

## PALMER MASTER SWITCHES CONTACTOR TYPE PIECE-PART DATA AND REPLACEMENT PROCEDURES

### 1. GENERAL

1.01 This section covers the contactor type master switches per specifications KS-5078 and KS-5078-01 and with Section 030-741-701 replaces X-72038. After replacing the parts, reference should be made to the section on Apparatus Requirements and Adjusting Procedures for readjustments.

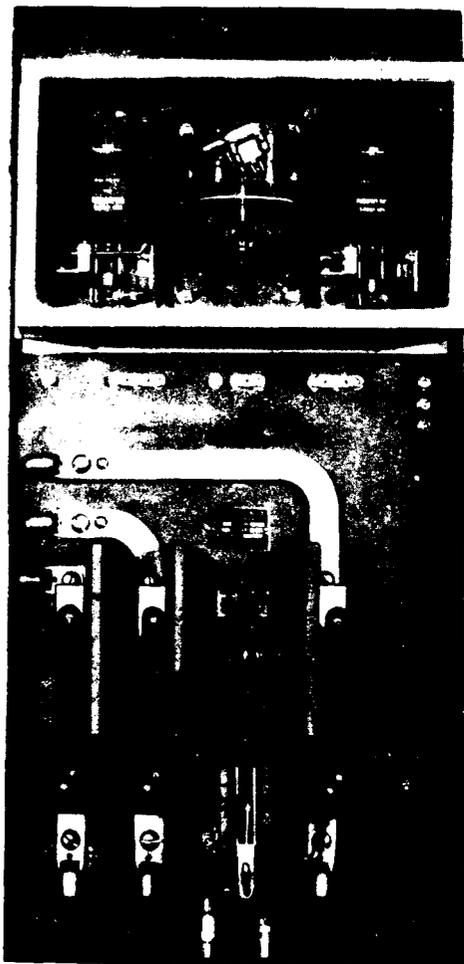


Fig. 1 - Master Switch (Without Cabinet)

1.02 Part 2, entitled "REPLACEMENT PARTS", covers the methods of ordering the various parts and includes illustrative figures.

1.03 Part 3, entitled "REPLACEMENT PROCEDURES", covers the approved procedures for the replacement of the parts.

### 2. REPLACEMENT PARTS

2.01 When ordering replacement parts give the name of the part as shown in the figures of this section and the serial number. The KS and list numbers are shown above the contactor switch on the late models and should also be included in the order when known. If the replacement part is for a voltage relay include the serial number of the relay; e.g., - voltage relay coil for relay serial 363 for Palmer master switch serial E135, KS-5078-01, List 01.

2.02 Miscellaneous parts such as screws, nuts, washers, etc., which are not named in the illustrations and which cannot be obtained locally should be ordered by describing the part and referring to the nameplate data including the serial, KS and list numbers if known; e.g., - bracket for supporting the lower contact from the base on voltage relay serial 363 for Palmer master switch serial E135, KS-5078-01, List 01.

2.03 The contact surfaces of the main brush contact, auxiliary metal contact and the fixed contact of the latest design shown in Fig. 4 are silver coated and additional stiffening laminations are placed on each side of the auxiliary contact. This guards against oxidation and improves the action. Whenever a contact brush requires replacement, it is recommended that complete replacement be made of the carbon contacts and springs and the brush and fixed contacts of all poles, except the alarm pole, unless these poles are already of the silver coated type. In addition to the better contact offered by the latest design, the installation of a complete set of main contacts insures more even pressure on all poles, requires very little fitting, if any, and minimizes the possibility of the contacts getting out of adjustment.

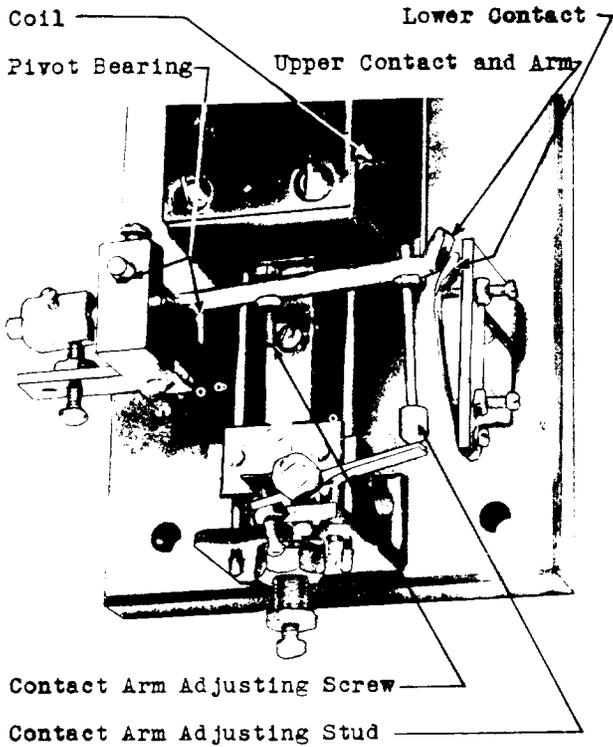


Fig. 2 - Voltage Relay



Fig. 3 - Time Delay Relay

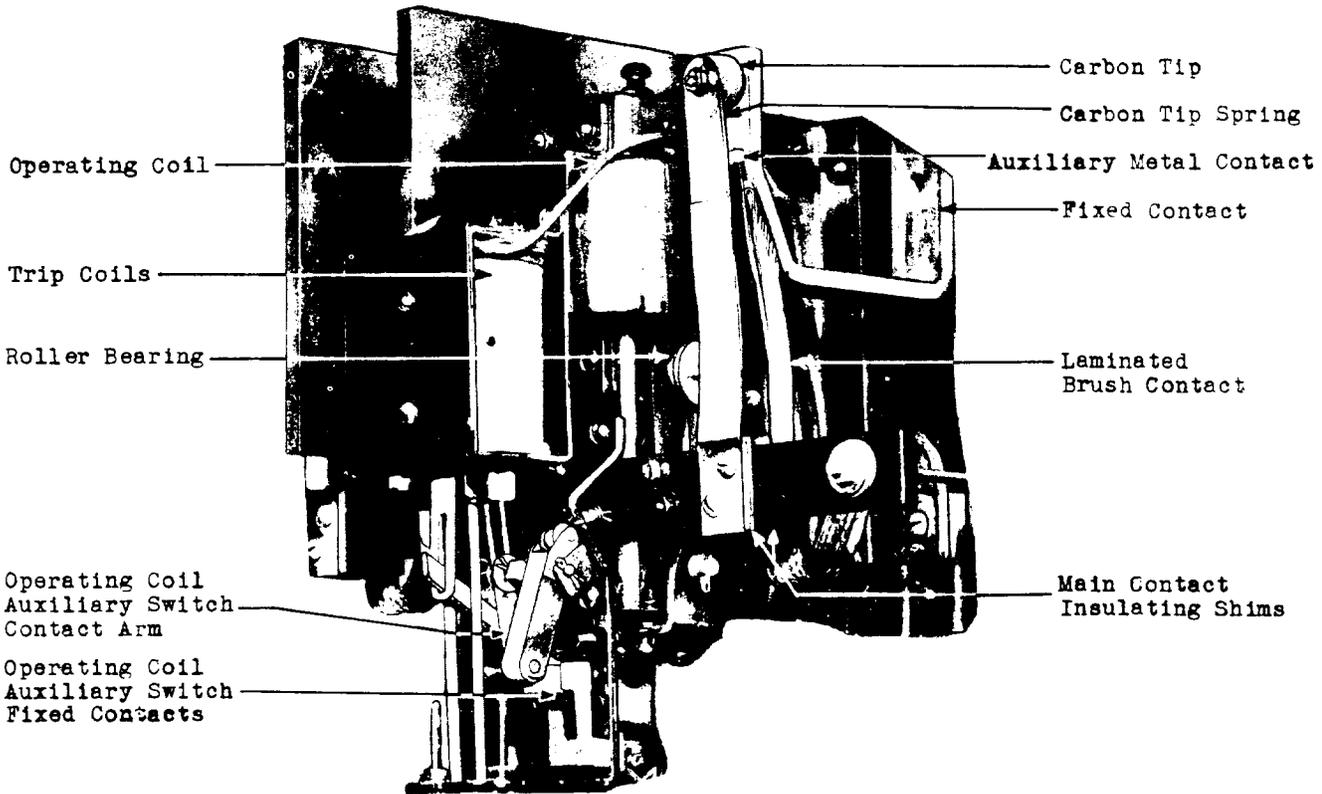


Fig. 4 - Contactor, Latch and Tripping Mechanism

### 3. REPLACEMENT PROCEDURES

#### 3.001 List of Tools and Materials

##### Tools

Screw-driver, jeweler's 7/8" R1005  
 " " 1-1/2" with 7/32" x .030" end,  
 R8210  
 Screw-driver, 5" Regular, A.T.&T. Std.  
 Drawing 46 x 34  
 Open end wrenches with openings 3/16",  
 5/16", 3/8", 7/16", 1/2", 9/16", and 5/8".

##### Materials

Cloth, KS-2423, twill jean or equivalent

3.002 The master switch cabinet covers which are fastened at the top are secured with two pins and not hinges. Consequently in removing the cover it must be pulled out from the bottom of the cabinet and raised sufficiently to clear the pins.

3.003 Before proceeding to make replacements be sure that the switch is removed from service by opening the a-c. line directly ahead of the switch as the live parts have line voltage on them. After the work is completed energy for testing may be obtained by reconnecting the service. Before making any replacements be sure that all the replacement parts, tools, etc. are at hand, in order that the switch will be out of service a minimum of time. After work is completed on a master switch, check that the screws, nuts and bolts are tightened firmly, especially those associated with current carrying parts.

3.004 Since the voltage and time delay relays are delicate instruments which are affected by dust, etc., the glass covered case should not be left off longer than is necessary. In putting on the case it should be noted that the gasket between the case and the panel is in place. Then tighten the screws firmly.

3.005 No replacement procedures are given for screws or other small parts when the procedure consists of a simple operation.

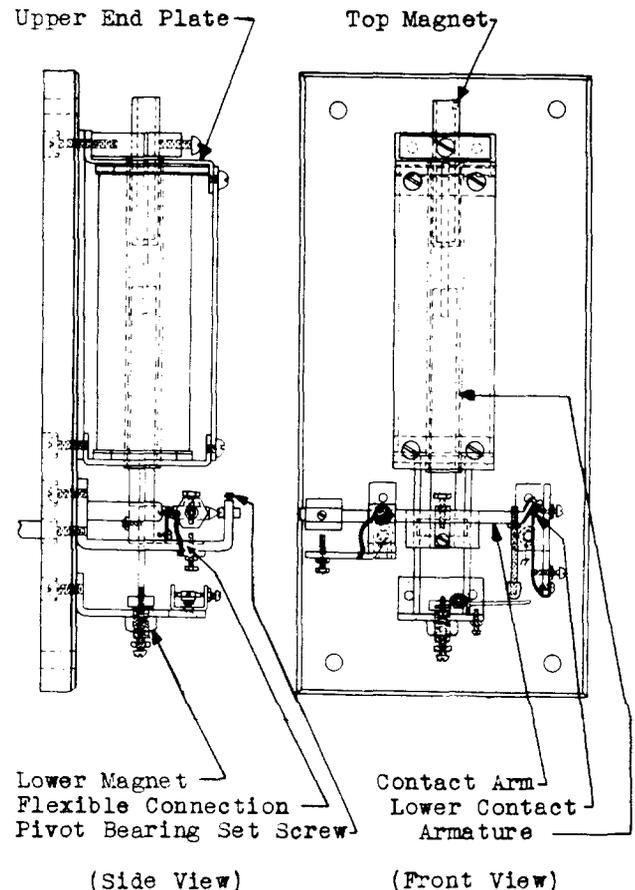
#### Voltage Relay and Parts

##### 3.01 Complete Relay

(1) To replace a voltage relay as shown in Fig. 5 disconnect the two coil terminals from their binding posts and remove the screws securing the relay panel to the master switch panel. (The relay contact terminals extend through the base as brass studs and make butt connections with flat springs on the rear of the master switch panel and release when the relay base is removed.) Mount the replacing relay.

#### 3.02 Voltage Relay Coil

(1) In replacing a coil it will be necessary to remove the relay and panel from the master switch panel, as covered in the preceding paragraph. The coil upper end plate may be removed by taking out the two screws in the front and the two in the rear of the panel as shown in Fig. 5. The coil may then be drawn out vertically and replaced in the reverse order, being careful while sliding the coil over the armature.



(Side View)

(Front View)

Fig. 5 - Voltage Relay

#### 3.03 Voltage Relay Contacts

(1) In replacing a contact, it is advisable to replace both the movable and stationary ones in order to insure a good contact surface. The cause of the defective contacts should first be corrected. The movable contact arm can be readily replaced by releasing the flexible connection and removing the pivot bearing set screw and pulling out the pivot bearing pin which releases the contact arm. The lower contact (fixed contact) may be readily replaced after removing the screw holding the associated spring.

Time Delay Relay3.04 Complete Relay

(1) To replace the entire relay, shown in Fig. 3, remove the nuts, washers and connections from the four terminals on the panel and the center screws at the bottom and top of the panel. In handling the relay, hold it by the panel or the frame to avoid injury to the rotating disc, the gear train or the mercury tube. Mount and connect the new relay and check its adjustment and operation.

3.05 Time Delay Relay Coils

(1) To replace the coils, it is preferable to remove the entire relay panel as covered in the preceding paragraph. The gear train, mercury tube and the relay frame should be taken off as a unit by taking out the screws securing the frame to the panel. The frame etc. can not be placed on a flat surface as it would rest on the disc and therefore should be supported to prevent injury to the disc.

(2) Remove the screws holding the two lower coils. The large coil can be slid down after smoothing out the outside lamination which is bent slightly to hold the coil in place. Assemble in the reverse order, shaping the lamination slightly as it was before to hold the upper coil in position.

3.06 Time Delay Relay Disc

(1) To replace a disc, remove the mercury tube leads at the panel terminals and remove the gear train and tilting mechanism as a unit. Unscrew the upper and lower bearings which release the disc. In putting in the new disc be particularly careful that the shaft fits into the upper bearing loosely and that the lower bearing does not bind the disc against the pole pieces. If the disc is not approximately midway between the pole pieces, take it out and adjust it on the shaft, after loosening the small set screws with a jewelers screw-driver. The disc should be held by the shaft to avoid possible bending of the disc. Assemble the parts.

3.07 Mercury Tube or Gear Train

(1) To replace the mercury tube or tilting mechanism or the gear train note the correct position of the tube, which is with the long end toward the left. Remove the tube and its connections. The two clips on the gear train frame holding the two tube leads should be opened to release the leads rather than taking out the long screws. To release the gear train remove the screws holding it to the frame. Assemble in the reverse order.

Contactor Switch3.08 Main Contacts

(1) The contacts can be replaced without removing the baffles between the poles but the removal of the baffles is easily accomplished and will materially assist in replacing the contacts. If one pole is used for ground connection for the floor alarm board it is suggested that the leads be disconnected from that pole to avoid arcing across the contact while working on the switch. The contacts can be replaced readily by removing the mounting screws. Be careful to put back the round insulating bushings in the mounting holes in the crossbar. If the switch has one insulating shim on the outside of the crossbar and two on the brush side, put them back as found since it is likely that the extra shim on the brush side will be required for adjustment on this particular switch.

3.09 Complete Contactor Switch

(1) Remove the barriers and the screw securing the flexible connection of each contactor brush. Note the position of the wire connections between the coils and terminals on the panel. Designate and disconnect the wires. On switches having the crossbar supported on each end from the panel by a shaft type bearing, remove these shafts. The entire mechanism can then be released by taking out the four screws securing the frame to the panel. The bent busbar fixed contacts may then be taken off if necessary. The new switch mechanism should be installed in the reverse order.

3.10 Contactor Switch Operating Coil

(1) Although it is not necessary to remove the contactor switch to replace the operating coil, it is easier to take the switch out to a bench as the switch must be disassembled to lower the operating coil armature sufficiently to replace the coil. Designate the leads and if the switch has a tripping mechanism, remove the tripping coils together with the case and the latch mechanism.

(2) It will be necessary to remove the two shafts in the operating mechanism shown in Fig. 6, but a sketch should first be made of the location of the bearings and washers, noting particularly the sizes of the latter. Take out the shafts and the coil cover and then lower the armature and take out the coil. It will be easier to insert the washers and bearings if the mechanism is placed on its side so that the two shafts will be vertical. Assemble in the reverse order and line up the brushes and check the operation of the switch.

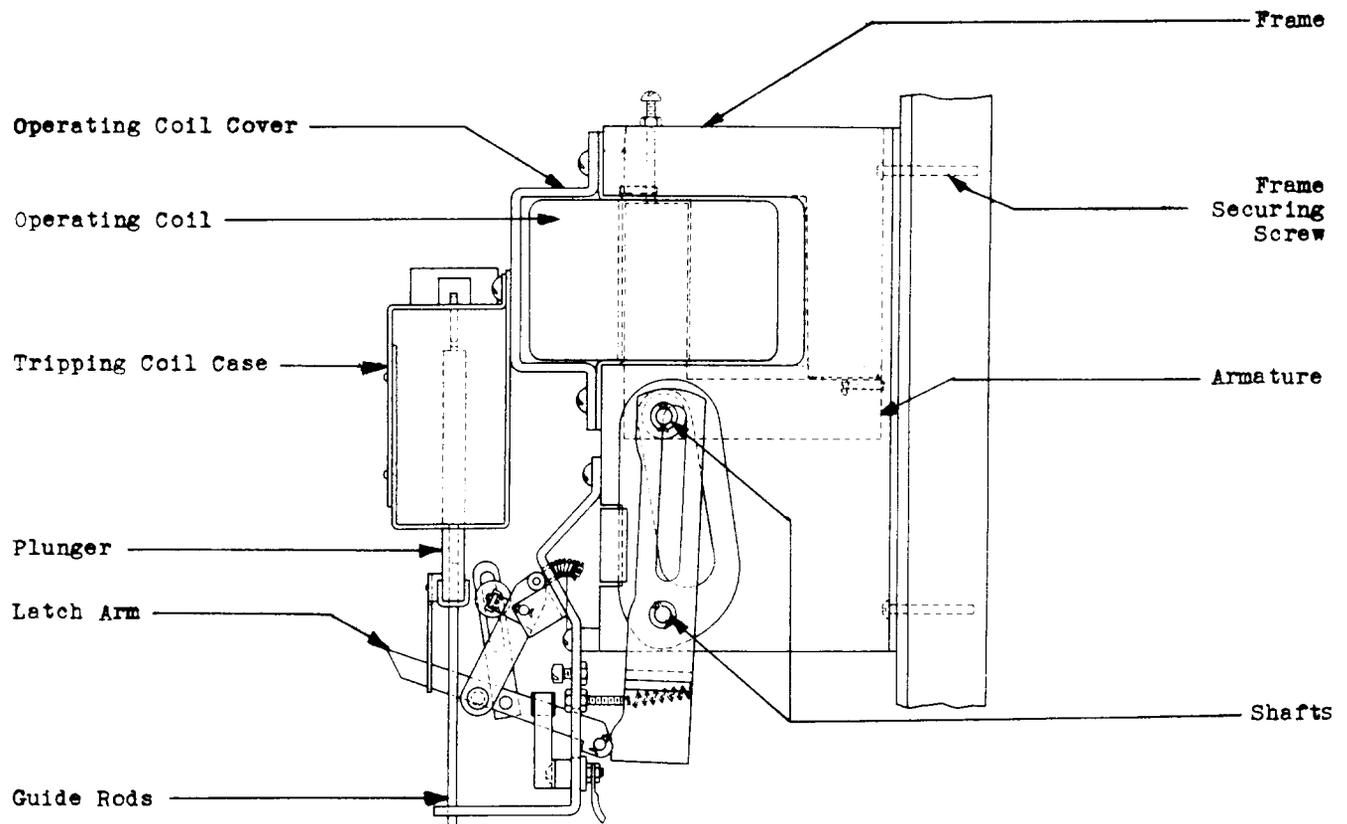


Fig. 6 - Operating, Latch and Tripping Mechanism

### 3.11 Roller Bearings

(1) The bearings can be replaced without taking the contact switch out, but it is easier to take it out to a bench. Remove the switch as in the preceding paragraph except that the trip mechanism can be left in place. Make a sketch of the position of the washers and bearings on the bearing shaft and replace the bearings. Assemble in the reverse order and check the operation of the switch.

### 3.12 Tripping Mechanism Coils

(1) Note the external wire connections to the coils and disconnect them at the terminals. By removing the three screws at the top of the coil covers and the two holding the covers together, the coils can be removed. The plunger must be held while removing the coil case as it is not attached to the case and would fall. Raise the case vertically to avoid bending the guide rods. Install the new coil and connect the leads. Raise the armature by hand and note that it is free to slide. Check the operation of the contactor switch and tripping and latch mechanism.

Bell Telephone Laboratories, Inc.