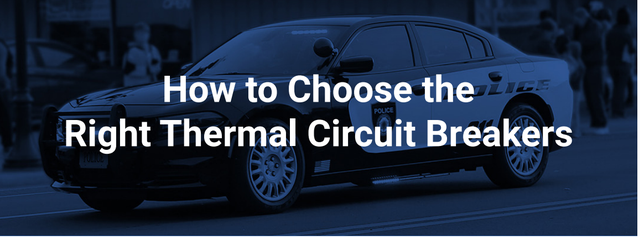

How to Choose the Right Thermal Circuit Breakers

When selecting circuit protection devices for trucks, off-road equipment and other mobile equipment, it's important to have a complete understanding of the system to be protected. Don't rush or minimize the process when planning your circuit protection.

The Heat Factor

In high-amp vehicle applications (typically ranging from 50-200 amps) ambient heat can contribute to nuisance tripping of circuit breakers, especially with under-the-hood applications. For example, a 100-amp rated circuit breaker might trip at 80 amps due to ambient heat. Thus, it's important to build the heat factor into your specifications. Using a slightly higher-amp circuit breaker than the minimum required can offset the likelihood of nuisance tripping and reduce wear on the breaker.

7 Easy Steps

Mechanical Products, a leading manufacturer of thermal circuit protection devices, recommends an easy seven-step process for selecting high-amp thermal overcurrent protection. Here are some highlights.

1. Determine which devices, components and circuits need to be protected and why. Keep the dynamics of circuit protection in mind. To avoid nuisance trips from start-up inrush and harmless power surges, include a margin of tolerance between the steady state current of the circuit and the rating of the protector. In general, the recommended margin for fuses is 25%; for circuit protectors, 15-20%.

2. Understand how potentially damaging overcurrents and natural inrush currents and surges can develop in your devices. Systems typically spike when you turn on the ignition, for example. Today's vehicle chassis are built to ensure safe current flow between the alternator, ignition, and battery, but variables can be introduced when you start adding additional circuits.

3. Determine where a circuit breaker should be placed. Depending on placement, you will need to consider the type and size of automotive wire or cable, the electrical connector, and ambient temperatures. Will the circuit be under the hood where temperatures are high, or somewhere else on the vehicle? Also consider surface and panel mounting options. Surface mounted breakers are convenient when adding additional circuits, but typically leave more exposed wires. Panel mounting is often subject to space limitations but enables wiring to be tucked away and out of sight. Series 17 Circuit Breakers from Mechanical Products come in panel-mountable options such as the ones shown below.

4. Calculate the magnitude and duration of the potential fault currents of the circuity and components you've identified. Determine maximum voltage requirements of the protective devices you will use.

Also consider what kind of environmental elements the circuit protection device will be exposed to. If your circuit protection device is going to be subject to harsh environmental elements, you might want to consider weather-proof or marine rated components.

5. List the supplementary requirements for the protective device. What will it be connected to? Possible items include an auxiliary switch for an alarm circuit, power distribution devices, or a battery separator or isolator. Also factor in environmental considerations, electrical trip time, relay trip time, and color identification if needed.

6. Determine the regulatory requirements. Depending on your application, you might be required to use circuit protection devices that are SAE rated or UL rated.

7. Choose a circuit protection device that meets all the requirements of your application.

The Importance of Documentation

No matter which brand of circuit protection you choose, make sure the manufacturer provides supporting documents and testing data so that you can be confident in the quality and reliability of the device.

Recessed Trip Button Circuit Breakers from Mechanical Products

- Recessed trip button are ideal for use in emergency vehicle applications where access needs to be restricted to maintenance and service personnel.
- Improves the safety of your fleet by sensing and preventing electrical over-currents and overloads.

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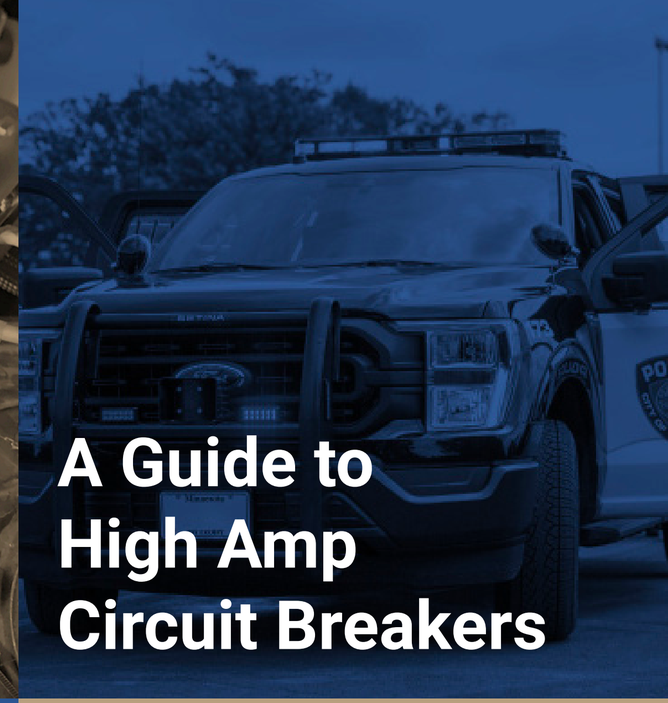

A Guide to High Amp Circuit Breakers

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High Amp Circuit Breaker Selection Guide

Mechanical Products Company

EATON

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Surface Mount - Automatic Reset

						
Supplier / Series Name	Eaton Series 181	Mechanical Products Series 171	Eaton Series 181	Mechanical Products Series 171	Eaton Series 181	Mechanical Products Series 171
Part Number	46930	48920	46931	48921	46933	48923
Stud Size	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud
Current Rating	50A	50A	60A	60A	80A	80A
Max Voltage Rating	30VDC	30VDC	30VDC	30VDC	30VDC	30VDC
Operating Temperature	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)
						
Supplier / Series Name	Eaton Series 181	Mechanical Products Series 171	Eaton Series 181	Mechanical Products Series 171	Eaton Series 181	Mechanical Products Series 171
Part Number	46935	48925	46937	48926	46939	48927
Stud Size	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud
Current Rating	100A	100A	120A	120A	150A	150A
Max Voltage Rating	30VDC	30VDC	30VDC	30VDC	30VDC	30VDC
Operating Temperature	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)

Surface Mount Switchable with Manual Push to Trip Button

						
Supplier / Series Name	Eaton Series 185	Mechanical Products Series 175	Eaton Series 185	Mechanical Products Series 175	Eaton Series 185	Mechanical Products Series 175
Part Number	46980	48880	46981	48881	46983	48883
Stud Size	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud
Current Rating	50A	50A	60A	60A	80A	80A
Max Voltage Rating	42VDC	48VDC	42VDC	48VDC	42VDC	48VDC
Operating Temperature	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)
						
Supplier / Series Name	Eaton Series 185	Mechanical Products Series 175	Eaton Series 185	Mechanical Products Series 175	Eaton Series 185	Mechanical Products Series 17
Part Number	46985	48885	46987	48886	46989	48887
Stud Size	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud
Current Rating	100A	100A	120A	120A	150A	150A
Max Voltage Rating	42VDC	48VDC	42VDC	48VDC	42VDC	48VDC
Operating Temperature	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)

Surface Mount - Manual Reset

						
Supplier / Series Name	Eaton Series 184	Mechanical Products Series 174	Eaton Series 184	Mechanical Products Series 174	Eaton Series 184	Mechanical Products Series 174
Part Number	46920	49054	46921	48961	46923	48963
Stud Size	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud
Current Rating	50A	50A	60A	60A	80A	80A
Max Voltage Rating	42VDC	48VDC	42VDC	48VDC	42VDC	48VDC
Operating Temperature	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)
						
Supplier / Series Name	Eaton Series 184	Mechanical Products Series 174	Eaton Series 184	Mechanical Products Series 174	Eaton Series 184	Mechanical Products Series 174
Part Number	46925	48965	46927	48966	46929	48967
Stud Size	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud	1/4"- 28 Threaded Stud
Current Rating	100A	100A	120A	120A	150A	150A
Max Voltage Rating	42VDC	48VDC	42VDC	48VDC	42VDC	48VDC
Operating Temperature	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)	–25°F (–32°C) to 180°F (82°C)	-40°F (-40°C) to 185°F (85°C)

Surface Mount Marine-Rated Manual Reset

						
Supplier / Series Name	Eaton Series 187	Mechanical Products Series 87	Eaton Series 187	Mechanical Products Series 87	Eaton Series 187	Mechanical Products Series 87
Part Number	46870	49125	46876	49128	46872	49130
Stud Size	5/16" - 18 Threaded Stud	5/16" - 18 Threaded Stud	5/16" - 18 Threaded Stud	5/16" - 18 Threaded Stud	5/16" - 18 Threaded Stud	5/16" - 18 Threaded Stud
Current Rating	50A	50A	80A	80A	100A	100A
Max Voltage Rating	48VDC	48VDC	48VDC	48VDC	48VDC	48VDC
Operating Temperature	–40°F (–40°C) to 185°F (85°C)	–40°F (–40°C) to 185°F (85°C)	–40°F (–40°C) to 185°F (85°C)	–40°F (–40°C) to 185°F (85°C)	–40°F (–40°C) to 185°F (85°C)	–40°F (–40°C) to 185°F (85°C)
Supplier / Series Name	Eaton Series 187	Mechanical Products Series 87	Eaton Series 187	Mechanical Products Series 87	Eaton Series 187	Mechanical Products Series 87
Part Number	46873	49131	46874	49132	46875	49133
Stud Size	5/16" - 18 Threaded Stud	5/16" - 18 Threaded Stud	5/16" - 18 Threaded Stud	5/16" - 18 Threaded Stud	5/16" - 18 Threaded Stud	5/16" - 18 Threaded Stud
Current Rating	120A	120A	150A	150A	200A	200A
Max Voltage Rating	48VDC	48VDC	48VDC	48VDC	48VDC	48VDC
Operating Temperature	–40°F (–40°C) to 185°F (85°C)	–40°F (–40°C) to 185°F (85°C)	–40°F (–40°C) to 185°F (85°C)	–40°F (–40°C) to 185°F (85°C)	–40°F (–40°C) to 185°F (85°C)	–40°F (–40°C) to 185°F (85°C)

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