



DESCRIPTION • INSTALLATION • MAINTENANCE INSTRUCTIONS

MAGNETIC CONTACTORS, TYPE MM Frame 301, 401 Direct Current Single Pole Spring Closed

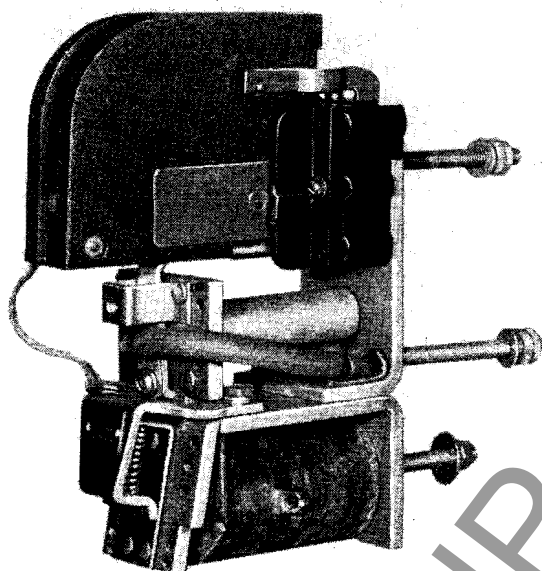


FIG. 1. Types MM-301, 401 Rear-Connected Contactors

TYPE MM CONTACTORS are general purpose magnetically-operated contactors suitable for use in motor controllers and other switching applications.

Rating.

TYPE	8 HR	1 HR	INTERRUPTION CAPACITY AT 600 V
MM-301	100A	133A	1000A
MM-401	150A	200A	1000A

The operating coils are rated for continuous duty and will operate the contactors at 80 to 100 percent of their rated voltage. The contactors are insulated for a maximum potential difference of 600 volts among parts.

DESCRIPTION

The contactors are of unit construction with all parts assembled on a common frame. The armature hinges on a knife-edge bearing which has an extremely long life and requires little maintenance.

The arc shield, which is held in place by the blowout pole pieces and a spring clip, may be removed by pulling it directly forward. An arc horn in the arc shield relieves the moving contact of excessive burning. The arc, which is drawn between the contacts when the contactor magnet closes, moves outward under the influence of the magnetic blowout field and transfers from the moving contact to the arc horn. A flexible connection which is provided to maintain the arc horn at the same potential as the moving contact serves also to prevent loss or misplacement of the arc shield when the latter is removed for inspection of the contacts.

The moving and stationary contacts are faced with solid silver. The moving contact is hinged on the armature in such a way that sliding or rubbing of the surfaces when the contacts meet is practically nonexistent, a provision essential to the long life of silver contacts.

Plates of nonmagnetic steel are secured to the underside of the armature to prevent the armature from sticking closed due to residual magnetism following the interruption of voltage to the operating coil.

Rear-connected contactors are held to the panel by three mounting studs, the upper two of which make provision for the electrical connections.

Front-connected contactors are provided with pressure type solderless terminals and are held to the panel by two mounting studs.

The contactors are suitable for mounting only on insulating panels up to 2 inches thick. As the frame is at the same potential as the moving contact, special insulating precautions must be taken if a contactor is to be mounted on a conducting surface.

Electrical Interlocks. The contactors will accommodate a total of two Type L-46 electrical interlocks. One or both of these may have normally-open contacts. However, no more than one of them may be a normally-closed interlock.

For more complete information refer to Instruction Leaflet 15-829-L46-1B.

The stationary contact assembly of the interlock is mounted on the molded base of the contactor beside the arc shield. A molded insulating detail occupies this location when the contactor is assembled without interlocks at the factory, and this must be discarded at the time an interlock is mounted. The moving contact assembly is secured to the contactor armature by means of a single screw. Care should be taken when installing an interlock to make certain that its moving parts function freely, and that the contact gaps and overtravels conform to the information given in its Instruction Leaflet.

The sequence in which the various switching operations occur as the contactor magnet closes is as follows: (1) the main contacts open, (2) the Type L-46 normally-closed interlock opens, and (3) the Type L-46 normally-open interlock closes.

INSTALLATION AND MAINTENANCE

Arc Shield. The arc shield and its arc horn are essential to the performance of the contactor and these parts should always be in place. The flexible connection leading from the arc horn should always be securely fastened to the frame. The arc shield may be removed by pulling it directly forward, allowing the magnetic blowout pole pieces (which act as its fixed supports) to guide it in its sliding movement. In replacing the arc shield, care must be taken that the guiding recesses in its sides locate themselves properly on and be gripped firmly by the supporting guides. If the guides are found to be spread apart so that they no longer grip the arc box firmly, remove the arc box and spring the guides together slightly by squeezing them with the fingers. The arc shield should be pushed back as far as it will go, until it is held securely against the molded base by the spring clips.

Armature and Bearing. The knife-edge bearing requires no maintenance other than the removal of accumulated dirt. Oil should not be used, as it hastens the collection of dust.

The magnet pole face is secured to the core by means of a bolt having a head that projects forward into a hole in the armature. Care should be taken that the parts maintain their proper alignment, and particularly that the bolt head be accurately centered in the armature hole. Dirt should not be allowed to accumulate.

Operating Coil. When a new operating coil is installed, the identification label should be examined to make certain that the voltage rating and the coil style number are correct for the application.

Table No. 1. OPERATING COILS

COIL VOLTS	TYPES MM 301, 401 CONTACTOR COILS
	Coil Style No.
115	1419 640
230	1419 641
550	1622 924

the more commonly used coils are listed in Table No. 1

This contactor has Class H coils which operate at a temperature rise of 150 degrees C. The surface temperature of the latter coils will be higher than that of Class A coils.

The steps to be followed in removing the operating coil are:

1. Remove the arc shield by sliding it forward.
2. Loosen the two bolts securing the armature stop to the upper side of the contactor frame until the armature stop can be raised clear of the two dowel pins which locate it in position.
3. Allow the self-contained assembly comprising the armature, armature stop, moving contact and springs to hang by the shunt.
4. Remove the bolt holding the pole face to the core of the magnet.
5. Disconnect the coil leads and slide the coil forward until it is clear of the contactor.

Contacts. Oil or other lubricant should not be used on the silver contacts. The discoloration which results from arcing and from exposure to the atmosphere usually is not harmful to their performance, and consequently no filing or dressing is necessary.

When the contacts are new they should meet sufficiently in advance of the final sealing of the armature against the magnet pole face, that a gap of approximately $\frac{5}{32}$ inch appears between the underside of the contact and the upper edge of the fully-sealed armature, as indicated in Fig. 2. As the contacts wear, the amount of this overtravel diminishes, and when at length it decreases to $\frac{1}{32}$ inch, the contacts should be replaced.

The moving contact can be removed for replacement by first disconnecting the shunt and then removing the contact spring. The stationary contact is slotted to facilitate removal, and it is necessary only to loosen the screw until the dowel projecting from the back of the contact is free of the locating hole in the stationary arc horn which serves as the contact support.

Table No. 2. CONTACT PRESSURES

CONTACTOR TYPE	CONTACT PRESSURE IN OUNCES	
	Initial	Final
MM-301 MM-401	9-12	22-26

The contact gap when the contacts are new should be $\frac{1}{4}$ to $\frac{5}{16}$ inch, as shown in Fig. 2.

If, after new contacts are installed, it is found that the overtravel and contact gap do not conform to the dimensions given, it may be necessary to bend the moving contact strap slightly.

The contact pressures when the contacts are new should be as indicated in Table No. 2.

To measure the final contact pressure, hook a loop of fine wire around the moving contact and by means of a spring scale measure the force necessary to separate the contacts.

If, after new contacts are installed, the pressures are not correct, it may be necessary to replace the contact spring or to adjust the contact overtravel in the manner described previously.

Failure of the magnet to open the contacts may result from an open-circuited operating coil, from a circuit condition in which the voltage is excessively low, or from the presence of friction between the

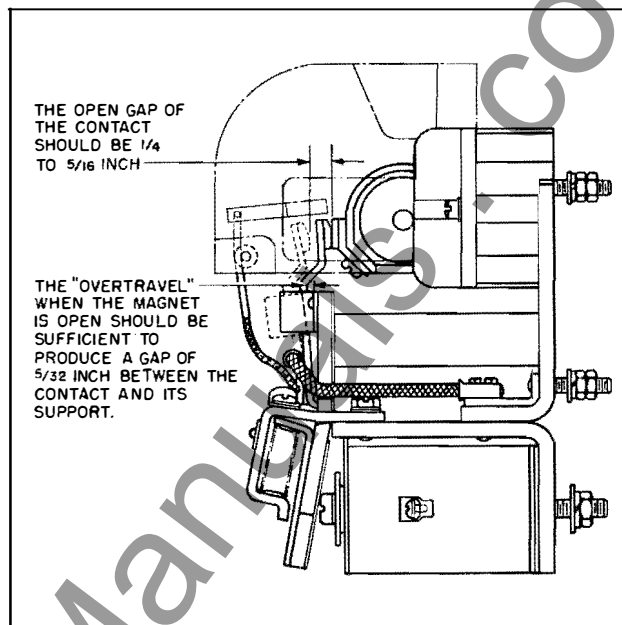


FIG. 2. Sectional View of Types MM-301, 401 Contactors with Contact in Closed Position

parts. Failure of the contacts to close may be caused by friction or by a defective closing spring.

Renewal Parts. Renewal parts may be ordered from the nearest Westinghouse Sales Office. Be sure to describe the part or parts required and give complete nameplate reading on the contactor for positive identification.



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