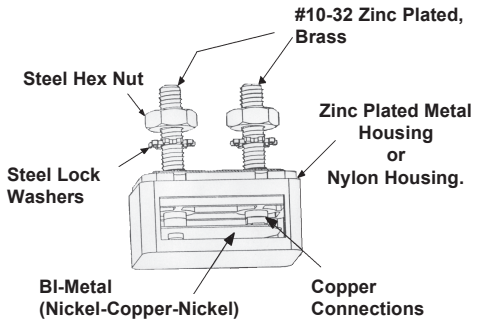
CIRCUIT BREAKERS



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.

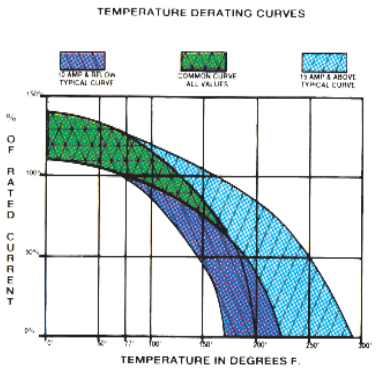
Sizing A Circuit Protector

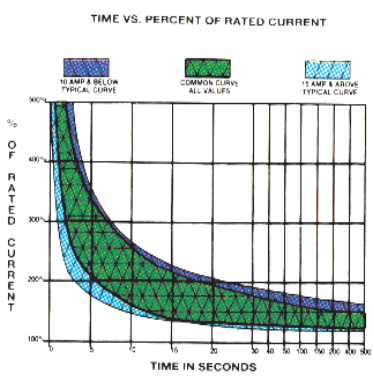
Temperature and percent of rated current will affect the performance characteristics of a thermal circuit breaker. These parameters should be taken into consideration when specifying which size and type device is needed for your application. All Pollak circuit protectors are designed to run continuously 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

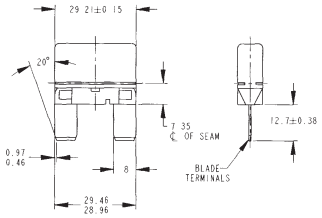




CIRCUIT BREAKERS - TYPE II

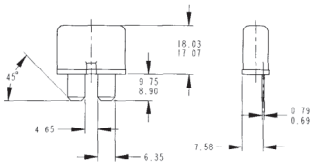
Maxi-Style Plug-In
OEM style replacement circuit breaker for Ford, Paccar, & Freightliner Body= (29.mm) L x (8.90mm) W x (21.6mm) H Blades= (12.7mm) L

54-950

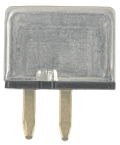


ATO Style Plug-In
OEM style replacement circuit breaker for Ford Class 8 Vehicles Body= (29.mm) L x (8.90mm) W x (21.6mm) H Blades= (12.7mm) L

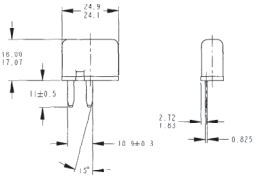
54-953



Mini-Style Plug-In
OEM style replacement circuit breaker for Freightliner and Paccar Class 8 Vehicles Body= .98" (24.90mm) L x .40“ (9.50mm) W x .70 (18.0mm) H Blades- .50" (11.00mm) L x 11" (2.90mm) W



54-957



MAXI STYLE METAL: TYPE II-Non-Cycling-Blade Terminals

Ampere Rating	Blade Terminals	Style
20	54-950	Generic
30	54-951	Generic

ATO STYLE METAL: TYPE II-Non-Cycling-Blade Terminals

Ampere Rating	Blade Terminals	Style
10	54-953	Ford HD 8
15	54-954	Ford HD 8
20	54-955	Ford HD 8
30	54-956	Ford HD 8

MINI BLADE METAL: TYPE II - Mon-Cycling-Blade Terminals

Ampere Rating	Blade Terminals	Style
10	54-597	Freightliner HD 8
15	54-958	Freightliner HD 8
20	54-959	Paccar HD 8
30	54-960	Paccar HD 8

CIRCUIT BREAKERS - TYPE III

Push Button - Manual Reset

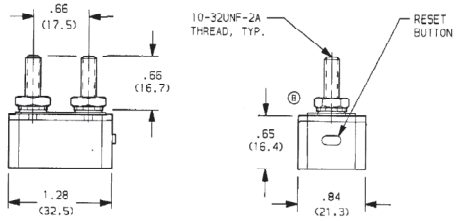
Breaker remains open on overload and has to be manually reset with the push of the button.

Single Pole Thermal Type Breakers
Rating From: 5A to 50A; 12VDC.
Operating Temperature: -10°F (-23°C) to 150°F (65°C).
Storage Temperature: -20CF (-29°C) to 200°F (93°C).
Applications: Battery charges, trucks, buses, RV's, trolling motors, etc.
Approvals: Complies with SAE Standard J553.

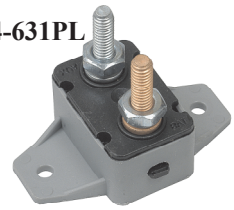
Ampere Rating	Plastic	Plastic w/ 90° Bracket	Maxi-Style
10	*	*	54-311PL
15	*	54-616PL	*
20	*	*	54-321PL
25	*	*	*
30	54-630PL	54-631PL	54-331PL
40	54-640PL	54-641PL	*
50	54-650PL	54-651PL	*

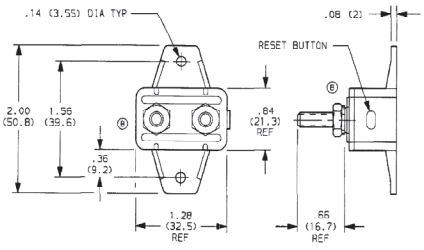
Note: Maxi-Style Breakers plug into Pollak Blade Type Fuse Panels. (See page 48)

54-630PL



54-631PL





54-311PL