

# POWER SWITCHING CENTERS

## INSTRUCTIONS

5KV to 15KV, INDOOR AND OUTDOOR  
600, 1200 & 2000 AMPERES



4630-S

- I. INSTALLATION
- II. OPERATION
- III. INSPECTION AND  
MAINTENANCE
- IV. SPARE PARTS



**I-T-E CIRCUIT BREAKER COMPANY**



## INDEX OF CONTENTS

SECTION	SUBJECT	PAGE
I.	<b>INSTALLATION</b>	
	A — INDOOR.....	3, 4
	GENERAL DETAILS, INDOOR AND OUTDOOR.....	5, 6
	B — OUTDOOR.....	7
II.	<b>OPERATION</b>	
	A — UNFUSED SWITCH WITH MANUALLY-ACTUATED SPRING-OPERATING MECHANISM .....	7
	B — FUSED SWITCH WITH MANUALLY-ACTUATED SPRING-OPERATING MECHANISM .....	8, 9
III.	<b>INSPECTION AND MAINTENANCE</b>	
	A — SWITCH AND FUSES.....	9, 10
	B — SPRING-OPERATING MECHANISM .....	10
IV.	<b>SPARE AND REPLACEMENT PARTS.....</b>	11



## I. INSTALLATION

### A — INDOOR

1. All PSC shipments of three bays or less will be shipped intact; those in excess of three bays will be suitably split for ease in handling.
2. Upon receipt of shipment, check for transportation damage. If damage exists, enter claim with carrier.
3. Remove all exterior packing, open doors and unbolt skid, Fig. 1.
4. With a crane and the lifting lugs, lift shipping section off skid and place over anchor bolts in proper position. Bolt down. Note square washers (A) should be used to hold assembly to floor, Fig. 2 (Anchor bolts and nuts, by customer, mounted as shown).

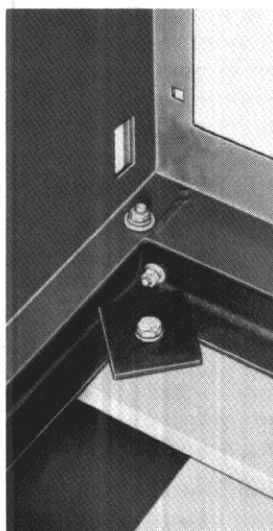


Fig. 1 4630-XX

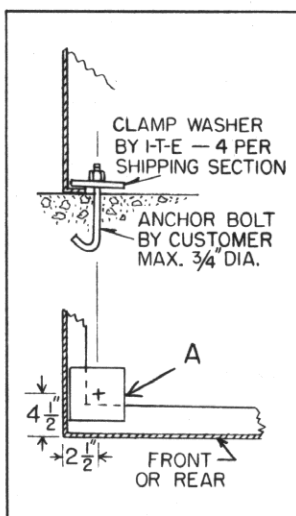


Fig. 2

5. Open all doors, front and rear, and inspect interior, removing all interior packing and bracing, Fig. 3.
6. If PSC is shipped in a single unit, skip this step. If shipping splits were necessary, note the following:—
  - a. Supplied loose, for each shipping split:
    1. One 3-phase set of main bus,
    2. One ground bus,
    3. Bolts and nuts to bolt shipping sections together,
    4. One set low-voltage wires if necessary.
  - b. Arrange sections in proper order on pad and bolt down.
  - c. Bolt shipping splits together with bolts supplied, Fig. 4. Some bolts (A) & (B) may have to be removed before putting shipping splits together.
  - d. Install main bus links, Fig. 5.
  - e. Install ground bus and any necessary ground connections within unit, Figs. 6 and 7.

f. If low-voltage wiring runs across a shipping split matched numbered terminal blocks are supplied on either side of the split and suitable wire is furnished for connections, Fig. 8.

1. Whenever a switch or thermostat controls a group of accessories, the source must be connected in the bay containing the switch, otherwise the source can be connected in any bay.
2. When more than one type of accessory (heater and lights) are supplied, they are wired for individual feed. The customer may parallel circuits as required.

Terminals are identified as follows:

- a. Heater circuit — X1 & Y1
- b. Light circuit — X2 & Y2
- c. Outlet circuit — X3 & Y3

7. Check entire PSC for loose connections, cracked or chipped insulators, etc.





# I. INSTALLATION (cont'd)

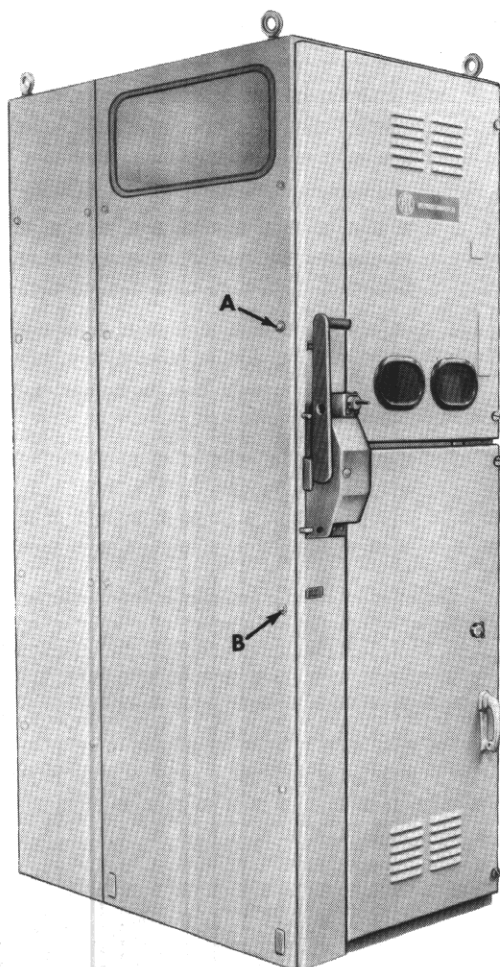


Fig. 4

4630-YY

8. Using duplicate keys to defeat interlock system, test switches for proper operation. (When received, note that each key interlock is provided with a key. All spare keys must be removed and destroyed, or given to a responsible person before energizing, to insure proper operation of interlock system.)

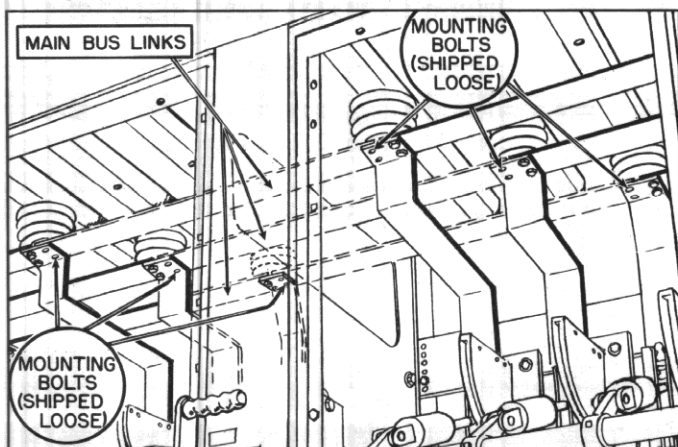


Fig. 5

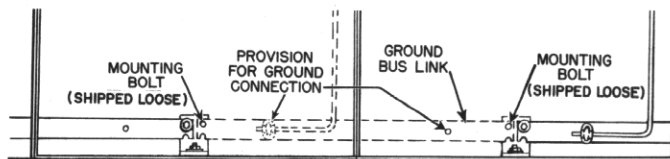


Fig. 6

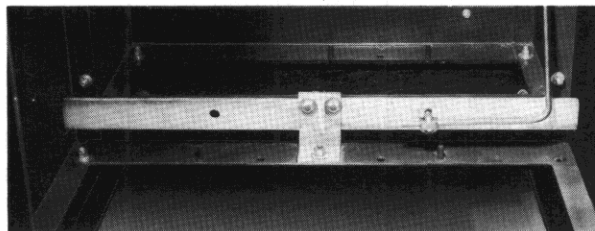


Fig. 7

4630-G

9. It is desirable, with all switches closed, to run a megger test on all phases to ground and also phase to phase (A-B, B-C) before making cable connections to unit. The megger reading should be a minimum of 800 megohms for such tests. Note: lightning arresters may affect megger readings as follows:

- a. Distribution class — no affect.
- b. Intermediate or station class arresters due to the ground leakage resistors should read approximately 250-300 megohms.

If readings are affected, isolate the arresters and retest.

10. Make all incoming and outgoing connections including low-voltage wiring, if any.

11. Close doors, removing all duplicate interlock keys to insure proper operation of interlock system, and energize.

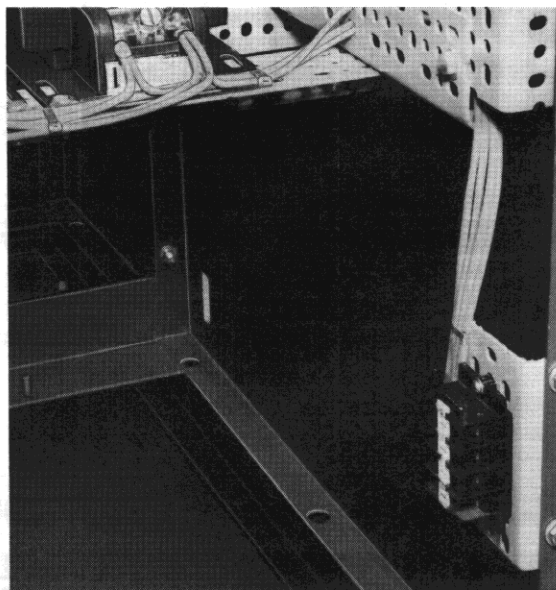


Fig. 8

4630-V



# I. INSTALLATION (cont'd)

## GENERAL DETAILS—CONSTRUCTION AND AUXILIARIES

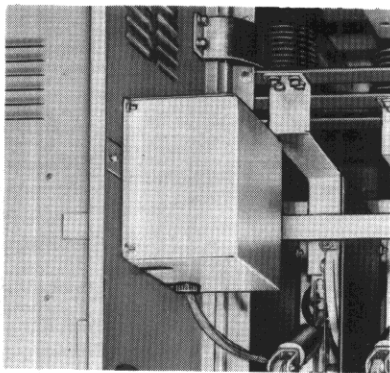


Fig. 10

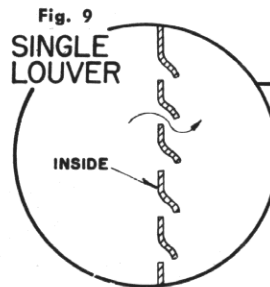
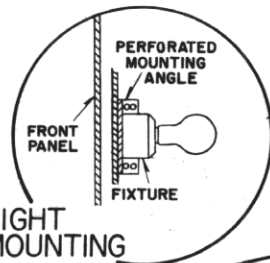
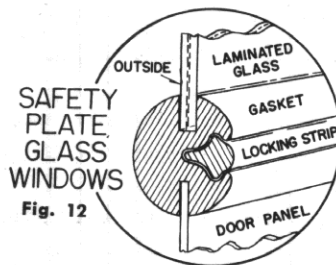
Fig. 9  
SINGLE LOUVERFig. 11  
LIGHT MOUNTING

Fig. 12



Fig. 13

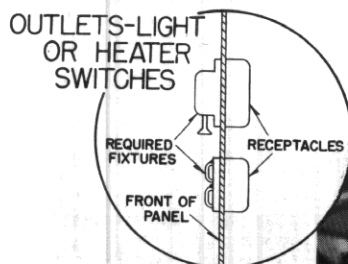


Fig. 14

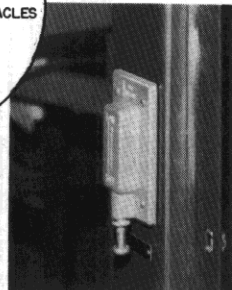
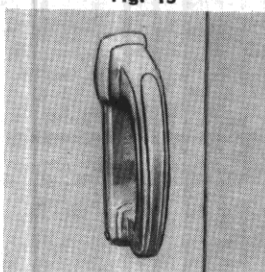
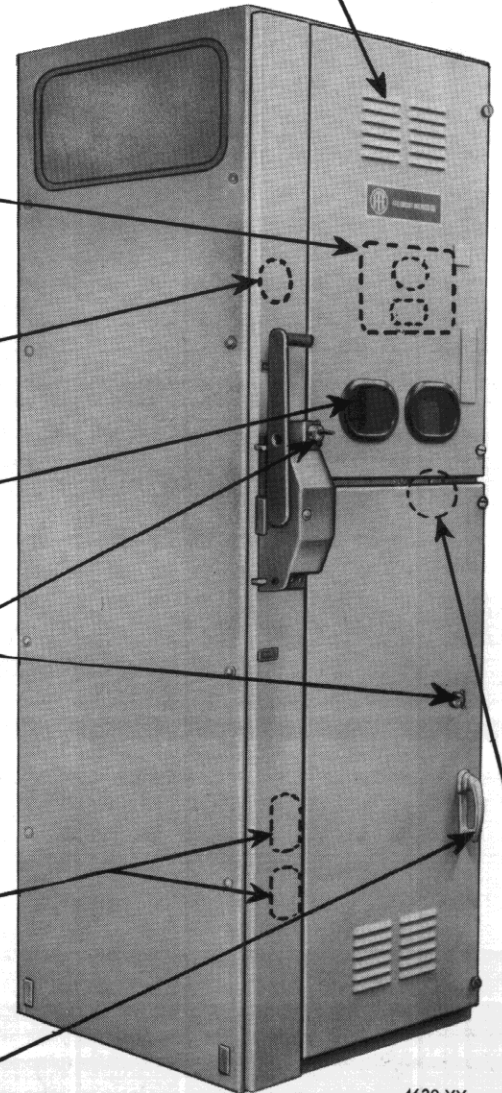


Fig. 15

Fig. 16  
MECHANICAL INTERLOCK

4630-YY

Supplied as optional when specified—  
Figs. 10, 11 and 14

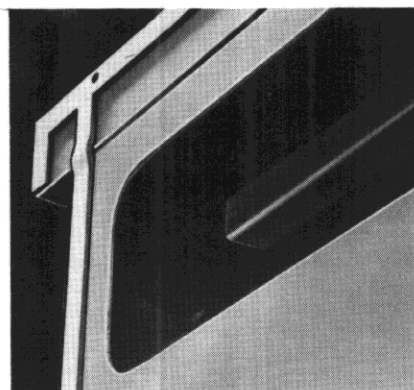
DOOR HANDLE WITH





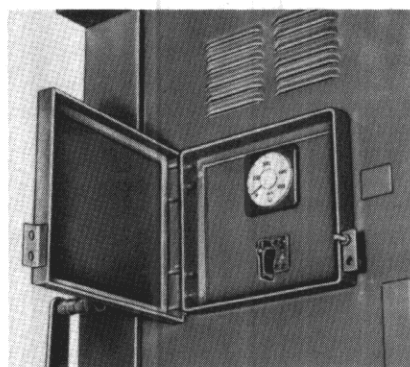
# I. INSTALLATION (cont'd)

## GENERAL DETAILS—OUTDOOR CONSTRUCTION



JOINT GASKETING

Fig. 17



METERING COVER

Fig. 19

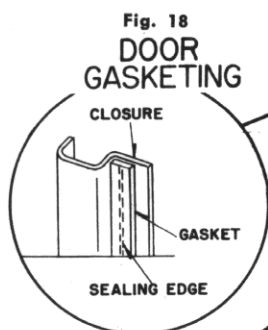
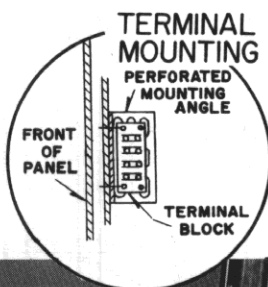


Fig. 18  
DOOR  
GASKETING

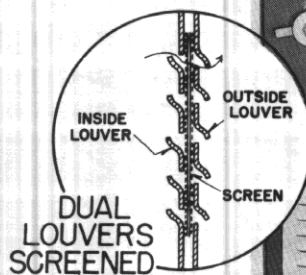


TERMINAL  
MOUNTING  
PERFORATED  
MOUNTING  
ANGLE

FRONT OF  
PANEL

TERMINAL  
BLOCK

SCREENED HEATER



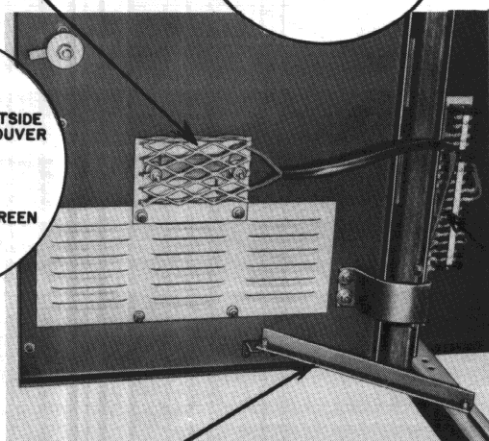
INSIDE  
LOUVER

OUTSIDE  
LOUVER

SCREEN

DUAL  
LOUVERS  
SCREENED

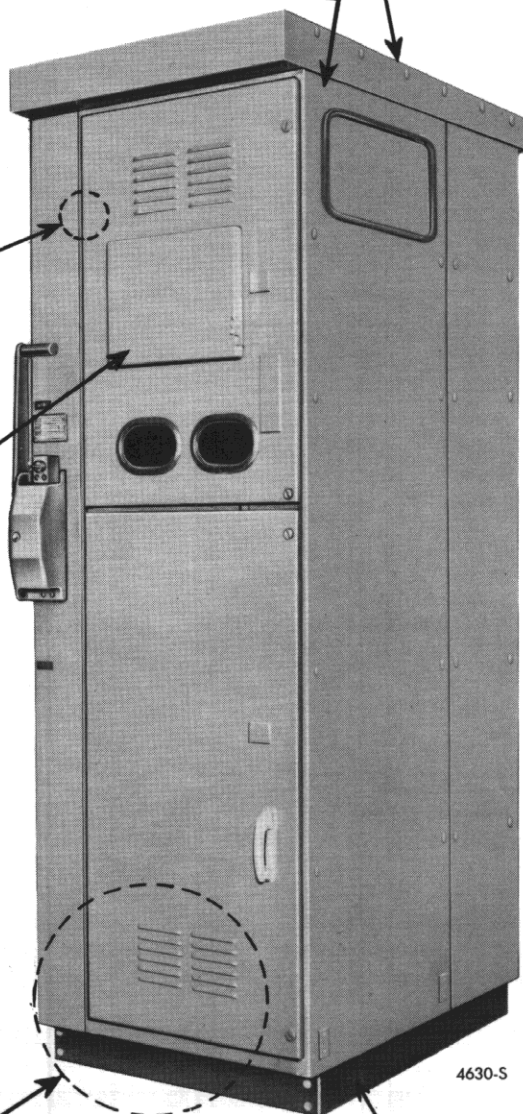
Fig. 20



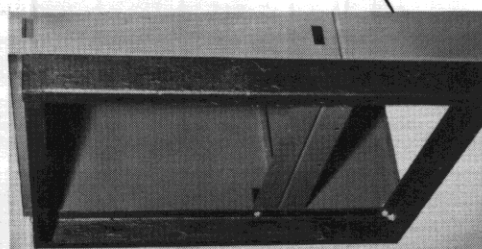
WINDLATCH

TERMINAL

SLOPED ROOF  
3-INCH OVERHANG FRONT AND REAR



4630-S



CHANNEL BASE - ASPHALTIC COATED

Fig. 21



## I. INSTALLATION (cont'd)

### B — OUTDOOR

For outdoor PSC assemblies, the installation instructions of the indoor PSC assemblies should be followed exactly, together with the following additions.

Refer to pages 5 and 6 for details of the following:

1. The basic outdoor construction differs from the indoor type in that it has:
  - a. Sloped overhanging roof section, bolted and gasketed on the top of each bay.
  - b. Gasketed door frames and meter compartment covers, Figs. 18 and 19.
  - c. If a rear section is added for extra depth, the two frames are bolted and gasketed together.
  - d. A steel channel base frame for each bay, asphalt coated, on which the actual unit is bolted, Fig. 2.
  - e. Gasketing is also provided between all bays.
2. If a PSC has two or more shipping splits, rubber gaskets are supplied in place, Fig. 17.

## II. OPERATION

### A — UNFUSED SWITCH WITH MANUALLY-ACTUATED SPRING-OPERATING MECHANISM

In this arrangement the handle mechanism is coupled through chain and sprocket with the spring-operating mechanism. If the handle mechanism has a Kirk key interlock, make sure it is unlocked before actuating the handle.

1. Moving handle up or down, whichever is synonymous with the switch operation, will charge the spring of the operating mechanism. Immediately when the spring is fully charged it will operate the switch independently from the handle itself.
2. A position indicator built into the handle housing will indicate the correct switch position. (Shown below).
  - a. Silver-green — Spring discharged — Switch open
  - b. Silver-red — Spring discharged — Switch closed

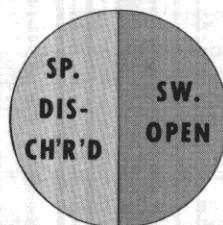


Fig. 22

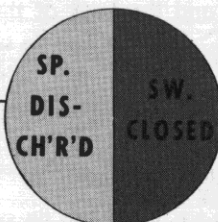
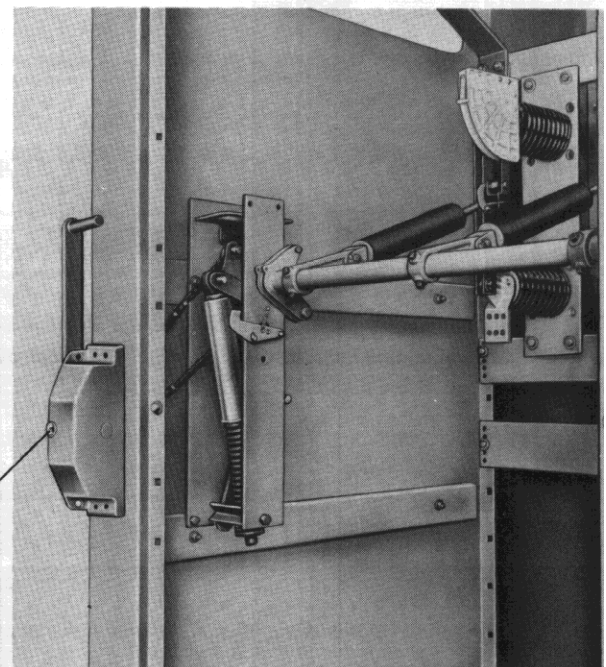


Fig. 23



4871-C

Fig. 24. Front chain drive connected to shaft through stored-energy spring operator for maximum fault closing.



## II. OPERATION (cont'd)

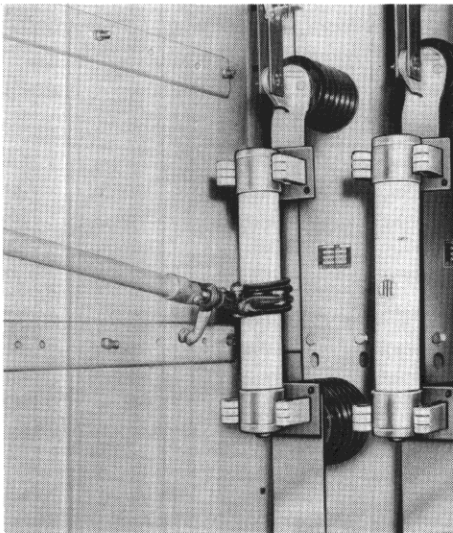
### B — FUSED SWITCH WITH MANUALLY-ACTUATED SPRING-OPERATING MECHANISM

A fused switch is an arrangement where the fuses are mounted either below or above the switch, see Fig. 26.

The door allowing access to the fuses is always interlocked with the switch-operating mechanism, so that it can only be opened when the switch is in the open position. Switch access door can only be opened after fuse access door is open. See also under interlocks.

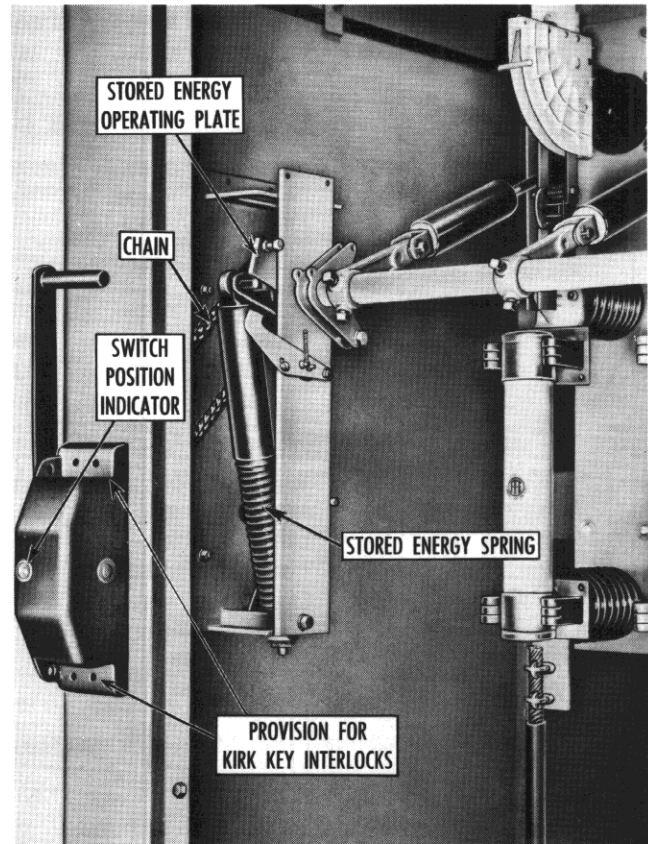
The functions of the manually-actuated spring-operating mechanism are the same as described under II., A.

Fuses can be removed with the fuse tool which can be supplied as accessory equipment with the Power Switching Center, see Fig. 25.



4661-V

Fig. 25 Fuse tool in use, removing fuse.



4871-D

Fig. 26 Fused switch with manually actuated spring operating mechanism.

## INTERLOCKS

### 1. FUSED SWITCH

Interlocks prevent access to fuses while switch is closed. Refer to Fig. 27, page 9, and Fig. 13, page 5.

Two keys are supplied, one with each interlock. For safe operation, one key must be removed and destroyed. Units are shipped with fuse access door closed and locked and switch closed.

To gain access to fuses, proceed as follows:

- a. Open switch, turn Key A2 on handle-interlock to lock open, and remove key.
- b. Insert key into interlock on fuse access door and turn to unlock.
- c. Open fuse access door, Key A2 is now held captive.

To restore service, reverse above procedure c, b, a.

NOTE: Fuse access door must be closed tightly before it can be locked and key can be obtained.

### 2. BUS TIE SWITCH — TWO INCOMING LINES

Interlocks prevent paralleling of incoming lines, loads can be fed from either line. Refer to Fig. 28.

Three keys are supplied, one with each interlock.

For safe operation, one key must be removed and destroyed.

Normally bus tie switch C is open and locked open. Two incoming line switches A and B are closed, and the keys of their interlocks are held captive.

To close bus tie switch proceed as follows:

- a. Open line switch (either A or B), turn Key A1 to lock open and remove key.
- b. Insert key interlock on bus tie switch C and turn to unlock.
- c. Close bus tie switch, key is now held captive.

To restore service, reverse above procedure c, b, a.





## II. OPERATION (cont'd)

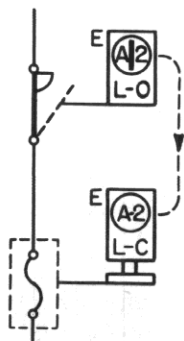


Fig. 27

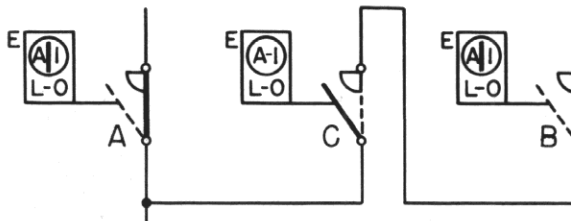


Fig. 28

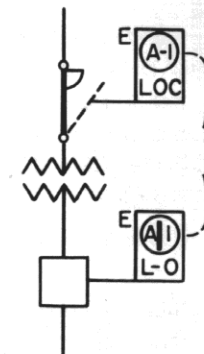


Fig. 29

### 3. SWITCH INTERLOCKED WITH PRIMARY OR SECONDARY BREAKER

Interlock prevents operation of switch when breaker is closed, Fig. 29. Two keys are supplied, one with each interlock. For safe operation, one key must be removed and destroyed.

Switch and breaker are closed, Key A1 is held captive in breaker interlock.

a. Open breaker and turn key in interlock to lock

open and remove key.

b. Insert key into switch interlock LOC and turn key to unlock, key is then held captive.

c. Open switch.

d. Turn key to lock switch in open position.

e. To restore service, unlock switch, close it, lock closed, and obtain key.

f. Insert key into breaker interlock, unlock and close breaker, key is then held captive.

## III. INSPECTION AND MAINTENANCE

### A — SWITCH AND FUSES

The interrupting contacts, quick-break blade and arc chute gradually erode when interrupting current, and should be visually inspected after approximately 100 normal load-interrupting operations. This inspection can be performed by opening the switch and noting the condition of the quick-break blades.



Fig. 30. 4033-B

End of auxiliary blade showing erosion of arcing tip.

If the moving arcing electrode (on the tip of the auxiliary, quick-break blade) shows bad erosion, Fig. 30 (approximately one-third burned away), the arc chute and quick-break blade should be replaced. To replace arc chute, loosen locknuts holding arc chute to support, (Fig. 32), pull arc chute away from switch base, rotating toward hinge, and remove. Discard and replace with new unit. To replace quick-break blade, remove bolt P, (Fig. 31) and lift off used blade.

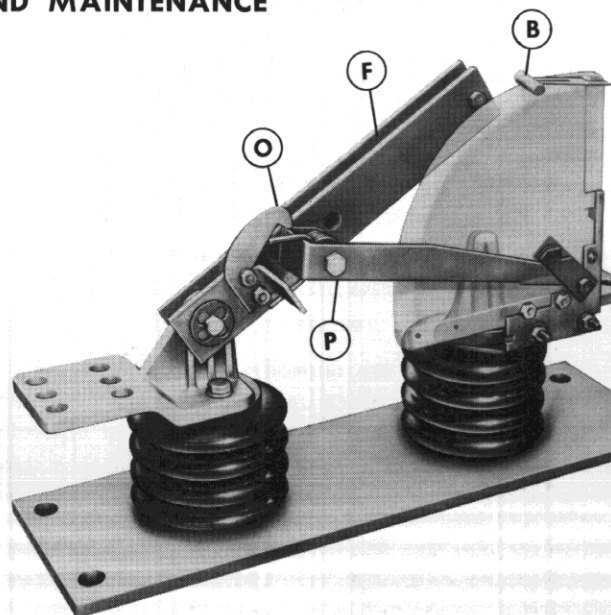
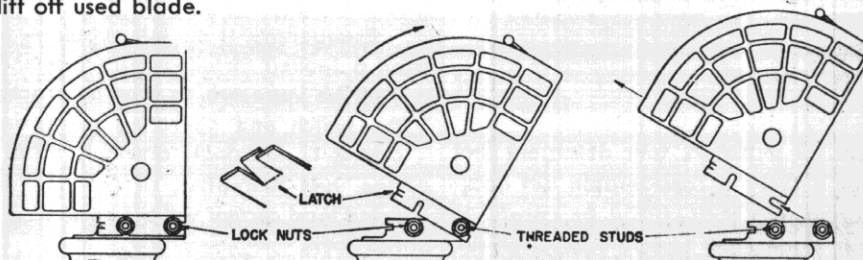


Fig. 31. 4738- Main blade opening, auxiliary blade about to be released. Half of arc-chute removed.





### III. INSPECTION AND MAINTENANCE (cont'd)

#### Quick-Break Blades

During switch operation, quick-break blade should not release until it is pulled out of contact by hook O, Fig. 31. When closing, quick-break blade should not leave flipper C, Fig. 35, until jaw blades R, have made contact.

#### Contact Adjustment

Should it ever be necessary to adjust the hinge contact pressure—(First) Loosen pressure adjusting nut S (Fig. 35) until there is negligible contact pressure (no clearance), (Second) tighten nut one-half turn. Hinge friction should be sufficient to hold a 4.8-kv blade (9-inch insulator centers) in any position and to just allow a 13.8-kv blade (12-inch insulator centers) to fall. No adjustment is required on jaw contact.

#### Fuses

I-T-E CL fuses are normally utilized in this type of equipment. The following instructions are for replacing fuse units after interruption:

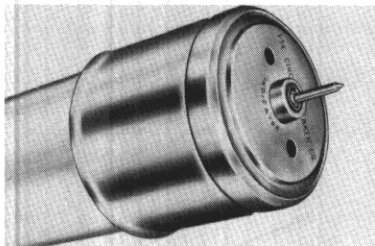


Fig. 33 4661-Q

1. When indicating pin is in the extended position, Fig. 33, the fuse **must** be replaced.
2. To replace fuses, grasp with fuse tool, Fig 34, and remove. Replace with new unit.

#### Lubrication

Switches that are normally closed, only require lubrication of jaw contacts approximately every 500 open-close operations. Use grade E NO-OX-ID or equivalent.

Switches that are open long periods of time should have jaw contacts cleaned and greased lightly with grade E NO-OX-ID as service conditions dictate.

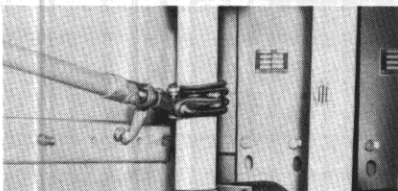
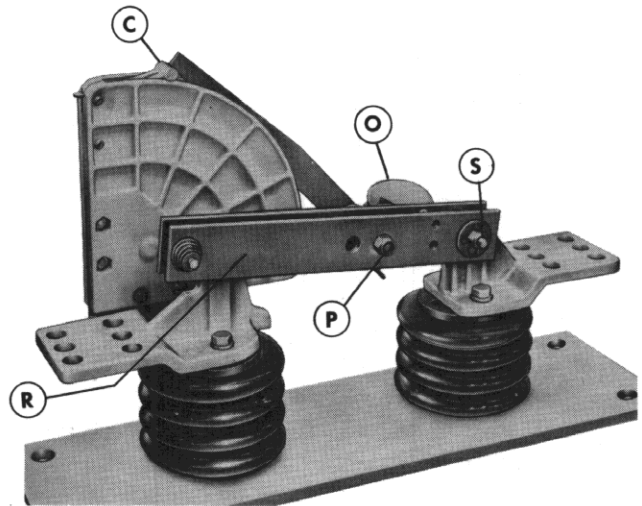


Fig. 34

4661-V

#### Cleaning

If required, clean all insulators with detergent (not soap) and water, or if there is considerable dirt accumulation, use trichlorethylene ( $\text{CHCl}_3$ ). Be careful to dry well with a soft clean cloth before reenergizing.



4738-C

Fig. 35. Main blade closing, auxiliary blade restrained and about to be released for closing.

#### B — SPRING-OPERATING MECHANISM

Check chain drive and spring-operating mechanism for loose or worn parts. All pivoting and moving surfaces, especially the chain, to be lubricated with molykote G or an equivalent good grade of grease.

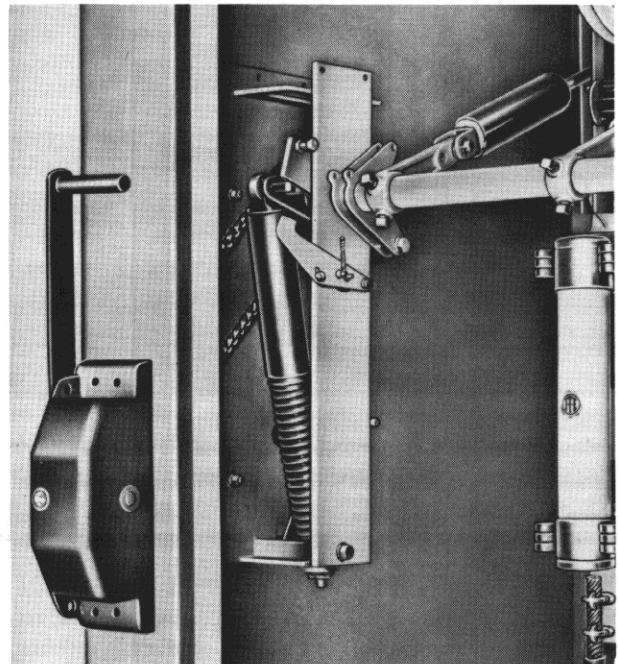


Fig. 36

4871-DC

**Emergency**—If the interrupter switch has been closed on a faulted circuit, it is recommended that the switch itself be inspected as soon as practical thereafter. Both the switch and operating mechanism are capable of closing on the single assembly rated fault without damage, and thereafter, of carrying and interrupting full rated load current without exceeding NEMA temperature rise limits.



#### IV. SPARE AND REPLACEMENT PARTS

For normal maintenance it is recommended that the user maintain the following spare parts stock (quantity is for 5 switches in operation):

Item	Description	Quantity
1	Insulating links (for switch mech.) Fig. 37	1 set
2	Quick-break blade, Fig. 38	3 each
3	Arc chute, Fig. 39	3 each
4	Flipper assembly, Fig. 39	3 each
5	Thumb screw and captivated nut, Fig. 40.	6 each
6	Insulators A-20, Fig. 41	4 each
	A-30, Fig. 42	2 each

NOTE: When ordering spare parts, state I-T-E shop order (S.O.) number, G.A. drawing number and serial number of each bay for which parts are being ordered as well as item number, description and quantity. For mounting dimensions and instructions, see DB Section 1632. For prices, refer to I-T-E representative.

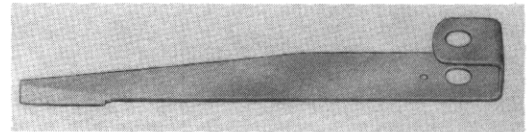


Fig. 38

4030-1X

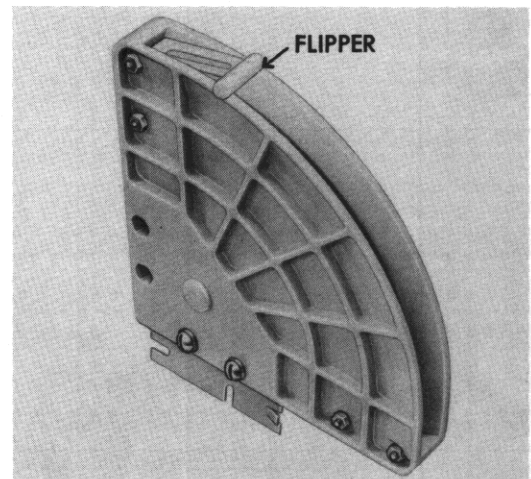


Fig. 39

4630-1X

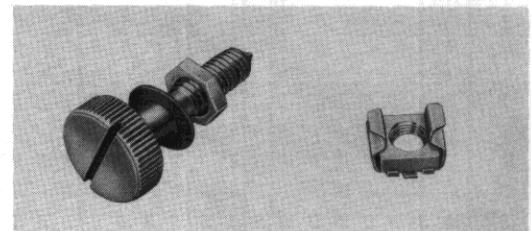


Fig. 40

4630-SS

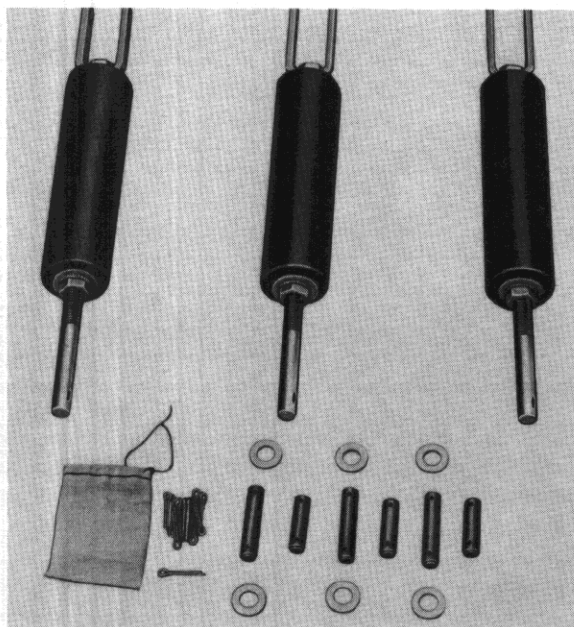


Fig. 37

4593-F

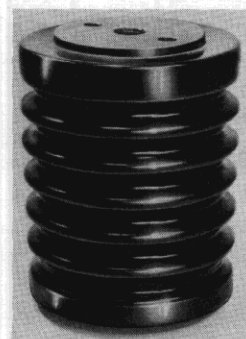


Fig. 41

4630-4

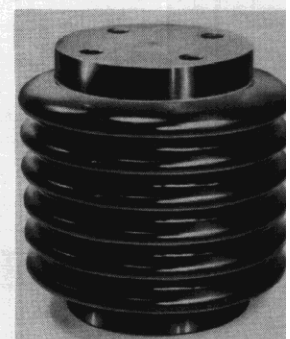


Fig. 42

4630-5

**SALES OFFICES:** Akron, Ohio • Amarillo, Texas • Atlanta, Georgia • Baltimore, Maryland • Beaumont, Texas  
Birmingham, Alabama • Boston, Massachusetts • Buffalo, New York • Butte, Montana • Charlotte, North Carolina  
Chicago, Illinois • Cincinnati, Ohio • Cleveland, Ohio • Columbia, South Carolina • Columbus, Ohio  
Dallas, Texas • Davenport, Iowa • Dayton, Ohio • Denver, Colorado • Detroit, Michigan • El Paso, Texas  
Flint, Michigan • Grand Rapids, Michigan • Houston, Texas • Huntington, W. Va. • Indianapolis, Indiana • Jackson,  
Mississippi • Jacksonville, Florida • Kansas City, Missouri • Knoxville, Tennessee • Lansing, Michigan • Little Rock,  
Arkansas • Los Angeles, California • Louisville, Kentucky • Lubbock, Texas • Memphis, Tennessee • Miami, Florida  
Milwaukee, Wisconsin • Minneapolis, Minnesota • Nashville, Tennessee • New Haven, Connecticut • New Orleans,  
Louisiana • New York, New York • Oklahoma City, Oklahoma • Omaha, Nebraska • Orlando, Florida • Peoria,  
Illinois • Philadelphia, Pennsylvania • Phoenix, Arizona • Pittsburgh, Pennsylvania • Portland, Oregon • Salt Lake  
City, Utah • San Antonio, Texas • San Francisco, California • Seattle, Washington • Shreveport, Louisiana  
St. Louis, Missouri • Syracuse, New York • Tampa, Florida • Toledo, Ohio • Tulsa, Oklahoma • Washington, D.C.



**I-T-E CIRCUIT BREAKER COMPANY**