

Thermography and Detecting Induced Ground Currents

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Thermography has proven to be a very effective method for detecting induced circulating ground currents in metal clad enclosures and cable runs. Substantial heating can be produced that make infrared inspection the premier method for early detection of this unwanted phenomenon.

(Please see sample images)

Current carrying conductors produce a magnetic field (flux) that is capable of inducing circulating ground currents if a magnetic path is present. If each conductor enters a metal enclosure separately, circulating ground currents in the ferrous metal are produced. The amount of circulating current is in direct relation to the total flux interaction with the conducting path along with the path's resistance.

Heating occurs as the induced ground currents circulate in the metal enclosure and conductor box connector. With high amperage conductors, heating can breakdown or melt conductor insulation producing catastrophic failures.

To eliminate this problem a number of different methods can help. If separate three-phase cable layout is required, cross bonding of cable shields will reduce the difference in circulating currents between conductors. The use of triangular cable supports will provide a symmetrical cable layout helping to reduce circulating currents.

If 3-phase conductors enter enclosure together inside one conduit or cable sheath, a canceling of inducing currents takes place and heating will be substantially reduced.

The below images show an infrared image and photo of induced current heating on center phase conductor as it enters the panel box. Temperature rise of 17 degrees Celsius - measured at the center phase box connector.

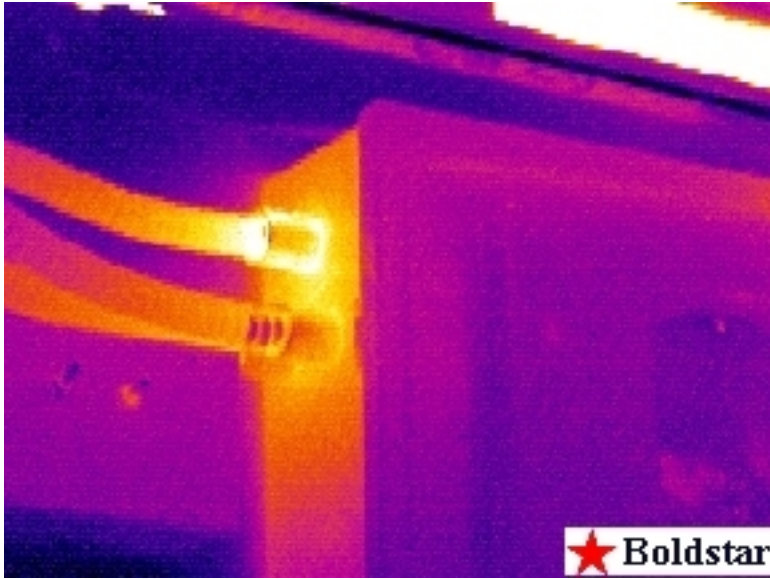


Image: Infrared image of 3-phase box connector heating due to induced magnetic currents.



Image: Digital photo of same electrical box connectors