Carling Technologies™
Innovative Designs. Powerful Solutions.

GFCI / ELCI

Circuit Protection

CATALOG

FOUNDED IN 1920

Since its founding, Carling Technologies has continually forged a tradition of leadership in quality and product innovation.

There are few products that Carling Technologies hasn't turned "ON" and fewer industries that haven't turned to Carling for solutions. With ISO and TS registered manufacturing facilities and technical sales offices worldwide, Carling ranks among the world's largest manufacturers of circuit breakers, switches, power distribution units, digital switching systems and electronic controls.

SWITCHES & CONTROLS
- Rocker
- Toggle
- Pushbutton
- Rotary

CIRCUIT PROTECTION
- Hydraulic-Magnetic
- Thermal
- GFCI / ELCI

CUSTOM SOLUTIONS
- PDU's
- Keypads
- Control Modules

MULTIPLEXED POWER SYSTEMS
- HMI Devices & I/O Modules
- Programmable Displays
- Data Communication Interfaces
- Electrical Systems Monitoring

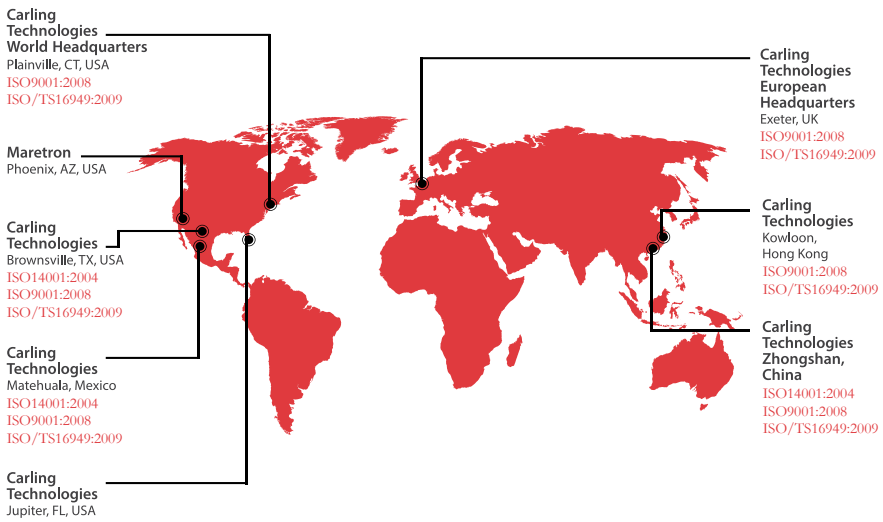
STRATEGIC MARKETS SERVED:

On/Off Highway | Marine | Telecom/Datacom | Military | Renewable Energy

OTHER SERVED INDUSTRIES:

Medical | Industrial Control | Audio / Visual | Commercial Food | HVAC | Floor Care | Generators | Small Appliances | Security Systems | Test & Measurment

GLOBAL LOCATIONS:



WORLDWIDE NUMBERS:

2200+ EMPLOYEES

150+ ENGINEERS

70+ DISTRIBUTORS

50+ REP FIRMS

COMPETITIVE ADVANTAGES+

Vertical Integration | Reliable & On-Time Delivery | Excellent Customer Service | Innovative & Eco-Friendly Products

GFCI/ELCI Circuit Protection

This catalog features Carling Technologies' current line of GFCIs/ELCIs products, which offer maximum equipment protection against overload and short circuits.

Carling's Equipment leakage circuit breakers function as hydraulic-magnetic circuit breakers, offering customized overload and short circuit protection. In addition, they sense and guard against faults to ground using innovative electronics technologies. With the exception of small amounts of leakage, the current returning to the power supply will be equal to the current leaving the power supply. If the difference between the current leaving and returning through the earth leakage circuit breaker exceeds the leakage sensitivity setting, the breaker trips and its LED illuminates. The LED gives a clear indication that the trip occurred as a result of leakage to ground. This protection helps prevent serious equipment damage and fire.

Within This Catalog, you will find comprehensive product information for each product series including applications, specifications and ordering schemes.

Available Online are tools such as part configurator, product selectors and stock checks. Please visit **www.carlingtech.com** for the latest information on all our products.

Application Solution Engineers are readily available to assist you in selecting the appropriate product for your application. For further assistance, please email us at **custservice@carlingtech.com**

Custom Design Solutions are available for OEMs that require specific product design and performance.

Other Circuit Protection Products such as thermal protection and ground fault circuit protection are also available. Please refer to **www.carlingtech.com** for a complete list of product offering.

Table of Contents

	 *PB-Series*	 *PC-Series*
POLES	1-3 poles, 3rd pole switched neutral	1-poles (1 circuit breaker + 1 GFCI sensor module), 120V, 2-pole (2 circuit breakers + 1 GFCI sensor module), 120/240V, or 120V with neutral break 2-pole (2 circuit breakers + 1 GFCI sensor module), 240VAC, 3-pole 120/240V with neutral break (sensor module has 2 pole width)
ACTUATOR STYLE	handle, rocker, flat rocker	handle, rocker, flat rocker, push-to-reset
LEAKAGE CURRENT TRIP LEVEL	30mA & 6mA	30mA & 6mA
LEAKAGE CURRENT TRIP TIME	**For 30mA leakage trip:** ≤ 22.2mA, shall not trip 30mA, shall trip within .10 seconds, complying with UL-1053 & ABYC E11. **For 6mA leakage trip:** ≤25ms	**For 30mA leakage trip:** ≤ 22.2mA, shall not trip 30mA, shall trip within .10 seconds, complying with UL-1053 & ABYC E11. **For 6mA leakage trip:** ≤25ms
MAX CURRENT & VOLTAGE RATINGS	0.10 - 30 amps @ 120/240VAC	0.10 - 50 amps @ 120/240VAC - 240VAC
MAX INTERRUPTING CAPACITY	5,000A	5,000A
AVAILABLE CIRCUITS	series trip	series trip
TERMINATION	.250” tabs, 8-32, 10-32, M4,M5 screw with upturned lugs, 8-32, 10-32, M4,M5 screw, bus type	10-32 threaded stud
MOUNTING METHOD	front panel	front panel
OPERATING TEMPERATURE	-35° C to +65° C	-35° C to +65° C
APPROVALS	UL 489, UL 1077, UL 1500	CSA Approved, UL 1053, UL 1500

**Manufacturer reserves the right to change product information without prior notice*

PB-Series

GFCI/ELCI & PANEL SEAL

The new PB-Series, AC Residual Current Circuit Breaker with Overcurrent Protection (RCBO), combines the ground fault protection of a GFCI with the familiar overcurrent tripping characteristics of a normal circuit breaker. It utilizes the hydraulic magnetic principle which provides precise operation and performance even when exposed to extremely hot and/or cold application environments. These precision mechanisms are temperature stable and are not adversely affected by temperature changes in their operating environment. As such, derating considerations due to temperature variations are not normally required, and heat-induced nuisance tripping is avoided.

Resources:

Download 3D CAD Files

IGS > STP >

Product Highlights:

- Overload, short circuit and ground fault protection in a single package
- Handle or rocker style actuators
- Wiping Contacts - Mechanical linkage with two-step actuation - cleans contacts, provides high, positive contact pressure & longer contact life.
- A trip-free mechanism, a safety feature which makes it impossible to manually hold the contacts closed during overload or fault conditions.
- A common trip linkage between all poles, another safety feature, ensures that an overload in one pole will trip all adjacent poles.
- Front panel mounting
- Integral push-to-test button

Benefits:

- Increases safety around boats and marinas
- Protects against electrical shock hazards in areas near water
- Protects against defects in wires & conductors
- Reduces fire and shock hazards from defects in permanently installed appliances such as water heaters, battery chargers, lighting fixtures, etc.
- Detects lower level ground faults which do not trip ordinary circuit breakers, but can lead to fires, and shock hazards for boating occupants

Typical Applications:

- Marine
- Generators
- Lighting

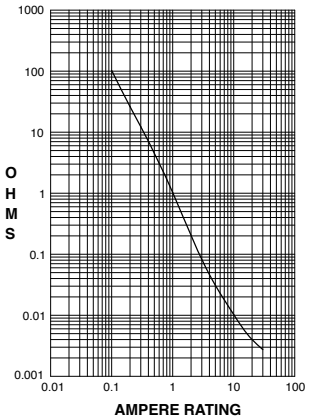
Electrical Tables

Table A: UL Listed configurations and performance capabilities as Circuit Breakers.

PB-SERIES TABLE A					
CIRCUIT CONFIGURATION	VOLTAGE			CURRENT RATING (AMPS)	INTERRUPTING CAPACITY (AMPS)
	MAX RATING VOLTS	FREQUENCY HERTZ	PHASE		
SERIES	120	60	1	.10-30	5000

Electrical

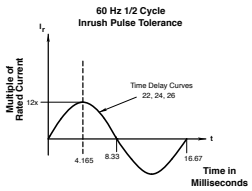
Maximum Voltage	120/240VAC 60 Hz
Current Ratings	Standard current coils: 0.100, 0.250, 0.500, 0.750, 1.00, 2.50, 5.00, 7.50, 10.0, 15.0, 20.0, 25.0 & 30.0 amps. Other ratings available, see ordering scheme.
Insulation Resistance	Minimum of 100 Megohms at 500 VDC.
Dielectric Strength	UL, CUL - 1500 V 60 Hz for one minute between all electrically isolated terminals. PB-Series circuit breakers comply with the 8mm spacing and 3750V 60 Hz dielectric requirements from hazardous voltage to operator accessible surfaces and between adjacent poles
Impedance	Values from Line to Load Terminal.



Ampere Rating

CURRENT (AMPS)	TOLERANCE (%)
0.100 - 5.0	± 15%
5.1 - 20.0	± 25%
20.1 - 30.0	± 35%

Pulse Tolerance Curve



Leakage To Ground

Standard Must Trip	120/240VAC 60 Hz
Leakage Current Ratings	5 & 30 milliamps. 5± 1mA For other ratings, consult factory.
Trip Time	300 ms Max. @ 100%, 40ms Max. @ 500% of must trip leakage current.
Test Button	On unit face along side of actuator.

Mechanical

Endurance	10,000 ON-OFF operations @ 6 per minute; with rated Current & Voltage.
Trip Free	All PB-Series Circuit Breakers will trip on overload or ground fault, even when Handle is forcibly held in the ON position.
Trip Indication	The operating Handle moves positively to the OFF position when an overload or ground fault causes the breaker to trip.

Physical

Number of Poles	1 - 3 poles, where the third pole is neutral
Internal Circuit Config.	Series Trip
Weight	Approximately 65 grams/pole. (2.32 ounces/pole.)
Standard Colors	Housing- Black; Actuator - See Ordering Scheme.

Environmental

Designed and tested in accordance with requirements of specification MIL-PRF- 55629 and MIL-STD-202 as follows:

Shock	Withstands 100 Gs, 6ms, sawtooth while carrying rated current per Method 213, Test Condition "I". Ultra-short curves tested @ 90% of rated current.
Vibration	Withstands 0.060" excursion from 10-55 Hz, and 10 Gs 55-500 Hz, at rated current per Method 204C, Test Condition A. Instantaneous and ultrashort curves tested at 90% of rated current.
Moisture Resistance	Method 106D, i.e., ten 24-hour cycles @ + 25°C to +65°C, 80-98% RH.
Salt Spray	Method 101, Condition A (90-95% RH @ 5% NaCl Solution, 96 hrs).
Thermal Shock	Method 107D, Condition A (Five cycles @ -55°C to +25°C to +85°C to +25°C).
Operating Temperature	-35° C to +65° C
Corrosion	Tested FMG Test. 3 weeks @ 30°C 75% RH, 100ppb H2S, 20ppb Cl2, 200ppb NO2

Agency Certifications

UL Listed

UL Standard 489	Circuit Breakers, Molded Case, (Guide DIVQ, File E129899)
UL Standard 1077	Supplementary Protectors
UL Standard 1053	Ground Fault Sensing and Relaying Equipment

*Manufacturer reserves the right to change product specification without prior notice.

PB	A	–	B	A	–	24	–	620	–	2	B	A	–	A	G
1 Series	2 System Voltage/Poles		3 Circuit	4 Actuator		5 Frequency & Delay		6 Current Rating		7 Terminal	8 Actuator Color	9 Mounting/ Barriers		10 Trip Level	11 Agency Approval

1 SERIES
PB

2 SYSTEM VOLTAGE / POLES
A 120 VAC single phase, one pole
B 120/240 VAC single phase, two pole
C 120/240 VAC single phase with switched neutral, three pole
D 120 VAC two pole with switched neutral

3 CIRCUIT
B Series Trip (Current)

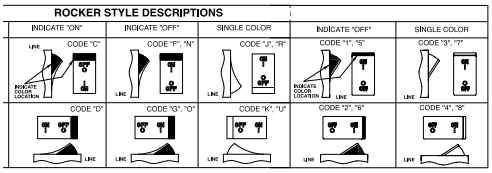
4 ACTUATOR [1]
Handle
A one per pole
B one per multipole unit

Two Color Curved Visi-Rocker
C Indicate ON, vertical legend
D Indicate ON, horizontal legend
F Indicate OFF, vertical legend
G Indicate OFF, horizontal legend

Single Color Curved Rocker
J Vertical legend
K Horizontal legend

Two Color Flat Visi-Rocker
1 Indicate OFF, vertical legend
2 Indicate OFF, horizontal legend

Single Color Flat Rocker
3 Vertical legend
4 Horizontal legend



5 FREQUENCY & DELAY
22 60Hz Short
24 60Hz Medium
26 60Hz Long

6 CURRENT RATING (AMPERES)

CODE	AMPERES	CODE	AMPERES	CODE	AMPERES	CODE	AMPERES
210	0.100	**285**	0.850	**450**	5.000	**712**	12.500
215	0.150	**290**	0.900	**455**	5.500	**613**	13.000
220	0.200	**295**	0.950	**460**	6.000	**614**	14.000
225	0.250	**410**	1.000	**465**	6.500	**615**	15.000
230	0.300	**512**	1.250	**470**	7.000	**616**	16.000
235	0.350	**415**	1.500	**475**	7.500	**617**	17.000
240	0.400	**517**	1.750	**480**	8.000	**618**	18.000
245	0.450	**420**	2.000	**485**	8.500	**620**	20.000
250	0.500	**522**	2.250	**490**	9.000	**622**	22.000
255	0.550	**425**	2.500	**495**	9.500	**624**	24.000
260	0.600	**527**	2.750	**610**	10.000	**625**	25.000
265	0.650	**430**	3.000	**710**	10.500	**630**	30.000
270	0.700	**435**	3.500	**611**	11.000		
275	0.750	**440**	4.000	**711**	11.500		
280	0.800	**445**	4.500	**612**	12.000		

7 TERMINAL [2]
1[3] Push-On 0.250 Tab (Q.C.)
2 Screw 8-32 w/upturned lugs
3 Screw 8-32 (Bus Type)
4 Screw 10-32 w/upturned lugs
5 Screw 10-32 (Bus Type)
B Screw M5 w/upturned lugs
C Screw M4 w/upturned lugs
E Screw M4 (Bus Type)
H Screw M5 (Bus Type)

8 ACTUATOR COLOR & LEGEND

Handle Actuator Color	I-O	ON-OFF	Dual	Rocker Actuator Color Single	Visi-Rocker
White	A	B	1	Black	White
Black	C	D	2	White	N/A
Red	F	G	3	White	Red
Green	H	J	4	White	Green
Blue	K	L	5	White	Blue
Yellow	M	N	6	Black	Yellow
Gray	P	Q	7	Black	Gray
Orange	R	S	8	Black	Orange

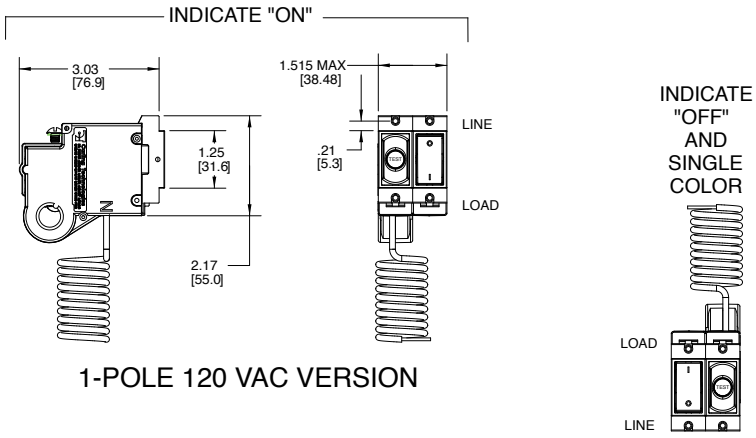
9 MOUNTING/BARRIERS

	MOUNTING STYLE	BARRIERS
	Threaded Insert, 2 per pole	
A	6-32 X 0.195 inches	yes
B	ISO M3 x 5mm	yes

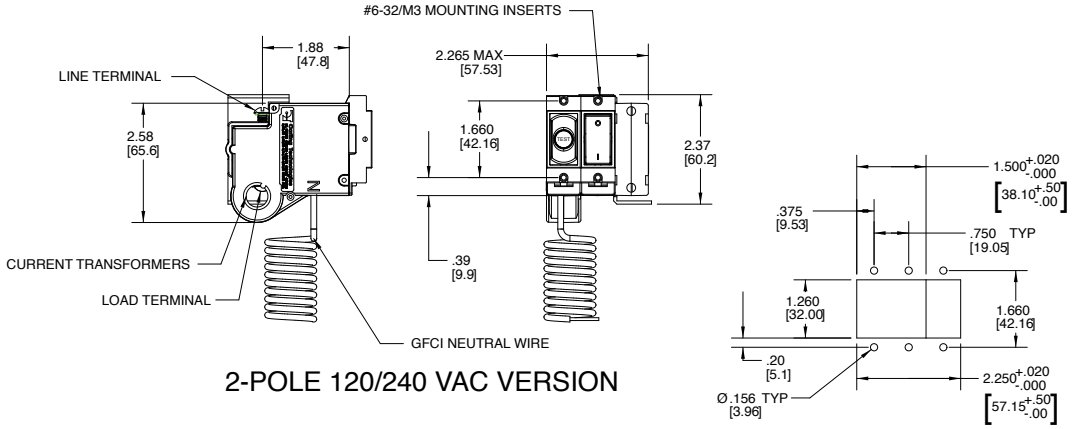
10 LEAKAGE CURRENT TRIP LEVEL - MAX. TRIP CURRENT
A 5 MA (CLASS A GFCI) [3,4]
E 30 MA (ELCI)

11 AGENCY APPROVAL
G UL489 Listed, CSA Certified
C UL1077
I UL1077/UL1500 Ignition Protected [5]

Notes:
1 Actuator Code:
A: Handle tie pin spacer(s) and retainers provided unassembled with multi-pole units.
B: Handle location as viewed from front of breaker:
2 pole - left pole 3 pole - center pole
2 Screw Terminals are recommended on ratings greater than 20 amps.
3 Available with leakage current trip level - Max trip current code E, and agency approval C.
4 30mA per UL1053, available with agency approval codes C & G.
5 UL1500 only available with 30MA trip level.

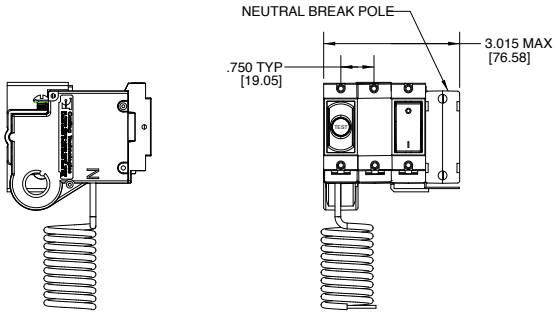


1-POLE 120 VAC VERSION



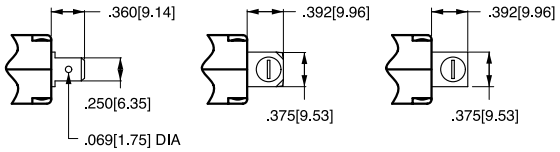
2-POLE 120/240 VAC VERSION

PANEL CUTOUT



2-POLE 120/240 VAC WITH NEUTRAL BREAK

TERMINAL DIMENSIONAL DETAIL & RATING



TAB (Q.C.)
30 AMP

UPTURN LUG
#8-32 30 AMP
#10-32 30 AMP
M5 30 AMP
M4 30 AMP

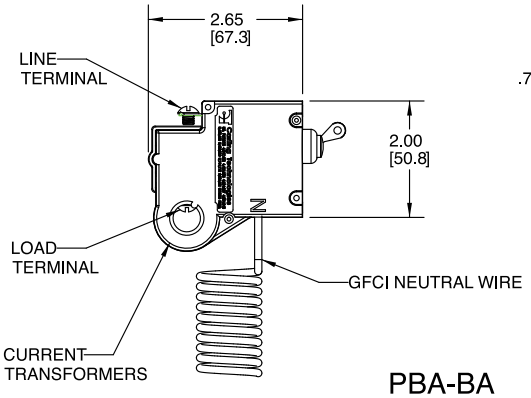
BUS
#8-32 30 AMP
#10-32 50 AMP

TABLE A
TIGHTENING TORQUE SPECIFICATIONS

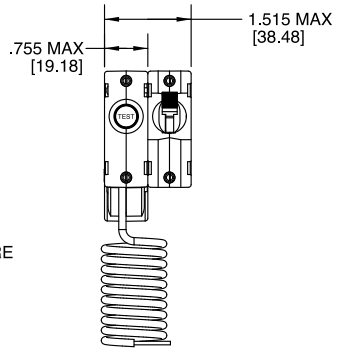
THREAD SIZE	TORQUE
#6-32 & M3 MOUNTING HARDWARE	7-9 IN-LBS [0.8-1.0 NM]
#8-32 & M4 THREAD TERMINAL SCREW	12-15 IN-LBS [1.4-1.7 NM]
#10-32 & M5 THREAD TERMINAL SCREW	15-20 IN-LBS [1.7-2.3 NM]

Notes:
1 All dimensions are in inches [millimeters].
2 Tolerance ±.020 [.51] unless otherwise specified.

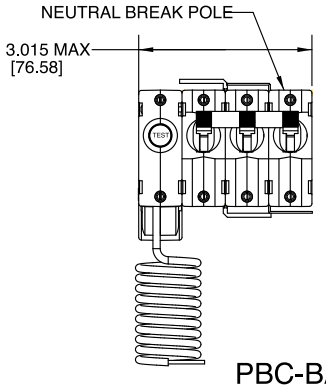
TYPICAL 1-POLE 120 VAC VERSION



PBA-BA



TYPICAL 2-POLE 120/240 VAC WITH NEUTRAL BREAK VERSION



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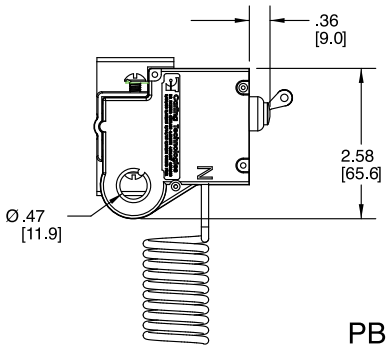
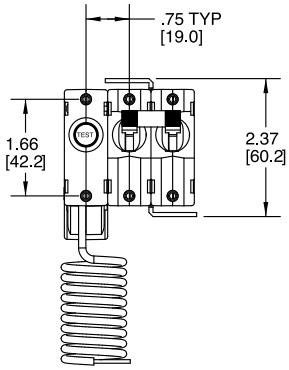
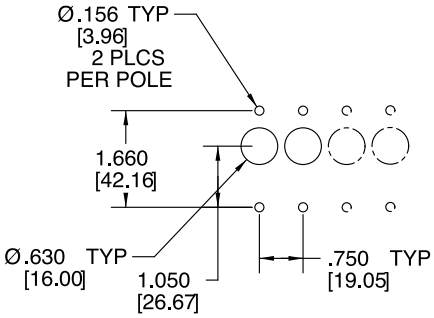
TYPICAL 2-POLE 120/240 VAC VERSION



PBB-BA



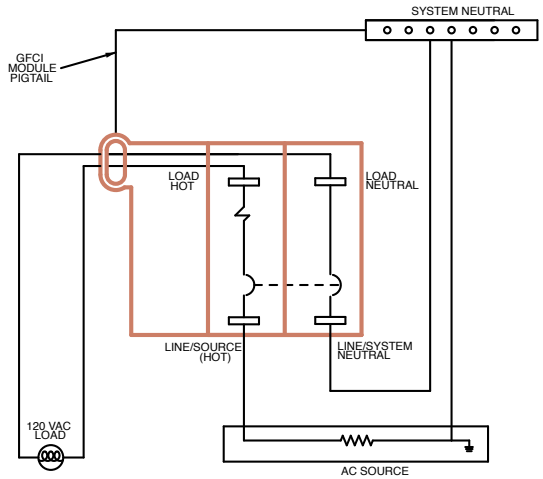


PANEL CUTOUT

Notes:

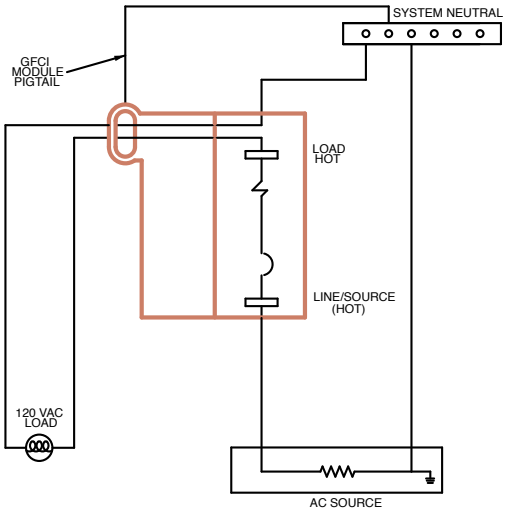
1 All dimensions are in inches [millimeters].
2 Tolerance ±.020 [.51] unless otherwise specified.

120 VAC with Switched Neutral



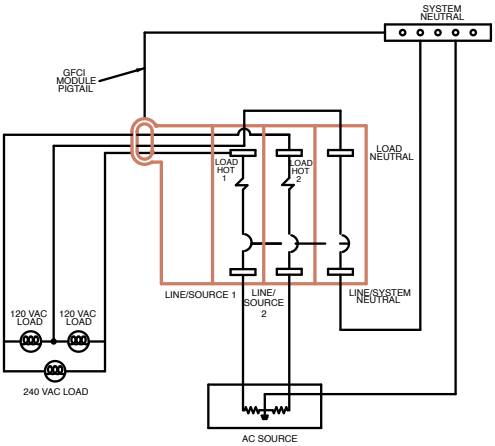
120 VAC WITH SWITCHED NEUTRAL

120 VAC without Switched Neutral



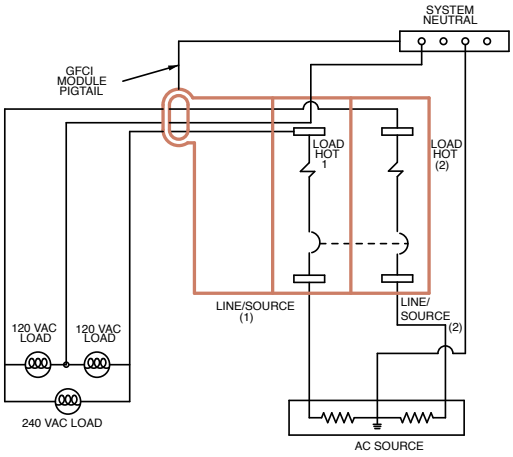
120 VAC WITHOUT SWITCHED NEUTRAL

120/240 VAC with Switched Neutral



120 VAC WITH SWITCHED NEUTRAL

120/240 VAC without Switched Neutral



120 VAC WITHOUT SWITCHED NEUTRAL

8	PB	-	1	4	1
1 Type Number	*2 Series*		*3 Actuator*	*4 Poles*	*5 Mounting*

1 TYPE NUMBER
8 Circuit Breaker Assembly

2 SERIES
PB

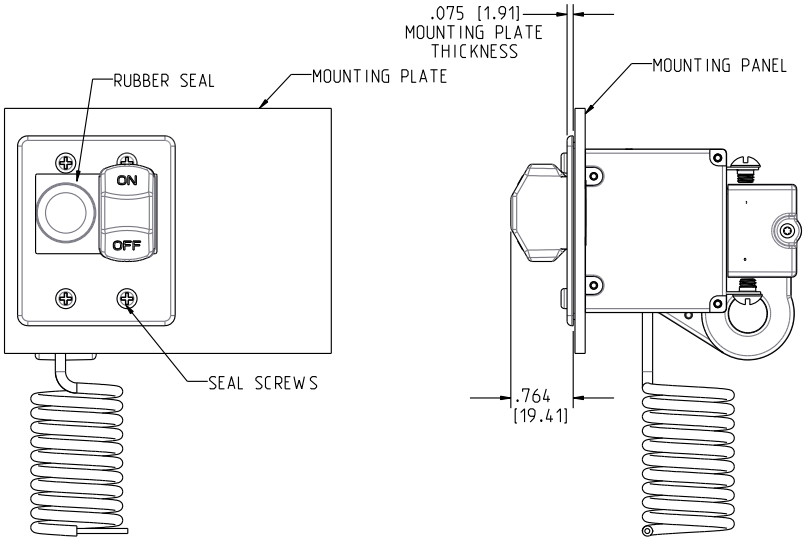
3 ACTUATOR TYPE
1 Handle, one per pole
2 Handle, one per multipole unit
A Rocker [2]

4 POLES PER UNIT - INCLUDING ELECTRONIC MODULE
2 Two
3 Three
4 Four

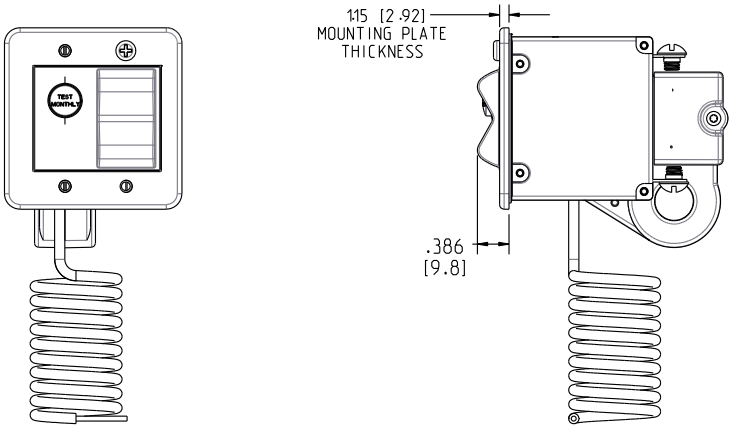
5 MOUNTING SCREWS / PLATE MATERIAL [1]
1 6-32 Thread Phillips Head
2 M-3 Thread Phillips Head
3 6-32 Thread Slotted Head
4 M-3 Thread Slotted Head
5 6-32 Thread Phillips Head with Stainless Steel Plate
6 M-3 Thread Phillips Head with Stainless Steel Plate
7 6-32 Thread Slotted Head with Stainless Steel Plate
8 M-3 Thread Slotted Head with Stainless Steel Plate

Notes:
1 Screws supplied to accommodate mounting panel thickness of 1/8" ± 1/32". Consult Factory for additional options
2 Available for Flat and Curved Rocker options - No Rockerguard Bracket

Handle Style Panel Seal

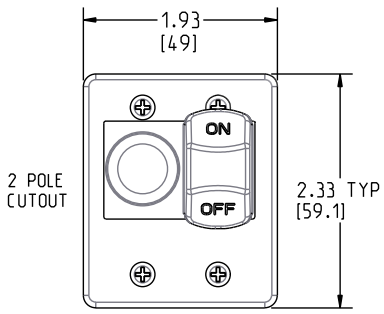


Rocker Style Panel Seal

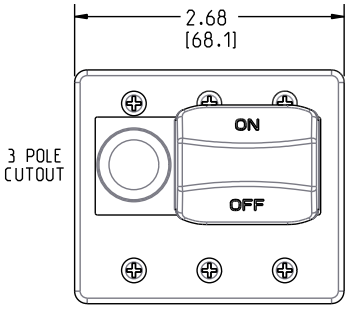


Handle Actuator

HANDLE, 1 PER POLE

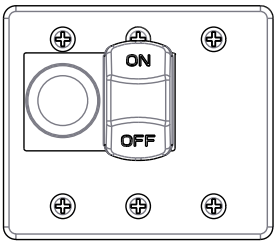


8PB-12



8PB-13

HANDLE, 1 PER MULTIPOLE UNIT



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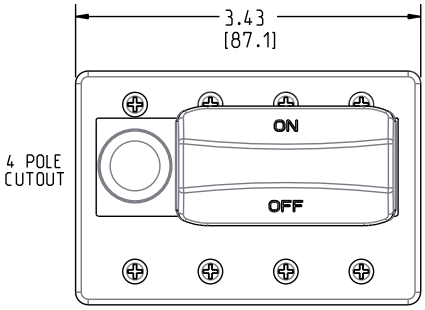

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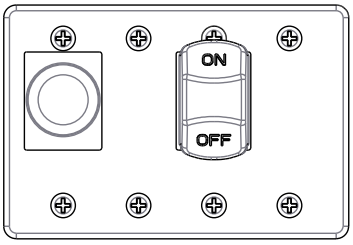
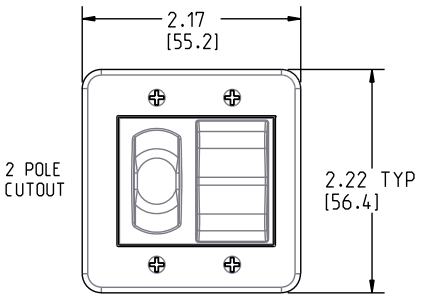
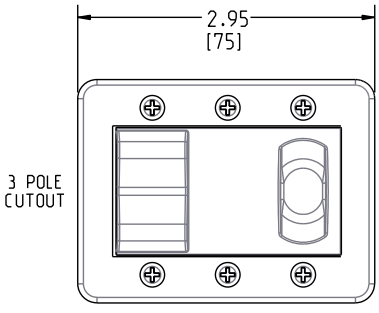


8PB-24

Rocker Actuator



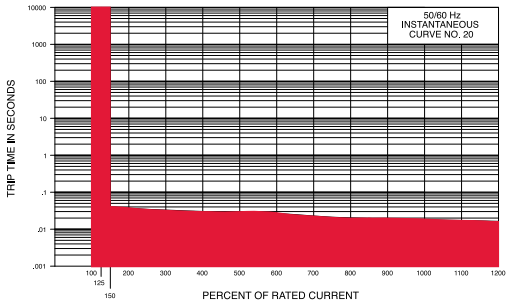
8PB-A2



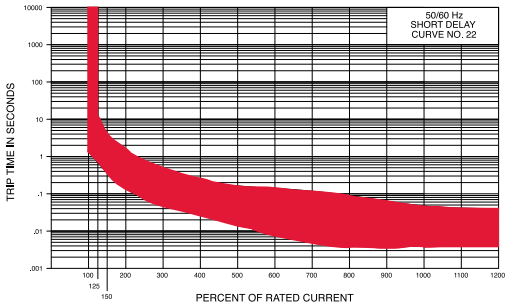
8PB-A3

Time Delay Curves

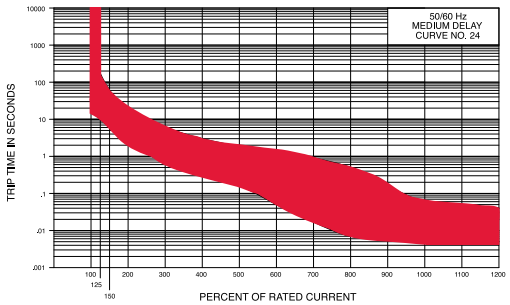
Instantaneous



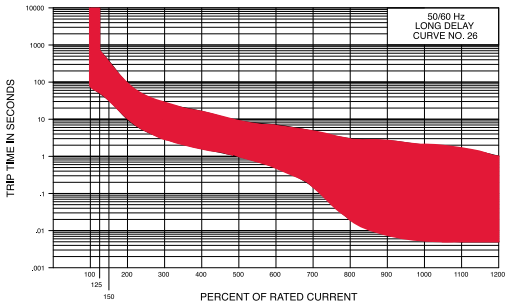
Medium



Short



Long



PC-Series

GFCI/ELCI & PANEL SEAL

The PC-Series, AC Residual Current Circuit Breaker with Overcurrent Protection (RCBO), combines the ground fault protection of a GFCI with the familiar overcurrent tripping characteristics of a normal circuit breaker. The PC-Series utilizes the hydraulic-magnetic principle which provides precise operation and performance even when exposed to extremely hot and/or cold application environments.

Resources:

Download 3D CAD Files

IGS > STP >

Product Highlights:

- Overload, short circuit and ground fault protection in a single package
- Handle style actuators and rocker style “acuguard”
- Wiping Contacts - Mechanical linkage with two-step actuation - cleans contacts, provides high, positive contact pressure & longer contact life
- A trip-free mechanism, a safety feature which makes it impossible to manually hold the contacts closed during overload or fault conditions.
- A common trip linkage between poles ensures that an overload in one pole will trip all adjacent poles.
- Front panel mounting
- Integral push-to-test button
- Two integrated LED indicators show if a breaker is closed w/ Line Voltage present, or has opened due to leakage current, opened due to overcurrent, or closed w/ no Line Voltage present.
- Optional Hot/Neutral reversal detection and protection

Benefits:

- Increases safety around boats, marinas and generators
- Protects against electrical shock hazards in areas near water
- Protects against defects in the wires & conductors
- Reduces fire and shock hazards from defects in permanently installed appliances such as water heaters, battery chargers, lighting fixtures, etc.
- Detects low level ground faults, which do not trip ordinary circuit breakers, that can lead to fires and shock hazards for boating occupants

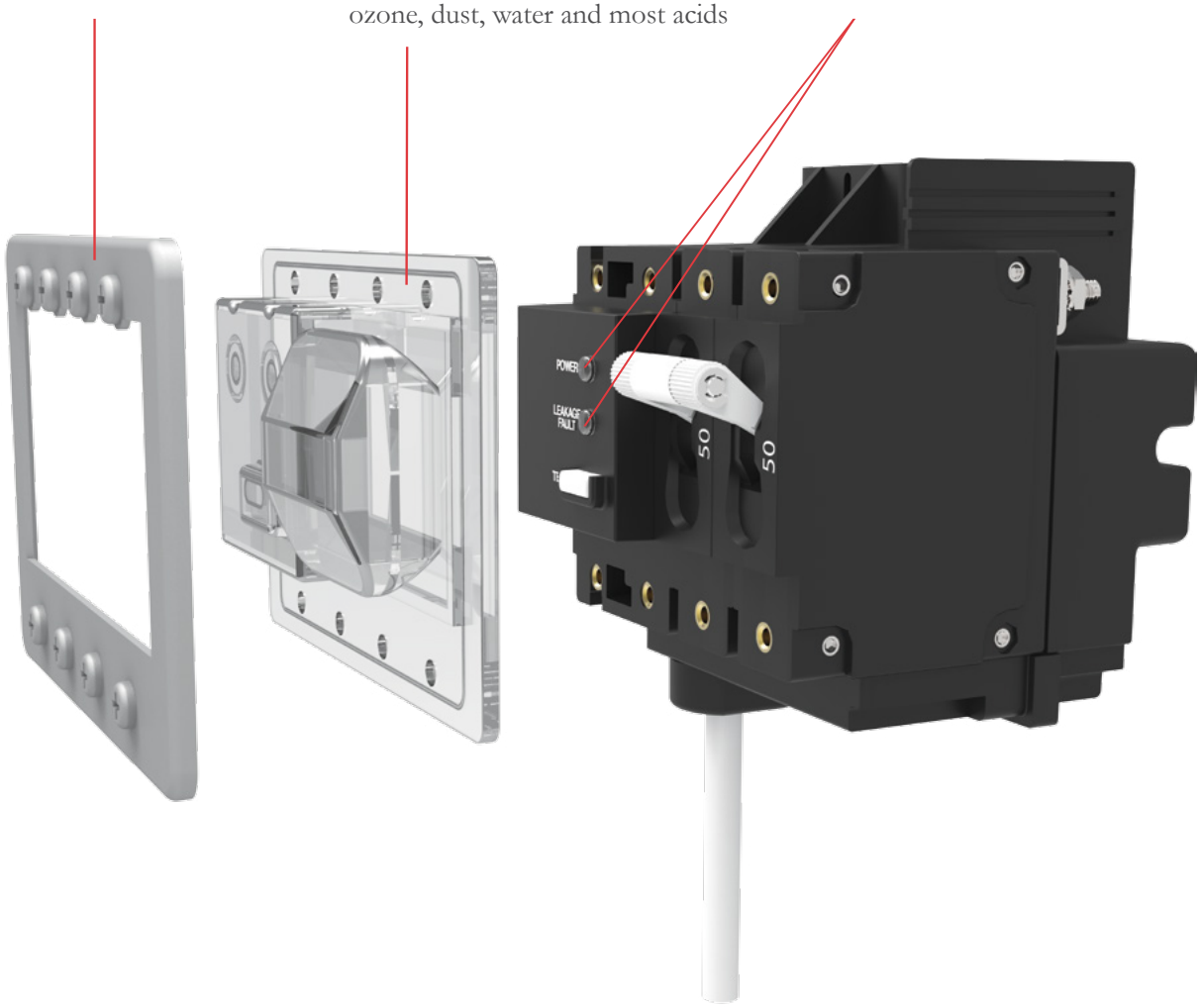
Typical Applications:

- Marine
- Generators
- Lighting

MOUNTING PLATE
Available in stainless steal or zinc chromate plated carbon steel

OPTIONAL SEAL
IP66/67 panel seals provide ideal protection against salt spray, ozone, dust, water and most acids

LEDs
Two separate lights that indicate power and ground fault leakage



Electrical Tables

Table A: UL Listed & CSA Certified configurations as a Ground Fault Circuit Interruptor

TABLE A : UL LISTED / CSA 22.2 No. 144.1 CONFIGURATIONS AS A GROUND FAULT CIRCUIT INTERRUPTOR							
	VOLTAGE			CURRENT RATING	SHORT CIRCUIT CAPACITY	GROUND FAULT TRIP LEVEL	
CIRCUIT CONFIGURATION	MAX. RATING	FREQUENCY	PHASE	AMPS	AMPS	MILLIAMPS	NOTES
SERIES	120	50 / 60	1	1 - 50	5000	6	1 or 2 Poles. One pole of a two pole unit must be Neutral
	120/240	50 / 60	1	1 - 50	5000	6	2 or 3 Poles. One pole of a three pole unit must be Neutral

Table B: UL Recognized as an Earth Leakage Circuit Interruptor - 120 and 120/240V

TABLE B : UL RECOGNIZED CONFIGURATIONS AS AN EARTH LEAKAGE CIRCUIT INTERRUPTOR - 120 and 120/240V							
	VOLTAGE			CURRENT RATING	SHORT CIRCUIT CAPACITY	GROUND FAULT TRIP LEVEL	
CIRCUIT CONFIGURATION	MAX. RATING	FREQUENCY	PHASE	AMPS	AMPS	MILLIAMPS	NOTES
SERIES	120	50 / 60	1	1 - 50	5000	30	1 or 2 Poles. One pole of a two pole unit must be Neutral
	120/240	50 / 60	1	1 - 50	5000	30	2 or 3 Poles. One pole of a three pole unit must be Neutral
SERIES IGNITION PROTECTED	120	50 / 60	1	1 - 50	3000	30	1 or 2 Poles. One pole of a two pole unit must be Neutral
	120/240	50 / 60	1	1 - 50	5000	30	2 or 3 Poles. One pole of a three pole unit must be Neutral

Table C: UL Recognized as an Earth Leakage Circuit Interruptor - 240V

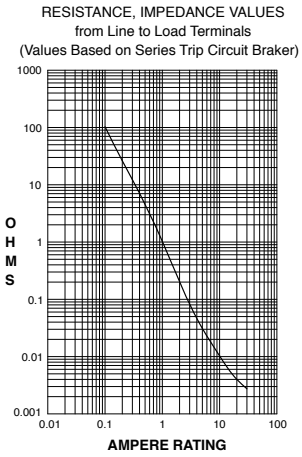
TABLE C : UL RECOGNIZED CONFIGURATIONS AS AN EARTH LEAKAGE CIRCUIT INTERRUPTOR - 240V							
	VOLTAGE			CURRENT RATING	SHORT CIRCUIT CAPACITY	GROUND FAULT TRIP LEVEL	
CIRCUIT CONFIGURATION	MAX. RATING	FREQUENCY	PHASE	AMPS	AMPS	MILLIAMPS	NOTES
SERIES	240	50 / 60	1	1 - 30	5000	30	2 or 3 Poles. One pole of a three pole unit must be Neutral. Suffix 11
SERIES IGNITION PROTECTED	240	50 / 60	1	1 - 50	3000	30	2 or 3 Poles. One pole of a three pole unit must be Neutral. Suffix 12

Agency Certifications

UL Standard 489	Circuit Breakers, Molded Case, (Guide DIVQ, File E129899)
UL Standard 1077	Supplementary Protectors
CSA 22.2 No. 144.1	Class A Ground Fault Circuit Interrupters
UL Standard 1053	Ground Fault Sensing and Relaying Equipment
UL Standard 1500	Ignition Protection

Electrical

Current Ratings	1 - 50 Amps maximum
Voltage Rating	120VAC, 120/240VAC, 240VAC
Current Trip Level	30mA & 6mA
Current Trip Time	For 30mA leakage trip: ≤ 22.2mA, shall not trip 30mA, shall trip within .10 seconds The above complies with & ABYC E11. For 6mA leakage trip: ≤25ms
Operating Frequency	50/60 Hz for 30mA leakage trip 60 Hz for 6mA leakage trip
Interrupt Capacity	5,000 Amps
Impedance	



CURRENT (AMPS)	TOLERANCE (%)
0.10 - 5.0	15%
5.1 - 20.0	25%
20.1 - 50.0	35%

Innovative Features

Indicator	Two integrated LEDs, Red & Green ◆ Green LED On, Red LED Off Line Voltage is present, the breaker is closed, and the device is protecting the circuits against over current and leakage current. ◆ Green LED Off, Red LED On The device has detected leakage current and has opened the circuit breaker. ◆ Green LED Flashing, Red LED Off The circuit breaker has opened due to over current or has been turned off manually ◆ Green LED Off, Red LED Off Line Voltage is not present ◆ Green LED Flashing, Red LED Off, Amber LED ON Indicates Hot & Neutral are reversed and the circuit breaker is open
Neutral Protection	When neutral is grounded on load side of circuit
Test Button	Located on Ground Fault Module

Mechanical

Endurance	10,000 ON-OFF operations @ 6 per minute; with rated Current & Voltage.
Trip Free	Trips on short circuit, overload or leakage to ground, even when actuator is forcibly held in the "On" position

Physical

Number of Poles (Breakers only)	1-pole (1 Circuit Breaker + 1 GFCI Sensor Module), 120V 2-pole (2 Circuit Breakers + 1 GFCI Sensor Module), 120/240V or 120V with Neutral Break. 240VAC two pole. 3-pole 120/240V with Neutral Break (Sensor module has 2 pole width) Circuit Breaker Line Side: #10-32, Threaded stud.
Termination	GFCI Sensor Module Load Side: #10-32 threaded stud. Neutral pigtail.
Mounting	Front Panel, #6-32 and M3 threaded inserts.
Actuator	Handle, Flat Rocker, Curved Rocker (with or without rocker guard), Push-to-Reset Rocker

Environmental

Designed and tested in accordance with requirements of specification MIL-PRF- 55629 and MIL-STD-202G as follows:

Shock	Withstands 100 G, 6ms, sawtooth at rated current per Method 213, Test Condition "I".
Vibration	Withstands 0.06" excursion from 10-55 Hz, and 10 G 55-500 Hz, a rated current per Method 204C, Test Condition A. Instantaneous & ultrashort curves tested at 90% of rated current.
Moisture Resistance	93% RH at 30°C for 168 Hours.
Operating Temperature	-35°C to +66°C
Corrosion	Humidity: 30±2°C, 70±2% relative humidity Mixed Flowing Gases: 100 ppb H2S, 20 ppb CI2, 200±50 ppb NO2

*Manufacturer reserves the right to change product specification without prior notice.

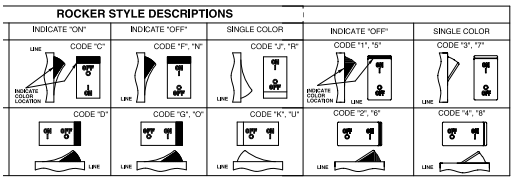
PC	B	-	B	A	-	24	-	620	-	1	B	A	-	A	10
1 Series	*2 System Voltage/Poles*		*3 Circuit*	*4 Actuator*		*5 Frequency & Delay*		*6 Current Rating*		*7 Terminal*	*8 Actuator Color*	*9 Mounting/ Barriers*		*10 Trip Level*	*11 Agency Approval*

1 SERIES
PC

2 SYSTEM VOLTAGE / POLES
A 120 VAC single phase, 1 pole
B 120/240 VAC single phase, 2 pole
C 120/240 VAC single phase with switched neutral, 3 pole
D 120 VAC single phase with switched neutral, 2 pole
E 120 VAC single phase with reversed polarity indicator, 2 pole
F 120/240 VAC single phase with reversed polarity indicator, 3 pole
G 240 VAC single phase, 2 pole

3 CIRCUIT
B Series Trip (Current)

4 ACTUATOR
Handle
A 1 per breaker pole
B 1 per unit
Two Color Curved Visi-Rocker
C Indicate ON, vertical legend
D Indicate ON, horizontal legend
F Indicate OFF, vertical legend
G Indicate OFF, horizontal legend
Single Color Curved Rocker
J Vertical legend
K Horizontal legend
Two Color Curved Visi-Rocker Push-to-Reset
N Indicate OFF, Vertical legend
O Indicate OFF, Horizontal legend
Single Color Curved Rocker Push-to-Reset
R Vertical legend
U Horizontal legend
Two Color Flat Visi-Rocker
1 Indicate OFF, vertical legend
2 Indicate OFF, horizontal legend
Single Color Flat Rocker
3 Vertical legend
4 Horizontal legend
Two Color Flat Visi-Rocker Push-to-Reset
5 Indicate OFF, vertical legend
6 Indicate OFF, horizontal legend
Single Color Flat Rocker Push-to-Reset
7 Vertical legend
8 Horizontal legend



5 FREQUENCY & DELAY
20 50/60Hz Instantaneous
21 50/60Hz Ultra Short
22 50/60Hz Short
24 50/60Hz Medium
26 50/60Hz Long

6 CURRENT RATING (AMPERES)

CODE	AMPERES	CODE	AMPERES	CODE	AMPERES	CODE	AMPERES
410	1.000	**445**	4.500	**610**	10.000	**618**	18.000
512	1.250	**450**	5.000	**710**	10.500	**620**	20.000
415	1.500	**455**	5.500	**611**	11.000	**622**	22.000
517	1.750	**460**	6.000	**711**	11.500	**624**	24.000
420	2.000	**465**	6.500	**612**	12.000	**625**	25.000
522	2.250	**470**	7.000	**712**	12.500	**630**	30.000
425	2.500	**475**	7.500	**613**	13.000	**635**	35.000
527	2.750	**480**	8.000	**614**	14.000	**640**	40.000
430	3.000	**485**	8.500	**615**	15.000	**650**	50.000
435	3.500	**490**	9.000	**616**	16.000		
440	4.000	**495**	9.500	**617**	17.000		

7 TERMINAL
1 Stud, 10-32 threaded

8 ACTUATOR COLOR & LEGEND

Handle Actuator Color	I-O	ON-OFF	Dual	Rocker Actuator Color Single	Rocker Actuator Color Visi-Rocker
White	A	B	1	Black	White
Black	C	D	2	White	N/A
Red	F	G	3	White	Red
Green	H	J	4	White	Green
Blue	K	L	5	White	Blue
Yellow	M	N	6	Black	Yellow
Gray	P	Q	7	Black	Gray
Orange	R	S	8	Black	Orange

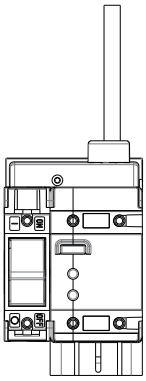
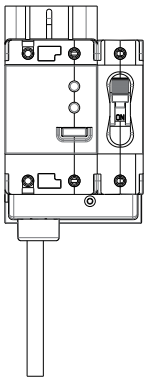
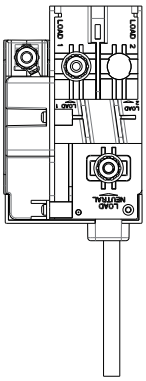
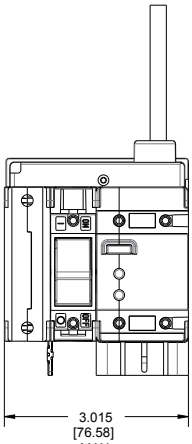
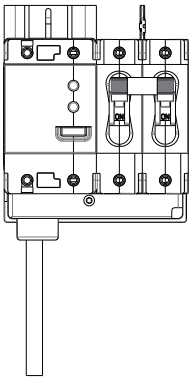
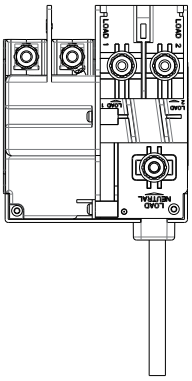
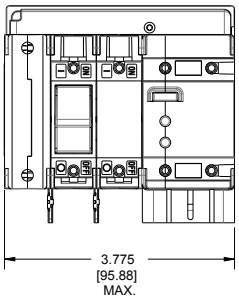
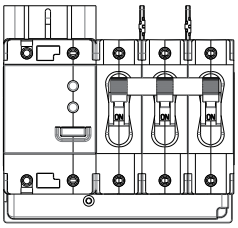
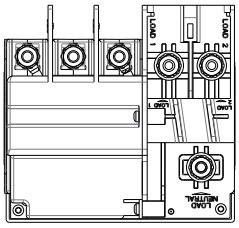
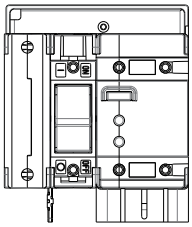
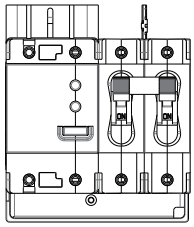
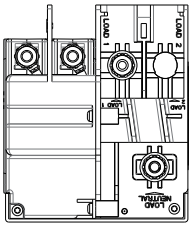
9 MOUNTING/BARRIERS

	MOUNTING STYLE	BARRIERS
	Threaded Insert, 2 per pole	
A	6-32 X 0.195 inches	yes
B	ISO M3 x 5mm	yes
	Rockerguard Bezel	
	Threaded Insert, 2 per pole	
C	6-32 X 0.195 inches	yes
D	ISO M3 x 5mm	yes
	Standard Bezel with Recessed Off-Side Flat Rocker	
	Threaded Insert, 2 per pole	
E	6-32 X 0.195 inches	yes
F	ISO M3 x 5mm	yes
	Push-to-Reset Bezel	
	Threaded Insert, 2 per pole	
G	6-32 X 0.195 inches	yes
H	ISO M3 x 5mm	yes

10 LEAKAGE CURRENT TRIP LEVEL - MAX. TRIP CURRENT
A 6 MA (CLASS A GFCI)
E 30 MA (ELCI) [1,2]

11 AGENCY APPROVAL
AA without Approvals
10 CSA certified
11 UL 1053 [1,2]
12 UL 1053 & UL 1500 [1,2]

Notes:
1 This device meets the requirements of ABCY E11.
2 30mA per UL1053, available with agency approval codes 11 & 12.

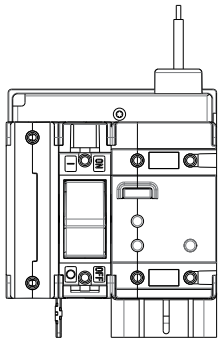
	INDICATE OFF / SINGLE COLOR ROCKER ACTUATOR	HANDLE / INDICATE ON ROCKER ACTUATOR	TERMINAL LOCATIONS
PCA 120 VAC VERSION			
PCB 120/240 VAC VERSION			
PCC 120/240 VAC VERSION W/ NEUTRAL BREAK			
PCD 120 VAC VERSION W/NEUTRAL BREAK			

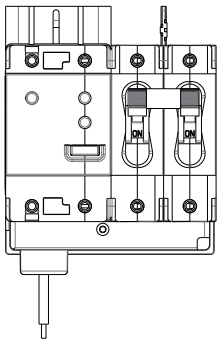
INDICATE OFF / SINGLE COLOR ROCKER ACTUATOR

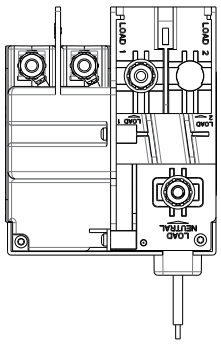
HANDLE / INDICATE ON ROCKER ACTUATOR

TERMINAL LOCATIONS

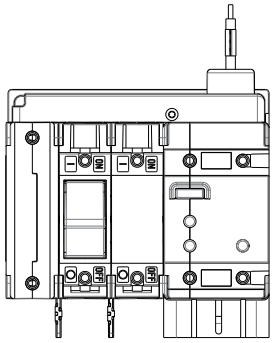
PCE
120 VAC VERSION
W/ REVERSE POLARITY
INDICATOR

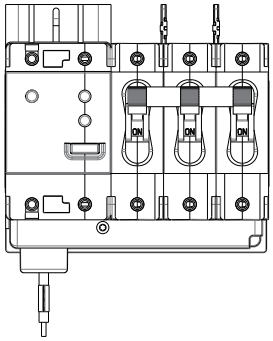


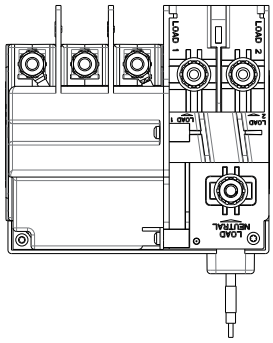




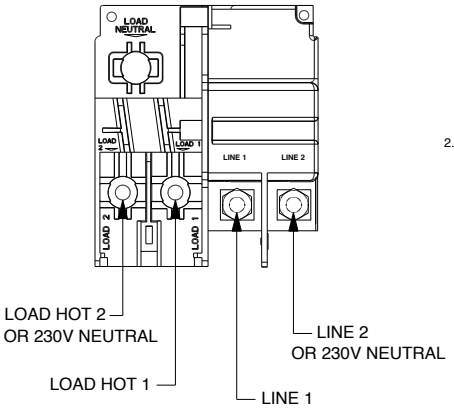
PCF
120/240 VAC VERSION
W/ REVERSE POLARITY
INDICATOR

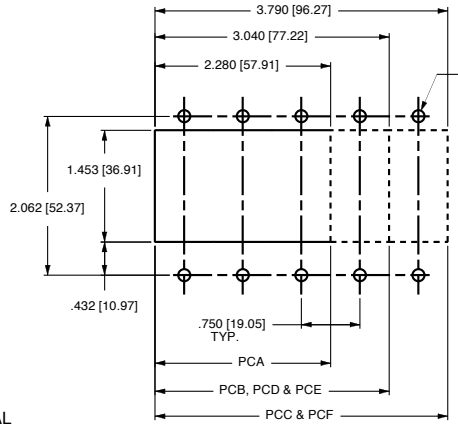




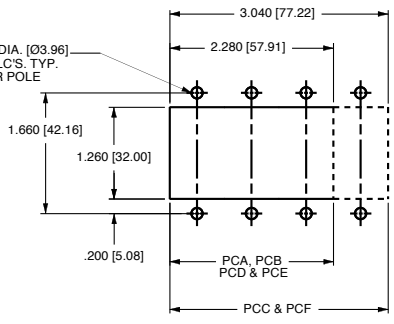


NOTE: NEUTRAL & GROUND PIGTAIL WIRES - SUPPLIED 12" LONG MIN. (CIRCUIT CODES A,B,E & F)





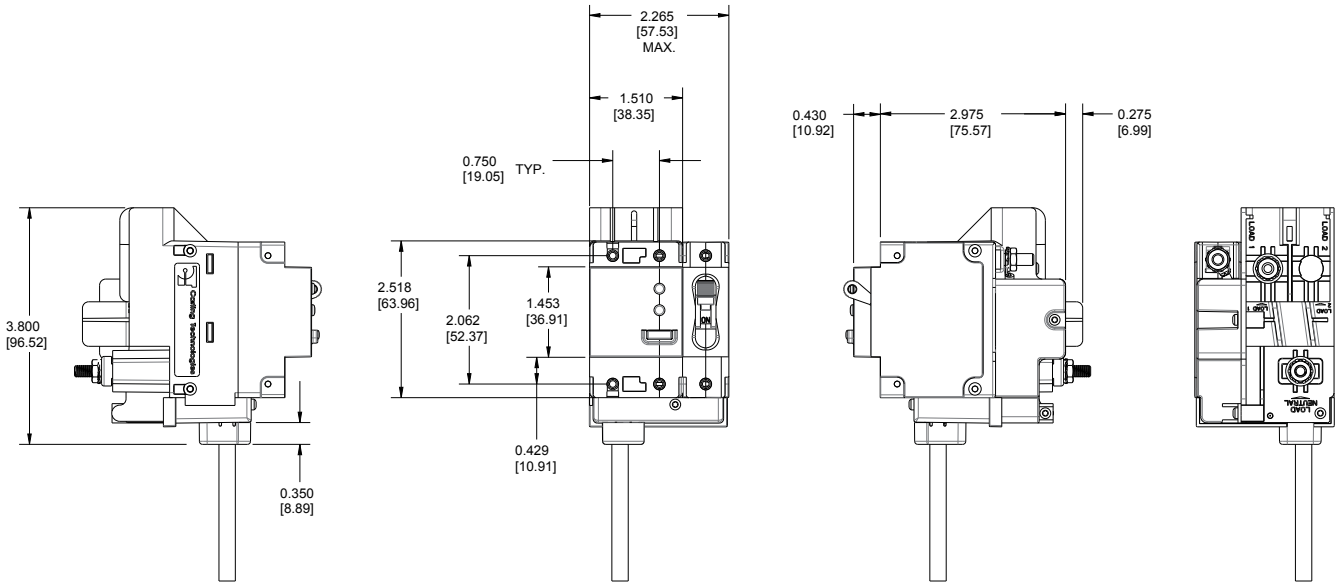
HANDLE ACTUATOR

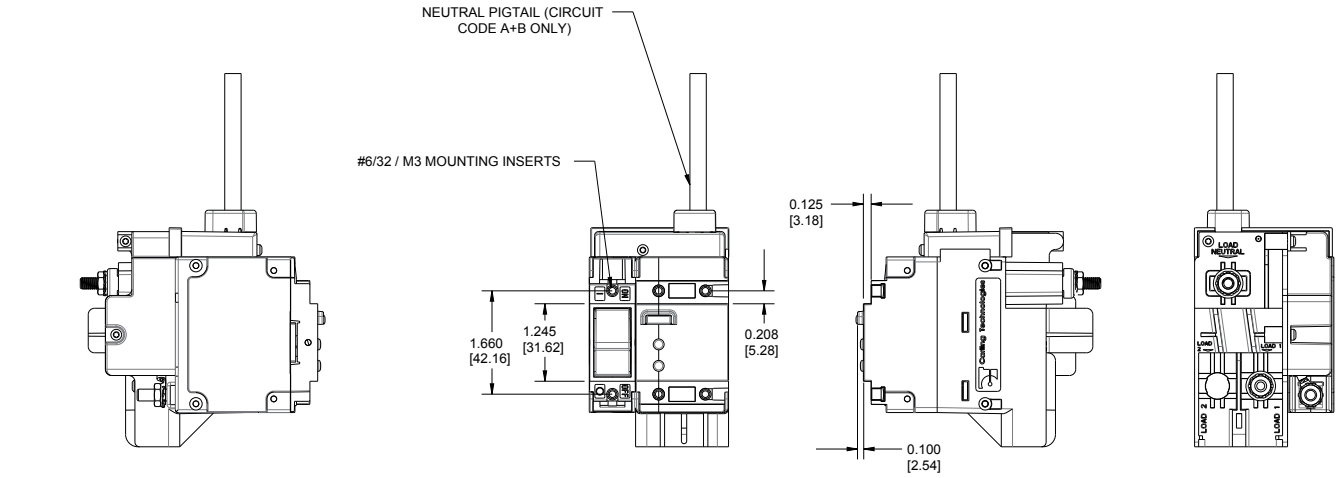


ROCKER ACTUATOR

PANEL CUTOUT DETAIL

TOLERANCES ±.005 [.12]





Notes:

For additional circuit breaker dimensions, reference the C-Series Breakers in the Carling Circuit Protection catalog

8	PC	-	1	4	1
1 Type Number	*2 Series*		*3 Actuator*	*4 Poles*	*5 Mounting*

1 TYPE NUMBER
8 Circuit Breaker Assembly

2 SERIES
PC

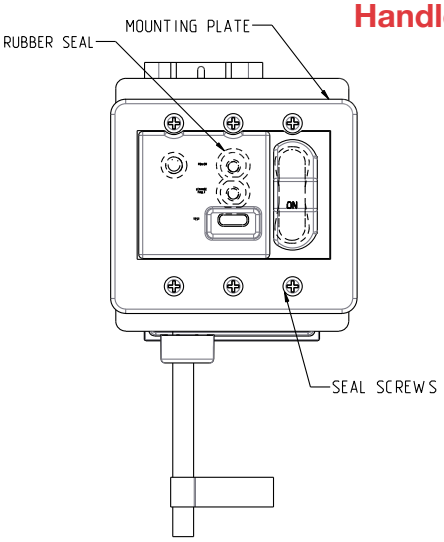
3 ACTUATOR TYPE
1 Handle, one per pole
2 Handle, one per multipole unit
A Rocker [2]

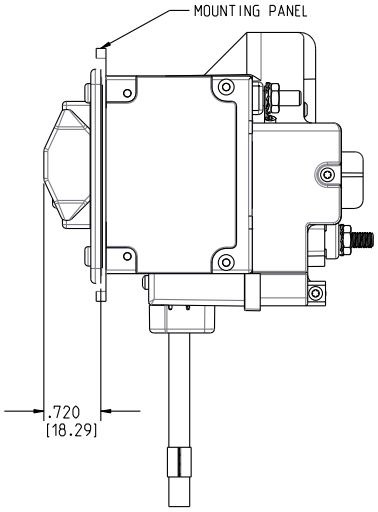
4 POLES PER UNIT - INCLUDING ELECTRONIC MODULE
3 Three
4 Four
5 Five

5 MOUNTING SCREWS / PLATE MATERIAL [1]
1 6-32 Thread Phillips Head
2 M-3 Thread Phillips Head
3 6-32 Thread Slotted Head
4 M-3 Thread Slotted Head
5 6-32 Thread Phillips Head w/ Stainless Steel Plate
6 M-3 Thread Phillips Head w/ Stainless Steel Plate
7 6-32 Thread Slotted Head w/ Stainless Steel Plate
8 M-3 Thread Slotted Head w/ Stainless Steel Plate

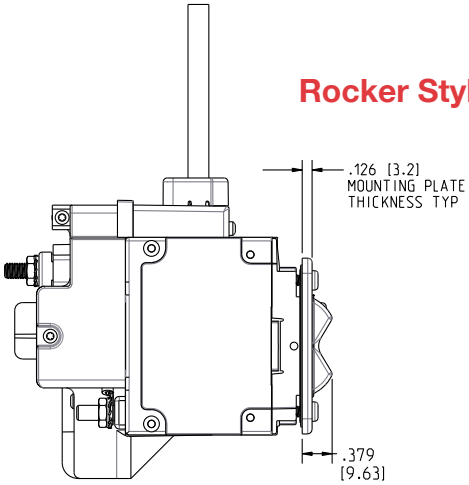
Notes:
1 Screws supplied to accommodate mounting panel thickness of 1/8" ± 1/32". Consult Factory for additional options
2 Available for Flat and Curved Rocker options - No Rockerguard Bracket

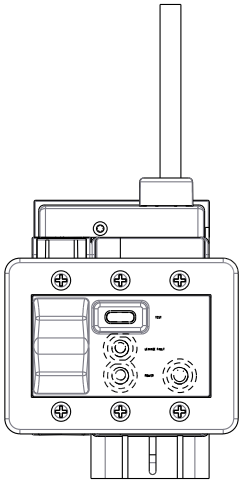
Handle Style Panel Seal



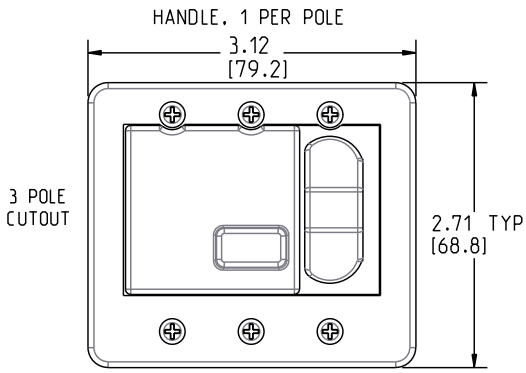


Rocker Style Panel Seal



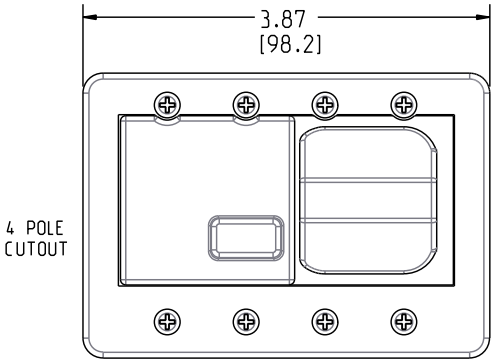


Handle Actuator

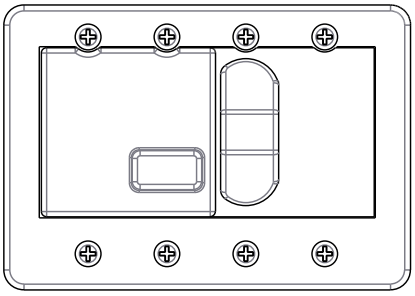


8PC-13

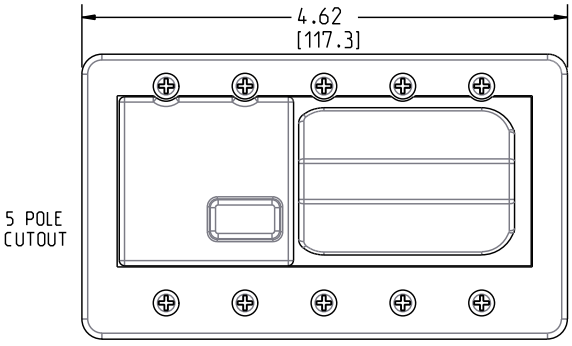
HANDLE, 1 PER MULTIPOLE UNIT



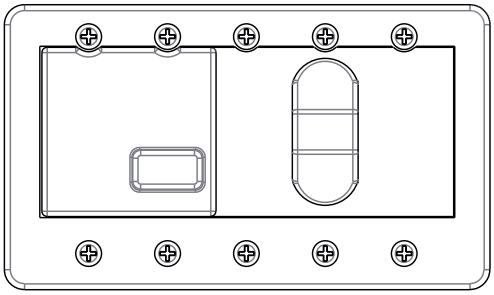
8PC-14



8PC-24

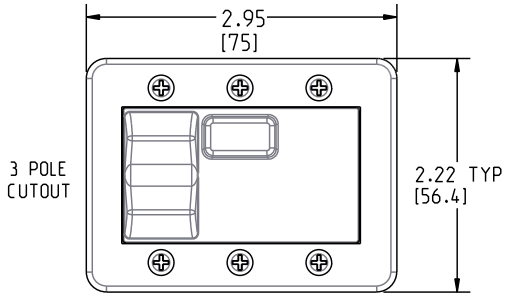


8PC-15

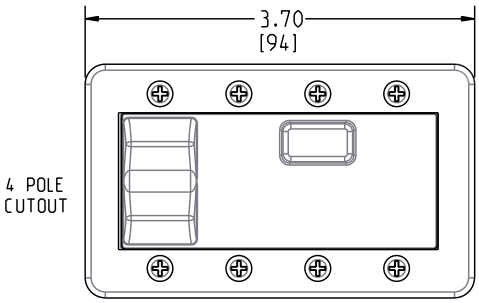


8PC-25

Rocker Actuator



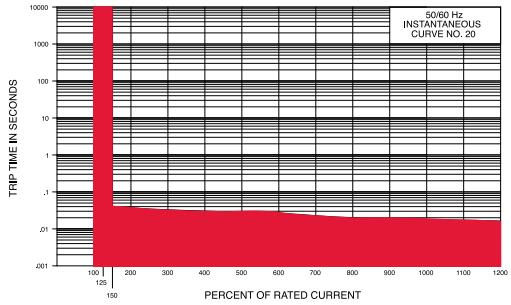
8PC-A3



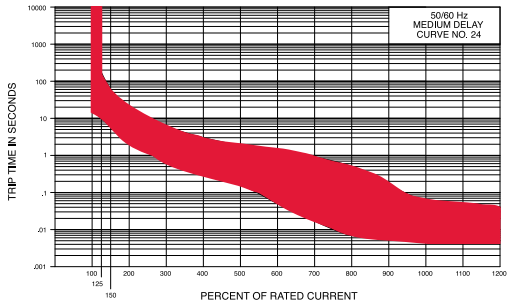
8PC-A4

Time Delay Curves

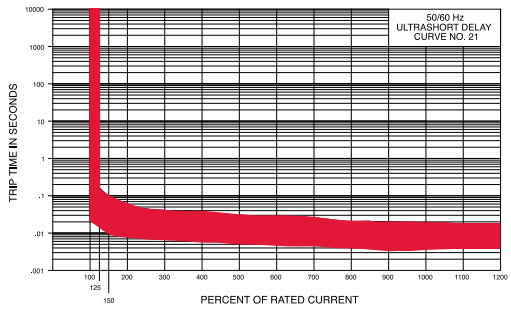
Instantaneous



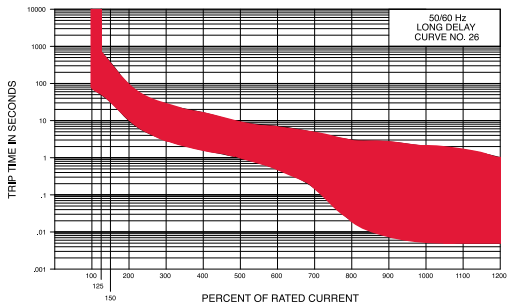
Medium



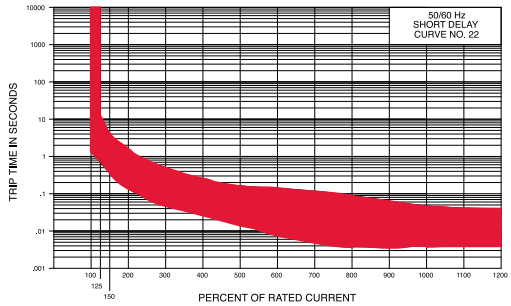
Ultra Short



Long



Short



TIME DELAY VALUES									
PERCENT OF RATED CURRENT									
DELAY	**100%**	**125%**	**150%**	**200%**	**400%**	**600%**	**800%**	**1000%**	**1200%**
20	No Trip	May Trip	.040 MAX	.035 MAX	.030 MAX	.025 MAX	.020 MAX	.017 MAX	.015 MAX
21	No Trip	.014 - .150	.011 - .095	.008 - .055	.006 - .035	.005 - .027	.005 - .021	.004 - .018	.004 - .017
22	No Trip	.700 - 12.0	.350 - 4.00	.130 - 1.30	.027 - .220	.008 - .130	.004 - .090	.004 -.045	.004 - .040
24	No Trip	10.0 - 160	6.00 - 60.0	2.20 - 20.0	.300 - 3.00	.050 - 1.30	.007 - .500	.005 - .060	.005 - .040
26	No Trip	50.0 - 700	32.0 - 350	10.0 - 90.0	1.50 - 15.0	.500 - 7.00	.020 - 3.00	.006 - 2.00	.005 - 1.00

Notes:

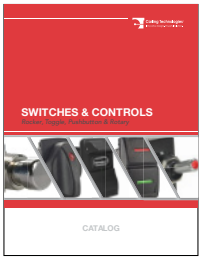
Other time delay values available, consult factory.
Delay Curves 21,22,24,26: Breakers to hold 100% and must trip at 125% of rated current and greater within the time limit shown in this curve.
Delay Curve 20: Breakers to hold 100% and must trip at 150% of rated current and greater within the time limit shown in this curve.
All Curves: Curve data shown represents breaker response at ambient temperature of 77°F (25°C) with no preloading. Breakers are mounted in standard wall-mount position.
The minimum inrush pulse tolerance handling capability is 12 times the rated current. These values are based on a 60 Hz 1/2 cycle, 8.33 ms pulse.

There are several catalogs available featuring complete details on all Carling Technologies products. Below is a list of useful information such as catalogs, brochures and videos. Please visit our website at **carlingtech.com** or scan the QR codes below for complete details.

www.carlingtech.com

Watch Company Profile Video

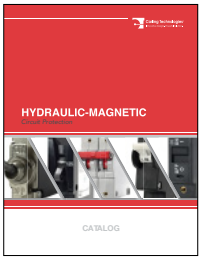
Switches & Controls



catalog

Complete line and ordering details for Switches & Control products including Rocker, Toggle, Pushbutton, and Rotary style switches.

Hydraulic-Magnetic



catalog

Complete line and ordering details for all hydraulic-magnetic circuit breakers.

Thermal

catalog

Complete line and ordering details for all thermal circuit breakers.

GFCI / ELCI

catalog

Complete line and ordering details for all GFCIs/ELCIs.

Marine

catalog *brochure*

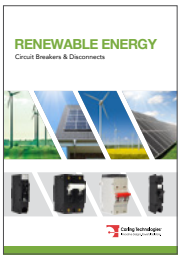
Complete line of ELCIs, thermal and hydraulic-magnetic circuit breakers specific for marine applications.

On-Off Highway

catalog *brochure*

Complete line of switches, controls and custom solutions specific for on-off highway applications.

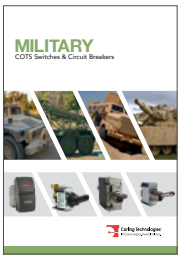
Renewable Energy



catalog *brochure*

Complete line of circuit breakers and disconnect products specific for renewable energy applications.

Military



catalog *brochure*

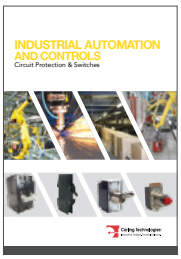
Complete line of COTS *(Commercial-Off-The-Shelf)* switches and circuit breakers specific for military applications.

Telecom/Datacom

catalog *brochure*

Complete line of hydraulic-magnetic circuit breakers specific for telecom/datacom applications.

Industrial Automation

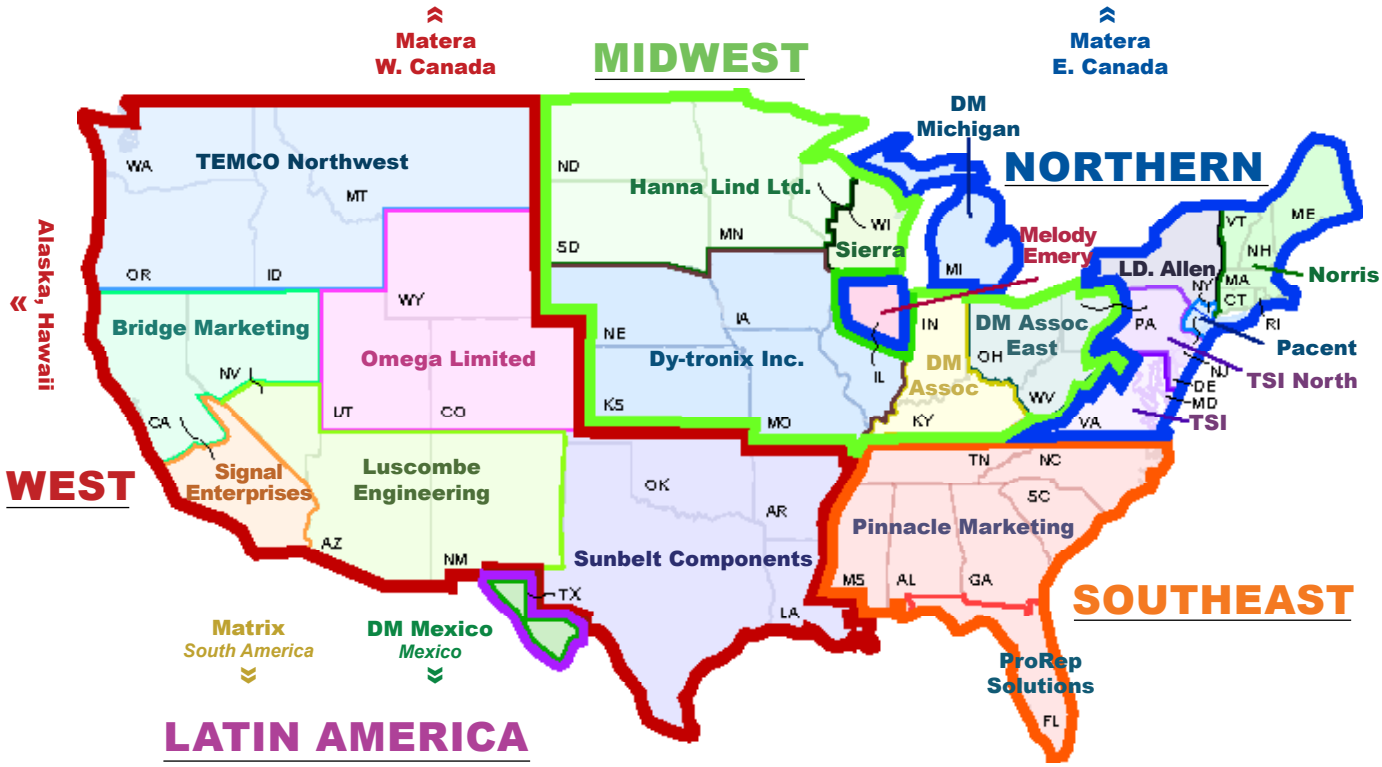


brochure

Complete line of switches and circuit breakers specific for industrial automation & controls applications.

Authorized Sales Representatives

Click on the group name on the map below to find your local representative or visit *www.carlingtech.com/findarep*.



Americas

Europe
Middle East
Africa

Asia-Pacific
Oceania

About Carling

Founded in 1920, Carling Technologies is a leading manufacturer of electrical and electronic switches and assemblies, circuit breakers, electronic controls, power distribution units, and multiplexed power distribution systems. With four ISO registered manufacturing facilities and technical sales offices worldwide, Carling Technologies Sales, Service and Engineering teams do much more than manufacture electrical components, they engineer powerful solutions! To learn more about Carling please visit **www.carlingtech.com/company-profile.**

To view all of Carling's environmental, quality, health & safety certifications please visit **www.carlingtech.com/environmental-certifications**

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