

APPLICATION NOTE

6 Things you need to do before making power quality measurements

1 Understand the problem/symptoms

Before starting electrical maintenance work or taking initial power quality measurements, it's a best practice to frame up exactly what is happening, especially if you are working in an unfamiliar environment. If specific machinery is involved, speaking to the equipment operator can often provide insight into the potential cause of a problem. Having a log of symptoms with the date and time they occurred also can be very useful for comparing with the data from the power quality measurements.

2 Understand the environment

If available, one-line diagrams can be invaluable to seeing how all the loads are fed. Sometimes the diagrams reveal that a sensitive load is on a circuit that feeds equipment known to cause certain types of power quality anomalies. Diagrams also aid in making a plan on where best to connect the power quality measurement device along with basic setup questions such as power type and nominal voltage. Walk around to familiarize yourself with the loads and how they are used. Knowing how they operate/cycle will help you to understand the data from the power quality measurement device. Check the electrical connections and then do a quick inspection at the panels for anything that looks loose or could be overheating. At this stage a thermal camera can be useful for quickly spotting overheating breakers or connections. This is also a good time to make note of breaker ratings. If a marginal loading problem surfaces during the power quality study, breaker ratings can be compared to measured amperage values to help identify the source of the issue.

3 Connect the power quality measurement device

Connect the voltage leads to the measurement device, being careful to match the labeling on each connector to the corresponding label on the instrument. Next, connect the voltage leads to the circuit, again paying attention to the connector labels and circuit phases. Verify that the alligator measurement clip is secure and the voltage leads are supported such that they do not pull the lead off the circuit. If connecting to a terminal block with recessed screws, magnetic tipped probes are recommended. Connect the current probes to the



circuit, paying attention to the arrow denoting direction of current flow along with matching the same phase with the voltage lead. If powering the instrument from the measurement leads, connect the jumper cables from the stackable plugs on the instrument to the corresponding inputs on the power supply. Otherwise, connect the AC power cord.

4 Verify connections

It is always a good idea to verify measurement connections before logging begins. Some power quality measurement devices such as the Fluke 1736 and 1738 Power Logger allow you verify connections via an intelligent verification function. Using this function enables you to digitally confirm that everything is wired correctly. If there is an error, you can choose to make the physical changes or simply hit the “Auto Correct” button to have the instrument make the changes for you inside the instrument. You also have the choice of using the phasor diagram to investigate further and can manually override any configuration made.

5 Begin dry run

Before wrapping things up, it’s a good practice to run a cycle to verify that the setups are what is expected. If you’re monitoring at a main panel, usually the check is to make sure that the voltage and current readings in meter mode are what you would expect to see. Sometimes you will find a mistake on the nominal voltage settings or that the current is outside the range of the current probe being used. Better to stay a little longer to confirm everything measuring correctly than to have to repeat the measurements due to insufficient or incorrect data.

6 Secure the location

Verify that the unit shows that it is on AC power and not running off of its internal battery. Make certain the all the wiring is secure and not exposed to any moving parts or high heat sources. Close up the cabinet so everything is safe and secure. Depending on the measurement location, a locking cable can be used with the measurement device as a theft deterrent. It also never hurts to leave a tag denoting who to contact in case others are working in the same location. This may prevent a possible disruption or disconnection of the measurement device.

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