

CIRCUIT BREAKERS

What are Circuit Protection Devices and how do they work?

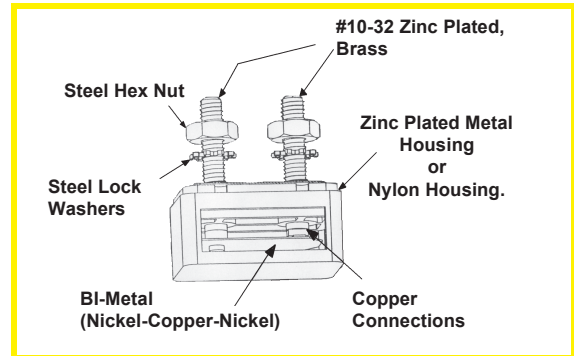
Circuit Protection Devices are manufactured for use in multiple power strips, boats, recreational vehicles, battery charges, welding equipment, portable generators, agricultural equipment, trucks, passenger and school buses and off-road construction equipment.

GENERAL OPERATING PRINCIPLES

Circuit Protectors are single pole thermal type devices. Basic construction consists of two terminals, one terminal with a composite alloy reed to which a precious metal contact has been attached, and the second terminal with a precious metal contact. When a circuit protector is assembled and in the operational mode, the precious metal contacts rest against each other. Current flow is from one terminal through the composite alloy reed to the contacts and out the second terminal. In general, the size, material composition and the way the reed is processed during manufacturing, coupled with the type of contacts and terminals, determines the current rating of the device. Under normal conditions, circuit protectors are designed to handle 100% of rated current on a continuous basis. When the current rating is exceeded heat will be generated and the composite alloy reed will bend up, separating the contacts. The speed at which this process occurs is dependent on two main variables, the amount of current in excess of rating and temperature. The method in which the breaker is reset depends on the types of breakers used.

Automatic Reset

Type 1 will cycle continuously during an over-current condition. The composite alloy material will bend and separate the contacts when an over current situation occurs and return to the run mode as it cools. This process will continue until the source of the over-current is removed or corrected.



Modified Reset

Type 2 Unlike the auto reset design, Type 2 has an additional resistive component built into it which raises the ambient temperature within the circuit protector. This limits the number of cycles (less than 10) by not allowing the composite alloy to cool and reset the circuit. The circuit will remain open with less than 1.0 amp current flow as long as the voltage is applied.

Manual Reset

Type 3 circuit protector introduces a non-current carrying object between the contacts when they open. To reset the contacts, an external button or lever must be activated to return to normal operation.

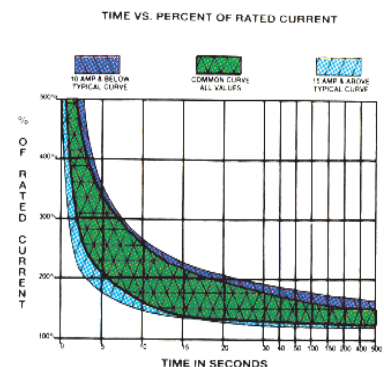
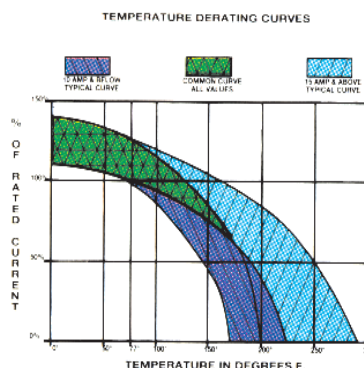
Sizing A Circuit Protector

Temperature and percent of rated current will affect the performance characteristics of a thermal circuit breaker. These parameters should be taken into consideration when specifying which size and type device is needed for your application. All Pollak circuit protectors are designed to run continuously at 100% of rated current at 77°F. However, as a general rule you should size your breaker so that your continuous current is 75-80% of the rated current of your circuit protector. For example, if your application runs at a continuous 8 amps, you should choose a 10 amp breaker.

Another major factor to consider is the affect that temperature has on the rating of the circuit protector. As with all thermal devices, as temperatures change the continuous current rating of the circuit protector changes. As stated earlier, all Pollak circuit protectors are designed to run continuously at 100% or rated current at 77°F. The bottom chart shows the effect temperature has on the rated current for circuit protectors.

Notes: Circuit Breakers vs fuses

	Circuit Breaker	Fuse
Resettable Cycles	Yes	No
Adjustable Ambient Compensation	Yes	No
Locate Anywhere (even under hood)	Yes	No
Permanent Mounting Capability	Yes	No



Typical Circuit Breaker Applications

Accessory Circuit, Cooling Fan, Door Locks, Headlamps, Tail Lamps, Window Lift, Sunroof, Trailing Package

CIRCUIT BREAKERS - TYPE I Cycling - Automatic Reset

Single Pole Thermal Type Breakers

Rating From: 5A to 50A; 12VDC.

Operating Temperature: -10°F (-23°C) to 150°F (65°C).

Storage Temperature: -20°F (-29°C) to 200°F (93°C).

Applications: Battery charges, trucks, buses, RV's, trolling motors, etc.

Approvals: Complies with SAE Standard J553.

Ampere Rating	Plastic Base 12 VDC	Metal Base 12 VDC
10	54-110PL	*
15	*	54-115
20	54-120PL	54-120
25	54-125PL	54-125
30	54-130PL	54-130
35	54-135PL	*
40	*	54-140
50	54-150PL	54-150
* Currently not available No Mounting Bracket		

Ampere Rating	Plastic Base 12 VDC	Metal Base 12 VDC
15	54-215PL	54-215
20	54-220PL	54-220
25	*	54-225
30	54-230PL	54-230
30	54-831PL (Plastic 24 VDC)	
40	54-240PL	54-240
50	54-250PL	54-250
* Currently not available 90° Mounting Bracket		

Ampere Rating	Plastic Base 12 VDC	Metal Base 12 VDC
10	54-510PL	*
15	54-515PL	54-515
20	54-520PL	54-520
25	*	54-525
30	54-530PL	54-530
40	54-540PL	54-540
50	54-550PL	54-550
* Currently not available Straight Mounting Bracket		

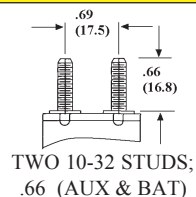
NOTES: PLASTIC VS METAL

- **VIBRATION**...Plastic housings with mounting brackets are one piece molded and are less prone to vibration. Metal housings with brackets are two piece designs. The bracket is attached by spot welding and can be loosened by vibration.
- **SHORTING OUT**...If a wire should loosen from a terminal on a plastic housing version, it will not short out against the housing as it may do with a metal housing.
- **WEIGHT**...The plastic housing is also lighter than the metal housing.

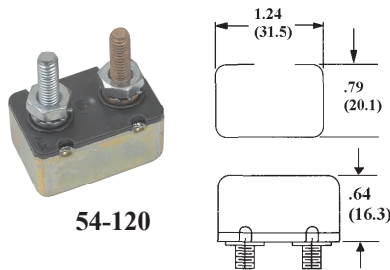
NOTES: 24V VS 12V CIRCUIT BREAKERS

- A 24V Circuit Breaker may be used in a 12V application because of the thermal metals used in assembly. However a 12V Circuit Breaker is not recommended for 24V since the materials are Heat affected...not current affected.

Terminal Options – Battery Terminal has yellow dichromate plating
Aux Terminal = Zinc Plating

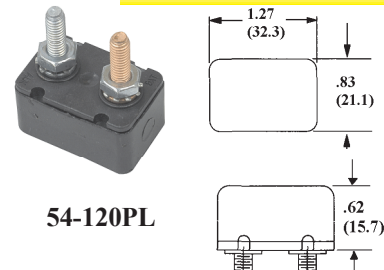


METAL COVER

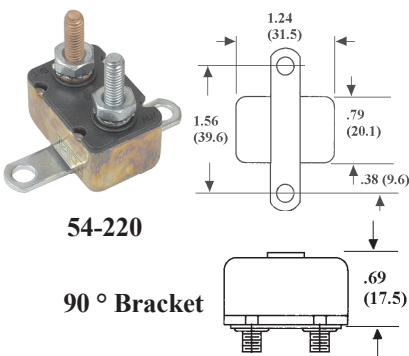


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PLASTIC COVER

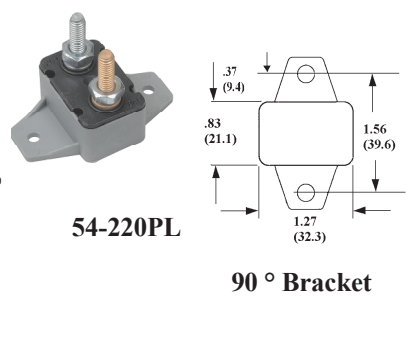


54-120PL



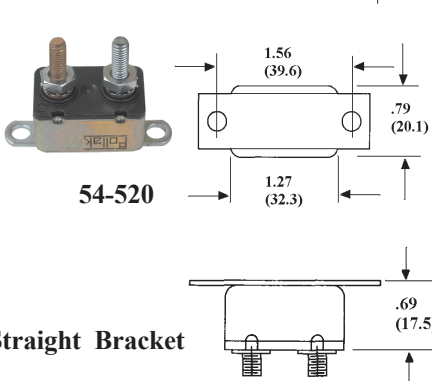
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90° Bracket



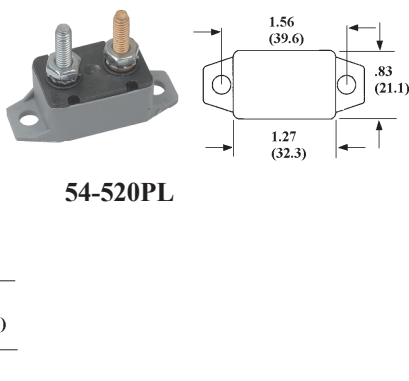
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90° Bracket



54-520

Straight Bracket



54-520PL