MAINTENANCE INSTRUCTION

BATTERY FIELD, BATTERY CHARGING AND SHUNT FIELD CONTACTORS

DESCRIPTION

The battery field, battery charging and shunt field contactors covered by this bulletin are identified by the following part numbers:

8184973	Battery Field Contactor (BF)
8191319 8222521	Battery Charging Contactor (BC)
8184974 8227489	Shunt Field Contactor (SF)

Fig. 1 illustrates battery field contactor 8184973. These contactors are all similar in appearance and construction, differing only in the number, arrangement and ratings of main and interlock contacts. All have a top mounted 74 volt DC operating coil that is interchangeable between contactors. The coil is held in place by a metal relay frame, the back of which is a mounting plate to facilitate installing on a panel, Fig. 2. The upper and lower portions of the relay are separated by an insulating plate. A back mounting plate holds the moulded upper and lower contact bases upon which the contacts and terminal studs are assembled.

The heavy duty or main contacts of all five of these contactors are protected from excessive arcing by an arrangement of permanent magnets. To prevent serious damage to the contacts and contactors, it is imperative that these magnets be assembled correctly with the north magnetic poles marked with red dots installed as shown in Figs. 3, 4, and 5. It is equally important to electrically connect the circuits for the main contacts with the correct polarity. Otherwise, the protective arc suppression features will be nullified and damage to the contactor will result. This point is particularly true of the BF and SF contactors where considerable inductive current flows when the circuits are opened.

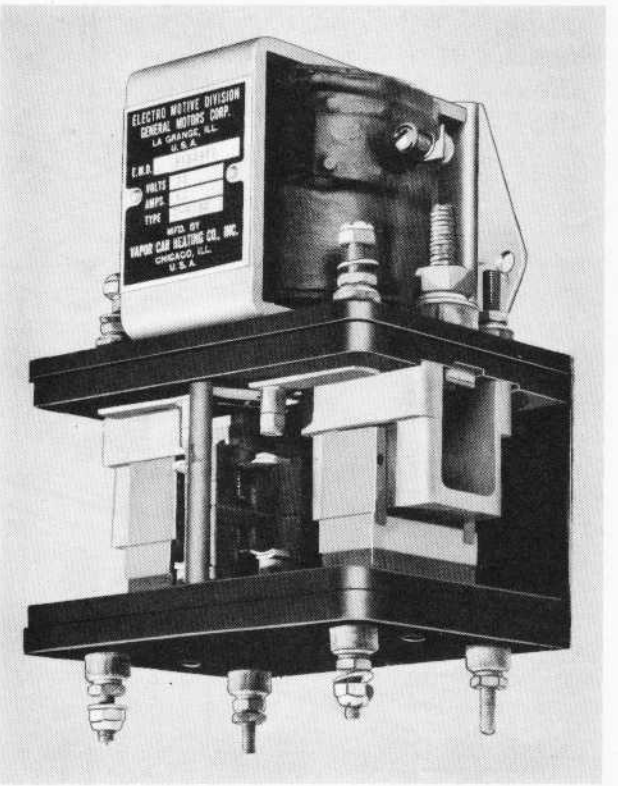

Fig. 1 - Battery Field Contactor 8184973

The battery field contactor has one main heavy duty normally open contact and two normally open and two normally closed interlocks. In locomotive operation, this contactor connects or disconnects the low voltage excitation circuits to the battery field windings of the main generator.

*THIS BULLETIN SUPERSEDES M.I. 598 REV. A AND ALL PREVIOUS EDITIONS.

The shunt field contactors are equipped with two normally open heavy duty main contacts connected in series and one normally open interlock. The purpose of this contactor is to connect the shunt field windings of the main generator into the excitation circuit as required by locomotive operation.

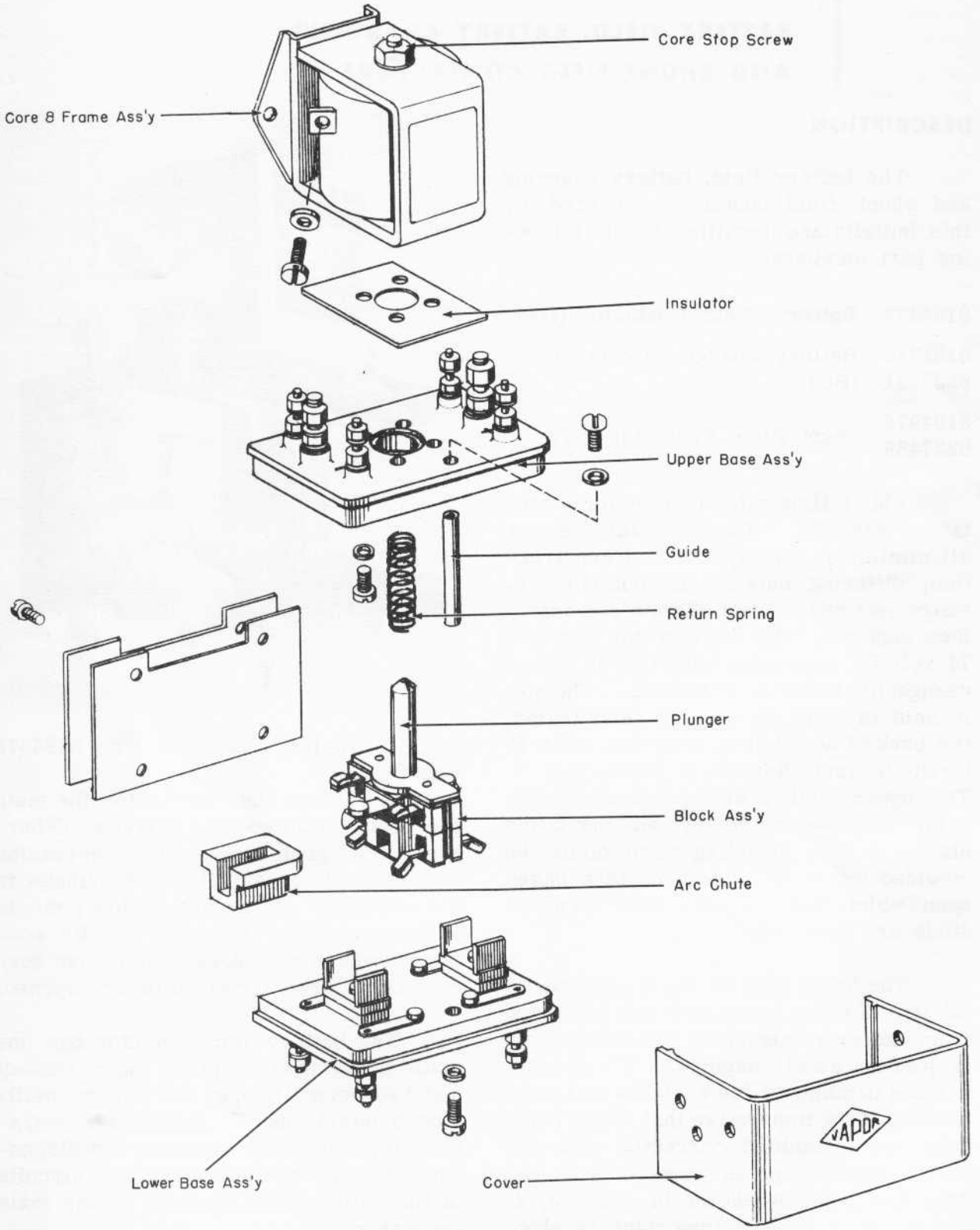

Fig. 2 - Exploded View

Shunt field contactor 8227489 replaces previously used contactor 8184974. The basic difference is main contact connections. The new contactor is a "Z" connected device while the old was a "U" connected device having high and low potential contacts on the same side of the contactor. Application of a new lead assembly to the old contactor from the right rear terminal to the left front (-) terminal will essentially make it a "Z" connected device comparable to the new replacement contactor.

The battery charging contactor is used to connect the auxiliary generator to the batteries through the battery charging equipment as dictated by locomotive operation. Both contactors, 8191319 and 8222521, are of the heavy duty type having one normally open main contact rated at 250 amperes. The only difference between them is that BC contactor 8222521 has one normally open and one normally closed interlock and is used in applications where a battery charging indication is desired. The BC contactor 8191319 has no interlocks.

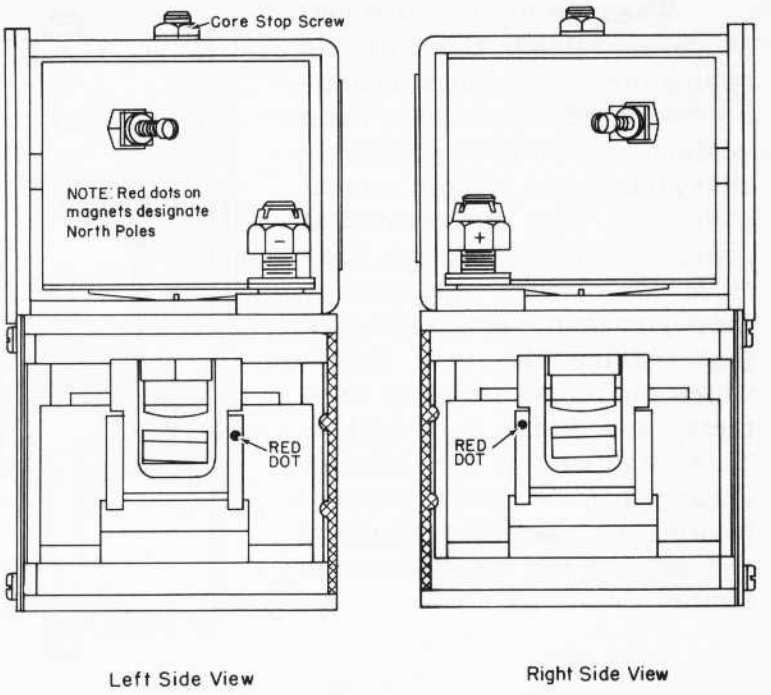

Fig. 3 - Location Of Permanent Magnets Contactors 8184973 (BF), 8191319 (SF) And 8222521 (BC)

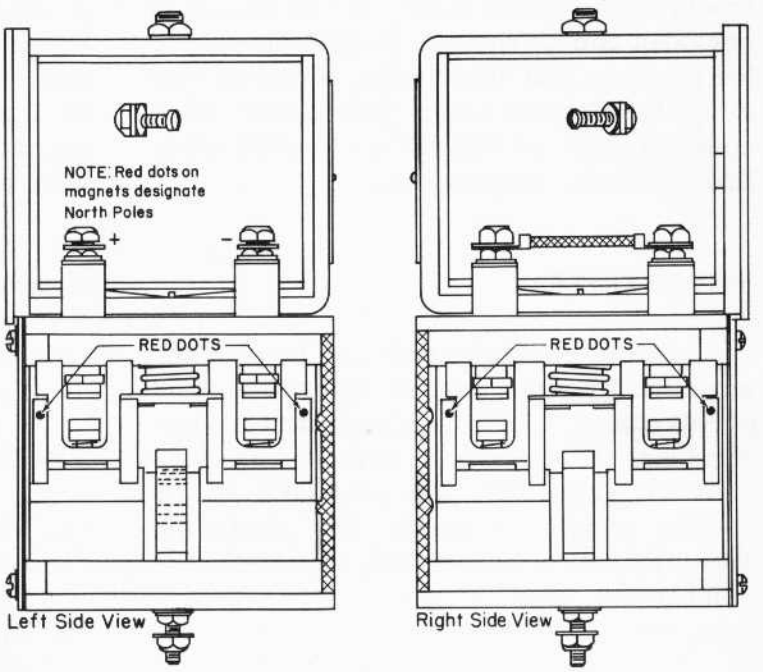

Fig. 4 - Location Of Permanent Magnets Contactor 8184974

OPERATION

The movable main contacts and auxiliary interlocks are assembled into one block assembly, Fig. 2. A metallic plunger extends upward from this block assembly. When the coil of the contactor is energized, this plunger is attracted upward overcoming the tension of a return spring. As the block assembly moves upward, the main contacts close and the auxiliary interlocks change position according to the design of the different model contactors. The movement of the block assembly is guided by a vertical guide pin at the center of the lower portion of the contactor, Fig. 2.

When the top mounted coil is de-energized, the return spring forces the block assembly downward, opening the main contacts and returning the auxiliary interlocks to their normal positions. The arc created at contact opening is drawn away from the contact surfaces by the permanent magnets mounted just outside the arc chutes which surround the main contacts, see Figs. 3, 4 and 5. This magnetic arc blowout arrangement is used to prevent burning of the main contacts and prolong the life of the contactor.

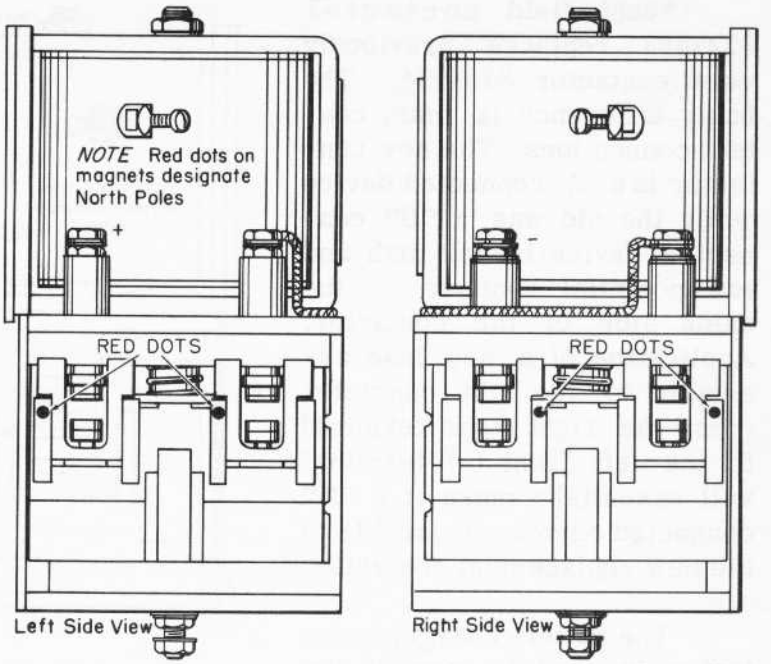

Fig. 5 - Location Of Permanent Magnets Contactor 8227489

MAINTENANCE

Under normal operating conditions these contactors should provide satisfactory service and trouble-free performance for an extended period of time. Their dust-free enclosure for contacts and interlocks, together with simplified construction and silver alloy contacts require but little attention other than periodic inspections.

INSPECTIONS

These contactors should be checked periodically for proper operation and performance. See that all electrical connections are tight and remove any foreign material with low pressure air or a soft brush. Operate the contactor manually, with power off, to check for mechanical binding.

CLEANING SILVER CONTACTS

Contacts may become blackened through normal operation. This will not in itself interfere with the electrical operation of the contactors. Abrasives should not be used to clean silver alloy contacts as there is a possibility that abrasive particles will become embedded in the contact surface causing poor electrical contact. If beads are formed on the contact face through misuse or arcing, to the extent that satisfactory contact cannot be made, they may be removed with a small clean mill file.

When the movable contacts are worn down to the point where only 1/32" or less of alloy material remains, the contacts should be replaced.

TESTS AND ADJUSTMENT

1. Measure coil resistance. It should be 355 $\pm$ 10% ohms for all contactors.

2. Apply a variable voltage across the coil of the contactor. Adjust the contactor pickup and dropout by means of the core stop screw, Fig. 2. Pickup should be 48 V. maximum and dropout 5-28 V. maximum.

3. After the above adjustments are completed, check the main contact air gap and wipe or overtravel. They

should be as specified in the Maintenance Data Section for each individual contactor. Also the normally closed auxiliary interlocks must break before the normally open contacts make.

4. Coat the core stop screw and locknut with GLYPTOL.

5. Hi-pot contactor in accordance with values listed in Maintenance Data Section.

MAINTENANCE DATA

Magnet Coil (All Contactors)

Resistance at 68° F.	355 ± 10% Ohms
Working Voltage	74 Volts
Maximum Pickup (68° F.)	48 Volts
Maximum Dropout (68° F.)	5-28 Volts

BF Contactor #8184973

Main Contact Rating (1 N.O.)	60 Amperes
Interlock Rating (2 N.O. - 2 N.C.)	10 Amperes
Main Contact Air Gap	5/32" Min.
Main Contact Wipe	1/16" Min.

SF Contactor #8184974

Main Contact Rating (2 N.O.)	10 Amperes
Interlock Rating (1 N.O.)	10 Amperes
Main Contact Air Gap	3/16" Min.
Main Contact Wipe	1/16" Min.

BC Contactor #8191319

Main Contact Rating (1 N.O.)	250 Amperes
Main Contact Air Gap	5/32" Min.
Main Contact Wipe	1/16" Min.

BC Contactor #8222521

Main Contact Rating (1 N.O.)	250 Amperes
Interlock Rating (1 N.O. - 1 N.C.)	10 Amperes
Main Contact Wipe	1/16" Min.

SF Contactor #8227489

Main Contact Rating (2 N.O.)	10 Amperes
Interlock Rating (1 N.O.)	10 Amperes
Main Contact Air Gap	3/16" Min.
Main Contact Wipe	1/16" Min.

Hi-Pot Test (1 Minute Duration - 60 Cycles)

Part No.	Coil To Ground	Coil To Contacts	Contacts To Ground 14	Aux. Contacts To Ground
8184973	600 Volts	600 Volts	600 Volts	
8184974	2400 Volts	2400 Volts	2400 Volts	600 Volts
8191319	600 Volts	600 Volts	600 Volts	
8222521	600 Volts	600 Volts	600 Volts	
8227489	2400 Volts	2400 Volts	2400 Volts	600 Volts