

## 85F- AND 85P-TYPE RELAYS REQUIREMENTS AND ADJUSTING PROCEDURES

### 1. GENERAL

**1.01** This section covers 85F-type relays, used in four party selective subscriber sets, and 85P-type relays used in 634FR and 653FR subscriber sets.

**1.02** This section is reissued to incorporate 85P-type relays. Since this is a general revision, arrows ordinarily used have been omitted.

**1.03** Reference shall be made to Section 020-010-711 covering general requirements and definitions for additional information necessary for the proper application of the requirements listed in this practice.

**1.04** Before making any tests or adjustments, see that the subscriber set is mounted plumb and that the relay is in proper alignment in the set since all relay adjustments depend upon these conditions.

**1.05** *Operate* means that when the operate current is applied the armature shall move from the back buffer to the front buffer and make the contact reliably.

**1.06** *Release* means that when the current is reduced from the operate to the release value the armature shall move from the front buffer to the back buffer and break the contact.

### 2. REQUIREMENTS

*Note:* Requirements apply to both 85F- and 85P-type relays unless otherwise specified.

#### 2.01- *Cleaning*

(1) The contacts shall be cleaned when necessary in accordance with Section 069-306-801 covering cleaning of relay contacts and parts.

(2) Other parts shall be cleaned when necessary in accordance with approved procedures.

**2.02** *Mounting:* The relay shall be mounted securely. Gauge by feel.

**2.03** *Cover Spring Pressure* — Fig. 1 (D): The cover springs shall have sufficient pressure against the cover to hold the cover securely in place. Gauge by feel.

**2.04** *Adjusting Nut Tightness — 85F-Type Relay:* The adjusting nut shall be sufficiently tight on the adjusting stud to hold any adjusted position. Gauge by feel. See Fig. 1(A).

**2.05** *Adjusting Stud and Contact Spring Clearance* — Fig. 1(B): The front contact spring shall not bind on the adjusting stud. Gauge by feel.

**2.06** *Front Contact Spring Position* — Fig. 1 (C): The front contact spring shall rest against the stop spring at the end nearest the contact when the relay is unoperated. Gauge by eye.

**2.07** *Contact Alignment* — Fig. 2(A): Contacts shall line up so the point of contact falls wholly within the circumference of the opposing contact disc. Gauge by eye.

#### 2.08 *Armature Movement:*

(1) 85F-Type Relay — The armature shall move freely in its bearings. Gauge by feel. See Fig. 3(C).

(2) 85P-Type Relay — The armature shall work freely and shall not rub against the frame of the relay. See Fig. 4.

**2.09** *Armature Position* — Fig. 3(A): The front edge of the armature shall be back of the adjacent side of the core when the armature is in the unoperated position. Gauge by eye.

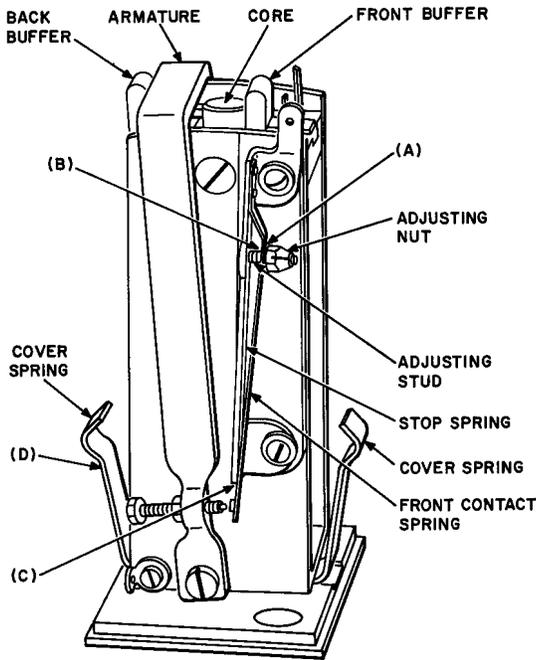


Fig. 1 — 85F-Type Relay — Arrangement of Operating Parts

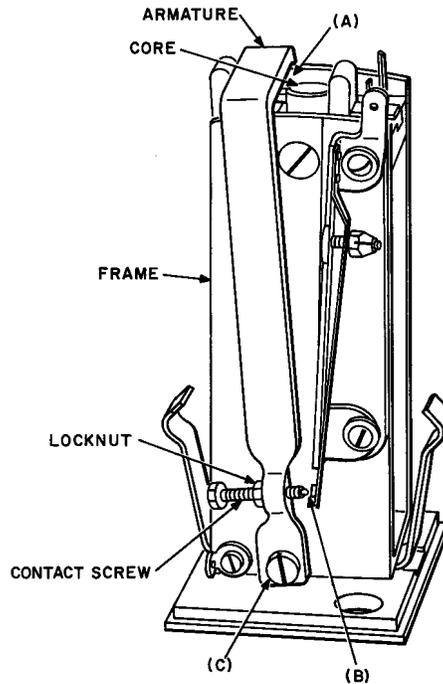


Fig. 3 — 85F-Type Relay — Correct Unoperated Armature Position

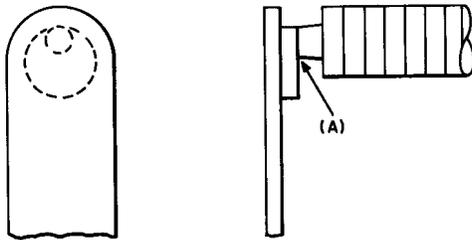


Fig. 2 — 85F-Type Relay — Contact Alignment

**2.10 Operated Armature Air Gap — Fig. 5(A) :**

There shall be a clearance of .004-inch minimum between the armature and the core measured at the closest point when the armature is resting against the front buffer. Use the No. 74-D gauge.

**2.11 Contact Separation:**

(1) 85F-Type Relay — The separation between the front contact spring and the contact screw when the relay is unoperated shall be approximately .015 inch. Gauge by eye.

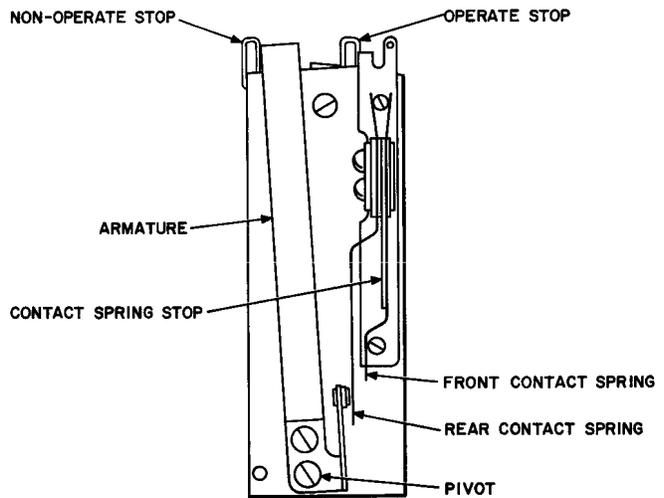


Fig. 4 — 85P-Type Relay — Arrangement of Operating Parts

(2) 85P-Type Relay — The separation between the contacts shall be noticeable (1/64-inch minimum).

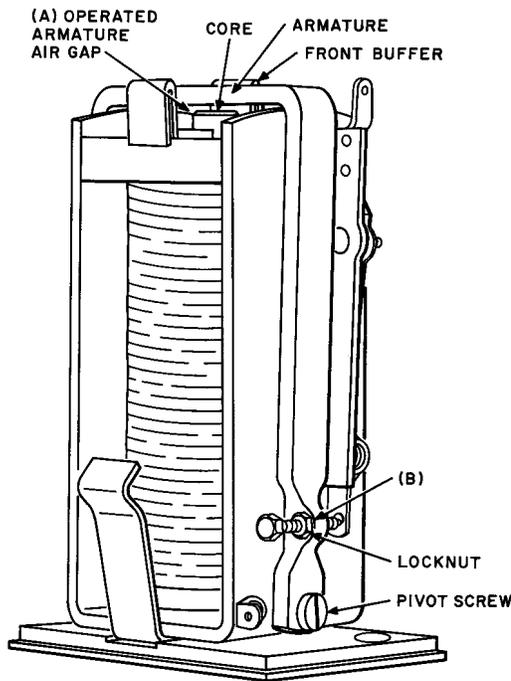


Fig. 5 — 85F-Type Relay — Showing Operated Air Gap and Locknut on Contact Screw

**2.12 Contact Follow:**

- (1) 85F-Type Relay — The front contact spring shall be lifted off the stop spring approximately .010 inch when the relay is operated electrically. Gauge by eye.
- (2) 85P-Type Relay — The contacts shall have appreciable follow (0.005-inch minimum). Gauge by eye.

**2.13 Tightness of Locknut** — 85F-Type Relay: The locknut on the contact screw shall be sufficiently tight to hold the screw in the adjusted position. Gauge by feel. See Fig. 5(B).

**2.14 Electrical Requirements:** The relay shall meet the electrical requirements specified on the circuit requirement table.

**3. ADJUSTING PROCEDURES**

**3.001 List of Tools, Gauges, Materials, and Test Apparatus**

| CODE OR SPEC NO.   | DESCRIPTION  |
|--|--|
| <b>TOOLS</b>   |  |
| 363  | Spring Adjuster  |
| 403A   | Wrench 5/32- and 3/16-Inch Hex Socket Double End           |
| 466A   | Adjusting Tool   |
| R-1572   | 4 Oz. Hammer   |
| R-2262<br>(2 required)   | 5/32- and 7/32-Inch Open Double-End Flat Wrench            |
| —  | 3-1/2 Inch C Screwdriver                                   |
| —  | P Long-Nose Pliers   |
| <b>GAUGES</b>  |  |
| 74-D   | Thickness Gauge Nest                                       |
| <b>MATERIALS</b>   |  |
| —  | Toothpicks, Hardwood, Flat on One End and Pointed at Other |
| KS-7860  | Petroleum Spirits  |
| <b>TEST APPARATUS</b>  |  |
| 35-C   | Test Set   |
| <b>3.01 Cleaning (Reqt 2.01):</b>  |  |
| (1) Clean the contacts in accordance with Section 069-306-801 covering cleaning of relay contacts and parts.   |  |
| (2) Clean other parts as outlined in 3.08.   |  |
| <b>3.02 Mounting (Reqt 2.02):</b> If the relay is not fastened securely to the mounting bracket, tighten the mounting screws securely with the 3-1/2 inch C screwdriver.               |  |
| <b>3.03 Cover Spring Pressure (Reqt 2.03):</b> If the cover does not fit properly, adjust the cover spring with the P long-nose pliers, applying them close to the base of the spring. |  |

**3.04 Adjusting Nut Tightness — 85F-Type Relay Only** (Reqt 2.04): If the adjusting nut is too loose on the adjusting stud, turn the nut in a counterclockwise direction with the 403A or R-2262 wrench until the slotted portion extends beyond the stud. Then force the slotted portions of the nut closer together using the P long-nose pliers as shown in Fig. 6.

**3.05 Adjusting Stud and Contact Spring Clearance** (Reqt 2.05): If the front contact spring rubs on the adjusting stud sufficiently to prevent its returning to its normal position against the adjusting nut after being pushed away from it, correct this fault by adjusting the stud using the P long-nose pliers applied to the hexagon portion of the adjusting nut.

**3.06 Front Contact Spring Position** (Reqt 2.06): If the front contact spring does not rest on the stop spring when the relay is unoperated, correct this by turning the adjusting nut in a clockwise direction with the 403A or R-2262 wrench.

**3.07 Contact Alignment** (Reqt 2.07): If the contacts are out of line vertically, slight adjustment may possibly be made by loosening the screws which hold the contact spring bracket to the frame of the relay using the 3-1/2 inch C screwdriver and then shifting the bracket. If this does not provide a satisfactory adjustment, remove the bracket and enlarge the holes in the

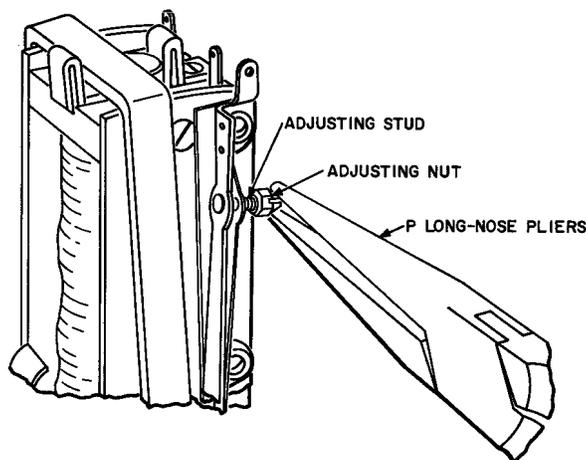


Fig. 6 — Method of Tightening Locknut

bushing through which the bracket mounting screws pass. Then reassemble.

### 3.08 Armature Movement:

(1) 85F-Type Relay [Reqt 2.08 (1)]: If the armature does not move freely, it is probably due to the armature pivot screws being bent or burred, the pivots or pivot holes being dirty, or the armature rubbing on the relay frame. Remove the relay from its mounting and then remove the pivot screws, using the 3-1/2 inch C screwdriver. Clean the pivots and holes with petroleum spirits applied with a clean toothpick. If the armature rubs on the frame, spread it very slightly. If the pivots are burred or bent, replace the screws. Reassemble the parts and check for freedom of movement.

**Note:** Before attempting to readjust a relay to meet its electrical requirements, see that it is mounted in a vertical position with the armature resting against the back buffer.

(2) 85P-Type Relay [Reqt 2.08(2)]: If relay does not meet this requirement, replace the relay. Check for rubbing of armature as follows:

- (a) Apply a slight pressure to the armature near the pivots so all the play in the pivots is taken up toward one side of the relay. Move the armature to and fro.
- (b) Repeat check with pivot play taken up toward other side of relay.
- (c) The armature, when released from the operated position, shall fall back to the nonoperate stop. Check this, after meeting the requirements of 1.04, by pushing the armature manually to the operate stop and then releasing it. To adjust proceed as follows:
  - (d) Adjust the operate stop so it is at right angles to the spoolhead. Use P long-nose pliers.
  - (e) If armature still fails to fall back from the operated position, increase the tension of the contact spring against the armature, by adjusting the rear contact spring

close to the spring pileup. Use 466A tool. This adjustment should be no more than is required to restore the armature to the nonoperated position.

**3.09 Armature Position** (Reqt 2.09): If the armature in the unoperated position is not back of the edge of the core, adjust the back buffer away from the armature with the P long-nose pliers as shown in Fig. 7. Exercise care to keep the armature very close to the core since otherwise the relay probably will fail to meet its electrical operate requirement.

**3.10 Operated Air Gap** (Reqt 2.10): If the operated armature air gap is too small, remove the armature and tap the part that passes over the core with the R-1572 hammer. Replace the armature and check the gap. Exercise care to keep the gap near the minimum specified since otherwise difficulty will probably be experienced in meeting the operate requirement. Also exercise care that the position of the front buffer is such that the armature in the operated position will be directly over the core.

### 3.11 Contact Separation:

(1) 85F-Type Relay [Reqt 2.11(1)]: To adjust for contact separation and contact follow, loosen the locknut with the R-2262 wrench and turn the contact screw with the 403A wrench or another R-2262 wrench until

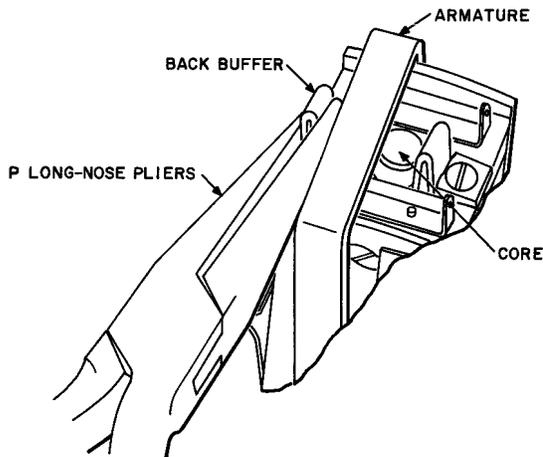


Fig. 7 — Method of Adjusting Armature Position (85F-Type Relay)

the contact separation is approximately .015 inch. This will provide a contact follow considerably above the minimum. Tighten the locknut securely.

(2) 85P-Type Relay [Reqt 2.11(2)]: Adjust the front contact spring and contact-spring stop using a 466A tool. The contact spring should be adjusted close to the spring pileup and should lie against the contact-spring stop when the contacts are open.

**Note:** If spring adjustments are changed to meet 2.11(2), recheck 2.08(2c).

### 3.12 Contact Follow:

(1) 85F-Type Relay [Reqt 2.12(1)]: Apply the operate requirement and if the armature moves freely in its bearings but the relay fails to start to operate, adjust the back buffer with the P long-nose pliers so that the armature will be nearer the core. If the relay starts to operate but fails to complete its operation, it may be that the contact separation is not large enough or that the tension of the front contact spring is too great. Adjust for contact separation as outlined in 3.11(1) and for tension of the front contact spring against the stop spring as outlined in 3.13. If the relays fails to start to operate after the back buffer has been adjusted as far forward as consistent with meeting the armature position requirement, it may be necessary to tilt the relay slightly forward by shifting the mounting bracket.

(2) 85P-Type Relay [Reqt 2.12(2)]: Adjust the front contact spring and contact-spring stop using a 466A tool. The contact spring should be adjusted close to the spring pileup and should lie against the contact-spring stop when the contacts are open.

**Note:** If spring adjustments are changed to meet 2.12(2), recheck 2.08(2c).

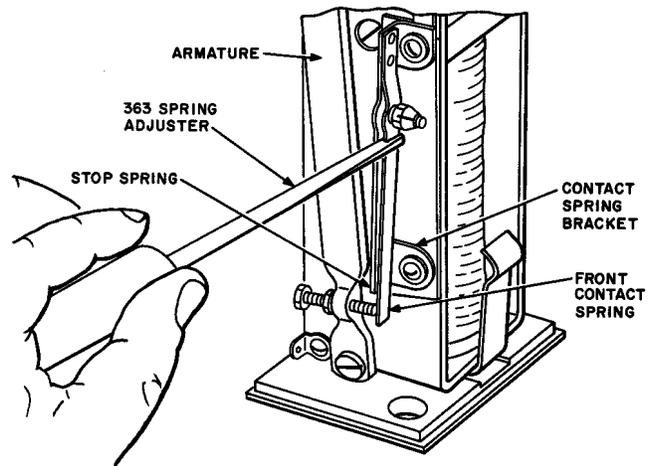
### 3.13 Tightness of Lockout (85F-Type Relay Only) (Reqt 2.13):

If the armature fails to release when the current is disconnected, increase the tension of the front contact spring against the stop spring by turning the adjusting nut in with the 403A or R-2262 wrench. If

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sufficient tension cannot be obtained in this way, adjust the spring with the 363 spring adjuster as shown in Fig. 8. Increasing the contact follow will also aid in meeting the release requirement. If these adjustments do not prove satisfactory, slightly increase the operated armature air gap as outlined in 3.10.

**3.14 Electrical Requirement (Reqt 2.14) .**



**Fig. 8 — Method of Tensioning Contact Spring (85F-Type Relay)**