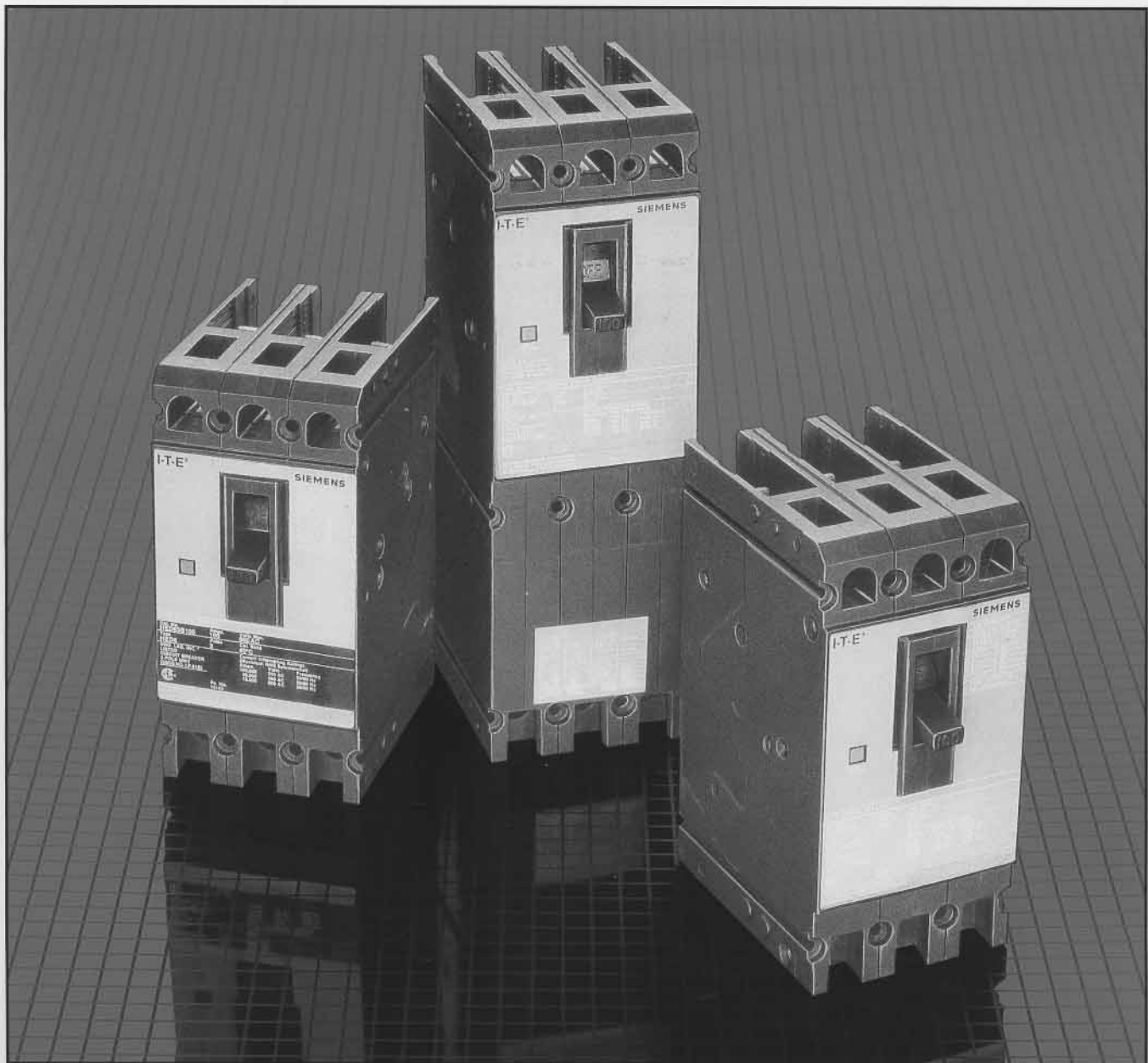


SIEMENS

I-T-E[®] Molded Case Circuit Breakers

ED-Frame
Information and
Instruction Guide





⚠ DANGER

Hazardous voltages are present inside the enclosures or panels in which the circuit breakers are installed. Death, serious injury, and/or equipment damage will result if circuit breakers are improperly applied or precaution is not used.

De-energize all incoming power prior to installation of circuit breakers or associated accessories.

Only qualified personnel should work on or around this equipment.

Position of circuit breaker handles shown in this booklet is for illustration purposes only. Circuit breakers are to be installed in OFF or TRIPPED position only.



I-T-E® ED-Frame Circuit Breakers 1, 2 and 3-Pole, 15-125 Amperes

Types ED2, ED4, ED6, HED4, HED6, HHED6
CED6, ED6-ETI, CED6-ETI

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NOTE: Information related to specific frame types or catalog numbers does not guarantee product availability. Technical information may change due to product revisions. Consult Siemens sales office concerning any variation of product information contained herein.

⚠ DANGER



Hazardous voltages are present in the equipment which will cause death or 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.

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. 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.

SUMMARY

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 sales office, listed on back of this instruction guide.

The contents of this instruction manual should 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.

Information and Instructions

General Information

General

ED-Frame Sentron™ Series circuit breakers, as shown on pages 5-9, are for use in individual enclosures, switchboards, panelboards and load centers. They are available as thermal magnetic trip (types ED2, ED4, ED6, HED4, HED6, HHED6, CED6), current limiting (type CED6) instantaneous magnetic trip only (motor circuit protection—types ED6-ETI, CED6-ETI) and molded case switches (types ED2, ED4, ED6, HHED6, CED6).

CED6 type Sentron™ Series circuit breakers combine thermal magnetic construction for overload protection and an additional set of patented “blow-apart” contacts in conjunction with the ED-Frame’s standard patented “blow-apart” contacts. This arrangement provides for current-limiting protection under high fault interrupting conditions as outlined in the National Electric Code, Article 240-1① and UL 489② standards. CED6 type ED-Frame circuit breakers are fuseless and therefore require no blown fuses to be located and replaced should a high current fault occur. The common trip feature of the circuit breaker is completely retained so that all poles of the circuit breaker open when caused to trip due to an overload or short circuit.

Pressure wire connectors, suitable for use with aluminum or copper wire are available for all ED-Frame circuit breakers. Rear connection studs or plug-in connector assemblies are also available (1, 2 and 3-pole). The latter mounting arrangement permits removal of the circuit breaker from its leads without physically coming in contact with either the line or load terminals. Special features such as a shunt trip, auxiliary and alarm switches and undervoltage trip devices are available for field adaptation. The installation and/or removal of these devices is to be accomplished by qualified personnel only. These devices are mounted externally and Underwriters Laboratories listed, page 53. Information concerning them is found on pages 16-19 and 51.

Thermal Magnetic

ED2, ED4, ED6, HED4, HED6, HHED6, CED6 type circuit breakers provide complete overload and short circuit protection by use of a time delay thermal trip element and an instantaneous magnetic trip element. Fixed instantaneous trip values are shown in the table below:

Fixed Instantaneous Trip

Ampere Rating	Fixed Instantaneous Band
15-25	400-700
30-125	600-1000

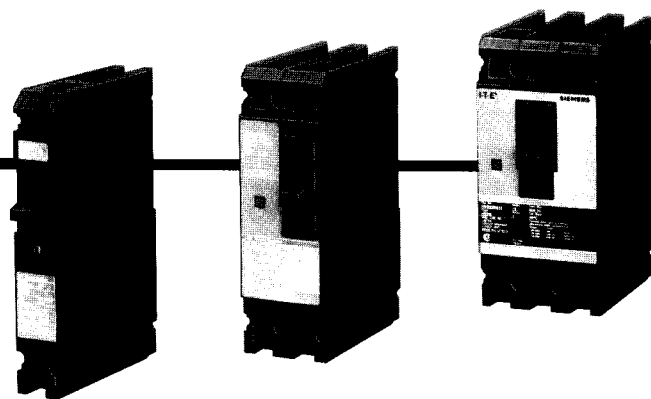
Circuit breakers are calibrated at the factory, under controlled temperature conditions for application at 40°C (104°F) ambient, to meet requirements as outlined in UL-489 standard for molded case circuit breakers. Catalog information is found on pages 48-50.

① National Electric 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.”

② Underwriters Laboratories (UL 489, Par. 2.5)

“A circuit breaker that does not employ a fusible element and that when operating within its current limiting range, limits the let-through I²t to a value less than the I²t of a ½ cycle wave of the symmetrical prospective current.”



Molded Case Switch

A molded case switch is available in the ED2, ED4, ED6, HHED6, CED6 type circuit breakers. 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 at a value over 1000A and protect itself against high fault conditions. No overload or low fault current protection is provided. This protection must be supplied by separate overcurrent devices. Catalog information is located on pages 48-51.

Interrupting Ratings—Symmetrical RMS Amperes (kA) Based on UL 489 Standards, UL File #E10848

Breaker Type	RMS Symmetrical Amperes (kA)							
	UL A.I.R.							
	AC				DC			
	120	240	277	480	600	125	250	500 ①
ED2 (1-P)	10	—	—	—	—	10	—	—
ED2 (2,3-P)	—	10	—	—	—	—	5 (2-P)	—
ED4 (1-P)	65	—	22	—	—	5	—	—
ED4 (2,3-P)	—	65	—	18	—	—	30 (2-P)	—
ED6 (2,3-P)	—	65	—	25	18	—	30 (2-P)	18 (3-P)
HED4 (1-P)	—	—	—	—	—	—	—	—
(15-30 Amps)	100	—	65	—	—	10	—	—
HED4 (1-P)	—	—	—	—	—	—	—	—
(35-110 Amps)	100	—	25	—	—	10	—	—
HED4 (2,3-P)	—	100	—	42	—	—	30 (2-P)	—
HED6 (2,3-P)	—	100	—	30	18	—	30 (2-P)	25 (3-P)
HHED6 (2,3-P)	—	100	—	65	25	—	—	—
CED6 (2,3-P)	—	200	—	200	100	—	30 (2-P)	50 (3-P)

① For 500VDC applications the customer's power supply and load must be wired as shown in Figure 1 on page 4.

Breaker Type	RMS Symmetrical Amperes (kA)		
	IEC A.I.R. (157-P1)		
	Volts AC (50/60 Hz)		
	220/240	380/415	500
ED4 (3-P)	65	18	NA
HED4 (3-P)	100	42	NA
HED6 (3-P)	100	30	NA
CED6 (3-P)	200	200	NA

Breaker Type	IEC A.I.R. (947-2)					
	(lcu)	(lcs)	(lcu)	(lcs)	(lcu)	(lcs)
ED6 (3-P)	65	17	35	9	18	5

Instantaneous Trip

ETI motor circuit interrupters, types ED6-ETI, CED6-ETI (adjustable instantaneous magnetic trip only) are designed for use in welding circuits, motor circuits and combination starters where short circuit protection only is required. When used in combination starters, they serve in conjunction with motor protective relays to offer the best available protection. The relays guard against motor overloads and the circuit breaker provides short circuit protection. Catalog information is located on page 50.

Information and Instructions

Operation and Maintenance

Instantaneous Trip Adjustments

Motor Full Load Amperes	ETI Trip Setting ^①		Breaker Ampere Rating
	Adjustment	Amperes	
.20 - .33	Low	2.6	1
.34 - .45	2	4.5	
.46 - .56	3	6	
.57 - .68	4	7.5	
.69 - .81	High	9	
.53 - .83	Low	7	2
.84 - 1.14	2	11	
1.15 - 1.45	3	15	
1.46 - 1.68	4	19	
1.69 - 2.00	High	22	
.76 - 1.29	Low	10	3
1.30 - 1.75	2	17	
1.76 - 2.29	3	23	
2.30 - 2.68	4	30	
2.69 - 3.18	High	35	
1.23 - 1.99	Low	16	5
2.00 - 2.75	2	26	
2.76 - 3.52	3	36	
3.53 - 4.14	4	46	
4.15 - 4.90	High	54	
2.30 - 3.83	Low	30	10
3.84 - 5.37	2	50	
5.38 - 6.52	3	70	
6.53 - 7.68	4	85	
7.69 - 9.10	High	100	
4.23 - 6.91	Low	55	25
6.92 - 9.61	2	90	
9.62 - 11.91	3	125	
11.92 - 13.83	4	155	
13.84 - 16.40	High	180	
6.15 - 10.37	Low	80	30
10.38 - 14.22	2	135	
14.23 - 18.06	3	185	
18.07 - 20.75	4	235	
20.76 - 24.50	High	270	
8.84 - 14.22	Low	115	40
14.23 - 19.60	2	185	
19.61 - 24.99	3	255	
25.00 - 28.83	4	325	
28.84 - 34.00	High	375	
13.84 - 23.06	Low	180	50
23.07 - 31.52	2	300	
31.53 - 39.99	3	410	
40.00 - 46.14	4	520	
46.15 - 54.50	High	600	
24.23 - 41.52	Low	315	100
41.53 - 56.91	2	540	
56.92 - 68.45	3	740	
68.46 - 76.91	4	890	
76.92 - 90.90	High	1000	
38.46 - 55.37	Low	500	125
55.38 - 70.75	2	720	
70.76 - 84.60	3	920	
84.61 - 96.14	4	1100	
96.15 - 113.60	High	1250	

^① All values calibrated within guidelines of UL 489.

Circuit Breaker Operation

With the mechanism latched and the contacts open, the operating handle will be in the OFF position. Moving the handle to the ON position closes the contacts and establishes a circuit through the breaker. Under overload or short circuit conditions sufficient to automatically trip or open the breaker, the operating handle moves to a position between ON and OFF. To relatch the circuit breaker after automatic operation, move the operating handle to the extreme OFF position. The circuit breaker is now ready for reclosing.

The overcenter toggle mechanism is trip free of the operating handle. The circuit breaker, therefore, cannot be held closed by means of the handle should a tripping condition exist. After automatic operation, the handle assumes an intermediate position between ON and OFF, thus displaying a clear indication of tripping.

Maintenance

Experience has shown that properly applied molded case circuit breakers normally do not require maintenance. However, some industrial users may choose to establish an inspection and maintenance procedure to be carried out on a regular basis. For detailed information, consult applicable NEMA publications or your local Siemens sales office.

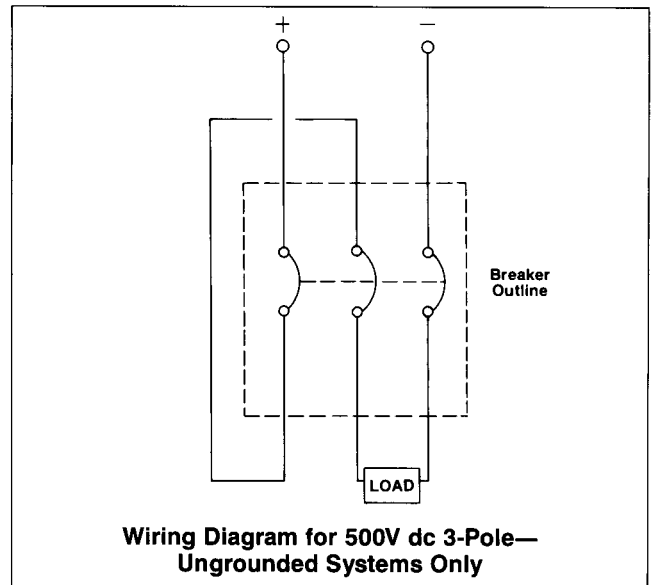
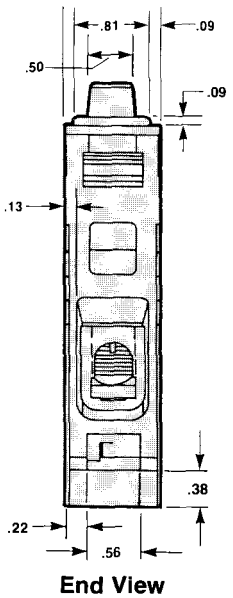
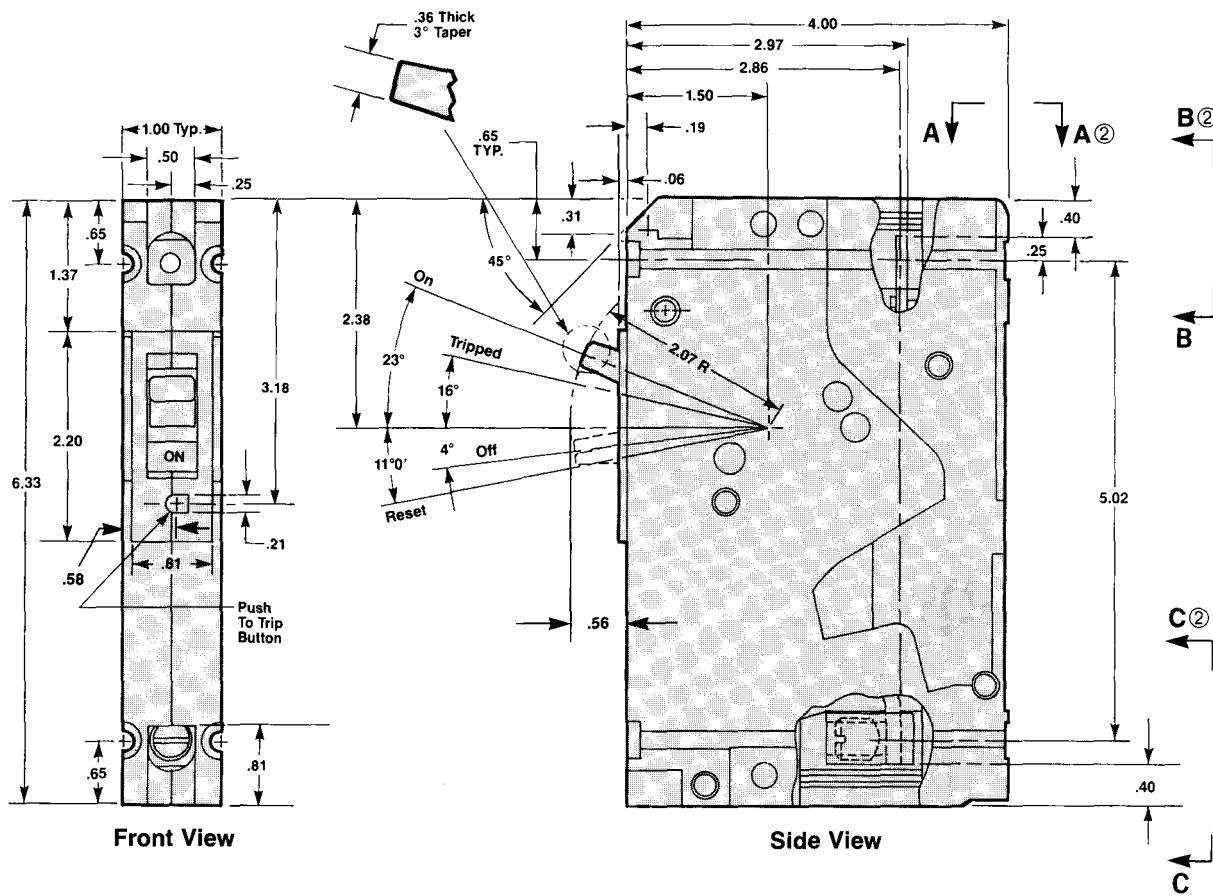


Figure 1

I-T-E ED-Frame Outline Drawings^① — 1-Pole

Types ED2, ED4, HED4,



Handle Operating Forces

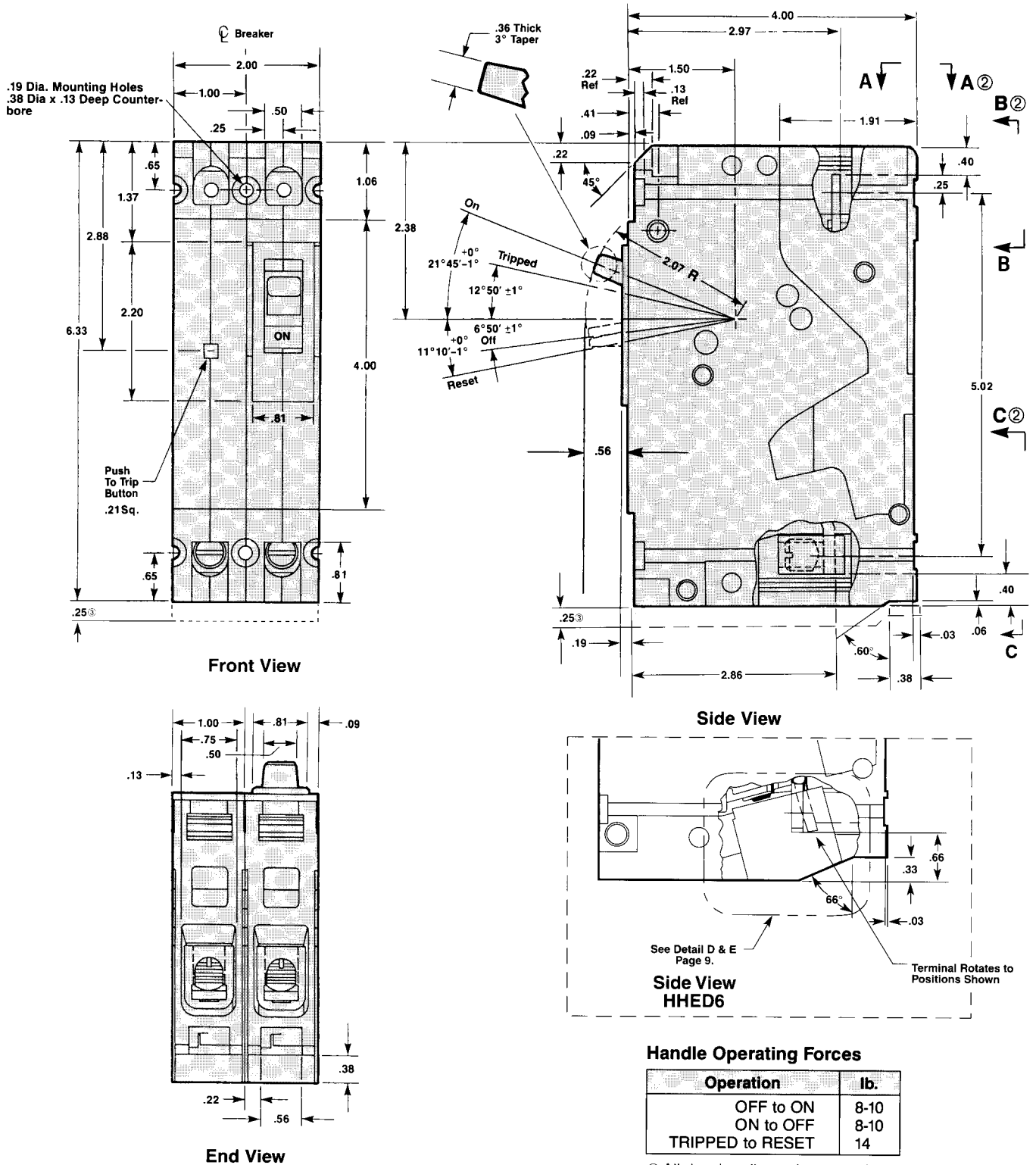
Operation	lb.
OFF to ON	4
ON to OFF	2
TRIPPED to RESET	6

① All drawing dimensions are shown in inches.

② See detail drawings on page 9.

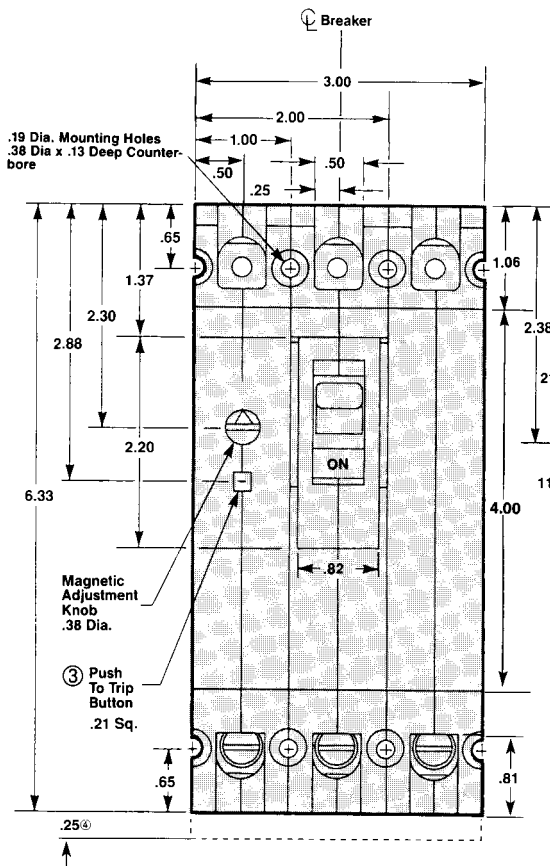
I-T-E ED-Frame Outline Drawings^①—2-Pole

Types ED2, ED4, ED6, HED4, HED6, HHED6

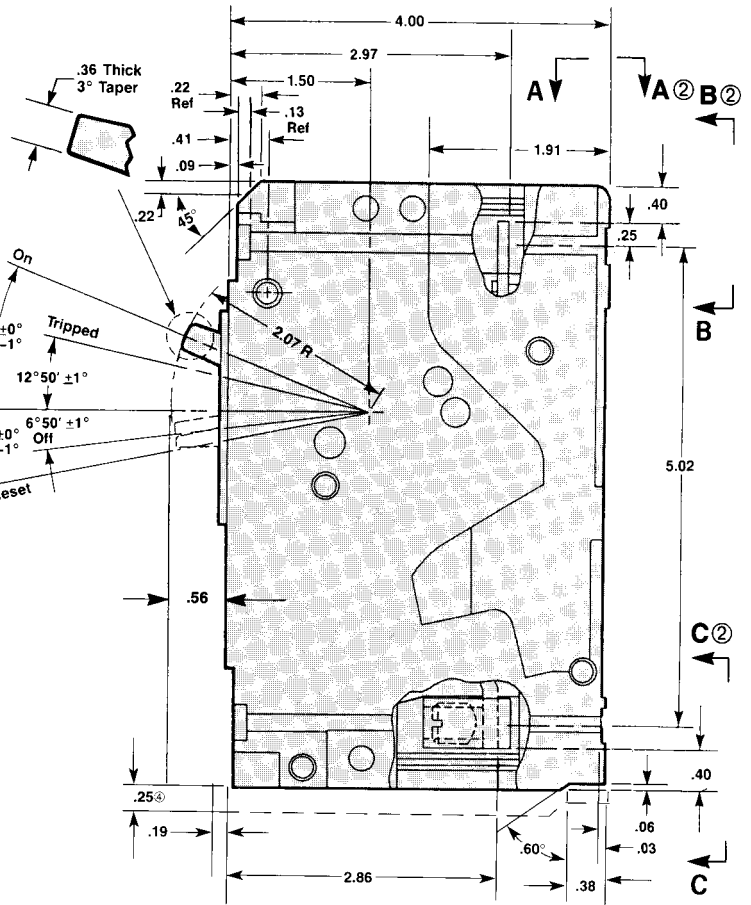


I-T-E ED-Frame Outline Drawings^①—3-Pole

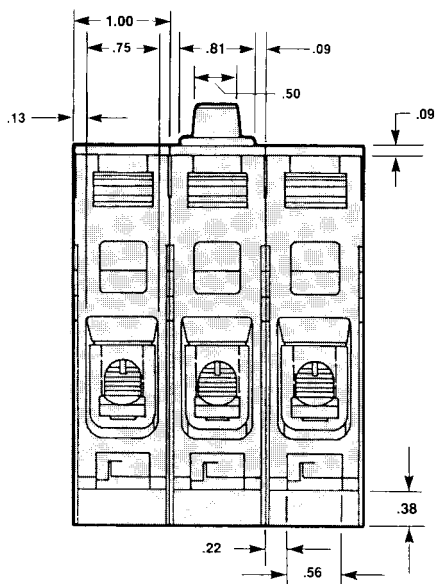
Types ED2, ED4, ED6, HED4, HED6, HHED6, ED6-ETI



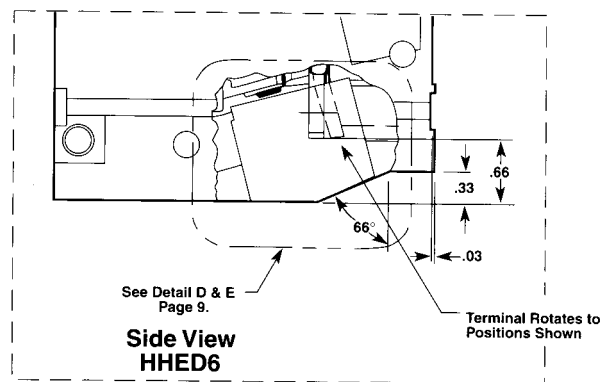
Front View



Side View



End View



Side View HHED6

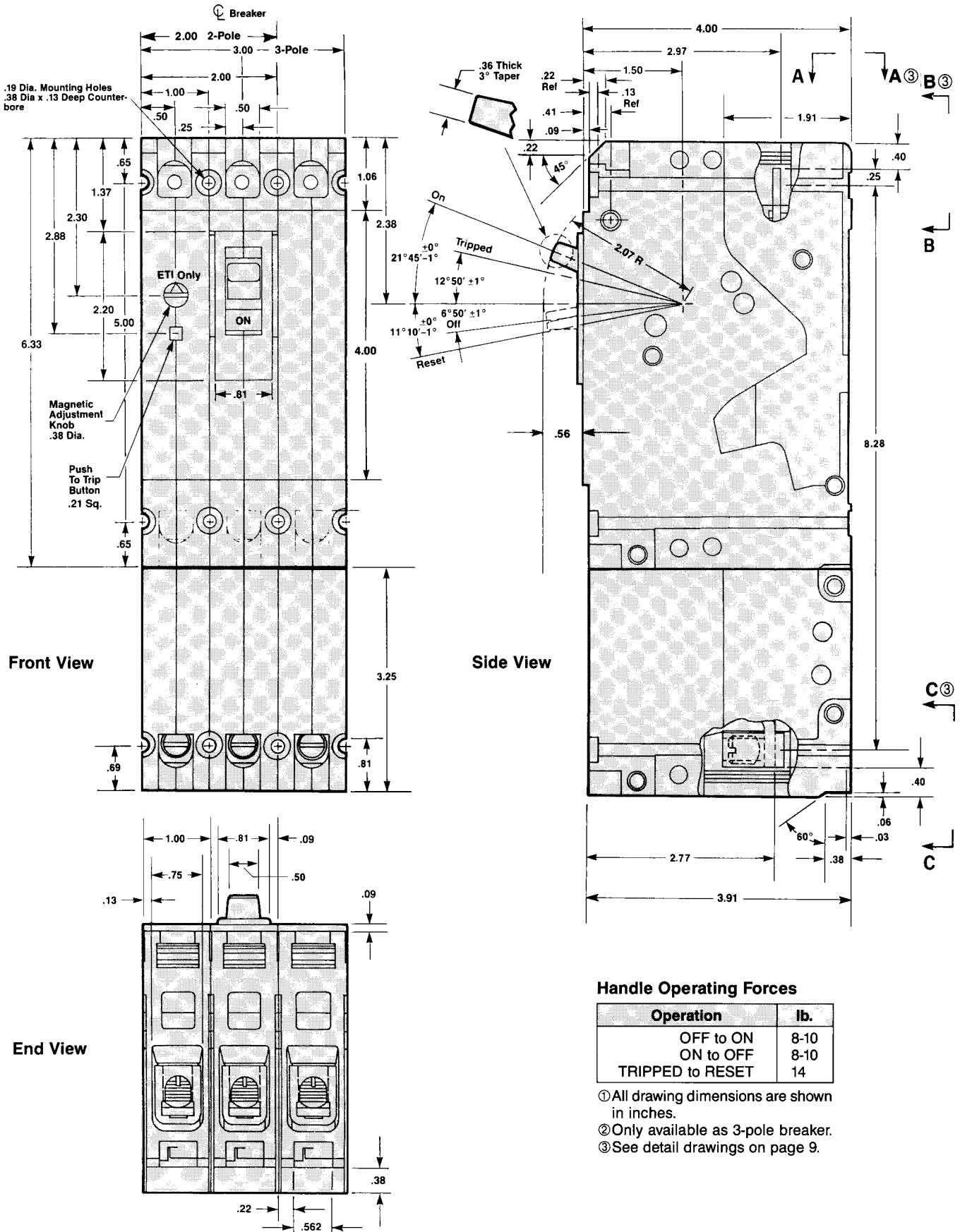
Handle Operating Forces

Operation	lb.
OFF to ON	8-10
ON to OFF	8-10
TRIPPED to RESET	14

- ① All drawing dimensions are shown in inches.
- ② See detail drawings on page 9.
- ③ Switch does not have push to trip button.
- ④ HHED6 is .25 in. longer.

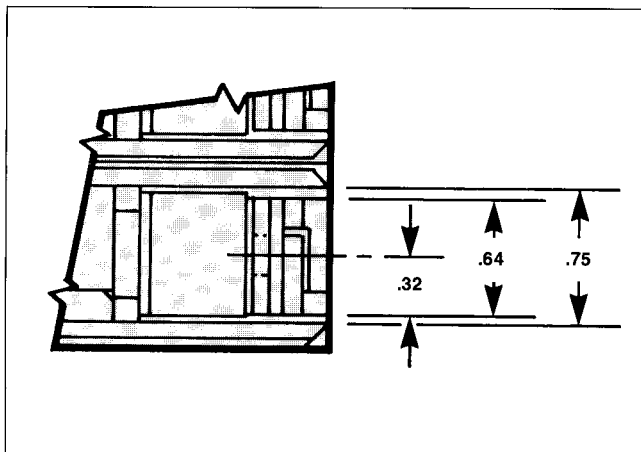
I-T-E ED-Frame Outline Drawings^①—2 and 3-Pole

Types CED6, CED6-ETI^②

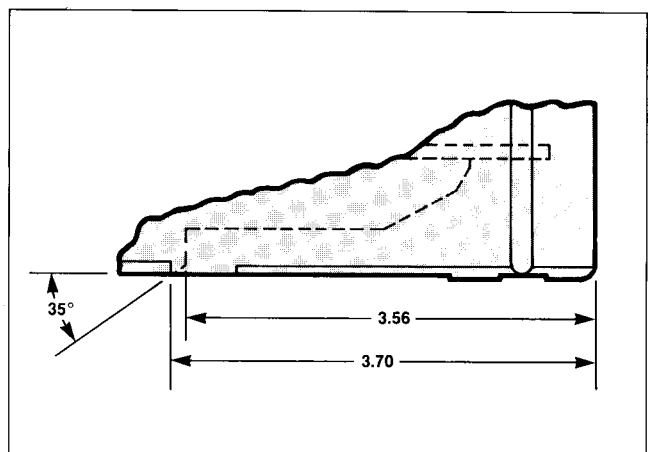


I-T-E ED-Frame Detail Drawings^①—1, 2 and 3-Pole

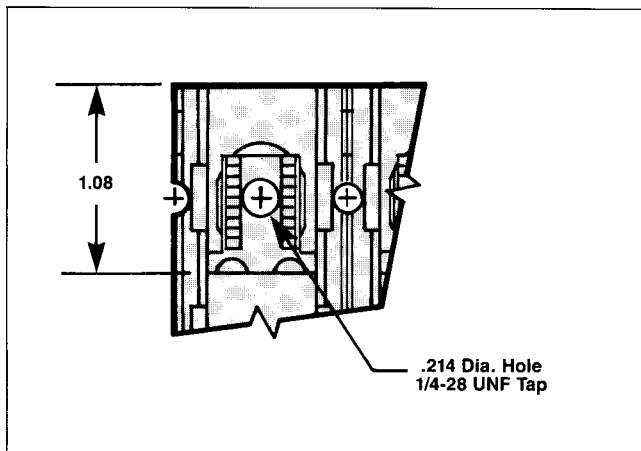
Types ED2, ED4, ED6, HED4, HED6, HHED6,
CED6, ED6-ETI, CED6-ETI



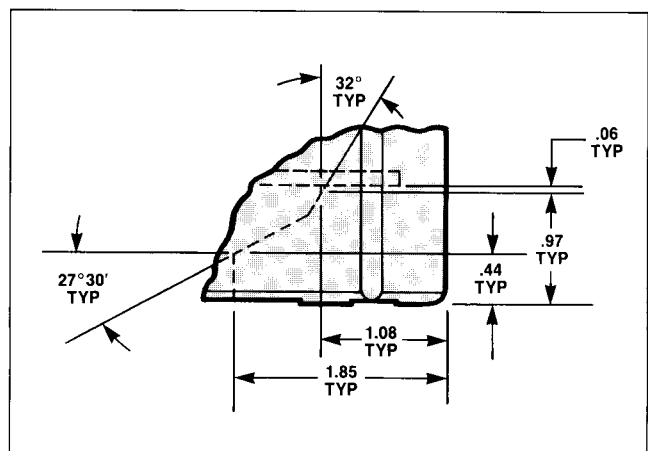
Detail A



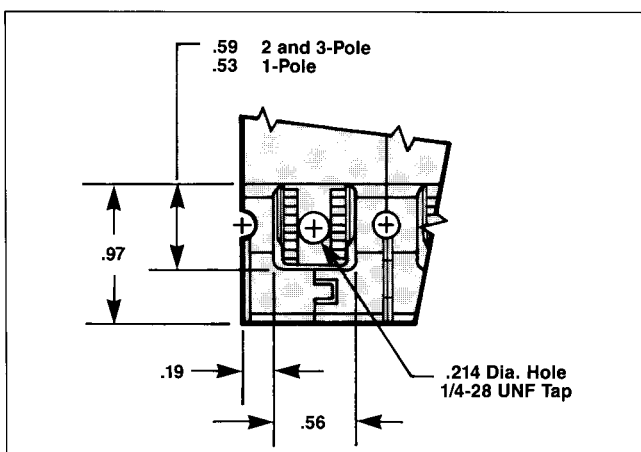
Thermal-Magnetic Breaker Line End Detail



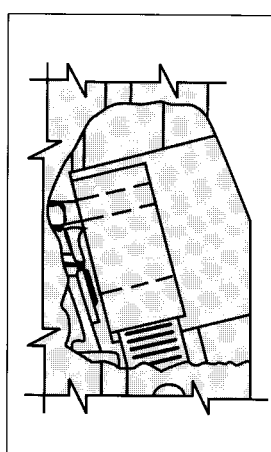
Detail B



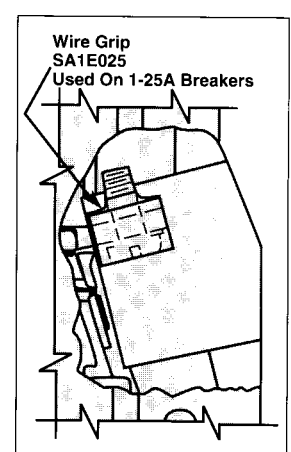
ETI Line End Detail



Detail C



Detail D



Detail E

①All drawing dimensions are shown in inches.

I-T-E Pressure Wire Connectors

⚠ DANGER
Hazardous Voltage.
Will cause death or severe injury.
Turn power off supplying switch-board or panel before installing.

⚠ SAFETY INSTRUCTIONS

- A. Place terminal connector body (1) onto breaker tab (2) in terminal cavity (3) (Figure 1).
- B. Insert cable into connector body between breaker tab and cable set screw, except SA1E025—place cable between breaker tab and connector body.
- C. Hold in place while tightening set screw (4) with a screwdriver or hex wrench on TA1E6125. See Table for proper wire size selection and screw tightening torque.

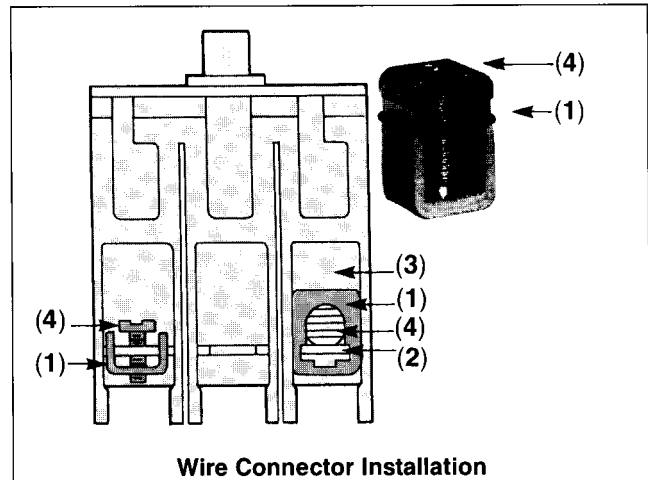
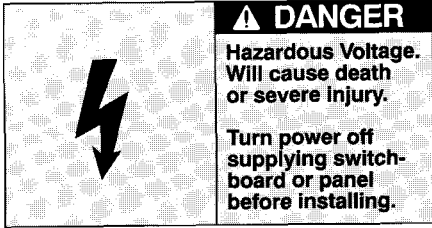


Figure 1

Wire Connectors and Tightening Torque

Connector Catalog Number	UL Connector Wire Range	Cable Wire Size	Cable Set Screw Tightening Torque In./Lb.	ED-Frame Breaker Type
SA1E025	(1 piece) #14-10 AWG (Cu) #12-10 AWG (Al)	#14-10 AWG	32	15-25A 1, 2 & 3-Pole Line & Load Side
LN1E100	(1 piece) #10-#2 AWG (Cu/Al)	#10 AWG #8 AWG #6-4 AWG #3 AWG #2-1/0 AWG	20 36 45 50 60	30-100A 1-Pole Line Side Only 2 or 3-Pole Line & Load Side All CED6 Line Side Only
LD1E060	(1 piece) #10 Cu #8-4 Cu/Al	#10 AWG #8 AWG #6-4 AWG	20 36 45	30-60A 1-Pole Load Side Only CED6 Load Side Only
LD1E100	(1 piece) #4 Cu #3-1/0 Cu/Al	#4 AWG #3-1/0 AWG #2-1/0 AWG	45 50 60	70-100A 1-Pole Load Side Only CED6 Load Side Only
TA1E6125	(1 piece) #3-3/0 Cu #1-2/0 Al	#3-3/0 AWG	80	110-125A 2 or 3-Pole Line & Load Side
TC1ED6150	(1 piece) #10-1/0 Cu	#10-1/0 Cu	100	30-125A 2 or 3-Pole Line & Load Side

I-T-E Compression Connector (CCE125)



SAFETY INSTRUCTIONS

General

NOTE: This instruction sheet outlines the recommended installation procedure. Use of these lugs in some installations may result in less wire bending space than is specified in the National Electric Code.

Installation of Compression Connector

- Turn off power supplying device before installation compression lugs.
- Remove any existing wire connectors from circuit breaker.
- Install circuit breaker.
- Preform cables to final configuration and strip insulation back $\frac{13}{16}$ in. on each conductor. Use an appropriate insulation stripping tool to avoid damaging the conductor. (See Figure 1.)

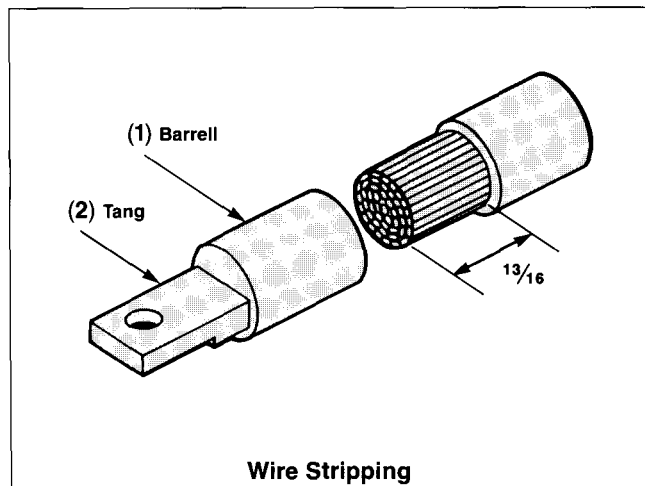


Figure 1

- Clean aluminum conductor surfaces thoroughly with a wire brush or other suitable means, to remove oxides and other contaminants from the conductor.

NOTE: Copper wires and the compression connector should not be cleaned abrasively.

- Remove cap from compression connector and insert cable fully into barrel (1) (Figure 1) of connector.
- Insure that connector tang(s) (2) (Figure 1) are in their proper orientation prior to crimping. This helps avoid twisting of cables during installation.

- Select an appropriate tool and die combination from Table 1 and make the required number of crimps within the boundaries stamped on the connector barrel. Refer to Figure 2 for sequence of multiple crimps.

Table 1—Compression Tool and Die Chart For Copper and Aluminum Conductors

Wire Size	Tool Mfgr.	Tool No.	Die No.	No. of Crimps
2/0	Homac	UT-5	TW TY	2
		UT-15	58/60	2
2/0	Burndy	Y 35	58/60	2
2/0	T & B	TBN-6	TW TY	2
		TBN-15	58/60	2
#14-2/0	Square D	VC-6	—	1

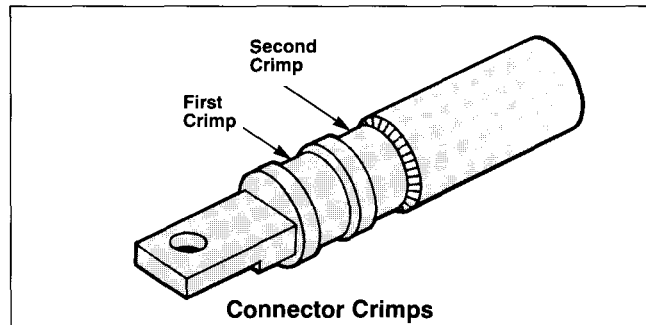


Figure 2

- Remove any inhibitor compound expelled during the crimping operation from the connector body and the cable insulation.
- Slip insulating cover over connector tang and then over connector barrel so that only the connector tang is exposed (Figure 3).

Warning: Short spacings will result if Step J is not followed.

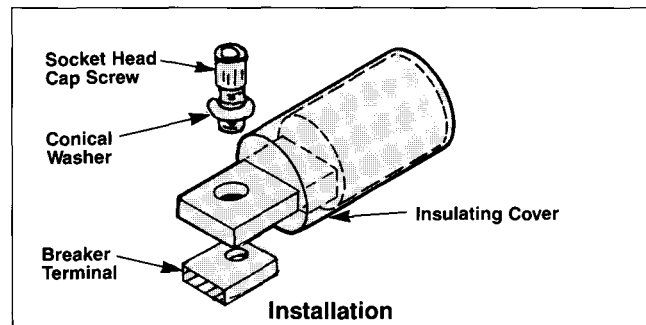


Figure 3

- Position connector tang on top of the circuit breaker terminal pad and secure with $\frac{1}{4}$ -28 x $\frac{1}{2}$ in. socket head cap screw and conical spring washer. Conical spring washer is to be installed with convex side of washer toward underside of screw head (Figure 3). Torque screw to 50 in-lb.

I-T-E Handle Locking Devices

ATTACHING I-T-E HANDLE BLOCKING DEVICE (E2HBL)

To Block Handle ON

Turn breaker ON. Assemble blocking device to breaker by positioning it below handle (Figure 1). Insert tabs (1) into slots (2) on either side of pad.

To Block Handle OFF

Turn breaker OFF. Assemble blocking device to breaker by positioning it above handle (Figure 1). Insert tabs (1) into slots (2) on either side of pad (Figure 2).

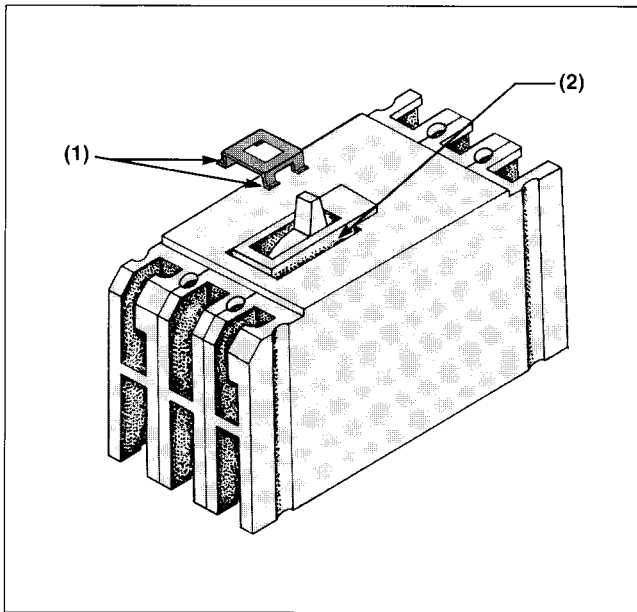


Figure 1

ATTACHING I-T-E PADLOCKING DEVICE (ED2HPL)

Assemble padlocking device to breaker by placing it over breaker handle (Figure 3). Position tabs (1) into slots (2) on either side of pad (Figure 4); tighten screws (3) to secure padlocking device.

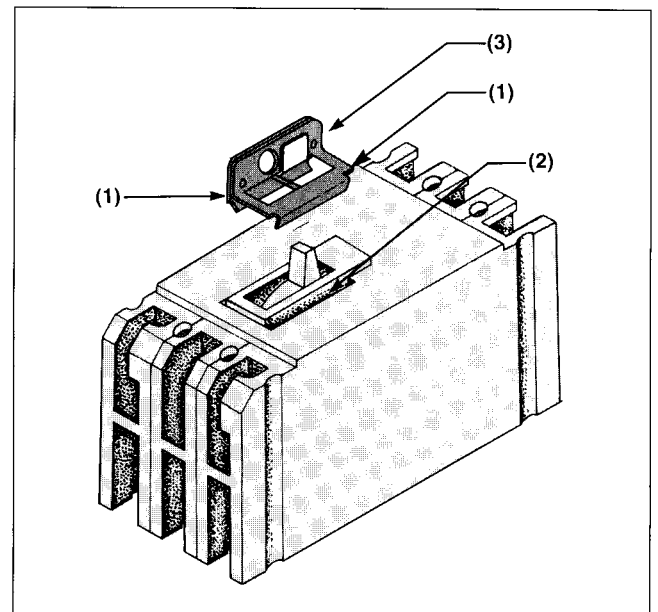


Figure 3

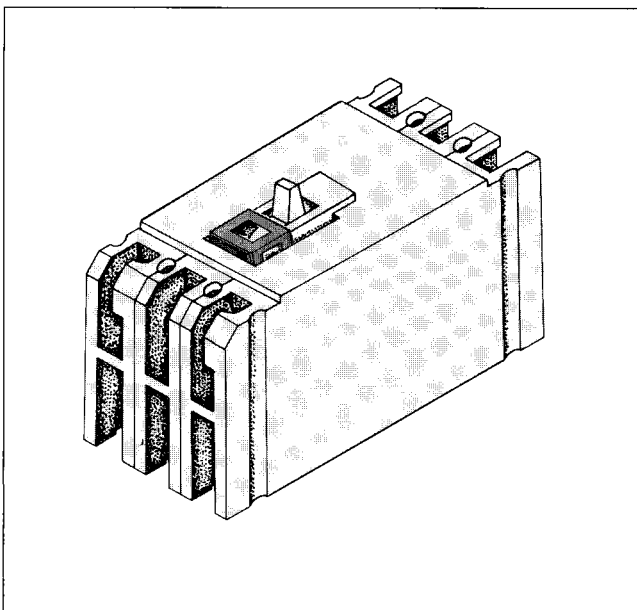


Figure 2

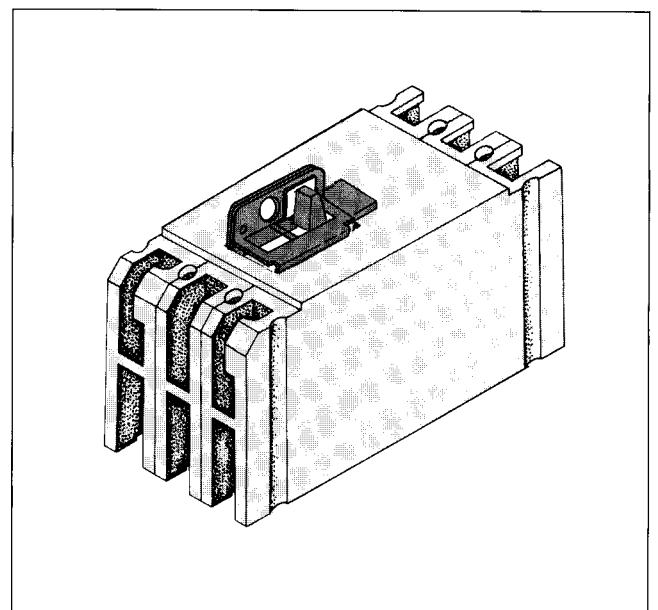


Figure 4

I-T-E Rear Connecting Studs

⚠ DANGER
Hazardous Voltage.
Will cause death or severe injury.
Turn power off supplying switchboard or panel before installing.

Mounting Preparation and Assembly

- A. Remove wire terminals from breaker.
- B. Select proper rear connecting stud assembly as required for line terminals (Figure 3) and load terminals (Figure 1).
- C. Align rear connecting studs with breaker terminals and secure to breaker terminals with #12-24 screws, lock-washers and flat washers.
- D. Install line shields on line side of breaker (Figure 3).
- E. Install two #3/8-16 silver finished brass nuts on the threaded end of each rear connecting stud.

SAFETY INSTRUCTIONS

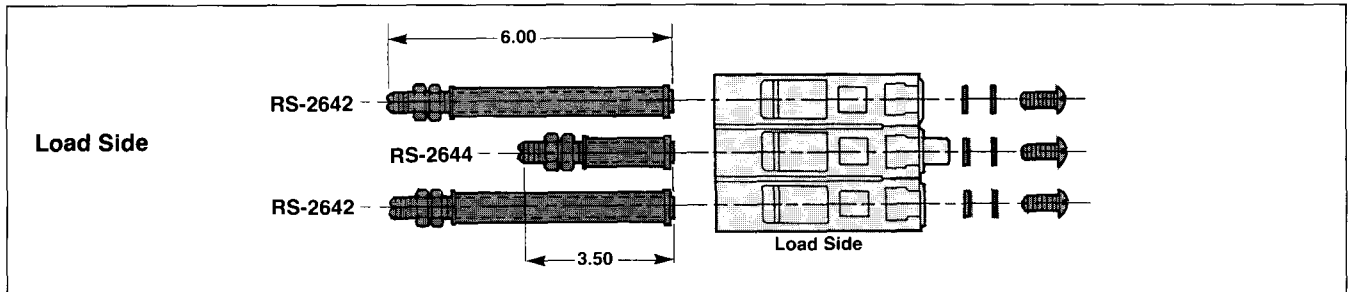


Figure 1

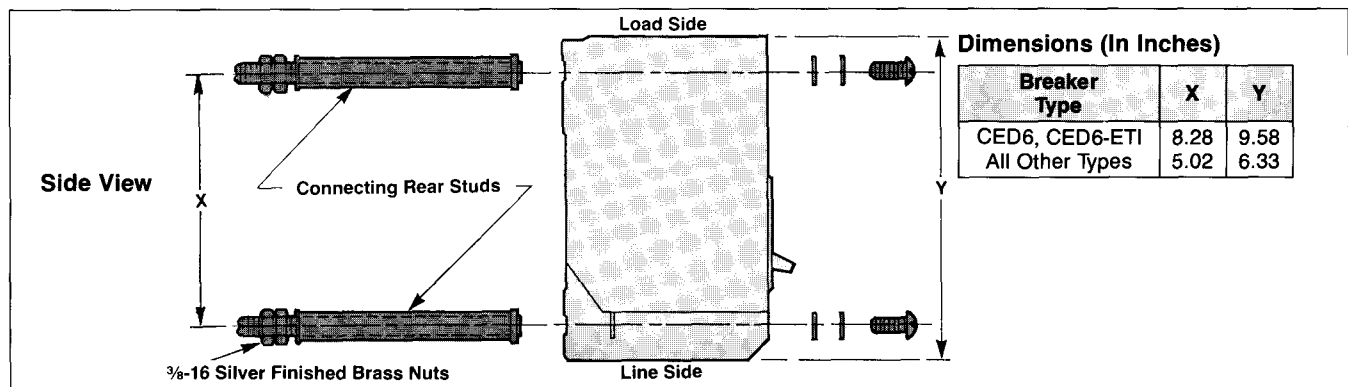


Figure 2

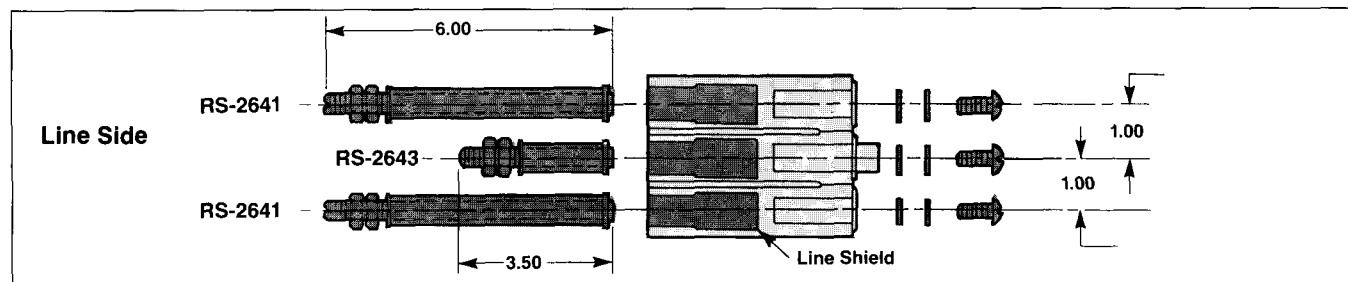


Figure 3

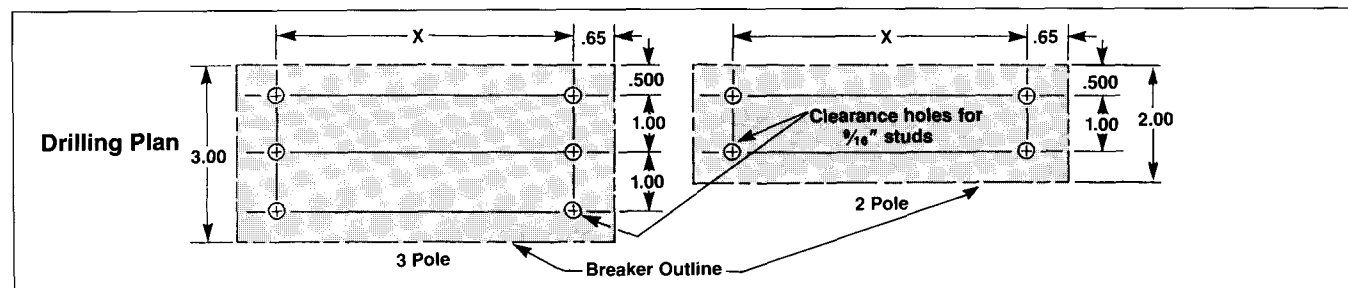
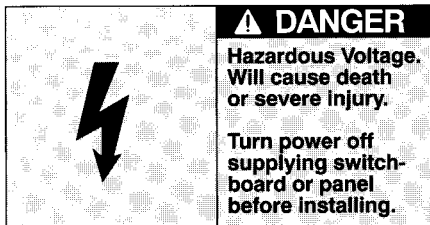


Figure 4

I-T-E Plug-In Adapters



SAFETY INSTRUCTIONS

General

A complete plug-in installation requires one line end adapter assembly (consisting of a mounting block, tulip connectors and associated hardware), one load end adapter assembly and one switchboard mounting plate. The switchboard mounting plate is optional and can be replaced by other mounting means to suit customer's requirements.

Application Information

Breaker Type	No. of Poles	Line End Adapter Cat. No.	Load End Adapter Cat. No.	Switch-board Mtg. Plate Cat. No.
CED6, CED6-ETI	2	PC2637	PC2638	PL2617
	3	PC2657	PC2658	PL2617
All Other Types	2	PC2637	PC2638	PL2616
	3	PC2657	PC2658	PL2616

Mounting Preparation (Figures 1 and 2)

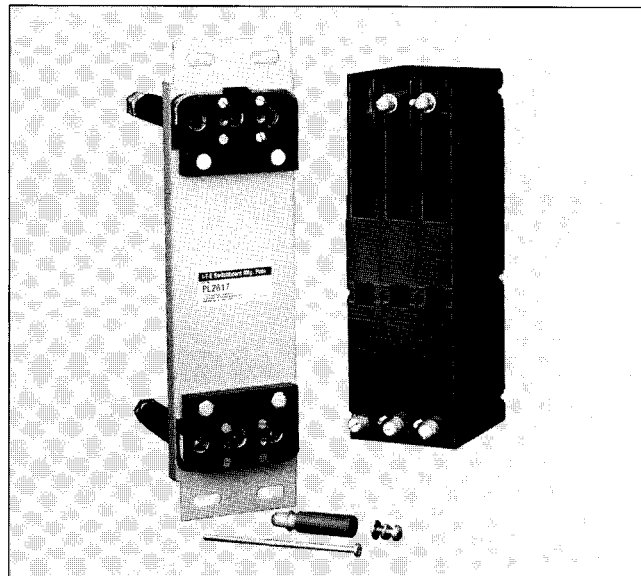
- If the switchboard mounting plate (1) is to be used, provide drilling as shown in Figure 1.
- If other mounting means are to be used, provide the cutouts and drilling required to mount the adapter blocks as shown in Figure 2.

Switchboard Mounting Plate, if used (Figure 3)

- Place switchboard mounting plate (1) in position at location previously prepared in Step A above. Secure in place with 1/4 in. hardware (furnished by customer).

Mounting Block (Figure 3)

- Align mounting block (2) with cutouts in switchboard mounting plate (or customer's mounting means as previously prepared in Step B above) and secure in place with 1/4 in. screws (3), washers (4) and (5) and hexnuts (6) furnished.



Breaker Preparation (Figure 4)

- Remove pressure wire connectors from breaker if present. Select line side breaker stud and insulator (11) and (12), assemble to terminals from back of breaker and secure to breaker terminals with #12-24 screws and washers (7), (8), (9) as shown in Figure 4. Recommended tightening torque for these screws is 2½-3 ft. lb. to assure a good electrical connection. Repeat this procedure for the remaining line and load connections, breaker studs and insulations.
- Insert line end shields (10) into slots provided at line end of breaker.
- Affix accessory warning labels (13), (14) to top of breaker as indicated in Figure 5.

Final Assembly (Figure 6)

- Make bus and/or cable connection to rear of mounting block studs using hex nuts (15) furnished to secure this connection.

Caution: Make certain that breaker operating handle is in the OFF position before proceeding with the next step.

- Align breaker with mounting blocks and force female tulip clips over male studs (11) in mounting blocks until breaker base bottoms against mounting block. Secure breaker in place with #8-32 x 4.06 in. mounting screws (16).
- If installation requires use of front panel trim, provide cutout for breaker escutcheon (Figure 7).

Installation Diagrams

Dimensions (In Inches)

Breaker Type	A	B	C
CED6, CED6-ETI	12.25	11.25	8.28
All Other Types	9.00	8.00	5.02

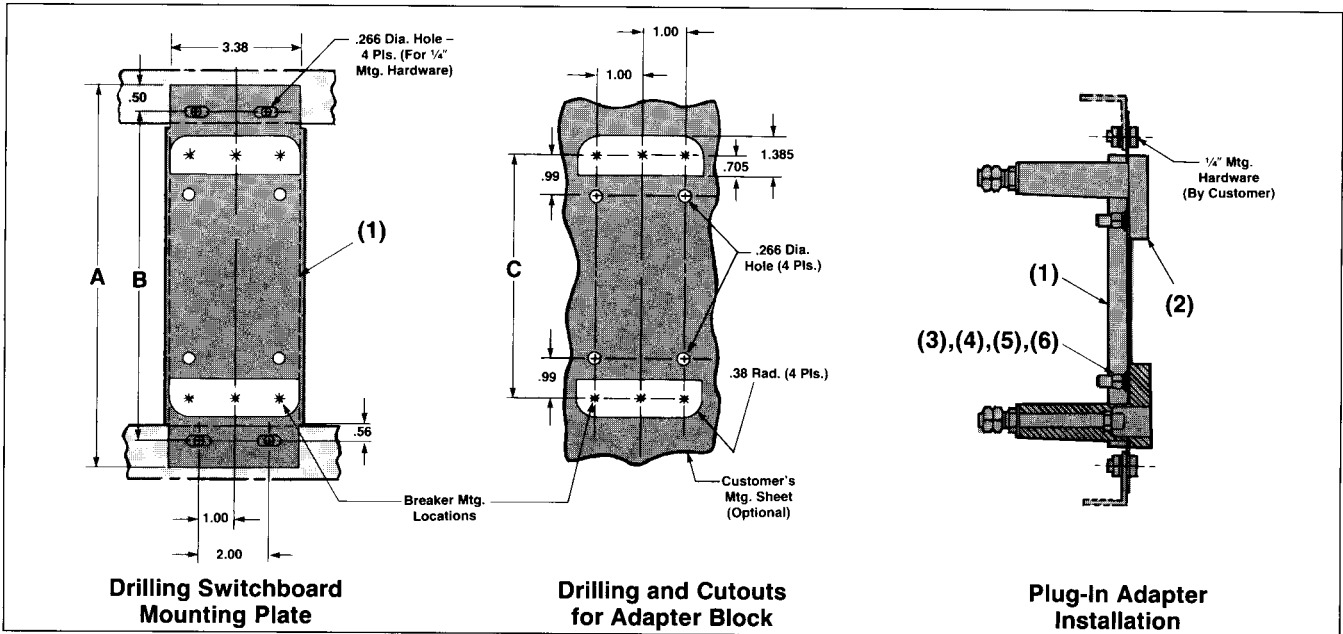


Figure 1

Figure 2

Figure 3

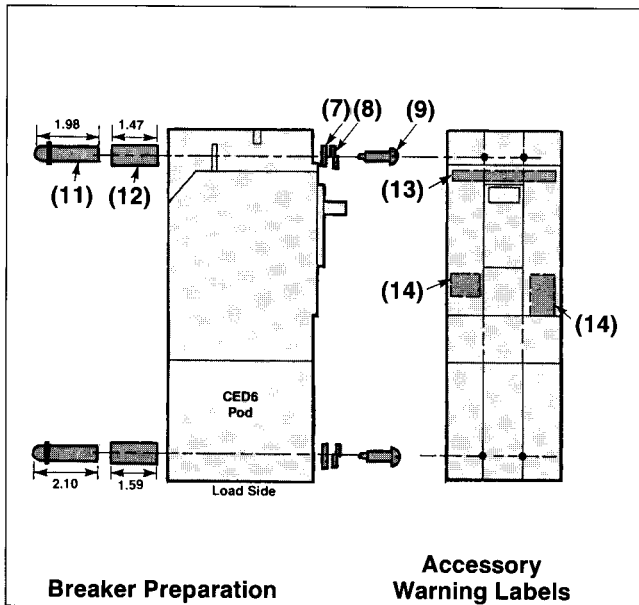


Figure 4

Figure 5

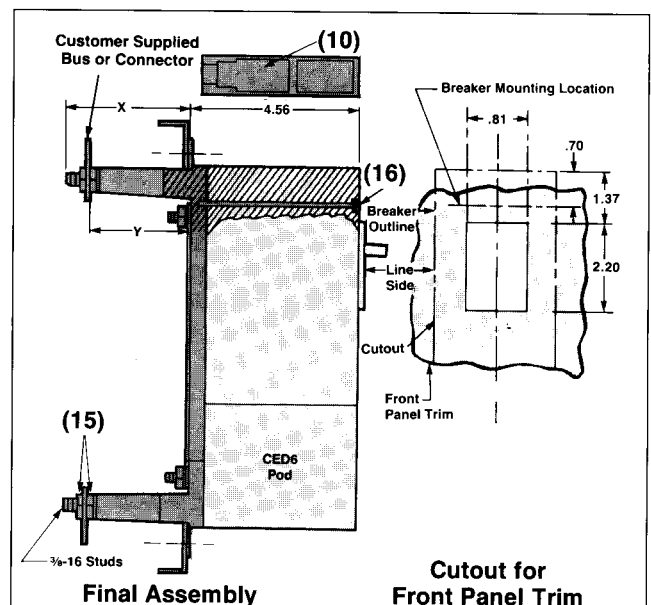


Figure 6

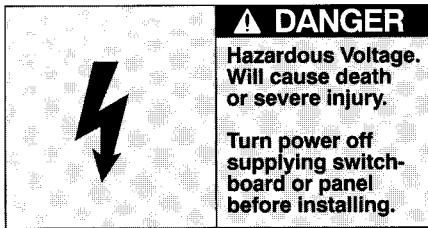
Figure 7

Dimensions (In Inches)

Pole	X	Y
Center	2.28	1.50
Left/Right	4.50	3.62

I-T-E Shunt Trip, Undervoltage Trip, Auxiliary Switch and Bell Alarm Switch Accessories

Installation



SAFETY INSTRUCTIONS

For this publication, the term circuit breaker also includes molded case switches and motor circuit interrupters.

Circuit Breaker Preparation

(A thru D for 1-pole circuit breakers; D for 2 and 3-pole circuit breakers.)

- For circuit breakers requiring knockouts, align accessory to circuit breaker as shown in Figure 1. Mark only the breaker knock-outs which correspond to the actuator blades protruding from the accessory package.
- Place the circuit breaker on a flat surface with the marked knock-outs facing you as shown in Figure 2.
- Using a sharp object such as a knife blade point, place point in groove of knock-out and tap on handle until groove is pierced. Move around the groove until the knock-out can be removed. NOTE: It is important that the slotted pin is completely exposed and that all plastic has been trimmed and removed until the edge of the knock-out has been cleaned and the metal pin has been exposed. The circuit breaker is ready for mounting the accessory unit.

Caution: Do not use excessive force or the internal mechanism of the circuit breaker may be damaged.

- Before assembling accessory unit to the breaker, make certain that all exposed accessory actuator slots are in line with the locating tabs (1) and the circuit breaker handle (2) is in the tripped position (Figure 1).

Accessory Mounting Instructions

Caution: Turn off and lock out all power before removing circuit breaker for modification. Breaker must be completely disconnected and removed from any electrical equipment before accessory is attached.

Never attempt to add more than one accessory module to the circuit breaker. Combinations must be ordered within a single module.

- Position accessory unit (3) against the side of the circuit breaker (4) carefully to determine that all accessory actuator blades are engaged into the actuator slots of the circuit breaker (5). NOTE: Fiber washer (6) must be placed between the circuit breaker and the accessory unit as shown in Figure 1.
- Secure accessory unit to the circuit breaker using two #6-20 x 1.38 in. thread cutting screws and split lockwashers (7).

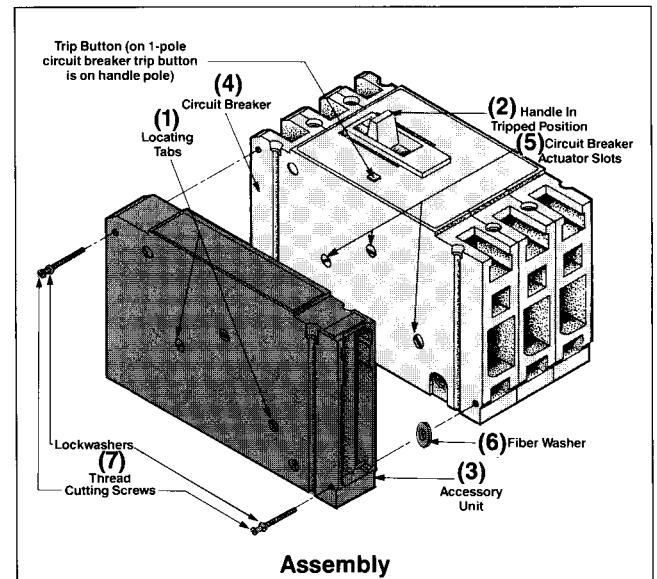


Figure 1

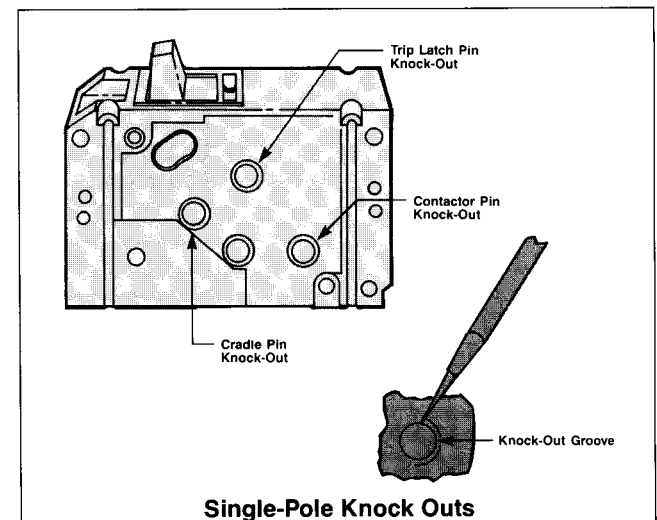


Figure 2

NOTE
Accessory module is used on all ED-Frame circuit breakers. Accessory *can not* be used with obsolete breaker types E2, E4, E6, HE4, HE6, CLE.

Mechanical Testing

Mechanical Operating Check

Shunt Trip and/or Undervoltage Trip

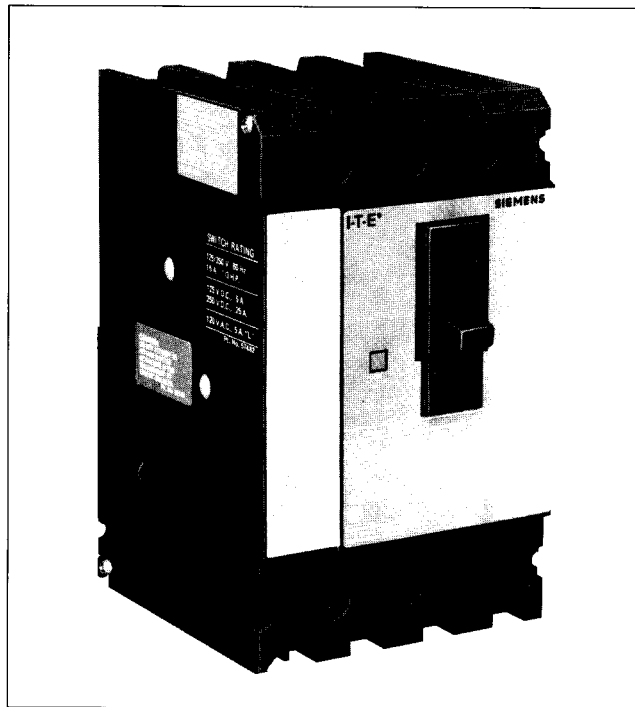
- A. Reset the circuit breaker and turn handle to ON position.
NOTE: With an undervoltage accessory assembled to the breaker without rated voltage applied to the coil, the breaker will not RESET and turn ON. Refer to Electrical Check on page 18.
- B. While observing the slotted actuators in the accessory unit, turn the breaker OFF and ON several times. The blade actuator slot (8) should nearly align with the locating tab when the breaker is OFF. When the breaker is moved to the ON position, the slot should travel clockwise approximately 40° (Figure 3).
- C. Place breaker in ON position and observe the trip latch actuator (9). The actuator slot should rotate a few degrees counterclockwise as the trip button (10) is depressed. After the breaker has tripped, the blade actuator slot and the cradle pin actuator slot (11) should nearly align with their respective locating tabs. (Figure 3).

Bell Alarm Switch

- A. For units with bell alarm contacts and either undervoltage or shunt trip, follow above directions for shunt trip.
- B. For bell alarm only. Reset breaker then turn to ON position. Trip the breaker, then observe the cradle pin actuator (11). The slot should nearly align with its locating tab (Figure 3).

Auxiliary Switch

- A. For units with auxiliary contacts and either undervoltage or shunt trip, follow directions above for shunt trip.
- B. For auxiliary contacts only. Reset the breaker, then turn it to the ON position. While observing the blade, turn the breaker OFF and ON several times. The slot in the blade actuator should nearly align with its locating tab when the breaker is in the OFF position. When the breaker is in the ON position, the slot should travel clockwise approximately 40° (Figure 3).



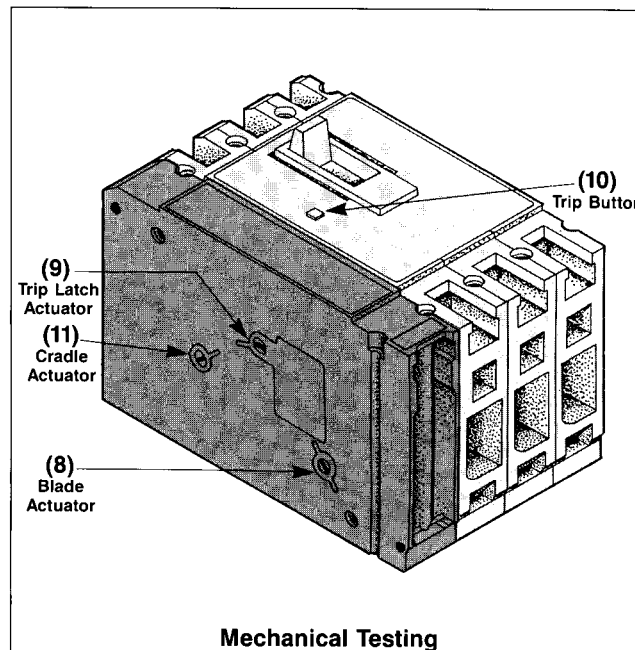
Circuit Breaker with Shunt Trip Attached

Recommended Combinations

Maximum Installable Accessory Combinations^①

Shunt Trip	Undervoltage Trip	Auxiliary Switch	Bellalarm Switch
1	0	2	0
0	1	2	0
1	0	1	1
0	1	1	1

^① Accessory combinations available only when ordered together. Additional accessories cannot be added to the combination at a later time. Always attach to left pole.



Mechanical Testing

Figure 3

I-T-E Shunt Trip and Undervoltage Trip

Electrical Check

Shunt Trip

- Reset and turn the circuit breaker handle to ON position.
- Connect test circuit to accessory terminals 1 and 2 (Figure 1).
- Preset test circuit voltage to 55 percent of the shunt trip voltage rating.
- Apply the 55 percent voltage rating value to the shunt trip device. *It must trip.*
- Remove test leads from terminals 1 and 2. Apply a continuity tester or ohm meter to the 1 and 2 terminals. Assure that coil limit contacts are open.

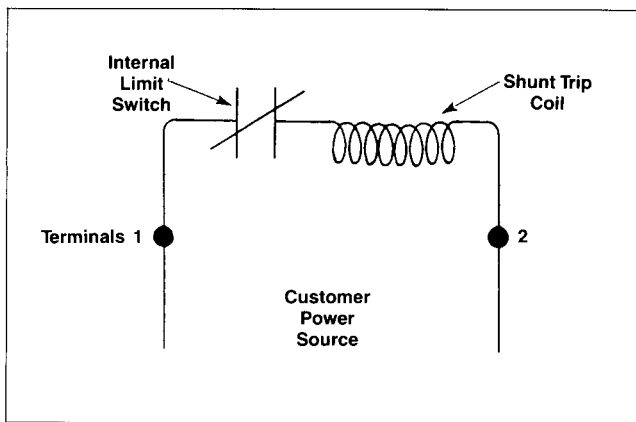


Figure 1

Undervoltage Trip

- With the circuit breaker in the OFF position, apply variable voltage supply leads to the accessory terminals marked 1 and 2 (Figure 2).
- Apply 100 percent of the accessory voltage rating to the undervoltage module.
- Turn the circuit breaker to the ON position. Breaker must remain closed.
- Reduce test voltage. Breaker must trip with voltage level between 70 and 35 percent of marked accessory rating.

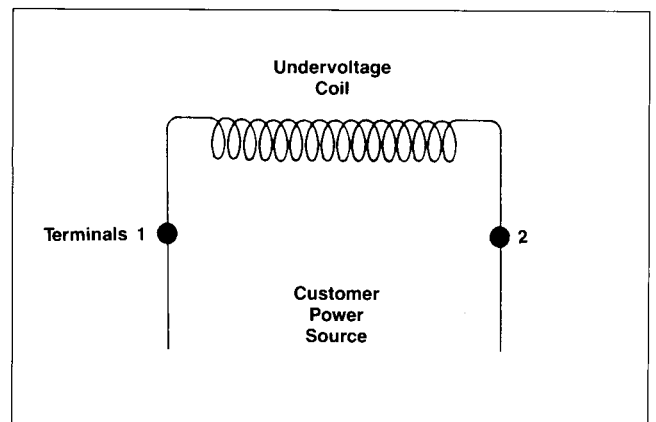


Figure 2

Electrical Data For Shunt Trip

Coil Voltage	Inrush Current At Rated Voltage (Amperes)	Catalog Number
60 Cycles AC		
24	1.200	S17ED60
48	0.800	S18ED60
120	0.395	S01ED60
208	0.265	S02ED60
240	0.165	S03ED60
277	0.190	S15ED60
480	0.145	S04ED60
600	0.080	S06ED60
DC		
24	2.20	S07ED60
48	1.20	S09ED60
125	0.50	S11ED60
250	0.35	S13ED60

Electrical Data For Undervoltage (UV) Trip

Coil Voltage	Sealed-In Current At Rated Voltage (Amperes)	Catalog Number
60 Cycles AC		
120	.030	U01ED60
208	.028	U02ED60
240	.016	U03ED60
277	.013	U16ED60
480	.008	U06ED60
600	.008	U08ED60
DC		
24	.110	U13ED60
48	.060	U14ED60
125	.027	U10ED60
250	.020	U12ED60

Shunt Trip and Undervoltage Trip Wiring Information

Tin plated accessory terminals, with binding head screws are provided. Terminals are suitable for use with No. 14-No. 22 AWG wire (Cu only) or 5/16 in. wide (max.) insulated crimp type connectors. Strip back wire 3/8 in. max.

I-T-E Auxiliary Switch and Bell Alarm Switch

Electrical Check

Auxiliary Switch Kits

Catalog Number	Number of Switches	Ampere Rating of Switch				
		Volts AC			Volts DC	
		120	240	480	125	250
A01ED62	1	5	15	—	.5	.25
A02ED62	2	5	15	—	.5	.25
A01ED64	1	15	15	15	.5	.25

All switch modules have 3 terminals (if single switch unit) 3, 5, 7; or 6 terminals (if double switch unit) 3, 5, 7-4, 6, 8.

Auxiliary Switch

- Use a buzzer or light attached to switch leads 7 and 5 (8 and 6 if double auxiliary switch module). With breaker in ON position, a light or buzzing noise should not be observed.
- Move handle to OFF position. Indicator light or buzzer should turn on.
- Attach test to leads 7 and 3 (8 and 4 if double auxiliary switch module). Light or buzzer should turn off.
- Move handle to ON position. Indicator light or buzzer should turn on. ①

① Should the indicator not function properly during "check" procedure, check for incorrect installation or wiring.

Bell Alarm Switch

- Check continuity of "B" and "B1" contacts per accessory label. See "Bell Alarm Switch" information on page 17 for definition of normal position.

Auxiliary Switch and Bell Alarm Switch Wiring Information

Auxiliary and bell alarm switches are three wire (3W) devices except for catalog number A02ED62B where the bell alarm switch is a two wire (2W) device, using terminals (1 and 2). Terminal connections and function are indicated on the accessory label.

Auxiliary switch contacts are either Type "A" or Type "B". Bell alarm switch contacts on three wire (3W), devices can be open or closed in the normal position. On two wire (2W) bell alarm switches, the contact is open in the normal position. The normal position refers to the deenergized state or OFF position of the circuit breaker. Auxiliary switch contacts are actuated when the circuit breaker closes. Type "A" contacts are OPEN when the breaker is OPEN. Type "B" contacts are CLOSED when the breaker is OPEN. Bell alarm switch contacts are actuated when the circuit breaker TRIPS.

Tin plated accessory terminals, with binding head screws are provided. Terminals are suitable for use with No. 14-No. 22 AWG wire (Cu only), or 5/16 in. wide (max.) insulated crimp type connectors. Strip back wire 3/8 in. max.

Auxiliary and Bell Alarm Switch Terminal Number and Contact Position Diagram

Accessory	Breaker Condition		
	TRIP	OFF	ON
Auxiliary Switch			
Second Auxiliary Switch ①			
Alarm Switch			
Alarm Switch Catalog Number A02ED62B Only			

① Used for devices containing two auxiliary switches, all Shunt Trip and Under-voltage Trip catalog numbers having an "AA" suffix and Auxiliary Switch catalog numbers A02ED62 and A02ED62B.

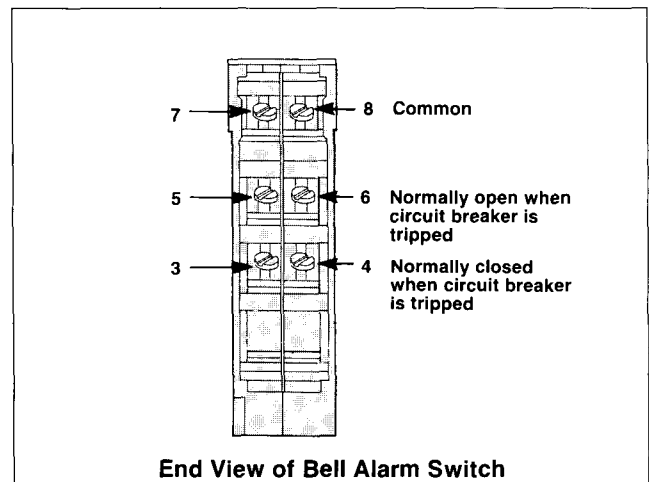
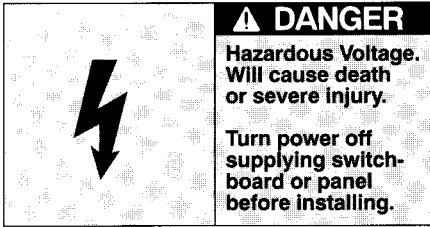


Figure 1

I-T-E Ground Fault Sensor



⚠ SAFETY INSTRUCTIONS

General Information

The ground fault circuit sensor/relay module kit functions to de-energize a circuit or portion of a circuit within an established period of time when the current to ground exceeds a predetermined value less than that required to operate the circuit breaker. It performs this operation by detecting $5\text{mA} \pm 1$ or $30\text{mA} \pm 6$ current difference between two or more load conductors passing through the sensor and actuating the relay to trip the circuit breaker. This current difference normally occurs from a low level ground fault in the load circuit, when load is supplied from a grounded power system.

The relay electronics operates from a 120V ac (66-132v) absolute limits, 60 Hz control power source not necessarily related to the load circuit monitored by the sensor. The relay module trip mechanism includes an auxiliary switch contact to de-energize the electronics when the relay module trips the attached circuit breaker.

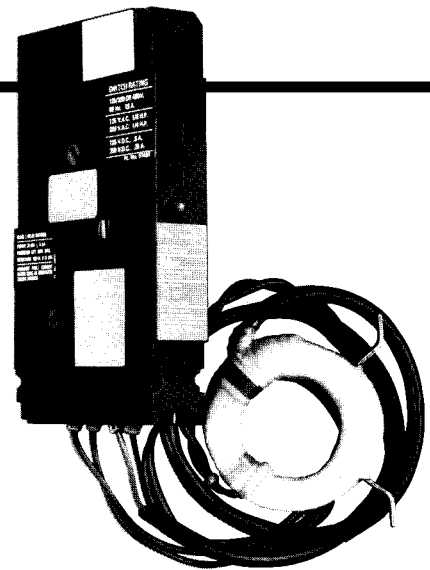
NOTES: Never attempt to add more than one accessory module to the circuit breaker.

This device is not intended for personnel protection against electrical shocks.

These sensors are to be used for equipment protection application only.

Installation/Test Procedure

- Refer to "Circuit Breaker Preparation" (pages 16-17) for breaker preparation, module mounting, mechanical testing (see "Shunt Trip and/or Undervoltage Trip") and electrical testing of bellalarm contacts (if required).
- The ground fault relay module can be used only with I-T-E Sensor #64232. Mounting hardware for sensor is supplied (#10-32 x $\frac{3}{8}$ in. screws and lockwashers). Mount circuit breaker/relay assembly and sensor as required.
- Sensor comes pre-assembled with leads, terminals and mounting feet. Sensor will accommodate four #1 AWG or smaller type TW conductors, or equivalent. Connect control source, sensing leads, PUSH TO TEST leads, and bellalarm contacts (if required) to terminals on bottom of relay. See Figure 1 for the proper terminal connections.
- Connect load circuit wiring (Figure 2).
- Control power for relay must be 120V ac (66V-132V), 60 Hz. Continuous: .010A at 120V ac. Inrush (trip): .8A pk max. at 120V ac.



Response Time

Threshold Level—approximately 2 seconds
115 percent of pickup—.70 second maximum
150 percent of pickup—.30 second maximum
250 percent of pickup—.20 second maximum

With the control source energized, push test button on face of relay module. The breaker should trip immediately. Reset by moving breaker handle to the fully OFF position, then to the ON position. Repeat the trip and reset procedure. The assembly is now fully operational. Periodic retesting is recommended to verify continued protection.

Testing Circuit

Momentary PUSH TO TRIP switch on face of relay initiates a simulated fault current through blue sensor leads (when energized at 120V ac).

NOTE: Circuit leakage from the load may add to or subtract from the test current, depending on circuit phase relationships. In the event of test difficulty, check control voltage and load circuit leakage. Some installation may require reversing the blue sensor lead connections for proper test circuit operation.

NOTE
Accessory module is used on all ED-Frame circuit breakers. Accessory *can not* be used with obsolete breaker types E2, E4, E6, HE4, HE6, CLE.

Installation Diagrams

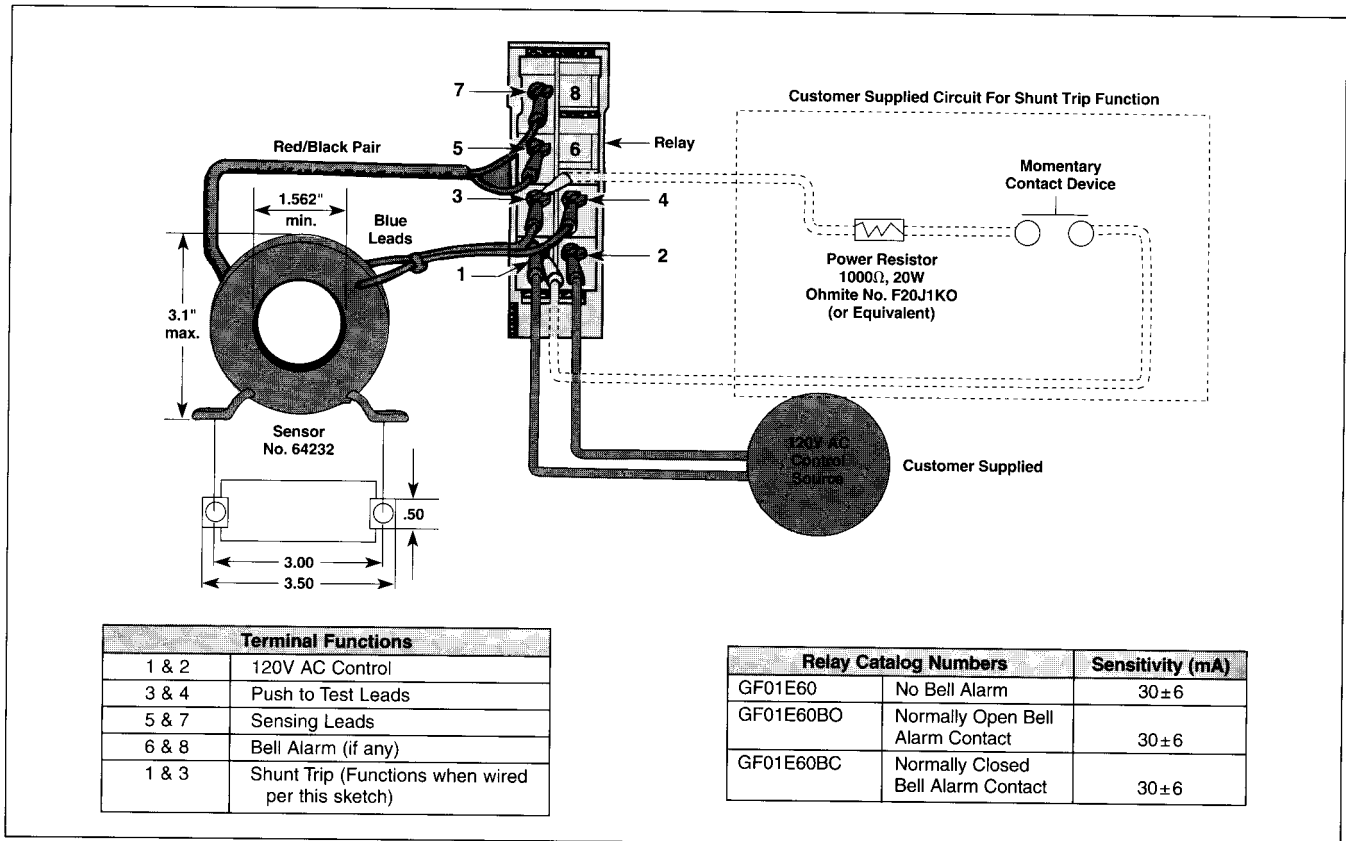


Figure 1

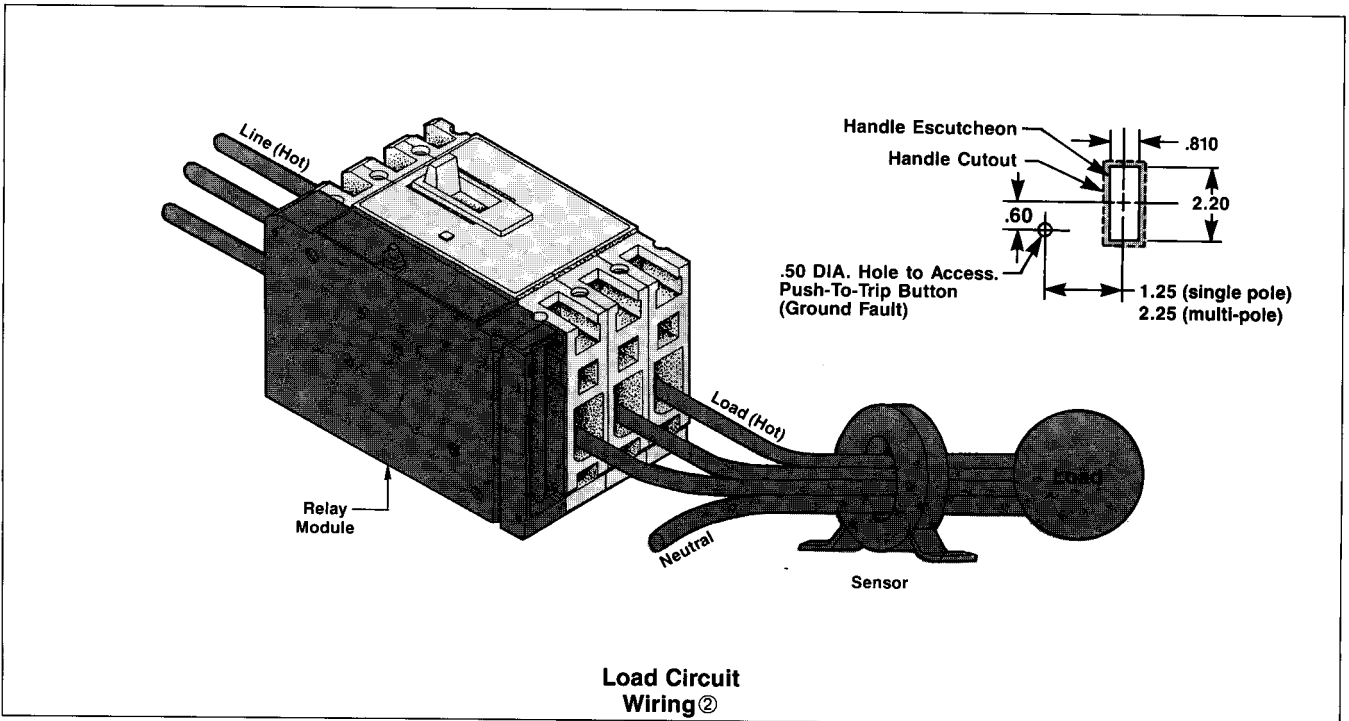
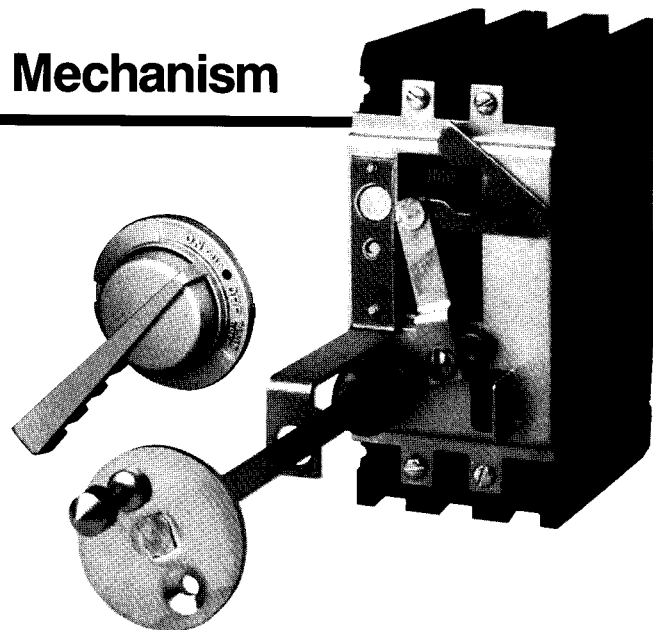
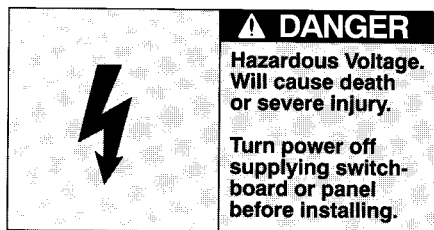


Figure 2

- ① Ground fault relay module can also be used on 1 or 2-pole ED-Frame circuit breakers.
- ② Accessory module is used on all ED-Frame circuit breakers.

I-T-E Rotary Handle Enclosure Mechanism

Types 1, 12



Standard Depth (D11CEU1) Variable Depth (D11CEU2)

General

Handle will permit locking the disconnect device in the OFF position using up to three locks having shackles up to $\frac{3}{8}$ in. in dia. 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 Figure 1.
- B. Measure distances **A** and **B** from mounting holes to walls of the enclosure (Figure 2).
- C. Find handle center dimensions **D** and **E** by adding enclosure thickness and cover overhang (**C₁** and **C₂**) to **A**- $\frac{1}{2}$ and **B** + 3.985. Drill hole **X** ($2\frac{1}{4}$ in. dia.) and drill either holes **Y** or **Z** ($\frac{5}{16}$ in. dia.) depending on handle orientation required (Figure 2a).
- D. If installing variable depth kit, measure distance **F** from breaker mounting surface to outside of cover (Figure 3). If distance **F** is less than 8 in., remove shaft guide bracket.

- E. Find length **G** by subtracting **F** from $16\frac{5}{8}$ in. Mark length **G** from end of operating shaft and cut shaft squarely at mark (Figure 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.

Installation Diagrams

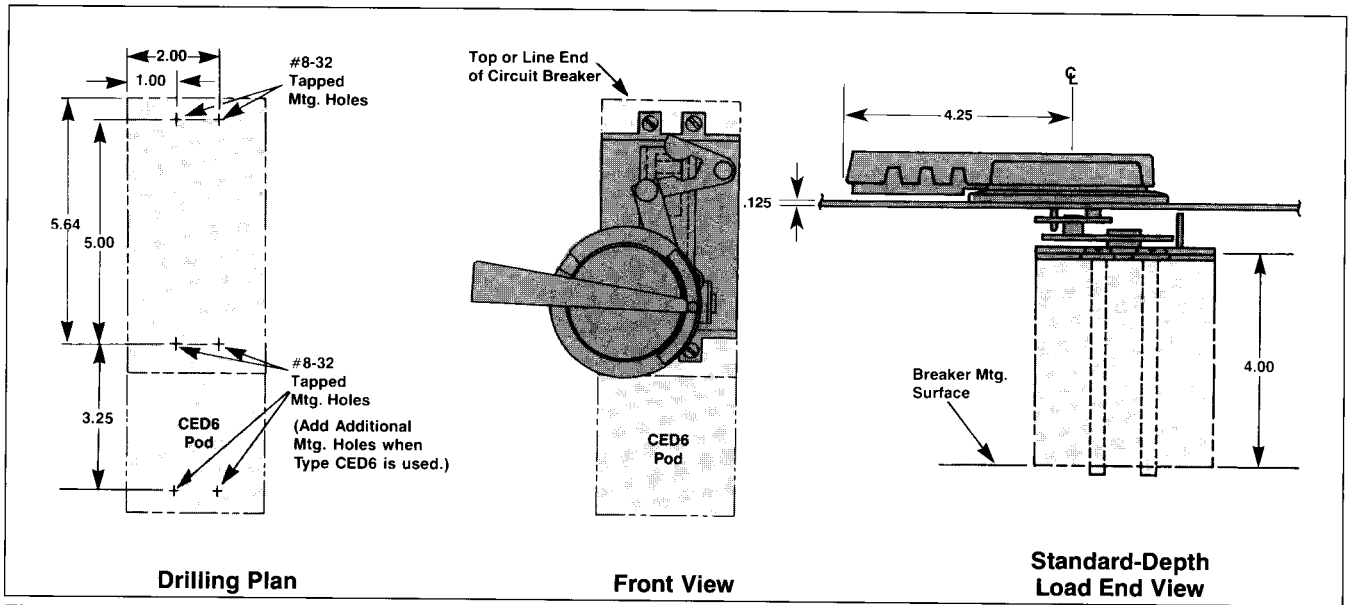


Figure 1

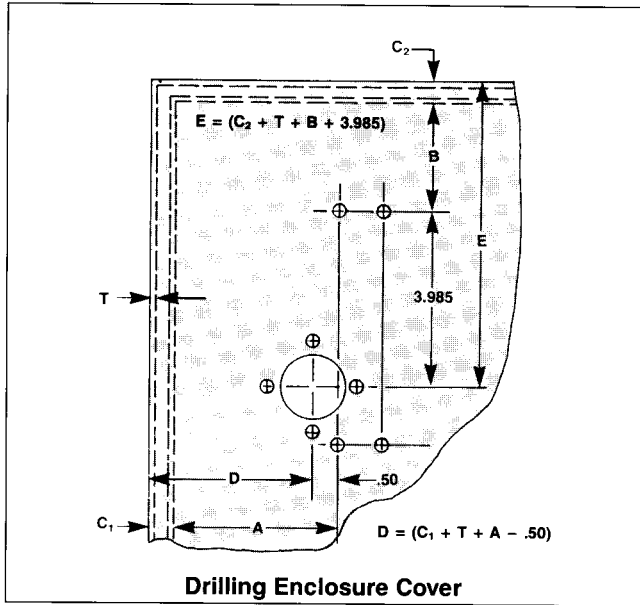


Figure 2

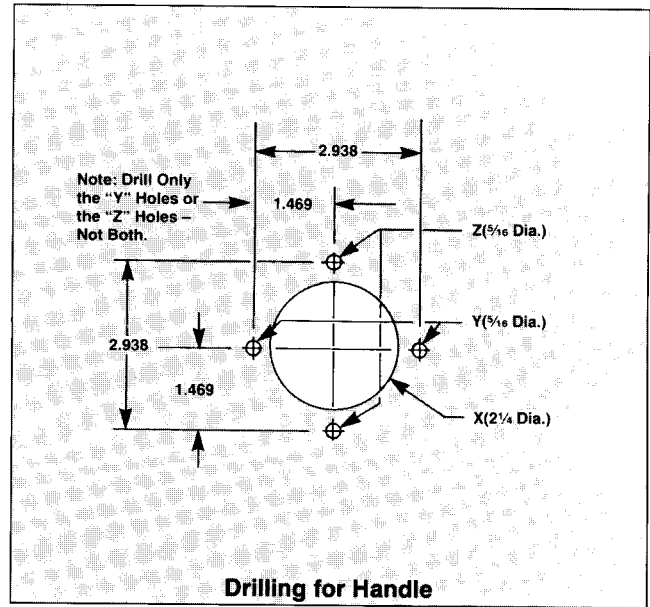


Figure 2a

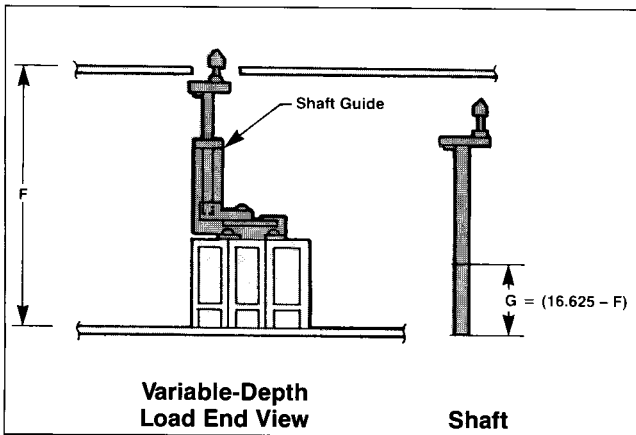
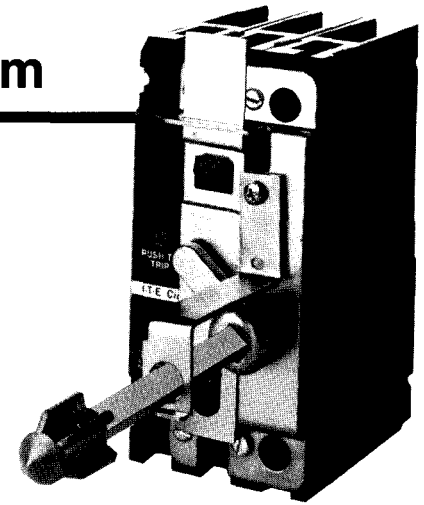
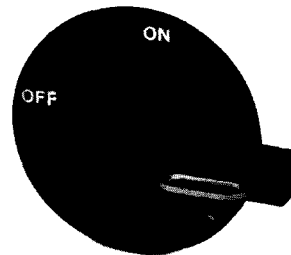
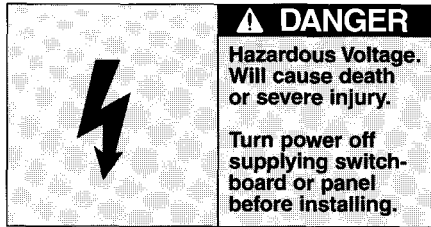


Figure 3

Figure 3a

I-T-E Rotary Handle Enclosure Mechanism

Types 1, 12



Standard-Depth (CRHOESD) Variable-Depth (CRHOEVD)

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 $\frac{5}{16}$ in. padlocks. The breaker operator can also be padlocked in the OFF position.

Drilling of Enclosure

- A. Catalog number RHOSSD standard depth shafts are used for minimum depth enclosures. Refer to minimum dimension **K** in Figure 2. Catalog Number RHOSVD variable depth shafts are used for all other enclosure depths. Shafts are cut to length **L** as shown in Figure 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 Figure 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 Figure 3. Tighten to 20 in. lb.

NOTE:

For Type 4 and 4x applications use Handle Catalog No. RHOH4 and appropriate illustrations.

Installation of Shaft (RHOSSD, RHOSVD)

- A. Shaft length for Variable Depth Operators $L = K - 3.32$ in. Attach the shaft (6) to the operating arm (7) of the breaker operator and tighten the set screw to 70 in. lb. min.

NOTE: The proper orientation of the "wings" (8) (shown in off position) at the end of the shaft when the breaker is in the OFF position (Figure 4).

NOTE: It is recommended that the shaft support bracket (9) be installed if the enclosure depth exceeds 10 in. Attach as shown in Figure 3. Tighten screw to 45 in. lb.

NOTE: RHOSSD Shaft is 2.93" Long
RHOSVD Shaft is 13.25" Long

Installation of Handle (CRHOH)

- A. Attach the handle (10) and gasket (11) to the enclosure door (12) and secure with four bolts, flatwashers, lockwashers and nuts supplied (14). Tighten nuts to 75 in. lb. (Figure 5).
- B. When the enclosure door is closed, check if 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 handle in OFF position, pull the lockplate (15) from the handle and insert up to three $\frac{5}{16}$ inch padlocks.

Installation Diagrams

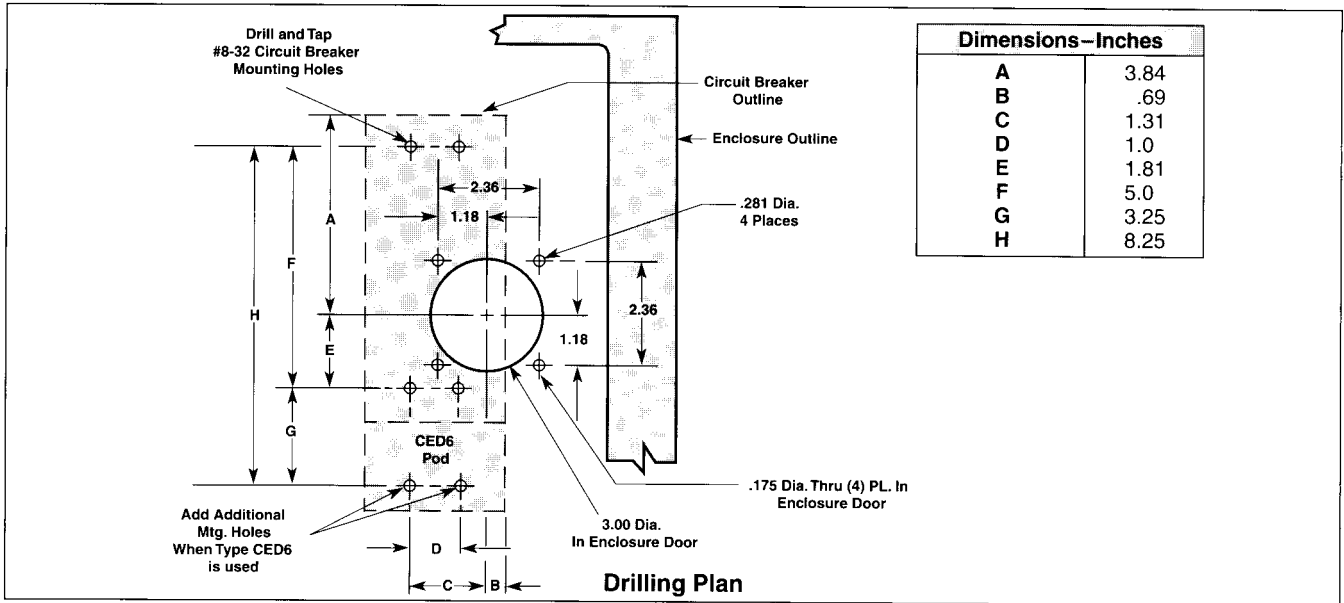


Figure 1

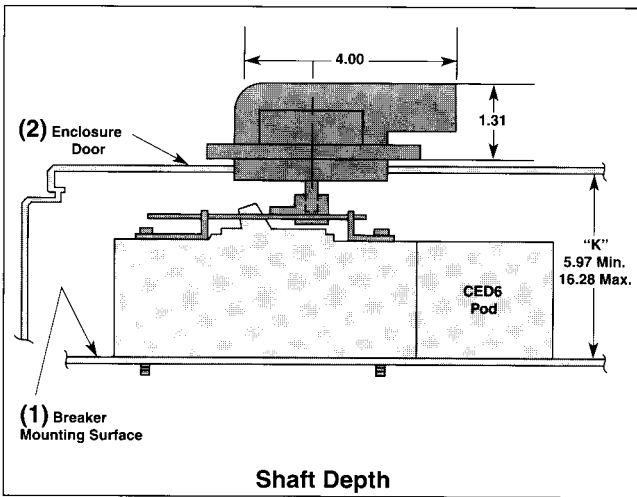


Figure 2

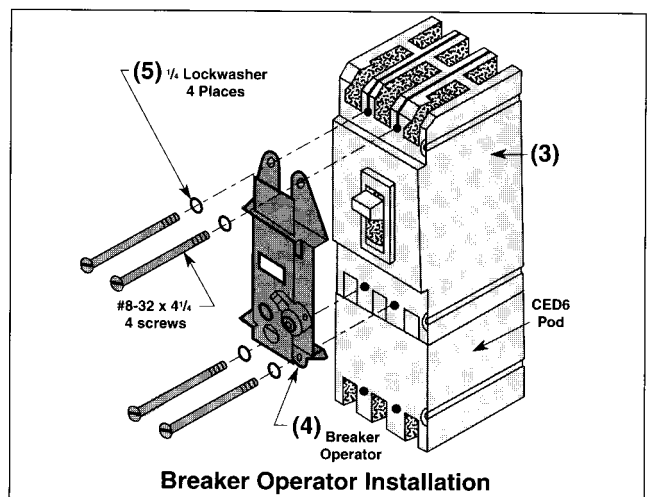


Figure 3

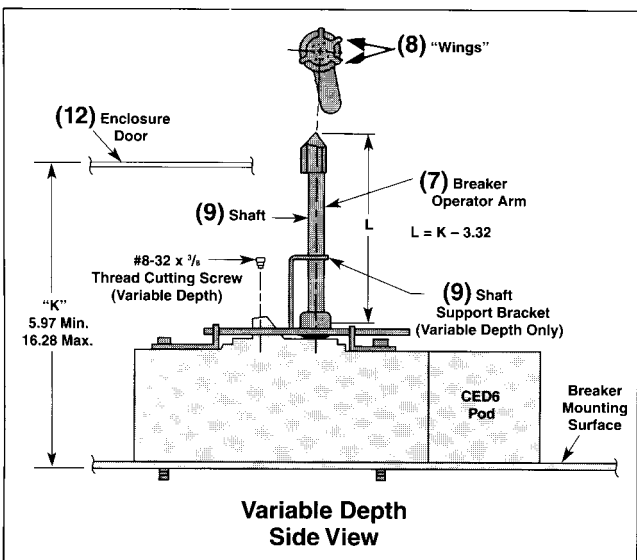


Figure 4

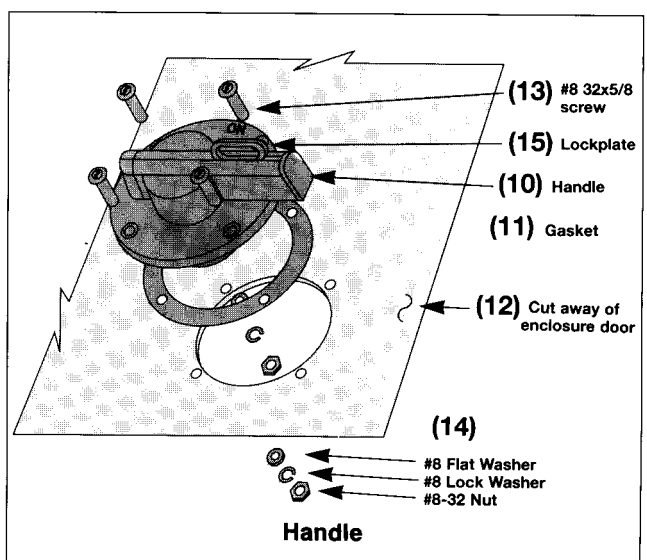
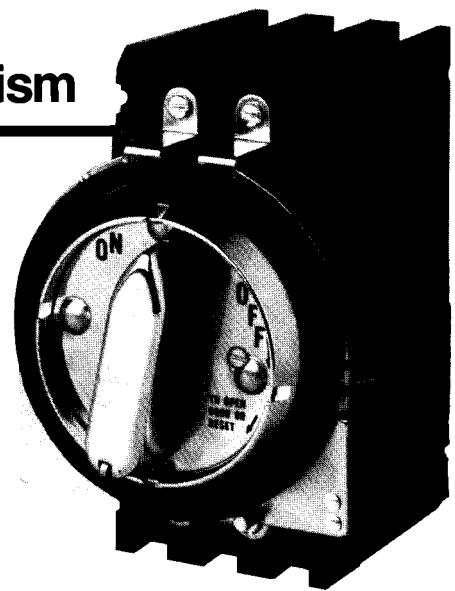
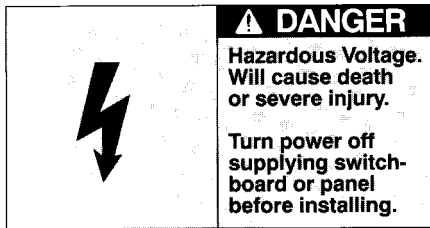


Figure 5

I-T-E Rotary Handle Enclosure Mechanism

Types 1, 12



Standard-Depth (E2RH1)

Drilling of Enclosure

- A. Drill breaker mounting holes **H** (1) in the enclosure per drilling plan on outline drawing (Figure 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 **N** and **P** from walls of enclosure (Figure 2).
- D. Relocate template on enclosure cover by adding enclosure thickness and cover overhang **R** to dimensions **N** and **P** (Figure 3).
- E. Remove backing from template and secure template on door.
- F. Drill holes **J** (3/8 in. dia.) and **K** (4 1/4 in. dia.) on template (Figure 3).

Circuit Breaker/Rotary Handle Mechanism Mounting

- A. Mount breaker with handle up by sliding it under the tabs in the mounting plate.
- B. With breaker in OFF position and rotary handle mechanism in OFF position, mount mechanism on breaker using four #8-32 x 4 1/4 in. screws. When mounting ED-Frame breakers with any handle operator, four spacers must be used as shown in Figure 4. Make sure opening in mechanism lever engages breaker handle. Tighten screws.
- C. Loosely secure the door rings with the three #6-32 x 1/4 in. screws provided. Position the interior ring (2) (contains latch tabs and threaded holes) as shown in Figure 5. The exterior ring mounts on the outside of the door with the small flange to the inside (Figure 6).
- D. Close the enclosure door and adjust external ring on door so it is concentric with handle ring. Tighten the three screws (4).
- E. Check the door operation. Latch on mechanism should engage latch tab (3) interior ring when breaker is ON and disengage latch tab when handle is rotated to OPEN DOOR position. Repeat Step C if a slight adjustment is necessary.
- F. Enclosure door may be opened when breaker is ON by turning defeater screw (5) on rotary handle face plate (Figure 4) in a clockwise direction.

Installation Diagrams

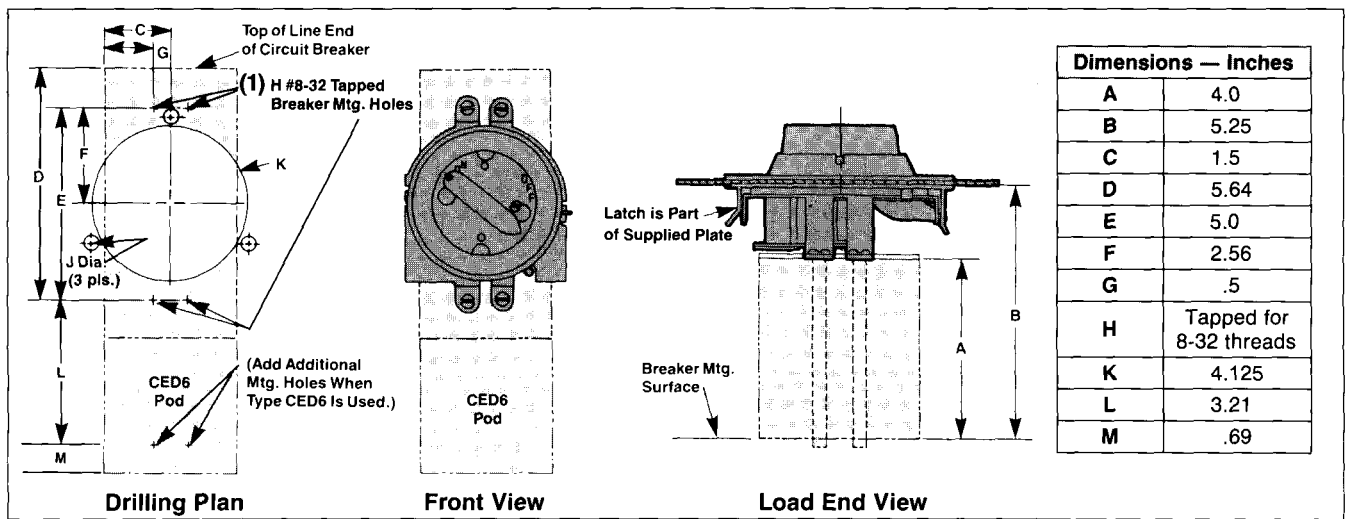


Figure 1

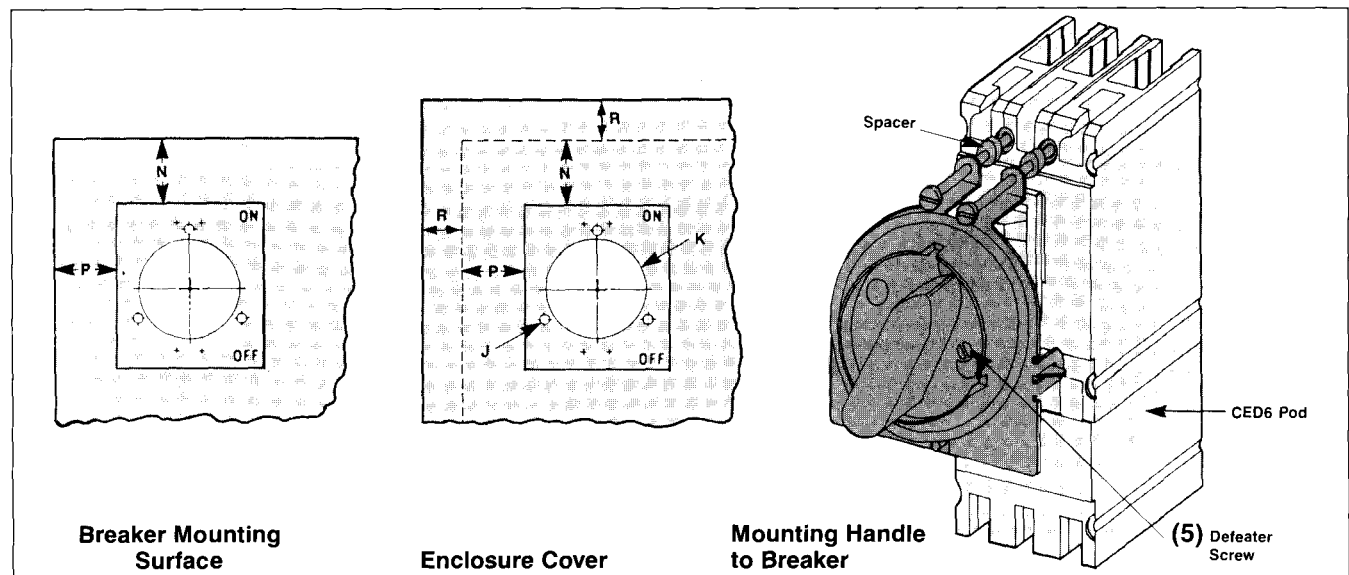


Figure 2

Figure 3

Figure 4

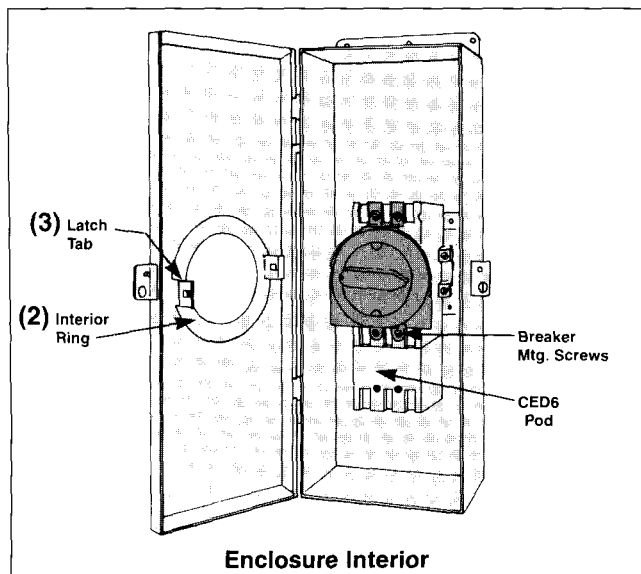


Figure 5

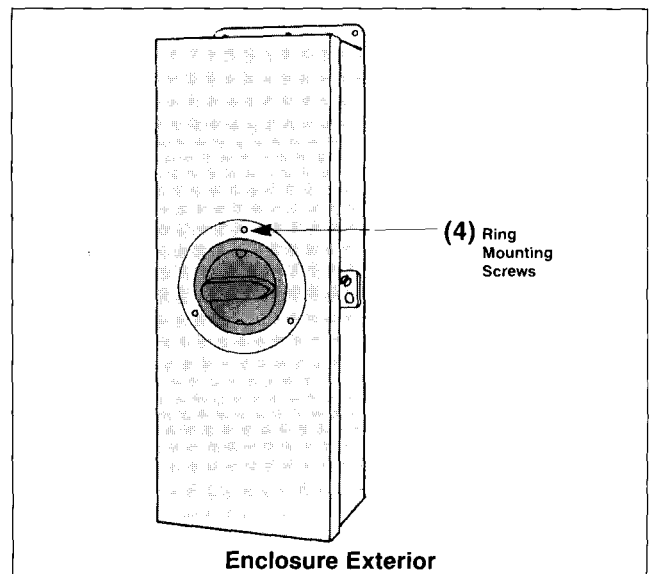
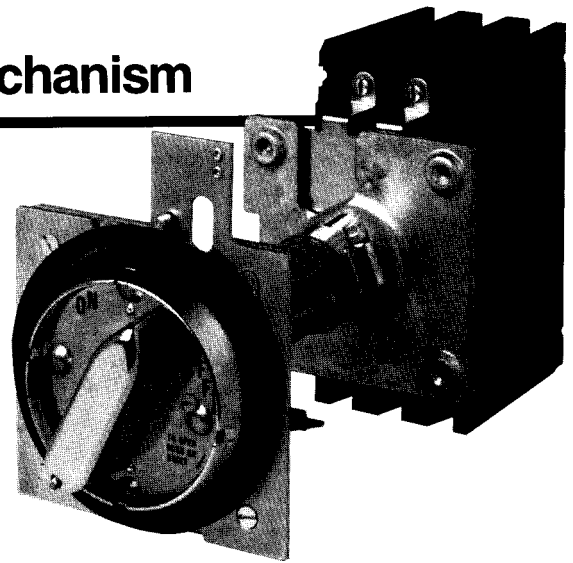
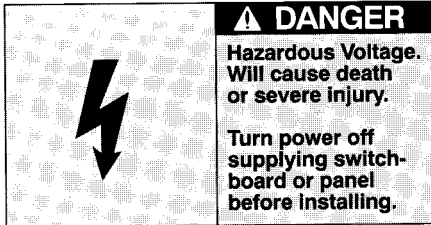


Figure 6

I-T-E Rotary Handle Enclosure Mechanism

Types 1, 12



Variable Depth (E2RHV [3], [5], [7] or [9])^①

INSTALLATION INSTRUCTIONS

Drilling of Enclosure

- A. Drill breaker mounting holes **H** (1) in the enclosure per drilling plan on outline drawing (Figure 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 **N** and **P** from walls of enclosure (Figure 2).
- D. Relocate template on enclosure cover by adding enclosure thickness and cover overhang **R** to dimensions **N** and **P** (Figure 3).
- E. Remove backing from template and secure template on door.
- F. Drill holes **J** ($\frac{3}{8}$ in. dia.) and **K** ($4\frac{1}{8}$ in. dia.) on template (Figure 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 #8-32 x $4\frac{1}{4}$ in. screws. When mounting ED-Frame breakers with any handle operator, four spacers must be used as shown in Figure 4. Make sure opening in mechanism lever engages breaker handle. Tighten screws.
- C. Loosely secure the door rings with three #6-32 x $\frac{1}{4}$ in. screws as provided. Position the interior ring (**2**) (contains latch tabs and threaded holes) as shown in Figure 5. The exterior ring mounts on the outside (Figure 6).
- D. Close the enclosure door and adjust external ring on door so it is concentric with handle ring. Tighten the three screws (**4**).
- E. Check the door operation. Latch on mechanism should engage latch tab (**3**) 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 (**5**) on rotary handle face plate (Figure 4) in a clockwise direction.

^①Use (3), (5), (7) or (9) as a suffix number. This indicates pipe length as related to enclosure depth.

Installation Diagrams

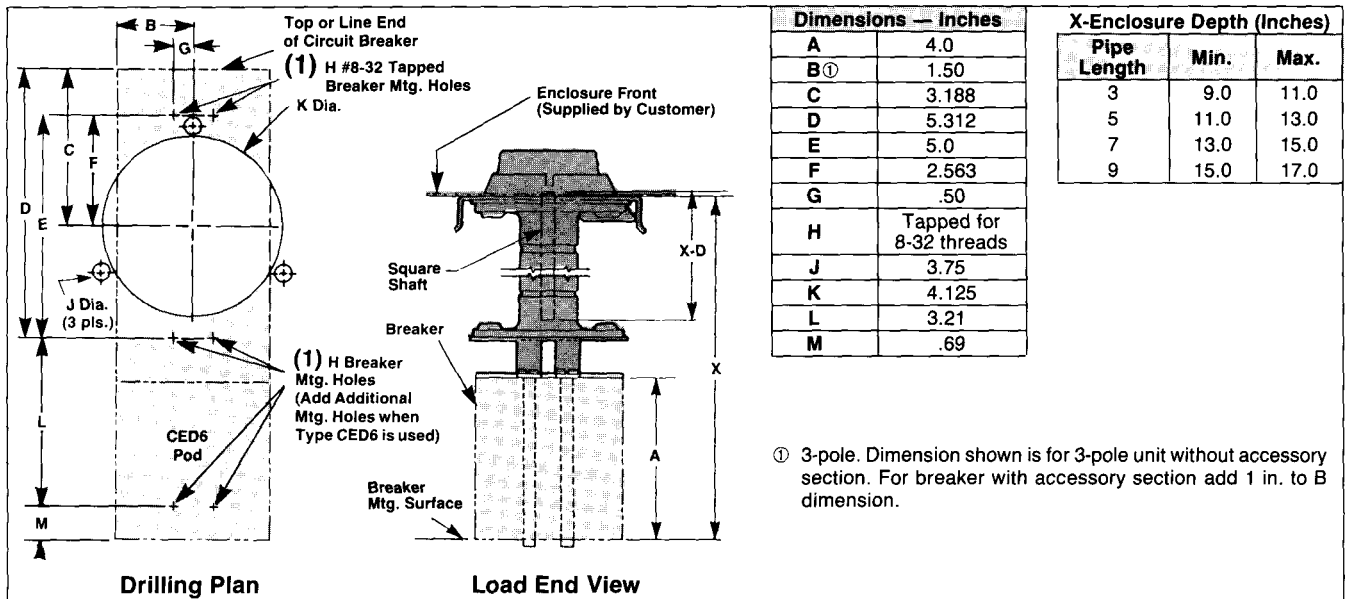


Figure 1

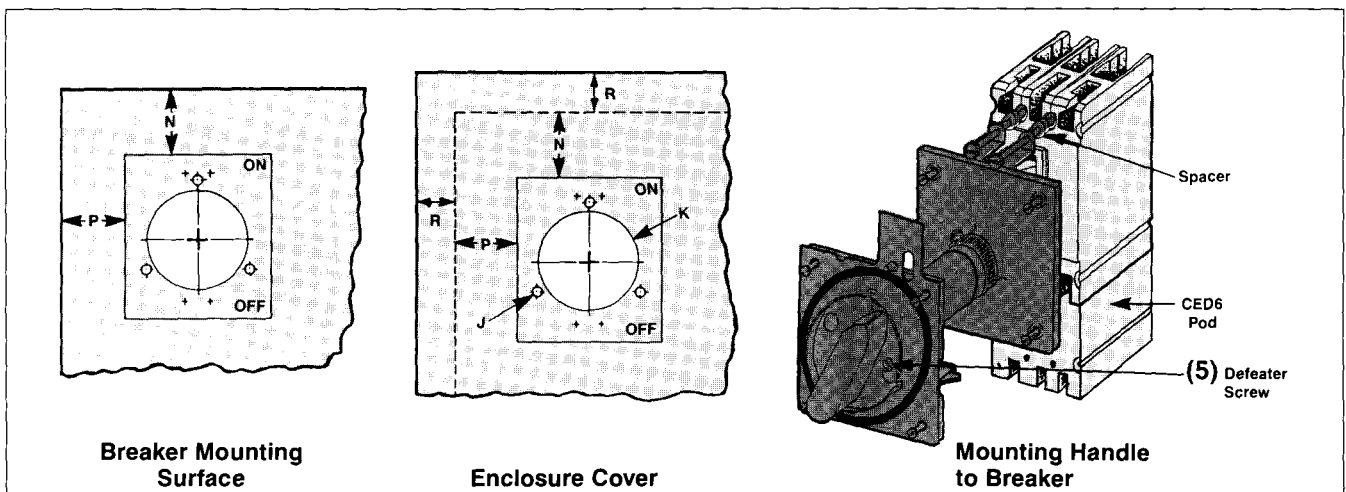


Figure 2

Figure 3

Figure 4

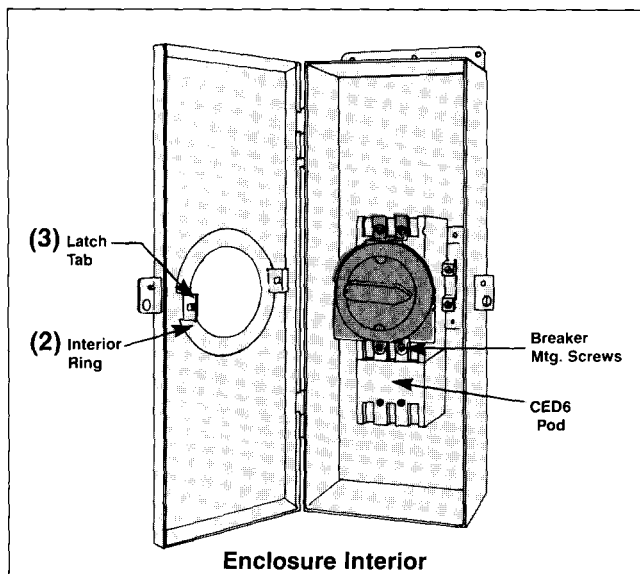


Figure 5

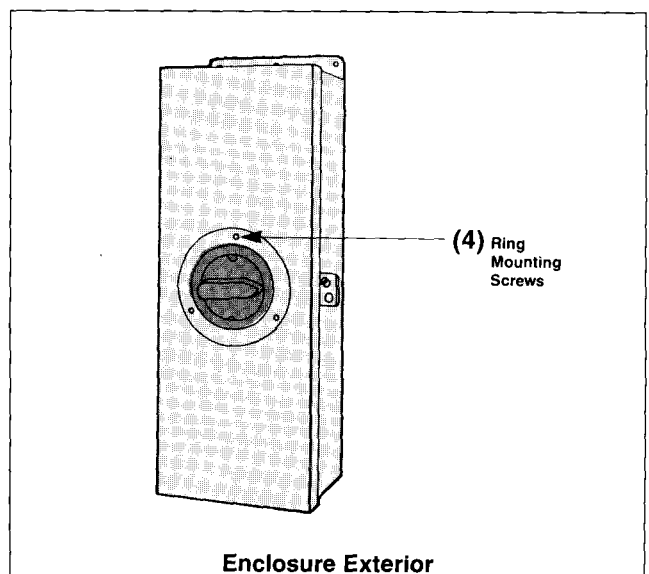
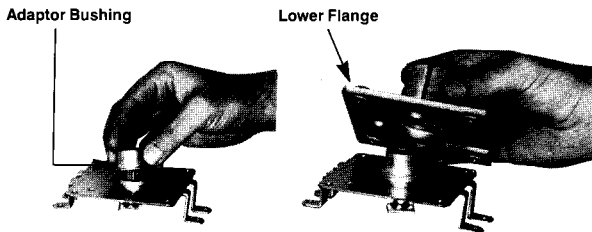


Figure 6

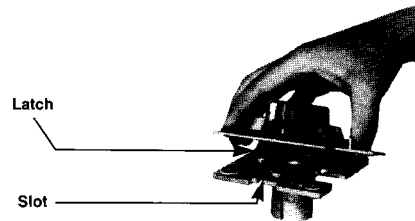
I-T-E Rotary Handle Enclosure Mechanism

Types 1, 12 — Mechanical Assembly

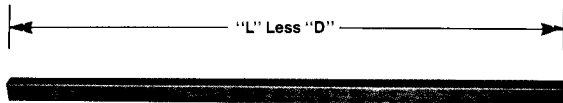
Variable-Depth (E2RHV [3], [5], [7] or [9])^①



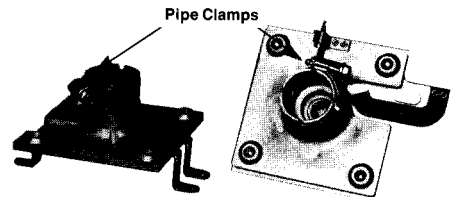
A. With adaptor bushing in place on bearing of lower mechanism, place lower flange (flange with the four tapped holes) on to the lower mechanism. Secure with four flat head screws.



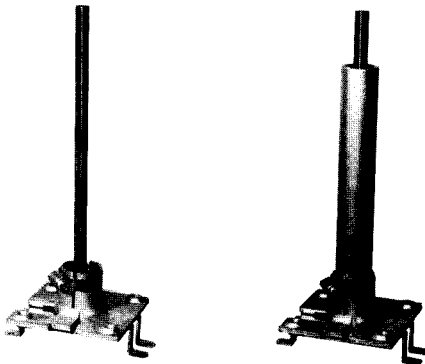
B. Place upper mechanism on upper flange (flange with four tapped holes) and secure with four flat head screws. Be sure latch on mechanism fits into elongated slot in flange.



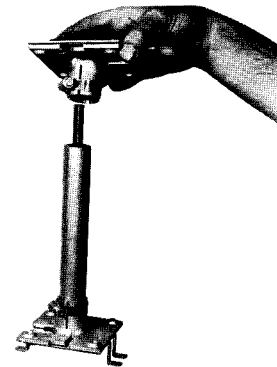
C. Cut square shaft to desired dimension. To do this subtract dimension **D** (see dimension chart on page 29) from **M** dimension which is the distance from the back of the breaker to inside of enclosure door.



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



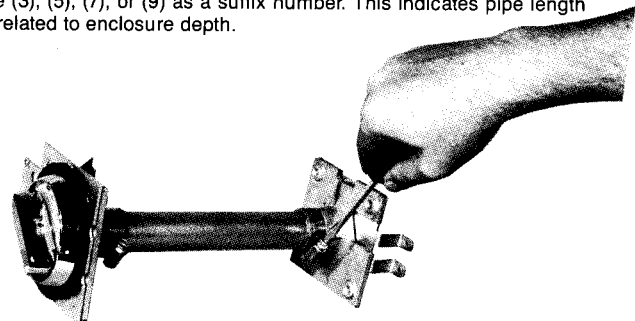
E. Place square shaft into bushing on lower mechanism and then place support pipe over this shaft and into collar or flange.



F. 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.

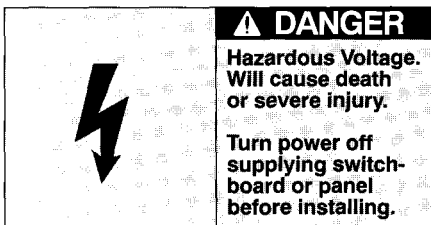
^①Use (3), (5), (7), or (9) as a suffix number. This indicates pipe length as related to enclosure depth.

G. Lay assembly on flat surface (this will square assembly). If **M** dimension is the minimum, as shown on dimensional chart, tighten pipe clamps with support pipe seated fully into both flange collars. If **M** dimension is other than minimum, adjust support pipe so that approximately the same amount of pipe is in each of the upper and lower flange collars. (A minimum of 1/2 in. pipe must be in each flange collar.) Tighten pipe clamps.



I-T-E Max-Flex™ Flange-Mount Handle Operator^①

Types 1, 3, 3R, 4, 4X, 12



⚠ SAFETY INSTRUCTIONS

GENERAL INFORMATION

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 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 600A. 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.

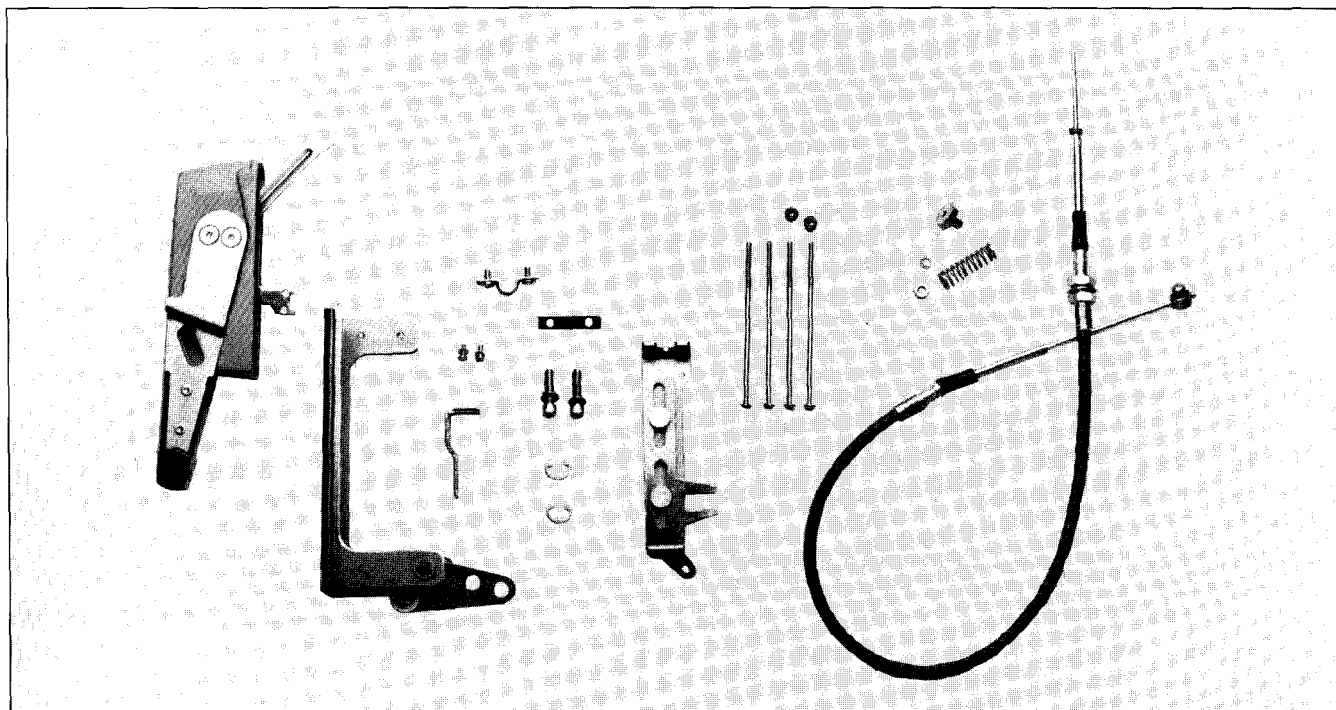
The cable design is flexible and rugged. It is similar to those cables used in aircraft control systems. The flexible cable comes in standard 3 or 4 ft. lengths. However, specific lengths can be special ordered up to 20 ft.

Operation

When properly installed, the Max-Flex Handle Operator is used to perform remote switching operations from outside of 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 to accepted practices.

①Accessory can be used on 3-pole circuit breakers only.



Unassembled Max-Flex™ Flange Mount Handle Operator

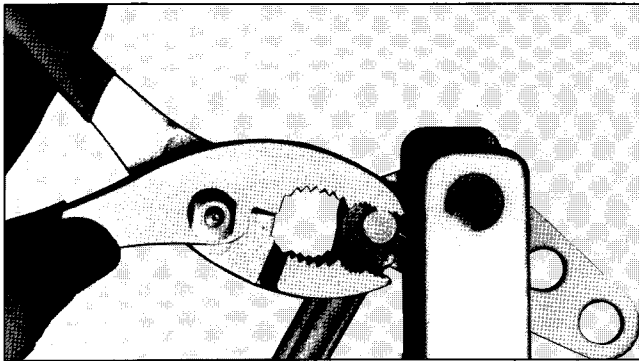
I-T-E Max-Flex™ Flange-Mount Handle Operator

Types 1, 3, 3R, 4, 4X, 12

INSTALLATION

Mounting Max-Flex™ Handle Operator to Enclosure Frame Assembly

- Drill the mounting holes in the enclosure flange and file all burrs (Figures 1 and 2). Note the maximum and minimum drill hole distances in Figure 2.
- Push the rubber gasket (1) down in the groove of the handle assembly (2) (Figure 3).
- The handle and the interlock mechanism 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 #1/4-20 x 1 in. socket head cap screws and lockwashers. Tighten cap screws from within the enclosure (Figure 3).



Secure E-Ring Connection

- 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) (Figure 3).
- Mount the interlock lever extension (10) to the interlock lever (3) using two #6-32 x 3/8 in. machine screws and lockwashers. Screws mount through the threaded lever extension into the lever (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 (Figure 2). With the enclosure door open and the handle in the ON position, the interlock can be defeated by turning the defater screw (11) on the operating handle counter-clockwise. When the enclosure door is closed, the door latch mechanism now automatically defeats the interlock.

- Weld the door catch bracket (12) to the enclosure door. (Figures 2 and 4).

NOTE: Holes may be drilled in the door catch bracket using the projections as centers. *User must provide the mounting hardware.*

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

INSTALLATION DIAGRAMS

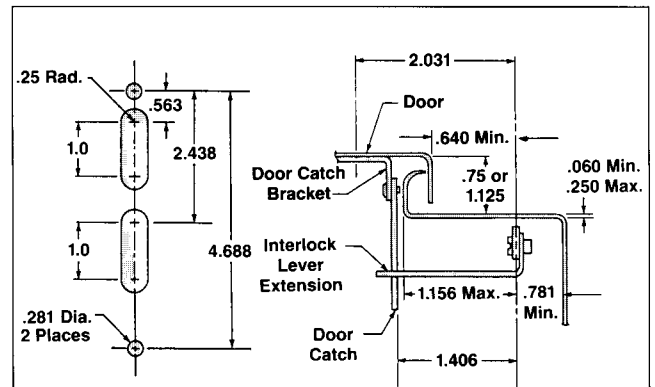


Figure 1

Figure 2

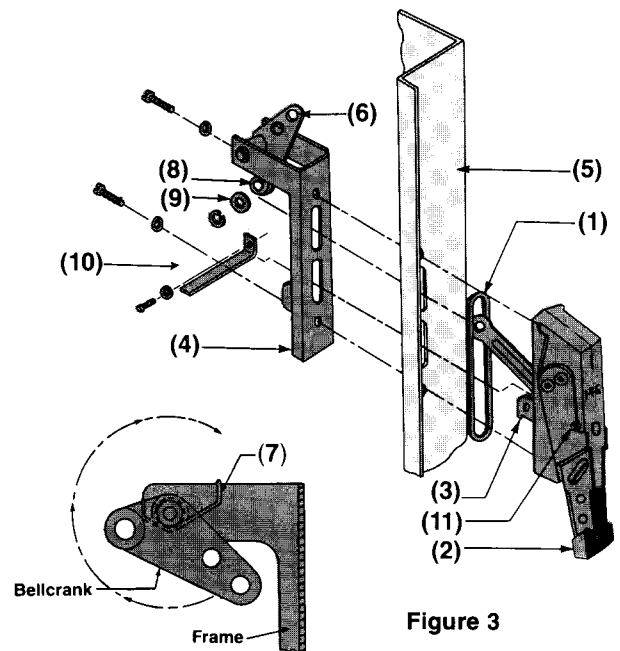


Figure 3

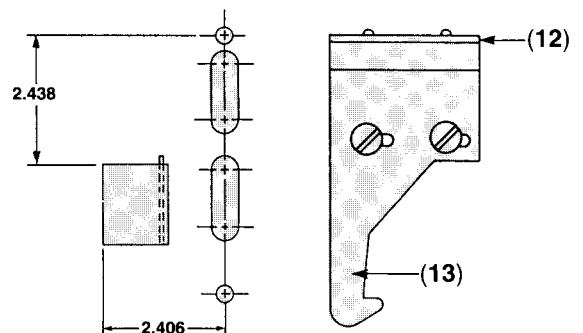


Figure 4

Assembly Instructions

Adjusting Door Catch Mechanism

- 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.
- 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 Steps A and B.

Mounting 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) (Figure 7) and the depth of the enclosure. Table 2 and Figure 5 show the horizontal range E of the circuit breaker in 8 to 30 in. enclosures.

Table 1 — Circuit Breaker Mounting Dimensions

Breaker Type	A	B	C	D	G	Tap Size
CED6, CED6-ETI	1.0	5.0	.65	8.93	3.25	#8-32
All Other Types	1.0	5.0	.65	6.33	—	#8-32

Table 2 — Maximum E Dimensions①

Cable	Enclosure Depth (Inches)							
	8"	10"	12"	16"	18"	20"	24"	30"
FHOECO36 (36")	13.8	13.5	13.0	10.7	8.7	5.3	—	—
FHOECO48 (48")	25.8	25.7	25.3	24.2	23.4	22.4	19.6	12.2

① Maximum E dimension only if F = 4.6.

Table 3 — F Dimensions

Enclosure Depth	36" Cable		48" Cable	
	Min.	Max.	Min.	Max.
8	-4.2	15.5	-16.0	27.0
10	-5.2	15.0	-16.5	27.0
12	-6.0	14.7	-17.0	26.8
16	-4.5	14.2	-16.5	26.5
18	-3.4	12.8	-16.0	25.5
20	0.6	10.0	-15.5	24.5
24	—	—	-14.0	22.5
30	—	—	-8.7	17.4

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

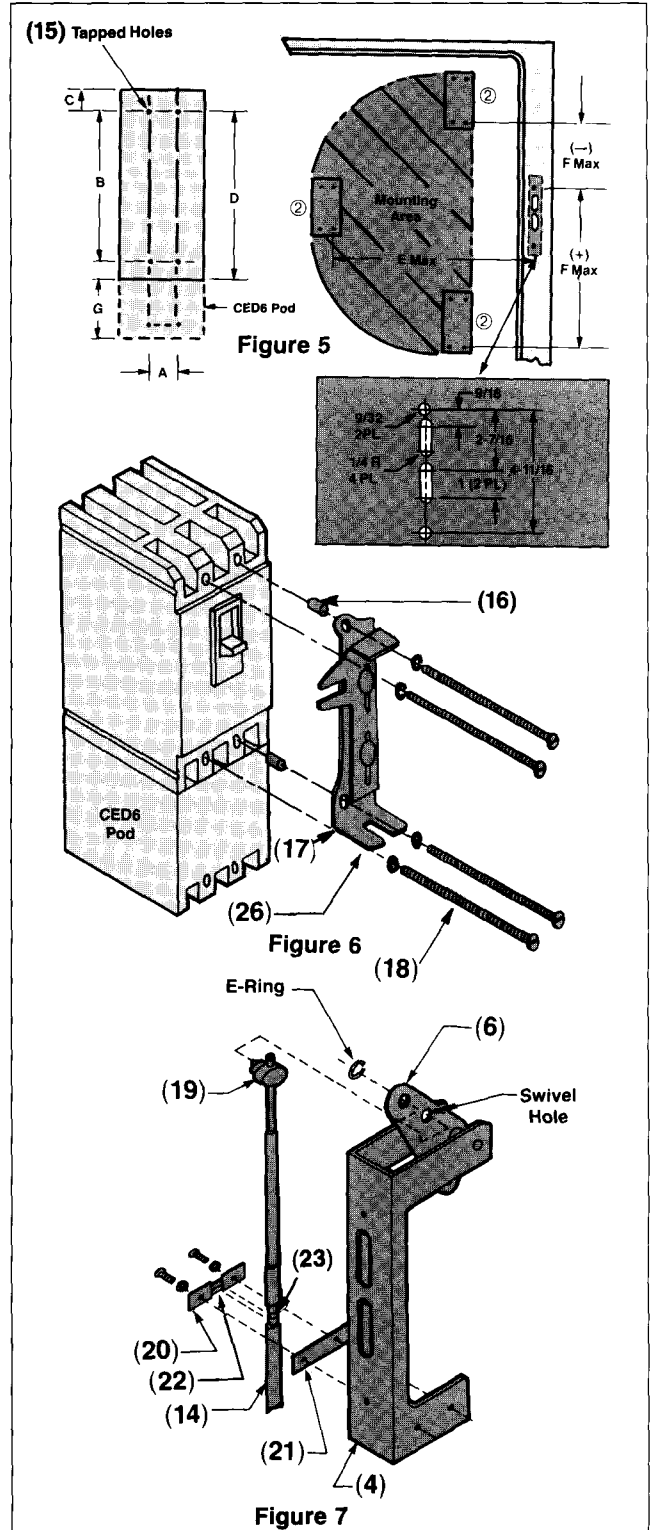
- Determine the desired circuit breaker mounting location using Tables 1, 2 and Figure 5.
- Drill and tap four mounting holes (15) in the enclosure back panel using dimensions A and B from Table 1.
- Mount the circuit breaker inside the back panel. Align the holes in the panel with the mounting holes of the breaker.
- Insert the three plastic spacers (16) into the circuit breaker mounting holes for support, as shown in Figure 6.
- Install the operating mechanism (17) on the spacers (16) and secure with the three #1/4-20 x 5 in. pan head screws and lockwashers. Insert the #1/4-20 x 4 1/4 in. 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.

Securing Operating Cable to Frame Assembly

- 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 (Figure 7).

- 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 in. screws and lockwashers. NOTE: Detent (22) in cable retainer must align with the groove (23) in the cable's metal fitting (Figure 7).

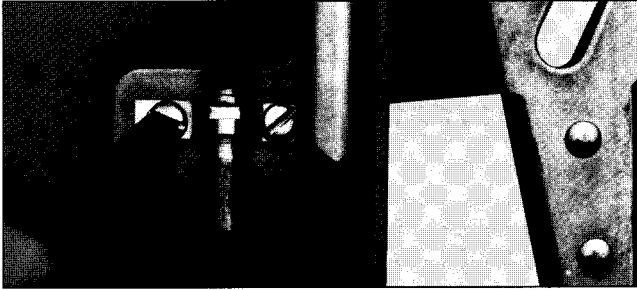
INSTALLATION DIAGRAMS



② Outlines represent breaker operator, not circuit breaker footprint.

I-T-E Max-Flex™ Flange-Mount Handle Operator

Types 1, 3, 3R, 4, 4X, 12

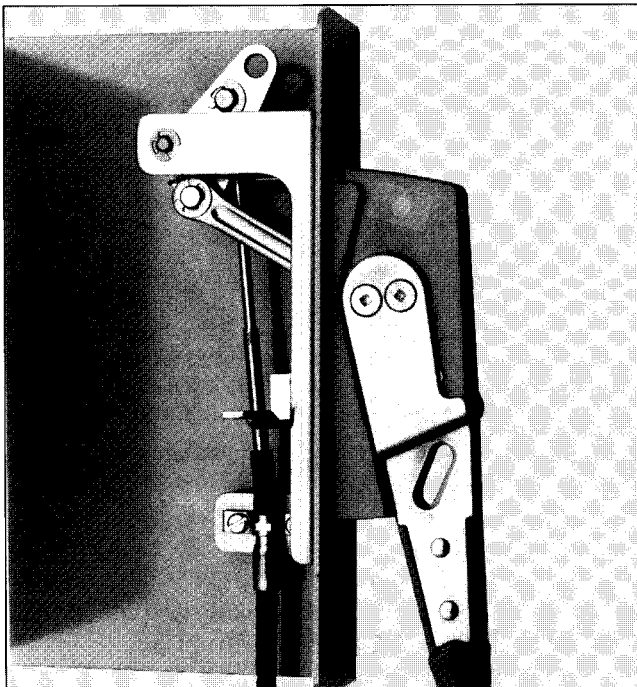


Tighten Detent Screws

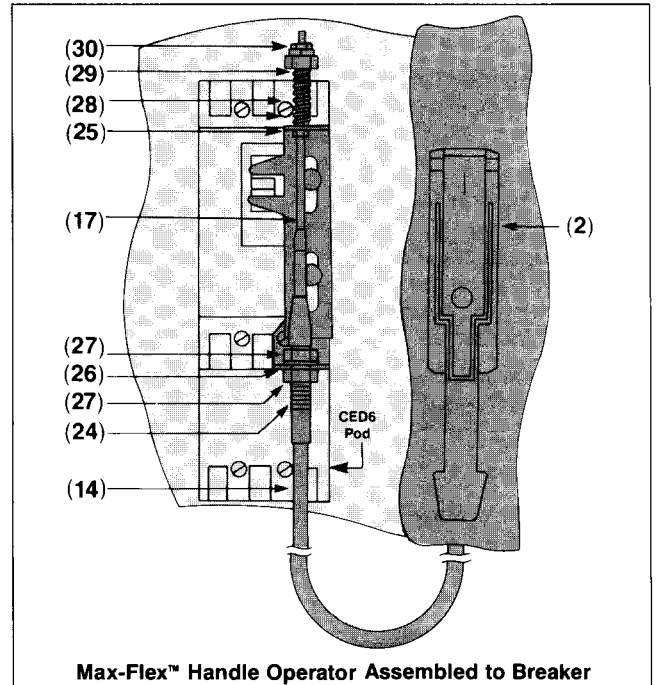
Securing Operating Cable to Circuit Breaker

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) (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 (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.



Side View of Max-Flex™ Handle Operator

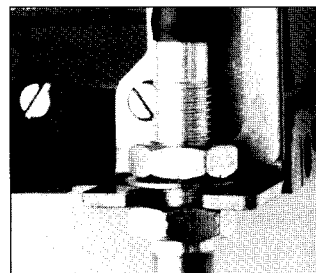


Max-Flex™ Handle Operator Assembled to Breaker

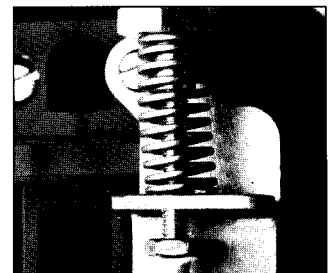
Figure 8

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 (14) 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 B, tighten the spring adjuster (29) one turn and repeat Step B. Continue this procedure until the breaker does reset, then tighten the adjuster spring one additional turn. Secure with the lockwasher and locknut (30).



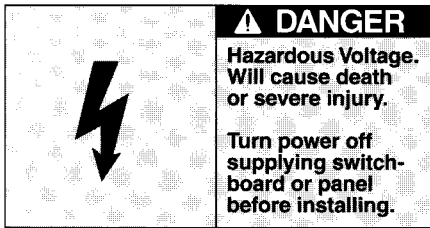
Fixed Plate Adjustment



Spring Adjustment

I-T-E Fixed-Depth Handle Operator

Types 1, 3, 3R, 4, 4X, 12



SAFETY INSTRUCTIONS

GENERAL INFORMATION

Description

The Fixed-Depth Handle Operator is designed to function with Siemens ED-Frame molded case circuit breakers and switches. A complete handle operator consists of a handle assembly, frame assembly, breaker operator assembly, adjustable door catch, and mounting hardware.

The operator features a trip indicator, the ability to padlock in the OFF position with up to three 5/16" padlocks, interlocks with I-T-E® DKR2, DKR3, DKL2 and DKL3 door latch mechanisms, and auxiliary switch (HAS-1) can be attached to provide remote indication of handle position.

Preparation

1. Turn OFF and lock out all power that supplies the circuit breaker and other equipment within the enclosure before installing this device.
2. Prepare mounting holes in the enclosure flange and the enclosure panel. (See Table below for hole dimensions and illustrations, Figures 1 and 2.)

Breaker Type	A	B	C	D	E	Tap Size F
ED, HED	2.38	6.81	1.00	5.00	—	#8-32 UNC
CED	2.38	6.81	1.00	5.00	3.25	#8-32 UNC

NOTE: All dimensions shown in inches.

Catalog Numbers	Fixed-Depth Handle Operators To Be Used With Following Breakers ^②
FDFBER FDFBEL FDFBER4 ^① FDFBEL4 ^①	ED2, ED4, ED6, HED4, HED6, HHED6, CED6, ED6-ET1, CED6-ET1

^① Catalog numbers with the suffix "4" are for installation in Types 1, 3, 3R, 4, 4X and 12 enclosures. Catalog numbers without the suffix "4" are for installation in Types 1, 3, 3R and 12 enclosures.

^② Fixed-Depth operators can only be installed on 3-Pole ED, HED and CED type circuit breakers.

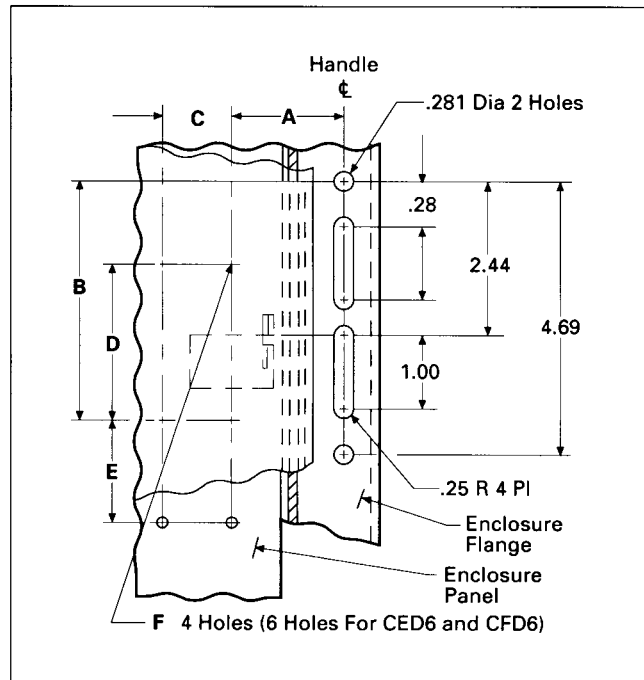


Figure 1

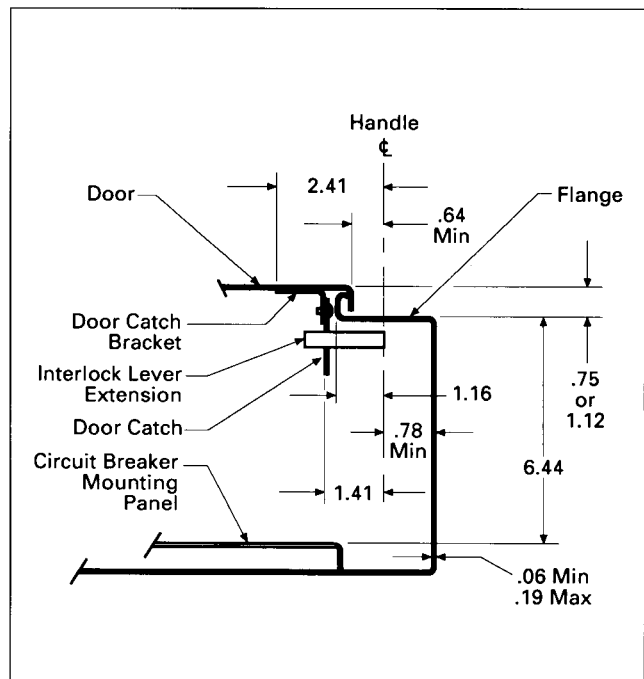


Figure 2

I-T-E Fixed-Depth Handle Operator

Types 1, 3, 3R, 4, 4X, 12

Installing Handle And Frame Assemblies (Figure 3)

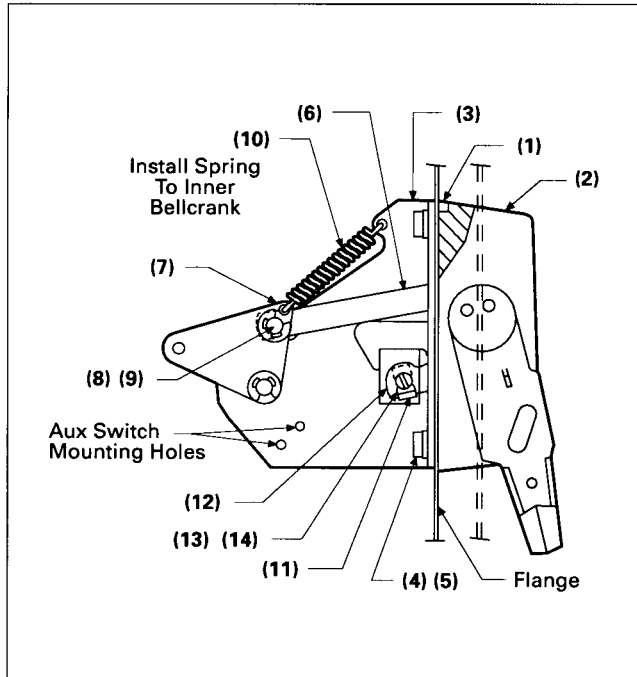


Figure 3

1. Secure gasket (1) into groove of handle assembly (2). Mount handle assembly (2) and frame assembly (3) to enclosure flange using two 1/4-20 x 3/4 in. socket head cap screws (4) and 1/4 in. lockwashers (5). Tighten screws (4) to 75 in.-lb.
2. Attach link (6) to bellcrank (7) using the 5/16 dia. x 5/8 in. grooved pin (8). Secure pin (8) using the two 5/16 in. E-type retaining rings (9).
3. (Catalog numbers FDFBER(4) and FDFBEL(4) only) Attach extension spring (10) to frame (3) and to inner bellcrank (7).
4. Attach the interlock lever extension (11) to the interlock lever (12) and secure with #8-32 x 3/8 in. screw (13) and #8 helical lockwasher (14). Tighten screw to 25 in.-lb.

Installing Door Catch (If Required) (Figure 4)

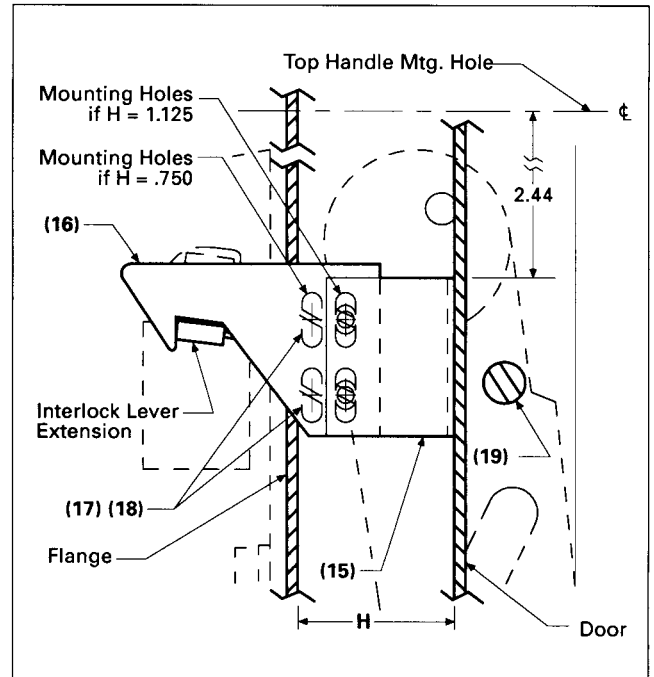


Figure 4

1. If no door catch is provided with the enclosure, weld the supplied door catch bracket (15) to the enclosure door and attach the adjustable door catch (16) to the door catch bracket (15) using the #8-32 x 5/16 in. mounting screws (17) and #8 external tooth lockwashers (18). Note the "H" dimension for the correct mounting holes. Tighten the mounting screws to 25 in.-lbs.

Adjusting Door Catch (Figure 4)

1. Move the handle to the OFF position and close the enclosure door. This action should release the interlock, allowing the handle to be turned ON. If the handle cannot be turned ON, loosen the screws (17) and adjust the door catch (16) downward in its slot, retighten the screws (17) and repeat.
2. Move the handle to the ON position and attempt to open the enclosure door. The door catch (16) should engage the interlock lever extension and hold the door closed. If the door can be opened, adjust the door catch (16) downward.
3. Repeat steps 1 and 2 to insure that the handle cannot be turned ON unless the door is fully closed and the door cannot be opened if the handle is in the ON position.

NOTE: The door can be opened when the handle is in the ON position by rotating the interlock defeater screw (19) located on either side of the handle housing.

I-T-E Fixed-Depth Handle Operator

Types 1, 3, 3R, 4, 4X, 12

Installing Breaker And Breaker Operator (Figures 5 And 6)

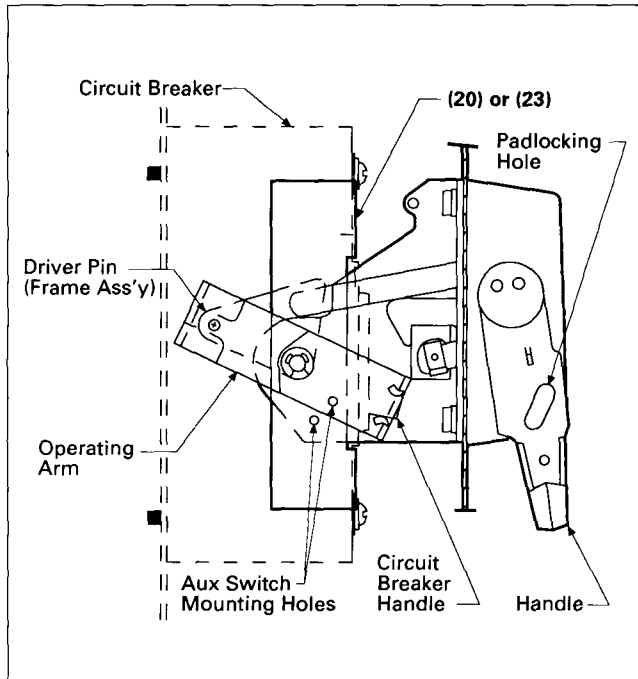


Figure 5

1. Move the operating handle and circuit breaker handle to the OFF position.
2. Locate the circuit breaker over the mounting holes in the enclosure panel and position the breaker operator (20) or (23) onto the circuit breaker, positioning the combination so that the operating arm engages the circuit breaker handle and the driver pin on the bell crank of the frame assembly.
3. Proceed with specific ED-frame instructions as follows:

Secure the breaker and breaker operator (20) to the enclosure panel using the four #8-32 x four 3/8 in. screws (21), four #8 lockwashers (22), and two spacers (spacers supplied with separate instructions). Tighten the screws to 16 to 18 in.-lbs.

Adjusting The Breaker Operator (Figure 6)

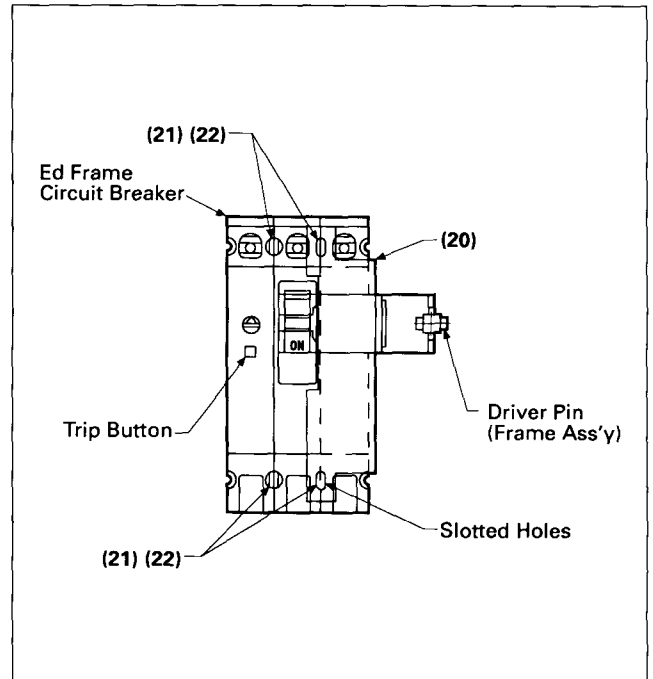


Figure 6

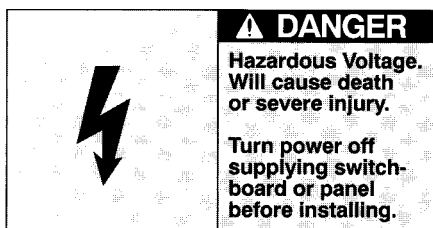
Adjusting The Breaker Operator (Figure 6)

1. Check that the circuit breaker turns ON and OFF by moving the operating handle UP for ON and DOWN for OFF. If the breaker does not turn ON, loosen the mounting screws, (21) or (24) and adjust the breaker operator upward 1/16 inch, tighten the mounting screws to 16 to 18 in.-lbs. and check if the breaker turns ON. Repeat if required.
2. To check the TRIP-RESET function, move the handle to the ON position and push the TRIP button located on the front of the circuit breaker. The circuit breaker will TRIP and the operating handle will move to an intermediate TRIP position. Move the operating handle from TRIP position to OFF and back to ON. The circuit breaker should RESET then turn ON. If the breaker does not RESET, loosen the breaker operator mounting screws (21) or (24) and adjust the breaker operator downward 1/16 inch and retighten the screws per step 5. Repeat if required.

Padlocking (Figure 5)

Move the handle to OFF position and attach padlock(s) at the indicated padlocking hole.

I-T-E Door Latch Mechanism (DKR2, DKR3, DKL2, DKL3)①



SAFETY INSTRUCTIONS

GENERAL INFORMATION

Description

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 1/4 in. x 1/2 in. steel latch bar.* Enclosures with an overall height less than 40 in. require the two-point door latch mechanism. When the overall height is greater than 40 in., 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 Handle Operator. The door handle can be padlocked to prevent unauthorized entry into the enclosure. Drawings in these 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 "counterclockwise" and vice versa, whenever those words appear.

Installation of the Door Latch Mechanism

A. Drill mounting holes in the enclosure door observing the minimum dimensions shown in Figure 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 Figure 1 for the following steps:

B. Place gasket (1) on handle plate (2) and attach handle plate to enclosure door with two thin wall hex nuts (3). Tighten the nuts to 100 in. lb.

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 1/8 turn to allow movement of the roller assemblies.

G. Place bottom spring (11) over the bottom thin wall hex nut inside the enclosure door.

H. Turn the handle 1/4 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 flange nut, then loosen 1/8 turn to allow movement of the roller assemblies (Figure 1).

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

I. Place top spring (13) over top thin wall hex nut. Attach lockout plate (14) to lockout screw using locking type flange nut. Tighten flange nut. Insert bent leg of spring into hole in lockout plate as shown in Figure 1 detail.

J. 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 (Figure 3).

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

L. Attach the door latch label to the door handle on the enclosure door.

Adjusting the Mechanism

If using in conjunction with the FHOH or FHOH4 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.

Minimum Dimensions (In Inches)

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

① The last letter and number designate right- or left-hand, 2 or 3 point latches.

Installation Diagrams

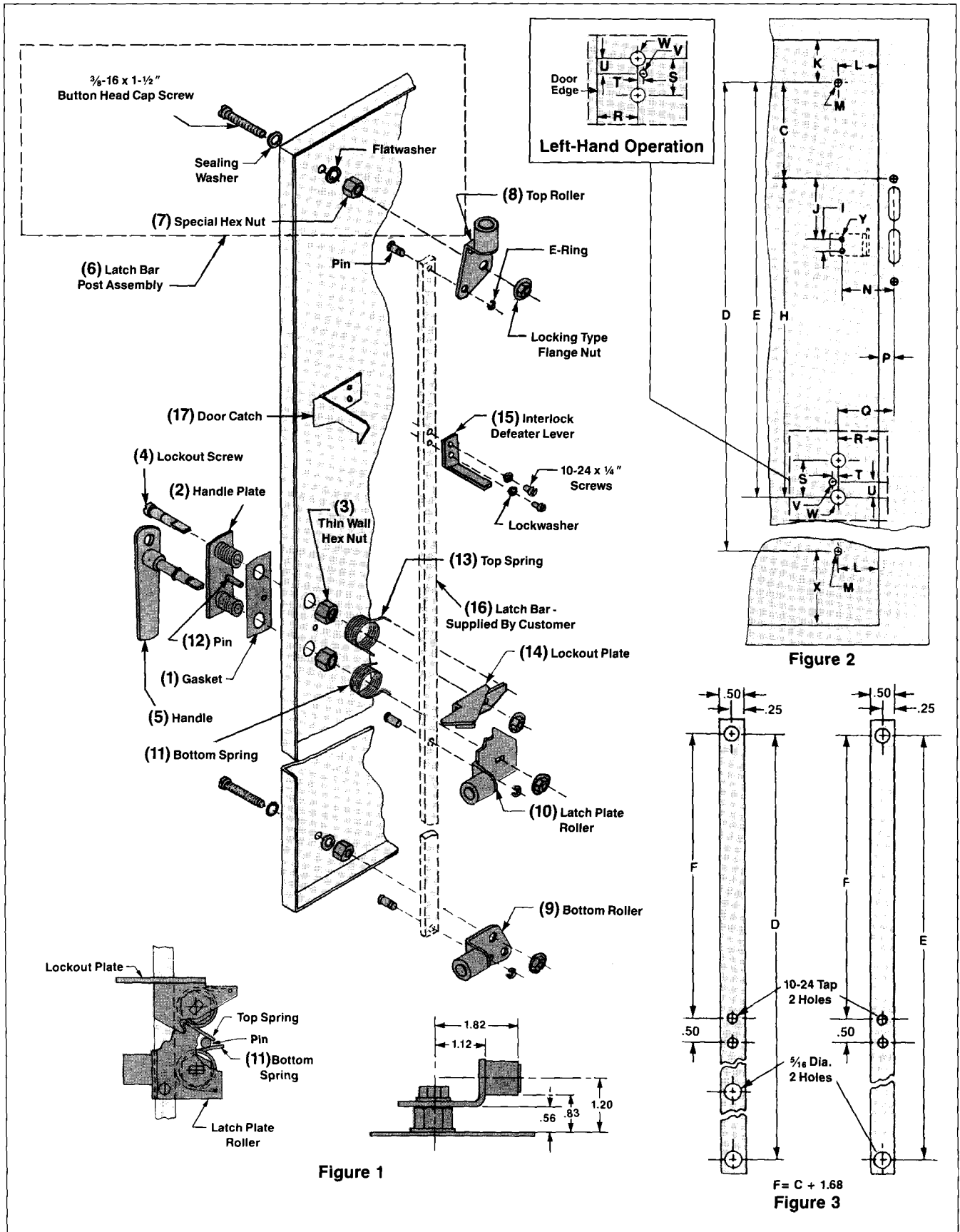


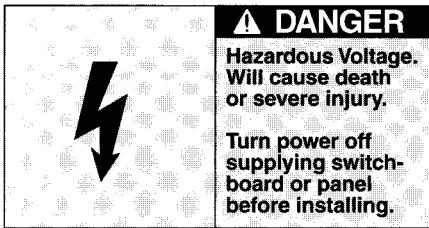
Figure 1

Figure 2

Figure 3

I-T-E TELEMANTD® Electric Motor Operator

Catalog Numbers MOE6120, MOE6240



SAFETY INSTRUCTIONS

INSTALLATION INSTRUCTIONS

Description

The motor operated mechanism is designed to open, close and reset a circuit breaker or switch by remote control. The customer must supply the circuit breaker or switch, normally ON and OFF pushbuttons, external wiring, a control power source, and all control logic. Consult the wiring diagram (Figure 3) for a typical control connection.

The motor operator is hinged for opening to the bottom (or load end of the breaker). see Figure 2.

NOTE: For Automatic Reset Operation a separate auxiliary contact must be provided by the customer.

Installation

1. Turn off and lock out all power supplying circuit breaker and motor operator before installation or servicing.
2. Mount the breaker and motor operator (with its cover open) together on the mounting panel as shown in Figure 2.
3. The 4 spacers are placed between the breaker and the motor operator mounting base plate.
4. The motor operator is aligned on top of the spacers and the (4) 8-32 screws and installed as shown in Figure 2.
5. Rotate cam to the off position. See label inside motor operator.
6. Close and latch the mechanism cover.
7. Complete the desired control connections and electrically test the motor operator system before reenergizing the breaker power terminals in accordance with the electrical operation.

Motor Operator	Frames	For Use With: I-T-E® Circuit Breakers And Switchtypes
MOE6120 MOE6240	ED	ED2, ED4, ED6, HED4 HED6, CED6, ED6-A, CED6-A

Electrical Operation

With the breaker and the operating mechanism in the OFF position, press the ON button to energize the motor. This action will close the breaker. When the breaker handle reaches the ON position, the motor circuit is disconnected by an internal limit switch.

Electrical Characteristics Table

Catalog No.	ON			OFF			
	In-Rush Amps	Running Amps	Time Hz	In-Rush Amps	Running Amps	Time Hz	Reset Amps
MOE6120	10.25	2.3	33	10.0	2.0	24	18
MOE6240	5.25	1.1	33	10.0	2.0	24	18

Closing or Opening Time: 0.6 seconds

With the breaker and the operating mechanism in the ON position, press the OFF button to energize the motor. This action will open the breaker. When the breaker handle reaches the OFF position, the motor circuit is disconnected by an internal limit switch.

When the circuit breaker trips automatically, there is no external indication that the breaker has tripped unless a separate bell alarm accessory (contact Siemens for appropriate catalog number) is provided to energize a customer furnished warning device. After the circuit breaker trips automatically, it is necessary to press the OFF button to move the breaker handle to the reset position.

Automatic Reset

For automatic reset, an auxiliary switch (Contact Siemens for appropriate Catalog Number) is used to return the breaker to the OFF/RESET position after it has been tripped. This auxiliary switch is mounted inside the breaker and wired in parallel with the OFF button. When the breaker trips, the auxiliary switch closes, thus energizing the motor circuit which moves the breaker to the OFF/RESET position.

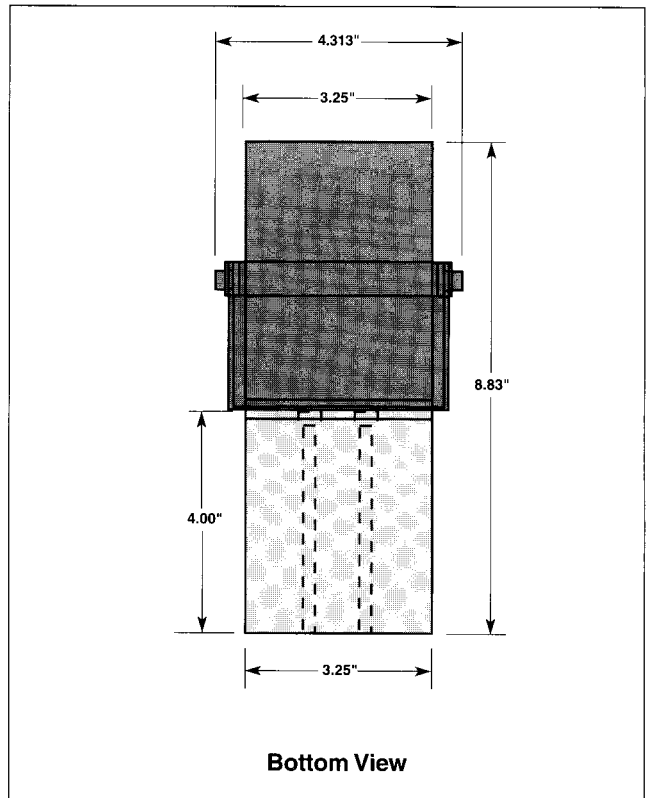


Figure 1

I-T-E TELEMANT® Electric Motor Operator

Catalog Numbers MOE6120, MOE6240

After the motor operated mechanism has reset the breaker, the motor operator internal limit switch opens the circuit. To provide automatic reset, the ON pushbutton must be a single pole double throw device and it must be wired per Figure 3.

Manual Operation

Operate the cover latch and swing the hinged motor operator cover away from the breaker to expose the breaker handle. To return to electrical operation, rotate cam to a position that matches the breaker handle. See instruction label inside operator.

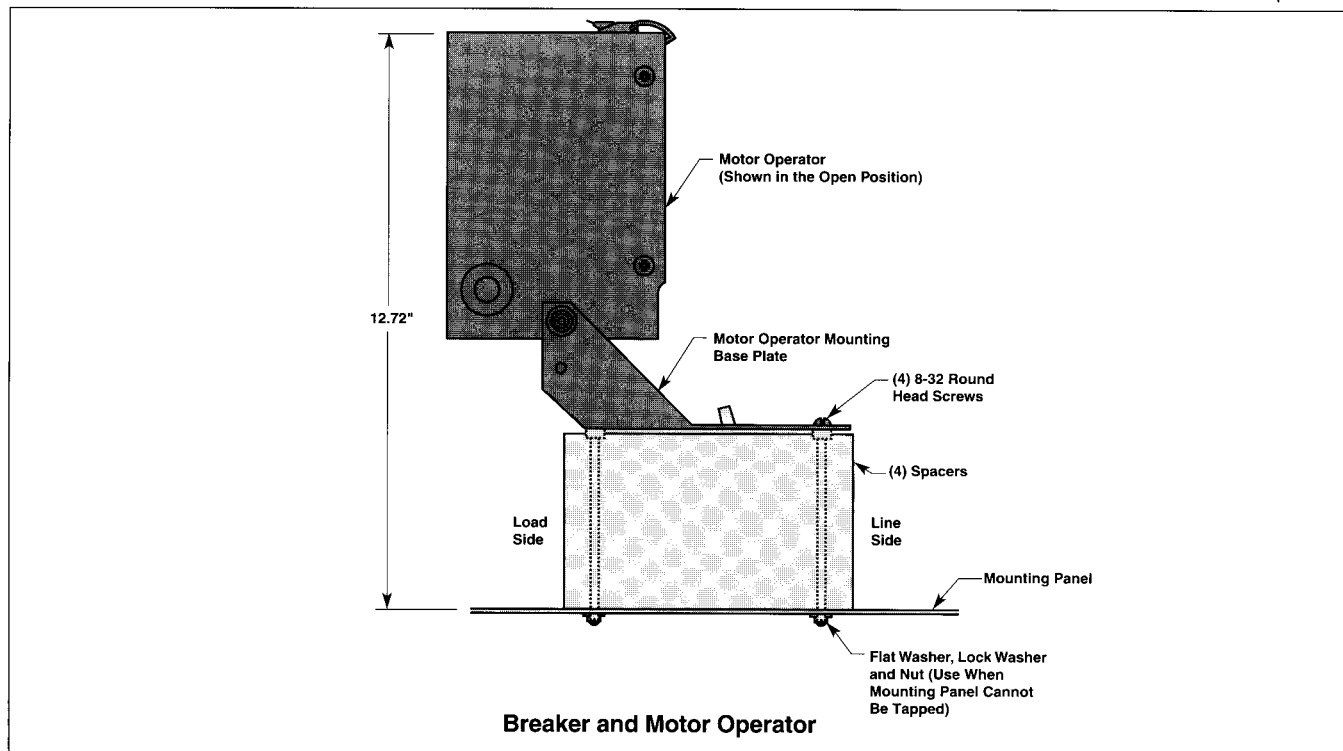


Figure 2

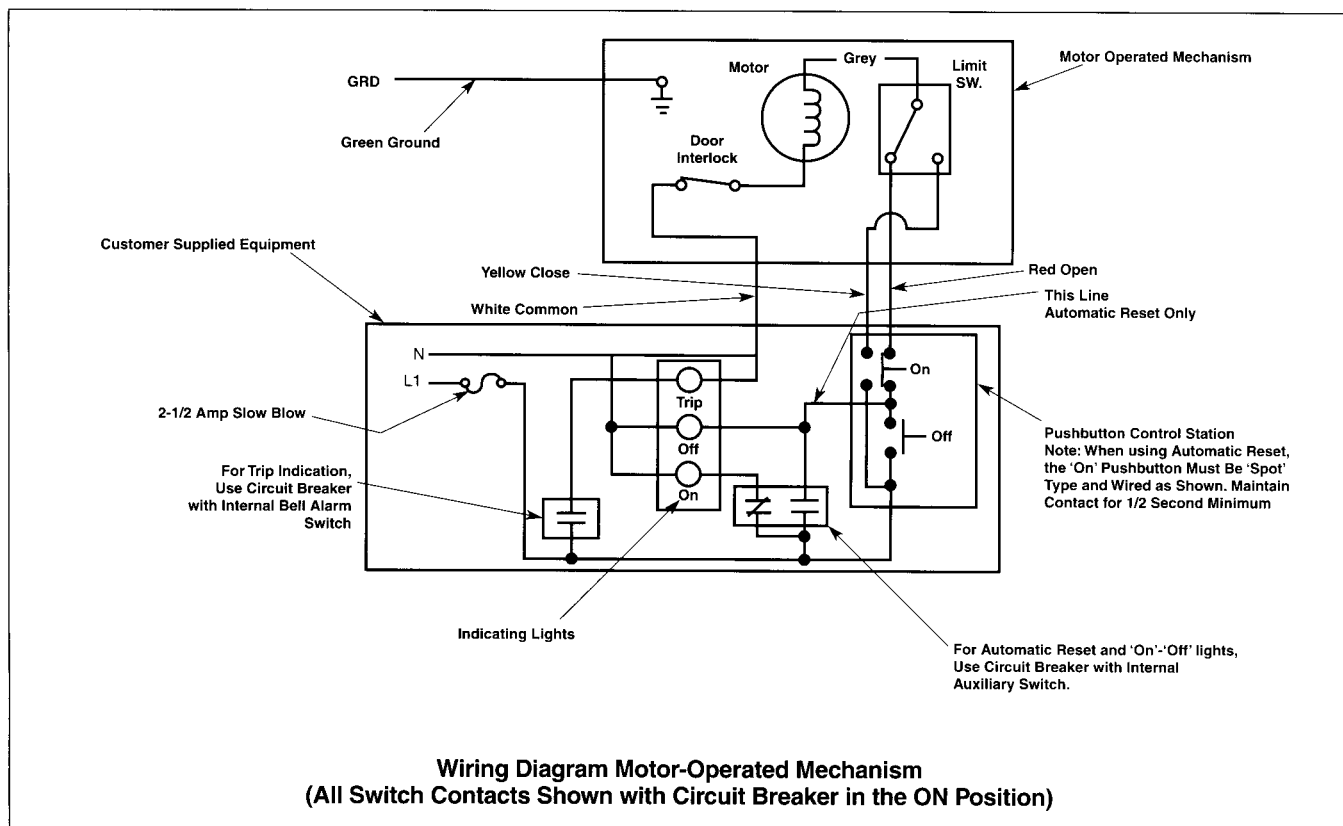
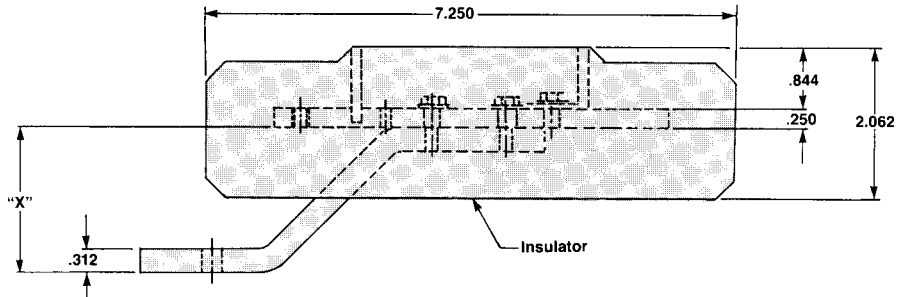
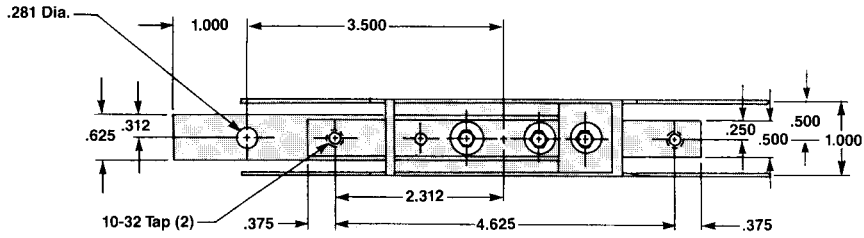


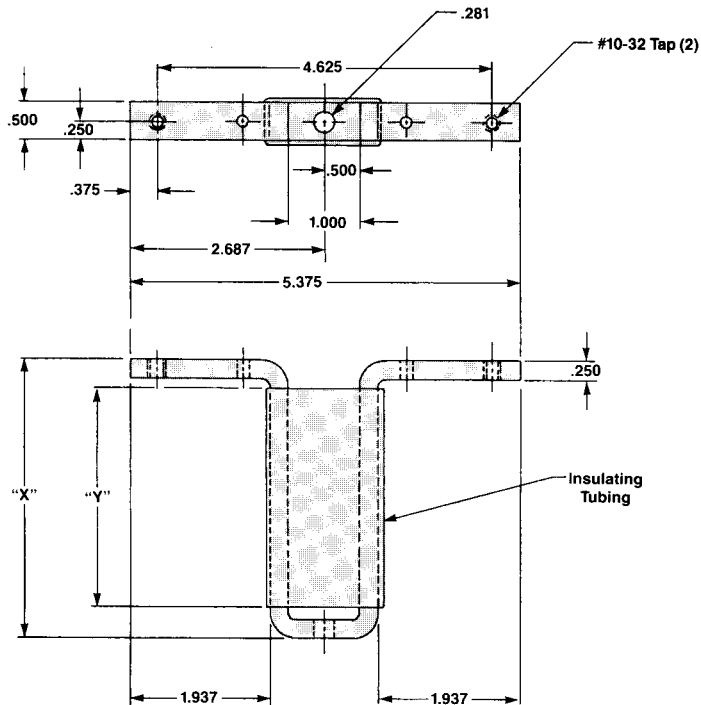
Figure 3

I-T-E Panelboard Connector Straps^①



Outside Connector Strap

Catalog Number	X
CS3600R	1.984
CS3602R	3.546



Inside Connector Strap

Catalog Number	X	Y
CS3601R	2.234	1.5
CS3603R	3.796	3.0

① These straps are not used in series 6 or 7 panelboards.

I-T-E Single Pole Mounting Bracket (E2BMB)^①

- A. Place short tab (1) in circuit breaker case slot and then slide both tabs toward matching holes in side of circuit breaker case (Figure 1).
- B. Long tab (2) must be snapped into place. (It can be removed by prying up with screwdriver and sliding it off.)

- C. Fasten mounting bracket to circuit breaker with self-tapping screw (3) provided (6 in. lb. max. torque).
- D. Mount breaker to enclosure surface with two #10-32 x ¼ in. mounting screws provided.

① This bracket is used for single pole mounting with or without accessory module.

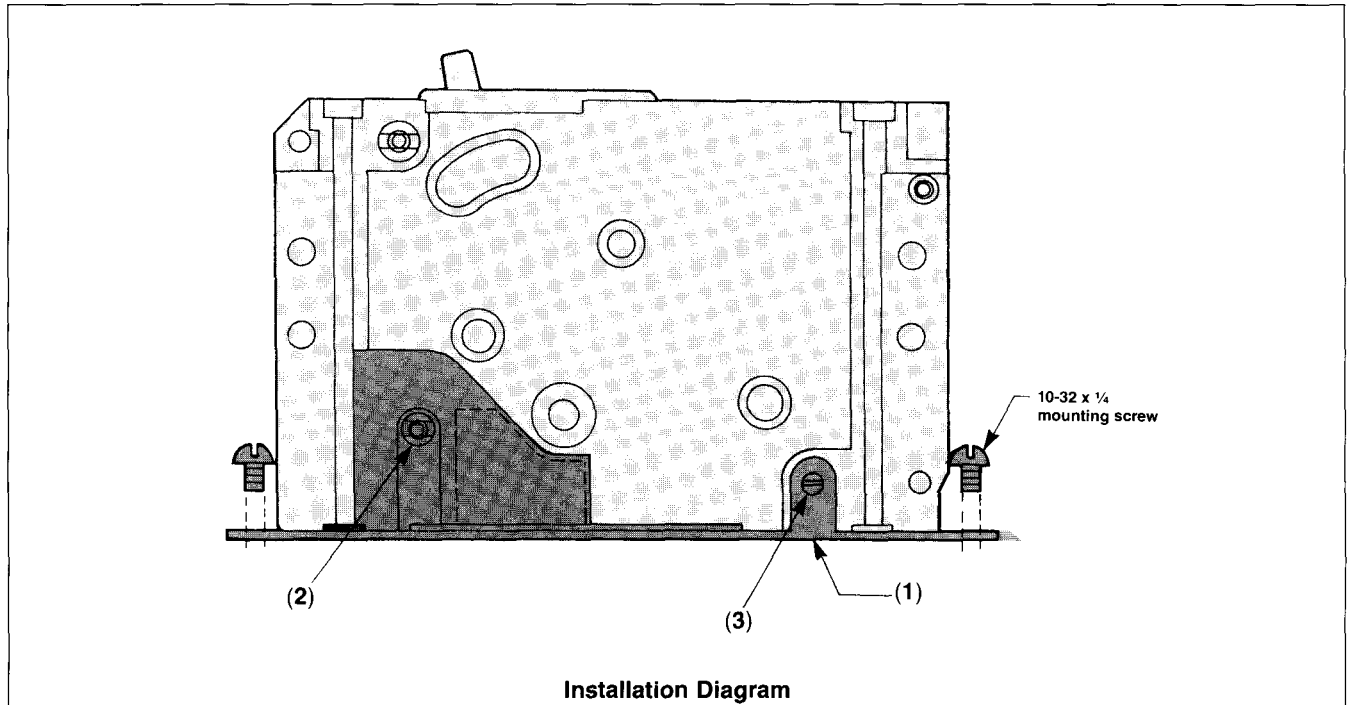


Figure 1

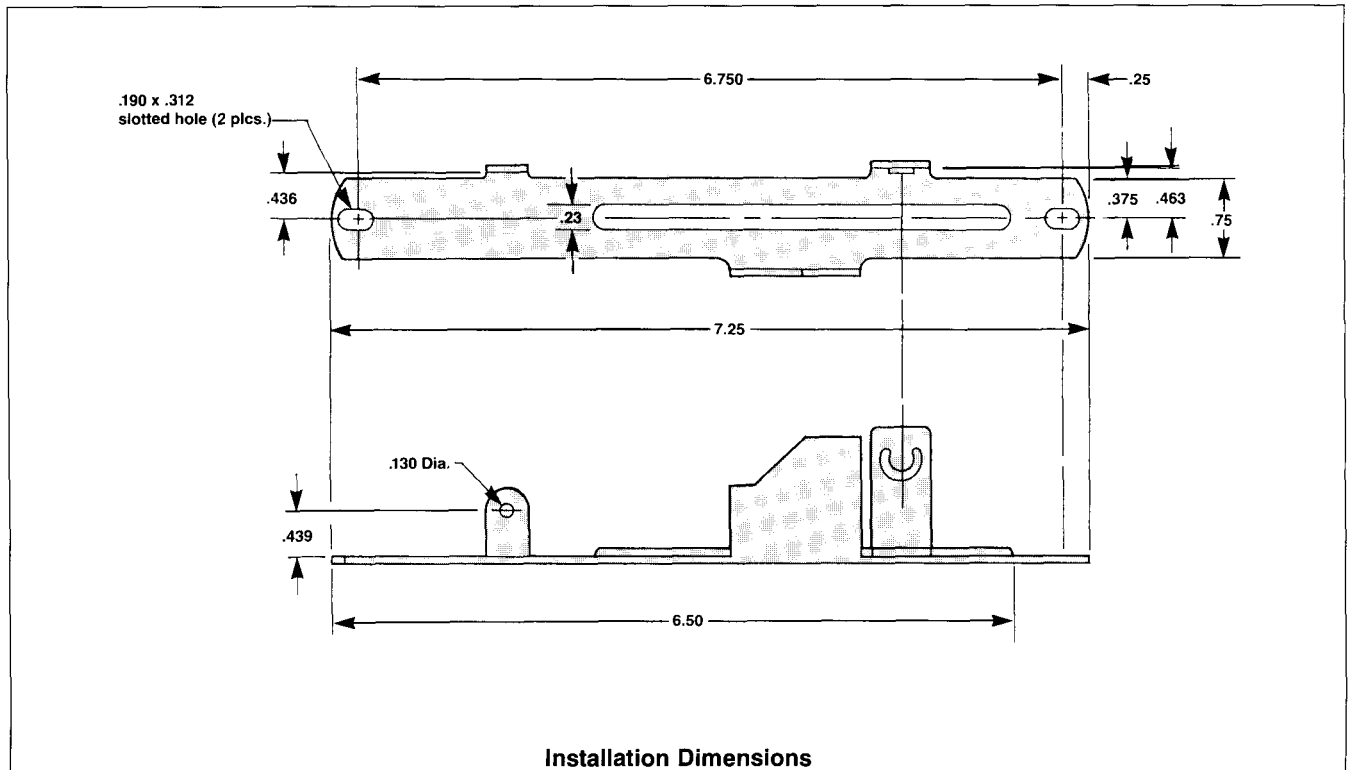


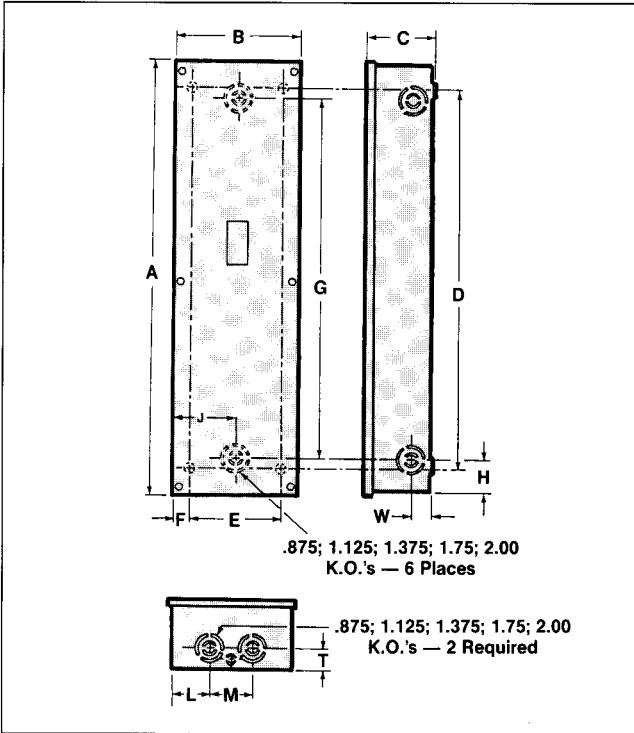
Figure 2

I-T-E Enclosures

Types 1, 3R, 4, 4x

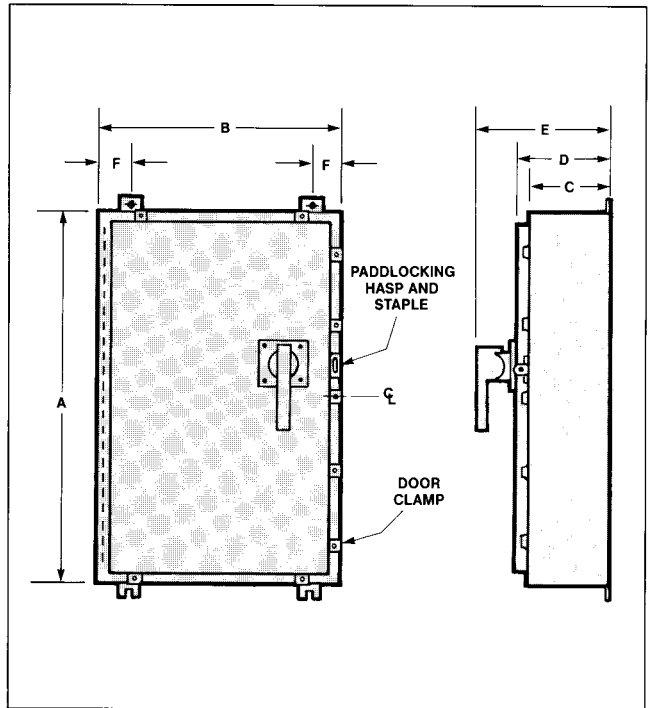
Type 1—E2N1S^①②, E2N1F^①②, CLE6N1S^①③,
CLE6N1F^①③

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



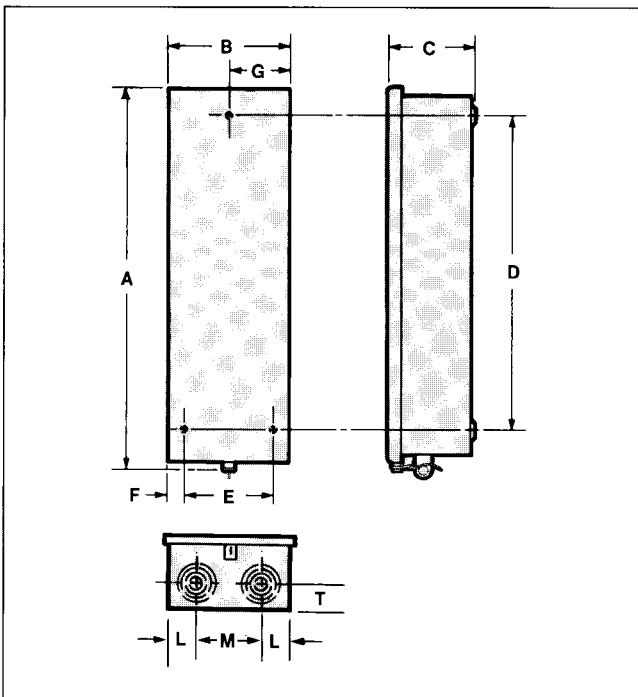
Type 4, 4X—ED6SS4^②

Stainless steel indoor or outdoor enclosure designed for use in areas where serious corrosion problems exist. Meets NEMA Type 3, 4, 4X, 12 and 13 requirements and UL 508 Type 4 and 4X requirements.



Type 3R—E2N3R^②, CLE6N3R^③

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



Dimension (In Inches)

Ref.	Catalog Number						
	E2N1S	E2N1F	CLE6N1S	CLE6N1F	E2N3R	CLE6N3R	ED6SS4
A	16.7	17.5	21.47	22.25	17.56	22.3	20.0
B	7.5	8.5	7.6	8.5	7.25	7.25	16.0
C	5.06	5.06	5.11	5.11	5.25	5.25	6.0
D	13.7	13.7	18.25	18.25	12.6	17.4	7.2
E	5.25	5.25	5.25	5.25	5.25	5.25	9.75
F	1.0	1.0	1.0	1.0	1.0	1.0	3.0
G	13.2	13.2	18.3	18.3	3.625	3.625	—
H	1.6	1.6	1.6	1.6	—	—	—
J	3.6	3.6	3.6	3.6	—	—	—
L	2.1	2.1	2.1	2.1	1.5	1.5	—
M	3.1	3.1	3.1	3.1	4.25	4.25	—
T	2.2	2.2	2.2	2.2	1.56	1.56	—
W	1.6	1.6	1.6	1.6	—	—	—

① "S" suffix is for surface mounted, "F" suffix is for flush mounted.

② For use with circuit breaker types ED2, ED4, ED6, HED4, HED6.

③ For use with circuit breaker type CED6.

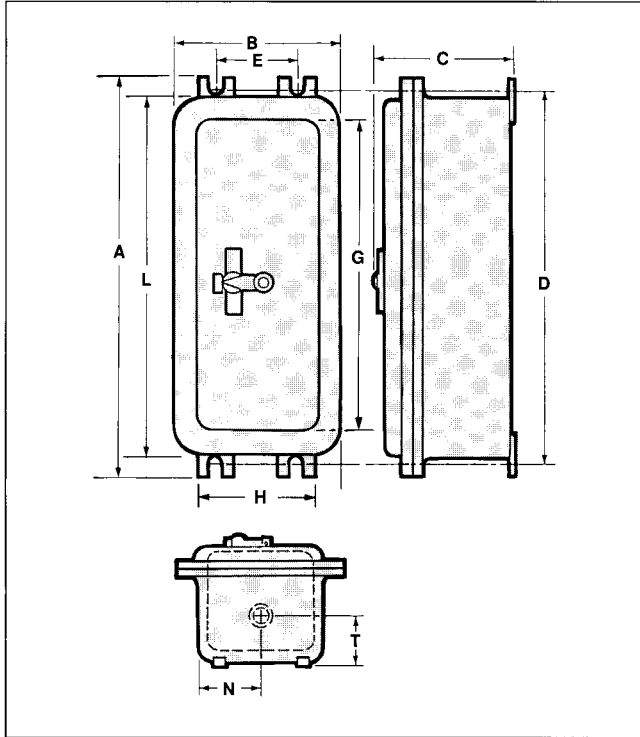
NOTE: Neutral supplied with each enclosure.

I-T-E Enclosures

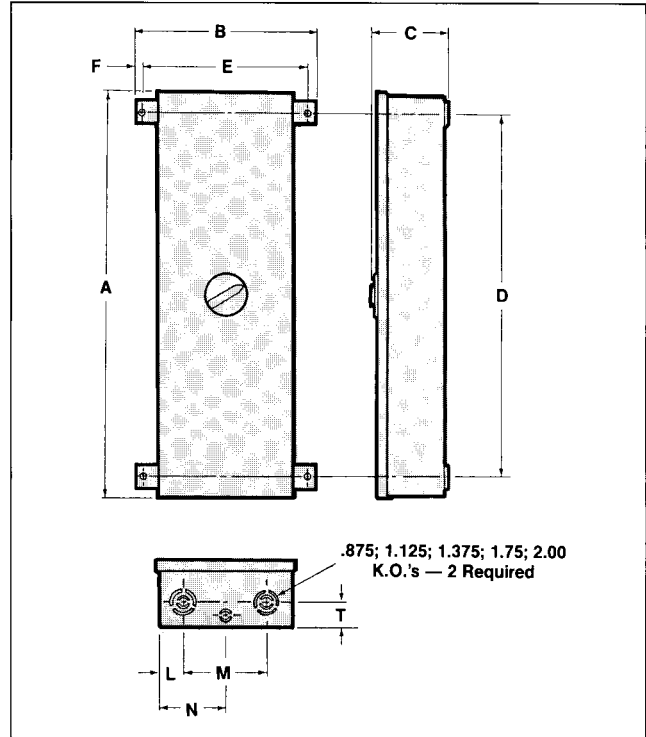
Types 7, 9, 12

Type 7, 9—EA (60A)①, EB (100A)①

Cast aluminum enclosure, classified as explosion and fire hazard only enclosure for use in hazardous locations; Class I—Group D, Class II—Groups E, F and G, Class III.

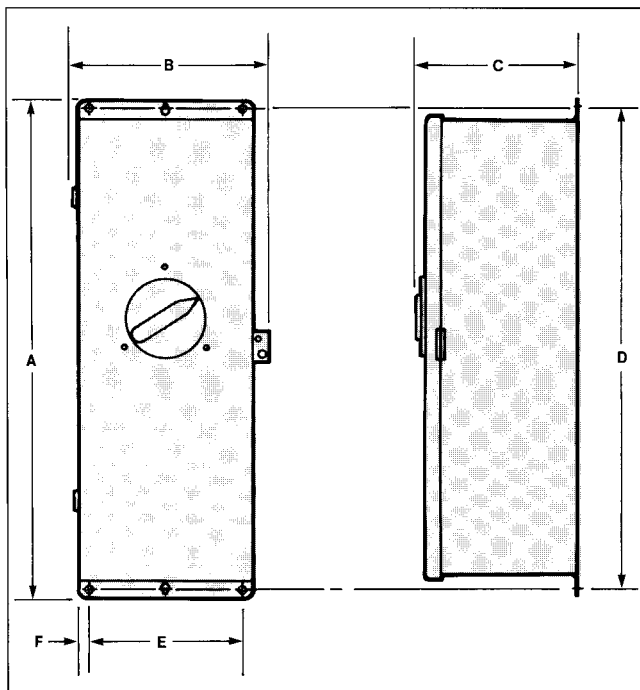


Type 12, 12K—CLE6N12②, CLE6N12K②③



Type 12, 12K—E2N12(K)①

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



Dimensions (In Inches)

Ref.	Catalog Number			
	EA (60A)	EB (100A)	E2N12K	CLE6N12K
A	14.3	19.4	18.6	22.6
B	9.4	9.9	7.5	8.3
C	6.6	6.7	5.8	7.06
D	13.1	18.0	16.75	22.0
E	5.5	6.0	6.06	6.06
F	—	—	.5	.5
G	10.75	16.0	—	—
H	5.1	6.5	—	—
L	14.25	19.4	—	2.0
M	—	—	—	3.1
N	4.7	4.95	—	4.15
T	1.6	2.0	—	2.4

①For use with circuit breaker types ED2, ED4, ED6, HED4, HED6.

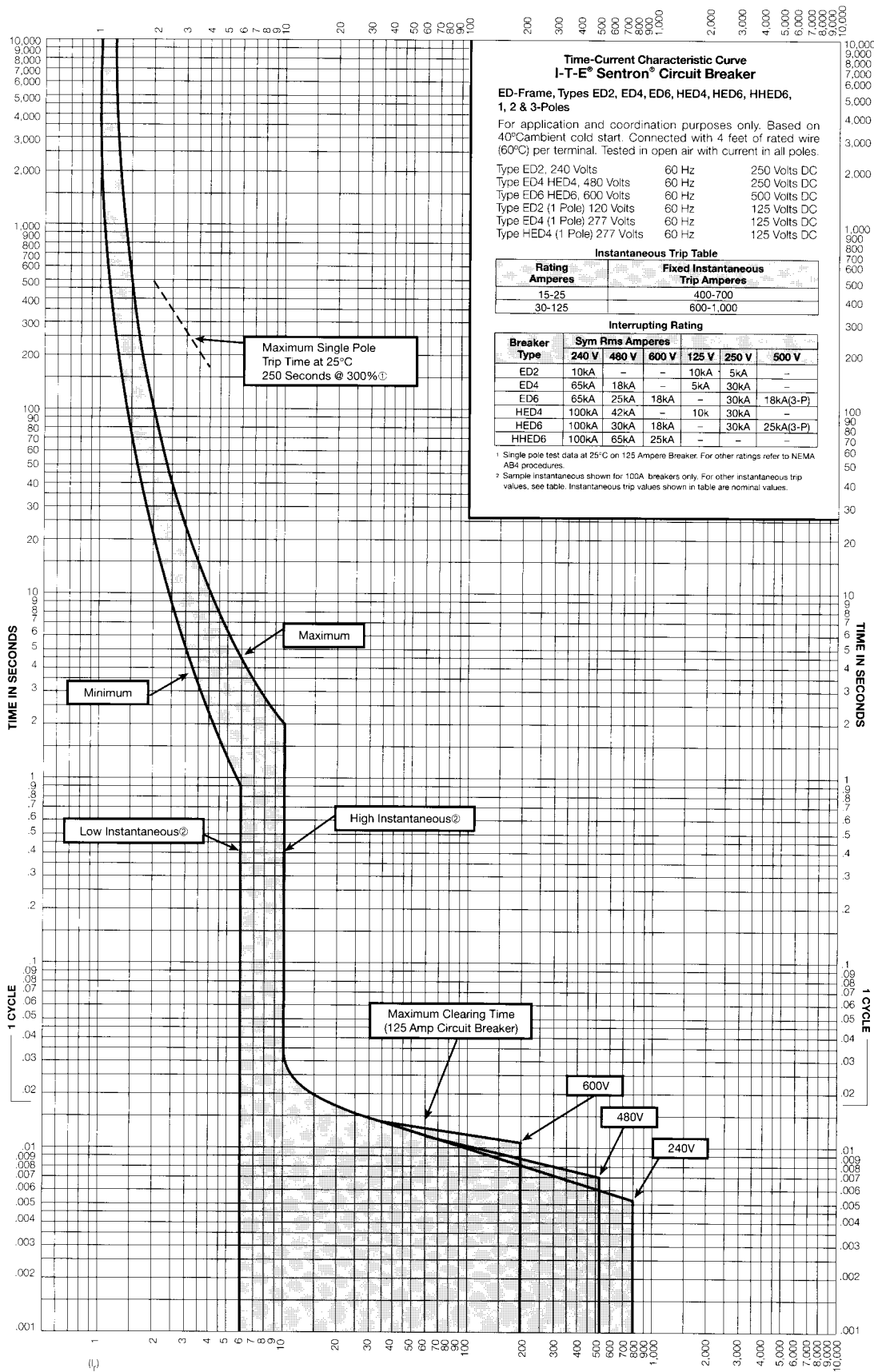
②For use with circuit breaker type CED6.

③Add "K" suffix when Type 12 with knockouts is required.

NOTE: Neutral supplied with each enclosure.

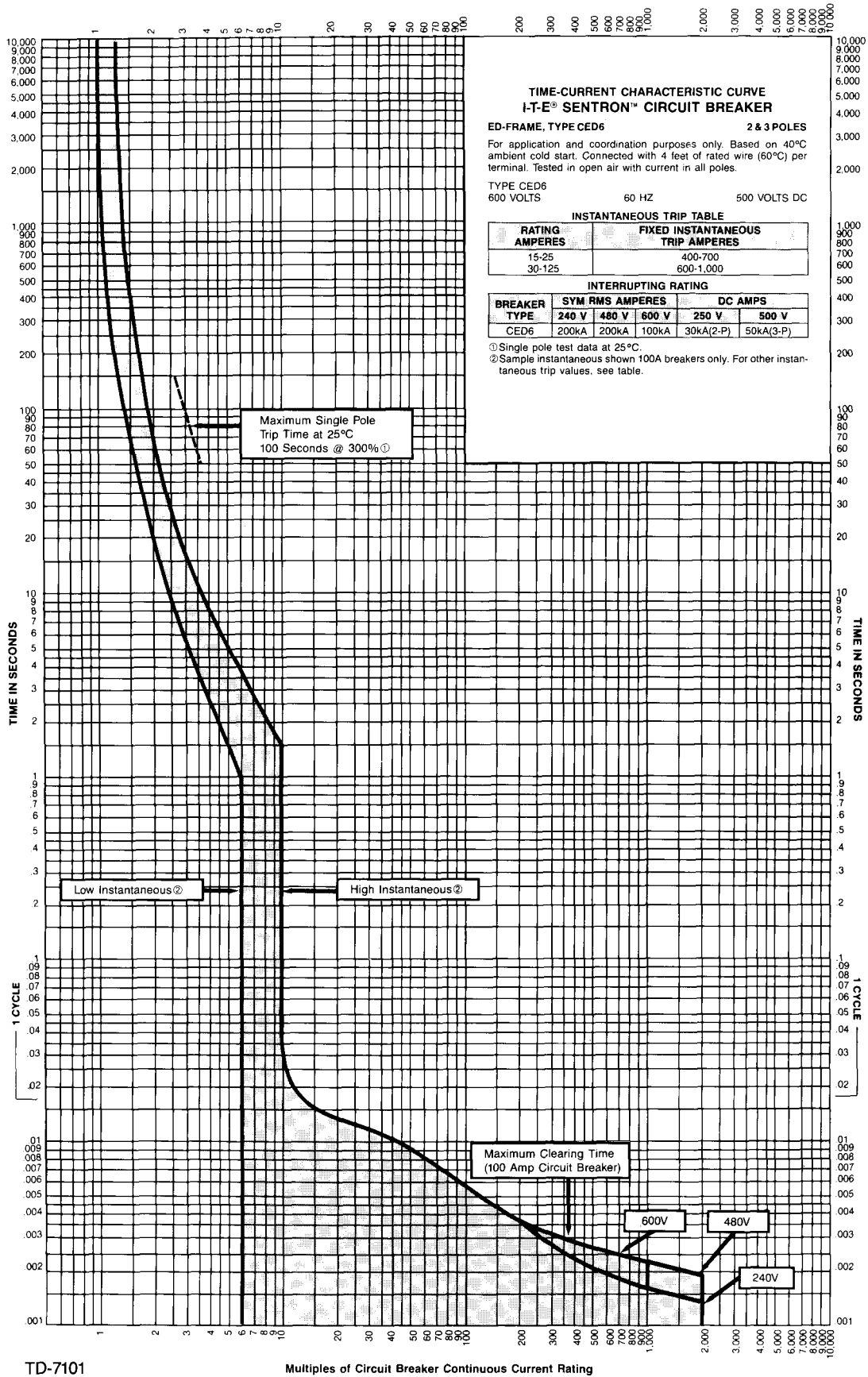
ED-Frame Time Current Curve

Types ED2, ED4, ED6, HED4, HED6, HHED6



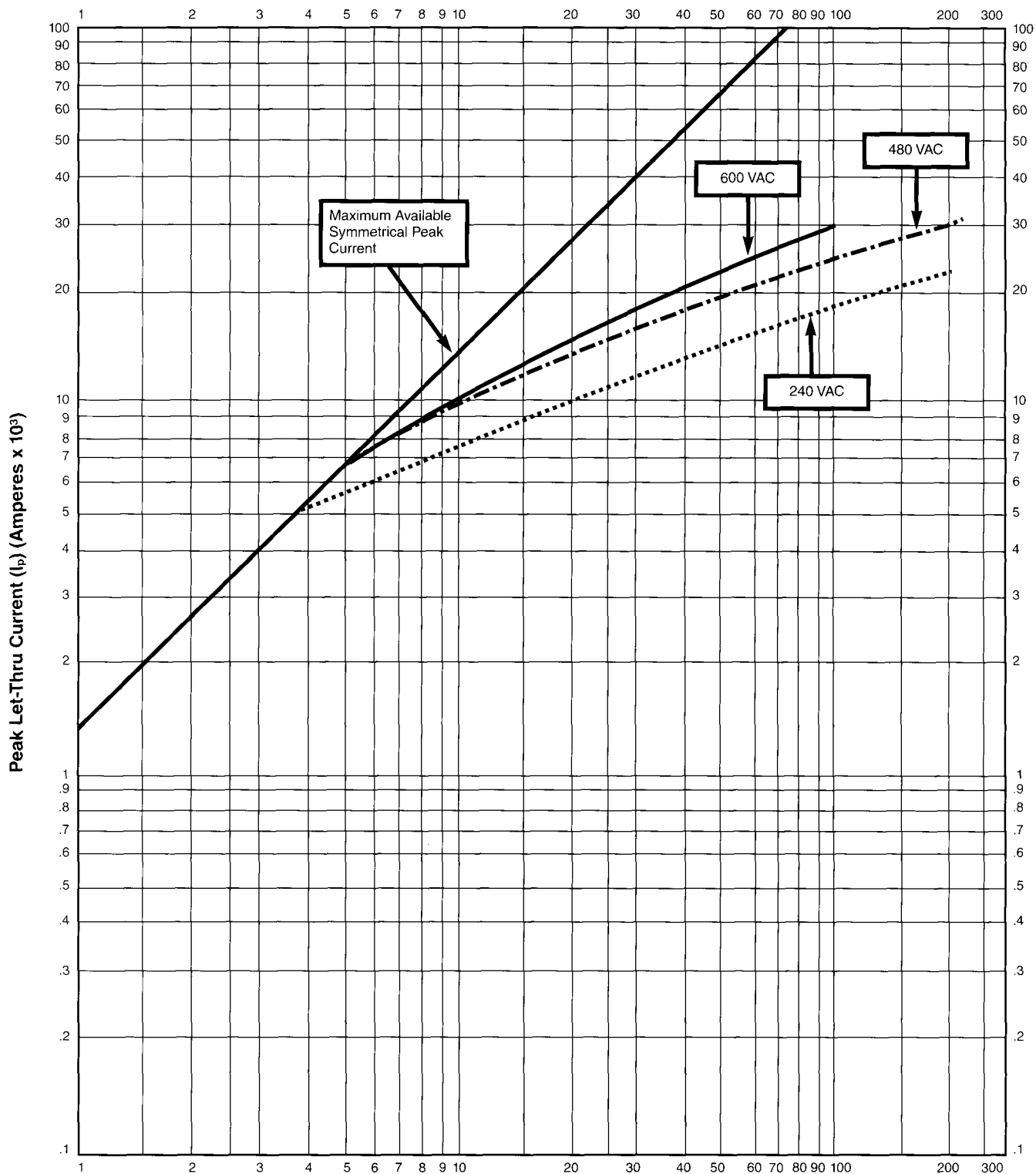
ED-Frame Time Current Curve

Type CED6



ED-Frame Peak Let-Thru Current (I_p) Curve

Type CED6

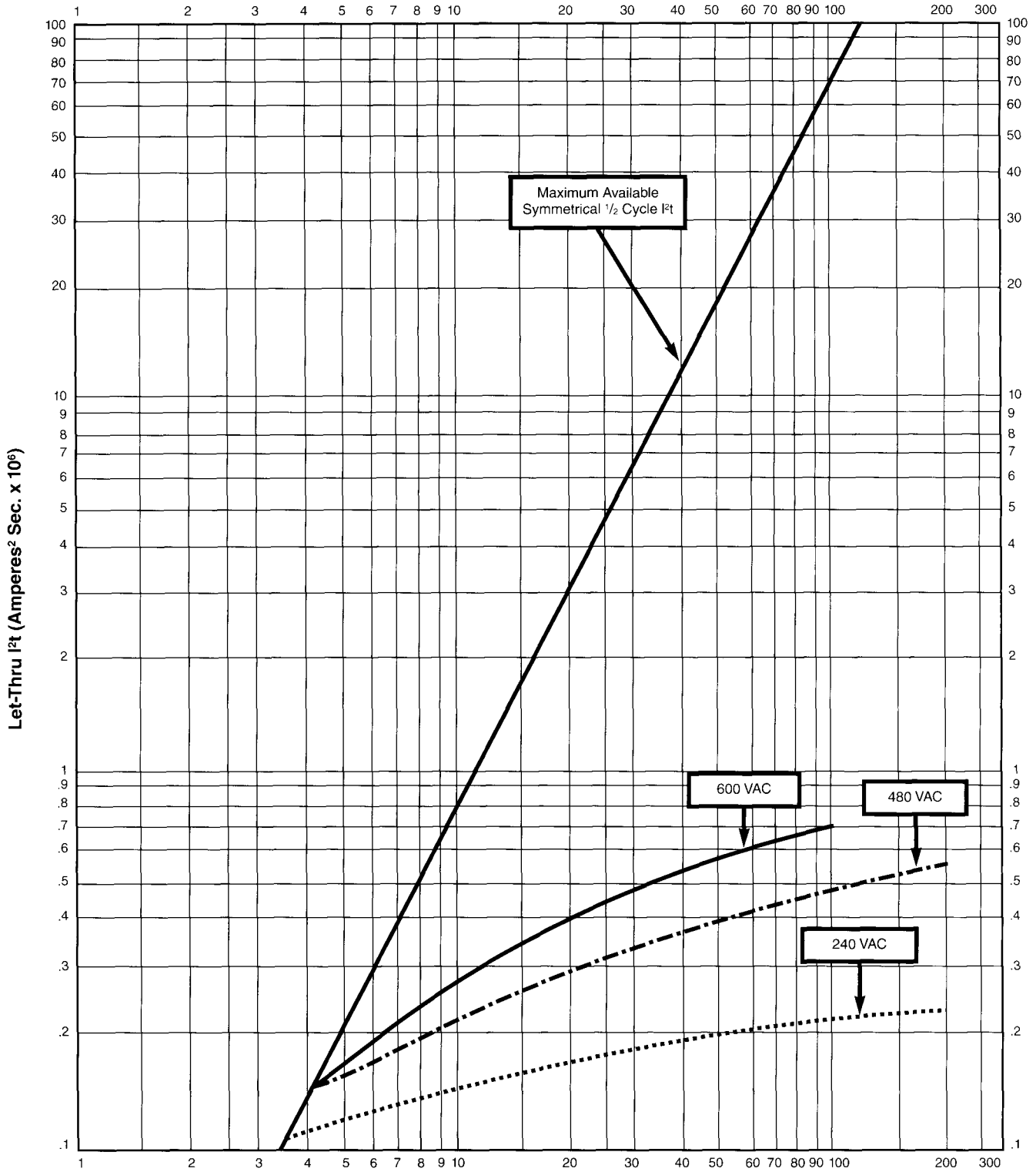


TD-7101-A (REV. 2)

Available Short Circuit Current
(RMS Symmetrical Amperes $\times 10^3$)

ED-Frame Let-Thru I²t Curve

Type CED6



TD-7101-B (REV. 2)

Available Short Circuit Current
(RMS Symmetrical Amperes x 10³)

Ordering Information

Circuit Breaker Catalog Numbers

ED2 Non-Interchangeable Trip

1-Pole

Ampere Rating	Complete Breaker Unenclosed Catalog Number	UL Interrupting Ratings (kA) (RMS Symmetrical Amperes)	
		120V AC	125V DC
15 ^①	ED21B015	10	5
20 ^①	ED21B020	10	5
25	ED21B025	10	5
30	ED21B030	10	5
35	ED21B035	10	5
40	ED21B040	10	5
45	ED21B045	10	5
50	ED21B050	10	5
60	ED21B060	10	5
70	ED21B070	10	5
80	ED21B080	10	5
90	ED21B090	10	5
100	ED21B100	10	5

SHIPPING: 30 per carton. (Wt. 38 lb.)

2-Pole

		240V AC	125/250V DC
15	ED22B015	10	5
20	ED22B020	10	5
25	ED22B025	10	5
30	ED22B030	10	5
35	ED22B035	10	5
40	ED22B040	10	5
45	ED22B045	10	5
50	ED22B050	10	5
60	ED22B060	10	5
70	ED22B070	10	5
80	ED22B080	10	5
90	ED22B090	10	5
100	ED22B100	10	5
Molded Case Switch ^{②③} 100	ED22S100A	10	5

SHIPPING: 10 per carton. (Wt. 25 lb.)

3-Pole

		240V AC	125/250V DC
15	ED23B015	10	N/A
20	ED23B020	10	N/A
25	ED23B025	10	N/A
30	ED23B030	10	N/A
35	ED23B035	10	N/A
40	ED23B040	10	N/A
45	ED23B045	10	N/A
50	ED23B050	10	N/A
60	ED23B060	10	N/A
70	ED23B070	10	N/A
80	ED23B080	10	N/A
90	ED23B090	10	N/A
100	ED23B100	10	N/A
Molded Case Switch ^{②③} 100	ED23S100A	10	N/A

SHIPPING: 10 per carton. (Wt. 38 lb.)

- ① Approved for frequent switching applications (SWD duty).
 ② Includes self-protecting instantaneous element—will trip at currents over 1000A.
 ③ May be used on a circuit capable of delivering not more than the indicated fault current when protected by a fuse or circuit breaker at 100 or 125 amperes.

ED4 Non-Interchangeable Trip

1-Pole

Ampere Rating	Complete Breaker Unenclosed Catalog Number	UL Interrupting Ratings (kA) ^③ (RMS Symmetrical Amperes)		
		120V AC	277V AC	125V DC
15 ^①	ED41B015	25	22	5
20 ^①	ED41B020	25	22	5
25	ED41B025	25	22	5
30	ED41B030	25	22	5
35	ED41B035	25	22	5
40	ED41B040	25	22	5
45	ED41B045	25	22	5
50	ED41B050	25	22	5
60	ED41B060	25	22	5
70	ED41B070	25	22	5
80	ED41B080	25	22	5
90	ED41B090	25	22	5
100	ED41B100	25	22	5

SHIPPING: 30 per carton. (Wt. 38 lb.)

2-Pole

		240V AC	480V AC	250V DC
15	ED42B015	65	18	30
20	ED42B020	65	18	30
25	ED42B025	65	18	30
30	ED42B030	65	18	30
35	ED42B035	65	18	30
40	ED42B040	65	18	30
45	ED42B045	65	18	30
50	ED42B050	65	18	30
60	ED42B060	65	18	30
70	ED42B070	65	18	30
80	ED42B080	65	18	30
90	ED42B090	65	18	30
100	ED42B100	65	18	30
110	ED42B110	65	18	30
125	ED42B125	65	18	30
Molded Case Switch ^{②③} 100 125	ED42S100A ED42S125A	65 65	18 18	30 30

SHIPPING: 10 per carton. (Wt. 25 lb.)

3-Pole

		240V AC	480V AC	250V DC
15	ED43B015	65	18	N/A
20	ED43B020	65	18	N/A
25	ED43B025	65	18	N/A
30	ED43B030	65	18	N/A
35	ED43B035	65	18	N/A
40	ED43B040	65	18	N/A
45	ED43B045	65	18	N/A
50	ED43B050	65	18	N/A
60	ED43B060	65	18	N/A
70	ED43B 70	65	18	N/A
80	ED43B080	65	18	N/A
90	ED43B090	65	18	N/A
100	ED43B100	65	18	N/A
110	ED43B110	65	18	N/A
125	ED43B125	65	18	N/A
Molded Case Switch ^{②③} 100 125	ED43S100A ED43S125A	65 65	18 18	N/A N/A

SHIPPING: 10 per carton. (Wt. 38 lb.)

- ③ IEC interrupting ratings are listed on page 51.

Ordering Information

Circuit Breaker Catalog Numbers

ED6 Non-Interchangeable Trip

2-Pole

Ampere Rating	Complete Breaker Unenclosed Catalog Number	UL Interrupting Ratings (kA)① (RMS Symmetrical Amperes)				
		Volts AC			Volts DC	
		240	480	600	250	500
15	ED62B015	65	25	18	30	N/A
20	ED62B020	65	25	18	30	N/A
25	ED62B025	65	25	18	30	N/A
30	ED62B030	65	25	18	30	N/A
35	ED62B035	65	25	18	30	N/A
40	ED62B040	65	25	18	30	N/A
45	ED62B045	65	25	18	30	N/A
50	ED62B050	65	25	18	30	N/A
60	ED62B060	65	25	18	30	N/A
70	ED62B070	65	25	18	30	N/A
80	ED62B080	65	25	18	30	N/A
90	ED62B090	65	25	18	30	N/A
100	ED62B100	65	25	18	30	N/A
110	ED62B110	65	25	18	30	N/A
125	ED62B125	65	25	18	30	N/A
Molded Case Switch②③						
100	ED62S100A	65	25	18	30	N/A
125	ED62S125A	65	25	18	30	N/A

SHIPPING: 10 per carton. (Wt. 25 lb.)

3-Pole

15	ED63B015	65	25	18	N/A	18
20	ED63B020	65	25	18	N/A	18
25	ED63B025	65	25	18	N/A	18
30	ED63B030	65	25	18	N/A	18
35	ED63B035	65	25	18	N/A	18
40	ED63B040	65	25	18	N/A	18
45	ED63B045	65	25	18	N/A	18
50	ED63B050	65	25	18	N/A	18
60	ED63B060	65	25	18	N/A	18
70	ED63B070	65	25	18	N/A	18
80	ED63B080	65	25	18	N/A	18
90	ED63B090	65	25	18	N/A	18
100	ED63B100	65	25	18	N/A	18
110	ED63B110	65	25	18	N/A	18
125	ED63B125	65	25	18	N/A	18
Molded Case Switch②③						
100	ED63S100A	65	25	18	N/A	N/A
125	ED63S125A	65	25	18	N/A	N/A

SHIPPING: 10 per carton. (Wt. 38 lb.)

① IEC interrupting ratings are listed below.

② Includes self-protecting instantaneous element—will trip at currents over 1000A.

③ May be used on a circuit capable of delivering not more than the indicated fault current when protected by a fuse or circuit breaker at 100 or 125 amperes.

IEC 157-1 (P1) Interrupting Ratings (kA)

Volts AC (50/60 Hz)	Circuit Breaker Type (3-P Only)			
	ED4	HED4	HED6	CED6
220/240	65	100	100	200
380/415	25	42	30	200

HED4 Non-Interchangeable Trip

1-Pole

Ampere Rating	Complete Breaker Unenclosed Catalog Number	UL Interrupting Ratings (kA)① (RMS Symmetrical Amperes)		
		120V AC	277V AC	125V DC
		15	HED41B015	100
20	HED41B020	100	100	10
25	HED41B025	100	100	10
30	HED41B030	100	100	10
35	HED41B035	100	100	10
40	HED41B040	100	100	10
45	HED41B045	100	100	10
50	HED41B050	100	100	10
60	HED41B060	100	100	10
70	HED41B070	100	100	10
80	HED41B080	100	100	10
90	HED41B090	100	100	10
100	HED41B100	100	100	10

SHIPPING: 30 per carton. (Wt. 38 lb.)

2-Pole

		240V AC	480V AC	250V DC
15	HED42B015	100	42	30
20	HED42B020	100	42	30
25	HED42B025	100	42	30
30	HED42B030	100	42	30
35	HED42B035	100	42	30
40	HED42B040	100	42	30
45	HED42B045	100	42	30
50	HED42B050	100	42	30
60	HED42B060	100	42	30
70	HED42B070	100	42	30
80	HED42B080	100	42	30
90	HED42B090	100	42	30
100	HED42B100	100	42	30
110	HED42B110	100	42	30
125	HED42B125	100	42	30

SHIPPING: 10 per carton. (Wt. 25 lb.)

3-Pole

		240V AC	480V AC	250V DC
15	HED43B015	100	42	N/A
20	HED43B020	100	42	N/A
25	HED43B025	100	42	N/A
30	HED43B030	100	42	N/A
35	HED43B035	100	42	N/A
40	HED43B040	100	42	N/A
45	HED43B045	100	42	N/A
50	HED43B050	100	42	N/A
60	HED43B060	100	42	N/A
70	HED43B070	100	42	N/A
80	HED43B080	100	42	N/A
90	HED43B090	100	42	N/A
100	HED43B100	100	42	N/A
110	HED43B110	100	42	N/A
125	HED43B125	100	42	N/A

SHIPPING: 10 per carton. (Wt. 38 lb.)

Ordering Information

Circuit Breaker Catalog Numbers

HED6 Non-Interchangeable Trip

2-Pole

Ampere Rating	Complete Breaker Unenclosed Catalog Number	UL Interrupting Ratings (kA) ① (RMS Symmetrical Amperes)				
		Volts AC			Volts DC	
		240	480	600	250	500
15	HED62B015	100	30	18	30	N/A
20	HED62B020	100	30	18	30	N/A
25	HED62B025	100	30	18	30	N/A
30	HED62B030	100	30	18	30	N/A
35	HED62B035	100	30	18	30	N/A
40	HED62B040	100	30	18	30	N/A
45	HED62B045	100	30	18	30	N/A
50	HED62B050	100	30	18	30	N/A
60	HED62B060	100	30	18	30	N/A
70	HED62B070	100	30	18	30	N/A
80	HED62B080	100	30	18	30	N/A
90	HED62B090	100	30	18	30	N/A
100	HED62B100	100	30	18	30	N/A
110	HED62B110	100	25	18	30	N/A
125	HED62B125	100	25	18	30	N/A

SHIPPING: 10 per carton. (Wt. 25 lb.)

3-Pole

15	HED63B015	100	30	18	N/A	25
20	HED63B020	100	30	18	N/A	25
25	HED63B025	100	30	18	N/A	25
30	HED63B030	100	30	18	N/A	25
35	HED63B035	100	30	18	N/A	25
40	HED63B040	100	30	18	N/A	25
45	HED63B045	100	30	18	N/A	25
50	HED63B050	100	30	18	N/A	25
60	HED63B060	100	30	18	N/A	25
70	HED63B070	100	30	18	N/A	25
80	HED63B080	100	30	18	N/A	25
90	HED63B090	100	30	18	N/A	25
100	HED63B100	100	30	18	N/A	25
110	HED63B110	100	25	18	N/A	25
125	HED63B125	100	25	18	N/A	25

SHIPPING: 10 per carton. (Wt. 25 lb.)

① IEC interrupting ratings are listed on page 49.

② Includes self-protecting instantaneous element.

③ May be used on a circuit capable of delivering not more than the indicated fault current when protected by a fuse or circuit breaker at 100 or 125 amperes.

Note: All tolerance ranges are within UL 489 standards.

HHED6 Non-Interchangeable Trip

2-Pole

Ampere Rating	Complete Breaker Unenclosed Catalog Number	UL Interrupting Ratings (kA) ① (RMS Symmetrical Amperes)		
		Volts AC		
		240	480	600
15	HHED62B015	100	65	25
20	HHED62B020	100	65	25
25	HHED62B025	100	65	25
30	HHED62B030	100	65	25
35	HHED62B035	100	65	25
40	HHED62B040	100	65	25
45	HHED62B045	100	65	25
50	HHED62B050	100	65	25
60	HHED62B060	100	65	25
70	HHED62B070	100	65	25
80	HHED62B080	100	65	25
90	HHED62B090	100	65	25
100	HHED62B100	100	65	25
110	HHED62B110	100	65	25
125	HHED62B125	100	65	25

Molded Case Switch ② ③				
100	HHED62S100A	100	65	25
125	HHED62S125A	100	65	25

3-Pole

15	HHED63B015	100	65	25
20	HHED63B020	100	65	25
25	HHED63B025	100	65	25
30	HHED63B030	100	65	25
35	HHED63B035	100	65	25
40	HHED63B040	100	65	25
45	HHED63B045	100	65	25
50	HHED63B050	100	65	25
60	HHED63B060	100	65	25
70	HHED63B070	100	65	25
80	HHED63B080	100	65	25
90	HHED63B090	100	65	25
100	HHED63B100	100	65	25
110	HHED63B110	100	65	25
125	HHED63B125	100	65	25

Molded Case Switch ② ③				
100	HHED63S100A	100	65	25
125	HHED63S125A	100	65	25

Ordering Information

Circuit Breaker Catalog Numbers

CED6 Non-Interchangeable Trip

2-Pole

Ampere Rating	Complete Breaker Unenclosed	UL Interrupting Ratings (kA) ① (RMS Symmetrical Amperes)				
		Volts AC			Volts DC	
	Catalog Number	240	480	600	250	500
15	CED62B015	200	200	100	30	N/A
20	CED62B020	200	200	100	30	N/A
30	CED62B030	200	200	100	30	N/A
40	CED62B040	200	200	100	30	N/A
50	CED62B050	200	200	100	30	N/A
60	CED62B060	200	200	100	30	N/A
70	CED62B070	200	200	100	30	N/A
80	CED62B080	200	200	100	30	N/A
90	CED62B090	200	200	100	30	N/A
100	CED62B100	200	200	100	30	N/A
125	CED62B125	200	200	100	30	N/A
Molded Case Switch ② ③						
100	CED62S100A	200	200	100	30	N/A
125	CED62S125A	200	200	100	30	N/A
SHIPPING: 5 per carton. (Wt. 20 lb.)						

3-Pole

Ampere Rating	Complete Breaker Unenclosed	UL Interrupting Ratings (kA) ① (RMS Symmetrical Amperes)				
		Volts AC			Volts DC	
	Catalog Number	240	480	600	250	500
15	CED63B015	200	200	100	N/A	50
20	CED63B020	200	200	100	N/A	50
30	CED63B030	200	200	100	N/A	50
40	CED63B040	200	200	100	N/A	50
50	CED63B050	200	200	100	N/A	50
60	CED63B060	200	200	100	N/A	50
70	CED63B070	200	200	100	N/A	50
80	CED63B080	200	200	100	N/A	50
90	CED63B090	200	200	100	N/A	50
100	CED63B100	200	200	100	N/A	50
125	CED63B125	200	200	100	N/A	50
Molded Case Switch ② ③						
100	CED63S100A	200	200	100	N/A	N/A
125	CED63S125A	200	200	100	N/A	N/A
SHIPPING: 5 per carton. (Wt. 30 lb.)						

Instantaneous Trip (Motor Circuit Protectors)

Ampere Rating	Complete Breaker Unenclosed		Instantaneous Trip Setting (Amperes) All Values are Nominal				
	Catalog Number		Low	2	3	4	High
	ED6-ETI (3-Pole)	CED6-ETI (3-Pole)					
1	ED63A001	CED63A001	2.6	4.5	6	7.5	9
2	ED63A002	CED63A002	7	11	15	19	22
3	ED63A003	CED63A003	10	17	23	30	35
5	ED63A005	CED63A005	16	26	36	46	54
10	ED63A010	CED63A010	30	50	70	85	100
25	ED63A025	CED63A025	55	90	125	155	180
30	ED63A030	CED63A030	80	135	185	235	270
40	ED63A040	CED63A040	115	185	255	325	375
50	ED63A050	CED63A050	180	300	410	520	600
100	ED63A100	CED63A100	315	540	740	890	1000
125	ED63A125	CED63A125	500	720	920	1100	1250
SHIPPING:	1 per carton. (Wt. 3.8 lb.)		1 per carton. (Wt. 6 lb.)				

① IEC interrupting ratings are listed on page 49.

② Includes self-protecting instantaneous element.

③ May be used on a circuit capable of delivering not more than the indicated fault current when protected by a fuse or circuit breaker at 100 or 125 amperes.

Note: All tolerance ranges are within UL 489 standards.

Ordering Information—Accessory Combinations

Auxiliary Switch

Control Voltage		1 Auxiliary Switch	1 Alarm Switch and 1 Auxiliary Switch	1 Alarm Switch and 2 Auxiliary Switches	2 Auxiliary Switches
AC	DC	Catalog Number	Catalog Number	Catalog Number	Catalog Number
120		A01ED62	A01ED62B	A02ED62	A02ED62B
208		A01ED62	A01ED62B	A02ED62	A02ED62B
240		A01ED62	A01ED62B	A02ED62	A02ED62B
277		A01ED64	A01ED64B	N/A	N/A
480		A01ED64	A01ED64B	N/A	N/A
600		N/A	N/A	N/A	N/A
	24	A01ED62	A01ED62B	A02ED62	A02ED62B
	48	A01ED62	A01ED62B	A02ED62	A02ED62B
	125	A01ED62	A01ED62B	A02ED62	A02ED62B
	250	A01ED62	A01ED62B	A02ED62	A02ED62B

Shunt Trip

Control Voltage		1 Shunt Trip	1 Shunt Trip and 1 Auxiliary Switch	1 Shunt Trip, 1 Auxiliary Switch and 1 Alarm Switch	1 Shunt Trip and 1 Alarm Switch	1 Shunt Trip and 2 Auxiliary Switches
AC	DC	Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
24		S17ED60	N/A	N/A	N/A	N/A
48		S18ED60	N/A	N/A	N/A	N/A
120		S01ED60	S01ED62A	S01ED62AB	S01ED62B	S01ED62AA
208		S02ED60	S02ED62A	S02ED62AB	S02ED62B	S02ED62AA
240		S03ED60	S03ED62A	S03ED62AB	S03ED62B	S03ED62AA
277		S15ED60	S15ED64A	S15ED64AB	S15ED64B	N/A
480		S04ED60	S04ED64A	S04ED64AB	S04ED64B	N/A
600		S06ED60	N/A	N/A	N/A	N/A
	24	S07ED60	S07ED62A	S07ED62AB	S07ED62B	S07ED62AA
	48	S09ED60	S09ED62A	S09ED62AB	S09ED62B	S09ED62AA
	125	S11ED60	S11ED62A	S11ED62AB	S11ED62B	S11ED62AA
	250	S13ED60	S13ED62A	S13ED62AB	S13ED62B	S13ED62AA

Undervoltage Trip

Control Voltage		1 Undervoltage Trip	1 Undervoltage Trip and 1 Auxiliary Switch	1 Undervoltage Trip, 1 Auxiliary Switch and 1 Alarm Switch	1 Undervoltage Trip and 1 Alarm Switch	1 Undervoltage Trip and 2 Auxiliary Switches
AC	DC	Catalog Number	Catalog Number	Catalog Number	Catalog Number	Catalog Number
120		U01ED60	U01ED62A	U01ED62AB	U01ED62B	U01ED62AA
208		U02ED60	U02ED62A	U02ED62AB	U02ED62B	U02ED62AA
240		U03ED60	U03ED62A	U03ED62AB	U03ED62B	U03ED62AA
277		U16ED60	U16ED64A	U16ED64AB	U16ED64B	N/A
480		U06ED60	U06ED64A	U06ED64AB	U06ED64B	N/A
600		U08ED60	N/A	N/A	N/A	N/A
	24	U13ED60	U13ED62A	U13ED62AB	U13ED62B	U13ED62AA
	48	U14ED60	U14ED62A	U14ED62AB	U14ED62B	U14ED62AA
	125	U10ED60	U10ED62A	U10ED62AB	U10ED62B	U10ED62AA
	250	U12ED60	U12ED62A	N/A	N/A	U12ED62AA

Bell Alarm Switch

Control Voltage		1 Alarm Switch
AC	DC	Catalog Number
120		B00ED62
208		B00ED62
240		B00ED62
277		B00ED64
480		B00ED64
600		N/A
	24	B00ED62
	48	B00ED62
	125	B00ED62
	250	B00ED62

Ground Fault Relays (Equipment Protection Only)

5mA	30mA
GF01ED65	GF01ED60
GF01ED65BO	GF01ED60BO
GF01ED65BC	GF01ED60BC

NOTE

Accessory module is used on all ED-Frame circuit breakers. Accessory *can not* be used with obsolete breaker types E2, E4, E6, HE4, HE6, CLE.

Each catalog number represents an add-on module. *Only one module can be added to a circuit breaker.*

Ordering Information

Additional Accessories

Item	Catalog No.
Pressure Wire Connectors 15-25A Line & Load Side	SA1E025
30-100A Single-Pole Line Side Only Multi-Pole Line & Load Side CED6 Load Side Only	LN1E100
30-60A Single-Pole Load Side Only CED6 Load Side Only	LD1E060
70-100A Single-Pole Load Side Only CED6 Load Side Only	LD1E100
110-125A Line & Load Side	TA1E6125
2- and 3-Pole 30-125A	TC1ED6150
Compression Connector 15-125A Line & Load Side	CCE125
Handle Blocking Device	E2HBL
Padlocking Device	ED2HPL
Rear Connecting Studs Line Side (Long) Load Side (Long) Line Side (Short) Load Side (Short)	RS2641 RS2642 RS2643 RS2644
Plug-In Adaptors Line Side (2-Pole) Load Side (2-Pole) Line Side (3-Pole) Load Side (3-Pole)	PC2637 PC2638 PC2657 PC2658
Switchboard Mounting Plates CED6 Breaker Type All Other Types	PL2617 PL2616
Ground Fault Sensing Relay Kits (30mA) Basic Kit Basic Kit with Normally Open Bell Alarm Basic Kit with Normally Closed Bell Alarm	GF01ED60 GF01ED60B0 GF01ED60BC
Ground Fault Sensing Relay Kits (5mA) Basic Kit Basic Kit with Normally Open Bell Alarm Basic Kit with Normally Closed Bell Alarm	GF01ED65 GF01ED65B0 GF01ED65BC
Rotary Handle Operators Standard Depth Variable Depth	D11CEU1 D11CEU2
Rotary Handle Operators Complete Mechanism Standard Depth Variable Depth Handle Breaker Operator Shaft Standard Depth Variable Depth	CRHOESD CRHOEVD RHOH ① RHOEBO RHOSSD RHOSVD

① For 4-4x application, order RHOH4 instead of RHOH.

Item	Catalog No.
Rotary Handle Operators Standard Depth Variable Depth	E2RH1 E2RHV9
Flange Mount Handle Operator Complete Mechanism Handle Breaker Operator Standard Cable (36 in.) Optional Cable (48 in.) Door Latch Mechanisms Left Side Right Side	FHOE036 FHOH ① FHOEBO FHOEC036 FHOEC048 DKL2,DKL3 DKR2,DKR3
Electric Motor Operators 120V AC 240V AC	MO6E120 MO6E240
Connector Straps Outside Strap Inside Strap	CS3600R CS3602R CS3601R CS3603R
Single Pole Mounting Bracket	E2BMB
Back Mounting Plate	E2BMB
Mounting Screw Kits	MSE6 ② MSE6100 ③
Enclosures Breaker Types ED2, ED4, ED6, HED4, HED6, HHED6 Type 1 (Surface Mounting) Type 1 (Flush Mounting) Type 3R Type 4, 4x Type 7, 9 15-60A 70-100A Type 12 Breaker Type CED6 Type 1 (Surface Mounting) Type 1 (Flush Mounting) Type 3R Type 12	E2N1S E2N1F E2N3R ED6SS4 EA EB E2N12 CLE6NIS CLE6NIF CLE6N3R CLE6N12
Time Current Curves Types ED2, ED4, ED6, HED4, HED6, HHED6 Type CED6	TD-7100 TD-7101
Let-Thru Curves Peak Current (I _p) I _{2t}	TD-7101-A TD-7101-B

① For 4-4x application, order FHOH4 instead of FHOH.

② Consists of 4 screws and assorted washers and/or nuts.

③ Consists of 100 screws and hardware.

UL Listings and File Numbers

Industry Specifications

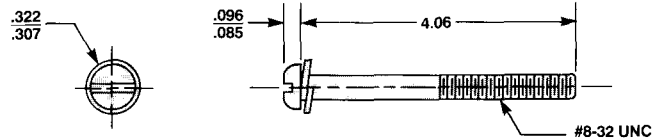
I-T-E Item	UL-489 File Number	CSA Report Number
Breakers	E10848	LR13077
Terminal Connectors	E23615 (SP)	
Plug-In Connectors	E23615	
Rear Studs	E23615	
Add-On External Accessories	E69455	LR13077
Shunt Trip		
Undervoltage Trip		
Aux. Switch		
Bell Alarm Switch		
Molded Case Switch	E68312	LR42022
Enclosures	E10848	
ETI Breakers	E10848	LR42022

National Fire Protection Assoc. (National Electrical Code®).

Federal Specification W-C-375B/GEN.

Underwriters Laboratories, Inc. (UL 489).

Canadian Standards Association (C22.2 No. 5).



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