

MAINTENANCE INSTRUCTION

MOTOR OPERATED TRANSFER SWITCH SWITCH MODULE

INTRODUCTION

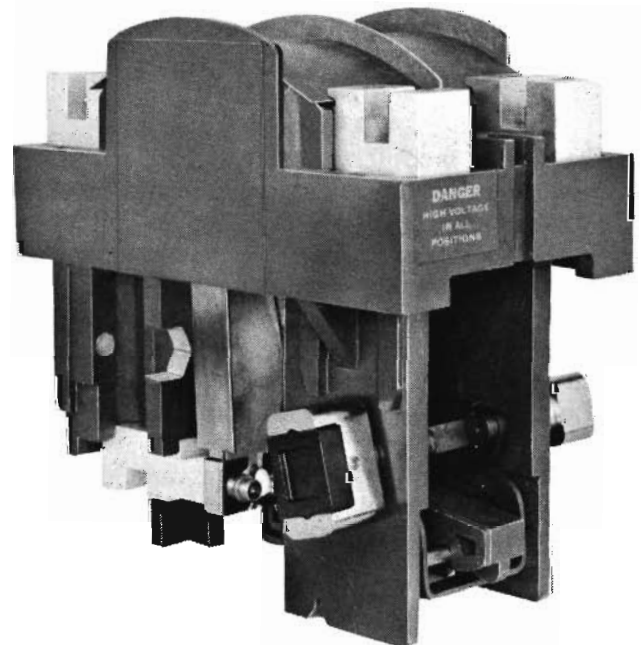
This publication provides maintenance data for the switch module portion of the transfer switch assembly. Refer to Maintenance Instruction M.I. 5421-2 for data on the motor module.

The motor operated transfer switch assembly is made up of from two to six power switches mounted on a common support of length to suit the total number of switches used. The switches are driven by a single motor through a segmented shaft, and a positive feed to the motor is required to move the switch contacts. When the motor operates to drive the switches, all poles operate together, and once the switches are positioned, they will not drop out.

DESCRIPTION

The switch module, Fig. 1, is rated at 1200 amperes and is designed to set up various power circuits. The actual switching function is provided by power contactors which make and interrupt the motor current. Hold-on features are built into the switch module to prevent the contacts from blowing open under fault current conditions.

Each switch module of the composite assembly is coupled to the motor module through couplings along the segmented shaft. Any switch or motor module can be removed or inserted without disturbing the other modules as long as the motor output shaft is manually rotated to the neutral "O" position. The mounting screws are accessible from the front. The movable contacts are operated through a spring-loaded linkage to the out-



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Fig.1 - Switch Module 8453174

put shaft. The springs provide the initial contact loading and the overtravel for contact wear. The stationary contacts are "trifurcated" to provide multiple current paths to minimize voltage drop at the contacts and to provide maximum service.

A motor cut-out relay, when added to the front of the switch module, provides a means of lifting the spring-loaded linkage to lock the movable contacts in the neutral position. A specific traction motor may thus be isolated from the power source. Additional interlock circuits are provided as part of the motor cut-out assembly.

*This bulletin is revised and supersedes previous issues of M.I. 5421 and M.I. 5421-1. It is to be used in conjunction with M.I. 5421-2.

This Maintenance Instruction applies to the following switch modules:

Description	Usage	Part No.
55° Without Motor Cut-Out	Off-Highway Vehicle	8422927
55° With Motor Cut-Out	Locomotive	8437887
220° With Motor Cut-Out	Locomotive	8453175
220° Without Motor Cut-Out	Locomotive	8453174

These instructions apply to all the switch modules unless specifically identified.

SAFETY PRECAUTIONS

WARNING

The switch module was designed for specific application to set up various circuits where circuits and devices are enclosed in suitably protective cabinets. Care has been taken in the design of the equipment to provide adequately for the safety of operating and service personnel, provided reasonable care and caution are exercised in the performance of operating and service functions.

The following safety considerations should always be carefully observed in the application, operation, or servicing of the equipment.

1. ELECTRICAL RATINGS of the equipment are values that should be considered to be **EXTREMELY DANGEROUS** to personnel.
2. EQUIPMENT SHOULD ALWAYS BE COMPLETELY DE-ENERGIZED BEFORE HANDLING OR PERFORMING ANY SERVICE OPERATIONS. Moving the switch contacts to the neutral position is not sufficient to render the equipment safe; the power lines must be disconnected or otherwise de-energized. If power lines are not de-energized, all parts of the device should be considered to be at maximum system voltage.
3. IF INSPECTION OF ENERGIZED EQUIPMENT IS NECESSARY, DO NOT TOUCH OR HANDLE ANY PARTS, OR INSPECT AT CLOSE RANGE. The discharge of hot gases and particles is always possible when the device is operated in an energized circuit.

4. Operating temperatures for the switch are high. Some parts of these devices may reach temperatures in excess of 93° C (200° F), **SERIOUS BURNS CAN RESULT FROM HANDLING THE EQUIPMENT AFTER IT HAS BEEN IN SERVICE AND BEFORE IT HAS BEEN ALLOWED TO COOL.**

SWITCH MODULE MAINTENANCE

Only skilled personnel familiar with electrical equipment and the hazards involved should be permitted to service the switch module. All safety precautions must be observed.

Minimum maintenance is required to keep the switch module in serviceable condition. Moving mechanical parts should be free from excess friction. Parts should also be checked for excessive wear. The bearing surfaces of the switch are designed to operate without lubrication. Do not oil or grease at any time.

Overheated parts are a sign of trouble and are recognized by oxidation of the silver plating on copper parts and by discoloration of molded parts. Pitting and discoloration on the contact tips are not critical until such erosion has consumed most of the contact material. Contacts are normally oxidized and smoked from regular service. Other switch parts should not show effects of high temperature operation.

The switch module should be kept clean, connections tight, and should be inspected and serviced at intervals as specified in the applicable Scheduled Maintenance Program.

Switch module maintenance parts have been grouped into kits. Refer to Service Data at rear of this Maintenance Instruction for kit contents and kit part numbers.

CONTACT MAINTENANCE

The contacts are not intended to interrupt large currents and are not likely to require much servicing, but should be inspected at regular intervals.

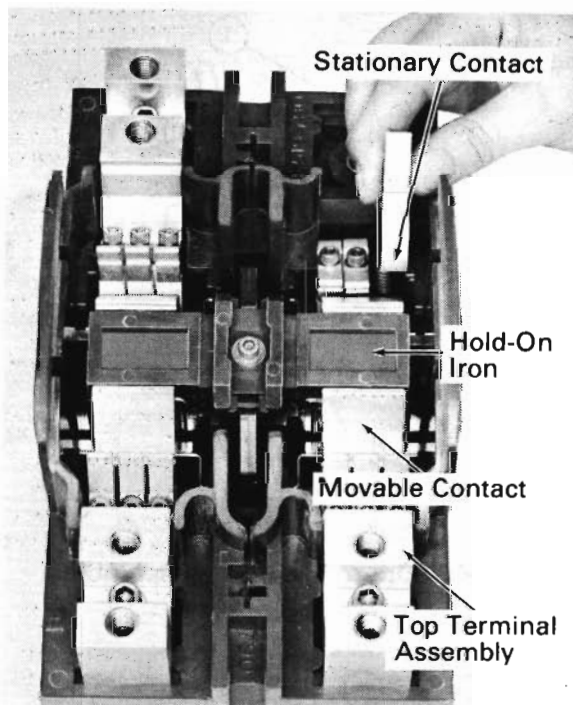
The contact tips must be free of foreign objects, but need not be smooth. Contact tips should not be cleaned, dressed or filed. The contacts will operate satisfactorily even though blackened, pitted, or eroded. Overtravel is provided at the contact support to compensate for allowable wear.

CAUTION

When performing locomotive circuit checks that require circuit isolation at a particular switch module, do not place paper or other insulating material between the contacts. Foreign material left on the contact tips can lead to failure of the switch. Refer to the applicable Locomotive Service Manual for instructions on centering an individual switch of the transfer switch assembly.

INSPECTION

1. Remove top covers by pushing one end of each cover out of slot in base molding and lift off.
2. Inspect the four stationary contact assemblies, Fig. 2, (three contacts to each assembly). Refer to Fig. 3 to determine if contacts are usable or require replacement. If one is eroded beyond wear limits shown in Fig. 3, replace stationary contact assembly and the mating movable contact.



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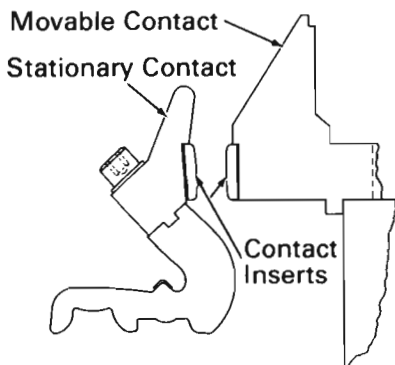
Fig.2 - Contact Assemblies

REMOVING AND REPLACING MOVABLE CONTACT ASSEMBLY

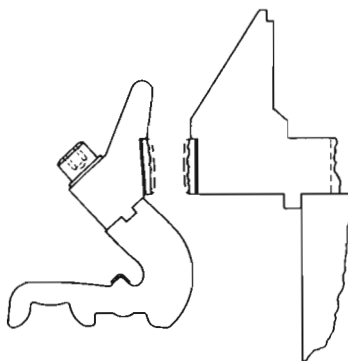
1. Remove operating head (4, Fig. 4) from operating lever (5) by removing screw (1) and washers (2, 3).
2. Remove two screws (1, Fig. 5), lockwashers (2), hold-on iron (3), pivot bracket (4), and movable contact (5).
3. Place new movable contact (5) over top of movable contact support (6). Add pivot

bracket (4), making certain that lower pivot ends engage with pivot guides. Add the hold-on iron (3) and two new screws and two new lockwashers (1, 2), but do not tighten screws at this time.

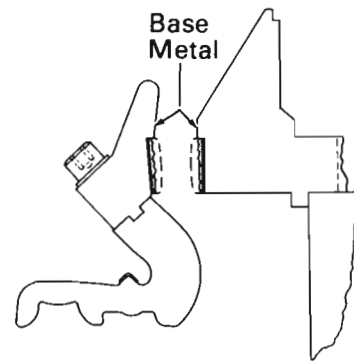
4. Center the hold-on iron within the top terminal molding to provide a minimum of 0.38 mm (.015") clearance on each side. Tighten screws.
5. Repeat Steps 1 thru 4 at the second movable contact assembly.



New Contacts



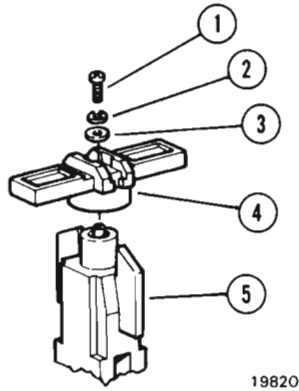
These contact inserts are rough, but still have enough insert material remaining to make them usable.



Contact inserts are worn to contact base metal. Replace stationary and movable contacts.

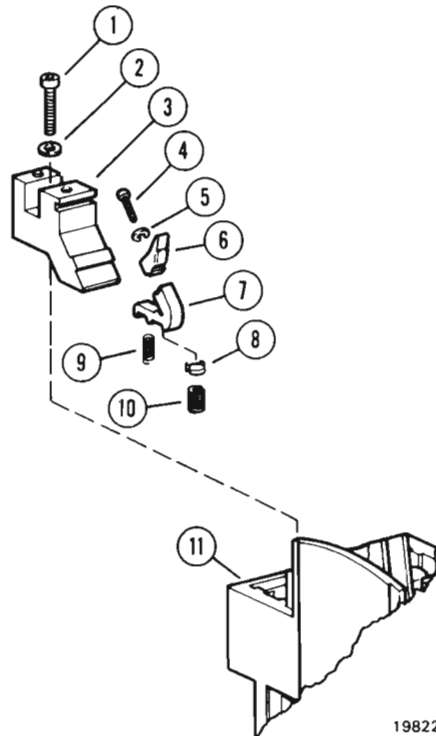
Fig.3 - Contact Wear Limits

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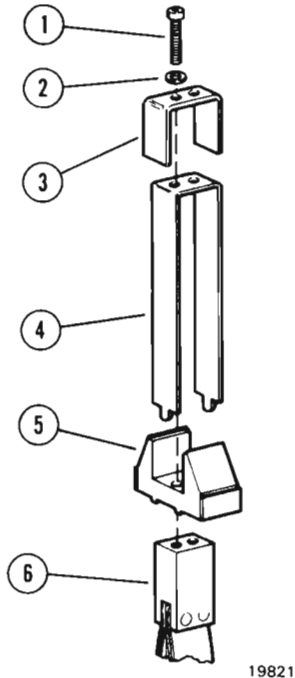
- 1. Screw
- 2. Lockwasher
- 3. Plain Washer
- 4. Operating Head
- 5. Operating Lever

Fig.4 – Operating Head Assembly



- 1. Screw
- 2. Lockwasher
- 3. Top Terminal Assembly
- 4. Screw
- 5. Lockwasher
- 6. Stationary Contact Tip
- 7. Stationary Contact Support
- 8. Pivot Spring Cap
- 9. Wipe Spring
- 10. Pivot Spring
- 11. Base Molding

Fig.6 – Stationary Contact Assembly



- 1. Screw
- 2. Lockwasher
- 3. Hold-On Iron
- 4. Pivot Bracket
- 5. Movable Contact
- 6. Movable Contact Support

Fig.5 – Movable Contact Assembly

REMOVING AND REPLACING STATIONARY CONTACT ASSEMBLIES

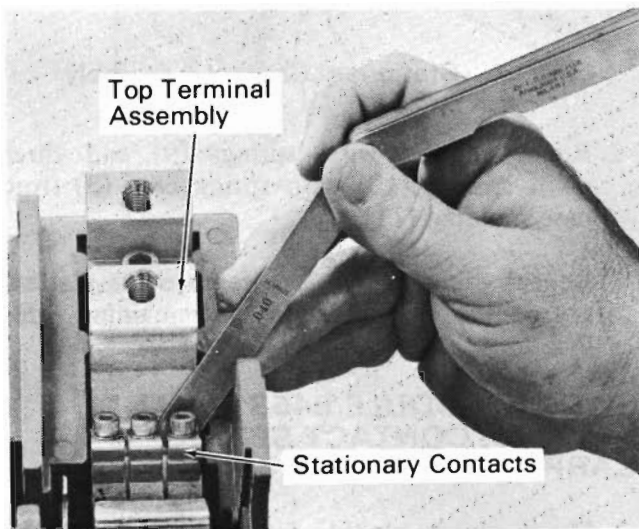
If inspection has determined that any one of the three stationary contact tips (6, Fig. 6) requires replacement, replace all three to maintain proper contact pressure distribution.

1. Remove screw (1, Fig. 6), releasing top terminal assembly (3) with the three stationary contact tips (6) and supports (7).
2. Remove three wipe springs (9) and three pivot springs (10) with spring caps (8) from base molding (11).
3. Repeat Steps 1 and 2 to remove the stationary contact assemblies in the remaining three locations.
4. Mate new stationary contact tips (6) to stationary contact supports (7). Secure the tips with new screws (4) and lockwashers (5). Ensure tips are centered on supports.
5. Ensure support areas for wipe springs (9) and pivot springs (10) are free of all foreign particles.
6. Place a wipe spring (9) over each of the three small pins in one of the four contact pockets.
7. Place a pivot spring (10) over each of the three larger pins in the same contact pocket.

8. Attach a pivot spring cap (8) to the bottom of each of the three stationary contact supports (7) by the spring tension of the two ears on spring cap. Bend ears inward, if necessary, to bind on the contact support.
9. Place one contact assembly with attached spring cap over wipe spring and pivot spring, making certain that the spring cap is firmly seated over the top of pivot spring. Position the remaining two contact assemblies in the same manner.
10. Insert the pointed nose of top terminal assembly (3) into the cavity in back of the stationary contact assembly, engaging the pivots of the mating parts.
11. Secure top terminal assembly (3) to base molding (11) with screw (1) and lockwasher (2). Be certain the pivots remain engaged and that the rear end of the top terminal assembly touches the base molding.
12. Check for freedom of motion at each stationary contact. A clearance of 0.51 mm to 1.14 mm (.020" to .045") shall be maintained behind the top edge of each stationary contact, Fig. 7.

NOTE

With device energized, gap between top terminal assembly and stationary contact tip shall be zero at one or more of the pivoted stationary contacts.



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Fig.7 - Checking Stationary Contact Clearance

13. Install the remaining three sets of stationary contacts and top terminal assemblies using the same procedure.

REBUILDING SWITCH MODULE

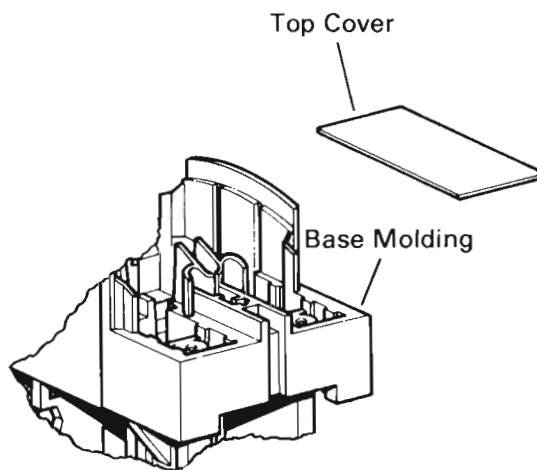
Under ordinary circumstances, replacement of the contacts is the extent of periodic maintenance required to ensure reliable operation. However, if the switch module is to be serviced or rebuilt for other reasons, use the following procedure.

WARNING

Do not disassemble switch module in the control cabinet. Disconnect switch module power cables and leads and remove switch module from the cabinet.

DISASSEMBLY

Remove top cover, Fig. 8, by pushing one end of each cover out of slot in base molding and lifting off. Remove the vertical barrier.

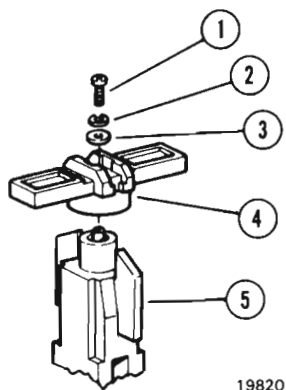


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Fig.8 - Top Cover Assembly

MOVABLE CONTACT ASSEMBLY

1. Remove operating head (4, Fig. 9) from operating lever (5) by removing screw (1) and washers (2, 3).
2. Remove two screws (1, Fig. 10) lockwashers (2), hold-on iron (3), pivot bracket (4), and movable contact (5).
3. Remove screw (10), releasing bottom terminal (12) with movable contact support (6).
4. Remove two screws (7) and lockwashers (8), releasing bottom terminal (12) and pivot guide (9) from movable contact support (6).
5. Repeat Steps 2, 3, and 4 to release the second movable contact assembly.



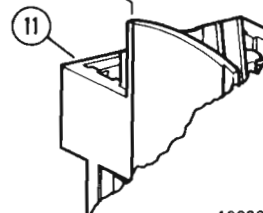
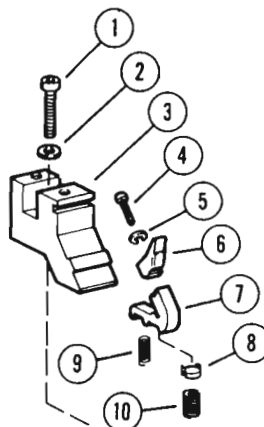
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- 1. Screw
- 2. Lockwasher
- 3. Plain Washer
- 4. Operating Head
- 5. Operating Lever

Fig.9 - Operating Head Assembly

STATIONARY CONTACT ASSEMBLY

1. Remove screw (1, Fig. 11), releasing top terminal assembly (3) with the three stationary contact tips (6) and supports (7).



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- 1. Screw
- 2. Lockwasher
- 3. Top Terminal Assembly
- 4. Screw
- 5. Lockwasher
- 6. Stationary Contact Tip
- 7. Stationary Contact Support
- 8. Pivot Spring Cap
- 9. Wipe Spring
- 10. Pivot Spring
- 11. Base Molding

Fig.11 - Stationary Contact Assembly

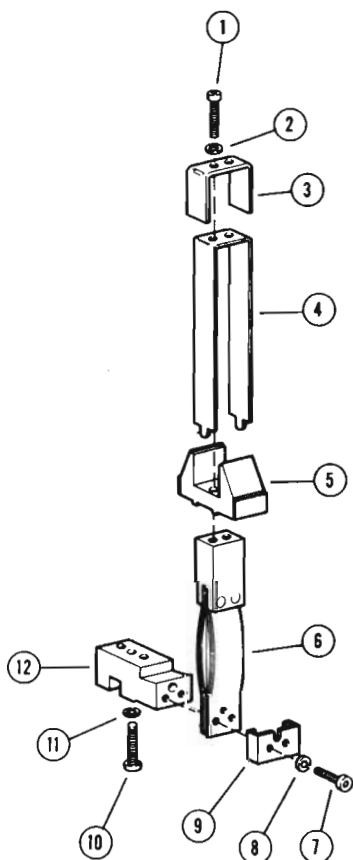
2. Remove three wipe springs (9) and three pivot springs (10) with spring caps (8) from base molding (11).

3. Repeat Steps 1 and 2 to remove the stationary contact assemblies in the remaining three locations.

SWITCH MODULE 8453174 AND 8453175, CONTACT SPRING CARRIER ASSEMBLY

1. Invert switch module for easy access to the parts.

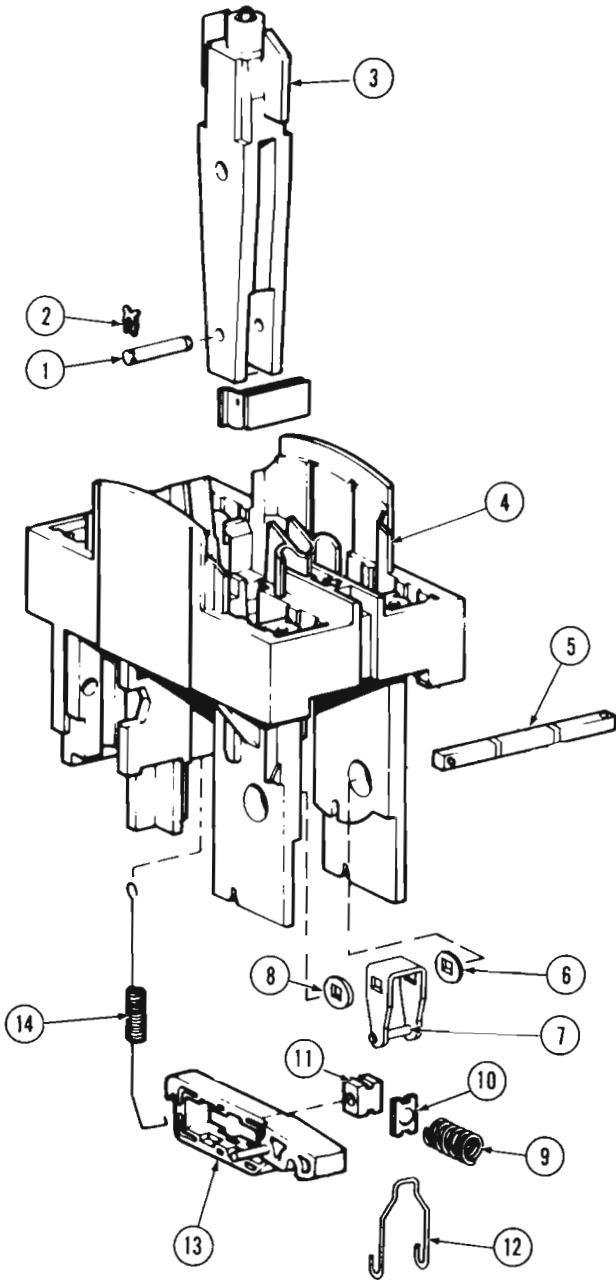
2. Unhook spring (15, Fig. 12) from contact spring carrier (14) and push down through base molding (4). Turn spring 90° and pull out through slot in base molding (4).



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- 1. Screw
- 2. Lockwasher
- 3. Hold-On Iron
- 4. Pivot Bracket
- 5. Movable Contact
- 6. Movable Contact Support
- 7. Screw
- 8. Lockwasher
- 9. Pivot Guide
- 10. Screw
- 11. Lockwasher
- 12. Bottom Terminal

Fig.10 - Movable Contact Assembly



- | | |
|--------------------|----------------------------|
| 1. Lower Pin | 8. Stop Washer |
| 2. X-Washer | 9. Compression Spring |
| 3. Operating Lever | 10. Spring Seat |
| 4. Base Molding | 11. Sliding Block |
| 5. Main Shaft | 12. Motor Cut-Out Link |
| 6. Stop Washer | 13. Contact Spring Carrier |
| 7. Main Lever | 14. Spring |

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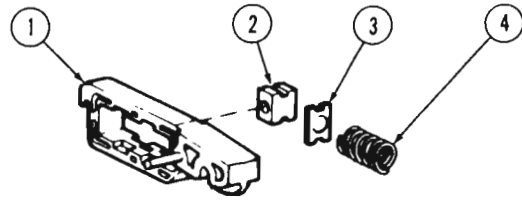
Fig.13 – Switch Module 8437887 And 8422927, Contact Spring Carrier Assembly

4. Slide the two spring seats (3) and sliding block (2) out of contact spring carrier (1).

OPERATING LEVER ASSEMBLY

NOTE

Movable contact support assemblies must be removed as indicated in the Movable Contact



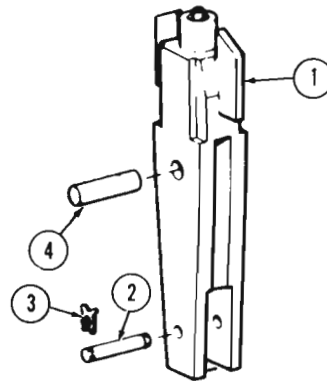
1. Contact Spring Carrier
2. Sliding Block
3. Spring Seat
4. Compression Spring

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Fig.14 – Contact Spring Carrier Compression Spring Removal

Assembly disassembly paragraph, prior to operating lever removal.

1. If contact carrier assembly has not been removed as indicated previously, and lower pin (2, Fig. 15) is in operating lever (1), remove lower pin (2).
2. Remove upper pin (4) from operating lever (1).
3. Lift operating lever (1) from top of the switch module.



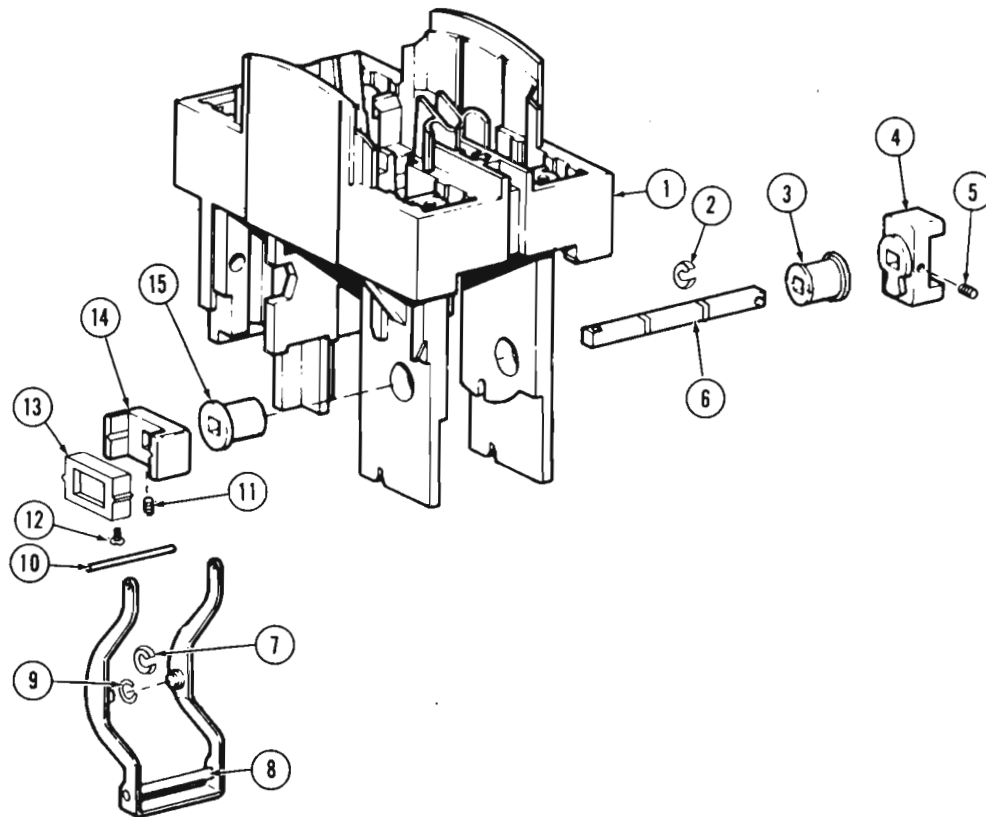
1. Operating Lever
2. Lower Pin
3. X-Washer
4. Upper Pin

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Fig.15 – Operating Lever Assembly

SWITCH MODULE 8453174 AND 8453175, MAIN SHAFT ASSEMBLY

1. Release setscrews (5 and 11, Fig. 16) in each of the couplings (4 and 14).
2. Remove couplings (4, 14) from main shaft.
3. Withdraw the main shaft (6) from either side, releasing bearings (3, 15).



- | | |
|-------------------|---------------------|
| 1. Base Molding | 9. Wire Form Spacer |
| 2. Retaining Ring | 10. Bearing Shaft |
| 3. Bearing | 11. Set Screw |
| 4. Coupling | 12. Machine Screw |
| 5. Set Screw | 13. Insert |
| 6. Main Shaft | 14. Coupling |
| 7. Retaining Ring | 15. Bearing |
| 8. Drive Lever | |

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Fig.16 - Switch Module 8453174 And 8453175,
Main Shaft Assembly

4. To remove drive lever assembly (8) and bearing shaft (10), remove machine screw (12).

SWITCH MODULE 8437887 AND 8422927, MAIN SHAFT ASSEMBLY

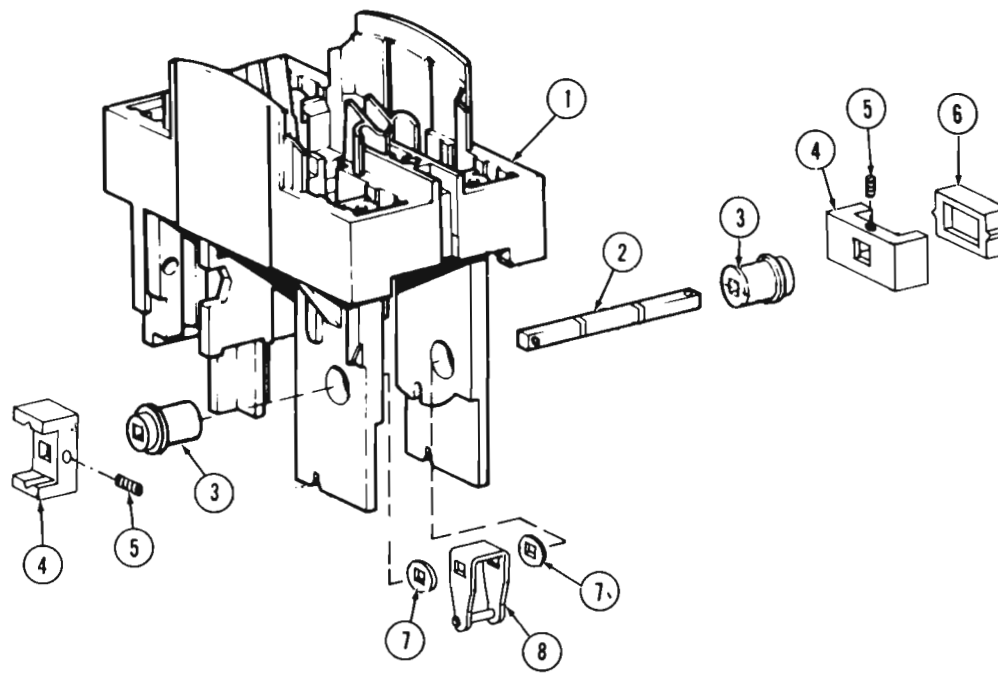
1. Release set screw (5, Fig. 17) in each of the couplings (4).
2. Remove couplings (4) from the main shaft (2).
3. Withdraw the main shaft (2) from either side, releasing bearings (3), stop washers (7) and drive lever assembly (8).

SWITCH MODULE 8453175 AND 8437887, MOTOR CUT-OUT ASSEMBLY

NOTE

If contact spring carrier (15 through 19 Fig. 18) has been removed from switch module, skip Steps 1 and 2 to remove motor cut-out assembly from switch module.

1. Lift end of contact spring carrier (18, Fig. 18) until the round shaft enters into the locking notches in base molding (1).
2. Lift the hooked ends of link (6) from the round shaft of the contact spring carrier (18).
3. Remove two screws (8) and lockwashers (9) releasing motor cut-out from the base molding (1).
4. Remove two screws (4) separating armature (7) and support brackets (5) from the assembly of magnet yoke (10) and magnet core (14).
5. Remove screw (12) separating magnet coil (11) from magnet yoke (10) and magnet core (14).
6. Remove two screws (2) to release limit switch (3).



- | | |
|-----------------|--------------------|
| 1. Base Molding | 5. Set Screw |
| 2. Main Shaft | 6. Coupling Insert |
| 3. Bearing | 7. Stop Washers |
| 4. Coupling | 8. Drive Lever |

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Fig.17 – Switch Module 8437887 And 8422927,
Main Shaft Assembly

BUILDING SUBASSEMBLIES

To rebuild the switch module, start by rebuilding the major subassemblies. Perform the following procedures.

CONTACT SPRING CARRIER ASSEMBLY

1. Place contact spring carrier (1, Fig. 19) in a holding fixture.
2. Place one spring seat (3) into position with domed face upward.
3. Place compression spring (4) against spring seat (3). Compress the compression spring with a flat file until it can be positioned against the contact spring carrier as shown in Fig. 20.
4. Turn the assembly end for end, and place sliding block (2, Fig. 19) against the first spring seat (3), so the dovetails of the sliding block interlock with the contact spring carrier (1).
5. Place the second spring seat (3) over sliding block (2), domed face upward.

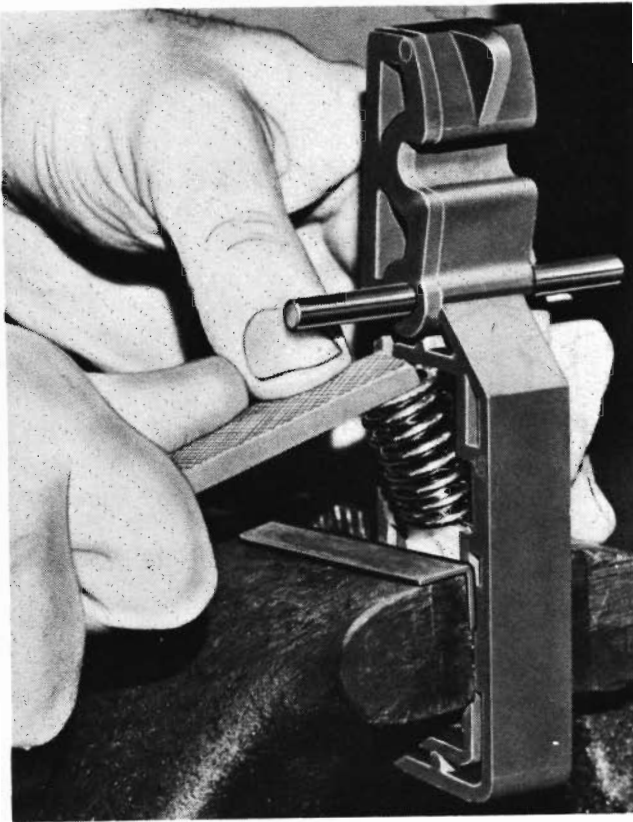
6. Place second compression spring (4) against its spring seat (3). Compress the compression spring with a flat file until it can be positioned in the contact spring carrier.

MOVABLE CONTACT SUPPORT AND BOTTOM TERMINAL ASSEMBLY

1. Position movable contact support (2, Fig. 21) against bottom terminal (1) so rivet head engages with clearance hole in the end of bottom terminal.
2. Place pivot guide (3) around end of movable contact support (2).
3. Assemble with two screws (5) and lockwashers (4), but do not tighten screws at this time.

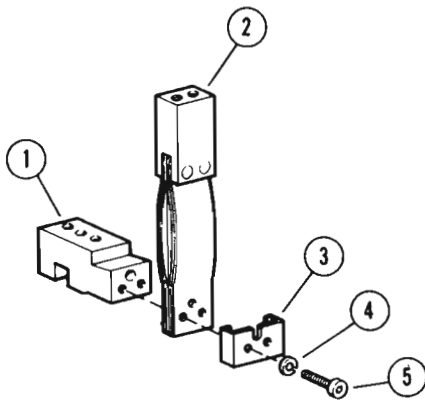
STATIONARY CONTACT ASSEMBLIES

1. Mate stationary contact tips (6, Fig. 22) to stationary contact supports (7). Secure the tips with screws (4) and lockwashers (5). Ensure tips are centered on supports.



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Fig.20 - Inserting Spring Into Contact Spring Carrier



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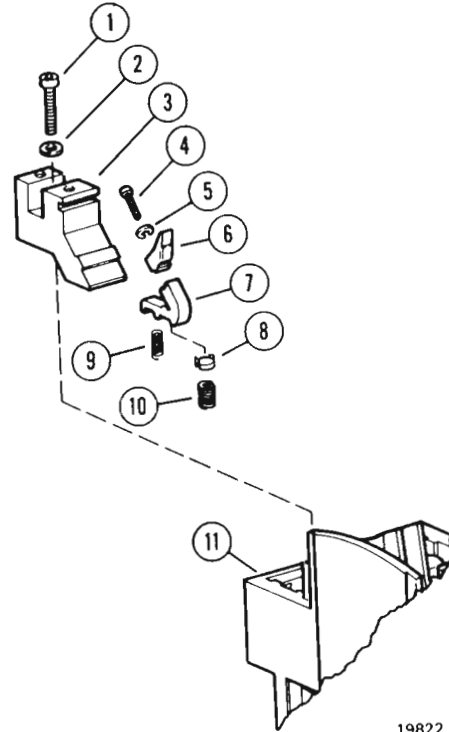
1. Bottom Terminal
2. Movable Contact Support
3. Pivot Guide
4. Lockwasher
5. Screw

Fig.21 - Movable Contact Support And Bottom Terminal Assembly

mm (.020" to .045") shall be maintained behind the top edge of each stationary contact, Fig. 23.

NOTE

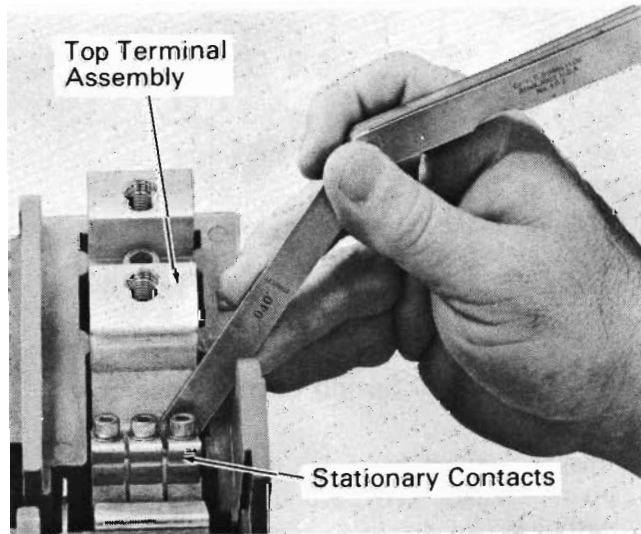
With device energized, gap between top terminal assembly and stationary contact tip shall be zero at one or more of the pivoted stationary contacts.



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1. Screw
2. Lockwasher
3. Top Terminal Assembly
4. Screw
5. Lockwasher
6. Stationary Contact Tip
7. Stationary Contact Support
8. Pivot Spring Cap
9. Wipe Spring
10. Pivot Spring
11. Base Molding

Fig.22 - Stationary Contact Assembly



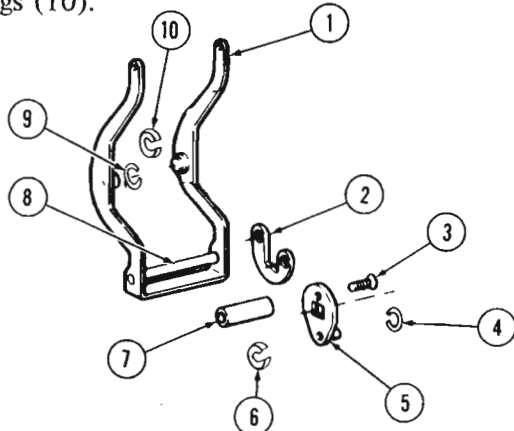
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Fig.23 - Checking Stationary Contact Clearance

10. Install the remaining three sets of stationary contacts and top terminal assemblies using the same procedure.

SWITCH MODULE 8453174 AND 8453175, DRIVE LINK ASSEMBLY

1. Place spacers (9, Fig. 24) and long legs of links (2) on studs on inside of drive lever (1) in the position shown. Secure with retaining rings (10).



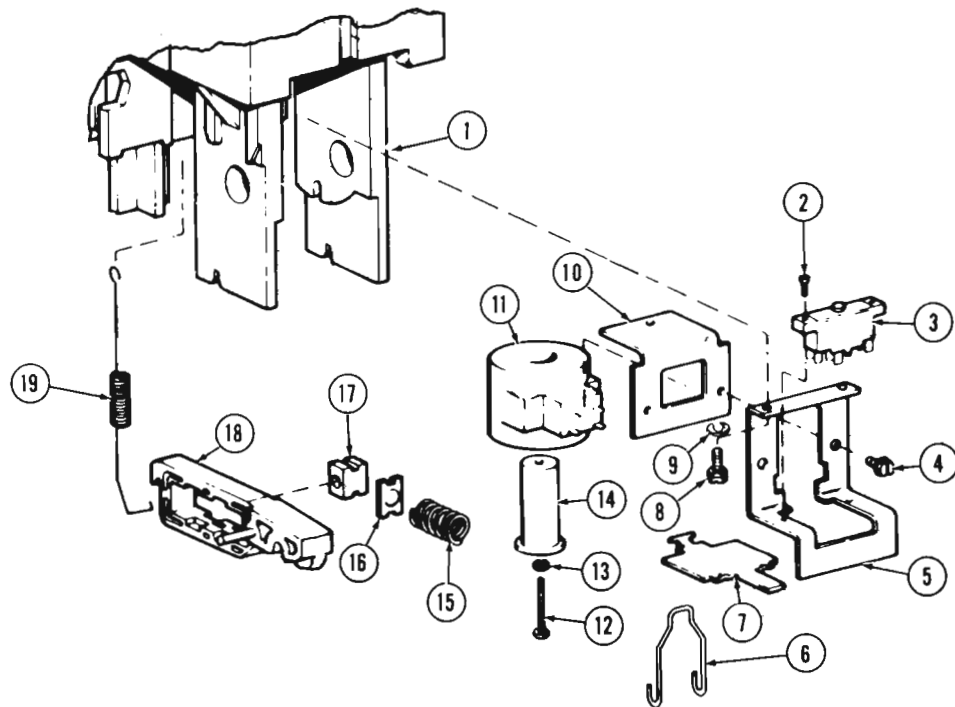
- | | |
|---------------------|---------------------|
| 1. Drive Lever | 6. Retaining Ring |
| 2. Link | 7. Spacer |
| 3. Screw | 8. Hollow Split Pin |
| 4. Wire Form Spacer | 9. Wire Form Spacer |
| 5. Drive Plate | 10. Retaining Ring |
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Fig.24 - Switch Module 8453174 And 8453175, Drive Link Assembly

2. Place spacers (4) on drive plate (5) studs and push studs on drive plate through the holes on the short legs of link (2) from the inside. Secure with retaining rings (6).
3. Position spacer (7) between holes in drive plates (5) and secure with screws (3). Apply Loctite to screw threads.

SWITCH MODULE 8453175 AND 8437887, MOTOR CUT-OUT ASSEMBLY

1. Position magnet coil (11, Fig. 25) onto magnet yoke (10) with coil terminals through the rectangular window on magnet yoke.
2. Remove magnet coil (observing which end is the "top"). Place a 1.6 mm (1/16") bead, 38 mm (1-1/2") diameter, of silicone RTV compound on the magnet yoke (10) where the magnet coil (11) was resting.
3. Replace magnet coil (11) in its original position, insert magnet core (14), and secure with screw (12) and lockwasher (13).



- | | |
|--------------------|----------------------------|
| 1. Base Molding | 11. Magnet Coil |
| 2. Screw | 12. Screw |
| 3. Limit Switch | 13. Lockwasher |
| 4. Screw | 14. Magnet Core |
| 5. Support Bracket | 15. Compression Spring |
| 6. Link | 16. Spring Seat |
| 7. Armature | 17. Sliding Block |
| 8. Screw | 18. Contact Spring Carrier |
| 9. Lockwasher | 19. Spring |
| 10. Magnet Yoke | |

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Fig.25 - Motor Cut-Out Switch

4. Place armature (7) over magnet core (14) and magnet yoke (10) with the embossed tabs downward and overhanging the magnet yoke (10).
5. Place support bracket (5) over armature (7) and secure with two screws (4).
6. Place limit switch (3) between tang of armature (7) and ledge on support bracket (5) over tapped holes. Secure with screws (2).

SWITCH MODULE 8453174 AND 8453175, FINAL ASSEMBLY

Perform the following procedure to complete the switch module assembly.

1. Place bearing shaft (41, Fig. 26) through the two holes in drive lever (38).
2. Place bearing shaft (41) in slots in base molding (59) and secure with screw (50) between legs of drive lever (38). Apply Loc-tite to screw (50).
3. Place coupling (12) on main shaft (10) so that set screw (13) engages with hole in shaft. Tighten set screw.
4. Place one bearing (11) over main shaft (10) with large end against coupling (12). Place free end of main shaft (10) through right-side bearing hole in base molding (59).
5. Push bearing (11) into right-side bearing hole in base molding (59).
6. Rotate main shaft (10) so right-hand set screw hole faces forward. Push shaft through drive plate (34) with links (36) at bottom. Push shaft through left-side bearing hole.
7. Place second bearing (54) over shaft with large end outward and push into left-side hole in base molding (59).
8. Place coupling (52) onto left-end of shaft so that the set screw (53) is engaged with hole in the shaft. Tighten set screw.
9. Position the operating lever (5) into base molding (59) and hole in position with upper pin (62).
10. Assemble retaining rings (9) on main shaft (10) inside of drive plate assemblies (34).
11. Place base molding in the inverted position. Attach the two movable contact and bottom terminal assemblies (42 through 49) to base molding (59) with screws (46) and lock-washers (47). Place the assembly in upright position.
12. Place movable contacts (49) over top end of movable contact supports (45). Add pivot brackets (55) making certain that lower pivot ends engage with the pivot guides (44). Add the movable hold-on irons (56) and secure with two screws (58) and lockwashers (57).
13. Center the movable hold-on irons (56) within the base molding (59) to provide a minimum of 0.38 mm (.015") clearance on each side. Tighten the two screws (42) at the bottom terminal which were left loose in Building Subassemblies procedure.
14. Position the operating head (4) over the top of operating lever (5) with the ends of operating head engaging both movable contacts. Install screw (1), lockwasher (2), and plain washer (3).
15. Invert the switch module. Position the contact spring carrier assembly (27 through 30) into the forked end of operating lever (5).

Couple contact spring carrier assembly to operating lever with lower pin (60). Clamp a new X-type washer (61) into groove on each end of pin.
16. Push end of spring (31) with loop through slot in rear center of base molding (59) and turn 90°.
17. Hook other end of spring (31) in slot at rear of contact spring carrier (30).
18. Press the front end of contact spring carrier (30) and rotate main shaft (10) until roll pin of drive lever (38) engages with notch in contact spring carrier (30).
19. Place the switch module in upright position. Push barrier (8) into the slots in base molding (59).
20. Snap two covers (7) into position between notches in base molding (59).

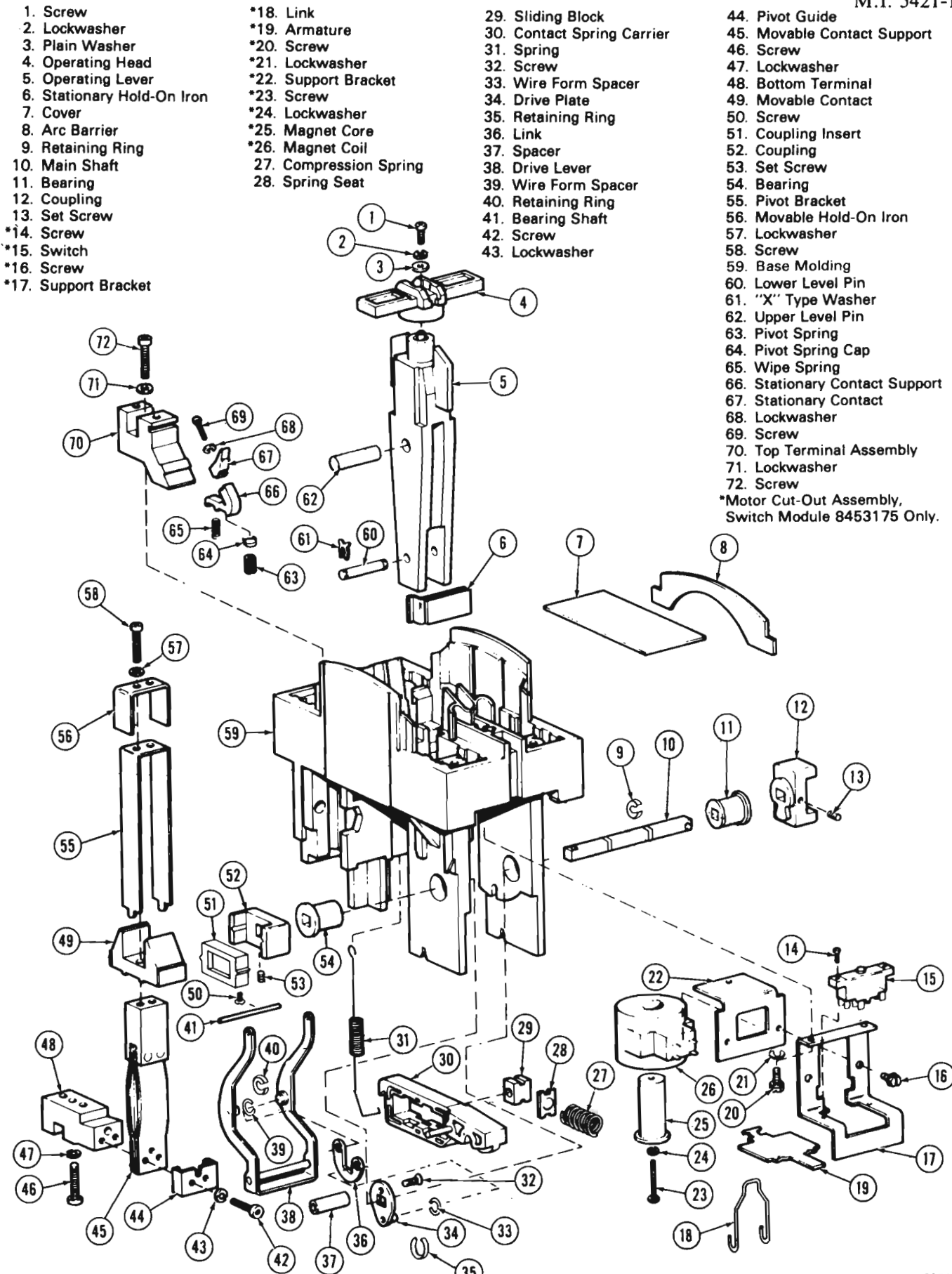


Fig.26 - Switch Module 8453174 And 8453175, Exploded View

SWITCH MODULE 8453175, MOTOR CUT-OUT ASSEMBLY

1. Slide the motor cut-out assembly into front cavity in the base molding (59, Fig. 26) and secure with two screws (20).
2. Place center section of link (18) over hook on armature (19).
3. Lift front end of contact spring carrier (30) and hook ends of link (18) over round pin of contact spring carrier (30).

SWITCH MODULE 8437887 AND 8422927, FINAL ASSEMBLY

1. Place coupling (11, Fig. 27) on main shaft (9) so that set screw (12) engages with hole in shaft. Tighten set screw.
2. Place one bearing (10) over main shaft (9) with short shoulder against coupling (11). Place free end of main shaft (9) through right-side bearing hole in base molding (46).
3. Push bearing (10) into right side bearing hole in base molding (46).
4. Rotate main shaft (9) so right-hand set screw faces up. Push main shaft (9) through stop washer (30), drive lever (31) with legs down, and stop washer (30).
5. Push main shaft (9) through left-side bearing hole. Place second bearing (10) over main shaft (9) with short shoulder outward. Push shaft into left-side hole in base molding (46).
6. Place coupling (11) onto left-end of main shaft (9) so that the set screw (12) is engaged with the hole in the shaft. Tighten set screw.
7. Position operating lever (5) into base molding (46) and hold in position with upper pin (51).
8. Place base molding (46) in the inverted position. Attach the two movable contact and bottom terminal assemblies (34 through 40) to base molding (46) with screws (37) and lockwashers (38). Place assembly in upright position.
9. Place movable contacts (41) over top end of movable contact supports (40). Add pivot brackets (42) making certain the lower pivot

ends engage with pivot guides (36). Add the movable hold-on irons (43) and secure with two screws (45) and lockwashers (44).

10. Center the movable hold-on irons (43) within the base molding (46) to provide a minimum of 0.38 mm (.015") clearance on each side. Tighten the two screws (34) at the bottom terminal which were left loose in Building Subassemblies procedure.
11. Position the operating head (4) over top of operating lever (5) with the ends of operating head engaging both movable contacts. Install screw (1), lockwasher (2), and plain washer (3).
12. Invert the switch module. Position the contact spring carrier assembly (27, 28, 29, 32) into the forked end of the operating lever (5). Couple contact spring carrier assembly to operating lever with lower pin (47). Clamp a new X-type washer (48) into groove on each end of pin.
13. Push end of spring (33) with loop through slot in rear center of base molding (46) and turn 90°.
14. Hook other end of spring (33) in slot at rear of contact spring carrier (32).
15. Press the front end of contact spring carrier (32) and rotate main shaft (9) until roll pin of drive lever (31) engages with notch in contact spring carrier (32).
16. Place the switch module in upright position. Push arc barrier (8) into the slots of base molding (46).
17. Snap two covers (7) into position between notches in base molding (46).

SWITCH MODULE 8437887, MOTOR CUT-OUT ASSEMBLY

1. Slide motor cut-out assembly into front cavity in the base molding (46, Fig. 27) and secure with two screws (20).
2. Place center section of link (19) over hook on armature (18).
3. Lift front end of contact spring carrier (32) and hook ends of link (19) over round pin of contact spring carrier (32).

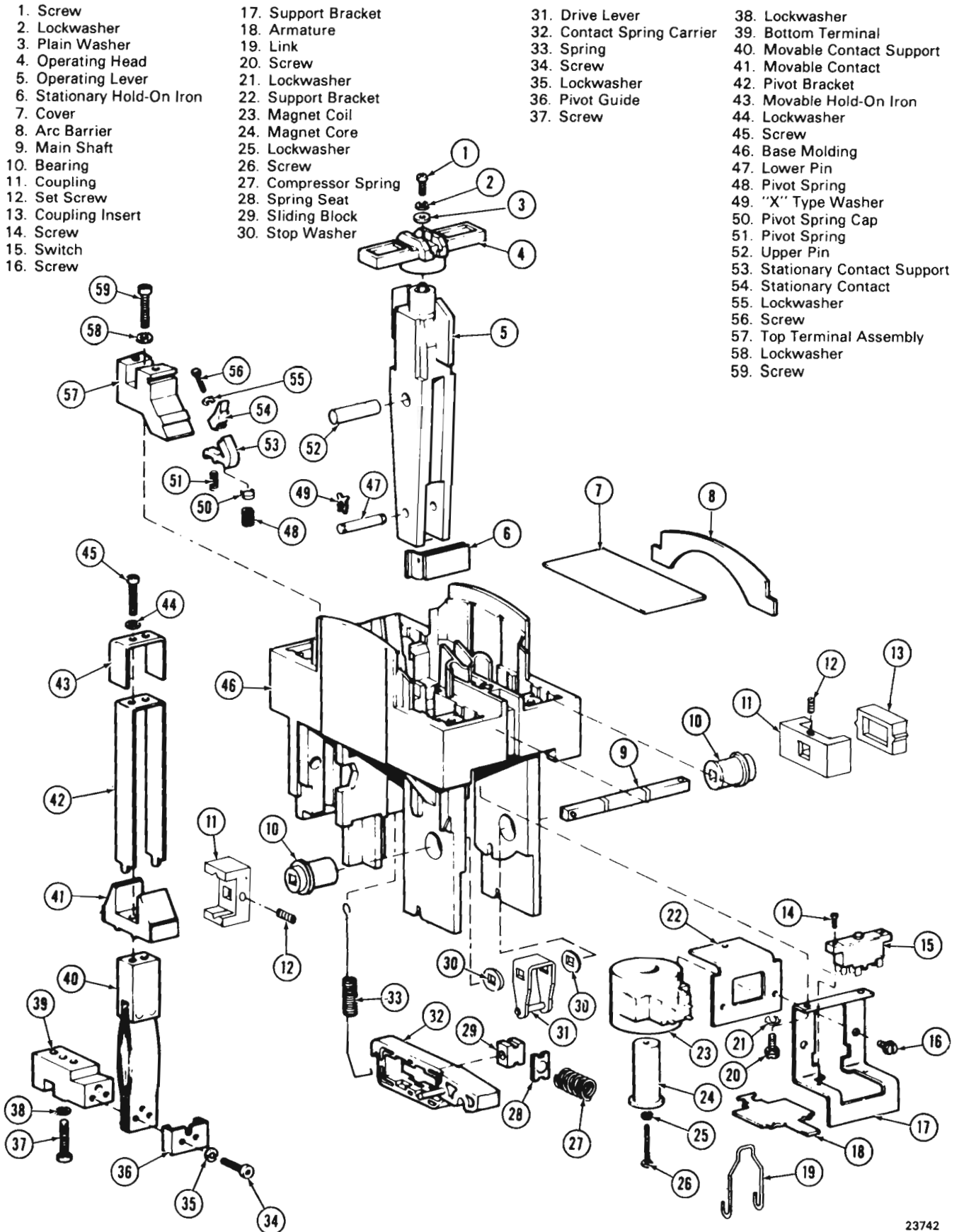


Fig.27 - Switch Module 8437887 And 8422927, Exploded View

SERVICE DATA

SPECIFICATIONS

RATING 1200 Amperes

HI POT

60 Hz, 1 Minute

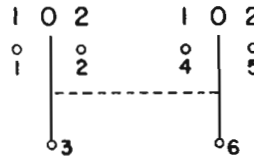
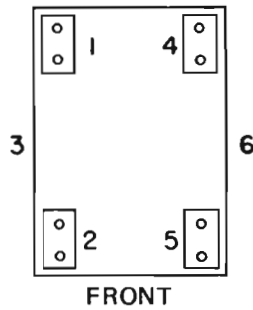
Contacts To Mounting

Between Poles 5400 V RMS

Between Open Contacts

NOTE

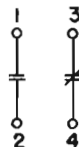
Hi Pot values above 5400 volts are not recommended.



Main Contact Schematic Diagram

MOTOR CUT-OUT, SWITCH MODULE 8453175 AND 8437887

Coil Rating 74 V DC
 Coil Resistance (at 20° C [68° F]) 190 Ohms (±10%)
 Coil Pickup (maximum at 20° C [68° F]) 48 V DC
 Contact Gap (motor cut-out energized) 2.39 mm (.094") minimum, after removing free motion in movable contact assembly



Limit Switch Schematic Diagram
 Motor cut-out de-energized.

MAINTENANCE PARTS, SWITCH MODULE 8453174, AND 8453175

Switch module maintenance parts have been grouped into 12 kits. For kit and component part numbers refer to Parts List 5421, Parts Catalog 190.

BASE MOLDING KIT (Section 2, Fig. 28) 8492379

<u>Ref.</u> <u>No.</u>	<u>No.</u> <u>Req.</u>	<u>Description</u>
3	1	Base Molding
4	4	Stationary Hold-On Iron
5	1	Label ("Danger" -- High Voltage In All Positions)
6	1	Label (Identification)

MOVABLE CONTACT KIT (Section 7, Fig. 28) 8492373

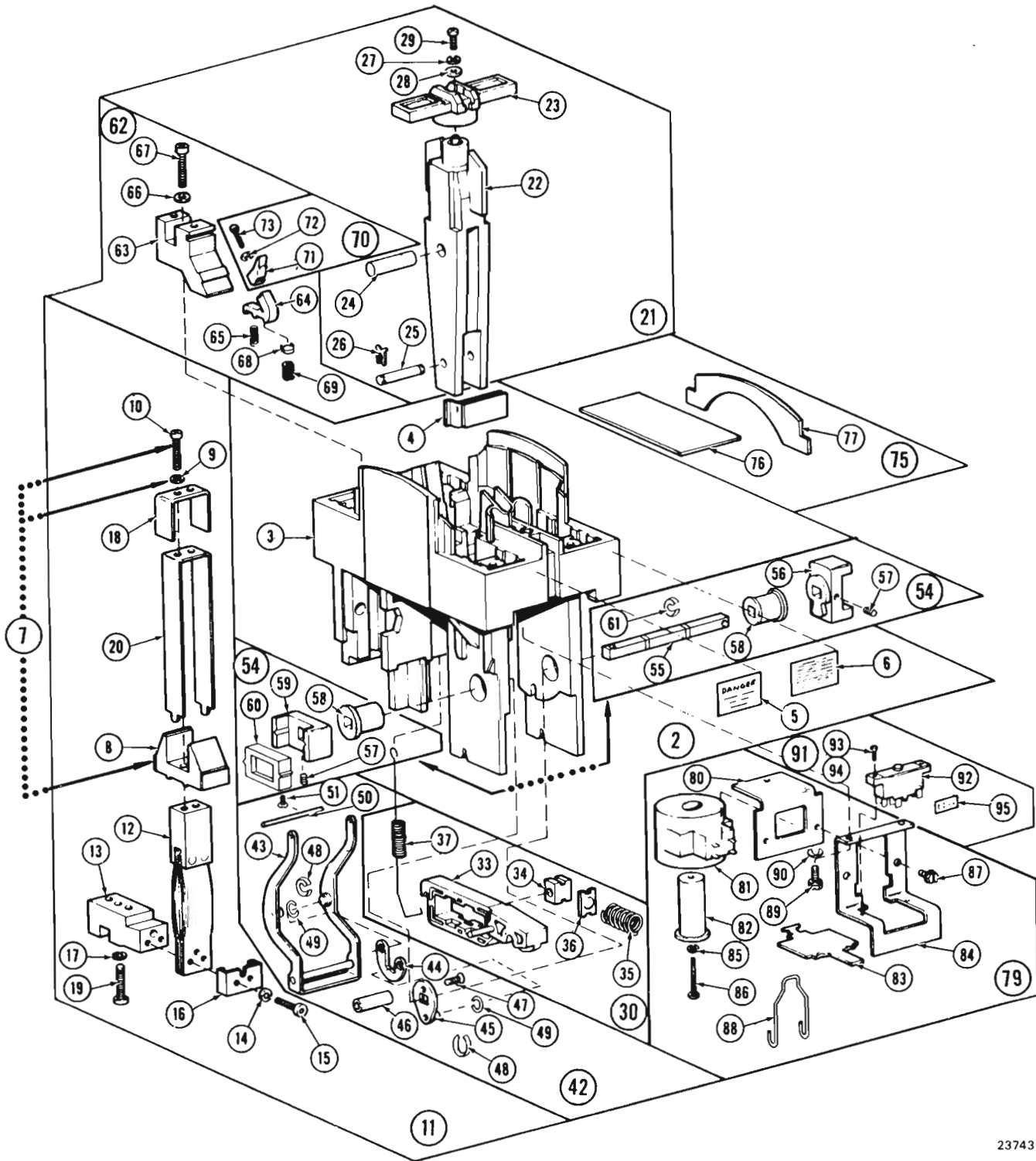
<u>Ref.</u> <u>No.</u>	<u>No.</u> <u>Req.</u>	<u>Description</u>
8	2	Movable Contact
9	4	Lockwasher
10	4	Cap Screw

MOVABLE CONTACT SUPPORT KIT (Section 11, Fig. 28) 8492376

<u>Ref.</u> <u>No.</u>	<u>No.</u> <u>Req.</u>	<u>Description</u>
12	2	Contact Support Assembly
13	2	Bottom Terminal Assembly
14	4	Lockwasher
15	4	Cap Screw
16	2	Pivot Guide
17	2	Lockwasher
18	2	Movable Hold-On Iron
19	2	Cap Screw
20	2	Pivot Bracket

OPERATING LEVER KIT (Section 21, Fig. 28) 8492377

<u>Ref.</u> <u>No.</u>	<u>No.</u> <u>Req.</u>	<u>Description</u>
22	1	Operating Lever
23	1	Operating Head
24	1	Upper Pin
25	1	Lower Pin
26	2	X-Type Washer
27	1	Lockwasher
28	1	Plain Washer
29	1	Cap Screw



23743

Fig.28 - Switch Module 8453174 And 8453175 Parts Kits

CONTACT SPRING CARRIER KIT (Section 30, Fig. 28) 8446414

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
33	1	Carrier
34	1	Sliding Block
35	2	Compression Spring
36	2	Spring Seat
37	1	Coil Spring

DRIVE LEVER KIT (Section 42, Fig. 28) 8492381

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
43	1	Main Lever
44	2	Drive Link
45	2	Drive Plate
46	1	Spacer
47	2	Machine Screw
48	4	Retainer Ring
49	4	Wire Form Spacer
50	1	Bearing Shaft
51	1	Machine Screw

COUPLING KIT (Section 54, Fig. 28) 8492380

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
55	1	Main Shaft
56	1	Shaft Coupling
57	2	Set Screw
58	2	Shaft Bearing
59	1	Shaft Coupling
60	1	Coupling Insert
61	2	Bearing Retainer Ring

TOP TERMINAL KIT (Section 62, Fig. 28) 8492375

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
63	4	Top Terminal Assembly
64	12	Stationary Contact Support
65	12	Wipe Spring
66	4	Lockwasher
67	4	Cap Screw
68	12	Pivot Spring Cap
69	12	Pivot Spring

STATIONARY CONTACT KIT (Section 70, Fig. 28) 8492374

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
71	12	Stationary Contact
72	12	Lockwasher
73	12	Cap Screw

SWITCH COVER KIT (Section 75, Fig. 28) 8492378

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
76	2	Cover
77	1	Arc Barrier

MOTOR CUT-OUT KIT, SWITCH MODULE 8453175 ONLY (Section 79, Fig. 28) 8492383

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
80	1	Support Bracket
81	1	Magnet Coil
82	1	Magnet Core
83	1	Coil Support Armature
84	1	Armature And Coil Support Bracket
85	1	Lockwasher
86	1	Machine Screw
87	2	Screw Assembly (including washer)
88	1	Motor Cut-Out Link
89	2	Cap Screw
90	2	Lockwasher (internal teeth)

MOTOR CUT-OUT SWITCH KIT, SWITCH MODULE 8453175 ONLY (Section 91, Fig. 28) 8492384

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
92	1	Push Button Switch
93	2	Machine Screw
94	2	Lockwasher
95	1	Label (terminal identification)

MAINTENANCE PARTS, SWITCH MODULE 8437887 AND 8422927

Switch module maintenance parts have been grouped into 11 kits. For kit and component part numbers refer to Parts List 5421, Parts Catalog 190 or 382 as applicable.

BASE MOLDING KIT (Section 2, Fig. 29) 8492379

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
3	1	Base Molding
4	4	Stationary Hold-On Iron
5	1	Label ("Danger" - High Voltage In All Positions)
6	1	Label (Identification)

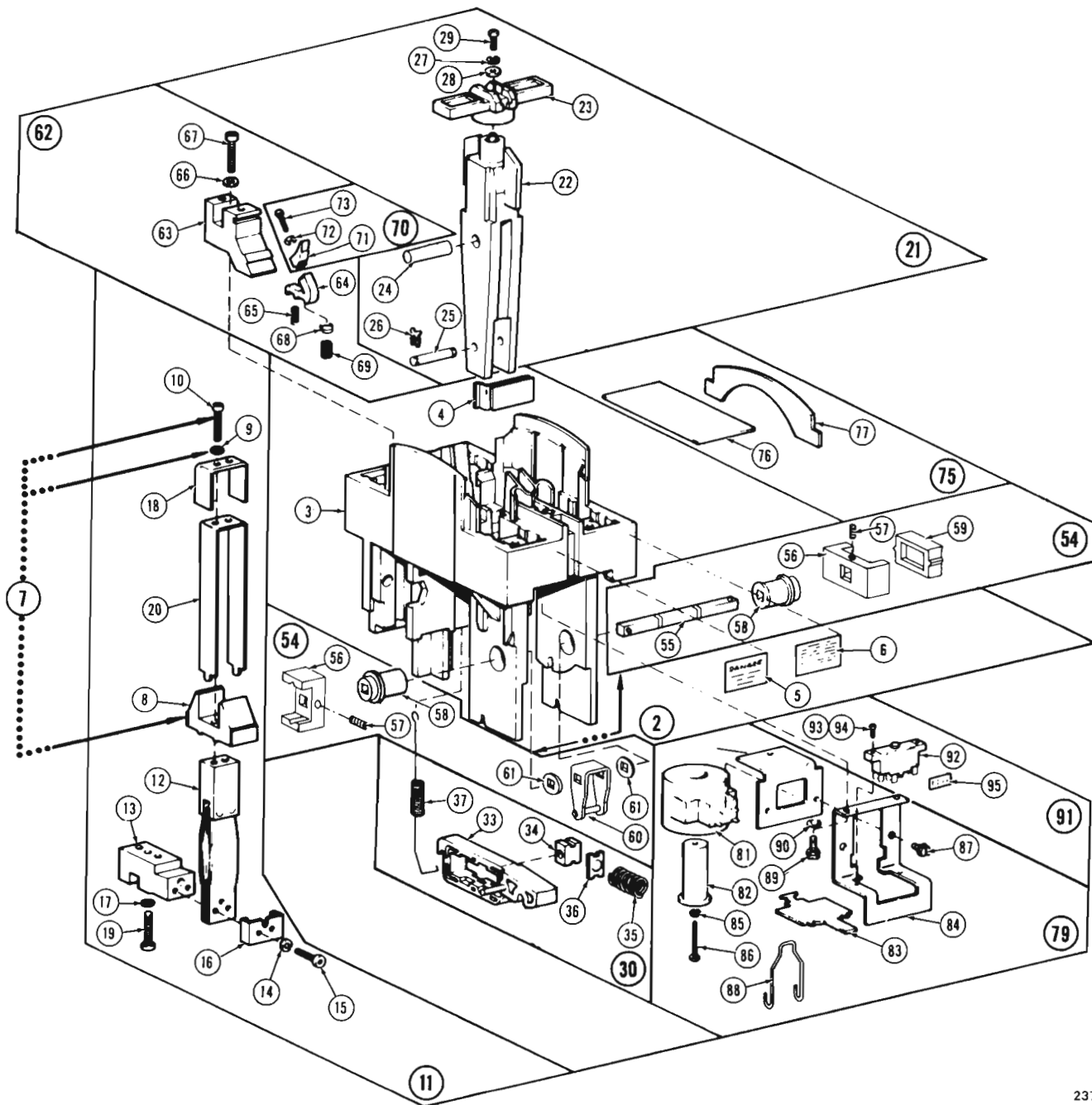


Fig.29 - Switch Module 8422927 And 8437887 Parts Kits

23744

MOVABLE CONTACT KIT (Section 7, Fig. 29) 8492373

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
8	2	Movable Contact
9	4	Lockwasher
10	4	Cap Screw

MOVABLE CONTACT SUPPORT KIT (Section 11, Fig. 29) 8492376

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
12	2	Contact Support Assembly
13	2	Bottom Terminal Assembly
14	4	Lockwasher
15	4	Cap Screw
16	2	Pivot Guide
17	2	Lockwasher
18	2	Movable Hold-On Iron
19	2	Cap Screw
20	2	Pivot Bracket

OPERATING LEVER KIT (Section 21, Fig. 29) 8492377

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
22	1	Operating Lever
23	1	Operating Head
24	1	Upper Pin
25	1	Lower Pin
26	2	X-Type Washer
27	1	Lockwasher
28	1	Plain Washer
29	1	Cap Screw

CONTACT SPRING CARRIER KIT (Section 30, Fig. 29) 9084423

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
33	1	Carrier
34	1	Sliding Block
35	2	Compression Spring
36	2	Spring Seat
37	1	Coil Spring

COUPLING KIT (Section 54, Fig. 29) 9084420

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
55	1	Main Shaft
56	2	Shaft Coupling
57	2	Set Screw
58	2	Shaft Bearing
59	1	Coupling Insert
60	1	Main Lever
61	2	Nylafil Stop Washer

TOP TERMINAL KIT (Section 62, Fig. 29) 8492375

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
63	4	Top Terminal Assembly
64	12	Stationary Contact Support
65	12	Wipe Spring
66	4	Lockwasher
67	4	Cap Screw
68	12	Pivot Spring Cap
69	12	Pivot Spring

STATIONARY CONTACT KIT (Section 70, Fig. 29) 8492374

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
71	12	Stationary Contact
72	12	Lockwasher
73	12	Cap Screw

SWITCH COVER KIT (Section 75, Fig. 29) 8492378

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
76	2	Cover
77	1	Arc Barrier

**MOTOR CUT-OUT KIT,
SWITCH MODULE 8437887 ONLY** (Section 79, Fig. 29) 8492383

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
80	1	Support Bracket
81	1	Magnet Coil
82	1	Magnet Core
83	1	Coil Support Armature
84	1	Armature And Coil Support Bracket
85	1	Lockwasher
86	1	Machine Screw
87	2	Screw Assembly (including washer)
88	1	Motor Cut-Out Link
89	2	Cap Screw
90	2	Lockwasher (internal teeth)

**MOTOR CUT-OUT SWITCH KIT,
SWITCH MODULE 8437887 ONLY** (Section 91, Fig. 29) 8492384

<u>Ref. No.</u>	<u>No. Req.</u>	<u>Description</u>
92	1	Push Button Switch
93	2	Machine Screw
94	2	Lockwasher
95	1	Label (terminal identification)

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