

RELAYS

L, N, AND S TYPES

PIECE-PART DATA AND REPLACEMENT PROCEDURES

1. GENERAL

1.01 This section covers the information necessary for ordering parts to be used in the maintenance of L-, N-, and S-type relays. It also covers approved procedures for replacing these parts.

1.02 This section is reissued to incorporate material from the addendum in its proper location. In this process marginal arrows have been omitted.

1.03 Part 2 of this section covers the piece-part numbers and the corresponding names of the parts which it is practicable to replace in the field in the maintenance of these relays. No attempt should be made to replace parts not designated. Part 2 also contains explanatory figures showing the different parts. This information is called Piece-part Data.

1.04 Part 3 of this section covers the approved procedures for the replacement of the parts covered under Part 2. This information is called Replacement Procedures.

1.05 Before making any replacements on the apparatus covered herein, remove the circuit from service.

2. PIECE-PART DATA

2.01 The figures included in this part show the various piece parts in their proper relation to other parts of a relay. The piece-part numbers of the various parts are given together with the names of the parts as listed by the Western Electric Company Merchandise Department. When these names differ from those in general use in the field, the latter names, in some cases, are shown in parentheses.

Used only on N, S
Type and L per
D-85075 Relays

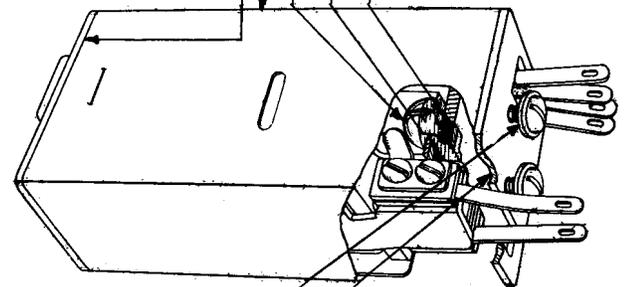
P-169125 Bushing

P-169121 Washers

P-169128 Screw

P-169120 Shell

P-169127 Plate
(Cover Cap)



P-213172 Insulator
(Used only on N
and S type and L
per D-85075 relays)

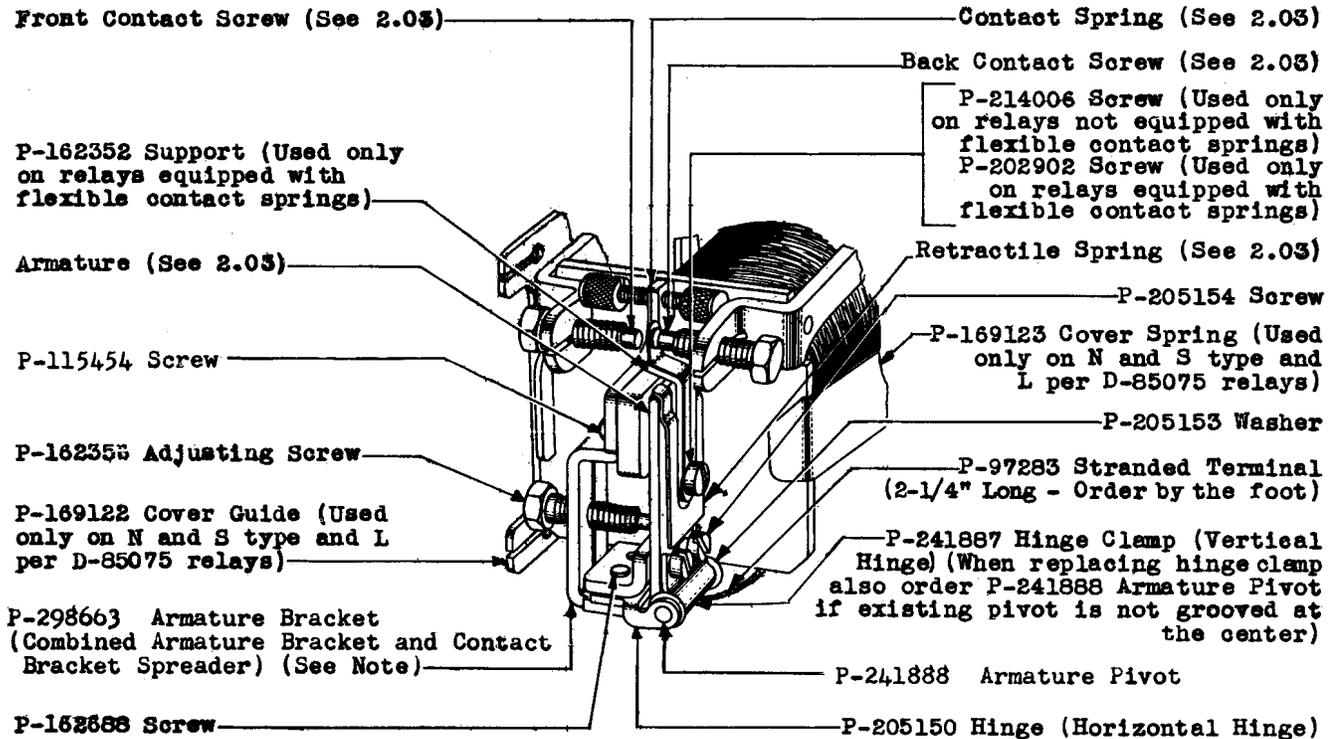
P-163502 Insulator
(Used only on L
Type relays
mounted on drilled
type panel)

P-139909 Screw
P-140818 Washer

Fig. 1 - Designation of Parts -
L-, N-, and S-type Relays

2.02 When ordering parts for replacement purposes, give the piece-part number as well as the name of the part, for example, P-205150 Hinge. Do not refer to the BSP number or any information shown in parentheses following the piece-part numbers.

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Note: Where a relay is equipped with a Separate Contact Bracket Spreader and Armature Bracket, and it is necessary to replace either of these parts, order P-298663 Armature Bracket (Combined Armature Bracket and Contact Bracket Spreader) and P-115454 screws.

Fig. 2 - Designation of Parts - L-, N-, and S-type Relays

2.03 The following is a list of the numbers and the corresponding names of piece parts which are not common to all L-, N-, and S-type relays. These parts are illustrated in Fig. 2. The list also includes similar piece-part information for additional relays (S533 through S536 relays).

Relay	Contact Screw		Contact Spring	Spring (Retractable Spring)	Armature
	Front	Back			
L1	P-162584	P-162584	P-208319	P-205158	P-205149
L2	P-206115	P-242350	P-206114	P-207992	P-205149
L3	P-206115	P-206115	P-208319	P-207992	P-205149
L8	P-206115	P-242350	P-206114	P-207992	P-205149
L9	P-294394	P-242350	P-294395	P-205158	P-205149
L11	P-162584	P-162584	P-287055	P-207992	P-205149
L12	P-294394	P-294394	P-294395	P-207992	P-205149
L13	P-294394	P-242350	P-294395	P-208251	P-205149
L14	P-206115	P-242350	P-287053	P-207992	P-205149
L15	P-294394	P-294394	P-294395	P-208251	P-205149
L16	P-206115	P-206115	P-208319	P-205158	P-205149
L17	P-294394	P-242350	P-294395	P-207992	P-205149
L18	P-206115	P-242350	P-206114	P-205158	P-205149
L19	P-206115	P-242350	P-206114	P-205158	P-249457
L20	P-206115	P-242350	P-206114	P-208251	P-205149

Relay	Contact Screw		Contact Spring	Spring (Retractable Spring)	Armature
	Front	Back			
L21	P-294394	P-242350	P-294395	P-207992	P-205149
L22	P-294394	P-242350	P-294395	P-208251	P-205149
L23	P-294394	P-294394	P-294395	P-207992	P-205149
L24	P-206115	P-206115	P-222055	P-205158	P-205149
L26	P-206115	P-206115	P-222055	P-207992	P-205149
L500	P-206115	P-242350	P-206114	P-207992	P-209479
L501	P-294394	P-242350	P-294395	P-208251	P-209479
L502	P-206115	P-242350	P-206114	P-208251	P-209479
L503	P-206115	P-206115	P-222055	P-205158	P-209479
L504	P-206115	P-206115	P-208319	P-208251	P-209479
L505	P-294394	P-294394	P-287052	P-207992	P-293994
N2	P-294394	P-242350	P-294395	P-208251	P-205149
N3	P-206115	P-206115	P-222055	P-205158	P-205149
N4	P-206115	P-206115	P-208319	P-205158	P-205149
S1	P-206115	P-242350	P-206114	P-207992	P-205149
S2	P-206115	P-242350	P-206114	P-205158	P-205149
S3	P-206115	P-242350	P-206114	P-207992	P-205149
S4	P-206115	P-242350	P-206114	P-205158	P-205149
S5	P-206115	P-206115	P-208319	P-207992	P-205149
S6	P-206115	P-242350	P-206114	P-207992	P-205149
S7	P-242350	P-294394	P-294395	P-207992	P-205149
S8	P-294394	P-242350	P-294395	P-207992	P-205149
S9	P-294394	P-242350	P-294395	P-207992	P-205149
S10	P-206115	P-206115	P-208319	P-205158	P-205149
S11	P-206115	P-206115	P-208319	P-207992	P-205149
S12	P-206115	P-242350	P-206114	P-208251	P-205149
S13	P-206115	P-242350	P-206114	P-207992	P-205149
S14	P-242350	P-206115	P-287054	P-207992	P-205149
S15	P-294394	P-242350	P-294395	P-207992	P-205149
S16	P-206115	P-242350	P-206114	P-207992	P-205149
S17	P-206115	P-242350	P-206114	P-207992	P-249457
S18	P-206115	P-206115	P-208319	P-205158	P-249457
S19	P-206115	P-242350	P-206114	P-208251	P-205149
S20	P-294394	P-294394	P-294395	P-208251	P-205149
S21	P-206115	P-242350	P-206114	P-207992	P-205149
S22	P-206115	P-206115	P-208319	P-205158	P-205149
S23	P-206115	P-242350	P-206114	P-207992	P-205149
S24	P-206115	P-242350	P-206114	P-207992	P-205149
S25	P-206115	P-242350	P-206114	P-205158	P-205149
S26	P-206115	P-242350	P-206114	P-207992	P-205149
S27	P-206115	P-242350	P-206114	P-205158	P-205149
S28	P-206115	P-242350	P-206114	P-207992	P-205149
S29	P-206115	P-206115	P-208319	P-208251	P-205149
S30	P-294394	P-242350	P-294395	P-208251	P-205149
S31	P-206115	P-242350	P-287053	P-207992	P-205149
S32	P-294394	P-242350	P-294395	P-207992	P-205149
S33	P-294394	P-242350	P-294395	P-207992	P-205149
S34	P-294394	P-294394	P-294395	P-207992	P-205149
S35	P-294394	P-242350	P-294395	P-205158	P-205149
S36	P-294394	P-294394	P-294395	P-207992	P-205149
S37	P-206115	P-242350	P-206114	P-207992	P-205149
S38	P-206115	P-242350	P-287053	P-208251	P-205149
S39	P-206115	P-242350	P-287053	P-208251	P-205149
S40	P-206115	P-206115	P-222055	P-208251	P-205149
S41	P-206115	P-242350	P-206114	P-207992	P-205149
S42	P-206115	P-242350	P-206114	P-205158	P-205149
S43	P-206115	P-242350	P-206114	P-207992	P-205149
S44	P-206115	P-242350	P-206114	P-207992	P-205149
S45	P-294394	P-294395	P-294395	P-207992	P-205149

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Relay	Contact Screw		Contact Spring	Spring (Retractable Spring)	Armature
	Front	Back			
S46	P-206115	P-206115	P-222055	P-208251	P-205149
S47	P-206115	P-206115	P-208319	P-208251	P-205149
S48	P-294394	P-294394	P-287052	P-208251	P-205149
S49	P-206115	P-242350	P-206114	P-208251	P-205149
S50	P-294394	P-242350	P-294395	P-208251	P-205149
S51	P-206115	P-206115	P-222055	P-208251	P-205149
S52	P-294394	P-242350	P-294395	P-208251	P-205149
S53	P-206115	P-206115	P-208319	P-207992	P-205149
S54	P-206115	P-242350	P-287053	P-208251	P-205149
S55	P-294394	P-242350	P-294395	P-205158	P-205149
S56	P-294394	P-294394	P-294395	P-208251	P-205149
S57	P-294394	P-242350	P-294395	P-207992	P-205149
S58	P-294394	P-242350	P-294395	P-205158	P-205149
S59	P-294394	P-294394	P-294395	P-205158	P-205149
S60	P-294394	P-294394	P-294395	P-207992	P-205149
S62	P-294394	P-294394	P-294395	P-205158	P-205149
S63	P-206115	P-206115	P-208319	P-207992	P-205149
S64	P-206115	P-206115	P-222055	P-208251	P-205149
S65	P-206115	P-206115	P-208319	P-207992	P-205149
S66	P-206115	P-206115	P-208319	P-208251	P-205149
S67	P-294394	P-294394	P-294395	P-208158	P-205149
S68	P-294394	P-294394	P-294395	P-208251	P-205149
S69	P-294394	P-294394	P-294395	P-205158	P-205149
S70	P-206115	P-206115	P-222055	P-208251	P-205149
S500	P-206115	P-242350	P-206114	P-207992	P-209479
S501	P-206115	P-242350	P-206114	P-207992	P-209479
S502	P-206115	P-206115	P-208319	P-207992	P-209479
S503	P-206115	P-206115	P-208319	P-207992	P-209479
S504	P-206115	P-206115	P-208319	P-207992	P-209479
S505	P-206115	P-242350	P-287053	P-207992	P-209479
S506	P-206115	P-242350	P-287053	P-205158	P-209479
S507	P-206115	P-206115	P-208319	P-208251	P-209479
S508	P-294394	P-294394	P-294395	P-205158	P-209479
S509	P-206115	P-242350	P-287053	P-208251	P-209479
S510	P-206115	P-206115	P-208319	P-205158	P-209479
S511	P-206115	P-242350	P-287053	P-207992	P-209479
S512	P-206115	P-206115	P-222055	P-207992	P-209479
S513	P-206115	P-242350	P-287053	P-207992	P-209479
S514	P-294394	P-242350	P-287052	P-208251	P-209479
S515	P-206115	P-206115	P-222055	P-208251	P-209479
S516	P-294394	P-294394	P-287052	P-208251	P-209479
S517	P-294394	P-294394	P-287052	P-207992	P-209479
S518	P-294394	P-294394	P-287052	P-208251	P-209479
S519	P-206115	P-206115	P-222055	P-207992	P-209479
S520	P-294394	P-294394	P-287052	P-207992	P-209479
S521	P-206115	P-206115	P-222055	P-207992	P-209479
S522	P-206115	P-206115	P-222055	P-208251	P-209479
S523	P-206115	P-206115	P-222055	P-208251	P-209479
S525	P-206115	P-206115	P-208319	P-208251	P-209479
S526	P-206115	P-206115	P-208319	P-205158	P-209479
S527	P-206115	P-206115	P-208319	P-207992	P-209479
S528	P-294394	P-294394	P-287052	P-208251	P-209479
S529	P-294394	P-294394	P-287052	P-207992	P-209479
S530	P-206115	P-206115	P-208319	P-207992	P-209479
S531	P-206115	P-206115	P-222055	P-208251	P-209479
S532	P-206115	P-206115	P-222055	P-208251	P-209479
S533	P-206115	P-206115	P-222055	P-208251	P-209479
S534	P-294394	P-294394	P-287052	P-207992	P-293994
S535	P-206115	P-206115	P-222055	P-207992	P-209479
S536	P-206115	P-206115	P-222055	P-208251	P-209479
D-77913	P-206115	P-242350	P-287053	P-207992	P-209479
D-78533	P-294394	P-242350	P-294395	P-207992	P-205149
D-78702	P-206115	P-242350	P-206114	P-208251	P-209479

Relay	Contact Screw		Contact Spring	Spring (Retractile Spring)	Armature
	Front	Back			
D-78705	P-206115	P-206115	P-208319	P-205158	P-205149
D-78772	P-206115	P-242350	P-206114	P-207992	P-209479
D-79001	P-206115	P-242350	P-206114	P-205158	P-205149
D-79247	P-294394	P-242350	P-294395	P-207992	P-205149
D-79295	P-206115	P-242350	P-206114	P-207992	P-209479
D-79331	P-294394	P-242350	P-294395	P-207992	P-205149
D-79745	P-242350	P-242350	P-208319	P-205158	P-205149
D-79746	P-242350	P-242350	P-208319	P-207992	P-205149
D-79933	P-206115	P-242350	P-206114	P-207992	P-209479
D-79934	P-206115	P-206115	P-208319	P-208251	P-209479
D-79955	P-294394	P-294394	P-294395	P-207992	P-205149
D-80046	P-294394	P-242350	P-294395	P-208251	P-209479
D-80053	P-242350	P-242350	P-208319	P-207992	P-205149
D-80341	P-206115	P-242350	P-206114	P-207992	P-209479
D-80344	P-294394	P-294394	P-294395	P-208251	P-205149
D-80345	P-206115	P-206115	P-208319	P-207992	P-205149
D-80347	P-206115	P-242350	P-206114	P-207992	P-209479
D-80360	P-294394	P-294394	P-294395	P-208251	P-205149
D-85075	P-294394	P-242350	P-294395	P-208251	P-205149
D-85323	P-206115	P-206115	P-208319	P-207992	P-205149
D-85350	P-242350	P-294394	P-294395	P-205158	P-205149
D-86428	P-206115	P-206115	P-208319	P-205158	P-205149
D-87300	P-294394	P-242350	P-294395	P-207992	P-205149
D-87712	P-294394	P-242350	P-294395	P-205158	P-205149
D-89419	P-206115	P-206115	P-208319	P-207992	P-205149
D-90994	P-294394	P-294394	P-294395	P-205158	P-205149
D-96830	P-294394	P-294394	P-287052	P-208251	P-209479
D-98732	P-294394	P-294394	P-287052	P-208251	P-209479

3. REPLACEMENT PROCEDURES

3.01 List of Tools and Materials

Code or Spec No.	Description
<u>Tools</u>	
43	3/16-inch and 1/4-inch Hex. Open Double-end Flat Wrench
or 349	3/16-inch and 7/32-inch Hex. Closed Double-end Offset Wrench
R-2739	Offset Screwdriver
KS-6854	Screwdriver
-	3-inch Cabinet Screwdriver
-	4-inch Regular Screwdriver

Materials

KS-14666 Cloth

3.02 No replacement procedures are specified for screws or other parts where the replacement consists of a simple operation.

3.03 After making any replacement of parts of an L-, N-, or S-type relay, the part or parts replaced shall meet the readjust requirements involved as specified in Section 040-514-701. Other parts whose adjustments may have been directly disturbed by the replacing operations, shall be checked to the readjust requirements and an over-all operation check shall be made of the relay before restoring the circuit to service.

3.04 In replacing some parts, it may be necessary to remove the relay from the mounting plate in order to obtain access to the part. Unsolder the leads and tag them. Remove the mounting screws with a 4-inch regular screwdriver and remove the relay.

3.05 When making any replacement of parts, place a KS-14666 cloth under the relay to be worked on in order to catch any parts which may drop from the relay.

3.06 Contact Spring, Contact Spring Support, and Retractable Spring: To replace any of these parts, proceed as follows. Insert the flat ends of two toothpicks between the back contact screw bracket and the front spool-head. Using the R-2739 offset screwdriver, remove the contact spring retaining screw. Substitute new parts as required. Mount the contact spring support, if provided, and the contact and retractile springs on the armature. Tighten the contact spring retaining screw securely and remove the toothpicks.

Armature, Armature Pivot, and Horizontal and Vertical Hinge

3.07 General: When replacing any of these parts, check whether the armature pivot is grooved at the center. If it is not grooved, replace it with a grooved pivot (P-241888 armature pivot).

3.08 Armature: To replace the armature, insert the flat ends of two toothpicks between the back contact screw bracket and the front spoolhead. Back off the retractile spring adjusting screw with the No. 43 wrench so that it clears the hole in the armature. Loosen the vertical hinge screws with the R-2739 offset screwdriver and remove the armature. Note the number of washers and their location on the armature pivot, since they should be retained in their original positions. Remove the contact and retractile springs, the contact spring support if provided, and the retaining and vertical hinge screws from the old armature and mount them on the new one. Mount the new armature, making sure that the washers are properly positioned on the armature pivot and if the vertical hinge is embossed, make sure that the embossing is in the groove on the armature pivot. Tighten the vertical hinge screws securely and remove the toothpicks.

3.09 Armature Pivot: To replace the armature pivot, remove the armature as covered in 3.08. Note the number of washers and their location on the armature pivot as they should be retained in their original positions on the new pivot. Remove the old pivot and washers. Take care when doing this not to lose any of the washers. Mount the new pivot with the washers in their proper positions. Remount the armature as covered in 3.08.

3.10 Horizontal Hinge: To replace the horizontal hinge, remove the armature as covered in 3.08. Then remove the vertical hinge and allow it to hang by its soldered connection. Loosen the horizontal hinge screws with the R-2739 offset screwdriver. Slide the horizontal hinge to the right and remove it. Remove the armature pivot and washers. Mount the new horizontal hinge and partially tighten the horizontal hinge screws. Insert the armature pivot in the horizontal hinge, making sure that the washers are properly located on the pivot. Remount the armature as covered in 3.08. Properly position the horizontal hinge and securely tighten the horizontal hinge screws.

3.11 Vertical Hinge: To replace the vertical hinge, loosen the vertical hinge screws with the R-2739 offset screwdriver and remove the hinge. Unsolder the wire from the old hinge and solder it on the new one. Mount the new hinge. Take care that the embossing on the hinge is in the groove on the armature pivot. Tighten the vertical hinge screws securely.

Combined Armature Bracket and Contact Bracket Spreader

3.12 To replace the combined armature bracket and contact bracket spreader or the separate armature bracket and associated contact bracket spreader, proceed as follows. Insert a toothpick between the front and back contact screw brackets and the front spoolhead. Remove the horizontal hinge screws with the R-2739 offset screwdriver or the KS-6854 screwdriver. Slide the armature and hinge assembly to the right until it is free from the relay and allow it to hang by the soldered connection on the vertical hinge. With the KS-6854 screwdriver, remove the mounting screws of the combined bracket or the separate contact bracket spreader. Remove the combined bracket or the two separate brackets. Remove the retractile spring adjusting screw from the bracket being replaced with the No. 43 wrench. Mount this screw on the new combined armature bracket and contact bracket spreader. Mount the new bracket on the relay but do not tighten the bracket mounting screws. Loosely mount the horizontal hinge screws. Slide the armature and hinge assembly into position as shown in Fig. 3. Securely tighten the horizontal hinge screws and the bracket mounting screws. Remove the toothpicks.

Note: When replacing a separate armature bracket and associated contact bracket spreader with the combined armature bracket and contact bracket spreader, make sure that the mounting screws specified for the combined bracket are used.

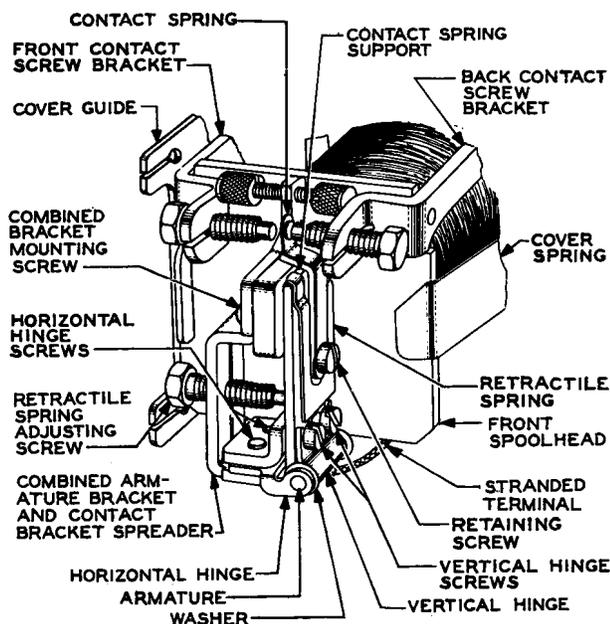


Fig. 3 - S-type Relay Equipped With Combined Armature Bracket and Contact Bracket Spreader

Cover Spring, Cover Guide, and Insulator

3.13 To remove a cover spring, cover guide, or insulator on relays so equipped, remove the relay from the mounting plate as covered in 3.04. Remove the cover. If the insulator is to be replaced, remove it and substitute the new insulator. If the cover spring or cover guide is to be replaced, remove the associated mounting screw using the 3-inch cabinet screwdriver. Remove the spring or guide as required and substitute the new

parts. Position the mounting end of the cover spring under the winding terminal at the rear of the relay core, and while holding the spring in place, mount the cover guide over the core at the opposite side of the relay. Make sure that the fiber washers are positioned between the cover spring and guide and the relay core. Insert and securely tighten the associated mounting screw. Check that the cover spring clears the winding terminals. Remount the relay securely on the mounting plate. Connect and solder the leads to the proper terminals.