Medium voltage products

VD4
Medium voltage vacuum circuit-breakers 12...36 kV - 630...4000 A - 16...50 kA

Power and productivity
for a better world™

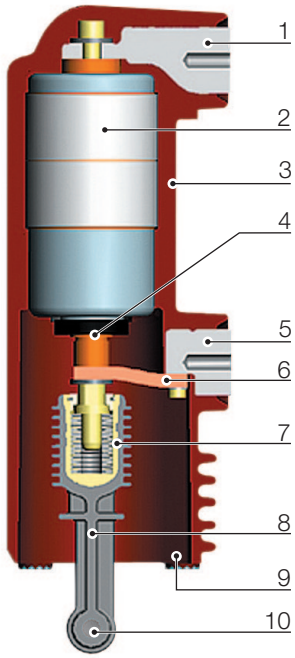
Index

1. Description

The new VD4 are a synthesis of renowned technology in designing and constructing vacuum interrupters embedded in poles, and excellency in design, engineering and production of circuit-breakers.
The VD4 medium voltage circuit-breakers use vacuum interrupters embedded in the poles. This construction technique makes the circuit-breaker poles particularly sturdy and protects the interrupter from impacts, dust deposits and humidity. The vacuum interrupter houses the contacts and makes up the interrupting chamber.

Current interruption in vacuum

The vacuum circuit-breaker does not require an interrupting and insulating medium. In fact, the interrupters do not contain ionisable material.
In any case, on separation of the contacts an electric arc is generated made up exclusively of melted and vaporised contact material.
The electric arc remains supported by the external energy until the current is cancelled in the vicinity of natural zero. At that instant, the rapid reduction in the load density carried and the rapid condensation of the metallic vapour, leads to extremely rapid recovery of the dielectric characteristics.
The vacuum interrupter therefore recovers the insulating capacity and the capacity to withstand the transient recovery voltage, definitively extinguishing the arc.
Since high dielectric strength can be reached in the vacuum,



1 Upper terminal
2 Vacuum interrupter
3 Housing/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 humidity**
- **Operation under different climatic conditions**
- **Limited switching energy**
- **Stored energy operating mechanism with anti-pumping device supplied as standard**
- **Simple customisation with a complete range of accessories**
- **Fixed and withdrawable version**
- **Compact dimensions**
- **Sealed-for-life poles**
- **Sturdiness and reliability**
- **Limited maintenance**
- **Circuit-breaker racking in and racking out with door closed**
- **Incorrect and hazardous operations are prevented thanks to special locks in the operating mechanism and in the truck**
- **High environmental compatibility**

even with minimum distances, interruption of the circuit is also guaranteed when separation of the contacts takes place a few milliseconds before passage of the current through natural zero.
The special geometry of the contacts and the material used, as well as the limited duration and low voltage of the arc, guarantee minimum contact wear and long life. Furthermore, the vacuum prevents their oxidation and contamination.

Operating mechanism

The low speed of the contacts, together with the reduced run and low mass, limit the energy required for the operation and therefore guarantee extremely limited wear of the system.
The circuit-breaker therefore only requires limited maintenance.
The VD4 circuit-breakers use a mechanical operating mechanism, with stored energy and free trip.
These characteristics allow opening and closing operations independent of the operator. The operating mechanism is of simple conception and use and can be customised with a wide range of accessories which are easy and rapid to install. This simplicity converts into greater reliability of the apparatus.

The structure

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

1. Description

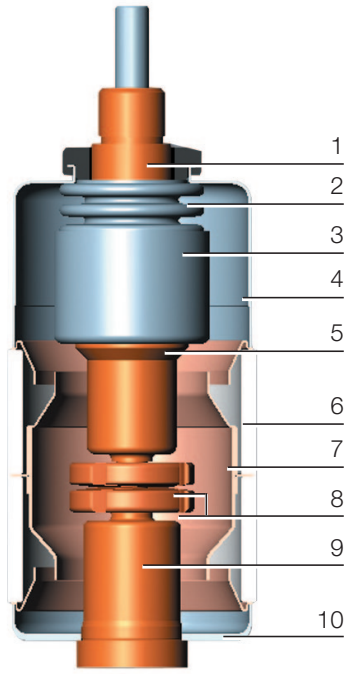
Quenching principle of ABB interrupters

In a vacuum interrupter, the electric arc starts at the moment of contact separation and is maintained until zero current and can be influenced by magnetic fields.

Vacuum arc – diffuse or contracted

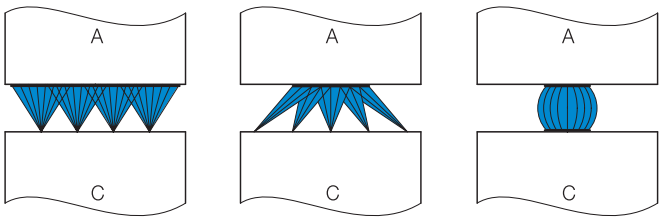
Following contact separation, single melting points form over the entire surface of the cathode, producing metal vapours which support the arc.
The diffuse vacuum arc is characterised by expansion over the contact surface and by an even distribution of thermal stress on the contact surfaces.

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 (above the rated value), the electric arc tends to be transformed from the diffuse into the contracted type, due to the Hall effect.
Starting at the anode, the arc contracts and as the current rises further it tends to become sharply defined. Near the area involved there is an increase in temperature with consequent thermal stress on the contact.
To prevent overheating and erosion of the contacts, the arc is kept rotating. With arc rotation it becomes similar to a moving conductor which the current passes through.



1 Stem/terminal
2 Twist protection
3 Bellows
4 Interrupter housing
5 Shield
6 Ceramic insulator
7 Shield
8 Contacts
9 Terminal
10 Interrupter housing

Vacuum interrupter



Schematic diagram of the transition from a diffuse arc to a contracted arc in a vacuum interrupter.

The spiral geometry of ABB vacuum interrupter contacts

The special geometry of the spiral contacts generates a radial magnetic field in all areas of the arc column, concentrated over the contact circumferences.

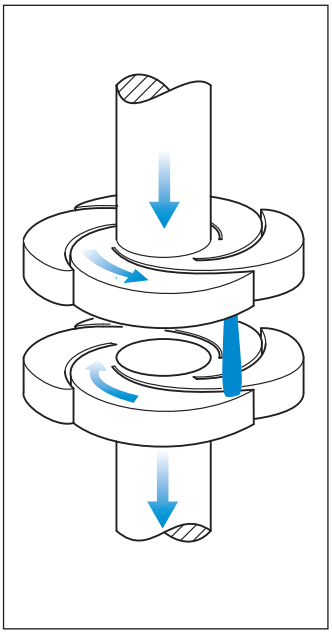
An electromagnetic force is self-generated and this acts tangentially, causing rapid arc rotation around the contact axis.

This means the arc is forced to rotate and to involve a wider surface than that of a fixed contracted arc.

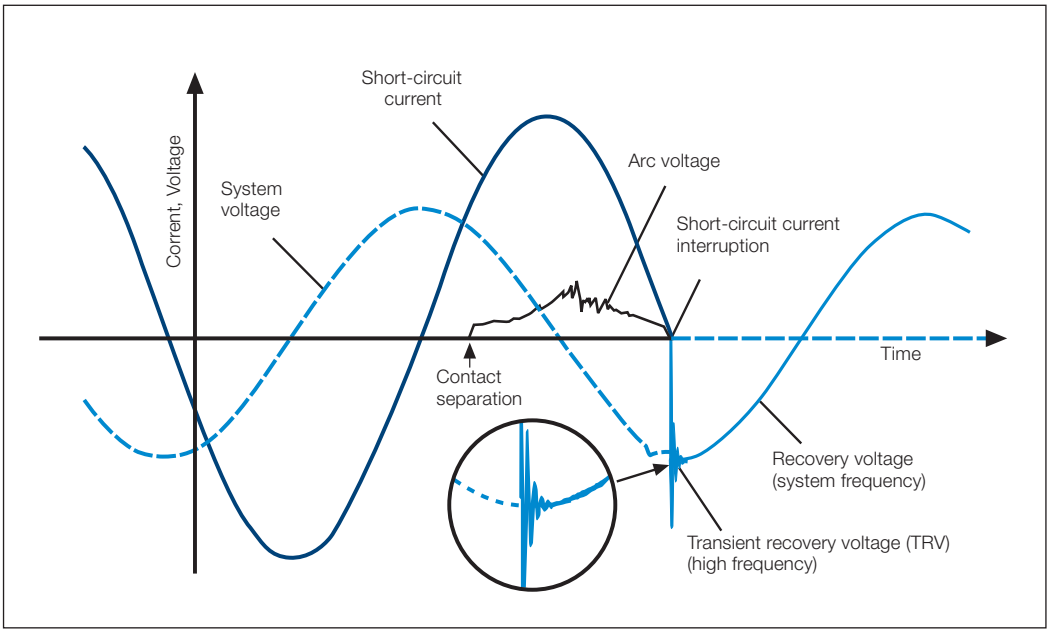
Apart from minimising thermal stress on the contacts, all this makes contact erosion negligible and, above all, allows the interruption process to be controlled even with very high short-circuits.

ABB vacuum interrupters interrupt at the natural passage of the current through zero, thereby preventing the arc from restriking after that event.

Rapid reduction in the current charge and rapid condensation of the metal vapours simultaneously with the zero current, allows maximum dielectric strength to be restored between the interrupter contacts within microseconds.



Radial magnetic field contact arrangement with a rotating vacuum arc.



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

1. Description

Versions available

The VD4 circuit-breakers are available in the fixed and withdrawable version 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

The VD4 circuit-breakers are used in power distribution for control and protection of cables, overhead lines, transformer and distribution substations, motors, transformers, generators and capacitor banks.

Standards

The VD4 circuit-breakers comply with the IEC 62271-100 Standards and with those of the major industrialised countries.
The VD4 circuit-breakers have undergone the tests indicated below and guarantee the safety and reliability of the apparatus in service in any installation.

- **Type tests:** heating, withstand insulation at power frequency, withstand insulation at lightning impulse, short-time and peak withstand current, mechanical life, short-circuit current making and breaking capacity.
- **Individual tests:** insulation of the main circuits with voltage at power frequency, auxiliary circuit and operating mechanism insulation, measurement of the main circuit resistance, mechanical and electrical operation.

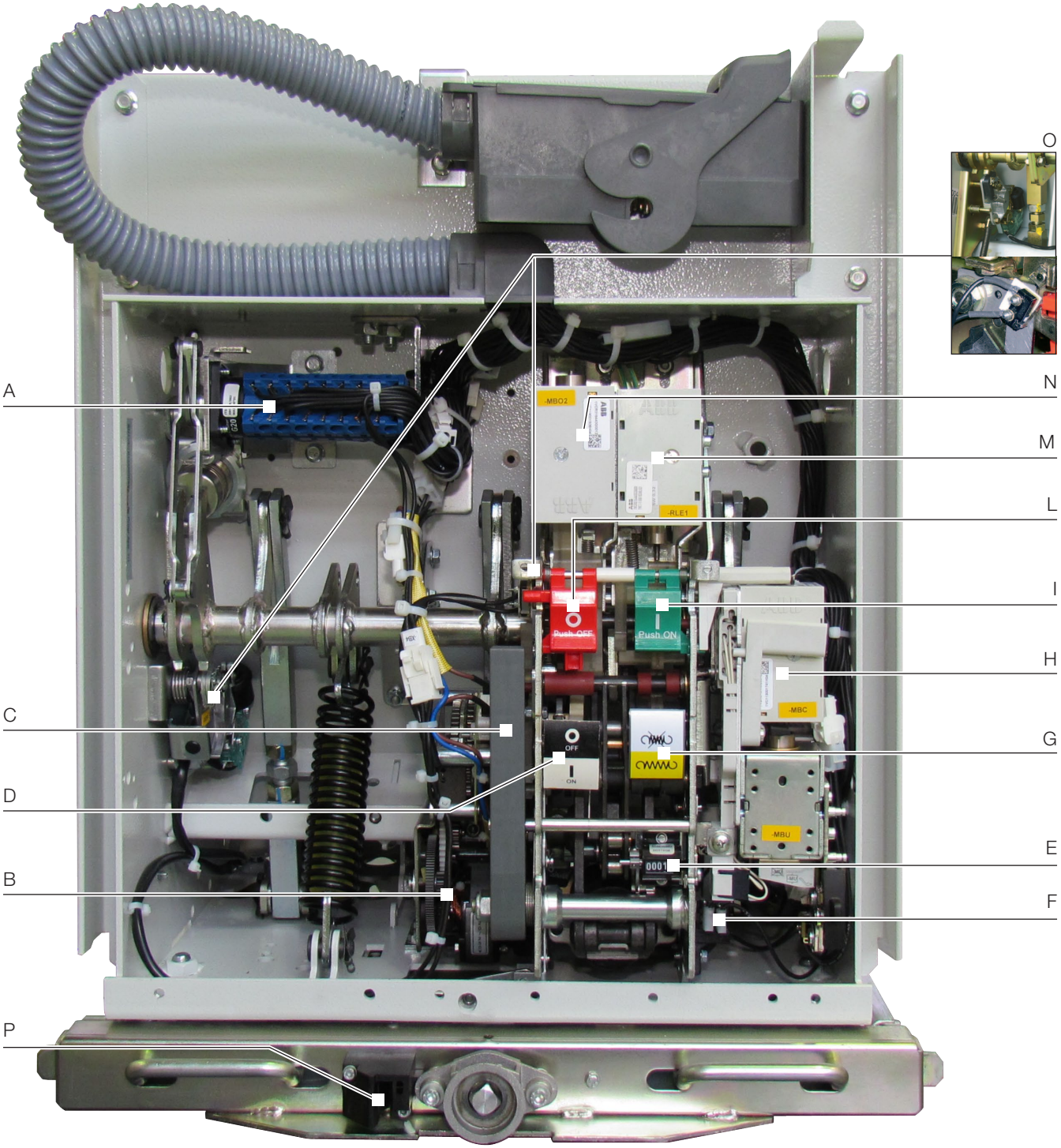
Service safety

Thanks to the complete range of mechanical and electrical locks (available on request), it is possible to construct safe distribution switchgear with the VD4 circuit-breakers.
The locking devices have been studied to prevent incorrect operations and to inspect the installations whilst guaranteeing maximum operator safety.
Key locks or padlock devices enable opening and closing operations and/or racking in and racking out.
The racking-out device with the door closed allows the circuit-breaker to be racked into or out of the switchgear only with the door closed.
Anti-racking-in locks prevent circuit-breakers with different rated currents from being racked in, and the racking-in and racking out operation with the circuit-breaker closed.

- **Highly reliable operating mechanisms thanks to a low number of components which are manufactured using production systems for large quantities**
- **Extremely limited and 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 is supplied as standard**
- **Built-in closing spring charging lever**
- **Key lock with circuit-breaker open**
- **Protective covering over the opening and closing pushbuttons to be operated using a special tool**
- **Padlock device on the operating pushbuttons**

Accessories

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



Circuit-breaker operating mechanism

A Open/closed auxiliary contacts
B Geared motor for closing spring charging
C Built-in closing spring charging lever
D Mechanical signalling device for circuit-breaker open/closed
E Mechanical operation counter
F Contacts for signalling spring charged/discharged
G Signalling device for closing springs charged/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

1. Description

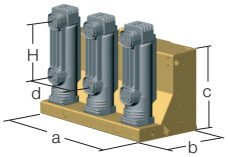
General characteristics of the complete VD4 series (*)

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

- IEC 62271-1
- IEC 62271-100

(*) For information about the 12 kV • 1250 ... 4000 A • 50/63 kA and 36/40.5 kV • 630 ... 2500 A • 16 ... 40 kA circuit-breakers, please see technical catalogue GCBA520PO102.

Rated voltage (1)	kV	12			
Rated frequency	Hz	50 - 60			
Rated normal 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)	158
Short-time withstand current	s	3	3	3	3
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		-	-	-	•



Technical documentation

To go into technical and application aspects of the VD4 circuit-breakers in depth, please ask us for the following publications:

– 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


DET NORSKE VERITAS
QUALITY SYSTEM CERTIFICATE
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Divisione SACE - T.M.S.
Via Friuli, 4 - 24044 Dalmine (BG) - Italy
Contrada Remartello - 65014 Loreto Aprutino (PE) - Italy
UNI EN ISO 9001:2000 (ISO 9001:2000)
Progettazione, produzione e servizio di interruttori, sezionatori, contattori e quadri elettrici di Media Tensione
Design, manufacture and service of Medium Voltage circuit-breakers, switches, contactors and switchboards
SINCERT


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ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATE
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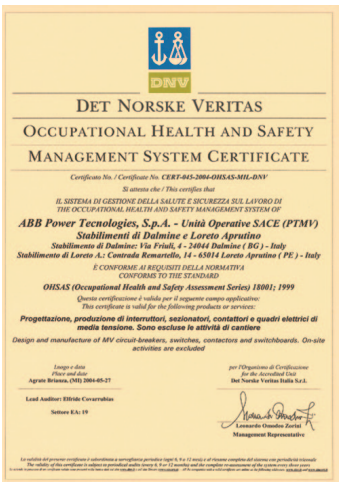
Contrada Remartello - 65014 Loreto Aprutino (PE) - Italy
UNI EN ISO 14001: 1996 (ISO 14001: 1996)
Progettazione, produzione e servizio di interruttori, sezionatori, contattori e quadri elettrici di Media Tensione
Design, manufacture and service of Medium Voltage circuit-breakers, switches, contactors and switchboards
SINCERT


DET NORSKE VERITAS
OCCUPATIONAL HEALTH AND SAFETY
MANAGEMENT SYSTEM CERTIFICATE
ABB Power Tecnologies, S.p.A. - Unità Operative SACE (PTMV)
Stabilimenti di Dalmine e Loreto Aprutino
Stabilimento di Dalmine: Via Friuli, 4 - 24044 Dalmine (BG) - Italy
Stabilimento di Loreto A.: Contrada Remartello, 14 - 63014 Loreto Aprutino (PE) - Italy
OHSAS (Occupational Health and Safety Assessment Series) 18001: 1999
Progettazione, produzione di interruttori, sezionatori, contattori e quadri elettrici di media tensione. Sono escluse le attività di cantiere
Design and manufacture of MV circuit-breakers, switches, contactors and switchboards. On-site activities are excluded


Sistema Nazionale per l'Accreditamento di Laboratori
CERTIFICATE OF ACCREDITATION
Number of Accreditation
0253
It is certified that
The Laboratory ABB TRASMISSIONE & DISTRIBUZIONE SpA
UNITA' OPERATIVA SACE T.M.S.
Via Friuli 4 - 24044 Dalmine - BG
Director
President
Roma, li 08 / 07 / 1999

	17.5		24	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	16 ... 31.5	16 ... 31.5	16 ... 40
	40 ... 80	100 ... 125	40 ... 80	40 ... 80	40 ... 100
	3	3	3	3	4
	•/•	•/•	•/•	•/•	•/•
	150 - 275	210 - 275	210 - 275	275	280 - 360 (4)
	205 - 310	310	310	328 / 280 (6)	328
	450 - 700	570 - 700	570 - 700	786 / 853 (6)	895 (6) - 1000
	424	424	424	492 / 789 (6)	555 - 686 (6)
	461 - 599 (5)	599 (5) (7)	631 - 661	876 / 973 (6)	1575
	73 - 105	94 - 180	100 - 110	170 / 210	290 - 350
	•	•	•	•	•
	-	-	-	•	•

(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 eat sink 616 mm (2500 A)
(6) Withdrawable version
(7) Circuit-breaker with eat sink 634 mm (3150 A)

Quality System

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

Environmental Management System

Complies with ISO 14001 Standards, certified by an independent organisation.

Test Laboratory

Complies with UNI CEI EN ISO/IEC 17025 Standards, accredited by an independent organisation.

Health and Safety Management System

Complies with OHSAS 18001 Standards, certified by an independent organisation.


Translation
Deutsche Akkreditierungsstelle Technik (DATech) e.V.
Signatory of the Multilateral Agreement of EA and ILAC for the mutual recognition
represented in the
Deutschen AkkreditierungsRat
Akkreditierung
The German Accreditation Body Technology (DATech) e.V. certifies that the Testing Laboratory
PEHLA Testing Laboratories Ratingen
Oberhausener Str. 33
D-40472 Ratingen
is competent under the terms of DIN EN ISO/IEC 17025 to carry out testing in the fields
High-Voltage Switchgear and Controlgear,
Current and Voltage Transformers,
Power Transformers and Busbar Systems
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The accreditation is valid until: October 14th, 2008
The annex is deemed part of this certificate and comprises 2 pages.
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Frankfurt/Main, October 15th, 2003
i.V. Dipl.-Ing. (FH) R. Egner
Head of the Accreditation Body
Member in EA, ILAC, IAF


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PEHLA Testing Laboratories Ratingen
Oberhausener Str. 33
D-40472 Ratingen
die Kompetenz nach DIN EN ISO/IEC 17025 besitzt, Prüfungen in den Bereichen
Hochspannungsschaltanlagen und -schaltgeräte,
Strom- und Spannungswandler, Transformatoren und
Sammelschienensysteme
nach den in der Anlage aufgeführten Normen und Spezifikationen auszuführen.
Die Akkreditierung ist gültig bis: 14.10.2008
Die Anlage ist Bestandteil der Urkunde und besteht aus 2 Seiten.
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Frankfurt/Main, 15.10.2003
i.V. Dipl.-Ing. (FH) R. Egner
Leiter der Akkreditierungsstelle
Akkreditierungsstelle in der TGA – Trägergemeinschaft für Akkreditierung GmbH


Deutsche Akkreditierungsstelle Technik (DATech) e.V.
vertreten im
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Akkreditierung
Die Deutsche Akkreditierungsstelle Technik (DATech) e.V. bestätigt hiermit, dass das Prüflaboratorium
ABB AG – Division Energietechnik
Calor Emag Mittelspannungsprodukte
Oberhausener Str. 33
D-40472 Ratingen
die Kompetenz nach DIN EN ISO/IEC 17025 besitzt, Prüfungen in den Bereichen
Hochspannungsschaltanlagen und -schaltgeräte,
Niederspannungs-Schaltgerätekombinationen,
Strom- und Spannungswandler, Transformatoren und
Sammelschienensysteme
nach den in der Anlage aufgeführten Normen und Spezifikationen auszuführen.
Die Akkreditierung ist gültig bis: 14.10.2008
Die Anlage ist Bestandteil der Urkunde und besteht aus 2 Seiten.
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Calor Emag Medium Voltage Products
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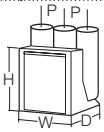
Frankfurt/Main, July 29th, 2005
i.V. Dipl.-Ing. (FH) R. Egner
Head of the Accreditation Body
Member in EA, ILAC, IAF

2. Selection and ordering
Fixed circuit-breakers

Fixed VD4 circuit-breaker (12 kV) (4)

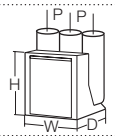
Circuit-breaker		VD4 12									
Standards	IEC 62271-100	•									
Rated voltage	Ur [kV]	12 (2)									
Rated insulation voltage	Us [kV]	12									
Withstand voltage at 50 Hz	Ud (1 min) [kV]	28									
Impulse withstand voltage	Up [kV]	75									
Rated frequency	fr [Hz]	50-60									
Rated normal current (40 °C)	Ir [A]	630	630	630	1250	1250	1250	1250	1250	1250	1250
Rated breaking capacity (rated short-circuit breaking current symmetrical)	Isc [kA]	16	16	16	16	16	16	—	—	—	—
		20	20	20	20	20	20	—	—	—	—
		25	25	25	25	25	25	—	—	—	—
		31.5	31.5	31.5	31.5	31.5	31.5	—	—	—	—
		—	—	—	—	—	—	40	40	—	—
		—	—	—	—	—	—	—	—	50	50
Rated short-time withstand current (3s)	Ik [kA]	16	16	16	16	16	16	—	—	—	—
		20	20	20	20	20	20	—	—	—	—
		25	25	25	25	25	25	—	—	—	—
		31.5	31.5	31.5	31.5	31.5	31.5	—	—	—	—
		—	—	—	—	—	—	40	40	—	—
		—	—	—	—	—	—	—	—	50	50
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	—	—	—	—
		—	—	—	—	—	—	100	100	—	—
		—	—	—	—	—	—	—	—	125	125
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•	•	•	•	•	•
Opening time	[ms]	33 ... 60									
Arcing time	[ms]	10 ... 15									
Total breaking time	[ms]	43 ... 75									
Closing time	[ms]	30 ... 60									
Maximum overall dimensions 	H [mm]	461	461	461	461	461	461	589	589	610	610
	W [mm]	450	570	700	450	570	700	570	700	600	750
	D [mm]	424	424	424	424	424	424	424	424	459	459
	Pole distance P [mm]	150	210	275	150	210	275	210	275	210	275
Weight	[kg]	73	75	79	73	75	79	84	84	146	158
Standardised table of dimensions	TN	7405(1)	7406(1)	—	7405(1)	7406(1)	—	—	—	—	—
	1VCD	—	—	000051(1)	—	—	000051(1)	003282(1)	003285(1)	003440	003441
Operating temperature	[°C]	- 5 ... + 40									
Tropicalization	IEC: 60068-2-30, 60721-2-1	•									
Electromagnetic compatibility	IEC: 62271-1	•									

(1) Poles in polyamide
(2) Available in 10 kV voltage version in accordance with GOST standards
(3) Up to 4000 A with forced ventilation
(4) On request, the closing spring can be loaded by means of a removable crank handle outside operating mechanism (instead of linear loading by a lever built into the front of operating mechanism)

•																
12 (2)																
12																
28																
75																
50-60																
1600	1600	1600	1600	1600	1600	1600	2000	2000	2000	2000	2500	2500	2500	3150 (3)	3150 (3)	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
20	20	20	—	—	—	—	20	20	—	—	20	20	—	20	—	
25	25	25	—	—	—	—	25	25	—	—	25	25	—	25	—	
31.5	31.5	31.5	—	—	—	—	31.5	31.5	—	—	31.5	31.5	—	31.5	—	
—	—	—	40	40	—	—	40	40	—	—	40	40	—	40	—	
—	—	—	—	—	50	50	—	—	50	50	—	—	50	—	50	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
20	20	20	—	—	—	—	20	20	—	—	20	20	—	20	—	
25	25	25	—	—	—	—	25	25	—	—	25	25	—	25	—	
31.5	31.5	31.5	—	—	—	—	31.5	31.5	—	—	31.5	31.5	—	31.5	—	
—	—	—	40	40	—	—	40	40	—	—	40	40	—	40	—	
—	—	—	—	—	50	50	—	—	50	50	—	—	50	—	50	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
50	50	50	—	—	—	—	50	50	—	—	50	50	—	50	—	
63	63	63	—	—	—	—	63	63	—	—	63	63	—	63	—	
80	80	80	—	—	—	—	80	80	—	—	80	80	—	80	—	
—	—	—	100	100	—	—	100	100	—	—	100	100	—	100	—	
—	—	—	—	—	125	125	—	—	125	125	—	—	125	—	125	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
33 ... 60																
10 ... 15																
43 ... 75																
30 ... 60																
599	599	599	589	589	610	610	599	599	610	610	599	599	610	635	636	
450	570	700	570	700	600	750	570	700	600	750	570	700	750	700	750	
424	424	424	424	424	459	459	424	424	459	459	424	424	459	424	459	
150	210	275	210	275	210	275	210	275	210	275	210	275	275	275	275	
93	98	105	84	84	146	158	98	105	146	158	98	105	163	140	177	
—	7407 (1)	7408 (1)	—	—	—	—	7407 (1)	7408 (1)	—	—	7407 (1)	7408 (1)	—	—	—	
000050	—	—	003282(1)	003285(1)	003440	003441	—	—	003440	003441	—	—	003441	000149 (1)	003443	
- 5 ... + 40																
•																
•																

2. Selection and ordering
Fixed circuit-breakers

Fixed VD4 circuit-breaker (17.5 kV) (3)

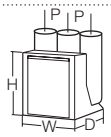
Circuit-breaker		VD4 17									
Standards	IEC 62271-100	•									
Rated voltage	Ur [kV]	17.5									
Rated insulation voltage	Us [kV]	17.5									
Withstand voltage at 50 Hz	Ud (1 min) [kV]	38									
Impulse withstand voltage	Up [kV]	95									
Rated frequency	fr [Hz]	50-60									
Rated normal current (40 °C)	Ir [A]	630	630	630	1250	1250	1250	1250	1250	1250	1250
Rated breaking capacity (rated short-circuit breaking current symmetrical)	Isc [kA]	16	16	16	16	16	16	—	—	—	—
		20	20	20	20	20	20	—	—	—	—
		25	25	25	25	25	25	—	—	—	—
		31.5	31.5	31.5	31.5	31.5	31.5	—	—	—	—
		—	—	—	—	—	—	40	40	—	—
		—	—	—	—	—	—	—	—	50	50
Rated short-time withstand current (3s)	Ik [kA]	16	16	16	16	16	16	—	—	—	—
		20	20	20	20	20	20	—	—	—	—
		25	25	25	25	25	25	—	—	—	—
		31.5	31.5	31.5	31.5	31.5	31.5	—	—	—	—
		—	—	—	—	—	—	40	40	—	—
		—	—	—	—	—	—	—	—	50	50
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	—	—	—	—
		—	—	—	—	—	—	100	100	—	—
		—	—	—	—	—	—	—	—	125	125
Operation sequence	[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•	•	•	•	•	•
Opening time	[ms]	33 ... 60									
Arcing time	[ms]	10 ... 15									
Total breaking time	[ms]	43 ... 75									
Closing time	[ms]	30 ... 60									
Maximum overall dimensions 	H [mm]	461	461	461	461	461	461	589	589	610	610
	W [mm]	450	570	700	450	570	700	570	700	600	750
	D [mm]	424	424	424	424	424	424	424	424	459	459
	Pole distance P [mm]	150	210	275	150	210	275	210	275	210	275
Weight	[kg]	73	75	79	73	75	79	84	84	146	158
Standardised table of dimensions	TN	7405(1)	7406(1)	—	7405(1)	7406(1)	—	—	—	—	—
	1VCD	—	—	000051(1)	—	—	000051(1)	003282(1)	003285(1)	003440	003441
Operating temperature	[°C]	- 5 ... + 40									
Tropicalization	IEC: 60068-2-30, 60721-2-1	•									
Electromagnetic compatibility	IEC: 62271-1	•									

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

	•													
	17.5													
	17.5													
	38													
	95													
	50-60													
	1600	1600	1600	1600	1600	1600	2000	2000	2000	2000	2500	2500	3150 (2)	3150 (2)
	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	20	20	—	—	—	—	20	20	—	—	20	—	20	—
	25	25	—	—	—	—	25	25	—	—	25	—	25	—
	31.5	31.5	—	—	—	—	31.5	31.5	—	—	31.5	—	31.5	—
	—	—	40	40	—	—	40	40	—	—	40	—	40	—
	—	—	—	—	50	50	—	—	50	50	—	50	—	50
	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	20	20	—	—	—	—	20	20	—	—	20	—	20	—
	25	25	—	—	—	—	25	25	—	—	25	—	25	—
	31.5	31.5	—	—	—	—	31.5	31.5	—	—	31.5	—	31.5	—
	—	—	40	40	—	—	40	40	—	—	40	—	40	—
	—	—	—	—	50	50	—	—	50	50	—	50	—	50
	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	50	50	—	—	—	—	50	50	—	—	50	—	50	—
	63	63	—	—	—	—	63	63	—	—	63	—	63	—
	80	80	—	—	—	—	80	80	—	—	80	—	80	—
	—	—	100	100	—	—	100	100	—	—	100	—	100	—
	—	—	—	—	125	125	—	—	125	125	—	125	—	125
	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	33 ... 60													
	10 ... 15													
	43 ... 75													
	30 ... 60													
	599	599	589	589	610	610	599	599	610	610	599	610	635	636
	570	700	570	700	600	750	570	700	600	750	700	750	700	750
	424	424	424	424	459	459	424	424	459	459	424	459	424	459
	210	275	210	275	210	275	210	275	210	275	275	275	275	275
	98	105	84	84	146	158	98	105	146	158	105	163	140	177
	7407 (1)	7408 (1)	—	—	—	—	7407 (1)	7408 (1)	—	—	7408 (1)	—	—	—
	—	—	003282 (1)	003285 (1)	003440	003441	—	—	003440	003441	—	003441	000149 (1)	003443
	- 5 ... + 40													
	•													
	•													

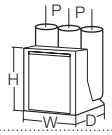
2. Selection and ordering
Fixed circuit-breakers

Fixed VD4 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 normal current (40 °C)		Ir [A]	630	630	1250	1250	1600	2000	2500
Rated breaking capacity (rated short-circuit breaking current symmetrical)		Isc [kA]	16	16	16	16	16	16	–
			20	20	20	20	20	20	–
			25	25	25	25	25	25	25
			–	–	31.5	–	31.5	31.5	31.5
Rated short-time withstand current (3s)		Ik [kA]	16	16	16	16	16	16	–
			20	20	20	20	20	20	–
			25	25	25	25	25	25	25
			–	–	31.5	–	31.5	31.5	31.5
Making capacity		Ip [kA]	40	40	40	40	40	40	–
			50	50	50	50	50	50	–
			63	63	63	63	63	63	63
			–	–	80	–	80	80	80
Operation sequence		[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•	•	•
Opening time		[ms]	33 ... 60						
Arcing time		[ms]	10 ... 15						
Total breaking time		[ms]	43 ... 75						
Closing time		[ms]	30 ... 60						
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 distance P [mm]	210	275	210	275	275	275	275
Weight		[kg]	100	104	100/106 (1)	104	110	110	110
Standardised table of dimensions		TN	7409	7410	7409	7410	7411	7411	7411
		1VCD	–	–	000172 (1)	–	–	–	–
Operating temperature		[°C]	- 5 ... + 40						
Tropicalization		IEC: 60068-2-30, 60721-2-1	•						
Electromagnetic compatibility		IEC: 62271-1	•						

(1) 31.5 kA version
(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)

Fixed VD4 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 normal current (40 °C)	Ir [A]	1250	1600	2000	2500 (1)
Rated breaking capacity (rated short-circuit breaking current symmetrical)	Isc [kA]	20	20	20	20
		25	25	25	25
		31.5	31.5	31.5	31.5
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			
Arcing time	[ms]	10 ... 15			
Total breaking time	[ms]	45 ... 75			
Closing time	[ms]	30 ... 60			
Maximum overall dimensions 	H [mm]	564	564	564	564
	W [mm]	778	778	778	778
	D [mm]	468	468	468	468
	Pole distance P [mm]	275	275	275	275
Weight	[kg]	150	150	170	170
Standardised table of dimensions	TN	1VYN300901-LT	1VYN300901-LT	1VYN300901-LT	1VYN300901-LT
Operating temperature	[°C]	- 5 ... + 40			
Tropicalization	IEC: 60068-2-30, 60721-2-1	•			
Electromagnetic compatibility	IEC: 62271-1	•			

(1) 2500 A with forced ventilation

2. Selection and ordering
Fixed circuit-breakers

Types of fixed version 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 uninterrupted 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	
kV	kA	P=150	P=210	P=275	P=210	P=275	P=150	P=210	P=275	P=210	P=275	P=275	Circuit-breaker type
		W=450	W=570	W=700	W=570	W=700	W=450	W=570	W=700	W=600	W=750	W=750	
12	16	630											VD4 12.06.16 p150
	20	630											VD4 12.06.20 p150
	25	630											VD4 12.06.25 p150
	31.5	630											VD4 12.06.32 p150
	16	1250											VD4 12.12.16 p150
	20	1250											VD4 12.12.20 p150
	25	1250											VD4 12.12.25 p150
	31.5	1250											VD4 12.12.32 p150
	20						1600						VD4 12.16.20 p150
	25						1600						VD4 12.16.25 p150
	31.5						1600						VD4 12.16.32 p150
	16		630										VD4 12.06.16 p210
	20		630										VD4 12.06.20 p210
	25		630										VD4 12.06.25 p210
	31.5		630										VD4 12.06.32 p210
	16		1250										VD4 12.12.16 p210
	20		1250										VD4 12.12.20 p210
	25		1250										VD4 12.12.25 p210
	31.5		1250										VD4 12.12.32 p210
	40				1250								VD4 12.12.40 p210
	50									1250			VD4 12.12.50 p210
	20							1600					VD4 12.16.20 p210
	25							1600					VD4 12.16.25 p210
	31.5							1600					VD4 12.16.32 p210
	40				1600								VD4 12.16.40 p210
	50									1600			VD4 12.16.50 p210
	20							2000					VD4 12.20.20 p210
	25							2000					VD4 12.20.25 p210
	31.5							2000					VD4 12.20.32 p210
	40							2000					VD4 12.20.40 p210
	50									2000			VD4 12.20.50 p210
	20							2500					VD4 12.25.20 p210
	25							2500					VD4 12.25.25 p210
	31.5							2500					VD4 12.25.32 p210
	40							2500					VD4 12.25.40 p210

H = Height of the circuit-breaker.
W = Width of the circuit-breaker.
D = Depth of the circuit-breaker.
u/l = Distance between bottom and top terminal.
l/g = Distance between the bottom terminal and the resting surface of the circuit-breaker.
P = Pole horizontal centre distance.

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

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

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

2. Selection and ordering
Fixed circuit-breakers

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

Ur	Isc	Rated uninterrupted current (40 °C) [A]											Circuit-breaker type
		H=461			H=589		H=599			H=610		H=635	
		D=424			D=424		D=424			D=459		D=459	
kV	kA	u/l=205			u/l=310		u/l=310			u/l=310		u/l=310	
		l/g=217.5			l/g=238		l/g=237.5			l/g=237		l/g=237.5	
		P=150	P=210	P=275	P=210	P=275	P=150	P=210	P=275	P=210	P=275	P=275	
		W=450	W=570	W=700	W=570	W=700	W=450	W=570	W=700	W=600	W=750	W=750	
17.5	16	630											VD4 17.06.16 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 the circuit-breaker.
W = Width of the circuit-breaker.
D = Depth of the circuit-breaker.
u/l = Distance between bottom and top terminal.
l/g = Distance between the bottom terminal and the resting surface of the circuit-breaker.
P = Pole horizontal centre distance.

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

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

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

2. Selection and ordering
Fixed circuit-breakers

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

Ur	Isc	Rated uninterrupted current (40 °C) [A]			Circuit-breaker type
		H=631		H=642	
		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	
24	16	630			VD4 24.06.16 p210
	20	630			VD4 24.06.20 p210
	25	630			VD4 24.06.25 p210
	16	1250			VD4 24.12.16 p210
	20	1250			VD4 24.12.20 p210
	25	1250			VD4 24.12.25 p210
	31.5	1250			VD4 24.12.32 p210
	16		630		VD4 24.06.16 p275
	20		630		VD4 24.06.20 p275
	25		630		VD4 24.06.25 p275
	16		1250		VD4 24.12.16 p275
	20		1250		VD4 24.12.20 p275
	25		1250		VD4 24.12.25 p275
	16			1600	VD4 24.16.16 p275
	20			1600	VD4 24.16.20 p275
	25			1600	VD4 24.16.25 p275
	31.5			1600	VD4 24.16.32 p275
	16			2000	VD4 24.20.16 p275
	20			2000	VD4 24.20.20 p275
	25			2000	VD4 24.20.25 p275
	31.5			2000	VD4 24.20.32 p275
	25			2500	VD4 24.25.25 p275
	31.5			2500	VD4 24.25.32 p275

H = Height of the circuit-breaker.
W = Width of the circuit-breaker.
D = Depth of the circuit-breaker.
u/l = Distance between bottom and top terminal.
l/g = Distance between the bottom terminal and the resting surface of the circuit-breaker.
P = Pole horizontal centre distance.

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

Ur	Isc	Rated uninterrupted current (40 °C) [A]				
		H = 876				
		L = 786				
		P = 478.5				
kV	kA	u/l = 328				Circuit-breaker type
		l/g = 428.5				
		l = 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 (1)	VD4 36.25.20 p275
	25				2500 A (1)	VD4 36.25.25 p275
	31.5				2500 A (1)	VD4 36.25.32 p275

H = Height of the circuit-breaker.
W = Width of the circuit-breaker.
D = Depth of the circuit-breaker.
u/l = Distance between bottom and top terminal.
l/g = Distance between the bottom terminal and the resting surface of the circuit-breaker.
P = Pole horizontal centre distance.
(1) = 2500 A rated current guaranteed with forced ventilation.

Standard fittings of fixed circuit-breakers

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

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

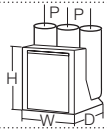
  Note: with the group of ten auxiliary contacts supplied as standard and the maximum number of electrical applications, three break contacts (signalling circuit-breaker open) and five make contacts (signalling circuit-breaker closed) are available.
- lever built into operating mechanism for linear loading of closing spring.

VD4 - up to 24 kV

VD4 - 36 kV

2. Selection and ordering
Withdrawable circuit-breakers

Withdrawable version circuit-breakers for UniGear ZS1 switchgear (12 kV) (5)

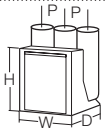
Circuit-breaker			VD4/P 12						
Standards		IEC 62271-100	•						
Rated voltage		Ur [kV]	12 (4)						
Rated insulation voltage		Us [kV]	12						
Withstand voltage at 50 Hz		Ud (1 min) [kV]	28						
Impulse withstand voltage		Up [kV]	75						
Rated frequency		fr [Hz]	50-60						
Rated normal current (40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

(1) Rated current guaranteed with circuit-breaker installed in UniGear ZS1 switchgear and with 40 °C ambient temperature.
(2) Up to 4000 A with forced ventilation.
(3) Poles in polyamide
(4) Available in 10 kV voltage version in accordance with GOST standards
(5) On request, the closing spring can be loaded by means of a removable crank handle outside 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).

	•											
	12 (4)											
	12											
	28											
	75											
	50-60											
	1600	1600	1600	1600	2000	2000	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	—	—	40	—	40	—
	—	—	50	50	—	—	50	50	—	50	—	50
	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	20	20	—	—	20	—	20	—
	—	—	—	—	25	25	—	—	25	—	25	—
	—	—	—	—	31.5	31.5	—	—	31.5	—	31.5	—
	40	40	—	—	40	40	—	—	40	—	40	—
	—	—	50	50	—	—	50	50	—	50	—	50
	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	50	50	—	—	50	—	50	—
	—	—	—	—	63	63	—	—	63	—	63	—
	—	—	—	—	80	80	—	—	80	—	80	—
	100	100	—	—	100	100	—	—	100	—	100	—
	—	—	125	125	—	—	125	125	—	125	—	125
	•	•	•	•	•	•	•	•	•	•	•	•
	33 ... 60											
	10 ... 15											
	43 ... 75											
	30 ... 60											
	691	691	691	691	691	691	691	691	691	691	730	742
	653	853	681	853	653	853	681	853	853	853	853	853
	641	642	643	643	642	642	643	643	640	643	640	643
	210	275	210	275	210	275	210	275	275	275	275	275
	174	176	180	193	160	166	190	205	186	225	221	240
	—	—	—	—	7415(3)	7416(3)	—	—	7417(3)	—	—	—
	003284(3)	003286(3)	003444	003445	—	—	003444	003445	—	003446	000153(3)	003447
	- 5 ... + 40											
	•											
	•											

2. Selection and ordering
Withdrawable circuit-breakers

Withdrawable version circuit-breakers for UniGear ZS1 switchgear (17.5 kV) (4)

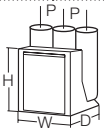
Circuit-breaker			VD4/P 17						
Standards		IEC 62271-100	•						
Rated voltage		Ur [kV]	17,5						
Rated insulation voltage		Us [kV]	17,5						
Withstand voltage at 50 Hz		Ud (1 min) [kV]	38						
Impulse withstand voltage		Up [kV]	95						
Rated frequency		fr [Hz]	50-60						
Rated normal current (40 °C) (1)		Ir [A]	630	1250	1250	1250	1250	1600	1600
Rated breaking capacity (rated short-circuit breaking current symmetrical)		Isc [kA]	16	16	—	—	—	—	—
			20	20	—	—	—	20	20
			25	25	—	—	—	25	25
			31,5	31,5	—	—	—	31,5	31,5
			—	—	40	40	—	—	—
			—	—	—	—	50	—	—
Rated short-time withstand current (3s)		Ik [kA]	16	16	—	—	—	—	—
			20	20	—	—	—	20	20
			25	25	—	—	—	25	25
			31,5	31,5	—	—	—	31,5	31,5
			—	—	40	40	—	—	—
			—	—	—	—	50	—	—
Making capacity		Ip [kA]	40	40	—	—	—	—	—
			50	50	—	—	—	50	50
			63	63	—	—	—	63	63
			80	80	—	—	—	80	80
			—	—	100	100	—	—	—
			—	—	—	—	125	—	—
Operation sequence		[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•	•	•
Opening time		[ms]	33 ... 60						
Arcing time		[ms]	10 ... 15						
Total breaking time		[ms]	43 ... 75						
Closing time		[ms]	30 ... 60						
Maximum overall dimensions		H [mm]	632	632	691	691	691	691	691
		W [mm]	503	503	653	853	681	653	853
		D [mm]	664	664	641	642	643	642	642
		Pole distance P [mm]	150	150	210	275	210	210	275
Weight		[kg]	116	116	174	176	180	160	166
Standardised table of dimensions		TN	7412(3)	7412(3)	—	—	—	7415(3)	7416(3)
		1VCD	—	—	003284(3)	003286(3)	003444	—	—
Operating temperature		[°C]	- 5 ... + 40						
Tropicalization		IEC: 60068-2-30, 60721-2-1	•						
Electromagnetic compatibility		IEC: 62271-1	•						

(1) Rated current guaranteed with circuit-breaker installed in UniGear ZS1 switchgear and with 40 °C ambient temperature.
(2) Up to 4000 A with forced ventilation.
(3) Poles in polyamide
(4) On request, the closing spring can be loaded by means of a removable crank handle outside 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).

	•											
	17,5											
	17,5											
	38											
	95											
	50-60											
	1600	1600	1600	1600	2000	2000	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	—	—	40	—	40	—
	—	—	50	50	—	—	50	50	—	50	—	50
	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	20	20	—	—	20	—	20	—
	—	—	—	—	25	25	—	—	25	—	25	—
	—	—	—	—	31,5	31,5	—	—	31,5	—	31,5	—
	40	40	—	—	40	40	—	—	40	—	40	—
	—	—	50	50	—	—	50	50	—	50	—	50
	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	50	50	—	—	50	—	50	—
	—	—	—	—	63	63	—	—	63	—	63	—
	—	—	—	—	80	80	—	—	80	—	80	—
	100	100	—	—	100	100	—	—	100	—	100	—
	—	—	125	125	—	—	125	125	—	125	—	125
	•	•	•	•	•	•	•	•	•	•	•	•
	33 ... 60											
	10 ... 15											
	43 ... 75											
	30 ... 60											
	691	691	691	691	691	691	691	691	691	691	730	742
	653	853	681	853	653	853	681	853	853	853	853	853
	641	642	643	643	642	642	643	643	640	643	640	643
	210	275	210	275	210	275	210	275	275	275	275	275
	174	176	180	193	160	166	190	205	186	225	221	240
	—	—	—	—	7415[3]	7416[3]	—	—	7417[3]	—	—	—
	003284[3]	003286[3]	003444	003445	—	—	003444	003445	—	003446	000153[3]	003447
	- 5 ... + 40											
	•											
	•											

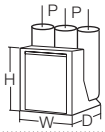
2. Selection and ordering
Withdrawable circuit-breakers

Withdrawable version 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 normal current (40 °C) (1)		Ir [A]	630	630	1250	1250	1600	2000	2500 (2)	3150 (3)
Rated breaking capacity (rated short-circuit breaking current symmetrical)		Isc [kA]	16	16	16	16	16	16	16	–
			20	20	20	20	20	20	20	–
			25	25	25	25	25	25	25	–
			–	–	31,5	31,5	31,5	31,5	31,5	31,5
Rated short-time withstand current (3s)		Ik [kA]	16	16	16	16	16	16	16	–
			20	20	20	20	20	20	20	–
			25	25	25	25	25	25	25	–
			–	–	31,5	31,5	31,5	31,5	31,5	31.5
Making capacity		Ip [kA]	40	40	40	40	40	40	40	–
			50	50	50	50	50	50	50	–
			63	63	63	63	63	63	63	–
			–	–	80	80	80	80	80	80
Operation sequence		[O - 0.3 s - CO - 15 s - CO]	•	•	•	•	•	•	•	•
Opening time		[ms]	33 ... 60							
Arcing time		[ms]	10 ... 15							
Total breaking time		[ms]	43 ... 75							
Closing time		[ms]	30 ... 60							
Maximum overall dimensions		H [mm]	794	794	794	794	838	838	838	838
		W [mm]	653	853	653	853	853	853	853	853
		D [mm]	802	802	802	802	790	790	790	790
		Pole distance P [mm]	210	275	210	275	275	275	275	275
Weight		[kg]	140	148	140/146 (4)	148	228	228	228	277
Standardised table of dimensions		TN	7413	7414	7413	7414	7418	7418	7418	–
		1VCD	–	–	000173 (4)	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 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).

General characteristics of withdrawable circuit-breakers for UniGear ZS2 and PowerCube 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 normal current (40 °C)		Ir [A]	1250	1600	2000	2500 (1)
Rated breaking capacity (rated short-circuit breaking current symmetrical)		Isc [kA]	20	20	20	20
			25	25	25	25
			31.5	31.5	31.5	31.5
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]	33 ... 60			
Arcing time		[ms]	10 ... 15			
Total breaking time		[ms]	45 ... 75			
Closing time		[ms]	30 ... 60			
Maximum overall dimensions		H [mm]	973	973	973	973
		W [mm]	842	842	842	842
		D [mm]	788	788	788	788
		Pole distance P [mm]	275	275	275	275
Weight		[kg]	230	230	230	230
Standardised table of dimensions		TN	1VYN300901-KG	1VYN300901-KG	1VYN300901-KG	1VYN300901-KG
Operating temperature		[°C]	- 5 ... + 40			
Tropicalization		IEC: 60068-2-30, 60721-2-1	•			
Electromagnetic compatibility		IEC: 62271-1	•			

(1) Up to 2500 A with forced ventilation.

2. Selection and ordering
Withdrawable circuit-breakers

Types of withdrawable version 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 uninterrupted current (40 °C) [A]					Circuit-breaker type
		W=650	W=800	W=1000	W=1000	W=1000	
		P=150	P=210	P=275	P=275	P=275	
kV	kA	u/l=205	u/l=310	u/l=310	u/l=310	u/l=310	
		ø=35	ø=79	ø=79	ø=109	ø=109	
	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
12	20		2000				VD4/P 12.20.20 p210
	25		2000				VD4/P 12.20.25 p210
	31.5		2000				VD4/P 12.20.32 p210
	40		2000				VD4/P 12.20.40 p210
	50		2000				VD4/P 12.20.50 p210
	40			1250			VD4/P 12.12.40 p275
	20			1600			VD4/P 12.16.20 p275
	25			1600			VD4/P 12.16.25 p275
	31.5			1600			VD4/P 12.16.32 p275
	40			1600			VD4/P 12.16.40 p275
	50			1600			VD4/P 12.16.50 p275
	20			2000			VD4/P 12.20.20 p275
	25			2000			VD4/P 12.20.25 p275
	31.5			2000			VD4/P 12.20.32 p275
	40			2000			VD4/P 12.20.40 p275
	50			2000			VD4/P 12.20.50 p275

W = Switchboard width.
P = Pole horizontal centre distance.
u/l = Distance between bottom and top terminal.
ø = Diameter of the isolating contact.

VD4 (12 kV) withdrawable circuit-breaker

Ur	Isc	Rated uninterrupted current (40 °C) [A]					Circuit-breaker type
		W=650	W=800	W=1000	W=1000	W=1000	
		P=150	P=210	P=275	P=275	P=275	
kV	kA	u/l=205	u/l=310	u/l=310	u/l=310	u/l=310	
		ø=35	ø=79	ø=79	ø=109	ø=109	
12	20				2500		VD4/P 12.25.20 p275
	25				2500		VD4/P 12.25.25 p275
	31,5				2500		VD4/P 12.25.32 p275
	40				2500		VD4/P 12.25.40 p275
	50				2500		VD4/P 12.25.50 p275
	20					3150 (1)	VD4/P 12.32.20 p275
	25					3150 (1)	VD4/P 12.32.25 p275
	31,5					3150 (1)	VD4/P 12.32.32 p275
	40					3150 (1)	VD4/P 12.32.40 p275
	50					3150 (1)	VD4/P 12.32.50 p275

W = Switchboard width.
P = Pole horizontal centre distance.
u/l = Distance between bottom and top terminal.
ø = Diameter of the isolating contact.
(1) Up to 4000 A with forced ventilation.

2. Selection and ordering
Withdrawable circuit-breakers

VD4 (17.5 kV) withdrawable circuit-breaker for UniGear ZS1 switchboard

Ur	Isc	Rated uninterrupted current (40 °C) [A]					Circuit-breaker type
		W=650	W=800	W=1000	W=1000	W=1000	
		P=150	P=210	P=275	P=275	P=275	
kV	kA	u/l=205	u/l=310	u/l=310	u/l=310	u/l=310	
		ø=35	ø=79	ø=79	ø=109	ø=109	
	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
17.5	20		2000				VD4/P 17.20.20 p210
	25		2000				VD4/P 17.20.25 p210
	31.5		2000				VD4/P 17.20.32 p210
	40		2000				VD4/P 17.20.40 p210
	50		2000				VD4/P 17.20.50 p210
	40			1250			VD4/P 17.12.40 p275
	20			1600			VD4/P 17.16.20 p275
	25			1600			VD4/P 17.16.25 p275
	31.5			1600			VD4/P 17.16.32 p275
	40			1600			VD4/P 17.16.40 p275
	50			1600			VD4/P 17.16.50 p275
	20			2000			VD4/P 17.20.20 p275
	25			2000			VD4/P 17.20.25 p275
	31.5			2000			VD4/P 17.20.32 p275
	40			2000			VD4/P 17.20.40 p275
	50			2000			VD4/P 17.20.50 p275

W = Switchboard width.
P = Pole horizontal centre distance.
u/l = Distance between bottom and top terminal.
ø = Diameter of the isolating contact.

VD4 (17.5 kV) withdrawable circuit-breaker for UniGear ZS1 switchboard

Ur	Isc	Rated uninterrupted current (40 °C) [A]					Circuit-breaker type
		W=650	W=800	W=1000	W=1000	W=1000	
		P=150	P=210	P=275	P=275	P=275	
kV	kA	u/l=205	u/l=310	u/l=310	u/l=310	u/l=310	
		ø=35	ø=79	ø=79	ø=109	ø=109	
17.5	20				2500		VD4/P 17.25.20 p275
	25				2500		VD4/P 17.25.25 p275
	31.5				2500		VD4/P 17.25.32 p275
	40				2500		VD4/P 17.25.40 p275
	50				2500		VD4/P 17.25.50 p275
	20					3150 (1)	VD4/P 17.32.20 p275
	25					3150 (1)	VD4/P 17.32.25 p275
	31.5					3150 (1)	VD4/P 17.32.32 p275
	40					3150 (1)	VD4/P 17.32.40 p275
	50					3150 (1)	VD4/P 17.32.50 p275

W = Switchboard width.
P = Pole horizontal centre distance.
u/l = Distance between bottom and top terminal.
ø = Diameter of the isolating contact.
(1) Up to 4000 A with forced ventilation.

2. Selection and ordering
Withdrawable circuit-breakers

VD4 (24 kV) withdrawable circuit-breaker for UniGear ZS1 switchboard

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

W = Switchboard width.
P = Pole horizontal centre distance.
u/l = Distance between bottom and top terminal.
ø = Diameter of the isolating contact.
(1) 2500 A rated current guaranteed with forced ventilation.
(2) 3150 A rated current guaranteed with forced ventilation.

VD4 (36 kV) withdrawable circuit-breaker

Ur	Isc	Rated uninterrupted current (40 °C) [A]				
kV	kA	H = 951 D = 788 W = 778 u/l = 380 ø = 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

H = Height of the circuit-breaker.
D = Depth of the circuit-breaker.
W = Width of the circuit-breaker.
u/l = Distance between bottom and top terminal.
ø = Diameter of the isolating contact.
P = Pole horizontal centre distance.
(1) 2500 A rated current guaranteed with forced ventilation

Standard fittings of withdrawable circuit-breakers for UniGear ZS1, ZS2 switchgear and similar panels

The basic versions of the withdrawable circuit-breakers are three-pole and fitted with:
- EL type manual operating mechanism
- mechanical signalling device for closing springs charged/discharged
- mechanical signalling device for circuit-breaker open/closed
- closing pushbutton
- opening pushbutton
- operation counter
- set of ten circuit-breaker open/closed auxiliary contacts
  Note: with the group of ten auxiliary contacts supplied as standard and the maximum number of electrical applications, three break contacts (signalling circuit-breaker open) and four make contacts (signalling circuit-breaker closed) are available.
- lever built into operating mechanism for linear loading of closing spring
- isolating contacts
- cord with connector (plug only) for auxiliary circuits, with striker pins which does not allow the plug to be 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 must be defined according to the number of pieces of apparatus ordered)
- locking electromagnet in the truck (compulsory for ABB switchgear). This device prevents racking the circuit-breaker into the switchgear with the auxiliary circuits disconnected (plug not inserted in the socket)
- door interlock (compulsory for ABB switchgear); this device prevents racking the circuit-breaker into the switchgear when the switchgear door is open.

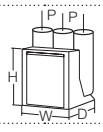
VD4 with poles in polyamide

VD4 – up to 24 kV

VD4 - 36 kV

2. Selection and ordering
Withdrawable circuit-breakers

Withdrawable version circuit-breakers for PowerCube modules (12 kV) (5)

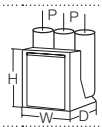
Circuit-breaker		VD4/P 12		VD4/W 12 (6)	
PowerCube module		PB1		PB2	
Standards	IEC 62271-100	•		•	
Rated voltage	Ur [kV]	12 (4)		12 (4)	
Rated insulation voltage	Us [kV]	12		12	
Withstand voltage at 50 Hz	Ud (1 min) [kV]	28		28	
Impulse withstand voltage	Up [kV]	75		75	
Rated frequency	fr [Hz]	50-60		50-60	
Rated normal current (40 °C) (1)	Ir [A]	630	1250	630	1250
Rated breaking capacity (rated short-circuit breaking current symmetrical)	Isc [kA]	16	16	16	16
		20	20	20	20
		25	25	25	25
		31.5	31.5	31.5	31.5
		—	—	—	—
		—	—	—	—
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
		—	—	—	—
		—	—	—	—
Making capacity	Ip [kA]	40	40	40	40
		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]	33 ... 60		33 ... 60	
Arcing time	[ms]	10 ... 15		10 ... 15	
Total breaking time	[ms]	43 ... 75		43 ... 75	
Closing time	[ms]	30 ... 60		30 ... 60	
Maximum overall dimensions 	H [mm]	628	628	691	691
	W [mm]	503	503	653	853
	D [mm]	662	662	642	642
	Pole distance P [mm]	150	150	210	210
Weight	[kg]	116	116	135	135
Standardised table of dimensions	TN	7412 (3)	7412 (3)	7420 (3)	7420 (3)
	1VCD	—	—	—	—
Operating temperature	[°C]	- 5 ... + 40		- 5 ... + 40	
Tropicalization	IEC: 60068-2-30, 60721-2-1	•		•	
Electromagnetic compatibility	IEC: 62271-1	•		•	

(1) Rated current guaranteed with circuit-breaker installed in PowerCube enclosure and with 40 °C ambient temperature
(2) Up to 4000 A with forced ventilation.
(3) Poles in polyamide
(4) Available in 10 kV voltage version in accordance with GOST standards
(5) On request, the closing spring can be loaded by means of a removable crank handle outside 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).

	VD4/P 12									VD4/W 12	
	PB2							PB3		PB3	
	•							•		•	
	12 (4)							12 (4)		12 (4)	
	12							12		12	
	28							28		28	
	75							75		75	
	50-60							50-60		50-60	
	1250	1250	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	—	40	—
	—	50	—	—	50	—	50	—	50	—	50
	—	—	—	—	—	—	—	—	—	—	—
	—	—	20	—	—	20	—	20	—	20	—
	—	—	25	—	—	25	—	25	—	25	—
	—	—	31.5	—	—	31.5	—	31.5	—	31,5	—
	40	—	—	40	—	40	—	40	—	40	—
	—	50	—	—	50	—	50	—	50	—	50
	—	—	—	—	—	—	—	—	—	—	—
	—	—	50	—	—	50	—	50	—	50	—
	—	—	63	—	—	63	—	63	—	63	—
	—	—	80	—	—	80	—	80	—	80	—
	100	—	—	100	—	100	—	100	—	100	—
	—	125	—	—	125	—	125	—	125	—	125
	•							•		•	
	33 ... 60							33 ... 60		33 ... 60	
	10 ... 15							10 ... 15		10 ... 15	
	43 ... 75							43 ... 75		43 ... 75	
	30 ... 60							30 ... 60		30 ... 60	
	691	691	691	691	691	690	691	691	691	730	691
	653	681	653	653	681	653	681	853	853	853	853
	641	643	642	641	643	642	643	640	643	640	643
	210	210	210	210	210	210	210	275	275	275	275
	174	180	160	174	180	160	190	186	225	221	240
	—	—	7415 (3)	—	—	7415 (3)	—	7417 (3)	—	—	—
	003284 (3)	003444	—	003284 (3)	003444	—	003444	—	003445	000152 (3)	003596
	- 5 ... + 40							- 5 ... + 40		- 5 ... + 40	
	•							•		•	
	•							•		•	

2. Selection and ordering
Withdrawable circuit-breakers

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

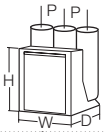
Circuit-breaker			VD4/P 17		VD4/W 17 (5)	
	PowerCube module		PB1		PB2	
Standards		IEC 62271-100	•		•	
Rated voltage		Ur [kV]	17,5		17,5	
Rated insulation voltage		Us [kV]	17,5		17,5	
Withstand voltage at 50 Hz		Ud (1 min) [kV]	38		38	
mpulse withstand voltage		Up [kV]	95		95	
Rated frequency		fr [Hz]	50-60		50-60	
Rated normal current (40 °C) (1)		Ir [A]	630	1250	630	1250
Rated breaking capacity (rated short-circuit breaking current symmetrical)		Isc [kA]	16	16	16	16
			20	20	20	20
			25	25	25	25
			31,5	31,5	31,5	31,5
			—	—	—	—
			—	—	—	—
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
			—	—	—	—
			—	—	—	—
Making capacity		Ip [kA]	40	40	40	40
			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]	33 ... 60		33 ... 60	
Arcing time		[ms]	10 ... 15		10 ... 15	
Total breaking time		[ms]	43 ... 75		43 ... 75	
Closing time		[ms]	30 ... 60		30 ... 60	
Maximum overall dimensions		H [mm]	628	628	691	691
		w [mm]	503	503	653	653
		D [mm]	662	662	642	642
		Pole distance P [mm]	150	150	210	210
Weight		[kg]	116	116	135	135
Standardised table of dimensions		TN	7412 (3)	7412 (3)	7420 (3)	7420 (3)
		1VCD	—	—	—	—
Operating temperature		[°C]	- 5 ... + 40		- 5 ... + 40	
Tropicalization		IEC: 60068-2-30, 60721-2-1	•		•	
Electromagnetic compatibility		IEC: 62271-1	•		•	

(1) Rated current guaranteed with circuit-breaker installed in PowerCube enclosure and with 40 °C ambient temperature.
(2) Up to 4000 A with forced ventilation.
(3) Poles in polyamide.
(4) On request, the closing spring can be loaded by means of a removable crank handle outside 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).

	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	
	1250	1250	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	—	40	—
	—	50	—	—	50	—	50	—	50	—	50
	—	—	—	—	—	—	—	—	—	—	—
	—	—	20	—	—	20	—	20	—	20	—
	—	—	25	—	—	25	—	25	—	25	—
	—	—	31,5	—	—	31,5	—	31,5	—	31,5	—
	40	—	—	40	—	40	—	40	—	40	—
	—	50	—	—	50	—	50	—	50	—	50
	—	—	—	—	—	—	—	—	—	—	—
	—	—	50	—	—	50	—	50	—	50	—
	—	—	63	—	—	63	—	63	—	63	—
	—	—	80	—	—	80	—	80	—	80	—
	100	—	—	100	—	100	—	100	—	100	—
	—	125	—	—	125	—	125	—	125	—	125
	•							•		•	
	33 ... 60							33 ... 60		33 ... 60	
	10 ... 15							10 ... 15		10 ... 15	
	43 ... 75							43 ... 75		43 ... 75	
	30 ... 60							30 ... 60		30 ... 60	
	691	691	691	691	691	690	691	691	691	730	691
	653	681	653	653	681	653	681	853	853	853	853
	641	643	642	641	643	642	643	640	643	640	643
	210	210	210	210	210	210	210	275	275	275	275
	174	180	160	174	180	160	190	186	225	221	240
	—	—	7415 (3)	—	—	7415 (3)	—	7417 (3)	—	—	—
	003284 (3)	003444	—	003284 (3)	003444	—	003444	—	003445	000152 (3)	003596
	- 5 ... + 40							- 5 ... + 40		- 5 ... + 40	
	•							•		•	
	•							•		•	

2. Selection and ordering
Withdrawable circuit-breakers

Withdrawable version 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 normal current (40 °C) (1)	Ir [A]		630	1250	1600	2000	2500 (2)
Rated breaking capacity (rated short-circuit breaking current symmetrical)	Isc [kA]		16	16	16	16	16
			20	20	20	20	20
			25	25	25	25	25
			–	31,5	31,5	31,5	31,5
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		
Arcing time	[ms]		10 ... 15		10 ... 15		
Total breaking time	[ms]		43 ... 75		43 ... 75		
Closing time	[ms]		30 ... 60		30 ... 60		
Maximum overall dimensions 	H [mm]		794	794	838	838	838
	W [mm]		653	653	853	853	853
	D [mm]		802	802	790	790	790
	Pole distance P [mm]		210	210	275	275	275
Weight	[kg]		140	140/146 (3)	228	228	228
Standardised table of dimensions	TN		7413	7413	7418	7418	7418
	1VCD		–	000173 (3)	–	–	–
Operating temperature	[°C]		- 5 ... + 40				
Tropicalization	IEC: 60068-2-30, 60721-2-1		•				
Electromagnetic compatibility	IEC: 62271-1		•				

(1) Rated current guaranteed with circuit-breaker installed in PowerCube enclosure and with 40 °C ambient temperature.
(2) 2300 A rated uninterrupted current guaranteed with natural ventilation; 2500 A rated current guaranteed with forced ventilation.
(3) 31.5 kA version.
(4) On request, the closing spring can be loaded by means of a removable crank handle outside 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).

Types of withdrawable version circuit-breakers available for PowerCube modules

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

VD4 withdrawable circuit-breaker (12 kV)

Ur	Isc	Rated uninterrupted current (40 °C) [A]				Circuit-breaker type
kV	kA	W=650 P=150 u/l=205 ø=35	W=750 P=210 u/l=310 ø=35	W=750 P=210 u/l=310 ø=79	W=1000 P=275 u/l=310 ø=109	
12	16	630				VD4/P 12.06.16 p150
	20	630				VD4/P 12.06.20 p150
	25	630				VD4/P 12.06.25 p150
	31.5	630				VD4/P 12.06.32 p150
	16	1250				VD4/P 12.12.16 p150
	20	1250				VD4/P 12.12.20 p150
	25	1250				VD4/P 12.12.25 p150
	31.5	1250				VD4/P 12.12.32 p150
	16		630			VD4/W 12.06.16 p210
	20		630			VD4/W 12.06.20 p210
	25		630			VD4/W 12.06.25 p210
	31.5		630			VD4/W 12.06.32 p210
	16		1250			VD4/W 12.12.16 p210
	20		1250			VD4/W 12.12.20 p210
	25		1250			VD4/W 12.12.25 p210
	31.5		1250			VD4/W 12.12.32 p210
	40			1250		VD4/P 12.12.40 p210
	50			1250		VD4/P 12.12.50 p210
	20			1600		VD4/P 12.16.20 p210
	25			1600		VD4/P 12.16.25 p210
	31.5			1600		VD4/P 12.16.32 p210
	40			1600		VD4/P 12.16.40 p210
	50			1600		VD4/P 12.16.50 p210
	20			2000		VD4/P 12.20.20 p210
	25			2000		VD4/P 12.20.25 p210
	31.5			2000		VD4/P 12.20.32 p210
	40			2000		VD4/P 12.20.40 p210
	50			2000		VD4/P 12.20.50 p210
	20				2500	VD4/P 12.25.20 p275
	25				2500	VD4/P 12.25.25 p275
	31.5				2500	VD4/P 12.25.32 p275
	40				2500	VD4/P 12.25.40 p275
	50				2500	VD4/P 12.25.50 p275
	20				3150 (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 = Pole horizontal centre distance.
u/l = Distance between bottom and top terminal.
ø = Diameter of the isolating contact.
(1) Up to 4000 A with forced ventilation.

2. Selection and ordering
Withdrawable circuit-breakers

VD4 withdrawable circuit-breaker (17.5 kV)

Ur	Isc	Rated uninterrupted 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	
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 = Pole horizontal centre distance.
u/l = Distance between bottom and top terminal.
ø = Diameter of the isolating contact.
(1) Up to 4000 A with forced ventilation.

VD4 withdrawable circuit-breaker (24 kV)

Ur	Isc	Rated uninterrupted current (40 °C) [A]		Circuit-breaker type
		W=800	W=1000	
kV	kA	P=210	P=275	
		u/l=310	u/l=310	
		ø=35	ø=79	
24	16	630		VD4/P 24.06.16 p210
	20	630		VD4/P 24.06.20 p210
	25	630		VD4/P 24.06.25 p210
	16	1250		VD4/P 24.12.16 p210
	20	1250		VD4/P 24.12.20 p210
	25	1250		VD4/P 24.12.25 p210
	31.5	1250		VD4/P 24.12.32 p210
	16		1600	VD4/P 24.16.16 p275
	20		1600	VD4/P 24.16.20 p275
	25		1600	VD4/P 24.16.25 p275
	31.5		1600	VD4/P 24.16.32 p275
	16		2000	VD4/P 24.20.16 p275
	20		2000	VD4/P 24.20.20 p275
	25		2000	VD4/P 24.20.25 p275
	31.5		2000	VD4/P 24.20.32 p275
	16		2300 (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 = Pole horizontal centre distance.
u/l = Distance between bottom and top terminal.
Ø = Diameter of the isolating contact.
(1) Up to 2500 A rated current guaranteed with forced ventilation.

Standard fittings of withdrawable circuit-breakers for PowerCube modules

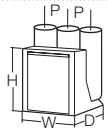
The basic versions of the withdrawable circuit-breakers are always three-pole and fitted with:

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

VD4 with poles in polyamide

2. Selection and ordering
Withdrawable circuit-breakers

Withdrawable circuit-breakers for ZS8.4 type 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 normal 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
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					
Arcing time	[ms]	10...15					
Total breaking time	[ms]	43...75					
Closing time	[ms]	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 distance P [mm]	150	150	150	150	210	210
Weight	[kg]	116	116	116	116	140	140
Standardised table of dimensions	1VCD	000092	000137	000137	000137	000089	000138
Operating temperature	[°C]	– 5 ... + 40					
Tropicalisation	IEC 60068-2-30	•					
	IEC 60721-2-1	•					
Electromagnetic compatibility	IEC 62271-1	•					

(1) Rated current guaranteed with circuit-breaker installed in switchgear with 40 °C ambient temperature.
(2) Special type with device for charging the closing spring by means of a rotary handle outside the operating mechanism.

	VD4/ZT8						VD4/ZS8			
	—						—			
	•						—			
	—						•			
	650	650	650	650	800	800	650	650	800	800
	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
	•						•			
	12	12	17.5	17.5	24	24	12	12	24	24
	12	12	17.5	17.5	24	24	12	12	24	24
	28	28	38	38	50	50	28	28	50	50
	75	75	95	95	125	125	75	75	125	125
	50-60						50-60			
	630	1250	630	1250	630	1250	630	1250	630	1250
	—	—	—	—	16	16	—	—	16	16
	20	20	20	20	20	20	20	20	20	20
	25	25	25	25	25	25	25	25	25	25
	—	—	—	—	16	16	—	—	16	16
	20	20	20	20	20	20	20	20	20	20
	25	25	25	25	25	25	25	25	25	25
	—	—	—	—	40	40	—	—	40	40
	50	50	50	50	50	50	50	50	50	50
	63	63	63	63	63	63	63	63	63	63
	•						•			
	33...60						33...60			
	10...15						10...15			
	43...75						43...75			
	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			
	•						•			
	•						•			
	•						•			

2. Selection and ordering
Withdrawable circuit-breakers

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

Ur	Isc	Rated uninterrupted current (40°C) [A]						Circuit-breaker type
		Panel without partition		Panel with partition		Special panel EON		
		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 = Switchboard width.
P = Pole horizontal centre distance.
u/l = Distance between bottom and top terminal.
Ø = Diameter of the isolating contact.

Standard fittings of withdrawable circuit-breakers for ZS8.4 switchgear

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

- EL type manual operating mechanism
- mechanical signalling device for closing springs charged/ discharged
- mechanical signalling device for circuit-breaker open/closed
- closing pushbutton
- opening pushbutton
- operation counter
- set of ten circuit-breaker open/closed auxiliary contacts
  Note: with the group of ten auxiliary contacts supplied as standard and the maximum number of electrical applications, three break contacts (signalling circuit-breaker open) and four make contacts (signalling circuit-breaker closed) are available.
- lever built into operating mechanism for linear loading of closing spring for VD4/Z8 and VD4/ZT8, external with crank operation for VD4/ZS8
- racking in/out lever (the quantity must be defined according to the number of pieces of apparatus ordered)

VD4/ZS8

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

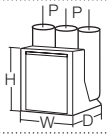
VD4/Z8 - VD4/ZT8

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

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

2. Selection and ordering
Withdrawable circuit-breakers

Withdrawable circuit-breakers for UniSwitch switchgear (CBW type unit) and UniMix switchgear (P1/E type unit) (24 kV)

Circuit-breaker			VD4/US 24 [3]		VD4/US 24 [4]	
		UniSwitch (unit CBW type)	•	•	–	–
		UniMix (unit P1/E type)	–	–	•	•
Standards		IEC 62271-100	•	•	•	•
Rated voltage		Ur [kV]	24	24	24	24
Rated insulation voltage		Us [kV]	24	24	24	24
Withstand voltage at 50 Hz		Ud (1 min) [kV]	50	50	50	50
Impulse withstand voltage		Up [kV]	125	125	125	125
Rated frequency		fr [Hz]	50-60	50-60	50-60	50-60
Rated normal current (40 °C) [1]		Ir [A]	630	1250	630	1250
Rated breaking capacity (rated symmetrical short-circuit current)		Isc [kA]	16 (20) [5]	16 (25) [5]	16	16
			20 (25) [5]	20 (25) [5]	20	20
			–	–	25	25
Rated short-time withstand current (3 s) [2]		Ik [kA]	16 (20) [5]	16 (25) [5]	16	16
			20 (25) [5]	20 (25) [5]	20	20
			–	–	25	25
Making capacity		Ip [kA]	40 (50) [5]	40 (50) [5]	40	40
			50 (63) [5]	50 (63) [5]	50	50
			—	—	63	63
Operation sequence		[O - 0.3 s - CO - 15 s - CO]	•	•	•	•
Opening time		[ms]	33 ... 60	33 ... 60	33 ... 60	33 ... 60
Arcing time		[ms]	10 ... 15	10 ... 15	10 ... 15	10 ... 15
Total breaking time		[ms]	43 ... 75	43 ... 75	43 ... 75	43 ... 75
Closing time		[ms]	30 ... 60	30 ... 60	30 ... 60	30 ... 60
Maximum overall dimensions		H [mm]	680	680	680	680
		W [mm]	653	653	653	653
		D [mm]	742	742	742	742
		Pole distance P [mm]	210	210	210	210
Weight		[kg]	125	125	125	125
Standardised table of dimensions		1VCD	000047	000047	000047	000047
Operating temperature		[°C]	- 5 ... + 40	- 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) The value and duration of the rated short-time withstand current depends on the switchgear. See the specific catalogues of the UniSwitch and UniMix switchgear
(3) The top shutter activation wheels of the UniSwitch switchgear (CBW unit) are mounted and adjusted by the manufacturer of the UniSwitch switchgear
(4) The top shutter activation wheels of the UniMix switchgear (P1/E unit) are available on request
(5) The values in brackets refer to the 12 kV rated voltage.

Withdrawable c.-breaker for UniSwitch switchgear (CBW type unit) and UniMix switchgear (P1/E type unit)				
Ur	Isc	Rated uninterrupted current (40 °C) [A]		Circuit-breaker type
kV	kA	UniSwitch CBW	UniMix P1/E	
		P=210	P=210	
		u/l=310	u/l=310	
		ø=35	ø=79	
24	16	630 (1)	630	VD4/US 24.06.16 p210
	20	630 (1)	630	VD4/US 24.06.20 p210
	25	—	630	VD4/US 24.06.25 p210
	16	1250 (1)	1250	VD4/US 24.12.16 p210
	20	1250 (1)	1250	VD4/US 24.12.20 p210
	25	—	1250	VD4/US 24.12.25 p210

(1) Isc 25 kA at 12 kV.
P = Horizontal centre distance between poles.
u/l = Distance between top and bottom terminal.
Ø = Diameter of the isolating contacts.

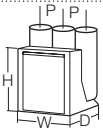
Standard fittings of withdrawable circuit-breakers for UniSwitch and UniMix switchgear

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

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

2. Selection and ordering
Withdrawable circuit-breakers

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

Circuit-breaker			VD4/SEC	VD4/P 12		VD4/P 17	
Standards		IEC 62271-100	•	•		•	
Rated voltage		Ur [kV]	24	12		17.5	
Rated insulation voltage		Us [kV]	24	12		17.5	
Withstand voltage at 50 Hz		Ud (1 min) [kV]	50	28		38	
Impulse withstand voltage		Up [kV]	125	75		95	
Rated frequency		fr [Hz]	50-60	50-60		50-60	
Rated normal current (40 °C) (1)		Ir [A]	630 - 1250	630	1250	630	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
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			
Arcing time		[ms]	10 ... 15	10 ... 15			
Total breaking time		[ms]	43 ... 75	43 ... 75			
Closing time		[ms]	30 ... 60	30 ... 60			
Maximum overall dimensions		H [mm]	743	628	628	632	632
		W [mm]	653	503	503	503	503
		D [mm]	742	662	662	664	664
		Pole distance P [mm]	210	150	150	150	150
Weight		[kg]	133	116	116	116	116
Standardised table of dimensions		1VCD	000190	7412 (2)	7412 (2)	7412 (2)	7412 (2)
Operating temperature		[°C]	- 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					Circuit-breaker type
Ur	Isc	Rated uninterrupted current (40 °C) [A]			
kV	kA	P=150 u/l=205 ø=35	P=150 u/l=205 ø=35	P=210 u/l=310 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 centre distance between poles.
u/l = Distance between top and bottom terminal.
Ø = Diameter of the isolating contacts.

Standard fittings of withdrawable circuit-breakers for UniSec

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

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

2. Selection and ordering
Optional accessories

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

1 Shunt opening release (-MBO1)

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

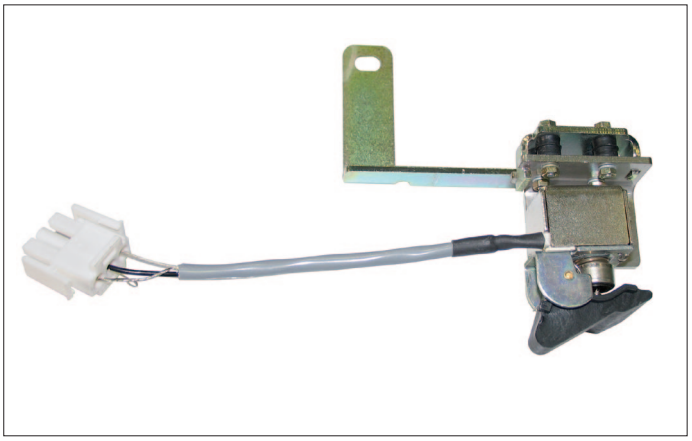
Characteristics	
Un	24-30-48-60-110...132-220...250 V DC
Un	48-60-110...127-220...250 V AC 50-60 Hz
Operating limits	65 ... 120% Un
Inrush power (Ps)	60...100 W / VA
Potenza di mantenimento (Pc)	1.5 W
Electronics self-consumption (no coil supplied); value independent of voltage applied	1.5 mA
Opening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

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

2 Additional shunt opening release (-MBO2)

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

3 Opening solenoid (-MO3)



The opening solenoid (-MO3) is a special release with demagnetisation to be combined with an overcurrent protection relay of the self-supplied type.
It is located in the operating mechanism (in the left side piece) and is not alternative to the additional shunt opening release (-MO2).
It is not available for 40 and 50 kA circuit-breakers.
Should the application of this accessory be required, specify the request at the time of order since subsequent application by the customer is not possible.
Note: for combination with the protection relays, please ask for the document: Data sheet 1VCD600854.
The opening solenoid (-MBO3) is available in two versions:
– For DC (release by discharging energy stored in protection relay against overcurrent of the self-supplied type)
– For AC (release by means of the energy supplied by an adder transformer on the secondaries of the protection current transformers (the TA is at customer's charge)

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

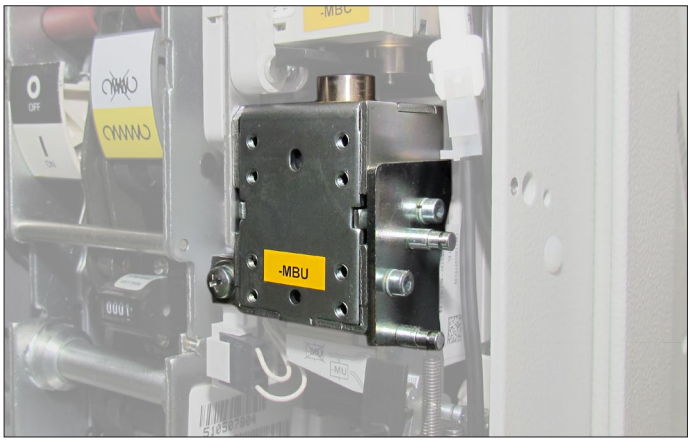
4 Shunt closing release (-MC)

Allows closing command of apparatus to be transmitted by remote control.
This release is suitable for both instantaneous and permanent duty. An auxiliary contact that de-energizes it after the circuit-breaker has closed is not envisaged.
The permanently supplied release provides the electrical anti-pumping function with both electrical opening and re-closing commands maintained. To guarantee the closing action, the current impulse must last at least 100 ms.
If there is the same supply voltage for shunt closing release -MBC and under-voltage release -MBU and the circuit-breaker must close automatically when auxiliary voltage returns, there must be a delay of at least 50 ms between under-voltage release energizing and energizing of the shunt closing release to allow the closing operation to take place.Continuity functionality can be checked with a continuity control device (CCC), opening circuit supervision (TCS)(*) or the STU functionality control device (see accessory 21, supplied on request).

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

2. 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), for locking on automatic closing/opening in the absence of voltage in the auxiliary circuits.
Supplied by means of the secondary output of a voltage transformer, it provides locking upon automatic closing/opening in the absence of voltage in the Medium Voltage main circuit.
If there is the same supply voltage for shunt closing release -MBC and under-voltage release -MBU and the circuit-breaker must close automatically when auxiliary voltage returns, there must be a delay of at least 50 ms between under-voltage release energizing and energizing of the shunt closing release to allow the closing operation to take place.

The undervoltage release is available in the following versions:

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

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

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

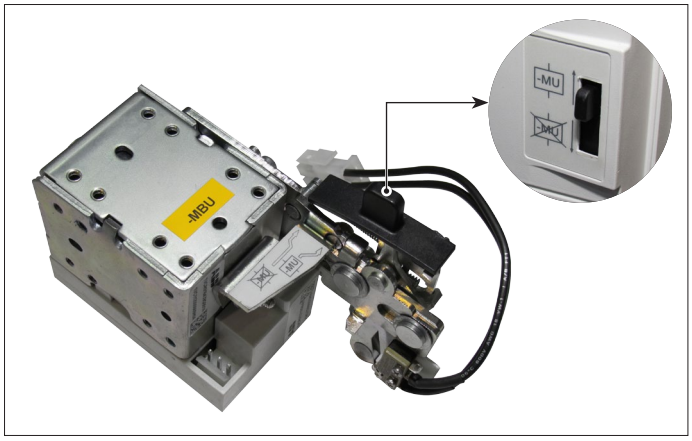
Note
As an alternative to the undervoltage release, an additional shunt opening release (-MBO4) with the same electrical and operating specifications as shunt opening release (-MBO1) can be installed on request (only for circuit-breakers 12..17.5 kV up to 40 kA and 24 kV up to 31.5 kA).
Warning! Since installation of the additional shunt opening release (-MBO4) requires a special mounting plate for releases, ask for application (-MBO4) when ordering and not after delivery.

5a Electronic time delay device (-KFT)

The electronic time delay device must be mounted externally in relation to the circuit-breaker. It allows release trip delay with established and adjustable times.
The use of the undervoltage release is recommended in order to prevent trips when the power supply network of the release may be subject to cuts or voltage drops of short duration.
If it is not supplied, circuit-breaker closing is disabled.
The time delay device must be combined with an undervoltage release for d.c.
Rated voltage of the undervoltage release must be within the selected range of working of the time-delay device.

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

6 Undervoltage release mechanical override



This is a mechanical device which allows the undervoltage release trip to be temporarily excluded.
It is always fitted with electrical signalling.
Should the application of this accessory be required, specify the request at the time of order since subsequent application by the customer is not possible.

2. Selection and ordering
Optional accessories

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

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

Note
The following are available using the standard group of ten auxiliary contacts and the maximum number of electrical accessories:
- for fixed circuit-breakers: three closing contacts "a" for signalling circuit-breaker open and five opening contacts "b" for signalling circuit-breaker closed;
- for withdrawable circuit-breakers: three closing contacts "a" for signalling circuit-breaker open and four opening contacts "b" for signalling circuit-breaker closed;

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

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

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

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

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

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

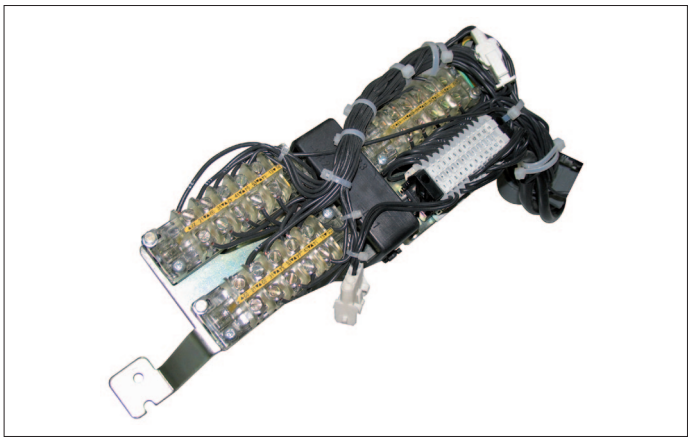
General characteristics	
Insulation voltage to standard VDE 0110, Group C	660 V AC 800 V DC
Rated voltage	24 V ... 660 V
Test voltage	2 kV for 1 min
Maximum rated current	10 A - 50/60 Hz
Breaking capacity	Class 1 (IEC 62271-1)
Number of contacts	5
Groups of contacts	10 / 16 / 20
Contact travel	90°
Actuating 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 mm^2

Electrical characteristics (according to IEC 60947)		
Rated current Un		Breaking capacity (10000 interruptions)
220 V AC	Cosφ = 0.70	20 A
220 V DC	Cosφ = 0.45	10 A
24 V DC	1 ms	12 A
	15 ms	9 A
	50 ms	6 A
60 V DC	1 ms	10 A
	15 ms	6 A
	50 ms	4,6 A
110 V DC	1 ms	7 A
	15 ms	4.5 A
	50 ms	3.5 A
220 V DC	1 ms	2 A
	15 ms	1.7 A
	50 ms	1.5 A
250 V DC	1 ms	2 A
	15 ms	1,4 A
	50 ms	1.2 A

Electrical characteristics (according to IEC 62271-100 class 1)	
Rated current Un	Breaking capacity
24 Vcc 20 ms	18,8 mA
60 Vcc 20 ms	7,4 mA
110 Vcc 20 ms	4,2 mA
250 Vcc 20 ms	1,8 mA

2. Selection and ordering
Optional accessories

7b Circuit-breaker auxiliary contacts (-BGB1, -BGB2, -BGB3) for 36 kV version



Electrical signalling of circuit-breaker open/closed can be provided with a set of 15 auxiliary contacts as an alternative to the 10 provided as standard.
Consult the following circuit diagrams for VD4 36 kV series with "7b" auxiliary contacts:
– for fixed circuit-breakers: 1VCD400236
– for withdrawable circuit-breakers: 1VCD400237

Note
With the group of ten auxiliary contacts supplied as standard and the maximum number of electrical applications, three break contacts (signalling circuit-breaker open) and five make contacts (signalling circuit-breaker closed) are available.
With the group of 15 auxiliary contacts, according to the electrical applications required, the following are available:
– for fixed circuit-breakers: thirteen auxiliary contacts, differently divided between break contacts and make contacts according to the figure selected of the electrical diagram;
– for withdrawable circuit-breakers, since the plug of the auxiliary circuits has a limited number of poles: five break contacts (signalling circuit-breaker open) and five make contacts (signalling circuit-breaker closed).

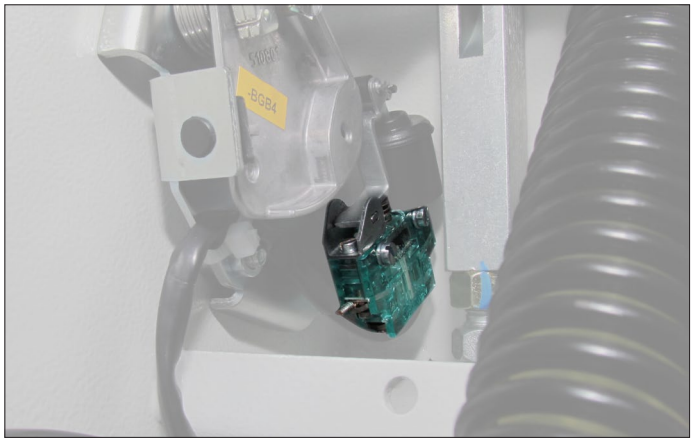
General characteristics

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

Electrical characteristics

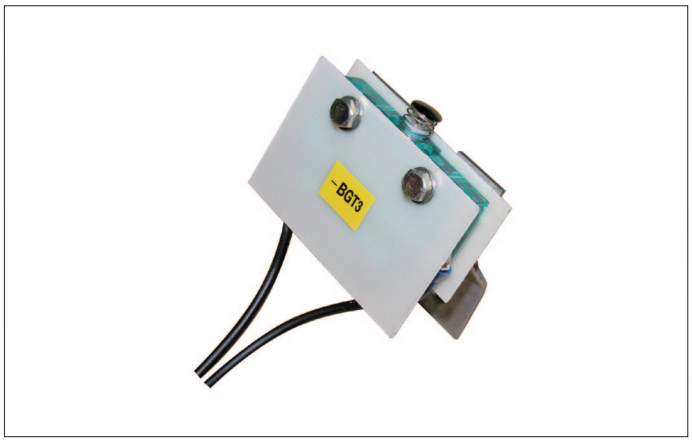
Un		Rated current	Breaking capacity
220 V a.c.	Cosφ = 0.7	2.5 A	25 A
380 V a.c.	Cosφ = 0.7	1.5 A	15 A
500 V a.c.	Cosφ = 0.7	1.5 A	15 A
660 V a.c.	Cosφ = 0.7	1.2 A	12 A
24 V d.c.	1 ms	10 A	12 A
	15 ms	10 A	12 A
	50 ms	8 A	10 A
	200 ms	6 A	7.7 A
60 V d.c.	1 ms	8 A	10 A
	15 ms	6 A	8 A
	50 ms	5 A	6 A
	200 ms	4 A	5.4 A
110 V d.c.	1 ms	6 A	8 A
	15 ms	4 A	5 A
	50 ms	2 A	4.6 A
	200 ms	1 A	2.2 A
220 V d.c.	1 ms	1.5 A	2 A
	15 ms	1 A	1.4 A
	50 ms	0.75 A	1.2 A
	200 ms	0.5 A	1 A

8 Transient contact (-BGB4)



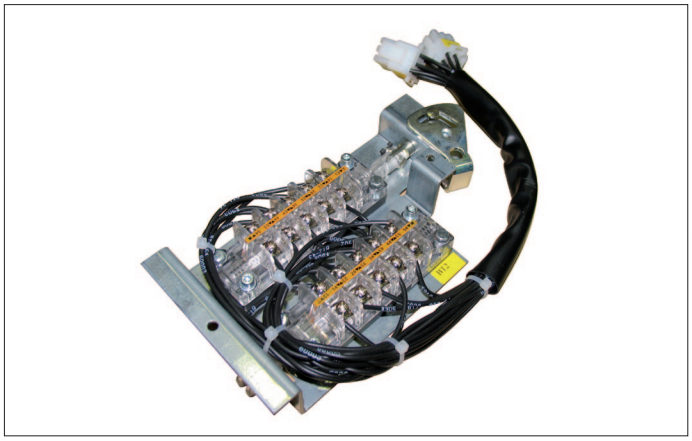
This contact closes momentarily (duration > 30 ms) on circuit-breaker opening controlled remotely with a shunt opening release.
The indication is not provided when opening is manual and local. In fact, a contact (–BGB11) is activated by the manual pushbutton and cuts off the transient contact closure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

9 Position contact (-BGT3)



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

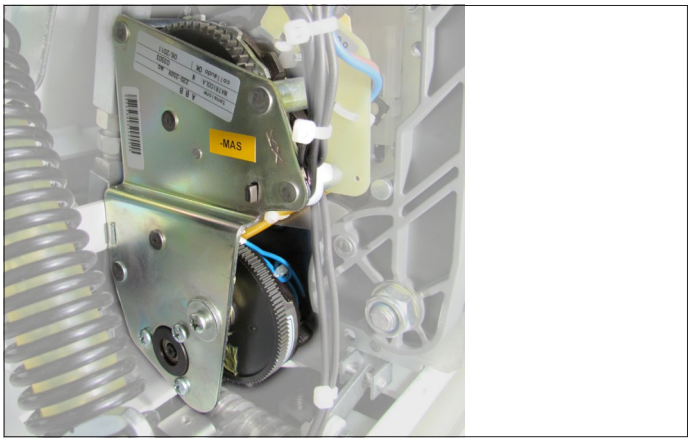
10 Transmitted contacts in the truck (-BGT1; -BGT2)



Transmitted contacts of the withdrawable circuit-breaker (installed in the circuit-breaker truck - only for VD4/P withdrawable circuit-breaker).
These contacts are either in addition or as an alternative to the position contacts (for signalling circuit-breaker racked out) located in the unit. They also carry out the function of the position contact **(-BGT3)**.
Contacts -BGT1 and BGT2 have the same general and electrical characteristics as auxiliary contacts "7b. -BGB1, -BGB2, -BGB3".

2. Selection and ordering
Optional accessories

11 Motor operator (-MAS)



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

Characteristics		
Un	24...30 - 48...60 - 110...130 - 220...250 V–	
Un	100...130 - 220...250 V~ 50/60 Hz	
Operating limits	85 ... 110% Un	
Power on inrush (Ps)	≤ 40 kA	50 kA
	DC = 600 W; AC = 600 VA	DC = 900 W; AC = 900 VA
Rated power (Pn)	DC = 200 W; AC = 200 VA	DC = 350 W; AC = 350 VA
Charging time	0,2 s	0,2 s
Charging time	6-7 s	6-7 s
Insulating voltage	2000 V 50 Hz (for 1 min)	2000 V 50 Hz (for 1 min)

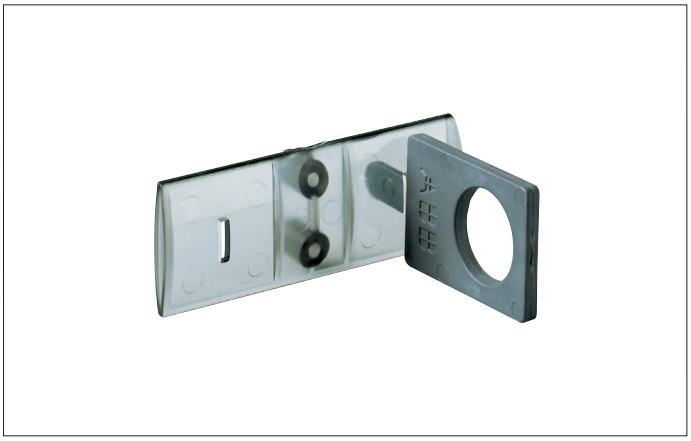
12 Contact for signalling closing spring charged/ discharged (-BGS2)

This consists of a microswitch which allows remote signalling of the state of the circuit-breaker operating mechanism closing pring.
The following signals are possible:
– contact open: signalling spring charged
– contact closed: signalling spring discharged.
The two signals must be used for circuits which have the same power supply voltage.

Protections and locks

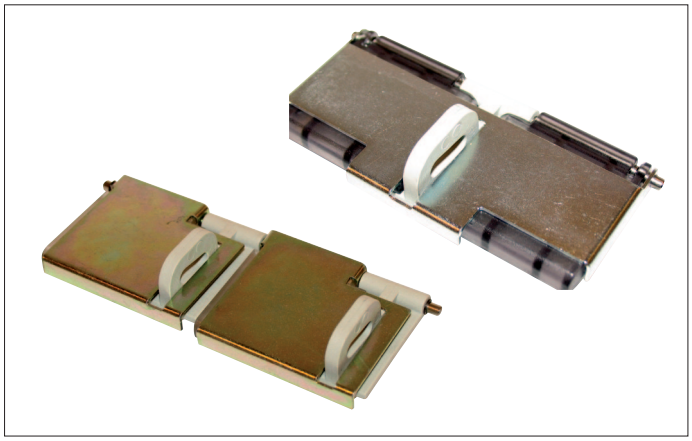
Various mechanical and electromechanical locking and protection devices are available.

13 Opening and closing pushbutton protection



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

14 Opening and closing pushbutton padlock



The device allows the opening and closing pushbuttons to be locked using a maximum of three padlocks (not supplied): ø 4 mm. Also prevents closing using remote control.
This lock is available in two versions:

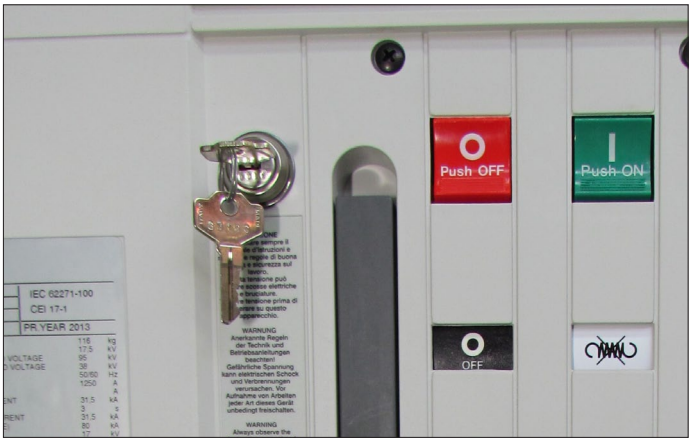
14A Possibility of padlocking both the pushbuttons without distinction

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

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

2. Selection and ordering
Optional accessories

15 Key lock in open position

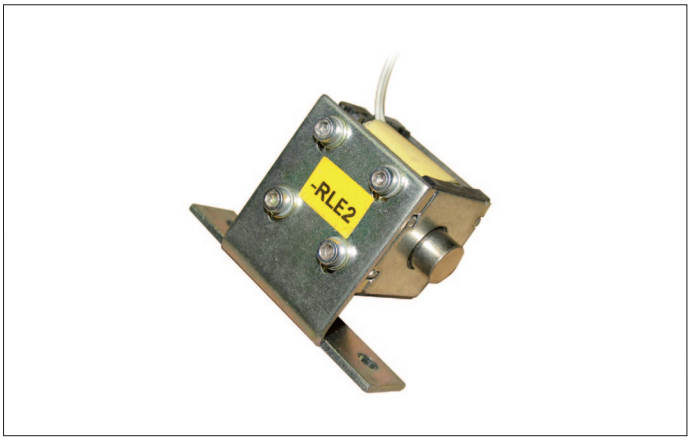


The lock is activated by a special circular lock.
Different keys (for a single circuit-breaker) are available, or the same keys (for several circuit-breakers).
To activate the lock, keep the opening pushbutton pressed down, turn the key and remove it.
With the key removed, the opening pushbutton automatically remains in the pressed position preventing local manual closing and remote electrical closing.

16 Locking magnet on the operating mechanism (-RLE1)

Only allows activation of the command with the electromagnet supplied.
The locking electromagnet in the operating mechanism has the same electrical characteristics as shunt closing release -MBC.

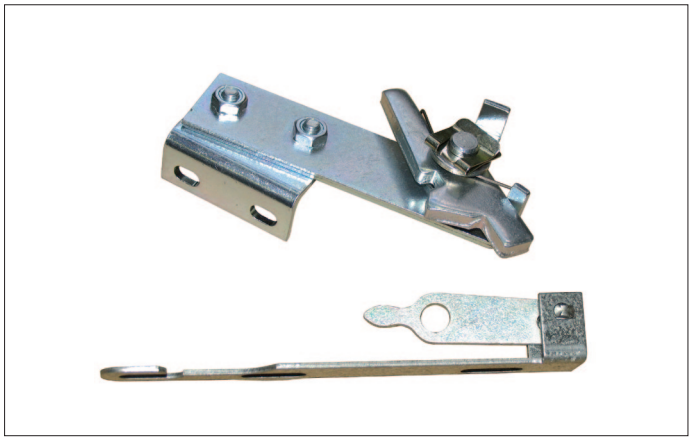
17 Locking magnet on the truck (-RLE2)



Compulsory accessory for the withdrawable versions for UniGear ZS1 switchgear and PowerCube modules, to prevent circuit-breaker racking into the switchgear with the auxiliary circuit plug disconnected.
The plug also makes the anti-insertion lock for a different rated current. Special striker pins do not allow insertion of the plug in the socket if the rated current of the circuit-breaker is lower than the rated current of the panel.
Note: a specific version for the circuit-breakers of ZS8.4 switchgear is available on request. This accessory is not available when the motor-operated truck is required.

Characteristics	
Un	24 - 30 - 48 - 60 - 110 - 125 - 127 - 132 - 220 - 240 V–
Un	24 - 30 - 48 - 60 - 110 - 125 - 127 - 220 - 230 ... 240 V~ 50/60 Hz
Operating limits	85 ... 110% Un
Nominal power (Pn)	DC 250 W; AC = 250 VA
Continuous power (Pc)	DC = 5 W; AC = 5 VA
Inrush duration	150 ms
Insulating voltage	2000 V 50 Hz (for 1 min)

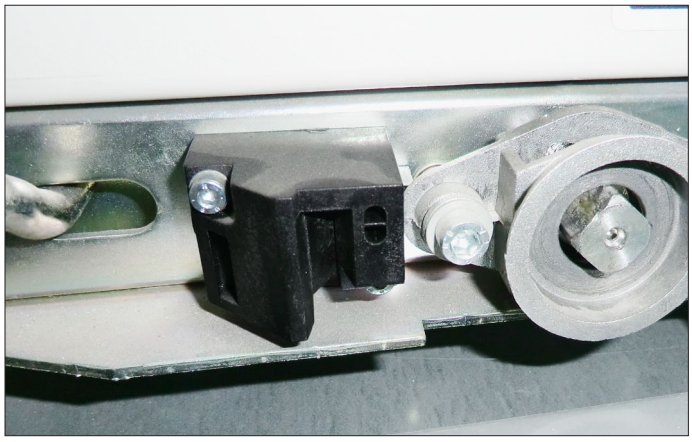
18 Interlock for fixed circuit-breaker



Device for fixed circuit-breakers which are converted into withdrawable ones by the customer. It allows a mechanical lock to be made, by the customer, which prevents racking-out/in with the circuit-breaker closed and prevents circuit-breaker closing during translation.
Note: The device must be requested when ordering since it must be assembled and tested in the factory.

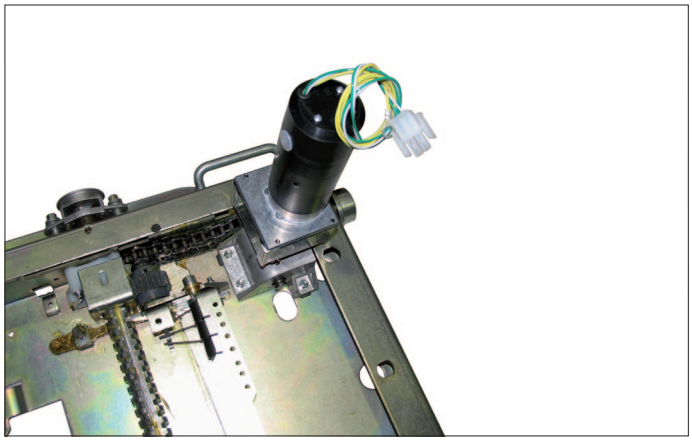
2. Selection and ordering
Optional accessories

19 Mechanical interlock with the door



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

20 Motorised truck (-MAT)



It allows racking-in and racking-out of the circuit-breaker in the switchgear to be carried out remotely, (only for circuit-breaker in withdrawable version for UniGear ZS1 and ZS8.4 switchgear and PowerCube modules).
The motor version with clutch can be ordered on request, so that racking-in/ out can be performed in an emergency if the truck motor fails to operate.

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

21 STU Shunt Test Unit

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

The control/monitoring Shunt Test Unit allows the continuity of releases with a rated operating voltage between 24 V and 250 V (AC and DC) to be checked, as well as the functionality of the electronic circuit of the release.
Checking continuity is carried out cyclically with an interval of 20 seconds between one test and the next.
The unit has optical signals by means of LEDs on the front. In particular the following information is indicated:
– POWER ON: power supply present
– (-MO) TESTING: test being carried out
– TEST FAILED: signal following a failed test or in the absence of auxiliary power supply
– ALARM: signal after three failed tests.

Two relays and a changeover are also available on board the unit, which allow remote signalling of the following two events:
– failure of a test (resetting is carried out automatically when the alarm stops)
– failure of three tests (resetting is only carried out by means of the manual - RESET – from the front of the unit).

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

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

3. Specific product characteristics

Resistance to vibrations

The VD4 circuit-breakers are designed to satisfy high levels of resistance to stresses caused by mechanical vibrations.
Many versions are able to satisfy both the 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).
For the versions approved by the shipping registers, please contact us.

Tropicalization

VD4 circuit-breakers are manufactured in compliance with the strictest regulations regarding use in hot-humid-saline climates.
All the more important metal parts are treated against corrosive substances corresponding **to standard EN 12500 class C5 atmospheric corrosion.**

Galvanisation is carried out in accordance with UNI ISO 2081 Standards, classification code Fe/Zn 12, with a thickness of $12x10^{-6}$ m, protected by a conversion layer mainly consisting of chromates in compliance with the UNI ISO 4520 Standard.

Altitude

The insulating property of air decreases as the altitude increases, therefore this must always be taken into account for external insulation of the apparatus (the internal insulation of the interrupters does not undergo any variations as it is guaranteed by the vacuum).
The phenomenon must always be taken into consideration during the design stage of the insulating components of apparatus to be installed over 1000 m above sea level.
In this case a correction coefficient must be considered, which can be taken from the graph on the next page, built up on the basis of the indications in the IEC 62271-1 Standards.
The following example is a clear interpretation of the indications given above.

Graph for determining the Ka correction factor according to the altitude

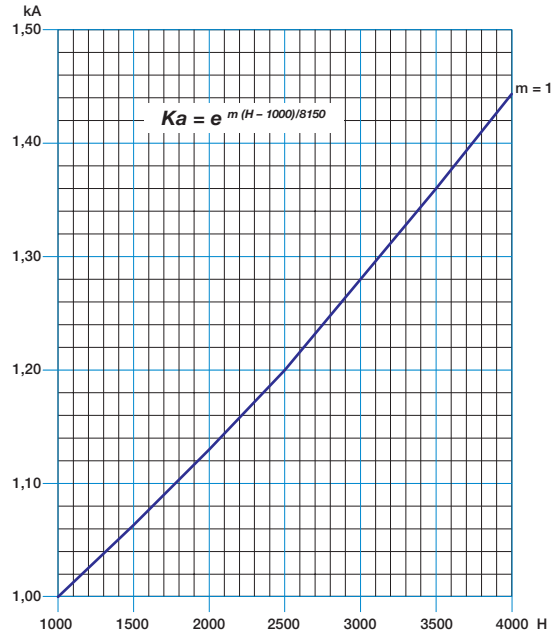
Example

- Installation altitude 2000 m
- Operation at the rated voltage of 12 kV
- Withstand voltage at power frequency 28 kV rms
- Impulse withstand voltage 75 kVp
- Ka factor obtained from graph = 1.13.

Considering the above parameters, the apparatus will have to withstand (under test and at zero altitude, i.e. at sea level):
– withstand voltage at power frequency equal to:
  28 x 1.13 = 31.6 kVrms
– impulse withstand voltage equal to:
  75 x 1.13 = 84.7 kVp.

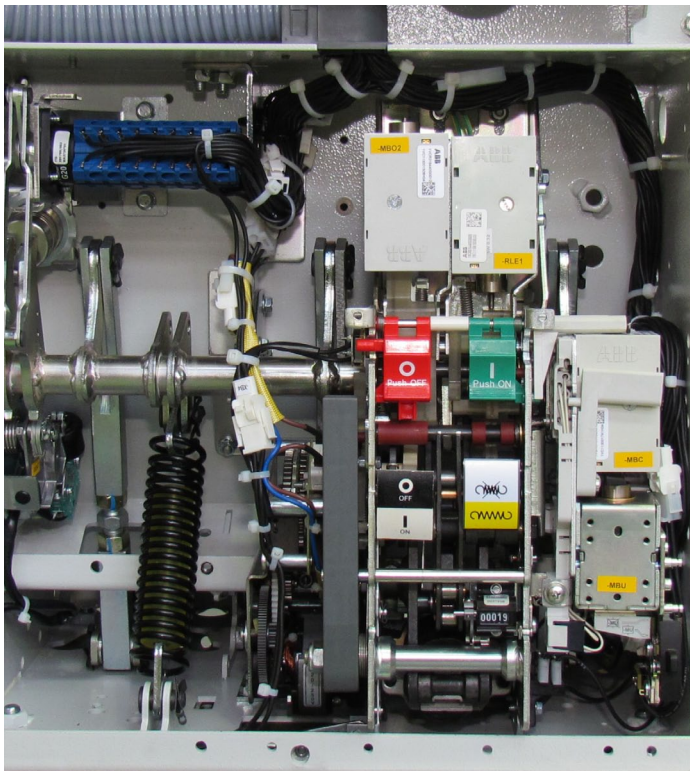
From the above, it can be deduced that for installations at an altitude of 2000 m above sea level, with 12 kV service voltage, apparatus must be provided with 17.5 kV rated voltage, characterised by insulation levels at power frequency of 38 kVrms with 95 kVp impulse withstand voltage.

H = altitude in metres;
m = value referred to power frequency and the lightning impulse withstand voltages and those between phases.



Anti-pumping device

The EL operating mechanism of VD4 circuit-breakers (in all versions) is fitted with a mechanical anti-pumping device which prevents re-closing due to either electrical or 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 avoids this situation, 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 re-launched.
Furthermore, the anti-pumping device only allows circuit-breaker closure if the following conditions are present at the same time:
– operating mechanism spring fully charged
– opening pushbutton and/or shunt opening release (-MBO1/-MBO2) not activated
– circuit-breaker open.



3. Specific product characteristics

REF 601 protection Device

On request, the REF 601 switchgear protection device is available for protection of the installations, which requires an auxiliary power supply for its operation unlike the previous PR512 which was a self-supplied release.
The REF 601 has protections and trip curves in accordance with the IEC 255-3 Standard. It sees to the protection function against overload (51), against instantaneous and delayed short-circuit (50-51) and against instantaneous and delayed homopolar ground fault (50N and 51N). It also detects the second harmonic component to prevent unwarranted tripping on connection of a transformer (68).

The unit has 3 inputs from current sensors of the type with Rogowsky coil, one input from external toroidal CT and from the keyboard 4 rated currents can be set: 40, 80, 250 and 1250 A.
If the unit is connected to 3 current sensors, the 50N and 51N protection functions are carried out with the vectorial sum of the phase currents; if only 2 current sensors are used, then the external toroidal current transformer must be provided for functions 50N and 51N.
The external toroidal current transformer can be with openable core or closed and with any transformation ratio as long with a 1 A secondary current.
The ABB current sensors of the type with Rogowsky coil provided for REF 601, are only suitable for installation on MV insulated cables.

The characteristics of the device are:
- trip precision
- wide adjustment ranges
- single and simultaneous adjustment of the three phases
- no limitation (due to the current sensors) to the rated breaking capacity and at the 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 in operation”, “relay in trip threshold”, “relay tripped”, “relay tripped due to exceeding phase current”, “relay tripped due to exceeding ground fault current”
- interface consisting of an LCD display and of “arrow” keys, “enter” and “esc” for easier navigation inside the “measurement”, “data recording”, “event recording”, “settings”, “configuration” and “test” menus
- three user levels: “operator” (only display, with free access, by keeping this key pressed for at least 5 sec.), “configurator” (like the previous one, but also with permission to set the protection parameters, i.e. times and thresholds, and communication, if present - access limited by a password), “administrator” (like the previous ones, but also with permission to set the password and configure the basic settings of the device, such as the rated current - access limited by a password)
- continual display of the current on the most highly loaded phase and of the round 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” specific 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 a.c.- d.c

Environmental protection programme

VD4 circuit-breakers are manufactured in accordance with the ISO 14000 Standards (Guidelines for environmental management).
The production processes are carried out in compliance with the Standards for environmental protection in terms of reduction in energy consumption as well as in raw materials and production of waste materials. All this is thanks to the medium voltage apparatus manufacturing facility environmental management system.
Assessment of the environmental impact of the life cycle of the product, obtained by minimising energy consumption and overall raw materials of the product, became a concrete matter during the design stage by means of targeted selection of the materials, processes and packing.
This is to allow maximum recycling at the end of the useful life cycle of the apparatus.

Spare parts

- Shunt opening release
- Additional shunt opening release
- Undervoltage release
- Time delay device for undervoltage release
- Shunt closing release
- Spring charging geared motor with electrical signalling of spring charged
- Contact signalling geared motor protection circuit-breaker open/closed
- Contact signalling closing spring charged/discharged
- Transient contact with momentary closing during circuit-breaker opening
- Circuit-breaker auxiliary contacts
- Locking electromagnet on the operating mechanism
- Position contact of the withdrawable truck
- Contacts signalling connected/isolated
- Opening solenoid
- Key lock in open position
- Isolation interlock with the door
- Protection for opening pushbutton
- Protection for closing pushbutton
- Locking electromagnet on the withdrawable truck
- Set of six isolating contacts.

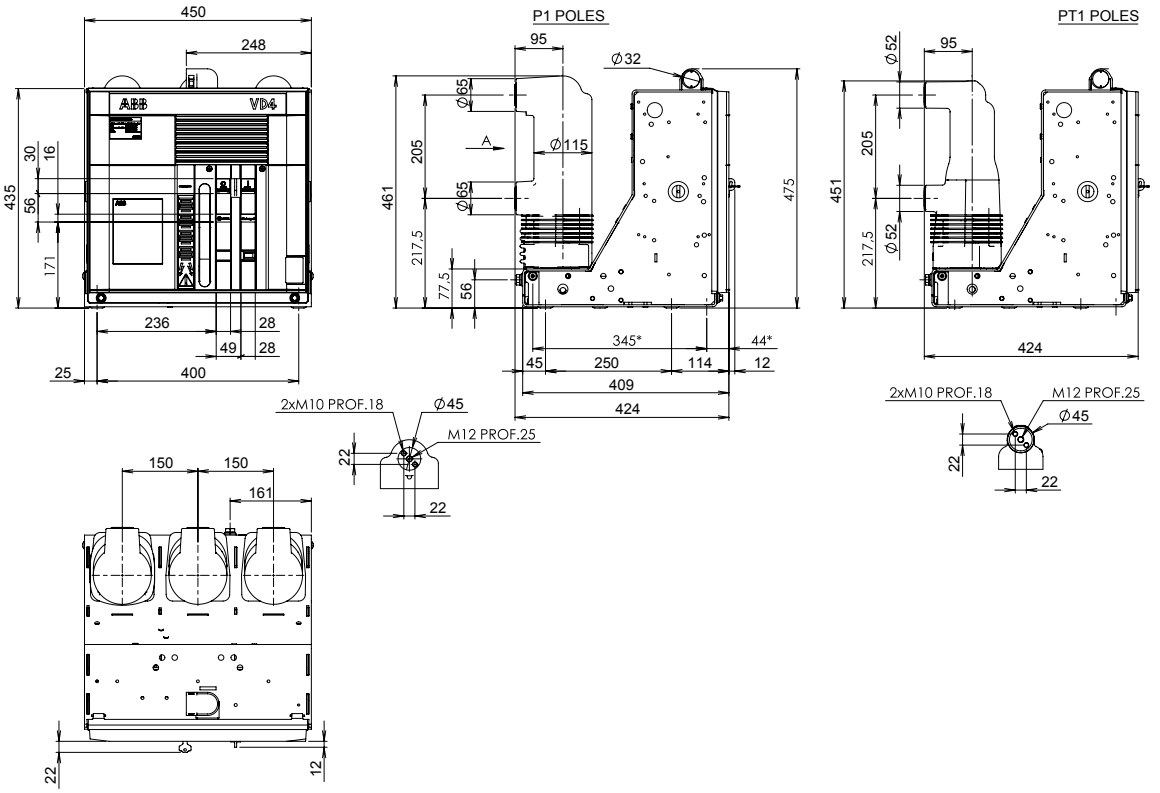
Ordering

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

4. Overall dimensions

Fixed circuit-breakers

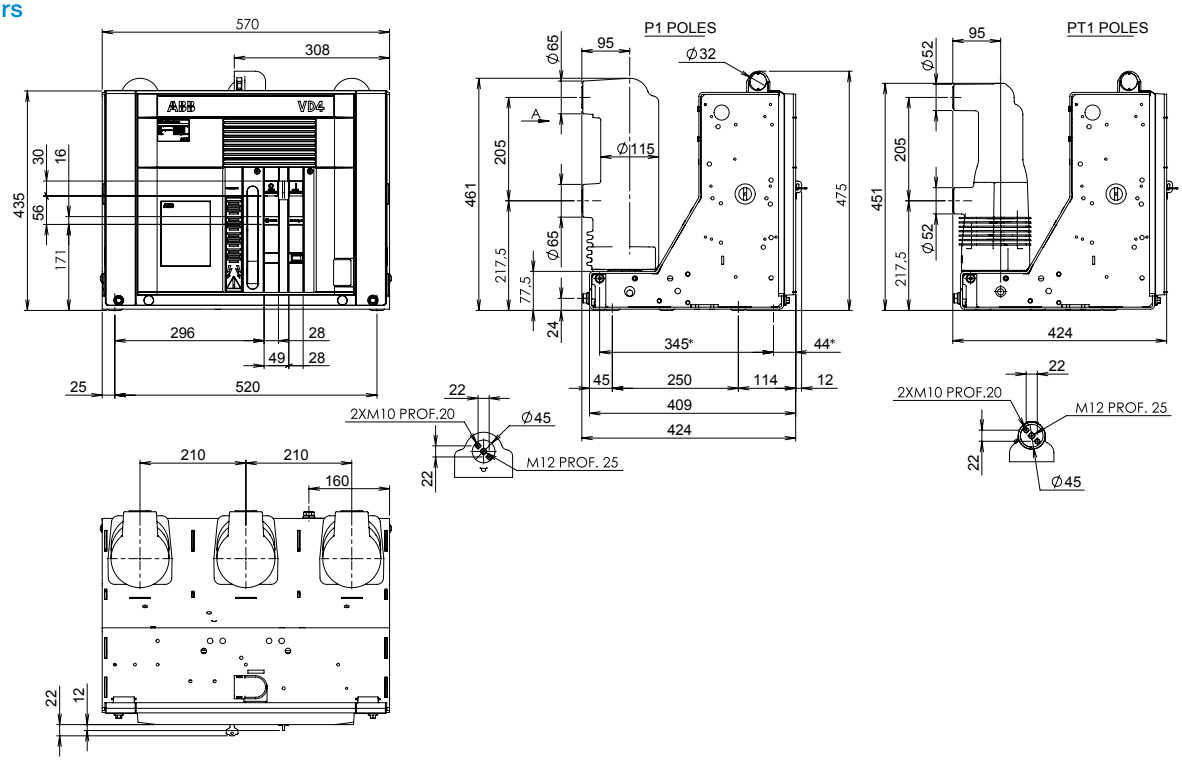
VD4		
TN	7405	
Ur	12	kV
	17.5	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA
	31.5	kA



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

Fixed circuit-breakers

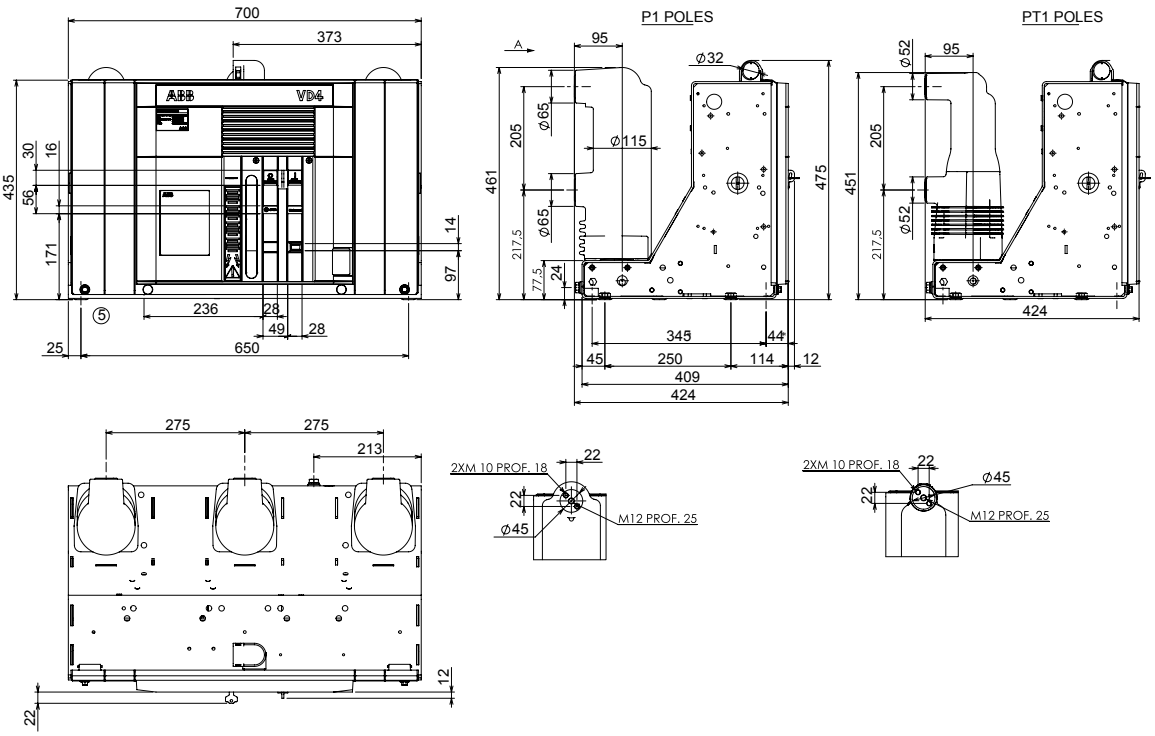
VD4		
TN	7406	
Ur	12	kV
	17.5	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA
	31.5	kA



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

Fixed circuit-breakers

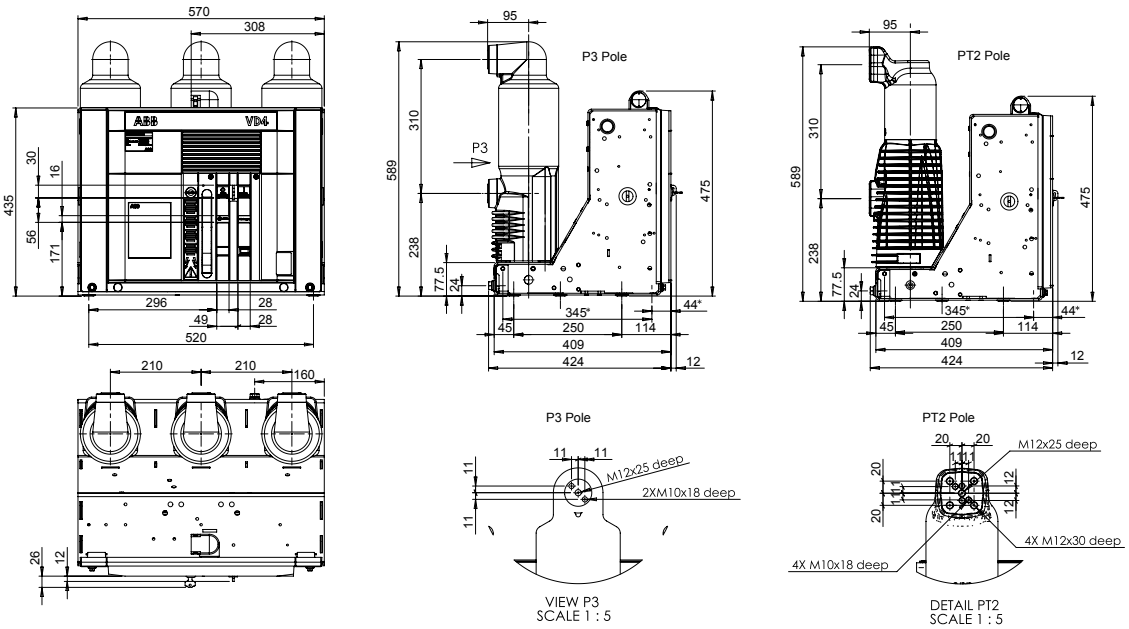
VD4		
TN	1VCD000051	
Ur	12	kV
	17.5	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA
	31.5	kA



(*) 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

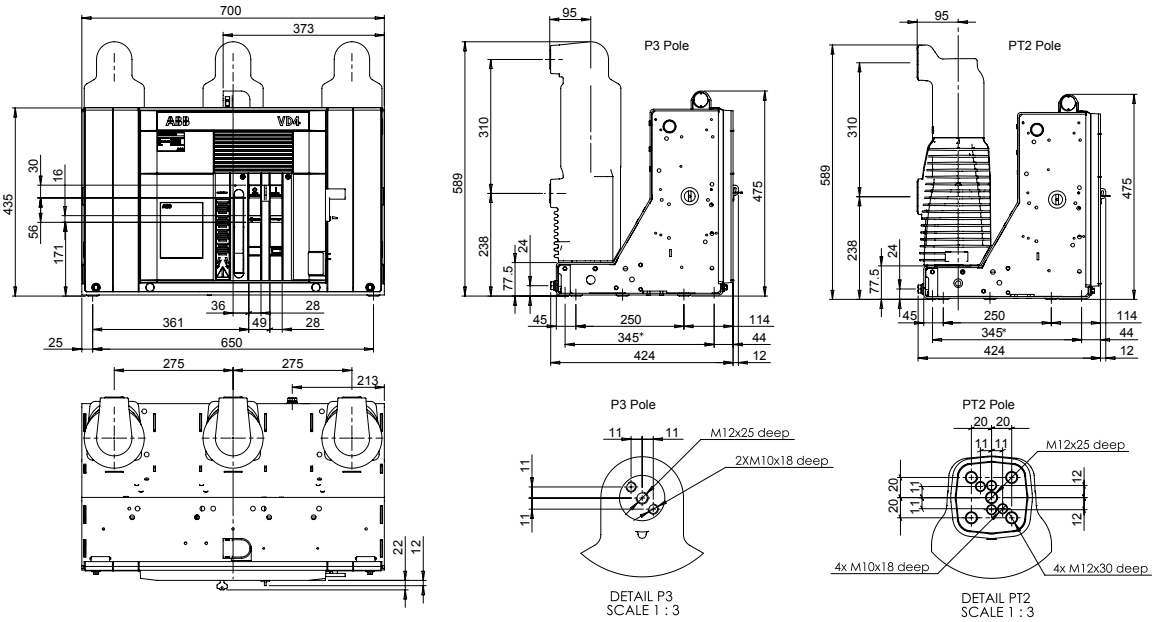


(*) Fixing interchangeability with previous series (345 x 650).

4. Overall dimensions

Fixed circuit-breakers

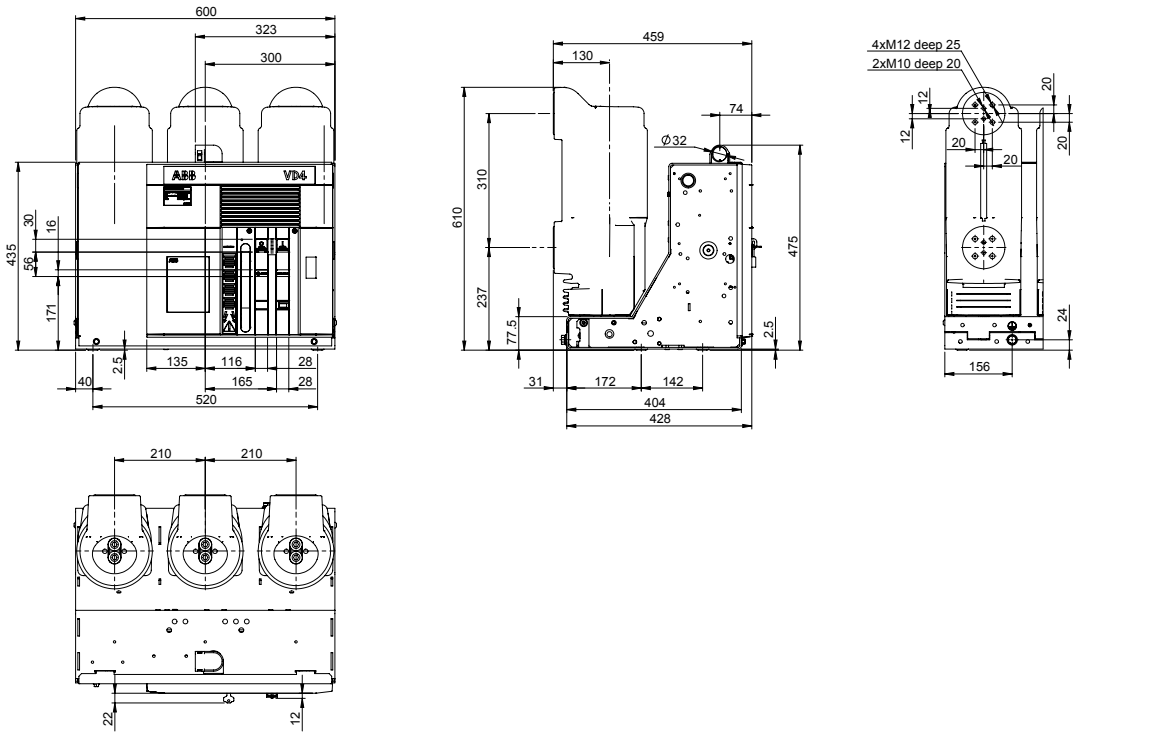
VD4		
TN	1VCD003285	
Ur	12	kV
	17.5	kV
Ir	1250	A
	1600	A
Isc	40	kA



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

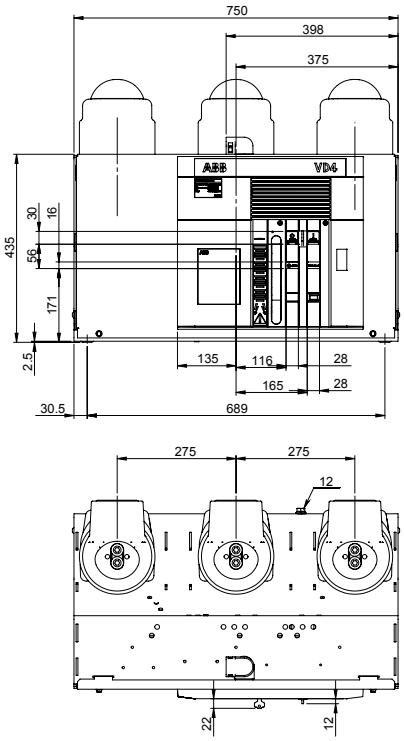
Fixed circuit-breakers

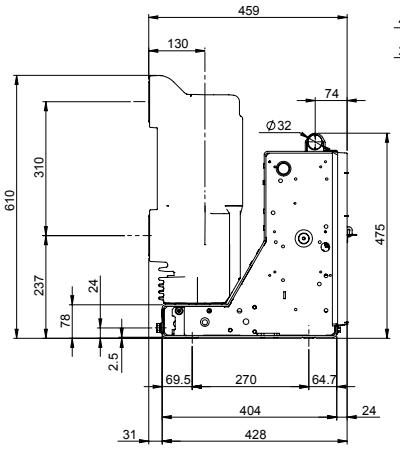
VD4		
TN	1VCD003440	
Ur	12	kV
	17.5	kV
Ir	1250	A
	1600	A
	2000	A
Isc	50	kA

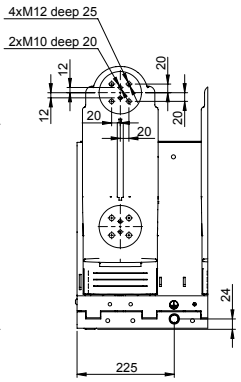


Fixed circuit-breakers

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

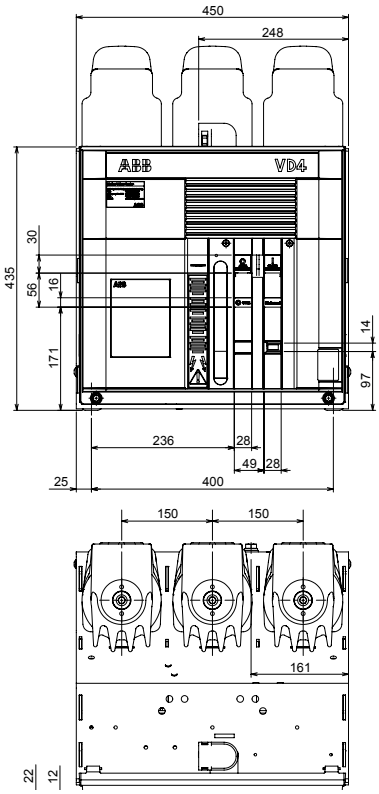


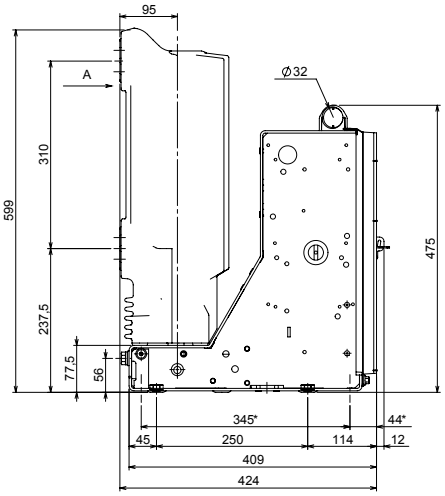


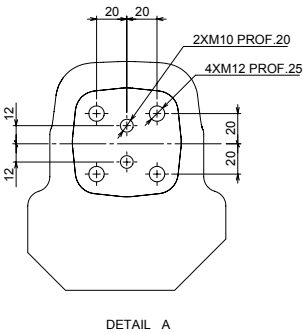


Fixed circuit-breakers

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







DETAIL A
SCALE 1 : 2 . 5

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

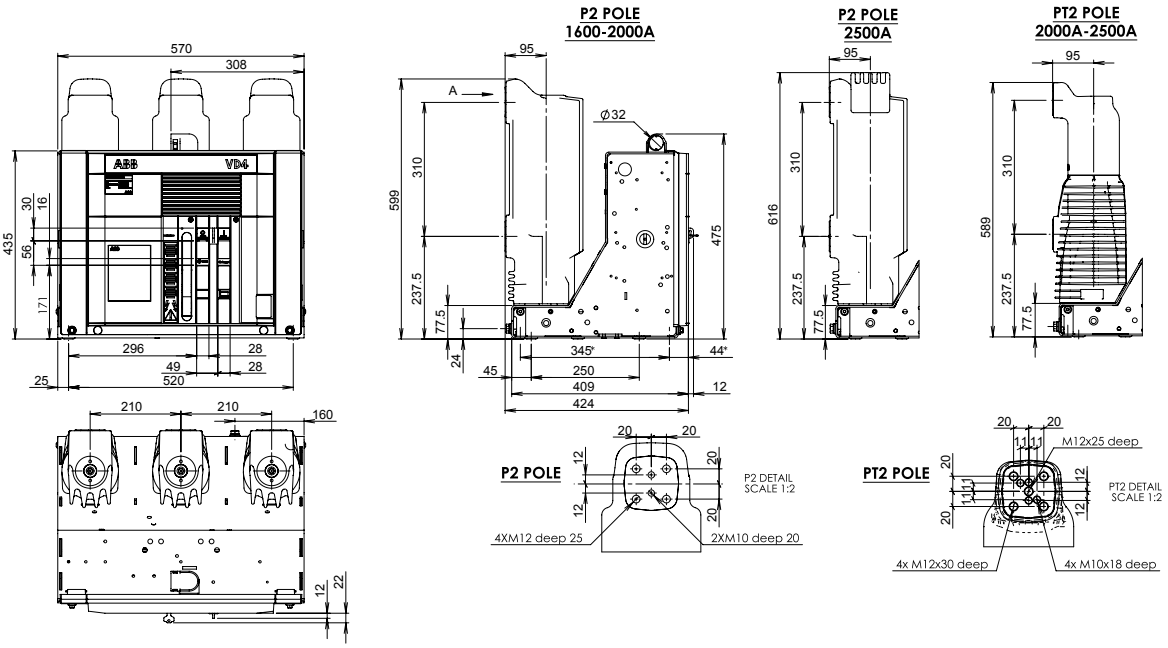
4. Overall dimensions

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

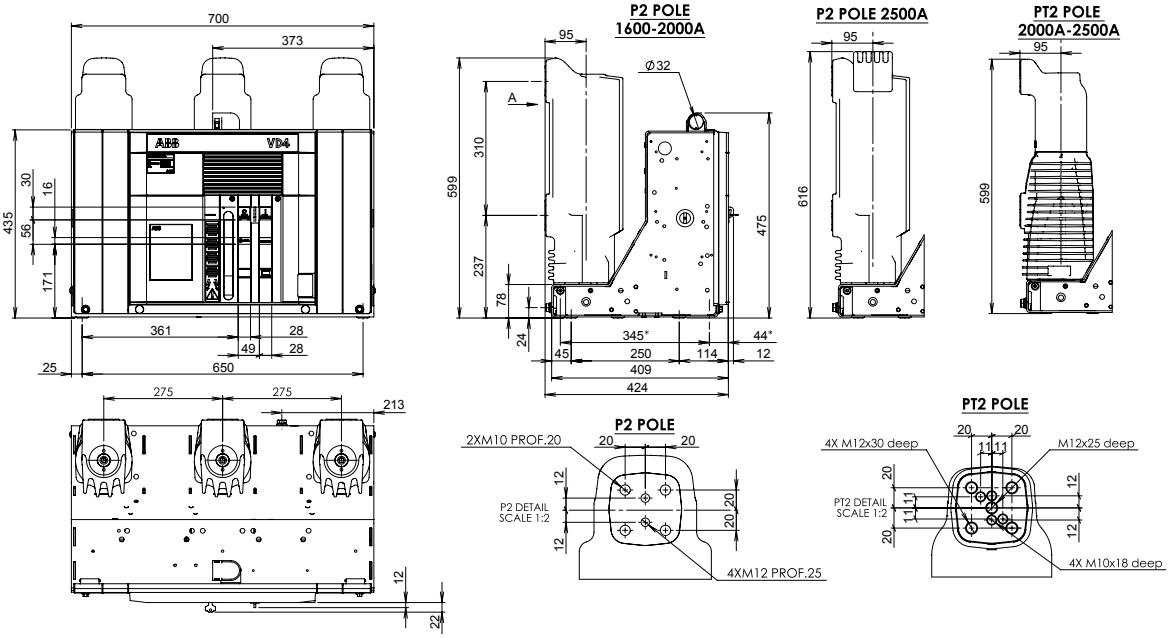


(*) Fixing interchangeability with previous series (345 x 650).

Fixed circuit-breakers

VD4		
TN	7408	
Ur	12	kV
	17.5	kV
Ir	1600	A
Isc	20	kA
	25	kA
	31.5	kA

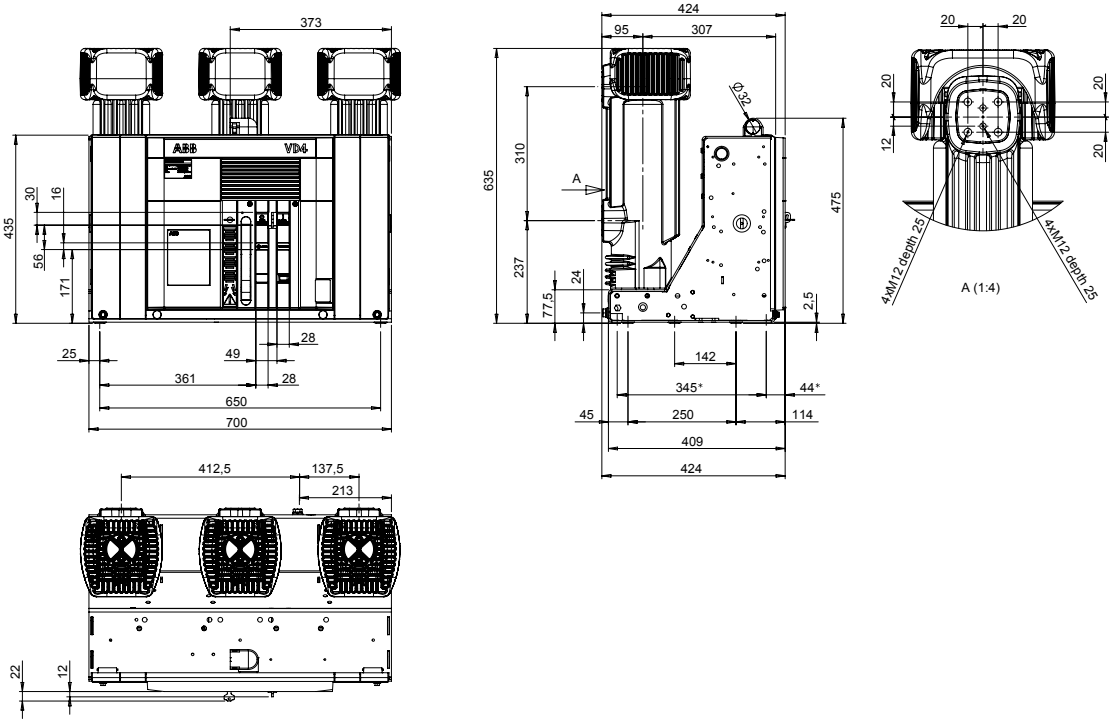
VD4		
TN	7408	
Ur	12	kV
	17.5	kV
Ir	2000	A
	2500	A
Isc	20	kA
	25	kA
	31.5	kA
	40	kA



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

Fixed circuit-breakers

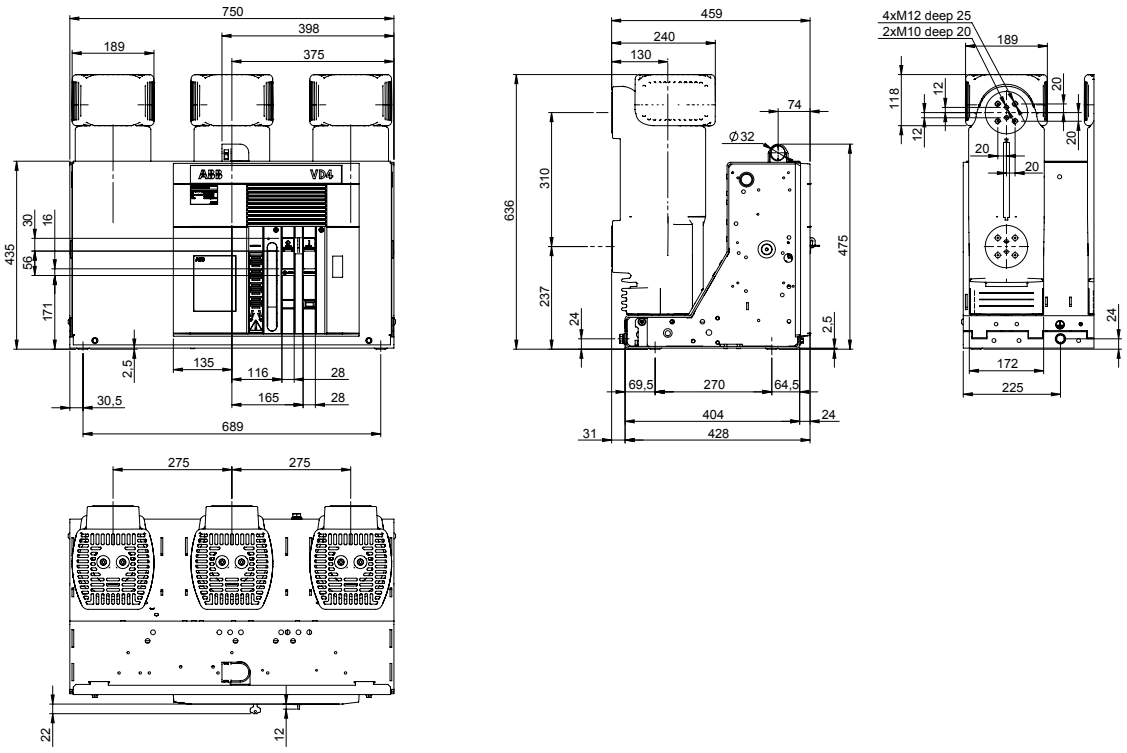
VD4		
TN	1VCD000149	
Ur	12	kV
	17.5	kV
Ir	3150	A
Isc	20	kA
	25	kA
	31.5	kA
	40	kA



(*) 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

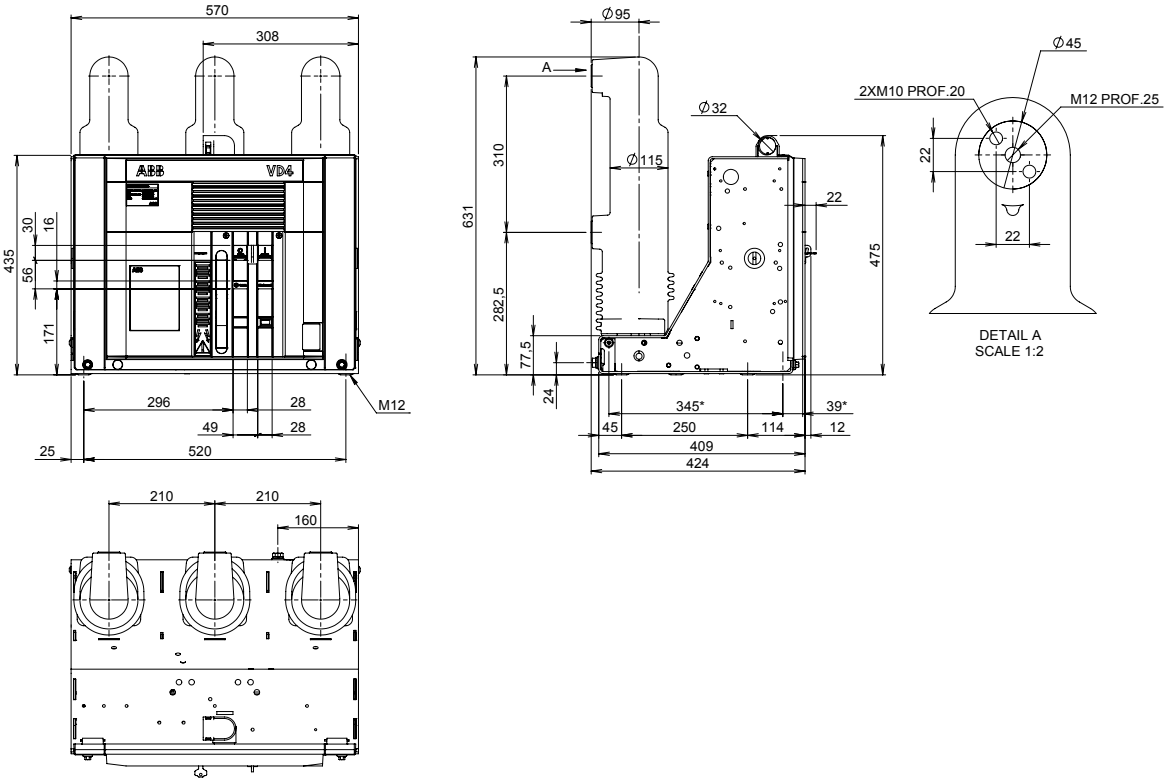


(*) 4000 A with forced ventilation.

4. Overall dimensions

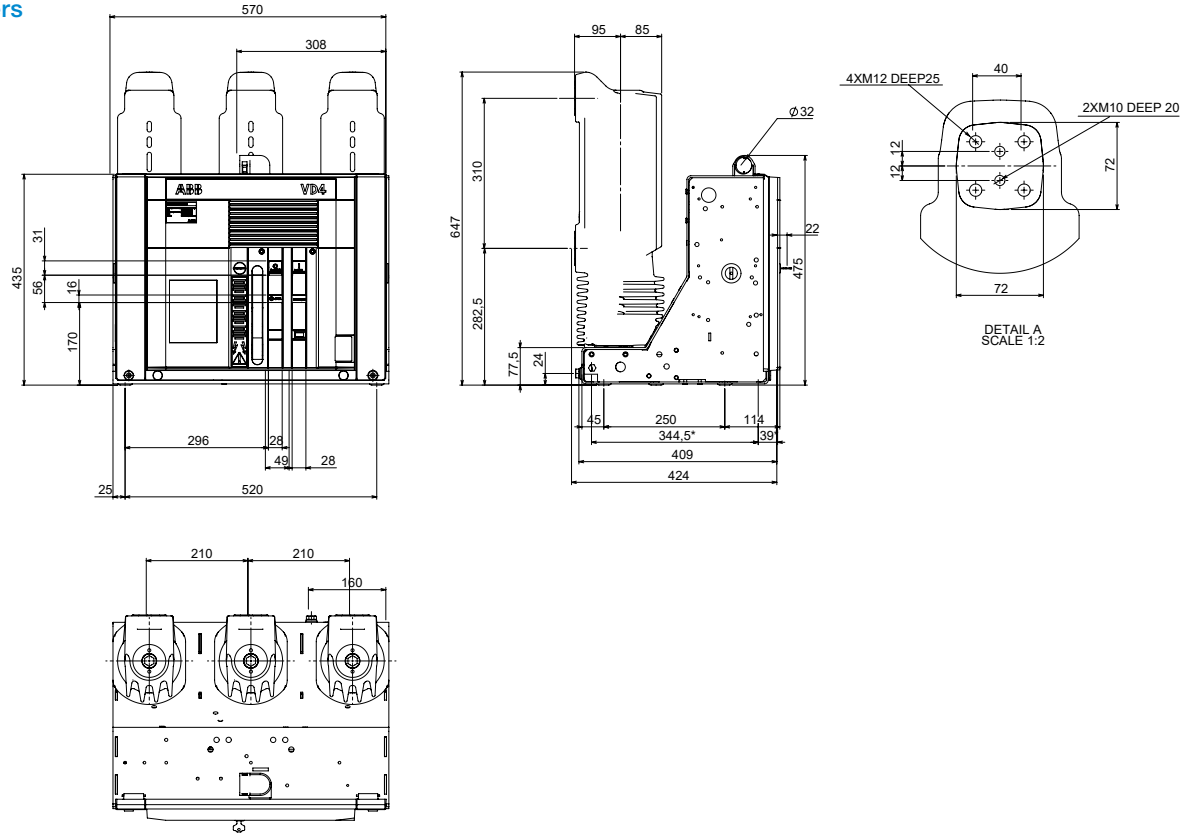
Fixed circuit-breakers

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



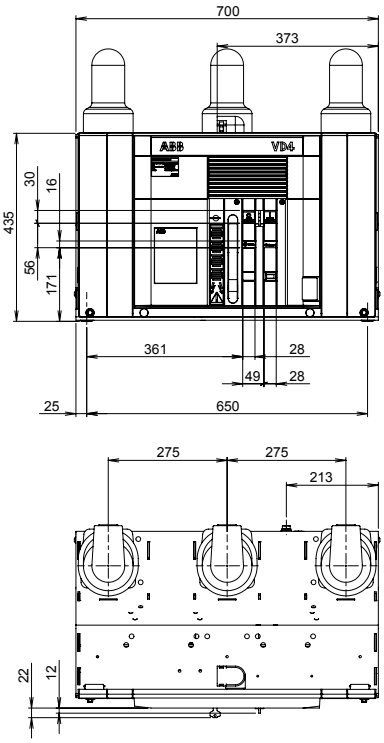
Fixed circuit-breakers

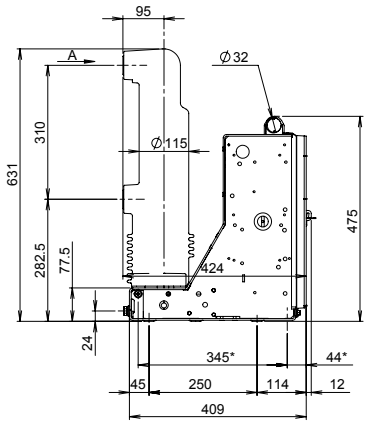
VD4		
TN	1VCD000172	
Ur	24	kV
Ir	630	A
	1250	A
Isc	31,5	kA

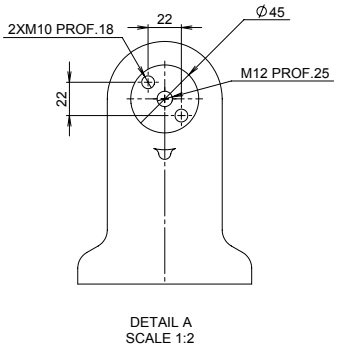


Fixed circuit-breakers

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



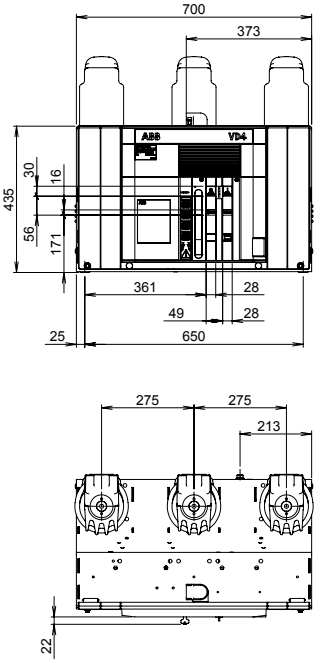


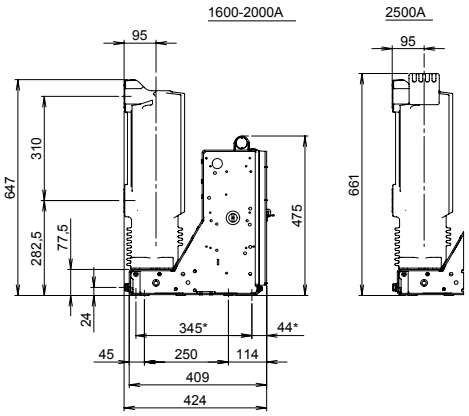


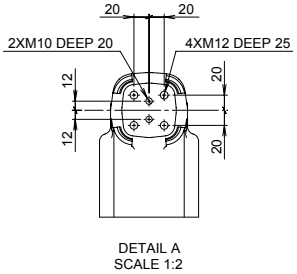
DETAIL A
SCALE 1:2

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





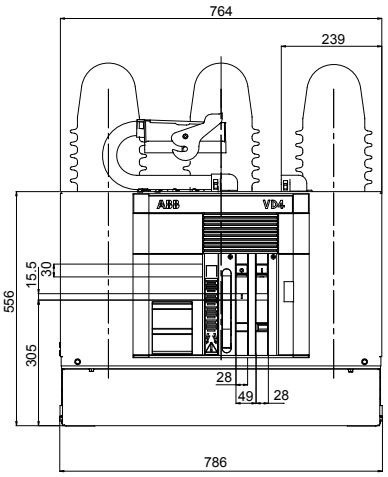


DETAIL A
SCALE 1:2

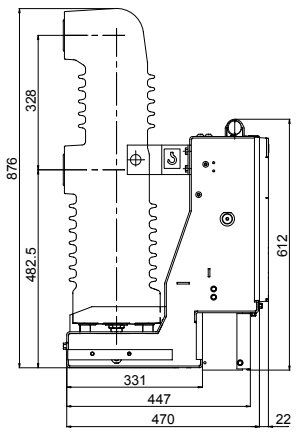
4. Overall dimensions

Fixed circuit-breakers

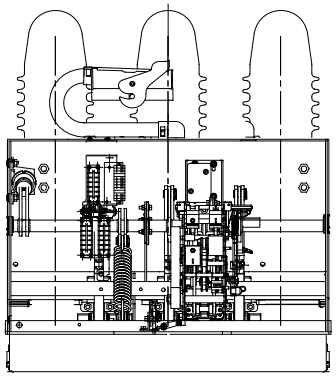
VD4		
TN	1VYN300901-LT	
Ur	36	kV
Ir	1250	A
	1600	A
	2000	A
	2500	A
Isc	20	kA
	25	kA
	31.5	kA



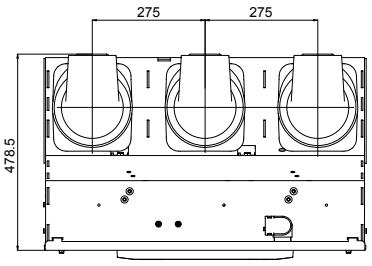
FRONT VIEW



SIDE VIEW



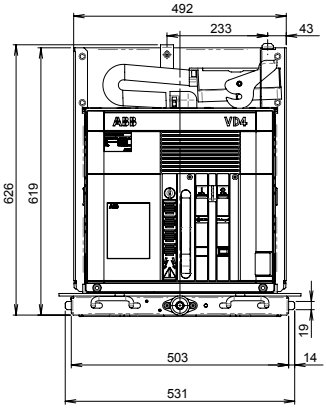
FRONT VIEW WITHOUT FRONT COVER

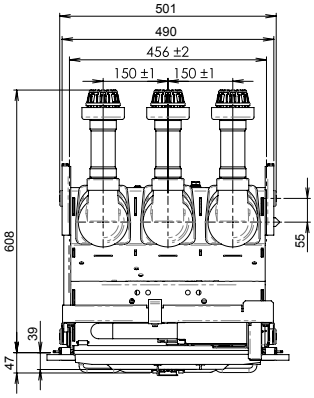


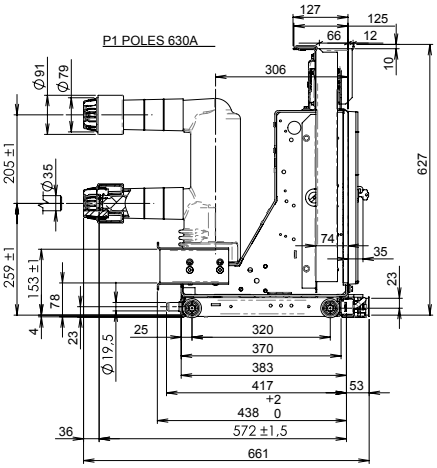
TOP

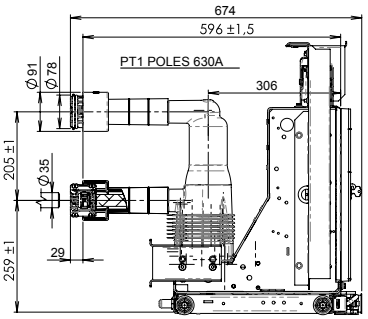
Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube PB1 modules

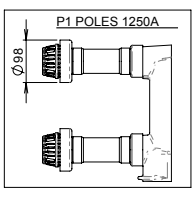
VD4/P		
TN	7412	
Ur	12	kV
	17.5	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA
	31.5	kA

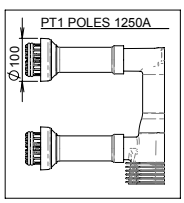






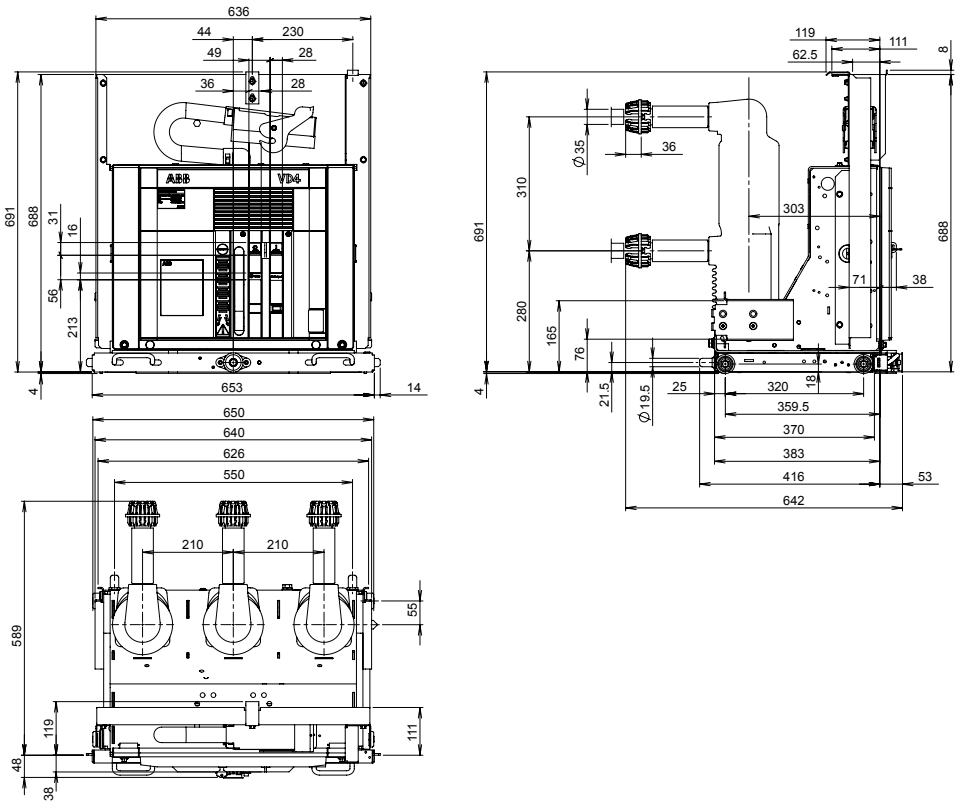






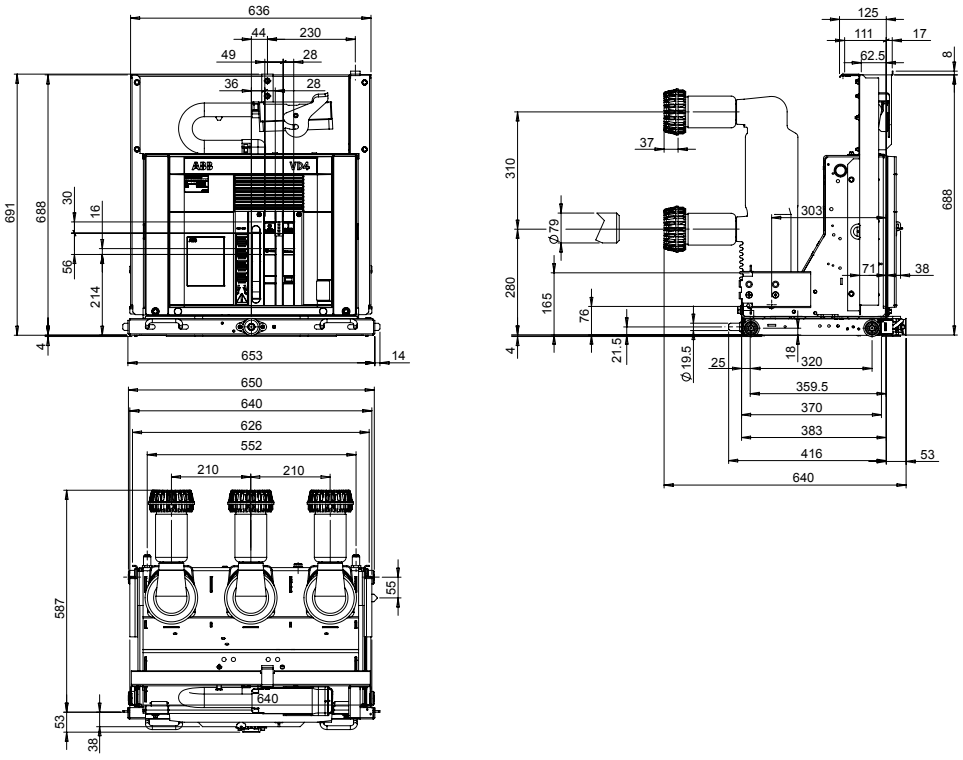
Withdrawable circuit-breakers for PowerCube PB2 modules

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



Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube PB2modules

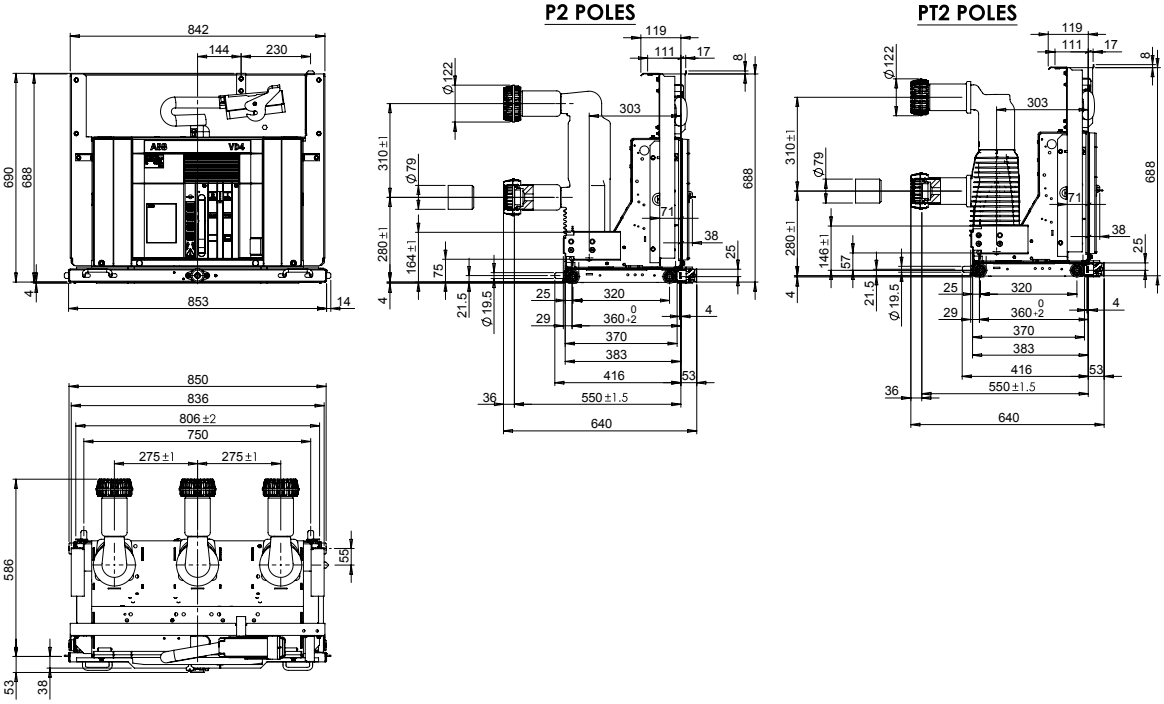
VD4/P		
TN	1VCD003284	
Ur	12	kV
	17.5	kV
Ir	1250	A
	1600	A
Isc	40	kA



4. Overall dimensions

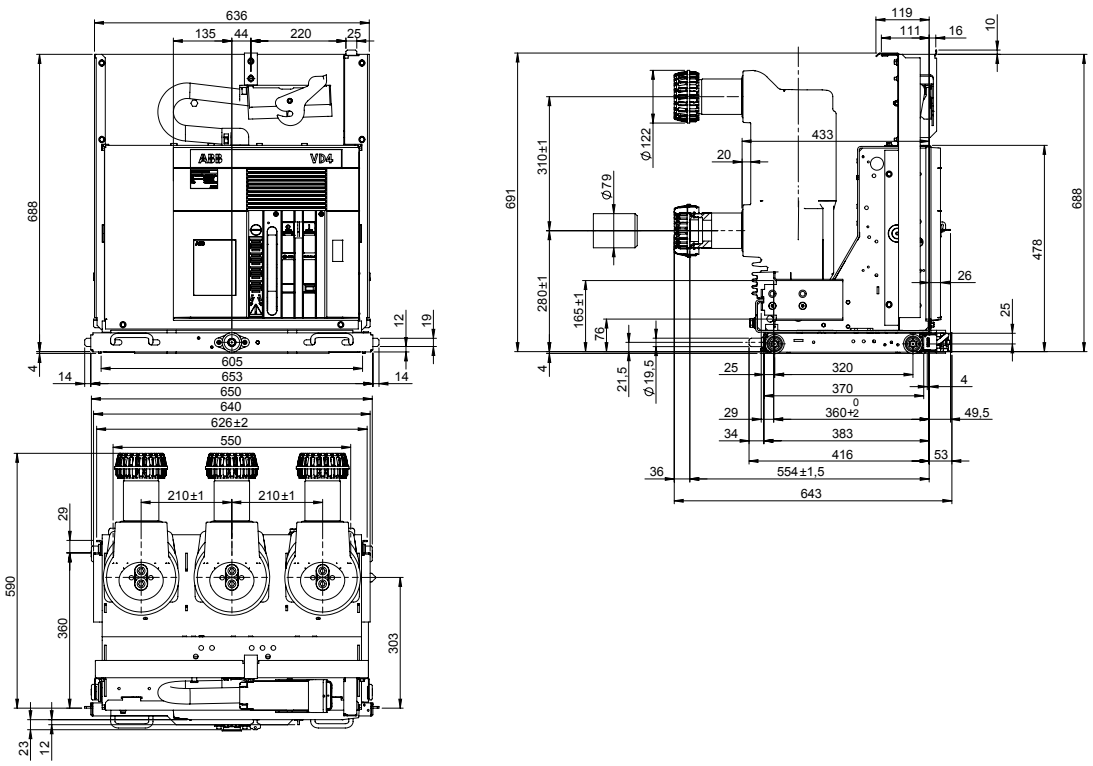
Withdrawable circuit-breakers for UniGear ZS1 switchgear

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



Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube PB2 modules

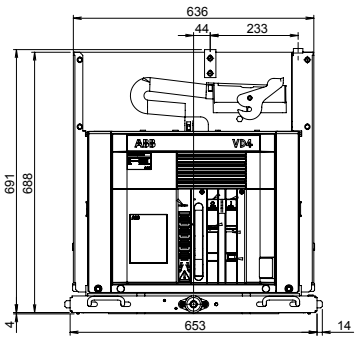
VD4/P		
TN	1VCD 003444	
Ur	12	kV
	17.5	kV
Ir	1250	A
	1600	A
	2000	A
Isc	50	kA

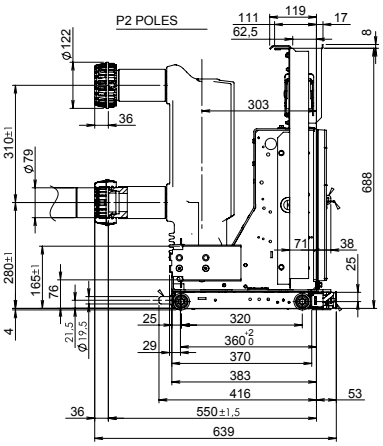


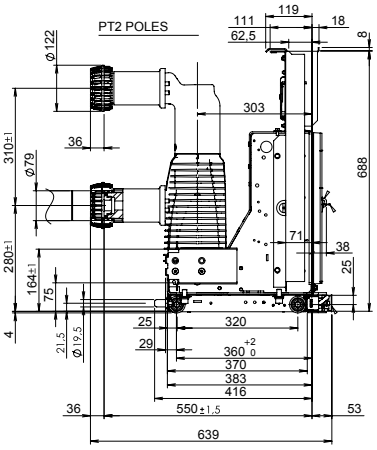
Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube PB2 modules

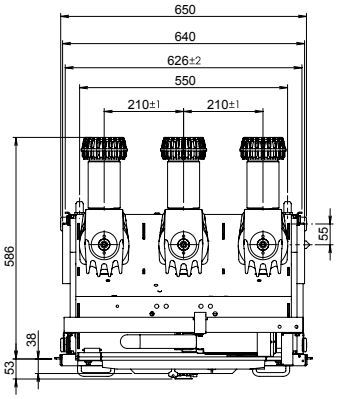
VD4/P		
TN	7415	
Ur	12	kV
	17.5	kV
Ir	1600	A
	2000	A
Isc	20	kA
	25	kA
	31.5	kA

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





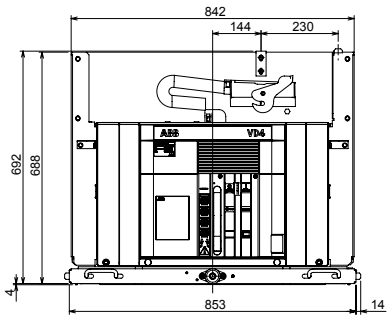


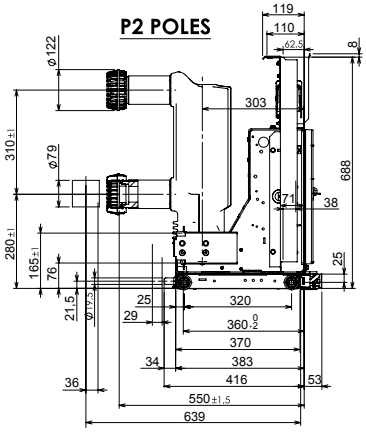


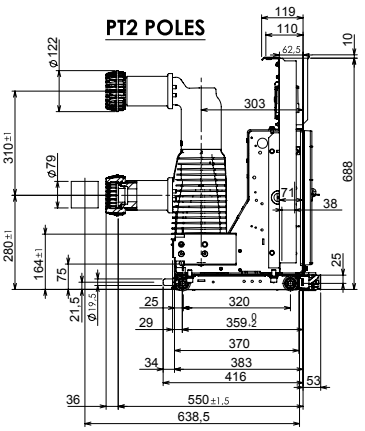
Withdrawable circuit-breakers for UniGear ZS1 switchgear

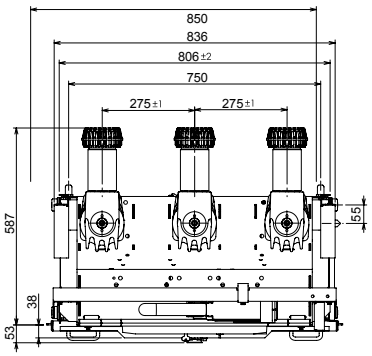
VD4/P		
TN	7416	
Ur	12	kV
	17.5	kV
Ir	1600	A
	2000	A
Isc	20	kA
	25	kA
	31.5	kA

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





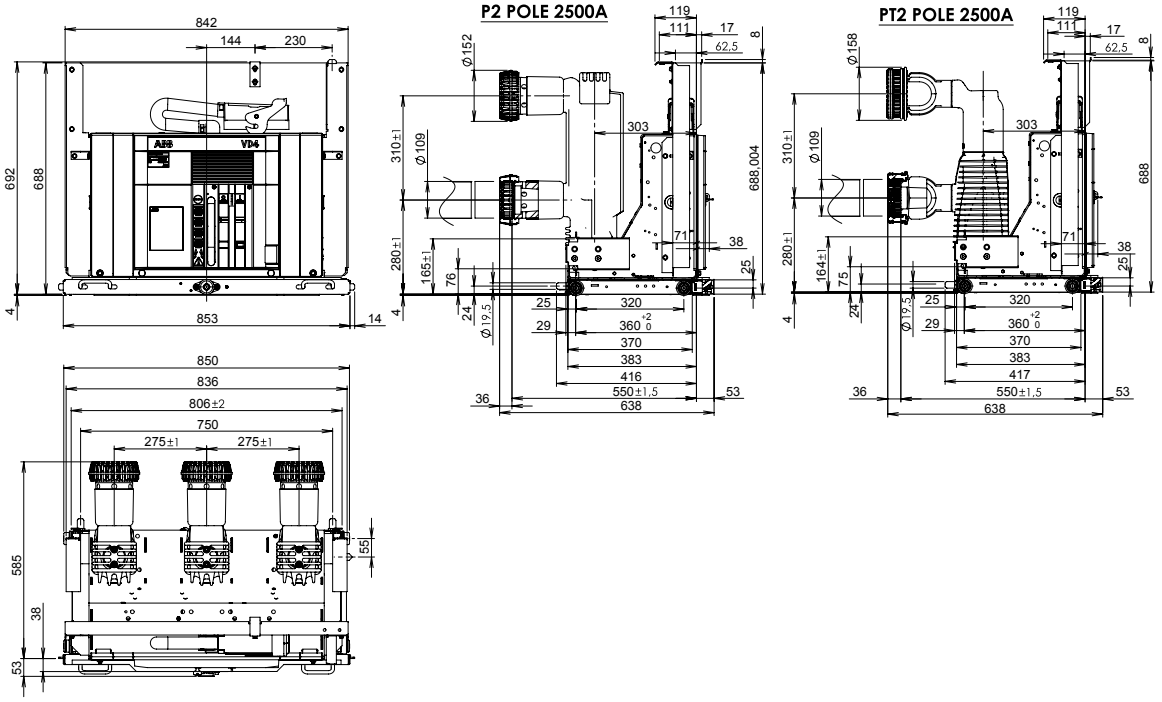




4. Overall dimensions

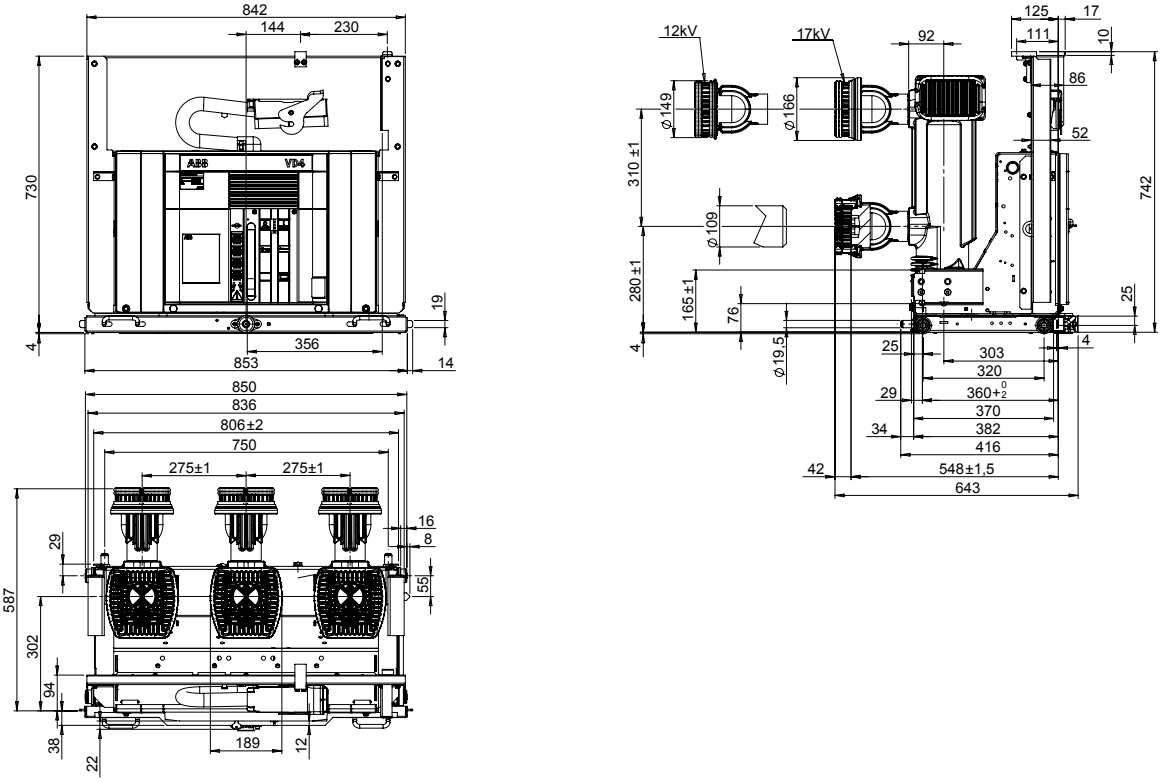
Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube PB3 modules

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



Withdrawable circuit-breakers for PowerCube PB3 modules

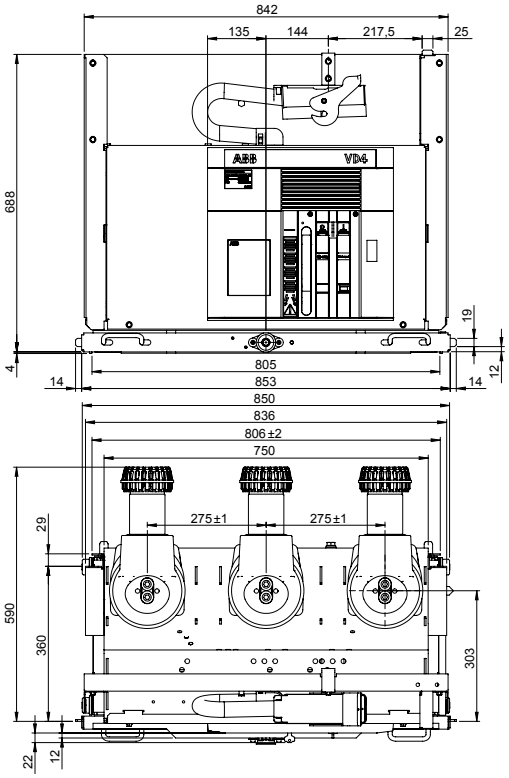
VD4/W		
TN	1VCD000152	
Ur	12	kV
	17.5	kV
Ir	3150	A (*)
Isc	20	kA
	25	kA
	31.5	kA
	40	kA

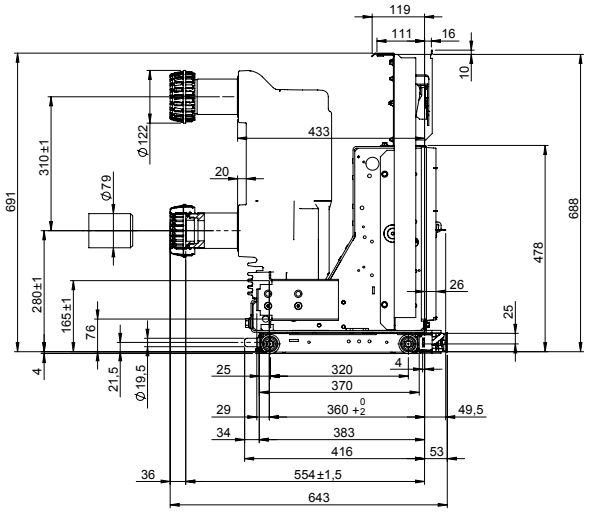


(*) 4000 A with forced ventilation.

Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube PB3 modules

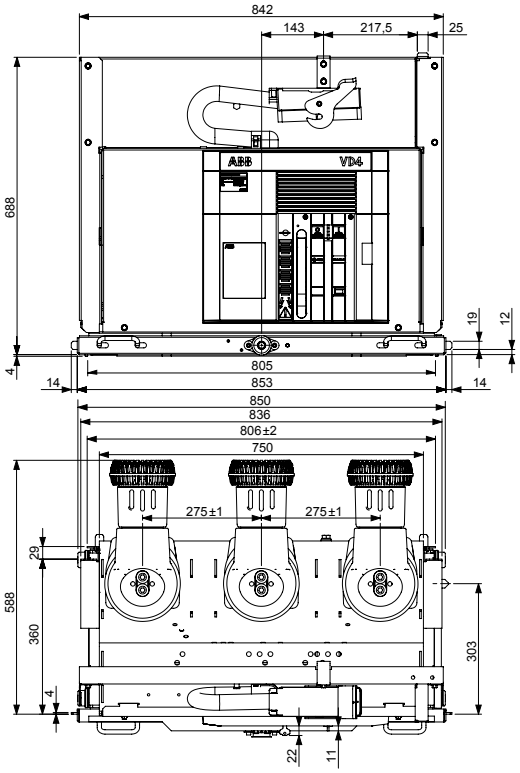
VD4/P		
TN	1VCD003445	
Ur	12	kV
	17.5	kV
Ir	1600	A
	2000	A
Isc	50	kA

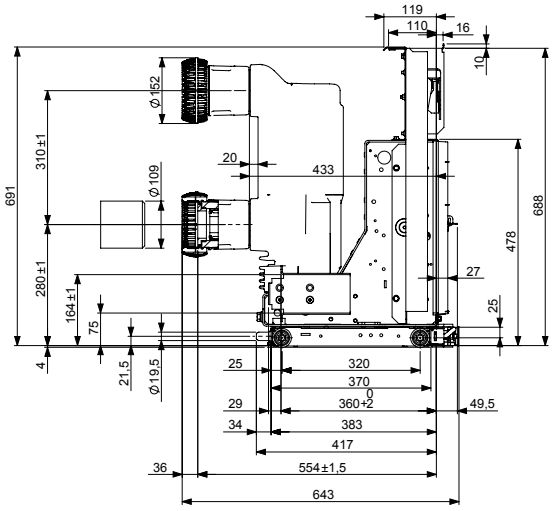




Withdrawable circuit-breakers for UniGear ZS1 switchgear

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

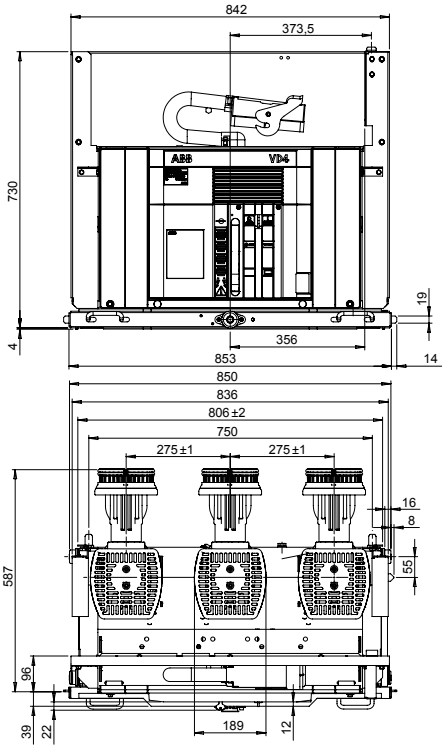


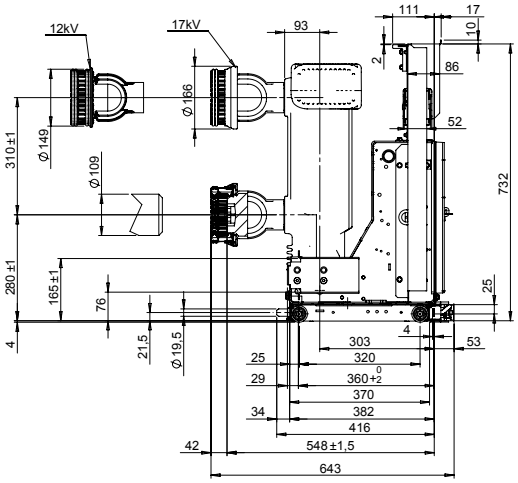


4. Overall dimensions

Withdrawable circuit-breakers for UniGear ZS1 switchgear

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

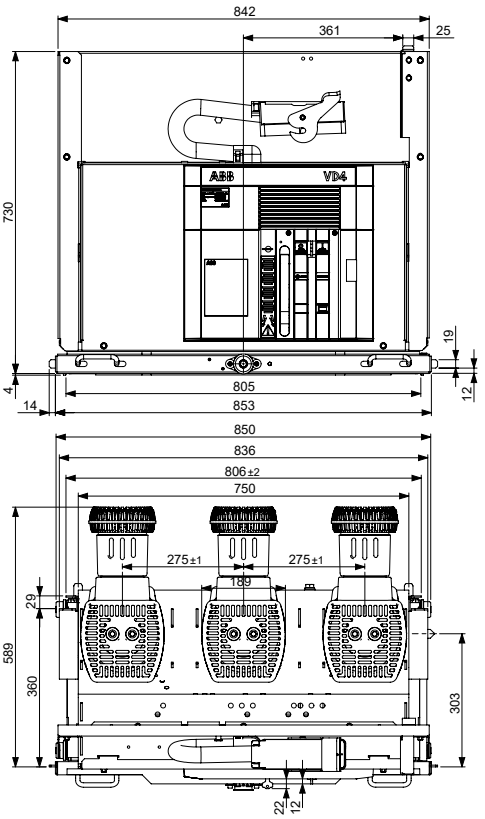


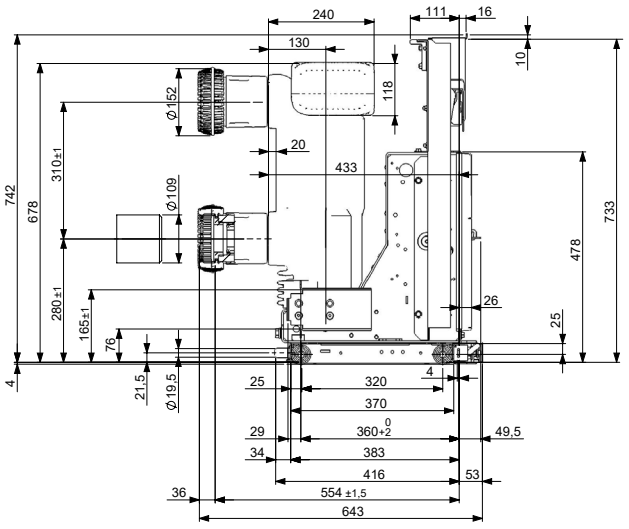


(*) 4000 A with forced ventilation.

Withdrawable circuit-breakers for UniGear ZS1 switchgear

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

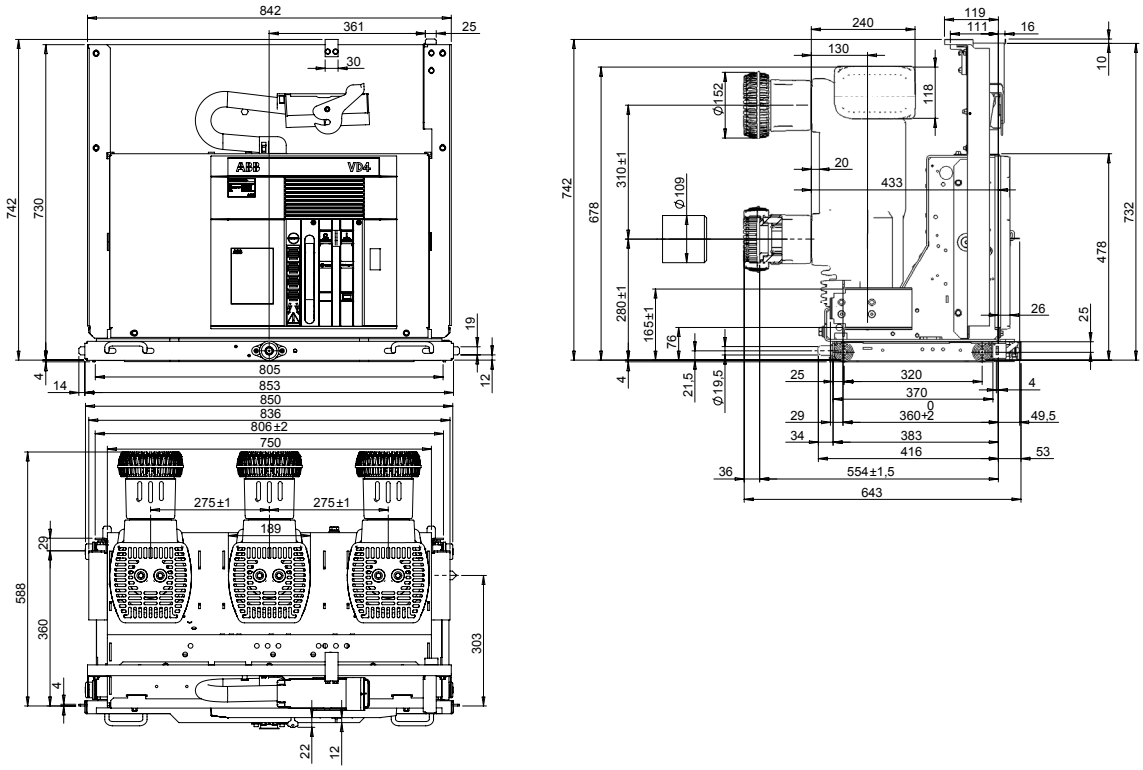




(*) 4000 A with forced ventilation.

Withdrawable circuit-breakers for PowerCube PB3 modules

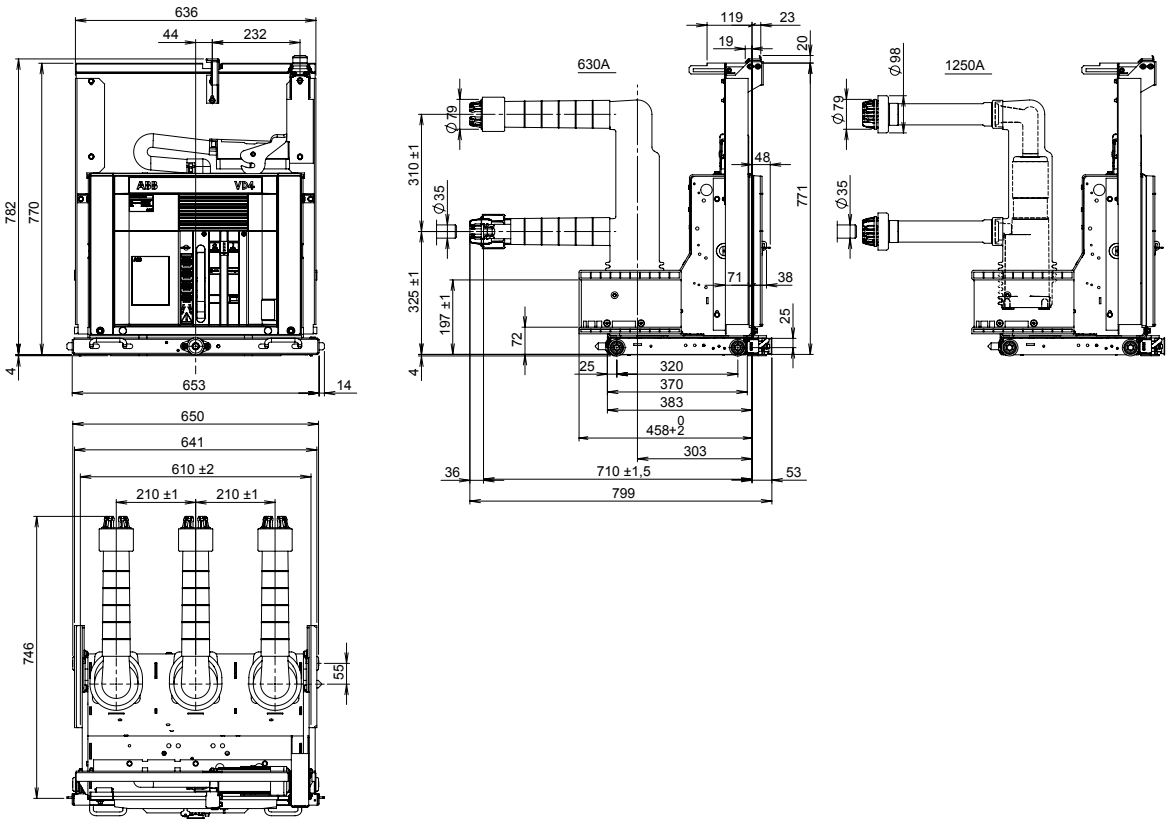
VD4/W		
TN	1VCD003596	
Ur	12	kV
	17.5	kV
Ir	3150	A (*)
Isc	50	kA



(*) 4000 A with forced ventilation.

Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube PB4 modules

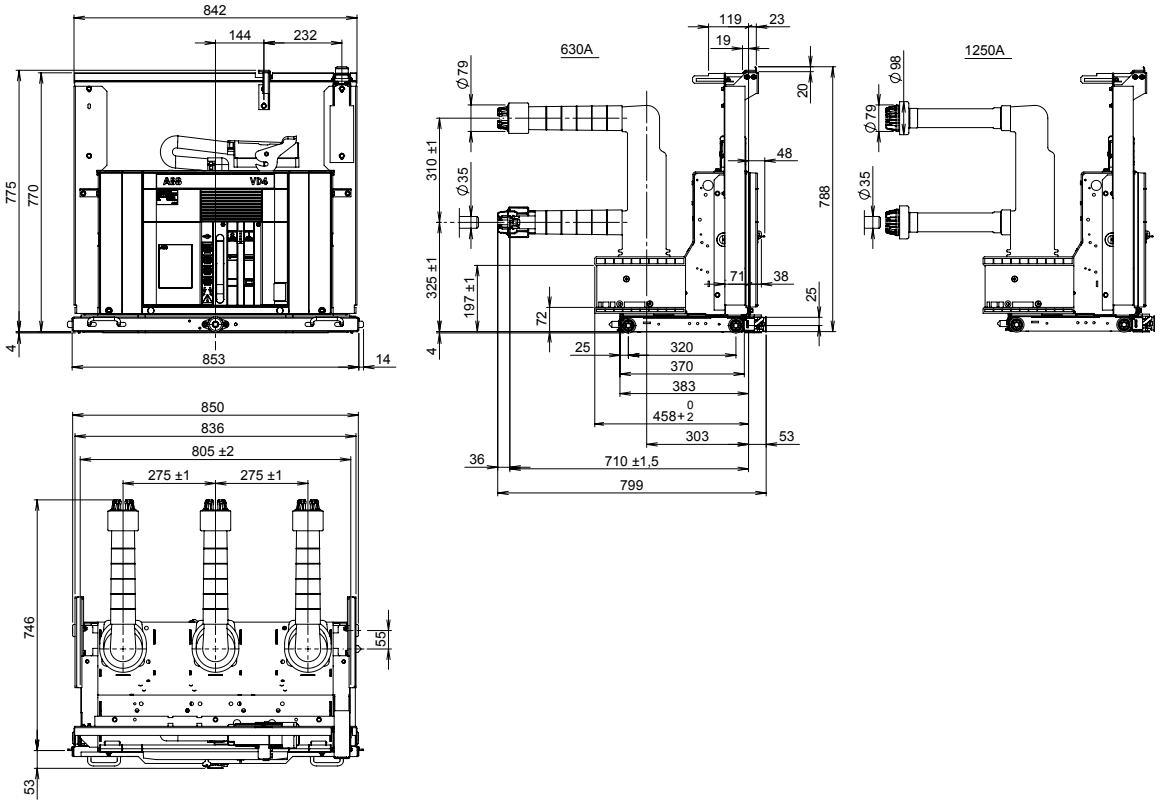
VD4/P		
TN	7413	
Ur	24	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA



4. Overall dimensions

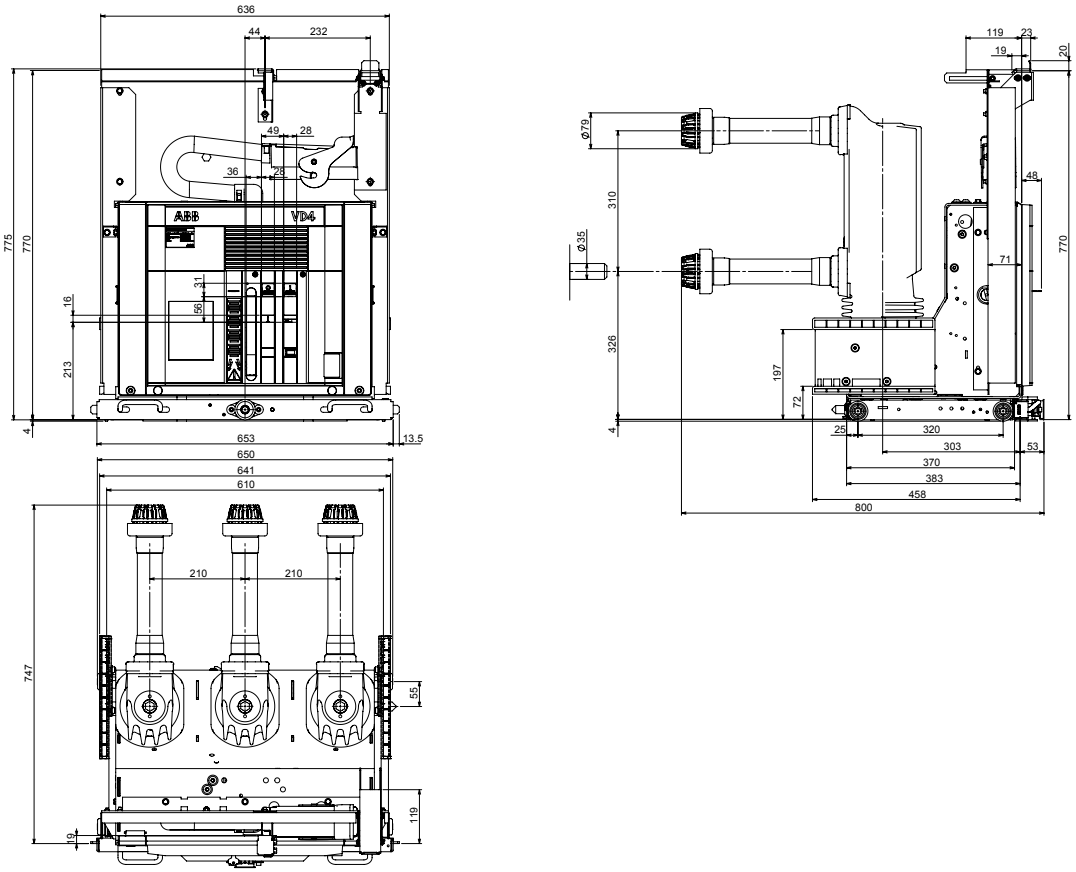
Withdrawable circuit-breakers for UniGear ZS1 switchgear

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



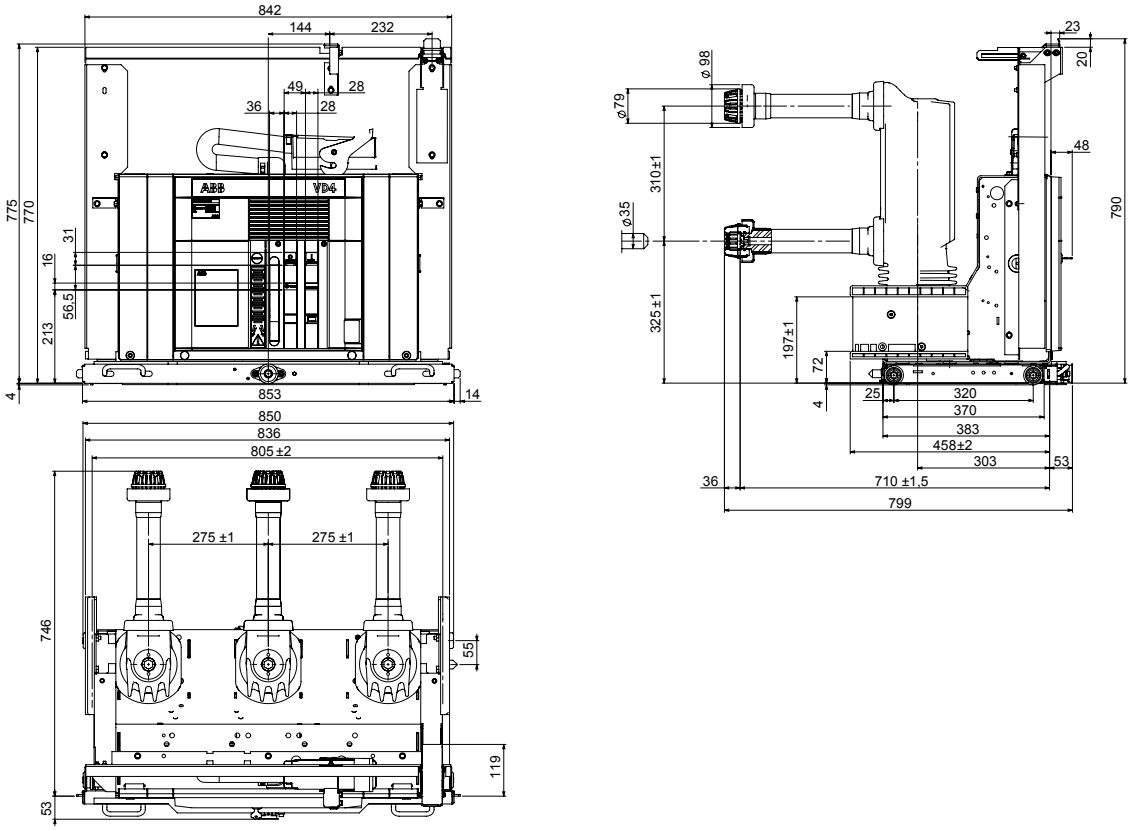
Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube PB4 modules

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



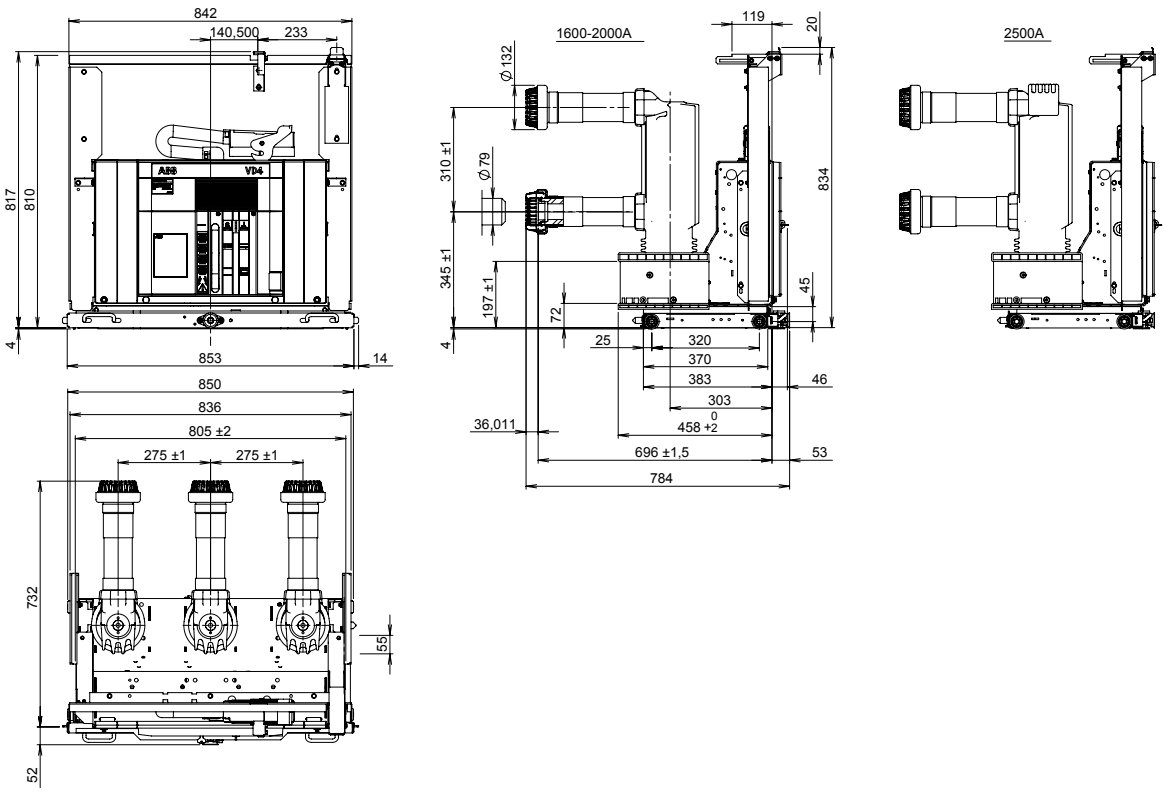
Withdrawable circuit-breakers for UniGear ZS1 switchgear

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

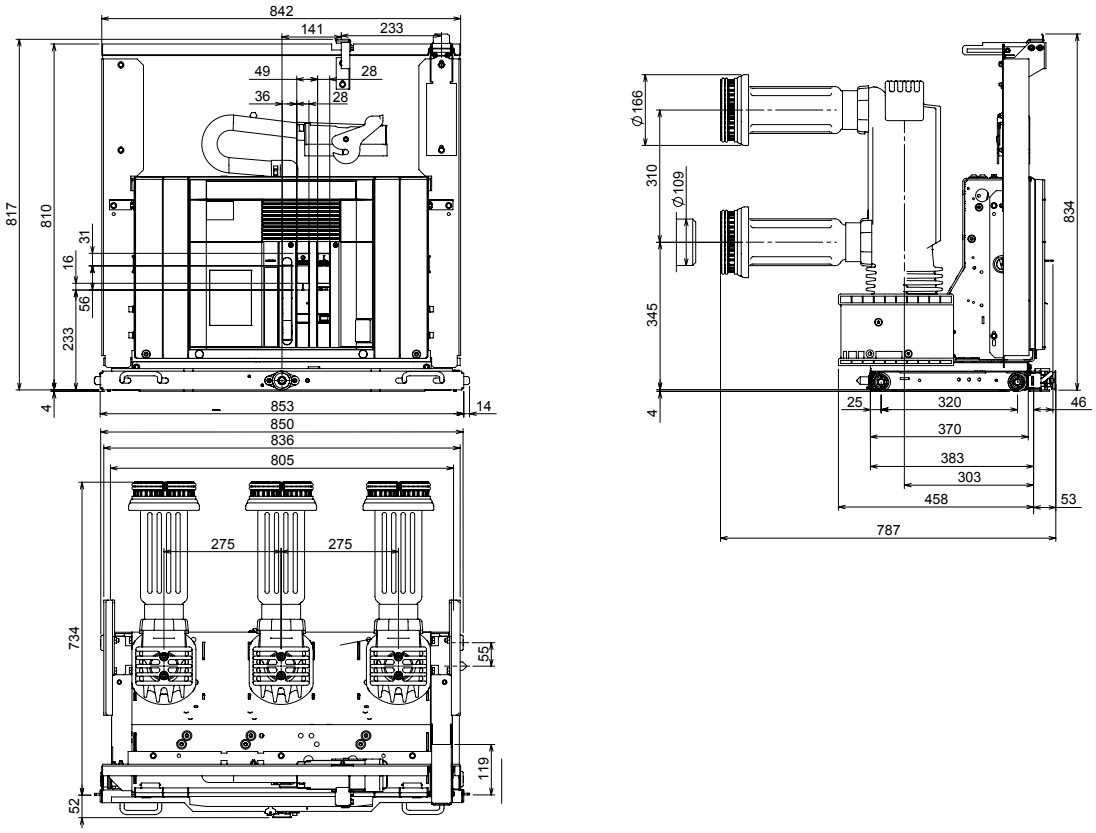


(1) The rated uninterrupted current of 2300 A is guaranteed with natural ventilation. The rated uninterrupted current of 2500 A is guaranteed with forced ventilation.

4. Overall dimensions

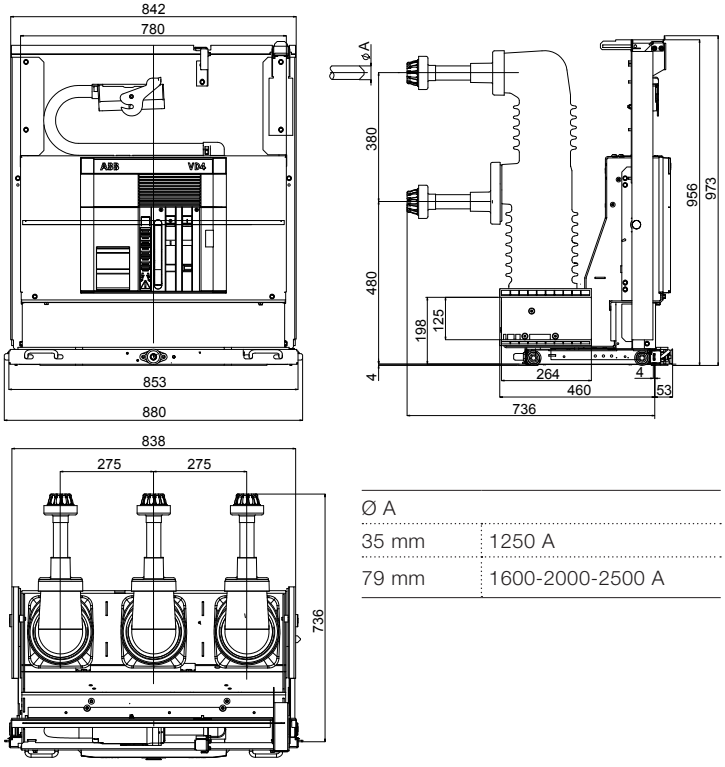
Withdrawable circuit-breakers for UniGear ZS1 switchgear

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



Withdrawable circuit-breakers for UniGear ZS2 switchgear

VD4/W		
TN	1VYN300901-KG	
Ur	36	kV
Ir	1250	A
	1600	A
	2000	A
	2500	A (*)
Isc	20	kA
	25	kA
	31.5	kA

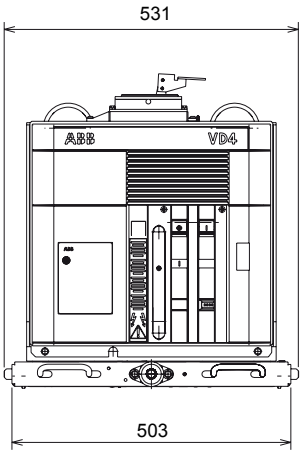


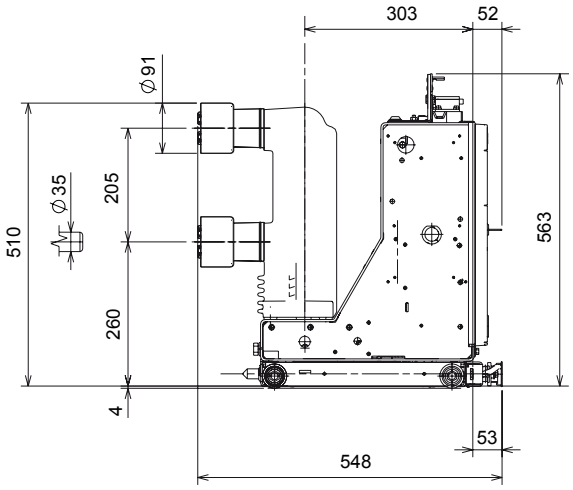
Ø A	
35 mm	1250 A
79 mm	1600-2000-2500 A

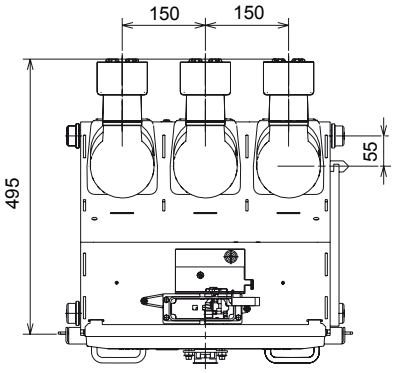
(*) The rated uninterrupted current of 2500 A is guaranteed with forced ventilation.

Withdrawable circuit-breakers for ZS8.4 switchgear

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



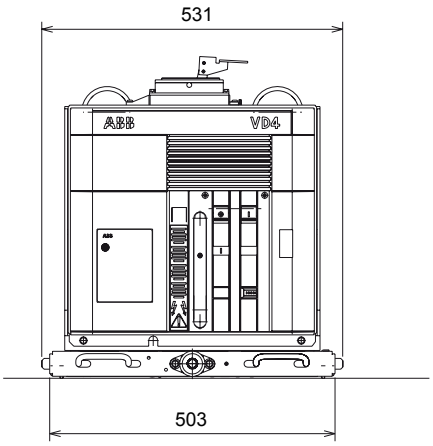


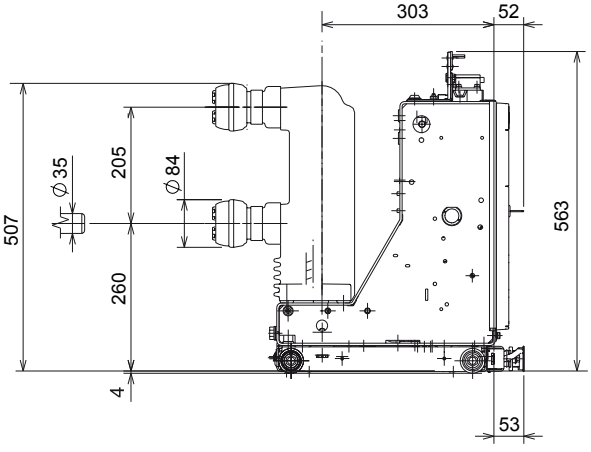


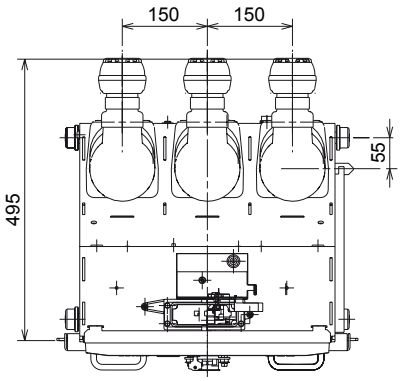
Withdrawable circuit-breakers for ZS8.4 switchgear

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



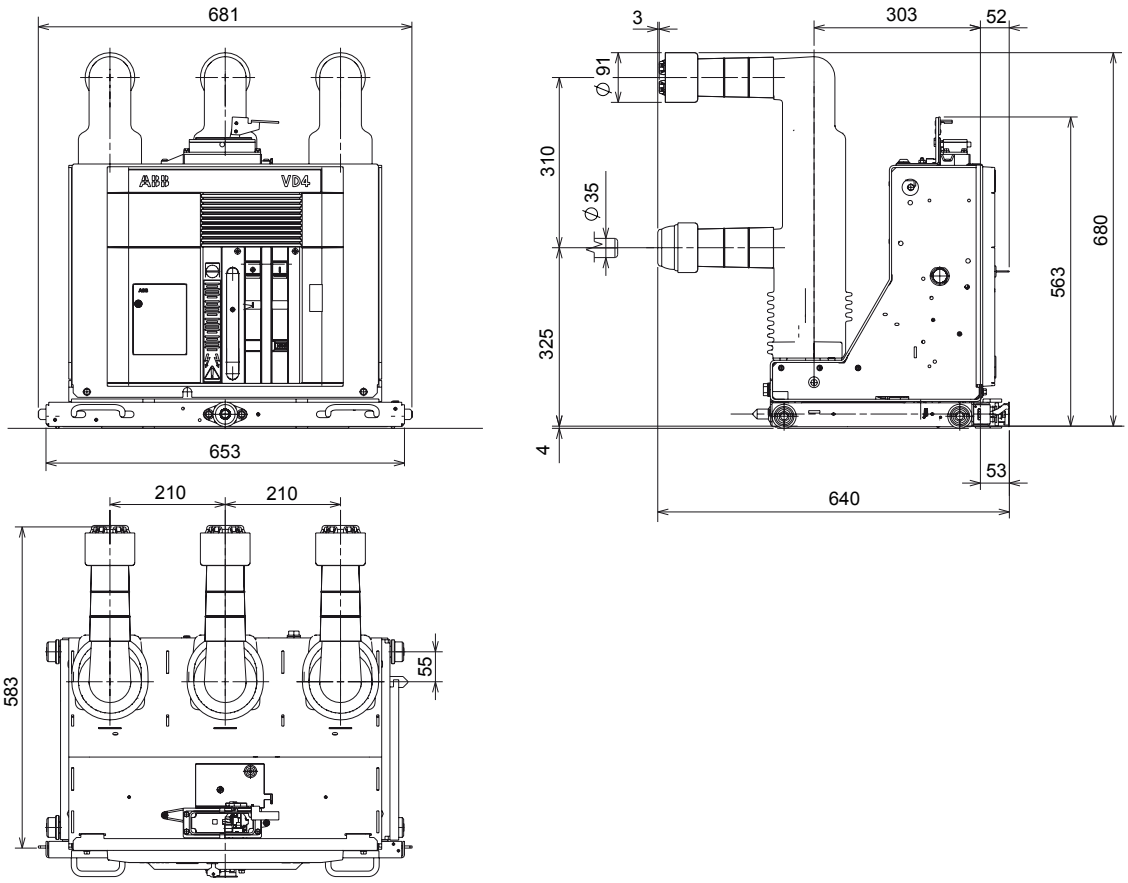




4. Overall dimensions

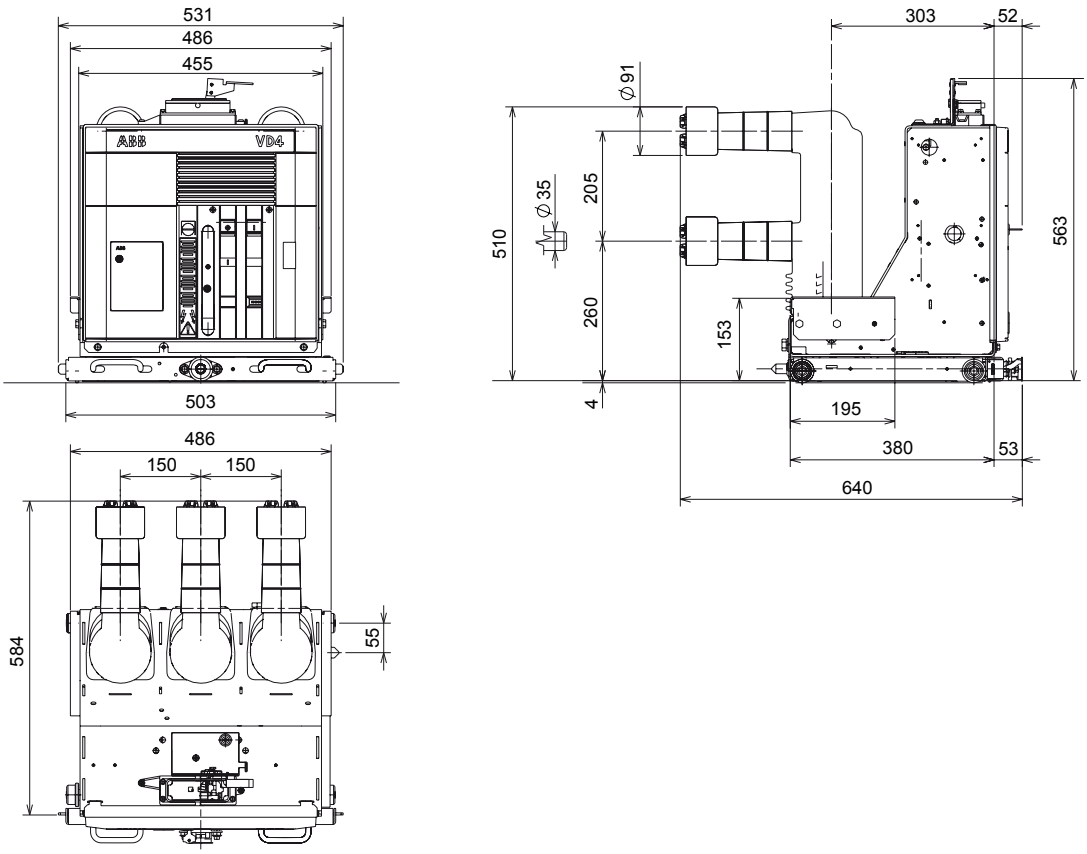
Withdrawable circuit-breakers for ZS8.4 switchgear

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



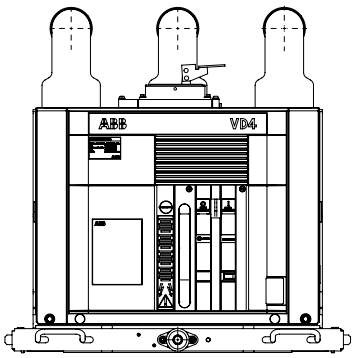
Withdrawable circuit-breakers for ZS8.4 switchgear

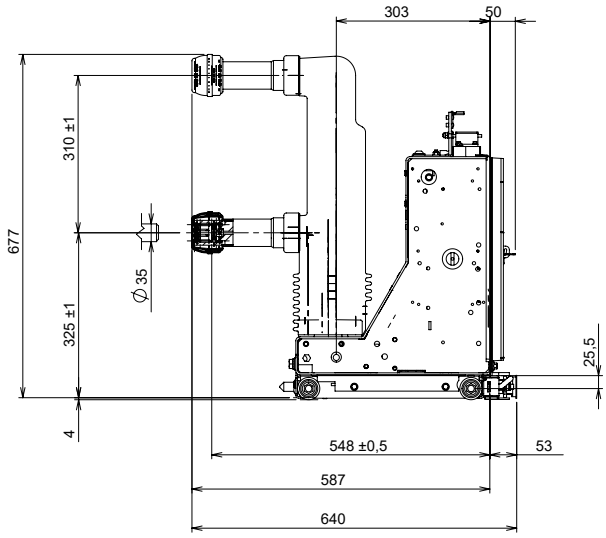
VD4/ZT8		
TN	1VCD000093	
Ur	12	kV
Ir	630	A
Isc	20	kA
	25	kA

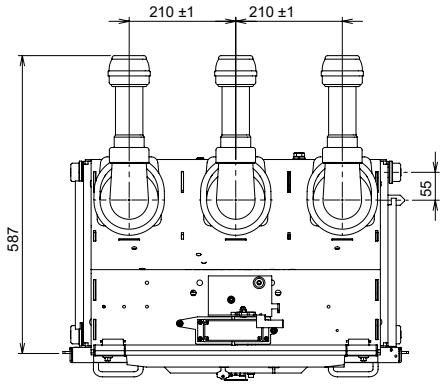


Withdrawable circuit-breakers for ZS8.4 switchgear

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



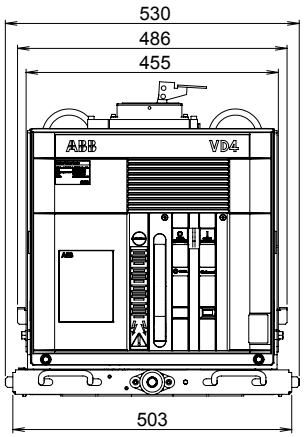


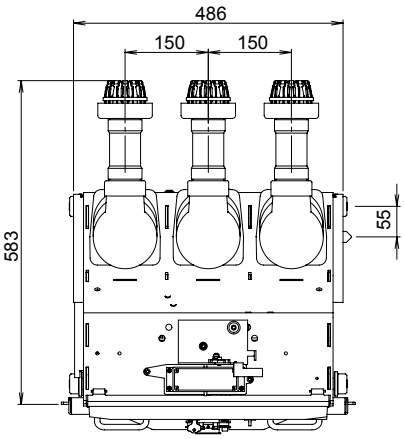


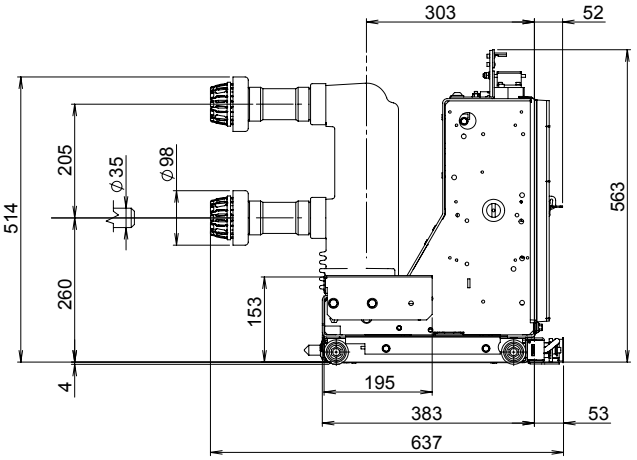
Withdrawable circuit-breakers for ZS8.4 switchgear

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



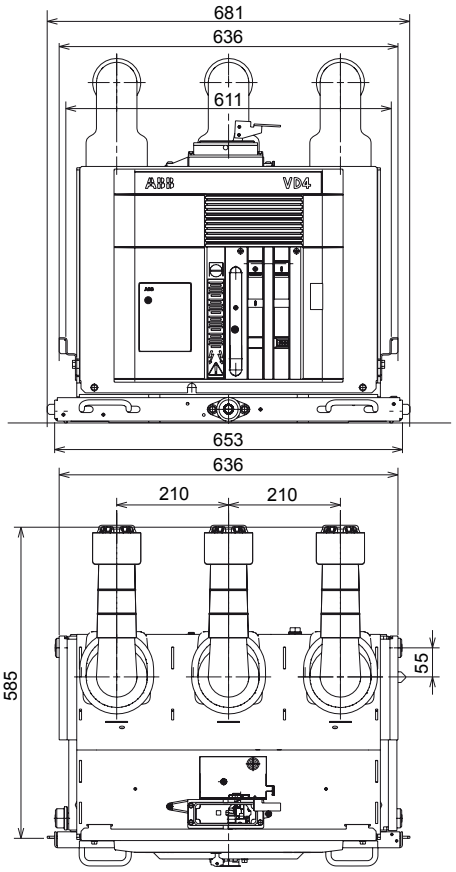


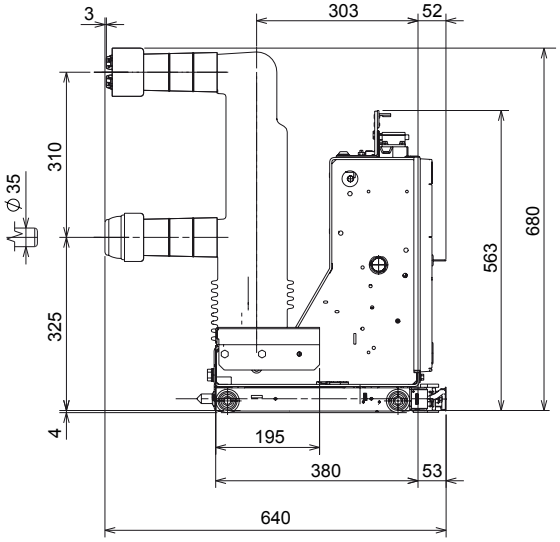


4. Overall dimensions

Withdrawable circuit-breakers for ZS8.4 switchgear

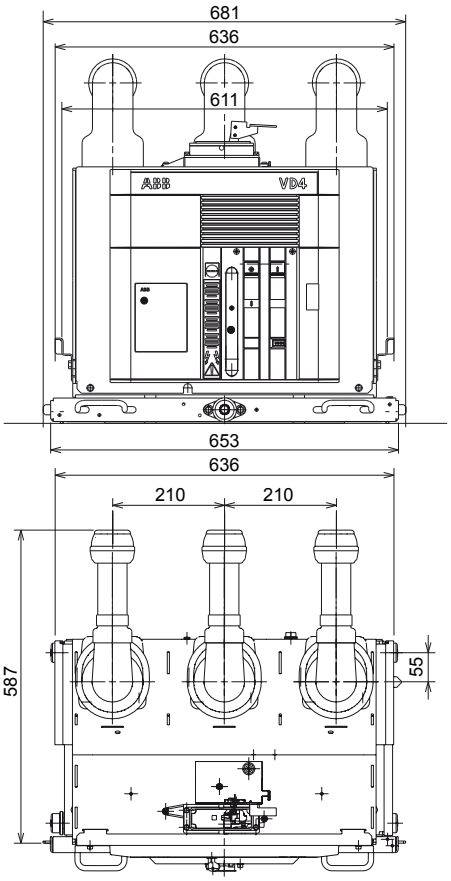
VD4/ZT8		
TN	1VCD000090	
Ur	24	kV
Ir	630	A
Isc	16	kA
	20	kA
	25	kA

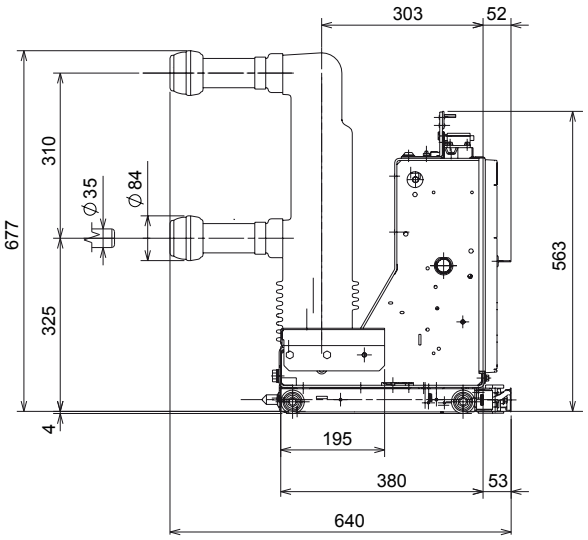




Withdrawable circuit-breakers for ZS8.4 switchgear

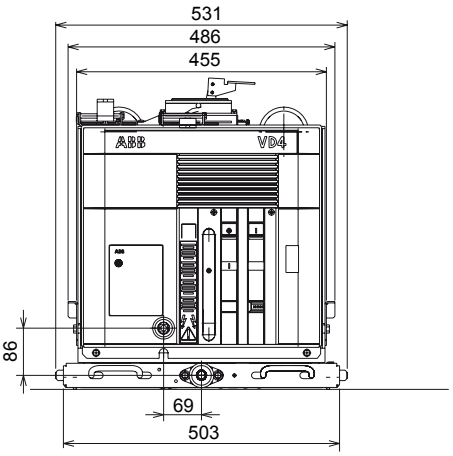
VD4/ZT8		
TN	1VCD000136	
Ur	24	kV
Ir	1250	A
Isc	16	kA
	20	kA
	25	kA

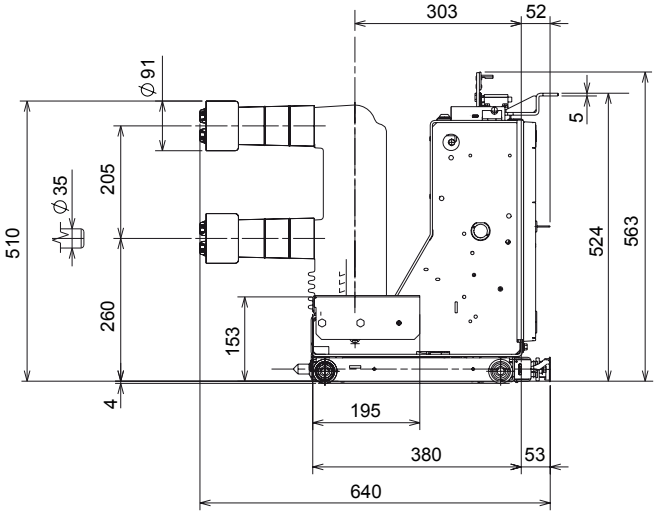


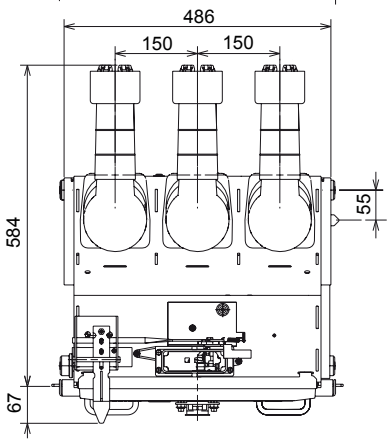


Withdrawable circuit-breakers for ZS8.4 switchgear

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

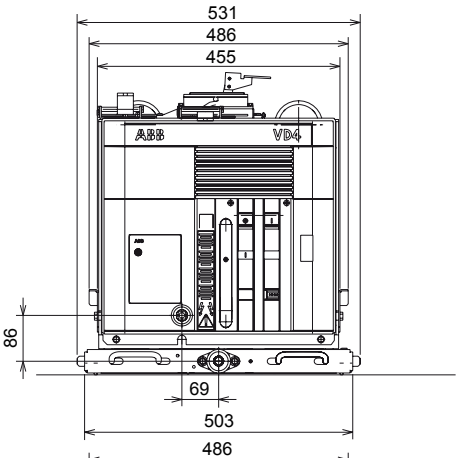


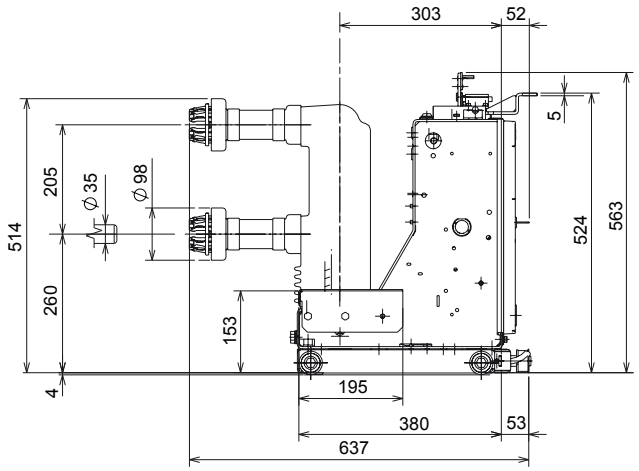


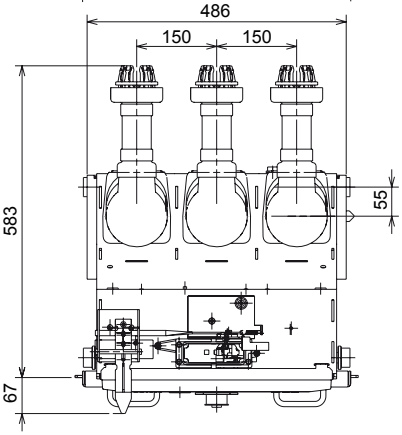


Withdrawable circuit-breakers for ZS8.4 switchgear

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



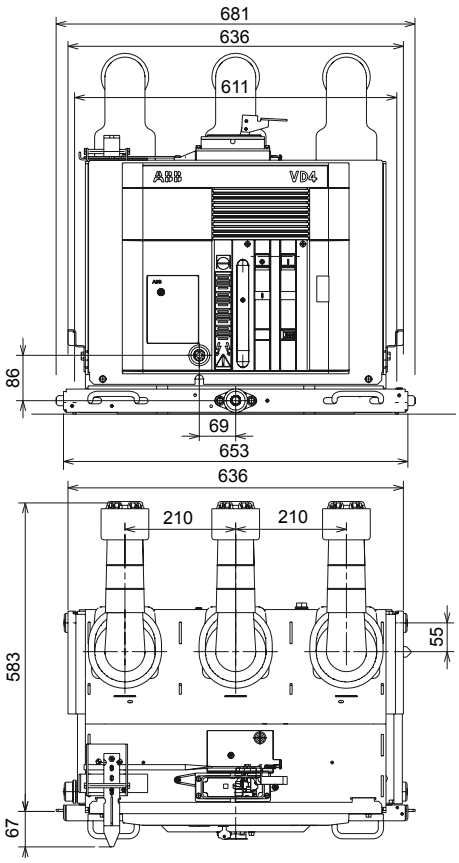


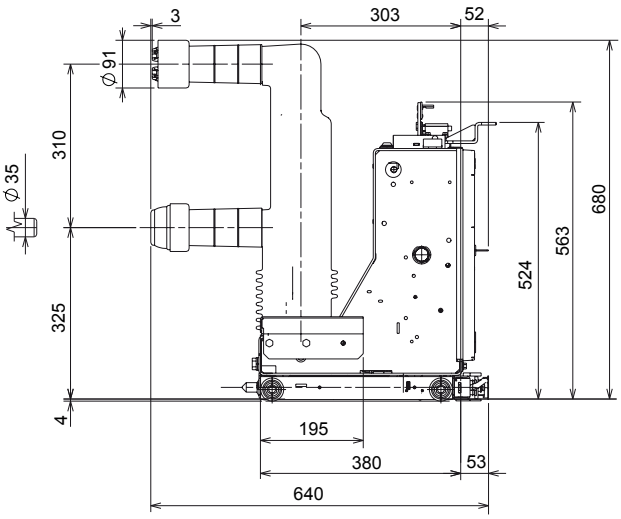


4. Overall dimensions

Withdrawable circuit-breakers for ZS8.4 switchgear

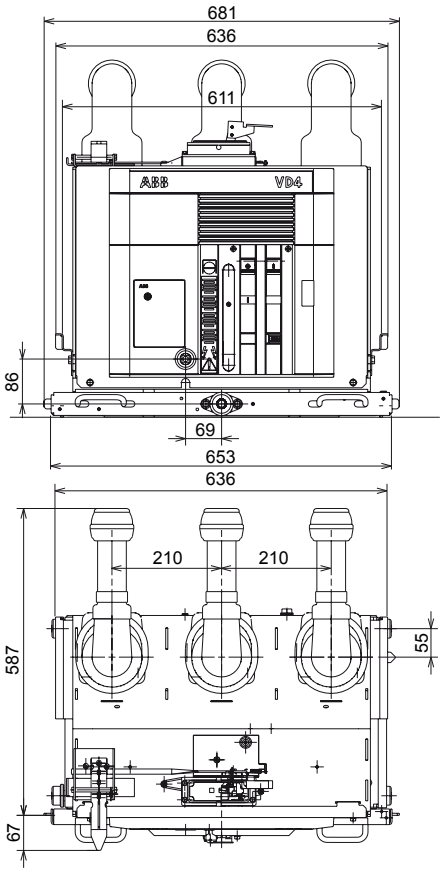
VD4/ZS8		
TN	1VCD000088	
Ur	24	kV
Ir	630	A
	16	kA
Isc	20	kA
	25	kA

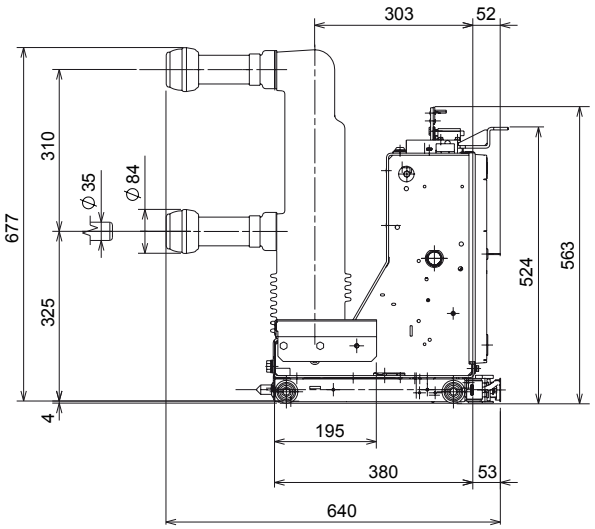




Withdrawable circuit-breakers for ZS8.4 switchgear

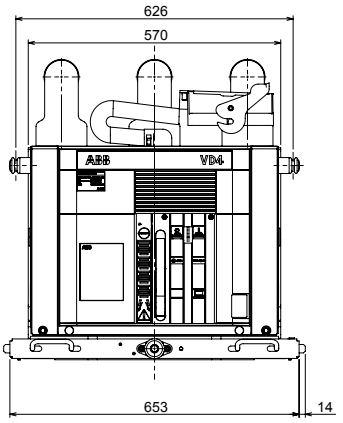
VD4/ZS8		
TN	1VCD000135	
Ur	24	kV
Ir	1250	A
	16	kA
Isc	20	kA
	25	kA

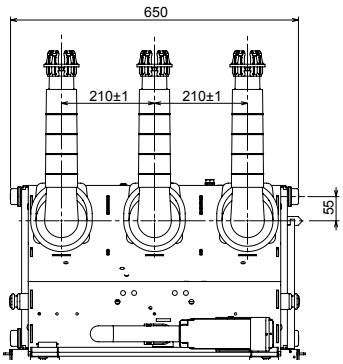


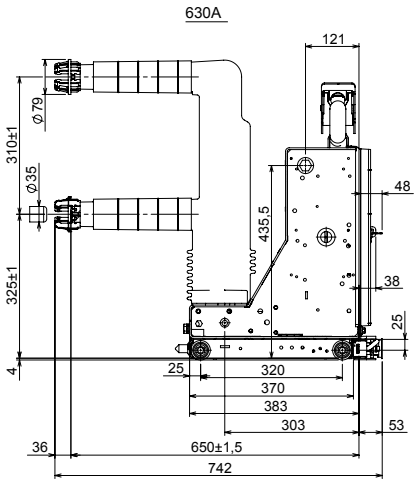


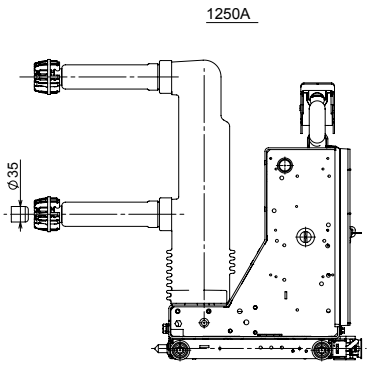
Withdrawable circuit-breakers for UniSwitch (CBW) and UniMix (P1/E) switchgear

VD4/US		
TN	1VCD000047	
Ur	24	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA



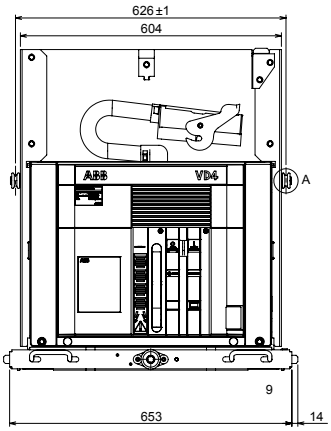


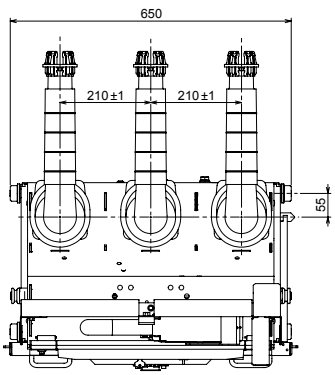


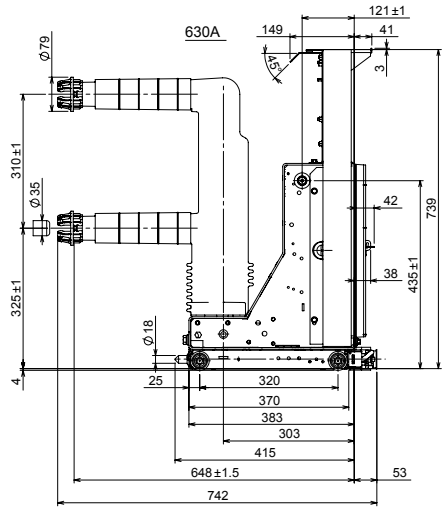


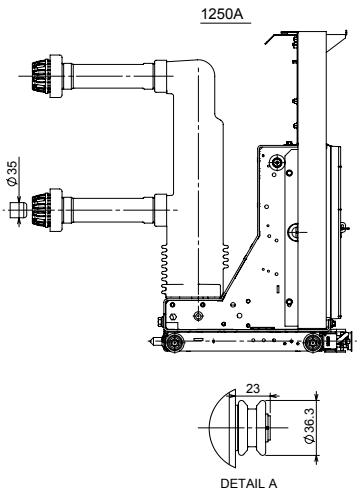
Withdrawable circuit-breakers for UniSec (WBC e WBS) switchgear

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









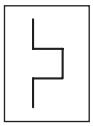
5. Electric circuit diagram

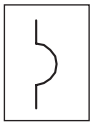
State of operation represented

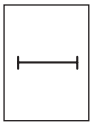
The diagrams shows the following conditions:

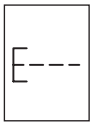
– Circuit-breaker open and connected (only withdrawable circuit-breaker)
– Circuits de-energized
– Closing springs discharged

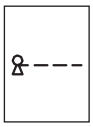
Graphical symbols for electric diagrams


Thermal effect

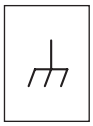

Electromagnetic effect

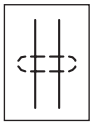

Timing

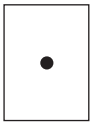

Pushbutton control

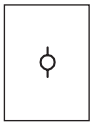

Key control

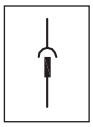

Earth (general symbol)

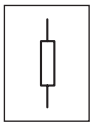

Mass, frame

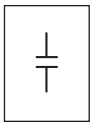

Conductors in shielded cable (two conductors shown)

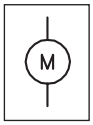

Connection of conductors


Terminal or clamp


Socket and plug (female and male)

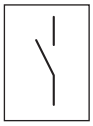

Resistor (general symbol)

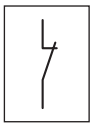

Capacitor (general symbol)

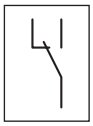


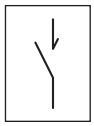
Motor (general symbol)

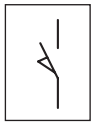

Rectifier with two half-waves (bridge)


Make contact


Break contact

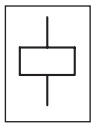

Change-over break before make contact

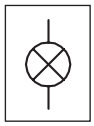

Passing make contact closing momentarily during release


Closing position contact (limit switch)


Opening position contact (limit switch)

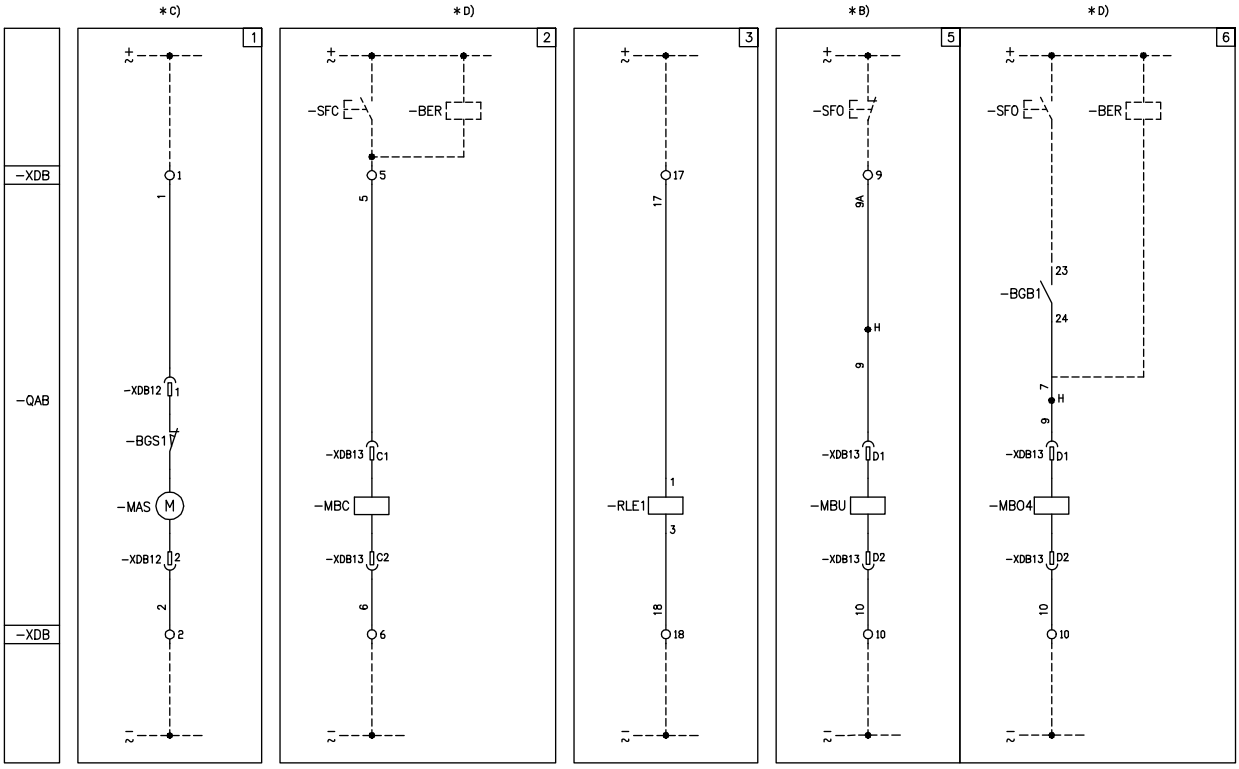

Power circuit-breaker with automatic opening

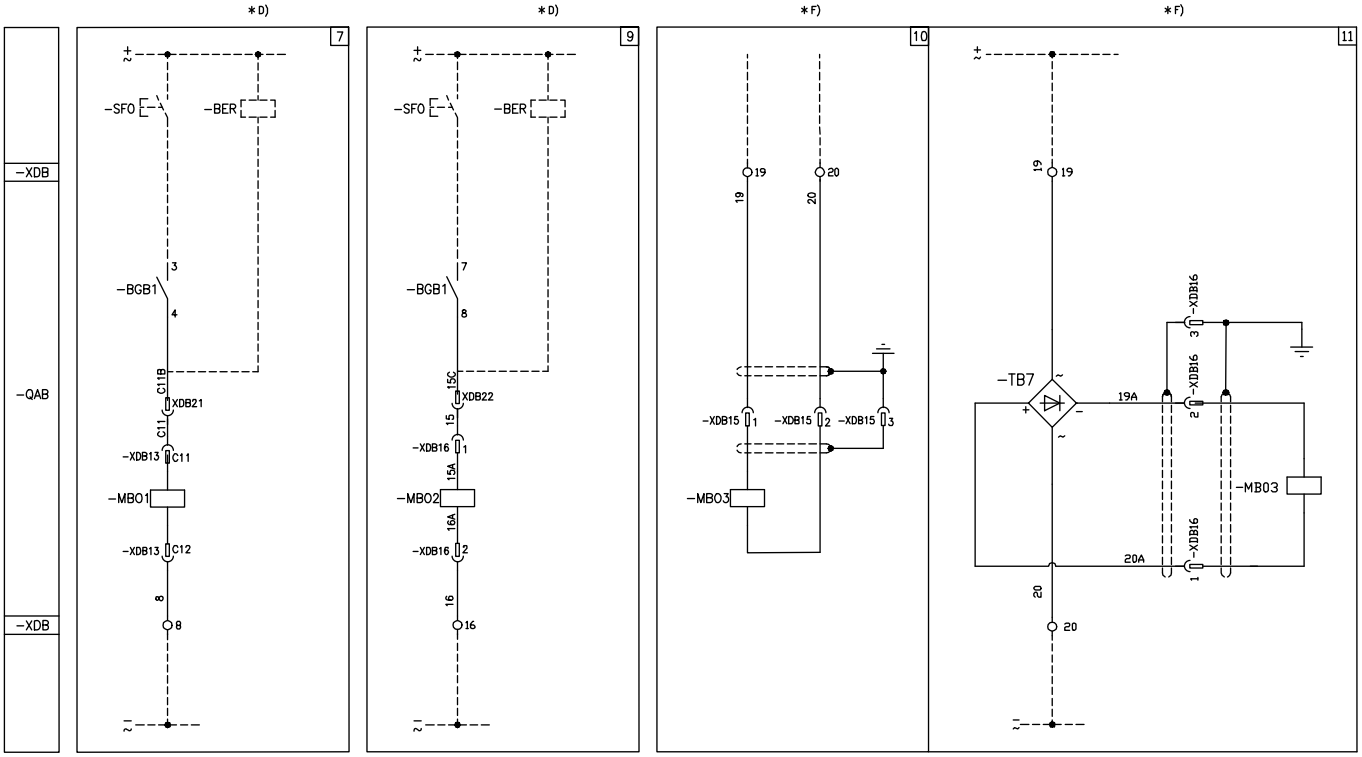

Control coil (general symbol)


Lamp (general symbol)

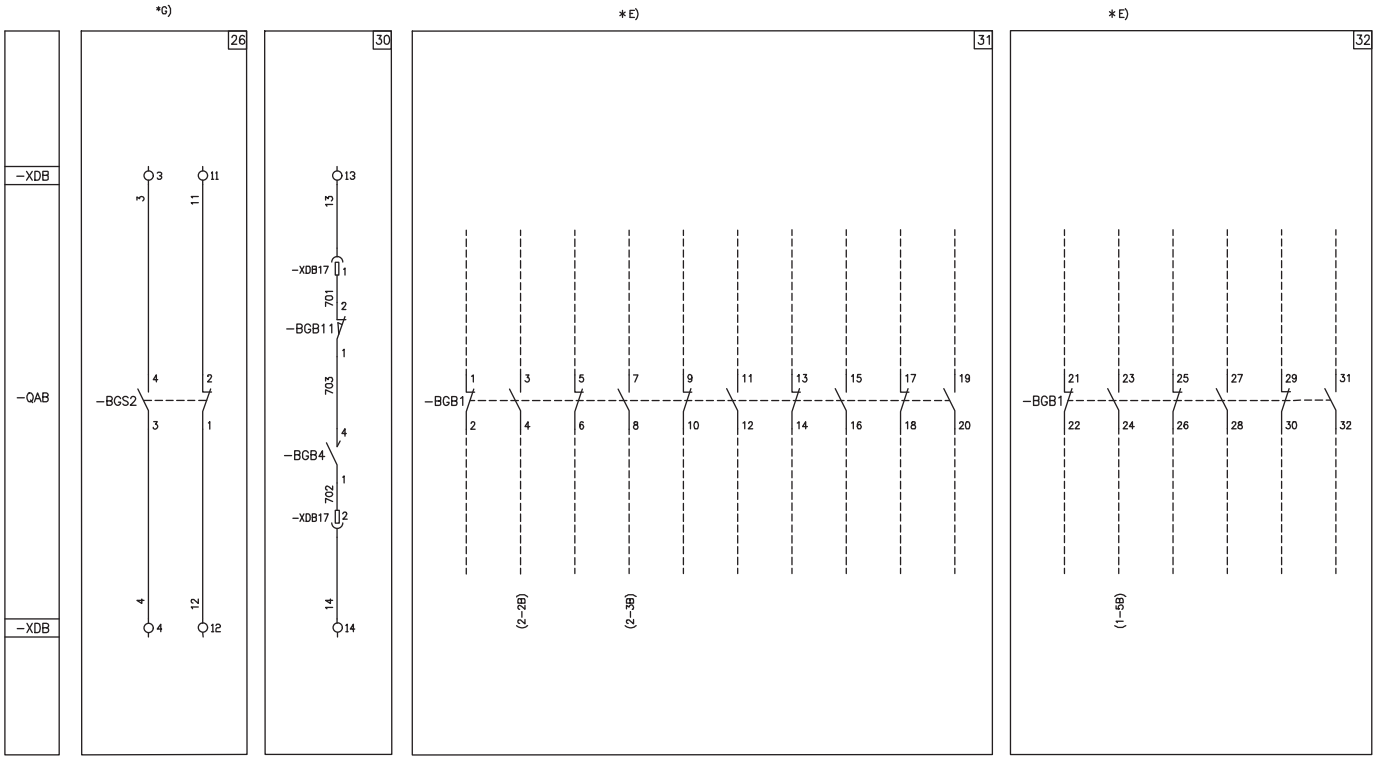
Electric circuit diagram of fixed circuit-breakers 12 .. 24 kV 1VCD 400046

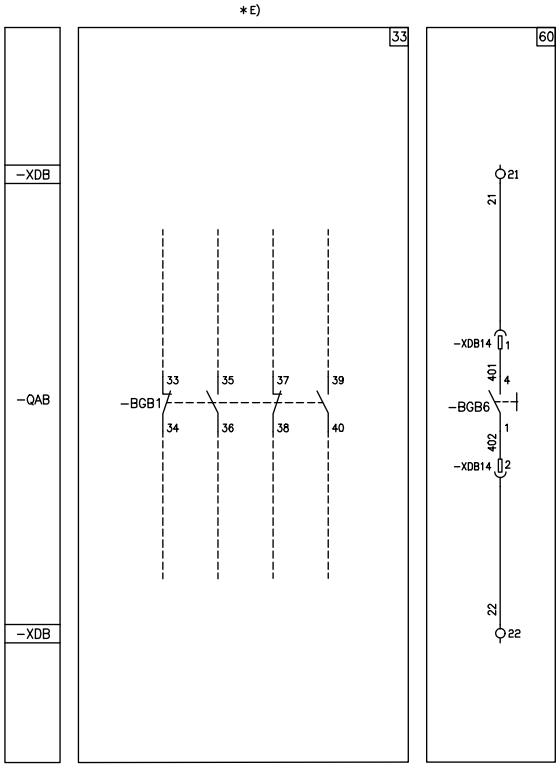
The electric circuit diagram given in this section regards the fixed circuit-breakers 12 .. 24 kV.

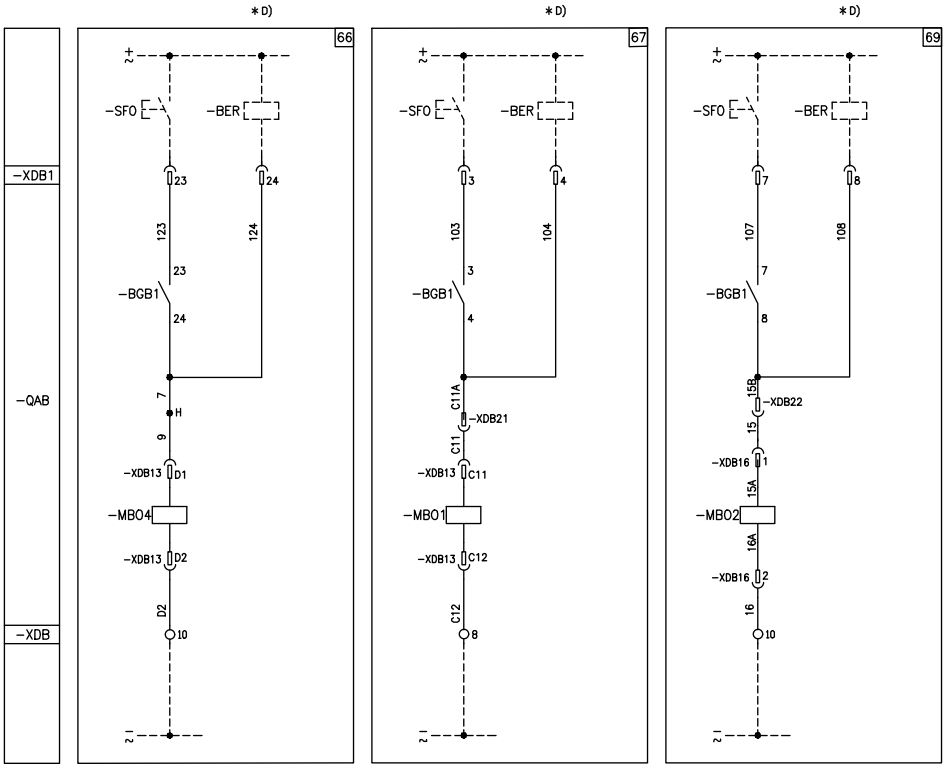


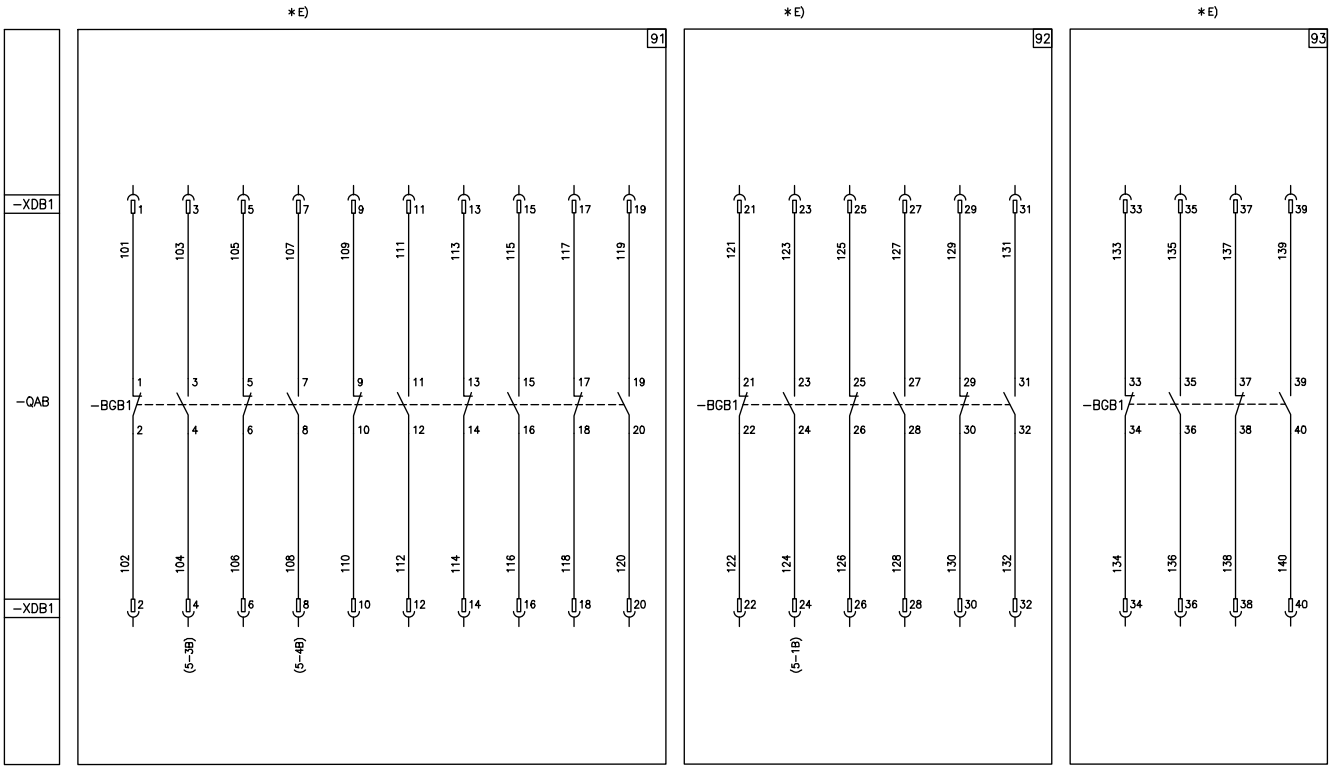


5. Electric circuit diagram






*D)
66
67
69
-XDB1
-QAB
-XDB
-SF0
-BER
-BGB1
-XDB13
-MBO4
-MBO1
-MBO2
-XDB21
-XDB22
-XDB16
C11A
C11
C12
D1
D2
H
15B
15A
16A


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

5. Electric circuit diagram

Caption

☐	=	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 signalling 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 signalling 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 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, 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 signalling 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 catalogue 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 operated 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 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 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.

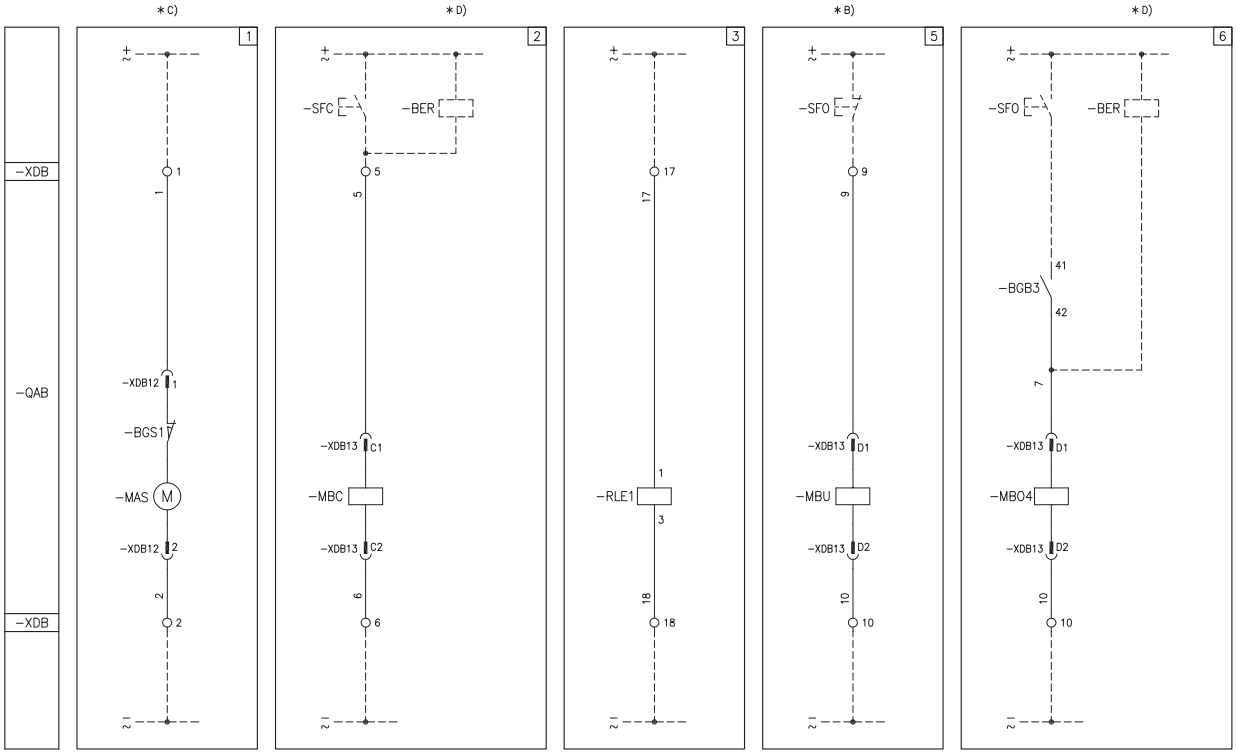
F) Figs. 10 and 11 are only available for VD4 up to 31.5 kA.

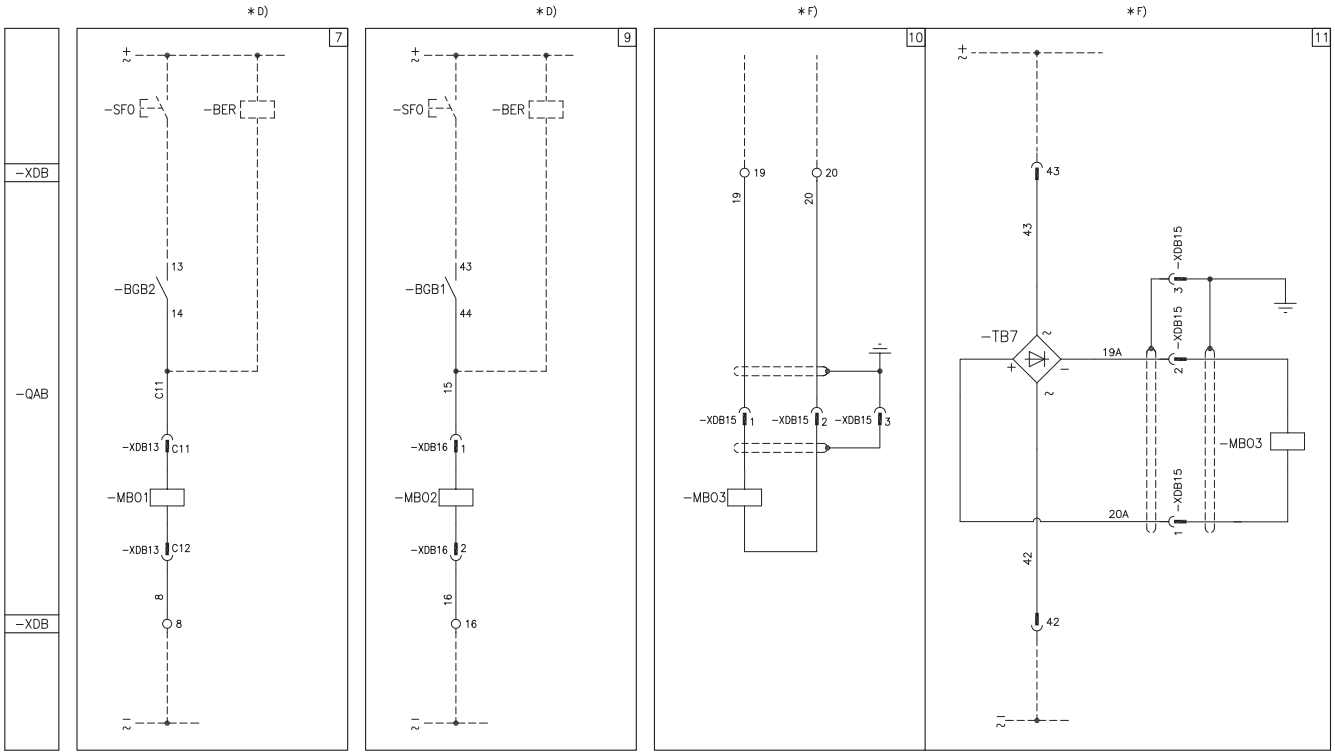
G) The energizing voltage must be the same for both signals.

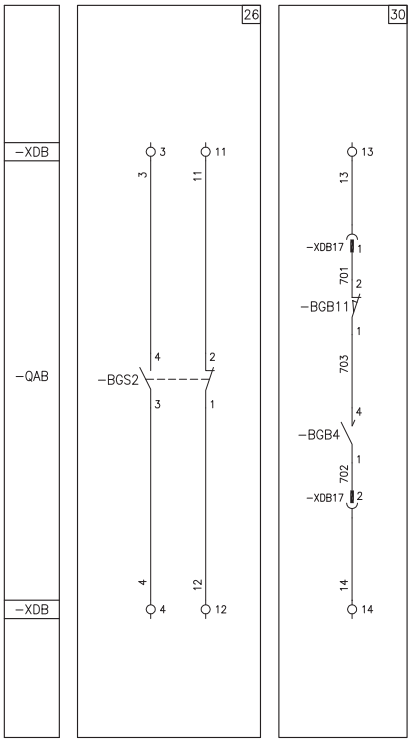
5. Electric circuit diagram

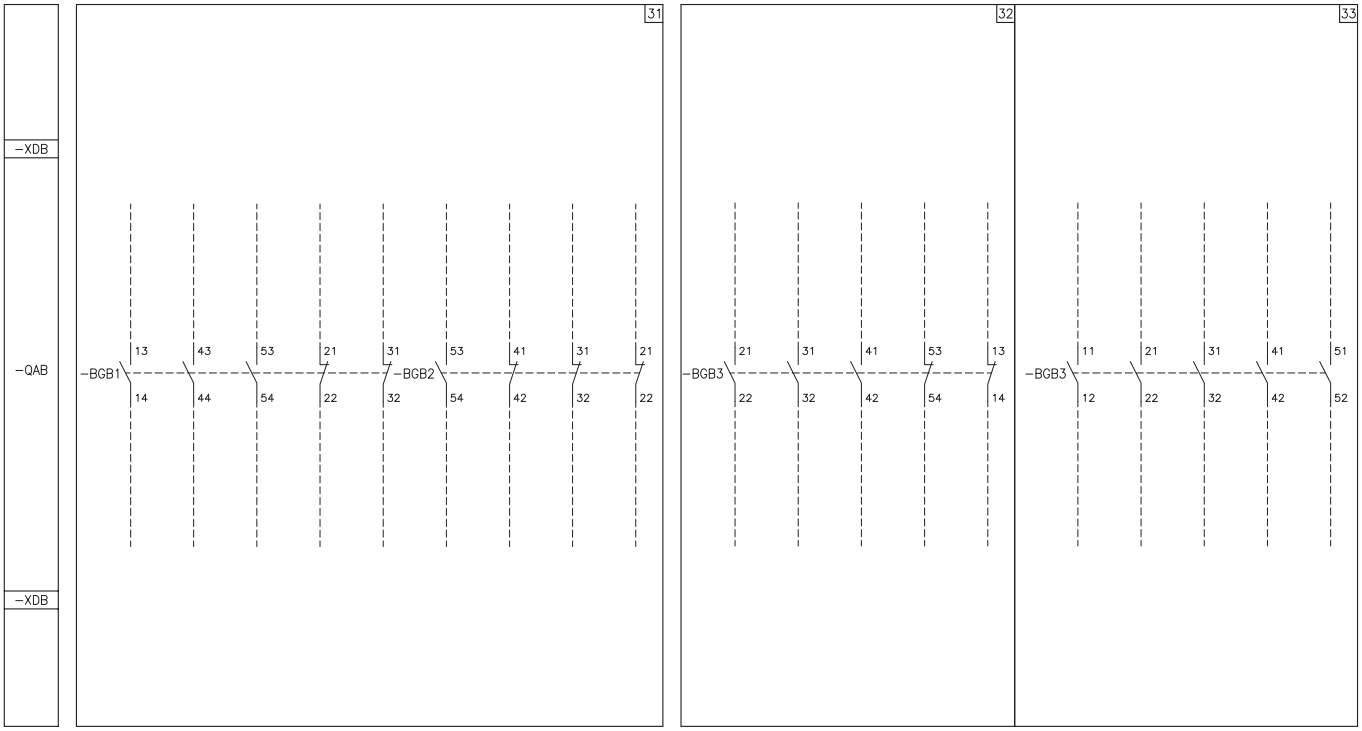
Electric circuit diagram of fixed circuit-breakers 36 kV 1VCD 400236

The electric circuit diagram given in this section regards the fixed circuit-breakers 36 **kA.**

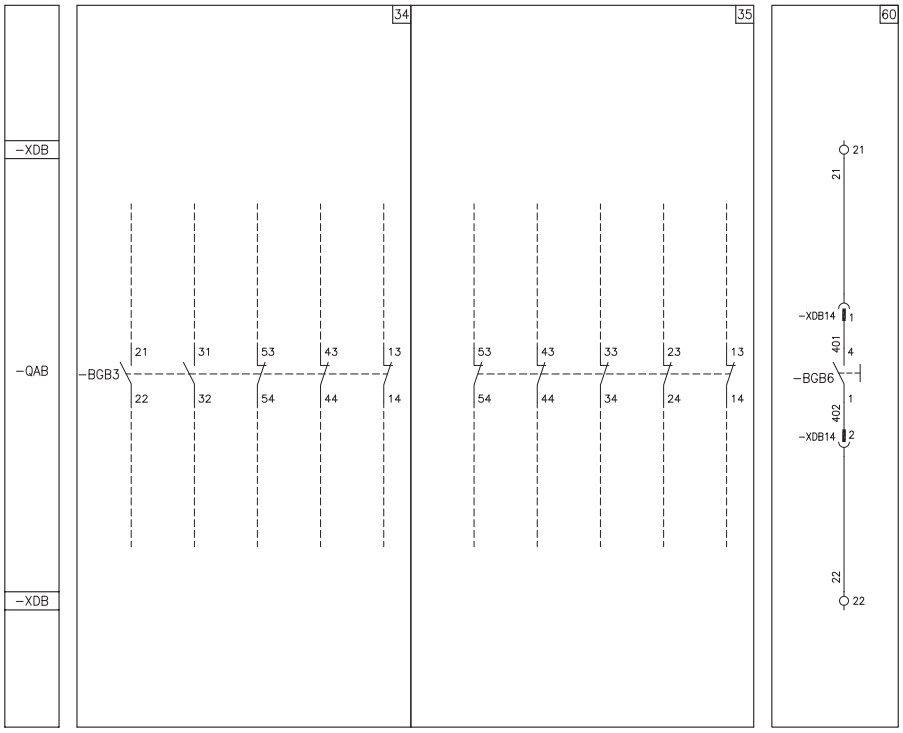


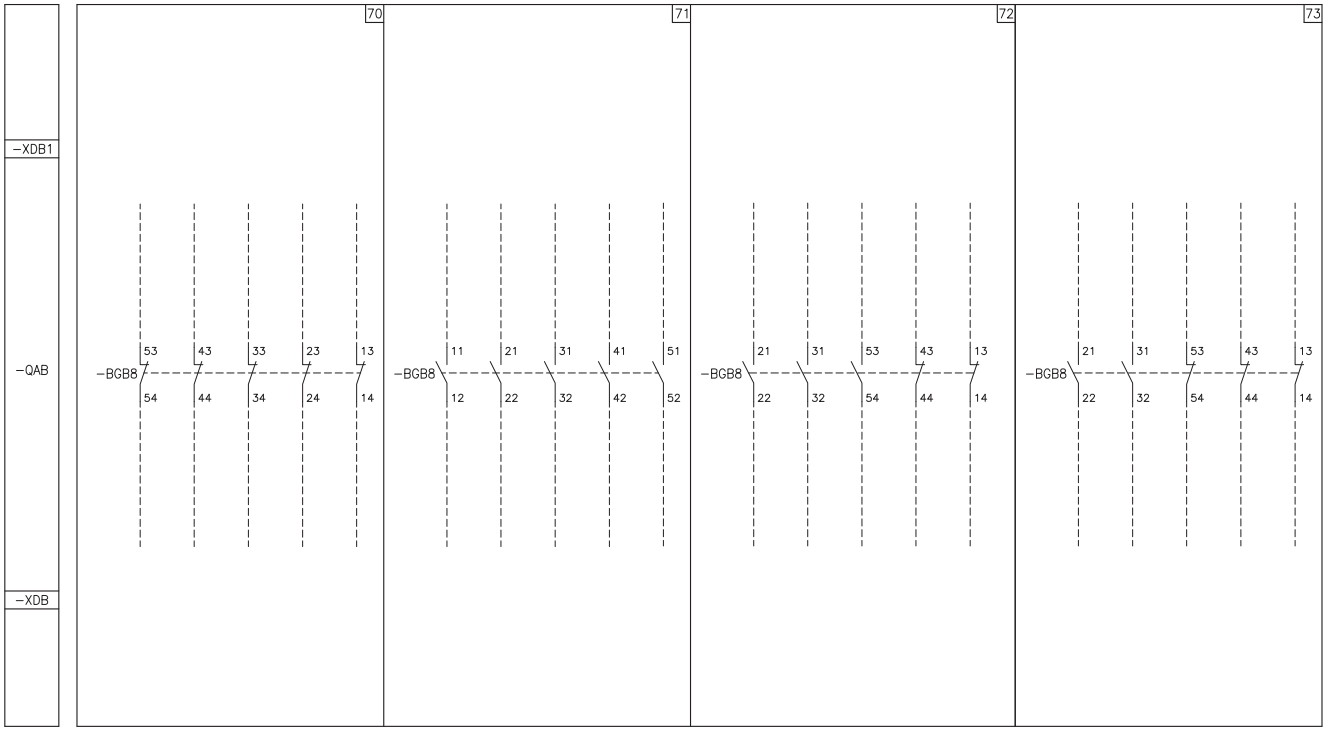



26
30
-XDB
-QAB
-XDB
-BGS2
-XDB17
-BGB11
-BGB4
-XDB17
701
702
703


31
32
33
-XDB
-QAB
-XDB
-BGB1
-BGB2
-BGB3
-BGB3

5. Electric circuit diagram





Caption

□ = Figure number of the diagram.
* = See note indicated by the letter.
-BER = SOR Test Unit device for monitoring the continuity of the shunt opening and closing release winding (see note D)
-BGB1, 2, 3, 8 = Auxiliary contacts of circuit-breaker.
-BGB4 = Auxiliary let-through contact of circuit-breaker with momentary closing during circuit-breaker opening.
-BGB6 = Contact for electrical signalling 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 signalling 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.
-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).
-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, ... ,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 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. 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 = Available auxiliary contacts of circuit-breaker.
Fig. 32, ..., 35 = Available auxiliary contacts of circuit-breaker.
Fig. 60 = Contact for electrical signalling of undervoltage release de-energized.
Fig. 70, ..., 73 = Available auxiliary contacts of circuit-breaker.

5. Electric circuit diagram

Incompatibility

The circuits indicated in the following figures cannot be supplied at the same time in the same circuit-breaker:

5-6 10-11 32-33-34-35 70-71 -72-73

Notes

A) Circuit-breaker is equipped solely with the applications specified in the order confirmation. Consult this catalogue 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.

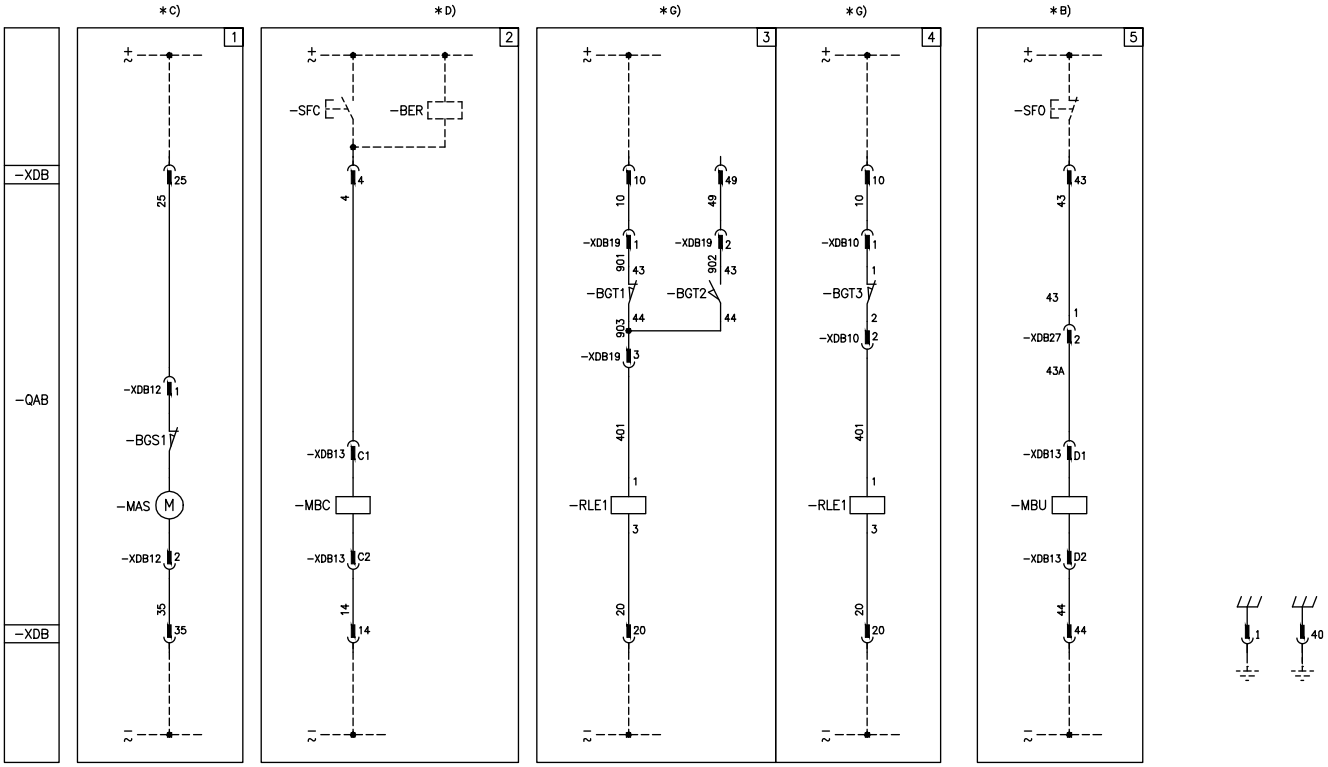
C) Check power of auxiliary circuit to find out whether several motors for loading the closing springs can be operated at the same time. To prevent excessive power draw, springs must be loaded by hand before auxiliary circuit is powered.

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.

E) When fig. 6 is required, contact -BGB3 (41-42) of fig. 32-33 is not available and fig. 34-35 cannot be supplied.
When fig. 9 is required, contact -BGB1 (43-44) of fig. 31 is not available.

F) Only available for 31.5 kA.

Electric circuit diagram of withdrawable circuit-breakers for UniGear switchgear and PowerCube enclosure 12 .. 24 kV 1VCD 400155

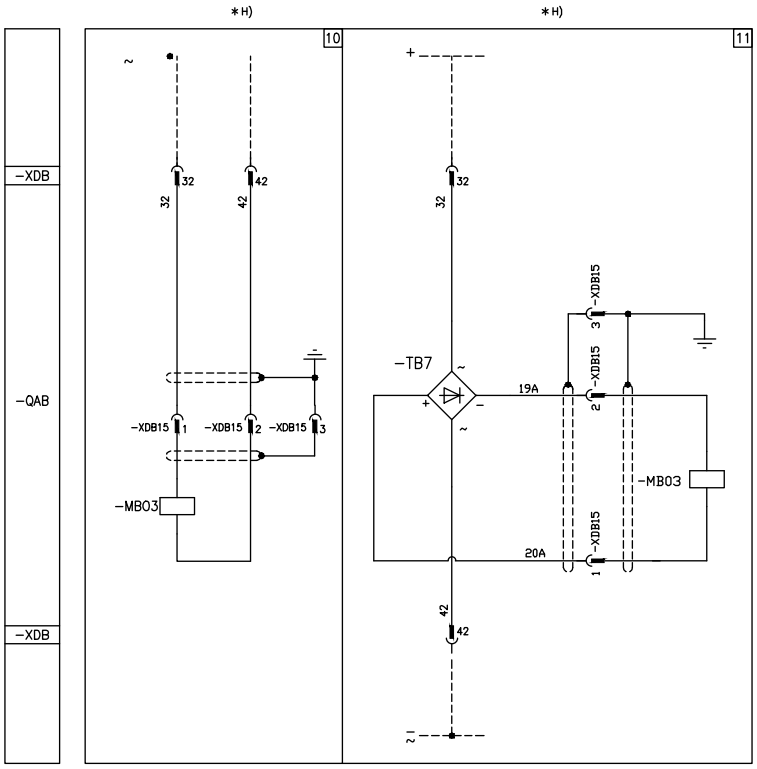


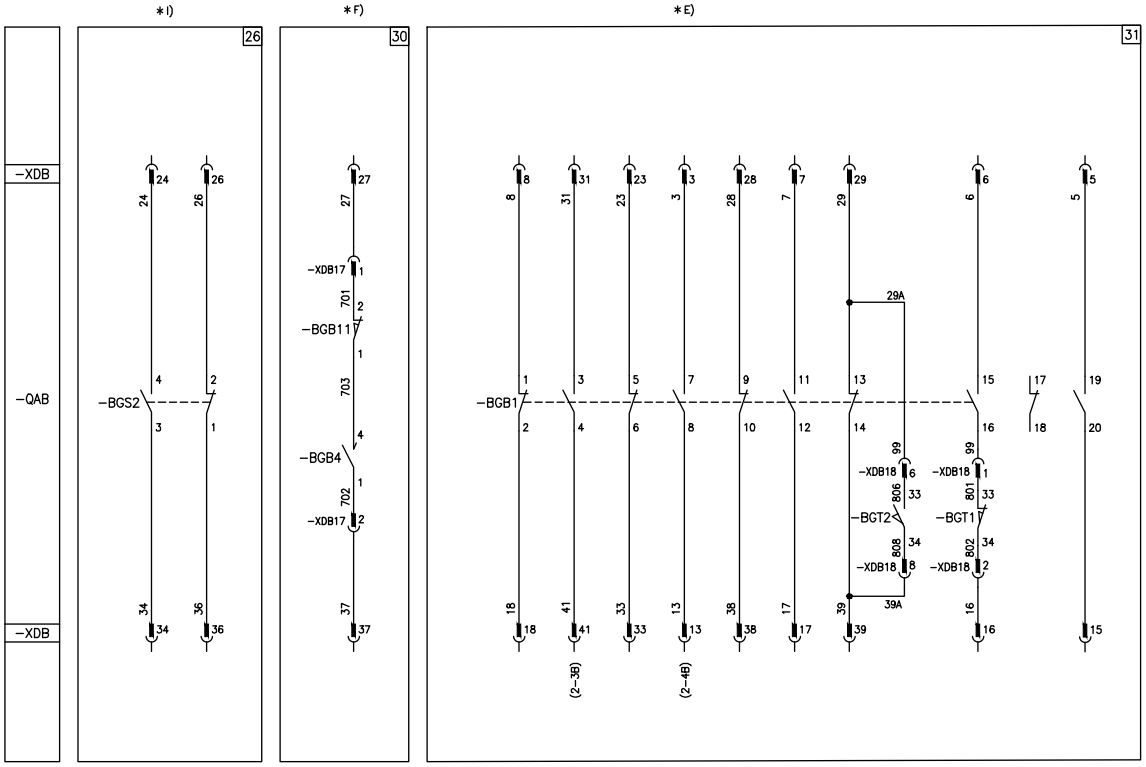
5. Electric circuit diagram

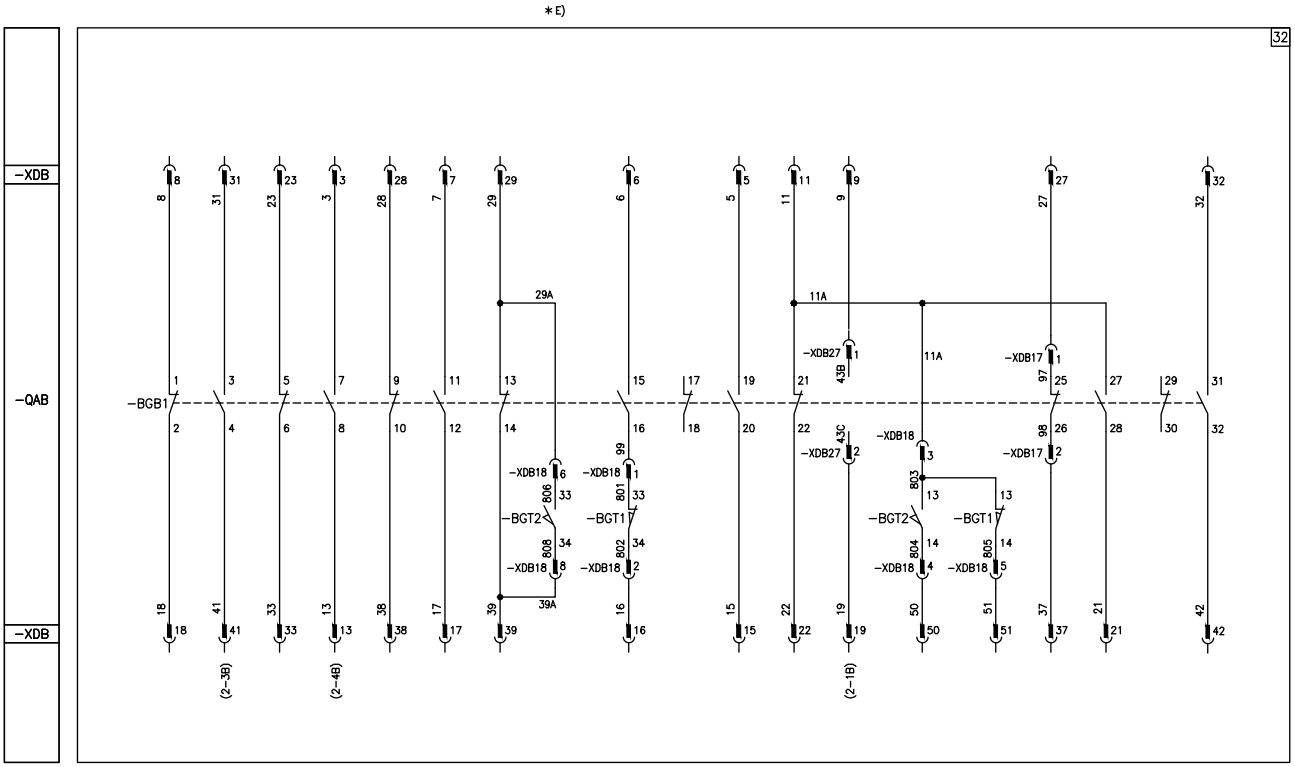
The electric circuit diagram given in this section regards the withdrawable circuit-breakers for UniGear switchgear and PowerCube 12 .. 24 kV enclosures; for withdrawable circuit-breakers with motorized truck, see diagram 1VCD400156.

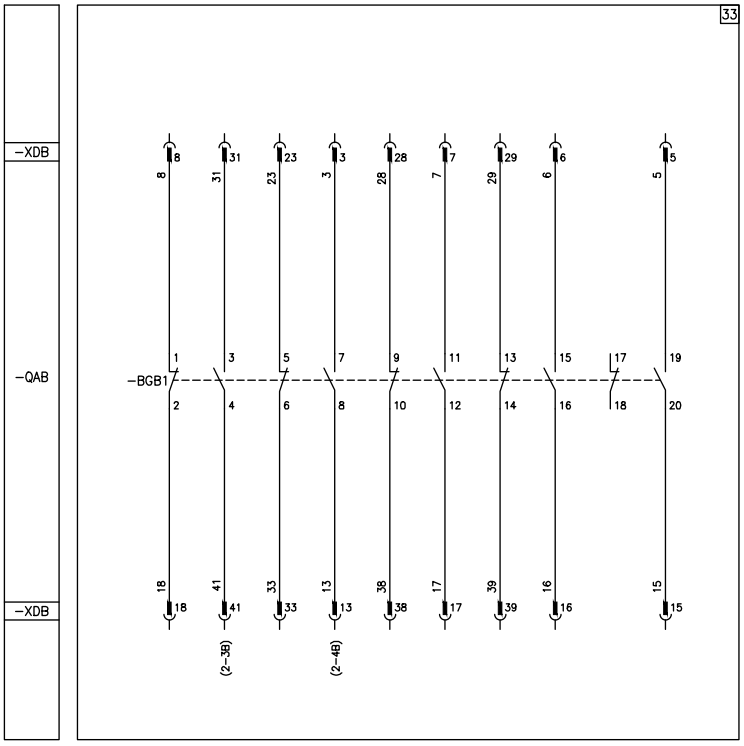
For circuit-breaker of ZS8.4 switchgears the following diagrams are available:

1VCD400158 Standard version
1VCD400159 Version with motorized truck.

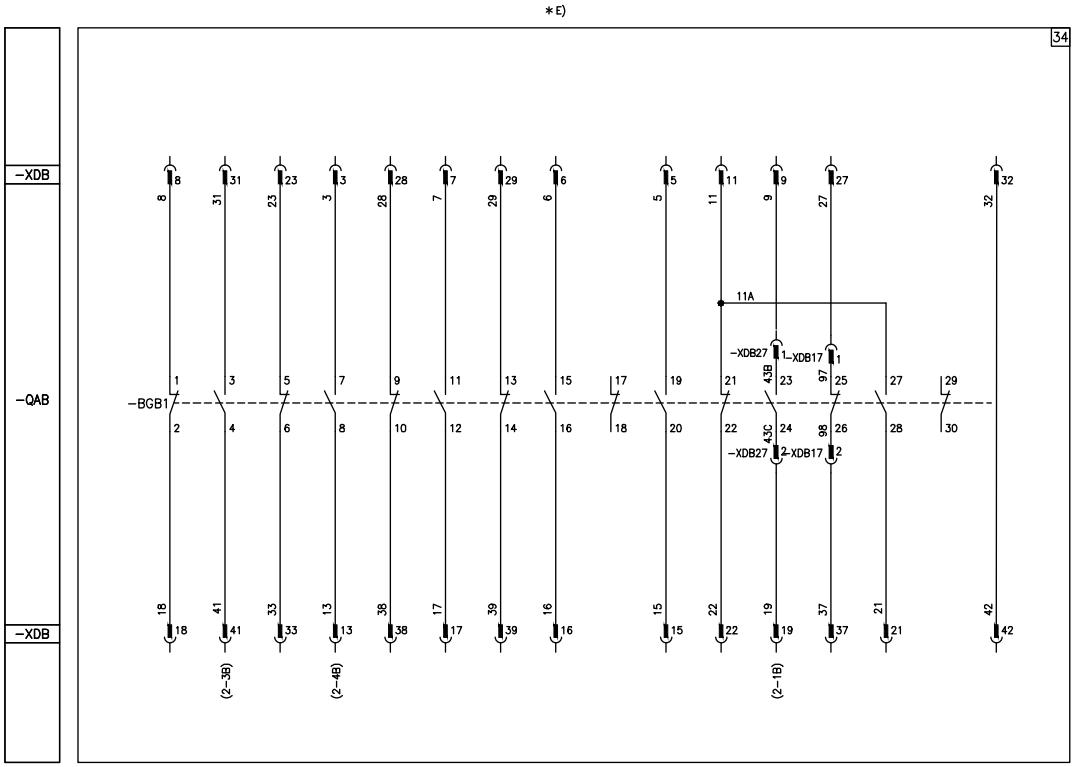


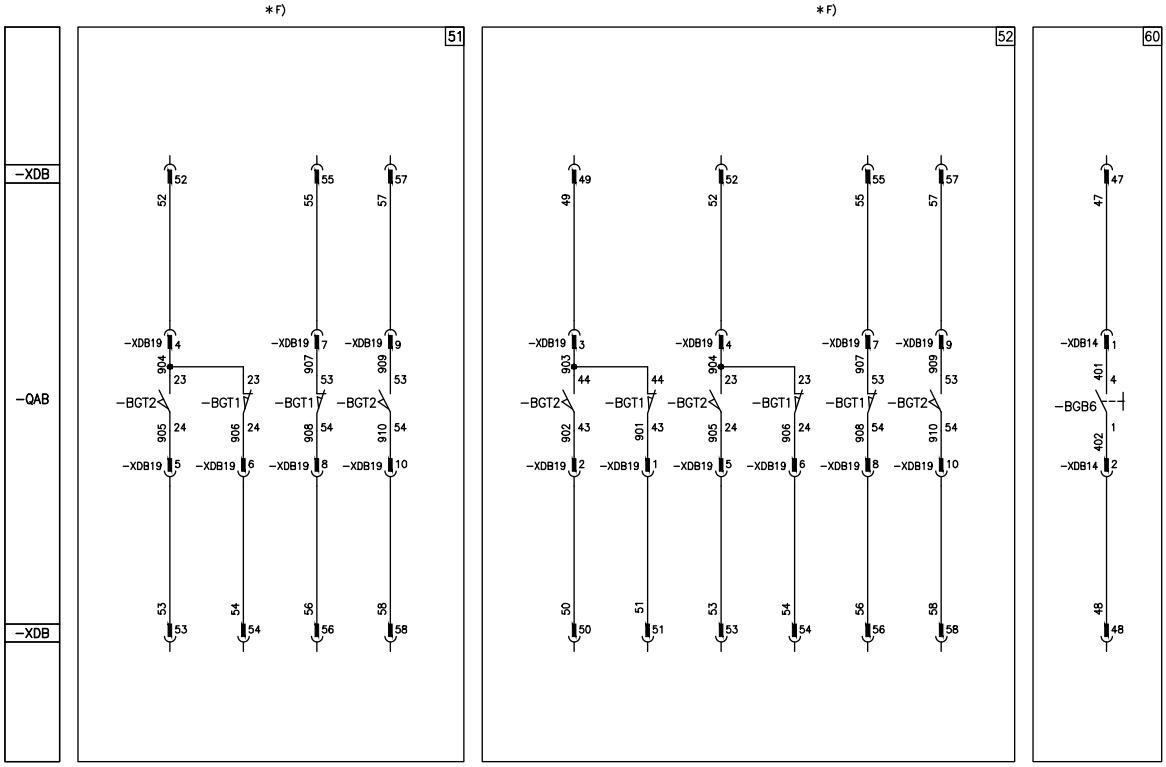



*E)
32
-XDB
-QAB
-XDB
-BGB1
-BGT2
-BGT1
-XDB18
-XDB27
-XDB17
29A
39A
11A
43B
43C
803
806
801
808
802
804
805
(2-3B)
(2-4B)
(2-1B)


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

5. Electric circuit diagram





Caption

□ = 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 signalling 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 signalling closing springs loaded-discharged.
-BGT1 = Electrical signalling contacts for circuit-breaker in racked-in position (see note F)
-BGT2 = Electrical signalling 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 = 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 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 = 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 -RL1 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 -RL1 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.

5. Electric circuit diagram

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 signalling 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 signalling 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 signalling of undervoltage release de-energized.

Incompatibility

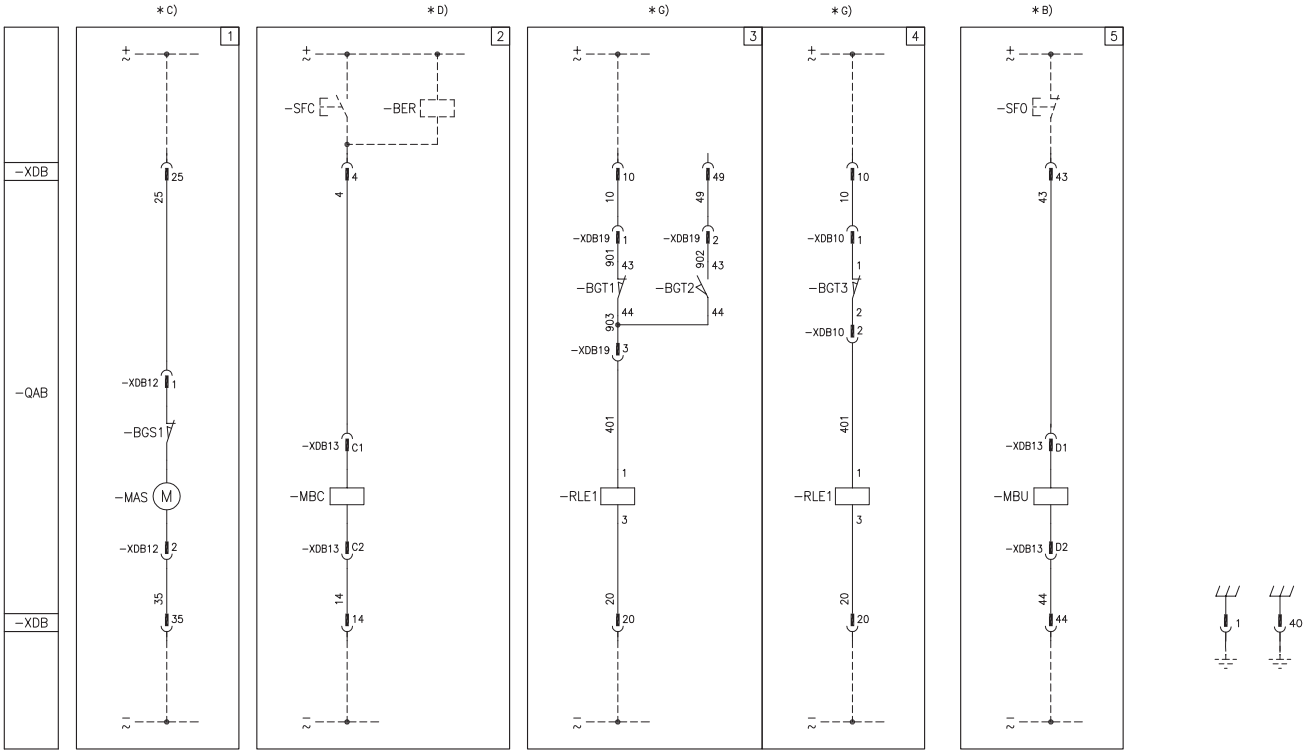
The circuits indicated in the following figures cannot be supplied at the same time in the same circuit-breaker:

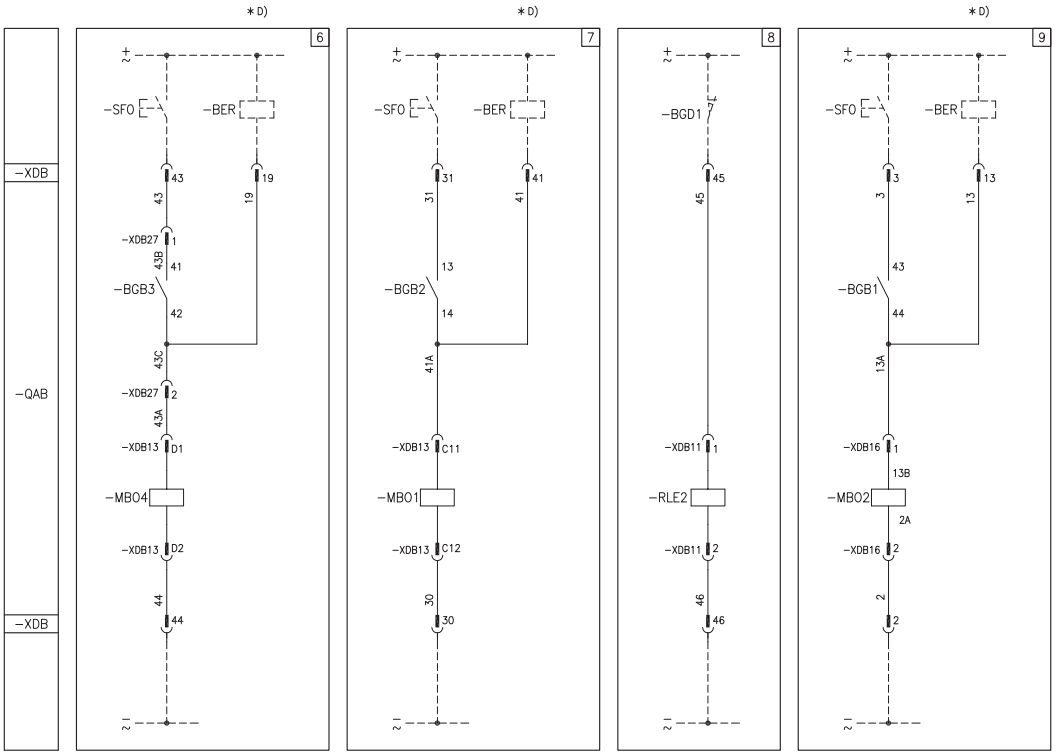
3-4	3-33-34	4-31-32	5-6	10-11
31-32-33-34	31-32-52	33-34-51	51-52	

Notes

A) Circuit-breaker is equipped solely with the applications specified in the order confirmation. Consult this catalogue 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 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 signalling 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 withdrawable circuit-breakers 36 kV 1VCD 400237

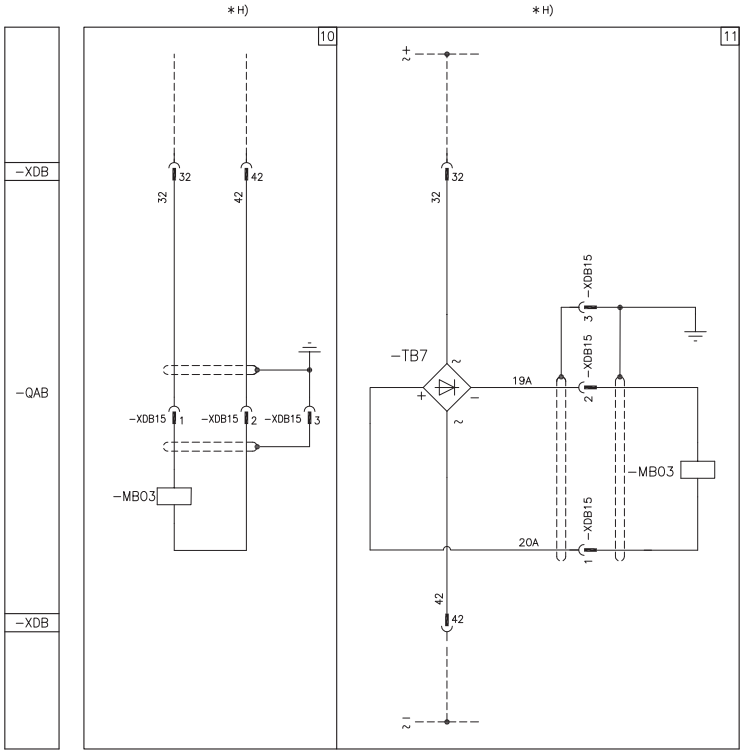


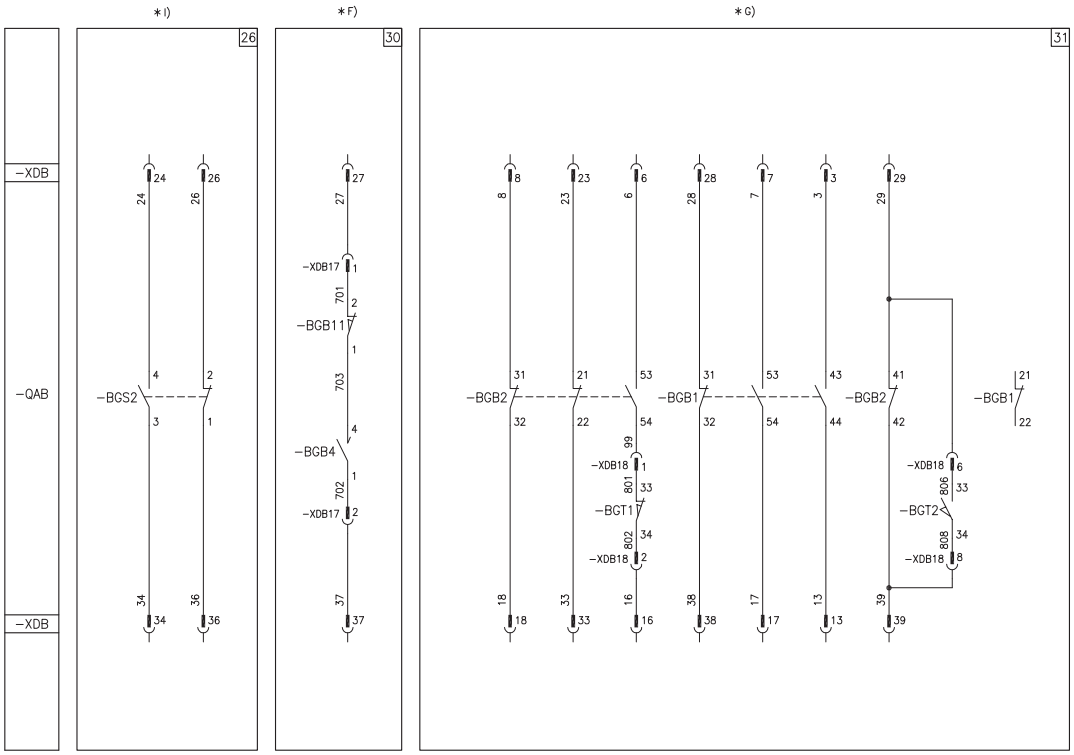


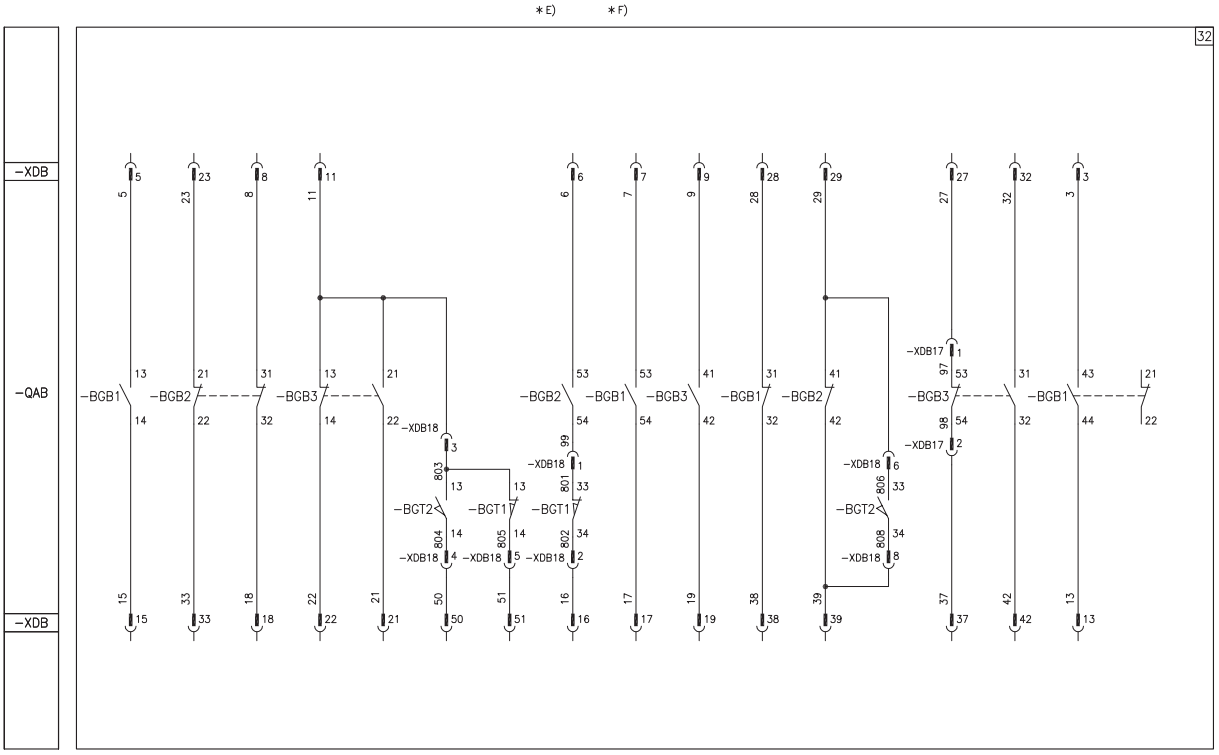
5. Electric circuit diagram

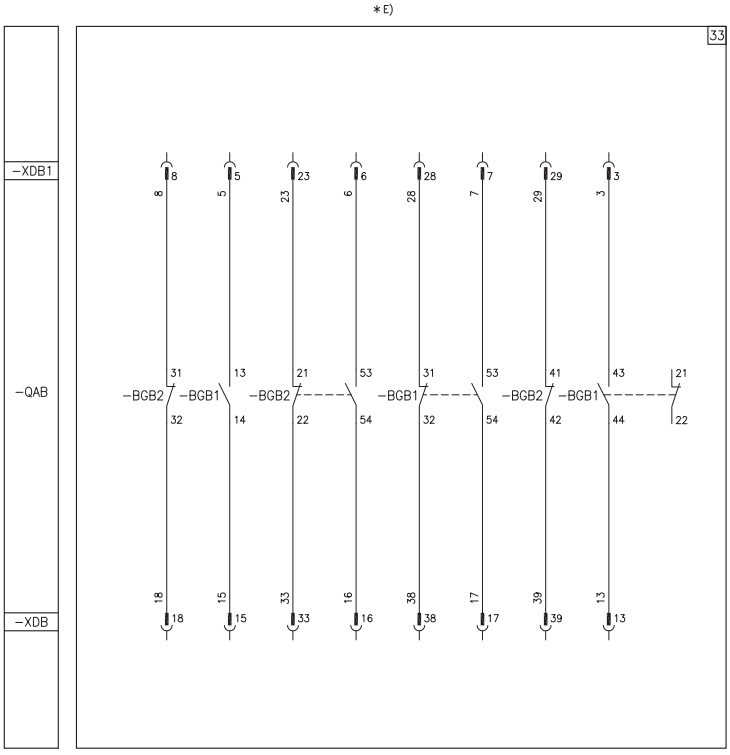
The electric circuit diagram given in this section regards the withdrawable circuit-breakers with **breaking capacity up to** 36 kV.

Note: the withdrawable version with motor-operated truck is not available for 36 kV.

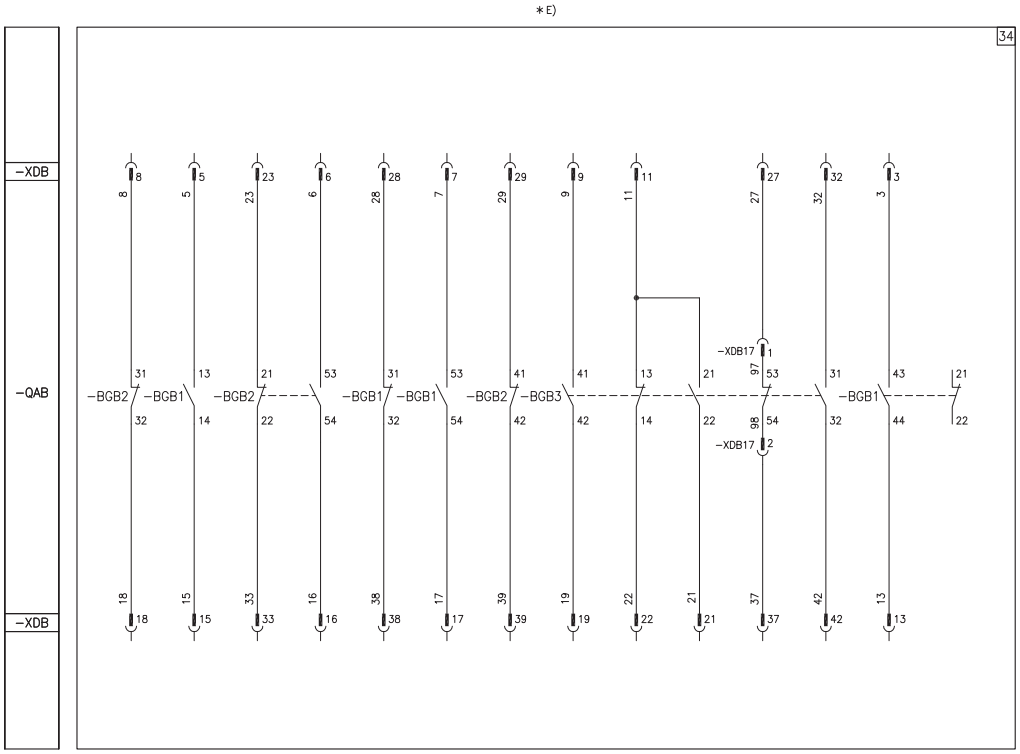


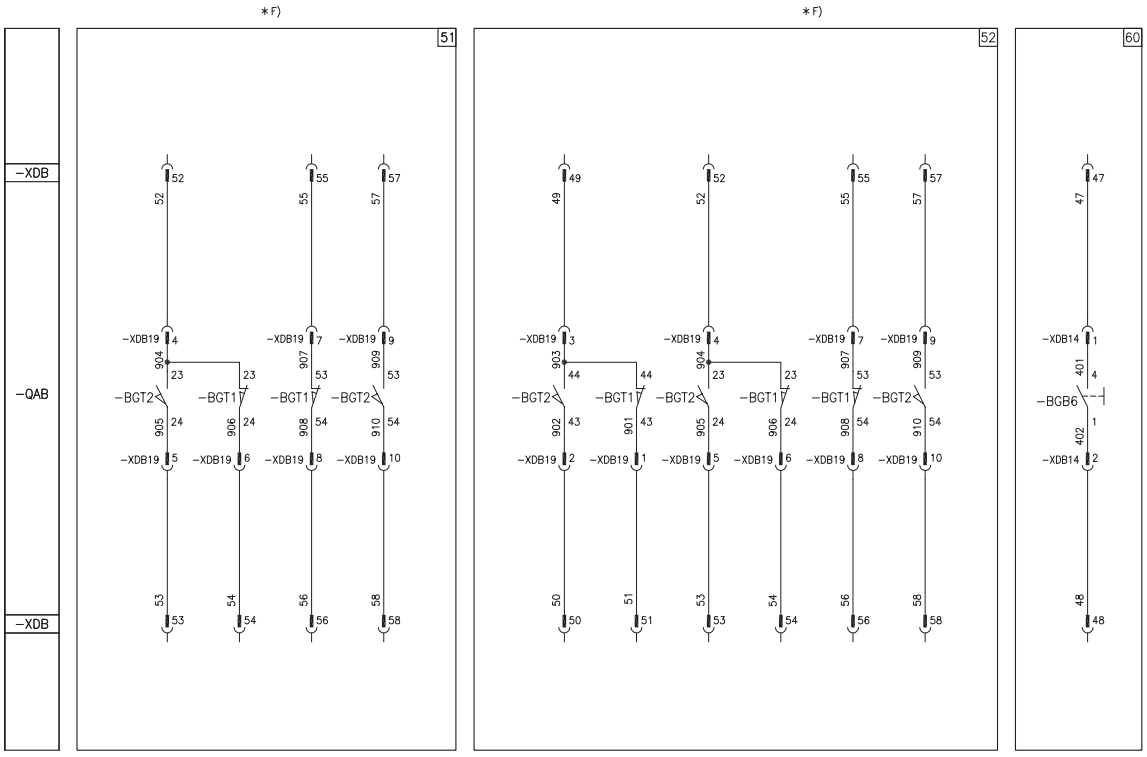



∗E)
∗F)
32
-XDB
-QAB
-XDB
-BGB1
-BGB2
-BGB3
-BGT1
-BGT2
-XDB18
-XDB17


∗E)
33
-XDB1
-QAB
-XDB
-BGB1
-BGB2

5. Electric circuit diagram





Caption

□ = 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 signalling 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 signalling closing springs loaded-discharged.
-BGT1 = Electrical signalling contacts for circuit-breaker in racked-in position (see note F).
-BGT2 = Contacts for electrical signalling 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 = 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).
-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 -RL1 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 -RL1 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).

5. Electric circuit diagram

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 signalling 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 signalling 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 signalling 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:

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 catalogue 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 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 signalling 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.

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