

VD4

Installation and service instructions 12 ... 40.5 kV - 630 ... 3150 A - 16 ... 50 kA



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I. For your safety!

- Make sure that the installation room (spaces, divisions and ambient) is suitable for the electrical apparatus.
- Check that all the installation, putting into service and maintenance operations are carried out by qualified personnel with suitable knowledge of the apparatus.
- Make sure that the standard and legal prescriptions are complied with during installation, putting into service and maintenance, so that installations according to the rules of good working practice and safety in the work place are constructed.
- Strictly follow the information given in this instruction manual.
- Check that the rated performance of the apparatus is not exceeded during service.
- Check that the personnel operating the apparatus have this instruction manual to hand as well as the necessary information for correct intervention.
- Pay special attention to the danger notes indicated in the manual by the following symbol:



Responsible behaviour safeguards your own and others' safety!
For any requests, please contact the ABB Assistance Service.

II. Introduction

This publication contains the information needed to install medium voltage VD4 circuit breakers and put them into service.

For correct use of the product, please read it carefully.

Like all the apparatus we manufacture, the VD4 circuit breakers are designed for different installation configurations.

However, this apparatus allows further technical-construction modifications (at the customer's request) to adapt to special installation requirements.

Consequently, the information given below may sometimes not contain instructions concerning special configurations.

Apart from this manual, it is therefore always

necessary to consult the latest technical documentation (electric circuit and wiring diagrams, assembly and installation drawings, any protection coordination studies, etc.), especially regarding any variants requested in relation to the standardised configurations.

Only use original spare parts for maintenance operations.

For further information, please also see the technical catalogue of the circuit breaker and the spare parts catalogue.



All the installation, putting into service, running and maintenance operations must be carried out by skilled personnel with in-depth knowledge of the apparatus.

III. Environmental protection programme

The VD4 circuit breakers are manufactured in accordance with the ISO 14000 Standards (Guidelines for environmental management). The production processes are carried out in compliance with the Standards for environmental

protection in terms of reduction in energy consumption as well as in raw materials and production of waste materials. All this is thanks to the medium voltage apparatus manufacturing facility environmental management system.



1. Packing and transport

The circuit breaker is shipped in special packing, in the open position and with the spring discharged. Each piece of apparatus is protected by a plastic cover to prevent any infiltration of water during the loading and unloading stages and to keep the dust off during storage.

2. Checking on receipt



Before carrying out any operation, always make sure that the operating mechanism spring is discharged and that the apparatus is in the open position.

On receipt, check the state of the apparatus, integrity of the packing and correspondence with the nameplate data (see fig. 1) with what is specified in the order confirmation and in the accompanying shipping note. Also make sure that all the materials described in the shipping note are included in the supply. Should any damage or irregularity be noted in the supply on unpacking, notify ABB (directly or through the agent or supplier) as soon as possible and in any case within five days of receipt. The apparatus is only supplied with the accessories specified at the time of ordering and validated in the order confirmation sent by ABB.

The accompanying documents inserted in the shipping packing are:

- instruction manual (this document)
- test certification
- identification label
- copy of the shipping documents
- electric wiring diagram.

Other documents which are sent prior to shipment of the apparatus are:

- order confirmation
- original shipping advice note
- any drawings or documents referring to special configurations/conditions.

A

1

3

4

7

B

5

ABB

Circuit breaker	IEC 62271-100
VD4	CEI 17-1
CLASSIFICATION	
SN	PR. YEAR
M MASS	kV
Ur	
ELECTRIC DIAGRAM	
FIG.	
OPERATING MECHANISM	
- MBO1 V	

Made by ABB

6

2

Caption

A Circuit breaker rating plate

B Operating mechanism rating plate

1 Type of apparatus

2 Symbols of compliance with Standards

3 Serial number

4 Circuit breaker characteristics

5 Characteristics of the operating mechanism auxiliaries

6 QR code

7 CMU power supply (VD4 evo only)

Fig. 1

3. Storage

When a period of storage is foreseen, our workshops can (on request) provide suitable packing for the specified storage conditions.

On receipt the apparatus must be carefully unpacked and checked as described in Checking on receipt (chap. 2).

If immediate installation is not possible, the packing must be replaced, using the original material supplied.

Insert packets of special hygroscopic substances inside the packing, with at least one standard packet for piece of apparatus.

Should the original packing not be available and immediate installation is not possible, store in a covered, well-ventilated, dry, dust-free, non-corrosive ambient, away from any easily flammable materials and at a temperature between -5°C and $+45^{\circ}\text{C}$.

In any case, avoid any accidental impacts or positioning which stresses the structure of the apparatus.

4. Handling

Before carrying out any operations, always make sure that the operating mechanism spring is discharged and that the apparatus is in the open position.

To lift and handle the circuit breaker, proceed as follows (fig. 2):

- use a special lifting tool (1) (not supplied) fitted with ropes with safety hooks (2);
- insert the hooks (2) in the supports (3) fixed to the frame of the circuit breaker and lift. Put the hooks (2) into the support holes (3) according to the type of apparatus (see table);
- on completion of the operation (and in any case before putting into service) unhook the lifting tool (1) and dismantle the supports (3) from the frame.

During handling, take great care not to stress the insulating parts and the terminals of the circuit breaker.



The apparatus must not be handled by putting lifting devices directly under the apparatus itself.

Should it be necessary to use this technique, put the circuit breaker onto a pallet or a sturdy supporting surface (see fig. 3).

In any case, it is always advisable to carry out lifting using the supports (3).

Version	Pole centre distance	Rated current	Hole
Fixed	150-210 mm	up to 1250 A	A
Fixed	275 mm	from 1600 to 3150 A	A
Fixed	210 mm	from 1600 to 2000 A	A
Fixed	210-275 mm	up to 4000 A	C
Withdrawable	150 mm	up to 1250 A	A
Withdrawable	210 mm	from 1600 to 2500 A	B
Withdrawable	275 mm	up to 1250 A	B
Withdrawable	275 mm	from 1600 to 3150 A	C
Withdrawable	210 mm	up to 1250 A	C
Withdrawable	210-275 mm	up to 4000 A	C

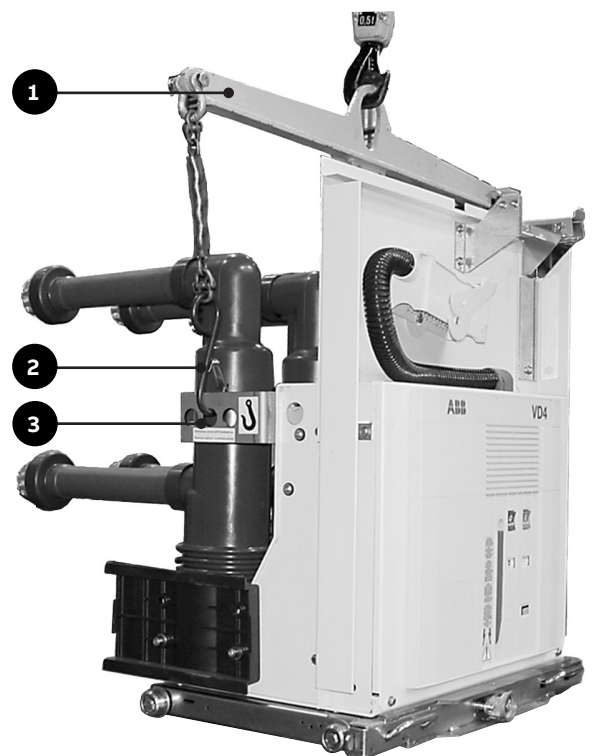


Fig. 2

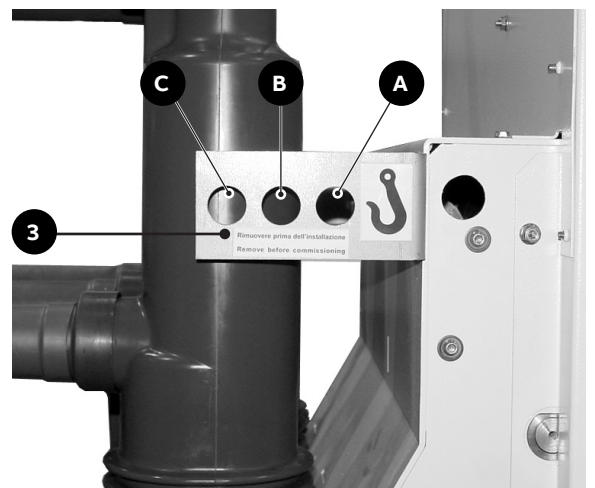


Fig. 2a Lifting support

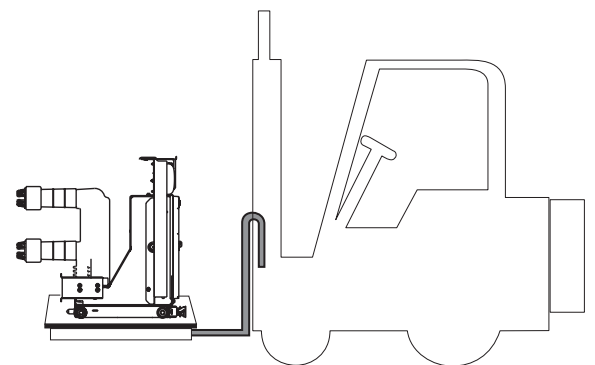


Fig. 3

5. Description

5.1. General

The VD4 are vacuum circuit breaker for indoor installation.

For the electrical performances, please refer to the corresponding technical catalogue code 1VCP000001.

For special installation requirements, please contact ABB.

The following versions are available:

- fixed
- withdrawable for UniGear ZS1 switchgear and PowerCube modules.

5.2. Reference Standards

The VD4 circuit breakers conform to the IEC 62271-100, CEI - VDE - BS Standards are equivalent to IEC Standards due to harmonization with IEC.

Some ratings are qualified also according to ANSI/IEEE standards.

5.3. EL operating mechanism

VD4 circuit breakers are equipped with modular EL spring operating mechanisms. The operating mechanism is designed to cover the whole range of performances as shown in the following table:

Type of operating mechanism	Rated short-circuit current
EL1 - EL2	Up to 31.5 kA
EL3 - EL3	Up to 40 kA - 24 kV, 31.5 kA
EL3 - EL3-S	40.5 kV up to 31.5 kA 40 kA up to 17.5 kV
EL1 TWIN	Up to 50 kA (rated current up to 2000 A)
EL2 TWIN	Up to 50 kA (rated current ≥ 2500 A)

5.4. VD4 evo

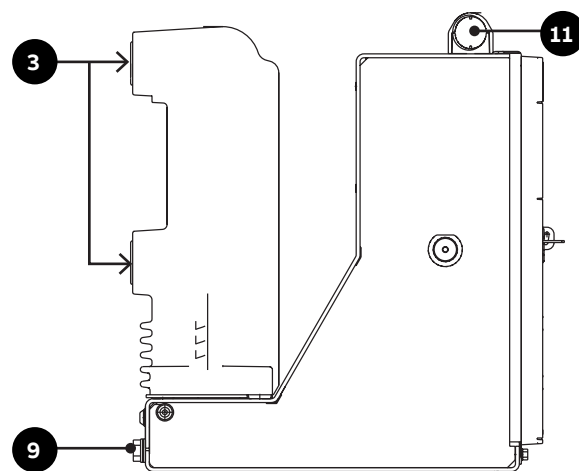
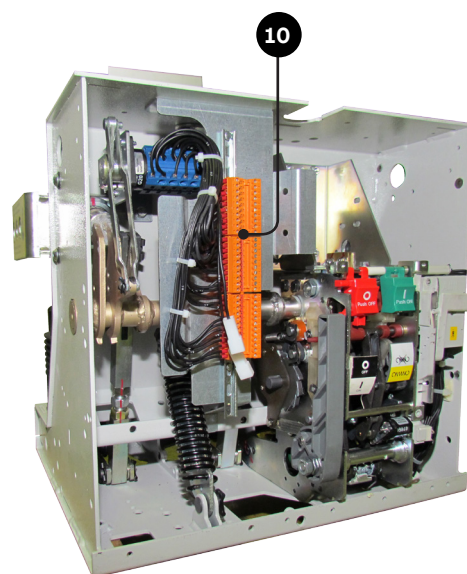
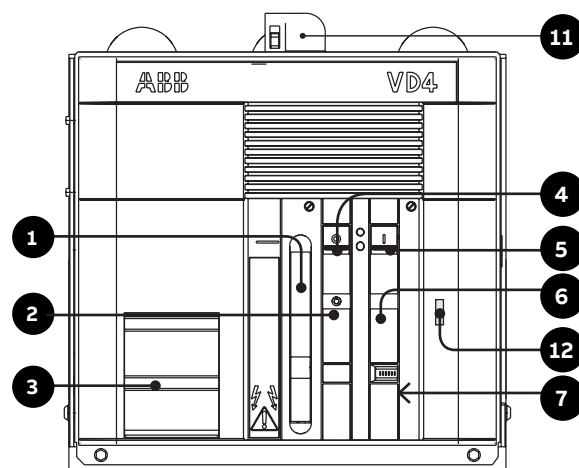
VD4 evo available with digital capabilities and sensors.

5.5. Fixed circuit breakers

The fixed circuit breaker (fig. 4) is the basic version complete with structure and front protection screen. The fixing holes are made in the lower part of the structure.

For the electrical connections of the circuit breaker auxiliary circuits, the terminal box (10) is available (also see par. 7.8.1.).

The earthing screw is placed in the rear part of the circuit breaker. For further details please see the caption to figure 4.



Caption

- 1 Lever for manual closing spring charging
- 2 Signalling device for circuit breaker open/closed
- 3 Rating plate
- 4 Opening pushbutton
- 5 Closing pushbutton
- 6 Signalling device for closing spring charged/discharged
- 7 Operation counter
- 8 Terminals
- 9 Earthing screw
- 10 Delivery terminal box
- 11 Cabling connection
- 12 Mechanical override of the undervoltage release (on request)

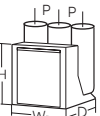
Fig. 4

5. Description

5.5.1. General characteristics of fixed circuit breakers

General characteristics of fixed circuit breakers (12 kV)



Circuit breaker		VD4 12						
Standards	IEC 62271-100	•						
Rated voltage	Ur [kV]	12 ⁽²⁾						
Rated insulation voltage	Us [kV]	12						
Withstand voltage at 50 Hz	Ud (1 min) [kV]	28						
Impulse withstand voltage	Up [kV]	75						
Rated frequency	fr [Hz]	50-60						
Rated normal current (40 °C)	Ir [A]	630	630	630	1250	1250	1250	1250 ⁽⁵⁾
Rated breaking capacity (rated short-circuit breaking current symmetrical)	Isc [kA]	16	16	16	16	16	16	–
		20	20	20	20	20	20	–
		25	25	25	25	25	25	–
		31.5	31.5	31.5	31.5	31.5	31.5	–
		–	–	–	–	–	–	40 ⁽⁵⁾
		–	–	–	–	–	–	–
		–	–	–	–	–	–	–
Rated short-time withstand current (3s)	Ik [kA]	16	16	16	16	16	16	–
		20	20	20	20	20	20	–
		25	25	25	25	25	25	–
		31.5	31.5	31.5	31.5	31.5	31.5	–
		–	–	–	–	–	–	40 ⁽⁵⁾
		–	–	–	–	–	–	–
		–	–	–	–	–	–	–
Making capacity	Ip [kA]	40	40	40	40	40	40	–
		50	50	50	50	50	50	–
		63	63	63	63	63	63	–
		80	80	80	80	80	80	–
		–	–	–	–	–	–	104 ⁽⁵⁾
		–	–	–	–	–	–	–
		–	–	–	–	–	–	–
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•						
	[O - 0.3 s - CO - 3 min - CO]	–	–	–	–	–	–	–
Opening time	[ms]	33 ... 60						
Arcing time	[ms]	10 ... 15						
Total breaking time	[ms]	43 ... 75						
Closing time	[ms]	30 ... 60						
<div></div> Maximum overall dimensions	H [mm]	461	461	461	461	461	461	589
	W [mm]	450	570	700	450	570	700	450
	D [mm]	424	424	424	424	424	424	424
	Pole distance P [mm]	150	210	275	150	210	275	150
Weight	[kg]	73	75	79	73	75	79	81
Standardised table of dimensions	TN	7405 ⁽¹⁾	7406 ⁽¹⁾	–	7405 ⁽¹⁾	7406 ⁽¹⁾	–	2RDA043108
	1VCD	–	–	000051 ⁽¹⁾	–	–	000051 ⁽¹⁾	
Operating temperature	[°C]	- 5 ... + 40						
Tropicalization	IEC: 60068-2-30, 60721-2-1	•						
Electromagnetic compatibility	IEC: 62271-1	•						

⁽¹⁾ Poles in polyamide

⁽²⁾ Available in 10 kV voltage version in accordance with GOST standards up to 50 kA

⁽³⁾ Up to 4000 A with forced ventilation

⁽⁴⁾ On request, the closing spring can be loaded by means of a removable crank handle outside operating mechanism (instead of linear loading by a lever built into the front of operating mechanism)

⁽⁵⁾ Available in VD4 evo only

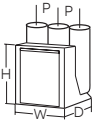
*) Consult ABB for the 4000 A version with natural ventilation

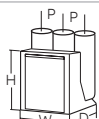
VD4 12								
•								
12 (°)								
12								
28								
75								
50-60								
1250	1250	1250	1250	1250	1600	1600	1600	1600
–	–	–	–	–	–	–	–	–
–	–	–	–	–	20	20	20	–
–	–	–	–	–	25	25	25	–
–	–	–	–	–	31.5	31.5	31.5	–
40	40	–	–	–	–	–	–	40
–	–	50	50	–	–	–	–	–
–	–	–	–	63	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	–	–	–	20	20	20	–
–	–	–	–	–	25	25	25	–
–	–	–	–	–	31.5	31.5	31.5	–
40	40	–	–	–	–	–	–	40
–	–	50	50	–	–	–	–	–
–	–	–	–	63	–	–	–	–
–	–	–	–	–	–	–	–	–
–	–	–	–	–	50	50	50	–
–	–	–	–	–	63	63	63	–
–	–	–	–	–	80	80	80	–
100	100	–	–	–	–	–	–	100
–	–	125	125	–	–	–	–	–
–	–	–	–	158	–	–	–	–
•								
–	–	–	–	–	–	–	┌	–
33 ... 60				≤45	33 ... 60			
10 ... 15				≤15	10 ... 15			
43 ... 75				≤60	43 ... 75			
30 ... 60				approx. 60	30 ... 60			
589	589	610	610	677.5	599	599	599	589
570	700	600	750	750	450	570	700	570
424	424	459	459	459	424	424	424	424
210	275	210	275	275	150	210	275	210
84	84	146	158	265	93	98	105	84
–	–	–	–	–	–	7407 (°)	7408 (°)	–
003282(°)	003285(°)	003440	003441	GCEM370562	000050	–	–	003282(°)
- 5 ... + 40								
•								
•								

5. Description

General characteristics of fixed circuit breakers (12 kV)



Circuit breaker		VD4 12						
Standards	IEC 62271-100	•						
Rated voltage	Ur [kV]	12 (°)						
Rated insulation voltage	Us [kV]	12						
Withstand voltage at 50 Hz	Ud (1 min) [kV]	28						
Impulse withstand voltage	Up [kV]	75						
Rated frequency	fr [Hz]	50-60						
Rated normal current (40 °C)	Ir [A]	1600	1600	1600	1600	2000	2000	
Rated breaking capacity (rated short-circuit breaking current symmetrical)	Isc [kA]	–	–	–	–	–	–	
		–	–	–	–	20	20	
		–	–	–	–	25	25	
		–	–	–	–	31.5	31.5	
		40	–	–	–	40	40	
		–	50	50	–	–	–	
		–	–	–	63	–	–	
Rated short-time withstand current (3s)	Ik [kA]	–	–	–	–	–	–	
		–	–	–	–	20	20	
		–	–	–	–	25	25	
		–	–	–	–	31.5	31.5	
		40	–	–	–	40	40	
		–	50	50	–	–	–	
		–	–	–	63	–	–	
Making capacity	Ip [kA]	–	–	–	–	–	–	
		–	–	–	–	50	50	
		–	–	–	–	63	63	
		–	–	–	–	80	80	
		100	–	–	–	100	100	
		–	125	125	–	–	–	
		–	–	–	158	–	–	
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	–	•	•	
	[O - 0.3 s - CO - 3 min - CO]	–	–	–	•	–	–	
Opening time	[ms]	33...60			≤45	33...60		
Arcing time	[ms]	10...15			≤15	10...15		
Total breaking time	[ms]	43...75			≤60	43...75		
Closing time	[ms]	30...60			approx. 60	30...60		
Maximum overall dimensions		H [mm]	589	610	610	677.5	599	599
		W [mm]	700	600	750	750	570	700
		D [mm]	424	459	459	459	424	424
		Pole distance P [mm]	275	210	275	265	210	275
Weight	[kg]	84	146	158	265	98	105	
Standardised table of dimensions	TN	–	–	–	–	7407 (¹)	7408 (¹)	
	1VCD	003285(¹)	003440	003441	GCEM370562	–	–	
Operating temperature	[°C]	- 5 ... + 40						
Tropicalization	IEC: 60068-2-30, 60721-2-1	•						
Electromagnetic compatibility	IEC: 62271-1	•						



⁽¹⁾ Poles in polyamide

⁽²⁾ Available in 10 kV voltage version in accordance with GOST standards up to 50 kA

⁽³⁾ Up to 4000 A with forced ventilation

⁽⁴⁾ On request, the closing spring can be loaded by means of a removable crank handle outside operating mechanism (instead of linear loading by a lever built into the front of operating mechanism)

^{*} Consult ABB for the 4000 A version with natural ventilation

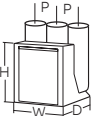
VD4 12								
•								
12 (²)								
12								
28								
75								
50-60								
2000	2000	2000	2500	2500	2500	2500	3150 (³)	3150 (³)
–	–	–	–	–	–	–	–	–
–	–	–	20	20	–	–	20	–
–	–	–	25	25	–	–	25	–
–	–	–	31.5	31.5	–	–	31.5	–
–	–	–	40	40	–	–	40	–
50	50	–	–	–	50	–	–	50
–	–	63	–	–	–	63		
–	–	–	–	–	–	–	–	–
–	–	–	20	20	–	–	20	–
–	–	–	25	25	–	–	25	–
–	–	–	31.5	31.5	–	–	31.5	–
–	–	–	40	40	–	–	40	–
50	50	–	–	–	50	–	–	50
–	–	63	–	–	–	63	–	–
–	–	–	–	–	–	–	–	–
–	–	–	50	50	–	–	50	–
–	–	–	63	63	–	–	63	–
–	–	–	80	80	–	–	80	–
–	–	–	100	100	–	–	100	–
125	125	–	–	–	125	–	–	125
–	–	158	–	–	–	158	–	–
•	•	–	•	•	•	–	•	•
–	–	•	–	–	–	•	–	–
		≤45	33...60			≤45	33...60	
		≤15	10...15			≤15	10...15	
		≤60	43...75			≤60	43...75	
		approx. 60	30...60			approx. 60	30...60	
610	610	677.5	599	599	610	677.5	635	636
600	750	750	570	700	750	750	700	750
459	459	459	424	424	459	459	424	459
210	275	275	210	275	275	275	275	275
146	158	265	98	105	163	265	140	177
–	–	–	7407 (¹)	7408 (¹)	–	–	–	–
003440	003441	GCEM370562	–	–	003441	GCEM370562	000149 (¹)	003443
- 5 ... + 40								
•								
•								



5. Description

General characteristics of fixed circuit breakers (15kV)

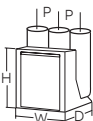


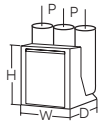
Circuit breaker		VD4/N 15		VD4 15		
Standard	IEEE C37.04	•		•		
Rated voltage	[kV]	15		15		
Rated frequency	[Hz]	60		50/60		
Short-circuit breaking current I _{sc}	[kA]	31.5		40		
Rated current I _r	[A]	1200	2000	1200	2000	
Short-time withstand current	[A]	31.5		40		
Short circuit withstand	[A]	3		2		
Close and latch capability	[kA]	82		104		
Operation sequence	[O - 0,3 s - CO - 3 min - CO]	•		•		
% DC component	[%]	40		30		
Interrupting time	[ms]	50		50		
Closing time	[ms]	30...60		30...60		
Mechanical endurance class	[M2]	10k		10k		
Lightning impulse withstand voltage U _p	[kV]	95		95		
Power frequency withstand voltage U _d	[kV]	36		36		
Operating temperature	[°C]	-5...+40		-20...+40		
<div><div>Maximum overall dimensions</div><div></div></div>	Height	[mm]	461	599	599	
	Width	[mm]	450	570	570	
	Depth	[mm]	424	424	424	
	Pole distance	[mm]	150	210	210	
Standard table of dimensions		TN	7407	7405	7407	
Weight		[kg]	73	80	75	

5. Description

General characteristics of fixed circuit breakers (17.5 kV)



Circuit breaker		VD4 17											
Standards	IEC 62271-100 •												
	VDE 0671; CEI EN 62271-100 File 7642 •												
Rated voltage	Ur [kV]	17.5											
Rated insulation voltage	Us [kV]	17.5											
Withstand voltage at 50 Hz	Ud (1 min) [kV]	38											
Impulse withstand voltage	Up [kV]	95											
Rated frequency	fr [Hz]	50-60											
Rated normal current (40 °C)	Ir [A]	630	630	630	1250	1250	1250	1250	1250	1250	1250	1250 (²)	
		16	16	16	16	16	16	-	-	-	-	-	
		20	20	20	20	20	20	-	-	-	-	-	
		25	25	25	25	25	25	-	-	-	-	-	
		31.5	31.5	31.5	31.5	31.5	31.5	-	-	-	-	-	
		-	-	-	-	-	-	40	40	-	-	40 (²)	
Rated breaking capacity (rated short-circuit breaking current symmetrical)	Isc [kA]	-	-	-	-	-	-	-	-	50	50	-	
		16	16	16	16	16	16	-	-	-	-	-	
		20	20	20	20	20	20	-	-	-	-	-	
		25	25	25	25	25	25	-	-	-	-	-	
		31.5	31.5	31.5	31.5	31.5	31.5	-	-	-	-	-	
		-	-	-	-	-	-	40	40	-	-	40 (²)	
Rated short-time withstand current (3s)	Ik [kA]	-	-	-	-	-	-	-	-	50	50	-	
		16	16	16	16	16	16	-	-	-	-	-	
		20	20	20	20	20	20	-	-	-	-	-	
		25	25	25	25	25	25	-	-	-	-	-	
		31.5	31.5	31.5	31.5	31.5	31.5	-	-	-	-	-	
		-	-	-	-	-	-	40	40	-	-	40 (²)	
Making capacity	Ip [kA]	-	-	-	-	-	-	-	-	50	50	-	
		40	40	40	40	40	40	-	-	-	-	-	
		50	50	50	50	50	50	-	-	-	-	-	
		63	63	63	63	63	63	-	-	-	-	-	
		80	80	80	80	80	80	-	-	-	-	-	
		-	-	-	-	-	-	100	100	-	-	104 (²)	
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•	•	•	•	•	•	•	
	Opening time	[ms]	33 ... 60										
Arcing time	[ms]	10 ... 15											
Total breaking time	[ms]	43 ... 75											
Closing time	[ms]	30 ... 60											
Maximum overall dimensions		H [mm]	461	461	461	461	461	461	589	589	610	610	589
		W [mm]	450	570	700	450	570	700	570	700	600	750	450
		D [mm]	424	424	424	424	424	424	424	424	459	459	424
		Pole distance P [mm]	150	210	275	150	210	275	210	275	210	275	150
Weight	[kg]	73	75	79	73	75	79	84	84	146	158	81	
Standardised table of dimensions	TN	7405 (¹)	7406 (¹)	-	7405 (¹)	7406 (¹)	-	-	-	-	-	2RDA043108	
	1VCD	-	-	000051 (¹)	-	-	000051 (¹)	003282 (¹)	003285 (¹)	003440	003441		
Operating temperature	[°C]	- 5 ... + 40											
Tropicalization	IEC: 60068-2-30, 60721-2-1 •												
Electromagnetic compatibility	IEC: 62271 •												



(°) Poles in polyamide

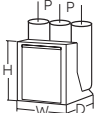
(°) Available in VD4 evo only

VD4 17														
•														
•														
17.5														
17.5														
38														
95														
50-60														
1600	1600	1600	1600	1600	1600	2000	2000	2000	2000	2500	2500	2500	3150	3150
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	20	-	-	-	-	20	20	-	-	20	20	-	20	-
25	25	-	-	-	-	25	25	-	-	25	25	-	25	-
31.5	31.5	-	-	-	-	31.5	31.5	-	-	31.5	31.5	-	31.5	-
-	-	40	40	-	-	40	40	-	-	-	40	-	40	-
-	-	-	-	50	50	-	-	50	50	-	-	50	-	50
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	20	-	-	-	-	20	20	-	-	20	20	-	20	-
25	25	-	-	-	-	25	25	-	-	25	25	-	25	-
31.5	31.5	-	-	-	-	31.5	31.5	-	-	31.5	31.5	-	31.5	-
-	-	40	40	-	-	40	40	-	-	-	40	-	40	-
-	-	-	-	50	50	-	-	50	50	-	-	50	-	50
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	50	-	-	-	-	50	50	-	-	50	50	-	50	-
63	63	-	-	-	-	63	63	-	-	63	63	-	63	-
80	80	-	-	-	-	80	80	-	-	80	80	-	80	-
-	-	100	100	-	-	100	100	-	-	-	100	-	100	-
-	-	-	-	125	125	-	-	125	125	-	-	125	-	125
•	•	•	•	•	•	•	•	•	•	•	•	•	•	-
33 ... 60														
10 ... 15														
43 ... 75														
30 ... 60														
599	599	589	589	610	610	599	599	610	610	599	599	610	635	636
570	700	570	700	600	750	570	700	600	750	570	700	750	700	750
424	424	424	424	459	459	424	424	459	459	424	424	459	424	459
210	275	210	275	210	275	210	275	210	275	210	275	275	275	275
98	105	84	84	146	158	98	105	146	158	98	105	163	140	177
7407 (¹)	7408 (¹)	-	-	-	-	7407 (¹)	7408 (¹)	-	-	7407 (¹)	7408 (¹)	-	-	-
-	-	003282 (¹)	003285 (¹)	003440	003441	-	-	003440	003441	-	-	003441	000149 (¹)	003443
- 5 ... + 40														
•														
•														

5. Description

General characteristics of fixed circuit breakers (24 kV)

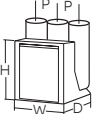


Circuit breaker		VD4 24							
Standards		IEC 62271-100 • VDE 0671; CEI EN 62271-100 File 7642 •							
Rated voltage		Ur [kV]	24						
Rated insulation voltage		Us [kV]	24						
Withstand voltage at 50 Hz		Ud (1 min) [kV]	50						
Impulse withstand voltage		Up [kV]	125						
Rated frequency		fr [Hz]	50-60						
Rated normal current (40 °C)		Ir [A]	630	630	1250	1250	1600	2000	2500
Rated breaking capacity (rated short-circuit breaking current symmetrical)		Isc [kA]	16	16	16	16	16	16	–
			20	20	20	20	20	20	–
			25	25	25	25	25	25	25
			–	–	31.5	–	31.5	31.5	31.5
Rated short-time withstand current (3s)		Ik [kA]	16	16	16	16	16	16	–
			20	20	20	20	20	20	–
			25	25	25	25	25	25	25
			–	–	31.5	–	31.5	31.5	31.5
Making capacity		Ip [kA]	40	40	40	40	40	40	–
			50	50	50	50	50	50	–
			63	63	63	63	63	63	63
			–	–	80	–	80	80	80
Operation sequence		[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•	•	•
Opening time		[ms]	33 ... 60						
Arcing time		[ms]	10 ... 15						
Total breaking time		[ms]	43 ... 75						
Closing time		[ms]	30 ... 60						
<div></div>		H [mm]	631	631	631	631	642	642	642
		W [mm]	570	700	570	700	700	700	700
		D [mm]	424	424	424	424	424	424	424
		Pole distance P [mm]	210	275	210	275	275	275	275
Weight		[kg]	100	104	100/106 ⁽¹⁾	104	110	110	110
Standardised table of dimensions		TN	7409	7410	7409	7410	7411	7411	7411
		1VCD	–	–	000172 ⁽¹⁾	–	–	–	–
Operating temperature		[°C]	- 5 ... + 40						
Tropicalization		IEC: 60068-2-30, 60721-2-1 •							
Electromagnetic compatibility		IEC: 62271-1 •							

⁽¹⁾ 31.5 kA version.

General characteristics of fixed circuit breakers (36 kV)

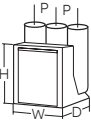


Circuit breaker		VD4 36			
Standards	IEC 62271-100	•			
Rated voltage	Ur [kV]	36			
Rated insulation voltage	Us [kV]	36			
Withstand voltage at 50 Hz	Ud (1 min) [kV]	70			
Impulse withstand voltage	Up [kV]	170			
Rated frequency	fr [Hz]	50			
Rated normal current (40 °C)	Ir [A]	1250	1600	2000	2500
		20	20	20	20
		25	25	25	25
		31.5	31.5	31.5	31.5
Rated breaking capacity (rated short-circuit breaking current symmetrical)	Isc [kA]	20	20	20	20
		25	25	25	25
		31.5	31.5	31.5	31.5
		40	40	40	40
Rated short-time withstand current (3s)	Ik [kA]	20	20	20	20
		25	25	25	25
		31.5	31.5	31.5	31.5
		40	40	40	40
Making capacity	Ip [kA]	63	63	63	63
		80	80	80	80
		100	100	100	100
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•			
Opening time	[ms]	35 ... 60			
Arcing time	[ms]	5 ... 15			
Total breaking time	[ms]	40 ... 75			
Closing time	[ms]	50 ... 65			
Maximum overall dimensions		H [mm]	884	884	884
		W [mm]	796	796	796
		D [mm]	501	501	501
		Pole distance P [mm]	275	275	275
Weight	[kg]	170	170	170	210
Standardised table of dimensions	TN	1VYN300901-RF	1VYN300901-RF	1VYN300901-RF	1VYN300901-RF
Operating temperature	[°C]	- 5 ... + 40			
Tropicalization	IEC: 60068-2-30, 60721-2-1	•			
Electromagnetic compatibility	IEC: 62271-1	•			

5. Description

General characteristics of fixed circuit breakers (40.5 kV)



Circuit breaker		VD4 40.5			
Standards	IEC 62271-100	• (1)			
Rated voltage	Ur [kV]	40.5			
Rated insulation voltage	Us [kV]	40.5			
Withstand voltage at 50 Hz	Ud (1 min) [kV]	95			
Impulse withstand voltage	Up [kV]	190			
Rated frequency	fr [Hz]	50			
Rated normal current (40 °C)	Ir [A]	1250	1600	2000	
		20	20	20	
		25	25	25	
		31.5	31.5	31.5	
Rated breaking capacity (rated short-circuit breaking current symmetrical)	Isc [kA]	20	20	20	
		25	25	25	
		31.5	31.5	31.5	
		50	50	50	
Rated short-time withstand current (3s)	Ik [kA]	25	25	25	
		31.5	31.5	31.5	
		50	50	50	
		80	80	80	
Making capacity	Ip [kA]	63	63	63	
		80	80	80	
Operation sequence	[O - 0.3 s - CO - 3 min - CO]	•	•	•	
Opening time	[ms]	35 ... 60	35 ... 60	35 ... 60	
Arcing time	[ms]	10 ... 15	10 ... 15	10 ... 15	
Total breaking time	[ms]	45 ... 75	45 ... 75	45 ... 75	
Closing time	[ms]	50 ... 65	50 ... 65	50 ... 65	
Maximum overall dimensions		H [mm]	884	884	
		W [mm]	796	796	
		D [mm]	501	501	
		Pole distance P [mm]	275	275	
Weight	[kg]	170	170	170	
Standardised table of dimensions	TN	2RDA043326A001	2RDA043326A001	2RDA043326A001	
Operating temperature	[°C]	- 20 ... + 40			
Tropicalization	IEC: 60068-2-30, 60721-2-1	•			
Electromagnetic compatibility	IEC: 62271-1	•			

⁽¹⁾ GOST version available on request.

5.5.2. Types of circuit breakers available in the fixed version

VD4 fixed circuit breaker without bottom and top terminals (12 kV)

Ur	Isc	Rated uninterrupted current (40°C) [A]												Circuit breaker type									
kV	kA	H=461				H=589				H=599					H=610		H=636		H=589				
		D=424				D=424				D=424					D=459		D=459		D=424				
		u/l=205				u/l=310				u/l=310					u/l=310		u/l=310		u/l=310				
		l/g=217.5				l/g=238				l/g=237.5					l/g=237		l/g=237		l/g=237.5				
		P=150		P=210		P=275		P=210		P=275		P=150			P=210		P=275		P=275		P=150		
		W=450		W=570		W=700		W=570		W=700		W=450			W=570		W=700		W=600		W=750		W=750
12	16	630												VD4 12.06.16 p150									
	20	630												VD4 12.06.20 p150									
	25	630												VD4 12.06.25 p150									
	31.5	630												VD4 12.06.32 p150									
	16	1250												VD4 12.12.16 p150									
	20	1250												VD4 12.12.20 p150									
	25	1250												VD4 12.12.25 p150									
	31.5	1250												VD4 12.12.32 p150									
	40												1250	VD4 12.12.40 p150									
	20													1600	VD4 12.16.20 p150								
	25													1600	VD4 12.16.25 p150								
	31.5													1600	VD4 12.16.32 p150								
	16	630												VD4 12.06.16 p210									
	20	630												VD4 12.06.20 p210									
	25	630												VD4 12.06.25 p210									
	31.5	630												VD4 12.06.32 p210									
	16	1250												VD4 12.12.16 p210									
	20	1250												VD4 12.12.20 p210									
	25	1250												VD4 12.12.25 p210									
	31.5	1250												VD4 12.12.32 p210									
	40	1250												VD4 12.12.40 p210									
	50													1250	VD4 12.12.50 p210								
	20													1600	VD4 12.16.20 p210								
	25													1600	VD4 12.16.25 p210								
	31.5													1600	VD4 12.16.32 p210								
	40	1600												VD4 12.16.40 p210									
	50													1600	VD4 12.16.50 p210								
	20													2000	VD4 12.20.20 p210								
	25													2000	VD4 12.20.25 p210								
	31.5													2000	VD4 12.20.32 p210								
	40													2000	VD4 12.20.40 p210								
	50												2000	VD4 12.20.50 p210									
	20													2500	VD4 12.25.20 p210								
	25													2500	VD4 12.25.25 p210								
	31.5													2500	VD4 12.25.32 p210								
	40													2500	VD4 12.25.40 p210								

H = Height of the circuit breaker.

W = Width of the circuit breaker.

D = Depth of the circuit breaker.

u/l = Distance between bottom and top terminal.

l/g = Distance between the bottom terminal and the resting surface of the circuit breaker.

P = Pole horizontal centre distance.

5. Description

VD4 fixed circuit breaker without bottom and top terminals (12 kV)

Ur	Isc	Rated uninterrupted current (40 °C) [A]										Circuit breaker type	
kV	kA	H=461			H=589		H=599			H=610			H=636
		D=424			D=424		D=424			D=459			D=459
		u/l=205			u/l=310		u/l=310			u/l=310			u/l=310
		l/g=217.5			l/g=238		l/g=237.5			l/g=237			l/g=237
		P=150	P=210	P=275	P=210	P=275	P=150	P=210	P=275	P=210	P=275		P=275
		W=450	W=570	W=700	W=570	W=700	W=450	W=570	W=700	W=600	W=750		W=750
12	16	630										VD4 12.06.16 p275	
	20	630										VD4 12.06.20 p275	
	25	630										VD4 12.06.25 p275	
	31.5	630										VD4 12.06.32 p275	
	16	1250										VD4 12.12.16 p275	
	20	1250										VD4 12.12.20 p275	
	25	1250										VD4 12.12.25 p275	
	31.5	1250										VD4 12.12.32 p275	
	40				1250							VD4 12.12.40 p275	
	50									1250		VD4 12.12.50 p275	
	20									1600		VD4 12.16.20 p275	
	25									1600		VD4 12.16.25 p275	
	31.5									1600		VD4 12.16.32 p275	
	40				1600							VD4 12.16.40 p275	
	50									1600		VD4 12.16.50 p275	
	20									2000		VD4 12.20.20 p275	
	25									2000		VD4 12.20.25 p275	
	31.5									2000		VD4 12.20.32 p275	
	40									2000		VD4 12.20.40 p275	
	50									2000		VD4 12.20.50 p275	
	20									2500		VD4 12.25.20 p275	
	25									2500		VD4 12.25.25 p275	
	31.5									2500		VD4 12.25.32 p275	
	40									2500		VD4 12.25.40 p275	
	50									2500		VD4 12.25.50 p275	
	20									3150 (1)		VD4 12.32.20 p275	
	25									3150 (1)		VD4 12.32.25 p275	
	31.5									3150 (1)		VD4 12.32.32 p275	
	40									3150 (1)		VD4 12.32.40 p275	
	50									3150 (1)		VD4 12.32.50 p275	

VD4 fixed circuit breaker without bottom and top terminals (15 kV)

Ur	Isc	Rated uninterrupted current (40 °C) [A]		Circuit breaker type	
kV	kA	H=461	H=599		
		D=424	D=424		
		u/I=205	u/I=310		
		I/g=217.5	I/g=237.5		
		P=150	P=210		
		W=450	W=570		
15	31.5	1200		VD4/N 15.12.32 p150	
	40		1200		VD4 15.12.40 p210
	31.5		2000		VD4/N 15.20.32 p210
	40		2000		VD4 15.20.40 p210

- H = Height of the circuit breaker.
- W = Width of the circuit breaker.
- D = Depth of the circuit breaker.
- u/l = Distance between bottom and top terminal.
- l/g = Distance between the bottom terminal and the resting surface of the circuit breaker.
- P = Pole horizontal centre distance.
- (1) Up to 4000 A with forced ventilation

VD4 fixed circuit breaker without bottom and top terminals (17.5 kV)

Ur	Isc	Rated uninterrupted current (40 °C) [A]												Circuit breaker type
kV	kA	H=461			H=589		H=599			H=610		H=635	H=589	
		D=424			D=424		D=424			D=459		D=459	D=424	
		u/I=205			u/I=310		u/I=310			u/I=310		u/I=310	u/I=310	
		I/g=217.5			I/g=238		I/g=237.5			I/g=237		I/g=237.5	I/g=237.5	
		P=150	P=210	P=275	P=210	P=275	P=150	P=210	P=275	P=210	P=275	P=275	P=150	
		W=450	W=570	W=700	W=570	W=700	W=450	W=570	W=700	W=600	W=750	W=750	W=450	
17.5	16	630											VD4 17.06.16 p150	
	20	630											VD4 17.06.20 p150	
	25	630											VD4 17.06.25 p150	
	31.5	630											VD4 17.06.32 p150	
	16	1250											VD4 17.12.16 p150	
	20	1250											VD4 17.12.20 p150	
	25	1250											VD4 17.12.25 p150	
	31.5	1250											VD4 17.12.32 p150	
	40												1250	VD4 17.12.40 p150
	16	630											VD4 17.06.16 p210	
	20	630											VD4 17.06.20 p210	
	25	630											VD4 17.06.25 p210	
	31.5	630											VD4 17.06.32 p210	
	16	1250											VD4 17.12.16 p210	
	20	1250											VD4 17.12.20 p210	
	25	1250											VD4 17.12.25 p210	
	31.5	1250											VD4 17.12.32 p210	
	40	1250											VD4 17.12.40 p210	
	50												1250	VD4 17.12.50 p210
	20												1600	VD4 17.16.20 p210
	25												1600	VD4 17.16.25 p210
	31.5												1600	VD4 17.16.32 p210
	40	1600											VD4 17.16.40 p210	
	50												1600	VD4 17.16.50 p210
	20												2000	VD4 17.20.20 p210
	25												2000	VD4 17.20.25 p210
	31.5												2000	VD4 17.20.32 p210
	40												2000	VD4 17.20.40 p210
	50												2000	VD4 17.20.50 p210

H = Height of the circuit breaker.

W = Width of the circuit breaker.

D = Depth of the circuit breaker.

u/l = Distance between bottom and top terminal.

l/g = Distance between the bottom terminal and the resting surface of the circuit breaker.

P = Pole horizontal centre distance.

5. Description

VD4 fixed circuit breaker without bottom and top terminals (17.5 kV)

Ur	Isc	Rated uninterrupted current (40 °C) [A]										Circuit breaker type	
kV	kA	H=461			H=589		H=599			H=610			H=635
		D=424			D=424		D=424			D=459			D=459
		u/l=205			u/l=310		u/l=310			u/l=310			u/l=310
		l/g=217.5			l/g=238		l/g=237.5			l/g=237			l/g=237.5
		P=150	P=210	P=275	P=210	P=275	P=150	P=210	P=275	P=210	P=275		P=275
		W=450	W=570	W=700	W=570	W=700	W=450	W=570	W=700	W=600	W=750		W=750
17.5	16	630										VD4 17.06.16 p275	
	20	630										VD4 17.06.20 p275	
	25	630										VD4 17.06.25 p275	
	31.5	630										VD4 17.06.32 p275	
	16	1250										VD4 17.12.16 p275	
	20	1250										VD4 17.12.20 p275	
	25	1250										VD4 17.12.25 p275	
	31.5	1250										VD4 17.12.32 p275	
	40	1250										VD4 17.12.40 p275	
	50	1250										VD4 17.12.50 p275	
	20	1600										VD4 17.16.20 p275	
	25	1600										VD4 17.16.25 p275	
	31.5	1600										VD4 17.16.32 p275	
	40	1600										VD4 17.16.40 p275	
	50	1600										VD4 17.16.50 p275	
	20	2000										VD4 17.20.20 p275	
	25	2000										VD4 17.20.25 p275	
	31.5	2000										VD4 17.20.32 p275	
	40	2000										VD4 17.20.40 p275	
	50	2000										VD4 17.20.50 p275	
	20	2500										VD4 17.25.20 p275	
	25	2500										VD4 17.25.25 p275	
	31.5	2500										VD4 17.25.32 p275	
	40	2500										VD4 17.25.40 p275	
	50	2500										VD4 17.25.50 p275	
	20	3150 (1)										VD4 17.32.20 p275	
	25	3150 (1)										VD4 17.32.25 p275	
	31.5	3150 (1)										VD4 17.32.32 p275	
	40	3150 (1)										VD4 17.32.40 p275	
	50	3150 (1)										VD4 17.32.50 p275	

H = Height of the circuit breaker.

W = Width of the circuit breaker.

D = Depth of the circuit breaker.

u/l = Distance between bottom and top terminal.

l/g = Distance between the bottom terminal and the resting surface of the circuit breaker.

P = Pole horizontal centre distance.

⁽¹⁾ Up to 4000 A with forced ventilation

VD4 fixed circuit breaker without bottom and top terminals (24 kV)

Ur	Isc	Rated uninterrupted current (40 °C) [A]			Circuit breaker type
		H=631	H=642		
kV	kA	D=424	D=424		
		u/l=310	u/l=310		
		l/g=282.5	l/g=282.5		
		P=210	P=275	P=275	
		W=570	W=700	W=700	
24	16	630			VD4 24.06.16 p210
	20	630			VD4 24.06.20 p210
	25	630			VD4 24.06.25 p210
	16	1250			VD4 24.12.16 p210
	20	1250			VD4 24.12.20 p210
	25	1250			VD4 24.12.25 p210
	31.5	1250			VD4 24.12.32 p210
	16		630		VD4 24.06.16 p275
	20		630		VD4 24.06.20 p275
	25		630		VD4 24.06.25 p275
	16		1250		VD4 24.12.16 p275
	20		1250		VD4 24.12.20 p275
	25		1250		VD4 24.12.25 p275
	16			1600	VD4 24.16.16 p275
	20			1600	VD4 24.16.20 p275
	25			1600	VD4 24.16.25 p275
	31.5			1600	VD4 24.16.32 p275
	16			2000	VD4 24.20.16 p275
	20			2000	VD4 24.20.20 p275
	25			2000	VD4 24.20.25 p275
	31.5			2000	VD4 24.20.32 p275
	25			2500	VD4 24.25.25 p275
	31.5			2500	VD4 24.25.32 p275

H = Height of the circuit breaker.

W = Width of the circuit breaker.

D = Depth of the circuit breaker.

u/l = Distance between bottom and top terminal.

l/g = Distance between the bottom terminal and the resting surface of the circuit breaker.

P = Pole horizontal centre distance.

5. Description

VD4 fixed circuit breaker without bottom and top terminals (36-40.5 kV)

Ur	Isc	Rated uninterrupted current (40 °C) [A]	
kV	kA	H = 884	Circuit breaker type
		W = 796	
		D = 501	
		u/l = 328	
		l/g = 428.5	
		P = 275	
36	20	1250 A	VD4 36.12.20 p275
	25	1250 A	VD4 36.12.25 p275
	31.5	1250 A	VD4 36.12.32 p275
	20	1600 A	VD4 36.16.20 p275
	25	1600 A	VD4 36.16.25 p275
	31.5	1600 A	VD4 36.16.32 p275
	20	2000 A	VD4 36.20.20 p275
	25	2000 A	VD4 36.20.25 p275
	31.5	2000 A	VD4 36.20.32 p275
	20	2500 A	VD4 36.25.20 p275
	25	2500 A	VD4 36.25.25 p275
	31.5	2500 A	VD4 36.25.32 p275
	20	1250 A	VD4 40.12.20 p275
	25	1250 A	VD4 40.12.25 p275
	31.5	1250 A	VD4 40.12.32 p275
40.5	20	1600 A	VD4 40.16.20 p275
	25	1600 A	VD4 40.16.25 p275
	31.5	1600 A	VD4 40.16.32 p275
	20	2000 A	VD4 40.20.20 p275
	25	2000 A	VD4 40.20.25 p275
	31.5	2000 A	VD4 40.20.32 p275

H = Height of the circuit breaker.

W = Width of the circuit breaker.

D = Depth of the circuit breaker.

u/l = Distance between bottom and top terminal.

l/g = Distance between the bottom terminal and the resting surface of the circuit breaker.

P = Pole horizontal centre distance.

5.5.3. Standard fittings for fixed circuit breakers

The basic versions of the fixed circuit breakers are three-pole and fitted with:

- EL type manual operating mechanism
- mechanical signalling device for closing spring charged/ discharged
- mechanical signalling device for circuit breaker open/closed
- closing pushbutton, opening pushbutton and operation counter
- set of ten circuit breaker open/closed auxiliary contacts

Note: with the set of ten auxiliary contacts supplied as standard and the maximum number of electrical applications possible, three make contacts (signalling circuit breaker open) and five break contacts (signalling circuit breaker closed) are available.

- lever for manual closing spring charging



VD4 evo - up to 17 kV



VD4 - up to 24 kV



VD4 - 36 kV

5.6. Withdrawable circuit breakers

The withdrawable circuit breakers up to 24 kV are available for UniGear ZS1 and UniSec switchgear, PowerCube modules (see fig. 5a) and for ZS8.4 switchgear (see fig. 5b).

The 36 kV circuit breakers are available for ZS2 switchgear.

They consist of a truck on which the supporting structure of the circuit breaker is fixed.

Circuit breakers for UniGear ZS1 and UniSec switchgear and for PowerCube modules (fig. 5a)

The cord with the connector (14) (plug) for connection of the operating mechanism electrical accessories comes out of the connection (15).

The strikers for operating the contacts (connected/ isolated) placed in the switchgear are fixed in the top part of the circuit breaker.

The shutter actuator (9) (roller (18) for UniSec version) are provided for operating the segregation shutters of the medium voltage contacts of the enclosure or of the switchgear are fixed on the sides of the circuit breaker.

The crosspiece with the handles (17) for hooking up the circuit breaker for the racking-in/out operations by means of the special operating lever (16) is mounted on the front part of the circuit breaker truck.

The circuit breaker is completed with the isolating contacts (8).

5. Description

The withdrawable circuit breaker is fitted with special locks on the front crosspiece, which allow hooking up into the corresponding couplings of the switchgear.

The locks can only be activated by the handles with the truck fully resting against the crosspiece.

The operating lever (16) must be fully inserted (also see par. 7.5.). A lock prevents the truck from advancing into the enclosure or fixed part when the earthing switch is closed.

Another lock prevents racking-in and racking-out with the circuit breaker closed. With the truck in an intermediate position between isolated and connected, a further lock prevents circuit breaker closing (either mechanical or electrical).

A locking magnet is also mounted on the truck which, when de-energised, prevents the truck racking-in operation.

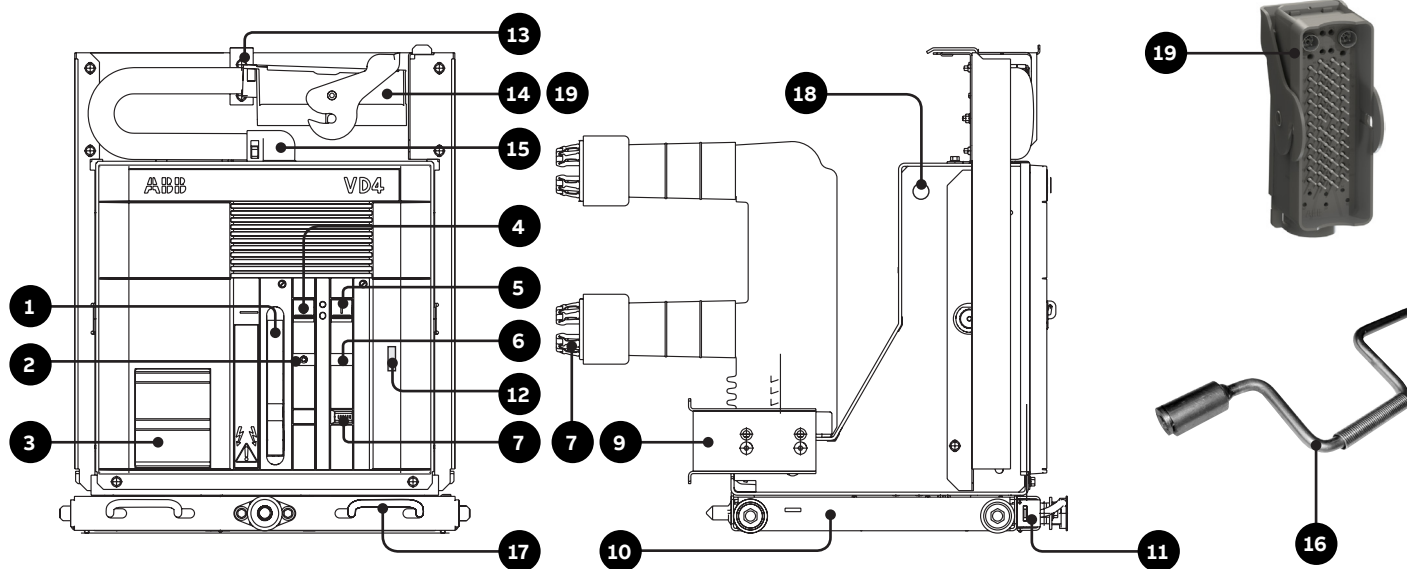
On request, an interlock is available which prevents racking-in of the circuit breaker with the door open, and door opening with the circuit breaker closed.

The lever for loading the closing spring (1) in the manual mode is built into the operating mechanism. The spring is loaded by repeatedly lowering the lever with linear movements until the yellow indicator (6) appears to show that loading is complete.

The spring can only be loaded with the switchgear door open.

Comply with the instructions in the UniGear switchgear manual for the operations that can be performed with the door open.

Note: on request, the closing spring loading device for withdrawable circuit breakers for UniGear switchgear can be supplied with the lever outside the operating mechanism and a rotary loading movement. This device is part of the standard equipment for VD4/ZS8 withdrawable circuit breakers only (see detail 1 of Fig. 5b on the next page). This rotary loading device allows the closing spring to be loaded with the switchgear door closed.



Caption

- | | |
|---|---|
| 1 Lever for manually charging the closing spring | 10 Truck |
| 2 Signalling device for circuit breaker open/closed | 11 Locks for hooking into the fixed part |
| 3 Rating plate | 12 Mechanical override of the undervoltage release (on request) |
| 4 Opening pushbutton | 13 Strikers for activating the contacts placed in the enclosure |
| 5 Closing pushbutton | 14 Connector (plug) |
| 6 Signalling device for closing spring charged/discharged | 15 Cabling connection |
| 7 Operation counter | 16 Operating lever for circuit breaker racking-in/out |
| 8 Isolating contacts | 17 Handles for activating the locks (11) |
| 9 Slide for operating the switchgear shutters (UniGear ZS1, PowerCube, ZS8.4) | 18 Shutters actuator (for UniSec version only) |
| | 19 Connector (plug) with two Harting connectors - VD4 evo only |

Fig. 5a

Circuit breakers for ZS8.4 switchgear (fig. 5b)

The socket (13) takes the connector (plug) placed in the switchgear.

The slides (9) for operating the segregation shutters of the medium voltage contacts of the switchgear are fixed on the sides of the circuit breaker.

The crosspiece with the handles (17) for hooking up the circuit breaker for the racking-in/out operations by means of the special operating lever (16) is mounted on the front part of the circuit breaker truck.

The circuit breaker is completed with the isolating contacts (8).

The withdrawable circuit breaker is fitted with special locks, described below (see fig. 5c - 5d).

1) Prevention of traverse with circuit breaker closed

With the circuit breaker closed, the feeler pin (16 - fig. 5c) prevents the shutter sliding (19 - fig. 5c) and therefore insertion of the lever (20 - fig. 5c) for traverse of the apparatus.

2) Prevention of traverse with socket-plug disconnected

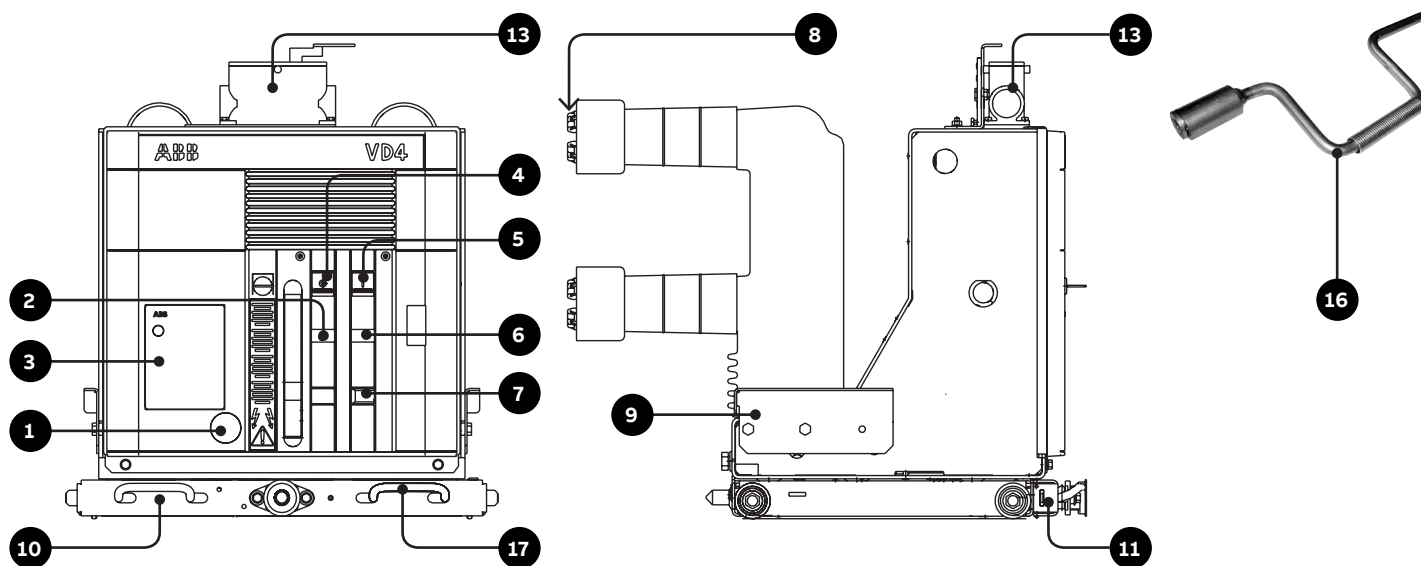
When the plug is not inserted in the socket (13), the stem (21 - fig. 5c) prevents the plate (22 - fig. 5c) lifting and traverse of the apparatus.

3) Prevention of switchgear door closing with socketplug disconnected (*)

When the plug is not inserted in the socket (13), the feeler pin (23 - fig. 5d) prevents door closing.

4) Prevention of circuit breaker racking-out with the socket-plug connected (*)

When the plug is inserted in the socket (13), the lock bolt (29 - fig. 5d) hits the pin (30 - fig. 5d) preventing the apparatus from being racked out of the switchgear.



Caption

- 1 Coupling for the manual closing spring charging lever (*)
- 2 Signalling device for circuit breaker open/closed
- 3 Rating plate
- 4 Opening pushbutton
- 5 Closing pushbutton
- 6 Signalling device for closing spring charged/discharged
- 7 Operation counter
- 8 Isolating contacts

- 9 Slide for operating the switchgear shutters
 - 10 Truck
 - 11 Locks for hooking into the fixed part
 - 13 Connector (plug)
 - 16 Operating lever for circuit breaker racking-in/out (a special version is provided for VD4/ZS8 Preussen Elektra EON circuit breakers)
 - 17 Handles for activating the locks (11)
- (*) Only VD4/ZS8 Preussen - Elektra EON version.

Fig. 5b

5. Description

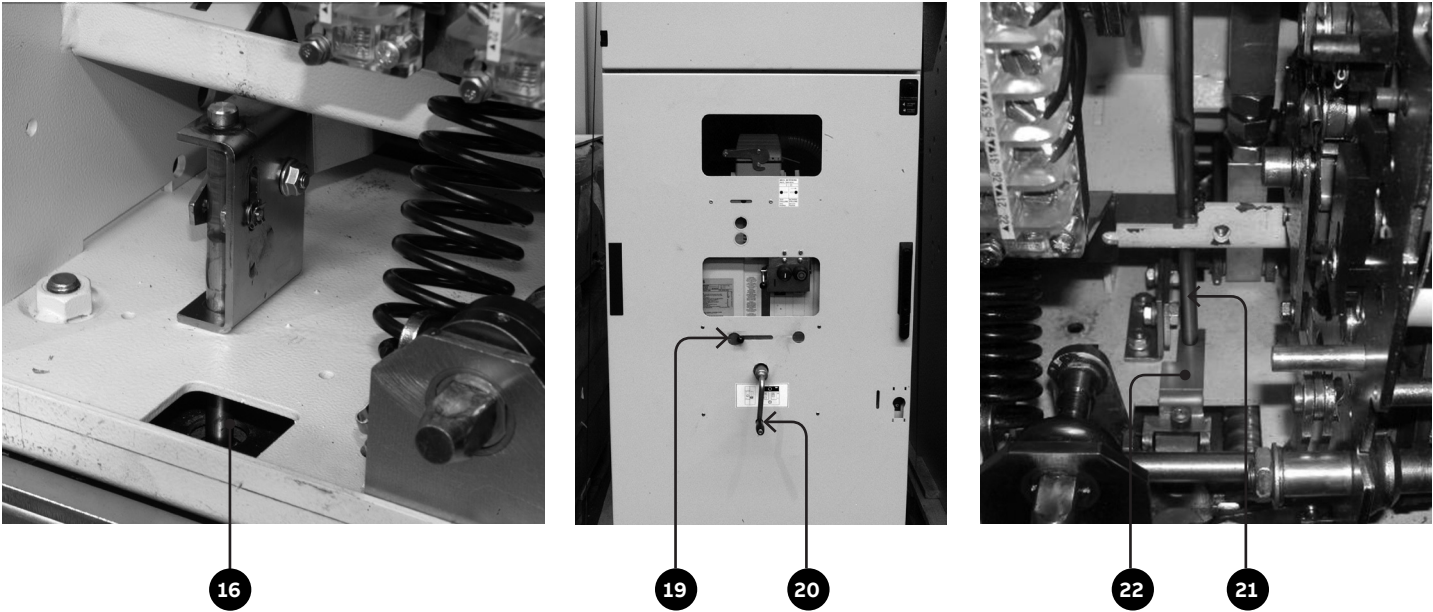


Fig. 5c

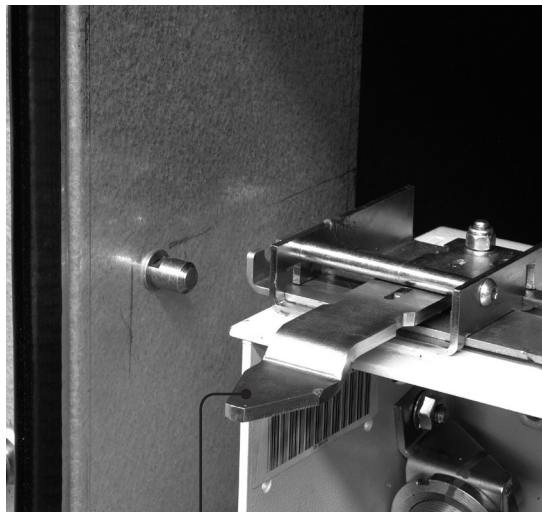
**23**

Fig. 5d

**30****29**

5. Description

5.6.1. General characteristics of withdrawable circuit breakers for UniGear ZS1 switchgear

General characteristics of withdrawable circuit breakers for UniGear ZS1 switchgear (12 kV)



Circuit breaker		VD4/P 12							
Standards	IEC 62271-100	•							
Rated voltage	Ur [kV]	12							
Rated insulation voltage	Us [kV]	12							
Withstand voltage at 50 Hz	Ud (1 min) [kV]	28							
Impulse withstand voltage	Up [kV]	75							
Rated frequency	fr [Hz]	50-60							
Rated normal current (40 °C) ⁽¹⁾	Ir [A]	630	1250	1250 ⁽⁴⁾	1250	1250	1250	1600	1600
Rated breaking capacity (rated short-circuit breaking current symmetrical)	Isc [kA]	16	16	-	-	-	-	-	-
		20	20	-	-	-	-	20	20
		25	25	-	-	-	-	25	25
		31.5	31.5	-	-	-	-	31.5	31.5
		-	-	40 ⁽⁴⁾	40	40	-	-	-
		-	-	-	-	-	50	-	-
Rated short-time withstand current (3s)	Ik [kA]	16	16	-	-	-	-	-	-
		20	20	-	-	-	-	20	20
		25	25	-	-	-	-	25	25
		31.5	31.5	-	-	-	-	31.5	31.5
		-	-	40 ⁽⁴⁾	40	40	-	-	-
		-	-	-	-	-	50	-	-
Making capacity	Ip [kA]	40	40	-	-	-	-	-	-
		50	50	-	-	-	-	50	50
		63	63	-	-	-	-	63	63
		80	80	-	-	-	-	80	80
		-	-	104 ⁽⁴⁾	100	100	-	-	-
		-	-	-	-	-	125	-	-
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•	•	•	•
Opening time	[ms]	33 ... 60							
Arcing time	[ms]	10 ... 15							
Total breaking time	[ms]	43 ... 75							
Closing time	[ms]	30 ... 60							
Maximum overall dimensions	H [mm]	628	628	693	691	691	691	691	691
	W [mm]	503	503	503	653	853	681	653	853
	D [mm]	662	662	651	641	642	643	642	642
	Pole distance P [mm]	150	150	150	210	275	210	210	275
Weight	[kg]	116	116	111	174	176	180	160	166
Standardised table of dimensions	TN 7412 ⁽²⁾	7412 ⁽²⁾	2RDA040163	-	-	-	7415 ⁽²⁾	7416 ⁽²⁾	
	1VCD	-	-	003284 ⁽²⁾	003286 ⁽²⁾	003444	-	-	
Operating temperature	[°C]	- 5 ... + 40							
Tropicalization	IEC: 60068-2-30, 60721-2-1	•							
Electromagnetic compatibility	IEC: 62271-1	•							

⁽¹⁾ Rated current guaranteed with circuit breaker installed in UniGear ZS1 switchgear and with 40 °C ambient temperature.

⁽²⁾ Up to 4000 A with forced ventilation

⁽³⁾ Poles in polyamide

⁽⁴⁾ Available in VD4 evo only


VD4/P 12											
•											
12											
12											
28											
75											
50-60											
1600	1600	1600	1600	2000	2000	2000	2000	2500	2500	3150 (°)	3150 (°)
–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	20	20	–	–	20	–	20	–
–	–	–	–	25	25	–	–	25	–	25	–
–	–	–	–	31.5	31.5	–	–	31.5	–	31.5	–
40	40	–	–	40	40	–	–	40	–	40	–
–	–	50	50	–	–	50	50	–	50	–	50
–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	20	20	–	–	20	–	20	–
–	–	–	–	25	25	–	–	25	–	25	–
–	–	–	–	31.5	31.5	–	–	31.5	–	31.5	–
40	40	–	–	40	40	–	–	40	–	40	–
–	–	50	50	–	–	50	50	–	50	–	50
–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	50	50	–	–	50	–	50	–
–	–	–	–	63	63	–	–	63	–	63	–
–	–	–	–	80	80	–	–	80	–	80	–
100	100	–	–	100	100	–	–	100	–	100	–
–	–	125	125	–	–	125	125	–	125	–	125
•	•	•	•	•	•	•	•	•	•	•	•
33 ... 60											
10 ... 15											
43 ... 75											
30 ... 60											
691	691	691	691	691	691	691	691	691	691	730	742
653	853	681	853	653	853	681	853	853	853	853	853
641	642	643	643	642	642	643	643	640	643	640	643
210	275	210	275	210	275	210	275	275	275	275	275
174	176	180	193	160	166	190	205	186	225	221	240
–	–	–	–	7415 (°)	7416 (°)	–	–	7417 (°)	–	–	–
003284 (°)	003286 (°)	003444	003445	–	–	003444	003445	–	003446	000153 (°)	003447
- 5 ... + 40											
•											
•											



5. Description

General characteristics of withdrawable circuit breakers
for OeM switchgear (15kV)

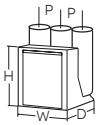


Circuit breaker		OeM panel	VD4/N/P 15		
Standard		IEEE C37.04 •			
Rated voltage		[kV]	15		
Rated frequency		[Hz]	60		
Short-circuit breaking current I _{sc}		[kA]	31.5		
Rated current I _r		[A]	1200	2000	
Short-time withstand current		[A]	31.5		
Short circuit withstand		[A]	3		
Close and latch capability		[kA]	82		
Operation sequence		[O - 0,3 s - CO - 3 min - CO]	•		
% DC component		[%]	40		
Interrupting time		[ms]	50		
Closing time		[ms]	30...60		
Mechanical endurance class		[M2]	10k		
Lightning impulse withstand voltage U _p		[kV]	95		
Power frequency withstand voltage U _d		[kV]	36		
Operating temperature		[°C]	-5...+40		
Maximum overall dimensions		Height	[mm]	632	691
		Width	[mm]	503	653
		Depth	[mm]	664	642
		Pole distance	[mm]	150	210
Standard table of dimensions		TN	7412	7415	
Weight		[kg]	116	160	

5. Description

General characteristics of withdrawable circuit breakers for UniGear ZS1 switchgear (17.5 kV)



Circuit breaker		VD4/P 17						
Standards	IEC 62271-100 •							
Rated voltage	Ur [kV]	17.5						
Rated insulation voltage	Us [kV]	17.5						
Withstand voltage at 50 Hz	Ud (1 min) [kV]	38						
Impulse withstand voltage	Up [kV]	95						
Rated frequency	fr [Hz]	50-60						
Rated normal current (40 °C) (1)	Ir [A]	630	1250	1250 (4)	1250	1250	1250	1600
Rated breaking capacity (rated short-circuit breaking current symmetrical)	Isc [kA]	16	16	-	-	-	-	-
		20	20	-	-	-	-	20
		25	25	-	-	-	-	25
		31.5	31.5	-	-	-	-	31.5
		-	-	40 (4)	40	40	-	-
		-	-	-	-	-	50	-
		-	-	-	-	-	-	-
Rated short-time withstand current (3s)	Ik [kA]	16	16	-	-	-	-	-
		20	20	-	-	-	-	20
		25	25	-	-	-	-	25
		31.5	31.5	-	-	-	-	31.5
		-	-	40 (4)	40	40	-	-
		-	-	-	-	-	50	-
		-	-	-	-	-	-	-
Making capacity	Ip [kA]	40	40	-	-	-	-	-
		50	50	-	-	-	-	50
		63	63	-	-	-	-	63
		80	80	-	-	-	-	80
		-	-	104 (4)	100	100	-	-
		-	-	-	-	-	125	-
		-	-	-	-	-	-	-
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•	•	•
Opening time	[ms]	33 ... 60						
Arcing time	[ms]	10 ... 15						
Total breaking time	[ms]	43 ... 75						
Closing time	[ms]	30 ... 60						
<div></div>	H [mm]	632	632	693	691	691	691	691
	W [mm]	503	503	503	653	853	681	653
	D [mm]	664	664	651	641	642	643	642
	Pole distance P [mm]	150	150	150	210	275	210	210
Weight	[kg]	116	116	111	174	176	180	160
Standardised table of dimensions	TN	7412 (3)	7412 (3)	2RDA040163-		-	-	7415 (3)
	1VCD	-	-	-	003284 (3)	003286 (3)	003444	-
Operating temperature	[°C]	- 5 ... + 40						
Tropicalization	IEC: 60068-2-30, 60721-2-1 •							
Electromagnetic compatibility	IEC: 62271-1 •							

(1) Rated current guaranteed with circuit breaker installed in UniGear ZS1 switchgear and with 40 °C ambient temperature.

(2) Up to 4000 A with forced ventilation.

(3) Poles in polyamide

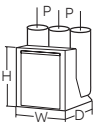
(4) Available in VD4 evo only

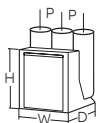
VD4/P 17													
•													
17.5													
17.5													
38													
95													
50-60													
1600	1600	1600	1600	1600	2000	2000	2000	2000	2500	2500	3150 (°)	3150 (°)	
-	-	-	-	-	-	-	-	-	-	-	-	-	
20	-	-	-	-	20	20	-	-	20	-	20	-	
25	-	-	-	-	25	25	-	-	25	-	25	-	
31.5	-	-	-	-	31.5	31.5	-	-	31.5	-	31.5	-	
-	40	40	-	-	40	40	-	-	40	-	40	-	
-	-	-	50	50	-	-	50	50	-	50	-	50	
-	-	-	-	-	-	-	-	-	-	-	-	-	
20	-	-	-	-	20	20	-	-	20	-	20	-	
25	-	-	-	-	25	25	-	-	25	-	25	-	
31.5	-	-	-	-	31.5	31.5	-	-	31.5	-	31.5	-	
-	40	40	-	-	40	40	-	-	40	-	40	-	
-	-	-	50	50	-	-	50	50	-	50	-	50	
-	-	-	-	-	-	-	-	-	-	-	-	-	
50	-	-	-	-	50	50	-	-	50	-	50	-	
63	-	-	-	-	63	63	-	-	63	-	63	-	
80	-	-	-	-	80	80	-	-	80	-	80	-	
-	100	100	-	-	100	100	-	-	100	-	100	-	
-	-	-	125	125	-	-	125	125	-	125	-	125	
•	•	•	•	•	•	•	•	•	•	•	•	•	
33 ... 60													
10 ... 15													
43 ... 75													
30 ... 60													
691	691	691	691	691	691	691	691	691	691	691	730	742	
853	653	853	681	853	653	853	681	853	853	853	853	853	
642	641	642	643	643	642	642	643	643	640	643	640	643	
275	210	275	210	275	210	275	210	275	275	275	275	275	
166	174	176	180	193	160	166	190	205	186	225	221	240	
7416(°)	-	-	-	-	7415(°)	7416(°)	-	-	7417(°)	-	-	-	
-	003284(°)	003286(°)	003444	003445	-	-	003444	003445	-	003446	000153(°)	003447	
- 5 ... + 40													
•													
•													

5. Description

General characteristics of withdrawable circuit breakers for UniGear ZS1 switchgear (24 kV)



Circuit breaker		VD4/P 24								
Standards	IEC 62271-100 •									
Rated voltage	Ur [kV]	24								
Rated insulation voltage	Us [kV]	24								
Withstand voltage at 50 Hz	Ud (1 min) [kV]	50								
Impulse withstand voltage	Up [kV]	125								
Rated frequency	fr [Hz]	50-60								
Rated normal current (40 °C) ⁽¹⁾	Ir [A]	630	630	1250	1250	1600	2000	2500 ⁽²⁾	3150 ⁽³⁾	
Rated breaking capacity (rated short-circuit breaking current symmetrical)	Isc [kA]	16	16	16	16	16	16	16	–	
		20	20	20	20	20	20	20	–	
		25	25	25	25	25	25	25	–	
		–	–	31.5	31.5	31.5	31.5	31.5	31.5	
Rated short-time withstand current (3s)	Ik [kA]	16	16	16	16	16	16	16	–	
		20	20	20	20	20	20	20	–	
		25	25	25	25	25	25	25	–	
		–	–	31.5	31.5	31.5	31.5	31.5	31.5	
Making capacity	Ip [kA]	40	40	40	40	40	40	40	–	
		50	50	50	50	50	50	50	–	
		63	63	63	63	63	63	63	–	
		–	–	80	80	80	80	80	80	
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•	•	•	•	
Opening time	[ms]	33 ... 60								
Arcing time	[ms]	10 ... 15								
Total breaking time	[ms]	43 ... 75								
Closing time	[ms]	30 ... 60								
Maximum overall dimensions		H [mm]	794	794	794	794	838	838	838	838
		W [mm]	653	853	653	853	853	853	853	853
		D [mm]	802	802	802	802	790	790	790	790
		Pole distance P [mm]	210	275	210	275	275	275	275	275
Weight	[kg]	140	148	140/146 ⁽⁴⁾	148	228	228	228	277	
Standardised table of dimensions	TN	7413	7414	7413	7414	7418	7418	7418	–	
	1VCD	–	–	000173 ⁽⁴⁾		–	–	–	000177	
Operating temperature	[°C]	- 5 ... + 40								
Tropicalization	IEC: 60068-2-30, 60721-2-1 •									
Electromagnetic compatibility	IEC: 62271-1 •									



⁽¹⁾ Rated current guaranteed with circuit breaker installed in UniGear ZS1 switchgear and with 40 °C ambient temperature.

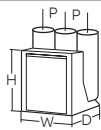
⁽²⁾ 2300 A rated current guaranteed with natural ventilation; 2500 A rated current guaranteed with forced ventilation.

⁽³⁾ 2700 A rated current guaranteed with natural ventilation; 3150 A rated current guaranteed with forced ventilation.

⁽⁴⁾ 31.5 kA version.

Withdrawable circuit breakers for UniGear ZS2 switchgear (36 kV)



Circuit breaker		VD4/W 36				
Standards	IEC 62271-100	•				
Rated voltage	Ur [kV]	36				
Rated insulation voltage	Us [kV]	36				
Withstand voltage at 50 Hz	Ud (1 min) [kV]	70				
Impulse withstand voltage	Up [kV]	170				
Rated frequency	fr [Hz]	50				
Rated normal current (40 °C)	Ir [A]	1250	1600	2000	2500 ⁽¹⁾	3150 ⁽²⁾
		20	20	20	20	20
		31.5	31.5	31.5	31.5	31.5
Rated breaking capacity (rated short-circuit breaking current symmetrical)	Isc [kA]	25	25	25	25	25
		31.5	31.5	31.5	31.5	31.5
		20	20	20	20	20
Rated short-time withstand current (3s)	Ik [kA]	25	25	25	25	25
		31.5	31.5	31.5	31.5	31.5
		20	20	20	20	20
Making capacity	Ip [kA]	63	63	63	63	63
		80	80	80	80	80
		50	50	50	50	50
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•
Opening time	[ms]	35 ... 60				
Arcing time	[ms]	10 ... 15				
Total breaking time	[ms]	45 ... 75				
Closing time	[ms]	50 ... 65				
Maximum overall dimensions		H [mm]	974	974	974	974
		W [mm]	880	880	880	880
		D [mm]	789	789	789	789
		Pole distance P [mm]	275	275	275	275
Weight	[kg]	230	245	275	275/315	315
Standardised table of dimensions	TN	1VYN300901-KG	1VYN300901-RA	1VYN300901-RA	1VYN300901-RA ⁽¹⁾ 1VYN300901-RB	1VYN300901-RB
Operating temperature	[°C]	- 5 ... + 40				
Tropicalization	IEC: 60068-2-30, 60721-2-1	•				
Electromagnetic compatibility	IEC: 62271-1	•				

⁽¹⁾ 2500 A with forced ventilation and tulip contacts diameter 79 mm (TN 1VYN300901-RA).

⁽²⁾ 3150 A with forced ventilation.

5. Description

5.6.2. Types of withdrawable circuit breakers available for UniGear ZS1 switchgear

VD4 withdrawable circuit breaker (12 kV)

Ur	Isc	Rated uninterrupted current (40 °C) [A]						Circuit breaker type	
kV	kA	W=650	W=800	W=1000	W=1000	W=1000	W=650		
		P=150	P=210	P=275	P=275	P=275	P=150		
		u/l=205	u/l=310	u/l=310	u/l=310	u/l=310	u/l=310		
		ø=35	ø=79	ø=79	ø=109	ø=109	ø=45		
12	16	630						VD4/P 12.06.16 p150	
	20	630						VD4/P 12.06.20 p150	
	25	630						VD4/P 12.06.25 p150	
	31.5	630						VD4/P 12.06.32 p150	
	16	1250						VD4/P 12.12.16 p150	
	20	1250						VD4/P 12.12.20 p150	
	25	1250						VD4/P 12.12.25 p150	
	31.5	1250						VD4/P 12.12.32 p150	
	40						1250	VD4/P 12.12.40 p150	
	40		1250					VD4/P 12.12.40 p210	
	50		1250					VD4/P 12.12.50 p210	
	20		1600					VD4/P 12.16.20 p210	
	25		1600					VD4/P 12.16.25 p210	
	31.5		1600					VD4/P 12.16.32 p210	
	40		1600					VD4/P 12.16.40 p210	
	50		1600					VD4/P 12.16.50 p210	
	20		2000					VD4/P 12.20.20 p210	
	25		2000					VD4/P 12.20.25 p210	
	31.5		2000					VD4/P 12.20.32 p210	
	40		2000					VD4/P 12.20.40 p210	
	50		2000					VD4/P 12.20.50 p210	
	40			1250					VD4/P 12.12.40 p275
	20			1600					VD4/P 12.16.20 p275
	25			1600					VD4/P 12.16.25 p275
	31.5			1600					VD4/P 12.16.32 p275
	40			1600					VD4/P 12.16.40 p275
	50			1600					VD4/P 12.16.50 p275
	20			2000					VD4/P 12.20.20 p275
	25			2000					VD4/P 12.20.25 p275
	31.5			2000					VD4/P 12.20.32 p275
	40			2000					VD4/P 12.20.40 p275
	50			2000					VD4/P 12.20.50 p275
	20				2500				VD4/P 12.25.20 p275
	25				2500				VD4/P 12.25.25 p275
	31.5				2500				VD4/P 12.25.32 p275
	40				2500				VD4/P 12.25.40 p275
	50				2500				VD4/P 12.25.50 p275
	20					3150 (1)			VD4/P 12.32.20 p275
	25					3150 (1)			VD4/P 12.32.25 p275
	31.5					3150 (1)			VD4/P 12.32.32 p275
	40					3150 (1)			VD4/P 12.32.40 p275
	50					3150 (1)			VD4/P 12.32.50 p275

W = Width of the switchgear..

P = Pole horizontal centre distance.

u/l = Distance between bottom and top terminal.

ø = Diameter of the isolating contact.

(*) Up to 4000 A rated current guaranteed with forced ventilation.

VD4 withdrawable circuit breaker (17.5 kV)

Ur	Isc	Rated uninterrupted current (40 °C) [A]						Circuit breaker type	
kV	kA	W=650	W=800	W=1000	W=1000	W=1000	W=650		
		P=150	P=210	P=275	P=275	P=275	P=150		
		u/l=205	u/l=310	u/l=310	u/l=310	u/l=310	u/l=310		
		ø=35	ø=79	ø=79	ø=109	ø=109	ø=45		
17.5	16	630						VD4/P 17.06.16 p150	
	20	630						VD4/P 17.06.20 p150	
	25	630						VD4/P 17.06.25 p150	
	31.5	630						VD4/P 17.06.32 p150	
	16	1250						VD4/P 17.12.16 p150	
	20	1250						VD4/P 17.12.20 p150	
	25	1250						VD4/P 17.12.25 p150	
	31.5	1250						VD4/P 17.12.32 p150	
	40						1250	VD4/P 17.12.40 p150	
	40		1250					VD4/P 17.12.40 p210	
	50		1250					VD4/P 17.12.50 p210	
	20		1600					VD4/P 17.16.20 p210	
	25		1600					VD4/P 17.16.25 p210	
	31.5		1600					VD4/P 17.16.32 p210	
	40		1600					VD4/P 17.16.40 p210	
	50		1600					VD4/P 17.16.50 p210	
	20		2000					VD4/P 17.20.20 p210	
	25		2000					VD4/P 17.20.25 p210	
	31.5		2000					VD4/P 17.20.32 p210	
	40		2000					VD4/P 17.20.40 p210	
	50		2000					VD4/P 17.20.50 p210	
	40			1250					VD4/P 17.12.40 p275
	20			1600					VD4/P 17.16.20 p275
	25			1600					VD4/P 17.16.25 p275
	31.5			1600					VD4/P 17.16.32 p275
	40			1600					VD4/P 17.16.40 p275
	50			1600					VD4/P 17.16.50 p275
	20			2000					VD4/P 17.20.20 p275
	25			2000					VD4/P 17.20.25 p275
	31.5			2000					VD4/P 17.20.32 p275
	40			2000					VD4/P 17.20.40 p275
	50			2000					VD4/P 17.20.50 p275
	20				2500				VD4/P 17.25.20 p275
	25				2500				VD4/P 17.25.25 p275
	31.5				2500				VD4/P 17.25.32 p275
	40				2500				VD4/P 17.25.40 p275
	50				2500				VD4/P 17.25.50 p275
	20					3150 (¹)			VD4/P 17.32.20 p275
	25					3150 (¹)			VD4/P 17.32.25 p275
	31.5					3150 (¹)			VD4/P 17.32.32 p275
	40					3150 (¹)			VD4/P 17.32.40 p275
	50					3150 (¹)			VD4/P 17.32.50 p275

W = Width of the switchgear.

P = Pole horizontal centre distance.

u/l = Distance between bottom and top terminal.

ø = Diameter of the isolating contact.

(¹) Up to 4000 A rated current guaranteed with forced ventilation

5. Description

VD4 withdrawable circuit breaker (24 kV)

Ur	Isc	Rated uninterrupted current (40 °C) [A]				Circuit breaker type
kV	kA	W=800	W=1000	W=1000	W=1000	
		P=210	P=275	P=275	P=275	
		u/l=310	u/l=310	u/l=310	u/l=310	
		ø=35	ø=35	ø=79	ø=109	
24	16	630				VD4/P 24.06.16 p210
	20	630				VD4/P 24.06.20 p210
	25	630				VD4/P 24.06.25 p210
	16	1250				VD4/P 24.12.16 p210
	20	1250				VD4/P 24.12.20 p210
	25	1250				VD4/P 24.12.25 p210
	31.5	1250				VD4/P 24.12.32 p210
	16		630			VD4/P 24.06.16 p275
	20		630			VD4/P 24.06.20 p275
	25		630			VD4/P 24.06.25 p275
	16		1250			VD4/P 24.12.16 p275
	20		1250			VD4/P 24.12.20 p275
	25		1250			VD4/P 24.12.25 p275
	31.5		1250			VD4/P 24.12.32 p275
	16			1600		VD4/P 24.16.16 p275
	20			1600		VD4/P 24.16.20 p275
	25			1600		VD4/P 24.16.25 p275
	31.5			1600		VD4/P 24.16.32 p275
	16			2000		VD4/P 24.20.16 p275
	20			2000		VD4/P 24.20.20 p275
	25			2000		VD4/P 24.20.25 p275
	31.5			2000		VD4/P 24.20.32 p275
	16			2300 ⁽¹⁾		VD4/P 24.25.16 p275
	20			2300 ⁽¹⁾		VD4/P 24.25.20 p275
	25			2300 ⁽¹⁾		VD4/P 24.25.25 p275
	31.5			2300 ⁽¹⁾		VD4/P 24.25.32 p275
	31.5				2700 ⁽²⁾	VD4/P 24.32.32 p275

W = Width of the switchgear.

P = Pole horizontal centre distance.

u/l = Distance between bottom and top terminal.

ø = Diameter of the isolating contact.

⁽¹⁾ 2500 A rated current guaranteed with forced ventilation.

⁽²⁾ 3150 A rated current guaranteed with forced ventilation.

VD4 withdrawable circuit breaker (36 kV)

Ur	Isc	Rated uninterrupted current (40 °C) [A]	
kV	kA	H = 951 - W = 788 - D = 778 - u/l = 380 - l/g = 399 - P = 275	Circuit breaker type
36	20	1250 A	VD4/W 36.12.20 p275
	25	1250 A	VD4/W 36.12.25 p275
	31.5	1250 A	VD4/W 36.12.32 p275
	20	1600 A	VD4/W 36.16.20 p275
	25	1600 A	VD4/W 36.16.25 p275
	31.5	1600 A	VD4/W 36.16.32 p275
	20	2000 A	VD4/W 36.20.20 p275
	25	2000 A	VD4/W 36.20.25 p275
	31.5	2000 A	VD4/W 36.20.32 p275
	20	2500 A ⁽¹⁾	VD4/W 36.25.20 p275
	25	2500 A ⁽¹⁾	VD4/W 36.25.25 p275
	31.5	2500 A ⁽¹⁾	VD4/W 36.25.32 p275
	20	3150 A ⁽²⁾	VD4/W 36.32.20 p275
	25	3150 A ⁽²⁾	VD4/W 36.32.25 p275
	31.5	3150 A ⁽²⁾	VD4/W 36.32.32 p275

H = Height of the circuit breaker.

W = Width of the switchgear.

D = Depth of the circuit breaker.

u/l = Distance between bottom and top terminal.

l/g = Distance between the bottom terminal and the resting surface of the circuit breaker.

P = Pole horizontal centre distance.

⁽¹⁾ 2500 A rated current guaranteed with forced ventilation and tulip contacts diameter 79 mm (TN 1VYN300901-RA).

⁽²⁾ 3150 A rated current guaranteed with forced ventilation.

5.6.3. Standard fittings of withdrawable circuit breakers for UniGear ZS1 switchgear (up to 24 kV) - UniGear ZS2 and PowerCube modules (VD4 36 kV)

The basic versions of the withdrawable circuit breakers are three-pole and fitted with:

- EL type manual operating mechanism
- mechanical signalling device for closing spring charged/discharged
- mechanical signalling device for circuit breaker open/closed
- closing pushbutton
- opening pushbutton
- operation counter
- set of ten auxiliary circuit breaker open/closed contacts

Note: with the set of ten auxiliary contacts supplied as standard and the maximum number of electrical applications possible, three make contacts (signalling circuit breaker open) and four break contacts (signalling circuit breaker closed) are available.

- lever for manually charging the closing spring
- isolating contacts
- cord with connector (plug only) for auxiliary circuits, withstriker pin which does not allow connection of the plugin the socket if the rated current of the circuit breaker isdifferent from the rated current of the panel
- racking-in/out lever (the quantity must be defined according to the number of pieces of apparatus ordered)
- locking electromagnet in the truck. This prevents the circuit breaker from being racked into the panel with auxiliary circuits not connected (plug not inserted in the socket).



VD4 with poles in polyamide



VD4 - 36 kV



VD4 - up to 24 kV



VD4 evo - up to 17 kV

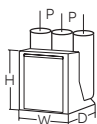
5. Description

5.6.4. General characteristics of withdrawable circuit breakers for PowerCube modules

General characteristics of withdrawable circuit breakers for PowerCube modules (12 kV)



Circuit breaker		VD4/P 12		VD4/W 12		VD4/P 12	
		PowerCube module	PB1	PB2		PB2	
Standards	IEC 62271-100	•		•		•	
Rated voltage	Ur [kV]	12		12		12	
Rated insulation voltage	Us [kV]	12		12		12	
Withstand voltage at 50 Hz	Ud (1 min) [kV]	28		28		28	
Impulse withstand voltage	Up [kV]	75		75		75	
Rated frequency	fr [Hz]	50-60		50-60		50-60	
Rated normal current (40 °C) ⁽¹⁾	Ir [A]	630	1250	630	1250	1250	1250
		16	16	16	16	-	-
		20	20	20	20	-	-
		25	25	25	25	-	-
		31.5	31.5	31.5	31.5	-	-
		-	-	-	-	40	-
Rated breaking capacity (rated short-circuit breaking current symmetrical)	Isc [kA]	-	-	-	-	-	50
		16	16	16	16	-	-
		20	20	20	20	-	-
		25	25	25	25	-	-
		31.5	31.5	31.5	31.5	-	-
		-	-	-	-	40	-
Rated short-time withstand current (3s)	Ik [kA]	-	-	-	-	-	50
		16	16	16	16	-	-
		20	20	20	20	-	-
		25	25	25	25	-	-
		31.5	31.5	31.5	31.5	-	-
		-	-	-	-	40	-
Making capacity	Ip [kA]	-	-	-	-	-	50
		40	40	40	40	-	-
		50	50	50	50	-	-
		63	63	63	63	-	-
		80	80	80	80	-	-
		-	-	-	-	100	-
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•		•		•	
Opening time	[ms]	33 ... 60		33 ... 60		33 ... 60	
Arcing time	[ms]	10 ... 15		10 ... 15		10 ... 15	
Total breaking time	[ms]	43 ... 75		43 ... 75		43 ... 75	
Closing time	[ms]	30 ... 60		30 ... 60		30 ... 60	
Maximum overall dimensions	H [mm]	628	628	691	691	691	691
	W [mm]	503	503	653	853	653	681
	D [mm]	662	662	642	642	641	643
	Pole distance P [mm]	150	150	210	210	210	210
Weight	[kg]	116	116	135	135	174	180
Standardised table of dimensions	TN	7412 ⁽²⁾	7412 ⁽²⁾	7420 ⁽²⁾	7420 ⁽²⁾	-	-
	1VCD	-	-	-	-	003284 ⁽³⁾	003444
Operating temperature	[°C]	- 5 ... + 40		- 5 ... + 40			
Tropicalization	IEC: 60068-2-30, 60721-2-1	•		•			
Electromagnetic compatibility	IEC: 62271-1	•		•			



⁽¹⁾ Rated current guaranteed with circuit breaker installed in PowerCube enclosure and with 40 °C ambient temperature

⁽²⁾ Up to 4000 A with forced ventilation.

⁽³⁾ Poles in polyamide

VD4/P 12					VD4/W 12			
PB2					PB3		PB3	
•					•		•	
12					12		12	
12					12		12	
28					28		28	
75					75		75	
50-60					50-60		50-60	
1600	1600	1600	2000	2000	2500	2500	3150 (²)	3150 (²)
-	-	-	-	-	-	-	-	-
20	-	-	20	-	20	-	20	-
25	-	-	25	-	25	-	25	-
31.5	-	-	31.5	-	31.5	-	31.5	-
-	40	-	40	-	40	-	40	-
-	-	50	-	50	-	50	-	50
-	-	-	-	-	-	-	-	-
20	-	-	20	-	20	-	20	-
25	-	-	25	-	25	-	25	-
31.5	-	-	31.5	-	31.5	-	31.5	-
-	40	-	40	-	40	-	40	-
-	-	50	-	50	-	50	-	50
-	-	-	-	-	-	-	-	-
50	-	-	50	-	50	-	50	-
63	-	-	63	-	63	-	63	-
80	-	-	80	-	80	-	80	-
-	100	-	100	-	100	-	100	-
-	-	125	-	125	-	125	-	125
•					•		•	
33 ... 60					33 ... 60		33 ... 60	
10 ... 15					10 ... 15		10 ... 15	
43 ... 75					43 ... 75		43 ... 75	
30 ... 60					30 ... 60		30 ... 60	
691	691	691	690	691	691	691	730	691
653	653	681	653	681	853	853	853	853
642	641	643	642	643	640	643	640	643
210	210	210	210	210	275	275	275	275
160	174	180	160	190	186	225	221	240
7415 (²)	-	-	7415 (²)	-	7417 (²)	-	-	-
-	003284 (²)	003444	-	003444	-	003445	000152 (²)	003596
- 5 ... + 40					- 5 ... + 40		- 5 ... + 40	
•					•		•	
•					•		•	



5. Description

General characteristics of withdrawable circuit breakers
for PowerCube modules (15kV)

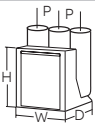


Circuit breaker		VD4/P 15	
		PowerCube module	PB2/E & PB2/FL
Standard	IEEE C37.04	•	
Rated voltage	[kV]	15	
Rated frequency	[Hz]	50/60	
Short-circuit breaking current I _{sc}	[kA]	40	
Rated current I _r	[A]	1200	2000
Short-time withstand current	[A]	40	
Short circuit withstand	[A]	2	
Close and latch capability	[kA]	104	
Operation sequence	[O - 0,3 s - CO - 3 min - CO]	•	
% DC component	[%]	30	
Interrupting time	[ms]	50	
Closing time	[ms]	30...60	
Mechanical endurance class	[M2]	10k	
Lightning impulse withstand voltage U _p	[kV]	95	
Power frequency withstand voltage U _d	[kV]	36	
Operating temperature	[°C]	-20...+40	
Maximum overall dimensions 	Height	[mm]	691
	Width	[mm]	653
	Depth	[mm]	642
	Pole distance	[mm]	210
Standard table of dimensions		TN	7415
Weight		[kg]	160

5. Description

General characteristics of withdrawable circuit breakers for PowerCube modules (17.5 kV)



Circuit breaker		VD4/P 17		VD4/W 17		VD4/P 17		
	PowerCube module	PB1		PB2		PB2		
Standards	IEC 62271-100	•		•		•		
Rated voltage	Ur [kV]	17.5		17.5		17.5		
Rated insulation voltage	Us [kV]	17.5		17.5		17.5		
Withstand voltage at 50 Hz	Ud (1 min) [kV]	38		38		38		
Impulse withstand voltage	Up [kV]	95		95		95		
Rated frequency	fr [Hz]	50-60		50-60		50-60		
Rated normal current (40 °C)(¹)	Ir [A]	630	1250	630	1250	1250	1250	
Rated breaking capacity (rated short-circuit breaking current symmetrical)	Isc [kA]	16	16	16	16	-	-	
		20	20	20	20	-	-	
		25	25	25	25	-	-	
		31.5	31.5	31.5	31.5	-	-	
		-	-	-	-	40	-	
		-	-	-	-	-	50	
		-	-	-	-	-	-	
Rated short-time withstand current (3s)	Ik [kA]	16	16	16	16	-	-	
		20	20	20	20	-	-	
		25	25	25	25	-	-	
		31.5	31.5	31.5	31.5	-	-	
		-	-	-	-	40	-	
		-	-	-	-	-	50	
		-	-	-	-	-	-	
Making capacity	Ip [kA]	40	40	40	40	-	-	
		50	50	50	50	-	-	
		63	63	63	63	-	-	
		80	80	80	80	-	-	
		-	-	-	-	100	-	
		-	-	-	-	-	125	
		-	-	-	-	-	-	
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•		•				
Opening time	[ms]	33 ... 60		33 ... 60				
Arcing time	[ms]	10 ... 15		10 ... 15				
Total breaking time	[ms]	43 ... 75		43 ... 75				
Closing time	[ms]	30 ... 60		30 ... 60				
Maximum overall dimensions		H [mm]	628	628	691	691	691	691
		W [mm]	503	503	653	653	653	681
		D [mm]	662	662	642	642	641	643
		Pole distance P [mm]	150	150	210	210	210	210
Weight	[kg]	116	116	135	135	174	180	
Standardised table of dimensions	TN	7412 (²)	7412 (²)	7420 (²)	7420 (²)	-	-	
	1VCD	-	-	-	-	003284 (³)	003444	
Operating temperature	[°C]	- 5 ... + 40		- 5 ... + 40				
Tropicalization	IEC: 60068-2-30, 60721-2-1	•		•				
Electromagnetic compatibility	IEC: 62271-1	•		•				

(¹) Rated current guaranteed with circuit breaker installed in PowerCube enclosure and with 40 °C ambient temperature.

(²) Up to 4000 A with forced ventilation.

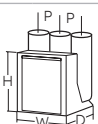
(³) Poles in polyamide.

VD4/P 17					VD4/W 17			
PB2					PB3		PB3	
•					•		•	
17.5					17.5		17.5	
17.5					17.5		17.5	
38					38		38	
95					95		95	
50-60					50-60		50-60	
1600	1600	1600	2000	2000	2500	2500	3150 (²)	3150 (²)
-	-	-	-	-	-	-	-	-
20	-	-	20	-	20	-	20	-
25	-	-	25	-	25	-	25	-
31.5	-	-	31.5	-	31.5	-	31.5	-
-	40	-	40	-	40	-	40	-
-	-	50	-	50	-	50	-	50
-	-	-	-	-	-	-	-	-
20	-	-	20	-	20	-	20	-
25	-	-	25	-	25	-	25	-
31.5	-	-	31.5	-	31.5	-	31.5	-
-	40	-	40	-	40	-	40	-
-	-	50	-	50	-	50	-	50
-	-	-	-	-	-	-	-	-
50	-	-	50	-	50	-	50	-
63	-	-	63	-	63	-	63	-
80	-	-	80	-	80	-	80	-
-	100	-	100	-	100	-	100	-
-	-	125	-	125	-	125	-	125
•					•		•	
33 ... 60					33 ... 60		33 ... 60	
10 ... 15					10 ... 15		10 ... 15	
43 ... 75					43 ... 75		43 ... 75	
30 ... 60					30 ... 60		30 ... 60	
691	691	691	690	691	691	691	730	691
653	653	681	653	681	853	853	853	853
642	641	643	642	643	640	643	640	643
210	210	210	210	210	275	275	275	275
160	174	180	160	190	186	225	221	240
7415 (²)	-	-	7415 (²)	-	7417 (²)	-	-	-
-	003284 (²)	003444	-	003444	-	003445	000152 (²)	003596
- 5 ... + 40					- 5 ... + 40		- 5 ... + 40	
•					•		•	
•					•		•	

5. Description

General characteristics of withdrawable circuit breakers for PowerCube modules (24 kV)



Circuit breaker	VD4/P 24						
	PowerCube module	PB4		PB5			
Standards	IEC 62271-100	•		•			
Rated voltage	Ur [kV]	24		24			
Rated insulation voltage	Us [kV]	24		24			
Withstand voltage at 50 Hz	Ud (1 min) [kV]	50		50			
Impulse withstand voltage	Up [kV]	125		125			
Rated frequency	fr [Hz]	50-60		50-60			
Rated normal current (40 °C) ⁽¹⁾	Ir [A]	630	1250	1600	2000	2500 ⁽²⁾	
		16	16	16	16	16	
		20	20	20	20	20	
		25	25	25	25	25	
		–	31.5	31.5	31.5	31.5	
Rated breaking capacity (rated short-circuit breaking current symmetrical)	Isc [kA]	16	16	16	16	16	
		20	20	20	20	20	
		25	25	25	25	25	
		–	31.5	31.5	31.5	31.5	
		–	31.5	31.5	31.5	31.5	
Rated short-time withstand current (3s)	Ik [kA]	16	16	16	16	16	
		20	20	20	20	20	
		25	25	25	25	25	
		–	31.5	31.5	31.5	31.5	
		–	31.5	31.5	31.5	31.5	
Making capacity	Ip [kA]	40	40	40	40	40	
		50	50	50	50	50	
		63	63	63	63	63	
		–	80	80	80	80	
		–	80	80	80	80	
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•	
Opening time	[ms]	33 ... 60		33 ... 60			
Arcing time	[ms]	10 ... 15		10 ... 15			
Total breaking time	[ms]	43 ... 75		43 ... 75			
Total breaking time	[ms]	30 ... 60		30 ... 60			
Maximum overall dimensions		H [mm]	794	794	838	838	838
		W [mm]	653	653	853	853	853
		D [mm]	802	802	790	790	790
		Pole distance P [mm]	210	210	275	275	275
Weight	[kg]	140	140/146 ⁽³⁾	228	228	228	
Standardised table of dimensions	TN	7413	7413	7418	7418	7418	
	1VCD	–	000173 ⁽³⁾	–	–	–	
Operating temperature	[°C]	- 5 ... + 40					
Tropicalization	IEC: 60068-2-30, 60721-2-1	•					
Electromagnetic compatibility	IEC: 62271-1	•					

⁽¹⁾ Rated current guaranteed with circuit breaker installed in PowerCube enclosure and with 40 °C ambient temperature.

⁽²⁾ 2300 A rated uninterrupted current guaranteed with natural ventilation; 2500 A rated current guaranteed with forced ventilation.

⁽³⁾ 31.5 kA version.

5.6.5. Types of withdrawable circuit breakers available for PowerCube modules

VD4 withdrawable circuit breaker (12 kV)

Ur	Isc	Rated uninterrupted current (40 °C) [A]					Circuit breaker type
kV	kA	W=650	W=800	W=1000	W=1000	W=1000	
		P=150	P=210	P=275	P=275	P=275	
		u/l=205	u/l=310	u/l=310	u/l=310	u/l=310	
		ø=35	ø=79	ø=79	ø=109	ø=109	
12	16	630					VD4/P 12.06.16 p150
	20	630					VD4/P 12.06.20 p150
	25	630					VD4/P 12.06.25 p150
	31.5	630					VD4/P 12.06.32 p150
	16	1250					VD4/P 12.12.16 p150
	20	1250					VD4/P 12.12.20 p150
	25	1250					VD4/P 12.12.25 p150
	31.5	1250					VD4/P 12.12.32 p150
	16	630					VD4/W 12.06.16 p210
	20	630					VD4/W 12.06.20 p210
	25	630					VD4/W 12.06.25 p210
	31.5	630					VD4/W 12.06.32 p210
	16	1250					VD4/W 12.12.16 p210
	20	1250					VD4/W 12.12.20 p210
	25	1250					VD4/W 12.12.25 p210
	31.5	1250					VD4/W 12.12.32 p210
	40	1250					VD4/P 12.12.40 p210
	50	1250					VD4/P 12.12.50 p210
	20	1600					VD4/P 12.16.20 p210
	25	1600					VD4/P 12.16.25 p210
	31.5	1600					VD4/P 12.16.32 p210
	40	1600					VD4/P 12.16.40 p210
	50	1600					VD4/P 12.16.50 p210
	20	2000					VD4/P 12.20.20 p210
	25	2000					VD4/P 12.20.25 p210
	31.5	2000					VD4/P 12.20.32 p210
	40	2000					VD4/P 12.20.40 p210
	50	2000					VD4/P 12.20.50 p210
	20	2500					VD4/P 12.25.20 p275
	25	2500					VD4/P 12.25.25 p275
	31.5	2500					VD4/P 12.25.32 p275
	40	2500					VD4/P 12.25.40 p275
	50	2500					VD4/P 12.25.50 p275
	20	3150 (I)					VD4/W 12.32.20 p275
	25	3150 (I)					VD4/W 12.32.25 p275
	31.5	3150 (I)					VD4/W 12.32.32 p275
	40	3150 (I)					VD4/W 12.32.40 p275
	50	3150 (I)					VD4/W 12.32.50 p275

W = Width of the switchgear.

P = Pole horizontal centre distance.

u/l = Distance between bottom and top terminal.

ø = Diameter of the isolating contact.

(*) Up to 4000 A rated current guaranteed with forced ventilation. Available on request.

5. Description

VD4 withdrawable circuit breakers (15kV)

Ur	Isc	Rated uninterrupted current (40 °C) [A]		Circuit breaker type
		W=650	W=800	
kV	kA	P=150	P=210	
		u/l=205	u/l=310	
		Ø=35	Ø=79	
15	31.5	1200		VD4/N/P 15.12.32 p150
	40		1200	VD4/P 15.12.40 p210
	31.5		2000	VD4/N/P 15.20.32 p210
	40		2000	VD4/P 15.20.40 p210

VD4 withdrawable circuit breaker (17.5 kV)

Ur	Isc	Rated uninterrupted current (40 °C) [A]					Circuit breaker type
		W=650	W=800	W=1000	W=1000	W=1000	
kV	kA	P=150	P=210	P=275	P=275	P=275	
		u/l=205	u/l=310	u/l=310	u/l=310	u/l=310	
		Ø=35	Ø=79	Ø=79	Ø=109	Ø=109	
17.5	16	630					VD4/P 17.06.16 p150
	20	630					VD4/P 17.06.20 p150
	25	630					VD4/P 17.06.25 p150
	31.5	630					VD4/P 17.06.32 p150
	16	1250					VD4/P 17.12.16 p150
	20	1250					VD4/P 17.12.20 p150
	25	1250					VD4/P 17.12.25 p150
	31.5	1250					VD4/P 17.12.32 p150
	16		630				VD4/W 17.06.16 p210
	20		630				VD4/W 17.06.20 p210
	25		630				VD4/W 17.06.25 p210
	31.5		630				VD4/W 17.06.32 p210
	16		1250				VD4/W 17.12.16 p210
	20		1250				VD4/W 17.12.20 p210
	25		1250				VD4/W 17.12.25 p210
	31.5		1250				VD4/W 17.12.32 p210
	40		1250				VD4/P 17.12.40 p210
	50		1250				VD4/P 17.12.50 p210
	20			1600			VD4/P 17.16.20 p210
	25			1600			VD4/P 17.16.25 p210
	31.5			1600			VD4/P 17.16.32 p210
	40			1600			VD4/P 17.16.40 p210
	50			1600			VD4/P 17.16.50 p210
	20			2000			VD4/P 17.20.20 p210
	25			2000			VD4/P 17.20.25 p210
	31.5			2000			VD4/P 17.20.32 p210
	40			2000			VD4/P 17.20.40 p210
	50			2000			VD4/P 17.20.50 p210
	20				2500		VD4/P 17.25.20 p275
	25				2500		VD4/P 17.25.25 p275
	31.5				2500		VD4/P 17.25.32 p275
	40				2500		VD4/P 17.25.40 p275
	50				2500		VD4/P 17.25.50 p275
	20					3150 ⁽¹⁾	VD4/W 17.32.20 p275
	25					3150 ⁽¹⁾	VD4/W 17.32.25 p275
	31.5					3150 ⁽¹⁾	VD4/W 17.32.32 p275
	40					3150 ⁽¹⁾	VD4/W 17.32.40 p275
	50					3150 ⁽¹⁾	VD4/W 17.32.50 p275

W = Width of the switchgear.
P = Pole horizontal centre distance.
u/l = Distance between bottom and top terminal.
Ø = Diameter of the isolating contact.
⁽¹⁾ Up to 4000 A rated current guaranteed with forced ventilation. Available on request.

VD4 withdrawable circuit breaker (24 kV)

Ur	Isc	Rated uninterrupted current (40 °C) [A]		Circuit breaker type
kV	kA	W=800	W=1000	
		P=210	P=275	
		u/l=310	u/l=310	
		ø=35	ø=79	
24	16	630		VD4/P 24.06.16 p210
	20	630		VD4/P 24.06.20 p210
	25	630		VD4/P 24.06.25 p210
	16	1250		VD4/P 24.12.16 p210
	20	1250		VD4/P 24.12.20 p210
	25	1250		VD4/P 24.12.25 p210
	31.5	1250		VD4/P 24.12.32 p210
	16		1600	VD4/P 24.16.16 p275
	20		1600	VD4/P 24.16.20 p275
	25		1600	VD4/P 24.16.25 p275
	31.5		1600	VD4/P 24.16.32 p275
	16		2000	VD4/P 24.20.16 p275
	20		2000	VD4/P 24.20.20 p275
	25		2000	VD4/P 24.20.25 p275
	31.5		2000	VD4/P 24.20.32 p275
	16		2300 (†)	VD4/P 24.25.16 p275
	20		2300 (†)	VD4/P 24.25.20 p275
	25		2300 (†)	VD4/P 24.25.25 p275
	31.5		2300 (†)	VD4/P 24.25.32 p275

W = Width of the switchgear.

P = Pole horizontal centre distance.

u/l = Distance between bottom and top terminal.

ø = Diameter of the isolating contact.

(†) Up to 2500 A rated current guaranteed with forced ventilation.

Standard fittings of withdrawable circuit breakers for PowerCube modules

The basic versions of the withdrawable circuit breakers are always three-pole and fitted with:

- EL type manual operating mechanism
- mechanical signalling device for closing springs charged/discharged
- mechanical signalling device for circuit breaker open/closed
- closing pushbutton
- opening pushbutton
- operation counter
- set of ten circuit breaker open/closed auxiliary contacts
Note: with the group of ten auxiliary contacts supplied as standard and the maximum number of electrical applications, three break contacts (signalling circuit breaker open) and four make contacts (signalling circuit breaker closed) are available.
- lever built into operating mechanism for linear loading of closing spring
- isolating contacts
- cord with connector (plug only) for auxiliary circuits, with striker pin which does not allow the plug to be inserted into the socket if the rated current of the circuit breaker is different from the rated current of the panel
- racking-in/out lever (the quantity must be defined according to the number of pieces of apparatus ordered)
- electromagnet lock in the truck. Prevents the circuit breaker from being racked into the panel when the auxiliary circuits are not connected (plug not in socket)
- door interlock (compulsory for ABB switchgear); this device prevents racking the circuit breaker into the switchgear when the switchgear door is open.



VD4 with poles in polyamide



5. Description

5.6.6. General characteristics of withdrawable circuit breakers for ZS8.4 switchgear



Circuit breaker		VD4/Z8					
Panel without partitions		•					
Panel with partitions		-					
Preussen Elektra - EON (²)		-					
		Width [kV]	650	650	650	650	800
		Depth [kV]	1000	1000	1000	1000	1200
		IEC 62271-100	•				
Standards		VDE 0671	•				
Rated voltage	Ur [kV]	12	12	17.5	17.5	24	24
Rated insulation voltage	Us [kV]	12	12	17.5	17.5	24	24
Withstand voltage at 50 Hz	Ud (1 min) [kV]	28	28	38	38	50	50
Impulse withstand voltage	Up [kV]	75	75	95	95	125	125
Rated frequency	fr [Hz]	50-60					
Rated normal current (40 °C) (¹)	Ir [A]	630	1250	630	1250	630	1250
Rated breaking capacity (rated symmetrical short-circuit current)		-	-	-	-	16	16
	Isc [kA]	20	20	20	20	20	20
		25	25	25	25	25	25
Rated short-time withstand current (3 s)		-	-	-	-	16	16
	Ik [kA]	20	20	20	20	20	20
		25	25	25	25	25	25
Making capacity		-	-	-	-	40	40
	Ip [kA]	50	50	50	50	50	50
		63	63	63	63	63	63
Operation sequence	[O-0.3s-CO-15s-CO]	•					
Opening time	[ms]	33...60					
Arcing time	[ms]	10...15					
Total breaking time	[ms]	43...75					
Closing time	[ms]	60...80					
Maximum overall dimensions	H [mm]	579	579	579	579	680	680
	W [mm]	503	503	503	503	653	653
	D [mm]	548	548	548	548	646	646
	Pole distance P [mm]	150	150	150	150	210	210
Weight	[kg]	116	116	116	116	140	140
Standardised table of dimensions	1VCD	000092	000137	000137	000137	000089	000138
Operating temperature	[°C]	- 5 ... + 40					
Tropicalisation	IEC 60068-2-30	•					
	IEC 60721-2-1	•					
Electromagnetic compatibility	IEC 62271-1	•					

(¹) Rated current guaranteed with circuit breaker installed in switchgear with 40 °C ambient temperature.

(²) Special type with device for charging the closing spring by means of a rotary handle outside the operating mechanism.

VD4/ZT8						VD4/ZS8			
-						-			
•						-			
-						•			
650	650	650	650	800	800	650	650	800	800
1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
•						•			
•						•			
12	12	17.5	17.5	24	24	12	12	24	24
12	12	17.5	17.5	24	24	12	12	24	24
28	28	38	38	50	50	28	28	50	50
75	75	95	95	125	125	75	75	125	125
50-60						50-60			
630	1250	630	1250	630	1250	630	1250	630	1250
-	-	-	-	16	16	-	-	16	16
20	20	20	20	20	20	20	20	20	20
25	25	25	25	25	25	25	25	25	25
-	-	-	-	16	16	-	-	16	16
20	20	20	20	20	20	20	20	20	20
25	25	25	25	25	25	25	25	25	25
-	-	-	-	40	40	-	-	40	40
50	50	50	50	50	50	50	50	50	50
63	63	63	63	63	63	63	63	63	63
•						•			
33...60						40...60			
10...15						10...15			
43...75						50...75			
60...80						60...80			
579	579	579	579	680	680	579	579	680	680
503	503	503	503	653	653	503	503	653	653
638	638	638	638	646	646	638	638	646	646
150	150	150	150	210	210	150	150	210	210
116	116	116	116	140	140	116	116	140	140
000093	000134	000134	000134	000090	000136	000091	000133	000088	000135
- 5 ... + 40						- 5 ... + 40			
•						•			
•						•			
•						•			

5. Description

5.6.7. General characteristics of withdrawable circuit breakers for ZS8.4 switchgear

VD4/ZS8 - VD4/ZT8 - VD4/Z8 withdrawable circuit breaker for ZS8.4 switchgear

Ur	Isc	Rated uninterrupted current (40 °C) [A]						Circuit breaker type
kV	kA	Panel without partition		Panel with partition		Special panel EON		
		W = 650	W = 800	W = 650	W = 800	W = 650	W = 800	
		P = 150	P = 210	P = 150	P = 210	P = 150	P = 210	
		u/l = 205	u/l = 310	u/l = 205	u/l = 310	u/l = 205	u/l = 310	
		ø = 35	ø = 35	ø = 35	ø = 35	ø = 35	ø = 35	
12	20	630						VD4/Z8 12.06.20 p150
	25	630						VD4/Z8 12.06.25 p150
	20	1250						VD4/Z8 12.12.20 p150
	25	1250						VD4/Z8 12.12.25 p150
	20			630				VD4/ZT8 12.06.20 p150
	25			630				VD4/ZT8 12.06.25 p150
	20			1250				VD4/ZT8 12.12.20 p150
	25			1250				VD4/ZT8 12.12.25 p150
	20					630		VD4/ZS8 12.06.20 p150
	25					630		VD4/ZS8 12.06.25 p150
	20					1250		VD4/ZS8 12.12.20 p150
	25					1250		VD4/ZS8 12.12.25 p150
17.5	20	630						VD4/Z8 17.06.20 p150
	25	630						VD4/Z8 17.06.25 p150
	20	1250						VD4/Z8 17.12.20 p150
	25	1250						VD4/Z8 17.12.25 p150
	20			630				VD4/ZT8 17.06.20 p150
	25			630				VD4/ZT8 17.06.25 p150
	20			1250				VD4/ZT8 17.12.20 p150
	25			1250				VD4/ZT8 17.12.25 p150
24	16		630					VD4/Z8 24.06.16 p210
	20		630					VD4/Z8 24.06.20 p210
	25		630					VD4/Z8 24.06.25 p210
	16		1250					VD4/Z8 24.12.16 p210
	20		1250					VD4/Z8 24.12.20 p210
	25		1250					VD4/Z8 24.12.25 p210
	16				630			VD4/ZT8 24.06.16 p210
	20				630			VD4/ZT8 24.06.20 p210
	25				630			VD4/ZT8 24.06.25 p210
	16				1250			VD4/ZT8 24.12.16 p210
	20				1250			VD4/ZT8 24.12.20 p210
	25				1250			VD4/ZT8 24.12.25 p210
	16						630	VD4/ZS8 24.06.16 p210
	20						630	VD4/ZS8 24.06.20 p210
	25						630	VD4/ZS8 24.06.25 p210
	16						1250	VD4/ZS8 24.12.16 p210
	20						1250	VD4/ZS8 24.12.20 p210
	25						1250	VD4/ZS8 24.12.25 p210

W = Width of the switchgear.

P = Pole horizontal centre distance.

u/l = Distance between bottom and top terminal.

ø = Diameter of the isolating contact.

5.6.8. Standard fittings for withdrawable circuit breakers for ZS8.4 switchgear

The basic versions of the withdrawable circuit breakers are always three-pole and fitted with:

- EL type manual operating mechanism
 - mechanical signalling device for closing spring charged/ discharged
 - mechanical signalling device for circuit breaker open/closed
 - closing pushbutton
 - opening pushbutton
 - operation counter
 - set of ten auxiliary circuit breaker open/closed contacts
- Note: with the set of ten auxiliary contacts supplied as standard and the maximum number of electrical applications possible, three make contacts (signalling circuit breaker open) and four break contacts (signalling circuit breaker closed) are available.
- lever for manually charging the closing springs incorporated in the operating mechanism for VD4/Z8 and VD4/ZT8, external with rotary movement for VD4/ZS8
 - isolating contacts
 - cord with connector (only plug) for auxiliary circuits, with striker pin which does not allow connection of the plug in the socket if the rated current of the circuit breaker is different from the rated current of the panel
 - racking-in/out lever (the quantity must be defined according to the number of pieces of apparatus ordered)

5.6.9. VD4/ZS8 (Preussen Elektra-EON version)

- Device for recharging the closing spring, with door closed, by means of removable rotary handle and outside the operating mechanism and the switchgear
- 64-pin Harting socket with mechanical interlock which prevents traverse of the circuit breaker when the plug is not inserted in the socket
- Interlock with the door which prevents insertion of the spring charging lever when the circuit breaker is closed
- Interlock with the door and the 64-pin Harting socket which prevents door closure when the plug is not inserted in the socket.

5.6.10. VD4/Z8 - VD4/ZT8

- Harting 64-pin socket with mechanical interlock which prevents traverse of the circuit breaker when the plug is not inserted in the socket.



Caption

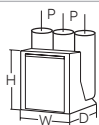
- 1) Device for spring charging with rotary handle
- 2) Harting 64-pin socket with mechanical interlock which prevents traverse when the socket is not inserted
- 3) Door-socket-spring charging device interlock (only VD4/ZS8 version)

5. Description

5.6.11. General characteristics of withdrawable circuit breakers for UniSwitch switchgear and UniMix (24 kV) switchgear



Circuit breaker		VD4/SEC	VD4/P 12	VD4/P 17	
Standards	IEC 62271-100	•	•	•	
Rated voltage	Ur [kV]	24	12	17.5	
Rated insulation voltage	Us [kV]	24	12	17.5	
Withstand voltage at 50 Hz	Ud (1 min) [kV]	50	28	38	
Impulse withstand voltage	Up [kV]	125	75	95	
Rated frequency	fr [Hz]	50-60	50-60	50-60	
Rated normal current (40 °C) (¹)	Ir [A]	630 - 1250	630	1250	630
		16	16	16	16
		20	20	20	20
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	25	25	25	25
		16	16	16	16
		20	20	20	20
Rated short-time withstand current (3 s)	Ik [kA]	25	25	25	25
		40	40	40	40
		50	50	50	50
Making capacity	Ip [kA]	63	63	63	63
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	•
Opening time	[ms]	33 ... 60	33 ... 60	33 ... 60	
Arcing time	[ms]	10 ... 15	10 ... 15	10 ... 15	
Total breaking time	[ms]	43 ... 75	43 ... 75	43 ... 75	
Closing time	[ms]	30 ... 60	30 ... 60	30 ... 60	
Maximum overall dimensions	H [mm]	743	628	628	632
	W [mm]	653	503	503	503
	D [mm]	742	662	662	664
	Pole distance P [mm]	210	150	150	150
Weight	[kg]	133	116	116	116
Standardised table of dimensions	1VCD	000190	7412 (²)	7412 (²)	7412 (²)
Operating temperature	[°C]	- 5 ... + 40	- 5 ... + 40	- 5 ... + 40	
Tropicalization	IEC: 60068-2-30, 60721-2-1	•	•	•	•
Electromagnetic compatibility	IEC 62271	•	•	•	•



(¹) Rated current guaranteed with circuit breaker installed in switchgear with 40 °C ambient temperature.

(²) Poles in polyamide.

Withdrawable circuit breakers for UniSec switchgear

Ur	Isc	Rated uninterrupted current (40 °C) [A]			Circuit breaker type
		P=150	P=150	P=210	
		u/l=205	u/l=205	u/l=310	
		ø=35	ø=35	ø=79	
12	16	630			VD4/P 12.06.16 p150
	20	630			VD4/P 12.06.20 p150
	25	630			VD4/P 12.06.25 p150
	16	1250			VD4/P 12.12.16 p150
	20	1250			VD4/P 12.12.20 p150
	25	1250			VD4/P 12.12.25 p150
17	16		630		VD4/P 17.06.16 p150
	20		630		VD4/P 17.06.20 p150
	25		630		VD4/P 17.06.25 p150
	16		1250		VD4/P 17.12.16 p150
	20		1250		VD4/P 17.12.20 p150
	25		1250		VD4/P 17.12.25 p150
24	16			630	VD4/SEC 24.06.16 p210
	20			630	VD4/SEC 24.06.20 p210
	25			630	VD4/SEC 24.06.25 p210
	16			1250	VD4/SEC 24.12.16 p210
	20			1250	VD4/SEC 24.12.20 p210
	25			1250	VD4/SEC 24.12.25 p210

P = Pole horizontal centre distance.

u/l = Distance between bottom and top terminal.

ø = Diameter of the isolating contact.

5.6.12. Standard fittings of withdrawable circuit breakers for UniSec

The basic versions of the withdrawable circuit breakers are three-pole and fitted with:

- EL type manual operating mechanism
- mechanical signalling device for closing springs charged/discharged
- mechanical signalling device for circuit breaker open/closed
- closing pushbutton
- opening pushbutton
- operation counter
- set of ten circuit breaker open/closed auxiliary contacts

- lever built into operating mechanism for linear loading of closing spring
- isolating contacts
- cord with connector (plug only) for auxiliary circuits, with striker pin which does not allow the plug to be inserted into the socket if the rated current of the circuit breaker is different from the rated current of the panel
- racking-in/out lever (the quantity must be defined according to the number of pieces of apparatus ordered)

Note: with the group of ten auxiliary contacts supplied as standard and the maximum number of electrical applications, three break contacts (signalling circuit breaker open) and four make contacts (signalling circuit breaker closed) are available.

5. Description

5.7. Characteristics of the electrical accessories

The accessories identified with the same number are alternative to each other.

1 Shunt opening release (-MBO1)

Allows opening command of apparatus to be enabled by remote control.
This release is suitable for both instantaneous and permanent duty. However, an auxiliary contact -BGB1 de-energizes it after circuit breaker has opened. In the case of instantaneous service, the current impulse must last at least 100 ms.
This release can be controlled by the following devices: coil continuity control (CCC), opening circuit supervision (TCS)(*) or the ABB STU functionality control device (see accessory 21, supplied on request).

Characteristics	
Un	24-30-48-60-110...132-220...250 V DC
Un	48-60-110...127-220...250 V AC 50-60 Hz
Operating limits	65 ... 120% Un
Inrush power (Ps)	60...100 W / VA
Continuous power consumption (Pc)	1.5 W
Electronics self-consumption (no coil supplied); value independent of voltage applied	1.5 mA
Opening time	33...60 ms
Insulation voltage	2000 V 50 Hz (for 1 min)

(*) The minimum current that the relay with TCS function (used for monitoring coil continuity) detects as a condition denoting that the trip circuit is operating correctly (specified for each relay in the relative manual), must be sensibly higher than the current consumption of the actual coil (~1.5 mA).
If this fails to occur, always add, in parallel to the TCS, a circuit able to absorb sufficient current to compensate the gap while preventing the total current in the TCS circuit from rising above the maximum threshold (Itcs < 10 mA for High Voltage coils - from 110V to 250V, and Itcs < 50 mA for Low Voltage coils from 24 V to 60 V).
A simple resistor can be sized for the purpose, depending on the parameters of the TCS and the auxiliary voltage range used.

2 Additional shunt opening release (-MBO2)

Similarly to shunt opening release -MBO1, this allows the opening command of the apparatus to be transmitted by remote control. It can be powered by the same circuit as main shunt opening release -MBO1 or by a circuit that is completely separate from release -MBO1.
This release is suitable for both instantaneous and permanent duty. However, an auxiliary contact -BGB1 de-energizes it after the circuit breaker has opened.
To guarantee the release action, the current impulse must last at least 100 ms.
Continuity functionality can be checked with a continuity control device (CCC), opening circuit supervision (TCS)(*) or the STU functionality control device (see accessory 21, supplied on request).
-MBO2 has the same electrical and operating characteristics as release -MBO1.



3 Opening solenoid (-MO3)

The opening solenoid (-MO3) is a special release with demagnetisation to be combined with an overcurrent protection relay of the self-supplied type.

It is located in the operating mechanism (in the left side piece) and is not alternative to the additional shunt opening release (-MO2).

It is not available for 40 and 50 kA circuit breakers. Should the application of this accessory be required, specify the request at the time of order since subsequent application by the customer is not possible.

Note: for combination with the protection relays, please ask for the document: Data sheet 1VCD600854.

The opening solenoid (-MBO3) is available in two versions:

- For DC (release by discharging energy stored in protection relay against overcurrent of the self-supplied type)
- For AC (release by means of the energy supplied by an adder transformer on the secondaries of the protection current transformers (the TA is at customer's charge)

(*) The minimum current that the relay with TCS function (used for monitoring coil continuity) detects as a condition denoting that the trip circuit is operating correctly (specified for each relay in the relative manual), must be sensibly higher than the current consumption of the actual coil (~1.5 mA).
If this fails to occur, always add, in parallel to the TCS, a circuit able to absorb sufficient current to compensate the gap while preventing the total current in the TCS circuit from rising above the maximum threshold (Itcs < 10 mA for High Voltage coils - from 110V to 250V, and Itcs < 50 mA for Low Voltage coils from 24 V to 60 V).
A simple resistor can be sized for the purpose, depending on the parameters of the TCS and the auxiliary voltage range used.

4 Shunt closing release (-MC)

Allows closing command of apparatus to be transmitted by remote control.
This release is suitable for both instantaneous and permanent duty. An auxiliary contact that de-energizes it after the circuit breaker has closed is not envisaged.

The permanently supplied release provides the electrical anti-pumping function with both electrical opening and re-closing commands maintained. To guarantee the closing action, the current impulse must last at least 100 ms.

If there is the same supply voltage for shunt closing release -MBC and under-voltage release -MBU and the circuit breaker must close automatically when auxiliary voltage returns, there must be a delay of at least 50 ms between under-voltage release energizing and energizing of the shunt closing release to allow the closing operation to take place. Continuity functionality can be checked with a continuity control device (CCC), opening circuit supervision (TCS)(*) or the STU functionality control device (see accessory 21, supplied on request).

Characteristics	
Un	24-30-48-60-110...132-220...250 V DC
Un	48-60-110...127-220...250 V AC 50-60 Hz
Operating limits	65 ... 120% Un
Inrush power (Ps)	60...100 W / VA
Continuous power consumption (Pc)	1.5 W
Electronics self-consumption (no coil supplied); value independent of voltage applied	
Opening time	33...60 ms
Insulation voltage	2000 V 50/60 Hz (for 1 min)



5. Description

5 Undervoltage release (-MBU)

The undervoltage release opens the circuit breaker when there is a sensible reduction or lack of the voltage that powers it. The circuit breaker can only close when the release is energized (the closing lock is obtained mechanically).

It can be used for remote release (by means of a pushbutton of the normally closed type), for locking on automatic closing/opening in the absence of voltage in the auxiliary circuits. Supplied by means of the secondary output of a voltage transformer, it provides locking upon automatic closing/opening in the absence of voltage in the Medium Voltage main circuit.

If there is the same supply voltage for shunt closing release -MBC and under-voltage release -MBU and the circuit breaker must close automatically when auxiliary voltage returns, there must be a delay of at least 50 ms between under-voltage release energizing and energizing of the shunt closing release to allow the closing operation to take place.

The undervoltage release is available in the following versions:

5A Undervoltage release (with supply shunted from a transformer on the supply side of the circuit breaker or from an auxiliary power supply, regardless of the state in which the circuit breaker is to be found).

5B Undervoltage release with -KFT electronic time-lag device (0.5 - 1 - 1.5 - 2 - 3 s) (with power supply as indicated for 5A); this device is supplied with a 0.5 s setting (the adjustments are described in the Circuit diagrams chapter)

Characteristics	
Un	24-30-48-60-110...132-220...250 V DC
Un	48-60-110...127-220...250 V AC 50-60 Hz
Operating limits	– circuit breaker opening: 35-70% Un
	– circuit breaker closing: 85-110% Un
Inrush power (Ps)	150 W / VA
Continuous power consumption (Pc)	1.55 W
Electronics self-consumption (no coil supplied); value independent of voltage applied	1.5 mA
Opening time	60...80 ms
Insulation voltage	2000 V 50/60 Hz (for 1 min)

Note
As an alternative to the undervoltage release, an additional shunt opening release (-MBO4) with the same electrical and operating specifications as shunt opening release (-MBO1) can be installed on request (only for circuit breakers 12..17.5 kV up to 40 kA and 24 kV up to 31.5 kA).

Warning! Since installation of the additional shunt opening release (-MBO4) requires a special mounting plate for releases, ask for application (-MBO4) when ordering and not after delivery.



5a Electronic time delay device (-KFT)

The electronic time delay device must be mounted externally in relation to the circuit breaker. It allows release trip delay with established and adjustable times.

The use of the undervoltage release is recommended in order to prevent trips when the power supply network of the release may be subject to cuts or voltage drops of short duration. If it is not supplied, circuit breaker closing is disabled.

The time delay device must be combined with an undervoltage release for d.c.

Rated voltage of the undervoltage release must be within the selected range of working of the time-delay device.

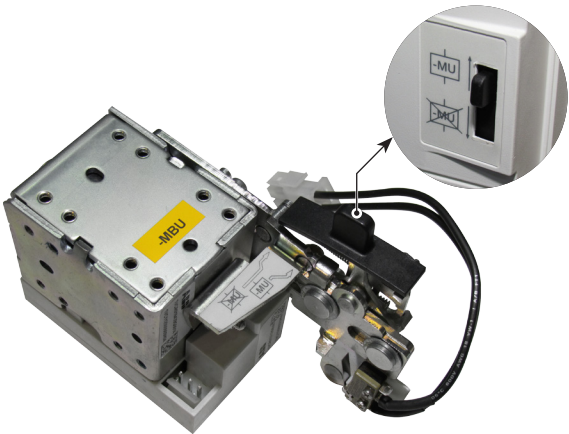
Characteristics of the time-delay device	
Un	24...30 - 48 - 60 - 110...127 - 220...250 V~
Un	48 - 60 - 110...127 - 220...240 - V~ 50/60 Hz
Adjustable opening time (release + time delay device): 0.5-1-1.5-2-3 s	

6 Undervoltage release mechanical override

This is a mechanical device which allows the undervoltage release trip to be temporarily excluded.

It is always fitted with electrical signalling.

Should the application of this accessory be required, specify the request at the time of order since subsequent application by the customer is not possible.



5. Description

7a Auxiliary contacts of the circuit breaker (-BGB1) for 12 to 24 kV versions

Electrical signalling of circuit breaker open/closed can be obtained with a group of 10, 16 or 20 auxiliary contacts for the fixed version and 10 or 16 auxiliary contacts for the withdrawable version. The standard equipment comprises 10 auxiliary contacts.

Note

The following are available using the standard group of ten auxiliary contacts and the maximum number of electrical accessories:

- for fixed circuit breakers: three closing contacts "a" for signalling circuit breaker open and five opening contacts "b" for signalling circuit breaker closed;
- for withdrawable circuit breakers: three closing contacts "a" for signalling circuit breaker open and four opening contacts "b" for signalling circuit breaker closed;

Circuit breakers in the fixed version are available with two finishing accessories (to be specified when ordering):

- non-wired auxiliary contacts; wiring to the terminals of the contacts is at the customer's charge (photo below left; the terminal box to which the other electrical accessories are wired is at the top); ask for instructions 1VCD601204 (available in the main languages) which describe how to remove, wire auxiliary contacts more easily and fit auxiliary contacts unit back into its housing;
- auxiliary contacts already wired to the terminal box (see photo at top right).

Consult circuit diagrams 1VCD400151 for fixed circuit breakers and 1VCD400155 for withdrawable circuit breakers.

Note: The main shunt opening release and/or the additional shunt opening release use 1 and/or 2 closing contacts "a", thereby reducing the number of auxiliary contacts available. Always check the maximum number of contacts available with non-standard equipment.

The new diagrams are interchangeable with the existing ones, with the following exceptions:

- diagram 1VCD400151 (substitutes 1VCD400046 and 1VCD400099)
- fig. 34 on the previous diagrams is represented by fig. 31 + fig. 32 on the new diagram;
- fig. 33 and fig. 35 on the previous diagrams are not available with the new layout
- diagram 1VCD400155 (substitutes 1VCD400047)



Auxiliary contacts –BGB1 conform to the following standards/regulations/directives:

- IEC 62271-100
- IEEE C37.54
- EN 61373 cat.1 class B / impact and vibration test
- Germanish Loyd regulation / vibrations envisaged by the shipping registers
- UL 508
- EN 60947 (DC-21A DC-22A DC-23A AC-21A)
- RoHS Directive

General characteristics	
Insulation voltage to standard	660 V AC
VDE 0110, Group C	800 V DC
Rated voltage	24 V ... 660 V
Test voltage	2 kV for 1 min
Maximum rated current	10 A - 50/60 Hz
Breaking capacity	Class 1 (IEC 62271-1)
Number of contacts	5
Groups of contacts	10 / 16 / 20
Contact travel	90°
Actuating force	0.66 Nm
Resistance	<6.5 mΩ
Storage temperature	-30 °C ... +120 °C
Operating temperature	-20 °C ... +70 °C (-30° ref. ANSI 37.09)
Contact overtemperature	10 K
Mechanical life	30.000 mechanical operations
Protection class	IP20
Cable section	1 mm ²

Electrical characteristics (according to IEC 60947)		
Rated current Un		Breaking capacity (10000 interruptions)
220 V AC	cosφ = 0.70	20 A
220 V DC	cosφ = 0.45	10 A
24 V DC	1 ms	12 A
	15 ms	9 A
	50 ms	6 A
60 V DC	1 ms	10 A
	15 ms	6 A
	50 ms	4.6 A
110 V DC	1 ms	7 A
	15 ms	4.5 A
	50 ms	3.5 A
220 V DC	1 ms	2 A
	15 ms	1.7 A
	50 ms	1.5 A
250 V DC	1 ms	2 A
	15 ms	1.4 A
	50 ms	1.2 A

Electrical characteristics (according to IEC 62271-100 class 1)		
Rated current Un		Breaking capacity
24 V DC 20 ms		18.8 A
60 V DC 20 ms		7.4 A
110 V DC 20 ms		4.2 A
250 V DC 20 ms		1.8 A

5. Description

7b Auxiliary contacts of the circuit breaker (-BGB1, -BGB2, -BGB3) for 36 kV version

As an alternative to the standard 10 contacts, electrical signaling of circuit breaker open/closed can be obtained with a group of 15 auxiliary contacts.

Consult the following circuit diagrams for VD4 36 kV series with "7b" auxiliary contacts:

- for fixed circuit breakers: 1VCD400236
- for withdrawable circuit breakers: 1VCD400237

Note

The following are available with the standard group of ten contacts and maximum electrical applications:

- three make contacts (circuit breaker open signal) and five break contacts (circuit breaker closed signal), and five break contacts (circuit breaker closed signal) for fixed circuit breakers, four break contacts (circuit breaker closed signal) for withdrawable circuit breakers.

Depending on the electrical applications required, the following are available with the group of 15 auxiliary circuits:

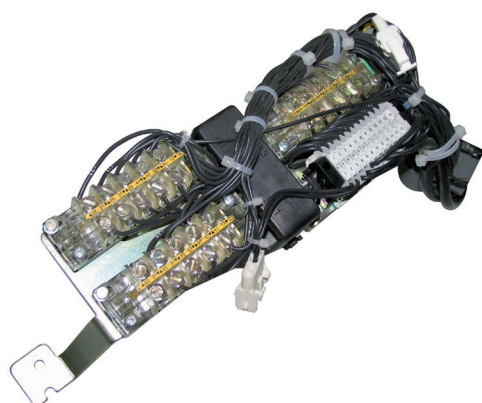
- for fixed circuit breakers: thirteen auxiliary contacts comprising the numbers of break contacts and make contacts established by the required wiring configuration;
- for withdrawable circuit breakers, since the plug of the auxiliary circuits has a limited number of pins: five make contacts (circuit breaker open signal) and five break contacts (circuit breaker closed signal).

General characteristics

Insulation voltage to standard VDE 0110, Group C	660 V AC 800 V DC
Rated voltage	24 V ... 660 V AC
Test voltage	2 kV 50 Hz (for 1 min)
Maximum rated current	10 A
Number of contacts	5
Contact travel	6 mm ... 7 mm
Actuating force	26 N
Resistance	3 mΩ
Storage temperature	-20 °C ... +120 °C
Operating temperature	-20 °C ... +70 °C
Contact overtemperature	20 K
Number of cycles	30.000
Unlimited breaking capacity if used with 10 A fuse in series	

Electrical characteristics

Un		Rated current	Breaking capacity
220 V AC	$\cos\varphi = 0.7$	2.5 A	25 A
380 V AC	$\cos\varphi = 0.7$	1.5 A	15 A
500 V AC	$\cos\varphi = 0.7$	1.5 A	15 A
660 V AC	$\cos\varphi = 0.7$	1.2 A	12 A
24 V DC	1 ms	10 A	12 A
	15 ms	10 A	12 A
	50 ms	8 A	10 A
	200 ms	6 A	7.7 A
60 V DC	1 ms	8 A	10 A
	15 ms	6 A	8 A
	50 ms	5 A	6 A
	200 ms	4 A	5.4 A
110 V DC	1 ms	6 A	8 A
	15 ms	4 A	5 A
	50 ms	2 A	4.6 A
	200 ms	1 A	2.2 A
220 V DC	1 ms	1.5 A	2 A
	15 ms	1 A	1.4 A
	50 ms	0.75 A	1.2 A
	200 ms	0.5 A	1 A



8 Transient contact (-BGB4)

This contact closes momentarily (duration > 30 ms) on circuit breaker opening controlled remotely with a shunt opening release.

The indication is not provided when opening is manual and local. In fact, a contact (-BGB11) is activated by the manual pushbutton and cuts off the transient contact closure (-BGB4).

The transient contact is activated directly from the main operating shaft when the indication is provided only on actual opening of the main circuit breaker contacts.

9 Position contact (-BGT3)

This contact is used, together with the locking magnet in the operating mechanism (-RLE1) to prevent remote closing during traverse into the unit.

It is only supplied for the withdrawable version circuit breakers for UniGear ZS1 switchgear and PowerCube modules.

It cannot be supplied when the transmitted contacts are requested in the truck (-BGT1; -BGT2).

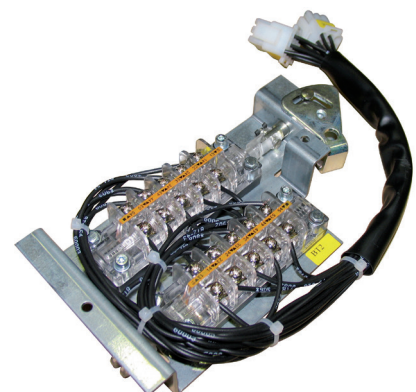


10 Transmitted contacts in the truck (-BGT1; -BGT2)

Transmitted contacts of the withdrawable circuit breaker (installed in the circuit breaker truck - only for VD4/P withdrawable circuit breaker).

These contacts are either in addition or as an alternative to the position contacts (for signalling circuit breaker racked out) located in the unit. They also carry out the function of the position contact (-BGT3).

Contacts -BGT1 and BGT2 have the same general and electrical characteristics as auxiliary contacts "7b. -BGB1, -BGB2, -BGB3".



5. Description

11 Motor operator (-MAS)

This carries out automatic charging of the circuit breaker operating mechanism closing spring. After circuit breaker closing, the geared motor immediately recharges the closing springs. In the case of a power cut or during maintenance work, the closing spring can be charged manually in any case (by means of the special crank handle incorporated in the operating mechanism).

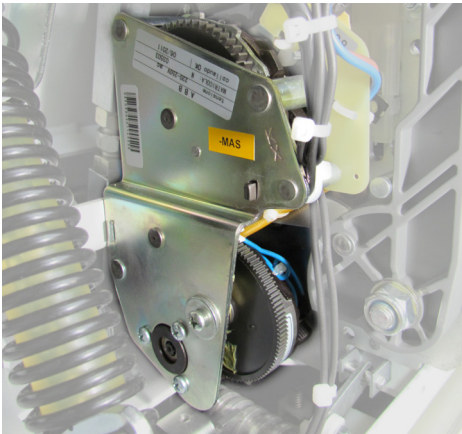
Characteristics		
Un	24...30 - 48...60 - 110...130 - 220...250 V~	
Un	100...130 - 220...250 V~ 50/60 Hz	
Operating limits	85 ... 110% Un	
Power on inrush (Ps)	≤ 40 kA	50 kA
	DC = 600 W; AC = 600 VA	DC = 900 W; AC = 900 VA
Rated power (Pn)	DC = 200 W; AC = 200 VA	DC = 350 W; AC = 350 VA
Inrush duration	0.2 s	0.2 s
Charging time	6-7 s	6-7 s
Insulating voltage	2000 V 50/60 Hz (for 1 min)	2000 V 50 Hz (for 1 min)

12 Contact for signalling closing spring charged/ discharged (-BGS2)

This consists of a microswitch which allows remote signalling of the state of the circuit breaker operating mechanism closing spring. The following signals are possible:

- contact open: signalling spring charged
- contact closed: signalling spring discharged.

The two signals must be used for circuits which have the same power supply voltage.

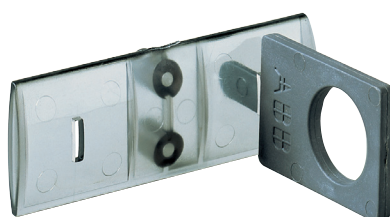


Protections and locks

Various mechanical and electromechanical locking and protection devices are available.

13 Opening and closing pushbutton protection

The protection only allows the opening and closing pushbuttons to be operated using a special tool.



14 Opening and closing pushbutton padlock

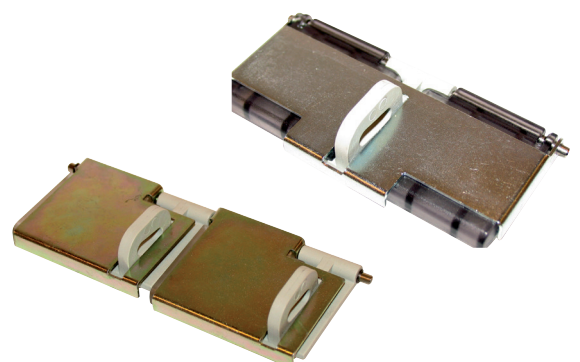
The device allows the opening and closing pushbuttons to be locked using a maximum of three padlocks (not supplied): \varnothing 4 mm. Also prevents closing using remote control.

This lock is available in two versions:

14A Possibility of padlocking both the pushbuttons without distinction

14B Separate padlocking of the opening and/or closing pushbutton.

N.B. Lock 14A prevents closure by remote control; lock 14B does not prevent closure by remote control.



5. Description

15 Key lock in open position

The lock is activated by a special circular lock. Different keys (for a single circuit breaker) are available, or the same keys (for several circuit breakers).

To activate the lock, keep the opening pushbutton pressed down, turn the key and remove it. With the key removed, the opening pushbutton automatically remains in the pressed position preventing local manual closing and remote electrical closing.

16 Locking magnet on the operating mechanism (-RLE1)

Only allows activation of the command with the electromagnet supplied.

The locking electromagnet in the operating mechanism has the same electrical characteristics as shunt closing release -MBC.



17 Locking magnet on the truck (-RLE2)

Compulsory accessory for the withdrawable versions for UniGear ZS1 switchgear and PowerCube modules, to prevent circuit breaker racking into the switchgear with the auxiliary circuit plug disconnected.

The plug also makes the anti-insertion lock for a different rated current. Special striker pins do not allow insertion of the plug in the socket if the rated current of the circuit breaker is lower than the rated current of the panel.

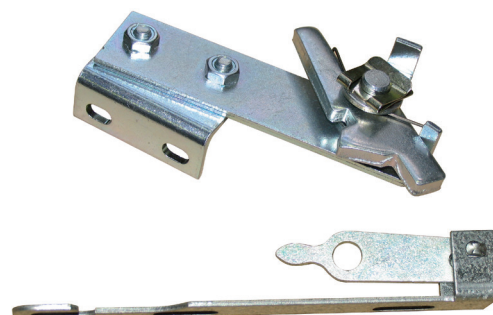
Note: a specific version for the circuit breakers of ZS8.4 switchgear is available on request. This accessory is not available when the motor-operated truck is required.

Characteristics	
Un	24 - 30 - 48 - 60 - 110 - 125 - 127 - 132 - 220 - 240 V~
Un	24 - 30 - 48 - 60 - 110 - 125 - 127 - 220 - 230 ... 240 V~ 50/60 Hz
Operating limits	85 ... 110% Un
Power on inrush (Ps)	d.c. 250 W; a.c. = 250 VA
Continuous power (Pc)	d.c. = 5 W; a.c. = 5 VA
Inrush duration	150 ms
Insulating voltage	2000 V 50/60 Hz (for 1 min)

18 Interlock for fixed circuit breaker

Device for fixed circuit breakers which are converted into withdrawable ones by the customer. It allows a mechanical lock to be made, by the customer, which prevents racking-out/in with the circuit breaker closed and prevents circuit breaker closing during translation.

Note: The device must be requested when ordering since it must be assembled and tested in the factory.



5. Description

19 Mechanical interlock with the door

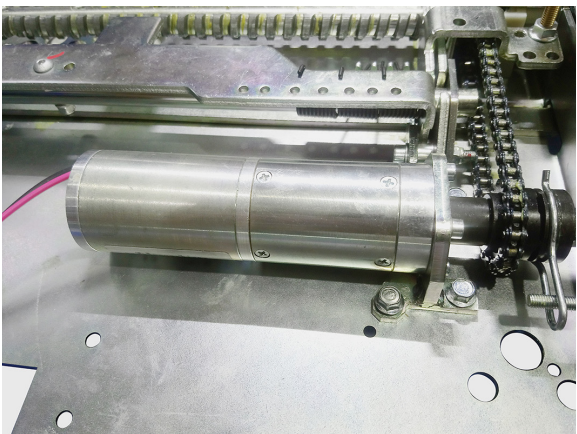
This device prevents circuit breaker racking-in when the switchgear door is open. It is only provided for circuit breakers used in switchgear UniGear ZS1 and PowerCube modules, fitted with a special actuator on the door.

20 Motorised truck (-MAT)

It allows racking-in and racking-out of the circuit breaker in the switchgear to be carried out remotely, (only for circuit breaker in withdrawable version for UniGear ZS1 and ZS8.4 switchgear and PowerCube modules).

The motor version with clutch is supplied as standard, so that racking-in/ out can be performed in an emergency if the truck motor fails to operate.

Characteristics	
Un	24 - 30 - 48 - 60 - 110 - 220 V-
Operating limits	85 ... 110% Un
Nominal power (Pn)	40 W



21 STU Shunt Test Unit

Due to the particular construction of these releases, checking the functionality of the shunt closing (-MBC) and opening (-MBO1, -MBO2) releases is not possible with dedicated relays (e.g. TCS Test Control Supervision, CCC Control Coil Continuity) or with the REF control and protection unit. The only device able to carry out a check of the functionality is the STU device. Please contact us if you want to carry out this control with devices other than STU. This device can be combined with the shunt opening release **(-MBO1; -MBO2)** or with the shunt closing release **(-MBC)** to check functionality and continuity.

The control/monitoring Shunt Test Unit allows the continuity of releases with a rated operating voltage between 24 V and 250 V (AC and DC) to be checked, as well as the functionality of the electronic circuit of the release.

Checking continuity is carried out cyclically with an interval of 20 seconds between one test and the next.

The unit has optical signals by means of LEDs on the front. In particular the following information is indicated:

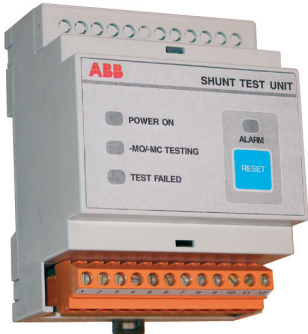
- POWER ON: power supply present
- (-MO) TESTING: test being carried out
- TEST FAILED: signal following a failed test or in the absence of auxiliary power supply
- ALARM: signal after three failed tests.

Two relays and a changeover are also available on board the unit, which allow remote signalling of the following two events:

- failure of a test (resetting is carried out automatically when the alarm stops)
- failure of three tests (resetting is only carried out by means of the manual - RESET – from the front of the unit).

There is also a manual - RESET – button on the front of the unit.

Characteristics	
Un	24 ... 250 V AC/DC
Maximum interrupted current	6 A
Maximum interrupted voltage	250 V AC



22 Digital accessories for VD4 evo CMU

The CMU is an embedded unit with Monitor & Diagnostic capabilities. It also embeds sensors for basic breaker monitoring features. It can be ordered stand alone or in combination with a range of Sensors from ABB sensors portfolio, depending on the monitoring needs (see next section). For more details please see the CMU datasheet 2RDA044111 6 CMU Dashboard Manual 2RDA044113.

Parameter	Unit	Min Value	Max Value
AUX Rated voltage	AC (V)	85	250
Working temperature range	°C	-20	+55
Storage temperature	°C	-30	+80



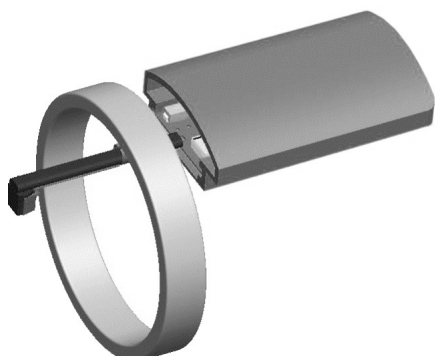
5. Description

23 Monitor & Diagnostic Sensors

23a STA201 Primary contacts thermal monitoring

The STA201 sensors embedded in the primary contact arms allow direct measurement of the temperature in one of the most critical points of the circuit breaker. The measurement is shared through wireless to the concentrator unit for Monitor & Diagnostic features.

For installation or replacements please consult dedicated device documentation.



23b SMA201 Smart Angle sensor

The SMA201 sensor is assembled on the breaker kinematic chain to allow direct measurement of the most important characteristic of a proper Opening or Closing operation. The measurement is shared to with the concentrator unit for Monitor & Diagnostic features.

For installation or replacements please consult dedicated device documentation.



23c STE201/STL201 Cables/BusBars thermal monitoring

The STE201/STL201 Temperature monitoring devices are key components in ABB's switchgear and apparatus monitoring & diagnostic solutions. The devices are battery-free, self-powered smart temperature sensors, using wireless communication technology for connecting to ABB's monitoring and diagnostics data concentrators. The sensor devices can be installed directly on high-voltage parts, inside medium-voltage switchgear. For installation or replacements please consult dedicated device documentation.



23d THS01 Environmental monitoring

The THS01 sensors allows the monitoring of the circuit breaker at room parameters for monitor and diagnostic purposes.

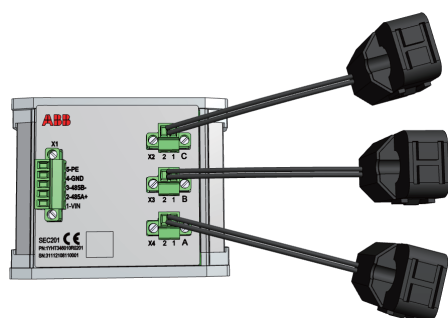
For installation or replacements please consult dedicated device documentation.



23e SEC201 Primary Current Sensor

The SEC201 sensor allows the measurement of primary currents for monitor and diagnostic of the circuit breaker from the current transformer secondary circuit. It allows electrical life monitoring and in combination with the thermal sensors enables advanced thermal monitoring and diagnostic features.

For installation or replacements please consult dedicated device documentation.



25 Serial Hub

The Serial communication hub is automatically delivered when more than one sensor with serial communication embedded in the CB has been ordered.

To be purchased separately in case of sensors upgrade after the ordering of the circuit breaker.

24 Digital upgrade KIT

It is available a complete kit to upgrade a VD4 evo with Digital feature for monitor and diagnostic. It includes the necessary connectors, concentrator unit CMU, and a flexible selection of ABB sensors. Please contact your sales representative for more information.

Please contact ABB for more details based on your needs.

6. Instructions for operating the circuit breaker

6.1. Safety indications



The VD4 circuit breakers guarantee a minimum IP2X degree of protection when installed in the following conditions:

- fixed circuit breaker, installed behind a protective metal net
- withdrawable circuit breaker, installed in switchgear.

Under these conditions the operator is totally guaranteed against accidental contact with moving parts.

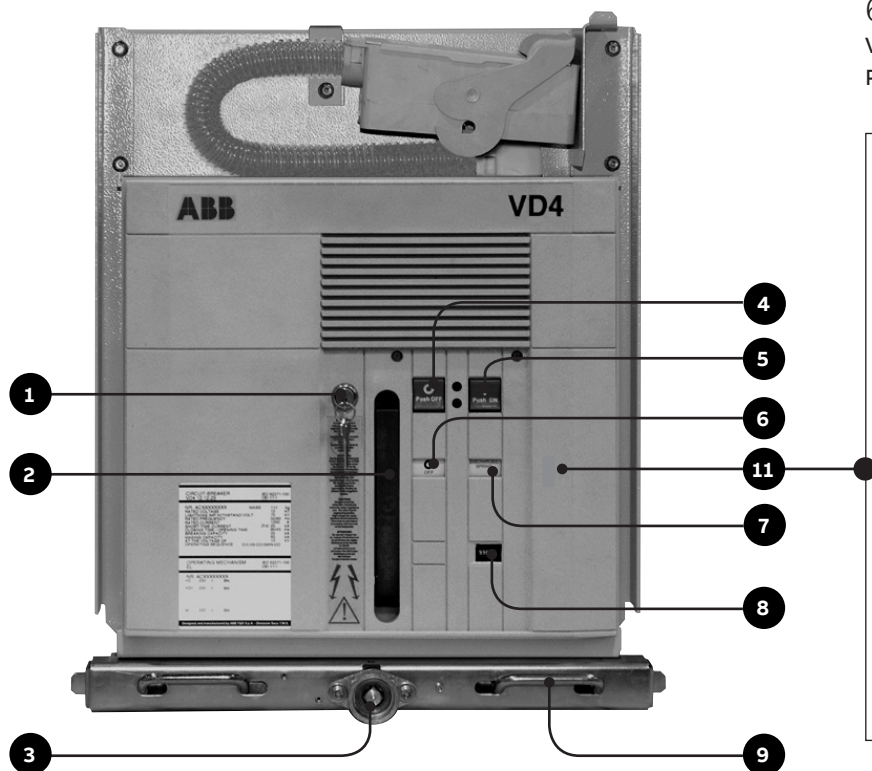
Should mechanical operations be carried out on the circuit breaker outside of the switchgear, take great care of the moving parts.

If the operations are prevented, do not force the mechanical interlocks and check that the operating sequence is correct.

Racking the circuit breaker in and out of the switchgear must be done gradually to avoid shocks which may deform the mechanical interlocks.

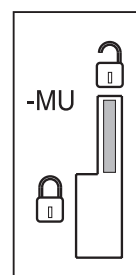
Due to safety reasons, the circuit breaker has to be treated as “switched on” if the switching position cannot be clearly determined.

In this case all high voltage connections to the circuit breaker have to be de-energized and zero potential on the primary side of the circuit breaker has to be confirmed prior to commissioning, operation, maintenance or repair work.





6.2. Switching and signalling parts

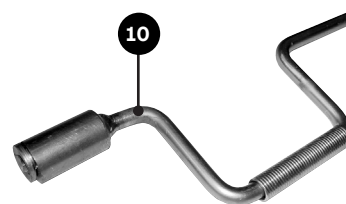
VD4 circuit breakers for UniGear switchgear and PowerCube modules (fig. 6a)



Mechanical override of the undervoltage release (on request)

 Undervoltage release enabled. The circuit breaker can only be closed if the undervoltage release is supplied with power.

 Undervoltage release disabled. The circuit breaker can also be closed if the undervoltage release is not supplied with power.



Caption

- 1 Key lock (if provided) (*)
 - 2 Lever for manually charging the closing spring (except version VD4/ZS8 - see figure 6b)
 - 3 Coupling lever for racking-out operation (withdrawable circuit breakers only)
 - 4 Opening pushbutton
 - 5 Closing pushbutton
 - 6 Signalling device for circuit breaker open/closed
 - 7 Signalling device for closing springs charged/discharged
 - 8 Operation counter.
 - 9 Handles for operating the truck locks (only for withdrawable circuit breakers)
 - 10 Operating lever for circuit breaker racking-in/out (there is a special version for VD4/ZS8)
 - 11 Mechanical undervoltage release override (on request).
- (*) Warning! To activate the key lock: open the circuit breaker, keep the opening pushbutton depressed, then turn the key and remove it from the housing.

Fig. 6a

6.3. Circuit breaker closing and opening operations

Circuit breaker operation can be either manual or electrical (fig. 6 - fig. 7).

a1) Manual closing spring charging for VD4 circuit breakers for UniGear switchgear and PowerCube modules (fig. 7a)

Repeatedly activate the charging lever (2) (maximum rotation angle of the lever: about 90°) until the yellow indicator (7) appears.

The maximum forces which can normally be applied to the lever are < 150 N for the EL1 operating mechanism, < 200 N for the EL2 operating mechanism and < 250 N for EL3 operating mechanism.

EL1 Twin and EL2 Twin type operating mechanisms are provided for circuit breakers with 50 kA breaking capacity.

For manual charging, the additional lever (1) should be inserted fully, as indicated in fig. 7c. In this way, the maximum force to be applied is < 200 N. For the type of operating mechanism, please refer to the rating plate in fig. 1.

a2) Closing spring loading in the manual mode for withdrawable VD4 circuit breakers for UniGear switchgear equipped with a hand-operated rotary loading device for the closing spring (refer to fig. 6b for indicative details)

Rotate the charging lever (2) (rotate about 12 times) until the yellow indicator (7) appears. The maximum force which can normally be applied to the lever is < 150 N for the EL1 operating mechanism and < 230 N for the EL3 operating mechanism.

The operation can be carried out with the door either open or closed and the circuit breaker either withdrawn or connected.

WARNING (fig. 6b): Fit the hand-operated loading lever of the closing spring (2b) into its housing (2a). Turn the lever clockwise (about 12 times) until the yellow indicator (7) appears to show that loading is complete. Once this happens, the lever will continue for half a turn without loading (without exercising any force), after which it will lock owing to a sudden load increase. Do not exercise force or try to continue loading as this will damage the device.

VD4 circuit breakers for ZS8.4 switchgear (fig. 6b)

a3) Manual closing spring charging for VD4 circuit breakers (fig. 7b)

Ruotare la leva di carica (2) fino alla comparsa del
Rotate the charging lever (2) until the yellow indicator (7) appears. The maximum force which can normally be applied to the lever is < 150 N for the EL1 operating mechanism and < 230 N for the EL3 operating mechanism.

The operation can be carried out with the door either open or closed and the circuit breaker either withdrawn or connected.

WARNING (fig. 6b): Fit the hand-operated loading lever of the closing spring (2b) into its housing (2a). Turn the lever clockwise (about 12 times) until the yellow indicator (7) appears to show that loading is complete. Once this happens, the lever will continue for half a turn without loading (without exercising any force), after which it will lock owing to a sudden load increase. Do not exercise force or try to continue loading as this will damage the device.

b) Electrical spring charging operation

On request, the circuit breaker can be fitted with the following accessories for electrical operation:

- geared motor for automatic closing spring charging
- shunt closing release
- shunt opening release.

The geared motor automatically recharges the spring after each closing operation until the yellow indicator (7) appears. If the power is cut off during charging, the geared motor stops and automatically starts recharging the springs again when the power returns.

In any case, it is always possible to complete the charging operation manually.

c) Circuit breaker closing

The operation can only be carried out with the closing spring completely charged.

For manual closing, press the pushbutton (5 - fig. 6b).

When there is a shunt closing release, the operation can also be carried out remotely by means of a special control circuit. Closing having taken place is indicated by the signalling device (6 - fig. 6b).

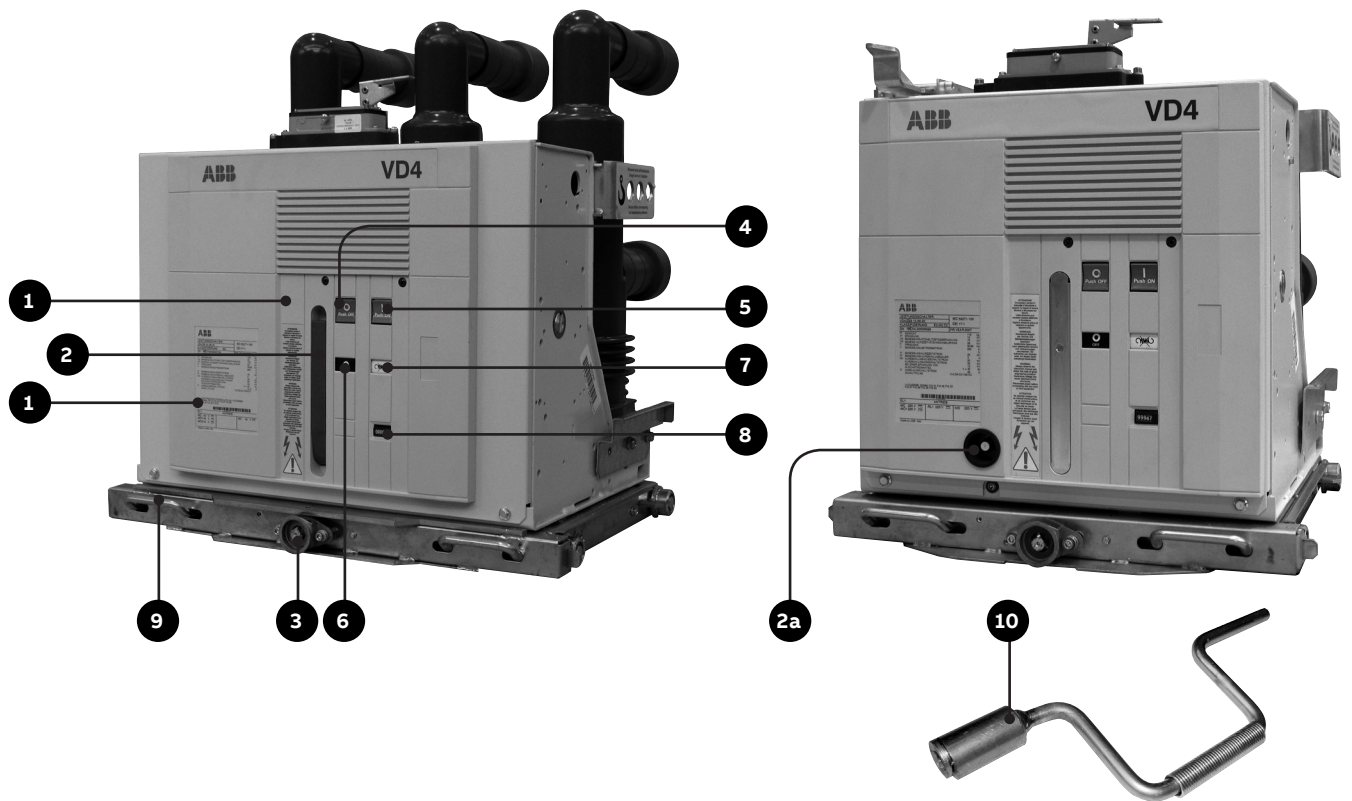
d) Circuit breaker opening

The operation can only be carried out with the closing spring completely charged.

For manual closing, press the pushbutton (5 - fig. 6b). When there is a shunt closing release, the operation can also be carried out remotely by means of a special control circuit.

Closing having taken place is indicated by the signalling device (6 - fig. 6b).

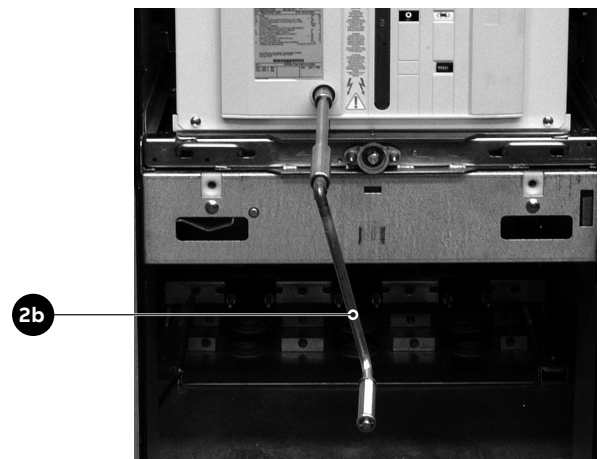
6. Instructions for operating the circuit breaker



Caption

- 1 Key lock (if provided)
- 2 Lever for manually charging the closing spring
- 2a Coupling for manual closing spring charging (when lever 2 is not provided)
- 2b Lever for manual closing spring charging for rotary charging device
- 3 Coupling for racking-out operation lever (only for withdrawable circuit breakers)
- 4 Opening pushbutton
- 5 Closing pushbutton
- 6 Signalling device for circuit breaker open/closed
- 7 Signalling device for closing spring charged/discharged
- 8 Operation counter.
- 9 Handles for operating the truck locks (only for withdrawable circuit breakers)
- 10 Operating lever for circuit breaker racking-in/out.

Fig. 6b



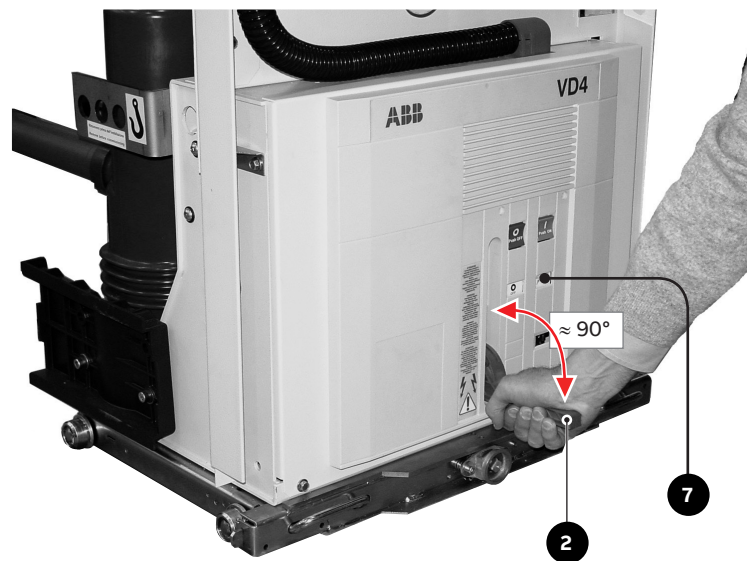


Fig. 7a

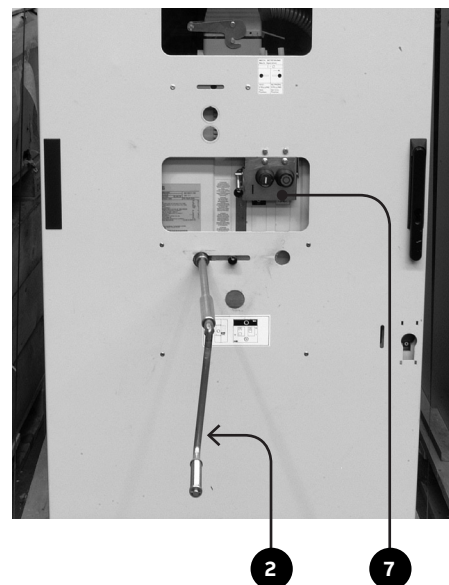


Fig. 7b

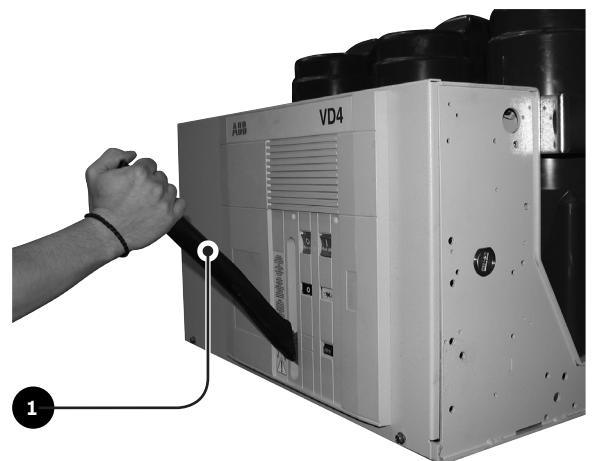
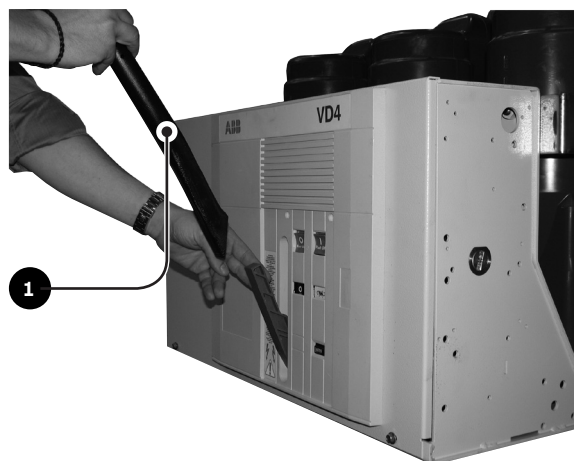



Fig. 7c

6.4 Detailed instruction of sensors and CMU Usage is in 2RDA044113 & 2RDA044114. only for VD4 evo

7. Installation

7.1. General

 **Correct installation is of primary importance. The manufacturer's instructions must be carefully studied and followed. It is good practice to use gloves for handling the pieces during installation.**

7.2. Installation and operating conditions

The following Standards must be taken into particular consideration during installation and service:

- IEC 62271-1/DIN VDE 0101
- VDE 0105: Electrical installation service
- DIN VDE 0141: Earthing systems for installations with rated voltage above 1 kV
- All the accident prevention regulations in force in the relative countries.

7.2.1. Normal conditions

Follow the recommendations in the IEC 62271-1 and 62271- 100 Standards. In more detail:

Ambient temperature	
Maximum	+ 40 °C
Average maximum over 24 hours	+ 35 °C
Minimum (according to class – 5), apparatus for indoor installation	– 5°

Humidity	
The average value of the relative humidity, measured for a period longer than 24 hours, must not exceed the 95%.	
The average value of the pressure of the water vapour, measured for a period longer than 24 hours, must not exceed 2.2 kPa.	
The average value of the relative humidity, measured for a period longer than 1 month, must not exceed the 90%.	
The average value of the pressure of the water vapour, measured for a period longer than 1 month, must not exceed 1.8 kPa.	

Altitude	
≤ 1000 m above sea level.	


7.2.2. Special conditions

Installations over 1000 m a.s.l.
Possible within the limits permitted by reduction of the dielectric resistance of the air.

Increase in the ambient temperature	
Reduction in the rated current.	
Encourage heat dissipation with appropriate additional ventilation.	

Climate	
To avoid the risk of corrosion or other damage in areas:	
• with a high level of humidity, and/or	
• with rapid and big temperature variations, take appropriate steps (for example, by using suitable electric heaters) to prevent condensation phenomena.	

For special installation requirements or other operating conditions, please contact ABB.

 **The areas involved by the passage of power conductors or auxiliary circuit conductors must be protected against access of any animals which might cause damage or disservices.**

7.2.3. Trip curves

The following graphs show the number of closing-opening cycles (No.) allowed, of the vacuum interrupters, according to the breaking capacity (Ia).

Caption (Figs. 8...)
No. Number of closing-opening cycles allowed for the vacuum interrupters.
Ia: Breaking capacity of the vacuum interrupters.

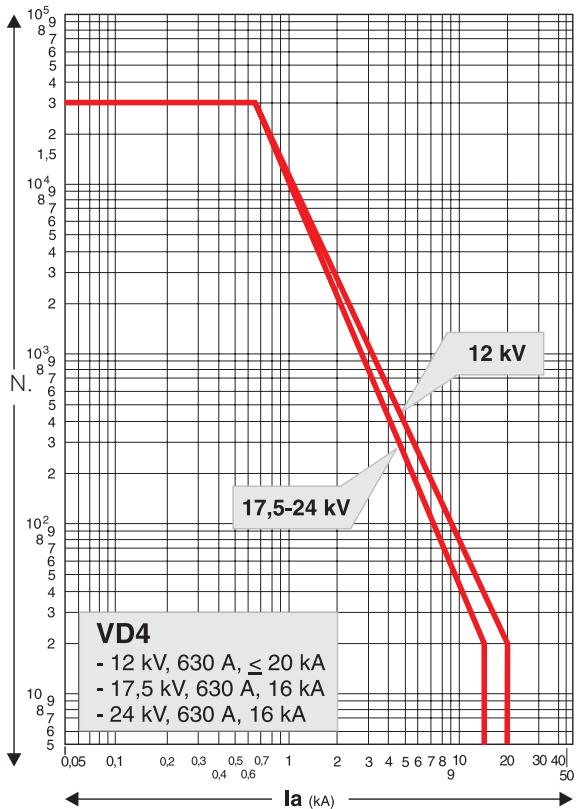


Fig. 8a

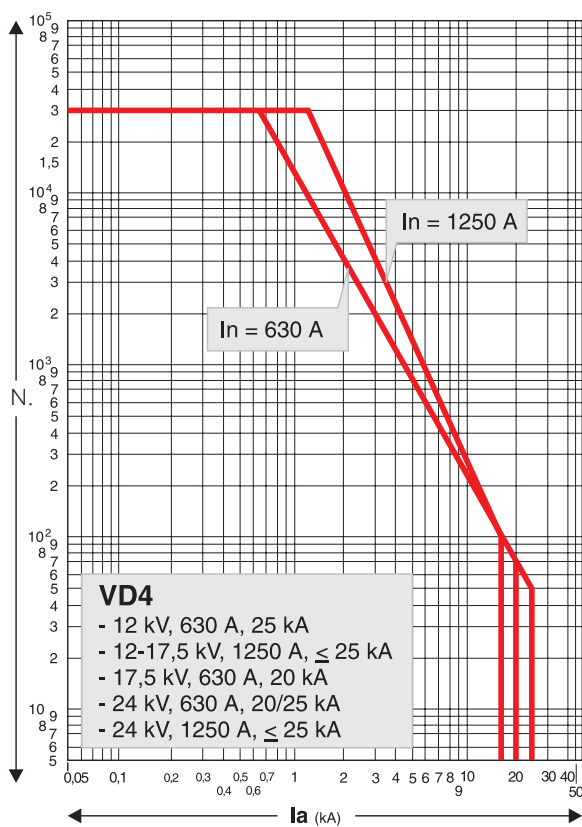


Fig. 8b

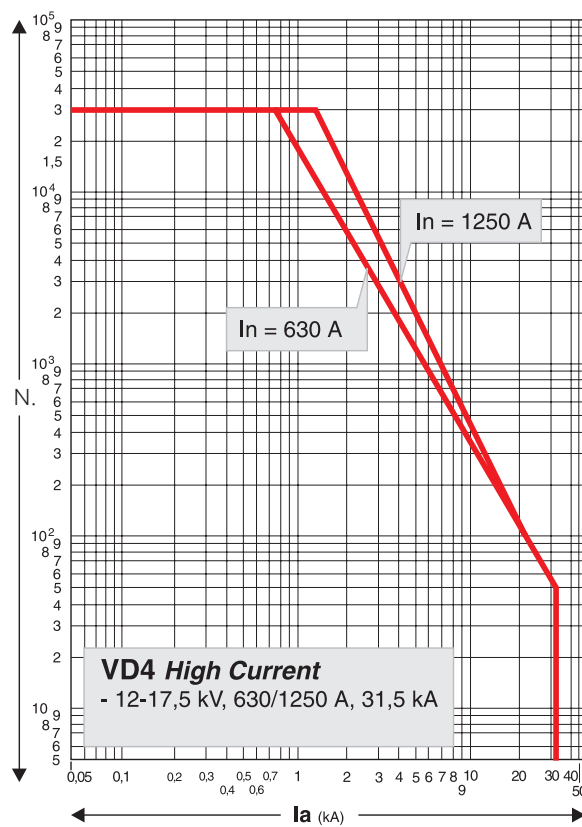


Fig. 8c

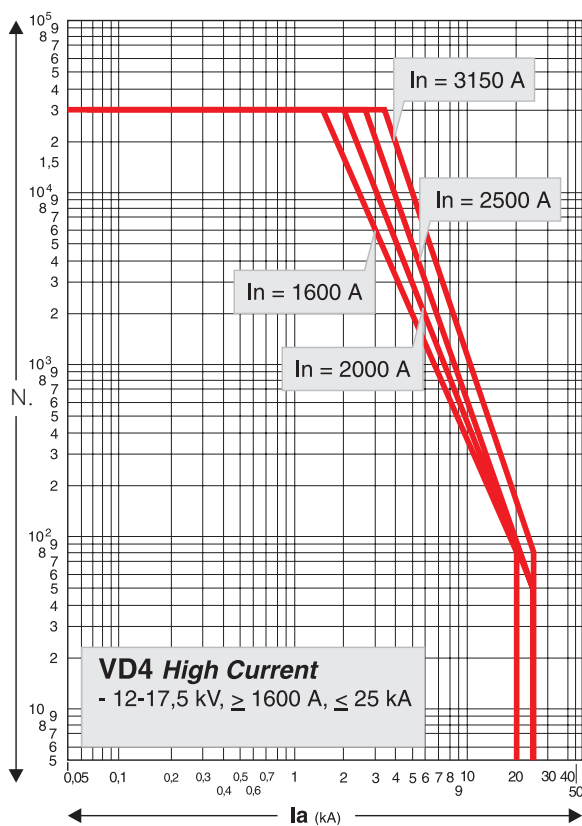


Fig. 8d

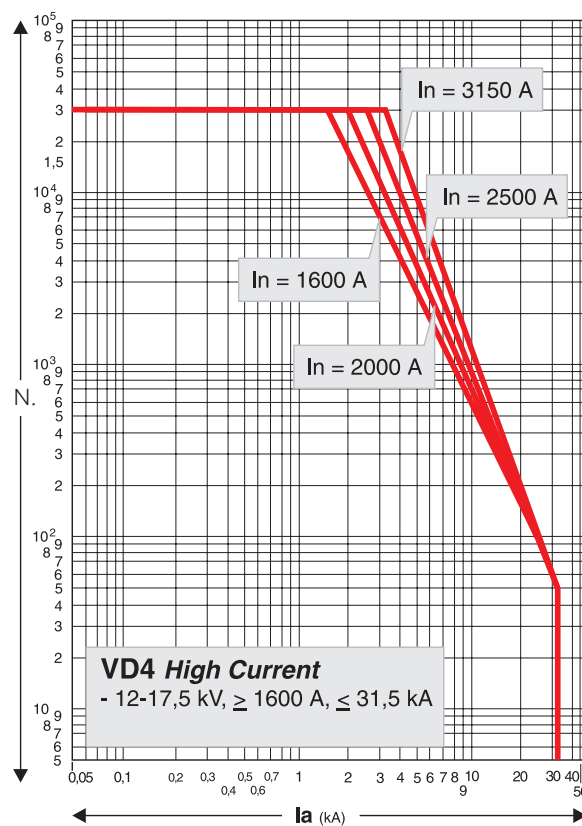


Fig. 8e

7. Installation

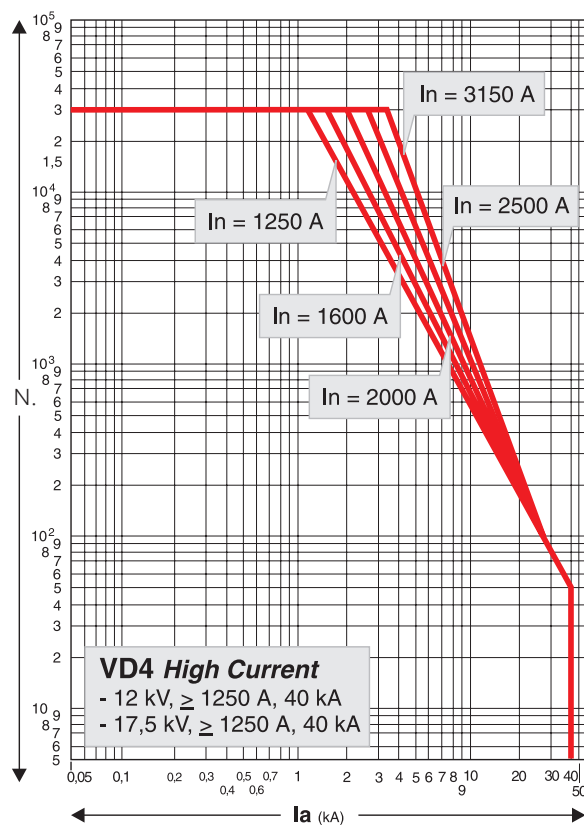


Fig. 8f

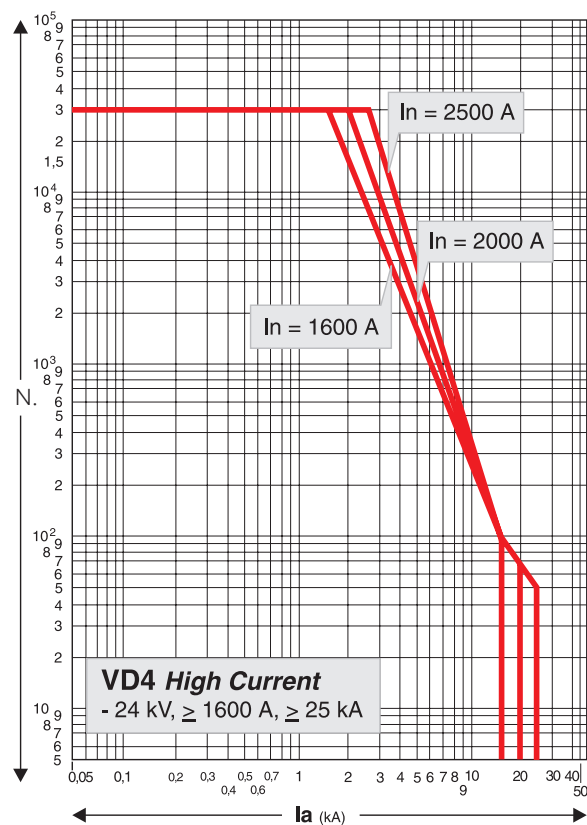


Fig. 8g

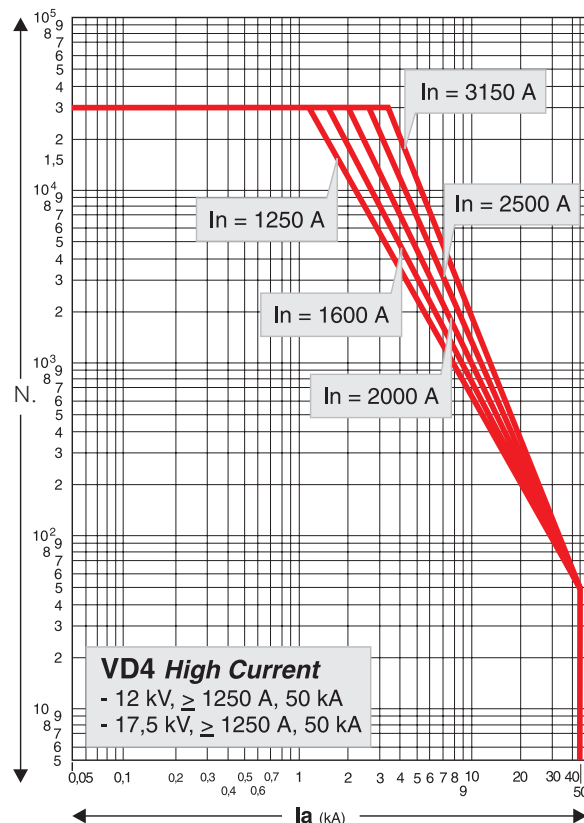


Fig. 8h

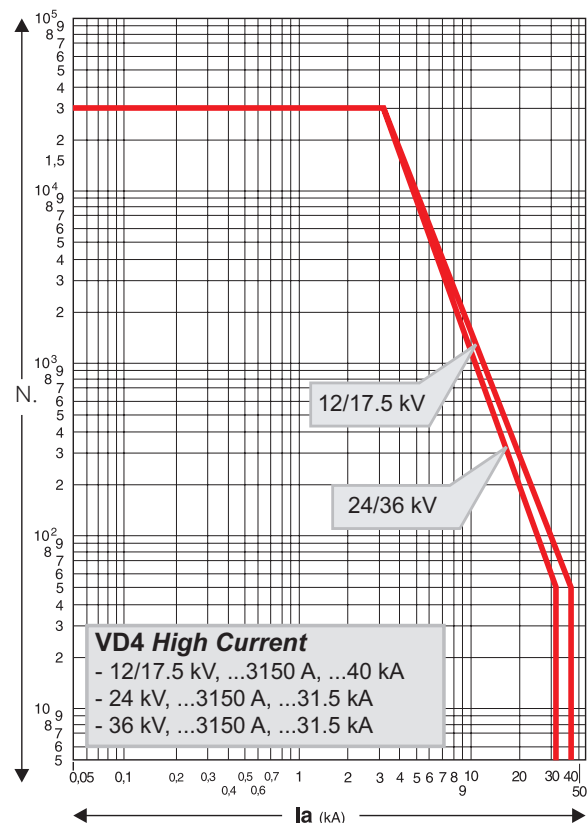


Fig. 8i

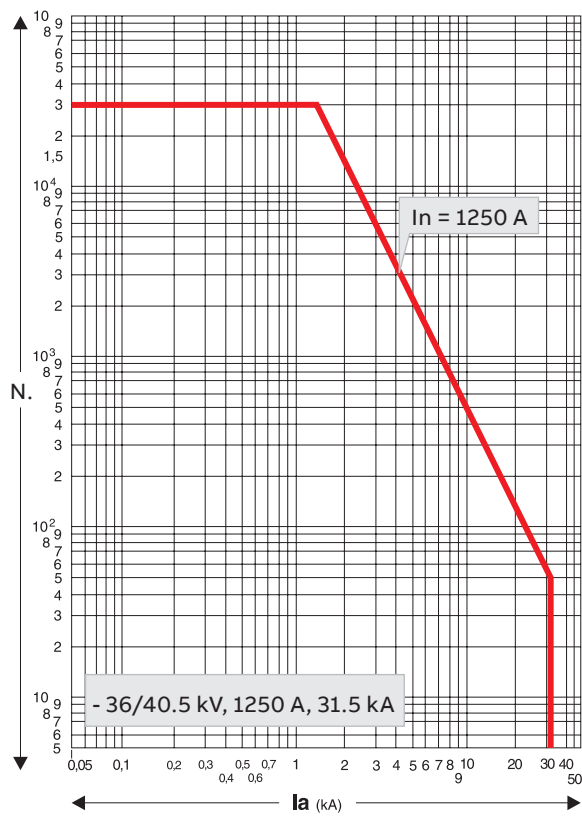


Fig. 8l

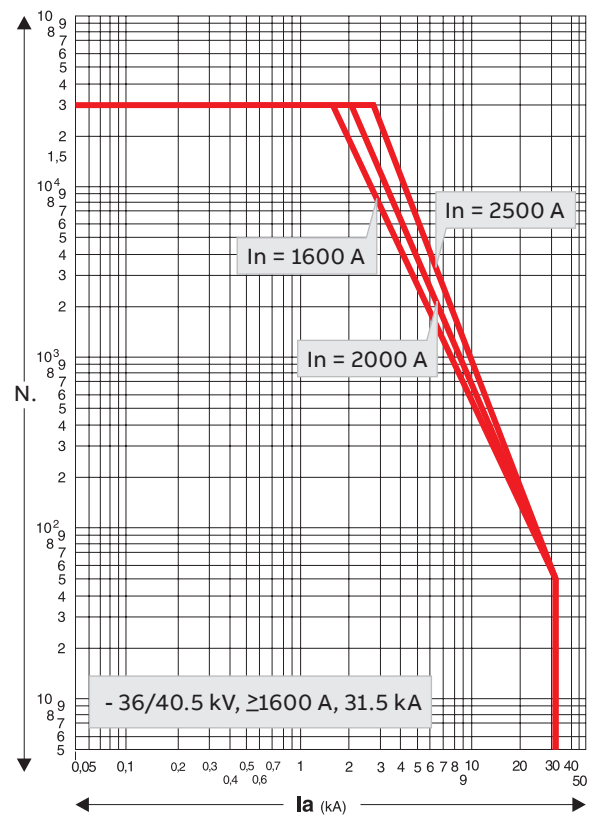


Fig. 8m

Breaking curves for vacuum interrupters embedded in thermoplastic poles for VD4 High Current:

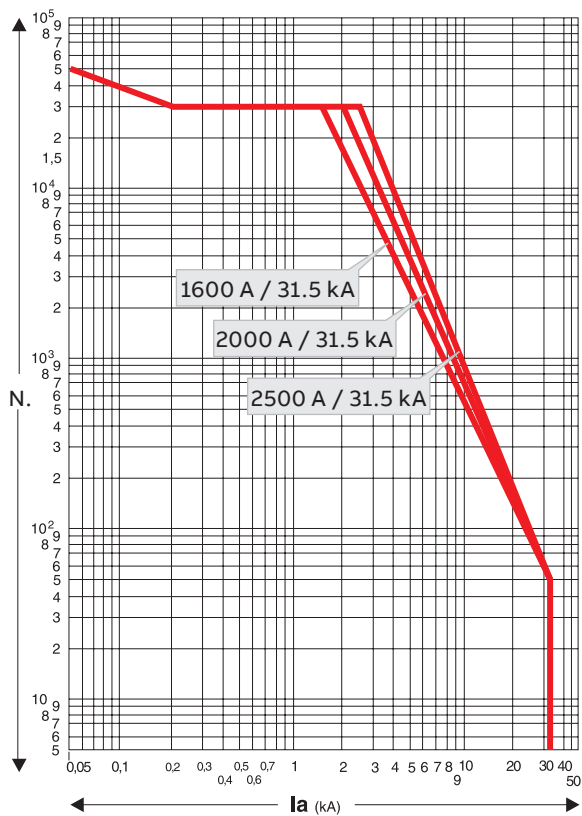


Fig. 8n

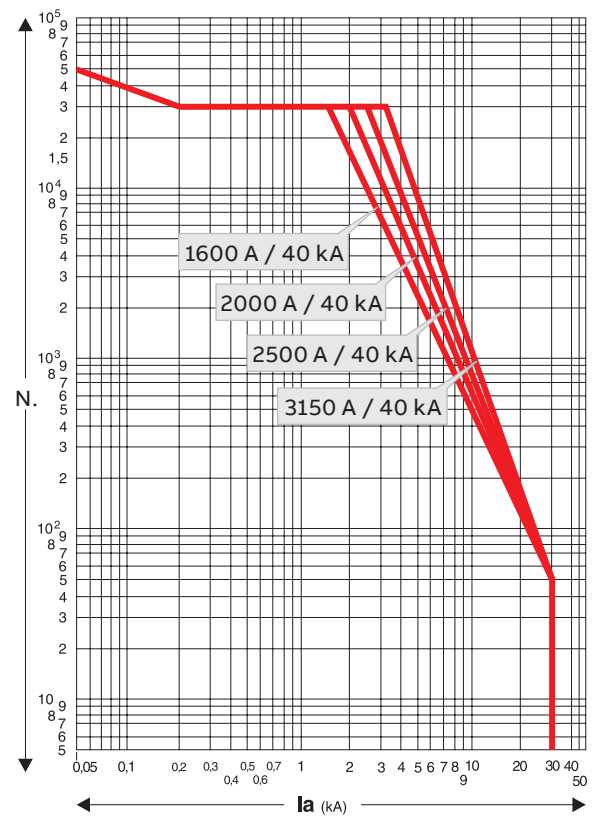


Fig. 8o

7. Installation

7.3. Preliminary operations

- Clean the insulating parts with clean dry cloths.
- Check that the top and bottom terminals are clean and free of any deformation caused by shocks received during transport or storage.

7.4. Installation of fixed circuit breakers

The circuit breaker can be mounted directly on supporting frames to be provided by the customer, or on a special supporting truck (available on request).

The circuit breaker, with supporting truck, must be suitably fixed to the floor of its own compartment by the customer.

The floor surface in correspondence with the truck wheels must be carefully levelled.

A minimum degree of protection (IP2X) must be guaranteed from the front towards live parts.

7.4.1. Mounting the circuit breaker on a truck made by other manufacturers

The VD4 circuit breakers which are not installed on ABB trucks, but on trucks made by the customer, must be fitted with one or two additional auxiliary contacts (activated by the mechanical lock and by the circuit breaker release device) to carry out the function of interrupting the shunt closing release circuit (-MBC) during traverse from isolated and vice versa.

In ABB trucks, this function is carried out by the -BGT1 and -BGT2 auxiliary contacts which cut of the release power supply during and before activation of the mechanical lock of the screw truck racking-in device. This means that the shunt closing release power supply can only be applied at the end of activation of the mechanical lock. In this way it is certain that no electrical impulse can activate the shunt closing release with the circuit breaker in an intermediate position.

7.5. Installation of withdrawable circuit breaker

The withdrawable circuit breakers are preset for use in UniGear ZS1, UniGear ZS2, UniSec switchgear and PowerCube modules.

For racking-in/racking-out of the switchgear, fully insert the lever (1) (fig. 9) in the appropriate seat (2) and work it clockwise for racking-in, and anti-clockwise for racking-out, until the limit switch positions are reached.

Circuit breaker racking-in/-out must be carried out gradually to avoid shocks which may deform the mechanical interlocks and the limit switches.

The torque normally required to carry out racking-in and racking-out is <25 Nm.

This value must not be exceeded. If operations are prevented or difficult, do not force them and check that the operating sequence is correct.

Note

To complete the racking-in/out operation, about 20 rotations of the lever are required for circuit breakers up to 17.5 kV, and about 30 rotations for 24 kV circuit breakers.

When the circuit breaker has reached the isolated for test/ isolated position, it can be considered racked into the switchgear and, at the same time, earthed by means of the truck wheels.

Withdrawable circuit breakers of the same version, and therefore with the same dimensions, are interchangeable.

However, when, for example, different electrical accessory fittings are provided, a different code for the plug of the auxiliary circuits does not allow incorrect combinations between panels and circuit breakers.

For the circuit breaker installation operations, also refer to the technical documentation of the above-mentioned switchgear.



- **The racking-in/-out operations must always be carried out with the circuit breaker open.**
- **When putting into service for the first time, it is advisable to charge the circuit breaker operating mechanisms manually so as not to overload the auxiliary power supply circuit.**

7.5.1. Circuit breakers with withdrawable motorized truck

Carry out the racking-in/racking-out test of the motorized truck in the same way as for a manual truck, following the instructions below:

- Rack the circuit breaker into the switchgear in the open and isolated position, with the power supply to the motor circuit cut off and with the enclosure door closed.
- Insert the manual racking-in lever (1) in the special coupling (2) Fig. 9, and take the motorized truck to about half its run between the isolated for test and the connected position. The torque needed to carry out truck handling is $< 25 \text{ Nm}$.
- In the case of accidental inversion of the truck motor power supply polarity, this operation allows a possible error in direction to be dealt with without any damage. Verification checks:
 - a) motor rotation clockwise during circuit breaker racking-in.
 - b) motor rotation anticlockwise during circuit breaker racking-out.
- Remove the manual lever (1) from the coupling (2) Fig. 9
- Supply the truck motor circuit.
- Activate the control for the electrical racking-in operation. When racking-in has taken place, check correct changeover of the relative auxiliary contact.
- On completion, activate the control for the electrical racking-out operation. When racking-out has taken place, check correct changeover of the relative auxiliary contact.
- In the case of a motor fault during a racking-in or racking-out operation, in an emergency the truck can be taken to the end of its run manually, after first cutting off the power supply to the motor power supply circuit and then, using the manual lever, work in the same way as with the manual truck.

Note

The clutch has to mechanically disconnect the motor to operate the truck by manual lever in the right way. To do it, perform one turn by manual lever in the opposite direction compared to the last motorized truck movement, before to operate by manual lever in the needed direction.

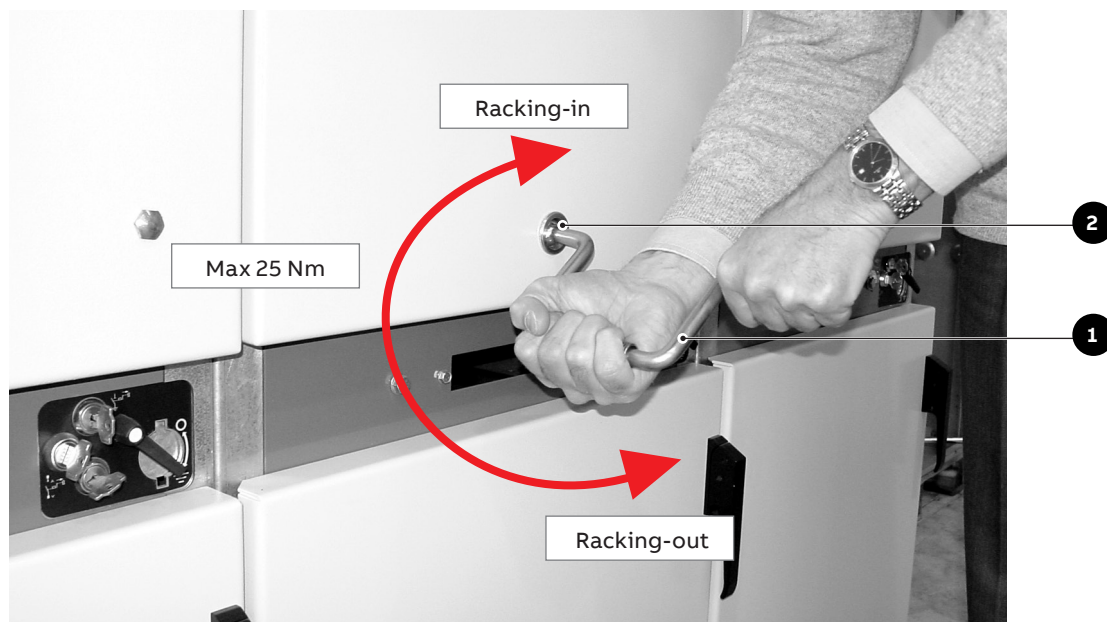


Fig. 9

7. Installation

7.6. Power circuit connections of fixed circuit breakers

7.6.1. General recommendations

- Select the cross-section of the conductors according to the service current and the short-circuit current of the installation.
- Prepare special pole insulators, near the terminals of the fixed circuit breaker or of the enclosure, sized according to the electrodynamic forces deriving from the short-circuit current of the installation.

7.6.2. Assembly of the connections

- Check that the contact surfaces of the connections are flat, and are free of any burrs, traces of oxidation or deformation caused by drilling or impacts received.
- According to the conductor material and the surface treatment used, carry out the operations indicated in table T1 on the contact surface of the conductor.

Assembly procedure

- Put the connections in contact with the circuit breaker terminals, taking care to avoid mechanical stresses (traction / compression) on, for example, the conducting busbars on the terminals.
- Interpose a spring washer and a flat washer between the head of the bolt and the connection.
- It is advisable to use bolts according to DIN class 8.8 Standards, also referring to what is indicated in table T2.
- In the case of cable connections, strictly follow the manufacturer's instructions to make the terminals.

T1

Bare copper

- Clean with a fine file or emery cloth.
- Tighten fully and cover the contact surfaces with 5RX Moly type grease

Copper or silver-plated aluminium

- Clean with a rough dry cloth.
- Only in the case of obstinate traces of oxidation, clean with a very fine grain emery cloth taking care not to remove the surface layer.
- If necessary, restore the surface treatment.

Bare aluminium

- Clean with a metal brush or emery cloth.
- Cover the contact surfaces again immediately with neutral grease
- Insert the copper-aluminium bimetal with surfaces shined (copper side in contact with the terminal; aluminium side in contact with the connection) between the aluminium connection and the copper terminal.

T2

Bolt	Recommended tightening torque (1)	
	Without lubricant	With lubricant (2)
M6	10.5 Nm	4.5 Nm
M8	26 Nm	10 Nm
M10	50 Nm	20 Nm
M12	86 Nm	40 Nm
M16	200 Nm	80 Nm

(1) The nominal tightening torque is based on a friction coefficient of the thread of 0.14 (distributed value the thread is subjected to which, in some cases, is not negligible). The nominal tightening torque with lubricant is according to the DIN 43673 Standards.

(2) Oil or grease. The thread and surfaces in contact with the lubricated heads. Take into account the deviations from the general Standards table (for example, for systems in contact or terminals) as foreseen in the specific technical documentation. The thread and surfaces in contact with the heads of bolts must be slightly oiled or greased, so as to obtain a correct nominal tightening torque.

7.7. Earthing

For the fixed version circuit breaker, carry out earthing by means of the special screw marked with the relative symbol.

Clean and degrease the area around the screw to a diameter of about 30 mm and, on completion of assembly, cover the joint again with Vaseline grease. Use a conductor (busbar or braid) with a cross-section conforming to the Standards in force.

7.8. Connection of the auxiliary circuits

Note: the minimum cross-section of the wires used for the auxiliary circuits must not be less than the one used for the internal cabling. Furthermore, they must be insulated for 3 kV of test.

7.8.1. Fixed circuit breaker

The customer can choose between two types of auxiliary circuit connections in the circuit breaker. The first type is supplied as the standard version. In this case, the auxiliary contacts must be disassembled from the structure of the circuit breaker, since their terminals cannot be directly accessed (fig. 10) (consult the installation manual). Part of the wiring is made during the production phase for the second type. This means that the customer can wire up by directly accessing the terminal boxes in the front part of the circuit breaker. In this case, the wiring operation is much faster and immediate.



Fig. 10

To prevent the cabling wires outside the circuit breaker (carried out by the customer) from accidentally coming into contact with moving parts and therefore undergoing damage to the insulation, it is recommended to fix the wires as shown in fig. 10a.

In both types of connection, the wires must pass through connection (2) while outside the circuit breaker, the cables must be screened by an appropriate sort of metallic protection (tube, duct, ...), which must be earthed.

7.8.2. Withdrawable circuit breakers

The auxiliary circuits of withdrawable circuit breakers are fully cabled in the factory as far as the connector (fig. 11).

For the external connections, refer to the electric wiring diagram of the switchgear.

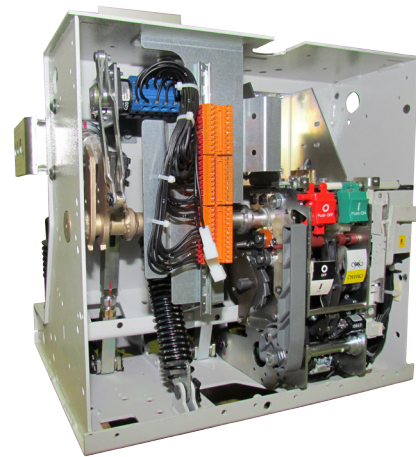


Fig. 10a

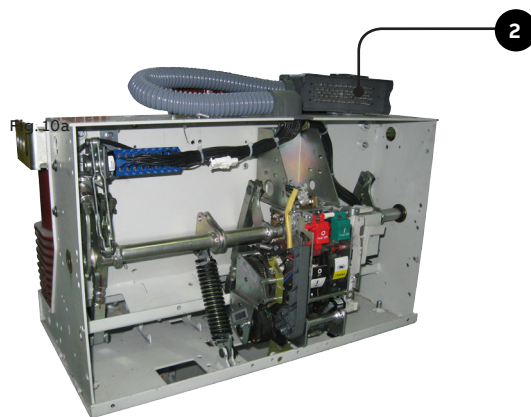


Fig. 11

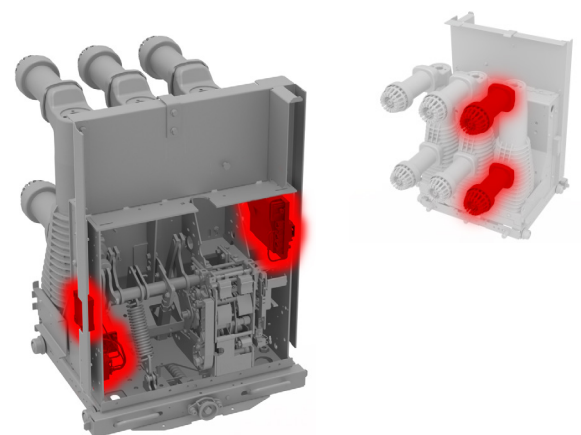


Fig. 12 VD4 evo with sensors

7. Installation

7.9. Sensors installation

Please refer to manual 2RDA044114 for sensor configuration.

7.9.1. Installation of CMU

Detailed instructions for installing CMU are available in 1VCD601733R0001

7.9.2. Installation of Serial Hub

Detailed instructions for installing Serial Hub are available in 1VCD601734R0001

7.9.3. Installation of Temperature Sensor

Detailed instructions for installing Temperature Sensor are available in 1VCD601730R0001

7.9.4. Installation of Angle Sensor

Detailed instructions for installing Angle Sensor are available in 1VCD601731R0001

8. Putting into service

8.1. General procedures



All the operations regarding putting into service must be carried out by ABB personnel or by suitably qualified customer personnel with in-depth knowledge of the apparatus and of the installation.

Should the operations be prevented, do not force the mechanical interlocks and check that the operating sequence is correct.

The operating forces which can be applied for racking-in withdrawable circuit breakers are indicated in paragraph 7.5.

Before putting the circuit breaker into service, carry out the following operations:

- check tightness of the power connections to the circuit breaker terminals;
- establish the setting of the primary electronic overcurrent release (if provided);
- check that the value of the power supply voltage of the auxiliary circuits is between 85% and 110% of the rated voltage of the electrical accessories;
- check that no foreign bodies, such as bits of packing, have got into the moving parts;
- check that there is a sufficient exchange of air in the installation place to avoid overtemperatures;
- also carry out the checks indicated in table T3.

Detailed instruction for putting sensors and CMU into service are available in 2RDA044114

8. Putting into service

T3

ITEM INSPECTED	PROCEDURE	POSITIVE CHECK
1 Insulation resistance.	<p>Medium voltage circuit</p> <p>With a 2500 V megger, measure the insulation resistance between the phases and the exposed conductive part of the circuit.</p> <p>Auxiliary circuits</p> <p>With a 500 V megger (if the apparatus installed allows this), measure the insulation resistance between the auxiliary circuits and the exposed conductive part.</p>	<p>The insulation resistance should be at least 50 Mohm and in any case constant over time.</p> <p>The insulation resistance should be a few Mohm and in any case constant over time.</p>
2 Auxiliary circuits.	Check that the connections to the control circuit are correct: proceed at the relative power supply.	Operations and signals normal.
3 Manual operating mechanism.	Carry out a few closing and opening operations (see cap. 6). N.B. Supply the undervoltage release and the locking magnet on the operating mechanism at the relative rated voltage (if provided).	The operations and relative signals take place normally.
4 Motor operator (if provided).	<p>Supply the spring charging geared motor at the relative rated voltage.</p> <p>Carry out a few closing and opening operations. N.B. Supply the undervoltage release and the locking magnet on the operating mechanism at the relative rated voltage (if provided).</p>	<p>The spring is charged normally. The signals are normal. With the spring charged, the geared motor stops.</p> <p>The geared motor recharges the spring after each closing operation.</p>
5 Undervoltage release (if provided).	<p>Supply the undervoltage release at the relative rated voltage and carry out the circuit breaker closing operation.</p> <p>Cut off power to the release.</p>	<p>The circuit breaker closes normally. The signals are normal.</p> <p>The circuit breaker opens. The signalling changes over.</p>
6 Shunt opening release and additional shunt opening release (if provided).	Close the circuit breaker and supply the shunt opening release at the relative rated voltage.	The circuit breaker opens normally. The signals are normal.
7 Shunt closing release (if provided).	Open the circuit breaker and supply the shunt closing release at the relative rated voltage.	The circuit breaker opens normally. The signals are normal
8 Key lock (if provided).	<p>Open the circuit breaker, keep the opening pushbutton depressed, then turn the key and remove it from the housing. Attempt the circuit breaker closing operation.</p> <p>Put the key back in and turn it 90°. Carry out the closing operation.</p>	<p>Neither manual nor electrical closing takes place.</p> <p>Both electrical and manual closing take place normally; in this position the key cannot be removed.</p>
9 Locking electromagnet (-RLE1) (if provided).	With the circuit breaker open, spring charged and locking electromagnet not supplied, attempt circuit breaker closing both manually and electrically.	Closing is not possible.
10 Auxiliary contacts in the operating mechanism.	Insert the auxiliary contacts in suitable signalling circuits. Carry out a few closing and opening operations.	Signals take place normally.
11 Locking electromagnet on the truck circuit breaker (-RLE2) (if provided).	<p>With the circuit breaker open, in the isolated for test position and the locking electromagnet not supplied, attempt racking-in of the circuit breaker.</p> <p>Supply the locking electromagnet and carry out the racking-in operation.</p>	<p>Racking-in is not possible.</p> <p>Racking-in takes place correctly.</p>
12 Auxiliary transmitted contacts for signalling circuit breaker racked-in, isolated (UniGear switchgear or PowerCube modules).	<p>Insert the auxiliary contacts in suitable signalling circuits.</p> <p>With the circuit breaker racked into the enclosure, carry out a few traverse operations from the isolated for test position to the connected position.</p> <p>Take the circuit breaker to the racked-out position.</p>	The signals due to the relative operations take place normally.
13 CMU and Sensors	Perform 50 & 5C to check if the CMU and Sensors are communicating.	Curves on dashboard as per the standard.

9. Maintenance

The maintenance operations are aimed at keeping the apparatus in good working condition for as long as possible.

In accordance with what is specified in the IEC 61208 / DIN 31 051 Standards, the following operations must be carried out.

Inspection:	Finding out the actual conditions
Overhauling:	Measures to be taken to maintain the specific conditions
Repairs:	Measures to be taken to restore the specific conditions.

9.1. General

ABB Advises you to refer to the SWAPs maintenance program to get a customized maintenance plan according to your specific environmental and operational conditions. Use the QR code below to access the SWAPs webpage and related creation tool.



Vacuum interruption does not produce any harmful effects even when there are frequent interruptions at the rated and short-circuit current.

The interventions during service and their aim are determined by the ambient conditions, by the sequence of operations and by the short-circuit interruptions.

Note

Respect the following Standards for maintenance work: the relative specifications given in the chapter on "Standards and Specifications";

- work safety regulations in the chapter on "Putting into service and operations";
- standards and specifications of the country where the apparatus is installed.

The maintenance operations must only be carried out by trained personnel and who follow all the safety regulations.

Furthermore, it is advisable to call on ABB personnel, at least in cases for checking the performances in service and for repairs. Cut the power supply off and put the apparatus under safe conditions during the maintenance operations.



Before carrying out any operations, check that the circuit breaker is open, with the spring discharged and that it is not supplied (medium voltage circuit and auxiliary circuits).

9.1.1. Operating life expectancy

The operating life expectancy for the VD4 circuit breakers is as follows:

- vacuum interrupters: up to 30.000 operations, according to their type (see par. 7.2.3. Trip curves);
- switching device, actuator and transmission system: up to 30.000 operations, under normal operating conditions, according to the type of circuit breaker and with regular
- with operations correctly executed it is possible to carry out up to 1000 racking-out/in operations (as prescribed in the IEC 60271-200 Standards);
- with operations correctly executed it is possible to carry out up to 500 racking-out/in operations (as prescribed in the IEEE/ANSI C37.20.2 Standards);
- the data regarding the operating life are basically applicable to all the components which cannot be directly affected by operator activity. The manually operated components (moving parts of isolatable parts, etc.) can vary their behaviour.

9. Maintenance

9.2. Inspections and functionality tests

9.2.1. Interruption devices in general

- Check the conditions of the interruption devices with regular inspections.
- Inspection at fixed intervals can be avoided when the apparatus is permanently under the control of qualified personnel.
- The checks must, first of all, include visual inspection to check for any contamination, traces of corrosion or electrical discharge phenomena.
- Carry out more frequent inspections when there are unusual operating conditions (including severe climatic conditions) and in the case of environmental pollution (e.g. high level of contamination or an atmosphere with aggressive agents).
- Visual inspection of the isolating contacts. It is recommended to turn the contact system alternately in order to keep the internal surface of the contact areas clean. The contact areas must be cleaned when there are signs of overheating (discoloured surface) (also see Repairs).



- In the case of abnormal conditions, take suitable overhauling measures (see Overhauling par.).

9.2.2. Stored energy operating mechanism

Carry out the functional test of the operating mechanism after 5.000 operations or during ordinary maintenance operations as specified in par. 9.2.1. and service the release devices at least every 5 years (see par. 9.3.2.).

Before doing the test, open the circuit breaker and carry out the following operations:

- in the case of withdrawable circuit breakers, take the circuit breaker to the isolated for test position
- in the case of fixed circuit breakers: cut off the power supply to the medium voltage circuit.

Note

Insulate the work area and make it safe, following the safety regulations specified in the IEC/DIN VDE Standards.

Functional test

- With the circuit breaker not connected to the load, carry out a few opening and closing operations.
- If foreseen, cut the power supply to the spring charging motor off. Discharge the spring by closing and opening the circuit breaker by means of the closing and opening pushbuttons.
- Visually inspect the lubrication conditions of the tulip isolating contacts, of the sliding surfaces, etc.
- Check correct electrical and mechanical operation of the various devices, with particular attention to the interlocks.
- The screws and nuts are tightened in the factory and correct tightening is marked with a collared sign. No further tightening operations are foreseen during the operating life of the circuit breaker. However, following any maintenance interventions, should it be necessary to re-tighten the screws or nuts, it is recommended to always replace the screws and nuts and to keep to the values indicated in fig. 12.

9.2.3. Circuit breaker pole

No other check except what has already been specified in par. 9.2.1. is necessary.

9.2.4. Withdrawable assembly (truck and circuit-breaker)

Visually inspect the components, especially those which may be damaged by incorrect operations (also see table in chap. 8).

Visually inspect the isolating contacts and that all the contact elements are clean, especially in cases where signs of overheating are found (also see par. 9.4.).

Visually inspect and carry out the functional tests of the locks, checking their correct operation and activation without abnormal force – maximum 25 N (also see table in chap. 8).

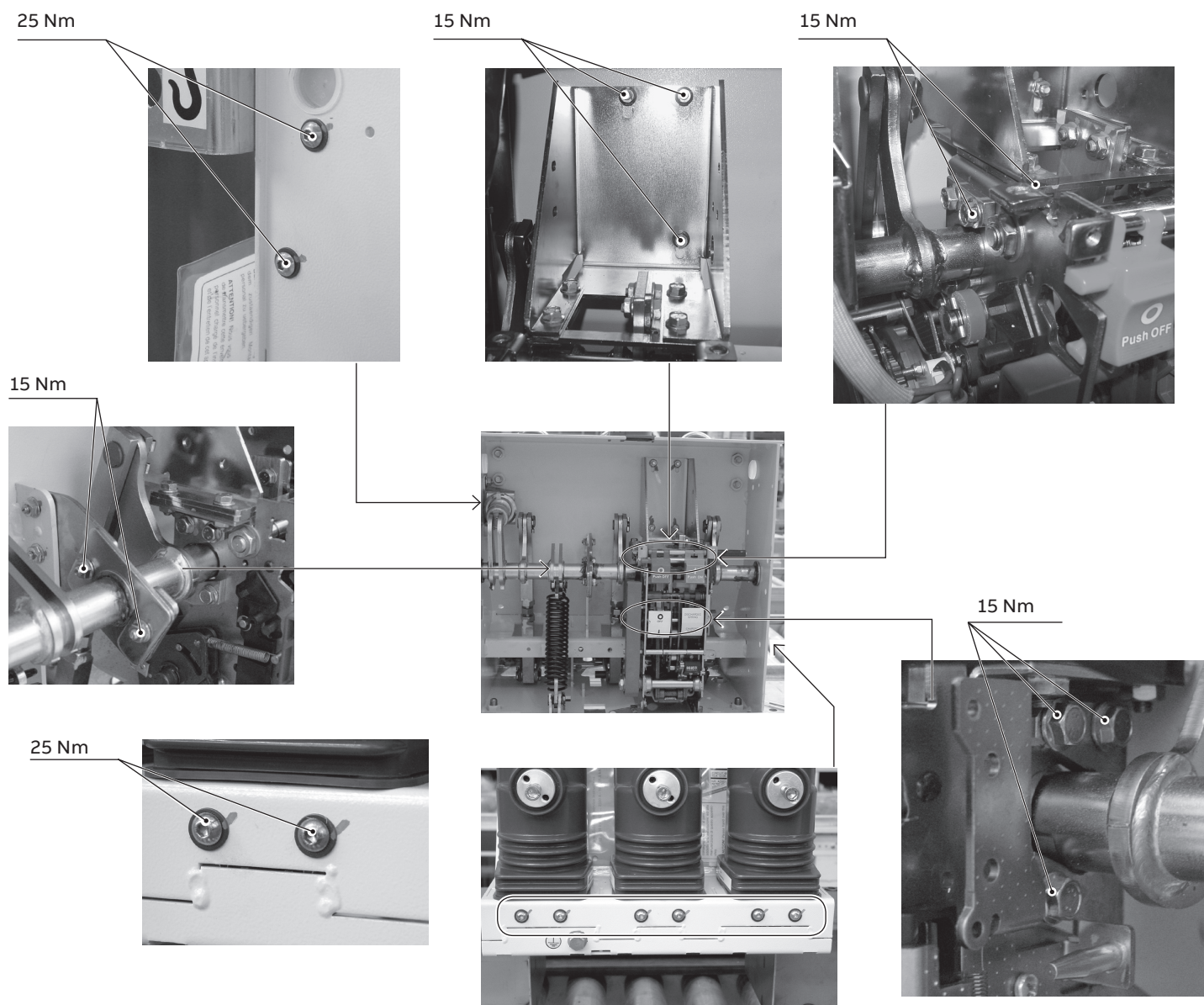
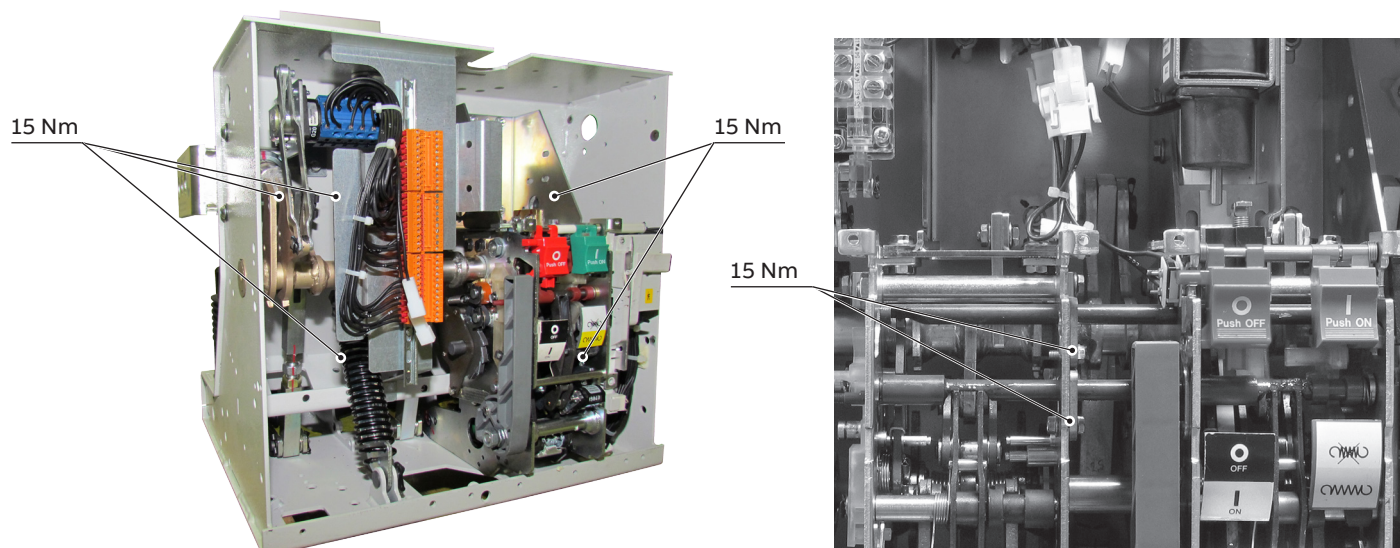
Checking tightness of the screws**EL Twin actuator - 50 kA**

Fig. 12

9. Maintenance

9.3. Overhauling

9.3.1. Interruption devices in general

Should it have been necessary to clean the devices during the inspections, according to what is specified in par. 9.2.1., use the following procedure:

- insulate the work area and make it safe, following the safety regulations specified in the IEC/DIN VDE Standards;
 - general cleaning of the surfaces:
 - dry and eliminate light deposits of dirt with a soft dry cloth;
 - more resistant deposits of dirt can be removed using slightly alkaline domestic type detergent or Rivolta BWR 210 type detergent;
 - cleaning insulating surfaces and conductive parts.
- After cleaning, rinse thoroughly with clean water and dry carefully.

Note

Only use detergents without halogens and never 1.1.1-trichloroethane, trichloroethylene or carbon tetrachloride!

9.3.2. Tripping device: actuator and transmission system

Circuit breakers up to 17.5 kV, 1250 A, 31.5 kA and up to 24 kV, 2500 A, 25 kA

To ensure correct operation of the circuit breaker, inspection and maintenance of the tripping devices is recommended every 10.000 operations. For this purpose, please contact the ABB Service office. Complete replacement of the actuator, shock absorber and of the other transmission system parts (shaft, main levers, safety rings, etc.) must be carried out after 30.000 operations.

IEEE circuit breakers 15kV up to 2000A, 40kA

To ensure correct operation of the circuit breaker, inspection and maintenance of the tripping devices must be carried out every 2.000 operations. For this purpose, please contact the ABB Service office. Replacement of spring charging motor (-MAS) must be carried out every 5.000 operations. Complete replacement of the shock absorber and of the other parts of the transmission system (shaft, main levers, safety rings, etc.) must be carried out every 10.000 operations.

Circuit breakers up to 17.5 kV, 40 kA and 24 kV, 31.5 kA

To ensure correct operation of the circuit breaker, inspection and maintenance of the tripping devices is recommended every 5.000 operations. For this purpose, please contact the ABB Service office. Complete replacement of the actuator must be carried out every 10.000 operations. Complete replacement of the shock absorber and of the other transmission system parts (shaft, main levers, safety rings, etc.) must be carried out after 30.000 operations.

Circuit breakers up to 17.5 kV, 3150 A, 40 kA and 36/40.5 kV

To ensure correct operation of the circuit breaker, inspection and maintenance of the tripping devices must be carried out every 5.000 operations. For this purpose, please contact the ABB Service office. Complete replacement of the shock absorber and of the other part of the transmission system (shaft, main levers, safety rings, etc.) must be carried out after 10.000 operations.

Circuit breakers up to 17.5 kV, 50 kA and EL twin actuator

To ensure correct operation of the circuit breaker, inspection and maintenance of the tripping devices must be carried out every 5.000 operations. For this purpose, please contact ABB Service. Complete replacement of the shock-absorber and of the other parts of the transmission system (shaft, main levers, safety rings, etc.) must be carried out every 10.000 operations.

Note

Dismantling and replacement of the operating mechanism (trip box) can only be carried out by ABB personnel or by skilled and specially trained personnel, particularly for the necessary adjustments.

Details regarding overhauling

- When foreseen, cut off the power supply to the spring charging motor and manually discharge the operating mechanism spring by closing and opening the circuit breaker.
- Replace the parts subjected to mechanical stress or stress due to particular environmental conditions, (contact and ABB service centre).
- Consult maintenance instruction manual 1VCP000558 for further details.

Note

These operations can only be carried out by ABB personnel or by skilled and specially trained personnel.

9.3.3. Circuit breaker pole

The circuit breaker pole and relative vacuum interrupter are maintenance-free until the maximum number of electrical operations for the type of interrupter is reached (see par. 7.2.3. Trip curves). The operating life of the vacuum interrupter is defined by the sum of the ultimate currents corresponding to the specific type of interrupter in accordance with what is indicated in the graphs of par. 7.2.3. Trip curves: when the sum of the ultimate currents is reached, the whole pole must be replaced.

Note

Dismantling and replacement of the pole can only be carried out by ABB personnel or by skilled and specially trained personnel, particularly for the necessary adjustments.

To carry out the interrupter test without dismantling the circuit breaker pole, use:

- the VIDAR vacuum tester, made by the company Programma Electric GmbH, Bad Homburg v.d.H.

To check vacuum tightness of the interrupter, the following test values must be set on the VIDAR tester:

Rated voltage of the circuit breaker	d.c. test voltage
12 kV	40 kV
17.5 kV	40 kV
24 kV - 36 kV - 40.5 kV	60 kV

CMU and Sensors The expected life expectancy for CMU and sensors is 10 years. After 10 years please get in touch with ABB Service for the replacement. For VD4 evo customers can replace the sensors themselves without any intervention from ABB Service.

Detailed instructions for installing the sensors is available. Please see section 7 - Installation for more details.

ABB shall provide the software updates from time to time.

The test must always be carried out with the circuit breaker open with the contacts at the nominal distance.



Procedure for testing the degree of vacuum of the interrupter of the circuit breaker poles:

- turn the power supply off and make the working area safe by following the safety regulations specified in the IEC/ DIN VDE Standards;
- open the circuit breaker;
- earth a terminal of each circuit breaker pole;
- connect the earth terminal of the VIDAR tester to the circuit breaker structure;
- connect the high voltage terminal of the VIDAR tester to the terminal of the circuit breaker pole not connected to earth (L1 phase) and carry out the test. Repeat the test for phases L2 and L3.

Note

The tester connection cables can produce an indication due to the capacitive effect. In this case the cables must not be removed.

9.4. Repairs

Replacement of spare parts and accessories must only be carried out by ABB personnel or suitably qualified and specially trained personnel.

Always work with the circuit breaker open and locked so that it cannot be closed again, with the work area insulated and made safe.

The operating mechanism spring must be discharged.

All power supply sources must be disconnected and made safe against any reclosing during removal and installation work.



Should maintenance be carried out by the customer's personnel, responsibility for the interventions remains with the customer.

The replacement of parts not included in the "List of spare parts/accessories" (par. 12.1.) must only be carried out by ABB personnel. In particular:

- complete pole with bushings/connections
- actuator and transmission system
- closing spring set
- opening spring
- shock-absorber.

10. Application of the X-ray emission Standards

One of the physical properties of vacuum insulation is the possibility of X-ray emission when the interrupter contacts are open.

The specific tests carried out at the PTB laboratories (Physikalisch-Technische Bundesanstalt, in Brunswick - Germany) show that local emission at a distance of 10 cm from the interrupter or pole surface, does not exceed 1 $\mu\text{Sv/h}$.

It follows that:

- at the rated service voltage the use of vacuum interrupters is absolutely safe;
- application of the withstand voltage at power frequency, according to the IEC 62271-100 and VDE 0670 Standards, is safe;
- application of a voltage higher than the withstand voltage at power frequency or of a test voltage in direct current, specified in the IEC and VDE Standards, cannot be used;
- limitation of the above-mentioned local phenomena, with interrupters with open contacts, depends on keeping the specific distance between the contacts.

This condition is intrinsically guaranteed by correct operation of the operating mechanism and by the adjustments of the transmission system.

11. Spare parts and accessories



All assembly operations of spare parts/ accessories must be carried out following the instructions enclosed with the spare parts, by ABB personnel or by suitably qualified customer personnel with in-depth knowledge of the apparatus (IEC 60694) and of all the Standards aimed at carrying out these interventions in safe conditions. Should the maintenance be carried out by the customer's personnel, responsibility for the interventions remains with the customer. Before carrying out any operation, always make sure that the circuit breaker is open, the spring discharged and that it is not energised (medium voltage circuit and auxiliary circuits).

To order circuit breaker spare parts/accessories, refer to the ordering sales codes indicated in the technical catalogue and always state the following:

- type of circuit breaker
- rated voltage of the circuit breaker
- rated normal current of the circuit breaker
- breaking capacity of the circuit breaker
- serial number of the circuit breaker
- rated voltage of any electrical spare parts.

For availability and to order spare parts, please contact our Service office.

11.1. List of spare parts

- Shunt opening release
- Additional shunt opening release
- Undervoltage release
- Contact for signalling undervoltage release energised/deenergised
- Time delay device for undervoltage release
- Mechanical override for undervoltage release
- Shunt closing release
- Spring charging geared motor with electrical signalling of spring charged
- Contact signalling protection circuit breaker of the geared motor open/closed
- Contact signalling closing spring charged/discharged
- Transient contact with momentary closing during circuit breaker opening
- Circuit breaker auxiliary contacts
- Locking electromagnet on the operating mechanism
- Position contact of the withdrawable truck
- Contacts signalling connected/isolated
- Opening solenoid
- Key lock in open position
- Isolation interlock with the door
- Protection for opening pushbutton
- Protection for closing pushbutton
- Locking electromagnet on the withdrawable truck
- Set of six tulip contacts
- CMU (for VD4 evo only)
- Temperature sensor with Smart Arm (for VD4 evo only)
- Angle sensor (for VD4 evo only)

12. Electric circuit diagrams

The standard VD4 circuit breaker electric circuit diagrams are as follows:

Free standing version:

- 1VCD400151: Fixed circuit breakers
- 1VCD400152: Fixed circuit breakers with 64-pole connector
- 1VCD400153: Fixed circuit breakers with 58-pole connector
- 1VCD400154: Fixed circuit breakers with truck

Withdrawable version

- 1VCD400155: Withdrawable circuit breakers
- 1VCD400156: Withdrawable motorized circuit breakers
- 1VCD400158 Withdrawable circuit breakers for ZS8.4 switchgear VD4/ZS8, ZT8 and Z8 with circuit breaker
- 1VCD400159: Withdrawable circuit breakers for ZS8.4 switchgear with VD4/ZS8, ZT8 and Z8 circuit breaker with motorized truck

50kA version

- 1VCD400166: Fixed circuit breakers 50 kA
- 1VCD400167: Withdrawable circuit breakers 50 kA
- 1VCD400168: Withdrawable circuit breakers 50 kA with motorized truck.

Each circuit breaker is always provided with the standard electric diagram or with a specific diagram in the case of a circuit breaker with non-standard cabling.

Free standing version VD4 evo 40 kA:

- 1VCD400316: Fixed circuit breakers

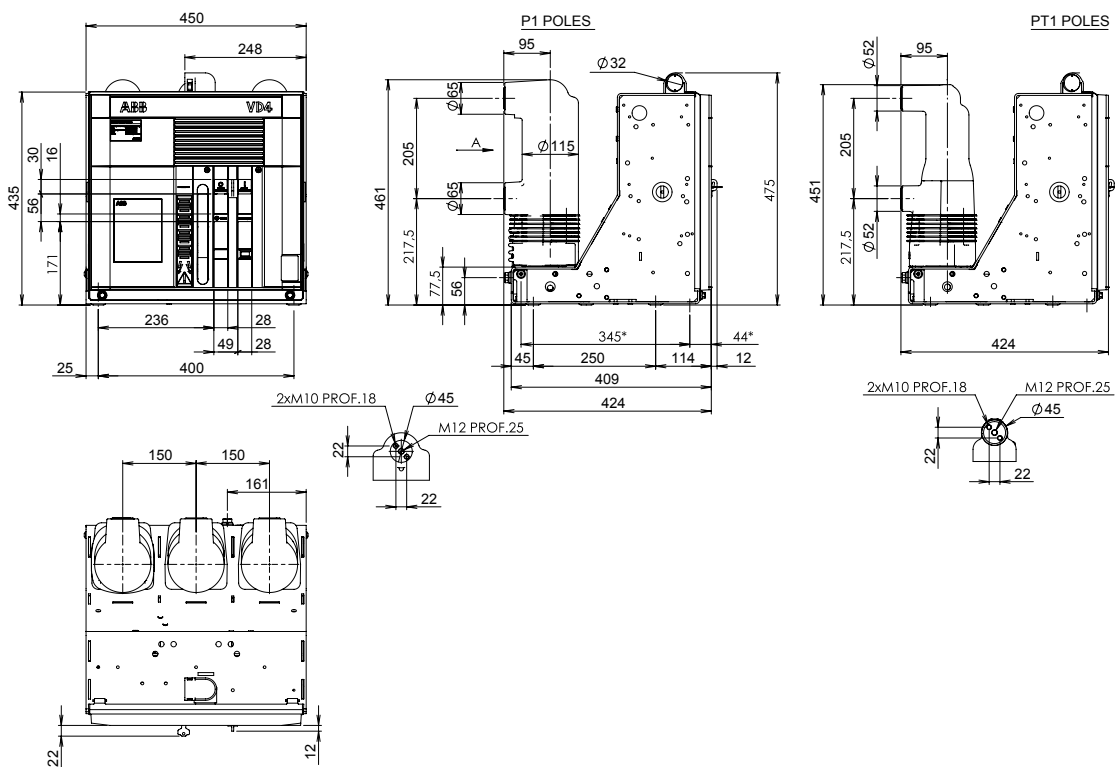
Withdrawable version VD4 evo 40 kA:

- 1VCD400311: Withdrawable circuit breakers
- 1VCD400312: Withdrawable motorized circuit breakers

13. Overall dimensions

Fixed circuit breakers

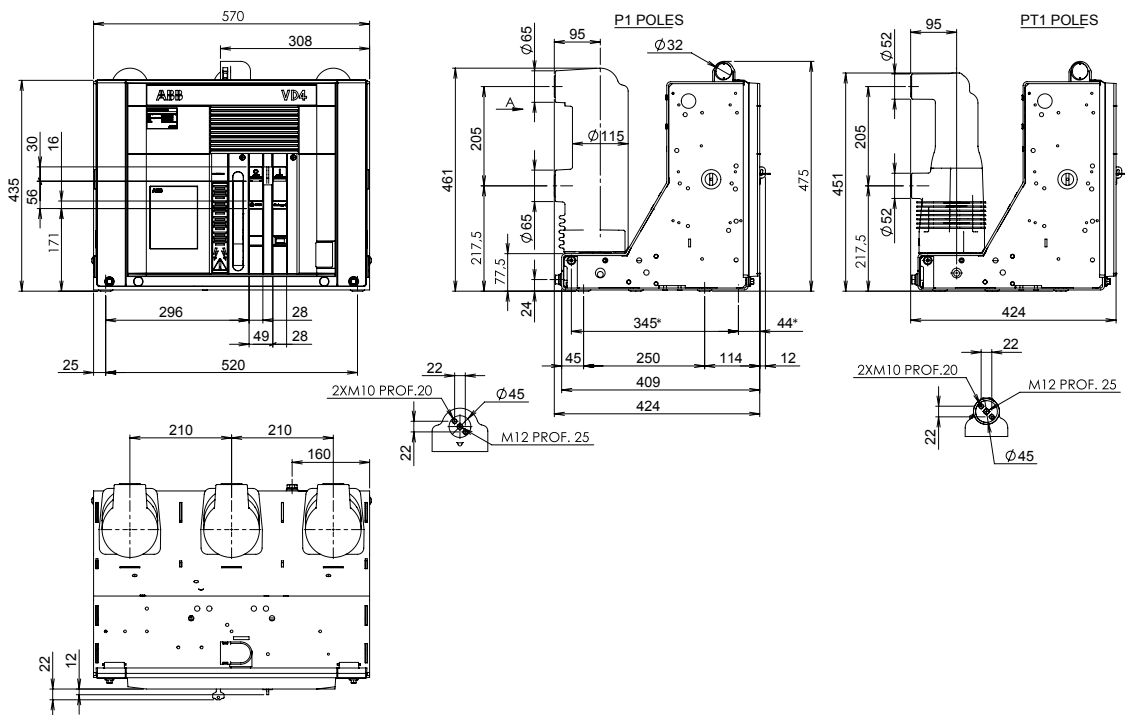
VD4			
TN	7405		
	12	kV	
Ur	15	kV	
	17.5	kV	
	630	A	
Ir	1200	A	
	1250	A	
	16	kA	
Isc	20	kA	
	25	kA	
	31.5	kA	



(*) Fixing interchangeability with previous series (345 x 400).

Fixed circuit breakers

VD4			
TN	7406		
	12	kV	
Ur	17.5	kV	
	630	A	
Ir	1250	A	
	16	kA	
Isc	20	kA	
	25	kA	
	31.5	kA	

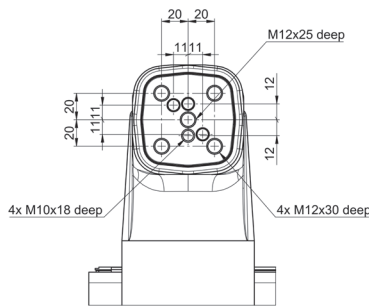
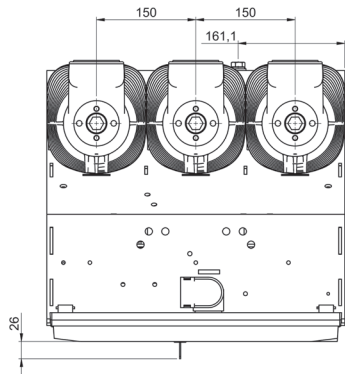
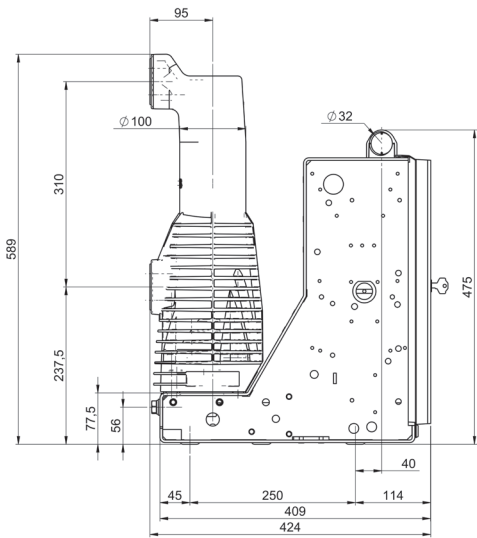
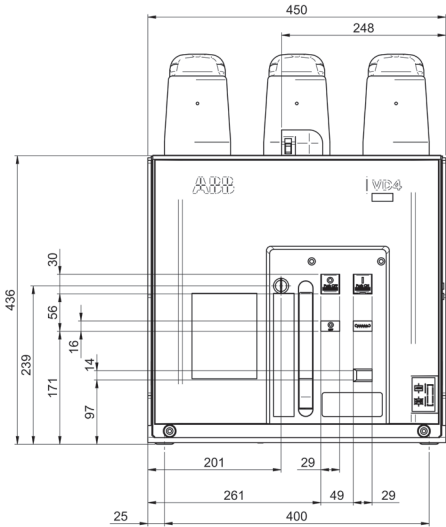


(*) Fixing interchangeability with previous series (345 x 520).

13. Overall dimensions

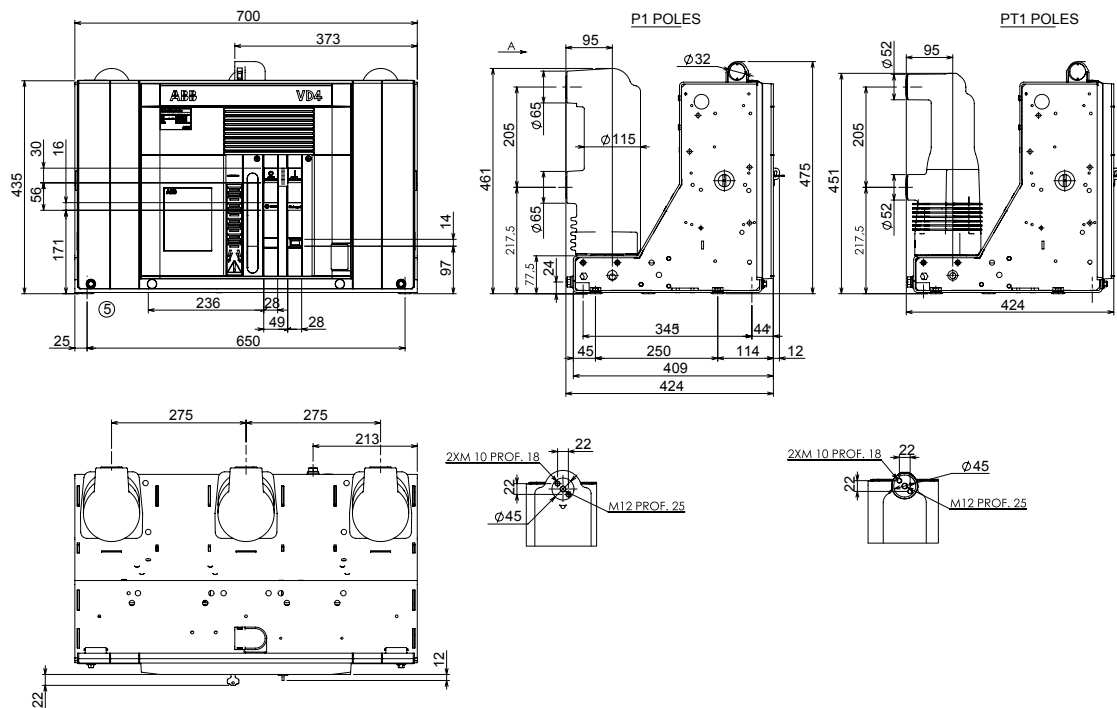
Fixed circuit breakers

VD4		
TN	2RDA043108	
Ur	12	kV
	17.5	kV
Ir	1250	A
	16	kA
	20	kA
	25	kA
Isc	31.5	kA
	40	kA



Fixed circuit breakers

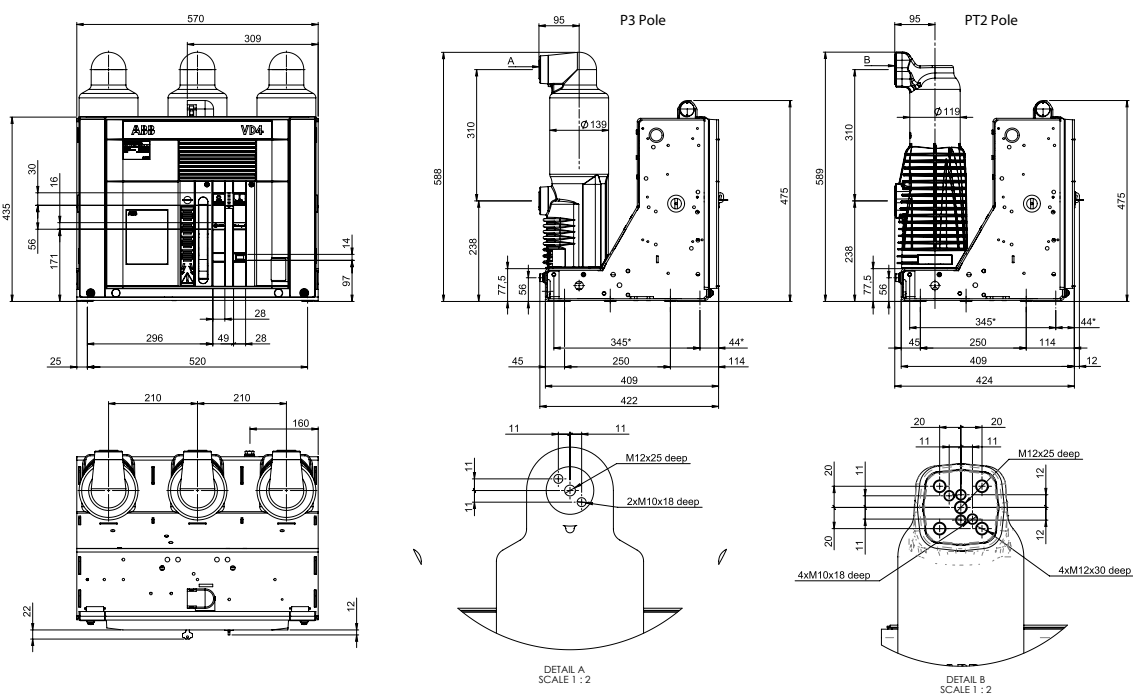
VD4			
TN	1VCD000051		
Ur	12	kV	
	17.5	kV	
Ir	630	A	
	1250	A	
Isc	16	kA	
	20	kA	
	25	kA	
	31.5	kA	



(*) Fixing interchangeability with previous series (345 x 650).

Fixed circuit breakers

VD4			
TN	1VCD003282		
Ur	12	kV	
	17.5	kV	
Ir	1250	A	
	1600	A	
Isc	40	kA	



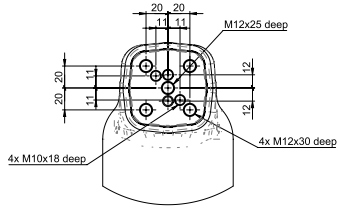
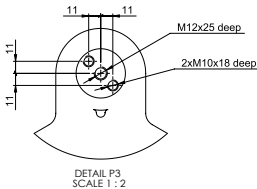
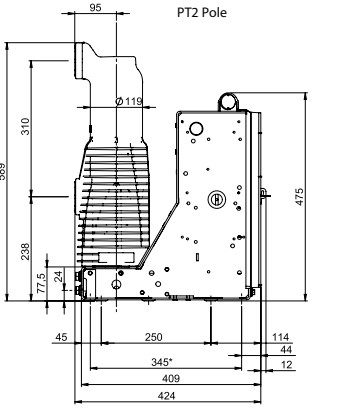
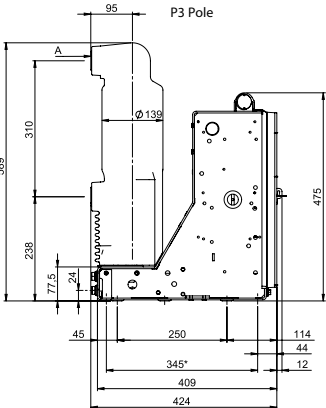
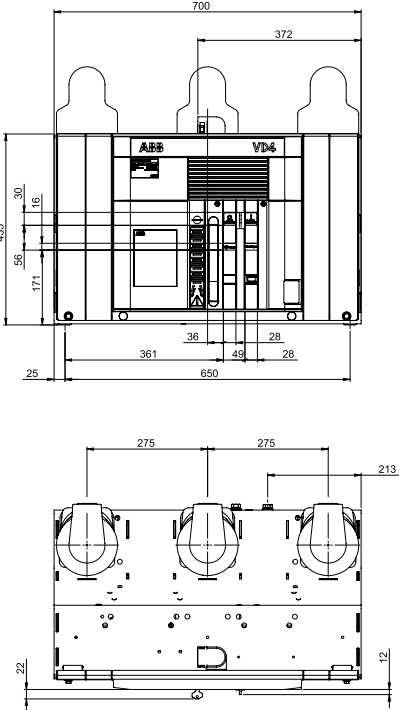
Type	Pole	Ur	Ir	Isc	Operating Mechanism	Version for
VD4 p210	P3	12-17.5 kV	1250A-1600A	40kA	EL	free standing installation
VD4 p210	PT2	12-17.5 kV	1250A-1600A	40kA	EL	free standing installation

(*) Fixing interchangeability with previous series (345 x 650).

13. Overall dimensions

Fixed circuit breakers

VD4		
TN	1VCD003285	
Ur	12	kV
	17.5	kV
Ir	1250	A
	1600	A
Isc	40	kA

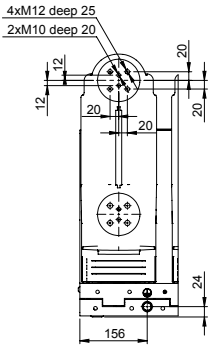
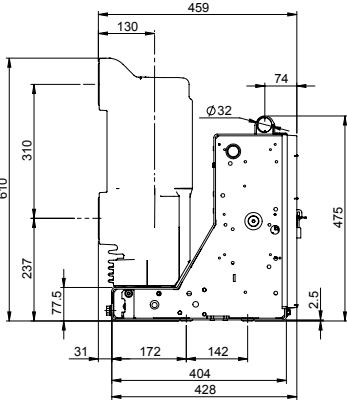
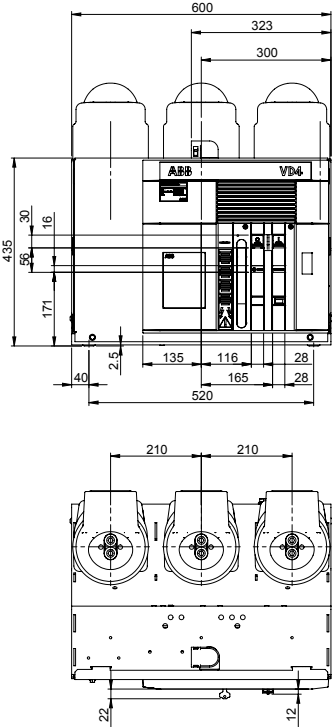


Type	Pole	Ur	Ir	Isc	Operating Mechanism	Version for
VD4 p275	P3	12-17.5 kV	1250A-1600A	40kA	EL	free standing installation
VD4 p275	PT2	12-17.5 kV	1250A-1600A	40kA	EL	free standing installation

(*) Fixing interchangeability with previous series (345 x 650).

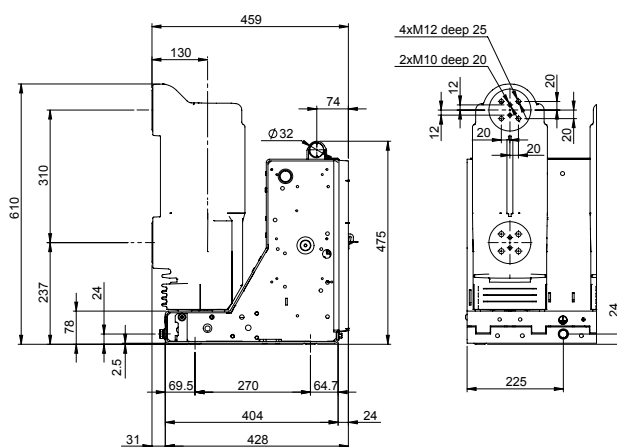
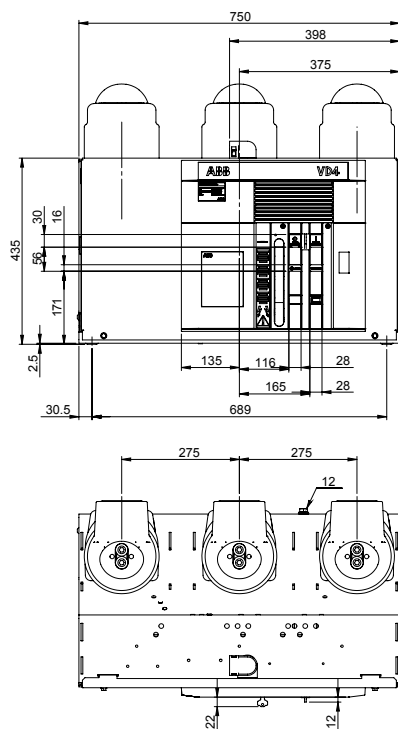
Fixed circuit breakers

VD4		
TN	1VCD003440	
Ur	12	kV
	17.5	kV
Ir	1250	A
	1600	A
Isc	2000	A
	50	kA



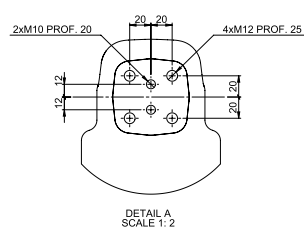
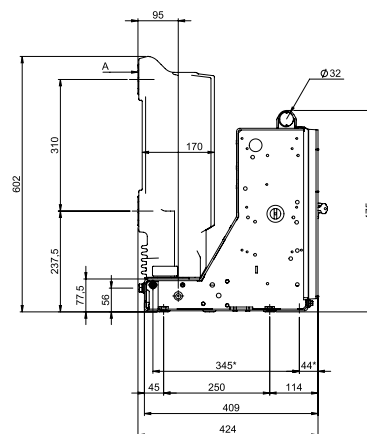
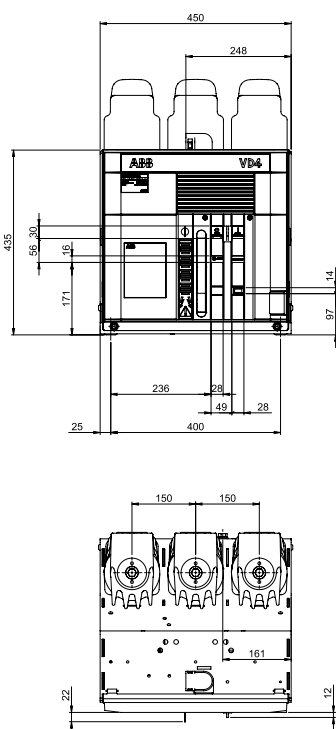
Fixed circuit breakers

VD4			
TN	1VCD003441		
Ur	12	kV	
	17.5	kV	
Ir	1250	A	
	1600	A	
	2000	A	
	2500	A	
Isc	50	kA	



Fixed circuit breakers

VD4			
TN	1VCD000050		
Ur	12	kV	
Ir	1600	A	
	20	kA	
Isc	25	kA	
	31.5	kA	



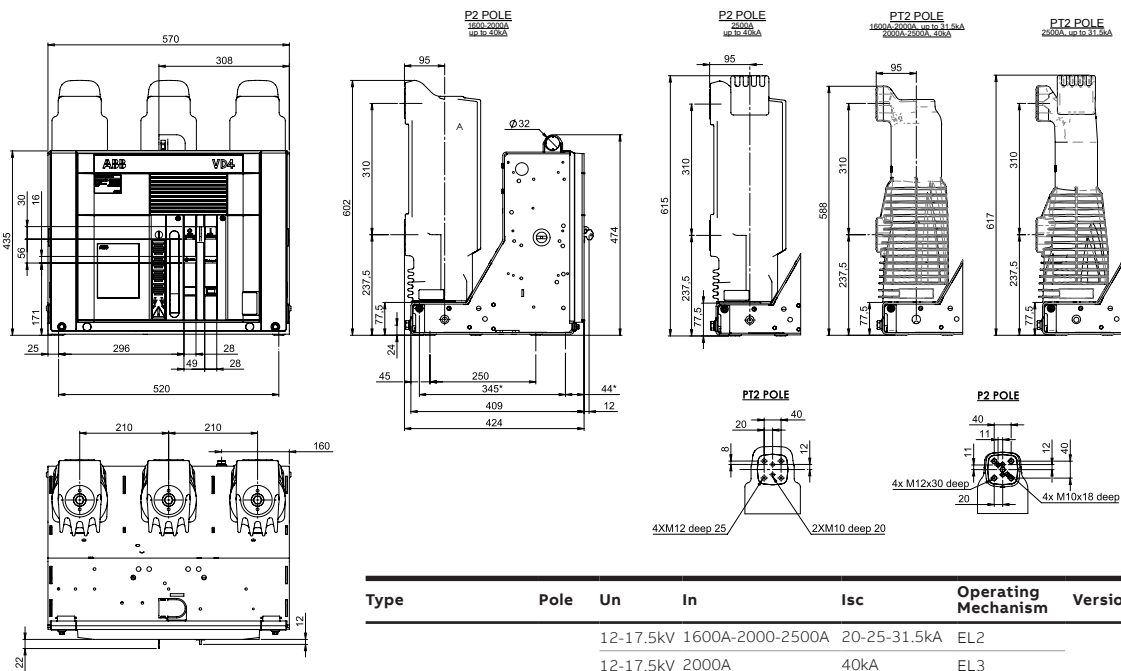
(*) Fixing interchangeability with previous series (345 x 400).

13. Overall dimensions

Fixed circuit breakers

VD4		
TN	7407	
Ur	12 kV	
	15 kV	
	17.5 kV	
Ir	1200 A	
	1600 A	
Isc	20 kA	
	25 kA	
	31.5 kA	

VD4		
TN	7407	
Ur	12 kV	
	15 kV	
	17.5 kV	
Ir	1200 A	
	2000 A	
	20 kA	
Isc	25 kA	
	31.5 kA	
	40 kA	



Type	Pole	Un	In	Isc	Operating Mechanism	Version for
VD4 p.210	P2	12-17.5kV	1600A-2000-2500A	20-25-31.5kA	EL2	free standing version
		12-17.5kV	2000A	40kA	EL3	
		12kV	2500A	40kA	EL3	
		15kV	2000A	31,5kA	EL3	
VD4 12/**/**/G p.210		12kV	1600A-2000-2500A	20-25-31.5kA	EL2	free standing version
VD4 p.210	P2	12-17.5kV	1600A-2000-2500A	20-25-31.5kA	EL3	
		12-17.5kV	2000A	40kA	EL3S	
		12kV	2500A	40kA	EL3S	
VD4 12/**/**/G p.210	PT2	15kV	1200A-2000A	40kA	EL3S	
		12kV	1600A-2000-2500A	20-25-31.5kA	EL3	

(*) Fixing interchangeability with previous series (345 x 650).

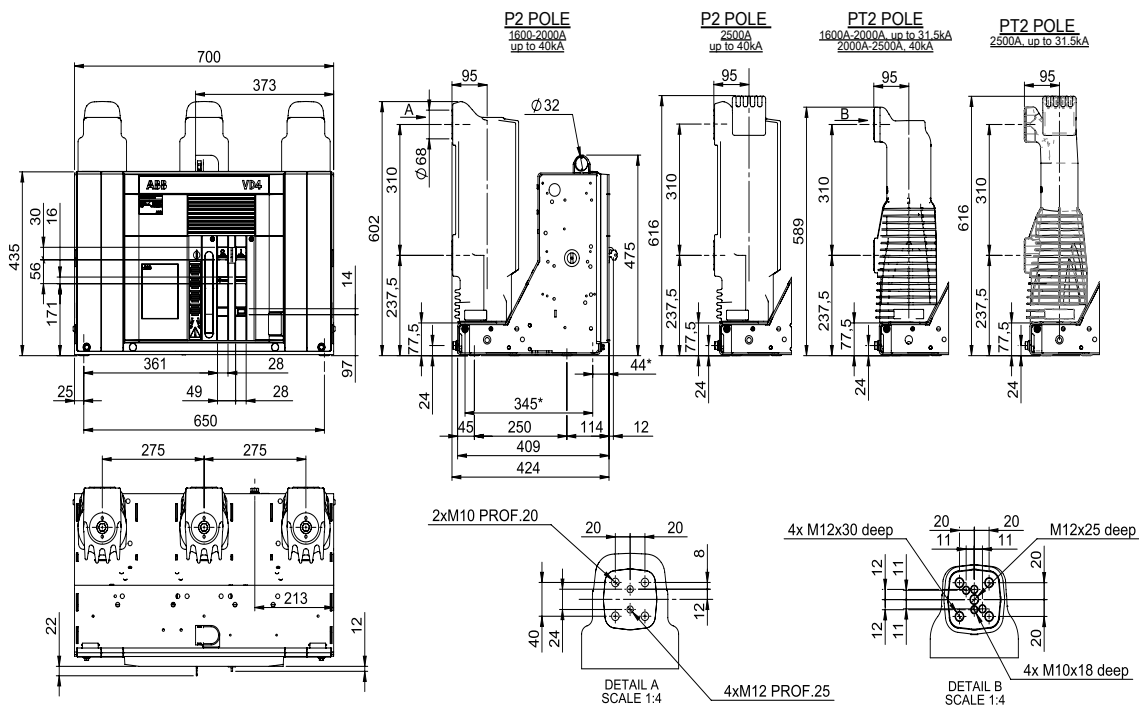
Fixed circuit breakers

VD4

TN	7408
Ur	12 kV
	17.5 kV
Ir	1600 A
	20 kA
Isc	25 kA
	31.5 kA

VD4

TN	7408
Ur	12 kV
	17.5 kV
Ir	2000 A
	2500 A
	20 kA
	25 kA
Isc	31.5 kA
	40 kA



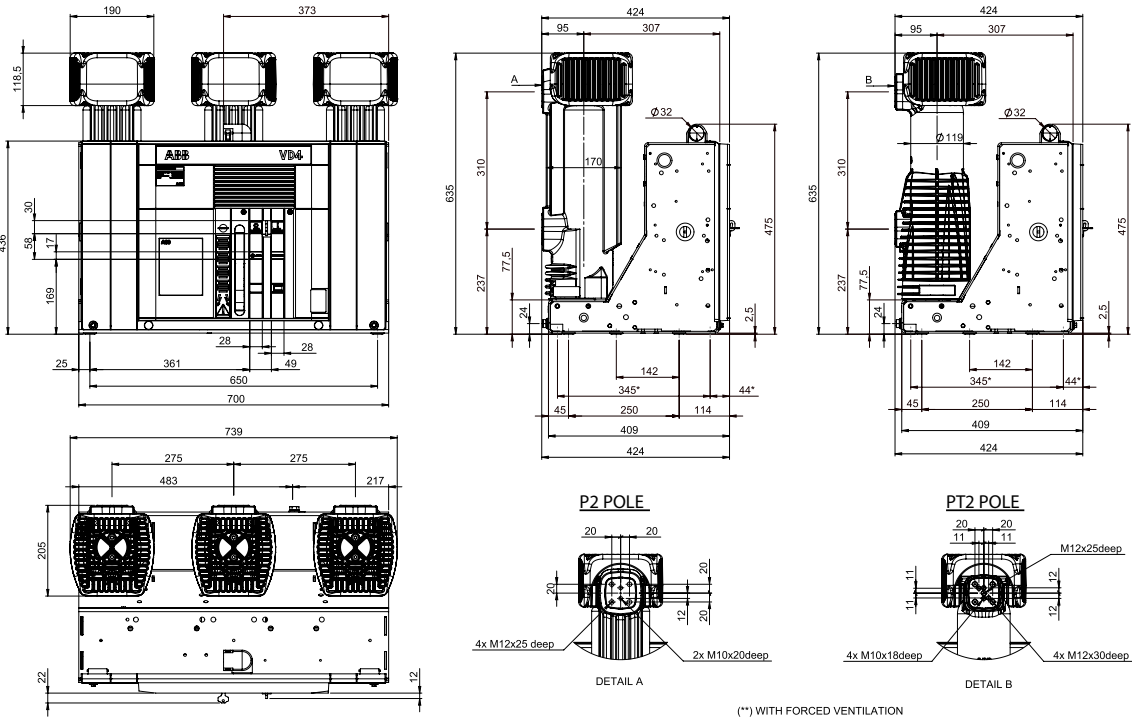
Type	Poles	Un	In	Isc	Operating Mechanism	Version for
VD4 p.275	P2	12-17.5kV	1600A-2000-2500A	20-25-31.5kA	EL2	free standing version
		12-17.5kV	2000-2500A	40kA	EL3	
VD4 12/**/**/G p.275	P2	12kV	1600A-2000-2500A	20-25-31.5kA	EL2	
		12kV	2000-2500A	40kA	EL3	
VD4 p.275	PT2	12-17.5kV	1600A-2000-2500A	20-25-31.5kA	EL3	
		12-17.5kV	2000-2500A	40kA	EL3S	
VD4 12/**/**/G p.275	PT2	12kV	1600A-2000-2500A	20-25-31.5kA	EL3	
		12kV	2000-2500A	40kA	EL3S	

(*) Fixing interchangeability with previous series (345 x 650).

13. Overall dimensions

Fixed circuit breakers

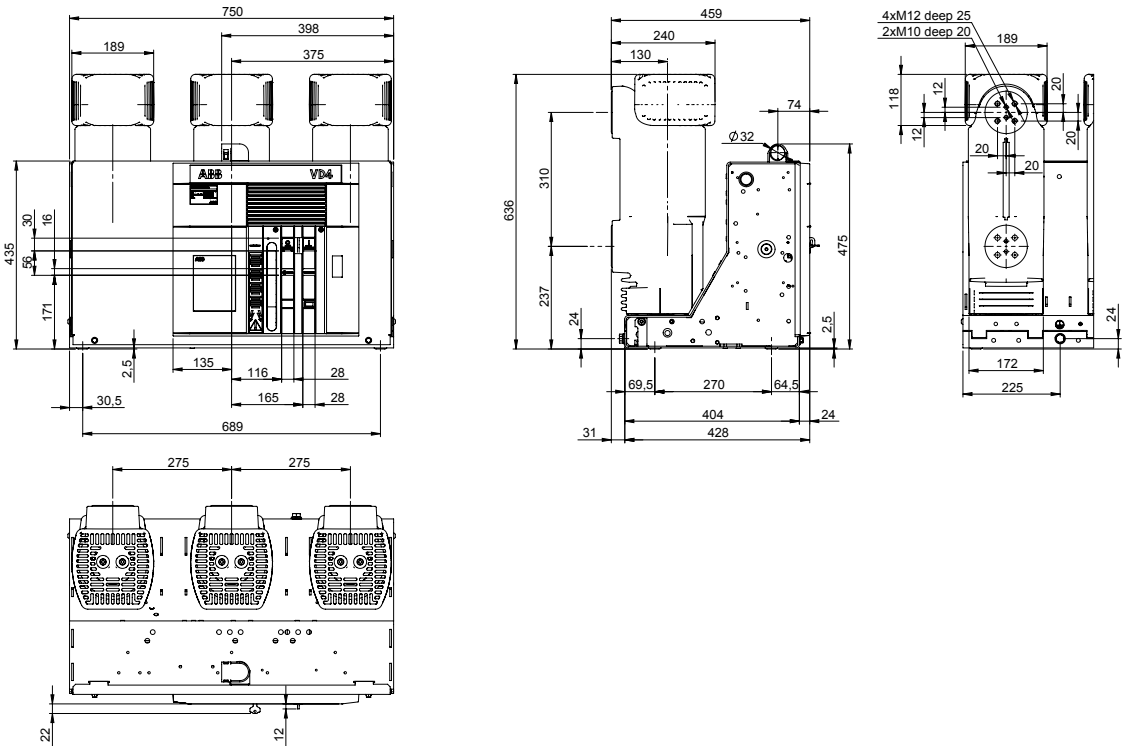
VD4		
TN	1VCD000149	
Ur	12	kV
	17.5	kV
Ir	3150	A
	20	kA
	25	kA
Isc	31.5	kA
	40	kA



(*) Fixing interchangeability with previous series (345 x 650).

Fixed circuit breakers

VD4		
TN	1VCD003443	
Ur	12	kV
	17.5	kV
Ir	3150	A (*)
Isc	50	kA

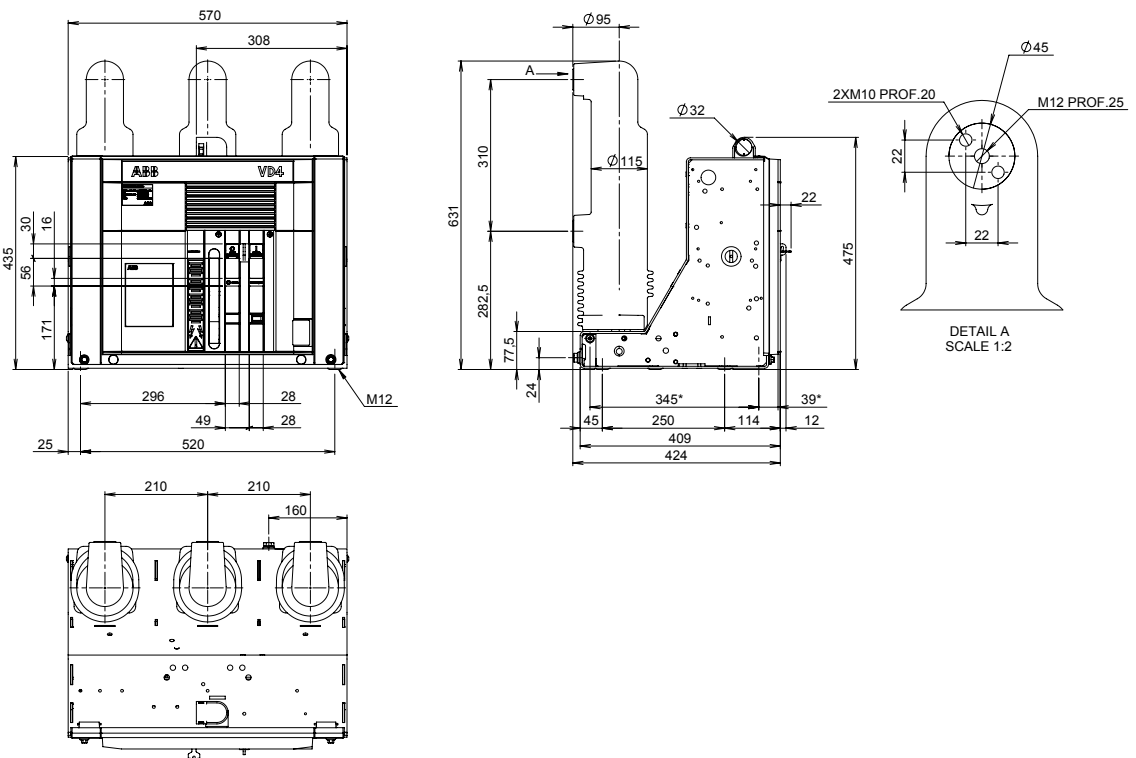


(*) 4000 A with forced ventilation.

Fixed circuit breakers

VD4

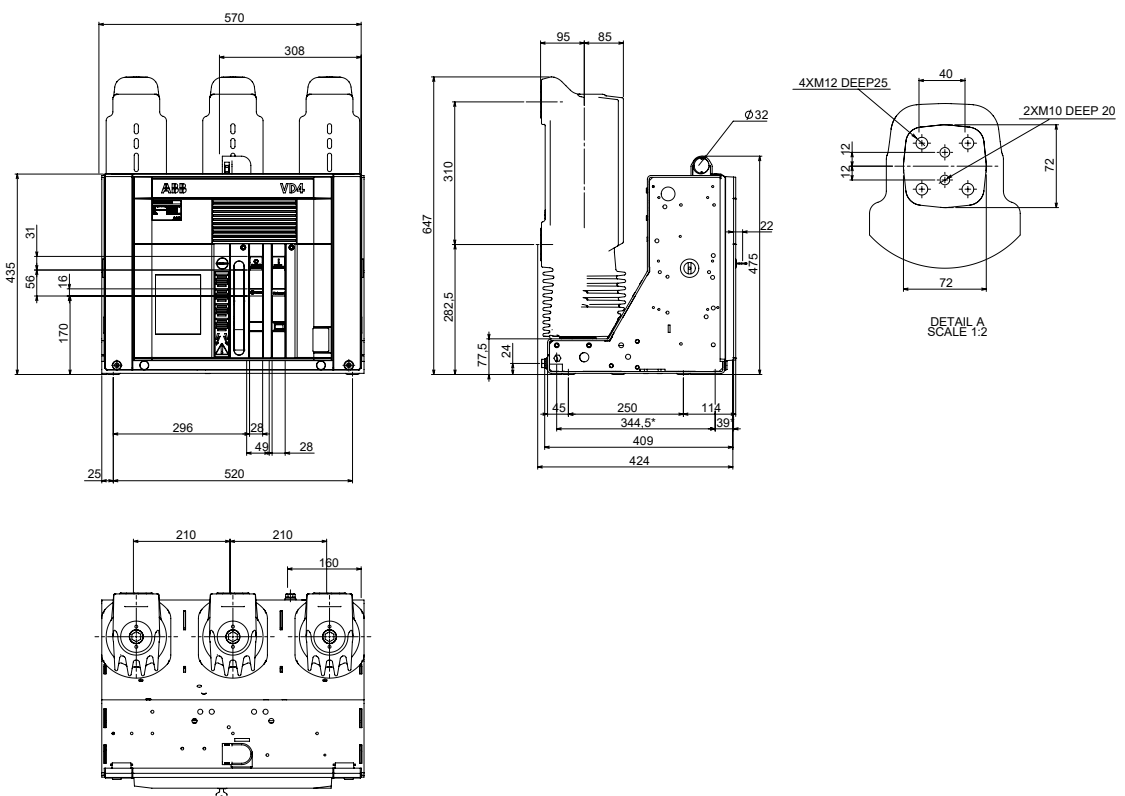
TN	7409	
Ur	24	kV
	630	A
Ir	1250	A
	16	kA
Isc	20	kA
	25	kA



Fixed circuit breakers

VD4

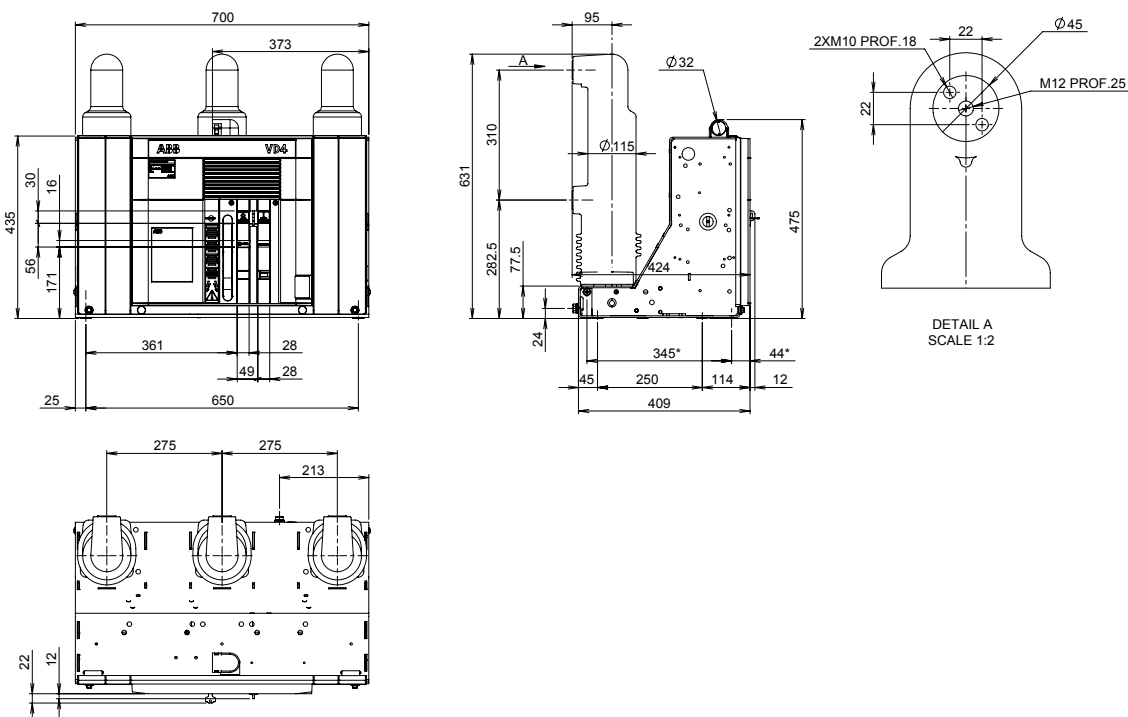
TN	1VCD000172	
Ur	24	kV
	630	A
Ir	1250	A
Isc	31,5	kA



13. Overall dimensions

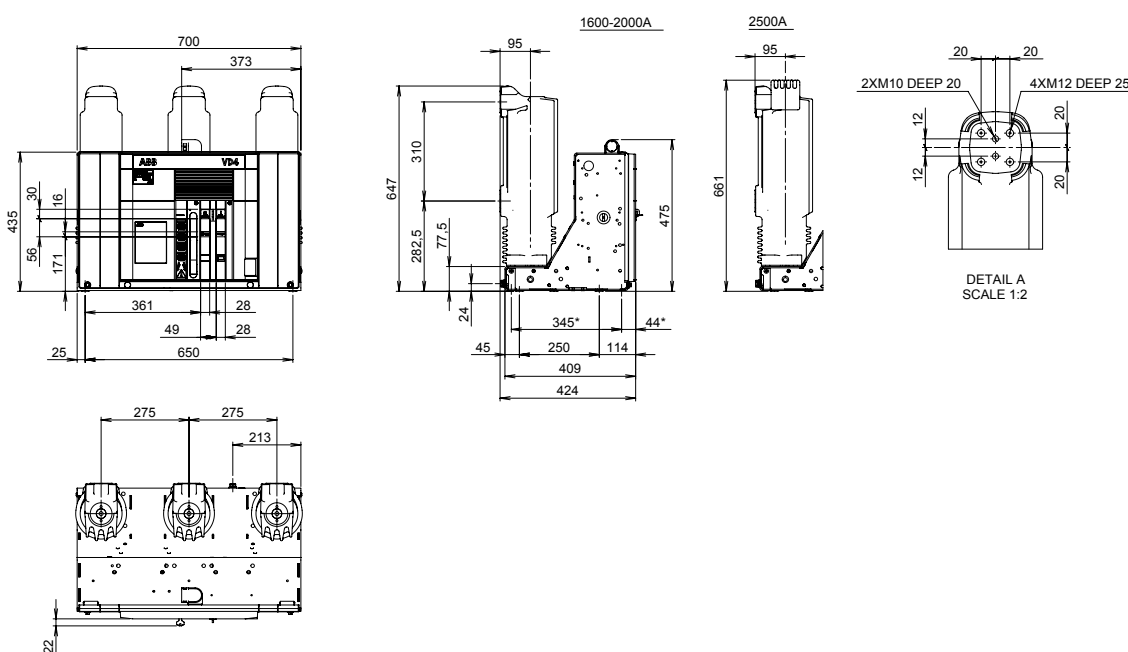
Fixed circuit breakers

VD4		
TN	7410	
Ur	24	kV
I _r	630	A
	1250	A
I _{sc}	16	kA
	20	kA
	25	kA



Fixed circuit breakers

VD4		
TN	7411	
Ur	24	kV
Ir	1600	A
	2000	A
	2500	A
Isc	16	kA
	20	kA
	25	kA
	31.5	kA



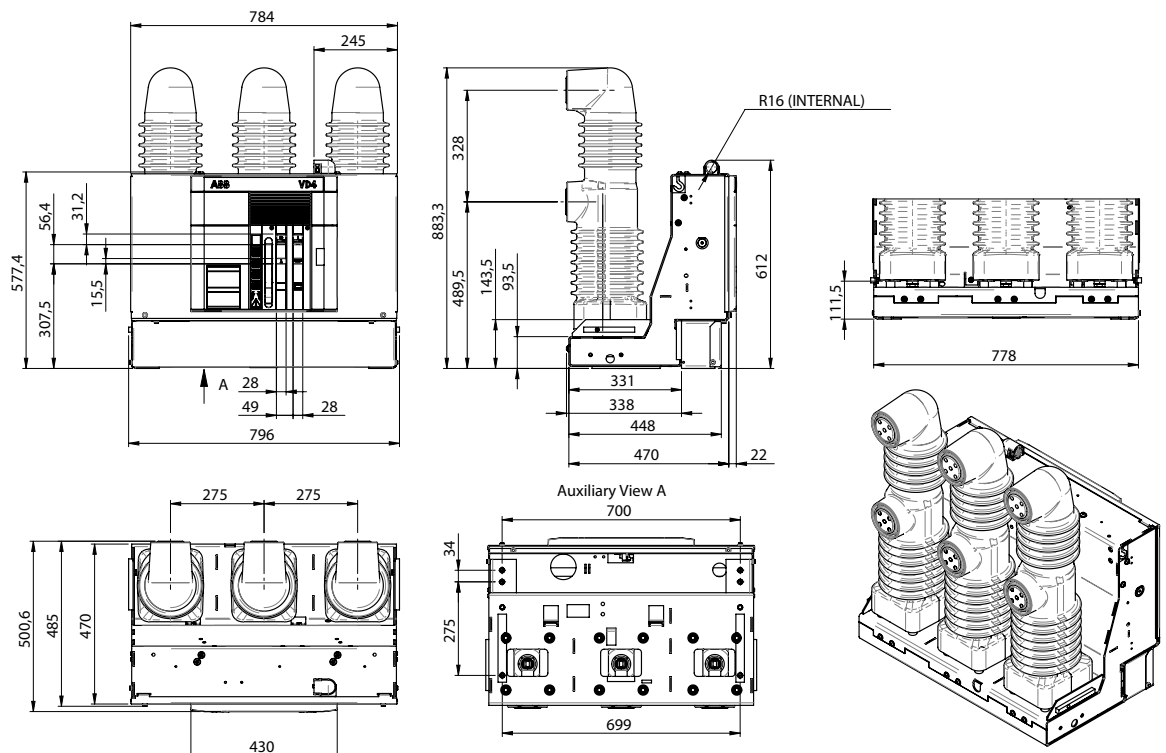
Fixed circuit breakers

VD4

TN	1VYN300901-RF
Ur	36 kV
	1250 A
	1600 A
I _r	2000 A
	2500 A
	20 kA
I _{sc}	25 kA
	31.5 kA

VD4

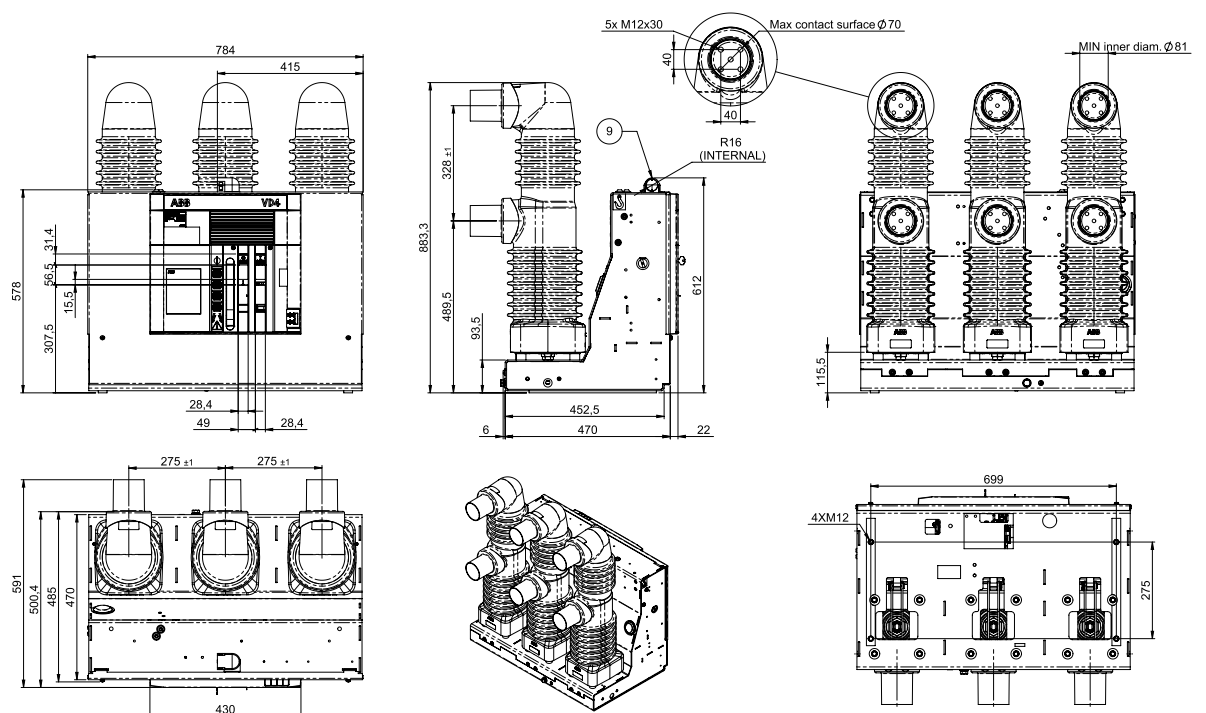
TN	1VYN300901-RF
Ur	38 kV
	1200 A
I _r	2000 A
I _{sc}	31.5 kA



Fixed circuit breakers

VD4

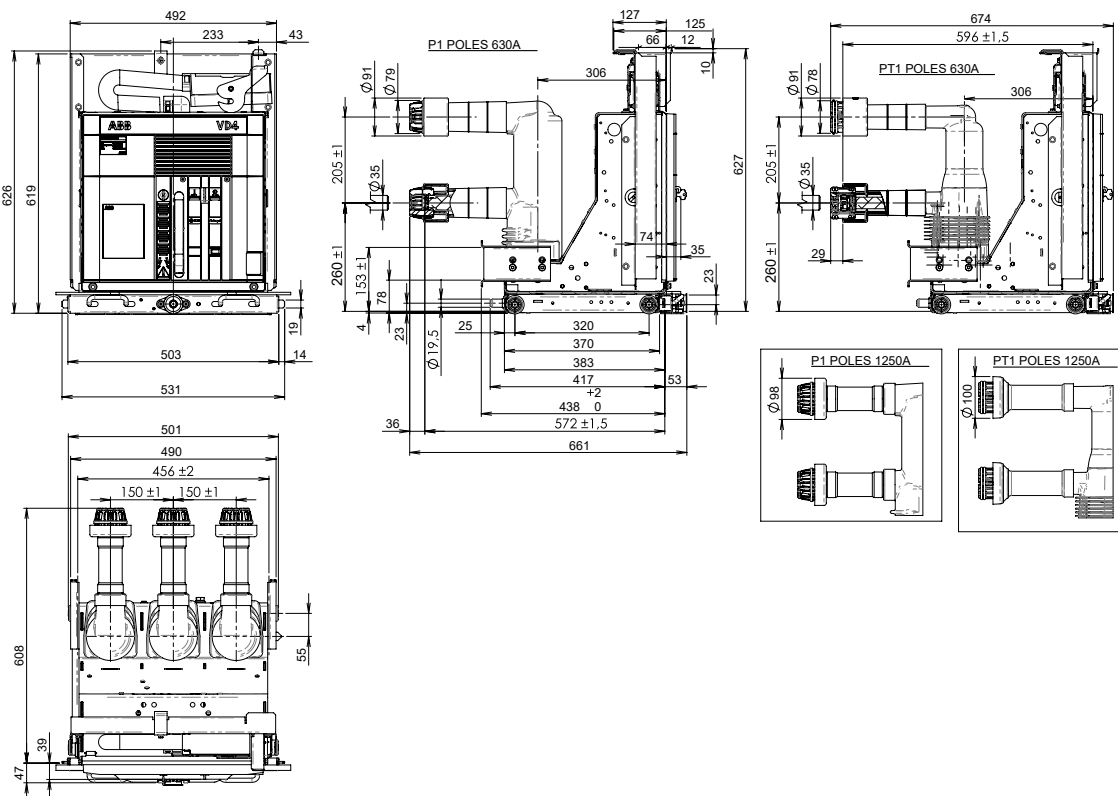
TN	2RDA043326A
Ur	40.5 kV
	1250 A
	1600 A
I _r	2000 A
I _{sc}	31.5 kA



Withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube PB1 modules

VD4/P

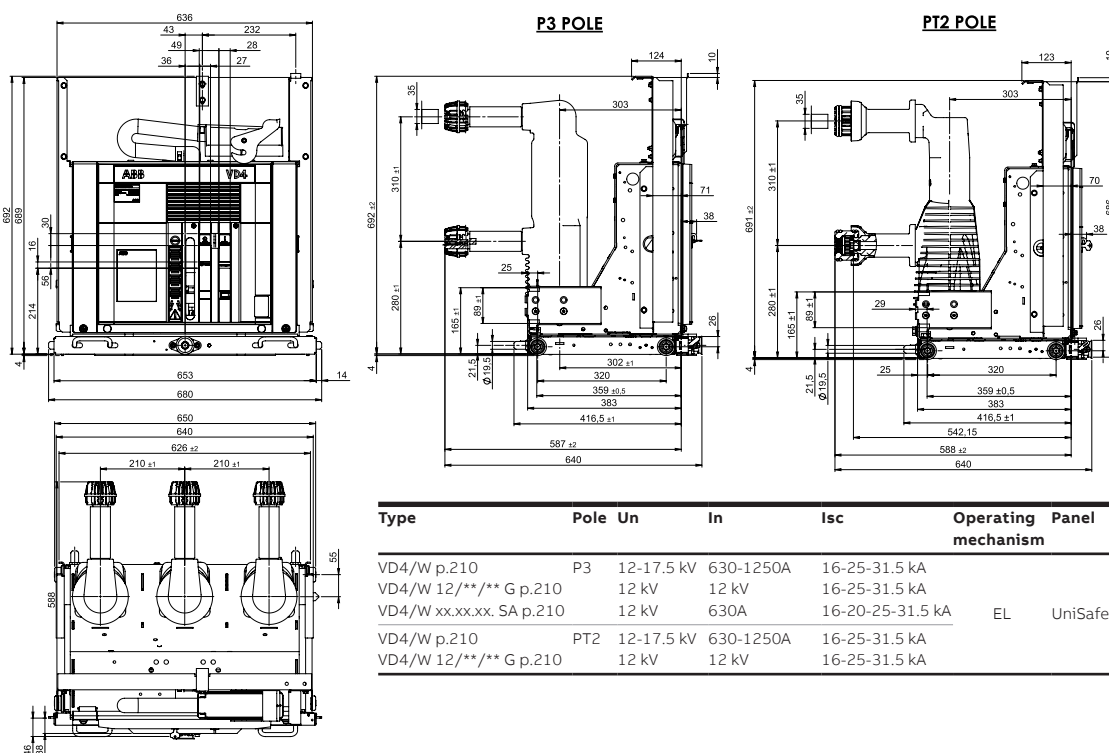
TN	7412
	12 kV
Ur	15 kV
	17.5 kV
	630 A
Ir	1200 A
	1250 A
	16 kA
Isc	20 kA
	25 kA
	31.5 kA



Withdrawable circuit breakers for PowerCube PB2 modules

VD4/W

TN	7420
	12 kV
Ur	17.5 kV
	630 A
Ir	1250 A
	16 kA
Isc	20 kA
	25 kA
	31.5 kA



Withdrawable circuit breakers for UniGear ZS1 switchgear

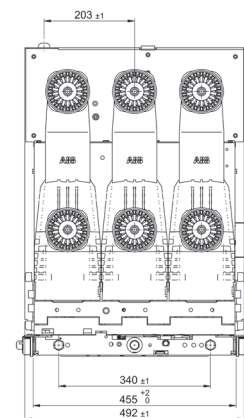
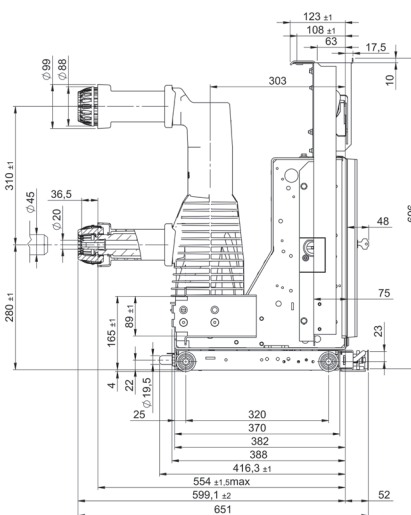
Technical drawings of the M2000 machine showing front and top views with dimensions.

Front View Dimensions:

- Overall width: 492
- Overall height: 693
- Top section width (left to right): 233, 43
- Top section height (left to right): 36, 49, 29
- Internal width (left to right): 24, 29
- Left side height (top to bottom): 282, 214, 30
- Internal height (top to bottom): 56, 16
- Bottom width (left to right): 503, 530
- Bottom right height: 13.5, 19

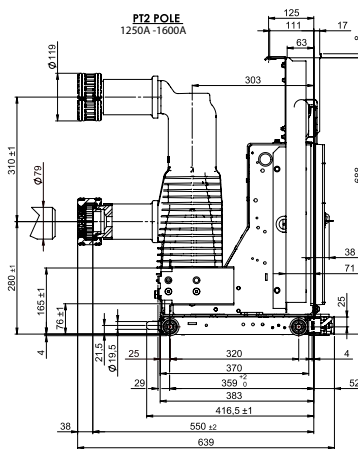
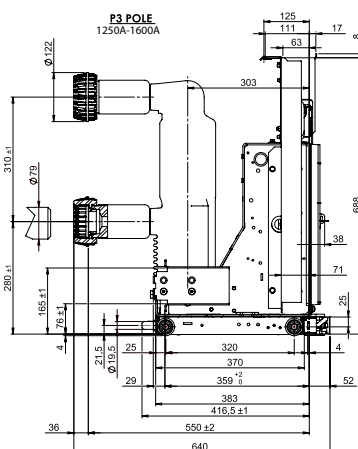
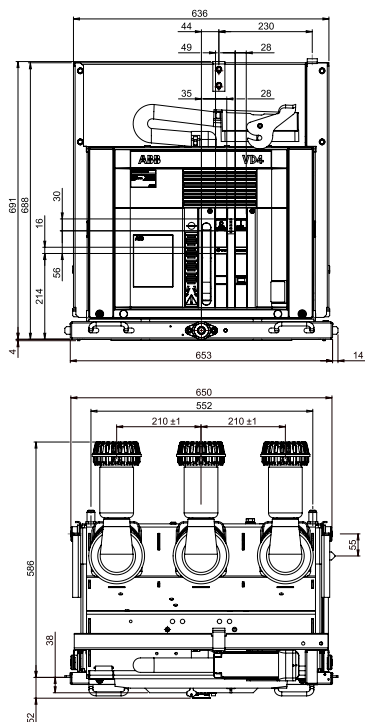
Top View Dimensions:

- Overall width: 501
- Overall height: 490
- Internal width (left to right): 150 ±1, 476 ±2, 150 ±1
- Right side height (top to bottom): 302 ±1, 359.5



Withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube PB2 modules

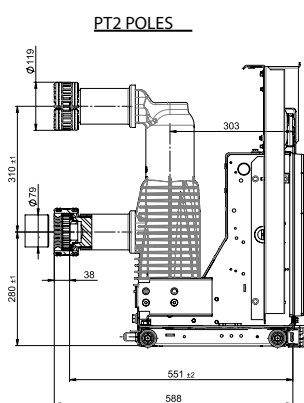
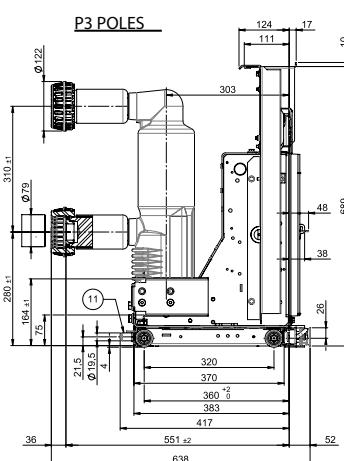
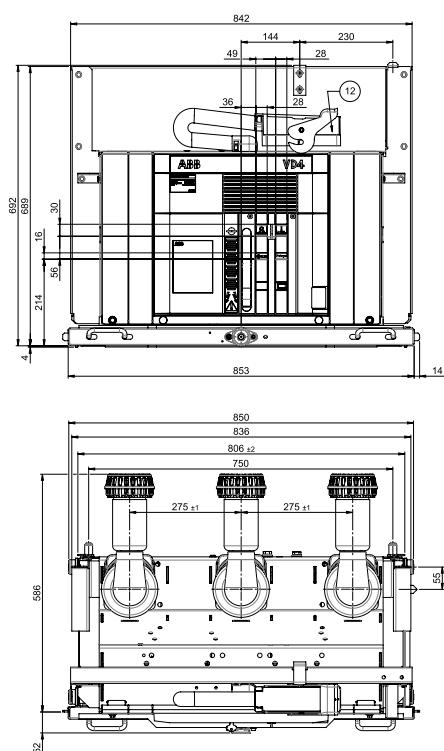
VD4/P		
TN	1VCD003284	
Ur	12	kV
	17.5	kV
Ir	1250	A
	1600	A
Isc	40	kA



C.B. type	Ur	Ir	Isc	Pole	Operating mechanism	Enclosure	Cubicle
VD4/P p.210	12-17.5 kV	1250-1600 A	40 kA	P3	EL	-	UniGear
VD4/P p.210	12-17.5 kV	1600 A	40 kA			PowerCube PB2	-
VD4/P p.210	12-17.5 kV	1250-1600 A	40 kA	PT2	EL	-	UniGear
VD4/P p.210	12-17.5 kV	1600 A	40 kA			PowerCube PB2	-

Withdrawable circuit breakers for UniGear ZS1 switchgear

VD4/P		
TN	1VCD003286	
Ur	12	kV
	17.5	kV
Ir	1250	A
	1600	A
Isc	40	kA

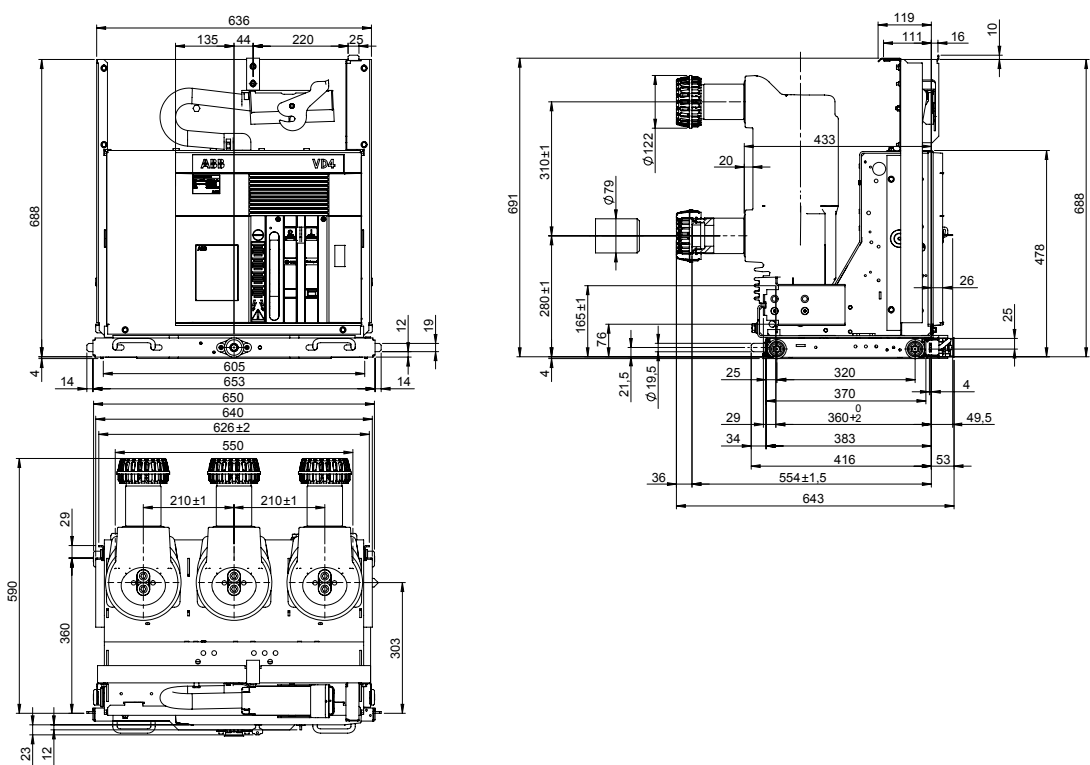


C.B. type	Ur	Ir	Isc	Pole	Operating mechanism	Cubicle
VD4 p.275	12-17.5 kV	1250-1600	40 kA	P	EL	UniGear ZS1
VD4 p.275	12-17.5 kV	1250-1600 A	40 kA	PT2	EL	UniGear ZS1

13. Overall dimensions

Withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube PB2 modules

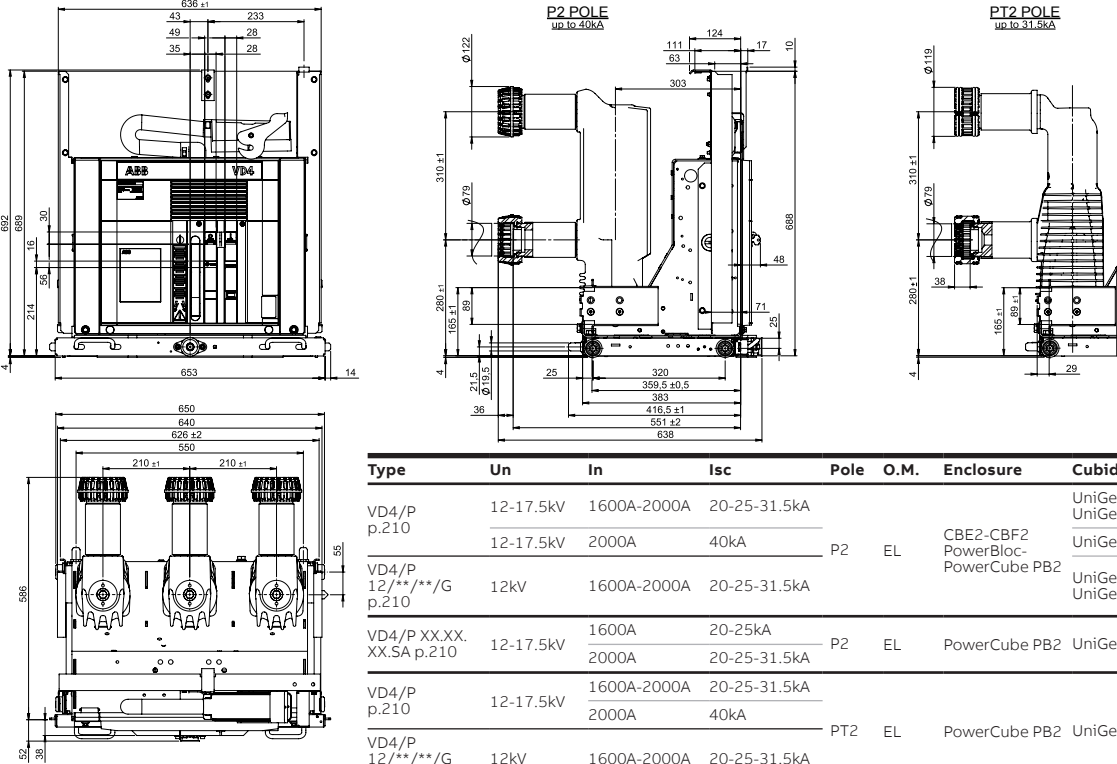
VD4/P			
TN	1VCD 003444		
Ur	12	kV	
	17.5	kV	
Ir	1250	A	
	1600	A	
	2000	A	
Isc	50	kA	



Withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube PB2 modules

VD4/P			
TN	7415		
Ur	12	kV	
	15	kV	
Ir	1600	A	
	2000	A	
Isc	20	kA	
	25	kA	
	31.5	kA	

VD4/P			
TN	7415		
Ur	12	kV	
	15	kV	
Ir	1200	A	
	2000	A	
Isc	40	kA	

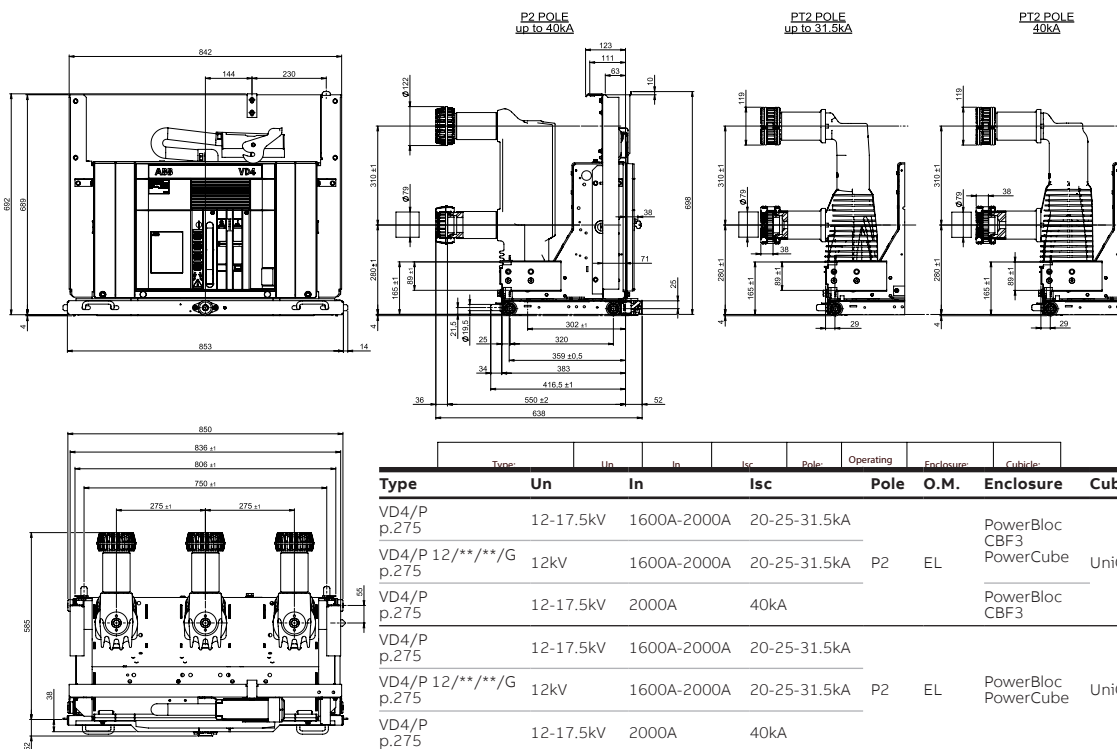


Type	Un	In	Isc	Pole	O.M.	Enclosure	Cubide
VD4/P p.210	12-17.5kV	1600A-2000A	20-25-31.5kA	P2	EL	CBE2-CBF2 PowerBloc- PowerCube PB2	UniGear UniGear ZS1
	12-17.5kV	2000A	40kA				UniGear
VD4/P 12/**/**/G p.210	12kV	1600A-2000A	20-25-31.5kA				UniGear UniGear ZS1
VD4/P XX.XX. XX.SA p.210	12-17.5kV	1600A	20-25kA	P2	EL	PowerCube PB2	UniGear
		2000A	20-25-31.5kA				
VD4/P p.210	12-17.5kV	1600A-2000A	20-25-31.5kA	PT2	EL	PowerCube PB2	UniGear
		2000A	40kA				
VD4/P 12/**/**/G p.210	12kV	1600A-2000A	20-25-31.5kA				
VD4/P p.210	15kV	1200A-2000A	40kA	PT2	EL	PowerCube PB2/E-PB2/FL	
VD4/N/P p.210	15kV	2000A	31.5kA	P2	EL		OeM panel

Withdrawable circuit breakers for UniGear ZS1 switchgear

VD4/P		
TN	7416	
Ur	12	kV
	17.5	kV
Ir	1600	A
	2000	A
Isc	20	kA
	25	kA
	31.5	kA

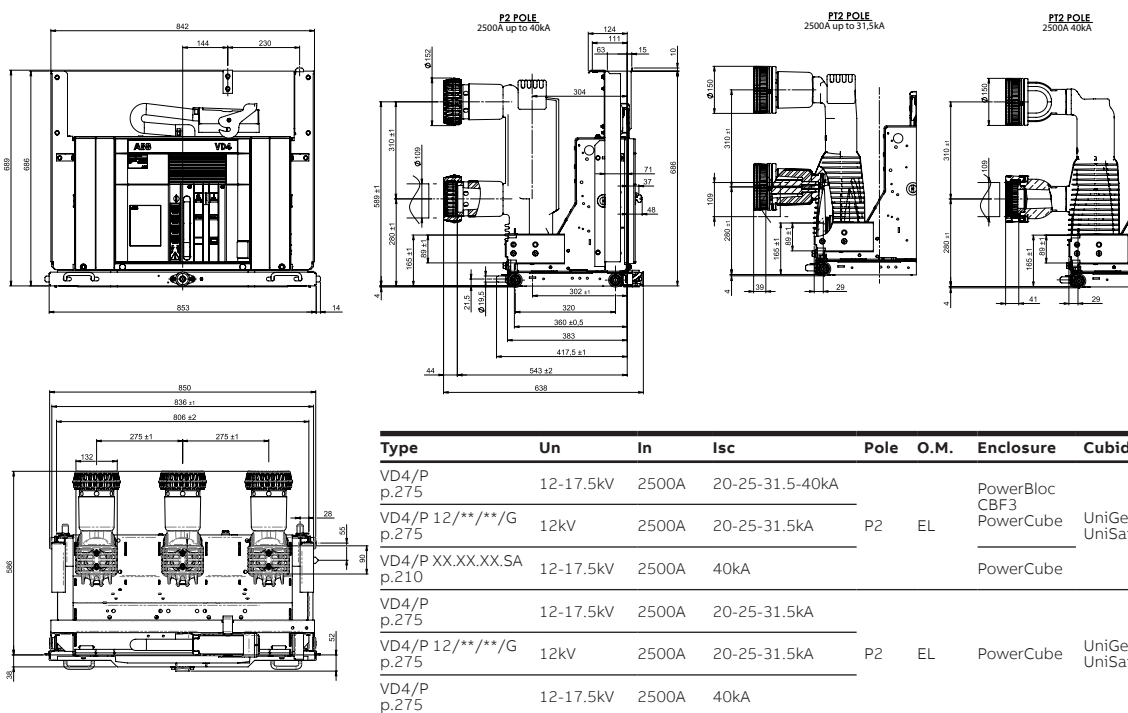
VD4/P		
TN	7416	
Ur	12	kV
	17.5	kV
Ir	2000	A
	40	kA



Type	Un	In	Isc	Pole	Operating	Enclosure	Cubicle
VD4/P p.275	12-17.5kV	1600A-2000A	20-25-31.5kA				
VD4/P 12/**/**/G p.275	12kV	1600A-2000A	20-25-31.5kA	P2	EL	PowerBloc CBF3 PowerCube	UniGear ZS1
VD4/P p.275	12-17.5kV	2000A	40kA			PowerBloc CBF3	
VD4/P p.275	12-17.5kV	1600A-2000A	20-25-31.5kA				
VD4/P 12/**/**/G p.275	12kV	1600A-2000A	20-25-31.5kA	P2	EL	PowerBloc PowerCube	UniGear ZS1
VD4/P p.275	12-17.5kV	2000A	40kA				
VD4/P XX.XX.XX.SA p.210	12kV	1600A	20-25kA				
		2000A	20-25-31.5kA				
	17.5kV	1600A	20-25kA				
		2000A	20-25-31.5kA	PT2	EL	PowerCube PB2	UniGear

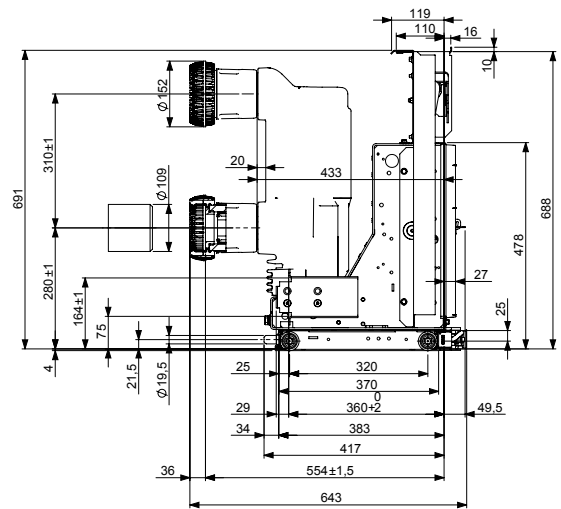
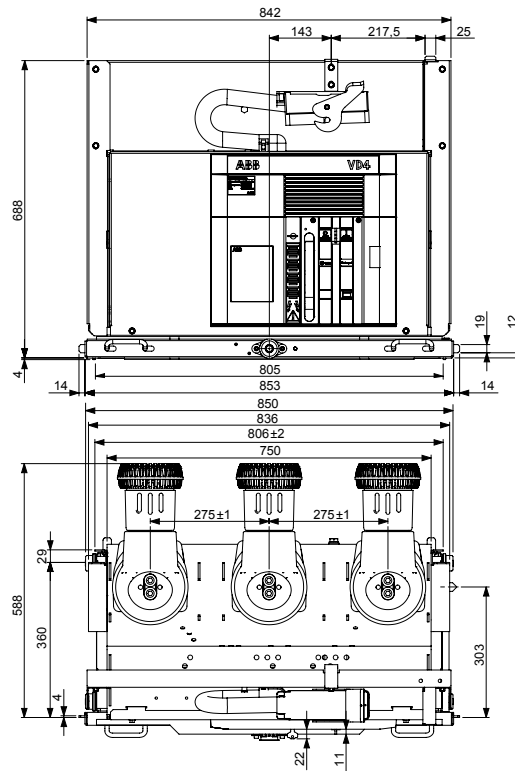
Withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube PB3 modules

VD4/P		
TN	7417	
Ur	12	kV
	17.5	kV
Ir	2500	A
	20	kA
Isc	25	kA
	31.5	kA
	40	kA

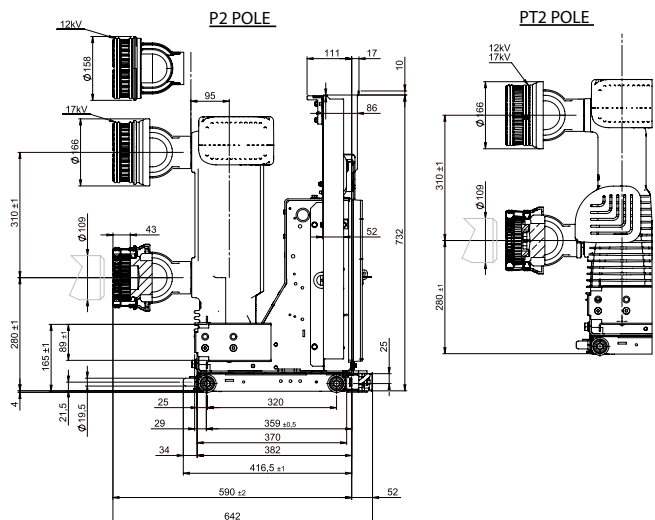
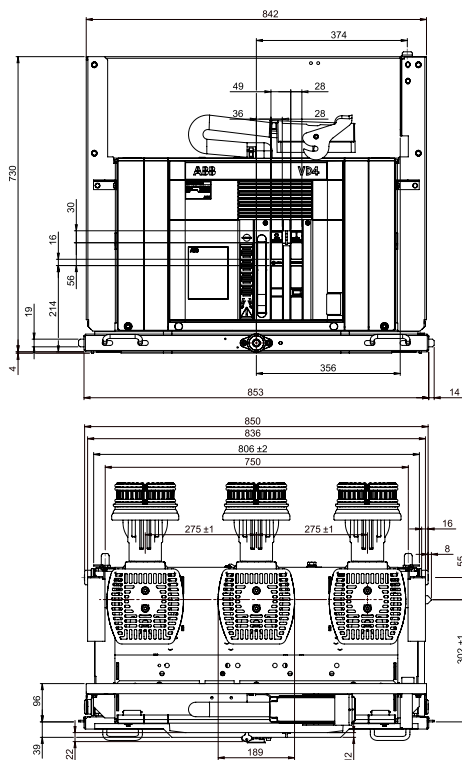


Type	Un	In	Isc	Pole	O.M.	Enclosure	Cubicle
VD4/P p.275	12-17.5kV	2500A	20-25-31.5-40kA				
VD4/P 12/**/**/G p.275	12kV	2500A	20-25-31.5kA	P2	EL	PowerBloc CBF3 PowerCube	UniGear ZS1 UniSafe
VD4/P XX.XX.XX.SA p.210	12-17.5kV	2500A	40kA			PowerCube	
VD4/P p.275	12-17.5kV	2500A	20-25-31.5kA				
VD4/P 12/**/**/G p.275	12kV	2500A	20-25-31.5kA	P2	EL	PowerCube	UniGear ZS1 UniSafe
VD4/P p.275	12-17.5kV	2500A	40kA				

VD4/P		
TN	1VCD003446	
Ur	12	kV
	17.5	kV
Ir	2500	A
Isc	50	kA



VD4/P		
TN	1VCD000153	
Ur	12	kV
	17.5	kV
Ir	3150	A (*)
Isc	40	kA



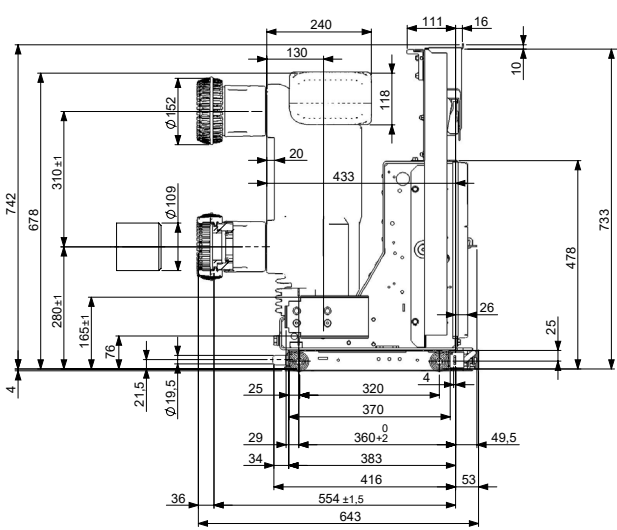
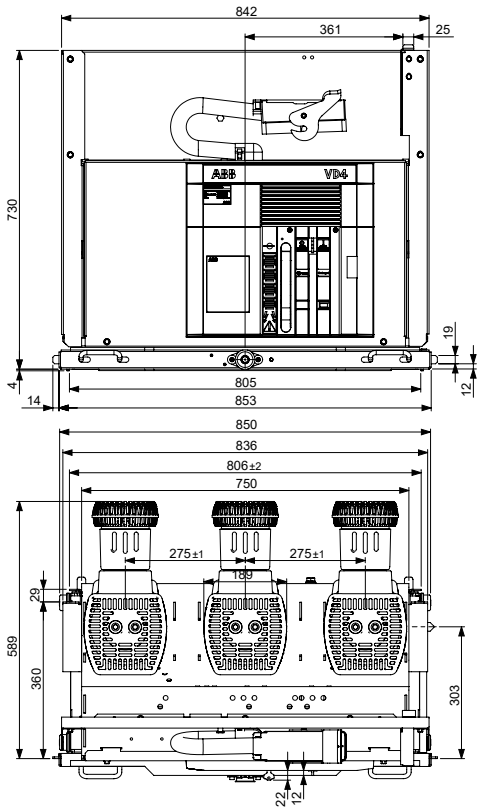
C.B. type	Pole	Ur	Ir	Isc	Oper. mech.	Cubicle
VD4/P.p.275	P2	12-17kV	3150A 4000A ⁽ⁿ⁾	20-25-32-40kA	EL	UniGear
VD4/P.p.275	PT2	12-17kV	3150A 4000A ⁽ⁿ⁾	20-25-32-40kA	EL	UniGear

(*) 4000 A with forced ventilation.

13. Overall dimensions

Withdrawable circuit breakers for UniGear ZS1 switchgear

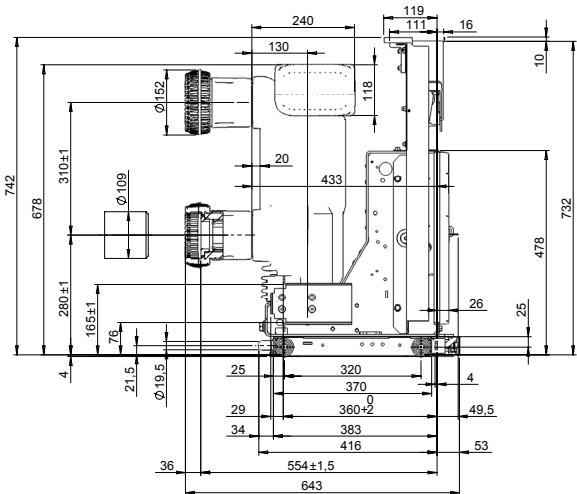
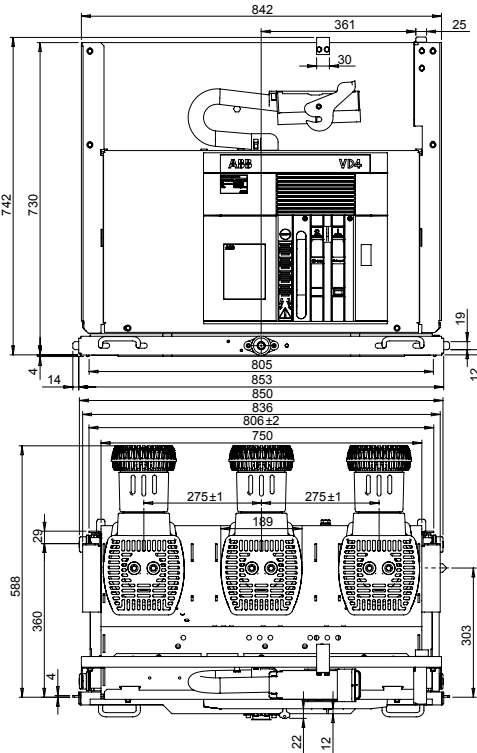
VD4/P			
TN	1VCD003447		
Ur	12	kV	
	17.5	kV	
Ir	3150	A (*)	
Isc	50	kA	



(*) 4000 A with forced ventilation.

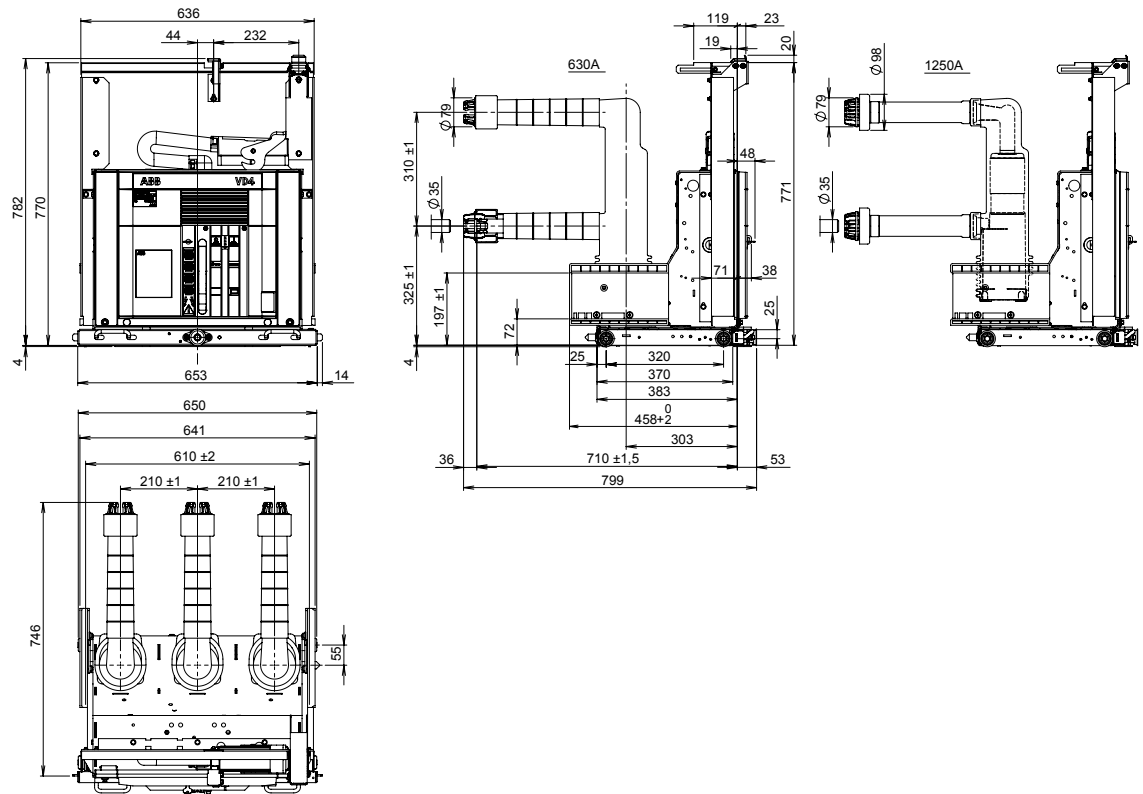
Withdrawable circuit breakers for PowerCube PB3 modules

VD4/W			
TN	1VCD003596		
Ur	12	kV	
	17.5	kV	
Ir	3150	A (*)	
Isc	50	kA	

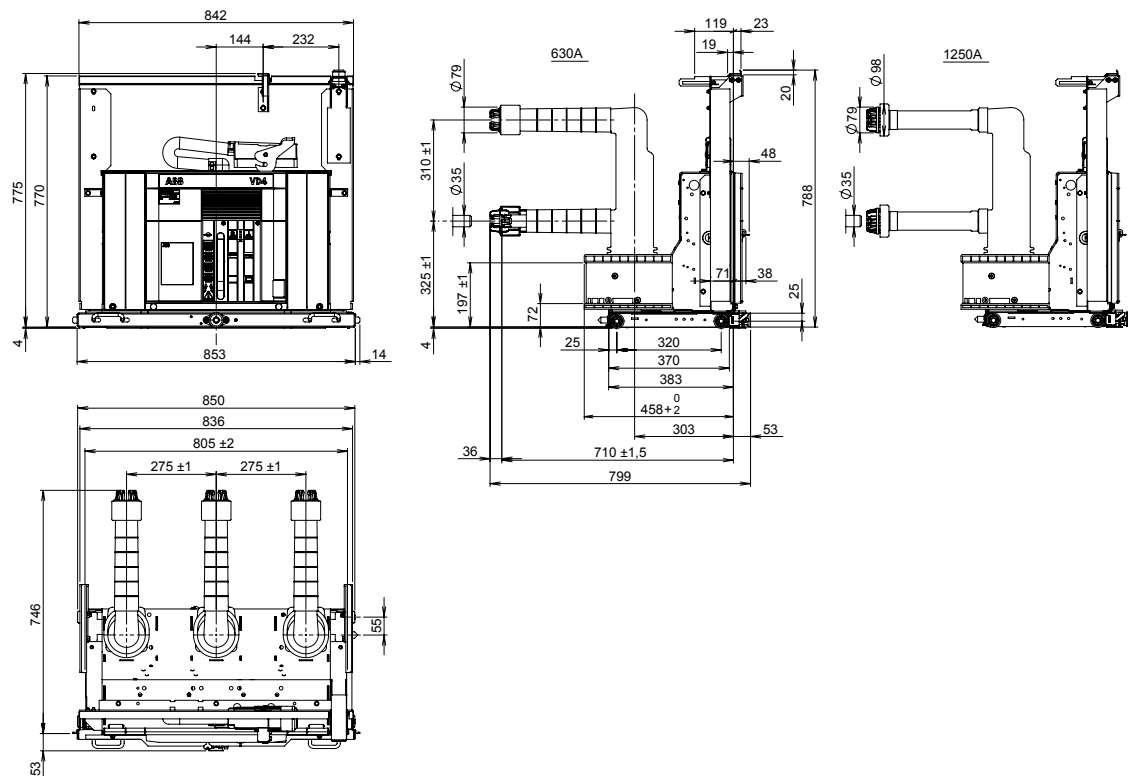


(*) 4000 A with forced ventilation.

VD4/P		
TN	7413	
Ur	24	kV
I _r	630	A
	1250	A
I _{sc}	16	kA
	20	kA
	25	kA



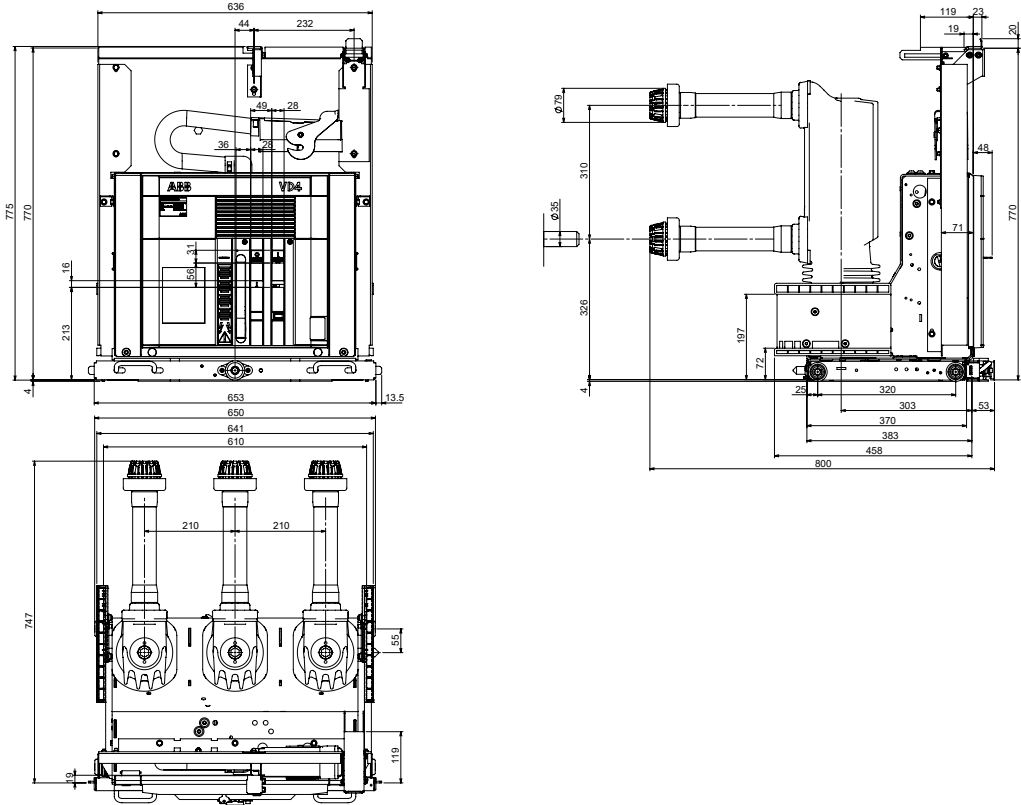
VD4/P		
TN	7414	
Ur	24	kV
I _r	630	A
	1250	A
I _{sc}	16	kA
	20	kA
	25	kA



13. Overall dimensions

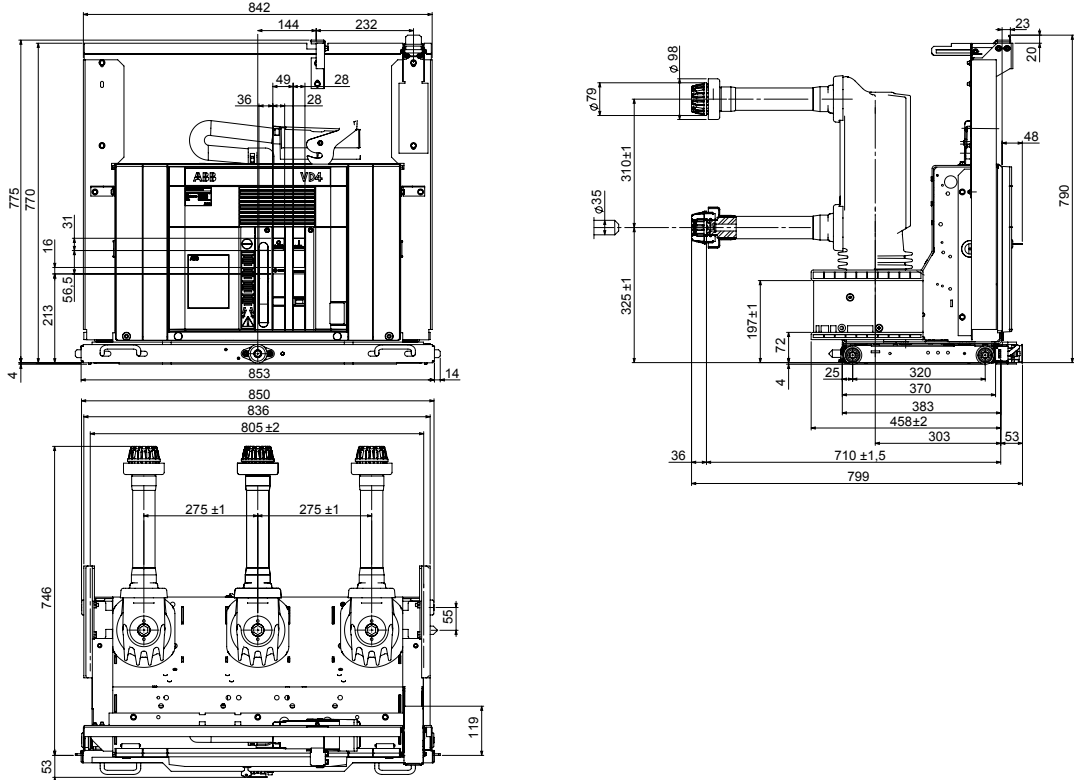
Withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube PB4 modules

VD4/P				
TN	1VCD000173			
Ur	24	kV		
Ir	1250	A		
Isc	31.5	kA		



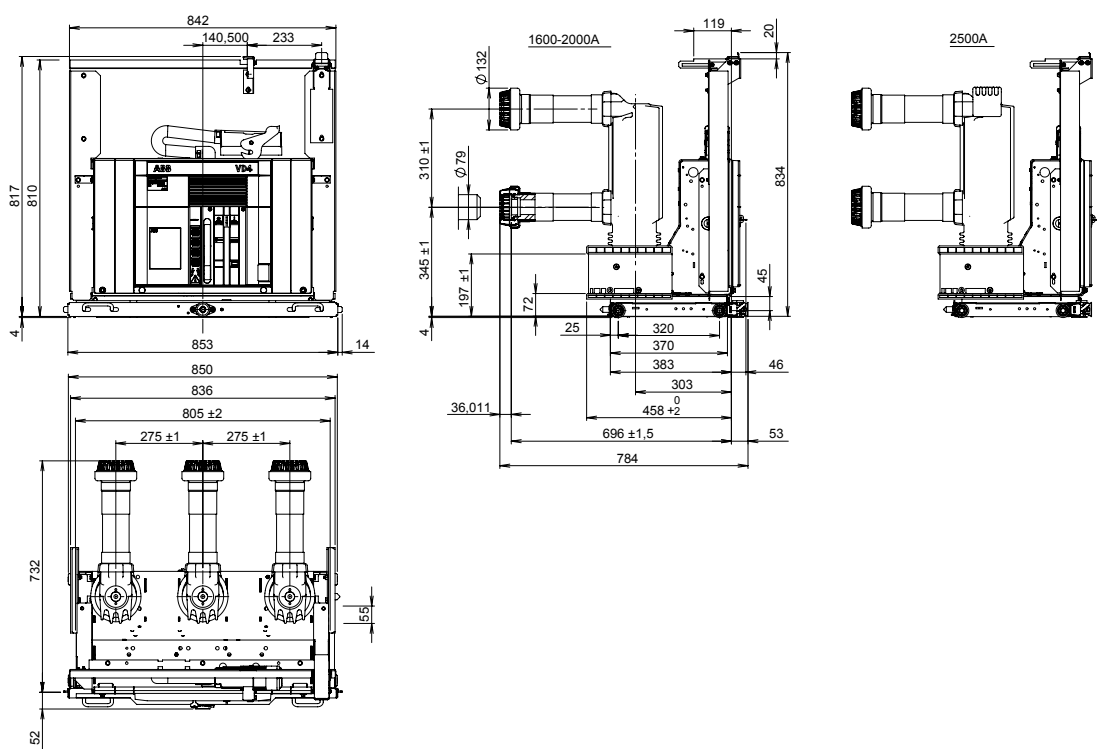
Withdrawable circuit breakers for UniGear ZS1 switchgear

VD4/P				
TN	1VCD000174			
Ur	24	kV		
Ir	1250	A		
Isc	31.5	kA		



Withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube PB5 modules

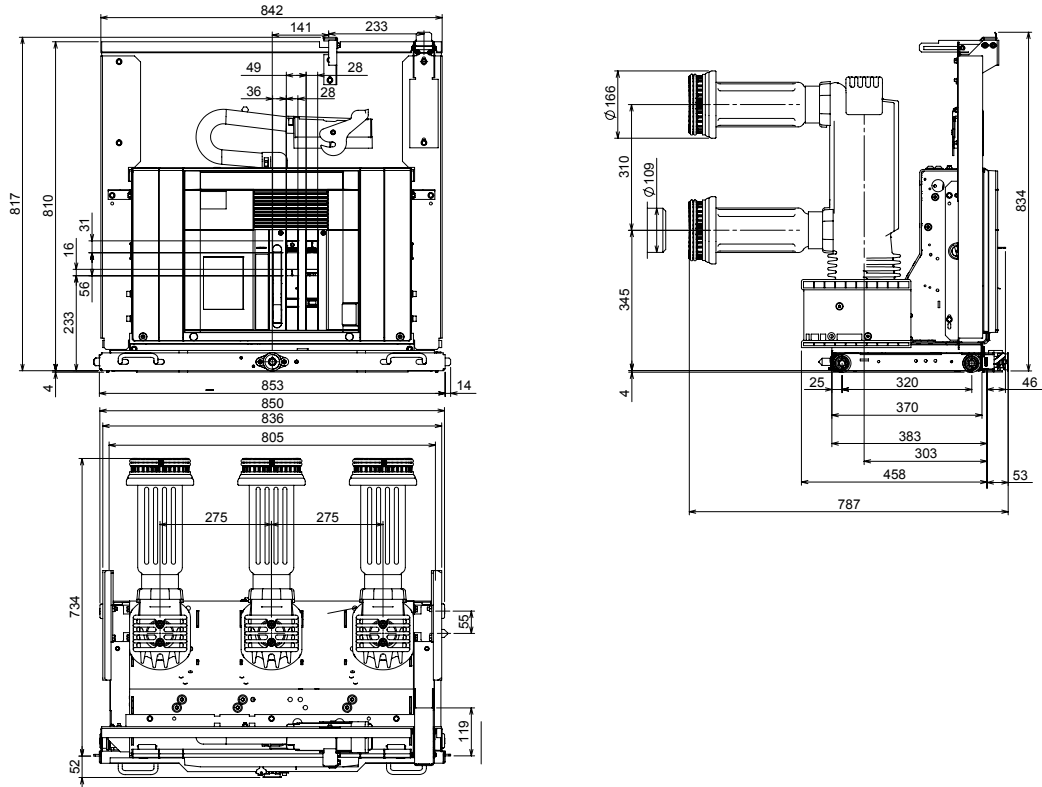
VD4/P			
TN	7418		
Ur	24	kV	
	1600	A	
Ir	2000	A	
	2500	A ⁽¹⁾	
	16	kA	
	20	kA	
Isc	25	kA	
	31.5	kA	



(1) The rated uninterrupted current of 2300 A is guaranteed with natural ventilation. The rated uninterrupted current of 2500 A is guaranteed with forced ventilation.

Withdrawable circuit breakers for UniGear ZS1 switchgear

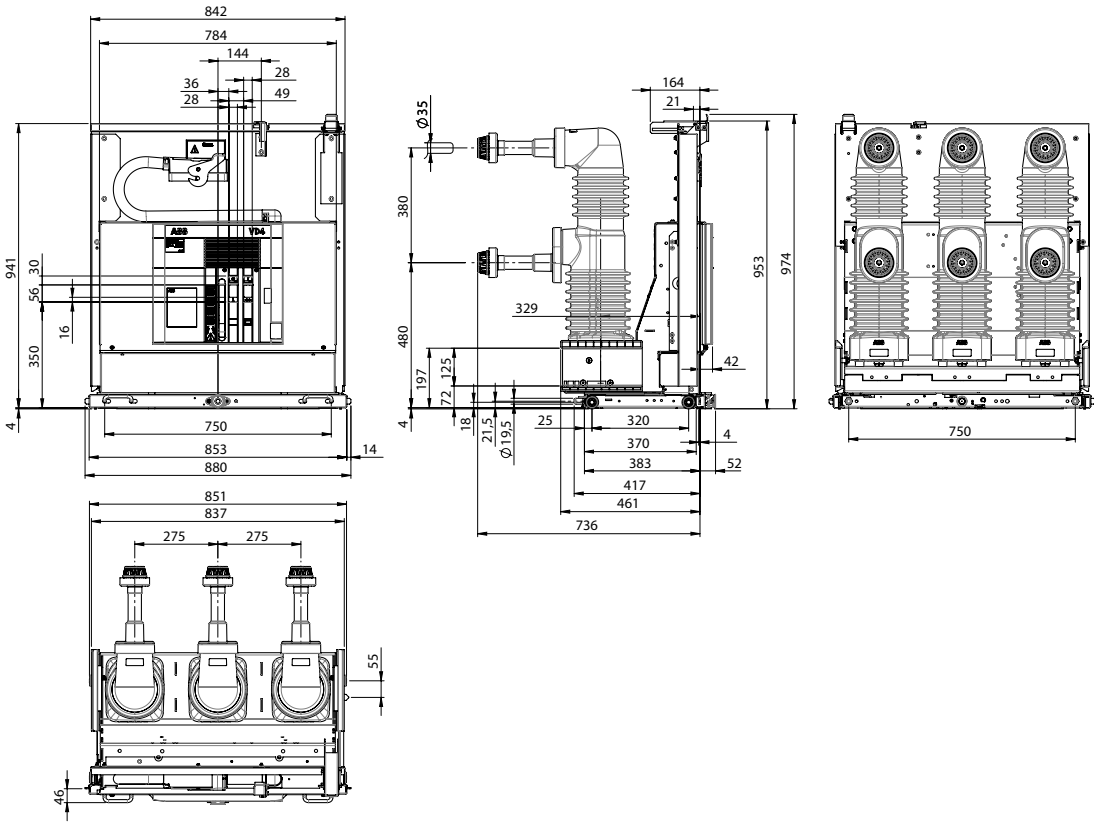
VD4/P			
TN	1VCD000177		
Ur	24	kV	
	3150	A	
Isc	31.5	kA	



13. Overall dimensions

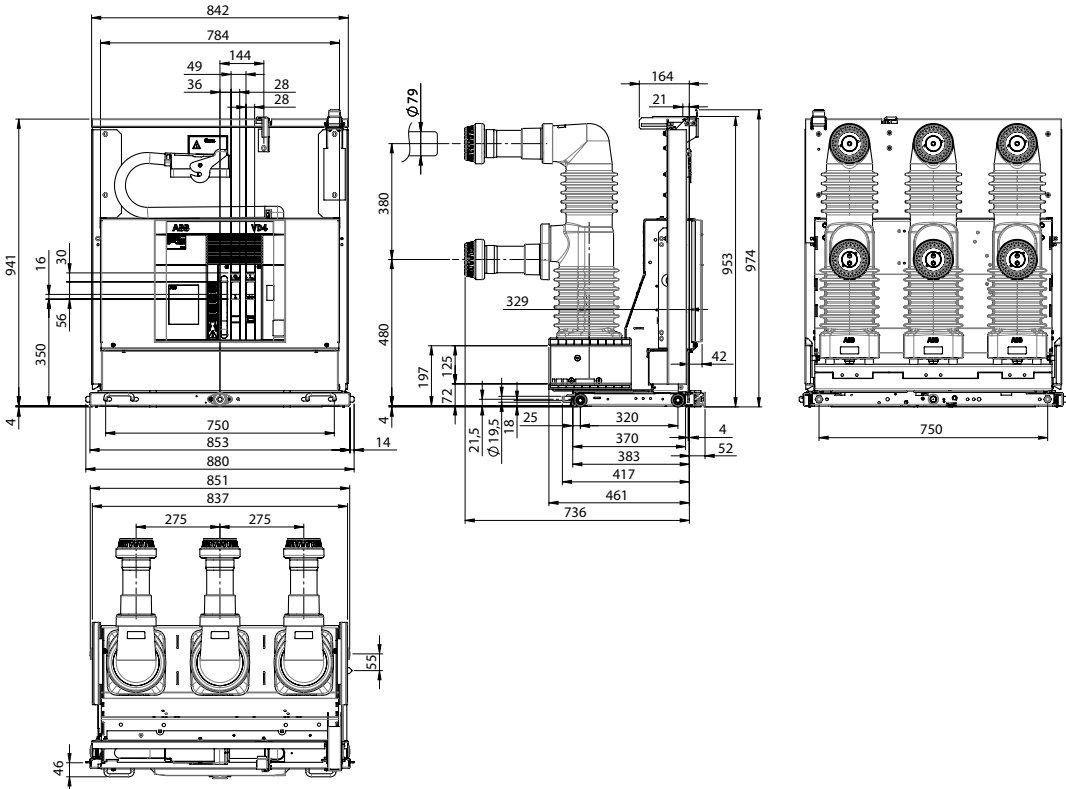
Withdrawable circuit breakers for UniGear ZS2 switchgear

VD4/W		
TN	1VYN300901-KG	
Ur	36	kV
Ir	1250	A
	20	kA
Isc	25	kA
	31.5	kA



Withdrawable circuit breakers for UniGear ZS2 switchgear

VD4/W		
TN	1VYN300901RA	
Ur	36	kV
	1600	A
Ir	2000	A
	2500	A (*)
	20	kA
Isc	25	kA
	31.5	kA

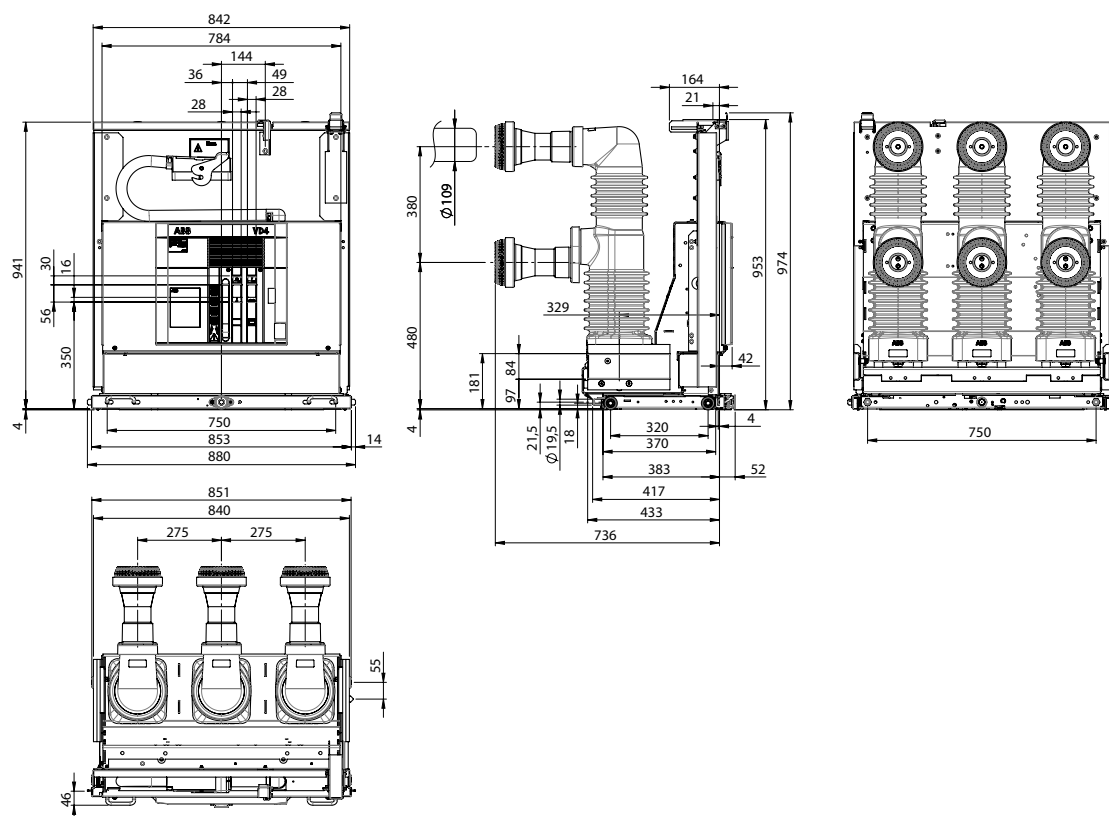


(*) The rated uninterrupted current of 2300 A is guaranteed with natural ventilation. The rated uninterrupted current of 2500 A is guaranteed with forced ventilation.

Withdrawable circuit breakers for UniGear ZS2 switchgear

VD4/w

TN	1VYN300901RB	
Ur	36	kV
Ir	2500	A (*)
	20	kA
Isc	25	kA
	31.5	kA

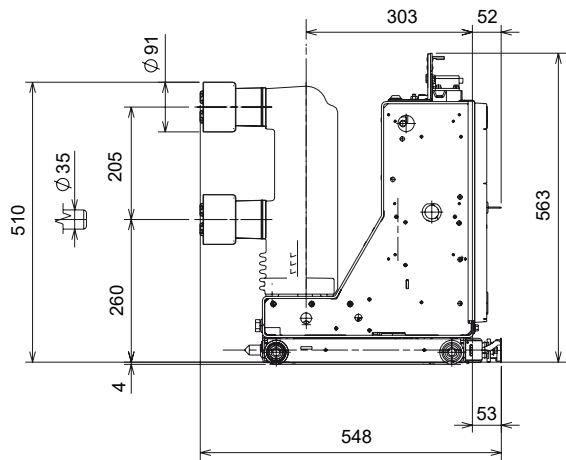
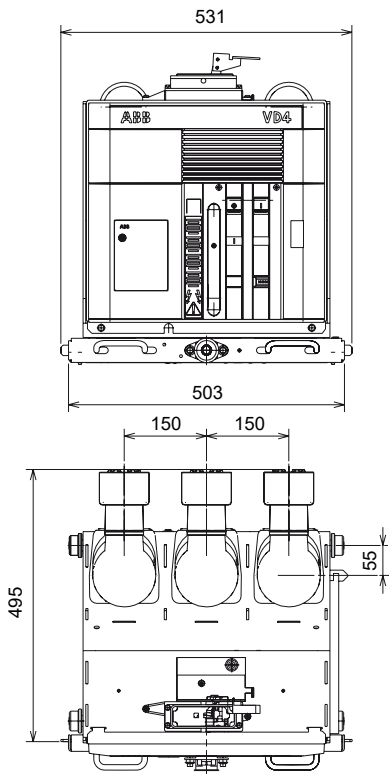


(*) The rated uninterrupted current of 3150 A is guaranteed with forced ventilation.

13. Overall dimensions

Withdrawable circuit breakers for ZS8.4 switchgear

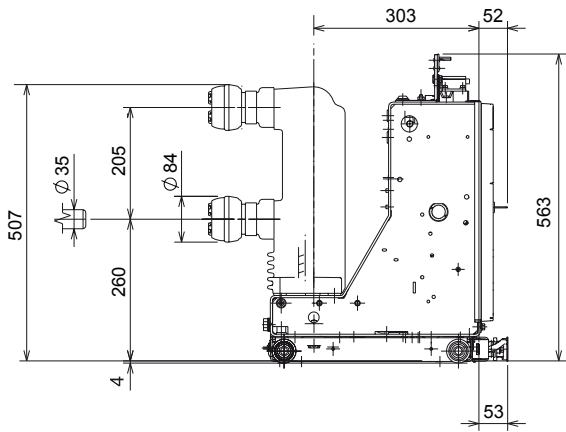
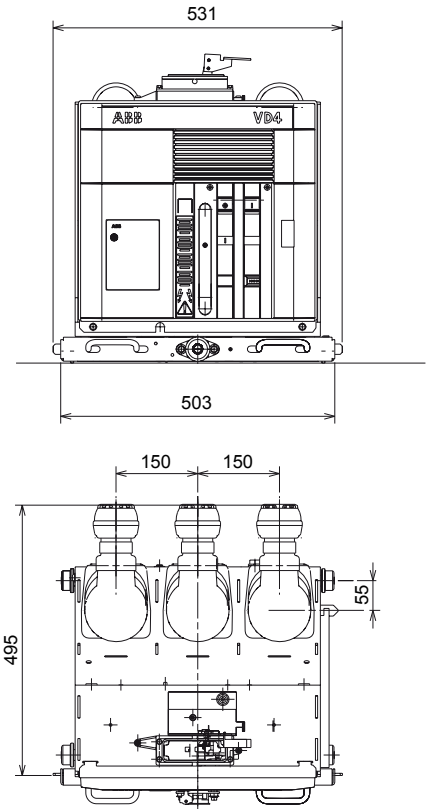
VD4/Z8			
TN	1VCD000092		
Ur	12	kV	
Ir	630	A	
Isc	20	kA	
	25	kA	



Withdrawable circuit breakers for ZS8.4 switchgear

VD4/Z8			
TN	1VCD000137		
Ur	12	kV	
Ir	1250	A	
Isc	20	kA	
	25	kA	

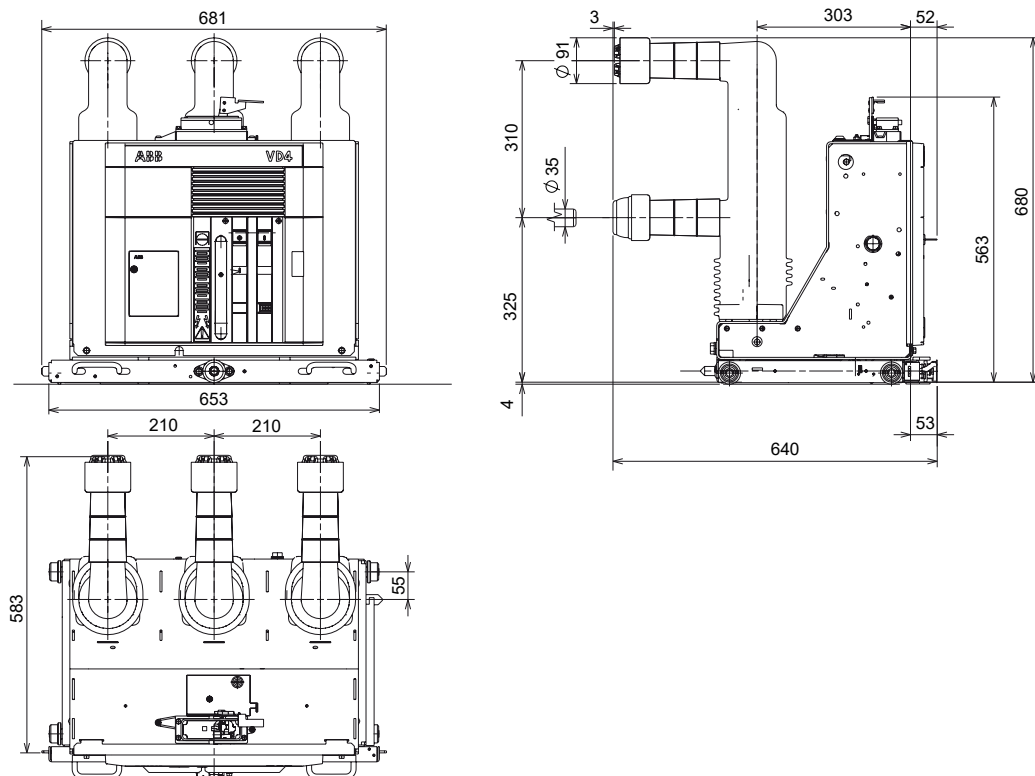
TN	1VCD000137		
Ur	17.5	kV	
Ir	630	A	
	1250	A	
Isc	20	kA	
	25	kA	



Withdrawable circuit breakers for ZS8.4 switchgear

VD4/Z8

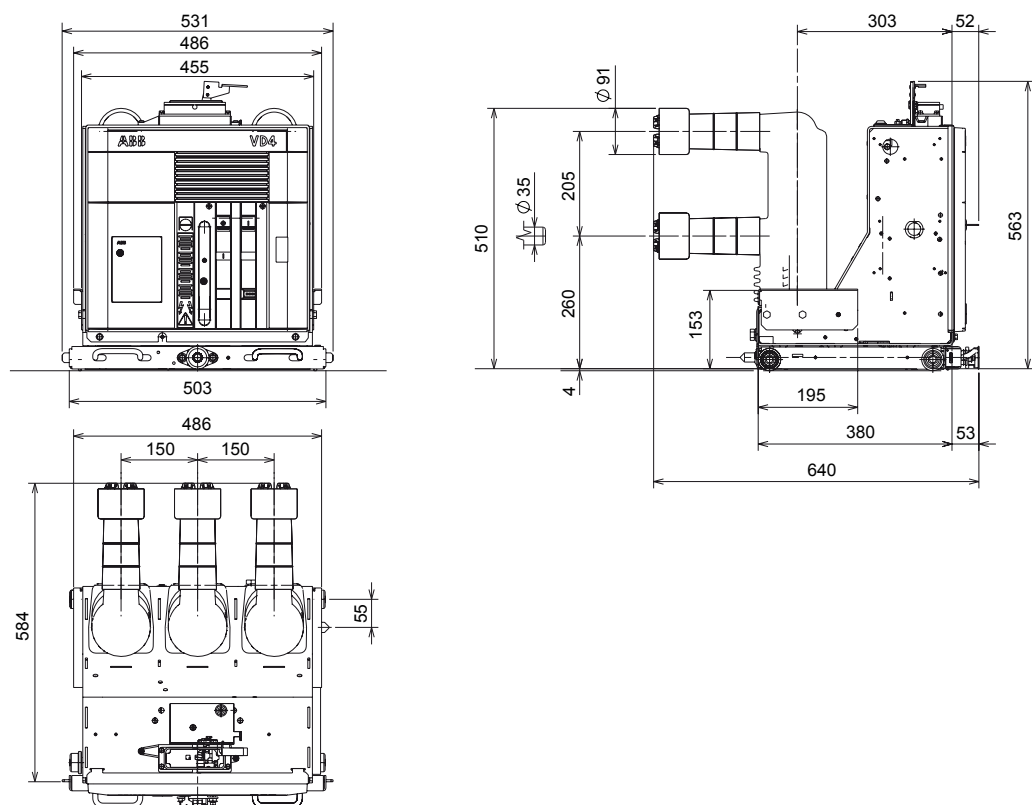
TN	1VCD000089	
Ur	24	kV
Ir	630	A
	16	kA
Isc	20	kA
	25	kA



Withdrawable circuit breakers for ZS8.4 switchgear

VD4/ZT8

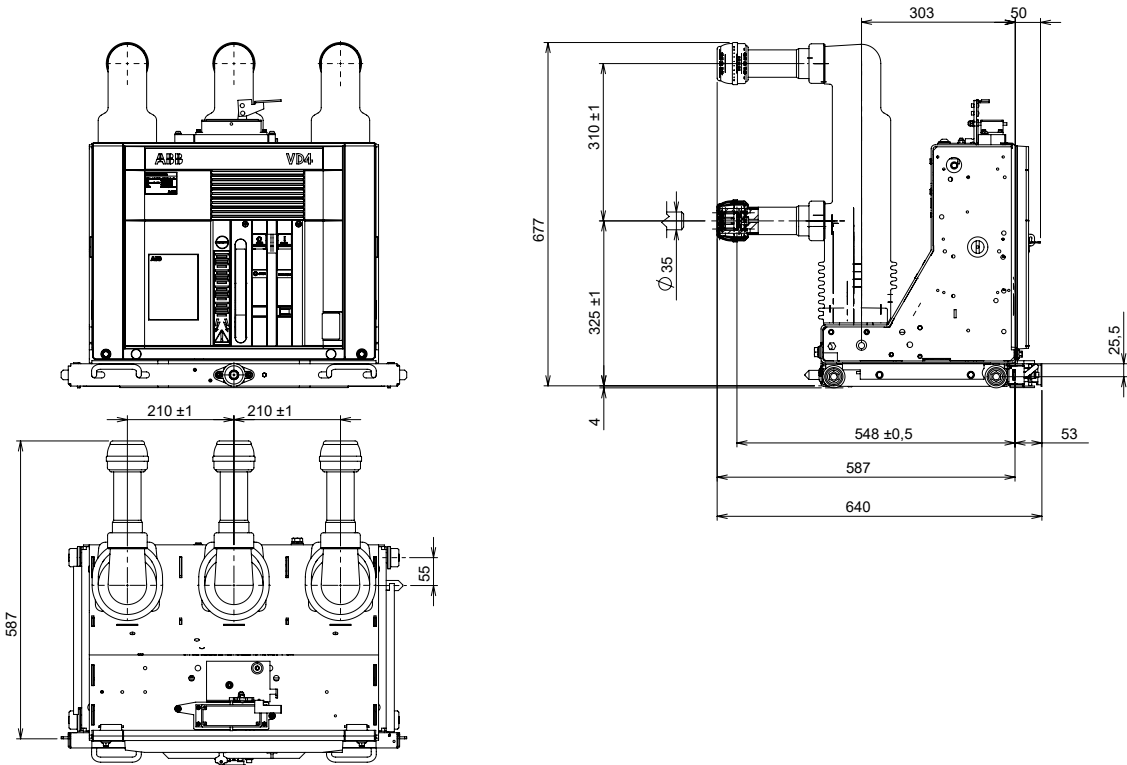
TN	1VCD000093	
Ur	12	kV
Ir	630	A
	20	kA
Isc	25	kA



13. Overall dimensions

Withdrawable circuit breakers for ZS8.4 switchgear

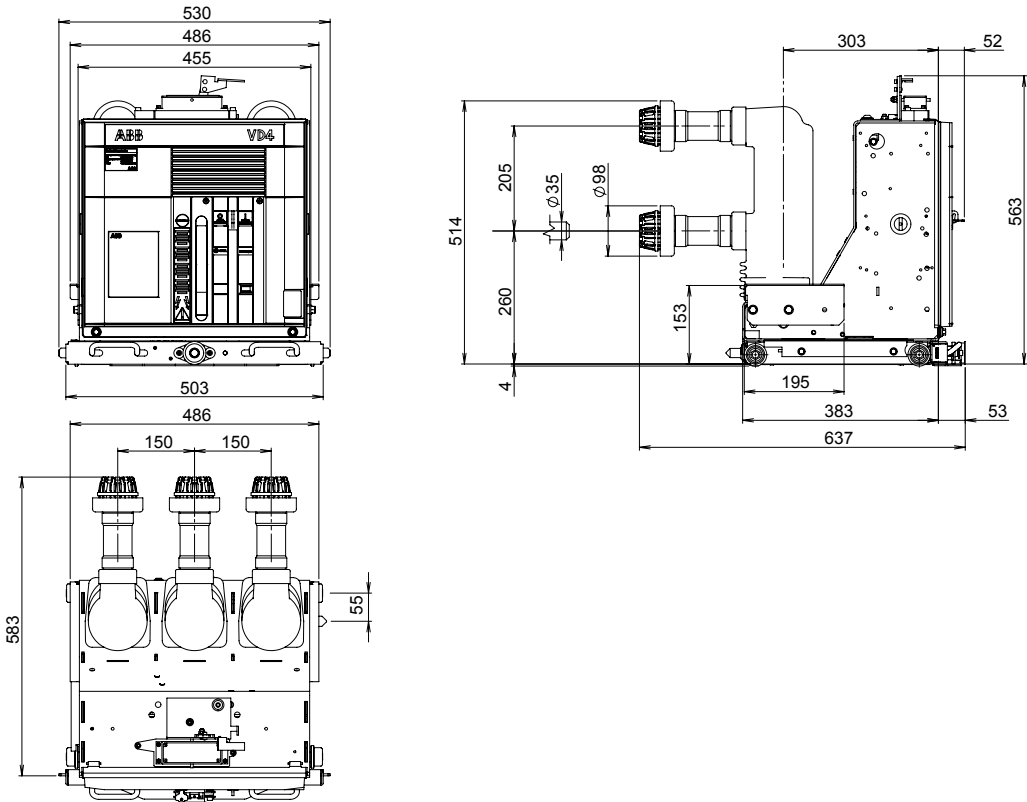
VD4/Z8			
TN	1VCD000138		
Ur	24	kV	
Ir	1250	A	
	16	kA	
Isc	20	kA	
	25	kA	



Withdrawable circuit breakers for ZS8.4 switchgear

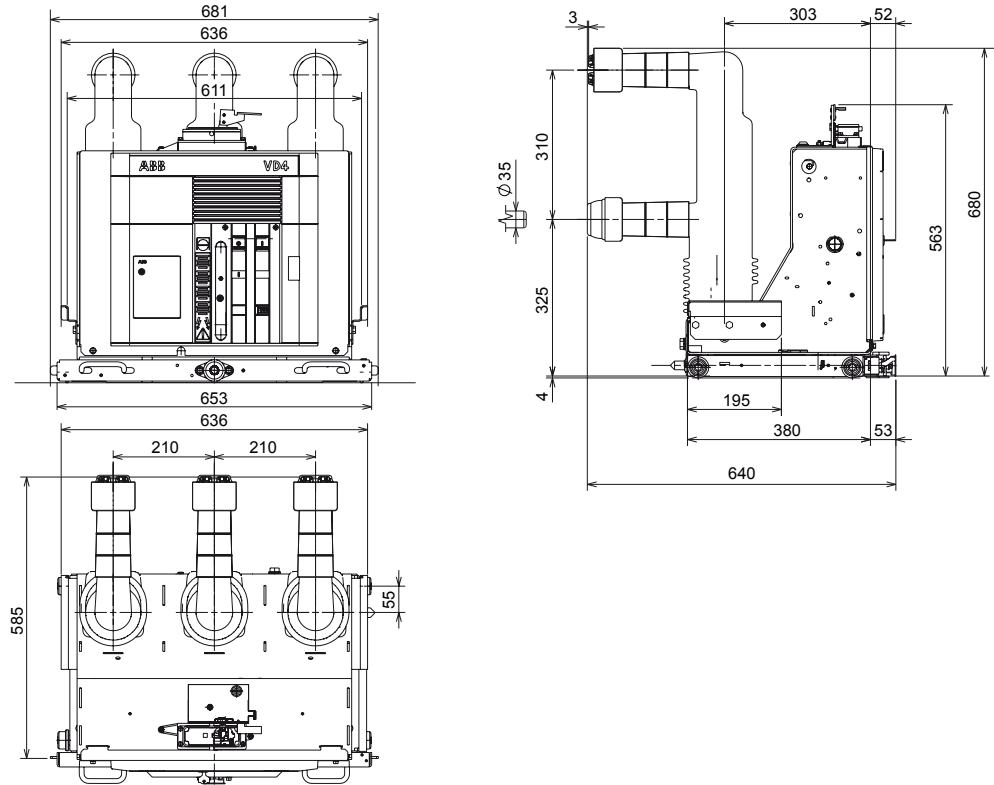
VD4/ZT8			
TN	1VCD000134		
Ur	12	kV	
Ir	1250	A	
Isc	20	kA	
	25	kA	

VD4/ZT8			
TN	1VCD000134		
Ur	17.5	kV	
Ir	630	A	
	1250	A	
Isc	20	kA	
	25	kA	



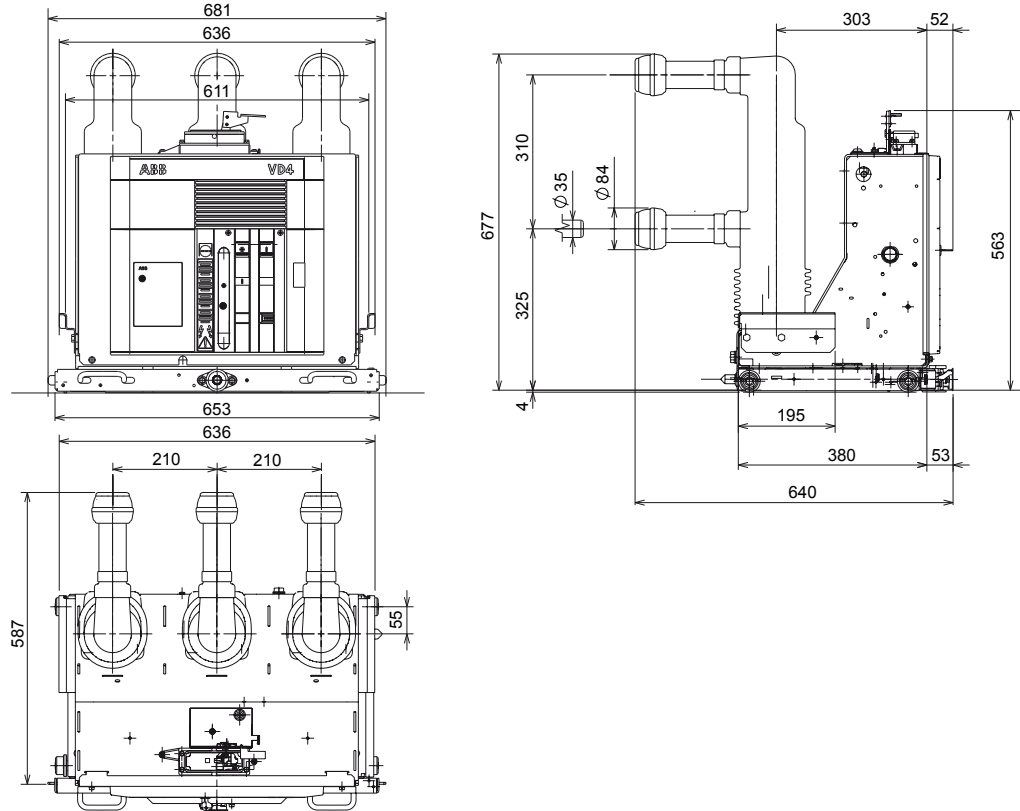
Withdrawable circuit breakers for ZS8.4 switchgear

VD4/ZT8			
TN	1VCD000090		
Ur	24	kV	
Ir	630	A	
	16	kA	
Isc	20	kA	
	25	kA	



Withdrawable circuit breakers for ZS8.4 switchgear

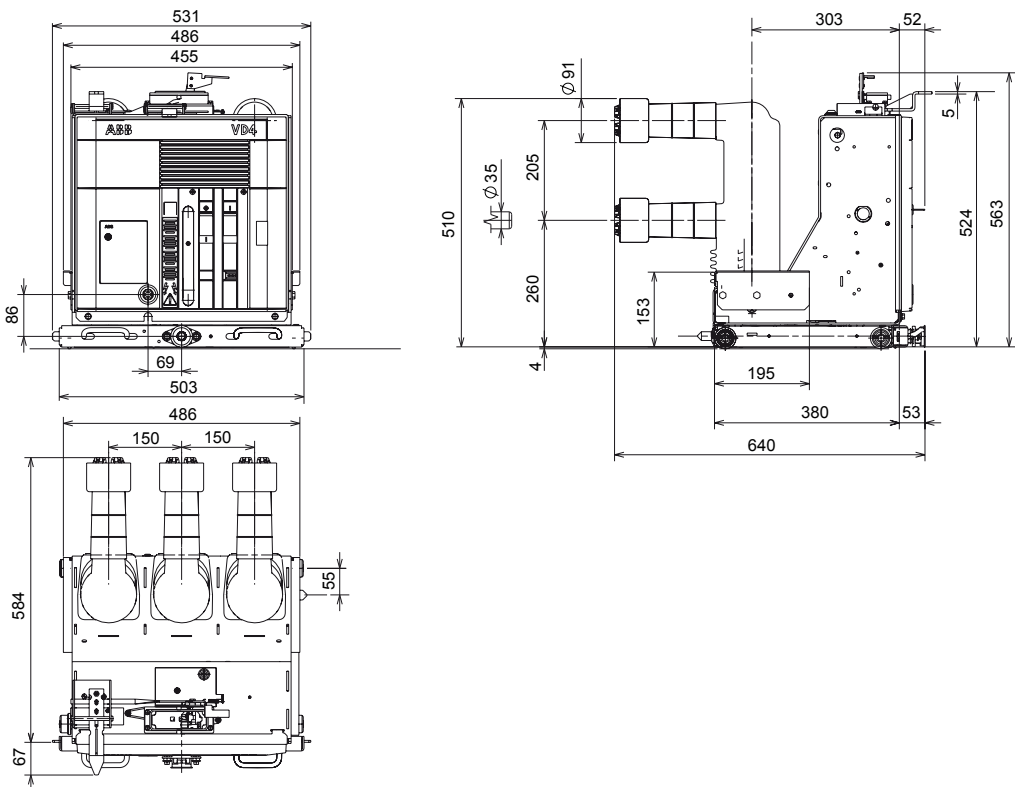
VD4/ZT8			
TN	1VCD000136		
Ur	24	kV	
Ir	1250	A	
	16	kA	
Isc	20	kA	
	25	kA	



13. Overall dimensions

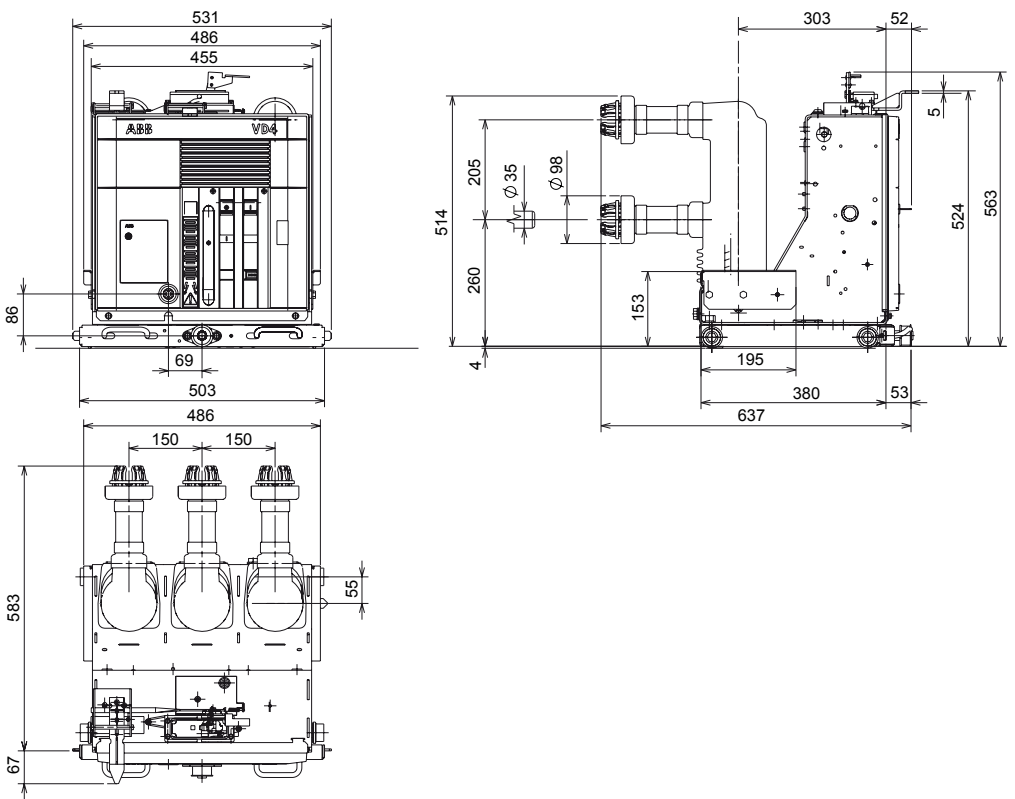
Withdrawable circuit breakers for ZS8.4 switchgear

VD4/ZS8			
TN	1VCD000091		
Ur	12	kV	
Ir	630	A	
Isc	20	kA	
	25	kA	



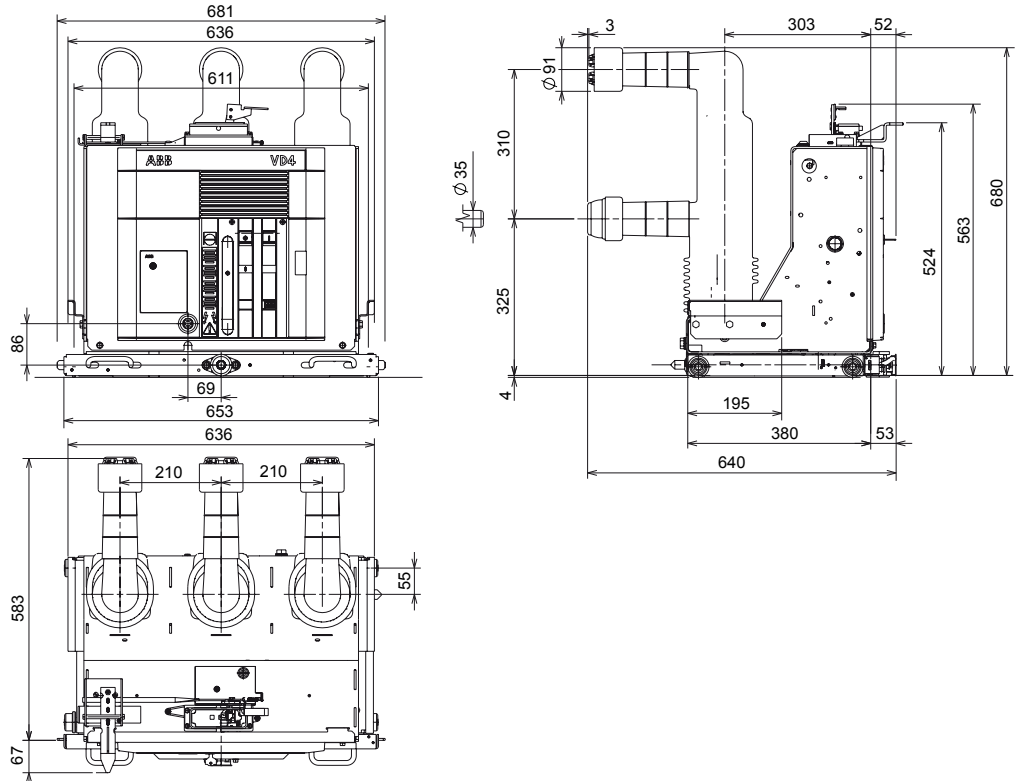
Withdrawable circuit breakers for ZS8.4 switchgear

VD4/ZS8			
TN	1VCD000133		
Ur	12	kV	
Ir	1250	A	
Isc	20	kA	
	25	kA	



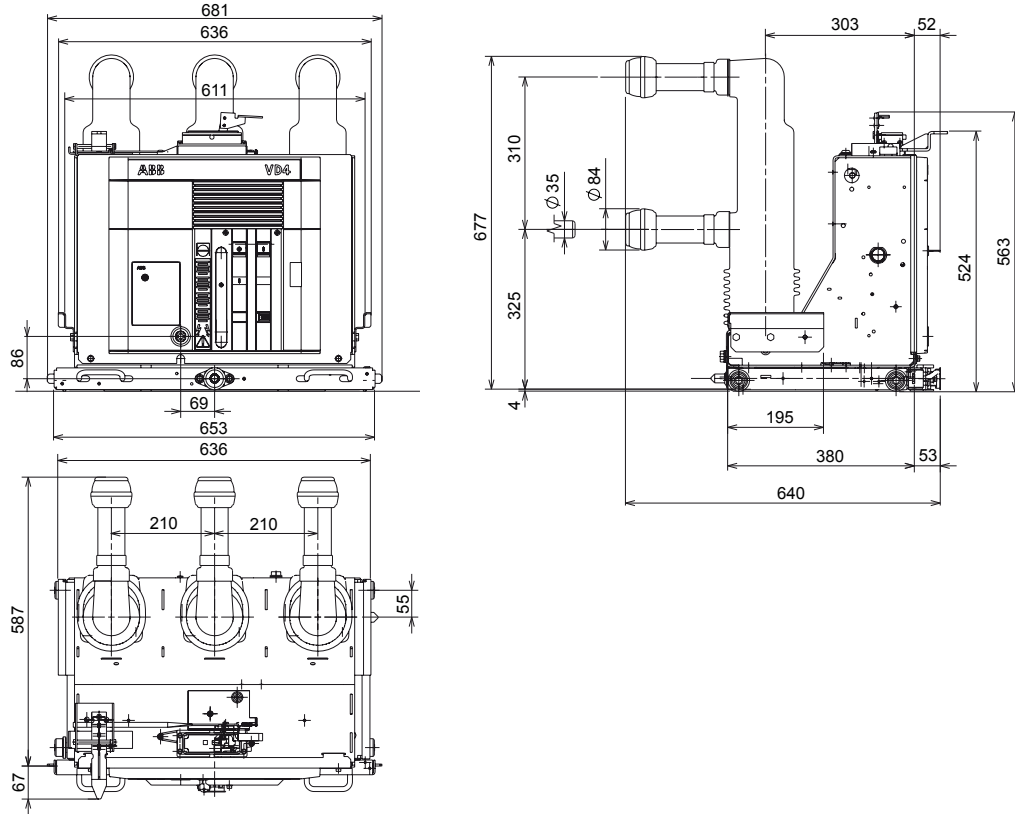
Withdrawable circuit breakers for ZS8.4 switchgear

VD4/ZS8			
TN	1VCD000088		
Ur	24	kV	
Ir	630	A	
	16	kA	
Isc	20	kA	
	25	kA	



Withdrawable circuit breakers for ZS8.4 switchgear

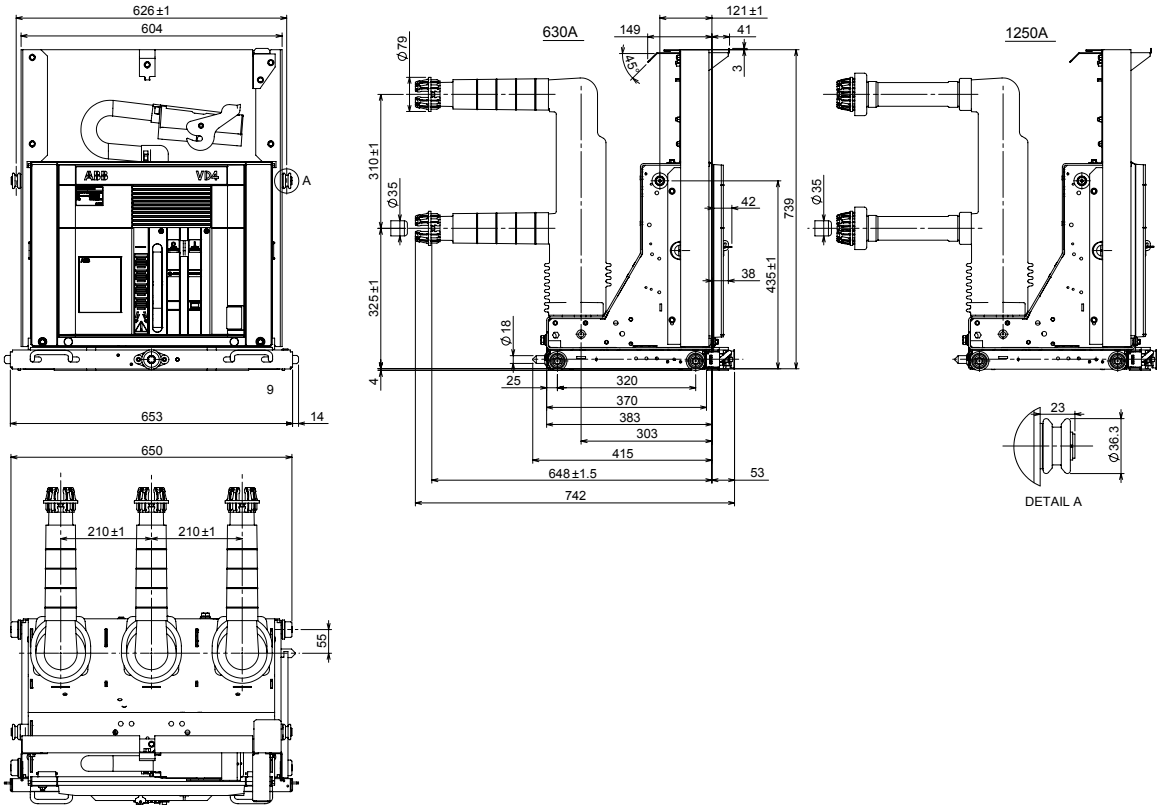
VD4/ZS8			
TN	1VCD000135		
Ur	24	kV	
Ir	1250	A	
	16	kA	
Isc	20	kA	
	25	kA	



13. Overall dimensions

Withdrawable circuit breakers for UniSec (WBC and WBS) switchgear

VD4/Sec		
TN	1VCD000190	
Ur	24	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA



14. Product quality and environmental protection

The apparatus are produced in compliance with the requirements of international standards for the quality management system and environmental management system. In these fields, the excellent level is proved by quality certificates according to ISO 9001 and by the EMS according to ISO 14 001.

End of life of product

The ABB company is committed to complying with the relevant legal and other requirements for environment protection according to the ISO 14 001 standard.

The duty of company is to facilitate subsequent recycling or disposal at the end of product life. During disposal of the product, it is always necessary to act in accordance with local legal requirements in force.

Methods of disposal

Disposal can either be carried out thermally in an incineration plant or by storing on a waste site.

Raw material	Recommended method of disposal
Metal material (Fe, Cu, Al, Ag, Zn, W, others)	Separation and recycling
Thermoplasts	Recycling or disposal
Epoxy resin	Separation of metal material and the disposal of rest
Rubber	Disposal
Oil as dielectric (transformer oil)	Draining from equipment and further recycling or disposal
Packing material – wood	Recycling or disposal

More product information:
abb.com/mediumvoltage
Your contact center:
abb.com/contactcenters
More service information:
abb.com/service

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