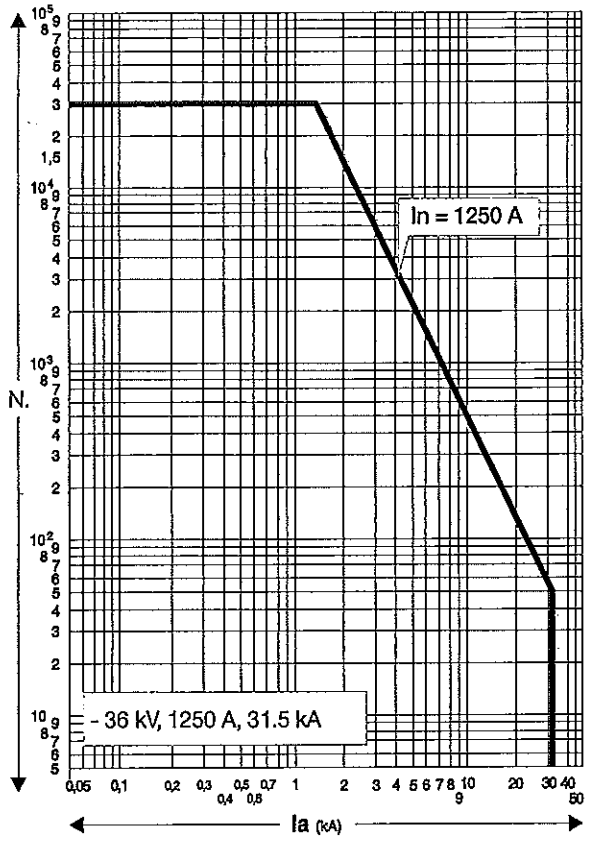


Fig. 8l

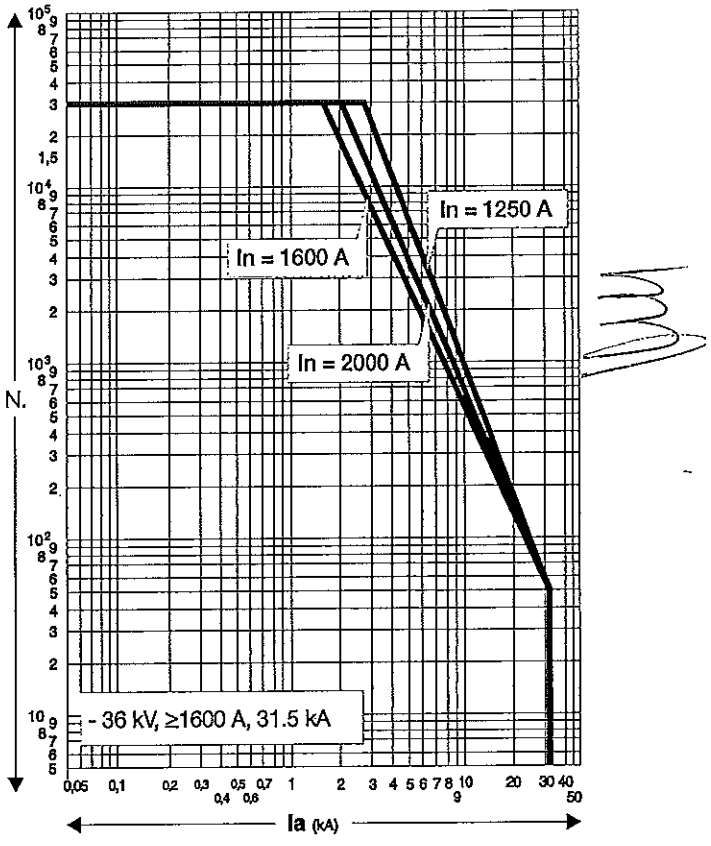


Fig. 8m

7.3. Preliminary operations

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

7.4. Installation of fixed circuit-breakers

The circuit-breaker can be mounted directly on supporting frames to be provided by the customer, or on a special supporting truck (available on request).
The circuit-breaker, with supporting truck, must be suitably fixed to the floor of its own compartment by the customer.
The floor surface in correspondence with the truck wheels must be carefully levelled.
A minimum degree of protection (IP2X) must be guaranteed from the front towards live parts.

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

The VD4 circuit-breakers which are not installed on ABB trucks, but on trucks made by the customer, must be fitted with one or two additional auxiliary contacts (activated by the mechanical lock and by the circuit-breaker release device) to carry out the function of interrupting the shunt closing release circuit (-MC) during traverse from isolated and vice versa.
In ABB trucks, this function is carried out by the -BT1 and -BT2 auxiliary contacts which cut of the release power supply during and before activation of the mechanical lock of the screw truck racking-in device. This means that the shunt closing release power supply can only by applied at the end of activation of the mechanical lock. In this way it is certain that no electrical impulse can activate the shunt closing release with the circuit-breaker in an intermediate position.

7.5. Installation of withdrawable circuit-breaker

The withdrawable circuit-breakers are preset for use in UniGear ZS1, UniGear ZS2, UniSec switchgear and PowerCube modules.
For racking-in/racking-out of the switchgear, fully insert the lever (1) (fig. 9) in the appropriate seat (2) and work it clockwise for racking-in, and anti-clockwise for racking-out, until the limit switch positions are reached.
Circuit-breaker racking-in/-out must be carried out gradually to avoid shocks which may deform the mechanical interlocks and the limit switches.

The torque normally required to carry out racking-in and racking-out is <25 Nm.
This value must not be exceeded. If operations are prevented or difficult, do not force them and check that the operating sequence is correct.

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

When the circuit-breaker has reached the isolated for test/ isolated position, it can be considered racked into the switchgear and, at the same time, earthed by means of the truck wheels.
Withdrawable circuit-breakers of the same version, and therefore with the same dimensions, are interchangeable. However, when, for example, different electrical accessory fittings are provided, a different code for the plug of the auxiliary circuits does not allow incorrect combinations between panels and circuit-breakers.
For the circuit-breaker installation operations, also refer to the technical documentation of the above-mentioned switchgear.

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

7.5.1. Circuit-breakers with withdrawable motorized truck

Carry out the racking-in/racking-out test of the motorized truck in the same way as for a manual truck, following the instructions below:
- Rack the circuit-breaker into the switchgear in the open and isolated position, with the power supply to the motor circuit cut off and with the enclosure door closed.
- Insert the manual racking-in lever (1) in the special coupling (2) Fig. 9, and take the motorized truck to about half its run between the isolated for test and the connected position. The torque needed to carry out truck handling is ≤ 25 Nm. In the case of accidental inversion of the truck motor power supply polarity, this operation allows a possible error in direction to be dealt with without any damage. Verification checks:

a) motor rotation **clockwise** during circuit-breaker racking-in.
b) motor rotation **anticlockwise** during circuit-breaker racking-out.

- Remove the manual lever (1) from the coupling (2) Fig. 9
- Supply the truck motor circuit.
- Activate the control for the electrical racking-in operation. When racking-in has taken place, check correct changeover of the relative auxiliary contact.
- On completion, activate the control for the electrical racking-out operation. When racking-out has taken place, check correct changeover of the relative auxiliary contact.
- In the case of a motor fault during a racking-in or racking-out operation, in an emergency the truck can be taken to the end of its run manually, after first cutting off the power supply to the motor power supply circuit and then, using the manual lever, work in the same way as with the manual truck.

Note
By means of the chain transmission, truck handling carried out using the manual lever makes the truck motor armature rotate which, behaving like a generator, can cause inverse voltage at the connection terminals.
This may damage the permanent magnet of the motor, therefore all the truck racking-in and racking-out operations carried out using the manual lever must be done without power supply in the motor circuit.

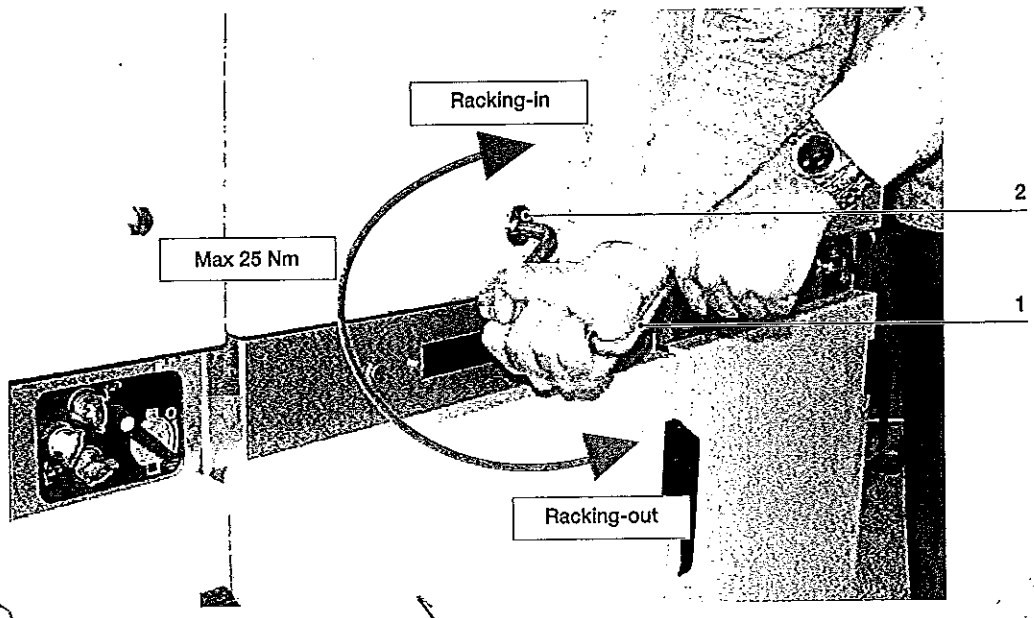


Fig. 9

7.6. Power circuit connections of fixed circuit-breakers

7.6.1. General recommendations

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

7.6.2. Assembly of the connections

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

Assembly procedure

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

T1

Bare copper
– Clean with a fine file or emery cloth.
– Tighten fully and cover the contact surfaces with 5RX Moly type grease.
Copper or silver-plated aluminium
– Clean with a rough dry cloth.
– Only in the case of obstinate traces of oxidation, clean with a very fine grain emery cloth taking care not to remove the surface layer.
– If necessary, restore the surface treatment.
Bare aluminium
– Clean with a metal brush or emery cloth.
– Cover the contact surfaces again immediately with neutral grease.
– Insert the copper-aluminium bimetal with surfaces shined (copper side in contact with the terminal; aluminium side in contact with the connection) between the aluminium connection and the copper terminal.

T2

Bolt	Recommended tightening torque (1)	
	Without lubricant	With lubricant (2)
M6	10,5 Nm	4.5 Nm
M8	26 Nm	10 Nm
M10	50 Nm	20 Nm
M12	86 Nm	40 Nm
M16	200 Nm	80 Nm

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

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

7.7. Earthing

For the fixed version circuit-breaker, carry out earthing by means of the special screw marked with the relative symbol. Clean and degrease the area around the screw to a diameter of about 30 mm and, on completion of assembly, cover the joint again with Vaseline grease. Use a conductor (busbar or braid) with a cross-section conforming to the Standards in force.

7.8. Connection of the auxiliary circuits

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

7.8.1. Fixed circuit-breaker

Connection of the circuit-breaker auxiliary circuits must be made by means of the terminal box (1) (fig. 10) mounted inside the circuit-breaker and the cables must pass through the connector (2).
Outside the connector, the cables must pass through a suitable metal protective cover (pipe, wiring duct, etc.), which must be earthed.

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

⚠ **Before removing the operating mechanism cover to access the terminal box, check that the circuit-breaker is open and the closing spring discharged.**

7.8.2. Withdrawable circuit-breakers

The auxiliary circuits of withdrawable circuit-breakers are fully cabled in the factory as far as the connector (fig. 11).
For the external connections, refer to the electric wiring diagram of the switchgear.

VD4 circuit-breaker for UniGear switchgear and PowerCube module.

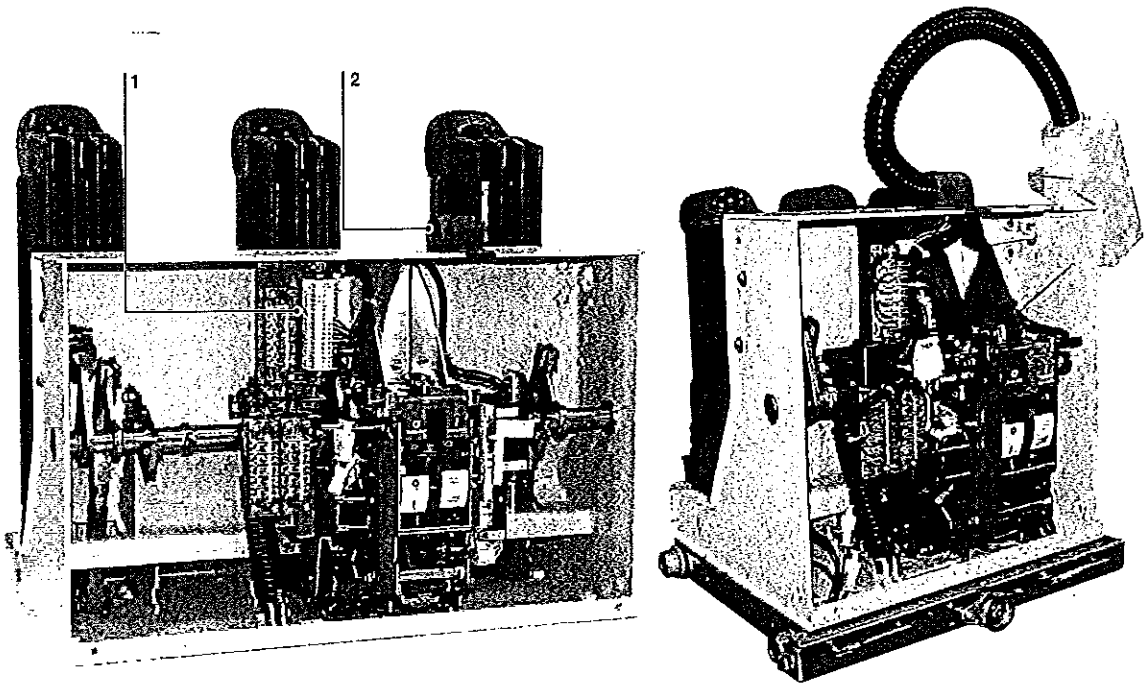


Fig. 10

VD4 circuit-breaker for ZS8.4 switchgear
(VD4/ZS8 version with rotary charging).

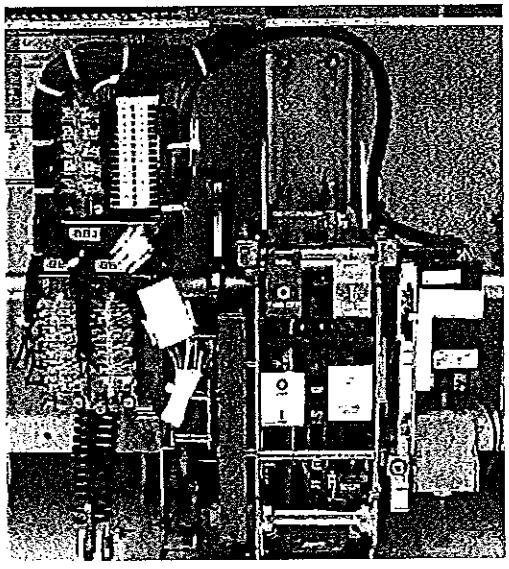


Fig. 10a

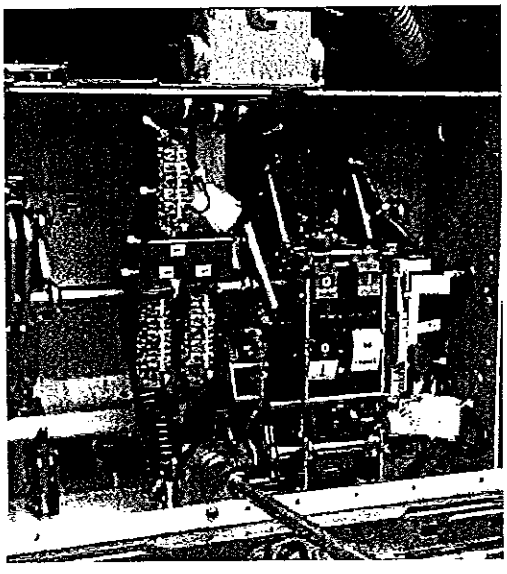


Fig. 11

8. Putting into service

8.1. General procedures

⚠ **All the operations regarding putting into service must be carried out by ABB personnel or by suitably qualified customer personnel with in-depth knowledge of the apparatus and of the installation. Should the operations be prevented, do not force the mechanical interlocks and check that the operating sequence is correct.**
The operating forces which can be applied for racking-in withdrawable circuit-breakers are indicated in paragraph 7.5.

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

T3

ITEM INSPECTED		PROCEDURE	POSITIVE CHECK
1	Insulation resistance.	**Medium voltage circuit** With a 2500 V megger, measure the insulation resistance between the phases and the exposed conductive part of the circuit.	The insulation resistance should be at least 50 Mohm and in any case constant over time.
		Auxiliary circuits With a 500 V megger (if the apparatus installed allows this), measure the insulation resistance between the auxiliary circuits and the exposed conductive part.	The insulation resistance should be a few Mohm and in any case constant over time.
2	Auxiliary circuits.	Check that the connections to the control circuit are correct: proceed at the relative power supply.	Operations and signals normal.
3	Manual operating mechanism.	Carry out a few closing and opening operations (see cap. 6). N.B. Supply the undervoltage release and the locking magnet on the operating mechanism at the relative rated voltage (if provided).	The operations and relative signals take place normally.
4	Motor operator (if provided).	Supply the spring charging geared motor at the relative rated voltage.	The spring is charged normally. The signals are normal. With the spring charged, the geared motor stops.
		Carry out a few closing and opening operations.N.B. Supply the undervoltage release and the locking magnet on the operating mechanism at the relative rated voltage (if provided).	The geared motor recharges the spring after each closing operation.
5	Undervoltage release (if provided).	Supply the undervoltage release at the relative rated voltage and carry out the circuit-breaker closing operation.	The circuit-breaker closes normally. The signals are normal.
		Cut off power to the release.	The circuit-breaker opens. The signalling changes over.
6	Shunt opening release and additional shunt opening release (if provided).	Close the circuit-breaker and supply the shunt opening release at the relative rated voltage.	The circuit-breaker opens normally. The signals are normal.
7	Shunt closing release (if provided).	Open the circuit-breaker and supply the shunt closing release at the relative rated voltage.	The circuit-breaker opens normally. The signals are normal.
8	Key lock (if provided).	Open the circuit-breaker, keep the opening pushbutton depressed, then turn the key and remove it from the housing. Attempt the circuit-breaker closing operation.	Neither manual nor electrical closing takes place.
		Put the key back in and turn it 90°. Carry out the closing operation.	Both electrical and manual closing take place normally; in this position the key cannot be removed.
9	Locking electromagnet (-RL1) (if provided).	With the circuit-breaker open, spring charged and locking electromagnet not supplied, attempt circuit-breaker closing both manually and electrically.	Closing is not possible.
10	Auxiliary contacts in the operating mechanism.	Insert the auxiliary contacts in suitable signalling circuits. Carry out a few closing and opening operations.	Signals take place normally.
11	Locking electromagnet on the truck circuit-breaker (-RL2) (if provided).	With the circuit-breaker open, in the isolated for test position and the locking electromagnet not supplied, attempt racking-in of the circuit-breaker.	Racking-in is not possible.
		Supply the locking electromagnet and carry out the racking-in operation.	Racking-in takes place correctly.
12	Auxiliary transmitted contacts for signalling circuit-breaker racked-in, isolated (UniGear switchgear or PowerCube modules).	Insert the auxiliary contacts in suitable signalling circuits. With the circuit-breaker racked into the enclosure, carry out a few traverse operations from the isolated for test position to the connected position. Take the circuit-breaker to the racked-out position.	The signals due to the relative operations take place normally.

9. Maintenance

The maintenance operations are aimed at keeping the apparatus in good working condition for as long as possible. In accordance with what is specified in the IEC 61208 / DIN 31 051 Standards, the following operations must be carried out.

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

9.1. General

The vacuum circuit-breakers are characterised by simple, sturdy construction and a long life.
The operating mechanism requires maintenance and functional inspections to reach the expected operating-life (see par. 9.3.2.).
The vacuum interrupters are maintenance-free for their whole operating life.
Vacuum interruption does not produce any harmful effects even when there are frequent interruptions at the rated and short-circuit current.
The interventions during service and their aim are determined by the ambient conditions, by the sequence of operations and by the short-circuit interruptions.

Note
Respect the following Standards for maintenance work:
- the relative specifications given in the chapter on "Standards and Specifications";
- work safety regulations in the chapter on "Putting into service and operations";
- standards and specifications of the country where the apparatus is installed.

The maintenance operations must only be carried out by trained personnel and who follow all the safety regulations.
Furthermore, it is advisable to call on ABB personnel, at least in cases for checking the performances in service and for repairs.
Cut the power supply off and put the apparatus under safe conditions during the maintenance operations.

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

9.1.1. Operating life expectancy

The operating life expectancy for the VD4 circuit-breakers is as follows:
- vacuum interrupters: up to 30,000 operations, according to their type (see par. 7.2.3. Trip curves);
- switching device, actuator and transmission system: up to 30,000 operations, under normal operating conditions, according to the type of circuit-breaker and with regular maintenance (see par. 9.3.2.);
- with operations correctly executed it is possible to carry out up to 1000 racking-out/in operations (as prescribed in the IEC 60271-200 Standards);
- the data regarding the operating life are basically applicable to all the components which cannot be directly affected by operator activity. The manually operated components (moving parts of isolatable parts, etc.) can vary their behaviour.

9.2. Inspections and functionality tests

9.2.1. Interruption devices in general

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

9.2.2. Stored energy operating mechanism

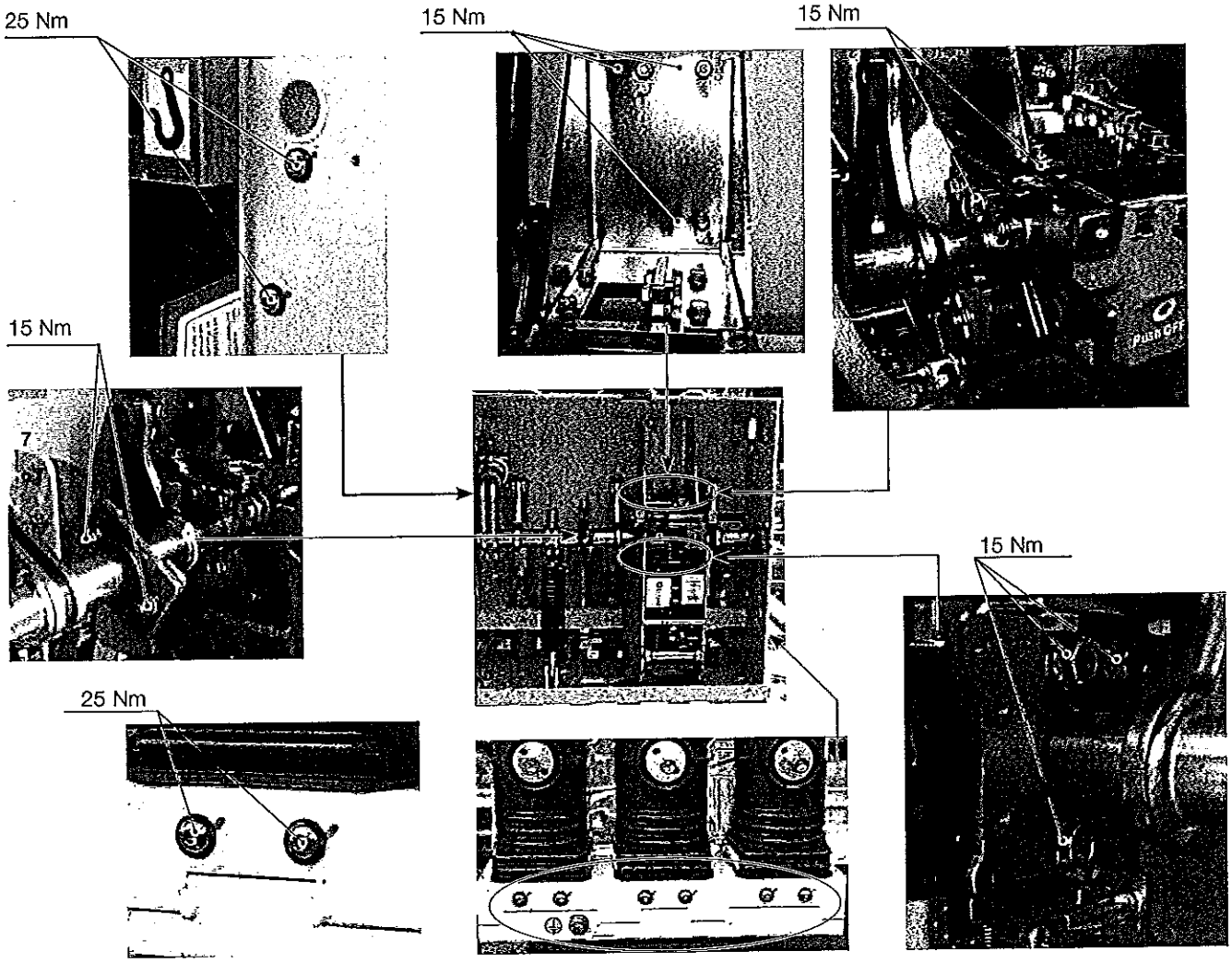
Carry out the functional test of the operating mechanism after 5,000 operations or during ordinary maintenance operations as specified in par. 9.2.1.
Before doing the test, open the circuit-breaker and carry out the following operations:
- in the case of withdrawable circuit-breakers, take the circuit-breaker to the isolated for test position
- in the case of fixed circuit-breakers: cut off the power supply to the medium voltage circuit.

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

Functional test

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

Checking tightness of the screws



EL Twin actuator - 50 kA

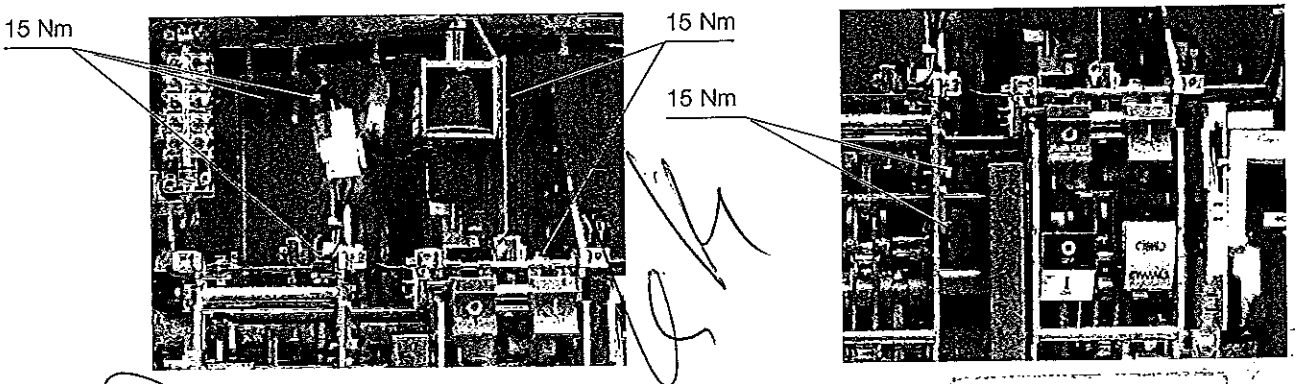


Fig. 12

9.2.3. Circuit-breaker pole

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

9.2.4. Withdrawable assembly (truck and circuit-breaker)

Visually inspect the components, especially those which may be damaged by incorrect operations (also see table in chap. 8).
Visually inspect the isolating contacts and that all the contact elements are clean, especially in cases where signs of overheating are found (also see par. 9.4.).
Visually inspect and carry out the functional tests of the locks, checking their correct operation and activation without abnormal force – maximum 25 N (also see table in chap. 8).

9.3. Overhauling

9.3.1. Interruption devices in general

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

- insulate the work area and make it safe, following the safety regulations specified in the IEC/DIN VDE Standards;
- general cleaning of the surfaces:
  - dry and eliminate light deposits of dirt with a soft dry cloth;
  - more resistant deposits of dirt can be removed using slightly alkaline domestic type detergent or Rivolta BWR 210 type detergent;
- cleaning insulating surfaces and conductive parts:
  - light dirt: with Rivolta BWR 210 detergent;
  - resistant dirt: with cold detergent type 716.

After cleaning, rinse thoroughly with clean water and dry carefully.

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

9.3.2. Tripping device: actuator and transmission system

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

To ensure correct operation of the circuit-breaker, inspection and maintenance of the tripping devices is recommended every 10,000 operations. For this purpose, please contact the ABB Service office.
Complete replacement of the actuator, shock absorber and of the other transmission system parts (shaft, main levers, safety rings, etc.) must be carried out after 30,000 operations.

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

To ensure correct operation of the circuit-breaker, inspection and maintenance of the tripping devices is recommended every 10,000 operations. For this purpose, please contact the ABB Service office.

Complete replacement of the actuator must be carried out every 10,000 operations.
Complete replacement of the shock absorber and of the other transmission system parts (shaft, main levers, safety rings, etc.) must be carried out after 30,000 operations.

Circuit-breakers up to 17.5 kV, 3150 A, 40 kA

To ensure correct operation of the circuit-breaker, inspection and maintenance of the tripping devices must be carried out every 5,000 operations. For this purpose, please contact the ABB Service office.
Complete replacement of the shock absorber and of the other part of the transmission system (shaft, main levers, safety rings, etc.) must be carried out after 10,000 operations.

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

To ensure correct operation of the circuit-breaker, inspection and maintenance of the tripping devices must be carried out every 10,000 operations. For this purpose, please contact ABB Service.
Complete replacement of the shock-absorber and of the other parts of the transmission system (shaft, main levers, safety rings, etc.) must be carried out every 10,000 operations.

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

Details regarding overhauling

- When foreseen, cut of the power supply to the spring charging motor and manually discharge the operating mechanism spring by closing and opening the circuit-breaker.
- Replace the parts subjected to mechanical stress or stress due to particular environmental conditions, (contact and ABB service centre).

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

9.3.3. Circuit-breaker pole

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

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

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

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

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

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

The test must always be carried out with the circuit-breaker open with the contacts at the nominal distance.
Procedure for testing the degree of vacuum of the interrupter of the circuit-breaker poles:

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

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

9.4. Repairs

Replacement of spare parts and accessories must only be carried out by ABB personnel or suitably qualified and specially trained personnel.
Always work with the circuit-breaker open and locked so that it cannot be closed again, with the work area insulated and made safe.
The operating mechanism spring must be discharged.
All power supply sources must be disconnected and made safe against any reclosing during removal and installation work.

⚠ **Should maintenance be carried out by the customer's personnel, responsibility for the interventions remains with the customer.**
The replacement of parts not included in the "List of spare parts/accessories" (par. 12.1.) must only be carried out by ABB personnel. In particular:

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

10. Application of the X-ray emission Standards

One of the physical properties of vacuum insulation is the possibility of X-ray emission when the interrupter contacts are open.
The specific tests carried out at the PTB laboratories (Physikalisch-Technische Bundesanstalt, in Brunswick - Germany) show that local emission at a distance of 10 cm from the interrupter or pole surface, does not exceed 1 mSv/h.

It follows that:

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

11. Spare parts and accessories

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

To order circuit-breaker spare parts/accessories, refer to the ordering sales codes indicated in the technical catalogue and always state the following:
- type of circuit-breaker
- rated voltage of the circuit-breaker
- rated normal current of the circuit-breaker
- breaking capacity of the circuit-breaker
- serial number of the circuit-breaker
- rated voltage of any electrical spare parts.

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

11.1. List of spare parts

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

12. Electric circuit diagrams

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

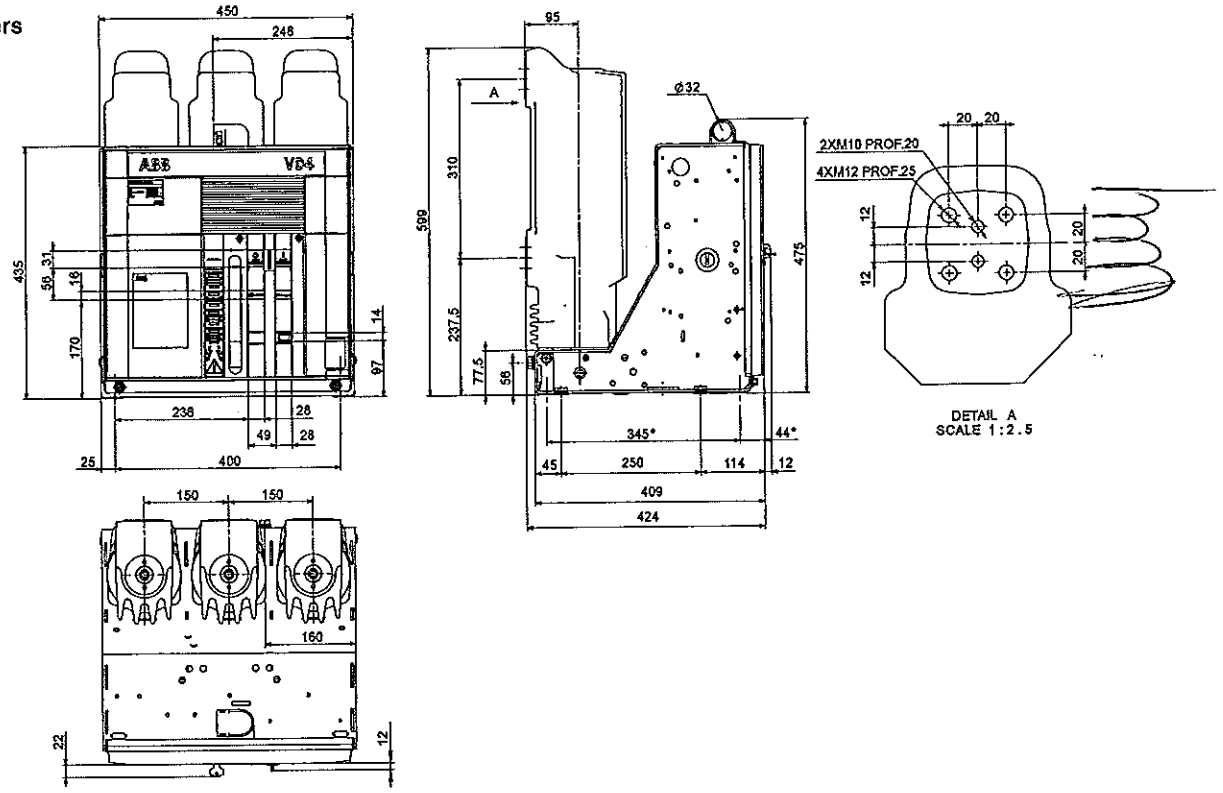
- 1VCD400046: Fixed circuit-breakers
- 1VCD400099: Fixed circuit-breakers 50 kA
- 1VCD400055: Fixed circuit-breakers with 64-pole connector
- 1VCD400064: Fixed circuit-breakers with 58-pole connector
- 1VCD400078: Fixed circuit-breakers with truck
- 1VCD400047: Withdrawable circuit-breakers
- 1VCD400048: Withdrawable circuit-breakers with motorized truck
- 1VCD400100: Withdrawable circuit-breakers 50 kA
- 1VCD400080: Withdrawable circuit-breakers for ZS8.4 switchgear VD4/ZS8, ZT8 and Z8 with circuit-breaker
- 1VCD400080: Withdrawable circuit-breakers for ZS8.4 switchgear with VD4/ZS8, ZT8 and Z8 circuit-breaker with motorized truck
- 1VCD400102: Withdrawable circuit-breakers with motorized truck 50 kA.

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

13. Overall dimensions

Fixed circuit-breakers

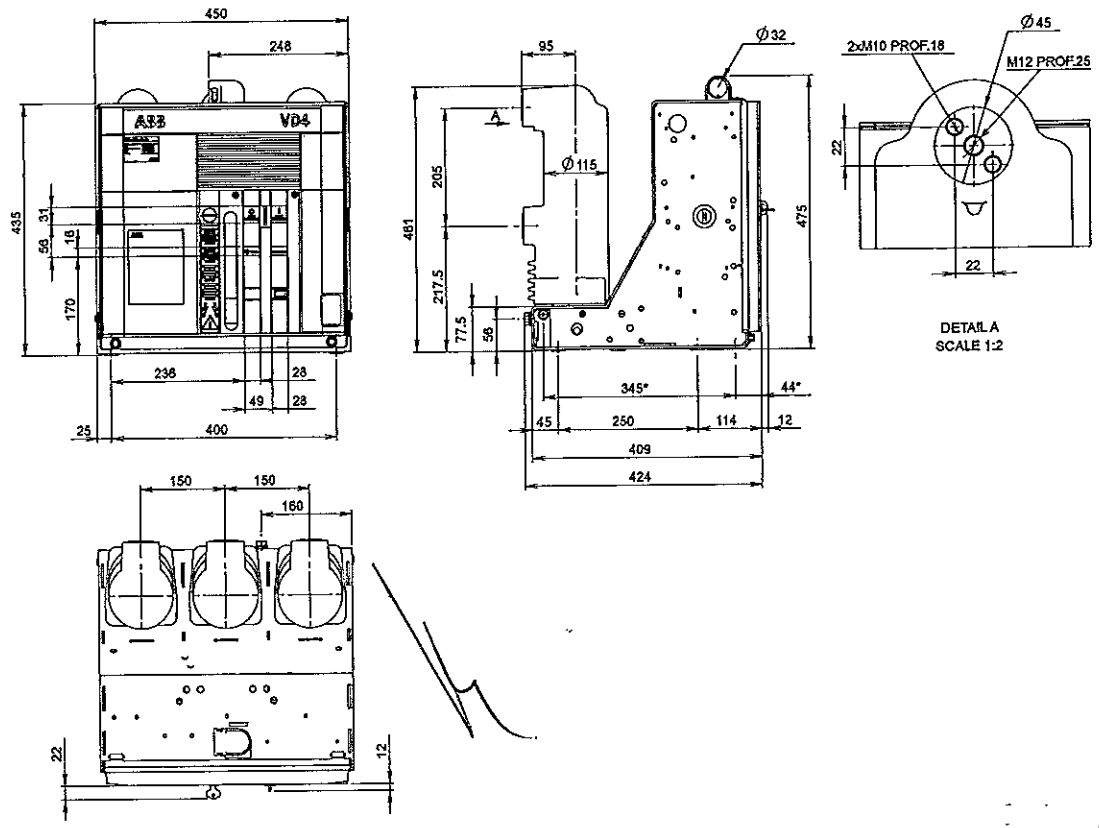
VD4		
TN	1VCD000050	
Ur	12	kV
	17.5	kV
Ir	1600	A
Isc	20	kA
	25	kA
	31.5	kA



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

Fixed circuit-breakers

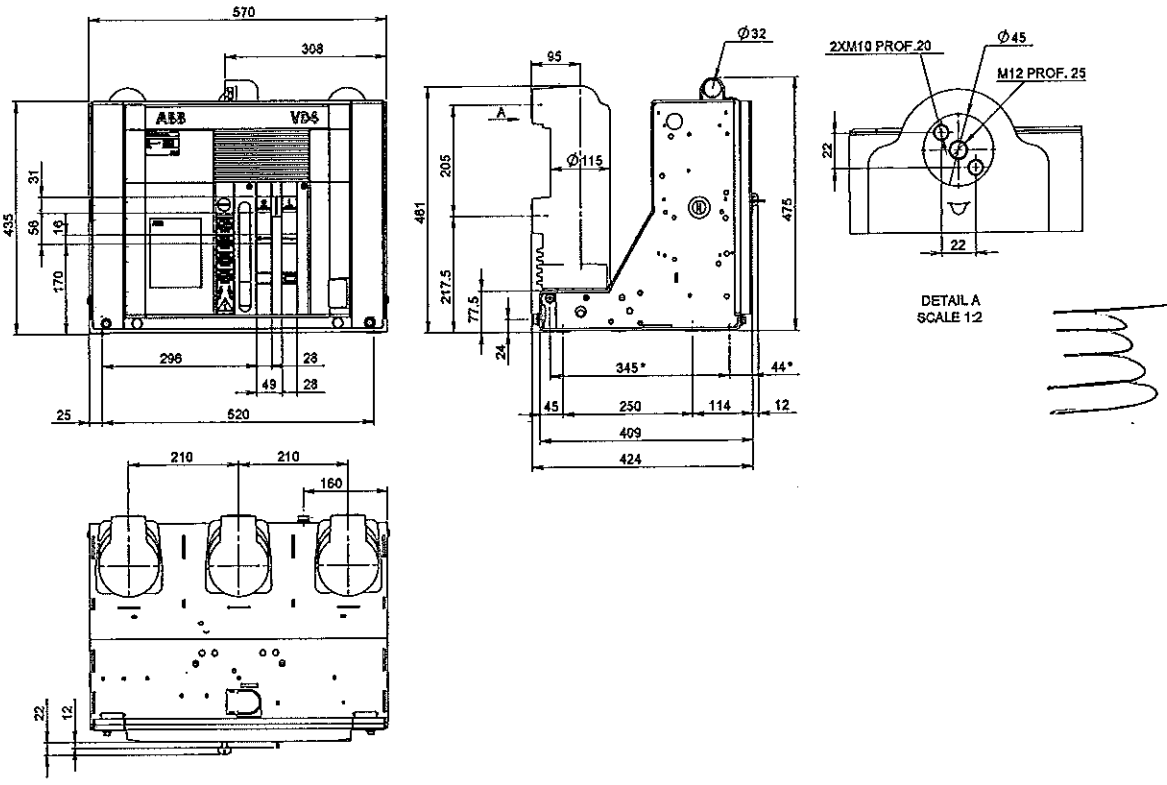
VD4		
TN	7405	
Ur	12	kV
	17.5	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA
	31.5	kA



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

Fixed circuit-breakers

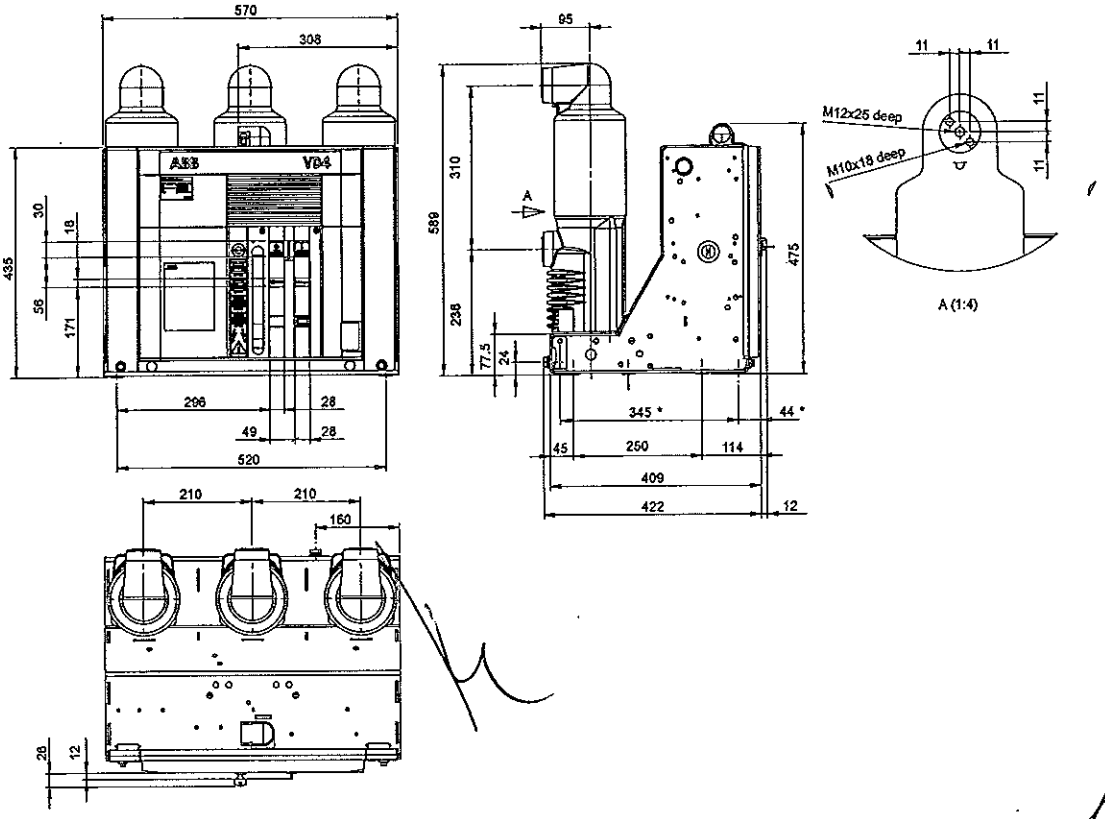
VD4		
TN	7406	
Ur	12	kV
	17.5	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA
	31.5	kA



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

Fixed circuit-breakers

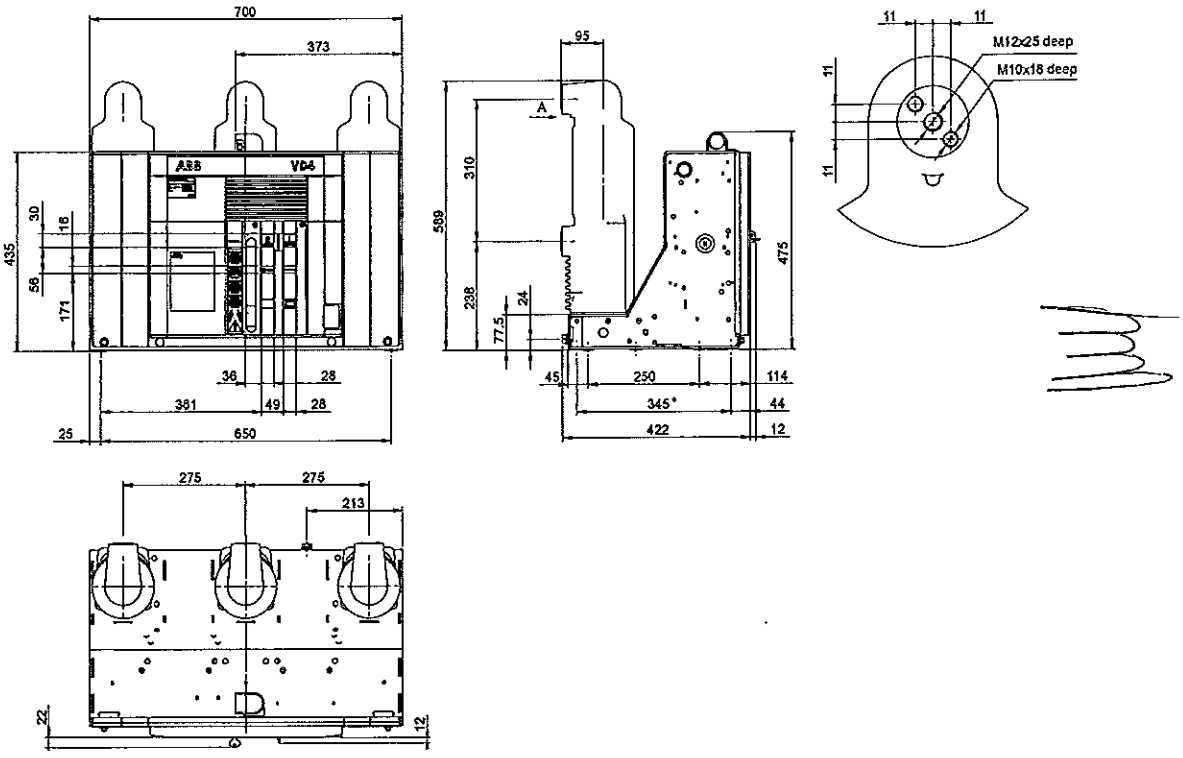
VD4		
TN	1VCD003282	
Ur	12	kV
	17.5	kV
Ir	1250	A
	1600	A
Isc	40	kA



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

Fixed circuit-breakers

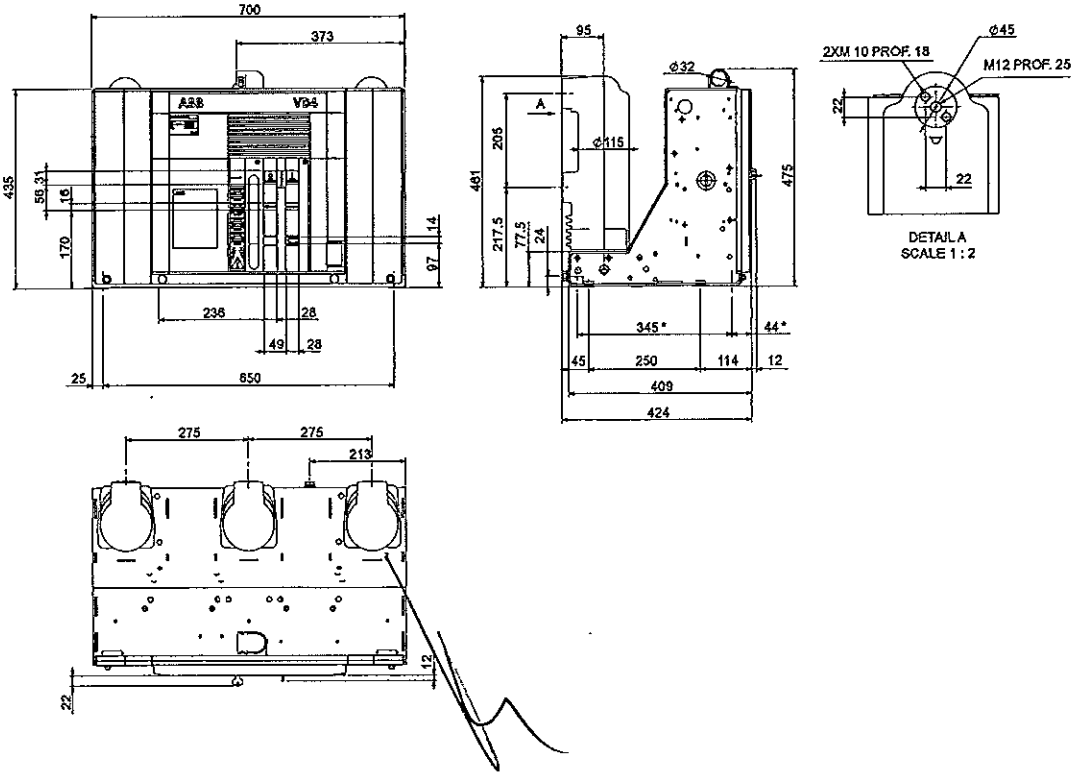
VD4		
TN	1VCD003285	
Ur	12	kV
	17.5	kV
Ir	1250	A
	1600	A
Isc	40	kA



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

Fixed circuit-breakers

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

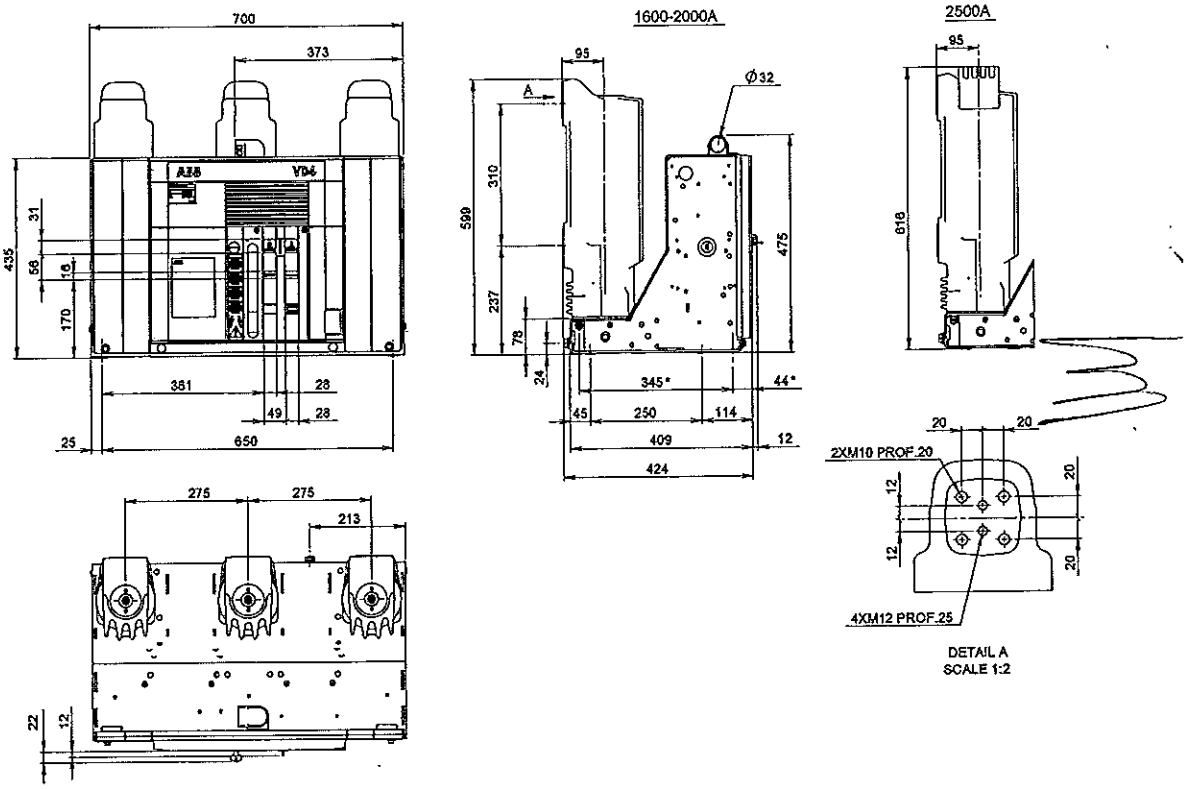


(*) Fixing interchangeability with previous series (345 x 650).

Fixed circuit-breakers

VD4		
TN	7408	
Ur	12	kV
	17.5	kV
Ir	1600	A
	2000	A
	2500	A
Isc	20	kA
	25	kA
	31.5	kA

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

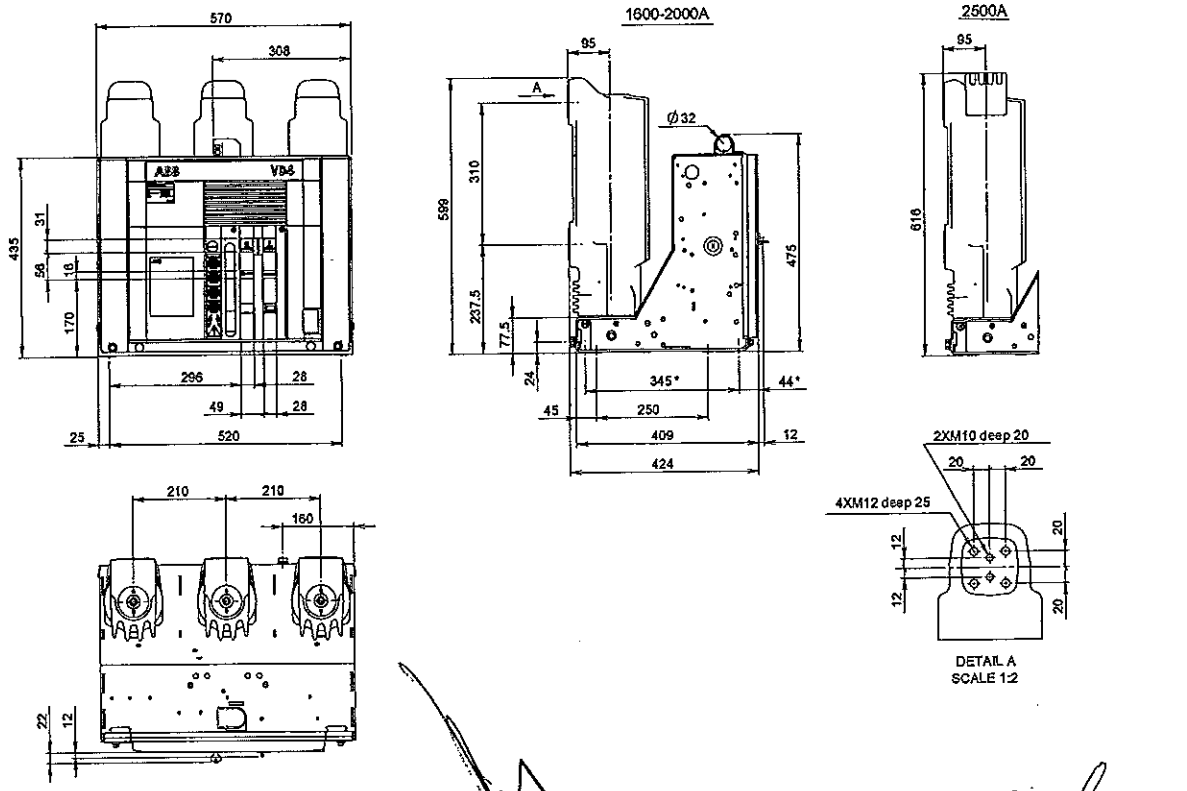


(*) Fixing interchangeability with previous series (345 x 650).

Fixed circuit-breakers

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

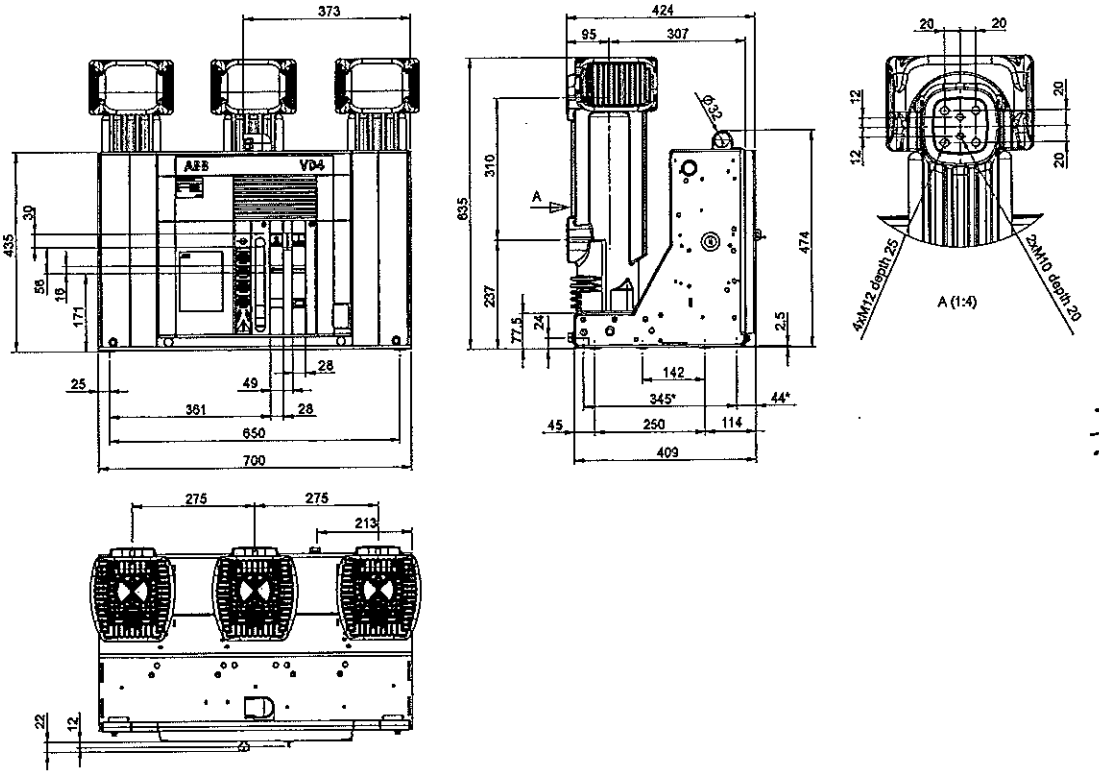
VD4		
TN	7407	
Ur	12-17.5	kV
Ir	1600	A
	2000	A
Isc	20	kA
	25	kA
	31.5	kA
	40	kA



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

Fixed circuit-breakers

VD4		
TN	1VCD000149	
Ur	12	kV
	17.5	kV
Ir	3150	A
	4000	A (**)
Isc	20	kA
	25	kA
	31.5	kA
	40	kA
	50	kA

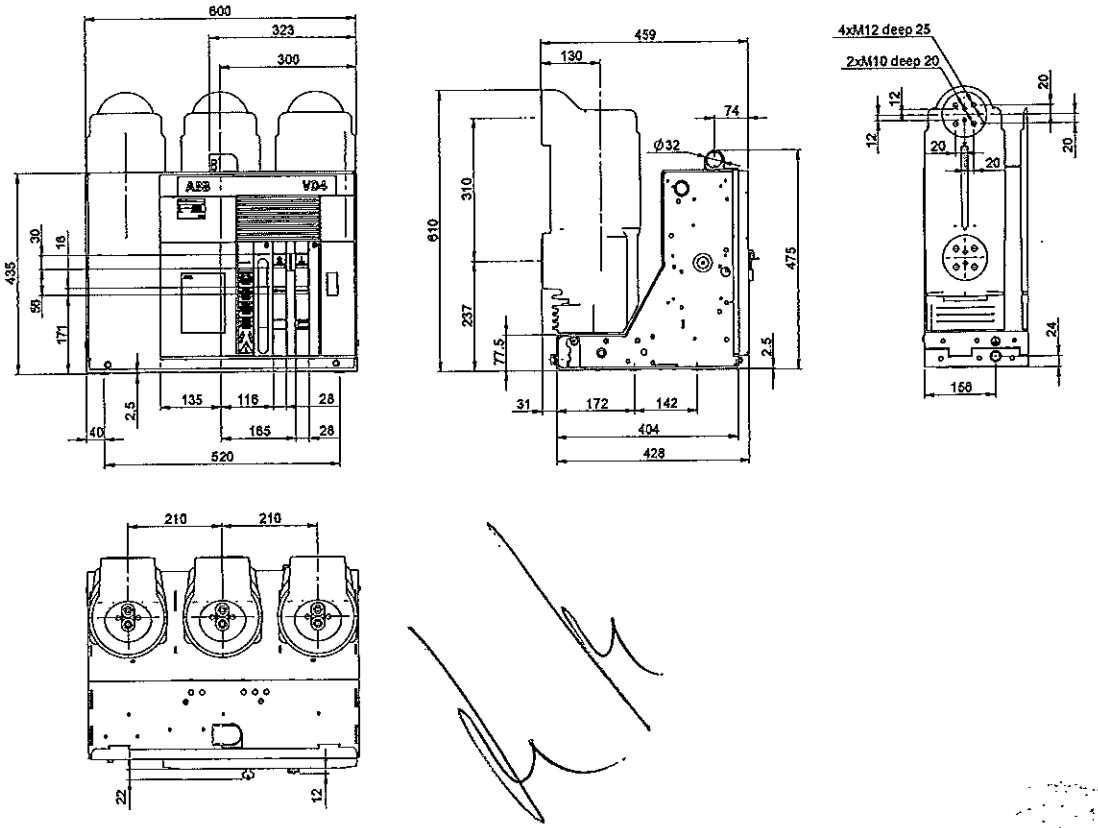


(*) Fixing interchangeability with previous series (345 x 650).

(**) With forced ventilation.

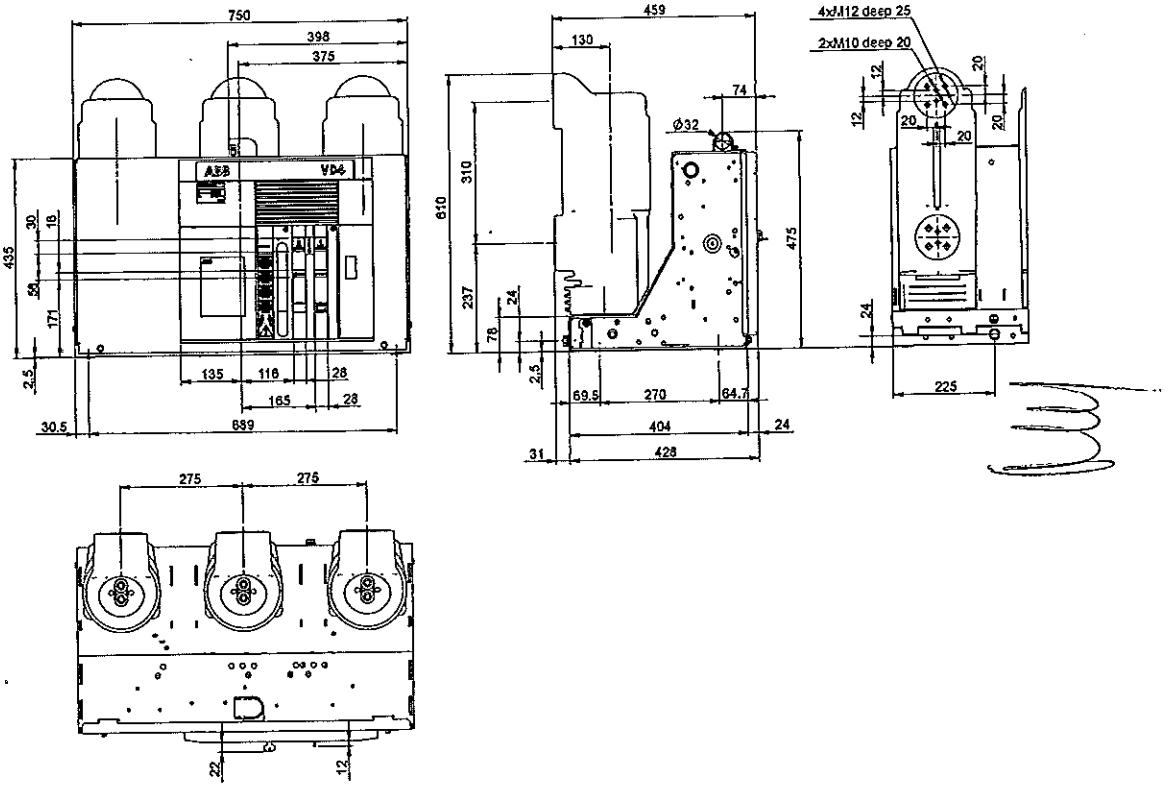
Fixed circuit-breakers

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



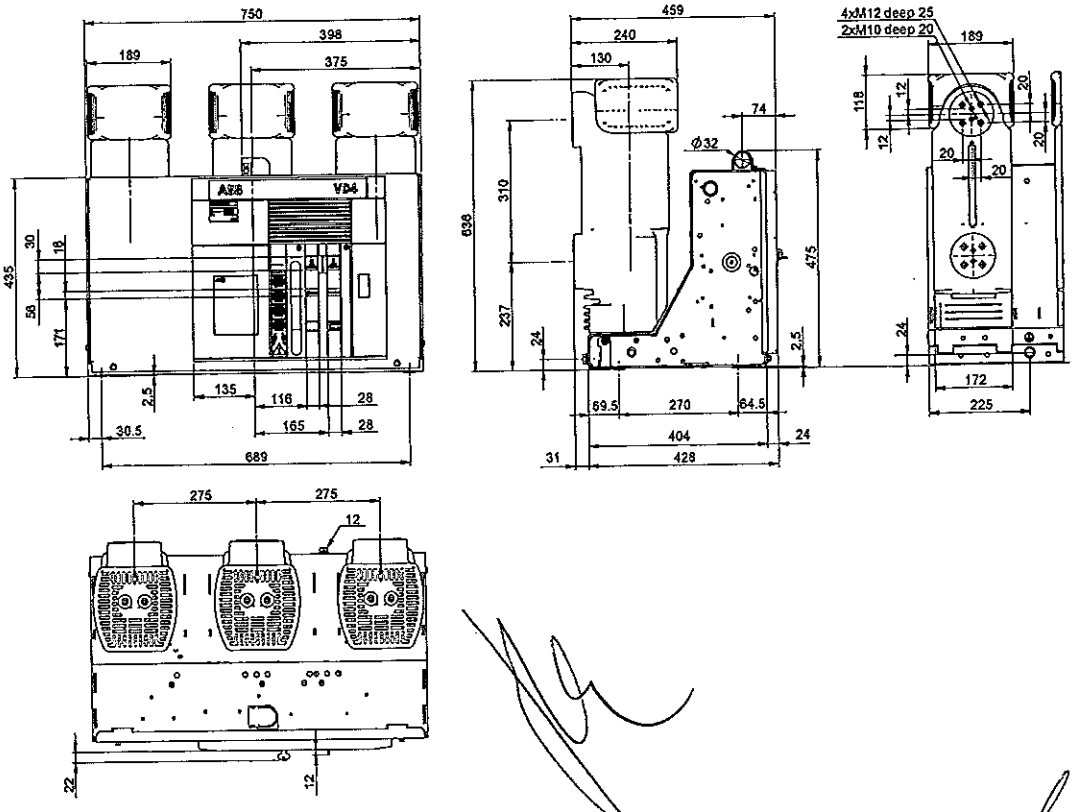
Fixed circuit-breakers

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



Fixed circuit-breakers

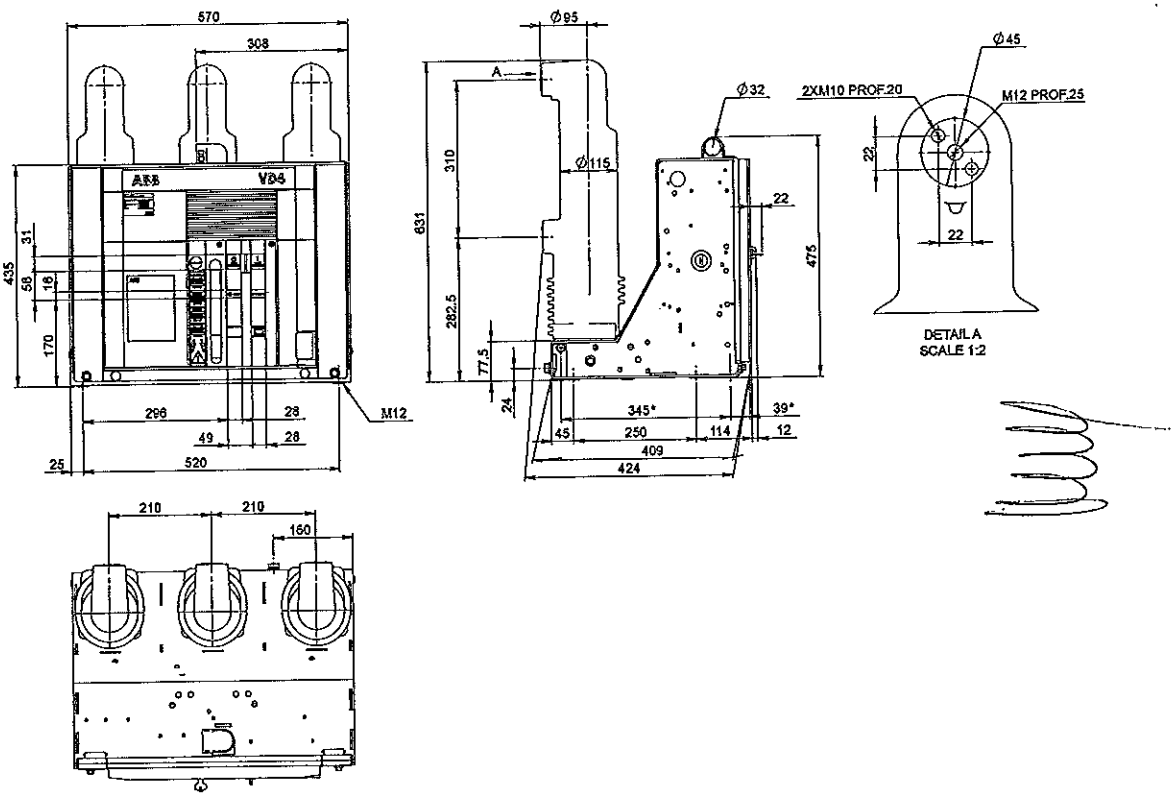
VD4		
TN	1VCD003443	
Ur	12	kV
	17.5	kV
Ir	3150	A (*)
Isc	50	kA



(*) 4000 A with forced ventilation.

Fixed circuit-breakers

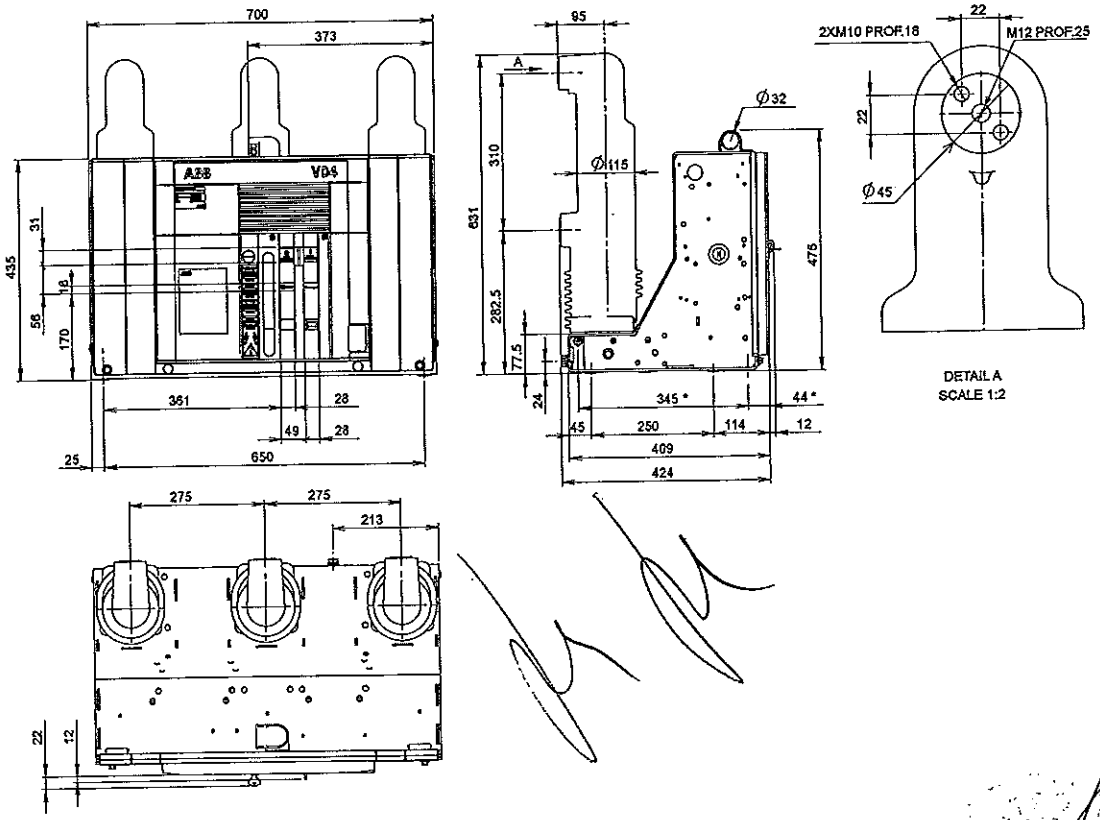
VD4		
TN	7409	
Ur	24	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA



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

Fixed circuit-breakers

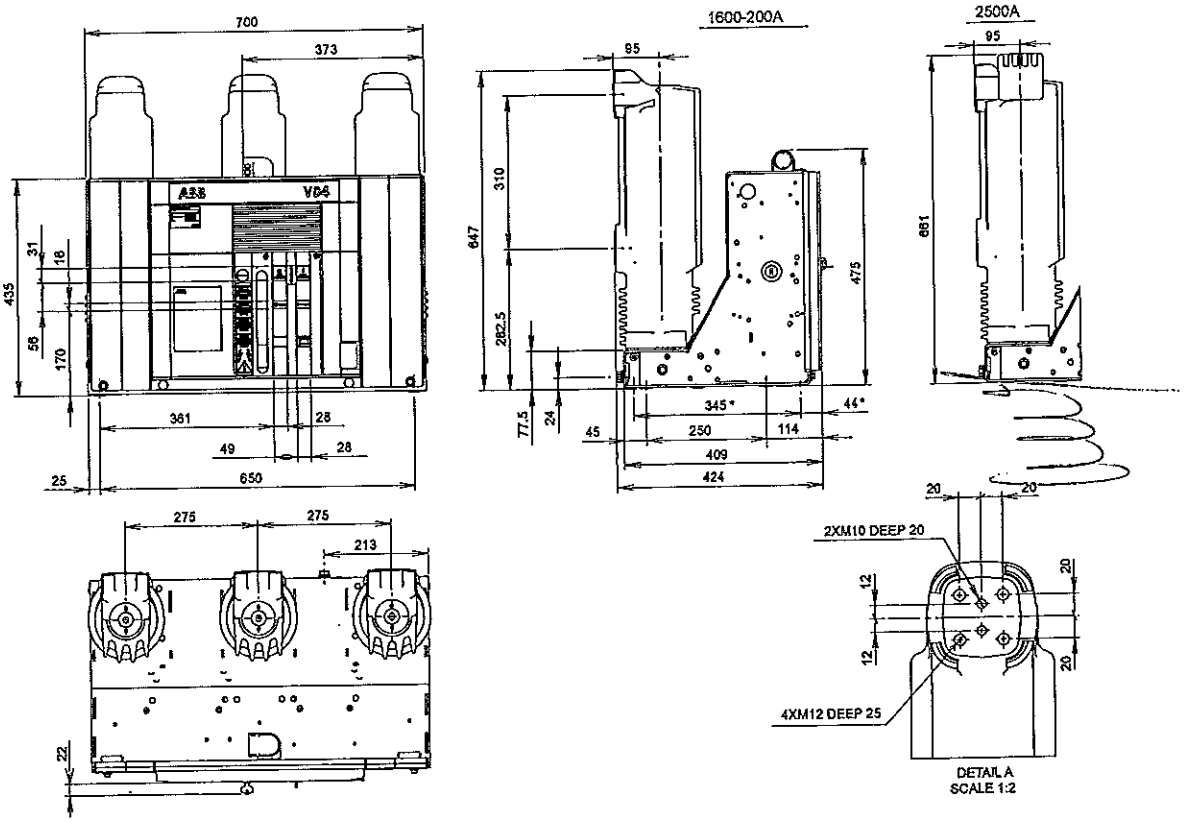
VD4		
TN	7410	
Ur	24	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA



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

Fixed circuit-breakers

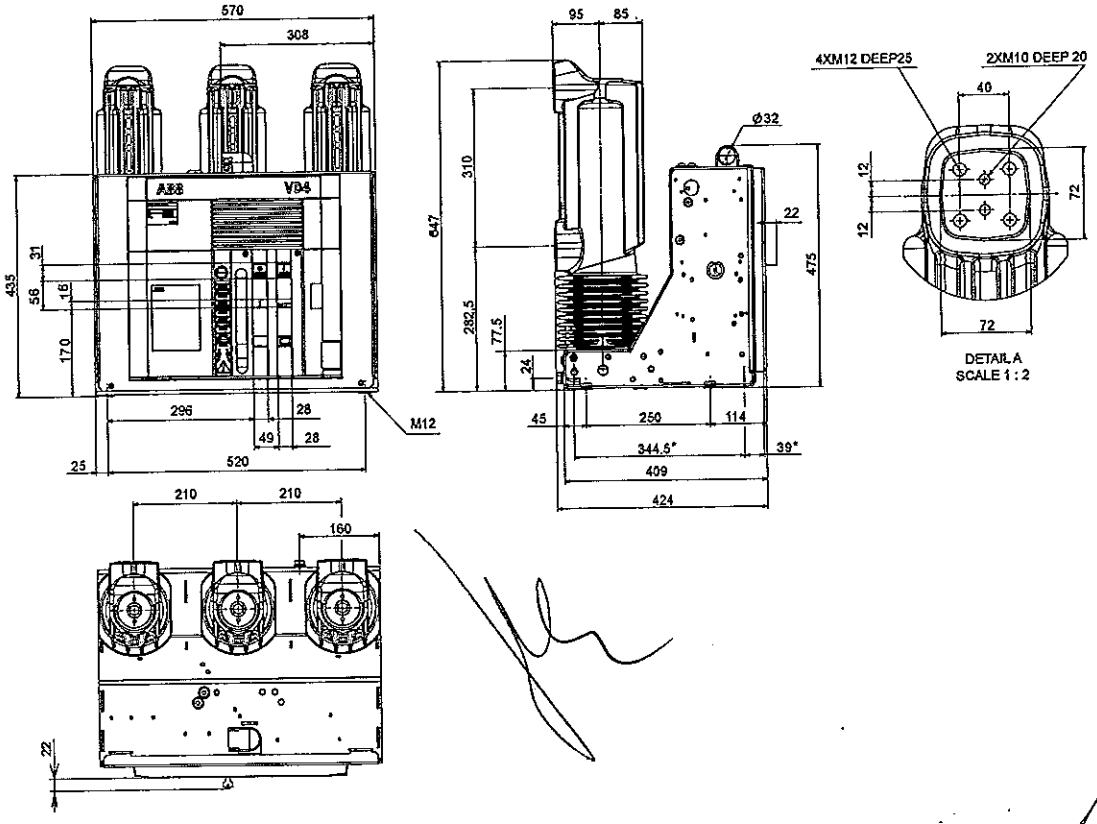
VD4		
TN	7411	
Ur	24	kV
Ir	1600	A
	2000	A
	2500	A
Isc	16	kA
	20	kA
	25	kA
	31,5	kA



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

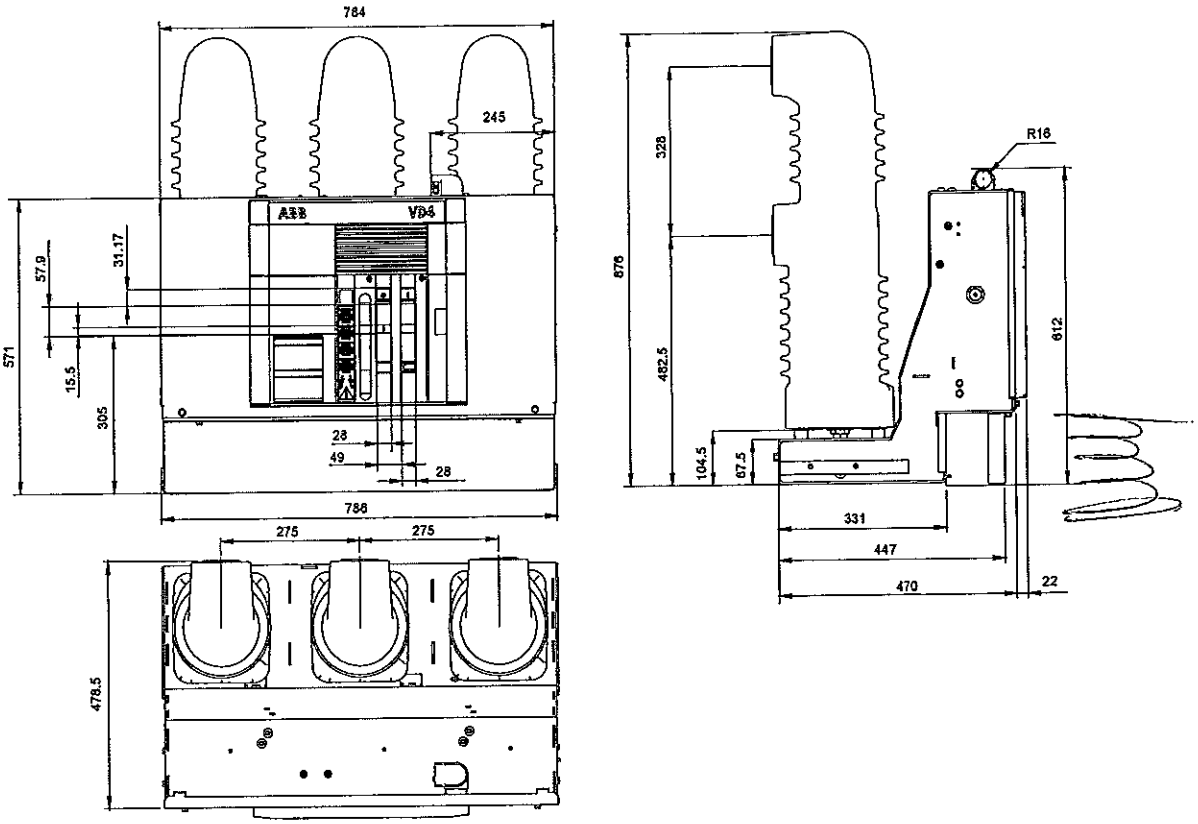
Fixed circuit-breakers

VD4		
TN	1VCD000172	
Ur	24	kV
Ir	1250	A
Isc	31.5	kA



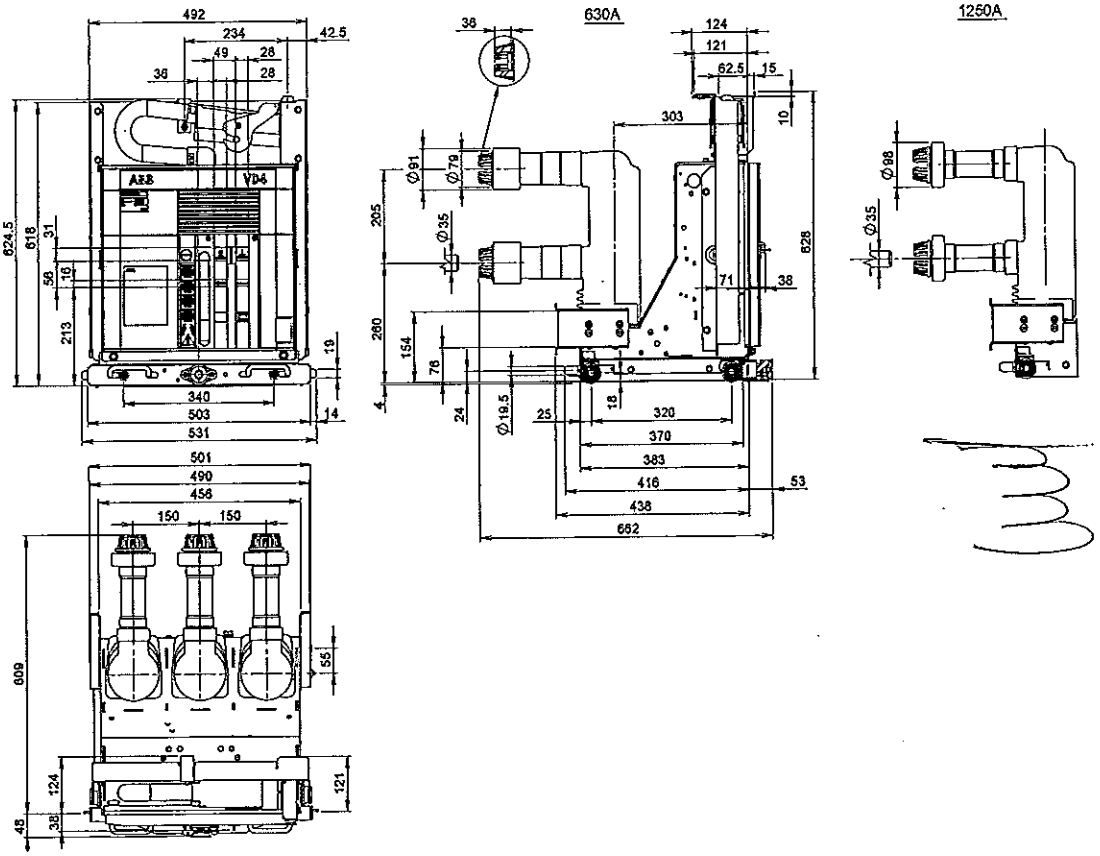
Fixed circuit-breakers

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



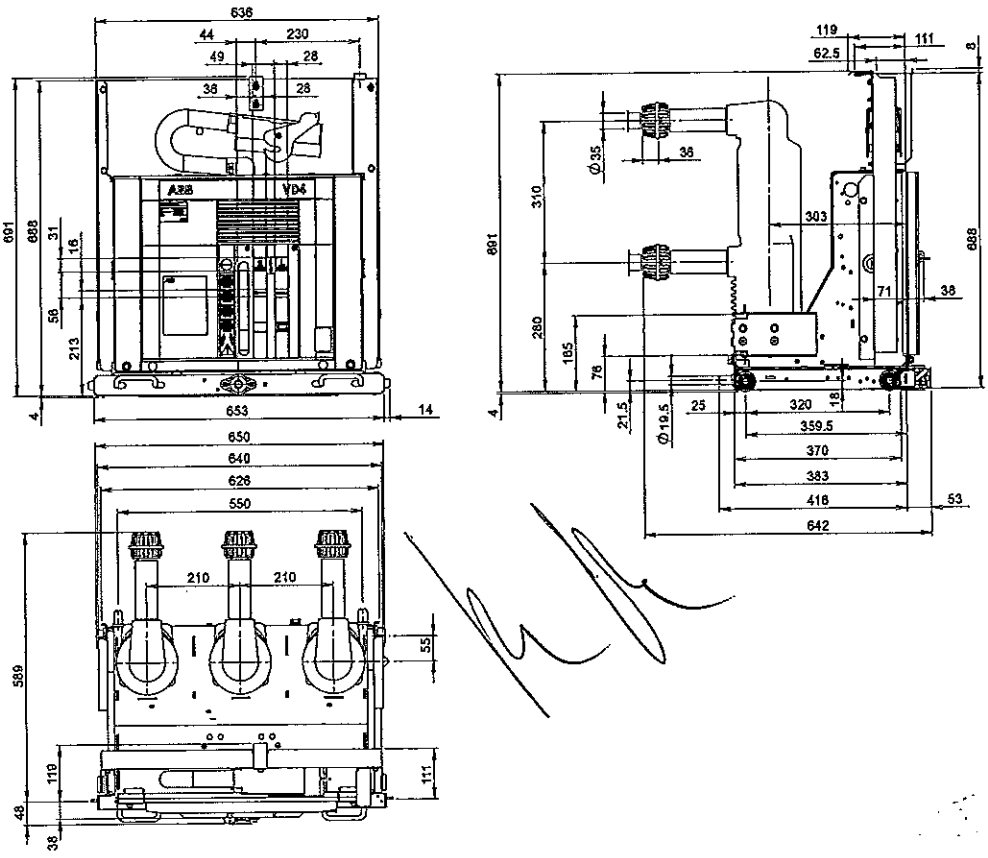
Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube modules

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



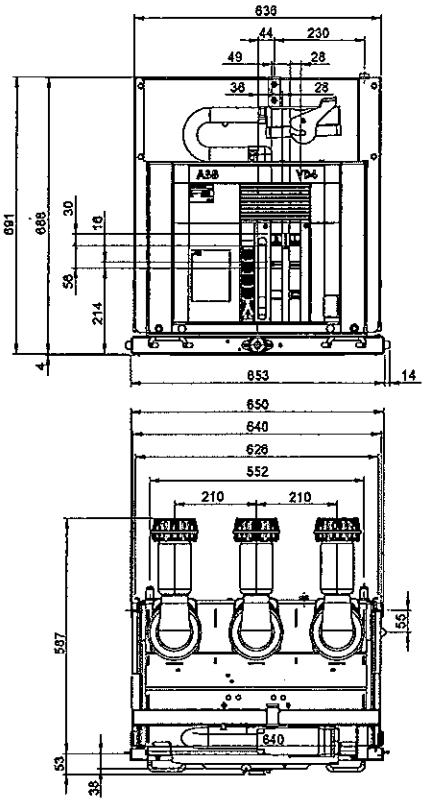
Withdrawable circuit-breakers for PowerCube modules

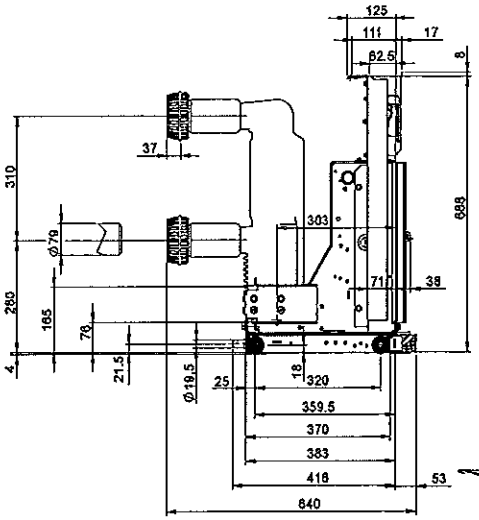
VD4/W		
TN	7420	
Ur	12	kV
	17.5	kV
Ir	630	A
	1250	A
Isc	16	kA
	25	kA
	31.5	kA



Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube modules

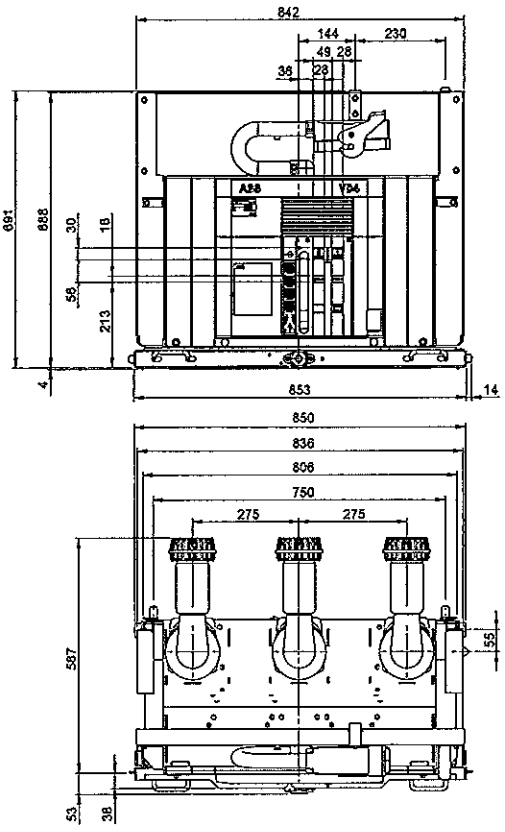
VD4/P		
TN	1VCD003284	
Ur	12	kV
	17.5	kV
Ir	1250	A
	1600	A
Isc	40	kA

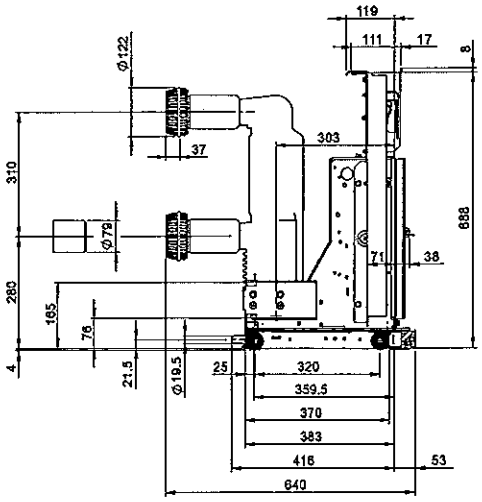




Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube modules

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

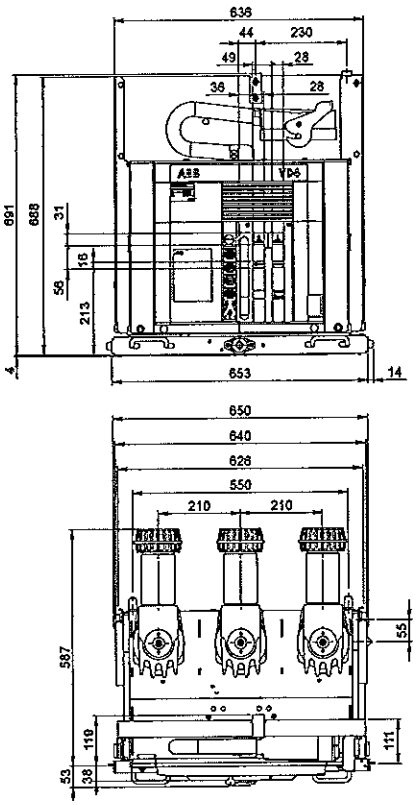


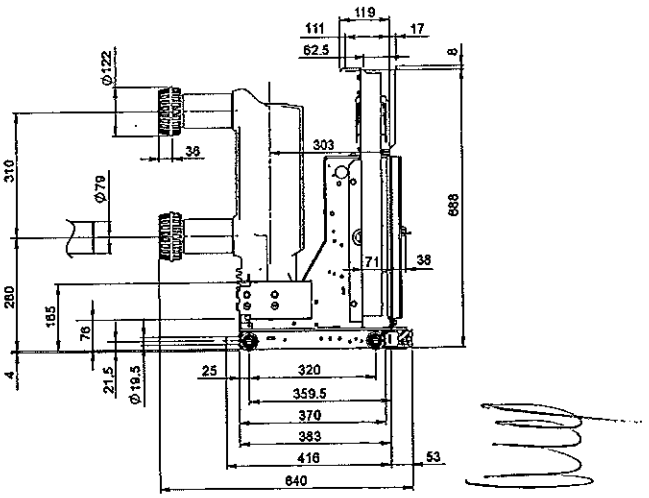


Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube modules

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

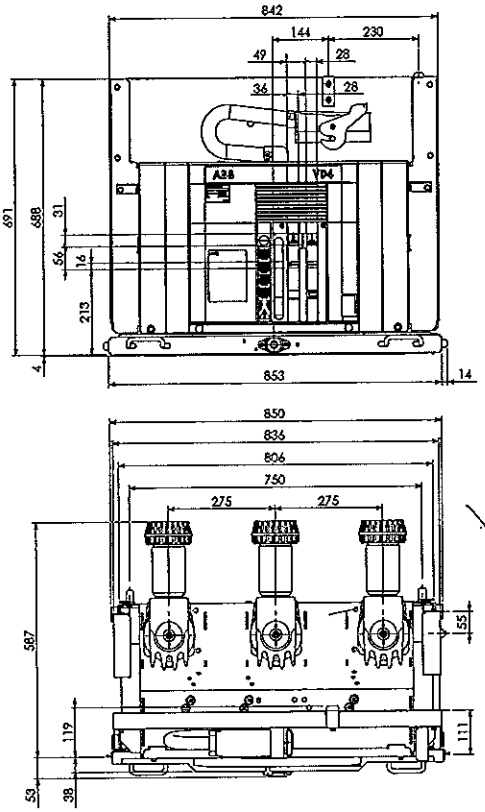


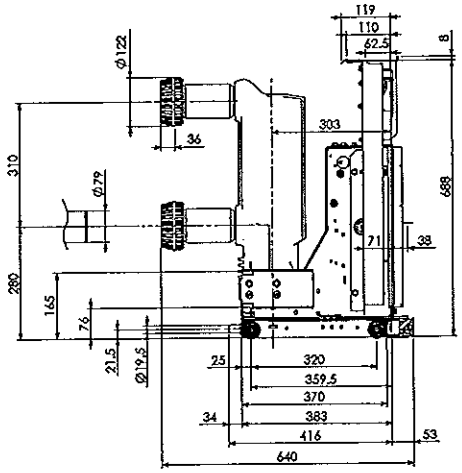


Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube modules

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

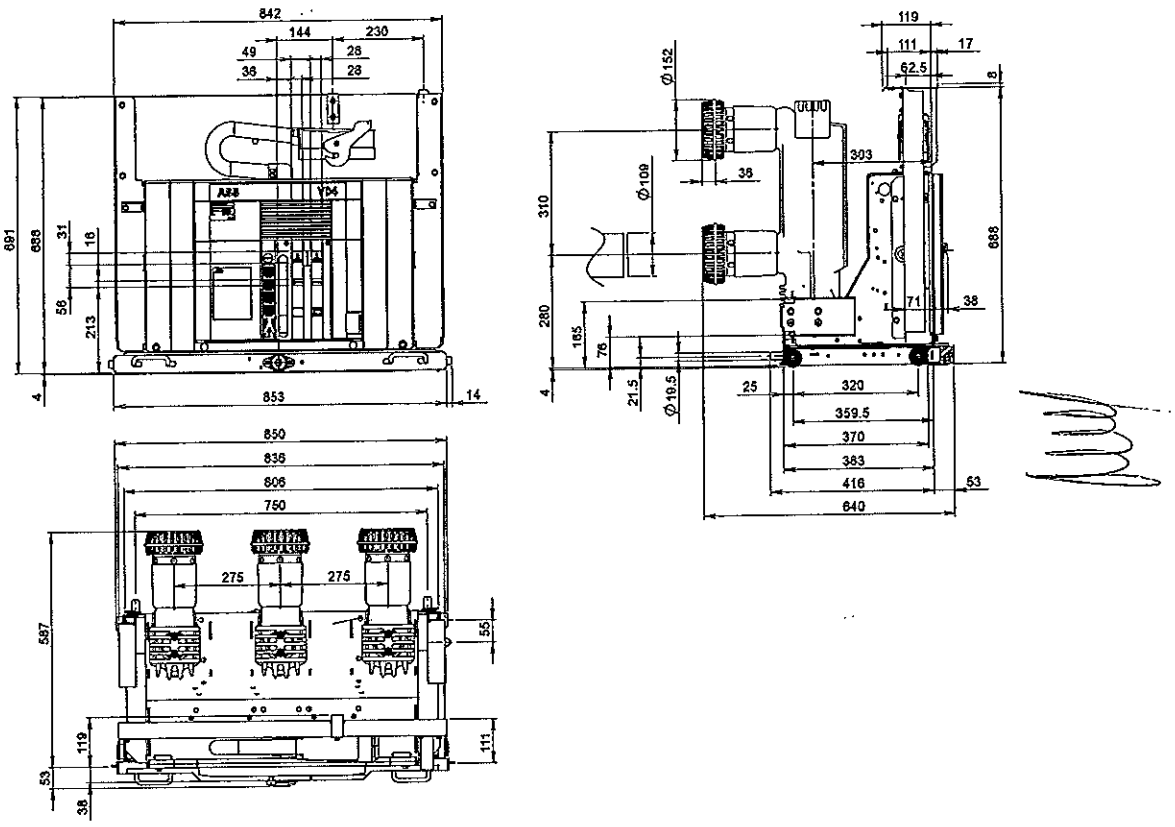
VD4/P		
TN	7416	
Ur	12	kV
	17.5	kV
Ir	2000	A
Isc	40	kA





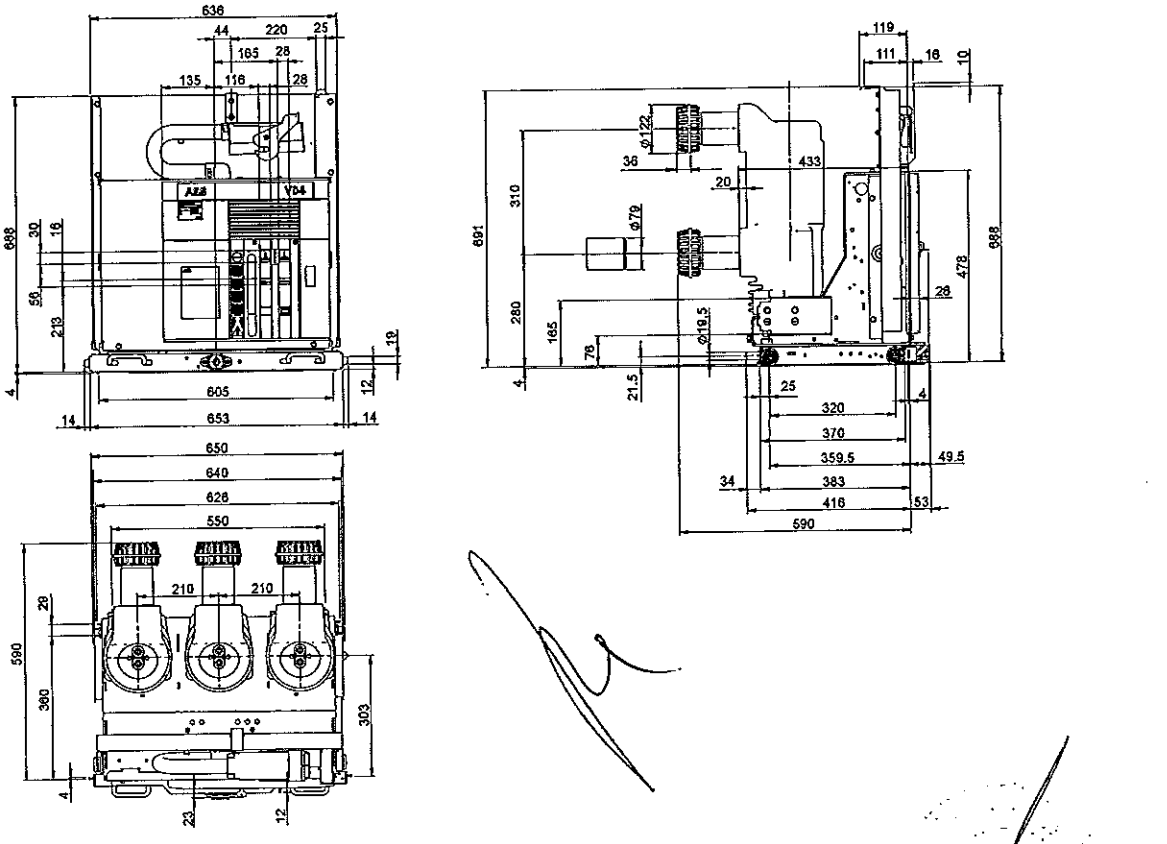
Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube modules

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



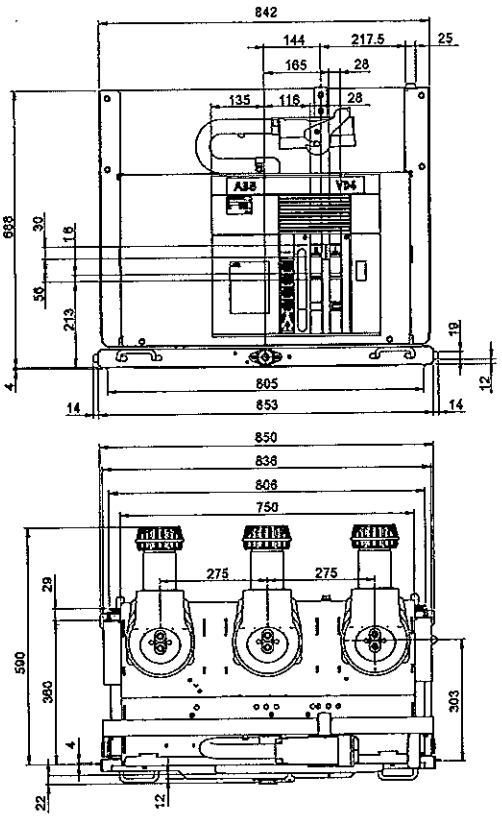
Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube modules

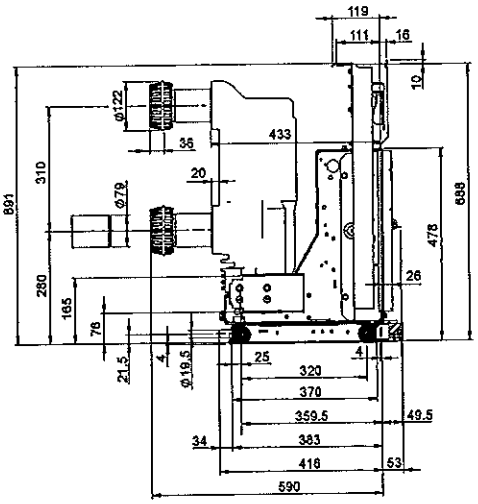
VD4/P		
TN	1VCD003444	
Ur	12	kV
	17.5	kV
Ir	1250	A
	1600	A
	2000	A
Isc	50	kA



Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube modules

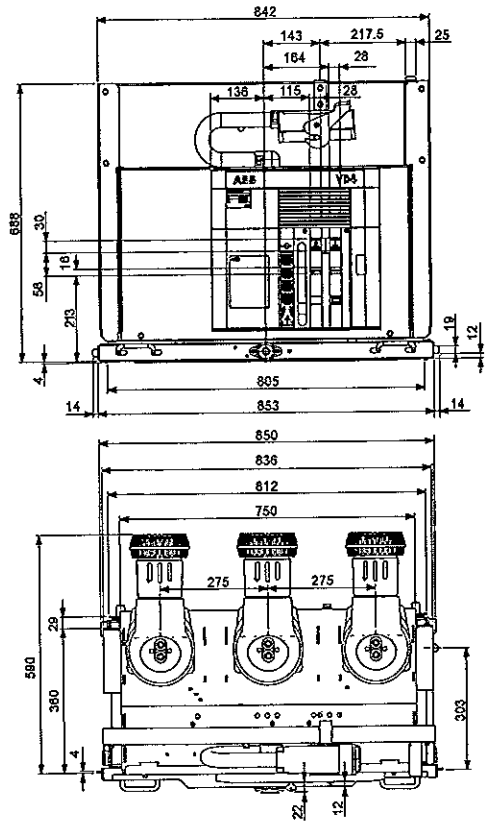
VD4/P		
TN	1VCD003445	
Ur	12	kV
	17.5	kV
Ir	1600	A
	2000	A
Isc	50	kA

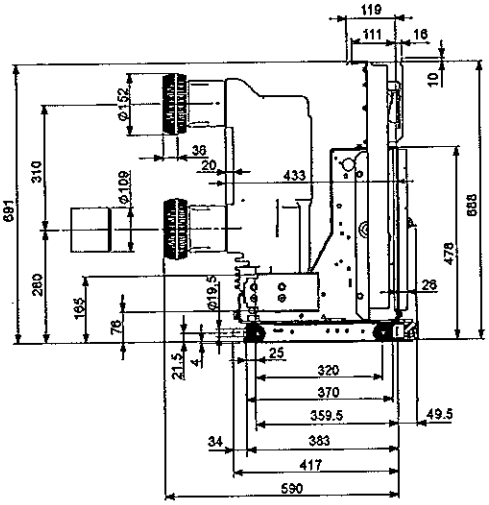




Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube modules

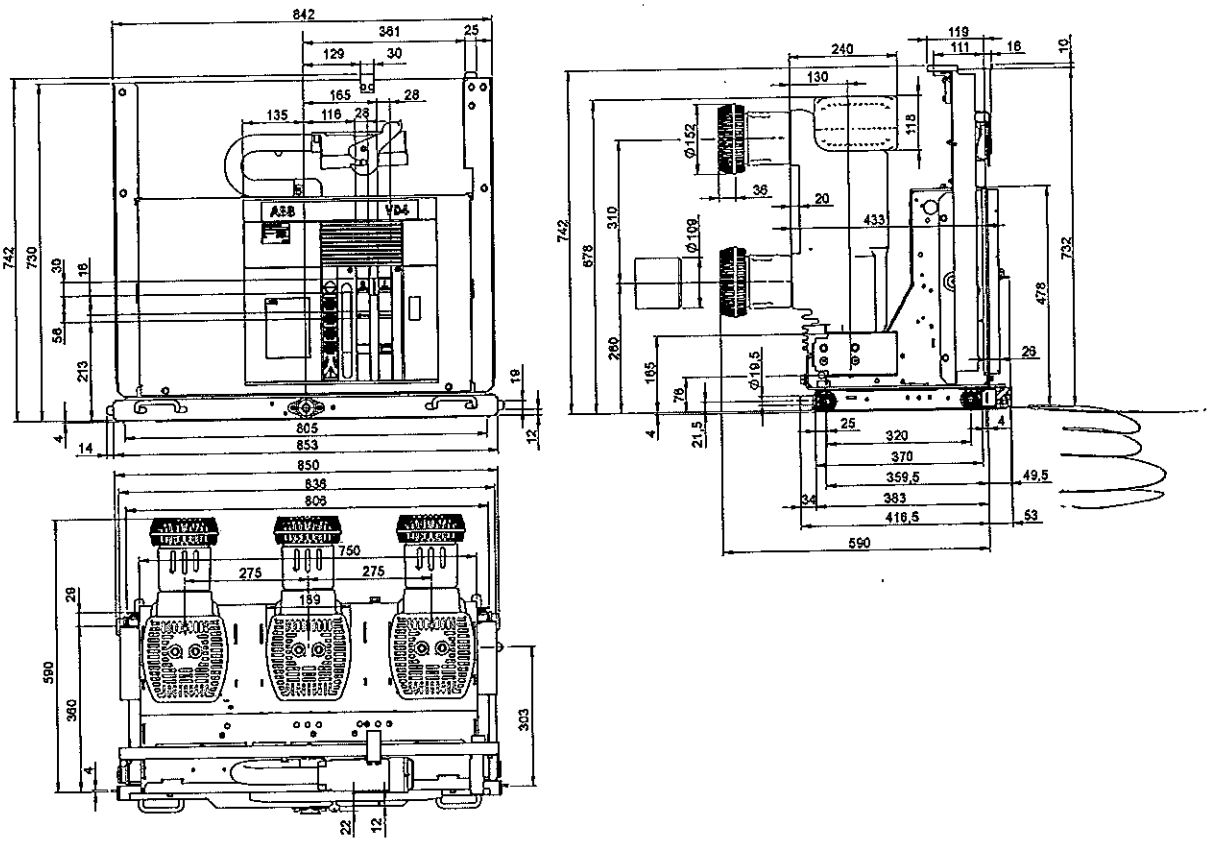
VD4/P		
TN	1VCD003446	
Ur	12	kV
	17.5	kV
Ir	2500	A
Isc	50	kA





Withdrawable circuit-breakers for PowerCube modules

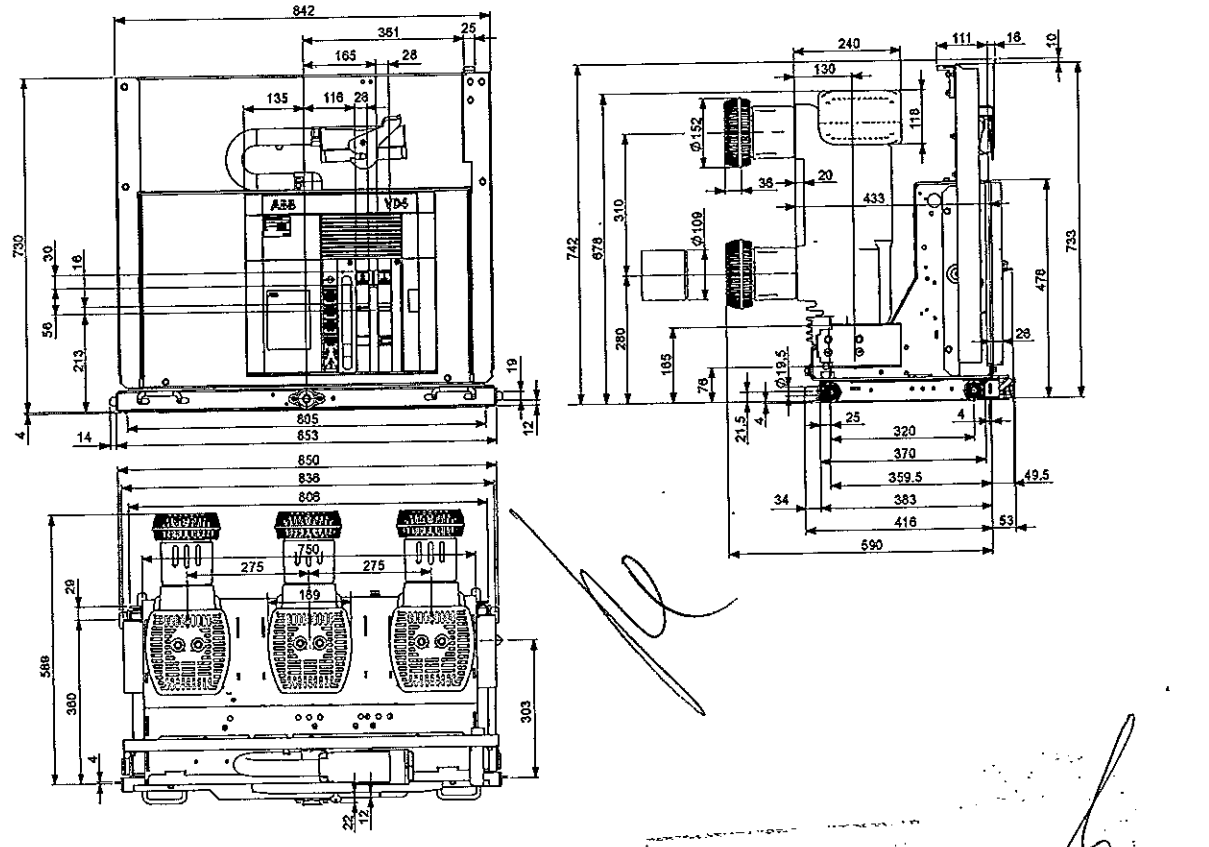
VD4/W		
TN	1VCD003596	
Ur	12	kV
	17.5	kV
Ir	3150	A (*)
Isc	50	kA



(*) 4000 A with forced ventilation.

Withdrawable circuit-breakers for UniGear ZS1 switchgear

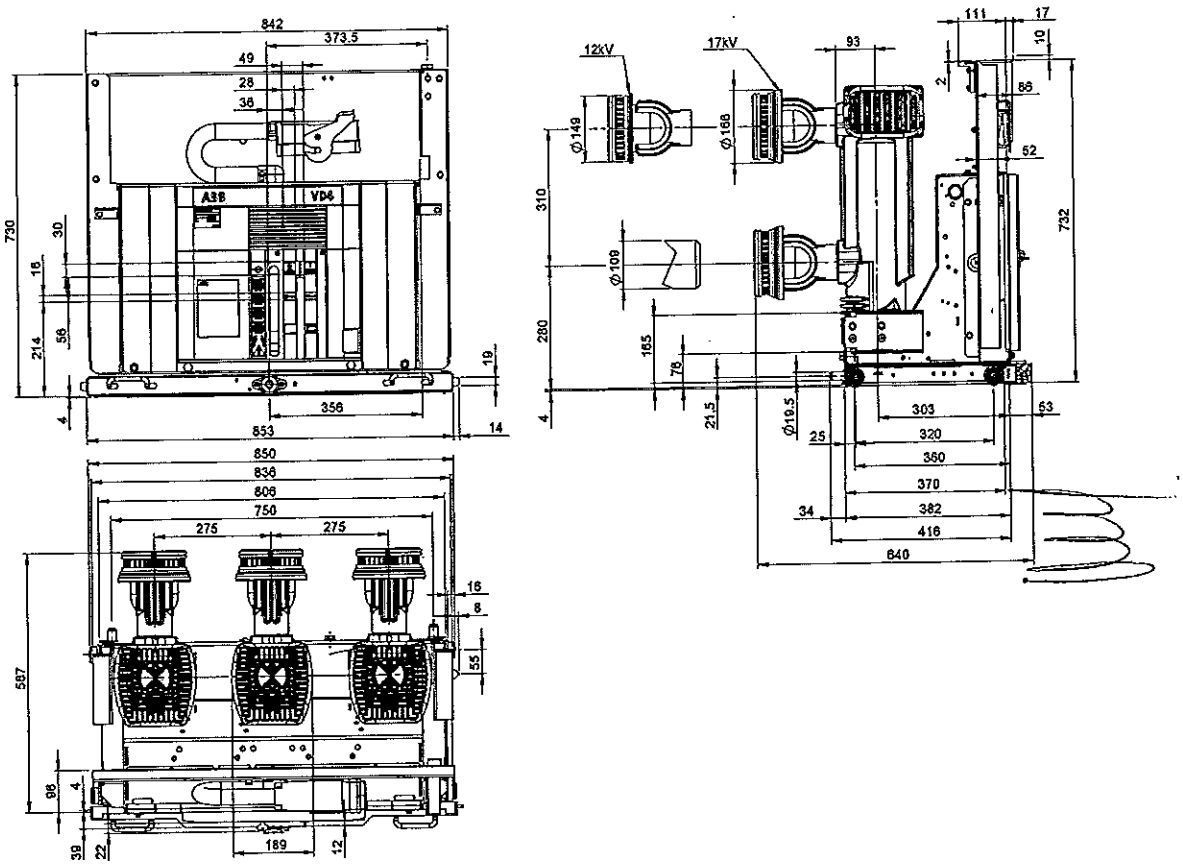
VD4/P		
TN	1VCD003447	
Ur	12	kV
	17.5	kV
Ir	3150	A (*)
Isc	50	kA



(*) 4000 A with forced ventilation.

Withdrawable circuit-breakers for UniGear ZS1 switchgear

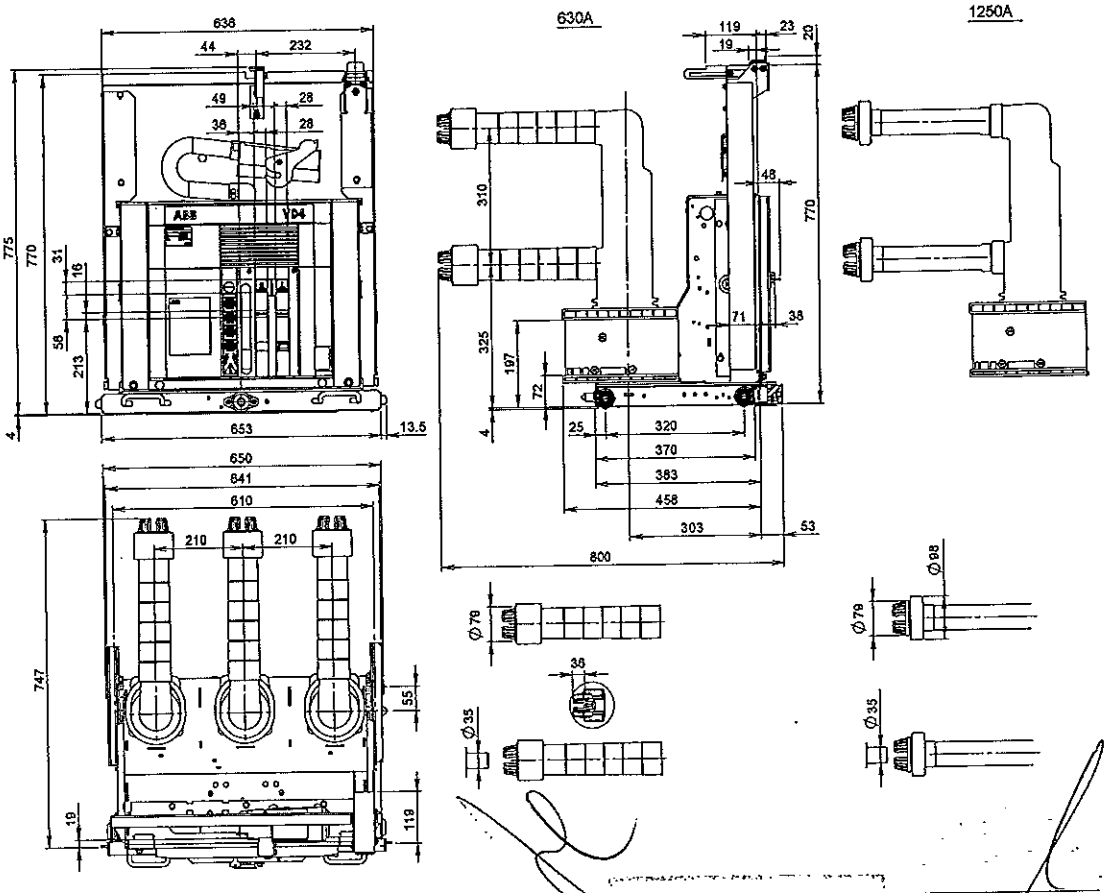
VD4/P		
TN	1VCD000153	
Ur	12	kV
	17.5	kV
Ir	3150	A (*)
Isc	20	kA
	25	kA
	31.5	kA
	40	kA



(*) 4000 A with forced ventilation.

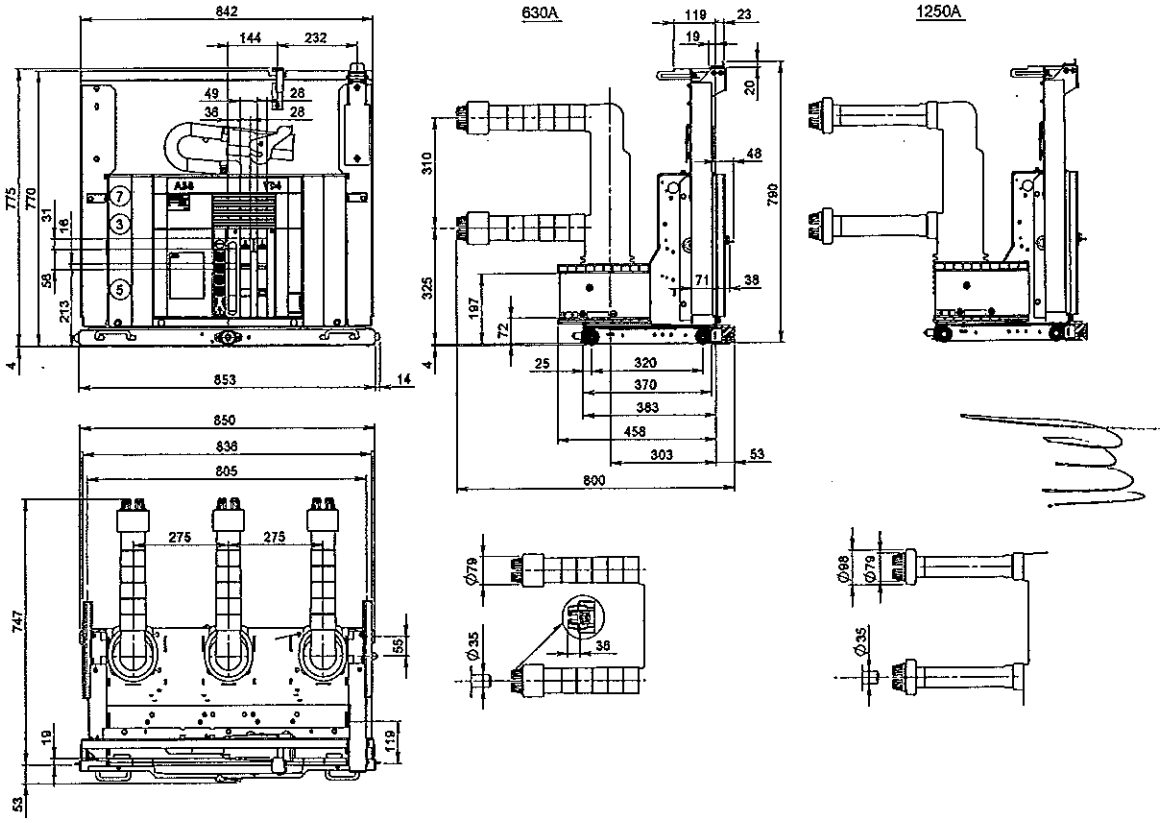
Withdrawable circuit-breakers for UniGear ZS1 switchgear and PowerCube modules

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



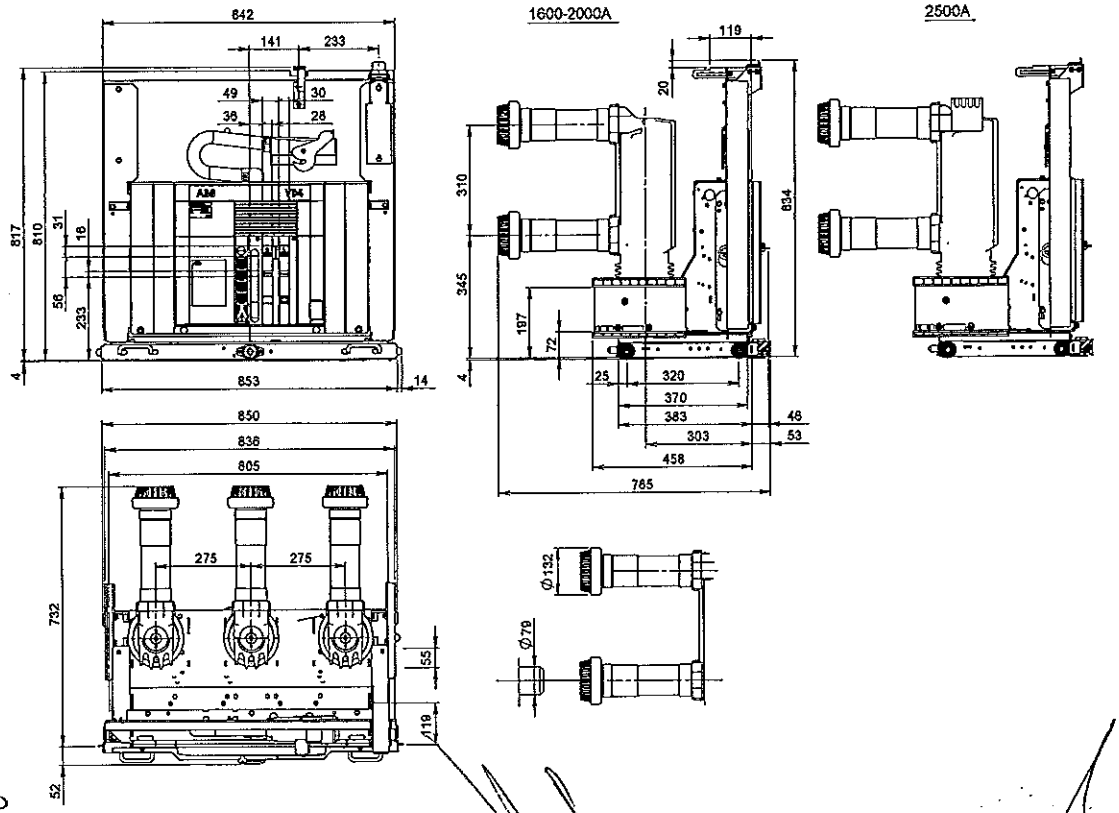
Withdrawable circuit-breakers for UniGear ZS1 switchgear

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

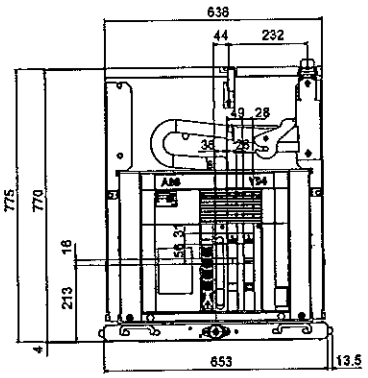
VD4/P		
TN	7418	
Ur	24	kV
Ir	1600	A
	2000	A
	2500	A (1)
Isc	16	kA
	20	kA
	25	kA
	31.5	kA

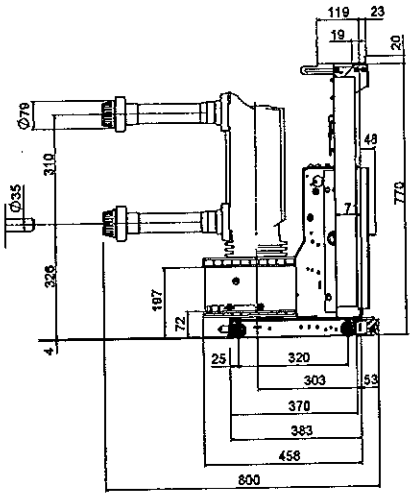


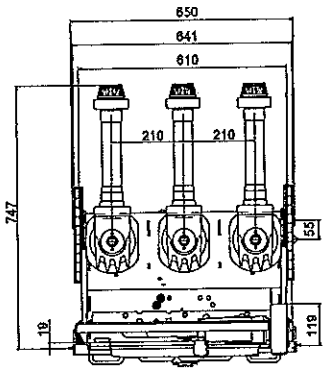
(1) The rated uninterrupted current of 2300 A is guaranteed with natural ventilation. The rated uninterrupted current of 2500 A is guaranteed with forced ventilation.

Withdrawable circuit-breakers for UniGear ZS1 switchgear

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

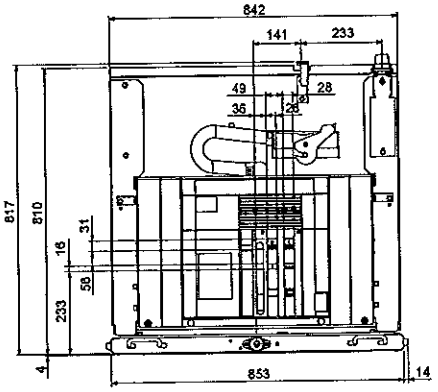


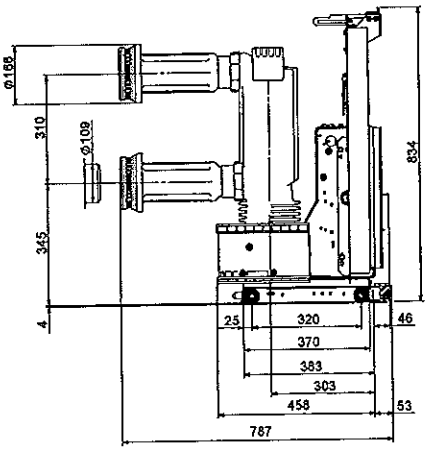


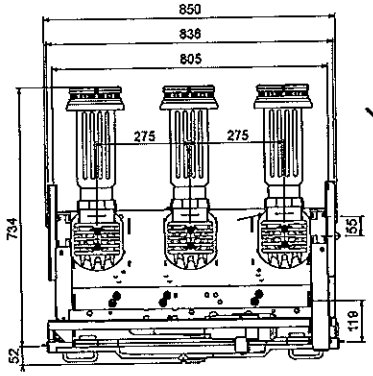


Withdrawable circuit-breakers for UniGear ZS1 switchgear

VD4/P		
TN	1VCD000177	
Ur	24	kV
Ir	2700	A
	3150	A
Isc	31.5	kA

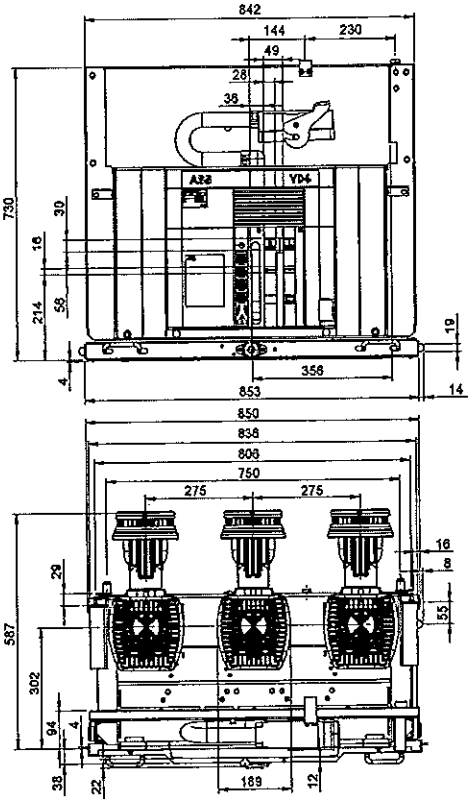


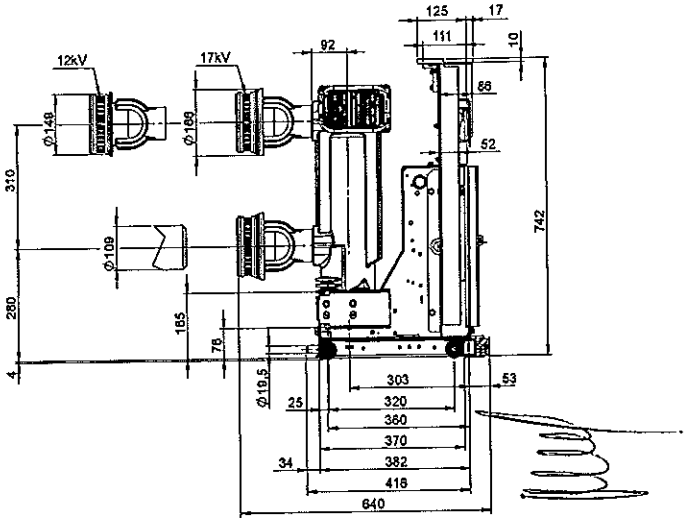




Withdrawable circuit-breakers for PowerCube modules

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

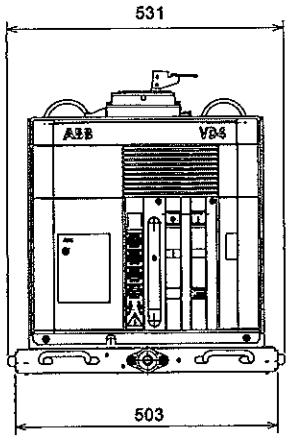


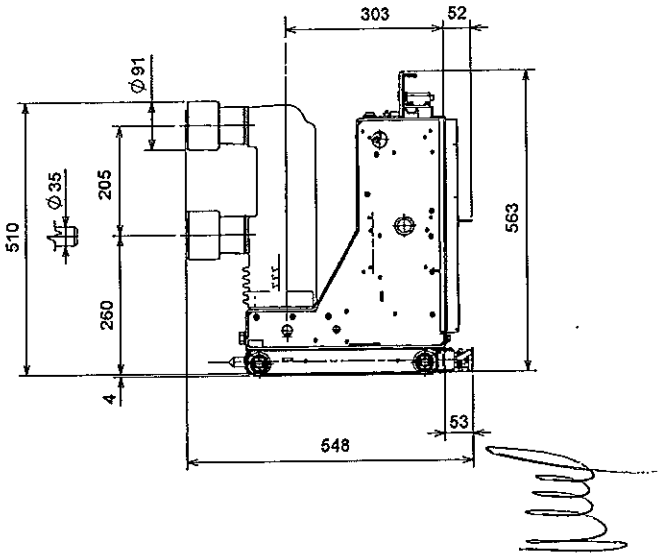


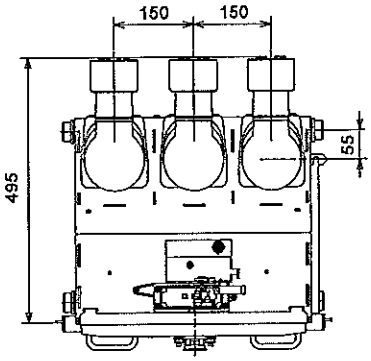
(*) 4000 A with forced ventilation.

Withdrawable circuit-breakers for ZS8.4 switchgear

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

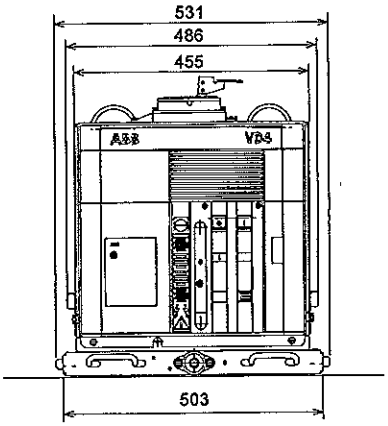


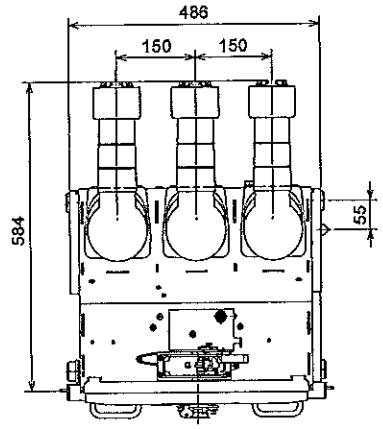


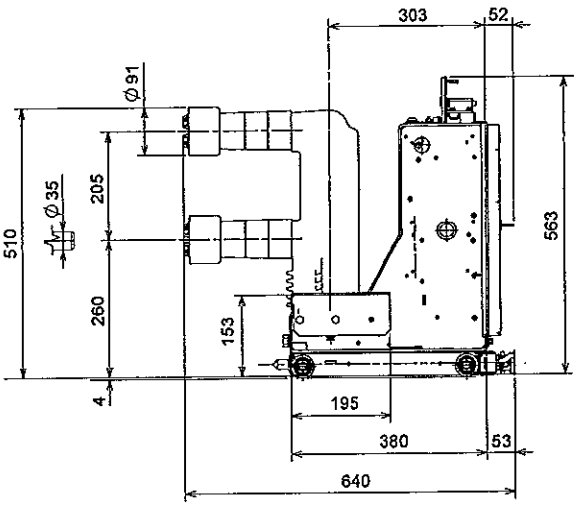


Withdrawable circuit-breakers for ZS8.4 switchgear

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

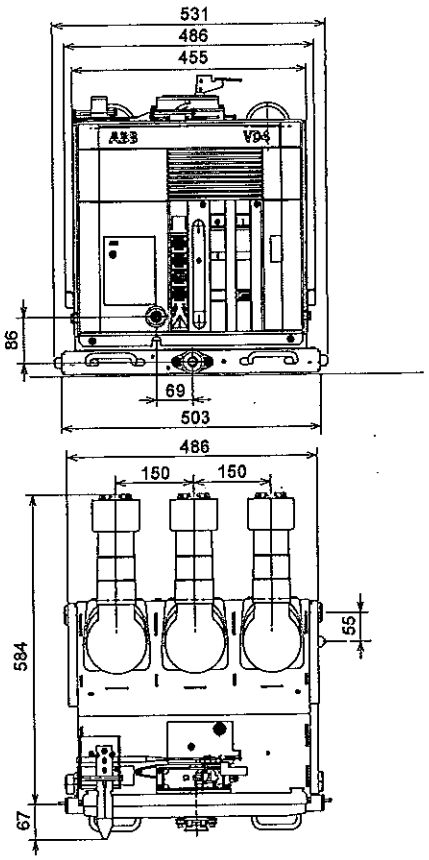


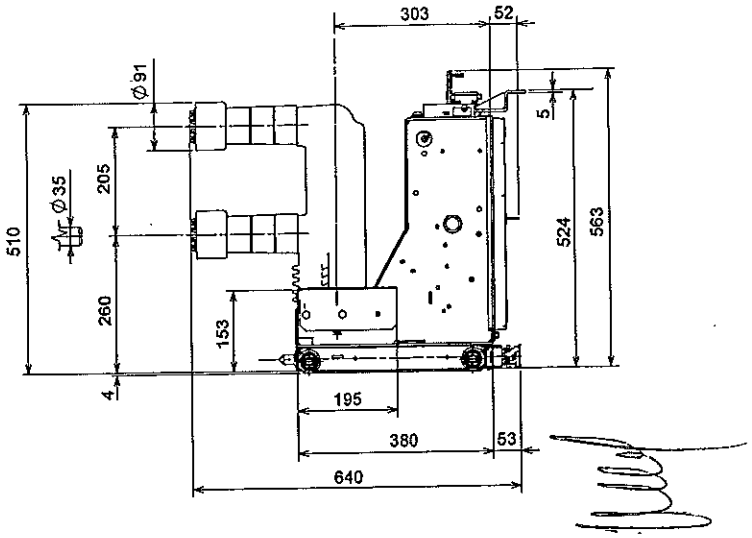




Withdrawable circuit-breakers for ZS8.4 switchgear

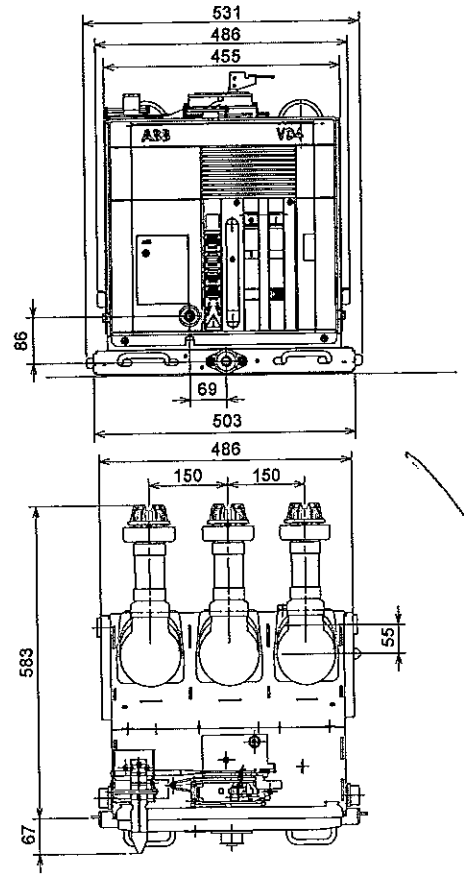
VD4/ZS8		
TN	1VCD000091	
Ur	12	kV
Ir	630	A
Isc	20	kA
	25	kA

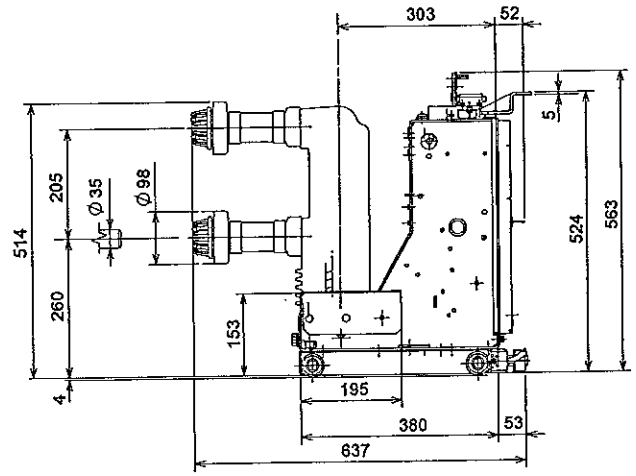




Withdrawable circuit-breakers for ZS8.4 switchgear

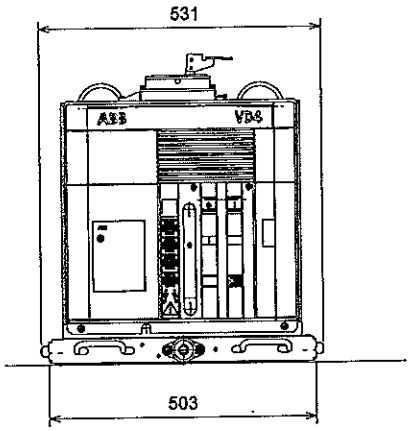
VD4/ZS8		
TN	1VCD000133	
Ur	12	kV
Ir	1250	A
Isc	20	kA
	25	kA

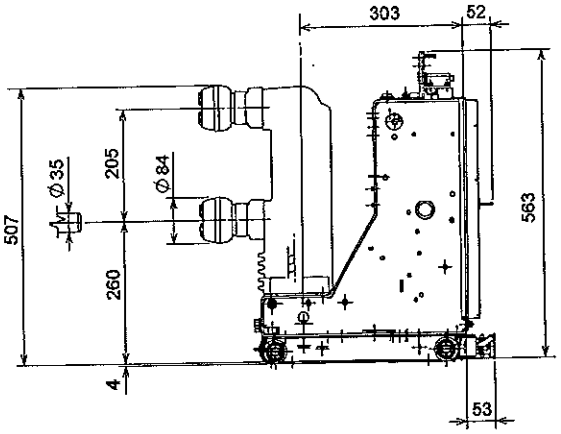


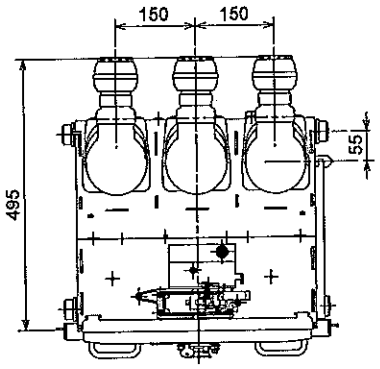


Withdrawable circuit-breakers for ZS8.4 switchgear

VD4/Z8		
TN	1VCD000137	
Ur	12	kV
	17.5	kV
Ir	630	A
	1250	A
Isc	20	kA
	25	kA

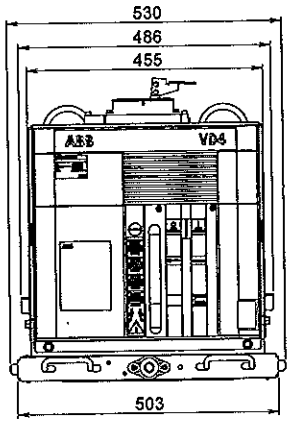


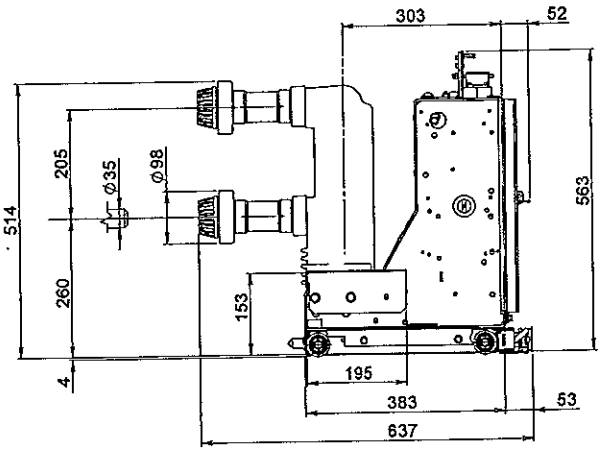


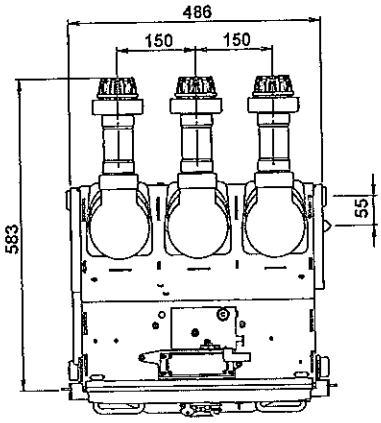


Withdrawable circuit-breakers for ZS8.4 switchgear

VD4/ZT8		
TN	1VCD000134	
Ur	12	kV
	17.5	kV
Ir	630	A
	1250	A
Isc	20	kA
	25	kA

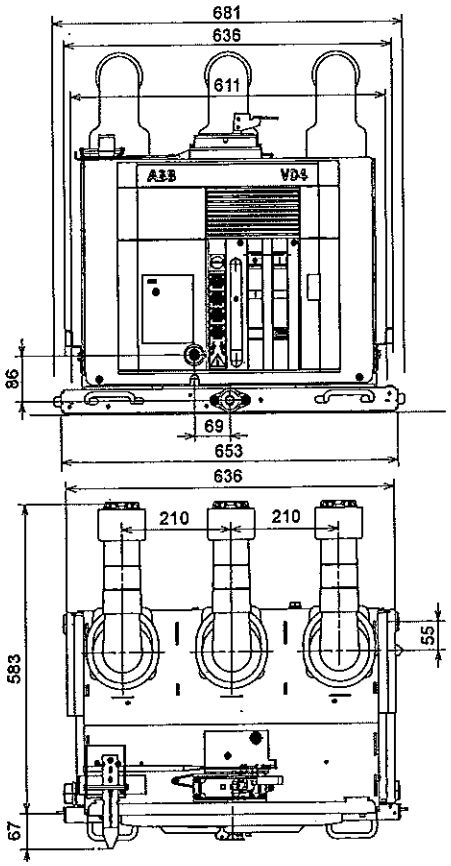


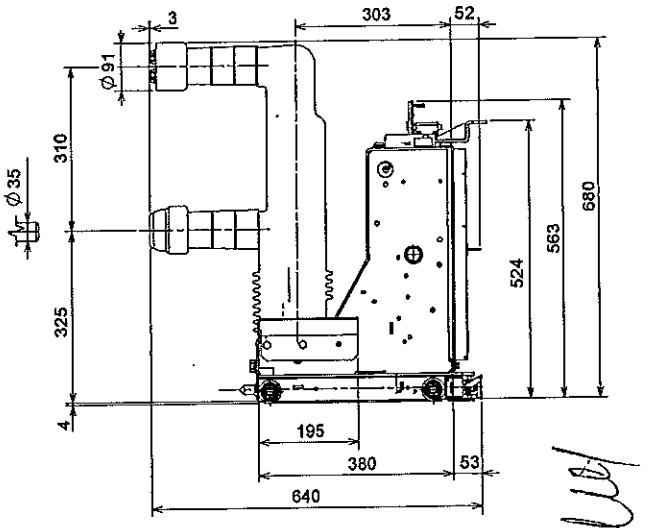




Withdrawable circuit-breakers for ZS8.4 switchgear

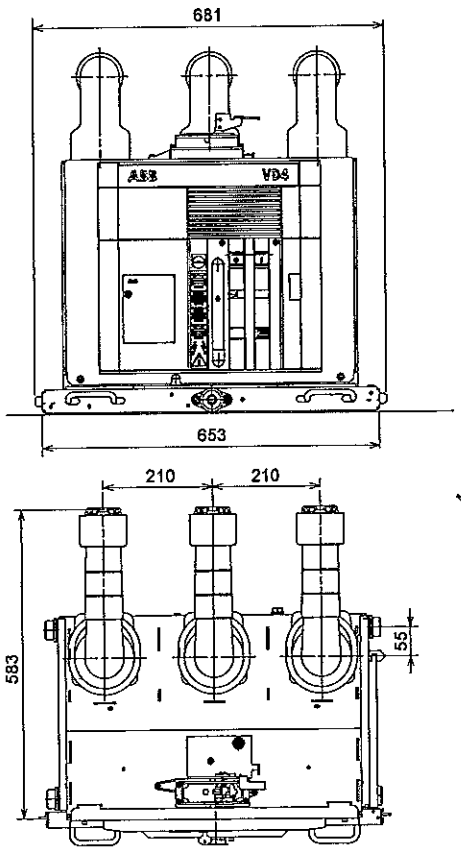
VD4/ZS8		
TN	1VCD000088	
Ur	24	kV
Ir	630	A
Isc	16	kA
	20	kA
	25	kA

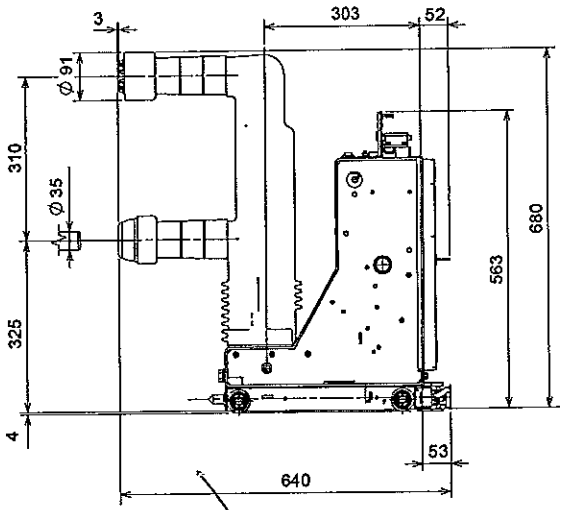




Withdrawable circuit-breakers for ZS8.4 switchgear

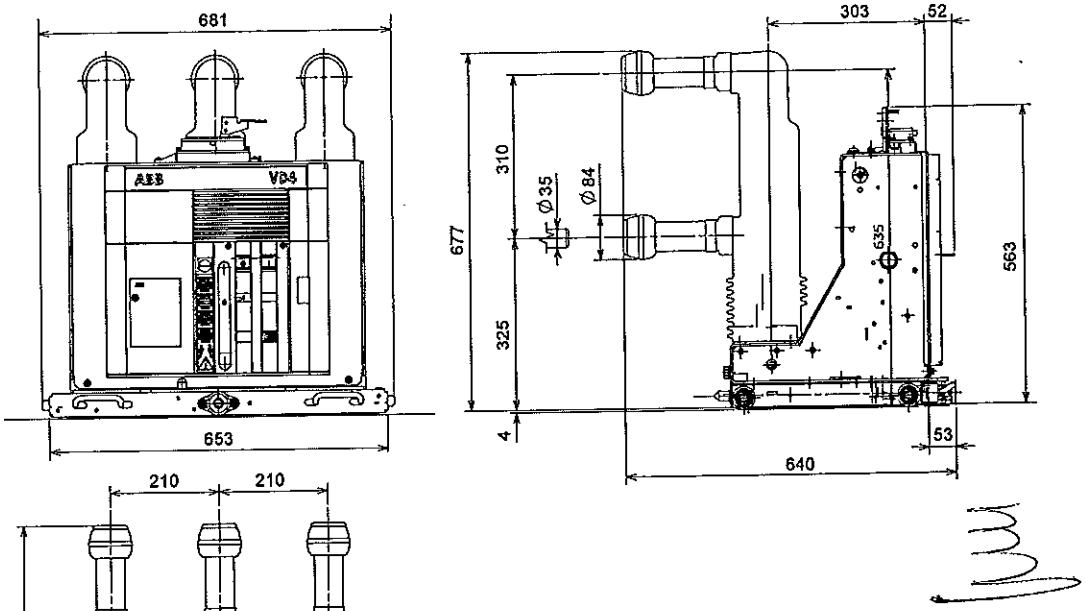
VD4/Z8		
TN	1VCD000089	
Ur	24	kV
Ir	630	A
Isc	16	kA
	20	kA
	25	kA





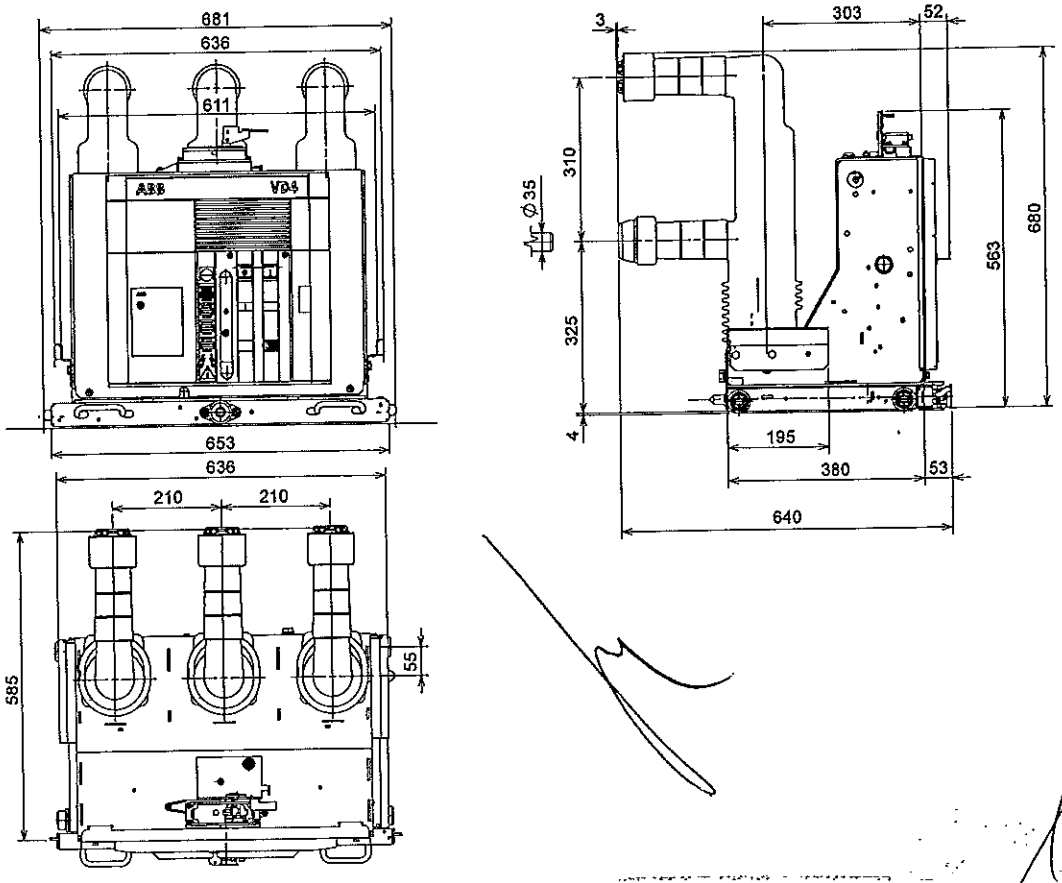
Withdrawable circuit-breakers for ZS8.4 switchgear

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



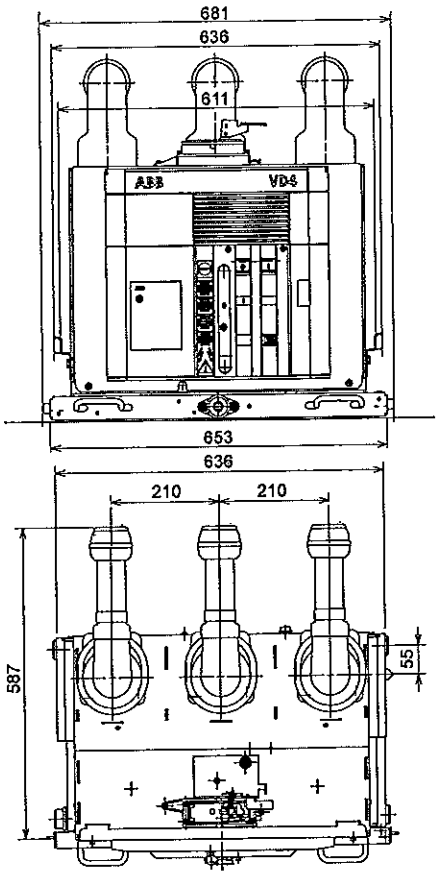
Withdrawable circuit-breakers for ZS8.4 switchgear

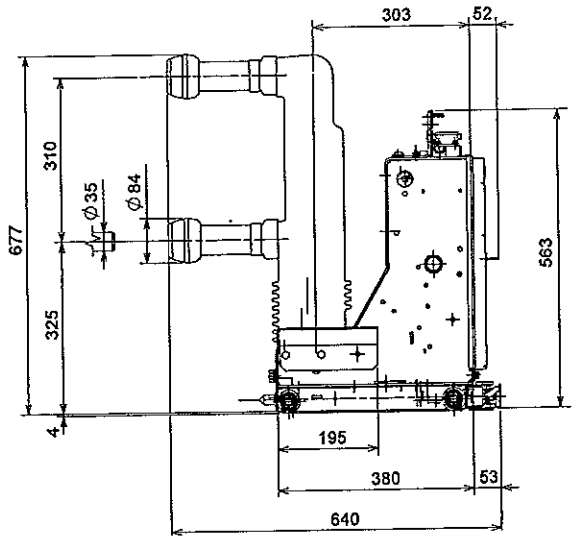
VD4/ZT8		
TN	1VCD000090	
Ur	24	kV
Ir	630	A
Isc	16	kA
	20	kA
	25	kA



Withdrawable circuit-breakers for ZS8.4 switchgear

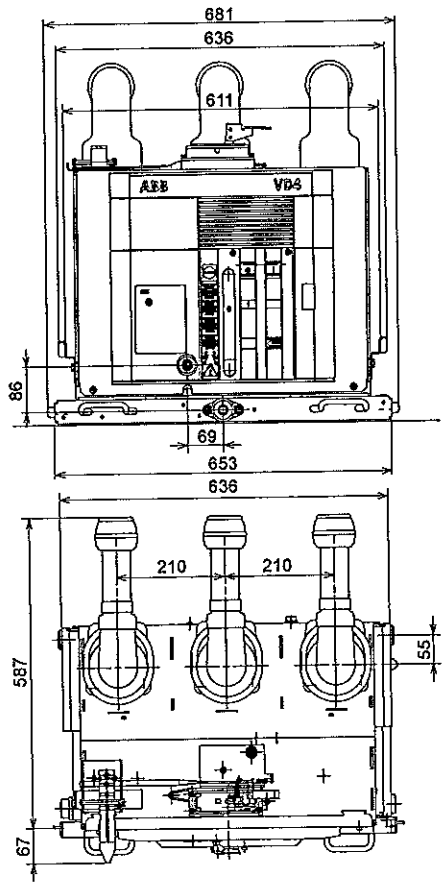
VD4/ZT8		
TN	1VCD000136	
Ur	24	kV
Ir	1250	A
Isc	16	kA
	20	kA
	25	kA

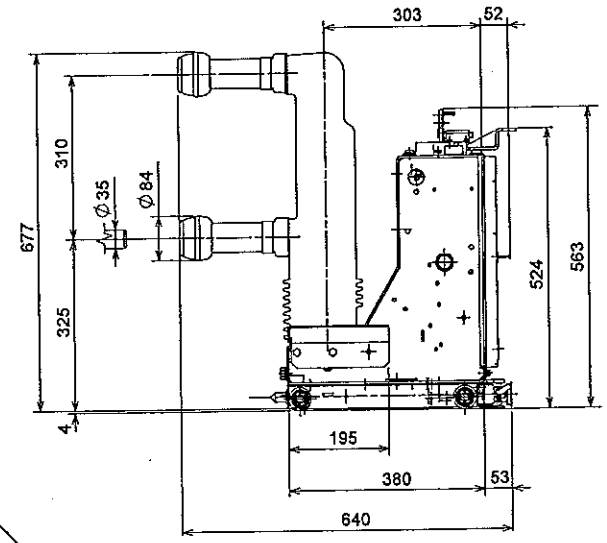




Withdrawable circuit-breakers for ZS8.4 switchgear

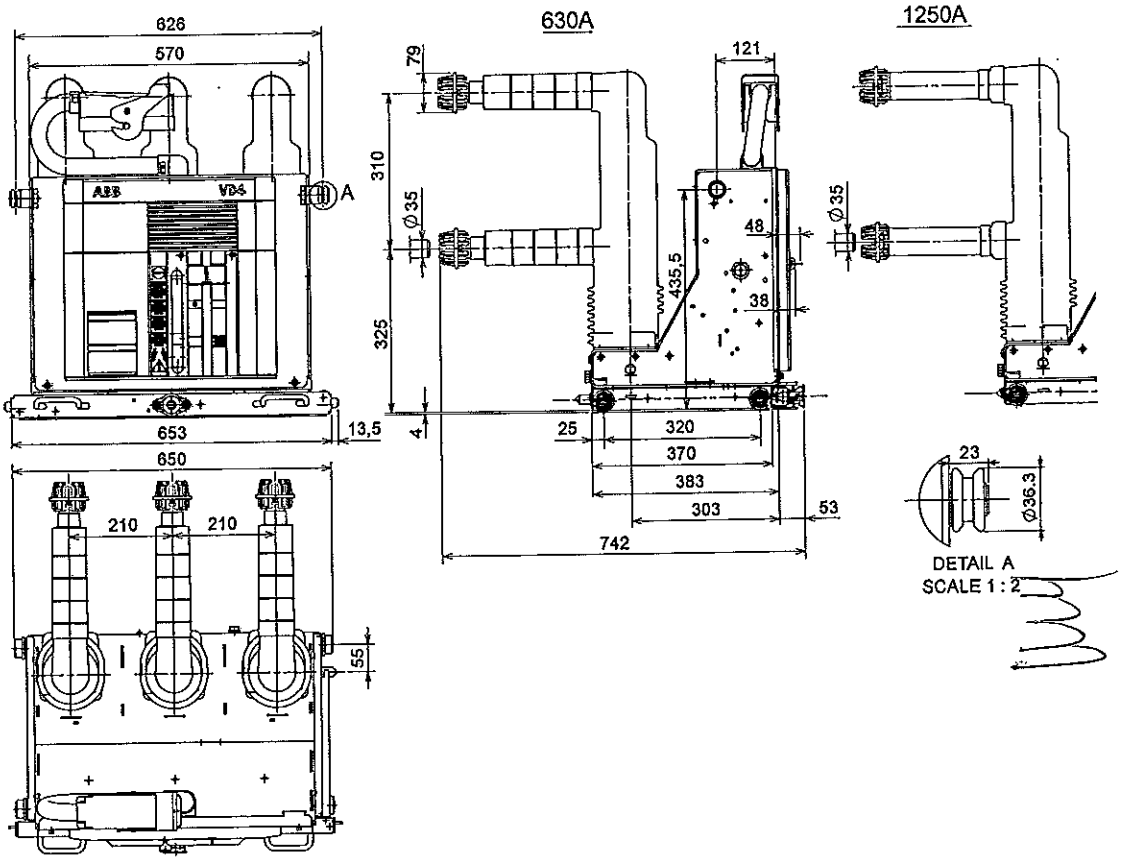
VD4/ZS8		
TN	1VCD000135	
Ur	24	kV
Ir	1250	A
Isc	16	kA
	20	kA
	25	kA





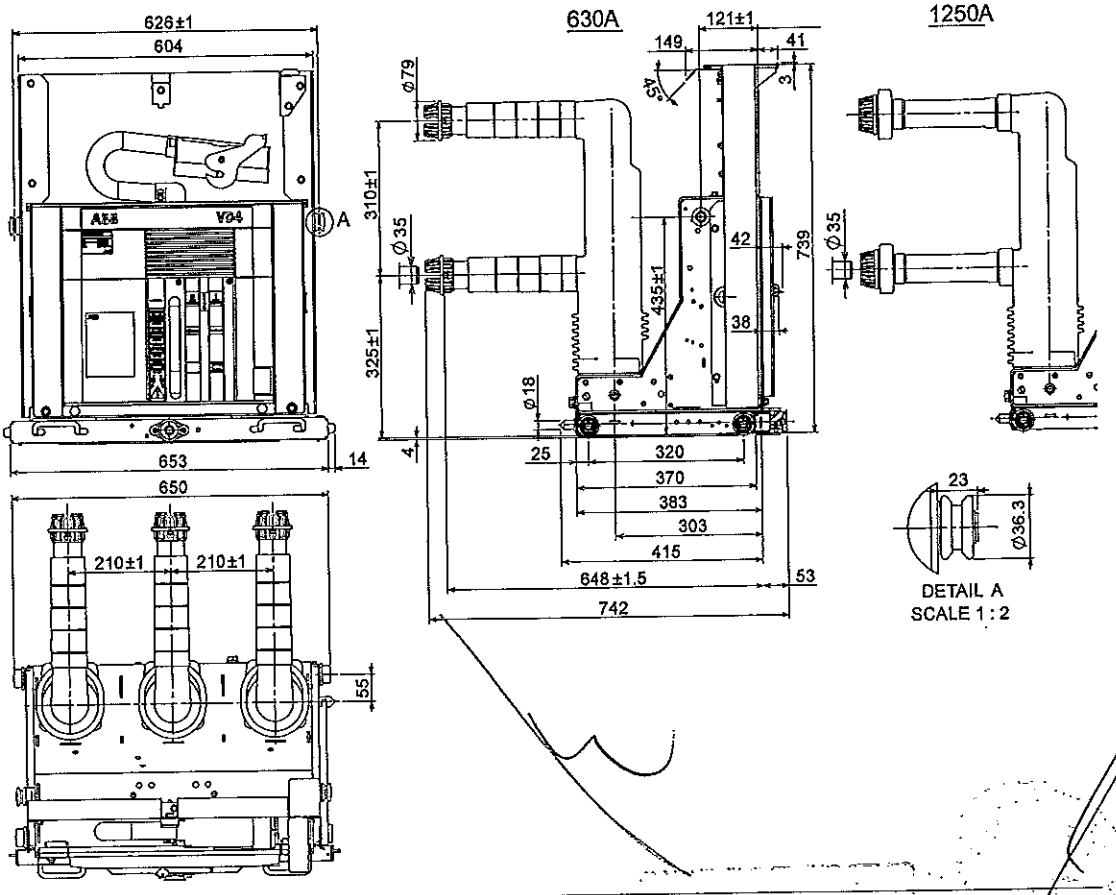
Withdrawable circuit-breakers for UniSwitch / UniMix switchgears

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

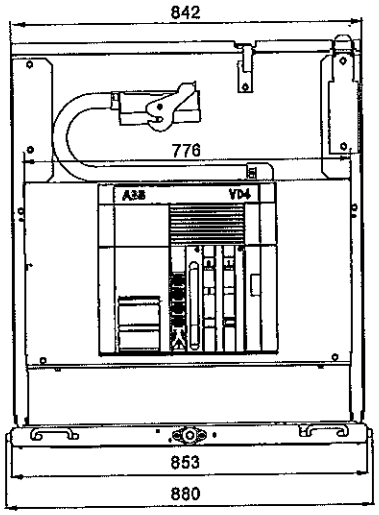


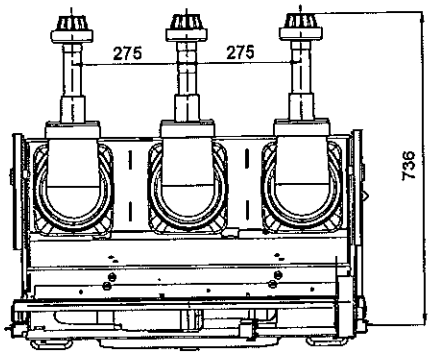
Withdrawable circuit-breakers for UniSec switchgears

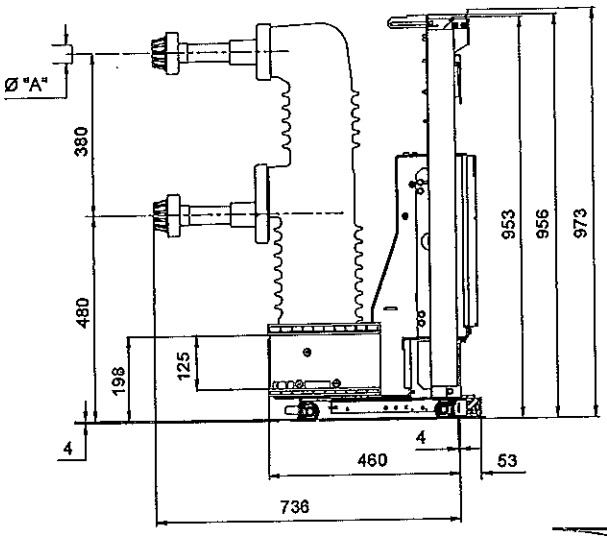
VD4/SEC		
TN	1VCD000190	
Ur	24	kV
Ir	630	A
	1250	A
Isc	16	kA
	20	kA
	25	kA



VD4		
TN	1VYN300901-KG	
Ur	36	kV
Ir	1250	A
	1600	A
	2000	A
Isc	31.5	kA







Breaker type	Ø A mm
VD4 36.12.32	35
VD4 36.16.32 - VD4 36.20.32	79

14. Product quality and environmental protection

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

End of life of product

The ABB company is committed to complying with the relevant legal and other requirements for environment protection according to the ISO 14 001 standard.
The duty of company is to facilitate subsequent recycling or disposal at the end of product life. During disposal of the product, it is always necessary to act in accordance with local legal requirements in force.

Methods of disposal

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

RAW MATERIAL	RECOMMENDED METHOD OF DISPOSAL
Metal material (Fe, Cu, Al, Ag, Zn, W, others)	Separation and recycling
Thermoplasts	Recycling or disposal
Epoxy resin	Separation of metal material and the disposal of rest
Rubber	Disposal
Oil as dielectric (transformer oil)	Draining from equipment and further recycling or disposal
Packing material – wood	Recycling or disposal
Packing material – foil	Recycling or disposal

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647654/011 - Rev. Y, en - Instruction Manual - 2014.03 (VD4 up to 36 kV; up to 50 kA) (gs)(b)

Power and productivity
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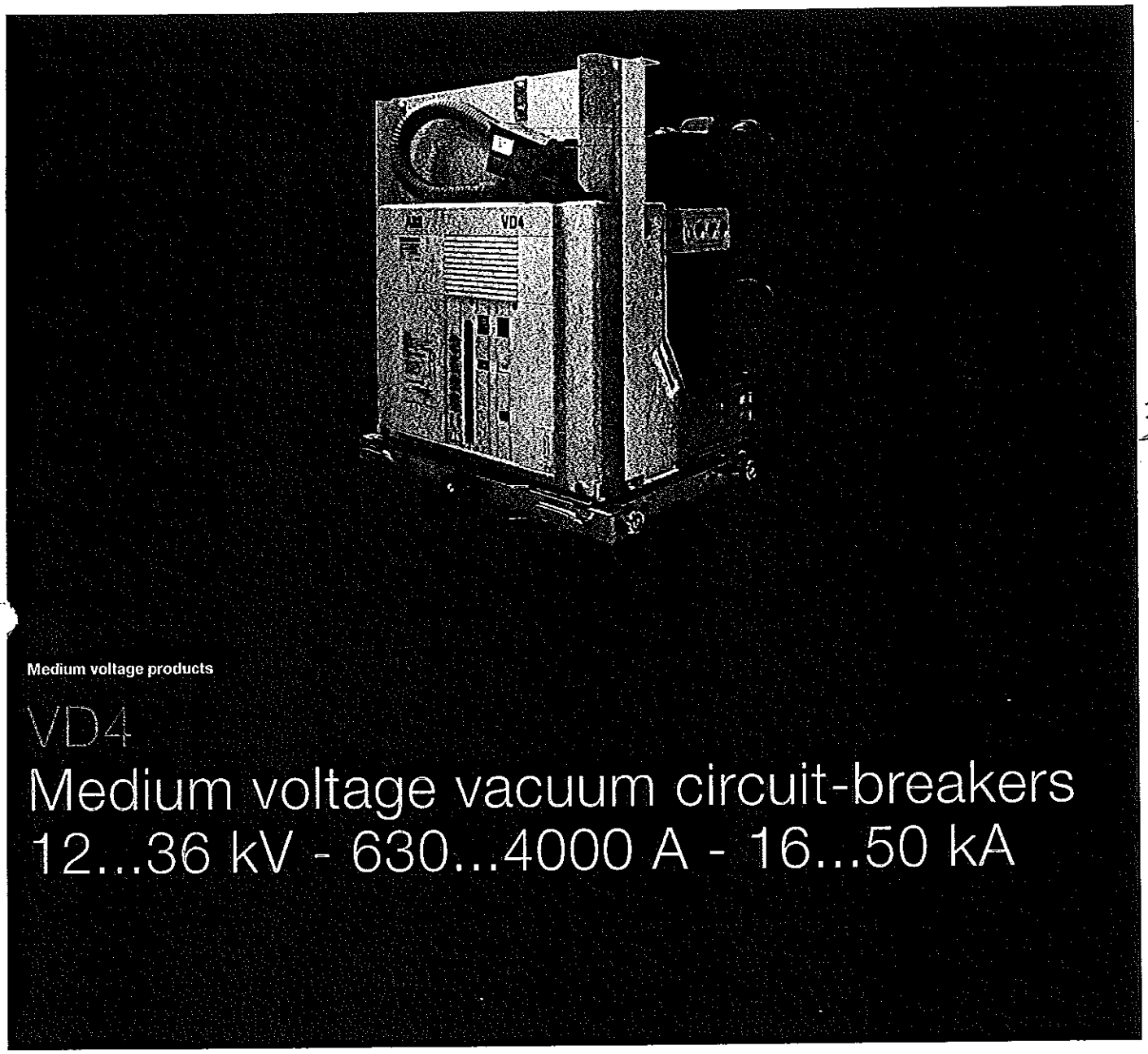
Приложение 1.1 помощен документ_CA_VD4-50kA(EN)V_1VCP000001_DigiPrint



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™

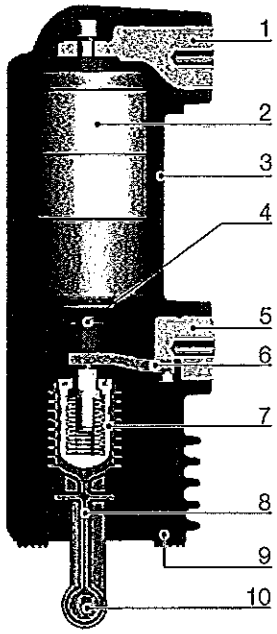
ABB

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

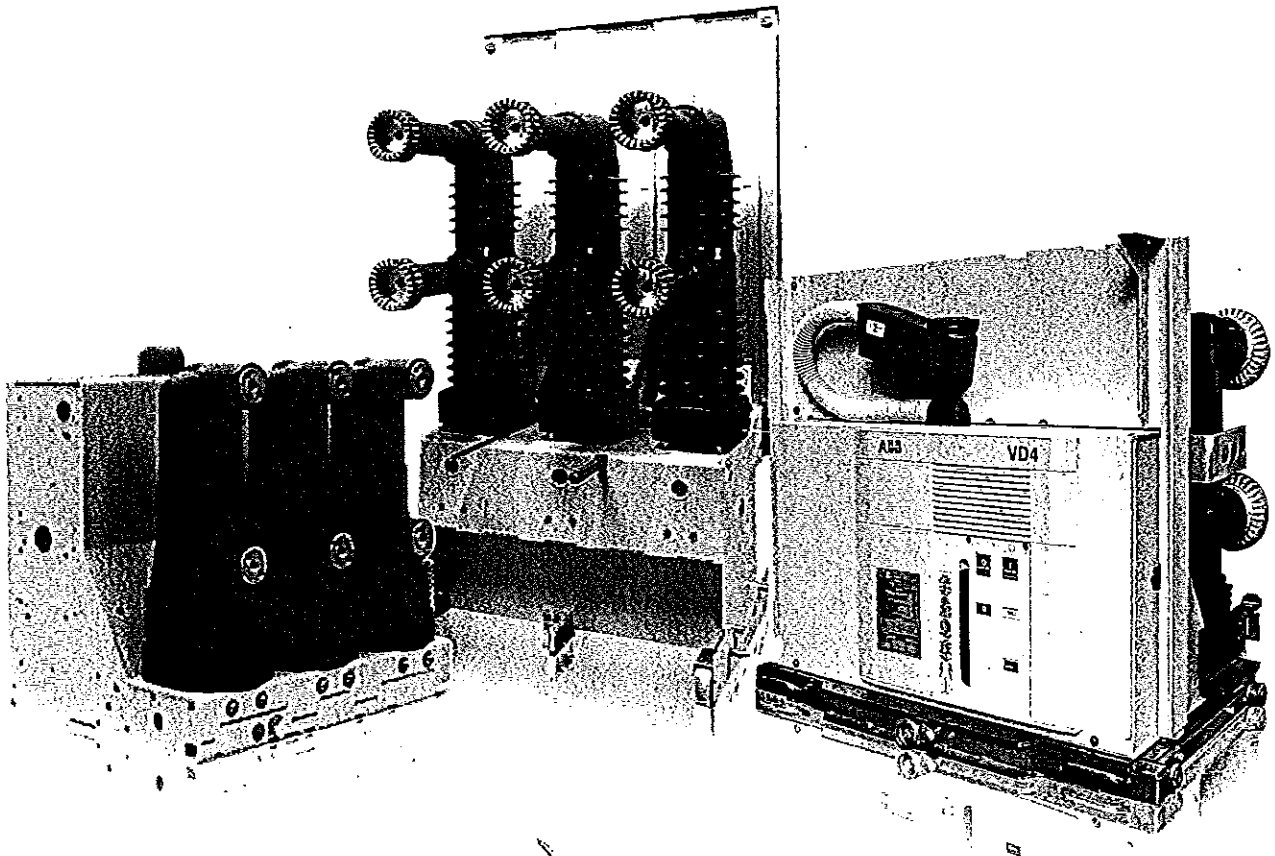
even with minimum distances, interruption of the circuit is also guaranteed when separation of the contacts takes place a few milliseconds before passage of the current through natural zero.
The special geometry of the contacts and the material used, as well as the limited duration and low voltage of 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

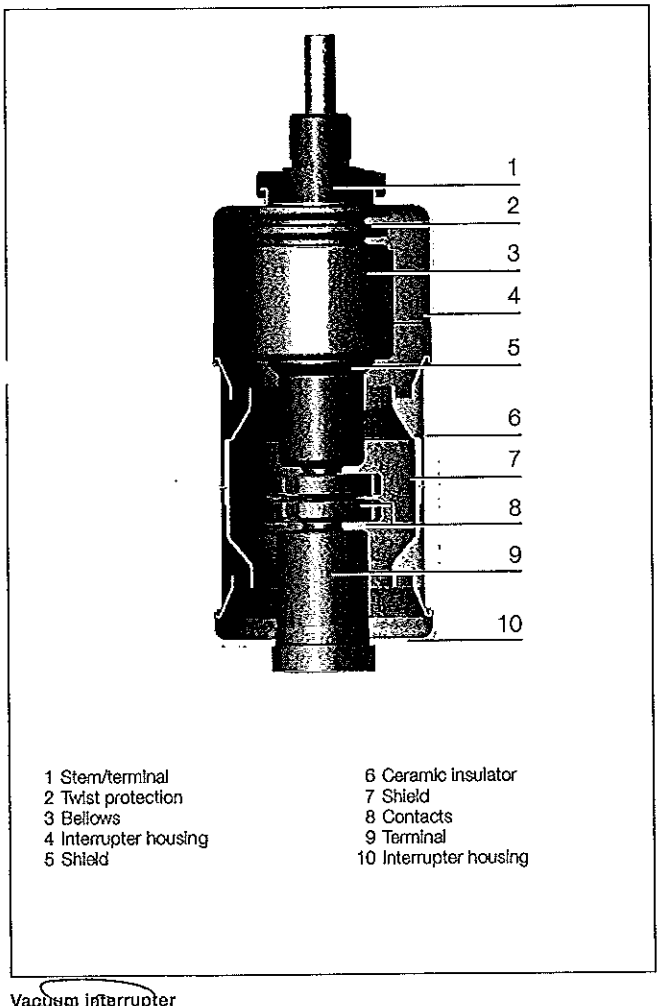
Quenching principle of ABB interrupters

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

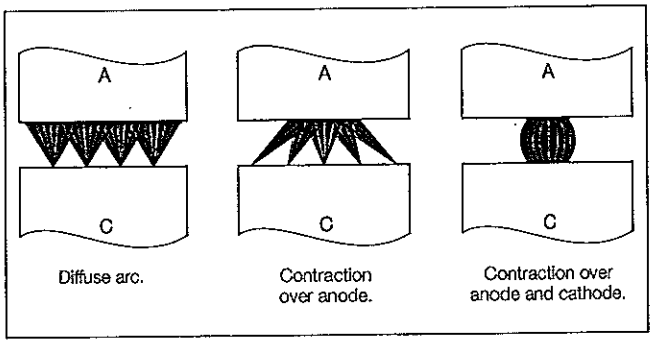
Following contact separation, single melting points form over the entire surface of the cathode, producing metal vapours which support the arc.
The diffuse vacuum arc is characterised by expansion over the contact surface and by an even distribution of thermal stress on the contact surfaces.

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.

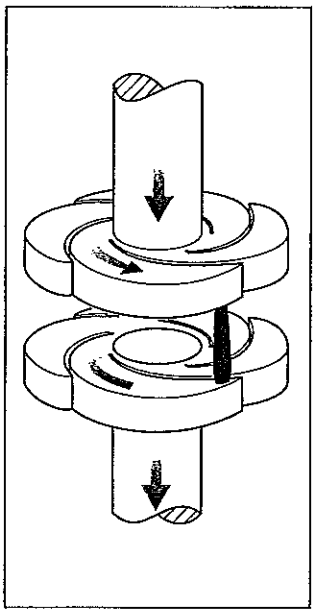
An electromagnetic force is self-generated and this acts tangentially, causing rapid arc rotation around the contact axis.

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

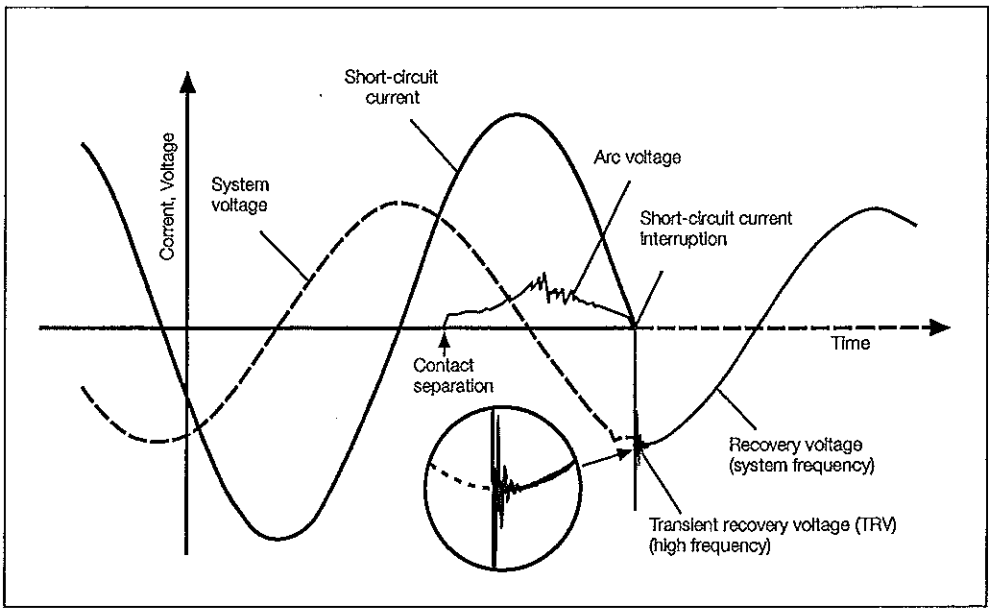
Apart from minimising thermal stress on the contacts, all this makes contact erosion negligible and, above all, allows the interruption process to be controlled even with very high short-circuits.

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.

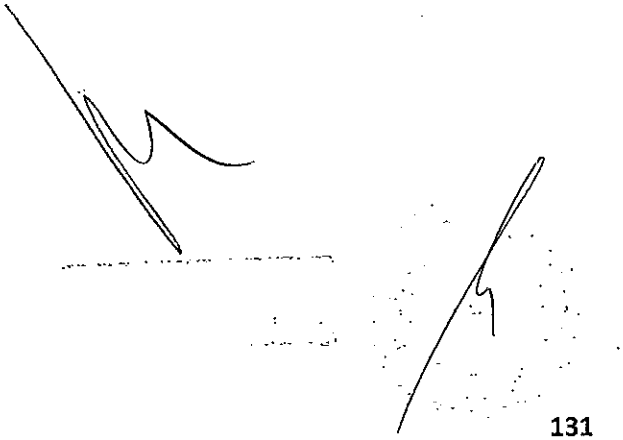
Service safety

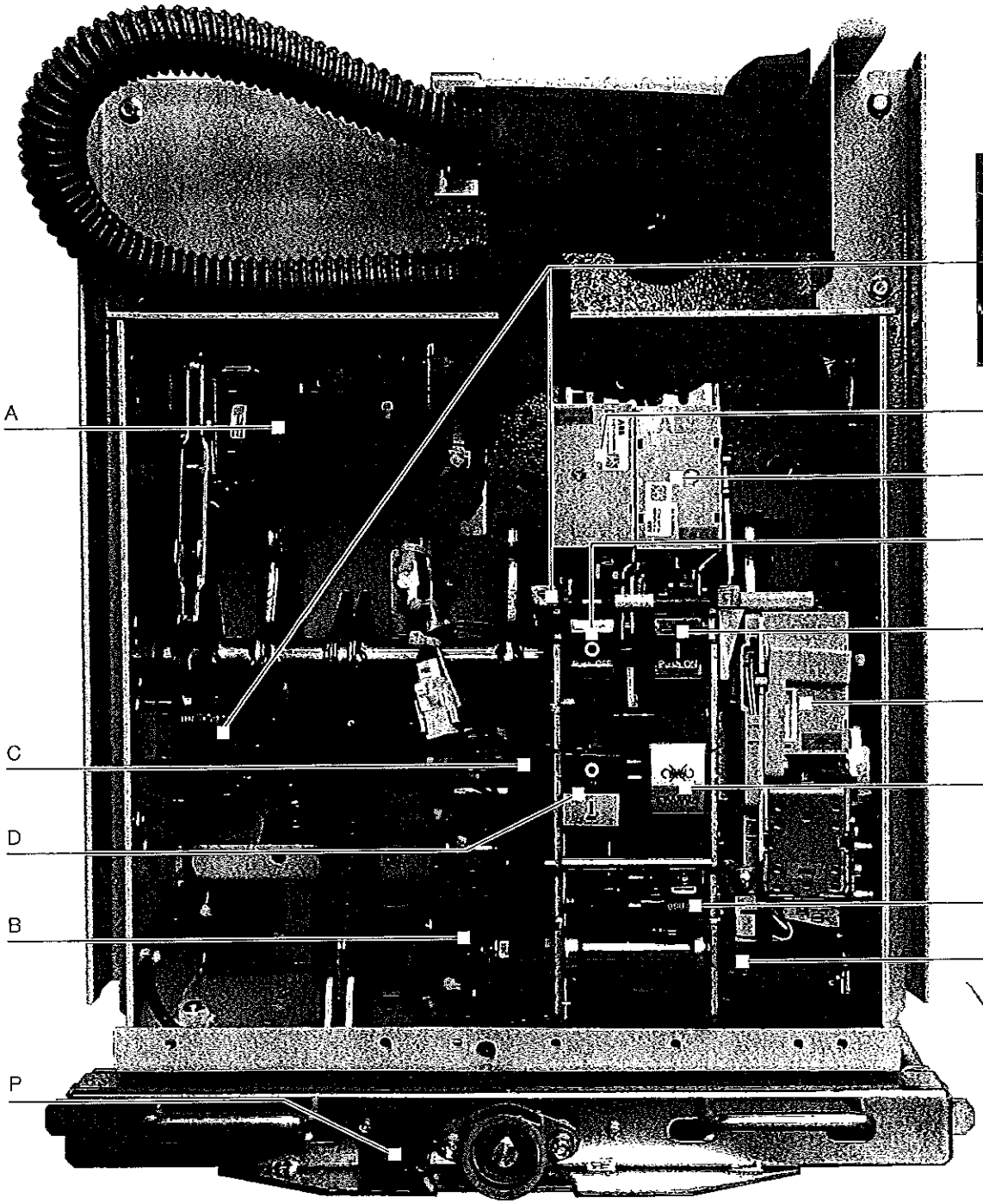
Thanks to the complete range of mechanical and electrical locks (available on request), it is possible to construct safe distribution switchgear with the VD4 circuit-breakers.
The locking devices have been studied to prevent incorrect operations and to inspect the installations whilst guaranteeing maximum 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

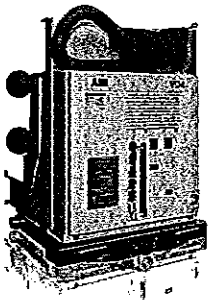
A Open/closed auxiliary contacts
B Geared motor for closing spring charging
C Built-in closing spring charging lever
D Mechanical signalling device for circuit-breaker open/closed
E Mechanical operation counter
F Contacts for signalling spring charged/discharged
G Signalling device for closing springs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

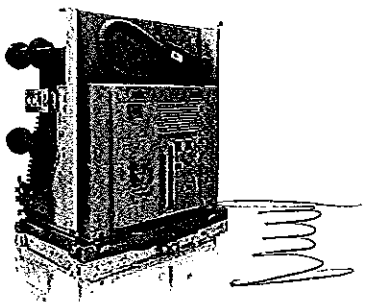
1. Description

General characteristics of the complete VD4 series (*)
The VD4 series of vacuum circuit-breakers conform to the specifications of the following standards:

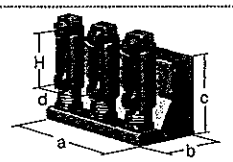
- IEC 62271-1
- IEC 62271-100

(*) 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		-	-	-	•

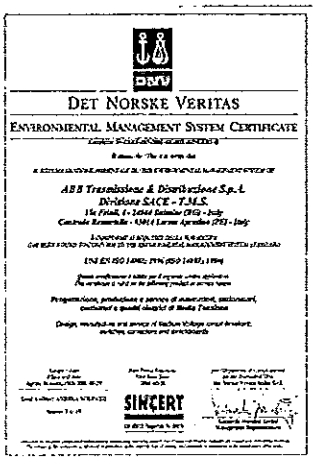


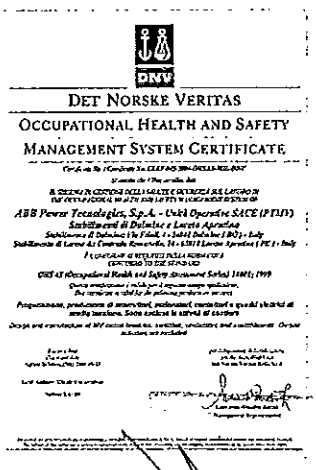
Technical documentation

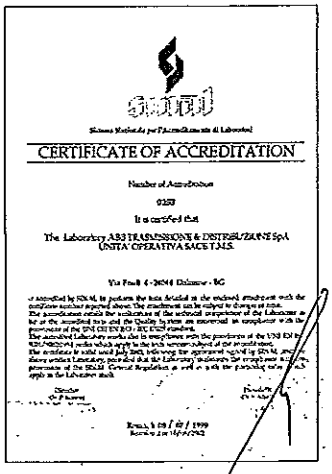
To go into technical and application aspects of the VD4 circuit-breakers in depth, please ask us for the following publications:

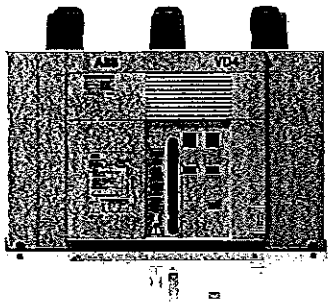
– PowerCube modules	code 1VCP000091
– Powerbloc modules	code BA441/03E
– UniGear ZS1 switchgear	code 1VCP000138
– ZS8.4 switchgear	code L2288
– REF542*plus* unit	code 1VTA100001
– UniSec	cod. 1VFM200003

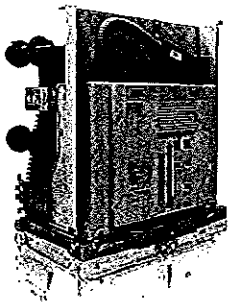

DET NORSKE VERITAS
QUALITY SYSTEM CERTIFICATE

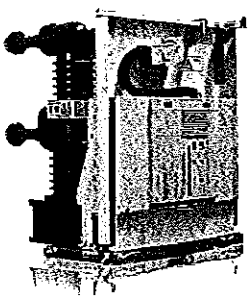

DET NORSKE VERITAS
ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATE


DET NORSKE VERITAS
OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM CERTIFICATE


CERTIFICATE OF ACCREDITATION







	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 [5]
	461 - 599 [5]	599 [5] [7]	631 - 661	876 / 973 [6]	1575
	73 - 105	94 - 180	100 - 110	170 / 210	290 - 350
	•	•	•	•	•
	-	-	-	•	•

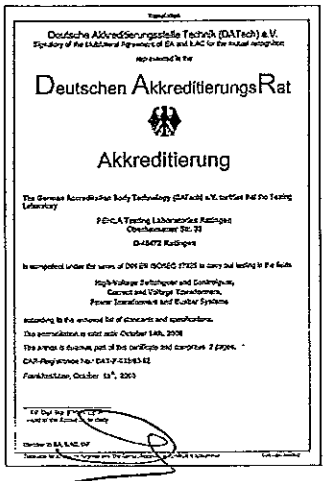
[1] Test voltage according to IEC 62271-1 Standards table 1a, VDE 0670, - part 1000, list 2
[2] With forced ventilation
[3] Higher values on request
[4] 360 mm for fixed version, 280 mm for withdrawable version
[5] Circuit-breaker with eat sink 616 mm (2500 A)
[6] Withdrawable version
[7] Circuit-breaker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


Deutsche Akkreditierungsstelle Technik (DATech) e.V.
Deutschen AkkreditierungsRat
Akkreditierung


Deutsche Akkreditierungsstelle Technik (DATech) e.V.
Deutschen AkkreditierungsRat
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Deutsche Akkreditierungsstelle Technik (DATech) e.V.
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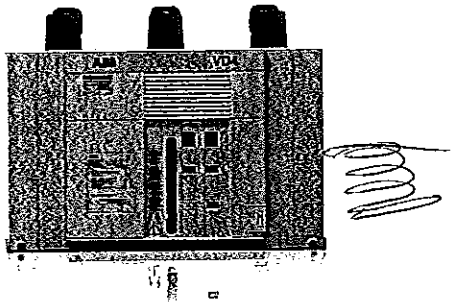
Accreditation

2. Selection and ordering
Fixed circuit-breakers

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



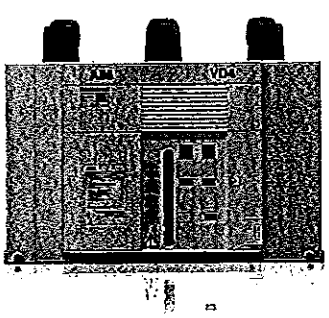
Circuit-breaker		VD4 12									
Standards	IEC 62271-100	•									
Rated voltage	Ur [kV]	12 (2)									
Rated insulation voltage	Us [kV]	12									
Withstand voltage at 50 Hz	Ud (1 min) [kV]	28									
Impulse withstand voltage	Up [kV]	75									
Rated frequency	fr [Hz]	50-60									
Rated normal 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)



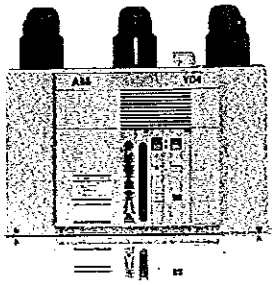
Circuit-breaker		VD4 17									
Standards	IEC 62271-100	•									
Rated voltage	Ur [kV]	17.5									
Rated insulation voltage	Us [kV]	17.5									
Withstand voltage at 50 Hz	Ud (1 min) [kV]	38									
Impulse withstand voltage	Up [kV]	95									
Rated frequency	fr [Hz]	50-60									
Rated normal 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	•									

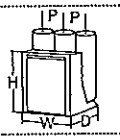
(1) Poles in polyamide
(2) Up to 4000 A with forced ventilation
(3) On request, the closing spring can be loaded by means of a removable crank handle outside operating mechanism (instead of linear loading by a lever built into the front of operating mechanism)

•														
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

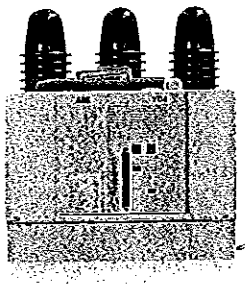
Fixed VD4 circuit-breaker (24 kV) (2)

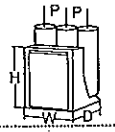


Circuit-breaker		VD4 24						
Standards	IEC 62271-100	•						
Rated voltage	Ur [kV]	24						
Rated insulation voltage	Us [kV]	24						
Withstand voltage at 50 Hz	Ud (1 min) [kV]	50						
Impulse withstand voltage	Up [kV]	125						
Rated frequency	fr [Hz]	50-60						
Rated normal current (40 °C)	Ir [A]	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]											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 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	
		u/l=205			u/l=310		u/l=310			u/l=310		u/l=310	
kV	kA	l/g=217.5			l/g=238		l/g=237.5			l/g=237		l/g=237.5	
		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]											
		H=461			H=589		H=599			H=610		H=635	
		D=424			D=424		D=424			D=459		D=459	
		u/l=205			u/l=310		u/l=310			u/l=310		u/l=310	Circuit-breaker type
kV	kA	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 p276
	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	
kV	kA	u/l=310		u/l=310	
		l/g=282.5		l/g=282.5	
		P=210	P=275	P=275	
		W=570	W=700	W=700	
24	16	630			VD4 24.06.16 p210
	20	630			VD4 24.06.20 p210
	25	630			VD4 24.06.25 p210
	16	1250			VD4 24.12.16 p210
	20	1250			VD4 24.12.20 p210
	25	1250			VD4 24.12.25 p210
	31.5	1250			VD4 24.12.32 p210
	16		630		VD4 24.06.16 p275
	20		630		VD4 24.06.20 p275
	25		630		VD4 24.06.25 p275
	16		1250		VD4 24.12.16 p275
	20		1250		VD4 24.12.20 p275
	25		1250		VD4 24.12.25 p275
	16			1600	VD4 24.16.16 p275
	20			1600	VD4 24.16.20 p275
	25			1600	VD4 24.16.25 p275
	31.5			1600	VD4 24.16.32 p275
	16			2000	VD4 24.20.16 p275
	20			2000	VD4 24.20.20 p275
	25			2000	VD4 24.20.25 p275
	31.5			2000	VD4 24.20.32 p275
	25			2500	VD4 24.25.25 p275
	31.5			2500	VD4 24.25.32 p275

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

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

Ur	Isc	Rated uninterrupted current (40 °C) [A]				
kV	kA	H = 876 L = 786 P = 478.5 u/l = 328 l/g = 428.5 l = 275				Circuit-breaker type
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

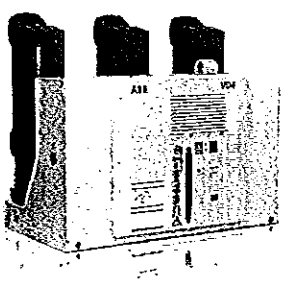
H = Height of the circuit-breaker.
W = Width of the circuit-breaker.
D = Depth of the circuit-breaker.
u/l = Distance between bottom and top terminal.
l/g = Distance between the bottom terminal and the resting surface of the circuit-breaker.
P = Pole horizontal centre distance.
(1) = 2500 A rated current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

Standard fittings of fixed circuit-breakers

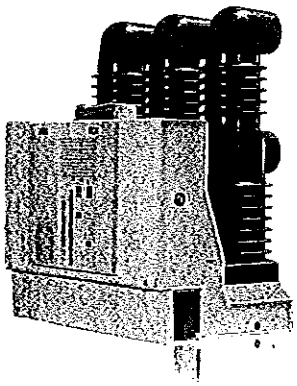
The basic versions of the fixed circuit-breakers are three-pole and fitted with:

- 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.



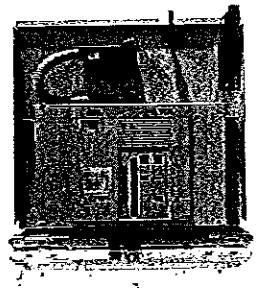
VD4 - up to 24 kV



VD4 - 36 kV

2. Selection and ordering
Withdrawable circuit-breakers

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



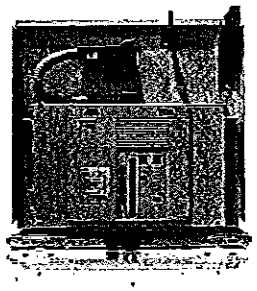
Circuit-breaker		VD4/P 12						
Standards	IEC 62271-100	•						
Rated voltage	Ur [kV]	12 (4)						
Rated insulation voltage	Us [kV]	12						
Withstand voltage at 50 Hz	Ud (1 min) [kV]	28						
Impulse withstand voltage	Up [kV]	75						
Rated frequency	fr [Hz]	50-60						
Rated normal current (40 °C) (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	•						

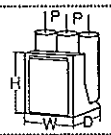
(1) Rated current guaranteed with circuit-breaker installed in UniGear ZS1 switchgear and with 40 °C ambient temperature.
(2) Up to 4000 A with forced ventilation.
(3) Poles in polyamide
(4) Available in 10 kV voltage version in accordance with GOST standards
(5) On request, the closing spring can be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



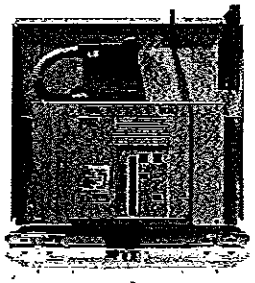
Circuit-breaker		VD4/P 17						
Standards	IEC 62271-100	•						
Rated voltage	Ur [kV]	17,5						
Rated insulation voltage	Us [kV]	17,5						
Withstand voltage at 50 Hz	Ud (1 min) [kV]	38						
Impulse withstand voltage	Up [kV]	95						
Rated frequency	fr [Hz]	50-60						
Rated normal current (40 °C) (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	•						

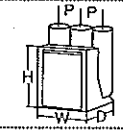
(1) Rated current guaranteed with circuit-breaker installed in UniGear ZS1 switchgear and with 40 °C ambient temperature.
(2) Up to 4000 A with forced ventilation.
(3) Poles in polyamide
(4) On request, the closing spring can be loaded by means of a removable crank handle outside operating mechanism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

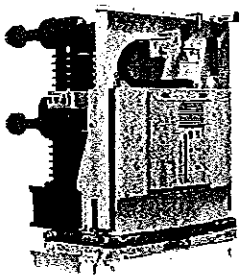
Withdrawable version circuit-breakers for UniGear ZS1 switchgear (24 kV) (5)

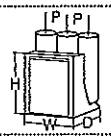


Circuit-breaker		VD4/P 24							
Standards	IEC 62271-100	•							
Rated voltage	Ur [kV]	24							
Rated insulation voltage	Us [kV]	24							
Withstand voltage at 50 Hz	Ud (1 min) [kV]	50							
Impulse withstand voltage	Up [kV]	125							
Rated frequency	fr [Hz]	50-60							
Rated normal current (40 °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.