

189-TYPE RELAYS REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.01 This section covers 189 type relays.

Electric Co. Inc. Installation
Department Handbook.

1.02 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 Operate means that when the operate current is applied the armature shall move sufficiently to make the front contact reliably.

1.03 Part 1, "General" and Part 2, "Requirements" form part of the Western

1.05 Release means that when the current is reduced from the operate value to the release value, the armature shall move from the operated position sufficiently to break the contact that has been made.

2. REQUIREMENTS

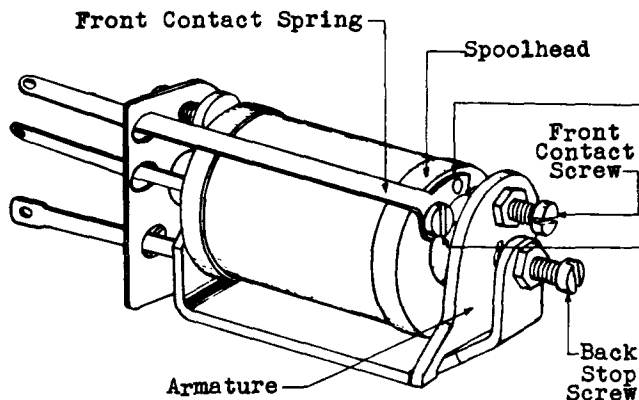


Fig. 1



Fig. 2

2.01 Relay Mounting Relays shall be mounted securely. Gauge by feel.

2.02 Front Contact Spring Position The front contact spring shall rest firmly against the spoolhead at least near the contact end. Gauge by feel and by eye.

2.03 Tightness of Front Contact Spring Screw The front contact spring screw shall be sufficiently tight to hold the front contact spring in the adjusted position. 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.

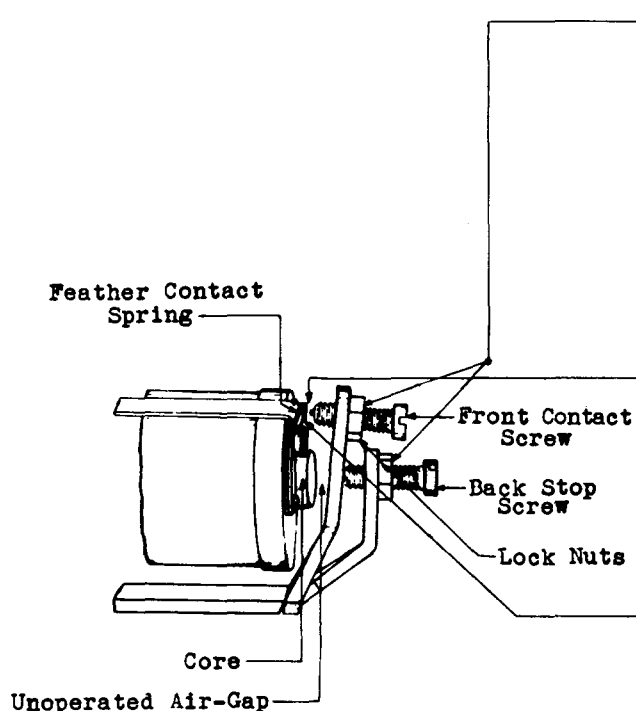


Fig. 3

2.05 Tightness of Lock Nuts The lock nuts shall be sufficiently tight to hold the screws in the adjusted position. Gauge by feel.

2.06 Electrical Requirements A relay shall meet the electrical requirements specified on the Circuit Requirement Table .

2.07 Contact Separation The separation between the contacts when the armature is resting against the back stop screw shall be:

Min. .005"

Use the No. 74-D gauge.

2.08 Feather Contact Spring Position The feather contact spring shall rest against the turned over portion of the front contact spring when it is not engaged by the front contact screw. Gauge by eye.

2.09 Cleaning The contacts and other parts shall be cleaned when necessary in accordance with Section 069-306-801 covering cleaning of relay contacts and parts.

3. ADJUSTING PROCEDURESTOOLS

<u>Code No.</u>	<u>Description</u>
35 (Part of Combination Tool 221)	3-1/2" Screw-driver
220 (Part of Combination Tool 221)	Wrench 3/16" Hex. Socket
-	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

GAUGES

74-D (or the replaced 74-C)	Thickness Gauge Nest
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TEST APPARATUS

35-C	Test Set
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MATERIALS

-	Toothpicks, Hardwood, Flat at One End and Point- ed at the Other
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3.01 RELAY MOUNTING (Rq.2.01)

M-1 If the relay is loose on the mounting plate tighten the mounting screws securely using the 3-1/2" cabinet screw-driver.

M-2 If the mounting screws are tight but the relay coil is loose, tighten the screw which holds the coil to the pole-piece with the 3-1/2" cabinet screw-driver. At the same time align the contacts in accordance with procedure 3.04. Since the mounting plate and insulator are provided with a hole through which the screw-driver can be applied, it is not necessary to remove the relay from the mounting plate.

3.02 FRONT CONTACT SPRING POSITION (Rq.2.02)
 3.03 TIGHTNESS OF FRONT CONTACT SPRING SCREW (Rq.2.03)

M-1 Front Contact Spring If the front contact spring is not resting against the spoolhead, loosen the

lock nut on the back stop screw with the No. 220 wrench and turn the screw in a counter-clockwise direction with the No. 35 screw-driver until it is possible to remove the armature without forcing. To position the front contact spring against the spoolhead first tighten the front contact spring screw, if loose, with the No. 35 screw-driver. If this does not correct the trouble, loosen the screw sufficiently to place the flat end of a toothpick between the spring and the spoolhead on the side of the screw toward the contact end of the spring. Tighten the screw and then force the front contact spring toward the spoolhead so that the tang of the spring rests in the hole in the spoolhead, by applying pressure to the contact end with the No. 35 screw-driver as shown on Fig. 4.

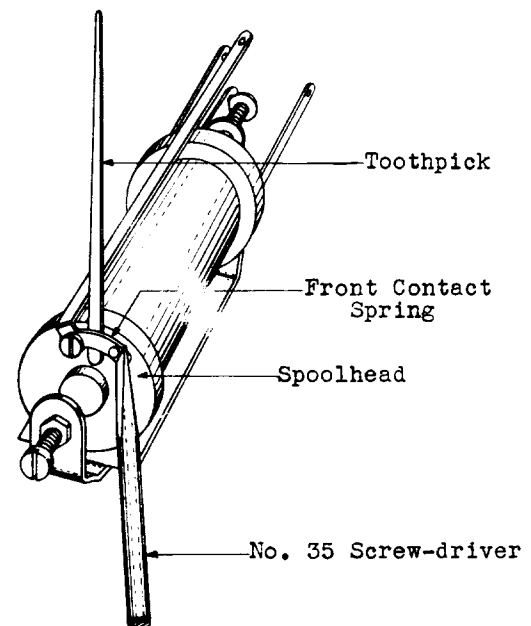


Fig. 4 - Method of Adjusting for Front Contact Spring Position

Exercise care to place the screw-driver on the tip of the spring and not on the contact so as to prevent marring the contact. On relays equipped with a flexible contact spring exercise care not to bend the turned over portion of the front contact spring toward the spoolhead during this operation since this will tend to destroy the purpose for which the feather contact spring is used.

Loosen the screw, remove the toothpick and retighten the screw securely. In tightening this screw, the front contact spring should be pressed against the spoolhead adjacent to the head of the

screw in order to relieve the tension against the screw head while tightening to prevent stripping of the threads in the spoolhead.

M-2 Front Contact Spring Screw To tighten this screw use the No. 35 screw-driver noting that the tang at the end of the front contact spring rests in the hole in the spool-head.

M-3 Reassemble the relay.

3.04 CONTACT ALIGNMENT (Rq.2.04)

M-1 To align contacts, loosen the screw at the rear of the relay which holds the coil to the pole-piece, and which is accessible due to a hole through the mounting plate and insulator, using the 3-1/2" cabinet screw-driver. Rotate the coil as required to align the contacts and retighten the screw. An attempt should be made to center the contacts.

3.05 TIGHTNESS OF LOCK NUTS (Rq.2.05)

M-1 To tighten loose lock nuts use the No. 220 wrench, holding the screw in position with the No. 35 screw-driver.

- 3.06 ELECTRICAL REQUIREMENTS (Rq.2.06)
- 3.07 CONTACT SEPARATION (Rq.2.07)
- 3.08 FEATHER CONTACT SPRING POSITION (Rq.2.08)

M-1 If the relay fails to meet the electrical requirements proceed as follows:

M-2 Operated Position of Armature
With the release current connected continuously to the relay as specified on circuit requirement tables apply the operate current. Loosen the lock nut on the front contact screw slightly with the No. 220 wrench and turn the front contact screw in a counter-clockwise direction with the No. 35 screw-driver to a point where the armature sticks when the operate current is released. Again apply the operate current and turn the front contact screw slightly in a clockwise direction until it has reached a point where the armature just releases when the operate current is released. Then turn the front contact screw approximately 1/16 of a turn further in a clockwise direction and tighten the lock nut.

M-3 Unoperated Position of Armature (Contact Separation) Loosen the lock nut on the back stop screw slightly with the No. 220 wrench and turn the back stop screw in a clockwise direction with the No. 35 screw-driver until the front contact screw just touches the front contact. Then turn the back stop screw in a counter clockwise direction approximately 1/4 turn which should allow a minimum clearance between the front contact and the screw of .005". Retighten the lock nut and check to make sure the relay meets all electrical requirements. If the relay fails to meet the electrical requirements after the operated and unoperated positions of the armature have been established, proceed as follows:

M-4 Operate Failure to meet this current requirement is probably due to the air-gap between the armature and core, when the armature is in the un-operated position, being too great and the unoperated armature air-gap should be reduced. To do this loosen the lock nut on the back stop screw with the No. 220 wrench and turn the screw in a clockwise direction with the No. 35 screw-driver noting that the contact separation requirement is still met. Tighten the lock nut securely. If impossible to meet the operate requirement by means of the adjustment of the unoperated air-gap and still meet the contact separation requirement slightly change the operated air-gap as outlined under M-5 consistent with meeting the release requirement.

M-5 Release Failure to meet this current flow requirement is probably due to the air-gap between the armature and core when the relay is in the operated position being too small and the operated armature air-gap should be increased slightly. To do this loosen the lock nut on the front contact screw with the No. 220 wrench and turn this screw in a clockwise direction with the No. 35 screw-driver, noting that the contact separation requirement is still met. Tighten the lock nut securely.

M-6 Feather Contact Spring Position
The adjustment of the feather contact spring also effects the operation of the relay and the tension of it against the turned over portion of the front contact spring should be considered in adjusting to meet the electrical requirements. To increase the tension insert the flat end of a toothpick between the spring and the front contact spring and slide the toothpick towards

the contact spring screw until the spring will rest firmly against the inside of the front contact spring. Take care not to kink the spring or give it an excessive bow. In case the spring is bowed excessively, the bow may be reduced by rubbing the spring with the No. 35 screw-driver adjacent to the front contact spring screw. To do this it will first be necessary to remove the armature as described in procedure 3.02. In its final adjusted position, the spring should curve slightly outward toward the armature rather than inward toward the front contact spring so that the front contact screw in its travel will make contact as long as possible.

M-7 Final Check In all cases after a relay has been adjusted, a check should be made to insure that it meets its electrical requirements. This check can generally be made by observing the operation of associated apparatus in the circuit.

3.09 CLEANING (Rq.2.09)

M-1 Clean the contacts and other parts in accordance with Section 069-306-801 covering cleaning of relay contacts and parts.

REASON FOR ISSUE COVERING CHANGES IN ADJUSTING PROCEDURES

1. To add a caution in applying the screw-driver in adjusting for Front Contact Spring Position (3.02).