

DISTRIBUTION SOLUTIONS

ConVac

Installation and operating instructions 7.2 kV and 12 kV - 400 A and 800 A



This instruction manual refers to the ConVac 7 and ConVac 12 free standing models

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1. For your safety!

- Make sure that the installation room (spaces, divisions and ambient) is suitable for the electrical apparatus.
- All installation, commissioning and maintenance operations must be carried out by qualified personnel with suitable knowledge of the apparatus.
- To ensure that the installations are built in accordance with the rules of good working practice and occupational safety, make sure that the regulatory and legal requirements are complied with during installation, commissioning and maintenance operations.
- Strictly follow the information provided in this instruction manual.
- Do not exceed the rated performance of the apparatus in operation.
- The instruction manual should be available at all times to the installer and others operating or servicing the apparatus. Person performing any type of operation, maintenance or service activity shall be adequately trained and shall carefully read and understand this instruction manual, in case of doubt please contact ABB Service.
- Pay special attention to the safety notes indicated in the manual by the following symbols.
- Appropriate PPE must be worn at all times



CAUTION

Responsible behaviour safeguards your own and others' safety!
Please contact the ABB Assistance Service for any further requirements.



ATTENTION

Un comportement responsable est la garantie de votre sécurité et de celle d'autrui !
Pour toute exigence contacter le Service Assistance ABB.



WARNING

Indicates a hazardous situation that has some probability of severe injury and substantial property damage.



AVIS

Indique une situation de risque avec possibilité d'accident grave et dommages importants.



DANGER

Indicates a hazardous situation that has a high probability of death, severe injury, and substantial property damage.



DANGER

Indique une situation dangereuse avec un risque élevé de mort, accident grave et dommages significatifs.



CAUTION

Indicates a hazardous situation that may result in minor or moderate injury and/or property damage.



ATTENTION

Indique une situation toujours à risque, mais avec un risque inférieur d'accident ou de dommages corporels.

NOTICE

Indicates a statement related to the safety of personnel or protection of property.

REMARQUE

Indique une déclaration qui concerne la sécurité du personnel ou la protection des biens.

NOTICE

Do not operate contactor unless it has been installed in accordance with these instructions.

REMARQUE

Ne pas mettre en fonction le contacteur s'il n'est pas installé conformément à ces instructions.

1.1. Foreword

The instructions in this manual refer to the ConVac fixed versions. Read and understand this manual before beginning installation, commissioning or operating the product.

Consult technical catalog 1VCP000695 for the electrical and construction specifications of ConVac contactors and their overall dimensions.

ConVac vacuum contactors are designed for different installation configurations and allow for technical-construction changes (at the customer's request) to adapt to special installation requirements. For custom built apparatus, in addition to this manual, it is necessary to consult the latest technical documentation (circuit and wiring diagrams, assembly and installation drawings, protection coordination studies, etc.), specifically regarding any variants requested in relation to the standard configurations.

Only use original spare parts for maintenance operations. Use of not original spare parts could lead to dangerous faults, in which case the warranty would become void.

Original spare parts are delivered with instruction sheets which contains all details for a correct and safe installation, operation and service. To ensure the correct installation carefully perform the checks indicated in the instruction sheets.

The manual and related drawings provide critical information for the installation, commissioning and operation of the apparatus and should be permanently retained with the product.

These instructions are general in nature. Installers and operators are responsible to follow safe work practices in compliance with local and national standards and codes. Please contact ABB if further information is required.



WARNING



Hazardous voltage. Risk of death, serious injuries to persons, damage to the apparatus or other property.

- **Disconnect the electric power source of the apparatus and ground it before performing maintenance work.**
- **Read and understand this instruction manual before installing, operating or servicing the apparatus.**
- **Installation and Maintenance must only be performed by qualified personnel.**
- **Use of unauthorized replacement parts for repairing the apparatus, modification of the apparatus itself or tampering by unqualified personnel create dangerous conditions which could result in death, serious injuries to persons or damage to the apparatus or to property.**
- **Comply with all local and national standards and codes in addition to the safety instructions provided in this manual.**



AVIS



Tension dangereuse. Risque de mort, dommages sérieux aux personnes, à l'appareillage ou aux biens.

- **Avant d'effectuer la maintenance, mettre l'appareillage hors tension et le mettre à la terre.**
- **Lire et comprendre ce manuel d'instructions avant l'installation, la mise en service ou la maintenance de l'appareillage.**
- **L'installation et la maintenance doivent être effectués uniquement par du personnel qualifié.**
- **L'utilisation de pièces détachées non autorisées pour les réparations de l'appareillage, la modification de l'appareillage ou sa détérioration de la part du personnel non qualifié créent des conditions dangereuses qui peuvent entraîner la mort ou des dommages sérieux aux personnes, à l'appareillage ou aux biens.**
- **Suivre les normes locales et nationales en plus des instructions de ce manuel qui concernent la sécurité.**

1. For your safety!

1.2. Environmental protection program

ConVac vacuum contactors are manufactured in accordance with ISO 14000 Standards (Guidelines for environmental management) in accordance with the environmental protection standards as to the reduction of energy consumption and the production of waste.

1.3. Application of the X-ray emission Standards

A risk with vacuum insulation is that X-rays could be emitted when the interrupter contacts are OPEN after an interruption. Tests performed 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 µSv/h. These results indicate:

- there is no risk of x-ray emission when vacuum interrupters are operated at the rated service voltage;

- application of power frequency impulse withstand voltage (according to the IEC 62271-1 standard) does not generate x-ray emissions;
- to avoid the risk of x-ray emission, voltage higher than power frequency impulse withstand voltage or than direct current test voltage (specified in the IEC standards) should not be applied;
- in interrupters with OPEN contacts, the specific gap between contacts must be maintained to avoid x-ray emission in addition to ensuring correct operation of the drive and by the proper settings of the transmission system.

Installation, commissioning, operation and service must be conducted by qualified personnel with knowledge of the apparatus and in compliance with all local and national standards and codes. The product rating must not be exceeded.

1.4. Field work

ABB offers field assistance to provide technical guidance when the apparatus is installed, repaired and serviced.

2. Description

ConVac medium voltage contactors operate with alternating current and are normally used for controlling medium voltage loads that require a large number of hourly operations.

A basic contactor consists of:

- 3 (three) insulating covers molded in thermoplastic material containing the vacuum interrupters
- Monostable electromagnetic actuator
- Electronic control board
- Auxiliary contacts
- Mechanical state indicator (OPEN-green/CLOSED-red).

The basic version of the contactors belonging to the ConVac medium voltage contactor is equipped with a monostable electromagnetic actuator (electrical latching).

On request, ConVac can be equipped with a kit which converts the contactor to the mechanically latched type.

2.1. Magnetic drive with electrical latching

ConVac contactors are equipped with a monostable electromagnetic drive. The electromagnet provides the double function of closing and holding. It allows the moveable ferromagnetic core to move from the OPEN position to the CLOSED position. Once the contactor has reached the CLOSED position, the drive system reduces the power supplied to the electromagnet to the minimum value able to keep the contactor CLOSED.

The energy required for the operation is provided by the end-user auxiliary power supply. Removal of auxiliary voltage immediately opens the contactor.

The power required by the electrically latched magnetic drive is shown in the table below:

Supply voltage	Starting	Hold
110-125 V DC AC 50-60Hz	7A ... 10A	50 W
220-240 V DC AC 50-60Hz	for 200ms	

Notes:

Average values at ambient temperature. The values may vary, depending on the specific auxiliary voltage applied.

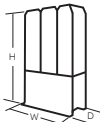
Supply sources of non-sinusoidal alternating or pulsating direct current or, in the case of self-supply by MV/LV transformers, must maintain the maximum and minimum rms values specified in international reference standard IEC 62271-106 and allow the power ratings given in the table above to be supplied in any case.

ABB	ConVac	ABB	ConVac
Ua control closing voltage		Ua control closing voltage	
110-125 V dc ac 50-60Hz		220-240 V dc ac 50-60Hz	
2RDA028965 A0001		2RDA028965 A0002	

Example of nameplate with auxiliary voltage indication.

2. Description

Parameters

Rated voltages	Rated voltage [Ur]		[kV]
	Rated insulation level [Ud] @50/60Hz		(1 min)[kV]
	Rated insulation level (Up), impulse		[kVp]
Rated frequency [fr]			[Hz]
Rated current	Rated operational current (Ie)		[A]
	Thermal current (Ith)		[A]
Short circuit and overload performance	Short-time withstand current [Ik] + rated duration [tk] or rated momentary current		
	Rated peak current		[kA peak]
	Short-time withstand current for 30 s		[A]
	Short circuit breaking current (Isc)- combined with fuses		[kA rms]
	Rated short-circuit making current (Ima)- combined with fuses		[kA rms]
	Damage classification		
	Short-circuit breaking capacity		[kA]
	Short circuit making capacity		[kA]
	Short circuit sequence		
	Rated making and breaking capacities, by utilization category of use		Category
	Rated making and breaking capacities and overload		[kA]
	Capacitive switching capabilities (62271-106 / IEEE C37.09a)		
	Configuration		
	Restrike performance		Class
	Rated current		[A]
	Inrush peak		[kA peak]
	Inrush current frequency		[Hz]
Mechanical life	Rated duty		[Cycles/hour]
	Life	Electrical latching	[Cycles]
		Mechanical latching	[Cycles]
Rated supply voltage of switching devices, and of auxiliary and control circuits (Ua)			
	Feeder type 1 (Drive unit and closing coil)		[Vdc - Vac 50-60Hz]
	Feeder type 2 (Drive unit and closing coil)		[Vdc - Vac 50-60Hz]
	Start-up current (Drive unit and closing coil)		[A peak] x 200ms
	Holding		[W]
	Pick-up voltage		[Vdc - Vac 50-60Hz]
	Drop-out voltage		[Vdc - Vac 50-60Hz]
	Opening coil-Kit RiMe (only for latched contactors)		[Vdc - Vac 50-60Hz]
	Start-up current RiMe kit 24V dc		[A peak]x100ms
	Start-up current RiMe kit 48V dc		[A peak]x100ms
	Start-up current RiMe kit 110-125Vac dc 50-60Hz		[A peak]x100ms
	Start-up current RiMe kit 220-240Vac dc 50-60Hz		[A peak]x100ms
Operating time	Opening time - Electrically latched		[ms]
	Opening time - Mechanically latched (kit RiMe)		[ms]
	Closing time		[ms]
Operating temperature ¹⁾			[°C]
Weight			
Overall dimensions		High	H
		Width	W
		Depth	D

¹⁾ For UL Class E2 interrupting capability with R/C Mersen fuse A072B1DAR0-18R

²⁾ For higher temperature please contact ABB

³⁾ Highest prospective peak current. Highest cut-off current of the SCPD intended is 45kA

⁴⁾ For UL Class E2 interrupting capability with R/C Mersen fuse A072B2DAR0-24R and SIBA R type 3011155.24R

⁵⁾ For UL Class E2 interrupting capability with R/C Mersen fuse A072B3DBR0-57X

IEC62271-106 (2021-04)			UL347 6th edition		UL347 7th edition	
	ConVac 7 400 A	ConVac 12 400 A		ConVac 7 400 A	ConVac 7R	ConVac 7 800 A
Ref. std	Value	Value	Ref. std	Value	Value	Value
5.2	7.2	12	4.1	7.2	7.2	7.2
5.3	20 (32)	28 (42)	4.2	20 (32)	20	20
5.3	60	75	4.2	60	60	60
5.4	50-60	50-60	-	50-60	50-60	50-60
5.101	400	400	4.101	400	400	800
5.102.5	400	400	4.4.101	400	400	800
5.6	6000x1sec	6000x1sec	4.6.2	6000x1sec	6000x1sec	12500x1sec
5.8	4000x4sec	4000x4sec	4.7.2			
5.7	15.6	15.6	4.6.1	-	-	-
7.6	2400	2400	6.202	2400	2400	4800
5.107	50	•	4.107 4.202	50 (Class E2 ¹⁾)	50 (Class E2 ⁴⁾)	50 (Class E2 ⁵⁾)
5.107	130 ³⁾	•	4.107 4.202	•	-	-
5.107.2.3	C	•	-	-	-	-
5.107	5	6	4.202	6 (Class E1)	6 (Class E1)	12.5 (Class E1)
5.107	13	15.6	4.202	15.6 (Class E1)	15.6 (Class E1)	32.5 (Class E1)
7.103	CO-3'-CO-3'CO	CO-3'-CO-3'CO	4.202	CO-2'-CO-2'CO	CO-2'-CO-2'CO	CO-2'-CO-2'CO
5.104	AC-4	AC-4	-	-	-	-
-	-	-	4.103 6.102	10CO @ 4kA 40CO @ 2.4kA	-	-
5.112	-	-	IEEE C37.09a	-	-	-
	back to back	back to back		back to back	back to back	-
	class C2			class C2	class C2	-
	250	250 Class C1 160 Class C2		250	250	-
	8	8 Class C1 6 Class C2		8	8	-
	2500	2500 Class C1 4700 Class C2		2500	2500	-
5.102	1200	1200	4.102.2	1200	1200	1200
7.102	1000000	1000000	6.101	1000000	1000000	300000
7.102	250000	250000	6.101	250000	100000	100000
5.9	-	-	4.8, 4.9	-		
-	110÷125	110÷125	-	110÷125	110÷125	110÷125
-	220÷240	220÷240		220÷240	220÷240	220÷240
-	7÷10.5	7÷10.5	-	7÷10.5	7÷10.5	7÷10.5
-	50	50	-	50	50	50
-	80%	80%	-	80%	80%	80%
-	65%	65%	-	65%	65%	65%
-	24-48 Vdc only 110-125 Vac dc 220-240 Vac dc	24-48 Vdc only 110-125 Vac dc 220-240 Vac dc	-	24-48 Vdc only 110-125 Vac dc 220-240 Vac dc	24 Vdc only 48 Vdc only 110-125 Vac dc 220-240 Vac dc	24 Vdc only 48 Vdc only 110-125 Vac dc 220-240 Vac dc
-	40	40	-	40	40	40
-	25	25	-	25	25	25
-	10	10	-	10	10	10
-	7	7	-	7	7	7
-	80÷100	80÷100	-	80÷100	45÷80	45÷80
-	15÷35	15÷35	-	15÷35	15÷35	15÷35
-	40÷70	40÷70	-	40÷70	40÷70	40÷70
IEC 60068	-30+70	-30+70	C37.09	-30+40 ²⁾	-30÷+40	-30÷+40
-	15÷20 [kg]/33-44 [lbs]	15÷20 [kg]/33-44 [lbs]		15÷20 [kg]/33-44 [lbs]	17÷22 [kg]/38-49 [lbs]	20÷25 [kg]/44-55 [lbs]
-	377 [mm]/14,8 [inch]	380 [mm]/15 [inch]		377 [mm]/15 [inch]	377 [mm]/15 [inch]	450 [mm]/17,7 [inch]
-	342 [mm]/13,5 [inch]	342 [mm]/13,5 [inch]		342 [mm]/13,5 [inch]	366 [mm]/14,4 [inch]	350 [mm]/13,8 [inch]
-	210 [mm]/8,3 [inch]	230 [mm]/9 [inch]		210 [mm]/8,3 [inch]	210 [mm]/8,3 [inch]	234 [mm]/9,2 [inch]

2. Description

2.2. Auxiliary contacts of the contactor

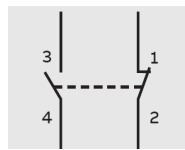
3 different sets of auxiliary contacts are available on the contactor for the customer's use:

- 2 normally OPEN + 2 normally CLOSED (circuit diagram 1VCD400279 fig. 3)
- 4 normally OPEN + 4 normally CLOSED (circuit diagram 1VCD400279 fig. 4)
- 6 normally OPEN + 6 normally CLOSED (circuit diagram 1VCD400279 fig. 5)

The auxiliary contacts are solidly connected with the medium voltage moving contacts (positively driven) and signal the contactor OPEN or CLOSED states. The auxiliary contacts conform to standard IEC 62271-1 2017 sub 7.10.3 "Verification of the operational characteristics of auxiliary contacts"

Main features:

- rated voltage: up to 250V AC DC
- rated current: up to 10A
- Breaking capacity and short-time in accordance with: classe 1 table 8 IEC 62271-1 2017



Each auxiliary block (composed by one normally open and one normally closed contact as for schematic picture) has to be supplied at the same voltage.

IEC 62271-1, Table 8 - Auxiliary contact classes

DC current			
Class	Rated continuous current	Rated short-time withstand current	Breaking capacity
$U_s \leq 48 \text{ V}$ $110 \text{ V} \leq U_s \leq 250 \text{ V}$			
1	10 A	100 A/30 ms	440 W
2	2 A	100 A/30 ms	22 W
3	200 mA	1 A/30 ms	50 mA

Note 1 Control contacts which are included in a control circuit of a mechanical switching device can be covered by this table.

Note 2 If insufficient current is flowing through the contact, oxidation can increase the resistance. Therefore, a minimum value of current is specified for class 1 contact.

Note 3 In the case of the application of solid state contacts, the rated short-time withstand current can be reduced if current-limiting equipment other than fuses, is employed.

Note 4 For all classes, breaking capacity are based on a circuit time constant of 20 ms with a tolerance of $^{+20}_0\%$.

Note 5 An auxiliary contact which complies with class 1 2 or 3 for DC can normally handle corresponding AC current and voltage.

Note 6 Breaking current at a defined voltage value between 110 V and 250 V can be deduced from the indicated power value for class 1 and class 2 contacts (for example, 2 A at 220 V DC for a class 1 contact).

- Breaking capacity in accordance with U.S. standards: (UL file No. E160730)
 - B300 – AC-15 : 240V 1.5A / 120V 3A
 - Q300 – DC-13 : 250V 0.27A / 125V 0.55A

The number of auxiliary contacts installed can be changed by replacing the entire kit following the instructions in this manual.



CAUTION

The auxiliary contacts must only be replaced by qualified personnel.



ATTENTION

Le remplacement des contacts auxiliaires doit être effectué uniquement par du personnel qualifié.

2.3. Compliance with Standards

ConVac contactors conform to Standards:

- IEC 62271-106 (2021);
- IEC 62271-1 (2017);
- IEC 62271-100 (2021)
- GB/T 14808-2016;
- DL/T 593-2016;
- UL347 ed 6th (ConVac 7 400A)
- UL347 ed 7th (ConVac 7R - ConVac 7 800A)

2.4. Protection against short-circuits

The value of the short-circuit current of the installation could exceed the breaking capacity of the contactor. End-user is responsible for protecting the contactor against short circuit through installation of fuses or other means.



CAUTION

The fuses must only be installed and replaced by qualified personnel.



ATTENTION

Le remplacement des fusibles doit être effectué uniquement par du personnel qualifié.

3. Check Shipment Contents


CAUTION

De-energize system and OPEN main protection device.

Do not damage or otherwise mechanically stress the insulating parts and contactor connections.


ATTENTION

Mettre le système hors tension et OUVRIR le dispositif principal de protection.

Ne pas endommager ou solliciter les parties isolantes des appareillages et les connexions du contacteur.

Inspect shipment upon delivery and check conformity of product with order confirmation sent by ABB. Contact ABB if the package is damaged. Repack the apparatus using the original material supplied until ready to install.

The contactor is shipped in a dedicated packaging and in the OPEN position.

Each component is packaged in a plastic bag to protect against water intrusion and dust during storage.

Remove the contactor from the packaging:

- OPEN the polyethylene bag and remove contactor
- avoid any kind of mechanical stress to the contactor
- confirm that the nameplate data (see Fig.1) matches order confirmation and shipping notification.

If product is damaged or does not conform to order, notify ABB (directly or through the agent or supplier) immediately but no later than five days of receipt.

The following documents are included with the apparatus shipment:

- instruction manual (this document)
- routine test certificate (on request)
- copy of the shipping notification
- circuit diagram.

A

B

C

D

E



THREE PHASE INDOOR VACUUM CONTACTOR		IEC 62271-1-106
ConVac 7		UL 347
SN 1VC1XX00000000	PR. YEAR 20XX	
Ur VOLTAGE	7.2kV	
Up LIGHTNING IMPULSE WITHSTAND VOLTAGE	60kV	
Ud POWER FREQUENCY WITHSTAND VOLTAGE	32kV	
fr FREQUENCY	50/60 Hz	
Ie RATED OPERATIONAL CURRENT	400A	
CAPACITIVE SWITCHING CURRENT-CLASS (IEC)	250A-C2	
CONTROLLER CLASS (UL)	E1 5kA	
	E2 50kA	

FOR OTHER CHARACTERISTICS, SEE NAMEPLATES ON ACCESSORIES
Made by ABB, Italy

F

ConVac 7.2 kV is shown for the sake of simplicity

- A Trademark
B Type of apparatus
C Serial number
D Characteristics of the apparatus
E Characteristics of the drive auxiliaries
F Reference standards



ConVac

Diagr. 1VCD400279 fig.3

240Vac-dc 10A, GP

2RDA030781A0001



3p INDOOR VACUUM CONTACTOR

ConVac 7

ELECTRICALLY LATCHED

ELECTRICAL DIAGRAM

1VCD400279 fig.1

MASS 15kg

DANGER

HIGH VOLTAGE

KEEP OUT



READ MANUAL INSTRUCTION BEFORE USE

1VCD001515



3p INDOOR VACUUM CONTACTOR

ConVac 7

MECHANICALLY LATCHED

110-125 V dc ac 50/60Hz

ELECTRICAL DIAGRAM

1VCD400279 fig.2

MASS 18kg

DANGER

HIGH VOLTAGE

KEEP OUT



READ MANUAL INSTRUCTION BEFORE USE

1VCD001515

Fig. 1

Prior to shipment of the apparatus, ABB provides:

- order confirmation
- original shipping notification
- certificate of origin
- other documents as requested by the customer

4. Handling

An individual contactor can be lifted by hand from the metal base. A forklift truck is recommended to move shipments containing two or more contactors.

Take the following precautions to ensure the contactor is not damaged during forklift movement.

1. Keep the contactor in the original position, as indicated by ABB
2. Make sure that the load is balanced on the truck or on the transport plate/pallet
3. Place protective material between the contactor and truck to avoid damage or scratches
4. Fasten the contactor to the truck or transport plate/pallet to prevent it from shifting or overturning
5. Avoid excessive speed, sudden starts and stops or sharp changes of direction when transporting the contactor
6. Only lift the contactor enough to avoid obstructions on the floor
7. Take care to avoid hitting structures, other apparatus and persons when transporting and handling the contactor
8. Never lift the contactor in an area where personnel are present.

9. Ensure that no force is applied to insulating parts or terminals of the contactor when the equipment is handled.

Contactors contents and identification labels must not be removed or defaced. Contactors are subject to UN3164 Standards for air or sea transport. Safety Data Sheet: 1VCD850182.

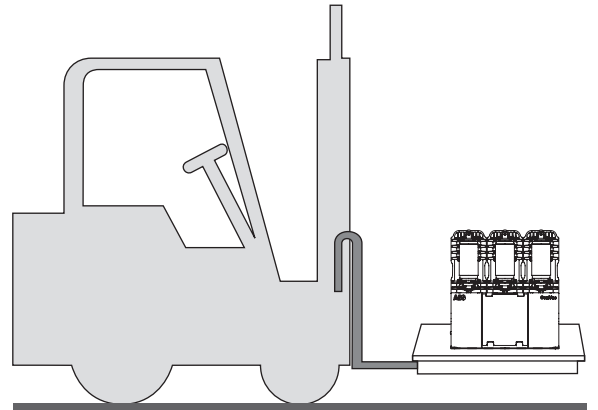


Fig. 2 - Handling with a forklift truck

5. Storage

Return contactor to original packaging if it will be stored for a period of time. Store in a dry, dust-free inside location free from adverse microclimatic conditions to prevent deterioration or rust or a temperatures outside the approved limits set out in the contactor documentation.

Place a minimum of one standard packet of desiccant bags/silicagel inside each component package.

Replace the bags every 6 months or so.

If the original packaging is no longer available and the apparatus cannot be installed immediately, store indoors in a ventilated, dry, dust-free, non-corrosive environment, away from any easily flammable materials and at a temperature between – 5 °C and + 40 °C (for product appropriate for other conditions).

6. Installation

6.1. General

Proper installation is imperative. Read and follow all instructions in this manual.

The contactor enclosure must be installed in a clean, dry place with good ventilation. It must be easily accessible for cleaning and inspection, leveled, positioned on its bearing foundation and securely fixed in place.



CAUTION

ConVac freestanding execution shall be installed under client responsibility. IP2X minimal protection degrees is recommended. Always refer also to specific local laws and regulations.



ATTENTION

La version indépendante des contacteurs ConVac doit être installée sous la responsabilité du client. Le niveau de protection IP2X est recommandé. Toujours faire référence aux normes locales.

6.2. Installation and operating conditions

Ensure compliance with the following standards during installation and service:

- IEC62271-1/DIN VDE 0101
- VDE 0105: Operation of electrical installations
- DIN VDE 0141: Grounding systems for power installations with rated voltages above 1 kV

6.3. Normal conditions

Comply with the recommendations in the IEC 62271-1 and 62271-106 standards. In detail:

Ambient temperature

Maximum	+ 70 °C (16h) ; + 40 °C for UL 347
Minimum	- 30 °C (16h)

Humidity

The average relative humidity value, measured for more than 24 hours, must not exceed 95%.

The average water vapor pressure value, measured for more than 24 hours, must not exceed 2.2 kPa.

The average relative humidity value, measured for more than 1 month, must not exceed 90%.

The average water vapor value, measured for more than 1 month, must not exceed 1.8 kPa.

Altitude

< 1000 m above sea level.

6.4. Special conditions

Installations above 1000 m a.s.l.

ConVac may be installed above 1000 m subject to the limits allowed by the reduction in the dielectric strength of the air.

Contact ABB if the altitude exceeds 2000 m.

Climate-Temperature increase

Protect the ConVac from condensation and corrosion by protection the apparatus (e.g. by installing electric heaters).

Contact ABB for special installation requirements or addressing other types of operating conditions.

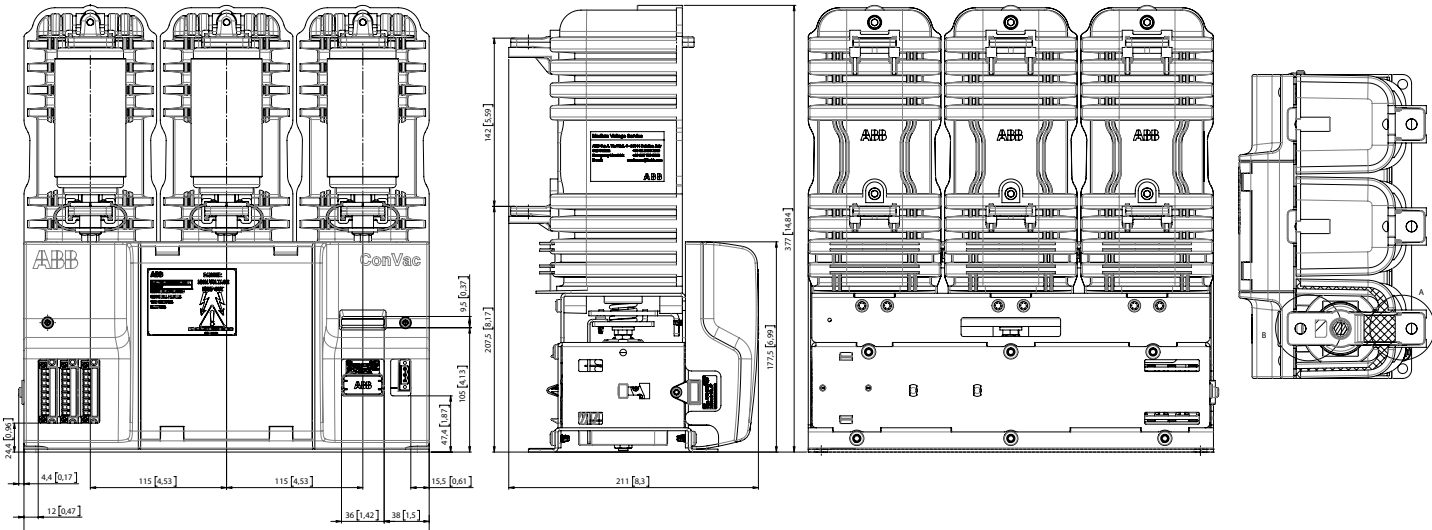
6.5. Overall dimensions

6.5.1. ConVac contactor

Refer to figure 3-4 for the overall dimensions and distances between fixing holes.
Choose one of the two assembly positions illustrated in figure 5.

ConVac 7 400 A

Electrically latched version



Mechanically latched version

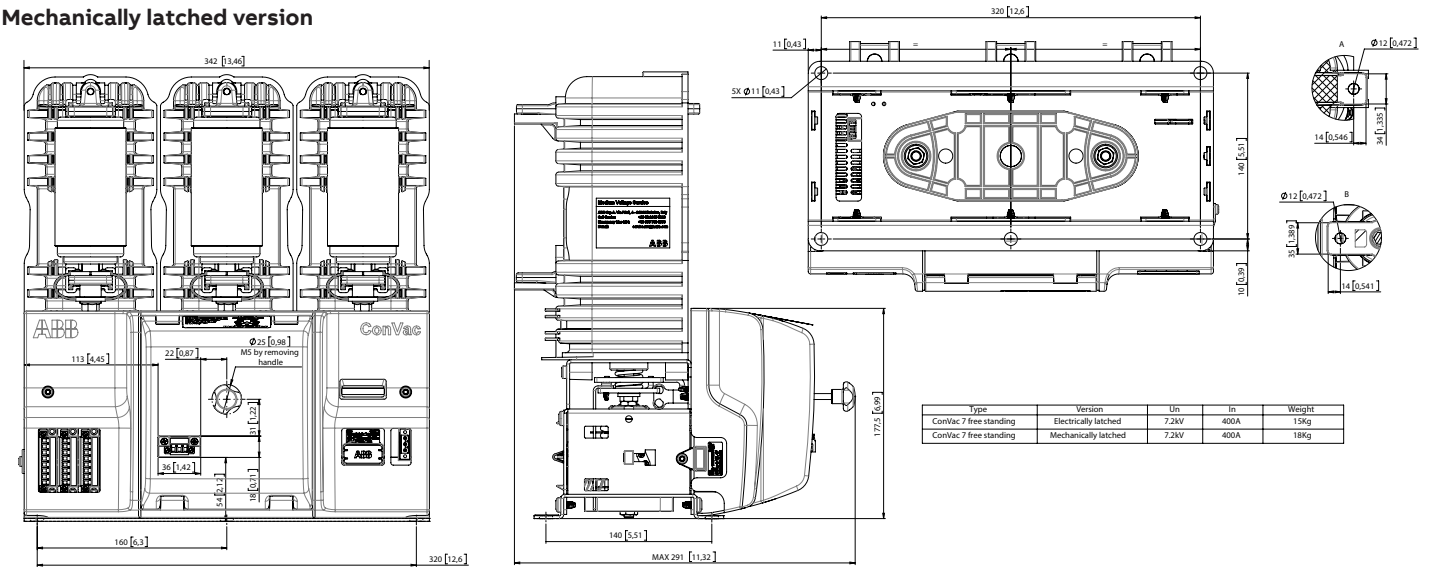


Fig. 3

ConVac 12 400 A

Mechanically latched version

Technical drawings of the ABB ConVac 308 vacuum robot, showing front, side, and top views with dimensions in millimeters and inches. The drawings include a 'Mechanically latched version' and a standard version. Dimensions are provided for overall size, internal components, and mounting points.

Fig. 4

Electrically latched version



ConVac 7R 400 A

Mechanically latched version

Type	Version	Un	In	Weight
ConVac 7R free standing	Electrically latched	7.2kV	400A	16kg
ConVac 7R free standing	Mechanically latched	7.2kV	400A	19kg

Fig. 6

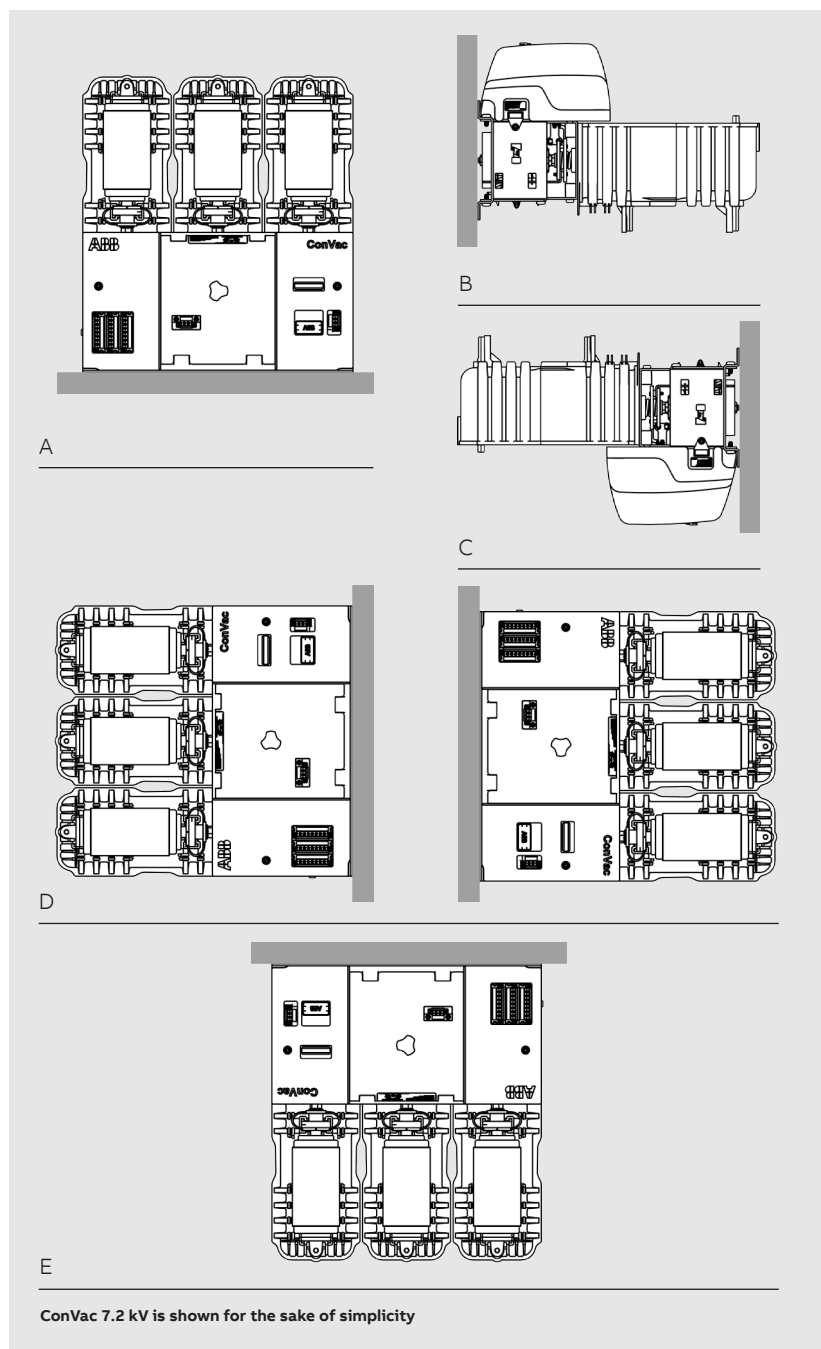


Fig. 7

Installation of the contactor

The contactor can be installed in the following positions:

- Fig. 5 A On the floor, with moving contacts at bottom.
- Fig. 5 B On a wall, with moving contacts horizontal and terminals at bottom.
- Fig. 5 C On a wall, with moving contacts horizontal and terminals at top.
- Fig. 5 D On a wall with moving contacts horizontal, interrupters on front (or rear) and terminals vertical.
- Fig. 5 E On the ceiling, with moving contacts at top:
Installation not allowed for ConVac 7 800 A.

In all positions, ensure that interrupters or live parts stay free from dirt and build up.

6. Installation

6.6. Assembly and connections

	WARNING
	De-energize and ground all the systems (both medium voltage and auxiliary voltage) before beginning installation.
	AVIS
	Désenergiser et mettre à la terre les systèmes (moyenne tension et tension auxiliaire) avant de commencer l'installation.

Foreword

Before proceeding with any installation work:

- Using approved high voltage test equipment, test all the power terminals to confirm they are not energized. Do not attempt to measure high voltage (above 600 Volts) with a voltmeter.
- Use a voltmeter to test all the terminals of the control and secondary circuits to confirm that the sources of incoming control and secondary voltage have been disconnect.
- After de-energizing but before proceeding with any work on the apparatus, confirm that power terminals have been grounded and are in safe conditions.
- Perform all the power isolation and grounding operations in accordance with established safety procedures.

Power circuit

General warnings

- Make sure that the contactor connections are clean and free from any deformation caused by knocks received during transport or storage.
- Choose the conductor cross-sections appropriate for the service and short-circuit current of the installation.
- Provide suitable supporting insulators near the terminals of the contactor, sized according to the electrodynamic stress caused by the short-circuit current of the installation. Do not force the connections.

Surface treatment of connections

The connections can be made of bare copper or bare aluminium. But it is always advisable to silver-plate the contact surfaces. The thickness of the surface coating must be even and regular.

Contactors assembly procedure

- Make sure that the contact surfaces of the connections are perfectly flat and without burrs, traces of oxidation or deformities.
- Perform the following operations on the contact surface of the contactor:
 - clean with a rough dry cloth
 - if there are traces of oxidation that are difficult to shift, clean with ultra-fine grain emery cloth taking care not to remove the surface finish layer
 - put the connections in contact with the circuit breaker terminals. Avoid causing mechanical stress to the terminals themselves.
- Insert a spring washer and a flat washer between the head of the bolt and the connection.
- Use DIN class 8.8 bolts. Size as indicated in the table in the next page.
- Follow manufacturer's instructions when making the cable connector terminations.

Grounding and wiring

ConVac 7 conforms to standard IEC 61000 on electromagnetic compatibility. Always comply with the indications in standard IEC 62271-200 when installing the contactor in a panel.

Take the utmost care when grounding and wiring the auxiliary circuits. Comply with the described procedures. Contact Service ABB for further advice.

NOTICE

For wiring according UL Standards use copper cables, Class 75 °C.

REMARQUE

Pour le câblage conforme à la norme UL utiliser des câbles en cuivre, classe 75 °C.

Bolt	Recommended tightening torque ¹⁾
	Without lubricant
M6	10.5 Nm
M8	26 Nm
M10	50 Nm
M12	86 Nm
M16	200 Nm

¹⁾ Tightening torque is dependent on the resistance class of the fasteners applied (minimum DIN class 8.8)

Always make a grounding connection between the frame of the ConVac and the main earthing system of the installation.

Use the shortest possible cables with an adequate section.

Earth connection of metal structures

Scrape paint from bearing structure and connect by copper braid or busbars to guarantee low impedance connections.

Use cables or busbars with an adequate section to make a low impedance ground connection. Scrape the paint from a sufficiently large area of the metal parts, tighten the fastening screws and protect the connected parts from oxidation.

Cables for ground connections must be no longer than necessary. Earth connection of the parts must guarantee the same electric potential.



Fig. 8 - Earthing

6. Installation

Figs. 9a - 9b A correct grounded connection

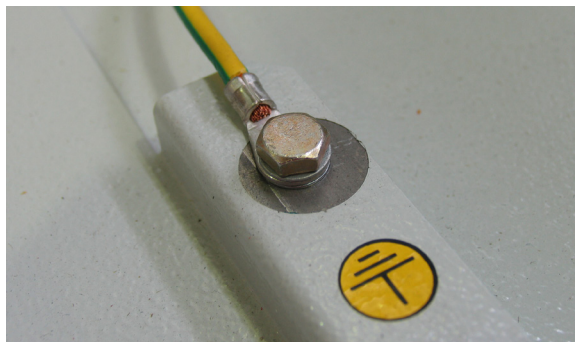


Fig. 9a



Fig. 9b

Figs. 9c - 9d An incorrect grounded connection

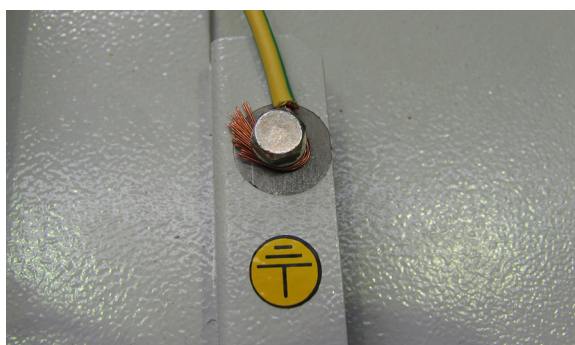


Fig. 9c

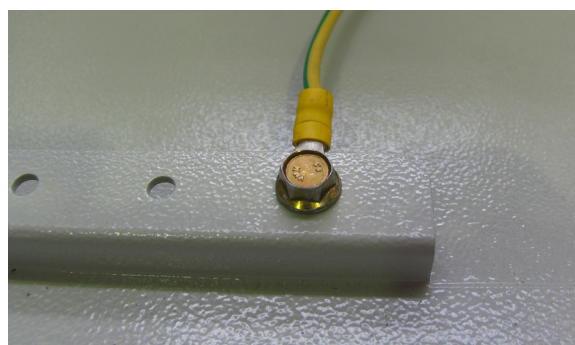


Fig. 9d

Auxiliary wiring

The connections in the medium voltage compartments must be as short as possible. Do not position them near medium voltage components. If possible, all long connections must be routed alongside the metal frame. Long connections must also be equipped with ferrite rings so as to suppress high frequency interference.

It is recommended to route the cables inside metal conduit (grounded in several points) when they are subject to, or could cause, interference.

Cabling and grounding procedures must comply with Standard IEC 61000-5-2: "Technical report: Installation and mitigation guidelines".

When possible, the power supply and auxiliary circuit cables should be twisted. Proper length must be calculated to avoid excessive voltage dips and possible faulty operation. Do not exceed the following indications: 100 m of cable 2 x 1.5 mm² plus earth.

To ensure the ConVac contactor functions correctly, the auxiliary voltage applied at the terminals of the control board must remain within the limits specified by the standard (85%-110% of the rated auxiliary voltage).

To limit electromagnetic emissions to the minimum, the auxiliary wiring entering the control board must pass through the ferrite (type Wurth 74270044) supplied with the contactor.



Surplus cable must be wound separately and positioned in the compartment with the low voltage apparatus. Do not position this cable near medium voltage parts or near cables that could generate interference or disturbance.

Connection of the auxiliary circuits

The cables used for connecting the auxiliary circuits must have 450/750 V rated voltage U_0/U and be insulated for at least 3 kV test voltage.

Note: disconnect the ground connection of the electronic feeder before performing the test.

Auxiliary circuits must be tested at the maximum voltage of 1 kV x 1 sec, as specified by the standards.

As specified and tested by standards UL 347 and UL 508, the control circuit (electronic board) must be protected by a "Limitron Class CC FNQ-R 600Vac ¼ - 30A time-delay fuse".

The section of the connection cables must not be less than 1.5 mm², min AWG 14 to 16.

The auxiliary circuits of the contactor must be connected using the supplied connector.

Outside, the wires must be routed inside appropriately earthed metal tubes or ducts.

In outside installations, wires must be run inside conduit or metal ducts.

Inspections

Pre-service checks:

- do not allow the weight of the medium voltage connections or cables to mechanically stress the contactor terminals.
- connections must be sufficiently tightened according to tightening torques indicated in page 17
- keep contactor and parts subject to medium voltage clean and dry .

Temperature rise

ConVac contactors have been tested to withstand 400 A or 800 A continuous thermal current in the fixed version (free air). Temperature rises in apparatuses are influenced by the following variables:

- positions of the contactors in the switchgear designed by the customer
- protection class (ventilation slits)
- current density of the feeder busbars (busbar duct - branches)
- ambient temperature
- presence of other heating sources (e.g. fuses)
- conductive material used and surface coating.

Consult ABB for further details if needed.

6. Installation

6.7. Description of the closing and opening operations

This chapter shall be read in conjunction with the circuit diagram of the contactor.

The basic ConVac contactors are equipped with a monostable electromagnetic actuator (electrical latching).
On request, ConVac can be equipped with a kit (RiMe) which converts the contactor to the mechanically latched type.

Version		Electrical latching	Mechanical latching (RiMe kit)
Operation		Functions in accordance with the state of the signal transmitted to the control board.	Functions by means of two electrically independent signals for closing and opening. Contactor closing takes place in the same way as the electrically latched version, i.e. by supplying the control board. Opening takes place by supplying the RiMe kit.
Opening	Description of the operation	The contactor opens when no power is supplied to inputs -XDB1:1 and XDB1:3. The release voltage and opening times are given in the rating table	Supply terminals -XDB3:4 and -XDB3:6. A pulse lasting at least 300 ms is recommended. Maximum suggested time 500ms. Note: a shorter pulse (minimum 200 ms) may cause the contactor to OPEN. To avoid pumping, the first command transmitted prevails in the case of contemporaneous supply to terminals -XDB1:1 and -XDB1-3 (closing) and terminals -XDB3:1 and -XDB3:3 (opening) (see interlock -RLM in fig 2 of the circuit diagram)
	Terminals used	-XDB1:1 and -XDB1:3 (-XDB1:2 earthed)	-XDB3:4 and -XDB3:6 (Control opening coil continuity: -XDB3:5 and -XDB3:6 -max 0.3A to avoid untimely/unwanted opening)
Closing	Description of the operation	Supply inputs -XDB1:1 and -XDB1-3 (-XDB1:2 earthed) The supply voltage values are indicated in the ratings table. Closing is guaranteed with a pulse of at least 300ms. Note: a shorter pulse can also CLOSE the contactor or lead to closing followed by immediate opening.	
	Terminals used	-XDB1:1 and -XDB1:3 (-XDB1:2 earthed)	

6.7.1. Contactor power supply

The contactor has been tested for the following auxiliary operating voltage values:

- 110-125V AC/DC 50-60Hz
- 220-240V AC/DC 50-60Hz

The contactor is pre-engineered for the operating voltage indicated in the order confirmation. The power supply voltage is indicated on the rating plate near the feeder connector.

The tolerance margins for the voltage values conform to Standard IEC 62271-106 and UL 347.



DANGER

Low voltage components may be live even with the high-voltage isolating means OPEN.



DANGER

Les composants de basse tension peuvent être sous tension même si les moyens d'isolation de la haute tension sont OUVERTS.

6.8. Emergency opening operation (only applies to mechanically latched contactors – RiMe kit)



CAUTION

The RiMe kit (Mechanical latching) features a manual emergency operation.
Manual emergency operations should only be conducted by qualified personnel in conformance with the following standards:

- IEC 62271-1/DIN VDE 0101
- VDE 0105: Operation of electrical installations
- DIN VDE 0141: Grounding systems for power installations with rated voltages above 1 kV



ATTENTION

Le kit RiMe (Retenue mécanique) est doté de manoeuvre manuelle de secours.
Les opérations manuelles de secours doivent être conduites seulement par personnel qualifié conformément aux standards suivantes:

- IEC 62271-1/DIN VDE 0101
- VDE 0105: Fonctionnement d'installations électriques
- DIN VDE 0141: Systèmes de mise à la terre pour installations électriques à tension nominale de plus de 1 kV

To perform the manual emergency opening operation proceed as follows:

- Ensure the contactor is de-energized and grounded.
- Double-check that safety conditions are ensured
- Pull handle A to manually open the contactor.
- If the contactor is bolted inside an enclosure, the manual tripping operation shall be performed at a safe distance by means of an insulated hotstick at customer care.

In case of need the handle can be unscrewed and a M5 pin is available to fix the insulating extension (or equivalent).

Force applied to the handle in order to open the contactor: 40 to 80N;

Handle travel required in order to open the contactor: 10 to 20 mm

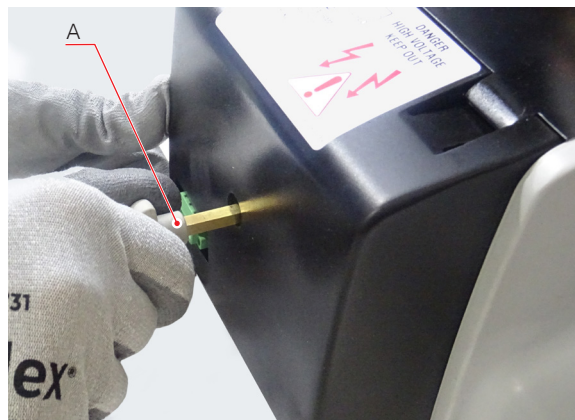


Fig. 10a

7. Commissioning

7.1. General procedures



CAUTION

Commissioning must only be conducted by qualified personnel with detailed knowledge of the apparatus and installation.



ATTENTION

La mise en service doit être exécutée par personnel qualifié ayant une qualification suffisante et une connaissance détaillée de l'appareillage et de l'installation.

Perform the following operations and those indicated in the table before commissioning the apparatus:

- confirm that the voltage and current applied are within the specified nominal values
- confirm that the power connections of the fixed contactors are tight
- clean the metal plates and insulating parts thoroughly with brushes and clean, dry cloths. Do not use compressed air
- check the ground connection of the fixed contactors

- confirm the space between the moving parts is clean and free from debris or foreign bodies
- confirm the value of the supply voltage of the auxiliary circuits is between:
Alternating current supply: 85% and 110% of the rated auxiliary voltage of the apparatus
Direct current supply (only for the opening coil-RiMe kit): 70% and 110% of the rated auxiliary voltage of the apparatus
- confirm that the vacuum interrupter of the contactor has not been damaged by accidental knocks. If in doubt, perform the test described in the below table to confirm.
- confirm that all the protective barriers and shields have been installed properly
- perform the inspections described in table below.



CAUTION

**Do not commission apparatus until all operations have been successfully completed.
Call Service ABB, if necessary.**



ATTENTION

Ne mettre pas l'appareillage en service jusqu'à toutes les opérations sont terminées avec succès. Si nécessaire contacter le Service ABB.

Component inspected	Procedure	Successful check
1 Insulation resistance	Medium voltage circuit Using a 2500 V Megger, measure insulation resistance between phases and earth of circuit	The insulation resistance should be at least 50 Mohm
2 Drive. OPEN/CLOSED indicator, operation counter (if installed)	Perform a few contactor closing and opening operations	Normal operations and signals
3 Auxiliary circuits	Check that the screws and terminals of the auxiliary circuits are tight and that the connections are correct. Proceed by energizing the apparatus	Normal operations and signals

8. Maintenance

Before starting



CAUTION

All maintenance or repair must be conducted by qualified personnel in accordance with all applicable national and local electrical codes.



ATTENTION

Toutes les opérations de maintenance ou réparation doivent être conduites par personnel qualifié conformément aux normes électriques nationales et locales.

- Check that all positions are OFF
- Confirm that the apparatus is in the OPEN position
- Disconnect contactor from electric power source and remove from the enclosure compartment
- If a part is replaced, report to ABB the number of operations conducted prior to the change and note the number on the maintenance book of the contactor
- When an accessory or the electronic board is replaced a functional test must be conducted responsibility for the interventions lies with the customer.

The following operations must be performed in accordance with standards IEC 61208/DIN 31051:

- Inspection:** Assessment of real conditions
- Servicing:** Measures able to maintain the required conditions
- Repair:** Measures able to restore the required conditions

All maintenance activity shall be performed in accordance to all safety and operational provisions in this manual and to the laws and specifications of the country where the apparatus is operated and/or installed.

8.1. General

Keep a written record on a maintenance card or service book of all maintenance and operations performed. Record the date, description of the fault and reference data indentifying the apparatus (see chap. 3 fig. 1).

Refer to articles 11.5 and 12 of standard IEC 62271-1 if further details are required.

Contact ABB customer support for assistance.

Replacement of the control board and modification of the auxiliary voltage of the contactor

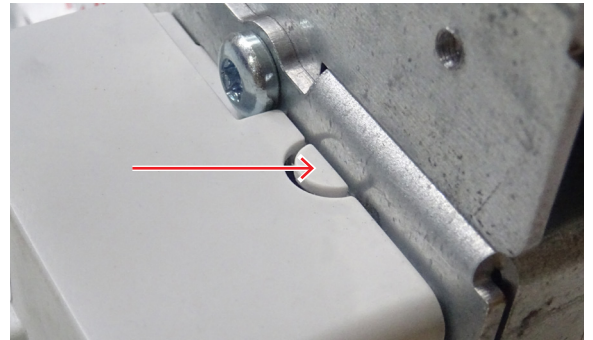
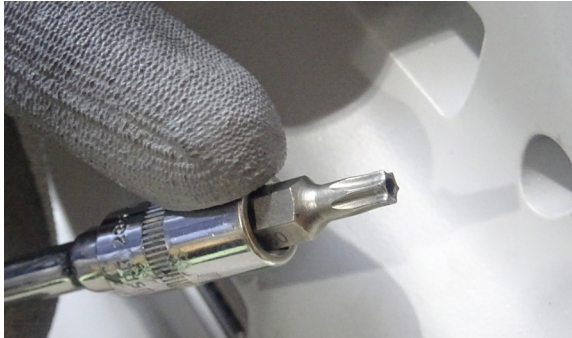


1. Disconnect the green three-pin connector



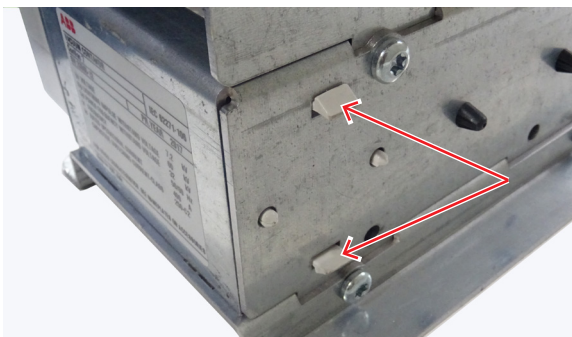
8. Maintenance

2. Remove the cover (if any) by unscrewing the two screws at the side (Torx T20 max 4 Nm)



4. Remove the board

3. Remove the board by releasing the 4 plastic clips (2 at front + 2 at rear)



5. WARNING! Never OPEN the plastic box containing the electronic board
6. Disconnect the white connector on the back of the board



7. If the pulse counter has been installed, record the number of operations shown on the counter



8. Pick up the new control board
9. Insert the white connector in the back of the new control board until there is an audible click.



10. Use a screwdriver to help route the two wires into their housing



8. Maintenance

11. Insert the board



Replacement of auxiliary contact kit

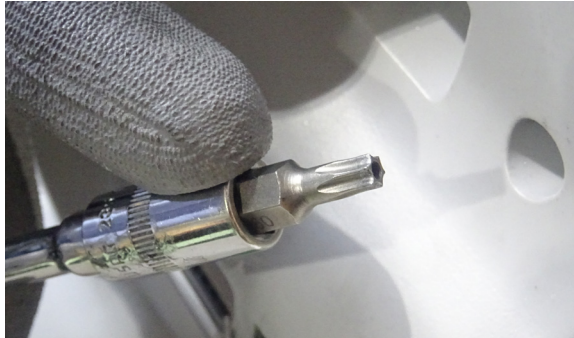
1. Disconnect electrical power source and confirm that the contactor is in the OPEN position (all voltages OFF)



2. Disconnect the green three-pin connector



3. Remove the cover (if any) by unscrewing the two screws at the sides (Torx T20 max 4 Nm)

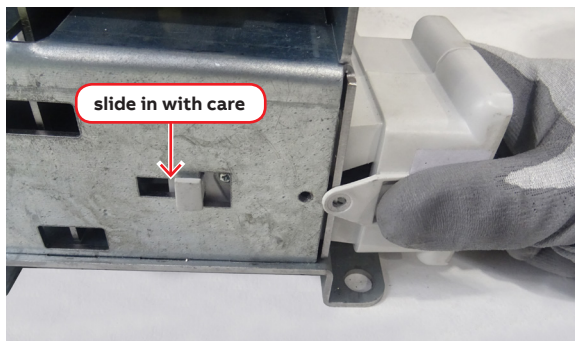


4. Remove the three screws and washers that fasten the auxiliary kit to the contactor frame: 2 screws on front -1 screw on the side



8. Maintenance

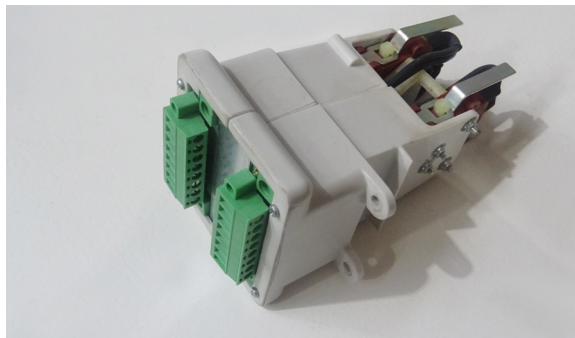
5. Remove the auxiliary contact kit from the contactor frame



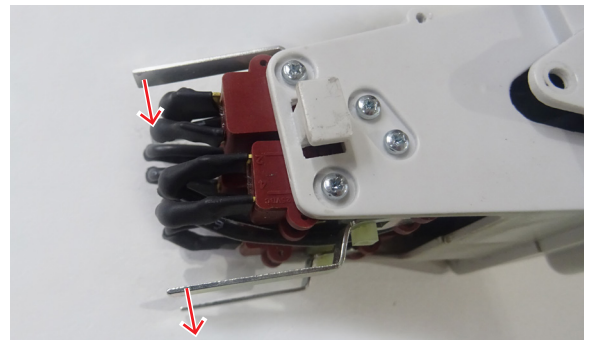
6. Do not OPEN, dismantle or disassemble auxiliary contact kit
7. Record the number of operations performed before to install the new kit



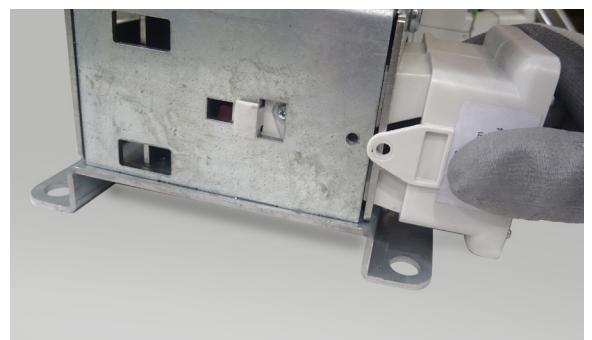
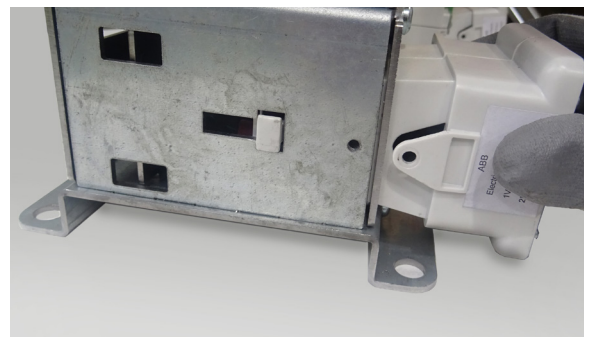
8. Pick up the new kit to be installed



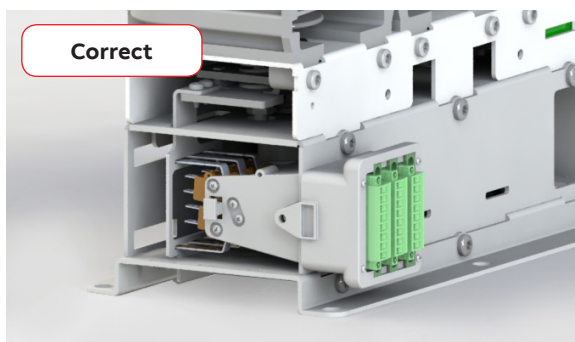
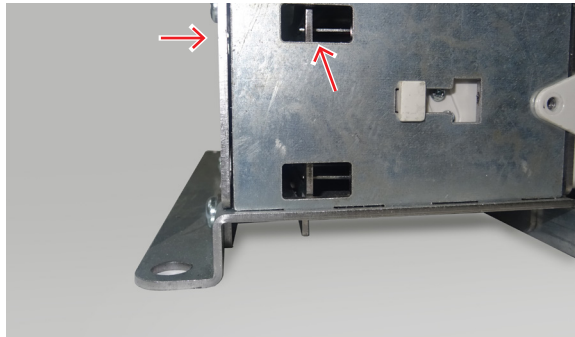
9. Move the microswitch blades down on the new auxiliary contact kit.



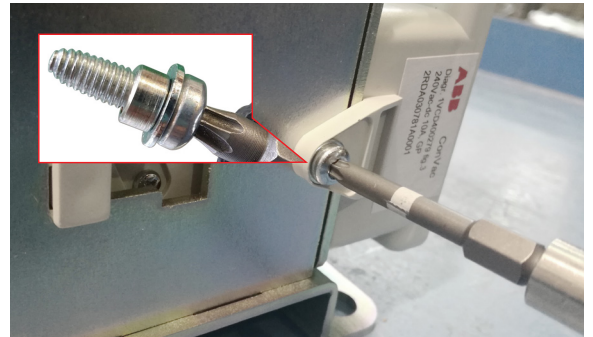
10. Carefully insert the new auxiliary contacts kit into the contactor frame.



11. View the microswitch levers through the side and rear inspection windows and confirm they are in their housing.



12. Reattach the 3 screws and washers and tighten to Torx T20 max 2.5 Nm.



8. Maintenance

13. Reattach the cover (if any) and tighten screws to (Torx T20 max 4 Nm)



14. Connect the green eight-pin connector/s



15. Perform several OPEN-CLOSE operations to check that the microswitches all switch as indicated in the circuit diagram

Installation or removal of the RiMe kit (opening coil)- mechanically latched contactor

ConVac can be equipped with a kit (RiMe) which converts the contactor from electrically latched to mechanically latched.

There are 4 RiMe kits corresponding to the different auxiliary voltages that drive the opening coil:

- 24 V DC
- 48 V DC
- 110-125 VAC DC 50-60Hz
- 220-240 VAC DC 50-60Hz

If a mechanically latched contactor is ordered, the product ships from the factory with the RiMe kit pre-installed and tested.

If the RiMe kit is not installed or will be replaced, install as follows:

Installation

1. Installation must be performed by qualified personnel in accordance with all applicable national and local standards, laws and electrical codes.
2. Confirm that the power is OFF and that the contactor is in the OPEN position



- Record the number of operations performed before installing the new kit



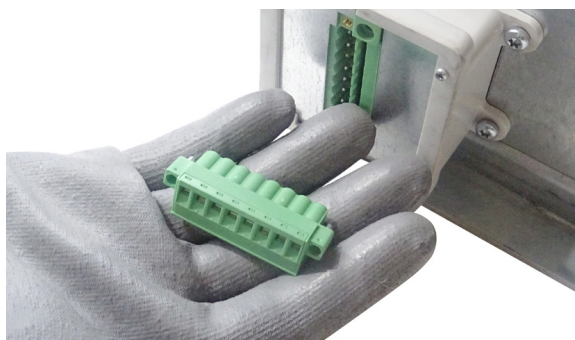
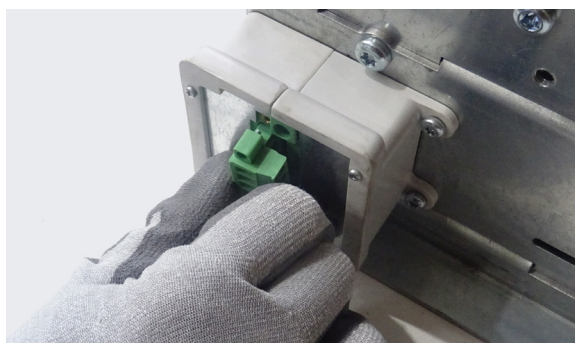
- Remove the cover (if any) by unscrewing the two screws at the sides (Torx T20 max 4 Nm)



- Disconnect the green three-pin connector from the control board



- Disconnect the green eight-pin connector/s from the auxiliary contacts



8. Maintenance

7. Remove the central part of the cover (if installed)



8. Pick up the new RiMe kit. **WARNING!** Never disassemble/OPEN the RiMe kit cover. Never disassemble parts of the kit or dismantle its components



9. Turn the new RiMe Kit until the label is on top



10. Fully insert the 4 rollers into the 2 slots in the frame



11. Fasten the RiMe kit to the contactor using the two screws supplied (Torx T30 10 to 12 Nm)



12. Temporarily unscrew the handle of the emergency opening lever



13. Attach the new black central cover in place (if used)

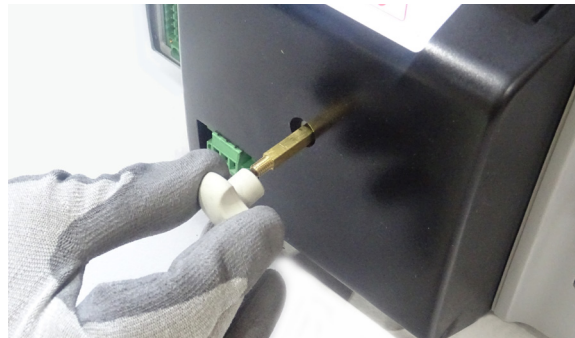


8. Maintenance

14. Reattach the cover (if any) and tighten screws to Torx T20 max 4 Nm.



15. Apply Loxeall 24-18 loctite to the threads of the emergency opening lever and reattach. The force needed to operate the emergency lever should be between 40 and 80N.



16. Perform several OPEN-CLOSE operations to check that the contactor functions as indicated in the circuit diagram provided in the delivered contactor documentation.
17. Do not operate the contactor unless the kit has been installed and checked in accordance to the above procedure.



If the RiMe kit must be removed for plant or maintenance requirements, complete the following:

Removal:

1. Make sure that the work is performed in safe conditions
2. Confirm that power is OFF and contactor is in the OPEN position
3. Record the number of operations performed before to installing the new kit



4. Disconnect the green three-pin connector from the control board and RiMe kit

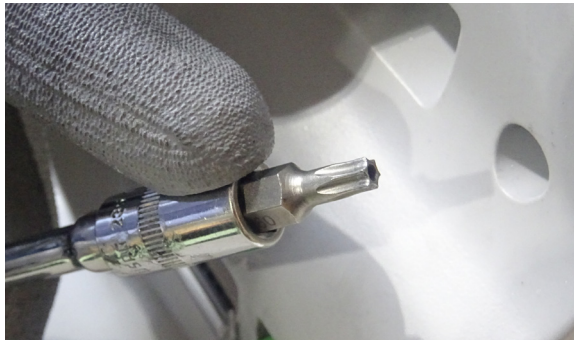


5. Disconnect the green eight-pin connector/s from the auxiliary contacts



8. Maintenance

6. Remove the cover (if any) by unscrewing the two screws at the sides (Torx T20 max 4 Nm)



7. Remove the central part of the cover (if installed)



8. Remove the RiMe kit by unscrewing the two screws with Torx T30 insert



10. Reattach the cover (if any) and tighten screws to (Torx T20 max 4 Nm)



9. Attach the new black central cover in place (if used)



11. Perform several OPEN-CLOSE operations to check that the contactor functions in accordance to the electrical schematic provided with the contactor
12. Do not operate the contactor unless the kit has been installed and checked in accordance to the above procedure

8. Maintenance

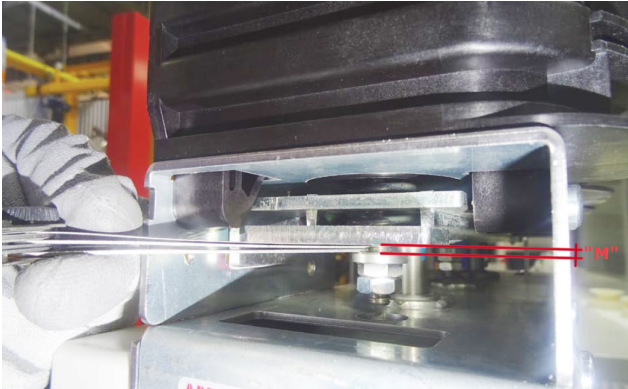
8.2. Inspection

- Conduct regular inspections as noted in Table 4 to check the condition of the equipment.
- Inspect the equipment to confirm there are no signs of contamination, corrosion or electric discharge (as described in table 4).

- Perform inspections more frequently in the case of unusual service conditions (including adverse weather conditions) and/or environmental pollution (e.g. gross contamination or aggressive atmosphere).

If abnormal conditions are observed, consult the "Service" section.

TABLE 4

Inspected part	Inspection frequency	Operation required
1 Insulating parts.	Once a year.	Visual examination of the insulating parts. The insulating parts must be free from built-up dust, damp, dirt (clean), cracks, traces of surface discharge or damage.
2 Structure.	Once a year or after every 100,000 operations.	Visual examination of the structure and mechanisms. The components must not be deformed in any way and must be free from accumulated dust, dirt, damage. The screws, nuts and bolts must be tightened to the correct degree.
3 Interrupter.	Once a year or after every 100,000 operations. If accidental knocks occur or after a short circuit.	Confirm that the interrupter is free from built-up dust, dirt, cracks, traces of surface discharges or damage. Perform a voltage test with the contacts OPEN at 16kV for 7.2kV contactor, 22.4kV for 12kV contactor for one minute (50-60Hz). If a discharge occurs during the test this indicates the degree of vacuum has deteriorated. Contact ABB Service.
4 Interrupter contacts.	Once a year or after every 50,000 interruptions at the rated current.	See figure.  The contact material vaporizes from the surfaces during each interruption and condenses elsewhere, within the vacuum interrupter. This is a normal process for vacuum sealed for life breaking technology. Overtravel "M" decreases as the contacts wear. When, with the contactor CLOSED, the distance "M" of any pole is below 1 mm, all the sub-assemblies must be replaced. Use a 1 mm thick thickness gauge to take this measurement. Warning ! Never unscrew the nuts of the vacuum interrupter. The overtravel distance must be checked, but not adjusted.
5 Auxiliary contacts.	Once a year or after every 100,000 operations.	Confirm that operation and signals are correct. Replace auxiliary contact after 400.000 OPEN/CLOSE cycles (or 800.000 operations). Replacement not needed for ConVac 7 800 A.
6 Auxiliary circuit conductors.	Once a year or after every 100,000 operations.	Confirm that all the screws and terminals of the auxiliary circuits are well tightened and have not worked loose or overheated.
7 Visual inspection of the main terminals.	Once a year or after every 100,000 operations	The contact zones must be cleaned if there are signs of overheating or tarnishing (discolored surface). Consult the "Repairs" section for further information.
8 Power connections.	Every 2 years or 100,000 operations.	Confirm that the connections are well tightened. Confirm that there is no trace of overheating or tarnishing.
9 Contactor.	Every 2 years or 100,000 operations.	Perform five no-load closing and opening operations. The contactor must work regularly.
10 Ground contact (fixed contactor).	Every 2 years or 100,000 operations.	Confirm that the connections are well tightened.
11 Insulation resistance.	Every 2 years or 100,000 operations.	See sect. 6.7.1.

8.3. Service after a short-circuit or overload

General

The ConVac contactor should be protected by fuses and/or by a circuit breaker.

After short-circuit breaking at maximum power, eliminate the cause of the fault, inspect the entire apparatus for signs of damage including inspection of the enclosure, terminals and conductors as set forth in Table 4. If the contactor is damaged, complete repairs or replacements before putting the equipment back into service.

Note: Use ONLY original parts.

Contact ABB Service for assistance.



CAUTION

Contactor should be inspected by ABB after 2,000,000 operations (1,000,000 cycles) or 10 years duty.
Contact the ABB Service.



ATTENTION

Le contacteur doit être inspecté par ABB après 2 000 000 de manoeuvres (1 000 000 de cycles) ou 10 années de fonctionnement. Le ConVac 7 800 A doit être inspecté après 600 000 opérations (300 000 cycles) ou 10 ans de service.

Vacuum interrupters

If there is no physical sign of mechanical or electrical stress and distance M exceeds the minimum value of 1 mm, the interrupters can be dielectrically tested as described in point 3 of table 4.

If the result of this test is positive, then the contactor can be put back into service after a fault.

Enclosures

External damage to the enclosure is an indicator of internal damage. Inspect for internal damage and conduct repairs before restoring service.

Internal terminals and conductors

Replace all damaged parts that appear discolored, or that show signs of melting or damage due to an electric arc. Pay particular attention to the moving parts.

Comply with the "inspection" procedure described in sect. 8.2, Table 4 of this manual, and in particular in table 4 point 6, before putting the apparatus back into service.

8.4. Repairs

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

Before beginning, turn power OFF and confirm that the contactor is in the OPEN position.



CAUTION

ABB is not responsible for repair or maintenance conducted by customer.



ATTENTION

ABB n'est pas responsable des réparations ou de la maintenance effectuées par le client.

8.5. Interrupter vacuum degree test

Following instruction refers to the verification required by table 4 point 3.

To perform the test do not disassemble the vacuum interrupters from the contactor. Use a VIDAR vacuum tester, manufactured by Programma Electric GmbH, Bad Homburg v.d.H.

The VIDAR vacuum degree test must always be performed with the contactor OPEN:

- turn power OFF and comply with safety regulations specified in IEC/DIN VDE standards as well as local laws, regulations and electrical codes
- OPEN the contactor
- ground one terminal of each contactor pole
- connect the ground terminal of the VIDAR tester to the structure of the contactor (earthing point of the contactor)
- connect the high voltage terminal of the VIDAR tester to the ungrounded terminal of the contactor pole (L1 phase) and proceed with the test. Repeat the test for phases L2 and L3.

The following test values applies:

Rated voltage of contactor	D.C. test voltage
7.2 kV	16 kV
12 kV	22.4 kV

8. Maintenance

8.6. Troubleshooting

**Before Inspection or Repair, turn main and auxiliary power OFF.
Do not commission the contactor if there are malfunctions.
Contact ABB for assistance.**



Warning

	Issue	Trouble-shooting						
		Control power or voltage supply low	Wrong Control voltage	Connections are bad or loose	Wiring does not match with diagram	Fuse/s are blown	Confirm that movable parts are not blocked	Confirm product is installed per instructions
Possible solution		Confirm feeder provides inrush current without voltage reduction or spark	Confirm there is power to the contactor if electrical latching or correct voltage if mechanical latching.	Check all the connections and tighten any loose connections	Correct the wiring in accordance to the wiring diagram.	Repair the fault and replace the fuse	Remove blockage. If the block is due to a contactor part contact ABB service.	Assemble the kit according to the instructions
Electrically latched	Contactor does not CLOSE	•	•	•	•	•	•	
	Contactor does not OPEN		•		•		•	
	Closing coil overheating		•	•	•		•	•
	Drive unit overheating	•	•	•	•			•
	Auxiliary contacts do not commute			•	•		•	•
Mechanically latched / RiMe kit	Contactor does not CLOSE	•	•	•	•	•	•	
	Contactor does not latch / latch does not engage							•
	Contactor does not OPEN on electrical command	•	•	•	•		•	•
	Contactor does not OPEN on manual operation						•	•
	RiMe kit overheating	•	•	•	•		•	•
	Auxiliary contacts does not commute			•	•		•	•

9. Spare parts and accessories

Refer to technical catalogue 1VCP000695 when ordering replacement parts/accessories and always indicate:

- type of contactor
- rated voltage of contactor
- rated thermal current of contactor
- serial number of contactor or accessories
- rated voltage and frequency of any electrical replacement parts.
- Number of operations performed by part being replaced (only for replacement parts)

Please contact ABB Service to check on availability and to order replacement parts.

9.1. List of spare parts

- Electronic control board
- Auxiliary contacts kits
- RiMe (Mechanical Latching)
- Closing coil. Part may only be replaced by ABB service (subject to applicable service charges) or by customers specifically trained in ABB service training courses

10. Product quality and environmental protection

The apparatus is manufactured in conformance with international standards concerning quality management and environmental management systems. ISO 9001 and ISO 14001 certificates available.

End of life of the products

ABB endeavors to comply with the environmental management standards, in accordance with the provisions established by Standard ISO 14001.

ABB provides customer assistance and support to facilitate the legally compliant recycling and disposal for products at the end of their life.

Disposal methods

The products can be disposed of by means of heat treatments, in incineration systems or by storage in dedicated areas as indicated in the table below.

Material	Recommended disposal method
Metals (Fe, Cu, Al, Ag, Zn, W, other)	Separation and recycling
Thermoplastics	Recycling or disposal
Epoxy resin	Separation of metal parts, disposal of resin parts
Rubber	Disposal
Dielectric oil (transformer oil)	Recovery, recycling or disposal
Wood for packaging	Recycling or disposal
Aluminium foil for packaging	Recycling or disposal



Notes

Grid of dots for notes.

For further details please contact:



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

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