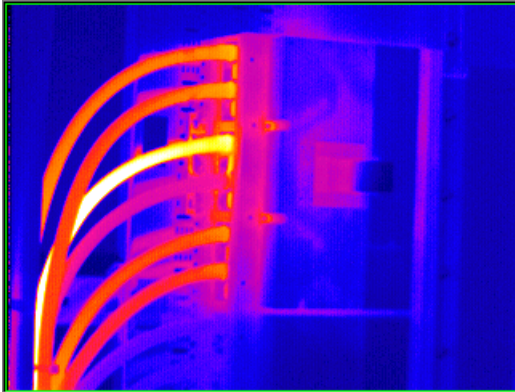


## The hot one is not always the culprit

When we think of infrared surveys we normally think that we are looking for hot spots. Most of the time that is correct. However sometimes a connection may be so bad that it has reduced the amount of current flow to zero. Consider the case below.



We show in the infrared image a three-phase breaker with two conductors per phase. We see on the center phase that one of the conductors is hotter than the others while its paired conductor is cooler. Measuring the temperatures from top to bottom we get the following:

T1	T2	C1	C2	B1	B2
90°	89°	104°	83°	89°	87°

We have a 21°F difference between the two center conductors (C1 and C2). One might be tempted to ignore the temperature difference or place a low priority on dealing with this exception. However, differences of this kind can only be caused by two things: a bad connection or a bad conductor.

A bad connection at the breaker on C1 was ruled out because upon looking at the connections we did not see a hot spot. (Both ends of the conductor looked the same.) Also, conductor C1 is hot along its entire length. It actually gets hotter as you move away from the breaker. This implies that the conductor is being heated by current flow and not being heated from one end by a bad connection. If it were being heated by a bad connection, the temperature of the conductor would decrease as you moved away from the connection.

The currents in the six conductors were measured and it was found that the currents in the top and bottom pairs were well balanced and running about 200 amps in each conductor. On the center phase, there were about 400 amps in the hot conductor and almost none in the cooler conductor. The conclusion is that we have a connection that is so bad that it is allowing almost no current to flow, thus forcing the conductor with the good connection to carry all the current.

This is a relatively new facility, less than two years old. It is our opinion that, when the electricians were wiring this panel, they forgot to tighten this connection.