PB-Series

Ground Fault Circuit Protection

The PB-Series utilizes the hydraulic magnetic principle which provides precise operation and performance even when exposed to extremely hot and/or cold application environments.
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.

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.

Features:

- 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

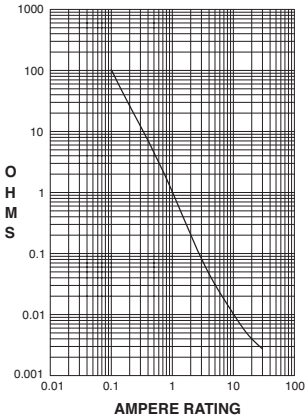
Electrical Tables

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

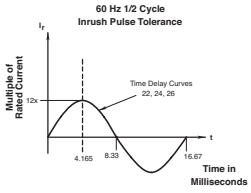
Maximum Voltage	120/240VAC 60 Hz
Current Ratings	Standard current coils: 0.100, 0.250, 0.500, 0.750, 1.00, 2.50, 5.00, 7.50, 10.0, 15.0, 20.0, 25.0 & 30.0 amps. Other ratings available, see ordering scheme.
Insulation Resistance	Minimum of 100 Megohms at 500 VDC.
Dielectric Strength	UL, CUL - 1500 V 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

Leakage Current Ratings	5 & 30 milliamps. 5± 1mA for UL943, other leakage ratings test to UL1053. 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 and 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 per UL943 FMG Test. 3 weeks @ 30°C 75% RH, 100ppb H2S, 20ppb CI2, 200ppb NO2

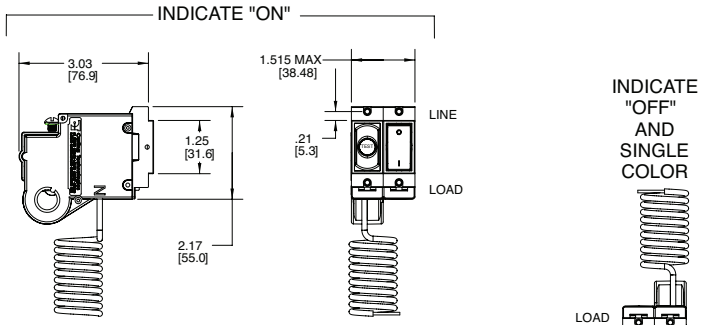
Agency Certifications

UL Listed

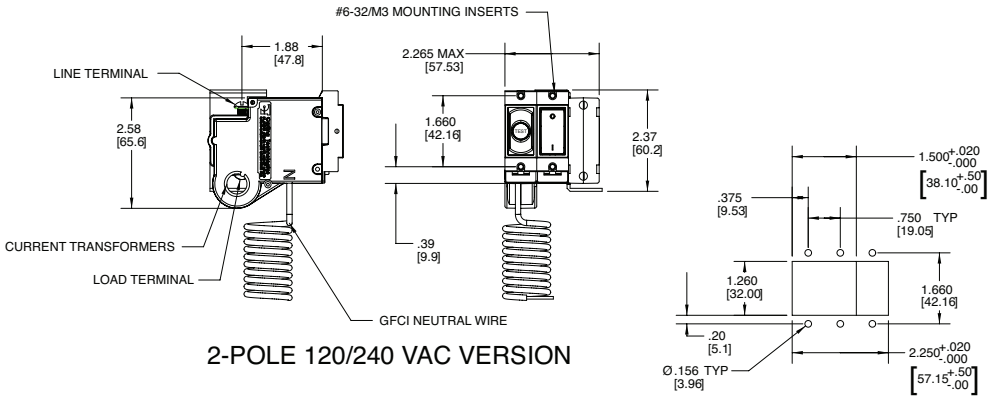
UL Standard 489	Circuit Breakers, Molded Case, (Guide DIVQ, File E129899)
UL Standard 1077	Supplementary Protectors
UL Standard 943	Class A Ground Fault Circuit Interruptors
UL Standard 1053	Ground Fault Sensing and Relaying Equipment

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

60 Johnson Avenue • Plainville, CT 06062–1177 • Phone: (860) 793–9281 • Fax: (860) 793–9231
Email: sales@carlingtech.com • www.carlingtech.com

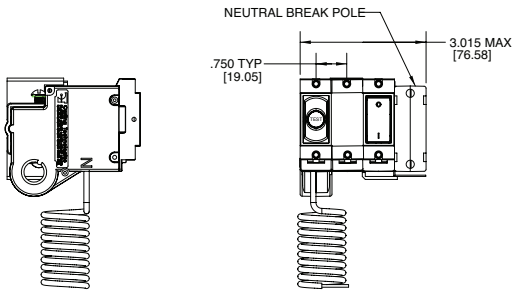


1-POLE 120 VAC VERSION



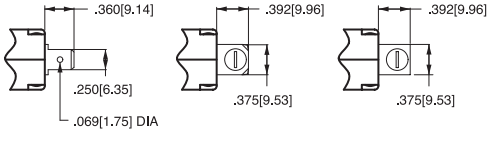
2-POLE 120/240 VAC VERSION

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

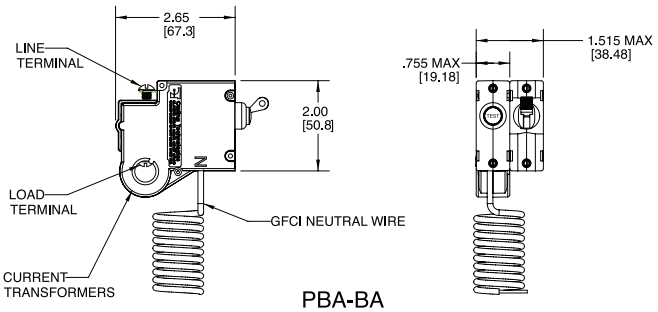
BUS
#8-32 30 AMP
#10-32 50 AMP

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]

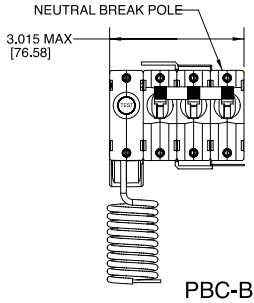
Notes:
1 All dimensions are in inches [millimeters].
2 Tolerance ±.020 [.51] unless otherwise specified.

TYPICAL 1-POLE 120 VAC VERSION



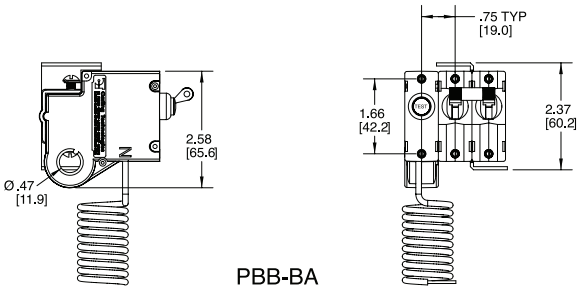
PBA-BA

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

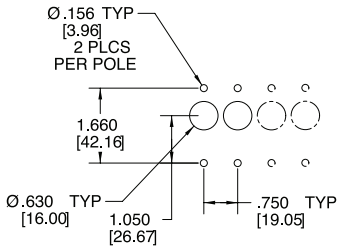


PBC-BA

TYPICAL 2-POLE 120/240 VAC VERSION



PBB-BA

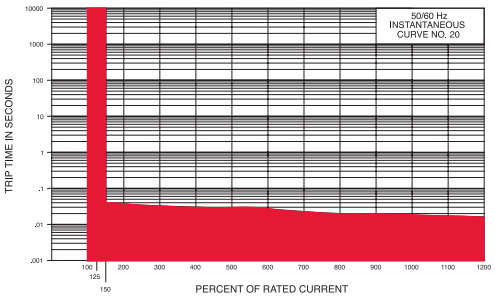


PANEL CUTOUT

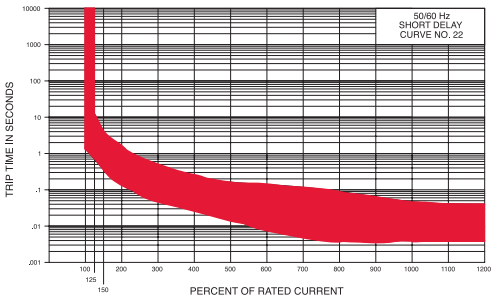
Notes:
1 All dimensions are in inches [millimeters].
2 Tolerance ±.020 [.51] unless otherwise specified.

Time Delay Curves

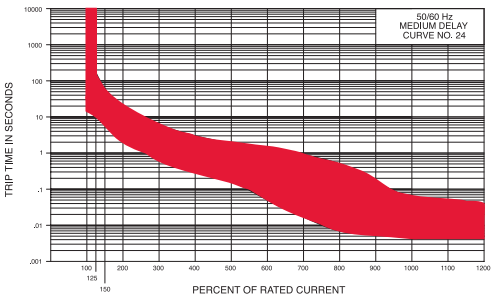
Instantaneous



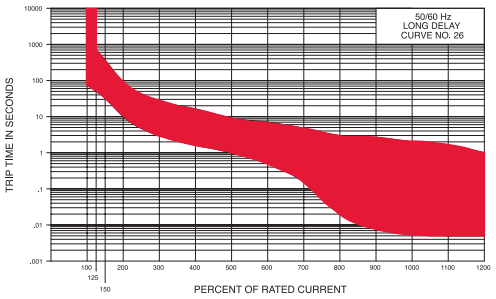
Medium



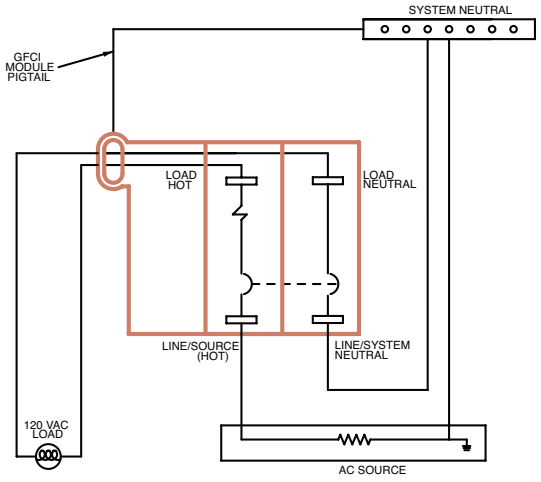
Short



Long

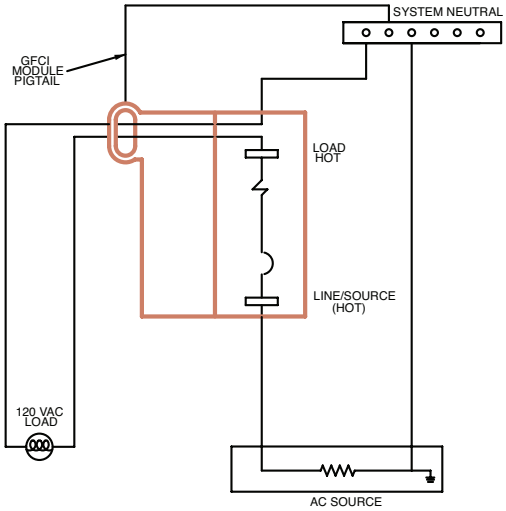


120VAC with Switched Neutral



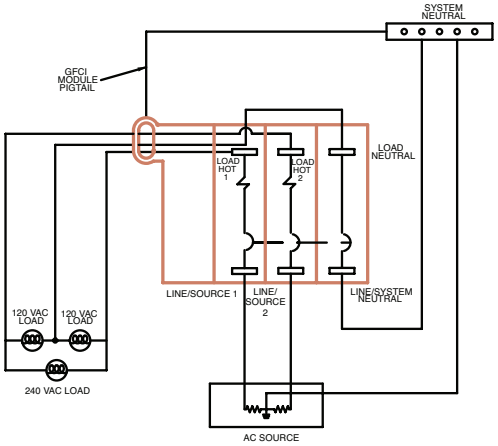
120 VAC WITHOUT SWITCHED NEUTRAL

120VAC without Switched Neutral



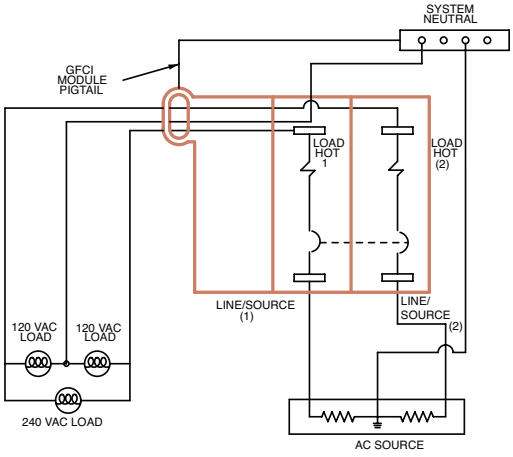
120 VAC WITHOUT SWITCHED NEUTRAL

120/240VAC with Switched Neutral



120 VAC WITHOUT SWITCHED NEUTRAL

120/240VAC without Switched Neutral



120 VAC WITHOUT SWITCHED NEUTRAL

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)

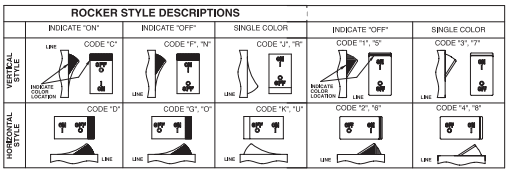
4 ACTUATOR[1]
Handle
A one per pole
B one per multipole unit

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

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

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)[3,4,5]
E 30 MA (ELCB)

11 AGENCY APPROVAL
G UL489 Listed, CSA Certified
C UL1077
I UL1077/UL1500 Ignition Protected, CSA Certified[6]

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 6mA per UL943, available with agency approval code G.
5 30mA per UL1053, available with agency approval codes C & G.
6 UL1500 only available with 30MA trip level.

60 Johnson Avenue • Plainville, CT 06062–1177 • Phone: (860) 793–9281 • Fax: (860) 793–9231
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