Checking Meter Readings

Notes

A quick check for proper readings consists of kW comparison (calculated per equation and compared to the meter reading) and a reasonable lagging 3-phase average power factor reading. If these checks are OK, there is no reason to do anything more.

If your calculations indicate that the meter readings are correct but the magnitudes are different from expected, check CT ratio, PT ratio and system type programmed into the meter versus what is actually installed.

What is "normal"?

Most power systems have a lagging (inductive) power factor. PowerLogic devices and software displays lagging power factor as negative, leading (capacitive) power factor as positive. The only time a leading power factor would be expected would be if the customer had power factor correction capacitors switched in or over-excited synchronous motors with enough capacitive KVARS on-line to overcorrect the power factor to leading.

Procedure

1. Verify Voltages between phases A-B, B-C and C-A using the front panel or software. These voltages must be balanced and within the expected range. Check for blown PT fuses or loose connections if you find voltage unbalance greater than 30%. If all three readings are out of range, verify your PT and System type configuration.
2. Read currents phase A, B, and C from the front panel or software. If you find "0" reading in one or two of the phases verify for shorts in the CT shorting block or for a shorted CT. If all phases read "0" verify that the meter is loaded at least 0.5% of CT ratio (Example: 1000A Circuit must have 5A of load). If all phases are out of the expected range, verify CT ratio configuration.
3. Read the following values from the front panel of the meter or using software: Voltage between phase A and B [V_{AB}], Current 3 phase average [$I_{3Phase\ Avg.}$], Power Factor 3 phase average [$PF_{3phaseAvg}$], Real Power 3-phase total [kW], Apparent Power 3-phase total [KVA], Reactive Power 3-phase total [KVAR]
4. Fill the following table

	Equation	Calculated	Read from Meter	"Normal"
KVA	$\frac{\sqrt{3} * V_{AB} * I_{3\varphi Avg}}{1000}$			Always positive
$\lvert PF_{3\varphi Avg}\rvert$				Lagging (negative) in the range -0.70 to 1.00
KW	$\frac{\sqrt{3} * V_{AB} * I_{3\varphi Avg} * PF_{3\varphi Avg}}{1000}$			Positive

In a "normal" case phase currents and voltages should be approximately equal.

5. If the calculated values are similar to the read values and these values are within the expected range, there is no reason to do anything more. If this is not true, follow the ***"Phasor_Diagram_Verification_3wire"*** and ***"Phasor_Diagram_Verification_4wire"*** procedures which are attached in this knowledgebase article.