

# MAINTENANCE INSTRUCTION

## AUXILIARY RELAYS — FORM C

### DESCRIPTION

The relays covered by this Maintenance Instruction are all of the same basic construction and are used in a wide variety of applications, see Fig. 1. They differ only in number, rating, contact arrangement and operating values.

The coils of these auxiliary relays operate off 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.

### MAINTENANCE

Due to simplicity of construction employing a minimum of moving parts together with gold diffused 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

At the time of inspection, the relay cover should be removed and the contacts checked for pitting or burning, see Fig. 2. Use a low pressure stream of dry compressed air and blow out any dust or dirt accumulation. Check for an accumulation of metallic dust adhering to the blowout magnets. In the event that badly burned or pitted contacts are apparent, the relay must be removed from the installation for overhauling. Do not file or dress relay contacts. Relay contacts will turn black (tarnish) in time with normal operation. This will not impair relay operation or indicate a need for servicing.

Inspect the electrical connection for tightness and electrical contact. Inspect the operating coil for burns or discoloration. Check resistance of the coil according to values given in the Service Data. Electrically inspect the relay for pickup and dropout using the values tabulated in the Service Data.

Check the movable mechanical parts of the relay for proper function. Do not apply lubrication of any type to these relays.

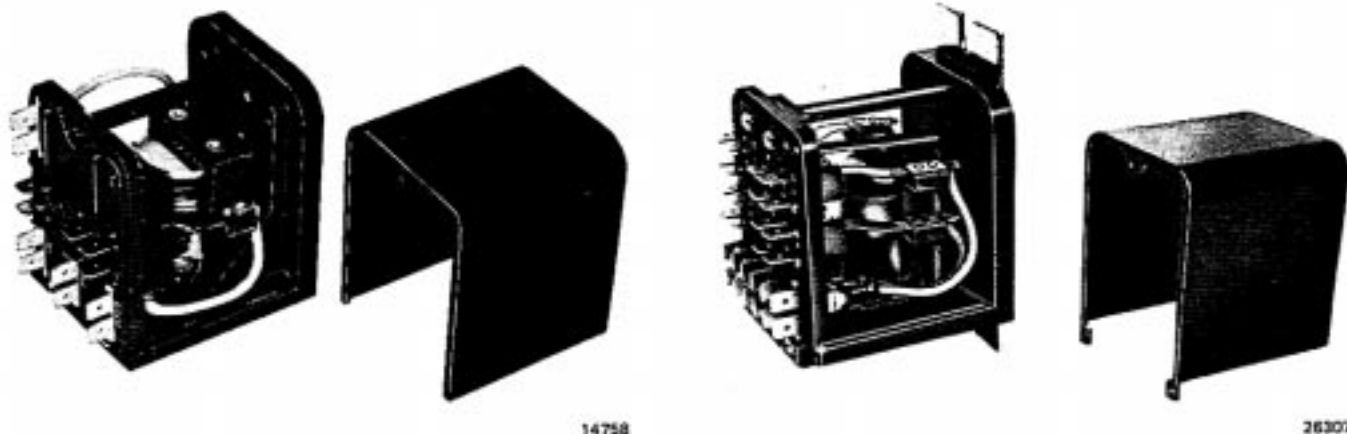
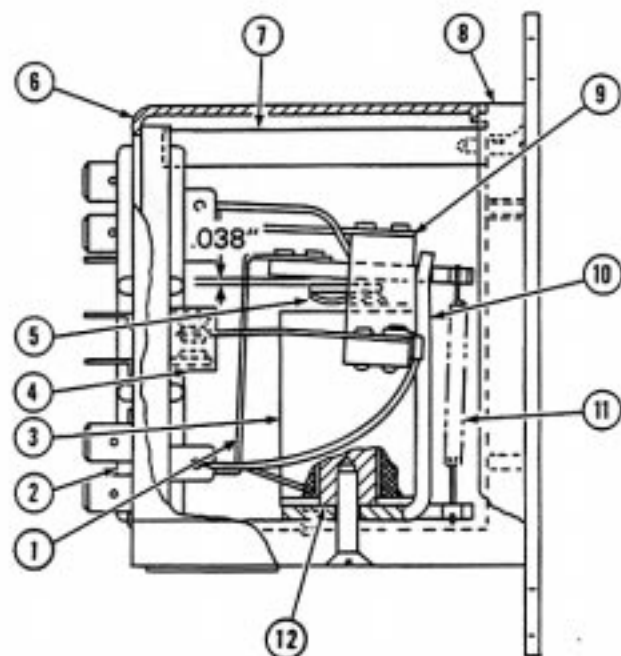


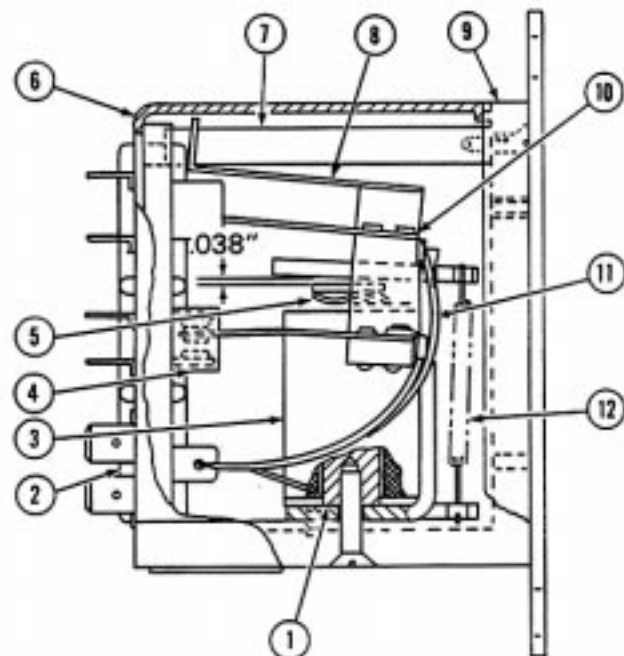
Fig.1 - Typical Auxiliary Relays

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



OLD DESIGN

- |                             |                     |
|-----------------------------|---------------------|
| 1. Flag Arm                 | 7. Reinforcing Post |
| 2. Contact Housing Assembly | 8. Relay Housing    |
| 3. Coil                     | 9. Carrier Assembly |
| 4. Blowout Magnets          | 10. Relay Frame     |
| 5. Wave Washer              | 11. Armature Spring |
| 6. Relay Cover              | 12. Coil Core       |



NEW DESIGN

- |                             |                      |
|-----------------------------|----------------------|
| 1. Coil Core                | 7. Reinforcing Post  |
| 2. Contact Housing Assembly | 8. Flag Arm          |
| 3. Coil                     | 9. Relay Housing     |
| 4. Blowout Magnets          | 10. Carrier Assembly |
| 5. Wave Washer              | 11. Relay Frame      |
| 6. Relay Cover              | 12. Armature Spring  |

26308

26308

Fig.2 - Cutaway Views Of Relays

## DISASSEMBLY PROCEDURE

After relay cover is removed, the entire working mechanism of relay can be disassembled from relay housing by removing the two flat head screws on terminal side of relay and the large flat head screw and washer on decal side of relay, see Fig. 2. On older devices, the relay mechanism is secured to the back of the housing by a flat head screw through the cover and the end of the reinforcing post. This screw must also be removed.

Remove armature spring from carrier assembly and relay frame. Be careful in removing spring so as not to stretch it to the extent of changing its tension strength. The relay core and wave washer can now be removed from the relay coil. To remove the relay coil, unsolder the two coil leads from terminals Y and Z with a 100 watt soldering iron.

If the carrier assembly and the contact housing assembly are both being replaced, no further unsoldering is necessary. In the event either one of the assemblies is being replaced it will be necessary to unsolder the leads connected to the individual terminals to separate the carrier assembly from the contact housing assembly.

## REASSEMBLY PROCEDURE

To reassemble the relay, follow a reverse order to that of disassembly. Make certain all parts are cleaned thoroughly before reassembly. The armature spring should have a free length measurement of 1.421" and should stretch to 1.646" with a 1-1/2 lb. load  $\pm 10\%$ . Solder with resin core solder only. Do not use acid core solder nor use more solder than is necessary to make a good electrical connection. Make certain the locating tabs of the coil frame fit into the holes in the relay housing, and the threaded hole in the core aligns with the hole in the housing to secure the coil and frame assembly to the relay housing with flat head screw and lockwasher.

## CHECKING AND ADJUSTING RELAY CONTACT PRESSURE

Replace the pan head screw that holds the cover, for accurately locating the contact housing assembly during the checking and adjusting procedure, but do not install the relay cover until the tests have been made. On newer devices, the two screws securing the terminal side of the relay to the reinforcing post will ensure correct alignment. Again, there is no need to

install the cover before testing. Check the pressure required to open all normally closed contacts with a gram gauge (5 to 150 range). This check can be made by connecting the normally closed contacts in series with a simple low voltage (6 volt) lamp circuit. The reading should be taken at the position the lamp is de-energized. Place the probe of the gauge up close to the movable contact, see Fig. 3. A minimum reading of 40 grams is acceptable before contact opening.

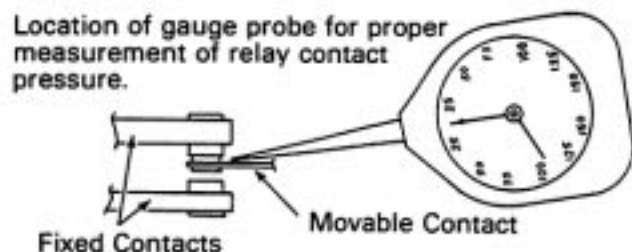


Fig.3 - Location Of Gauge Probe

With a DC voltage of approximately 2 to 3 volts above the rated pickup voltage, energize the relay coil. Check the pressure required to open all contacts which close when coil is energized. A minimum reading of 40 grams should be obtained on this test.

If the minimum reading of 40 grams is not obtained, the contact brush assembly will have to be adjusted. Using a bending tool described in Fig. 4, make gradual adjustments along the length of the contact brush assembly. Do not make any sharp creases or bends in the assembly. When making a correction for a pressure reading of the normally closed contacts, this will affect the pressure reading of the contacts that are closed when the coil is energized. Therefore, all contacts should be rechecked whenever an adjustment is made.

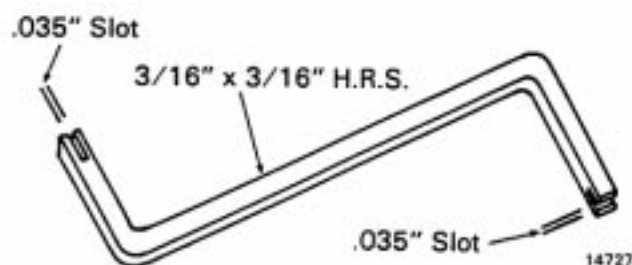


Fig.4 - Example Of Relay Adjusting Tool

Check the air gap between all normally open contacts and between open contacts when the relay is energized. This air gap should be .045" minimum.

Check the travel gap from the center of the relay core to the carrier assembly. This travel gap should be .038" minimum, see Fig. 2.

## PICKUP AND DROPOUT TEST VOLTAGE

In order to make the pickup and dropout checks, a variable DC voltage supply should be connected to the relay coil. See Fig. 5 for a schematic wiring of a test setup. Proper readings for various operating voltages will be found in the Service Data.

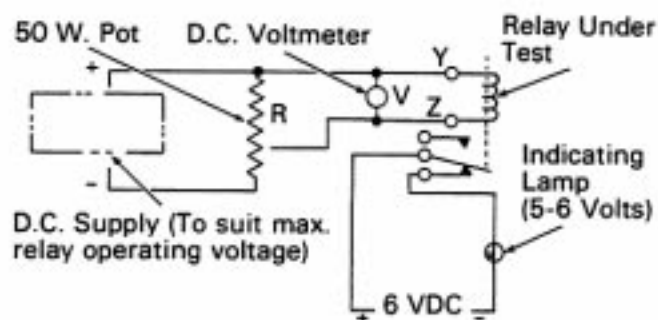


Fig.5 - Suggested Test Setup

Set the 50 watt potentiometer shown in Fig. 5 to maximum resistance, then gradually increase the voltage applied to the coil. An indicating lamp connected across the contacts will mark the pickup or dropout points. Slowly reduce the applied voltage to determine the dropout point; the indicating lamp will go out when the point is reached.

If the pickup and dropout points are not obtained as outlined in the Service Data section, check lead arrangement, contact pressure and carrier travel gap. Readjust if necessary. Check the armature spring to be sure it is in good condition and that it meets specifications as outlined under "Reassembly Procedure" in this instruction.

Check to be sure that the carrier assembly is positioned properly so that the contact arms are centered between the blowout magnets. Manually center the carrier if necessary.

Install the relay cover by removing the pan head screw and then assembling the cover to the relay using this same screw to secure cover to housing. On new devices, simply attach the cover using three pan head screws at top center and bottom two corners of relay terminal side.

The relay should be cycled 25 to 50 times with a 6 volt, 4 milliamp load (test lamp) connected across each set of contacts. Positive contact should be accomplished on each cycle or the relay must be reworked.

## SERVICE DATA

Part No.	Contacts: Interlocks	Operating Coil Resistance @ 25° C - Ohms	Operating Voltage @ 25° C		
			Working	Max. Pickup	Dropout
8357415	3NO-3NC	1128 ± 15%	74	48	5-28
8363168	2NO-2NC	1853 ± 15%	74	48	5-28
8364979	2NO-2NC	702 ± 12%	48	32	5-18
8369626	2NO-2NC	296 ± 12%	28	21	1-9
8370794	3NO-3NC	4320 ± 15%	120	98	12-42
8370839	2NO-2NC	1853 ± 15%	74	48	5-28
8383678	2NO-2NC	1128 ± 15%	74	48	5-28
8392855	2NO-2NC	1128 ± 15%	74	48	5-28
8398823	2NO-2NC	180 ± 15%	120	90	28-65
8399581	3NO-3NC	702 ± 15%	48	36	2-18
8403578	2NO-2NC	1128 ± 15%	74	35	4-28
8405985	1NO-1NC	1853 ± 15%	74	48	5-28
8407979	3NO-3NC	176 ± 10%	28	18	1-9
8408359	2NO-2NC	1128 ± 15%	74	48	5-28
8408975	3NO-3NC	1128 ± 15%	74	48	5-28
8428700*	3NO-3NC	1128 ± 15%	74	48	5-28
8451991	3NO-3NC	16,500 ± 20%**	120AC	98AC	5-65AC
9516672	4NO-4NC	1033 ± 5%	74	46	5-28
9535873	4NO-4NC	682 ± 5%	48	36	2-18
9535874	4NO-4NC	173 ± 5%	24	18	1-9
9535875	4NO-4NC	4500 ± 5%	120	90	10-50
9535877	4NO-4NC	13,680 ± 10%**	120AC	93AC	10-56AC
9535878	4NO-4NC	26,680 ± 10%**	220AC	186AC	20-112AC

### NOTE

\*No blowout magnets.

\*\*Operating coil resistance from "Y" to "Z". This includes resistance of diodes used to rectify AC input voltage. Use Model #260 Weston meter with the RX 100 scale.

The following items are applicable to *all* relays listed above.

**Armature Spring**

Free Length . . . . . 1.421"  
 Stretch Length . . . . . 1.646" with a 1-1/2 lb. load ± 10%

Contact Pressure . . . . . 40 Grams Min.

Contact Air Gap . . . . . .045" Min.

**Hi-Pot Data (60 Cycles)**

Coil to Ground . . . . . 600 V.RMS for 8428700 only - all others are 1000 V.RMS  
 Coil to Contact . . . . . 2400 V.RMS  
 Contact to Contact . . . . . 2400 V.RMS  
 Contact to Ground . . . . . 2400 V.RMS

• • • • **A Service Department Publication** • • • •

Electro-Motive Division Of General Motors La Grange, Illinois 60525