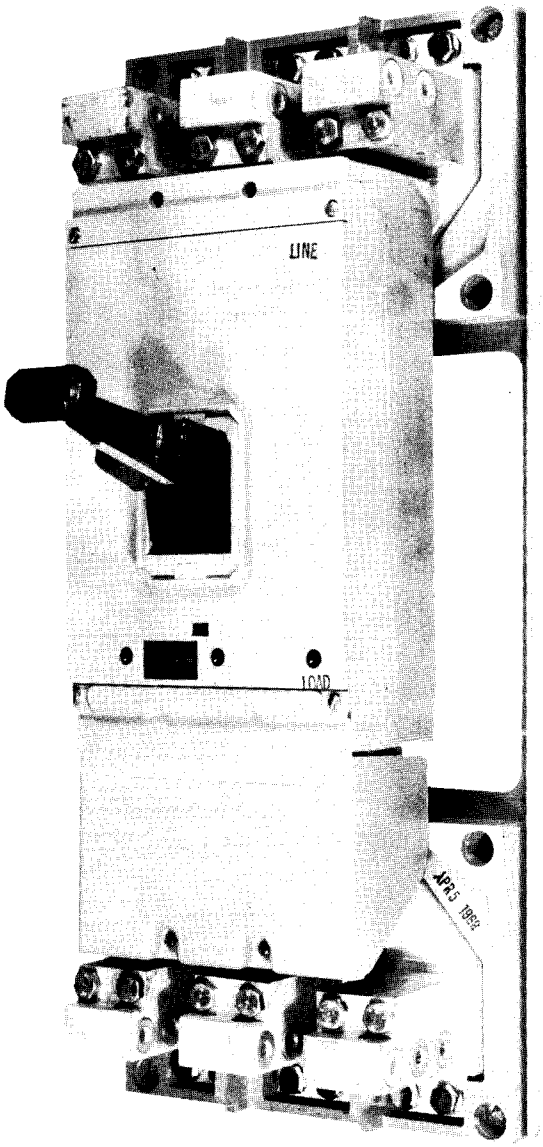
IB-2.4.7-5
ISSUE A

MOLDED-CASE CIRCUIT BREAKERS

INSTRUCTIONS

1600-AMPERE
ET®-C CP-FRAME CORDON® CIRCUIT BREAKERS
3 POLE, 800-1600 AMPERES



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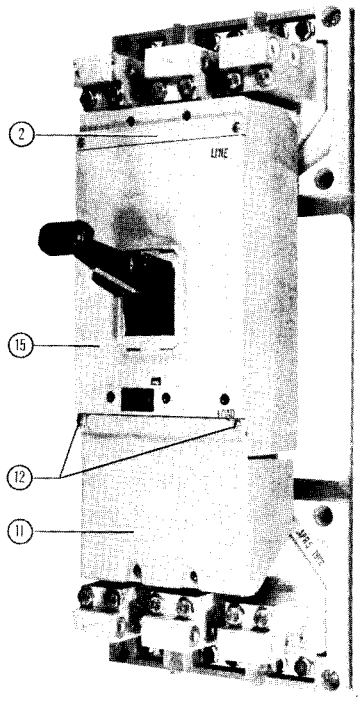

Fig. 1 — Front View of Circuit Breaker Extension Handle in Place

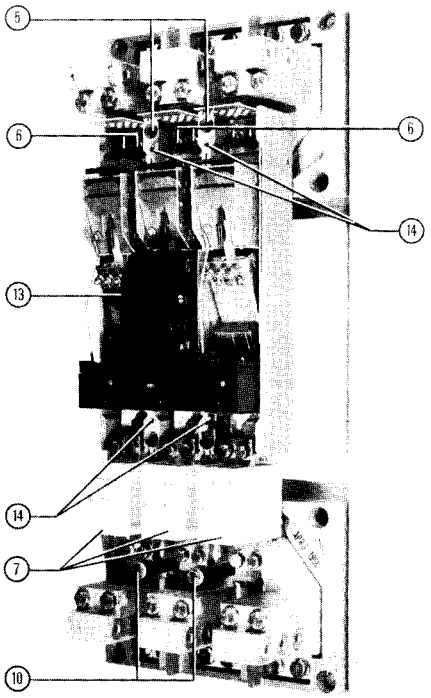

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Fig. 2 — Front View of Circuit Breaker End Covers, Breaker Cover and Operating Handle Extension Removed.

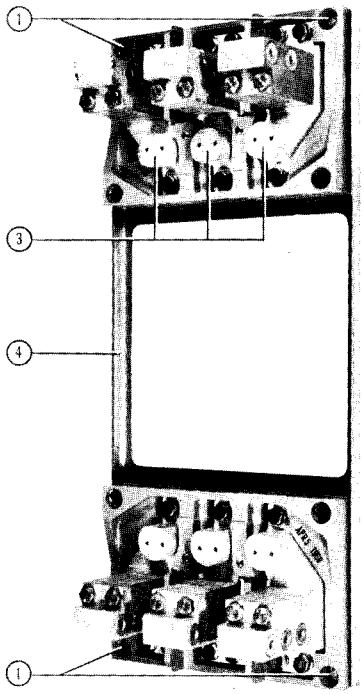

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Fig. 3 — Connect-All Assembly (Front Connected)

INSTRUCTIONS FOR 1600-AMPERE CP-FRAME CORDON CIRCUIT BREAKERS 3 POLE, 800-1600 AMPERES

GENERAL

CP-frame CORDON circuit breakers are calibrated for operation in an ambient of 40C and are for use in load centers, power panelboards, distribution switchboards, secondary unit substations, and all types of individual enclosures where the available fault currents exceed the interrupting rating of heavy duty and extra heavy duty molded case circuit breakers.

CORDON circuit breakers combine the operating features of the ET molded-case circuit breaker and the current-limiting high interrupting characteristics of the Amp-trap*. There are, therefore, two protective units in the CORDON breaker design; the standard circuit breaker trip unit which provides thermal-magnetic overload protection, and the Amp-traps, which provide additional interrupting capacity above the standard breaker interrupting rating. The coordination is such that unless the magnitude of the fault reaches the fusing point of the Amp-traps, they are unaffected, and the standard circuit breaker overload devices perform their normal function.

The common trip feature of the circuit breaker is completely retained so that all poles of the circuit breaker open when any Amp-trap blows. Removal of the Amp-trap housing automatically opens the breaker contacts.

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. The handle will assume an intermediate position between "ON" and "OFF" after automatic operation, thus giving a clear indication of tripping.

The circuit breakers operate on a common trip principle so that an overcurrent or short circuit on any pole will simultaneously open all poles.

Nominal instantaneous trip values are externally adjustable with five (5) trip points as shown below:

Breaker Ampere Rating	Nominal Instantaneous Values				
	LO	2	3	4	HI
800	3200	3600	4100	5100	5600
1000-1600	4000	5000	6000	7000	8000

ETI circuit breakers (adjustable instantaneous magnetic trip only) can be furnished and are designed for use in welding circuits, motor circuits and combination starters where short circuit protecton only is required. When used in combination starters, they serve in conjunction with motor protective relays to offer complete protection. The starter relays guard against motor overloads; the circuit breaker provides short circuit protection.

Special features such as shunt trip, auxiliary and alarm switches and undervoltage trip devices are available and are mounted internally. Information concerning these special features is available upon request.

INTERRUPTING RATINGS

The interrupting ratings of the CP-frame circuit breakers are based on circuits adjusted to the rated short circuit current (at specified voltage) before the insertion of the circuit breaker.

Based on NEMA Test Procedures		
Volts	Amperes	
	Asymmetrical	Symmetrical
240 ac	235,000	200,000
480 ac	120,000	100,000
600 ac	120,000	100,0000
250 dc	100,000	

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 trip or open the breaker automatically, the operating handle moves to a position between "ON" and "OFF" as previously described. 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.

INSTALLATION AND REPLACEMENT

CP-frame CORDON circuit breakers as shipped are complete including pressure wire connectors and Connect-All mounting block assembly or Reverse Mounting Block assembly. For complete circuit breaker installation and replacement of Amp-trap current-limiting fuses, refer to the following sections.

WARNING FOR CIRCUIT BREAKER REMOVAL

THE CIRCUIT BREAKER SHOULD BE IN THE "OFF" POSITION AND, IF PRACTICABLE, THE SWITCHBOARD DE-ENERGIZED BEFORE INSPECTING, CHANGING, INSTALLING OR REMOVING THE CIRCUIT BREAKER OR AMP-TRAPS. IF THE BUS CANNOT BE DE-ENERGIZED, USE INSULATED HANDLE TOOLS, RUBBER GLOVES AND A RUBBER FLOORMAT.

NOTE: CP-frame circuit breakers can be added to or removed from the Connect-All or Reverse Mounting Block assemblies without disturbing cable or bus connection.

TO MOUNT CONNECT-ALL ASSEMBLY AND CONNECTORS OR REVERSE MOUNTING BLOCK ASSEMBLY AND CONNECTORS

See WARNING FOR CIRCUIT BREAKER REMOVAL.

1. Drill required holes and provide escutcheon cutout in accordance with mounting arrangement desired (refer to Fig. 6) in support angles and front sheet supplied by customer.
2. Remove four (4) bolts (1, Fig. 3) in the Connect-All assembly, and in a similar location in the Reverse Mounting Block assembly, re-use these bolts to mount the appropriate mounting arrangement to support angles. Tighten bolts securely.

   NOTE: Do not disturb similar bolts on inside corners of insulating blocks.
3. (Refer to Figures 3, 8 or 9.) Make line and load bus or cable connections. If CONNECT-ALL assembly is used, bus or pressure wire connectors may be mounted on front or back of terminal straps. If REVERSE MOUNTING BLOCK assembly is used, bus or pressure wire connectors can only be mounted on back of terminal connector straps.

TO MOUNT CIRCUIT BREAKER ON CONNECT-ALL ASSEMBLY OR REVERSE MOUNTING BLOCK ASSEMBLY

See WARNING FOR CIRCUIT BREAKER REMOVAL.

1. Remove breaker end cover assembly (2, Fig. 1) from line end of breaker.
2. Position breaker on round copper terminals protruding from the mounting block connector (3, Fig. 3) and fasten the breaker to the mounting block assembly (4, Fig. 3) with two slotted fillister head screws, flatwashers and lockwashers (5, Fig. 2), furnished with mounting block unit. Tighten screws securely.
3. Make terminal connections between line end breaker terminals and line end mounting block connector straps (3, Fig. 3). Use two hex head machine bolts, flatwashers and lockwashers (6, Fig. 2) per terminal furnished with mounting block unit. Tighten these six bolts with a torque of 11-13 ft.-lbs. Replace breaker end cover assembly (2, Fig. 1).
4. Mount Amp-trap current-limiting fuses (7, Fig. 2) to breaker load terminals and round copper terminals (8, Fig. 5) protruding from mounting block connector straps with four hex head (⅜" dia. x 1½" long) bolts, flatwashers and lockwashers (9, Fig. 5) furnished with the Amp-trap unit. Tighten these twelve terminal bolts with a torque of 11-13 ft.-lbs.
5. Assemble Amp-trap cover stud assemblies (10, Fig. 2) to the appropriate mounting block arrangement. Tighten studs securely.
6. Fasten Amp-trap cover assembly (11, Fig. 2) to cover studs, (screws are captivated on the Amp-trap cover assembly), and to breaker with two #10 screws, flatwashers and lockwashers (12, Fig. 1) furnished with the Amp-trap unit. Tighten screws securely.

The circuit breaker is now ready for operation.

TO REPLACE AMP-TRAP CURRENT-LIMITING FUSES

See WARNING FOR CIRCUIT BREAKER REMOVAL.

1. Move operating handle (13, Fig. 2) to "OFF" position.
2. Remove Amp-trap cover assembly (11, Fig. 1), retain screws.
3. Remove hex head bolts, flatwashers and lockwashers (9, Fig. 5), four bolts per Amp-trap, which hold the Amp-trap to the breaker load terminal and the round terminal pad of the breaker mounting arrangement, and remove the Amp-trap.

Replace new Amp-trap current-limiting fuses following steps 1-3 above in reverse order.

The circuit breaker is now ready for operation.

TO REMOVE CIRCUIT BREAKER FROM CONNECT-ALL ASSEMBLY OR REVERSE MOUNTING BLOCK ASSEMBLY

See WARNING FOR CIRCUIT BREAKER REMOVAL.

1. Move operating handle (13, Fig. 2) to "OFF" position.
2. Remove Amp-trap cover assembly (11, Fig. 1), retain screws.
3. Remove hex head bolts, flatwashers and lockwashers (9, Fig. 5) four bolts per Amp-trap, and remove the Amp-trap.
4. Remove line side end cover assembly (2, Fig. 1).
5. Remove hex head bolts, flatwashers and lockwashers (6, Fig. 2) which connect the breaker line terminals to the pads of the mounting arrangement.
6. USING EXTREME CARE: Loosen and remove breaker mounting fillister head screws, flatwashers and lockwashers (5, Fig. 2) from line end of breaker. CAREFULLY lift breaker away from its mounting arrangement.

REPLACEMENT OF OVERCURRENT TRIP UNITS

See WARNING FOR CIRCUIT BREAKER REMOVAL.

1. Move operating handle (13, Fig. 2) to "OFF" position.
2. Remove Amp-trap cover assembly (11, Fig. 1), retain screws.
3. Remove hex head bolts, flatwashers and lockwashers (9, Fig. 5), four bolts per Amp-trap, and remove the Amp-traps.

4. Remove line side end cover assembly (2, Fig. 1).
5. Remove breaker cover screws (14, Fig. 2) and breaker cover (15, Fig. 1).
6. Remove three (3) bolts, flatwashers and lockwashers (16, Fig. 4) which connect the trip unit load terminals to the breaker load terminals. Retain screws.
7. On outside poles: remove screws with lockwashers (17, Fig. 4) which are holding arc wires and trip unit terminals to breaker base. Bend arc wires (18, Fig. 5) up and away from breaker base.
8. Loosen trip unit anchor screw (19, Fig. 4) in mechanism pole.
9. Hold circuit breaker operating handle away from trip unit area. Lift trip unit out of circuit breaker base.

TO REPLACE OR INSTALL A NEW TRIP UNIT

1. Hold beaker handle away from trip unit area, lower trip unit carefully into base. CAUTION: Make sure that slots (20, Fig. 4) in trip unit latch bracket, engage latch pin (21, Fig. 5) on mechanism.
2. Tighten trip unit anchor screw (19, Fig. 4) mechanism pole securely to base. (Recommended torque 11 to 13 ft.-lbs.)
3. Replace arc wires (18, Fig. 5) and screws and lockwashers (17, Fig. 4) on outside poles, tighten screws securely. (Recommended torque 11 to 13 ft.-lbs.)
4. At load end of trip unit, replace hex head bolts, lockwashers and flatwashers (16, Fig. 4) and tighten securely. (Recommended torque 11 to 13 ft.-lbs.)
5. Replace Amp-traps (7, Fig. 2), secure in place with four hex head bolts, lockwashers and flatwashers (9, Fig. 5) per Amp-trap.
6. Replace breaker cover (15, Fig. 1) and cover screws (14, Fig. 2).
7. Mount breaker on mounting block unit (either Connect-All or Reverse Mounting Block). Replace end cover assembly (2, Fig. 1) and Amp-trap cover assembly (11, Fig. 1).

INSPECTION AND MAINTENANCE

See WARNING FOR CIRCUIT BREAKER REMOVAL.

Should the circuit breaker appear to be overheating, inspect for any loose or otherwise defective terminal connections.

When a circuit breaker is not operated for long periods of time, a high resistance film may form on the contact surfaces which will also result in overheating. This high resistance film may be minimized, and in most cases removed, by opening and closing the circuit breaker several times under load.

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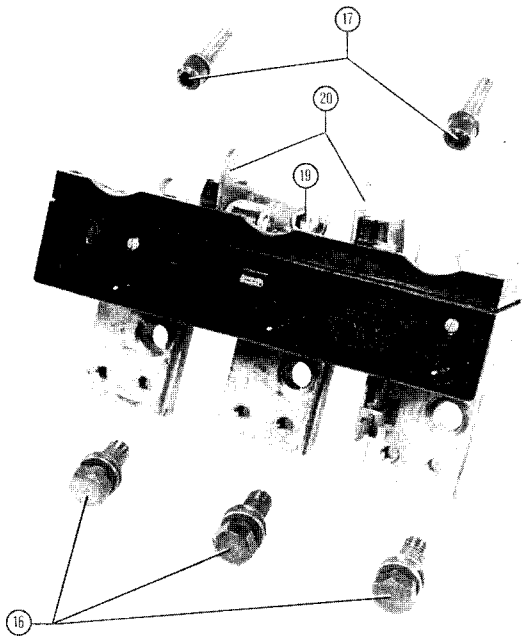


Fig. 4 — 3-Pole Trip Unit

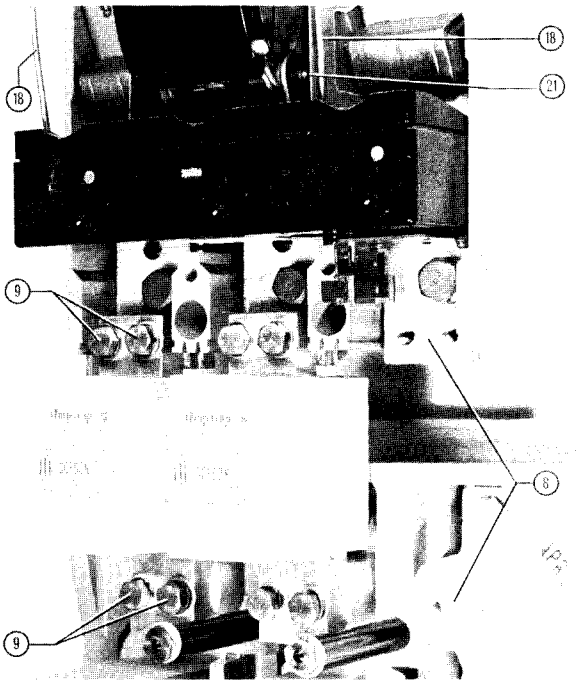
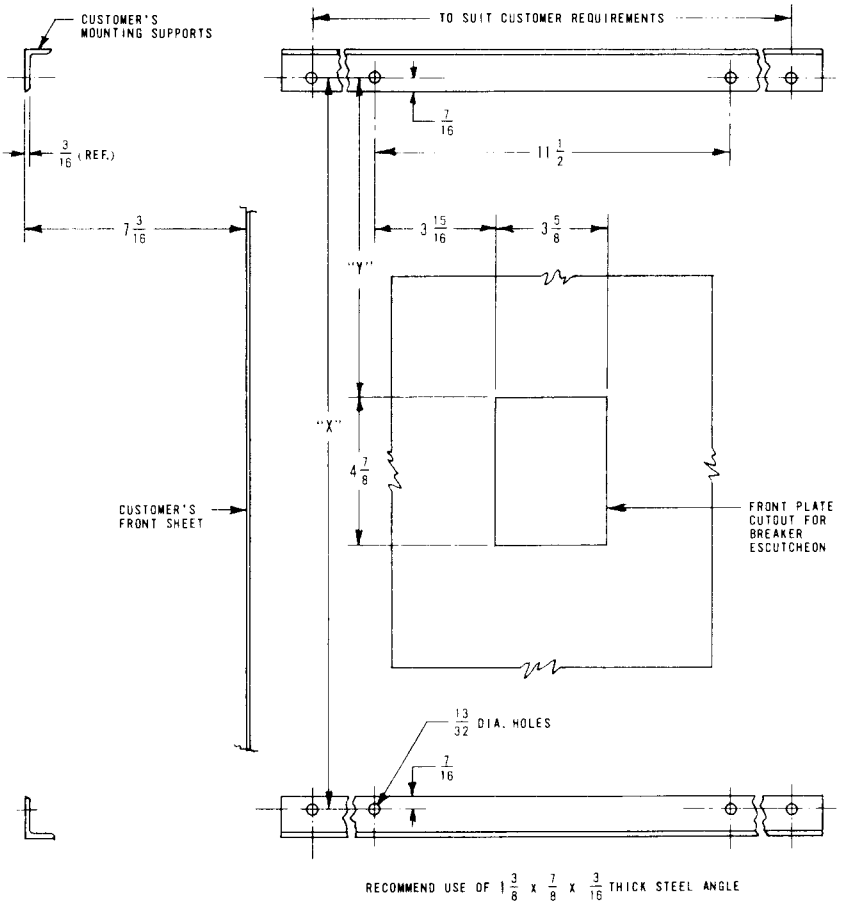


Fig. 5 — Partial Front View of Circuit Breaker Showing Method of Mounting the Amp-Traps and Trip Unit



MOUNTING BLOCK ASSEMBLY	"X" DIM.	"Y" DIM.
CONNECT-ALL MOUNTING BLOCK CAT. NO. MB-9309	30	10 1/2
REVERSE MOUNTING BLOCK CAT. NO. MBR-9308	22 3/4	6 7/8

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Fig. 6 — Mounting Supports and Front Plate Drilling

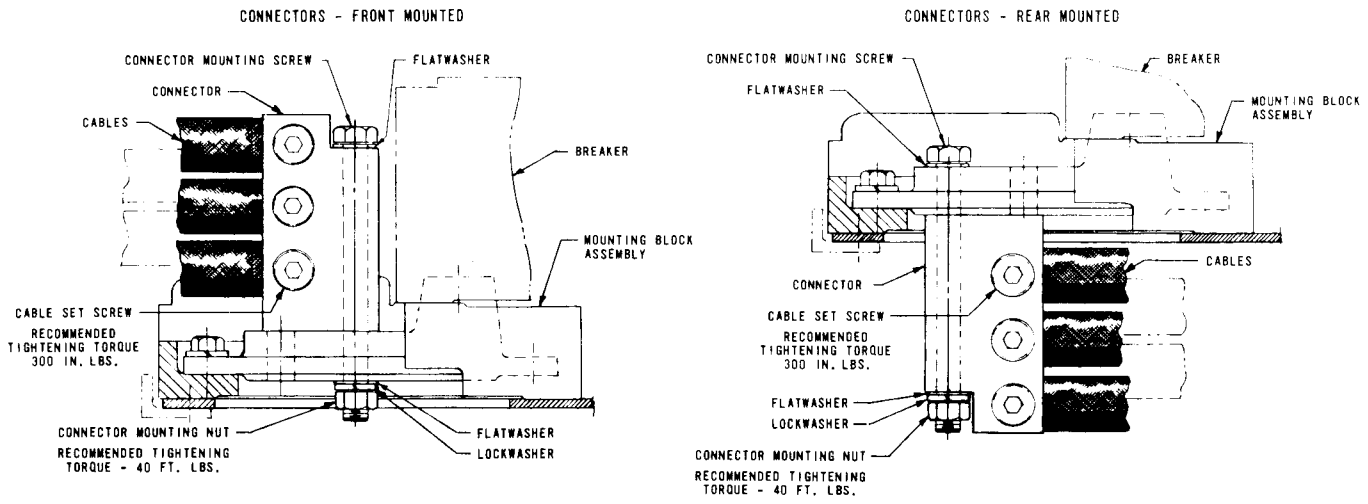

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Fig. 7 — Connector Mounting

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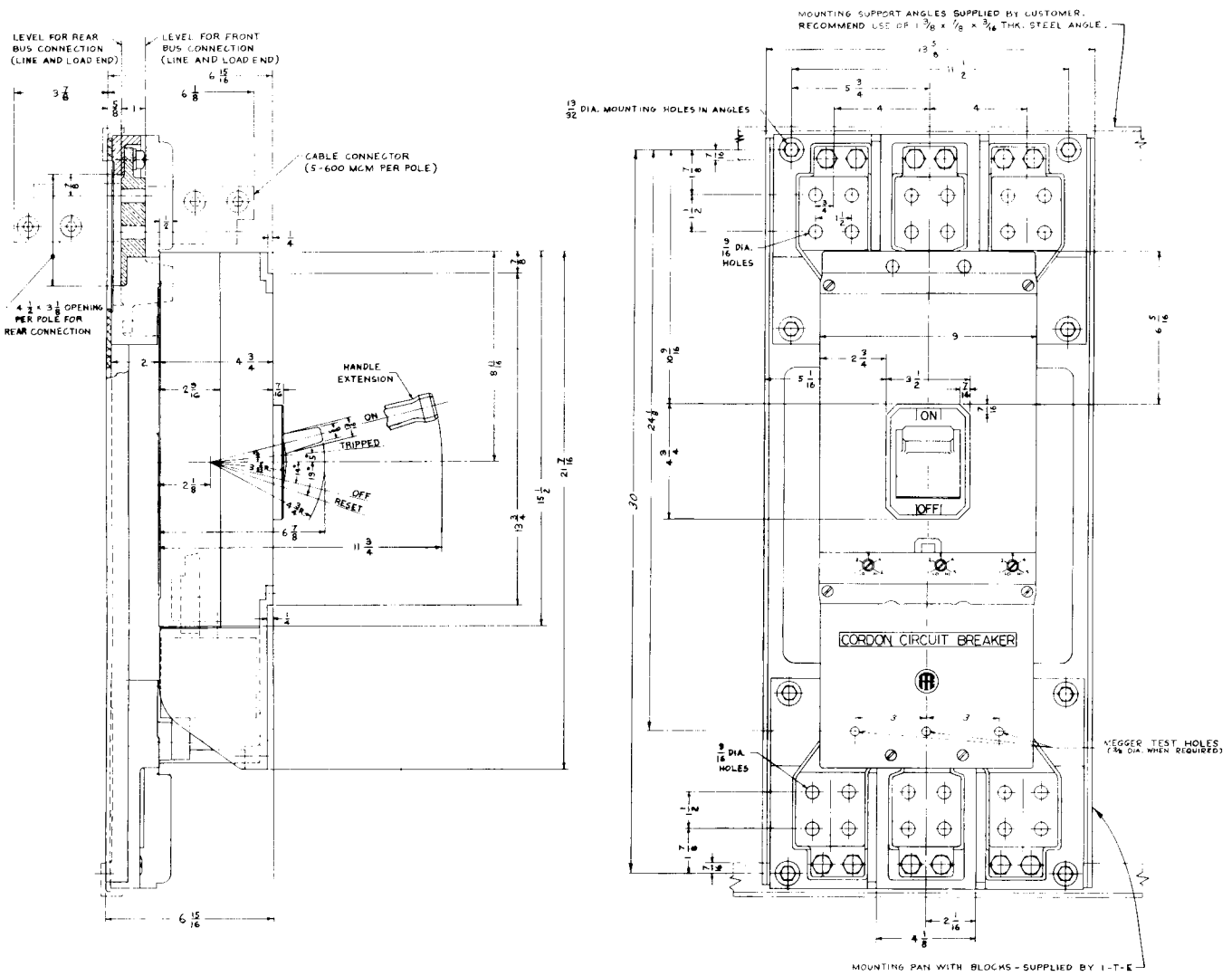
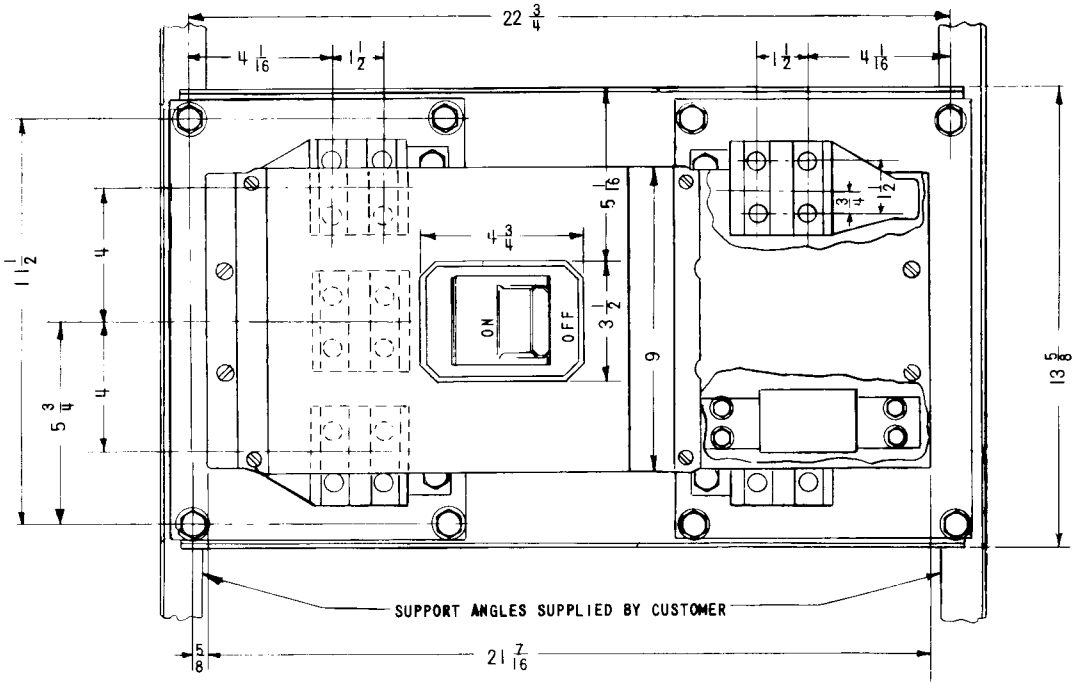


Fig. 8 — 1600-Ampere CP-Frame Circuit Breaker Dimensional Drawings with Connect-All Assembly



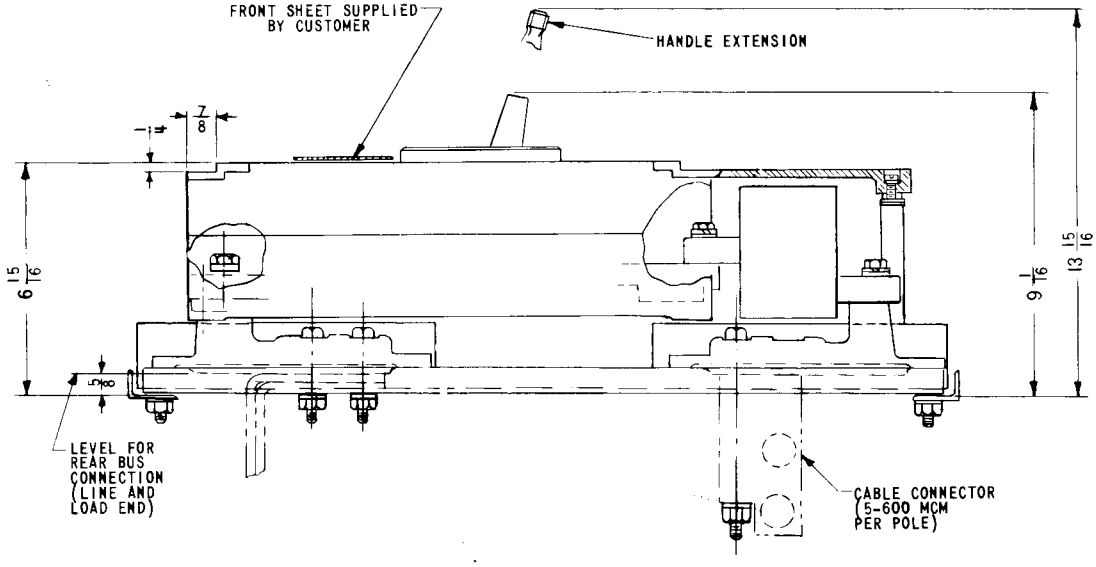


Fig. 9 — 1600-Ampere CP-Frame Circuit Breaker Dimensional Drawings with Reverse Mounting Block Assembly

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