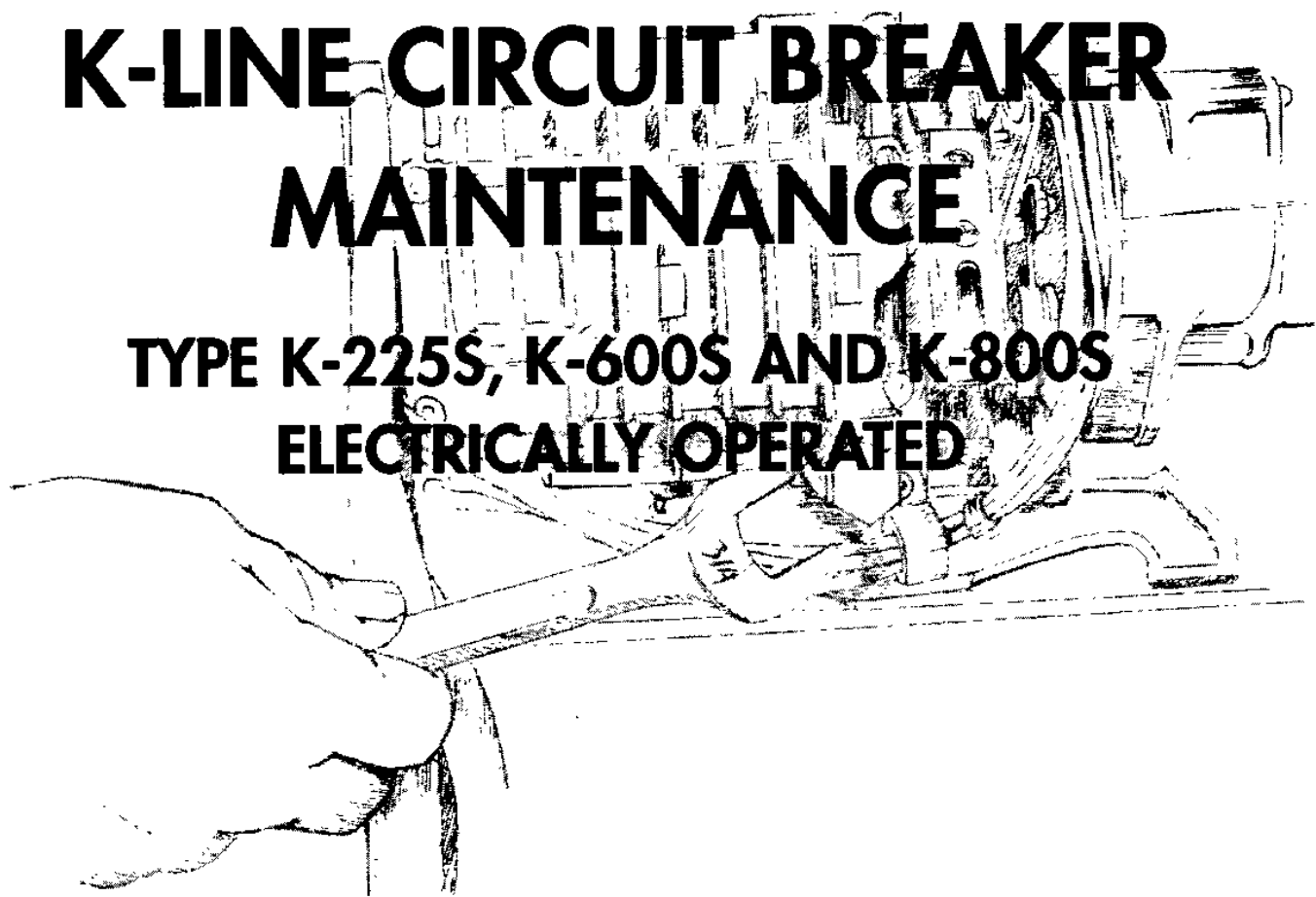



# **K-LINE CIRCUIT BREAKER MAINTENANCE**

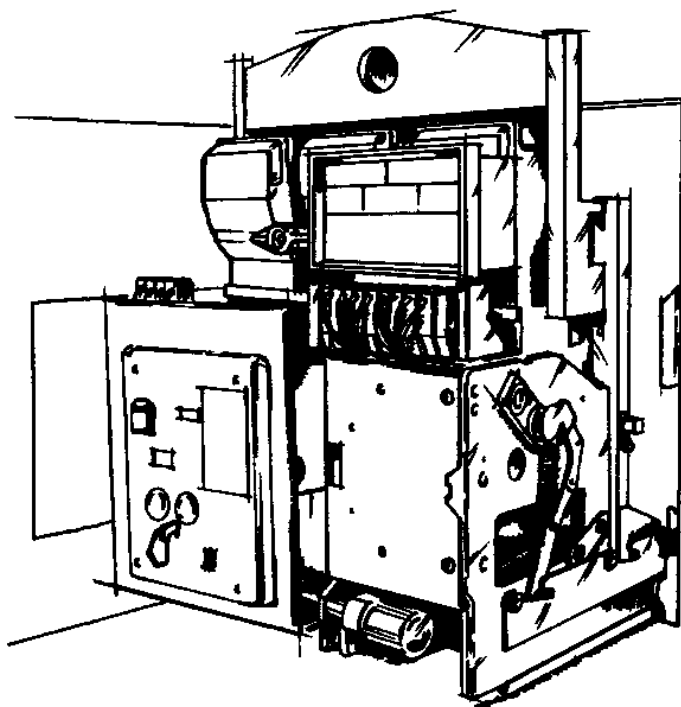
**TYPE K-225S, K-600S AND K-800S  
ELECTRICALLY OPERATED**



**ABB SERVICE, INC.  
TRAINING SERVICES**

**ABB**

- 
1. ABOUT THIS COURSE
  2. PREPARING FOR WORK
  3. INITIAL INSULATION RESISTANCE TEST
  4. INSPECTIONS
  5. MAIN MOVING CONTACTS AND STATIONARY CONTACTS
  6. CONTACT RESISTANCE TEST
  7. OPERATING MECHANISM CHECKS AND RETURN OF  
ARC CHUTES AND POWER SHEILD
  8. FINAL INSULATION RESISTANCE TEST



#### **OBJECTIVE-**

**THIS COURSE WILL TEACH THE STUDENT TO  
PREPARE FOR AND PERFORM PREVENTIVE MAINTENANCE  
ON A K-LINE TYPE K-225S, K-600S OR K-800S  
ELECTRICALLY OPERATED CIRCUIT BREAKER.**

THIS MANUAL BEGINS AND ENDS WITH A REPORT FORM. THE COURSE HAS BEEN DEVELOPED TO FOLLOW THE SEQUENCE OF PROCEDURES THAT WOULD BE ENCOUNTERED UNDER ACTUAL WORKING CONDITIONS. THE REPORT FORM HAS BEEN DESIGNED TO RECORD THOSE EVENTS.

VARIATIONS IN THE SEQUENCE OF THE PROCEDURES MAY OCCUR DUE TO CIRCUMSTANCES OR PERSONAL PREFERENCE.

THE TEST DATA YOU RECORD IS A VITAL ASPECT OF YOUR WORK AND IS ALWAYS A PART OF A GOOD MAINTENANCE PROGRAM.

Manufacturer: \_\_\_\_\_ Model/Type: \_\_\_\_\_

Serial Number: \_\_\_\_\_

Voltage: \_\_\_\_\_ Ampere Rating: \_\_\_\_\_

Initial Insulation Resistance

At 1000 V.D.C. Meg Ohms

Breaker Closed

Breaker Open

Expected

As Found

As Left

Arc Chutes

Primary Disconnects

Secondary Disconnects

Racking Device

Frame

Auxiliary Devices/Switches

Tightness of Connections

Ground Clip

As Found

As Left

Main Moving Contacts and Stationary Contacts

Contact Alignment

Contact Pressure

Contact Resistance

"A" Phase

"B" Phase

"C" Phase

Expected

Operating Mechanism

Trip Bar Latch Engagement

Latch Engagement

Shunt Trip

Control Device

Manual Charge

Manual Close

Manual Trip

Electrical Charge

Electrical Close

Electrical Trip

Final Insulation Resistance

At 1000 V.D.C. Meg Ohms

Breaker Closed

Breaker Open

Expected

Legend: As Found, S=Satisfaction, U=Unsatisfactory, As Left, A=Adjusted, RPD=Repair, RPL=Replace

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Mfg. \_\_\_\_\_ Type \_\_\_\_\_

Serial No. \_\_\_\_\_

Part No. \_\_\_\_\_

Pickup \_\_\_\_\_ Delay \_\_\_\_\_ Pickup \_\_\_\_\_ Delay \_\_\_\_\_

Short-Time \_\_\_\_\_ GND \_\_\_\_\_

Pickup \_\_\_\_\_ Delay \_\_\_\_\_ Pickup \_\_\_\_\_

Ampere Tap \_\_\_\_\_ Long-Time \_\_\_\_\_ Inst. \_\_\_\_\_

Trip Functions

Prim. Injct. ☐ S04 ☐

Function	Expected	"A" Phase	"B" Phase	"C" Phase
LT PU Amps				
LT Delay Sec @ 300%				
BT PU Amps				
ST Delay Sec @ 150%				
Inst PU Amps				
GND PU Amps				
Gnd Delay Sec @ 150%				
Sensor Checks	OK	Not OK		

Location: \_\_\_\_\_

Substation: \_\_\_\_\_

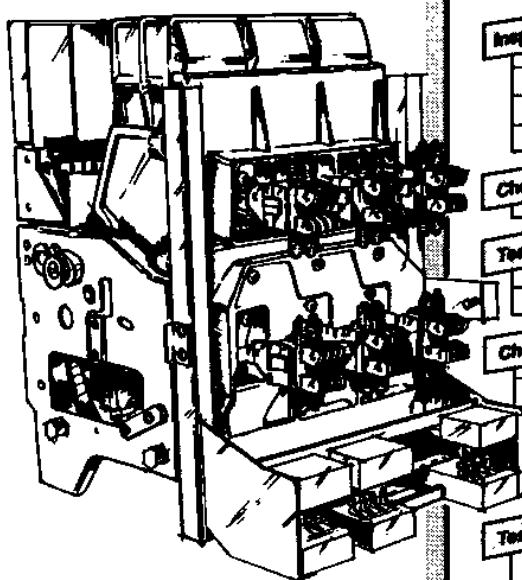
Breaker ID: \_\_\_\_\_

Date: \_\_\_\_\_

Sign: \_\_\_\_\_

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Circuit Breaker

Manufacturer: \_\_\_\_\_ Model/Type: \_\_\_\_\_  
Serial Number: \_\_\_\_\_  
Voltage: \_\_\_\_\_ Ampere Rating: \_\_\_\_\_

Test

Initial Insulation Resistance

At 1000 V.D.C. Meg Ohms	Breaker Closed	Breaker Open	Expected

Inspection

	As Found	As Left		As Found	As Left
Arc Chutes			Frame		
Primary Disconnects			Auxiliary Devices/Switches		
Secondary Disconnects			Tightness of Connections		
Racking Device			Ground Clip		

Check

Main Moving Contacts and Stationary Contacts

Contact Alignment	Contact Pressure		

Test

Contact Resistance

"A" Phase	"C" Phase		
		Expected	
"B" Phase			

Check

Operating Mechanism

Trip Bar Latch Engagement	Manual Close		
Latch Engagement	Manual Trip		
Shunt Trip	Electrical Charge		
Control Device	Electrical Close		
Manual Charge	Electrical Trip		

Test

Final Insulation Resistance

At 1000 V.D.C. Meg Ohms	Breaker Closed	Breaker Open	Expected

Legend: As Found, S=Satistaction, U=Unsatisfactory, As Left, A=Adjusted, RPD=Repair, RPL=Replace

Comments

Trip Unit Settings

Mfg. \_\_\_\_\_ Type \_\_\_\_\_  
Serial No. \_\_\_\_\_  
Part No. \_\_\_\_\_

Pickup	Delay	Pickup	Delay
Short-Time		GND	
Pickup	Delay	Pickup	
Long-Time		Inst.	

Test

Trip Functions

Function	Expected	"A" Phase	"B" Phase	"C" Phase
LT PU Amps				
LT Delay Sec @ 300%				
BT PU Amps				
BT Delay Sec @ 150%				
Inst PU Amps				
GND PU Amps				
Gnd Delay Sec @ 150%				
Sensor Checks	OK	Not OK		

Location: \_\_\_\_\_  
Substation: \_\_\_\_\_  
Breaker ID: \_\_\_\_\_  
Date: \_\_\_\_\_  
Sign: \_\_\_\_\_



## **SAFETY NOTES**

**DE-ENERGIZE BOTH THE PRIMARY AND CONTROL CIRCUITS BEFORE ANY INSPECTION, ADJUSTMENT OR REPLACEMENTS OF PARTS. MAKE CERTAIN THE BREAKER IS OPEN AND THAT CLOSING SPRINGS ARE NOT CHARGED BY OBSERVING THE INDICATOR.**

**WHEN IT IS NECESSARY TO CHARGE THE CLOSING SPRINGS OR CLOSE THE CIRCUIT BREAKER, MAKE SURE TO STAY CLEAR OF ALL OPERATING PARTS.**

**STATIONARY BREAKERS SHOULD BE CHECKED FOR OPERATION WITH THE CONTROL CIRCUIT ENERGIZED AND THE PRIMARY POWER DE-ENERGIZED. DRAWOUT BREAKERS SHOULD BE WITHDRAWN TO THE TEST POSITION FOR CHECKING BREAKER OPERATION. FOR FURTHER INSPECTION, ADJUSTMENT, CLEANING OR REPLACEMENT OF PARTS, THE DRAWOUT AND STATIONARY BREAKERS SHOULD BE WITHDRAWN AND MOVED TO A SUITABLE WORK AREA.**

**FOLLOW APPLICABLE OSHA GUIDELINES REGARDING THE STORAGE, USE AND HANDLING OF CLEANING MATERIALS AND CHEMICALS.**

**FOLLOW APPLICABLE OSHA GUIDELINES REGARDING ELECTRICAL, EYE AND DUST PROTECTION.**



## **PERIODIC MAINTENANCE INSPECTION**

**THE SAFE AND SUCCESSFUL FUNCTIONING OF THE CONNECTED APPARATUS DEPENDS UPON THE PROPER OPERATION OF THE CIRCUIT BREAKER. THEREFORE, IT IS RECOMMENDED THAT A MAINTENANCE PROGRAM BE ESTABLISHED THAT ALLOWS FOR INSPECTION AS FOLLOWS:**

**K-225 AFTER 2,500 OPERATIONS**

**K-600, K-600S - AFTER 1,750 OPERATIONS**

**K-800, K800S - AFTER 1,750 OPERATIONS**

**THE ABOVE INSPECTION PERIODS APPLY FOR NO LOAD OR LOAD CURRENT SWITCHING. IF THE LISTED NUMBER OF OPERATIONS ARE NOT COMPLETED IN THE FIRST YEAR OF SERVICE, THE CIRCUIT BREAKER SHOULD BE INSPECTED REGARDLESS. THE CIRCUIT BREAKER SHOULD ALSO BE INSPECTED AFTER A**



## LUBRICATION

K-LINE CIRCUIT BREAKERS ARE LUBRICATED DURING FACTORY ASSEMBLY AS FOLLOWS:

1. ALL MATING SURFACES OF MOVING CURRENT CARRYING JOINTS HAVE BEEN LUBRICATED WITH **NO-OX-ID** SPECIAL GRADE A GREASE MANUFACTURED BY DEARBORN CHEMICAL COMPANY.
2. ALL OTHER MECHANISM PARTS, BEARINGS, PINS, ETC. HAVE BEEN LUBRICATED WITH **ANDEROL L757** MANUFACTURED BY TENNECO CHEMICAL, INC., INTERMEDIATE DIVISION. THE CIRCUIT BREAKER REQUIRES NO LUBRICATION DURING ITS NORMAL SERVICE LIFE. HOWEVER, IF GREASE SHOULD BECOME CONTAMINATED OR IF PARTS HAVE BEEN REPLACED, ANY RELUBRICATION SHOULD BE DONE WITH **NO-OX-ID** OR **ANDEROL** GREASE AS APPLICABLE.

### NOTES:

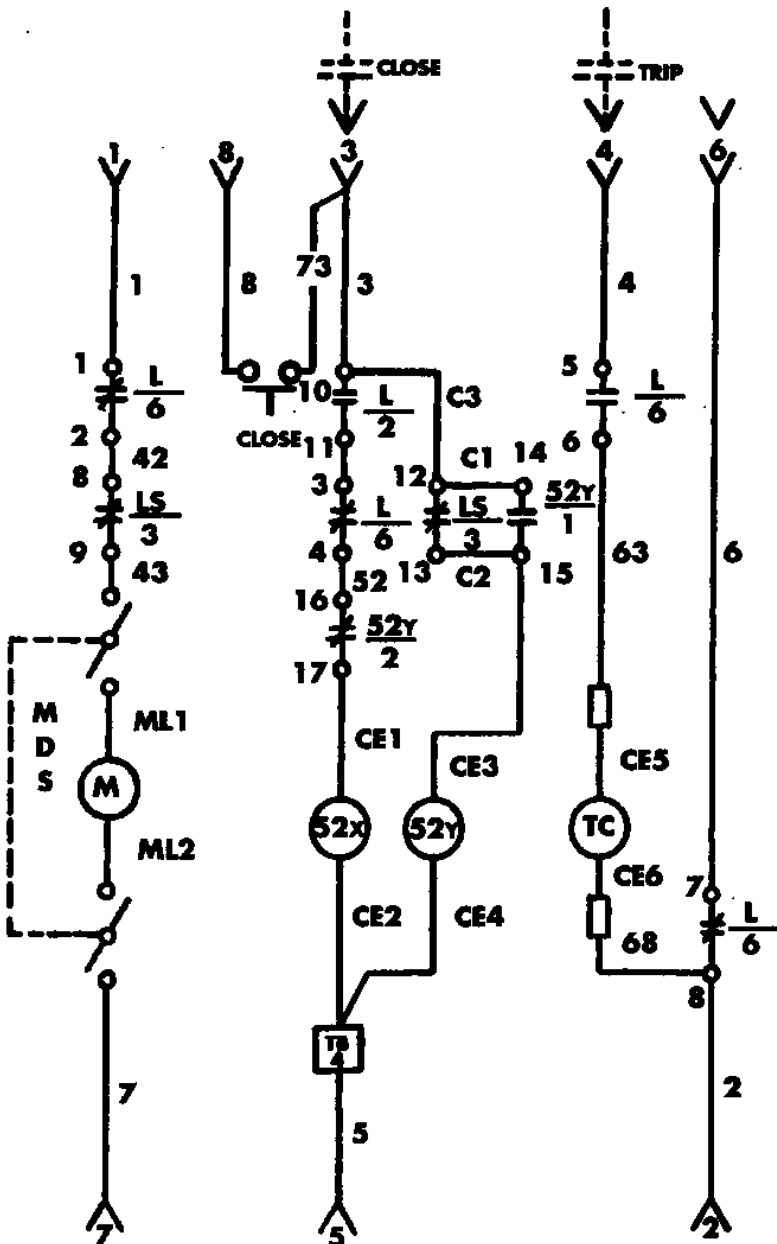
1. **DO NOT** USE **NO-OX-ID** GREASE ON ANY MAIN AND ARCING CONTACT SURFACES.
2. IT IS RECOMMENDED THAT THE PRIMARY DISCONNECTS BE MAINTAINED BY RENEWING **NO-OX-ID** GREASE DURING MAINTENANCE PERIODS.
3. **DO NOT** USE LIGHT OIL TO LUBRICATE ANY MECHANISM PARTS
4. **DO NOT** ALLOW GREASE TO BE DEPOSITED ON ANY LATCH ROLLER SURFACE DURING RELUBRICATION.
5. THE CHARGING MOTOR IS SEALED AND NO LUBRICATION IS REQUIRED.
6. **DO NOT** LUBRICATE OVERCURRENT TRIP DEVICE OR OTHERWISE CLEAN SPRAY WITH ANY SUBSTANCE OTHER THAN AIR.



# DRAWOUT CIRCUIT BREAKER

## LEGEND

- M ..... CHARGING MOTOR
- TC ..... TRIP COIL
- MDS .... CHARGING MOTOR DISCONNECT SWITCH
- LS/1, LS/3 LIMIT SWITCH CONTACTS  
CLOSED WHEN SPRINGS ARE DISCHARGED  
OPEN WHEN SPRINGS ARE CHARGED
- LS/2 .... LIMIT SWITCH CONTACTS  
OPEN WHEN SPRINGS ARE DISCHARGED  
CLOSED WHEN SPRINGS ARE CHARGED
- L/A ..... CONTACT CLOSED WHEN BREAKER IS CLOSED
- L/B ..... CONTACT OPEN WHEN BREAKER IS CLOSED
- 52X ..... LATCH RELEASE COIL
- 52Y ..... CONTROL COIL
- 52Y/1 ... LOCKOUT RELAY CONTACT, NORMALLY OPEN
- 52Y/2 ... LOCKOUT RELAY CONTACT, NORMALLY CLOSED

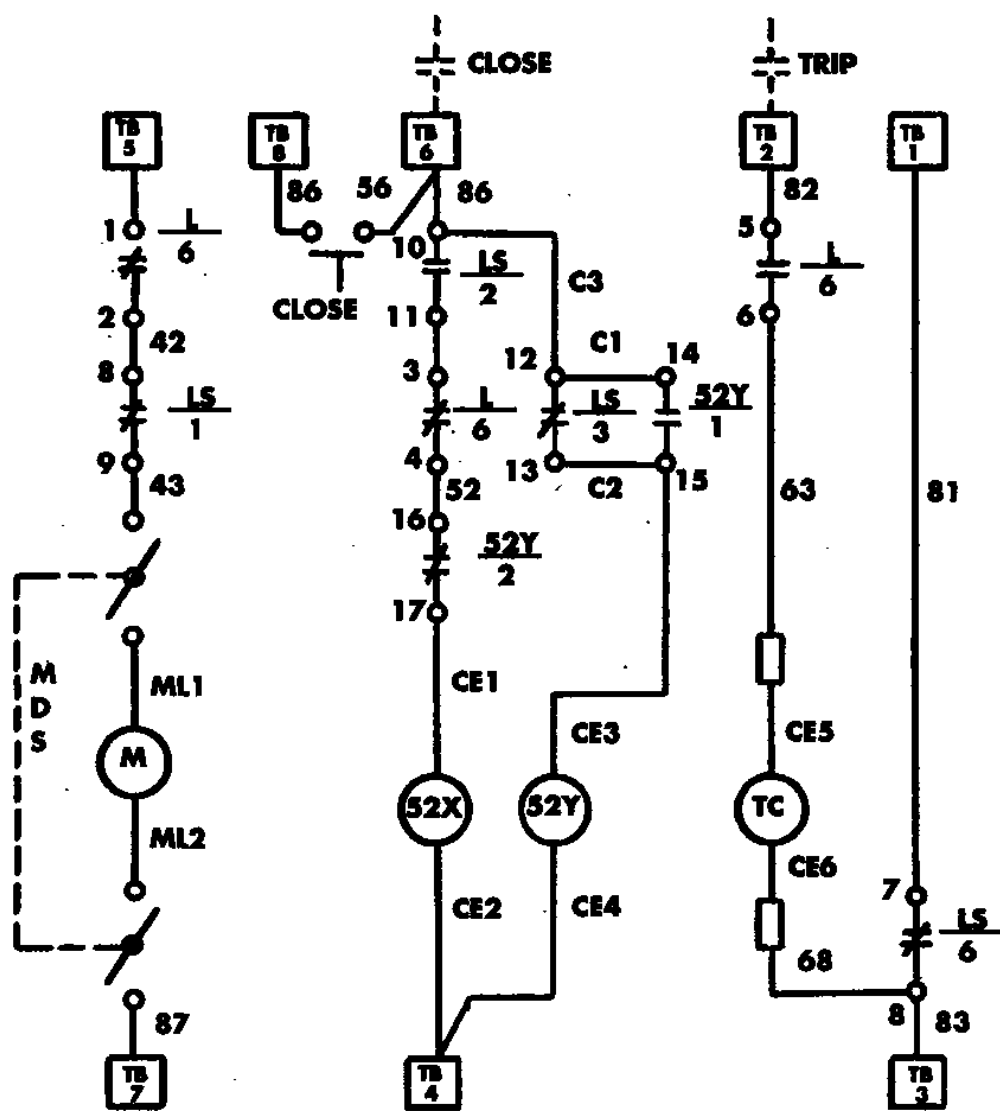


**ABB**

# STATIONARY CIRCUIT BREAKER

## LEGEND

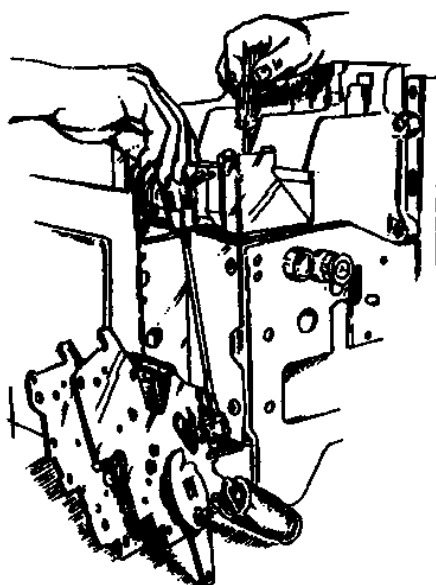
- M ..... CHARGING MOTOR
- TC ..... TRIP COIL
- MDS ..... CHARGING MOTOR DISCONNECT SWITCH
- LS/1, LS/3 . LIMIT SWITCH CONTACTS  
CLOSED WHEN SPRINGS ARE DISCHARGED  
OPEN WHEN SPRINGS ARE CHARGED
- LS/2 ..... LIMIT SWITCH CONTACTS  
OPEN WHEN SPRINGS ARE DISCHARGED  
CLOSED WHEN SPRINGS ARE CHARGED
- L/A ..... CONTACT CLOSED WHEN BREAKER IS CLOSED
- L/B ..... CONTACT OPEN WHEN BREAKER IS CLOSED
- 52X ..... LATCH RELEASE COIL
- 52Y ..... CONTROL COIL
- 52Y/1 ..... LOCKOUT RELAY CONTACT, NORMALLY OPEN
- 52Y/2 ..... LOCKOUT RELAY CONTACT, NORMALLY CLOSED



**Schematic Diagram of Control Circuit**

## HAND TOOLS

EXTENDIBLE SMALL MIRROR  
FLASHLIGHT  
6" RULER  
6" WIRE CUTTER (TO CUT TIE WRAPS)  
NEEDLE NOSE PLIERS  
8" LONG 1/4" SHANK FLAT  
SCREWDRIVER  
8" LONG 1/4" SHANK PHILLIPS  
SCREWDRIVER  
14" LONG 5/16" SHANK FLAT  
SCREWDRIVER  
14" LONG 3/16" SHANK FLAT  
SCREWDRIVER  
SOCKET SET WITH 3/8" DRIVE  
3/8" RATCHET DRIVE  
7/16" OPEN END OR BOX WRENCH  
3/32" OPEN END WRENCH  
K-LINE BREAKER RACKING TOOL  
TIE-WRAPS  
FB303B WIRE GAP GAUGE 3/32"-  
5/64"  
3/32" FLAT WIRE GAUGE



## CLEANING EQUIPMENT

CLEAN 2" FLAT 8" LONG BRUSH  
CLEAN 1" DIAMETER LONG BRUSH  
SPRAY CAN AND AIR NOZZLE  
SPRAY SOLVENT CAN  
6" X 9" SCOTCH BRITE PAD  
3 TO 4 LINT-FREE RAGS  
APPROX. 12" X 15"

## LUBRICANTS

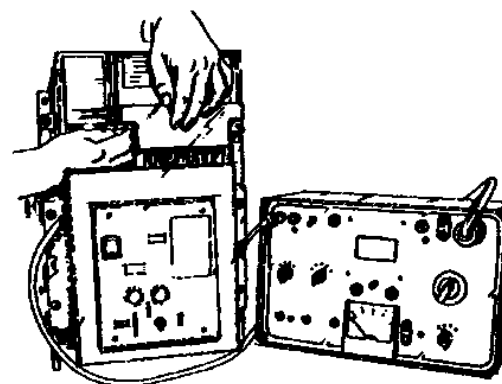
NO-OX-ID  
ANDEROL 750

## SAFETY EQUIPMENT

SAFETY EQUIPMENT IS REQUIRED FOR  
ELECTRICAL, EYE AND DUST PROTECTION

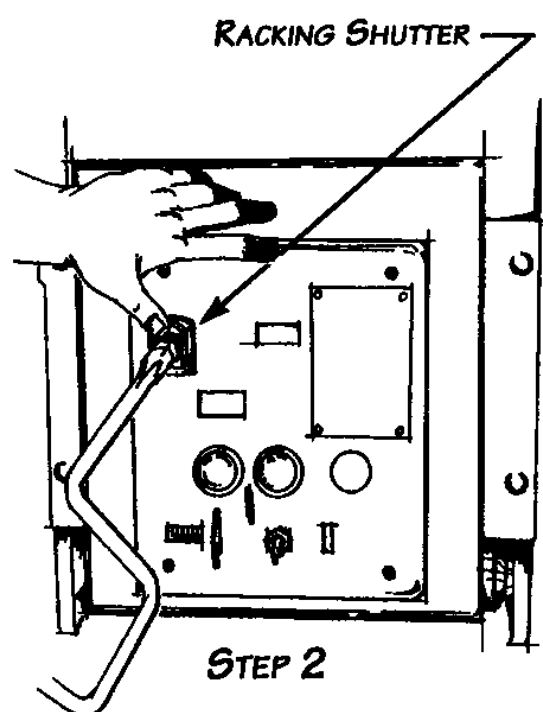
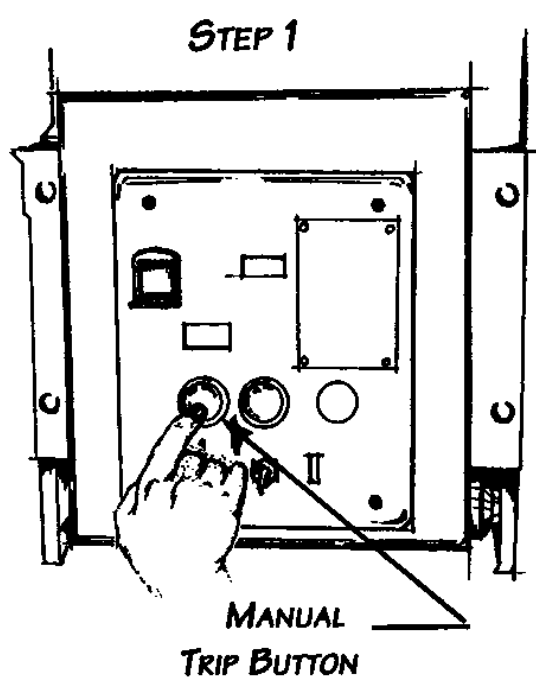
## TEST EQUIPMENT

LOW RESISTANCE OHMMETER TEST UNIT  
504 POWER SHIELD TEST SET  
1000-VOLT INSULATION TESTER



**Caution**

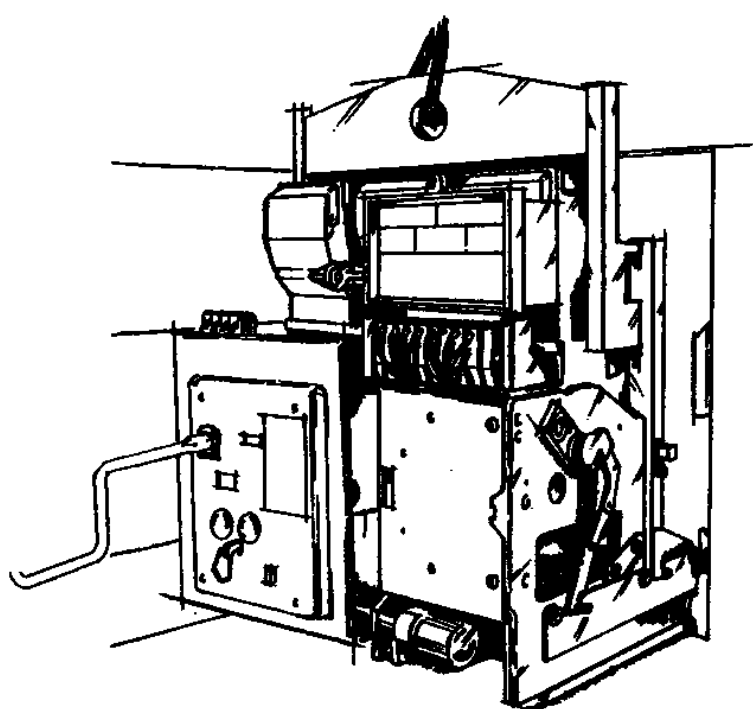
If the closing springs are charged, they will automatically discharge when inserting or withdrawing the circuit breaker in the switchgear compartment.



**NOTE:** KEEP THE COMPARTMENT DOOR CLOSED WHEN EITHER OPENING OR CLOSING THE BREAKER.

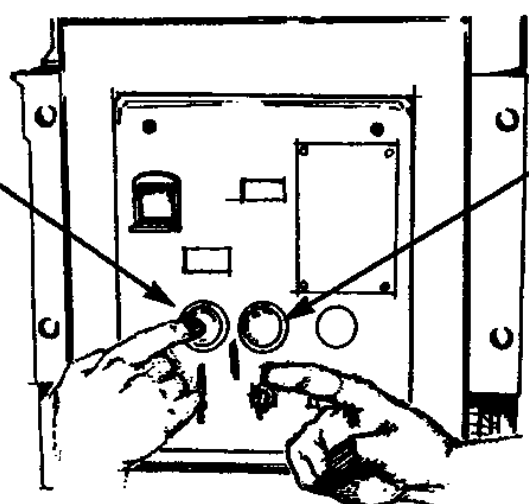
**STEP 1.**  
TRIP THE CIRCUIT BREAKER, EITHER FROM THE REMOTE MOUNTED CONTROL PANEL OR BY PUSHING THE MANUAL TRIP BUTTON.

**STEP 2.**  
LIFT THE RACKING SHUTTER AND INSERT THE RACKING CRANK.



**STEP 3.**  
TURN THE RACKING CRANK COUNTERCLOCK-  
WISE UNTIL THE POSITION INDICATOR ON  
THE RIGHT SIDE OF THE ESCUTCHEON BOX  
SHOWS "DISCONNECTED."

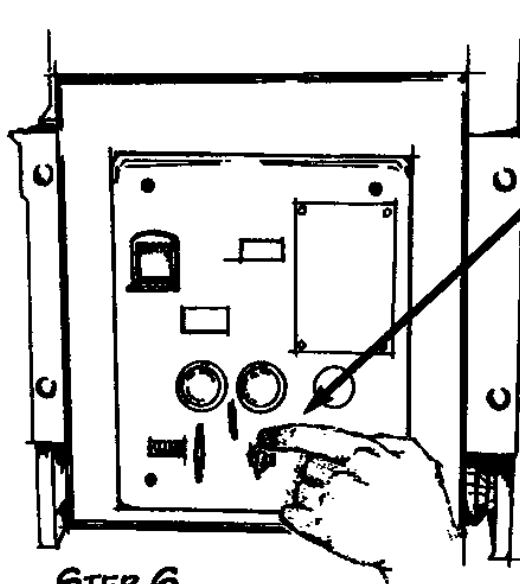
MANUAL TRIP  
BUTTON



MANUAL  
CLOSE  
LEVER

**STEP 5.**  
DISCHARGE THE CLOSING SPRINGS, IF NOT  
ALREADY DISCHARGED, BY LIFTING THE  
MANUAL CLOSE LEVER AND THEN PUSHING  
THE MANUAL TRIP BUTTON, WHILE HOLDING  
THE MANUAL CLOSE LEVER UP.

**STEP 4.**  
REMOVE RACKING CRANK AND OPEN COMPARTMENT DOOR.

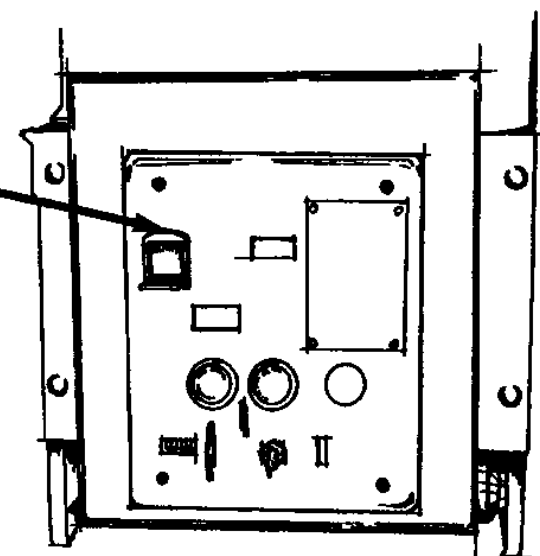


**STEP 6.**

PLACE CLOSING SPRING CHARGING MOTOR DISCONNECT SWITCH IN "OFF" POSITION.

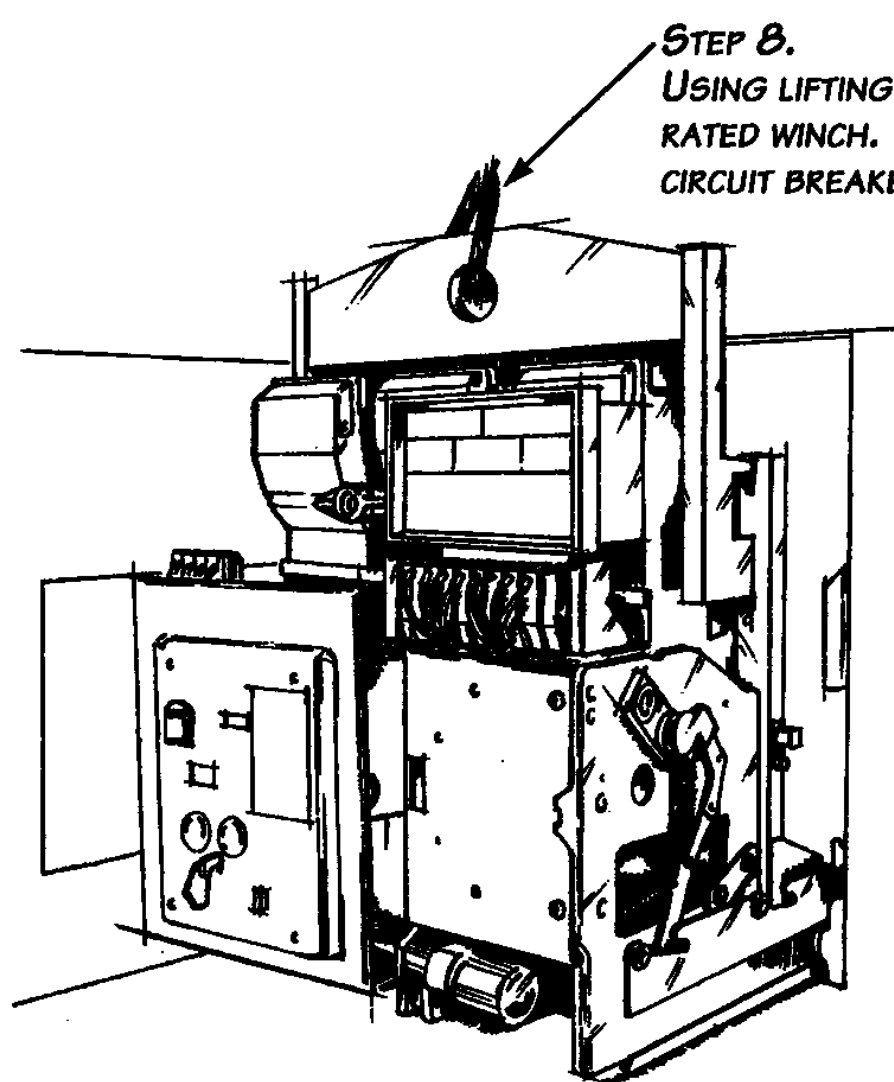
MOTOR DISCONNECT SWITCH

RACKING SHUTTER



**STEP 7.**

PULL CIRCUIT BREAKER FORWARD UNTIL TRACKS ARE FULLY EXTENDED AND IN THE LATCHED POSITION.

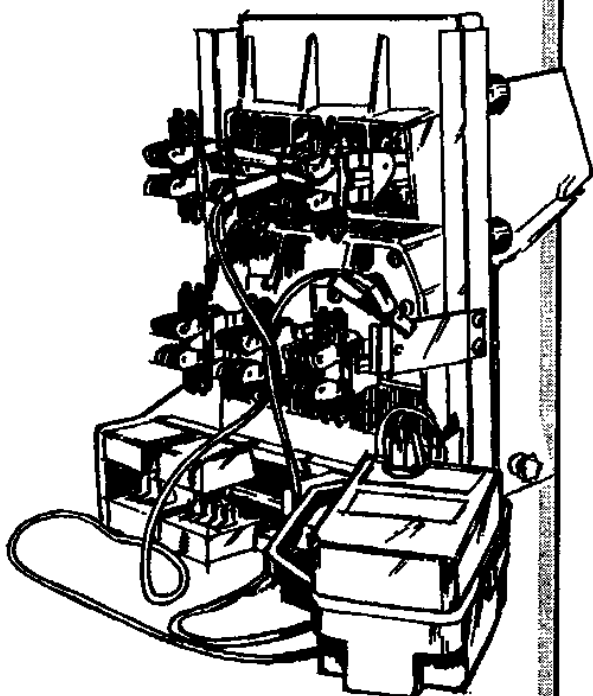


**STEP 8.**  
USING LIFTING YOKE, AND A PROPERLY  
RATED WINCH. PICK UP WEIGHT OF  
CIRCUIT BREAKER.

**STEP 9.**  
PULL CIRCUIT BREAKER FORWARD,  
RELEASING THE POSITIONING PINS  
FROM THE CUT-OUT SECTIONS OF  
THE TRACKS.

**STEP 10.**  
REMOVE CIRCUIT BREAKER FROM  
TRACKS AND CABINET WITH LIFT-  
ING YOKE.

**STEP 11.**  
PUSH CABINET LATCH ON EACH  
TRACK BACK INTO CABINET AND  
RETURN TRACKS, THEN CLOSE  
DOOR.



Circuit Breaker

Manufacturer: \_\_\_\_\_ Model/Type: \_\_\_\_\_  
Serial Number: \_\_\_\_\_  
Voltage: \_\_\_\_\_ Ampere Rating: \_\_\_\_\_

Test

Initial Insulation Resistance

At 1000 V.D.C. Meg Ohms

	Breaker Closed	Breaker Open	Expected

Inspection

	As Found	As Left	As Found	As Left
Arc Chutes			Frame	
Primary Disconnects			Auxiliary Devices/Switches	
Secondary Disconnects			Tightness of Connections	
Racking Device			Ground Clip	

Check

Main Moving Contacts and Stationary Contacts

Contact Alignment		Contact Pressure	
-------------------	--	------------------	--

Test

Contact Resistance

"A" Phase	"C" Phase	Expected
"B" Phase		

Check

Operating Mechanism

Trip Bar Latch Engagement		Manual Close	
Latch Engagement		Manual Trip	
Shunt Trip		Electrical Charge	
Control Device		Electrical Close	
Manual Charge		Electrical Trip	

Test

Final Insulation Resistance

At 1000 V.D.C. Meg Ohms

Breaker Closed	Breaker Open	Expected

Legend: As Found, S= Satisfactory, U= Unsatisfactory, As Left, A= Adjusted, RPD= Repair, RPL= Replace

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Trip Unit Settings

Mfg. \_\_\_\_\_ Type \_\_\_\_\_  
Serial No. \_\_\_\_\_  
Part No. \_\_\_\_\_

Pickup	Delay	Pickup	Delay
Short-Time		GND	
Ampere Tap	Long-Time	Inst.	

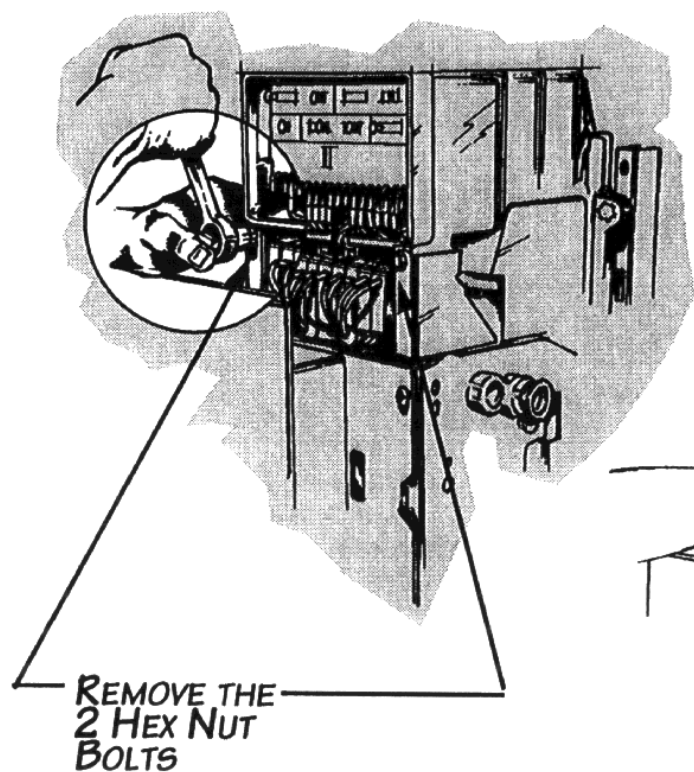
Trip Functions

Function	Expected	"A" Phase	"B" Phase	"C" Phase
LT PU Ampe				
LT Delay Sec @ 800%				
BT PU Ampe				
BT Delay Sec @ 180%				
Inst PU Ampe				
GND PU Ampe				
Gnd Delay Sec @ 180%				
Sensor Checks	OK		Not OK	

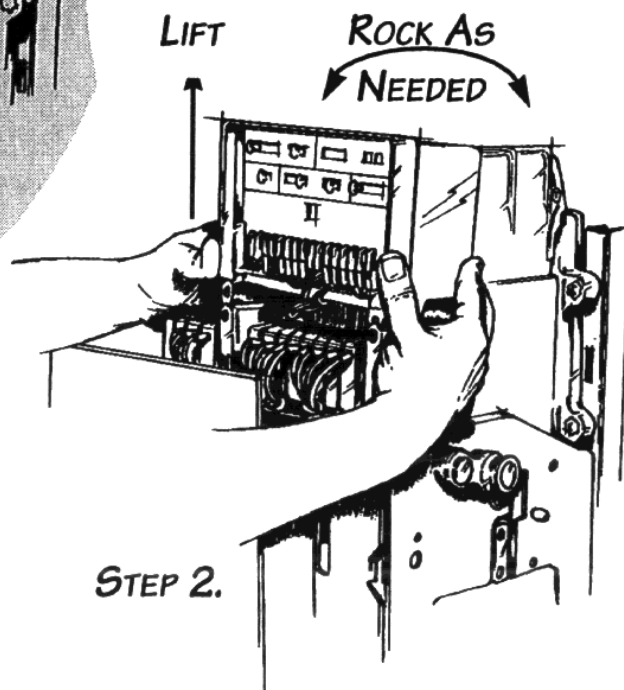
Location: \_\_\_\_\_  
Substation: \_\_\_\_\_  
Breaker ID: \_\_\_\_\_  
Date: \_\_\_\_\_  
Sign: \_\_\_\_\_



**STEP 1.**



**NOTE:** WHEN PLACING POWER SHIELD DOWN (STEP 4), BE CAREFUL NOT TO BREAK ANY CONNECTIONS.



**STEP 1.**

RECORD ALL SETTINGS FROM POWER SHIELD ON TEST AND INSPECTION REPORT FORM.

**STEP 2.**

REMOVE HEX NUT BOLTS (2) USING  $7/16$ " WRENCH. PLACE NUT BOLTS BACK IN HOLDING BRACKETS TO PREVENT THEIR LOSS.

**STEP 3.**

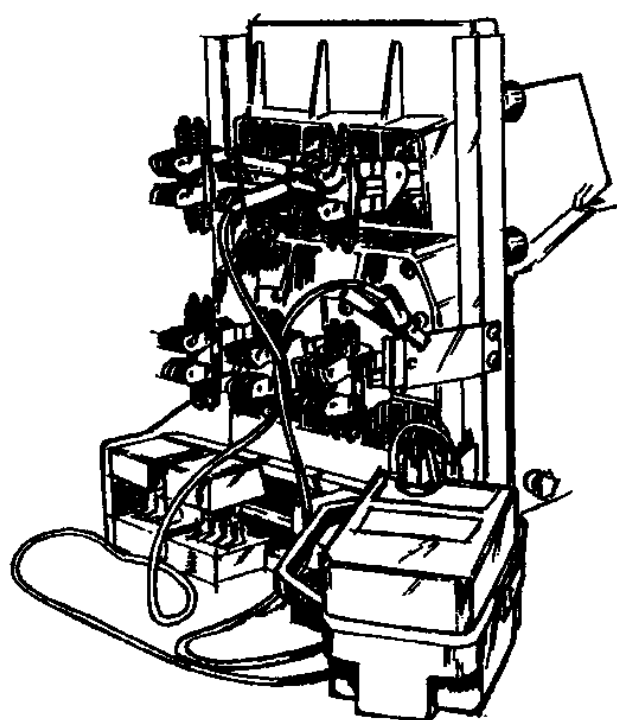
LIFT POWER SHIELD UP, ROCKING IT SLIGHTLY IF NEEDED, TO REMOVE, LEAVE THE POWER CONTROL CABLE CONNECTED TO THE POWER SHIELD.

**STEP 4.**

PLACE POWER SHIELD TO ONE SIDE OF BREAKER, BEING CAREFUL NOT TO BIND OR PULL THE CONTROL CABLE.

## INSULATION RESISTANCE TEST

THE INSULATION RESISTANCE TEST IS PERFORMED TO VERIFY THE INTEGRITY OF THE CIRCUIT BREAKER INSULATION SYSTEM. THIS TEST WILL ALSO AID IN DETERMINING THE SUITABILITY OF THE CIRCUIT BREAKER FOR CONTINUED SERVICE.



DUE TO THE NUMBER AND VARIETY OF TEST SETS, THE FOLLOWING PROCEDURE HAS BEEN WRITTEN TO INDICATE CONNECTIONS BETWEEN A GENERIC TEST SET AND THE CIRCUIT BREAKER BEING TESTED.

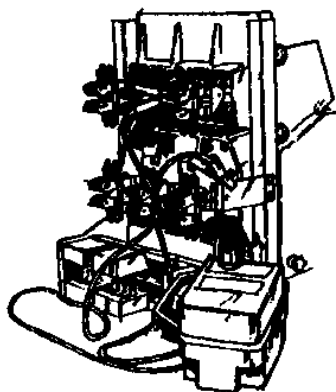
PRIOR TO PERFORMING ANY TEST YOU SHOULD BECOME FAMILIAR WITH THE TEST EQUIPMENT. READ AND FOLLOW THE TEST EQUIPMENT MANUFACTURER'S OPERATION AND SAFETY GUIDELINES PROVIDED WITH YOUR SPECIFIC TYPE/MODEL OF TEST EQUIPMENT. READ AND UNDERSTAND THE CIRCUIT BREAKER MANUFACTURER'S OPERATION AND SAFETY GUIDELINES BEFORE YOU BEGIN TESTING.

TEST SET LEADS ARE TO BE CONNECTED TO THE PRIMARY DISCONNECTS, AND WHEN REQUIRED, TO THE COMMON LEAD TO THE CIRCUIT BREAKER GROUND CLIP.

THE INSULATION TEST IS PERFORMED AT 1000 VOLTS DC FOR ONE MINUTE.

WITH THE CIRCUIT BREAKER CLOSED, APPLY TEST VOLTAGE AND RECORD THE MEG OHM READING FOR EACH OF THE FOLLOWING CONNECTIONS:

"A" PHASE TO "B" PHASE	"A" PHASE TO GROUND CLIP
"B" PHASE TO "C" PHASE	"B" PHASE TO GROUND CLIP
"C" PHASE TO "A" PHASE	"C" PHASE TO GROUND CLIP

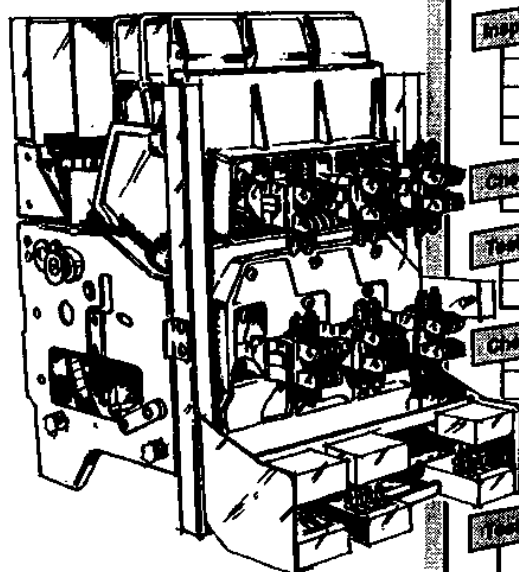


WITH THE CIRCUIT BREAKER OPEN, APPLY TEST VOLTAGE AND RECORD THE MEG OHM READING FOR EACH OF THE FOLLOWING CONNECTIONS:

"A" PHASE LINE TO LOAD  
"B" PHASE LINE TO LOAD  
"C" PHASE LINE TO LOAD

READINGS OF LESS THAN 1.5 MEG OHMS PER EVERY 1000-VOLTS WARRANT A CLOSE VISUAL INSPECTION OF THE INSULATION SYSTEM.

YOU WILL BE LOOKING FOR CRACKS, EVIDENCE OF ARCING, BURNING, OVERHEATING, AND/OR ANY OTHER SIGNS OF APPARENT PHYSICAL DAMAGE. ANY OF THESE CONDITIONS MUST BE CORRECTED BEFORE THE CIRCUIT BREAKER IS RETURNED TO SERVICE.



Circuit Breaker

Manufacturer: \_\_\_\_\_ Model/Type: \_\_\_\_\_  
Serial Number: \_\_\_\_\_  
Voltage: \_\_\_\_\_ Ampere Rating: \_\_\_\_\_

Test

Initial Insulation Resistance

At 1000 V.D.C. Meg Ohms

Breaker Closed	Breaker Open	Expected

Inspection

	As Found	As Left		As Found	As Left
Arc Chutes			Frame		
Primary Disconnects			Auxiliary Devices/Switches		
Secondary Disconnects			Tightness of Connections		
Racking Device			Ground Clip		

Check

Main Moving Contacts and Stationary Contacts

Contact Alignment		Contact Pressure		
-------------------	--	------------------	--	--

Test

Contact Resistance

"A" Phase		"C" Phase		
"B" Phase		Expected		

Check

Operating Mechanism

Trip Bar Latch Engagement		Manual Close		
Latch Engagement		Manual Trip		
Shunt Trip		Electrical Charge		
Control Device		Electrical Close		
Manual Charge		Electrical Trip		

Test

Final Insulation Resistance

At 1000 V.D.C. Meg Ohms

Breaker Closed	Breaker Open	Expected

Legend: As Found, S=Satifaction, U=Unsatisfactory, As Left, A=Adjusted, RPD=Repair, RPL=Replace

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Trip Unit Settings

Mfg. \_\_\_\_\_ Type \_\_\_\_\_  
Serial No. \_\_\_\_\_  
Part No. \_\_\_\_\_

Pickup	Delay	Pickup	Delay
Short-Time		GND	
Ampere Tap	Pickup	Delay	Pickup
	Long-Time		Inst.

Test

Trip Functions

Prm. Inject. ☐ 804 ☐

Function	Expected	"A" Phase	"B" Phase	"C" Phase
LT PU				
LT Delay				
Sec @ 300%				
BT PU				
BT Delay				
Sec @ 150%				
Inst PU				
Inst Delay				
Sec @ 150%				
GND PU				
GND Delay				
Sec @ 150%				
Sensor Checks		OK	Not OK	

Location: \_\_\_\_\_

Substation: \_\_\_\_\_

Breaker ID: \_\_\_\_\_

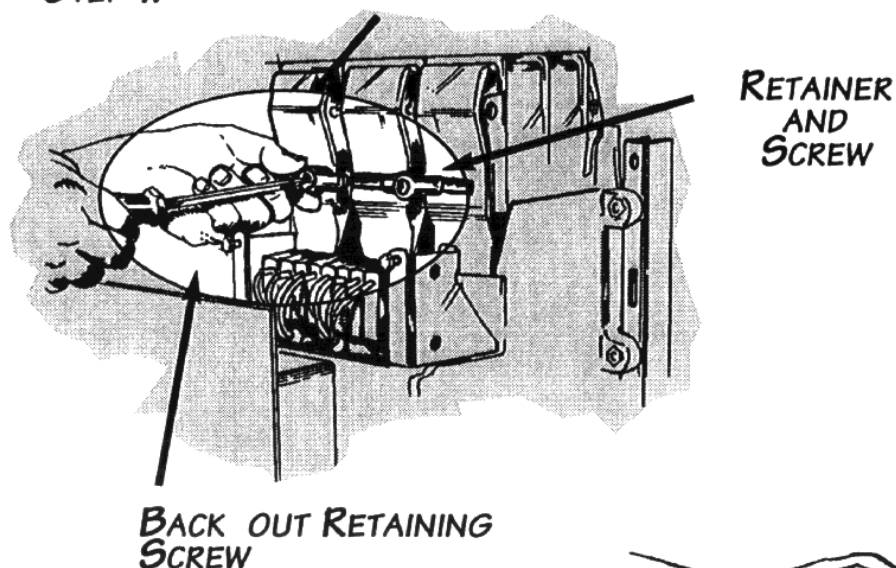
Date: \_\_\_\_\_

Sign: \_\_\_\_\_

## Caution

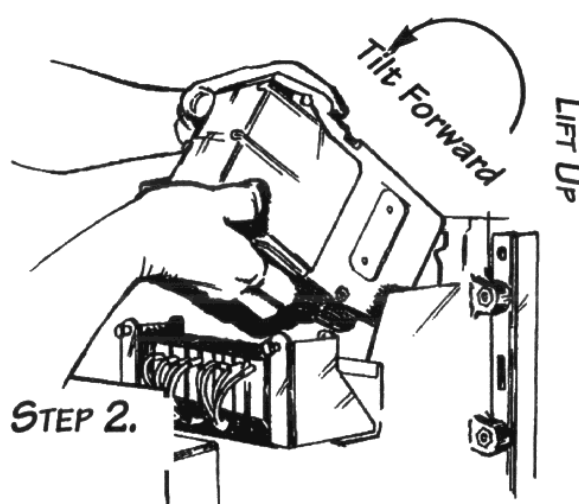
Closing Spring must be discharged before any work can start.

### STEP 1. ARC CHUTE



STEP 1.  
REMOVE ARC CHUTE RETAINERS,  
USING A STANDARD FLAT SCREW-  
DRIVER TO BACK OUT RETAINING  
SCREWS (2 RETAINING SCREWS,  
2 RETAINERS).

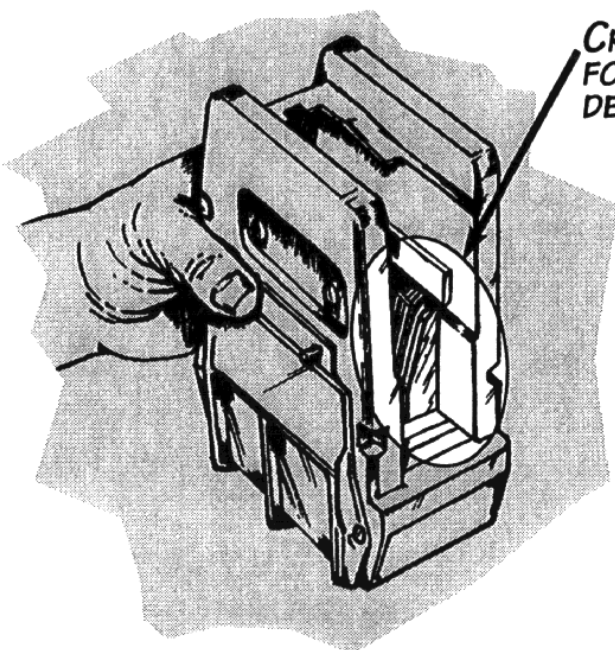
STEP 2.  
HOLD FIRMLY ONTO ARC CHUTE,  
LIFT UP AND TILT FORWARD.



NOTE: WHEN ARC CHUTE  
RETAINERS HAVE BEEN REMOVED,  
THE ARC CHUTES WILL FALL FOR-  
WARD, BUT THEY WILL NOT FALL  
OUT OF CIRCUIT BREAKER.

## Caution

Closing spring must be discharged before any work can start



STEP 1.

CRITICAL INSPECTION AREA LOOK FOR CRACKS, PIECES OF SLAG, DEPOSITS ON PLATES.



STEP 2.

CLEAN WITH DRY COMPRESSED AIR

### STEP 1.

INSPECT EACH ARC CHUTE FOR CONDITIONS THAT WOULD REQUIRE REPLACEMENT:

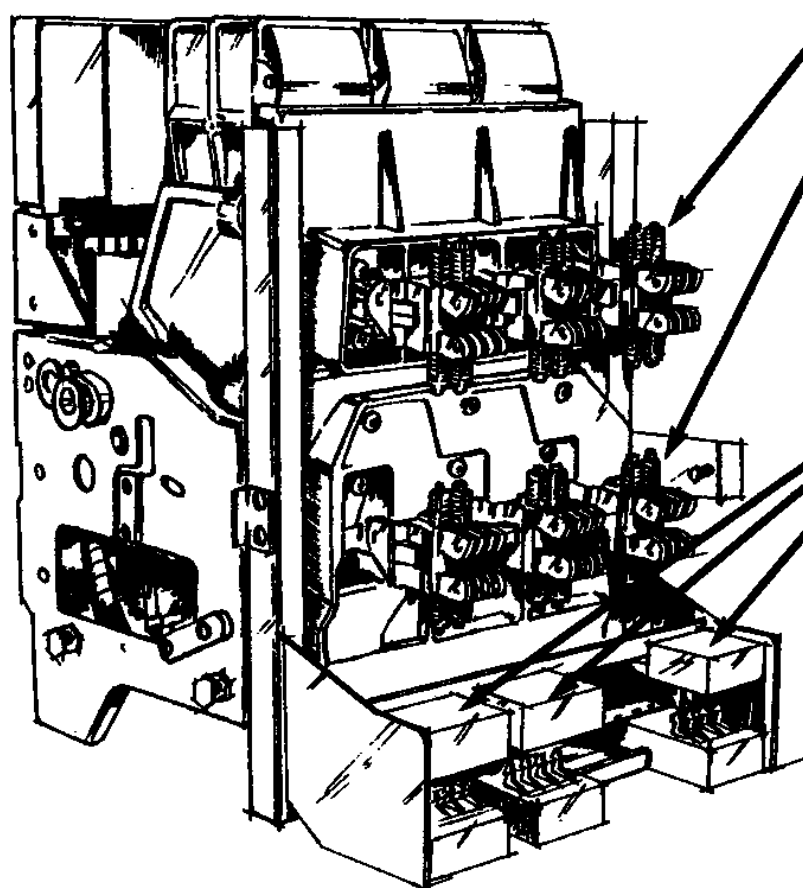
- CRACKS
- PIECES OF SLAG
- DEPOSITS ON PLATES

### STEP 2.

CLEAN ARC CHUTE WITH DRY, COMPRESSED AIR BY PLACING AIR HOSE AT LOWER BOTTOM, TILTING UPWARD AND BLOWING DEBRIS OUT.

### STEP 3.

REPEAT STEPS 1 AND 2



### **PRIMARY DISCONNECTS**

**STEP 1.**  
INSPECT FOR DIRT, LOOSE OR MISSING  
FASTENERS, PITTING OR BURNING OR  
OTHER PHYSICAL DAMAGE.

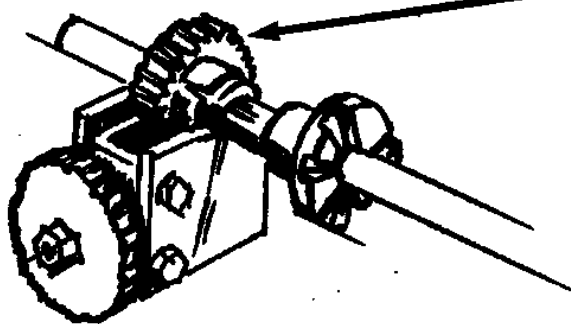
**STEP 2.**  
CLEAN WITH DEGREASER ON A LINT  
FREE RAG AND REAPPLY A LIGHT COAT  
OF **NO-OX-ID** LUBRICATION.

### **SECONDARY DISCONNECTS**

**STEP 1.**  
INSPECT FOR DIRT, CRACKS OR  
OTHER PHYSICAL DAMAGE.

**STEP 2.**  
BUFF METAL SURFACES LIGHTLY  
WITH SCOTCH BRITE CLEANER.

**STEP 3**  
CLEAN PLASTIC SURFACES WITH  
NON-ACETONE CLEANER.

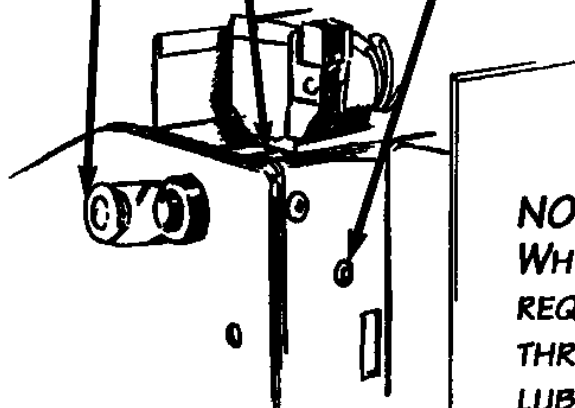


INSPECT ALL GEARS, RACKING CAMS, PINS AND SHAFT FOR WEAR AND OTHER PHYSICAL SIGNS OF DAMAGE.

GEAR CAN BE SEEN THROUGH HERE.

LOOK FOR ELONGATION OF THE HOLE IN THE MECHANISM FACE PLATE, WHERE THE SUPPORT BRACKET IS ATTACHED, AND CHECK FOR TIGHTNESS OF FIT.

LOOK CAREFULLY AT THE SHAFT AND MAIN GEAR WHILE TURNING THE RACKING CRANK. CHECK FOR WORN OR DAMAGED TEETH ON THE GEAR.

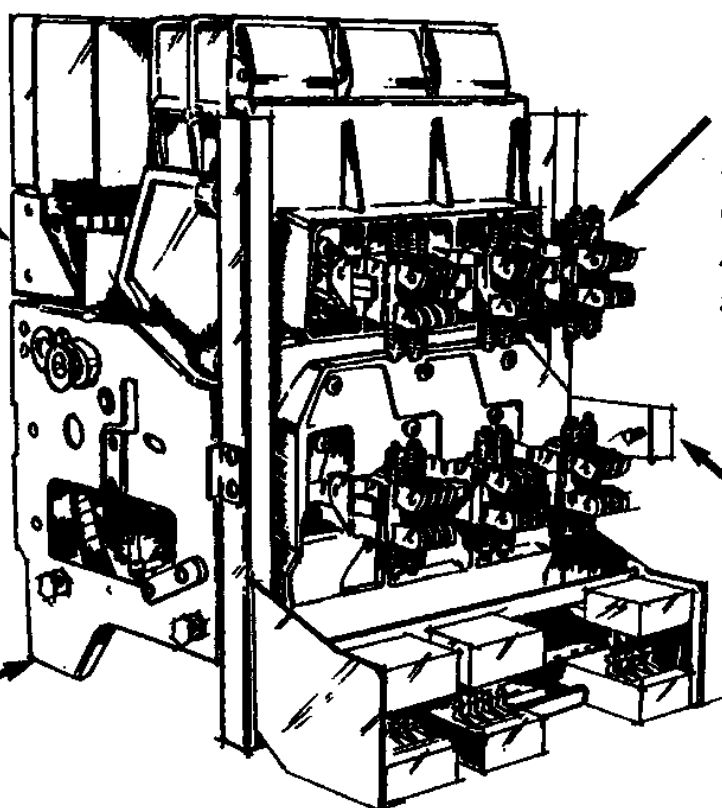


**NOTE:**  
WHEN CLEANING AND RELUBRICATION IS REQUIRED, **DO NOT** SPRAY SOLVENTS DOWN THROUGH THE MECHANISM TO REMOVE OLD LUBRICANTS, DUST OR DEBRIS.



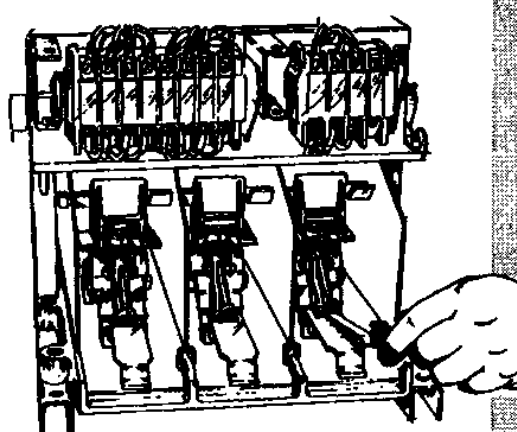
INSPECT THE AUXILIARY DEVICE AND SWITCH FOR CONDITION OF WIRING AND TERMINALS.

INSPECT THE FRAME'S GENERAL CONDITION FOR ARCING, BURNING, OVERHEATING, CRACKS, DIRT, DEBRIS AND OTHER OBVIOUS PHYSICAL DAMAGE. ALSO CHECK FOR LOOSE OR MISSING FASTENERS, CLIPS PINS OR SPRINGS.



INSPECT FOR TIGHTNESS OF CONNECTIONS ON ALL OF THE ELECTRICAL AND MECHANICAL NUTS; BOLTS AND SCREWS ON THE PRIMARY AND SECONDARY DISCONNECTS.

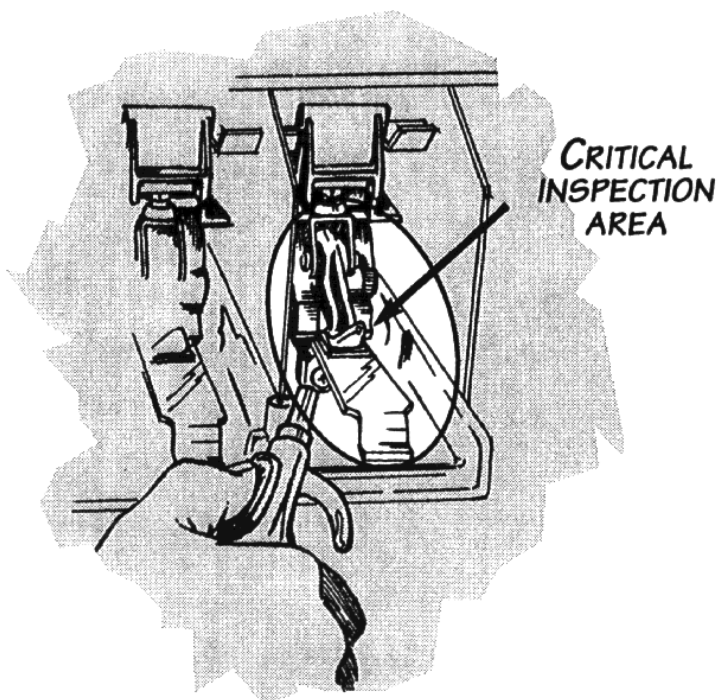
INSPECT GROUND CLIP FOR SPRING TENSION. CHECK TIGHTNESS OF FIT FOR ALL SCREWS AND NUTS. INSPECT FOR ARCING, BURNING OR OVERHEATING.



# ABB

## Caution

Closing spring must be discharged before beginning any inspection and alignment procedure.



### STEP 1.

BLOW OUT ANY DUST AND DEBRIS WITH DRY, COMPRESSED AIR, THEN WIPE DOWN ALL ACCESSIBLE SURFACES WITH A LINT-FREE RAG.

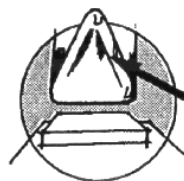
### STEP 2.

INSPECT EACH CONTACT ASSEMBLY FOR:

- ARCING
- PITTING
- OVERHEATING
- LOOSENESS

### STEP 3.

INSPECT ADJACENT INSULATION FOR SIGNS OF OVERHEATING OR CRACKING.



LOOK FOR ARCING, PITTING, OVERHEATING AND CHECK FOR GENERAL LOOSENESS.

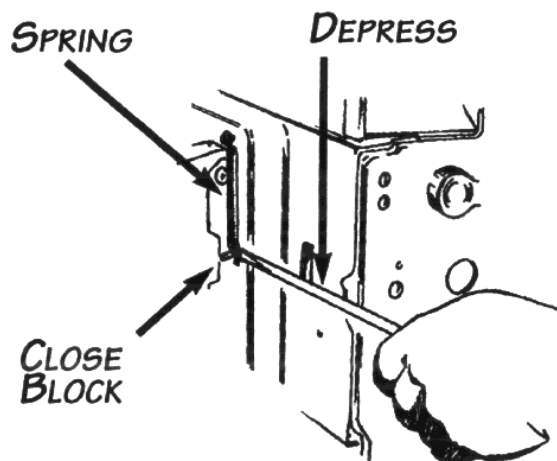
REPEAT THESE STEPS ON REMAINING CONTACTS.

### NOTE:

REPLACEMENT MAY BE REQUIRED WHEN EXCESSIVE ARCING, PITTING, AND OVERHEATING CONDITIONS EXIST. SOME PITTING AND DISCOLORATION ARE NOT DETRIMENTAL, UNLESS THEY INTERFERE WITH PROPER CONTACT ADJUSTMENT.

MOVE MAINTENANCE HANDLE UP & DOWN UNTIL  
SPRING CHARGE INDICATOR SHOWS CHARGED

CLOSE SPRING  
CHARGING MOTOR



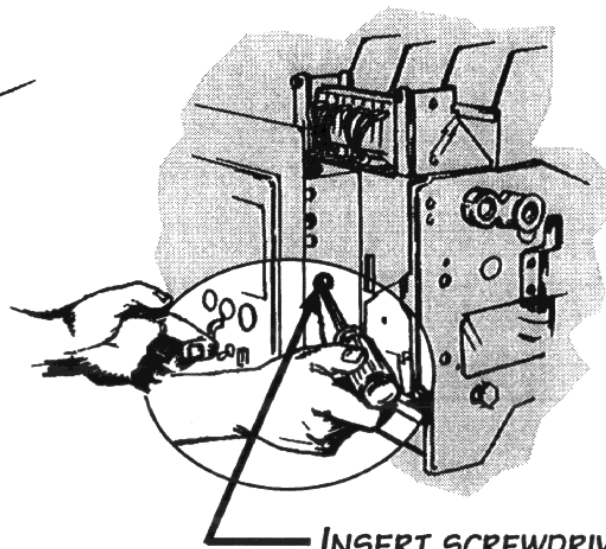
VIEW LOOKING INSIDE OF ESCUTCHEON BOX.

#### STEP 1.

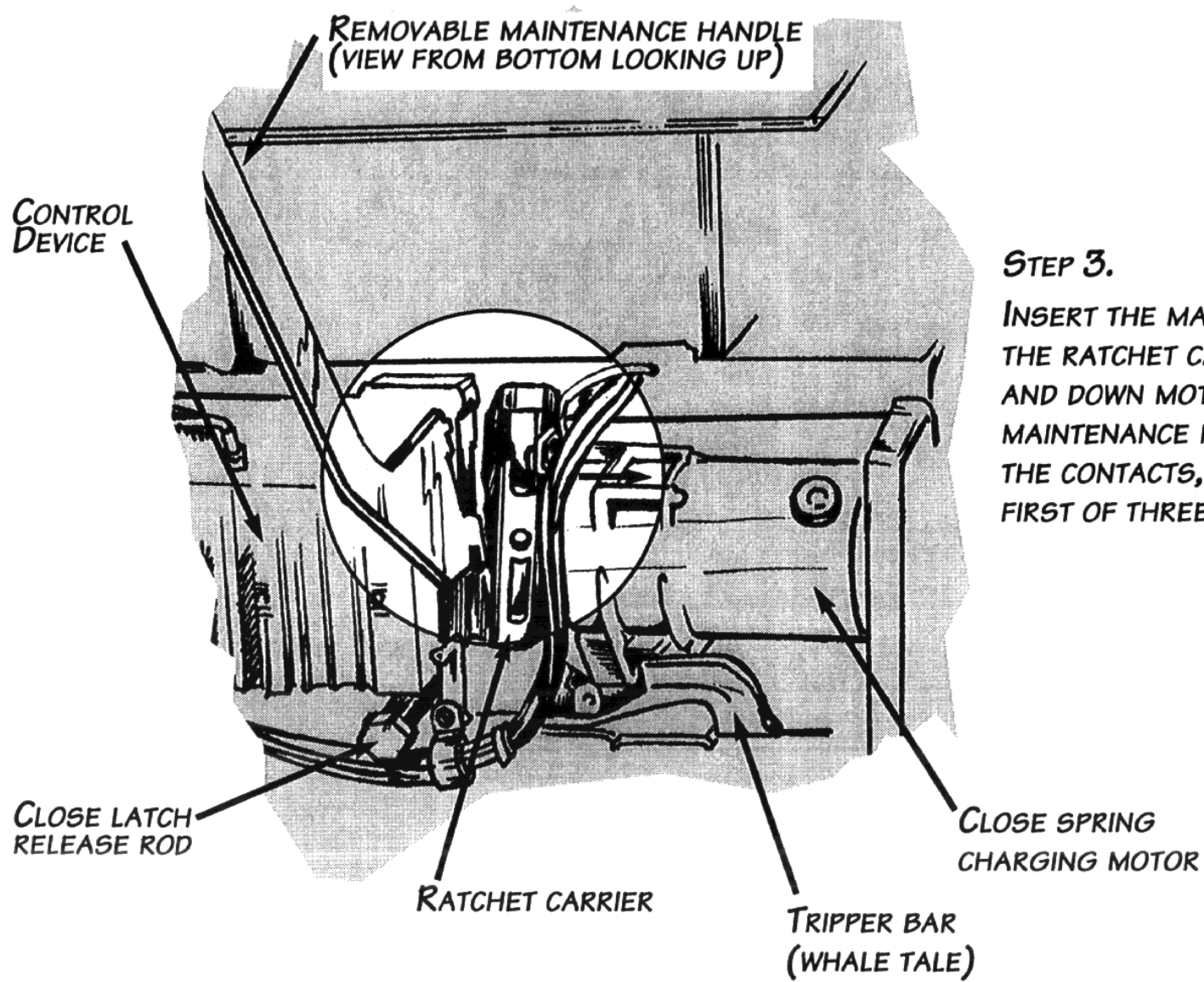
CHARGE SPRINGS USING THE  
MAINTENANCE HANDLE.

#### STEP 2.

INSERT A SCREWDRIVER THROUGH  
THE HOLE IN THE ESCUTCHEON BOX  
(ON THE RIGHT SIDE WHEN FACING  
THE CIRCUIT BREAKER) AND PRESS  
THE CLOSE BLOCK LEVER PIN DOWN-  
WARD, WHILE HOLDING THE CLOSE  
BLOCK LEVER PIN DOWN, LIFT THE  
MANUAL CLOSE LEVER. THE CLOSE  
BLOCK LEVER PIN WILL NOW REMAIN  
IN THE DOWN POSITION.

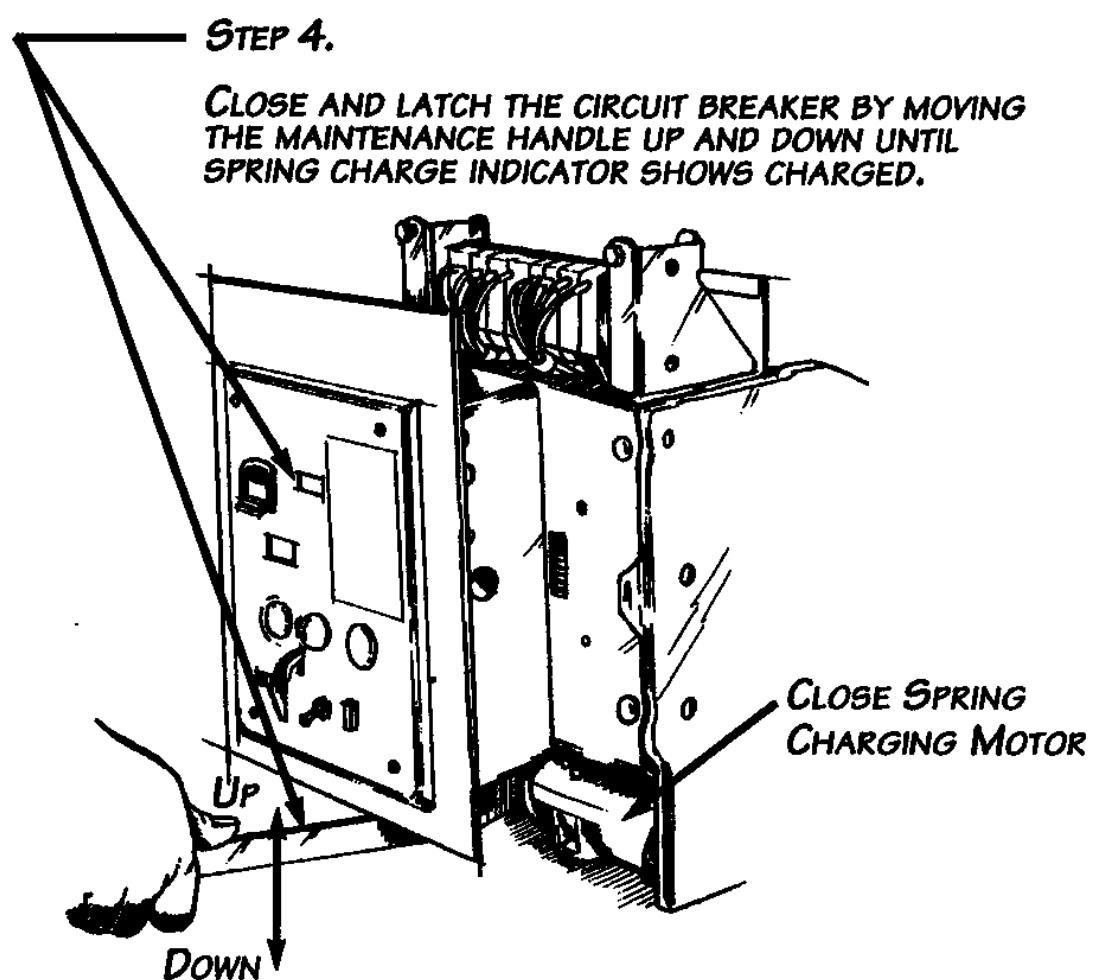


INSERT SCREWDRIVER, DEPRESS  
CLOSE BLOCK LEVER PIN.



**STEP 3.**

INSERT THE MAINTENANCE HANDLE INTO THE RATCHET CARRIER AND USE AN UP AND DOWN MOTION TO OPERATE THE MAINTENANCE HANDLE, SLOWLY CLOSING THE CONTACTS, STOPPING WHEN THE FIRST OF THREE CONTACTS JUST TOUCH.

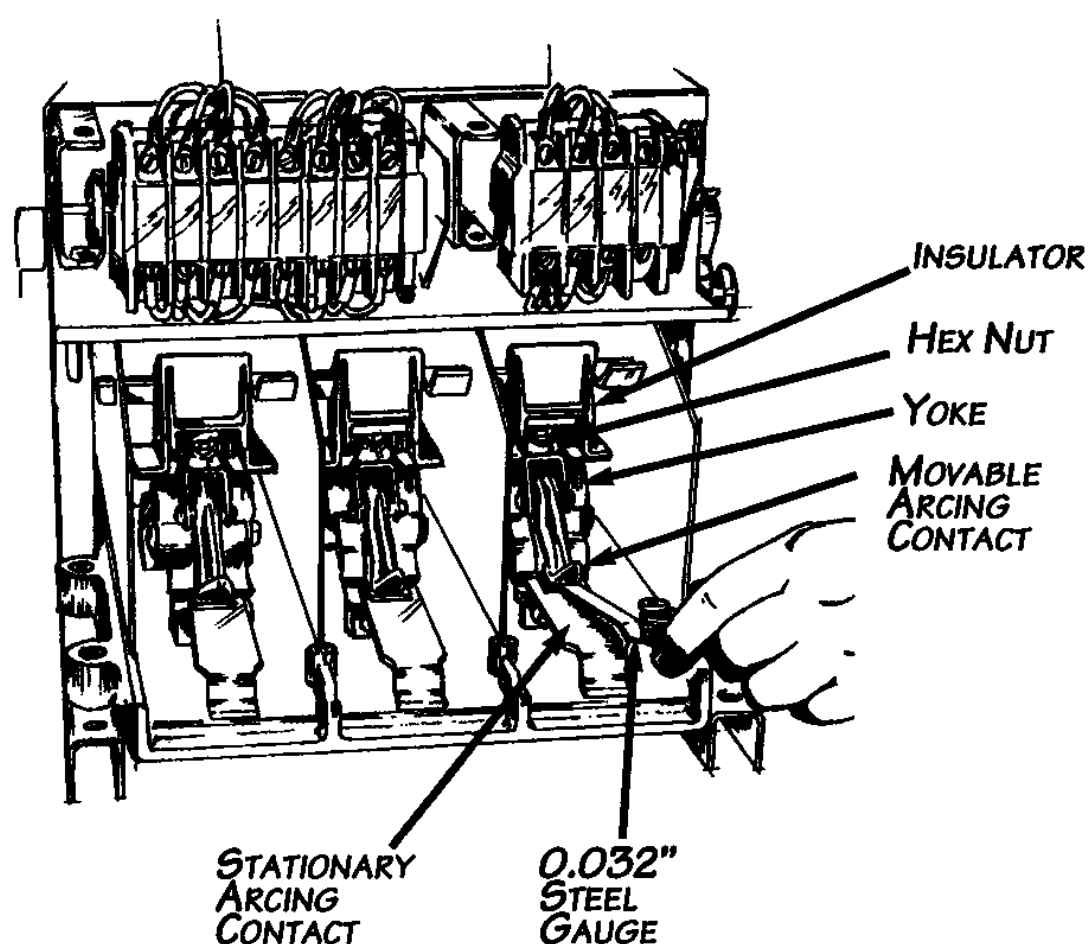


**STEP 4.**

**CLOSE AND LATCH THE CIRCUIT BREAKER BY MOVING THE MAINTENANCE HANDLE UP AND DOWN UNTIL SPRING CHARGE INDICATOR SHOWS CHARGED.**

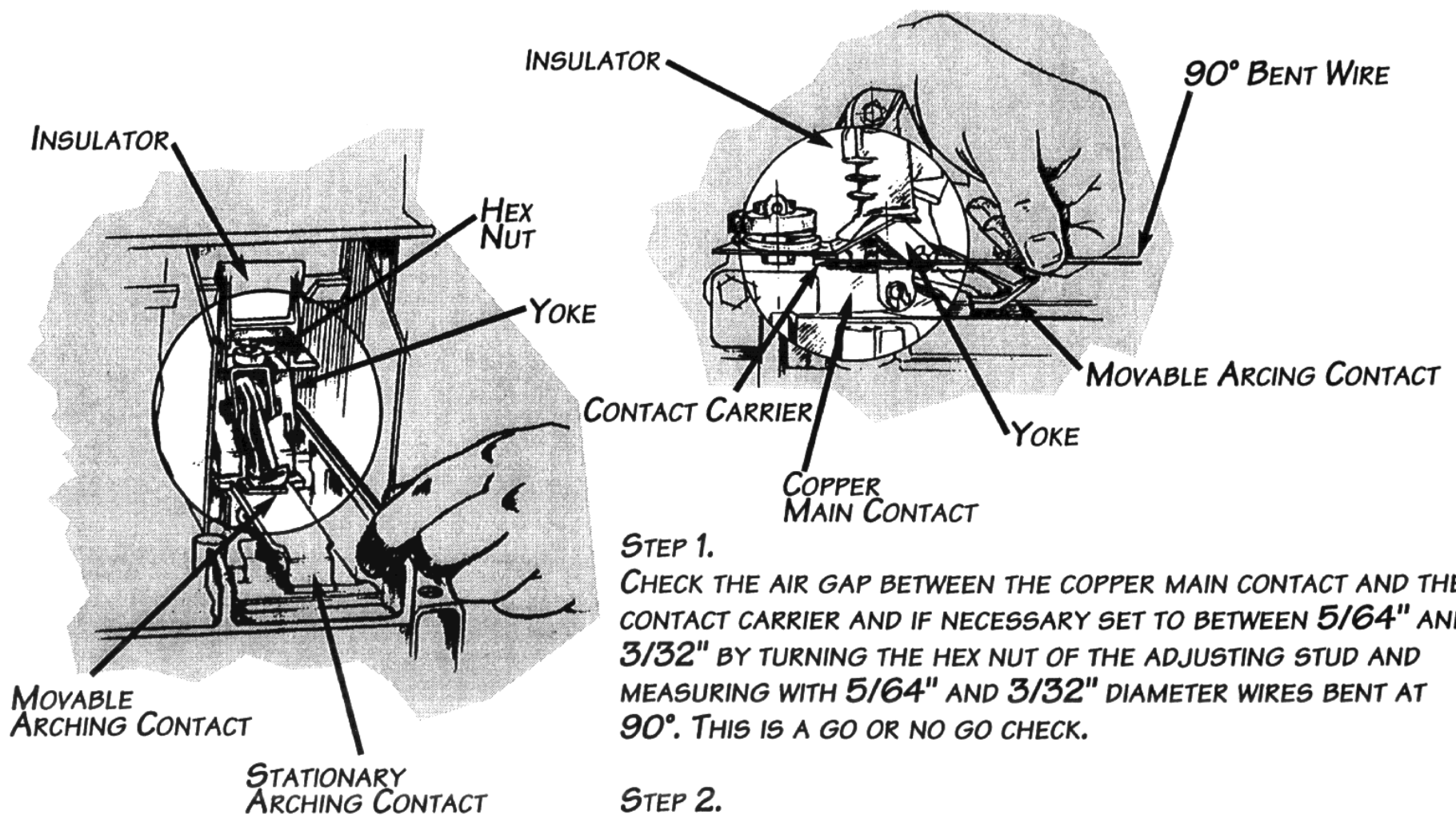
**CLOSE SPRING CHARGING MOTOR**

**NOTE: BE SURE TO RESET THE CHARGING CRANK AFTER THE FINAL SLOW CLOSE PROCEDURE, OR ELECTRICAL OPERATION MAY BE AFFECTED.**



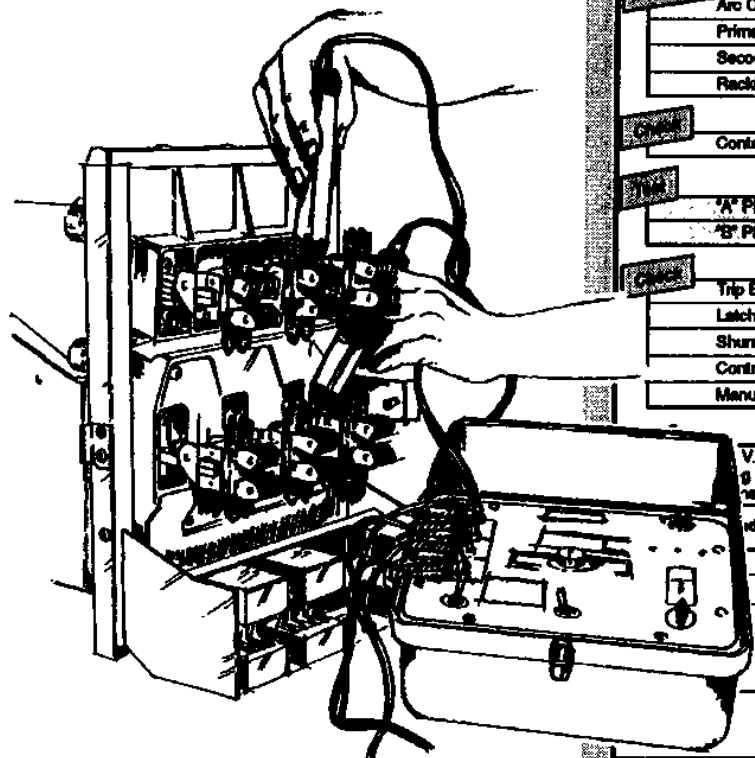
**STEP 1.**

SET THE STATIONARY ARCING CONTACT AND THE MOVABLE ARCING CONTACT ON THE OTHER TWO POLES TO WITHIN 0.032" OF TOUCHING, IF NEEDED, BY TURNING THE HEX NUT OF THE ADJUSTING STUDS AND MEASURING WITH A 0.032" FLAT METAL GAUGE.









**Current Breaker**

Manufacturer: \_\_\_\_\_ Model/Type: \_\_\_\_\_  
Serial Number: \_\_\_\_\_  
Voltage: \_\_\_\_\_ Ampere Rating: \_\_\_\_\_

**Test**

Initial Insulation Resistance			
At 1000 V.D.C.	Breaker Closed	Breaker Open	Expected
Meg Ohms			

**Inspection**

	As Found	As Left	As Found	As Left
Arc Chutes			Frame	
Primary Disconnects			Auxiliary Devices/Switches	
Secondary Disconnects			Tightness of Connections	
Racking Device			Ground Clip	

**Check**

Main Moving Contacts and Stationary Contacts	
Contact Alignment	Contact Pressure

**Test**

Contact Resistance	
"A" Phase	"C" Phase
"B" Phase	Expected

**Check**

Operating Mechanism	
Trip Bar Latch Engagement	Manual Close
Latch Engagement	Manual Trip
Shunt Trip	Electrical Charge
Control Device	Electrical Close
Manual Charge	Electrical Trip

Final Insulation Resistance			
V.D.C.	Breaker Closed	Breaker Open	Expected
g			
15			

ID: As Found, B=Belief, U=Unsatisfactory, As Left, As Adjusted, RPD=Repair, RPL=Replace

**Over Unit Summary**

Mfg. \_\_\_\_\_ Type \_\_\_\_\_  
Serial No. \_\_\_\_\_  
Part No. \_\_\_\_\_

Pickup	Delay	Pickup	Delay
Short-Time		GND	

Pickup	Delay	Pickup
Long-Time		Inst.

**Test**

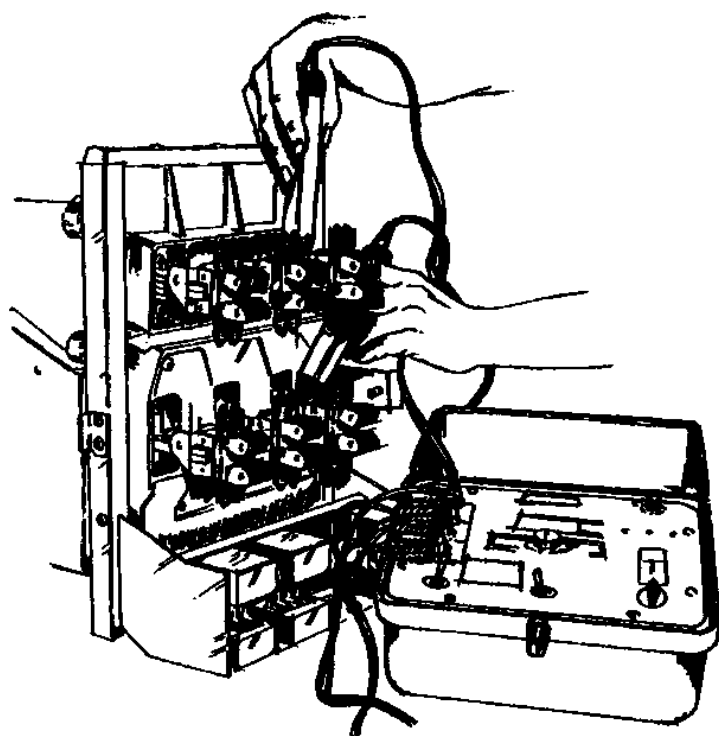
Function	Expected	"A" Phase	"B" Phase	"C" Phase
LT PU Amps				
LT Delay Sec @ 300%				
BT PU Amps				
ST Delay Sec @ 150%				
Inst PU Amps				
GND PU Amps				
Gnd Delay Sec @ 150%				
Sensor Checks	OK		Not OK	

Location: \_\_\_\_\_  
Substation: \_\_\_\_\_  
Breaker ID: \_\_\_\_\_  
Date: \_\_\_\_\_  
Sign: \_\_\_\_\_



## THE CONTACT RESISTANCE TEST

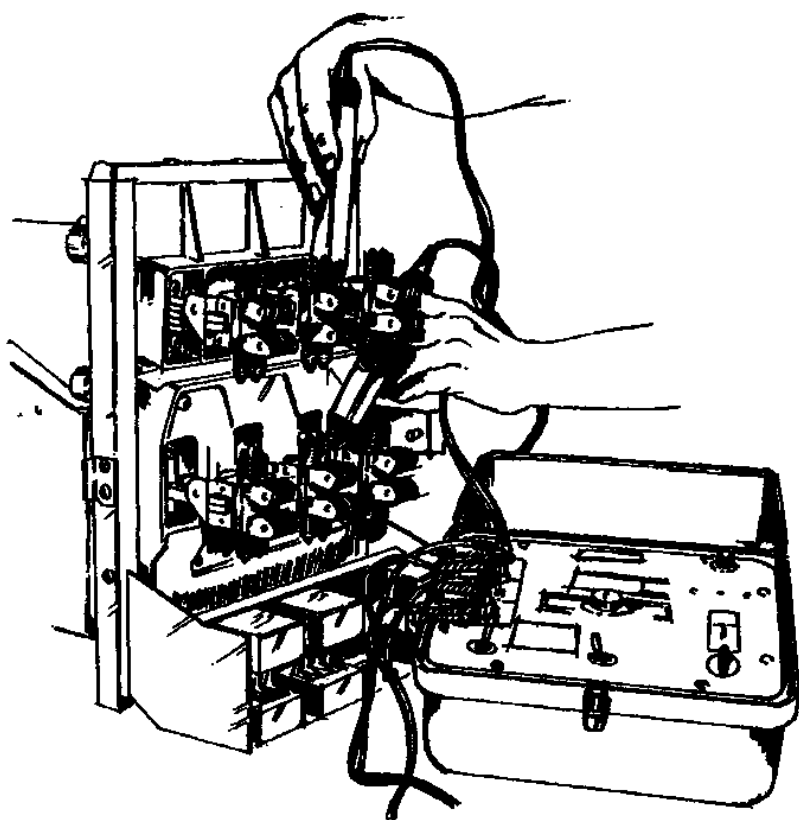
THE CONTACT RESISTANCE TEST IS PERFORMED TO DETERMINE THE CONDITION OF THE MAIN CONTACT STRUCTURE AND PRIMARY LEAD ASSEMBLIES AND THE SUITABILITY OF THE CIRCUIT BREAKER FOR CONTINUED SERVICE.



DUE TO THE NUMBER AND VARIETY OF DIGITAL LOW RESISTANCE OHMMETERS, THE FOLLOWING PROCEDURE HAS BEEN WRITTEN TO INDICATE CONNECTIONS BETWEEN A GENERIC DLRO TEST SET TO THE CIRCUIT BREAKER BEING TESTED.

READ AND FOLLOW THE TEST EQUIPMENT MANUFACTURER'S OPERATION AND SAFETY GUIDELINES PROVIDED WITH YOUR SPECIFIC TYPE/MODEL OF TEST EQUIPMENT.

READ AND UNDERSTAND THE CIRCUIT BREAKER MANUFACTURER'S OPERATION AND SAFETY GUIDELINES BEFORE YOU BEGIN TESTING.



THE TEST SET LEADS ARE TO BE CONNECTED TO THE PRIMARY DISCONNECTS, ACROSS THE PHASE POLE ASSEMBLY.

THIS TEST IS PERFORMED AT 10 AMPS DC OR GREATER, ALLOWING TIME FOR THE SET METER READING TO STABILIZE (APPROX. 30 SECS.).

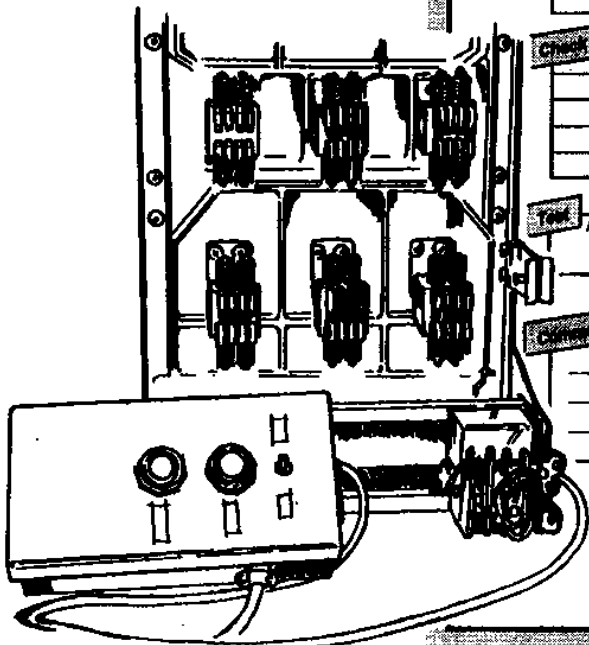
WITH THE CIRCUIT BREAKER CLOSED, APPLY TEST CURRENT AND RECORD THE MICRO-OHM READINGS FOR:

"A" PHASE LINE TO LOAD  
"B" PHASE LINE TO LOAD  
"C" PHASE LINE TO LOAD

READINGS THAT DEVIATE FROM ADJACENT POLES, OR PREVIOUSLY TESTED BREAKERS (OF THE SAME MANUFACTURER) BY MORE THAN FIFTY PERCENT (50%) OR EXCEED TWO HUNDRED (200) MICRO-OHMS WARRANT A CLOSE INSPECTION.

SLIGHT PITTING OR DISCOLORATION IS NOT CONSIDERED HARMFUL, HOWEVER, BADLY BURNED AND PITTED CONTACTS MUST BE REPLACED.

NOTE: REMOVE ALL DIRT AND GREASE FROM CONTACTS WITH A LINT-FREE CLOTH BEFORE TEST-



Check

Manufacturer: \_\_\_\_\_ Model/Type: \_\_\_\_\_  
Serial Number: \_\_\_\_\_  
Voltage: \_\_\_\_\_ Ampere Rating: \_\_\_\_\_

Test

Initial Insulation Resistance

At 1000 V.D.C.	Breaker Closed	Breaker Open	Expected
Meg Ohms			

Inspect

	As Found	As Left		As Found	As Left
Aux Chutes			Frame		
Primary Disconnects			Auxiliary Devices/Switches		
Secondary Disconnects			Tightness of Connections		
Racking Device			Ground Clip		

Check

Main Moving Contacts and Stationary Contacts

Contact Alignment	Contact Pressure

Test

Contact Resistance

"A" Phase	"C" Phase

Check

Operating Mechanism

Trip Bar Latch Engagement	Manual Close		
Latch Engagement	Manual Trip		
Shunt Trip	Electrical Charge		
Control Device	Electrical Close		
Manual Charge	Electrical Trip		

Test

Final Insulation Resistance

At 1000 V.D.C.	Breaker Closed	Breaker Open	Expected
Meg Ohms			

Comments

Legend: As Found, S-Substitution, U-Unsatisfactory, As Left, As Adjusted, RPD-Repair, RPL-Replace

Check

Mfg. \_\_\_\_\_ Type \_\_\_\_\_  
Serial No. \_\_\_\_\_  
Part No. \_\_\_\_\_

Test

Pickup	Delay	Pickup	Delay
Short-Time		GND	

Test

Pickup	Delay	Pickup
Ampere Trip	Long-Time	Inst.

Check

Trip Functions

Function	Expected	"A" Phase	"B" Phase	"C" Phase
LT PU Amps				
LT Delay Sec @ 300%				
ST PU Amps				
ST Delay Sec @ 160%				
Inst PU Amps				
GND PU Amps				
Gnd Delay Sec @ 160%				
Sensor Checks	OK	Not OK		

Location:

Substation:

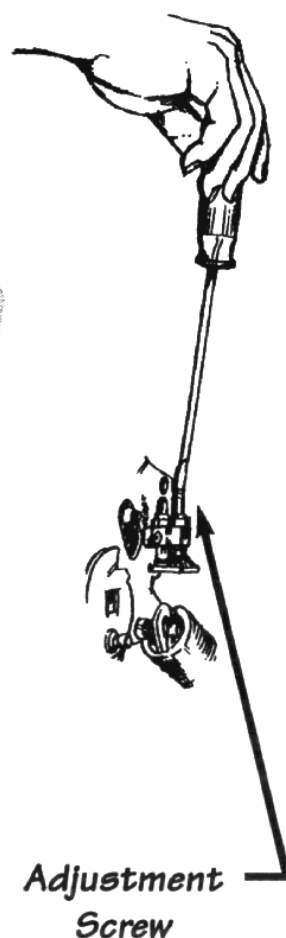
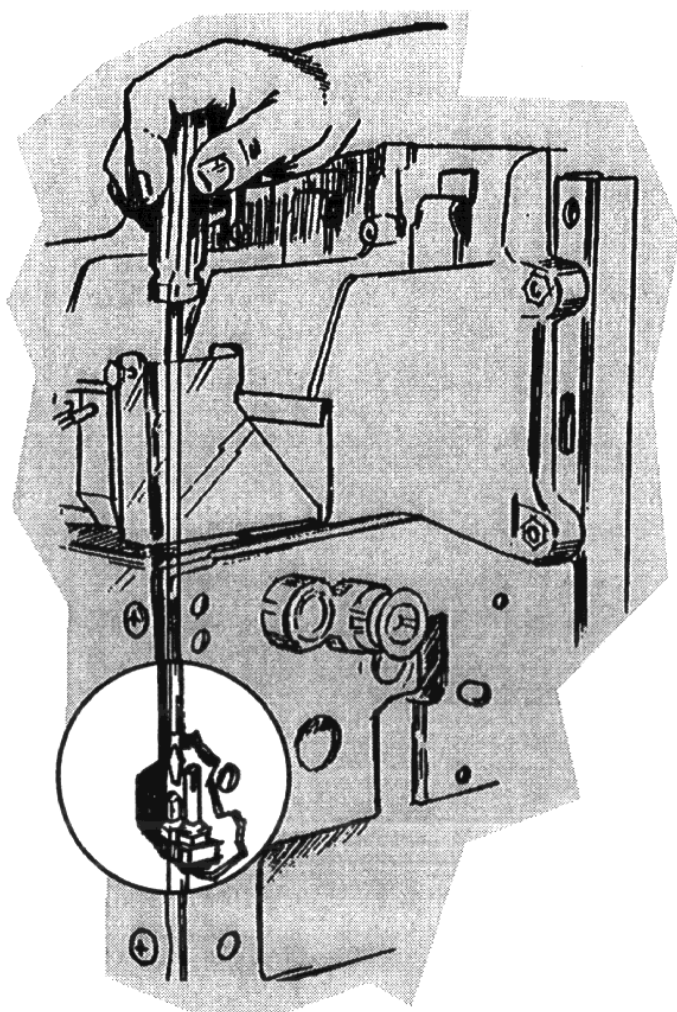
Breaker ID:

Date:

Sign:

**Caution**

*Circuit breaker must be positioned on a stable surface before you begin work.*



**STEP 1.**

**BACK OFF LATCH ENGAGEMENT ADJUSTING SCREW BY TURNING IT COUNTERCLOCKWISE UNTIL EXCESSIVE LATCH ENGAGEMENT IS ASSURED.**

**STEP 2.**

**CLOSE THE CIRCUIT BREAKER.**

**STEP 3.**

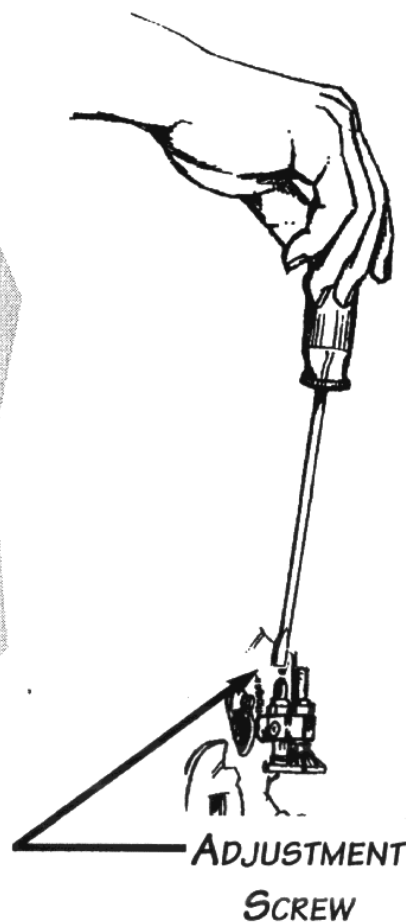
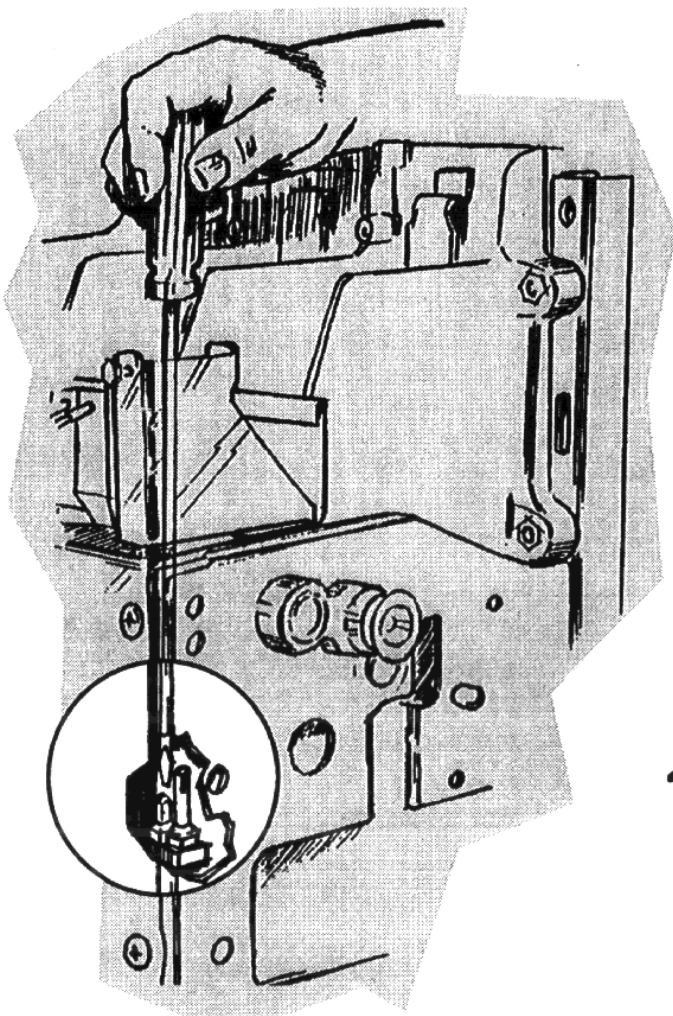
**TURN THE LATCH ENGAGEMENT ADJUSTING SCREW DOWN SLOWLY (CLOCKWISE) UNTIL IT TRIPS THE CIRCUIT BREAKER.**

**STEP 4.**

**BACK OFF LATCH ENGAGEMENT ADJUSTING SCREW 2 FULL TURNS COUNTERCLOCKWISE, BEING CAREFUL NOT TO BACK OFF SO FAR AS TO DISENGAGE THE SCREW FROM THE ASSEMBLY.**

**Caution**

*Circuit Breaker must be positioned on a stable surface before you begin work.*



**STEP 1.**

**BACK OFF TRIPPER BAR LATCH ENGAGEMENT ADJUSTING SCREW BY TURNING IT COUNTERCLOCKWISE TO ASSURE EXCESSIVE TRIPPER BAR TRAVEL.**

**STEP 2.**

**CLOSE THE CIRCUIT BREAKER.**

**STEP 3.**

**TURN THE ADJUSTING SCREW DOWN SLOWLY (CLOCKWISE) UNTIL THE LATCH JUST RELEASES, TRIPPING THE CIRCUIT BREAKER.**

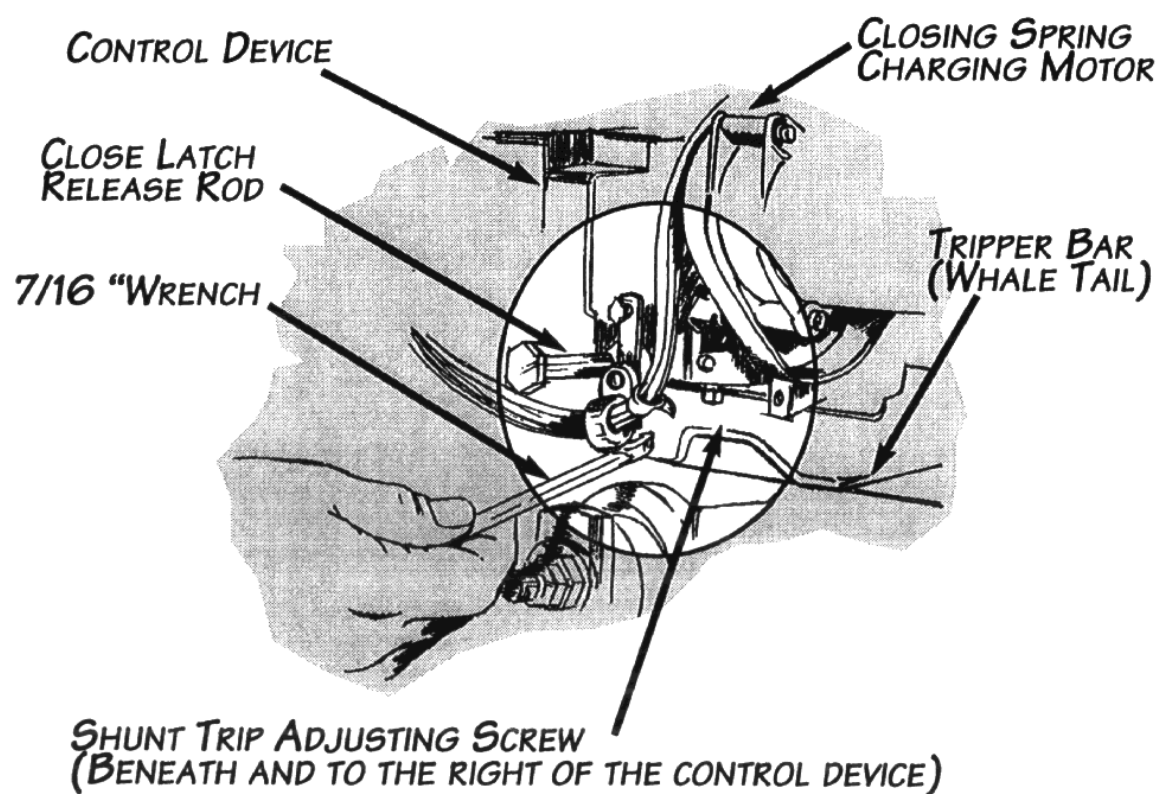
**STEP 4.**

**BACK OFF THE ADJUSTING SCREW 3-1/2 TURNS COUNTERCLOCKWISE.**

## Caution

Circuit breaker should be open, with closing springs discharged.

**NOTE:** PERFORM THIS ADJUSTMENT ONLY ON A SHUNT TRIP THAT HAS MALFUNCTIONED OR BEEN REPLACED.



### STEP 1.

ROTATE HEX HEAD ADJUSTMENT SCREW CLOCKWISE UNTIL IT IS NOT POSSIBLE TO TURN IT FURTHER. **DO NOT FORCE.**

### STEP 2.

ROTATE THE ADJUSTMENT SCREW COUNTERCLOCKWISE 7 COMPLETE TURNS.

### STEP 3.

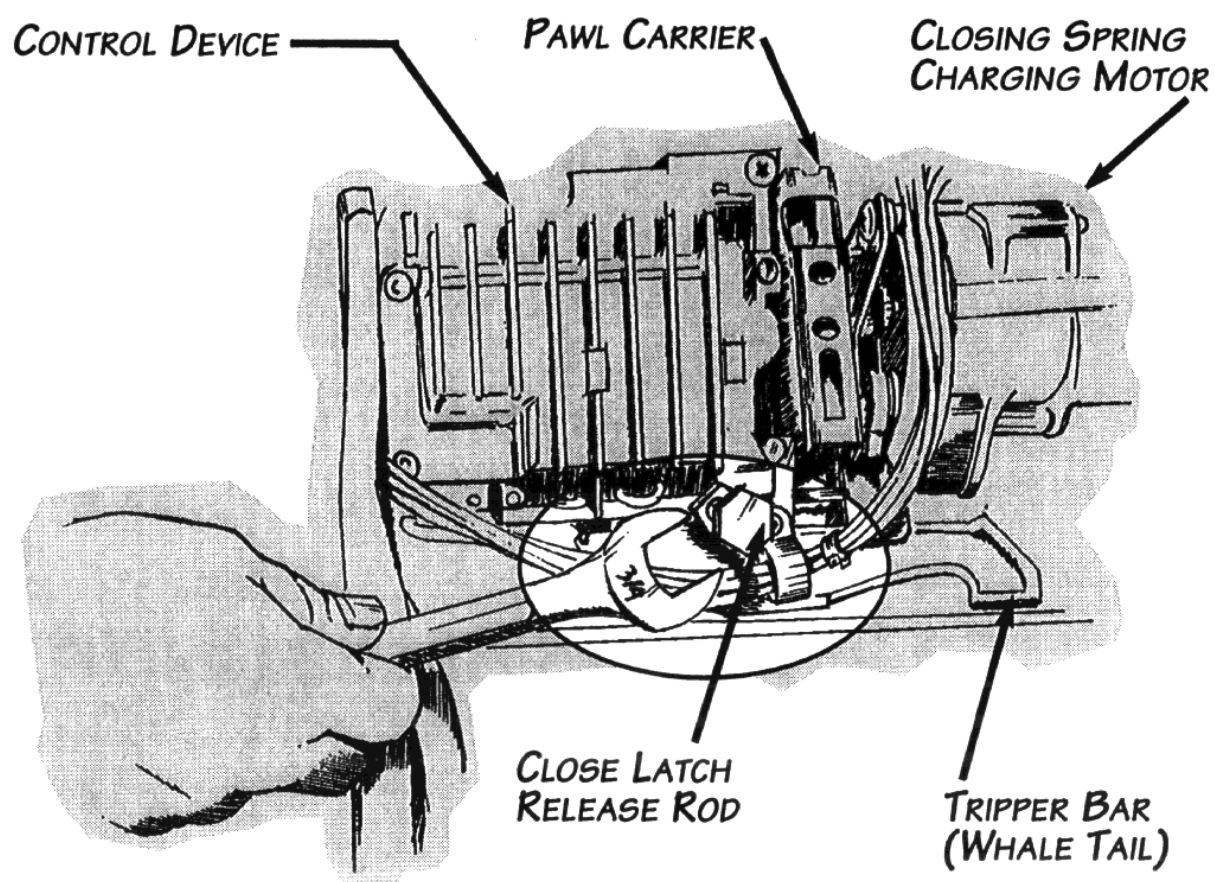
CHARGE THE BREAKER CLOSING SPRINGS.

### STEP 4.

APPLY REQUIRED VOLTS TO TERMINALS 2 AND 4 OF THE CIRCUIT BREAKER.

**NOTE:** REMOVE ALL TOOLS FROM BREAKER.

**NOTE:** CLOSE LATCH RELEASE ROD OVERTRAVEL ADJUSTMENT IS PERFORMED WHEN THE CONTROL DEVICE HAS BEEN REPLACED.



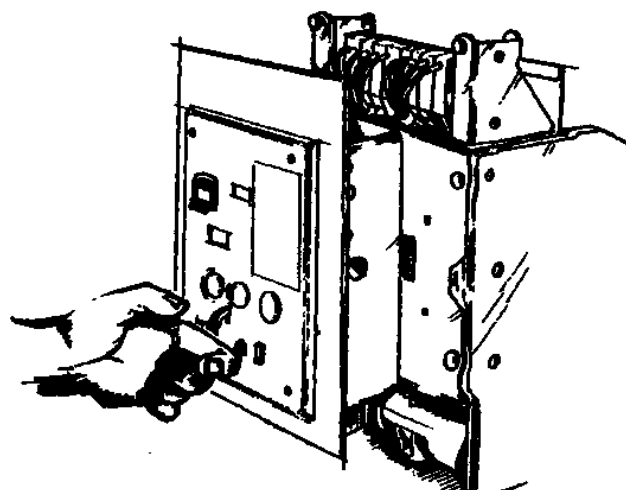
**STEP 1.**  
BACK OFF THE CLOSE LATCH RELEASE ROD BY TURNING CLOCKWISE UNTIL CIRCUIT BREAKER WILL NOT CLOSE WHEN CLOSE LATCH RELEASE ROD IS PUSHED UPWARD TO FULL EXTENT OF ITS TRAVEL.

**STEP 2.**  
CHARGE THE CLOSING SPRINGS.

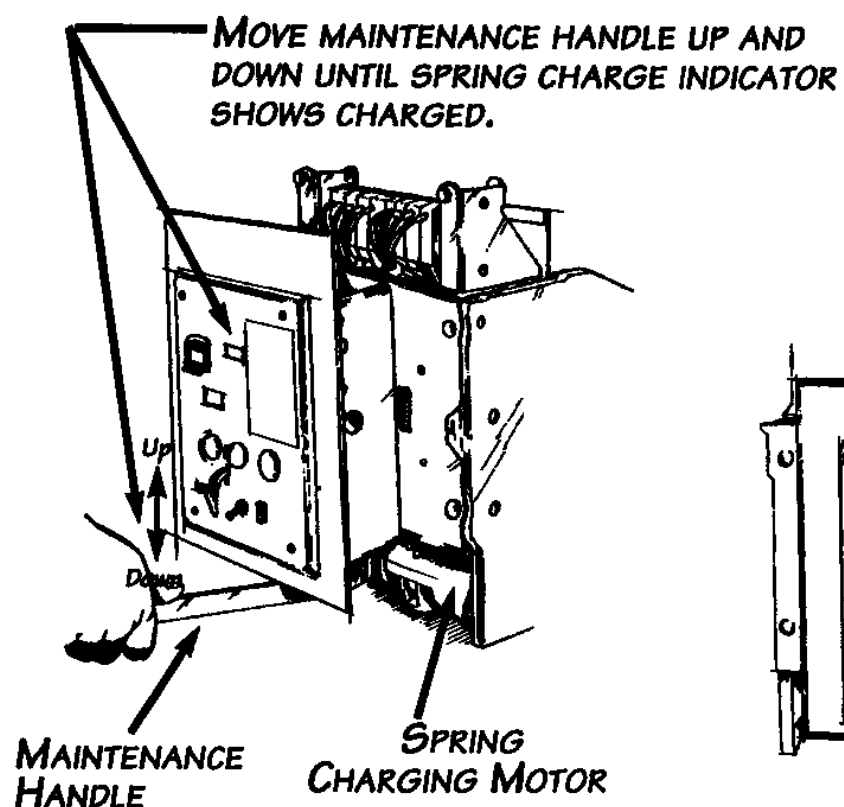
**STEP 3.**  
PUSH CLOSE LATCH RELEASE ROD TO FULL EXTENT OF ITS TRAVEL. THEN, HOLDING RELEASE ROD IN THIS POSITION, TURN THE ROD UPWARD (CLOCKWISE) UNTIL THE CIRCUIT BREAKER CLOSSES.

**STEP 4.**  
TURN THE RELEASE ROD AN ADDITIONAL 1 1/2 TURNS.

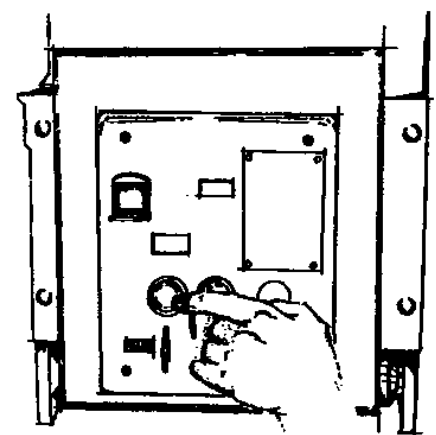




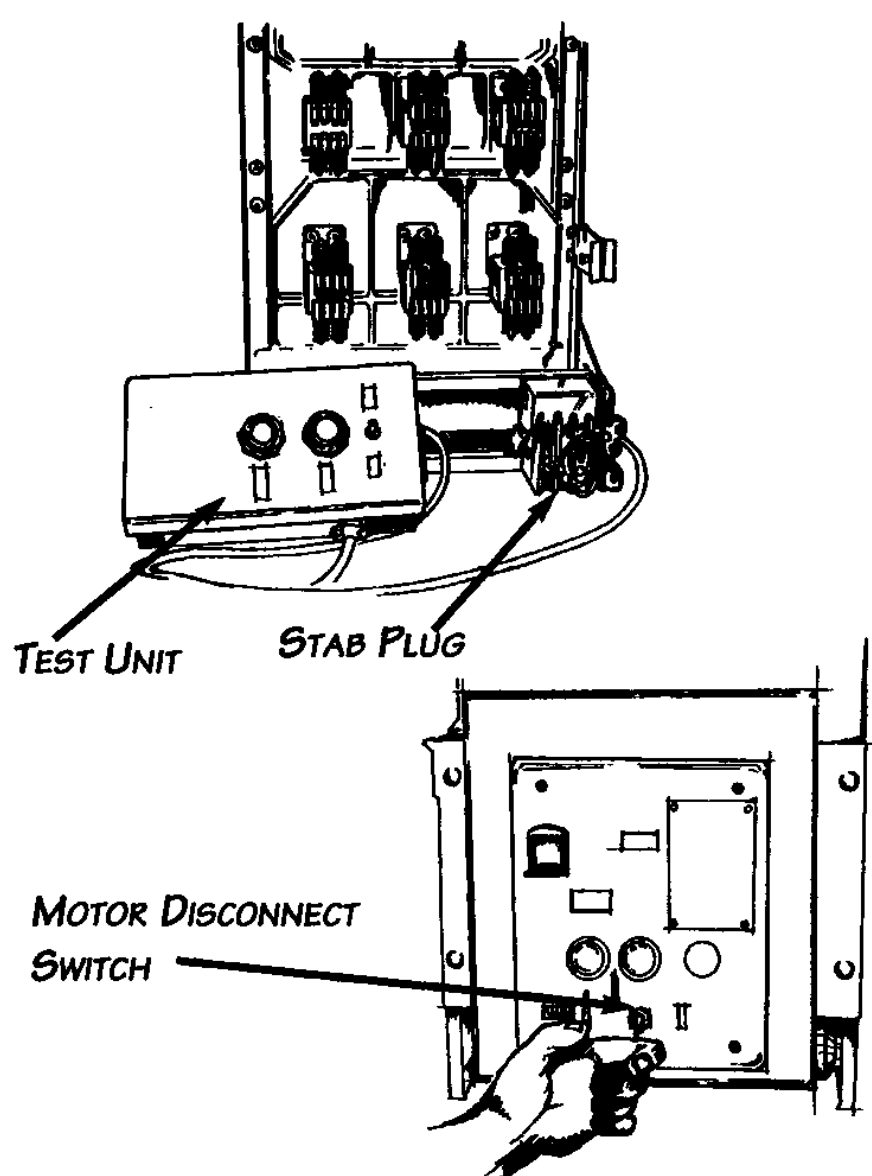
**MANUAL CLOSE**  
LIFT MANUAL CLOSE LEVER. BREAKER SHOULD CLOSE AND LATCH.



**MANUAL CHARGE**  
VERIFY THAT THE SPRING CHARGE INDICATOR SHOWS THE SPRINGS TO BE IN A CHARGED POSITION.



**MANUAL TRIP**  
PUSH THE MANUAL TRIP BUTTON, BREAKER SHOULD OPEN.



## **ELECTRICAL CHARGE**

### **STEP 1.**

**DISCHARGE THE CLOSING SPRINGS.**

### **STEP 2.**

**SET MOTOR DISCONNECT SWITCH  
IN "OFF" POSITION.**

### **STEP 3.**

**INSERT STAB PLUG FROM TEST  
UNIT INTO SECONDARY CONTROLS  
DISCONNECT.**

### **STEP 4.**

**ACTIVATE TEST UNIT.**

### **STEP 5.**

**SET MOTOR DISCONNECT SWITCH  
TO "ON" POSITION. THE SPRINGS WILL CHARGE.**

## ELECTRICAL CLOSE

### STEP 1.

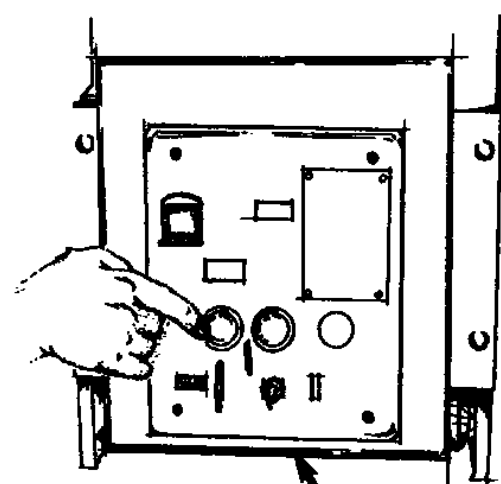
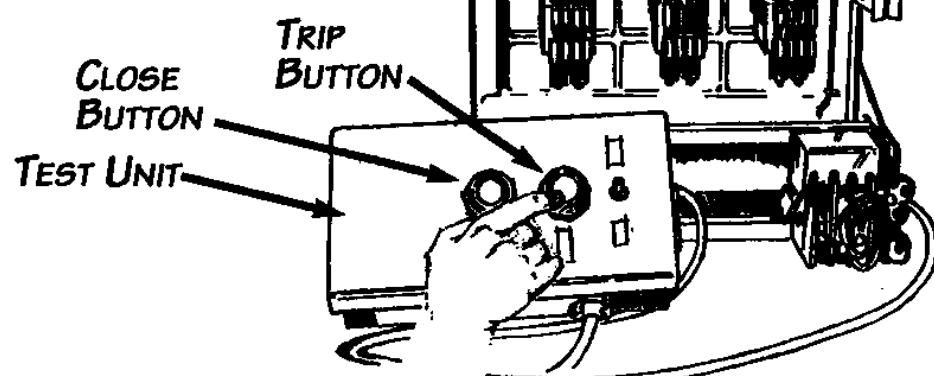
CONNECT THE TEST UNIT TO THE  
CIRCUIT BREAKER.

### STEP 2.

CHECK THAT SPRINGS ARE  
CHARGED AND THAT THE  
BREAKER IS OPENED.

### STEP 3.

CLOSE THE CIRCUIT BREAKER BY  
DEPRESSING THE  
CLOSE BUTTON ON THE



ESCUTCHEON BOX

## ELECTRICAL TRIP

### STEP 1.

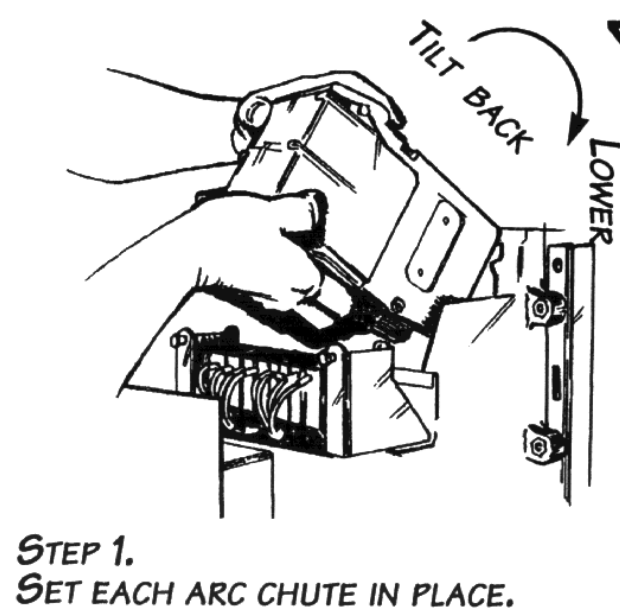
CONNECT THE TEST UNIT TO THE  
CIRCUIT BREAKER.

### STEP 2.

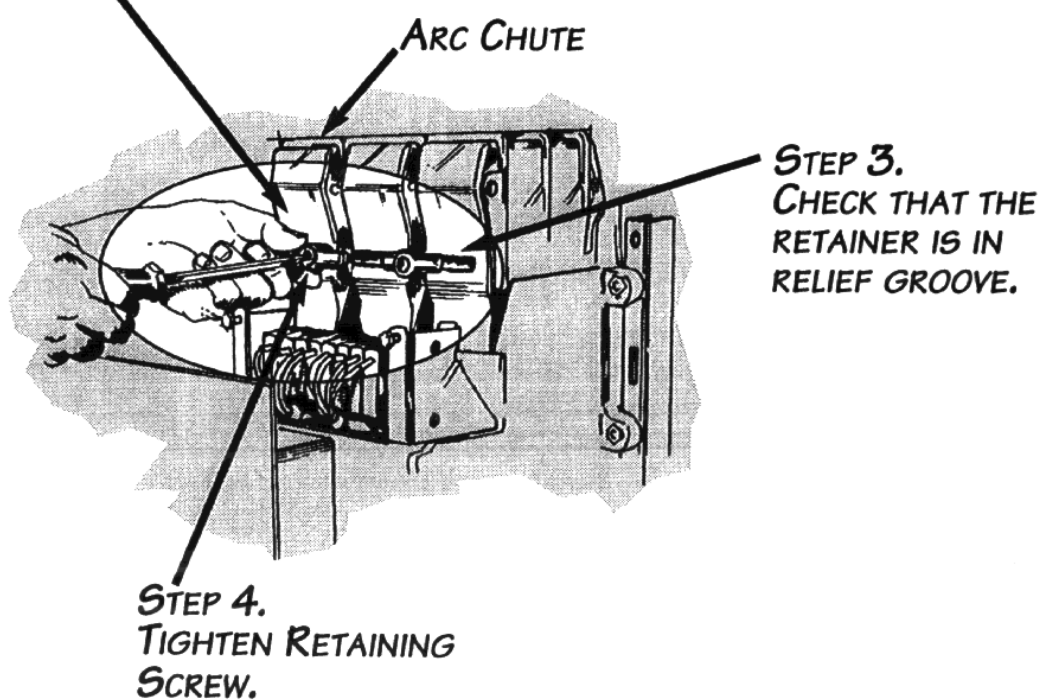
CHECK THAT THE CIRCUIT IS CLOSED.

### STEP 3.

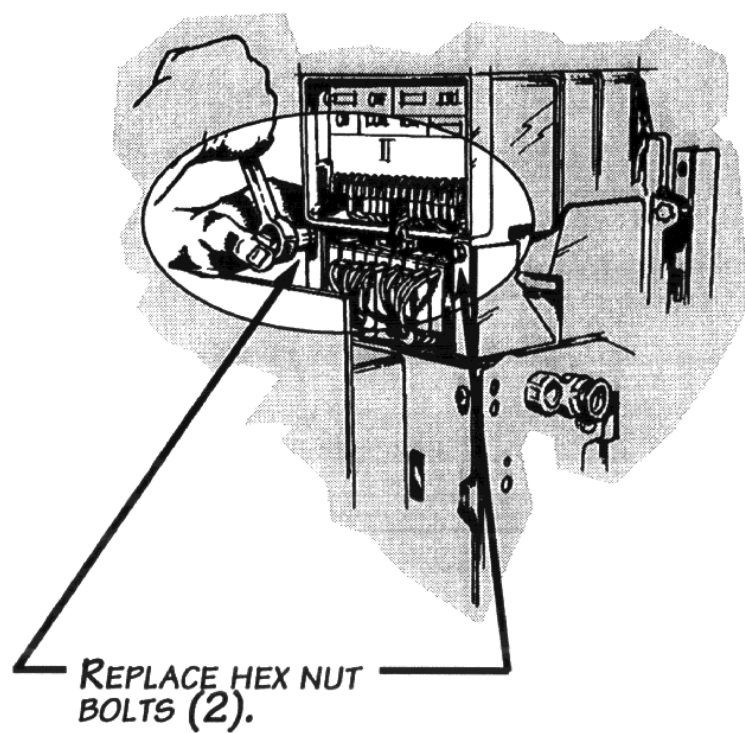
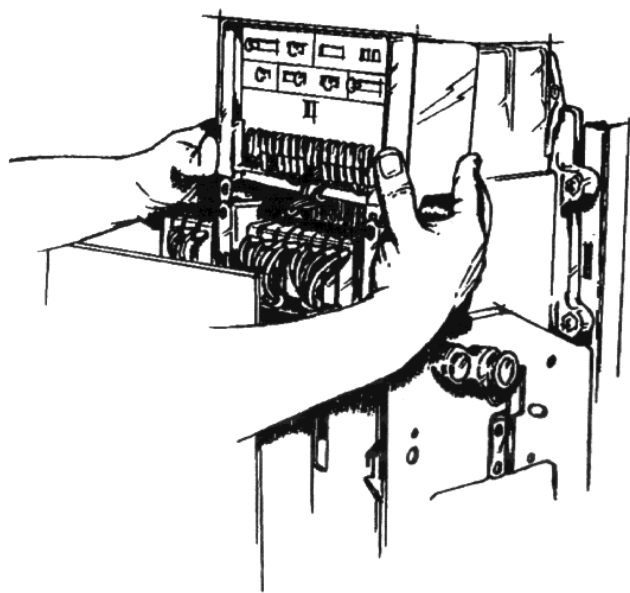
TRIP THE CIRCUIT BREAKER BY DEPRESSING  
THE TRIP BUTTON ON THE TEST UNIT.



**STEP 2.**  
INSERT AND THREAD RETAINING SCREW WITH RETAINER INTO THE THREADED HOLE ON BACK OF UPPER POLE ASSEMBLY. CHECK TO SEE THAT THE RETAINER IS IN THE GROOVE. TIGHTEN THE RETAINING SCREWS.



REMOVE THE BOLTS STORED ON THE POWER SHIELD  
BRACKETS. REPLACE THE POWER SHIELD. REPLACE  
THE HEX NUT BOLTS.

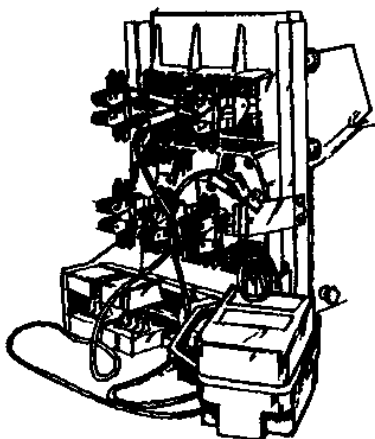


TEST SET LEADS ARE TO BE CONNECTED TO THE PRIMARY DISCONNECTS, AND WHEN REQUIRED, TO THE COMMON LEAD TO THE CIRCUIT BREAKER GROUND CLIP.

THE INSULATION TEST IS PERFORMED AT 1000 VOLTS DC FOR ONE MINUTE.

WITH THE CIRCUIT BREAKER CLOSED, APPLY TEST VOLTAGE AND RECORD THE MEG OHM READING FOR EACH OF THE FOLLOWING CONNECTIONS:

"A" PHASE TO "B" PHASE	"A" PHASE TO GROUND CLIP
"B" PHASE TO "C" PHASE	"B" PHASE TO GROUND CLIP
"C" PHASE TO "A" PHASE	"C" PHASE TO GROUND CLIP



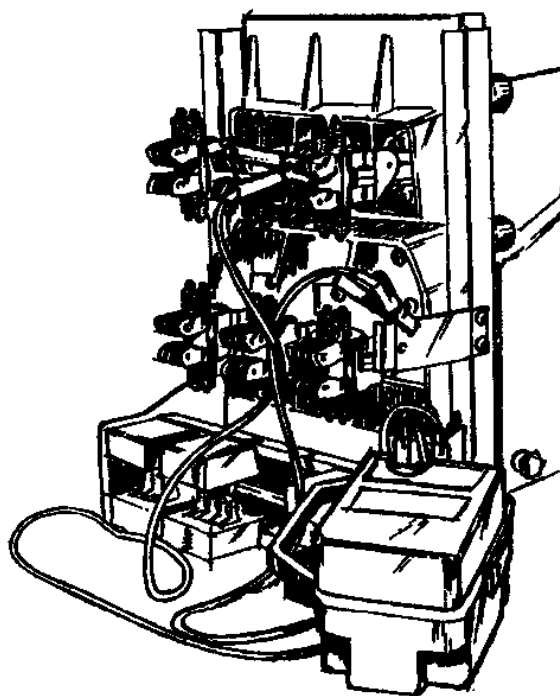
WITH THE CIRCUIT BREAKER OPEN, APPLY TEST VOLTAGE AND RECORD THE MEG OHM READING FOR EACH OF THE FOLLOWING CONNECTIONS:

"A" PHASE LINE TO LOAD  
"B" PHASE LINE TO LOAD  
"C" PHASE LINE TO LOAD

READINGS OF LESS THAN 1.5 MEG OHMS PER EVERY 1000-VOLTS WARRANT A CLOSE VISUAL INSPECTION OF THE INSULATION SYSTEM.

LOOK FOR CRACKS, EVIDENCE OF ARCING, BURNING, OVERHEATING, AND/OR ANY OTHER SIGNS OF APPARENT PHYSICAL DAMAGE.

ANY OF THESE CONDITIONS MUST BE CORRECTED BEFORE THE CIRCUIT BREAKER IS RETURNED TO SERVICE.



Circuit Breaker

Manufacturer: \_\_\_\_\_ Model/Type: \_\_\_\_\_  
Serial Number: \_\_\_\_\_  
Voltage: \_\_\_\_\_ Ampere Rating: \_\_\_\_\_

Test

Initial Insulation Resistance

At 1000 V.D.C. Meg Ohms	Breaker Closed	Breaker Open	Expected

Inspection

	As Found	As Left		As Found	As Left
Arc Chutes			Frame		
Primary Disconnects			Auxiliary Devices/Switches		
Secondary Disconnects			Tightness of Connections		
Racking Device			Ground Clip		

Check

Main Moving Contacts and Stationary Contacts

Contact Alignment	Contact Pressure		

Test

Contact Resistance

'A' Phase	'B' Phase	'C' Phase	Expected

Check

Operating Mechanism

Trip Bar Latch Engagement	Manual Close		
Latch Engagement	Manual Trip		
Shunt Trip	Electrical Charge		
Control Device	Electrical Close		
Manual Charge	Electrical Trip		

Test

Final Insulation Resistance

At 1000 V.D.C. Meg Ohms	Breaker Closed	Breaker Open	Expected

Comments

Legend: As Found, S-Satisfaction, U-Unsatisfactory, As Left, A-Adjusted, RPD-Repair, RPL-Replace

Test Unit

Mfg. \_\_\_\_\_ Type \_\_\_\_\_  
Serial No. \_\_\_\_\_  
Part No. \_\_\_\_\_

Pickup

Delay

Pickup

Delay

Short-Time

GND

Pickup

Delay

Pickup

Delay

Amps Tap

Long-Time

Incl.

Test

Trip Functions

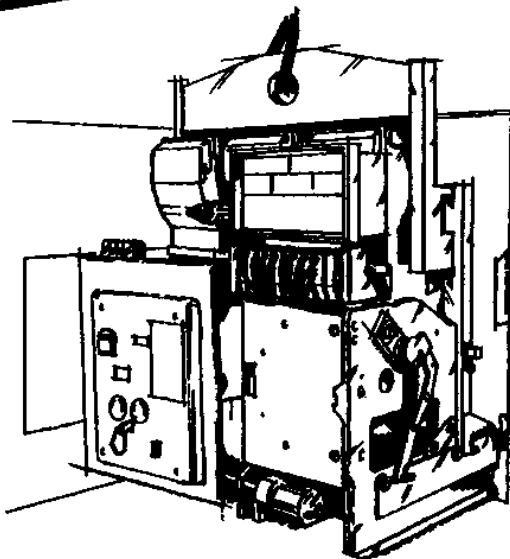
Prim. Injct. ☐ 800 ☐

Function	Expected	"A" Phase	"B" Phase	"C" Phase
LT PU Amps				
LT Delay Sec @ 300%				
ST PU Amps				
ST Delay Sec @ 150%				
Incl PU Amps				
GND PU Amps				
Gnd Delay Sec @ 150%				
Sensor Checks	OK	Not OK		

Location: \_\_\_\_\_  
Substation: \_\_\_\_\_  
Breaker ID: \_\_\_\_\_  
Date: \_\_\_\_\_  
Sign: \_\_\_\_\_

UPON COMPLETION OF ANY WORK  
ON THE CIRCUIT BREAKER FILL IN  
THE APPROPRIATE SECTION OF THE  
TEST REPORT THEN...

SIGN, DATE AND  
FILE THE  
REPORT FORM



Circuit Breaker

Manufacturer: \_\_\_\_\_ Model/Type: \_\_\_\_\_  
Serial Number: \_\_\_\_\_  
Voltage: \_\_\_\_\_ Ampere Rating: \_\_\_\_\_

Test

Initial Insulation Resistance

At 1000 V.D.C. Meg Ohms	Breaker Closed	Breaker Open	Expected

Inspection

	As Found	As Left		As Found	As Left
Arc Chutes			Frame		
Primary Disconnects			Auxiliary Devices/Switches		
Secondary Disconnects			Tightness of Connections		
Racking Device			Ground Clip		

Check

Main Moving Contacts and Stationary Contacts

Contact Alignment		Contact Pressure		
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Test

Contact Resistance

"A" Phase		"C" Phase		
"B" Phase		Expected		

Check

Operating Mechanism

Trip Bar Latch Engagement		Manual Close		
Latch Engagement		Manual Trip		
Shunt Trip		Electrical Charge		
Control Device		Electrical Close		
Manual Charge		Electrical Trip		

Test

Final Insulation Resistance

At 1000 V.D.C. Meg Ohms	Breaker Closed	Breaker Open	Expected

Comments

Legend: As Found, B-Satisfaction, Un-Satisfactory, As Left, As-Adjusted, RPD-Repair, RPL-Replace

Trip Unit Settings

Mfg. \_\_\_\_\_ Type \_\_\_\_\_  
Serial No. \_\_\_\_\_  
Part No. \_\_\_\_\_

Pickup	Delay	Pickup	Delay
Short-Time		GND	
	Pickup	Delay	Pickup
Ampere Tap	Long-Time		Inst.

Trip Functions

Prvs. Injct. ☐ SBI ☐

Function	Expected	"A" Phase	"B" Phase	"C" Phase
LY PU Amps				
LY Delay Sec @ 300%				
ST PU Amps				
ST Delay Sec @ 150%				
Inst PU Amps				
GND PU Amps				
Gnd Delay Sec @ 150%				
Sensor Checks	OK		Not OK	

Location: \_\_\_\_\_  
Substation: \_\_\_\_\_  
Breaker ID: \_\_\_\_\_  
Date: \_\_\_\_\_  
Sign: \_\_\_\_\_

FOR ADDITIONAL TEST PROCEDURES, REFER TO  
POWER SHIELD AND PRIMARY INJECTION TEST BOOK

Report Form

ABB