

D-C CONTACTOR - PLUNGER TYPE

KS-5722

1. GENERAL

- 1.01 This section covers a plunger-type d-c contactor KS-5722.
- 1.02 Reference shall be made to Section A400.001 covering General Requirements and Definitions for additional information necessary for the proper application of the requirements listed herein.
- 1.03 Requirements and associated procedures marked with a number sign (#) need not be checked by the installer unless it is thought that the requirement is not being met, or performance indicates that such a check is advisable.
- 1.04 Requirements and associated procedures marked with an asterisk (\*) need not be checked during maintenance unless the apparatus or part is made accessible for other reasons, or performance indicates that such a check is advisable.
- 1.05 This contactor is said to operate when the plunger has moved sufficiently for the contacts to close with reliable contact.
- 1.06 This contactor is said to release when the plunger has moved sufficiently for the contacts to open.
- 1.07 When work is done on a contactor in an operating circuit, see that service is maintained. Do not touch at the same time, live terminals or parts which are at different potentials, or otherwise short-circuit them.

2. REQUIREMENTS

- 2.01 Mounting: The contactor shall be fastened securely to the panel. The component parts shall be held together securely. Gauge by feel.
- 2.02 Contact Surfaces shall be clean and free from build-ups which might interfere with reliable contact. Gauge by eye.
- 2.03 Contact Pressure: The contact pressure of each contact shall be minimum.

Type	Rating Amperes	Pressure Grams
Single-pole	50	350
Single-pole	100	1450
Double-pole	50	175

Use push-pull tension gauge.

2.04 Freedom of Operation: The plunger mechanism shall operate smoothly, without binding. Gauge by feel.

2.05 Electrical Requirements

- (a) The contactor shall meet the electrical requirements specified on the Circuit Requirements Table.
- (b) Where electrical requirements are not specified on the Circuit Requirements Table, operation of the relay shall be checked at any voltage available within the voltage range on the relay nameplate.
- (c) Check of electrical requirements may be at the temperature at which the relay is found, unless H (hot) or C (cold) is specified in the Circuit Requirements Table.

Note: Where electrical requirements are not specified in the Circuit Requirements Table, (b) and (c) provide that normal operation of the relay is considered a satisfactory check. This would also apply where no nameplate range or other operate values are available.

(d) Where H is specified in the Circuit Requirements Table without heating instructions, the relay coils shall be energized for at least 1 hour prior to the test.

(e) Where C is specified in the Circuit Requirements Table without cooling instructions, the relay shall be de-energized for at least 2 hours prior to the test.

\*#2.06 Temperature: The temperature shall not exceed

	Maximum
Coils	85C (185F)
Contacts	105C (221F)

If the temperature is thought to be excessive, measure by thermometer.

**3. ADJUSTING PROCEDURES**

3.001 List of Tools, Gauges, Materials, and Test Apparatus (Equivalents may be substituted, if desired.)

Tools

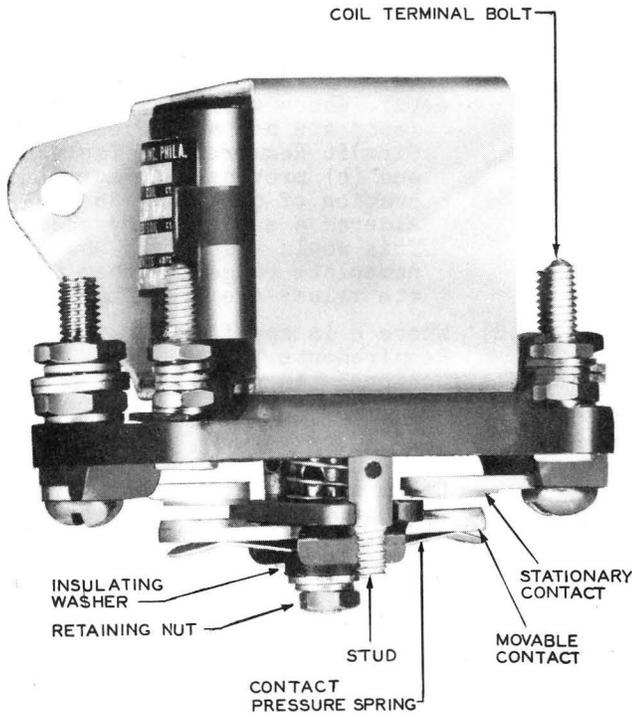
- Burnisher, No. 265C
- Pliers, P-long nose, 6-1/2"
- Screwdriver, 3" cabinet
- Wrench, 1/4" and 3/8" hex. open double-end, No. 418A
- Wrench, 5/16" and 7/32" hex. open double-end, No. 417A

Gauges

- Gauge, push-pull tension; No. 79C, 0-200 grams, 79C, 0-1000 grams, or 79F 0-6000 grams
- Thermometer, 0°C-200C, R-1032
- Voltmeter, D-C, Weston, Model 280, ranges 150-60-3 or 180-60-3 (if the available 35-type test set is not equipped with a voltmeter)

Materials (See Sections A710.011 and A710.012)

- Cloth, abrasive, 150 grade
- Cloth, cleaning, twill jean, D-98063
- Pad, felt
- Spirits, petroleum



**Fig. 1 - Single-pole, 50-ampere Contactor**

Test Apparatus

Test set, 35 type

3.002 General Procedure

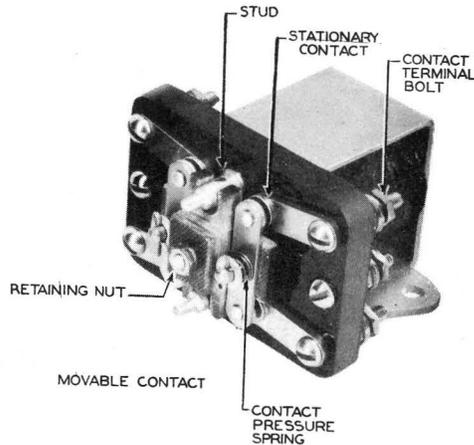
- (1) It is recommended that requirements be checked and any required adjustments be made in the order outlined in the following paragraphs.
- (2) When checking mechanical requirements, disconnect the contactor from the working circuit. If it becomes necessary to remove it from its mounting in order to obtain access to its parts, disconnect all power supply from the winding and contact circuits by opening switches, if provided, or removing the fuse or fuses. Then disconnect the leads from the terminals, using the wrench.

3.01 Mounting (Rq. 2.01)

- (1) Tighten loose mounting screws with the screwdriver.

3.02 Contact Surfaces (Rq. 2.02)

- (1) The purpose of cleaning contacts is to remove any gummy or dirty substance that would interfere with reliable contact. It is not necessary or desirable to keep contacts polished or shining. Clean contacts by wiping with a cloth moistened with petroleum spirits, followed by a dry cloth.
- (2) There shall be as little smoothing of contacts as is consistent with satisfactory operation. Contacts should be smoothed while closed. Insert a burnisher or a strip of abrasive cloth between the contacts to be cleaned, and draw it back and forth until the build-ups are reduced sufficiently to insure reliable contact. Then clean the contacts as outlined in (1) above.



**Fig. 2 - Double-pole, 50-ampere Contactor**

(3) Contacts which are badly worn should be replaced. When replacement is required, replace the entire set of movable and stationary contacts. To remove the movable contact of a single-pole contactor, insert a piece of stiff wire in the hole in the plunger to prevent turning, and remove the retaining nut with the 418A wrench. Lift off the metal washers, the insulating washer, the contact pressure spring, and the contacts. Replace in the reverse order. To remove the movable contacts of a double-pole contactor, remove the cotter pin, washer, and pressure spring. The stationary contacts can be replaced by the use of the 418A wrench and a screwdriver.

### 3.03 Contact Pressure (Rq. 2.03)

(1) To measure contact pressure, disconnect the contacts from the power supply and energize the operating coil or hold the contactor operated manually, taking care not to press on any part of the contact pressure spring. Insert the tip of the gauge at the edge of the movable contact farthest from the middle of the supporting bar and exert a pull away from the stationary contact. Read the gauge as the movable contact leaves the stationary contact.

(2) Replace the contact pressure spring where contact pressures are below the minimum.

### 3.04 Freedom of Operation (Rq. 2.04)

(1) With the contacts disconnected from power, operate the contactor by hand, observing its action. If it is

sticky, disconnect and remove it from its mounting and disconnect the coil at its terminal bolts. In the case of a single-pole contactor, unscrew the studs which hold the stationary contact support in place, by inserting a stiff wire in the holes provided for the purpose. The plunger and the chamber in which it operates are now accessible for cleaning.

(2) In the case of a double-pole contactor, it is necessary to remove the movable contact assembly. To do this, hold the plunger against turning by inserting a stiff wire in a hole which is accessible between the movable contact assembly and the stationary contact support, and unscrew the retaining nut with the 417A wrench. Finally, unscrew the studs.

### 3.05 Electrical Requirements (Rq. 2.05)

(1) A check of the operation of the contactor is made by connecting a voltmeter across the coil terminals. If there is no indication on the voltmeter, a study of the associated circuit is necessary to determine whether the absence of voltage indicates a circuit fault, or is a condition to be overcome by blocking a relay, or otherwise changing circuit conditions. Failure to operate with rated voltage at the coil terminals may be due to an open coil. To check for an open coil, connect the voltmeter in series with the operating voltage and the coil. If no indication appears on the voltmeter, the coil is open and should be replaced.

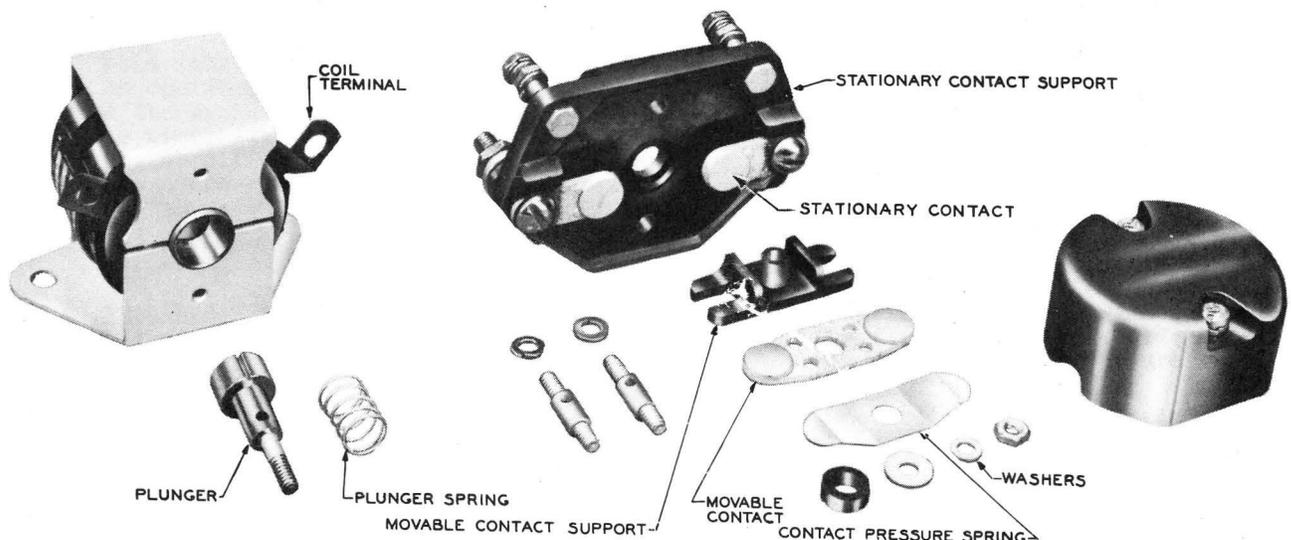


Fig. 3 - Single-pole, 50-ampere Contactor, Exploded View

(2) When checking for any electrical requirement, except the check of operation discussed in (1) above, the contactor should be disconnected from the working circuit.

(3) Where requirements are in volts, direct current is meant unless otherwise specified, and a 35-type test set should be used, supplemented by a d-c voltmeter if the test set is without one. Where test set preparation has not been specified in the Circuit Requirements Table, disconnect both coil terminals and furnish both battery and ground through the test set with B/G or B/G/V preparation.

(4) If the contactor does not release, check the armature for freedom of operation and clean or replace. Check the plunger spring to see that it has

sufficient compression to return the plunger to the open position and stretch the spring or replace it, as necessary.

\*#3.06 Temperature (Rq. 2.06)

(1) Hold the bulb of the thermometer against the hottest spot in question, covering that part of the bulb not in contact with the contactor by a piece of felt or the equivalent.

(2) If the temperature exceeds the specified limit, see that requirements 2.02 to 2.04 are met. If the temperature is above the limit, with nameplate rated coil voltage not exceeded, refer the matter to the supervisor, as the coil or contacts may need to be replaced.

Bell Telephone Laboratories, Inc.