

Enclosed Circuit Breakers—Power Defense



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Enclosed Circuit Breakers—Power Defense

Product Description

Eaton's Power Defense™ circuit breakers are enclosed to meet the needs of various applications. Ratings are 15–1200 A, NEMA 1, 3R, 12/3R and 4X.

Application Description

NEMA 1 General Purpose

- Surface mount up to 1200 A or flush mount up to 400 A
- Designed for indoor use in commercial buildings, apartment buildings, and other areas where a general-purpose enclosure is applicable
- Front operable and is capable of being padlocked in the OFF position
- UL listed as suitable for service entrance application

NEMA 3R Rainproof

- Designed for outdoor use to serve as a main disconnect and protective device for feeder circuits
- Side operable and is capable of being padlocked in the OFF position
- UL listed as suitable for service entrance application

NEMA 12/3R Dustproof

- No knockouts or other openings
- Designed for severe conditions where oil, coolant, dust and other foreign material may exist
- Side operable and is capable of being padlocked in the OFF position
- UL listed as suitable for service entrance application
- NEMA 3R rating achieved by removing screw in the bottom endwall



NEMA 1 General Purpose



NEMA 3R Rainproof



NEMA 12/3R Dustproof

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Switching Devices

Enclosed Circuit Breakers

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NEMA 4/4X Waterproof

- No knockouts or other openings
- Designed for use in dairies, borax mines, breweries, paper mills and other process industries
- Side operable and is capable of being padlocked in the OFF position
- UL listed as suitable for service entrance application



NEMA 4/4X Waterproof

Features, Benefits and Functions

Standard Features

- NEMA Type 1, 3R, 12/3R, 4X
- Padlockable in the OFF position
- Fully assembled from the factory, including enclosure, breaker and other applicable components

Optional Features

- PXR 10 and PXR 20 electronic trip units available
- For ground fault applications, LSIG protection is available
- Lock ON provision available
- Modifications available such as custom paint, key interlocks and more
- Enclosures available for 100% rated breakers (400 A–600 A, 800 A–1200 A)

For additional requests or options, call the Flex Center at 888-329-9272 or email FlexSwitches@eaton.com.

Standards and Certifications

- UL 489
- CSA 22.2, No. 4 and No. 5
- NEMA 250



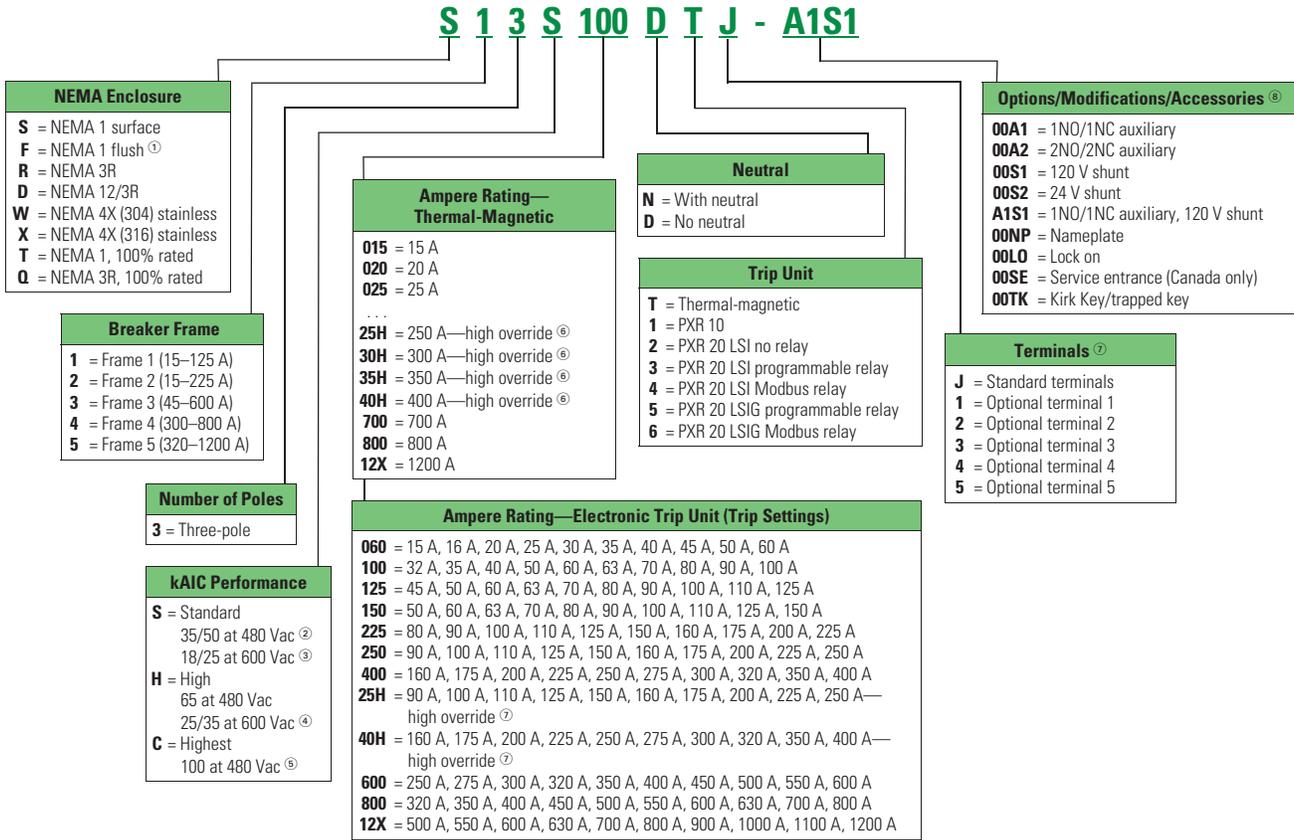
Seismic Qualifications

- Enclosed circuit breakers meet or exceed the requirements of Uniform Building Code (UBC) and California Department of Health Care Access and Information (HCAI), formerly the Office of Statewide Health Planning and Development (OSHPD)



Catalog Number Selection

Assembled Enclosed Circuit Breakers



Notes

- ① 400 A maximum.
- ② 35 kAIC for Frames 1, 2, 3 and 4. 50 kAIC for Frame 5.
- ③ 18 kAIC for Frames 1, 2, 3 and 4. 25 kAIC for Frame 5.
- ④ 25 kAIC for Frames 1 and 2. 35 kAIC for Frames 3, 4 and 5.
- ⑤ Applicable only for Frames 2 and 3.
- ⑥ 600 A Frame 3 and enclosures only.
- ⑦ See terminal selection chart.
- ⑧ More combinations and options are available.

Product Selection

PD Breaker Enclosures—Enclosure Only

Breaker Frame	Breaker Maximum Ampere Rating	Number of Poles	NEMA Rating	Catalog Number
PD1	125	2/3	NEMA 1	SPD1K0125
			NEMA 1 flush	FPD1K0125
			NEMA 3R	RPD1K0125
			NEMA 12/3R	DPD1K0125
			NEMA 4X	WPD1K0125
PD2	225	2	NEMA 1	SPD2J0225
			NEMA 1 flush	FPD2J0225
		3	NEMA 1	SPD2K0225
			NEMA 1 flush	FPD2K0225
		2/3	NEMA 3R	RPD2K0225
			NEMA 12/3R	DPD2K0225
			NEMA 4X	WPD2K0225
PD3 (400 A)	400	2/3	NEMA 1	SPD3K0400
			NEMA 1 flush	FPD3K0400
			NEMA 3R	RPD3K0400
			NEMA 12/3R	DPD3K0400
			NEMA 4X	WPD3K0400
			NEMA 1, 100% rated	SPD3L0600
			NEMA 3R, 100% rated	RPD3L0600
PD3 (600 A)	600	2/3	NEMA 1	SPD3K0600
			NEMA 3R	RPD3K0600
			NEMA 12/3R	DPD3K0600
			NEMA 4X	WPD3K0600
			NEMA 1, 100% rated	SPD3L0600
			NEMA 3R, 100% rated	RPD3L0600
			PD4	800
NEMA 3R	RPD4K0800			
NEMA 12/3R	DPD4K0800			
NEMA 4X	WPD4K0800			
PD5	1200	2/3		
			NEMA 3R	RPD5K1200
			NEMA 12/3R	DPD5K1200
			NEMA 4X	WPD5K1200
			NEMA 1, 100% rated	SPD5L1200
NEMA 3R, 100% rated	RPD5L1200			

Neutral Kits

PD Breaker Enclosures	Breaker Maximum Ampere Rating	Neutral Kits					
		Standard Neutral Kits			Neutral Kits with Current Sensor		
Breaker Frame	Breaker Maximum Ampere Rating	Catalog Number	Neutral Lug Size	Ground Lug Size	Catalog Number	Neutral Lug Size	Ground Lug Size
PD1	125	ECB225NK	(1) 250MCM–6	(1) 14–4/0	—	—	—
PD2	225	ECB225NK	(1) 250MCM–6	(1) 14–4/0	ECB225NSK	(1) 250MCM–6	(1) 14–4/0
PD3 (400 A)	400	ECB400NK	(1) 750MCM–1/0 or (2) 300MCM–1/0	(2) 3/0–250MCM	ECB400NSK	(1) 750MCM–1/0	(2) 3/0–250
PD3 (600 A)	600	DS600NK	(1) 750MCM–1/0 and (1) 600MCM–2	(2) 2–500MCM	ECB600NSK	(1) 750MCM–1/0 (1) 600MCM–2	(2) 2–500
PD4	800	DS800NK	(4) 750MCM–1/0	(3) 3/0–400MCM	ECB800NSK	(4) 750MCM–1/0	(3) 3/0–400
PD5	1200	DS800NK	(4) 750MCM–1/0	(3) 3/0–400MCM	ECB1200NSK	(4) 750MCM–1/0	(3) 3/0–400

Trip Units

Frame	kAIC Rating	Trip Unit ^①	Terminals ^②	Catalog Number Circuit Breaker ^{③④}	Frame	Trip Unit ^{③④}						
1	Standard	Thermal Magnetic	Standard	PDG13GXXXXTFFJ	—	—						
			Optional	PDG13GXXXXTFFN								
	High	Thermal Magnetic	Standard	PDG13MXXXXTFFJ	—	—						
			Optional	PDG13MXXXXTFFN								
2	Standard	Thermal Magnetic	"J" Standard	PDG23GXXXXTFFJ	—	—						
				PDG23GYYYYB2NJ								
				PDG23GYYYYE2NJ								
				PDG23GYYYYE3RJ								
	High	Thermal Magnetic	Optional	PDG23GXXXXTFFN	—	—						
				PDG23GYYYYB2NN								
				PDG23GYYYYE2NN								
				PDG23GYYYYE3RN								
				3 (400 A and 600 A)			Standard	Thermal Magnetic	Any	—	400 A: PDG33G0400FNNN 600 A: PDG33G0600FNNN	PDG3XTFA3XXXX
										PDG3XPXR3YYYYB2N		
PDG3XPXR3YYYYE2N												
PDG3XPXR3YYYYE3R												
High	Thermal Magnetic	Any	—		For 400 A: PDG33M0400FNNN For 600 A: PDG33M0600FNNN	PDG3XTFA3XXXX						
			PDG3XPXR3YYYYB2N									
			PDG3XPXR3YYYYE2N									
			PDG3XPXR3YYYYE3R									
			3 (400 A 100% rated and 600 A 100% rated)			Standard	Thermal Magnetic	Any	—	400 A 100% rated: PDF33G0400FNNN 600 A 100% rated: PDF33G0600FNNN	PDG3XTFA3XXXX	
									PDG3XPXR3YYYYB2N			
PDG3XPXR3YYYYE2N												
PDG3XPXR3YYYYE3R												
High	Thermal Magnetic	Any		—	For 400 A: PDF33M0400FNNN For 600 A: PDF33M0600FNNN	PDG3XTFA3XXXX						
				PDG3XPXR3YYYYB2N								
				PDG3XPXR3YYYYE2N								
				PDG3XPXR3YYYYE3R								
				4		Standard	Thermal Magnetic	Any	—	PDG43G0800FNNN	PDG4XTFA3XXXX	
									PDG4XPXR30800B2N			
PDG4XPXR30800E2N												
PDG4XPXR30800E3R												
High	Thermal Magnetic	Any	—		PDG43M0800FNNN	PDG4XTFA3XXXX						
			PDG4XPXR30800B2N									
			PDG4XPXR30800E2N									
			PDG4XPXR30800E3R									
			5			Standard	PXR20 LSI	Any	PDG53K0800E2NN and PDG53K1200E2NN	—	—	
									PDG53K0800E3RN and PDG53K1200E3RN			
High	PXR20 LSI	Any		PDG53M0800E2NN and PDG53M1200E2NN	—	—						
				PDG53M0800E3RN and PDG53M1200E3RN								
5 (100% rated)	Standard	PXR20 LSI	Any	PDF53K0800E2NN and PDF53K1200E2NN	—	—						
				PDF53K0800E3RN and PDF53K1200E3RN								
	High	PXR20 LSI	Any	PDF53M0800E2NN and PDF53M1200E2NN	—	—						
				PDF53M0800E3RN and PDF53M1200E3RN								

Notes

- ① LSI and LSIG refer to protection settings within the electronic trip unit. LSI = Long, Short and Instantaneous; LSIG = Long, Short, Instantaneous and Ground Fault.
 ② See "Terminal Selection" section for standard and optional terminals.
 ③ YYYY = For Electronic Trip Units, substitute YYYY for that range of trip settings. If they select the 60 A maximum for the Frame 2, then YYYY = 0060.
 ④ XXXX = For Thermal-Magnetic Trip Units, substitute XXXX for their amperage selection. If they select 100 A, then XXXX = 0100.

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Switching Devices

Enclosed Circuit Breakers

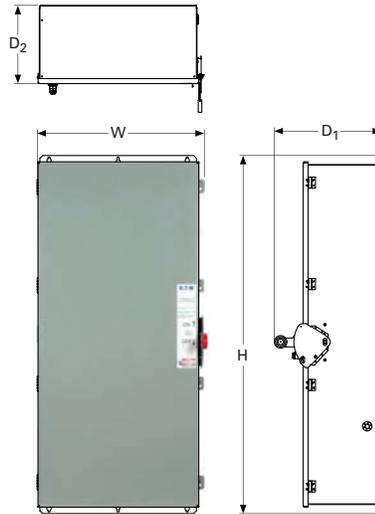
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Terminal Selection

Frame	Ampere Rating	Size	Three-Pole Kit Catalog Number
"J" Standard Terminal			
1	15–125	(1) 14–3/0	PDG1X3T125
2	15–100	(1) 14–1/0	PDG2X3T100
	110–225	(1) 4–4/0	PDG2X3TA225
3	100–225	(1) 3–350MCM	PDG3X3TA300
	250–350	(1) 250MCM–500MCM	PDG3X3TA350
	400	(2) 3/0–250MCM	PDG3X3TA400
	450–600	(2) 2–500MCM	PDG3X3TA630
4	300–700	(2) 1–500MCM	PDG4X3TA700
	800	(3) 3/0–400MCM	PDG4X3TA800
5	800	(3) 3/0–400MCM	(3) PDG5X1TA1000
	1200	(4) 4/0–500MCM	(3) PDG5X1TA1200

Frame	Description	Size	Three-Pole Kit Catalog Number
Optional Terminal			
1	Option 1	(1) 14–1/0	PDG1X3TA125
2	Option 1	(1) 6–300MCM	PDG2X3TA225A
	Option 2—Copper	(1) 4–4/0	PDG2X3T225
3	Option 1—Copper	(1) 3–350MCM	PDG3X3T300
	Option 2—Copper	(1) 250MCM–500MCM	PDG3X3T350
	Option 3—Copper	(2) 3/0–250MCM	PDG3X3T400
	Option 4—Copper	(1) 500MCM–750MCM	PDG3X3T401H
	Option 5—Copper	(2) 2–500MCM	PDG3X3T630
4	Option 1	(2) 500MCM–750MCM	PDG4X3TA801
	Option 2—Copper	(2) 2/0–500MCM	(3) PDG4X1T600
	Option 3—Copper	(3) 3/0–300MCM	(3) PDG4X1T800
5	Option 1	(2) 1–500MCM	(3) PDG5X1TA700
	Option 2	(3) 500MCM–750MCM	(3) PDG5X1TA1201
	Option 3—Copper	(2) 2/0–500MCM	(3) PDG5X1T700
	Option 4—Copper	(3) 3/0–500MCM	(3) PDG5X1T1000
	Option 5—Copper	(4) 3/0–400MCM	(3) PDG5X1T1200

Dimensions



NEMA 1 Surface

Breaker Frame	NEMA Ratings	Maximum Ampere Rating	Height (H)	Width (W)	Depth (D1)	Depth (D2)	Approximate Weight in Lb (kg)
PD 1	NEMA 1	125	18.50 (469.9)	8.00 (203.2)	10.35 (262.9)	5.20 (132.1)	13 (6)
	NEMA 3R, 12/3R, 4X	125	18.50 (469.9)	8.00 (203.2)	11.05 (280.7)	5.90 (149.9)	14 (6)
PD 2	NEMA 1	225	22.80 (579.1)	8.00 (203.2)	10.35 (262.9)	5.20 (132.1)	17 (8)
	NEMA 3R, 12/3R, 4X	225	22.80 (579.1)	8.00 (203.2)	11.55 (293.4)	6.40 (162.6)	25 (11)
PD 3	NEMA 1, 3R, 12/3R, 4X	400	38.10 (967.7)	10.60 (269.2)	14.85 (377.2)	9.70 (246.4)	70 (32)
	NEMA 1 (surface only), 3R, 12/3R, 4X	600	49.90 (1267.5)	21.30 (541.0)	13.55 (344.2)	8.40 (213.4)	93 (42)
	NEMA 1 100%	600	53.63 (1362.3)	26.48 (672.5)	9.25 (234.9)	7.54 (191.6)	210 (95)
	NEMA 3R 100%	600	53.63 (1362.3)	26.48 (672.5)	14.96 (380.0)	9.82 (249.4)	210 (95)
PD 4	NEMA 1 (surface only), 3R, 12/3R, 4X	800	60.00 (1524.0)	20.80 (528.3)	18.15 (461.0)	13.00 (330.2)	139 (63)
PD 5	NEMA 1 (surface only)	1200	60.00 (1524.0)	20.80 (528.3)	18.15 (461.0)	13.00 (330.2)	190 (86)
	NEMA 3R, 12/3R, 4X	1200	60.00 (1524.0)	27.80 (706.1)	18.15 (461.0)	13.00 (330.2)	210 (95)
	NEMA 1 100%	1200	70.99 (1803.0)	29.62 (752.4)	15.53 (394.6)	13.81 (350.9)	323 (147)
	NEMA 3R 100%	1200	71.56 (1817.7)	29.62 (752.4)	18.91 (480.4)	13.80 (350.5)	323 (147)

Raintight Hubs

All rainproof enclosures 30–400 A are shipped with plate over cutout. Hubs are not supplied with screws on 30–400 A enclosures. Use screws from plate.

Raintight Hubs**Raintight Tubs** ^①

Hubs	Hub Diameter		Catalog Number
	Inches	mm	
Small			
For use with RPD1–RPD3 (400 A) enclosures	0.75	19.1	DS075H1
	1.00	25.4	DS100H1
	1.25	31.8	DS125H1
	1.50	38.1	DS150H1
	2.00	50.8	DS200H1
Large			
For use with RPD1–RPD3 (400 A) enclosures	2.00	50.8	DS200H2
	2.50	63.5	DS250H2
	3.00	76.2	DS300H2

Note

^① Myers hubs, Cat. No. ST-1 through 10, zinc, aluminum or stainless may be used on Type 3R, 12, 4X enclosures.

Power Xpert Enclosed Circuit Breakers



Power Xpert Enclosed Circuit Breakers

Product Description

The Power Xpert® enclosed circuit breaker (ECB) with Arcflash Reduction Maintenance System™ is an extension of the arc-flash-risk-reducing solutions currently offered by Eaton. The assembly provides an enclosed circuit breaker with functionality that allows the operator to place the breaker into a maintenance mode, thus reducing the amount of available arc flash incident energy downstream.

The information is taken directly from the National Electrical Code® (NEC) 2023.

240.87 Arc Energy Reduction

Where the highest continuous current trip setting for which the actual overcurrent device installed in a circuit breaker is rated or can be adjusted is 1200 amperes or higher, 240.87(A), (B), and (C) shall apply.

(A) Documentation

Documentation shall be available to those authorized to design, install, operate, or inspect the installation as to the location of the circuit breaker(s). Documentation shall also be provided to demonstrate that the method chosen to reduce clearing time is set to operate at a value below the available arcing current.

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(B) Method to Reduce Clearing Time

One of the following means shall be provided and shall be set to operate at less than the available arcing current:

1. Zone selective interlocking
2. Differential relaying
3. Energy-reducing maintenance switching with local status indicator
4. Energy-reducing active arc flash mitigation system
5. An instantaneous trip setting; temporary adjustment of the instantaneous trip setting to achieve arc energy reduction shall not be permitted
6. An instantaneous override
7. An approved equivalent means

Informational Note No. 1: An energy-reducing maintenance switch allows a worker to set a circuit breaker trip unit to “no intentional delay” to reduce the clearing time while the worker is working within an arc-flash boundary as defined in NFPA 70E-2021,

Standard for Electrical Safety in the Workplace, and then to set the trip unit back to a normal setting after the potentially hazardous work is complete.

Informational Note No. 2: An energy-reducing active arc-flash mitigation system helps in reducing arcing duration in the electrical distribution system. No change in the circuit breaker or the settings of other devices is required during maintenance when a worker is working within an arc-flash boundary as defined in NFPA 70E-2021, Standard for Electrical Safety in the Workplace.

Informational Note No. 3: An instantaneous trip is a function that causes a circuit breaker to trip with no intentional delay when currents exceed the instantaneous trip setting or current level. If arcing currents are above the instantaneous trip level, the circuit breaker will trip in the minimum possible time.

Informational Note No. 4: See IEEE 1584-2018, IEEE Guide for Performing Arc Flash Hazard Calculations, for guidance in determining arcing current.

Features**Standard Features**

- PXR 20 or 25 trip unit with ALSI protection
- Full range, 55 A to 1200 A
- NEMA Type 1, 3R, 12/3R, 4X
- 600 Vac maximum
- 65 kAIC maximum at 480 Vac
- Additional control relay included to allow users to enable the Arcflash Reduction Maintenance System Maintenance Mode via a remote input signal
- 48 W power supply
- 100 VA CPT
- Arcflash Reduction Maintenance System maintenance mode can be initiated in the following ways:
 - Cover control (including padlockable selector switch and blue LED indication light)
 - Remotely via input signal
 - DIP switch on front of trip unit
- Padlockable in the OFF position ^①
- Padlockable enclosure
- Three-position handle (ON/Tripped/OFF)
- Assembly is fully factory wired and ready to go out of the box
- Can be applied on three-phase and single-phase systems ^②

Notes

- ^① From the factory, the handle can only be locked in the OFF position and can accommodate a maximum of three padlocks. Field modification to drill the shroud can allow locking in the ON position. Check with your local AHJ for requirements. The breaker will trip as usual, even with the handle locked ON.
- ^② For single-phase applications, the customer must wire using the breaker's two outside poles.

Optional Features

- Standard molded case breaker accessories available
- For ground fault applications, ALSIG protection is available
- Surge protective device (200 kA)
- Modifications available such as custom paint, 316-stainless enclosures, lock-on provisions, and more; call the Flex Center at 888-329-9272 for more information

Standards and Certifications

- UL 489 (File Number E309241)
- cUL® 489 (File Number E309241)
- NEC 240.87 Compliant



1.2

Switching Devices

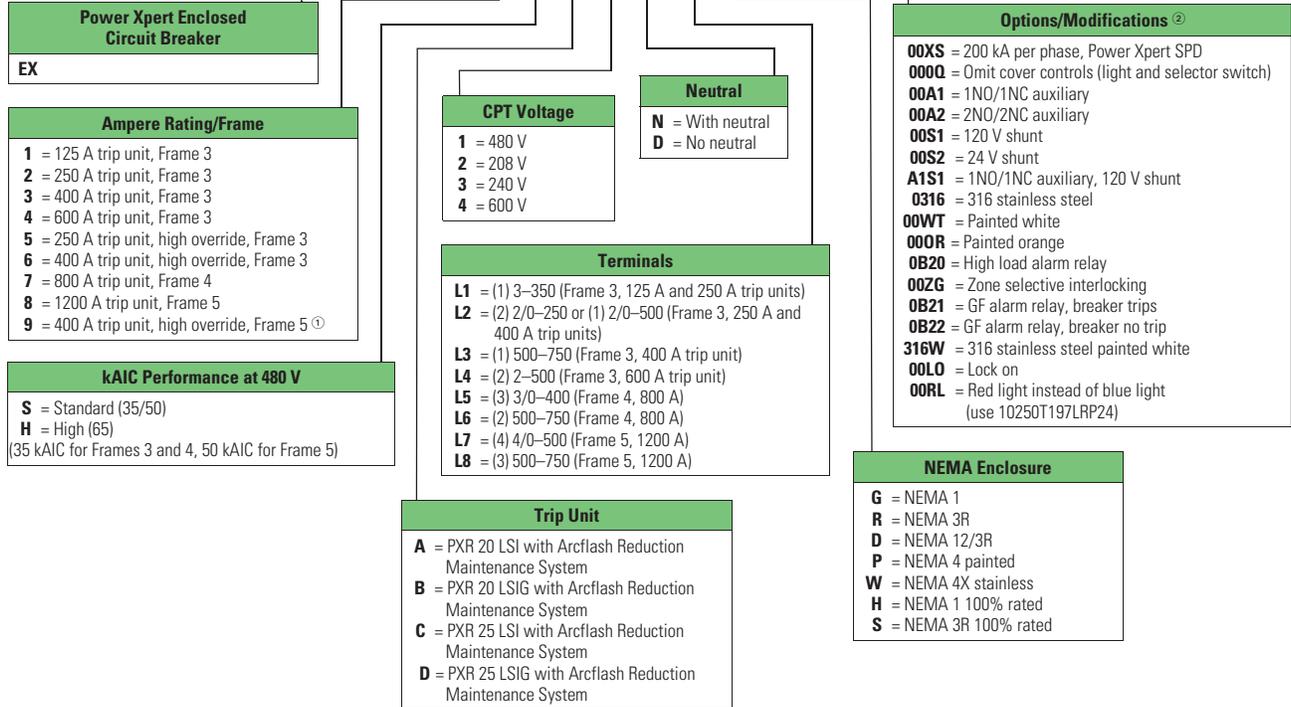
Enclosed Circuit Breakers

1

Catalog Number Selection

Power Xpert Enclosed Circuit Breaker

EX 3 H A 1 N L3 R - A1S1



Notes

- ① Trip unit options A and C only (ground fault protection not available).
- ② More combinations and options are available. Contact the Switching Device Flex Center at 1-888-329-9272 or FlexSwitches@eaton.com for more information.

Product Selection

EX1



Short-Circuit Ratings

Breaker Frame	kAIC Ratings				Catalog Numbers
	240 Vac	480 Vac	600 Vac	250 Vdc ^①	
PDG3	65	35	18	22	EX1S, EX2S, EX3S, EX4S, EX5S, EX6S
	100	65	35	42	EX1H, EX2H, EX3H, EX4H, EX5H, EX6H
PDG4	65	35	18	22	EX7S
	100	65	35	42	EX7H
PDG5	85	50	25	—	EX8S, EX9S
	100	65	35	—	EX8H, EX9H

Neutral Field Kits

Ampere Rating/ Breaker Frame	Catalog Number Prefix	Trip Unit	Neutral Assembly	Neutral Wire Range
125 A PD3 frame	EX1S, EX1H	ALSI	DS400NK	750 kcmil–1/0 (2) 300 kcmil–1/0
		ALSIG	ECB400NSK	750–1/0
250 A PD3 frame	EX2S, EX2H EX5S, EX5H (HO)	ALSI	DS400NK	750 kcmil–1/0 (2) 300 kcmil–1/0
		ALSIG	ECB400NSK	750–1/0
400 A PD3 frame	EX3S, EX3H EX6S, EX6H (HO)	ALSI	DS400NK	750 kcmil–1/0 (2) 300 kcmil–1/0
		ALSIG	ECB400NSK	750–1/0
600 A PD3 frame	EX4S, EX4H	ALSI	DS600NK	(1) 750–1/0 (1) 600–2
		ALSIG	ECB600NSK	(1) 750–1/0 (1) 600–2
800 A PD4 frame	EX7S, EX7H	ALSI	DS800NK	(4) 750–1/0
		ALSIG	ECB800NSK	(4) 750–1/0
1200 A PD5 frame	EX8S, EX8H	ALSI	DS800NK	(4) 750–1/0
		ALSIG	ECB1200NSK	(4) 750–1/0
400 A PD5 frame	EX9S, EX9H	ALSI	DS800NK	(4) 750–1/0
		ALSIG	ECB800NSK	(4) 750–1/0

Notes

^① DC ratings available in thermal-magnetic breakers only.

Note: (HO) refers to High Override frame.

1.2

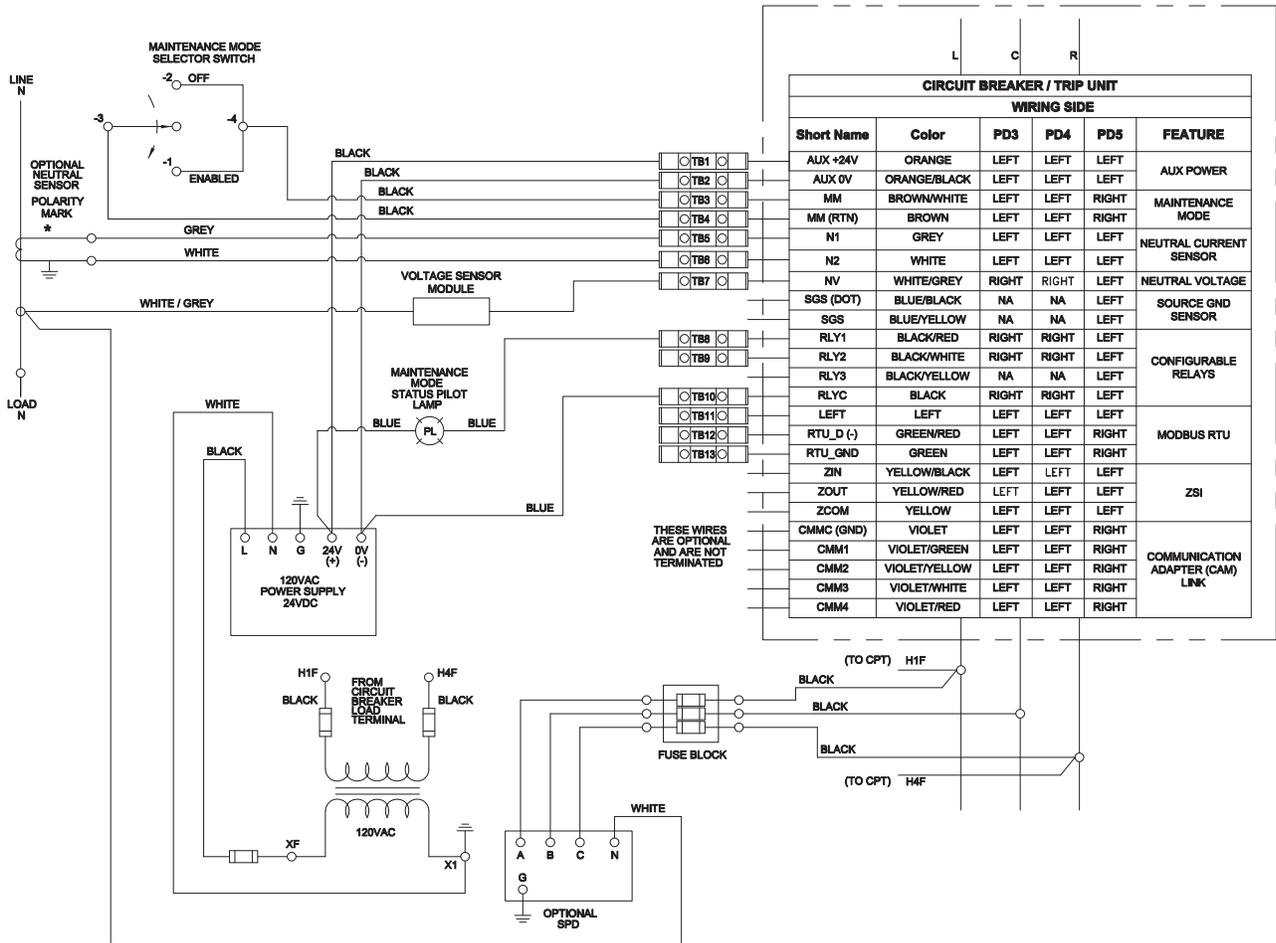
Switching Devices

Enclosed Circuit Breakers

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Wiring Diagram

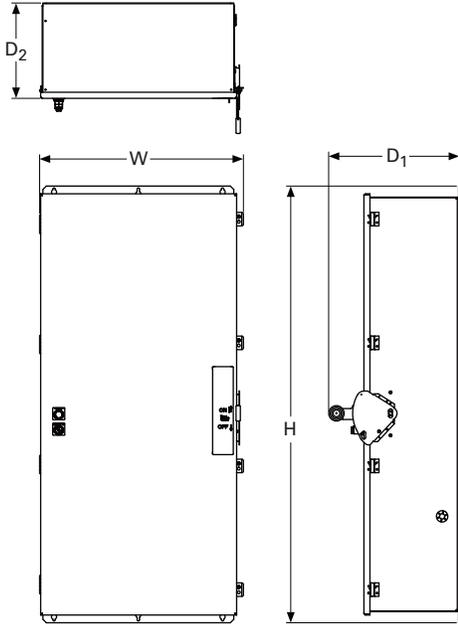
ECB with Arcflash Reduction Maintenance System Wiring



Dimensions

Approximate Dimensions in Inches (mm)

ECB with Arcflash Reduction Maintenance System



Dimensions for Continuous Current Ratings 80%

Breaker Frame	Height (H)	Width (W)	NEMA 1		NEMA 3R, 4, 4X, 12/3R	
			Depth (D1)	Depth (D2)	Depth (D1)	Depth (D2)
PD3	53.63	26.48	9.25	7.54	12.69	7.54
PD4	63.49	29.62	15.53	13.81	18.93	13.81
PD5	63.49	29.62	15.53	13.81	15.53	13.81

Dimensions for Continuous Current Ratings 100%

Breaker Frame	NEMA 1				NEMA 3R			
	Height (H)	Width (W)	Depth (D1)	Depth (D2)	Height (H)	Width (W)	Depth (D1)	Depth (D2)
PD3	53.63	26.48	9.25	7.54	53.63	26.48	14.96	9.82
PD5	70.99	29.62	15.53	13.81	71.56	40.65	18.91	13.81