Overview

Product Selection Guide

Type BR Loadcenters

Description

Service

Single-phase, three-wire, 120/240 Vac
Three-phase, four-wire, 208Y/120 Vac
Three-phase, three-wire, 240 Vac delta

Short-Circuit Current Rating

10 kAIC: All single- and three-phase loadcenters 70–225 A, 8 to 42 circuits
22 kAIC: All convertible loadcenters using 125 A rated Type BRH main breakers or selected factory-installed 125 A rated Type BRH main breaker
25 kAIC: All convertible and factory-installed single-phase loadcenters rated 150 and 200 A using Type CSR main breakers

Main Breaker/Main Lug Loadcenters

Single-phase
Main breaker: 100, 125, 150, 200, 225, 400, 600 A
Main lugs: 70, 125, 150, 200, 225, 400, 600 A
Three-phase
Main breaker: 100, 125, 150, 200, 225, 400, 600 A
Main lugs: 100, 125, 150, 200, 225, 400, 600 A

Convertible Loadcenters

Main breaker: single-phase up to 200 A and three-phase up to 225 A
Main lugs: single-phase up to 200 A and three-phase up to 190 A

Branch Breakers

Types BR, BRH and BRHH: 10–150 A, single-, two- and three-pole; selected amperage available in switching duty, HACR, shunt trip and high magnetic setting
Type GFTCB: 15–60 A
Types BJ and BJH: 125–225 A; two- and three-pole
Type BD Twin: 10–50 A; two of one-pole; take one 1-inch (25.4 mm) space
Type BQ and BQC Multibreaker: 15–30 A. Two of two-pole or one two-pole and two one-pole; takes two 1-inch (25.4 mm) spaces
Type BRW: 15–30 A; two-pole water heater breakers
Type BRSN: 15–30 A; two-pole switching neutral breakers
Type BR 15–100 A; two-pole, 240 Vac delta breakers
BR-AFCI arc fault circuit interrupter

Enclosures

NEMA Type 1 indoor
NEMA Type 3R outdoor
NEMA 4X
Meets or exceeds UL requirements for indoor or outdoor applications

Loadcenter and Breaker Accessories

Branch circuit breaker:
Auxiliary components
Hold-down kits
Handle ties
Lockoffs
Lockdogs
Complete line of ground bar kits 5, 10, 14 and 21 circuit, some with additional #2/0 lugs; each terminal will accommodate: (3) #14–#10 Cu/Al or (1) #14–#4 Cu/Al
Main and sub-feed lugs 125, 150, 225 A—two- and three-pole
Shunt trips
Surge protection:
Single-phase plug-on surge protector
Single-phase bottle type surge protector
Three-phase bottle type surge protector
Single-phase whole home surge protector
Universal rainproof conduit hubs
Group One: 3/4, 1, 1-1/4, 1-1/2, 2 inches (19.1, 25.4, 31.8, 38.1, 50.8 mm)
Group Two: 2, 2-1/2, 3 inches (50.8, 63.5, 76.2 mm)
Adapter plate

Bussing

Tin-plated aluminum as standard
Limited copper bus panels available

Tin-plated aluminum as standard
1.2 Loadcenters and Circuit Breakers

Type BR Loadcenters and Circuit Breakers

Product Description

Loadcenters are enclosures specifically designed to house the branch circuit breakers and wiring required to distribute power to individual circuits. They contain either a main breaker when used at the service entrance point or a main lug when used as a sub-panel to add circuits to existing service. The main breaker protects the main entire panel and can be used as a service disconnect. The branch breakers protect the wires leading to individual electrical loads such as fixtures and outlets.

Features, Benefits and Functions

Loadcenter Construction

Eaton’s Type BR loadcenters have standard tin-plated aluminum bus with a limited availability of copper bus. The sum of the handle ratings connected to any stab is limited to 150 A maximum on the 100 and 125 A loadcenters, and 200 A on loadcenters with 150 A or higher main bus. NEMA Type 1 boxes or enclosures are manufactured from galvanized steel. Raintight boxes are manufactured from galvanized steel, then finished using an electrostatic powder coat, baked urethane paint process.

Neutrals

Eaton Type CH loadcenters feature two types of neutrals:

Insulated/Bondable Split Neutral

Panels are supplied with split insulated neutrals with an insulated cross strap. For service entrance applications, the neutral must be bonded by using the bonding strap supplied with the panel. For non-service entrance (sub-panel) applications, the panel may be installed with the bonding strap not connected to the neutral. Separate ground bars must be used on non-service entrance panels.

Neutral and Ground Terminals

The standard terminals on grounds and neutrals are rated to accept (3) #14–#10 Cu/Al or (1) #14–4, provided the cables terminated are of the same material. For larger cables, add-on neutral lugs may be ordered from the accessories on Page V1-T1-66.

Note: NEC allows only one current-carrying conductor per hole on neutrals unless otherwise noted.

Bottom Fed Loadcenters

For single-phase 225 A and below loadcenters that are bottom fed, a standard panel can be rotated 180 degrees to allow straight-in wiring of power cables to the main terminals. Because the main circuit breaker handle operates horizontally, the orientation of the main circuit breaker handle is consistent with the requirements of NEC 2008 Article 240.81.

Gutter Splicing

Loadcenters are not UL listed as wiring troughs. Therefore, gutter splicing of riser cables to tap off to the main device is not permitted. Refer to NEC 2008 Article 312.8.

Fire Rating

Due to the numerous openings in both loadcenter boxes and trims, they should not be mounted in firewalls. There is no approved method for sealing the enclosures for this application.

Date Code

The date of manufacture of each loadcenter is printed on the outside of the carton as well as inside the loadcenter. On the carton, the date code is printed on the end carton label. In the loadcenter, the date code is located on the small white label located on the right side wall (with the main device on top). The date code is in the following format: F # # &. The “F” is the numeric code for the Lincoln, IL plant, and the three numbers are the year and week of manufacturing, e.g., 023. The “!” sign at the end signifies the decade of the 2010. Therefore, the date code F0236 indicates that the product was manufactured in the 23rd week of 2010. The 1980s are represented by the “+” sign and the 1990s are represented by a “=” at the end of the code.

Surge Protectors

Complete home surge protection is available in multiple options, including a factory-installed option that provides the highest level of surge protection in a residential design. See Tab 3 for more details.

Circuit Breaker Case Interrupting Capacity

- 10 kAIC
- 22 kAIC
- 25 kAIC

Warranty Information

- 10-year limited loadcenter warranty
- 10-year limited branch breaker warranty
1.2 Loadcenters and Circuit Breakers

Type BR Loadcenters and Circuit Breakers

Warranty
10-year warranty on all Type BR loadcenters and circuit breakers.
Standards and Certifications

**UL Listings**

All Eaton Type BR loadcenters are listed under UL File E52977 except the 2–8 circuit loadcenters, up through and including 125 A, which are listed under UL File E8741.

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**Catalog Number Selection**

**Single- and Three-Phase Through 600 A**

**Phase**

- Blank = Single-phase
- 3 = Three-phase

**Eaton’s Type BR Loadcenter**

**Factory Options**

- SUR = Factory integrated surge

**Bus**

- Blank = Aluminum bus
- C = Copper bus

**Main Device**

- B = Main breaker
- L = Main lug
- N = Convertible main
- H = Main breaker high AIC

**Construction**

- Blank = No feed thru lugs
- F = Feed-through lugs
- G = Ground bar
- P = Current design
- NY = NY City gutter space

**Enclosure**

- R = NEMA Type 3R rainproof
- S = NEMA Type 1 indoor with surface trim
- F = NEMA Type 1 indoor with flush trim
- Blank = NEMA Type 1 indoor with combination trim
- RIS = Riser panel

**Amperes**

- 50 = 50 A
- 70 = 70 A
- 100 = 100 A
- 125 = 125 A
- 150 = 150 A
- 200 = 200 A
- 225 = 225 A
- 300 = 300 A
- 400 = 400 A
- 600 = 600 A

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**Note**

(1) No character space used.
Loadcenters and Circuit Breakers

Type BR Loadcenters and Circuit Breakers

1.2

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.
2. UL 489—Standards for Molded Case Circuit Breakers.
3. UL 50—Standards for Service Equipment.

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.

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 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.

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.
1.2 Loadcenters and Circuit Breakers
Type BR Loadcenters and Circuit Breakers

G. Branch circuit breakers may also be used in the 1/2-inch (12.7 mm) per pole ratings that include two-pole 1-inch (25.4 mm) wide modules and four-pole 2-inch (60.8 mm) wide modules. Two-pole circuit breakers must incorporate a common trip mechanism. The exclusive CTL rejection tab feature shall be provided to limit the number of branch devices for a loadcenter to 42, in compliance with NEC Article 394.15.

H. Circuit breakers shall be completely enclosed in a molded case of thermoset material. No internal aluminum parts shall be used. All internal ferrous parts shall be plated to prevent corrosion.

I. All terminals shall be listed for use with copper or aluminum conductors. Terminals shall be of the box lug or clamp type design. The terminals shall meet UL 486B requirements and shall be suitable for use with either 60 °C or 75 °C wire.

J. The calibrated bimetal assembly shall be mechanically isolated from the load terminal using a flexible braided copper shunt wire, such that movement of the terminals due to twisting and overtorquing does not affect breaker calibration.

K. Breakers shall be SWD rated and/or HACR rated as required.

L. Arc Fault Interrupting circuit breakers, (AFI), shall be provided on all 15 and 20 A single-phase 120/240 Vac circuits except those indicated as remote controlled breakers. AFI breakers shall be “Classified for mitigating the effects of arcing faults,” or conforming to UL Standard 1699 and as defined by Article 210.12 Section A of the 1999 NEC Code.

Surge Protection Devices
See Volume 1, Tab 2 for complete details on surge protection.

Enclosures
A. Loadcenter shall have NEMA Type 1 general purpose or NEMA Type 3R rainproof enclosures as indicated on the drawings and shall be surface or combination flush/surface mounted except where noted.

B. Boxes shall be made from galvanized sheet steel having multiple knockouts. Rainproof boxes shall use galvanized steel or an approved coating system which meets or exceeds standards for outdoor NEMA Type 3R enclosures. Boxes shall be of sufficient size to provide at least a minimum code gutter space on all sides.

C. The deadfront shall have an easy adjustment feature for flush applications.

D. Boxes shall be factory assembled into a single rigid structure.

E. Unless otherwise noted on drawings, hinged doors covering all circuit breaker handles shall be included in all trims. Trim doors shall not uncover any live parts in making the circuit breaker handles accessible. If key locks are required, all locks shall be keyed alike.

F. Combination trims for flush and surface panels shall be flat and shall overlap the box by at least 5/8-inch (15.9 mm) all around. Trims shall be mounted by a screwdriver without the need for special tools.

Finish
A. Trims shall be bonderized and finished with a light gray ANSI-61 enamel. The paint finish shall be of a type to which field applied paint will adhere.

Factory Testing
A. The standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of UL and NEMA.