ELECTRO-MOTIVE DIVISION • GENERAL MOTORS CORPORATION
SERVICE DEPARTMENT

MAINTENANCE INSTRUCTION

AUXILIARY RELAYS

GENERAL DESCRIPTION

The relays covered by this bulletin and tabulated in Table I are all of the same basic construction and are used in a wide variety of applications. They differ only in size, number, rating and arrangement of contacts, and operating values. Figs. 1 and 2 illustrate the two size groups into which all of these relays fall. The smaller size relays, Fig. 1, have a 10 ampere capacity rating while the larger size have a 20 ampere rating in most cases. Relay 8210254 has a 35 ampere capacity and 8138583 has a 50 ampere capacity even though these two contactors are of the same size as the relay illustrated in Fig. 2.

The relays all consist of a base, a coil assembly and a contact assembly. The coil of the relay is top mounted and is held in place inside the magnet yoke, Fig. 3, by a hollow center stud and nut. The contact assembly consists of an upper and lower stationary contact assembly,

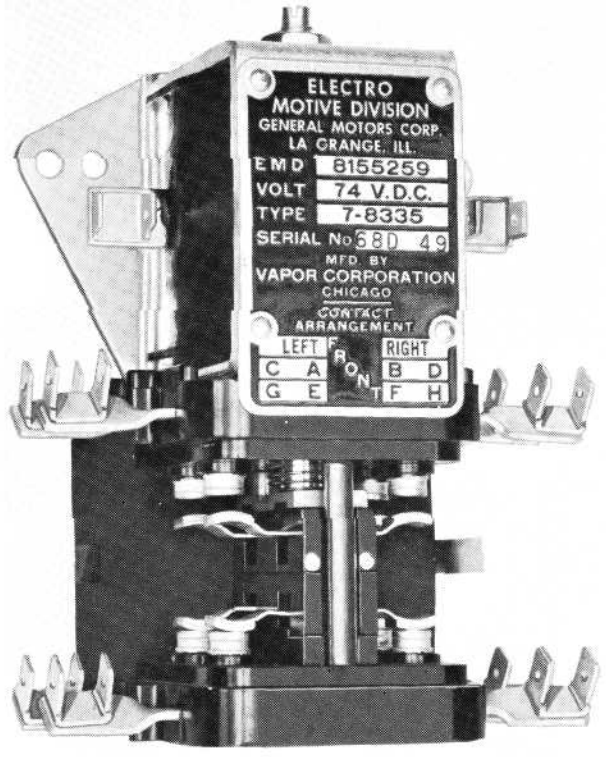

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Fig. 1 — Typical Ten Ampere Capacity Relay

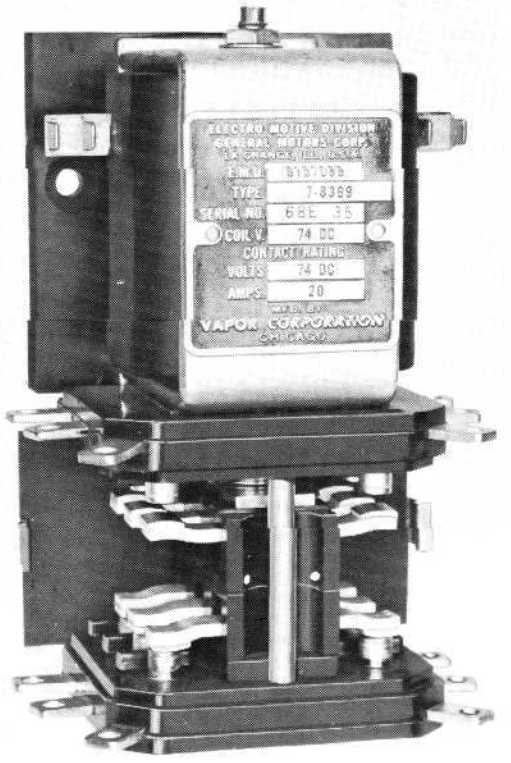

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Fig. 2 — Typical Twenty Ampere Capacity Relay

*This bulletin is revised and supersedes previous issues of this number.

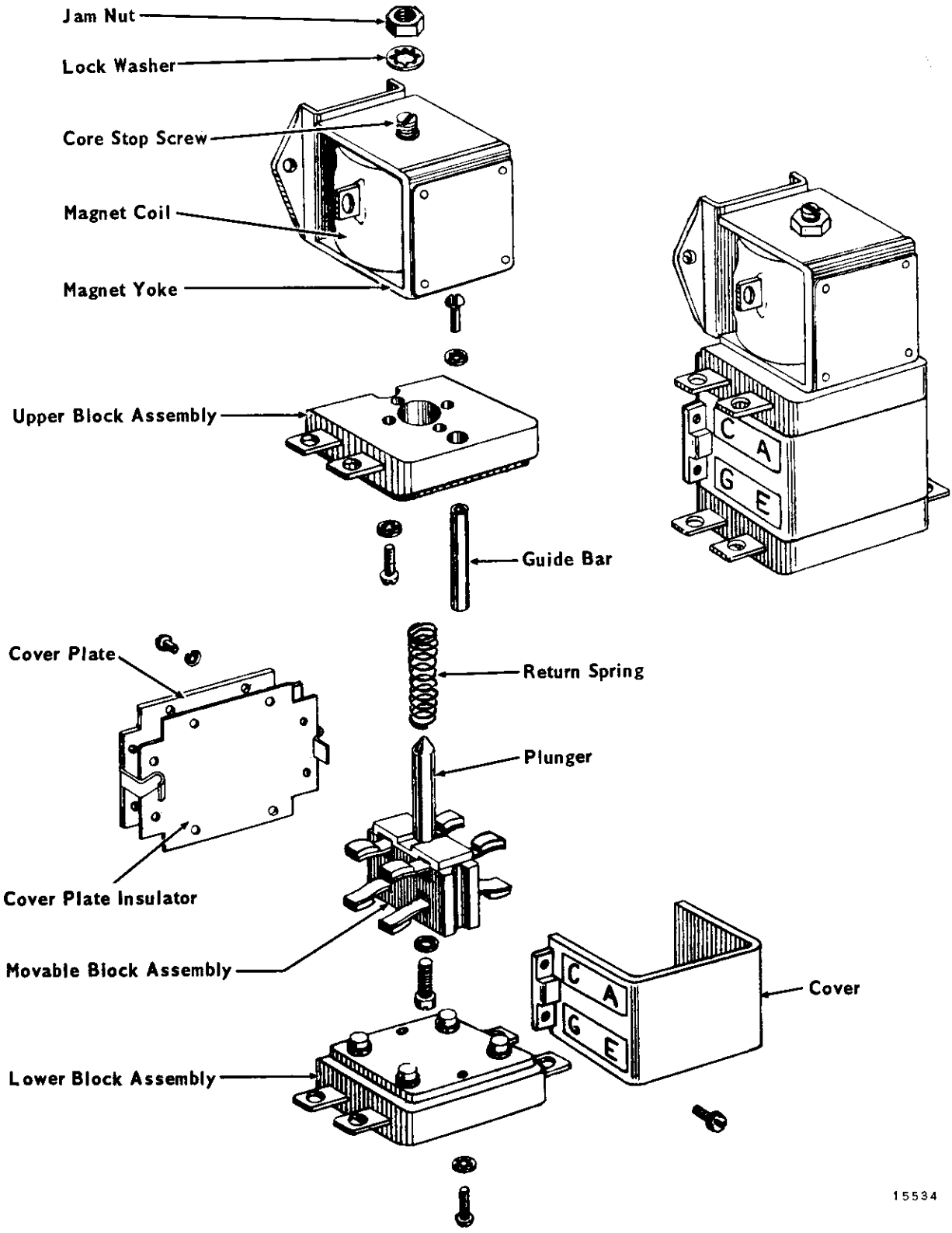

Fig. 3 — Exploded View — All Relays

a movable contact assembly, a back cover and a front cover. The upper stationary contact assembly consists of a phenolic block with stationary contacts and external connectors moulded into the block. In some cases tapped inserts are moulded into the phenolic block and the contacts screw into them. The block is attached to the magnet yoke with machine screws.

The lower stationary contact assembly also consists of external connectors and stationary contacts or tapped inserts moulded into a phenolic block. The lower block is connected to the upper stationary contact assembly by two guide bars.

The movable contact assembly consists of an armature plunger, a return spring, movable contact bars and phenolic spacers. The armature plunger moves inside the hollow center stud which holds the magnet coil in the yoke. The phenolic spacers are fastened to the armature plunger by a machine screw. The movable interlock bars are connected to the phenolic spacers by small springs held in place by metal studs and retainer rings. The springs provide the necessary overtravel and contact pressure. The return spring which is around the armature plunger acts to return the contacts to their normal position when the relay coil is de-energized. The two guide bars position the spacer blocks to align the movable contacts with stationary contacts.

The coils of these auxiliary relays are operated by 74 volt control circuits in most cases. The contact arrangements are designed to set up a variety of control circuits for product operation. The individual wiring diagrams will indicate relay function.

OPERATION

When the top mounted coil of these relays is energized, the armature plunger is attracted upward, overcoming the tension of the return spring. All of the contacts change position when this occurs. The movable contact bars and phenolic spacers of the different relays are arranged to produce the desired sequence of operation such as normally open contacts close before normally closed contacts open or vice-versa.

When the relay coil is de-energized, the movable contact assembly is forced downward by the return spring, returning the contacts to their normal position. The arc created at de-energization is not sufficient to require any form of arc suppression.

MAINTENANCE

Due to simplicity of construction employing a minimum of moving parts together with silver alloy contacts and dust free enclosure, these auxiliary relays will provide satisfactory service over a long period of time. Maintenance requirements center primarily around occasional inspections to qualify the relays for continued service.

INSPECTION

1. Check the cover for cracks, discoloration or poor fit. Clean any accumulation of dirt or dust from the relay with a soft brush and air.

2. Inspect the electrical connection for tightness and electrical contact.

3. Inspect the operating coil for burns or discoloration. Check resistance of the coil according to values given in the Maintenance Data Section, Table I.

4. Inspect the alloy contacts for contact gap, wipe action and surface condition.

The contact gap and overtravel for each relay is listed in the Maintenance Data Section, Table I, of this bulletin. Alloy contacts will operate satisfactorily even though blackened, pitted or eroded. Do not clean, dress or file contact surface. Replace contacts when any part of the alloy is worn away to the base metal. For best results, both the stationary and movable contacts should be replaced if either alloy tip is worn to the base metal. In all cases, NO FILING should be done.

5. Check the movable mechanical parts of the relay for proper function.

6. Do not use any oil as these relays need no lubrication.

7. Electrically inspect the relay for pickup and dropout using the values tabulated in the Maintenance Data Section, Table I, in this bulletin. Adjustment is obtained by positioning the plunger core stop screw and jam nut, see Fig. 3.

ADJUSTMENT OF PICKUP AND DROPOUT

There is only a single adjustment for pickup and dropout on these relays. The settings can be made while the relay is mounted in its position on the product or on a work bench. The relay must be in a vertical position in either case. Connect a variable source of DC power (such as a motor-generator set) to the relay coil. A voltmeter must be connected across the line in order to read the voltage. Adjustment is made by loosening the jam nut on the top of the magnet yoke assembly and turning the core stop screw with a screwdriver. Set the pickup of the relay according to the values listed in the Maintenance Data Section, Table I, of this bulletin. Tighten the jam nut and proceed to check the dropout of the relay. It should also agree with the values given under Maintenance Data for the particular relay in question. If dropout value is not satisfactory, check for binding of the armature plunger or a broken or fatigued return spring.

ADJUSTMENT OF CONTACT AIR GAP AND OVERTRAVEL

The contact air gap and contact wipe of the relay being worked on should be correct after the pickup and dropout has been adjusted as outlined above. If the values do not agree with those given under Maintenance Data, Table I, the contact brush assemblies have become slightly bent. If this is the case, movable contact arms should be straightened.

REPLACEMENT OF OPERATING COIL

To replace the operating coil of the relay, first remove the jam nut and lockwasher from the tube and stop core assembly, see Fig. 3. Next unscrew the tube and stop core assembly from the magnet yoke assembly. Push the magnet coil, together with the anchor washer underneath the coil, from the magnet yoke, pushing to the right. The anchor washer replaces fish paper spacer washers used on earlier models of these relays. Some older models may have two set screws and jam nuts holding the operating coil in place.

Apply the new operating coil by reversing the procedure outlined above. Set the pickup and dropout of the new coil by adjusting the stop core assembly as outlined previously.

REPLACEMENT OF CONTACTS

Except for a few early models, stationary contacts are moulded into the upper and

lower contact base assemblies. The stationary contacts on those early models may be replaced by merely unscrewing the contacts from their tapped insert and applying the new contact. When the stationary contacts need replacing on new models, the entire upper or lower contact bases must be replaced. Proceed as follows:

1. Remove the interlock cover by releasing the cover clips, Fig. 3, and pulling off the cover (older models may have had the cover applied by means of four screws and nuts).

2. Remove the back cover plate and cover plate insulator by removing the four screws holding them in place, Fig. 3.

3. Remove the lower contact base assembly by removing the two screws holding it to the upper contact base assembly.

   When the lower base is removed, the plunger and movable contact block assembly will come out.

CAUTION: Use care in removing lower base as spring pressure will cause movable block assembly to come out quickly. If dropped, the phenolic block may break.

4. To remove the upper contact base assembly, remove the screws holding it to the magnet yoke assembly.

The movable interlock bars may be removed from the movable contact assembly by merely removing the screw holding the plunger and contact block assembly together, see Fig. 3. The interlock bars will then slide out of the contact assembly.

MAINTENANCE DATA

TABLE I

EMD Part No.	Contact Arrangement	Contact Rating	Coil Resistance	Pickup	Dropout	Contact (Minimum) Gap	Contact (Minimum) Lift
8138583	2 N.O. 1 N.C.	50 Amps.	496 Ohms ± 5% @ 20° C (68° F)	48 Volts DC Max.	5-28 Volts DC	3/32"	1/32"
8155259	2 N.O. 2 N.C.	10 Amps.	1100 Ohms ± 10% @ 20° C (68° F)	48 Volts DC Max.	5-28 Volts DC	1/16"	1/32"
8157086	3 N.O. 3 N.C.	20 Amps.	400 Ohms ± 10% @ 20° C (68° F)	48 Volts DC Max.	5-28 Volts DC	3/32"	1/32"
8157398	2 N.O.	20 Amps.	526 Ohms ± 4% @ 20° C (68° F)	52 Volts DC Max.	5-28 Volts DC	3/32"	1/32"
8160329	2 N.O. 2 N.C.	20 Amps.	87 Ohms ± 10% @ 20° C (68° F)	24 Volts DC Max.	2-10 Volts DC	3/32"	1/32"
8174804	3 N.O. 1 N.C.	10 Amps.	1100 Ohms ± 10% @ 20° C (68° F)	48 Volts DC Max.	5-28 Volts DC	1/16"	1/32"
8174805	2 N.O. 2 N.C.	10 Amps.	50 Ohms ± 10% @ 20° C (68° F)	11 Volts DC Max.	6 Volts DC Max.	1/16"	1/32"
8182398	2 N.O. 2 N.C.	10 Amps.	50 Ohms ± 10% @ 20° C (68° F)	10 - 13.6 Volts DC	2.6 - 3.3 Volts DC	1/16"	1/32"
8187245	4 N.O. 2 N.C.	10 Amps.	598 Ohms ± 10% @ 20° C (68° F)	48 Volts DC Max.	5-28 Volts DC	1/16"	1/32"
8188947	4 N.O. 2 N.C.	20 Amps.	495 Ohms ± 10% @ 20° C (68° F)	48 Volts DC Max.	5-28 Volts DC	3/32"	1/32"
8190872	3 N.O. 3 N.C.	10 Amps.	598 Ohms ± 10% @ 20° C (68° F)	48 Volts DC Max.	5-28 Volts DC	1/16"	1/32"
8210254	2 N.O.	35 Amps.	495 Ohms ± 10% @ 20° C (68° F)	48 Volts DC Max.	5-28 Volts DC	3/32"	5/64"
8227936	3 N.O. 3 N.C.	20 Amps.	1125 Ohms ± 10% @ 20° C (68° F)	90 Volts DC Max.	9-42 Volts DC	3/32"	1/32"
8272598	5 N.O. 1 N.C.	10 Amps.	598 Ohms ± 10% @ 20° C (68° F)	48 Volts DC Max.	5-28 Volts DC	.010"	.010"
8341764	2 N.O.	10 Amps.	590 Ohms ± 10% @ 20° C (68° F)	48 Volts DC Max.	5-28 Volts DC	1/16"	1/32"

NOTE: All relays have a 74 Volt DC working voltage except,

8160329 - 32 Volts DC
8174805 - 64 Volts circuit with 100 ohms in series
8182398 - 18 Volts DC
8227936 - 120 Volts DC

Hi-Pot Test (Relays 8138583, 8157086, 8160329, 8174805, 8182398, 8210254) - 1 Minute Duration

Coil To Ground	600 Volts RMS	- 60 Cycles
Coil To Contacts	600 Volts RMS	- 60 Cycles
Contacts To Ground	600 Volts RMS	- 60 Cycles
Contacts To Contacts	600 Volts RMS	- 60 Cycles

Hi-Pot Test (Relays 8157398, 8227936) - 1 Minute Duration

Coil To Frame	1200 Volts RMS	- 60 Cycles
Coil To Contact	1200 Volts RMS	- 60 Cycles
Contact To Contact	1200 Volts RMS	- 60 Cycles
Contact To Frame	1200 Volts RMS	- 60 Cycles

Hi-Pot Test (Relays 8155259, 8174804, 8187245, 8190872, 8272598, 8188947) - 1 Minute Duration

Coil To Ground	600 Volts RMS	- 60 Cycles
Coil To Contacts	2400 Volts RMS	- 60 Cycles
Contacts To Ground	2400 Volts RMS	- 60 Cycles
Contacts To Contacts	2400 Volts RMS	- 60 Cycles

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