

# 1.2

## Loadcenters and Circuit Breakers

### Type BR Loadcenters and Circuit Breakers

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### Overview

#### Product Selection Guide

#### 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 150 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

## 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.

### Insulated/Bondable Single Neutral

Panels are supplied with a single insulated neutral. For service entrance applications, all that is required to bond the neutral is to loosen the bonding screw and the neutral screw directly beside it, insert the bonding strap into the neutral bar, and re-tighten both connections. The single neutral can be moved by the contractor to the other side of the panel, if desired. When used as a service entrance panel, unused neutral connections may be used for the termination of equipment grounds. 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.

### Grounds

In service entrance applications where the neutral is bonded, unused neutral holes may be used for terminating ground conductors. In sub-feed panels, the neutral must be isolated (non-bonded), and ground wires must be terminated on a separate ground bar.

The insulated/bondable single/split neutral panels have sufficient terminations for both ground and neutral conductors. The insulated/bondable single split neutral panels are supplied with a separate factory-installed ground bar if the catalog number contains a "G." If not, a separate ground bar should be installed. Insulated/Bondable Single Neutral panels are supplied without a ground bar (unless otherwise noted), and ground bar kits if needed must be purchased separately.

### 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 "1" sign at the end signifies the decade of the 2010. Therefore, the date code F023& would indicate 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

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#### Type BR Loadcenter

Extra 1.5 inch Knockout (38.1 mm)

- Larger knockout provides easier installation and time savings

Top or Bottom Feed

- Straight-in wiring saves labor and material
- One panel for either top or bottom applications

2/0 Lug

- Easily removable and can be installed in any location on the neutral bar

Type BR AFCI Breakers

- Compact design for easier wiring and improved wireway access
- Optional LED indicates one of six trip codes for circuit diagnostics
- Provides a clean gutter space

Standard Tin-Plated Aluminum Bus

- Excellent conductivity and corrosion resistance
- Copper bus options available for select catalog numbers

Drywall Marking on Enclosure

- Indicates proper mounting depth for flush applications

"Tangential" Center Knockout

- Easier installation for conduit applications

Commercial Grade Main Breaker

- 25 kAIC series rated main breaker for superior protection

Neutral Bus (Strap)

- Is easily removable for sub-panel applications

Bonding Z-Strap

- Provides easy field conversion for service entrance applications

Twin Neutral Bars

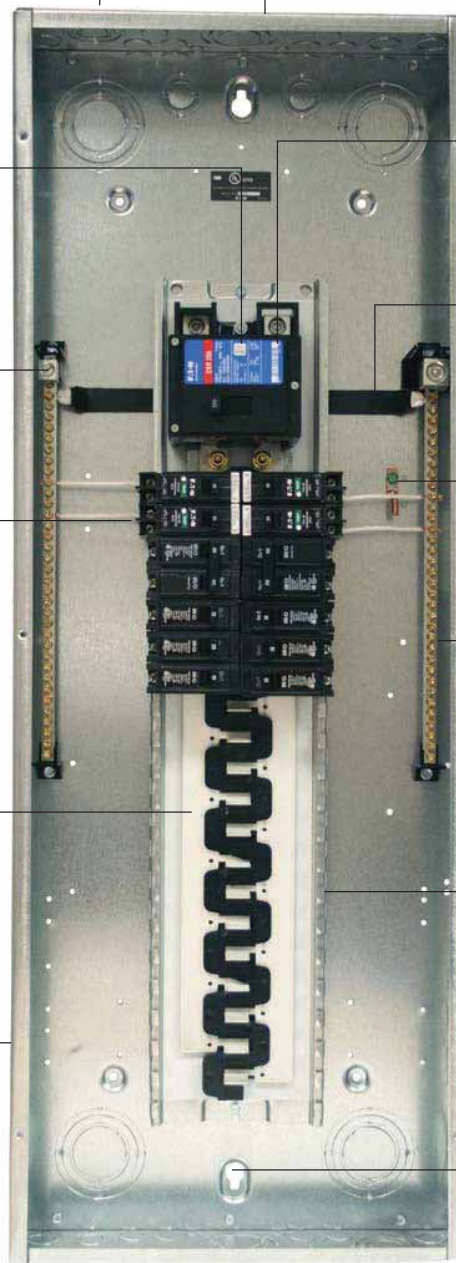
- Minimum 150% neutral capacity

Steel Backpan

- Provides solid and reliable breaker mounting—single piece design for stability and durability

Single Keyhole Mounting

- One keyhole at the top and bottom provides easier mounting and leveling



#### Warranty

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

### Standards and Certifications

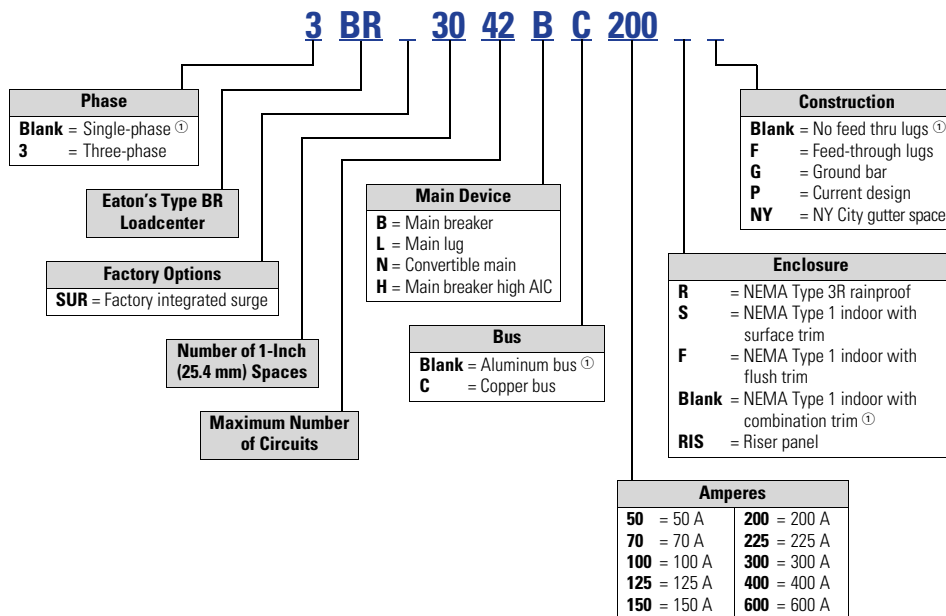
#### UL Listings

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.



### Catalog Number Selection

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





#### Note

① No character space used.

### Single-Phase—Main Lug Loadcenters

#### Single-Phase Three-Wire—120/240 Vac—Insulated/Bondable Split Neutral, continued

Main Ampere Rating	Maximum Number 1-Inch (25.4 mm)		Enclosure Type	Box Size	Wire Size Range Cu/Al 60 °C or 75 °C for Main Lugs	Loadcenter Catalog Number with Combination or NEMA Type 3R Cover <sup>①</sup>	
	Spaces	Circuits					
BR1224L125 	125	12	12	Indoor	#6–2/0	BR1212L125 <sup>②③④⑤</sup>	
		12	24	Indoor		B1	BR1224L125 <sup>②④⑤</sup>
		12	24	Indoor		B1	BR1224L125G <sup>②④⑤</sup>
		12	24	Indoor		B1	BR1224L125DG <sup>②④⑤⑥</sup>
		12	24	Outdoor		B1R	BR1224L125R <sup>②⑤⑦</sup>
		16	16	Indoor		B2	BR1616L125 <sup>②④⑤</sup>
		16	24	Indoor		B2	BR1624L125 <sup>②④</sup>
		16	24	Indoor		B2	BR1624L125G <sup>②④</sup>
		16	24	Outdoor		B2R	BR1624L125R <sup>②⑦</sup>
		20	20	Indoor		C1	BR2020L125 <sup>②④⑤</sup>
		20	24	Indoor		C1	BR2024L125 <sup>②④</sup>
		20	24	Indoor		C1	BR2024L125G <sup>②④⑤</sup>
		20	24	Outdoor		C1R	BR2024L125R <sup>②⑦</sup>
		24	24	Indoor		C2	BR2424L125 <sup>②④</sup>
		24	24	Indoor		C2	BR2424L125G <sup>②④⑤</sup>
		30	42	Indoor		D1	BR3042L125 <sup>②④</sup>
		150	16	30		Indoor	C2
20	30		Indoor	C2	BR2030L150 <sup>④⑨</sup>		
BR1224L200 	200	8	16	Outdoor	#1–300 kcmil	BR816L200RF <sup>⑤⑦⑩</sup>	
		12	24	Indoor		B2	BR1224L200 <sup>④⑤⑨</sup>
		12	24	Outdoor		B2R	BR1224L200R <sup>⑤⑦⑨</sup>
		20	40	Indoor		C2	BR2040L200 <sup>④⑨</sup>
		20	40	Indoor		C2	BR2040L200G <sup>④⑤⑨</sup>
		20	40	Outdoor		C3R	BR2040L200R <sup>⑦⑨</sup>
		24	40	Indoor		C4	BR2440L200 <sup>④⑨</sup>
		30	40	Indoor		D1	BR3040L200 <sup>④⑨</sup>
		30	40	Indoor		D1	BR3040L200G <sup>④⑤⑨</sup>
		30	40	Outdoor		D1R	BR3040L200R <sup>⑦⑨</sup>
		40	40	Indoor		G1	BR4040L200 <sup>④⑨</sup>
		40	40	Indoor		G1	BR4040L200G <sup>④⑤⑨</sup>
		40	40	Outdoor		G1R	BR4040L200R <sup>⑦⑨</sup>
		60	120	Indoor		L3	BR60120L200 <sup>⑩</sup>
		225	42	42		Indoor	L1
42	42		Outdoor	L1R	BR4242L225R <sup>⑦</sup>		

#### Notes

- ① Ground bar kits priced separately unless otherwise noted. See **Page V1-T1-66**.
- ② Has notch for BREQS125 hold-down kit.
- ③ Single, movable neutral is provided.
- ④ Combination cover style.
- ⑤ Suitable for use as service equipment when not more than six main disconnecting means are provided and when not used as a lighting and appliance panelboard (see Article 408.34 of the NEC).
- ⑥ Ground bars GBK5 and GBK520 installed.
- ⑦ Rainproof panels are furnished with hub closure plates. For rainproof hubs, refer to **Page V1-T1-66**.
- ⑧ Ground bar GBK1220 installed.
- ⑨ Has notch for BRHDK125 hold-down kit.
- ⑩ Includes through-feed lugs for both phase and neutral conductors.
- ⑪ Includes main lugs. Loadcenters can convert to main breaker using kit.

### Dimensions

Approximate Dimensions in Inches (mm)

#### Residential/Commercial/New York City Loadcenters, Unit Enclosures—Box Sizes

**Note:** Box sizes do not include covers/fronets.

#### Residential Loadcenters—NEMA Type 1 Indoor

Box Size	Height	Width	Depth
A1	15.00 (381.0)	11.25 (285.8)	3.75 (95.3)
B1	16.75 (425.5)	14.31 (363.5)	3.88 (98.4)
B2	18.75 (476.3)	14.31 (363.5)	3.88 (98.4)
C1	21.00 (533.4)	14.31 (363.5)	3.88 (98.4)
C2	23.00 (584.2)	14.31 (363.5)	3.88 (98.4)
C4	27.00 (685.8)	14.31 (363.5)	3.88 (98.4)
D1	29.13 (739.8)	14.31 (363.5)	3.88 (98.4)
G1	34.13 (866.8)	14.31 (363.5)	3.88 (98.4)
L1	39.00 (990.6)	14.31 (363.5)	3.88 (98.4)
L2	45.00 (1143.0)	14.31 (363.5)	3.88 (98.4)
L3	48.38 (1228.3)	14.31 (363.5)	3.88 (98.4)
2	8.63 (219.1)	5.00 (127.0)	3.50 (88.9)
3	9.44 (239.7)	4.50 (114.3)	3.00 (76.2)
4	13.00 (330.2)	11.00 (279.4)	3.56 (90.5)
5	9.44 (239.7)	4.50 (114.3)	3.00 (76.2)
6	12.00 (304.8)	6.88 (174.6)	4.50 (114.3)
7	13.00 (330.2)	11.00 (279.4)	3.56 (90.5)
9	14.50 (368.3)	6.50 (165.1)	3.50 (88.9)

#### Residential Loadcenters—NEMA Type 3R Outdoor

Box Size	Height	Width	Depth
B1R	16.75 (425.5)	14.31 (363.5)	5.19 (131.8)
B2R	18.75 (476.3)	14.31 (363.5)	5.19 (131.8)
C3R	25.00 (635.0)	14.31 (363.5)	5.19 (131.8)
D1R	29.13 (739.8)	14.31 (363.5)	5.19 (131.8)
G1R	34.13 (866.8)	14.31 (363.5)	5.19 (131.8)
L1R	39.00 (990.6)	14.31 (363.5)	5.19 (131.8)
L2R	45.00 (1143.0)	14.31 (363.5)	5.19 (131.8)
L3R	48.75 (1238.2)	14.31 (363.5)	5.19 (131.8)
2R	8.63 (219.1)	5.00 (127.0)	3.50 (88.9)
3R	9.44 (239.7)	4.50 (114.3)	3.00 (76.2)
4R	13.00 (330.2)	11.00 (279.4)	3.56 (90.5)
5R	9.44 (239.7)	4.50 (114.3)	3.00 (76.2)
6R	11.75 (298.5)	6.50 (165.1)	4.50 (114.3)
7R	13.00 (330.2)	11.00 (279.4)	3.56 (90.5)
8R	27.00 (685.8)	10.50 (266.7)	4.75 (120.7)
9R	14.25 (362.0)	6.50 (165.1)	4.00 (101.6)
C1R	21.00 (533.4)	14.31 (363.5)	5.19 (131.8)

#### Commercial Loadcenters—NEMA Type 1 Indoor

Box Size	Height	Width	Depth
19	44.00 (1117.6)	16.16 (410.4)	6.25 (158.8)
20	44.00 (1117.6)	16.16 (410.4)	6.25 (158.8)
22	54.00 (1371.6)	16.22 (412.0)	6.31 (160.3)
24	66.50 (1689.1)	16.22 (412.0)	6.31 (160.3)

#### Commercial Loadcenters—NEMA Type 3R Outdoor

Box Size	Height	Width	Depth
42	38.00 (965.2)	16.31 (414.3)	6.38 (161.9)
43	44.00 (1117.6)	16.31 (414.3)	6.38 (161.9)
46	54.00 (1371.6)	16.31 (414.3)	6.38 (161.9)
47	66.56 (1690.7)	16.31 (414.3)	6.38 (161.9)

#### New York City Loadcenters—NEMA Type 1 Indoor

Box Size	Height	Width	Depth
A	38.00 (965.2)	18.13 (460.4)	5.00 (127.0)
B	44.00 (1117.6)	18.13 (460.4)	5.00 (127.0)
C	66.50 (1689.1)	18.13 (460.4)	6.25 (158.8)

#### ECC Unit Enclosures—NEMA Type 1 Indoor

Height	Width	Depth
23.25 (590.6)	8.88 (225.4)	4.50 (114.3)

#### ECC Unit Enclosures—NEMA Type 3R Outdoor

Height	Width	Depth
23.68 (601.7)	9.31 (236.5)	5.44 (138.1)