

## INSPECTION AND REPLACEMENT OF CONTACT TIPS FOR POWER, REVERSER AND SHUNTING SWITCHGEAR

### INSPECTION OF CONTACT TIPS

The contact tips of the power, reverser and shunting switchgear should be inspected periodically for worn, burned or eroded contacts. Sample views of these conditions can be seen in Fig. 7-1. Routine inspection and immediate replacement of contact tips such as these will contribute to higher efficiency and more reliable service.

At the present time contact tips used on all EMD switchgear are made of alloy material. The contacting surfaces of these alloy tips take on irregularities during the first few operating cycles. It is during this initial operation that the majority of contact wear occurs. The discoloration on the surfaces of the contact tips, which results from repeated cycling, is a good conductor of electricity and does not affect contact operation.

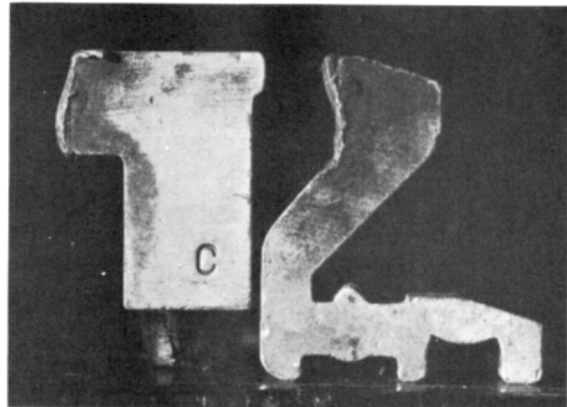
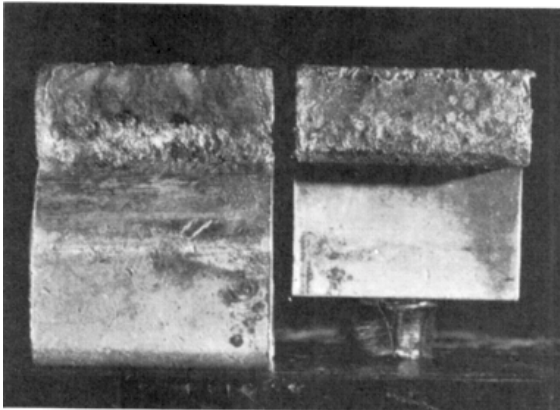
Normal wear and erosion continues after the initial wear period, and in some cases the appearance of the contact tips gives the false impression that the tips are not operating satisfactorily. See Fig. 7-2 for sample views of contact tips that are still usable.

**ALLOY CONTACTS WILL OPERATE SATISFACTORILY EVEN THOUGH BLACKENED, PITTED, AND ERODED. DO NOT CLEAN, DRESS, OR FILE CONTACT SURFACES. REPLACE CONTACTS WHEN ANY PORTION OF THE ALLOY MATERIAL IS WORN TO THE BASE METAL.**

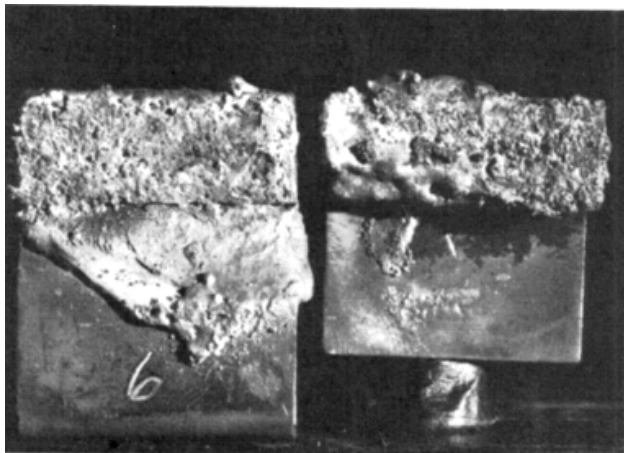
Regardless of how the surfaces of the contact tips appear, as long as there is alloy material on both contact surfaces, the entire service life has not been used. However, when a routine electrical equipment inspection is made, if any portion of the alloy is worn away to base metal, the contacts should be replaced. For best results, both stationary and movable contacts should be replaced if either tip is worn to base metal.

Life cycle load tests performed on presently used switchgear have indicated that contact tips have a life expectancy of 3-1/2 to 4 years or longer. This life expectancy is based on normal locomotive usage. Contactors that interrupt severe fault currents caused by circuitry malfunction will not last.

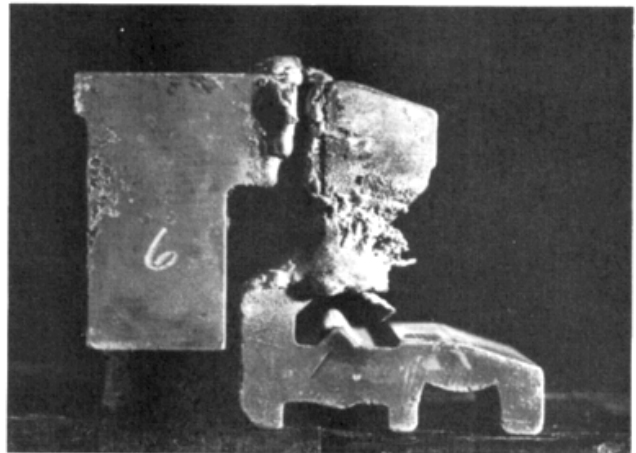
# DO NOT USE



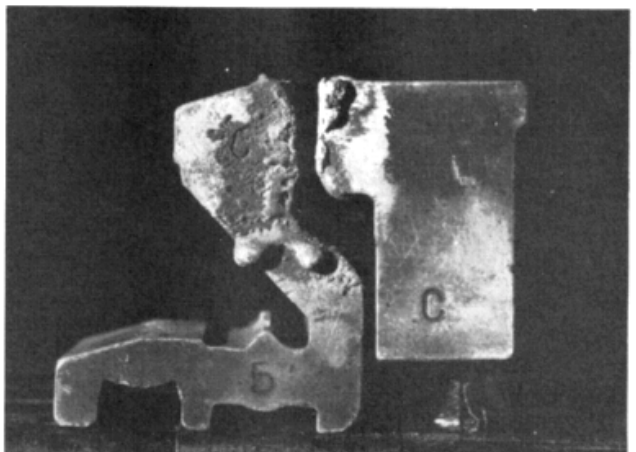
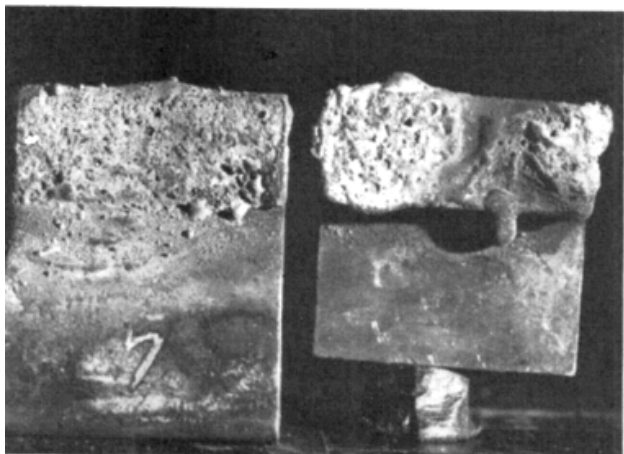
Normal Erosion - Alloy Completely Eroded Away Should Be Replaced



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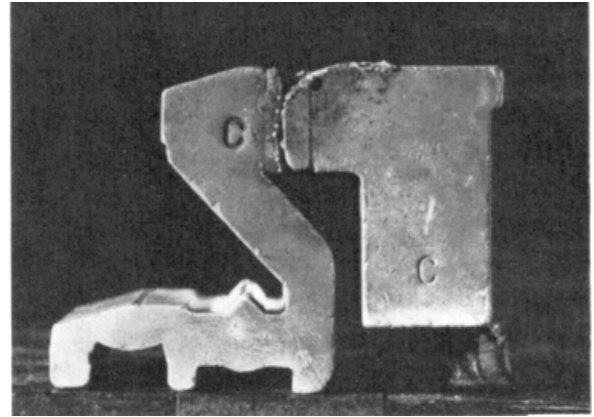
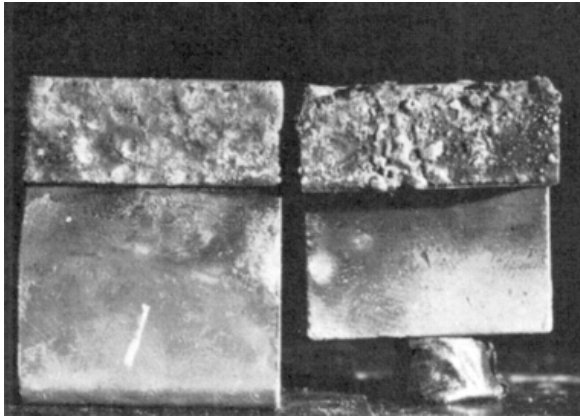


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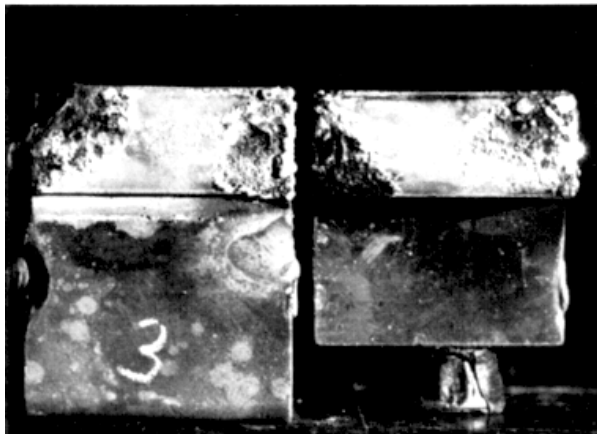


Contacts Destroyed By Fault Current  
Fig. 7-1 - Sample Views Of Contacts That Should Be Replaced

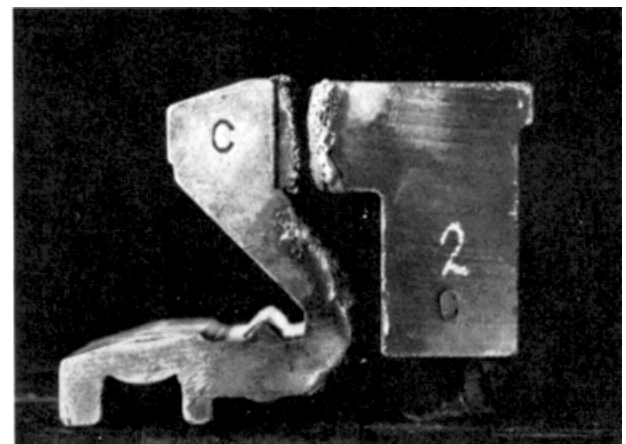
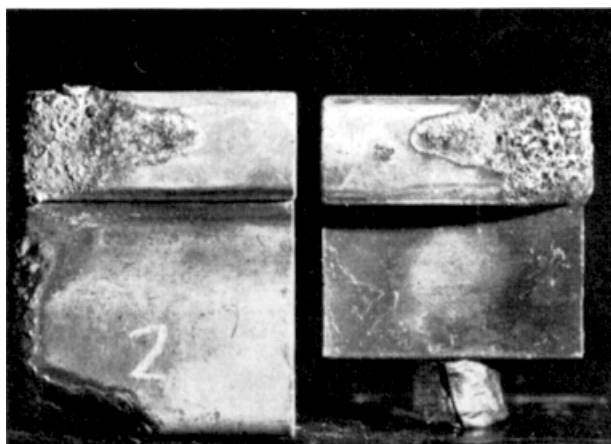
# USABLE



Full Face Erosion



Corner Burn Or Erosion



Corner And Partial Erosion

Fig. 7-2 - Sample Views Of Usable Contacts

## REMOVAL AND REPLACEMENT OF CONTACT ASSEMBLIES ON TRANSFER AND RE-VERSER SWITCHES

### REMOVAL AND REPLACEMENT OF MOVABLE CONTACT ASSEMBLIES, Fig. 7-3

1. Remove top cover to expose the contact assembly.
2. Remove white silastic material from top of screw.
3. Using 3/16" hex head key (allen wrench), remove socket head cap screw and lockwasher.
4. Lift out movable hold-on iron and movable contact assembly.
5. Replace movable contact assembly and re-assemble, with movable hold-on iron, socket head cap screw, and lockwasher, to movable contact bar assembly. Do not tighten screw at this time.
6. Carefully align the movable contact assembly, then tighten socket head cap screw.
7. Apply a small amount of silastic material extending from head of socket head cap screw to movable hold-on iron.

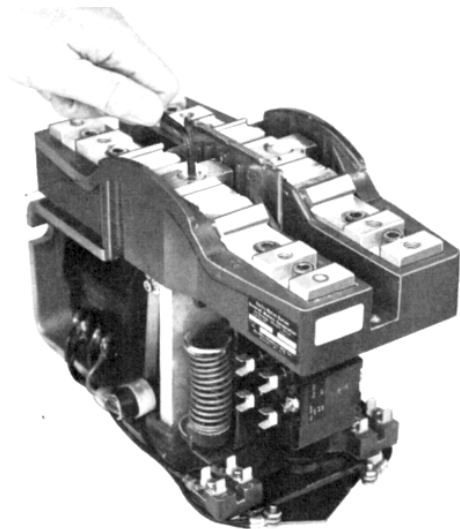


Fig. 7-3 - Removing Movable Contact Assembly Of Transfer Or Reverser Switch

### REMOVAL AND REPLACEMENT OF THE TOP AND FLEXIBLE STATIONARY CONTACT ASSEMBLIES, Fig. 7-4

1. Remove power leads connected to the top stationary contact assembly.
2. Using 1/4" hex head key (allen wrench), remove two socket head cap screws and lockwashers.
3. Lift out the top stationary contact assembly and the flexible stationary contact assembly.
4. Place a new flexible stationary contact assembly in place being careful that pivot spring assembly and wipe springs are in place and vertical.
5. Place new top stationary contact assembly in place, then install socket head cap screws with lockwashers and tighten.
6. Check movement between top stationary contact assembly and the flexible stationary contact assembly. Also check contact gap. Refer to Service Data for proper movement and proper contact gap.
7. Replace power leads and top cover.

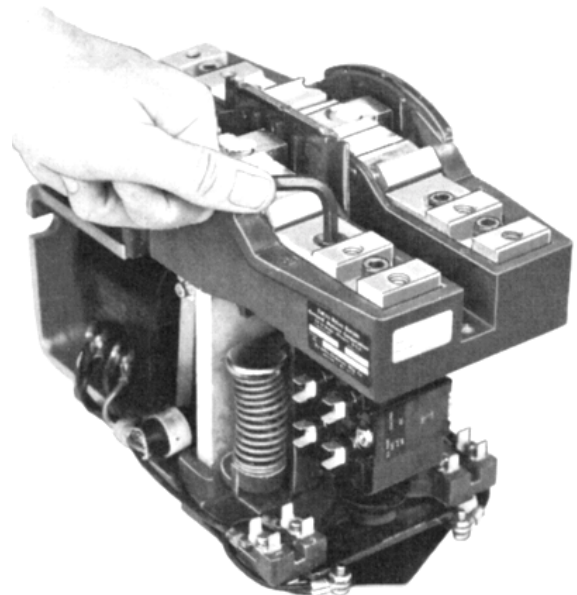


Fig. 7-4 - Removing Stationary Contact Assembly Of Transfer Or Reverser Switch



## REMOVAL AND REPLACEMENT OF CONTACT ASSEMBLIES ON TRACTION MOTOR FIELD SHUNTING CONTACTOR

### REMOVAL AND REPLACEMENT OF MOVABLE CONTACT ASSEMBLIES, Fig. 7-5

1. Remove the molded angle cover from the shunting contactor.
2. Remove the hex head cap screw, lockwasher, and flat washer holding the movable contact assemblies to the lower stationary contact block.
3. Remove the movable contact spring from between the movable contact assembly and the operating lever. A screwdriver may be used to compress the movable contact spring for removal.
4. Remove the U-clamp from the lower stationary contact block. A screwdriver may be used to pry the U-clamp loose from the block. The U-clamp remains a part of the movable contact assembly.
5. Lift the contact assembly from the contactor.
6. Place a new contact assembly into position on the contactor.
7. Insert the movable contact spring between the movable contact assembly and the operating lever. A screwdriver may be used to compress the spring.

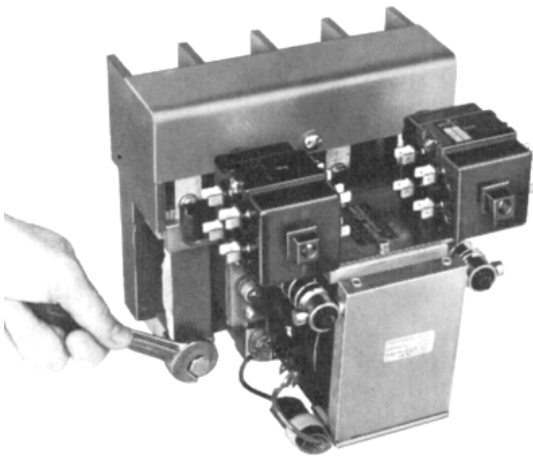


Fig. 7-5 - Removing Movable Contact Assembly Of Shunting Contactor

8. Position the U-clamp over the hole in the lower stationary contact block. Press the U-clamp into position.
9. Install the hex head cap screw, lockwasher, and flat washer, then tighten the screw securely.

### REMOVAL AND REPLACEMENT OF STATIONARY CONTACT ASSEMBLY, Fig. 7-6

1. Remove all leads and/or bus bars from the stationary contact assembly.
2. Using a 5/16" hex head key (alien wrench), remove socket head cap screw and lockwasher from top of stationary contact assembly.
3. Lift out the stationary contact assembly.
4. Place new stationary contact assembly into position.
5. Install socket head cap screw and lockwasher. Do not tighten the screw at this time.
6. Ensure that stationary contact assembly is properly seated and aligned with the movable contact assembly, then tighten socket head cap screw securely. Refer to Service Data for contact gap.
7. Replace all leads and/or bus bars, and replace the molded angle cover.

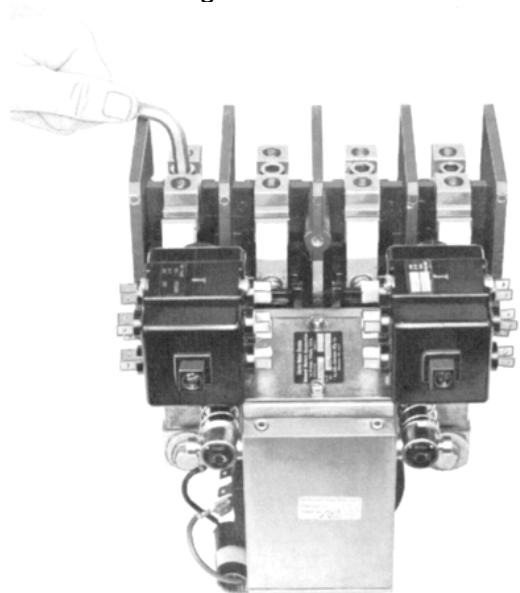


Fig. 7-6 - Removing Stationary Contact Assembly Of Shunting Contactor

## REMOVAL AND REPLACEMENT OF ARC TIP ASSEMBLIES AND MAIN CONTACT ASSEMBLIES

### REMOVAL OF MOVABLE ARC TIP ASSEMBLY, Fig. 7-7

1. Remove arc chute assembly by lifting up and tilting the arc chute assembly back from the main body of the contactor.
2. Using a 5/32" hex head key (alien wrench), remove the socket head cap screw and lockwasher holding the movable arc tip assembly to the movable contact bar.
3. Remove the arc tip assembly by pulling up on the arc tip assembly while moving it from side to side.

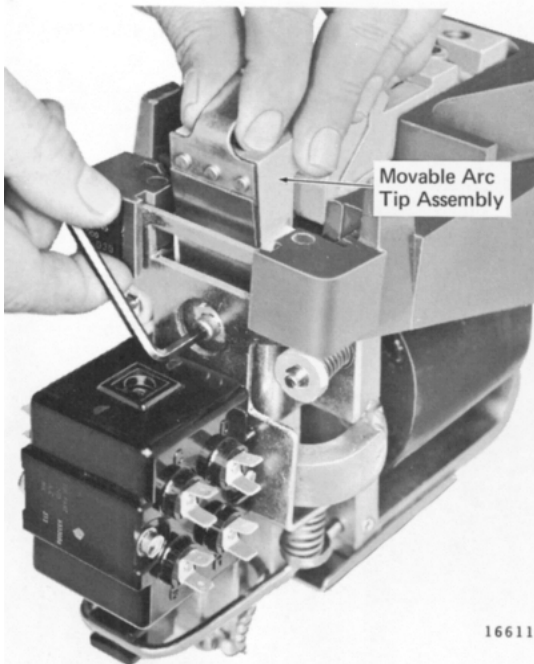


Fig. 7-7 - Removal Of Movable Arc Tip Assembly

### REMOVAL AND REPLACEMENT OF THE MOVABLE MAIN CONTACT ASSEMBLY, Fig. 7-8

1. Using a 3/16" hex head key (alien wrench), remove two socket head cap screws, and lockwashers holding the movable main contact assembly in place. After the screws are removed, the movable main contact assembly may be removed and replaced with a new contact assembly.

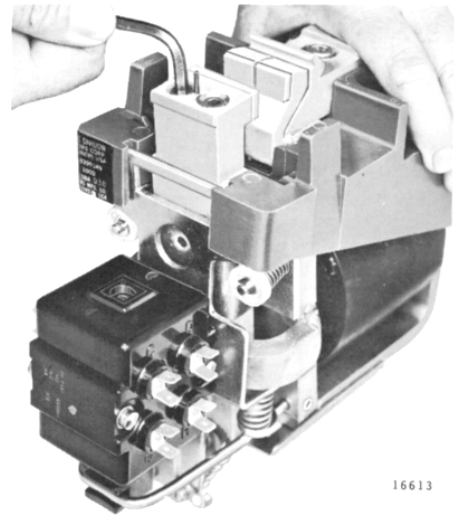


Fig. 7-8 - Removing Movable Contact Assembly From Power Contactor

2. Place new movable main contact assembly in place and install the two socket head cap screws and lockwashers. Do not tighten the screws at this time.
3. Ensure that the movable main contact assembly is properly seated, then using a 3/16" hex head key tighten the socket head cap screws securely.
4. Recheck seating of the contact assembly after the screws are tightened.

### REPLACEMENT OF MOVABLE ARC TIP ASSEMBLY, Fig. 7-9

1. Insert the new arc tip assembly between the hold-on bracket and the movable main contact assembly.

**CAUTION:** Make certain the arc tip assembly is inserted between the hold-on magnet bracket and the movable main contact assembly, not in front of the hold-on magnet bracket.

2. Align the hole in the movable arc tip assembly and the hole in the movable contact bar with the hole in the hold-on magnet bracket.
3. Install the socket head cap screw to hold the movable arc tip assembly and the movable contact bar to the hold-on magnet bracket, then tighten the socket head cap screw securely.

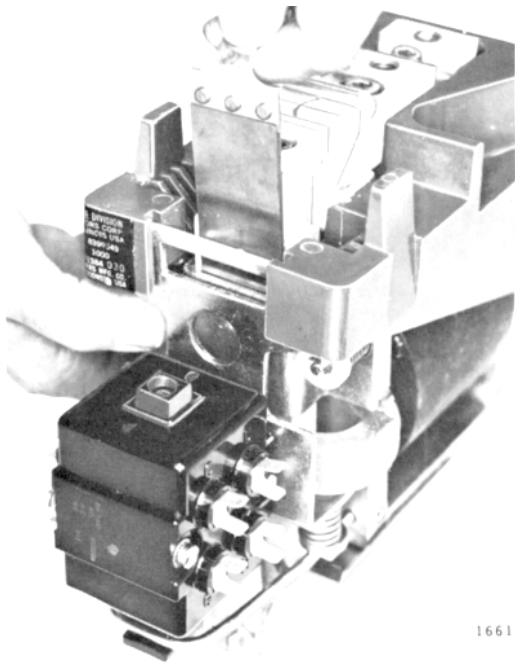


Fig. 7-9 - Insertion Of New Movable Arc Tip Assembly

### REMOVAL AND REPLACEMENT OF TOP STATIONARY CONTACT ASSEMBLY AND FLEXIBLE STATIONARY CONTACT ASSEMBLY, Fig. 7-10

1. Remove power leads and/or bus bars connected to the top stationary contact assembly.

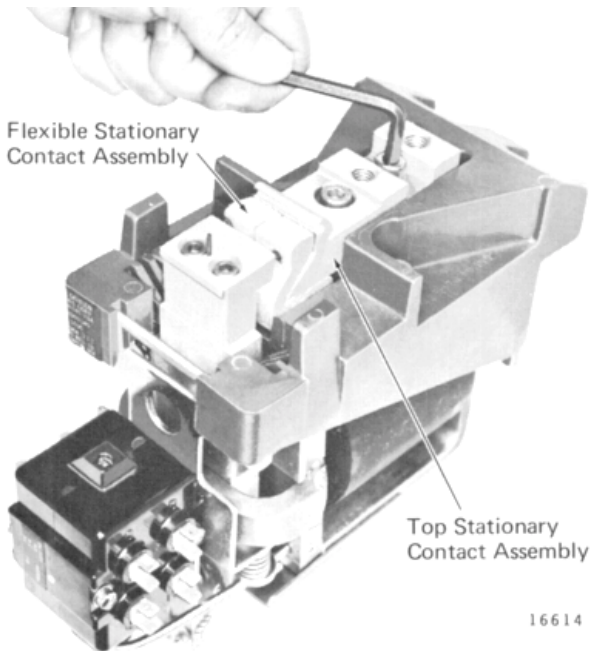


Fig. 7-10 - Removing Stationary Contact Assembly Of Power Contactor

2. Using a 1/4" hex head key (allen wrench), remove two socket head cap screws and lockwashers.
3. Lift out the top stationary and flexible stationary contact assemblies.
4. Place new flexible stationary contact assembly in position being careful that pivot spring assembly and wipe springs are in place and vertical.
5. Place new top stationary contact assembly in place, then install the two socket head cap screws with lockwashers and tighten.
6. Check movement between top stationary contact assembly and the flexible stationary contact assembly. Also check contact gap. Refer to Service Data for movement and contact gap.
7. Replace power leads and/or bus bars.

### REMOVAL AND REPLACEMENT OF STATIONARY ARC TIP ASSEMBLY, Fig. 7-11

The stationary arc tip is located in the arc chute assembly.

1. Using a screwdriver, remove two fillister head machine screws and lockwashers.
2. Lift out the stationary arc tip assembly.
3. Place the new stationary arc tip in proper position, then install the two fillister head machine screws and lockwashers. Tighten the screws securely.

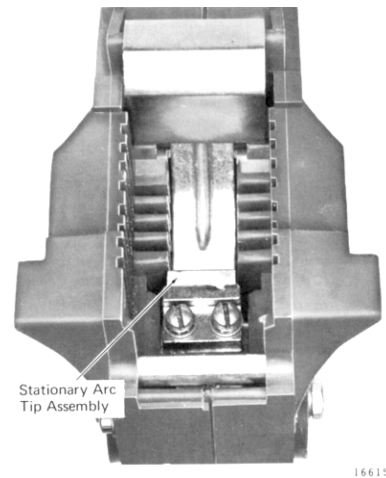


Fig. 7-11 - Replacement Of Stationary Arc Tip Assembly



## SERVICE DATA

## CONTACT TIPS

## ROUTINE MAINTENANCE PARTS AND EQUIPMENT

	<u>Contactors</u>	<u>Switches</u>	
	8399648	8328962	8341261
	<u>Power</u>	<u>Transfer</u>	<u>Reverser</u>
Movable Contact Assembly . . . . .	8339390	8339361	8339361
Top Stationary Contact Assembly . . . . .	8339355	8339355	8339355
Flexible Stationary Contact Kit Assembly . . . . .	8441835	8339354	8339354
Movable Arcing Tip Assembly . . . . .	8407132		
Stationary Arcing Tip Assembly . . . . .	8407131		
Arc Chute Assembly . . . . .	8399841		
Silastic (2 oz. Tube) . . . . .		8305837	8305837

## SPECIFICATIONS

	<u>Power</u>	<u>Transfer</u>	<u>Reverser</u>
Current Rating . . . . .	1000 Amp.	1000 Amp.	1000 Amp.
Contact Pressure . . . . .	9 - 10 lbs.	5 lbs. Min.	5 lbs. Min.
Contact Wear Allowance . . . . .	1/16" Ea.	3/32" Ea.	3/32" Ea.
Contact Gap . . . . .	1/2" ± 1/32"	13/32" ± 3/64"	13/32" ± 3/64"
Contacts . . . . .	1 N.O.	DPDT	DPDT
Movement between top stationary contact assembly and flexible stationary contact assembly . . . . .	3/64" ± 1/64"	3/64" ± 1/64"	3/64" ± 1/64"

## REFERENCES

Allis Chalmers - Type 398 Power Contactors .	M. I. 5438
Cutler Hammer Type "S" Power Contactors .	M. I. 5439
Allis Chalmers Type 399 Magnetic Switches .	M. I. 5428
Allis Chalmers Type 397 Field Shunting Contactors	M. I. 5376