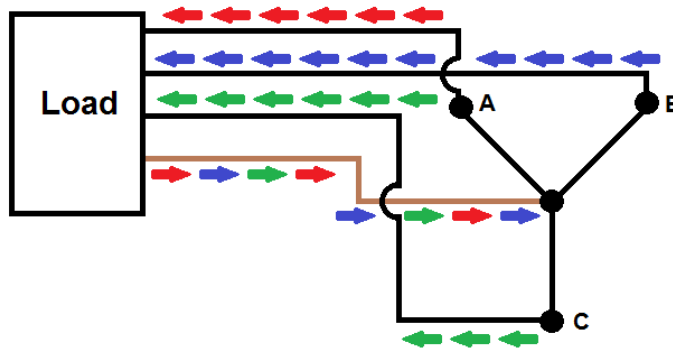


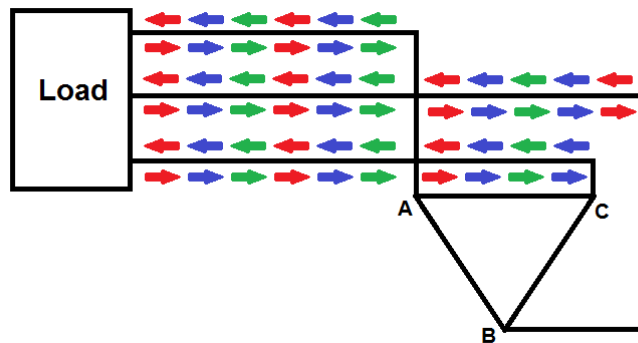
Delta Measurement with an MPQ1000

The power measurement for a delta configuration uses a 2 wattmeter method even though there are 3 phases.

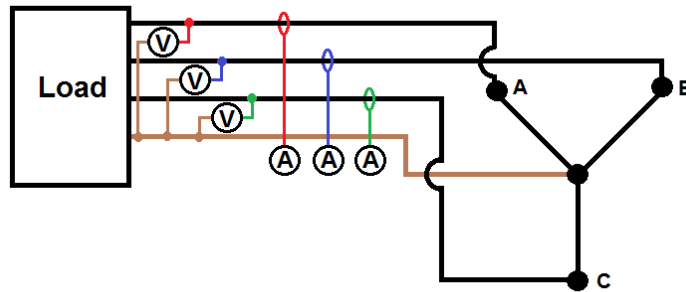
In a wye configuration, the power flow return is always on the neutral wire.



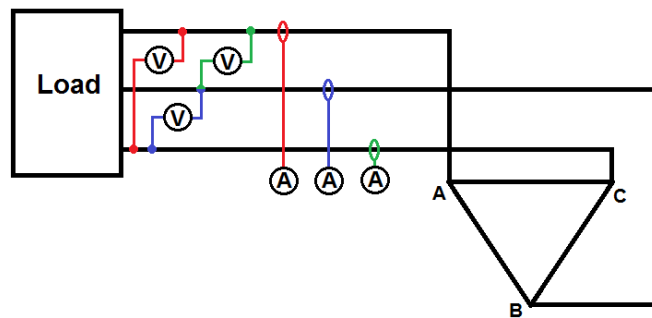
In a delta, the power flow return is on one of the phases.



When measuring a wye all the voltages are referenced to neutral, referred to as line voltages. The measured currents are also line currents. Since both the voltage and currents are line values, the measurement does not introduce any phase shift.



When measuring a delta, all the voltages are referenced to other lines; there is no neutral. This means the measured voltage in a delta are phase voltages. The measured currents are still line currents. Since the voltages are phase voltages but the currents are line currents, the measurement itself introduces a 30-degree phase shift.



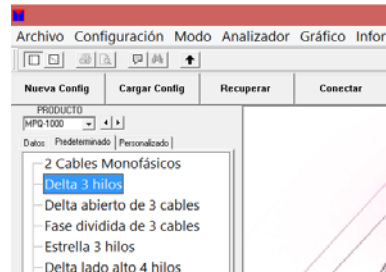
The 3 phase voltages and 3 line currents can be measured and then the power can be calculated mathematically by using the $\sqrt{3}$. This will calculate the proper power values provided the delta is balanced. The more unbalanced the delta is, the more error is introduced into this type of measurement. A 2 wattmeter method will provide accurate values regardless of how well balanced the delta is.

The MPQ allows you to measure the delta values using both methods.

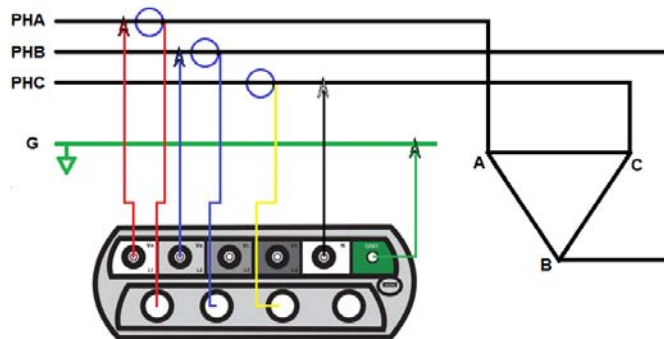
To measure a Delta configuration using an MPQ1000, first activate the “3 Wire Delta” configuration.



If it is not present in your MPQ1000, then upload it from the Metrosoft PQ PC Software. (Version 2.6.2.1 or later). It is located under the default tab.

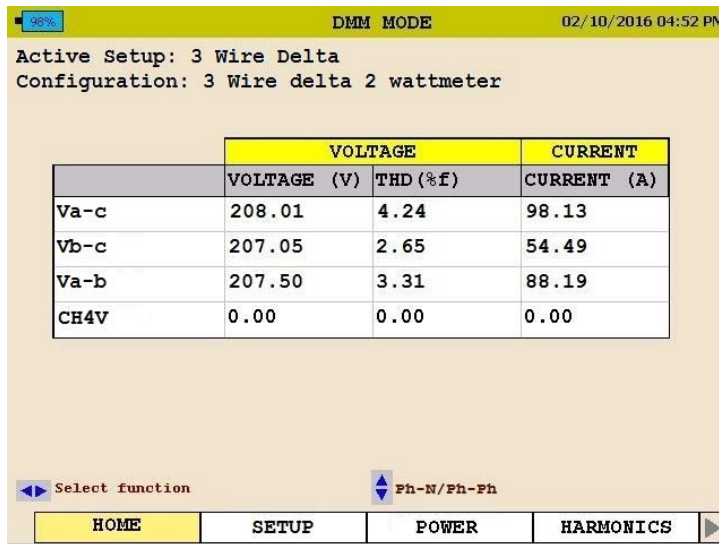


Once the “3 Wire Delta” configuration is active connect the analyzer as shown.



Note the connect Phase C voltage to the N input of the analyzer. This is because it is used as the reference.

When viewing the DMM screen, all phase voltages will be displayed as well as all line currents.

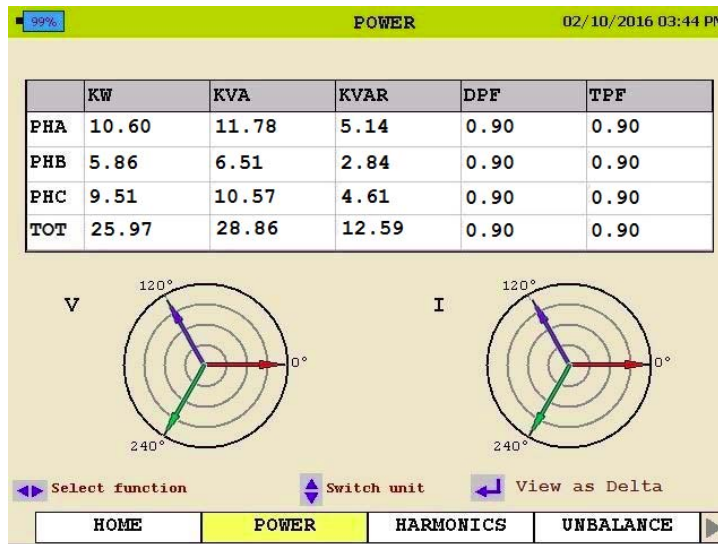


When viewing the Power DMM screen, you can view the total measured power and the phase angles of phase voltage to line current.



This screen displays the total power going to the load. It also displays the phase voltage versus line current phase angles.

By pushing the ENTER key the display will toggle, so you can view the calculated power on each phase as well as the phase angles of the phase voltage to the phase current.



This will get the power going through each phase and the phase angles between the phase voltages and phase currents.

When ready to record just push the record button. The analyzer will measure the voltages on the line and the frequency, and will automatically configure the limits. It will then automatically read the values to which the CTs are set. The analyzer will verify it is connected properly and then start recording.

