

Technical Data and Specifications**General**

- A. The Contractor shall furnish and install deadfront loadcenters incorporating circuit breakers of the number, rating and type as specified herein and as shown on the contract drawings.
- B. The loadcenter and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of UL, NEMA and NEC including:
 1. UL 67—Standards for Panelboards.
- C. UL 50—Standards for Cabinets and Boxes.
- D. UL 489—Standards for Molded Case Circuit Breakers.
- E. UL 869—Standards for Service Equipment.
- F. Federal Specification W-C 375B—Circuit Breakers.
- G. Federal Specification W-C P115b—Panel Power Distribution Type 1, Class 2.

Qualifications

- A. The manufacturer of the loadcenter shall be the manufacturer of the circuit breaker within the loadcenter.
- B. For the equipment specified herein, the manufacturer shall be ISO 9000 certified.
- C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of seven (7) years.

Manufacturers

- A. Eaton.

Ratings

- A. Loadcenters shall be rated for 120/240 Vac and shall have short-circuit ratings as shown on the drawings or as herein scheduled, but not less than 10,000 amperes rms symmetrical.
- B. Circuit breakers shall be a minimum of 125 A frame. Circuit breakers 15 through 125 A trip size shall take up the same pole spacing.
- C. Loadcenters shall be labeled with a UL short-circuit rating. When series combination ratings are applied with integral or remote upstream devices, a label shall be provided. Series combination ratings shall cover all trip ratings of installed frames. It shall state the conditions of the UL series ratings including:
 1. Size and type of upstream device.
 2. Branch devices that can be used.
 3. UL series short circuit rating.

Construction

- A. All interiors, with the exception of the branch circuit breakers, shall be completely factory assembled with main breakers, main lugs, or no main device.
- B. Interiors shall be designed so that circuit breakers can be replaced without disturbing adjacent units and without removing the main bus connectors and shall be designed so that circuits may be changed without machining, drilling, or tapping.

- C. Physical means shall be provided to prevent the installation of more overcurrent devices than that number for which the enclosure was designed, rated and approved. Half-size breakers shall have a UL listed rejection tab over the line terminals. Loadcenter interiors must have notched stabs to accept these rejection tab class CTL breakers, if required and approved.

Bus

- A. Busbars for the main and cross connectors shall be [tin-plated aluminum] [copper] in accordance with Underwriters Laboratories standards. Busing shall be braced throughout to conform to industry standard practice governing short-circuit stresses in loadcenters.
- Note:** Note to spec writer—select one (copper available in limited ratings).
- B. Neutral busing shall have a suitable lug for each outgoing feeder requiring a neutral connection of same ampacity as branch.

Wiring/Termination

- A. All wire connectors and terminals shall be of the anti-turn solderless type and shall be suitable for copper or aluminum wire of the sizes indicated. All connectors must meet the "Requirements for Wire Connectors and Soldering Lugs" as stated in UL 486B.
- B. All loadcenters where marked shall be suitable for use with 60 °C or 75 °C rated wire.

Circuit Breakers

- A. Circuit breakers shall be molded case type. Circuit breakers shall have four-rivet construction (GFI Type—5 rivets). Multipole circuit breakers shall be of a stack pole design to provide electrical phase isolation.
- B. Each pole of the circuit breaker will provide inverse time delay overload and instantaneous short-circuit protection by means of both thermal and magnetic sensors.
- C. The circuit breaker calibration shall not be affected by environmental changes in relative humidity. The thermal bimetal element shall be welded to the steel frame and calibration shall be set independent of the molded case by computer controlled equipment.
- D. All circuit breakers shall be operated by a toggle-type handle and multipole circuit breakers shall have an internal common trip mechanism. The circuit breakers shall incorporate trip mechanisms that are mechanically trip-free from the handle. The handle position shall provide visual trip indication.
- E. Contacts shall be of non-welding silver alloy.
- F. All circuit breakers shall have the trip rating inscribed on the handle on each circuit breaker pole. Also, unique color-coded cases that indicate the UL listed 10 kA or 22 kA interrupting ratings. Breakers shall be able to be used as main or branch disconnect devices.

BR Circuit Breakers



BR Circuit Breakers

Product Description

Plug-On Branch Feeder Type Arc Fault Circuit Breakers, Type BR—10 kAIC, 120 Vac and 120/240 Vac

A branch feeder type arc fault circuit interrupter is a device intended to mitigate high current arcing faults in the complete circuit, including connected cords. High current arcing faults can occur from line to neutral or line to ground. These arcing faults are in parallel with the load and produce the most energy of all arcing faults.

The branch feeder type AFCI is required in the 1999 and 2002 National Electrical Code.

The Combination Type AFCI is required in the 2005, 2008, and 2011 National Electrical Code.

Plug-On Combination Type Arc Fault Circuit Breakers, Type BR—10 kAIC, 120 Vac and 120/240 Vac

A combination type arc fault circuit interrupter is a device that includes all of the protection offered by the branch feeder AFCI (mitigation of high current arcing faults in the complete circuit, including connected cords). In addition it provides direct detection of persistent low current arcing faults down to 5 amps with associated mitigation of fire hazards in the cords connected to the outlets. High current arcing faults can occur from line to neutral or line to ground. These arcing faults are in parallel with the load and produce the most energy of all arcing faults. The current level of low current arcing faults is limited by the load.

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Plug-On Ground Fault Circuit Breakers, Type GFCB and GFEP—10/22 kAIC, 120 Vac and 120/240 Vac

Ground Fault

Application Notes

Single-pole GFCBs are designed for use in two-wire, 120 Vac circuits. See **Page V1-T1-87** for a typical wiring configuration.

Two-pole GFCBs are designed for use in three-wire, 120/240 Vac circuits, 120 Vac multiwire circuits employing common, neutral and two-wire, 240 Vac circuits obtained from a 120/240 Vac source.

Page V1-T1-87 shows typical wiring configurations for a 120/240 Vac multiwire circuits, and a 240 Vac, two-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 120 Vac power source to the ground fault sensing circuit.

The figures are shown with a 120/240 Vac, single-phase, three-wire power source, but are also applicable to a 120/208 Vac, three-phase, four-wire power supply. For all figures, the electrical operation of the GFCB is not affected by the equipment ground.

Non-CTL Plug-On Replacement—Circuit Breakers, Type BRD—10 kAIC, 120/240 Vac

Non-CTL 10 kAIC for Replacement Purposes Only

For replacement in enclosures manufactured prior to 1968 with unnotched stabs. Circuit breakers do not have rejection tab.

1.2

Loadcenters and Circuit Breakers

Type BR Loadcenters and Circuit Breakers

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BR Breakers



Type BR Breakers, 1-Inch (25.4 mm) per Pole 240 Vac, 10, 22 and 42 kAIC

Three-Pole 240 Vac
Common Trip Requires Three
1-Inch (25.4 mm) Spaces
5 per Shelf Carton



Ampere Rating	Wire Size Range Cu/Al 60 °C or 75 °C	10 kAIC Catalog Number	22 kAIC Catalog Number
10	#14-4	BR310	—
15	#14-4	BR315 ①	BRH315
20	#14-4	BR320 ①	BRH320
25	#14-4	BR325	BRH325
30	#14-4	BR330	BRH330
35	#14-4	BR335	BRH335
40	#14-4	BR340	BRH340
45	#14-4	BR345	BRH345
50	#14-4	BR350	BRH350
55	#14-3	BR355	BRH355
60	#4-1/0	BR360	BRH360
70	#4-1/0	BR370	BRH370
80	#4-1/0	BR380	BRH380
90	#4-1/0	BR390	BRH390
100	#4-1/0	BR3100	BRH3100

Plug-On Branch Feeder Type Arc Fault Circuit Breakers, Type BR—10 kAIC, 120 Vac and 120/240 Vac

Type BR AFCI Circuit Breaker



Type BR, 1-Inch (25.4 mm) Wide FIRE-GUARD AFCI Circuit Breakers

Poles	Ampere Rating	Configuration	Catalog Number
Single-pole 10 kAIC	15	AFCI	BR115AF ②
	20	AFCI	BR120AF ②
Single-pole 22 kAIC	15	AFCI	BRH115AF
	20	AFCI	BRH120AF
Two-pole 10 kAIC ③④	15	AFCI Common Trip	BRL215AF
	20	AFCI Common Trip	BRL220AF

Notes

- ① One pole, 1-inch (25.4 mm) per pole circuit breakers are available with high magnetic setting for switching large tungsten lamp loads. Add suffix H to catalog number.
 - ② Clamshell packaging available with CS modification code on the end of catalog number.
 - ③ Common trip refers to two-pole 240 V load application sourced by 120/240 Vac (see **Page V1-T1-87**).
 - ④ Independent trip refers to two-pole multi-wire, home run or shared neutral circuits (see **Pages V1-T1-87 and V1-T1-88**).
- All Type BR single-, two- and three-pole circuit breakers carry listing for HACR application. For circuit breakers with a shunt trip, add ST suffix.