# Performing a Power Factor test with a 3 phase 3 wire delta service type:

Issue: When testing a meter using the 3P 3 W delta service the test stops when performing A element PF test. The unit will sit indefinitely and the meter does not pulse.

Solution: The fact is the meter and test board are actually doing exactly what they should be doing in this situation. The problem for the tester is that no watts are being supplied to the meter, therefore the meter does not pulse. The figures below demonstrate how that works.

Below is a view of a vector diagram supplying unity PF to A element:
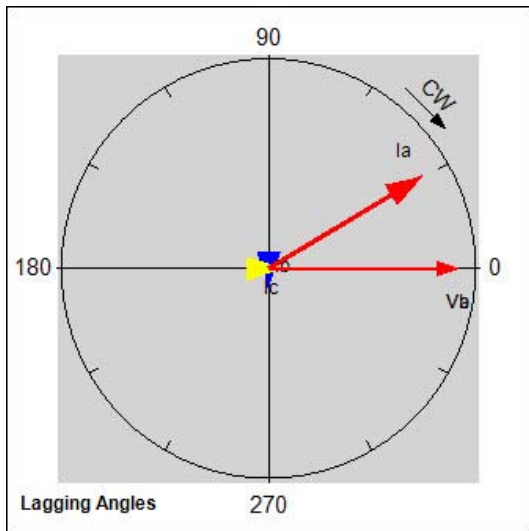
Below is a view of a vector diagram supplying .5 PF (60 degree shift) to A element:
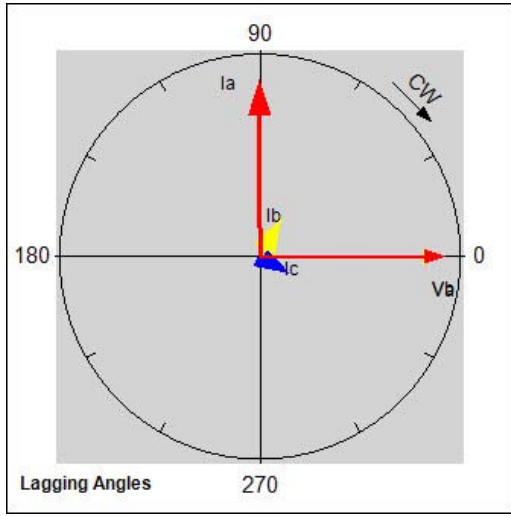
As you can see this creates a 90 degree shift between A element voltage and A element current. This 90 degree shift means ZERO watts are being measured by the meter. Only VARS. This creates a situation where you will not receive a watthour pulse from the meter.

We can work around this problem. In the test sequences that are used we can create a custom A element PF step with a 45 degree shift (instead of the default 60 degree shift).

Below is a view of a vector diagram supplying 45 degree shift to A element:
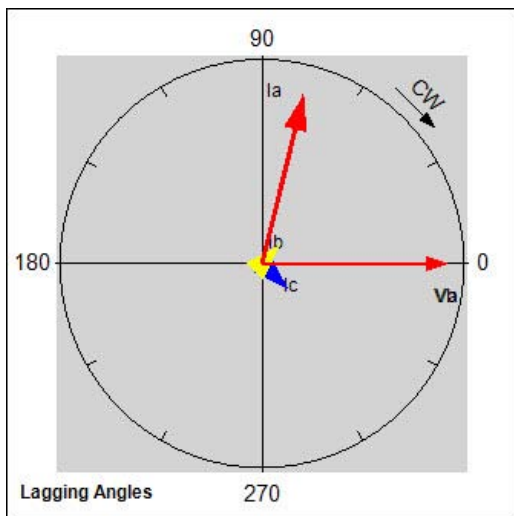
In this condition the meter is measuring watthours and the test step can be run.

The test sequence below displays a sample test sequence with the A element PF test set with 45 degree phase angle.

Step	Element	Test	As Found	As Left	Pulses	Volts	Amps	Phase Angle
1	S	FL			1	120	2.5	0
2	S	LL			1	120	0.25	0
3	S	PF			1	120	2.5	60
4	A	FL			1	120	2.5	0
5	A	PF			1	120	2.5	45
6	C	FL			1	120	2.5	0
7	C	PF			1	120	2.5	60

The link below shows an example of creating a test sequence in Winboard 3 with the changes described above.

http://www.radianresearch.com/upgrade/3P_3W_Delta_A_element_PF_Test_Sequence.mp4

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