

REQUIREMENTS AND ADJUSTING PROCEDURES
FOR
CENTRAL OFFICE AND PBX APPARATUS

Issue No.	Date of Issue	Approved	
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A. T. & T. CO. STANDARD			

208 AND 214 TYPE RELAYS

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
Department of Development
Bell Telephone Laboratories

REASON FOR REISSUE

These Requirements and Adjusting Procedures (R.A.P.) are issued to replace specification X-70076-02, Issue 1 for the following reasons:

1. To make changes in requirements as listed on Sheet 1 attached hereto.

2. To change, add and illustrate the Adjusting Procedures.

3. To bring the information up to date and to issue it as an R.A.P..

CHANGES IN ADJUSTING PROCEDURES FROM X-70076-02, ISSUE 1

<u>Paragraph No.</u>	<u>Change</u>	<u>Paragraph No.</u>	<u>Change</u>
1.003	Was 1.6. KS-2631 screw-driver omitted. 3-1/2" cabinet screw-driver added. Added 35-C test set.	2.02	Added.
	1.2 to 1.5, 3.01 to 3.016, 3.11 and 3.12 of X-70076-02, Issue 1 omitted.	-	Other paragraphs reworded and renumbered as required.

CHANGES IN REQUIREMENTS FROM X-70076-02, ISSUE 1

<u>Paragraph No.</u>	<u>Change</u>	<u>Paragraph No.</u>	<u>Change</u>
3.001 to) 3.004)	Were 2.001 to 2.004. Reworded.	-	2.6 of X-70076-02, Issue 1 omitted.
3.005	Was 2.008. Reworded.	3.01	Was 2.2. Added method of checking.
3.006	Added.	3.02	Added.
-	2.005 to 2.007 of X-70076-02, Issue 1 omitted.	3.04 and) 3.10)	Were 2.5 and 2.4 and were "Readjust Only".
-	2.1 of X-70076-02, Issue 1 omitted as a requirement but covered under 3.001 to 3.003.	-	Other paragraphs reworded and renumbered as required

SECTION 1 - GENERAL

1.001 The Requirements and Adjusting Procedures specified herein cover 208 and 214 type relays and replace specification X-70076-02, Issue 1.

1.002 Reference shall be made to R.A.P. X-70000-01 covering General Requirements, Definitions and Information, for additional information necessary for the proper application of this R.A.P.

1.003 List of Tools, Gauges and Test Apparatus required for the Apparatus covered by this R.A.P.

<u>Code No.</u>	<u>Description</u>
46 or 102	Wrench 3/8" Hex. Socket
220	Wrench 3/16" Hex. Socket
264	Retractable Spring Lug Adjuster
-	Bell System Cabinet Screw-driver - 3-1/2" per A.T.&T. Co. Drawing 46-X-40

Tools (Cont.)

<u>Code No.</u>	<u>Description</u>
-	Bell System P-Long Nose Pliers - 6-1/2" per A.T.&T.Co. Drawing per 46-X-56
	<u>Gauges</u>
73-A	.018" - .022" Armature Gap Gauge
73-B	.007" - .008" Armature Gap Gauge
73-D or (the replaced 73-C)	.013" - .017" Armature Gap Gauge
74-D or (the replaced 74-A or 74-C)	Nest of Thickness Gauges
	Nest of Thickness Gauges

Test Apparatus

35-C Current Flow Test Set

SECTION 2 - ADJUSTING PROCEDURES2.01 MOUNTING (Rq.3.01)

M-1 Relays that are not fastened securely to the mounting plate should have the mounting nut tightened with the No. 46 or 102 wrench.

2.02 COVER SPRING PRESSURE (Rq.3.02)

M-1 If the cover spring does not have sufficient pressure against the relay cover adjust the front ends of the spring with the long nose pliers. The spring should be bent outward and then the tip bent in to facilitate slipping on the cover.

M-2 If the prongs of the cover spring do not rest on the front spoolhead, remove the mounting nut with the No. 46 or 102 wrench and then remove the relay from the mounting plate. Remove the cover spring from the relay and bend inward the rear of the spring. Reassemble the cover spring on the relay, replace the relay on the mounting plate and tighten the mounting nut securely.

2.03 CONTACT ALIGNMENT (Rq.3.03)

M-1 If the contacts are out of line from front to rear it will be necessary to replace the relay.

M-2 If the contacts are out of line vertically correct as follows: Loosen the contact assembly at the front of the relay and then shift the contact lugs until the contacts line up properly. The pileup should then be securely retightened without shifting the positions of the contacts. Use the No. 220 wrench to loosen and tighten the assembly on relays equipped with nuts and the 3-1/2" cabinet screw-driver on relays equipped with screws. If impossible to align the contacts in this manner, adjust the front and back contact lugs (not the armature contact lug) up or down as required with the long nose pliers.

2.04 ARMATURE MOVEMENT (Rq.3.04)

M-1 Relays having armatures that bind should be replaced.

2.05 UNOPERATED ARMATURE AIR-GAP (Rq.3.05)2.06 CONTACT SEPARATION (Rq.3.06)2.07 OPERATED ARMATURE AIR-GAP (Rq.3.07)

M-1 Unoperated Armature Air-gap To change the unoperated armature air-gap, insert the proper gauge and adjust the back contact lug to the right or left as required. Do not adjust the armature contact lug. Use the No. 264 adjuster as shown in Fig. A to adjust the back contact lug. Twisting the adjuster to the left decreases the gap and twisting it to the right increases the gap. In using the gauges, insert the "enter" gauge, corresponding to the minimum limit of the gap specified for the relay being adjusted, and adjust the lug so that the gauge can be inserted and withdrawn with

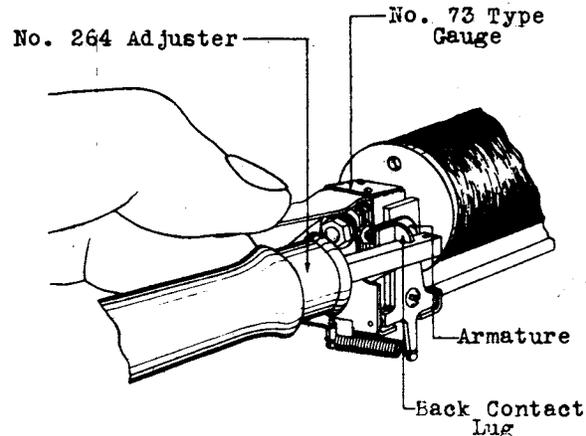


Fig. A - Procedure of Adjusting Unoperated Armature Air-gap

very little friction. This will insure that the minimum limit is met and the maximum can be checked with the "not enter" gauge. The "not enter" end of the 73-B gauge may enter since the maximum limit specified for the relays requiring this gauge has been changed from .0075" to .008".

M-2 Contact Separation To change the contact gap separation adjust the front contact lug to the right or left as required.

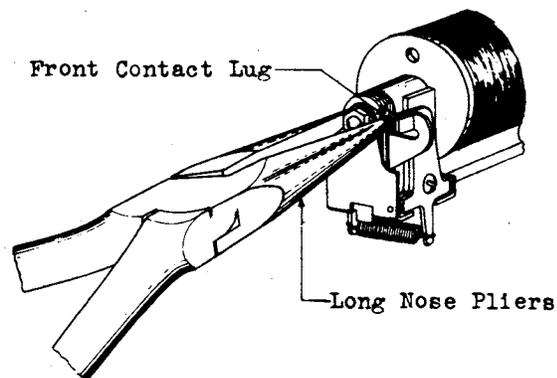


Fig. B - Procedure of Adjusting for Contact Separation Adjusting Front Contact Lug to Left

Do not adjust the armature contact lug. The lug should be adjusted to the left to increase the separation and to the right to decrease the separation. Use the long nose pliers to adjust the front contact lug to the left. Apply them over the lug assembly mounting screw or nut and the lug exercising care not to mar the contact. See Fig. B.

Use the 3-1/2" cabinet screw-driver to adjust the lug to the right inserting it between the lug assembly and the lug and prying the lug to the right. See Fig. C.

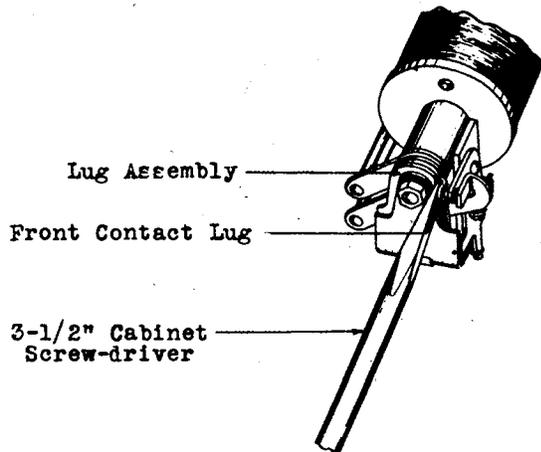


Fig. C - Procedure of Adjusting For Contact Separation Adjusting Front Contact Lug to Right.

M-3 Operated Armature Air-gap In general, the operated armature air-gap requirement will be automatically met if the relay meets its contact separation and unoperated armature air-gap requirements. In case it does not correct as follows: First attempt to correct by reducing the contact separation towards the minimum in accordance with the method outlined in M-2. If it is not possible to correct the fault in this way, make a further attempt to correct it by increasing the armature gap towards the maximum in accordance with the method outlined in M-1, and again adjusting the contact separation towards the minimum.

2.08 ELECTRICAL REQUIREMENTS (Rq.3.08)
2.09 FRAME RETRACTILE SPRING LUG (Rq.3.09)

M-1 Operate and Hold If the relay fails to meet its operate or hold requirement it is probably due to the tension of the retractile spring being too great. Reduce the ten-

sion of the retractile spring by adjusting the frame retractile spring lug to the right using the No. 264 adjuster as shown in Fig. D. Do not adjust the armature retractile spring lug as this may result in the bending of the bearing pin.

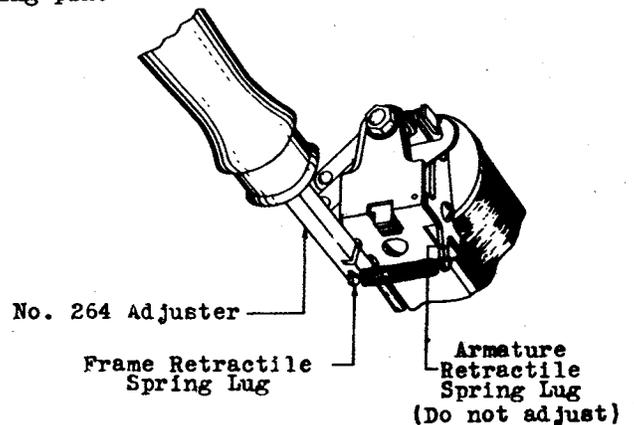


Fig. D - Procedure of Adjusting For Electrical Requirements

M-2 Non-operate and Release If the relay fails to meet its non-operate or release requirement it is probably due to the tension of the retractile spring being too light. Increase the tension of the retractile spring by adjusting the frame retractile spring lug to the left using the No. 264 adjuster as shown in Fig. D. Do not adjust the armature retractile spring lug.

M-3 The frame retractile spring lug should not be bent to an angle greater than 45° either way from the vertical. If the relay cannot be made to meet its electrical requirements by adjusting the lug within these limits, the fault may be due to a defective retractile spring which should be replaced by another spring. If a new spring is put on the relay, care should be taken that it is the proper one, as the springs vary with the relay code.

2.10

CLEANING

(Rq.3.10)

M-1 Clean the contacts and other parts in accordance with the "X" specification covering cleaning of relay contacts and parts. If the contacts are burnished, the contact separation, unoperated armature air-gap and operated armature gaps should be checked.

Attached:

R.A.P. X-70076-01, Sheets 1 and 2,
Issue 2-D

SECTION 3 - REQUIREMENTS**REASON FOR REISSUE**

This section is reissued to replace the requirements section of specification X-70076-02, Issue 1, for the following reasons:

1. To omit the requirement that the armature retractile spring lug shall not be bent in adjusting (2.6 of X-70076-02, Issue 1) as this is covered in Section 2 (Adjusting Procedures).
2. To omit the Contact Pressure requirement (2.1 of X-70076-02, Issue 1) as a requirement and cover it under the Definitions (3.001 to 3.003).
3. To add a Cover Spring Pressure requirement (3.02).
4. To make the Armature Movement and Cleaning requirements test as well as readjust requirements (3.04 and 3.10).

DEFINITIONS AND GENERAL INFORMATION

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|---|--|
| <p>3.001 <u>Operate</u> means that when the operate current is applied the armature shall break the back contact and make the front contact reliably.</p> <p>3.002 <u>Non-Operate</u> means that when the non-operate current is applied the armature shall not move from the unoperated position sufficiently to make the front contact or to reduce the back contact pressure enough to cause an unreliable contact.</p> <p>3.003 <u>Release</u> means that when the current is reduced from the operate or hold value to the release value, the armature shall move from the operated position sufficiently to break the contact that has been made and to make reliably the contact that has been broken.</p> | <p>3.004 <u>Hold</u> means that when the current is reduced abruptly from the operate to the hold value, the armature shall not move from its operated position sufficiently to break the contact which has been made or to make the contact that has been broken.</p> <p>3.005 <u>Figs. 1, H and L</u> The information formerly given in these figures is now covered in the requirements on Sheets 1 and 2.</p> <p>3.006 <u>Additional General Information Reference</u> shall be made to R.A.P. X-70000-01 covering General Requirements, Definitions and Information for additional information necessary for the proper application of the requirements listed on these sheets.</p> |
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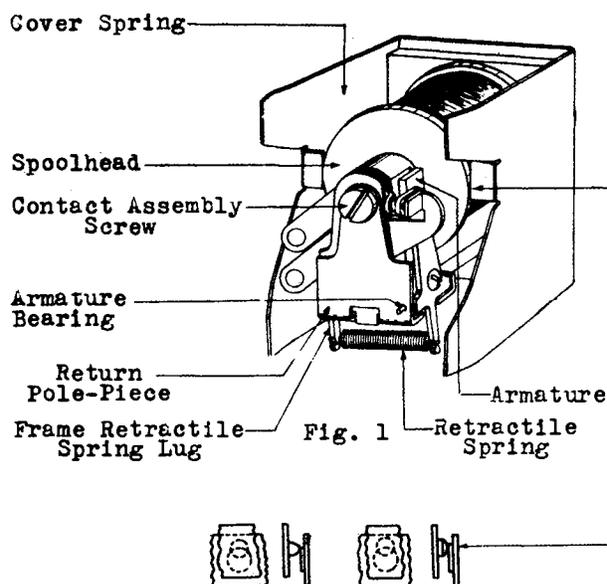
REQUIREMENTS

Fig. 2

- 3.01 Mounting Relays shall be fastened securely to the mounting plate. This shall be checked for by applying a vertical and a horizontal pressure to the relay and not by attempting to turn the relay. Gauge by feel.
- 3.02 Cover Spring Pressure
 - (a) The cover spring shall have sufficient pressure against the relay cover to hold the cover securely in place. Gauge by feel.
 - (b) The prongs of the cover spring shall rest on the front spoolhead when the cover is off. Gauge by eye.
- 3.03 Contact Alignment Contacts shall line up, with the end play of the armature taken up in both directions, so that the point of contact falls wholly within the circumference of the opposing contact disc. Gauge by eye.
- 3.04 Armature Movement The armature shall move freely in its bearings. Gauge by feel.

**REQUIREMENTS
FOR**

208 AND 214 TYPE RELAYS

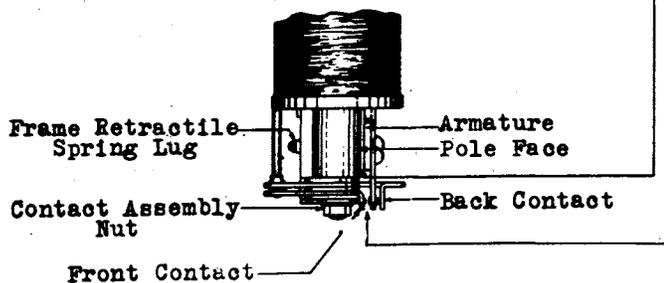


Fig. 3

- 3.05 Unoperated Armature Air Gap shall be as specified in Table "A" below. The gap shall be measured at the point of minimum separation between the armature and pole face when the armature is touching the back contact. Use gauges 73-A, B and 73-D. Disregard "Not enter" notation on gauge 73-B.
- 3.06 Contact Separation shall be as specified in Table "A" below. The separation shall be measured between the armature contact and the front contact when the armature is touching the back contact and pushed back as far as possible towards the spoolhead on its bearing pin. Use gauge 74-D.

Table "A"

Relay Code	Unoperated Armature Air Gap		Contact Separation	
	Min.	Max.	Min.	Max.
208-B,C,E,) F,G,M,) N,S,T,) U,W,Y,) AA,AB,) AC,AD)	.013"	.017"	.004"	.007"
208-H,J,K,L) 214-A)	.007"	.008"	.003"	.004"
208-P,R,AE,) AF)	.018"	.022"	.004"	.007"

The values for higher coded relays are given on the circuit requirement table.

- 3.07 Operated Armature Air-Gap The armature shall not touch the pole face when the relay is electrically operated.
- 3.08 Electrical Requirements The relay shall meet the electrical requirements specified on the "Circuit Requirements Table".
- 3.09 Frame Retractable Spring Lug shall not be bent more than 45° either way from vertical. Gauge by eye.
- 3.10 Cleaning Contacts and other parts shall be cleaned when necessary in accordance with the "X" specification covering cleaning of relay contacts and parts.