

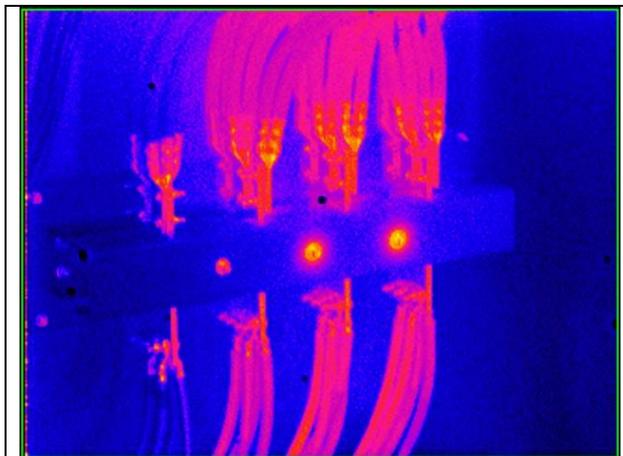
Detecting Electrical System Overloads

Statistically, overloaded circuits are the second most common cause of exceptions found during infrared inspections of electrical systems. Although overloads are quite common, they can be tricky to accurately diagnose.

As electrical current flows through a conductor, heat is generated. As circuit load increases, so does the amount of heat. Electrical circuits are designed so that loads will not exceed the circuit's ability to safely carry a sustained load and the amount of heat associated with such load.

Typically, overcurrent protection devices such as fuses or circuit breakers are designed to protect circuits from overload conditions. These devices will interrupt the circuit when the current reaches a predetermined level for a specified period of time.

Serious problems such as fires can be caused by sustained overloads. Such overloads may be caused by: improperly sized wiring, and improperly sized or defective overcurrent protection. Fortunately, a thermal imager can be used to detect the thermal patterns associated with sustained overloads.



Thermal image shows overloaded cables at terminal block. Overload confirmed with ammeter readings.

When using a thermal imager to detect potential overloads, one should keep the following in mind:

- Overloaded conductor(s) will be uniformly warm throughout entire length
- For polyphase circuits, all conductors may be uniformly warm

- Depending upon ambient conditions and imager settings, overloaded circuits may not appear remarkably warmer than adjacent circuits

Because an infrared imager cannot measure electrical current, suspected overloads must be confirmed with an ammeter while observing all requisite safety precautions. For greatest accuracy, a true RMS sensing ammeter is recommended. Circuits found to be overloaded should be immediately investigated for cause and corrected.

Infrared inspection of power distribution systems is one of the many topics covered in the [Level I Infraspction Institute Certified Infrared Thermographer® training course](#). For information on thermographer training or to obtain a copy of the [*Standard for Infrared Inspection of Electrical Systems & Rotating Equipment*](#), visit us online at www.infraspction.com or call us at 609-239-4788.