

TRANSFER SWITCHES AND CONTROL RELAYS ELECTRICALLY OPERATED

REPLACEMENT PARTS AND PROCEDURES

1. GENERAL

1.01 This section covers the information necessary for ordering parts to be used in the maintenance of the KS-5350, KS-5451, KS-5728, KS-15503, KS-15598, and KS-15806 control relays, and KS-5264 transfer switch. This section also covers the approved procedures for replacing these parts.

1.02 This section is reissued to add replacement part information and procedures for the KS-5728, KS-15503, KS-15598, and KS-15806 relays, to add and revise information to conform with the latest manufacture, and to amplify various procedures. Detailed reasons for reissue will be found at the end of the section.

1.03 Part 2 of this section covers the various parts which it is practicable to replace in the field in the maintenance of this apparatus. No attempt should be made to replace the parts not designated. Part 2 also contains explanatory figures showing the different parts. This information is called Replacement Parts.

1.04 Part 3 of this section covers the approved procedures for the replacement of parts covered in Part 2. This information is called Replacement Procedures.

1.05 Information enclosed by parentheses () is not ordering information. This information may be references to notes, parts re-

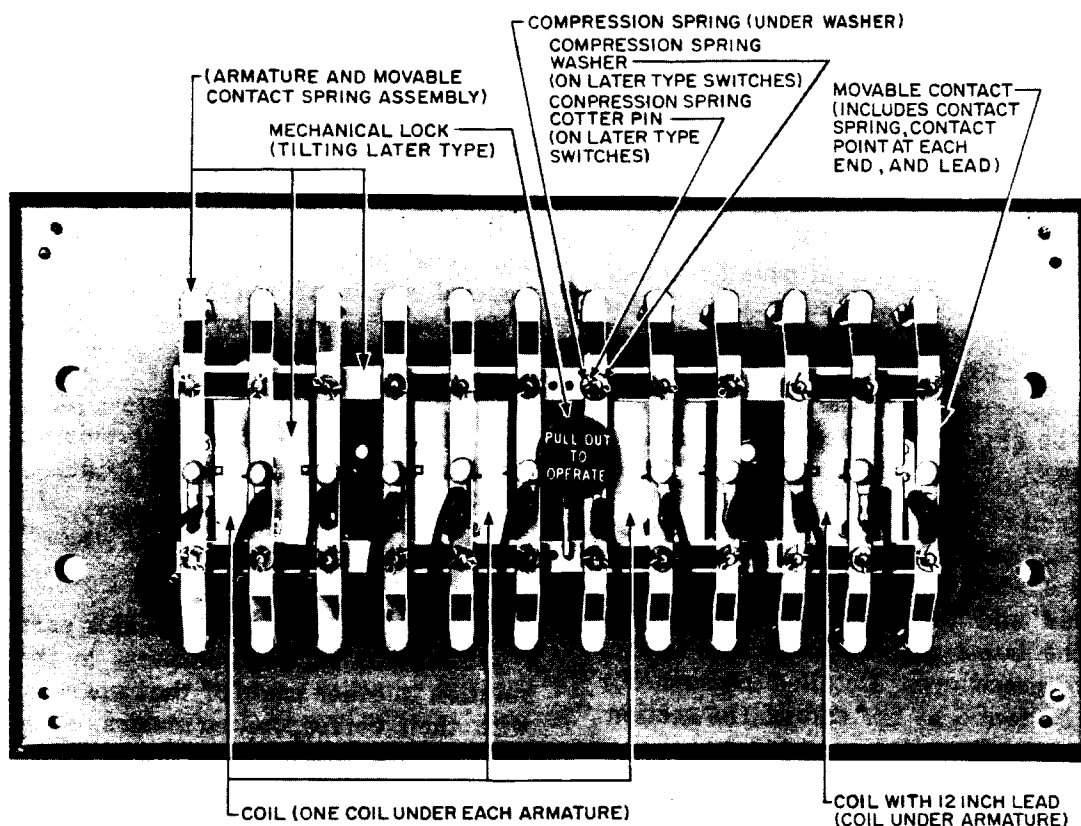
ferred to in other portions of the section and not considered replaceable, or part names in general use in the field if these names differ from those assigned by the manufacturer.

1.06 Abbreviation NO contact signifies normally open contact. Abbreviation NC contact signifies normally closed contact.

2. REPLACEMENT PARTS

2.01 The figures included in this part show the various replaceable parts in their proper relation to other parts of the apparatus together with their corresponding names.

2.02 When ordering parts for replacement purposes, give the quantity, the name of the part as shown in the figures of this section, and the nameplate data of the apparatus for which the part is ordered, including the manufacturer's name, the name of the apparatus, the KS specification and list number, the coil voltage range or current and type (ac or dc), and the voltage and current contact ratings and type (ac or dc). For example: 1—stationary NO contact for Struthers-Dunn, Inc, relay KS-5451 L01, 20-28 volts dc coil, 115 volts ac 6 ampere contacts. Do not refer to the BSP number or to information in parentheses in the figures.



**Fig. 1 — KS-5264 Transfer Switch — Front View
(4-Coil, Later Type Switch Shown)**

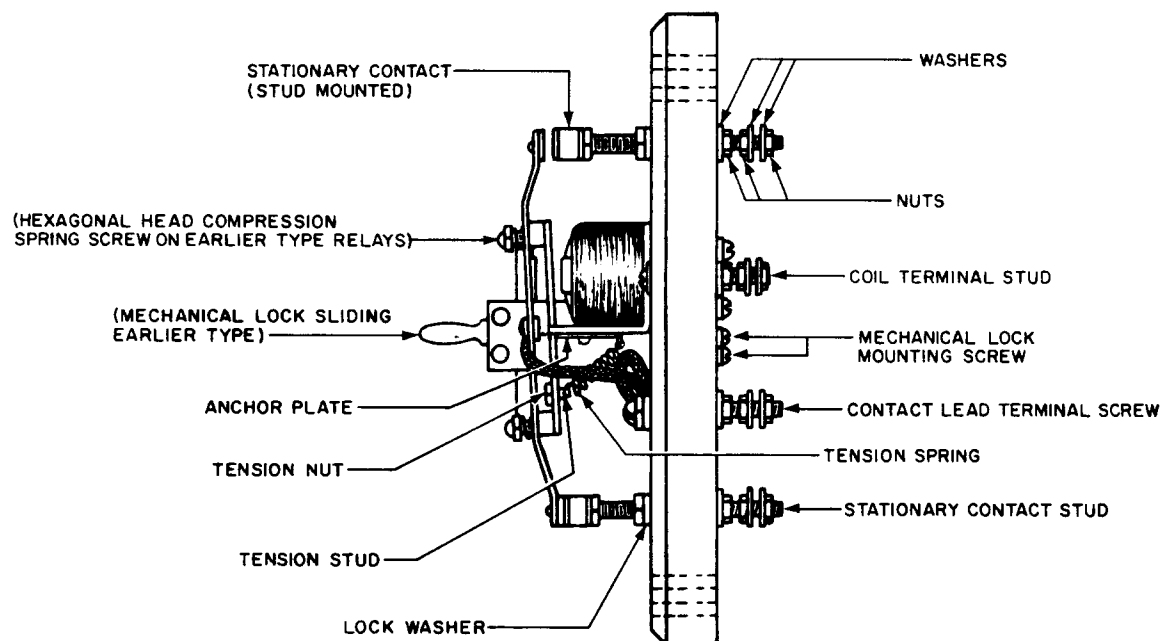
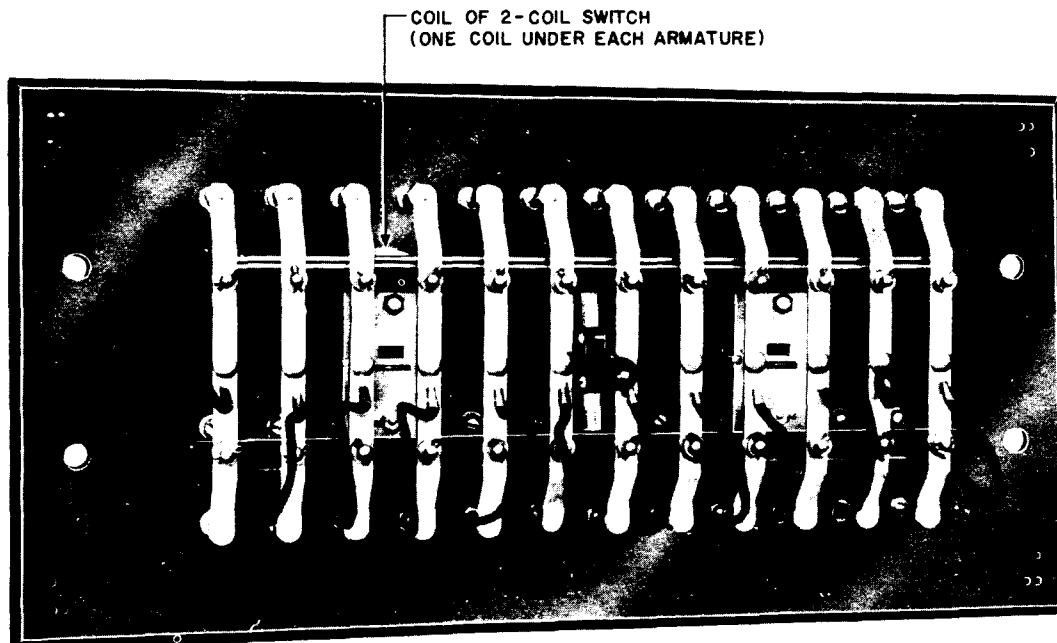
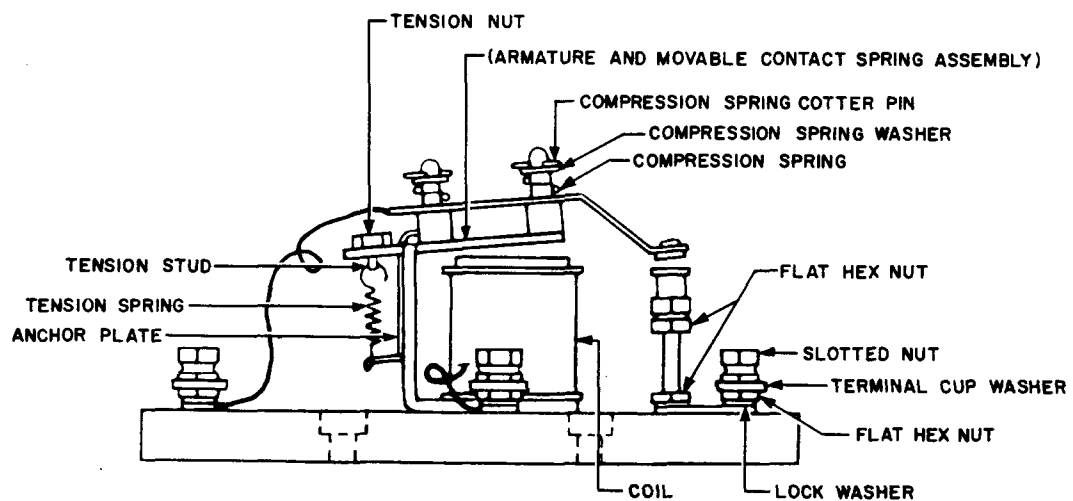


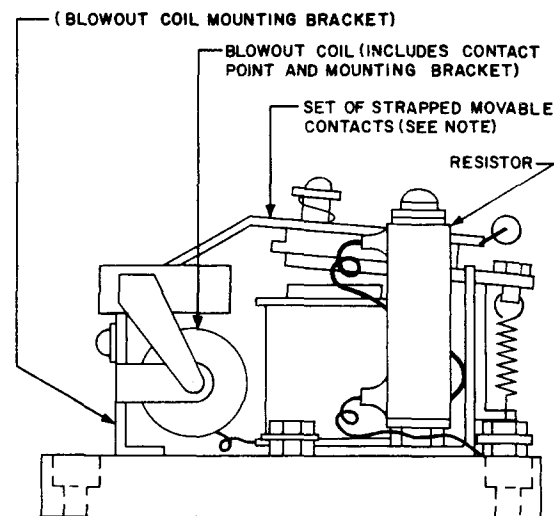
Fig. 2 — KS-5264 Transfer Switch — End View



**Fig. 3 – KS-5264 Transfer Switch
(2-Coil, Earlier Type Switch Shown)**

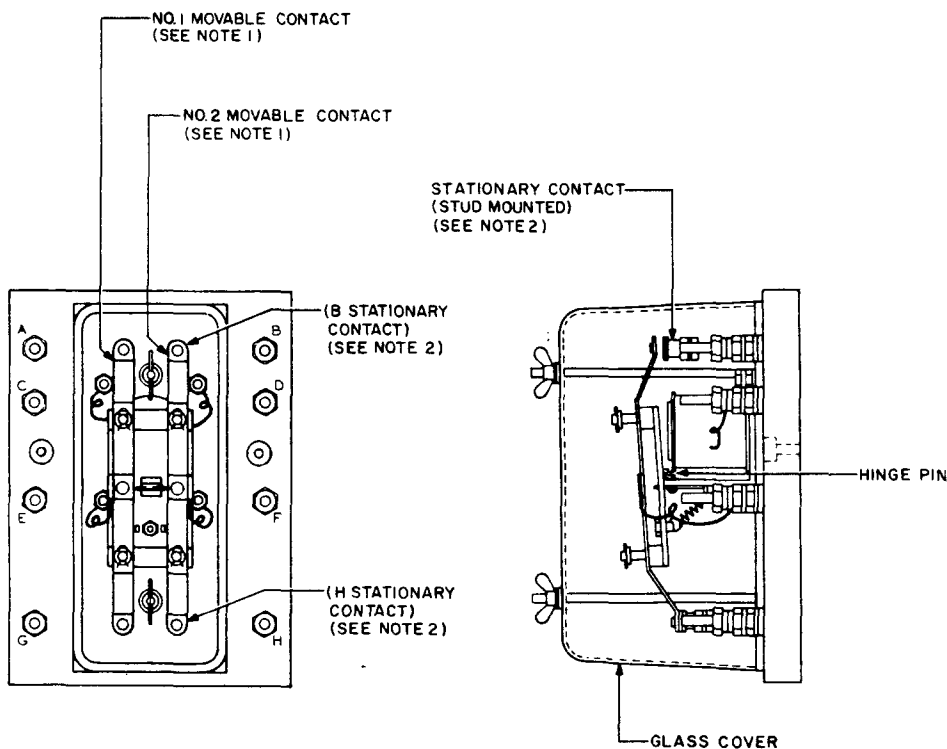


**Fig. 4 – KS-5350 Control Relay (Knife-Edge Armature Pivot
and Anchor Plate Type Relay Shown)**



NOTE: EACH MOVABLE CONTACT CONSISTS OF A CONTACT SPRING AND A CONTACT POINT. THE TWO MOVABLE CONTACTS ARE JOINED PERMANENTLY BY A WIRE STRAP. IN ADDITION, IN SOME CASES, A LEAD IS ATTACHED TO A MOVABLE CONTACT AND IS PART OF THE SET OF CONTACTS.

Fig. 5 – KS-5350 Control Relay (List 37 Shown)

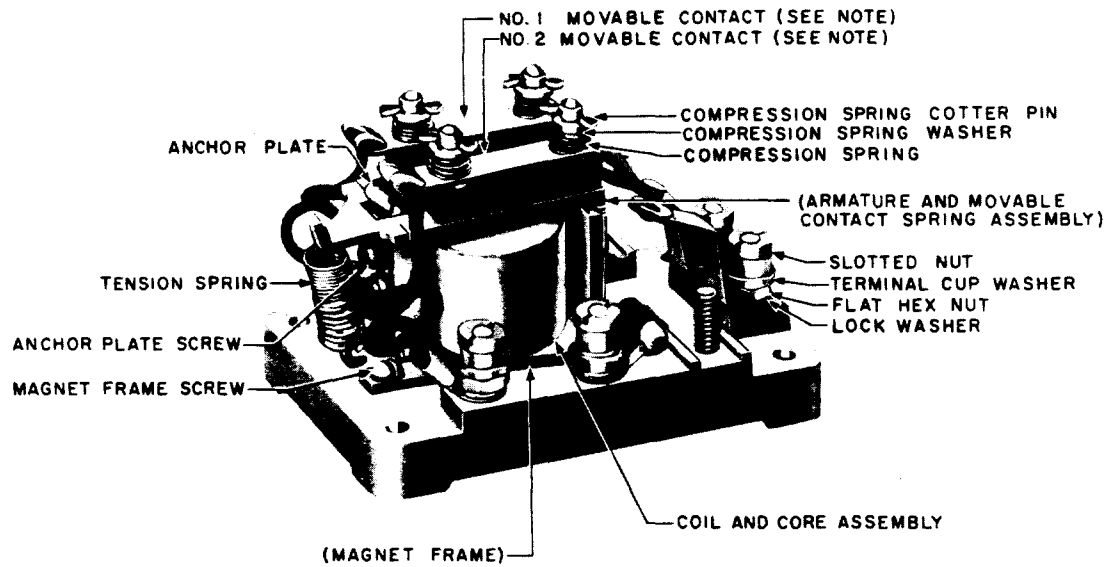


NOTES:

1. EACH MOVABLE CONTACT INCLUDES A CONTACT SPRING, A CONTACT POINT AT EACH END ON A DOUBLE THROW OR A CONTACT POINT AT ONE END ON A SINGLE THROW, AND A LEAD. MOVABLE CONTACTS ARE NUMBERED FROM LEFT TO RIGHT STARTING WITH NO.1, WHEN VIEWING THE TOP OF THE RELAY WITH THE OPEN END OF THE ARMATURE UPWARD.

2. WHEN ORDERING B OR H STATIONARY CONTACT FOR THE KS-5350L22 CONTROL RELAY, SPECIFY - CARBON STATIONARY CONTACT. WHEN ORDERING OTHER STATIONARY CONTACTS FOR THIS RELAY, SPECIFY - SILVER STATIONARY CONTACT.

Fig. 6 – KS-5350 Control Relay (List 22 Shown)



NOTE: EACH MOVABLE CONTACT INCLUDES A CONTACT SPRING, A CONTACT POINT, AND A LEAD. MOVABLE CONTACTS ARE NUMBERED FROM LEFT TO RIGHT STARTING WITH NO. 1, WHEN VIEWING THE TOP OF THE RELAY WITH THE OPEN END OF THE ARMATURE UPWARD.

Fig. 7 – KS-5451 Relay
(List 1 Shown)

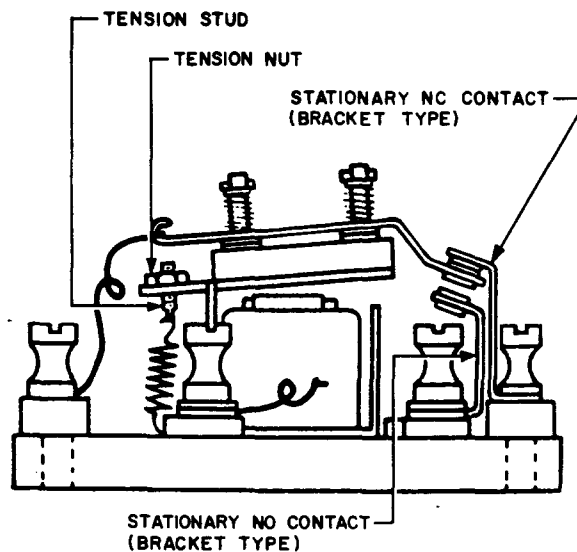


Fig. 8 – KS-5451 Relay
(List 21 Shown)

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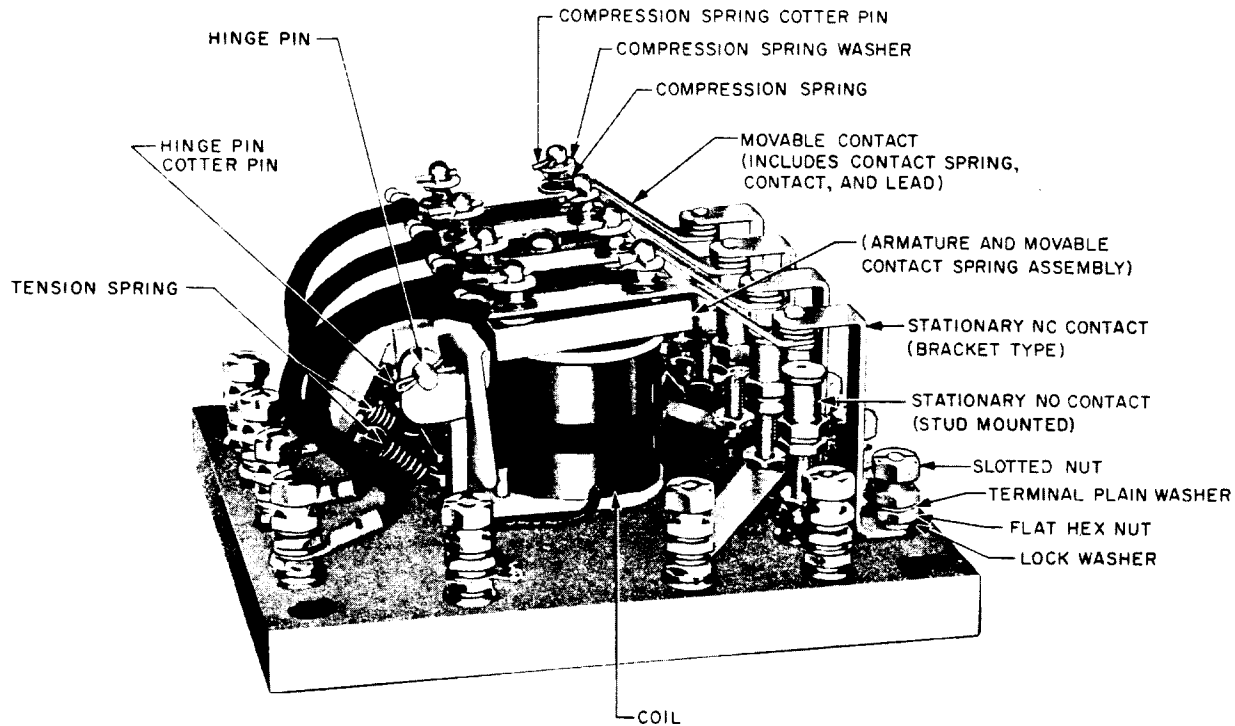
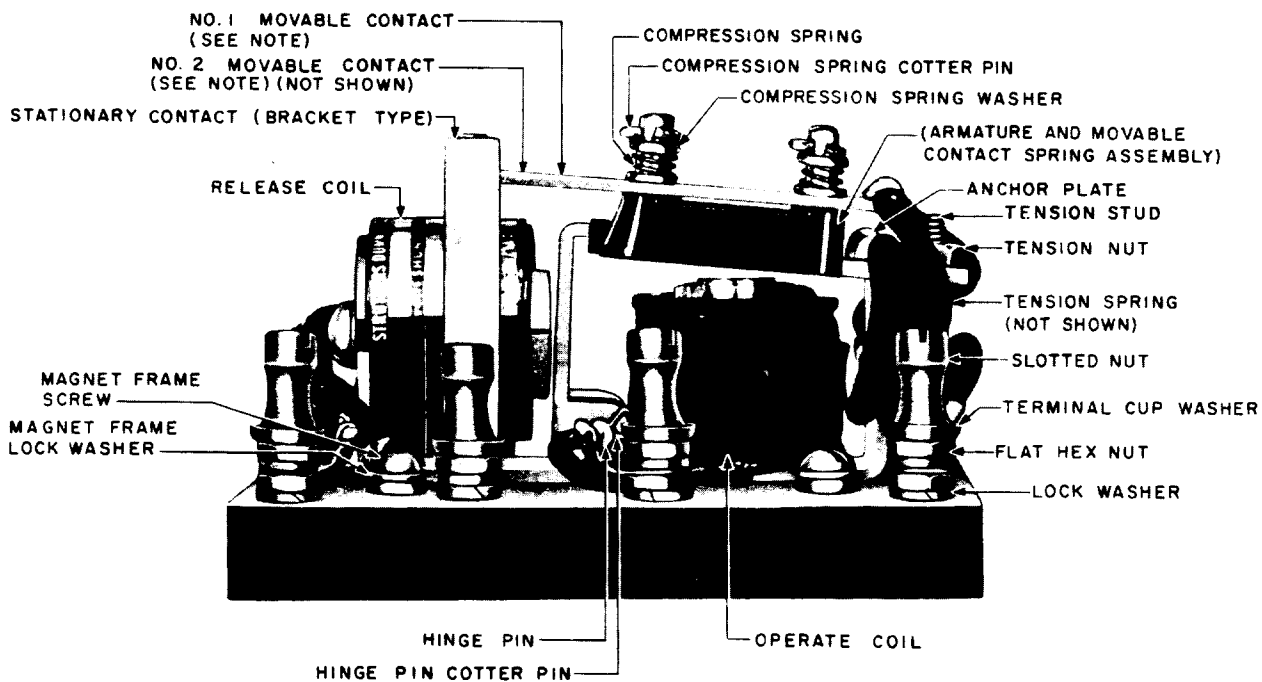


Fig. 9 – KS-5728 Relay



NOTE: EACH MOVABLE CONTACT INCLUDES A CONTACT SPRING, A CONTACT POINT, AND A LEAD. MOVABLE CONTACTS ARE NUMBERED FROM LEFT TO RIGHT STARTING WITH NO. 1, WHEN VIEWING THE TOP OF THE RELAY WITH THE OPEN END OF THE ARMATURE UPWARD.

Fig. 10 – KS-15503 Relay

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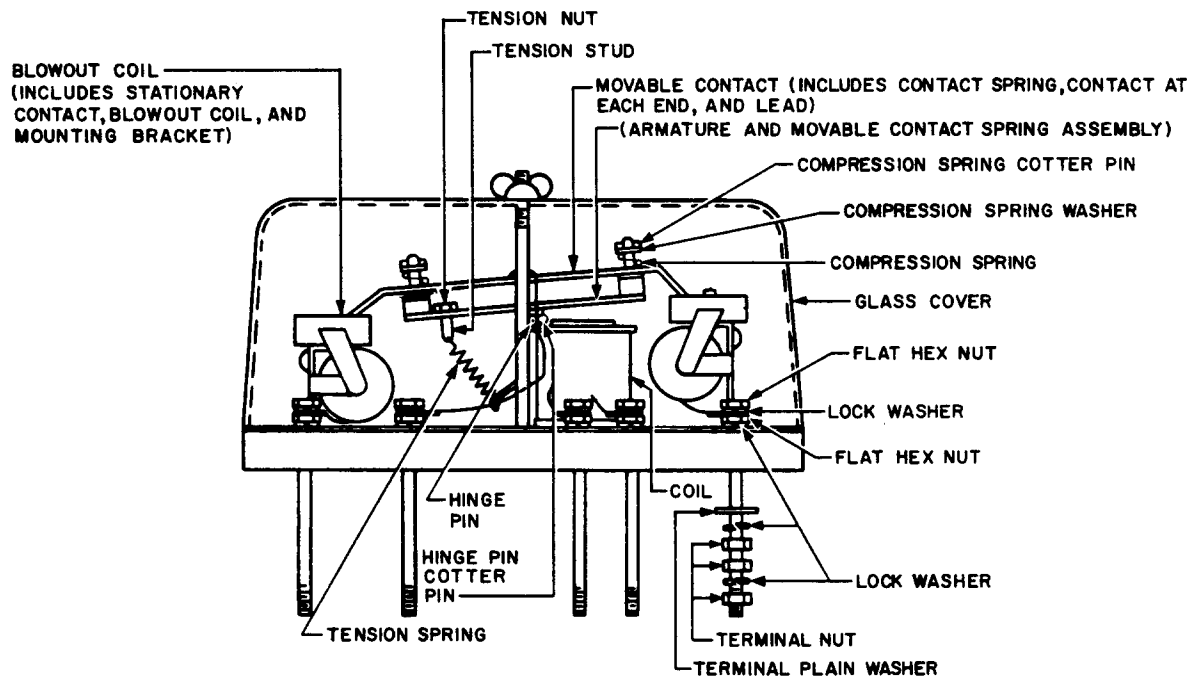


Fig. 11 – KS-15598 Relay

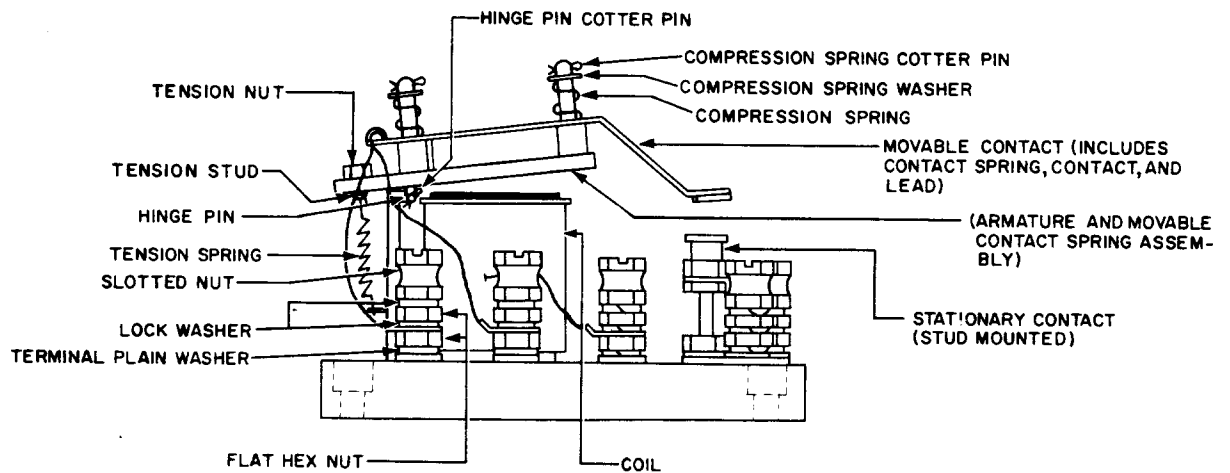


Fig. 12 – KS-15806 Relay

3. REPLACEMENT PROCEDURES**3.01 List of Tools, Materials, and Test Apparatus**

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
63	5/16-, 3/8-, and 7/16-inch Open-end Wrench
417A (2 required)	1/4- and 3/8-inch Open Double-end Flat Wrench
KS-6780 L (as required)	Connecting Clip
—	Long-nose Pliers
—	3-inch C Screwdriver (or the replaced 3-inch cabinet screwdriver)
—	5-inch E Screwdriver
MATERIALS	
— (as required)	No. 14 Insulated Copper Wire
TEST APPARATUS	
— (as required)	No. 893 Cord, 3 Feet Long, Equipped With Two No. 360A Tools (No. 1W13A Cord) and Two No. 365 or KS-6278 Connecting Clips
— (as required)	No. 893 Cord, 6 Feet Long, Equipped With Two No. 360A Tools (No. 1W13B Cord) and Two No. 365 or KS-6278 Connecting Clips

3.02 Caution: Use care when working in close quarters with live parts. Do not touch at the same time or short circuit live terminals or parts which are at different potentials. Disconnect all power from the coils and contact circuits by opening switches, if provided, or by removing the fuse or fuses, or by otherwise making disconnections as required.

3.03 Maintenance of Service: Before making any replacements, be sure that service will be maintained by means of temporary wiring. To maintain service while work is being done affecting closed contacts of working circuits, bridge the current-carrying contacts, making the connections at the most convenient points in the circuit other than at the relay, if practicable. For strapping where the voltage does not exceed 150 volts, No. 1W13A or 1W13B cords are suggested, with No. 365 connecting clips or KS-6278 connecting clips at both ends. Lengths of No. 14 wire, or of flexible cord, such as is commonly used in lighting circuits, with KS-6780 connecting clips, are required where the voltage exceeds 150 volts.

3.04 Removal of Relay or Switch From Panel: When it is necessary to remove a relay or switch to gain access to the back of the base to facilitate the replacement of parts, tag the leads before disconnecting them to facilitate reconnecting them. Remove the apparatus from the panel using the proper wrench or screwdriver.

3.05 After making any replacement of parts of a relay or transfer switch, the part or parts replaced shall meet the readjust requirements involved as specified in Section 040-633-701. Other parts whose adjustments may have been directly disturbed by the replacement operations shall be checked to the readjust requirements and an over-all operation check shall be made of the relay or transfer switch before restoring the circuit to service.

3.06 No replacement procedures are specified for parts where the replacement consists of a simple operation.

3.07 Tension Spring (Adjustable): To replace the tension spring, remove the tension nut, raising the stud so that the nut will be free of the stops in its removal. Removal of the nut will free the tension stud. Unhook both ends of the tension spring. Replace the tension spring and reassemble in the reverse order.

3.08 Tension Stud and Nut: To replace the tension stud and nut, remove the parts as covered in 3.07. Replace parts as required and reassemble in the reverse order.

3.09 Tension Spring (Not Adjustable): To replace the tension spring, unhook both ends of the spring using the long-nose pliers. Replace the tension spring and reassemble in the reverse order.

3.10 Anchor Plate: To replace the anchor plate, remove the tension spring as covered in 3.07 or 3.09, as required. Remove the screw or screws securing the anchor plate to the magnet frame using the C screwdriver. Replace the anchor plate and reassemble in the reverse order.

3.11 Compression Spring Held by Hexagonal Head Screw: To replace the compression spring, remove the hexagonal head screw with a suitable open end wrench. Replace the compression spring and reassemble in the reverse order.

3.12 Compression Spring Held by Cotter Pin and Washers: To replace any of these parts, remove the cotter pin using the long-nose pliers. Remove and replace parts as required and reassemble in the reverse order, spreading the ends of the cotter pin as required to hold the washer in place.

Contacts

3.13 Movable Contact: To replace a movable contact, replace the complete contact spring which includes the contact, contact spring, and a permanently attached lead. If adjacent contact springs are joined by a permanently attached lead, replace the joined contact springs and lead as a set. To remove a contact spring, disconnect the attached lead from the screw terminal using the E screwdriver or the No. 417A wrench as required. Remove the compression springs and associated parts as covered in 3.11 or 3.12, as required. Replace the contact spring and reassemble in the reverse order.

3.14 Stationary Contact (Bracket Type): To replace a stationary contact consisting of a bracket and contact assembly, remove the terminal screw using the E screwdriver or the No. 417A wrench as required, remove the washers, disconnect the external lead from the

terminal, and then remove the nut which secures the bracket to the relay base using the No. 417A wrench. Replace the contact bracket and reassemble in the reverse order.

3.15 Stationary Contact (Stud Mounted): To replace a stationary contact which is stud mounted, hold the locknut under the stationary contact with the No. 417A wrench, and turn the contact counterclockwise using the other No. 417A wrench. Remove the contact, leaving the washer in place above the locknut. Replace the contact and reassemble in the reverse order.

3.16 Removal of Armature and Movable Contact Spring Assembly Held by Anchor Plate: Remove the screw or screws which secure the anchor plate, or anchor plates on the KS-5264 transfer switch, to the magnet frame, using the C screwdriver. On the KS-5264 transfer switch, if the mechanical lock is the later type, tilting type, loosen the setscrew in the side of the handle at least one turn, using the C screwdriver, and unscrew the handle from the lock. If the armature tension spring interferes with the removal of the anchor plate screws, remove the spring as covered in 3.07 or 3.09, as required. The removal of the anchor plate screws will free the entire armature and contact spring assembly and the anchor plate which can then be removed. To facilitate the work, the leads attached to the armature contact springs may be disconnected, after tagging, from their screw terminals.

3.17 Removal of Armature and Movable Contact Spring Assembly Held by Hinge Pin:

To remove an armature and movable contact spring assembly, remove the cotter pin at one end of the hinge pin and remove the hinge pin, using the long-nose pliers. This will free the entire armature and contact spring assembly which can then be removed. To facilitate work, the leads attached to the armature contact springs may be disconnected, after tagging, from their screw terminals.

Coils

3.18 KS-5264 Transfer Switch: To replace a coil, proceed as follows with the mechanical lock in the neutral position. Remove the

armature and movable contact spring assembly as a unit, including all the contact springs and armatures of the switch, as covered in 3.16. Mark the coil leads, for later reference, to indicate their respective terminal connections. Disconnect the coil leads from the terminals using the E screwdriver or the No. 63 wrench as required. Insert the E screwdriver in the hole in back of the panel and remove the magnet core screw that secures the core to the base. Remove the core from the coil and replace the coil and reassemble in the reverse order,
 ↗ comparing the coil leads with the marked leads of the replaced coil for correct terminal connections.

3.19 KS-5350, KS-5728, KS-15503, KS-15598, or KS-15806 Relay: To replace an operate coil on the KS-15503 relay and a coil on any other of these relays, proceed as follows. Remove the glass cover, if furnished on the relay. Then remove the armature and movable contact spring assembly as a unit as covered in 3.16 or 3.17 as required. Disconnect the coil leads from their screw terminals using the E screwdriver or the No. 417A wrench as required. Remove the sealing compound in back of the relay base covering the magnet core mounting screw and remove the screw using the E screwdriver. Remove the core from the coil and substitute a new coil. Reassemble in the reverse order.

↗ **3.20 KS-15503 Relay:** To replace a release coil on the KS-15503 relay, remove one of the stationary bracket-type contacts as covered in 3.14. Remove the armature and contact spring assembly as covered in 3.16 or 3.17, as required. Disconnect the coil leads from their screw terminals using the E screwdriver or the No. 417A wrench as required. Remove the magnet core mounting screw using the E screwdriver and remove the core and coil. Remove the core from the coil, substitute a new coil, and reassemble
 ↗ in the reverse order.

3.21 KS-5451 Relay: To replace a coil, remove the armature and movable contact spring assembly as a unit as covered in 3.16 or 3.17,

as required. Disconnect the coil leads from their screw terminals using the E screwdriver or the No. 417A wrench as required. Remove the magnet frame screws which secure the magnet frame to the relay base using the E screwdriver and then remove the assembly of the magnet frame, core, and coil from the base. Remove the magnet core mounting screw using the E screwdriver and remove the core and coil from the magnet frame. Substitute a new coil and core assembly and reassemble in the reverse order.

3.22 Blow-Out Coil (Earlier Type): The earlier type blow-out coil is fastened to its mounting bracket by means of one screw. To replace the blow-out coil, remove the sealing compound which covers the two screws in back of the relay base which secure the blow-out coil mounting bracket to the relay base. Remove the two screws using the C screwdriver and remove the mounting bracket, blow-out coil, and attached contact as an assembly. Replace the assembly with the later-type blow-out coil assembly, including the later-type mounting bracket, and reassemble in the reverse order.

3.23 Blow-Out Coil (Later Type): The later-type blow-out coil is fastened to its mounting bracket by means of two screws. To replace the blow-out coil, disconnect the blow-out coil lead from its screw terminal using the E screwdriver or the No. 417A wrench as required. Loosen the two screws which secure the blow-out coil to its mounting bracket using the C screwdriver and remove the blow-out coil and attached contact from the bracket as an assembly. Replace the blow-out coil and contact assembly and reassemble in the reverse order.

Mechanical Lock

3.24 To replace the mechanical lock, remove the screws that secure the mechanical lock to the switch base from the back of the base using the regular screwdriver and then remove the mechanical lock. Substitute the new mechanical
 ↗ lock and reassemble in the reverse order.

REASONS FOR REISSUE

1. To add replacement information for the KS-5264 transfer switch due to change in manufacture (Fig. 1 and 3.16).
2. To add figures for the KS-5350 control relay (Fig. 4, 5, and 6).
3. To add a figure and to revise replacement information due to change in manufacture for the KS-5451 control relay (Fig. 8 and 3.21).
4. To add the KS-5728, KS-15503, KS-15598, and KS-15806 control relays (Fig. 9, 10, 11, and 12, and 3.19 and 3.20).
5. To revise the list of tools, materials, and test apparatus (3.01).
6. To add safety precautions (3.02).
7. To amplify the procedure for maintenance of service (3.03).
8. To add a procedure for general application on removal of apparatus from the panel (3.04).
9. To amplify the procedure for replacing the adjustable armature tension spring (3.07).
10. To add replacement information on movable contacts joined by permanent wiring (3.13).
11. To amplify the procedure for removal of the armature and movable contact spring assembly (3.16).
12. To add replacement information for an armature held by a hinge pin (3.17).
13. To amplify coil replacement information on the KS-5264 transfer switch (3.18).
14. To add a procedure for replacement of blow-out coils (3.22 and 3.23).
15. To revise replacement information on the mechanical lock (3.24).