RELAYS

215 AND 255 TYPES

AND ASSOCIATED NO. 18B CONNECTING BLOCK

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 215- and 255-type relays and associated No. 18B connecting block. 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 215- and 255-type relays and associated No. 18B connecting block. 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 in Part 2. This information is called Replacement Procedures.

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 the 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.

2.02 When ordering piece parts for replacement purposes, give both the number and the name of the piece part; for example, "P-290441 Armature." Do not refer to the BSP number or to any information shown in parentheses following the piece-part numbers.

2.03 Piece parts for relays per D specification shall be ordered in accordance with the following table. Parts for which piece-part numbers are not given should be ordered by giving the name of the part and the D specification number; for example, "Coil for relay per D-80397."

D Specification	Ordering Information
D-80397 (See note)	Order parts as specified for No. 215FA relay except (a) Coil (b) P-219709 Frame (c) P-260982 Shell (d) P-149794 Biasing Spring Bracket (e) P-483699 Biasing Spring and Stud (f) P-115953 Screws
D-85341 (See note)	Order parts as specified for No. 215B relay except (a) P-293840 Coil (b) P-219709 Frame (c) P-260982 Shell (d) P-149794 Biasing Spring Bracket (e) P-483699 Biasing Spring and Stud (f) P-115953 Screws
D-85342 (See note)	Order parts as specified for No. 215A relay except (a) Coil (b) P-219709 Frame (c) P-260982 Shell (d) P-149794 Biasing Spring Bracket (e) P-483699 Biasing Spring and Stud (f) P-115953 Screws

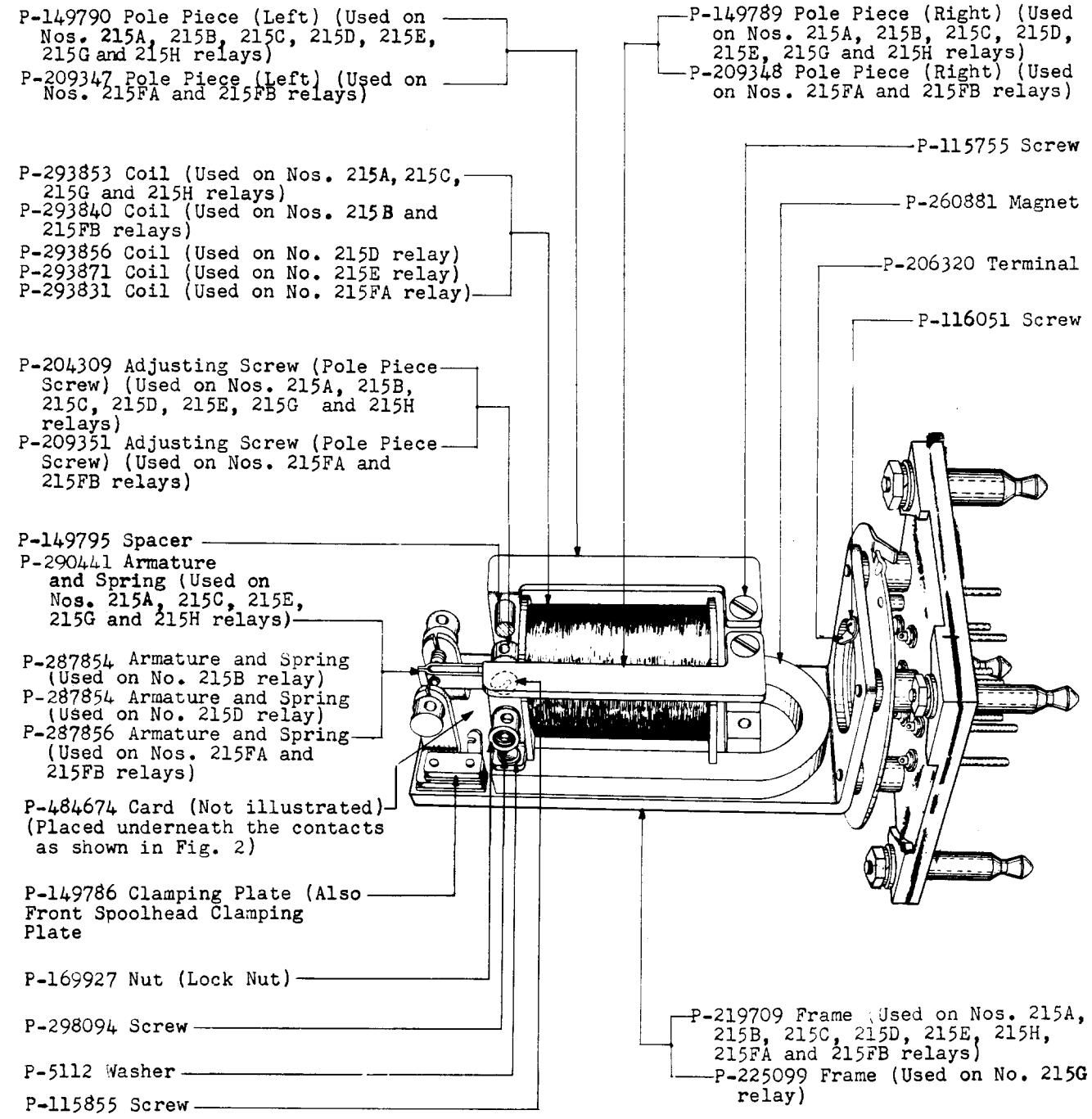


Fig. 1 - 215-type Relays (Without Cover)

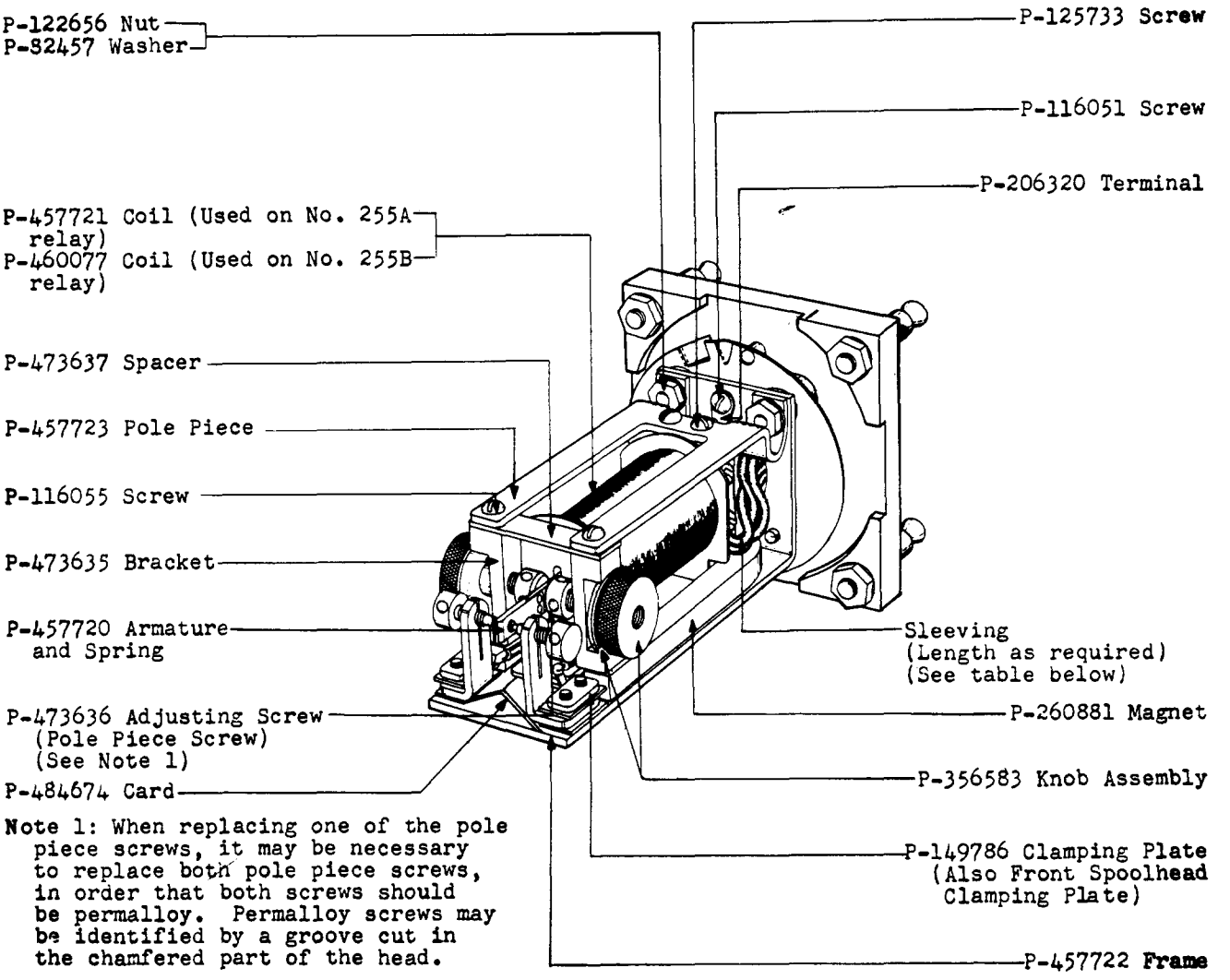


Fig. 2 - 255-type Relays (Without Cover)

	SLEEVING (ORDER BY FOOT)					
	215 TYPE				255 TYPE	
TERMINAL NO.	215A, 215C, 215D, 215E, 215G, 215H		215B, 215FA, 215FB		255A, 255B	
	COLOR	P. P. NO.	COLOR	P. P. NO.	COLOR	P. P. NO.
1	BLUE-WHITE	P-311320	BLUE-WHITE	P-311320	BLUE-WHITE	P-311320
2	GREEN	P-311316	GREEN	P-311316	GREEN	P-311316
3	BLUE	P-311317	ORANGE	P-311315	BLUE	P-311317
4	BLACK	P-311319	-	-	BLACK	P-311319
5	RED	P-311318	BLACK	P-311319	RED	P-311318
6	WHITE	P-311314	-	-	WHITE	P-311314
7	ORANGE	P-311315	RED	P-311318	ORANGE	P-311315
8	ORANGE-WHITE	P-311321	ORANGE-WHITE	P-311321	—	—

D Specification	Ordering Information
D-160418	Order parts as specified for No. 255A relay except (a) Cover (b) P-220616 Contact Screw (c) P-311321 Sleeving
D-164987	Order parts as specified for No. 255A relay except (a) Armature Spring (b) Contact Screw
D-167087	Order parts as specified for No. 255B relay except (a) Contact Screw (b) Armature Spring

Note: Piece parts (d), (e), and (f) are assembled on relays the same as corresponding parts of No. 215G relay. (See Figs. 6 and 8.)

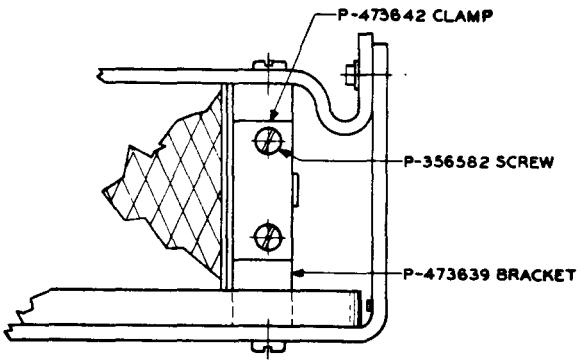
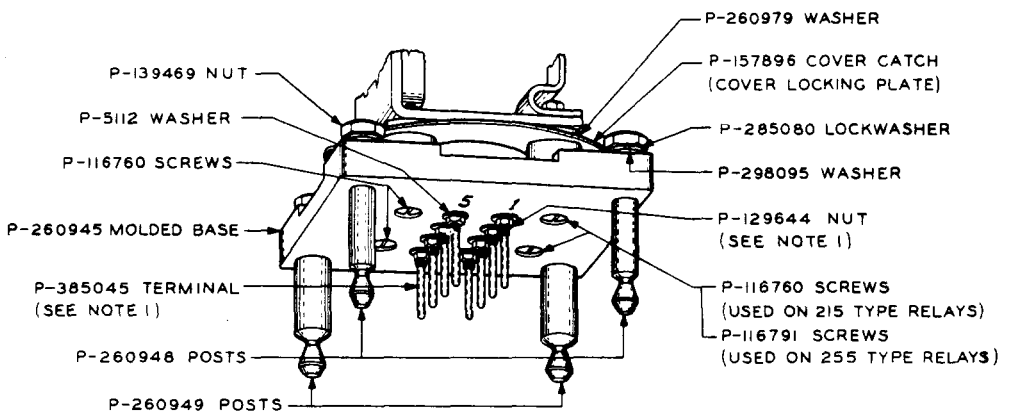
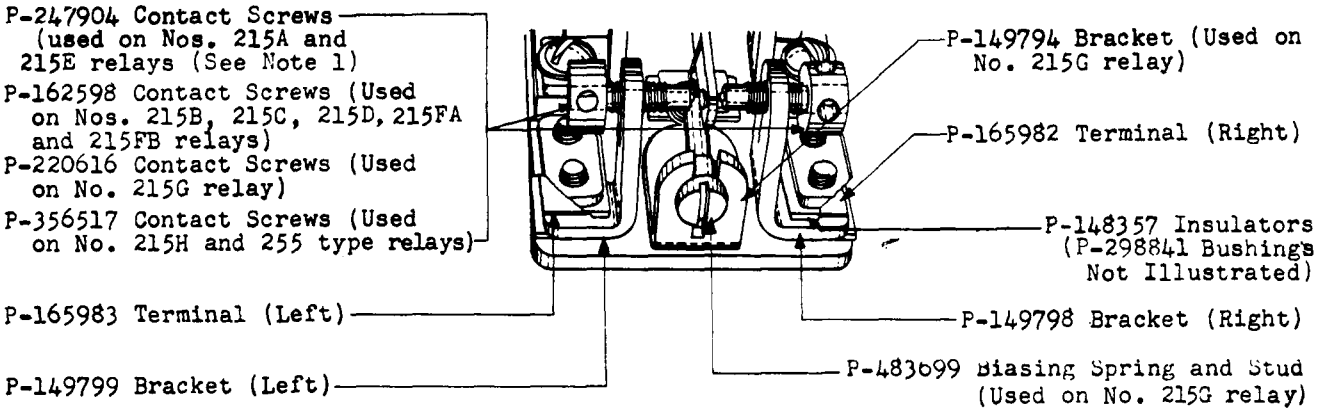


Fig. 3 - Armature Bracket Assembly (255-type Relays Only)



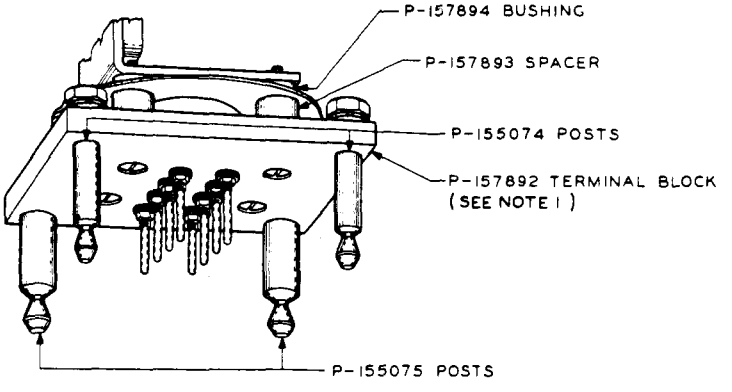
NOTE 1: WHEN IT IS NECESSARY TO REPLACE A TERMINAL OR ITS ASSOCIATED NUT, REPLACE BOTH TERMINAL AND THE NUT

Fig. 4 - Terminal Base Assembly



Note 1: On 215A Relays used in Telegraph Applications, Contact Screws P-356517 shall be used.

Fig. 5 - Terminal Block Assembly



NOTE 1: WHEN REPLACING TERMINAL BLOCK P-157892 WITH MOLDED BASE P-260945, ALSO ORDER THE ASSOCIATED WASHERS P-260979 AND POSTS P-260948 AND P-260949

Fig. 6 - Contact Combinations for 215- and 255-type Relays and Biasing Spring Arrangement for No. 215G Relay

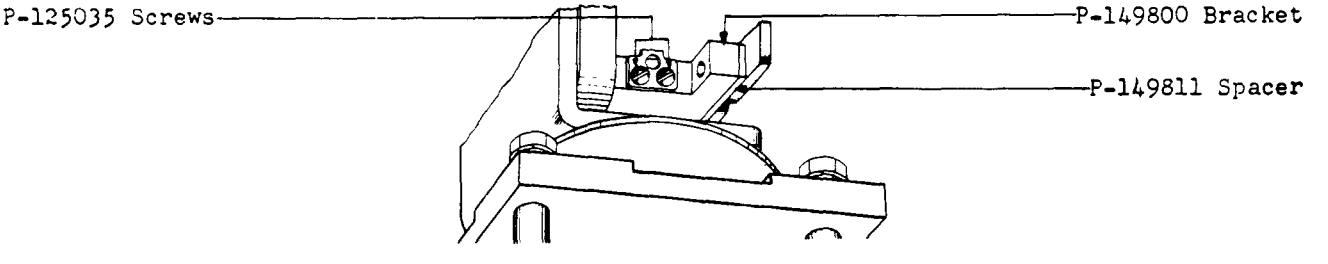


Fig. 7 - Armature Bracket Assembly (215-type Relays Only)

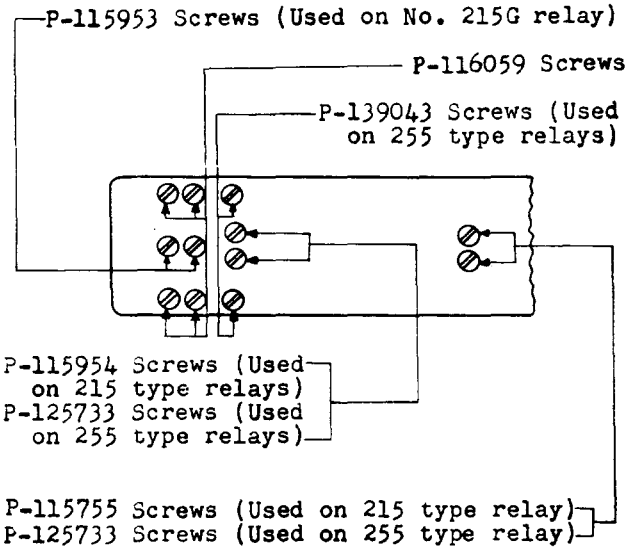


Fig. 8 - Relay - Bottom View

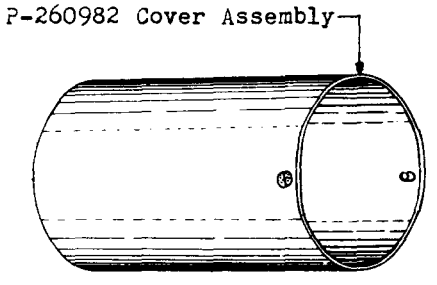


Fig. 9 - Cover Assembly

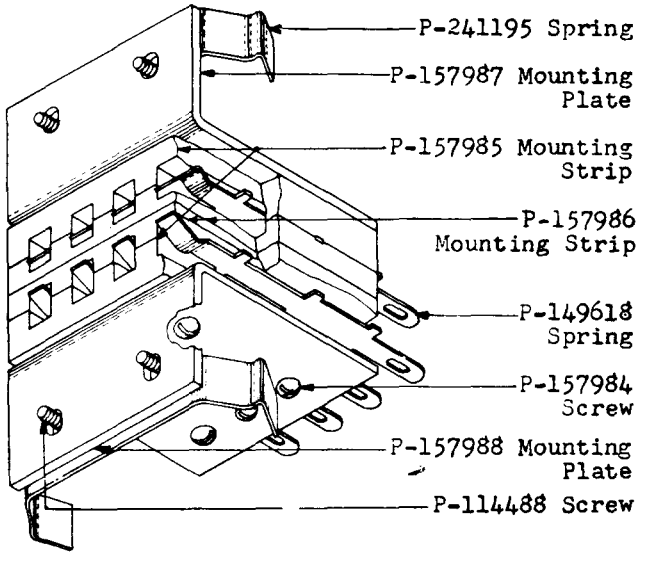


Fig. 10 - No. 18B Connecting Block

3. REPLACEMENT PROCEDURES

3.01 List of Tools

Code No.	Description
46	3/8-in. Hex. Single-end Socket Wrench
206	30-degree Offset Screwdriver
207	90-degree Offset Screwdriver
340 (two required)	Adjusting Key
403A	5/32-in. and 3/16-in. Hex. Double-end Socket Wrench
417A	1/4-in. and 3/8-in. Hex. Open Double-end Flat Wrench
485A	Smooth-jaw Pliers
-	5-in. Diagonal Pliers
-	3-in. Cabinet Screwdriver
-	4-in. Regular Screwdriver

3.02 At the time of making a replacement of parts, clean the relay in accordance with Section 069-306-801 covering cleaning of relay contacts and parts. After making any replacement of parts of a 215- or 255-type relay, the part or parts replaced shall meet the readjust requirements involved as specified in Section 040-232-701. Other parts whose adjustment may have been disturbed by the replacing operations shall be checked to the test requirements and an overall operation check shall be made of the relay before restoring the circuit to service.

3.03 No replacement procedures are specified for screws and other parts when the replacement procedure consists of a single simple operation.

3.04 Remagnetization of the permanent magnets of relays is required after removal under certain conditions, as covered in Section 040-232-701 covering the requirements for the particular relay and Section 040-231-811 covering remagnetization of permanent magnets.

Connecting Block Parts

3.05 Mounting Spring: Remove the screws which attach the mounting spring to the mounting plate with the 3-inch cabinet screwdriver and remove the spring. Substitute the new part and fasten it in place by tightening the mounting screws securely.

3.06 Connecting Block Springs: To replace an individual connecting block spring, loosen the screws which attach the mounting spring to the mounting plate with the 3-inch cabinet screwdriver. Loosen the connecting block assembly screws with the 3-inch

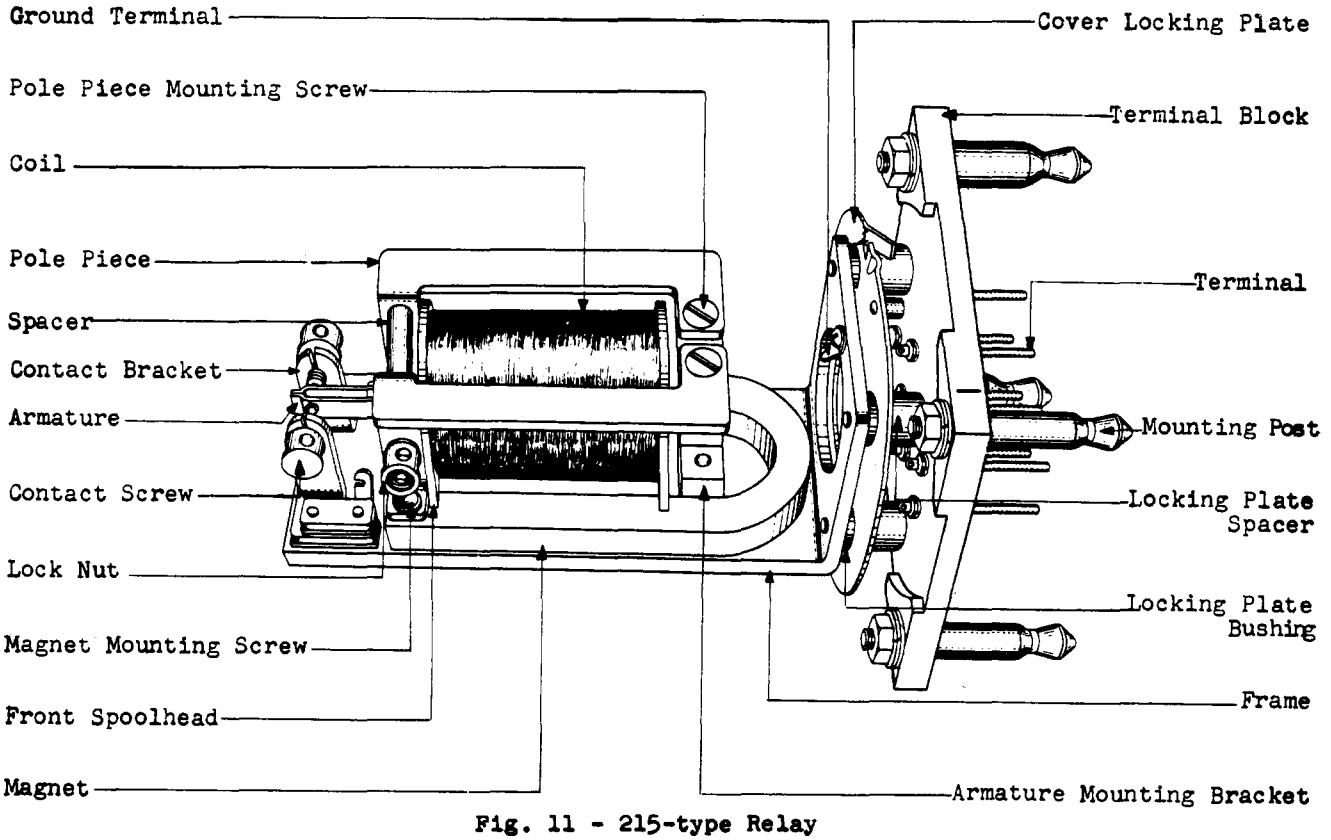


Fig. 11 - 215-type Relay

cabinet screwdriver sufficiently to permit the defective spring to be withdrawn from the rear of the connecting block. Insert the new spring in position, taking care that it is in proper alignment with the other springs, and position it so that the sides of the spring do not touch the mounting strip. Tighten the connecting block assembly screws and connect the lead to the terminal of the connecting block spring which was replaced.

3.07 Connecting Block Mounting Strips and Mounting Plates: Disconnect the leads and remove the connecting block from its mounting by removing the connecting block mounting screws with the 3-inch cabinet screwdriver and remove the connecting block assembly screws using the 3-inch cabinet screwdriver. Substitute the new part and reassemble the block, taking care before tightening the connecting block assembly screws to see that the sides of the spring do not touch the mounting strip and that the mounting plates are in approximate alignment with each other. Fasten the connecting block securely to its mounting. When assembling the connecting block to the mounting plate, use a 215- or 255-type relay as a gauge to insure that the connecting block is properly positioned. Reconnect the leads to the connecting block terminals.

Relay Parts

3.08 Mounting Posts and Associated Parts: To replace a mounting post or associated part, remove the mounting post nut with the No. 46 wrench and remove the mounting post from the terminal block or the molded base as the case may be. Substitute the new part as required, and tighten the mounting post nut securely.

Terminals, Terminal Nuts, Locking Plate Spacers, Locking Plate Bushings, Locking Plate Washers, and Sleeving

3.09 Remove the nuts on the terminal block mounting screws of 255-type relays with the No. 417A wrench. On either 215- or 255-type relays remove the terminal block mounting screws with the 4-inch regular screwdriver. Replace the locking plate spacers or bushings, if necessary, on relay so equipped. In cases when the molded base is used, replace the washers if necessary. If a terminal requires replacing, hold the wiring end of the terminal with the No. 485A pliers, remove the terminal nut with the No. 403A wrench and remove the terminal from the terminal block. Unsolder the lead from the terminal. When replacing the new terminal, add a lockwasher between the head of the terminal and the terminal block, and a plain washer between the terminal block and the terminal nut, if not already equipped. Tighten the nut securely. If the remaining terminals are not equipped with the two washers as specified, make the necessary changes and additions. If any of the sleeving is damaged, replace it at this time. Resolder the leads to the terminals and

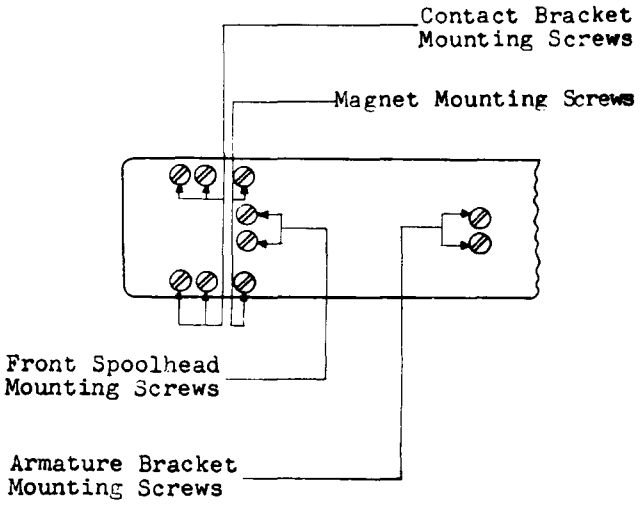


Fig. 12 - Bottom View - 255 Type Relay

remount the terminal block assembly to the frame of the relay, tightening the terminal block mounting screws securely.

Terminal Block, Molded Base, and Cover Locking Plate

3.10 To replace the terminal block (or molded base) or the cover locking plate, remove the terminal block from the relay frame as described in 3.09. Remove the terminal nuts from all terminals, taking care to mark or otherwise record the positions of the terminals so that they can be replaced in the new block in their proper position. Remove the terminal block from the terminals. If necessary to replace the locking plate, do so at this time. Remove the locking plate spacers and bushings (washers on relays having a molded base) from the old locking plate and position them on the new locking plate. If the terminal block is to be replaced, remove the mounting posts from the terminal block and remount them, as outlined in 3.08, in their proper positions on the new terminal block. Insert the terminals, in the manner outlined in 3.09, in their proper positions on the new terminal block. Remount the terminal block assembly to the relay as covered in 3.09

Pole Piece, Pole-piece Screw Mounting Bracket, and Pole-piece Screws

3.11 215-type Relays (Pole Piece and Pole-piece Screw): To replace the pole piece or pole-piece screw, first remove the locknut from the pole-piece screw with the No. 340 adjusting key. Remove the magnet mounting screw with the No. 206 and No. 207 offset screwdrivers. Remove the spacer mounting screw and the pole-piece mounting screw with the 3-inch cabinet screwdriver which will free the pole piece. Substitute the new pole piece or pole-piece screw as required. Reassemble the parts and tighten all screws securely.

3.12 255-type Relays (Pole-piece Screws and Pole-piece Screw Mounting Bracket): To replace the pole-piece screws or pole-piece screw mounting bracket, remove the magnet mounting screw and the pole-piece mounting screw associated with the bracket, with the 3-inch cabinet screwdriver and remove the bracket. Remove the knob assembly and the pole-piece screws. Substitute the new part and reassemble the pole-piece screws, bracket, and knob assembly. Remount the bracket and tighten both mounting screws securely.

3.13 255-type Relay (Pole Piece): Remove the pole-piece mounting screws with the 3-inch cabinet screwdriver. Remove the nuts on the terminal block mounting screws with the No. 417A wrench and the two associated terminal block mounting screws with the 4-inch regular screwdriver. Replace the pole piece. Reposition the screws and tighten all screws and nuts securely.

Armature

3.14 215-type Relays: To remove armature P-290441, loosen the locknuts and back off the pole-piece screws sufficiently to clear the armature using the No. 340 adjusting key. On relays equipped with a biasing spring, the biasing spring shall be backed away from the armature. Remove the armature mounting screws with the 3-inch cabinet screwdriver and withdraw the armature from the front. Reposition the new armature and tighten the armature mounting screws securely. To remove armatures, other than P-290441, having a vertical height of the mounting (clamping) surface which does not permit withdrawal from the front, the following procedure should be used. Use the No. 340 adjusting key to loosen the locknuts and to back off the pole-piece screws sufficiently to clear the armature. If a biasing spring is used, back it away from the armature. Remove the armature mounting screws with the 3-inch cabinet screwdriver. The armature is then free to slide back toward the terminal block. With the diagonal pliers, cut the old armature at the two small legs adjacent to the center hole. Remove the two pieces and replace with a new armature. When using armature P-290441, insert as described above. When using armatures P-287854 and P-287856, it will be necessary to remove the terminal block mounting screws with the 4-inch regular screwdriver. Carefully lower the terminal block assembly to clear the hole in the frame. Replace the armature, reassemble the parts and tighten all screws securely.

3.15 255-type Relays: To remove the armature, loosen the armature clamp mounting screws with the 3-inch cabinet screwdriver and withdraw the armature from the front.

Reposition the new armature and tighten the clamp mounting screws securely.

Armature Bracket

3.16 215-type Relay: Remove the armature as covered in 3.14. Remove the armature bracket and pole-piece mounting screws with the 3-inch cabinet screwdriver. Substitute the new bracket, reassemble the parts, and tighten all screws securely.

3.17 255-type Relays: Remove the armature as covered in 3.15. Remove the pole piece as covered in 3.13. Remove the armature bracket mounting screws with the 3-inch cabinet screwdriver and remove the bracket. Substitute the new bracket and tighten the bracket mounting screws securely. Reassemble the pole piece and armature as covered in 3.13 and 3.15 respectively.

Magnets

3.18 Observe the following cautions with respect to magnets:

(1) Never remove the magnet unless absolutely necessary.

(2) Keep the magnets free from the influence of stray magnetic fields.

(3) Do not subject the magnets to mechanical shock.

(4) Do not permit the magnets to come into contact with magnetic bodies other than the relay structure.

(5) Remagnetize the magnet as covered in 3.04.

When it becomes necessary to replace a magnet proceed as outlined in 3.19 or 3.20.

3.19 2.15-type Relays: To replace the magnet, first back away the biasing spring if one is used. Remove the locknuts from the pole-piece screws with the No. 340 adjusting key. Remove the magnet mounting screws with the Nos. 206 and 207 offset screwdrivers. Remove the front spoolhead mounting screws and armature bracket mounting screws with the 3-inch cabinet screwdriver. Lift the coil sufficiently so that the magnet may be replaced. Make sure that the beveled edge at the rear of the magnet or punch mark on the side of the magnet (when the magnet has a punch mark) is in the same relative position with respect to the frame as the corresponding mark was on the magnet which was removed. Tighten all screws securely.

3.20 255-type Relays: Remove the nuts on the terminal block mounting screws with the No. 417A wrench and the two associated terminal block mounting screws which hold the pole piece with the 4-inch regular screwdriver. Remove the magnet mounting screws, the front spoolhead mounting screws, and the armature bracket mounting screws with the 3-inch cabinet screwdriver. Lift the coil assembly sufficiently to remove the magnet. Reposition the new magnet and replace and tighten all screws securely.

Coil

3.21 215-type Relays: When replacing the coil observe the cautions for magnets as outlined in 3.18. To replace the coil, remove the terminal block mounting screws with the 4-inch regular screwdriver. Unsolder the coil leads from the terminals and designate the terminals so that the new coil may be properly rewired. Back off the biasing spring if the relay is so equipped. Remove the locknuts from the pole-piece screws with the No. 340 adjusting key. Remove the magnet mounting screws with the Nos. 206 and 207 offset screwdrivers, and the armature bracket and front spoolhead mounting screws with the 3-inch cabinet screwdriver. Lift the coil, armature, and pole pieces as an assembly from the relay frame. Remove the armature mounting screws with the 3-inch cabinet screwdriver and withdraw the armature from the coil. Place the armature in the new coil, reset but do not tighten the armature mounting screws and relocate the coil, armature, and pole-piece assembly in the frame. Place the armature bracket, magnet, and front spoolhead mounting screws in position and tighten them securely. Position the armature and tighten the armature mounting screws securely. If the sleeving on the leads of the old coil is in good condition, remove it and transfer it to the proper leads of the new coil. If the sleeving is in poor condition, replace it. Cut it to proper size. Resolder the coil leads. Remount the terminal block and tighten the mounting screws securely.

3.22 255-type Relays: When replacing the coil observe the cautions for magnets as outlined in 3.18. Remove the terminal block mounting screws with the 4-inch regular screwdriver and No. 417A wrench. Unsolder the coil leads from the terminals and designate the terminals so that the new coil may be properly rewired. Remove the armature clamp mounting screws with the 3-inch cabinet screwdriver and withdraw the armature. Remove the magnet mounting screws, front spoolhead mounting screws, and armature bracket mounting screws with the 3-inch cabinet screwdriver. Replace the coil and place the armature bracket, magnet, and front spoolhead mounting screws in position and tighten them securely. Reassemble the armature and armature clamp and tighten the armature clamp mounting screws securely. If the sleeving on the leads of the old coil is in good condition, remove it and transfer it to the proper leads of the new coil. If the sleeving is in poor condition, replace it. Cut it to proper size. Resolder the coil leads. Remount the terminal block and tighten the mounting screws and nuts securely.

Frame

3.23 215-type Relays: When replacing the relay frame observe the cautions for magnets as outlined in 3.18. Remove the terminal block mounting screws with the 4-inch regular screwdriver. Remove the terminals, except the one connected to the ground lead, from the terminal block, as covered in 3.09, but do not unsolder the leads. Use the 3-inch cabinet screwdriver to remove the ground lead from the frame. Back off the biasing spring if the relay is so equipped. Remove the locknuts from the pole-piece screws with the No. 340 adjusting key. Remove the magnet mounting screws with the Nos. 206 and 207 offset screwdrivers and the armature bracket and front spoolhead mounting screws with the 3-inch cabinet screwdriver. Lift the coil, armature, and pole pieces as an assembly from the relay frame. Remove the contact screw bracket mounting screws and biasing screw bracket mounting screws (when equipped) with the 3-inch cabinet screwdriver. Assemble the parts on the new relay frame and replace and tighten all screws securely. Remount the terminals and terminal block and tighten the mounting screws and nuts securely.

3.24 255-type Relay: When replacing the relay frame, observe the cautions for magnets as outlined in 3.18. Remove the terminal block mounting screws with the 4-inch regular screwdriver and No. 417A wrench. Remove the terminals, except the one connected to the ground lead, from the terminal block, as covered in 3.09, but do not unsolder the leads. Use the 3-inch cabinet screwdriver to remove the ground lead from the frame. Remove the armature bracket mounting screws, front spoolhead mounting screws, and magnet mounting screws with the 3-inch cabinet screwdriver and lift the magnet, coil, and pole piece as an assembly from the frame. Remove the contact screw bracket mounting screws with the 3-inch cabinet screwdriver. Assemble the parts on the new relay frame and tighten all screws securely. Remount the terminals and terminal block and tighten the mounting screws and nuts securely.