SIEMENS-ALLIS

Installation • Operation • Maintenance

Instructions

5KV HIGH VOLTAGE
CONTACTORS AC AIR BREAK
TYPE 81H2 and 81H3

WARNING

DANGEROUS VOLTAGES ARE PRESENT IN CONTACTOR COMPONENTS WHICH CAN CAUSE SERIOUS INJURY, ELECTROCUTION, AND EQUIPMENT DAMAGE. ALWAYS USE SAFETY PRECAUTIONS AND DISCONNECT ALL POWER SOURCES BEFORE WORKING WITH THIS EQUIPMENT.

TABLE OF CONTENTS

NOTE

These instructions do not purport to cover every possible detail or variation in the equipment nor do they provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired, the matter should be referred to Siemens-Allis Custom Control Division in Wichita Falls, Texas.

WARNING

THERE IS A HAZARD OF ELECTRIC SHOCK OR BURN WHENEVER WORKING IN OR AROUND ELECTRICAL EQUIPMENT. **TURN OFF POWER** SUPPLYING THIS EQUIPMENT BEFORE ANY ADJUSTMENTS, SERVICING, WIRING, PARTS REPLACEMENT, OR BEFORE ANY OTHER ACT REQUIRING PHYSICAL CONTACT WITH ELECTRICAL WORKING COMPONENTS OF THIS EQUIPMENT IS PERFORMED.

THE SUCCESSFUL AND SAFE OPERATION OF HIGH VOLTAGE MOTOR CONTACTORS IS DEPENDENT UPON PROPER HANDLING, INSTALLATION, OPERATION AND MAINTENANCE AS WELL AS UPON PROPER DESIGN AND MANUFACTURE. FAILURE TO FOLLOW CERTAIN FUNDAMENTAL INSTALLATION AND MAINTENANCE REQUIREMENTS MAY LEAD TO PERSONAL INJURY AND THE FAILURE AND LOSS OF THE CONTACTOR, AS WELL AS DAMAGE TO OTHER PROPERTY.

Siemens-Allis high voltage contactors are built in accordance with the latest applicable provisions of the National Electrical Code, Underwriters Laboratories Standards and Procedures, NEMA Standards, and the National Electrical Safety Code. These publications and this instruction manual should be thoroughly read and understood prior to beginning any work on this equipment.

NOTE

***Authorized and Qualified personnel** —
For the purpose of this manual, a qualified person is one who is familiar with the installation, construction or operation of the equipment and the hazards involved. In addition, he has the following qualifications:

(a)is **trained and authorized** to energize, de-energize, clear, ground, tag circuits and equipment in accordance with established safety practices.

(b)is **trained** in the proper care and use of protective equipment such as rubber gloves, hard hat, safety glasses or face shields, flash clothing, etc., in accordance with established safety practices.

(c)is **trained** in rendering first aid.

GENERAL DESCRIPTION

GENERAL

The Type 81H2 and 81H3 low voltage air-break contactors are designed primarily for Siemens-Allis Series 81000 Controllers, and are used in starting, reversing or plugging ac motors with line voltage from 2200 volts, to a maximum of 5000 volts.

The basic contactor is a compact design, measuring 18 inches wide, 27.5 inches high and 23.25 inches deep for single barrel fuses and 31.5 inches deep for double barrel fuses.

Fused, draw-out contactors are used in Class E2 controllers, and un-fused draw-out contactors are used in Class E1 controllers. Stationary, manual draw-out contactors are similar to the draw-out contactors used for Class E1 controllers except without the control power transformer, control power transformer fuses and racking attachment.

The power contacts are double break and have a contact angle of 45 degrees which facilitates natural arc movement into the arc chute. This angle also provides a wedging action yielding a higher effective contact pressure, and reducing the build-up of dust and dirt.

The accessibility of the contactor allows quick and convenient inspection and testing. The arc chute features lift out arc chutes, and hinged blowout coil pieces that swing back to expose the power contacts for quick inspection and replacement.

The supporting base consists of a welded steel frame. The pushrods, contact support blocks and other insulating parts are constructed of glass polyester. All insulating material that is in contact with high voltage current carrying parts is flame retardant and track resistant.

An auxiliary contact panel assembly for magnet operation consists of a silicon rectifier, three NO and three NC auxiliary contacts and one NC latch release contact which are used to bring control power to the contactor and contacts. The auxiliary contacts are operated by an auxiliary drive link from the magnet armature.

The stationary contact assemblies are mounted on a glass polyester support block along with the blowout coil assemblies. One terminal of each blowout coil is connected to the stationary contact assembly.

Contactors are supplied with an optional single-phase trip bar which offers single phase protection resulting from a blown power fuse as an optional feature.

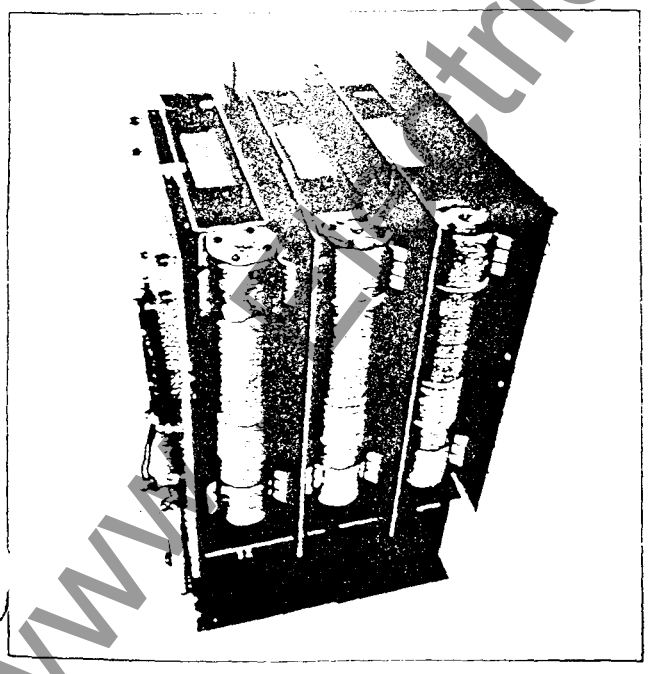


FIGURE 1: Type 81H2 Contactor

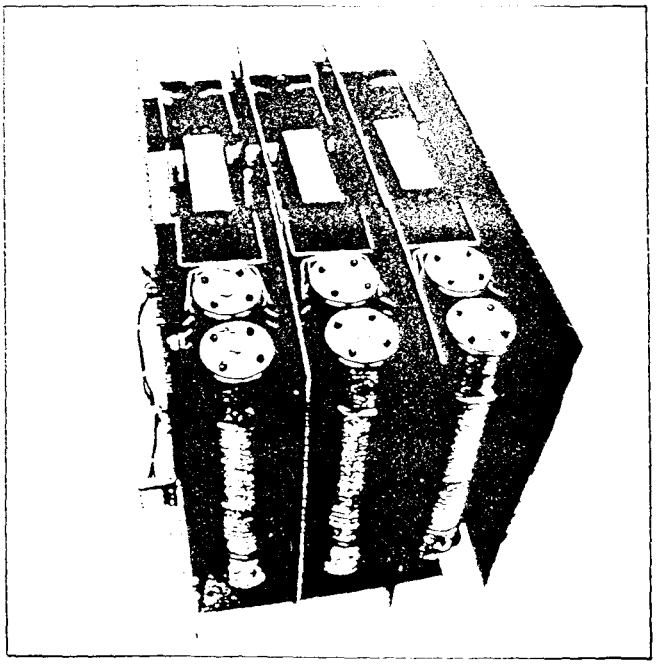


FIGURE 2: Type 81H3 Contactor

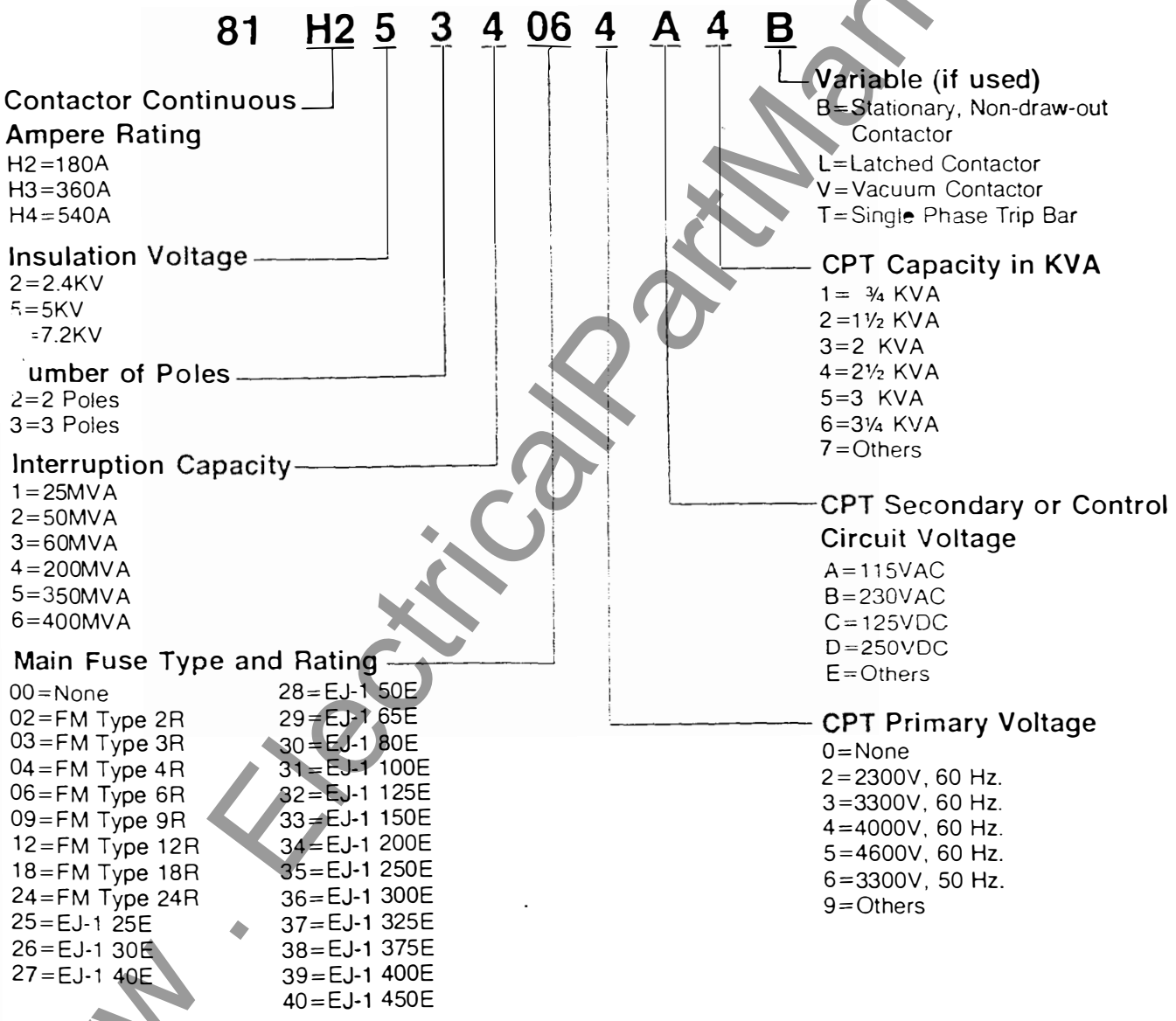
CONTACTOR RATING

Enclosed Continuous Ampere Rating	MVA Interrupting Capacity		Horsepower Rating at Utilization Voltage						KV Impulse Level (BIL)
			2300 Volts, Three-Phase			4000 & 4600 Volts, Three-Phase			
	Unfused for Class E1 Controllers	Fused for Class E2 Controllers	Synchronous Motors		Induction Motors	Synchronous Motors		Induction Motors	
			0.8PF	1PF		0.8PF	1PF		
180	25 @ 2300-4600V	200 @ 2300V 350 @ 4000V 400 @ 4600V	700	900	700	1250	1500	1250	60
360	50 @ 2300-4600V	200 @ 2300V 350 @ 4000V 400 @ 4600V	1500	1750	1500	2500	3000	2500	60

Auxiliary Contacts: Each contactor is equipped with 2 N.O. and 2 N.C. extra auxiliary contacts for customer use. These contacts are rated 600V. 10A (NEMA Class A600)

NOMENCLATURE

The contactors can be identified through the nomenclature description shown below:



xample: Contactor Type 81H2535064A2
180A contactor, 5KV, 3 poles, used in Class E2 controllers, interruption rating is 350MVA utilizing FM fuse Type 6R,
CPT primary is 4000V, secondary is 115VAC, 60Hz the CPT capacity is 1½KVA, and the contactor is an air break type.

RECEIVING

An immediate inspection should be made for any damage which may have occurred during shipment upon receipt of this equipment. The inspection should include examination of the packaging material and the contactor. Be sure to look for concealed damage and **do not** discard the packaging material. If damage is found, note damage on "Bill of Lading" prior to accepting receipt of the shipment, if possible.

> NOTE
>
> THE WAY VISIBLE SHIPPING DAMAGE IS TREATED BY THE CONSIGNEE PRIOR TO SIGNING THE DELIVERY RECEIPT CAN DETERMINE THE OUTCOME OF THE DAMAGE CLAIM TO BE FILED. NOTIFICATION TO THE CARRIER WITHIN THE 15 DAY LIMIT ON CONCEALED DAMAGE IS ESSENTIAL IF LOSS RESULTING FROM UNSETTLED CLAIMS IS TO BE ELIMINATED OR MINIMIZED.
>
> A CLAIM SHOULD BE IMMEDIATELY FILED WITH THE CARRIER, AND THE SIEMENS-ALLIS SALES OFFICE SHOULD BE NOTIFIED IF DAMAGE OR LOSS IS DISCOVERED. A DESCRIPTION OF THE DAMAGE AND AS MUCH IDENTIFICATION INFORMATION AS POSSIBLE SHOULD ACCOMPANY THE CLAIM.

HANDLING

For convenience and safety in lifting or moving the contactor, the lifting device as shown in Fig. 3 should be purchased.

> NOTE
>
> THE LIFTING DEVICE IS NOT INTENDED TO BE USED AS A MEANS OF TRANSPORTING THE CONTACTOR IN THE RAISED POSITION. THE CONTACTOR SHOULD BE TRANSPORTED WITH THE LIFTING DEVICE IN ITS LOWERED POSITION.

A crane or hoist is also recommended to handle the contactor, if the lifting device is not available. Refer to Fig. 4 for recommended lifting method. A forklift truck can also be utilized. See precautions on Pages 6 & 7 prior to moving the contactor.

The following precautions should be taken when moving the contactor with a crane or hoist:

1. Keep the contactor in an upright position only.
2. Select rigging lengths to compensate for any unequal weight distribution.
3. Do not allow the angle between the lifting cables and vertical to exceed 45°.
4. NEVER LIFT A CONTACTOR ABOVE AN AREA WHERE PERSONNEL ARE LOCATED.

If a forklift is utilized, the following precautions should be taken when moving contactors:

1. Keep the contactor in an upright position only.

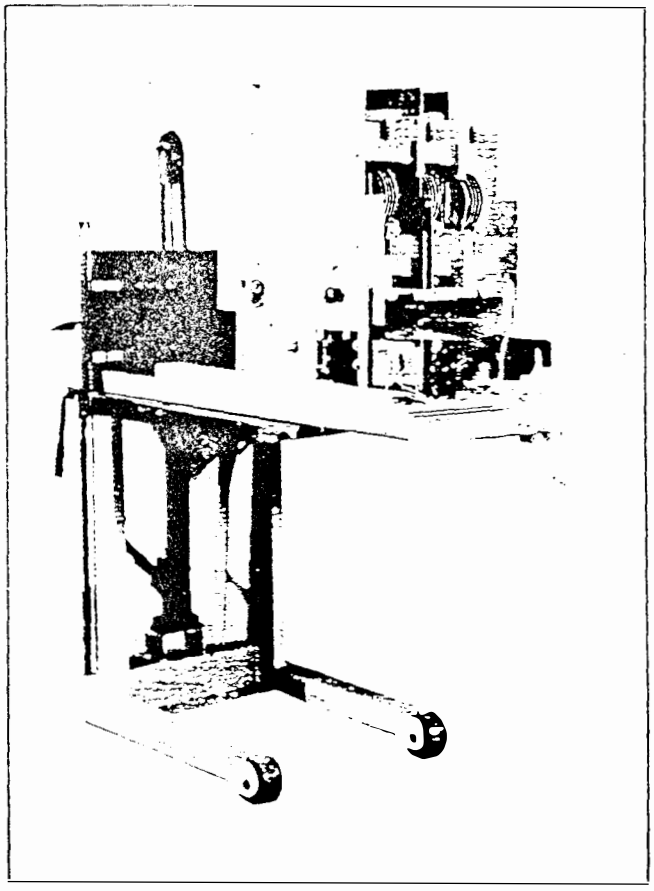


FIGURE 3: Recommended Lifting Method Utilizing Lifting Device

2. Make sure the load is properly balanced on the forks.
3. Place protective material between the contactor and the forklift to prevent bending or scratching
4. Securely strap the contactor to the forklift to prevent shifting or tipping.
5. Excessive speeds and sudden starts, stops, and turns must be avoided when handling the contactor.
6. Lift the contactor only high enough to clear obstructions on the floor.
7. Take care to avoid collisions with structures, other equipment, or personnel when moving the contactor
8. NEVER LIFT A CONTACTOR ABOVE AN AREA WHERE PERSONNEL ARE LOCATED.

STORAGE

The contactor must be stored in a clean, dry, dust and condensation free environment if it cannot be placed into service reasonably soon after receipt. Do not store equipment outdoors. A standard 150 watt light bulb, connected to burn continuously should be placed within the contactor to prevent condensation.

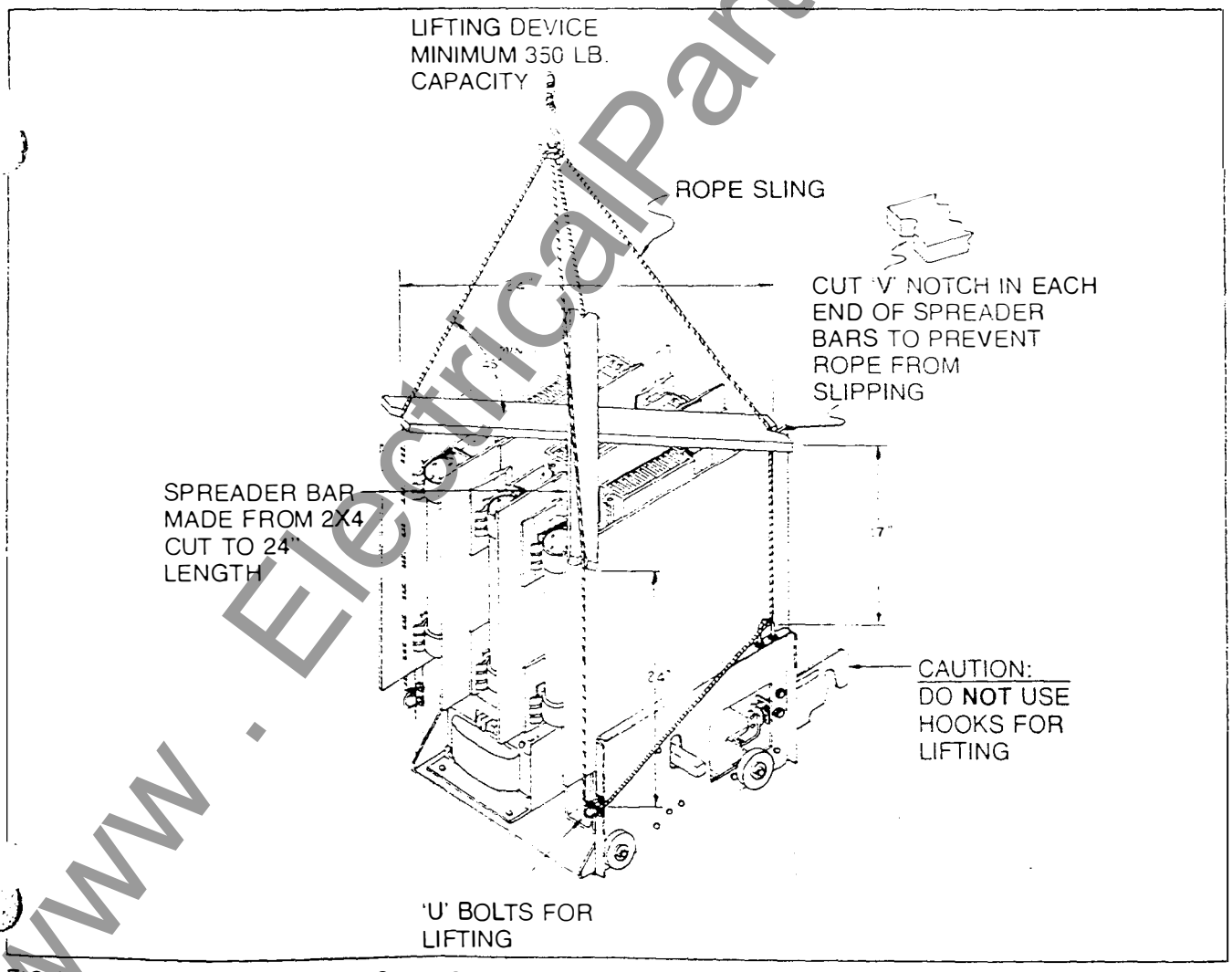


FIGURE 4: Lifting Method By A Crane Or Hoist

WARNING

SERIOUS INJURY AND EQUIPMENT DAMAGE CAN OCCUR THROUGH ACCIDENTAL CONTACT WITH ENERGIZED WIRING OR BUS SYSTEM. DISCONNECT AND LOCK-OUT INCOMING POWER AND CONTROL VOLTAGE SOURCES BEFORE BEGINNING WORK ON THIS OR ANY OTHER ELECTRICAL EQUIPMENT. CHECK ALL CONTROL CIRCUIT TERMINALS WITH A VOLTMETER TO MAKE CERTAIN THAT THE EQUIPMENT IS TOTALLY DEENERGIZED. USE A HIGH VOLTAGE STATASCOPE TO CHECK POWER TERMINALS. DO NOT ATTEMPT TO MEASURE HIGH VOLTAGE WITH A VOLT-OHM METER. IT IS RECOMMENDED THAT SAFETY GROUND BE CONNECTED TO THE POWER BUS AFTER THE SYSTEM HAS BEEN DEENERGIZED. AND PRIOR TO WORKING ON THE EQUIPMENT. FOLLOW THE PROCEDURE OUTLINED IN THE PRE-ENERGIZATION CHECK SECTION OF THIS MANUAL BEFORE POWER IS RESTORED.

SITE PREPARATION AND MOUNTING

Installation shall be in accordance with the National Electrical Code. ANSI. and NFPA 70 Standards.

The contactor should be installed in a clean dry heated place with good ventilation. It should be readily accessible for cleaning and inspection and should be carefully set up and leveled on its supporting foundation and secured in place.

All adjustments have been made at the factory before shipping and generally no change is required. See that all contact surfaces are clean and smooth, and that current-carrying parts are not damaged.

ELECTRICAL CONNECTIONS

Inspect all insulated wiring to see that no damage has resulted from installing the contactor. Test the high voltage wiring for possible grounds or short circuits.

WARNING

DIELECTRIC AND MEGGER TESTING IS HAZARDOUS. AND SHOULD ONLY BE CONDUCTED BY QUALIFIED PERSONNEL. REFER TO TEST DEVICE INSTRUCTIONS FOR SAFETY INSTRUCTIONS.

A dielectric test at 2¼ times the nominal system voltage plus 2000 volts applied for one minute between phases and from all phases to ground is the preferred method. Be sure to disconnect any devices (control power transformer. etc.) from the circuit which could be damaged by the test voltage. If a hi-pot tester is not available. then a Megger test at 1000 volts is a suitable second choice.

Make sure that all current-carrying parts outside the contactor have adequate current-carrying capacity and are correctly insulated in accordance with the requirements of the National Electrical Code (NEC). All electrical connections should be made carefully per furnished wiring diagram. Tighten all lugs to recommended torque values. Use recommended crimping tools only, if crimp lugs are supplied.

OPERATION

PRE-ENERGIZATION CHECK

WARNING

TO AVOID SERIOUS INJURY AND EQUIPMENT DAMAGE, PERFORM THE FOLLOWING CHECKS BEFORE ENERGIZING THE HIGH VOLTAGE CIRCUIT:

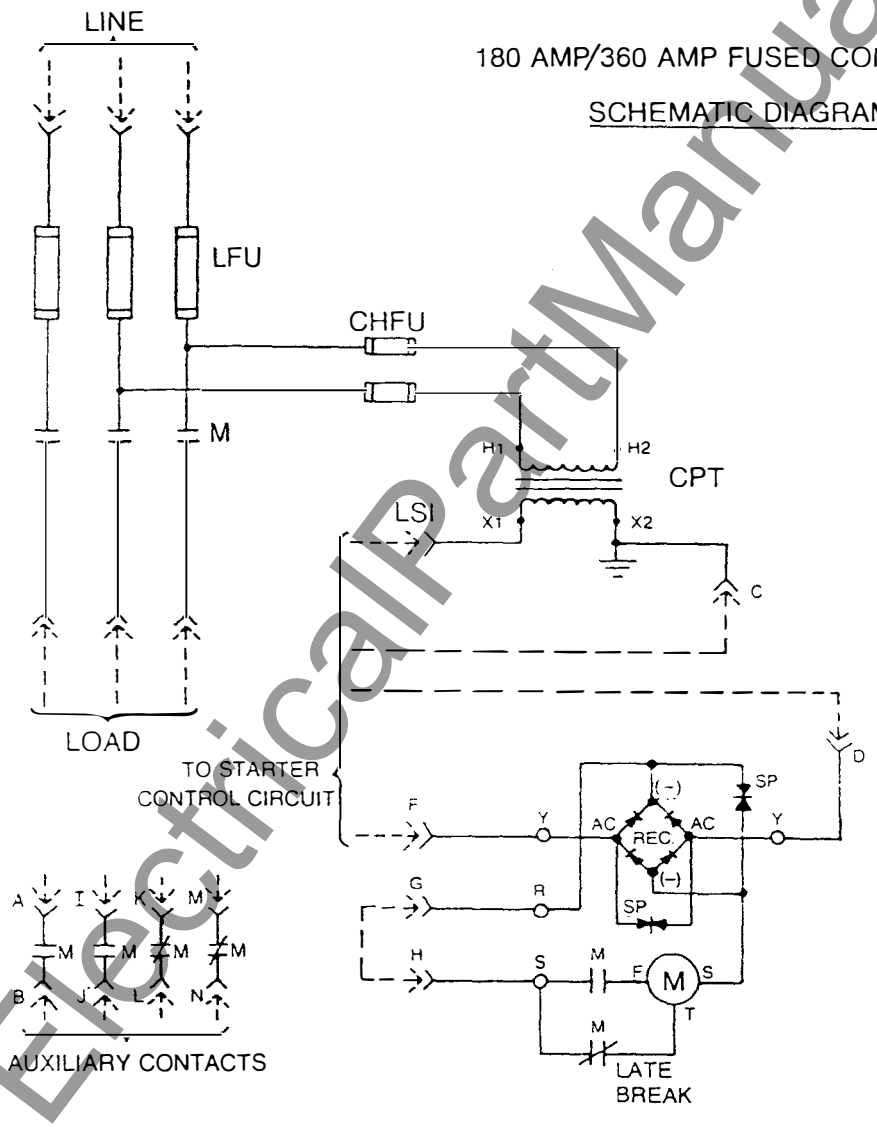
1. Be sure all arc chutes are correctly installed and all phase barriers are in place.
2. Operate the contactor by hand to be sure that all parts move freely. Clean any excessive amounts of dust and dirt that may have accumulated if the contactor has been in storage.
3. Connect only test power and operate the contactor electrically several times. The contactor should pick-up and seal cleanly with no pumping or chattering at 85% to 110% of rated control voltage (see operating data).

The contactor may now be placed in service by connecting main incoming cables. The contactor must be appropriately guarded or isolated before energizing the high voltage circuit.

OPERATING DATA

DESCRIPTION	230 Volt AC Supply	115 Volt AC Supply	250 Volt DC Supply	125 Volt DC Supply
Rated control voltage	230 volts	115 volts	250 volts	125 volts
Pick-up voltage	150 volts	80 volts	160 volts	85 volts
Drop-out voltage	90 volts	50 volts	80 volts	50 volts
Pick-up time (to contact touch)	12-13 cycles	13 cycles	14 cycles	13-14 cycles
*Fast drop-out time (to contact break)	4-5 cycles	4-5 cycles	4-5 cycles	4-5 cycles
*Normal drop-out time (to contact break)	25-35 cycles	25-35 cycles	—	—
Normal inrush current Maximum inrush current	5.0 a. 6.5 a.	10.0a. 13.0a.	3.5 a. 4.5 a.	7.0 a. 9.0 a.
Normal sealing current Maximum sealing current	0.2 a. 0.25a.	0.4a. 0.5a.	0.13a. 0.15a.	0.26a. 0.30a.

*Drop out times shown in above table are not total clearing times. Contactor clearing time is equal to drop-out time plus arcing time. Arcing times vary depending on voltage and current being interrupted.



CPT .....CONTROL POWER TRANSFORMER
CHFU .....CONTROL TRANSFORMER PRIMARY FUSE
LFU .....LINE FUSE
LSI .....LINE SWITCH INTERLOCK
M .....MAIN CONTACTOR
REC .....RECTIFIER
SP .....SURGE PROTECTOR

Figure 5: Schematic Diagram, 180 amp and 360 amp Fused Contactor

MAINTENANCE

WARNING

SERIOUS INJURY AND EQUIPMENT DAMAGE CAN OCCUR THROUGH ACCIDENTAL CONTACT WITH ENERGIZED WIRING OR BUS SYSTEM. DISCONNECT AND LOCK-OUT INCOMING POWER AND CONTROL VOLTAGE SOURCES BEFORE BEGINNING WORK ON THIS OR ANY OTHER ELECTRICAL EQUIPMENT. CHECK ALL CONTROL CIRCUIT TERMINALS WITH A VOLTMETER TO MAKE CERTAIN THAT THE EQUIPMENT IS TOTALLY DEENERGIZED. USE A HIGH VOLTAGE STATASCOPE TO CHECK POWER TERMINALS. DO NOT ATTEMPT TO MEASURE HIGH VOLTAGE WITH A VOLT-OHM METER. IT IS RECOMMENDED THAT SAFETY GROUND BE CONNECTED TO THE POWER BUS AFTER THE SYSTEM HAS BEEN DEENERGIZED. AND PRIOR TO WORKING ON THE EQUIPMENT. FOLLOW THE PROCEDURE OUTLINED IN THE PRE-ENERGIZATION CHECK SECTION OF THIS MANUAL BEFORE POWER IS RESTORED.

The customer must establish a periodic program to insure trouble-free and safe operation. The frequency of inspection, periodic cleaning, and preventive maintenance schedule will depend upon the operation conditions. NFPA Publication 70B "Electrical Equipment Maintenance" may be used as a guide to establish such a program. The following items should be included in any maintenance checklist. For more details read the succeeding pages.

- ☐ **Proper installation of arc chutes and phase barriers**
- ☐ **Main contacts**
- ☐ **Magnet coil**
- ☐ **Auxiliary contacts**
- ☐ **Fuse clips**
- ☐ **Terminals and joints**
- ☐ **Arc chutes**
- ☐ **Cleaning**
- ☐ **Tightening torques**
- ☐ **Mechanical and electrical operation of the contactor**

ARC CHUTE AND PHASE BARRIER REMOVAL AND RE-INSTALLATION

Refer to Figure 6
First remove the contactor from the cubicle, handles are provided for that purpose, and disconnect the control plug. Remove the arc chutes by lifting the back end of the arc chute until it releases, then lift the entire arc chute upward and out

Re-install the arc chutes by sliding in the bottom of the arc chute first, then push the front arc runner clip down over the front stationary contact until the notches in the front of the arc chute fit into mating grooves in the contactor insulator block. Next push the rear of the arc chute down so that the rear arc runner clip engages over the rear stationary contact. The horizontal grooves on the side of the arc chute should line up with the top of the blow-out plates, when the arc chute is properly seated.

WARNING

TO AVOID INJURY AND EQUIPMENT DAMAGE, DO NOT ENERGIZE CONTACTOR UNLESS ARC CHUTES AND PHASE BARRIERS ARE INSTALLED.

MAIN CONTACT INSPECTION AND REPLACEMENT

All main contacts are made from a material especially suited for making and breaking high electrical currents while resisting welding and erosion due to arcing. The contacts are brazed to a copper alloy base material which serves to support them, carry electrical current and conduct heat away. This base material is subject to erosion and welding if exposed to arcing; therefore contacts must be replaced when the contact material is worn nearly to the point of exposing the base material. As a guide, the contacts must be replaced when an amount of contact material equal to the wear allowance has been eroded away.

CONTACT WEAR ALLOWANCE	
Type 81H2 (180 amp)	1/16
Type 81H3 (360 amp)	3/32

The interval between inspections will vary with the nature of the load being switched. It is recommended that the contacts be inspected after the first 1,000 operations. If only minor pitting is observed, then the inspection interval can be increased. Evidence of heavy pitting and erosion of contact material means the contact should be checked more frequently to determine if the wear allowance is being approached.

WARNING

TO AVOID INJURY AND EQUIPMENT DAMAGE, CONTACTS MUST BE REPLACED BEFORE ANY PART OF ONE CONTACT MAKES CONTACT WITH THE BASE MATERIAL OF ITS MATING CONTACT.

Refer to Figures 11 & 12
When contacts require replacement, replace contacts (65) and (35) and springs (32) on all three phases at the same time. To gain access to all contacts, remove four phase barriers (66) and (67) and all three arc chutes (14). Then swing back hinged blowout coil assemblies to expose power contacts.

Remove hex lock nuts allowing cap screws to slip out of pushrod (28). Movable contact (35) is now accessible for replacement.

To replace the stationary contact assembly (65), remove the associated hardware.

MAGNET COIL REPLACEMENT

Refer to Figures 11 & 12
Remove wire connections from coil. Loosen hex head machine screw (94). Slide magnet assembly from the base of the yoke (40). Machine screw (94) along with magnet core (17) can then be lifted from the coil along with washers (18), (19), (20), (21) and the lock washer. Remove the coil and reassemble following the reverse procedure.

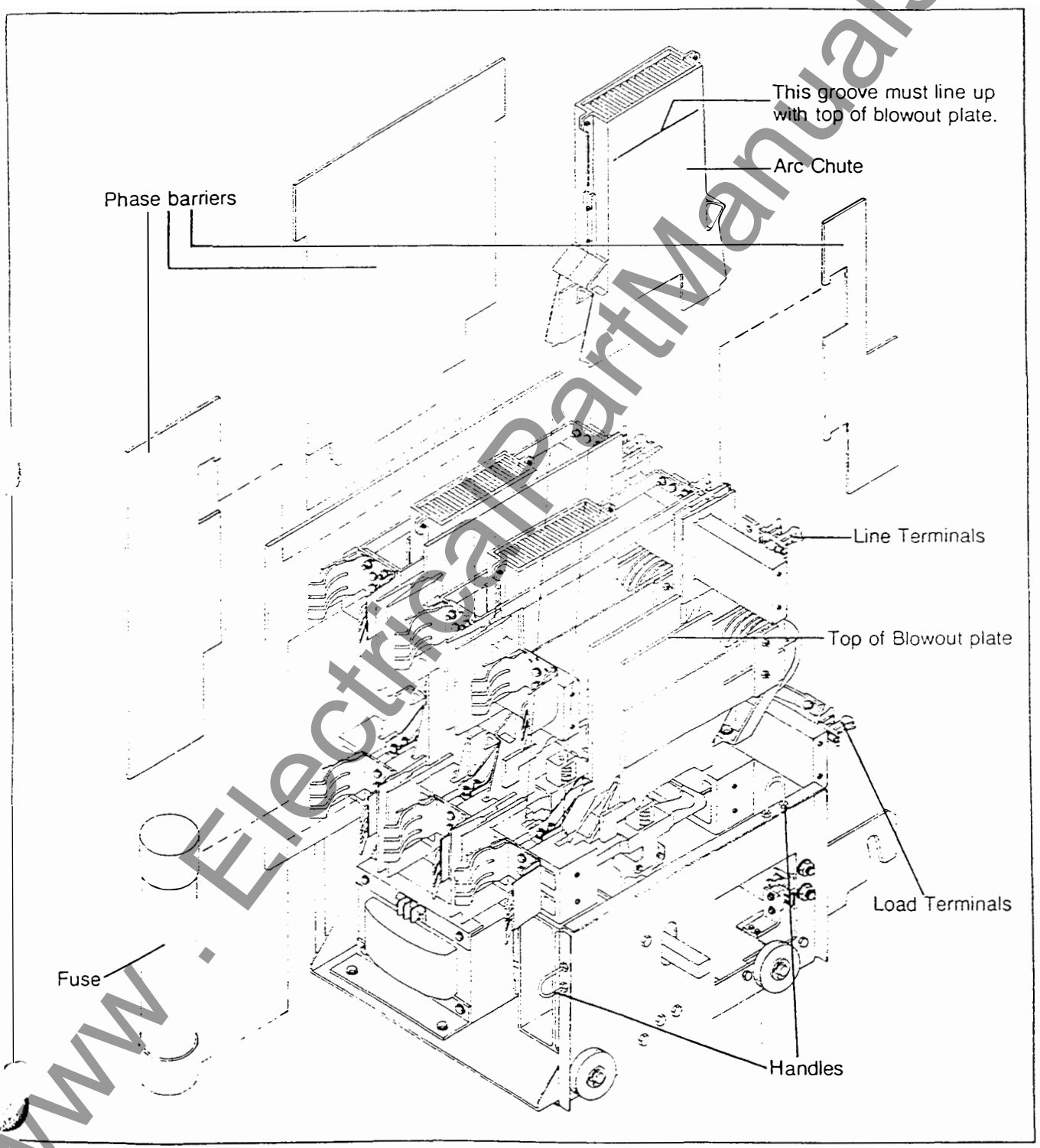


FIGURE 6: Arc Chute, Phase Barrier and Fuse Location on Contactor Assembly

AUXILIARY CONTACT ADJUSTMENT

Refer to Figures 11 & 12
Tighten auxiliary drive link (39) to coupling angle (46) just enough to remove excessive free play. Do not overtighten

FUSE CLIP INSPECTION

Closely examine fuse clips. If there is any sign of overheating or looseness check the spring pressure or tightness of clamps. Replace the fuse clips if the spring pressure compares unfavorably with that of other similar fuse clips. Make sure that fuses are completely inserted.

TERMINALS AND JOINTS

If joints or terminations appear to be badly discolored, corroded or pitted, or show evidence of having been subjected to high temperature, the parts should be disassembled and replaced or cleaned.

Examine all wire or cable connections for evidence of looseness or overheating. Re-torque if necessary. If major discoloration or cable damage is apparent, replace the damaged parts.

ARC CHUTE INSPECTION AND MAINTENANCE

The arc chutes should be inspected as part of routine maintenance each time the contacts are inspected. The arc chute ceramic will become discolored slightly due to normal arcing during contactor operation. Dust and dirt will also tend to accumulate after a period of time. The following procedure should be used to clean the arc chutes after they have been removed from the contactor.

WARNING

TO AVOID PERSONAL INJURY, ALWAYS USE SAFETY GLASSES WHEN USING COMPRESSED AIR

1. Blow out dust and dirt by directing dry compressed air from the bottom of the arc chute up through the spaces between the ceramic arc splitters. The air should also be directed over the surface of the ceramic flash plates located in the lower portion of the chute (refer to Figure 7).

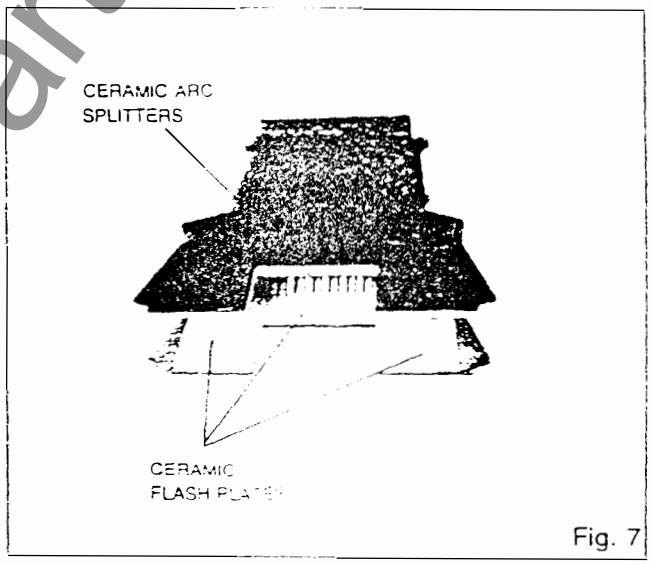


Fig. 7

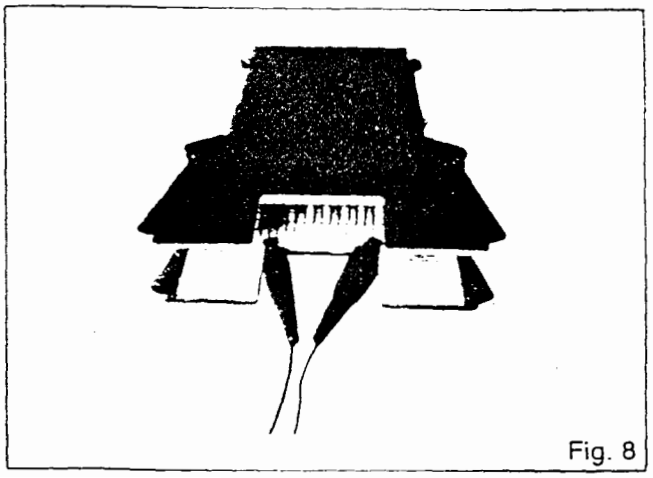


Fig. 8

2. Using a cloth or by light sanding, remove any additional loose residue (carbon, etc.) from the flash plates. Pay particular attention to the areas which have vertical grooves on the ceramic surface. Do not use abrasives which might embed conducting particles in the ceramic (emery cloth, wire brush, etc.)

In addition to periodic cleaning, the arc chutes should be inspected for any obvious physical damage such as cracked or missing ceramic pieces. Small chips or slight cracks in the ceramic should not cause concern as long as large pieces are not missing or are in danger of falling out of the assembly. If any components require replacement, the complete arc chute assembly must be replaced.

Heavy electrically conductive deposits may accumulate on the flash plates after prolonged periods of operation at medium-to-heavy currents or after the contactor has been required to interrupt at or near its full rating. This could interfere with proper contactor operation. It is recommended that a dielectric or Megger test be performed as follows to verify dielectric strength of the flash plate surfaces. If a megger is used, the recommended test voltage is 1000 volts.

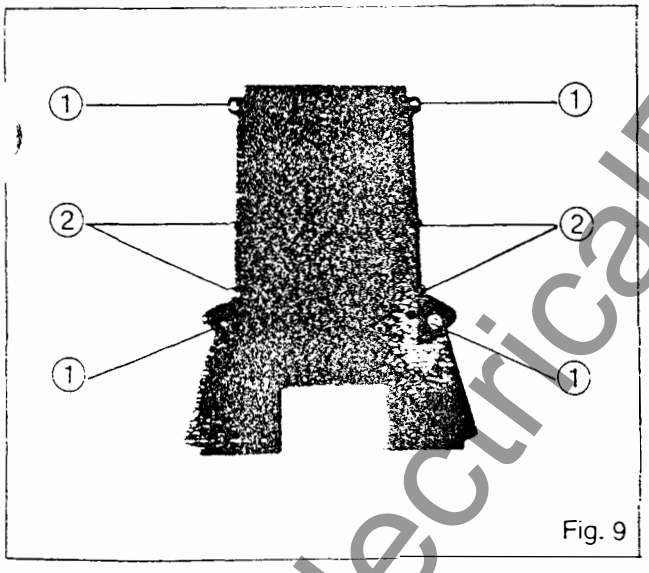


Fig. 9

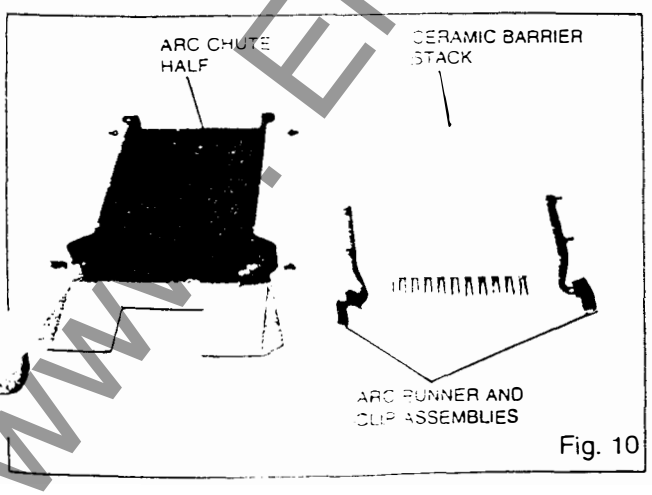


Fig. 10

WARNING

TO AVOID PERSONAL INJURY AND EQUIPMENT DAMAGE, REFER TO THE TEST DEVICE INSTRUCTIONS BEFORE PERFORMING DIELECTRIC OR MEGGER TESTING.

1. Clip Megger or dielectric tester leads on the flash plates at the points shown in Figure 8 using alligator clips or the equivalent.

2. The area between the clips should withstand 9KV AC (13KV DC) for one minute or should indicate a resistance of at least 100 Megohms. Be sure to test both left and right sides of the arc chute. If either side fails to meet the dielectric requirement, then disassembly and cleaning is necessary before placing the arc chute back into service. If an arc chute fails the test, then disassembly and cleaning of all three arc chutes is recommended.

DISASSEMBLY AND CLEANING OF ARC CHUTES

CAUTION

ARC CHUTE DISASSEMBLY SHOULD BE PERFORMED ONLY IF THE DIELECTRIC TEST DESCRIBED IN THESE INSTRUCTIONS WAS NOT PASSED.

Refer to Figure 9

1. Lay the arc chute on its side.

2. Remove the hardware which attaches the two arc chute halves at four locations marked (1) in Figure 9.

3. Loosen, but do not remove, the four arc runner attachment screws identified as (2).

4. Carefully lift off one of the arc chute halves to expose the ceramic barrier stack and the arc runner and clip assemblies. Refer to Figure 10.

5. Remove the barrier stack and the arc runners.

WARNING

TO AVOID PERSONAL INJURY, SAFETY GLASSES SHOULD BE WORN WHEN PERFORMING THIS PROCEDURE.

6. Clean flash plates on the bottom of the arc chute halves by dry nonconductive sandblasting. All of the dark colored deposits should be removed and the ceramic surfaces should appear white after sandblasting.

7. Wipe off the arc chute halves with a dry cloth and reassemble the arc chute by reversing the disassembly procedure. The ceramic barrier stack can be installed either way but the "V" notches in the splitter plates must be toward the bottom.

8. Repeat the dielectric test to ensure that the dielectric strength has been restored to the flash plate surfaces, in which case the arc chutes can now be returned to service.

It is recommended that disassembly and sandblasting of the arc chute be done no more than three (3) times during the service life of any arc chute. After this point, other parts of the arc chute may have become contaminated to the extent that performance is degraded and the entire arc chute should be replaced.

RECOMMENDED TORQUE VALUES

When making bolted assemblies, the following considerations should be generally followed. The tightening torques are determined by the size of hardware used.

1. Metal-to-Metal - Apply standard tightening torque as listed:

Thread Size	Torque (In.-Lb.)
8-32	14-20
10-32	20-30
1/4-20	40-60
5/16-18	168-228
3/8-16	240-360
1/2-13	480-600

2. Metal-to-Insert Molded in Compound Part - Apply approximately 2/3 of standard tightening torque.

3. Compound-to-Insert Molded in Compound Part - Apply approximately ½ of standard tightening torque.

4. Compound-to-Compound - Apply approximately ½ of standard tightening torque.

PERIODIC CLEANING

Accumulation of dust and foreign material such as coal dust, cement dust, or lamp black must be removed from the contactor and all surfaces must be wiped clean at regular intervals. Dust can collect moisture, causing voltage breakdown. Do not use compressed air as it will only redistribute contaminants on other surfaces.

MAINTENANCE AFTER A FAULT

The excessive currents occurring during a fault may result in structure, component and/or conductor damage due to mechanical distortion, thermal damage, metal deposits, or smoke. After a fault, repair the cause of the fault, inspect all equipment per NEMA Standards Publication No. ICS 2-302 and make any necessary repairs or replacements prior to placing the equipment into service again. Be sure that all replacements (if any) are of the proper rating and are suitable for the application. If in doubt consult your field sales representative.

The following procedures are recommended for this inspection:

WARNING

TO AVOID SERIOUS INJURY AND EQUIPMENT DAMAGE, ALL EQUIPMENT MUST BE DEENERGIZED, DISCONNECTED AND ISOLATED TO PREVENT ACCIDENTAL CONTACT WITH LIVE PARTS. CHECK VOLTAGE ON ALL CONTROL TERMINALS AND ON ALL LINE AND LOAD TERMINALS. OF THE CONTACTOR WITH PROPER TEST EQUIPMENT BEFORE TOUCHING OR WORKING ON EQUIPMENT. ONLY QUALIFIED PERSONNEL SHOULD BE INVOLVED IN THE INSPECTION AND REPAIR PROCEDURE AND ALL PLANT SAFETY PROCEDURES MUST BE OBSERVED.

TERMINALS AND INTERNAL CONDUCTORS

Replace all damaged parts which show evidence of discoloration, melting or arcing damage.

CONTACTOR

Replace the contacts and contact springs if the contacts are welded or show heat damage, displacement of metal, evidence of binding or excessive wear. If deterioration extends beyond the contacts, replace the entire contactor. Examples of such deterioration include evidence of arcing on the contactor moldings and insulation damage.

OVERLOAD RELAYS

1. The complete overload relay must be replaced if burnout of the heater element has occurred. Any indication of an arc striking or burning overload relay, also requires replacement.

2. If there is no visual indication of damage that would require replacement, contact operation must be verified by electrically or mechanically tripping and resetting the overload relay.

FUSE HOLDERS

Replace fuse holders if the insulating mounts, barriers, or fuse clips show signs of damage, deterioration, heating, distortion or looseness.

FUSES

Always replace all three fuses in a three phase circuit even though only one or two are open circuited since internal damage suffered by fuses not replaced could result in nuisance shut-down later.

Perform the "Pre-Energization Check" procedures detailed in this manual before restoring the equipment to service.

TROUBLESHOOTING

In the unlikely event that operating problems are encountered, use the following trouble shooting chart to isolate the cause of the malfunction and find the remedy. If the corrective action given in the chart fails to correct the difficulty, consult your field sales representative.

The following information is required if it is necessary to write to Siemens-Allis relative to the equipment problems.

1. Manufacturer's serial number and part number, if available.
2. Nameplate data on contactor.
3. Duty cycle and any details of operation.
4. Length of time in service and approximate total number of operations.
5. Voltage, current and frequency.
6. Description of any problem.
7. Any other pertinent information.

TROUBLESHOOTING CHART

WARNING

REMOVE ALL POWER TO CONTACTOR PRIOR TO MAKING THESE CHECKS EXCEPT WHERE CONTROL POWER IS REQUIRED AND EXERCISE CAUTION AT ALL TIMES.

TROUBLE	CAUSE	REMEDY
CONTACTS Overheating of contacts.	Overload. Insufficient contact pressure.	Reduce current load. Clean contact surfaces. Replace contact springs if weak and/or replace contacts if wear allowance — per contact is used up.
	Loose connection.	Check and tighten power connections.
Contact chatter or pumping.	Poor contact in control circuit.	Check all connections in control circuit for tightness.
	Improper functioning of late break contact (between T & S in contactor coil circuit).	The N.O. contact of "M" in parallel with the N.C. late break contact must close before late break contact opens. If this sequence is not followed check for worn contacts and physical damage of pole assembly (47 and 48); also check leaf spring drive (41) for mechanical damage.
	Fluttering control relay such as pressure or temperature switch.	Properly adjust switch or replace.

TROUBLESHOOTING

TROUBLE	CAUSE	REMEDY
Contact chatter or pumping.	Abnormally low control voltage.	Measure control voltage. Voltage must be at least 85% of rated value shown in OPERATING DATA.
	Open coil.	Check continuity of coil and replace if defective.
Short contact life.	Bounce on closing.	Check operating voltage. Should not exceed rated voltage by more than 10%.
	Improper seating of arc runners.	Refer to Arc Chute Installation instructions.
	Low voltage; magnet not sealing.	Measure control voltage. Voltage must be at leat 85% of rated value shown in OPERATING DATA.
	Fluttering control relay such as pressure or temperature switch.	Properly adjust switch or replace.
	Excessive jogging.	Check application.
	Foreign materials in operating or contact mechanisms.	Remove.
Welding of contacts.	Inadequate contact pressure.	Replace contacts if wear allowance is exceeded. Replace contact pressure springs.
	Fluttering control relay such as pressure or temperature switch.	Properly adjust switch or replace.
	Low control voltage, contactor dropping partially open.	Measure voltage to determine if abnormally low dips in voltage occur, particularly during motor start-up.

TROUBLE	CAUSE	REMEDY
Welding of contacts.	Mechanical interference.	Check for mechanical binding and adjust.
	Misadjustment of mechanical interlock for contactors installed in **Series 81000** Controller.	Adjust mechanical interlock. Refer to **Series 81000** High Voltage Controllers Instruction Book CC 3818
COIL/RECTIFIER Burned-Out coil or rectifier.	Failure of magnet armature to close.	Check for mechanical binding of contactor.
	Fluttering control relay such as pressure or temperature switch.	Properly adjust switch or replace.
	Mechanical interlock interference.	Adjust. Refer to **Series 81000** High Voltage Controllers Instruction Book CC 3818.
	Failure of late break contact to open.	Check leaf spring drive (41) and late break contact assembly (48) for mechanical damage.
	Control voltage too high.	Measure voltage. Voltage should not exceed rated voltage by more than 10%
	High ambient temperature.	Ambient temperature outside contactor enclosure should not exceed 40°C.

PARTS LIST

ITEM	DESCRIPTION	PART NUMBER	CONTACTOR QUANTITIES			
			DRAWOUT		STATIONARY	
			180A 3 POLE	360A 3 POLE	180A 3 POLE	360A 3 POLE
1	Support Plate	25-205-537-061	1	1	-	-
2	Side Plate L.H.	25-205-537-012	1	1	1	1
3	Side Plate R.H.	25-205-537-013	1	1	1	1
4	Bumper Support Assembly	25-131-570-547	1	1	1	1
5	Coil Support	25-205-537-011	1	1	1	1
6	Bracket	25-131-570-089	2	2	2	2
7	Side Barrier (with Single Barrel fuse)	25-205-537-014	2	2	2	2
	Side Barrier (with Double Barrel fuse) 360A	25-205-537-053	-	2	-	-
8	Blowout Core	25-131-570-507	3	3	3*	3*
9	R.H. Blowout Plate Ass'y 180A	25-205-537-504	3	-	3*	-
	360A	25-205-537-512	-	3	-	3*
10	L.H. Blowout Plate Ass'y 180A	25-205-537-503	3	-	3*	-
	360A	25-205-537-511	-	3	-	3*
11	Blowout Coil Washer	14-133-782-001	6	6	6*	6*
12	Blowout Coil Ass'y 180A	25-205-537-505	3	-	3*	-
	360A	25-205-537-509	-	3	-	3*
13	Insulating Tube	14-172-010-001	3	3	3*	3*
14	Arc Chute Ass'y	25-131-017-503	3	3	3*	3*
15	End Cap	25-131-570-031	6	-	6*	-
16	Magnet Yoke Assembly	14-319-712-501	1	1	1	1
17	Magnet Core	14-142-161-001	1	1	1	1
18	Neoprene Washer	14-129-241-023	1	1	1	1
19	Plastic Washer	14-145-664-001	1	1	1	1
20	Steel Wasner	14-179-558-001	1	1	1	1
21	Stainless Steel Washer	14-171-157-013	1	1	1	1
22	Shim (.015 Thick)	14-133-780-002	2	2	2	2
23	Stationary Pivot Seat	14-145-322-001	1	1	1	1
24	Spring	14-145-712-001	2	2	2	2
25	Pivot Bar	14-230-539-001	1	1	1	1
26	Movable Pivot Seat	14-145-321-001	1	1	1	1
27	Movable Contact Carrier	14-321-927-002	1	1	1	1
28	Contact Push Rod	14-227-879-002	3	3	3*	3*
29	Interlock Shaft	25-131-570-137	1	1	1	1
30	Barrel Nut	14-145-379-002	1	1	1+	1+
31	Bearing Pin	14-145-379-001	1	1	1	1
32	Contact Pressure Spring	14-145-668-001	3	3	3*	3*
33	Spring Saddle	14-142-157-001	3	3	3*	3*
34	Movable Contact Guide	14-141-685-001	3	3	3*	3*
35	Movable Contact Ass'y 180A	25-205-537-501	3	-	3*	-
	360A	25-205-537-510	-	3	-	3*
36	Contact Arm	14-321-928-002	1	1	1	1
37	Bearing	14-123-887-004	2	2	2	2
38	Aux. Contact Actuator Arm	14-147-033-001	1	1	1	1

* - On 2-pole contactors, reduce indicated quantity by one-third.
\+ - Part not required on 2-pole contactor.
\# - Part required only on 2-pole contactor.