

## RELAYS

### 267 TYPE, D-99739, AND D-175787

#### REQUIREMENTS AND ADJUSTING PROCEDURES

#### 1. GENERAL

1.01 This section covers 267-type, D-99739, and D-175787 relays.

1.02 This section is reissued to include information for the No. 267C and D-175787 relays. Detailed reasons for reissue will be found at the end of the section.

1.03 Reference shall be made to Section 020-010-711 for additional information necessary for the proper application of the requirements listed herein.

1.04 Asterisk: Requirements are marked with an asterisk (\*) when to check for them would necessitate the dismantling or dismounting 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.

1.05 Operate: A relay is said to operate if, when current is connected to its windings, the armature moves sufficiently to cause the back contact to break and the front contact to make.

1.06 Nonoperate: A relay is said to non-operate if, when current is connected to its winding, the armature does not move sufficiently to make the open contact or to cause the closed contact to become unreliable.

1.07 Hold: A relay is said to hold if, after the relay has operated and the current is reduced abruptly, the armature does not move from the operated position sufficiently to break the contact which has been made.

1.08 Release: A relay is said to release if the armature moves from the core sufficiently to break the contact that has been closed and to make the contact that has been broken.

#### 2. REQUIREMENTS

2.01 Cleaning: The contacts and other parts of the relay shall be cleaned when necessary in accordance with Section 069-306-801.

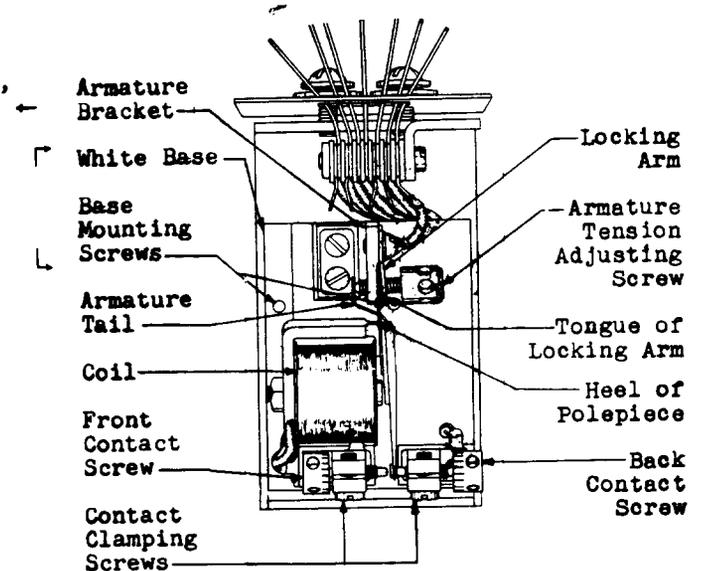


Fig. 1 - No. 267A and D-99739 Relays Equipped With a White Base - Top View

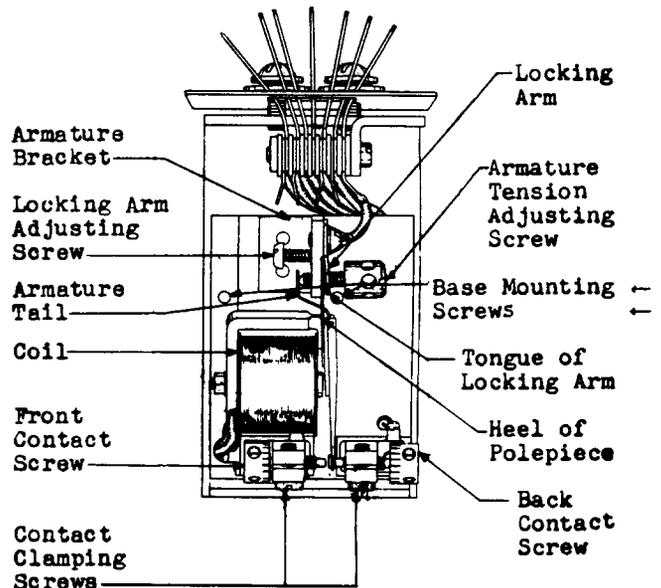


Fig. 2 - Nos. 267A and 267B Relays Equipped With a Locking Arm Adjusting Screw - Top View

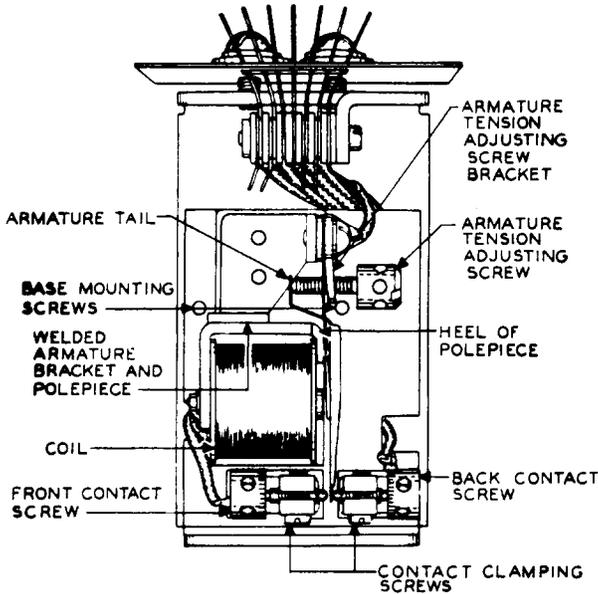


Fig. 3 - 267-type and D-175787 Relays Equipped With Welded Armature Bracket and Pole Piece - Top View

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

Gauge by feel.

Check by grasping the front end of the relay frame.

2.03 Tightness of Screws

(a) The contact post mounting screws and contact clamping screws shall be sufficiently tight to hold the contact posts and contact screws, respectively, in their adjusted position.

Gauge by feel.

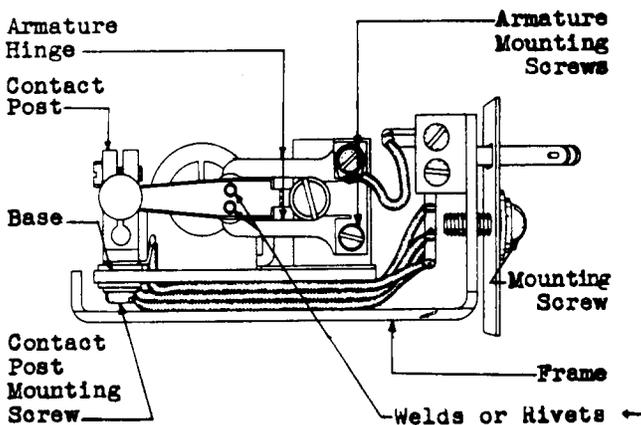


Fig. 4 - Relay - Side View

(b) The base mounting screws shall be sufficiently tight to securely hold the relay base to the relay frame.

Gauge by feel by grasping the relay base between the thumb and forefinger and attempting to move it.

\*(c) The armature tension adjusting screw shall be sufficiently tight to hold its adjusted position.

Gauge by feel.

\*(d) The screws which mount the armature bracket and pole piece on the base shall be sufficiently tight to hold the associated parts in their aligned positions.

Gauge by feel.

2.04 Contact Alignment: Fig. 5(A) - Contacts shall line up so that the point of contact falls wholly within the boundary of the opposing contact.

Gauge by eye.

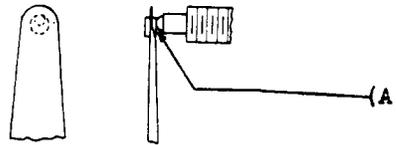


Fig. 5 - Contact Alignment

2.05 Operated Airgap: (Readjust Only) Fig. 6(A) - The airgap between the armature and pole face, when the relay is electrically operated on the specified operate current, shall be

Min 0.002 in.  
Max 0.003 in.

Gauge by means of the division marks on the head of the front contact screw. One division is equal to 0.0005 inch at the pole face.

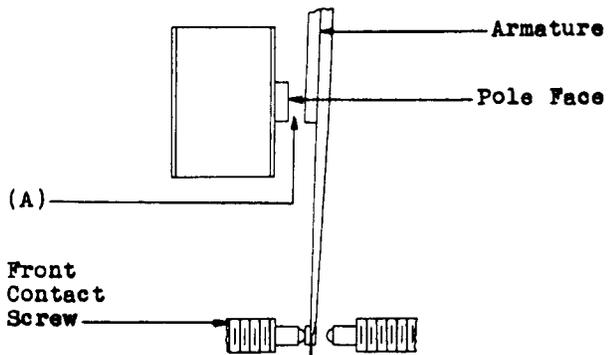


Fig. 6 - Operated Airgap

2.06 Contact Travel: Fig. 7(A) - The contact travel, measured between the

armature and each contact screw, shall be

Min 0.003 in.  
Max 0.005 in.

Use the 74D gauge and check the travel with the armature resting against each contact screw. Electrically operate the relay when checking back contact separation. If there is a difference between the measured travel on opposite sides of the armature, it is an indication that the contacts on the side of the armature having the smaller travel are pitted. When no other contact travel values are specified on the circuit requirement table and there is a difference in the measured travel, the requirement need only be met on the side of the armature having the greater travel.

2.07 Electrical Requirements: The relay shall meet the electrical requirements as specified on the circuit requirement table.

2.08 Back Contact Pressure: Fig. 7(B) - The pressure between the armature and the back contact, measured with no current through the relay, shall be

Min 3 grams

Use the 70F gauge applied to the armature in front of the contact.

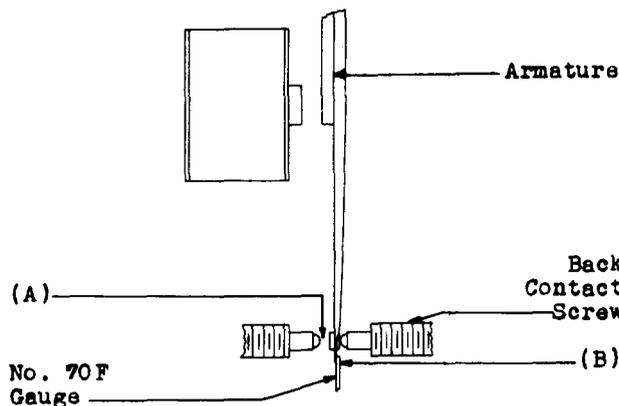


Fig. 7 - Contact Travel

2.09 Position of Contact Screws: (Before turnover only) The clearance between the head of each contact screw and its associated contact post shall not be less than 1/64 in.

Gauge by eye.

### 3. ADJUSTING PROCEDURES

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

Code or  
Spec No.

Description

#### Tools

340	Adjusting Key
417A	1/4-in. and 3/8-in. Hex. Open Double-End Flat Wrench
563A	90-degree Offset Screwdriver
564A	45-degree Offset Screwdriver
R-1005	Jeweler's Screwdriver
KS-6320	Orange Stick
KS-6854	3-1/2-in. Screwdriver
KS-14250,L1	Flashlight
-	3-in. Cabinet Screwdriver
-	4-in. Regular Screwdriver
-	6-1/2-in. P-long-nose Pliers

#### Gauges

70F	10-0-10 Gram Gauge
74D	Thickness Gauge Nest

#### Materials

-	Two No. 893 Cords, 6 feet long, each equipped with two No. 360A tools (1W13B cord) and one KS-6278 connecting clip
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#### Test Apparatus

35-type Test Set

#### 3.01 Cleaning (Rq 2.01)

- (1) Clean the contacts and other parts in accordance with Section 069-306-801.

#### 3.02 Relay Mounting (Rq 2.02)

- (1) If the relay is not securely fastened to the mounting plate, tighten the mounting screws with the 4-inch regular screwdriver.

#### 3.03 Tightness of Screws (Rq 2.03)

- (1) If the contact screws are not sufficiently tight in their brackets, tighten the clamping screws with the 3-inch cabinet screwdriver.
- (2) If the base mounting screws are loose, ← tighten them on the underside of the relay frame with the Nos. 563A and 564A offset screwdrivers.
- (3) If necessary to tighten any of the other screws on the relay, remove the relay from the mounting plate with the 4-inch regular screwdriver.

(4) If the relay is a No. 267A or D-99739 relay, equipped with a white base, and the armature tension adjusting screw is not sufficiently tight, remove the armature tension adjusting screw. Insert the blade of the 3-inch cabinet screwdriver between the tongue of the locking arm and the armature bracket and pry the locking arm away from the armature bracket slightly. Care should be taken, in this operation, not to damage the armature hinge. Replace the armature tension adjusting screw and adjust it to meet the back contact pressure requirement, using the No. 340 adjusting key.

(5) If the relay is a No. 267A or No. 267B relay, equipped with a locking arm adjusting screw, and the armature tension adjusting screw is not sufficiently tight in its locking arm, turn the locking arm adjusting screw in with the 3-inch cabinet screwdriver until the armature tension adjusting screw is tight in its locking arm. Then adjust the armature tension adjusting screw to meet the back contact pressure requirement, using the No. 340 adjusting key.

(6) If the relay is a 267-type or D-175787 relay, equipped with a welded armature bracket and pole piece and the armature tension adjusting screw is not sufficiently tight, remove the armature tension adjusting screw bracket together slightly with the P-long-nose pliers. Replace the armature tension adjusting screw and adjust it to meet the back contact pressure requirement, using the No. 340 adjusting key.

(7) If the contact posts, pole piece, armature bracket, or welded armature bracket and pole piece are not securely fastened in place, tighten their associated screws with the KS-6854 screwdriver and check for requirements 2.05, 2.06, 2.07, and 2.08.

(8) Remount the relay on the mounting plate.

### 3.04 Contact Alignment (Rq 2.04)

(1) If the contacts do not line up properly, use the 3-inch cabinet screwdriver to loosen the armature mounting screws and shift the armature, as required, exercising care not to distort or damage the armature hinge. If necessary remove the relay from its mounting with the 4-inch regular screwdriver. Tighten the screws securely and remount the relay if it was removed.

### 3.05 Operated Airgap (Rq 2.05) 3.06 Contact Travel (Rq 2.06)

(1) Preparation of Flashlight for Adjusting Contacts: Operate the flashlight

switch and connect one end of each of the No. 893 cords, by means of a 360-type tool, to the terminals of the bottom cap of the flashlight. Use the flashlight as specified below in making the adjustments. Closure of contacts will be indicated by lighting the flashlight and opening of contacts by extinguishing the flashlight.

(2) Connect the flashlight across the front contact and the armature bracket from the front of the relay. Loosen the front contact clamping screw slightly with the 3-inch cabinet screwdriver and back off the front contact screw with the No. 340 adjusting key until the front contacts do not make with the relay electrically operated and with the armature touching the pole face. Then turn the front contact screw in until the lamp lights. Then set the operated armature airgap by turning the screw in between 4 and 5 divisions on the head of the screw. Each division on the head of the screw corresponds to 0.001-inch travel at the contact. The movement of the armature at the pole face is approximately half the movement at the contact. Tighten the clamping screw securely.

(3) To adjust the contact travel after the operated airgap has been set, connect the flashlight across the front and back contacts. Loosen the clamping screw for the back contact screw slightly with the 3-inch cabinet screwdriver and turn the back contact screw in with the No. 340 adjusting key until the lamp just lights. Then back off the back contact screw 3 to 5 divisions on the head of the screw. Each division on the head of the contact screw corresponds to 0.001-inch contact travel. Tighten the clamping screw securely.

### 3.07 Electrical Requirements (Rq 2.07) 3.08 Back Contact Pressure (Rq 2.08)

(1) Operate and Hold: If the relay fails to operate or hold, back off the armature tension adjusting screw with the No. 340 adjusting key. The operate may be further facilitated by reducing the contact travel and the hold by reducing the operated armature airgap as covered in 3.05 and 3.06.

(2) Nonoperate and Release: If the relay fails to nonoperate or release, turn the armature tension adjusting screw in with the No. 340 adjusting key. The nonoperate may be further facilitated by increasing the contact travel and the release by increasing the operated armature airgap as covered in 3.05 and 3.06.

(3) If the electrical requirements cannot be met or the relay does not operate properly in the circuit, it may be due to improper positioning of the armature. With the relay in the unoperated position, using

an orange stick, press lightly against the armature at the rear of the pole piece and observe that there is no movement of the armature at the heel of the pole piece. Then press the armature halfway between the rivets or welds and the end of the armature and observe that there is a movement of the armature.

(4) If the relay still fails to meet its electrical requirements, observe that in the operated position the rear of the armature rests on the heel part of the pole piece.

(5) If this condition does not exist in the case of the No. 267A or D-99739 relay, equipped with a white base, remove the relay mounting screws with the 4-inch regular screwdriver. Loosen the coil mounting nut with the No. 417A wrench and turn the coil core in approximately 1/8 turn with the R-1005 jeweler's screwdriver. If necessary, turn in the coil core an additional amount to insure that the armature pivots at the heel of the pole piece. Tighten the coil nut securely. Reset the operated airgap and contact travel as outlined in 3.05 and 3.06. Then adjust the relay as covered in (1) and (2) to meet the electrical requirements.

(6) If satisfactory back contact pressure is not obtained following the adjustment to meet the electrical requirements, reduce the operated armature airgap and

contact travel toward the minimum exercising care to meet the nonoperate and the release requirements. If the contact pressure or if contact screw clearance cannot be met under these circumstances, refer the matter to the supervisor.

#### REASONS FOR REISSUE

1. To add information for the No. 267C and D-175787 relays.
2. To amplify figure information. (Fig. 1, Fig. 2, and Fig. 4)
3. To add a new figure. (Fig. 3)
4. To revise the list of tools, gauges, and materials. (3.001)
5. To reword a procedure for tightness of screws [3.03(2)].
6. To revise a procedure for tightness of screws [3.03(4)].
7. To reword the procedure for contact alignment [3.04(1)].
8. To revise the procedure for preparation of the flashlight [3.05 and 3.06(1)].
9. To amplify a procedure for meeting the electrical requirements [3.07 and 3.08 (3)].