

## 24-A TELEGRAPH RELAY REQUIREMENTS AND ADJUSTING PROCEDURES

### 1. GENERAL

1.1 This section covers the requirements and adjusting procedures for the 24-A telegraph relay. Unless otherwise specified herein or in the "Circuit Requirement Tables" on circuit drawings the requirements covered by this section apply to all 24-A telegraph relays.

1.2 Part 2 of this section covers the requirements for the inspection of mechanical adjustments which shall be used to determine whether the relay is in proper condition for delivery to the customer and for service. These are called "Requirements".

1.3 Part 3 of this section covers the readjust requirements and gives the approved maintenance methods of meeting these requirements. This part is called "Adjusting Procedures".

1.4 The facilities for meeting the requirements in this section are provided in the form of standard tools and gauges. However, if it is found by experience that adjustments for meeting certain requirements can be made satisfactorily by "feel" or by "eye" these methods may be employed. It is suggested that checking with tools and gauges be made often enough to insure that proper test and adjustment requirements are being met. Furthermore, where requirements are close, it would be advisable to use tools and gauges to obtain adjustments.

1.5 *Operate — Operated Position* Operate means that the specified operating current should pull the armature towards the pole face until the armature carries the auxiliary contact springs far enough to close the front contact. This is also the operated position of the armature.

1.6 *Non-operate — Unoperated Position* Non-operate means that the specified non-operating current should not cause the armature to leave its unoperated position, that is, against the back contact.

1.7 *Release* Release means that the armature should return to its unoperated position when the operating current is reduced to releasing value.

1.8 The following is a list of the tools and gauges specified in Parts 2 and 3 for use in inspecting and readjusting the relay.

CODE NO.	DESCRIPTION
TOOLS	
35	3-1/2" Screw-driver
—	Long-nose pliers
GAUGES	
74-C or (the replaced 74-A)	Gauge Gauge

### 2. REQUIREMENTS

2.001 Unless otherwise specified any relay covered by this section shall meet the following requirements.

2.002 Requirements are given in the order in which adjustments should be made by the Telephone Company.

2.003 Unless otherwise specified these requirements are both test and readjust requirements.

2.1 *Armature End Play* The end play of the armature in its bearings shall not be more than .005". This shall be judged by eye. However, the armature shall not bind in its bearings.

2.2 *Contact Alignment* Contacts shall line up with the end play of the armature taken up in both directions, so that their centers are not out of alignment more than 25% of the diameter of the contact point. This shall be judged by eye.

**2.3 Movement of Coils** The insulated ring on the vertical brass pillar shall be so located as to prevent any shake of the coils, but shall not prevent free adjustment under 2.8. The screws which clamp the yoke to the pole piece shall be tight.

**2.4 Windlass** The windlass shall be sufficiently tight in its bracket to hold any adjusted position.

**2.5 Auxiliary Contact Springs** The auxiliary contact springs shall be vertically parallel and the auxiliary contact spring nearest the back contact screw shall just touch the bent end of the backstop spring to prevent rebound.

**2.6 Contact Cleaning (Readjust Only)** Clean the contacts only when necessary and in accordance with approved procedures.

**2.7 Contact Separations** The contact separation, that is, the separation between the armature contact and the contact on the auxiliary springs and the separation between the contact on the auxiliary springs and the front contact shall be within the limits of minimum .004", maximum .005" and minimum .002", maximum .0025" respectively.

**2.8 Magnetic Air-Gap (Readjust Only)** After the contact adjustments have been made, the coils shall be brought up until the stop pin on the nearest pole face just touches the armature. They shall then be withdrawn one turn of the adjusting screw.

**2.9 Electrical Requirements** The relay shall be capable of meeting the electrical requirements specified on the "Circuit Requirements Table".

**2.10 Lock Nuts** The lock nuts on the front and back contact screws shall be sufficiently tight to hold any adjusted position.

### 3. ADJUSTING PROCEDURES

#### 3.01 General

**3.011** In readjusting to requirements which specify only one limit (either a minimum or a maximum limit) it is advisable if possible, to provide some margin inside the limit for deterioration.

**3.012** A relay should be readjusted in accordance with the following methods to meet the readjust requirements specified in Part 2.

**3.013** Unless otherwise specified, where two limits are given and no margin is provided between the readjust limits and the test limits, an effort should be made, in readjusting a relay, to work to the mean of the limits.

#### 3.02 Armature End Play (Reqt 2.1)

Lightly tap the pivot bushings until there is slight end play of the armature. The end play, however, should not exceed .005". At the same time the end play is corrected, align the contacts in accordance with 2.2. Care should be taken to tap the bushings lightly.

#### 3.03 Contact Alignment (Reqt 2.2)

Tap the pivot bushings lightly until contacts are properly aligned. At the same time correct the end play of the armature if necessary, in accordance with 2.1.

#### 3.04 Movement of Coils (Reqt 2.3)

With the #35 tool loosen the set screw that holds the insulated ring on the vertical brass pillar between the coils and adjust the position of the ring until the shaking or rocking movement of the coils is eliminated but not so tightly as to interfere with the endwise movement of the coils. Defective screws should be replaced.

#### 3.05 Windlass (Reqt 2.4)

Remove the windlass from the bracket and force the slotted parts of the bracket closer together with a pair of pliers and then replace the windlass. In removing the windlass use a turning-up movement. Replace the windlass by forcing it between the slotted parts of the bracket.

#### 3.06 Auxiliary Contact Springs (Reqt 2.5)

If the springs are out of vertical, due to the brass rod having been improperly bent, the rod should be straightened by a pair of long-nose pliers until the springs are free.

#### 3.07 Contact Cleaning (Reqt 2.6)

Clean the contacts in accordance with approved procedures.

**3.08 Contact Separation (Reqt 2.7)**

The separation between the front contact and the right-hand contact on the auxiliary springs should be approximately .002". It will be satisfactory if the clearance is sufficient to allow a piece of thin paper to pass. Leaving the paper in position between these contacts the back contact should then be screwed until the .004" blade of the No. 74-C gauge can be slid between the armature contact and the back contact. Both lock nuts should be tightened up at the time each adjustment is made.

**3.09 Magnetic Air-Gap (Reqt 2.8)**

As the magnetic air-gap may be re-adjusted many times each day by the telegraph repeater attendants to meet the variations of line conditions it is necessary for the installer only to give the relay an adjustment which will

enable it to meet the electrical requirements on the "Circuit Requirements Table". It is permissible to adjust the air-gap and the spring tension on the armature in order to secure satisfactory operation.

**3.10 Electrical Requirements (Reqt 2.9)**

After the above adjustments have been completed, regulate the tension of the retractive spring by turning the windlass until the relay meets its readjust electrical requirements. If the spring is defective to such an extent that it causes difficulty in meeting the electrical requirements, it should be replaced.

**3.11 Lock Nuts (Reqt 2.10)**

Securely tighten the lock nuts on the contact screws, exercising care not to change any adjustments.