GINNA STATION
UNIT #1
COMPLETED
DATE:-
TIME-

ROCHESTER GAS AND ELECTRIC CORPORATION

GINNA STATION

CONTROLLED COPY NUMBER 4

PROCEDURE NO. M-32.2 REV. NO. 7

DB-50 REACTOR TRIP CIRCUIT BREAKER INSPECTION, MAINTENANCE AND TEST

TECHNICAL REVIEW

PORC REVIEW DATE MAR 27 1985

QC REVIEW

PLANT SUPERINTENDENT

APR 02 1985
EFFECTIVE DATE

QA X NON-QA _____ CATEGORY 1.0

REVIEWED BY: _____

THIS PROCEDURE CONTAINS 35 PAGES

M-32.2

DB-50 REACTOR TRIP CIRCUIT BREAKER INSPECTION, MAINTENANCE AND TEST

1.0 PURPOSE:

1.1 To provide instructions to perform inspection, maintenance and test of DB-50 Reactor Trip and Reactor Trip Bypass Breakers.

2.0 REFERENCES:

2.1 Westinghouse switchgear division instruction book 1B-33-850-3C instructions for DB-50, DBF-16 and DBL-50 air circuit breakers.

2.2 Westinghouse Technical Bulletin NSD-TB-83-02, Rev. 1, dated September 13, 1983.

2.3 Maintenance program for DB-50 reactor trip switchgear revision 0, October 14, 1983.

2.4 NRC generic letter 83-28.

2.5 November 23, 1984 NRC request for additional information concerning generic letter 83-28.

2.6 W FCN RGE 0-40503 shunt coils RT switchgear.

2.7 RG&E's 2/28/84 response to NRC's request for supplemental information concerning generic letter 83-28.

3.0 INITIAL CONDITIONS:

3.1 Notify QC prior to starting the job, for assignment of Inspection Personnel.

_____

3.2 Plant may be in any mode of operations.

_____

3.3 The Shift Supervisor and Head Control Operator shall be notified just prior to any inspection or maintenance on the reactor trip system.

Shift Supervisor _____

Head Control Operator _____

4.0 PRECAUTIONS:

4.1 Obtain replacement parts in accordance with A-801..

5.0 INSTRUCTIONS:

5.1 Indicate here and on front cover of procedure the breaker to be worked on. N/A other spaces not required.

A _____ B _____ Bypass _____ Spare_____

5.2 Remove from Service:

5.2.1 At power (mark N/A if not at power).

5.2.1.1 Establish communications between Control Room, Relay Room, and Reactor Trip Breaker.

_____

5.2.1.2 Electricians place reactor trip bypass breaker into position to bypass breaker under going maintenance, and rack into the "Fully Racked In" position. Verify that 20 AST and 20 ET indicating lights are illuminated at breaker panel.

_____

5.2.1.3 "Close" By-pass Breaker by actuation of reset pushbutton switch in reactor logic test cabinet of the opposite train. Verify that 20 AST and 20 ET indicating lights are NOT illuminated.

_____

5.2.1.4 "Trip" By-pass Breaker by actuation of pushbutton trip switch in reactor logic test cabinet of the opposite train. Verify that 20 AST and 20 ET indicating lights are illuminated.

_____

5.2.1.5 "Close" By-pass Breaker by actuation of reset pushbutton switch, and verify that 20 AST and 20 ET indicating lights are not illuminated.

_____

5.2.1.6 "Trip" Reactor Trip Breaker to be worked on by actuation of pushbutton trip switch in the reactor logic test cabinet for that train.

_____

5.3 Notify I/C shop foreman to perform PT-32.5, Reactor Trip Breakers "A" & "B" Train Response Time Testing.

_____

5.4 Hold breaker in accordance with A-1401 Station Holding Rules, if applicable.

_____

5.5 Testing:

5.5.1 Trip Bar (Fig. 1):

5.5.1.1 Energize the undervoltage coil from a dc source, at the rated voltage, with a capacity of at least 0.25 amperes.

_____

5.5.1.2 Mechanical trip force test.

5.5.1.2.1 Raise and lower the trip bar by hand to assure that it does not bind; i.e., it should feel like a free weight. Close the breaker and initiate a trip by pushing down the positioning lever. Log results on data sheet.

_____

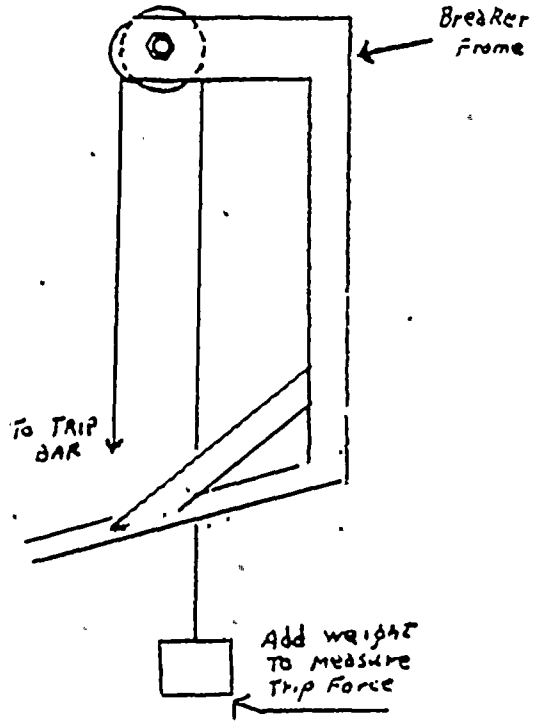
5.5.1.2.2 Close the breaker manually.

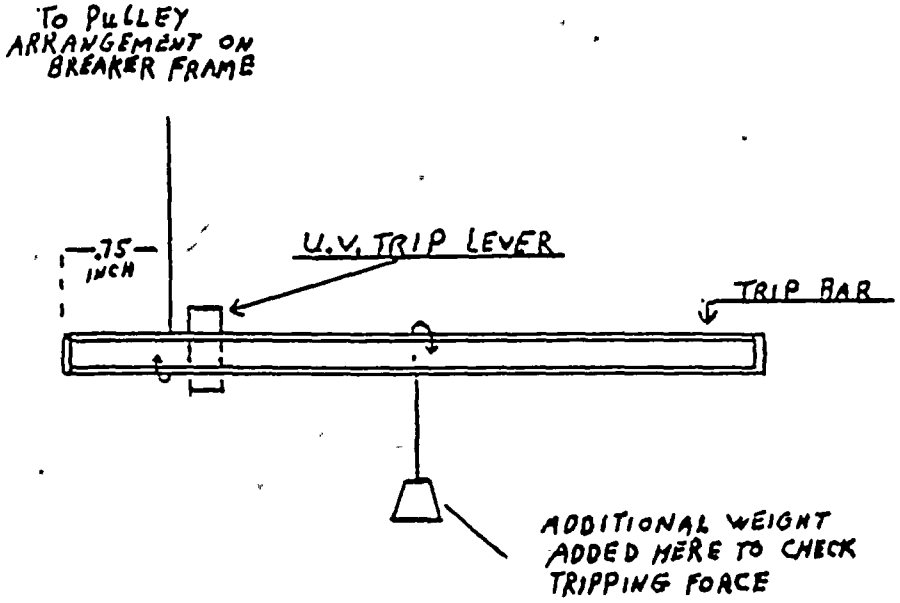
_____

5.5.1.2.3 Add weights to weight stand via bearing arrangement pulling vertically on the trip bar. Record the total weight (weights and weight stand) added to the bar. The trip force should be 870 grams or less. Log results on data sheet.

_____

5.5.1.2.4 The following steps are to establish that there is margin in the trip force of the undervoltage device.


Breaker Frame
To Trip Bar
Add weight To measure Trip Force


To Pulley Arrangement on Breaker Frame
.75 inch
U.V. Trip Lever
Trip Bar
Additional weight added here to check tripping force

5.5.1.2.5 Load the trip bar (see attached drawing) with a weight of 460 grams minimum to 560 grams maximum.

_____

5.5.1.2.6 Manually close the breaker.

_____

5.5.1.2.7 De-energize the undervoltage coil and observe and that the breaker trips. If the breaker does not trip, it is an indication that the undervoltage device requires cleaning and/or lubrication or replacement. Log results on data sheet.

_____

5.5.1.2.8 Re-energize the undervoltage coil and manually close breaker.

_____

5.5.1.2.9 Apply 70 VDC ± .5v to shunt trip circuit and apply trip signal. Repeat 5 times. If breaker fails to trip notify I&C Supervisor. Log results on data sheet.

_____

5.5.1.2.10 Remove the weights.

_____

5.6 Cleaning:

5.6.1 When cleaning is required, it should consist of wiping with paper towels or lint-free cloths to remove dust and dirt. In some cases, brushing with a medium bristle or stiff bristle brush may be necessary. Do not use a wire brush. Brushing should be supplemented by vacuuming.

If sticky or gummy substances are present, a mild solvent such as Stoddards Solvent may be used. The preferred method is to apply the solvent by dampening a paper towel and wiping the affected area. In confined areas or in cleaning small parts, apply the solvent sparingly using a small brush. Do not apply the solvent to coils, wires, or other electrically insulated parts.

CAUTION: Keep sparks and flames away. Do not breathe large quantities of vapor. Avoid excess contact with skin.

step 5.6.1 cont.

Except for use in cleaning of removed arc chutes, avoid the use of high pressure air. Dirt, grit or other substances can be driven into spaces between parts creating friction, which would not otherwise occur. Log results on data sheet.

5.7 Inspections:

5.7.1 Operating Mechanism (Fig. 1):

NOTE: This test will require two persons. Since the Undervoltage Trip Attachment (UVTA) is deenergized it must be temporarily restrained in the reset position. One person will be required to hold back the UVTA reset lever (Figure 4) by means of a wire or nylon cord (12" minimum). The other person will perform the following:

CAUTION: Keep hands and tools well away from moving parts of the breaker to avoid personal injury or equipment.

5.7.1.1 Rotate the manual operating handle slowly in a clockwise direction to move the contacts toward the closed position.

5.7.1.2 Observe whether all moving parts are in proper alignment and move freely.

5.7.1.3 Be sure that the contacts are clean and properly aligned.

5.7.1.4 If the contacts are in alignment and all parts move freely, continue the clockwise rotation until the breaker is latched.

5.7.1.5 Push the "push-to-trip" button to trip the breaker. the toggle linkage should collapse and the moving contact assembly move freely to the full open position. This should be followed immediately by complete resetting of the links in the toggle mechanism. The links must always be free to move without friction or binding. Log results on data sheet.

5.7.1.6 Remove temporary restraining wire or cord from UV trip attachment.

_____

5.7.2 Retaining Rings:

5.7.2.1 Check that all retaining rings are securely in place on all visible shafts and pins as follows:

	Qty
Hinge Pins on Station Arcing Contact	6
Hinge Pins on moveable main contact	6
Crossbar	2
Operating Mechanism	11
Auxiliary Switch Linkage	3
Pantograph	7
Positioning and Interlock Lever	2
Shunt Trip Attachment	1
Undervoltage Attachment	5
Total	43

Log results on data sheet.

_____

5.7.3 Bolts:

5.7.3.1 Check all visible bolts and nuts for tightness. Log results on data sheet.

_____

5.7.4 Pole Bases:

5.7.4.1 Physical condition, i.e. cleanliness, cracks. Log results on data sheet.

_____

5.7.5 Arc Chutes:

5.7.5.1 While a somewhat pitted, mottled and sooty appearance is normal, be alert for heavy erosion or broken plates. Damaged chutes should be replaced. Log results on data sheet.

5.7.6 Arcing & Main Contacts (Fig. 1):

5.7.6.1 Check for roughness, spawling, galling & distortion. Log results on data sheet.

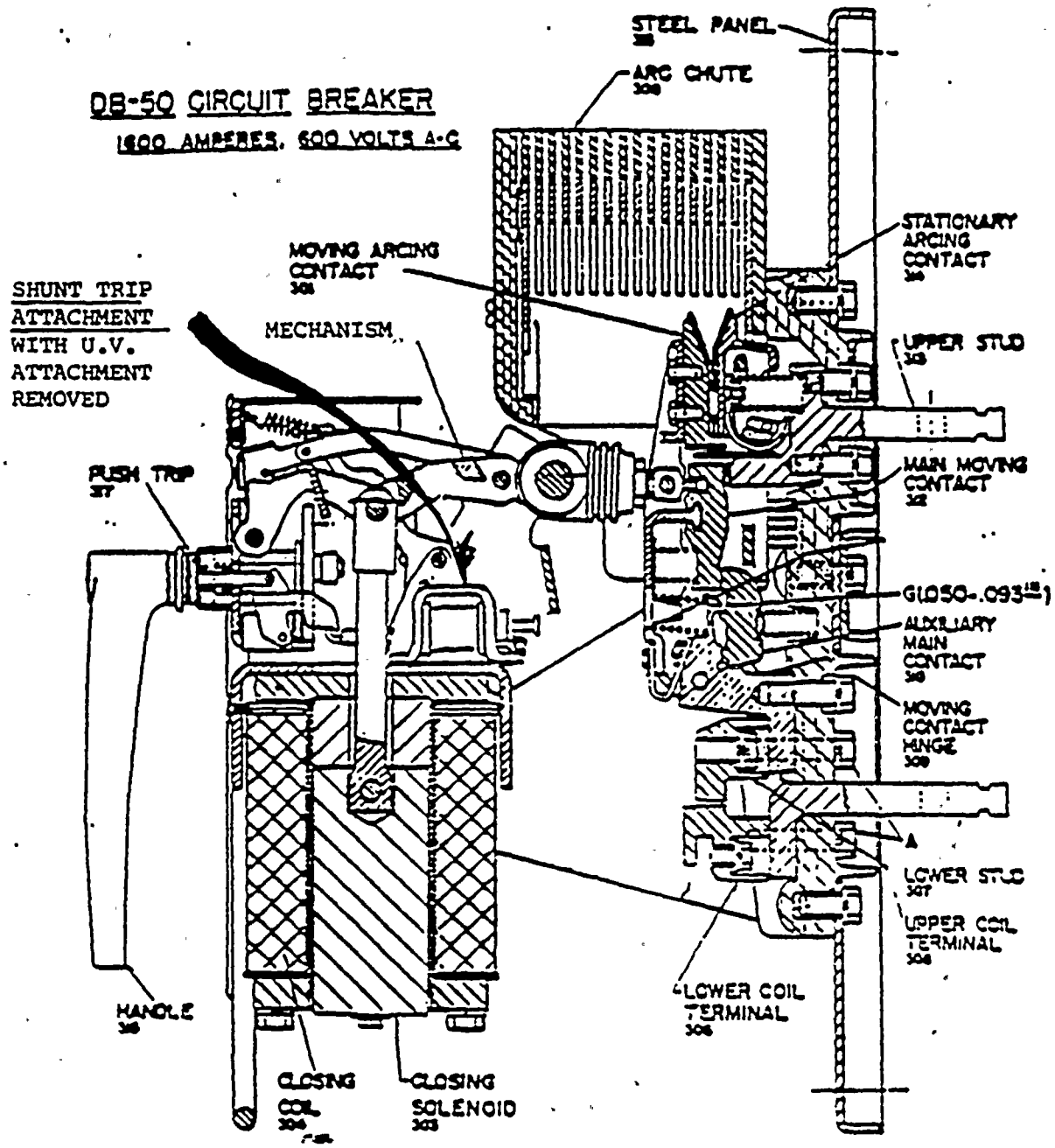
NOTE: Some tarnishing is normal due to silver oxides and sulfides. Dress or replace per sec. V-A-1.

5.7.6.2 The DB-50 arcing contact should touch first on closing, open last on opening. Contact pressure on the mains is maintained by adjusting gap G to 050-093 inches. This gap is adjusted by removing the cross BHR and screwing the insulting link in or out on the stud. Be sure to tighten the lock nuts after each adjustment. Log results on data sheet.

CAUTION: Do not over-adjust as this will cause the contact springs to compress to the solid position and thus increase the closing effort.

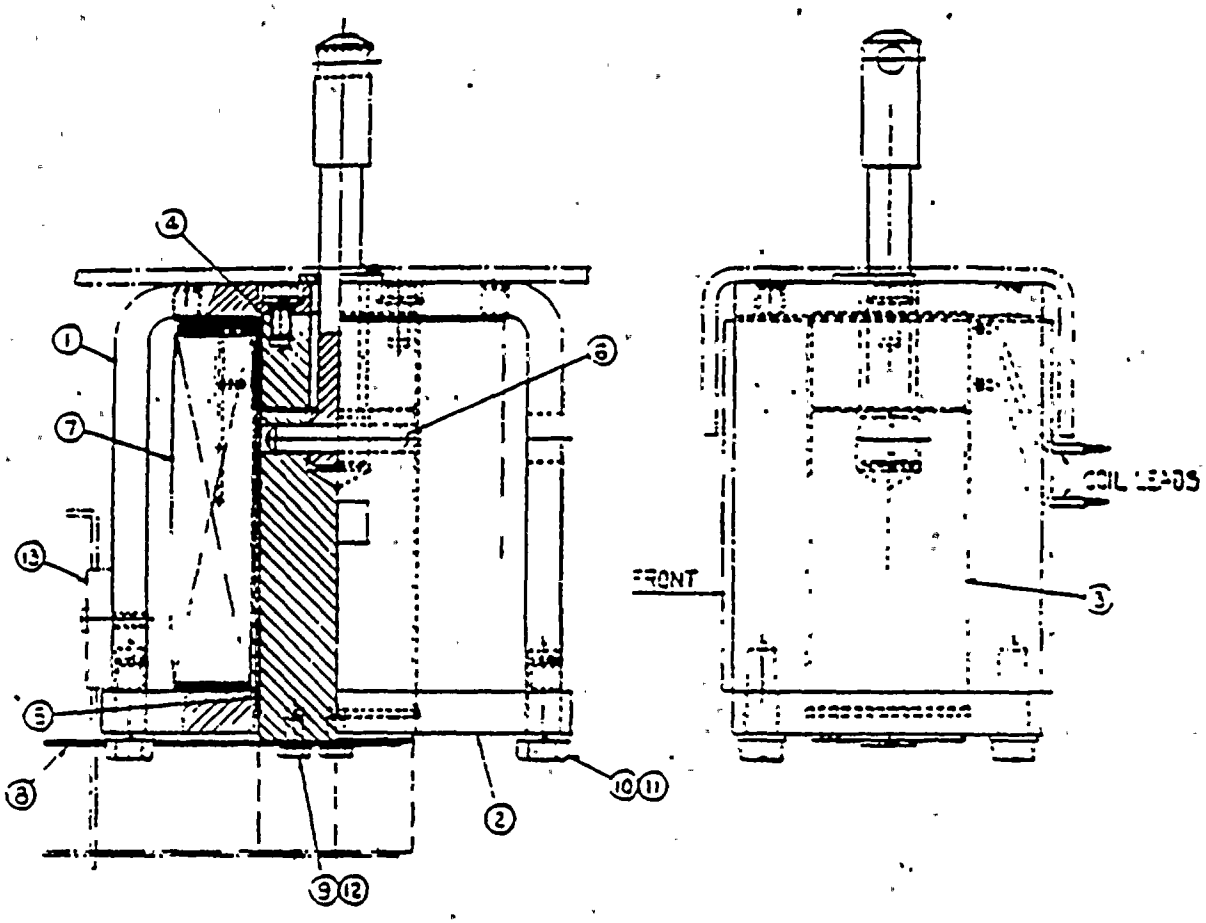
5.7.6.3 Check for over-adjustment by prying the stationary arc tips open to at least 1/16 - inch gap. Log results on data sheet.

5.7.6.4 Re-install the three arc chutes.

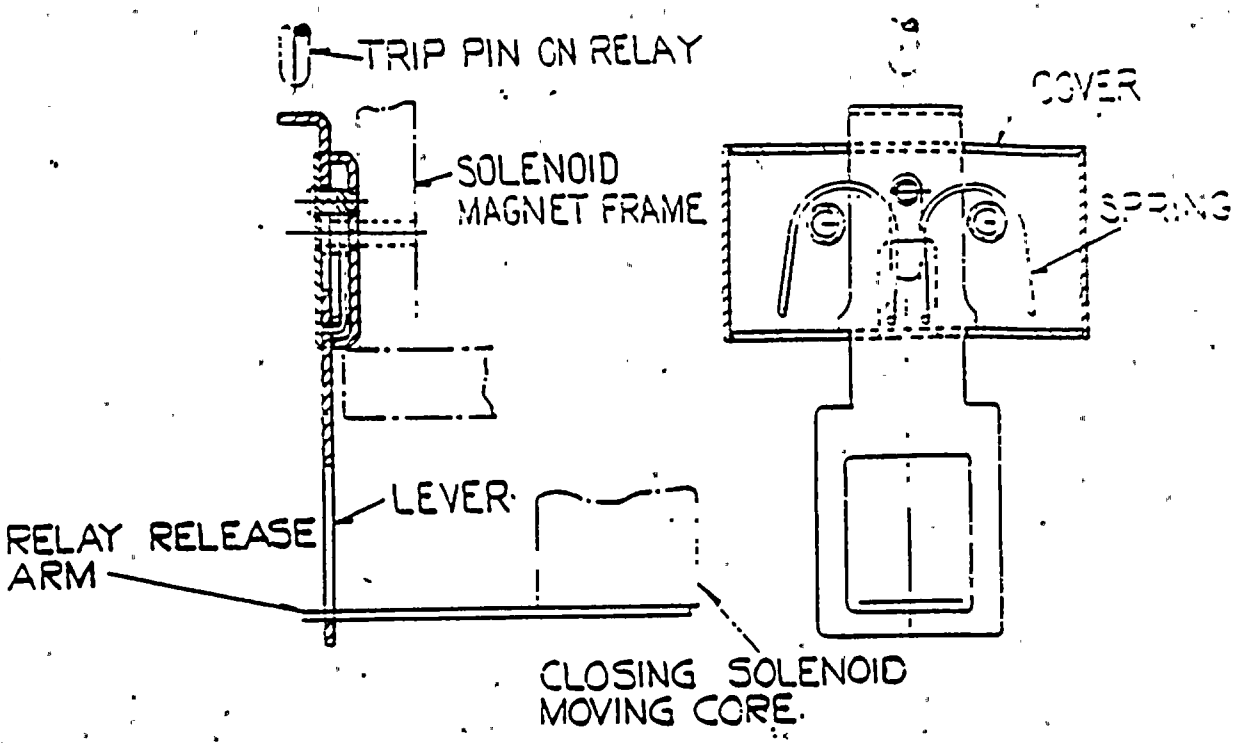


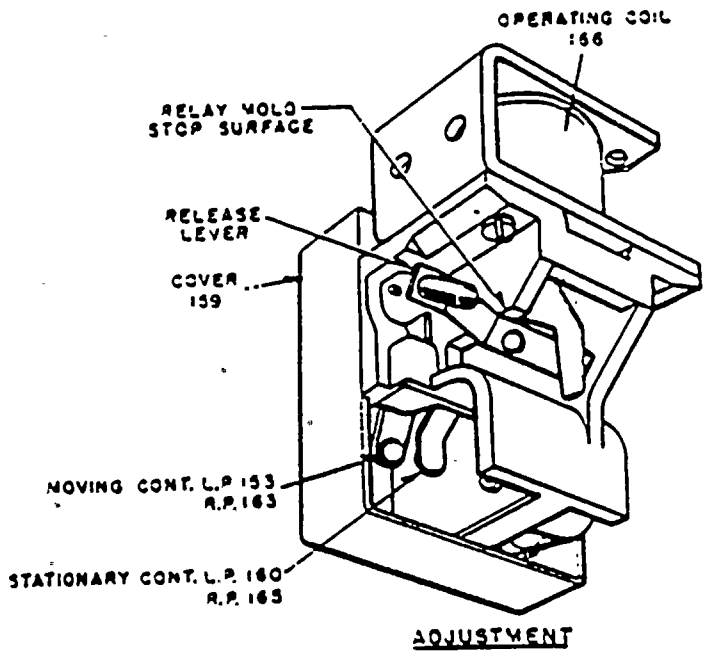
BREAKER SHOWN IN CLOSED POSITION

CLOSING SOLENIOD - CONSTRUCTION DETAILS

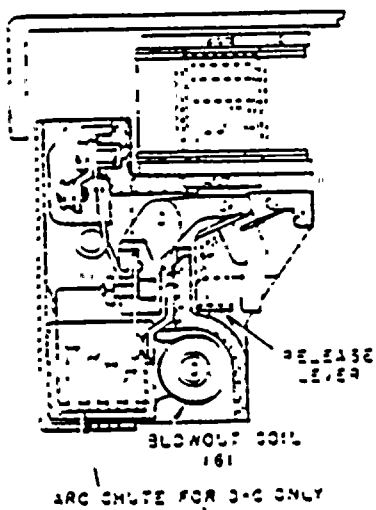


CONTROL RELAY - ADJUSTMENT AND CONSTRUCTION DETAILS





ADJUSTMENT



ARC CHUTE FOR 3-C ONLY

5.7.7 Insulating Link (Fig. 1):

5.7.7.1 Check for cleanliness, chips, cracks, and tightness of locknut. Log results on data sheet.

_____

5.7.8 Wiring:

5.7.8.1 Check condition of insulation and terminations. Log results on data sheet.

_____

5.7.9 Closing Solenoid (Fig. 2):

5.7.9.1 Check for loose bolts. Log results on data sheet.

_____

5.7.10 Control Relay (Fig. 3):

5.7.10.1 Examine contacts for burning wear & pitting; replace if necessary. Log results on data sheet.

_____

5.7.11 Undervoltage Trip Attachment (UVTA) (Fig. 4):

5.7.11.1 With the UV attachment deenergized but held in the reset position by a temporary restraining wire or cord on the reset lever, (per activity 2a) the breaker is closed manually. Then, the temporary restraint is slowly released*, allowing UV attachment to perform the breaker trip function before the reset lever comes to rest. Monitor for unhesitant, smoother, positive, snap-action of the UV attachment, and breaker trip. Log results on data sheet.

_____

*CAUTION: Be sure to hold the very end of the restraining line and keep both hands, as well as equipment, away from crossbar which will snap back as breaker trips.

5.7.11.2 If lubrication of UV Attachment is considered necessary, lubricate per Attachment 1. (NA otherwise)

_____

5.7.11.3 With UV coil energized inspect for visible gap between UVTA trip level and breaker trip bar with breaker half-way closed. Log results on data sheet.

_____

5.7.11.4 Dropout Voltage Test:

5.7.11.4.1 Connect a d.c. power supply (adjustable 10-125V, rated 5 amps at 125V) and a voltmeter (± 1% accuracy) across UVTA coil by means of test leads across SECONDARY CONTACT terminals. Apply rated voltage and close breaker manually.

NOTE: Obtain "Reference" dropout voltage from previous completed procedure for this breaker and log on data sheet.

5.7.11.4.2 Reduce voltage to within 5-6 volts of last recorded dropout voltage (on very first test make quick trial run) and then decrease voltage slowly (15 sec/volt) until breaker trips. Repeat test twice and average the three readings. Record the average dropout voltage on data sheet. If this is the very first dropout voltage test on this UTVA, then the measurement also becomes its "REFERENCE" dropout voltage.

5.7.11.4.3 Replace UTVA under the following criteria, based on "after lubrication" data: a) Dropout voltage is greater than 75 VDC and less than 37.5 VDC. b) Dropout voltage differs by more than ± 5 volts from the "REFERENCE" voltage.

|__| Replaced |__| Not Replaced

5.7.11.5 Check mounting bolt tightness.

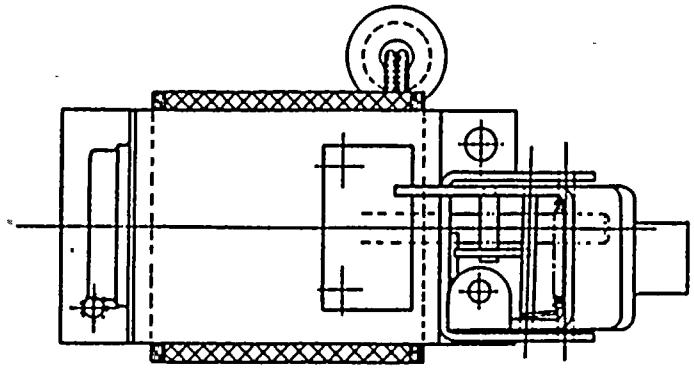
5.7.12 Shunt Trip Attachment (Fig. 5)

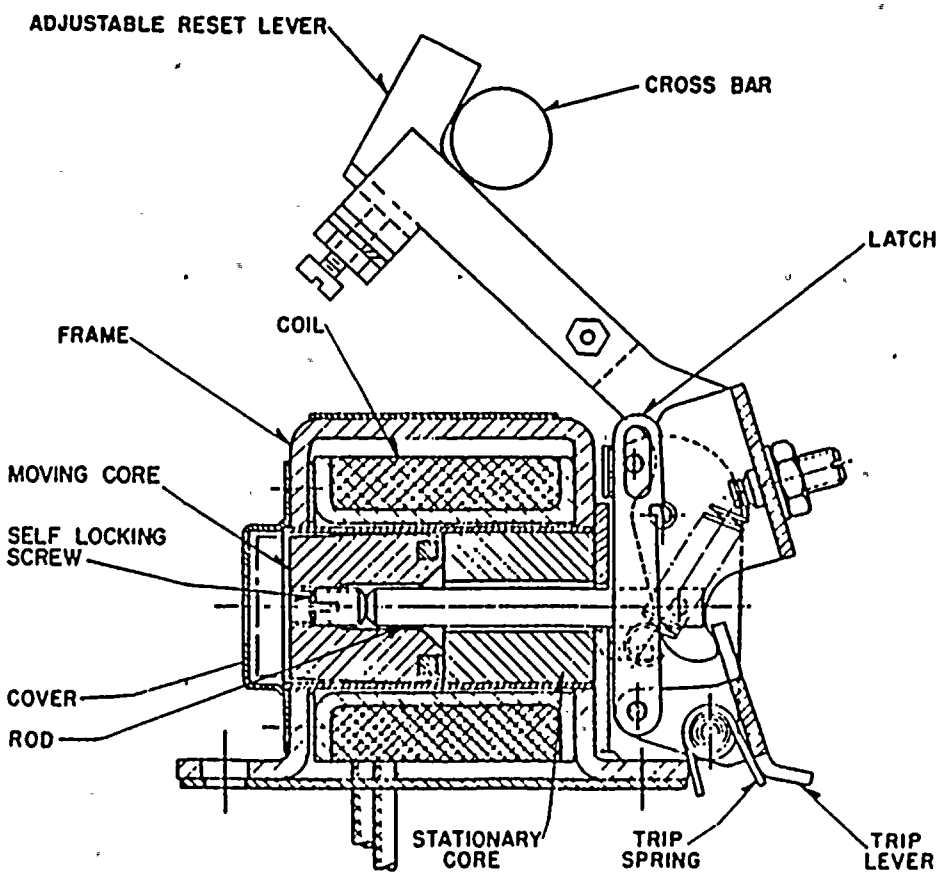
5.7.12.1 With the breaker in the open position, manually push the moving core against the stationary core (should feel free and non-binding) and rotate the breaker handle to the closed position. The breaker should be trip free. (Trip lever will raise trip bar which prevents closing of breaker.) Log results on data sheet.

5.7.12.2 The trip lever of the shunt trip should have from 1/32 to 1/8 inch clearance to the trip bar. Log results on data sheet.

5.7.12.3 Check mounting bolts. Log results on data sheet.

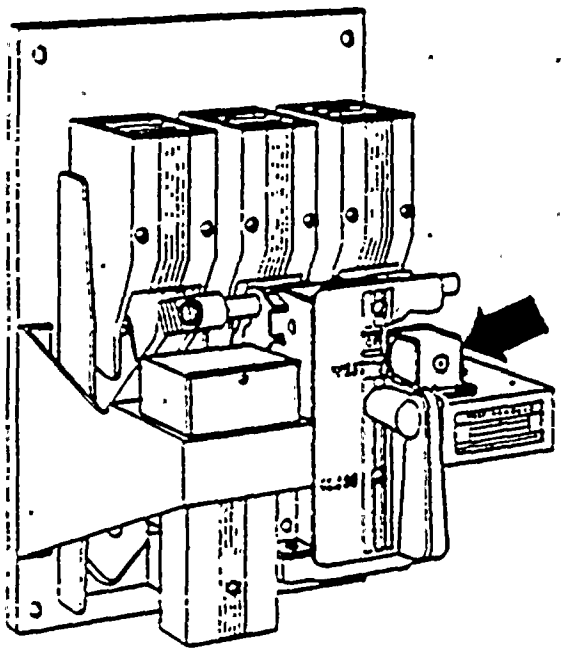
5.7.12.4 Close breaker and apply 70 VDC to shunt coil of closed breaker via SECONDARY CONTACT Terminals. If breaker does not trip, replace SHUNT TRIP attachment. Log results on data sheet.



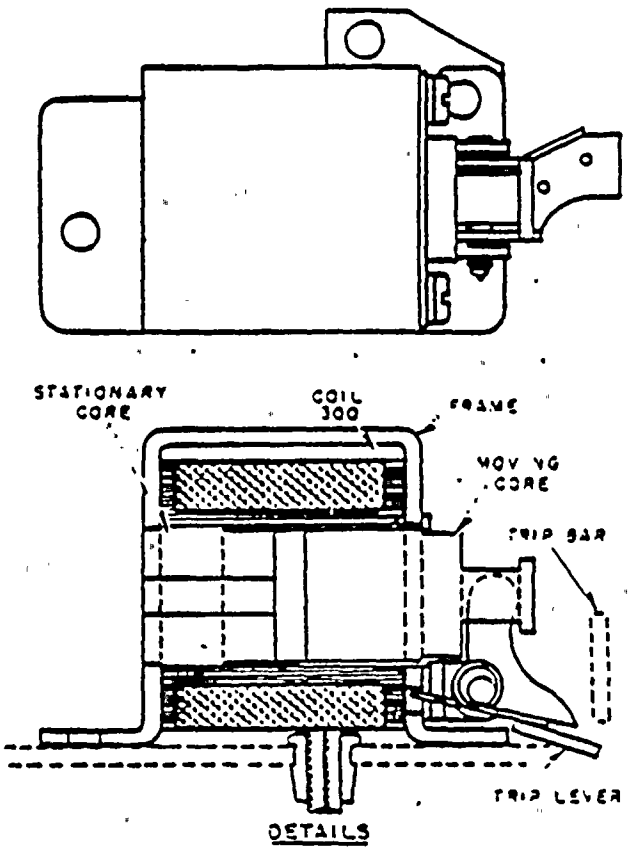


- Undervoltage Trip Attachment - Construction Details

SHUNT TRIP ATTACHMENT - LOCATION AND CONSTRUCTION DETAILS



LOCATION



DETAILS

5.7.13 Auxiliary Switches (Fig. 6)

5.7.13.1 Manually operate breaker and check contact engagement in the breaker "CLOSED" and "OPEN" positions. Log results on data sheet.

_____

5.7.13.2 Inspect contacts for burning & pitting. Log results on data sheet.

_____

5.7.13.3 Check mounting bolts. Log results on data sheet.

_____

5.7.14 Positioning Lever:

5.7.14.1 The spring-loaded positioning lever on the left side of the breaker should be inspected for:

Lever Should be undistorted and move freely.

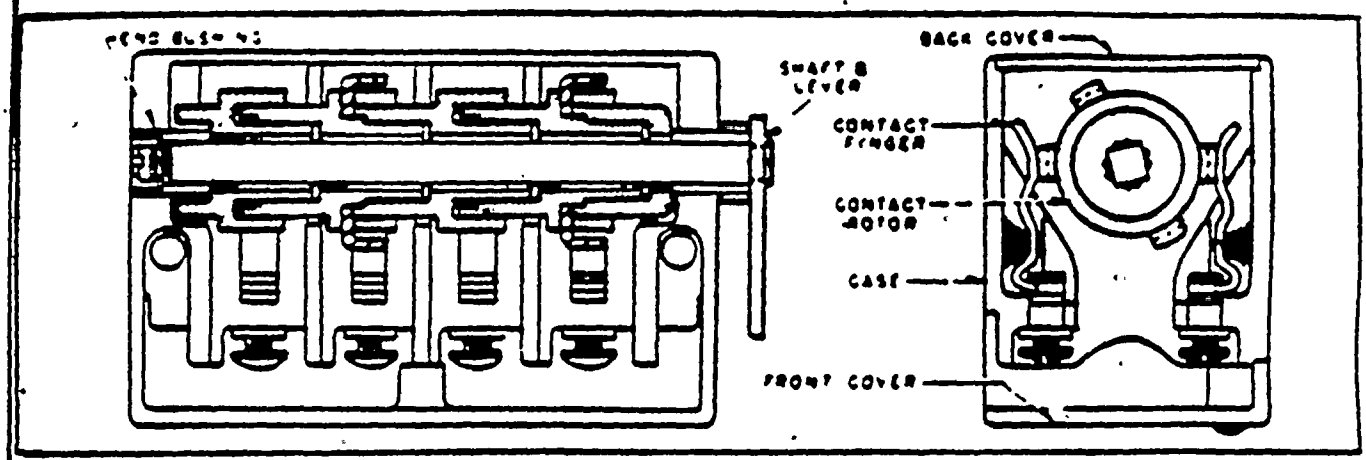
Stop pin should be undistorted.

Trip arm should be undistorted.

Clearance between trip tab and trip bar on breaker positioning attachment on left side of breaker. (Clearance should be 1/8" minimum to 3/16" maximum.) Log results on data sheet.

_____

AUXILIARY SWITCH - CONSTRUCTION DETAILS



5.7.15 Cell Interlocks:

5.7.15.1 Depress the positioning interlock lever on left side of breaker; closed breaker should trip.

_____

5.8 Breaker Megger Readings:

5.8.1 With breaker open measure resistance between each phase to ground and phase to phase, using 500 volt megger. Log results on data sheet.

_____

5.8.2 With breaker closed measure resistance between each phase to ground and phase to phase, using a 500 volt megger. Log results on data sheet.

_____

5.9 Testing:

5.9.1 Trip Bar (Fig. 1):

5.9.1.1 Energize the undervoltage coil from a dc source, at the rated voltage, with a capacity of at least 0.24 amperes.

_____

5.9.1.2 Mechanical trip force test.

5.9.1.2.1 Raise and lower the trip bar by hand to assure that it does not bind; i.e., it should feel like a free weight. Close the breaker and initiate a trip by pushing down the position lever. Log results on data sheet.

_____

5.9.1.2.2 Close the breaker manually.

_____

5.9.1.2.3 Add weights to weight stand via bearing arrangement pulling vertically on the trip bar. Record the total weight (weights and weight stand) added to the bar. The trip force should be 870 grams or less. Log results on data sheet.

_____

5.9.1.2.4 The following steps are to establish that there is margin in the trip force of the undervoltage device.

5.9.1.2.5 Load the trip bar (see attached drawing) with a weight of 460 grams minimum to 560 grams maximum.

_____

5.9.1.2.6 Manually close the breaker.

_____

5.9.1.2.7 De-energize the undervoltage coil and observe and that the breaker trips. If the breaker does not trip, it is an indication that the undervoltage device requires replacement. Log results on data sheet.

_____

5.9.1.2.8 Re-energize the undervoltage coil and manually close breaker.

_____

5.9.1.2.9 Apply 70 VDC ± .5v to shunt trip circuit and apply trip signal. Repeat 5 times. If breaker fails to trip notify I&C Supervisor. Log results on data sheet.

_____

5.9.1.2.10 Remove the weights.

_____

5.10 Function Check Prior to Returning to Service:

5.10.1 Check for any tools and equipment left in breaker.

_____

5.10.2 After inspection and maintenance, perform a final operational check of the UV Attachment and breaker trip action by closing the breaker either manually or electrically, then tripped by de-energizing of the UV Attachment. Repeat this 10 times and document on attached data sheet.

NOTE: This applies to post maintenance testing and is not associated with PT or RSSP test procedures.

_____

5.11 Switchgear Enclosure: (N/A this step if switchgear is alive and/or if maintenance was on spare Rx breaker.)

5.11.1 Inspect both the stationary portions of the main, as well as, secondary disconnecting devices for abnormal wear and overheating. Discolorations of the surface is not harmful unless corrosion due to atmospheric conditions is sufficiently severe as to leave deposits on the contact surfaces. Any deposits must be removed by rubbing with a clean cloth moistened with Stoddard's Solvent, otherwise a new-contact has to be installed. Log results on data sheet.

_____

5.11.2 Remove dust from buses, connections, supports, enclosure surfaces etc. using the methods outlined in Section III.

_____

5.11.3 Check buses, primary connections and supports for tight bolts; also, check all secondary wiring connections at the terminal blocks. Log results on data sheet.

_____

5.11.4 Inspect the positioning stop bracket and support rails for signs of mechanical damage and corrosion. Log results on data sheet.

_____

5.11.5 Check breaker support wheels for free movement. Inspect cell interlock switches for distortion, free movement and test for proper contact operation. Log results on data sheet.

_____

5.11.6 Megger test switchgear bus and wiring. Log results on data sheet.

_____

5.11.7 Place the breaker in the cubicle, place it in the "test" position, and close the breaker.

_____

5.11.7.1 Depress the position lever, and the breaker should trip.

_____

5.11.7.2 Try closing the breaker between the "test" and "connected" position; it should not close.

_____

5.12 Remove hold on breaker. _____

5.13 Notify Results and Test supervisor of maintenance performed and the need to test the reactor trip breaker using test procedures PT-32.5 (Reactor Trip Breakers "A" & "B" Train Response Time Testing). _____

5.14 I&C Supervisor and the Electric Shop Foreman review the results of this procedure and evaluate them to the previous breaker maintenance results.

COMMENTS: _____

_____

Electric Foreman _____

I&C Supervisor _____

COMPLETED BY: _____

DATE COMPLETED: _____

ELECTRICIAN FOREMAN: _____

Q. C. SUPERVISION: _____

RESULTS & TEST SUPERVISION: _____

I&C SUPERVISOR: _____

POST PORC REVIEW DATE: _____

IV LUBRICATION

UVTA FIELD LUBRICATION

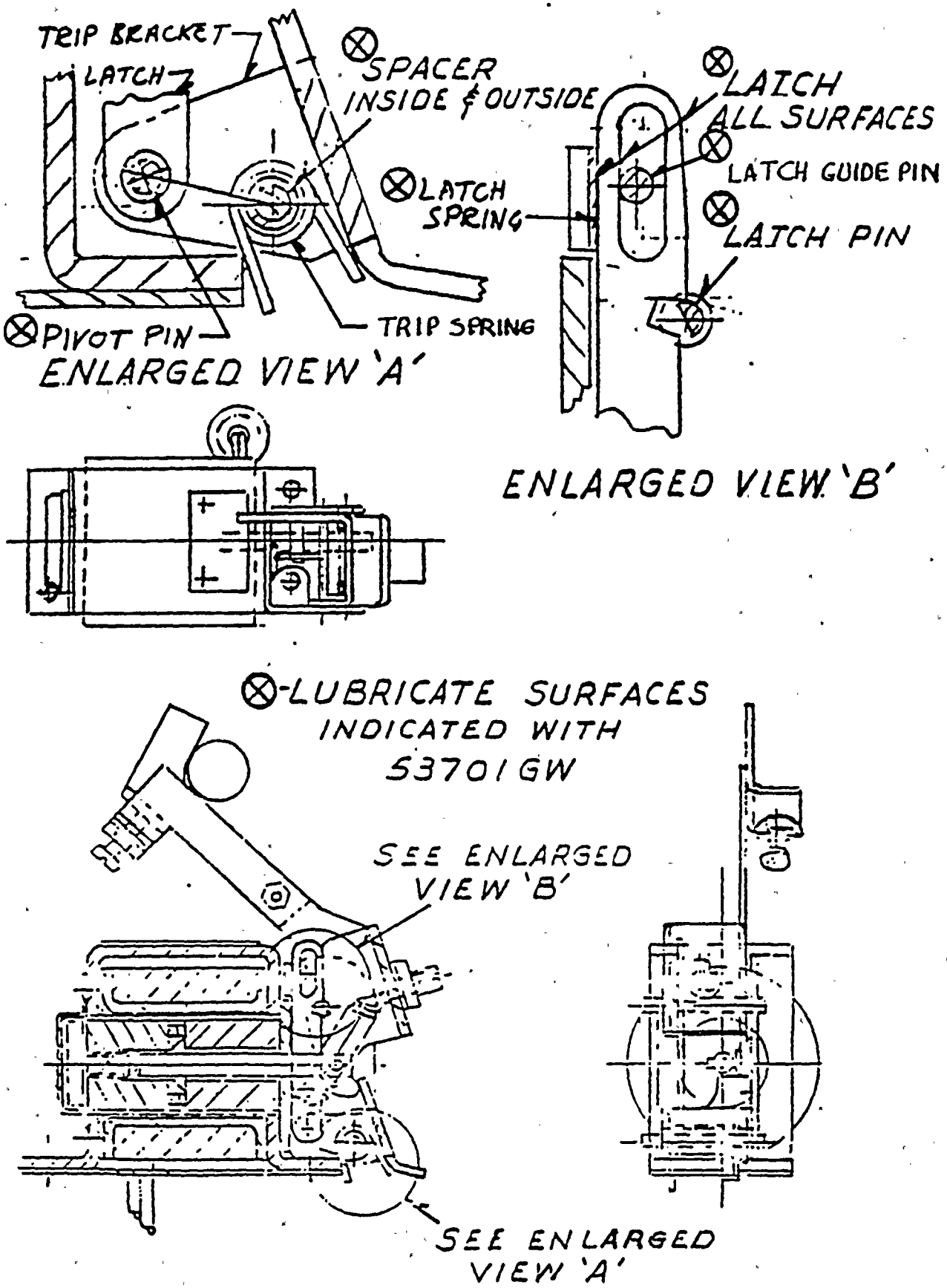


FIG. 8

IV Lubrication

A. The only points requiring periodic re-lubrication on the DB-50, as configured for reactor trip service, are located on the UV trip attachment. These should be lubricated with 53701GW lubricant (see "C" below) as follows:

Lubrication Points -- Referring to the attached sketch (Fig. 8), the following points require periodic lubrication:

1. Latch to latch spring
2. Latch loop to latch guide-pin
3. Latch to latch pin
4. Latch pivot pin
5. Pin running through the trip spring

NOTE: The latch pin, latch guide pin, latch pivot pin, and the trip spring pin are to be lubricated at all points along their lengths where there is existing or potential metal-to-metal contact, including ends where pins pass through support brackets. In addition, lubricant should be applied to bracket inside surfaces which may contact latch pivot pin ends.

Lubrication Techniques

1. The lubricant is to be applied using the container and dispensing tube provided with the Lubrication Kit. Lubricant handling and application techniques are further described in the Instruction Sheet accompanying the Kit, and reproduced on following pages.

2. The lubrication may be performed without removing the UVTA from its mounting. However, special care is required to reach all lubrication points by varying the direction of the application bottle dispensing tube.

3. Dispense drops of lubricant at designated points by placing tip of dispensing tube at the appropriate location and gently raising the container.

4. Apply lubricant liberally at all points, and manually exercise the mechanism during and following lubricant application. This manual exercising is accomplished by first blocking the Breaker partially towards the closed position (so that the UTVA reset lever is released). Exercise the device by manipulating the reset lever.

Lubrication Precautions

1. The lubrication mixture must be kept thoroughly mixed prior to and throughout the procedure by vigorously shaking the container occasionally.

2. Place a cloth beneath the UVTA while applying lubricant to collect over-shoot and run-off lubricant.

3. Additional precautions on handling of the lubricant are provided in the Instruction Sheet accompanying the Lubrication Kit. (See attached procedure on following pages)

4. Intervals between relubrication of the UVTA should not exceed 200 Breaker operation cycles. (Breaker open then Breaker closed equals one cycle.)

B. In cases where a solvent has been used to clean a circuit breaker so that originally applied lubrication may have been removed or in cases where a circuit breaker shows signs of sluggishness or friction, lubricant 53701GW may be applied sparingly to all mechanism pins, bearing points, and latch surfaces. Upon completion of lubrication, the breaker should be closed and tripped several times.

CAUTION: NEVER USE 53701GW LUBRICANT ON CURRENT CARRYING PARTS.

C. Lubrication Materials The only UVTA lubricant approved by Westinghouse is a composition of a finely ground and purified natural ore of molybdenum disulfide and iso-propyl alcohol. It is prepared by mixing 5 parts by weight of this lubricating grade molybdenum disulfide with 3 parts by weight of commercial grade iso-propyl alcohol. This lubricant is identified as Westinghouse Spec 53701GW, Rev. C. For better flow characteristics, the mix ratio has been revised slightly from earlier batches. Any on-hand supplies of lubricant to an earlier Revision of this Specification may be used providing lubricant application is closely monitored to ascertain that adequate flow is attained.

This lubricant, including handling and dispensing accessories, is commercially available thru:

William F. Nye, Inc.
P.O. Box G-927,
New Bedford, Mass. 02742;
Phone 617-996-6721

Specify Lubrication Kit Westinghouse No. 693C500G04.

PROCEDURE FOR USING LUBRICATION KIT (693C500G04) OF MOLYBDENUM DISULFIDE W 53701GW

Contents

1 - Glass Container of Lubricant, 53701GW, Rev. C
1 - Glass Container of Solvent, 51100CN
1 - Dispensing Assembly, 693C500G03

NOTE: The solvent and the liquid portion of the lubricant are flammable. Proper ventilation should be maintained. Keep away from sparks, fire or flame.

Application

1. Thoroughly mix contents in glass container of lubricant by shaking vigorously for two minutes.

2. Pour lubricant into plastic container and attach the dispensing tube assembly. Tighten the tube assembly on the container. Pull gently on tube to make sure it is fully extended.

3. Dispense drops of lubricant at designated points by placing tip of dispensing tube at appropriate location and raising lubricant container to the vertical position. Squeeze container gently if necessary.

   It may be desirable to try out the dispenser to get a feel for the position required to dispense one drop. The closer the lubricant container is to a vertical position above the tube tip, the faster the flow. By lowering the container to the horizontal position the flow of lubricant can be stopped.

4. While using the lubricant, shake the container about every minute to keep the lubricant from settling out.

5. If the contents have been left standing for longer than 5 minutes, it will require shaking for two minutes.

6. After using the dispenser for lubrication and if lubricant is to be stored overnight or longer, the following storage steps should be taken.

   a) Remove dispensing tube assembly from container and poor lubricant into original container and seal with cap.

   b) Wipe excess lubricant from outside surface of dispensing tube with a clean towel or cloth.

   c) Add 1/4 to 1/2 inch of solvent to dispensing container and attach dispensing tube assembly to top of container, then shake.

   d) Invert container to wash lubricant from dispensing tube. 12 to 15 drops of solvent should clean tube. The solvent is flammable and should be dispensed into a suitable container used for storage of flammable waste solvents. Remove dispensing tube assembly, discard excess solvent, and store the clean dispensing tube assembly for future use.

   e) Seal solvent container with original cap.

7. If tip of dispensing tube assembly becomes clogged it can usually be cleaned by inserting a common pin into the tip opening to clear it. Repeat Sec. 6(c) and (d).

Clean-Up

Lubricant can be removed from skin areas by using liquid hand cleaner and water.

NOTE: If lubricant does not dispense properly, clean dispenser tube per section 6 and/or section 7. If lubricant still does not dispense properly, examine tube for damage and if damaged, replace dispenser tube assembly, 693C500G03. If the dispenser tube assembly is satisfactory, replace container of lubricant with a new one.

DATA SHEET

REACTOR TRIP BREAKER _____A _____B _____BYPASS

WESTINGHOUSE DB-50 S/N _____

TYPE OF INSPECTION: _____ANNUAL _____SPECIAL

5.5.1 Trip Bar - _____Acceptable _____ Unacceptable

5.5.1.2 Trip bar trip force _____ grams

Loaded trip bar UV test _____Tripped _____Didn't trip

Loaded trip bar shunt trip test
_____Acceptable _____Unacceptable

CORRECTIVE ACTIONS: _____
_____
_____

5.6 Cleanliness - _____Good _____Fair _____Poor

CORRECTIVE ACTIONS: _____
_____
_____

5.7.1 Operating Mechanism - _____Acceptable ____ Unacceptable

CORRECTIVE ACTIONS: _____
_____
_____

5.7.2 Retaining Rings - _____None missing _____One or more missing (Identify)

CORRECTIVE ACTIONS: _____
_____
_____

DATA SHEET

5.7.3 Bolts - _____Tight _____Loose (Identify)

CORRECTIVE ACTIONS: _____

_____

_____

5.7.4 Pole Bases - _____Good _____Poor

CORRECTIVE ACTIONS: _____

_____

_____

5.7.5 ARC Chutes: _____ No erosion or damage

_____ Moderate erosion

_____ Heavy erosion and/or damaged plates

CORRECTIVE ACTIONS: _____

_____

_____

5.7.6 Arcing and Main Contacts

Condition: _____Good _____Fair _____Unacceptable

Alignment: _____Acceptable _____Unacceptable

Gap: Phase A _____in. Phase B _____in. Phase C ___in.

CORRECTIVE ACTIONS: _____

_____

_____

5.7.7 Insulating Links: _____Good _____Fair _____Poor

5.7.8 Wiring: _____Good _____Fair _____Poor

CORRECTIVE ACTIONS: _____

_____

_____

DATA SHEET

5.7.9 Closing Solenoid Bolts: _____Tight _____Loose

CORRECTIVE ACTIONS: _____

_____

_____

5.7.10 Control Relay Contacts: _____Good _____Fair ____Poor

CORRECTIVE ACTIONS: _____

_____

_____

5.7.11 Undervoltage Trip attachment:

Action: _____Acceptable _____Acceptable after lube

_____Unacceptable

Gap: _____Acceptable _____Unacceptable

Bolt: _____Tight _____Loose

DROPOUT VOLTAGE TEST

Reference voltage: _____ VDC

1st_____VDC 2nd_____VDC 3rd_____VDC

Average_____VDC

CORRECTIVE ACTIONS: _____

_____

_____

5.7.12 Shunt Trip Attachment:

Core Movement: _____Free _____Binding

Trip Free: _____Yes _____No

Trip Bar Clearance: _____Acceptable _____Not Acceptable

Mounting Bolts: _____Tight _____Loose

DATA SHEET

SHUNT TRIP VOLTAGE TEST:

_____ Acceptable _____ Not acceptable

CORRECTIVE ACTIONS: _____

_____

_____

5.7.13 Auxiliary Switches:

Contact Engagement: _____Acceptable _____ Unacceptable

Contact Pitting: _____Good _____Fair _____Poor

Bolts: _____Tight _____Loose

CORRECTIVE ACTIONS: _____

_____

_____

5.7.14 Positioning Lever: _____Acceptable _____ Unacceptable

CORRECTIVE ACTIONS: _____

_____

_____

5.7.15 Cell Interlocks Tests:

_____ Acceptable _____ Unacceptable

CORRECTIVE ACTIONS: _____

_____

_____

5.8 Breaker Megger Readings:

Breaker Open

Phase 1 - Phase 2 _____ Phase 1 - Phase 3 _____

Phase 2 - Phase 3 _____ Phase 1 - Gnd

Phase 2 - Gnd _____ Phase 3 - Gnd _____

DATA SHEET

Step 5.8 cont.

Breaker Closed

Phase 1 - Phase 2 _____ Phase 1 - Phase 3 ___

Phase 2 - Phase 3 _____ Phase 1 - Gnd _____

Phase 2 - Gnd _____ Phase 3 - Gnd _____

CORRECTIVE ACTIONS: _____

_____

_____

5.9.1 Trip Bar - _____Acceptable _____Unacceptable

5.9.1.2 Trip bar trip force _____ grams

Loaded trip bar UV test _____Tripped _____Didn't trip

Loaded trip bar shunt trip test
_____Acceptable _____Unacceptable

CORRECTIVE ACTIONS: _____

_____

_____

5.10 Function Check:

Manual test of UV Attachment UV operation verified 10 times
_____Satisfactory _____Unsatisfactory

5.11 Switchgear Enclosure:

Cleanliness: _____Good _____Fair _____Poor

Disconnect Devices: _____Good _____Fair _____Poor

Bolts & Connections: _____Tight _____Loose

Stop Bracket, Support Rails, Interlock Switches:

_____OK _____Not OK

DATA SHEET

Step 5.11 cont.

Megger Test: _____Acceptable _____Unacceptable

CORRECTIVE ACTIONS: _____

_____

_____

COMMENTS: _____

_____

_____

COMPLETED BY: _____

DATE COMPLETED: _____

ELECTRICIAN FOREMAN REVIEW: _____