ELECTRO-MOTIVE DIVISION • GENERAL MOTORS CORPORATION
SERVICE DEPARTMENT

MAINTENANCE INSTRUCTION

TYPE VE-9 AND VE-9S RELAYS 8277235 AND 8291023

DESCRIPTION

Type VE-9 relay, Fig. 1, and VE-9S relay are direct current relays used in a variety of applications depending on the locomotive model. Current locomotive models use the relay as a brake warning relay, overvoltage relay, wheel slip relay, and wheel creep relay.

The relay combines heavy duty construction with performance characteristics to provide maximum dependable service.

The relay contacts are silver alloy and are rated at 5 amperes. Silver alloy contacts do not require cleaning or dressing. Even though contacts may become blackened and slightly pitted, satisfactory operation will be obtained as silver oxide is an excellent conductor.

The material of the contact driver which was formerly nylon, is now made of glass polyester to improve the performance of the relay. All moving parts of the relay, Fig. 2, are protected by a dustproof box-type cover.

A permanent magnet blowout, Fig. 2, has been added to the cover for longer contact life. This cover is directly interchangeable with the former cover. Since the contacts next to the cover are affected by the magnetic blowout, their polarity must be observed to obtain full benefit from the blowout. See Maintenance Data.

Internal electrical connections are made on 1/4" terminal studs with washers and

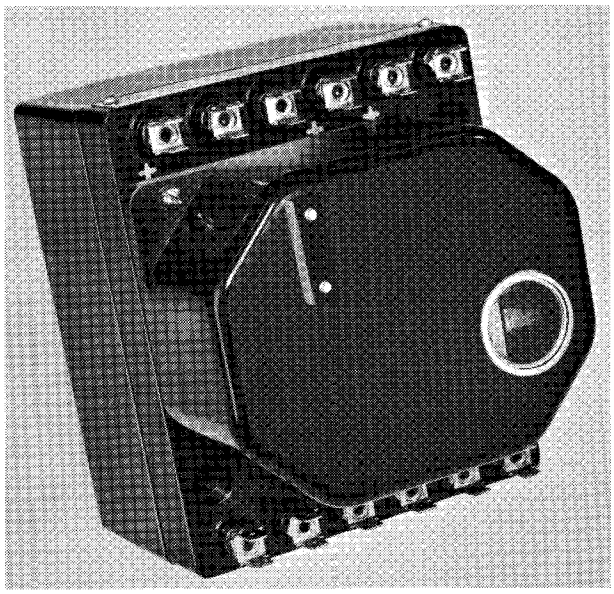

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Fig. 1- VE-9 Relay

standard hexagon nuts. Terminal identification letters are stamped on the front of the relay and the contact terminals are located across the top when the relay is mounted with the nameplate up, and in the reverse location when the relay is inverted.

OPERATION

Refer to Fig. 3 for component location.

The armature is positioned so that the coil poles are on opposite sides and ends of the armature. When voltage is applied to the coils of the relay, a magnetic attraction is established between the coil poles and the ends of the armature. When the voltage across the relay coils becomes high enough, the armature will pick up. The movement of the armature in a clockwise direction towards the coil poles

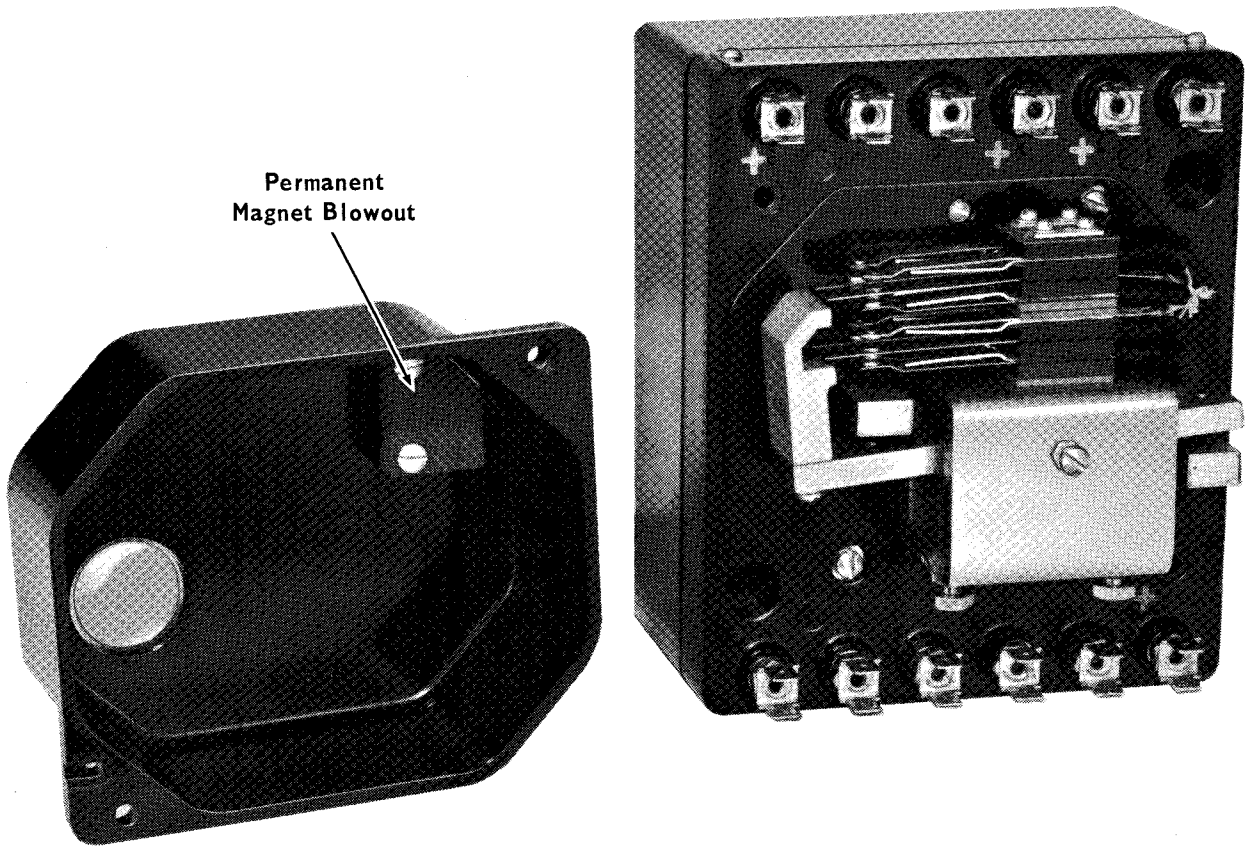

Fig. 2- Front Of Relay – Cover Removed

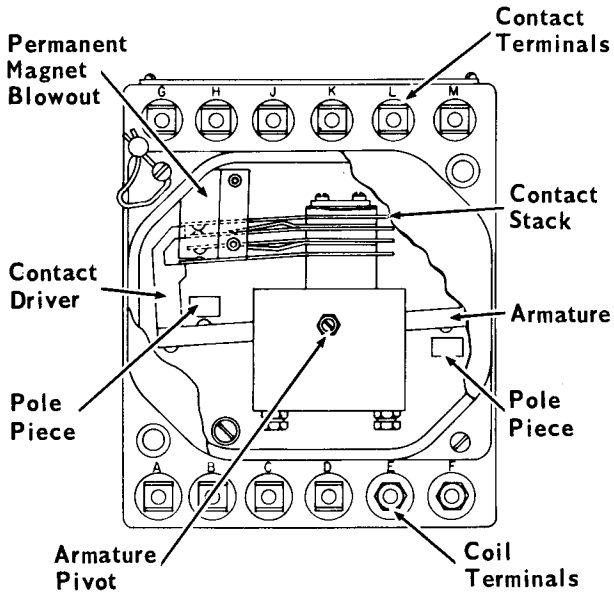

Fig. 3- VE-9 Relay
Cross - Section

causes the insulated contact driver to push against the contact stack heel spring. This action opens the normally closed contacts and closes the normally open contacts.

The voltage acting upon the relay must drop substantially below the pickup voltage before the armature will move counterclockwise and allow the contacts to return to their normal position.

For specific information relating to voltage relay operation, refer to locomotive diagrams.

MAINTENANCE

The relay has been designed to withstand rugged service and to require a minimum

of maintenance or attention. The use of silver alloy contacts, the dustproof cover with the magnetic blowout and the glass polyester contact driver contributes to trouble free performance and long service life.

The relay is manufactured to close tolerances with precise and fine internal adjustments. Therefore, it is suggested that maintenance be limited to the following procedure to qualify the relay for continued service.

TEST PROCEDURE

Perform the tests at intervals specified in the Scheduled Maintenance Program without removing the relay and with the unit shut down and isolated.

1. Check the pickup and dropout of the relay, on voltage through the J-K coil of relay 8277235 and through the A-B coil of relay 8291023.

2. Relay 8277235. Connect test circuit lead from milliammeter to terminal J and the lead from the adjustable rheostat to terminal K. See Fig. 4.

   Relay 8291023. Connect test circuit lead from milliammeter to terminal A and the lead from the adjustable rheostat to terminal B. See Fig. 5.

3. A test light may be connected across relay terminals A and B to observe relay pickup and dropout.

4. Gradually increase coil current, check relay pickup by adjusting the rheostat. Refer to Maintenance Data for applicable pickup value.

5. Reduce coil current and check the relay dropout. Refer to Maintenance Data for applicable dropout value.

6. On relay 8291023 only, check pickup and dropout of relay on voltage coil C-D by following Steps 3, 4, and 5.

REMOVING RELAY

If the relay does not meet the specified pickup and dropout values it should be replaced and the defective relay returned to Electro-Motive on a Rebuild and Return basis. Servicing relay internal adjustments requires special equipment.

Electro-Motive has a relay tester 8246474 which can be used in place of the milliammeter and rheostat when testing coil voltage. The leads are long enough to permit checking the VE-9 and VE-9S relays on most EMD locomotives.

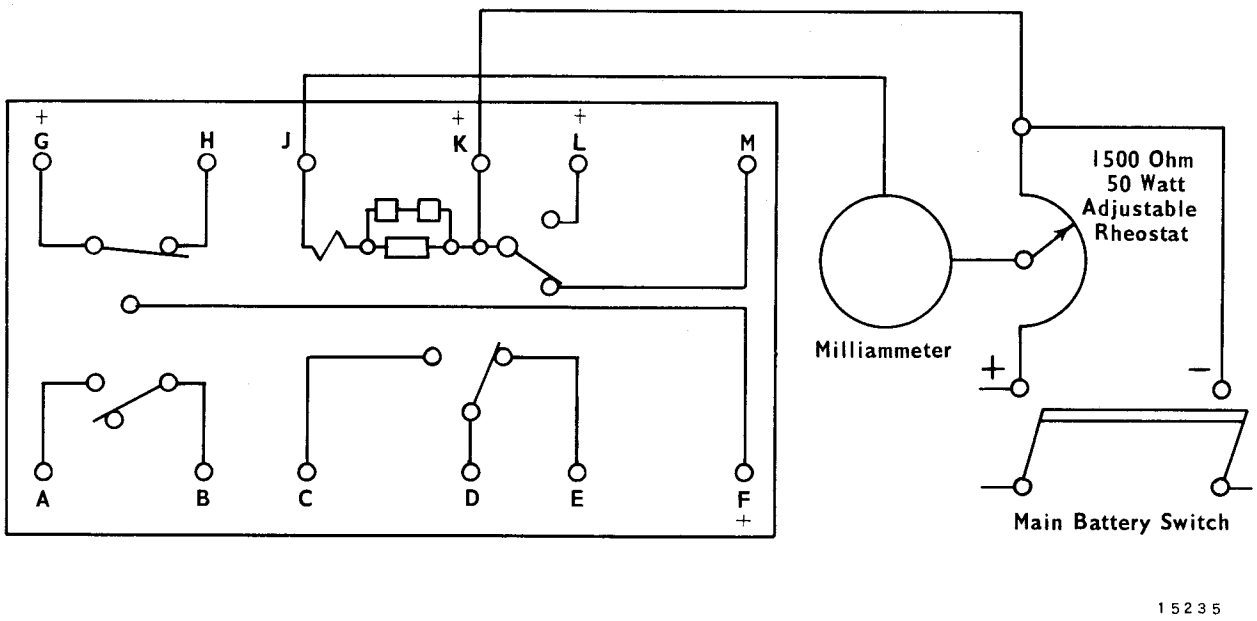

Fig. 4 — Pickup And Dropout Test Diagram — Relay 8277235

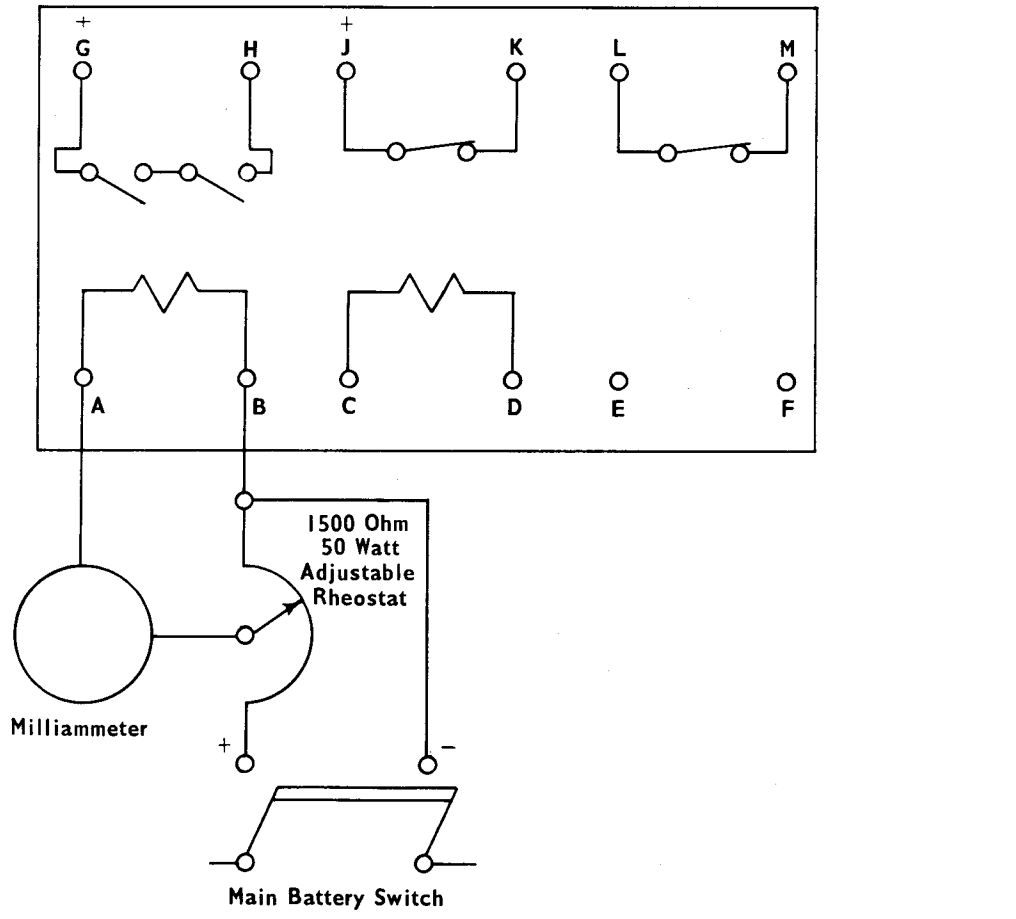

Fig. 5 — Pickup And Dropout Test Diagram — Relay 8291023

MAINTENANCE DATA

	8277235	8291023
Contacts		
Arrangement	4 N.O. - 3 N.C.	1 N.O. - 2 N.C.
Rating	5 amperes	5 amperes
J-K Coil		
Resistance ± 10%	6000 Ohms ± 10% @ 20° C. (Includes 3280 Ohm coil and temperature compensation resistors)	
A-B Coil Resistance		44 Ohms ± 10% @ 20° C.
Continuous Rating		.250 amperes
C-D Coil Resistance		220 Ohms ± 10% @ 20° C.
Continuous Rating		.140 Amperes
Relay Pickup		
J-K Coil Only	40 - 45 MA	
A-B Coil Only		206 - 220 MA
C-D Coil Only		64 - 69 MA
Relay Dropout		
J-K Coil Only	22 - 28 MA	
A-B Coil Only		122 - 142 MA
C-D Coil Only		38 - 44 MA
Hy-Pot Test		
Coils to Contacts		
Contacts to Contacts	2400 volts	2400 volts
Coil to Ground	R.M.S. 60 cycles	R.M.S. 60 cycles
Coil to Coil		
Magnetic Blowout		
Positive Contacts	F, G, L, K	G and J

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