Panel phasing and eGauge installation

Correct phasing (associating a CT with the correct voltage reference) is a critical component of the eGauge installation. Ideally, phasing should be verified using a handheld multimeter to determine the phase of a conductor monitored by a given CT. Generally this is less of a concern for split phase services, but three phase services **will** encounter severe accuracy issues if phasing is incorrect.

eGauge technical support can offer assistance with determining correct phasing. However, correct phasing **cannot** be guaranteed in this manner. Correct phasing requires on-site verification, performed by a licensed electrician. eGauge **does not** suggest phase testing or opening electrical panels for any reason unless qualified to do so. Below is a description of panel phasing and a diagram, and for further reading a document with additional examples is below.

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PANEL PHASING GUIDE

The most common installation issue with retrofit energy metering is known as a phase mix-up, which will cause invalid power readings and often lower-than-expected power factor. In addition, the power readings may be the opposite of expected polarity (based on CT orientation).

In typical U.S. split-phase and three-phase panels, breakers alternate sequentially from top to bottom; three-phase services go A, B, C, A, B, C and so on. Breakers horizontally parallel are on the same phase; the top breakers on both sides are phase “A,” the next set of breakers are phase “B,” and so on. When monitoring incoming feeds of a 120/208-V panel, it’s generally expected for CT1 to measure phase A (black), CT2 to measure phase B (red) and CT3 to measure phase C (blue).

Often, the first unused or available breaker slot for a retrofit meter installation is not on the A phase, but instead may be on the B or C phase. For example, if the meter’s L1 voltage input is on a breaker using phase B, then L2 will land on C and L3 on A. Now there is an offset between the system’s true L1 and meter’s designated L1.

If the CTs are installed with CT1 on A (black), CT2 on B (red) and CT3 on C (blue), there is now a phase mix-up because CT1 is on the system’s A phase but the eGauge’s L3 phase. This issue is more likely to occur when the meter is not close to the CTs, so voltage connections cannot be directly traced between the eGauge and the panel.

The best method to confirm phasing is correct is to use a handheld voltmeter set for the AC voltage of the system. Place one probe on the L1 voltage terminal of the eGauge and the other probe to

the conductor CT1 is around. A reading of 0 VAC indicates it is the same phase and CT1 is truly monitoring L1, while a reading of 208 V (or other phase-to-phase voltage) indicates they are different phases and CT1 is not on L1. This method can be used on any electrical service.

The eGauge Channel Checker tool and oscilloscope waveform viewer may be used to help identify phase mix-ups. If a phase mix-up is found, the software can be configured to apply the CT to the correct line without having to physically relocate the CTs.

We recommend this method be used in addition to other commissioning techniques on all retrofit energy meter installations to ensure correct readings and avoid problems that may require revisiting and inspecting the installation.