

**SPECIFICATION****Title of the invention :****CONTACTOR.****Field of the invention**

The present invention concerns a contactor constituted by a contacts-block having a case that bears stationary contacts connected to connecting terminals and in which is housed a moving contact-holder fitted out with contact-bridges which cooperate with the said stationary contacts so as to constitute a plurality of poles and by an electromagnet unit which activates this contact-holder by means of a lever so as to open or close the contacts.

Discussion of the Background

It is found on the market small contactors of the above mentioned type.

On some of these contactors, the contact holder is movable along a direction which is parallel to the fixing basis and to the axis of the electromagnet used to move the contact-holder. The contact-holder and the electromagnet are mounted side by side, one above the other. On these known contactors, the front surface is not adapted to receive several additive modules.

SUMMARY OF THE INVENTION

The present invention proposes to provide a contactor having a contacts case suited, by means of a recess opened on the front, to house one or several additives modules. Through the medium of this recess and different equipments, it is possible to recess in the case different additives suited to the signalling or to the suppression and/or an interlocking mechanism. The mechanical link between the contacts-holder and the movable parts of the electromagnet is suited to be linked to the movable parts of a direct-current electromagnet or of an alternating-current electromagnet. The same contacts unit is suited to be mounted with a direct-current electromagnet or an alternating-current electromagnet.

The contactor is characterized in that the contacts case has a central recess and in that

an additive module connected to the terminals of the coil is housed in said recess.

According to a feature, the additive module is constituted by a printed-circuit board on which are fastened pins for electrical connection, said pins being provided with spade terminals which fasten on the connecting terminals, said printed-circuit board being mounted in the recess.

According to another feature, the bordering walls of the recess are provided with slots in which the additive module is embedded.

According to another feature, a projecting part relative to the bottom of the recess, is located in the said central recess, this projecting part having an hole that receives the end of the actuating lever connected to the electromagnet.

According to another feature, the contact-holder has a linking part in which the actuating lever can be engaged, this linking part being provided with means insuring an articulated link with the lever.

BRIEF DESCRIPTION OF THE DRAWINGS.

The invention will be now described in more detail by way of examples with reference to embodiments shown in the appended drawings in which:

- Figure 1 is a perspective view of the contactor in accordance with the invention;
- Figure 2 is an exploded perspective view of a contactor in accordance with the invention wherein the motor unit is of an alternating-current type;
- Figure 3 is a view in cross-section of the contactor from figures 1 and 2, this cross-section being made through the actuating lever;
- Figure 4 is an exploded perspective view of a contactor in accordance with the invention wherein the motor unit is of a direct-current type.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

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The contactor shown in the drawings is composed, at the rear, of a motor unit 1 and, at the front, of a contacts unit 2 provided with a plurality of poles, those units being housed in an insulating case 6 constituted by several parts.

- 5 The motor unit 1 is housed in a base 61 provided with a flange suited to the fixing of the apparatus on a support. The base 61 allows the mounting of the contactor either on a rail through a recess 64 associated with snap-astebner or on a plate by means of two lateral flanges 611 in which some fastening passages 612 are provided.
- 10 A plurality of poles suited each to switch on or switch off a power current between two connecting terminals 23 and 24 are housed in a case 62 which is mounted above the base 61.

- Each pole insures a double break. It comprises two stationary contacts 21 and 22 and a
15 movable bridge 31 bearing built up pastilles which coopere with pastilles which are built up on the stationary contacts.

- The contact- bridges 31 of the different poles are mounted on a movable contact holder 3 guided in a rectilinear way in the case 6, along an axis X-X'. This contact holder 3
20 comprises an insulating core 32 in which some compartments are housed, the contact-bridges 31 being mounted in said compartments. The core 32 is constituted by two parts 321 and 322 which are fixed together and allows the mounting of the contact-bridges and their associated springs. The core has a finger 323 which emerges on the front of the contactor.

- 25 The guiding axis X-X' of the contact-holder 3 is parallel to the rear surface of the base 61. A pull-back spring 33 is mounted between the core 32 and the case 6 so as to pull up the said contact holder in at rest position (contacts opened or closed) when there is no actuation of the electromagnet.

- 30 The stationary contacts 21 and 22 are respectively connected to the connecting terminals 23 and 24 which are brought into alignment and open outside on the front surface of the case 62. Those connecting terminals 23 and 24 are in preference screwed terminals and are housed between isolating partition-walls 621 of the case,
35 those partition-walls extending perpendicularly to the axis X-X'. The terminals 23 and 24 and the associated stationary contacts are mounted on the case 62, from outside,

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between the isolating partition-walls 621 which form compartments.

The case 62 has a front central recess 65 which extends in hollow relative to the front surface of the case 62, in a parallel direction to the guiding axis X-X'. This recess 65 which is used for the embedding of different modules extend between the two rows of partition-walls 621 isolating the connecting terminals and is bounded by two partition-walls 662 which are perpendicular to the partition-walls 621 and by a bottom 623. This recess 65 has a substantially rectangular cross-section and can be used for the housing of a locking device for reversing contactors.

A bottom 63 is fixed under the case 62 so as to form a chamber in which the contact holder unit 3 is housed.

A cover 66 is mounted above the case 62 so as to cover the recess 65 and the connection terminals to which holes permit the access. This cover 66 has a port in which emerges the finger 323 of the contact-holder 3.

The contact-holder 3 is actuated in translation along the axis X-X' by the motor unit which is provided with an electromagnet 4 housed in the base 61. In the figure 2 embodiment, the electromagnet 4 is of an alternating current type and is composed of a stationary yoke 42, a travelling yoke and magnet coil 43, the travelling yoke 41 being mechanically linked at the contact holder 3. In the figure 4 embodiment, the electromagnet 4 is of a direct current type and is composed of a stationary core 45, a travelling core 44 and a magnet coil 46, the travelling core 44 being mechanically linked at the contact-holder by a polar plate 47. The magnet coil 43 or 46 is equipped with driving terminals which emerge in the case 62, near the connection terminals.

The recess 65 is useful for lodging an additive module 8 which is connected at the connecting terminals 23 and 24. This additive module 8 may be a signalization module or a suppression module.

The additive module 8 is constituted by a printed-circuit board 81 at which are fastened rigid pins 82 and 83 equipped with spade terminals 84, 85 which fasten on the terminals 431 and 432 of the magnet coil. The module is mounted in the central recess 65 so that the printed-circuit board 81 is perpendicular to the longitudinal axis of said recess. The spade terminals 84 and 85 insure the electrical connection and the fixing. The partition-



walls 622 which border the central recess 65 are provided with slots 625 in which the additive module 8 is recessed.

In the central recess 65 there is a part in shape of nipple 624 which is in projection relative to the bottom of the recess. This projecting part 624 forms a hole or well 626 receiving the end 71 of the actuating lever 7 while the other end 73 is linked to the travelling yoke 41 of the electromagnet. The end 71 of the lever 7 in the well 626 is located above the level of the bottom 623. The end 73 of the lever is engaged in an aperture 411 of the travelling yoke 41 of the electromagnet.

The projecting part 624 is located near a lateral side of the case 62 and near the means of fixing 625 of the additive module 8.

The contact-holder 3 has a linking part 33 in shape of a cage in which can be engaged the actuating lever 7, this linking part 33 being provided with resilient means able to insure an articulated link with the actuating lever 7 associated with the alternating-current electromagnet or a simple link with the polar plate 47 of the direct-current electromagnet.

In the figures 3 and 4 embodiments, the actuating lever 7 has an articulated cross union 72 that clips in the linking part 33 of the contact-holder 3. An aperture 631 cut in the bottom 63 allows the passage of the lever 7 in the case 62.

In the figure 4 embodiment, a finger of the polar piece 47 is engaged in the linking part 33 of the contact-holder 3.

The operation of the apparatus will now be described.

The contactor heretofore described can receive in its central front recess 65, an additive module 8 (for the signalling or for the suppression) and/or an interlocking device if the contactor is associated with a second contactor so as to constitute an reversing contactor.

The contact-case 62 which is mounted on the alternating-current version is the identical to the case mounted on the direct-current version.

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In the alternating-current version shown in the figures 2 and 3, the actuating lever 7 is engaged in the linking part 33 of the contact-holder and is clipped in this part, after the mounting of the case and of its internal parts.

- 5 In the direct-current version shown in the figure 4, the finger of the polar plate is simply engaged in the linking part 33 of the contact-holder3.

Obviously, numerous modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of
10 the appended claims, the invention may be practiced otherwise than as specifically described.

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CLAIMS

- 1- Contactor constituted by a contact block (1) having a case (62) carrying stationary
5 contacts (21,22) connected to connecting terminals (23,24) and in which is housed a
moving contact-holder (3) fitted out with contacts-bridges (31) which cooperate with the
said stationary contacts so as to constitute a plurality of poles and by a motor unit (2)
provided with an electromagnet (4) which actuates this contact-holder (3) by means of
an actuating lever (7) so as to open or close the contacts, characterized in that the
10 contact-case (62) has on the front surface a central recess (65) and in that an additive
module (8) connected to the terminals (431, 432) is housed in said recess (65).
- 2- Contactor according to claim 1, characterized in that the additive module (8) is
constituted by a printed-circuit board (81) on which pins for electrical connection (82,83)
15 are fastened, said pins being provided with spade terminals (84,85) that fasten on the
connecting terminals (23,24), said printed-circuit board being mounted in the central
recess (65).
- 3- Contactor according to any one of the preceding claims, characterized in that the
20 bordering walls (622) of the recess (65) are provided with slots (625) in which the
additive module (8) is recessed.
- 4- Contactor according to any one of the preceding claims, characterized in that a
projecting part (624) relative to the bottom of the recess (65), is located in the said
25 central recess (65), this projecting part (624) having an opening (625) that receives the
end (71) of the actuating lever (7) connected to the electromagnet.
- 5- Contactor according to any one of the preceding claims, characterized in that the
contact-holder (3) has a linking part (33) in which the actuating lever (7) can be
30 engaged, this linking part (33) being provided with means insuring an articulated link
with the actuating lever (7).
- 6- Contactor according to any one of the preceding claims, characterized in that the
actuating lever (7) has an articulated cross union that clips in the linking part (33) which
35 has resilient articulated linking means for cooperation with said actuating lever (7).

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7- Contactor according to any one of the preceding claims, characterized in that the printed-circuit board (81) of the additive mounts perpendicularly to the longitudinal axis of the recess (65).

5 8- Contactor according to any one of the preceding claims, characterized in that the additive module (8) is connected to the terminals (431, 432) of the coil.

9- Contactor according to any one of the preceding claims, characterized in that a cover (66) is mounted above the case (62) so as to cover the recess (65) and the connection terminals.
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