

Molded Case Circuit Breakers

Electrical Aftermarket Products and Services

CHB Circuit Breaker — Miniature Circuit Breakers

EATON | **Cutler-Hammer**

March 2006

Aftermarket Solutions, Ref. No. [018]

CHB Circuit Breaker

Originally a Cutler-Hammer Product

The CHB breaker continues to be available as a replacement breaker for use in Cutler-Hammer Type PB Panelboards.

When combined with the mounting base, CHB breakers were also used for surface and DIN rail mount cable-in/cable-out applications. (See photo below)

For "new" cable-in/cable-out applications, Eaton recommends the use of our most current product offering:

- QUICKLAG Type QC Breakers (1-inch per pole).
- QCR Breakers — Rear Mount (1/2-inch per pole).
- QCF Breakers — Front Mount (1/2-inch per pole).

QCR and QCF Breakers provide a 50% space savings over 1-inch per pole designs of the same rating.



CHB Breaker Mounting Base

Table 3-5. CHB Mounting Bases

Description	Catalog Number
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Low Ampere

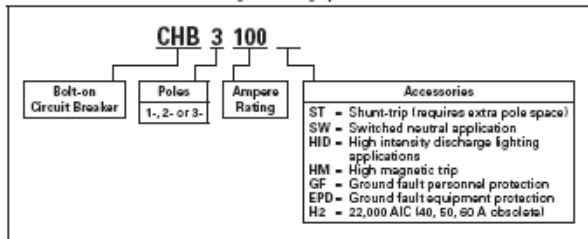
15 – 60 A	1-Pole 2-Pole 3-Pole	CHB9L1 CHB9L250 CHB9L350
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High Ampere

25 – 60 A 25 – 125 A 25 – 100 A	1-Pole 2-Pole 3-Pole	CHB9H1 CHB9H2125 CHB9H3100
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CHB Circuit Breaker — Catalog Numbering

Table 3-6. CHB Circuit Breaker Catalog Numbering System



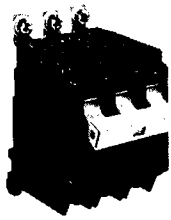
CUTLER-HAMMER CIRCUIT BREAKERS

6/15/89

Supersedes TIP 4411-1
dated 11/1/81

Loadcenter/Panelboard Breakers

TECHNICAL
INFORMATION
PUBLICATION
CH/CHB/CHT

1 POLE
CH1 POLE
CHBTWIN 1 POLE
TYPE CHT2 POLE
CH3 POLE
CHB

TERMINAL WIRE SIZE RANGE

Breaker Amperes	Wire Size Range, AL/CU	Temperature Rating
15-30	#14 — 8	60/75°C
35-50	#8 — 4	60/75°C
60-70	#8 — 2	60/75°C
80-125	#4 — 1/0	75°C
150	#1/0 — 3/0	75°C

RATINGS

Circuit Breaker		Rating		Interrupting Capacity AIC
Type	Poles	Amps	Volts Ac	
CH, CHT PLUG-ON				
CHT Twin	1	15-20	120/240V	10,000
CH GFCI	1 2	15-30 15-30	120/240V	10,000
CH Standard	1 2 3	15-50 15-150 15-100	120/240V 120/240V 240V	10,000
CHB BOLT-ON				
CHB GFCI	1	15-30	120/240V	10,000
CHB Standard	1 2 3	15-50 15-125 15-100	120/240V 120/240V 240V	10,000
CHB-H2	1 2 3	15-30 15-50 15-60	120/240V 240V 240V	22,000
CHB-H4	2	60-125	120/240V	42,000

DESIGN CHARACTERISTICS

- **Ratings** — 15A through 150A maximum in various pole configurations. See tables for specific types, poles, voltages and AIC.
- **HACR** — All types (except GFCI, CHB-H2 & CHB-H4) through 60A sizes are UL labeled for Heating Air Conditioning, and Refrigeration equipment applications.
- **SWD** — All 15-20A single-pole breakers, except GFCIs, are suitable for Switching Duty on 120V fluorescent lighting loads.
- **Operation** — Quick-make, quick-break and trip-free. Type CH & CHT breaker handles trip to the full "OFF" position for high visibility. Normal handle movement to the ON position will restore power in residential loadcenter applications. Type CHB breaker handles trip to a position between ON and OFF, and require movement to full "OFF" to reset the breaker. Contacts are sintered weld-resistant silver tungsten.
- **Tripping Characteristics** — Inverse time element thermal-magnet tripping. Directly heated bi-metal thermal tripping element is calibrated at 40°C and sealed after assembly.
- **Terminals** — Standard box lug wire connectors suitable for either copper or aluminum wire.
- **Standards** — Meet or exceed Federal Specifications W-P-131a and W-C-375b Class 1a, 1b, 2b and 2c (ac rating only). UL listing under files E3624, E8741, E11713 and E51287.

OPTIONAL FEATURES

- **Shunt Trip** — factory installed on type CH & CHB — requires one additional pole space.
- **Handle Lock** — field installed.
- **Handle Padlocking Device** — field installed.

APPLICATION

Type CHT twin, or half-size, breakers are to be used in designated circuit positions in specific twin-circuit Cutler-Hammer loadcenters. Dual single-pole type CHT breakers occupy the 3/4" wide mounting position needed for one single-pole type CH breaker.

Type CH circuit breakers are designed for application in all Cutler-Hammer loadcenters, type PB & PH panelboards, combination meter panels and multi-metering modules.

Type CHB circuit breakers of similar internal construction and size as type CH breakers are also 3/4" wide per pole. They are interchangeable with type CH breakers in Cutler-Hammer type PB & PH panelboards as well as meter panels and multi-metering modules.

The installation and use of Cutler-Hammer products should be in accordance with the provisions of the U.S. National Electrical Code and/or other local codes or industry standards that are pertinent to the particular end use. Installation or use not in accordance with these codes and standards could be hazardous to personnel and/or equipment.

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UL LISTED SERIES-TESTED RATINGS

Combinations of Main and Branch circuit breakers suitable for application to the available fault current, in RMS symmetrical amperes, for the voltage indicated.

Downstream (Branch) Circuit Breakers			Upstream (Main) Breaker					
			CHB-H4		CHH		JL	
			42,000A		100,000A		200,000A	
Type	Poles	Amperes	120/240V	240V	120/240V	240V	120/240V	240V
CHT	1 pole	15-20A	X	---	X	---	---	---
CH, CHB 10,000 AIC	1 pole	15-50A	X	---	X	---	---	---
	2 pole	15-70A	X	---	X	---	---	---
	2 pole	80-125A	X	---	X	---	X	---
	3 pole	15-100A	X	X	X	X	X	X
CHB-H2 22,000 AIC	1 pole	15-30A	X	---	X	---	X	---
	2 pole	15-50A	X	X	X	X	X	X
	3 pole	15-60A	X	X	X	X	X	X
CHB-H4 42,000 AIC	2 pole	60-100A	---	---	X	---	X	---

INSTALLATION

All CH, CHT and CHB breakers are installed by first engaging a mounting (foot) to the pan side-rail. From this point, the line-side contact clip of a plug-in breaker is pushed over the plated pin part of the copper phase bar. Bolt-in breakers are bolted to threaded plated studs on the phase bars. The slotted self-aligning nut is held captive to the breaker by a retaining loop.

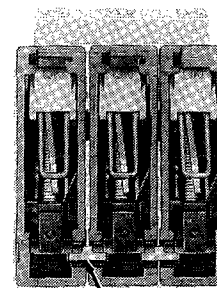
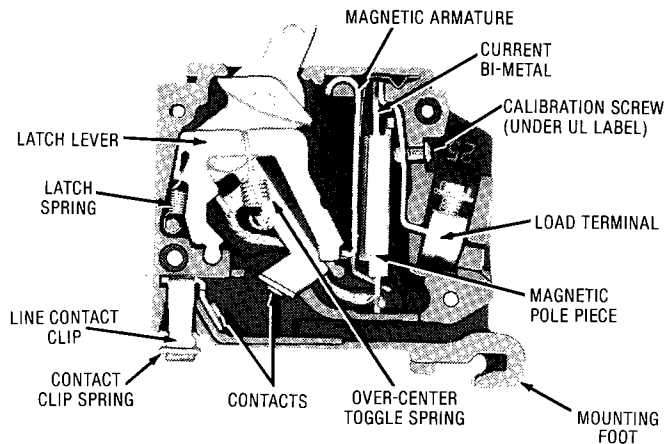
OPERATION

Magnetic Tripping — This is the primary trip arrangement. Under severe, short circuit or overload conditions, the magnetic armature assembly disengages from the latch lever notch which allows the tripping spring to snap the contacts open.

Thermal Tripping — The secondary tripping mechanism consists of a bi-metal element which introduces a time delay into the circuit preventing nuisance tripping under conditions of mild overload such as motor starting or temporary harmless excess current demands. When mild overloads persist, the thermal overload mechanism initiates the instantaneous tripping spring to snap contacts open.

Multi-pole Circuit Breakers — An internal common trip interlock in multi-pole breakers mechanically links the automatic trip mechanism of each pole section together. When an over-current condition is detected by any single pole, the interlock trips all poles simultaneously. Each pole is a fully enclosed, complete circuit breaker unit with no internal interconnecting handle ties between pole sections. This compartmentalized construction eliminates the possibility of pole to pole flash-over.

The externally locked individual operating handles are used for manual "ON-OFF" operation of the breaker only. This handle in combination with the common trip interlock assures simultaneous operation of all poles under any condition.



COMMON TRIP INTERLOCK

CUTAWAY OF MULTI-POLE BREAKER

See note on installation and use of this product at bottom of page 1.

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GFCI DESCRIPTION AND OPERATION

The GFCI is a standard CH or CHB breaker, combined with an electronic package that monitors and interrupts the circuit if a ground fault of approximately 5 milliamperes or larger occurs. This is accomplished by passing the line and neutral conductors through the core of a differential current transformer. Under normal conditions, the current through the line and neutral conductors are equal and no transformer output results. When a ground fault exists, however, the current transformer senses the unbalance and generates a small current output. This output is electronically amplified and activates the breaker trip mechanism.

A manually-operated test circuit is built in to check the ground-fault sensing function. This circuit consists of a test button in series with a resistor connected from line to neutral. When the test button is operated, a simulated fault current flows through this circuit and trips the GFCI.

GFCI APPLICATION

The GFCI breaker is designed to protect personnel from potentially hazardous ground faults arising from use of defective appliances or portable tools. The NEC requires the use of GFCI protection for receptacles outside residences, in attached garages, bathrooms and adjacent to sinks and swimming pool areas.

Single pole GFCIs are designed for use in 2-wire, 120V ac circuits. Figure 1 shows a typical wiring configuration.

Double pole GFCIs are designed for use in 3-wire, 120/240V ac circuits, 120V ac multi-wire circuits employing common, neutral and 2-wire, 240V ac circuits obtained from a 120/240V source.

Figures 2 and 3 illustrate typical wiring configurations for 120V ac multi-wire circuits. Figure 4 depicts a 240V, 2-wire circuit. Note the "panel neutral" conductor connects to the neutral bar, even though the neutral is not included in the load circuit. This connection is necessary to supply a 120V ac power source to the ground-fault sensing circuit.

The figures are shown with a 120/240 volt, 1 phase, 3-wire power source, but are also applicable to a 120/208 volt, 3-phase, 4-wire power supply. For all figures the **electrical operation of the GFCI is not affected by the equipment ground.**

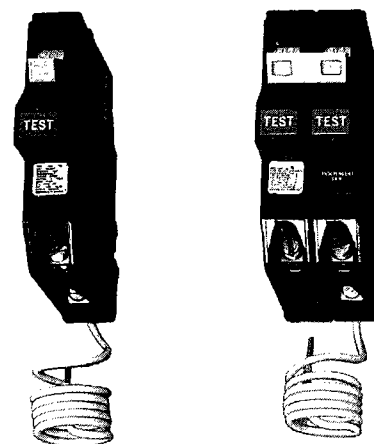


FIGURE 1
1 POLE

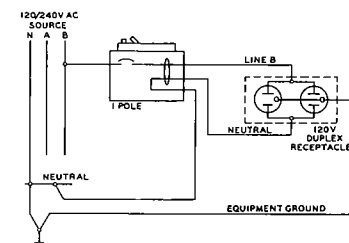


FIGURE 2
2 POLE

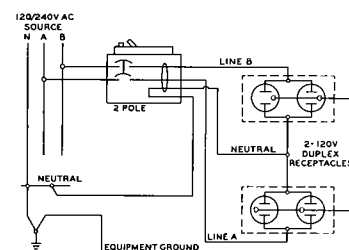


FIGURE 3
2 POLE

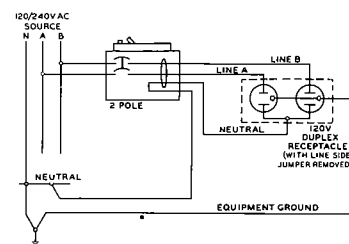
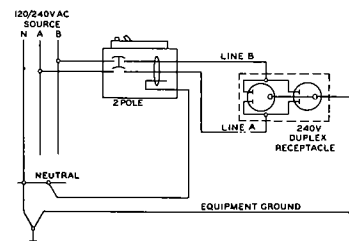


FIGURE 4
2 POLE



See note on installation and use of this product at bottom of page 1.

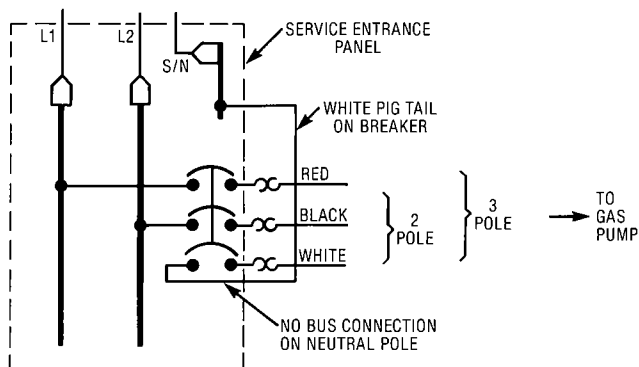
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TYPE CH/CHB SWITCHED NEUTRAL

For applications such as gas pumps, a switched neutral circuit breaker opens the neutral line of a branch circuit along with the power lines. The following diagram shows 2 and 3 pole switched neutrals.



SWITCHED NEUTRAL BREAKER DIAGRAMS