

**RELAYS**  
**150 TYPE AND NO. 218A**  
**AND ASSOCIATED 26A CONNECTING BLOCK**  
**REQUIREMENTS AND ADJUSTING PROCEDURES**

**1. GENERAL**

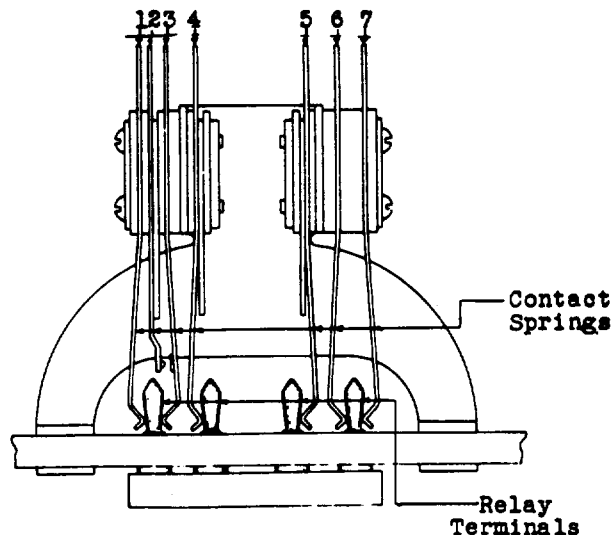
- 1.01 This section covers 150 type relays and the No. 218-A relay and its associated 26-A connecting block.
- 1.02 This section is reissued to incorporate material from the addendum in its proper location. In this process marginal arrows have been omitted.
- 1.03 Reference shall be made to Section 020-010-711 covering General Requirements and Definitions for additional information necessary for the proper application of the requirements listed herein.
- 1.04 Part 1, "General" and Part 2, "Requirements" form part of the Western Electric Co. Inc. Installation Department handbook.
- 1.05 Requirements are marked with an asterisk (\*) when to check for them would necessitate the dismantling or dismounting of apparatus, or would affect the adjustment involved or other adjustments. No check need be made for these requirements unless the apparatus or part is made accessible for other reasons or its performance indicates that such a check is advisable.
- 1.06 Operate means that under the specified operating conditions the armature should vibrate to such an extent that the contact will open sufficiently to cause the associated relays to function.
- 1.07 Non-operate means that under the specified non-operating conditions the armature should not vibrate to such an extent that the contacts will open sufficiently to cause the associated relays to function.

**2. REQUIREMENTS**

- 2.01 Contact Cleaning The contacts shall be cleaned when necessary in accordance with the section covering cleaning of relay contacts and parts.
- 2.02 Tightness of Assembly of 26-A Connecting Block All springs in a given assembly shall be held in their relative positions to one another and the connecting block frame by being securely fastened at their bases. Gauge by feel.

**\*2.03 Contact Requirement for 26-A Connecting Block**

- (a) Contact springs No. 1 and No. 6 shall make contact with springs No. 3 and No. 7 respectively when the relay is removed from the block. Gauge by eye.
- (b) Contact spring No. 2 shall not make contact with spring No. 3 when the relay is inserted into the block, but it shall make before the relay terminals leave the block spring when the relay is withdrawn. Gauge by eye.



**26-A Connecting Block**

**Fig. 1**

**2.04 Relay Mounting**

- (a) 150 type relays shall be supported by the felt pads so that the wooden base does not come in contact with the mounting rack. The relay shall be mounted approximately level. Gauge by eye.
- (b) 218-A relay terminals shall be held securely by the associated connecting block. Gauge by feel.

- \*2.05 Sponge Rubber Pads (218-A relay) The sponge rubber pads shall be soft and shall support the relay clear of its base. Gauge by eye and feel.

- 2.06 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 except for opposing contacts having the same diameter in which case their centers shall not be out of alignment more than 25% of the diameter of the contact points. Gauge by eye.

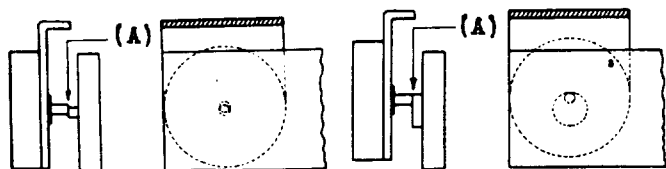


Fig. 2

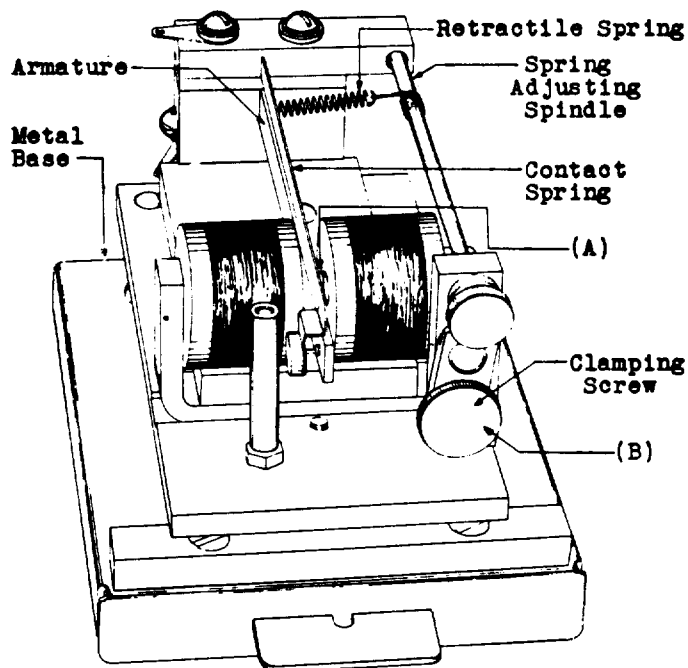


Fig. 3 - General View - No. 218-A Relay

- 2.07 Core Air-gaps - Fig. 3 (A) -

- (a) The air-gap between the armature and each core shall be approximately equal. Gauge by eye.
- (b) The armature shall not stick to either core. Gauge by eye and feel.

- 2.08 Back Stop Gap - Fig. 4 (A) - The gap between the contact spring and the back stop screw on relays so equipped, shall be approximately .004". Gauge by eye.

- 2.09 Tightness of Back Stop Screw - Fig. 4 (B) - The back stop screw shall be held sufficiently tight in the

bracket to hold in any adjusted position. Gauge by feel.

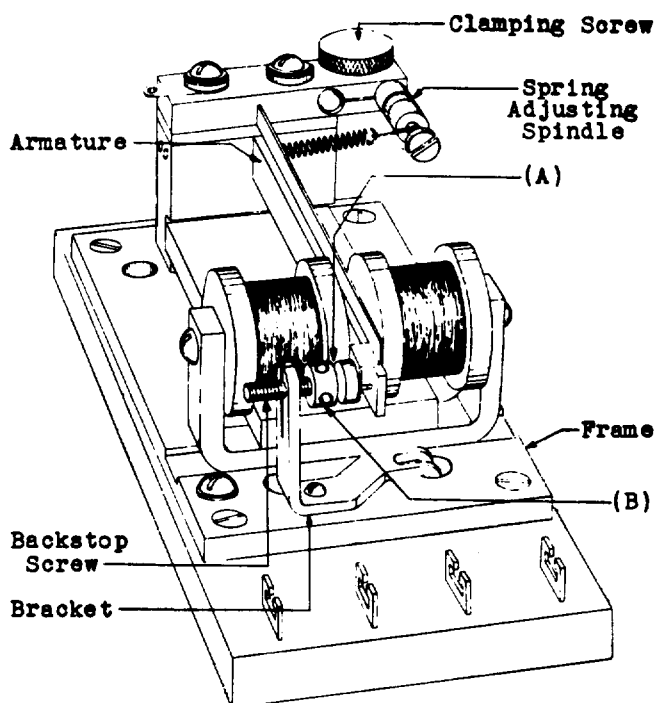


Fig. 4 - General View - No. 150-A Relay

- 2.10 Clamping Screw - Fig. 3 (B) - The knurled clamping screw shall be sufficiently tight to hold the contact spring adjusting spindle in any adjusted position. Gauge by feel.

#### 2.11 Electrical Requirements

(a) Except as covered in (b) and (c) all relays shall meet the electrical requirements specified on the circuit requirement tables.

(b) When the 150 type relay is used in a toll or telegraph circuit in a toll office and (1) an a-c voltage test set is used and (2) a-c voltage requirements are not shown in the circuit requirement table, the following a-c voltage requirements shall be used.

(c) In toll offices where no testing facilities are provided, the relay shall be considered satisfactory for turnover if it meets its mechanical requirements and functions satisfactorily in the circuit.

- 2.12 Retractable Spring Position In its finally adjusted position there shall be a perceptible clearance between the end of the retractile spring and the spring adjusting spindle. Gauge by eye.

A-C VOLTAGE REQUIREMENTS								
Relay Code	Type of Circuit	Series Conn.	Freq. in Cycles	A-C Test and Readjust Requirements				Shunt Res.
				Meter Settings				
				Volts Across T & R Leads				
				Test		Readjust		
				Opr.	N.O.	Opr.	N.O.	
150A 150B	Type A CX Ringers	Ret. Coil 0.5 M.F.	135	1.6		1.28		30
150D	Type B CX Ringers	Rep. Coil Wdgs.	135	3.05		2.72		30
150E 150F	Type A CX Ringers	Ret. Coil 0.5 M.F.	135	1.45		1.12		30

### 3. ADJUSTING PROCEDURES

#### Tools

Code No.	Description
206	Screw-driver 30 Offset
207	Screw-driver 90 Offset
259	Spring Adjuster
300	Spring Adjuster
340	Adjusting Key
KS-6015	Duck-bill Pliers
-	Bell System 3-1/2" Cabinet Screw-Driver - Per A.T.&T. Co. Dwg. 46-X-40
-	Bell System P-Long-Nose Pliers - 6-1/2" Per A.T.&T. Co. Dwg. 46-X-56

#### 3.01 Contact Cleaning (Rq. 2.01)

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

#### 3.02 Tightness of Assembly of 26-A Connecting Block (Rq. 2.02)

M-1 To tighten loose spring assembly mounting screws, use the No. 206 and 207 offset screw-drivers.

#### 3.03 Contact Requirement for 26-A Connecting Block (Rq. 2.03)

M-1 To check the contact requirement for the connecting block observe that the contacts make and break in the manner specified.

M-2 If the contacts do not make when the relay is removed from the block, apply the No. 259 or the No. 300 spring adjuster to the springs close to the point where they leave the insulators as shown in Fig. 5 and adjust as required.

#### 3.04 Relay Mounting (Rq. 2.04)

M-1 150 Type Relays If the relay is not supported by the felt pads and the wooden base comes in contact with the mounting, determine whether or not this is due to one or both of the felt pads being missing in which case replace them. If the relay is not approximately level, shift it until this requirement is met.

M-2 218-A Relay If the relay is not held securely by its associated connecting block, remove the relay and increase the tension of the connecting block springs with the No. 259 or No. 300 spring adjuster. Place the adjuster on the spring close to the point where it leaves the insulators as shown in Fig. 5

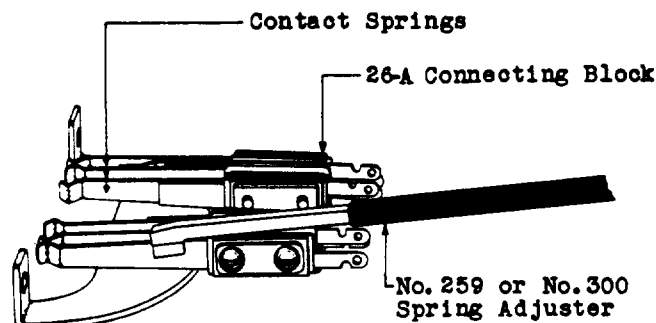


Fig. 5 - Method of Adjusting Connecting Block Springs

#### 3.05 Sponge Rubber Pads (Rq. 2.05)

M-1 Note whether or not the four sponge rubber pads are in good condition in order that none of the energy of the relay will be transferred to the relay mounting. Replace the pads if it is found that they have deteriorated to such an extent that the relay rests on its supporting base or that the relay fails to operate on the specified operating current after the mechanical adjustment has been made or after it has been placed in the circuit.

#### 3.06 Contact Alignment (Rq. 2.06)

M-1 To align the contacts so that they are properly centered release the tension of the retractile spring by turning the clamping screw and spring adjusting spindle in a counter-clockwise direction and shift the contact spring as follows:

M-2 With the relay removed from the mounting rack or the connecting block, loosen the two screws which hold the contact spring block in position using the 3-1/2" cabinet screw-driver. Align the contacts horizontally by shifting the block backward or forward as required.

M-3 Align the contacts vertically by applying a vertical pressure to the contact spring close to the supporting block with the duck-bill pliers as shown in Fig. 6.

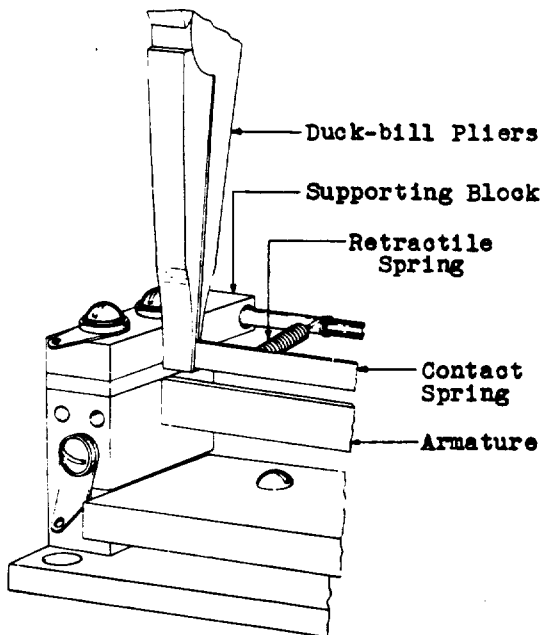


Fig. 6 - Method of Adjusting Contact Spring for Vertical Contact Alignment

M-4 While making this adjustment check that the contact spring floats between the armature and the back stop and that the spring is approximately parallel with the armature. Tighten the mounting screws securely.

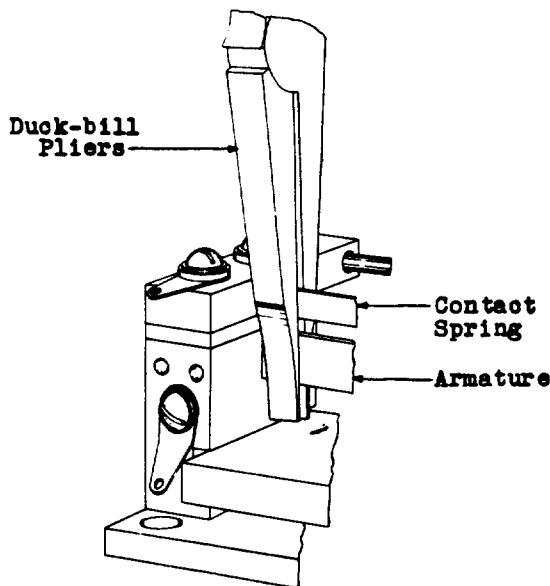


Fig. 7 - Method of Centering Armature

### 3.07 Core Air-gap (Rq.2.07)

M-1 If the air-gap on each side of the armature is not approximately the same or if the armature sticks to either core, remove the relay from the rack or connecting block, release the tension of the retractile spring by turning the clamping screw and spring adjusting spindle in a counter clockwise direction, and adjust the armature slightly to the right or left as required using the duck-bill pliers as shown in Fig. 7. Exercise extreme caution in adjusting the armature as it is liable to be loosened and thus cause a defective relay.

### 3.08 Back Stop Gap (Rq.2.08)

### 3.09 Tightness of Back Stop Screw (Rq.2.09)

M-1 To adjust for proper clearance between the back stop screw and the contact spring turn the stop screw in with the No. 340 adjusting key, applied as shown in Fig. 8, until it just touches the spring and then back it off 1/4 turn. This will provide approximately .004" clearance between the screw and the spring.

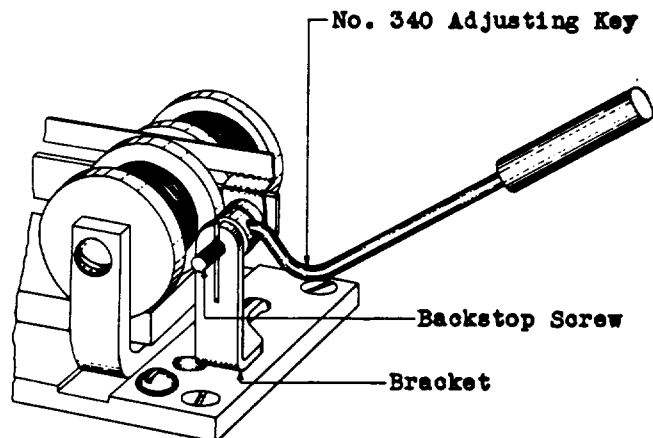


Fig. 8 - Method of Adjusting Backstop Gap

M-2 If the back stop screw is not sufficiently tight in the bracket, remove the relay from the rack and loosen the screw which fastens the back stop bracket to the frame with the 3-1/2" cabinet screw-driver sufficiently to permit the bracket to be rotated to a position where the back stop screw can be removed. Remove the screw from the bracket using the No. 340 adjusting key and force the two parts of the bracket sufficiently together with the long nose

pliers to insure that the screw will hold any adjusted position. See Fig. 9. Replace the screw, fasten the bracket securely to the frame in its proper position and adjust for back stop gap as outlined in M-1 above.

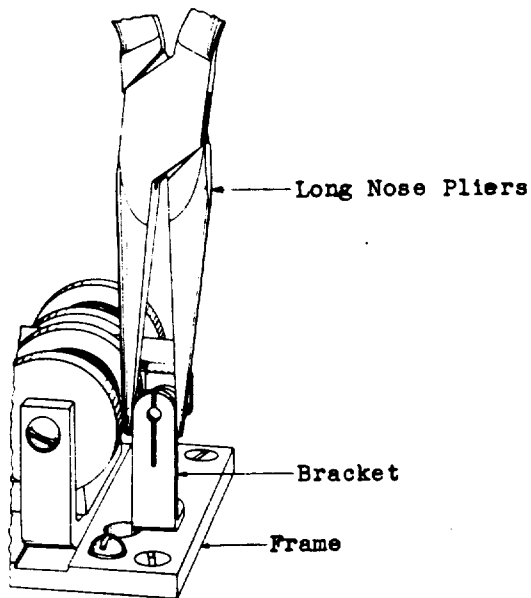


Fig. 9 - Method of Tightening Backstop Screw

### 3.10 Clamping Screw (Rq.2.10)

M-1 If the contact spring adjusting spindle does not hold its adjusted position tighten the knurled clamping screw with the fingers.

### 3.11 Electrical Requirements (Rq.2.11)

#### 3.12 Retractable Spring Position (Rq.2.12)

M-1 While intermittently operating and releasing the key which applies the operate current to the relay, increase the tension of the retractile spring gradually until the lamp in the test set fails to light or if a test set is not used until the contact spring does not leave the armature. To do this, loosen the knurled clamping screw slightly with the fingers and turn the spring adjusting spindle in a clockwise direction using the 3-1/2" cabinet screwdriver for 150 type relays and the fingers for the No. 218-A relays. Then slowly decrease the tension of the retractile spring by turning the adjusting spindle in a counter-clockwise direction just enough to permit the relay to operate as indicated by the lamp in the test set lighting or by the relays associated with the relay under adjustment. Then decrease the tension further by turning the adjusting spindle in a counter-clockwise direction approximately 1/8 of a turn. Retighten the knurled clamping screw.

M-2 If the relay fails to meet the non-operate requirement as indicated by the lamp in the test set or by the relays associated with the relay under adjustment, reduce the back stop gap slightly by turning the stop screw in with the No. 340 adjusting key as shown in Fig. 8. If the relay still fails to meet the non-operate requirement, it may be necessary to compensate for this by slightly altering the adjustment of the associated relays.

M-3 If it is impossible to obtain a satisfactory adjustment by means of the retractile spring, the trouble is probably due to the contact spring having an initial tension against the armature or due to the armature not being correctly centered between the cores. Check these points and adjust as outlined under procedure 3.06, M-4 and 3.07 where necessary. Failure to obtain a satisfactory adjustment may also be due to the sponge rubber pads, on relays so equipped, supporting the relay so that it tilts to the left or right. In this case replace the pads as required. Difficulty in adjusting may also be due to the retractile spring being too stiff. In this case, it should be stretched slightly.