ELECTRO-MOTIVE

M.I. 5426
*Rev. A

MAINTENANCE INSTRUCTION

TRANSFER SWITCHES 8464113, 8464114, 8464116, 8464117, 8464118

DESCRIPTION

The data contained in this Maintenance Instruction will apply to transfer switches 8464113, 8464114, 8464116, 8464117, and 8464118 unless specifically identified.

The transfer switch, Fig. 1, is a two-pole, double throw, 1000 ampere, magnetic switch. It is designed to set up various power circuits, but not to make or break load current. Hold-on features are built in to prevent the contacts from blowing open under fault conditions.

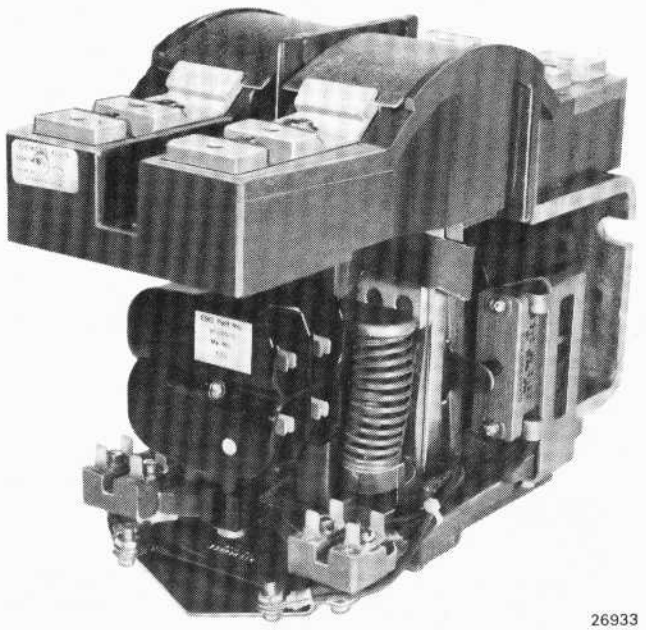

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Fig.1 – Transfer Switch 8464117

The switch is operated by an intermittent duty magnet coil. For continuous operation, the coil is economized with a series resistor. Normal excitation of the economized operating coil is 0.78 ampere at 74 VDC.

A four circuit interlock switch is enclosed in a dustproof housing. Circuit connections for the interlock are provided by external terminal tabs.

Terminal identification letters are molded into the interlock housing.

The transfer switches are of the same basic design. Refer to Service Data for differences between the switches.

SAFETY PRECAUTIONS

WARNING

This transfer switch was designed for specific application to circuits of diesel-electric equipment where the circuits and devices are enclosed in suitably protective cabinets. Care has been taken in the design of the equipment to provide for the safety of operating and service personnel, provided care is 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.

*This bulletin is revised and supersedes previous issues of this number. Areas of change are indicated by vertical bars in the margins.

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. De-energizing the operating coil is not sufficient to render the equipment safe; the power lines must also be disconnected or otherwise de-energized. If power lines are not de-energized, all parts of the device should be considered to be at the maximum system voltage.

3. IF INSPECTION OF ENERGIZED EQUIPMENT IS NECESSARY, DO NOT TOUCH OR HANDLE ANY PARTS. DO NOT STAND IN FRONT OF THE EQUIPMENT OR AT CLOSE RANGE TO PERFORM VISUAL INSPECTIONS. The discharge of hot gases and particles is always likely when the switch is operated in an energized circuit.

4. Operating temperatures for the switch are high. Some parts of these devices may normally 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.

MAINTENANCE

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

NOTE

For a complete disassembly or reassembly of the transfer switch, refer to the rebuild section of this Maintenance Instruction.

Minimum maintenance is required to keep the transfer switch 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 switches are designed to operate without lubrication. Do not oil or grease at any time.

Contacts are normally oxidized and smoked from regular service. Other switch parts should not show effects of high temperature operation.

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

Torque values for all fasteners unless otherwise noted.

Screw Size	Torque N·m (in-lbs)
10-32	1.7-2.3 (15-20)
0.250-20	6.2-7.3 (55-65)
0.312-18	9.6-11.3 (85-100)
0.375-16	22.6-25.4 (200-225)

MAIN CONTACTS

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.

INSPECTION

1. Remove top covers by pushing one end of each cover out of slot in top terminal molding, and lift off.

2. Inspect the four stationary contact assemblies, Fig. 2. 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 and the mating movable contact.

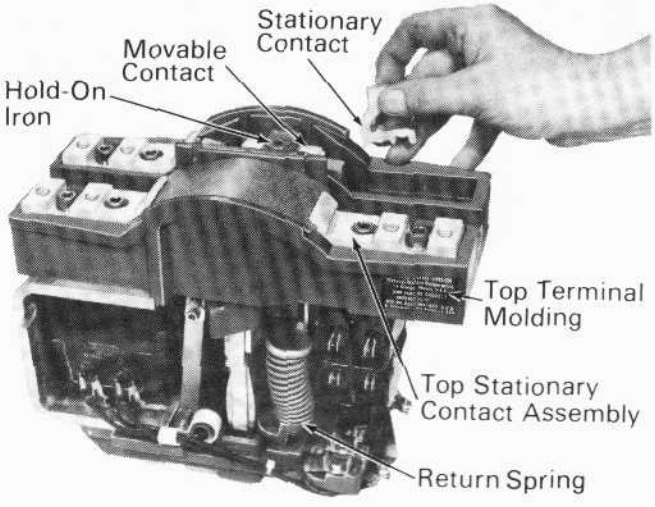
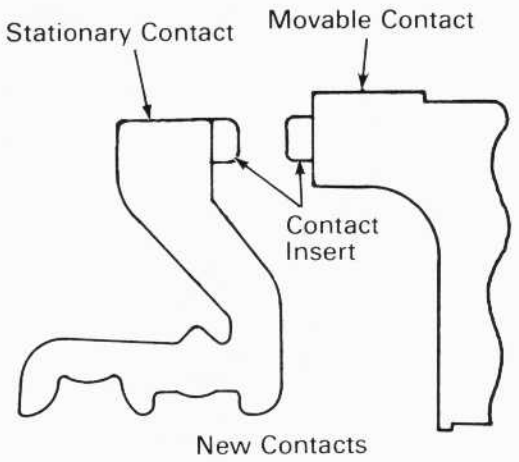
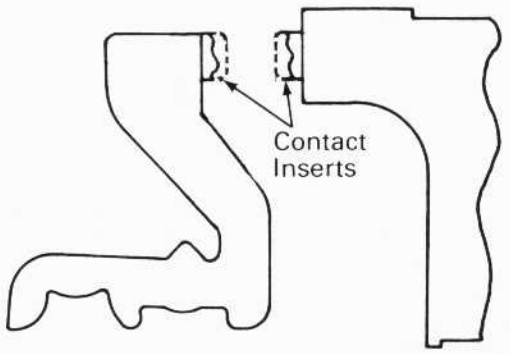
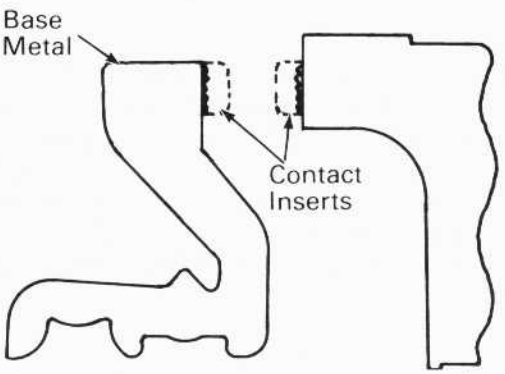


Fig.2 – Removing Stationary Contacts





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.

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Fig.3 - Main Contact Wear Limits

REPLACEMENT OF STATIONARY CONTACTS

1. Remove return springs, Fig. 2.

2. Remove top stationary contact assemblies, stationary contacts, and spacers by removing the retaining screws and lockwashers.

3. Ensure that support areas for pivot and wipe springs are free of all foreign particles.

4. Position spacer on the top terminal molding, with the short leg of the "L" down between the pivot springs and the long leg extending back between the wipe springs.

5. Place new stationary contacts over wipe springs and pivot springs. Be certain that the spring caps are firmly seated on the pivot springs.

6. Insert pointed nose of the top stationary contact assembly into cavity in back of the stationary contact, engaging mating pivots.

7. With the pivots engaged, and the top stationary contact assembly held back against the stop in the top terminal molding, secure with two screws and lockwashers.

8. Check for freedom of movement of both stationary contacts. There should be clearance behind the contacts.

REPLACEMENT OF MOVABLE CONTACTS

1. If not already done, remove return springs, Fig. 2.

2. Remove sealant from heads of screw securing hold-on iron, and remove screw, lockwasher, hold-on iron, and movable contact.

3. Position new movable contact and hold-on iron over movable contact support assembly and secure with screw and lockwasher. Torque screw to 13-15 N·m (115-130 in-lbs). Apply silicone (RTV) compound to head of screw.

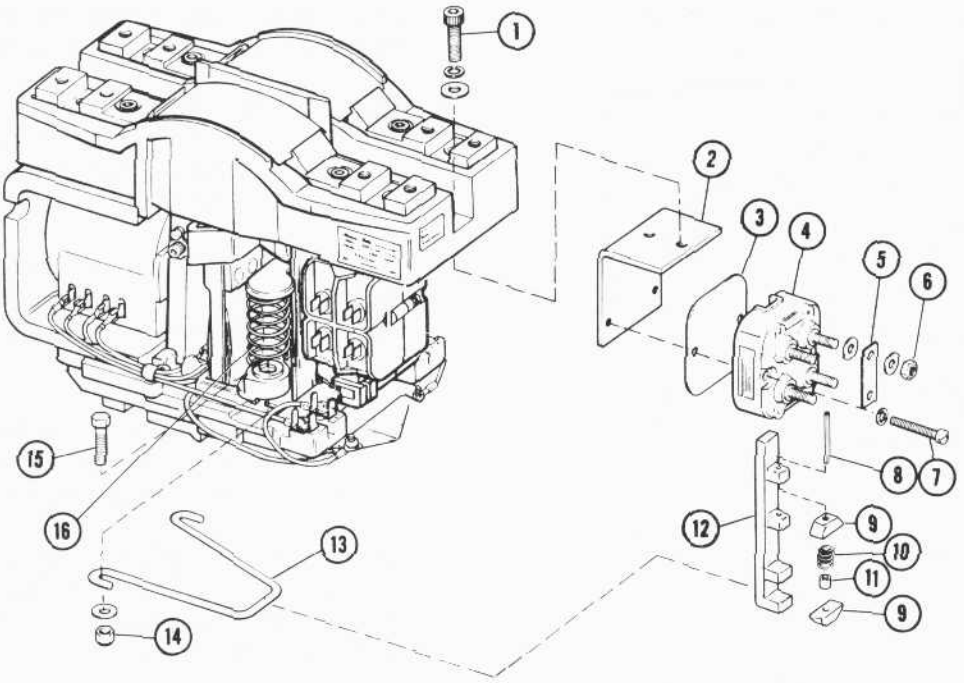
4. Replace return springs.

60 AMPERE AUXILIARY SWITCH (TRANSFER SWITCH 8464114 ONLY)

INSPECTION

1. Remove return springs (16, Fig. 4).

2. Remove two screws (7) and separate base assembly (4), contact carrier (12), and insulating plate (3). Switch contacts must be replaced when they are worn 0.8 mm (1/32") on each contact face.



1. Hex Head Socket Screw
2. Support Bracket
3. Insulating Plate
4. Base Assembly
5. Connecting Link
6. Nut
7. Round Head Screw
8. Roll Pin
9. Movable Contacts
10. Compression Spring
11. Spacer
12. Contact Carrier
13. Operating Lever
14. Hug Locknut
15. Hex Head Screw
16. Return Spring

Fig.4 – 60 Ampere Auxiliary Switch, Exploded View

NOTE

If the movable contacts (9) in the contact carrier (12) are worn 0.8 mm (1/32″), the contacts should be replaced. If the stationary contacts within the base assembly (4) are worn 0.8 mm (1/32″), the base assembly should be replaced.

REPLACEMENT OF CONTACTS

1. Drive roll pin (8, Fig. 4) out of contact carrier (12), separating contact carrier, movable contacts (9), compression spring (10), and spacer (11). Discard worn movable contacts.

2. Drive roll pin (8) through one hole in the shoulder of contact carrier (12), so that the end of the roll pin is 10 mm (3/8″) from the shoulder.

3. Assemble one new movable contact (9), spacer (11), and compression spring (10) on roll pin (8).

4. Compress spring (10) and position other new movable contact (9) against the shoulder of the contact carrier (12) without roll pin (8).

5. Secure the assembly by driving the roll pin (8) through the other movable contact (9) and the hole in the other shoulder of the contact carrier (12).

NOTE

If inspection has determined that the stationary contacts are worn beyond 0.8 mm (1/32″) reassemble switch using new base assembly (4).

6. Position contact carrier (12) in base assembly (4) with two movable contacts (9) between the stationary contacts in the base assembly.

7. Position these two parts over the insulating plate (3) on the support bracket (2) and secure with two round head screws (7) and lockwashers. The operating lever (13) must be positioned between the two lower shoulders on contact carrier (12). See Fig. 5.

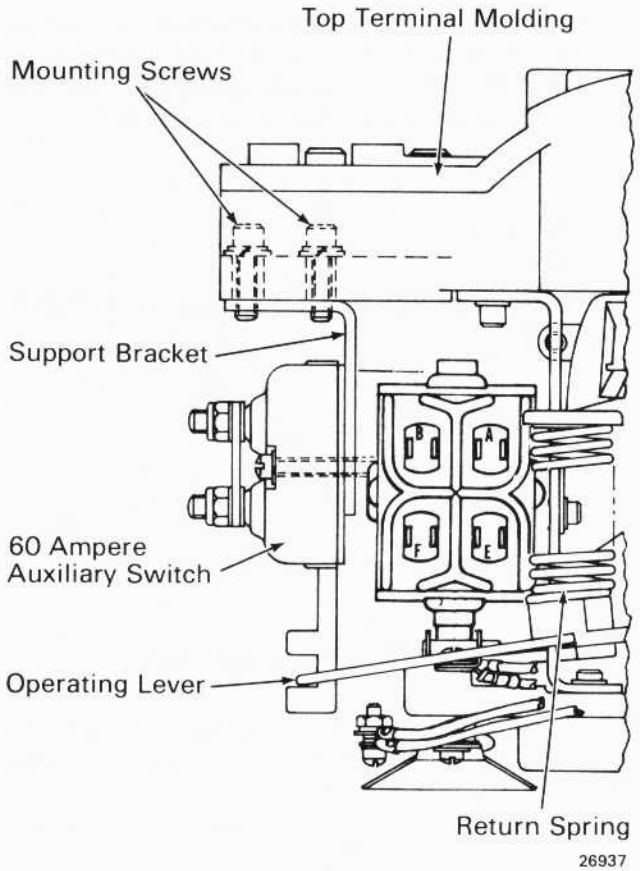


Fig.5 - 60 Ampere Auxiliary Switch

INTERLOCK ASSEMBLY

NOTE

Transfer switches have serial numbers such as 81H03M45536. When the last five digits of the serial number are 45536 or higher, the transfer switch is equipped with type 707 interlock assembly. Type 707 interlock assemblies have part numbers of 9539484, 9539490, or 9539500.

Transfer switches with the last five digits of the serial number lower than 45536 are equipped with type 387 interlock assemblies. Type 387 interlock assemblies have part numbers of 8253273, 8260393, or 8341965.

The type 387 interlock assembly and parts for the type 387 interlock assembly are no longer manufactured and will be available only until Electro Motive stock is depleted. When parts are required or interlock replacement is required, a type 707 interlock assembly should be specified. Refer to Service Data for correct interlock assembly part number.

INSPECTION

1. If transfer switch is equipped with 60 ampere auxiliary switch, Fig. 5, or with traction motor cutout assembly, Fig. 6, remove the two mounting screws and the auxiliary switch or the motor cutout assembly before proceeding.

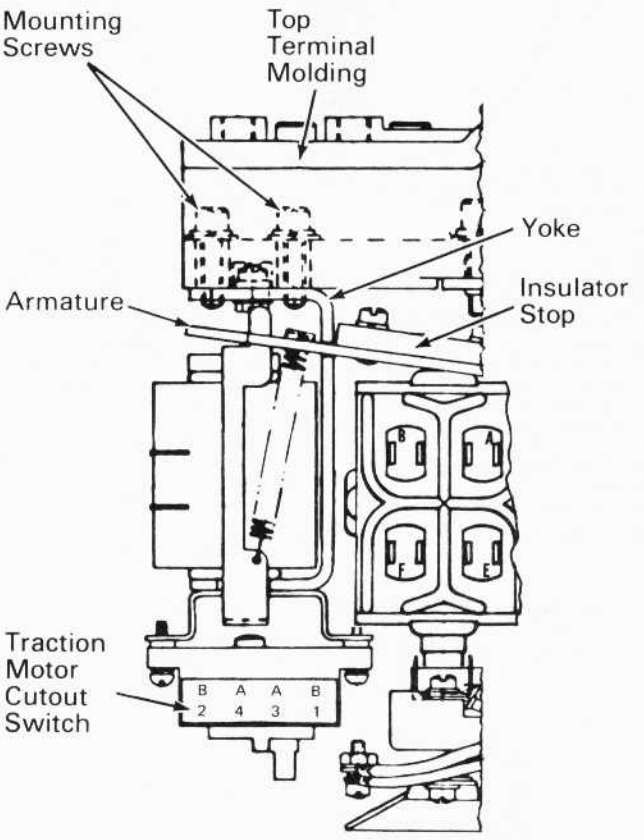


Fig.6 - Traction Motor Cutout Switch

2. Remove two parting screws (2, Fig. 7) from interlock assembly and carefully remove left-hand cover (13).

3. Carefully remove contact carrier assembly (14). Inspect stationary contacts in the interlock cover halves and inspect movable contacts in the contact carrier assembly.

NOTE

If movable contacts in contact carrier are worn beyond specified limits, the movable contacts should be replaced. If the stationary contacts in the interlock cover halves are defective or loose, the interlock assembly should be replaced with a new interlock assembly.

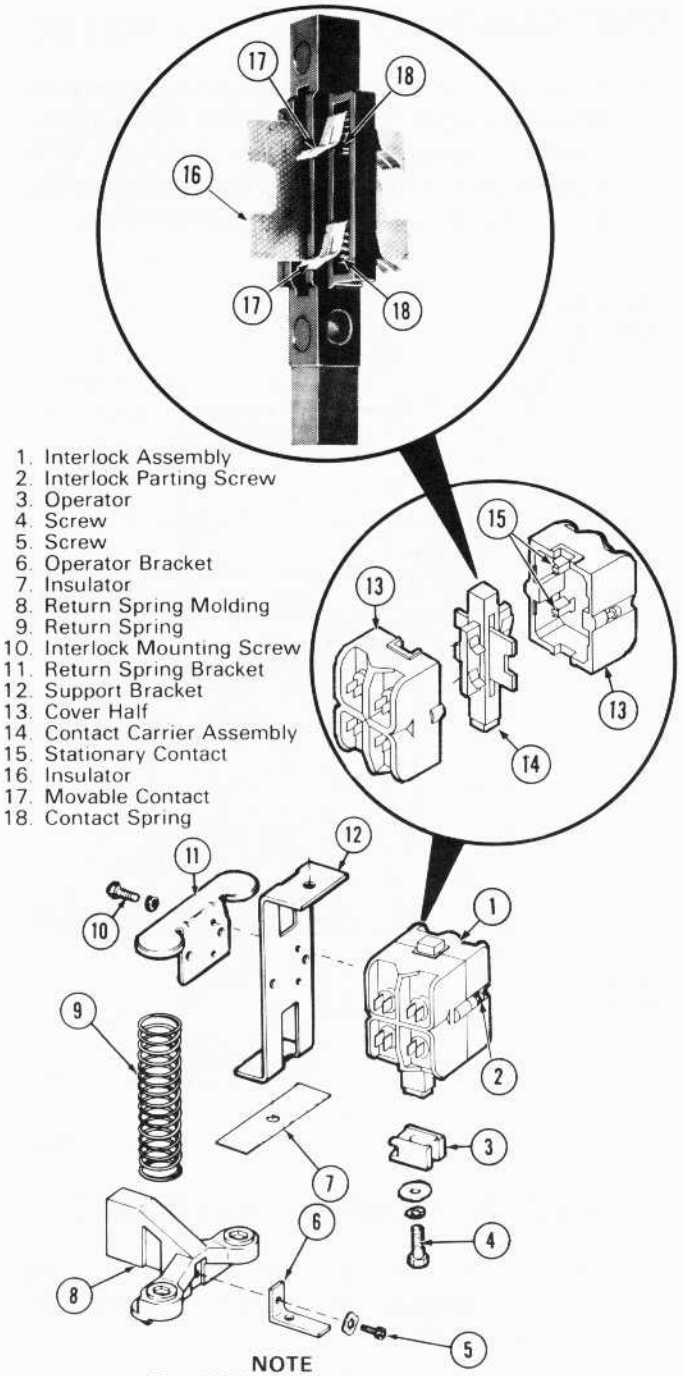


Fig.7 – Interlock Assembly, Partial Exploded View

Type 707 interlock stationary and movable contacts do not require replacement until contact tips have worn or eroded through to base metal. New contact tips are 0.38 mm (.015") thick.

Type 387 interlock contacts are no longer usable when stationary contacts have worn or eroded 0.51 mm (.020") or movable contacts have worn or eroded 1 mm (.040") when compared to new contact dimensions. Refer to Fig. 8. If stationary or movable contacts are required for the interlock assembly, type 707 interlock assembly should be specified.

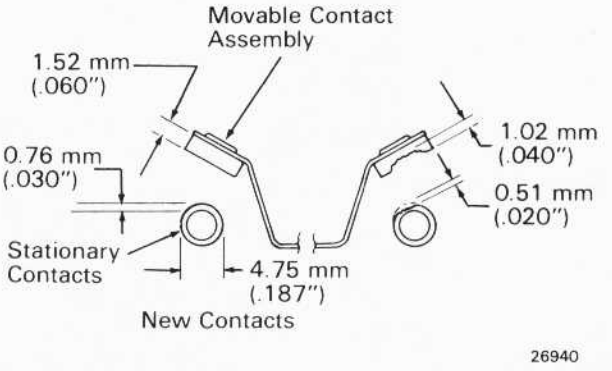


Fig.8 – Interlock Contact Wear Limits

REPLACEMENT OF ASSEMBLY

If it is determined after inspection that interlock assembly should be replaced with a new interlock assembly, proceed as follows:

NOTE

If the last five digits of the serial number of the transfer switch is lower than 45536, and the transfer switch is equipped with a traction motor cutout switch, it will be necessary to replace the armature on the traction motor cutout switch with a new type armature (notched to clear the new type 707 auxiliary interlock). Refer to Traction Motor Cutout Switch section and to Fig. 17 for proper assembly and disassembly instruction.

1. Remove return springs (9, Fig. 7).

2. Remove two screws (10) to separate top return spring bracket (11), support bracket (12), and interlock assembly (1).

3. Remove screw (4) and interlock operator (3). Observe position of slot in interlock operator in relation to interlock terminals.

4. Position interlock operator (3) on new interlock assembly and secure with screw (4), lockwasher, and Belleville washer. Ensure interlock operator is positioned correctly.

5. Attach new interlock assembly (1) to support bracket (12) and top return spring bracket (11) with screws (10) and lockwashers. Operator bracket (6) fits into slot in interlock operator (3).

6. When transfer switch is in de-energized condition, top of contact carrier (14) must be within 0.79 mm (.031") of flush with top of interlock housing. Bend operator bracket (6) for adjustment.

REPLACEMENT OF CONTACTS - TYPE 707 INTERLOCK

If determined after inspection that interlock movable contacts should be replaced, proceed as follows:

CAUTION

Each movable contact must be positioned properly and not inverted because this could cause malfunction of the contactor. Carefully note the position of each contact before removal.

1. Remove contact carrier, Fig. 9 from interlock assembly cover half.

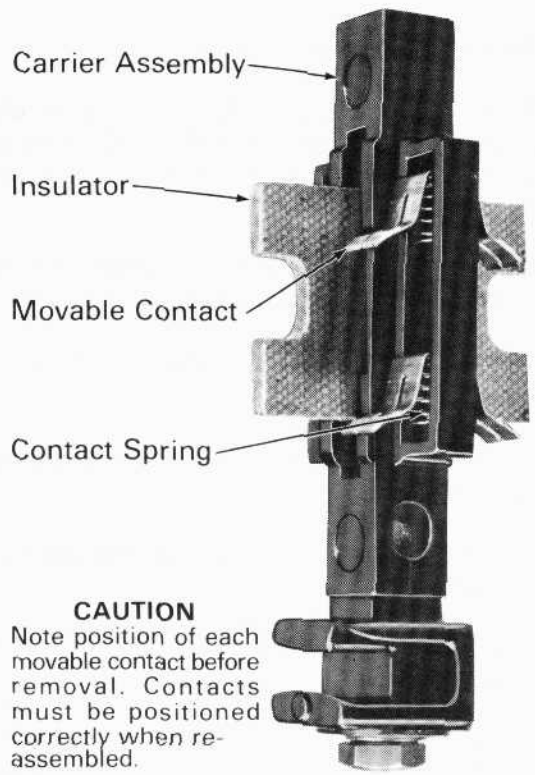


Fig.9 - Interlock Contact Carrier Assembly

2. Hold contact carrier in one hand and tilt forward the movable contact to be removed.

3. Using a screwdriver or similar tool, push down on end of contact spring. Pull out spring while pushing down to free contact spring from its retainer. Remove contact spring.

4. Turn movable contact sideways (rotate 90°) and remove movable contact.

5. To install new movable contact, reverse Steps 2, 3, and 4. Ensure each movable contact is positioned correctly.

CAUTION

When placing contact carrier into interlock cover, ensure that each movable contact tip is mated to each stationary contact. It is possible to place the contact carrier into the interlock cover half so that the movable contact tips will not engage the stationary contacts.

6. When all movable contacts to be replaced have been replaced, very carefully place contact carrier into interlock cover remaining on the transfer switch. Ensure each movable contact tip is mated to each stationary contact as shown in Fig. 10. Align slot in operator with operator bracket.

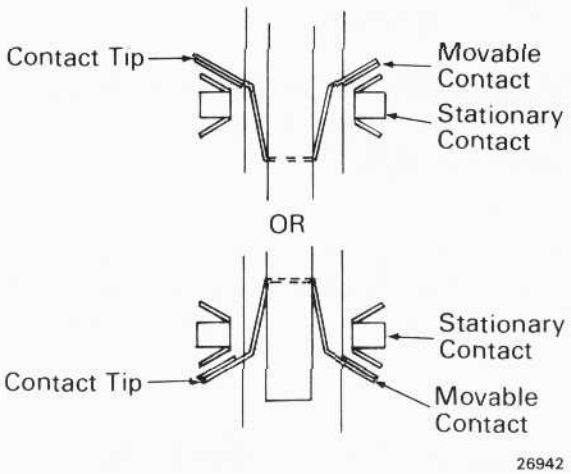


Fig.10 - Interlock Contacts

7. Gently slide insulator up until the insulator fits into notches in the interlock cover half as shown in Fig. 11.

8. Hold the insulator in place and move contact carrier from end to end to ensure movable contacts are positioned correctly.

9. Apply other cover half to interlock assembly. Ensure the movable contact tips are mated to the stationary contacts. Fasten securely. Move contact carrier from end to end to ensure the movable contacts are positioned correctly.

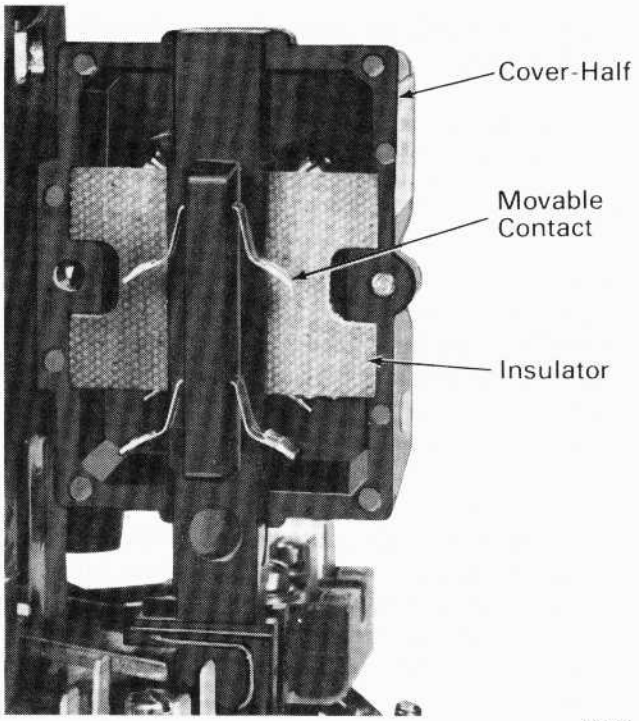


Fig.11 – Contact Carrier Assembled In Interlock Cover Half

REASSEMBLY OF 60 AMPERE AUXILIARY SWITCH (IF APPLICABLE)

Position the 60 ampere auxiliary switch and support bracket on the operating lever and top terminal molding and secure with two screws, lockwashers, and plain washers as shown in Fig. 5.

REASSEMBLY OF TRACTION MOTOR CUTOUT SWITCH (IF APPLICABLE)

1. Position the traction motor cutout switch assembly with the insulator stops under the armature and the yoke against the top terminal molding as shown in Fig. 6.

2. Attach with mounting screws, plain washers, and lockwashers.

NOTE

If adjustment of the switch is required, refer to "Rebuilding Transfer Switch" Section of this Maintenance Instruction.

REBUILDING TRANSFER SWITCH

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

DISASSEMBLY

WARNING

Do not disassemble transfer switch in the cabinet. Disconnect switch power cables and leads to interlock assembly, and remove switch from control cabinet.

SUBASSEMBLIES, Fig. 12

1. Remove top covers (16) by pushing one end of each cover out of slot in top terminal molding, and lift off.

2. Remove return springs (37).

3. Remove one screw (56) and cable clip. Disconnect rectifier assembly leads from coil (4) and remove rectifier assembly (71), cable clip (57), and sleeve (55).

4. Remove two screws (61), disconnecting leads from the resistor (60) terminals.

5. Remove four screws (52), tab connections (51), and lead (73).

6. Disconnect leads (58 and 49) from magnet coil (4) and remove.

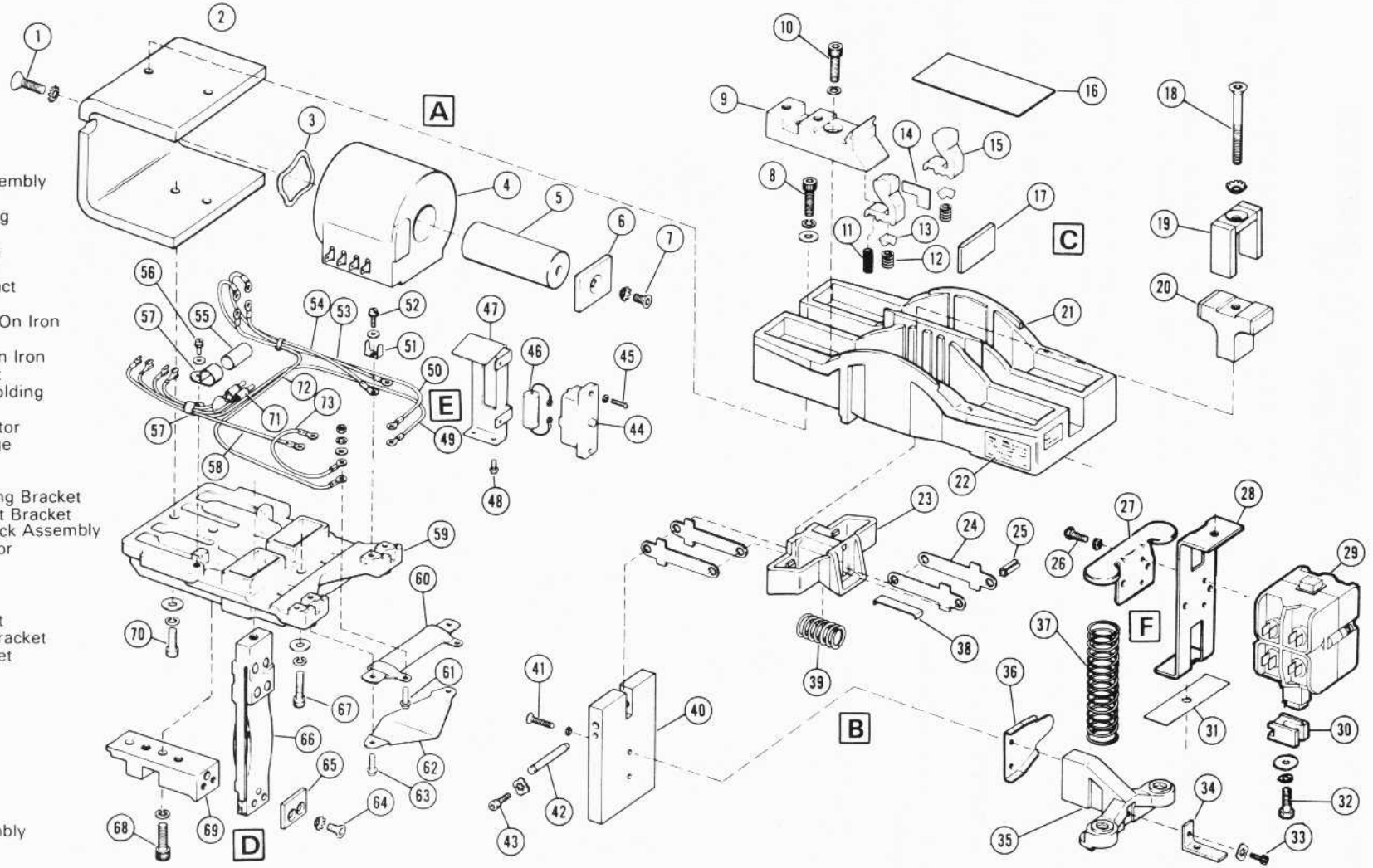
7. Remove two screws (63), resistor guard (62) and resistor (60).

8. Remove two screws (48) and limit switch (44) with assembly.

9. Remove sealant, two screws (18), movable hold-on irons (19) and movable contact assemblies (20).

If transfer switch is equipped with a 60 ampere auxiliary switch, Fig. 5, or traction motor cutout switch, Fig. 6, remove mounting screws and remove switch before proceeding.

10. Remove three screws (8) and top terminal molding (21) with assembly.



1. Capscrew
2. Magnet Yoke
3. Spring Washer
4. Magnet Coil
5. Magnet Core
6. Pole Plate
7. Screw
8. Screw
9. Top Contact Assembly
10. Screw
11. Dual Wipe Spring
12. Pivot Spring
13. Pivot Spring Cap
14. Spacer
15. Stationary Contact
16. Top Cover
17. Stationary Hold-On Iron
18. Screw
19. Movable Hold-On Iron
20. Movable Contact
21. Top Terminal Molding
22. Nameplate
23. Armature Operator
24. Armature Linkage
25. Roll Pin
26. Screw
27. Top Return Spring Bracket
28. Interlock Support Bracket
29. Type 707 Interlock Assembly
30. Interlock Operator
31. Insulator
32. Capscrew
33. Screw
34. Operator Bracket
35. Return Spring Bracket
36. Operating Bracket
37. Return Spring
38. Link Guide
39. Spring
40. Armature
41. Screw
42. Bearing Pin
43. Screw
44. Limit Switch
45. Self-Tap Screw
46. Capacitor Assembly
47. Switch Bracket
48. Screw
49. Flex Lead Assembly, 330 mm (13")
50. Flex Lead Assembly, 197 mm (7-3/4")
51. Tab Connection
52. Screw
53. Flex Lead Assembly, 159 mm (6-1/4")
54. Flex Lead Assembly, 225 mm (8-7/8")
55. Sleeve
56. Screw
57. Cable Clip
58. Flex Lead Assembly, 194 mm (7-5/8")
59. Bottom Terminal Molding
60. Resistor (55W, 750 ohm)
61. Screw
62. Resistor Guard
63. Screw
64. Screw
65. Clamping Plate
66. Movable Contact Support
67. Capscrew
68. Capscrew
69. Bottom Terminal
70. Capscrew
71. Rectifier Assembly
72. Flex Lead Assembly, 381 mm (15")
73. Flex Lead Assembly, 114 mm (4-1/2")

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Fig.12 – Transfer Switch, Exploded View

11. Remove screw (67) and remove interlock (29) with assembly.

12. Remove armature (40) and operator (23) with assembly.

13. Remove four screws (68) and two contact supports (66) and terminal assemblies (69).

14. Remove two screws (70) and separate magnet yoke (2) with assembly from bottom terminal molding (59).

MAGNET YOKE ASSEMBLY, Fig. 13

1. Remove screws (7), pole plate (6), magnet coil (4), and spring washer (3).

2. Remove screw (1) and separate magnet core (5) and magnet yoke (2).

ARMATURE AND OPERATOR ASSEMBLY, Fig. 14

1. Remove screw (11), bearing pin (10), and operator assembly (1, 2, 3, 8, and 13).

2. Remove roll pin (3) and slide armature linkage (2) out of armature operator (1).

3. Remove link guide (13) and return spring (8) from armature operator (1).

4. Remove screw (7) and operator for interlock (6) from return spring bracket (5).

5. Remove two screws (12), operating bracket (4), and return spring bracket (5).

If transfer switch is equipped with a 60 ampere auxiliary switch, remove two screws (15, Fig. 4), hug locknut (14), and operating lever (13).

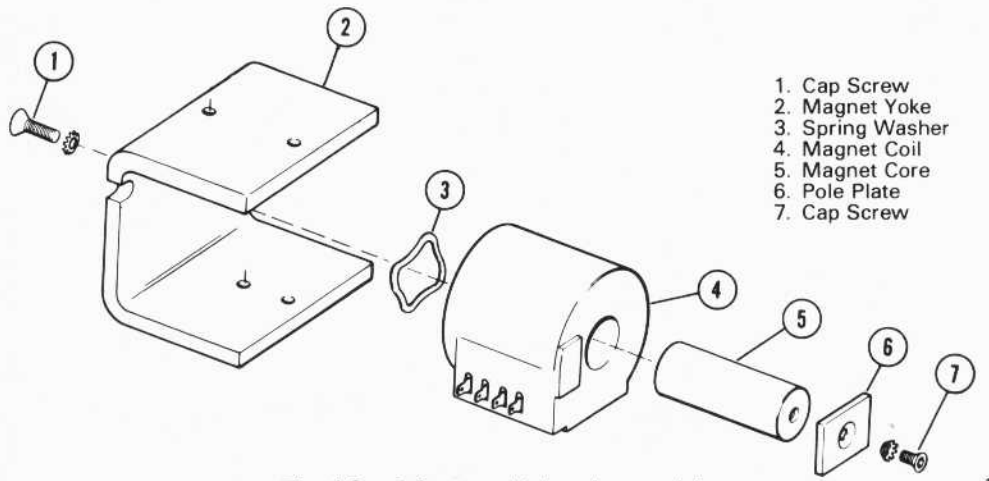


Fig.13 – Magnet Yoke Assembly

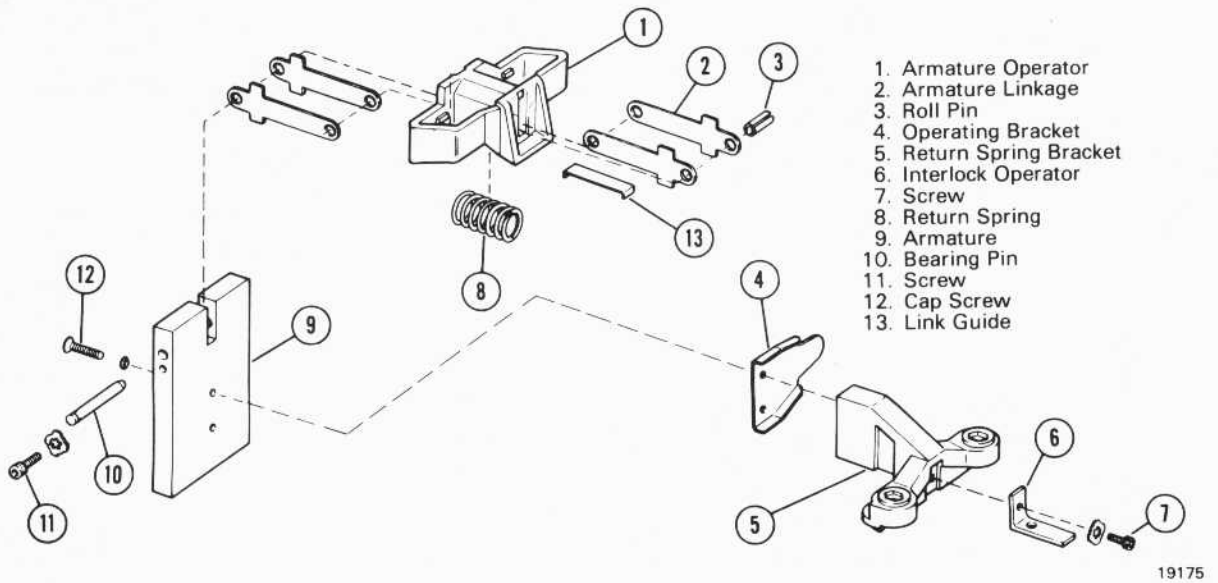


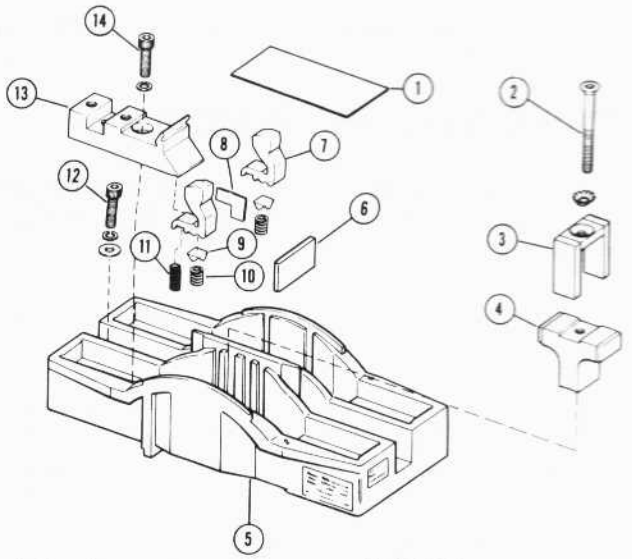
Fig.14 – Armature And Operator Assembly

TOP TERMINAL ASSEMBLY, Fig. 15

1. Remove two screws (14) and top contact assembly (13).

2. Lift out stationary contacts (7), spacers (8), pivot springs (10), with caps (9), and wipe springs (11).

3. Remove four stationary hold-on irons (6) from top terminal molding (5).



1. Top Cover
2. Cap Screw
3. Movable Hold-On Iron
4. Movable Contact Assembly
5. Top Terminal Molding
6. Stationary Hold-On Iron
7. Stationary Contact
8. Spacer
9. Pivot Spring Cap
10. Pivot Spring
11. Wipe Spring
12. Cap Screw
13. Top Contact Assembly
14. Cap Screw

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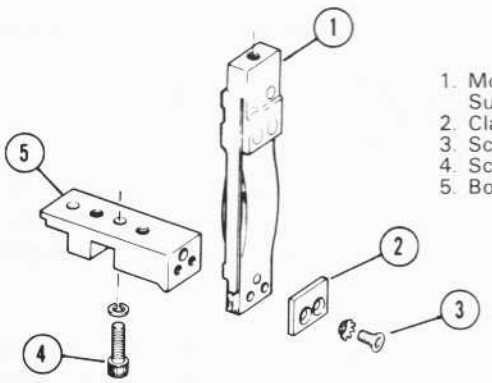
Fig.15 – Top Terminal Assembly

CONTACT SUPPORT AND TERMINAL ASSEMBLY, Fig. 16

1. Remove two screws (3), clamping plate (2), and movable contact support (1) from bottom terminal (5).



1. Movable Contact Support
2. Clamping Plate
3. Screw
4. Screw
5. Bottom Terminal

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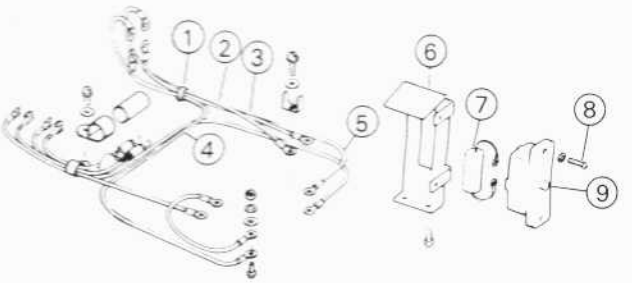
Fig.16 – Contact Support And Bottom Terminal Assembly

2. Repeat Step 1 for other contact support and terminal assembly.

LIMIT SWITCH ASSEMBLY, Fig. 17

1. Remove two screws (8) and switch bracket (6) from limit switch assembly.

2. Cut ty-wraps (1). Remove four terminal screws from limit switch (9), capacitor (7), and flexible lead assemblies (2, 3, 4, 5).



1. Ty-Wrap
2. Flexible Lead Assembly, 225 mm (8-7/8")
3. Flexible Lead Assembly, 159 mm (6-1/4")
4. Flexible Lead Assembly, 381 mm (15")
5. Flexible Lead Assembly, 197 mm (7-3/4")
6. Switch Bracket
7. Capacitor
8. Screw
9. Limit Switch

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Fig.17 – Limit Switch Assembly

INTERLOCK ASSEMBLY, Fig. 18

1. Remove screw (6) and interlock operator (5).

2. Remove two screws (1) to separate top return spring bracket (2).

NOTE

For disassembly or assembly of interlock assembly, refer to Maintenance Section of this Maintenance Instruction.

TRANSFER SWITCH 8464114 60 AMPERE AUXILIARY SWITCH, Fig. 19

1. Remove four nuts (5) and connection link (4).

2. Remove two screws (6) and separate base assembly (3), contact carrier (11), insulating plate (2), and support bracket (1).

3. Drive roll pin (7) out of contact carrier (11), separating contact carrier (11), movable contacts (8), compression spring (9), and spacer (10).

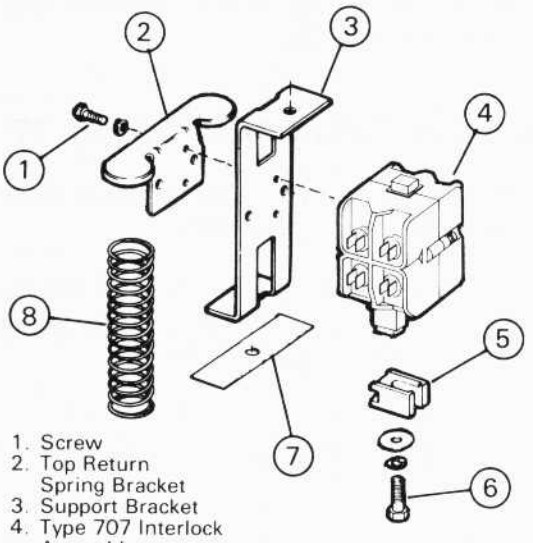


Fig.18 - Interlock Assembly

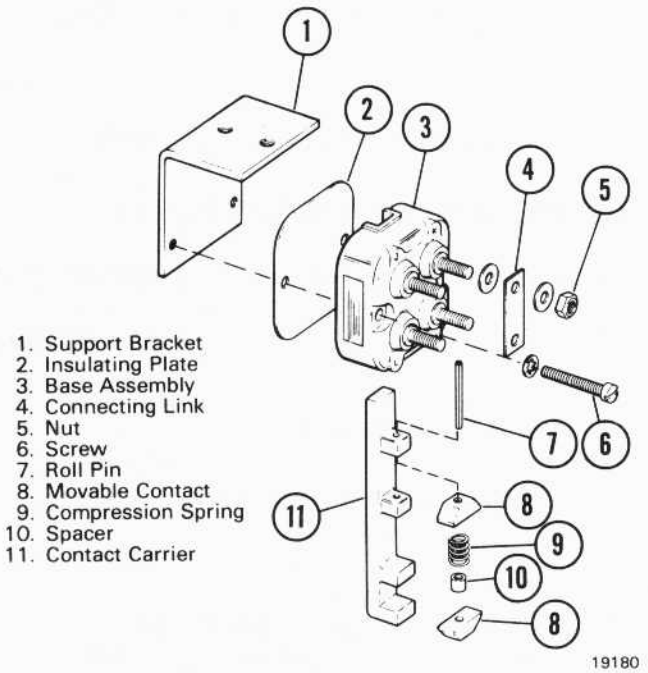


Fig.19 - 60 Ampere Auxiliary Switch, Exploded View

TRANSFER SWITCH 8464118 TRACTION MOTOR CUTOUT SWITCH, Fig. 20

1. Remove four screws (4) and two insulator stops (3).

2. Remove four screws (13) and two micro-switches (14).

3. Remove two springs (5), switch operator (7), and armature assembly (6).

4. Remove two screws (16) and switch support (17).

5. Remove screw (15), magnet core (12) with pole plate (9), "O" rings (10), and coil (11).

6. Remove screw (8) and separate pole plate (9) and magnet core (12).

7. Remove adjusting nut (2) and screw (19) from yoke (18).

BUILDING SUBASSEMBLIES

To rebuild the transfer switch, start by building the major subassemblies. Perform the procedures as follows:

Torque values for all fasteners unless otherwise noted.

Screw Size	Torque N·m (in-lbs)
10-32	1.7-2.3 (15-20)
0.250-20	6.2-7.3 (55-65)
0.312-18	9.6-11.3 (85-100)
0.375-16	22.6-25.4 (200-225)

MAGNET YOKE ASSEMBLY, Fig. 13

1. Position the magnet core (5) over counter-sunk hole in magnet yoke (2) and secure with screw (1) and lockwasher.

2. Position spring washer (3) and magnet coil (4) on magnet core (5) with the flat side of the coil toward the bottom of magnet yoke (2).

3. Locate pole plate (6) on the end of magnet coil (4) with the short side against the boss on the coil end. Secure with screw (7) and lockwasher.

ARMATURE AND OPERATOR ASSEMBLY, Fig. 14

1. Position operating bracket (4) and return spring bracket (5) on armature (9). Secure with two screws (12) and lockwashers. Apply Loctite to threads of screws.

2. Locate operator for interlock (6) on return spring bracket (5) and secure with screw (7) and lockwasher. Apply Loctite to screw threads.

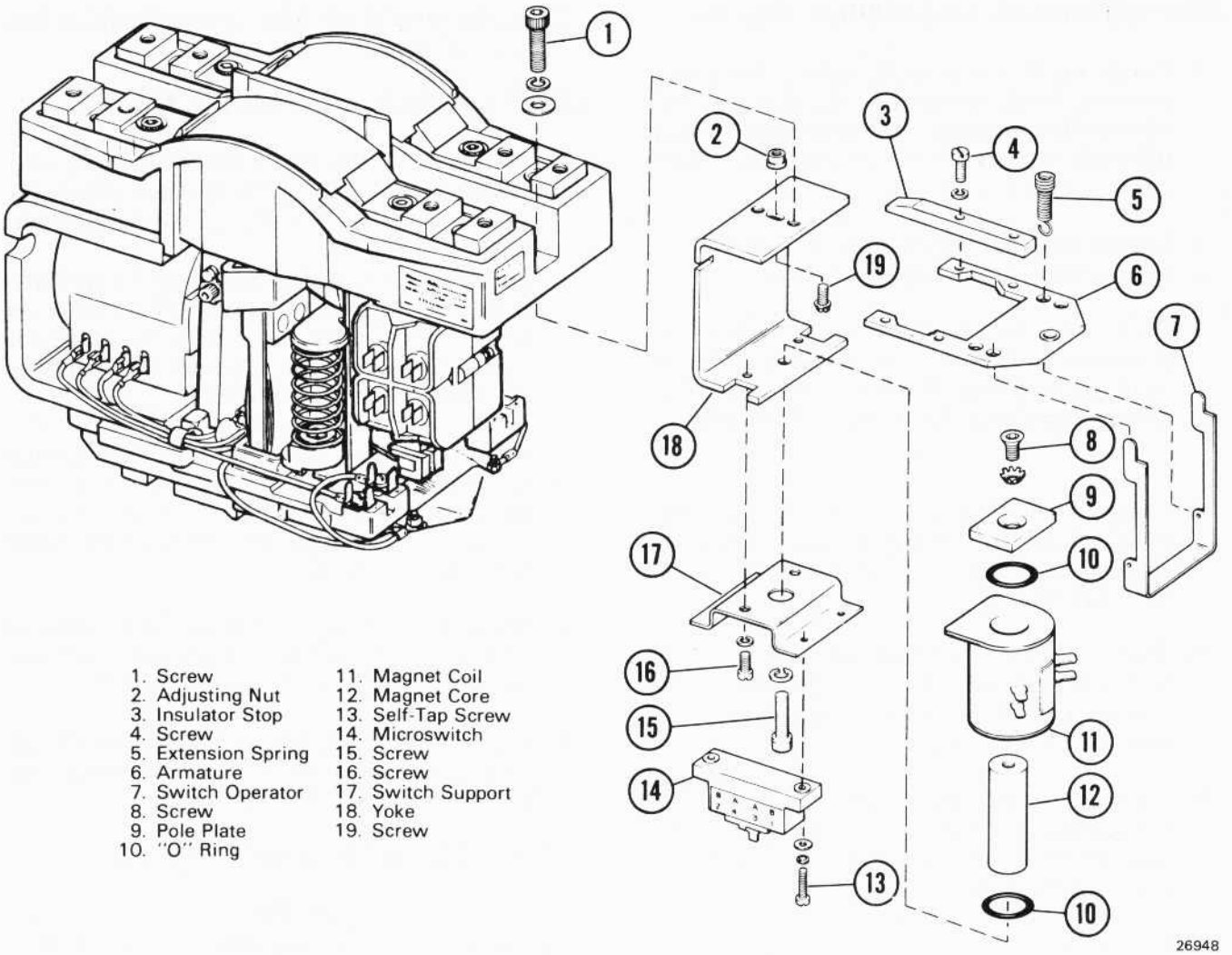


Fig.20 – Traction Motor Cutout Switch, Exploded View

3. Place spring (8) in cavity in armature operator (1) and slide link guide (13) into position.

4. Position armature linkage (2) in armature operator (1). Slide the two outer links in from one end of the armature operator and the two inner links from the other end. Secure with roll pin (3).

5. Slide armature linkage (2) into slot in armature (9). Push bearing pin (10) into hole in armature (9) and armature linkage (2). Secure with screw (11) and lockwasher.

If transfer switch is equipped with 60 ampere auxiliary switch, refer to Fig. 21 and perform the following step.

1. Position operating lever on bottom of return spring bracket, place locknuts in hex holes in return spring bracket and secure with two screws and washers.

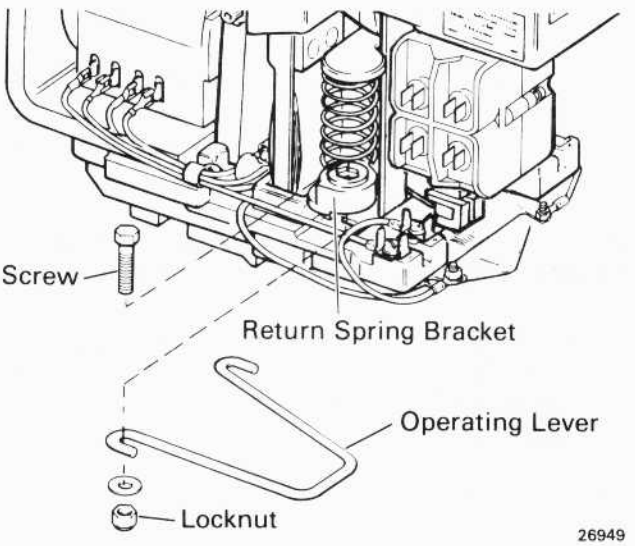


Fig.21 – Operating Lever Assembly

TOP TERMINAL ASSEMBLY, Fig. 15

1. Place top terminal molding in a horizontal position. Apply silastic to eight slots for hold-on iron (6) mounting. Push four hold-on irons (6) to the bottom of the slots before the silastic cures.

2. Ensure that the support areas for springs (10, 11) are free of all foreign particles.

3. Place one dual wipe spring (11) over the projections adjacent to the rear hole in the top terminal molding. The wire connecting dual springs must be at the bottom of the hole.

4. Place pivot spring caps (9) on one end of two pivot springs (10). Place the other end of the springs over the conical front pins in the top terminal molding.

5. Insert one spacer (8) with the short leg of the "L" down between pivot springs (10) and the long leg extending back between halves of the dual wipe spring (11).

6. Position two stationary contacts (7) over dual wipe spring (11) and the two pivot springs (10). Ensure that spring caps (9) are firmly seated on pivot springs (10).

7. Insert the pointed nose of the top terminal assembly (13) into the cavity in back of stationary contact assembly, engaging the mating pivots.

8. With the pivots engaged and the stationary contacts (7) held back against the stop in the top terminal molding (5), secure with two screws (14) and lockwashers.

9. Check for freedom of movement of both stationary contacts. There should be clearance behind the contacts.

CONTACT SUPPORT AND BOTTOM TERMINAL ASSEMBLY, Fig. 16

1. Position movable contact support assembly (1) and clamping plate (2) on end of bottom terminal (5) and secure with two screws (3) and lockwashers.

2. Repeat Step 1 for other contact support and terminal assembly.

LIMIT SWITCH ASSEMBLY, Fig. 17

1. Connect capacitor assembly (7) leads and flexible leads (2, 3, 4, 5) to limit switch (9) terminals as shown in Fig. 22 wiring diagram.

2. Form leads on capacitor assembly (7, Fig. 17) to center the capacitor over the "A" terminals on the left, form lead (4) to run down the left side of capacitor (7) and lead (2) down the right side and secure with one ty-wrap (1).

3. Viewing the limit switch (9) from the terminal side, with the "A" terminals on the left, form lead (4) to run down the left side of the capacitor (7) and lead (2) down the right side and secure with one ty-wrap (1).

4. Bring all four leads (2, 3, 4, 5) down under the limit switch (9) and bundle the wires with one ty-wrap (1) in front of the limit switch.

5. Position limit switch (9) with capacitor (7) and leads attached on switch bracket (6) and secure with screws (8) and lockwashers.

INTERLOCK ASSEMBLY, Fig. 18

NOTE

For assembly of interlock, refer to Maintenance Section.

1. Position the interlock assembly (4) and top return spring bracket (2) on support bracket (3) and secure with two screws (1) and lockwashers.

2. Position interlock operator (5) on interlock assembly (4) and secure with screw (6), lockwasher, and Belleville washer.

TRANSFER SWITCH 8464114, 60 AMPERE AUXILIARY SWITCH, Fig. 19

1. Drive roll pin (7) through one hole in one shoulder of contact carrier (11), so that the end of the roll pin is 9.5 mm (3/8") from other shoulder.

2. Assemble one movable contact (8), spacer (10), and compression spring (9) on roll pin (7).

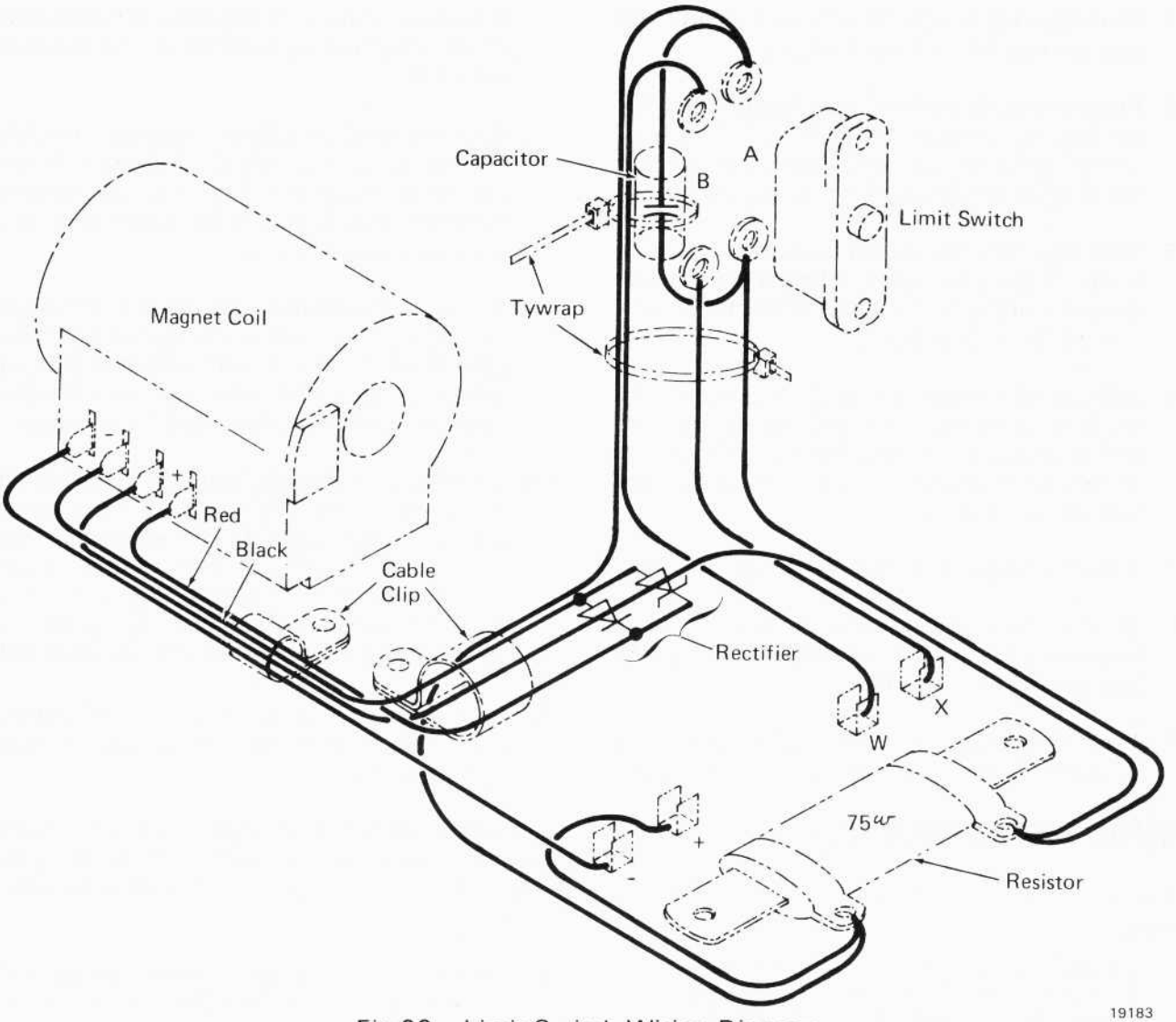


Fig.22 – Limit Switch Wiring Diagram

3. Compress spring (9) and position other movable contact (8) against the shoulder of the contact carrier (11) without the roll pin (7).

4. Secure the assembly by driving the roll pin (7) through the other movable contact (8) and the hole in the other shoulder of the contact carrier (11).

5. Position contact carrier (11) in base assembly (3) with the two movable contacts (8) between the stationary contacts in the base assembly.

6. Position these two parts over the insulating plate (2) on the support bracket (1) and secure with two screws (6) and lockwashers.

7. Place one plain washer on each of the two terminal studs (K and M). Position connecting link (4) over washers and secure with two nuts (5) and washers.

8. Place two washers on each of two terminal studs (J and L) and secure with two nuts (5).

TRANSFER SWITCH 8464118, TRACTION MOTOR CUTOUT SWITCH, Fig. 20

1. Position pole plate (9) on either end of magnet core (12) and secure with screw (8) and lockwasher.

2. Assemble "O" rings (10) and coil (11) on magnet core (12) and pole plate (9) with coil flange on end toward pole plate.

3. Position these parts on the yoke with the flat shoulder of the coil (11) flange against the yoke and the long sides of the pole plate (9) parallel to the sides of the yoke (18). Secure with screw (15) and lockwasher.

5. Position switch support (17) and secure with two screws (16) and lockwashers.

6. Place two springs (5) through the holes nearest the legs in armature assembly (6). Heads of springs to be on the side of the armature with the smaller outside diameter of the eyelet.

7. Slide legs of armature (6) through the slots in back of the yoke (18). The larger outside diameter of the eyelet in the armature is to be toward the pole plate (9).

8. Slide switch operator (7) up through the slots in the bottom of yoke (18) and through the two holes in the armature (6). The long straight side of the switch operator is to be toward the open side of the yoke.

9. Attach springs (5) to the switch operator (7).

10. Position both microswitches (14) on switch support (17) with four screws (13), plain washers, and lockwashers.

11. Position insulator stops (3) on armature assembly (6) with four screws (4) and lockwashers.

FINAL ASSEMBLY, Fig. 23

Torque values for all fasteners unless otherwise noted.

Screw Size	Torque N·m (in-lbs)
10-32	1.7-2.3 (15-20)
0.250-20	6.2-7.3 (55-65)
0.312-18	9.6-11.3 (85-100)
0.375-16	22.6-25.4 (200-225)

1. Position bottom terminal molding (59) on bottom of magnet assembly (A) and secure with two screws (70), plain washers, and lockwashers.

2. Insert one contact support and terminal assembly (D) through one slot in bottom terminal molding (59). Position against molding and secure with two screws (68) and lockwashers. Repeat for other contact support and terminal assembly.

3. Insert armature and operator assembly (B) between magnet assembly (A) and contact support and terminal assemblies (D). Contact support and terminal assemblies are to pass through openings in armature operator (23). Bottom of armature (40) is to be seated on bottom terminal molding (59), between guides on molding and against bottom leg on magnet yoke (2).

4. Position insulator (31) and interlock assembly (F) on bottom terminal molding (59) with operator bracket (34) in slot of interlock operator (30).Secure with screw (67), plain washer, and lockwasher.

5. Position top terminal assembly (C) over magnet assembly (A), armature and operator armature (B), contact support and terminal (D), and interlock assembly (F). Secure with three screws (8), plain washers, and lockwashers.

6. Position one movable contact assembly (20), and hold-on iron (19) over one contact support and terminal assembly (D) and secure with screw (18) and lockwasher. Torque screw 13 to 15 N·m (115 to 130 in-lbs). Repeat for other movable contact assembly. Apply silicone (RTV) compound to heads of both screws (18).

If transfer switch does not have a 60 ampere auxiliary switch or traction motor cutout switch proceed to Step 7.

If transfer switch is equipped with a 60 ampere auxiliary switch, position switch on operating lever with two screws, lockwashers, and plain washers as shown in Fig. 24.

If transfer switch is equipped with a traction motor cutout switch, refer to Fig. 25 and perform the followings procedure:

a. Place a 5.16 mm (.203″) spacer between each normally closed main contact.

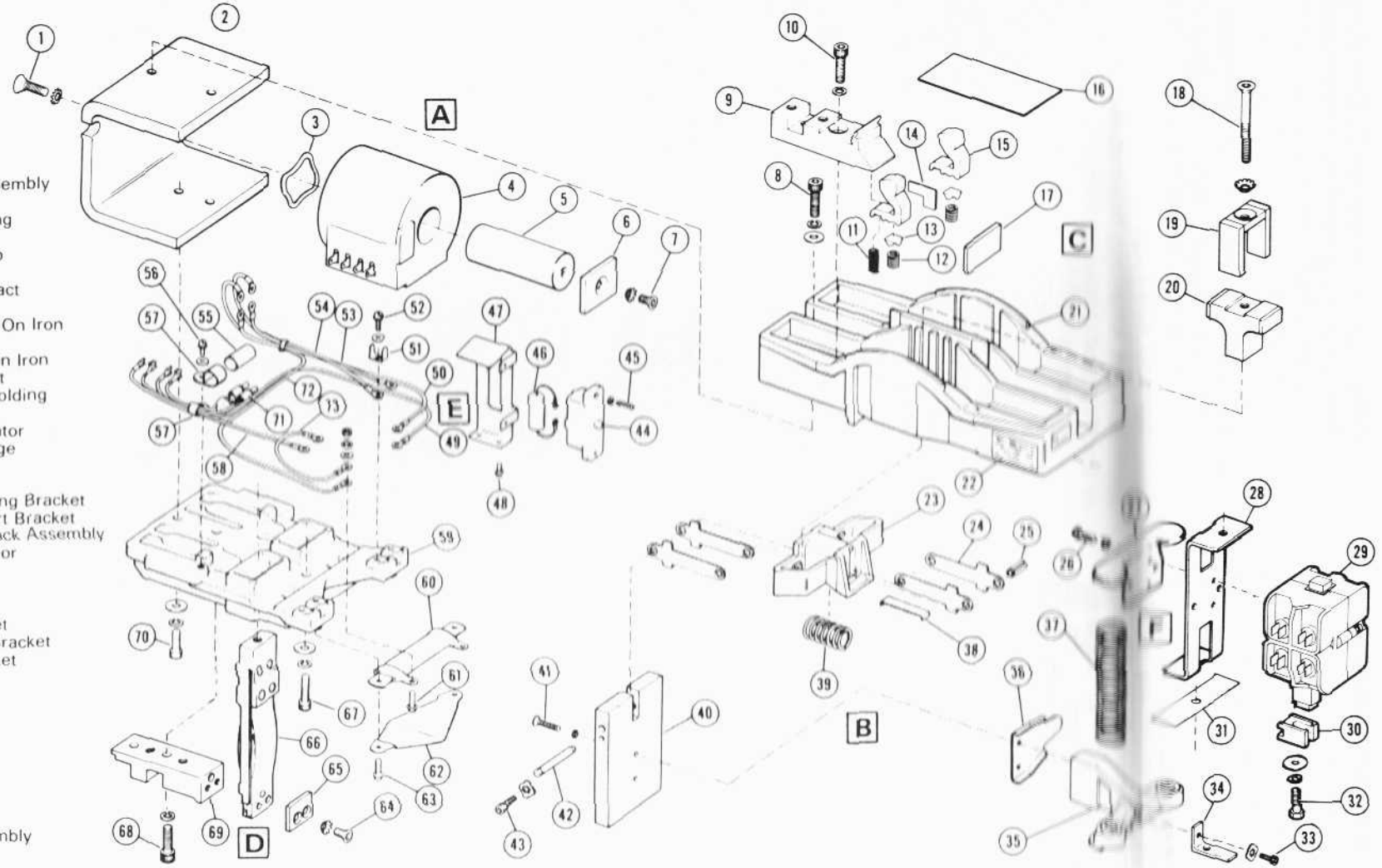
b. Loosen adjusting screw and install cutout switch assembly with mounting screws and partially tighten.

c. Adjust switch assembly, in the motor cutout position, so the insulator stop will touch above the step of armature operator.

d. Tighten adjusting screw and tighten switch mounting screws.

e. Remove 5.16 mm (.203″) spacer.

f. Ensure switch is positioned so insulator stop is above the step of armature operator. Measure the gap of movable contacts by applying finger pressure to the movable contacts (to remove the slack) toward the



1. Capscrew
2. Magnet Yoke
3. Spring Washer
4. Magnet Coil
5. Magnet Core
6. Pole Plate
7. Screw
8. Screw
9. Top Contact Assembly
10. Screw
11. Dual Wipe Spring
12. Pivot Spring
13. Pivot Spring Cap
14. Spacer
15. Stationary Contact
16. Top Cover
17. Stationary Hold-On Iron
18. Screw
19. Movable Hold-On Iron
20. Movable Contact
21. Top Terminal Molding
22. Nameplate
23. Armature Operator
24. Armature Linkage
25. Roll Pin
26. Screw
27. Top Return Spring Bracket
28. Interlock Support Bracket
29. Type 707 Interlock Assembly
30. Interlock Operator
31. Insulator
32. Capscrew
33. Screw
34. Operator Bracket
35. Return Spring Bracket
36. Operating Bracket
37. Return Spring
38. Link Guide
39. Spring
40. Armature
41. Screw
42. Bearing Pin
43. Screw
44. Limit Switch
45. Self-Tap Screw
46. Capacitor Assembly
47. Switch Bracket
48. Screw
49. Flex Lead Assembly, 330 mm (13")
50. Flex Lead Assembly, 197 mm (7-3/4")
51. Tab Connection
52. Screw
53. Flex Lead Assembly, 159 mm (6-1/4")
54. Flex Lead Assembly, 225 mm (8-7/8")
55. Sleeve
56. Screw
57. Cable Clip
58. Flex Lead Assembly, 194 mm (7-5/8")
59. Bottom Terminal Molding
60. Resistor (55W, 750 ohm)
61. Screw
62. Resistor Guard
63. Screw
64. Screw
65. Clamping Plate
66. Movable Contact Support
67. Capscrew
68. Capscrew
69. Bottom Terminal
70. Capscrew
71. Rectifier Assembly
72. Flex Lead Assembly, 381 mm (15")
73. Flex Lead Assembly, 114 mm (4-1/2")

26944

Fig.23 -Transfer Switch, Exploded View

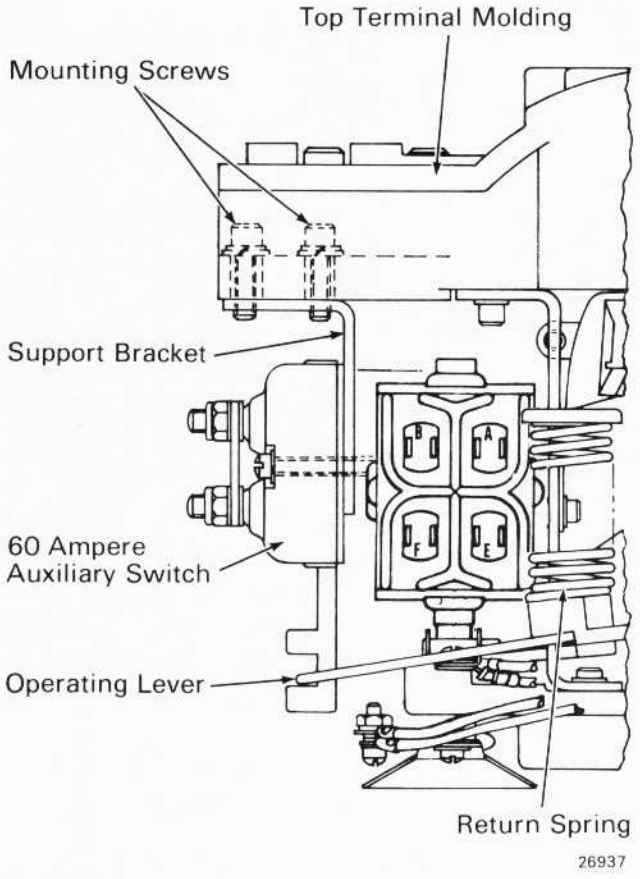


Fig.24 - 60 Ampere Auxiliary Switch

contact gap to be measured. Each of the four contact gaps shall be a minimum of 1.58 mm (.062"). Readjust position of switch if required.

g. Position the switch so the insulator stop is below the step in armature operator as shown in Fig. 25. With the armature operator down against the return spring bracket, clearance between the insulator stop and armature operator shall be a minimum of 0.25 mm (.010").

With the armature operator up against the top terminal molding, the clearance can be up to a maximum of 3.68 mm (.145"). Adjust by bending the switch armature at the yoke, if required.

7. Position limit switch assembly, (44, Fig. 23) on bottom terminal molding (59) and secure with two screws (48). Apply Loctite to screw threads.

8. Position resistor (60) and resistor guard (62) on bottom terminal molding (59) and secure with two screws (63). Apply Loctite to screw threads.

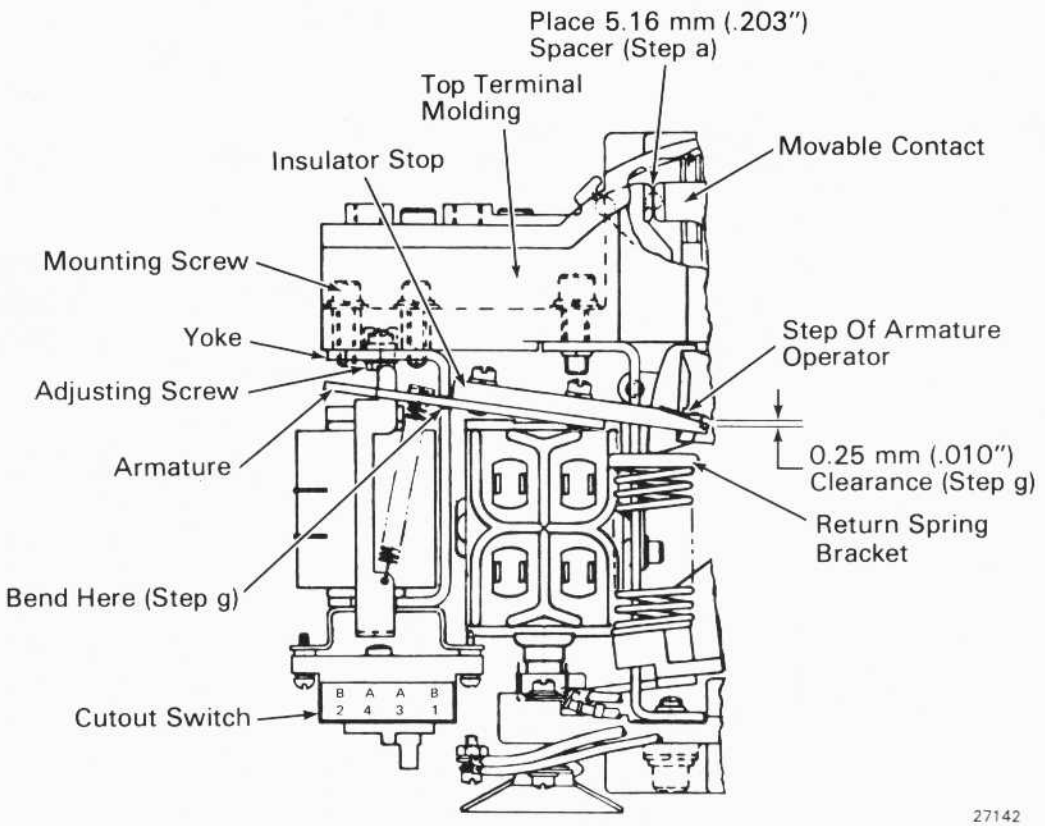


Fig.25 - Traction Motor Cutout Switch

NOTE

Refer to Fig. 22 wiring diagram as an aid to flexible lead connections.

9. Position flexible lead assemblies (53, 54, 58, and 73) and four tab connections (51) on bottom terminal molding (59) and secure with four screws (52) and plain washers. Connect the flexible leads in the following sequence: (53) right side, (54) right center, (73) left center, and (58) left side.

10. Connect flexible leads (50 and 49) to right-hand resistor (60) terminal and flexible leads (72 and 73) to left-hand resistor (60) terminal with two screws (61), plain washers, lockwashers, and nuts.

11. Connect flexible leads (58 and 49) and rectifier (71) leads to coil (4) terminals.

12. Place a cable clip (57) on the four leads from coil (4) terminals. Place a sleeve (55) and cable clip (57) on rectifier assembly (71). Position cable clips (57) on bottom terminal molding (59) and secure with screw (56) and plain washer.

13. Install return springs (37).

14. Assemble top covers (16) in slots in top contact assemblies (9).

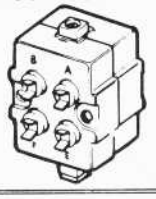
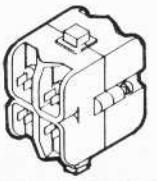
15. Check interlock position. With interlock assembly (F) in the open position, the contact carrier (plunger) must be within 0.79 mm (.031″) of flush with top of interlock housing.

16. With interlock assembly (F) in the closed position, the step at the bottom of contact carrier must be within 0.79 mm (.031″) of flush with bottom of interlock housing.

SERVICE DATA

SPECIFICATIONS

Type 387 interlock assembly is currently replaced by Type 707 interlock assembly. When ordering a replacement interlock assembly, Type 707 interlock assembly part numbers should be used.

Transfer Switch	Type 387 Interlock Assembly	Type 707 Interlock Assembly	
			
8464113	8253273	9539484	
8464114	8353273	9539484	60 Ampere Auxiliary Switch
8464116	8260393	9539490	
8464117	8341965	9539500	
8464118	8341965	9539500	Traction Motor Cutout Switch

26953

MAIN CONTACTS

Rating	1000 amperes
Pressure (minimum)	2.268 kg (5 lbs)
Wipe Gap	0.25 mm to 1.52 mm (.010″ to .060″)
Wear Allowance (total)	2.4 mm (3/32″)
Gap (minimum, energized or de-energized)	6 mm (1/4″)

INTERLOCK CONTACTS

Movable Contact Travel	9.53 mm (.375″)
Lift, Short Wipe – at 2.5 mm (3/32″) deflection	113 g (.25 lb)
Lift, Long Wipe – at 6 mm (1/4″) deflection	136 g (.30 lb)
Wear Allowance (total)	
Type 707	0.51 mm (.020″)
Type 387	1.52 mm (.060″)
Arrangement - Interlocks 8253273, 9539484	
A-B, C-D	Normally Closed
E-F, G-H	Normally Open
Arrangement – Interlocks 8260393, 9539490	
A-B	Normally Closed
C-D, E-F, G-H	Normally Open
Arrangement – Interlocks 8341965, 9539500	
C-D	Normally Closed
A-B, E-F, G-H	Normally Open

MAGNET COIL

Resistance (at 20° C)	19.8 ohms (± 10%)

OPERATION

Working Voltage (intermittent)	74 VDC
Pickup (at 20° C)	48 VDC
Dropout (at 20° C)	5 - 28 VDC

ECONOMIZING RESISTOR (AT 20° C)

Resistance	75 ohms (± 5%)
Wattage	55 watts

W-X CIRCUIT

Rating (at 74 VDC)	1 ampere

60 AMPERE AUXILIARY SWITCH (Transfer Switch 8464114 Only)

Contact Current Rating	60 amperes
Contact Spring Pressure (nominal)	680 g (1.5 lbs)
Contact Gap (nominal)	4.8 mm (3/16″)
Contact Lift (nominal)	2.4 mm (3/32″)
Contact Wear Allowance (each face)	0.8 mm (1/32″)
Contact Arrangement	
J-K	Open
L-M	Closed

TRACTION MOTOR CUTOUT SWITCH (Transfer Switch 8464118 Only)

Coil Resistance (at 20° C)	464 or 725 ohms
Coil Pickup (maximum at 20° C)	48 VDC
Coil Rating	74 VDC

Contact Arrangement

Switch De-energized	
1-2	Open
3-4	Closed
Switch Energized	
1-2	Closed
3-4	Open

HI POT

	60 Hz, 1 Minute
Magnet Coil To Mounting	600 V RMS
Magnet Coil To Main Contacts	
Main Contacts To Mounting	
Main Contacts To Interlock Contacts	
Between Adjacent Terminals	2400 V RMS
Interlock Contacts To Mounting	
*Main Contacts To 60 Ampere Auxiliary Switch	
*60 Ampere Auxiliary Switch To Mounting	
**Motor Cutout Switch Coil To Mounting	600 V RMS
**Motor Cutout Switch Microswitch Terminals To Mounting	600 V RMS

*Transfer Switch 8464114 Only
**Transfer Switch 8464118 Only

MATERIAL LIST

Silicone (RTV) Compound - 2 oz. tube	8305837
Loctite Retaining Compound - 10 cc tube	8471182