Bolted contact switches

Pringle switches

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Eaton's Pringle bolted contact switches

History

Eaton's Pringle® switches have helped pioneer the development of high-quality electrical products for commercial and industrial applications since 1891. Eaton's Pringle bolted contact switch was the first in the industry and is a standard in high-current switching applications. They are custom-built, are used in many heavy-duty applications and are suitable for use in UL® 891 switchboards.

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Bolted pressure technology

Why our bolted pressure contact switch works better

- Conducts high current with greater efficiency than knife spring or butt contact devices
- The bolted contact switch opens and closes easily
- The operating mechanism closes the switch blades quickly and actuates a bolting mechanism that applies pressure to both the hinge and the jaw contacts, providing current-conducting efficiency equivalent to that of a bolted busbar
- The entire switch bolting mechanism is non-magnetic to ensure that inductive heating can not occur in any of the switch components, which ensures long-term switch reliability

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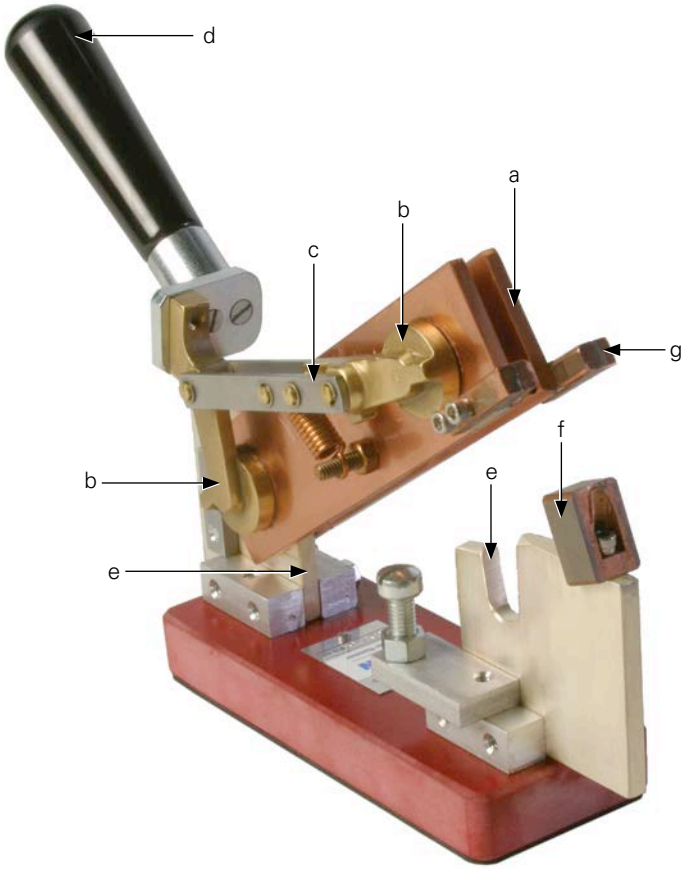

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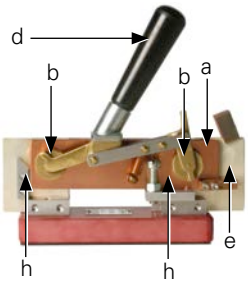

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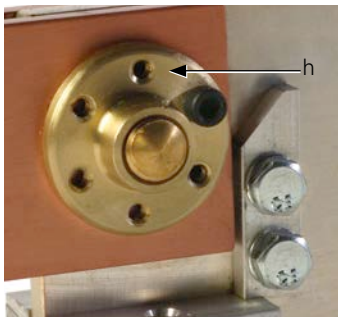

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1. **Switch is shown in open position. Diagram shows:**
   (a) Two parallel movable blades
   (b) Hinge and jaw bolts
   (c) Linkage
   (d) Handle
   (e) Stationary contacts
   (f) Contact block
   (g) Arc tips

2. **Switch blades (a) are closed over stationary contacts (e). Continued motion of operating handle (d) cranks hinge and jaw bolts (b) into clamping nuts (h) on opposite side, applying bolted pressure at both the hinge and jaw contacts.**

3. **Shows clamp nut (h) with pressure adjustment**

4. **Shows clamping mechanism detail**

CBC electrical trip and QA manually operated

Bolted contact switches

Charge-before-close (CBC) electrical trip

The CBC switch features the Pringle bolted pressure principle and can be manually or electrically tripped. The switch features a quick-acting stored energy mechanism. The spring is compressed by the operating handle and released near the end of the stroke to provide quick, positive switching action independent of the speed with which the handle is operated. A stored energy latch mechanism and solenoid trip release provide simple and economical electrical opening.

The CBC is operated by rotating the handle counterclockwise to charge. The switch can be closed only after the opening spring has been charged. After closing, the switch can be tripped manually by a mechanical pushbutton or electrically by remotely sending a signal to the solenoid. During trip, there is no handle movement.

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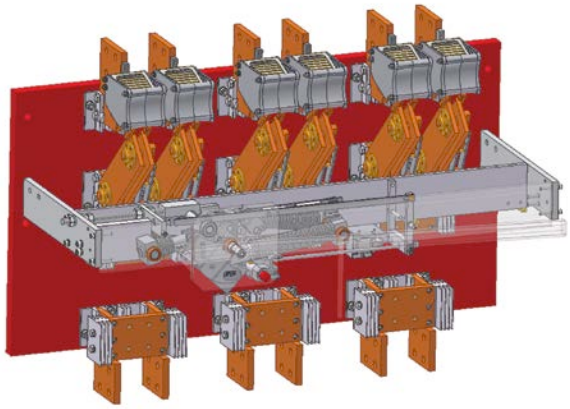

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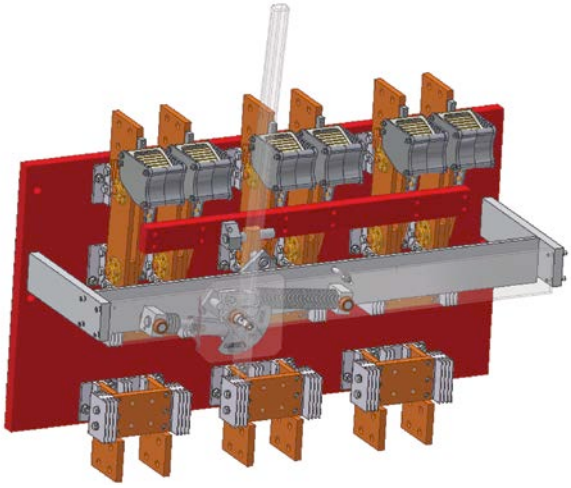

Quick acting (QA) manually operated

The QA switch features the Pringle bolted pressure principle with a quick-acting operating mechanism. The switch operation is achieved via manual operation. The spring is compressed by the operating handle and released near the end of the stroke to provide quick, positive switching action independent of the speed with which the handle is operated. The QA switch mechanism prevents teasing of the contacts.

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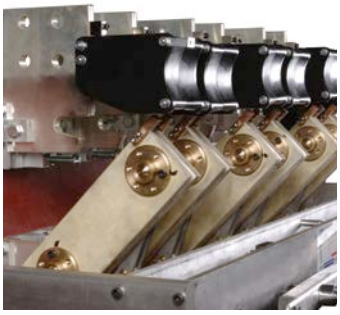

5. **Open 3000 A CBC switch without extra accessories**
6. **Closed 3000 A QA switch without extra accessories**
7. **CBC bottom-fed switch**
8. **QA top-fed switch, with blown fuse detector option on main panel**
9. **Detail of arc chute and pole assembly (shown open)**

Features and accessories

- NEMA® standard terminal drilling
- Provision for padlocking in OPEN position
- Two-pole switches are same as three-pole, except right-hand pole is omitted
- Can be supplied in NEMA 1 or 3R enclosures
- Can be top or bottom feed

Performance standards

- 800 A to 4000 A switches (UL 977)

Temperature

All CBC and QA switches will carry 100% of rated current without exceeding 60 °C rise at terminals. The maximum allowed ambient, when operating at 100% rated load, is 40 °C.

No-load endurance

- 800 A switches: 3500 no-load operations
- 1200 A switches: 2500 no-load operations
- 1600 A to 2500 A switches: 2000 no-load operations
- 3000 A and 4000 A switches: 1000 no-load operations

Load make-and-break ability

- 800 A to 4000 A switches: three load make operations at 1200% of rating
- 800 A to 4000 A switches: three load break operations at 600% of rating

Load make-and-break ability at 200% of rating

- 800 A to 1200 A switches: 100 operations
- 1600 A to 2400 A switches: 50 operations

Ratings/withstand ability

Pringle QA and CBC switches

- Fusible and non-fusible switches are 100% load break and 100% load make rated
- Switches are capable of breaking 12X and making 6X overload currents
- Switches have a short-circuit rating of 200,000 rms symmetrical amperes at rated voltage when protected by Class L fuses

The Class L fuses can clear faults in one-half cycle or less, and the clearing time does not change with age or load conditions. There is no calibration required—when a blown fuse is replaced with a new one, original circuit protection is restored.

Trip solenoid (CBC only)

Solenoid is capable of tripping at 55% of rated voltage.

Spring mechanism

The unique spring design is created by a series of concave-convex washers. The paired-washer spring design provides a higher force/distance ratio, making it easier to operate the mechanism.

Should any pair of washers become inoperable for any reason, the entire spring assembly will still be operable by means of the remaining pairs. This is unlike what would happen if a coil spring were to fracture or fatigue.

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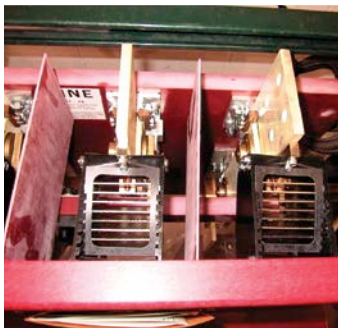

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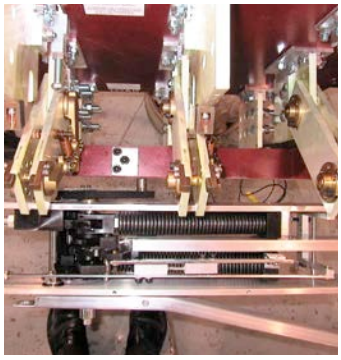

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1. **Detail of arc chute assembly**
2. **Sample spring configuration**
3. **Top view of the CBC shunt trip switch**
4. **Spring detail for a CBC switch**
5. **Pole assembly and pole yoke assembly**
   Switch is in closed position

CBC top feed ordering information

Amperes	Catalog Number ❶	Dimensions in Inches ❷ (mm) A	B	C	D	E	F	Weight Lbs (kg)
800	**CB0833T120480**	28.00 (711.2)	24.00 (609.6)	16.50 (419.1)	5.50 (139.7)	6.50 (165.1)	26.13 (663.7)	140 (64)
1200	**CB1233T120480**	28.00 (711.2)	24.00 (609.6)	16.50 (419.1)	5.50 (139.7)	6.50 (165.1)	28.00 (711.2)	180 (82)
1600	**CB1633T120480**	28.00 (711.2)	24.00 (609.6)	16.50 (419.1)	5.50 (139.7)	6.50 (165.1)	28.00 (711.2)	180 (82)
2000	**CB2033T120480**	28.00 (711.2)	24.00 (609.6)	16.50 (419.1)	5.50 (139.7)	6.50 (165.1)	28.00 (711.2)	180 (82)
2500	**CB2533T120480**	32.00 (812.8)	28.00 (711.2)	17.50 (444.5)	6.00 (152.4)	8.00 (203.2)	28.00 (711.2)	215 (98)
3000	**CB3033T120480**	44.00 (1117.6)	40.00 (1016.0)	22.50 (571.5)	9.00 (228.6)	11.00 (279.4)	28.00 (711.2)	390 (177)
4000	**CB4033T120480**	44.00 (1117.6)	40.00 (1016.0)	22.50 (571.5)	9.00 (228.6)	11.00 (279.4)	28.00 (711.2)	390 (177)

❶ For 240 V solenoid, change catalog number from **120** to **240**.

❷ Dimensions shown for reference only. Certified drawings sent on request.

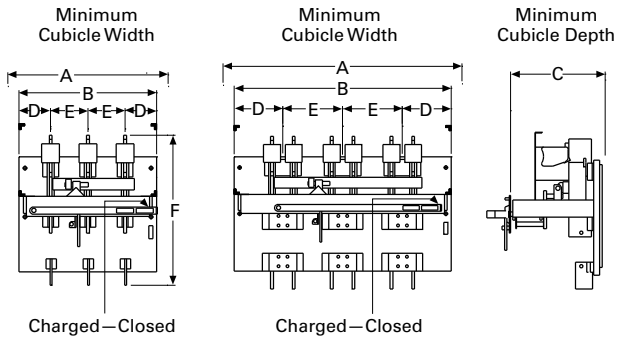
CBC bottom feed ordering information

Amperes	Catalog Number ❶	Dimensions in Inches ❷ (mm) H	I	J	K	L	M	Weight Lbs (kg)
800	**CB0833B120480**	28.00 (711.2)	24.00 (609.6)	16.50 (419.1)	5.50 (139.7)	6.50 (165.1)	30.13 (765.3)	155 (70)
1200	**CB1233B120480**	28.00 (711.2)	24.00 (609.6)	16.50 (419.1)	5.50 (139.7)	6.50 (165.1)	32.00 (812.8)	200 (91)
1600	**CB1633B120480**	28.00 (711.2)	24.00 (609.6)	16.50 (419.1)	5.50 (139.7)	6.50 (165.1)	32.00 (812.8)	200 (91)
2000	**CB2033B120480**	28.00 (711.2)	24.00 (609.6)	16.50 (419.1)	5.50 (139.7)	6.50 (165.1)	32.00 (812.8)	200 (91)
2500	**CB2533B120480**	32.00 (812.8)	28.00 (711.2)	17.50 (444.5)	6.00 (152.4)	8.00 (203.2)	32.00 (812.8)	240 (109)
3000	**CB3033B120480**	44.00 (1117.6)	40.00 (1016.0)	22.50 (571.5)	9.00 (228.6)	11.00 (279.4)	32.00 (812.8)	430 (195)
4000	**CB4033B120480**	44.00 (1117.6)	40.00 (1016.0)	22.50 (571.5)	9.00 (228.6)	11.00 (279.4)	32.00 (812.8)	430 (195)

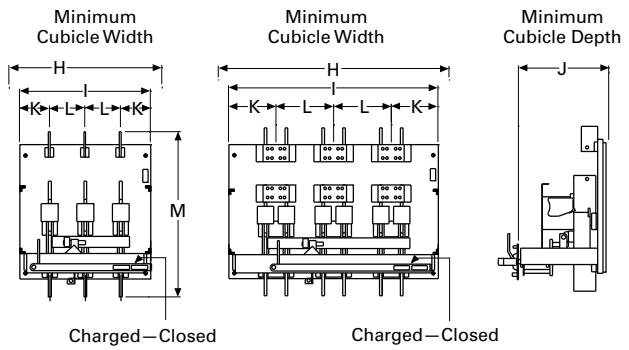
❶ For 240 V solenoid, change catalog number from **120** to **240**.

❷ Dimensions shown for reference only. Certified drawings sent on request.

800 A to 4000 A CBC



800 A to 4000 A CBC-B



QA top feed ordering information

Amperes	Catalog Number	Dimensions in Inches ❶ (mm) A	B	C	D	E	F	Weight Lbs (kg)
800	**QA0833T480**	24.00 (609.6)	20.00 (508.0)	12.00 (304.8)	4.00 (101.6)	6.00 (152.4)	22.50 (571.5)	95 (43)
1200	**QA1233T480**	28.00 (711.2)	24.00 (609.6)	14.00 (355.6)	5.50 (139.7)	6.50 (165.1)	28.00 (711.2)	160 (73)
1600	**QA1633T480**	28.00 (711.2)	24.00 (609.6)	14.00 (355.6)	5.50 (139.7)	6.50 (165.1)	28.00 (711.2)	160 (73)
2000	**QA2033T480**	28.00 (711.2)	24.00 (609.6)	14.00 (355.6)	5.50 (139.7)	6.50 (165.1)	28.00 (711.2)	160 (73)
2500	**QA2533T480**	32.00 (812.8)	28.00 (711.2)	15.00 (381.0)	6.00 (152.4)	8.00 (203.2)	28.00 (711.2)	190 (86)
3000	**QA3033T480**	44.00 (1117.6)	40.00 (1016.0)	20.00 (508.0)	9.00 (228.6)	11.00 (279.4)	28.00 (711.2)	350 (159)
4000	**QA4033T480**	44.00 (1117.6)	40.00 (1016.0)	20.00 (508.0)	9.00 (228.6)	11.00 (279.4)	28.00 (711.2)	350 (159)

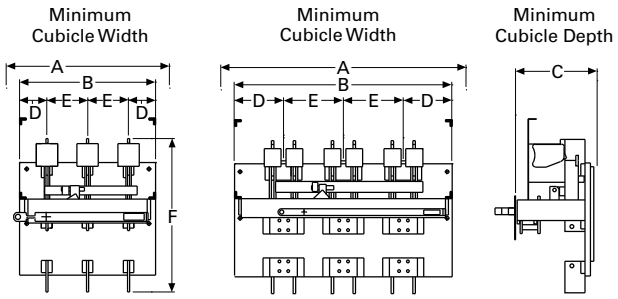
❶ Dimensions shown for reference only. Certified drawings sent on request.

QA bottom feed ordering information

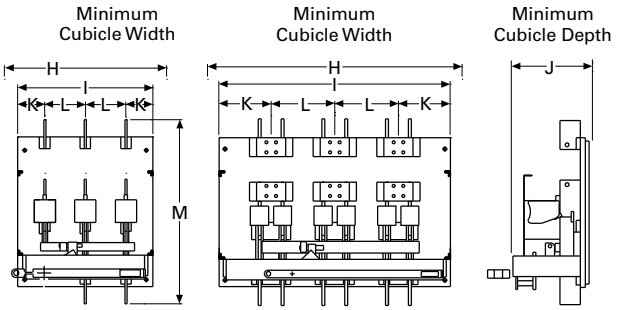
Amperes	Catalog Number	Dimensions in Inches ❶ (mm) H	I	J	K	L	M	Weight Lbs (kg)
800	**QA0833B480**	24.00 (609.6)	20.00 (508.0)	12.00 (304.8)	4.00 (101.6)	6.00 (152.4)	27.00 (685.8)	110 (50)
1200	**QA1233B480**	28.00 (711.2)	24.00 (609.6)	14.00 (355.6)	5.50 (139.7)	6.50 (165.1)	32.00 (812.8)	180 (82)
1600	**QA1633B480**	28.00 (711.2)	24.00 (609.6)	14.00 (355.6)	5.50 (139.7)	6.50 (165.1)	32.00 (812.8)	180 (82)
2000	**QA2033B480**	28.00 (711.2)	24.00 (609.6)	14.00 (355.6)	5.50 (139.7)	6.50 (165.1)	32.00 (812.8)	180 (82)
2500	**QA2533B480**	32.00 (812.8)	28.00 (711.2)	15.00 (381.0)	6.00 (152.4)	8.00 (203.2)	32.00 (812.8)	215 (98)
3000	**QA3033B480**	44.00 (1117.6)	40.00 (1016.0)	20.00 (508.0))	9.00 (228.6)	11.00 (279.4)	32.00 (812.8)	400 (182)
4000	**QA4033B480**	44.00 (1117.6)	40.00 (1016.0)	20.00 (508.0))	9.00 (228.6)	11.00 (279.4)	32.00 (812.8)	400 (182)

❶ Dimensions shown for reference only. Certified drawings sent on request.

800 A to 4000 A QA



800 A to 4000 A QA-B



Accessories

Bolted contact switches

CBC and QA switches come with various types of accessories

Accessories available

- Ground fault relay for use with CBC (no integral CT) ❶
- Phase-failure relay and capacitor tripping ❶
- Undervoltage relay and capacitor tripping ❶
- Blown-fuse sensing with option for tripping ❶
- Key interlocking
- Auxiliary contacts
- Indicator light schemes

❶ CBC only.

Phase failure relay features

- Power ON indication
- Phase reversal
- Phase unbalanced protection (2% to 8% adjustable) with indication (LED)
- Phase loss protection with indication (LED)
- Undervoltage protection (80%) with indication (LED)
- Overvoltage protection (115%) with indication (LED)
- Adjustable trip time delay (instantaneous to 30 sec)
- Adjustable reset time delay (1 sec to 5 min)
- Automatic reset
- Clear cover
- Meets NEC® service entrance requirements
- Maintains fault indication after loss of power

Ground fault features

- Integral test panel with "push to test" and "shunt trip bypass" pushbuttons for proper testing of device with the ability to trip or not trip the protective device
- Positive visual trip indicator
- Adjustable time delay
- Discrete current threshold adjustment
- Clear plastic cover
- Electromechanical relay output positive ON and OFF
- Meets NEC service entrance requirements

Blown fuse detection options

- Blown fuse detector with three normally ON indicating lights (does NOT trip)
- Blown fuse detector with three normally OFF indicating lights (does NOT trip)
- Blown fuse detector without lights (trips switch)
- Blown fuse detector with three normally ON indicating lights (trips switch)
- Blown fuse detector with three normally OFF indicating lights (trips switch)

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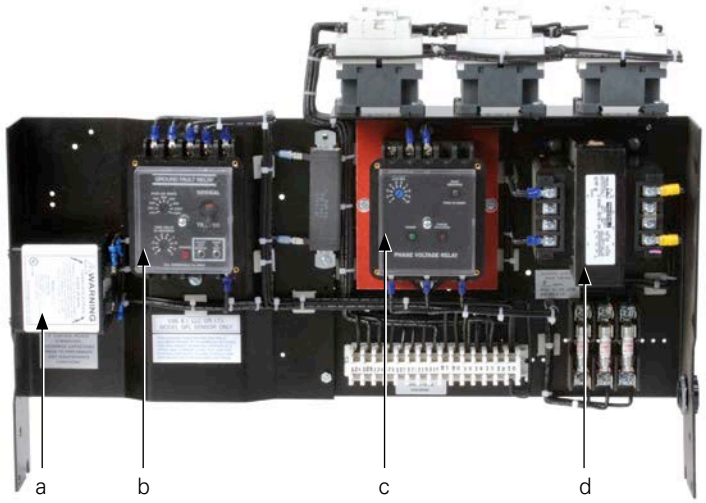

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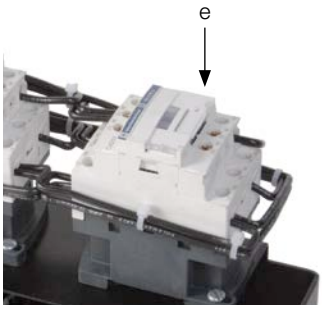

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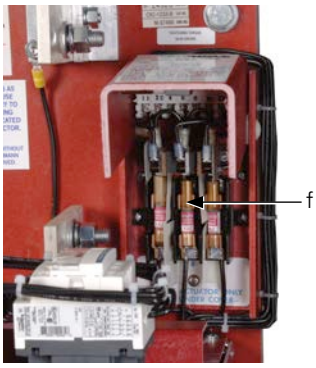

1. **A switch can include the following accessories mounted on a pan assembly:**
   (a) Capacitor
   (b) Ground fault relay
   (c) PF relay
   (d) Control power transfer
2. **Blown fuse detector light indicator relays feature (showing lights normally ON when the switch is ON or OFF)**
   (e) Mounted to main pan assembly
3. **CBC switch with phase failure relay and blown fuse detector lights**
4. **Blown fuse detector**
   (f) Blown fuse detector with lights option mounted to CBC switch

Switch variations

Bolted contact switches

FP-CBC ground fault protector

The fault protector combines the features of a CBC with integrated zero-sequence sensor and ground fault protection on the switch.

Ratings

- 480 V, UL
- 600 V, CSA®
- 800 A to 4000 A, 200 kAIC

Features

- Charge-before-close mechanism
- Manual/electrical trip, quick-positive switching action
- Integrated zero-sequence sensor and ground fault protection
- Three-pole, four-wire
- Can be supplied in NEMA 1 or 3R enclosures

Accessories

- Blown fuse detector
- Phase failure relay with capacitor trip

Note: 5000 A and 6000 A ratings are available (no UL listing).

EO-CBC—electrically operated

The EO-CBC combines the features of a CBC but includes an operator with a linear motor that electrically charges the stored-energy mechanism and closes the switch.

Ratings

- 480 V and 600 V
- 800 A to 6000 A, 200 kAIC

Features

- Identical dimensions to CBC
- Quick-positive switching action
- Bottom feed configuration available
- Three-pole, three-wire
- Can be supplied in NEMA 1 or 3R enclosures
- Separately mounted control box (supplied)

Notes: All switches are rated 480 V; control circuit on all switches is 120 Vac.

A control box sized approximately 16 x 14 x 6 that is available for separate mounting includes a control power transformer.

PMS—mill switch

The PMS is an enclosed switch commonly used as a disconnect switch with a side-operated mechanism. Applications include steel mills, foundries, shipyards, heavy equipment warehouses and any other industrial plant requiring similar applications.

Ratings

- AC or DC applications
- 800 A to 4000 A

Features

- Two- or three-pole
- Fusible or non-fusible configurations
- Four basic configurations are available to meet different application requirements:
  - Cable entry in the top and exit out of the bottom (TB)
  - Cable entry and exit in the top (TT)
  - Cable entry in the bottom and top exit (BT)
  - Bottom entry and exit of cable (BB)
- All terminals are drilled to NEMA standards:
  - Accepts four connectors per terminal for 800 A to 2000 A switches
  - Accepts six connectors per terminal for 2500 A to 4000 A switches (cable sizes #2 to 1000 kcmil)
- Enclosures for PMS offer a variety of features; enclosures are NEMA 12 for wall or column mounting—indoors or outdoors

Additional products using Pringle's bolted pressure contact technology

- Manual transfer switches:
  - Come in either vertical or horizontal configurations
  - Come in NEMA 1 or 3R enclosures
- Live front switches:
  - Switch comes in one-, two-, three- or four-pole
  - Non-load break ratings; has non-spring slow make–slow break characteristics

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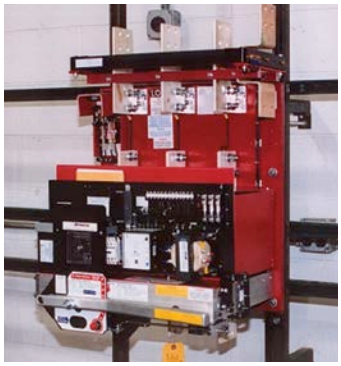

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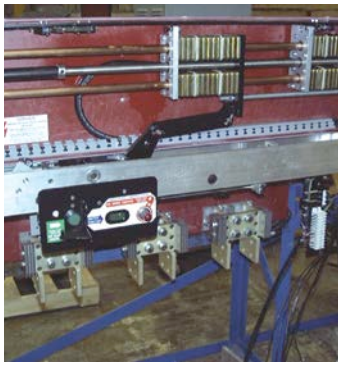

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1. **FP—fault protector**
   CBC with integrated zero-sequence sensor and ground fault protection.
2. **EO—electrically operated CBC**
   3000 A switch shown.
3. **PMS—mill switch**
   Two-pole, 250 Vdc, wallmounted.

Replacement parts and service

Bolted contact switches

4. Pringle switch detail—example shown is 3000 A
(a) Deadfront
(b) Pole yolk assembly
(c) Pole assembly (6)
(d) Arc chute assembly (6)

5. CBC operating/deadfront mechanism (notice the use of two-spring mechanism)

6. QA operating/deadfront mechanism

Contact information

To place an order for Eaton's Pringle bolted pressure contact switches and/or replacement parts, please call 1-800-356-1243. For service, please call 1-888-329-9272. Additional information is available at Eaton.com/pringle.

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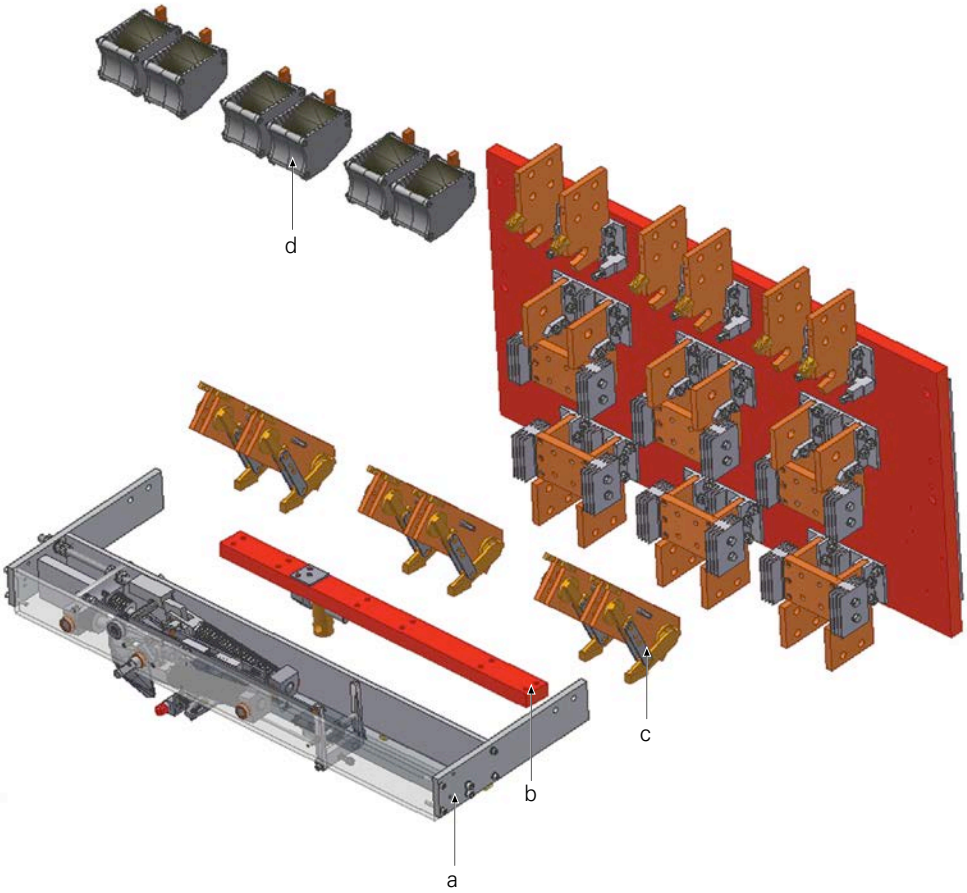

Replacement parts and service

Replacement parts

To ensure proper and efficient operation of your Pringle switch and minimize downtime caused by damaged parts, or to upgrade your existing switches, we offer the following parts for field or Pringle service technician installation:

- Pole and pole yoke assembly
- Arc chute assembly or arcing parts
- Bolted pressure clamping mechanism
- Coil/solenoid assembly
- Complete operating mechanism (deadfront)
- Complete pan assembly or individual accessory parts
- Handles

Servicing your Eaton Pringle switch

Pringle switches are often the main disconnect switch in a distribution system. Continuous operation and minimal downtime are therefore critical. Although these switches rarely fail, like any other mechanical device, regular maintenance is recommended. We have a dedicated team ready to assist you.

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Eaton is dedicated to ensuring that reliable, efficient and safe power is available when it's needed most. With unparalleled knowledge of electrical power management across industries, experts at Eaton deliver customized, integrated solutions to solve our customers' most critical challenges.

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