ELECTRO-MOTIVE DIVISION • GENERAL MOTORS CORPORATION
SERVICE DEPARTMENT
MAINTENANCE INSTRUCTION

AC MAGNETIC CONTACTORS

DESCRIPTION

The AC magnetic contactor, Fig. 1, is a multiple pole, normally open device actuated by an electro-magnetic coil with a single winding. The coil is energized by DC power from the control circuit supply. On locomotive applications the coil is energized and the main contacts closed to supply AC power for operation of the cooling system fan motor. On MU generating units, similar contactors are used in the excitation and generator field flashing circuits.

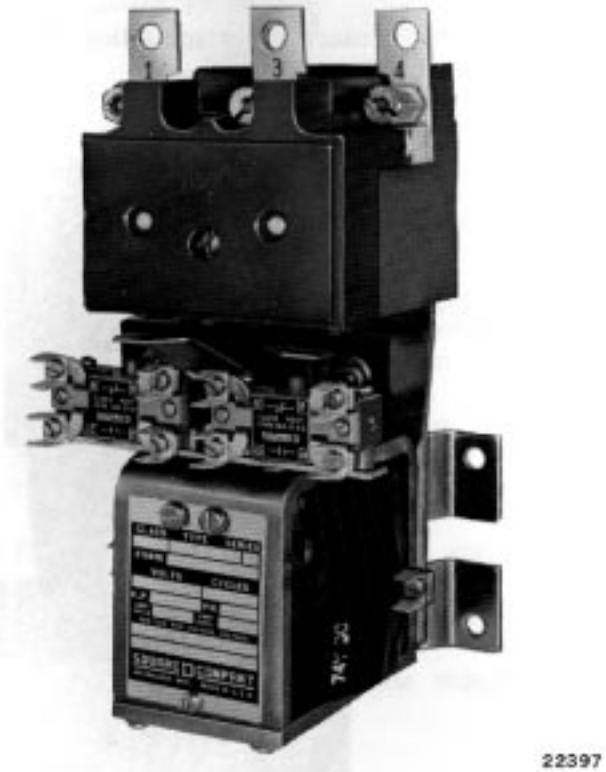

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Fig. 1 – Typical AC Magnetic Contactor

The contactor can be equipped with a second set of contacts. On locomotives equipped with more than one cooling fan, the auxiliary interlock contacts are used in circuits that keep each fan contactor energized until coolant temperature drops to normal. Auxiliary interlock contacts are also used to control shutter operation.

The main movable contacts are assembled to a plunger rod and cross bar assembly and are actuated by a single plunger shaft.

Terminal identification is molded into the main contact cover.

OPERATION

When the magnetic coil is energized, a magnetic field is propagated drawing the armature in against the tension of the return springs. This armature pushes the plunger and cross rod assembly which is fixed to the movable contacts. After the movable contacts have mated with the fixed contacts and completed a circuit, the motion of the armature and cross bar continues to provide a wiping action between the fixed contacts and the movable ones. When the cross bar continues to advance after the contacts have mated, the movement is taken up by a spring loaded connection between the cross rod and the movable contacts.

On some contactors, an arm is attached to the push rod which activates the auxiliary interlock switches. These switches are used for the making and breaking of various circuits associated with fan control.

SAFETY PRECAUTIONS

Observe the following safety precautions while operating or servicing the equipment.

WARNING: Exercise extreme care when performing service functions. Dangerous voltages and/or arcing are always possible when working with high voltage and current equipment.

1. These contactors control electrical power to equipment that operates at extremely dangerous voltages. Use caution when handling equipment.

2. De-energize equipment before handling or performing any service operations by disconnecting or otherwise de-energizing the power feed lines. It is not sufficient to de-energize only the operating coil of the contactor. All components must be considered unsafe unless power lines are de-energized.

3. If necessary to inspect energized equipment, do not handle or touch any parts. Never perform visual inspections at close range or while standing in front of the equipment. Discharge of hot gases and/or particles are possible when operating the contractor in an energized circuit.

4. Before handling contactor, always allow a period for cooldown after the contactor has been in service. Normal operating temperature of the contactor is high. Certain components may normally reach temperatures in excess of 93° C (200° F).

MAINTENANCE

Only skilled personnel familiar with electrical equipment and the hazards involved should be permitted to service the contactor. All safety precautions must be observed.

Minimum maintenance is required to keep the contactor in serviceable condition. Moving mechanical parts should be free from excess friction. Parts should also be checked for excessive wear. The bearing surfaces of the switches are designed to operate without lubrication. Do not oil or grease at any time.

Contacts are normally oxidized and smoked from regular service. Other switch parts should not show effects of high temperature operation.

The contactor should be kept clean, connections must be tight, and should be inspected and serviced at intervals as specified in the applicable Scheduled Maintenance Program.

CONTACTOR INSPECTION

1. Remove dust and dirt with a brush or air hose.

2. Check molded parts for breaks and cracks.

3. Check for damaged and loose terminals.

4. Check coil for damaged insulation.

5. Check for free movement of all moving parts.

MAIN CONTACTS

The contact tips should be free of foreign matter, but need not be smooth. Contact tips should not be cleaned, dressed, or filed. The contacts will operate satisfactorily even though blackened, pitted, or eroded. Overtravel is provided at the contact support to compensate for allowable wear.

INSPECTION

1. Remove contact cover mounting screw, Fig. 2. Remove contact cover.

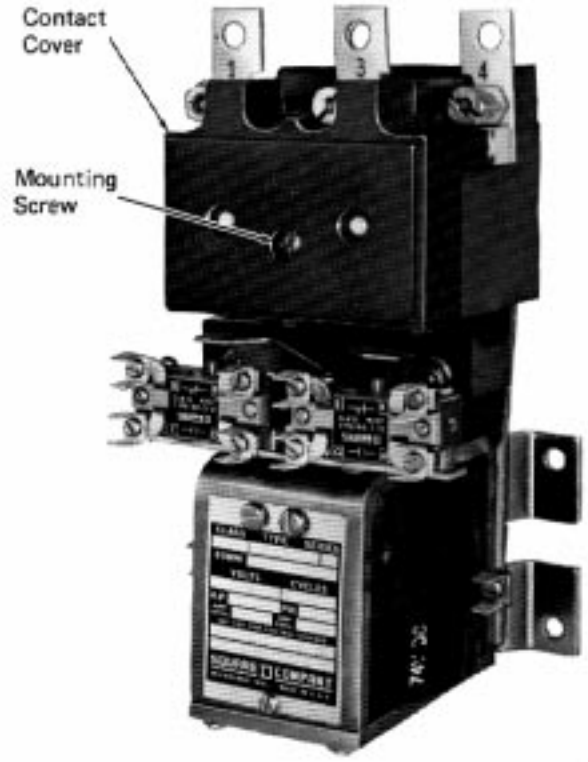

Fig. 2 - Main Contact Inspection

2. Check contact surfaces for wear. Renew contacts if silver alloy is worn or nearly worn to the copper base; refer to Contact Renewal.

CONTACT RENEWAL

STATIONARY CONTACTS

NOTE: To ensure proper load sharing, always replace contacts in pairs.

1. With contact cover removed, remove regular round head screw, Fig. 3, and lockwasher from each stationary contact. Lift out stationary contacts.

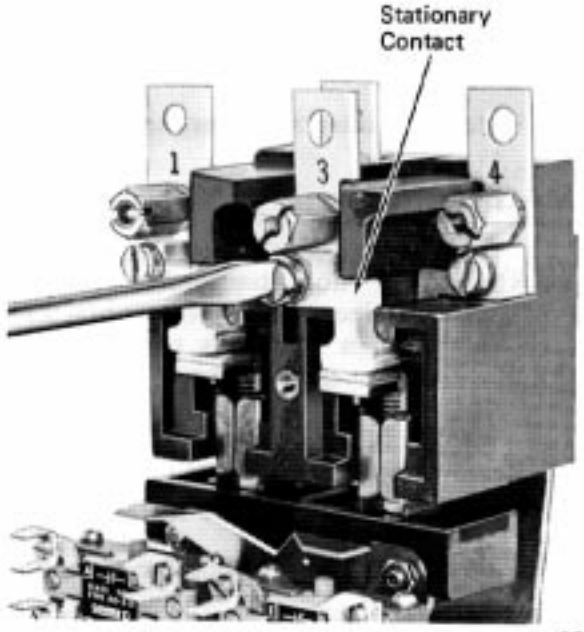

Fig. 3 – Stationary Contact Renewal

2. Place new contacts into position and install mounting screws and lockwashers. Do not tighten screws at this time.

3. Ensure that stationary contacts are properly seated and aligned with the movable contact, then tighten mounting screw securely.

4. Reinstall contact cover unless movable contacts require renewal.

MOVABLE CONTACTS

1. If not already removed, remove contact cover, Fig. 2.

2. If contactor is equipped with interlocks, Fig. 4, remove interlock mounting screws, lockwashers, and bushings from interlock mounting bracket. Remove interlocks.

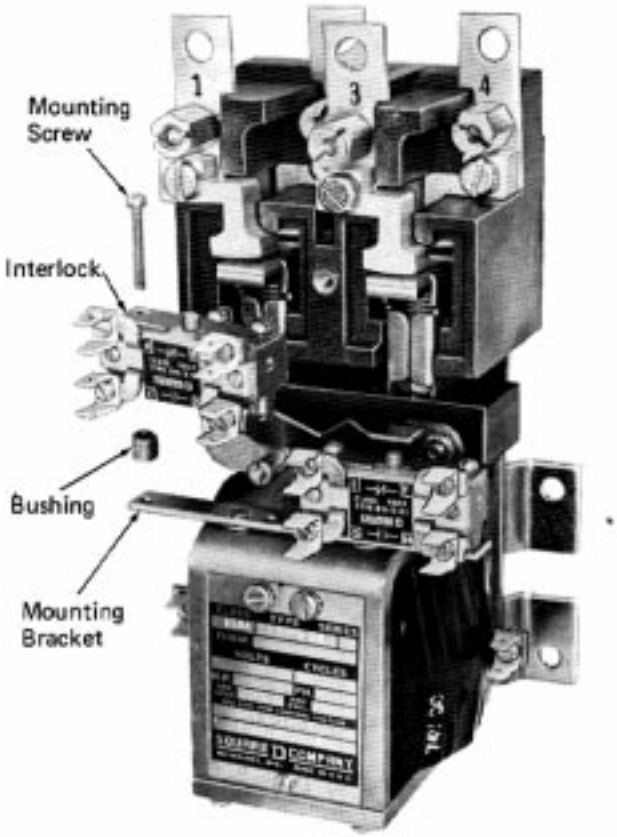

Fig. 4 – Removing Contactor Interlocks

3. Remove machine nuts, Fig. 5, that secure contact carrier to plunger rod assembly. Remove interlock operator, if equipped, and contact carrier. Ensure that any shims placed under the contact carrier during assembly remain in place.

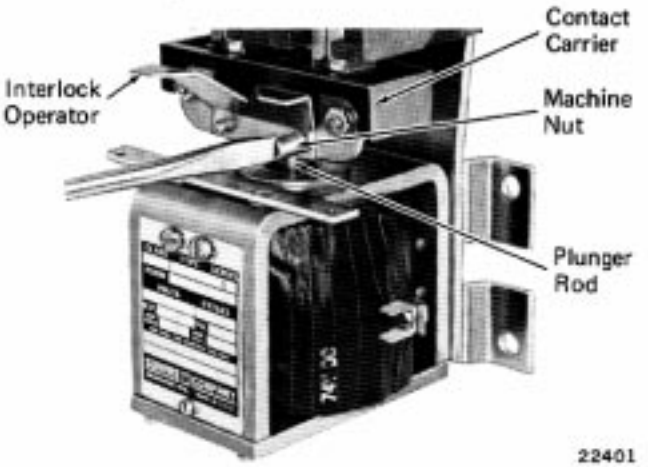

Fig. 5 – Removing Contact Carrier Assembly

NOTE: During operation the contact carrier must move freely through the contact block. Shims are used during factory alignment to provide the necessary clearance. If for any reason the shims are removed during disassembly, it is important that they are

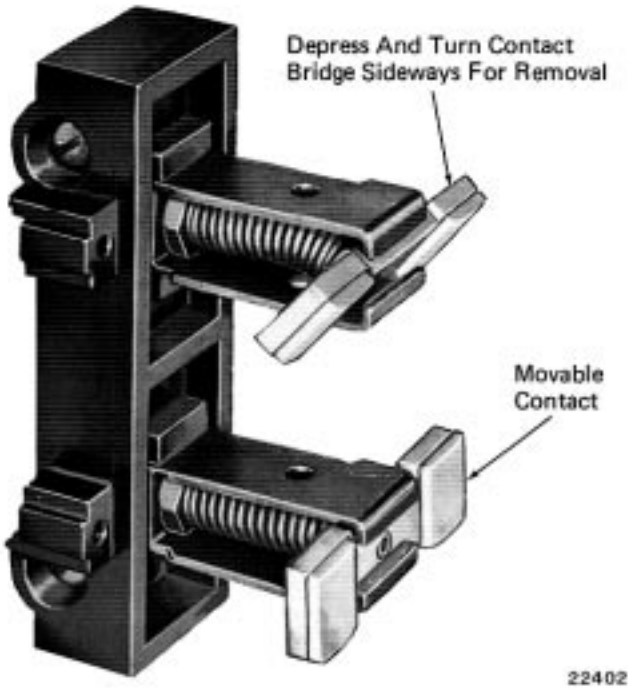

Fig. 6 – Removing Movable Contacts From Carrier

returned to their original position in order to maintain proper alignment.

4. Remove movable contact by depressing and turning the contact, then removing it sideways from slot in end of carrier, Fig. 6.

5. Insert new contacts using the same motion as removal. Ensure that contacts are properly seated against contact spring.

6. Reverse disassembly steps to assemble contactor.

AUXILIARY INTERLOCKS

Auxiliary interlocks can be checked using a continuity checker.

1. Remove wires connected to Faston terminals.

2. Check continuity of each set of contacts by alternately depressing and releasing the interlock operator. A small schematic diagram showing auxiliary interlock contact position is affixed to each interlock.

3. Renew any defective interlocks, refer to Interlock Renewal.

INTERLOCK RENEWAL

1. Remove contact cover, Fig. 2.

2. Remove interlock mounting screws, lockwashers, and bushings from interlock mounting bracket, Fig. 4, remove interlock.

3. Install new interlock reversing above steps.

MAGNET COIL

WARNING: Do not disassemble contactor in cabinet. Disconnect contactor power cables and leads to interlock assembly, then remove contactor from cabinet.

1. Remove mounting screws, Fig. 7, and remove magnet bottom plate from magnet frame.

2. Slide magnet coil off armature plunger.

3. Install new magnet coil. Ensure that pin at top of magnet coil fits into hole in magnet frame.

4. Place insulating ring over armature plunger and reassemble magnet bottom plate to magnet frame.

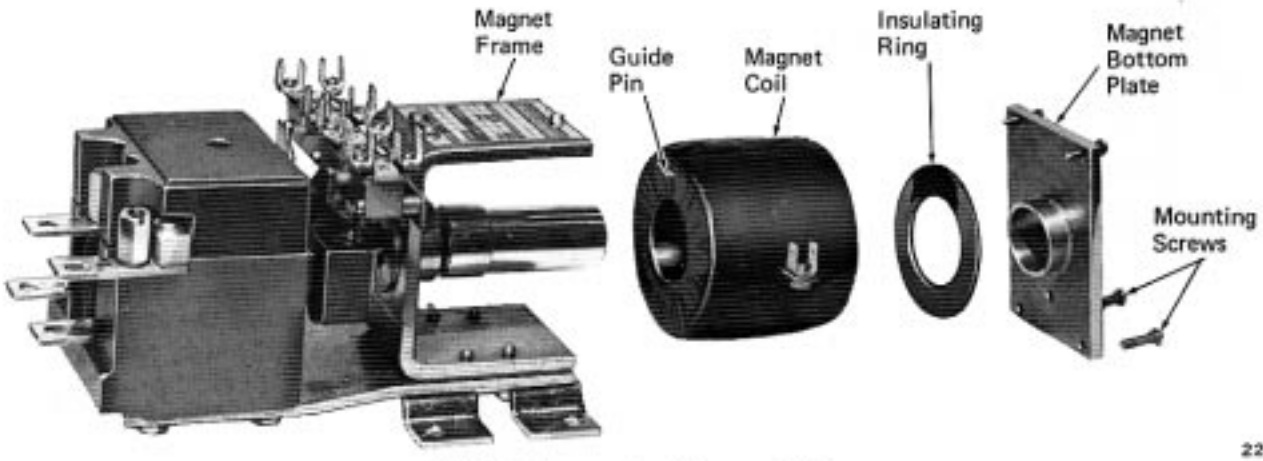

Fig. 7 – Removing Magnet Coil

SERVICE DATA

SPECIFICATIONS

	8138370	8288736	8290221	8307357	8314549	8418569	8483578
Contact Bridges	3	3	2	2	2	2	3
Contacts	6	6	4	4	4	4	6
Contact Current Rating (amperes)	50	50	100	100	100	150	100
Coil Impedance ± 10% at 20° C (68° F), ohms	200	500	200	200	200	200	200
Operating Voltages (DC) at 20° C (68° F)							
Maximum Pickup Voltage	50	95	48	48	48	48	48
Drop Out Voltage	4-28	12 min.	5-28	5-28	5-28	5-28	5-28
Working Voltage	74	120	74	74	74	74	74
High Potential Test Voltage (RMS 60 Hz, 1 min.							
Coil To Ground	600	1500	600	600	600	600	600
Coil To Main Contacts	600	1500	600	600	600	600	600
Main Contacts To Ground	600	1500	2400	2400	2400	2400	2400
Between Main Contacts	600	600	2400	2400	2400	2400	2400
Interlock Contacts To Ground	600	600	600	—	600	600	600
Between Interlock Contacts	600	600	600	—	600	600	600

Litho in U.S.A.