

RELAYS

NO. 85-F

1. GENERAL

- 1.01 This section covers No. 85-F Relays and replaces specification K-70058-01, Issue 1-D.
- 1.02 Reference shall be made to Section A400.001 covering General Requirements and Definitions for additional information necessary for the proper application of the requirements listed herein.
- 1.03 Part 1, "General" and Part 2, "Requirements" form part of the Western Electric Co. Inc. Installation Department handbook.
- 1.04 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.
- 1.05 Release means that when the current is reduced from the operate to the release value (open circuit) the armature shall move from the front buffer to the back buffer and break the contact that has been made.

2. REQUIREMENTS

- 2.01 Cleaning
  - (a) The contacts shall be cleaned when necessary in accordance with the section covering cleaning of relay contacts and parts.
  - (b) 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 - Fig. 1 (A) - The adjusting nut shall be sufficiently tight on the adjusting stud to hold any adjusted position. Gauge by feel.
- 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.

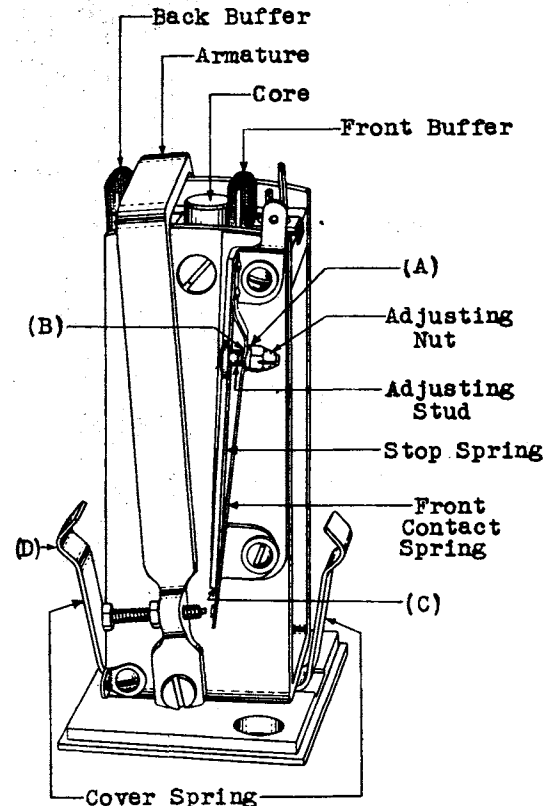


Fig. 1

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

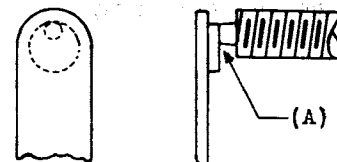


Fig. 2

- 2.08 Armature Movement - Fig. 3 (C) - The armature shall move freely in its bearings. Gauge by feel.

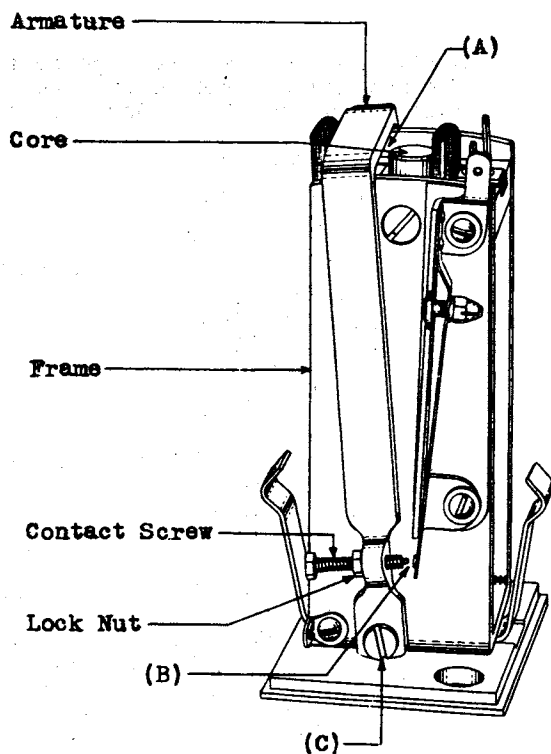


Fig. 3

- 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.

- 2.10 Operated Armature Air-gap - Fig. 4 (A) - There shall be a clearance between the armature and the core measured at the closest point when the armature is resting against the front buffer of Min. .004" Use the No. 74-D gauge.

- 2.11 Contact Separation - Fig. 3 (B) - The separation between the front contact spring and the contact screw when the relay is unoperated shall be approximately .015". Gauge by eye.

- 2.12 Contact Follow The front contact spring shall be lifted off the stop spring approximately .010" when the relay is operated electrically. Gauge by eye.

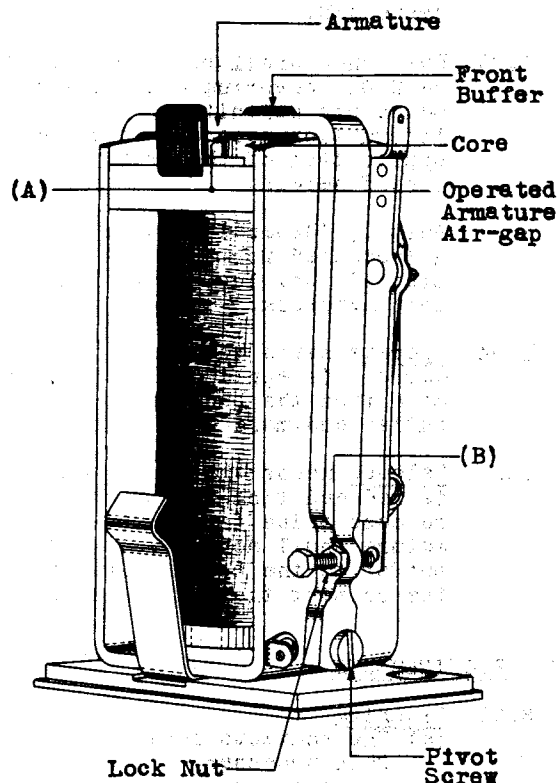


Fig. 4

- 2.13 Tightness of Lock Nut - Fig. 4 (B) - The lock nut on the contact screw shall be sufficiently tight to hold the screw in the adjusted position. Gauge by feel.

- 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**

<u>Code No.</u>	<u>Description</u>
<u>Tools</u>	
363	Spring Adjuster
403-A	Wrench 5/32" and 3/16" Hex. Socket Double-End
R-1572	4 oz. Hammer
R-2262 (2 required)	Wrench 5/32" and 7/32" Hex. Open Double-End Flat
-	Bell System 3-1/2" Cab- inet Screw-driver per A.T. & T.Co. Drawing 46-X-40
-	Bell System P-Long Nose Pliers - 6-1/2" per A.T. & T.Co. Drawing 46-X-56
<u>Gauges</u>	
74-D	Thickness Gauge Nest
<u>Materials</u>	
-	Toothpicks, Hardwood, Flat on One End and Pointed At Other
-	C.P. Carbon Tetrachloride

**Test Apparatus**

35-C	Test Set
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**3.01 Cleaning (Rq.2.01)**

M-1 Clean the contacts in accordance with the section covering cleaning of relay contacts and parts.

M-2 Clean other parts as outlined in procedure 3.08.

**3.02 Mounting (Rq.2.02)**

M-1 If the relay is not fastened securely to the mounting bracket, tighten the mounting screws securely with the 3-1/2" cabinet screw-driver.

**3.03 Cover Spring Pressure (Rq.2.03)**

M-1 If the cover does not fit properly, adjust the cover spring with the long nose pliers, applying them close to the base of the spring.

**3.04 Adjusting Nut Tightness (Rq.2.04)**

M-1 If the adjusting nut is too loose on the adjusting stud, turn the nut in a counter-clockwise direction with the No. 403-A or R-2262 wrench until the slotted portion extends beyond the stud. Then force the slotted portions of the nut closer together using the long nose pliers as shown in Fig. 5.

**3.05 Adjusting Stud and Contact Spring Clearance (Rq.2.05)**

M-1 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 long nose pliers applied to the hexagon portion of the adjusting nut.

**3.06 Front Contact Spring Position (Rq.2.06)**

M-1 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 No. 403-A or R-2262 wrench.

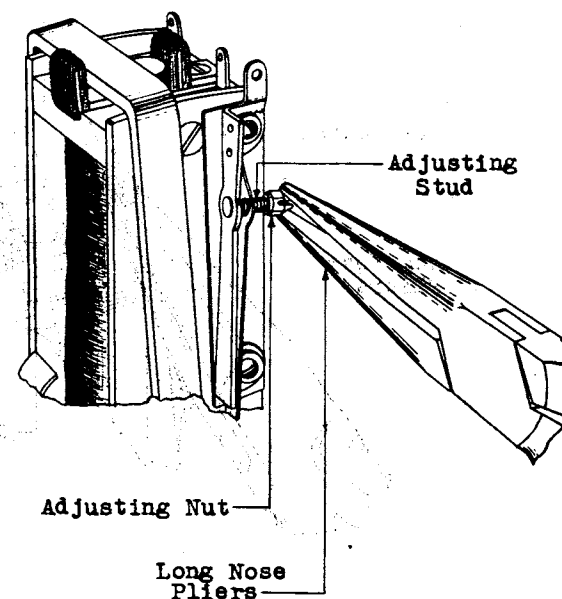


Fig. 5 - Method of Tightening Adjusting Nut

**3.07 Contact Alignment (Rq.2.07)**

M-1 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 with the 3-1/2" cabinet screw-driver and shifting the bracket. If this does not provide a satisfactory adjustment remove the bracket and enlarge the holes in the bushing through which the bracket mounting screws pass. Then reassemble.

**3.08 Armature Movement (Rq.2.08)**

M-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" cabinet screw-driver. Clean the pivots and holes with C.P. carbon tetrachloride 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.

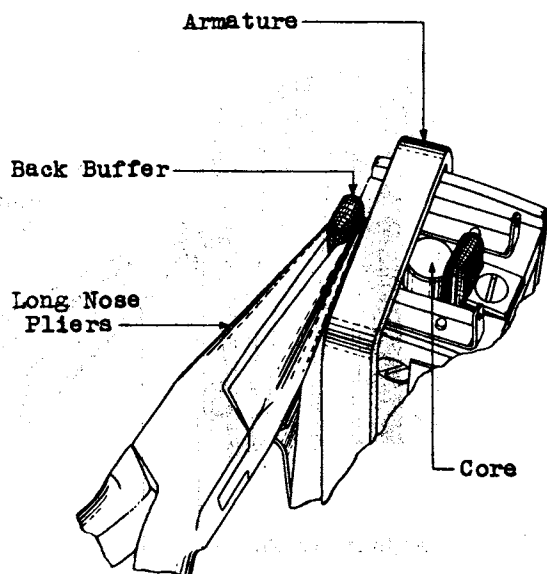


Fig. 6 - Method of Adjusting Armature Position

- 3.09 Armature Position (Rq.2.09)
- 3.10 Operated Armature Air-Gap (Rq.2.10)
- 3.11 Contact Separation (Rq.2.11)
- 3.12 Contact Follow (Rq.2.12)
- 3.13 Tightness of Lock Nut (Rq.2.13)
- 3.14 Electrical Requirements (Rq.2.14)

M-1 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.

M-2 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 long nose pliers as shown in Fig. 6. Exercise care to keep the armature very close to the core since otherwise the relay probably will fail to meet its electrical operate requirement.

M-3 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.

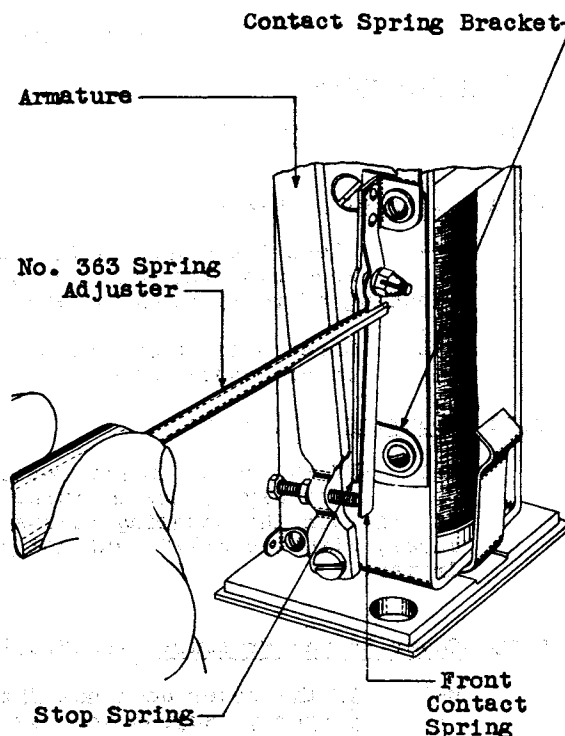


Fig. 7 - Method of Tensioning Contact Spring

## 3.09-3.14 (Continued)

M-4 To adjust for contact separation and contact follow loosen the lock nut with the R-2262 wrench and turn the contact screw with the No. 403-A wrench or another R-2262 wrench until the contact separation is approximately .015". This will provide a contact follow considerably above the minimum. Tighten the lock nut securely.

M-5 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 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 M-4 and for

tension of the front contact spring against the stop spring as outlined in M-6. If the relay 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.

M-6 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 No. 403-A or R-2262 wrench. If sufficient tension cannot be obtained in this way adjust the spring with the No. 363 spring adjuster as shown in Fig. 7. Increasing the contact follow will also aid in meeting the release requirement. If these adjustments do not prove satisfactory increase the operated armature air-gap slightly as outlined in M-3.

## APPROVED:

Bell Telephone Laboratories, Inc.  
Department of Development and Research

FAC 10-16-30  
GWK 10-16-30