

**RELAYS
AL AND AM TYPES
(MAGNETIC LATCHING TYPES)
REQUIREMENTS AND ADJUSTING PROCEDURES**

1. GENERAL

1.001 This addendum supplements Section 040-505-701, Issue 2.

1.002 This addendum is issued to revise 2.07, revise Fig. 4, and to correct Fig. titles for Fig. 2 and Fig. 8. The attached pages must be inserted in the section in accordance with the filing instructions above.

2. REQUIREMENTS

The following changes apply to Part 2 of the section:

- (a) 2.07—revised
- (b) Fig. 2—title corrected
- (c) Fig. 4—revised
- (d) Fig. 8—title corrected

ATTACHED:

**Page 3 dated December, 1973, revised
Page 4 dated December, 1973, revised
Page 9 dated December, 1973, revised
Page 10 dated December, 1973 reissued**

Note: If the armature and core of the relays are not clean and free of magnetic and nonmagnetic particles, the relay may not latch or, in the case of AM-type relays, the relay may fail to remain latched after the other half of the relay has been operated and released several times.

2.02 Relay Mounting: The relay shall be fastened securely to the mounting plate.

Gauge by feel by applying the KS-6320 orange stick to the upper- and lower-right corners of the core plate.

2.03 Vertical Clearance: The clearance between the relay and apparatus mounted directly above or below shall be:

Min 1/16 inch

Gauge by eye.

2.04 Contact Cover Tightness: Fig. 1(A)—The contact cover shall be held firmly in place.

Gauge by feel.

2.05 Armature Position (AL-type relay): Fig. 3(A)—The armature hinge spring legs, where they are secured to the armature legs, shall bear against the outer legs of the core with the relay in the operated and unoperated positions. Operate the relay electrically and gauge by eye.

2.06 Balancing Spring Tension: Fig. 2(C) and 3(B)—With the relay in the unoperated position, the combined tension of the balancing spring legs shall be sufficient to hold the card against the associated surfaces on the armature and the armature against its backstop. (See requirement 2.07.)

Note: Before checking the balancing spring tension, apply the soak current and then the no-flux current specified for the relay in requirement 2.13.

Gauge the position of the card and armature by eye and feel.

2.07 Armature Back Tension: Fig. 2(A) and 4(A)—The armature shall bear against its backstop with a pressure of:

RELAY	TEST (grams)	READJUST (grams)
AL-1 ◆Code◆		After a negative soak of -0.300 amps and a no-flux release of $+0.0435$ amps, the armature should rest against the backstop surface of the core plate with a force of about 100 grams.
AL-2 ◆Code◆	Min 25, No Max	Min 30, No Max
AM Type	Min 35, Max 115	Min 40, Max 110

Note: Before checking the armature back tension, apply the soak current and then the no-flux current specified for the relay in the circuit requirements table.

Use the 62B or 70J gauge as follows. On AL-type relays, apply the gauge to the tip of the armature as shown in Fig. 4(A). On AM-type relays, apply the gauge to the armature in front of the armature backstop as shown in Fig. 2(A), making sure that the gauge clears the backstop and magnetic shield.

2.08 Movable Twin Contact Spring Position: Fig. 5(A) and 6(A)—The twin springs of a movable pair shall be in the respective comb grooves associated with the position on the relay in which the springs are mounted.

Gauge by eye.

2.09 Contact Make and Break (see Tables A and B)

- (a) Both contacts of the movable twin springs shall make with their associated single contact on the fixed spring in the electrically operated position of the relay for normally open contacts and in the unoperated position for normally closed contacts.

Gauge by eye and feel.

- (b) With the relay electrically energized against a gauge of the thickness indicated in (1), (2), or (3) below inserted in the armature gap except in the cases (#) covered in (2), the following conditions shall be met.

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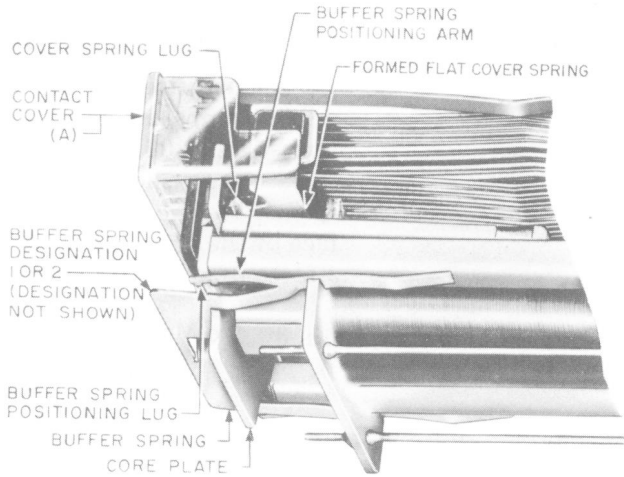


Fig. 1—AL Type Relay Showing Contact Cover and Buffer Spring

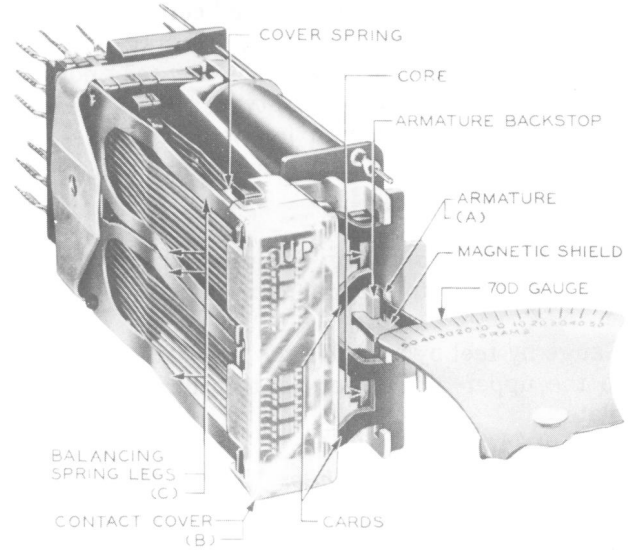


Fig. 2—AM Type Relay—Gauging Armature Back Tension

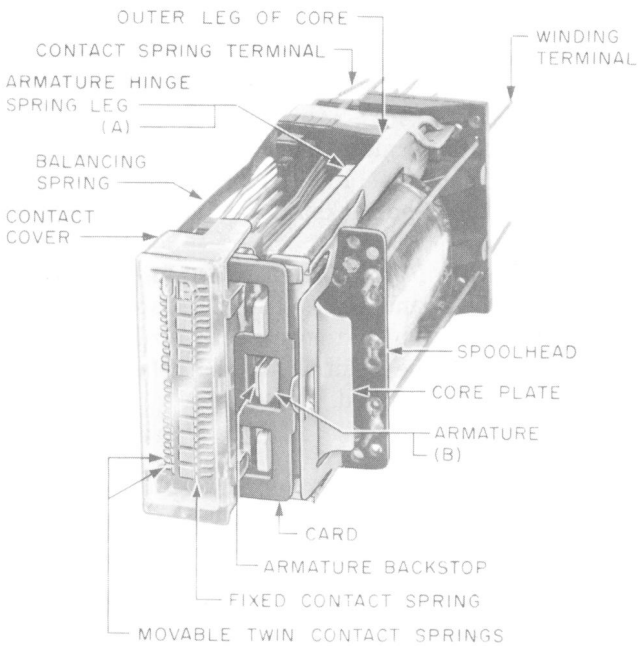


Fig. 3—AL Type Relay Showing Armature Position

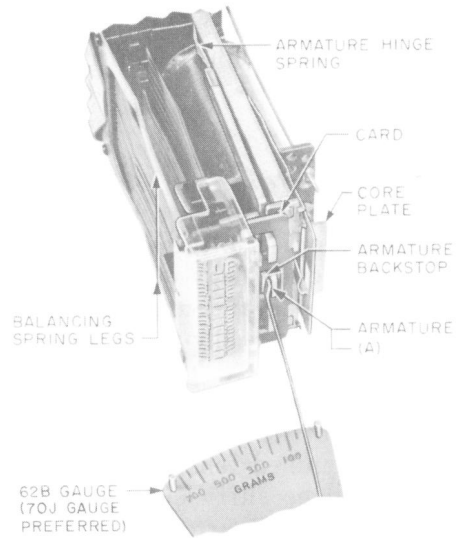


Fig. 4—Method of Checking Armature Back Tension for AL Type Relay

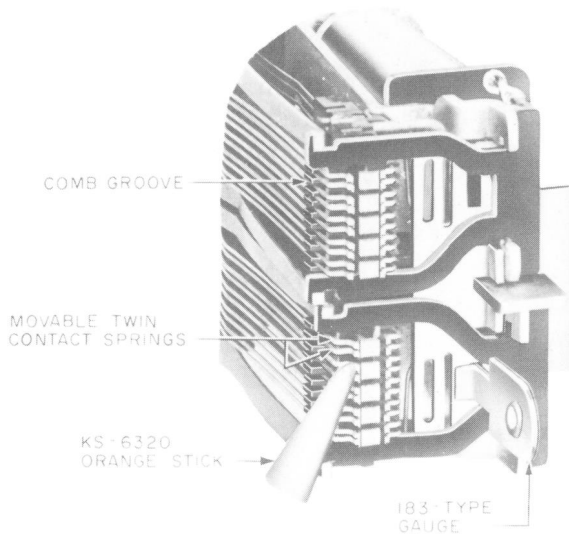


Fig. 8—Method of Checking Open or Closed Contacts of AM-Type Relay

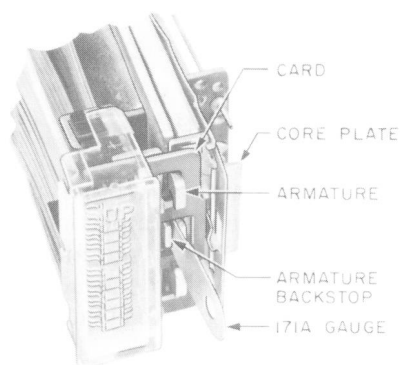


Fig. 9—Gauge Inserted Between Armature and Armature Backstop of AL-Type Relay

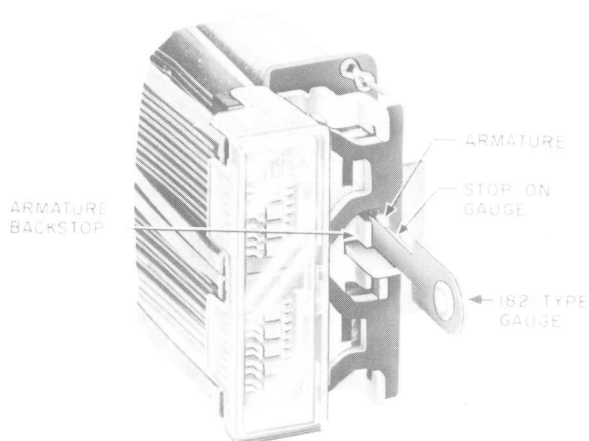


Fig. 10—182-Type Gauge Inserted Between Armature and Armature Backstop

2.12 Buffer Spring Tension (AL-type relay):

With the relay in the unoperated position, the tension of the buffer spring against the center leg of the core shall be:

Test—Min 20 grams

Readjust—Min 25 grams

Use the 70D gauge applied adjacent to the operating lug as shown in Fig. 11.

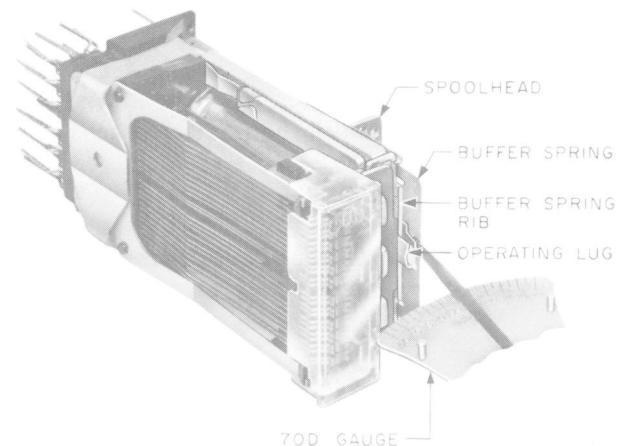


Fig. 11—Method of Checking Buffer Spring Tension

2.13 Electrical Requirements: The relay shall meet the electrical requirements specified on the circuit requirements table.

Note: If a hold requirement is specified on the circuit requirements table to control the minimum release time, the requirement is considered met if, after the relay has operated and the current is reduced abruptly to the hold value, the armature remains in the operated position for at least 2 seconds. The period of 2 seconds may be judged satisfactorily by saying "one hundred and fifty-five," pronouncing each syllable fully and distinctly.

2.14 Timing Requirements: When specified on the circuit requirements table, the relay shall meet the times specified.

2.15 Latching Force (AM-type relay only):

With the relay in the latched position, the force required to mechanically release the relay shall be

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Test—Min 140 grams

Readjust—Min 150 grams

Use the 62B gauge

Note: The specified latching forces apply after the side of the relay to be checked is pulsed onced (operated and released) and then latched and the other side is then pulsed for approximately 100 cycles.

To check the requirement, demagnetize the relay (soak and no-flux) and then apply the operate current. Press the 62B gauge against the card midway between the armature legs and slowly increase the pressure until the relay releases.

3. ADJUSTING PROCEDURES

3.001 List of Tools, Gauges, Materials, and Test Apparatus

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
363	Spring adjuster
510C	Portable lamp [equipped with 561A straight tip and W2CB (24V) or W2BL (48V) cord]
534K	Spring adjuster (0.018-inch balancing spring)
534G	Spring adjuster (0.020- and 0.025-inch balancing springs)
535A	Spring adjuster
628A	Balancing spring lifter
KS-6320	Orange stick
768A	Armature blocking tool
R-2753	Adjuster
—	4-Inch E-screwdriver
—	D screwdriver

GAUGES

62B	0-700 Gram gauge
70D	50-0-50 Gram gauge
70J	0-150 Gram gauge
171A	Thickness gauge nest
184A	Thickness gauge nest (consists of 182- and 183-type gauges)

MATERIALS

—	Toothpicks, hardwood, flat at one end and pointed at the other
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TEST APPARATUS

35 Type	Test set
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3.01 Cleaning (Reqt 2.01)

(1) Clean the contacts and other parts of the relay in accordance with Section 069-306-801. Before cleaning the armature and core, apply the soak current and then the nonflux current specified for the relay on the circuit requirements table. After cleaning, check that requirements 2.08, 2.09, and 2.10 are met.

3.02 Relay Mounting (Reqt 2.02)

3.03 Vertical Clearance (Reqt 2.03)

(1) To tighten mounting screws, use the 4-inch E screwdriver. To position the relay on the mounting plate, slightly loosen the mounting screws of the relay with the 4-inch E screwdriver and shift the relay as required. Retighten the mounting screws securely, taking care that the relay is in proper alignment and that there is the specified clearance above and below the relay. To retighten the mounting screws of relays equipped with the flexible mounting assembly, tighten the mounting screws until they are snug, then loosen the screws two-thirds of a turn.