

## SIGNALS

### 42-TYPE

### REQUIREMENTS AND ADJUSTING PROCEDURES

#### 1. GENERAL

- 1.01 This section covers 42 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 Electrically operated means that the signal shall be operated under circuit conditions on the normal office voltage.

#### 1.07 Operate

- (a) On signal: equipped with shutter stops operate means that when the operate current is applied the shutter shall strike the shutter stop and the face of the shutter shall be visible through the shutter window.
- (b) On signals not equipped with shutter stops operate means that when the operate current is applied the armature shall strike the armature stop on the polepiece and the face of the shutter shall be visible through the shutter window.

1.08 Release means that when the operate current is reduced to the release value, the armature shall move from the operated position and the shutter shall rest on the inside ledge of the faceplate.

#### 2. REQUIREMENTS

2.01 Cleaning The signal shall be cleaned in accordance with approved procedures.

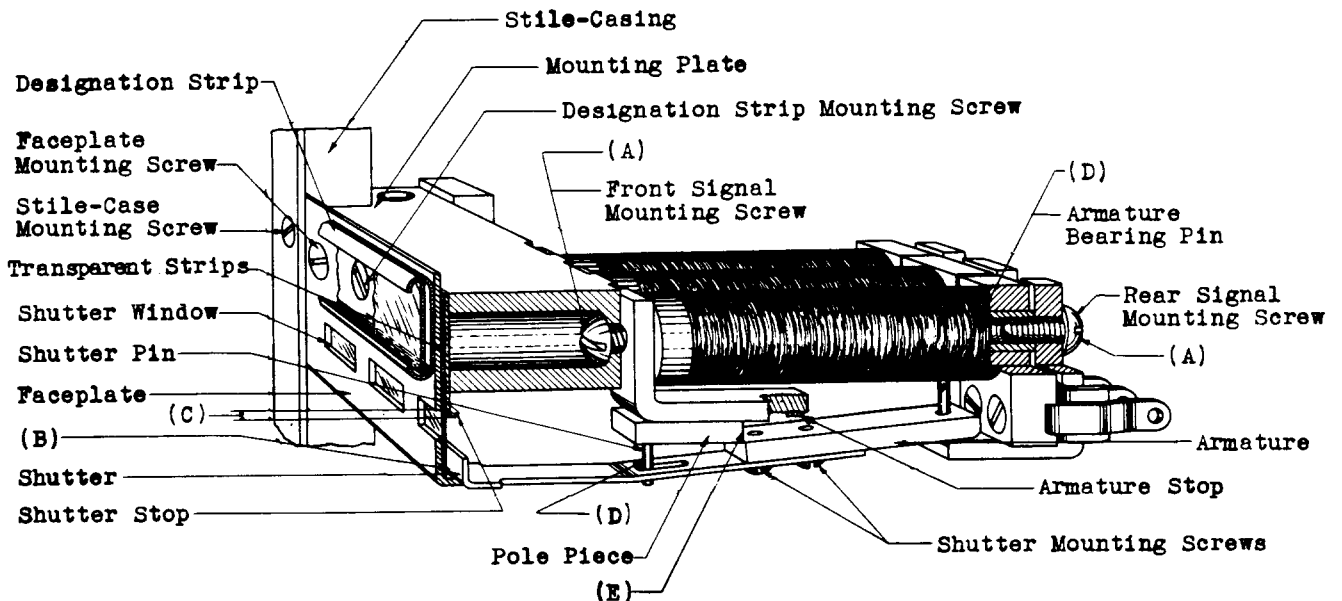


Fig. 1 - 42 Type Signals

- \*2.02 Mounting - Fig. 1 (A) - The signal shall be securely fastened to the mounting plate.
- \*2.03 Shutter Movement - Fig. 1 (B) - There shall be sufficient clearance between the face (front end) of the shutter and the inside surface of the transparent strip to allow the shutter to move freely. Gauge by eye.
- 2.04 Visibility of Shutter
  - (a) On signals equipped with a shutter stop the shutter shall rest against the bottom of the stop when the signal is in the operated position. Gauge by eye.
  - (b) On signals not equipped with a shutter stop the face of the shutter shall be completely exposed when the signal is in the operated position. Gauge by eye.
  - (c) On all signals the face of the shutter shall be completely out of sight when the signal is in the unoperated position. Gauge by eye.
- 2.05 Position of the Shutter Stop
  - \* (a) With the shutter stop and faceplate assembled on the signal strip, the shutter stop shall rest on the faceplate mounting screws.
  - (b) Fig. 1 (C) - The shutter stop shall extend below the shutter windows approximately the same distance at both ends of the strip.
- \*2.06 Armature Movement - Fig. 1 (D) - The armature shall move freely on the shutter pin and armature bearing pin. Gauge by feel and by eye.
- \*2.07 Clearance Between Armature and Pole Piece - Fig. 1 (E) - With the play of the shutter assembly taken up toward the rear of the signal there shall be a perceptible clearance (min. .005") between the end of the armature and the pole piece.
- \*2.08 Position of Shutter with Respect to the Shutter Pin In the unoperated position of the signal the bottom surface of the shutter shall not be below the end of the shutter pin.
- \*2.09 Clearance Between Adjacent Shutters There shall be a perceptible clearance (min. .010") between edges of adjacent shutters. This requirement shall be met with the play between adjacent shutters taken up.
- 2.10 Electrical Requirements The signal shall meet the electrical requirements specified on the circuit requirement table. When applying these requirements, there shall be at least two deenergized signals when mounted 20 per strip (one deenergized signal when mounted 10 per strip) or an equivalent space immediately adjacent on both sides of the signal under test.

**3. ADJUSTING PROCEDURES****Tools**

<u>Code No.</u>	<u>Description</u>
35	Screw-driver - 3-1/2"
303	Spring Adjuster
R-2993	Cleaning Brush
-	Bell System Regular Screw-driver - 4" per A.T.&T. Co. Drawing 46-X-34

**Gauges**

66-C (or the re-placed 66-A and 66-B)	Thickness Gauge Nest
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**Materials**

KS-7860	Petroleum Spirits
-	No. 20 Bare Tinned Copper Wire
-	No. 1 Cotton Sleeveing
-	Toothpicks, Hardwood, Flat at one End and Pointed at the Other

**3.01 Cleaning (Rq.2.01)**

M-1 Clean the armature stop and shutter stop as outlined in procedures 3.03 and 3.06. Clean other parts by brushing them with the R-2993 brush.

**3.02 Mounting (Rq.2.02)**

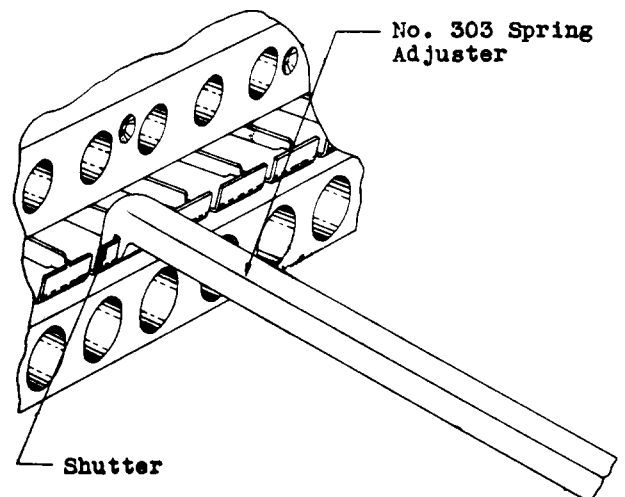
M-1 If the signal is not securely fastened to the mounting plate, remove the designation strip mounting screws with the No. 35 screw-driver. Then tighten the signal mounting screw with the screw-driver. Take the necessary means to prevent the coil of the signal from twisting while tightening the signal mounting screw. After this operation, securely fasten the designation strip to the faceplate.

**3.03 Shutter Movement (Rq.2.03)****3.04 Visibility of Shutter (Rq.2.04)****3.05 Position of the Shutter Stop (Rq.2.05)**

M-1 Operate the signal electrically and note whether or not it binds. A binding condition may be due to rubbing of the shutter on the nearby parts or binding in the armature bearing pin. If the shutter does not operate satisfactorily, it may also be due to

the sticking of the armature on the armature stop or sticking of the shutter on the shutter stop when provided.

M-2 If bind is present it will be necessary to remove the faceplate in order to eliminate this condition. Before removing the faceplate identify any other shutter in the same strip that is not meeting the visibility requirements so that the necessary readjustments may be made while the faceplate is removed. Remove the stile-case mounting screws with the No. 35 screw-driver. Then remove the stile-casing. Remove the designation strip and faceplate using the No. 35 screw-driver to remove the mounting screws. If the bind is due to the armature sticking on the armature stop, clean the stop as follows: Place a piece of No. 1 cotton sleeveing over a piece of No. 20 bare tinned copper wire. Bend the end of the wire to form a small loop and then moisten it with petroleum spirits. Insert the wire between the signals and turn it so that the loop is flat against the stop. Clean it by rubbing the wire back and forth. Take care in performing this operation not to get the petroleum spirits on the winding coil. If the bind is due to the shutter touching the faceplate bend the tip of the shutter backward with the No. 303 spring adjuster as shown in Fig. 2.



**Fig. 2 - Method of Adjusting Shutter for Clearance**

M-3 If the shutter sticks on the shutter stop, clean the lower surface of the lip of the stop and the top edge of the shutter face with a KS-2423 cloth moistened with petroleum spirits.

## .03-3.05 (Continued)

M-4 Signals Equipped with Shutter Stops After removing the stile-casing, designation strip and faceplate as outlined in M-2, remove the shutter stop.

M-5 Place the .040" blade of the No. 66-C gauge flat against the under side of the signal mounting immediately above the shutter of the signal at fault.

M-6 Operate the signal electrically and note that the shutter touches the gauge by moving the gauge slightly and noticing whether or not there is a slight bind.

M-7 If the shutter does not touch the gauge, place the blade of the No. 35 screw-driver on the top surface of the shutter so that the tip of the blade is flush against the surface of the shutter and is against the shutter pin as shown in Fig. 3. Hold the shut-

ter in this position with the screw-driver and raise the top of the shutter upward with the thumb. Recheck the requirement as outlined in M-6 above and, if necessary, repeat the operation until the shutter rubs on the gauge. Take care in making these adjustments not to twist one edge of the shutter more than the other.

M-8 Readjust any other signal in the strip which may require readjustment before reassembling the signal strip.

M-9 Signal Not Equipped with Shutter Stop To adjust a shutter which was not entirely exposed when the signal was electrically operated, place the blade of the No. 35 screw-driver on the top surface of the shutter as outlined in M-7 and adjust as required.

M-10 To adjust a shutter which was not completely out of sight when the signal was in the unoperated position, raise the shutter with the thumb from

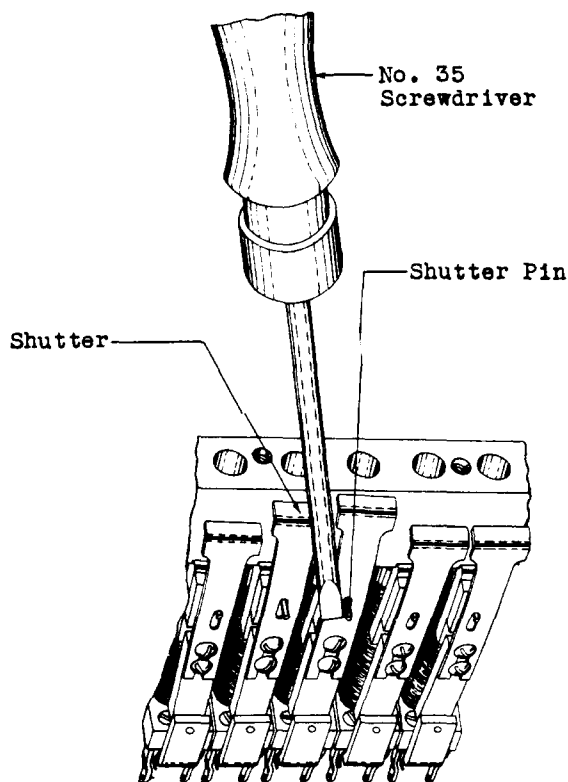


Fig. 3 - Method of Adjusting Shutter for Visibility

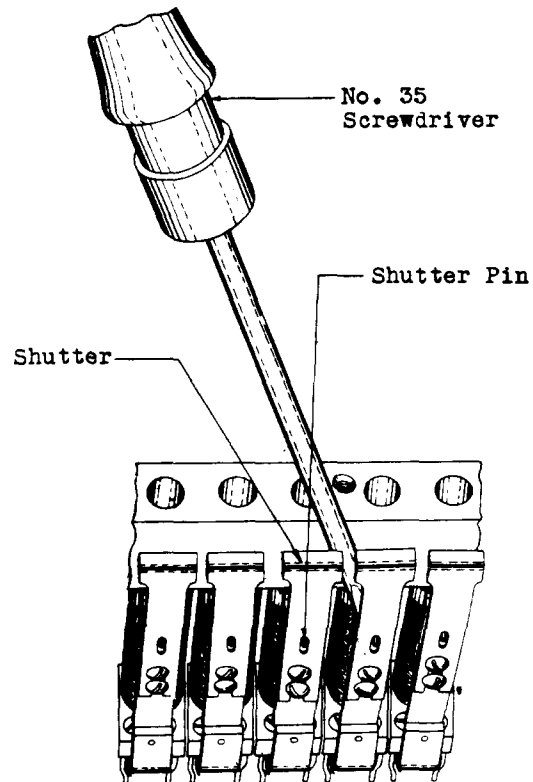


Fig. 4 - Method of Adjusting Shutter for Visibility

## 3.03-3.05 (Continued)

the unoperated position to the operated position. Place the blade of the No. 35 screw-driver under the shutter so that the flat face of the blade is flush against the under surface of the shutter and the side of the blade is against the side of the shutter pin as shown in Fig. 4. Pry up on the screw-driver so that the shutter will be held flush against the pole piece and with the finger force the tip of the shutter down. Take care not to twist one edge of the shutter more than the other.

M-11 After the above adjustments have been satisfactorily made, check the location of the shutters to determine whether they are on the shutter pin or whether they have dropped off in making the preceding adjustments. To check the location of the shutters, proceed as follows: Insert a piece of paper under the shutters. The paper should be nine inches by approximately six inches. Assemble the transparent strip in place on the faceplate. Then place the blade of the No. 35 screw-driver under the lower surface of the shutter and raise the shutter on the pin as shown in Fig. 5. If the shutter can be moved vertically, it is an indication that it is on the shutter pin; if not, move the shutter horizontally until it is apparently

under the pin, then raise it vertically.

M-12 Then bend the remainder of the paper upward over the front of the signals as shown in Fig. 6. This raises the shutters on their pins. Then place the faceplate over the paper in its normal position. The paper will now be between the shutters and the faceplate. Turn the faceplate down so that the inside is uppermost and the projection (or lip) at the bottom is beneath the shutters. The faceplate now holds the shutters in place and the paper may be pulled out from under the shutters.

M-13 Then insert the paper over the lips of the shutters beneath the signal mounting. Place the shutter stop in position on the mounting with the lip beneath the bottom surface of the mounting but above the paper. Hold it in place by bending the paper upward over the front of the signals as outlined above. With the paper held in this position, tip the faceplate upward into place taking care not to disengage the shutters when performing this operation. Then pull the paper from beneath the faceplate. Secure the faceplate, transparent strip and shutter stop in place with the faceplate mounting screws. A toothpick may be used to align the holes in the parts with the holes in the mounting strip.

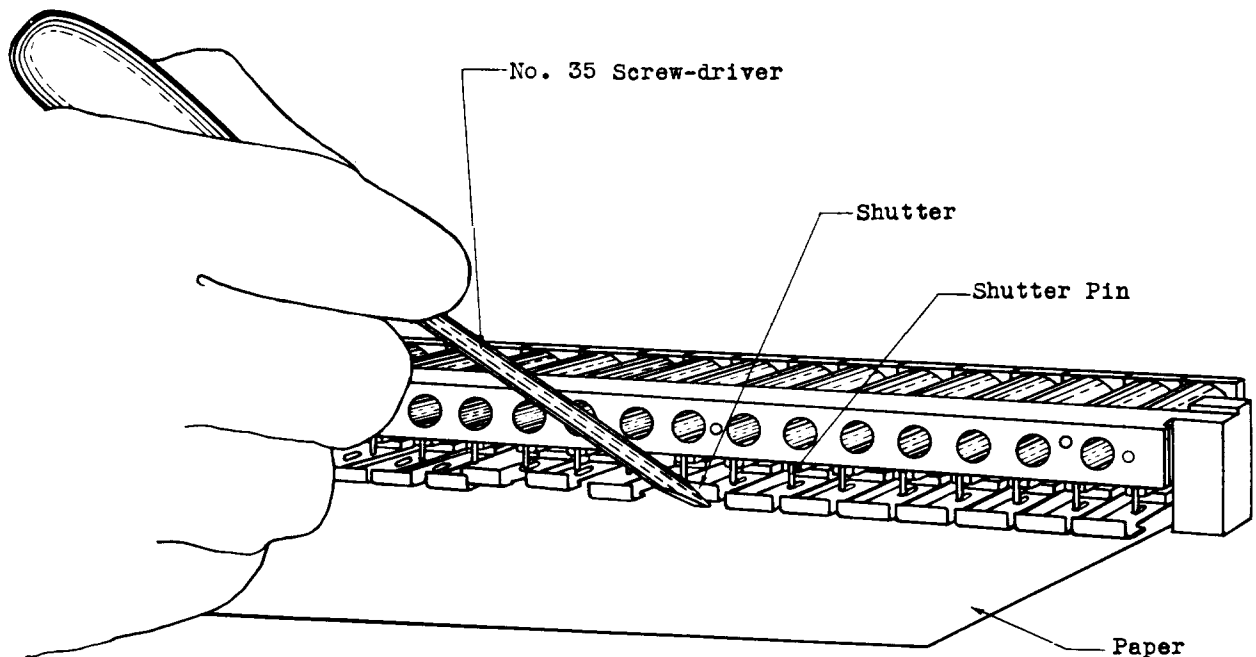


Fig. 5 - Method of Checking Location of Shutter

## 3.03-3.05 (Continued)

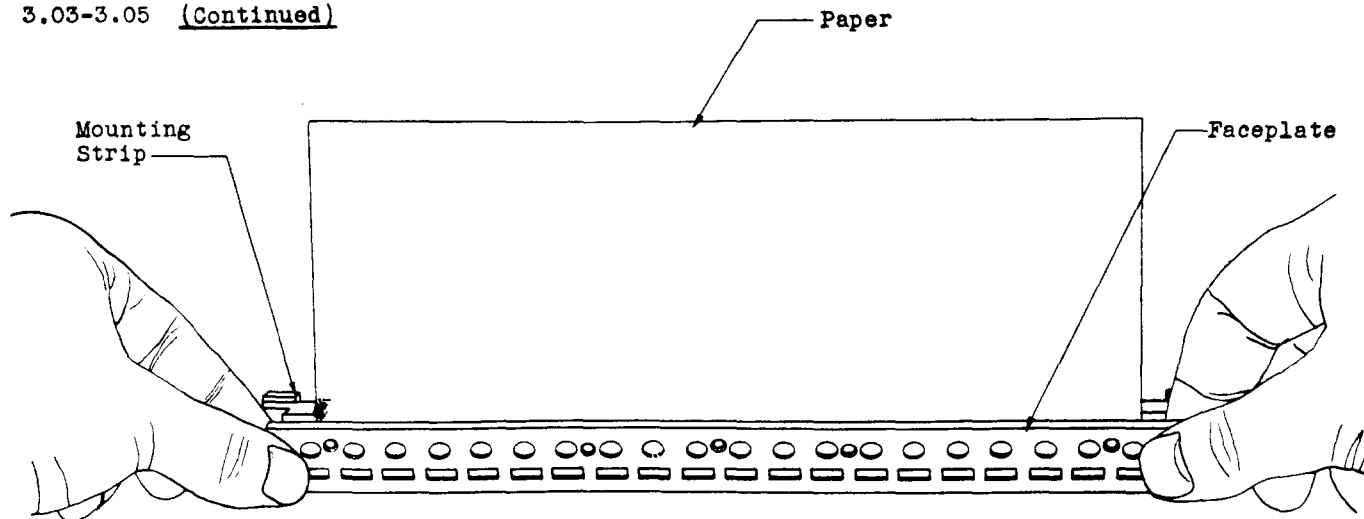


Fig. 6 - Method of Assembling  
Faceplate on Mounting Strip

M-14 With the mounting screws in place but not tightened, tap the strip so that the shutter stop drops down to rest on the faceplate mounting screws. This is important since it is necessary for proper operation of the signal that the shutter stop be in its maximum downward position. The shutter stop should extend below the top of the shutter windows approximately an equal amount at both ends of the strip. Securely tighten the faceplate mounting screws and replace the designation strip and stile casing.

- 3.06 Armature Movement (Rq.2.06)
- 3.07 Clearance Between Armature and Pole-Piece (Rq.2.07)
- 3.08 Position of Shutter on Shutter Pin (Rq.2.08)
- 3.09 Clearance Between Adjacent Shutters (Rq.2.09)

M-1 Before making any of the following readjustments, it will be necessary to remove the signal strip at fault from the switchboard. Before doing this replace the faceplate if it has been removed as outlined in procedures 3.03 and 3.05, M-11 to M-13 inclusive. To remove the signal strip proceed as follows: Loosen the strip mounting screws with the 4" regular screw-driver and turn the mounting lug so that the strip may be removed from the rear of the board. Remove and invert the strip so that the following readjustments may be made. Take care in doing this not to break or damage any soldered connections.

M-2 If the shutter binds on the shut-

ter pin or the armature on the armature bearing pin, remove all dirt from the armature, bearing pin and the shutter pin with the R-2993 brush.

M-3 If bind is still present it may be due to the coil and armature bearing pin assembly or the shutter pin assembly being twisted. If this is the case, remove the faceplate as outlined in procedures 3.03 to 3.05, then loosen the front and rear signal mounting screws with the No. 35 screw-driver and twist the coil and armature bearing pin assemblies or the shutter pin assembly so that the pins are vertical. Then securely tighten the signal mounting screws.

M-4 If the clearance between the armature and pole-piece is not satisfactory, remove the shutter from the armature by removing the shutter mounting screws with the No. 35 screw-driver. Loosen the pole-piece mounting screw with the No. 35 screw-driver and move the pole-piece toward the faceplate as far as possible, then securely tighten the mounting screws. Replace and securely fasten the shutter.

M-5 If the shutter does not assume the correct position with respect to the shutter pin, remove the shutter as outlined above. Straighten the shutter with the fingers as required and replace it.

M-6 If the clearance between adjacent shutters is unsatisfactory, shift the shutter at fault by loosening the shutter mounting screws with the No. 35 screw-driver. With the shutter satis-

## 3.06-3.09 (Continued)

factorily located securely tighten the mounting screws in place.

M-7 If sufficient clearance cannot be obtained in this manner, place the blade of the No. 35 screw-driver against the rear angle pole-piece of the signal at fault on the side opposite the direction in which the signal is to be moved and using the adjacent signal to obtain the necessary leverage, adjust the signal as required.

M-8 After the above readjustments have been satisfactorily made check requirements 2.02, 2.03, and 2.04 to see if these requirements are met. If the faceplate has been removed, replace it as follows:

M-9 Make sure that all the shutters are on their associated shutter pins. Then place the shutter stop in position on the mounting strip. Assemble the transparent strip in the faceplate. Place the faceplate and transparent strip over the shutter stop, if used, and secure them in place with the faceplate mounting screws.

M-10 With the strip reassembled reverse the strip so that it may be replaced in the switchboard in its former position. Take care in doing

this not to break any wires or soldered connections. Turn the clamping lugs and securely tighten the mounting screws with the 4" regular screw-driver.

M-11 After mounting the strip, loosen the faceplate mounting screws and assure that the shutter stop is located in its extreme downward position as outlined in procedures 3.03 to 3.05, M-14. Then recheck requirements 2.03, 2.04, 2.05 and 2.10. If the signals are satisfactorily adjusted replace the designation strip.

3.10 Electrical Requirements (Rq.2.10)

M-1 If the signal fails to meet the electrical requirements specified on the circuit requirement table, readjust as specified in the foregoing adjusting procedures.

M-2 If the signal still does not meet the electrical requirements loosen the rear signal mounting screw with the No. 35 screw-driver and move the pole-piece upward toward the coil to aid the operate test or move it downward away from the coil to aid the release test. Check the electrical requirements before securely tightening the screw. After making this adjustment check the operation of the other signals in the group before tightening their mounting screws.