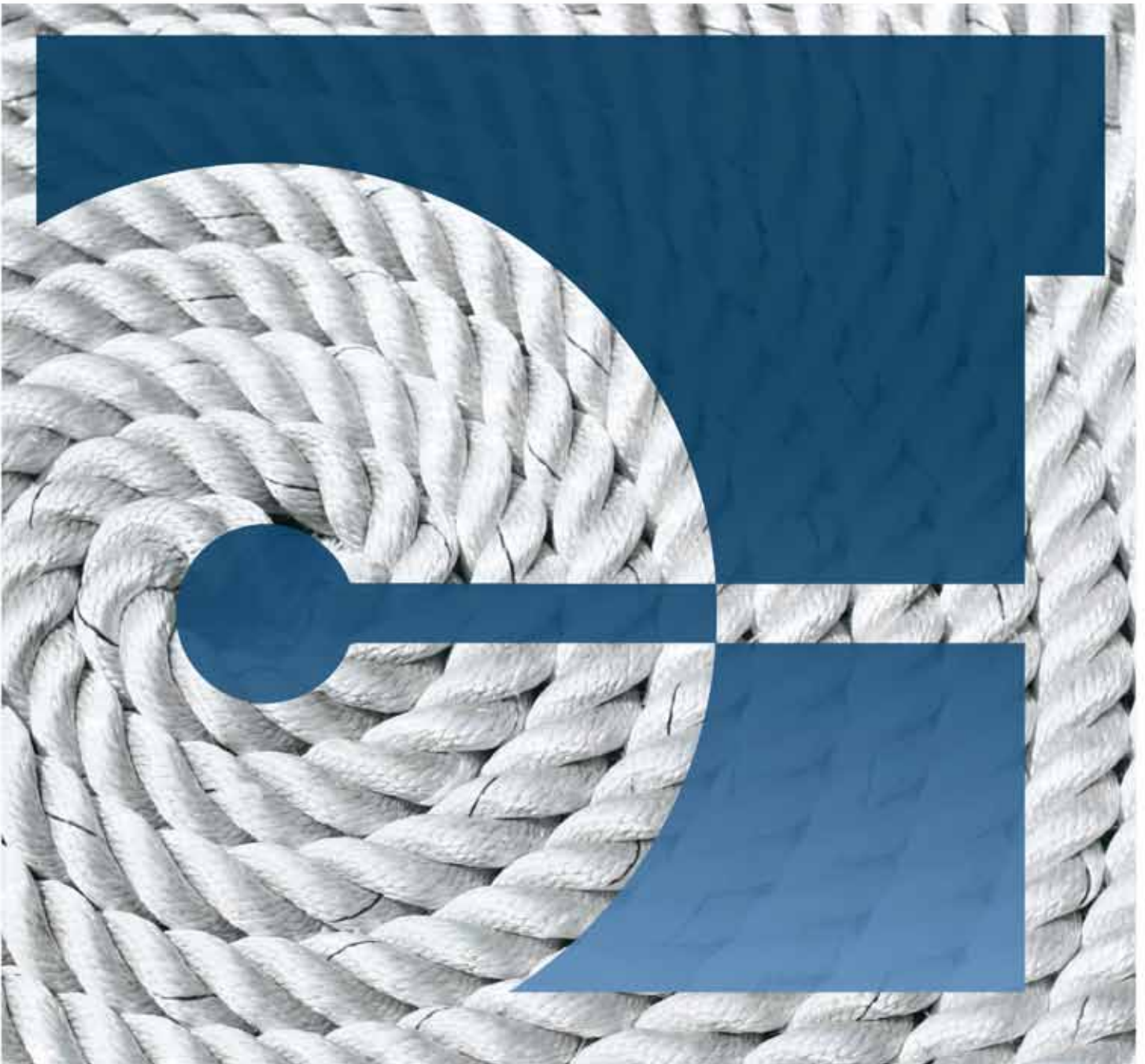


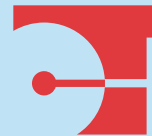
# Marine Switches, Circuit Breakers & ELCI/GFCIs





## About Carling Technologies

Founded in 1920, Carling Technologies is a leading manufacturer of electrical and electronic switches and assemblies, hydraulic magnetic and thermal circuit breakers, electronic controls, power distribution units, digital switching systems, and multiplexed power distribution systems. With four ISO certified manufacturing facilities and corporate offices worldwide, Carling Technologies does much more than manufacture electrical components, it engineers powerful solutions! By applying its "Quality by Design" product development and manufacturing principles, Carling manufactures products that are not only highly efficient and cost effective but that also assure the safety of boaters worldwide.



**Carling Technologies™**

Innovative Designs. Powerful Solutions.





# Marine Switches, Circuit Breakers and ELCI/GFCIs

With years of design and manufacturing experience, Carling Technologies is the market leader in marine application switches, circuit breakers and ELCIs. From small boats to luxury yachts, OEM design engineers trust our products not only for their style but also for their performance. Carling's switches are widely used and the most recognizable switch brand in the industry with unmatched quality and aesthetics. Its circuit breakers and ELCIs are guaranteed to perform under extreme marine environments while keeping boats and boaters safe from electrical currents. By drawing upon over 90 years of design experience, Carling Technologies is also able to provide custom product solutions that are sure to meet the most stringent design requirements.

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### V-Series Contura Switches

The most popular switch and a staple in the marine industry, the V-Series switches offer countless unique options including choices for ratings, colors, illuminations and symbols. These switches feature removable actuators in a choice of actuator styles and colors, and are available in single or double pole configurations. The V-Series switches can be illuminated with either square, oval and/or bar shaped lenses.



#### CONTURA XIII

Contura XIII is a departure from any previous V series actuator styles. The familiar rectangular shape of Contura has now been tapered towards the center to create a unique figure 8-like shape which looks great as a single stand-alone switch, or when combined with 3 or more switches in a pod, the individual lines and curves serve to create additional looks and forms. Rocker top and bottom grip serrations provide tactile feel, while options for round or bar lenses and most any legend imprint are available to complete your panel design.

#### CONTURA XIV

Contura XIV represents a bold addition to existing V series actuator options. The traditional rectangular envelope has now taken on a whole new dimension through the addition of top and bottom indents coupled with a center channel, providing definitive tactile distinction between on and off positions. Indents are available in either a single or 2 stepped style, which both seamlessly incorporate optional bar or square lens options, as well as any of the hundreds of printed legends, which are offered.

## V- Series Contura Switches



### CONTURA II & III

The Contura II & III actuators are constructed of thermoplastic polycarbonate and are offered with either a hard nylon overlay or a "soft-touch" elastomer overlay. These Contura models incorporate aesthetic designs on the top and bottom of the rocker featuring two rows of raised "bumps" on the Contura II and three "indented" lines on the Contura III.



### CONTURA IV

The Contura IV's "Shape to create a Shape" actuator supports the designer, by working with the curves, contours and advanced styling of the latest panel designs, flowing with these advanced curves and radii. This actuator style fits on the Contura II & III flush bracket/bezel.

### CONTURA V

The symmetrically curved Contura V actuator provides the perfect complement to the Contura IV's "Shape to create a Shape" design concept. It can be mounted in between two Contura IV's, by itself, or in groups. This actuator style is available with all flush style mounting brackets.



### CONTURA VI

The Contura VI WAVE sealed rocker switches, when used in a row, create an uniquely appealing "wave" design on your panel. A variety of colors and finishes are available for both rocker and wave insert. Contura VI features bar and oval lenses.

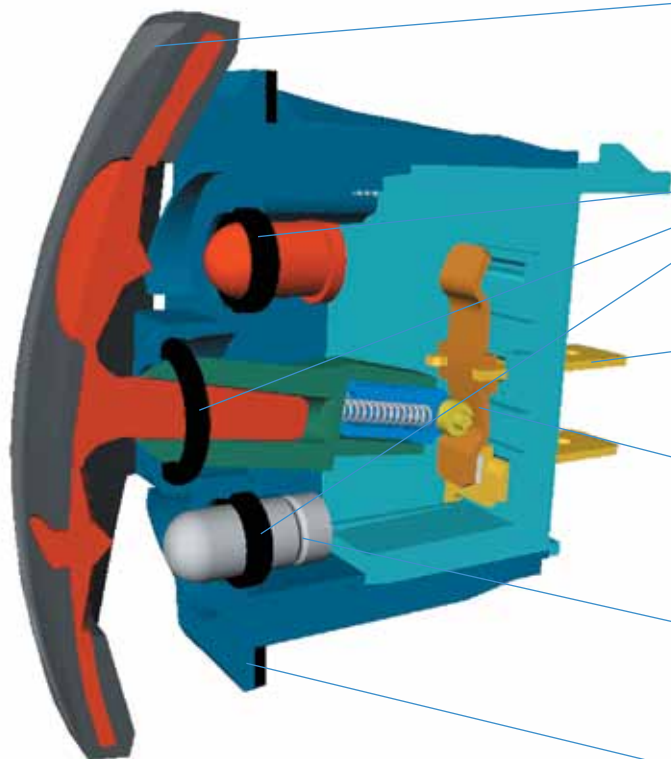


### CONTURA VII

A softened version of earlier Contura styles featuring gently curved corners and edges assuring compatibility with most any panel design. Intuitive feel is maximized by the use of 2 embossed circular pads located at opposite ends of the rocker. Any combination of Bar or Oval style lenses can be located in the pads providing a truly unique look, exclusive to Contura VII.



## V- Series Contura Switches



### MAXIMUM DESIGN OPTIONS WITH MINIMUM INVENTORIES

Panel redesign is a snap, requiring no tooling change, with our removable interchangeable actuators. A unique balance between aesthetics and functionality.

### SEALS OUT WATER, DUST AND DEBRIS

Dual seal protection locks out elements. Certified to IP66/IP68 for front panel components of the actual switch.

### CLEAN CONNECTIONS

Offered in both eight and ten terminal base options to accommodate most any circuit need. AMP & Packard compatible connectors available.

### WITHSTANDS EXTREME TEMPERATURES

Roller pin mechanism eliminates need for lubricants, so it can withstand from  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .

### MULTIPLE LIGHTING OPTIONS

Incandescent lamps & LED lighting. Our LED illumination is offered in a wide array of light intensities, colors, as well as dual level, tri-color, and flashing options.

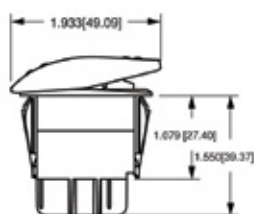
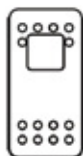
### OPTIONAL PANEL SEAL

Helps prevent water/dust ingress behind panel.

## DIMENSIONAL SPECIFICATIONS: IN. [MM]

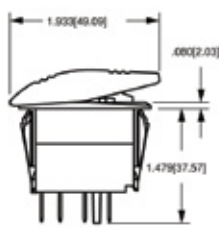
### CONTURA II STYLE

SHOWN WITH SQUARE LENS



8 TERMINAL BASE W/BARRIERS

### CONTURA III STYLE



8 TERMINAL BASE W/O BARRIERS

### CONTURA IV & V STYLE

IV - SHOWN WITH BAR LENS  
V - SHOWN WITH ROUND LENS



10 TERMINAL BASE W/BARRIERS

### CONTURA VI

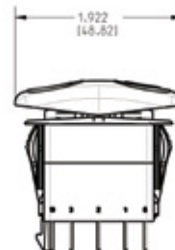
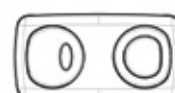
SHOWN WITH OVAL LENS



10 TERMINAL BASE W/BARRIER AND LAMP TERMINAL

### CONTURA VII STYLE

SHOWN WITH BAR AND ROUND LENSES



10 TERMINAL BASE W/O BARRIERS

## Electrical

Contact Rating .....	4VA@ 24VDC (MAX) resistive
	15 amps, 125 VAC
	10 amps, 250 VAC
	1/2 HP 125-250 VAC
	20 amps, 4-14 VDC
	15 amps, 15-28 VDC
	10A 14VT
	6A 125 VAC L
Dielectric Strength .....	1500 Volts RMS
Insulation Resistance .....	50 Megohms
Initial Contact Resistance.....	10 milliohms max. @ 4 VDC
Life .....	50,000- 100,000 cycles circuit dependent
Contacts.....	Silver cad-oxide, silver tin-oxide, fine silver
Terminals	Brass or copper/silver plate 1/4" (6.3mm) Quick Connect terminations standard. Solder lug, Wire Lead

## Mechanical

Endurance .....	150,000 cycles minimum
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## Physical

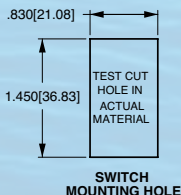
Lighted .....	Incandescent - rated 10,000 hours
	Neon - rated 25,000 hours
	LED - rated 100,000 hours 1/2 life
	(LED is internally ballasted for voltages to 24 VDC)
Seals.....	Internal
	Optional external gasket panel seal
Base.....	Polyester blend rated to 125C with a UL flammability rating of 94 V-O.
Contura II, III, IV, V	
Actuator .....	Hard Surface: Basic actuator structure molded of thermoplastic polycarbonate with a hard Nylon 66 thermoplastic surface overlay. Soft Surface: Basic actuator structure molded of thermoplastic polycarbonate with an elastomer overlay.

## Actuator Travel (Angular Displacement)

2 position .....	18°
3 positions .....	9° from center

## Mounting Specifications

Panel Thickness Range	
# of gaskets	<b>Acceptable Panel Thickness</b>
0	.030 to .250 (.76mm to 4.76mm)
1	.030 to .109 & .147 to .157 (.76 to 2.77mm & 3.73 to 3.98mm)
Recommended: No gasket with panel thickness of .032, .062, .093, .125, .187 or .250	



## Agency Certifications



## Environmental

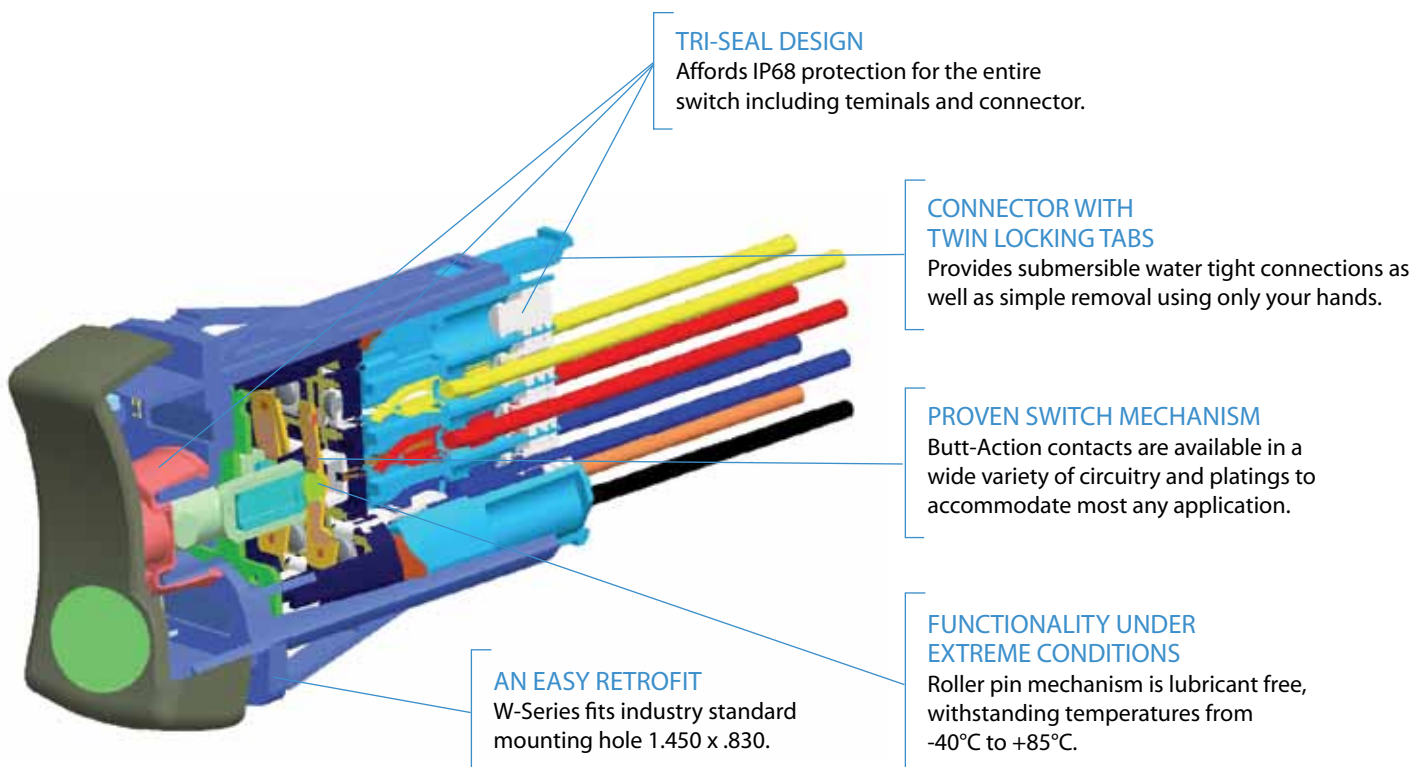
Environmental .....	Sealed version: IP68, in accordance with IEC 529, BS 5490, DIN 400 50 & NFC 20 010. This rating applies to front panel components of the actual switch itself and signifies protection against dust and the prolonged effects of immersion under pressure. The standard test for immersion under pressure requires submersion under one meter of water for 30 minutes. The V-Series switch has exceeded these parameters, having been actuated and illuminated during submersion.
Corrosion.....	Flowing Mixed Gas (FMG) Class III 3 year accelerated exposure per ASTM B-827, B-845 Silver and gold contacts
Operating Temperature.....	-40° C to + 85° C
Vibration 1 .....	Per Mil-Std 202F, Method 204D Test Condition A 0.06 DA or 10G's 10-500 Hz. Tested with VCH connector. Test criteria - No loss of circuit during test and pre and post test contact resistance.
Vibration 2 .....	Resonance search 24-50 Hz 0.40 DA 50-2000 ±10 G's peak Results Horizontal Axis 3-5 G's max. Random 24 Hz 0.06 PSD-Gsq/Hz 60 Hz 0.50 100 Hz 0.50 200 Hz 0.025 2000 Hz 0.025 No loss of circuit during test; <10μ seconds chatter.
Shock.....	Per Mil-Std 202F, Method 213B, Test Condition K @ 30G's. Tested with VCH connector. Test criteria - No loss of circuit during test, pre and post test contact resistance.
Salt Spray .....	Per Mil-Std 202F, Method 101D, Test Condition A, 48 Hrs. Sealed version only.
Dust.....	Per Mil-Std 810C, Method 510.2 Air Velocity 300 ±200 Feet/Min, Test Duration 16 Hrs.
Thermal Shock.....	Per Mil-Std 202F, Method 107F, Test Condition A, -55°C to 85°C. Test criteria - pre and post test contact resistance
Moisture Resistance .	Per Mil-Std 202F, Method 106F, Test Criteria - pre and post test contact resistance
Ignition Protection.....	All Contura switches with sealed construction meet the requirements of UL1500/ISO8846 for ignition protection, in addition to conformance with EC directive 94/25/EC for marine products.



### W-Series Fully Submersible Rocker Switch

Carling Technologies set the standard for performance, reliability and aesthetics with the widely successful, often imitated, but never duplicated, V-Series rocker switches. Building further upon that platform, Carling has once again raised the bar with the fully submersible W-Series. The W-Series traditional appearance features complete IP68 protection, even below the panel, where the critical connection is made from your wiring harness. When used in conjunction with the integrated connector, the totally submersible W-Series provides a seal for up to ten individual wires, assuring compatibility with even the most complex circuitry.

The W-Series also offers a wide variety of accoutrements including endless illumination options featuring dual level and multicolor LEDs, progressive and hazard warning circuits, ratings up to 10A 24V, choice of paddle, rocker, locking or laser etched actuators, hundreds of standard legend choices and the electrical performance and reliability that is the hallmark of Carling Technologies products.





# W-Series Fully Submersible Rocker Switch

## Electrical

Contact Rating	0.4VA @ 24VDC 10 amps, 3-24VDC
Dielectric Strength	1500 Volts RMS
Insulation Resistance	50 Megaohms
Initial Contact Resistance	10 milliohms max. @ 4 VDC
Life	100,000 cycles
Contacts	Silver tin-oxide, 88/12
Terminals	Copper with silver or gold plating. Quick Connect terminations.
Voltage	3-24 VDC
Overcurrent	15A for 50 cycles

## Mechanical

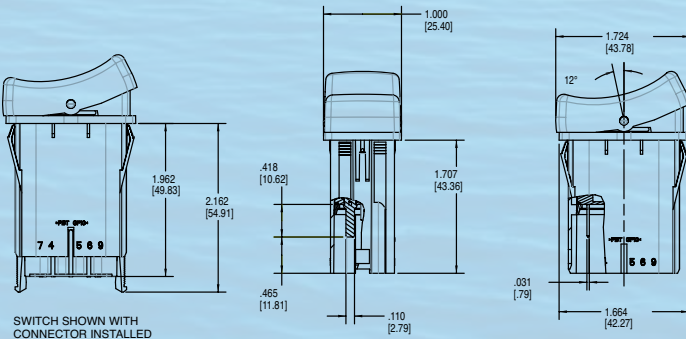
Endurance	250,000 cycles minimum
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## Physical

Lighted	LED - rated 100,000 hours 1/2 life (LED is internally ballasted for voltages to 24 VDC)
Seals	Neoprene
Base	Polyester blend rated to 125C with a UL flammability rating of 94V0.
Actuator	Basic actuator structure molded of thermoplastic polycarbonate with a hard Nylon 66 thermoplastic surface overlay.
Lens	Polycarbonate rated at 100°C
Function	2 & 3 Position Rocker Style
Operation	Maintained & Momentary
Base	PA 6/6 30GF (glass filled)
Actuator	PA 6/6 13GF
Bracket	PBT 10GF
Connector	PBT 10GF, polarized

## Actuator Travel (Angular Displacement)

24° full throw



### Notes:

WCH connector is intended for use with Tyco/Amp .110 Junior Power Timer, female contacts, and wire seals. For 14-16 awg wire, specify Tyco/Amp P/N 927766-3. For 16-20 awg wire, specify Tyco/Amp P/N 927770-3. Tyco/Amp cable seal P/N 828904-1 (20-18 awg wire) or P/N 828905-1 (16-14 awg wire) is required for each individual wire lead, and Tyco/Amp cable plug, P/N 828922-1, is required to seal each unused connector opening. Consult Tyco/Amp for the cable seal recommended for your specific wire gauge and thickness.

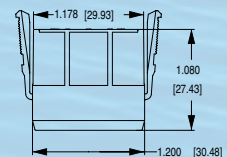
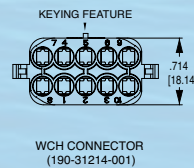
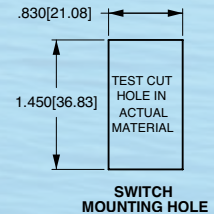
## Environmental

Environmental	IP68, Fully submersible
Corrosion/	
Chemical Splash	Flowing Mixed Gas (FMG) Class III 3 year accelerated exposure per ASTM B-827, B-845
Operating Temperature	40°C to +85°C, 22 cycles, 300 hours
Vibration 1	Per Mil-Std 202F, Method 204D Test Condition A 0.06 DA or 10G's 10-500 Hz.
Vibration 2	Resonance search 24-50 Hz 0.40 DA 50-2000 ±10 G's peak Results Horizontal Axis 3-5 G's max. Random 24 Hz 0.06 PSD-Gsq/Hz 60 Hz 0.50 100 Hz 0.50 200 Hz 0.025 2000 Hz 0.025
Handling/Drop	One meter onto concrete floor
Salt Spray	Per Mil-Std 202F, Method 101D, Test Condition A, 48 Hrs.
Dust	IP6X
Thermal Shock	Per Mil-Std 202F, Method 107F, Test Condition A, -55°C to 85°C. Test criteria - pre and post test contact resistance
Moisture Resistance/	
Humidity	Per Mil-Std 202F, Method 106F, Test Criteria - pre and post test contact resistance

## Mounting Specifications

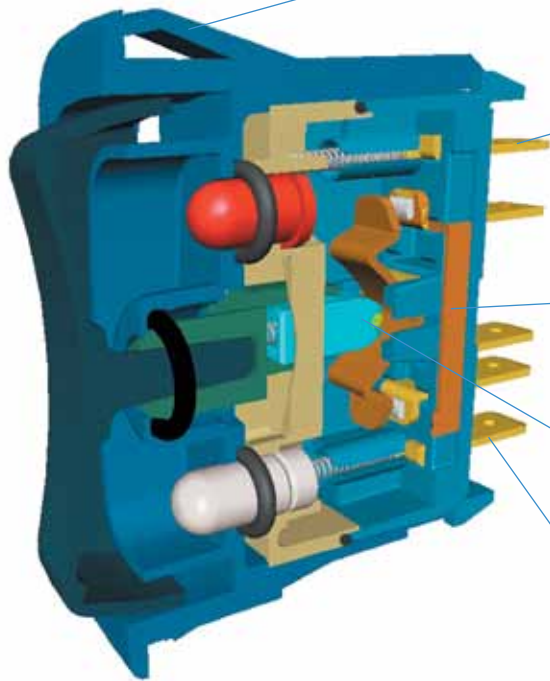
Panel Thickness Range .032 to .125

For optimum panel fit, the following panel thicknesses are suggested:  
.032, .062, .093, .125



### L-Series Sealed Switch

Making the right connections has never been easier — with the L-Series Rocker Switch from Carling Technologies. Not only does this innovative switch offer total design flexibility, it has set new standards for both performance and reliability. It's IP67 certified, and able to withstand temperatures from -40°C to +85°C. A 12 terminal switch base accommodates countless switch and lamp circuit combinations. Additional features include LED illuminated lenses or laser etched rockers, as well as hundreds of legend choices and several accessories.



#### ELIMINATES NEED FOR RETOOLING

Neatly proportioned, our L-Series fits an industry standard mounting hole of 1.734" x .867" (44.0 mm x 22.0 mm).

#### INTEGRATES EASILY INTO YOUR SYSTEM

You can choose from a variety of termination options, including .250 TAB QC & .187 TAB QC. Optional connector allows for prewiring of wire harnesses.

#### ENSURES GREATER SHOCK PROTECTION

Welded lamp connection and one-piece internal, jumperless terminal withstand extreme shock and vibration.

#### WITHSTANDS EXTREME TEMPERATURES

Roller pin mechanism eliminates need for lubricants, so it can withstand from -40°C to +85°C.

#### MAXIMIZES YOUR DESIGN FLEXIBILITY

Twelve terminals offer you an extensive range of switch and lamp circuit options, including LED or incandescent illumination.



## Electrical

Contact Rating	0.4VA @ 24VDC (MAX) resistive, 15 amps, 125VAC, 10 amps, 250VAC, 20 amps, 4-14VDC, 15 amps, 15-28VDC
Dielectric Strength	1250 Volts RMS between pole to pole, 3750 Volts RMS between live parts and accessible surfaces
Insulation Resistance	50 Megaohms
Initial Contact Resistance	10 milliohms max. @ 4VDC
Life	100,000 cycles maintained, 50,000 cycles momentary at rated voltage and current
Contacts	90/10 silver-nickel, silver tin-oxide, gold
Terminals	Brass or copper/silver plate 3/16" (4.76mm) & 1/4" (6.3mm) Quick Connect terminations standard.

## Mechanical

Endurance	250,000 cycles minimum
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## Physical

Lighted	Incandescent - rated 10,000 hours LED - rated 100,000 hours 1/2 life (LED is internally ballasted for voltages to 24 VDC)
Seals	Rocker, base & bracket are sealed.
Base	Nylon 66 GF rated to 85°C with a flammability rating of 94V0.
Rocker	Nylon 66 Reinforced, rated to 105°C (modular lens). Locking rocker, standard rocker & paddle. Laser etching with a polycarbonate actuator.
Lock	Acetal
Lens	Polycarbonate rated at 100°C.
Bracket	Nylon Zytel
Connector	Nylon 66 rated at 85°C. Polarized.

## Actuator Travel (Angular Displacement)

2 position	26°
3 positions	13° from center

## Environmental

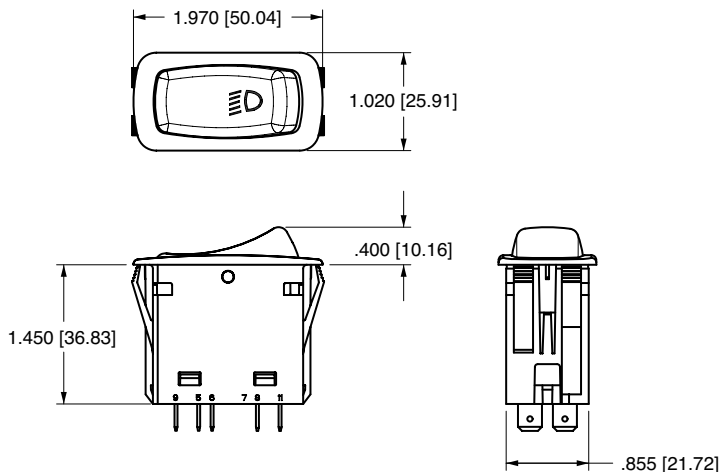
Environmental	IP67 for above panel components of the actual switch, representing an index of protection as applied to electrical equipment in accordance with IEC 529, BS 5490, DIN 400 50 & NFC 20 010.
Corrosion Resistance	Mixed Flowing Gas MFG Class III per ASTM B-827 & B-845, Method H, with 3 years exposure.
Operating Temperature	-40°C to + 85°C
Vibration 1	Per Mil-Std 202F, Method 204D Test Condition A 0.06 DA or 10G's 10-500 Hz. Tested with VCH connector. Test criteria - No loss of circuit during test and pre and post test contact resistance.
Vibration 2	Resonance search 24-50 Hz 0.40 DA50-2000 ±10 G's peak. Results Horizontal Axis 3-5 G's max. Random 24 Hz 0.06 PSD-Gsq/Hz 60 Hz 0.50 100 Hz 0.50 200 Hz 0.025 2000 Hz 0.025 No loss of circuit during test; <10µ chatter.
Shock	Per Mil-Std 202F, Method 213B, Test Condition K @ 30G's. Tested with VCH connector. Test criteria - No loss of circuit during test, pre, and post test contact resistance.
Salt Spray	Per Mil-Std 202F, Method 101D, Test Condition A, 48 Hrs.
Thermal Shock	Per Mil-Std 202F, Method 107F, Test Condition A, -55°C to 85°C. Test criteria - pre and post test contact resistance.
Moisture Resistance	Per Mil-Std 202F, Method 106F, Test Criteria - pre and post test contact resistance.

## Mounting Specifications

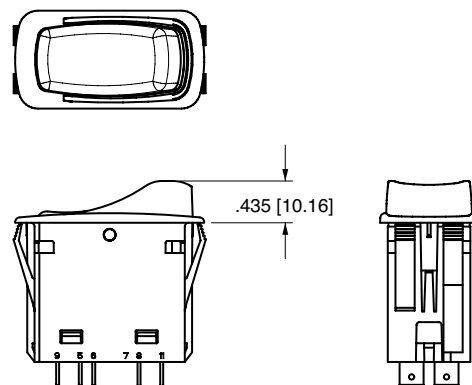
### Panel Thickness Range

Acceptable Panel Thickness	.030 to .156 (.76mm to 3.96mm)
Recommended:	.030, .062, .093, .125 and .156

**L-SERIES**  
SHOWN WITH LASER ETCHED  
ACTUATOR

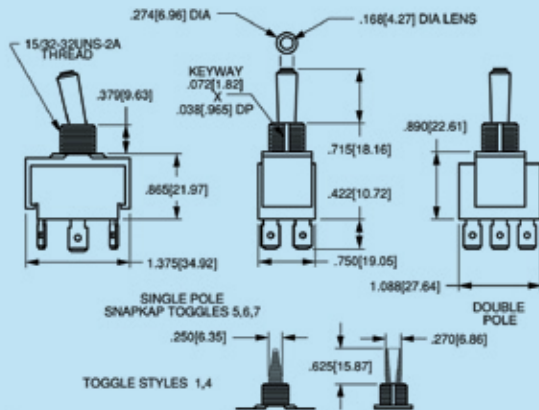
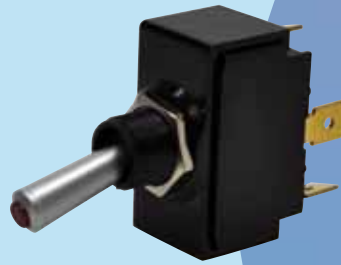


**L-SERIES**  
SHOWN WITH ROCKER GUARD



## LT-Series Toggle Switch

The LT-Series illuminated toggle switches feature a three-color lighting sequence from a single lamp. These lighted toggles contain neoprene bushing seals for dust and moisture protection and provide a simple way to dress-up most any Marine or Transportation industry panel. A variety of circuits and terminations are available.



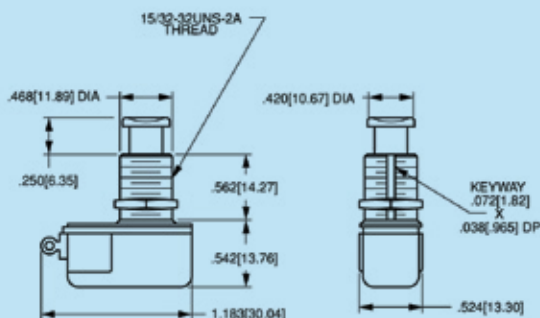
**Dielectric Strength**  
1000V-live to dead metal parts  
**Electrical Life**  
50,000 cycles- maintained  
25,000 cycles- momentary  
**Mechanical Life**  
100,000 cycles  
**Operating Temperature**  
32°F to 185°F (0°C to 85°C)

**MOUNTING HOLE**  
Keyway should point down for maximum water resistance



## P27-Series Pushbutton Switch

The P27-Series pushbutton switches are single pole, AC rated switches suitable for general purpose applications with a shallow back panel. These switches are momentary action with a medium actuation force (26 oz. typical). The P27-Series switch is equipped with a slow-make, slow-break contact mechanism, rated at 6 amps with a nylon concave pushbutton.



**Dielectric Strength**  
UL/CSA:  
1000V - live to dead metal parts  
**Electrical Life**  
25,000 cycles  
**Mechanical Life**  
100,000 cycles  
**Operating Temperature**  
32°F to 85°F (0°C to +85°C)

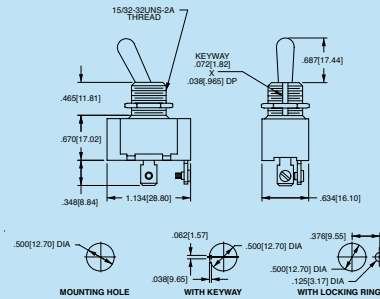




## F & G-Series Toggle Switches

With a storied history in the marine market, these general purpose toggle switches are available with options tailored to meet most any need. Ratings to 20A 277VAC, various actuator, bushing, termination, and circuit choices allow this versatile switch to easily integrate into a variety of different applications.

### F-Series Single Pole Toggle Switch



#### Dielectric Strength

UL/CSA:

1000V - live to dead metal parts

#### Electrical Life

50,000 cycles- maintained

25,000 cycles- momentary

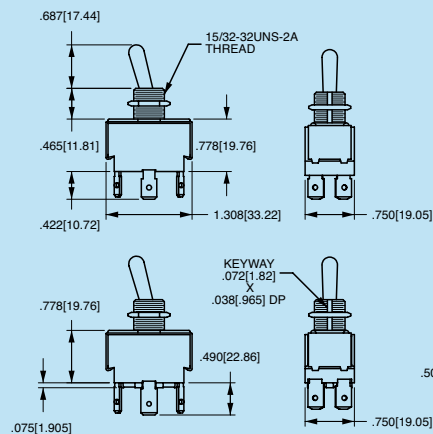
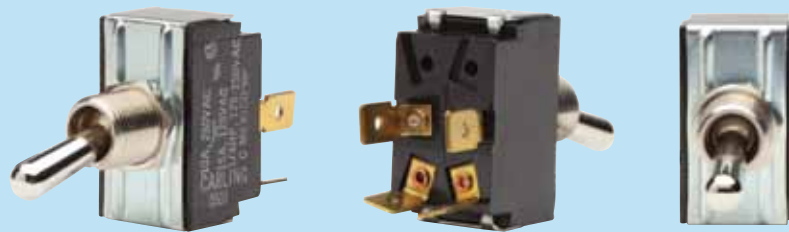
#### Mechanical Life

100,000 cycles

#### Operating Temperature

0°F to 150°F (-17.8°C to +65.6°C)

### G-Series Toggle Switch



#### Dielectric Strength

UL/CSA: 1000V - live to dead metal parts & opposite polarity VDE: 4000V - live to dead metal parts; 1250V - opposite polarity & across open contacts

#### Electrical Life

50,000 cycles- maintained

25,000 cycles- momentary

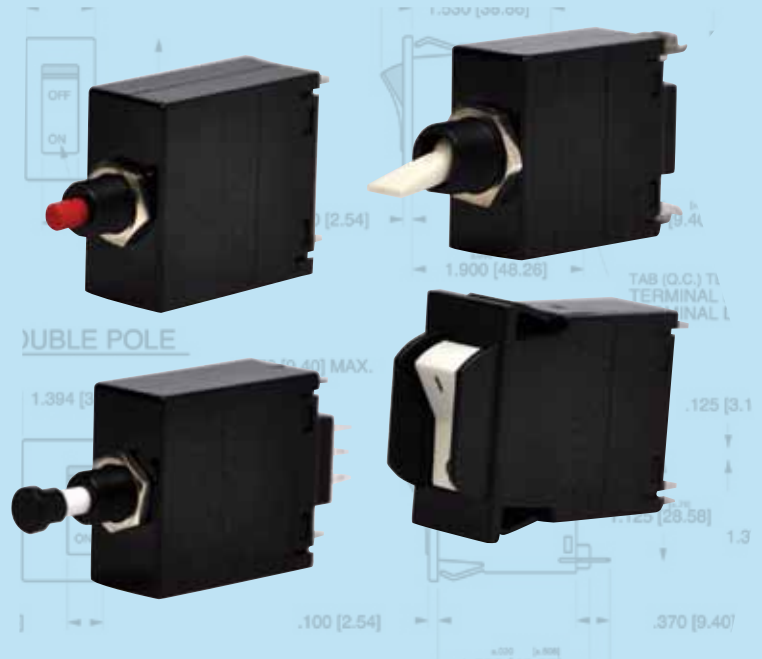
#### Mechanical Life

100,000 cycles

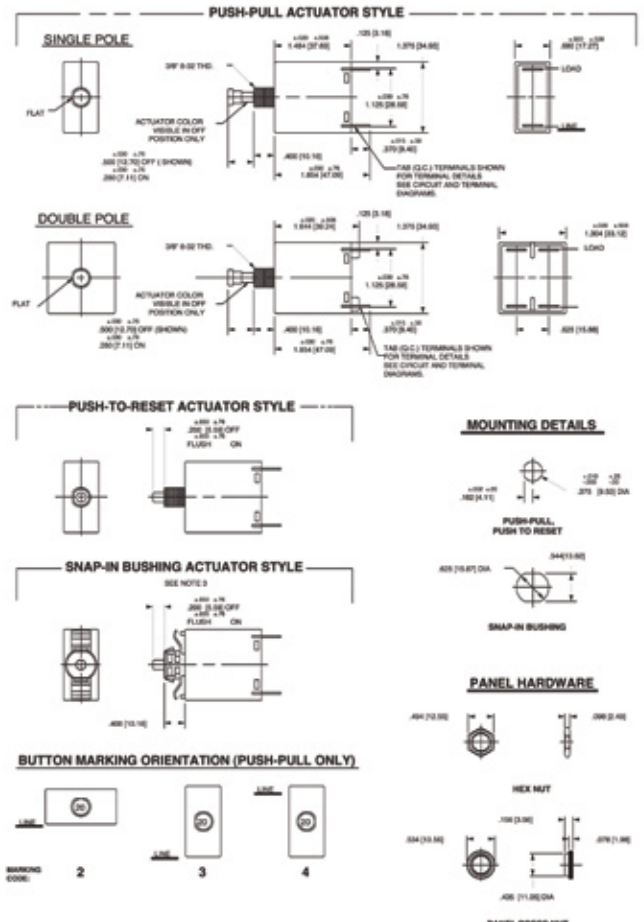
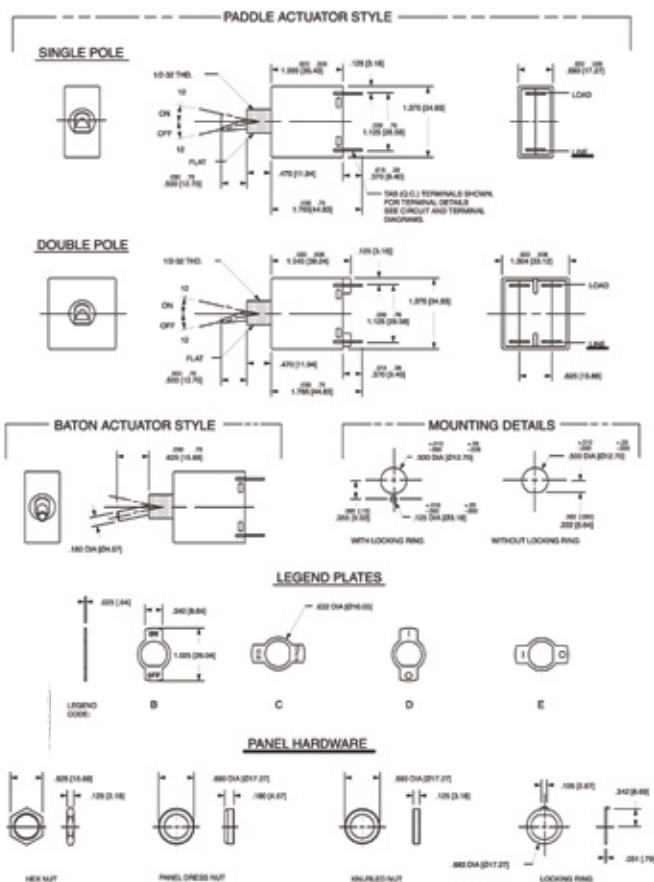
#### Operating Temperature

32°F to 185°F (0° to 85°C)

Available in a choice of rocker actuator styles and colors, push button, push-pull, paddle, and baton style handle actuators, the Visi-Rocker® two-color actuators, as well as non-illuminated or illuminated rocker versions with LED or neon bulbs. The exclusive Rockerguard® bezel helps prevent inadvertent actuation. "Wiping" contact design insures long term reliability. Various styling options allow design flexibility.



## M-SERIES PUSHBUTTON FORM & FIT DRAWING

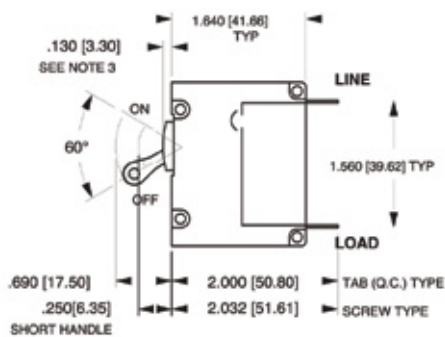
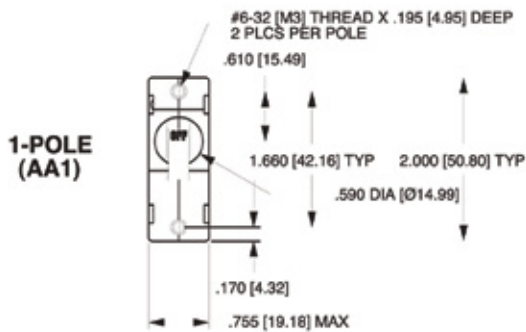




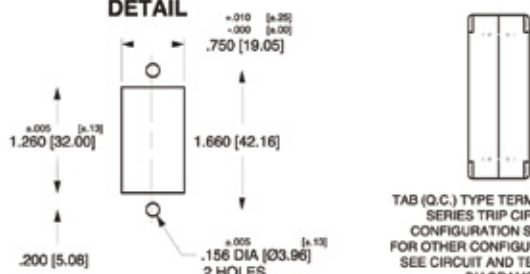


### A-Series Circuit Breaker

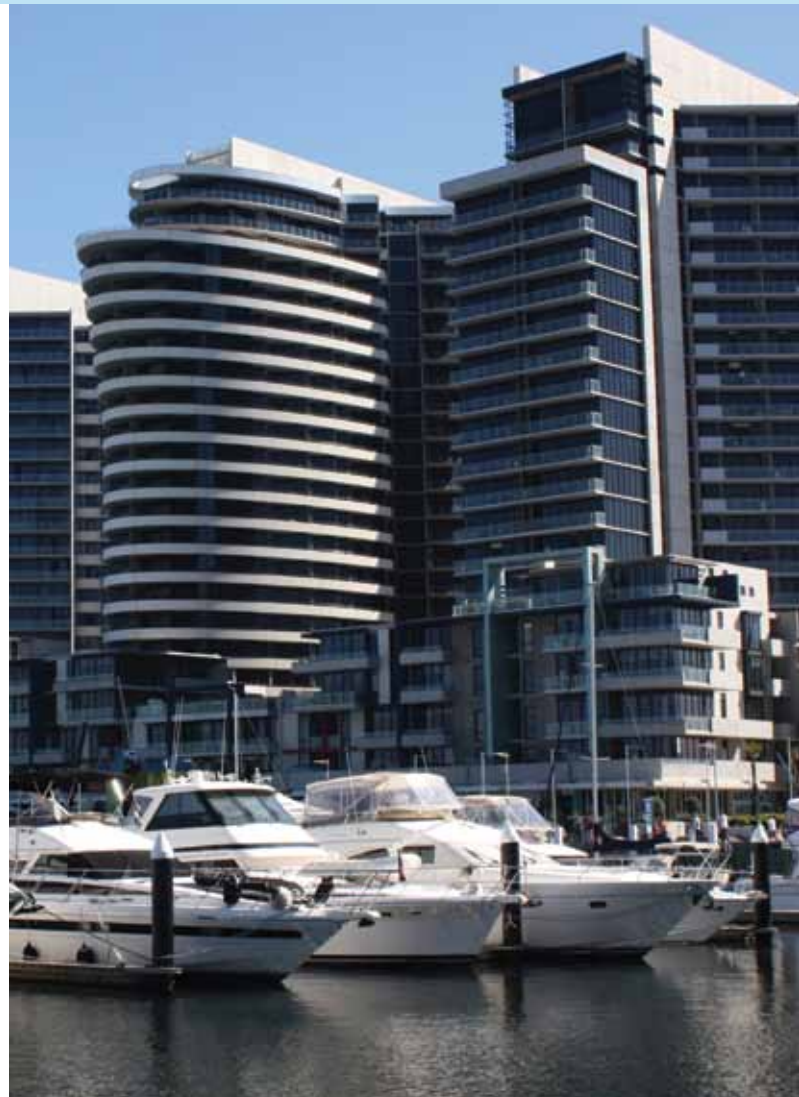
Compact in size and well known for its proven reliability, the A-Series utilizes the hydraulic magnetic principle which provides precise operation and performance even when exposed to extremely hot and/or cold application environments. When aesthetics demand a clean contemporary and functional design, the visi-rocker two-color actuator can be specified. A rocker guard and push-to-reset bezel helps prevent inadvertent actuation. A specially constructed version is now available for applications requiring CE markings. It can be configured as 1-6 poles (handle), 1-3 poles (rocker), 0.02 – 50 amps, up to 277 VAC or 80 VDC, with a choice of time delays, terminals and actuator colors.



#### PANEL CUT-OUT DETAIL



TAB (Q.C.) TYPE TERMINALS IN SERIES TRIP CIRCUIT CONFIGURATION SHOWN. FOR OTHER CONFIGURATIONS, SEE CIRCUIT AND TERMINAL DIAGRAMS.

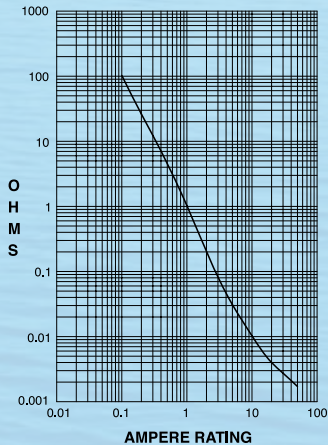




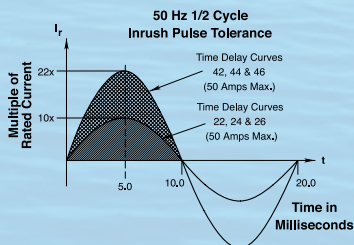
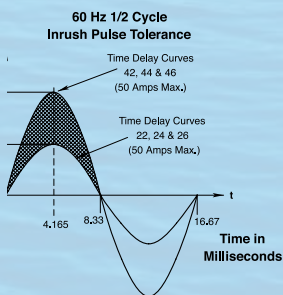
## Electrical

Maximum Voltage.....	277VAC 50/60 Hz, 80VDC
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, 35.0, 40.0, 50.0. Other ratings available - consult ordering scheme.
Standard Voltage Coils .....	DC-6V, 12V; AC-120V, Other ratings available, consult ordering scheme.
Auxiliary Switch Rating .....	SPDT; 10.1 A - 250VAC, 1.0 A - 65VDC/0.5 A - 80 VDC, 0.1A - 125VAC (with gold contacts).
Insulation Resistance .....	Minimum: 100 Megohms at 500 VDC
Dielectric Strength .....	UL, CSA - 1500V 60 Hz for one minute between all electrically isolated terminals. A-Series rocker circuit breakers comply with the 8mm spacing & 3750V dielectric requirements from hazardous voltage to operator accessible surfaces per EN 60950 and VDE 0805.
Resistance, Impedance .....	Values from Line to Load Terminal - based on Series Trip Circuit Breaker.

RESISTANCE, IMPEDANCE VALUES  
from Line to Load Terminals  
(Values Based on Series Trip Circuit Breaker)



CURRENT (AMPS)	TOLERANCE (%)
0.100 - 5.0	15%
5.1 - 20.0	25%
20.1 - 50.0	35%



## Agency Certifications



## Mechanical

Endurance.....	10,000 ON-OFF operations @ 6 per minute; with rated Current & Voltage.
Trip Free .....	All A-Series Circuit Breakers will trip on overload, even when the actuator is forcibly held in the ON position.
Trip Indication .....	The operating actuator moves positively to the OFF position when an overload causes the circuit breaker to trip. When mid-trip handle is specified, the handle moves to the mid position on electrical trip of the circuit breaker. When mid-trip handle with alarm switch is specified, the handle moves to the mid position & the alarm switch actuates when the circuit breaker is electrically tripped.

## Physical

Number of Poles .....	1 - 6 Poles (handle) and 1-3 poles (rocker) at 30 Amps or less. 1 and 2 poles at 31 Amps thru 50 Amps.
Internal Circuit Configurations .....	Series, (with or without auxiliary switch), Shunt and Relay with current or voltage trip coils, Dual Coil, Switch Only with or without auxiliary switch.
Weight .....	Approximately 65 grams/pole. (Approximately 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 & MIL-STD-202 as follows:

Shock .....	Withstands 100 Gs, 6ms, sawtooth while carrying rated current per Method 213, Test Condition "I". Instantaneous and 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; ten 24-hour cycles @ +25°C to +65°C, 80-98% RH. 56 days @ +85°C, 85% 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.....	-40° C to +85° C



## B-Series Circuit Breaker

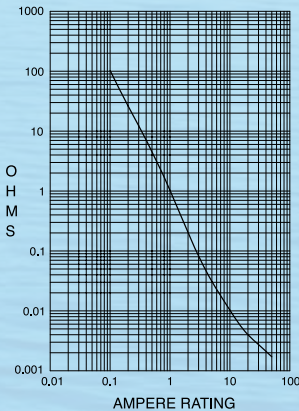
The image displays two perspectives of a compact, black plastic 2-pole circuit breaker. The front view shows a black handle with a yellow release button. A white label provides technical details: "2-POLE (BA2)", "60A", "10kV", "UL 489", "NEMA 3B", "CIRCUIT BREAKER", "TRIP UNIT", "1 POLE", "175°C", "100% RATED CURRENT", "100% RATED VOLTAGE", "100% RATED POWER". Dimensions are listed as ".610 [15.49]" for width, "1.660 [42.16]" for height, and "2.00 [50.80] TYP" for depth. Mounting holes are spaced at ".680". The side view shows the mounting bracket and terminal block. Technical specifications include "#6-32 [M3] THREAD X .195 [4.95] DEEP" and "2 PLCS PER POLE".



## Electrical

Maximum Voltage.....	277VAC 50/60 Hz, 80VDC
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, 35.0, 40.0, 50.0. Other ratings available - consult ordering scheme.
Standard Voltage Coils .....	DC-6V, 12V; AC-120V, Other ratings available, consult ordering scheme.
Auxiliary Switch Rating .....	SPDT; 10.1 A - 250VAC, 1.0 A-65VDC/0.5 A - 80 VDC, 0.1A - 125VAC (with gold contacts).
Insulation Resistance .....	Minimum: 100 Megohms at 500 VDC
Dielectric Strength .....	UL, CSA - 1500V 60 Hz for one minute between all electrically isolated terminals. A-Series rocker circuit breakers comply with the 8mm spacing & 3750V dielectric requirements from hazardous voltage to operator accessible surfaces per EN 60950 and VDE 0805.
Resistance, Impedance .....	Values from Line to Load Terminal - based on Series Trip Circuit Breaker.

RESISTANCE, IMPEDANCE VALUES  
from Line to Load Terminals  
(Values Based on Series Trip Circuit Breaker)



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

## Agency Certifications



## Mechanical

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

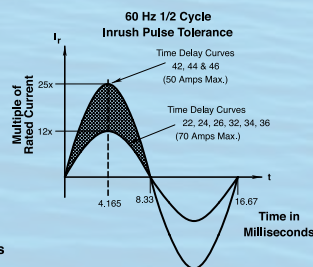
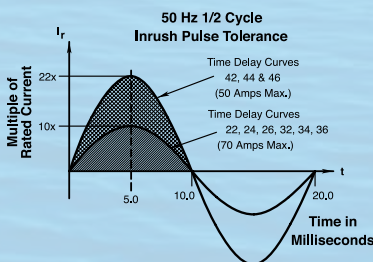
  

Number of Poles .....	1 - 6 poles at 30 Amps or less. 1 and 2 poles at 31 Amps thru 50 Amps.
Internal Circuit Config. ....	Series, (with or without auxiliary switch), Shunt and Relay with current or voltage trip coils, Dual Coil, Switch Only (with or without auxiliary switch).
Weight .....	Approximately 65 grams/pole. (Approximately 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:

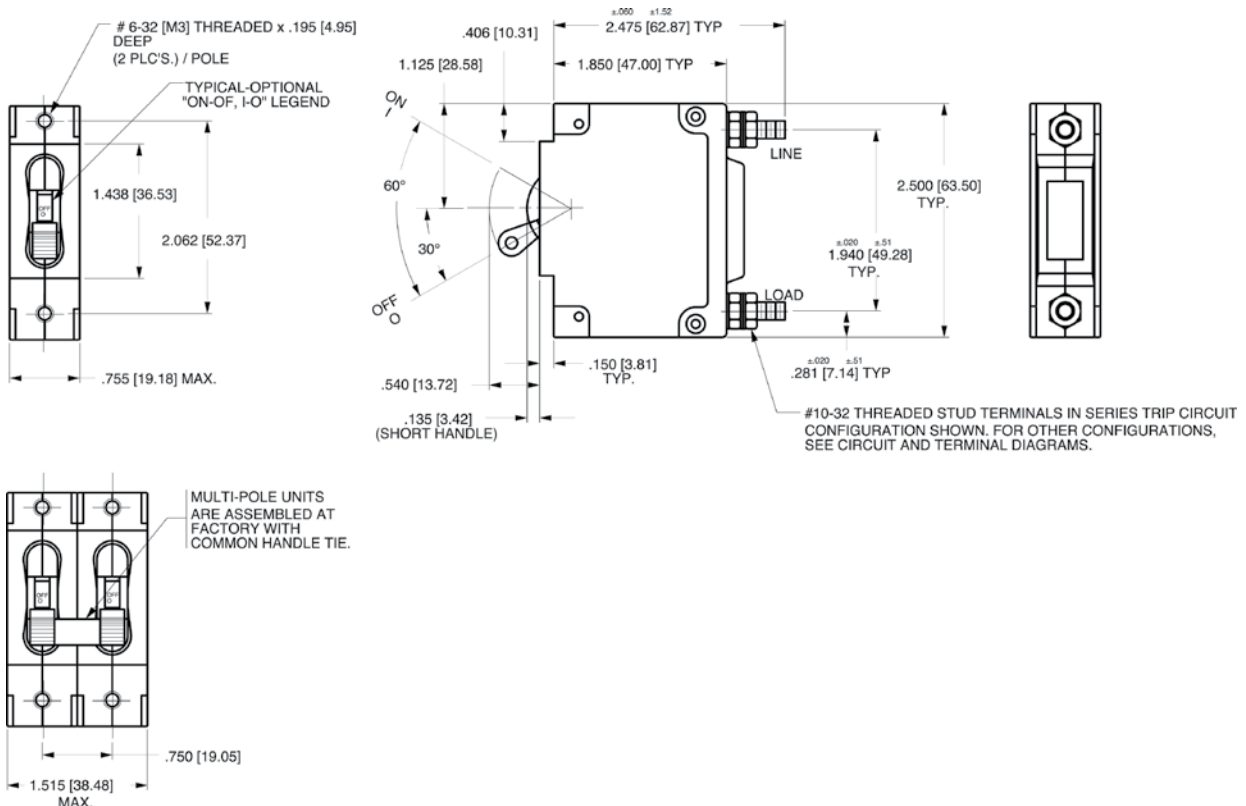
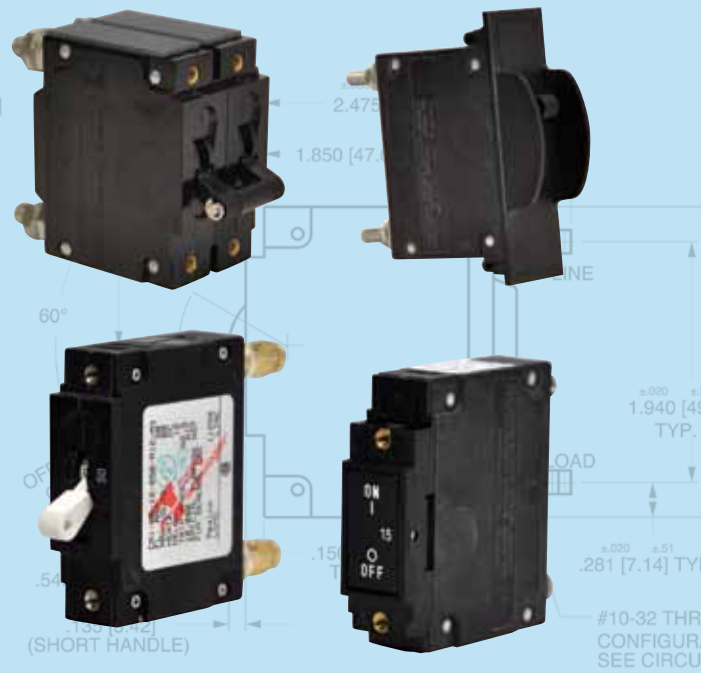
Shock .....	Withstands 100 Gs, 6ms, sawtooth while carrying rated current per Method 213, Test Condition "I". Instantaneous and ultra-short curves tested @ 90% of rated current.
Vibration .....	Withstands 0.060" excursion from 10- 55 Hz, and 10 Gs 55-500 Hz, at rated current per Method 204C, Test Condition 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.....	-40° C to +85° C



### C-Series Circuit Breaker

The C-Series circuit breaker was designed for applications that require higher amperage and voltage handling capabilities in a compact design. It is available with American Standard or Metric Threaded Stud terminals, or Saddle Clamp screw terminals. Additional options include mid-trip handle style actuator, solid color rocker actuators and visi-rocker two color actuators. The visi-rocker option can be specified to indicate either the ON or TRIPPED/OFF mode while the optional rocker guard and push-to-reset bezel can help prevent inadvertent actuation.

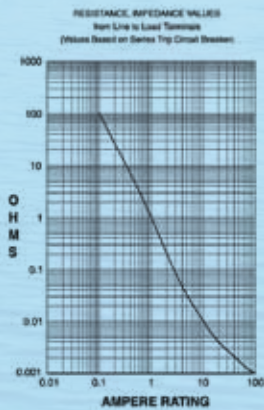
The C-Series UL489 breakers employ a unique arc chute design which results in obtaining higher interrupting capacities, up to 50,000 amps. Thermoset glass filled polyester half shell construction increases mechanical & electrical strength and the Wiping Contacts – Mechanical linkage with two-step actuation cleans contacts, provides high, positive contact pressure & longer contact life; It can be configured as 1-6 poles, 0.02 - 100 amps, up to 480 VAC or 80 VDC, UL489 up to 240 VAC or 125 VDC, with choice of time delays and actuator colors.





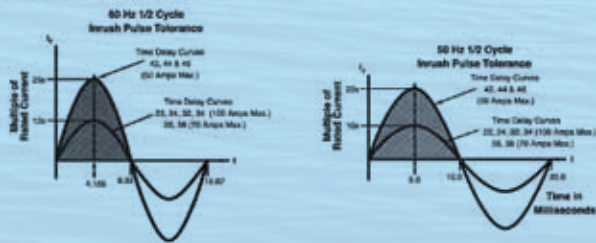
## Electrical

Maximum Voltage.....	277VAC 50/60 Hz, 80VDC
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, 35.0, 40.0, 50.0. Other ratings available - consult ordering scheme.
Standard Voltage Coils .....	DC-6V, 12V; AC-120V, Other ratings available, consult ordering scheme.
Auxiliary Switch Rating .....	SPDT; 10.1 A - 250VAC, 1.0 A- 65VDC/0.5 A - 80 VDC, 0.1A - 125VAC (with gold contacts).
Insulation Resistance .....	Minimum: 100 Megohms at 500 VDC
Dielectric Strength .....	UL, CSA - 1500V 60 Hz for one minute between all electrically isolated terminals. A-Series rocker circuit breakers comply with the 8mm spacing & 3750V dielectric requirements from hazardous voltage to operator accessible surfaces per EN 60950 and VDE 0805.
Resistance, Impedance .....	Values from Line to Load Terminal - based on Series Trip Circuit Breaker.



CURRENT (AMPS)	TOLERANCE (%)
0.10 - 5.0	15%
5.1 - 20.0	25%
20.1 - 100.0	35%

### Pulse Tolerance Curves



## Agency Certifications



## Mechanical

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

## Physical

Number of Poles .....	1 - 6 poles at 30 Amps or less. 1 and 2 poles at 31 Amps thru 50 Amps.
Internal Circuit Config. ....	Series, (with or without auxiliary switch), Shunt and Relay with current or voltage trip coils, Dual Coil, Switch Only (with or without auxiliary switch).
Weight .....	Approximately 65 grams/pole. (Approximately 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:

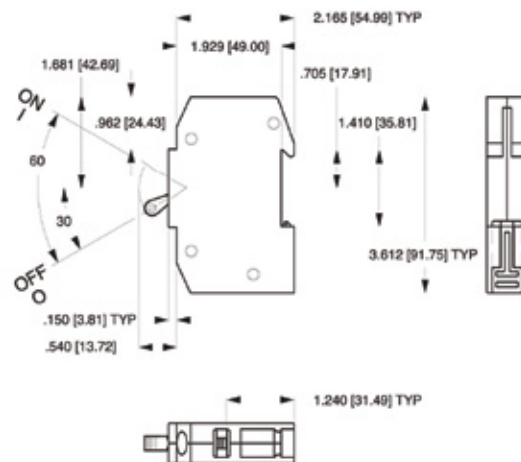
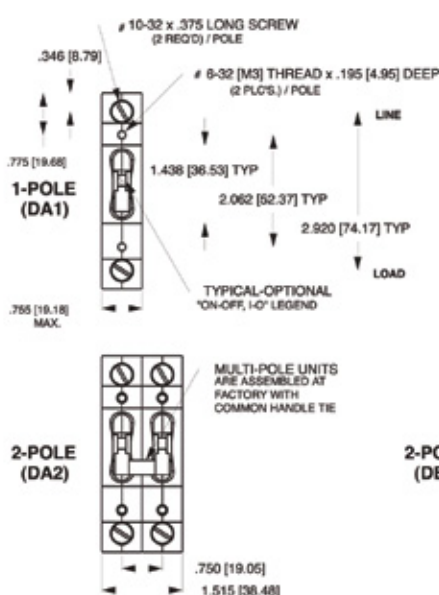
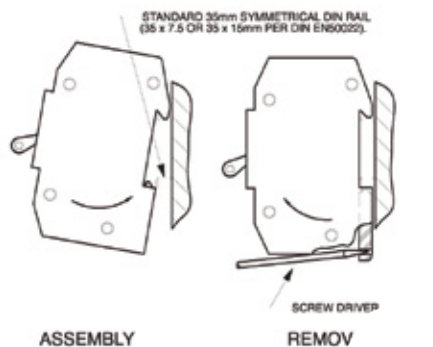
Shock .....	Withstands 100 Gs, 6ms, sawtooth while carrying rated current per Method 213, Test Condition "I". Instantaneous and ultra-short curves tested @ 90% of rated current.
Vibration .....	Withstands 0.060" excursion from 10-55 Hz, and 10 Gs 55-500 Hz, at rated current per Method 204C, Test Condition A. Instantaneous and ultrashort curves tested at 9 0% 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.....	-40° C to +85° C

### D-Series Circuit Breaker

Designed for snap-on-back panel rail mounting on either a 35mm x 7.5mm, or a 35mm x 15mm Symmetrical Din Rail, allowing rapid and simple mounting and removal of the breaker. It features recessed, wire-ready, touch-proof, shock-resistant terminals, suitable for automatic screwdriver assembly, as well as "Dead Front" construction characteristics.

Available with a Visi-Rocker two-color actuator, which can be specified to indicate either the ON or the TRIPPED/OFF mode, or solid color rocker or handle type actuators. All actuator types fit in the same industry standard panel cutouts.

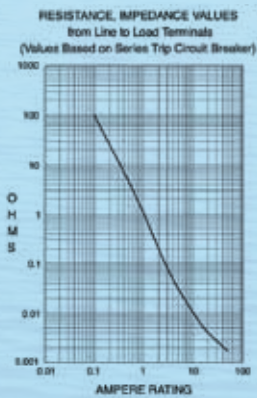
The D-Series can be configured as 1 - 4 poles (Handle), 1 - 3 poles (Rocker), with a choice of time delays and with ratings of 0.02 - 50 amps and up to 480 VAC or 65 VDC.





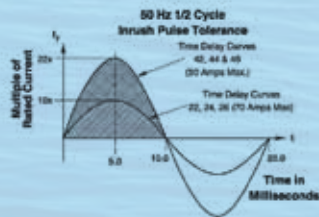
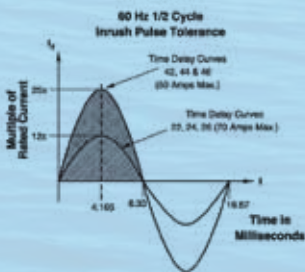
## Electrical

Maximum Voltage .....	AC, 480 wye/277 VAC (See Table A), 50/60 Hz, 65VDC
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, 35.0, 40.0 & 50.0. Other ratings available - consult factory.
Standard Voltage Coils .....	DC - 6V, 12V; AC - 120V, other ratings available, see ordering scheme.
Insulation Resistance .....	Minimum of 100 Megohms at 500 VDC.
Dielectric Strength .....	UL, CSA: 1960 V 50/60 Hz for one minute between all electrically isolated terminals. D-Series circuit breakers comply with the 8mm spacing and 3750V 50/60 Hz dielectric requirements from hazardous voltage to operator accessible surfaces and between adjacent poles per Publications EN 60950 and VDE 0805.
Resistance, Impedance .....	Values from Line to Load Terminal - based on Series Trip Circuit Breaker



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

## Pulse Tolerance Curves



## Agency Certifications



## Mechanical

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

## Physical

Number of Poles .....	Rocker Type: 1-3; Handle Type: 1-4
Internal Circuit Config. ....	Switch Only and Series Trip with current or voltage trip coils.
Weight .....	Approximately 128 grams/pole (Approximately 4.57 ounces/pole)
Standard Colors .....	Housing - Black; Actuator - See Ordering Scheme.
Mounting .....	Mounts on a standard 35mm Symmetrical DIN Rail (35 x 7.5 or 35 x 15mm per DIN EN5002).

## Environmental

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

Shock .....	Withstands 100 Gs, 6ms, sawtooth while carrying rated current per Method 213, Test Condition "I". Instantaneous and 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 ultra-short 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 .....	-40° C to +85° C



### E-Series Circuit Breaker

Ideally suited for higher amperage applications, the E-Series is available with front and back mounting, screw terminals, stud terminals and heavy duty box wire connectors for solid wire or a pressure plate connector for stranded wire. Consult factory for an optional power selector device.

The E-Series is UL Listed and CSA Certified for Branch Circuit protection which does not require a fuse backup. It is also UL Recognized and CSA Certified as a Supplementary Protector and as a Manual Motor Controller.

The E-Series can be configured as 1-6 poles, .1 - 100 amps, up to 600 VAC or 125 VDC, with choice of time delays and actuator colors.

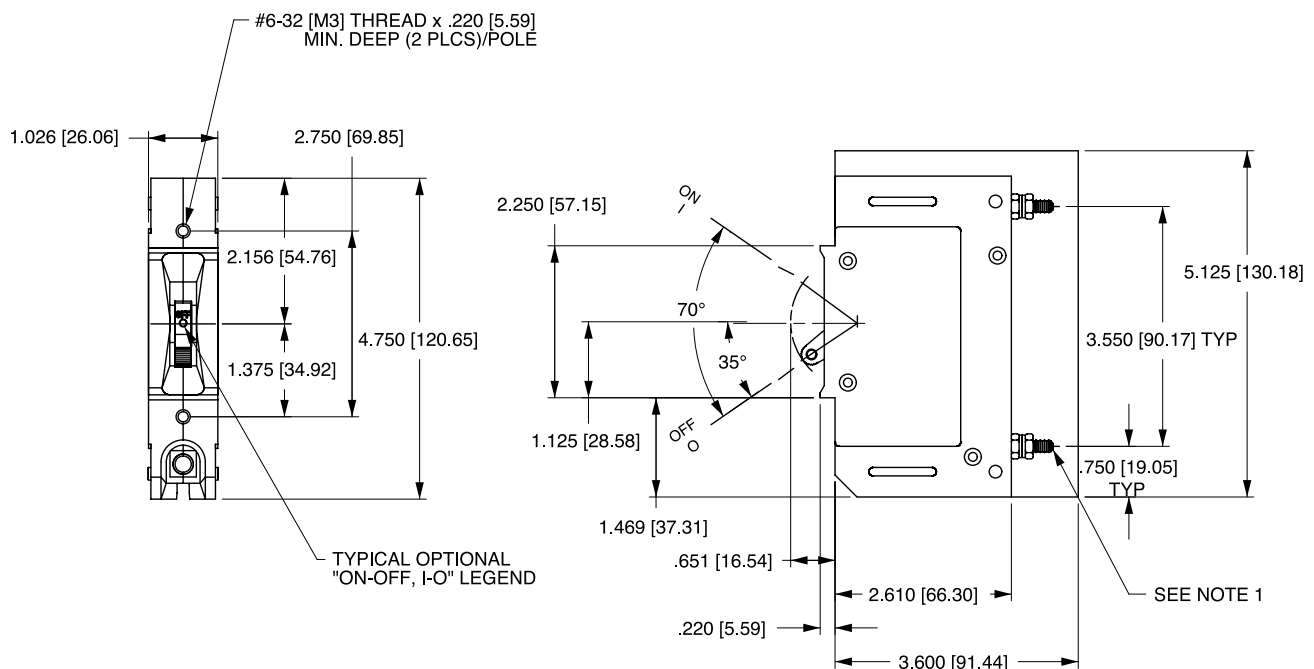


#### ELECTRICAL

**Table A:**

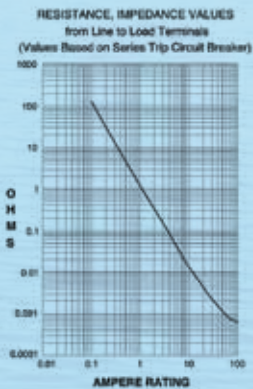
Lists UL Listed (489) & CSA Certified (C22.2 No.5) configurations & performance capabilities as a Molded Case Circuit Breaker.

E-SERIES TABLE A : UL489 LISTED BRANCH CIRCUIT BREAKERS					
CIRCUIT CONFIGURATION	VOLTAGE			CURRENT RATING	INTERRUPTING CAPACITY (AMPS)
	MAX. RATING	FREQUENCY	PHASE	FULL LOAD AMPS	WITHOUT BACKUP FUSE
SERIES	80	DC	---	0.10 - 125	50,000
	125	DC	---	0.10 - 125	10,000
	120	50 / 60	1	0.10 - 125	10,000
	120 / 240	50 / 60	1	0.10 - 125	10,000
	240	50 / 60	1 & 3	0.10 - 100	5,000



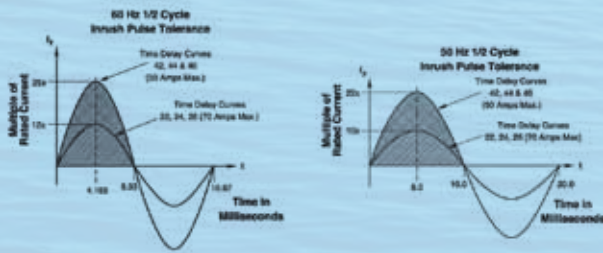
## Electrical

Maximum Voltage.....	600VAC 50/60 Hz, 125VDC (See Table A)
Current Ratings .....	Standard current coils: 0.100, 0.250, 0.500, 1.00, 2.50, 5.00, 7.50, 10.0, 15.0, 20.0, 25.0, 30.0, 50.0, 60.0, 70.0 & 100 Amp.
Auxiliary Switch Rating.....	SPDT; 10.1A 250VAC, 1.0A 65VDC; 0.5A 80VDC, 0.1A 125VAC (with gold contacts).
Insulation Resistance .....	Minimum of 100 Megohms at 500 VDC.
Dielectric Strength.....	UL, CSA: 2200 V 50/60 Hz for one minute between all electrically isolated terminals. E-Series Circuit Breakers comply with the 8mm spacing and 3750V 50/60 Hz dielectric requirements from hazardous voltage to operator accessible surfaces, between adjacent poles and from main circuits to auxiliary circuits per Publications EN 60950 and VDE 0805.
Resistance, Impedance .....	Values from Line to Load Terminal - based on Series Trip Circuit Breaker.



CURRENT (AMPS)	TOLERANCE (%)
0.10 - 5.0	± 15%
5.1 - 20.0	± 25%
20.1 - 125.0	± 35%

## Pulse Tolerance Curves



## Agency Certifications



## Mechanical

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

## Physical

Number of Poles .....	1 - 6
Mounting .....	A 3" minimum spacing must be provided between the circuit breaker arc venting area on back connected E-Series circuit breakers and grounded obstructions. E-Series circuit breakers must be mounted on a vertical surface.
Connectors, Box Type .....	Front connected E-Series circuit breakers are supplied with box type pressure connectors that accept copper or aluminum conductors as follows: 1/0-14 Copper, 1/0-12 Aluminum.
Internal Circuit Configuration.....	Series and Switch Only, (with or without auxiliary switch). Shunt with current coils.
Weight .....	Approximately 252 grams/pole (Approximately 9 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".
Vibration .....	Withstands 0.060" excursion from 10-55 Hz, and 10 Gs 55-500 Hz, at rated current per Method 204C, Test Condition A.
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 .....	-40° C to +85° C



## CMB-Series Thermal Circuit Breaker

**Rating:**  
3 to 20A, 125-250VAC, 32VDC

**Approvals:**  
UL, CUL, CSA, TUV, CE  
UL1500/ISO8846 for ignition  
protection/marine

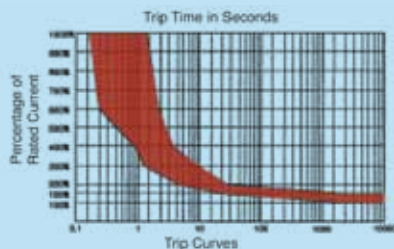
**Dielectric Strength:**  
2500 VAC/ 1 minute

**Interrupting capacity:**  
2500 amps

**Insulation Resistance:**  
100M ohms

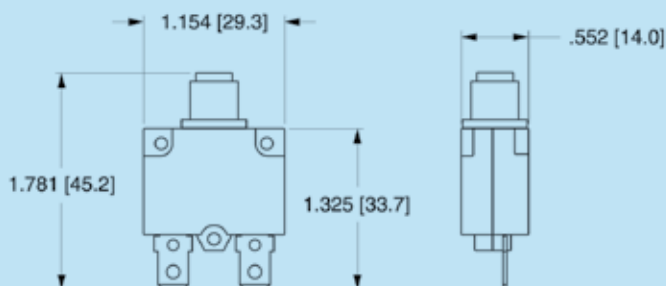
**Operating Temperature:**  
-10°C to 60°C

**Voltage drop:**  
< 0.25 V



CORRECTION FACTOR*	
0°C	x .67
10°C	x .72
15°C	x .83
18°C	x .87
25°C	x 1.00
32°C	x 1.05
40°C	x 1.18
50°C	x 1.33
60°C	x 1.67

OVERLOAD	TRIP TIME
100%	NO TRIP
150%	TRIP IN 1 HR.
200%	4 - 40 SEC.
300%	1.2 - 12 SEC.
400%	0.5 - 5.5 SEC.
500%	0.4 - 3.5 SEC.
600%	0.3 - 2.5 SEC.



## CLB-Series Thermal Circuit Breaker

**Rating:**  
3 to 60A, 125-250VAC, 32VDC

**Approvals:**  
UL, CUL, CSA, TUV, CE  
UL1500/ISO8846 for ignition  
protection/marine

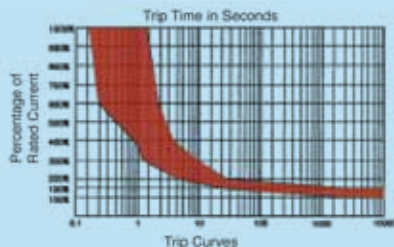
**Dielectric Strength:**  
2500 VAC/ 1 minute

**Interrupting capacity:**  
2500 amps

**Insulation Resistance:**  
100M ohms

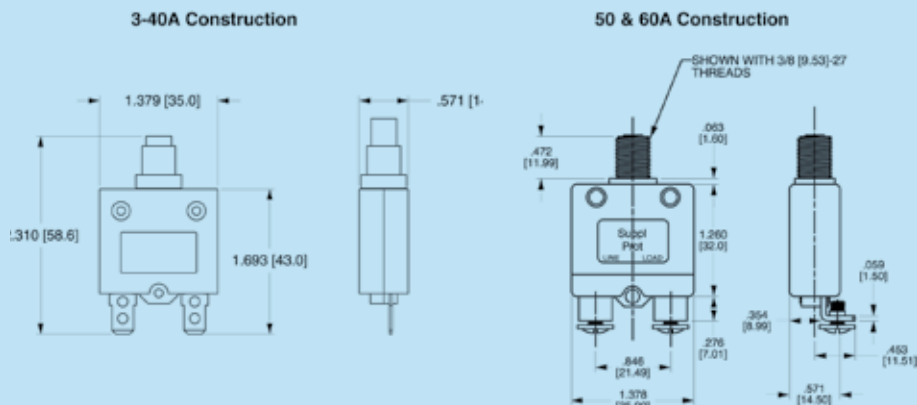
**Operating Temperature:**  
-10°C to 60°C

**Voltage drop:**  
< 0.25 V



CORRECTION FACTOR*	
0°C	x .67
10°C	x .72
15°C	x .83
18°C	x .87
25°C	x 1.00
32°C	x 1.05
40°C	x 1.18
50°C	x 1.33
60°C	x 1.67

OVERLOAD	TRIP TIME
100%	NO TRIP
150%	TRIP IN 1 HR.
200%	5 - 35 SEC.
300%	1.5 - 9 SEC.
400%	0.9 - 5.5 SEC.
500%	0.5 - 3.5 SEC.
600%	0.3 - 2.8 SEC.





## PB-Series ELCI/GFCI

The PB-Series, an AC Residual Current Circuit Breaker with Overcurrent Protection (RCBO), combines the ground fault protection of an ELCI with the familiar overcurrent tripping characteristics of a normal circuit breaker. The PB-Series increases safety around boats and marinas by detecting lower level ground faults, which do not trip ordinary circuit breakers, but can lead to fires and shock hazards. A specially designed panel seal that provides maximum environmental protection is also available.



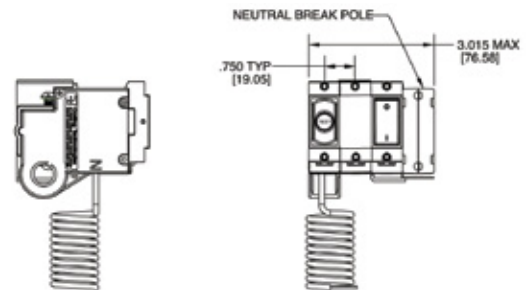
PB-SERIES SHOWN WITH SEAL

### ELECTRICAL

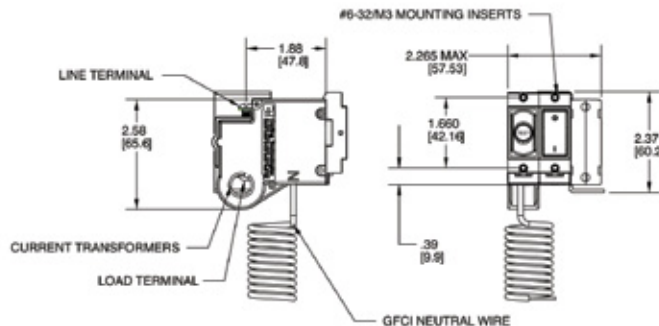
**Table A:**

UL Listed configurations and performance capabilities as Circuit Breakers

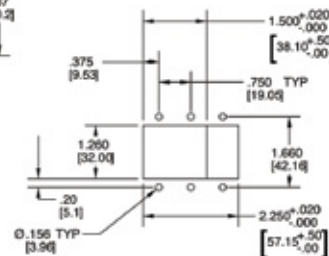
PB-SERIES TABLE A					
CIRCUIT CONFIGURATION	VOLTAGE			CURRENT RATING (AMPS)	INTERRUPTING CAPACITY (AMPS)
	MAX RATING VOLTS	FREQUENCY HERTZ	PHASE		
SERIES	120/240	60	1	10-30	5000



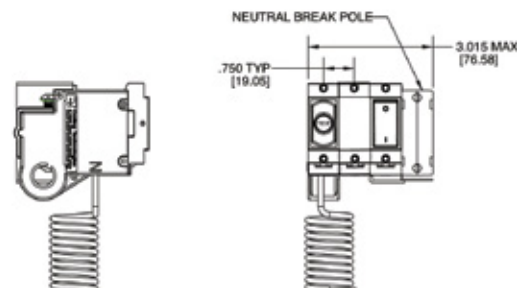
2-POLE 120/240 VAC WITH NEUTRAL BREAK



2-POLE 120/240 VAC VERSION



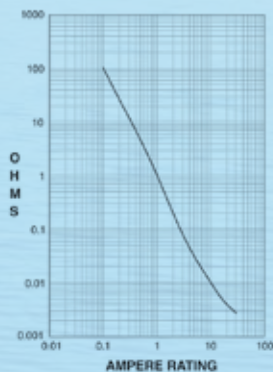
PANEL CUTOUT



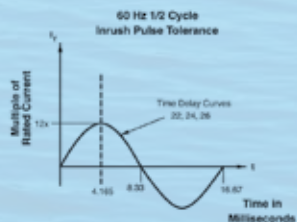
2-POLE 120/240 VAC WITH NEUTRAL BREAK

## 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.



CURRENT (AMPS)	TOLERANCE (%)
0.10 - 5.0	15%
5.1 - 20.0	25%
20.1 - 30.0	35%



## Agency Certifications



## 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. (Approximately 2.32 ounces/pole.)
Standard Colors .....	Housing- Black; Actuator - See ordering details online or on full ELCI/GFCI catalog.

## 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 H <sub>2</sub> S, 20ppb Cl <sub>2</sub> , 200ppb NO <sub>2</sub>

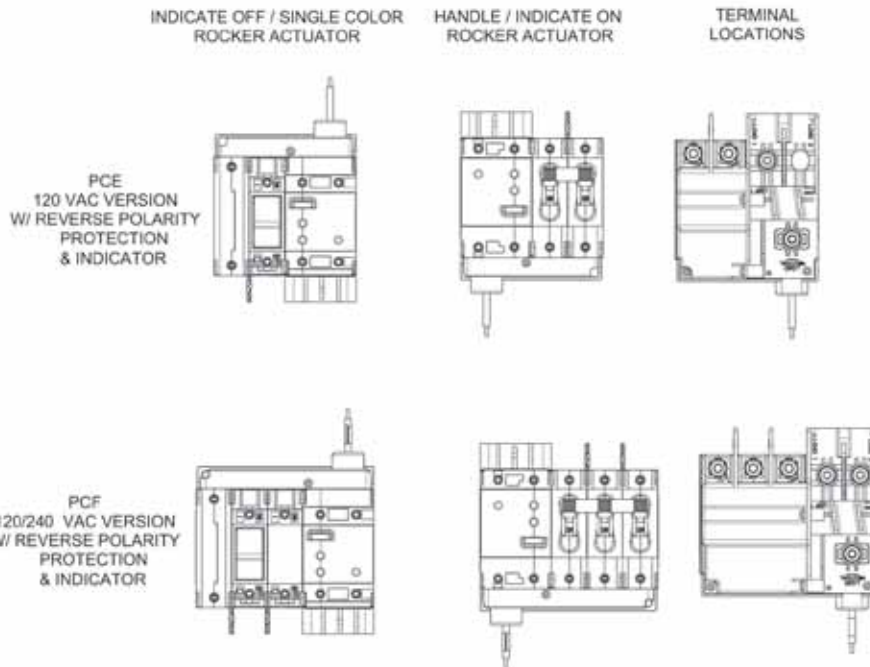
## Leakage To Ground

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 3 .....	00 ms Max. @ 100%, 40ms Max. @ 500% of must trip leakage current.
Test Button .....	On unit face along side of actuator.

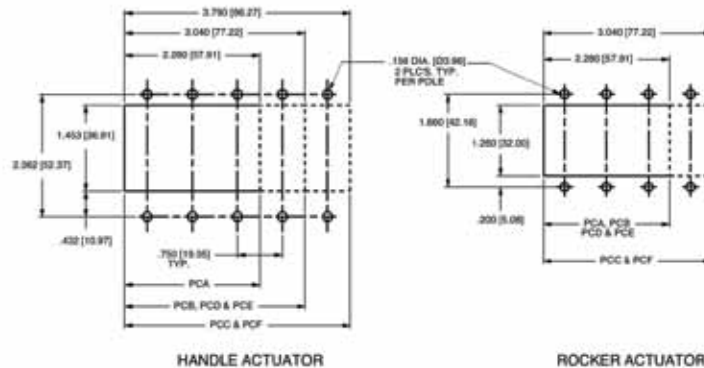


## PC-Series ELCI/GFCI

The PC-Series ELCI combines all safety characteristics of the PB-Series in a user friendly package featuring two integrated LED indicators, which distinguish if a breaker is closed with line voltage present, or has opened due to leakage current, or has opened due to over current, or is closed with no line voltage present. The optional hot/neutral reversal detection and protection safeguards against incorrect circuit wiring. A specially designed panel seal that provides maximum environmental protection is also available.



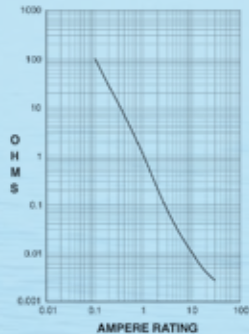
NOTE: NEUTRAL & GROUND PIGTAIL WIRES - SUPPLIED 12" LONG MIN. (CIRCUIT CODES A,B,E & F)



## Electrical

Current Rating .....	1 - 50 Amps maximum
Voltage Rating .....	120VAC, 120/240VAC
Leakage Current Trip Level .....	30mA & 6mA
Leakage Current Trip Time .....	For 30mA leakage trip: $\leq 22.2\text{ms}$ , shall not trip 30mA, shall trip within .10 seconds The above complies with UL-1053 & ABYC E11. For 6mA leakage trip: $\leq 25\text{ms}$ The above complies with UL-943.
Operating Frequency .....	50/60 Hz for 30mA leakage trip 60 Hz for 6mA leakage trip
Interrupt Capacity .....	5,000 Amps
Impedence .....	

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
	<ul style="list-style-type: none"> <li>• <b>Green LED On, Red LED Off</b> Line Voltage is present, the breaker is closed, and the device is protecting the circuits against over current and leakage current.</li> <li>• <b>Green LED Off, Red LED On</b> The device has detected leakage current and has opened the circuit breaker.</li> <li>• <b>Green LED Flashing, Red LED Off</b> The circuit breaker has opened due to over current or has been turned off manually</li> <li>• <b>Green LED Off, Red LED Off</b> Line Voltage is not present</li> <li>• <b>Green LED Flashing, Red LED Off, Amber LED ON</b> Indicates Hot &amp; Neutral are reversed and the circuit breaker is open</li> </ul>
Grounded Neutral Protection .....	When neutral is grounded on load side of circuit
Test Button .....	Located on Ground Fault Module

## Agency Certifications



## Mechanical

Endurance .....	10,000 ON-OFF operations @ 6 per minute; with rated Current and 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. 3-pole 120/240V with Neutral Break (Sensor module has 2 pole width)
Termination .....	Circuit Breaker Line Side: #10-32, threaded stud. 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, at rated current per Method 204C, Test Condition A. Instantaneous and ultrashort curves tested at 90% of rated current.
Moisture Resistance/ Humidity .....	93% RH at 30°C for 168 Hours.
Corrosion .....	UL-943-6.21, 3 weeks Humidity: 30 $\pm$ 2°C, 70 $\pm$ 2% relative humidity Mixed Flowing Gases: 100 ppb H2S 20 ppb Cl2 200 $\pm$ 50 ppb NO2
Operating Temperature .....	-35°C to +66°C





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