

## SIGNALS

### 34 AND 41 TYPES

### REQUIREMENTS AND ADJUSTING PROCEDURES

#### 1. GENERAL

- 1.01 This section covers 34 and 41 type signals.
- 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 dismantling 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 when the operate current is applied the armature shall move sufficiently to open the normally closed contact reliably, or make the normally open contact reliably, and to cause the signal ball to be visible.

1.07 Release means that when the operate or soak current is reduced to the release value, or open circuit, the armature shall move from the operated position sufficiently to break reliably the contact that has been made, or reliably make the contact that has been broken, and to cause the signal ball not to be visible.

#### 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 methods.

2.02 Signal Mounting Signals shall be fastened securely to the mounting plate.

2.03 Armature Movement The armature shall move freely in its bearings. Gauge by feel.

\*2.04 Contact Alignment Contacts shall line up so that the point of contact falls wholly within the circumference of the opposing contact disc. Gauge by eye.

2.05 Flexible Contact Spring Position The flexible contact springs shall rest on the stop springs, at least on the end of the stop springs that are nearest the contacts. Gauge by eye.

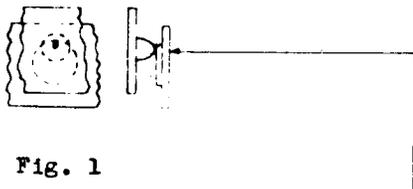


Fig. 1

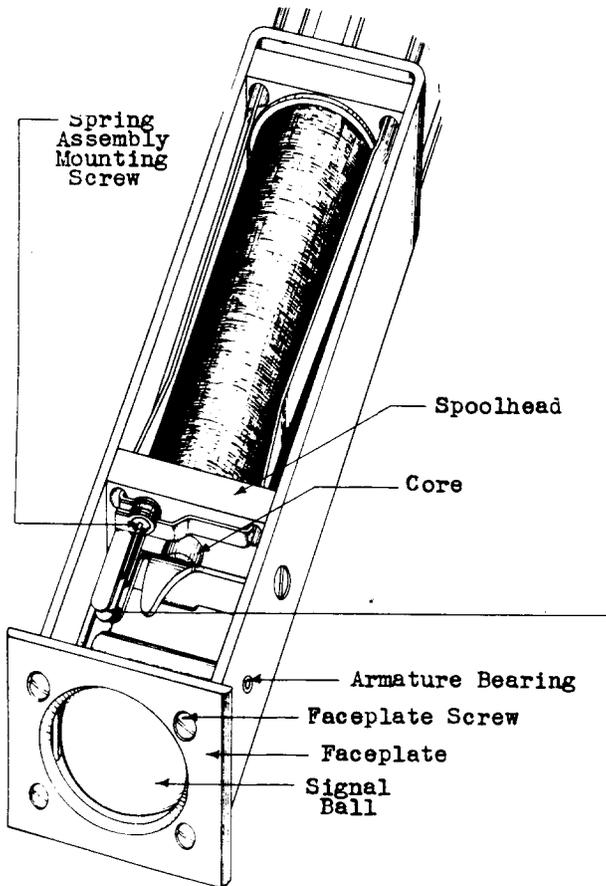


Fig. 2

2.06 Contact Separation

- (a) The separation between contacts normally open shall be perceptible (approximately .005"). Gauge by eye.
- \* (b) The separation between contacts that are opened when the signal is operated shall be perceptible (approximately .005"). Gauge by eye.

\*2.07 Contact Follow The contact follow shall be perceptible (approximately .005") when the armature is manually operated to its fully operated position against the core. Gauge by eye.

\*2.08 Armature Air-Gap The armature shall not touch the face of the core as the signal operates electrically. Gauge by eye.

2.09 Electrical Requirements The signal shall meet the electrical requirement specified on the circuit requirement table.

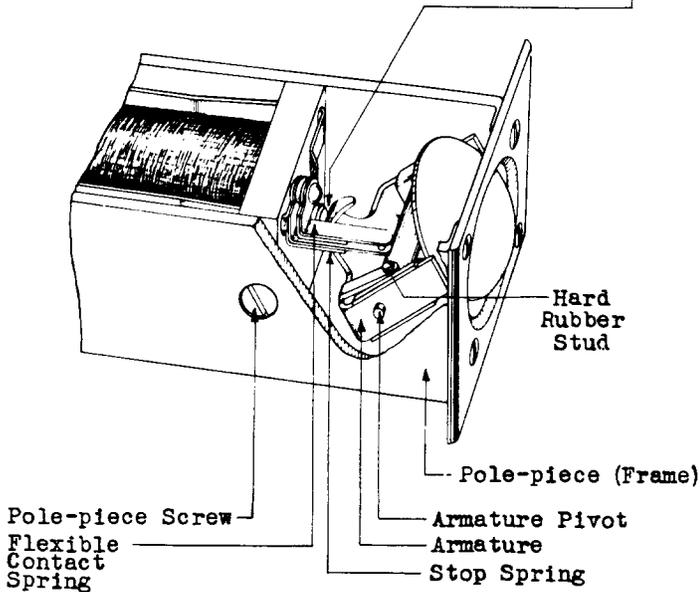


Fig. 3

3. ADJUSTING PROCEDURESTOOLS

<u>Code No.</u>	<u>Description</u>
35	Screw-driver - 3-1/2"
102	Wrench - 3/8" Hex. Socket
371	Spring Adjuster
KS-6015	Duck-bill Pliers
-	Bell System P-Long Nose Pliers - 6-1/2" per A.T.& T.Co. Drawing 46-X-56
-	Bell System Cabinet Screw-driver - 3-1/2" per A.T.& T.Co. Drawing 46-X-40

TEST APPARATUS

35-C Test Set

MATERIALS

KS-7860 Petroleum Spirits

- Toothpicks - Hardwood - Flat at One End and Pointed at the Other

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 the armature bearings, the armature stop and the core as outlined in procedure 3.03.

3.02 SIGNAL MOUNTING (Rq.2.02)

M-1 To tighten signals that are loose on the mounting plate, securely tighten the mounting nuts with the No. 102 wrench.

3.03 ARMATURE MOVEMENT (Rq.2.03)

M-1 If the armature does not move freely in its bearings, remove the signal from its mounting by removing the mounting nut with the No. 102 wrench and then slipping the signal forward out of its cover. Remove the face plate screws with the No. 35 screw-driver and remove the face plate. Then loosen the two pole piece screws with the 3-1/2" cabinet screw-driver, spread

the front end of the pole piece (frame) apart and remove the armature assembly from its bearings.

M-2 Clean thoroughly the bottom of the core, core face and the entire armature assembly, except the hard rubber stud when equipped, with petroleum spirits, exercising care to prevent it from coming in contact with the spoolhead and insulators. Clean the bearings and armature pivots with petroleum spirits applied with a clean toothpick. Do not use the same toothpick for more than one operation. Before replacing the armature and face plate, check requirements 2.04 to 2.09 inclusive and make any adjustments necessary as described under their respective procedures.

M-3 Reassemble the armature and face plate and remount the signal by reversing the operation described in M-1. Tighten the mounting nut securely.

3.04 CONTACT ALIGNMENT (Rq.2.04)

M-1 If the contacts do not line up properly, remove the signal from its mounting and the face plate and armature from the relay as described in procedure 3.03, M-1. Then loosen the assembly mounting screw with the No. 35 screw-driver and shift the position of the springs. Exercise care that the adjustment just made is not destroyed as the assembly mounting screw is tightened since the springs have a tendency to turn with the screw. On signals equipped with only one contact spring and a contact on the armature, align the contacts if necessary by adjusting the stop spring to the right or left as required with the duck-bill pliers. Before replacing the armature and face plate check requirements 2.05 to 2.09 inclusive and make any adjustments necessary as described under their respective procedures. Then reassemble and remount the signal as described in procedure 3.03 M-3.

3.05 FLEXIBLE CONTACT SPRING POSITION (Rq.2.05)Springs Without Tangs

M-1 If the flexible front contact springs do not rest on the stop springs at the contact end remove the signal from its mounting and the face plate from the signal as described in procedure 3.03 M-1 and correct as follows: Insert the end of a piece

## 3.05 (Continued)

of No. 22 or No. 24 bare tinned copper wire, bent at right angles and flattened slightly with the long nose pliers, between the flexible spring and the stop spring as near as possible to the base of the flexible spring. Apply a slight downward pressure to the flexible contact spring with the No. 35 screw-driver as shown in Fig. 4 and then remove the wire. Before replacing the face plate and remounting the signal, check requirements 2.04 and 2.06 to 2.09 inclusive and make any adjustments necessary as described under their respective procedures. Then reassemble and remount the signal as described in procedure 3.03 M-3.

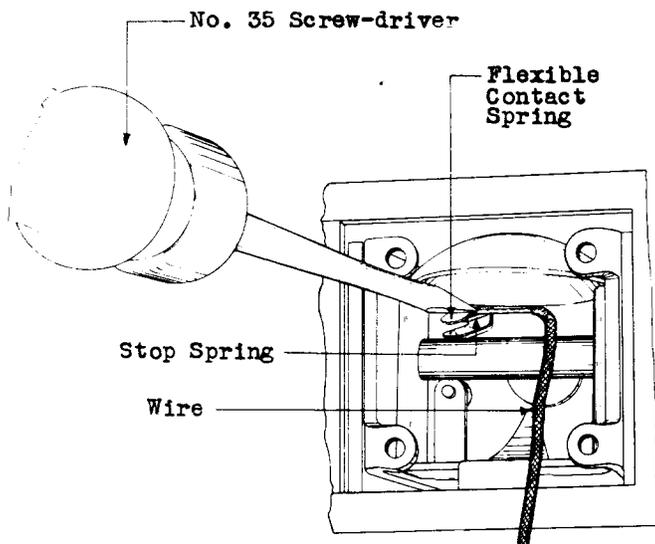


Fig. 4 - Method of Adjusting Flexible Contact Spring

M-2 If the top flexible contact spring does not rest on its stop spring due to the flexible spring being distorted, loosen the spring assembly mounting screw with the No. 35 screw-driver, turn the flexible spring in a clockwise direction through an angle of 180°, and adjust it with the duck-bill pliers as shown in Fig. 5. It will be satisfactory to have a slight kink in the flexible contact spring at the base of the spring. This kink may be introduced in making the adjustment outlined in M-1. After resetting the spring in position, tighten the spring assembly mounting screw securely noting that the contacts are in proper alignment. When tightening the screw, exercise care that the adjustment just made is not destroyed since

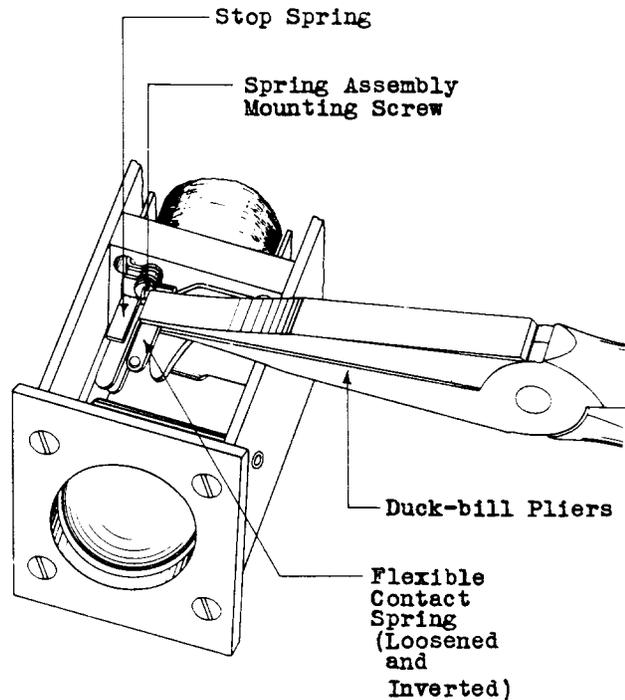


Fig. 10 - Method of Straightening Upper Flexible Contact Spring

the springs have a tendency to turn with the assembly mounting screw as it is tightened. Clean the contacts at this time in accordance with procedure 3.01.

M-3 If the lower flexible contact spring is not positioned correctly, due to kinks, it will be necessary to remove it from the spring assembly in order to straighten the spring.

#### Springs With Tangs

M-4 If the flexible contact spring does not rest on the stop spring at its contact end, remove the signal from its mounting as outlined in procedure 3.03 M-1. Then remove the spring assembly mounting screw with the No. 35 screw-driver and adjust the spring manually. Exercise care not to break off the tangs.

- 3.06 CONTACT SEPARATION (Rq.2.06)
- 3.07 CONTACT FOLLOW (Rq.2.07)
- 3.08 ARMATURE AIR-GAP (Rq.2.08)
- 3.09 ELECTRICAL REQUIREMENTS (Rq.2.09)

M-1 In making the following adjustment, remove the signal from its mounting as described in procedure 3.03 M-1.

## 3.06-3.09 (Continued)

M-2 To adjust the contact separation, remove the face plate, by removing the face plate screws with the No. 35 screw-driver. To increase the contact separation apply the blade of the No. 35 screw-driver between the upper stop spring and the lower flexible contact spring as shown in Fig. 6 and exert a slight upward pressure on the screw-driver. To decrease the contact separation apply the blade of the No. 35 screw-driver near the base of the upper flexible contact spring and exert a downward pressure or apply the blade near the base of the lower stop spring and exert an upward pressure. On signals equipped with only one contact spring adjust it upward or downward as required.

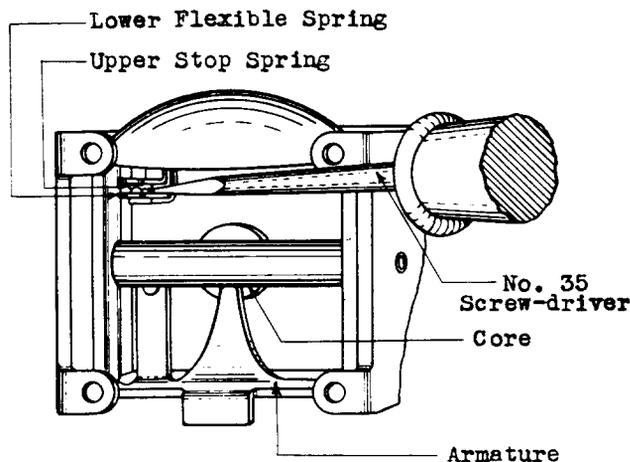


Fig. 6 - Method of Adjusting for Contact Separation and Contact Follow

M-3 Contact Separation If necessary to adjust for contact separation it is advisable to make this separation as near the minimum value as is consistent with meeting all the other requirements.

M-4 Contact Follow If the contact follow is insufficient it may be due to excessive contact separation in which case decrease the separation as outlined in M-2. The contact follow will be satisfactory when, with the armature in the fully operated position, there is a clearance between the upper flexible contact spring and its stop spring. If the signal is being operated on alternating current, it will be satisfactory if the contacts only make and insure a reliable electrical circuit through them.

M-5 Electrical Requirements and Armature Air-Gap If the signal fails to release, increase the contact follow by adjusting the springs as outlined in M-2 and M-4. It should be noted that the contact separation requirement is still met and that the flexible spring rests on its stop spring.

M-6 Failure to release may also be due to an accumulation of dirt on the armature stop pin, on the bottom of the core, or may be due to dirty bearings. In this case, clean the armature and bearings as described in procedure 3.03.

M-7 If the signal still fails to release, examine the armature to determine whether there is sufficient clearance between it and the core when the signal is operated. An insufficient clearance between the armature and the core with the armature in the operated position may result from worn bearings. Move the armature toward and away from the core and if the motion is excessive compensate for it by increasing the gap between the armature and the core. To do this revolve the signal so that its smaller axis turns through an angle of 180°. With the armature held firmly in the position shown in Fig. 7 adjust it on each side of the offset portion slightly toward the center with the long nose pliers.

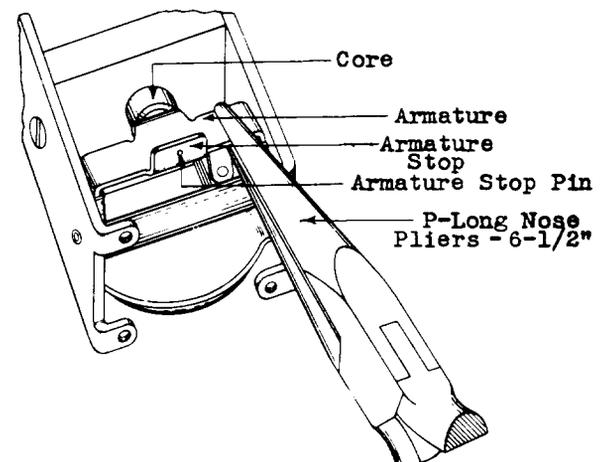


Fig. 7 - Method of Adjusting Armature

## 3.06-3.09 (Continued)

An increase in separation between the armature and core will also affect the operation of the signal. Care must therefore be exercised in making this adjustment that the gap between the armature and core will not be so great as to prevent the armature from operating properly when the operate current is applied.

M-8 If the contact separation and contact follow is close to the minimum value in each case and the signal fails to meet its operate requirement, it may be due to any one or all of the following reasons: The tail of the armature being distorted so that the armature gap does not decrease uniformly as the signal operates; that portion of the armature which in the operated position is opposite the core being bent; or worn bearings which allow the armature excessive front and back motion.

M-9 If the tail of the armature is distorted, operate the signal manually noting that the separation between the armature and the core is least when the armature is in the fully operated position. Should this separation be less between some point on the tail of the armature and the core than that between the armature and the core when the armature is in the operated position, correct this condition by adjusting the tail piece with the No. 371 spring adjuster as shown in Fig. 8. Operate the signal manually

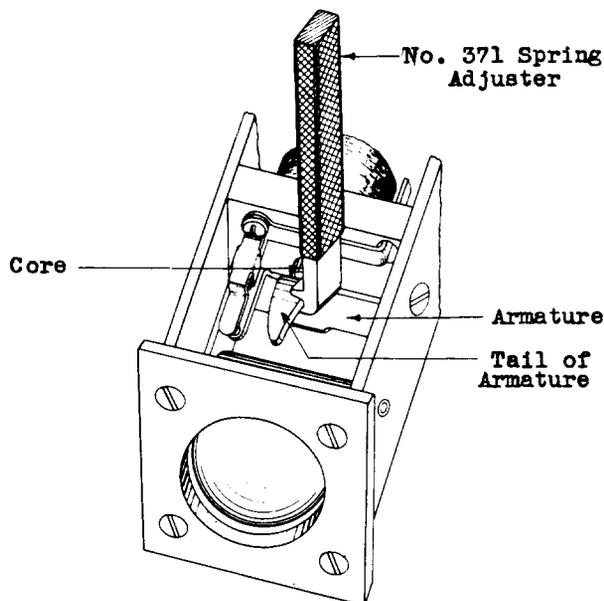


Fig. 8 - Method of Adjusting Tail of Armature

and while holding it firmly in this position adjust the required portion of the tail of the armature by exerting a slight pulling force on the spring adjuster (toward the front of the signal). Care must be exercised when adjusting the tail of the armature since the slightest deformation may affect the correct operation of the signal. After each adjustment of the tail of the armature, operate the armature manually and recheck the separation between each point on the armature and the core as the armature is being operated.

M-10 Worn or dirty bearings likewise may cause failure of the armature to operate correctly. If the bearings are dirty clean them as outlined in procedure 3.03 M-2. Move the armature toward and away from the core. If the motion is excessive when the operate current is applied, the armature may freeze against the core before it has reached the fully operated position. To correct this condition increase the separation between the armature and core as outlined in M-7.

M-11 Operate the armature manually and see whether the gap between the armature and the core in this position is excessive. The cause of this excessive gap may be due to that part of the armature, which in the operated position is opposite the core, being bent. To correct for this condition adjust as outlined in M-7 except that in reducing the gap, adjust the armature on both sides of the off-set portion in a direction away from the center.

M-12 If the signal operates when the non-operate current is applied, increase the tension of the contact spring operated directly by the armature by forcing the spring and its associated stop spring downward with the No. 35 screw-driver. After making this adjustment see that the springs do not touch the metal portion of the armature and then check to determine whether the relay will operate when the operate current is applied.

M-13 When any adjustments are made so as to cause the signal to operate more easily, a recheck must be made to determine whether or not it will release.

3.06-3.09 (Continued)

M-14 After making the adjustments  
described in procedures M-1  
to M-12 inclusive, reassemble and

remount the signal as described in  
procedure 3.03 M-3.