can be replaced at any time

Technical data

Rated voltage	U_r	12 kV	24 kV	36 kV	38,5 kV
Rated frequency	f_r	50 Hz	50 Hz	50 Hz	50 Hz
Rated current	I_r	630 ... 2500 A ⁸⁾	630 ... 2500 A ⁸⁾	630 ... 2500 A ⁸⁾	630 ... 1250 A
Rated short-time current	I_k	20 ... 40 kA	20 ... 31,5 kA	20 ... 31,5 kA	20 kA
Rated short-circuit duration	t_k	3 s	3 s	3 s	3 s
Rated peak withstand current	I_p	50 ... 100 kA	50 ... 80 kA	50 ... 80 kA	50 kA
Rated impulse withstand voltage	U_p	75 kV	125 kV	170 kV	180 kV
Rated power frequency withstand voltage	U_d	28 kV	50 kV	70 kV	80 kV
Closing time approx.	ms	65	65	65	65
Arcing time	ms	<17	<17	<17	<17
Opening time approx.	ms	60	65	70	70
Direct current component	%	23	23	23	23
Rated short circuit breaking current	I_{sc}	20 ... 40 kA	20 ... 31,5 kA	20 ... 31,5 kA	20 kA
Rated short circuit making current		50 ... 100 kA	50 ... 80 kA	50 ... 80 kA	50 kA
Rated cable charging breaking current	I_c	25 A	31,5 A	50 A	50 A
Operating cycles					
- of the vacuum tube at rated short circuit breaking current		100	100	100	100
- of the breaker mechanism		10.000	10.000	10.000	10.000
Cable charging switching class		C2	C2	C2	C2
Mechanical life		M2	M2	M2	M2
Application class		S1	S1	S1	S1

8) for application in metal-encapsulated panels, are additional ventilation and cooling measures necessary, from 1600 A

Types:

- V...BK-EA with coil spring stored energy mechanism, front-panel mounting for manual operation, ON and OFF
- V...F-BK with coil spring stored energy mechanism, front-panel mounting for manual operation
- V...KUF with coil spring stored energy mechanism and suitable for automatic reclosing (ARC), front-panel mounting for motorised operation

Rated switching action sequence:

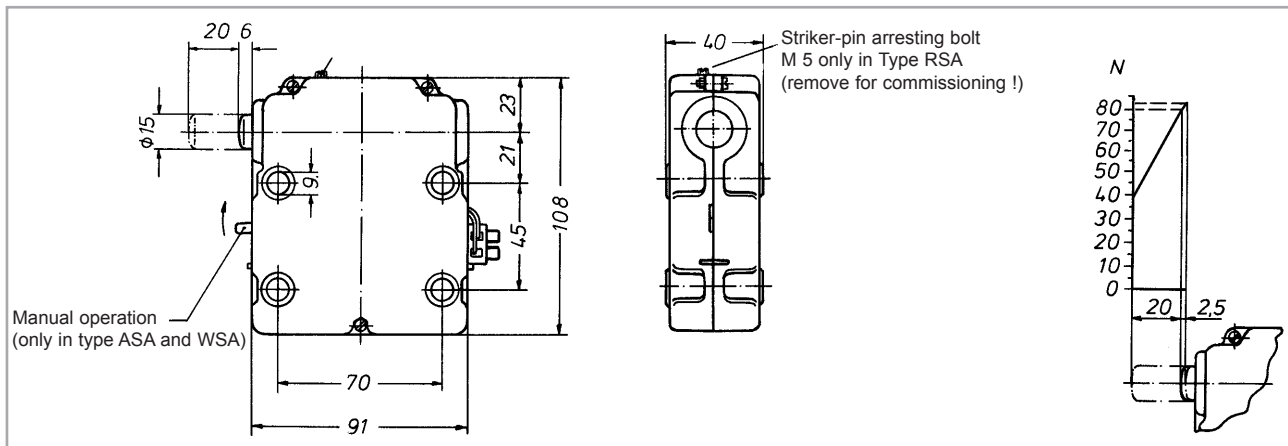
- O - 0,3s - CO - 15s - CO for motorised actuator
- O - 3 min - CO for manual actuator

Type designation

Examples:

	V12-630-20 F-BK	V24-1250-25 KUF
Vacuum circuit breaker	V	V
Rated current (12 kV or 24 kV)	12	24
Rated voltage (630 A or 1250 A)	630	1250
Rated short-circuit breaking current (kA)	20	25
Design for front-panel mounting (e.g. on switchgear truck)	F	F
- with coil-spring energy storage mechanism	BK	BK
Design for front-panel mounting (e.g. on switchgear truck)	F	F
- with coil-spring energy storage mechanism and suitable for auto-reclosing (ARC)	F	KU

Schematic diagram of release mechanism



Type	Rated current (A)	Rated voltage (V)	AC operation		DC operation		Part no.
			Consumption (VA)	Part no.	Rated voltage (V)	Consumption (W)	
• Shunt release							
ASA	-	-	-	-	12	56	772 04012
ASA	-	-	-	-	24	56	772 04024
ASA	-	-	-	-	48	88	772 04048
ASA	-	-	-	-	60	56	772 04060
ASA	-	100/110	105	772 03110	110	57	772 04110
ASA	-	230	110	772 03220	220	50	772 04220
• Under-voltage release							
RSA	-	-	-	-	24	10	772 05024
RSA	-	-	-	-	48	10	772 05048
RSA	-	100/110	19,5	772 05110	60	10	772 05060
RSA	-	-	-	-	110	10	772 05115
RSA	-	230	19,5	772 05220	220	10	772 05225
• Transformer-operated release							
WSA	0,5	-	18	772 06005	-	-	-
WSA	1,0	-	18	772 06010	-	-	-
WSA	5,0	-	18	772 06050	-	-	-

Motor-operated mechanism

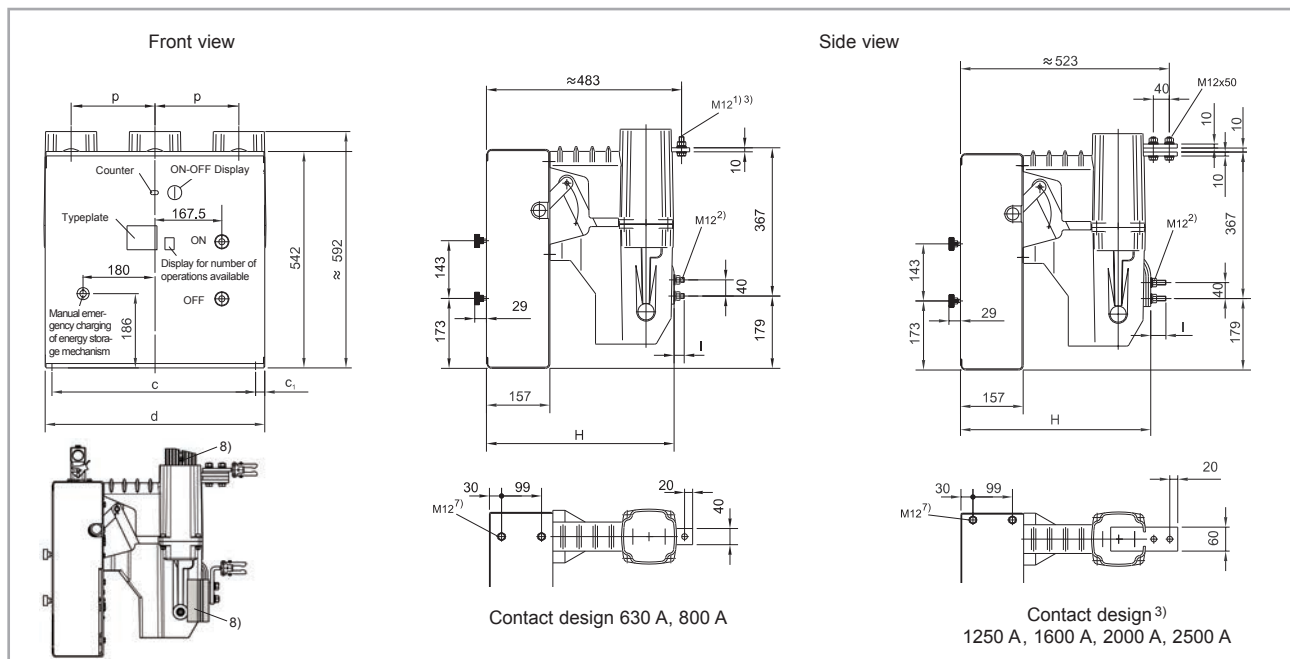
Motors can optionally be delivered for AC or DC systems.

The motors operate in short-time duty (S2).

The supply voltage should not deviate from the rated supply voltage by more than -15% to +10%.

Motor voltage (V)	Current input (A)	Consumption (VA)	Consumption (W)	Charging time (s)	Motor protection switch	
					..A	(A)
110 AC	2,2	242		8,2	2,5 - 4	2,5
230 AC	1,2	276		7,8	1 - 1,6	1
24 DC	8,8		211	9,3	6,3 - 10	9
48 DC	4,5		216	7,3	4 - 6,3	4,4
60 DC	4,5		270	5,7	4 - 6,3	4,6
110 DC	2,2		242	8,2	2,5 - 4	3
220 DC	1,3		286	8,8	1 - 1,6	1,1

Vacuum circuit-breaker Ur 12 kV



Type	Rated voltage	Rated current	Rated short circuit breaking current	Pole distance p (mm)	c	c ₁	d	H	I	Weight approx. (kg)	Part no. ⁴⁾	Drawing no.
V12-630-20 KUF	12 kV	630 A	20 kA	155 ⁶⁾	420	23	460	464,5	25	100	747 0400x	103293-001
V12-630-20 KUF	12 kV	630 A	20 kA	210	510	23	550	464,5	25	103	747 1400x	103294-001
V12-630-25 KUF	12 kV	630 A	25 kA	155 ⁶⁾	420	23	460	464,5	25	100	747 0401x	094237-001
V12-630-25 KUF	12 kV	630 A	25 kA	210	510	23	550	464,5	25	103	747 1401x	096848-001
V12-800-20 KUF	12 kV	800 A	20 kA	155 ⁶⁾	420	23	460	464,5	25	102	747 0410x	103295-001
V12-800-20 KUF	12 kV	800 A	20 kA	210	510	23	550	464,5	25	105	747 1410x	105151-001
V12-800-25 KUF	12 kV	800 A	25 kA	155 ⁶⁾	420	23	460	464,5	25	102	747 0411x	097092-001
V12-1250-20 KUF	12 kV	1250 A	20 kA	155 ⁶⁾	420	23	460	470,5	29	105	747 0420x	103296-001
V12-1250-20 KUF	12 kV	1250 A	20 kA	210	510	23	550	470,5	29	110	747 1420x	103297-001
V12-1250-25 KUF	12 kV	1250 A	25 kA	155 ⁶⁾	420	23	460	470,5	29	105	747 0421x	096849-001
V12-1250-25 KUF	12 kV	1250 A	25 kA	210	510	23	550	470,5	29	110	747 1421x	096850-001
V12-1600-31,5 KUF	12 kV	1600 A ⁸⁾	31,5 kA	250 ⁵⁾	500	60	620	482,5	38	110	747 2432x	119267-001
V12-2500-31,5 KUF	12 kV	2500 A ⁸⁾	31,5 kA	250 ⁵⁾	500	60	620	482,5	38	112	747 9152x	104762-001
V12-2500-40-BK-EA	12 kV	2500 A ⁸⁾	40 kA	250 ⁵⁾	500	60	620	477	36	130	747 2152x	117081-001

The vacuum circuit-breakers of **type KUF** listed here are equipped with a motor actuator and are suitable for auto-reclosing (ARC). All breakers are also available as **type F-BK**, manually operated circuit-breakers. All types are also available as 1-pole design.

1) hexagon bolt M12x40 (from 1600 A; M12x50) with nut, washer and lock washer

2) threaded pin (fixed) with nut, washer and lock washer

3) for 1250 A two connecting bolts and one connecting bar, from 1600 A two connecting bolts and two connecting bars!

4) the last digit of the part numbers indicates the respective motor voltage:

747 xxxx1 = 230 V AC

747 xxxx2 = 110 V AC

747 xxxx3 = 220 V DC

747 xxxx4 = 110 V DC

747 xxxx5 = 60 V DC

747 xxxx6 = 48 V DC

747 xxxx7 = 24 V DC

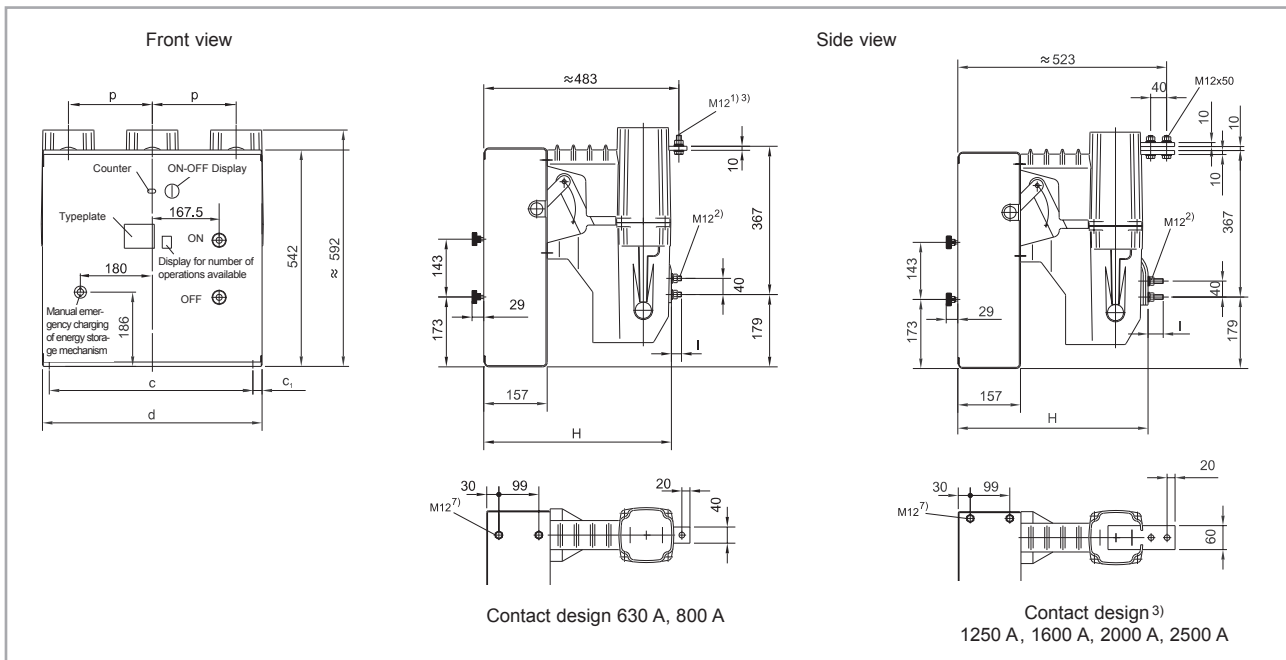
5) appropriate extra insulation is required

6) appropriate bar support is required

7) press-in nuts M12 at the top and bottom for mounting switchgear, refer also to c and c₁

8) for application in metal-encapsulated panels, are additional ventilation and cooling measures necessary

Vacuum circuit-breaker Ur 24 kV

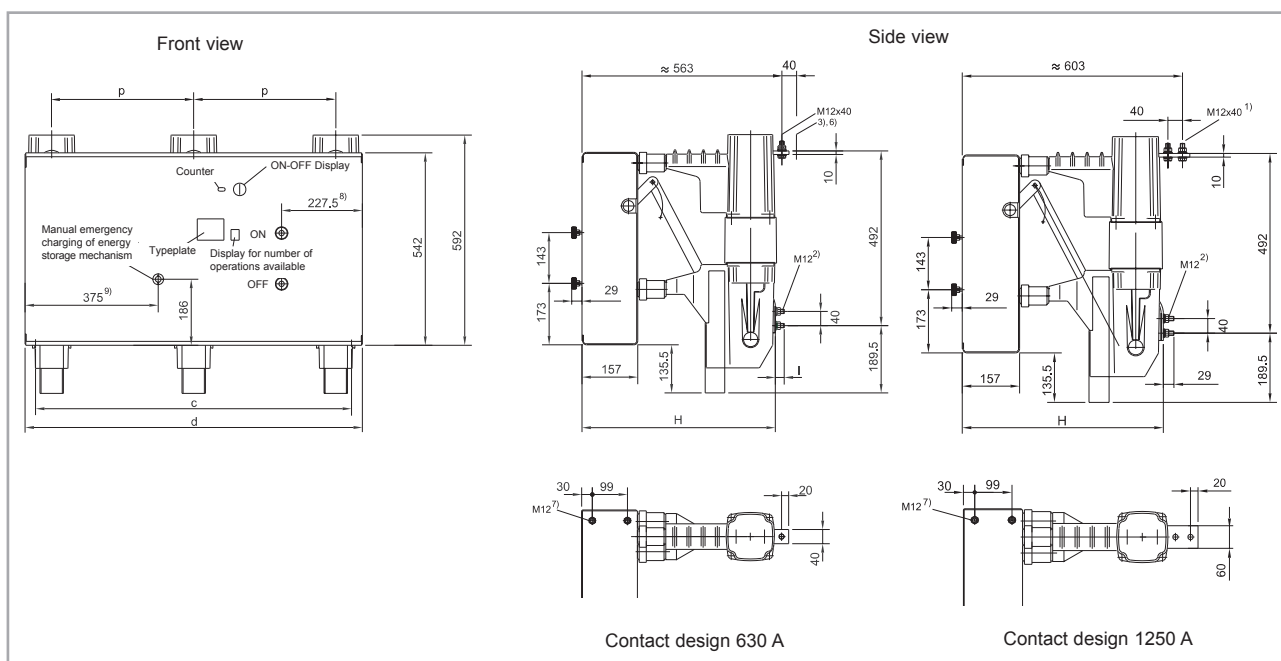


Type	Rated voltage	Rated current	Rated short circuit breaking current	Pole distance p (mm)	c	c ₁	d	H	l	Weihth approx. (kg)	Part no. ⁴⁾	Drawing no.
V24-630-20 KUF	24 kV	630 A	20 kA	225 ⁵⁾	540	23	580	464,5	25	107	747 3400x	103303-001
V24-630-20 KUF	24 kV	630 A	20 kA	250	500	60	620	464,5	25	110	747 4400x	103304-001
V24-630-20 KUF	24 kV	630 A	20 kA	275	640	20	680	464,5	25	113	747 5400x	103305-001
V24-630-25 KUF	24 kV	630 A	25 kA	225 ⁵⁾	540	23	580	464,5	25	107	747 3401x	096851-001
V24-630-25 KUF	24 kV	630 A	25 kA	250	500	60	620	464,5	25	110	747 4401x	096852-001
V24-630-25 KUF	24 kV	630 A	25 kA	275	640	20	680	464,5	25	113	747 5401x	096853-001
V24-800-20 KUF	24 kV	800 A	20 kA	225 ⁵⁾	640	23	580	470,5	29	109	747 3410x	103306-001
V24-800-20 KUF	24 kV	800 A	20 kA	250	540	60	620	476,5	38	112	747 4410x	103307-001
V24-800-25 KUF	24 kV	800 A	25 kA	225 ⁵⁾	640	23	580	476,5	38	109	747 3411x	096854-001
V24-800-25 KUF	24 kV	800 A	25 kA	250	540	60	620	476,5	38	112	747 4411x	096855-001
V24-1250-20 KUF	24 kV	1250 A	20 kA	225 ⁵⁾	540	23	580	470,5	29	113	747 3420x	103308-001
V24-1250-20 KUF	24 kV	1250 A	20 kA	250	500	60	620	470,5	29	118	747 4420x	103309-001
V24-1250-20 KUF	24 kV	1250 A	20 kA	275	640	20	680	470,5	29	123	747 5420x	103310-001
V24-1250-25 KUF	24 kV	1250 A	25 kA	225 ⁵⁾	540	23	580	470,5	29	113	747 3421x	096856-001
V24-1250-25 KUF	24 kV	1250 A	25 kA	250	500	60	620	470,5	29	118	747 4421x	096857-001
V24-1250-25 KUF	24 kV	1250 A	25 kA	275	640	20	680	470,5	29	123	747 5421x	096858-001
V24-1600-31,5 KUF	24 kV	1600 A ⁸⁾	31,5 kA	250	500	60	620	470,5	29	120	747 4432x	098808-001
V24-1600-31,5 KUF	24 kV	1600 A ⁸⁾	31,5 kA	275	640	20	680	476,5	23	125	747 5432x	098809-001
V24-2000-31,5 KUF	24 kV	2000 A ⁸⁾	31,5 kA	250	500	60	620	470,5	38	122	747 4442x	103312-001
V24-2000-31,5 KUF	24 kV	2000 A ⁸⁾	31,5 kA	275	640	20	680	476,5	38	127	747 5442x	098812-001
V24-2500-31,5 KUF	24 kV	2500 A ⁸⁾	31,5 kA	250	500	60	620	482,5	38	124	747 4452x	098811-001
V24-2500-31,5 KUF	24 kV	2500 A ⁸⁾	31,5 kA	275	640	20	680	470,5	38	129	747 5452x	103313-001

The vacuum circuit-breakers of **type KUF** listed here are equipped with a motor actuator and are suitable for auto-reclosing (ARC). All breakers are also available as **type F-BK**, manually operated circuit-breakers. All types are also available as 1-pole design.

Footnotes 1) to 8) see left side page 8

Vacuum circuit-breaker Ur 36 kV and 38,5 kV



Type	Rated voltage	Rated current	Rated short circuit breaking current	Pole distance p (mm)	c	d	H	I	Weight approx. (kg)	Part no. ⁴⁾	Drawing no.
V36-630-20 KUF	36 kV	630 A	20 kA	275 ⁵⁾	640	680	544,5	25	122	747 6403x	096859-001
V36-630-20 KUF	36 kV	630 A	20 kA	370 ⁵⁾	500	860	544,5	31	125	747 9356x	120382-002
V36-630-20 KUF	36 kV	630 A	20 kA	400	890	950	544,5	25	130	747 7403x	096861-001
V36-1250-20 KUF	36 kV	1250 A	20 kA	275 ⁵⁾	640	680	550,5	29	126	747 6423x	096860-001
V36-1250-20 KUF	36 kV	1250 A	20 kA	370 ⁵⁾	500	860	552	31	130	747 9323x	120382-001
V36-1250-20 KUF	36 kV	1250 A	20 kA	400	890	950	550,5	29	134	747 7423x	096862-001
V36-2500-31,5 KUF	see page 11										
V36-630-20 KUF	38,5 kV	630 A	20 kA	275 ⁵⁾	640	680	544,5	25	125	747 6402x	096863-001
V36-630-20 KUF	38,5 kV	630 A	20 kA	400	890	950	544,5	25	133	747 9403x	096865-001
V36-1250-20 KUF	38,5 kV	1250 A	20 kA	275 ⁵⁾	640	680	550,5	29	129	747 6422x	096864-001
V36-1250-20 KUF	38,5 kV	1250 A	20 kA	400	890	950	550,5	29	137	747 9423x	096866-001

The vacuum circuit-breakers of **type KUF** listed here are equipped with a motor actuator and are suitable for auto-reclosing (ARC). All breakers are also available as **type F-BK**, manually operated circuit-breakers. All types are also available as 1-pole design.

1) hexagon bolt M12x40 (from 1600 A; M12x50) with nut, washer and lock washer

2) threaded pin (fixed) with nut, washer and lock washer

3) for 1250 A two connecting bolts and one connecting bar, from 1600 A two connecting bolts and two connecting bars!

4) the last digit of the part numbers indicates the respective motor voltage:

747 xxxx1 = 230 V AC

747 xxxx2 = 110 V AC

747 xxxx3 = 220 V DC

747 xxxx4 = 110 V DC

747 xxxx5 = 60 V DC

747 xxxx6 = 48 V DC

747 xxxx7 = 24 V DC

5) appropriate extra insulation is required

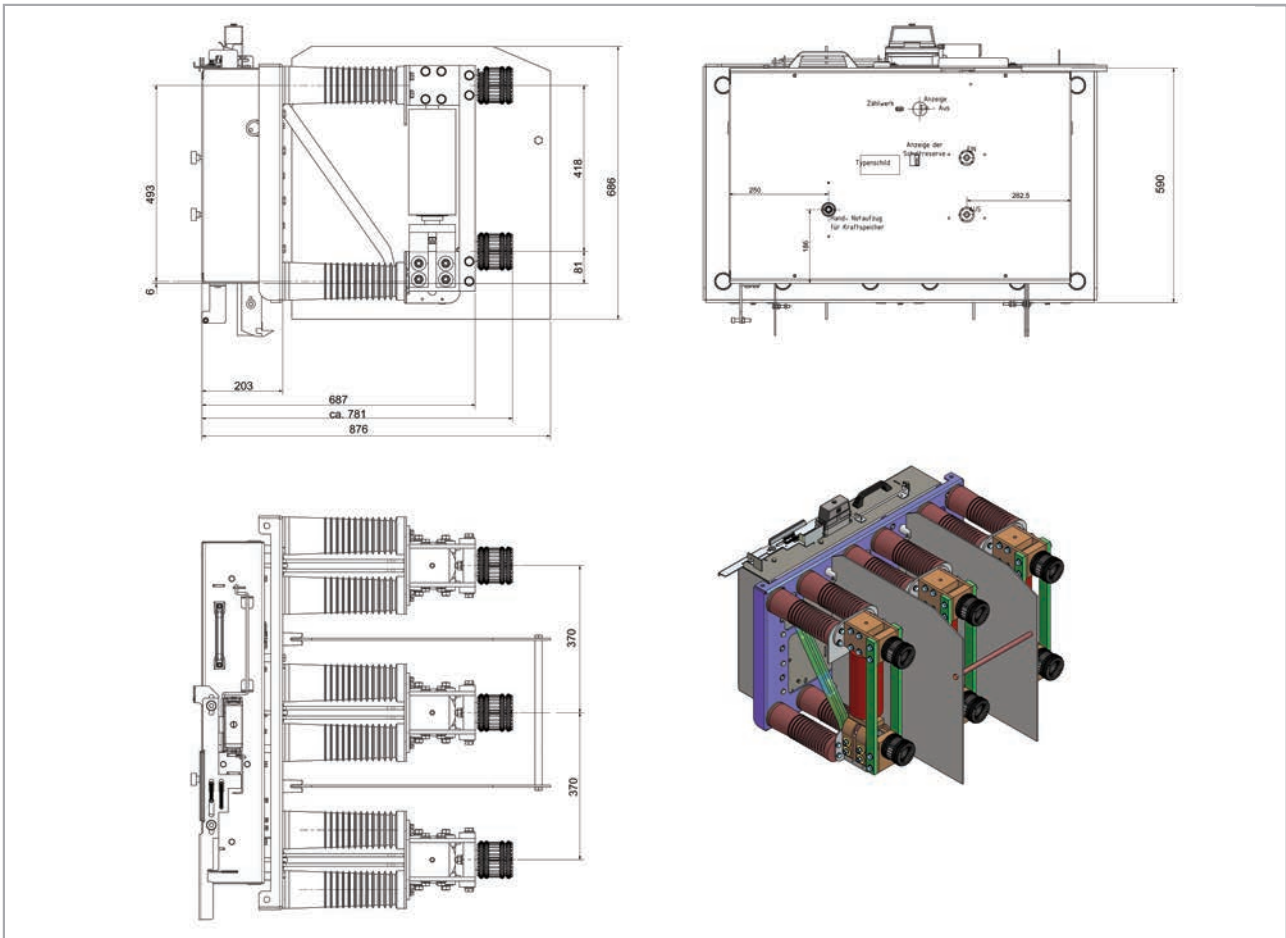
6) appropriate bar support is required

7) press-in nuts M12 at the top and bottom for mounting switchgear, refer also to c and c₁

8) for pole distance p=275; 172,5 mm

9) for pole distance p=275; 160 mm

Vacuum circuit-breaker V36-2500-31,5 KUF



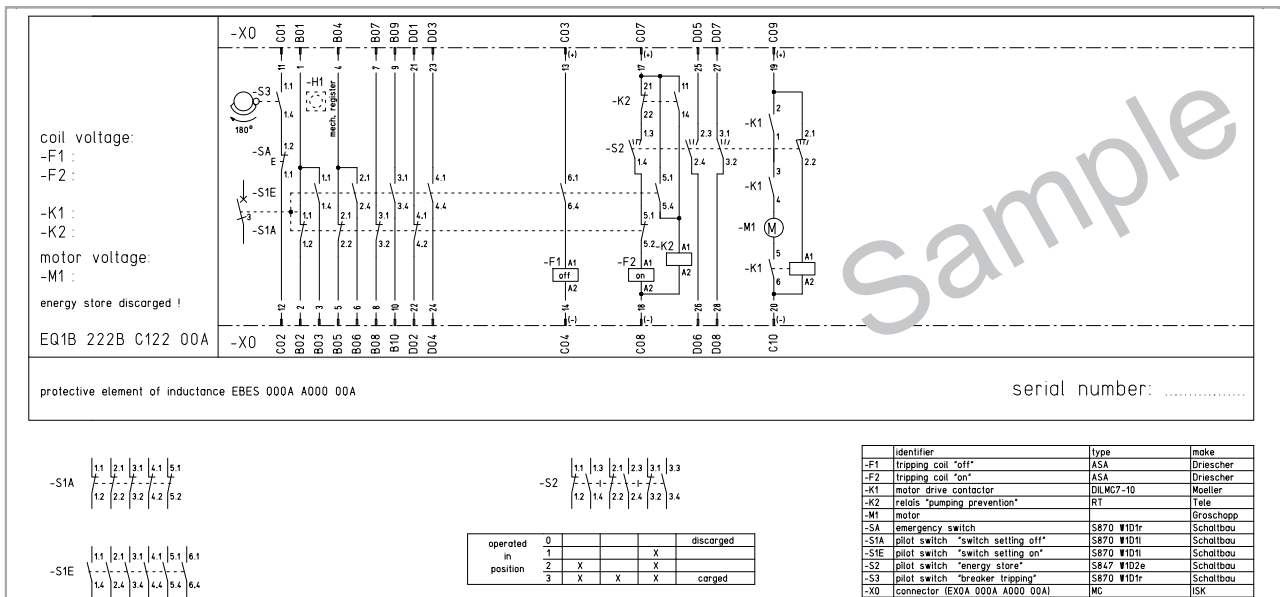
Type	Rated voltage	Rated current	Rated short circuit breaking current	Pole distance p in (mm)	Weight approx. (kg)	Part no.	Drawing no.
V36-2500-31,5 KUF ¹⁰⁾	36 kV	2500 A	31,5 kA	370 ^{5,6)}	300	747 93553	120216-001

5) appropriate extra insulation is required

6) appropriate bar support is required

10) with plug-in contacts 2500 A

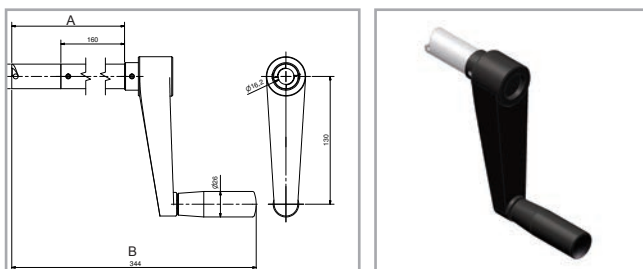
Sample wiring diagram



Accessories

The accessories for the vacuum circuit-breaker consists of a emergency hand-crank for the energy storage mechanism. More accessories for the application in switchgears,

for e.g. withdrawable trucks with and without motor actuator, auxiliary truck or service truck, can be find in *brochure 785*, switchpanels in withdrawable design Type WEL or E2K, E3K.



Part no.	A	B	Drawing no.	Application
770 60113	50	184	096793-001	integral mounting 12, 24, 36 kV
770 60114	210	344	096793-002	integral mounting 12, 24, 36 kV
770 60115	410	544	096793-003	withdrawable-unit design range 300 mm
770 60116	310	444	096793-004	withdrawable-unit design range 200 mm
770 60117	100	234	096793-005	integral mounting 36 and 38,5 kV



Dimensions, weights , diagrams and descriptions in the list are non-binding. Subject to change without notice.

STROM • SICHER • SCHALTEN

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