DISTRIBUTION SOLUTIONS

VD4

Medium voltage vacuum circuit breakers
12...40.5 kV - 630...4000 A - 16...63 kA

VD4 medium voltage circuit breakers use vacuum interrupters embedded in the poles. This construction method makes the poles particularly sturdy and protects the interrupter from shocks, dust and condensation.
VD4 circuit breakers are the best choice for the majority of modern electricity distribution applications and are used in transformer and distribution substations to control and protect motors, transformers, capacitor banks and for protecting cables.

Table of contents

VD4:
its strengths, your benefits

Global availability

Safety and protection

Reliable in extreme conditions

Productivity
Maximize your output

Services and training
- Dedicated training for installation and maintenance
  - Specialized ABB personnel for installation and maintenance
- Backup at your location and analysis for special applications
  - ABB technical support helps you choose the best solution for your specific application

Easy to install
- Withdrawable version available
  - Circuit breaker can be rapidly racked-in/out for maintenance
  - The complete circuit breaker is ready for installation in the switchgear

Speed up your projects
- Breaker+cassette proposal
  - Speedier engineering thanks to tried-and-tested ABB design
- Technical collaboration agreements
  - New switchgear configurations take less time to develop

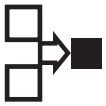
Continuous operation
- Excellent quality product thanks to high process automation
  - Reliable, high quality product

Reliability
Protect your assets

Safety and protection
- Motor-driven truck for remote circuit breaker racking-in/out
  – The breaker can be safely put into the service or test position without the need for an operator in front of the switchgear
- Truck interlocking magnet: prevents breaker from being racked into switchgear with different rated current or without the auxiliary circuit plug connected
  – No risk of installing the wrong breaker in the switchgear or without its protection functions having been activated.

Reliable in extreme conditions
- Vacuum interrupters embedded in the poles
  – The core components of the breaker are completely protected against mechanical shocks, dust and condensation

Global availability
- The world’s best-selling circuit breaker
  – Our worldwide presence means you can rely on us for any type of support you may require



Optimized interface

- Standardized product family up to 40.5 kV, 4000A
  - A common, simplified interface and accessories for the whole product family
- Mechanically Interchangeable with HD4
  - The same switchgear configuration is used to host breakers with both interruption technologies
- Fixed version with truck assembled and ready to be customized
  - The contact system most suited to your switchgear can be designed and created thanks to the already assembled interlocking system

Efficiency
Optimize your investments

Affordable Range

- Technical collaboration agreements
  - Allow you to cut investment costs when new switchgears are designed

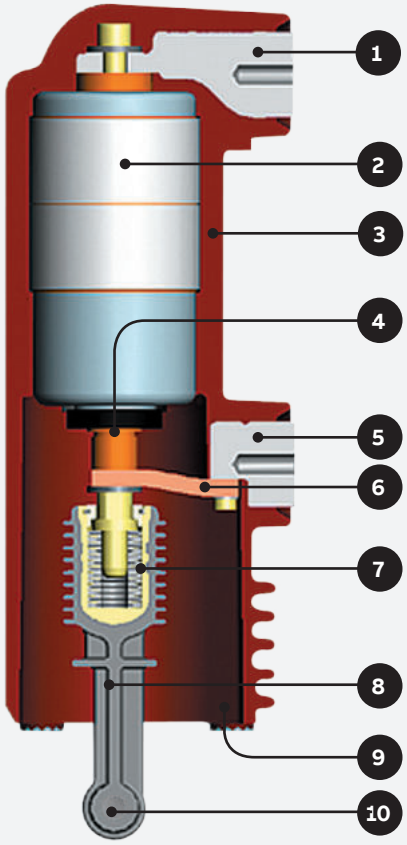
Optimized logistics

- Poles in thermoplastic material make the breaker lighter
  - Easily handled breakers and reduced transport charges

Description

These new VD4 circuit breakers exemplify ABB's proven vacuum interrupter engineering and manufacturing technology, as well as the superior design standards employed in the production of circuit breakers.
VD4 medium voltage circuit breakers use vacuum interrupters embedded in the poles. This construction technique makes the poles of the circuit breaker particularly sturdy and protects the interrupter from shocks, dust and condensation. The vacuum interrupter houses the contacts and forms the interruption chamber.

Vacuum current interruption
The vacuum circuit breaker does not require an interrupting and insulating medium. Interrupters do not, in fact, contain ionizable material.
The electric arc that generates when the contacts separate is merely formed by melted and vaporized contact material.
Supported by the external energy, the electric arc persists until the current annuls near natural zero crossing. In that instant, the dielectric properties are very rapidly restored by the sharp reduction in the density of the conveyed load and rapid condensation of the metallic vapor.
Thus the vacuum interrupter recovers insulating capacity and the ability to withstand transient recovery voltage, thereby definitively extinguishing the arc.



1 Upper terminal
2 Vacuum interrupter
3 Enclosure/pole
4 Stem of moving contact
5 Lower terminal
6 Flexible connection
7 Tie-rod spring fork
8 Tie-rod
9 Pole fixing
10 Connection to operating mechanism

Vacuum interrupter embedded in the pole

- **Vacuum interruption technique**
- **Vacuum contacts protected against oxidation and contamination**
- **Vacuum interrupter embedded in the pole**
- **Interrupter protected against shocks, dust and condensation**
- **Operation under different climatic conditions**
- **Limited switching energy**
- **Stored energy operating mechanism with anti-pumping device supplied as standard**
- **Simple customizing with a complete range of accessories**
- **Fixed and withdrawable version**
- **Compact dimensions**
- **Sealed-for-life poles**
- **Sturdy and reliable**
- **Limited maintenance**
- **Circuit breaker racked in and out with door closed**
- **Incorrect and hazardous operations are prevented thanks to special locks in the operating mechanism and truck**
- **High environmental compatibility**

Since high dielectric strength can be reached in the vacuum, even with minimum distances, circuit breaking is also guaranteed when the contacts separate a few milliseconds before natural current zero crossing.
The special shape of the contacts, the material used, as well as the limited duration and low voltage of the arc, guarantee minimum contact wear and long life. In addition, the vacuum also prevents contact oxidation and contamination.

Operating mechanism
The low speed of the contacts, their reduced travel and exposed conductive part, limit the energy required for the operation and therefore guarantee extremely low wear on the system.
This means that the circuit breaker only requires very little maintenance.

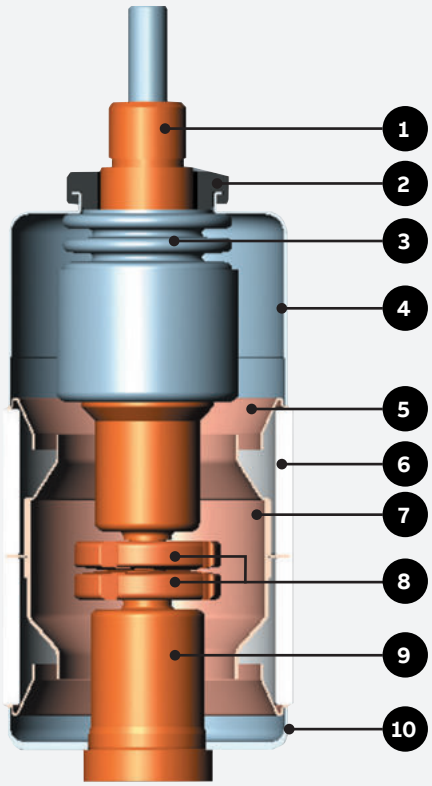
VD4 circuit breakers have mechanical operating mechanisms with stored energy and free trip. These characteristics allow opening and closing operations to be performed independently of the operator. The operating mechanism is of a simple design, easy to use and can be customized with a wide range of accessories which are straightforward and rapidly installed. This simplicity enhances the reliability of the apparatus.

The structure
The operating mechanism and the poles are fixed to a metal frame which also acts as the support for the fixed version of the circuit breaker.
The compact structure is sturdy and ensures mechanical reliability.
Apart from the isolating contacts and the cord with plug for connecting the auxiliary circuits, the withdrawable version is complete with truck for racking it in and out of the switchgear or enclosure with the door closed.

Description

Interruption principle of ABB interrupters

In a vacuum interrupter, the electric arc begins the instant in which the contacts separate. It persists until zero current is reached and can be influenced by the magnetic field.



1. Stem/terminal
2. Twist protection
3. Metal bellows
4. Interrupter enclosure
5. Centring ring
6. Ceramic insulator
7. Shield
8. Contacts
9. Terminal
10. Interrupter enclosure

Vacuum interrupter

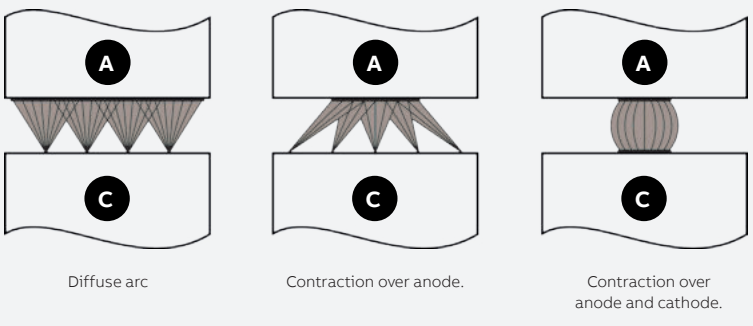


Diagram of transition from diffuse arc to contracted arc in a vacuum interrupter.

Vacuum arc – diffuse or contracted

Individual melting points form on the surface of the cathode after the contacts separate. This leads to the formation of metallic vapors which support the arc itself.

The diffuse vacuum arc is characterized by expansion over the contact surface itself and by evenly distributed thermal stress.

At the rated current of the vacuum interrupter, the electric arc is always of the diffuse type. Contact erosion is very limited and the number of current interruptions very high.

As the interrupted current value increases (beyond rated value), the electric arc tends to change from the diffuse to contracted type, owing to the Hall effect.

Starting out from the anode, the arc contracts and tends to concentrate as the current increases. There is a temperature rise on a level with the affected area and the contact is consequently subjected to thermal stress.

To prevent the contacts from overheating and becoming eroded, the arc is made to rotate. By turning, the arc becomes similar to a moving conductor through which current passes.

The spiral shape of ABB vacuum interrupter contacts

The special spiral shape of the contacts generates a radial magnetic field in all parts of the arc column, concentrated around the circumferences of the contacts.

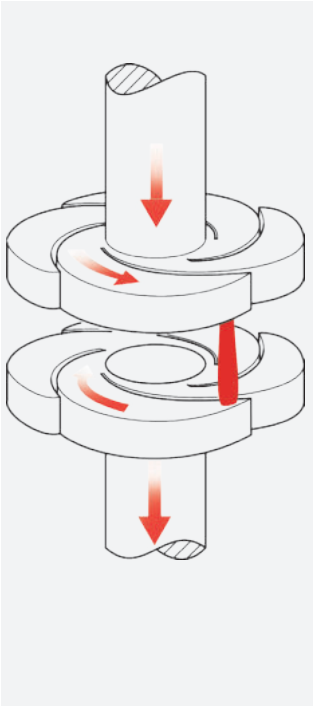
The electromagnetic force that self-generates, acts tangentially and causes the arc to spin rapidly around the axis of the contacts.

This forces the arc to turn and affect a larger area than that of a fixed contracted arc.

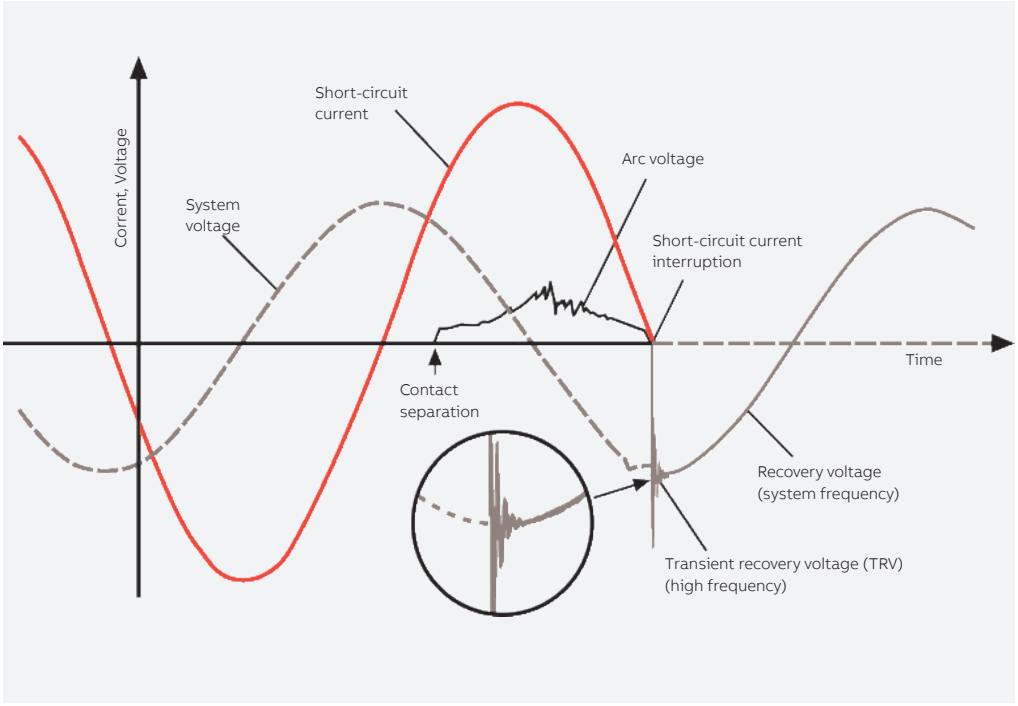
Besides minimizing the thermal stress to which the contacts are subjected, all this ensures that these latter are only eroded to a negligible extent and, above all, allows the interruption process to be controlled even with very high short-circuit current values.

ABB vacuum interrupters interrupt at natural current zero crossing, thereby preventing the arc from restriking after this has occurred.

Rapid reduction in current density at the same time as the zero current instant allow maximum dielectric strength to be re-established between the interrupter contacts within a few microseconds.



Geometry of radial magnetic field contact with a rotating vacuum arc.



Development of current and voltage trends during a single phase vacuum interruption process.

Description

Versions available

VD4 circuit breakers are available in the fixed and withdrawable versions with front operating mechanism.
The withdrawable version is available for UniGear ZS1, ZS2, ZS8.4 and UniSec switchgear and for PowerCube and Powerbloc enclosures.

Fields of application

VD4 circuit breakers are used in power distribution systems for controlling and protecting cables, transformer and distribution substations, motors, transformers and capacitor banks.

Standards

VD4 circuit breakers comply with IEC 62271-100 Standards and those of the major industrialized countries.
VD4 circuit breakers undergo the tests indicated below and guarantee the safety and reliability of apparatus in service in every installation.

- **Type tests:** temperature rise, tests to verify the insulation level (tests with rated lightning impulse withstand voltage and power frequency withstand voltage), peak and short-time withstand current tests, mechanical life, shortcircuit current making and breaking capacity.
- **Individual tests:** insulation of the main circuits with voltage at power frequency, auxiliary and operating circuit insulation, measurement of the main circuit resistance, mechanical and electrical operation.

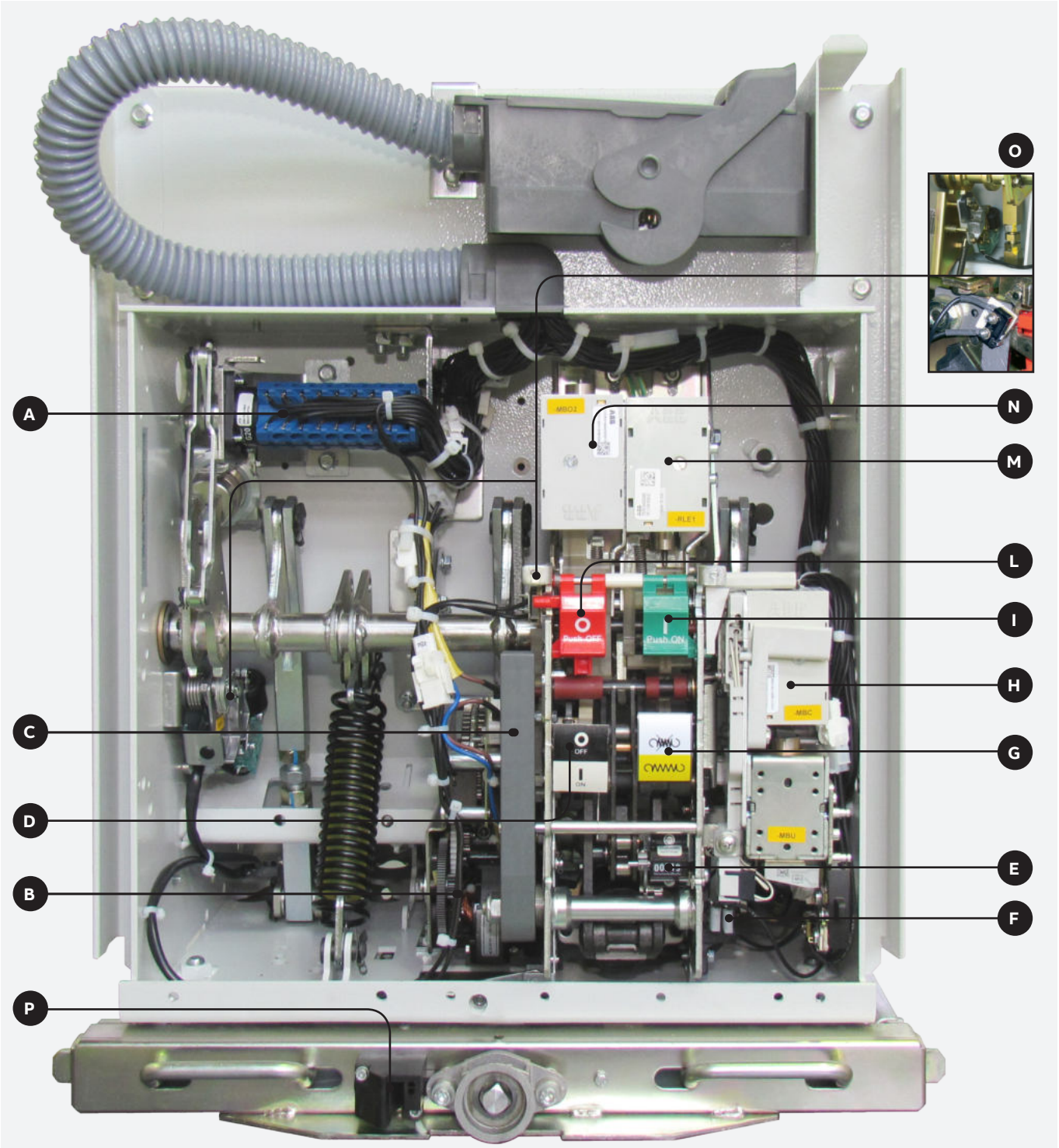
Safe service

Thanks to the complete range of mechanical and electrical locks (available on request), VD4 circuit breakers can be used to create reliable distribution switchgear.
The locking devices are designed to prevent incorrect operations and allow the installations to be inspected in conditions of operator safety.
Key locks or padlocks enable the opening and closing and/or racking in and out operations.
The device for racking-out with the door closed only allows the circuit breaker to be racked in or out of the switchgear with the door closed.
Anti-racking-in locks prevent circuit breakers with different rated currents from being racked in, and racking-in and out operations with the circuit breaker closed.

- **Highly reliable operating mechanisms since they have very few components**
- **Extremely limited, simple maintenance**
- **Accessories common to the entire range**
- **Electrical accessories that can be easily and quickly installed or replaced thanks to wiring pre-engineered with plug-socket connectors**
- **Mechanical anti-pumping device supplied as standard equipment**
- **Built-in closing spring loading lever**
- **Circuit breaker open key lock**
- **Protective covering over the opening and closing pushbuttons that can only operated with a special tool**
- **Padlock device on the operating pushbuttons**

Accessories

VD4 circuit breakers have a complete range of accessories able to meet all installation requirements.
The operating mechanism has a standardized range of accessories and replacement parts which are easy to identify and order.
The accessories are installed conveniently from the front of the circuit breaker. Electrical connection is performed with plug-socket connectors.
Use, maintenance and operation of the apparatus are simple and require limited use of resources.



Circuit breaker operating mechanism

A Open/closed auxiliary contacts
B Geared motor for loading closing spring
C Built-in closing spring loading lever
D Mechanical signaling device for circuit breaker open/closed
E Mechanical operation counter
F Contacts for signaling spring loaded/discharged
G Signaling device for closing springs loaded/discharged
H Service releases
I Closing pushbutton
L Opening pushbutton
M Operating mechanism locking electromagnet
N Additional shunt opening release
O Transient contact
P Lock that prevents racking-in when door is open

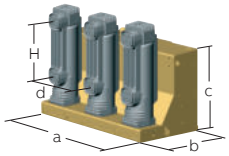
Description

General characteristics of the VD4 series

The VD4 series of vacuum circuit breakers conform to the specifications of the following standards:

- IEC 62271-1
- IEC 62271-100

Rated voltage (1)		**kV**	**12**			
Rated frequency		Hz	50 - 60			
Rated thermal current		A	630 . . . 4000 (2)			
Short-time withstand current and breaking capacity		kA	16 ... 31.5	40	50	63
Making capacity		kA	40 ... 80	100	125 (3)	164
Admissible short-time withstand current		s	3	3	3	3 (8)
Fixed / withdrawable version			•/•	•/•	•/•	•/•
Maximum overall dimensions (fixed version)	d (mm)		150 - 275	210 - 275	210 - 275	275
	H (mm)		205 - 310	310	310	310
	a (mm)		450 - 700	570 - 700	600 - 750	750
	b (mm)		424	424	459	459
	c (mm)		461 - 599	599 (5)	608 (7)	677
Weight		kg	73 - 105	94 - 180	147 - 260	260
Embedded poles			•	•	•	-
Assembled poles			-	-	-	•



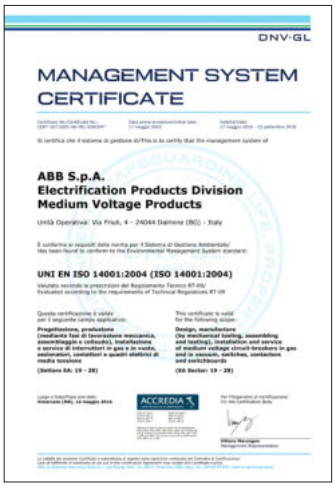
(1) Test voltage according to IEC 62271-1 Standards table 1a, VDE 0670, - part 1000, list 2
(2) With forced ventilation
(3) Higher values on request
(4) 360 mm for fixed version, 280 mm for withdrawable version
(5) Circuit breaker with heat sink 616 mm (2500 A)
(6) Withdrawable version
(7) Circuit breaker with heat sink 634 mm (3150 A)
(8) 1s for withdrawable version

Technical documentation

Order the following publications for more details about the technical aspects and applications of VD4 circuit breakers:

- PowerCube modules code 1VCP000091
- Powerbloc modules code BA441/03E
- UniGear ZS1 switchgear code 1VCP000138
- ZS8.4 switchgear code L2288
- REF542*plus* unit code 1VTA100001
- UniSec cod. 1VFM200003


DNV·GL
MANAGEMENT SYSTEM CERTIFICATE
ABB S.p.A.
Electrification Products Division
Medium Voltage Products
UNI EN ISO 9001:2008 (ISO 9001:2008)
ACCREDIA


DNV·GL
MANAGEMENT SYSTEM CERTIFICATE
ABB S.p.A.
Electrification Products Division
Medium Voltage Products
UNI EN ISO 14001:2004 (ISO 14001:2004)
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Electrification Products Division
Medium Voltage Products
BS OHSAS 18001:2007
ACCREDIA


ACCREDIA
CERTIFICATO DI ACCREDITAMENTO
Accreditation Certificate
ABB S.p.A. Power Products Division

17.5			24	36	36/40.5
50 - 60			50 - 60	50-60	50-60
630 . . . 4000 (2)			630 . . . 3150 (2)	630 ... 3150	630 ... 3150
16 ... 31.5	40 ... 50	63	16 ... 31.5	16 ... 31.5	16 ... 40
40 ... 80	100 ... 125	164	40 ... 80	40 ... 80	40 ... 100
3	3	3 (8)	3	3	3
•/•	•/•	•/•	•/•	•/•	•/•
150 - 275	210 - 275	275	210 - 275	275	280 - 360 (4)
205 - 310	310	310	310	328	328
450 - 700	570 - 700	750	570 - 700	786 / 853 (6)	895 (6) - 1000
424	424	459	424	492 / 789 (6)	555 - 686 (6)
461 - 599 (5)	599 (5) (7)	677	631 - 661	876 / 973 (6)	1575
73 - 105	94 - 180	260	100 - 110	170 / 210	290 - 350
•	•	-	•	•	•
-	-	•	-	•	•

Quality System
Complies with EN ISO 9001 Standards, certified by an independent organisation.

Test Laboratory
Complies with EN ISO/IEC 17025 Standards, accredited by an independent organisation.

Environmental Management System
Complies with EN ISO 14001 Standards, certified by an independent organisation.

Health and Safety Management System
Complies with OHSAS 18001 Standards, certified by an independent organisation.


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Deutschen AkkreditierungsRat
Akkreditierung


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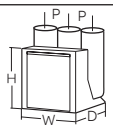
Deutschen AkkreditierungsRat
Accreditation

Selection and ordering
Fixed circuit breakers

VD4 fixed circuit breaker (12 kV) ([3])

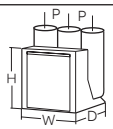
Circuit breaker		VD4 12				
Standards	IEC 62271-100	•				
Rated voltage	Ur [kV]	12 ([2])				
Rated insulation voltage	Us [kV]	12				
Withstand voltage at 50 Hz	Ud (1 min) [kV]	28				
Impulse withstand voltage	Up [kV]	75				
Rated frequency	fr [Hz]	50-60				
Rated thermal current (40 °C)	Ir [A]	630	630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

VD4 12						
•						
12 (²)						
12						
28						
75						
50-60						
1250	1250	1250	1250	1250	1250	1250
16	–	–	–	–	–	–
20	–	–	–	–	–	–
25	–	–	–	–	–	–
31.5	–	–	–	–	–	–
–	40	40	40	–	–	–
–	–	–	–	50	50	–
–	–	–	–	–	–	63
16	–	–	–	–	–	–
20	–	–	–	–	–	–
25	–	–	–	–	–	–
31.5	–	–	–	–	–	–
–	40	40	40	–	–	–
–	–	–	–	50	50	–
–	–	–	–	–	–	63
40	–	–	–	–	–	–
50	–	–	–	–	–	–
63	–	–	–	–	–	–
80	–	–	–	–	–	–
–	100	100	100	–	–	–
–	–	–	–	125	125	–
–	–	–	–	–	–	164
•	•	•	•	•	•	–
–	–	–	–	–	–	•
33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60	28...40
10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10...15
43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	38...55
30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	≤55
461	589	589	589	610	610	615
700	570	570	700	600	750	750
424	424	424	424	459	459	459
275	210	210	275	210	275	275
79	84	84	84	146	158	265
–	–	–	–	–	–	–
000051 (¹)	003282 (¹)	003282 (¹)	003285 (¹)	003440	003441	003945
- 5 ... + 40						
•						
•						

(¹) Poles in polyamide
(²) Available at 10kV according to GOST R 52565 standard with Ud=42kV
(³) 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)

Selection and ordering
Fixed circuit breakers

VD4 fixed circuit breaker (12 kV) ([3])

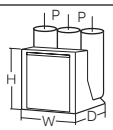
Circuit breaker		**VD4 12**				
Standards	IEC 62271-100	•				
Rated voltage	Ur [kV]	12 ([2])				
Rated insulation voltage	Us [kV]	12				
Withstand voltage at 50 Hz	Ud (1 min) [kV]	28				
Impulse withstand voltage	Up [kV]	75				
Rated frequency	fr [Hz]	50-60				
Rated thermal current (40 °C)	Ir [A]	1600	1600	1600	1600	1600
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	–	–	–	–	–
		20	20	20	–	–
		25	25	25	–	–
		31.5	31.5	31.5	–	–
		–	–	–	40	40
		–	–	–	–	–
		–	–	–	–	–
Admissible rated short-time withstand current (3s)	Ik [kA]	–	–	–	–	–
		20	20	20	–	–
		25	25	25	–	–
		31.5	31.5	31.5	–	–
		–	–	–	40	40
		–	–	–	–	–
		–	–	–	–	–
Making capacity	Ip [kA]	–	–	–	–	–
		50	50	50	–	–
		63	63	63	–	–
		80	80	80	–	–
		–	–	–	100	100
		–	–	–	–	–
		–	–	–	–	–
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•
	[O - 0.3 s - CO - 3 min - CO]	–	–	–	–	–
Opening time	[ms]	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60
Arcing time	[ms]	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
Total breaking time	[ms]	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75
Closing time	[ms]	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60
Maximum overall dimensions 	H [mm]	599	599	599	589	589
	W [mm]	450	570	700	570	700
	D [mm]	424	424	424	424	424
	Pole center distance P [mm]	150	210	275	210	275
Weight	[kg]	93	98	105	84	84
Standardized dimensions table	TN	–	7407 ([1])	7408 ([1])	–	–
	1VCD	000050	–	–	003282([1])	003285([1])
Operating temperature	[°C]	- 5 ... + 40				
Tropicalization	IEC: 60068-2-30, 60721-2-1	•				
Electromagnetic compatibility	IEC: 62271-1	•				

VD4 12							
•							
12 (2)							
12							
28							
75							
50-60							
1600	1600	1600	2000	2000	2000	2000	2000
–	–	–	–	–	–	–	–
–	–	–	20	20	–	–	–
–	–	–	25	25	–	–	–
–	–	–	31.5	31.5	–	–	–
–	–	–	40	40	–	–	–
50	50	–	–	–	50	50	–
–	–	63	–	–	–	–	63
–	–	–	–	–	–	–	–
–	–	–	20	20	–	–	–
–	–	–	25	25	–	–	–
–	–	–	31.5	31.5	–	–	–
–	–	–	40	40	–	–	–
50	50	–	–	–	50	50	–
–	–	63	–	–	–	–	63
–	–	–	–	–	–	–	–
–	–	–	50	50	–	–	–
–	–	–	63	63	–	–	–
–	–	–	80	80	–	–	–
–	–	–	100	100	–	–	–
125	125	–	–	–	125	125	–
–	–	164	–	–	–	–	164
•	•	–	•	•	•	•	–
–	–	•	–	–	–	–	•
33 ... 60	33...60	28...40	33...60	33...60	33...60	33...60	28...40
10 ... 15	10...15	10...15	10...15	10...15	10...15	10...15	10...15
43 ... 75	43...75	38...55	43...75	43...75	43...75	43...75	38...55
30 ... 60	30...60	≤55	30...60	30...60	30...60	30...60	≤55
610	610	677.5	599	599	610	610	615
600	750	750	570	700	600	750	750
459	459	459	424	424	459	459	459
210	275	265	210	275	210	275	275
146	158	265	98	105	146	158	265
–	–	–	7407 (1)	7408 (1)	–	–	–
003440	003441	003945	–	–	003440	003441	003945
	- 5 ... + 40						
	•						
	•						

(1) Poles in polyamide
(2) Available at 10kV according to GOST R 52565 standard with Ud=42kV
(3) 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)

Selection and ordering
Fixed circuit breakers

VD4 fixed circuit breaker (12 kV) ([3])

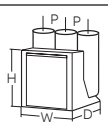
Circuit breaker		**VD4 12**			
Standards	IEC 62271-100	•			
Rated voltage	Ur [kV]	12 ([2])			
Rated insulation voltage	Us [kV]	12			
Withstand voltage at 50 Hz	Ud (1 min) [kV]	28			
Impulse withstand voltage	Up [kV]	75			
Rated frequency	fr [Hz]	50-60			
Rated thermal current (40 °C)	Ir [A]	2500	2500	2500	2500
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	–	–	–	–
		20	20	–	–
		25	25	–	–
		31.5	31.5	–	–
		40	40	–	–
		–	–	50	–
		–	–	–	63
Admissible rated short-time withstand current (3s)	Ik [kA]	–	–	–	–
		20	20	–	–
		25	25	–	–
		31.5	31.5	–	–
		40	40	–	–
		–	–	50	–
		–	–	–	63
Making capacity	Ip [kA]	–	–	–	–
		50	50	–	–
		63	63	–	–
		80	80	–	–
		100	100	–	–
		–	–	125	–
		–	–	–	164
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	–
	[O - 0.3 s - CO - 3 min - CO]	–	–	–	•
Opening time	[ms]	33...60	33...60	33...60	28...40
Arcing time	[ms]	10...15	10...15	10...15	10...15
Total breaking time	[ms]	43...75	43...75	43...75	38...55
Closing time	[ms]	30...60	30...60	30...60	≤55
Maximum overall dimensions 	H [mm]	599	599	610	615
	W [mm]	570	700	750	750
	D [mm]	424	424	459	459
	Pole center distance P [mm]	210	275	275	275
Weight	[kg]	98	105	163	265
Standardized dimensions table	TN	7407 ([1])	7408 ([1])	–	–
	1VCD	–	–	003441	003945
Operating temperature	[°C]	- 5 ... + 40			
Tropicalization	IEC: 60068-2-30, 60721-2-1	•			
Electromagnetic compatibility	IEC: 62271-1	•			

VD4 12		
•		
12 (2)		
12		
28		
75		
50-60		
3150 (4)	3150 (4)	3150 (4)
–	–	–
20	–	–
25	–	–
31.5	–	–
40	–	–
–	50	–
–	–	63
–	–	–
20	–	–
25	–	–
31.5	–	–
40	–	–
–	50	–
–	–	63
–	–	–
50	–	–
63	–	–
80	–	–
100	–	–
–	125	–
–	–	164
•	•	–
–	–	•
33...60	33...60	28...40
10...15	10...15	10...15
43...75	43...75	38...55
30...60	30...60	≤55
635	636	637
700	750	750
424	459	459
275	275	275
140	177	265
–	–	–
000149 (1)	003443	003945
- 5 ... + 40		
•		
•		

(1) Poles in polyamide
(2) Available at 10kV according to GOST R 52565 standard with Ud=42kV
(3) 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)
(4) Up to 4000 A with forced ventilation

Selection and ordering
Fixed circuit breakers

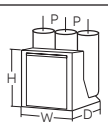
VD4 fixed circuit breaker (17.5 kV) (2)

Circuit breaker		VD4 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 thermal current (40 °C)	Ir [A]	630	630	630	1250	1250	1250
Rated breaking capacity (rated symmetrical short-circuit current)	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
		–	–	–	–	–	–
		–	–	–	–	–	–
		–	–	–	–	–	–
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
		–	–	–	–	–	–
		–	–	–	–	–	–
		–	–	–	–	–	–
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
		–	–	–	–	–	–
		–	–	–	–	–	–
		–	–	–	–	–	–
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•	•
	[O - 0.3 s - CO - 3 min - CO]	–	–	–	–	–	–
Opening time	[ms]	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60
Arcing time	[ms]	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
Total breaking time	[ms]	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75
Closing time	[ms]	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60
Maximum overall dimensions 	H [mm]	461	461	461	461	461	461
	W [mm]	450	570	700	450	570	700
	D [mm]	424	424	424	424	424	424
	Pole center distance P [mm]	150	210	275	150	210	275
Weight	[kg]	73	75	79	73	75	79
Standardized dimensions table	TN	7405 (1)	7406 (1)	–	7405 (1)	7406 (1)	–
	1VCD	–	–	000051 (1)	–	–	000051 (1)
Operating temperature	[°C]	- 5 ... + 40					
Tropicalization	IEC: 60068-2-30, 60721-2-1	•					
Electromagnetic compatibility	IEC: 62271-1	•					

VD4 17											
•											
17.5											
17.5											
38											
95											
50-60											
1250	1250	1250	1250	1250	1600	1600	1600	1600	1600	1600	1600
–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	20	20	–	–	–	–	–
–	–	–	–	–	25	25	–	–	–	–	–
–	–	–	–	–	31.5	31.5	–	–	–	–	–
40	40	–	–	–	–	–	40	40	–	–	–
–	–	50	50	–	–	–	–	–	50	50	–
–	–	–	–	63							63
–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	20	20	–	–	–	–	–
–	–	–	–	–	25	25	–	–	–	–	–
–	–	–	–	–	31.5	31.5	–	–	–	–	–
40	40	–	–	–	–	–	40	40	–	–	–
–	–	50	50	–	–	–	–	–	50	50	–
–	–	–	–	63							63
–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	50	50	–	–	–	–	–
–	–	–	–	–	63	63	–	–	–	–	–
–	–	–	–	–	80	80	–	–	–	–	–
100	100	–	–	–	–	–	100	100	–	–	–
–	–	125	125	–	–	–	–	–	125	125	–
–	–	–	–	164							164
•	•	•	•	–	•	•	•	•	•	•	–
–	–	–	–	•	–	–	–	–	–	–	•
33 ... 60	33 ... 60	33 ... 60	33 ... 60	28 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60	28 ... 40
10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
43 ... 75	43 ... 75	43 ... 75	43 ... 75	38 ... 55	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	38 ... 55
30 ... 60	30 ... 60	30 ... 60	30 ... 60	≤55	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	≤55
589	589	610	610	677.5	599	599	589	589	610	610	615
570	700	600	750	750	570	700	570	700	600	750	750
424	424	459	459	459	424	424	424	424	459	459	459
210	275	210	275	275	210	275	210	275	210	275	265
84	84	146	158	265	98	105	84	84	146	158	265
–	–	–	–	–	7407 (1)	7408 (1)	–	–	–	–	–
003282 (1)	003285 (1)	003440	003441	003945	–	–	003282 (1)	003285 (1)	003440	003441	003945
- 5 ... + 40											
•											
•											

Selection and ordering
Fixed circuit breakers

VD4 fixed circuit breaker (17.5 kV) (2)

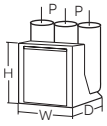
Circuit breaker		VD4 17				
Standards	IEC 62271-100	•				
Rated voltage	Ur [kV]	17.5				
Rated insulation voltage	Us [kV]	17.5				
Withstand voltage at 50 Hz	Ud (1 min) [kV]	38				
Impulse withstand voltage	Up [kV]	95				
Rated frequency	fr [Hz]	50-60				
Rated thermal current (40 °C)	Ir [A]	2000	2000	2000	2000	2000
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	–	–	–	–	–
		20	20	–	–	–
		25	25	–	–	–
		31.5	31.5	–	–	–
		40	40	–	–	–
		–	–	50	50	–
		–	–	–	–	63
Rated short-time withstand current (3s)	Ik [kA]	–	–	–	–	–
		20	20	–	–	–
		25	25	–	–	–
		31.5	31.5	–	–	–
		40	40	–	–	–
		–	–	50	50	–
		–	–	–	–	63
Making capacity	Ip [kA]	–	–	–	–	–
		50	50	–	–	–
		63	63	–	–	–
		80	80	–	–	–
		100	100	–	–	–
		–	–	125	125	–
		–	–	–	–	164
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	–
	[O - 0.3 s - CO - 3 min - CO]	–	–	–	–	•
Opening time	[ms]	33 ... 60	33 ... 60	33 ... 60	33 ... 60	28 ... 40
Arcing time	[ms]	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
Total breaking time	[ms]	43 ... 75	43 ... 75	43 ... 75	43 ... 75	38 ... 55
Closing time	[ms]	30 ... 60	30 ... 60	30 ... 60	30 ... 60	≤55
Maximum overall dimensions 	H [mm]	599	599	610	610	615
	W [mm]	570	700	600	750	750
	D [mm]	424	424	459	459	459
	Pole center distance P [mm]	210	275	210	275	275
Weight	[kg]	98	105	146	158	265
Standardized dimensions table	TN	7407 (1)	7408 (1)	–	–	–
	1VCD	–	–	003440	003441	003945
Operating temperature	[°C]	- 5 ... + 40				
Tropicalization	IEC: 60068-2-30, 60721-2-1	•				
Electromagnetic compatibility	IEC: 62271-1	•				

VD4 17					
•					
17.5					
17.5					
38					
95					
50-60					
2500	2500	2500	3150 (3)	3150 (3)	3150 (3)
–	–	–	–	–	–
20	–	–	20	–	–
25	–	–	25	–	–
31.5	–	–	31.5	–	–
40	–	–	40	–	–
–	50	–	–	50	–
–	–	63	–	–	63
–	–	–	–	–	–
20	–	–	20	–	–
25	–	–	25	–	–
31.5	–	–	31.5	–	–
40	–	–	40	–	–
–	50	–	–	50	–
–	–	63	–	–	63
–	–	–	–	–	–
50	–	–	50	–	–
63	–	–	63	–	–
80	–	–	80	–	–
100	–	–	100	–	–
–	125	–	–	125	–
–	–	164	–	–	164
•	•	–	•	•	–
–	–	•	–	–	•
33 ... 60	33 ... 60	28 ... 40	33 ... 60	33 ... 60	28 ... 40
10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
43 ... 75	43 ... 75	38 ... 55	43 ... 75	43 ... 75	38 ... 55
30 ... 60	30 ... 60	≤55	30 ... 60	30 ... 60	≤55
599	610	677.5	635	636	637
700	750	750	700	750	750
424	459	459	424	459	459
275	275	275	275	275	275
105	163	265	140	177	265
7408 (1)	–	–	–	–	–
–	003441	003945	000149 (1)	003443	003945
- 5 ... + 40					
•					
•					

(1) Poles in polyamide
(2) 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)
(3) Up to 4000 A with forced ventilation

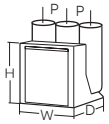
Selection and ordering
Fixed circuit breakers

VD4 fixed circuit breaker (24 kV) (2)

Circuit breaker		VD4 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 thermal current (40 °C)	Ir [A]	630	630	1250	1250	1600	2000	2500
Rated breaking capacity (rated symmetrical short-circuit current)	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
Admissible 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	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60
Arcing time	[ms]	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
Total breaking time	[ms]	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75
Closing time	[ms]	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60
Maximum overall dimensions 	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 center distance P [mm]	210	275	210	275	275	275	275
Weight	[kg]	100	104	100/106 (1)	104	110	110	110
Standardized 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	•						

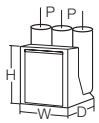
(1) 31.5 kA version
(2) On request, the closing spring can be loaded by means of a removable crank handle outside operating mechanism (instead of linear loading by a lever built into the front of operating mechanism)

VD4 fixed circuit breaker (36 kV)

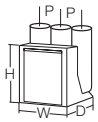
Circuit breaker		VD4 36			
Standards	IEC 62271-100	•			
Rated voltage	Ur [kV]	36			
Rated insulation voltage	Us [kV]	36			
Withstand voltage at 50 Hz	Ud (1 min) [kV]	70			
Impulse withstand voltage	Up [kV]	170			
Rated frequency	fr [Hz]	50			
Rated thermal current (40 °C)	Ir [A]	1250	1600	2000	2500
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	20	20	20	20
		25	25	25	25
		31.5	31.5	31.5	31.5
Admissible rated short-time withstand current (3s)	Ik [kA]	20	20	20	20
		25	25	25	25
		31.5	31.5	31.5	31.5
Making capacity	Ip [kA]	50	50	50	50
		63	63	63	63
		80	80	80	80
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•			
Opening time	[ms]	35 ... 60	35 ... 60	35 ... 60	35 ... 60
Arcing time	[ms]	10 ... 15	10 ... 15	10 ... 15	10 ... 15
Total breaking time	[ms]	45 ... 75	45 ... 75	45 ... 75	45 ... 75
Closing time	[ms]	50 ... 65	50 ... 65	50 ... 65	50 ... 65
Maximum overall dimensions 	H [mm]	884	884	884	884
	W [mm]	796	796	796	796
	D [mm]	501	501	501	501
	Pole center distance P [mm]	275	275	275	275
Weight	[kg]	170	170	170	210
Standardized dimensions table	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	•			

Selection and ordering
Fixed circuit breakers

VD4 fixed circuit breaker in floor rolling version (36 kV)

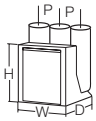
Circuit breaker		VD4 36				
Standards	IEC 62271-100	•				
Rated voltage	Ur [kV]	36				
Rated insulation voltage	Us [kV]	36				
Withstand voltage at 50 Hz	Ud (1 min) [kV]	95				
Impulse withstand voltage	Up [kV]	185				
Rated frequency	fr [Hz]	50-60				
Rated thermal current (40 °C)	Ir [A]	630	1250	1600	2000	2500
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	16	16	–	–	–
		20	25	–	–	–
		–	25	25	25	25
		–	31.5	31.5	31.5	31.5
		–	40	40	40	40
Admissible rated short-time withstand current (3s)	Ik [kA]	16	16	–	–	–
		20	25	–	–	–
		–	25	25	25	25
		–	31.5	31.5	31.5	31.5
		–	40	40	40	40
Making capacity	Ip [kA]	40	40	–	–	–
		50	50	–	–	–
		–	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]	≤45	≤45	≤45	≤45	≤45
Arcing time	[ms]	≤15	≤15	≤15	≤15	≤15
Total breaking time	[ms]	≤60	≤60	≤60	≤60	≤60
Closing time	[ms]	approx. 60	approx. 60	approx. 60	approx. 60	approx. 60
Maximum overall dimensions 	H [mm]	1575	1575	1575	1575	1575
	W [mm]	1000	1000	1000	1000	1000
	D [mm]	555	555	555	555	555
	Pole distance P [mm]	360	360	360	360	360
Weight	[kg]	320	320	320	355	355
Standardized dimensions table	TN	GCEM 700198	GCEM 700198	GCEM 700198	GCEM 700198	GCEM 700198
Operating temperature	[°C]	- 5 ... + 40				
Tropicalization	IEC: 60068-2-30, 60721-2-1	•				
Electromagnetic compatibility	IEC: 62271-1	•				

VD4 fixed circuit breaker (38 kV) - IEEE C37.09 Standards

Circuit breaker		VD4 38	
Standards	IEEE C37.09	•	
Rated voltage	Ur [kV]	38	
Rated insulation voltage	Us [kV]	38	
Withstand voltage at 50 Hz	Ud (1 min) [kV]	80	
Impulse withstand voltage	Up [kV]	150	
Rated frequency	fr [Hz]	60	
Rated thermal current (40 °C)	Ir [A]	1200	2000
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	31.5	31.5
Rated short-time withstand current (3s)	Ik [kA]	31.5	31.5
Making capacity	Ip [kA]	82	82
Operation sequence	[O - 0.3 s - CO - 3 min - CO]	•	•
Opening time	[ms]	30 ... 35	30 ... 35
Arcing time	[ms]	5 ... 15	5 ... 15
Total breaking time	[ms]	35 ... 50 3-cycle	35 ... 50 3-cycle
Closing time	[ms]	50 ... 65	50 ... 65
Maximum overall dimensions 	H [mm]	884	884
	W [mm]	796	796
	D [mm]	501	501
	Pole center distance P [mm]	275	275
Weight	[kg]	170	170
Standardized dimensions table	TN	1VYN300901-RF	1VYN300901-RF
Operating temperature	[°C]	- 5 ... + 40	
Tropicalization	IEC: 60068-2-30, 60721-2-1	•	
Electromagnetic compatibility	IEC 62271-1	•	

Selection and ordering
Fixed circuit breakers

VD4 fixed circuit breaker in floor rolling version (40 kV)

Circuit breaker		**VD4 40** (1)				
Standards	IEC 62271-100	•				
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]	185-200				
Rated frequency	fr [Hz]	50-60				
Rated thermal current (40 °C)	Ir [A]	630	1250	1600	2000	2500 (2)
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	16	16	–	–	–
		20	20	–	–	–
		–	25	25	25	25
		–	31.5	31.5 (2)	31.5 (2)	31.5 (2)
		–	40	40	40	40
Admissible rated short-time withstand current (3s)	Ik [kA]	16	16	–	–	–
		20	20	–	–	–
		–	25	25	25	25
		–	31.5	31.5	31.5	31.5
		–	40	40	40	40
Making capacity	Ip [kA]	40	40	–	–	–
		50	50	–	–	–
		–	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]	≤45	≤45	≤45	≤45	≤45
Arcing time	[ms]	≤15	≤15	≤15	≤15	≤15
Total breaking time	[ms]	≤60	≤60	≤60	≤60	≤60
Closing time	[ms]	approx. 60	approx. 60	approx. 60	approx. 60	approx. 60
Maximum overall dimensions 	H [mm]	1575	1575	1575	1575	1575
	W [mm]	1000	1000	1000	1000	1000
	D [mm]	555	555	555	555	555
	Pole center distance P [mm]	360	360	360	360	360
Weight	[kg]	320	320	290	340	340
Standardized dimensions table	TN	GCEM 700198	GCEM 700198	GCEM 700198	GCEM 700198	GCEM 700198
Operating temperature	[°C]	- 5 ... + 40				
Tropicalization	IEC: 60068-2-30, 60721-2-1	•				
Electromagnetic compatibility	IEC: 62271-1	•				

(1) GOST version available on request.
(2) Version for capacity banks available on request.


ABB
392 RBP 0003
392 RCS 0001

Selection and ordering
Fixed circuit breakers

Types of fixed circuit breakers available

Complete the circuit breaker selected with the optional accessories indicated on the following pages.

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

Ur	Isc	Rated thermal current (40°C) [A]											
		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	
kV	kA	W=450	W=570	W=700	W=570	W=700	W=450	W=570	W=700	W=600	W=750	W=750	Circuit breaker type
	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
	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
12	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 circuit breaker.
W = Width of circuit breaker.
D = Depth of circuit breaker.
u/l = Distance between bottom and top terminals.
l/g = Distance between bottom terminal and bearing surface of circuit breaker.
P = Horizontal center distance of poles.

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

Ur	Isc	Rated thermal current (40°C) [A]												
		H=461			H=589		H=599			H=610		H=636	H=677,5	
		D=424			D=424		D=424			D=459		D=459	D=459	
kV	kA	u/l=205			u/l=310		u/l=310			u/l=310		u/l=310	u/l=310	**Circuit breaker type**
		l/g=217.5			l/g=238		l/g=237.5			l/g=237		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	P=275	
		W=450	W=570	W=700	W=570	W=700	W=450	W=570	W=700	W=600	W=750	W=750	W=750	
	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
	63												1250	VD4 12.12.63 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
	63												1600	VD4 12.16.63 p275
12	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
	63												2000	VD4 12.20.63 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
	63												2500	VD4 12.25.63 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
	63												3150 (1)	VD4 12.32.63 p275

H = Height of circuit breaker.
W = Width of circuit breaker.
D = Depth of circuit breaker.
u/l = Distance between bottom and top terminals.
l/g = Distance between bottom terminal and bearing surface of circuit breaker.
P = Horizontal center distance of poles.
(1) Up to 4000 A with forced ventilation.

Selection and ordering
Fixed circuit breakers

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

Ur	Isc	Rated thermal current (40 °C) [A]											
		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	
kV	kA	l/g=217.5			l/g=238		l/g=237.5			l/g=237		l/g=237.5	Circuit breaker type
		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 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
	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 circuit breaker.
W = Width of circuit breaker.
D = Depth of circuit breaker.
u/l = Distance between bottom and top terminals.
l/g = Distance between bottom terminal and bearing surface of circuit breaker.
P = Horizontal center distance of poles.

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

Ur	Isc	Rated thermal current (40 °C) [A]												
		H=461			H=589		H=599			H=610		H=635	H=677,5	
		D=424			D=424		D=424			D=459		D=459	D=459	
kV	kA	u/l=205			u/l=310		u/l=310			u/l=310		u/l=310	u/l=310	Circuit breaker type
		l/g=217.5			l/g=238		l/g=237.5			l/g=237		l/g=237.5	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	P=275	
		W=450	W=570	W=700	W=570	W=700	W=450	W=570	W=700	W=600	W=750	W=750	W=750	
	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
	63												1250	VD4 17.12.63 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
	63												1600	VD4 17.16.63 p275
17.5	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
	63												2000	VD4 17.20.63 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
	63												2500	VD4 17.25.63 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
	63												3150 (1)	VD4 17.32.63 p275

H = Height of circuit breaker
W = Width of circuit breaker
D = Depth of circuit breaker
u/l = Distance between bottom and top terminals
l/g = Distance between bottom terminal and bearing surface of circuit breaker
P = Horizontal center distance of poles
(1) Up to 4000 A with forced ventilation.

Selection and ordering
Fixed circuit breakers

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

Ur	Isc	Rated thermal current (40 °C) [A]			Circuit breaker type
		H=631		H=642	
		D=424		D=424	
		u/l=310		u/l=310	
kV	kA	l/g=282.5		l/g=282.5	
		P=210	P=275	P=275	
		W=570	W=700	W=700	
	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
24	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 circuit breaker.
W = Width of circuit breaker.
D = Depth of circuit breaker.
u/l = Distance between bottom and top terminals.
l/g = Distance between bottom terminal and bearing surface of circuit breaker.
P = Horizontal center distance of poles.

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

Ur	Isc	Rated thermal current (40 °C) [A]				Circuit breaker type
		H = 884				
		W = 796				
kV	kA	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

H = Height of circuit breaker.
W = Width of circuit breaker.
D = Depth of circuit breaker.
u/l = Distance between bottom and top terminals.
l/g = Distance between bottom terminal and bearing surface of circuit breaker.
P = Horizontal center distance of poles

Selection and ordering
Fixed circuit breakers

VD4 (36 kV) fixed circuit breaker

Ur	Isc	Rated thermal current (40 °C) [A]	Circuit breaker type
kV	kA	H= 1575 W= 555 D= 1000 u/l=328 l/g=900 P=360	
36	16	630A	VD4 36.06.16 p360
	20	630A	VD4 36.06.20 p360
	16	1250A	VD4 36.12.16 p360
	20	1250A	VD4 36.12.20 p360
	25	1250A	VD4 36.12.25 p360
	31.5	1250A	VD4 36.12.31 p360
	40	1250A	VD4 36.12.40 p360
	25	1600A	VD4 36.16.25 p360
	31.5	1600A	VD4 36.16.31 p360
	40	1600A	VD4 36.16.40 p360
	25	2000A	VD4 36.20.25 p360
	31.5	2000A	VD4 36.20.31 p360
	40	2000A	VD4 36.20.40 p360
	25	2500A	VD4 36.25.25 p360
	31.5	2500A	VD4 36.25.31 p360
	40	2500A	VD4 36.25.40 p360

H = Height of circuit breaker
W = Width of circuit breaker.
D = Depth of circuit breaker.
u/l = Distance between bottom and top terminals.
l/g = Distance between bottom terminal and bearing surface of circuit breaker.
P = Horizontal center distance of poles.

VD4 (38 kV) fixed circuit breaker

Ur	Isc	Rated thermal current (40 °C) [A]	Circuit breaker type
kV	kA	H = 884 W = 796 P = 501 u/l = 328 l/g = 490 l = 275	
38	31.5	1200 A	VD4 38.12.32 p275
	31.5	2000 A	VD4 38.20.32 p275

H = Height of circuit breaker
W = Width of circuit breaker.
D = Depth of circuit breaker.
u/l = Distance between bottom and top terminals.
l/g = Distance between bottom terminal and bearing surface of circuit breaker.
P = Horizontal center distance of poles.

VD4 (40 kV) fixed circuit breaker

Ur	Isc	Rated thermal current (40 °C) [A]	Circuit breaker type
kV	kA	H= 1575 W= 555 D= 1000 u/l=328 l/g=900 P=360	
40	16	630A	VD4 40.06.16 p360
	20	630A	VD4 40.06.20 p360
	16	1250A	VD4 40.12.16 p360
	20	1250A	VD4 40.12.20 p360
	25	1250A	VD4 40.12.25 p360
	31.5	1250A	VD4 40.12.31 p360
	40	1250A	VD4 40.12.40 p360
	25	1600A	VD4 40.16.25 p360
	31.5	1600A	VD4 40.16.31 p360
	40	1600A	VD4 40.16.40 p360
	25	2000A	VD4 40.20.25 p360
	31.5	2000A	VD4 40.20.31 p360
	40	2000A	VD4 40.20.40 p360
	25	2500A	VD4 40.25.25 p360
	31.5	2500A	VD4 40.25.31 p360
	40	2500A	VD4 40.25.40 p360

H = Height of circuit breaker
W = Width of circuit breaker.
D = Depth of circuit breaker.
u/l = Distance between bottom and top terminals.
l/g = Distance between bottom terminal and bearing surface of circuit breaker.
P = Horizontal center distance of poles.

Standard equipment of fixed circuit breakers
The basic versions of the fixed circuit breakers are three-pole and equipped with:

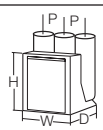
- EL or Classic manual operating mechanism
- mechanical signaling device for closing springs loaded/discharged
- mechanical signaling device for circuit breaker open/closed
- closing pushbutton, opening pushbutton and operation counter
- set of ten auxiliary circuit breaker break/make contacts
  Note: three break contacts (signaling circuit breaker open) and five make contacts (signaling circuit breaker closed) are available with the group of ten auxiliary contacts supplied as standard and the maximum number of electrical applications.
- lever built into operating mechanism for linear loading of closing spring.

VD4 - up to 24 kV

VD4 - 36 kV

Selection and ordering
Withdrawable circuit breakers

Withdrawable circuit breakers
for UniGear ZS1 switchgear (12 kV) (4)

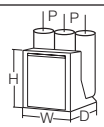
Circuit breaker		VD4/P 12					
Standards	IEC 62271-100	•					
Rated voltage	Ur [kV]	12 (2)					
Rated insulation voltage	Us [kV]	12					
Withstand voltage at 50 Hz	Ud (1 min) [kV]	28					
Impulse withstand voltage	Up [kV]	75					
Rated frequency	fr [Hz]	50-60					
Rated thermal current (40 °C) (1)	Ir [A]	630	1250	1250	1250	1250	1250
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	16	16	–	–	–	–
		20	20	–	–	–	–
		25	25	–	–	–	–
		31.5	31.5	–	–	–	–
		–	–	40	40	–	–
		–	–	–	–	50	–
		–	–	–	–	–	63
Admissible rated short-time withstand current (3s)	Ik [kA]	16	16	–	–	–	–
		20	20	–	–	–	–
		25	25	–	–	–	–
		31.5	31.5	–	–	–	–
		–	–	40	40	–	–
		–	–	–	–	50	–
		–	–	–	–	–	63 (5)
Making capacity	Ip [kA]	40	40	–	–	–	–
		50	50	–	–	–	–
		63	63	–	–	–	–
		80	80	–	–	–	–
		–	–	100	100	–	–
		–	–	–	–	125	–
		–	–	–	–	–	164
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•	–
	[O - 0.3 s - CO - 3 min - CO]	–	–	–	–	–	•
Opening time	[ms]	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60	28 ... 40
Arcing time	[ms]	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
Total breaking time	[ms]	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	38 ... 55
Closing time	[ms]	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	≤55
Maximum overall dimensions 	H [mm]	628	628	691	691	691	735
	W [mm]	503	503	653	853	681	851
	D [mm]	662	662	641	642	643	650
	Pole center distance P [mm]	150	150	210	275	210	275
Weight	[kg]	116	116	174	176	180	270
Standardized dimensions table	TN	7412 (3)	7412 (3)	–	–	–	–
	1VCD	–	–	003284 (3)	003286 (3)	003444	003943
Operating temperature	[°C]	- 5 ... + 40					
Tropicalization	IEC: 60068-2-30, 60721-2-1	•					
Electromagnetic compatibility	IEC: 62271-1	•					

VD4/P 12						
•						
12 (2)						
12						
28						
75						
50-60						
1600	1600	1600	1600	1600	1600	1600
–	–	–	–	–	–	–
20	20	–	–	–	–	–
25	25	–	–	–	–	–
31.5	31.5	–	–	–	–	–
–	–	40	40	–	–	–
–	–	–	–	50	50	–
–	–	–	–	–	–	63
–	–	–	–	–	–	–
20	20	–	–	–	–	–
25	25	–	–	–	–	–
31.5	31.5	–	–	–	–	–
–	–	40	40	–	–	–
–	–	–	–	50	50	–
–	–	–	–	–	–	63 (5)
–	–	–	–	–	–	–
50	50	–	–	–	–	–
63	63	–	–	–	–	–
80	80	–	–	–	–	–
–	–	100	100	–	–	–
–	–	–	–	125	125	–
–	–	–	–	–	–	164
•	•	•	•	•	•	–
–	–	–	–	–	–	•
33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60	28 ... 40
10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	38 ... 55
30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	≤55
691	691	691	691	691	691	735
653	853	653	853	681	853	851
642	642	641	642	643	643	650
210	275	210	275	210	275	275
160	166	174	176	180	193	270
7415(3)	7416(3)	–	–	–	–	–
–	–	003284(3)	003286(3)	003444	003445	003943
- 5 ... + 40						
•						
•						

(1) Rated current guaranteed with circuit breaker installed in UniGear ZS1 switchgear and with 40 °C ambient temperature.
(2) Available at 10kV according to GOST R 52565 standard with Ud=42kV
(3) Poles in polyamide
(4) On request, the closing spring can be loaded by means of a removable crank handle outside the operating mechanism (instead of linear loading, only possible with the door open, by means of a lever built into the front of the operating mechanism).
(5) For 1s

Selection and ordering
Withdrawable circuit breakers

Withdrawable circuit breakers
for UniGear ZS1 switchgear (12 kV) (4)

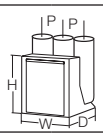
Circuit breaker			VD4/P 12				
Standards		IEC 62271-100	•				
Rated voltage		Ur [kV]	12 (2)				
Rated insulation voltage		Us [kV]	12				
Withstand voltage at 50 Hz		Ud (1 min) [kV]	28				
Impulse withstand voltage		Up [kV]	75				
Rated frequency		fr [Hz]	50-60				
Rated thermal current (40 °C) (1)		Ir [A]	2000	2000	2000	2000	2000
Rated breaking capacity (rated symmetrical short-circuit current)		Isc [kA]	–	–	–	–	–
			20	20	–	–	–
			25	25	–	–	–
			31.5	31.5	–	–	–
			40	40	–	–	–
			–	–	50	50	–
			–	–	–	–	63
Admissible rated short-time withstand current (3s)		Ik [kA]	–	–	–	–	–
			20	20	–	–	–
			25	25	–	–	–
			31.5	31.5	–	–	–
			40	40	–	–	–
			–	–	50	50	–
			–	–	–	–	63 (5)
Making capacity		Ip [kA]	–	–	–	–	–
			50	50	–	–	–
			63	63	–	–	–
			80	80	–	–	–
			100	100	–	–	–
			–	–	125	125	–
			–	–	–	–	164
Operation sequence		[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	–
		[O - 0.3 s - CO - 3 min - CO]	–	–	–	–	•
Opening time		[ms]	33 ... 60	33 ... 60	33 ... 60	33 ... 60	28 ... 40
Arcing time		[ms]	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
Total breaking time		[ms]	43 ... 75	43 ... 75	43 ... 75	43 ... 75	38 ... 55
Closing time		[ms]	30 ... 60	30 ... 60	30 ... 60	30 ... 60	≤55
Maximum overall dimensions		H [mm]	691	691	691	691	735
		W [mm]	653	853	681	853	851
		D [mm]	642	642	643	643	650
		Pole center distance P [mm]	210	275	210	275	275
Weight		[kg]	160	166	190	205	270
Standardized dimensions table		TN	7415 (3)	7416 (3)	–	–	–
		1VCD	–	–	003444	003445	003943
Operating temperature		[°C]	- 5 ... + 40				
Tropicalization		IEC: 60068-2-30, 60721-2-1	•				
Electromagnetic compatibility		IEC: 62271-1	•				

VD4/P 12					
•					
12 (4)					
12					
28					
75					
50-60					
2500	2500	2500	3150 (6)	3150 (6)	3150 (6)
–	–	–	–	–	–
20	–	–	20	–	–
25	–	–	25	–	–
31.5	–	–	31.5	–	–
40	–	–	40	–	–
–	50	–	–	50	–
–	–	63	–	–	63
–	–	–	–	–	–
20	–	–	20	–	–
25	–	–	25	–	–
31.5	–	–	31.5	–	–
40	–	–	40	–	–
–	50	–	–	50	–
–	–	63 (5)	–	–	63 (5)
–	–	–	–	–	–
50	–	–	50	–	–
63	–	–	63	–	–
80	–	–	80	–	–
100	–	–	100	–	–
–	125	–	–	125	–
–	–	164	–	–	164
•	•	–	•	•	–
–	–	•	–	–	•
33 ... 60	33 ... 60	28 ... 40	33 ... 60	33 ... 60	28 ... 40
10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
43 ... 75	43 ... 75	38 ... 55	43 ... 75	43 ... 75	38 ... 55
30 ... 60	30 ... 60	≤55	30 ... 60	30 ... 60	≤55
691	691	735	730	742	735
853	853	851	853	853	851
640	643	650	640	643	650
275	275	275	275	275	275
186	225	270	221	240	270
7417(3)	–	–	–	–	–
–	003446	003943	000153(3)	003447	003943
- 5 ... + 40					
•					
•					

(1) Rated current guaranteed with circuit breaker installed in UniGear ZS1 switchgear and with 40 °C ambient temperature.
(2) Available at 10kV according to GOST R 52565 standard with Ud=42kV
(3) Poles in polyamide
(4) On request, the closing spring can be loaded by means of a removable crank handle outside the operating mechanism (instead of linear loading, only possible with the door open, by means of a lever built into the front of the operating mechanism).
(5) For 1s
(6) Up to 4000 A with forced ventilation

Selection and ordering
Withdrawable circuit breakers

Withdrawable circuit breakers
for UniGear ZS1 switchgear (17.5 kV) ([4])

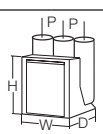
Circuit breaker			**VD4/P 17**					
Standards		IEC 62271-100	•					
Rated voltage		Ur [kV]	17.5					
Rated insulation voltage		Us [kV]	17.5					
Withstand voltage at 50 Hz		Ud (1 min) [kV]	38					
Impulse withstand voltage		Up [kV]	95					
Rated frequency		fr [Hz]	50-60					
Rated thermal current (40 °C) ([1])		Ir [A]	630	1250	1250	1250	1250	1250
Rated breaking capacity (rated symmetrical short-circuit current)		Isc [kA]	16	16	–	–	–	–
			20	20	–	–	–	–
			25	25	–	–	–	–
			31.5	31.5	–	–	–	–
			–	–	40	40	–	–
			–	–	–	–	50	–
			–	–	–	–	–	63
Admissible rated short-time withstand current (3s)		Ik [kA]	16	16	–	–	–	–
			20	20	–	–	–	–
			25 ([2])	25 ([2])	–	–	–	–
			31.5 ([2])	31.5 ([2])	–	–	–	–
			–	–	40	40	–	–
			–	–	–	–	50	–
			–	–	–	–	–	63 ([5])
Making capacity		Ip [kA]	40	40	–	–	–	–
			50	50	–	–	–	–
			63	63	–	–	–	–
			80	80	–	–	–	–
			–	–	100	100	–	–
			–	–	–	–	125	–
			–	–	–	–	–	164
Operation sequence		[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•	–
		[O - 0.3 s - CO - 3 min - CO]	–	–	–	–	–	•
Opening time		[ms]	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60	28 ... 40
Arcing time		[ms]	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
Total breaking time		[ms]	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	38 ... 55
Closing time		[ms]	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	≤55
Maximum overall dimensions 		H [mm]	632	632	691	691	691	735
		W [mm]	503	503	653	853	681	851
		D [mm]	664	664	641	642	643	650
		Pole center distance P [mm]	150 ([2])	150 ([2])	210	275	210	275
Weight		[kg]	116	116	174	176	180	270
Standardized dimensions table		TN	7412([3])	7412([3])	–	–	–	–
		1VCD	–	–	003284([3])	003286([3])	003444	003943
Operating temperature		[°C]	- 5 ... + 40					
Tropicalization		IEC: 60068-2-30, 60721-2-1	•					
Electromagnetic compatibility		IEC: 62271-1	•					

VD4/P 17						
•						
17.5						
17.5						
38						
95						
50-60						
1600	1600	1600	1600	1600	1600	1600
–	–	–	–	–	–	–
20	20	–	–	–	–	–
25	25	–	–	–	–	–
31.5	31.5	–	–	–	–	–
–	–	40	40	–	–	–
–	–	–	–	50	50	–
–	–	–	–	–	–	63
–	–	–	–	–	–	–
20	20	–	–	–	–	–
25	25	–	–	–	–	–
31.5	31.5	–	–	–	–	–
–	–	40	40	–	–	–
–	–	–	–	50	50	–
–	–	–	–	–	–	63 ([5])
–	–	–	–	–	–	–
50	50	–	–	–	–	–
63	63	–	–	–	–	–
80	80	–	–	–	–	–
–	–	100	100	–	–	–
–	–	–	–	125	125	–
–	–	–	–	–	–	164
•	•	•	•	•	•	–
–	–	–	–	–	–	•
33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60	28 ... 40
10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	38 ... 55
30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	≤55
691	691	691	691	691	691	735
653	853	653	853	681	853	851
642	642	641	642	643	643	650
210	275	210	275	210	275	275
160	166	174	176	180	193	270
7415([3])	7416([3])	–	–	–	–	–
–	–	003284([3])	003286([3])	003444	003445	003943
- 5 ... + 40						
•						
•						

([1]) Rated current guaranteed with circuit breaker installed in UniGear ZS1 switchgear and with 40 °C ambient temperature.
([2]) Please consult drawing 2RDA032149 of “Overall dimensions” section for 210 mm pole center distance.
([3]) Poles in polyamide
([4]) On request, the closing spring can be loaded by means of a removable crank handle outside the operating mechanism (instead of linear loading, only possible with the door open, by means of a lever built into the front of the operating mechanism).
([5]) For 1s

Selection and ordering
Withdrawable circuit breakers

Withdrawable circuit breakers
for UniGear ZS1 switchgear (17.5 kV) ([4])

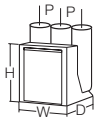
Circuit breaker			**VD4/P 17**				
Standards	IEC 62271-100	•					
Rated voltage	Ur [kV]	17.5					
Rated insulation voltage	Us [kV]	17.5					
Withstand voltage at 50 Hz	Ud (1 min) [kV]	38					
Impulse withstand voltage	Up [kV]	95					
Rated frequency	fr [Hz]	50-60					
Rated thermal current (40 °C) ([1])	Ir [A]	2000	2000	2000	2000	2000	
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	–	–	–	–	–	
		20	20	–	–	–	
		25	25	–	–	–	
		31.5	31.5	–	–	–	
		40	40	–	–	–	
		–	–	50	50	–	
		–	–	–	–	63	
Admissible rated short-time withstand current (3s)	Ik [kA]	–	–	–	–	–	
		20	20	–	–	–	
		25	25	–	–	–	
		31.5	31.5	–	–	–	
		40	40	–	–	–	
		–	–	50	50	–	
		–	–	–	–	63 ([5])	
Making capacity	Ip [kA]	–	–	–	–	–	
		50	50	–	–	–	
		63	63	–	–	–	
		80	80	–	–	–	
		100	100	–	–	–	
		–	–	125	125	–	
		–	–	–	–	164	
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	–	
	[O - 0.3 s - CO - 3 min - CO]	–	–	–	–	•	
Opening time	[ms]	33 ... 60	33 ... 60	33 ... 60	33 ... 60	28 ... 40	
Arcing time	[ms]	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	
Total breaking time	[ms]	43 ... 75	43 ... 75	43 ... 75	43 ... 75	38 ... 55	
Closing time	[ms]	30 ... 60	30 ... 60	30 ... 60	30 ... 60	≤55	
Maximum overall dimensions 	H [mm]	691	691	691	691	735	
	W [mm]	653	853	681	853	851	
	D [mm]	642	642	643	643	650	
	Pole center distance P [mm]	210	275	210	275	275	
Weight	[kg]	160	166	190	205	270	
Standardized dimensions table	TN	7415 ([3])	7416 ([3])	–	–	–	
	1VCD	–	–	003444	003445	003943	
Operating temperature	[°C]	- 5 ... + 40					
Tropicalization	IEC: 60068-2-30, 60721-2-1	•					
Electromagnetic compatibility	IEC: 62271-1	•					

VD4/P 17					
•					
17.5					
17.5					
38					
95					
50-60					
2500	2500	2500	3150 (2)	3150 (2)	3150 (2)
–	–	–	–	–	–
20	–	–	20	–	–
25	–	–	25	–	–
31.5	–	–	31.5	–	–
40	–	–	40	–	–
–	50	–	–	50	–
–	–	63	–	–	63
–	–	–	–	–	–
20	–	–	20	–	–
25	–	–	25	–	–
31.5	–	–	31.5	–	–
40	–	–	40	–	–
–	50	–	–	50	–
–	–	63 (5)	–	–	63 (5)
–	–	–	–	–	–
50	–	–	50	–	–
63	–	–	63	–	–
80	–	–	80	–	–
100	–	–	100	–	–
–	125	–	–	125	–
–	–	164	–	–	164
•	•	–	•	•	–
–	–	•	–	–	•
33 ... 60	33 ... 60	28 ... 40	33 ... 60	33 ... 60	28 ... 40
10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
43 ... 75	43 ... 75	38 ... 55	43 ... 75	43 ... 75	38 ... 55
30 ... 60	30 ... 60	≤55	30 ... 60	30 ... 60	≤55
691	691	735	730	742	735
853	853	851	853	853	851
640	643	650	640	643	650
275	275	275	275	275	275
186	225	270	221	240	270
7417 (3)	–	–	–	–	–
–	003446	003943	000153 (3)	003447	003943
- 5 ... + 40					
•					
•					

(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) On request, the closing spring can be loaded by means of a removable crank handle outside the operating mechanism (instead of linear loading, only possible with the door open, by means of a lever built into the front of the operating mechanism).
(5) For 1s

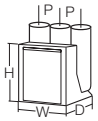
Selection and ordering
Withdrawable circuit breakers

Withdrawable circuit breakers for UniGear ZS1 switchgear (24 kV) ([5])

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 thermal current (40 °C) ([1])	Ir [A]	630	630	1250	1250	1600 ([6])	2000 ([6])	2500 ([2]) ([6])	3150 ([3]) ([6])
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	16	16	16	16	16	16	16	–
		20	20	20	20	20	20	20	–
		25 ([6])	25 ([6])	25 ([6])	25 ([6])	25	25	25	–
		–	–	31.5 ([6])	31.5 ([6])	31.5	31.5	31.5	31.5
Admissible 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	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60
Arcing time	[ms]	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
Total breaking time	[ms]	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75
Closing time	[ms]	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	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 center distance P [mm]	210	275	210	275	275	275	275	275
Weight	[kg]	140	148	140/146 ([4])	148	228	228	228	277
Standardized dimensions table	TN	7413	7414	7413	7414	7418	7418	7418	–
	1VCD	–	–	000173 ([4])	000174 ([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.
([5]) On request, the closing spring can be loaded by means of a removable crank handle outside the operating mechanism (instead of linear loading, only possible with the door open, by means of a lever built into the front of the operating mechanism).
([6]) Contact ABB for the 27 kV version

Withdrawable circuit breakers for UniGear ZS2 switchgear and Powerbloc modules (36 kV)

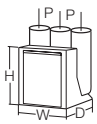
Circuit breaker		VD4/W 36				
Standards	IEC 62271-100	•				
Rated voltage	Ur [kV]	36				
Rated insulation voltage	Us [kV]	36				
Withstand voltage at 50 Hz	Ud (1 min) [kV]	70				
Impulse withstand voltage	Up [kV]	170				
Rated frequency	fr [Hz]	50				
Rated thermal current (40 °C) (1)	Ir [A]	1250	1600	2000	2500 (1)	3150 (2)
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	20	20	20	20	20
		25	25	25	25	25
		31.5	31.5	31.5	31.5	31.5
Admissible rated short-time withstand current (3s)	Ik [kA]	20	20	20	20	20
		25	25	25	25	25
		31.5	31.5	31.5	31.5	31.5
Making capacity	Ip [kA]	50	50	50	50	50
		63	63	63	63	63
		80	80	80	80	80
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•
Opening time	[ms]	35 ... 60	35 ... 60	35 ... 60	35 ... 60	35 ... 60
Arcing time	[ms]	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
Total breaking time	[ms]	45 ... 75	45 ... 75	45 ... 75	45 ... 75	45 ... 75
Closing time	[ms]	50 ... 65	50 ... 65	50 ... 65	50 ... 65	50 ... 65
Maximum overall dimensions 	H [mm]	974	974	974	974	974
	W [mm]	880	880	880	880	880
	D [mm]	789	789	789	789	789
	Pole center distance P [mm]	275	275	275	275	275
Weight	[kg]	230	245	275	275/315	315
Standardized dimensions table	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 79 mm diameter tulip contacts TN 1VYN300901 RA.
2500 A without forced ventilation and 109 mm diameter tulip contacts TN 1VYN300901-RB available for UniGear ZS2 only.
(2) 3150 A with forced ventilation.
Available for UniGear ZS2 only.

Selection and ordering
Withdrawable circuit breakers

Withdrawable circuit breakers in floor rolling version for UniGear ZS3.2 switchgear and Powerbloc modules (36 kV)(*)

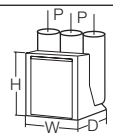
(*) Up to 31.5 kA for UniGear ZS3.2.

Circuit breaker		**VD4/P 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]	95					
Impulse withstand voltage	Up [kV]	185					
Rated frequency	fr [Hz]	50-60					
Rated thermal current (40 °C)	Ir [A]	630	1250	1600	2000	2500 (2)	3150 (1)
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	16	16	–	–	–	–
		20	25	–	–	–	–
		–	25	25	25	25	25
		–	31.5	31.5	31.5	31.5	31.5
		–	40	40	40	40	–
Admissible rated short-time withstand current (3s)	Ik [kA]	16	16	–	–	–	–
		20	25	–	–	–	–
		–	25	25	25	25	25
		–	31.5	31.5	31.5	31.5	31.5
		–	40	40	40	40	–
Making capacity	Ip [kA]	40	40	–	–	–	–
		50	50	–	–	–	–
		–	63	63	63	63	63
		–	80	80	80	80	80
		–	100	100	100	100	–
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•	•
Opening time	[ms]	≤45	≤45	≤45	≤45	≤45	≤45
Arcing time	[ms]	≤15	≤15	≤15	≤15	≤15	≤15
Total breaking time	[ms]	≤60	≤60	≤60	≤60	≤60	≤60
Closing time	[ms]	approx. 60	approx. 60	approx. 60	approx. 60	approx. 60	approx. 60
Maximum overall dimensions 	H [mm]	1575	1575	1575	1575	1575	1575
	W [mm]	840	840	840	840	840	840
	D [mm]	685	685	685	685	685	685
	Pole center distance P [mm]	280	280	280	280	280	280
Weight	[kg]	290	290	340	340	340	380
Standardized dimensions table	TN	GCEM 700198					
Operating temperature	[°C]	- 5 ... + 40					
Tropicalization	IEC: 60068-2-30, 60721-2-1	•					
Electromagnetic compatibility	IEC: 62271-1	•					

(1) version only available with forced ventilation and assembled pole

General characteristics of withdrawable circuit breakers for UniGear ZS3.2 and Powerbloc modules (40 kV)(*)

(*) Up to 31.5 kA for UniGear ZS3.2.

Circuit breaker		VD4/P 40					
Standards	IEC 62271-100	•					
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]	200					
Rated frequency	fr [Hz]	50-60					
Rated thermal current (40 °C)	Ir [A]	630	1250	1600	2000	2500	3150 (1)
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	16	16	–	–	–	–
		20	20	–	–	–	–
		–	25	25	25	25	25
		–	31.5	31.5	31.5	31.5	31.5
		–	40	40	40	40	
Admissible rated short-time withstand current (3s)	Ik [kA]	16	16	–	–	–	–
		20	20	–	–	–	–
		–	25	25	25	25	25
		–	31.5	31.5	31.5	31.5	31.5
		–	40	40	40	40	
Making capacity	Ip [kA]	40	40	–	–	–	–
		50	50	–	–	–	–
		–	63	63	63	63	63
		–	80	80	80	80	80
		–	100	100	100	100	–
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	–	–	–	–	•
Opening time	[ms]	≤45	≤45	≤45	≤45	≤45	≤45
Arcing time	[ms]	≤15	≤15	≤15	≤15	≤15	≤15
Total breaking time	[ms]	≤60	≤60	≤60	≤60	≤60	≤60
Closing time	[ms]	approx. 60	approx. 60	approx. 60	approx. 60	approx. 60	approx. 60
Maximum overall dimensions 	H [mm]	1575	1575	1575	1575	1575	1575
	W [mm]	840	840	840	840	840	840
	D [mm]	685	685	685	685	685	685
	Pole center distance P [mm]	280	280	280	280	280	280
Weight	[kg]	290	290	340	340	340	380
Standardized dimensions table	TN	GCEM 700198					
Operating temperature	[°C]	- 5° ... + 40°					
Tropicalization	IEC: 60068-2-30, 60721-2-1	•					
Electromagnetic compatibility	IEC: 62271-1	•					

(1) version only available with forced ventilation and assembled pole

Selection and ordering
Withdrawable circuit breakers

Types of withdrawable circuit breakers available for UniGear ZS1 switchgear

Complete the circuit breaker selected with the optional accessories indicated on the following pages.

VD4 (12 kV) withdrawable circuit breaker

Ur	Isc	Rated thermal current (40 °C) [A]				Circuit breaker type
		W=650	W=800	W=1000	W=1000	
		P=150	P=210	P=275	P=275	
kV	kA	u/l=205	u/l=310	u/l=310	u/l=310	
		ø=35	ø=79	ø=79	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
	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
	63				1250	VD4/P 12.12.63 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
	63				1600	VD4/P 12.16.63 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
	63				2000	VD4/P 12.20.63 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
	63				2500	VD4/P 12.25.63 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
	63				3150 (1)	VD4/P 12.32.63 p275

W = Switchgear width.
P = Horizontal center distance of poles.
u/l = Distance between bottom and top terminals.
ø = Diameter of isolating contact.
(1) Up to 4000 A with forced ventilation.

VD4 (17.5 kV) withdrawable circuit breaker for UniGear ZS1 switchgear

Ur	Isc	Rated thermal current (40 °C) [A]				Circuit breaker type
		W=650	W=800	W=1000	W=1000	
		P=150	P=210	P=275	P=275	
kV	kA	u/l=205	u/l=310	u/l=310	u/l=310	
		ø=35	ø=79	ø=79	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
	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
	63				1250	VD4/P 17.12.63 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
	63				1600	VD4/P 17.16.63 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
	63				2000	VD4/P 17.20.63 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
	63				2500	VD4/P 17.25.63 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
	63				3150 (1)	VD4/P 17.32.63 p275

W = Switchgear width.
P = Horizontal center distance of poles.
u/l = Distance between bottom and top terminals.
ø = Diameter of isolating contact.
(1) Up to 4000 A with forced ventilation.

Selection and ordering
Withdrawable circuit breakers

VD4 (24 kV) withdrawable circuit breaker for UniGear ZS1 switchgear

Ur	Isc	Rated thermal current (40 °C) [A]				
		W=800	W=1000	W=1000	W=1000	
		P=210	P=275	P=275	P=275	
kV	kA	u/l=310	u/l=310	u/l=310	u/l=310	Circuit breaker type
		ø=35	ø=35	ø=79	ø=109	
	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
24	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 = Switchgear width.
P = Horizontal center distance of poles.
u/l = Distance between bottom and top terminals.
ø = Diameter of isolating contact.
(1) 2500 A rated current guaranteed with forced ventilation.
(2) 3150 A rated current guaranteed with forced ventilation.

VD4 withdrawable circuit breaker in floor rolling version (36 kV)

Ur	Isc	Rated thermal current (40 °C) [A]					Circuit breaker type
kV	kA	H= 1575 W= 840 D= 685 u/l=328 l/g=900 P=280					
36	16	630A					VD4/P 36.06.16 p280
	20	630A					VD4/P 36.06.20 p280
	16		1250A				VD4/P 36.12.16 p280
	20		1250A				VD4/P 36.12.20 p280
	25		1250A				VD4/P 36.12.25 p280
	31.5		1250A				VD4/P 36.12.31 p280
	40		1250A				VD4/P 36.12.40 p280
	25			1600A			VD4/P 36.16.25 p280
	31.5			1600A			VD4/P 36.16.31 p280
	40			1600A			VD4/P 36.16.40 p280
	25				2000A		VD4/P 36.20.25 p280
	31.5				2000A		VD4/P 36.20.31 p280
	40				2000A		VD4/P 36.20.40 p280
	25					2500A	VD4/P 36.25.25 p280
	31.5					2500A	VD4/P 36.25.31 p280
	40					2500A	VD4/P 36.25.40 p280
	25					3150A	VD4/P 36.31.25 p280 (1)
	31.5					3150A	VD4/P 36.31.31 p280 (1)

H = Height of circuit breaker
W = Switchgear width.
D = Depth of circuit breaker.
u/l = Distance between bottom and top terminals.
l/g = Distance between bottom terminal and bearing surface of circuit breaker.
P = Horizontal center distance of poles.
(1) version only available with forced ventilation and assembled pole

Selection and ordering
Withdrawable circuit breakers

VD4 (36 kV) withdrawable circuit breaker

Ur	Isc	Rated thermal 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 circuit breaker.
D = Depth of circuit breaker.
W = Width of circuit breaker.
u/l = Distance between bottom and top terminals.
l/g = Distance between bottom terminal and bearing surface of circuit breaker.
P = Horizontal center distance of poles.
(1) 2500 A rated current guaranteed with forced ventilation and 79 mm diameter tulip contacts (TN 1VYN300901-RA)
2500 A without forced ventilation and 109 mm diameter tulip contacts TN 1VYN300901-RB available for UniGear ZS2 only.
(2) 3150 A rated current guaranteed with forced ventilation. Available for UniGear ZS2 only.

VD4 withdrawable circuit breaker in floor rolling version (40 kV)

Ur	Isc	Rated thermal current (40 °C) [A]	
kV	kA	H= 1575 W= 840 D= 685 u/l=328 l/g=900 P=280	Circuit breaker type
40	16	630A	VD4/P 40.06.16 p280
	20	630A	VD4/P 40.06.20 p280
	16	1250A	VD4/P 40.12.16 p280
	20	1250A	VD4/P 40.12.20 p280
	25	1250A	VD4/P 40.12.25 p280
	31.5	1250A	VD4/P 40.12.31 p280
	40	1250A	VD4/P 40.12.40 p280
	25	1600A	VD4/P 40.16.25 p280
	31.5	1600A	VD4/P 40.16.31 p280
	40	1600A	VD4/P 40.16.40 p280
	25	2000A	VD4/P 40.20.25 p280
	31.5	2000A	VD4/P 40.20.31 p280
	40	2000A	VD4/P 40.20.40 p280
	25	2500A	VD4/P 40.25.25 p280
	31.5	2500A	VD4/P 40.25.31 p280
	40	2500A	VD4/P 40.25.40 p280
	25	3150A	VD4/P 40.31.25 p280 (1)
	31.5	3150A	VD4/P 40.31.31 p280 (1)

H = Height of circuit breaker.
D = Depth of circuit breaker.
W = Width of circuit breaker.
u/l = Distance between bottom and top terminals.
l/g = Distance between bottom terminal and bearing surface of circuit breaker.
P = Horizontal center distance of poles
(1) Version only available with forced ventilation and assembled pole

Standard equipment of withdrawable circuit breakers for UniGear ZS1, ZS2, ZS3.2 switchgear and similar panels

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

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

  Note: three break contacts (signaling circuit breaker open) and four make contacts (signaling circuit breaker closed) are available with the group of ten auxiliary contacts supplied as standard and the maximum number of electrical applications.
- lever built into operating mechanism for linear loading of closing spring
- isolating contacts
- cord with connector (plug only) for auxiliary circuits, with striker pins which prevent the plug from being inserted into the socket if the rated current of the circuit breaker is lower than the rated current of the panel
- racking-out/in lever (the quantity depends on the number of apparatuses ordered)
- locking electromagnet in the truck (mandatory for ABB switchgear). This device prevents the circuit breaker from being racked into the switchgear when the auxiliary circuits are not connected (plug not in in the socket)
- door interlock (mandatory for ABB switchgear). This device prevents the circuit breaker from being racked into the switchgear when the switchgear door is open.

VD4 with poles in polyamide

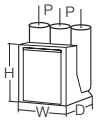
VD4 - 36 kV

VD4 - up to 24 kV

VD4 - 36/40 kV in floor rolling version

Selection and ordering
Withdrawable circuit breakers

Withdrawable circuit breakers for PowerCube modules (12 kV) ([5])

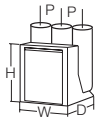
Circuit breaker		**VD4/P 12**		**VD4/W 12 ([6])**			
	PowerCube module	**PB1**		**PB2**			
Standards	IEC 62271-100	•		•			
Rated voltage	Ur [kV]	12 ([4])		12			
Rated insulation voltage	Us [kV]	12		12			
Withstand voltage at 50 Hz	Ud (1 min) [kV]	28		28			
Impulse withstand voltage	Up [kV]	75		75			
Rated frequency	fr [Hz]	50-60		50-60			
Rated thermal current (40 °C) ([1])	Ir [A]	630	1250	630	1250	1250	1250
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	16	16	16	16	–	–
		20	20	20	20	–	–
		25	25	25	25	–	–
		31.5	31.5	31.5	31.5	–	–
		–	–	–	–	40	–
		–	–	–	–	–	50
Admissible 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	33 ... 60	33 ... 60	33 ... 60	33 ... 60
Arcing time	[ms]	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
Total breaking time	[ms]	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75
Closing time	[ms]	30 ... 60	30 ... 60	30 ... 60	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 center distance P [mm]	150	150	210	210	210	210
Weight	[kg]	116	116	135	135	174	180
Standardized dimensions table	TN	7412 ([3])	7412 ([3])	7420 ([3])	7420 ([3])	–	–
	1VCD	–	–	–	–	601243 ([3])	003444
Operating temperature	[°C]	- 5 ... + 40		- 5 ... + 40			
Tropicalization	IEC: 60068-2-30, 60721-2-1	•		•			
Electromagnetic compatibility	IEC: 62271-1	•		•			

VD4/P 12							VD4/W 12	
PB2					PB3		PB3	
•					•		•	
12 (4)					12 (4)		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	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60
10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75
30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	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 (3)	–	–	7415 (3)	–	7417 (3)	–	–	–
–	003284 (3)	003444	–	003444	–	003445	000152 (3)	003596
- 5 ... + 40					- 5 ... + 40		- 5 ... + 40	
•					•		•	
•					•		•	

(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
(4) Available in 10 kV voltage version to GOST standards
(5) On request, the closing spring can be loaded by means of a removable crank handle outside the operating mechanism(instead of linear loading, only possible with the door open, by means of a lever built into the front of the operating mechanism).
(6) VD4/W does not need insulation for the feed-through and tulip contacts in module PB2. On request, the same circuit breaker with insulated feed-through and tulip contacts is available for installation in enclosures not produced by ABB (version VD4/PW)

Selection and ordering
Withdrawable circuit breakers

Withdrawable circuit breakers for PowerCube modules (17.5 kV) (4)

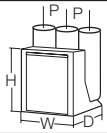
Circuit breaker		VD4/P 17		VD4/W 17 (5)			
	PowerCube module	PB1		PB2			
Standards	IEC 62271-100	•		•			
Rated voltage	Ur [kV]	17.5		17.5			
Rated insulation voltage	Us [kV]	17.5		17.5			
Withstand voltage at 50 Hz	Ud (1 min) [kV]	38		38			
Impulse withstand voltage	Up [kV]	95		95			
Rated frequency	fr [Hz]	50-60		50-60			
Rated thermal current (40 °C) (1)	Ir [A]	630	1250	630	1250	1250	1250
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	16	16	16	16	–	–
		20	20	20	20	–	–
		25	25	25	25	–	–
		31.5	31.5	31.5	31.5	–	–
		–	–	–	–	40	–
		–	–	–	–	–	50
Admissible 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	33 ... 60	33 ... 60	33 ... 60	33 ... 60
Arcing time	[ms]	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
Total breaking time	[ms]	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75
Closing time	[ms]	30 ... 60	30 ... 60	30 ... 60	30 ... 60	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 center distance P [mm]	150	150	210	210	210	210
Weight	[kg]	116	116	135	135	174	180
Standardized dimensions table	TN	7412 (3)	7412 (3)	7420 (3)	7420 (3)	–	–
	1VCD	–	–	–	–	601243 (3)	003444
Operating temperature	[°C]	- 5 ... + 40		- 5 ... + 40			
Tropicalization	IEC: 60068-2-30, 60721-2-1	•		•			
Electromagnetic compatibility	IEC: 62271-1	•		•			

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	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60
10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75
30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	30 ... 60	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 (3)	–	–	7415 (3)	–	7417 (3)	–	–	–
–	003284 (3)	003444	–	003444	–	003445	000152 (3)	003596
- 5 ... + 40					- 5 ... + 40		- 5 ... + 40	
•					•		•	
•					•		•	

(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.
(4) On request, the closing spring can be loaded by means of a removable crank handle outside the operating mechanism (instead of linear loading, only possible with the door open, by means of a lever built into the front of the operating mechanism).
(5) VD4/W does not need insulation for the feed-through and tulip contacts in module PB2. On request, the same circuit breaker with insulated feed-through and tulip contacts is available for installation in enclosures not produced by ABB (version VD4/PW).

Selection and ordering
Withdrawable circuit breakers

Withdrawable circuit breakers for PowerCube modules (24 kV) ([4])

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 thermal current (40 °C) ([1])	Ir [A]	630	1250	1600	2000	2500 ([2])
Rated breaking capacity (rated symmetrical short-circuit current)	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
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
Making capacity	Ip [kA]	40	40	40	40	40
		50	50	50	50	50
		63	63	63	63	63
		–	80	80	80	80
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•
Opening time	[ms]	33 ... 60	33 ... 60	33 ... 60	33 ... 60	33 ... 60
Arcing time	[ms]	10 ... 15	10 ... 15	10 ... 15	10 ... 15	10 ... 15
Total breaking time	[ms]	43 ... 75	43 ... 75	43 ... 75	43 ... 75	43 ... 75
Closing time	[ms]	30 ... 60	30 ... 60	30 ... 60	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 center distance P [mm]	210	210	275	275	275
Weight	[kg]	140	140/146 ([3])	228	228	228
Standardized dimensions table	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 uninterrupted current guaranteed with forced ventilation.
([3]) 31.5 kA version.
([4]) On request, the closing spring can be loaded by means of a removable crank handle outside the operating mechanism (instead of linear loading, only possible with the door open, by means of a lever built into the front of the operating mechanism).

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Selection and ordering
Withdrawable circuit breakers

Types of withdrawable circuit breakers available for PowerCube modules

Complete the circuit breaker selected with the optional accessories indicated on the following pages.

VD4 (12 kV) withdrawable circuit breaker

Ur	Isc	Rated thermal current (40 °C) [A]				Circuit breaker type
		W=650	W=750	W=750	W=1000	
		P=150	P=210	P=210	P=275	
kV	kA	u/l=205	u/l=310	u/l=310	u/l=310	
		ø=35	ø=35	ø=79	ø=109	
	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/W 12.12.40 p210
	40			1250		VD4/P 12.12.40 p210
	50			1250		VD4/P 12.12.50 p210
12	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 (1)	VD4/W 12.32.20 p275
	25				3150 (1)	VD4/W 12.32.25 p275
	31,5				3150 (1)	VD4/W 12.32.32 p275
	40				3150 (1)	VD4/W 12.32.40 p275
	50				3150 (1)	VD4/W 12.32.50 p275

W = Enclosure width.
P = Horizontal center distance of poles.
u/l = Distance between bottom and top terminal.
ø = Diameter of isolating contact.
(1) Up to 4000 A with forced ventilation.

VD4 (17.5 kV) withdrawable circuit breaker

Ur	Isc	Rated thermal current (40 °C) [A]				
		W=650	W=750	W=750	W=1000	
		P=150	P=210	P=210	P=275	
kV	kA	u/l=205	u/l=310	u/l=310	u/l=310	Circuit breaker type
		ø=35	ø=35	ø=79	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 = Enclosure width.
P = Horizontal center distance of poles.
u/l = Distance between bottom and top terminals.
ø = Diameter of isolating contact.
(1) Up to 4000 A with forced ventilation.

Selection and ordering
Withdrawable circuit breakers

VD4 (24 kV) withdrawable circuit breaker

Ur	Isc	Rated thermal current (40 °C) [A]		
		W=800	W=1000	
kV	kA	P=210	P=275	Circuit breaker type
		u/l=310	u/l=310	
		ø=35	ø=79	
	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
24	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

W = Enclosure width.
P = Horizontal center distance of poles.
u/l = Distance between bottom and top terminals.
ø = Diameter of isolating contact.
(1) Up to 2500 A rated current guaranteed with forced ventilation.

Standard equipment of withdrawable circuit breakers for PowerCube modules

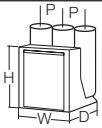
The basic versions of the withdrawable circuit breakers are always three-pole and equipped with:

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

  Note: three break contacts (signaling circuit breaker open) and four make contacts (signaling circuit breaker closed) are available with the group of ten auxiliary contacts supplied as standard and the maximum number of electrical applications.
- lever built into the operating mechanism for linear loading of closing spring
- isolating contacts
- cord with connector (plug only) for auxiliary circuits, with striker pins which prevent the plug from being inserted into the socket if the rated current of the circuit breaker is different from the rated current of the switchgear
- racking-in/out lever (the quantity depends on the number of apparatuses ordered)
- locking electromagnet in the truck. This prevents the circuit breaker from being racked into the switchgear when the auxiliary circuits are not connected (plug not in in the socket).
- door interlock (mandatory for ABB switchgear); this device prevents the circuit breaker from being racked into the switchgear when the switchgear door is open.

Selection and ordering
Withdrawable circuit breakers

Withdrawable circuit breakers for ZS8.4 switchgear (12 - 17.5 - 24 kV)

Circuit breaker		VD4/Z8					
	Panel without partitions	•	•	•	•	•	•
	Panel with partitions	–	–	–	–	–	–
	Preussen Elektra - EON (2)	–	–	–	–	–	–
	Width [mm]	650	650	650	650	800	800
	Depth [mm]	1000	1000	1000	1000	1200	1200
Standards	IEC 62271-100	•					
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 thermal current (40 °C) (1)	Ir [A]	630	1250	630	1250	630	1250
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	–	–	–	–	16	16
		20	20	20	20	20	20
		25	25	25	25	25	25
Admissible rated short-time withstand current(3 s)	Ik [kA]	–	–	–	–	16	16
		20	20	20	20	20	20
		25	25	25	25	25	25
Making capacity	Ip [kA]	–	–	–	–	40	40
		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	33...60	33...60	33...60	33...60	33...60
Arcing time	[ms]	10...15	10...15	10...15	10...15	10...15	10...15
Total breaking time	[ms]	43...75	43...75	43...75	43...75	43...75	43...75
Closing time	[ms]	30...60	30...60	30...60	30...60	30...60	30...60
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 center distance P [mm]	150	150	150	150	210	210
Weight	[kg]	116	116	116	116	140	140
Standardized dimensions table	1VCD	000092	000137	000137	000137	000089	000138
Operating temperature	[°C]	– 5 ... + 40					
Tropicalization	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 air temperature.
(2) Special type with device for loading the closing spring by means of a crank 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	33...60	33...60	33...60	33...60	33...60	33...60	33...60	33...60	33...60
10...15	10...15	10...15	10...15	10...15	10...15	10...15	10...15	10...15	10...15
43...75	43...75	43...75	43...75	43...75	43...75	43...75	43...75	43...75	43...75
30...60	30...60	30...60	30...60	30...60	30...60	30...60	30...60	30...60	30...60
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			
•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•	•

Selection and ordering
Withdrawable circuit breakers

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

Ur	Isc	Rated uninterrupted current (40°C) [A]						Circuit breaker type
		Panel without partition		Panel with partition		Special EON panel		
		W = 650	W = 800	W = 650	W = 800	W = 650	W = 800	
kV	kA	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 = Switchgear width.
P = Horizontal center distance of poles.
u/l = Distance between bottom and top terminals.
Ø = Diameter of isolating contact.

Standard equipment of withdrawable circuit breakers for ZS8.4 switchgear

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

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

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

- lever built into the operating mechanism for linear loading of closing spring for VD4/Z8 and VD4/ZT8, external with crank operation for VD4/ZS8
- racking in/out lever (the quantity depends on the number of apparatuses ordered)

VD4/ZS8

- device for loading the closing springs with the door closed, by means of a removable crank handle outside the operating mechanism and the switchgear
- Harting 64-pin socket with mechanical interlock which prevents the circuit breaker from being moved when the plug is not in in the socket
- door interlock, which prevents the spring loading lever from being inserted when the circuit breaker is closed
- door interlock and Harting 64-pin socket, which prevent the door from closing when the plug is not in in the socket.

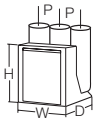
VD4/Z8 - VD4/ZT8

- Harting 64-pin socket with mechanical interlock which prevents the circuit breaker from being moved when the plug is not in in the socket.

Key
1) Device with crank handle for loading closing spring (only version VD4/ZS8)
2) Harting 64 plus socket with mechanical interlock which prevents circuit breaker from being moved when socket is not inserted
3) Interlock that prevents door from closing if plug is not in socket (only version VD4/ZS8))

Selection and ordering
Withdrawable circuit breakers

General characteristics of withdrawable circuit breakers for UniSec switchgear (units WBC and WBS)

Circuit breaker		VD4/P 12		VD4/P 17		VD4/SEC
Standards	IEC 62271-100	•		•		•
Rated voltage	Ur [kV]	12		17.5		24
Rated insulation voltage	Us [kV]	12		17.5		24
Withstand voltage at 50 Hz	Ud (1 min) [kV]	28		38		50
Impulse withstand voltage	Up [kV]	75		95		125
Rated frequency	fr [Hz]	50-60		50-60		50-60
Rated thermal current (40 °C) (1)	Ir [A]	630	1250	630	1250	630 - 1250
Rated breaking capacity (rated symmetrical short-circuit current)	Isc [kA]	16	16	16	16	16
		20	20	20	20	20
		25	25	25	25	25
Admissible rated short-time withstand current (3 s)	Ik [kA]	16	16	16	16	16
		20	20	20	20	20
		25	25	25	25	25
Making capacity	Ip [kA]	40	40	40	40	40
		50	50	50	50	50
		63	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]	628	628	632	632	743
	W [mm]	503	503	503	503	653
	D [mm]	662	662	664	664	742
	Pole center distance P [mm]	150	150	150	150	210
Weight	[kg]	116	116	116	116	133
Standardized dimensions table	1VCD	7412 (2)	7412 (2)	7412 (2)	7412 (2)	000190
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 withdrawable circuit breaker installed in switchgear with 40 °C ambient temperature.
(2) Poles in polyamide.

Withdrawable circuit breaker for UniSec switchgear

Ur	Isc	Rated uninterrupted current (40 °C) [A]			Circuit breaker type
		P=150	P=150	P=210	
kV	kA	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 = Horizontal center distance between poles.
u/l = Distance between top and bottom terminals.
Ø = Diameter of isolating contacts.

Standard equipment of withdrawable circuit breakers for UniSec switchgear

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

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

  Note: three break contacts (signaling circuit breaker open) and four make contacts (signaling circuit breaker closed) are available with the group of ten auxiliary contacts supplied as standard and the maximum number of electrical applications.
- lever built into the operating mechanism for linear loading of closing spring
- isolating contacts
- cord with connector (plug only) for auxiliary circuits, with striker pins which prevent the plug from being inserted into the socket if the rated current of the circuit breaker is different from the rated current of the switchgear
- racking-in/out lever (the quantity depends on apparatuses ordered)

Selection and ordering
Optional accessories

For circuit breakers up to 36 kV, 50 kA with EL operating mechanism
Accessories with the same number are alternative to each other.

1 Shunt opening release (-MBO1)
Allows the opening command of the apparatus to be enabled by remote control.
This release is suitable for both instantaneous and permanent duty. However, there is always an auxiliary contact, -BGB1, that de-energizes it after the 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)

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 supplied 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, there is always an auxiliary contact, -BGB1, that 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.

(*) 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 self-consumption current 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 up to 100 mA.
A simple resistor can be sized for the purpose, depending on the parameters of the TCS and the auxiliary voltage range used.
For further details consult the Guidelines for use of the Smart Coil 1VCD601416

3 Opening solenoid (-MBO3)

The opening solenoid (-MBO3) is a special demagnetization release to be used in conjunction with an overcurrent protection relay of the self-supplied type.
It is situated in the operating mechanism (in the left side) and is not an alternative to the additional shunt opening release **(-MBO2).**
It is not available for 40 and 50 kA circuit breakers.
Should this accessory be required, specify at the time of order since it cannot be installed later on by the customer.
Note: ask ABB for info for use in conjunction with the protection relay.

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

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

4 Shunt closing release (-MBC)

Allows the 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	1.5 mA
Closing time	30...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 up to 100 mA.
A simple resistor can be sized for the purpose, depending on the parameters of the TCS and the auxiliary voltage range used.
For further details, consult the Guidelines for use of the Smart Coil 1VCD601416

Selection and ordering
Optional accessories

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) and 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 undervoltage 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
Insulation voltage	2000 V 50 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 12..17.5 kV circuit breakers 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.

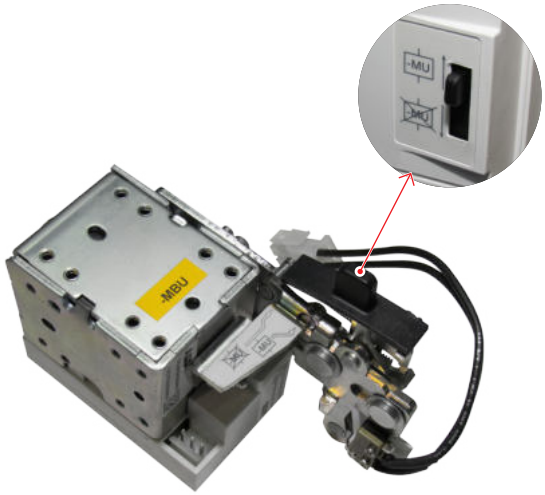
5C Electronic time-lag device (-KFT)

The electronic time-lag device must be installed outside the circuit breaker. It allows release tripping to be delayed by preset and adjustable times.
Use of the undervoltage release is recommended for the purpose of preventing trips when the power supply network of the release may be subject to interruptions or voltage drops of short duration.
If it is not being energized, circuit breaker closing is inhibited.
The time-lag device must be used in conjunction with an undervoltage release for d.c.
The voltage of the undervoltage release must be within the operating range of the electronic time-lag device.

Characteristics of the time-lag 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-lag device):	0.5-1-1.5-2-3 s

6 Mechanical override of the undervoltage release

This is a mechanical device which allows the undervoltage release trip to be temporarily excluded.
It is always equipped with electrical signaling.
If this accessory is required, it must be specified at the time of order since it cannot be installed later on by the customer.



Selection and ordering
Optional accessories

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

Electrical signaling of circuit breaker open/closed can be obtained with a group of 10, 16, 20 or 24 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 signaling circuit breaker open and five opening contacts “b” for signaling circuit breaker closed;
- for withdrawable circuit breakers: three closing contacts “a” for signaling 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 at 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 the auxiliary contacts more easily and fit the auxiliary contact unit back into its housing;
- auxiliary contacts already wired to the terminal box (see photo at 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 VDE 0110, Group C	660 V AC 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 mm²

Electrical characteristics (according to IEC 60947)		
Rated current Un		Breaking capacity (10000 interruptions)
220 V AC	Cosφ = 0.70	20 A
220 V AC	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 voltage Un	Breaking capacity
24 V DC 20 ms	18.8 mA
60 V DC 20 ms	7.4 mA
110 V DC 20 ms	4.2 mA
250 V DC 20 ms	1.8 mA

(*) For application at 24 V DC and with currents lower than 2,5 mA golden contacts are recommended.

8 Transient contact (-BGB4)

This contact closes momentarily (duration > 30 ms) upon circuit breaker opening controlled remotely with a shunt opening release.
The indication is not provided when opening is manual and local. In this case, a contact (–BGB11) is activated by the manual pushbutton and cuts off the transient contact closing signal (–BGB4).
The transient contact is activated directly from the main operating shaft, thus the indication is provided only on actual opening of the main circuit breaker contacts.

Selection and ordering
Optional accessories

9 Position contact (-BGT3)
This contact is used, together with the locking magnet in the operating mechanism **(-RLE1)**, to prevent remote closing as the circuit breaker is racked into the compartment.
It is only supplied for withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube modules.
It cannot be supplied when transmitted contacts in the truck are requested **(-BGT1; -BGT2)**.

10 Transmitted contacts (*) in the truck (-BGT1; -BGT2)
Transmitted contacts of withdrawable circuit breakers (installed in the circuit breaker truck - only for VD4/P withdrawable circuit breakers). These contacts are either in addition or alternatives to the position contacts (for signaling circuit breaker racked out). They also act as position contacts **(-BGT3)**.

(*) For application at 24 V DC and with currents lower than 10 mA golden contacts are recommended.

11 Motor operator (-MAS)

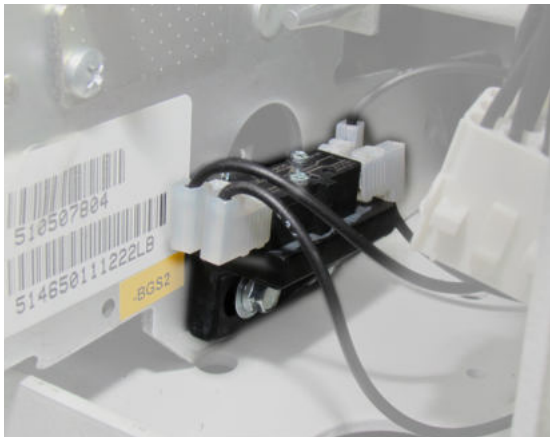
Automatically loads the closing springs of the circuit breaker operating mechanism. After circuit breaker closing, the geared motor immediately reloads the closing springs.
If there is a power cut or during maintenance work, the closing spring can be loaded in the manual mode (by means of the special crank handle built into 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	
Inrush power (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
Loading time	6-7 s	6-7 s
Insulation voltage	2000 V 50 Hz (for 1 min)	2000 V 50 Hz (for 1 min)

12 Contact for signaling closing spring loaded/ discharged (-BGS2)

Consists of a microswitch which allows the state of the closing spring of the circuit breaker operating mechanism to be remotely signaled.
The following signals are possible:
- contact open: spring loaded signal
- contact closed: spring discharged signal.

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



Selection and ordering
Optional accessories

Protections and locks

Various mechanical and electromechanical locking and protection devices are available.

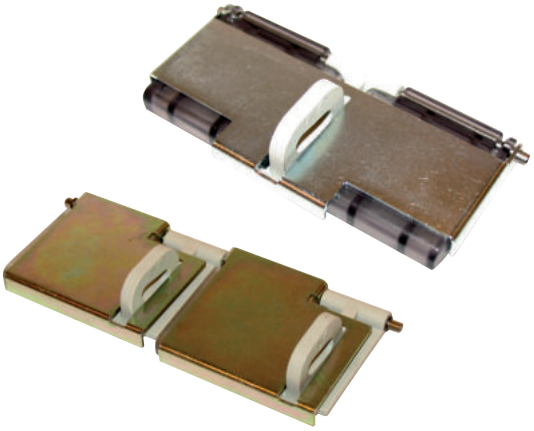
13 Opening and closing pushbutton protection
The protection only allows the opening and closing pushbuttons to be operated using a special tool.

14 Opening and closing pushbutton padlock
The device allows the opening and closing pushbuttons to be locked using up to three ø 4 mm diameter padlocks (not supplied).
The padlock 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 closing by remote control; lock 14B does not prevent closing by remote control.

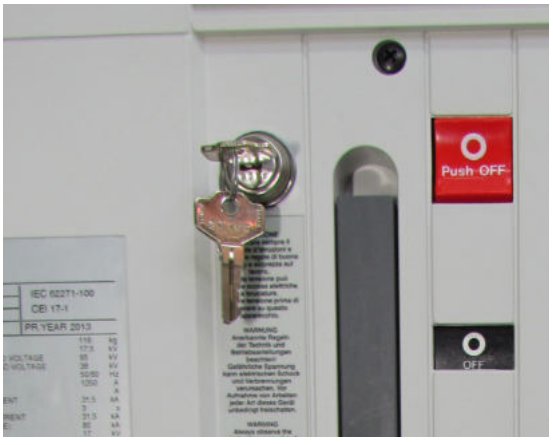


15 Key lock in open position

The lock is activated by a special circular lock. Different keys (for a single circuit breaker), or the same keys (for several circuit breakers) are available.
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, thereby preventing local manual closing and remote electrical closing.
Different keys(for the same breaker) or same keys (for different breakers) are available.

16 Locking magnet on the operating mechanism (-RLE1)

Only allows the command to be activated when the electromagnet is energized.
The locking electromagnet in the operating mechanism has the same electrical characteristics as shunt closing release -MBC.

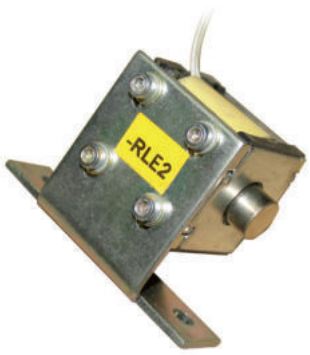


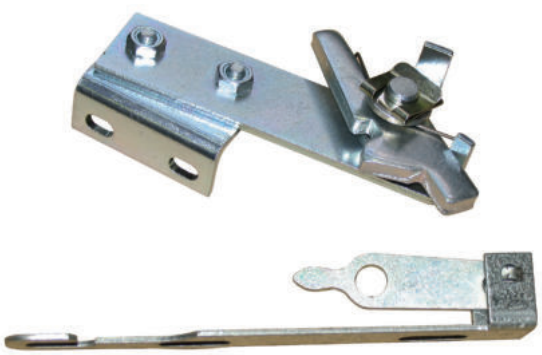
Selection and ordering
Optional accessories

17 Locking magnet on the truck (-RLE2)
Mandatory accessory for withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube modules. Prevents the circuit breaker from racking into the switchgear when the auxiliary circuit plug is disconnected.
The plug also acts as an anti-insertion lock if the rated current is different. Special striker pins prevent the plug from being inserted into 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
Inrush power (Pn)	DC 250 W; AC = 250 VA
Continuous power (Pc)	DC = 5 W; AC = 5 VA
Inrush duration	150 ms
Insulation voltage	2000 V 50 Hz (for 1 min)

18 Interlock for fixed circuit breakers
Device for fixed circuit breakers which have been converted into withdrawable ones by the customer. It allows a mechanical lock to be created by the customer to prevent racking-out/in with the circuit breaker closed and prevents circuit breaker closing while moving.
Note: The device must be requested when ordering since it must be assembled and tested in the factory.



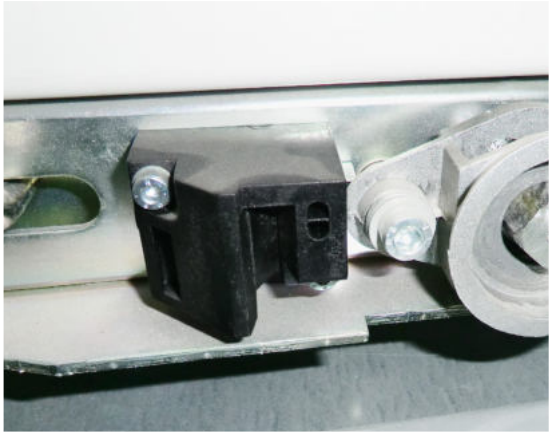


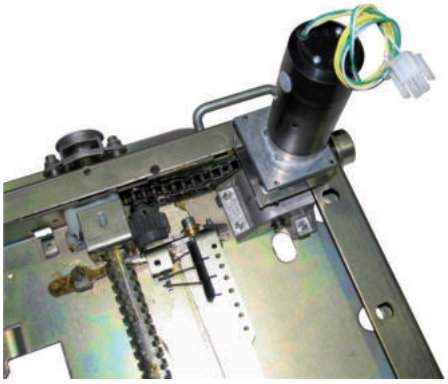
19 Mechanical interlock with door
This device prevents the circuit breaker from being racked-in when the switchgear door is open. It is only provided for circuit breakers used in UniGear ZS1 switchgear and PowerCube modules equipped with a special actuator on the door.
It is not available for circuit breakers with motor-driven truck (-MAT).

20 Motor-driven truck (-MAT)
Allows the circuit breaker to be remotely racked-in and out of the switchgear (only for withdrawable circuit breakers for UniGear ZS1 and ZS8.4 switchgear and PowerCube modules).
The motor-driven version with clutch can be ordered on request. It enables the circuit breaker to be racked-in/out in an emergency if the truck motor fails to operate.

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

It is also possible to order the magnetothermic micro circuit breaker protect the motor from over current and temperature. Provided as loose part.





Selection and ordering
Optional accessories

21 STU Shunt Test Unit
Device which monitors the functionality and continuity of opening/closing shunt releases. Owing to their particular construction, checking the functionality of closing (-MBC) and opening (-MBO1, -MBO2) shunt releases cannot be performed by 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 monitor the functionality of these releases is the STU device. Please contact us if this function must be provided by devices other than STU.
The STU Shunt Test Unit can be used in conjunction with the shunt opening release **(-MBO1; -MBO2)** or shunt closing release **(-MBC)** to check their functionality and continuity.
The Shunt Test Unit allows the continuity of releases with rated operating voltage between 24 V and 250 V (AC and DC) to be monitored, as well as the functionality of the electronic circuit of the release.
Continuity is monitored cyclically with intervals of 20 seconds between one test and the next.
The unit has optical signals with LEDs on the front. The following information is given:
- POWER ON: power supply present
- (-MO) TESTING: test in progress
- 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 the unit and allow the following two events to be remotely signaled:
- failure of a test (with automatic reset when alarm ceases)
- failure of three tests (resetting can only be obtained by means of the manual - RESET – from the front of the unit).

There is also a manual - RESET – key 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 Extension cord for 58 pins plug
The extension cord with 58 pins available in two lengths 1.5m and 3m, in addition to the standard plug.

For circuit breakers up to 40.5 kV, 40 kA with Classic operating mechanism

Accessories with the same number are alternatives to each other.

1 Shunt opening release -MO1 (-Y2)

The shunt opening release allows the apparatus to be opened by remote control.
An auxiliary contact -BB2 (-S4) always de-energizes it after opening.

Characteristics	
Ua: 24 - 30 - 48 - 60 - 110 - 125 - 220 - 240 V-	
Ua: 100 - 110 - 125 - 220 - 230 - 240 V ~ 50 … 60 Hz	
Service tolerances:	DC 70 … 110% Ua
	AC 85 … 110% Ua
Short-term power consumption:	approx. DC 250 W; approx. AC 250 VA
Admissible maximum operating time:	8 s

2 Additional shunt opening release -MO2 (-Y9)

The additional shunt opening release has the same function as shunt opening release -MO1 (-YO2).
The additional shunt opening release is available on request and requires use of auxiliary contact -BB1 (-S3), which is part of the standard equipment.

Characteristics	
Ua: 24 - 30 - 48 - 60 - 110 - 125 - 220 - 240 V-	
Ua: 100 - 110 - 125 - 220 - 230 - 240 V ~ 50 … 60 Hz	
Service tolerances:	DC 70 … 110% Ua
	AC 85 … 110% Ua
Short-term power consumption:	approx. DC 250 W; approx. AC 250 VA
Admissible maximum operating time:	8 s

Selection and ordering
Optional accessories

3 Shunt closing release -MC (-Y3)

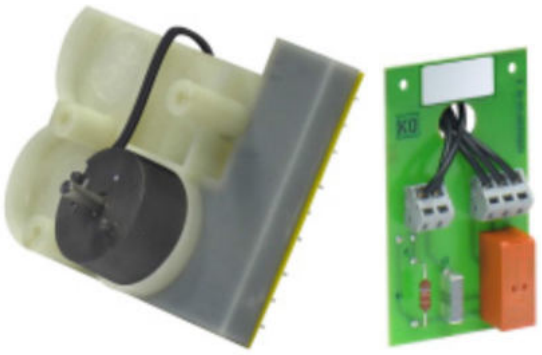
The shunt closing release allows the circuit breaker to be closed by remote control.
Auxiliary contact -BS1 (-S1) cuts off the power supplied to the release after the closing springs have been loaded, while auxiliary contact -BB1 (-S3) cuts off the power supplied to the release after the circuit breaker has closed.
Both are required and are part of the standard equipment.
The shunt closing release is optional in circuit breakers with manual opening mechanisms but mandatory for circuit breakers with motor-operated drives.
Application of the shunt closing release includes anti-pumping relay -K0.
The permanently supplied release provides the electrical anti-pumping function with both electrical opening and re-closing commands maintained.
Circuit breaker closing is only re-enabled once the active closing command has been interrupted.

Characteristics	
Ua: 24 - 30 - 48 - 60 - 110 - 125 - 220 - 240 V-	
Ua: 100 - 110 - 125 - 220 - 230 - 240 V ~ 50 ... 60 Hz	
Service tolerances:	DC 70 ... 110% Ua
	AC 70 ... 110% Ua
Short-term power consumption:	approx. DC 250 W; approx. AC 250 VA
Admissible maximum operating time:	8 s

4 Locking magnet on operating mechanism RL1 (-Y1) with auxiliary contacts -BL1 (-S2)

Only allows the operating mechanism to be activated when the electromagnet is energized.
To enable the circuit breaker to close, the locking magnet must be energized for at least 100 ms before the circuit breaker closing command.
Auxiliary contact -BL1 (-S2) is required and is part of the standard equipment.

Characteristics	
Ua: 24 - 30 - 48 - 60 - 110 - 125 - 220 - 240 V-	
Ua: 100 - 110 - 125 - 220 - 230 - 240 V ~ 50 ... 60 Hz	
Service tolerances:	DC 85 ... 110% Ua
	AC 85 ... 110% Ua
Short-term power consumption:	approx. DC 10 W; approx. AC 10 VA
Admissible maximum operating time:	unlimited



5 Undervoltage release -MU (-Y4)

The undervoltage release opens the circuit breaker when there is an appreciable drop or lack of the voltage that supplies it.
It trips when the auxiliary voltage is between 70% and 30% of its rated value.
The circuit breaker can only close again when the voltage reaches 85% of its rated value.
The undervoltage release trips instantaneously, but can also be accompanied by an electronic time-lag device.

Characteristics of the non-delayed version	
Ua: 24 - 30 - 48 - 60 - 110 - 125 - 220 V-	
Ua: 100 - 110 - 125 - 220 V ~ 50 … 60 Hz	
Power consumption:	approx. DC 10 W
	approx. AC 11 VA
Maximum service tolerance:	110% Ua
Voltage for readiness closing:	> 85% UN
Trip voltage:	30 … 70% Ua
Operating time:	immediate
Admissible maximum operating time:	none

5.1 Electronic time-lag device -KT (-RN3U)

Use of the delayed undervoltage release is useful for preventing trips when the supply network of the release may be subject to power cuts or brief voltage dips.
The voltage of the undervoltage release must be within the operating range of the electronic time-lag device (a coupler transformer must be connected in series for rated voltages other than 100-110 V AC).
The electronic time-lag device must be assembled externally in relation to the circuit breaker. It allows the tripping action of the release to be delayed on the basis of preset and adjustable time settings.

Characteristics	
Ua: 100 - 110 V ~ 50 … 60 Hz	
Power consumption:	approx. AC 10 VA
Service tolerances:	110% Ua
Voltage for readiness closing:	> 70% Ua
Trip voltage:	< 70% Ua
a) standard: operating time 0.5... 4 s, adjustable in 0.5 s steps	
b) when closing is performed by means of auxiliary contacts: operating time is 0.5... 2s, adjustable in 0.5s steps with suitable coil	
Admissible maximum operating time:	none

Selection and ordering
Optional accessories

6 Opening solenoid -MO3 (-Y7)

Use of the overcurrent release may be advisable in systems where the auxiliary voltage is unable to provide reliable continuity of service.
The release must receive the opening pulse on the basis of the current from the secondary winding of an intermediate current transformer or a delayed overvoltage relay.
During continuous service, the secondary winding of the MO3 is short-circuited by an auxiliary contact.

Characteristics	
Power consumption in continuous service mode:	connection to 2 phases 35 VA connection to 3 phases 2 VA
Trippping power consumption:	approx. 15 VA
Readiness tripping:	70% IN
Power consumption of intermediate current transformer at IN = 5 A and continuous operation (short-circuited secondary winding):	Winding A 1 VA Winding B 1 VA Winding C 1.5 VA
Power consumption of intermediate current transformer at IN = 5 A and continuous operation (open secondary winding):	Winding A 15 VA Winding B 15 VA Winding C 25 VA
Primary current of intermediate current transformer:	3 x 5
Secondary current of intermediate current transformer:	~ 0.4 A

7 Auxiliary contacts of circuit breaker -BS1, -BB1, -BB2, -BB3 (S1, S3, S4, S5)

The circuit breaker can be equipped with five-pole auxiliary contacts for monitoring, interlocking and signaling. Auxiliary contact -BB2 (-S4) is part of the basic equipment of all circuit breakers with motor-driven operating mechanisms.
Auxiliary contact -BB3 (-S5) is optional.
Also consult the circuit-diagram.

Characteristics	
Ua:	24 (*) ... 250 V
Test voltage:	2.5 kV
Rated current:	Ith^2 = 10 A

(*) For application at 24 V DC and with currents lower than 10 mA golden contacts are recommended.

8 Auxiliary contact for signaling effective opening -BB4 (-S7)

Auxiliary contact -BB4 (-S7), also known as transient contact, is part of the basic equipment of all circuit breakers.
It is used for signaling effective opening of the circuit breaker (the transient signal lasts 30ms).

Characteristics	
Ua:	24 (*) ... 250 V
Test voltage:	2.5 kV
Rated current:	Ith^2 = 10 A

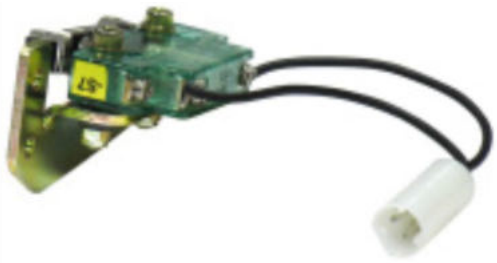
(*) For application at 24 V DC and with currents lower than 10 mA golden contacts are recommended.

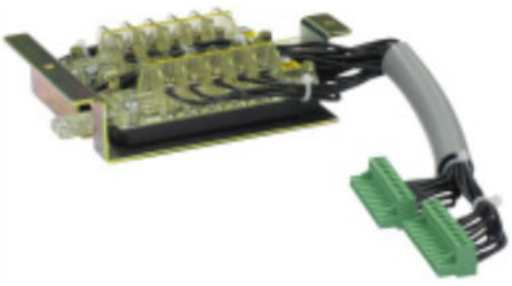
9 Transmitted contacts in truck -BT1, -BT2 (-S8, -S9)

The auxiliary contacts signal whether the circuit breaker is racked in or out.
In the intermediate position, the circuit breaker is mechanically interlocked.

Characteristics	
Ua:	24 (*) ... 250 V
Test voltage:	2.5 kV
Rated current:	Ith^2 = 10 A

(*) For application at 24 V DC and with currents lower than 10 mA golden contacts are recommended.





Selection and ordering
Optional accessories

10 Motor-operated drive -MS (-M0)

The spiral spring of circuit breakers with motor-operated drive is automatically loaded by an electric motor installed in the actual drive on the load side of each closing operation.

Characteristics	
Ua:	24 - 30 - 48 - 60 - 110 - 125 - 220 - 240 V-
Ua:	110 - 240 V ~ 50 ... 60 Hz
Loading time:	max. 15 s
Reloading time:	max. 15 s
Service tolerances:	85 ... 110% Ua
Power consumption during loading:	approx. DC 230 ... 260 W; approx. AC 260 VA
Weight:	1.5 kg

Fuse motor:

rated supply voltage	power consumption	Fuse motor (ABB-Stotz mcb)	loading time (maximum)
V	VA/W	A	S
AC 110	260	1.6 S 281 UC-K	10
220	260	0.75	10
240	260	0.75	10
DC 110	230	1.60	10
125	260	1.60	10
220	240	0.75	10
240	260	0.75	10
24			15
30			15
48			15
60			15

Properties of Gefeg motor	
Ua:	24 - 48 - 60 - 110 - 125 - 220 - 240 V-
Ua:	110 - 240 V ~ 50 ... 60 Hz
Loading time:	max. 15 s
Reloading time:	max. 15 s
Service tolerances:	85 ... 110% Ua
Power consumption during loading:	app. DC 130 ... 140 W; app. AC 150 – 170 VA
Weight:	1.5 kg

Fuse motor:

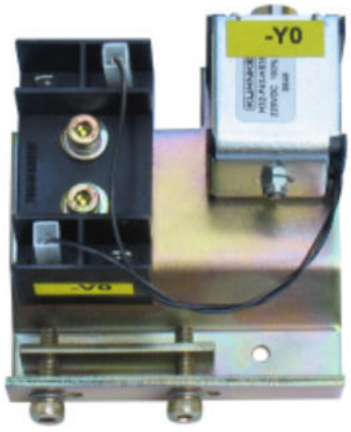
rated supply voltage	power consumption	Fuse motor (ABB-Stotz mcb)	loading time (maximum)
V	VA/W	A	S
AC 110	150	1.6 S 281 UC-K	15
220	150	0.75	15
240	170	0.75	15
DC 24	130	4.0 S 282 UC-K	15
48	130	3.00	15
60	130	2.00	15
110	140	1.00 / 1.60 *	10
125	160	1.00 / 1.60 *	15
220	140	0.75	15
240	150	0.75	15

* VD4 63 kA motor

11 Locking magnet on truck -RL2 (-Y0)

The locking magnet on the truck prevents circuit breaker travel in the absence of auxiliary voltage.

Characteristics	
Ua: 24 - 30 - 48 - 60 - 110 - 125 - 220 - 240 V-	
Ua: 100 - 110 - 125 - 220 - 230 - 240 V ~ 50 … 60 Hz	
Service tolerances:	DC; AC 85 … 110% Ua
Power consumption:	approx. DC 10 W; approx. AC 10 VA
Admissible maximum operating time:	unlimited



Specific product characteristics

Vibration resistance

VD4 circuit breakers are designed to provide high levels of resistance to stress caused by mechanical vibrations.
Many versions comply with the type-approval criteria of the major International Shipping Registers (DNV, Lloyd's Register, RINA) and the qualification criteria of the International Seismic Standards (IEEE 344, IEEE 323 and IEC 60980).
Please contact us if you wish to know which versions have been type-approved by the shipping registers.

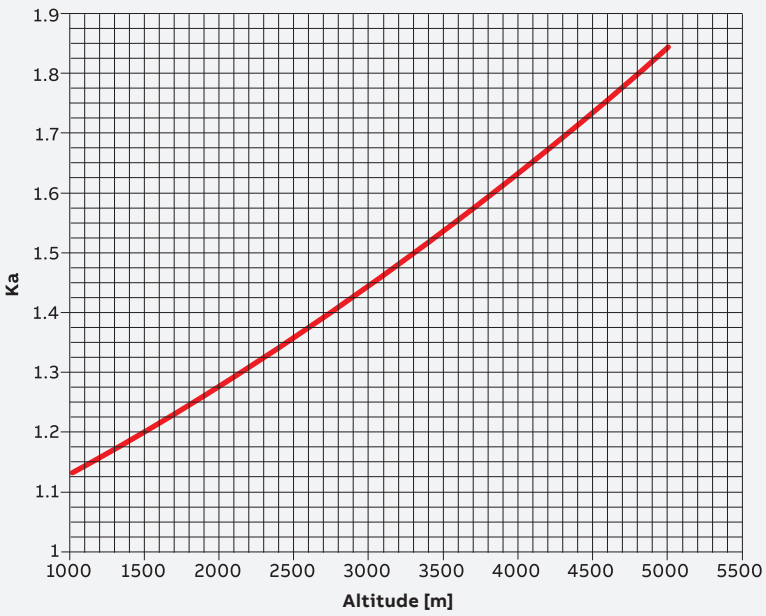
Tropicalization

VD4 circuit breakers are manufactured in compliance with the most stringent specifications concerning their use in hot-humid-saline climates.
All the more important metal parts are treated against corrosive substances in compliance with atmospheric **corrosivity class C5 of standard BS EN 12500.**
Galvanizing treatment is applied in accordance with ISO 2081 Standards, classification code Fe/Zn 12, thickness $12x10^{-6}$ m, protected by a conversion layer formed mainly by chromates in compliance with ISO 4520 Standards.

Altitude

The insulating property of air decreases as the altitude increases, therefore this must always be considered with regard to the external insulation of the apparatus (the internal insulation of the interrupters is not liable to change since it is guaranteed by the vacuum).
Altitude must always be taken into account when the insulating components of apparatus to be installed over 1000 m above sea level is designed. In these cases a correction coefficient must be applied. This can be found from the graph on the next page, which has been created on the basis of the indications in Standard IEC 62271-1.
The following example provides a clear interpretation of the indications given above.

Graph for determining the Ka correction factor according to altitude, Example (IEC):



Ka = $e^{mH/8150}$ with m=1
H = altitude in meters
m = value with reference to power frequency test voltage and lightning impulse withstand voltage as well as line-to-line voltage. Value defined for m = 1

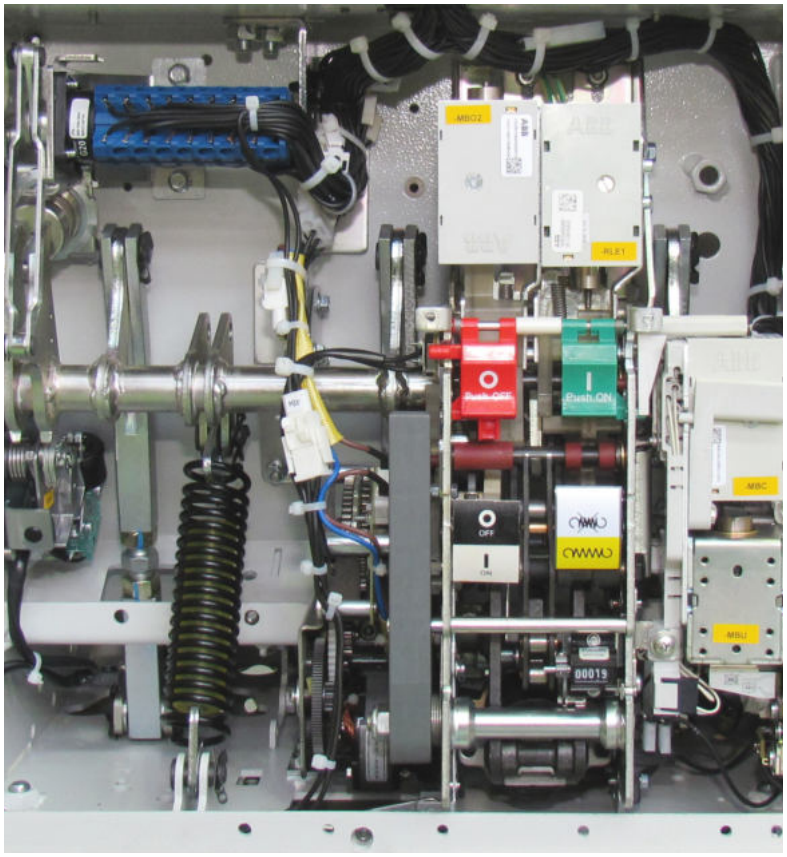
- Installation altitude: 2000 m
- Service at 7 kV rated voltage
- Power frequency withstand voltage 20 kV rms
- Impulse withstand voltage 60 kVp
- Ka Factor = 1.28 (see graph).

On the basis of the parameters above, the apparatus must ensure the following withstand values (test performed at zero altitude i.e. at sea level):

- power frequency withstand voltage equal to: 20 x 1.28 = 25.6 kVrms
- impulse withstand voltage equal to: 60 x 1.28 = 76.8 kVp.

It will be apparent from the above that apparatus with 17 kV rated voltage characterized by 38 kV rms power frequency insulation levels and 95 kVp impulse withstand voltage must be provided for installations at an altitude of 2000 m above sea level with 12 kV service voltage.

Specific product characteristics



Anti-pumping device

The EL operating mechanism of VD4 circuit breakers (in all versions) is equipped with a mechanical anti-pumping device which prevents re-closing due to both electrical and mechanical commands.
Should both the closing command and any one of the opening commands (local or remote) be active at the same time, there would be a continuous succession of opening and closing commands.
The anti-pumping device prevents this situation by ensuring that each closing operation is only followed by an opening operation and that there is no other closing operation after this. To obtain a further closing operation, the closing command must be released and then enabled again.
Furthermore, the anti-pumping device only allows the circuit breaker to be closed if the following conditions are present at the same time:

- operating mechanism spring fully loaded
- opening pushbutton and/or shunt opening release (-MBO1/-MBO2) not activated
- circuit breaker open.

REF 601 protection device

On request, the REF 601 switchgear protection device is available for protecting the installations. It requires an auxiliary power supply in order to operate, unlike the previous PR512 which was a self-supplied relay.
REF 601 has protections and trip curves that conform to IEC 255-3 Standards. It protects against overloads (51), against instantaneous and delayed short-circuits (50-51) and against instantaneous and delayed homopolar earth faults (50N and 51N). It also detects the second harmonic component to prevent unwarranted tripping when a transformer is switched-in (68).

The unit has 3 inputs from current sensors of the Rogowsky coil type and one input from an external ring-type CT. 4 rated currents can be set via the keyboard: 40, 80, 250 and 1250 A.
If the unit is connected to 3 current sensors, the 50N and 51N protection functions are obtained by means of the vectorial sum of the phase currents.
If only 2 current sensors are used, an external ring-type current transformer must be provided for functions 50N and 51N.
The external ring-type current transformer can have an openable or closed core and any transformation ratio so long as the secondary current is 1 A.
The ABB current sensors of the Rogowsky coil type provided for REF 601 are only suitable for installation on MV insulated cables.
The characteristics of the device are:

- trip precision
- broad adjustment ranges
- single and simultaneous adjustment of the three phases
- no limitation (due to the current sensors) to the rated breaking capacity or short-time withstand current of the circuit breaker
- pushbuttons for local electrical operation of the circuit breaker (opening and closing pushbutton
- 5 distinct indicators: “relay operating”, “relay in trip threshold”, “relay tripped”, “relay tripped due to phase current having been exceeded”, “relay tripped for earth fault current having been exceeded”
- interface consisting of an LCD display and “arrow”, “enter” and “esc” keys for facilitated navigation in the “measurement” menu, “data recording”, “event recording”, “settings”, “configuration” and “test” menus

- three user levels: “operator” (display only, with free access by keeping this key pressed for at least 5 sec.), “configurator” (same as the previous level) but also with authorization to set the protection parameters (i.e. times and thresholds), and communication if present (access limited by a password), “administrator” (same as the previous levels), but also with authorization to set the password and configure the basic settings of the device, such as the rated current (access limited by a password)
- continuous display of the current on the most highly loaded phase and of the earth current
- recording of the value of the currents which caused the device to trip
- storage of the number of openings carried out by the device
- event log (storage of the parameters described above in the last 5 trips of the device) in a non-volatile memory
- curves “ß = 1” or “ß = 5” and curve “RI” specifically designed for the Belgian market (only REF 601 IEC)
- circuit breaker opening by means of an undervoltage release (only REF 601 CEI)
- version, on request, with RS485 4-wire serial communication
- MODBUS RTU full duplex protocol
- multi-voltage feeder 24 … 240 V AC- DC
- REF 601 is also available in a version specifically designed for the Italian market to CEI 0-16 standards (see brochure entitled “Solutions for upgrading to CEI 0-16 standards”) , with 80 or 250 A rated current which can be selected via the keyboard. It is always supplied with 3 sensors for installation on insulated MV cable, a 40/1 A ring-type CT for homopolar protection and undervoltage release for the circuit breaker opening operation.

Environmental protection programme

VD4 circuit breakers are manufactured in accordance with the ISO 14000 Standards (Guidelines for environmental management).
The production processes are implemented in accordance with the environmental protection standards as to the reduction of energy consumption and the production of waste.
All this is achieved thanks to the environmental management system applied in the medium voltage apparatus manufacturing facility.
Assessment of the environmental impact during the life-cycle of the product obtained by reducing the overall energy consumption and use of raw materials to the minimum, is put into effect during the design engineering stage through an accurate choice of materials, processes and packaging.
This to allow the products and components to be recycled to the utmost degree at the end of their useful life.

Spare parts

- Shunt opening release
- Additional shunt opening release
- Undervoltage release
- Time-lag device for undervoltage release
- Shunt closing release
- Spring loading geared motor with electrical signaling of spring loaded
- Contact signaling geared motor protection circuit breaker open/closed
- Contact signaling closing spring loaded/ 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 signaling connected/isolated
- Opening solenoid
- Open position key lock
- Isolation interlock with door
- Protection for opening pushbutton
- Protection for closing pushbutton
- Locking electromagnet on withdrawable truck
- Set of six isolating contacts.

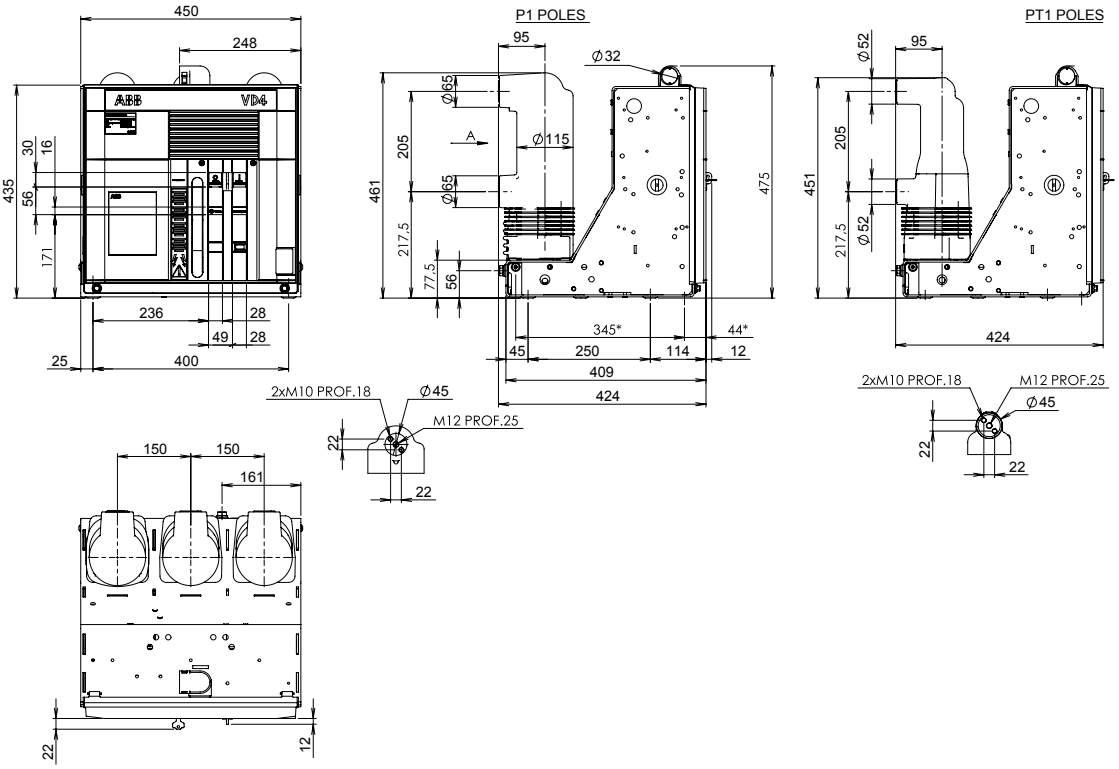
Ordering

For availability and to order spare parts, please contact our Service department, specifying the circuit breaker serial number.

Overall dimensions

Fixed circuit breakers

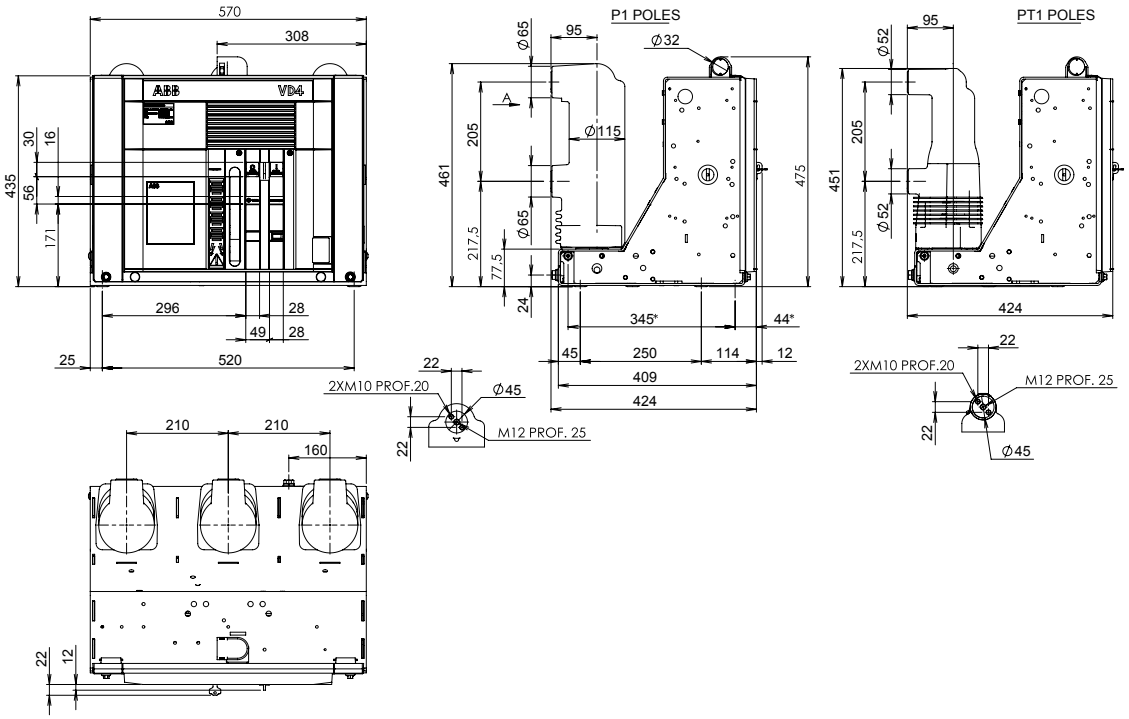
VD4		
TN	7405	
Ur	12	kV
	17.5	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA
	31.5	kA



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

Fixed circuit breakers

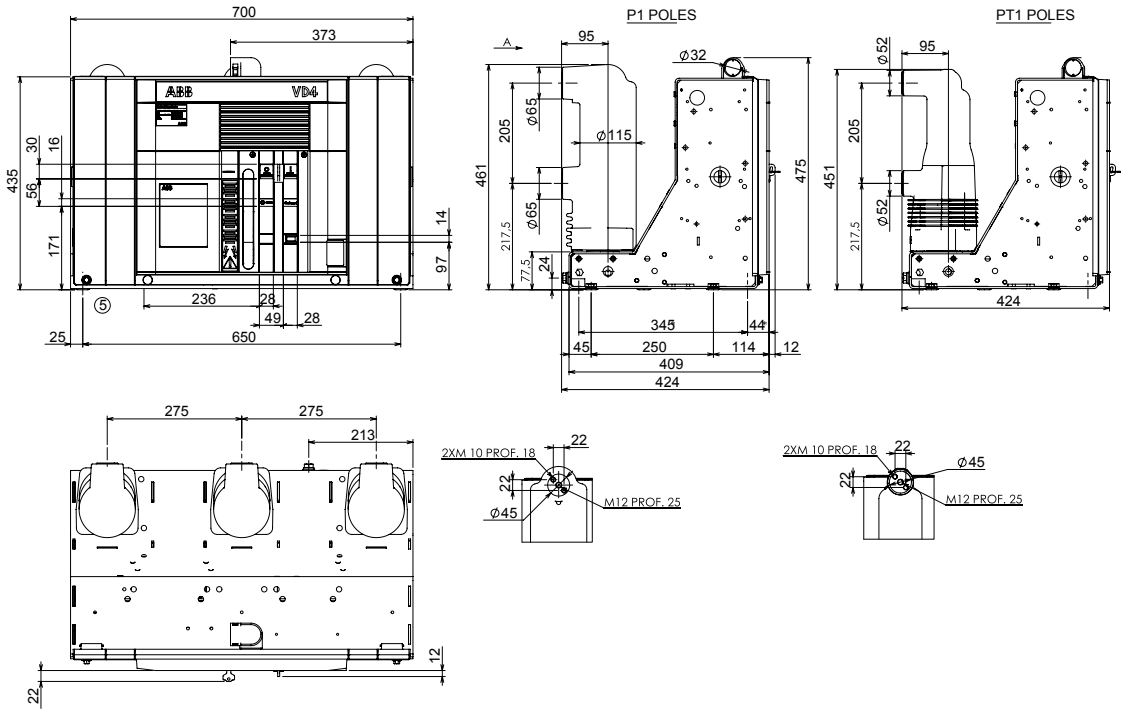
VD4		
TN	7406	
Ur	12	kV
	17.5	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA
	31.5	kA



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

Fixed circuit breakers

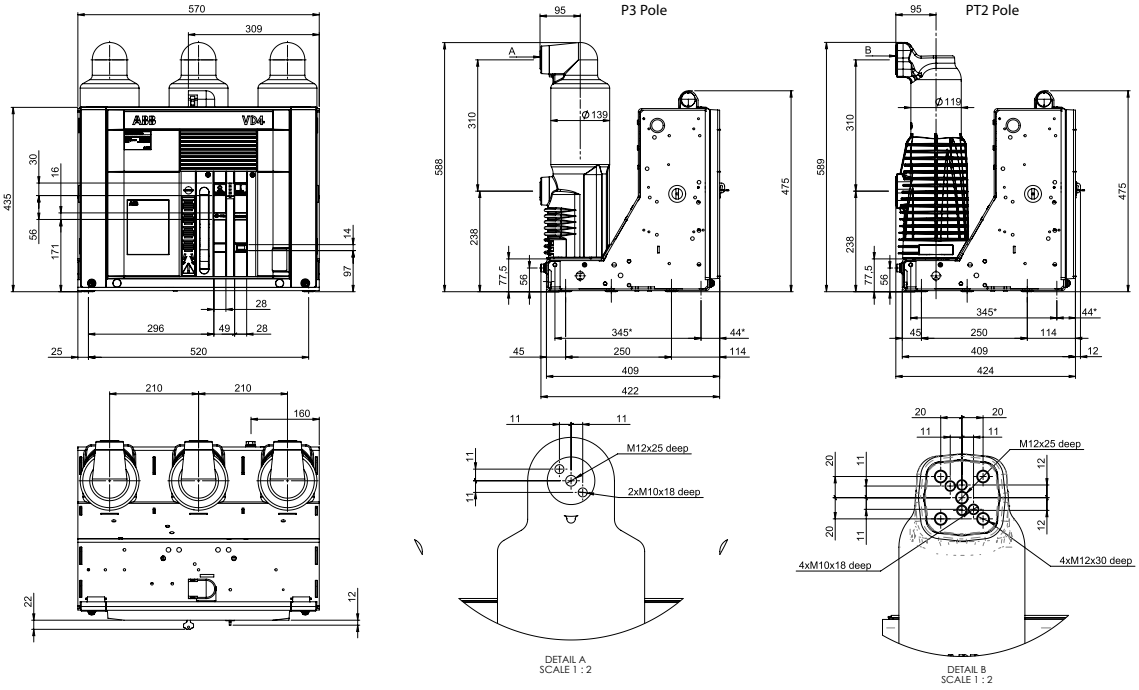
VD4		
TN	1VCD000051	
Ur	12	kV
	17.5	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA
	31.5	kA



(*) 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



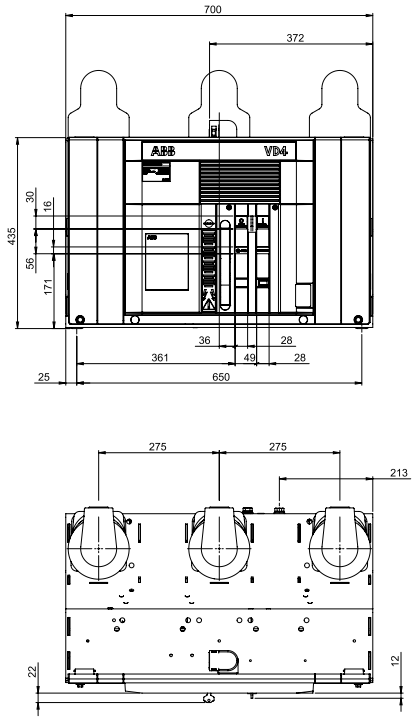
Type	Pole	Ur	Ir	Isc	Operating Mechanism	Version for
VD4 p210	P3	12-17.5 kV	1250A-1600A	40kA	EL	free standing installation
VD4 p210	PT2	12-17.5 kV	1250A-1600A	40kA	EL	free standing installation

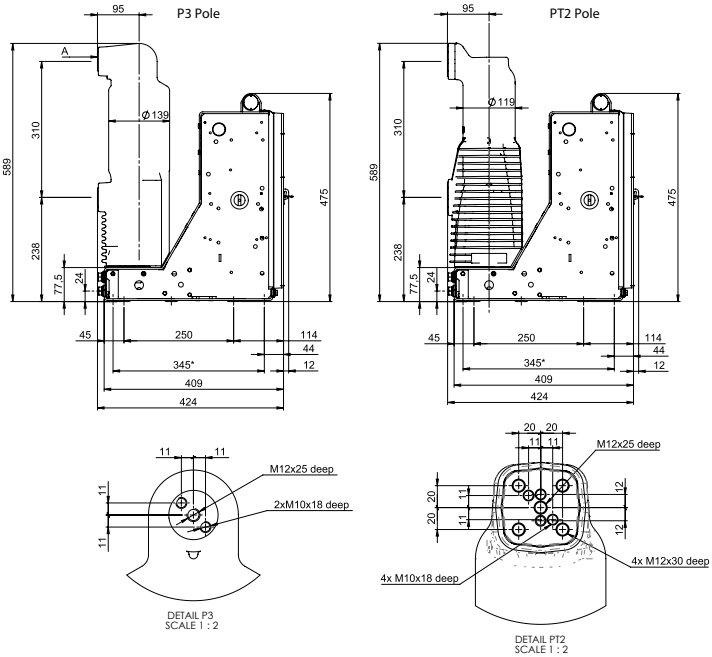
(*) Fixing interchangeability with previous series (345 x 650).

Overall dimensions

Fixed circuit breakers

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



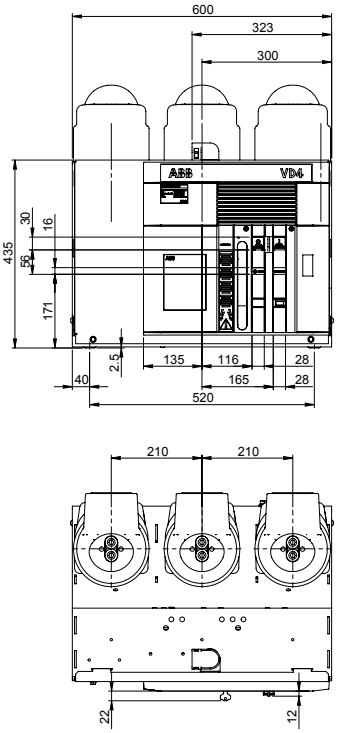


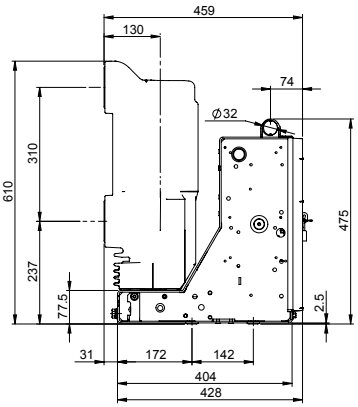
Type	Pole	Ur	Ir	Isc	Operating Mechanism	Version for
VD4 p275	P3	12-17.5 kV	1250A-1600A	40kA	EL	free standing installation
VD4 p275	PT2	12-17.5 kV	1250A-1600A	40kA	EL	free standing installation

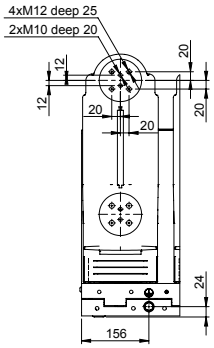
(*) Fixing interchangeability with previous series (345 x 650).

Fixed circuit breakers

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

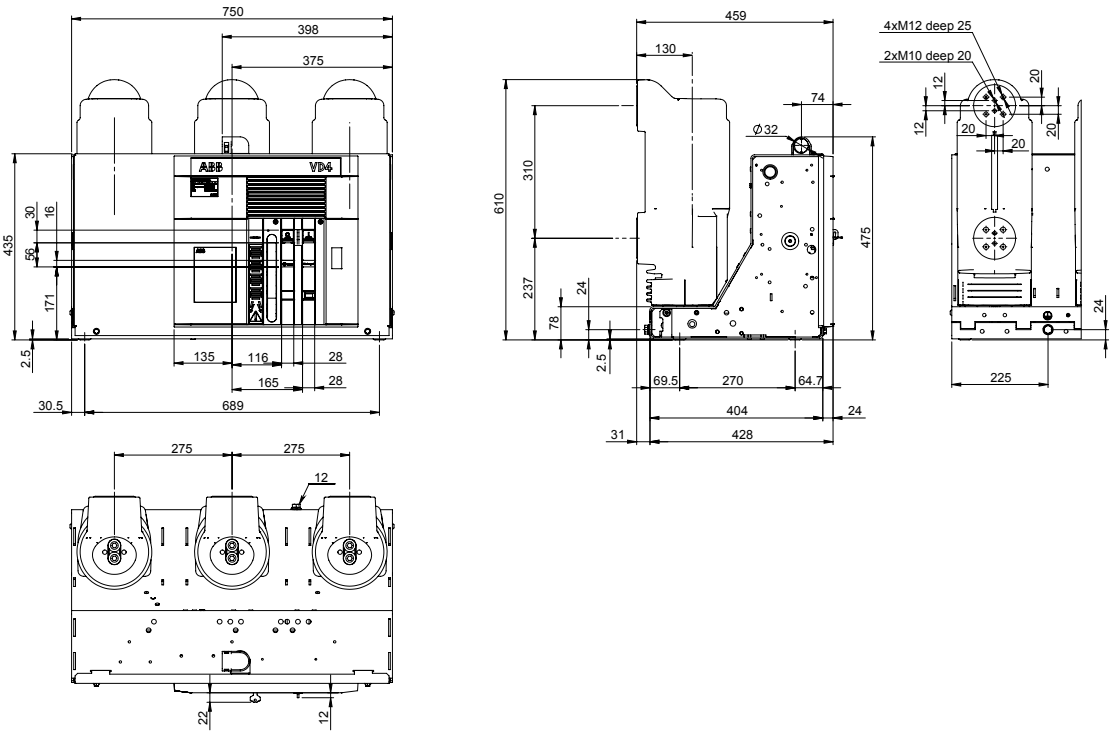






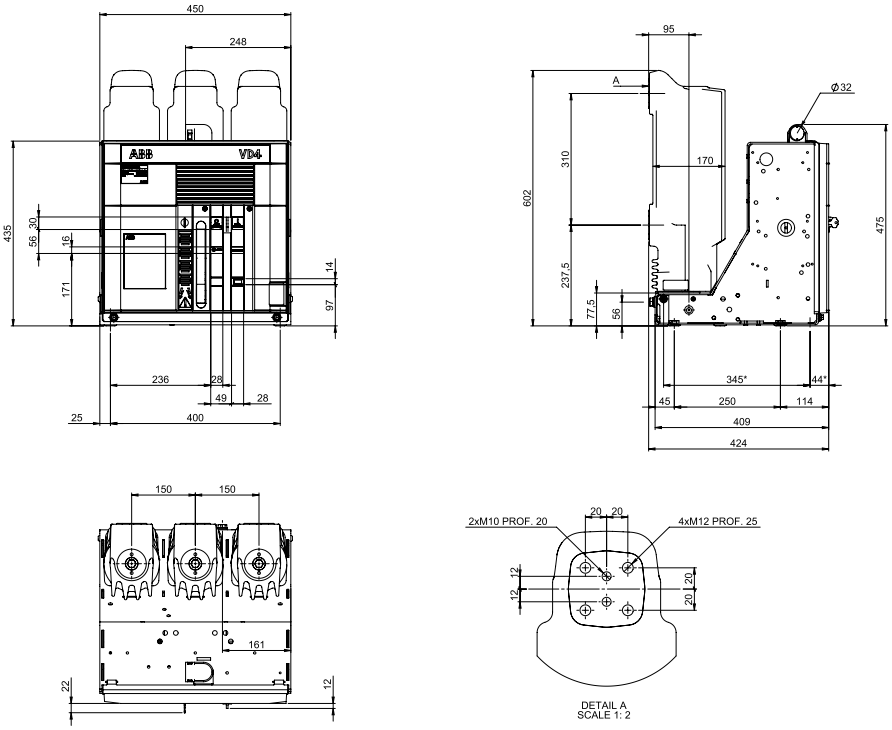
Fixed circuit breakers

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
Isc	20	kA
	25	kA
	31.5	kA



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

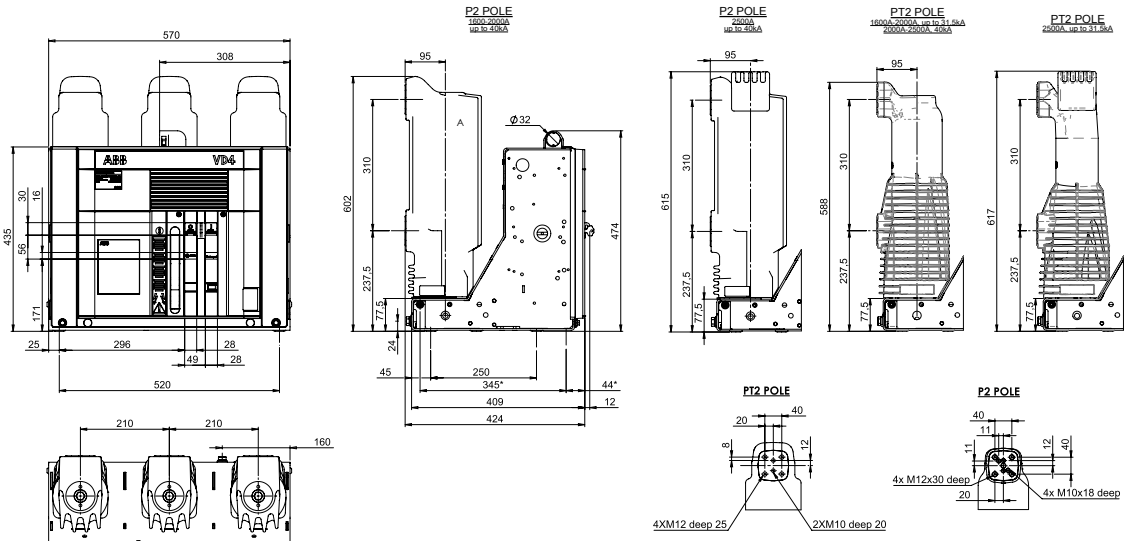
Overall dimensions

Fixed circuit breakers

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

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

VD4		
TN	7407	
Ur	12	kV
Ir	2500	A
Isc	20	kA
	25	kA
	31.5	kA
	40	kA



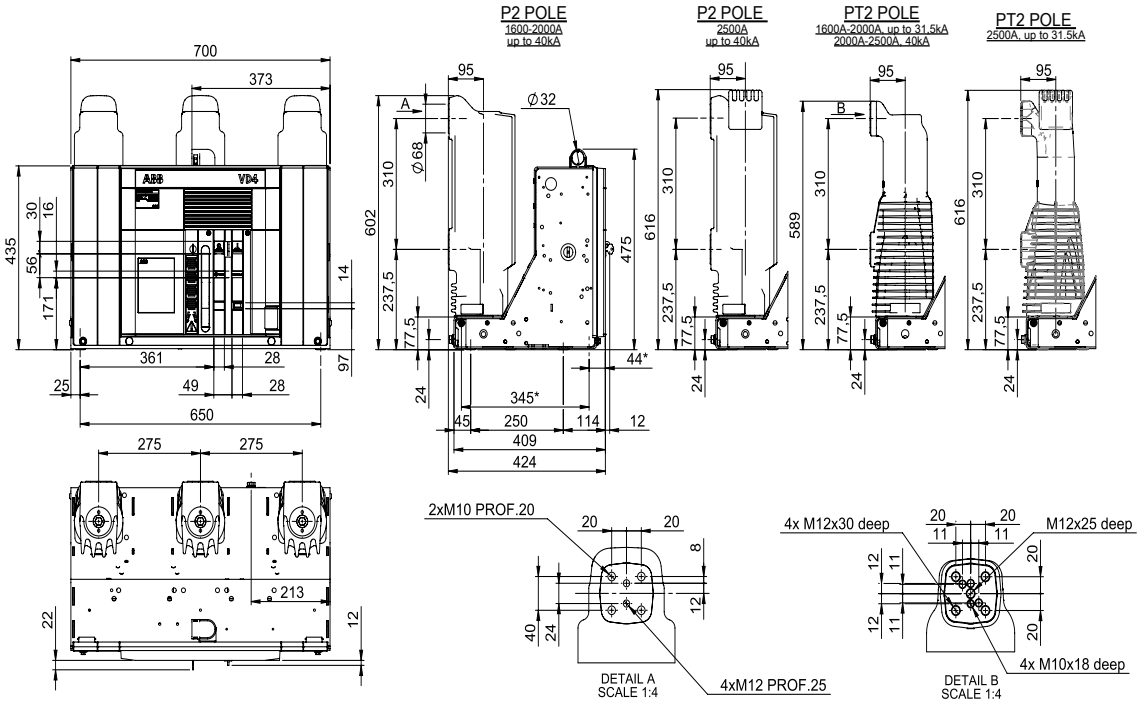
Type	Pole	Un	In	Isc	Operating Mechanism	Version for
VD4 p.210	P2	12-17.5kV	1600A-2000-2500A	20-25-31.5kA	EL2	free standing version
		12-17.5kV	2000A	40kA	EL3	
		12kV	2500A	40kA	EL3	
VD4 12/**/**/G p.210		12kV	1600A-2000-2500A	20-25-31.5kA	EL2	
VD4 p.210	P2	12-17.5kV	1600A-2000-2500A	20-25-31.5kA	EL3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

VD4		
TN	7408	
Ur	12	kV
	17.5	kV
Ir	2000	A
	2500	A
Isc	20	kA
	25	kA
	31.5	kA
	40	kA



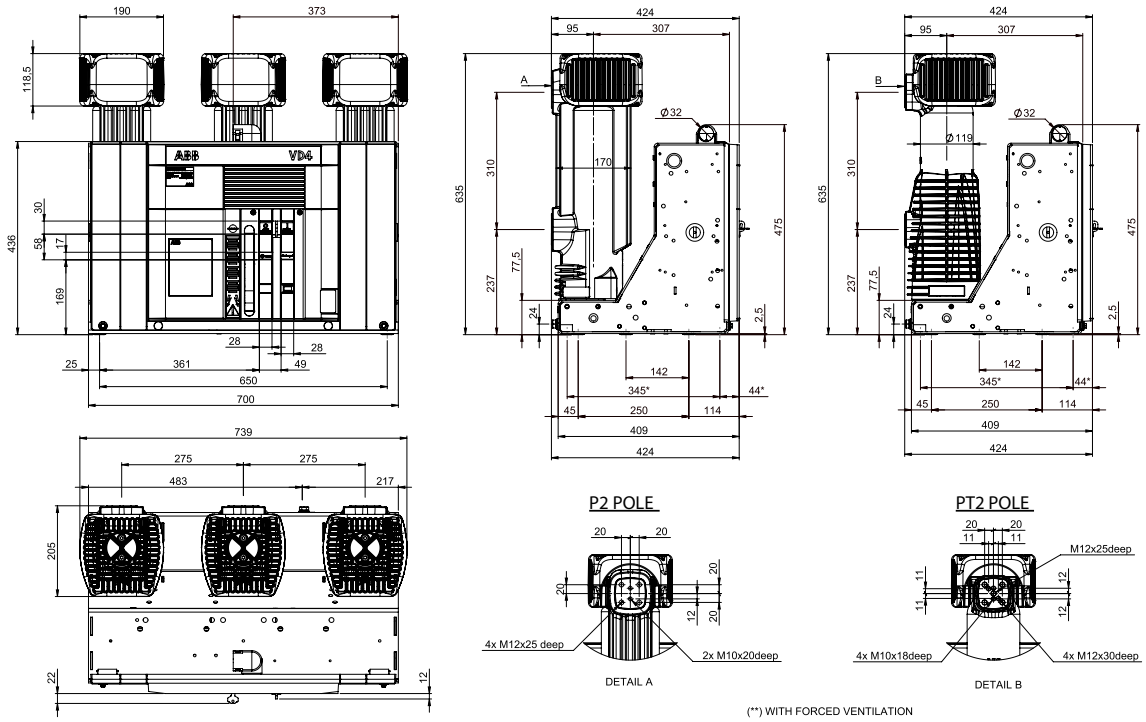
Type	Poles	Un	In	Isc	Operating Mechanism	Version for
VD4 p.275	P2	12-17.5kV	1600A-2000-2500A	20-25-31.5kA	EL2	free standing version
		12-17.5kV	2000-2500A	40kA	EL3	
VD4 12/**/**/G p.275	P2	12kV	1600A-2000-2500A	20-25-31.5kA	EL2	
		12kV	2000-2500A	40kA	EL3	
VD4 p.275	PT2	12-17.5kV	1600A-2000-2500A	20-25-31.5kA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

Overall dimensions

Fixed circuit breakers

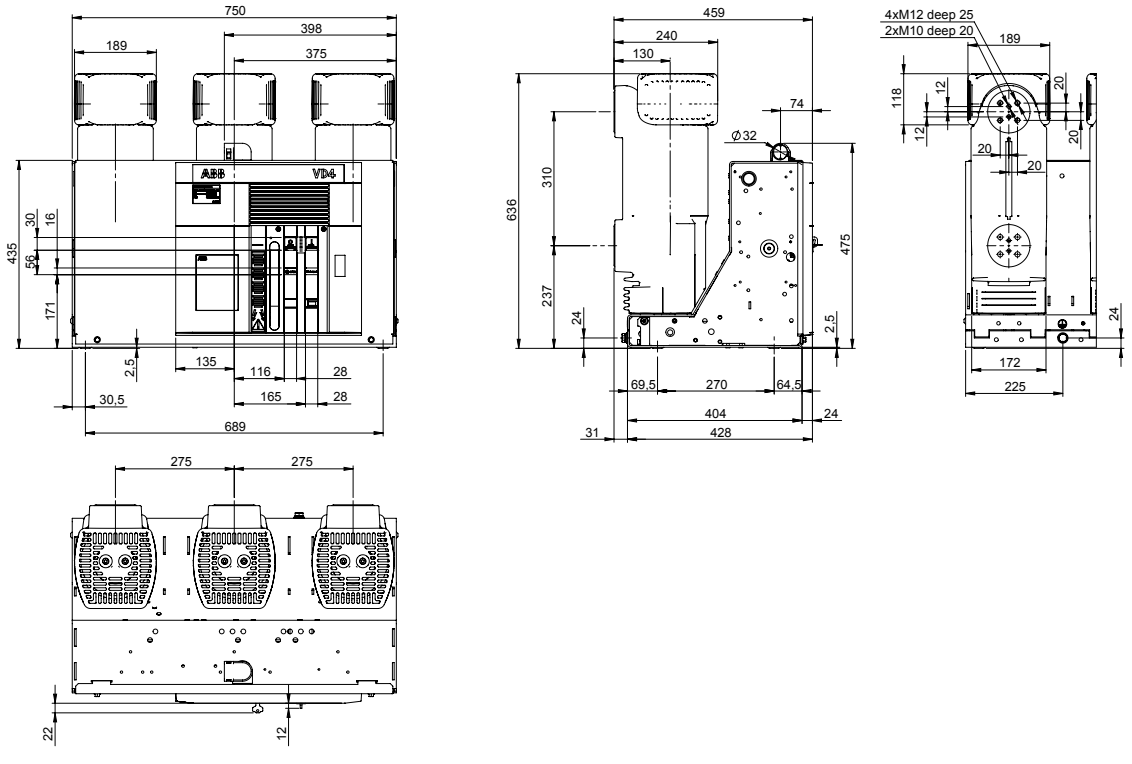
VD4		
TN	1VCD000149	
Ur	12	kV
	17.5	kV
Ir	3150	A
Isc	20	kA
	25	kA
	31.5	kA
	40	kA



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

Fixed circuit breakers

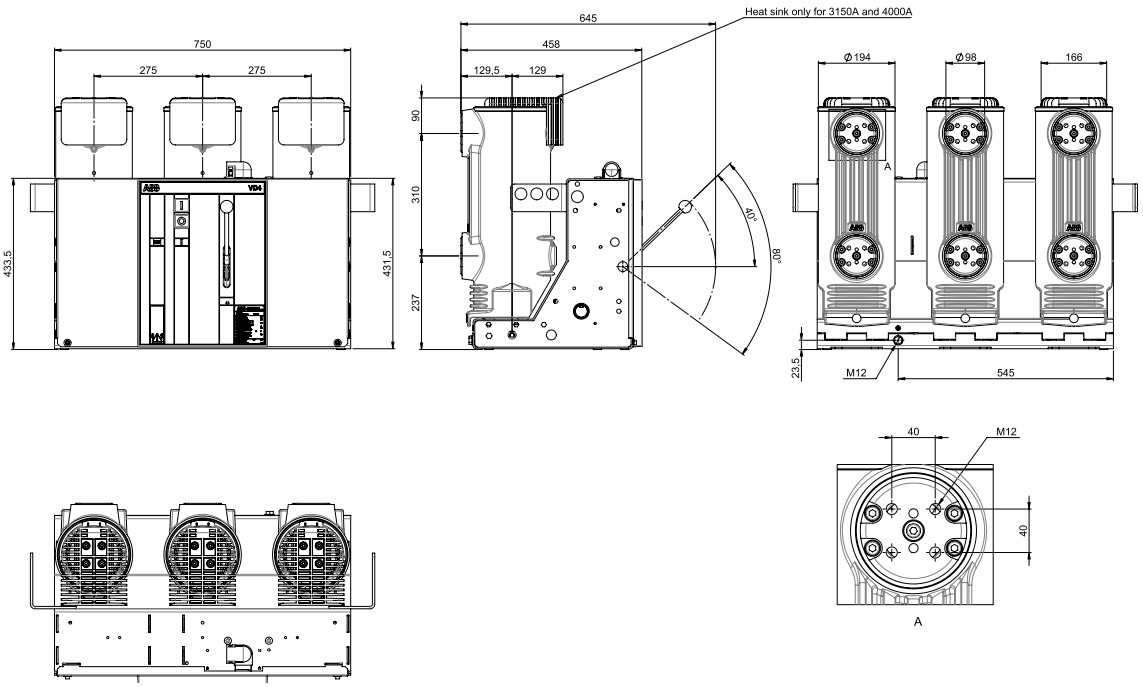
VD4		
TN	1VCD003443	
Ur	12	kV
	17.5	kV
Ir	3150	A (*)
Isc	50	kA



(*) 4000 A with forced ventilation.

Fixed circuit breakers

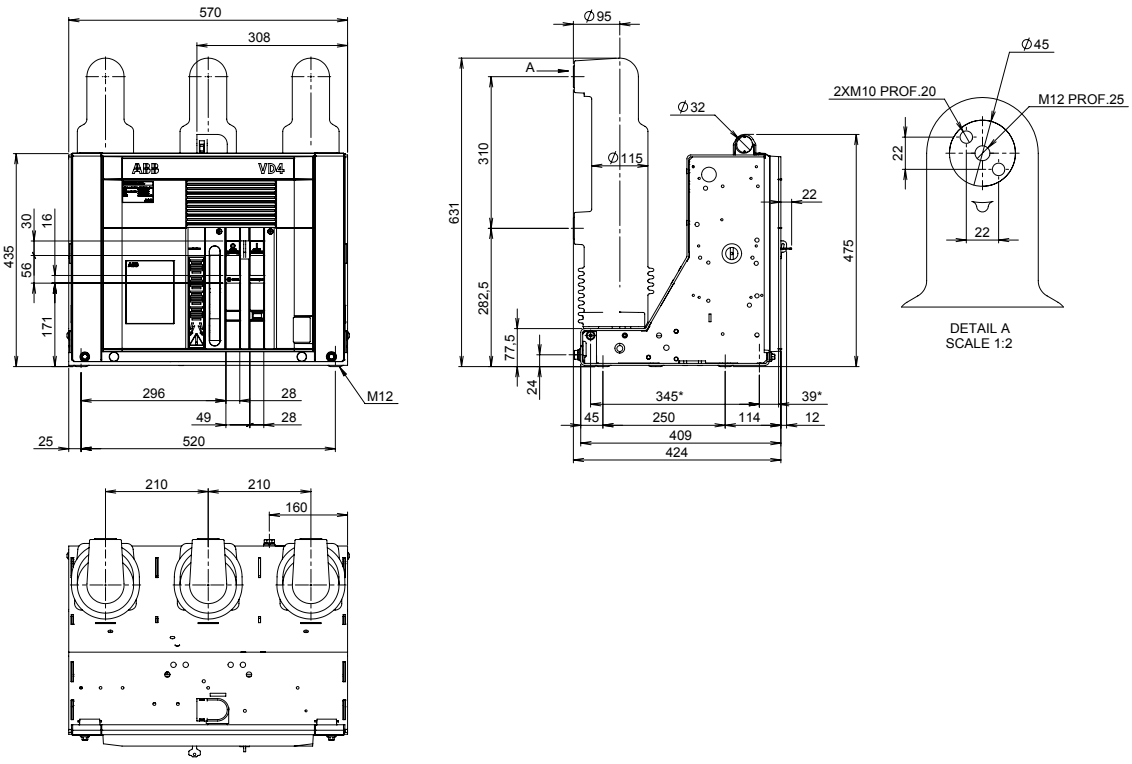
VD4		
TN	1VCD003945	
Ur	12	kV
	17	kV
Ir	1250	A
	1600	A
	2000	A
	2500	A
	3150	A (*)
Isc	63	kA



(*) 4000 A with forced ventilation

Fixed circuit breakers

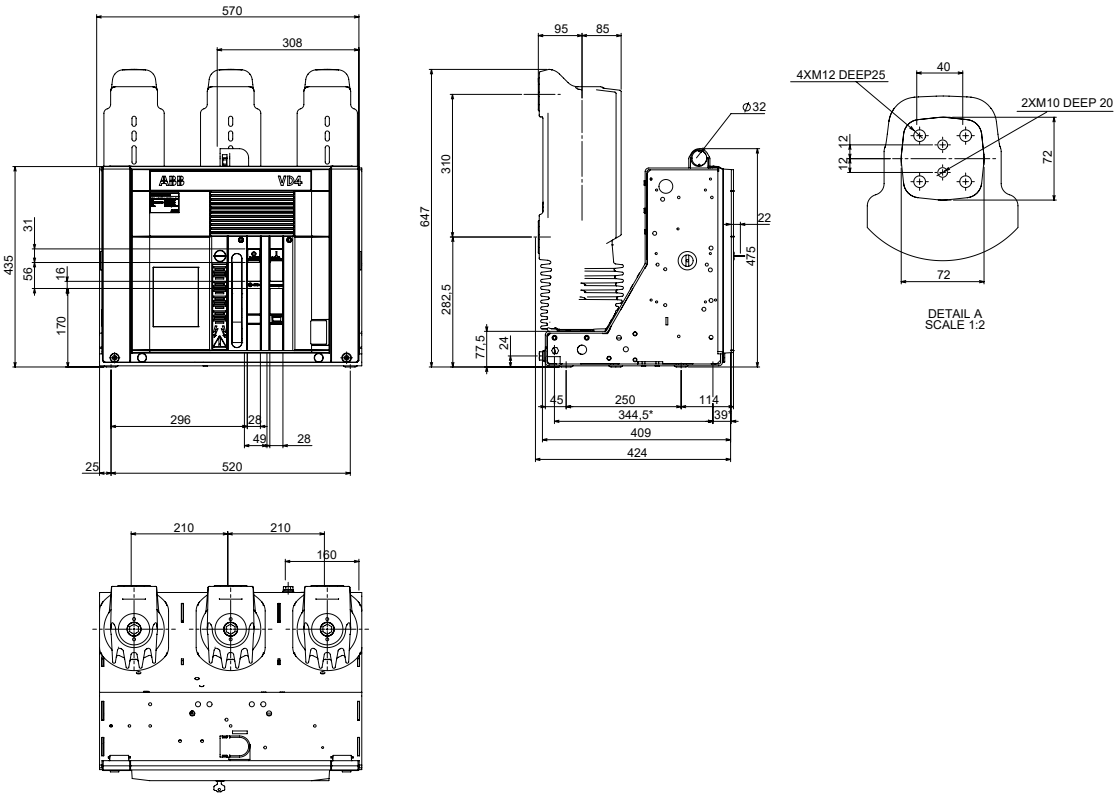
VD4		
TN	7409	
Ur	24	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA



Overall dimensions

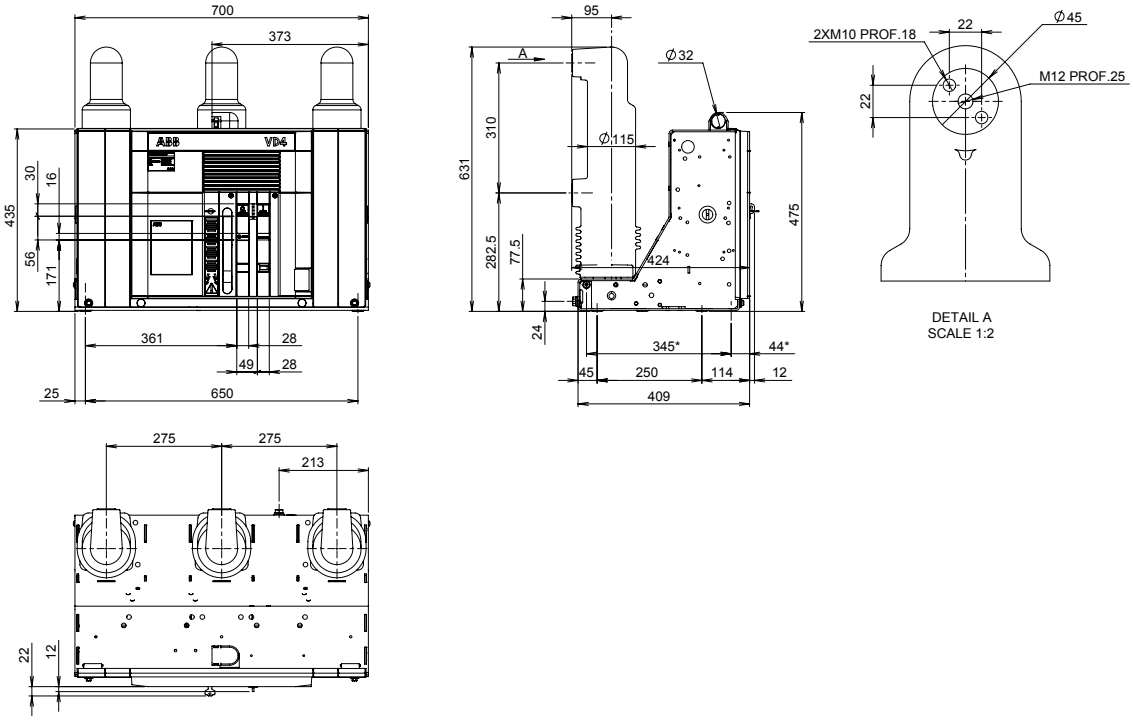
Fixed circuit breakers

VD4		
TN	1VCD000172	
Ur	24	kV
Ir	630	A
	1250	A
Isc	31,5	kA



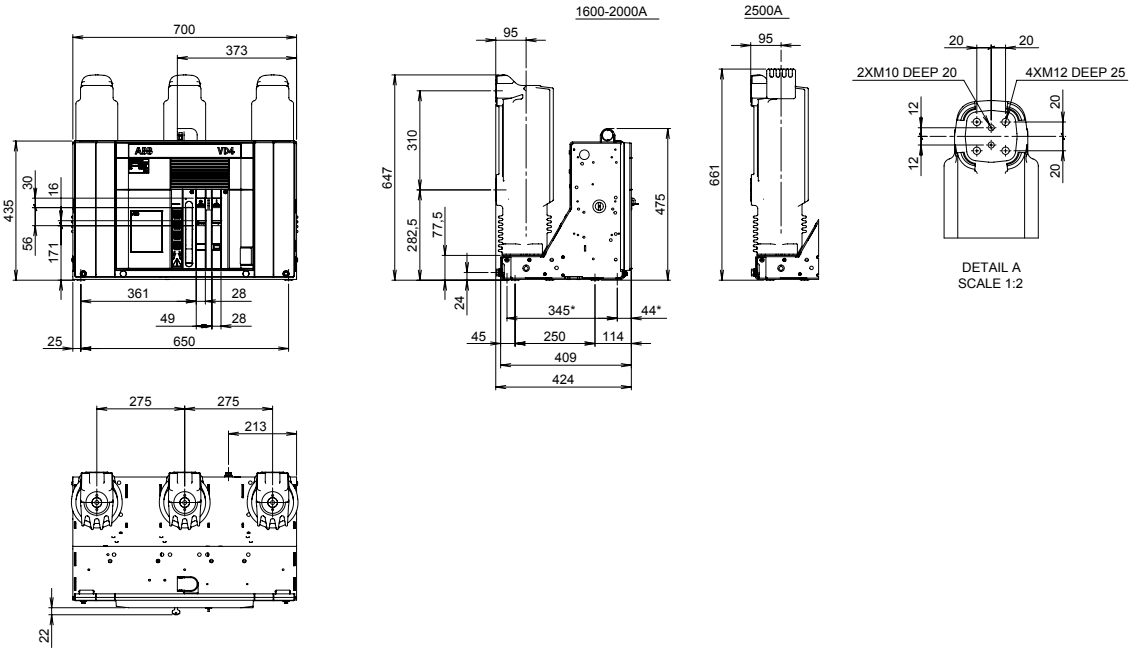
Fixed circuit breakers

VD4		
TN	7410	
Ur	24	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA



Fixed circuit breakers

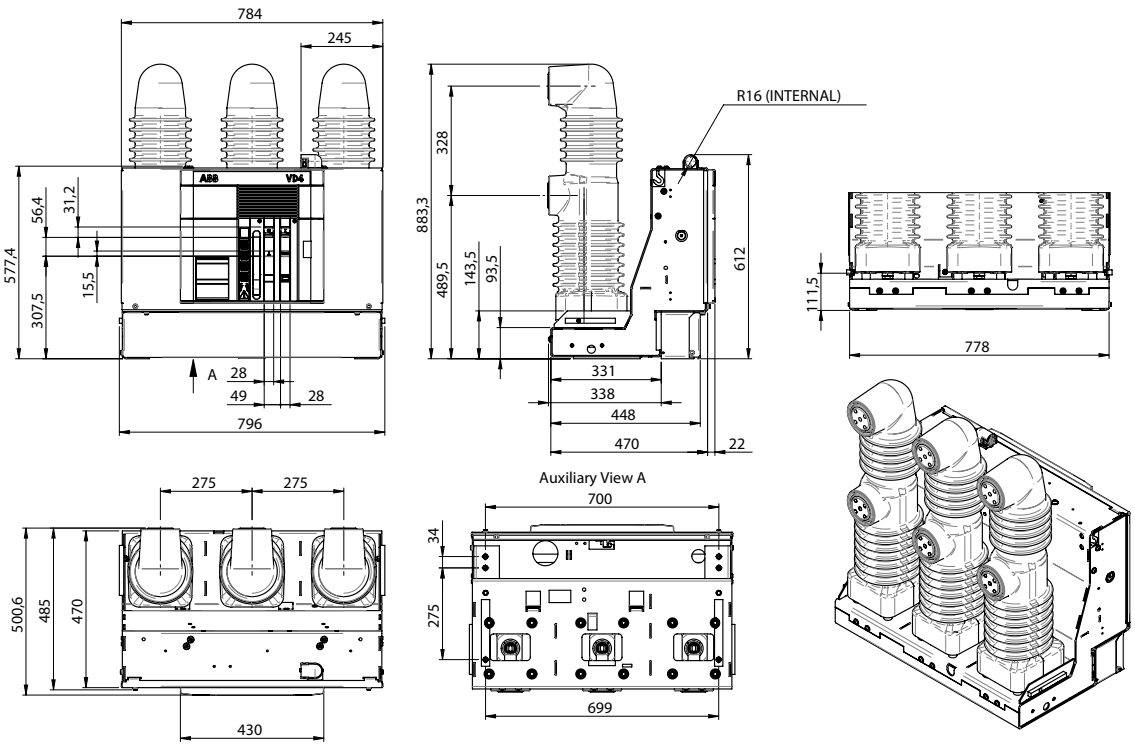
VD4		
TN	7411	
Ur	24	kV
Ir	1600	A
	2000	A
	2500	A
Isc	16	kA
	20	kA
	25	kA
	31.5	kA



Fixed circuit breakers

VD4		
TN	1VYN300901-RF	
Ur	36	kV
Ir	1250	A
	1600	A
	2000	A
	2500	A
Isc	20	kA
	25	kA
	31.5	kA

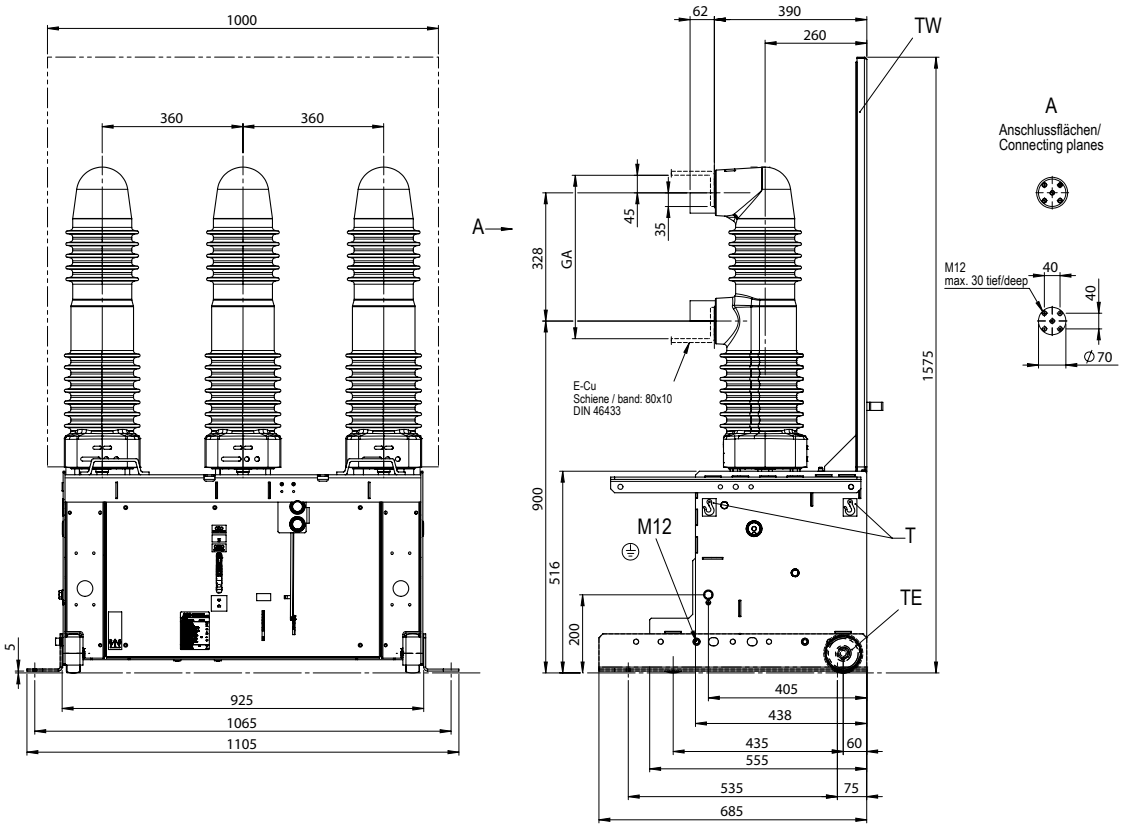
VD4		
TN	1VYN300901-RF	
Ur	38	kV
Ir	1200	A
	2000	A
Isc	31.5	kA



Overall dimensions

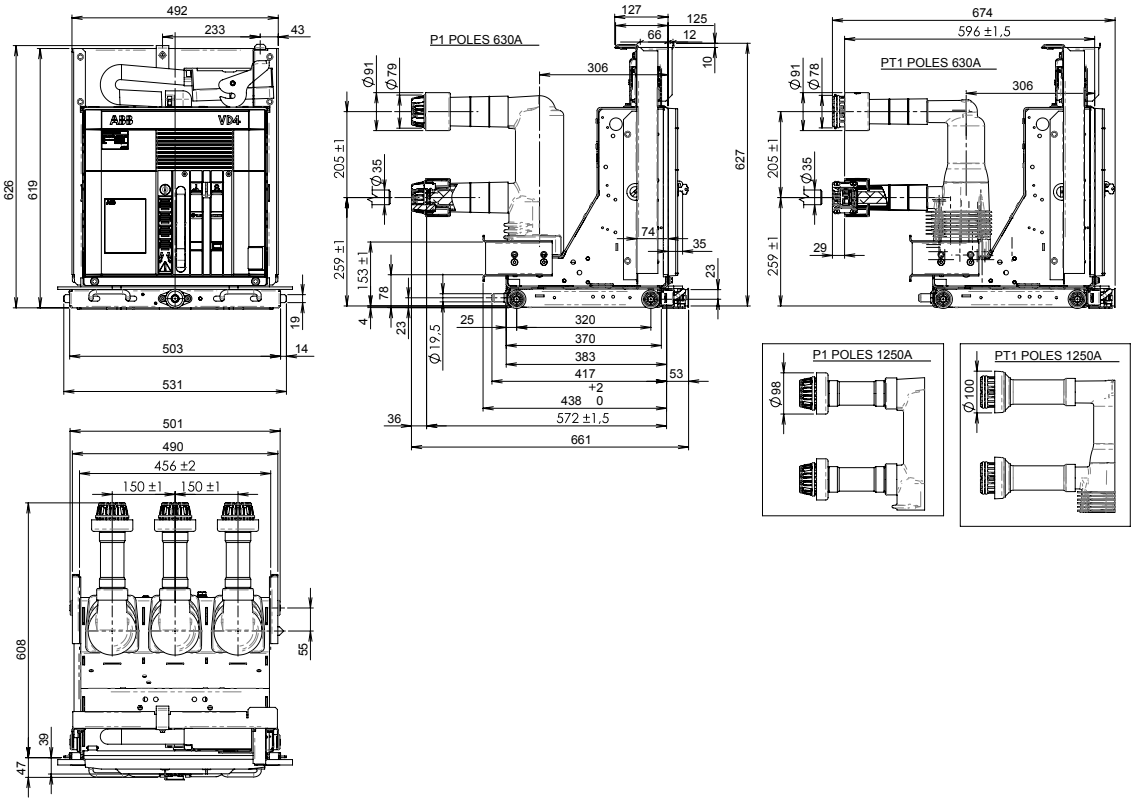
Fixed circuit breakers

VD4		
TN	GCEM700198	
Ur	36-40,5	kV
Ir	1250	A
	1600	A
	2000	A
	2500	A
Isc	20	kA
	25	kA
	31.5	kA
	40	kA



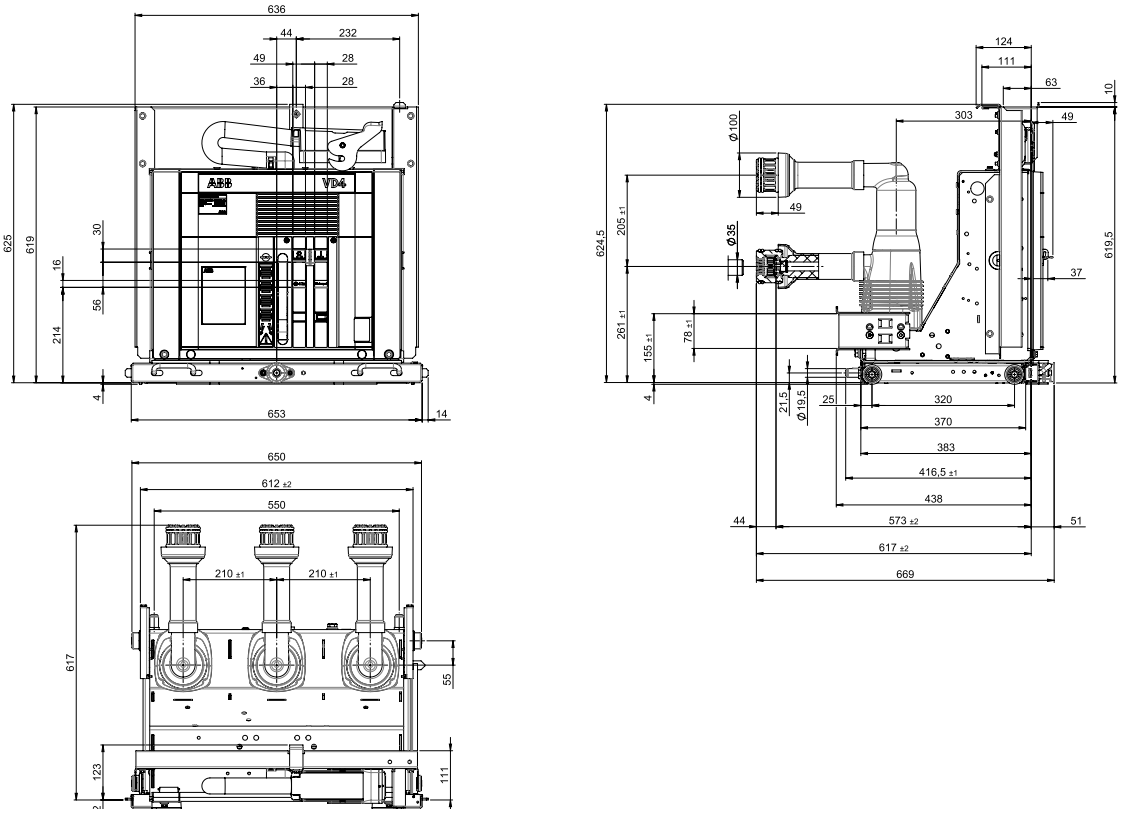
Withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube PB1 modules

VD4/P		
TN	7412	
Ur	12	kV
	17.5	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA
	31.5	kA



Withdrawable circuit breakers for UniGear ZS1 switchgear

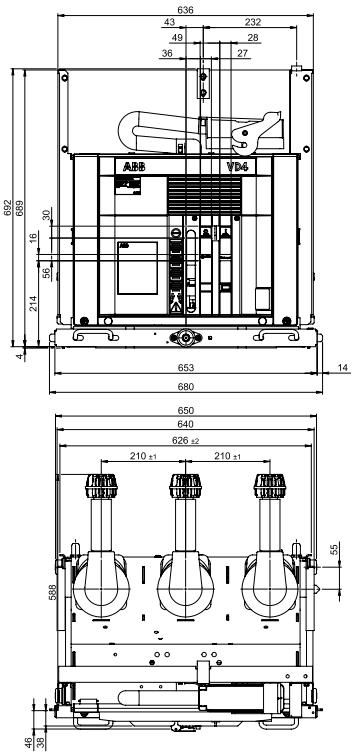
VD4/P		
TN	2RDA032149	
Ur	17.5	kV
Ir	630	A
	1250	A
Isc	25	kA
	31.5	kA



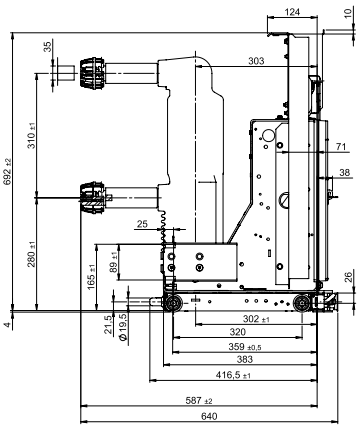
Overall dimensions

Withdrawable circuit breakers for PowerCube PB2 modules

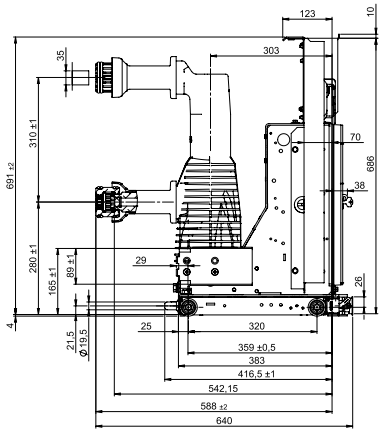
VD4/W		
TN	7420	
Ur	12	kV
	17.5	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA
	31.5	kA



P3 POLE



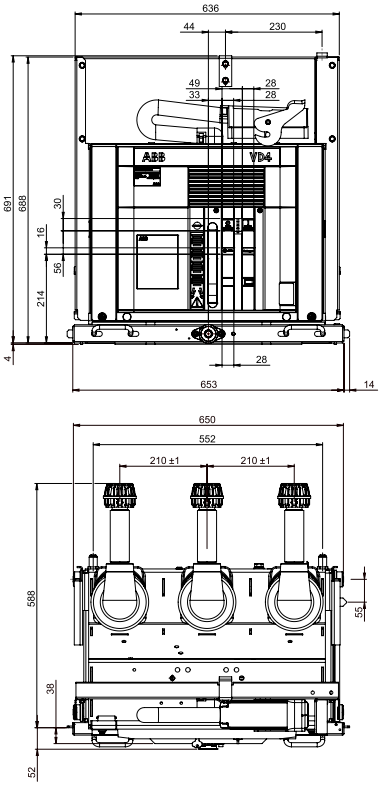
PT2 POLE



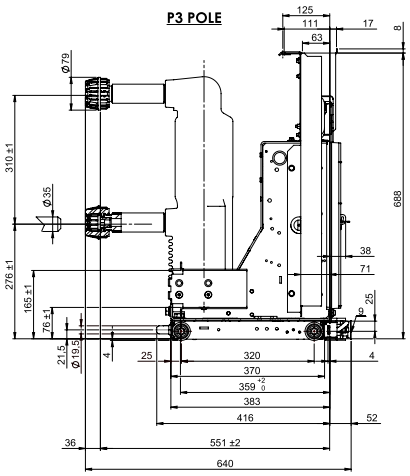
Type	Pole	Un	In	Isc	Operating mechanism	Panel
VD4/W p.210	P3	12-17.5 kV	630-1250A	16-25-31.5 kA	EL	UniSafe
VD4/W 12/**/** G p.210		12 kV	12 kV	16-25-31.5 kA		
VD4/W xx.xx.xx. SA p.210		12 kV	630A	16-20-25-31.5 kA		
VD4/W p.210	PT2	12-17.5 kV	630-1250A	16-25-31.5 kA		
VD4/W 12/**/** G p.210		12 kV	12 kV	16-25-31.5 kA		

Withdrawable circuit breakers for PowerCube PB2 modules

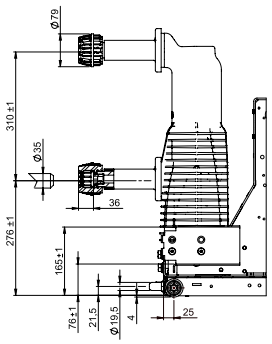
VD4/W		
TN	1VCD601243	
Ur	12	kV
	17	kV
Ir	1250	A
Isc	40	kA



P3 POLE



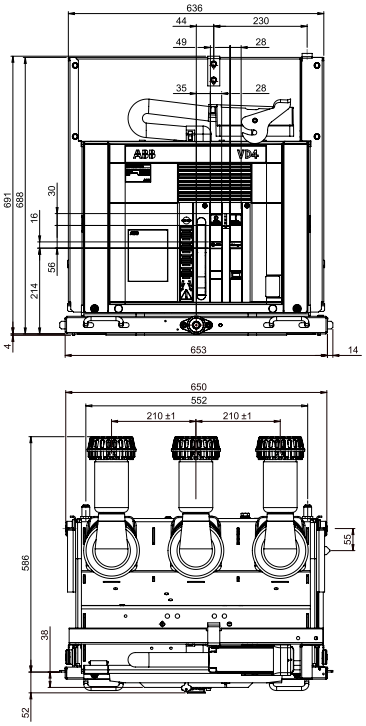
PT2 POLE

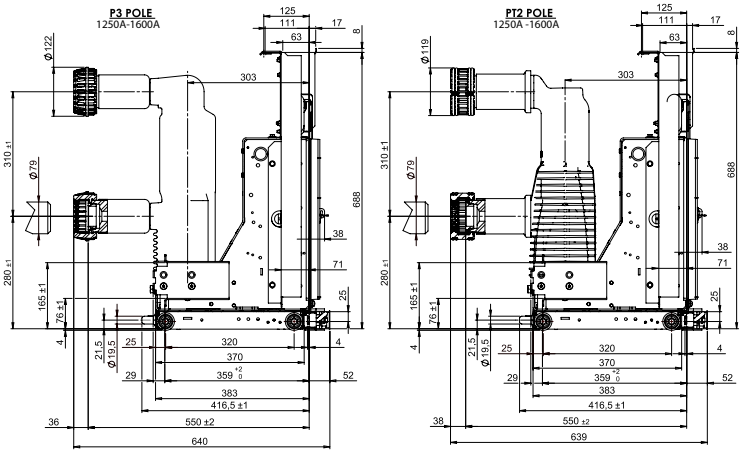


C.B. type	Ur	Ir	Isc	Pole	Operating mechanism	Cubicle
VD4/W p.210	12-17.5 kV	1250 A	40 kA	P3	EL	PowerCube PB2
VD4/W p.210	12-17.5 kV	1250 A	40 kA	PT2	EL	PowerCube PB2

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

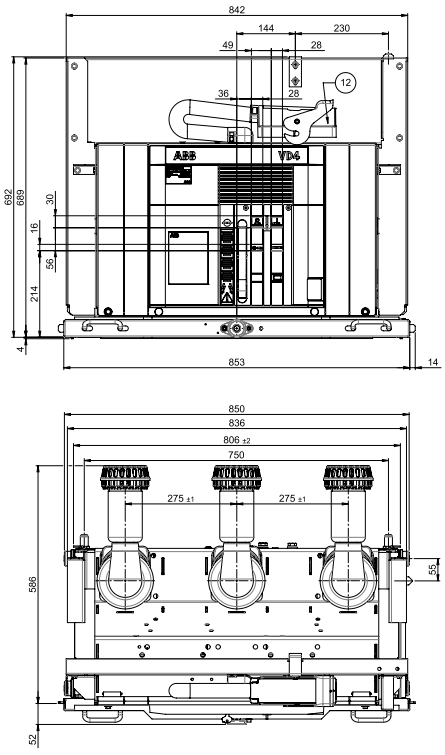


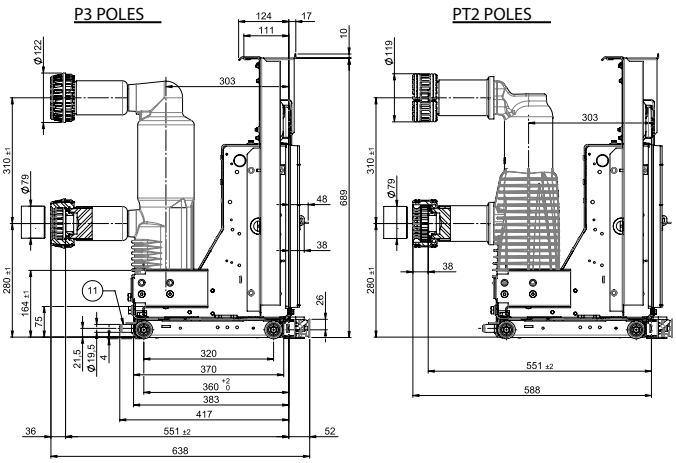


C.B. type	Ur	Ir	Isc	Pole	Operating mechanism	Enclosure	Cubicle
VD4/P p.210	12-17.5 kV	1250-1600 A	40 kA	P3	EL	–	UniGear
VD4/P p.210	12-17.5 kV	1600 A	40 kA			PowerCube PB2	–
VD4/P p.210	12-17.5 kV	1250-1600 A	40 kA	PT2	EL	–	UniGear
VD4/P p.210	12-17.5 kV	1600 A	40 kA			PowerCube PB2	–

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



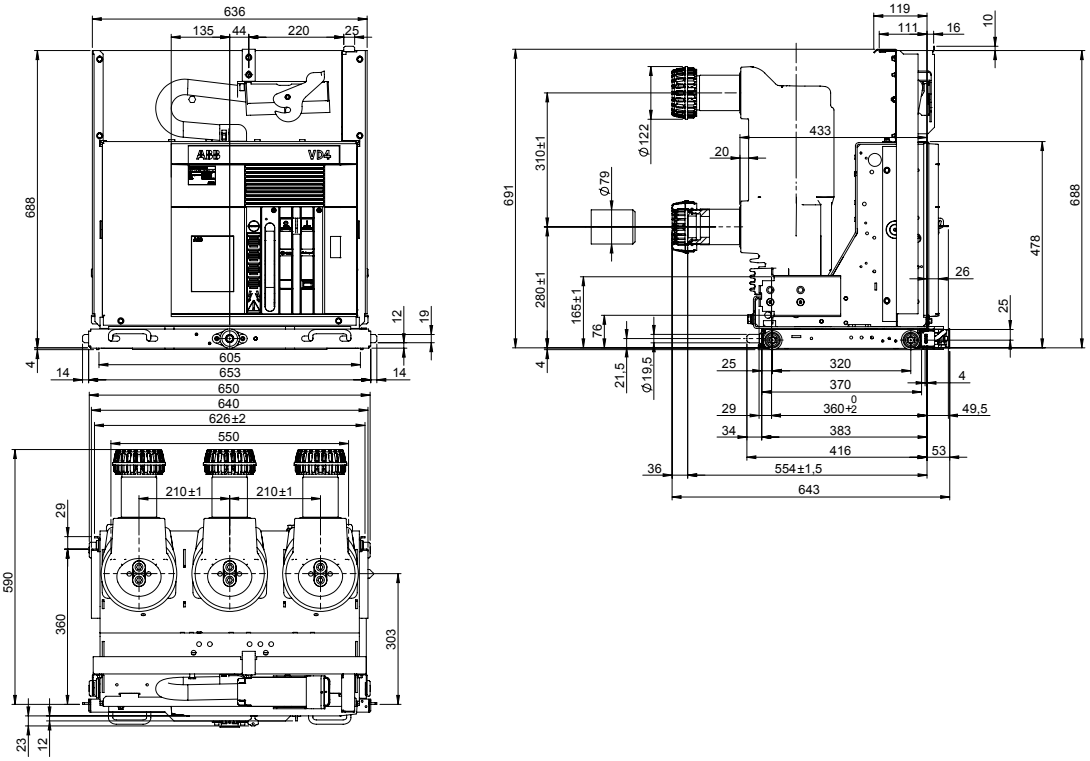


C.B. type	Ur	Ir	Isc	Pole	Operating mechanism	Cubicle
VD4 p.275	12-17.5 kV	1250-1600	40 kA	P	EL	UniGear ZS1
VD4 p.275	12-17.5 kV	1250-1600 A	40 kA	PT2	EL	UniGear ZS1

Overall dimensions

Withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube PB2 modules

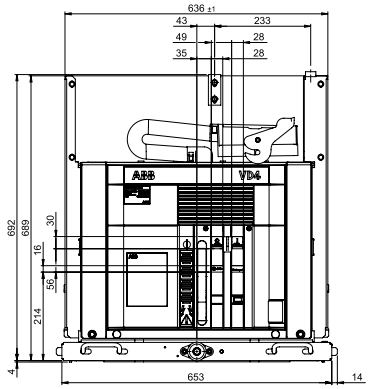
VD4/P		
TN	1VCD 003444	
Ur	12	kV
	17.5	kV
Ir	1250	A
	1600	A
	2000	A
Isc	50	kA

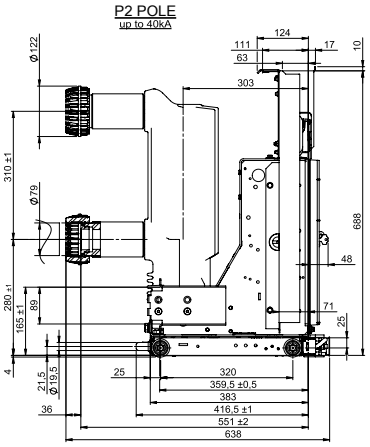


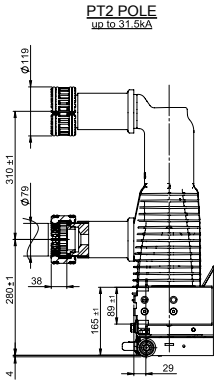
Withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube PB2 modules

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

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





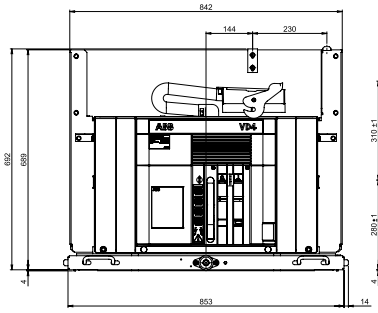


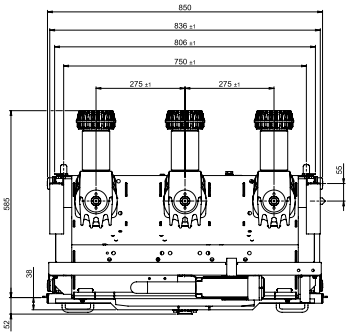
Type	Un	In	Isc	Pole	O.M.	Enclosure	Cubide
VD4/P p.210	12-17.5kV	1600A-2000A	20-25-31.5kA	P2	EL	CBE2-CBF2 PowerBloc-PowerCube PB2	UniGear UniGear ZS1
	12-17.5kV	2000A	40kA				UniGear
VD4/P 12/**/**/G p.210	12kV	1600A-2000A	20-25-31.5kA				UniGear UniGear ZS1
VD4/P XX.XX. XX.SA p.210	12-17.5kV	1600A	20-25kA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

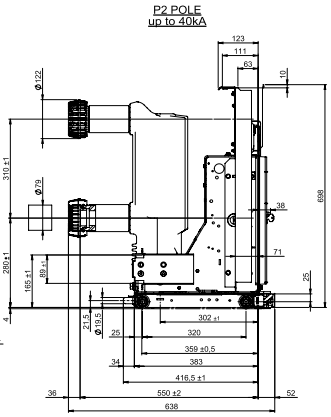
Withdrawable circuit breakers for UniGear ZS1 switchgear

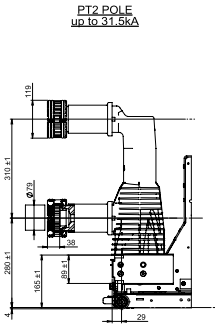
VD4/P		
TN	7416	
Ur	12	kV
	17.5	kV
Ir	1600	A
	2000	A
Isc	20	kA
	25	kA
	31.5	kA

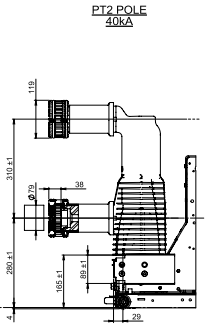
VD4/P		
TN	7416	
Ur	12	kV
	17.5	kV
Ir	2000	A
Isc	40	kA







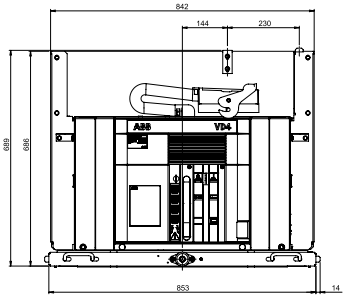


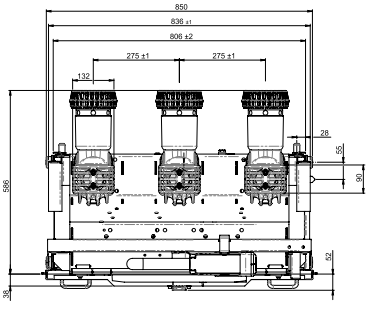


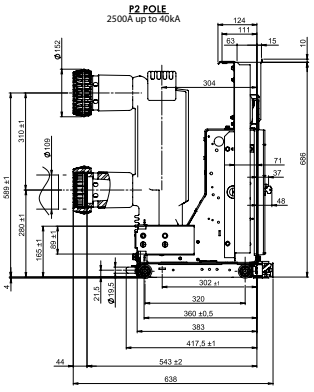
Type	Un	In	Isc	Pole	O.M.	Enclosure	Cubide
VD4/P p.275	12-17.5kV	1600A-2000A	20-25-31.5kA	P2	EL	PowerBloc CBF3 PowerCube	UniGear ZS1
VD4/P 12/**/**/G p.275	12kV	1600A-2000A	20-25-31.5kA				
VD4/P p.275	12-17.5kV	2000A	40kA			PowerBloc CBF3	
VD4/P p.275	12-17.5kV	1600A-2000A	20-25-31.5kA	P2	EL	PowerBloc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

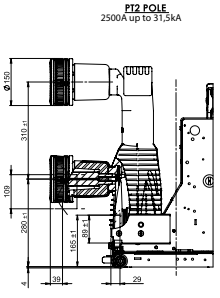
Withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube PB3 modules

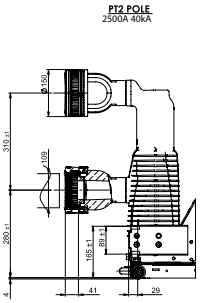
VD4/P		
TN	7417	
Ur	12	kV
	17.5	kV
Ir	2500	A
Isc	20	kA
	25	kA
	31.5	kA
	40	kA









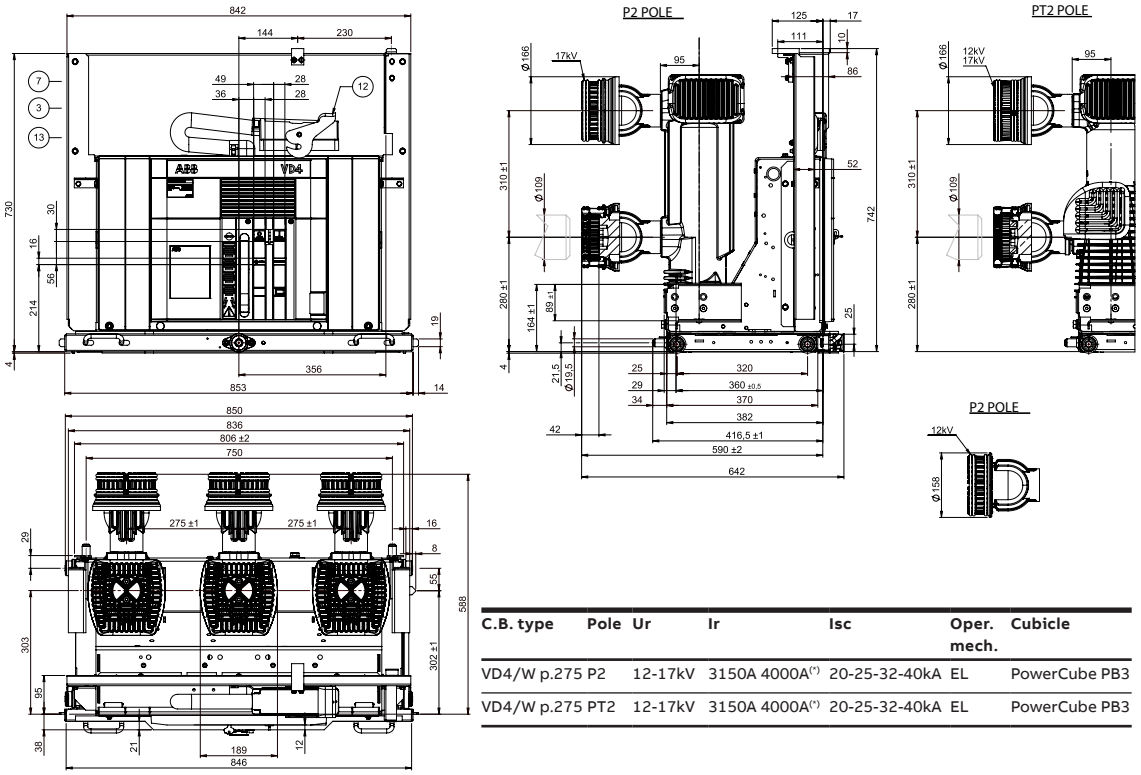


Type	Un	In	Isc	Pole	O.M.	Enclosure	Cubide
VD4/P p.275	12-17.5kV	2500A	20-25-31.5-40kA	P2	EL	PowerBloc CBF3 PowerCube	UniGear ZS1 UniSafe
VD4/P 12/**/**/G p.275	12kV	2500A	20-25-31.5kA				
VD4/P XX.XX.XX.SA p.210	12-17.5kV	2500A	40kA			PowerCube	
VD4/P p.275	12-17.5kV	2500A	20-25-31.5kA	P2	EL	PowerCube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

Overall dimensions

Withdrawable circuit breakers for PowerCube PB3 modules

VD4/W		
TN	1VCD000152	
Ur	12	kV
	17.5	kV
Ir	3150	A (*)
Isc	20	kA
	25	kA
	31.5	kA
	40	kA

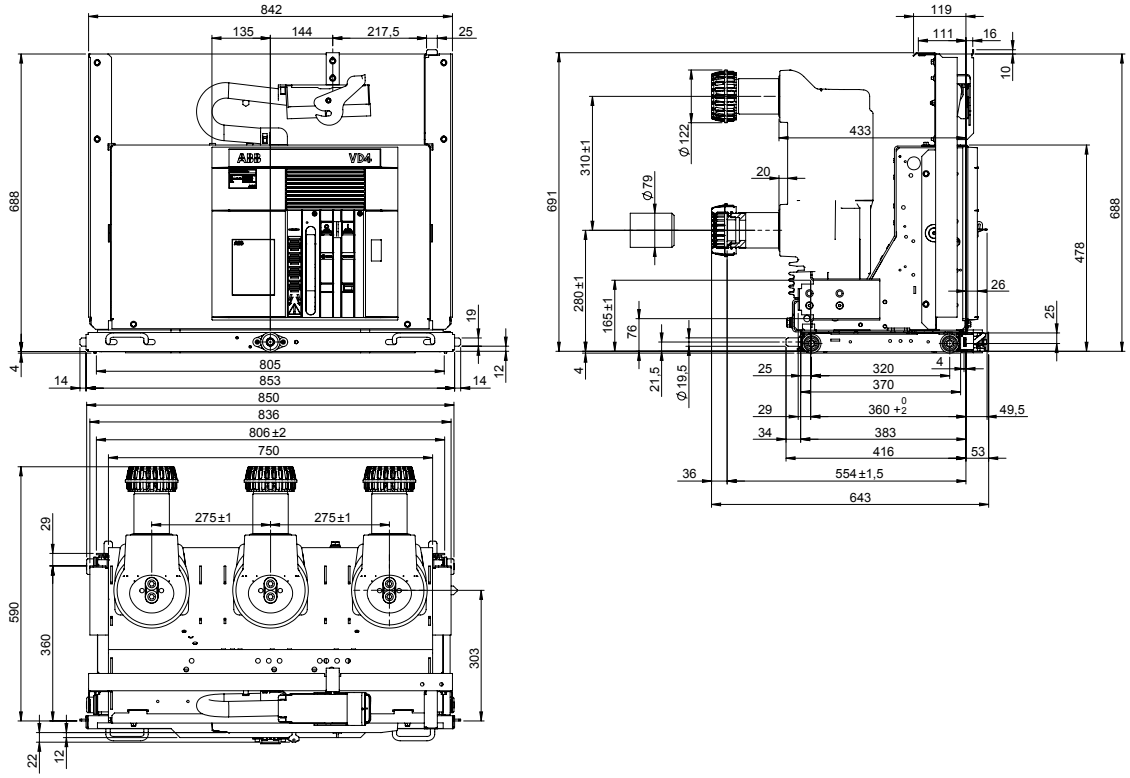


C.B. type	Pole	Ur	Ir	Isc	Oper. mech.	Cubicle
VD4/W p.275 P2		12-17kV	3150A 4000A(*)	20-25-32-40kA	EL	PowerCube PB3
VD4/W p.275 PT2		12-17kV	3150A 4000A(*)	20-25-32-40kA	EL	PowerCube PB3

(*) 4000 A with forced ventilation.

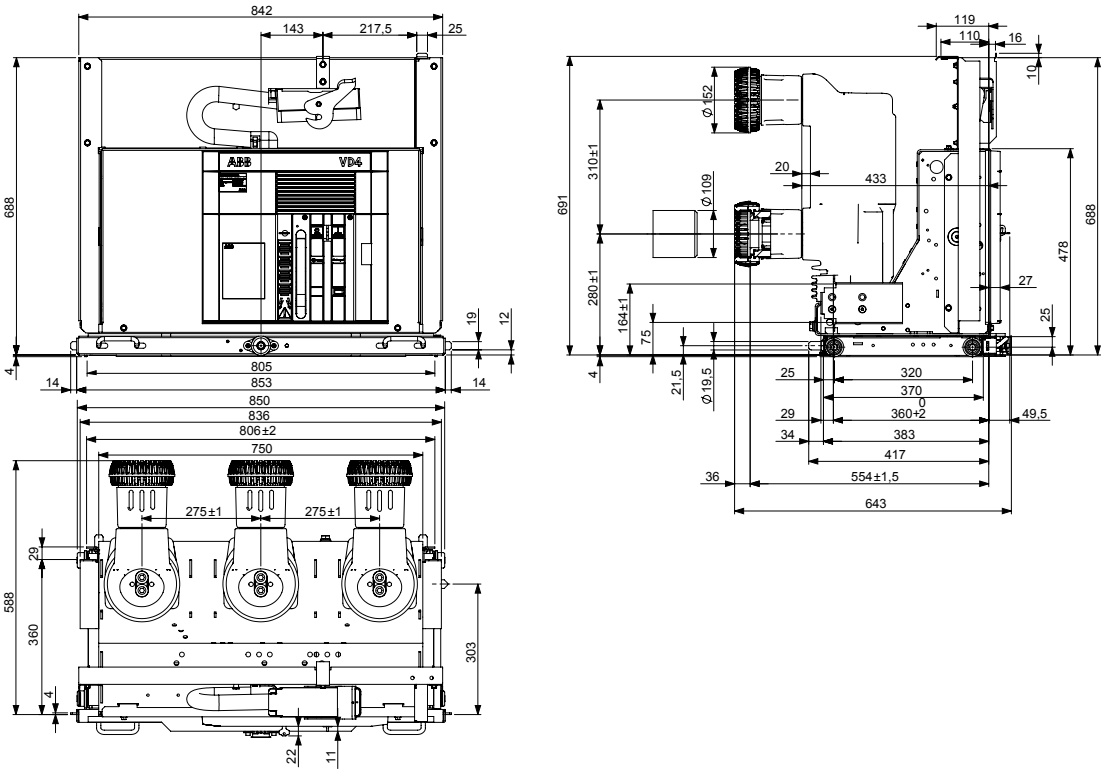
Withdrawable circuit breakers for UniGear ZS1 switchgear

VD4/P		
TN	1VCD003445	
Ur	12	kV
	17.5	kV
Ir	1600	A
	2000	A
Isc	50	kA



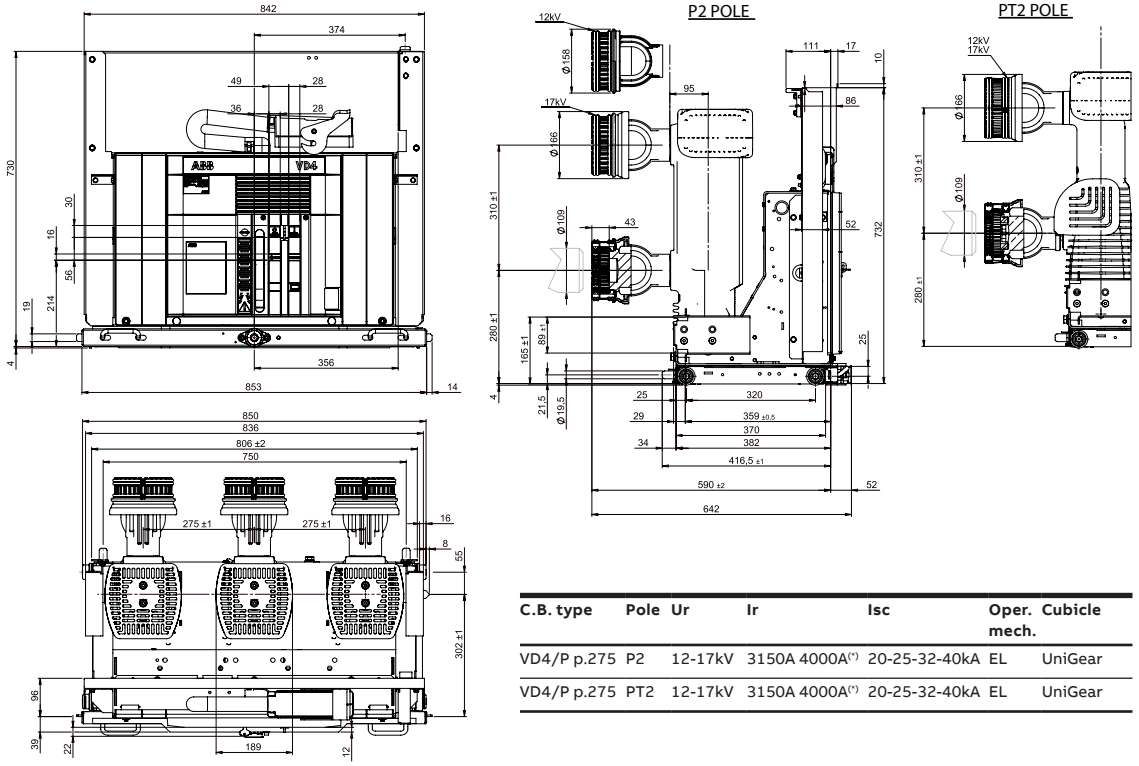
Withdrawable circuit breakers for UniGear ZS1 switchgear

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



Withdrawable circuit breakers for UniGear ZS1 switchgear

VD4/P		
TN	1VCD000153	
Ur	12	kV
	17.5	kV
Ir	3150	A (*)
Isc	20	kA
	25	kA
	31.5	kA
	40	kA



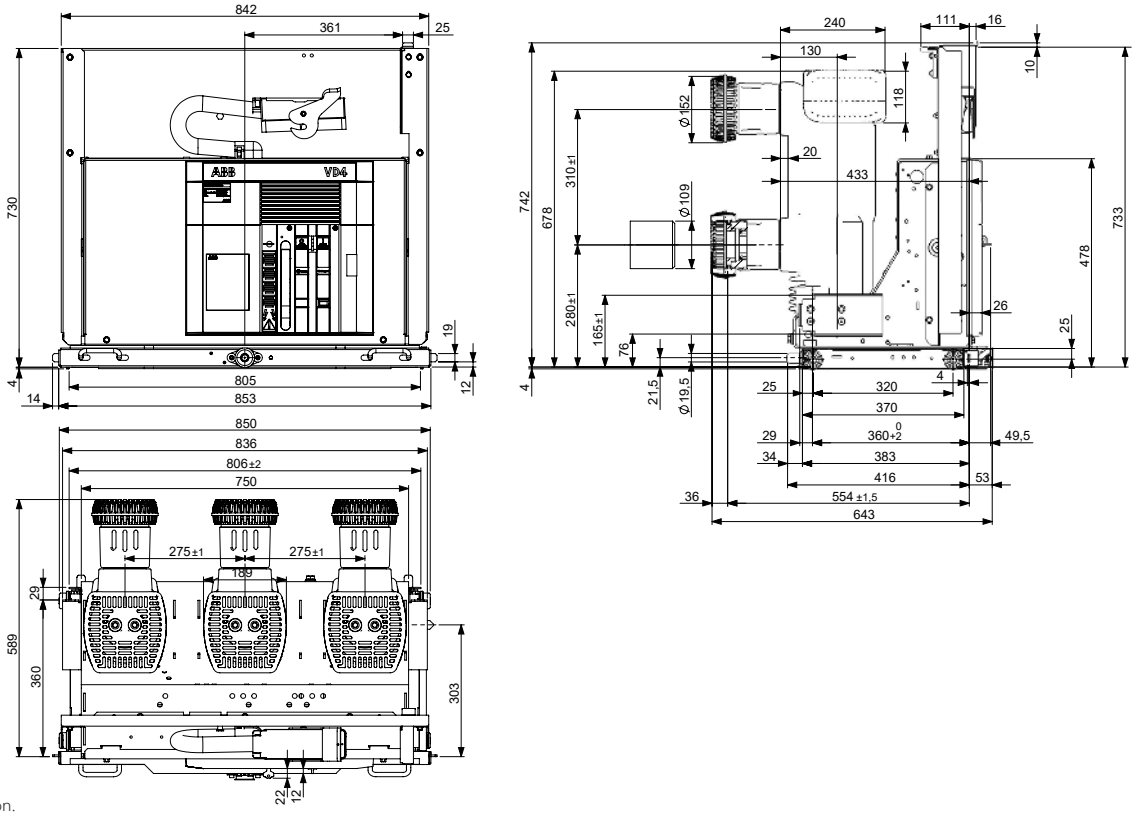
C.B. type	Pole	Ur	Ir	Isc	Oper. mech.	Cubicle
VD4/P p.275	P2	12-17kV	3150A 4000A(*)	20-25-32-40kA	EL	UniGear
VD4/P p.275	PT2	12-17kV	3150A 4000A(*)	20-25-32-40kA	EL	UniGear

(*) 4000 A with forced ventilation.

Overall dimensions

Withdrawable circuit breakers for UniGear ZS1 switchgear

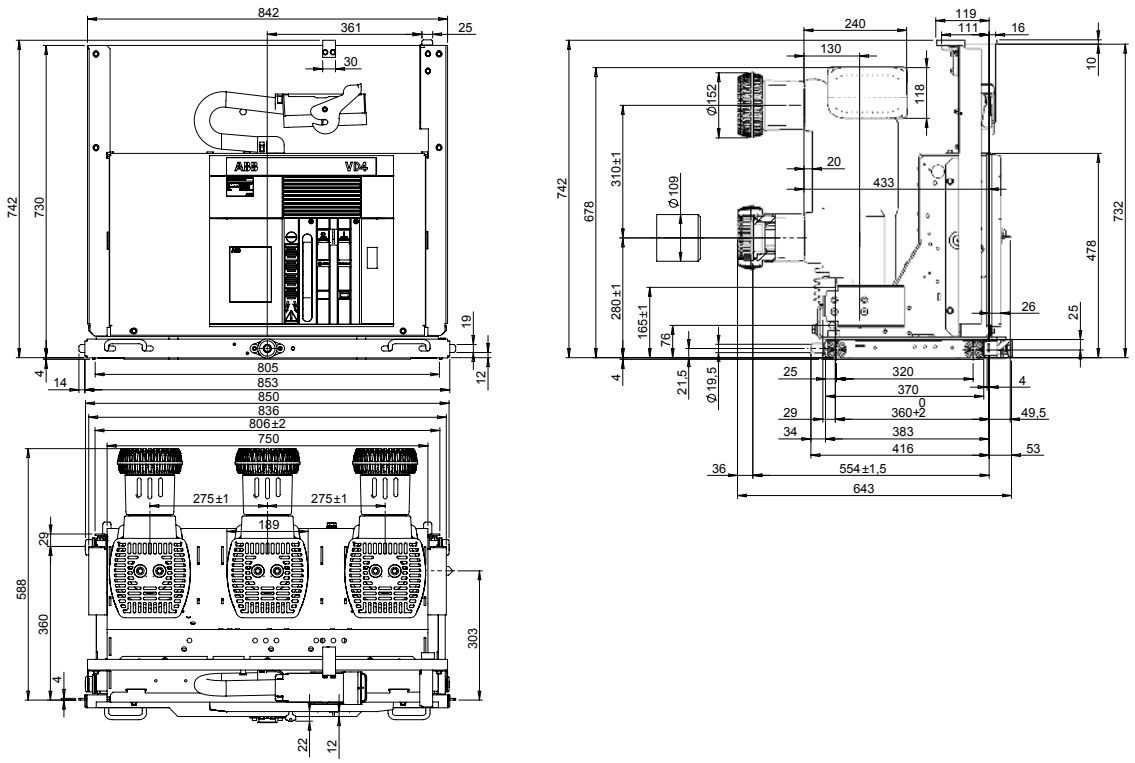
VD4/P		
TN	1VCD003447	
Ur	12	kV
	17.5	kV
Ir	3150	A (*)
Isc	50	kA



(*) 4000 A with forced ventilation.

Withdrawable circuit breakers for PowerCube PB3 modules

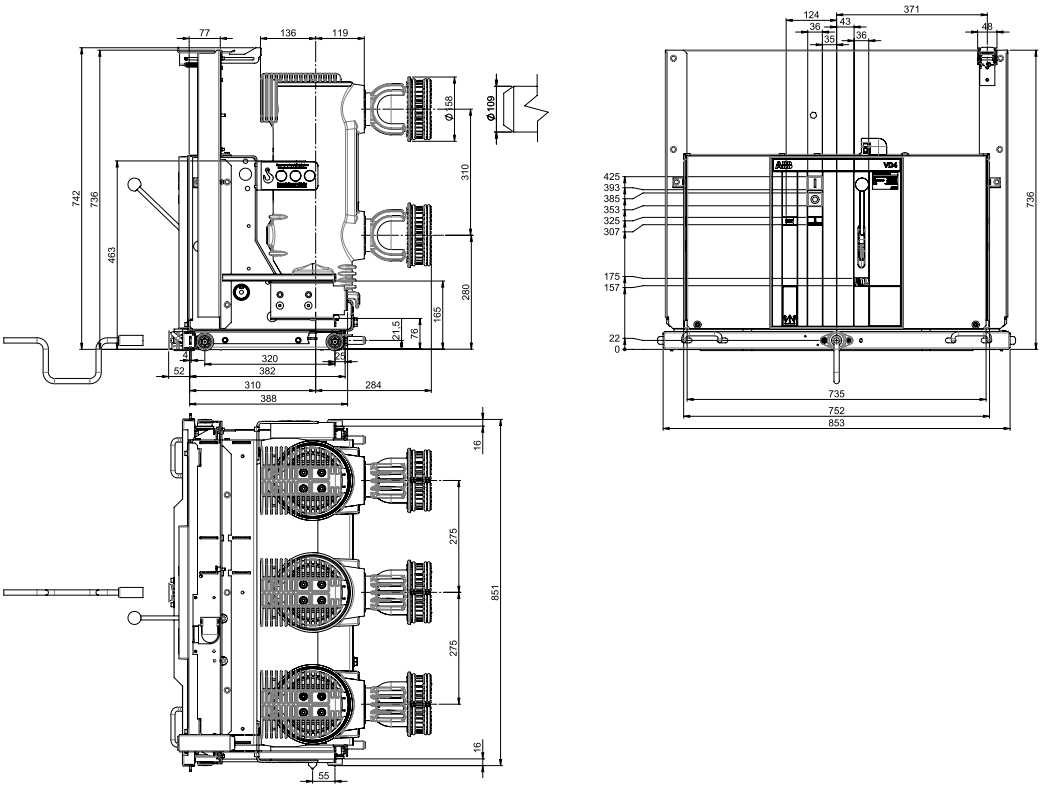
VD4/W		
TN	1VCD003596	
Ur	12	kV
	17.5	kV
Ir	3150	A (*)
Isc	50	kA



(*) 4000 A with forced ventilation.

Withdrawable circuit breakers for UniGear ZS1 switchgear

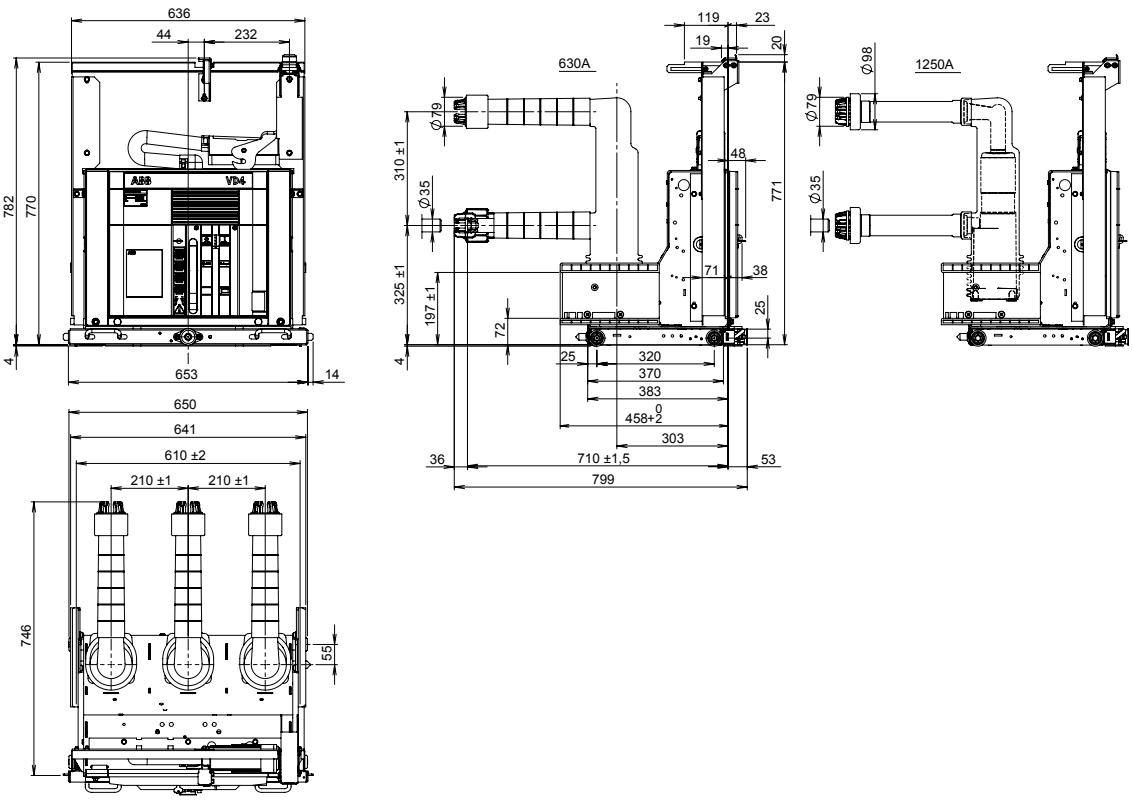
VD4/P		
TN	1VCD003943	
Ur	12	kV
	17	kV
Ir	1250	A
	1600	A
	2000	A
	2500	A
	3150	A (*)
Isc	63	kA



(*) 4000 A with forced ventilation.

Withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube PB4 modules

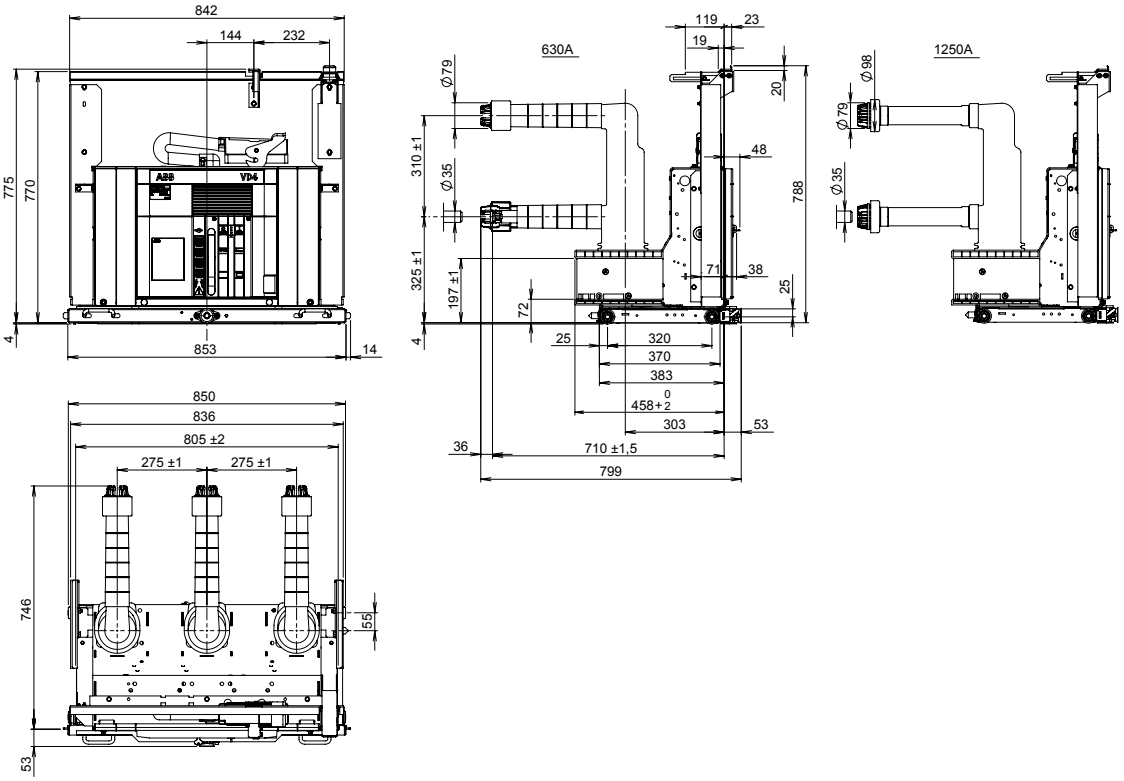
VD4/P		
TN	7413	
Ur	24	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA



Overall dimensions

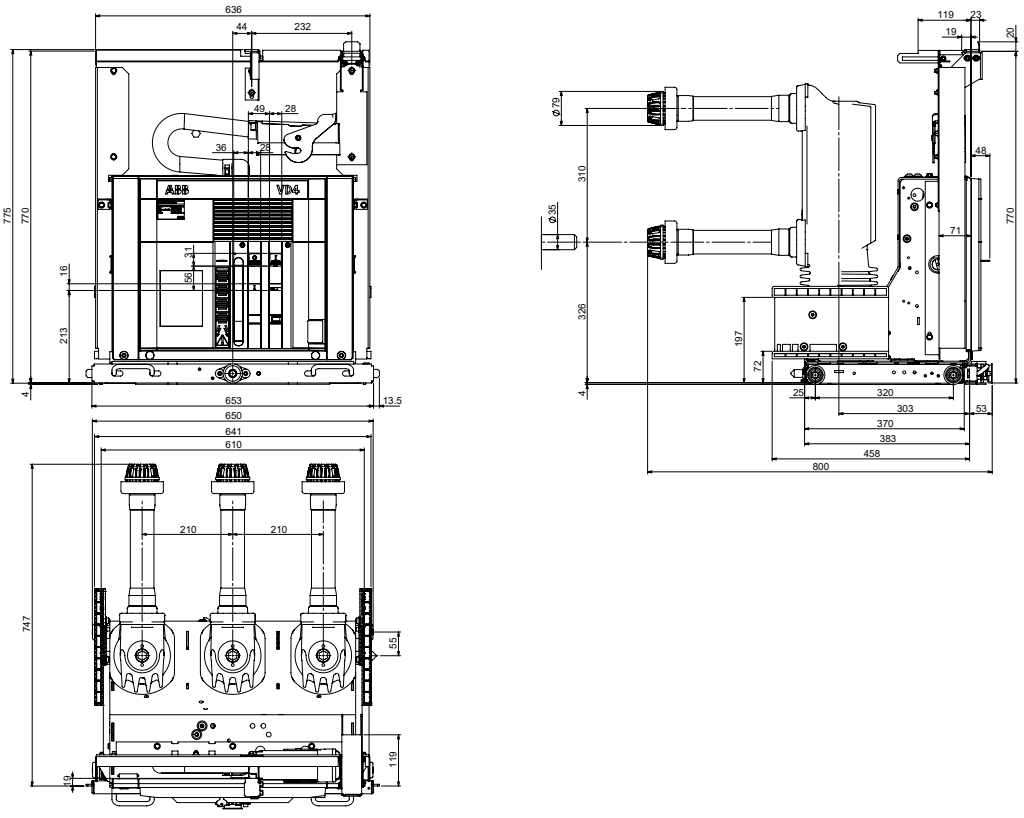
Withdrawable circuit breakers for UniGear ZS1 switchgear

VD4/P		
TN	7414	
Ur	24	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA



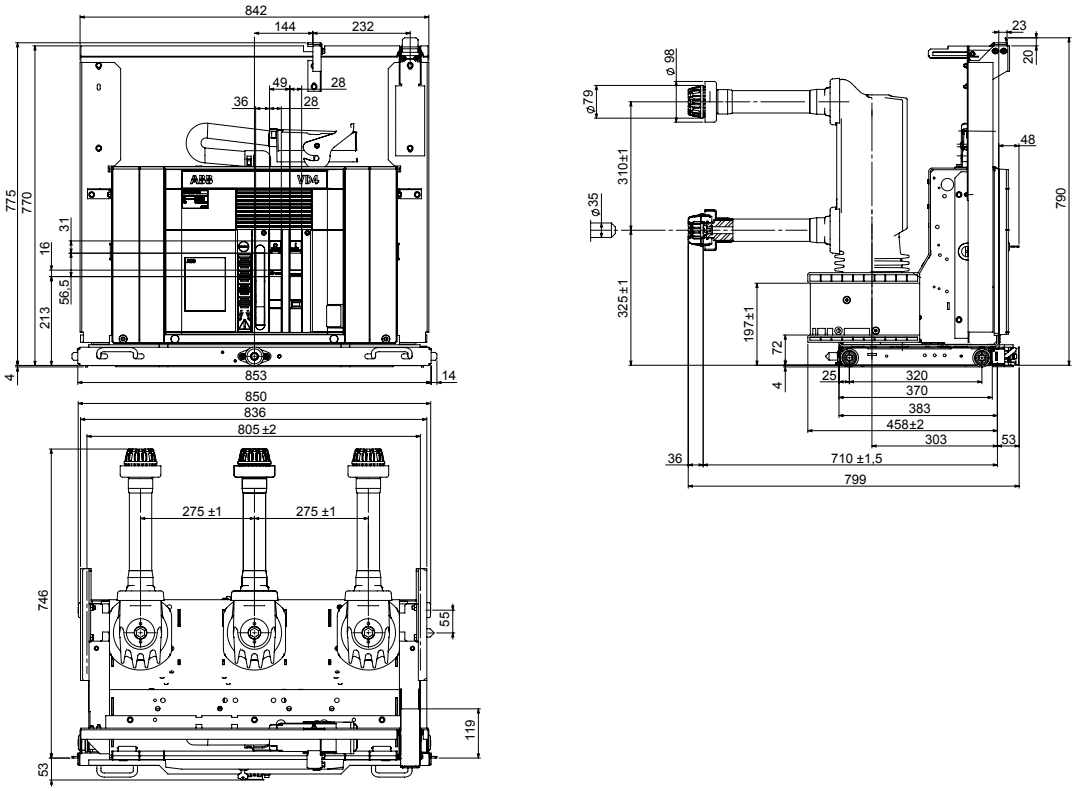
Withdrawable circuit breakers for UniGear ZS1 switchgear and PowerCube PB4 modules

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



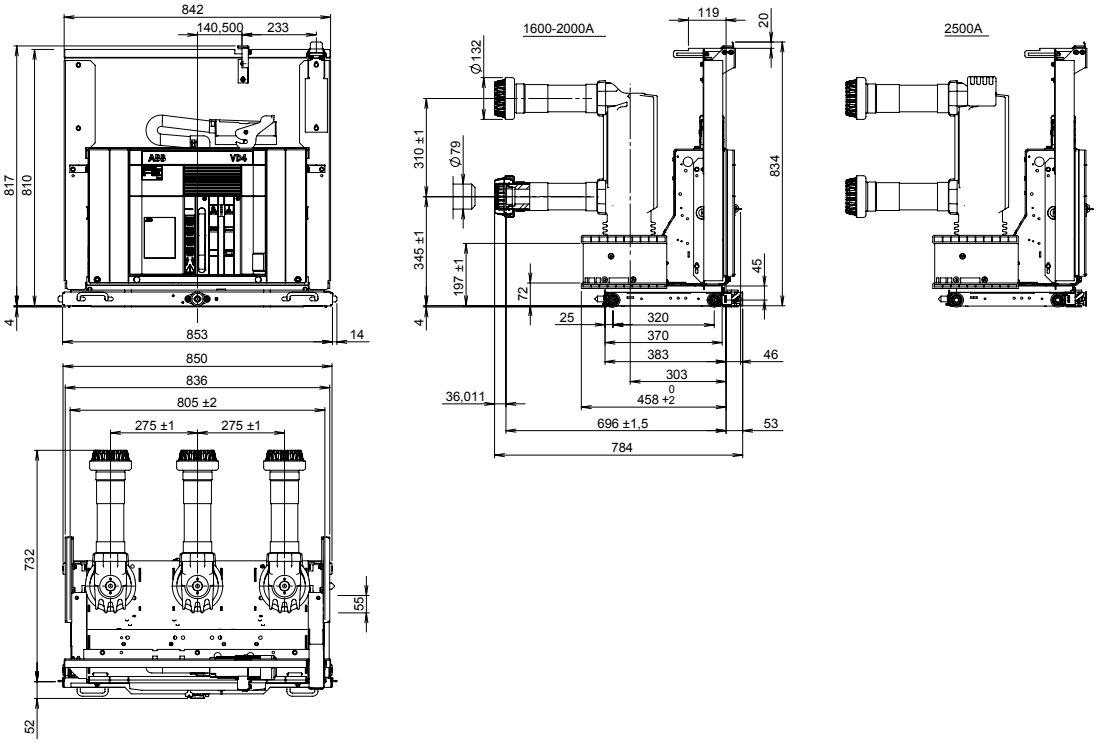
Withdrawable circuit breakers for UniGear ZS1 switchgear

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
Ir	1600	A
	2000	A
	2500	A (1)
Isc	16	kA
	20	kA
	25	kA
	31.5	kA

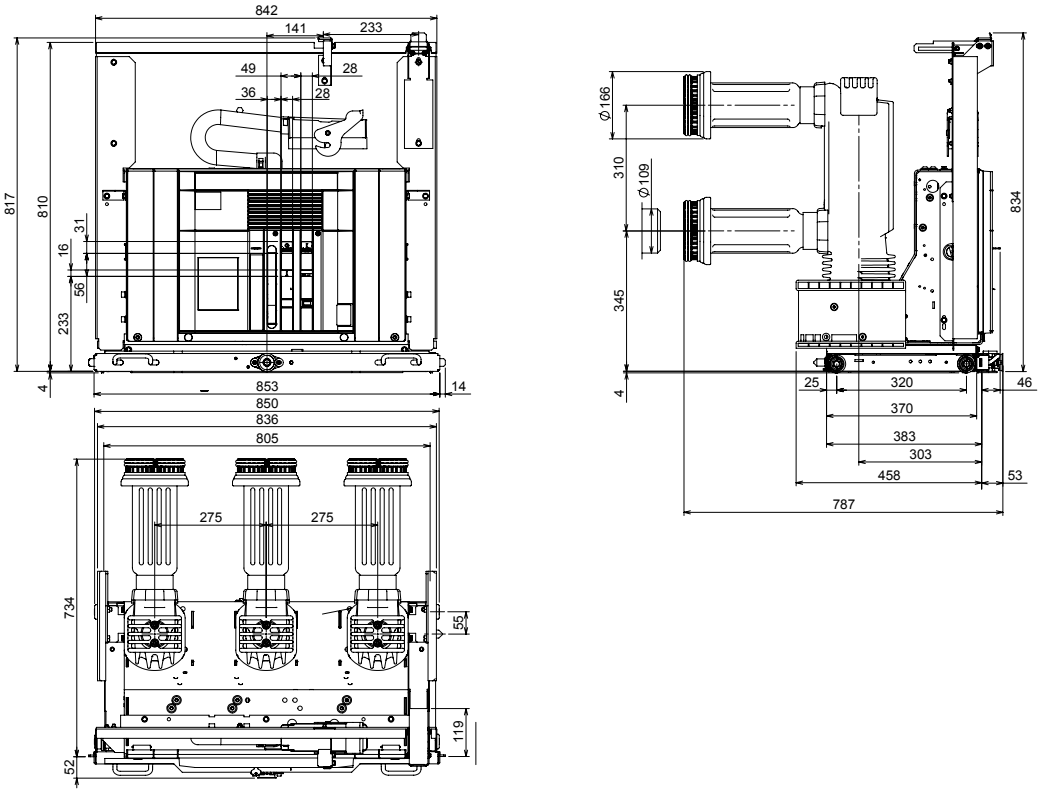


(1) 2300 A rated uninterrupted current is guaranteed with natural ventilation. 2500 A rated uninterrupted current is guaranteed with forced ventilation.

Overall dimensions

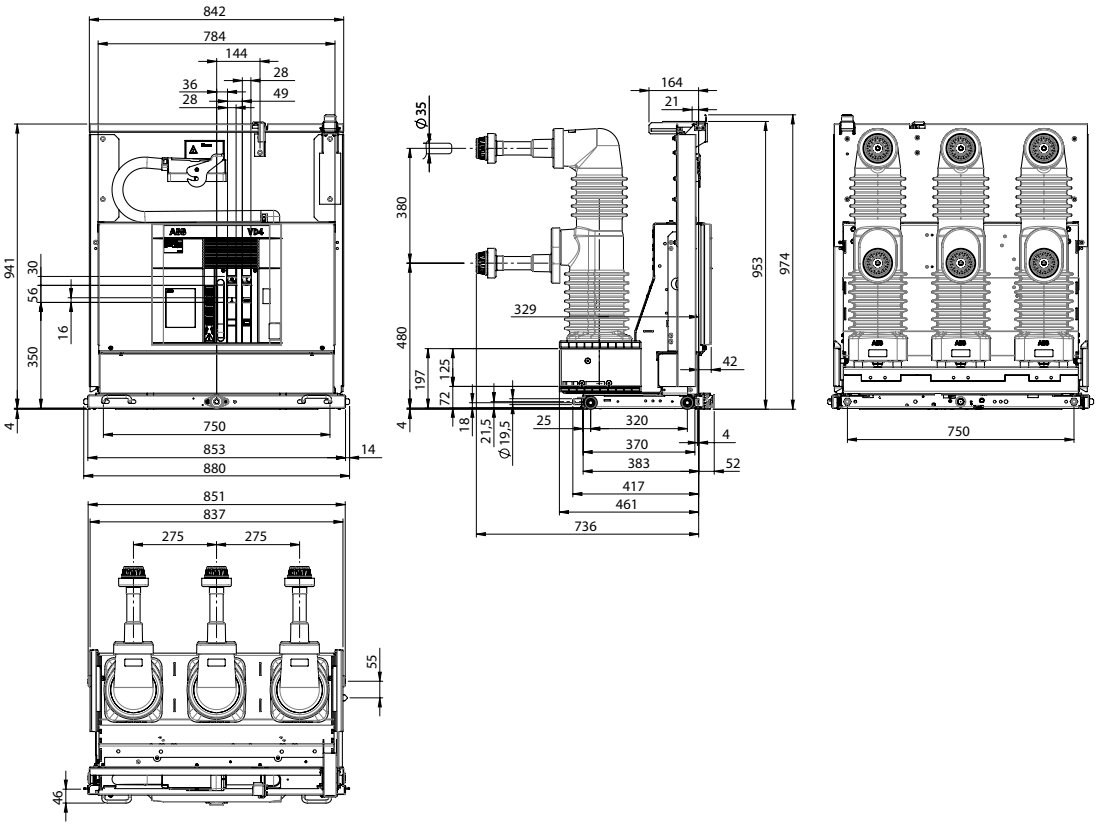
Withdrawable circuit breakers for UniGear ZS1 switchgear

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



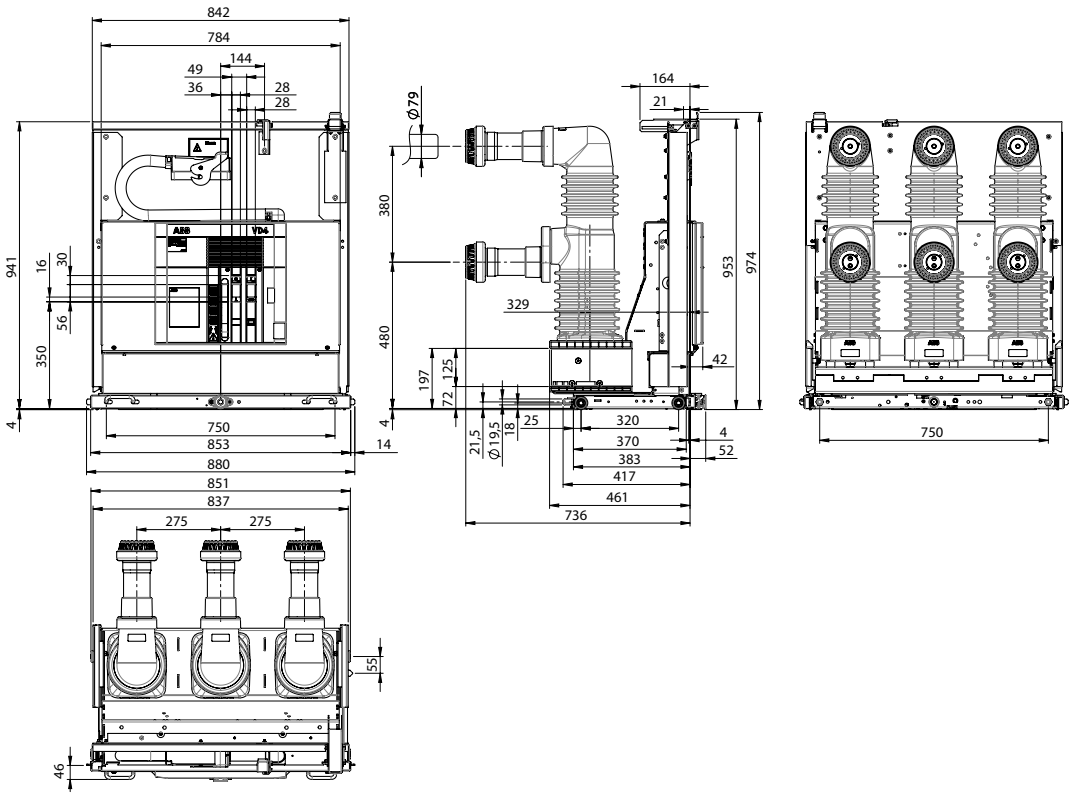
Withdrawable circuit breakers for UniGear ZS2 switchgear and Powerbloc modules

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 and Powerbloc modules

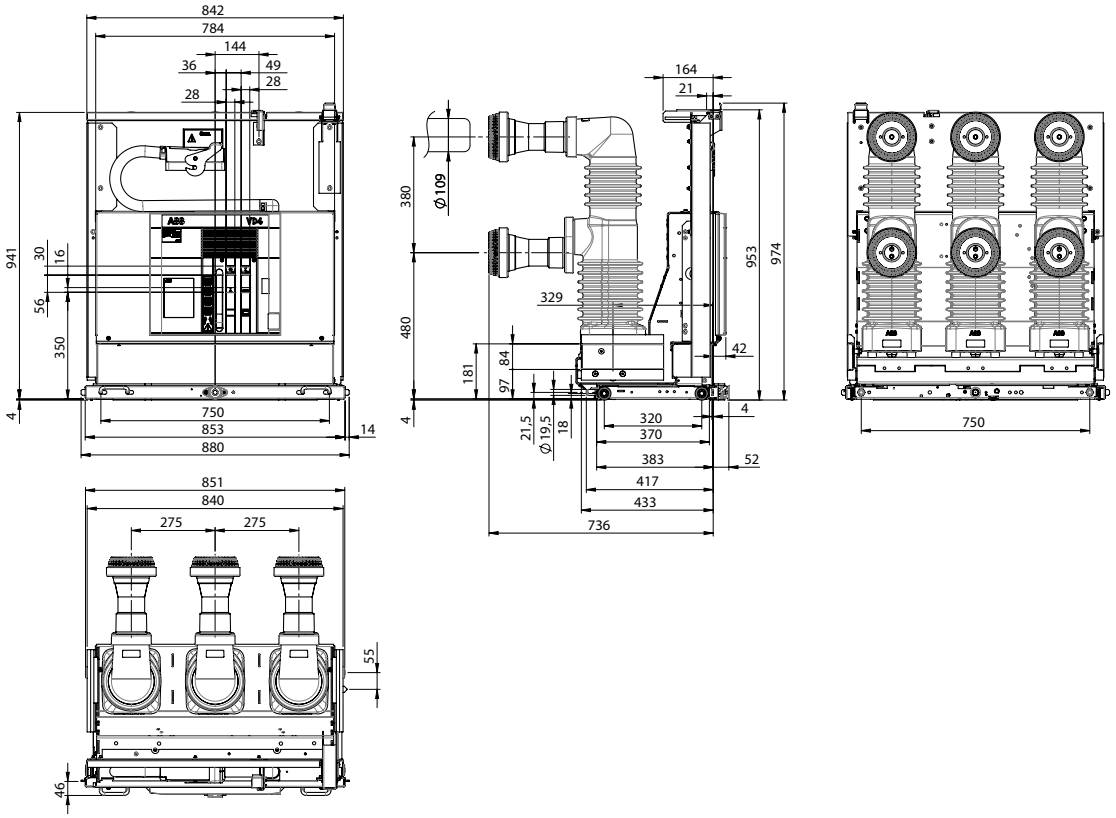
VD4/W		
TN	1VYN300901RA	
Ur	36	kV
Ir	1600	A
	2000	A
	2500	A (*)
Isc	20	kA
	25	kA
	31.5	kA



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

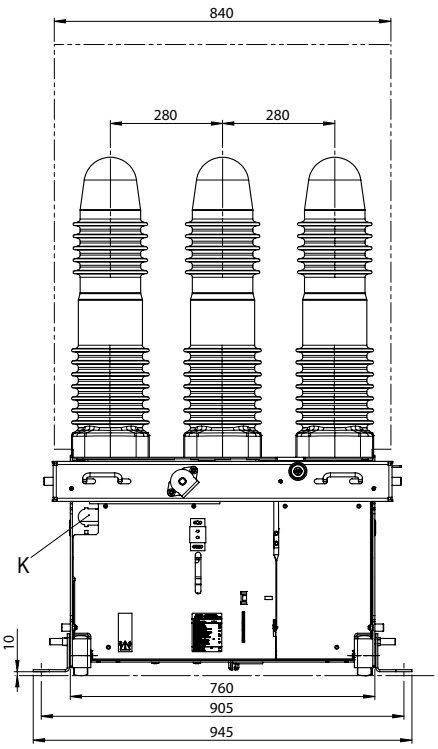


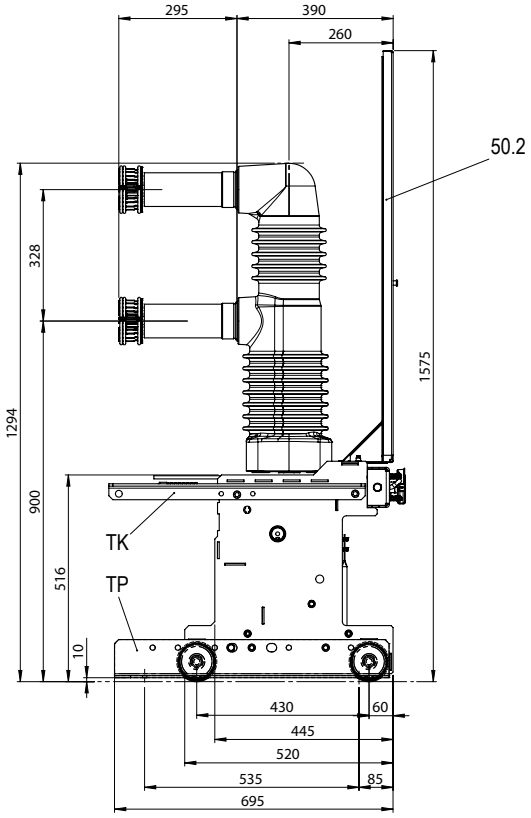
(*) 3150 A rated uninterrupted current is guaranteed with forced ventilation.

Overall dimensions

Withdrawable circuit breakers for ZS3.2 switchgear

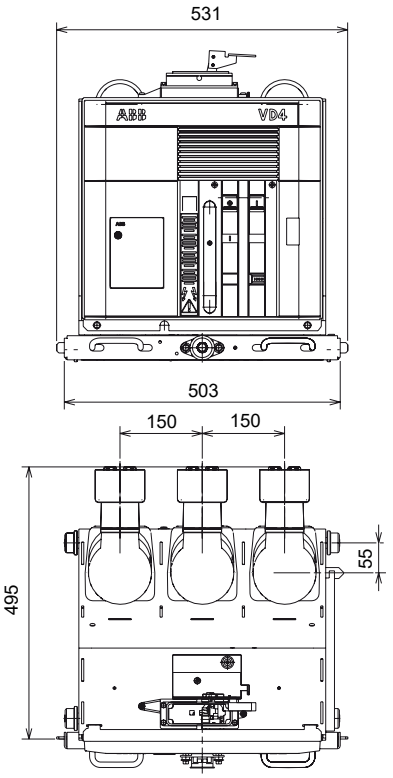
VD4		
TN	GCEM700198	
Ur	36-40.5	kV
Ir	1250	A
	1600	A
	2000	A
	2500	A
	3150	A
Isc	20	kA
	25	kA
	31.5	kA
	40	kA

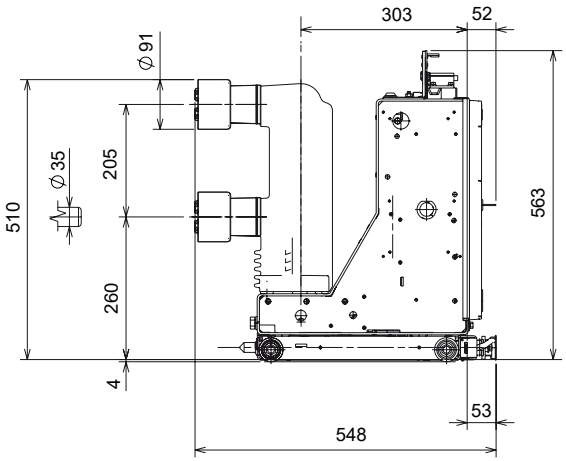




Withdrawable circuit breakers for ZS8.4 switchgear

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

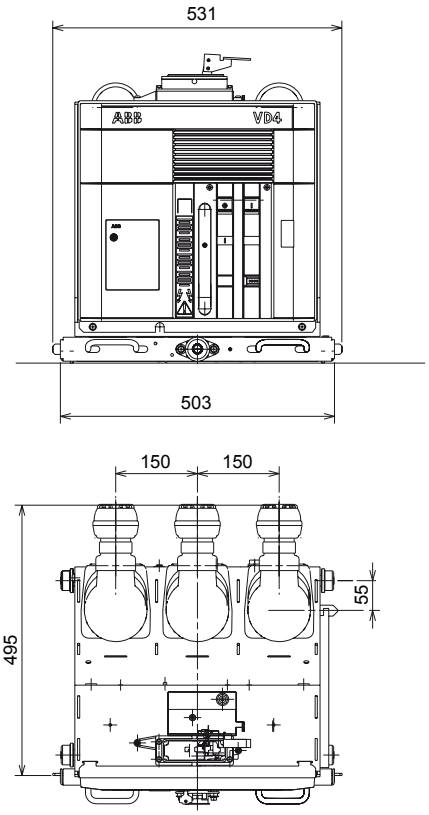


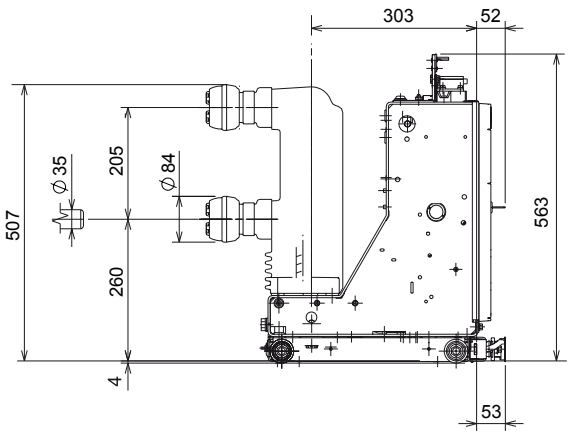


Withdrawable circuit breakers for ZS8.4 switchgear

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

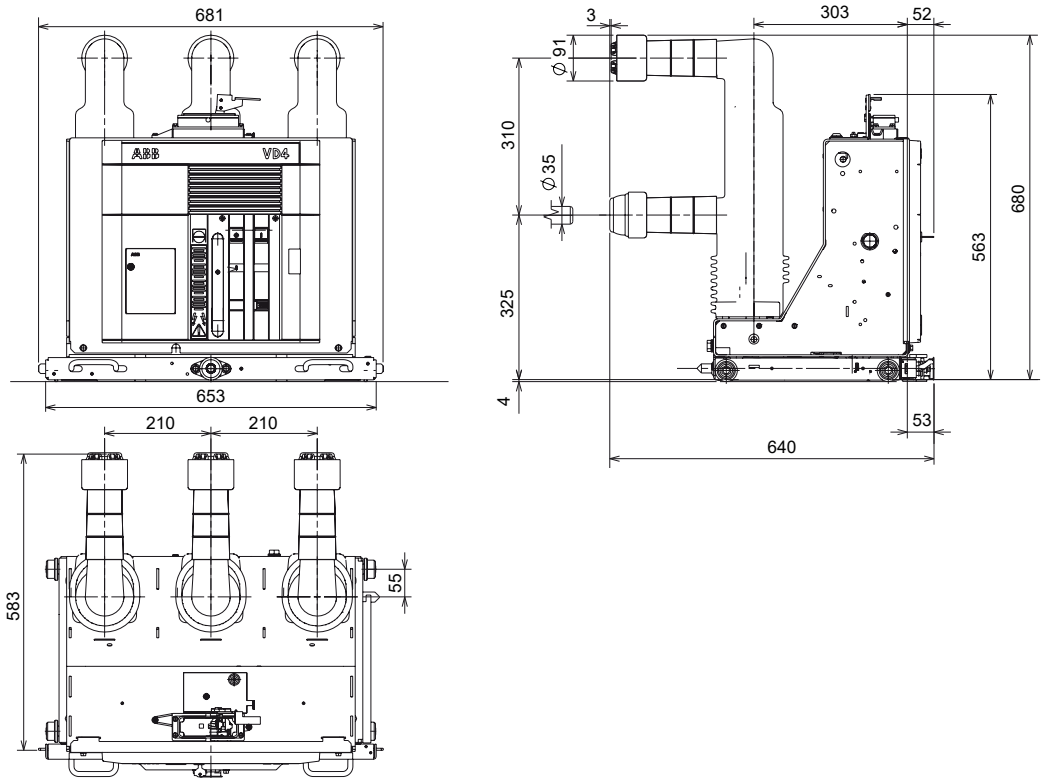




Overall dimensions

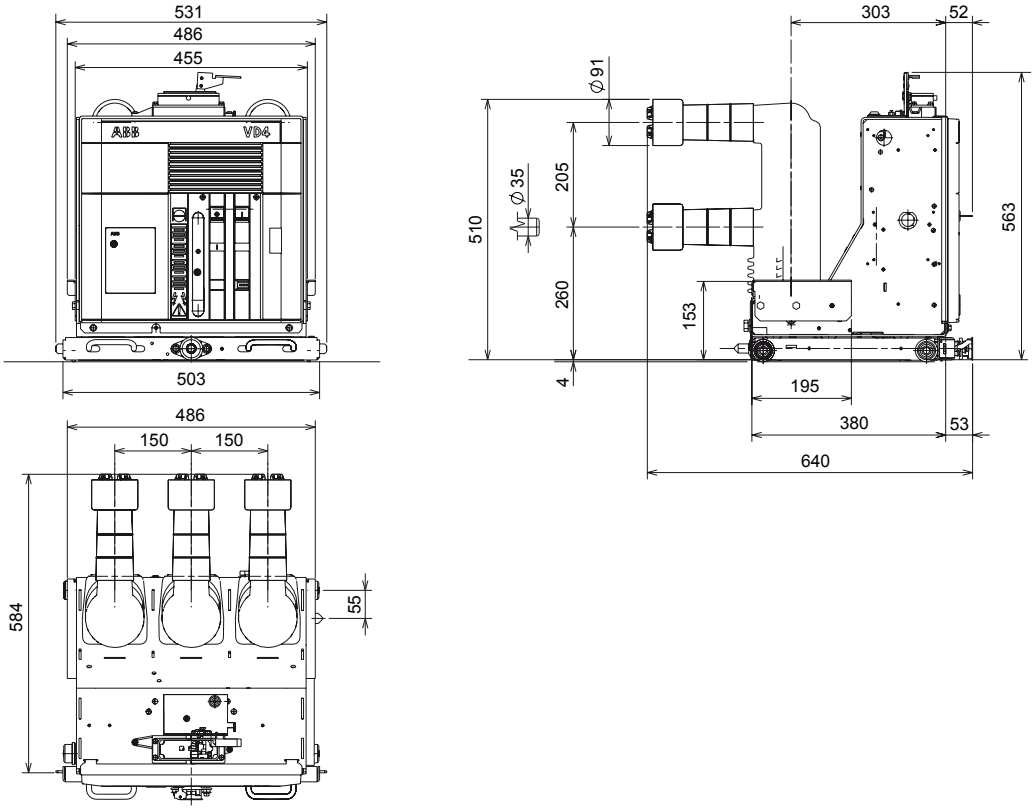
Withdrawable circuit breakers for ZS8.4 switchgear

VD4/Z8		
TN	1VCD000089	
Ur	24	kV
Ir	630	A
Isc	16	kA
	20	kA
	25	kA



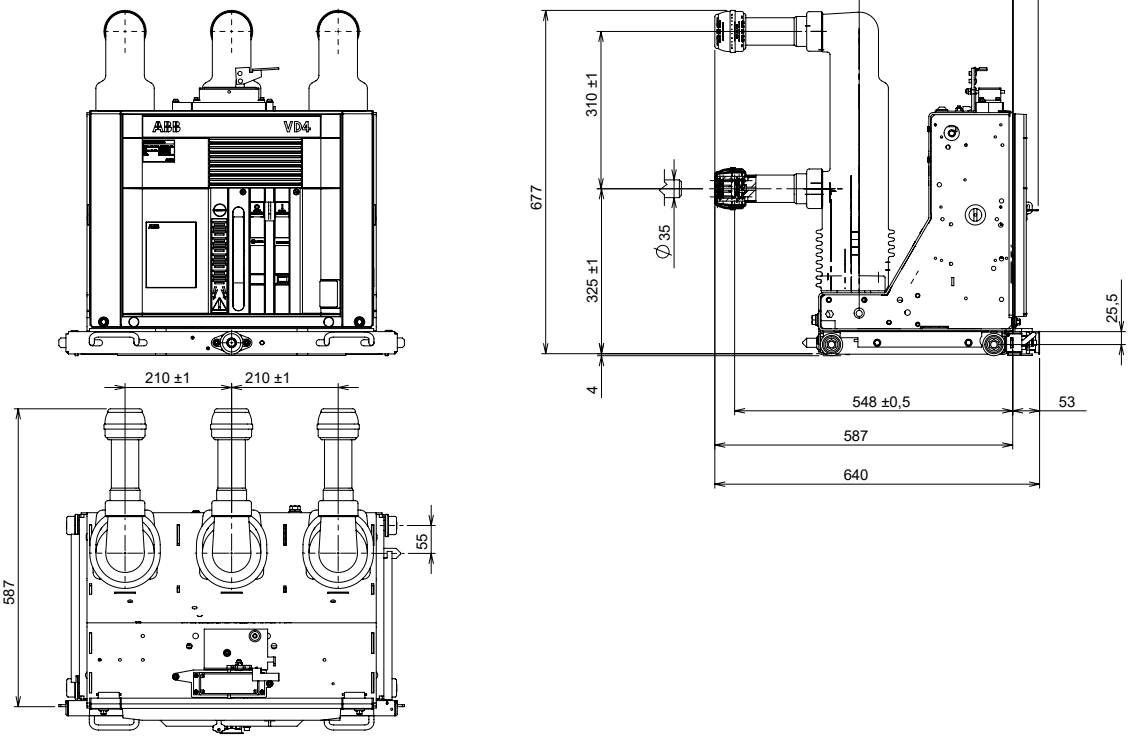
Withdrawable circuit breakers for ZS8.4 switchgear

VD4/ZT8		
TN	1VCD000093	
Ur	12	kV
Ir	630	A
Isc	20	kA
	25	kA



Withdrawable circuit breakers for ZS8.4 switchgear

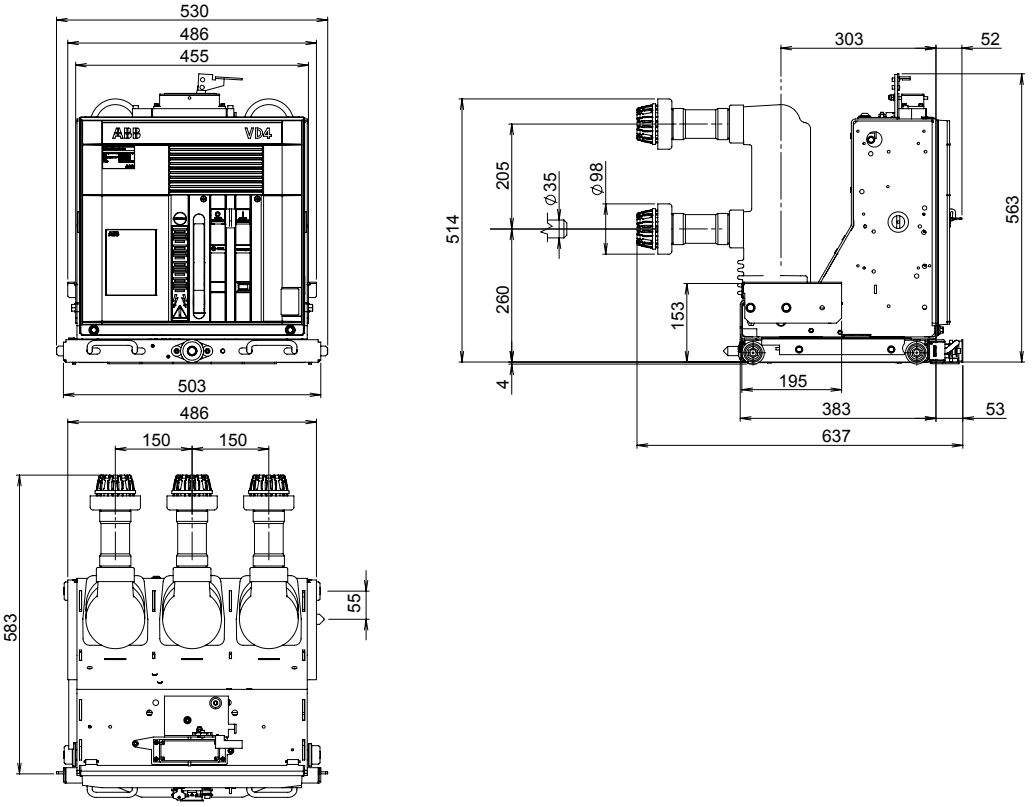
VD4/Z8		
TN	1VCD000138	
Ur	24	kV
Ir	1250	A
Isc	16	kA
	20	kA
	25	kA



Withdrawable circuit breakers for ZS8.4 switchgear

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

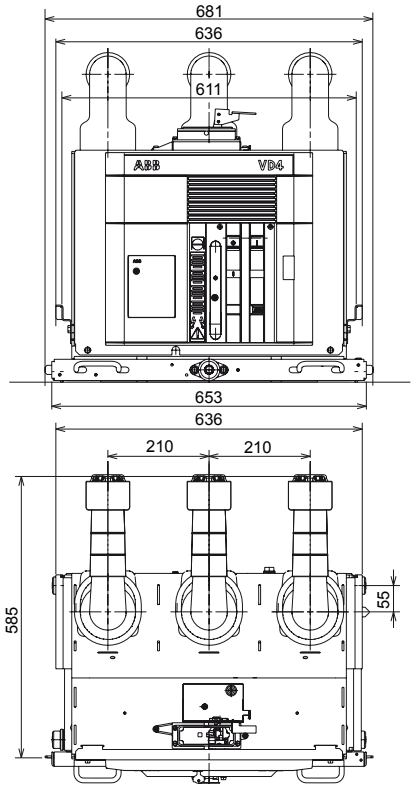
VD4/ZT8		
TN	1VCD000134	
Ur	17.5	kV
Ir	630	A
	1250	A
Isc	20	kA
	25	kA

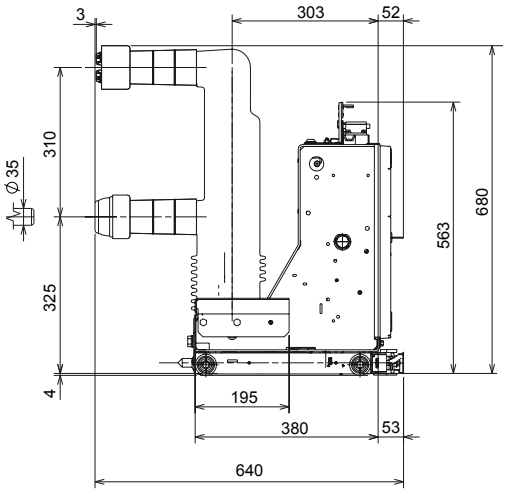


Overall dimensions

Withdrawable circuit breakers for ZS8.4 switchgear

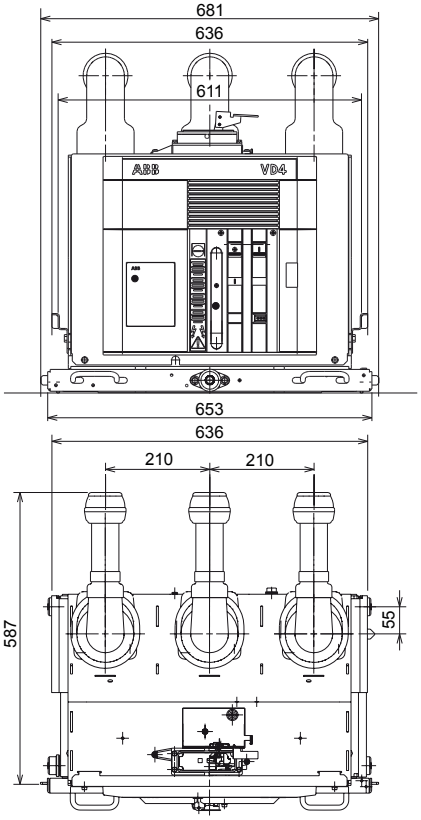
VD4/ZT8		
TN	1VCD000090	
Ur	24	kV
Ir	630	A
	16	kA
Isc	20	kA
	25	kA

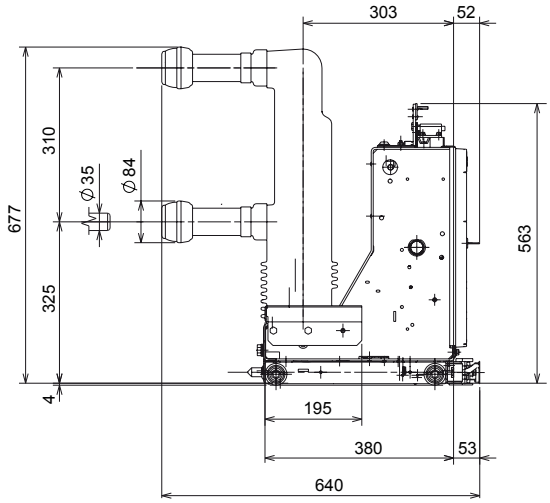




Withdrawable circuit breakers for ZS8.4 switchgear

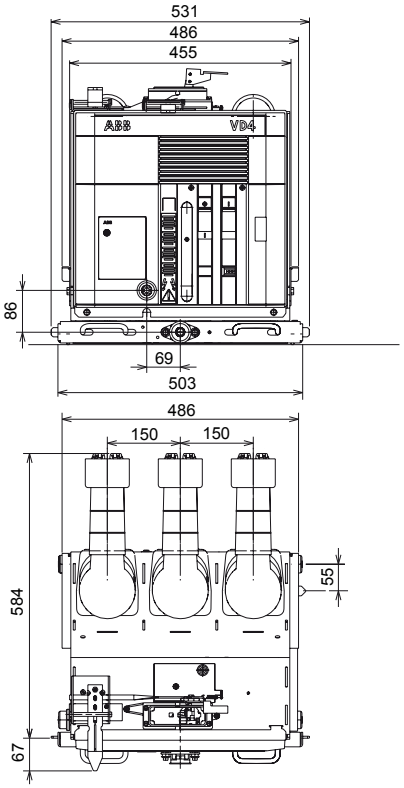
VD4/ZT8		
TN	1VCD000136	
Ur	24	kV
Ir	1250	A
	16	kA
Isc	20	kA
	25	kA

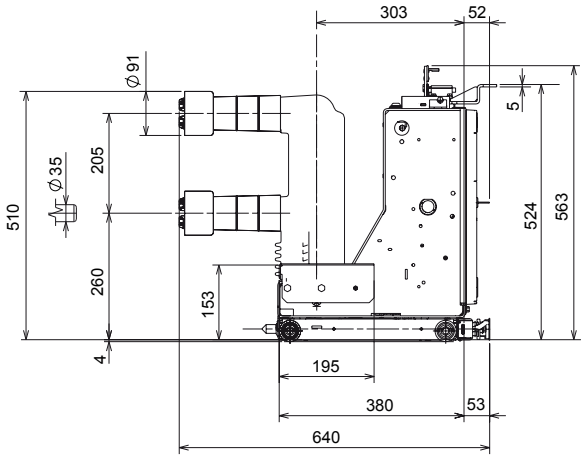




Withdrawable circuit breakers for ZS8.4 switchgear

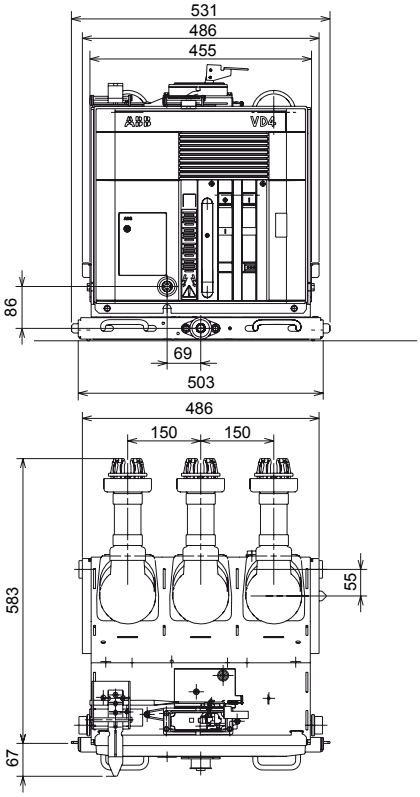
VD4/ZS8		
TN	1VCD000091	
Ur	12	kV
Ir	630	A
Isc	20	kA
	25	kA

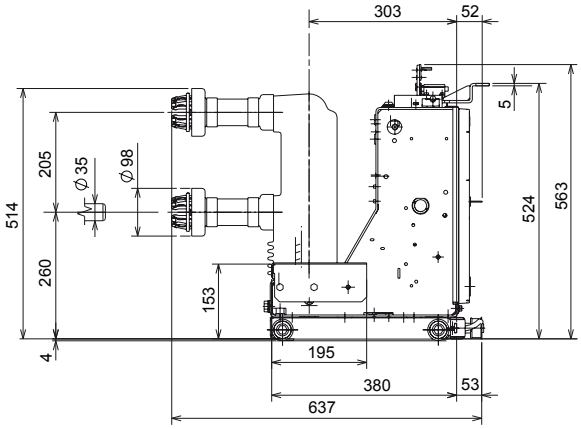




Withdrawable circuit breakers for ZS8.4 switchgear

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

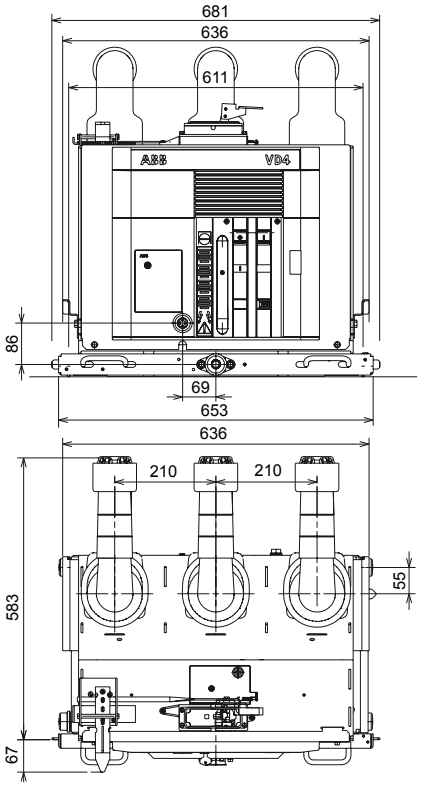


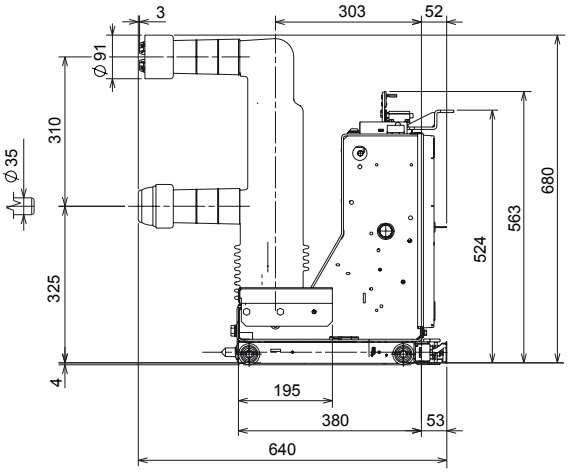


Overall dimensions

Withdrawable circuit breakers for ZS8.4 switchgear

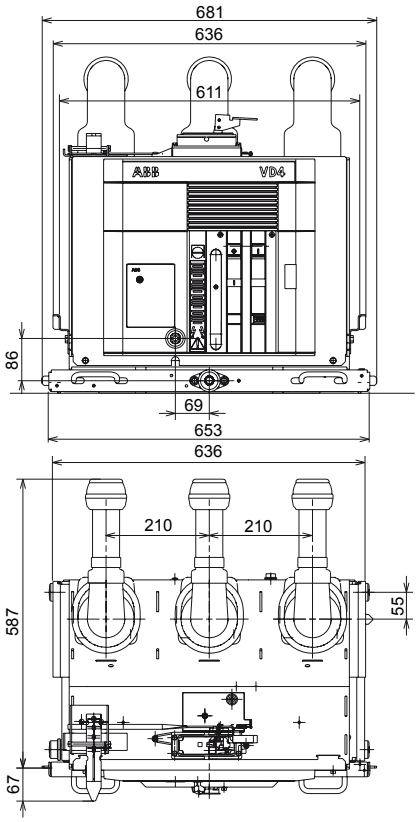
VD4/ZS8		
TN	1VCD000088	
Ur	24	kV
Ir	630	A
	16	kA
Isc	20	kA
	25	kA

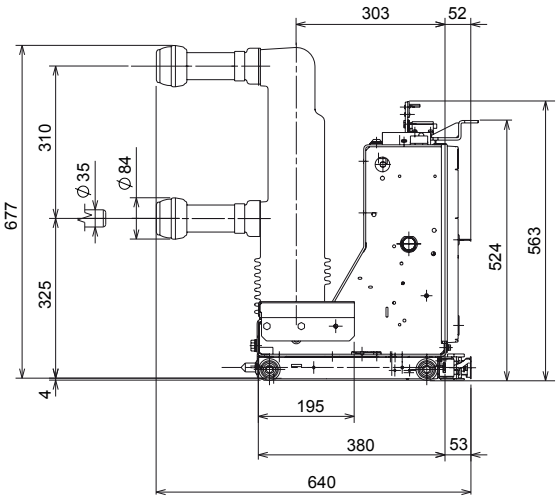




Withdrawable circuit breakers for ZS8.4 switchgear

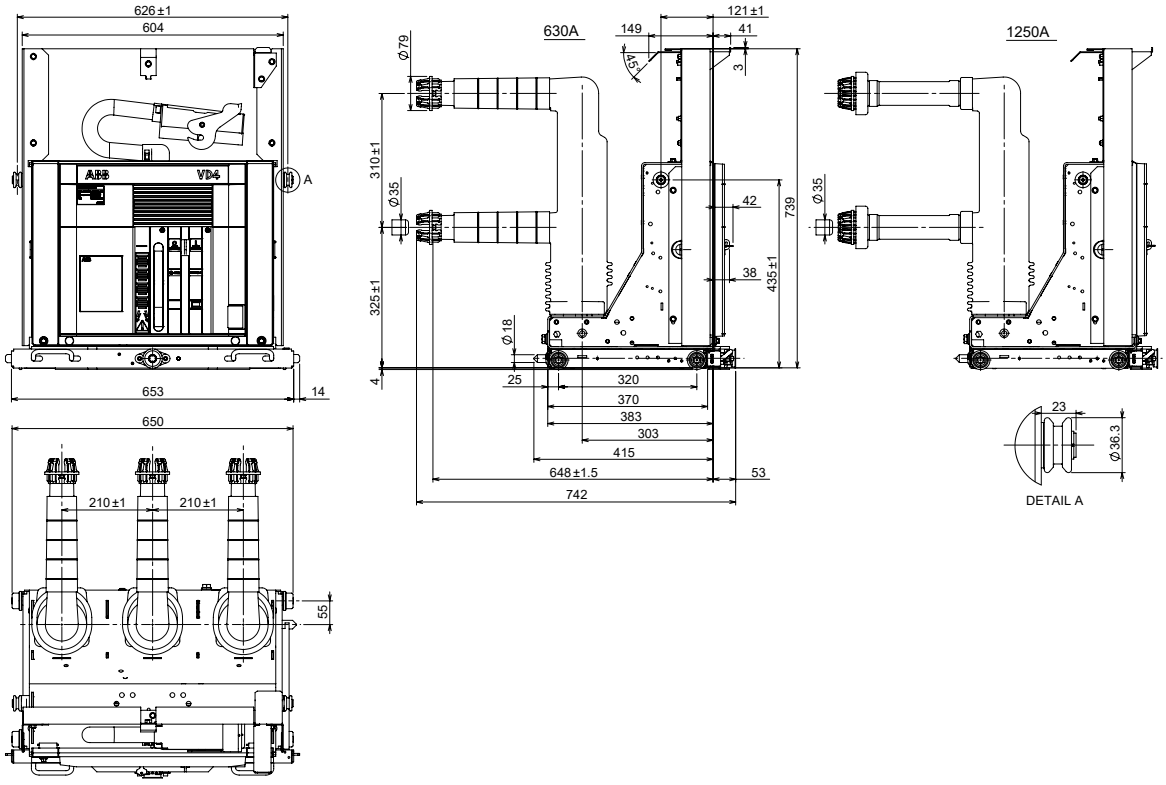
VD4/ZS8		
TN	1VCD000135	
Ur	24	kV
Ir	1250	A
	16	kA
Isc	20	kA
	25	kA





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



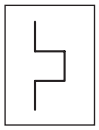
Electric circuit diagram

Operating state shown

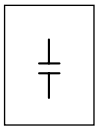
The diagrams are shown the following conditions:

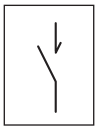
- Circuit breaker open and connected (only withdrawable circuit breaker)
- Circuits de-energized
- Closing springs discharged

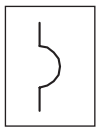
Graphical symbols for electric diagrams

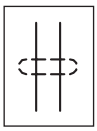

Thermal effect

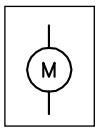

Exposed conductive part, frame


Capacitor (general symbol)

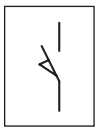

Passing make contact closing momentarily during release

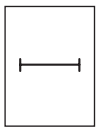

Electromagnetic effect

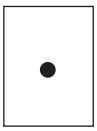

Conductors in shielded cable (e.g. two conductors)

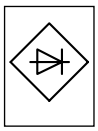


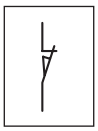
Motor (general symbol)

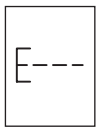

Closing position contact (limit switch)

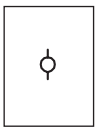

Timing

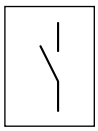

Connection of conductors

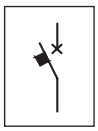

Rectifier with two half-waves (bridge)

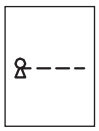

Opening position contact (limit switch)


Pushbutton control

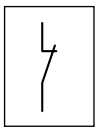

Terminal or clamp

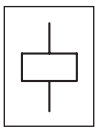

Make contact


Power circuit breaker with automatic opening

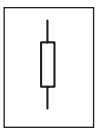

Key control

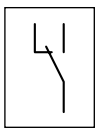

Socket and plug (female and male)

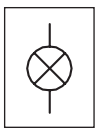

Break contact


Control coil (general symbol)


Earth (general symbol)

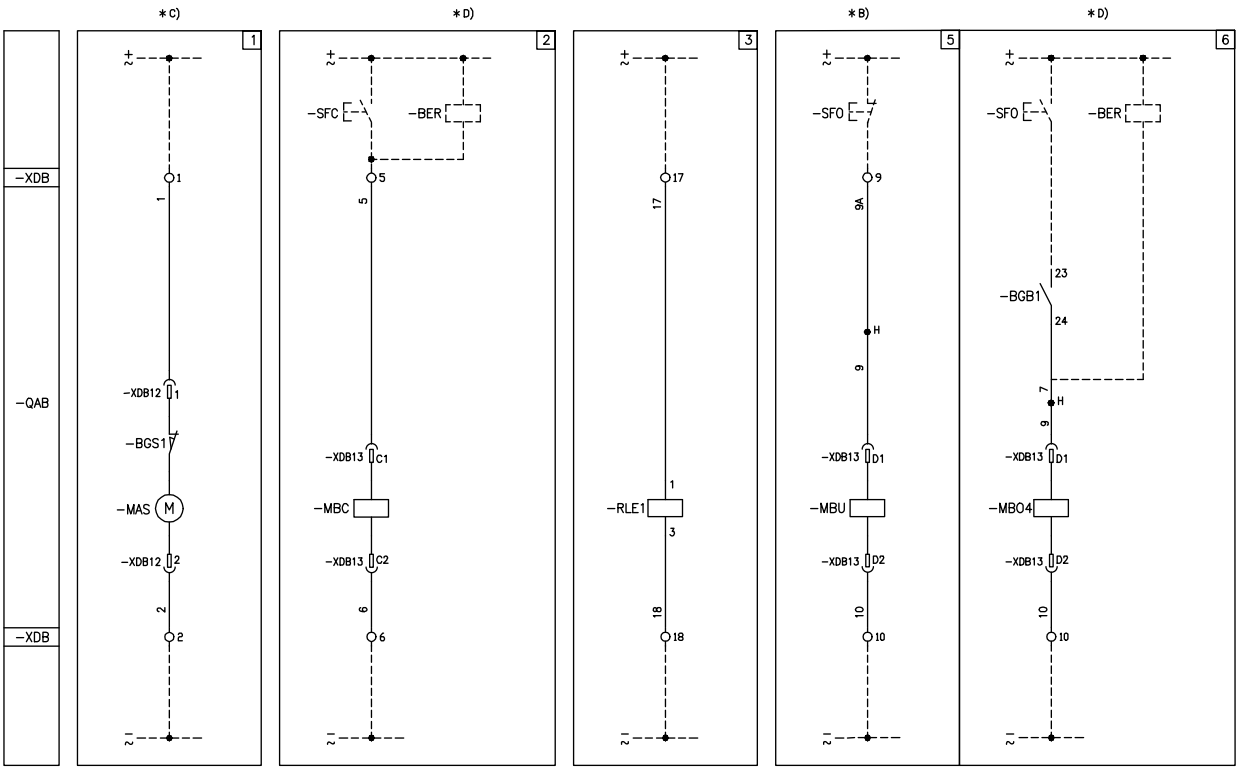

Resistor (general symbol)

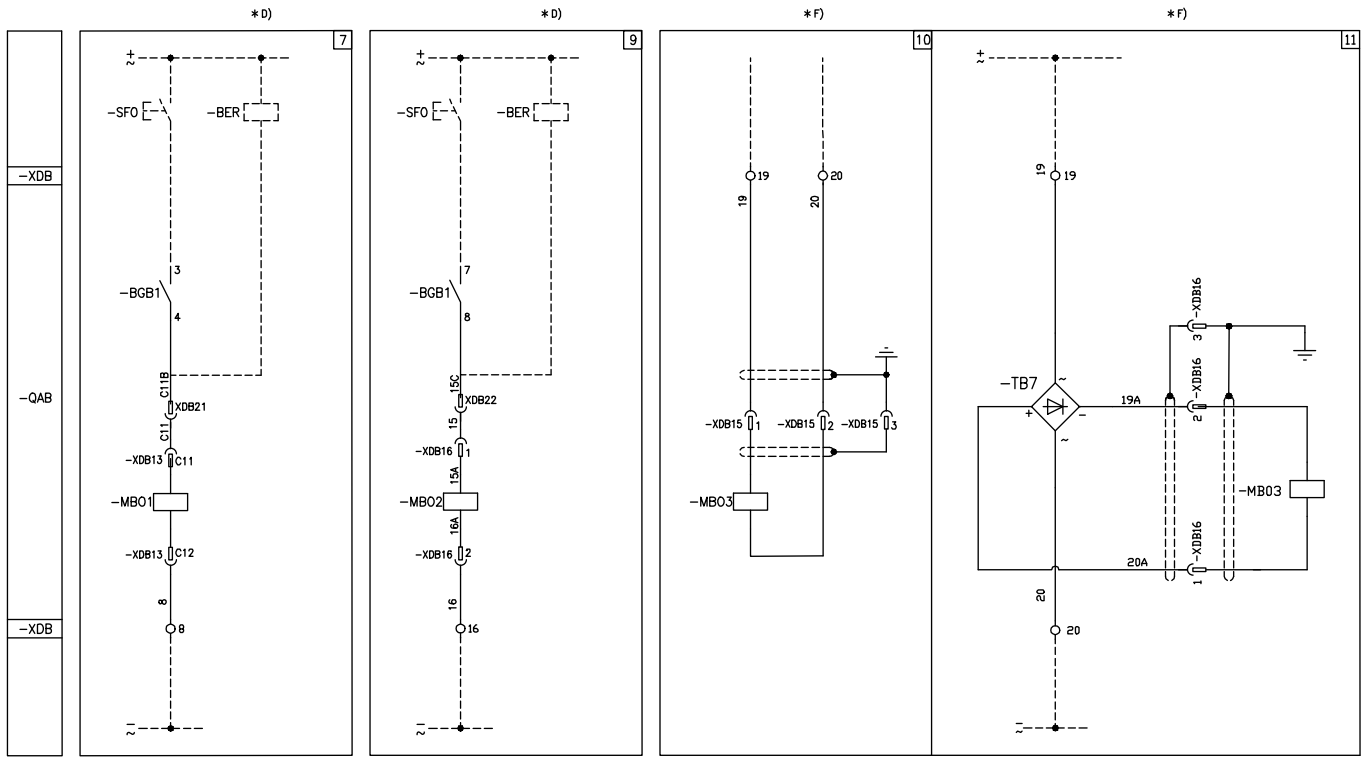

Change-over break before make contact


Lamp (general symbol)

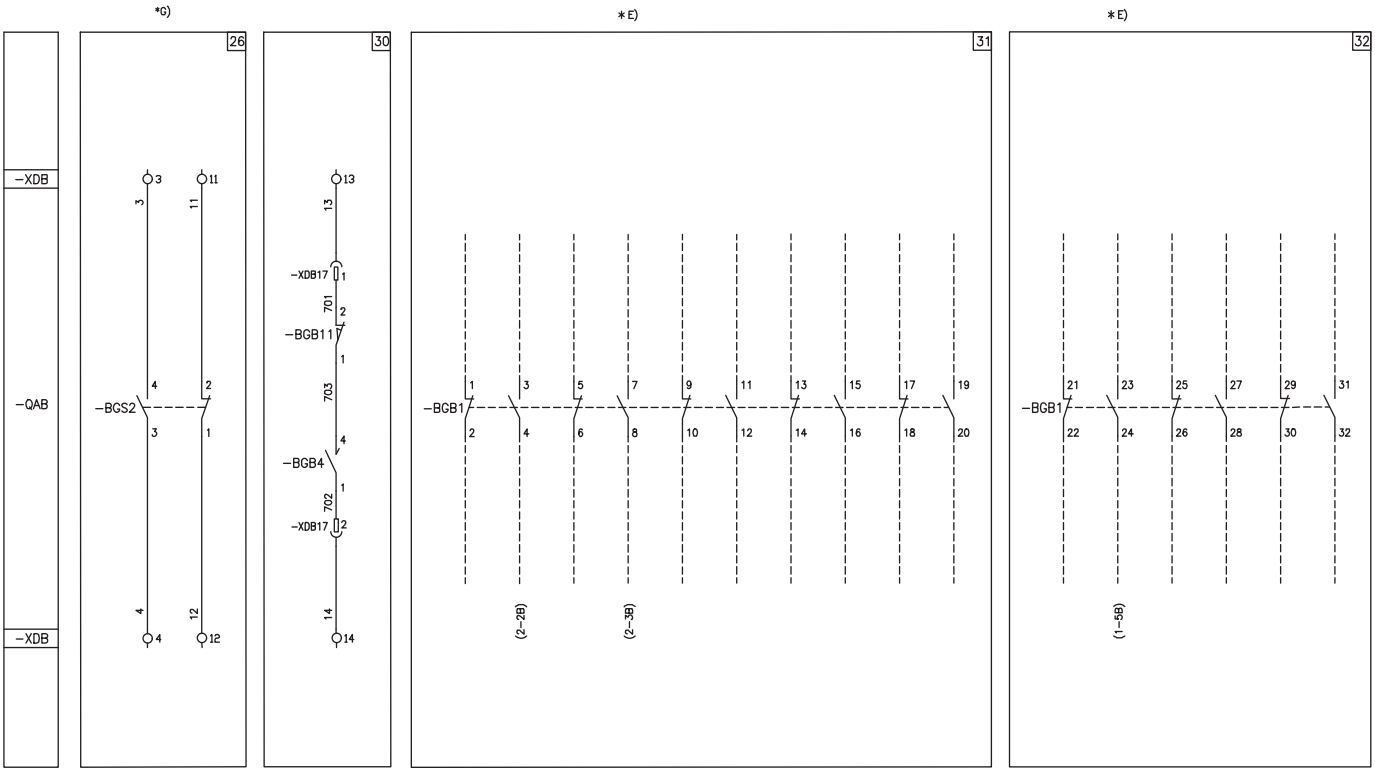
Electric circuit diagram of 12 .. 36 kV fixed circuit breakers 1VCD400151

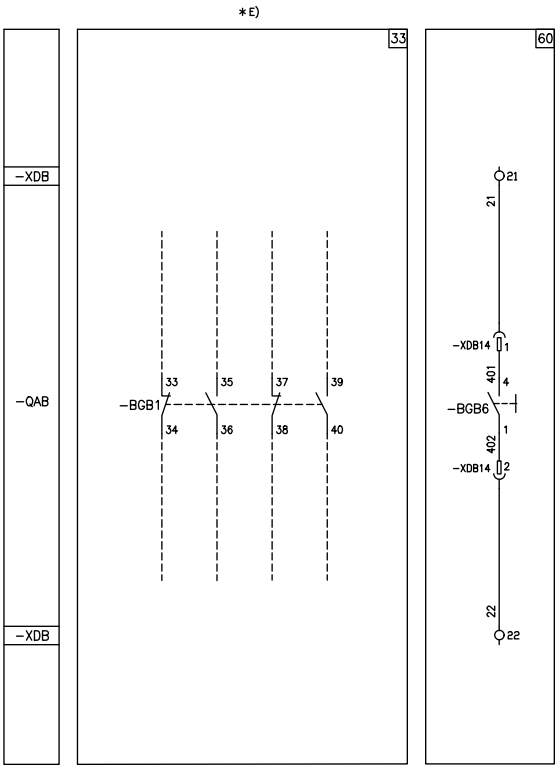
The electric circuit diagram in this section concerns 12 .. 36 kV fixed circuit breakers.

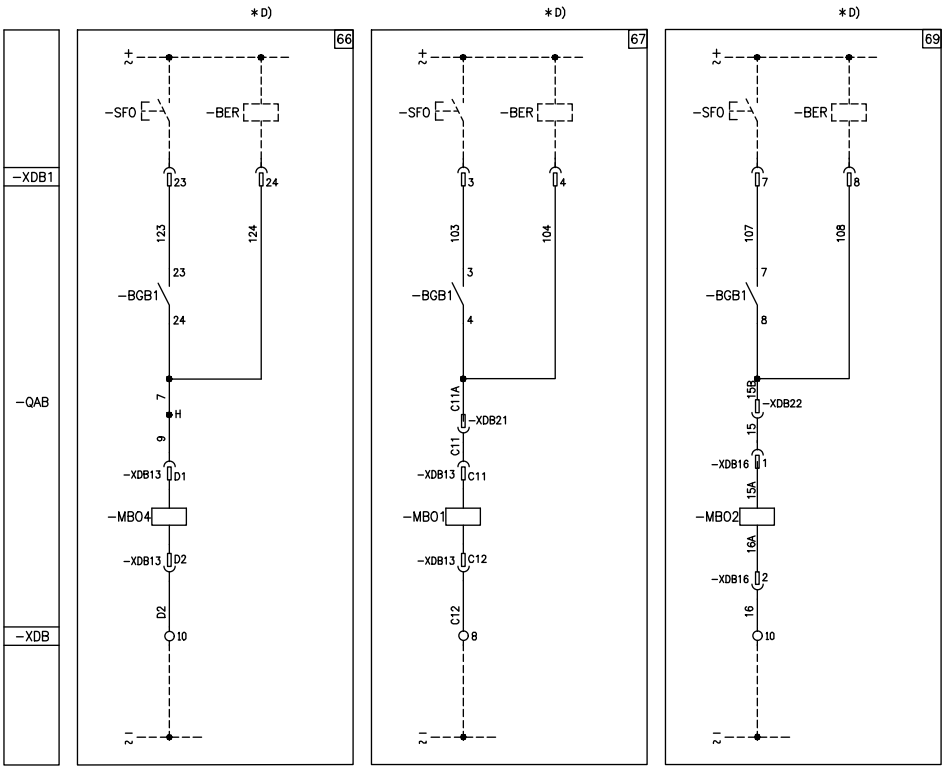


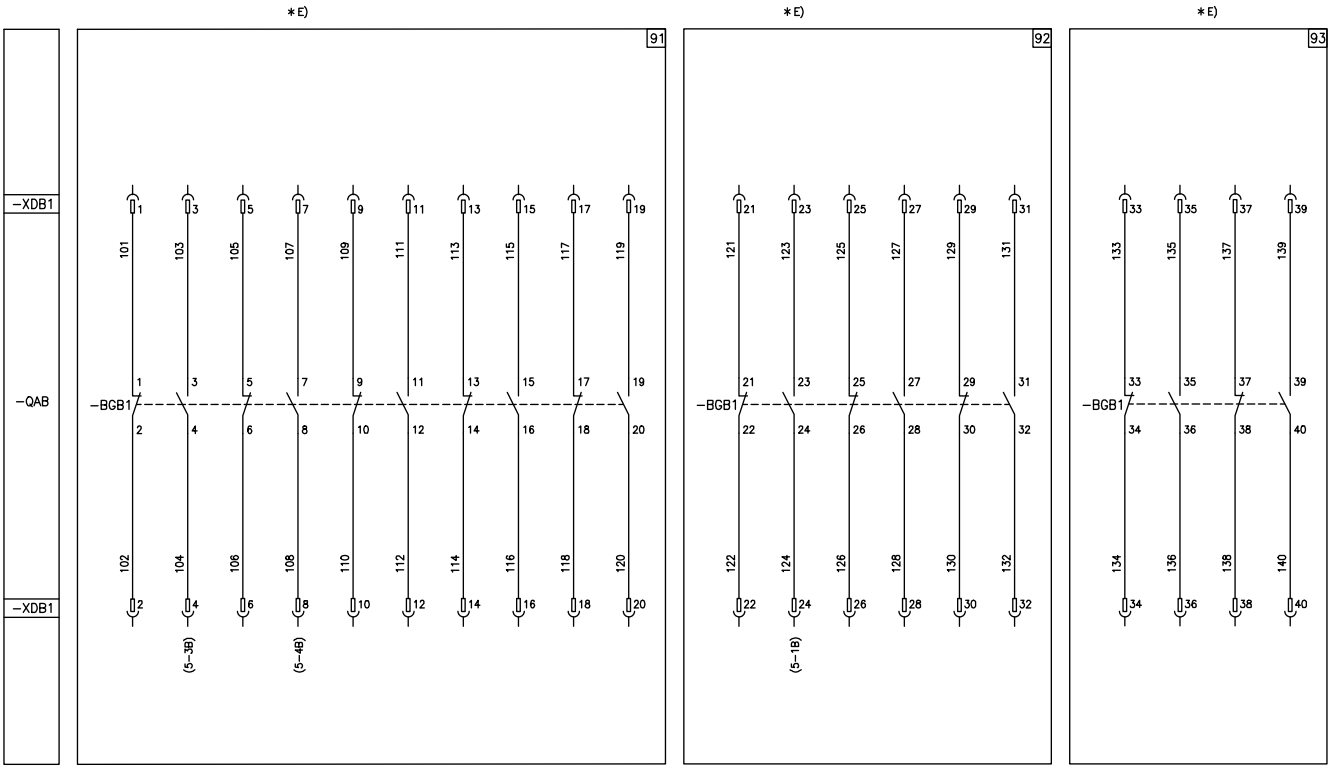


Electric circuit diagram






*D)
66
67
69
-XDB1
-QAB
-XDB
-SFO
-BER
-BGB1
-XDB13
-MBO4
-MBO1
-MBO2
-XDB21
-XDB22
-XDB16
D1
D2
C11
C12
H


*E)
91
92
93
-XDB1
-QAB
-BGB1
(5-3B)
(5-4B)
(5-1B)

Electric circuit diagram

Key		
□	=	Figure number of the diagram.
*	=	See note indicated by the letter.
-BER	=	SOR Test Unit device for monitoring continuity of shunt opening and closing release winding (see note D)
-BGB1	=	Auxiliary contacts of circuit breaker.
-BGB4	=	Auxiliary let-through contact of circuit breaker with momentary closing during circuit breaker opening.
-BGB6	=	Contact for electrical signaling of undervoltage release de-energized.
-BGB11	=	Contact for cutting off electrical signal -BGB4 if opening operation is performed in the manual mode.
-BGS1	=	Limit contact of spring loading motor.
-BGS2	=	Contact for signaling closing springs loaded-discharged.
-MAS	=	Motor for loading closing springs (see note C).
-MBC	=	Shunt closing release (see note D).
-MBO1	=	First shunt opening release (see note D).
-MBO2	=	Second shunt opening release (see note D).
-MBO3	=	Opening solenoid for release outside circuit breaker (see note F).
-MBO4	=	Third shunt opening release (see note D).
-MBU	=	Under-voltage release (see note B).
-QAB	=	Circuit breaker applications.
-RLE1	=	Locking magnet. Mechanically inhibits circuit breaker closing if de-energized. (Consumption can be limited by connecting a delayed operation enabling pushbutton in series).
-SFC	=	Pushbutton or contact for closing circuit breaker.
-SFO	=	Pushbutton or contact for opening circuit breaker.
-TB7	=	Rectifier for release -MBO3.
-XDB	=	Terminal box of circuit breaker circuits.
-XDB1	=	Connector of circuit breaker circuits.
-XDB10, ...,17	=	Connectors of applications.

Description of the figures		
Fig. 1	=	Circuit of motor for loading closing springs (see note C).
Fig. 2	=	Shunt closing release (anti-pumping is achieved mechanically), (see note D).
Fig. 3	=	Locking magnet. Mechanically inhibits circuit breaker closing if de-energized. Consumption can be limited by connecting a delayed operation enabling pushbutton in series.
Fig. 5	=	Instantaneous undervoltage release (see note B).
Fig. 6, 66	=	Circuit of third shunt opening release with possibility of continuous control of winding (see note D).
Fig. 7, 67	=	Circuit of first shunt opening release with possibility of continuous control of winding (see note D).
Fig. 9, 69	=	Circuit of second shunt opening release with possibility of continuous control of winding (see note D).
Fig. 10	=	Opening solenoid for release outside circuit breaker.
Fig. 11	=	Opening solenoid for release outside circuit breaker with AC supply.
Fig. 26	=	Electrical signaling of closing springs loaded and discharged.
Fig. 30	=	Auxiliary let-through contact of circuit breaker with momentary closing during circuit breaker opening.
Fig. 31, 91	=	Available auxiliary contacts of circuit breaker (see note E).
Fig. 32, 92	=	Available auxiliary contacts of circuit breaker (see note E).
Fig. 33, 93	=	Available auxiliary contacts of circuit breaker (see note E).
Fig. 60	=	Contact for electrical signaling of undervoltage release de-energized.

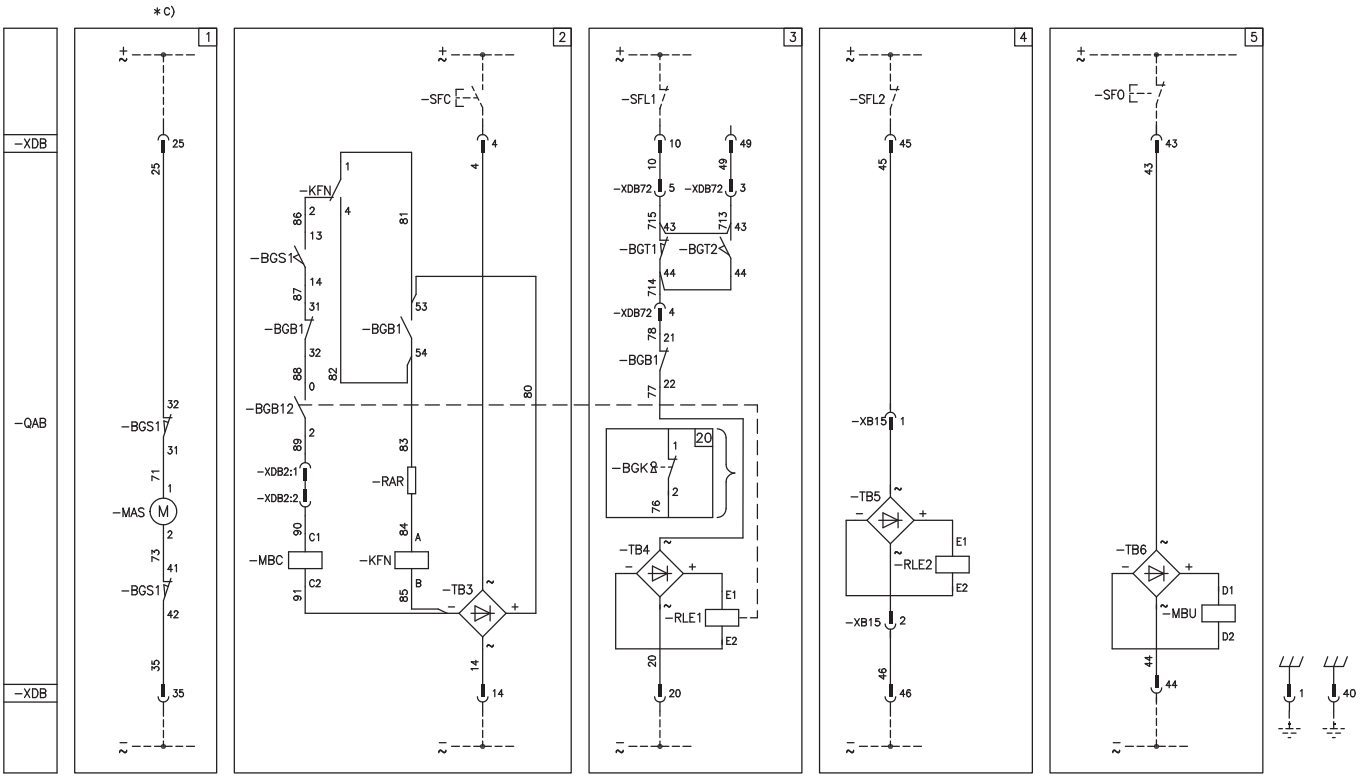
Incompatibility			
The circuits indicated in the following figures cannot be supplied at the same time in the same circuit breaker:			
5-6-66	7-67	9-69	31-91
32-92	33-93	10-11	

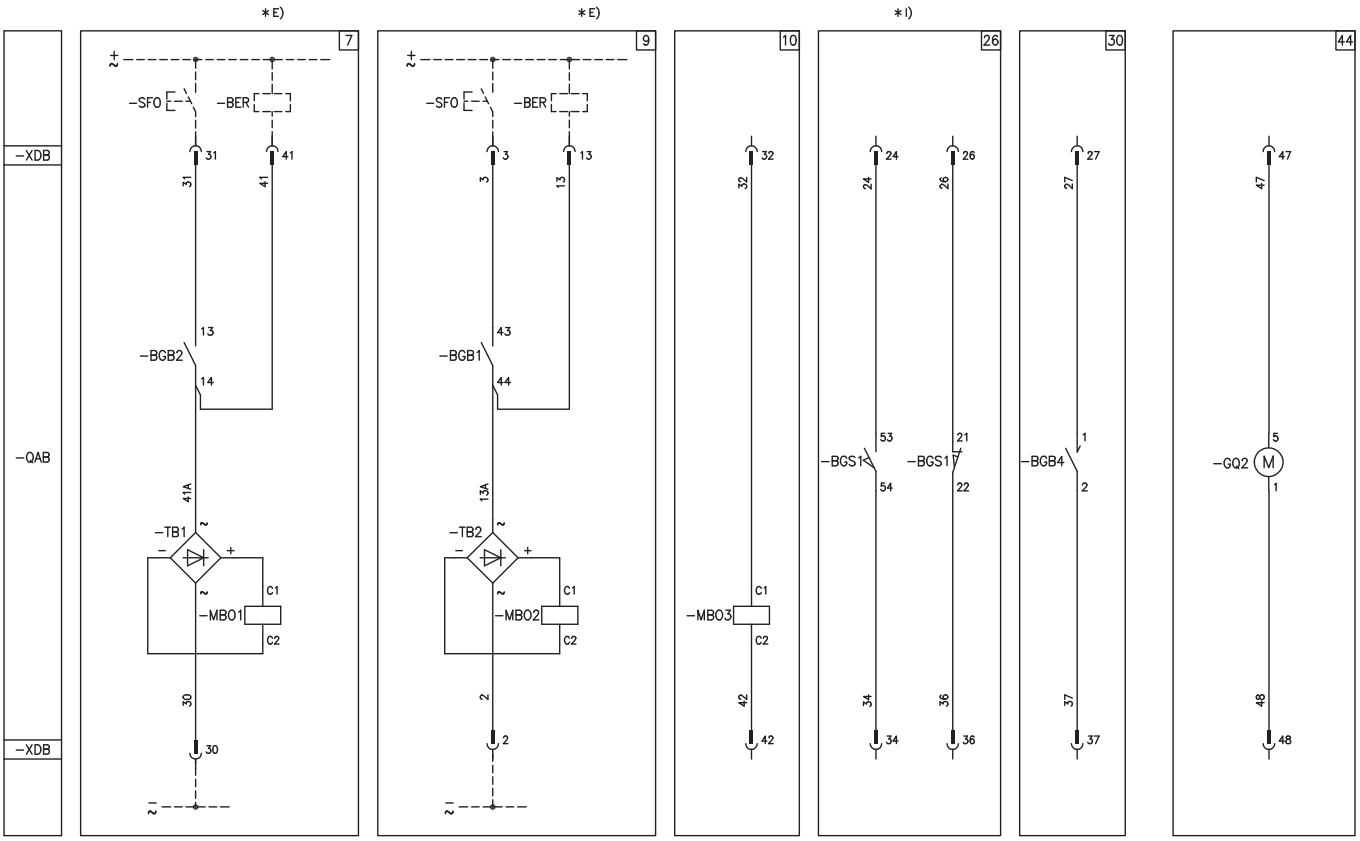
Notes	
A)	The circuit breaker is equipped solely with the applications specified in the order confirmation. Consult this catalog for information about how to make out an order.
B)	The undervoltage release can be supplied for energizing with voltage derived from the supply side of the circuit breaker or from an independent source. Circuit breaker closing is only allowed when the release is energized (closing lock is obtained mechanically). If there is the same power supply for the shunt closing and under-voltage releases and the circuit breaker must close automatically when auxiliary voltage returns, there must be a 50 ms delay between the under-voltage release's enabling instant and energizing of the shunt closing release. Incompatible with -MBO4.
C)	Check power of auxiliary circuit to find out whether several motors for loading the closing springs can be started at the same time. To prevent excessive power draw, the springs must be loaded by hand before the auxiliary circuit is powered.
D)	The circuit for monitoring the continuity of the release winding must only be used for that purpose. The SOR Test Unit can be used for checking the continuity of the various different releases. -MBO4 incompatible with -MBU. -MBO4 not available for VD4 50 kA.
E)	When fig. 6 is required, contact -BGB1 (23-24) of fig.32 is not available. When fig. 7 is required, contact -BGB1 (3-4) of fig. 31 is not available. When fig. 9 is required, contact -BGB1 (7-8) of fig. 31 is not available. When fig. 32 is required, it is obligatory to supply the auxiliary contacts of fig. 31. When fig. 33 is required, it is obligatory to supply the auxiliary contacts of fig. 32. When fig. 66 is required, contact -BGB1 (23-24) of fig. 92 is not available. When fig. 67 is required, contact -BGB1 (3-4) of fig. 91 is not available. When fig. 69 is required, contact -BGB1 (7-8) of fig. 91 is not available. When fig. 92 is required, it is obligatory to supply the auxiliary contacts of fig. 91. When fig. 93 is required, it is obligatory to supply the auxiliary contacts of fig. 92. Figs. 33 and 93 are not available for VD4 50 kA.
F)	Figs. 10 and 11 are only available for VD4 up to 31.5 kA.
G)	The energizing voltage must be the same for both signals.

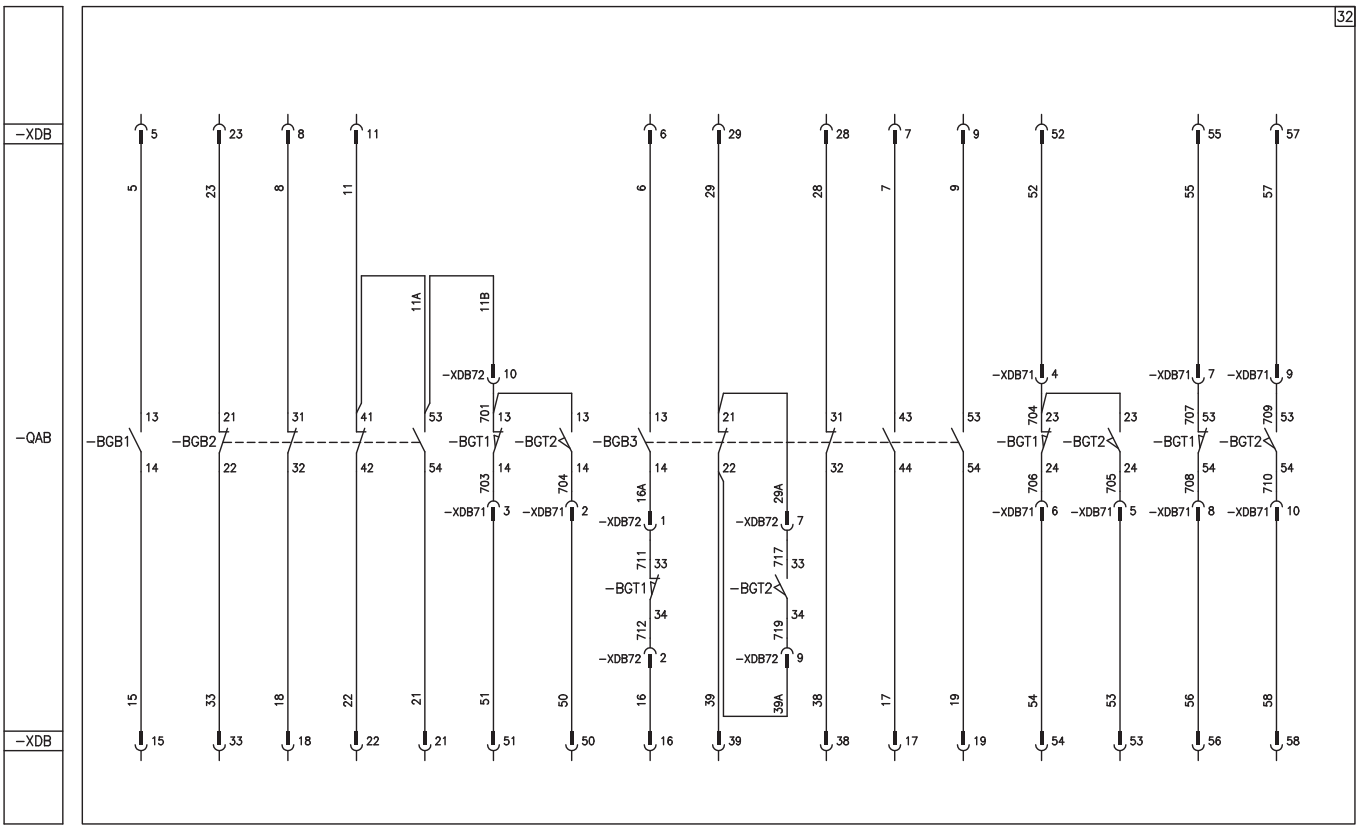
Electric circuit diagram

Electric circuit diagram of 36-40.5 kV fixed circuit breakers with Classic operating mechanism 1VCD400231

The electric circuit diagram in this section concerns 36 - 40.5 kV fixed circuit breakers with Classic operating mechanism.




*E)
*E)
*I)
7
9
10
26
30
44
-XDB
-QAB
-XDB
-SFO
-BER
-BGB2
-BGB1
-TB1
-TB2
-MBO1
-MBO2
-MBO3
-BGS1
-BGS1
-BGB4
-GQ2
M


32
-XDB
-QAB
-XDB
-BGB1
-BGB2
-BGT1
-BGT2
-BGB3
-BGT1
-BGT2
-XDB72
-XDB71
-BGT1
-BGT2
-XDB72
-XDB72
-XDB71
-XDB71
-XDB71
-XDB71

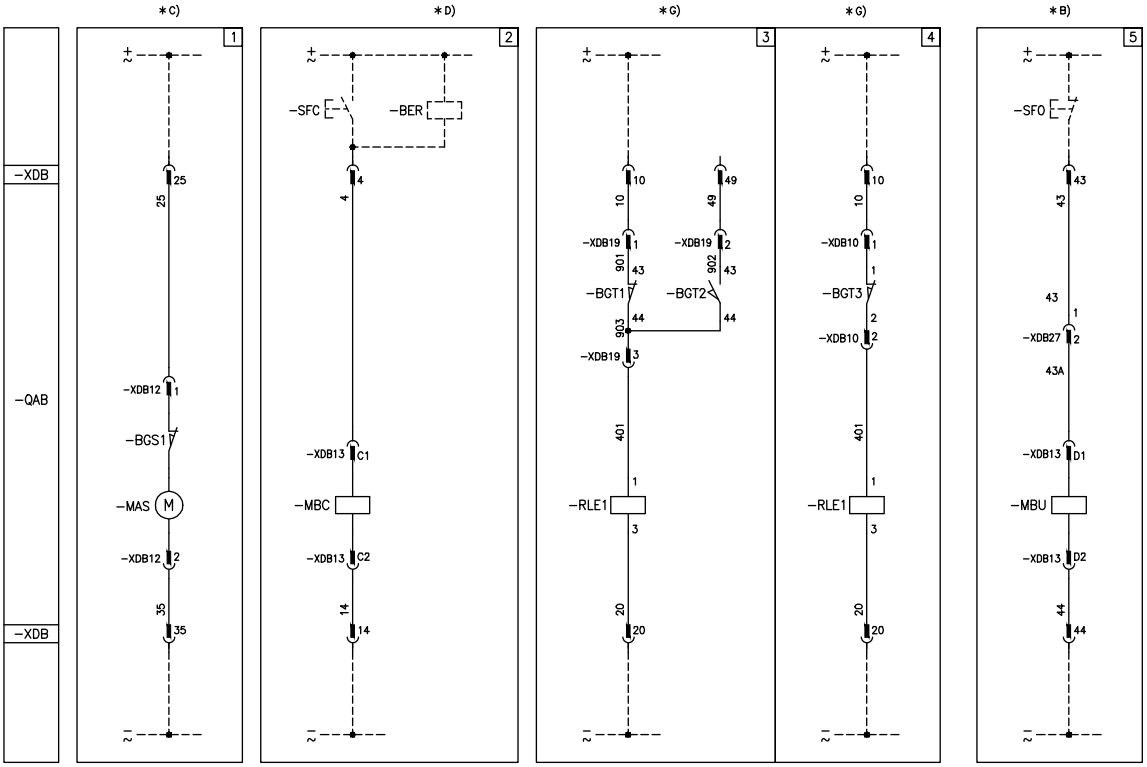
Electric circuit diagram

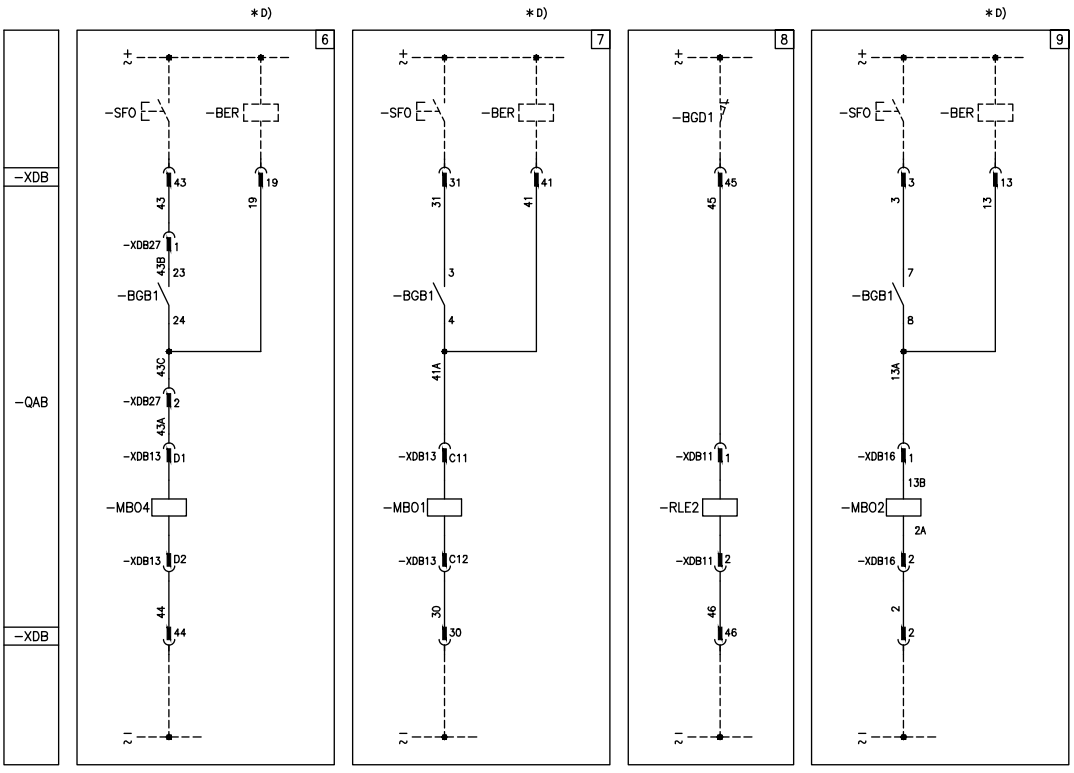
Key		
☐	=	Reference number of diagram figure
*	=	See note indicoted by the letter
-BER	=	Device for the supervision of shunt opening release coil continuity (see note E)
-BGB1,..., -BGB3	=	Circuit breaker auxiliary contacts
-BGB4	=	Auxiliary passing contact (closing momentarily when circuit breaker opens)
-BGB12	=	Auxiliary contact for block closing of the circuit breaker
-BGK	=	Contact operated by the key lock preventing the c. breaker closing
-BGS	=	Umit switch signalling closing springs charged or discharged
-BGT1	=	Contacts signalling c. breaker in the connected position
-BGT2	=	Contacts signalling c. breaker in the isolated position
-MAS	=	Motor for the closing charging springs (see note C)
-MBC	=	Shunt closing release
-MB01	=	First shunt opening release (see note E)
-MB02	=	Second shunt opening release (see note E)
-MB03	=	Indirect overcurrent relay
-MBU	=	Instantaneous undervoltoge release
-KFN	=	Antipumping relay
-QAB	=	Main circuit breaker
-RAR	=	Resistor
-RLE1	=	Locking magnel If de-energized it prevents the c. breaker closing
-RLE2	=	Locking magnet an the truck. If de-energized it prevents the c. breaker racking-in and racking-out mechanically
-SFC	=	Pushbutton or contact for the circuit breaker closing
-SFO	=	Pushbutton or contact for the circuit breaker opening
-SFL1	=	Contact locking the c. breaker closing
-SFL2	=	Contact locking the c. breaker rocking-in and rocking-out
-TB1	=	Rectifier for -M01
-TB2	=	Rectifier for -M02
-TB3	=	Rectifier for -MBC and -KFN
-TB4	=	Rectifier for -RLE1
-TB6	=	Rectifier for -MBU
-GQ2	=	Ventilator
-XDB	=	Connector for the c. breaker circuits
-XDB2	=	Connector of the accessories
-XDB71, -XDB72	=	Connectors of the accessories

Description of the figures		
Fig. 1	=	Springs charging-motor circuit (see note C)
Fig. 2	=	Shunt closing release
Fig. 3	=	Locking magnet on the operating mechanism. If de-energized it prevents the c. breaker closing
Fig. 4	=	Locking magnet on the truck. If de-energized it prevents the c. breaker racking-in and racking-out mechanically.
Fig. 5	=	Instantaneous undervoltoge release
Fig. 7	=	First shunt opening release circuit with possibility of permanent supervision of coil continuity (see note E)
Fig. 9	=	Second shunt opening release circuit with possibility of permanent supervision of coil continuity (see note E)
Fig. 10	=	Indirect overcurrent relay
Fig. 26	=	Contact signalling charged or discharged closing springs (see note I)
Fig. 30	=	Wiping contact 35ms for C.B. tripped indication
Fig. 32	=	C. breaker available auxiliary contacts
Fig. 44	=	Ventilation circuit

Notes	
A)	The circuit breaker is delivered complete with the accessories listed in the order aknowledgement only. To draw up the order examine the apparatus catalogue.
C)	Check the power supply available on the auxiliary circuit to verify if it is odeguate to start several closing spring-charging motors simultaneously. To prevent excessive consumption the closing springs must be charged manually before energizing the auxiliary circuit.
E)	The circuit for the supervision of shunt opening release coil continuity shall be used for this function only.
I)	Both limit switches signalling must be working at the same supply voltage.

Electric circuit diagram of 12 .. 24 kV withdrawable circuit breakers for UniGear switchgear and PowerCube enclosure 1VCD400155



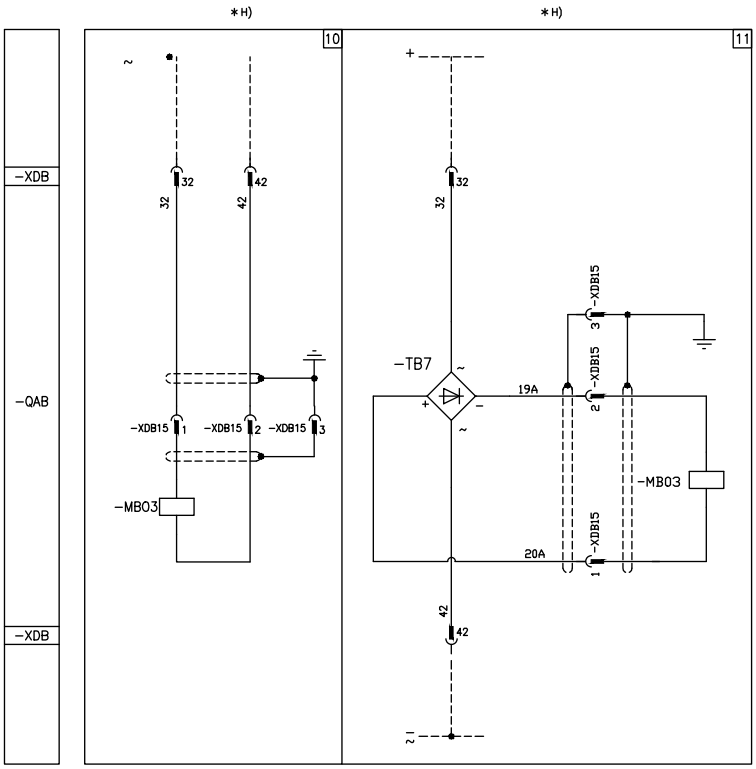


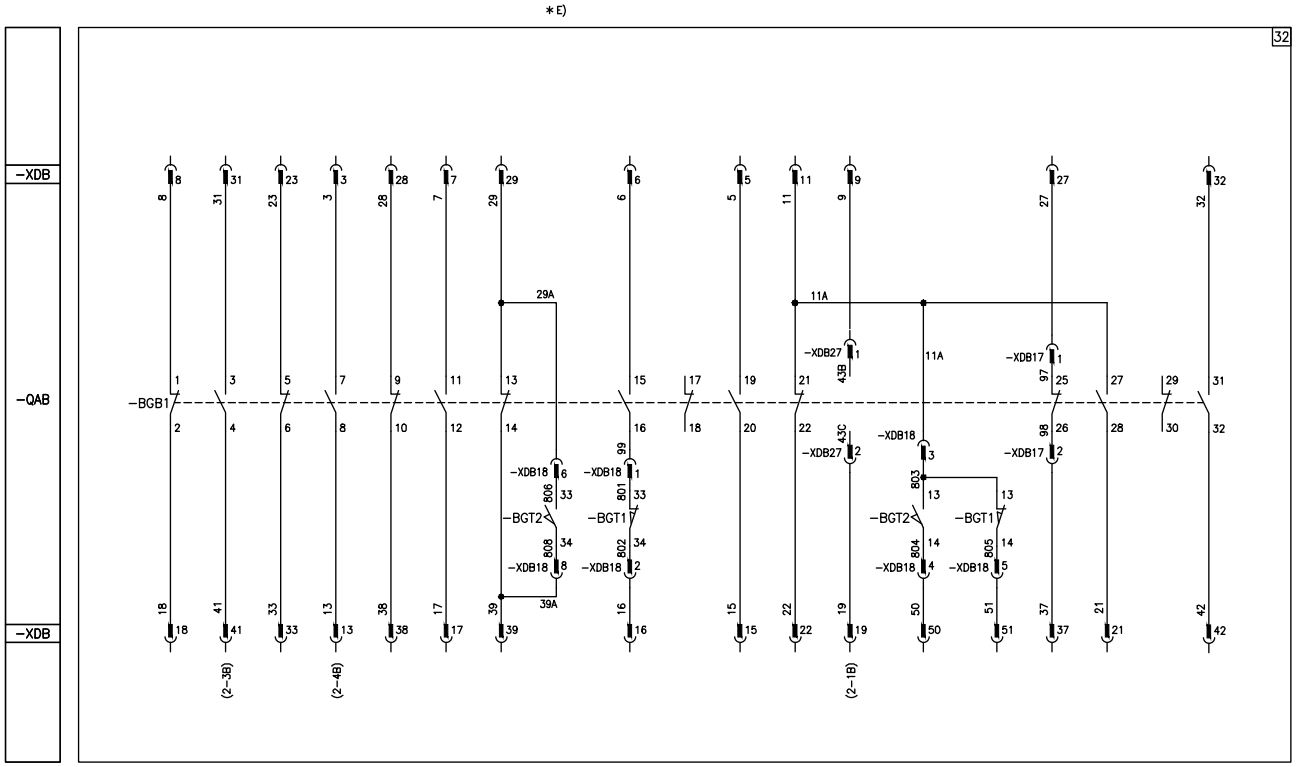
Electric circuit diagram

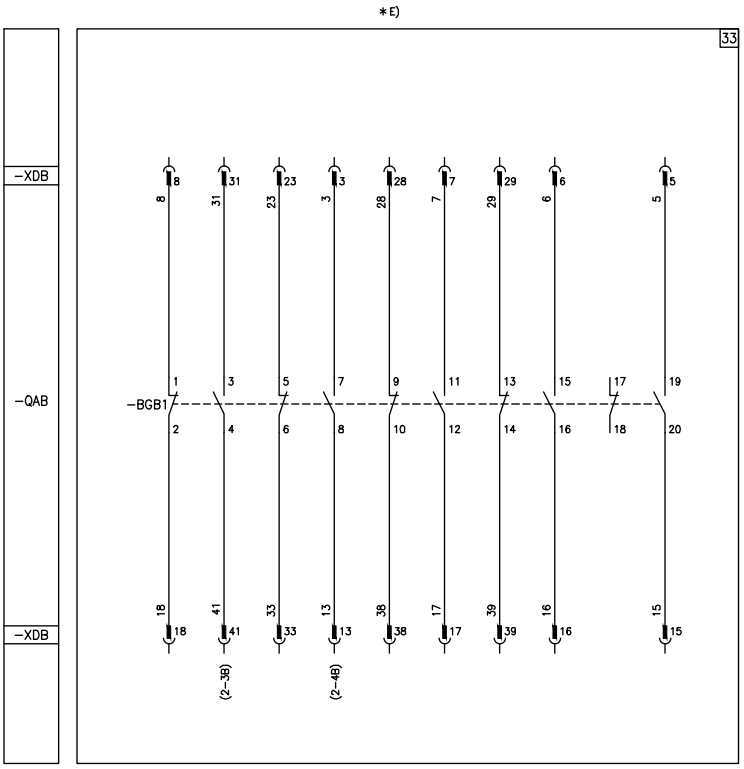
The electric circuit diagram in this section concerns 12 .. 24 kV withdrawable circuit breakers for UniGear switchgear and PowerCube enclosures. See diagram 1VCD400156 for withdrawable circuit breakers with motor-driven truck.

The following diagrams are available for circuit breakers for ZS8.4 switchgear:

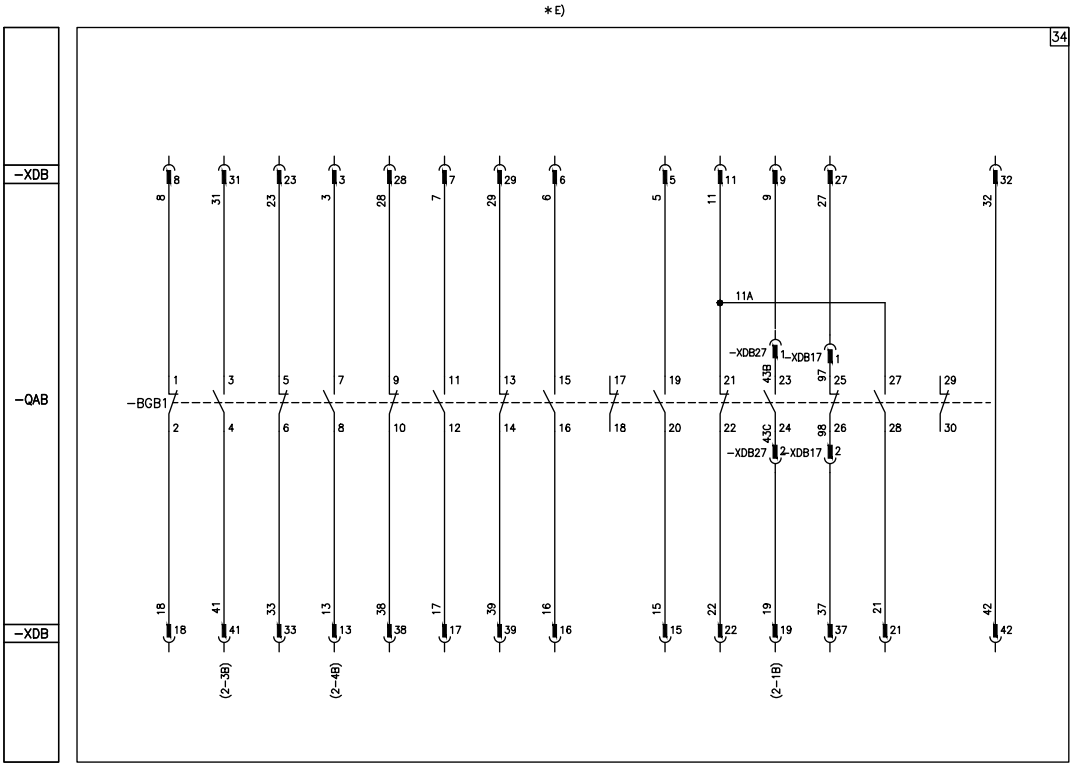
- **1VCD400158** Standard version
- **1VCD400159** Version with motorized truck.

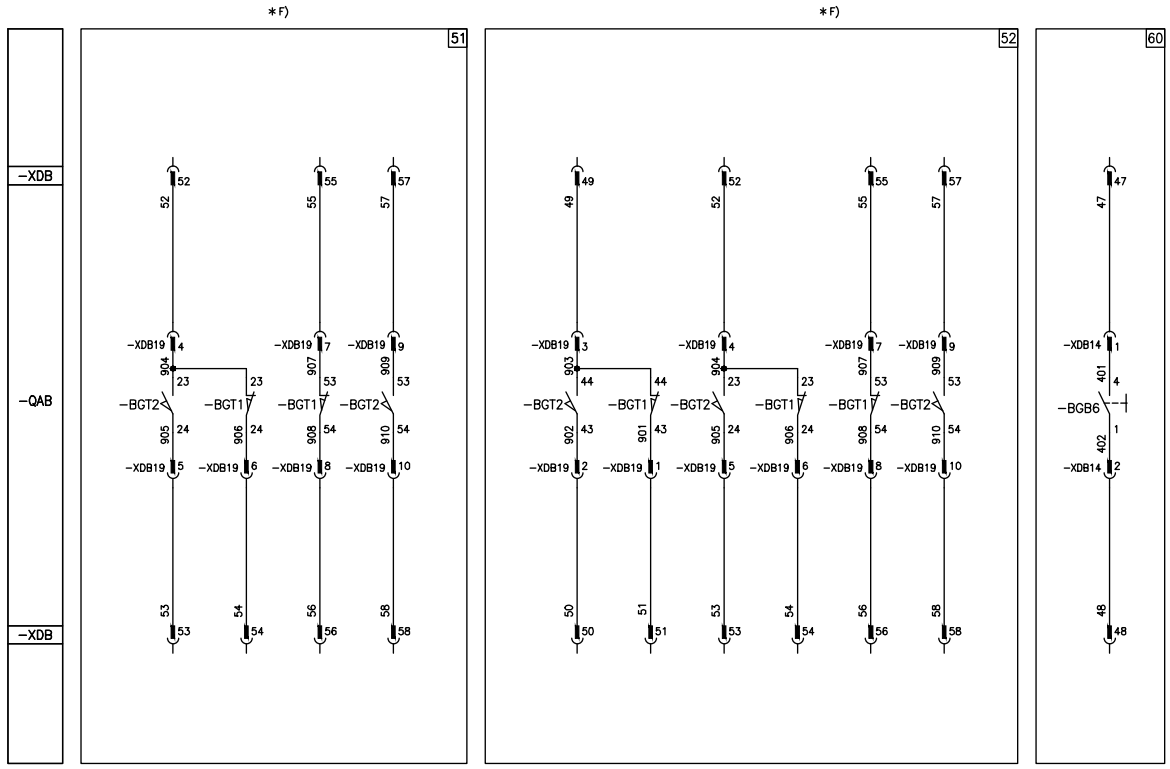



*E)
32
-XDB
-QAB
-XDB
-BGB1
-XDB18
-BGT2
-BGT1
-XDB27
-XDB17
29A
39A
11A
43B
43C
(2-3B)
(2-4B)
(2-1B)


*E)
33
-XDB
-QAB
-XDB
-BGB1
(2-3B)
(2-4B)

Electric circuit diagram





Key		
□	=	Figure number of the diagram.
*	=	See note indicated by the letter.
-BER	=	SOR Test Unit device for monitoring continuity of shunt opening and closing release winding (see note D).
-BGB1	=	Auxiliary contacts of circuit breaker.
-BGB4	=	Auxiliary let-through contact of circuit breaker with momentary closing during circuit breaker opening.
-BGB6	=	Contact for electrical signaling of undervoltage release de-energized.
-BGB11	=	Contact for cutting off electrical signal -BGB4 if opening operation is performed in the manual mode.
-BGD1	=	Enclosure door position contact.
-BGS1	=	Limit contact of spring loading motor.
-BGS2	=	Contact for signaling closing springs loaded-discharged.
-BGT1	=	Electrical signalling contacts for circuit breaker in racked-in position (see note F)
-BGT2	=	Electrical signaling contacts for circuit breaker in isolated position (see note F).
-BGT3	=	Circuit breaker position contact, open during isolating travel.
-MAS	=	Motor for loading closing springs (see note C).
-MBC	=	Shunt closing release (see note D).
-MBO1	=	First shunt opening release (see note D).
-MBO2	=	Second shunt opening release (see note D).
-MBO3	=	Opening solenoid for release outside circuit breaker.
-MBO4	=	Third shunt opening release (see note D).
-MBU	=	Undervoltage release (see note B).
-QAB	=	Circuit breaker applications.
-RLE1	=	Locking magnet. Mechanically inhibits circuit breaker closing if de-energized. (Consumption can be limited by connecting a delayed pushbutton in series so as to enable the operation).
-RLE2	=	Locking magnet (on truck). Mechanically inhibits circuit breaker racking-in and isolating if de-energized. (Consumption can be limited by connecting a delayed pushbutton in series so as to enable the operation).
-SFC	=	Pushbutton or contact for closing circuit breaker.
-SFO	=	Pushbutton or contact for opening circuit breaker.
-TB7	=	Rectifier for release -MBO3.
-XDB	=	Terminal box of circuit breaker circuits.
-XDB10, ... , 27	=	Connectors of applications.
-XDB28	=	Connectors of applications.

Description of the figures		
Fig. 1	=	Circuit of motor for loading closing springs (see note C).
Fig. 2	=	Shunt closing release (anti-pumping is achieved mechanically). (see note D).
Fig. 3	=	Locking magnet. Mechanically inhibits circuit breaker closing if de-energized. (If -RLE1 is required, provide this figure when fig.31 or 32 are selected). Consumption can be limited by connecting a delayed pushbutton in series so as to enable the operation.
Fig. 4	=	Locking magnet. Mechanically inhibits circuit breaker closing if de-energized. (If -RLE1 is required, provide this figure when fig.33 or 34 are selected). Consumption can be limited by connecting a delayed pushbutton in series so as to enable the operation.
Fig. 5	=	Instantaneous undervoltage release (see note B).
Fig. 6	=	Circuit of third opening release with continuous control of winding (see note D).
Fig. 7	=	Circuit of first opening release with continuous control of winding (see note D).
Fig. 8	=	Locking magnet (on truck). Mechanically inhibits circuit breaker racking-in and isolating if de-energized. (Consumption can be limited by connecting a delayed pushbutton in series so as to enable the operation).
Fig. 9	=	Circuit of second opening release with continuous control of winding (see note D).
Fig. 10	=	Opening solenoid for release outside circuit breaker.
Fig. 11	=	Opening solenoid for release outside circuit breaker with AC supply.
Fig. 26	=	Electrical signalling of closing springs loaded and discharged.
Fig. 30	=	Auxiliary let-through contact of circuit breaker with momentary closing during circuit breaker opening.
Fig. 31, ... , 34	=	Available auxiliary contacts of circuit breaker (see note E).
Fig. 51	=	Contacts for electrical signaling of circuit breaker in racked-in and isolated positions located on circuit breaker truck (obligatory when fig. 31 or 32 are required).
Fig. 52	=	Contacts for electrical signaling of circuit breaker in racked-in and isolated positions located on circuit breaker truck (supplied on request when fig. 33 to 34 are required).
Fig. 60	=	Contact for electrical signaling of undervoltage release de-energized.

Electric circuit diagram

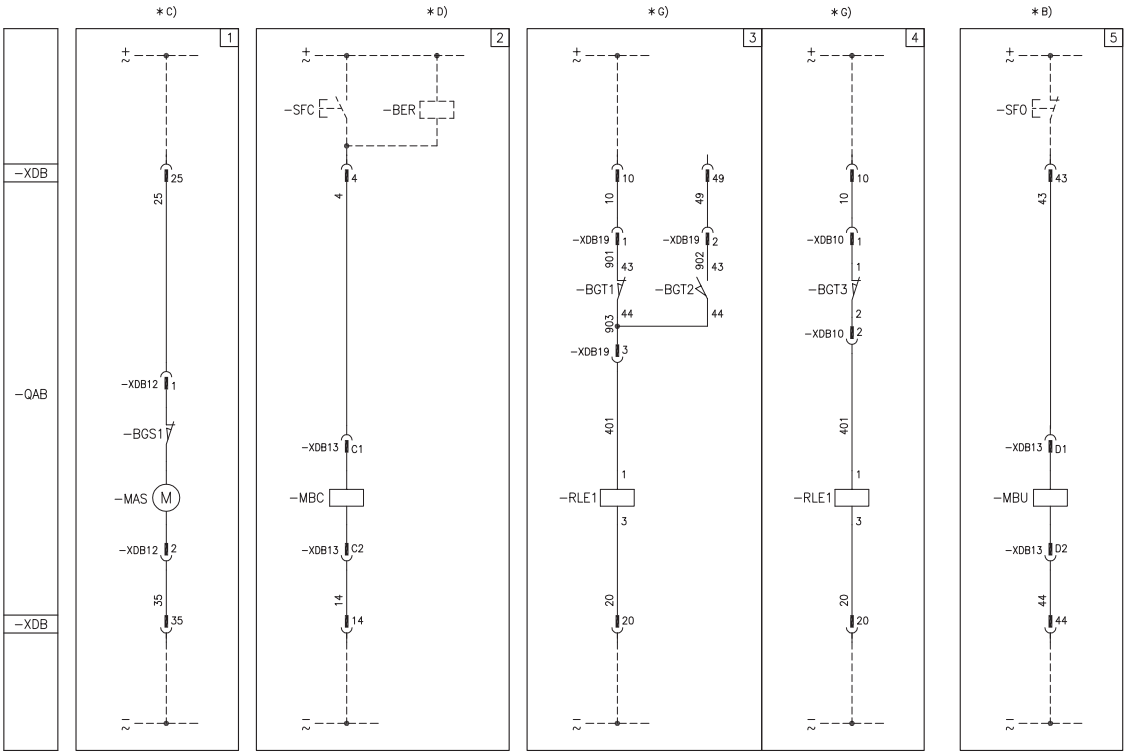
Incompatibility				
The circuits indicated in the following figures cannot be supplied at the same time in the same circuit breaker:				
3-4	**3-33-34**	**4-31-32**	**5-6**	**10-11**
31-32-33-34	**31-32-52**	**33-34-51**	**51-52**	

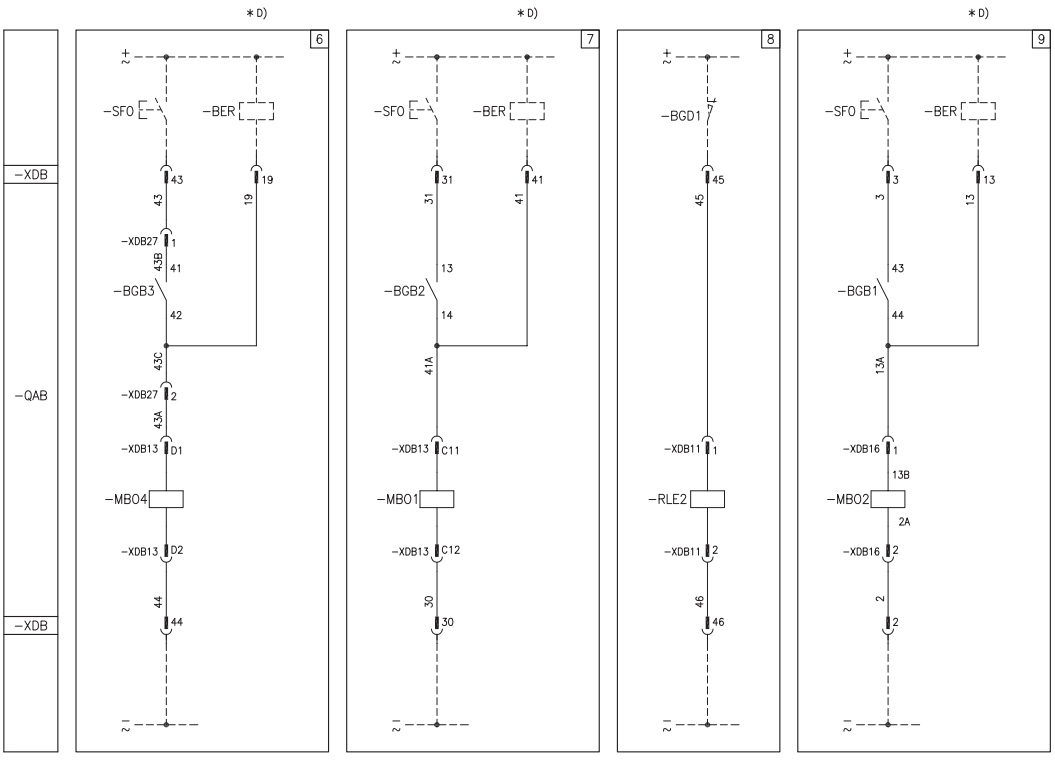
Notes	
A)	Circuit breaker is equipped solely with the applications specified in the order confirmation. Consult this catalog for information about how to make out an order.
B)	The undervoltage release can be supplied for energizing with voltage derived from the supply side of the circuit breaker or from an independent source. Circuit breaker closing is only allowed when the release is energized (closing lock is obtained mechanically). If there is the same power supply for the shunt closing and undervoltage releases and the circuit breaker must close automatically when auxiliary voltage returns, there must be a 50 ms delay between the undervoltage release's enabling instant and energizing of the shunt closing release. Incompatible with -MBO4.
C)	Check power of auxiliary circuit to find out whether several motors for loading the closing springs can be operated at the same time. To prevent excessive power draw, the springs must be loaded by hand before auxiliary circuit is powered.
D)	The circuit for monitoring the continuity of the release windings must only be used for that purpose. The SOR Test Unit can be used for checking the continuity of the various different releases: -MBO4 incompatible with -MBU. -MBO4 not available on Vmax and VD4 50kA.
E)	When fig. 6 is required, contact -BGB1 (23-24) of fig. 32-34 is not available. When fig. 7 is required, contact -BGB1 (3-4) of fig. 31-32-33-34 is not available. When fig. 9 is required, contact -BGB1 (7-8) of fig. 31-32-33-34 is not available. When fig. 10 or 11 are required, contact -BGB1 (31-32) of fig. 32 and 34 is not available. When fig. 30 is required, contact -BGB1 (25-26) of fig. 32 and 34 is not available.
F)	The contacts for electrical signaling of circuit breaker in isolated and racked-in position (-BGT1 and BGT2) shown in fig. 51-52 are installed on circuit breaker truck (movable part).
G)	Fig. 3 is supplied when fig. 31 or 32 are required. Fig. 4 is supplied when fig. 33 or 34 are required (in this case, it is obligatory to supply –BGT3).
H)	Fig. 10 is only available for VD4 up to 31.5 kA and Vmax. Fig. 11 is only available for VD4 up to 31.5 kA.
I)	The energizing voltage must be the same for both signals.

Electric circuit diagram of 36 kV withdrawable circuit breakers 1VCD400237

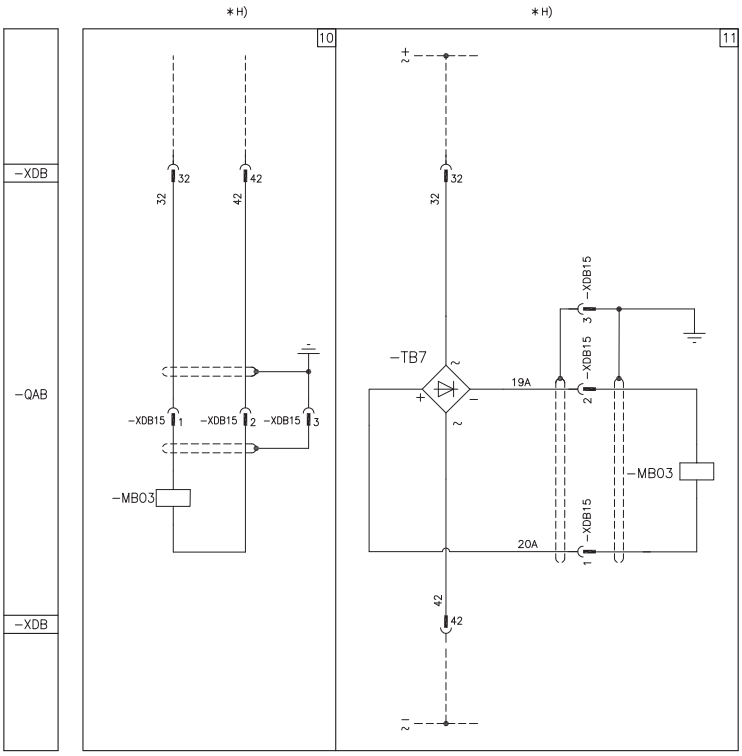
The electric circuit diagram in this section concerns 36 kV withdrawable circuit breakers.

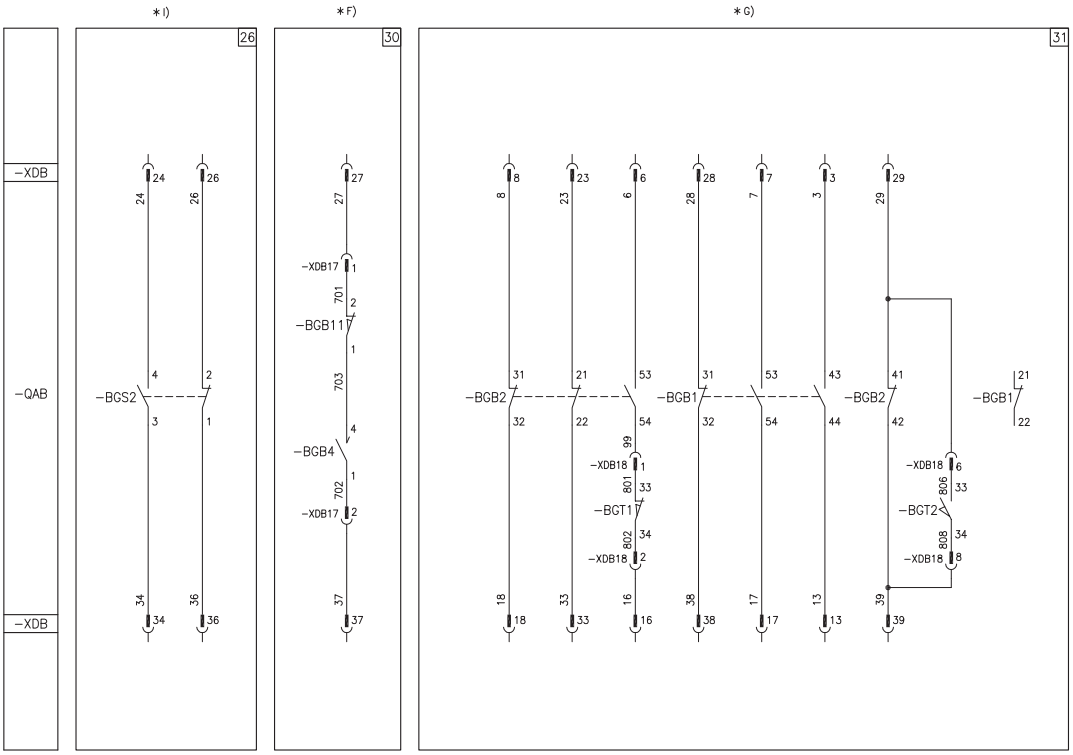
Version with motor-driven truck 1VCD 400240

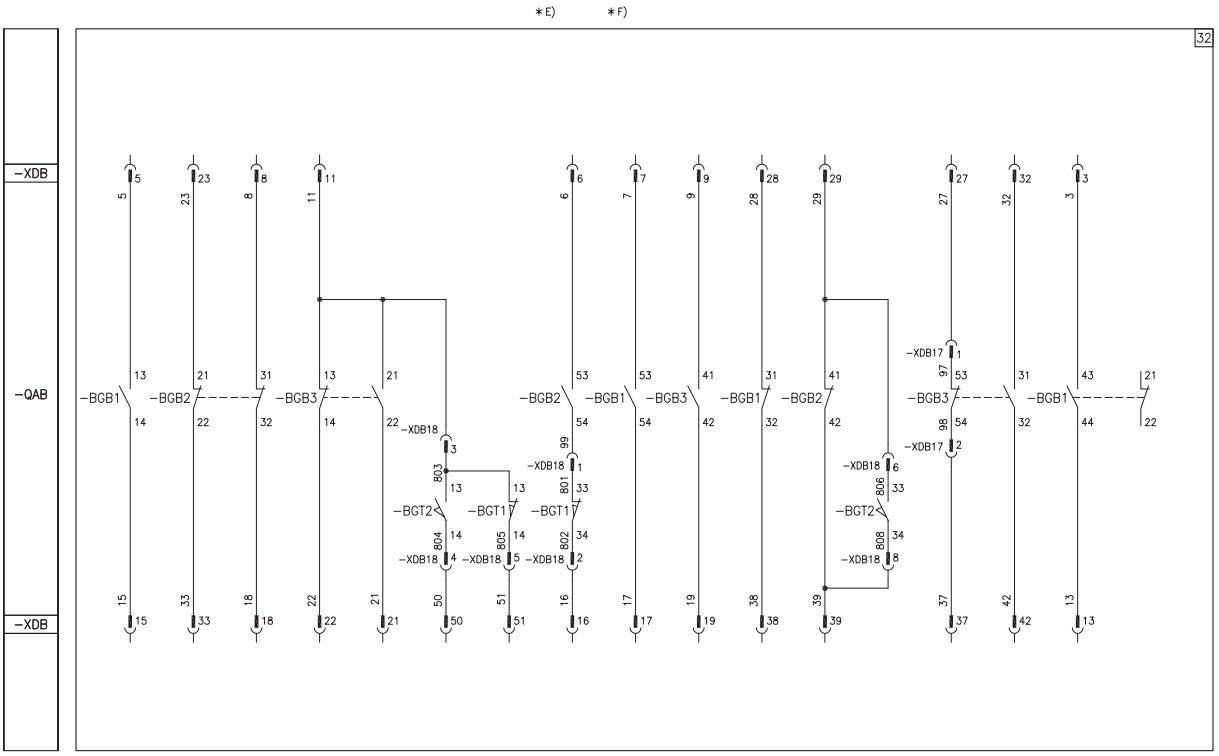


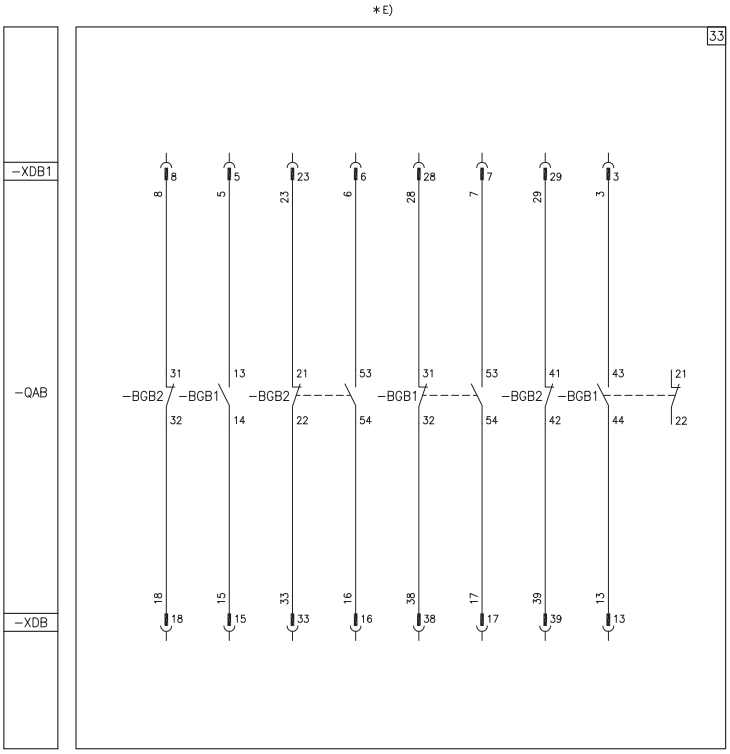


Electric circuit diagram

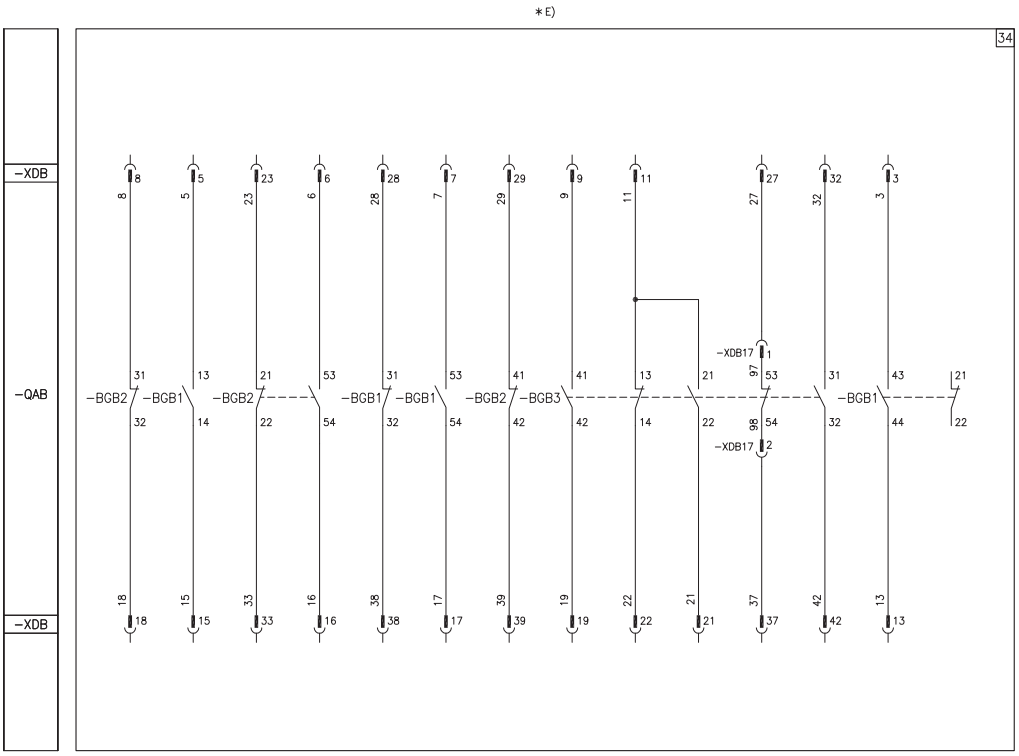


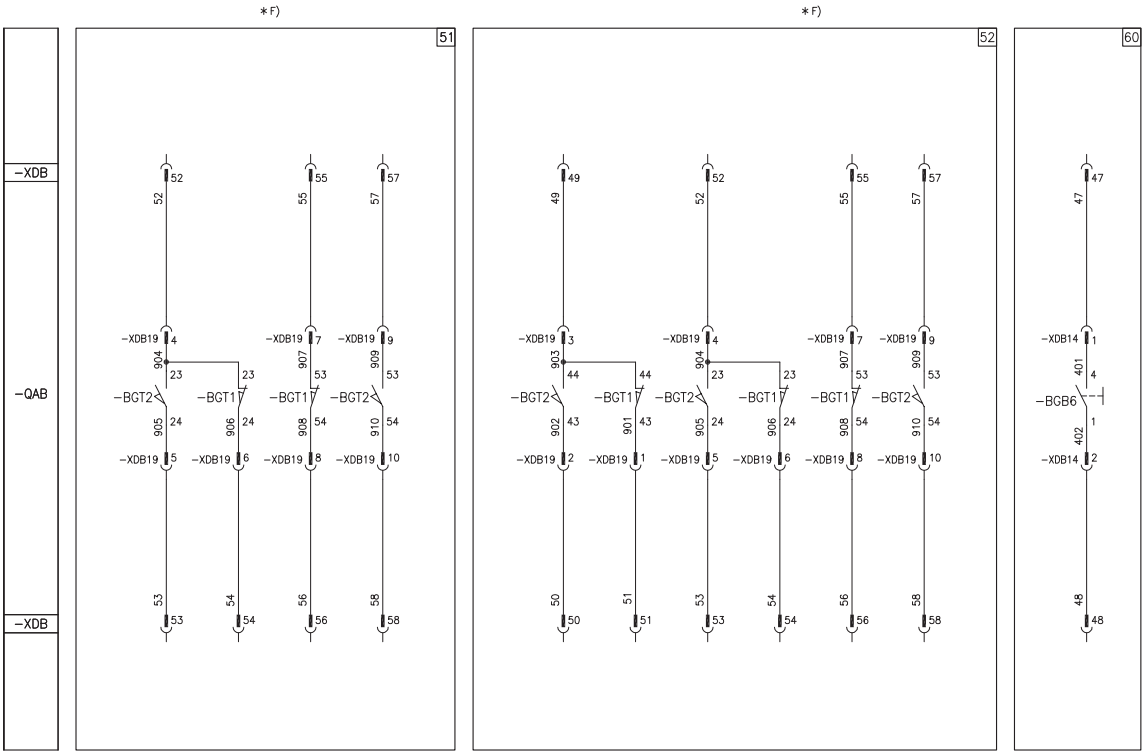



∗E)
∗F)
32
-XDB
-QAB
-XDB
-BGB1
-BGB2
-BGB3
-BGT1
-BGT2
-XDB18
-XDB17


∗E)
33
-XDB1
-QAB
-XDB
-BGB1
-BGB2

Electric circuit diagram





Key		
☐	=	Figure number of the diagram
*	=	See note indicated by the letter.
-BER	=	SOR Test Unit device for monitoring continuity of shunt opening and closing release winding (see note D)
-BGB1, ... ,3	=	Auxiliary contacts of circuit breaker.
-BGB4	=	Auxiliary let-through contact of circuit breaker with momentary closing during circuit breaker opening.
-BGB6	=	Contact for electrical signaling of undervoltage release de-energized.
-BGB11	=	Contact for cutting off electrical signal -BGB4 if opening operation is performed in the manual mode
-BGD1	=	Enclosure door position contact.
-BGS1	=	Limit contact of spring loading motor.
-BGS2	=	Contact for signaling closing springs loaded-discharged.
-BGT1	=	Electrical signalling contacts for circuit breaker in racked-in position (see note F).
-BGT2	=	Contacts for electrical signaling of circuit-breaker in isolated position (see note F).
-BGT3	=	Circuit breaker position contact, open during isolating travel.
-MAS	=	Motor for loading closing springs (see note C).
-MBC	=	Shunt closing release (see note D).
-MBO1	=	First shunt opening release (see note D).
-MBO2	=	Second shunt opening release (see note D).
-MBO3	=	Opening solenoid for release outside circuit breaker.
-MBO4	=	Third shunt opening release (see note D).
-MBU	=	Undervoltage release (see note B).
-QAB	=	Circuit breaker applications.
-RLE1	=	Locking magnet. Mechanically inhibits circuit breaker closing if de-energized. (Consumption can be limited by connecting a delayed operation enabling pushbutton in series).
-RLE2	=	Locking magnet (on truck). Mechanically inhibits circuit breaker racking-in and isolating if de-energized. (Consumption can be limited by connecting a delayed pushbutton in series so as to enable the operation).
-SFC	=	Pushbutton or contact for closing circuit breaker.
-SFO	=	Pushbutton or contact for opening circuit breaker.
-TB7	=	Rectifier for release -MBO3.
-XDB	=	Terminal box of circuit breaker circuits.
-XDB10, ... , 27	=	Connectors of applications.
-XDB28	=	Connector of applications.

Description of the figures		
Fig. 1	=	Circuit of motor for loading closing springs (see note C).
Fig. 2	=	Shunt closing release (anti-pumping is achieved mechanically), (see note D).
Fig. 3	=	Locking magnet. Mechanically inhibits circuit breaker closing if de-energized. (If -RLE1 is required, provide this figure when fig. 31 or 32 are selected). Consumption can be limited by connecting a delayed pushbutton in series so as to enable the operation.
Fig. 4	=	Locking magnet. Mechanically inhibits circuit breaker closing if de-energized. (If -RLE1 is required, provide this figure when fig.33 or 34 are selected). Consumption can be limited by connecting a delayed pushbutton in series so as to enable the operation.
Fig. 5	=	Instantaneous undervoltage release (see note B).
Fig. 6	=	Circuit of third shunt opening release with continuous control of winding (see note D).
Fig. 7	=	Circuit of first opening release with continuous control of winding (see note D).
Fig. 8	=	Locking magnet (on truck). Mechanically inhibits circuit breaker racking-in and isolating if de-energized. (Consumption can be limited by connecting a delayed pushbutton in series so as to enable the operation).
Fig. 9	=	Circuit of second shunt opening release with continuous control of winding (see note D).
Fig. 10	=	Opening solenoid for release outside circuit breaker.
Fig. 11	=	Opening solenoid for release outside circuit breaker with AC supply.
Fig. 26	=	Electrical signaling of closing springs loaded and discharged.
Fig. 30	=	Auxiliary let-through contact of circuit breaker with momentary closing during circuit breaker opening.
Fig. 31, ... , 34	=	Available auxiliary contacts of circuit breaker (see note E).
Fig. 51	=	Contacts for electrical signaling of circuit breaker in racked-in and isolated positions located on circuit breaker truck (obligatory when fig.31 or 32 are required).
Fig. 52	=	Contacts for electrical signaling of circuit breaker in racked-in and isolated positions located on circuit breaker truck (supplied on request when fig.33 to 34 are required).
Fig. 60	=	Contact for electrical signaling of undervoltage release de-energized.

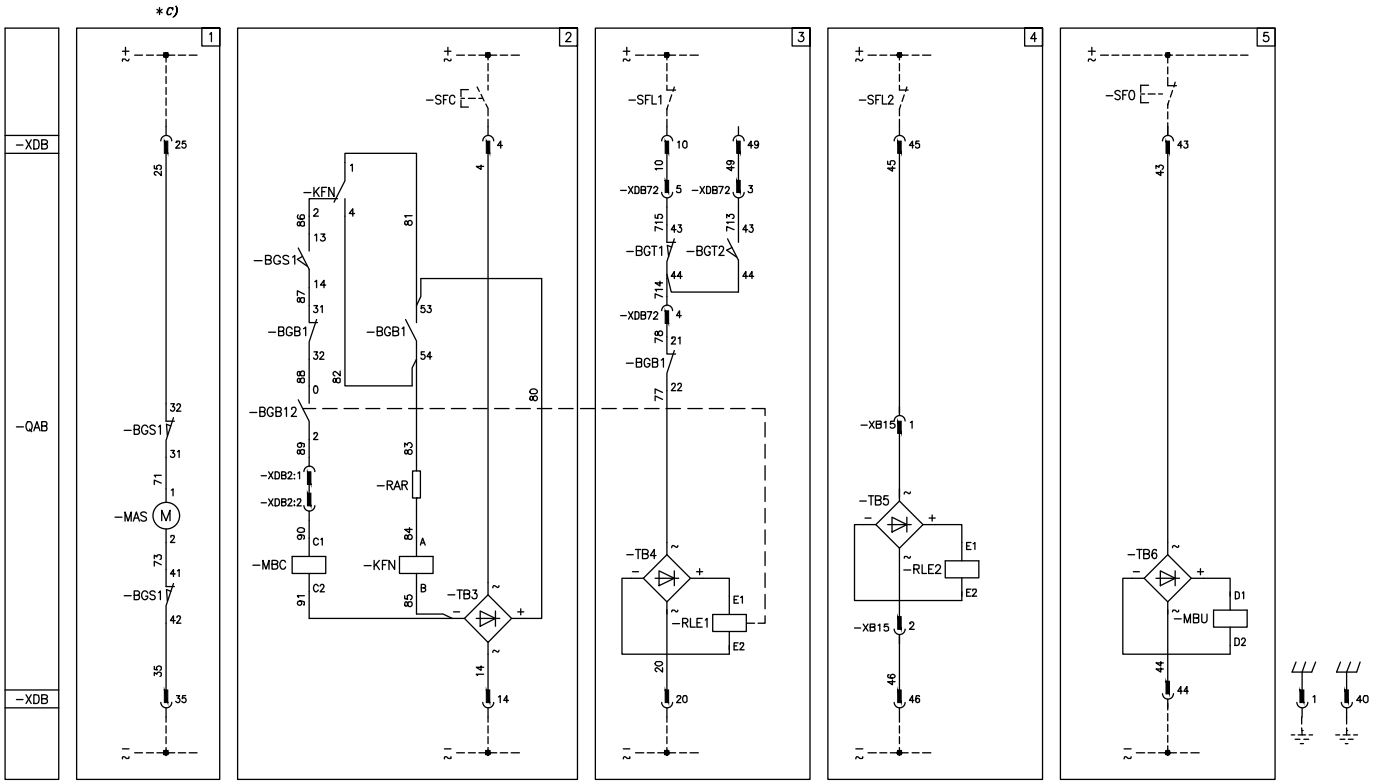
Electric circuit diagram

Incompatibility				
The circuits indicated in the following figures cannot be supplied at the same time in the same circuit breaker:				
3-4	**3-33-34**	**4-31-32**	**5-6**	**10-11**
31-32-33-34	**31-32-52**	**33-34-51**	**51-52**	

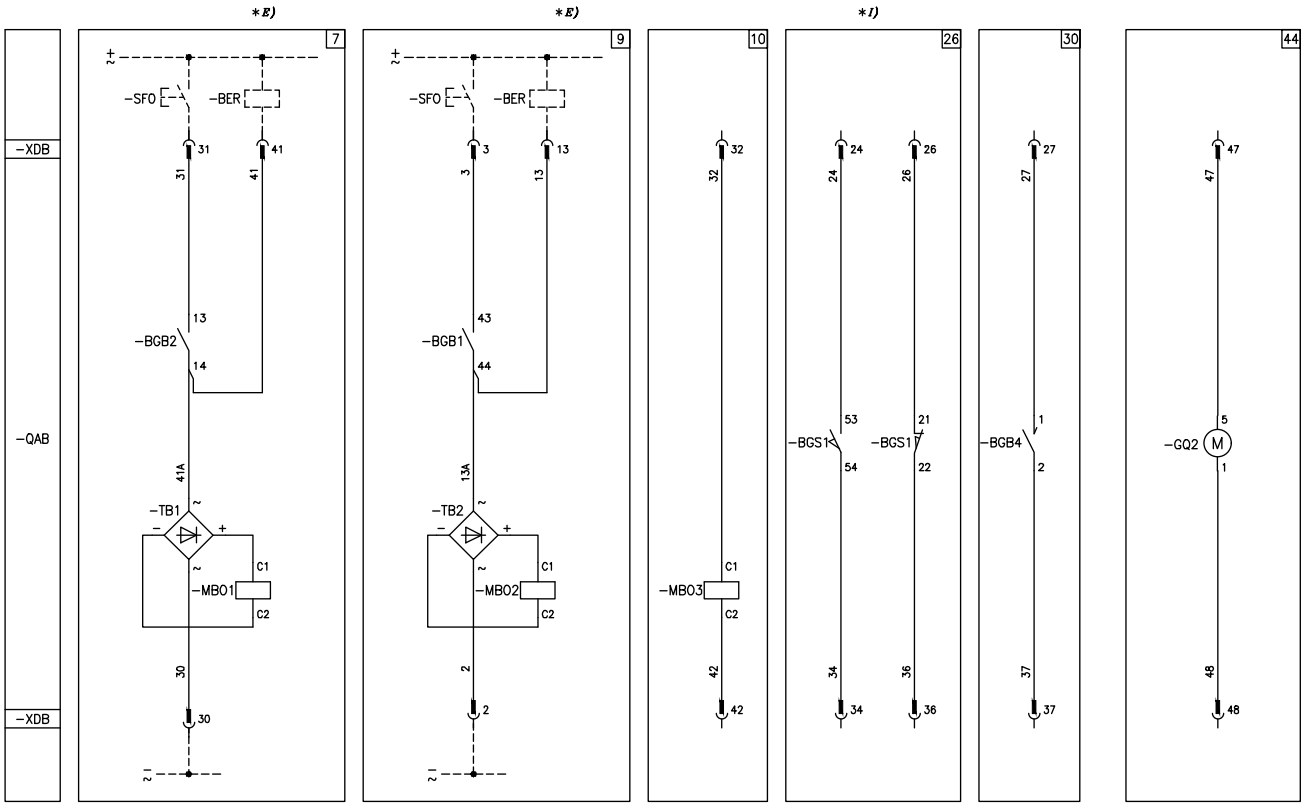
Notes	
A)	The circuit breaker is equipped solely with the applications specified in the order confirmation. Consult this catalog for information about how to make out an order.
B)	The undervoltage release can be supplied for energizing with voltage derived from the supply side of the circuit breaker or from an independent source. Circuit breaker closing is only allowed when the release is energized (closing lock is obtained mechanically). If there is the same power supply for the shunt closing and under-voltage releases and the circuit breaker must close automatically when auxiliary voltage returns, there must be a 50 ms delay between the undervoltage release's enabling instant and energizing of the shunt closing release. Incompatible with -MBO4.
C)	Check power of auxiliary circuit to find out whether several motors for loading the closing springs can be operated at the same time. To prevent excessive power draw, springs must be loaded by hand before auxiliary circuit is powered.
D)	The circuit for monitoring the continuity of the release windings must only be used for that purpose. The SOR Test Unit can be used for checking the continuity of the various different releases. -MBO4 incompatible with -MBU.
E)	When fig. 6 is required, contact -BGB3 (41-42) of fig. 32-34 is not available. When fig. 9 is required, contact -BGB1 (43-44) of fig. 31-32-33-34 is not available. When fig. 10 or 11 are required, contact -BGB3 (31-32) of fig. 32 and 34 is not available. When fig. 30 is required, contact -BGB3 (53-54) of fig. 32 and 34 is not available.
F)	The contacts for electrical signaling of circuit breaker in racked-in and isolated positions (-BGT1 and -BGT2) shown in fig. 51-52 are located on circuit breaker truck (moving part).
G)	Fig. 3 is supplied when fig. 31 or 32 are required. Fig. 4 is supplied when fig. 33 or 34 are required (in this case, it is obligatory for -BGT3 to be supplied).
H)	Fig. 10 is only available for VD4 up to 31.5 kA. Fig. 11 is only available for VD4 up to 31.5 kA.
I)	The energizing voltage must be the same for both signals.

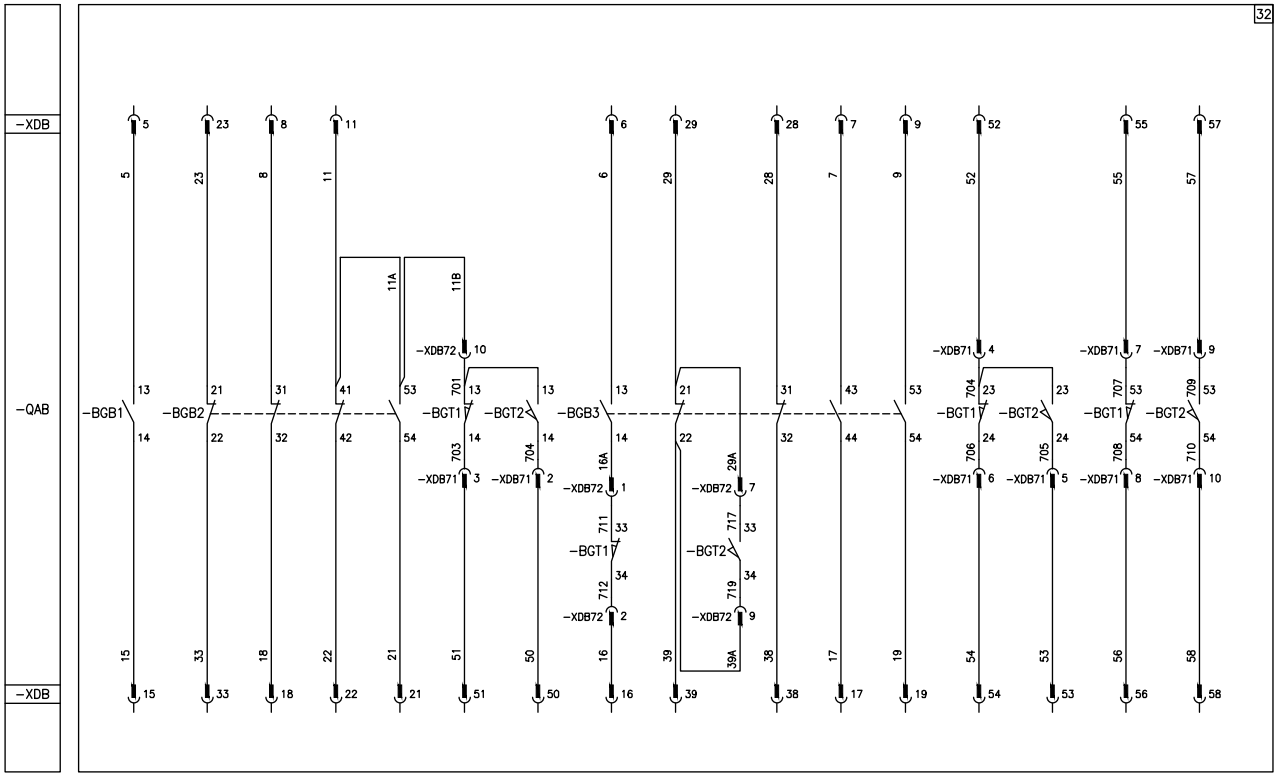
Electric circuit diagram for 36-40.5 kV and 63 kA withdrawable circuit breakers with Classic operating mechanisms 1VCD400231

The circuit diagram in this section concerns 36-40.5 kV plug-in circuit breakers with Classic operating mechanism.



Electric circuit diagram





Key		
☐	=	Reference number of diagram figure
*	=	See note indicated by the letter
-BER	=	Device for the supervision of shunt opening release coil continuity (see note E)
-BGB1, ..., -BGB3	=	Circuit breaker auxiliary contacts
-8GB4	=	Auxiliary passing contact (closing momentarily when circuit breaker opens)
-8GB12	=	Auxiliary contact for block closing of the circuit breaker
-BGS	=	Limit switch signalling closing springs charged or discharged
-BGT1	=	Contacts signalling circuit breaker in the connected position
-BGT2	=	Contacts signalling circuit breaker in the isolated position
-MAS	=	Motor for the closing charging springs {see note C)
-MBC	=	Shunt closing release
-MBO1	=	First shunt opening release (see note E)
-MBO2	=	Second shunt opening release (see note E)
-MBO3	=	Indirect overcurrent relay
-MBU	=	Instantaneous undervoltoge release
-KFN	=	Antipumping relay
-QAB	=	Main circuit breaker
-RAR	=	Resistor
-RLE1	=	Locking magnet. If de-energized it prevents the circuit breaker closing
-RLE2	=	Locking magnet on the truck. If de-energized it prevents the circuit breaker racking-in and racking-out mechanically
-SFC	=	Pushbutton or contact for the circuit breaker closing
-SFO	=	Pushbutton or contact for the circuit breaker opening
-SFL1	=	Contact locking the circuit breaker closing
-SFL2	=	Contact locking the circuit breaker racking-in and racking-out
-TB1	=	Rectifier for -MO1
-TB2	=	Rectifier for -MO2
-TB3	=	Rectifier for -MBC and -KFN
-TB4	=	Rectifier for -RLE1
-TB6	=	Rectifier for -MBU
-GQ2	=	Ventilator
-XDB	=	Connector for the circuit breaker circuits
-XDB2	=	Connector of the accessories
-XDB71, -XDB72	=	Connectors of the accessories

Description of the figures		
Fig. 1	=	Springs charging-motor circuit {see note C)
Fig. 2	=	Shunt closing release
Fig. 3	=	Locking magnet on the operating mechanism. If de-energized it prevents the circuit breaker closing
Fig. 4	=	Locking magnet on the truck. If de-energized it prevents the circuit breaker racking-in and racking-out mechanically
Fig. 5	=	Instantaneous undervoltage release
Fig. 7	=	First shunt opening release circuit with possibility of permanent supervision of coil continuity (see note E)
Fig. 9	=	Second shunt opening release circuit with possibility of permanent supervision of coil continuity (see note E)
Fig. 10	=	Indirect overcurrent relay
Fig. 26	=	Contact signalling charged or discharged closing springs (see note I)
Fig. 30	=	Wiping contact 35ms for C.B. tripped indication
Fig. 32	=	Circuit breaker available auxiliary contacts
Fig. 44	=	Ventilation circuit

Notes	
A)	The circuit breaker is delivered complete with the accessories listed in the order aknowledgement only. To draw up the order examine the apparatus catalogue.
C)	Check the power eupply available on the auxiliary circuit to verify if it is adeguate to start several closing spring-charging motors simultaneously. To prevent excessive consumption the closing springs must be charged manually before energizing the auxiliary circuit.
E)	The circuit for the supervision of shunt opening release coil continuity shall be used for this function only.
I)	Both limit switches signalling must be working at the same supply voltage.

Notes

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For more information please contact:

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

1VCP000001 - Rev. Z en - Technical catalog - 2021-05 (VD4-63 kA) (gs)