Medium voltage products

HD4 equipped with Kraus & Naimer auxiliary contacts Instructions for replacing the auxiliary contacts

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For your safety

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

- Check that the personnel operating the apparatus have this instruction manual to hand as well as the necessary information for correct intervention.
- During the installation operations, make sure that the circuit-breaker is in the open position, that the springs of the operating mechanism are discharged and that there are no live parts.
- Do not stress the insulating parts of the circuit-breaker's auxiliary circuit when the wiring is installed.

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

1. Description

1.1. General information

This manual contains instructions about how to replace the Kraus & Naimer auxiliary contacts used in HD4 circuit-breakers equipped with ESH mechanical operating mechanisms, in the fixed and withdrawable versions.

Electrical signalling of the circuit-breaker open/closed status includes a group of 14 auxiliary contacts supplied with the standard versions.

A terminal box situated inside the circuit-breaker is available for the fixed versions while for the withdrawable versions, the auxiliary contacts are connected by means of the circuit-breaker's electrical plug.

Notes
The number of auxiliary contacts available may vary, depending on the electrical applications required.

1.2. Reference Standards

Kraus & Naimer auxiliary contacts conform to the following standards/regulations/directives:

- IEC 62271-100
- IEEE C37.54
- EN61373 cat.1 class B / vibration test
- EN61373 cat.1 class B / impact test
- Germanish Loyd regulation / vibrations envisaged by the shipping registers
- UL 508
- EN 60947 (DC-21A DC-22A DC23A AC-21A)
- RoHS Directive

1.3. Technical characteristics

Electrical characteristics:

Insulation voltage to VDE 0110 standards, group C	660 V AC 800 V DC
Rated voltage	24 V ... 660 V
Test Voltage	2 KV for 1 min
Maximum rated current	10 A - 50/60 Hz
Breaking capacity	Class 1 (IEC 62271-1)
Number of contacts	10 / 16 / 20
Contact travel	90°
Actuating force	0.6 Nm
Resistance	< 6.5 mΩ
Storage temperature	-30 °C ... +120 °C
Operating temperature	-20 °C ... +70 °C (-30° acc. to UL 37.09)
Contact temperature rise	10 K
Mechanical life	30,000 mechanical operations
Protection class	IP20
Cable section	1 mm^2

Note: The main shunt opening release and/or the additional shunt opening release use one and/or two contacts (normally open), thereby reducing the number of auxiliary contacts available.

Additional requirements (IEC 60947)

Rated voltage Un		Breaking capacity (10,000 breaks)
220 V AC	cosφ = 0.70	20 A
220 V AC	cosφ = 0.45	10 A
24 V DC	1 ms	12 A
	15 ms	9 A
	50 ms	6 A
60 V DC	1 ms	10 A
	15 ms	6 A
	50 ms	4.6 A
110 V DC	1 ms	7 A
	15 ms	4.5 A
	50 ms	3.5 A
220 V DC	1 ms	2 A
	15 ms	1.7 A
	50 ms	1.5 A
250 V DC	1 ms	2 A
	15 ms	1.4 A
	50 ms	1.2 A

2. Replacement of the auxiliary contacts

All the operations described below must be performed by sufficiently trained personnel with in-depth knowledge of the equipment.

2.1. Cable connections

Make sure that the circuit-breaker is open and the closing spring discharged before removing the operating mechanism cover to access the the auxiliary contacts.

Note: the minimum cross-section of the wires used for the auxiliary circuits must not be less than the one used for the internal wiring. In addition, the cables must also be insulated for 3 kV test voltage.

Replacement of auxiliary contacts for the circuit-breakers (see Fig. 1 and Fig. 2 below) must be performed as shown in the circuit diagram of the circuit-breaker (example: diagram 1VCD400197 -fig. 32 for plug-in circuit-breakers).

The cables on the outside and inside of the circuit-breaker must always be housed in an appropriate container (e.g. a tube, duct) or held in place by clamps.

To prevent the wiring inside the circuit-breaker from accidentally coming into contact with moving parts, which could damage the insulation, always make sure that the cables are fixed to the internal structure of the circuit-breaker at a safe distance from moving parts.

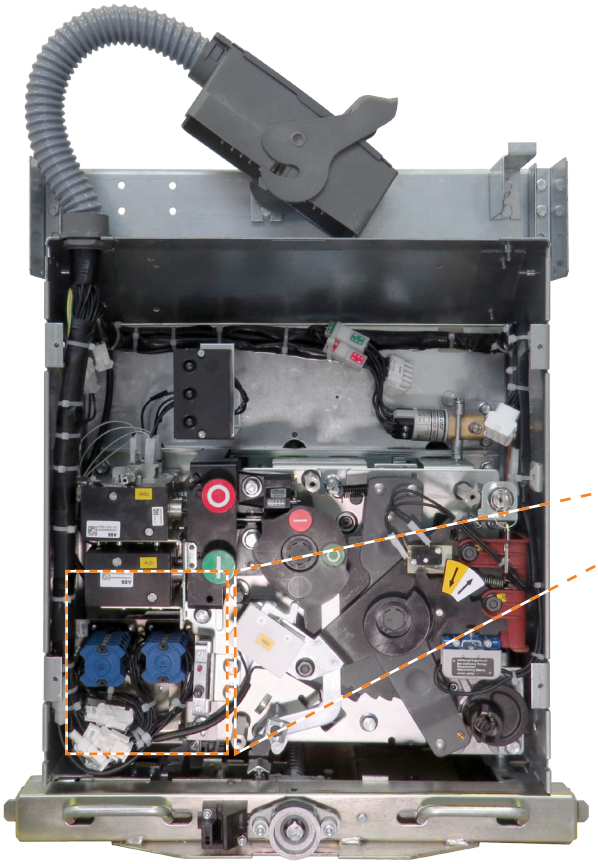


Fig. 1 - Front view of circuit-breaker

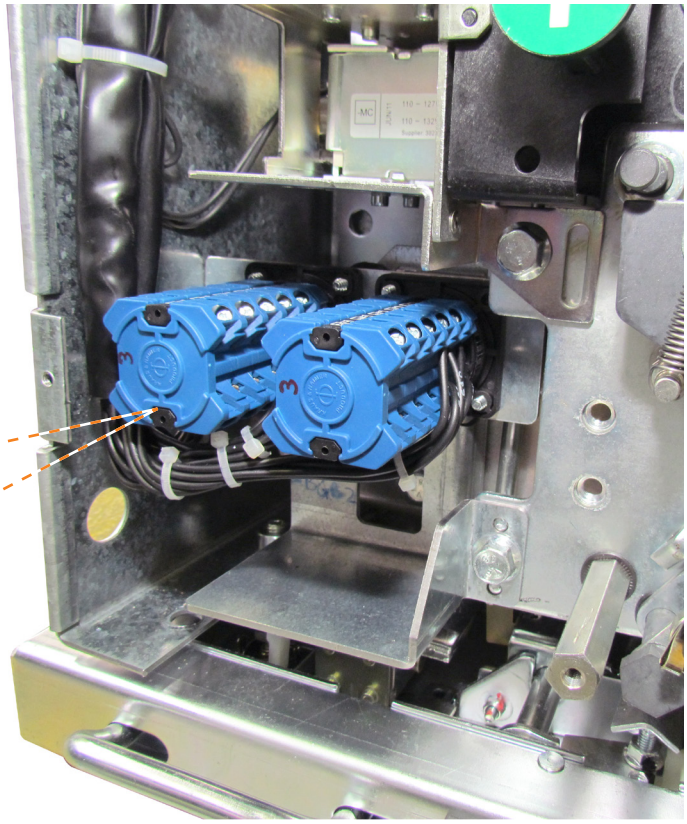


Fig. 2 - View of the auxiliary contact assembly

2.2. Instructions for disassembling and replacing the auxiliary contacts

A) Remove the clip (split pin) [1] and washer [2] from the rod that moves the auxiliary contacts [3].
B) Remove the rod that operates the auxiliary contacts [3] from the hole of the operating lever of the circuit-breaker's operating mechanism [4].
C) Unsrew the screws [5] (ISO 41631 – Standard hex nuts with flange - M8x16 mm) and remove the auxiliary contact assembly from the structure of the operating mechanism.
D) Disconnect the wires from the auxiliary contacts that need to be replaced by unscrewing the screws of the terminals that provide the electrical connection. During this stage, it is forbidden to use tools that could damage, cut and thus shorten the connection cables of the main wiring. If this happens, correct assembly of the new auxiliary contacts could be compromised.
D) Wire the new auxiliary contacts as shown in the circuit diagram (e.g. 1VCD400197 - fig. 32) so as to remake the original wiring of the circuit-breaker.
E) Fit the new auxiliary contact assembly onto the structure of the circuit-breaker by tightening the screws [5] (ISO 41631 - Std. hex nuts with flange - M8 16 mm) using 30 Nm tightening torque.
F) Fit the rod that operates the auxiliary contacts [3] into the hole of the operating lever of the circuit-breaker's operating mechanism [4], as indicated in point B.
D) Re-assemble the washer [2] and clip (split pin) [1] as indicated in point A.
E) To prevent the wiring from accidentally coming into contact with moving parts, which could damage the insulation, always fix the cables to the internal structure of the circuit-breaker at a safe distance from moving parts.

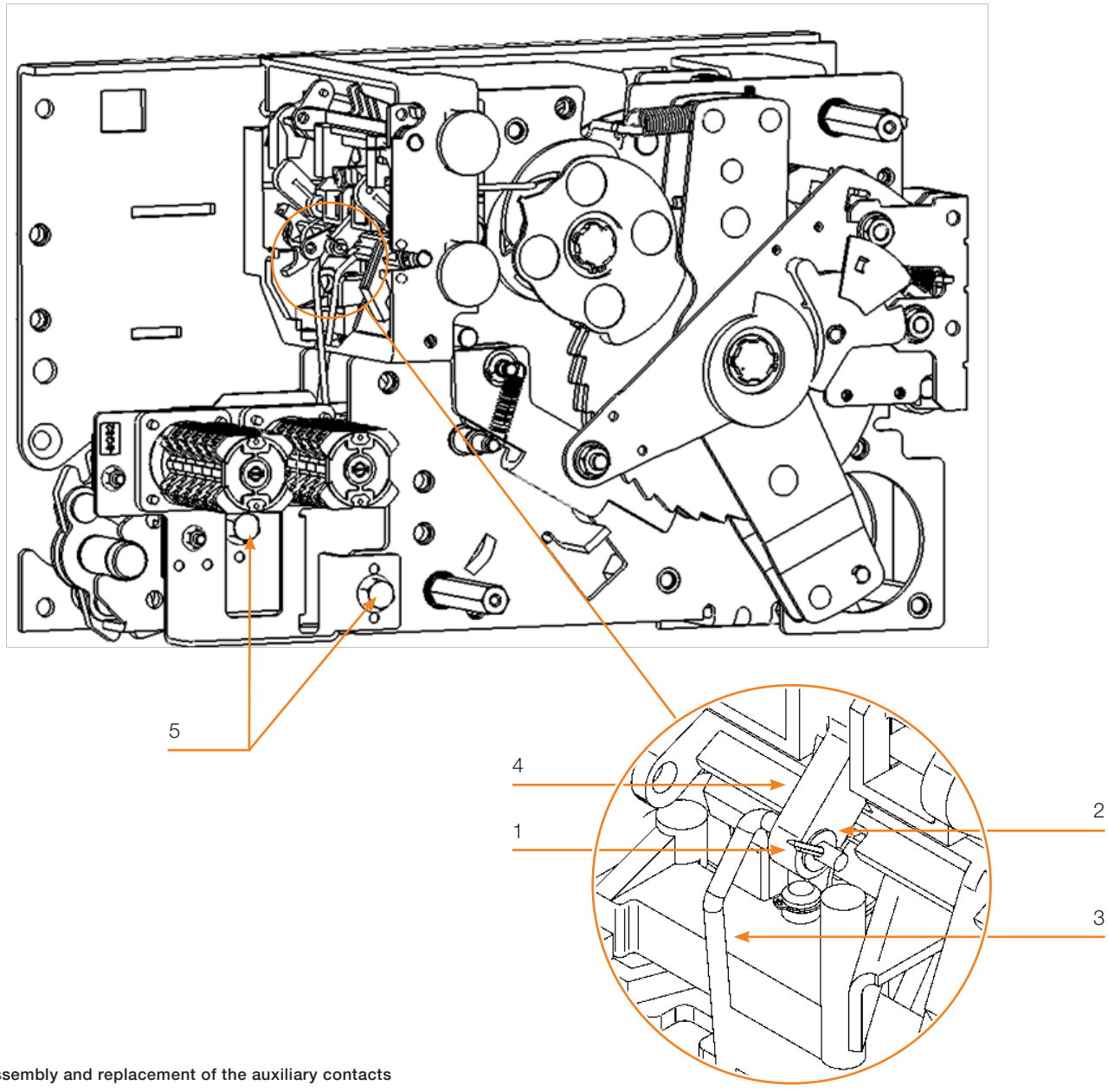
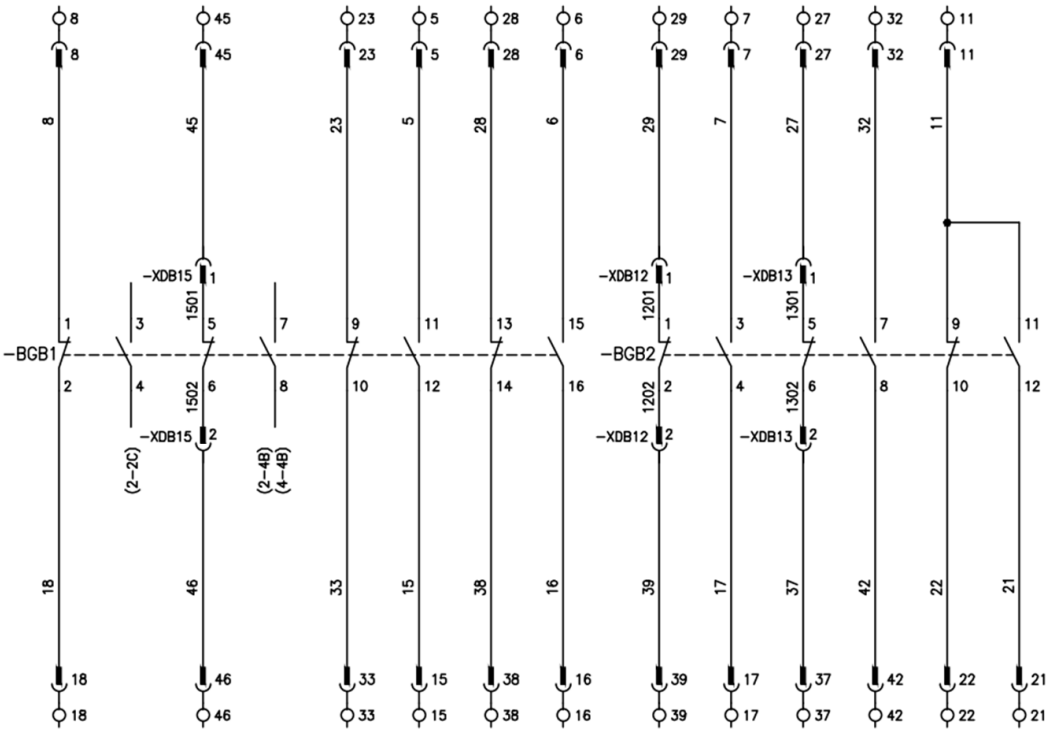


Fig. 3 – Disassembly and replacement of the auxiliary contacts

2.3. Circuit diagrams

Electrical connection of the auxiliary contacts is illustrated in the circuit diagram of circuit-breaker HD4.
An example of the connection layout of Kraus & Naimer auxiliary contacts for a plug-in circuit-breaker is given below. The contacts are shown in the condition where the circuit-breaker is open.

Notes
Each circuit-breaker is always supplied with its circuit diagram or with a specific circuit diagram if special wiring is involved. Always refer to the circuit diagram supplied with the equipment to make sure which auxiliary contacts are really available.



The contacts are shown in the condition where the circuit-breaker is open

Notes

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1VCD601364 V.5735 Rev.-, en - Instruction manual - 2015.07 (HD4 Contact Instruction) (gs)

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