

TeSys contactors

Variable composition contactors

The variable composition contactor range is split into 3 groups:

■ **Low power switching contactors:**

- type CV1 B●, 80 to 1000 A,
- type CV3 B●, 80 to 500 A.

For motor control, the references of these contactors are given on pages 26216/2 and 26216/3.

For other applications, the composition of the commercial references is described on page 26218/3.

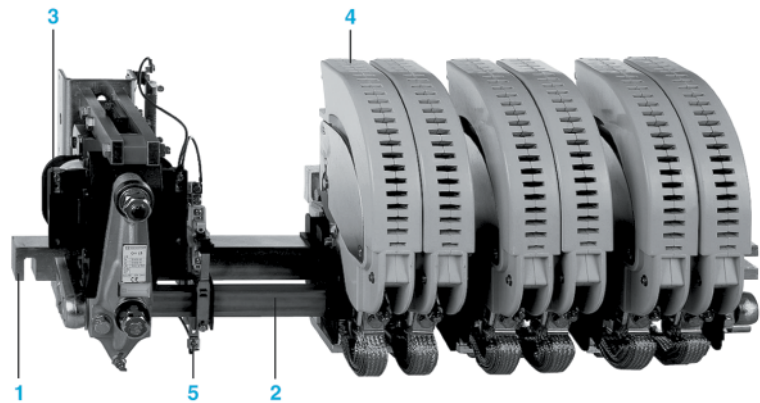
■ **Increased power switching contactors:**

- type LC1 B●, 800 to 2750 A. References shown on pages 26101/2 and 26101/3.

■ **Specific contactors** (large number of main poles, pole arrangement, customised fixing and dimensions, component referencing, etc.) :

- type CV1 ●B, 80 to 1000 A,
- type CV3 ●B, 80 to 2750 A.

To order these contactors, complete the Order form on page 26218/5.



- 1 Mounting bar
- 2 Rotating armature shaft
- 3 Electromagnet
- 4 Main pole
- 5 Instantaneous auxiliary contacts, type GM

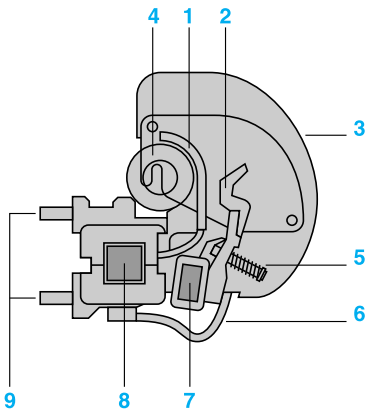
Variable composition contactors are particularly suited for switching a.c. or d.c. motors and other circuits and are capable of providing a high number of operating cycles.

Their variable composition design allows them to be built to customer specification.

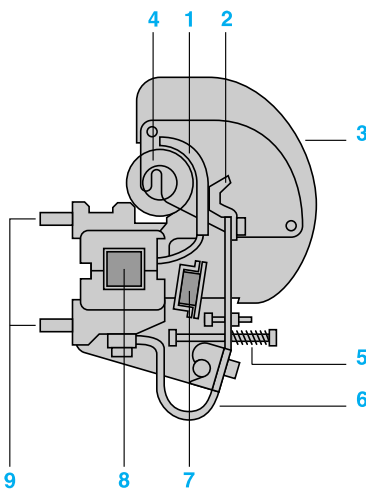
Applications

These variable composition contactors are ideally suited for the most frequently encountered applications:

- Switching a.c. squirrel cage and slip-ring motors in all utilisation categories (AC-2, AC-3, AC-4).
- Switching d.c. motors in all utilisation categories (DC-2, DC-3, DC-4, DC-5).
- Switching a.c. resistive loads (category AC-1) and d.c. resistive loads (category DC-1).
- Switching distribution circuits (category AC-1).
- Short-circuiting of rotor resistors.
- Switching capacitors, power factor correction.
- Switching transformer primaries.
- Switching inductive circuits with high time constant ($L/R > 15$ ms)
Example: alternator excitation circuit.
- Severe duty requirements and main pole arrangements comprising 1 to 6 N/O and/or N/C poles.



N/O pole 80...2750 A.



N/C pole 80...1000 A.

- 1 Fixed contact
- 2 Moving contact
- 3 Arc chamber
- 4 Blow-out coil
- 5 Pole pressure spring
- 6 Braided conductor
- 7 Rotating armature shaft (moving contact actuator)
- 8 Mounting bar
- 9 Terminal lugs

Power circuit

The principal function of a main pole is to make and break the supply current. It is designed to continuously carry its nominal operational current.

Making the current

On energisation of the electromagnet coil, the armature shaft rotates and the moving contact makes with the fixed contact. The contact pressure, maintained by the pole pressure spring, is sufficient to overcome the electrodynamic forces of transient current peaks (e.g.: switching a transformer, starting a motor, etc.).

Breaking the current

On de-energisation of the electromagnet coil, the contacts separate and electrical arcing is dissipated by the blow-out coil and arc chamber. To optimise the performance of the magnetic blow-out, the blow-out coil can be selected to suit the operational current, which is particularly important when switching d.c. The N/C pole operates in a reverse manner to the N/O pole, i.e. the contacts are closed whilst the electromagnet coil is de-energised and open during energisation.

Main pole types

CV1 contactors

■ 690 V a, 220 V c / pole

- N/O poles 80...1000 A (PN1),
- N/C poles 80...1000 A (PR1).

■ Variants:

- no-load breaking poles
 - N/O poles 80...1000 A (PN5),
 - N/C poles 80...1000 A (PR5).
- arc chambers with splitters for dispersing the electric arc: 1000 V ~ / 440 V ≡ per pole
 - N/O poles 500...1000 A (PN3),
 - N/C poles 500...1000 A (PR3).

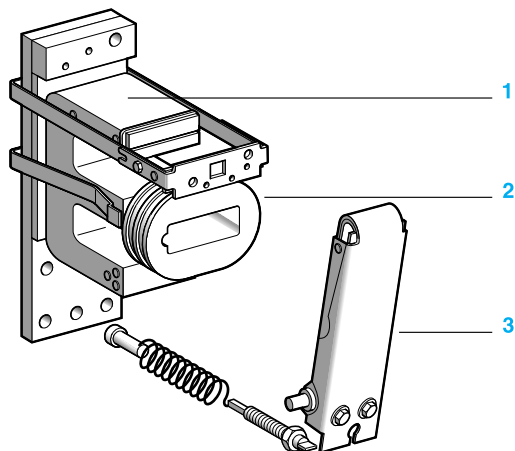
CV3 contactors

■ 1000 V ~, 440 V ≡ / pole

- N/O poles 0...500 A (PA3),
- N/C poles 80...500 A (PR3),
- N/O poles 750...2750 A (PA1).

■ Variants:

- high making capacity poles 750...2750 A (PA2),
- high breaking capacity poles and poles with reduced safety clearances (arc chambers with closed splitters) 750...2750 A (PA1PX8),
- no-load breaking poles
 - N/O poles 750...2750 A (PA5).



- 1 Electromagnet core
- 2 Coil
- 3 Electromagnet armature

Control circuit

- 2 types of electromagnet: E shaped core and U shaped core.
- 2 types of coil: type WB1 and type WB2.

Electromagnet with E shaped core and coil type WB1 for a.c. supply

- **Electromagnet with E shaped laminated iron core, type EB or EC (1)**
 - with central air gap machined in armature,
 - with single coil type **WB1** fitted on centre limb of core.

The upper limb incorporates a shading ring, the armature rotates.
- **Coil - direct a.c. 50 or 60 Hz supply**
 - 20 to 600 V,
 - 1200 operations/hour.

At the moment of inrush, with the armature open, the coil impedance is low and power consumption is high.
 In the sealed state the armature is closed, the coil impedance increases and power consumption is low.
 The inrush current is 6 to 10 times higher than the sealed current.

- **Coil - d.c. supply via economy resistor or a.c. 50 to 400 Hz supply via individual rectifier and economy resistor**
 - 12 to 500 V,
 - 120 operations/hour.

At the moment of inrush, the full actuating voltage is applied to the coil and the inrush current is determined by the coil resistance.
 In the sealed state an additional resistor is switched automatically in series with the coil, so as to reduce power consumption.
 This economy resistor is switched by a N/C auxiliary contact which is adjusted to open only when the armature is fully closed.
 The inrush current is 15 to 40 times higher than the sealed current.

Coils type WB1, used in conjunction with laminated iron cores, have a much higher inrush current than sealed current, whatever the nature of the supply current.

When establishing the current and selecting the supply voltage rating, it is important to take into account the line voltage drop due to the inrush current.

Electromagnet with U shaped core and coil type WB2 for d.c. supply

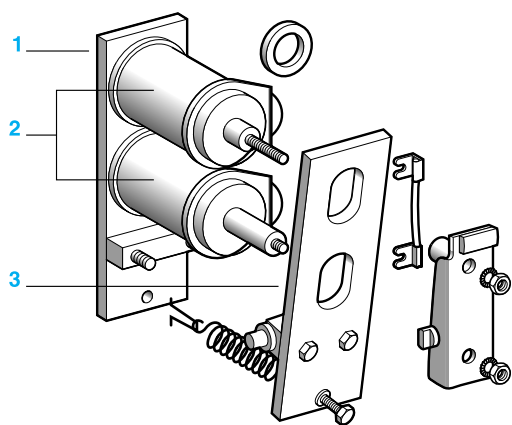
- **Electromagnet with U shaped solid iron core, type EK:**
 - 2 similar coils type **WB2** connected in series, one coil being fitted to each limb of the core,
 - the armature rotates.
- **Coils for d.c. supply**
 - 12 to 600 V,
 - 1200 operations/hour.

The coils for this type of electromagnet have a considerable number of turns so as to obtain sufficient magnetic flux to attract the armature.

Due to its simplicity and relatively slow movements the assembly is very robust and, therefore, has increased mechanical durability.

The inrush current is equal to the sealed current.

(1) For contactor compositions requiring an increased number of poles, use EC electromagnets.



- 1 Electromagnet core
- 2 Coil
- 3 Electromagnet armature

Instantaneous and time delay auxiliary contacts

Signalling, electrical interlocking and slave functions can be achieved by using auxiliary contacts.

Instantaneous auxiliary contacts suitable for use with all contactor types are available in 2 versions:

- 1 **N/O** instantaneous contact, reference ZC4 GM1.
- 1 **N/C** instantaneous contact, reference ZC4 GM2.

Time delay auxiliary contacts suitable for use with contactors CV1 and CV3:

- **On-delay** 1 C/O, reference ZC2 GG1.
- **Off-delay** 1 C/O, reference ZC2 GG5.

Time delay contacts make or break at a specified time after the electromagnet armature closes or opens. This delay may be adjusted between 0.2 and 180 seconds.

Assembling reversing/changeover contactor pairs

Mounting accessories

For applications involving the switching of reversing motors or changeover circuits, contactors of different ratings can easily be mounted vertically and interlocked. Mechanical interlock kits are available (see page 26222/3) and auxiliary contacts can be used for electrical interlocking.