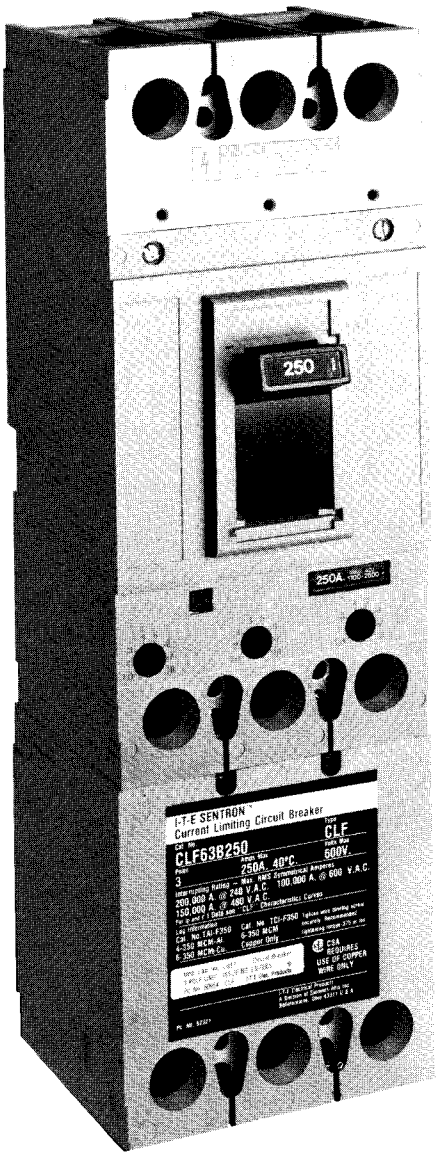
SIEMENS

Information and Instruction Guide
F-Frame
Type CLF

I-T-E® Molded Case Circuit Breakers



Bulletin IB-2.2.8-4C

I-T-E F-Frame
Type CLF
Model ETCL
2 and 3 Pole 70-250 Amperes

WARNING

Dangerous voltages are present inside the enclosures, or panels in which this circuit breaker is installed. Serious injury, electrocution, and/or equipment damage is possible unless extreme caution is used when examining this circuit breaker while it is still in service.

De-energize all incoming power if conditions exist which are contrary to those described in this instruction book or which are otherwise unusual.

Only qualified personnel should work on or around this equipment.

TABLE OF CONTENTS

IMPORTANT

The information contained herein is general in nature and is not intended for specific application purposes nor is it intended as a training manual for unqualified personnel. Refer to Note for definition of a **qualified person***. It does not relieve the user of responsibility to use sound practices in application, installation, operation and maintenance of the equipment purchased or in personnel safety precautions. Should a conflict arise between the general information contained in this publication and the contents of drawings or supplementary material or both, the latter shall take precedence. I-T-E Electrical Products Division of Siemens Energy & Automation, Inc. reserves the right to make changes in specifications shown herein or add improvements at any time without notice or obligation.

NOTE

*** Authorized and qualified personnel-**

For the purpose of this manual a qualified person is one who is familiar with the installation, construction or operation of the equipment and the hazards involved. In addition, he has the following qualifications:

(a) **is trained and authorized** to de-energize, clear, ground, and tag circuits and equipment in accordance with established safety practices.

(b) **is trained** in the proper care and use of protective equipment such as rubber gloves, hard hat, safety glasses or face shields, flash clothing, etc., in accordance with established safety practices.

(c) **is trained** in rendering first aid.

NOTE

These instructions do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation, or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the local I-T-E Electrical Product Division of Siemens Energy & Automation, Inc. sales office.

The contents of this instruction manual shall not become part of or modify any prior or existing agreement, commitment or relationship. The sales contract contains the entire obligation of Siemens Energy & Automation, Inc. The warranty contained in the contract between the parties is the sole warranty of Siemens Energy & Automation, Inc. Any statements contained herein do not create new warranties or modify the existing warranty.

NEMA PROCEDURES NOTE

Dangerous voltages are present in the equipment which can cause severe personal injury and product failure. Always de-energize and ground the equipment before maintenance. Maintenance should be performed only by qualified personnel. The use of unauthorized parts in the repair of the equipment or tampering by unqualified personnel will result in dangerous conditions which can cause severe personal injury or equipment damage. Follow all safety instructions contained herein.

GENERAL INFORMATION FOR I-T-E CURRENT LIMITING F- FRAME CIRCUIT BREAKERS AND SWITCHES 2 AND 3 POLE, 70-250 AMPERES

General

CLF — Current Limiting Sentron circuit breakers are calibrated for operation in an ambient of 40°C and are for use in panelboards, switchboards and individual enclosures. They are available with non-interchangeable trip units and molded case switches.

Sentron circuit breakers combine thermal-magnetic construction for overload protection and a patented "blow-apart" contact arrangement for current-limiting protection under high fault interruption conditions. This combination of old and new principles make a device that easily meets the requirements for current-limiting circuit breakers, as outlined in the National Electrical Code (240-11)① and UL 489, paragraph 2.4A② of the Underwriters Laboratory. To this end, Sentron circuit breakers have no fuses to replace when they have been required to function due to short-circuit conditions. The common trip feature of the circuit breaker is completely retained so that all poles of the circuit breaker open when an overload or short circuit occurs.

Pressure wire connectors, suitable for use with aluminum or copper wire are available for all CLF circuit breakers. Rear connection studs or plug-in connector assemblies are also available (2 and 3 pole). The latter type of arrangement permits the removal of the circuit breaker from its leads without physically coming in contact with either the line or load terminals. Special features such as shunt trip, auxiliary and alarm switches and undervoltage trip devices are available for field adaptation. These devices are mounted internally and UL listed, page 47. Information concerning these special devices can be found on page 45.

Thermal Magnetic

CLF circuit breakers provide complete overload and short circuit protection by use of a time-delay thermal trip element and an instantaneous magnetic trip device. Nominal instantaneous trip values are externally adjustable with eight trip points as shown below:

Breaker Ampere Rating	NOMINAL INSTANTANEOUS VALUES							
	Low	2	3	4	5	6	7	HI
70 - 90	600	640	690	730	770	810	850	900
100 - 110	700	770	840	920	990	1060	1140	1200
125 - 150	800	900	1000	1100	1200	1300	1400	1500
175 - 200	900	1060	1210	1370	1520	1780	1930	2000
225 - 250	1100	1300	1500	1700	1900	2100	2300	2500

All values ± 25% on Low Setting, ± 20% on High Setting based on UL 489 Standards.

Circuit breakers are calibrated at the factory, under controlled temperature conditions for a 40°C (104°F) ambient. The cover on the trip unit is sealed to prevent access to the trip elements. Alterations of the calibration of these elements should not be attempted. Removal of the special sealed line cover voids the Underwriters' Laboratories, Inc. listing for that specific circuit breaker.

Molded Case Switch

A molded case switch is available in the FJ6 type circuit breaker. This device employs the same operating mechanism as the thermal magnetic and magnetic only units. A preset instantaneous function is factory installed to allow the switch to trip and protect itself at a high fault condition. No overload or low fault current protection is provided. This protection must be supplied by separate overcurrent devices. Catalog numbers for ordering and informational purposes can be found on pages 44-46.

Interrupting Ratings

The interrupting ratings of the CLF Sentron circuit breakers are based on procedures and standards established by the Underwriters Laboratory.

Volts AC	Amperes RMS Symmetrical
240	200,000
480	150,000
600	100,000

Circuit Breaker Operation

With the mechanism latched and the contacts open, the operating handle will be in the "OFF" position. Moving the operating handle to the "ON" position closes the contacts and establishes a circuit through the circuit breaker. Under overload or short-circuit conditions sufficient to trip or open the circuit breaker automatically, the operating handle moves to a position between "ON" and "OFF" as previously described. To relatch the circuit breaker after an automatic operation, move the operating handle to the extreme "OFF" position. Automatic tripping can also be simulated for service maintenance purposes by pressing the red trip button located in the molded case beneath the operating handle.

Warning for Circuit Breaker Removal

The circuit breaker should always be in the "TRIPPED" or "OFF" position; and if practical, the switchboard de-energized before inspecting, changing, installing or removing the circuit breaker. Never attempt to add a feature pod with the circuit breaker mounted in any panel or switchboard. If the bus cannot be de-energized, use insulated hand tools, rubber gloves and a rubber floormat.

①National Electrical Code

(240-11) "A current-limiting overcurrent protective device which, when interrupting currents in its current-limiting range, will reduce the current flowing in the faulted circuit to a magnitude substantially less than that obtainable in the same circuit, if the device were replaced with a solid conductor having comparable impedance."

②Underwriters Laboratory

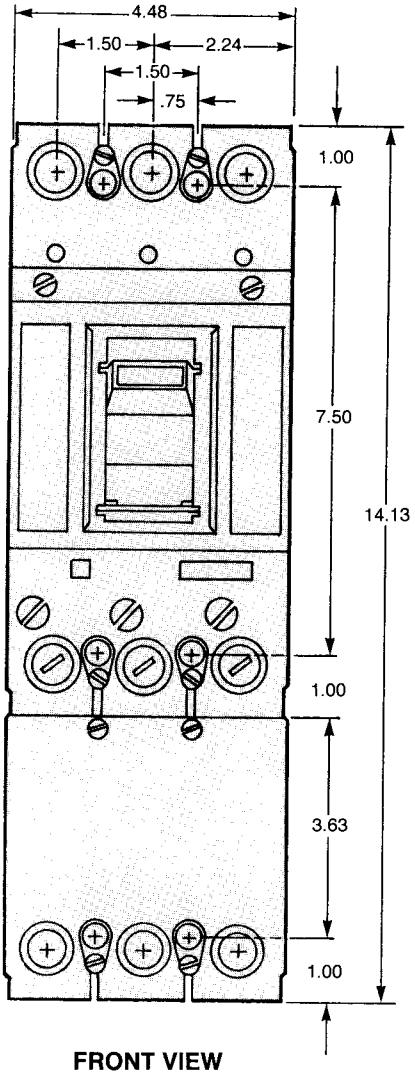
(UL 489, Par. 2.4A) "A circuit breaker that does not employ a fusible element and that when operating within its current-limiting range, limits the let-through I^2t of a ½ cycle wave of the symmetrical prospective current."

Maintenance

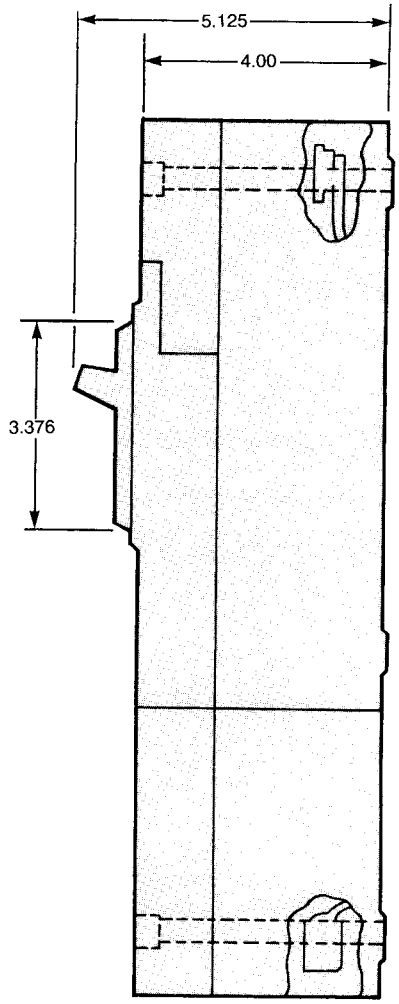
Specific maintenance schedules are recommended in order to assure a proper functioning circuit breaker. This schedule should include the following items:

1) Breaker should trip when "Push To Trip" button is pushed.
2) All terminal connector screws are at recommended torque values.
3) Visual inspection for broken or cracked case (Damage caused by external sources)
4) For additional testing information consult NEMA - PROCEDURES FOR VERIFYING PERFORMANCE OF MOLDED CASE CIRCUIT BREAKERS.

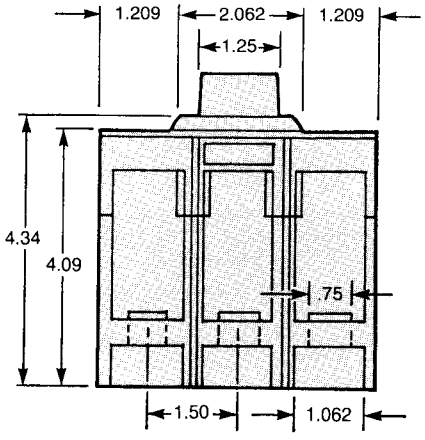
I-T-E F FRAME, TYPE CLF OUTLINE DRAWINGS



FRONT VIEW



SIDE VIEW



END VIEW

DIMENSIONS IN INCHES

NOTE: FOR A MORE DETAILED OUTLINE DRAWING
CONTACT I-T-E SALES OFFICE

INSTRUCTIONS FOR INSTALLING I-T-E TERMINAL CONNECTORS

⚠ DANGER

Hazardous Voltage. Will cause severe personal injury or death.

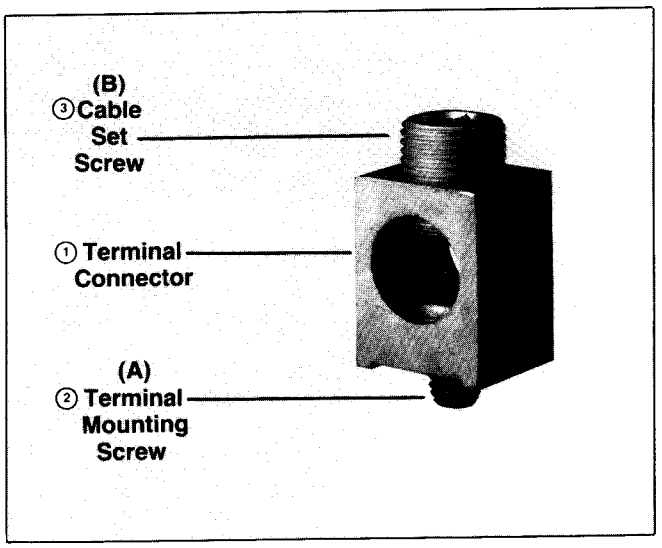
Turn power off supplying device before installing.

⚠ SAFETY INSTRUCTIONS

① Place terminal connector body into terminal cavities as shown in the illustration.

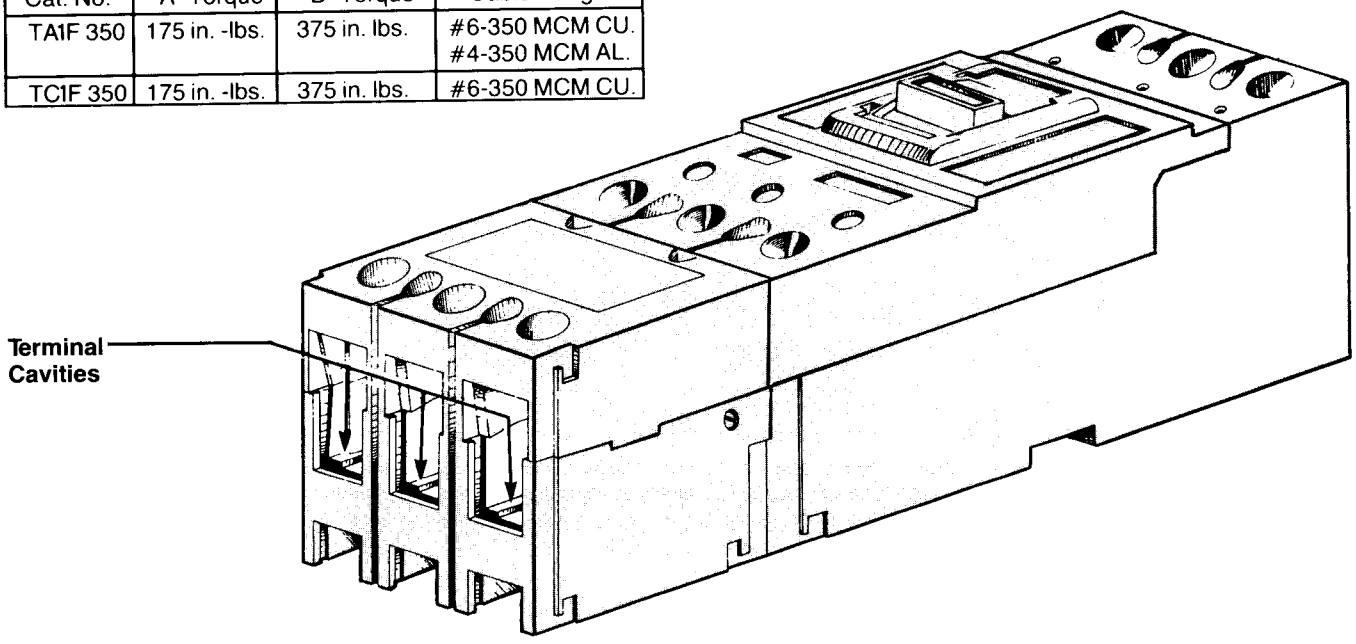
② Torque terminal mounting screw (A) to specified torque value.

③ Place cable set screw (B) into threaded body opening. After cable has been inserted into cable cavity, torque cable set screw to specified torque value.



Terminal Connector – Catalog Number TA1F350

Solderless Connector Torque Values			
Cat. No.	"A" Torque	"B" Torque	Cable Range
TA1F 350	175 in. -lbs.	375 in. lbs.	#6-350 MCM CU. #4-350 MCM AL.
TC1F 350	175 in. -lbs.	375 in. lbs.	#6-350 MCM CU.



ATTACHING I-T-E HANDLE BLOCKING DEVICE CAT. NO. F6HB1

To Block Handle "On".

Turn Breaker "On". Assemble blocking device to breaker by positioning over handle as shown, with handle opening of blocking device toward the line end. Insert tab **A** into slot **A1**. Push toward handle and downward in area shown until tab **B** drops into slot **B1** as shown in Fig. 2.

To Block Handle "Off".

Turn Breaker "Off" Reverse handle blocking device so that handle opening of blocking device is toward the load end. Insert tab **A** into slot **B1**. Push toward handle and downward in area shown until tab **B** seats in slot **A1**.

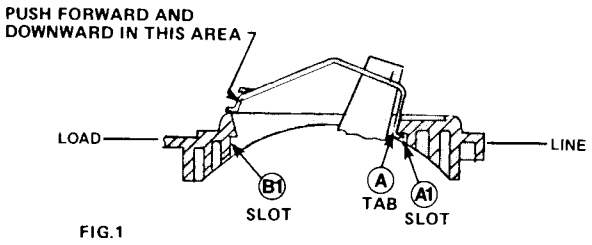


FIG.1

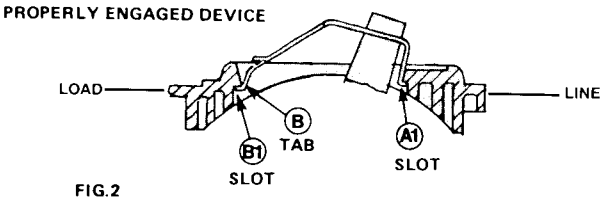


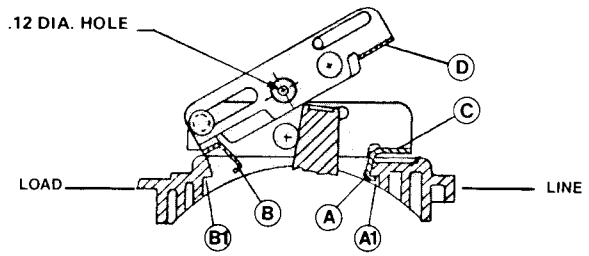
FIG.2

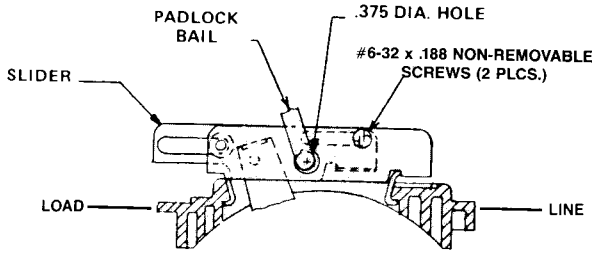
ATTACHING I-T-E PADLOCKING DEVICE CAT. NO. F6PL1

With breaker in tripped position, assemble padlocking device to breaker by positioning over handle as shown. Insert tab **A** into slot **A1**. Pivot tab **B** into slot **B1** until surface **D** is resting on surface **C**.

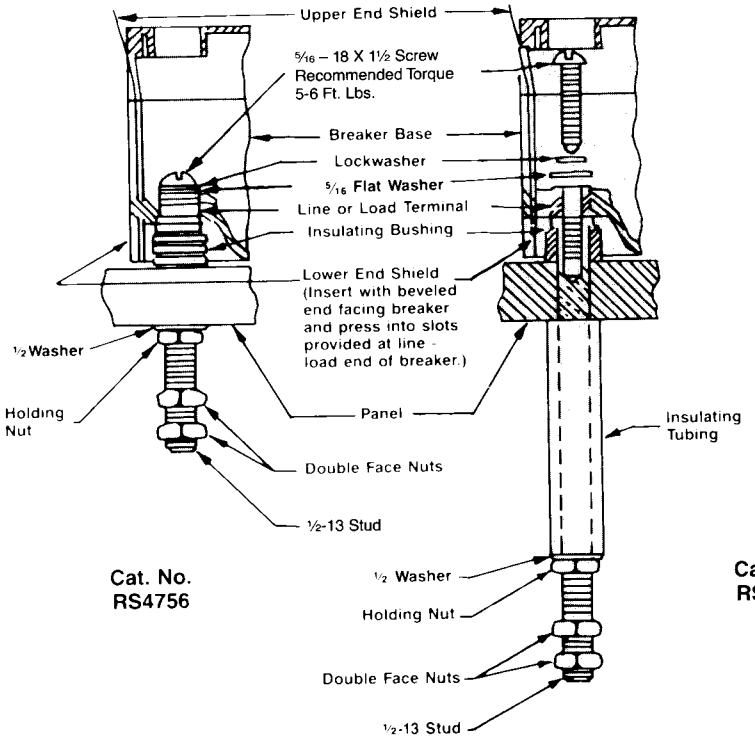
Install #6-32 x .188 non-removable screws (2 places). To padlock handle in "Off" position move breaker handle to "Off" and move slider to the left as shown below until .375 dia. holes line up, allowing padlock to be installed.

NOTE: To padlock circuit breaker in "On" position, enlarge .12 dia. hole of slider to .375 dia. before assembly to breaker. File away burrs after drilling. Assemble padlocking device to breaker as explained above, then turn breaker "On" and install padlock.



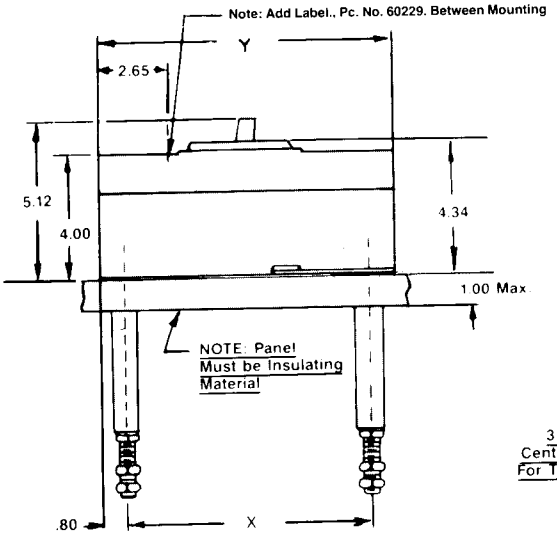


INSTRUCTIONS FOR INSTALLATION OF I-T-E CIRCUIT BREAKER REAR CONNECTING STUDS



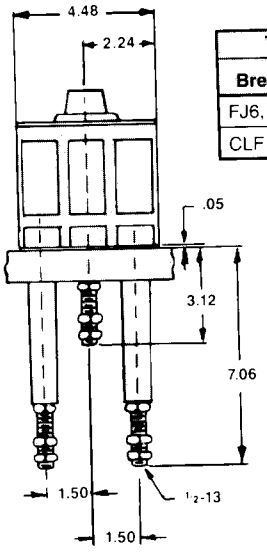
POLE	QUANTITY REQUIRED PER BREAKER
2	4 of RS4755
3	4 of RS4755 plus 2 of RS4756

BREAKER LENGTH	
Breaker Type	Y
FJ6, F6, HF6	9.50
CLF	14.13



Side View

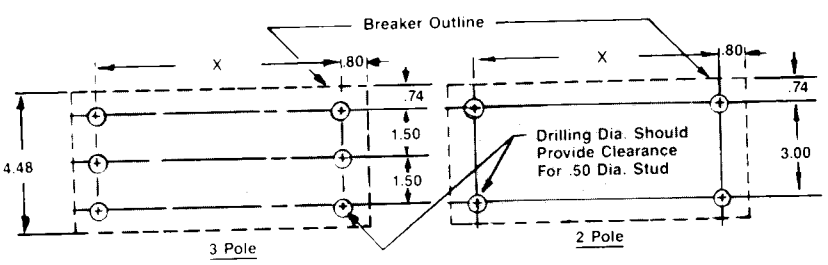
F-Frame
3 Pole Shown
Center Pole Omitted
For Two Pole Breaker



End View

TERMINAL SPACING	
Breaker Type	X
FJ6, F6, HF6	7.90
CLF	12.53

Drilling Plan



INSTRUCTIONS FOR INSTALLATION OF I-T-E CIRCUIT BREAKER PLUG-IN ADAPTERS

A complete plug-in installation requires one line end adapter assembly (consisting of mounting block, tulip connectors and associated hardware), one load end adapter assembly. An optional switchboard mounting pan is available or customer can supply a mounting means to suit his requirements.

APPLICATION INFORMATION	NO. POLES	LINE END ADAPTER CAT. NO.	LOAD END ADAPTER CAT. NO.	SWITCHBOARD MTG. PAN CAT. NO.
	2	PC4753	PC4753	PL4763
	3	PC4754	PC4754	PL4763

MOUNTING PREPARATION: (Figs. 1 & 2)

1. If the switchboard mounting pan (1) is to be used, provide required drilling as shown in Fig. 1.
2. If other mounting means are to be used, provide the cutouts and drilling required to mount the adapter blocks as shown in Fig. 2.

SWITCHBOARD MOUNTING PAN (If used): (Fig. 3)

3. Place switchboard mounting pan (1) in position at location previously prepared in step 1 above. Secure in place with $\frac{5}{16}$ hardware (hardware furnished by customer).

MOUNTING BLOCK: (Fig. 3)

4. Align mounting block (2) with cutouts in switchboard mounting pan (or customer's mounting means as previously prepared in Step 2 above) and secure in place with $\frac{3}{8}$ flatwashers (3), lockwashers (4) and $\frac{3}{8}$-16 hex nuts (5) furnished.

BREAKER PREPARATION: (Fig. 4): Remove pressure wire connectors from breaker if present.

5. Place tulip clip assembly (6) on back of breaker in recess provided in base molding. Secure in place with $\frac{5}{16}$ flatwashers (7), lockwashers (8) & $\frac{5}{16}$-18 x 1½ round head screws (9) furnished. Recommended tightening torque for these bolts is 5-6 ft. lbs. to assure a good electrical connection. Repeat this procedure for the remaining tulip clip assemblies.
6. Slide upper end shields (10) and insert lower end shields (11) with beveled end facing breaker and press into slots provided at line & load end of breaker.
7. Add accessory label (12) to top of breaker as indicated on Instruction Sheet.

FINAL ASSEMBLY (Fig. 5)

8. Make bus and/or cable connection to rear of mounting block studs using hex nuts (13) furnished to secure this connection.
   CAUTION: Make certain that breaker operating handle is in the "Off" position before proceeding with the next step.
9. Align breaker with mounting blocks and force female tulip clips over male studs in mounting block until breaker base bottoms against mounting block. Secure breaker in place with ¼-20 x 4¼ long mounting screws (14), lockwashers (15) and flatwashers (16) furnished.
10. If installation requires use of front panel trim, provide cutout for breaker escutcheon as shown in Fig. 6.

DIAGRAMS FOR INSTALLATION OF I-T-E CIRCUIT BREAKER PLUG-IN ADAPTER

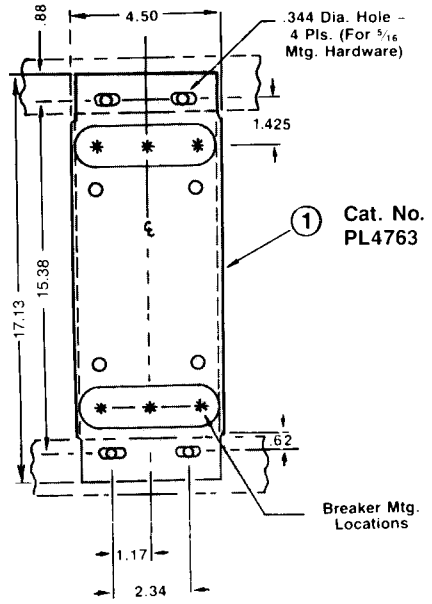


Fig. 1

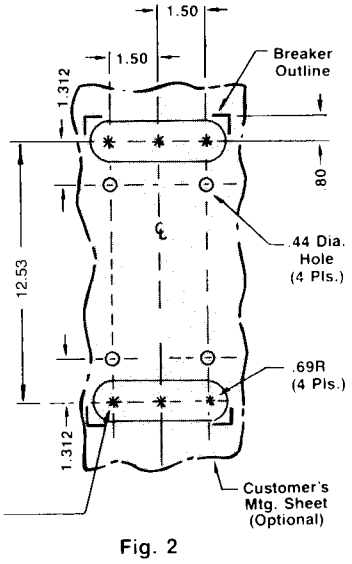


Fig. 2

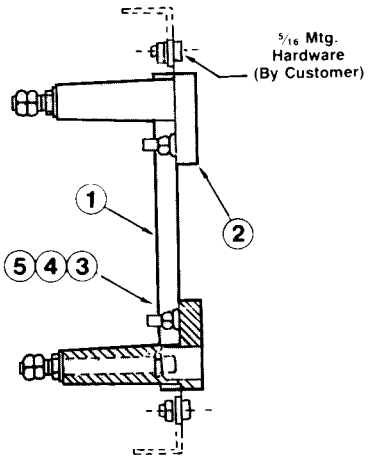


Fig. 3

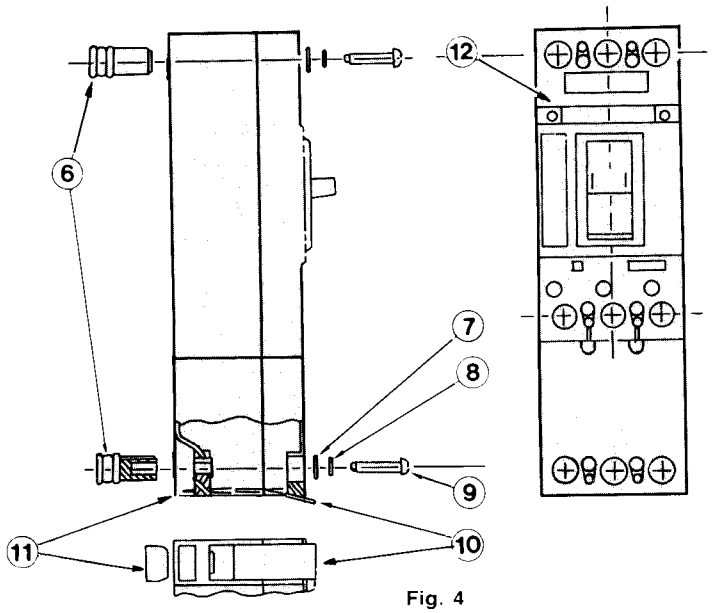
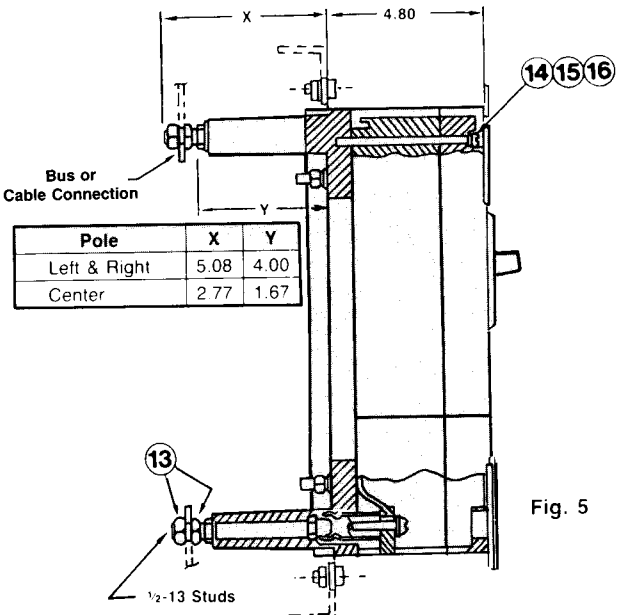


Fig. 4



Pole	X	Y
Left & Right	5.08	4.00
Center	2.77	1.67

Fig. 5

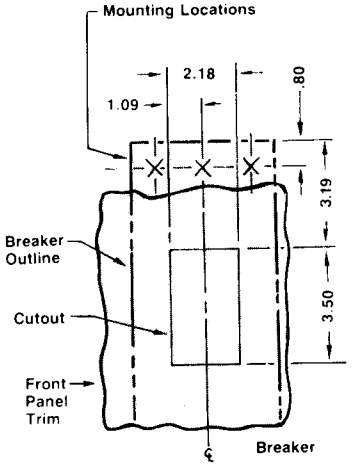


Fig. 6

INSTRUCTIONS FOR ASSEMBLING
I-T-E WALKING BEAM TYPE INTERLOCK
PANEL MOUNTED CIRCUIT BREAKER

1. Drill panel per panel drilling instruction sheet.
2. Break out proper knock-out (see Fig. 1 below) using screwdriver. Use needle file to smooth opening in base to indicated dimensions. In both cases, prevent loose plastic from entering base, and test to see that plunger (**8**) Fig. 2 moves freely within opening.
3. Assemble support (**1**) and spacers (**2**) to rear of panel using screws (**3**), lockwashers (**4**) and nuts (**5**) supplied as shown in Fig. 2. Note: Five (**5**) spacers, each .015 in. thick, are provided; and depending on the customer panel gauge number, use quantity of spacers indicated on chart in upper right hand corner. Example: If customer panel is 12 ga., use two (**2**) spacers.
4. Add circuit breakers (as prepared in Step 2) to customer panel for panel mounted units.
5. Assemble rocker arm sub-assembly (**6**) to support (**1**) with rocker arm pin (**7**). Be sure rocker arm spring (part of rocker arm sub-assembly) rests on top of projections on support (**1**) as shown in Fig. 2. Insert rocker arm pin (**7**) through rocker arm sub-assembly (**6**) and through upper hole in plunger (**8**), one on each side of support. Note position of plunger (See Fig. 2). Insert cotter pins (**9**) into holes of all three rocker arm pins (**7**). Spread cotter pins. Note: Heads of rocker arm pins (**7**) must be on upper side of assembly, and cotter pins (**9**) on lower side.
6. With both circuit breakers in "Off" position, interlock must move freely.
7. With one circuit breaker "On", the other circuit breaker must not close.

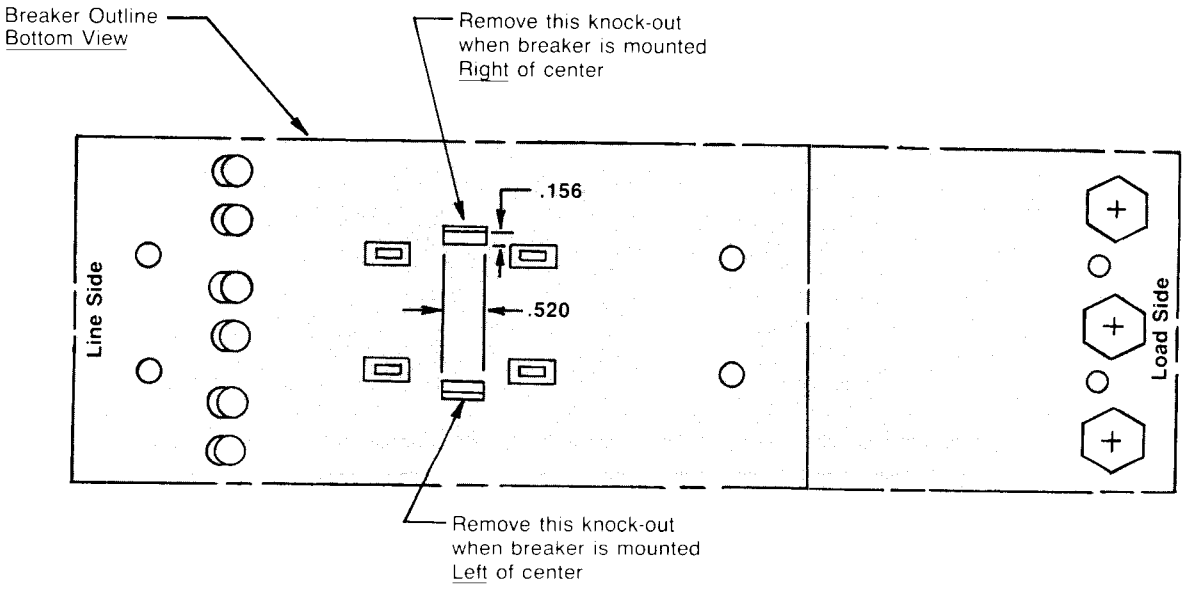
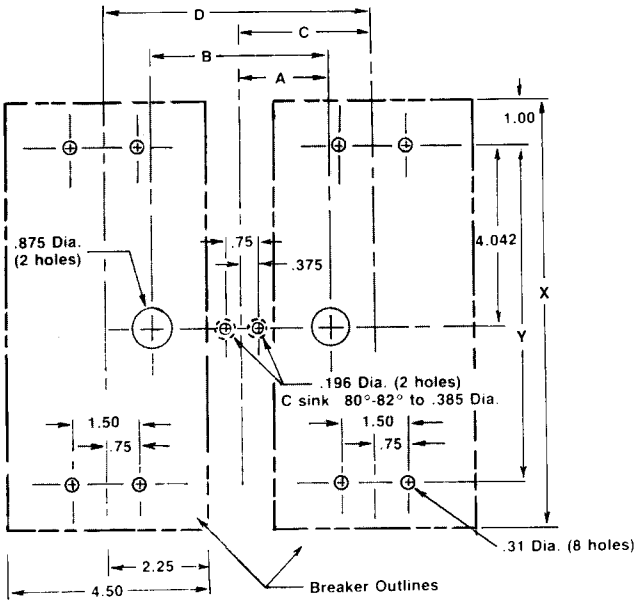


Fig. 1

DIAGRAMS FOR ASSEMBLING
I-T-E WALKING BEAM TYPE INTERLOCK (MI5426)
PANEL MOUNTED CIRCUIT BREAKER

REAR OF PANEL — LINE SIDE
PANEL MOUNTING



REAR OF PANEL — LOAD SIDE

DIMENSIONAL REFERENCE

Breaker Types	X	Y
FJ6, F6, HF6	9.50	7.50
CLF	14.13	12.13

BREAKERS ON	A	B	C	D
4.50 IN. CENTERS	1.273	2.546	2.25	4.50
6.00 IN. CENTERS	2.023	4.046	3.00	6.00

Gage No.	Nominal Thickness In.	Quantity Of Spacers
10	0.135	0
11	0.120	1
12	0.105	2
13	0.090	3
14	0.075	4
16	0.060	5

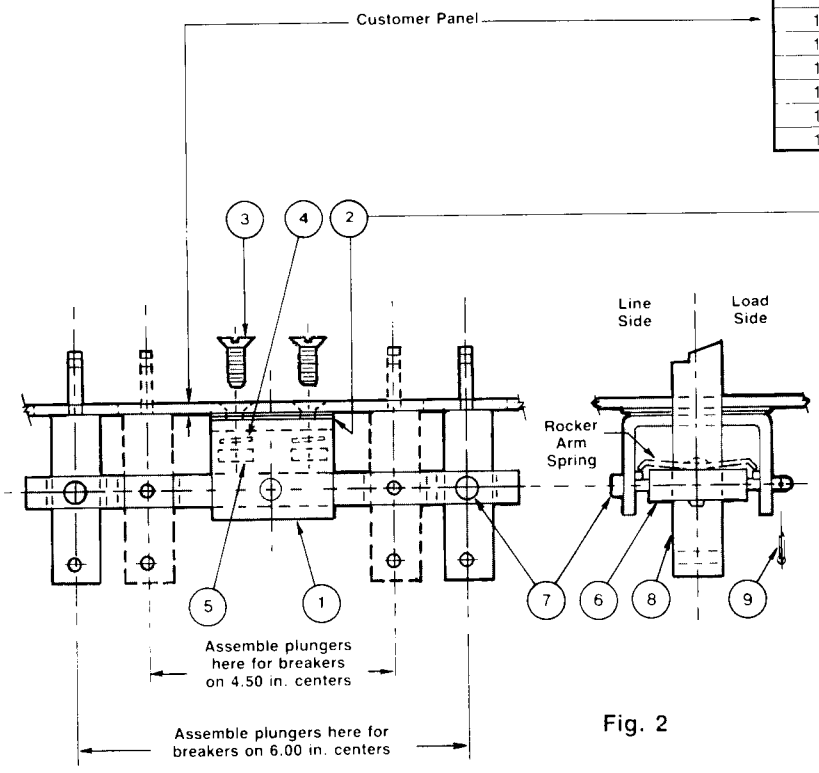


Fig. 2

INSTRUCTIONS FOR ASSEMBLING
I-T-E WALKING BEAM TYPE INTERLOCK
PLUG-IN MOUNTED CIRCUIT BREAKER

1. Drill panel per panel drilling instruction sheet.
2. Break out proper knock-out (see Fig. 1 below) using screwdriver. Use needle file to smooth opening in base to indicated dimensions. In both cases, prevent loose plastic from entering base, and test to see that plunger (**8**) Fig. 2 moves freely within opening.
3. Assemble support (**1**) and spacers (**2**) to rear of panel using screws (**3**), lockwashers (**4**) and nuts (**5**) supplied as shown in Fig. 2. Note: Five (**5**) spacers, each .015 in. thick, are provided; and depending on the customer panel gauge number, use quantity of spacers indicated on chart in upper right hand corner. Example: If customer panel is 12 ga., use two (**2**) spacers.
4. Add circuit breakers (as prepared in Step 2) to mounting blocks for plug-in mounted units. Refer to instructions for installation of circuit breaker plug-in adapters supplied with Plug-In Mounting Assemblies.
5. Assemble rocker arm sub-assembly (**6**) to support (**1**) with rocker arm pin (**7**). Be sure rocker arm spring (part of rocker arm sub-assembly) rests on top of projections on support (**1**) as shown in Fig. 2. Insert rocker arm pin (**7**) through rocker arm sub-assembly (**6**) and through lower hole in plunger (**8**), one on each side of support. Note position of plunger (See Fig. 2). Insert cotter pins (**9**) into holes of all three rocker arm pins (**7**). Spread cotter pins. Note: Heads of rocker arm pins (**7**) must be on upper side of assembly, and cotter pins (**9**) on lower side.
6. With both circuit breakers in "Off" position, interlock must move freely.
7. With one circuit breaker "On", the other circuit breaker must not close.

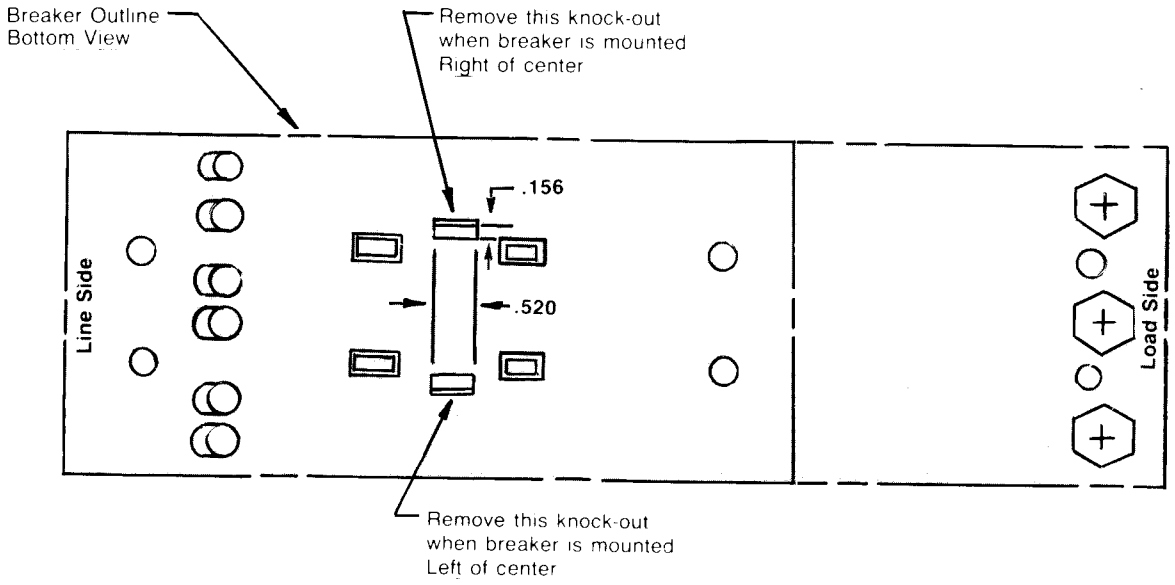
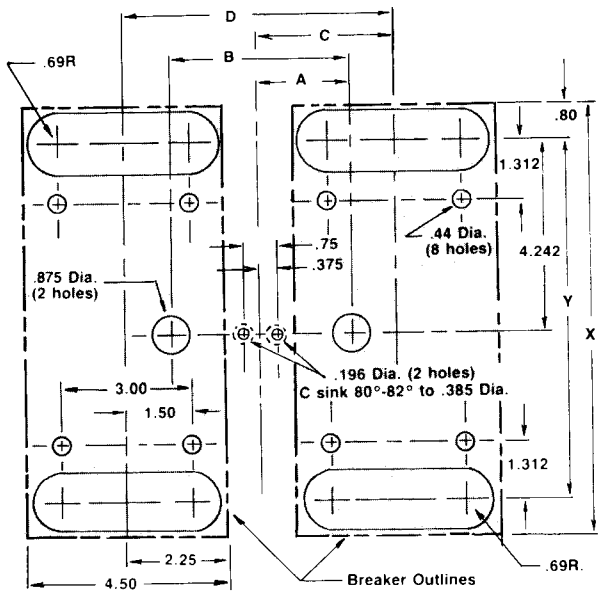


Fig. 1

PANEL DRILLING DIAGRAMS FOR I-T-E WALKING BEAM TYPE INTERLOCK (MI5443) PLUG-IN MOUNTED CIRCUIT BREAKER

REAR OF PANEL — LINE SIDE
PLUG-IN MOUNTING



REAR OF PANEL — LOAD SIDE

DIMENSIONAL REFERENCE

Breaker Types	X	Y
FJ6, F6, HF6	9.50	7.90
CLF	14.13	12.53

BREAKERS ON	A	B	C	D
4.50 IN. CENTERS	1.273	2.546	2.25	4.50
6.00 IN. CENTERS	2.023	4.046	3.00	6.00

Gage No.	Nominal Thickness In.	Quantity Of Spacers
10	0.135	0
11	0.120	1
12	0.105	2
13	0.090	3
14	0.075	4
16	0.060	5

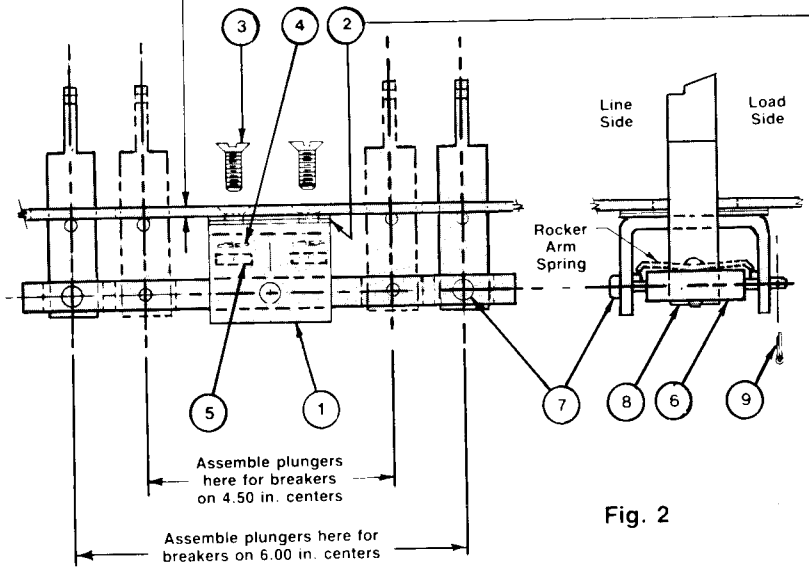


Fig. 2

ACCESSORY INSTALLATION INSTRUCTIONS FOR I-T-E SHUNT TRIP, UNDERVOLTAGE TRIP & AUXILIARY SWITCH UNITS

CIRCUIT BREAKER PREPARATION

⚠ DANGER

Hazardous Voltage. Will cause severe personal injury or death.

Breaker must be completely disconnected and removed from any electrical equipment before accessories are installed.

STEP 1.

Depress trip button (See Fig. 1) to trip circuit breaker prior to removing cover. Before attaching accessory unit, circuit breaker MUST be in tripped position.

STEP 2.

Remove four load end cover screws (A, Fig. 1) and, if breaker is mounted, also remove mounting screws (B, Fig. 1). Remove load end cover only. Accessory units can be mounted in either right or left poles of the circuit breaker.

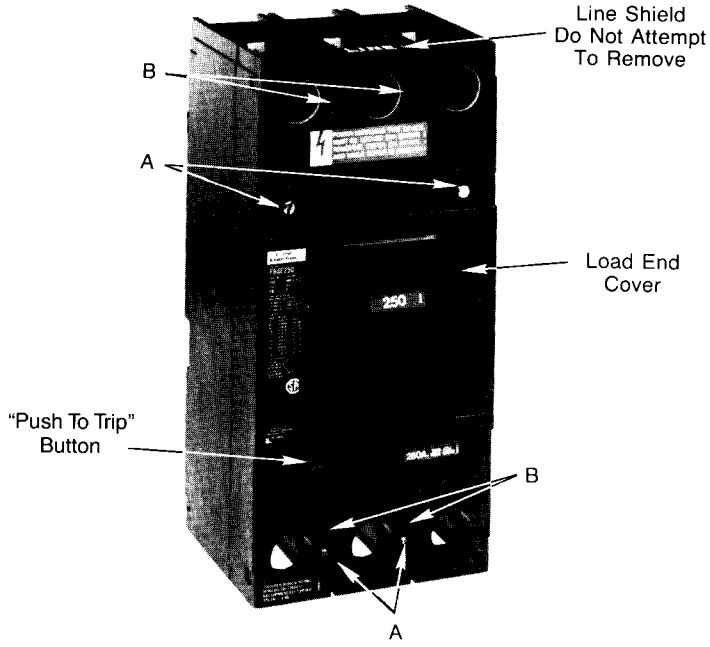


Fig. 1
Cover Screw location

ACCESSORY MOUNTING INSTRUCTIONS

STEP 3.

Feed accessory leads down and through $\frac{7}{8}$ x $\frac{5}{32}$ elongated opening (C, Fig. 2) to bring leads out of bottom of circuit breaker. Note: Leads must be brought out in the same order as they exit wire retainer of accessory case.

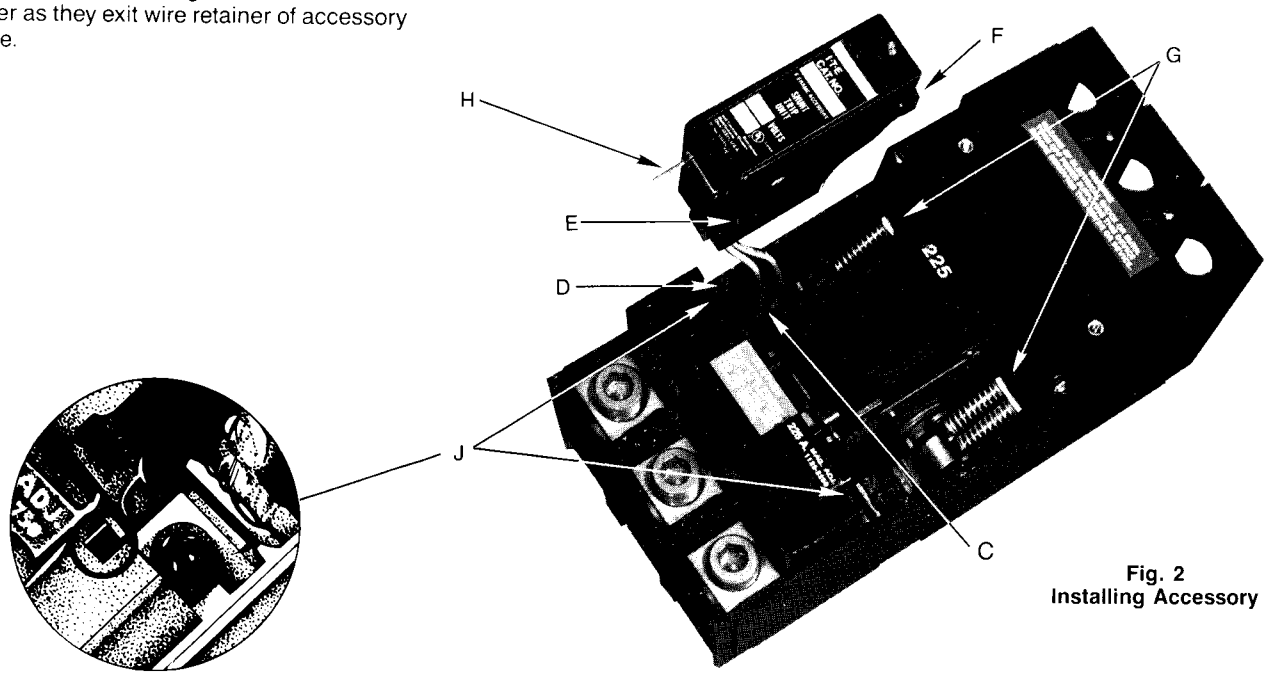


Fig. 2
Installing Accessory

STEP 4.

Accessory is located in circuit breaker by two ribs (E, Fig. 2), one on each side of accessory. Slide accessory ribs down into two grooves (D, Fig. 2) in base. When accessory is installed correctly, tops of ribs on side of accessory will be at same level as top outside edge of circuit breaker base and front of accessory (F, Fig. 2) will rest on pad (G, Fig. 2) of line shield. Pull gently and evenly on accessory wire leads (2 to 6 wires) while lowering accessory into base. Make sure all the slack is removed from leads inside breaker.

NOTE: On shunt trip and undervoltage trip units, be sure to guide transfer link (H, Fig. 2) into opening (J, Fig. 2) at the top of trip unit.

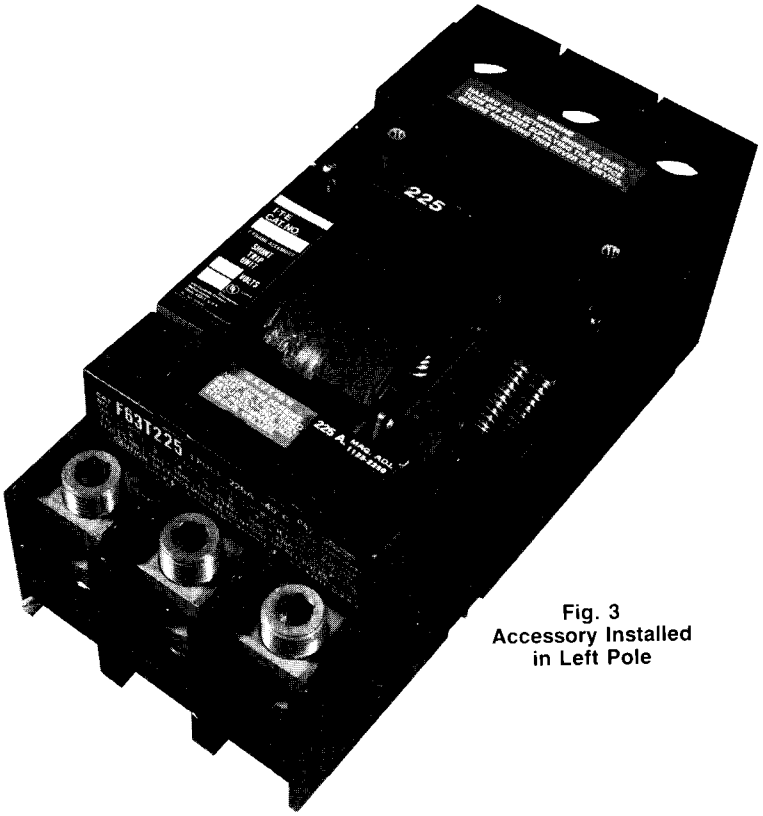


Fig. 3
Accessory Installed in Left Pole

STEP 5.

Replace load end cover and cover screws (quantity 4) and mounting screws (quantity 4) if mounted.

STEP 6.

Add two labels to circuit breaker. Attach identification label (K, Fig. 4) to top of circuit breaker on right hand side. Make sure correct identification square or squares have been checked (✓). Attach wiring label (L, Fig. 4) on side of circuit breaker base as shown.

STEP 7.

Refer to Electrical Check, page 19.

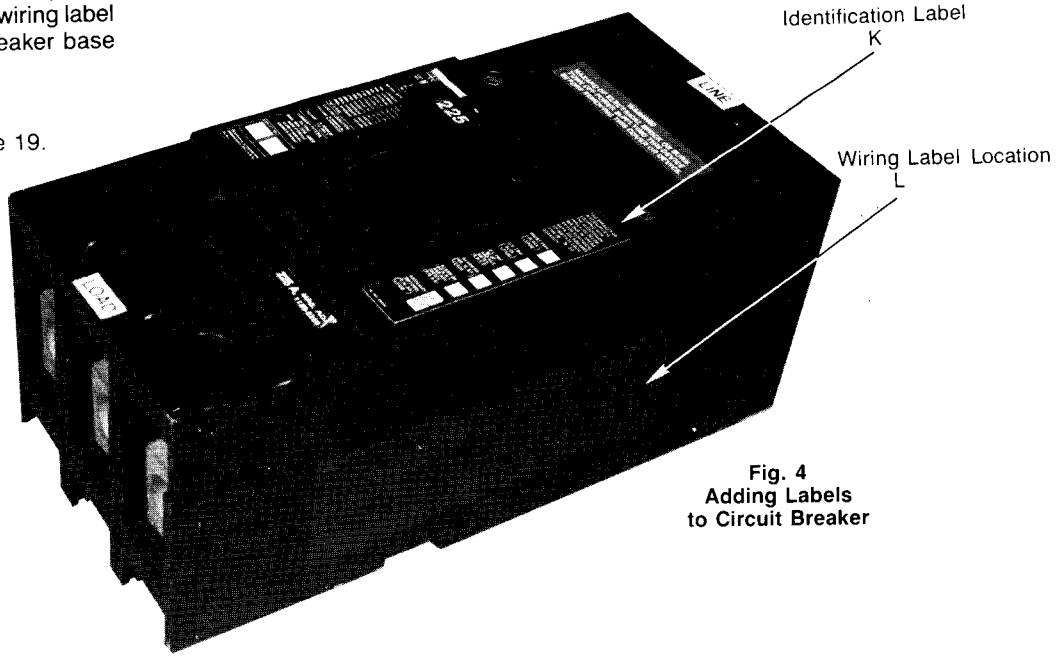


Fig. 4
Adding Labels to Circuit Breaker

I-T-E AUXILIARY SWITCH INFORMATION

AUXILIARY SWITCH KITS

Cat. No.	Number Of Switches	Ampere Rating of Switch				
		AC Voltage			DC Voltage	
		120 V	240 V	480 V	125 V	250 V
A01F62	1	7.2	7.2		0.5	0.25
A02F62	2	7.2	7.2		0.5	0.25
A01F64	1	7.2	7.2	7.2	0.5	0.25
A02F64	2	7.2	7.2	7.2	0.5	0.25

ALL SWITCHES HAVE THREE LEADS AND ARE IDENTIFIED AS FOLLOWS:

Wire Markings	Wire Color	Switch Terminals or Contacts
C or C1	White	C – Common terminal
A or A1	Black	A – Contact open when breaker is open, closed when breaker is closed.
B or B1	Red	B – Contact closed when breaker is open, open when breaker is closed.

MECHANICAL/ELECTRICAL CHECK

1. Use a buzzer or light indicator attached to switch leads A and C. With breaker in "On" position, a light or buzz should be observed.
2. Move handle to "Off" position. Indicator light or buzzer should turn off.
3. Attach test to leads B and C. Light or buzzer should turn on.
4. Move handle to "On" position. Indicator light or buzzer should turn off.

SHOULD THE INDICATOR NOT FUNCTION PROPERLY DURING CHECK PROCEDURE, CHECK FOR INCORRECT INSTALLATION OR WIRING.

MAXIMUM ACCESSORY COMBINATIONS THAT CAN BE INSTALLED

ONE SHUNT TRIP* + ONE UNDERVOLTAGE TRIP + ONE AUXILIARY SWITCH
ONE SHUNT TRIP* + TWO AUXILIARY SWITCHES
ONE SHUNT TRIP* + ONE BELLALARM + ONE AUXILIARY SWITCH
ONE UNDERVOLTAGE TRIP + THREE AUXILIARY SWITCHES
ONE UNDERVOLTAGE TRIP + ONE BELLALARM + TWO AUXILIARY SWITCHES
ONE BELLALARM + THREE AUXILIARLY SWITCHES
FOUR AUXILIARY SWITCHES

*SHUNT TRIP UNITS INCLUDE A COIL CLEARING SWITCH

SHUNT TRIP ACCESSORY

1. Reset and turn circuit breaker ON.
2. Attach test circuit to accessory leads. When the test voltage reaches 55 percent or more of the rated coil voltage, the circuit breaker should trip.
3. With breaker TRIPPED or OFF, check to make sure coil circuit has opened.

ELECTRICAL DATA FOR SHUNT TRIP

Coil Voltage	Inrush Current At Rated Voltage (Amperes)	Cat. No.
60 CYCLES AC		
120	.395	S01F60
208	.265	S02F60
240	.165	S03F60
277	.190	S15F60
480	.145	S04F60
600	.080	S06F60
DC		
24	2.2	S07F60
48	1.2	S09F60
125	.5	S11F60
250	.35	S13F60

UNDERVOLTAGE TRIP ACCESSORY

1. With breaker in TRIPPED position, connect test circuit to accessory leads. Energize undervoltage trip device at 85 percent of the marked rated voltage of the coil. Reset and turn breaker handle ON.
2. Reduce voltage to 35 percent of rated coil voltage. Circuit breaker must trip. (Undervoltage device must trip between 70 and 35% of rated voltage.)

ELECTRICAL DATA FOR UNDERVOLTAGE (UV) TRIP

Coil Voltage	Sealed-In Current At Rated Voltage (Amperes)	Cat. No.	
60 CYCLES AC		1 UV Trip Plus 1 Aux. Sw.	1 UV Trip Only
120	.03	W01F64	U01F60
208	.018	W02F64	U02F60
240	.016	W03F64	U03F60
277	.013	W16F64	U16F60
480	.008	W06F64	U06F60
*600	.008	W08F64	U08F60
DC			
24	.11	W13F64	U13F60
48	.06	W14F64	U14F60
125	.027	W10F64	U10F60
**250	.02	W12F64	U12F60

* Kit includes a 30k ohm, 25 watt resistor (Clarostat Cat. No. VP-25-K or equivalent).

** Kit includes a 2.5k ohm, 25 watt resistor (Clarostat Cat. No. VP-25-K or equivalent).

Note: Resistor to be mounted externally of circuit breaker & connected by installer.

Note: All auxilliary switch ratings are the same as auxilliary switch kit A01F64.
480V ac application maximum.

INSTALLATION INSTRUCTIONS FOR I-T-E BELLALARM UNITS

⚠ DANGER

Hazardous Voltage. Will cause severe personal injury or death.

Breaker must be completely disconnected and removed from any electrical equipment before accessories are installed.

CIRCUIT BREAKER PREPARATION

STEP 1.

Depress trip button (See Fig. 1) to trip circuit breaker prior to removing cover. Before attaching accessory unit, circuit breaker MUST be in tripped position.

STEP 2.

Remove four load end cover screws (A, Fig. 1) and, if breaker is mounted, also remove mounting screws (B, Fig. 1). Remove load end cover and handle with barrier. Accessory units can be mounted in either right or left poles of the circuit breaker.

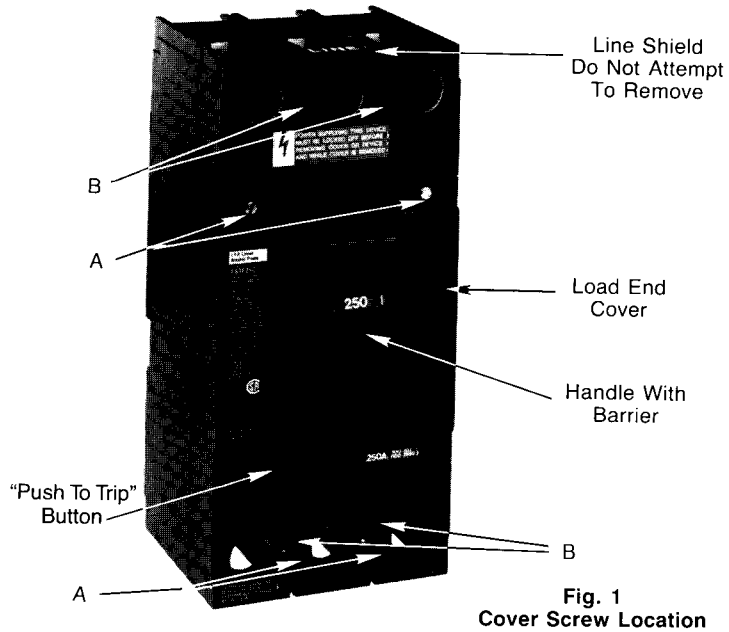


Fig. 1
Cover Screw Location

ACCESSORY MOUNTING INSTRUCTIONS

STEP 3.

Snap-in actuator member (C, Fig. 2) at $\frac{5}{16}$ square opening of accessory housing into microswitch actuator (.050 x .232 slot). Fig. 2 shows accessory unit ready for installation in right pole of circuit breaker. If left pole mounting is desired, insert actuator member on opposite side.
CAUTION: DO NOT DISTORT ACTUATOR

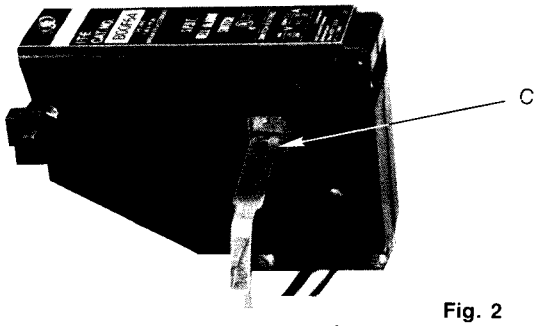


Fig. 2
Installing Actuator Member

STEP 4.

Feed accessory leads down and through $\frac{7}{8}$ x $\frac{5}{32}$ elongated opening (D, Fig. 3) to bring leads out the bottom of circuit breaker. NOTE: Leads must be brought out in the same order as they exit wire retainer of accessory case.

STEP 5.

Accessory is located in circuit breaker by two ribs (F, Fig. 3), one on each side of the accessory. Slide accessory ribs down into two grooves (E, Fig. 3) in base. When accessory is installed correctly, tops of the ribs on side of the accessory will be at the same level as the top outside edge of the circuit breaker base and front of the accessory (G, Fig. 3) will rest on pad (H, Fig. 3) of line shield. Pull gently and evenly on accessory wire leads (3 to 6 wires) while lowering accessory into base. Make sure actuator member (C, Fig. 2) rests in the recess of the circuit breaker frame (pivoting point) and all the SLACK is removed from leads inside breaker.

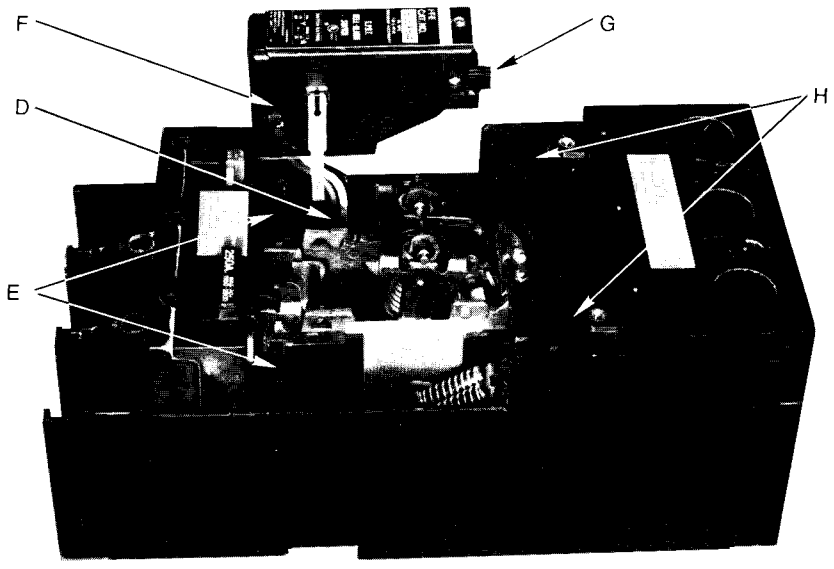


Fig. 3
Installing Accessory

STEP 6.

Replace handle with barrier, load end cover and 4 cover screws and 4 mounting screws if mounted. See Fig. 1.

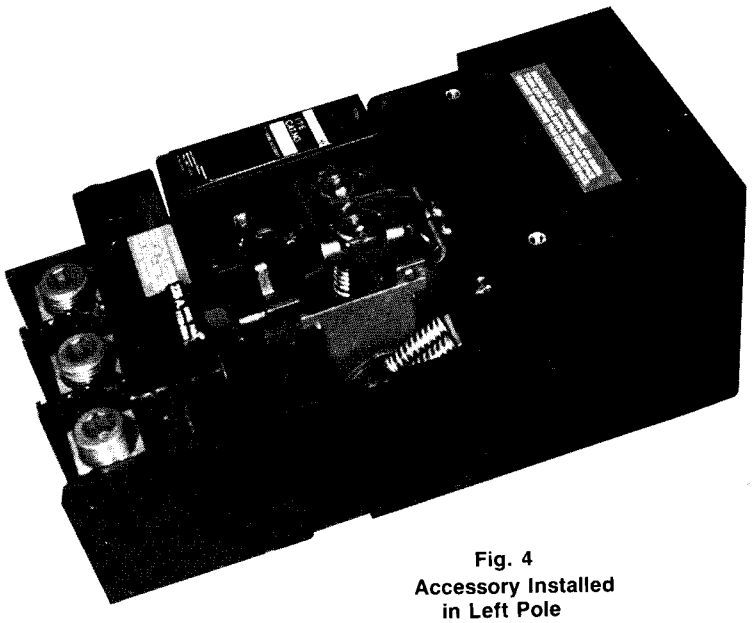


Fig. 4
Accessory Installed in Left Pole

STEP 7.

Add the two labels provided to circuit breaker. Attach identification label (J, Fig. 5) to top of the circuit breaker on the right hand side. Make sure correct identification square or squares have been checked (✓). Attach wiring label (K, Fig. 5) on side of the circuit breaker base as shown.

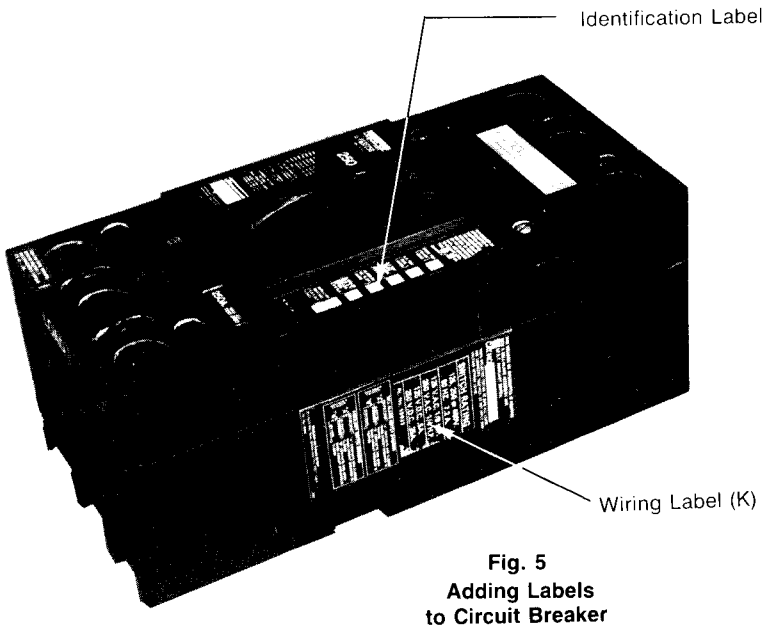


Fig. 5
Adding Labels to Circuit Breaker

I-T-E BELLALARM INFORMATION

BELL ALARM SWITCH KITS

Cat. No.	Number Of Auxiliary Switches	Ampere Rating of Switch				
		AC Voltage			DC Voltage	
		125 V	250 V	480 V	125 V	250 V
B00F64	0	7.2	7.2	7.2	0.50	0.25
C01F64	1	7.2	7.2	7.2	0.50	0.25

BELLALARM HAS THREE LEADS AND ARE IDENTIFIED AS FOLLOWS:

Wire Markings	Wire Color	Switch Terminals or Contacts.
C	White	C - Common terminal
A	Yellow	N.C. - Normally closed contact (Closed when circuit breaker is tripped).
B	Brown	N.O. - Normally open contact (Open when circuit breaker is tripped).

MECHANICAL/ELECTRICAL CHECK

1. Use a buzzer or light indicator attached to switch leads A and C. With breaker in "On" position, trip breaker by depressing red trip button. Indicator light or buzzer should operate.

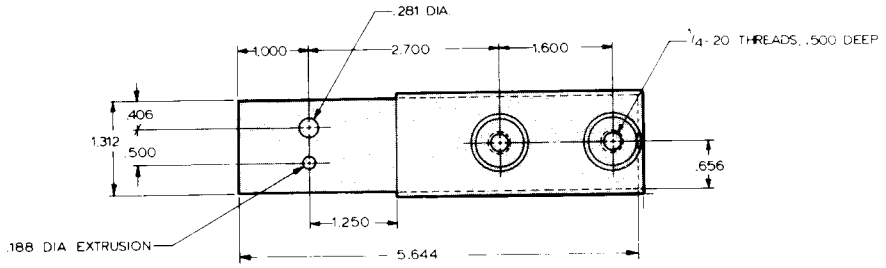
2. Reset breaker to "Off". Indicator light or buzzer should turn off.

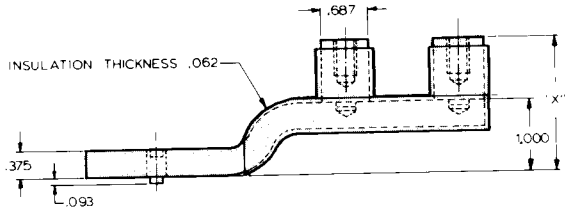
3. Move breaker handle to "On". Indicator light or buzzer should remain off.

SHOULD THE INDICATOR NOT FUNCTION PROPERLY DURING CHECK PROCEDURE, CHECK FOR INCORRECT INSTALLATION OR WIRING.

I-T-E PANELBOARD CONNECTOR STRAPS

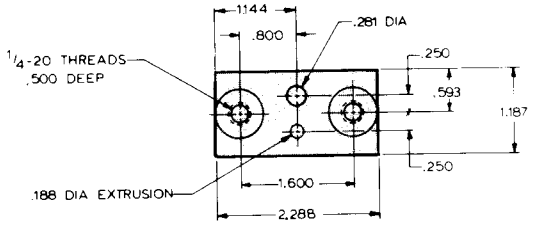
OUTSIDE CONNECTOR STRAP

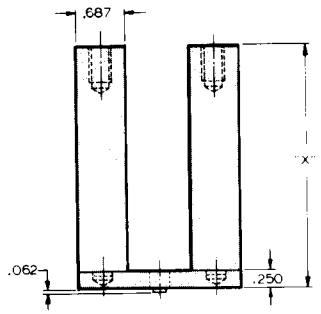




CAT. NO.	"X"
CS3610R	1.875
CS3612R	3.437

INSIDE CONNECTOR STRAP

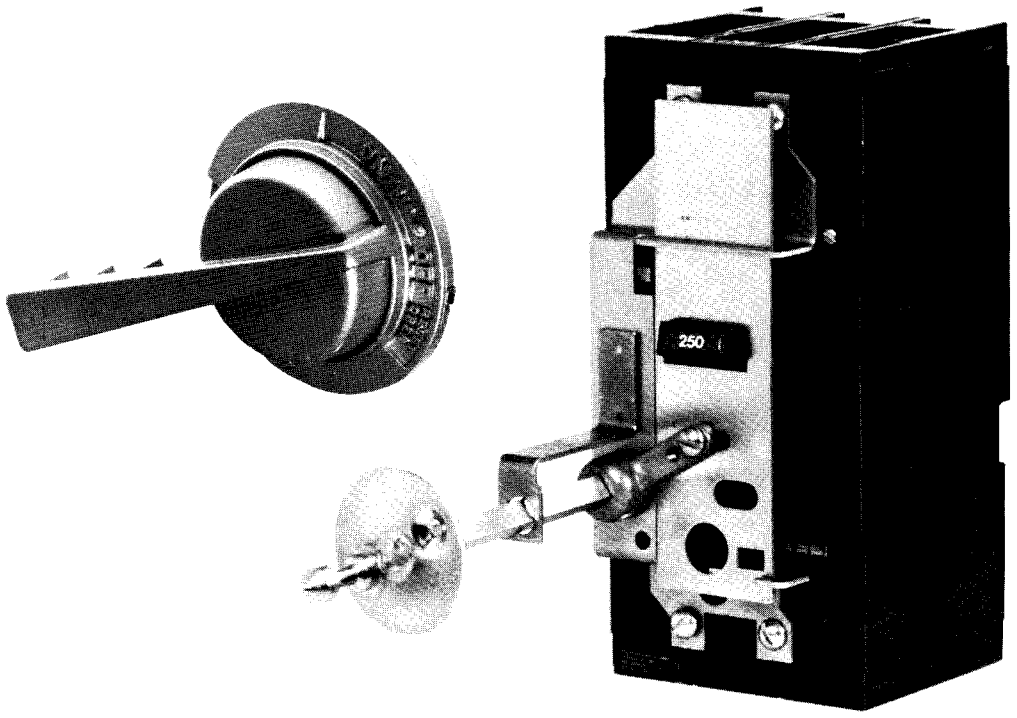




CAT. NO.	"X"
CS3611R	1.875
CS3613R	3.437

NOTE: THESE STRAPS ARE NOT USED BY I-T-E IN SERIES 6 PANELBOARDS.

INSTRUCTIONS FOR I-T-E STANDARD-DEPTH (D11CFU1) AND VARIABLE-DEPTH (D11CFU2) ROTARY-HANDLE ENCLOSURE MECHANISM



⚠ DANGER

Hazardous Voltage. Will cause severe personal injury or death.

Turn power off supplying device before installing.

⚠ SAFETY INSTRUCTIONS

General

Handle will permit locking the disconnect device in the "Off" position using up to three locks having shackles up to 3/8 inches in diameter. Provision for locking in "On" position is provided, but the handle plate must have the material covering the locking notch removed. This can be done with a hacksaw or file. The handle has a voidable interlock. Voiding the interlock requires inserting a small screwdriver into the rectangular opening in the handle plate, which will release the handle.

Mounting Instructions

A. Drill and tap breaker mounting holes as shown in Fig. 1.

B. Measure distances "A" and "B" from mounting holes to walls of the enclosure. See Fig. 2.

C. Find handle center dimensions "D" and "E" by adding enclosure thickness and cover overhang ($C_1 + C_2$) to ("A"–11/16) and ("B"+5 7/16). Drill hole "X" (2 1/4 dia.) and drill either holes "Y" or "Z" (5/16 dia.) depending on handle orientation required. See Fig. 2a.

D. If installing variable depth kit, measure distance "F" from breaker mounting surface to outside of cover. See Fig. 3. If distance "F" is less than 8 inches then remove shaft guide bracket. (J)

E. Find length "G" by subtracting "F" from 16 5/8 inches. Mark length "G" from end of operating shaft and cut shaft squarely at mark. See Fig. 3a.

F. Breaker must be "tripped" during installation. Push red button marked "Push To Trip".

G. Using screws supplied with kit, attach mechanism plate to breaker and mount in enclosure in position shown.

H. Insert end of operating shaft into square socket in cast operating arm so that top of shaft has proper relationship to handle. Tighten set screw in operating arm (Recommended torque: 75 in. lb.)

I. Place handle and cork gasket on outside of cover and place handle mounting bracket on inside of cover; fasten together loosely through cover with the two short screws provided.

J. Adjust handle so that cover will not open when handle is in "Off" position but will open when handle is between "Off" and "Reset/Open" positions. Tighten screws and operate handle "On" and "Off" to see that circuit breaker operates satisfactorily.

DIAGRAMS FOR
I-T-E STANDARD-DEPTH (D11CFU1) AND VARIABLE-DEPTH (D11CFU2)
ROTARY-HANDLE ENCLOSURE MECHANISM

Outline Drawing and Drilling Plan

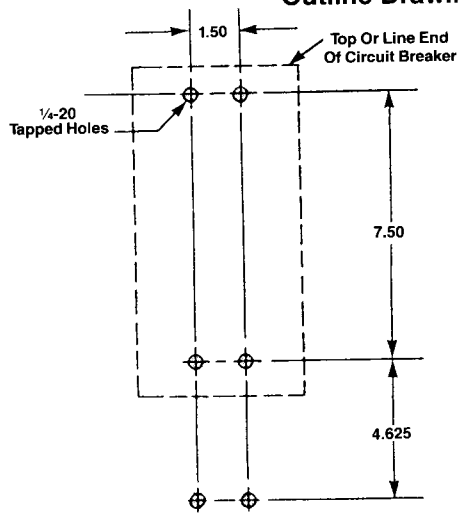


Fig. 1
Drilling Plan

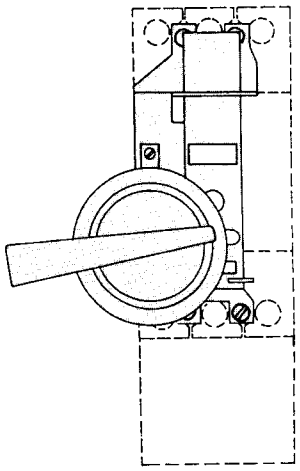


Fig. 1a
Front View

Driling of Enclosure and Enclosure Cover

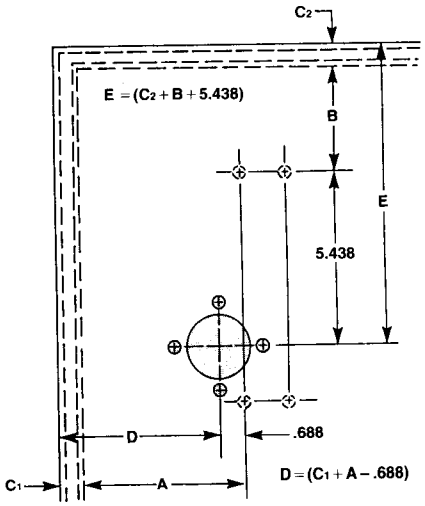


Fig. 2
Enclosure Cover

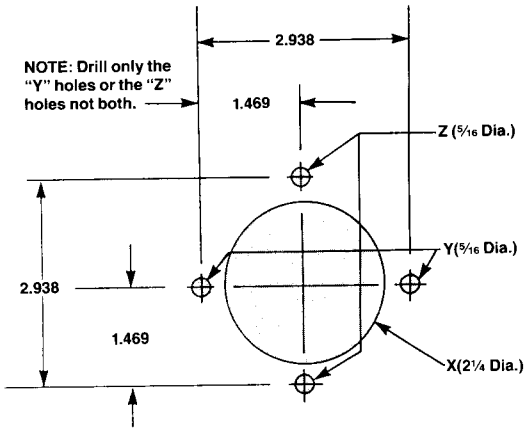


Fig. 2a

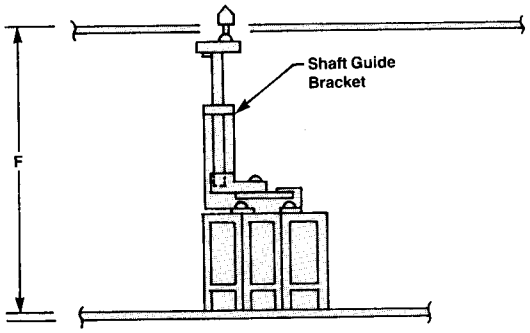


Fig. 3
Variable Depth
Load End View

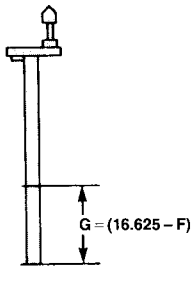
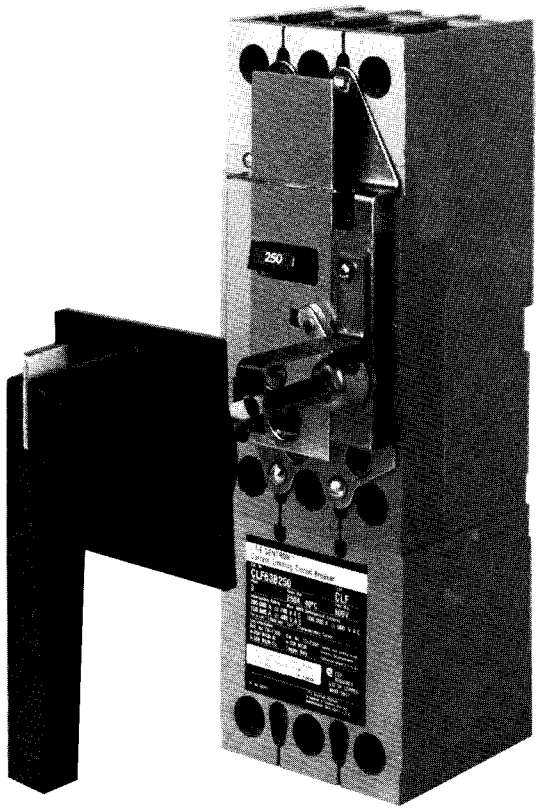


Fig. 3a

INSTRUCTIONS FOR I-T-E STANDARD-DEPTH (RHOFSD) AND VARIABLE-DEPTH (RHOFVD) ROTARY-HANDLE ENCLOSURE MECHANISM



⚠ DANGER

Hazardous Voltage. Will cause severe personal injury or death.

Turn power off supplying device before installing.

⚠ SAFETY INSTRUCTIONS

General Information

When properly installed, the rotary handle operator provides single point latching of the enclosure door. For maximum protection against unauthorized entry into the enclosure, additional latching means should be provided. The handle can be padlocked in the "Off" position with up to three 5/16 inch padlocks. The breaker operator can also be padlocked in the "Off" position.

Drilling of Enclosure

A. Catalog Number RHOFSD standard depth shafts are used for minimum depth enclosures. Refer to minimum "K" dimension in Fig. 1a.
Catalog Number RHOFVD variable depth shafts are used for all other enclosure depths. Shafts are cut to length "L" as shown in Fig. 3.

B. Drill and tap circuit breaker mounting holes in breaker mounting surface (**1**) and handle mounting holes in enclosure door (**2**) as shown in Fig. 1.

Installation of Breaker and Breaker Operator

A. Attach the circuit breaker (**3**) and breaker operator (**4**) to the enclosure panel using the four mounting screws and lockwashers (**5**) as shown in Fig. 2. Tighten to 75 in. lbs.

Installation of Shaft

A. Shaft length for Variable Depth Operators "L" = "K" – 3.61 inch. Attach the shaft (**6**) to the operating arm (**7**) of the breaker operator and tighten the set screw to 70 in. lbs. min.

NOTE: The proper orientation of the "wings" (**9**) (shown in off position) at the end of the shaft when the breaker is in the "Off" position. See Fig. 3.

NOTE: It is recommended that the shaft support bracket (**10**) be installed if the enclosure depth exceeds 10 inches. Attach as shown in Fig. 3. Tighten to 45 in. lbs.

Installation of Handle

A. Attach the handle (**11**) and gasket (**12**) to the enclosure door (**13**) and secure with the four bolts, lockwashers and nuts supplied (**14**). Tighten to 75-in. lbs. See Fig. 4.

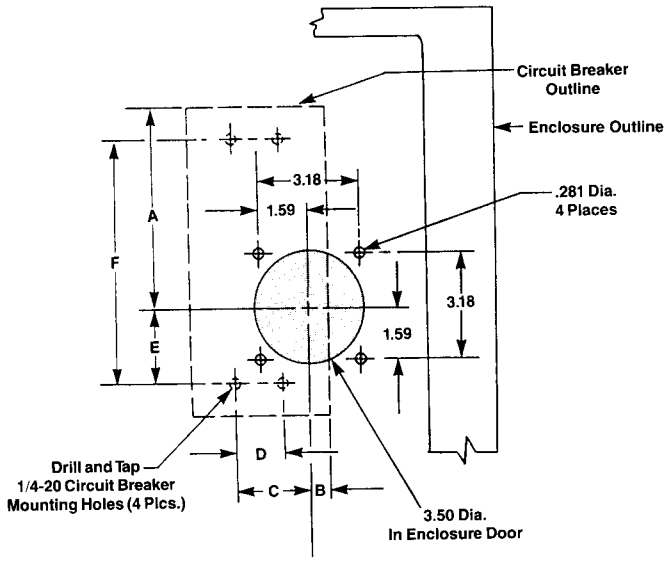
B. Make sure that when the enclosure door is closed, the handle interlocks with the shaft in all handle positions except "Reset/Open." To open the enclosure door when the breaker is in the "On" position, rotate the screw slot on the handle plate counter-clockwise. This procedure will defeat the interlock.

C. To lock the handle in the "Off" position, pull the lock plate (**16**) from the handle into the grooves on the handle plate (**17**) located at the interlock defeater screw and insert the padlocks.

D. The unit can be modified to lock in the "On" position by cutting slots in the boss located beneath the letters "On". NOTE: The score lines on the inside diameter below the letters "On" indicate the slot locations.

DIAGRAMS FOR
I-T-E STANDARD-DEPTH (RHOFSD) AND VARIABLE-DEPTH (RHOFVD)
ROTARY-HANDLE ENCLOSURE MECHANISM

Outline Drawing and Drilling Plan



Dimensions – Inches	
A	6.19
B	.62
C	2.38
D	1.50
E	2.31
F	7.50

Fig. 1
Drilling Plan

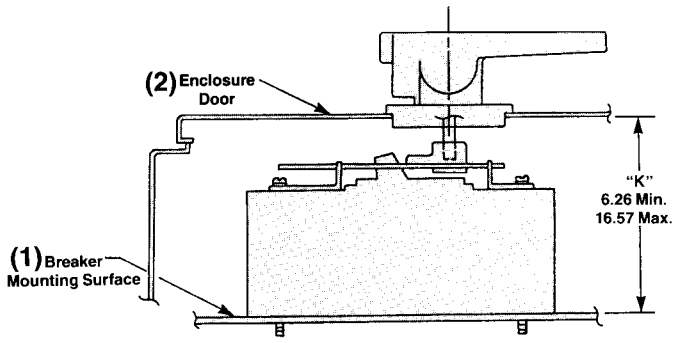


Fig. 1a

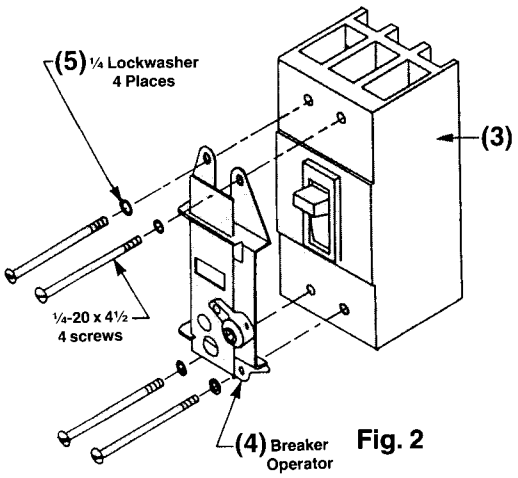


Fig. 2

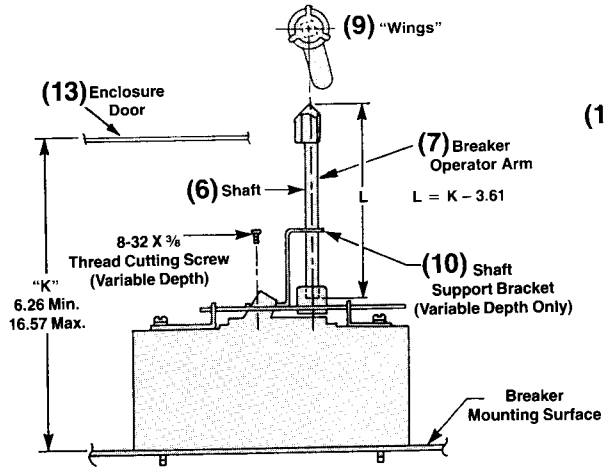


Fig. 3
Variable Depth
Side View

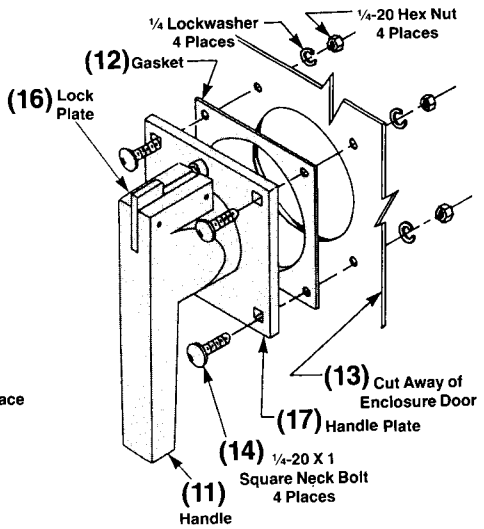
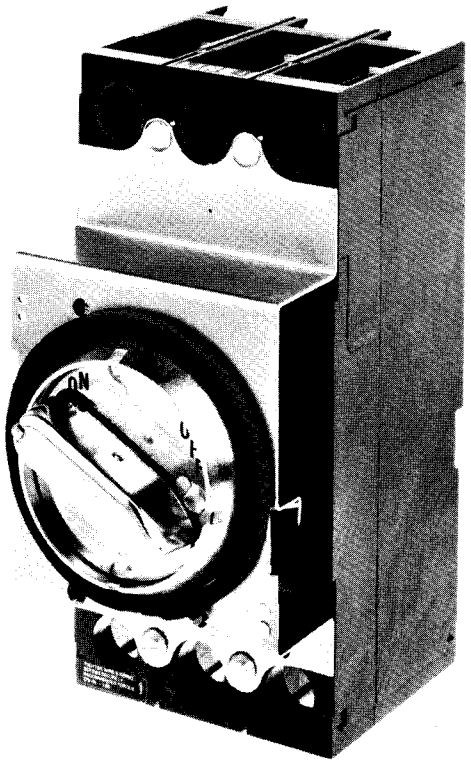


Fig. 4
Handle

INSTRUCTIONS FOR I-T-E STANDARD-DEPTH ROTARY-HANDLE ENCLOSURE MECHANISM (F6RH1)



⚠ DANGER

Hazardous Voltage. Will cause severe personal injury or death.

Turn power off supplying device before installing.

⚠ SAFETY INSTRUCTIONS

Drilling of Enclosure

A. Drill four breaker mounting holes (**H**) in the enclosure per drilling plan on outline drawing. See Fig. 1.
B. Place template on breaker mounting surface so that the four centers in the template line up with the breaker mounting holes. Make sure "On-Off" indications on template are in same direction as "On-Off" indications on the breaker. To hold template in place, punch two holes in template with breaker mounting screws and tighten into breaker mounting holes.
C. Measure distances "L" and "M" from walls of enclosure. See Fig. 2.
D. Relocate template on enclosure cover by adding enclosure thickness and cover overhang "L" to dimensions "L" and "M". See Fig. 3.
E. Remove backing from template and secure template on door.
F. Drill holes "J" (⅜ inch dia.) and "K" (4⅛ inch dia.) on template. See Fig. 3.

Circuit Breaker/Rotary Handle Mechanism Mounting

A. Mount breaker with handle up by sliding it under the tabs in mounting plate.
B. With breaker in "Off" position and rotary handle mechanism in "Off" position, mount mechanism on breaker using four screws (#8-32 × 4¼ inch). Make sure opening in mechanism lever engages breaker handle. Tighten screws.
C. Loosely secure the door rings with 3 screws provided (#6-32 × ¼ inch). Position the interior ring (**1**) (has the latch tabs and threaded holes) as shown in Fig. 4. The exterior ring mounts on the outside of the door with the small flange to the inside. See Fig. 5.
D. Close the enclosure door and adjust external ring on door so it is concentric with handle ring. Tighten the three screws (**3**).
E. Check the door operation. Latch on mechanism should engage latch tab (**2**) interior ring when breaker is "On" and disengage latch tab when handle is rotated to "Open Door" position.
F. Enclosure door may be opened when breaker is "On" by turning defeater screw on rotary handle face plate, in a clockwise direction.

DIAGRAMS FOR
I-T-E STANDARD-DEPTH ROTARY-HANDLE
ENCLOSURE MECHANISM (F6RH1)

Outline Drawing and Drilling Plan

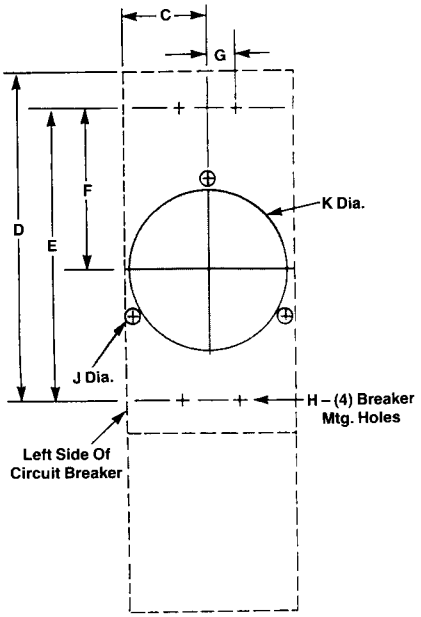


Fig. 1
Drilling Plan

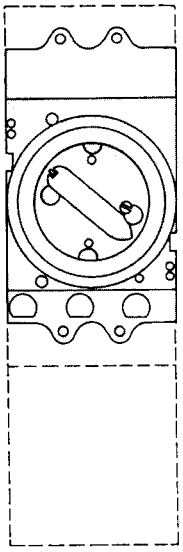


Fig. 1a
Front-View

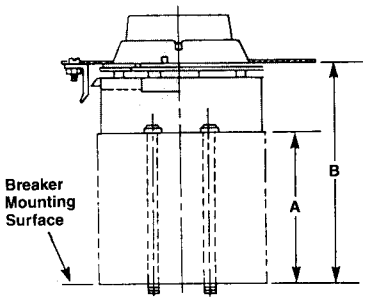


Fig. 1b
Load End View

Dimensions – Inches	
A	4.0
B	5.813
C	2.25
D	8.50
E	7.50
F	4.25
G	.75
H	¼-20
J	.177
K	3.875

Drilling of Enclosure and Enclosure Cover

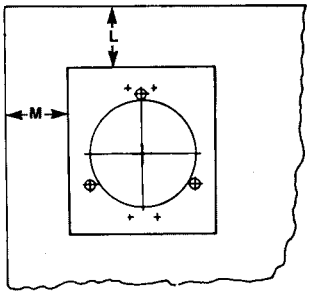


Fig. 2
Breaker Mounting
Surface

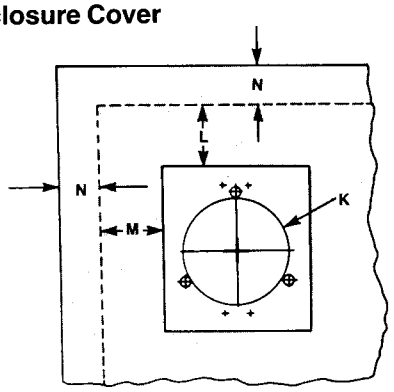


Fig. 3
Enclosure Cover

Final Assembly

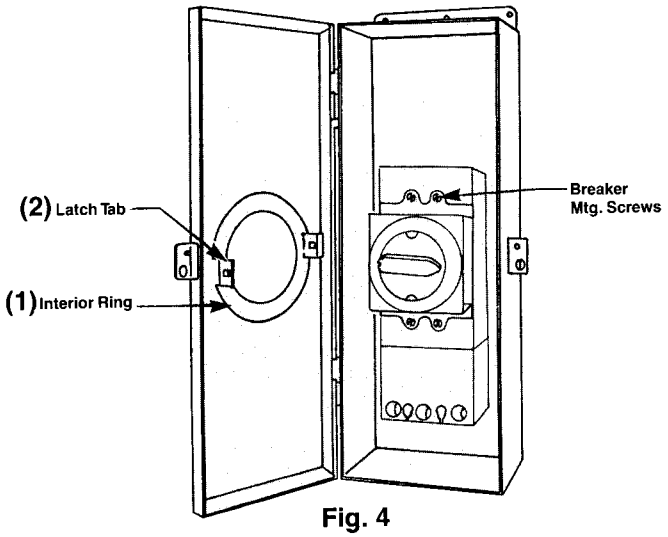


Fig. 4

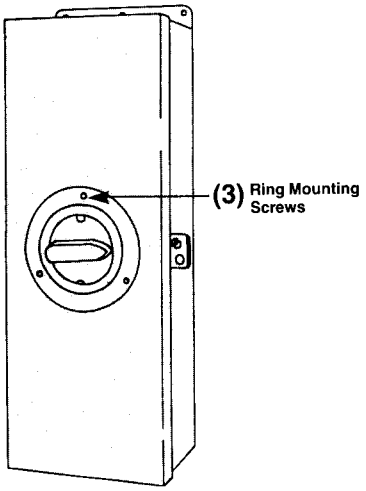
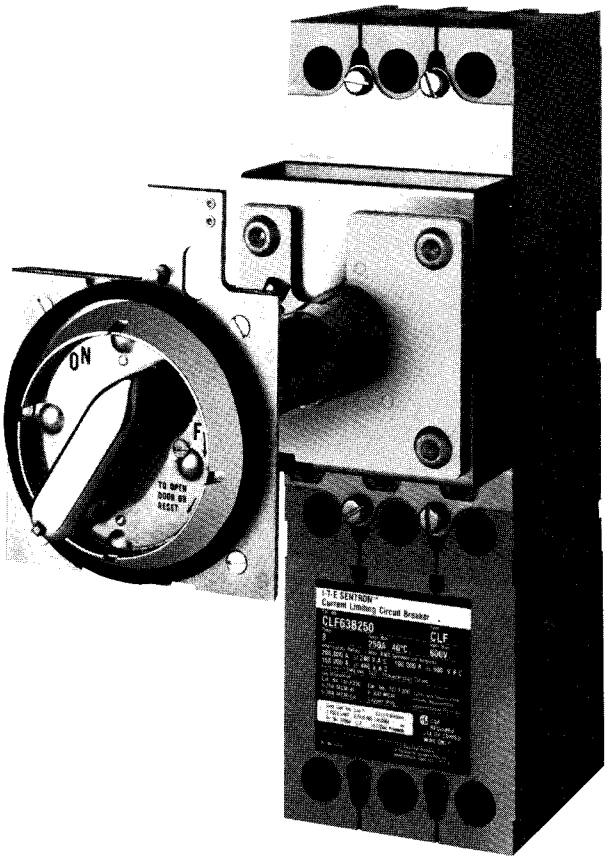


Fig. 5

INSTRUCTIONS FOR I-T-E VARIABLE-DEPTH ROTARY-HANDLE ENCLOSURE MECHANISM (F6RHV9)



⚠ DANGER

Hazardous Voltage. Will cause severe personal injury or death.

Turn power off supplying device before installing.

⚠ SAFETY INSTRUCTIONS

Drilling of Enclosure

A. Drill four breaker mounting holes (**H**) in the enclosure per drilling plan on outline drawing. See Fig. 1.
B. Place template on breaker mounting surface so that the four centers in the template line up with the breaker mounting holes. Make sure "On-Off" indications on template are in same direction as "On-Off" indications on the breaker. To hold template in place, punch two holes in template with breaker mounting screws and tighten into breaker mounting holes.
C. Measure distances "M" and "N" from walls of enclosure. See Fig. 2.
D. Relocate template on enclosure cover by adding enclosure thickness and cover overhang "P" to dimensions "M" and "N". See Fig. 3.
E. Remove backing from template and secure template on door.
F. Drill holes "J" (⅜ inch dia.) and "K" (4⅛ inch dia.) on template. See Fig. 3.

Circuit Breaker/Rotary Handle Mechanism Mounting

A. Mount breaker with handle up by sliding it under the tabs in mounting plate.
B. With breaker in "Off" position and rotary handle mechanism in "Off" position, mount mechanism on breaker using four screws (#1¼-20 × 4¼ inch). Make sure opening in mechanism lever engages breaker handle. Tighten screws.
C. Loosely secure the door rings with 3 screws provided (#6-32 × ¼ inch). Position the interior ring (**1**) (has the latch tabs and threaded holes) as shown in Fig. 4. The exterior ring mounts on the outside of the door with the small flange to the inside. See Fig. 5.
D. Close the enclosure door and adjust external ring on door so it is concentric with handle ring. Tighten the three screws (**3**).
E. Check the door operation. Latch on mechanism should engage latch tab (**2**) interior ring when breaker is "On" and disengage latch tab when handle is rotated to "Open Door" position.
F. Enclosure door may be opened when breaker is "On" by turning defeater screw on rotary handle face plate, in a clockwise direction.

DIAGRAMS FOR I-T-E VARIABLE-DEPTH ROTARY-HANDLE ENCLOSURE MECHANISM (F6RHV9)

Outline Drawing and Drilling Plan

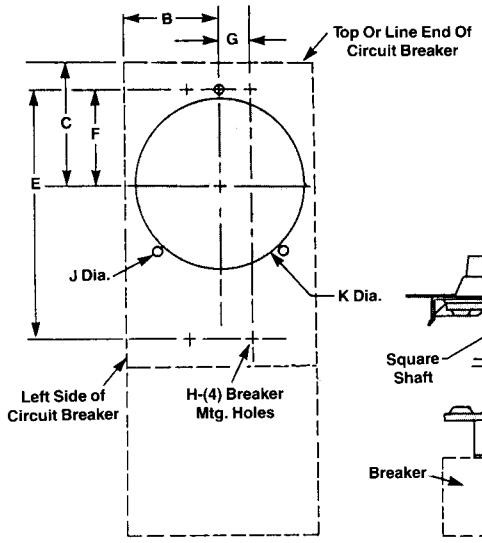


Fig. 1
Drilling Plan

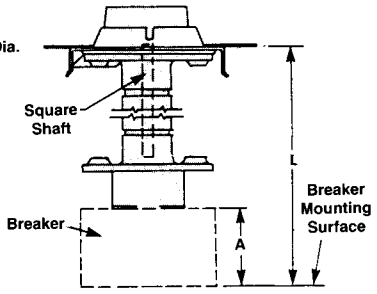


Fig. 1a
Load End View

Dimensions – Inches	
A	4.0
B	2.25
C	5.125
D	5.312
E	7.5
F	4.125
G	.75
H	¼-20
J	.375
K	4.125

L Enclosure Depth Dimensions – Inches		
3 in. Pipe	Min	9.5
	Max.	11.5
5 in. Pipe	Min.	11.5
	Max.	13.5
7 in. Pipe	Min.	13.5
	Max.	15.5
9 in. Pipe	Min.	15.5
	Max.	17.5

Drilling of Enclosure and Enclosure Cover

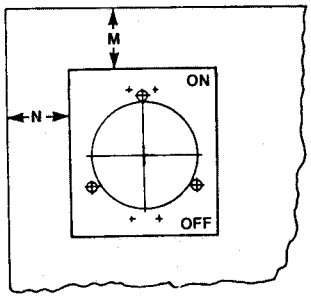


Fig. 2
Breaker Mounting Surface

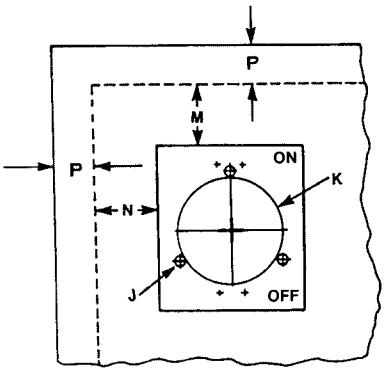


Fig. 3
Enclosure Cover

Final Assembly

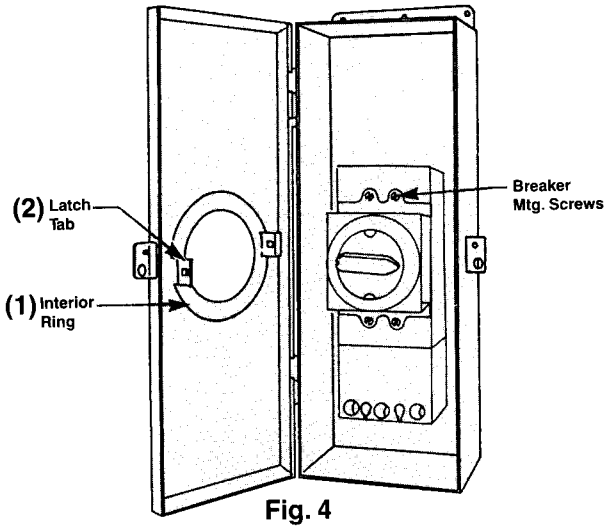


Fig. 4

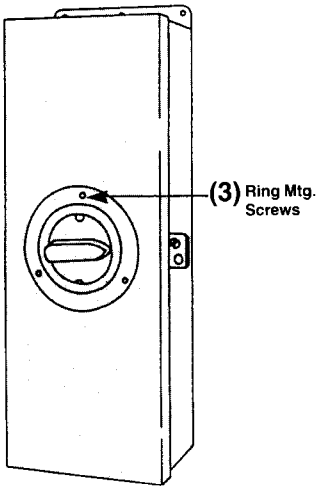
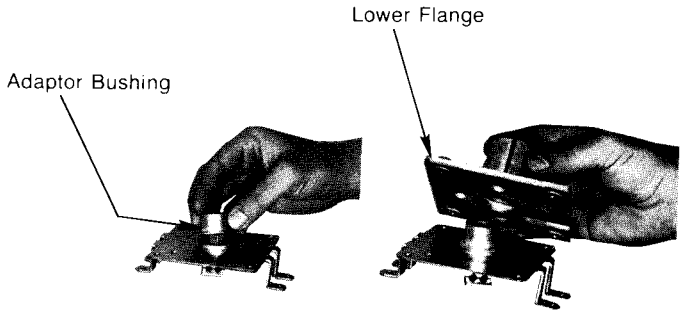
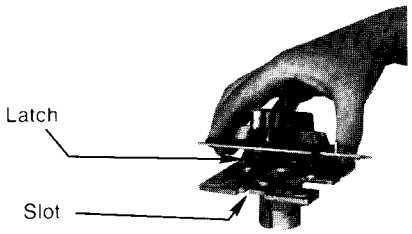


Fig. 5

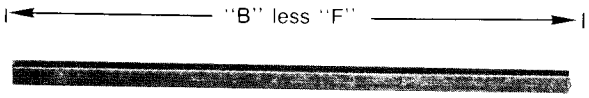
ASSEMBLY OF MECHANISM



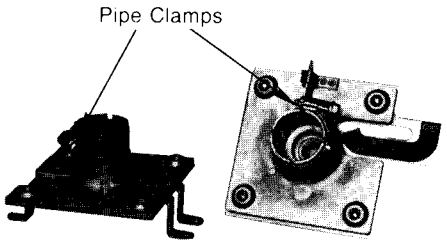
1. With adapter bushing in place on bearing of lower mechanism, place lower flange (flange with the 4 tapped holes) on to the lower mechanism. Secure with four flat head screws.



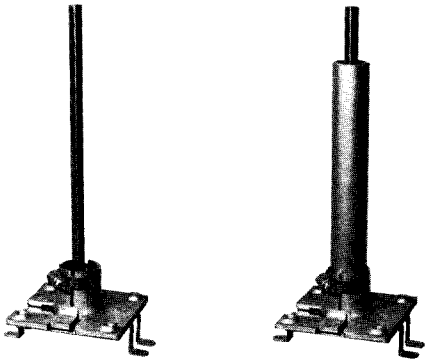
2. Place upper mechanism on upper flange (flange with 4 tapped holes) and secure with four flat head screws. Be sure latch on mechanism fits into elongated slot in flange.



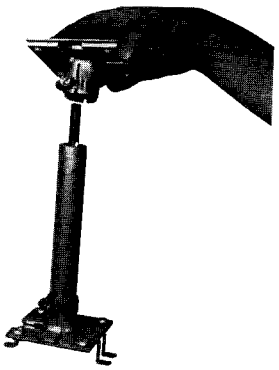
3. Cut square shaft to desired dimension. To do this subtract dimension "F" (see dimension chart) from "B" dimension which is the distance from the back of the breaker to inside of enclosure door.



4. Place pipe clamp on the collar of each flange. Do not tighten.

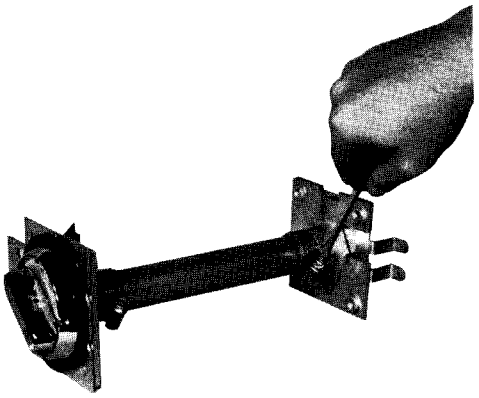


5. Place square shaft into bushing on lower mechanism and then place support pipe over this shaft and into collar of flange.



6. With both lower and upper mechanisms in "OFF" position (lower mechanism is "OFF" when square shaft is turned fully to the right) place upper mechanism on to support pipe. Make sure square shaft engages upper mechanism.

7. Lay assembly on flat surface (this will square assembly). If "B" dimension is the minimum, as shown on dimensional chart, tighten pipe clamps with support pipe seated fully into both flange collars. If "B" dimension is other than minimum, adjust support pipe so that approximately same amount of pipe is in each of the upper and lower flange collars. (A minimum of ½ inch of pipe must be in each flange collar). Tighten pipe clamps.



GENERAL INFORMATION FOR I-T-E MAX-FLEX™ FLANGE MOUNT HANDLE OPERATOR

⚠ DANGER

Hazardous Voltage. Will cause severe personal injury or death.

Turn power off supplying device before installing.

⚠ SAFETY INSTRUCTIONS

Description

The I-T-E Max-Flex Flange Mount Handle Operator is a flexible cable control device used for the remote switching of a circuit breaker within an enclosure. The flexible cable is connected directly to the breaker switch handle at one end and a factory installed switch handle operator at the other end. The remote operator handle, located on the enclosure flange, is used to perform mechanical open/close switching operations. This is accomplished through the cable's sliding center race enclosed within the cable.

Function

The advanced design concept of the Max-Flex Flange Mount Handle Operator provides for greater flexibility when locating a circuit breaker within an enclosure. The circuit breaker can be mounted almost anywhere, at any angle and on almost any convenient surface. The same flexibility applies when locating the switch handle operator on the flange section of the enclosure.

Application

The Max-Flex Operator is designed to work with I-T-E circuit breakers having current ratings through 600 amperes. The Max-Flex unit meets all the industrial criteria such as UL and Automotive Industry Standards.

Design

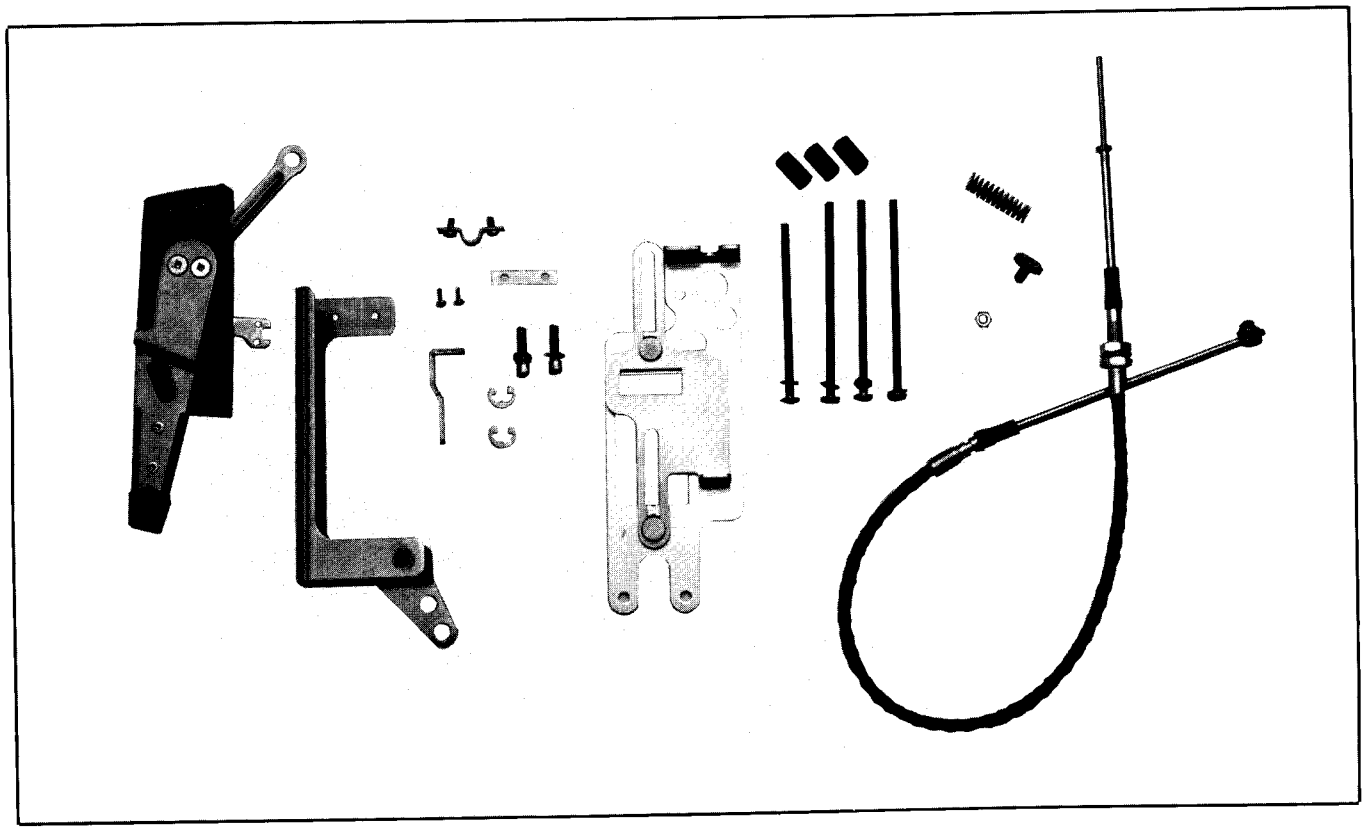
The new Max-Flex Handle Operator provides maximum flexibility in design and assembly of electrical equipment. Since there are no linkages to assemble, the Max-Flex system can save time during installation.

The cable design is flexible and rugged. It is similar to those cables used in aircraft control systems. The flexible cable comes in standard 3 or 4 foot lengths. However, specific lengths can be special ordered up to 20 feet.

Operation

When properly installed, the Max-Flex Handle Operator is used to perform remote switching operations from outside the enclosure. Switching is accomplished, by pushing the Max-Flex Handle Operator up for "ON" and down for "OFF". The mechanical advantage gained with this device simplifies switching operations when compared with local switching at the breaker.

This unique design offers breaker trip indication as a standard feature. Interlocking provisions are included and described below. All switching functions are standard according to accepted practices.



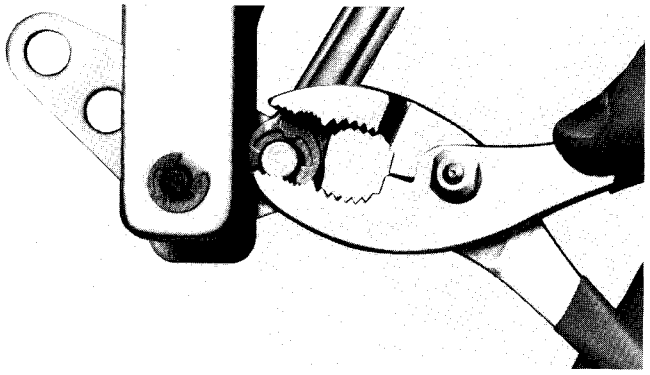
INSTRUCTIONS FOR INSTALLING
I-T-E MAX-FLEX™
FLANGE MOUNT HANDLE OPERATOR

Step 1: Mounting the Max-Flex™ Handle Operator To The Enclosure Frame Assembly

A. Drill the mounting holes in the enclosure flange and file all burrs. See Figures 1 & 2. Note the maximum and minimum drill hole distances in Figure 2.

B. Push the rubber gasket (**1**) down into the groove of the handle assembly (**2**). See Figure 3.

C. The handle (**7**) and the interlock mechanism (**3**) are supplied pre-assembled from the factory. NOTE: For ease of assembly, move the operating handle to the "ON" position ("up" toward the top of the enclosure). Mount the frame (**4**) and handle assembly (**2**) to the enclosure flange (**5**) with two ¼-20 x 1" socket head cap screws and lockwashers. Tighten cap screws from within the enclosure. See figure 3.



Secure E-Ring Connection

D. Rotate the bellcrank (**6**) clockwise to engage the return spring (**7**). Hold the bellcrank in position and place the plastic washer and connecting link onto the bellcrank pin (**8**). Using pliers, secure the connection with an E-ring (**9**). See Figure 3.

E. Mount the interlock lever extension (**10**) to the interlock lever (**3**) using two #6-32 x 3/8" machine screws and lockwashers. Screws mount through the threaded lever extension into the lever. See Figure 3.

Operating Note: With the enclosure door open, the operating handle cannot be moved from the "OFF" to "ON" position without deliberately defeating the interlock mechanism. In the "OFF" position, the interlock can be defeated by pushing the interlock lever extension (**10**) downward while moving the handle to the "ON" position (see Fig. 2). With the enclosure door open and the handle in the "ON" position, the interlock can be defeated by turning the defeater screw (**11**) on the operating handle counter-clockwise. When the enclosure door is closed, the door latch mechanism now automatically defeats the interlock.

F. Weld the door catch bracket (**12**) to the enclosure door. See Figures 2 & 4. NOTE: Holes may be drilled in the door catch bracket using the projections as centers. User must provide the mounting hardware.

G. Fasten the door catch (**13**) to the door catch bracket with (2) #8-32 x 5/16" pan head screws and external tooth lockwashers. See Figure 2.

Step 2: Adjusting the Door Catch Mechanism

A. Close the enclosure door and move the handle into the "ON" position. Adjust the door catch downward if the handle cannot be moved from the "ON" position.

B. With the handle in the "ON" position, try to open the enclosure door without turning the defeater screw in the handle. If the door opens, readjust the door catch and repeat A & B.

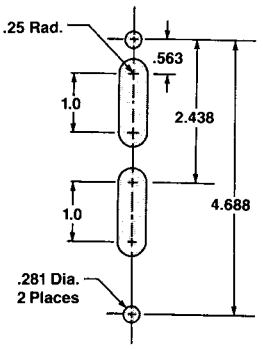


Fig. 1

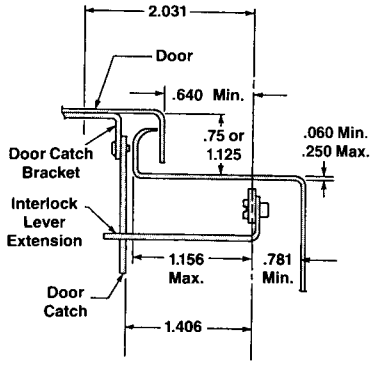


Fig. 2

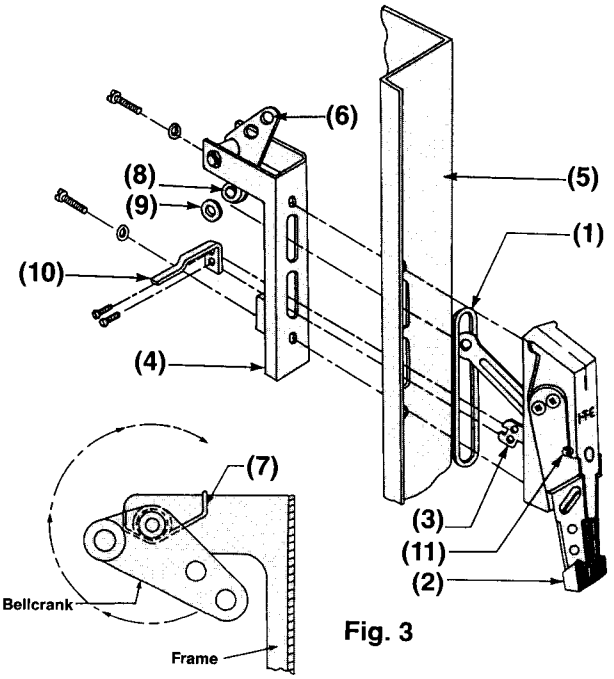


Fig. 3

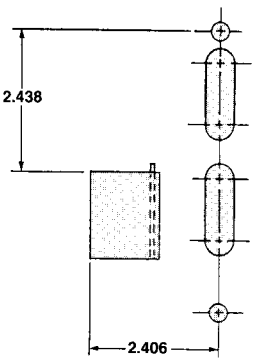


Fig. 4

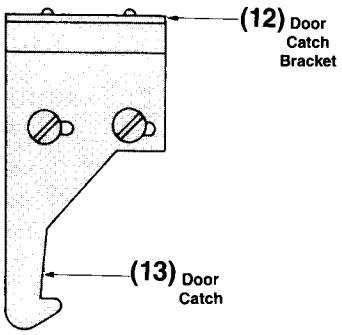


Fig. 4a

INSTRUCTIONS FOR INSTALLING
I-T-E MAX-FLEX™
FLANGE MOUNT HANDLE OPERATOR

Step 3: Mounting the Breaker Operator

The circuit breaker can be mounted remotely from the handle within a range that is limited by the length of the operating cable (**14**) and the depth of the enclosure. Table 2 and Figure 5 show the vertical range (**E**) of the circuit breaker in 8-16 inch enclosures, when mounted at the horizontal distance "F" from the handle.

Table 1

Cat. No.	Frame	A"	B"	C"	D"	F"Min.	Top Size
FH0F036 FH0F048	CLF	1.50	7.50	1.0	13.125	5.0	¼-20

Table 2

Cat. No.	Frame	E" Dimensions					
		8"		10"		12-16"	
		Min.	Max.	Min.	Max.	Min.	Max.
FH0F036	CLF	12.5	25.25	6.0	24.0	3.25	18.5

Table 3

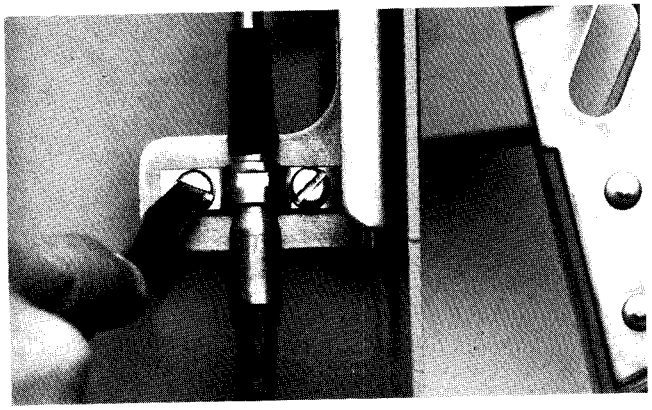
Cat. No.	Frame	E" Dimensions					
		16"		18"		24"	
		Min.	Max.	Min.	Max.	Min.	Max.
FH0F048	CLF	-30.25	30.50	-10.25	28.50	-4.75	27.0

Caution: When installed, the cable bend radius should not be less than 3 inches. This minimum wire bending requirement must be met to insure operating safety. The mounting procedure is as follows:

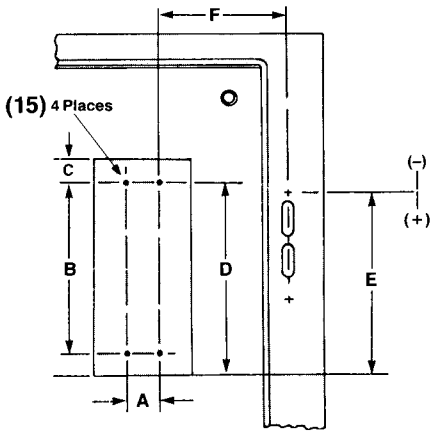
A. Determine the desired circuit breaker mounting location using Tables 1, 2 and Figure 5.
B. Drill and tap four mounting holes (**15**) in the enclosure back panel using dimensions "A" and "B" from Table 1.
C. Mount the circuit breaker inside the back panel. Align the holes in the panel with the mounting holes of the breaker.
D. Insert the three plastic spacers (**16**) into the circuit breaker mounting holes for support, as shown in Figure 6.
E. Install the operating mechanism (**17**) on the spacers (**16**) and secure with the three ¼-20 x 5" pan head screws and lockwashers. Insert the ¼-20 x 4¼" pan head screw through the hole without a spacer (**18**). Mount the circuit breaker and operating mechanism to the enclosure panel with the screws supplied.

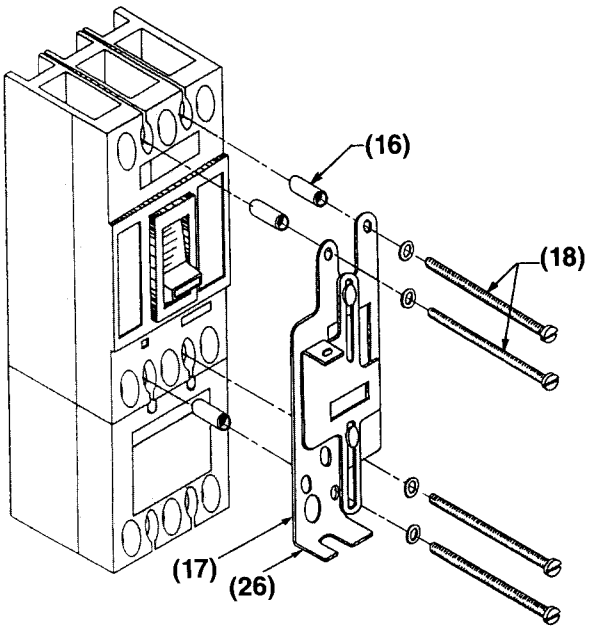
Step 4: Securing the Operating Cable To The Frame Assembly

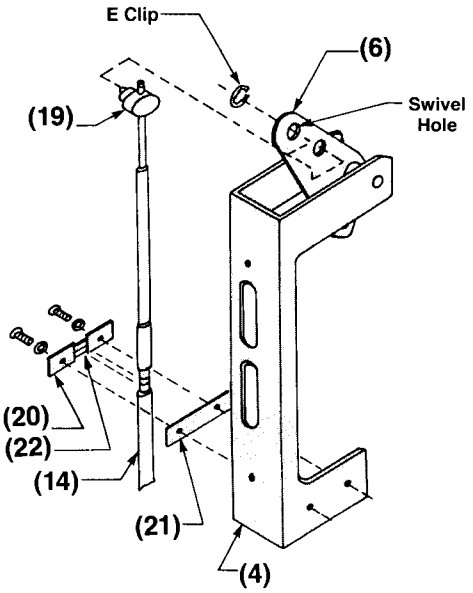
A. To attach the operating cable (**14**) to the frame assembly (**4**), move the operating handle (**2**) to the "ON" position and attach the cable swivel (**19**) to the outer hole of the bellcrank (**6**). Secure the connection with an E-ring. See Figure 7.



Tighten Detent Screws







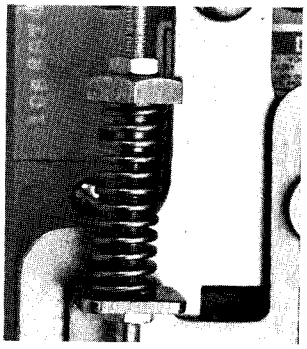
B. Secure the cable (**14**) to the frame assembly (**4**) by placing it between the cable retainer clip (**20**) and the shim (**21**), secure with two #10-32 x 3/8" screws and lockwashers. NOTE: Detent (**22**) in cable retainer must align with the groove (**23**) in the cable's metal fitting. See Figure 7.

Step 5: Securing The Operating Cable To The Circuit Breaker

WARNING: Before attaching the cable to the circuit breaker, installers **must** confirm that the power from the supply source has been de-energized.

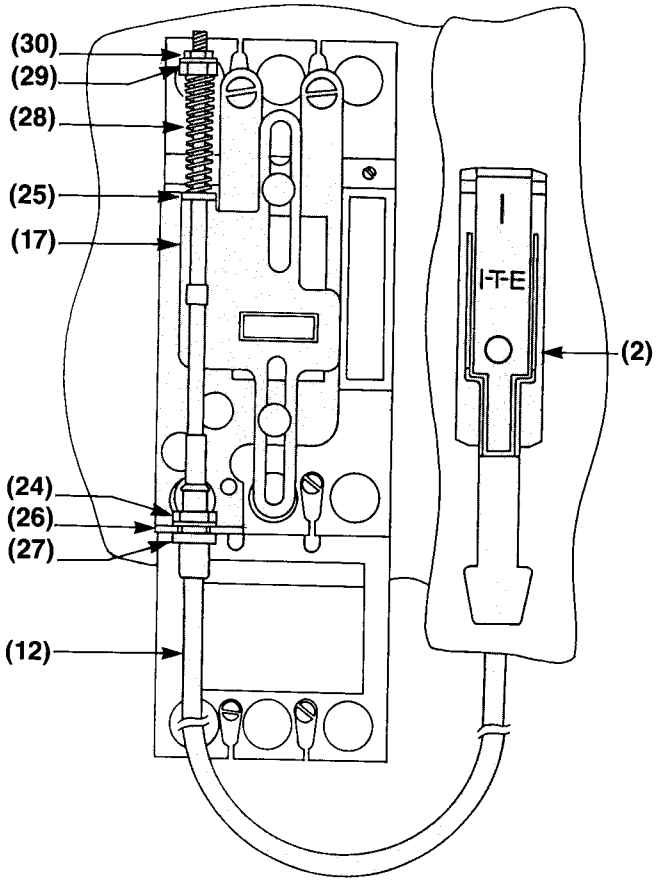
A. Move the circuit breaker handle to the "ON" position.
B. Remove the soft plastic cap from the end of the threaded cable rod (**24**) and slide the rod through the hole in the sliding plate tab (**25**) of the circuit breaker operating mechanism (**17**). See Figure 8.
C. Move the flange mount operating handle (**2**) to its maximum "ON" position and hold it in place.
D. Place the cable mounting threads (**24**) into the slot on the fixed plate tab (**26**) so that the two mounting nuts (**27**) are on both sides of the tab. Adjust the two mounting nuts so that the #10-32 nut on the cable rod just touches the sliding plate tab (**25**). Tighten the mounting nuts (**27**) to secure the cable. See Figure 8.
E. Continue holding the operating handle in the "ON" position and place the spring (**28**) over the end of the rod. Screw on the spring adjuster (**29**) and tighten until it begins to compress the spring. DO NOT OVERTIGHTEN.

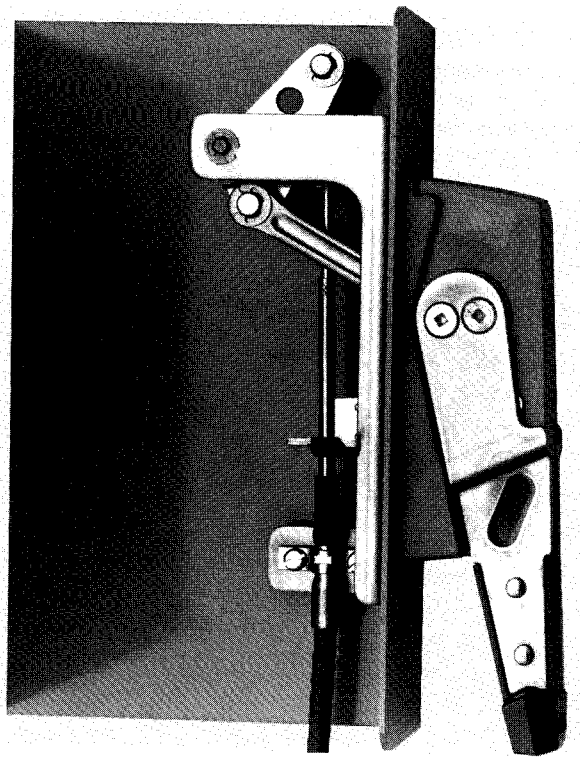
Fixed Plate Adjustment


Spring Adjustment

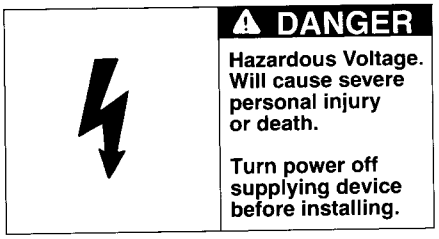
Step 6: Making Cable Adjustments

A. Check that circuit breaker turns "OFF" and "ON" by moving the operating handle (**2**) up for "ON" and down for "OFF". If the breaker does not switch "ON", loosen the cable mounting nuts (**27**) at the fixed plate tab (**26**), hold the operating handle in the maximum "ON" position, and move the cable (**12**) toward the top of the breaker. Retighten the mounting nuts (**27**) to secure.
B. Trip the circuit breaker by pressing the "Push To Trip" button on the front of the circuit breaker.
C. Check that circuit breaker resets by moving the operating handle (**2**) from "ON" to "OFF" and back to "ON". If the breaker resets, tighten the spring adjuster (**29**) one additional turn. Attach the lockwasher and #10-32 locknut to the end of the cable rod (**24**), and tighten the locknut.
D. If the circuit breaker does not reset after Step 2, tighten the spring adjuster (**29**) one turn and repeat Step 2. Continue this procedure until the breaker does reset, then tighten the adjuster spring one additional turn. Secure with the lockwasher and locknut (**30**).




Side View of Max-Flex Handle Operator

INSTRUCTIONS FOR
I-T-E DOOR LATCH MECHANISM (DKR2, DKR3, DKL2, DKL3)



SAFETY INSTRUCTIONS

General Information

These door latch mechanisms are for use in standard or custom built enclosures. The door latch post assemblies and the door catch are supplied with the kits. **Users must supply their own ¼" x ½" steel latch bar.**

Enclosures with an overall height less than 40 inches require the two-point door latch mechanism. When the overall height is greater than 40 inches, the three-point latch mechanism is used.

The door latch mechanism can be used with or without the type FHOH Flange Mount Handle Operator. These instructions apply when the door latch mechanism is mounted adjacent to and interlocks with the FHOH Operator. The door handle can be padlocked to prevent unauthorized entry into the enclosure.

Drawings in the installation instructions are oriented for right-hand flange installation. Left-hand flange installation drawings are "mirror" images of the right-hand versions. For left-hand flange installation, substitute "clockwise" for "counter clockwise" and vice-versa, whenever those words appear.

All dimensions are given in inches.

Installation of the Door Latch Mechanism

A. Drill mounting holes in the enclosure door observing the minimum dimensions shown in Fig. 2. See FHOH Handle Operator instructions for flange drilling pattern.

NOTE: "D" and "E" dimensions are determined by the height of the enclosure.

Refer to Fig. 1 for the following steps:

B. Place gasket (**1**) on handle plate (**2**) and attach handle plate to enclosure door with 2 thin-wall hex nuts (**3**). Tighten the nuts.

C. Insert lockout screw (**4**) and handle (**5**) through holes in the handle plate.

D. Install latch bar post assembly (**6**) (screw, sealing washer, flat washer, and special hex nut (**7**), if used.)

E. Attach top (**8**), bottom (**9**) and latch plate rollers (**10**) to latch bar with retaining pins and E-rings.

NOTE: Two-point latch does not have bottom roller.

F. Fasten the top and bottom rollers to the enclosure door with locking type flange nuts. Tighten the nuts, then loosen them ⅛ turn to allow movement of the roller assemblies.

G. Place bottom spring (**11**) (larger wire diameter) over the bottom thinwall hex nut inside the enclosure door.

H. Turn the handle ¼ turn clockwise (looking from inside the enclosure door) and attach the latch plate roller to the handle shaft, while inserting the bent leg of the spring into the hole in the latch plate. Fasten with a locking type flange nut. Tighten the nut, then loosen ⅛ turn to allow movement of the roller assemblies. See Fig. 1.

NOTE: Straight leg of spring must rest against pin (**12**) on handle plate. See inset on Fig. 1.

I. Attach the interlock defeater lever (**15**) to the latch bar (**16**) with two #10 lockwashers and #10-24 screws.

NOTE: The position of lever depends on enclosure depth. See Fig. 3.

J. Weld or rivet the door catch (**17**) to the enclosure door. **User must supply the mounting hardware.**

K. Attach the door latch label next to the door handle on the enclosure door.

Adjusting the Mechanism

If using in conjunction with the FHOH Flange Mount Handle Operator, perform the following steps:

A. With the door in the open (unlatched) position, close the door, but do not turn the door handle. The lockout plate should latch the door partially closed.

B. Turn the handle "clockwise" to stop. This will engage the rollers against the enclosure flange, securing the door fully closed.

C. Check that the circuit breaker can be turned "ON". If the breaker will not turn "ON", adjust the interlock defeater lever downward to engage the lever on the handle operator.

D. To open the door, insert a screwdriver into the handle screw and turn the screw and handle "counterclockwise". The door will only open partially if the operating handle is in the "ON" position. If the door fully opens with the handle in the "ON" position, adjust the interlock defeater lever upward and repeat steps C. and D.

NOTE: To open the door when the handle is in the "ON" position, turn the latch defeater screw located on the side of the operating handle.

DIAGRAMS FOR
I-T-E DOOR LATCH MECHANISM (DKR2, DKR3, DKL2, DKL3)

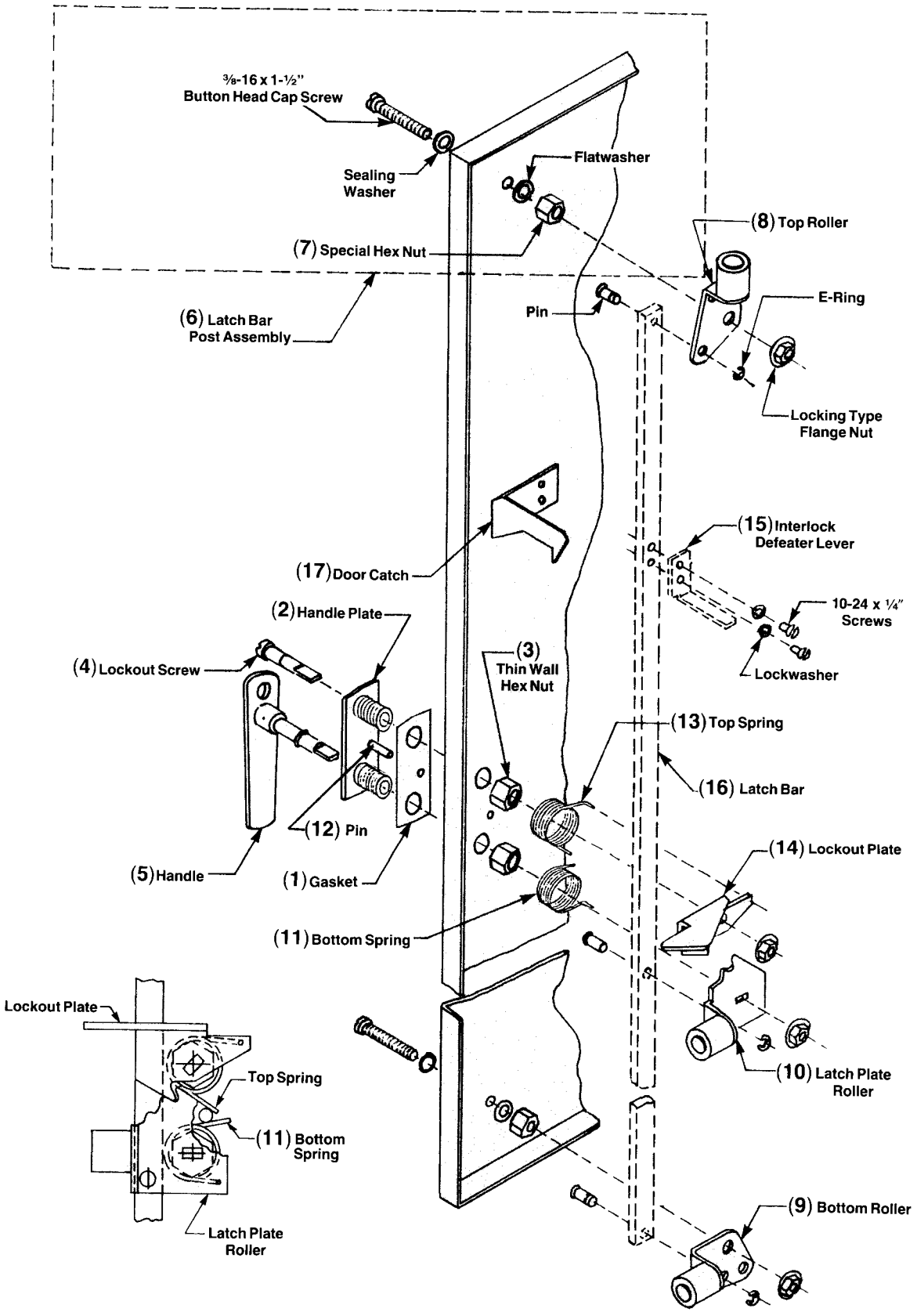
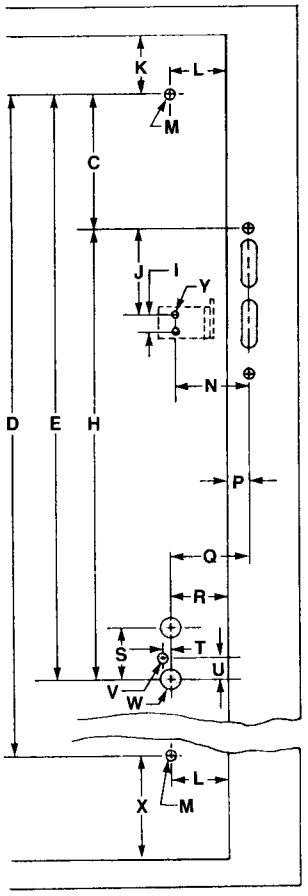


Fig. 1

DIAGRAMS FOR INSTALLING
I-T-E DOOR LATCH MECHANISM (DKR2, DKR3, DKL2, DKL3)



Minimum Dimensions (Inches)	
C	1.922
H	9.375
I	.50
J	2.688
K	1.859
L	1.797
M	.391 Dia.
N	2.297
P	.719
Q	2.594
R	1.875
S	1.625
T	.250
U	.688
V	.281 Dia.
W	.703 Dia.
X	2.484
Y	.219 Dia.

Fig. 2

F = C + 1.68

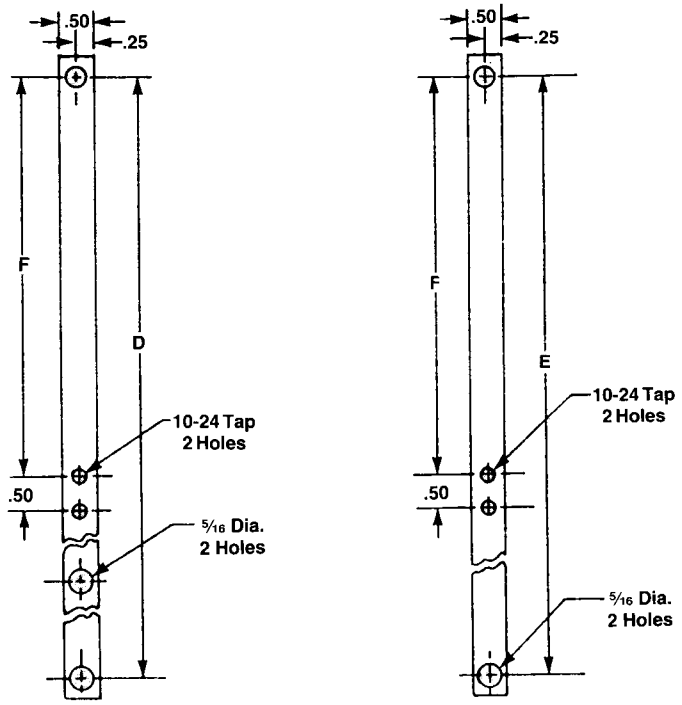


Fig. 3

INSTRUCTIONS FOR MOUNTING
I-T-E SIDE HANDLE OPERATOR – D11FLU

Add openings to enclosure flange as shown in Fig. 1. Weld interlock latch to inside of cover. Note: If vault handle kit is used, the interlock latch is not required and may be discarded. Refer to vault handle kit instruction sheet.

The handle mechanism and interlock mechanism are supplied preassembled. Before disassembling, note the position of the levers (Items A & B) of the interlock mechanism with respect to (Item C) of the handle mechanism in Fig. 2. Lever (A) must be placed in back of handle mechanism (Item C) and lever (B) in front. Care must be taken to insure this relationship is maintained when the device is reassembled.

Assemble handle mechanism from the outside of the enclosure. (Operating handle must be moved to the approximate middle of its stroke for ease of assembly.) Assemble mounting frame and interlock mechanism from inside of enclosure. When properly assembled the operating handle cannot be moved from the "Off" position to the "On" position while the cover is open.

Assemble Circuit breaker mounting plate to mounting frame with four ¼-20 screws supplied and provide end support as shown in Fig. 4 below. Mount Circuit Breaker operating mechanism and Circuit Breaker on mounting plate with four ¼-20 x 4-¼ long screws as shown in Fig. 3.

NOTE: Slot of rocker arm must engage roller of handle mechanism.

Nominal position (¼-20 screw) covers elongated slot of mechanism bracket, adjust if necessary.

Operation:

The handle cannot be moved from the "Off" position to the "On" position while the door is open, unless the Interlock mechanism is deliberately voided. This involves turning the screw in the handle housing counter-clockwise before moving the operating handle.

To open door while the handle is in the "On" position the same screw is turned clockwise.

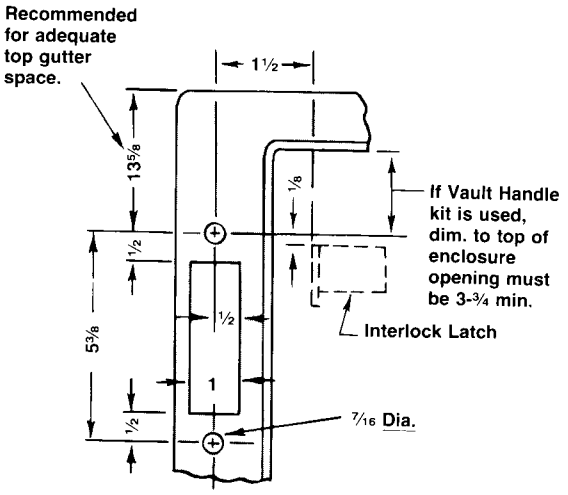


Fig. 1

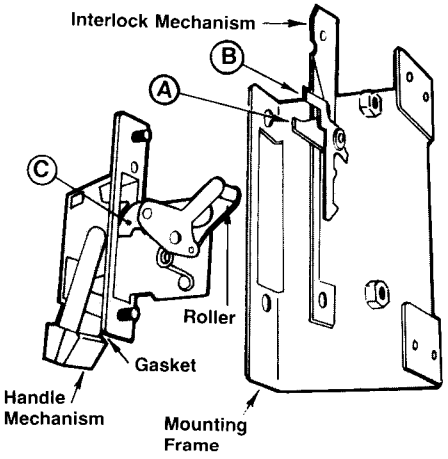


Fig. 2

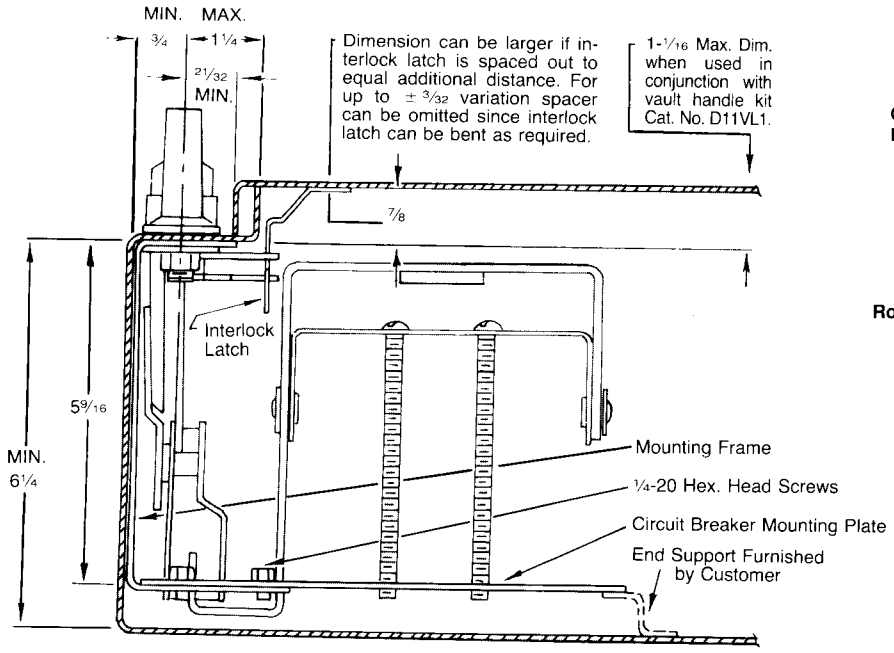


Fig. 4

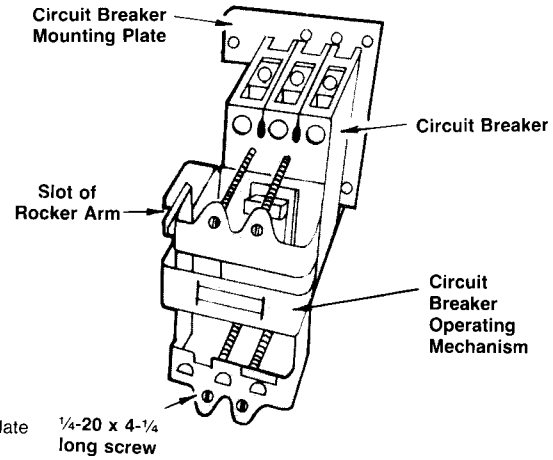


Fig. 3

INSTRUCTIONS FOR MOUNTING
I-T-E SIDE HANDLE OPERATOR – D11FRU

Add openings to enclosure flange as shown in Fig. 1. Weld interlock latch to inside of cover. Note: If vault handle kit is used, the interlock latch is not required and may be discarded. Refer to vault handle kit instruction sheet.

The handle mechanism and interlock mechanism are supplied preassembled. Before disassembling, note the position of the levers (Items A & B) of the interlock mechanism with respect to (Item C) of the handle mechanism in Fig. 2. Lever (A) must be placed in back of handle mechanism (Item C) and lever (B) in front. Care must be taken to insure this relationship is maintained when the device is reassembled.

Assemble handle mechanism from the outside of the enclosure. (Operating handle must be moved to the approximate middle of its stroke for ease of assembly.) Assemble mounting frame and interlock mechanism from inside of enclosure. When properly assembled the operating handle cannot be moved from the "Off" position to the "On" position while the cover is open.

Assemble Circuit breaker mounting plate to mounting frame with four ¼-20 screws supplied and provide end support as shown in Fig. 4 below. Mount Circuit Breaker operating mechanism and Circuit Breaker on mounting plate with four ¼-20 x 4-¼ long screws as shown in Fig. 3.

NOTE: Slot of rocker arm must engage roller of handle mechanism.

Nominal position (¼-20 screw) covers elongated slot of mechanism bracket, adjust if necessary.

Operation:

The handle cannot be moved from the "Off" position to the "On" position while the door is open, unless the Interlock mechanism is deliberately voided. This involves turning the screw in the handle housing clockwise before moving the operating handle.

To open door while the handle is in the "On" position the same screw is turned counter-clockwise.

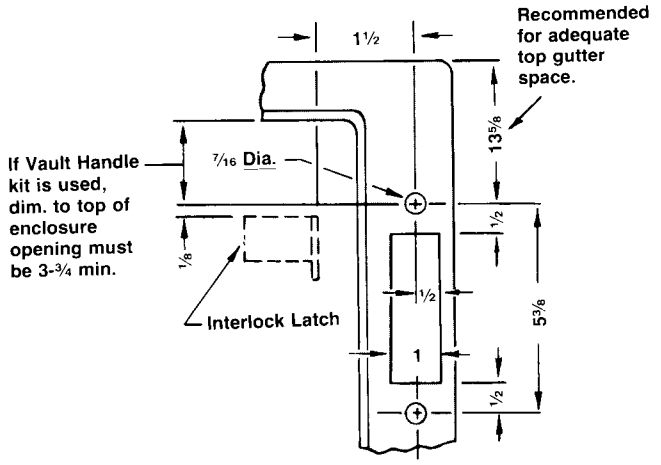


Fig. 1

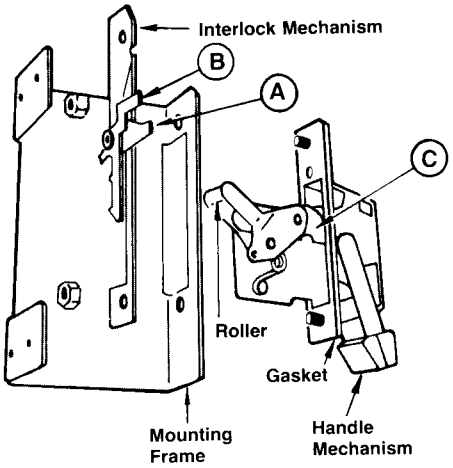


Fig. 2

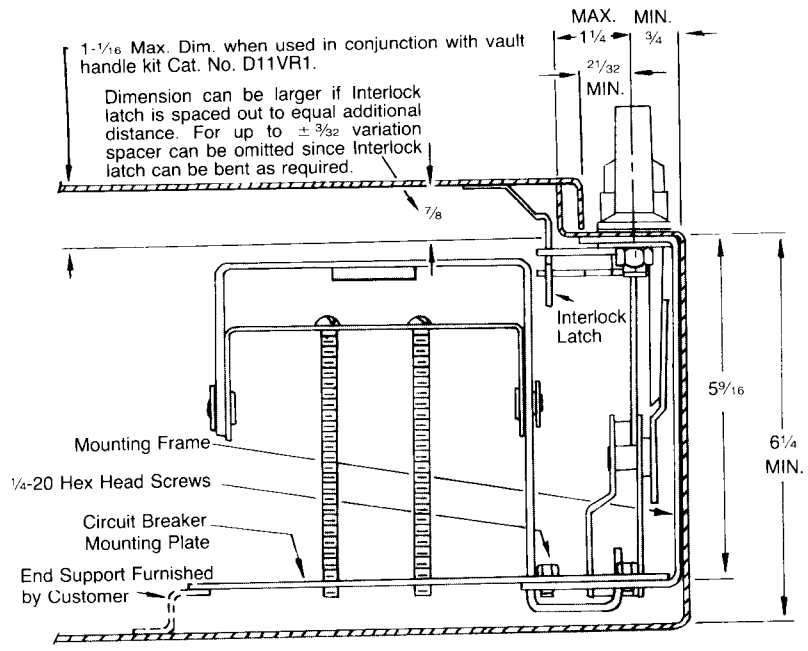


Fig. 4

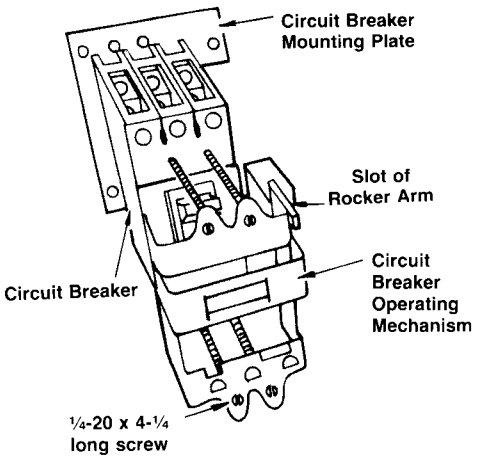
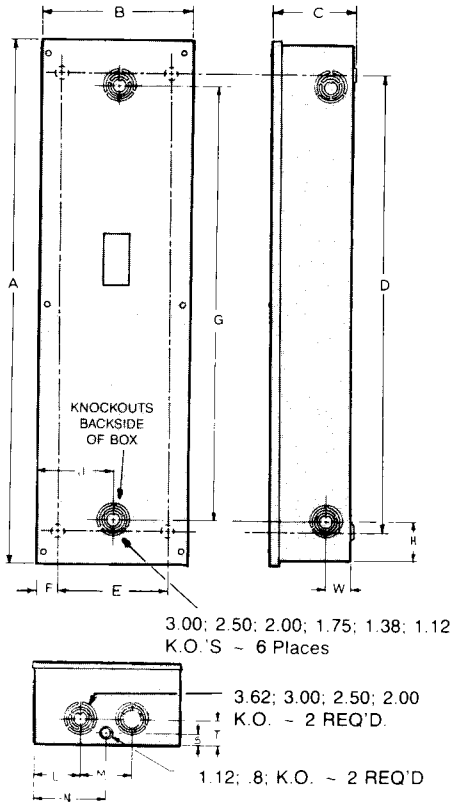


Fig. 3

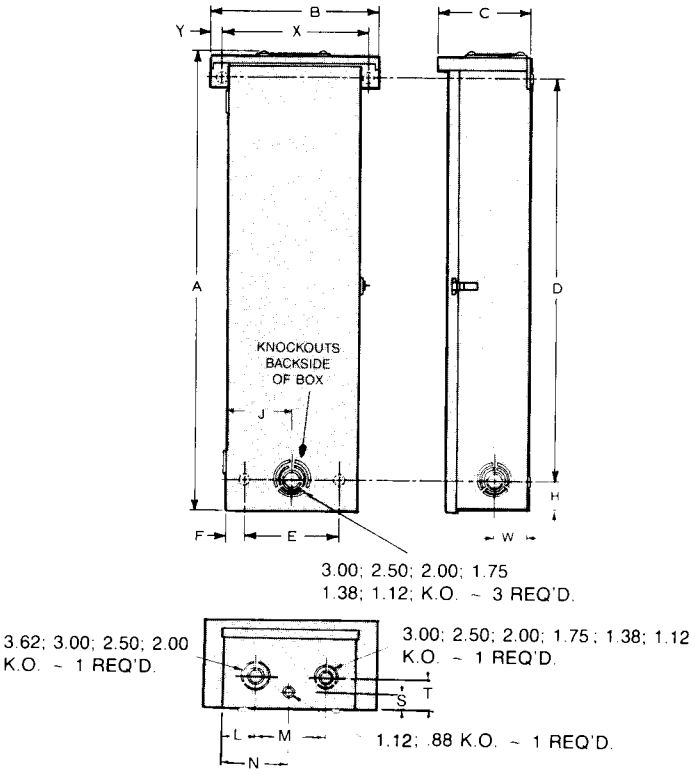
TYPE I — F6N1S

General purpose indoor, sheet steel enclosure for use in normal atmosphere, listed as service entrance equipment.



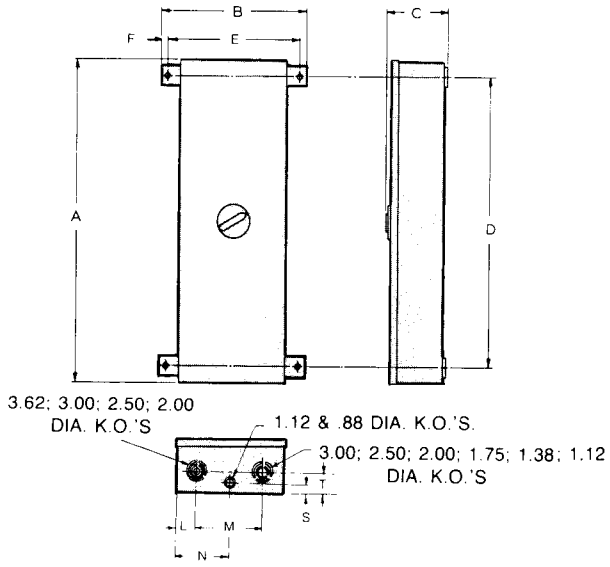
TYPE 3R — F6N3R

An outdoor, sheet-steel enclosure providing protection against driving rain, sleet or snow. Listed as service-entrance equipment.



TYPE 12K — F6N12K

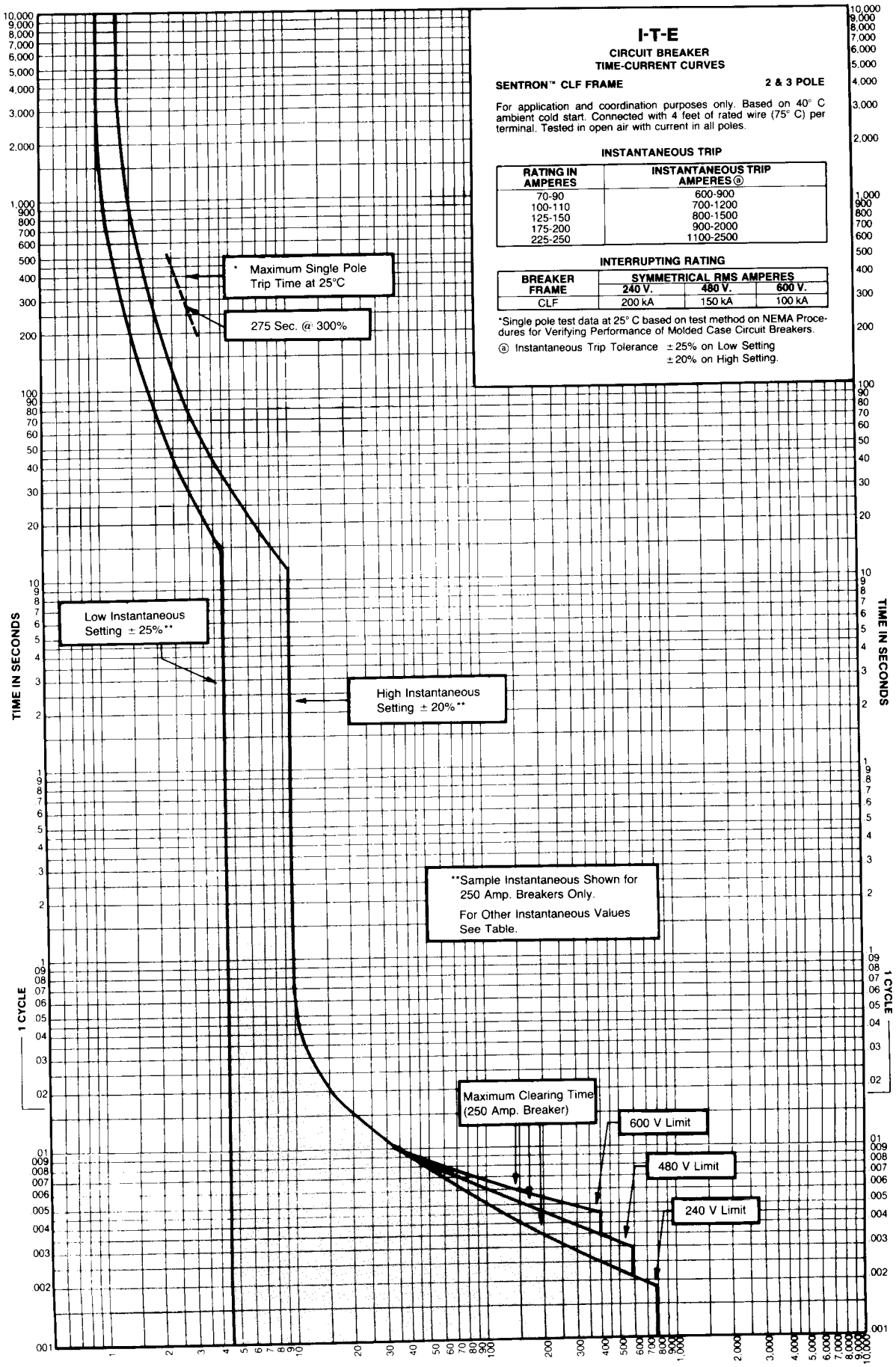
A special-industry, sheet-steel enclosure for indoor use in atmosphere containing particles of lint, dust, dirt, sawdust and other foreign matter.



ENCLOSURE DIMENSIONS — INCHES

REF.	CAT. NO.		
	F6N1S	F6N3R	F6N12K
A	38.4	38.6	38.6
B	11.5	14.1	14.2
C	5.1	7.8	7.0
D	33.0	33.3	34.0
E	8.0	8.0	13.0
F	1.56	1.56	.62
G	32.6	—	—
H	2.8	2.7	—
J	5.8	5.6	—
K	—	—	—
L	2.6	2.6	2.6
M	6.4	6.4	6.4
N	5.9	6.0	6.0
P	—	—	—
R	—	—	—
S	1.1	1.1	1.1
T	2.3	2.3	2.3
W	2.2	2.3	—
X	—	12.50	—
Y	—	.81	—

I-T-E TIME/CURRENT CURVES
CLF FRAME 600 VOLTS, 60 HZ, 70-250 AMPERES



ORDERING INFORMATION
I-T-E CIRCUIT BREAKER CATALOG NUMBERS

Breaker Frame	Ampere Rating	Instantaneous Trip Range Min.	Instantaneous Trip Range Max.	Complete Breaker Unenclosed Cat. No.		UL Interrupting Ratings (kA) (RMS Symmetrical Amperes) VAC 120	120/240	240	277	480	600
CLF 2 Pole① 600V AC	70	600	900	CLF62B070	Non-Interchangeable Trip			200		150	100
	80	600	900	CLF62B080				200		150	100
	90	600	900	CLF62B090				200		150	100
	100	700	1200	CLF62B100				200		150	100
	110	700	1200	CLF62B110				200		150	100
	125	800	1500	CLF62B125				200		150	100
	150	800	1500	CLF62B150				200		150	100
	175	900	2000	CLF62B175				200		150	100
	200	900	2000	CLF62B200				200		150	100
	225	1100	2500	CLF62B225				200		150	100
	250	1100	2500	CLF62B250				200		150	100
	250	Molded Case Switch②		CLF62S250A				200		150	100
	SHIPPING:	12 lbs. each									
CLF 3 Pole 600V AC	70	600	900	CLF63B070	Non-Interchangeable Trip			200		150	100
	80	600	900	CLF63B080				200		150	100
	90	600	900	CLF63B090				200		150	100
	100	700	1200	CLF63B100				200		150	100
	110	700	1200	CLF63B110				200		150	100
	125	800	1500	CLF63B125				200		150	100
	150	800	1500	CLF63B150				200		150	100
	175	900	2000	CLF63B175				200		150	100
	200	900	2000	CLF63B200				200		150	100
	225	1100	2500	CLF63B225				200		150	100
	250	1100	2500	CLF63B250				200		150	100
	250	Molded Case Switch②		CLF63S250A				200		150	100
	SHIPPING:	14 lbs. each									

① Two Pole Available in 3 Pole Width Only
② Includes Self Protecting Instantaneous Element.
SPECIAL NOTE: For 50°C application replace "B" letter in catalog number with the letter "M" for ordering purposes.

ORDERING INFORMATION
I-T-E CIRCUIT BREAKER ACCESSORIES

AUXILIARY SWITCH COMBINATIONS

Control Voltage		1 Auxiliary Switch	1 Alarm Switch & 1 Auxiliary Switch	2 Auxiliary Switches
AC	DC	Cat. No.	Cat. No.	Cat. No.
120		A01F62	C01F64	A02F62
208		A01F62	C01F64	A02F62
240		A01F62	C01F64	A02F62
277		A01F64	C01F64	A02F64
480		A01F64	C01F64	A02F64
600		—	—	—
	24	A01F62	C01F64	A02F62
	48	A01F62	C01F64	A02F62
	125	A01F62	C01F64	A02F62
	250	A01F62	C01F64	A02F62

UNDERVOLTAGE TRIP COMBINATIONS

Control Voltage		1 Undv. Trip	1 Undv. Trip & 1 Aux. Switch
AC	DC	Cat. No.	Cat. No.
120		U01F60	W01F64
208		U02F60	W02F64
240		U03F60	W03F64
277		U16F60	W16F64
480		U06F60	W06F64
600		U08F60	W08F64*
	24	U13F60	W13F64
	48	U14F60	W14F64
	125	U10F60	W10F64
	250	U12F60	W12F64

* Auxiliary switch is rated for 480 VAC only.

ALARM SWITCH COMBINATIONS

Control Voltage		1 Alarm Switch	1 Alarm Switch & 1 Auxiliary Switch
AC	DC	Cat. No.	Cat. No.
120		B00F64	C01F64
208		B00F64	C01F64
240		B00F64	C01F64
277		B00F64	C01F64
480		B00F64	C01F64
600		—	—
	24	B00F64	C01F64
	48	B00F64	C01F64
	125	B00F64	C01F64
	250	B00F64	C01F64

SHUNT TRIP COMBINATIONS

Control Voltage		1 Shunt Trip
AC	DC	Cat. No.
120		S01F60
208		S02F60
240		S03F60
277		S15F60
480		S04F60
600		S06F60
	24	S07F60
	48	S09F60
	125	S11F60
	250	S13F60

ORDERING INFORMATION
I-T-E CIRCUIT BREAKER ACCESSORIES

ADDITIONAL ACCESSORIES

Item	Catalog No.
Terminal Connectors	
#6-350 MCM CU.	TC1F350
#4-350 MCM AL.	TA1F350
Handle Blocking Device	F6HB1
Padlocking Device	F6PL1
Rear Connecting Studs	
Short Length	RS4756
Long Length	RS4755
Plug-In Adaptors	
2 Pole (2 Required Per Breaker)	PC4753
3 Pole (2 Required Per Breaker)	PC4754
Mechanical Interlock	
Breaker Panel Mounted	MI5426
Breaker Plug-In Mounted	MI5443
Rotary Handle Operator	
Standard Depth –	
Interior Enclosure Depth $5^{13}/_{16}$	D11CFU1
Variable Depth –	
Interior Enclosure Depth $5^{13}/_{16}$ to $16^{5}/_{8}$	D11CFU2

Item	Catalog No.
Rotary Handle Operator	
Standard Depth	RHOFSD
Variable Depth	RHOFVD
Rotary Handle Operator	
Standard Depth	F6RH1
Variable Depth	F6RHV9
Flange Mount Handle Operator	
Handle Operator	FHOH
Breaker Operator	FHOFBO
Cable Operator (36 inches)	FHOFCO36
Door Latch Mechanism	
Left Side	DKL2, DKL3
Right Side	DKR2, DKR3
Side Handle Operator	
Left Side	D11FLU
Right Side	D11FRU
Enclosures	
Type 1	F6N1S
Type 3R	F6N3R
Type 12K	F6N12K

I-T-E Item	UL File Number
Breakers	– E 10848
Terminal Connectors	– E 23615 (Sp)
Plug-in Connectors	– E 69435
Rear Studs	– E 69435
Internal Accessories	– E 69455
Shunt trips	
Undervoltage	
Aux. Switch	
Bellalarm	
Molded Case Switch	– E 68312
Enclosures	– E 10848
Connector Straps	– E 69435

Circuit Breaker Mounting Screws ¼-20 x 4.00″

PROCEDURES FOR VERIFYING PEFORMANCE OF MOLDED CASE CIRCUIT BREAKERS — AB2
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