ELECTRO-MOTIVE

M.I. 5400

MAINTENANCE INSTRUCTION

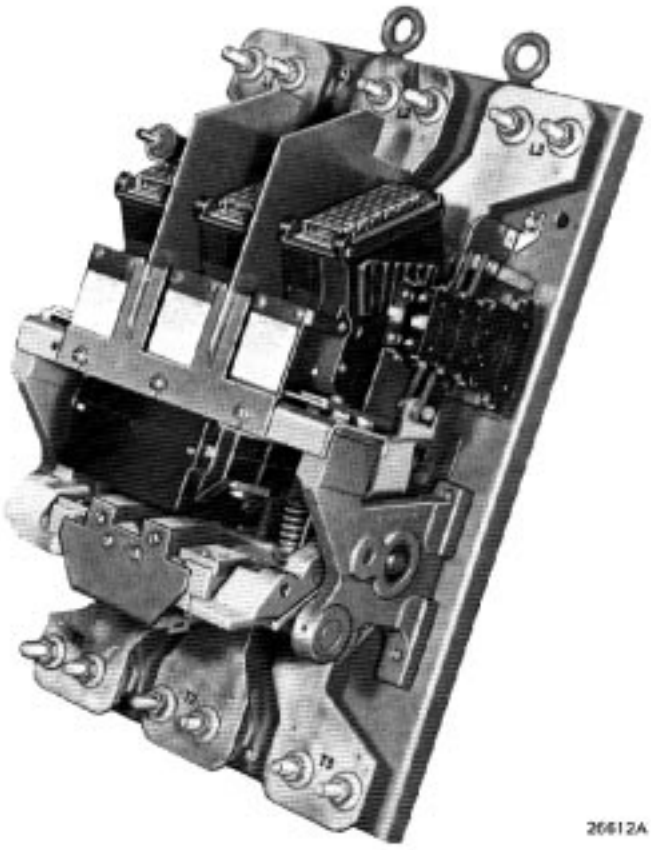
9332148, 9332149, 9510676 HEAD END POWER AC CONTACTOR

INTRODUCTION

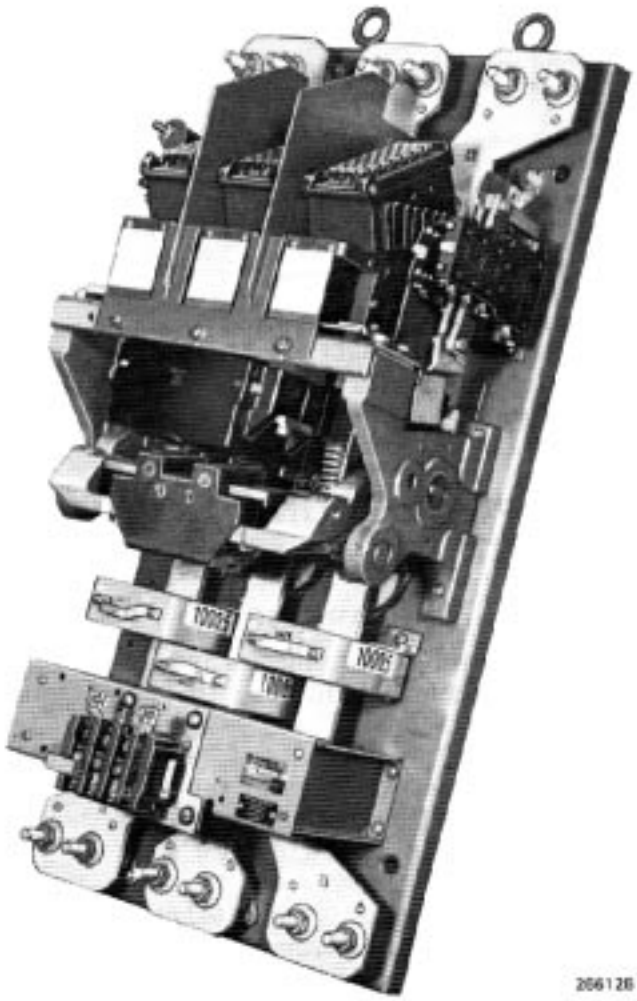
The head end power AC contactor, Fig. 1, is a three-pole, three-phase contactor. It is used on a locomotive as the main power switching device between the head end generator and the coaches.

This Maintenance Instruction will apply to 9932148, 9332149, and 9510676 head end power AC contactors unless specifically identified.

The major differences between the 9332148 and the 9332149 contactors are the position of the thermal



9510676 Contactor



9332148 Contactor

Fig. 1 – Head End Power AC Contactor

overload relay and the current transformer turns ratio. The 9332148 contactor has a 1000:5 transformer and the 9332149 contactor has a 1600:5 transformer.

The 9332149 contactor is also equipped for forced cooling air across the main contacts. The enclosure vent holes and air source should be checked periodically to assure proper air flow.

The 9510676 contactor does not have a thermal overload relay or a current transformer.

MAINTENANCE

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

Minimum maintenance is required to keep the power contactor 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 contactor are designed to operate without lubrication. Do *not* oil or grease at any time.

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

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

MAIN POWER CONTACT INSPECTION

WARNING

Disconnect power to contactor and disconnect coil leads before performing any inspection procedure.

The main power contact tips should be free of foreign objects, but need not be smooth. Contact tips should not be cleaned, dressed, or filed.

Main power contacts are subjected to both mechanical and electrical wear. Normal mechanical wear is insignificant. Electrical wear is caused by arcing which erodes the contact. During arcing a small portion of each contact is vaporized and blown away.

Accurate determination of when to replace worn contacts with new contacts should combine judgement regarding the appearance of the contacts and actual measurement of wear.

It is suggested that the movable contacts be inspected first. If the movable contacts are in good condition, the stationary contacts should also be in good condition. If the movable contacts appear to be questionable, check the stationary contacts also. Refer to Renewal Of Main Power Contacts procedure for contact removal and replacement.

If it is determined that one contact is defective, it is advisable to replace all contacts. Refer to Service Data for contact kit part number. The contact kit part number is also included on the nameplate of the contactor.

IRREGULARITY OF CONTOUR

Irregularity of contour usually involves a slantwise type of contact wear. As an example, one corner of a contact may wear more quickly than the other three corners wear away. Contacts should be replaced when it is noted that one contact is nearing the condition in which it will be making direct contact with the plate. The plate is the material on which the contact tip is fastened. If the plate is contacted, welding of the contacts may occur.

PITTING

The pitted surface has high spots and low spots. Pitting of a contact that is wearing well will show a uniform texture. When it appears that chunks are being torn away from the arcing surface, it is advisable to replace the contacts with new contacts.

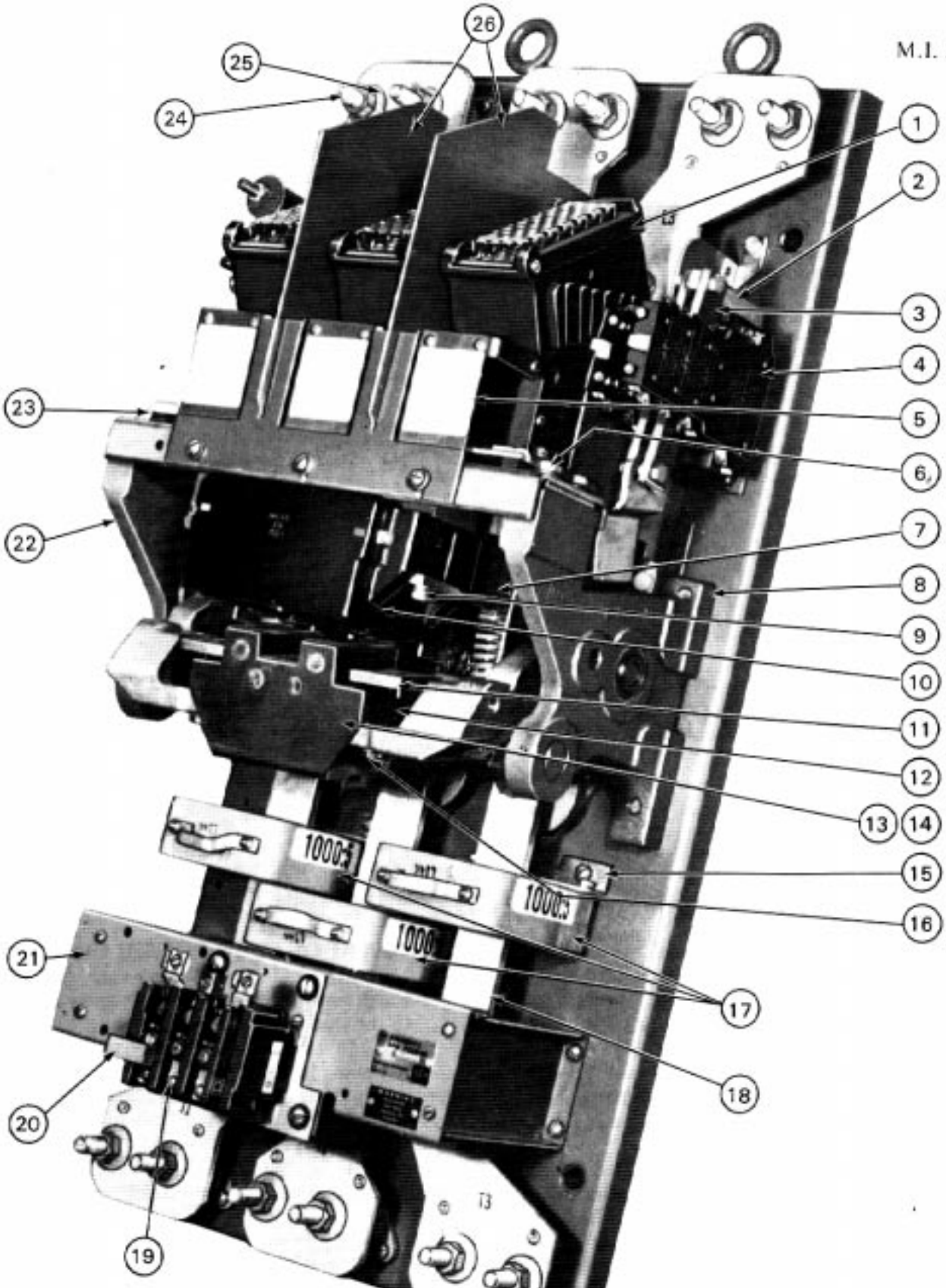
WEAR ALLOWANCE

The wear allowance of a contact is the total thickness of contact material that may be worn before the contact becomes inadequate to carry the current.

A contact is serviceable if the remaining contact material is not less than 0.38 mm (.015").

RENEWAL OF CONTACTOR COMPONENTS

Under ordinary circumstances, replacement of contacts with new contacts is the extent of periodic maintenance required to ensure reliable operation. However, if the contactor is to be serviced or rebuilt for other reasons, use the following procedure as applicable. Refer to Fig. 2.



1. Arc Chute
2. Post
3. Lever
4. Interlock
5. Spring Plate
6. Hex Head Screw And Lockwasher
7. Lever
8. Base, Right-Hand (Includes Bearing)
9. Pan Head Screw With Clamp
10. Coil
11. Clamp
12. Insulator
13. Armature
14. Spring (Does Not Show)
15. Bracket
16. Hex Head Screw With Lockwasher
17. Current Transformer
18. Connector
19. Overload Relay
20. Button, White
21. Top Plate
22. Base, Left-Hand (Includes Bearing)
23. Control Relay
24. Terminal Stud
25. Keps Nut With Conical Washer
26. Arc Shield

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Fig.2 - Head End Power AC Contactor 9332148

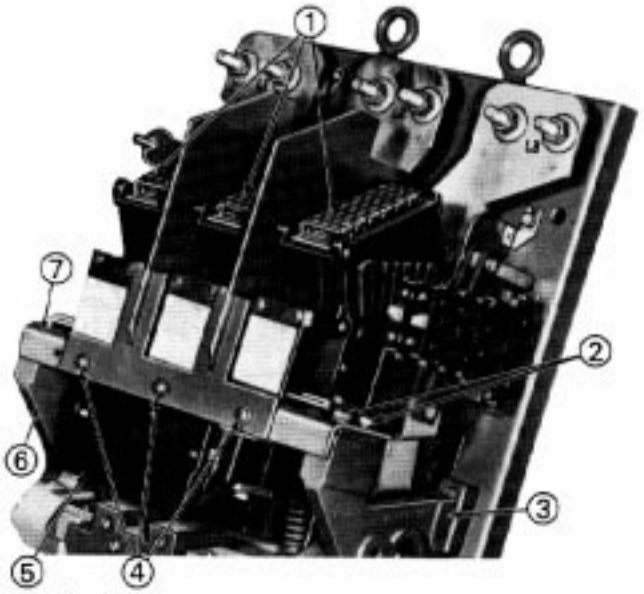
WARNING

Disconnect power to contactor and disconnect coil leads before performing any maintenance procedures.

RENEWAL OF MAIN OPERATING COIL

1. Ensure power leads to the contactor and leads to the operating coil are disconnected.

2. Remove the three arc chutes (1, Fig. 3) by loosening the three screws in the spring plate (4) and pulling the arc chutes straight up.



1. Arc Chute
2. Cap Screw With Lockwasher
3. Base, Right Hand
4. Spring Plate Screw
5. Operating Coil
6. Base, Left-Hand
7. Support Channel

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Fig.3 – Operating Coil Removal

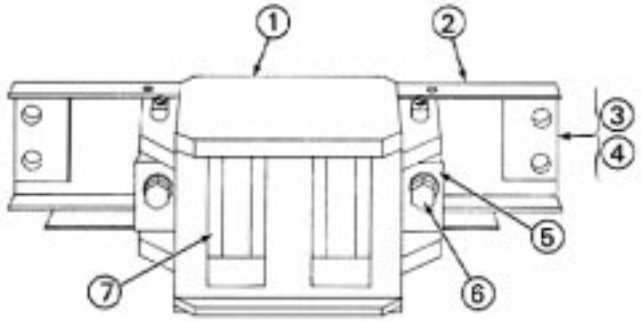
NOTE

The magnet frame and coil assembly being removed in Step 3 weighs approximately 8 kg (18 lbs).

3. Remove the four cap screws (2) securing the steel support channel containing the magnet frame and operating coil (5). Slide the support channel sideways about 38 mm (1-1/2") until one end of the support channel clears the associated base (3 or 6). Pull the free end of the support channel forward and slide the channel assembly off the other base.

4. Turn the support channel assembly over, (2, Fig. 4).

5. Remove cap screws (6) and clamps (5) securing operating coil (1) to magnet frame (7). Note the



1. Operating Coil
2. Support Channel
3. Plate
4. Shim
5. Coil Clamp
6. Cap Screw
7. Magnet Frame

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Fig.4 – Magnet Frame And Operating Coil

coil terminal position to determine the new coil position. Remove the old coil and install a new coil. Visually center new coil on the magnet frame. Replace the clamps and cap screws.

NOTE

The arc chutes and steel channel with the magnet frame and coil must be removed prior to removing the power contacts. If the power contacts are to be renewed, perform the following procedure prior to reassembling the arc chutes and steel channel with magnet frame and coil.

6. Reassemble the channel assembly to the contactor. Remount the arc chutes and connect coil and contactor leads.

RENEWAL OF MAIN POWER CONTACTS

1. Ensure power leads to the contactor and leads to the operating coil are disconnected.

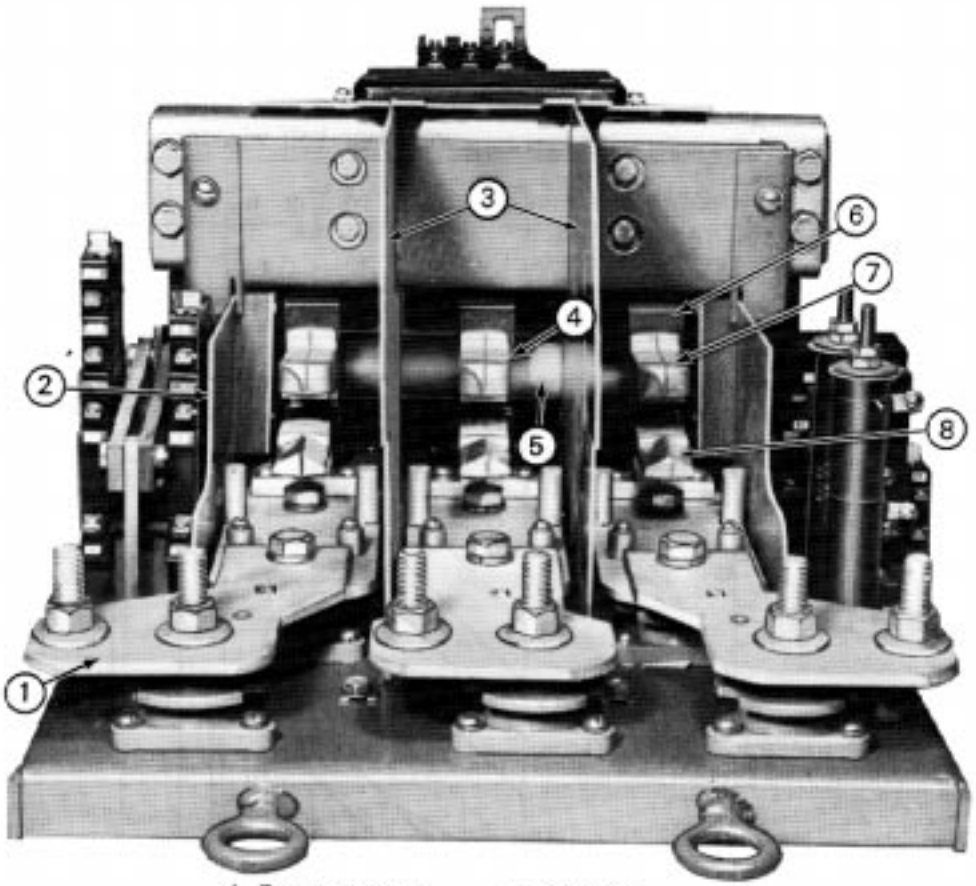
2. If the arc chutes and steel channel containing the magnet frame and coil are assembled to contactor, perform Steps 1, 2, and 3 of Renewal Of Main Operating Coil procedure.

3. Remove the arc shields (3, Fig. 5).

4. Remove the stationary contacts (8).

5. Remove and install the movable contacts (7) as follows. It is recommended that each movable contact be replaced separately. The amount of shims (4) between the movable contact (7) and the contact finger block (6) may vary for each pole.

   a. Remove cap screw holding the braided connector to the movable contact (7).



1. Terminal Plate
2. Insulator Assembly
3. Arc Shield
4. Shims (Do Not Show)
5. Insulator
6. Contact Finger Block
7. Movable Contact
8. Stationary Contact

Fig.5 – Power Contact Assembly

b. Remove cap screw holding the movable contact (7) to the contact finger block (6).

c. Install new movable contact (7) to the contact finger block (6). Use same amount of shims between the movable contact and the contact finger block as were there previously.

d. Install braided connector to movable contact (7).

6. Install new stationary contacts (8).

7. Remount arc shields (3). Position control wires in the notch provided in the arc shield.

8. Reassemble the channel assembly to the contactor. Remount the arc chutes and connect coil and contactor leads.

RENEWAL OF CURRENT TRANSFORMERS (9332148 And 9332149 Contactors ONLY)

1. Ensure leads to the contactor and leads to the operating coil are disconnected.

2. Remove the screws holding the top plate (21, Fig. 2) to the side plates. Disconnect the current transformer leads.

3. Remove connectors (18).

4. Remove the screws holding the brackets (15) to the contactor mounting plate and remove all three current transformers simultaneously.

5. Remove screws holding brackets (15) to the current transformers.

6. Reassemble new current transformers to contactor in reverse order of disassembly (Steps 5 through 1).

ARC CHUTE

The arc chutes seldom require renewal. Some burning and discoloration are normal. When maintenance is performed, brush out any loose particle accumulations from the arc chutes.

Replace arc chutes before the molded housing has worn one-half way through.

Refer to Fig. 6 for contactor arcing clearance requirements.

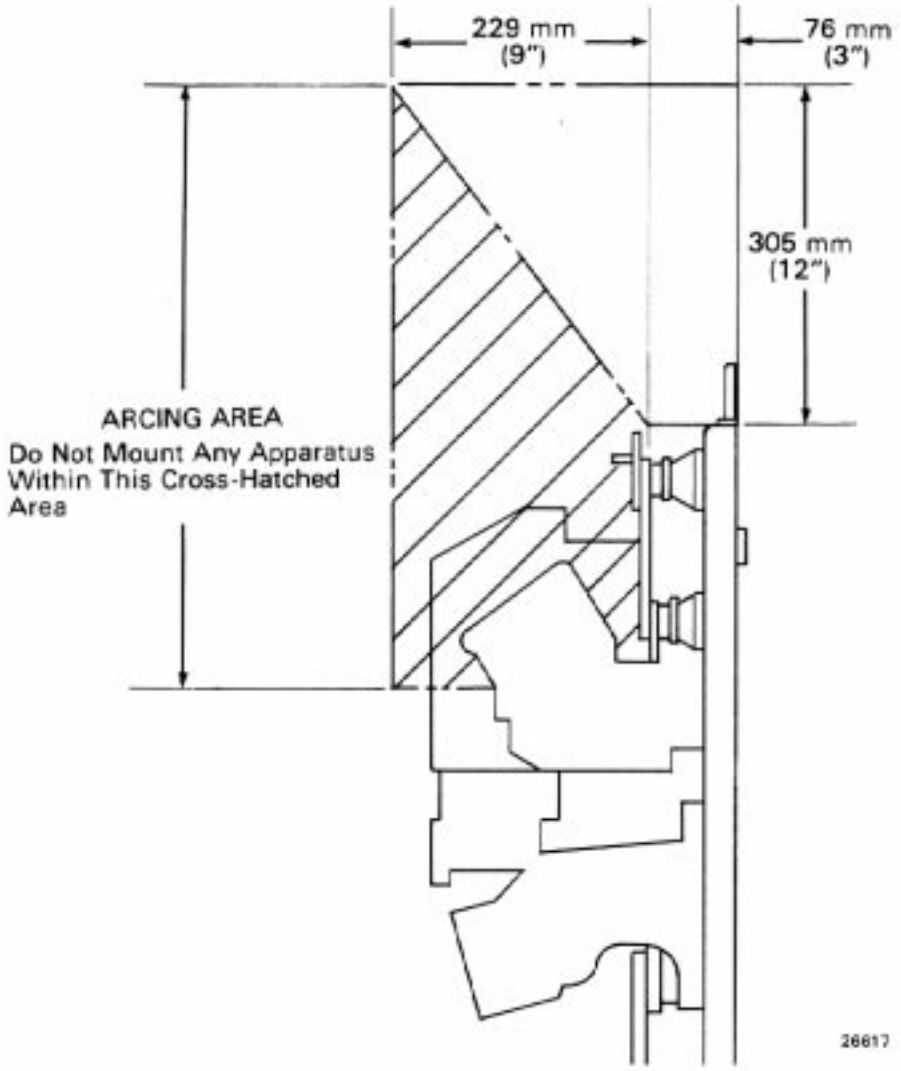


Fig.6 – Contactor Arcing Clearance Requirements

Parts List

The following is a list of available replacement parts.

9332148	1			Head End Power Contactor
9332149		1		Head End Power Contactor
9510676			1	Head End Power Contactor
9311857	1	1	1	Contactor Coil, 74 VDC
9311858	1	1	1	Interposing Relay ACIR, 3 Pole
9311864	6	6	6	Stationary Contact
9311865	3	3	3	Movable Contact
9311863	1	1	1	ACIR Relay Coil, 74 VDC
NPN	1	1		Thermal Overload Relay, Including Heater Coils
9529182	1	1	1	Main Contact Kit, Includes Retainers And Springs
9311859	3	3	3	Stationary Contact
9311860	3	3	3	Movable Contact
9311856	3	3	3	Arc Chute Assembly
9311861	3			Current Transformer, 1000:5, CTTA, CTTB, CTTC
9529178		3		Current Transformer, 1600:5, CTTA, CTTB, CTTC
9529179	1	1	1	Interlock Assembly, Base, 1 N.O. - Left Side
NPN	1	1	1	Interlock Assembly, Base, 1 N.O., 1 N.C.- Right Side
9529180	4	4	4	Interlock Assembly, Add-On, 1 N.C.
9529183	1	1	1	Interlock Assembly, ACIR, 1 N.O./1 N.C.