

Ducted Systems Technical Services: Service Tips Letter

Letter: ST-008-23

Date: March 14, 2023

To: Field service techs and installers

Subject: **How to Correct Low Voltage Transformer Phasing**

Product/s: Equipment Utilizing Multiple Stepdown Transformers in 3-150 Tons

Summary: This letter is to provide a general understanding and field solution to equipment that may encounter nuisance alarms or appear to have component failures from transformers that are out of phase with each other.

Johnson Controls Technical Services has over the years continued to receive calls regarding nuisance codes, components, and overall equipment not operating in heating or cooling modes when parallel transformers are out of phase. The out-of-phase transformers can create alarm codes on controls and have relays or other electrical components not engaging when energized. This is due to the sine waves of the AC power source not being in sync with the transformers and can result in them having two positive or negative signals at the affected device or component.

To verify a piece of equipment with more than one transformer are correctly in phase with each other. You can follow the steps outlined below. All equipment manufactured by Johnson Controls does have phasing verified during the end-of-line functional test prior to shipment to ensure the operation is not inhibited by this event.

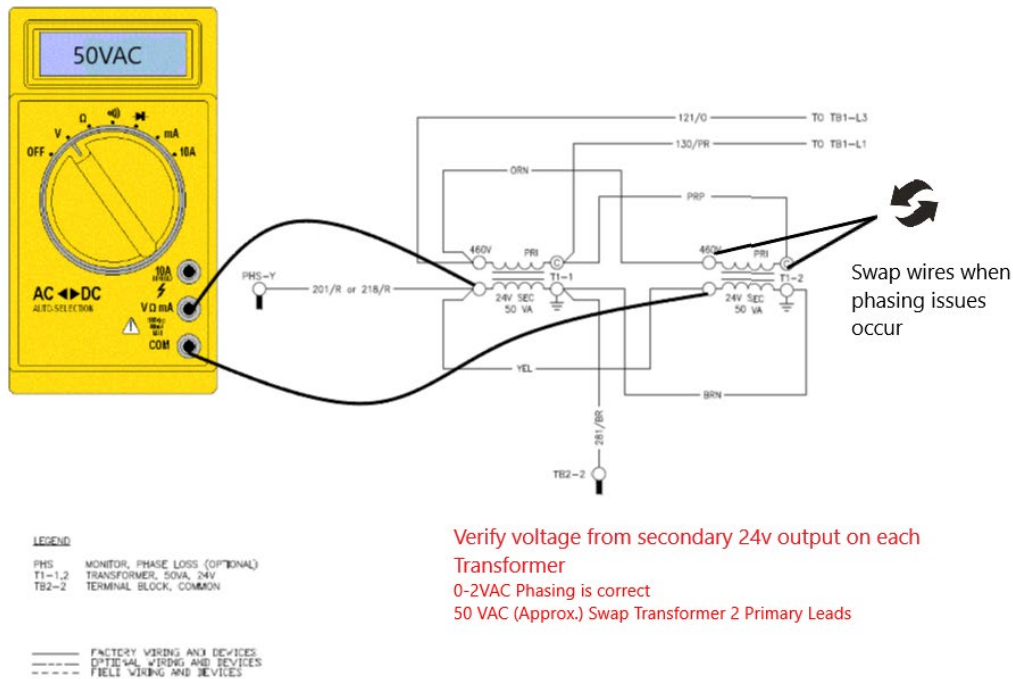
Note: Johnson Controls advises before testing any live electrical system that proper PPE and a properly rated and operationally confirmed voltage measuring tool is utilized by a certified HVAC Technician. It is also advised when wiring or repairing electrical components or systems that lockout-tagout processes are followed and verification that the circuit is discharged before making any wiring changes.

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Troubleshooting Steps:

1. To verify transformer phasing, shut off power to the equipment and remove the wires from the 24v output of the transformer on its secondary side.
2. Then utilize a properly rated voltmeter and place leads on both transformers 24v output terminals with the equipment energized.
- 3a. Properly phased circuits should register 0-2VAC.
- 3b. An improperly phased parallel is normally found to be around 50VAC.
3. If found to be out of phase it is advised to de-energize the equipment and swap the two "line" primary power leads on one transformer. Then perform the same test.
4. If voltage is now at 0-2VAC, verify equipment operation and if issues persist, please contact Technical Services or local support.

ELEMENTARY DIAGRAM



NOTE: Diagram is for educational and demonstration purposes only.

General wiring, wire number, color, and transformer size will vary based on nomenclature of equipment. Always consult your equipment's diagram on the systems panels or in the installation and technical guides. (Manuals and wiring diagram documents are available in Solutions Navigator)