NO. IN 820.10

INSTRUCTION MANUAL

FEDERAL PACIFIC ELECTRIC COMPANY
HIGH VOLTAGE MAGNETIC-AIR POWER CIRCUIT BREAKER
TYPE DST-5KV & 15KV
H6 SPRING MECHANISM OPERATED

VOLTAGE KV	INTERRUPTING POWER MVA	CONTINUOUS CURRENT AMP RMS	FRAME	ASSEMBLY NO.
5KV	75MVA	1200	17"	1551E5094
5KV	75MVA	1200	21"	1551E4890
	150MVA			1552E4890
	250MVA			1553E4890
	150MVA	2000		1554E4890
	250MVA			1555E4890
15KV	250MVA	1200	30"	1551E4915
	500MVA			1552E4915
	750MVA			1553E4915
	250MVA	2000		1554E4915
	500MVA			1555E4915
	750MVA			1556E4915

September, 1970

GENERAL DESCRIPTION

(A) INTRODUCTION

The DST magnetic air circuit breaker is electrically operated, horizontal drawout, three pole, for indoor and outdoor metal-clad switchgear.

The component parts are mounted on a welded steel frame equipped with wheels so that it can be easily moved into its cell. It has insulated interphase barriers, and a steel grounded front barrier to assure safety to operating personnel.

Primary disconnect contacts carry the load current, and secondary disconnect contacts carry the control circuits for operating the circuit breaker.

The truck mounted breaker is so interlocked with the racking-in mechanism that it is not possible to rack in the circuit breaker to its operating position when the circuit breaker is closed. It is also not possible to rack the circuit breaker out from its operating position when the circuit breaker is closed. This protection is accomplished by a trip-lever that must be lifted before the racking crank can be inserted in the breaker frame.

These magnetic air circuit breakers are precision jig built devices and are factory adjusted and tested in compliance with NEMA standard factory operational tests. Each breaker is assigned a serial number and a careful record of each test is logged. This serial number should be referred to if it becomes necessary to contact the factory concerning a breaker.

(B) BREAKER FRAME

The breaker frame is a welded fabricated steel assembly very amply braced.

Four inch diameter wheels provide ease of withdrawel.

(C) INTERLOCKING

The interlock bar prevents operation of the circuit breaker unless the circuit breaker is in the "withdrawn", "test" or "operate" position.

The manually operated interlock bar prevents insertion of the "racking-in" crank, unless the interlock bar is raised.

When the interlock bar is raised it trips the circuit breaker and renders the closing mechanism mechanically and electrically trip-free.

(D) RACKING-IN

The racking-in device is simple - positive and sturdy, requiring only 17.5 turns of the crank for full travel of the breaker. The racking mechanism position locks the circuit breaker in both test and operate positions. The breaker position is clearly indicated within the cell.

(E) GROUNDING

Breaker frame substantially grounded in both "operating" and "test" positions. A copper bar bolted to the breaker frame provides wiping action against stationary contact located in cell.

(F) BREAKER - Dead Front

Note, breaker has front steel plate that closes against a matching cell trim in switchgear cell making a completely "dead-front" arrangement.

(G) PRIMARY DISCONNECTS

Primary disconnects are self-aligning and consists of high pressure finger segments of extruded copper, heavily silver plated. Pressure is exerted on each finger by an individual leaf spring. A single brass retaining ring encircles the cluster of fingers. The disconnects are located on the breaker (not in the cell) for convenient inspection and maintenance when breaker is withdrawn from the housing.

(H) SECONDARY DISCONNECTS

Secondary disconnect contact assembly may be locked in place to connect and disconnect simultaneously with primary disconnects or unlocked to permit manual operation of secondary contacts with breaker in "test" position only.

Secondary contacts may be readily engaged from front of breaker, before breaker is placed in "operating" position.

(I) CONTACTS

Main contacts of heavy copper and inlaid silver carry the normal operating current when the breaker is in operation. Arcing takes place between special arcing contacts which are extremely resistant to arc damage. The main contacts are individually spring load and self aligning. Arcing contacts are available as spare parts and may be readily replaced in the field.

(J) ARC-CHUTE

The arc-chute is a ceramic baffle filled chamber equipped with a magnetic structure that forces the arc into constrictions provided by the baffling. The magnetic field is generated by electro-magnetic coils within the arc chute. Cooling and elongation of the arc within the baffle structure forces early extinction of current.

By removing bolts, the arc-chute may be easily tipped back on a hinge, so contacts can be inspected or adjusted during servicing.

II. SHIPMENT & RECEIVING

(A) SHIPMENT

All circuit breakers are assembled in the factory before shipment, and tested for optional performance. Shipment is made in a total of three (3) crates. The basic circuit breaker on its truck is in one (1) crate. The three (3) arc-chutes are packed in a separate crate. The interphase barriers are packed in one (1) crate.

The serial number of each circuit breaker is on its nameplate and also marked on the circuit breaker crate. The three (3) crates are marked with the factory order number.

A copy of the packing list, enclosed in a waterproof envelope is nailed on the outside of the circuit breaker crate. One envelope only is furnished with orders for more than one circuit breaker shipped to a single destination.

Each circuit breaker, in its crate, is enclosed in a polyethyelene dust and mositure-proof envelope. Within this envelope is a quantity of silica-gel to absorb moisture.

It is recommended that this envelope not be opened prior to putting circuit breaker into service.

(B) INSPECTION UPON RECEIPT OF SHIPMENT

When a shipment of circuit breakers is received, each circuit breaker should be examined before it is removed from the railroad car or truck. If any damage or indication of rough handling is evident, a description of the cohdition should be written on the

(B) INSPECTION UPON RECEIPT OF SHIPMENT (cont'd.)

freight bill, a claim should be filed against the carrier immediately, and notice of the extent of damage sent immediately to the company at the address of the company from which shipment was made, giving serial number of the breaker, the carrier's name, and the car number if shipped by rail. This information enables the company to supply needed information to assist the purchaser in support of the claim.

III. INSPECTION, INSTALLATION & OPERATION:

(A) Introduction

This section outlines routine inspection of new circuit breaker, installation and operation of circuit breaker, and inspection and adjustment procedures required for normal maintenance of circuit breaker in service.

(B) Inspection of New Circuit Breaker

All circuit breakers are factory adjusted and should require no adjustment. If the following inspection indicates deviations from the dimensions shown, reference should be made to the maintenance section for adjusting procedure.

1. After uncrating breaker check for evidence of any shipping or handling damage.

2. Remove any accumulated dust with a clean, dry cloth.

3. Check for any loosened hardware.

4. Check adjustment of main and arcing contacts.

   a. With breaker open, Gap "A" Fig. V A1.

   $5\ 1/8 \pm \frac{1}{2} - 1/8$ for 15KV

   $2\ 7/8 \pm 3/8 - 1/8$ for 5KV

   b. Using maintenance close knob, close breaker slowly until arcing tips just make contact holding contacts. In this position, measure Gap "B", Fig. V A2 between main contacts with "GO" - "NO-GO" gauge.

   All breakers - "GO" - 3/8"
   "NO-GO" - 1/2"

   (refer to paragraph III, B-5 for information on maintenance closing of circuit breaker).

   c. Again utilizing maintenance close knob, allow circuit breaker to close and recharge. Scribe a line along main contacts (see Fig. V A3a). Trip breaker open and scribe second line (Fig. V A3b). For all breakers gap should be 1/8" ± 1/16.

5. Electrical and mechanical operation test.

a. With breaker not in housing use test jumper to connect the circuit breaker to control circuit. (Note, remove contact blocking pads from control relays).

b. Energize control circuit. This will result in immediate charging of stored energy mechanism. (Charging motor circuit can be manually opened by operating cutoff switch D. This switch must be reset before recharging can be accomplished.

c. Insert maintenance close knob E in valve F, Fig. V B. Turn knob clockwise hand-tight. (Turn racking-in crank counterclockwise several turns to release draw-out interlock). Pull manual spring release knob G. Slowly turn knob F counterclockwise allowing contacts to slowly close. (Contacts can be stopped in any intermediate position be tightening knob F.) Allow breaker to fully close. Remove knob F from valve and insert in interlock bar H. Reset charging motor lock-out switch causing spring mechanism to charge. Visually note correct position of spring charge indicator J and contact position indicator K, Fig. V B.

d. Trip circuit breaker by lifting interlock bar H. Visually check indicators and operation counter, for correct operation. Lock-out switch D should be in "OFF" (Bat up) position.

e. Reset lock-out switch D, close and trip breaker electrically.

f. Check draw-out interlock by lifting interlock bar H, inserting racking crank and turning clockwise to extreme "withdrawn" position. Spring mechanism should discharge and breaker remain open.

g. Disconnect test jumper from breaker.

h. Install arc chutes referring to Fig. V C. Arc chutes should first be inspected for damage, loose hardware, shipping blocks and then blown out with dry air before installation. Check for tight connections of coil leads, front and rear supports. Finally, slowly close and open breaker (III B-3) to insure clearance in arc chutes.

i. Install interphase barriers.
Note: Make certain outer barrier sheets are within breaker frame.

j. Visually observe primary disconnect clusters. They should be free of dirt and have reasonable alignment play. (Note: Lubricate primary and secondary disconnect contacts with a good grade of high temperature contact lubricant).

(C) Installation and normal operation of circuit breaker.

(Main bus network must be inspected and approved prior to installation of circuit breaker).

1. Inspect cell.

a. Operate shutter manually be depressing indicator arm. (Caution: Buswork may be energized) Shutter should move up and down freely. Observe interior of primary disconnect bushing. They should be clean and free of any obstructions.

2. Insert the breaker into cell to extreme withdrawn position. Racking crank must be turned completely counterclockwise. Roll breaker to stop at withdrawn position. Turn crank clockwise, racking breaker to "Test" position as indicated by marker on cell wall. Unlock secondary disconnect operating rod, Fig. V B device L, and manually connect secondary disconnect contacts. Remove racking crank and reset motor lock-out switch. Operate circuit breaker electrically several times to insure engagement of secondary contacts and proper operation of control circuitry.

3. The circuit breaker is now ready to be put into service by racking into "Operate" position. Be sure to reset motor lock-out switch after racking breaker to "IN" position.

IV. Routine Circuit Breaker Maintenance:

(A) Introduction

In order to keep the circuit breaker in top operational condition and to guarantee many years of trouble feee performance, a maintenance schedule should be established. The maintenance log sheet Section VI is a general outline of such a program.

This section describes adjustments and procedures which may become necessary as part of a maintenance schedule.

(B) Contact Deflection Adjustment

(Note: Upper and lower bolts in support board must be tight before attempting to adjust contacts).

1. Main Contacts

With arc chutes and interphase barrier removed:

a. and the breaker open, remove pin Y, Fig. V D from clevis X.

b. loosen jam nut W.

c. if more contact deflection is required, turn clevis counterclockwise. (½ turn of clevis produces approx. 1/32" change at main contact).
Reassemble clevis to main shaft with pin. Slow-close breaker, recharge mechanism and check dimension between scribed lines on contact bar. This dimension must be 1/8" ± 1/16. When correct deflection is obtained, assemble retaining cotter pins into pin Y. Tighten jam nut W.

2. Arcing Contacts

a. Slow-close breaker contacts to a point where 3/8" "GO", ½" "NO-GO" condition exists between main contact at point B, Fig. V A2.

b. Hold contacts in this position by tightening knob E, Fig. V B in valve.

c. Loosen jam nuts on spring guide shaft CC + DD, Fig. V A2 and adjust position of arcing tip by rotating nut DD until all tips just make (within 1/16") with stationary arcing contact.

d. Retighten jam nut CC.

(C) Contact Replacement

1. Replacement of Arcing Contacts

   a. Replace old contact with new contacts. Follow adjusting procedure shown in Fig. V A1 & V A2. Care must be taken to tighten shunt connection on moving arcing contacts.

2. Replacement of Main Contacts

   a. Replace old stationary contacts with new contacts. See Fig. V A3b, Items EE & FF.

   b. Moving main contacts must be replaced in their entirety. Check and adjust the entire contact structure on all three poles per Section III A,B,C, and IV B after replacing the moving main contact structure.

3. Check deflection of main contacts, open gap, arcing contact lead as described in III A,B,C, and IV B. Adjust as required.

(D) Main Contact Gap Adjustment

Under normal conditions the contact gap will remain within established tolerances, Fig. V E shows shock absorber assembly. This device controls the open gap of the contacts and must be adjusted if the contact gap is to be modified. If it becomes necessary to make this adjustment the factory should be notified and detailed instructions will be given.

(E) Mechanism Adjustment Check

Refer to Fig. V F,G,H for pertinent dimensions necessary to check normal position of mechanism linkages. If deviations are found, the factory should be notified and detailed instructions will be given.

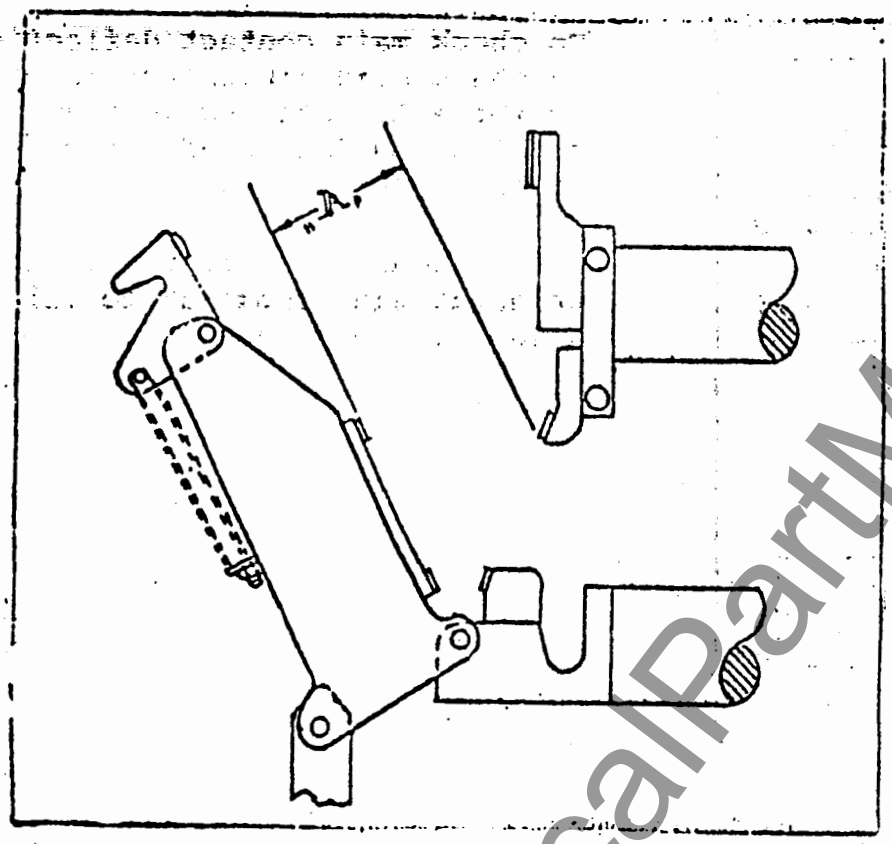
(F) Stored Energy Mechanism

Fig. V I, describes normal functional requirements of the stored energy mechanism, all of which by design should remain constant. If there is any deviation from data given, the factory should be notified and detailed instructions will be given.

V. Figures & Diagrams

A. Contact Structure

1. Open Position



"A" Open Gap

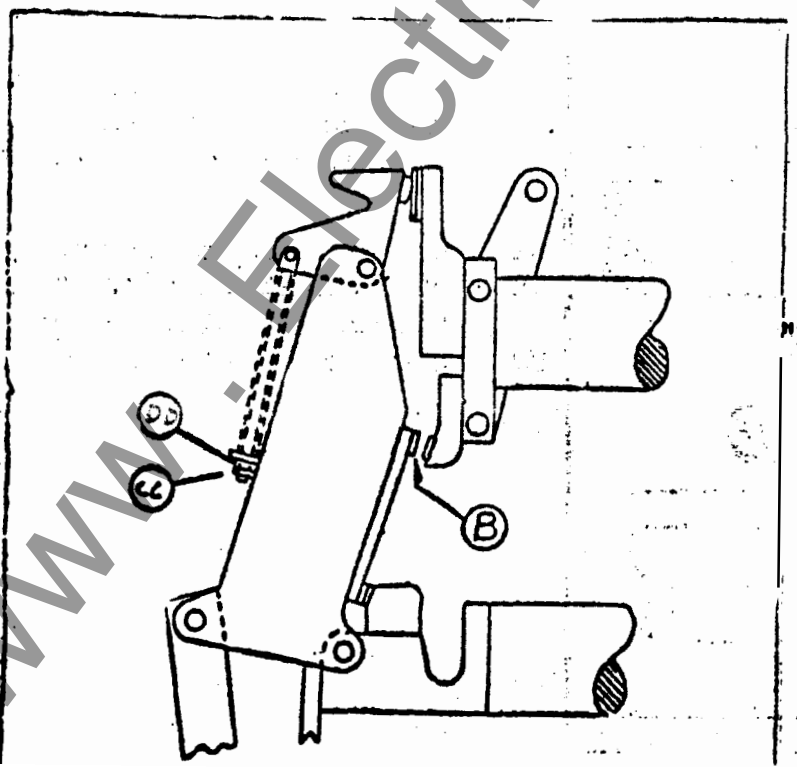
+ 3/8

5KV 2 7/8 - 1/8 inch

+ 1/2

15KV 5 1/8 - 1/8 inch

2. Main Transfer Gap



"B" Transfer Gap

5KV & 15KV Breakers

"GO" Gage 3/8 inch

"NO - GO" Gage ½ inch

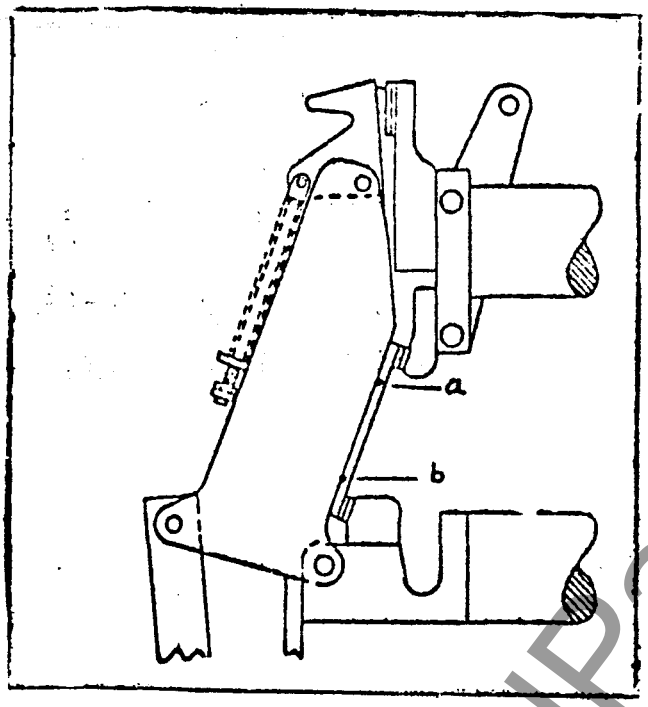
CC = Jam Nut

DD = Adjusting Nut

V. Figures & Diagrams

A. Contact Structure

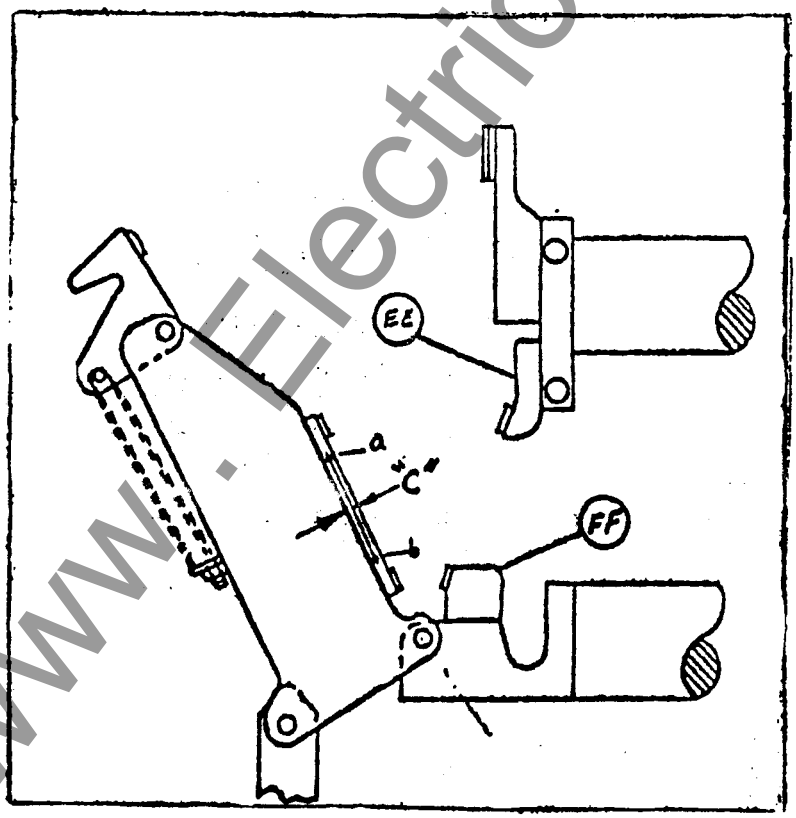
3. Closed Position



3 a.

To check main contact deflection scribe a line on contact bar from (a) to (b). Breaker must be closed and charged.

Trip circuit breaker and scribe a second line from (a) to (b).

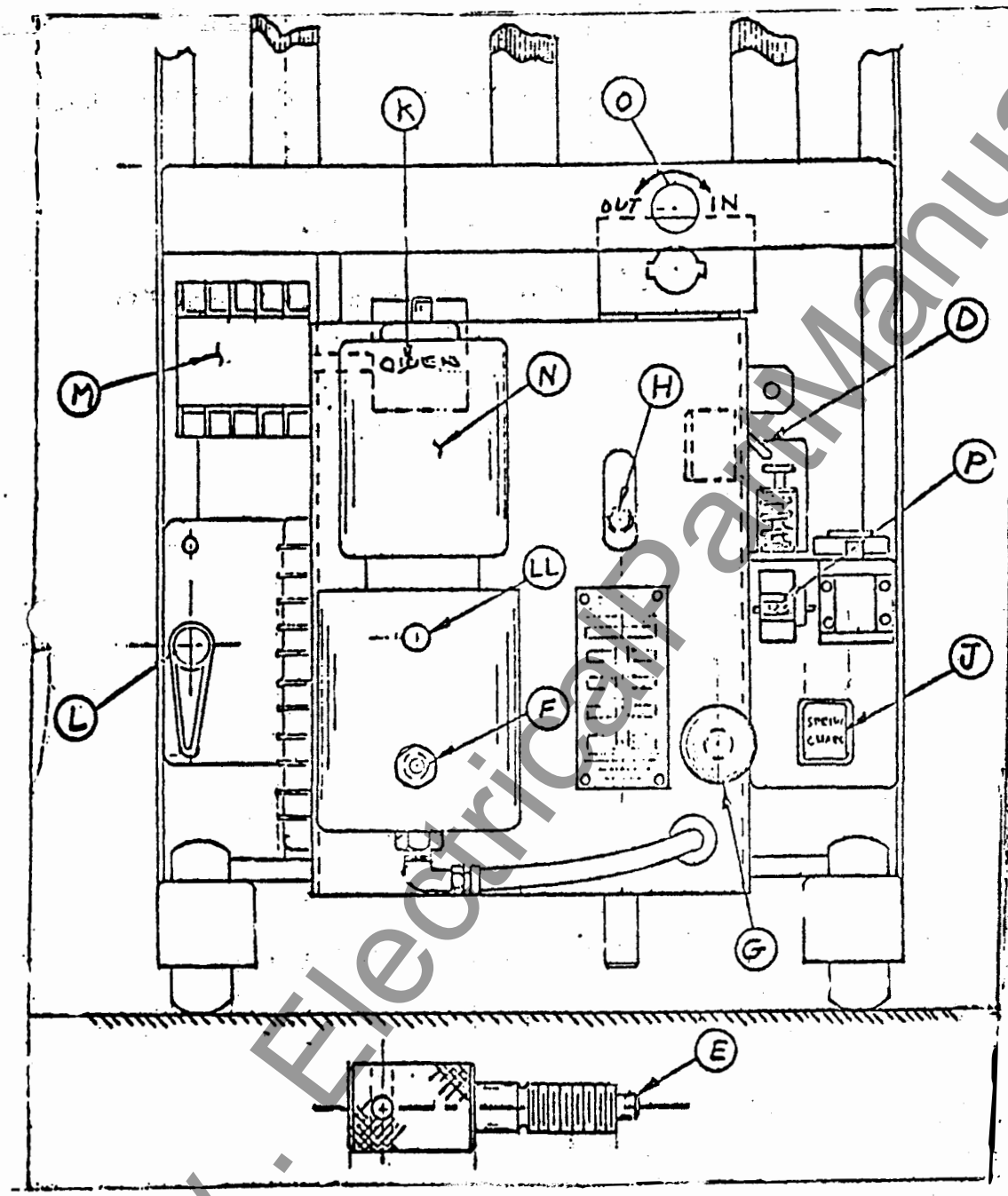


The deflection distance "C" should be 1/8 ± 1/16 inch.

EE - Upper main stationary contact

FF - Lower main stationary contact

V. (B) Breaker Mechanism Front View



D - Lock-out switch

E - Maintenance close knob.

F - Control valve.

G - Manual spring release knob.

H - Interlock bar.

J - Spring charge indicator.

K - Open-close indicator.

L - Secondary disconnect operating handle.

M - Auxiliary switch.

N - Hydraulic pump and motor.

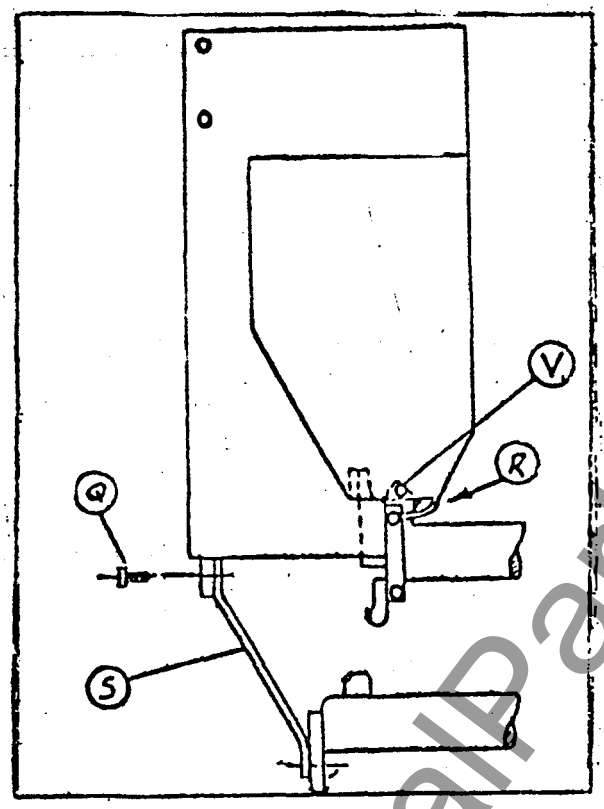
O - Draw-out-rack-in crank hole.

P - Operation counter

LL - Sump Filler Plug.

V. (C) Arc Chute

1. Mounted on breaker contact structure.



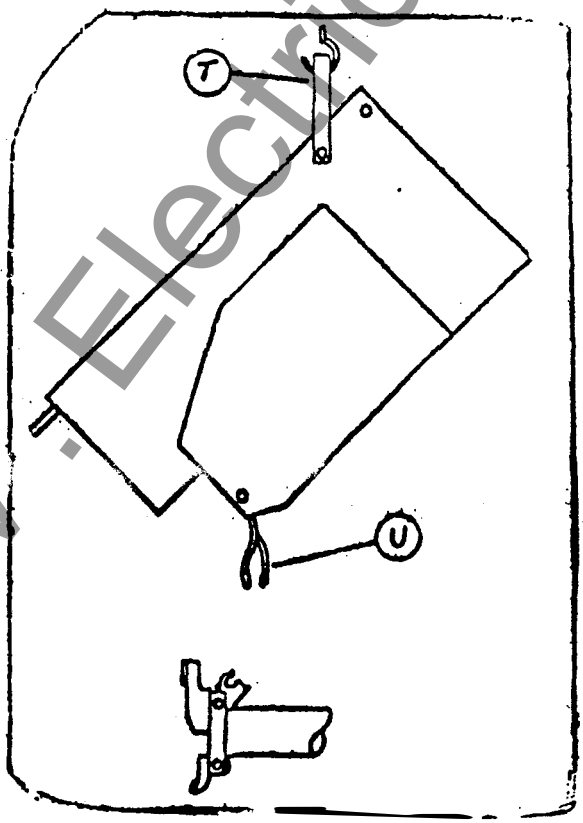
Q - Front support mounting bolt.

R - Blow-out coil lead mounted.

S - Front support.

V - Arc-chute pin in support bracket.

2. Removed using lifting yoke.

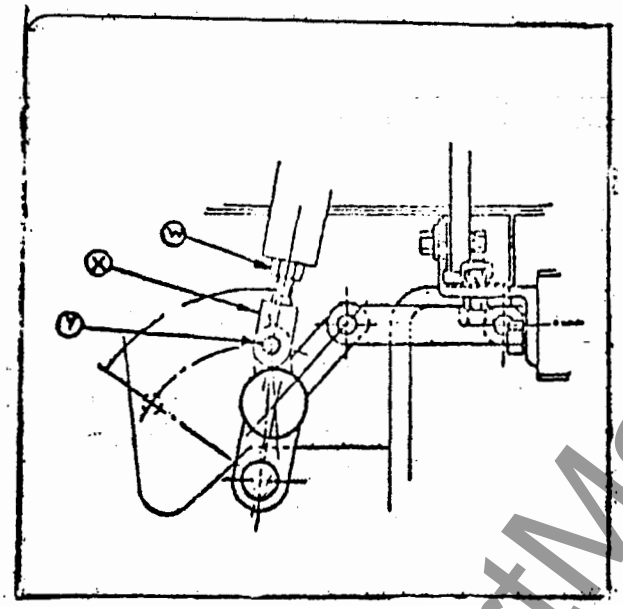


T - Lifting yoke.

U - Blow-out coil leads.

V. Figure & Diagram

(D) Contact Push Rod Linkage

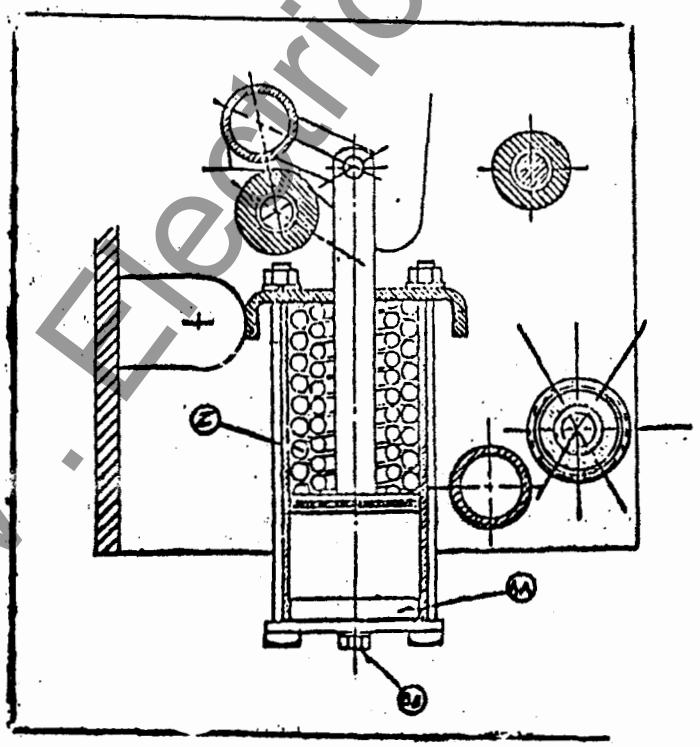


W - Jam nut

Y - Clevis pin

X - Clevis

(E) Shock Absorber Assembly



1501-0083 SPRING 5KV (2 Req.)

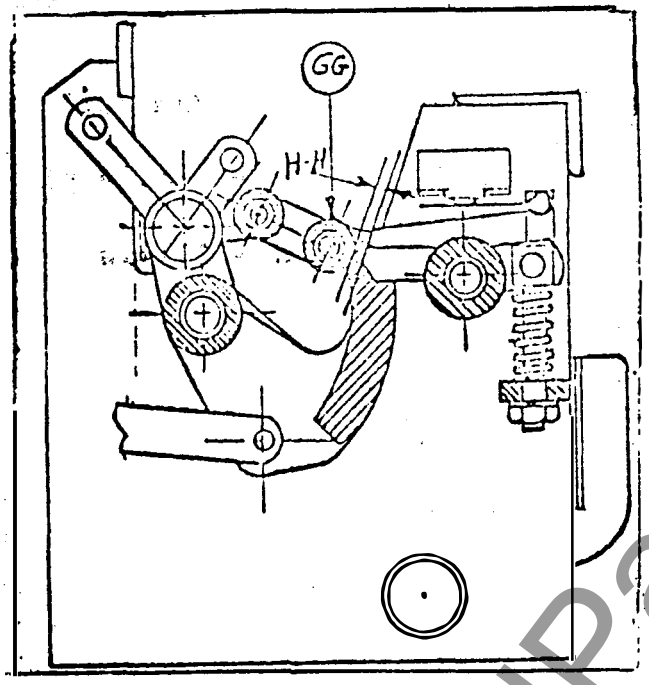
E - Opening springs.

AA - Open position stop.

BB - Shock absorber vent.

V. (F) Operating Mechanism Closed & Discharged

(Over travel position).

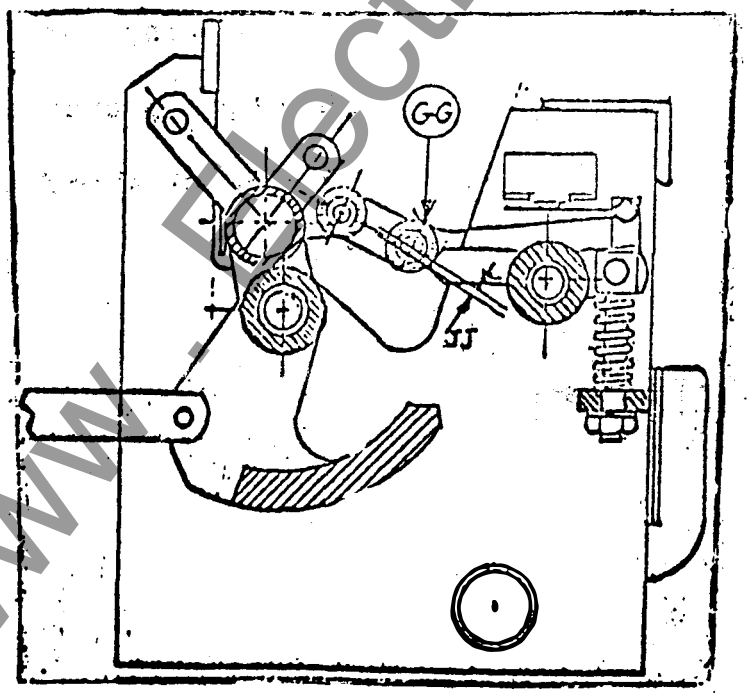


GG = Trip roller

Gap "H-H" trip roller to prop face for 5KV & 15KV circuit breakers over travel position. 1/8" + 1/16 - 0

V. (G) Operating Mechanism Closed & Charged

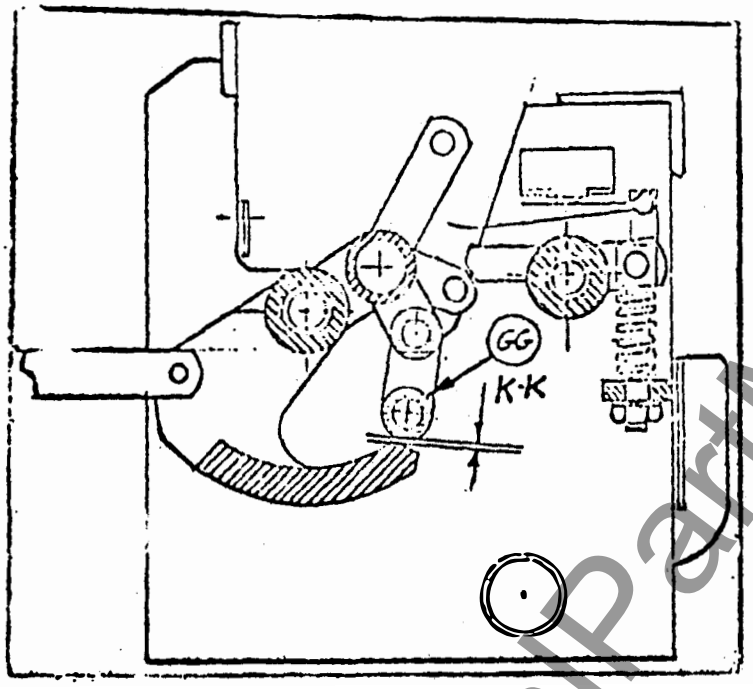
(Position on prop face).



Tangent point location trip roller on prop face. Dimension JJ. 1/8 inch ± 1/32 inch.

V. (H) Operating Mechanism Open & Charged

(Trip roller gap position).

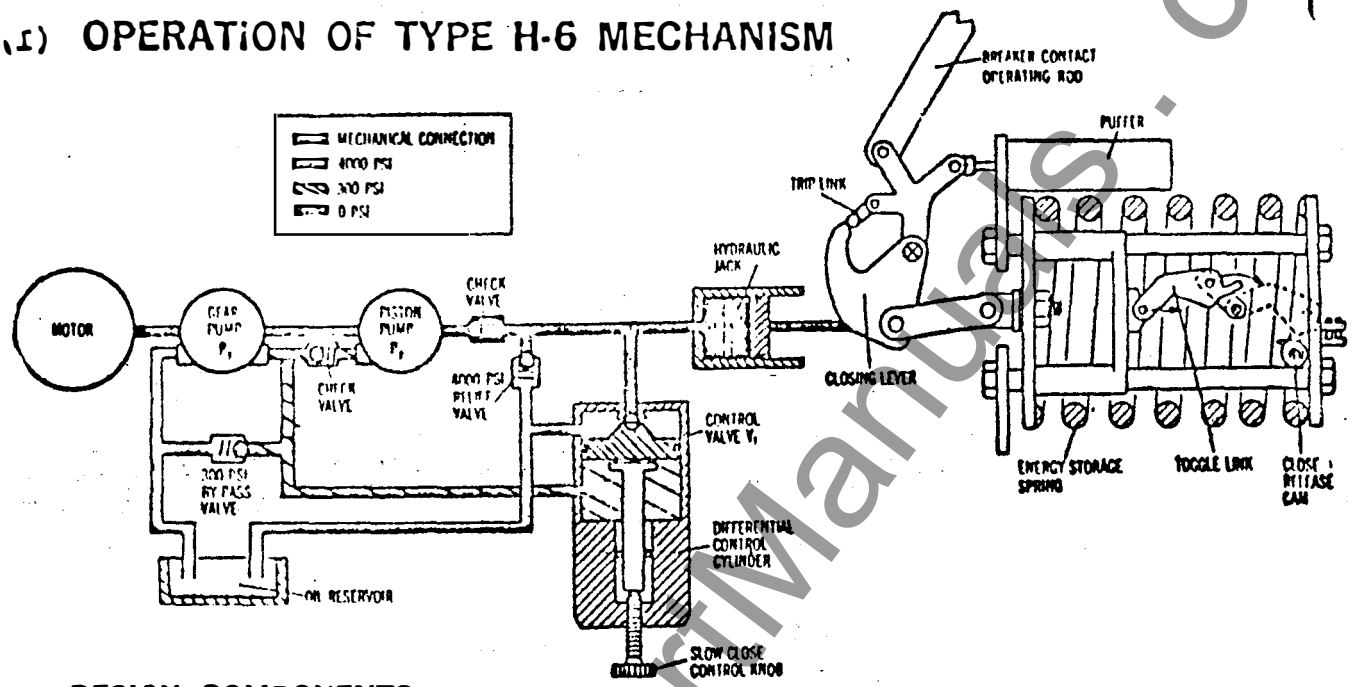


GG - Trip roller

Gap KK trip roller to closing lever face 1/8 inch min. ¼ inch max.

V. Figures & Diagrams

(1) OPERATION OF TYPE H-6 MECHANISM



DESIGN COMPONENTS

- Motor starts, gear pump P_1 pumps low pressure (300 psi) oil to piston pump P_2, closing control Valve V_1.
- Piston pump P_2 pumps high pressure (4000 psi) oil to hydraulic ram which compresses spring.
- When spring is fully charged, an over-toggle type latch picks up spring pressure and mechanically holds spring in charged condition.
- Motor stops, control valve V_1 opens, and high pressure oil is released to reservoir or sump.

MAINTENANCE SLOW CLOSE OPERATION

- With spring charged, motor circuit is opened to prevent further motor operation. Oil remains in hydraulic ram at pressure of oil in sump.
- Slow close control knob is tightened manually, holding valve V_1 closed, and trapping oil in hydraulic ram.
- Manual close button is operated, releasing latch, and the spring pressure is held by the hydraulic system.
- Releasing "slow close control" opens valve V_1 and allows oil to flow slowly to sump. The spring energy is used to slow-close the breaker contacts against restraint of hydraulic ram. Speed of closing is dependent upon the degree of opening of valve V_1, which controls rate of flow of oil to the reservoir or sump.

TRIP-FREE OPERATION

Energizing of the trip coil at any point in the closing stroke breaks the trip free lever and roller line, and removes closing force from main operating shaft of breaker.

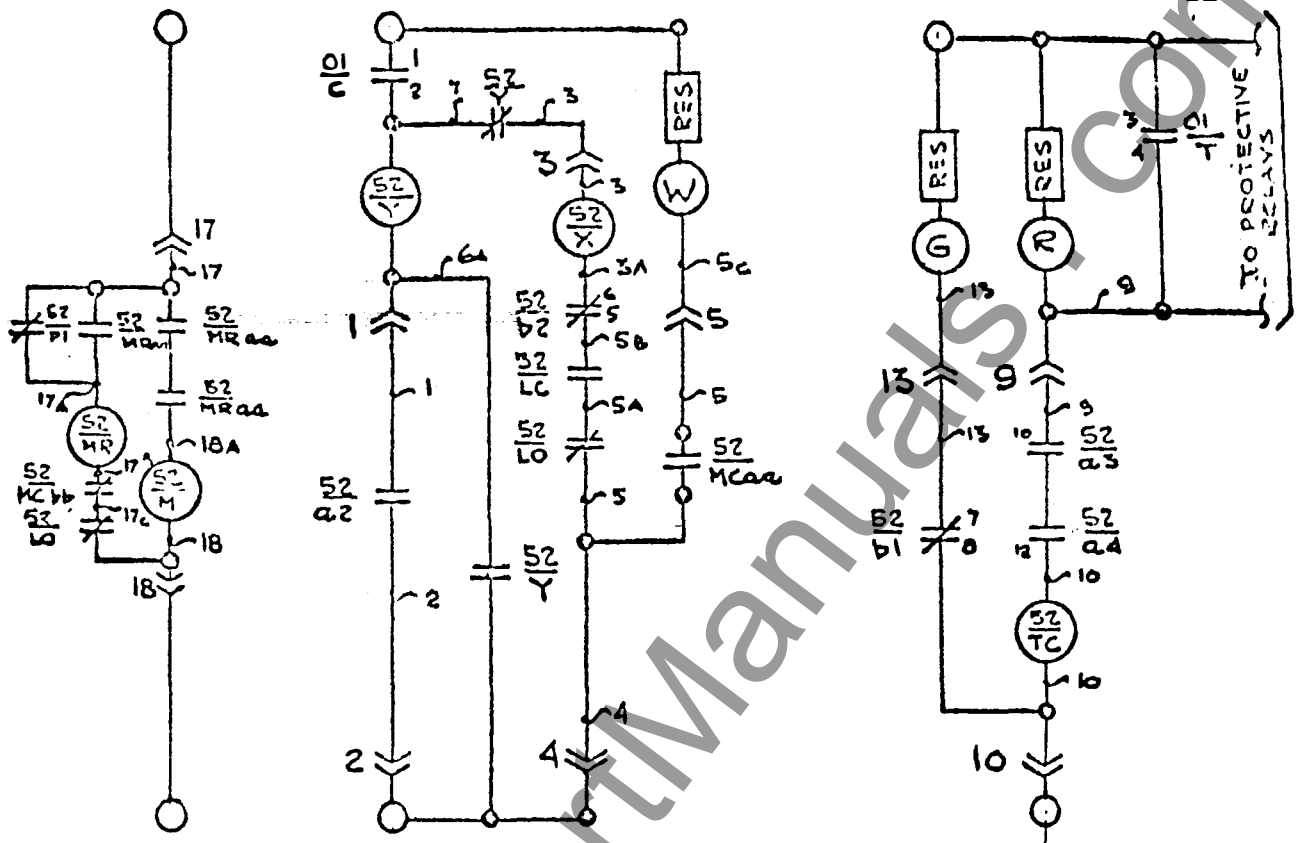
ANTIPUMP OPERATION

The H-6 mechanism utilizes a mechanical antipump system. A single, heavy-duty link system goes over toggle against an adjustable stop to hold the main power spring compressed. When the manual or the electrical release is operated, a rotary cam raises the link system back over toggle and permits the main drive spring to drive the breaker closed. The rotary cam is so arranged that it must be reset (released) before another raising action can occur, thus accomplishing antipump action in a simple, straight-forward manner.

EMERGENCY MANUAL CLOSING

Provisions are made for manually charging the spring through the hydraulic system;

V. (J)



TYPICAL H-6 CONTROL SCHEMATIC DIAGRAM

NOTE: Contacts shown with c.b. open & discharged & relays not energized. (Refer to wiring diagram indicated on circuit breaker nameplate for wiring details).

DEVICE	DESCRIPTION	CONTROL POWER REQUIREMENTS			
		Circuit	Voltage Volts DC/RMS	Current Amp	Time Sec.
01	Breaker Control Switch	Charge	48V AC/DC	18	5.0
52 Y	Anti-Pump Relay	Charge	115V AC/125V DC	7.5	5.0
52 a	N.O. Bkr. Aux. Sw. contact	Charge	230V AC/250V DC	3.7	5.0
52 b	N.C. Bkr. Aux. Sw. contact	Close	48V AC	1.6	.05
52/P1	Prop. Switch	Close	115V AC	0.48	.05
52/M	Spring Charging Motor	Close	230V AC	0.24	.05
52/MR	Charging Motor Relay	Close	48V DC	24	.05
52 MCaa	Limit Sw. Closed when the spring is fully charged.	Close	125V DC	9	.05
52 MCbb	Limit sw. closed when the spring is discharged	Close	250V DC	4.5	.05
52 LC	Lockout Switch	Trip	24V DC	25.6	.03
52/...	Spring discharging coil	Trip	48V DC	9	.03
52/TC	Trip Coil	Trip	125V DC	5	.03
52/LC	Latch Check Switch	Trip	230V AC	1	3 sec. max.

VI. SUGGESTED AIR CIRCUIT BREAKER LOG SHEET

Inspection	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Date										
Inspector										
OPERATION COUNTER										
OPERATIONS SINCE SERVICING										
VISUAL INSPECTION										
ARC-CHUTES										
ARCING CONTACTS										
ARCING CONTACT ALIGNMENT										
MAIN CONTACTS										
MAIN CONTACT ALIGNMENT										
AUXILIARY SWITCH										
SECONDARY DISCONNECTS										
PRIMARY DISCONNECTS										
LUBRICATION										
TRIP MECHANISM										
CLOSING MECHANISM										
RACKING-IN-MECHANISM										
PRIMARY DISCONNECTS										
OPERATIONAL INSPECTION										
MANUAL CLOSE										
MANUAL TRIP										
ELECTRICAL CLOSE										
ELECTRICAL TRIP										
LOW VOLTAGE TRIP										
PUFFER AND ARC CHUTES										

Code:

G-Good, F-Fair, X-should be replaced next inspection.

NOTES: _____

American Standard

Rated Control Voltages and Their Ranges for Power Circuit Breakers

ASA
Reg. U. S. Pat. Off.
C37.8-1952
Revision of
C37.8-1945

*UDC 621.316.571
621.3.027

Direct Current*

Rated Voltage	Control	Power Supply		Tripping Voltage Range
		Solenoid or Motor Operator	Stored Energy Operator†	
24‡	....	....	....	14-30‡
48	....	....	....	28-60
125	90-130	90-130§	90-130	70-140
250	180-260	180-260§	180-260	140-280

Alternating Current

Rated Voltage	Control	Power Supply		Tripping Voltage Range
		Solenoid or Motor Operator	Stored Energy Operator†	
115	95-125‖	....	95-125	95-125
230	190-250‖	190-250§	190-250	190-250

*Control from exciter circuits is not recommended.

†For driving motors for air compressors and compressed spring mechanisms.

‡24-volt tripping is not recommended, unless the circuit breaker is located close to the battery and relay and adequate electrical conductors are provided between the battery and trip coil.

§Some operating mechanisms will not meet all of the closing requirements over the full control voltage range. In such cases, it will be necessary to provide for two ranges of closing voltage. Where applicable, the preferred method of obtaining the double range of closing voltage is by the use of tapped coils. Otherwise, it will be necessary for the user to designate one of the two closing voltage ranges listed below as representing the condition existing at the breaker location due to battery or lead voltage drop or control power transformer regulation.

Rated Voltage	Closing Voltage Ranges for Power Supply
125 direct current	90-115 or 105-130
250 direct current	180-230 or 210-260
230 alternating current	190-230 or 210-250

‖Includes heater circuits.

NOTE: It is recommended that trip, closing, relay coils, etc, normally connected continuously to one d-c potential should be connected to the negative wire of the control circuit to minimize electrolytic deterioration.

Approved June 19, 1952, by the American Standards Association, Incorporated

Sponsor: Electrical Standards Board

*Universal Decimal Classification

VIII. Auxiliary and Miscellaneous Equipment:

(A) Extra Auxiliary Switch
(Provides 3 additional "a" and 3 additional "b" contacts).

1. 5KV 17 & 21 inch frame.	1551C5106
2. 15KV 30 inch frame.	1551B5057

(B) Manual Charging Pump
(All breakers) 1551-5113

(Used to manually charge operating spring mechanism in the event no control power is available. This pump is not required for maintenance).

Operating Instruction Bulletin 1500A0040

(C) Swivel Wheel Handling Dolly
(All breakers 2 required) 2251X3889

(Raises front of bkr. onto swivel wheels to permit easy handling of breaker outside of cell).

(D) Draw-Out Crank
(All breakers) 2251-0222

(Req. to rack bkr. into and out of cell).

(E) Arc-Chute Lifting Yoke

17" Frame	1551-2826
21" & 30" Frame	1551-0429

(F) Capacitor Trip Device 2753E0137

230V AC 60 Cycle
Supply required.

PGEP 80102
DB 75 Rack and
+ 2 breaker pins

IX. Recommended Spare Parts

(A) Contact Parts

1. 5KV Breakers

QUAN/BKR.	DESCRIPTION	APPLICATION	PART. NO.
3	Arcing cont. stationary	75,150 & 250 MVA 1200 & 2000 Amp	1551A3334
3	Arcing contact moving	75, 150 MVA,1200 Amp	1551A3335
3 L.H. 3 R.H.	Arcing contact moving Arcing contact moving	250MVA, 1200 Amp & 150 & 250 MVA, 2000 Amp	1551B4445 L.H. 1551B4445 R.H.
3	Main contact upper stationary	75,150 & 250 MVA 1200 & 2000 Amp	1551A2756
3	Main contact lower stationary	75,150 & 250 MVA 1200 & 2000 Amp	1551A2892
3	Main moving contact assembly	75MVA, 1200 Amp	1551D5041
3	Main moving contact assembly	150 MVA, 1200 Amp	1552D5041
3	Main moving contact assembly	250 MVA, 1200 Amp	1551D5044
3	Main moving contact assembly	150 & 250 MVA, 2000 Amp	1552D5044
3	Arcing contact shunt for moving contact	75, 150 MVA, 1200 Amp	1551A4963
6	Arcing contact shunt for moving contact	150MVA,-2000 Amp & 250MVA,-1200 & 2000 Amp	1552A4963
6	Contact bracket shunt for moving contact	75, 150 & 250 1200A & 2000A	1551[illegible]187

IX. Recommended Spare Parts

(A) Contact Parts

2. 15KV Breakers

QUAN/BKR.	DESCRIPTION	APPLICATION	PART NO.
3	Arc Contact Stationary		1551A3334
3	Arcing Contacts Moving	250 & 500 MVA	1551B4957
3	Arcing Contacts Moving	750 MVA ONLY	1551B4445
3	Arcing Contacts Moving	750 MVA ONLY	1552B4445
3	Main Contact Upper Stationary	1200A	1552A1930
3	Main Contact Upper Stationary	2000A	1551A1930
3	Main Contact Lower Stationary	1200A	1551A4262
3	Main Contact Lower Stationary	2000A	1551A1931
3	Main Moving Contact Assembly	1200A, 250 & 500MVA	1551D4965
3	Main Moving Contact Assembly	2000A, 250 & 500MVA	1552D4968
3	Main Moving Contact Assembly	1200 A 2000A,750MVA	1551D5050
3	Arcing Contact Shunt for moving contact	250 & 500MVA, 1200A & 2000A	1551A0188
6	Arcing Contact Shunt for moving contact	750MVA, 1200 & 2000A	1551A4444
6	Main contact bracket shunt for moving contact	250 & 500MVA, 1200A & 2000 Amp	1551A0187
6	Main contact bracket shunt for moving contact	750MVA, 1200 & 2000A	1551A0187

1501 0306
1502 0308

(B) Arc Chutes

1. 5KV Breakers

QUAN/BKR.	DESCRIPTION	APPLICATION	PART NO.
3	17" 5KV Breaker	75MVA 1200A	1551D2510
3	17" 5KV Breaker	150 & 250MVA 1200A	1551D4550
3	21" 5KV Breaker	75,150 & 250MVA 1200A & 150 & 250 2000A	1551D4550

2. 15KV Breakers

30"

QUAN/BKR.	DESCRIPTION	APPLICATION	PART NO.
3	Arc Chute	250 & 500MVA, 1200A 2000A	1551D4760
3	Arc Chute	750MVA, 1200A& 2000A	1551D4590

(C) Shunt Close (All Breakers)

QUAN/BKR.	DESCRIPTION	PART NO.
1	48V AC/DC	1101B5327
1	115V AC/ 125V DC	1102B5327
1	230V AC/ 250V DC	1103B5327

(D) Shunt Trip

QUAN/BKR.	DESCRIPTION	PART NO.
1	24V DC	1551B0409
1	48V DC	1551B1002
1	125V DC	1551B1003

(E) Hydraulic Pump

QUAN/BKR.	DESCRIPTION	PART NO.
1	48V AC/ DC	1503C4886
1	115V AC/ 125V DC	1502C4886
1	230V AC/ 250V DC	1501C4886
1	Hydraulic Ram Assembly	1551B5095

(F) Motor Relay

QUAN/BKR.	DESCRIPTION	PART NO.
1	48V AC	1501B4908
1	115V AC	1502B4908
1	230V AC	1503B4908
1	48V DC	1504B4908
1	125V DC	1505B4908
1	250V DC	1506B4908

(G) Latch Check Switch

QUAN/BKR.	DESCRIPTION	PART NO.
1	Latch check switch	1152C6340

(H) Motor Cut-Off Switch

QUAN/BKR.	DESCRIPTION	PART NO.
1	Motor cut-off switch	1101A5686

(I) Lock-Out Switch

QUAN/BKR.	DESCRIPTION	PART NO.
1	Lock-out switch	114-002

(J) Hydraulic Hose

QUAN/BKR.	DESCRIPTION	PART NO.
1	Hydraulic hose	1501A4918

INSTRUCTION BULLETIN 1500A0040

USE OF MANUAL HYDRAULIC PUMP FOR EMERGENCY SPRING CHARGING OF HYDRAULIC STORED ENERGY MECHANISM

ASSEMBLY NO.
1551-5113

Caution - Extreme care must be exercised during the manual charging operation if the breaker is in the connected position since the bus may be energized.

PROCEDURE

(1) Fill manual hand pump with Mil Spec. H5606A-AM2 hydraulic oil (insure hose cap is in place and pump check valve is closed).

(2) Open sump filler plug to allow escape of excess oil which will be pumped into the system. (Place pan under pump unit).

(3) Disengage hose attachment from bottom of breaker hydraulic unit.

(4) Remove hose cap and connect manual hand pump to join the hose unit disengaged in Step 3.

(5) Remove slow close control knob from lift to trip bar.

(6) Insert and securely hand tighten slow close control knob at differential control cylinder (same as insertion for slow close operation).

(7) Operate manual hydraulic pump until springs are fully charged. (Indicated by sound of spring holding latch engaging. If control power is available and secondaries are connected white light on unit door or test cabinet will light).

(8) To disconnect after springs are fully charged, follow Step 6 to 2 in reverse order.