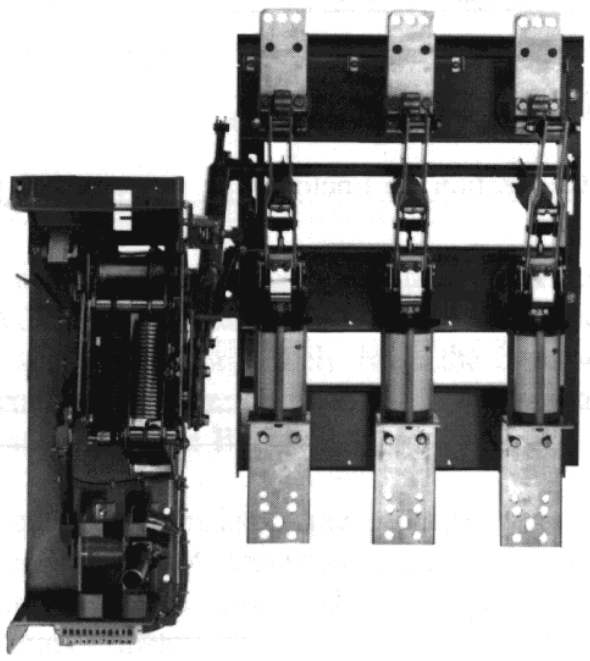
July, 1990

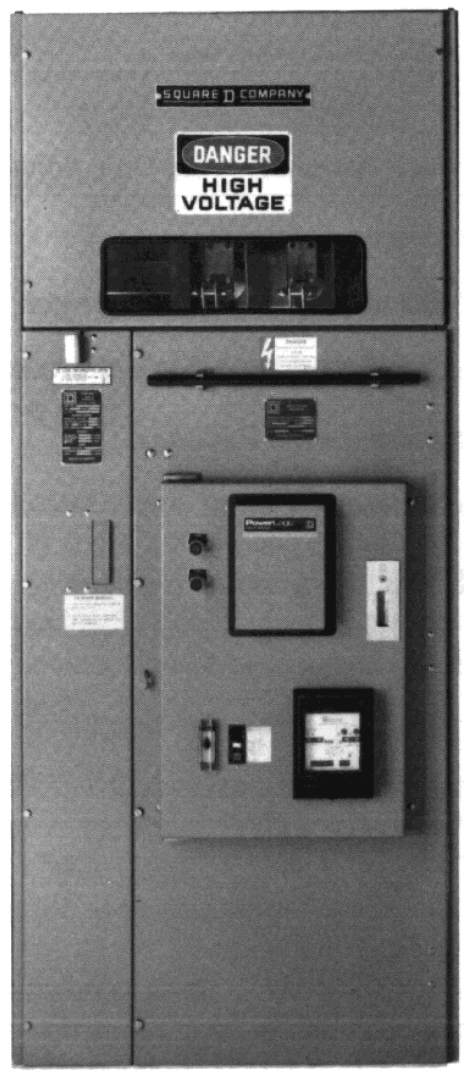
Manual 9845-3

Installation & Maintenance Manual

VISI/VAC®

CIRCUIT INTERRUPTER TYPE B





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VISI/VAC CIRCUIT INTERRUPTER
TYPE B

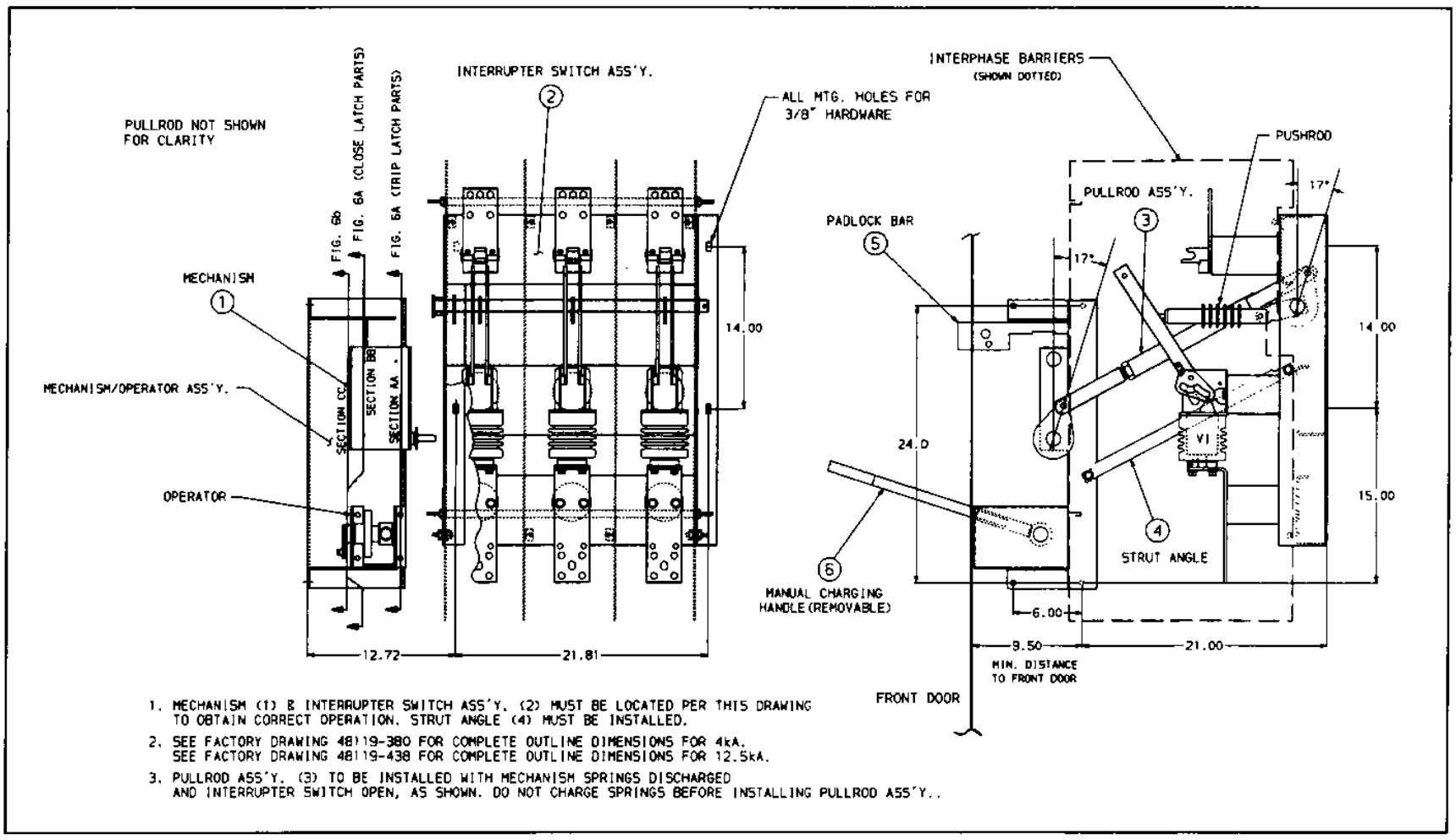


Figure 1

1. INTRODUCTION

These instructions cover the operation and maintenance of Type B VISI/VAC Circuit Interrupters. Type B has the stored energy mechanism mounted separately from the 3-phase switch base interrupter assembly. See Figure 1 for major component identification for Type B Circuit Interrupters.

The mechanism connects to the interrupter assembly with an adjustable pull rod assembly. A strut angle also runs between the mechanism and the interrupter assembly. This angle must be installed for proper operation.

VISI/VAC Circuit Interrupters are available in two different interrupting ratings: 4kA and 12.5kA. The difference between the two types is the vacuum interrupter. Servicing instructions are similar for both interrupting ratings.

Type B VISI/VAC Circuit Interrupters are available with either motor operated or manually operated stored energy mechanisms. Motor operated assemblies allow remote electrical opening and closing operations and can also be operated manually should control power be lost. Figure 2 shows both a motor and manual operation. Both types contain one way clutch bearings on the operator shaft to allow the manual charging handle to be operated in multiple strokes to complete a manual operation.

2. INSPECTION, RECEIVING, HANDLING, STORAGE

The equipment should be unpacked, checked against the bill of lading for completeness, and inspected for shipping damage when received and *before* being accepted. The equipment ratings and catalog numbers given on the name plate and shipping documents should be checked against the purchasing specifications.

If the VISI/VAC Circuit Interrupters are installed in switchgear manufactured by Square D, no adjustments should be required before the interrupters can be operated. Customer's normal pre-energization testing procedure is still recommended.

If the purchaser of these VISI/VAC Circuit Interrupters is an OEM manufacturer, then he will need to install them in his equipment (per Figure 1) and adjust per section 14 of these instructions. See Figures 3A and 3B for lifting instructions and weights for the VISI/VAC components.

When VISI/VAC Circuit Interrupters, or indoor switchgear incorporating them, must be stored, they should be stored in a clean, dry location. When incorporated in outdoor switchgear and stored in an unheated location, the heaters in the switchgear should be energized.

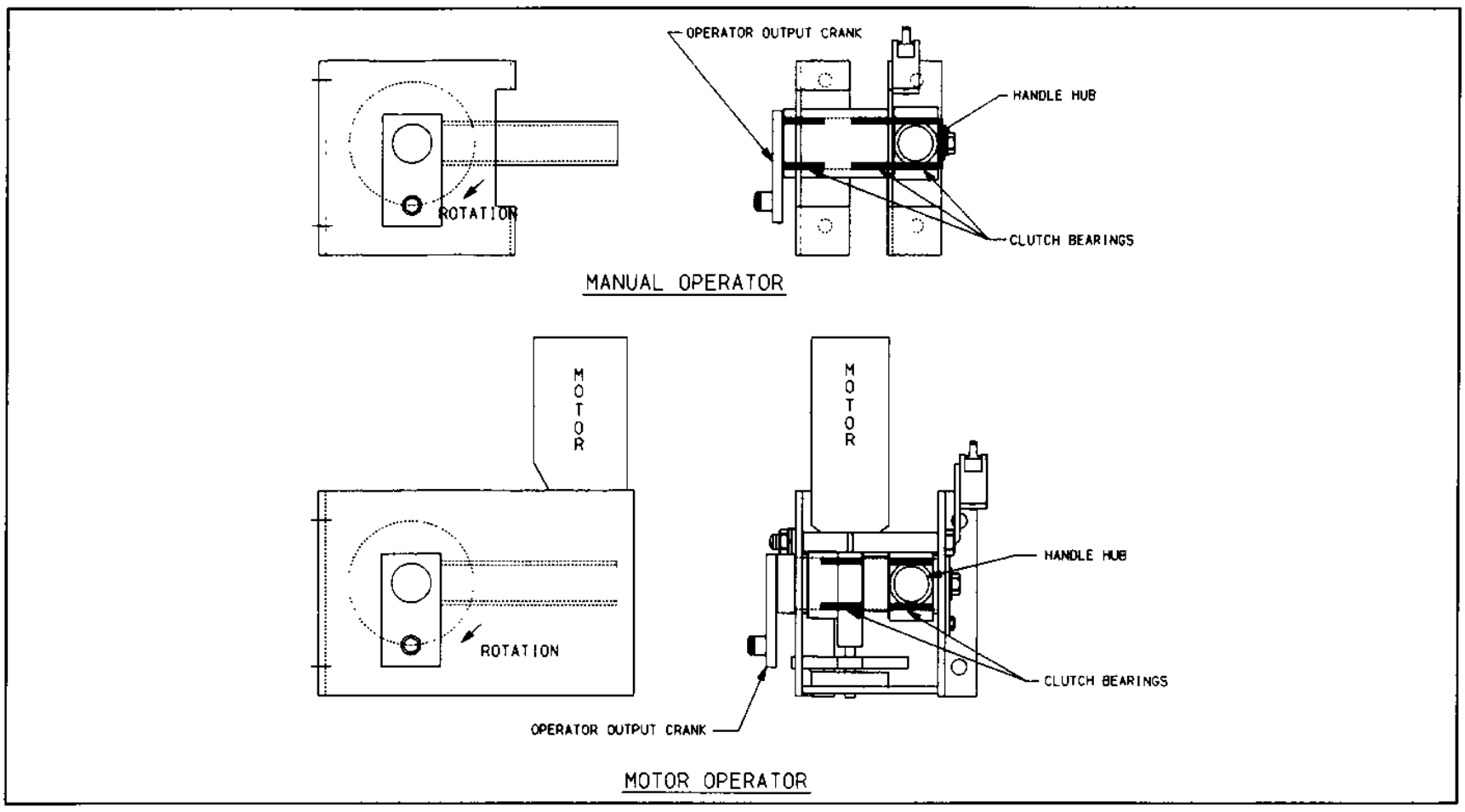


Figure 2
Operator Sub-Assemblies

3. RATINGS

Ratings for unfused VISI/VAC Circuit Interrupters are as follows:

Voltage Class	5KV		15.5KV	
Rating Class	4.0 KA	12.5 KA	4.0 KA	12.5 KA
Maximum Design Voltage (RMS)	5.5 KV	5.5 KV	15.5 KV	15.5 KV
Continuous Current (60 HZ—RMS)	600 Amp	600 Amp	600 Amp	600 Amp
Impulse Withstand (1.2 × 50 Wave)	60 KV (±) (Note 1)	60 KV (±) (Note 1)	95 KV (±) (Note 1)	95 KV (±) (Note 1)
Dielectric Withstand (60 Hz—One Minute)	19 KV	19 KV	36 KV	36 KV
Interrupting Current Capacity (RMS SYM)	4.0 KA	12.5 KA	4.0 KA	12.5 KA
Momentary & Fault Closing Current (ASYM—RMS)	20 KA (34 PK)	20 KA (34 PK)	20 KA (34 PK)	20 KA (34 PK)
Short Time Current Capacity (SYM—RMS)	12.5 KA (1 Second)	12.5 KA (3 Seconds)	12.5 KA (1 Second)	12.5 KA (3 Seconds)

Table #1

NOTE:
1. Interphase barriers must be in place to meet this withstand level.

Figure 3
Lifting Procedures And Weights

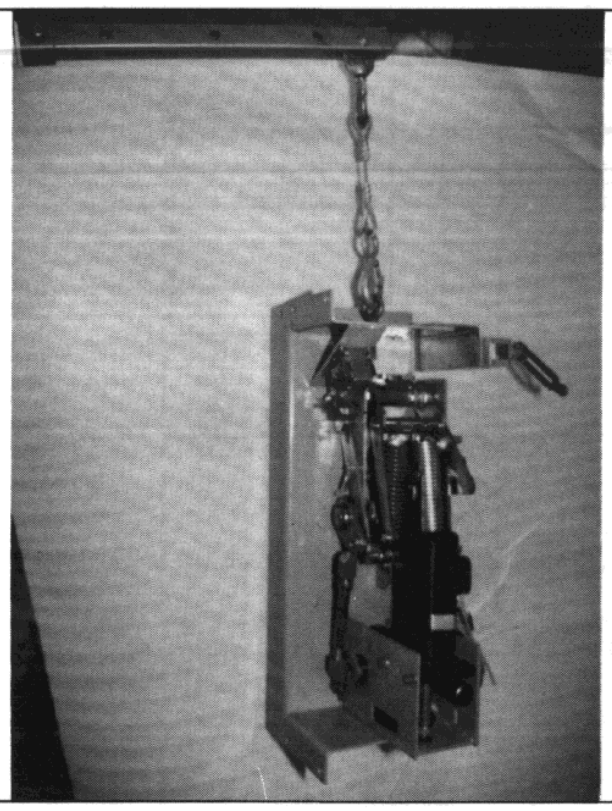


Figure 3a
Mechanism/Operator Assembly
(Has Hole In Support For Lifting Eye.)

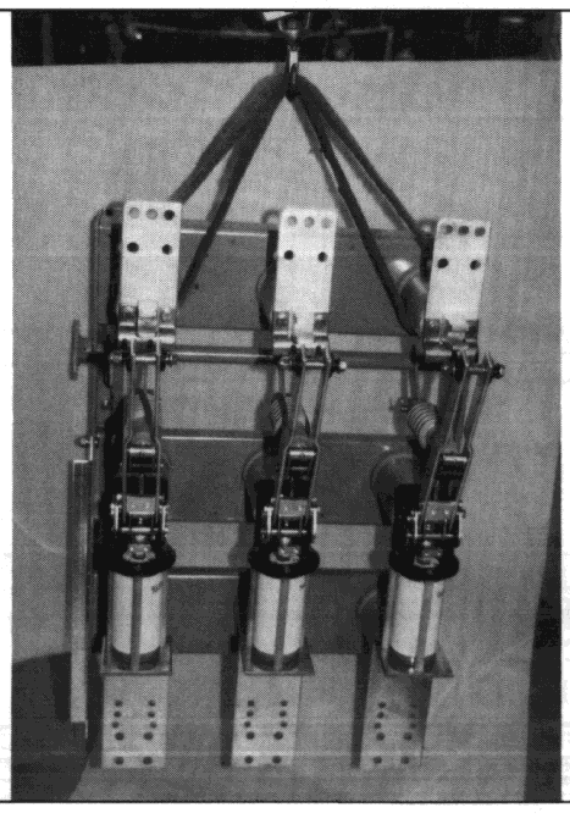


Figure 3b
Interrupter Switch Assembly
(Wrap Band Around Two Outside Insulators)

Assembly Weights

4.0 KA Interrupter Switch Assembly	110 Pounds
12.5 KA Interrupter Switch Assembly	116 Pounds
Mechanism/Operator Assembly—Motor Operator	60 Pounds
Mechanism/Operator Assembly—Manual Operator	52 Pounds

Figure 4
Interlock Switches

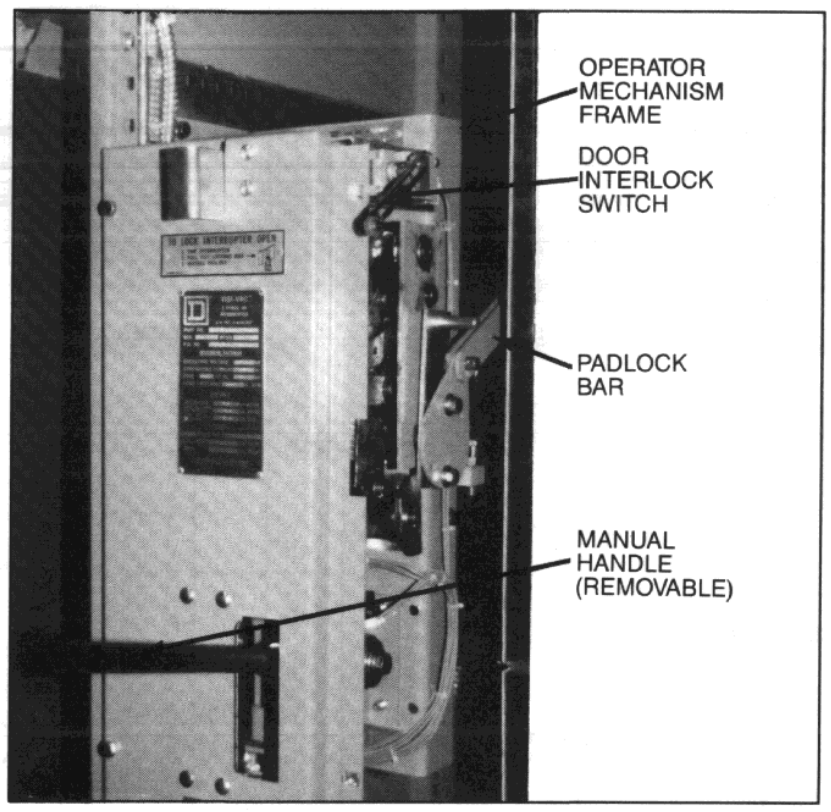


Figure 4a

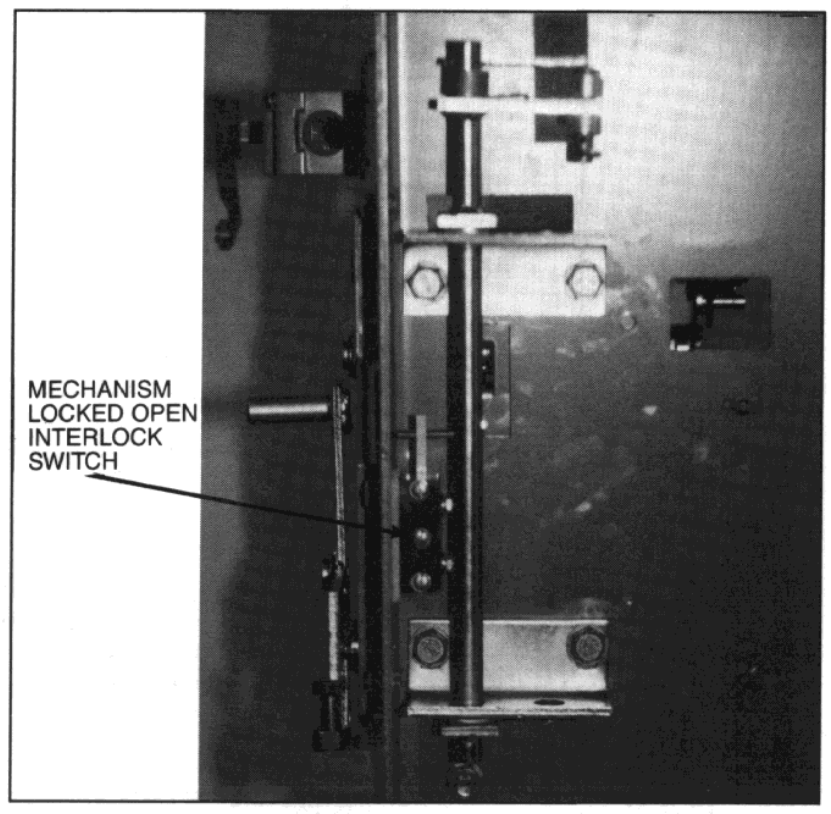


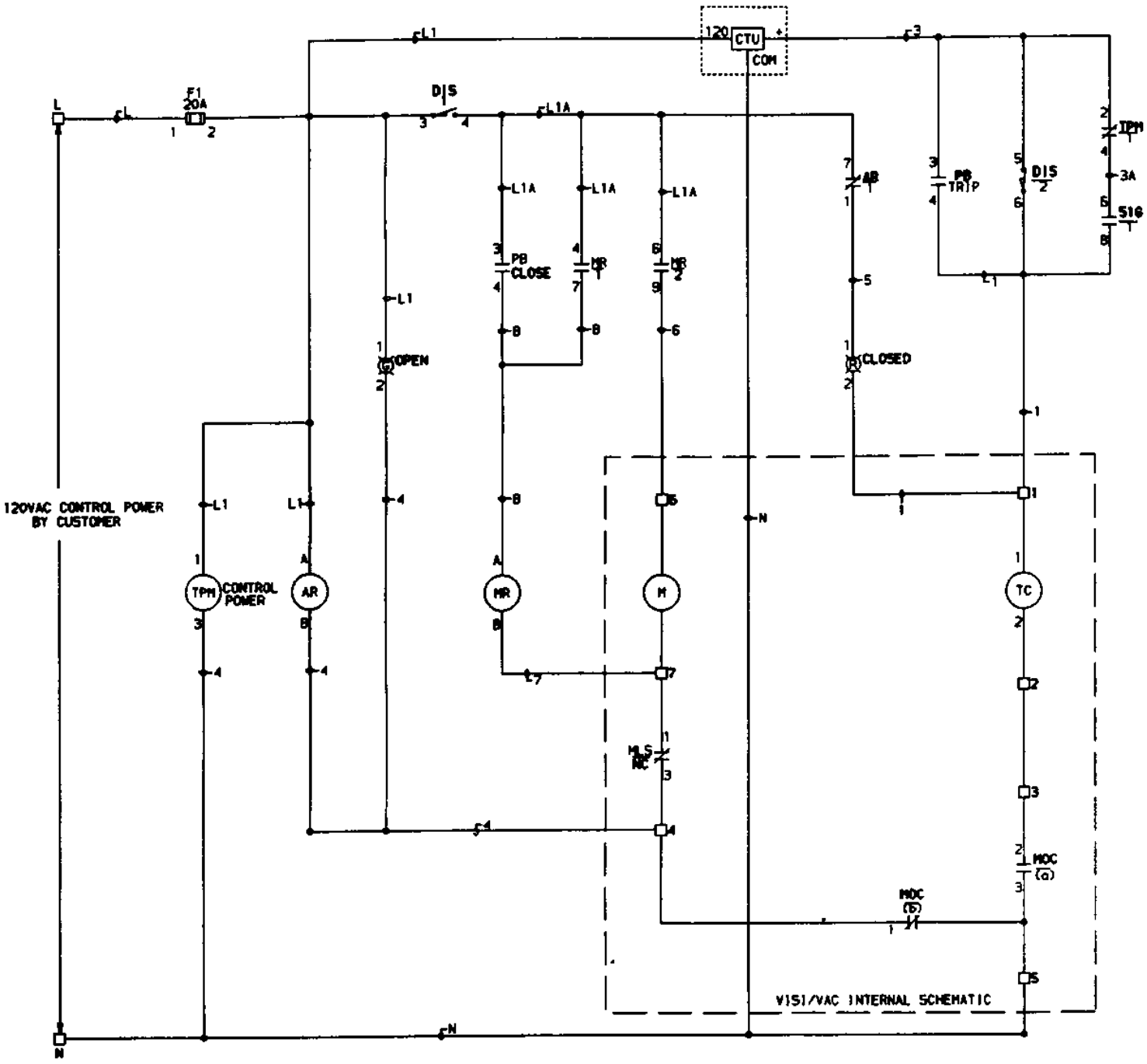
Figure 4b
Rear View-Mechanism Sub-Assembly

4. OPERATION

CAUTION

1. THE FOLLOWING INSTRUCTIONS ARE WRITTEN FOR SQUARE D MANUFACTURED SWITCHGEAR. THE SAME

VISI/VAC CIRCUIT INTERRUPTER
TYPE B



LEGEND

G	-GREEN PILOT LIGHT (OPEN)
R	-RED PILOT LIGHT (CLOSED)
CTU	-CAPACITOR TRIP UNIT (ST-520)
DIS	-DOOR INTERLOCK SWITCH
MOC	-MECHANISM OPERATED CONTACTS
MLS	-MOTOR LIMIT SWITCH

Figure 5a
Electrical Close/Electrical Trip

INSTRUCTIONS ARE VALID WHEN AN OEM HAS INSTALLED THE VISI/VAC CIRCUIT INTERRUPTER INTO HIS OWN EQUIPMENT OR REPLACES AN INTERRUPTER MODULE ASSEMBLY, EXCEPTION BEING IF OEMS CONTROLS AND INTERLOCKS VARY FROM THOSE STANDARD WITH SQUARE D.

2. THE REMOVABLE MANUAL CHARGING HANDLE SHOULD NOT BE INSTALLED DURING ELECTRICAL OPERATION.

3. MOTOR OPERATED VISI/VAC CIRCUIT INTERRUPTERS HAVE ELECTRICAL INTERLOCK SWITCHES WHICH PREVENT ELECTRICAL OPERATION IF AN ASSOCIATED FUSE COMPARTMENT DOOR IS OPEN OR THE PADLOCK BAR IS IN THE OUTWARD POSITION. (SEE FIGURES 4A AND 4B.)

4. FIGURES 5A AND 5B SHOW TYPICAL SCHEMATIC WIRING DIAGRAMS FOR THE VISI/VAC CIRCUIT INTERRUPTER. REFER TO SPECIFIC JOB DRAWINGS FOR ACTUAL WRIING OF THE DEVICE IN YOUR APPLICATION.

5. INTERRUPTER BARRIERS ARE REQUIRED FOR ALL RATINGS AND APPLICATIONS OF THIS CIRCUIT INTER-

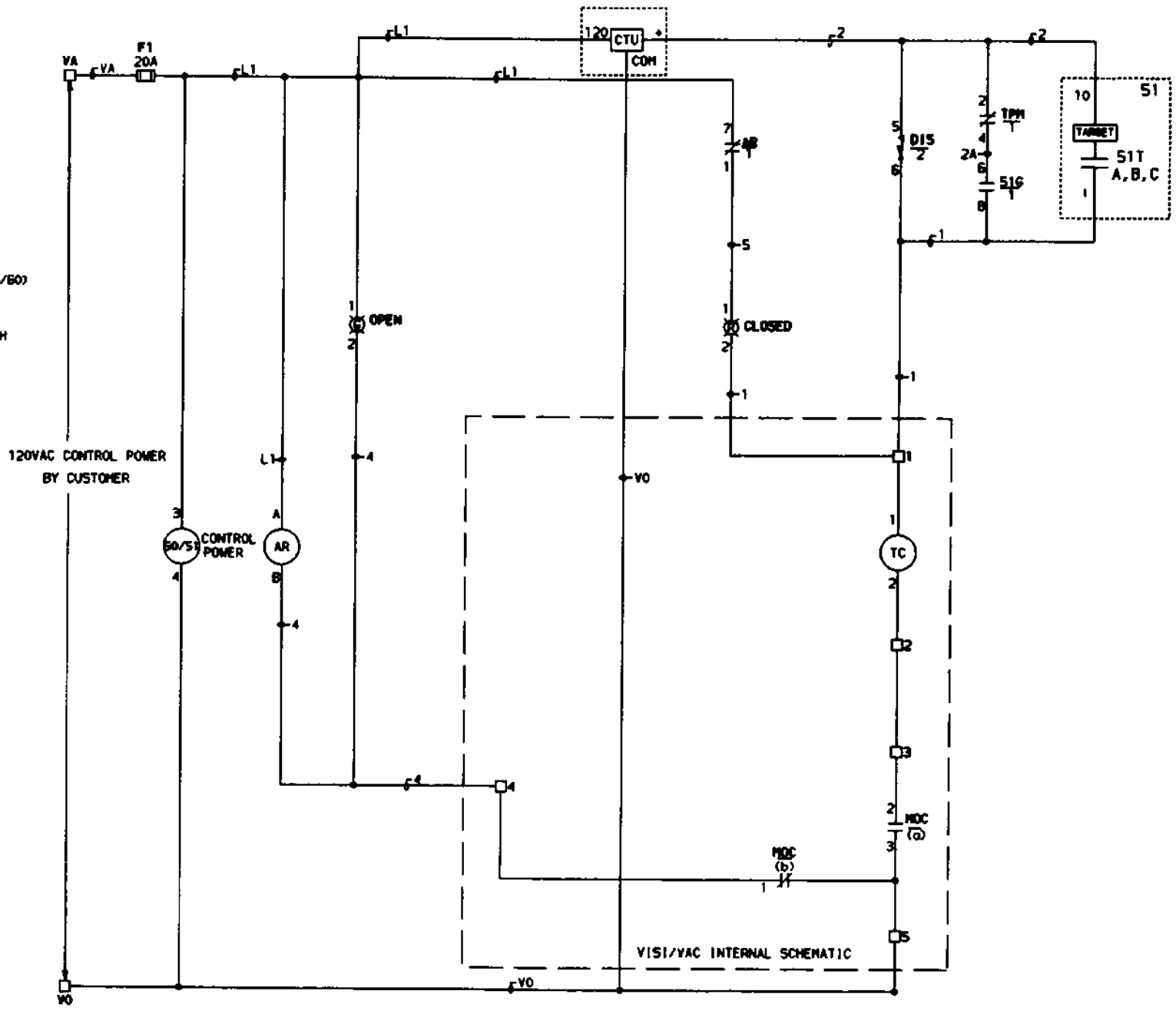


Figure 5b
Manual Close/Electric Trip

RUPTER. BARRIERS ARE 1/8″ THICK POLYESTER-GLASS SHEET LOCATED AS SHOWN IN FIGURE 1.

4.1 To Close Electrically

Push red button momentarily on front panel of switchgear. Charging motor will energize. Circuit interrupter will close after motor runs approximately 15 seconds.

4.2 To Open Electrically

Push green button on front panel of switchgear momentarily. Circuit interrupter will open instantly.

4.3 To Close Manually

Install manual charging handle into the handle hub of the operator, through the front panel. Move handle up and down alternately until circuit interrupter closes.

4.4 To Open Manually

Install manual charging handle as in step 4.3 above. Move handle up and down. Interrupter will open after approximately one to three strokes

4.5 To Padlock Circuit Interrupter Open

Open circuit interrupter manually or electrically. Pull padlock bar away from panel (See Figure 1) and install padlock shackle

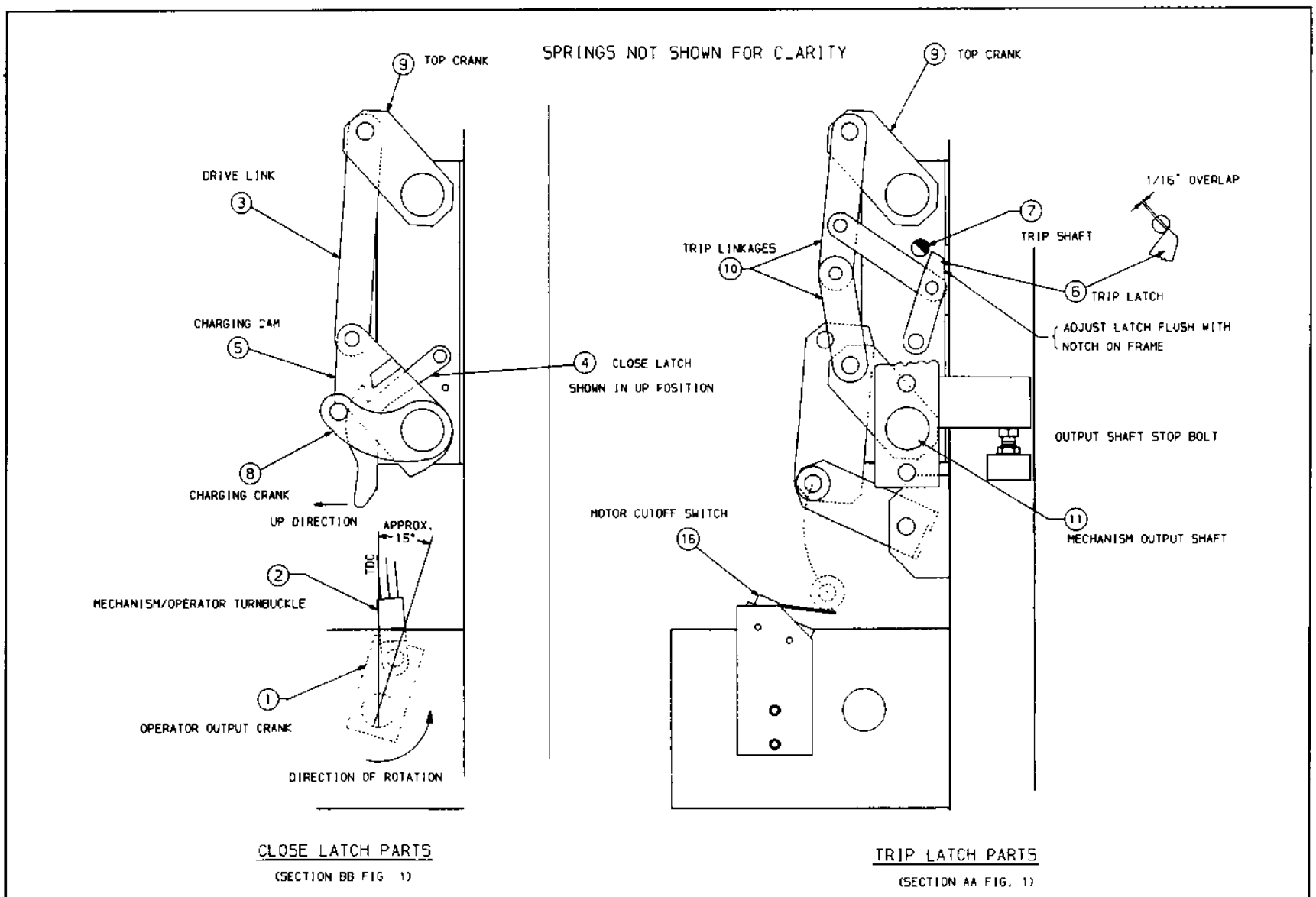


Figure 6a
Mechanism

through the small hole in the padlock bar. The padlock bar cannot be pulled out far enough to install the padlock unless the interrupter is open and all the operating springs are discharged.

WARNING

DO NOT ATTEMPT TO CHARGE SPRINGS MANUALLY IF THE CIRCUIT INTERRUPTER IS PADLOCKED OPEN. IN THE EVENT THIS DOES OCCUR, IT MAY BE NECESSARY TO *FORCE* THE PADLOCK BAR BACK INTO THE PANEL WHEN THE PADLOCK IS REMOVED. REPEATED AND FORCED ATTEMPTS TO CHARGE SPRINGS WHEN LOCKED OPEN MAY DAMAGE ONE-WAY CLUTCH BEARINGS, REQUIRING REPLACEMENT.

THE MECHANISM CANNOT BE CHARGED ELECTRICALLY WHEN THE PADLOCK BAR IS "OUT." AN OPTIONAL KEY INTERLOCK CAN ALSO BE MOUNTED ON THE FRONT OF THE PANEL TO LOCK THE CIRCUIT INTERRUPTER OPEN.

5. MECHANISM OPERATING SEQUENCE

Assume at the start of the sequence all springs are discharged, the circuit interrupter is open and the operator output crank is at the bottom of its stroke.
Note: The closing spring (left) is colored red, the openings spring (right) silver.

5.1 Closing—See Figures 6A, 6B, 6C.

a. Operator crank (#1) is driven (manually or electrically) counter clock-wise (viewed from right side) and charges the opening spring through the mechanism/operator turnbuckle (#2) and drive link (#3). At approximately 15° "before top dead center" (BTDC) of the operator output crank, close latch (#4) clears the mating surface on the charging cam (#5) and up into its latched position.

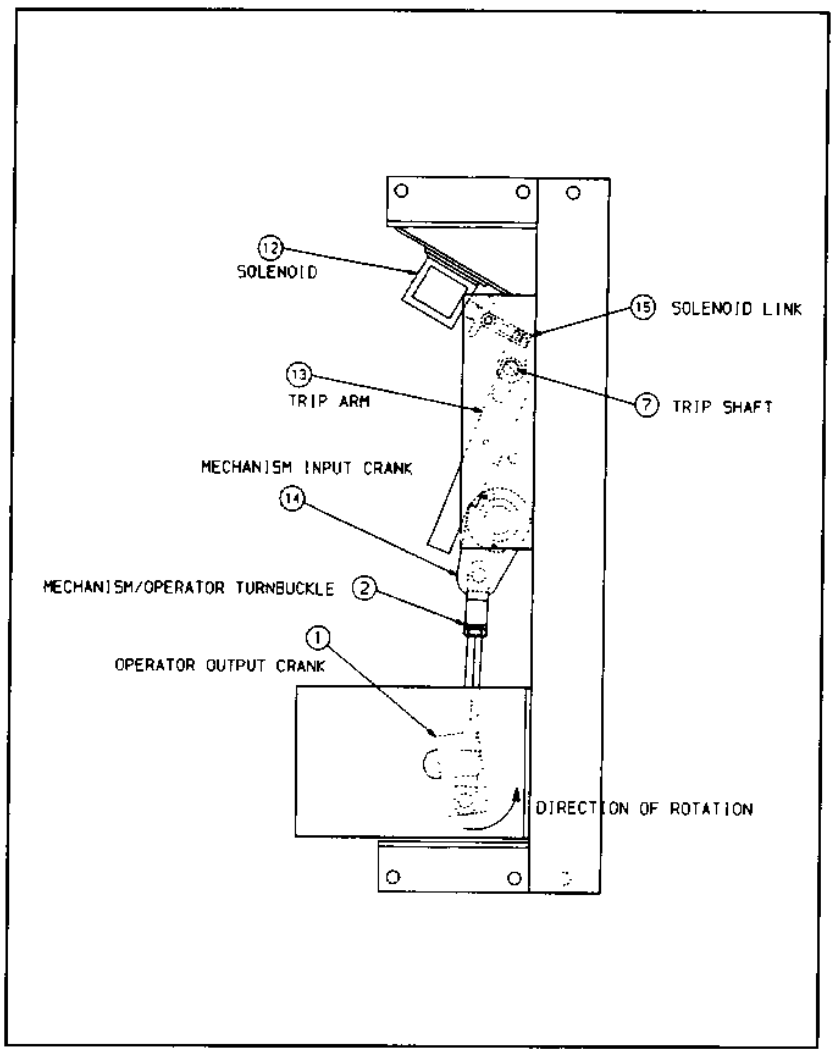


Figure 6b
Right Side of Trip Linkage

b. As the operator output crank continues toward "top dead center" (TDC), the trip latch (#6) latches behind the notch on the trip shaft (#7). There will be a "click" prior to TDC as the trip latch passes the notch on the trip shaft. At TDC the rear edge of the trip latch (#6) is "flush" with edge of cutout notch on mechanism frame.

c. The operator output crank goes over center. Both the close latch (#4) and trip latch (#6) snap into place (audibly) as the opening spring is latched in the extended position. The operator crank then continues in the downward stroke *toward* "bottom dead center" (BDC).

d. During the down stroke of the operator output crank the closing spring is stretched by means of charging crank (#8).

e. At approximately 15° before bottom dead center (BBDC), the pin on the charging crank (#8) releases the close latch (#4).

f. Release of the close latch allows the red close spring to exert force down on the top crank (#9).

g. The force of the closing spring is transmitted from the top crank (#9) to the mechanism output shaft (#11) through the collapsible trip linkages (#10). The trip latch (#6) prevents these linkages from collapsing during the closing stroke.

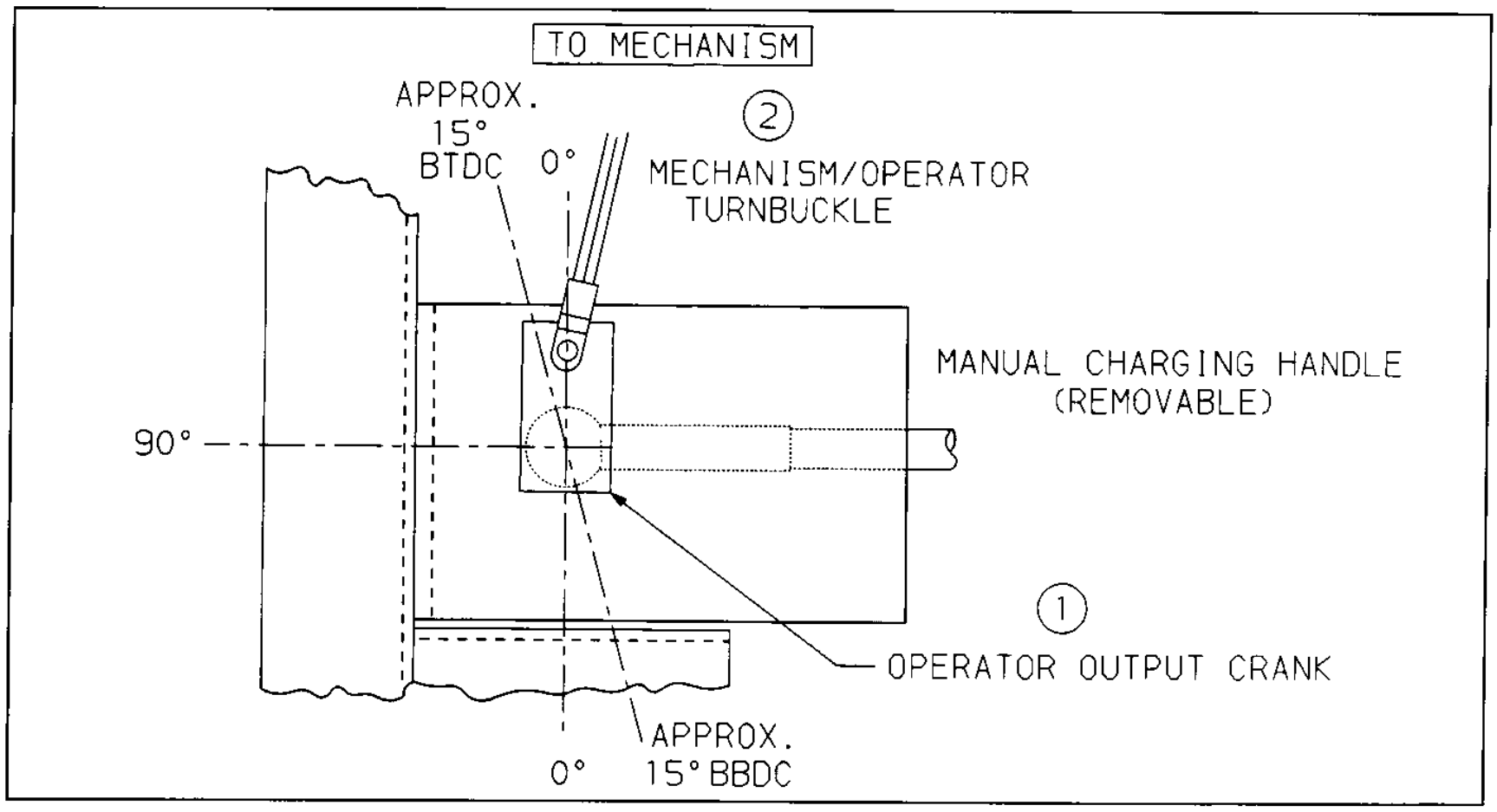


Figure 6c
Operator Assembly

h. The mechanism output shaft (#11) closes the VISI/VAC Circuit Interrupter through the pull rod assembly (#3 on Figure 1).

i. The motor is shut off by the motor cut-off switch (#16) (or an auxiliary switch contact) when the mechanism output shaft reaches the closed position.

5.2 Opening Operations—See Figures 6A, 6B, & 6C.

5.2.1 Electrical Opening

a. The solenoid (#12) rotates the trip shaft (#7) counter clockwise (CCW) through the solenoid link (#15) and releases the trip latch (#6).

b. Release of the trip latch (#6) allows trip linkages (#10) to collapse under the force of the opening spring.

c. Force of the opening spring rotates the mechanism output shaft (#11) clockwise (CW) and opens the VISI/VAC Circuit Interrupter through the pull rod assembly (#3 on Figure 1).

5.2.2 Manual Opening

a. Multiple strokes of manual charging handle moves operator output crank (#1) upward from bottom dead center (BDC).

b. This upward motion is transmitted to the trip arm (#13) by means of a notch on mechanism input crank (#14).

c. Trip arm (#13) rotates trip shaft (#7) CCW by engagement of roll pin in trip arm (#13) with roll pin through trip shaft.

d. Rotation of trip shaft releases trip latch and interrupter trips as described above for electrical tripping.

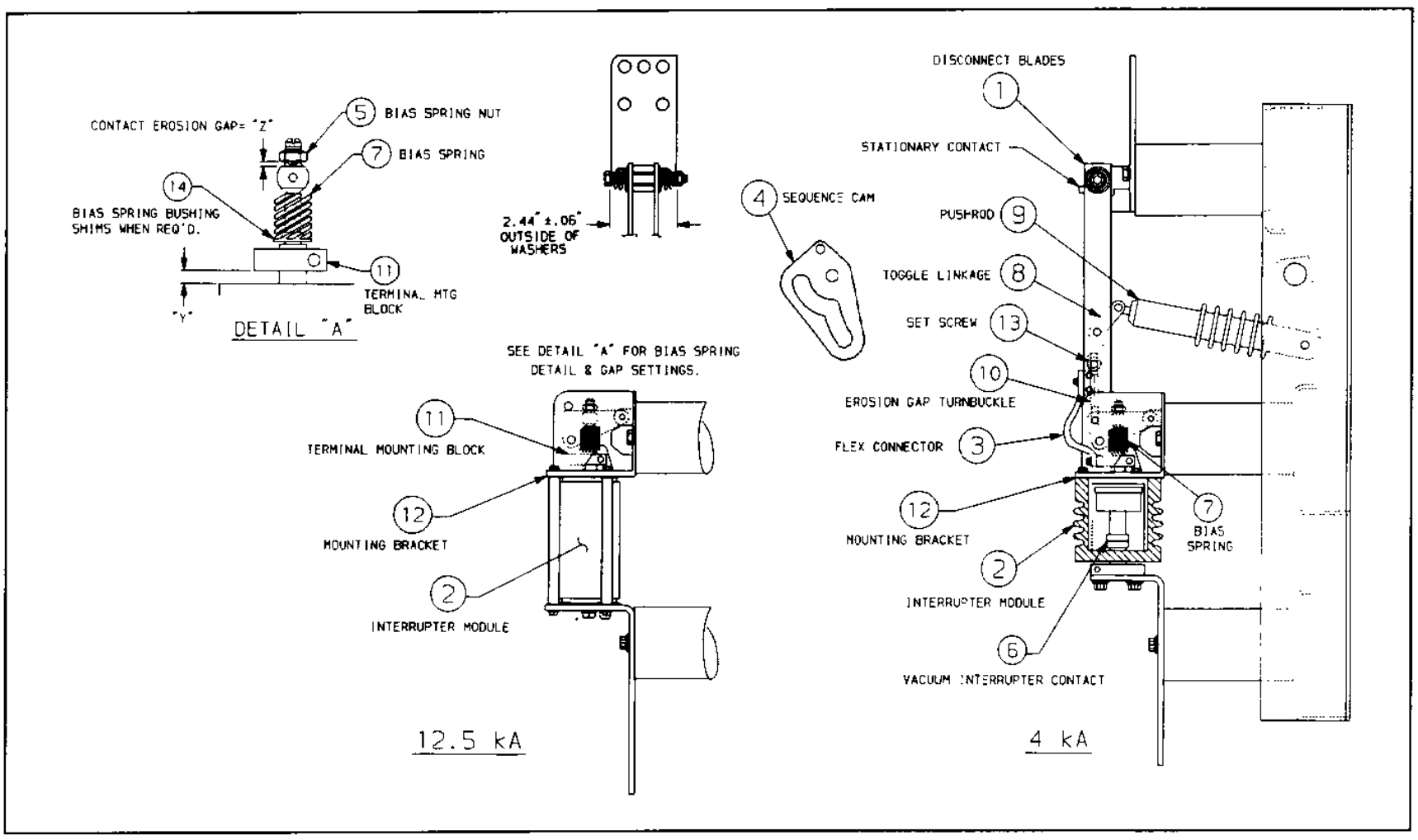


Figure 7

6. INTERRUPTER SWITCH ASSEMBLY— POLE UNIT OPERATION

Noting Figure 7, each of the three identical pole units consist of a set of visible disconnect blades (#1) in series with a vacuum interrupter module (#2). The connection between the blades and the vacuum interrupter module is made via a flexible connector (#3).

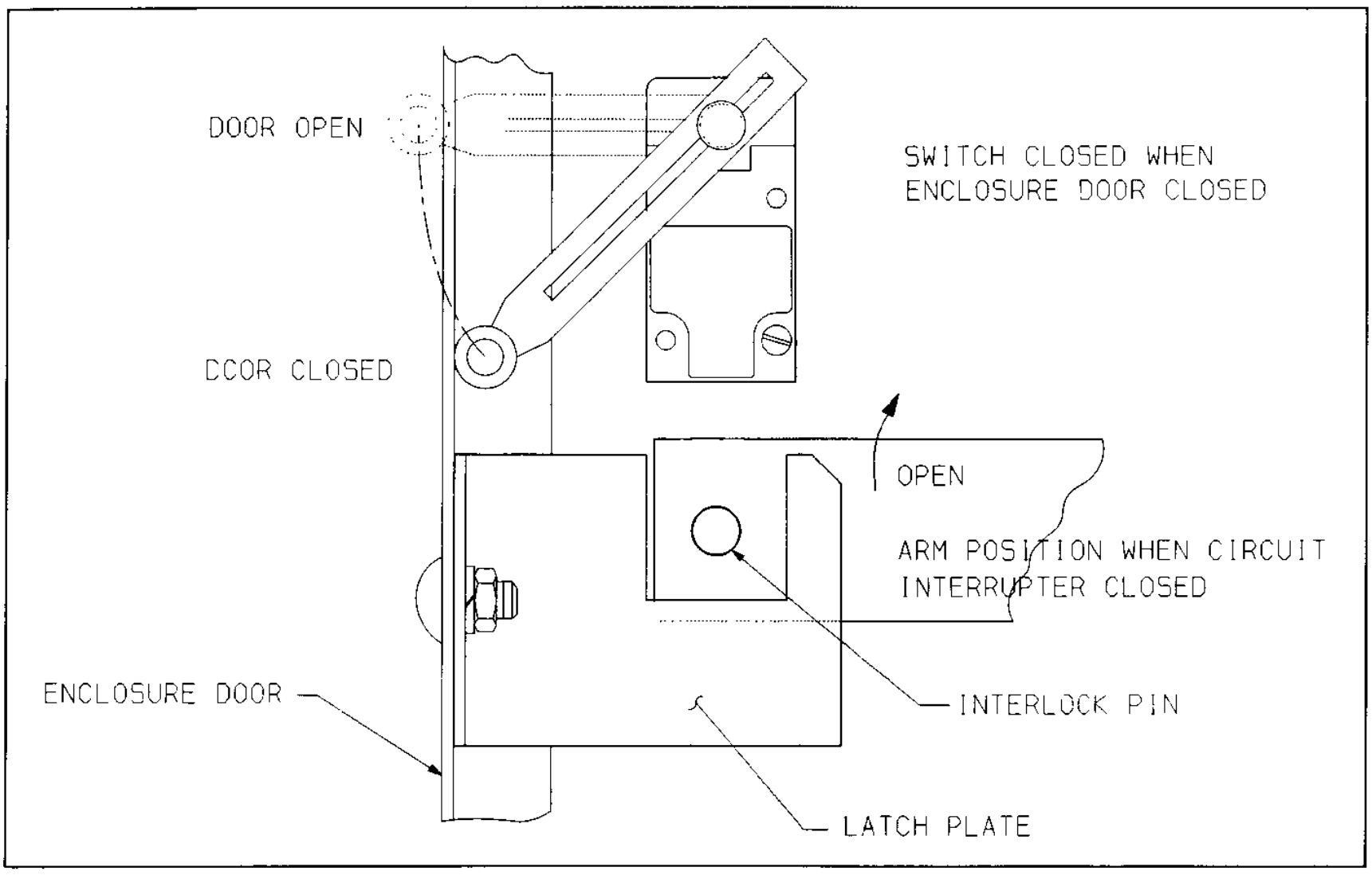


Figure 8
Door Interlock

The opening and closing of the two contacts, blade and vacuum module, in series is controlled by sequence cam (#4) attached to the visible disconnect blades such that sequence cam (#4) insures the vacuum interrupter module always makes and breaks the circuit. The disconnect blades provide visible proof the circuit is open. Therefore:

When closing, the vacuum interrupter module contacts (#6) close *after* the visible blades close.

When opening, the vacuum interrupter module contacts (#6) open *before* the visible blades open.

When closed, the vacuum interrupter module contact, inside the vacuum module enclosure, is held closed by a force applied from the bias spring (#7). The bias spring is compressed by toggle linkage (#8), mounted on the disconnect blades, the vacuum interrupter module contacts are closed. It is essential that the toggle linkage goes "over toggle" when the circuit interrupter is closed (See Figure 12). Otherwise, the vacuum interrupter module could be damaged when subjected to high short circuit currents and possibly weld because of insufficient contact force. See section 10 for adjustments, if the pole linkages do not "toggle".

7. INTERLOCKS

The fuse door on the cubicle is interlocked mechanically and electrically with the VISI/VAC mechanism. The VISI/VAC Circuit Interrupter must be in the open position before the enclosure door can be opened. The mechanism cannot be operated electrically with the enclosure door open. The latch plate on the door must be positioned carefully to prevent the interlock pin on the mechanism from striking the latch plate and thus preventing the VISI/VAC mechanism going to full stroke and interrupter switch pole unit mechanisms from going "into toggle".

8. MAINTENANCE

WARNING

PRIOR TO PERFORMING ANY SERVICE OR MAINTENANCE WORK, OPEN THE CIRCUIT INTERRUPTER, DISCONNECT ALL HIGH VOLTAGE SOURCES FROM IT AND GROUND THE INTERRUPTER TERMINALS. IN ADDITION, MOMENTARILY GROUND THE DISCONNECT SWITCH BLADES OF THE CIRCUIT INTERRUPTER TO ELIMINATE ANY RESIDUAL CHARGE ON THE VACUUM MODULE ASSEMBLY AND ITS MOLDED INSULATION. DISCONNECT CONTROL VOLTAGE SOURCE.

SQUARE D COMPANY RECOMMENDS EACH USER DEVELOP HIS OWN MAINTENANCE SCHEDULE, BASED UPON THEIR OWN INDIVIDUAL NEEDS BECAUSE OF THE WIDE VARIATIONS IN OPERATING CONDITIONS. UNTIL SUCH AN INDIVIDUAL SCHEDULE IS DEVELOPED, WE RECOMMEND THE VISI/VAC CIRCUIT INTERRUPTER BE INSPECTED AFTER ONE (1) YEAR IN SERVICE, OR AFTER 200 OPERATIONS, WHICHEVER OCCURS FIRST. IT IS ALSO RECOMMENDED THE CIRCUIT INTERRUPTER BE INSPECTED FOR DAMAGE FOLLOWING HEAVY EXPOSURE TO THROUGH CURRENTS OR INTERRUPTIONS NEAR ITS MAXIMUM RATING. THE CONTACT EROSION GAPS SHOULD BE MEASURED.

The following are recommended procedures for routine maintenance of VISI/VAC Circuit Interrupters:

8.1 Vacuum Interrupter Module Contact Erosion Measurement

The circuit interrupter must be in the closed position and the pole mechanism "in toggle" (See Figure 12). To determine the amount of vacuum interrupter module contact erosion, measure accurately dimension "y" (See Figure 7) on the pole assembly. (Measure at right side, inboard corner of the terminal mounting block #11 through the opening in the right side of the mounting bracket #12.) Subtract the dimension measured from the value of "y" recorded on the vacuum interrupter module assembly. The result is the cumulative erosion since initially manufactured. Should this calculated erosion value exceed the values below, the pole unit should be replaced.

VISI/VAC Rating	*Maximum Allowable Contact Erosion*
4.0 KA	.100"
12.5 KA	.080"

NOTE:
Dimension "Z" (contact erosion gap, Figure 7) will also indicate the contact erosion present but does not indicate the *cumulative* value *if* the gap has been re-adjusted since the device was manufactured.

8.2 Insulating Surfaces

Using a clean, dry cloth, remove all dirt and moisture from the outside of all insulating surfaces.

8.3 Loose or Worn Parts

Check the mechanism, operator and switch assembly pole units for loose hardware, worn or broken parts. Replace or repair as required. Use Locktite 262 (red) to lock screws where required. *DO NOT* use Locktite on flexible connector hardware, since it has insulating qualities which may cause a bad electrical connection.

8.4 Lubrication

It is not normally necessary to disassemble any of the mechanism or the current carrying parts to relubricate them until the circuit interrupter has operated approximately 1000 close-open cycles. The unit should *NOT* be washed down with high pressure cleaning solution. Square D does *NOT* recommend this practice and it will void the warranty. Wipe dirt or grime off before relubricating.

Use Mobil synthetic grease type SHC-32 to relubricate gears, bearing and latch surfaces on the mechanism, the operator, and the interrupter pole units. Also use SHC-32 to lubricate the disconnect blade contact surfaces. Clean the disconnect blade contact surfaces with a solvent such as mineral spirits before relubricating.

Unspecified types of greases should not be substituted for SHC-32, as they may *NOT* be compatible with synthetic greases and may impair the lubricating properties of the grease applied at the factory. (Mobil 28 is the military spec version of SHC-32.)

It is recommended that the VISI/VAC Circuit Interrupter be manually operated several times after lubrication and observed for proper operation.

9. TESTING

The tests listed below have been performed at the factory prior to shipment. The values and procedures are listed here as a guide to re-testing interrupter performance after maintenance.

WARNING

KEEP CLEAR OF MOVING PARTS AS INJURY MAY OCCUR DUE TO MOVING DISCONNECT BLADES AND SPRING DISCHARGING MECHANISM. HIGH VOLTAGE BUS MUST BE DE-ENERGIZED AND GROUNDED BEFORE PERFORMING TESTS 9.1, 9.2, 9.3 AND 9.4.

9.1 Operation and Time Limits

a. The mechanism charges and closes within 18 seconds (max) after the motor is energized at 100% rated control voltage.

b. The mechanism charges and closes when energized at minimum rated control voltage. Time to close will be longer than at 100% rated voltage.

c. The vacuum interrupter module contacts open within 3 cycles after trip coil is energized at 100% rated control voltage.

9.2 Contact Overlap Timing Check

Vacuum interrupter module contacts and interrupter switch disconnect blades (which are connected in series) have a time differential between them during closing and opening operations.

During "closing", (blades close first) the differential time is:

VISI/VAC Rating	*Differential Time*
4.0 KA	9-12 milliseconds
12.5 KA	11-14 milliseconds

During "opening", (vacuum interrupter module contacts open first) the differential time is:

VISI/VAC Rating	*Differential Time*
4.0 KA	12-18 milliseconds
12.5 KA	15-20 milliseconds

Consult the factory on repair instructions if the times you measure are less than those listed.

9.3 Contact Resistance (Circuit Interrupter Closed)

Measure contact resistance from the upper stationary contact pad (upper jaw) to the pad at the bottom of the vacuum interrupter module. Resistance values should not exceed 85 microhms, when new. For reference, the resistance of the vacuum interrupter (alone) normally will not exceed 30 microhms. Resistance values will change after the interrupter is in service.

9.4 Dielectric Tests

WARNING

HIGH VOLTAGE INCOMING LINE CABLES ARE TO BE DE-ENERGIZED AND ISOLATED FROM INTERRUPTER. OUTGOING LOAD CABLES ARE TO BE DE-ENERGIZED AND ISOLATED FROM CIRCUIT INTERRUPTER.

KEEP AREA CLEAR OF PERSONNEL. USE RECOGNIZED SAFETY PRECAUTIONS WHILE PERFORMING DIELECTRIC TEST.

MAINTAIN A DISTANCE OF SIX FEET BETWEEN PERSONNEL AND THE DEVICE BEING TESTED WHILE ENERGIZED.

DO NOT EXCEED SPECIFIED TEST VOLTAGES SINCE INJURIOUS X-RAYS MAY BE EMITTED.

VISIBLE DISPLAY AND/OR AUDIBLE NOISE MAY BE EVIDENT DURING THE APPLICATION OF THE TEST VOLTAGE AND IS ACCEPTABLE UNLESS BREAKDOWN OCCURS.

9.4.1 Interrupter-Primary Parts - Apply 27kV AC, 60 Hz to each of the following connections for one minute:

(Note: 36kV used for factory and design tests)

a. Circuit Interrupter Closed

Phase to Phase: Energize each phase separately with other phases and interrupter frame grounded.

b. Circuit Interrupter Open

Across Contacts: Energize the top stationary terminals of each phase of the circuit interrupter separately, ground bottom contact of interrupter module frame and both ends of all other phases.

Across Vacuum Interrupter Module Alone: Energize bottom contact of each vacuum interrupter module, ground disconnect switchblade. This test is performed to verify the presence of vacuum within the vacuum interrupter module.

WARNING

DISCHARGE THE VACUUM INTERRUPTER CONTACTS (MOVABLE AND STATIONARY) AND DISCONNECT BLADES TO GROUND BEFORE HANDLING. THESE AREAS CAN RETAIN STATIC CHARGE AFTER A HI-POT TEST.

9.4.2 Control Circuits

NOTE:
Isolate all control circuits from ground. Isolate charging motor and solid state devices from the rest of the control circuits. The solid state devices are not to be tested dielectrically.

a. Control and secondary wiring to ground. Apply 1500 volts AC for (1) one minute between the isolated control circuits and ground. All switches closed or shorted during test.

b. Charging Motor. With motor isolated from rest of control circuit, apply 900 volts AC for (1) one minute between motor leads and grounded frame of interrupter.

10. INTERRUPTER SWITCH ASSEMBLY POLE UNIT ADJUSTMENTS (FIGURE 7)

NOTE:
Adjustments of sections 10 through 14 are normally required *only* when installing new assemblies or for repair. Adjustments of Section 14 are required for new assemblies installed by an OEM.

a. Install each interrupter pole unit assembly on the switch base frame (with blades at "closed" position). Align disconnect switch blades on each pole with stationary contact jaw assembly so both are straight. Move stationary contact assembly to center blade spacer in jaw. Tighten insulators onto base.

b. Adjust clamping force on stationary contact jaw by adjusting distance between outside surfaces of spring returning washers to 2.44″ ± 06″ as shown in Figure 7.

c. *Open* the interrupter pole unit by "pushing" push rod (#9). Do not pull blades open directly.

d. Adjust the length of the interrupter bias spring, using bias spring nut (#5), to the following dimensions:

Device Rating	*Spring Length*
4.0 KA	1.18″
12.5 KA	1.10″

CAUTION

NUT #5 SHOULD ONLY BE ADJUSTED WHEN THE SWITCH AND INTERRUPTER MODULE ARE "OPEN".

e. *Close* interrupter pole unit by "pulling" push rod (#9). Insure that toggle linkage (#8) and erosion gap turnbuckle (#10) go "into toggle" as shown on Figure 12.

f. In closed position, measure and *record* "Y" (closed) dimension. Initial dimension should be approximately as follows:

Device Rating	*"Y" Closed Dimension*
4.0 KA	.250″
12.5 KA	.220″

g. Adjust erosion gap turnbuckle (#10) so that dimension "Z" (erosion gap) is set to the dimensions listed below. The turnbuckle should be adjusted with the switch open thus it may be necessary to "close" and "open" interrupter pole unit several times.

Device Rating	*"Z" Dimension*
4.0 KA	.100″
12.5 KA	.080″

Lock erosion gap turnbuckle with set screw (#13). Apply Locktite 262 red (or equivalent) to set screw threads.

NOTE:
Turnbuckle should be adjusted with flat side toward front of switch against the flexible connector connection block.

11. TRIP LATCH ENGAGEMENT ADJUSTMENT—ON SPRING MECHANISM SUBASSEMBLY

Adjust trip latch engagement on mechanism to 1/16 inch ± .01 as shown on Figure 6A before installing close and opening springs. Adjust overlap by moving bracket on which roll pin, through trip shaft, rests.

12. MECHANISM ADJUSTMENTS—(INTERRUPTER SWITCH ASSEMBLY AND MECHANISM IN ENCLOSURE)

NOTE:
ALL ADJUSTMENTS ARE MADE BY OPERATING THE MECHANISM "MANUALLY".

CAUTION

1. DO NOT OPERATE MECHANISM UNLESS PULLROD ASSEMBLY (#3, FIGURE 1) IS CONNECTED TO THE INTERRUPTER SWITCH. OPERATION OF THE MECHANISM WITH PULLROD NOT CONNECTED TO THE INTERRUPTER SWITCH COULD DAMAGE MECHANISM PARTS AND AFFECT FACTORY ADJUSTMENTS.
2. STRUT ANGLE (#4, FIGURE 1) BETWEEN THE MECHANISM OPERATOR ASSEMBLY AND THE INTERRUPTER SWITCH *MUST* BE INSTALLED PRIOR TO MECHANISM OPERATION. STRUT ANGLE SHOULD NOT BE FORCED INTO PLACE SINCE PARTS COULD BE "STRAINED".

a. Operate mechanism until operator output crank is approximately 15° BTDC (Before Top Dead Center), Figure 6C.

b. Then adjust mechanism/operator turnbuckle (Figure 6C) CW or CCW until charging cam (#5, Figure 6A) is just high enough for closing latch to latch.

c. Now arm the mechanism and operator until the operator output crank (#2, Figure 6C) is at top dead center.

d. Check to see that the back edge of the trip latch (#6) is flush with the notch in the mechanism housing frame (Figure 9A). If not flush, adjust mechanism output shaft stop bolt (either "up" or "down") until the trip latch is flush with the notch (Figure 9A).

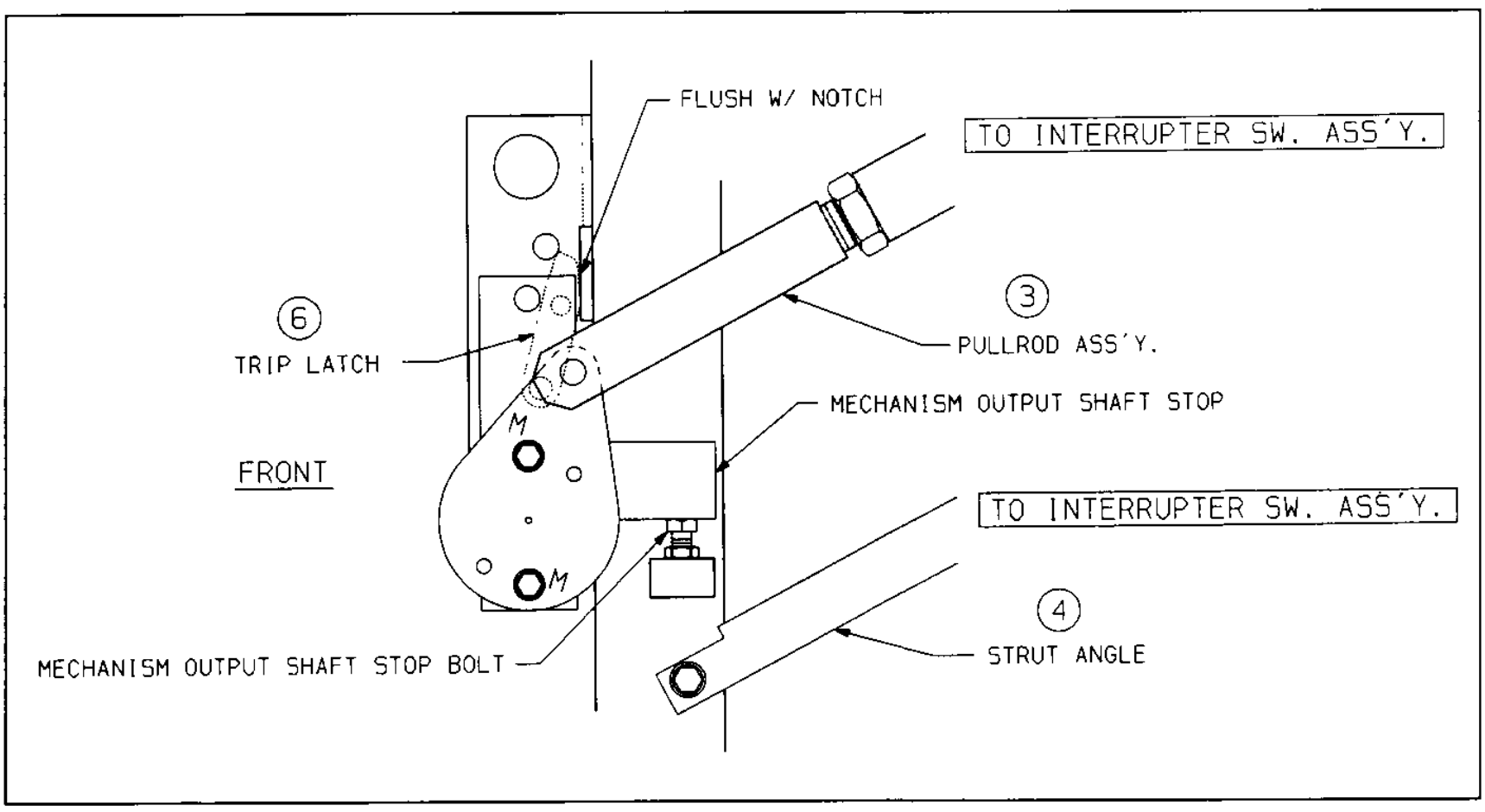


Figure 9a
Mechanism

NOTE:

1. Adjusting the mechanism output shaft stop bolt "up" moves the trip latch toward the "base" of the mechanism housing and "down" moves it toward the "front" of the housing.

2. During trip latch adjustment, if the interrupter switch shaft stop (#2, Figure 10) is against the interrupter switch shaft stop bolt (#3, Figure 10) adjust the stop bolt "in" until the switch shaft stop is not touching. (Leave approximately .06" clearance).

e. Operate mechanism until circuit interrupter closes. Operator output crank should be approximately 15° BBDC (Before Bottom Dead Center), Figure 6C.

NOTE:
Adjustment Reference: 15° position of operator output crank.

1. Lengthening turnbuckle—Close latch latches sooner and switch closes later.

2. Shortening turnbuckle—Close latch latches later and switch closes sooner.

3. Ideally, the close latch latches at about the same angle "BTDC" as the switch closes "BBDC" (approximately 15°).

f. Any adjustment of the mechanism/operator turnbuckle will require re-adjustment of the trip latch and output shaft stop bolt (#3, Figure 10). Reference adjustment "d" above.

13. ADJUSTMENT OF INTERRUPTER SWITCH ASSEMBLY AND MECHANISM CONNECTION—(IN THE ENCLOSURE)

NOTE:
ALL ADJUSTMENTS ARE MADE BY OPERATING THE MECHANISM "MANUALLY".

CAUTION

TO PREVENT POSSIBLE INJURY, DO *NOT* DEVIATE FROM ORDER OF SEQUENCE.

a. Be certain NO power can be supplied to the mechanism trip coil.

b. Note Figure 11. Remove tension spring #1 from trip arm #2 and position trip arm #2 so it cannot engage with the notch on the mechanism input crank #3 or bind during mechanism operation.

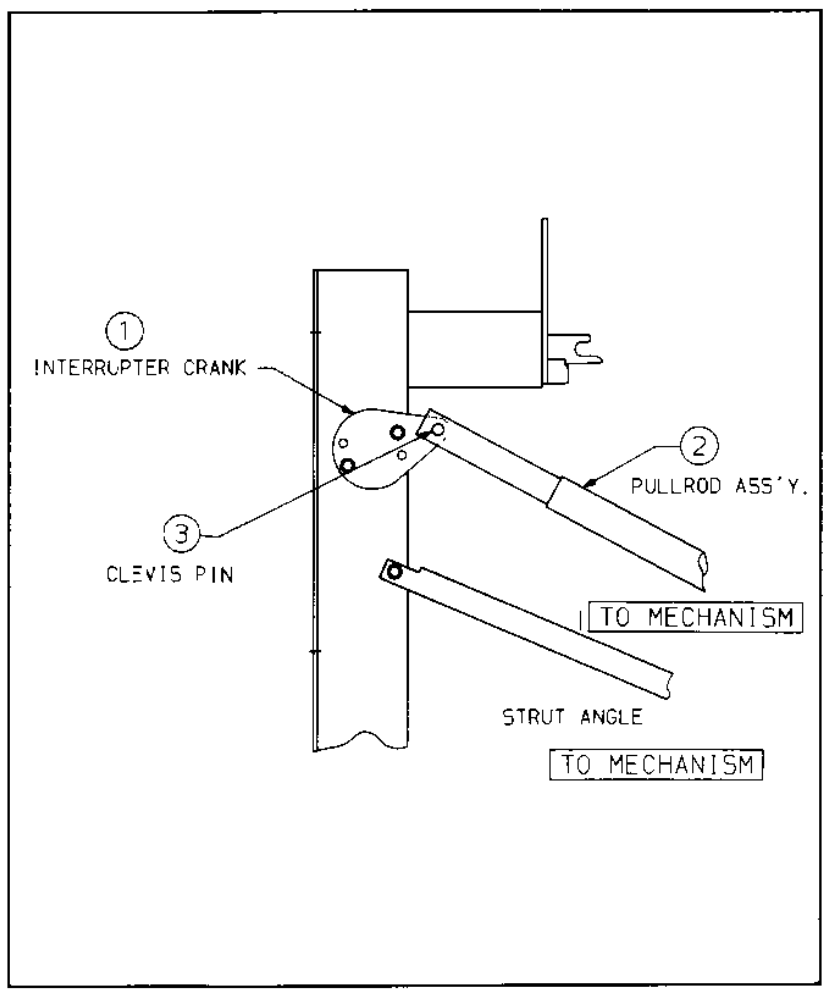


Figure 9b
Left Side View

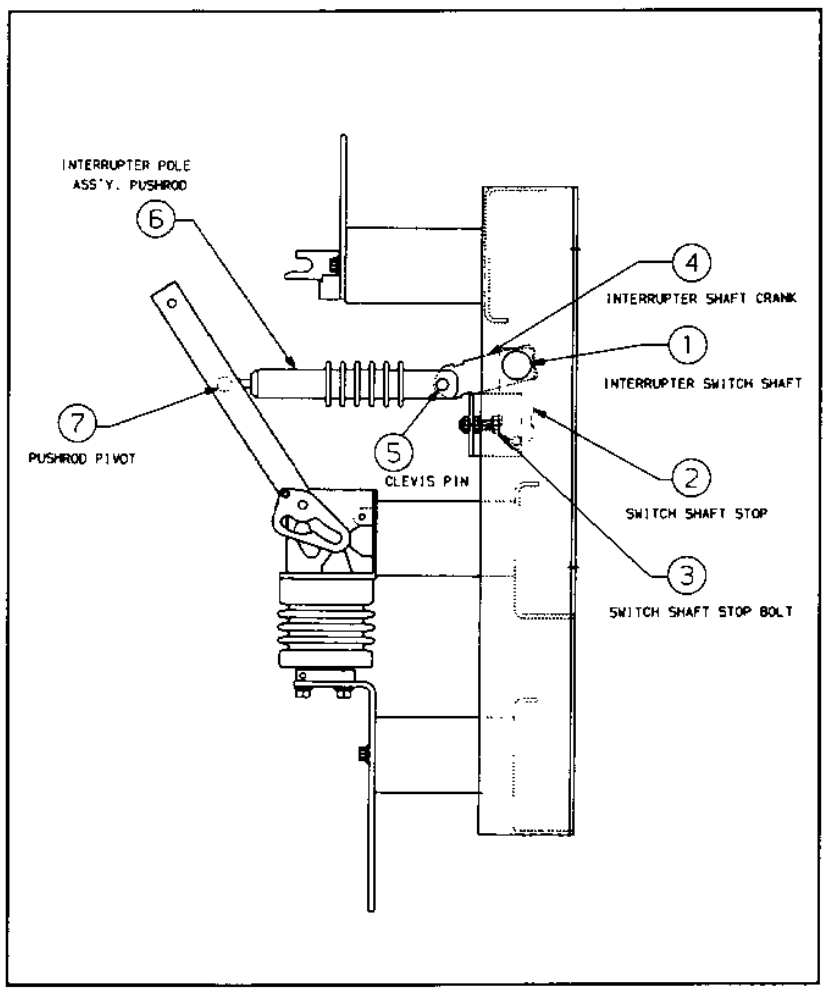


Figure 10

c. Operate mechanism until interrupter switch just closes. Check links for "over toggle". See Figure 12.

d. Remove manual charging handle from operator.

e. Figure 10, Disconnect all three interrupter pole assembly pushrods (#6) from interrupter shaft cranks (#4) by removing cotter key and clevis pin (#5).

f. Figure 9B, Disconnect pullrod assembly (#2), between mechanism and interrupter, from interrupter crank (#1) by removing cotter key and clevis pin (#3). DO NOT disconnect by removing bolts.

g. Figure 10, Adjust one interrupter switch pole assembly pushrod #6 until approximately three (3) threads extend through the pushrod pivot #7.

h. Rotate interrupter switch shaft (Figure 10) #1 and reconnect previously adjusted pole assembly pushrod #6 to shaft crank using clevis pin and cotter key (#5).

i. Figure 9B, Adjust pull rod assembly (#2) until hole in pullrod (#2) lines up with hole in interrupter crank (#1). Reconnect using clevis pin and cotter key (#3). (NOTE: Clevis pin should be loose.)

j. Figure 10, Adjust the two remaining pushrods (#6) until holes in pushrods line up with holes in shaft cranks (#4)

k. Figure 10, Reconnect pushrods to shaft cranks using clevis pins and cotter keys (#5). (NOTE: Clevis pins should be loose to turn.)

l. Figure 11, Place trip arm (#2) back in its original position and replace tension spring (#1)

m. Install manual handle and operate mechanism through complete cycle

n. Figure 12, With interrupter switch closed, check that the disconnect blades can be moved "in" and "out" approximately 1/8" at the stationary contact jaw without switch going out of toggle.

o. Figure 10, With interrupter switch "open", set distance between interrupter switch shaft stop (#2) and switch shaft stop bolt (#3) to approximately .06".

p. Following the above adjustments, operate the circuit interrupter, using the mechanism (manually or electrically) through 60 closing and opening operations to pre-condition the vacuum interrupter modules.

q. Following the above 60 operations, re-adjust the erosion gap, *if* necessary, per Section 10-g & Figure 7).

Check also the stroke of the vacuum interrupter module. The stroke is determined as follows:

1. Measure "Y" (Figure 7) dimension with circuit interrupter in both the "closed" and "open" position.

2. The difference between these dimensions is the vacuum interrupter module *stroke*.

Stroke dimensions must be within the following ranges:

Device Rating	*Stroke Range*
4.0 KA	.200 to .280
12.5 KA	.315 to .440

NOTE:
Stroke dimensions outside the above ranges should be handled as indicated in Section 15, "SPECIAL ADJUSTMENTS".

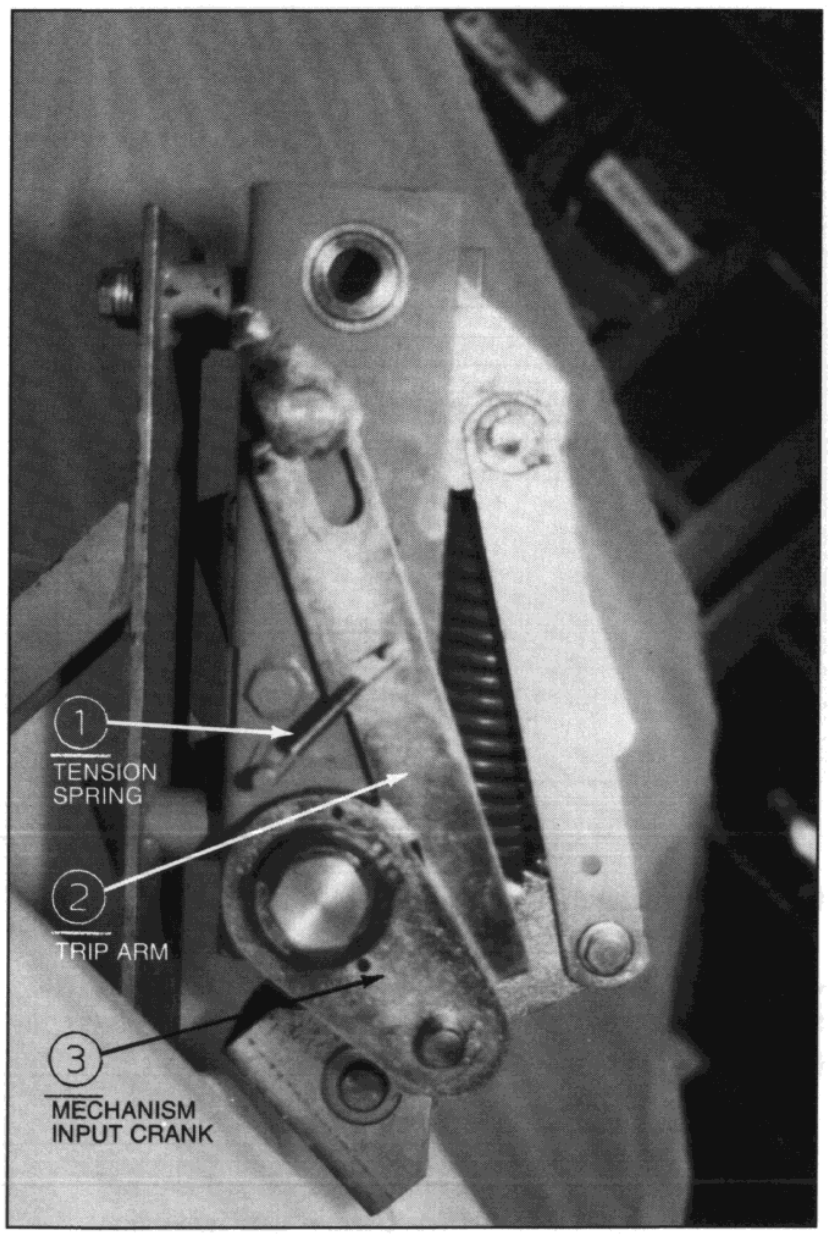


Figure 11

14. MAIN PULL ROD ADJUSTMENT—IN ENCLOSURE

NOTE:
OEMs must make only the following adjustments while installing VISI/VAC Circuit Interrupters in their OEM Enclosures. Adjustments in Sections 10, 11, 12 and 13 were made at the factory.

Following mounting of the interrupter switch assembly and the mechanism/operator assembly in the enclosure and connecting the strut angle and pullrod assembly, the following adjustments are required:

a. Using the manual charging handle, operate the mechanism and operator until the interrupter switch just closes and goes "over toggle" as shown in Figure 12.

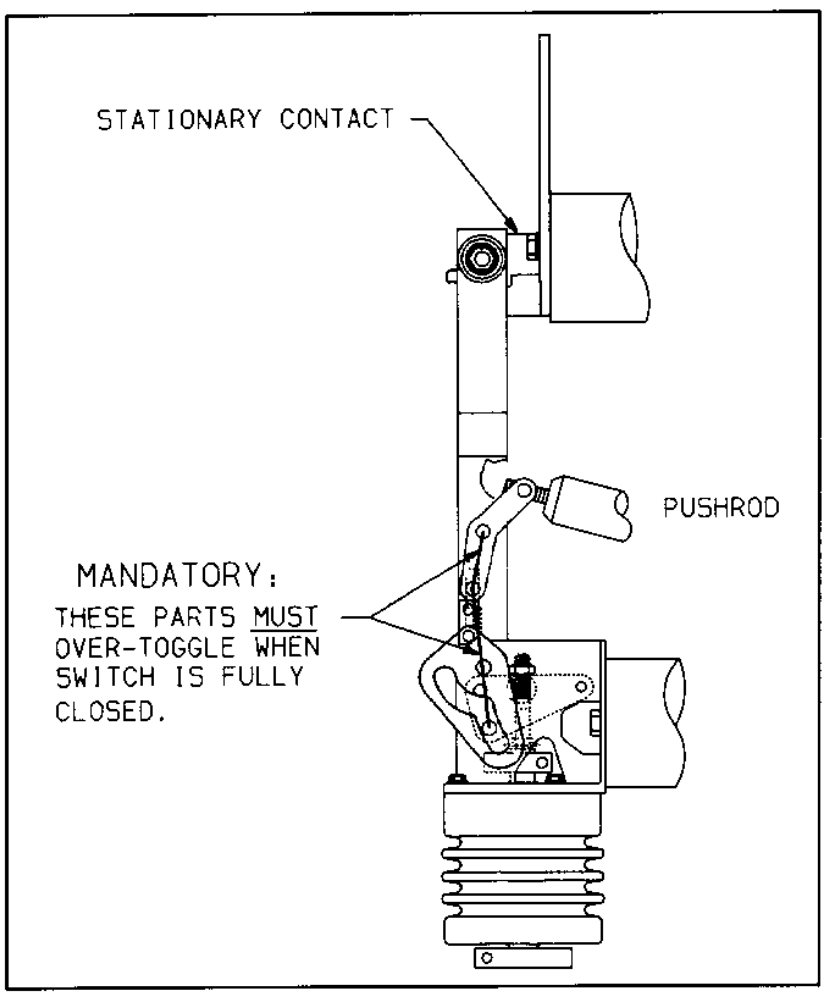


Figure 12

b. Remove manual charging handle from operator.

c. Figure 9B, Disconnect pullrod assembly (#2) from the interrupter switch crank (#1) by removing cotter key and clevis pin (#3). *DO NOT* disconnect by removing bolts.

NOTE:
If interrupter switch pole assemblies have not "gone into toggle" (See Figure 12), push into "toggle" by hand by pulling on pole pushrods.

d. Adjust pullrod assembly until hole in pullrod is aligned with hole in interrupter crank. Re-connect using clevis pin and cotter key. (Note: Clevis pin should be loose enough to turn by hand.)

e. Operate the circuit interrupter several times using the manual charging handle. If the interrupter switch and mechanism/operator do not operate properly, re-adjust per Sections 12 and 13 above.

15 SPECIAL ADJUSTMENTS

15.1 Non-Conforming Stroke Dimensions

The stroke dimensions can be affected by the length tolerances of the vacuum interrupter module parts and also the condition of internal materials when manufactured. These variations can occasionally result in stroke values which do not conform to the ranges indicated in Section 13 (q) after the 60 pre-conditioning operations have been completed. The following procedures should be followed to permit conformance to the stated stroke range values.

a. *4.0 KA Device*

1. Stroke between .170″ and .199″. Adjust bias spring length (compress) to obtain .200″ by "turning" bias spring-nut (#5) *downward* (CW), Figure 7. Reset erosion gap (Section 10-g) to value shown in Section 8.1.

2. Stroke above .280″. Add shims between bias spring bushing (#14) and interrupter module terminal stem (See Detail "A", Figure 7) to change stroke to .280″ or less. Re-set erosion gap (Section 10-g) to value shown in Section 8.1.

3. Stroke less than .170″. Change vacuum interrupter module. Repeat all adjustments of Section 10.

b. *12.5 KA Device*

1. Stroke between .285″ and .314″. Adjust bias spring length (compress) to obtain .315″ by "turning" bias spring-nut (#5, Figure 7) downward (CW). Reset erosion gap (Section 10-g) to values shown in Section 8.1.

2. Stoke above .440″. Add shims—between bias spring bushing (#14) and interrupter module terminal stem, (see detail "A", Figure 7), to change stroke to .440″ or less. Reset erosion gap (Section 10-g) to value shown in Section 8.1.

3. Stroke less than .285″ change vacuum interrupter module. Repeat all adjustments of Section 10.

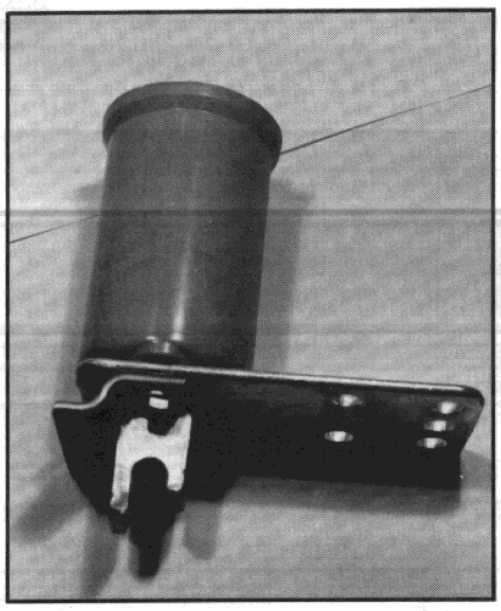
16. RECOMMENDED SPARE PARTS AND/OR RENEWAL PARTS

Quantities are not based upon expected fatigue or wear problem, but upon possible field contingencies where moveable assemblies are operated and possibly damaged and may require fast replacement of such parts from stock.

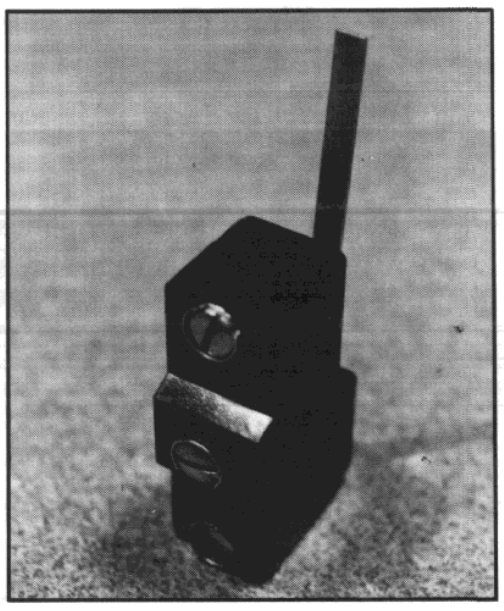
SUGGESTED STOCKING QUANTITIES OF RECOMMENDED SPARE PARTS

Quantity of VISI/VAC Units (Stocked Installed)		1-5	6-50	51-100
Part Description	Part No.			
Vacuum Interrupter Assembly	48119-060-50 4KA	1	2	4
	48119-060-51 12.5KA			
Stationary Contact Assembly (Upper Jaw)	48119-002-02	—	1	2
Charging Mechanism Assembly	48119-144-53	1	2	4
Electrical Charging System (Operator)	48119-202-50	—	1	2
Charging Motor (Only)	48119-200-50	—	1	2
Manual Charging System	48119-427-50	—	—	1
Aluminum Pullrod Assembly	48119-345-50	—	—	1
Pushrod	48119-063-01	1	2	4
Solenoid	26002-14500	1	2	4
Limit Switch	26202-07093	1	2	4

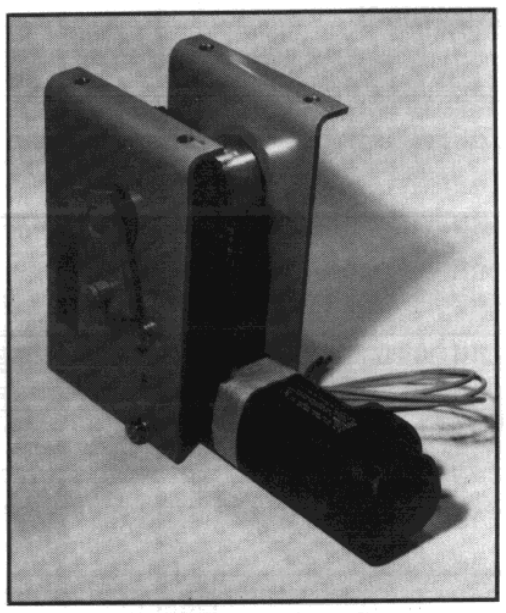
Spare Parts



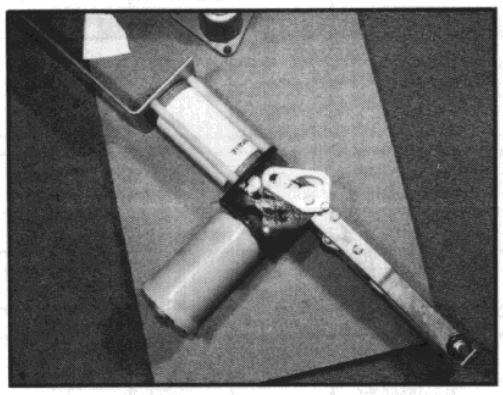
Stationary Contact Assembly
(Upper Jaw)



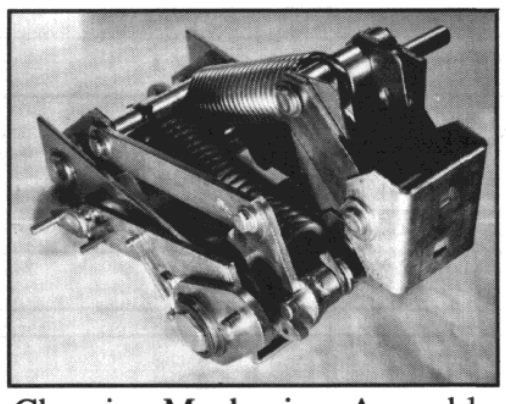
Solenoid



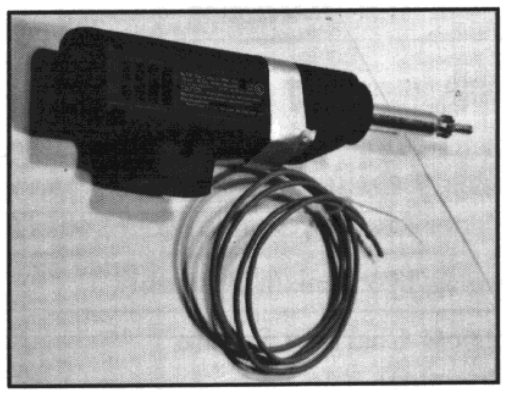
Electrical Charging System
(Operator)



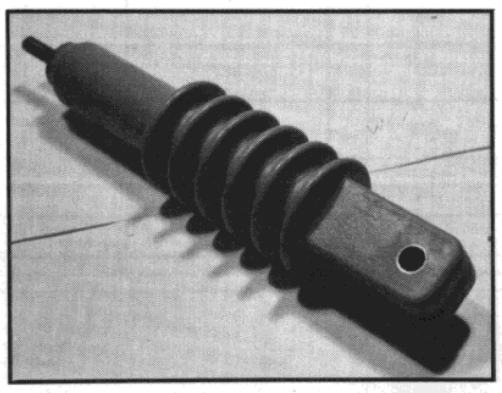
Vacuum Interrupter Assembly



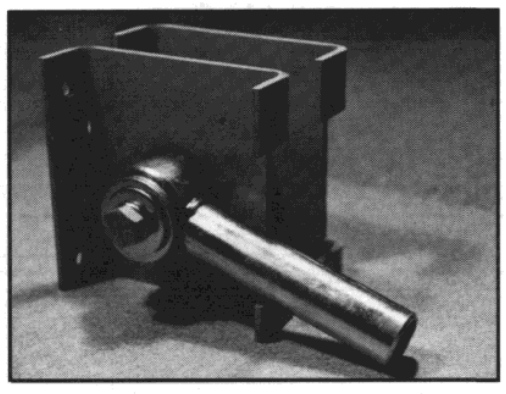
Charging Mechanism Assembly



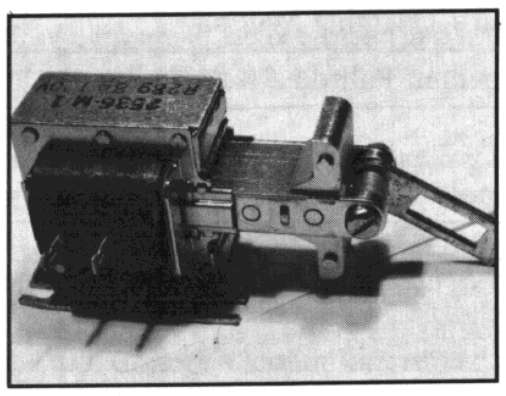
Charging Motor (Only)



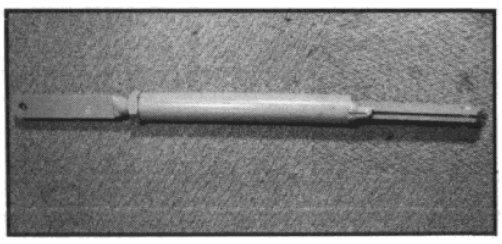
Pushrod



Manual Charging System



Limit Switch



Aluminum Pullrod Assembly

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