Medium voltage products

VD4 (with EL operating mechanism) equipped with Kraus & Naimer auxiliary contacts
Instructions for wiring the auxiliary contacts

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For your safety!

- Make sure that the installation room (space, divisions and environment) is suitable for the electrical apparatus.
- Make sure that all the installation, putting into service and maintenance operations are carried out by skilled personnel with in-depth knowledge of the equipment.
- Make sure that all the installation, service and maintenance operations comply with the standards and laws so as to ensure that the installations are constructed in accordance with the rules of good workmanship and safety in the work place.
- Strictly comply with the instructions in this manual.
- Make sure that the rated performance of the apparatus is not exceeded during service.
- Pay special attention to the information in the manual highlighted by the following symbol:

- Make sure that the personnel are provided with this manual and are aware of all the relevant information while operating on the apparatus.
- During the installation operations, make sure that the circuit-breaker is in the open position, that the springs of the operating mechanism are not loaded 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 publication describes fixed-version VD4 circuit-breakers with EL mechanical operating mechanisms and Kraus & Naimer auxiliary contacts not wired to the terminal box. Electrical signalling of the circuit-breaker open/closed state is provided by a group of 10 auxiliary contacts, which are part of the standard equipment. Alternatively, a group of 16 or 20 auxiliary contacts can be supplied on request.
The auxiliary contacts must be wired at the customer's charge. On request, they can be supplied wired to a terminal box situated in the enclosure of the circuit-breaker's operating mechanism.
This document contains instructions on how the customer must wire the auxiliary contacts.

Notes
Depending on the electrical applications required (see circuit diagram), the group of 10 auxiliary contacts (supplied as part of the standard equipment) includes 5 NO and 5 NC contacts for fixed circuit-breakers.
Depending on the electrical applications required (see circuit diagram), the group of 16 auxiliary contacts includes 8 NO and 8 NC contacts for fixed and withdrawable circuit-breakers.
Depending on the electrical applications required (see circuit diagram), the group of 20 auxiliary contacts includes 10 NO and 10 NC contacts for fixed circuit-breakers.

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	24V ... 660 V
Test Voltage	2 kV per 1 min
Maximum rated current	10 A - 50/60Hz
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 overtemperature	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 interruptions)
220 V AC	cosφ = 0.70	20 A
220 V AC	cosφ = 0.45	10 A
24 V DC	1 ms	12 A
	15 ms	9 A
	50 ms	6 A
60 V DC	1 ms	10 A
	15 ms	6 A
	50 ms	4.6 A
110 V DC	1 ms	7 A
	15 ms	4.5 A
	50 ms	3.5 A
220 V DC	1 ms	2 A
	15 ms	1.7 A
	50 ms	1.5 A
250 V DC	1 ms	2 A
	15 ms	1.4 A
	50 ms	1.2 A

2. Instructions for wiring 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 t hat the closing spring is not loaded before removing the cover of the operating mechanism.

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. They must also be insulated for 3 kV test voltage.

The customer is responsible for connecting the external wiring of the auxiliary circuits (Fig. 1 and Fig. 2) as shown in the circuit diagram (example: 1VCD400151 Fig. 31 - 32 - 33).
Some of the auxiliary contact terminals can be connected to the terminal box in the circuit-breaker (Fig. 1), depending on the accessories required.
Outside the circuit-breaker, the cables must be housed in a suitable enclosure (pipe, duct, etc.) preferably made of metal, so as to ensure they are properly earthed and protected.
To prevent the customer's wiring in the enclosure of the circuit-breaker's operating mechanism 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 removing the auxiliary contacts

A) Remove the clip [1] from the stud [2]

B) Remove the stud [2] from the hole in the main shaft [3] and set the washer aside for use later on [5]

C) Remove the levers [6] from the lever of the main shaft [3]

D) Unsrew the nuts [4] (ISO 41631 – Standard hex nuts with flange - M6 10 mm) and remove the auxiliary contact assembly from the structure of the circuit-breaker.

E) Wire the auxiliary contacts as shown in the circuit diagram (example 1VCD400151 Fig. 31 - 32 - 33)

F) Fit the auxiliary contact assembly back onto the structure of the circuit-breaker by tightening the nuts [4] (ISO 41631 - Std. hex nuts with flange - M6 10 mm) using 12 Nm tightening torque. The auxiliary contacts must be installed in the horizontal position.

G) Fit stud [2] back in place as described in point C), B), A)

H) The wires must be positioned and fixed to the upper part of the circuit-breaker's structure to prevent the external wiring (installed by the customer) from accidentally coming into contact with moving parts of the operating mechanism, as this could damage the insulation.

Fig. 3 – Disassembly of the auxiliary contacts

2.3. Circuit diagrams

The circuit diagram of the fixed VD4 circuit-breaker is 1VCD400151.
The diagrams of the Kraus & Naimer auxiliary contacts to be wired by the customer are given below.

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 wiring 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
Fig. 31 group of 10 auxiliary contacts (standard equipment)
Fig. 32 group of 6 auxiliary contacts (on request, in addition to the 10 basic auxiliary contacts)
Fig. 33 group of 4 auxiliary contacts (on request, in addition to the 10 basic + 6 extra auxiliary contacts)

Notes

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