



## **Powermetrix Division**

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### Verification Test for a RD-3X and an 8903

#### **Overview:**

This application note details how to use a Fluke 6105 to verify a 3 phase Radian reference standard, RD-3X, using the 8903 as an interface.

#### **Procedure:**

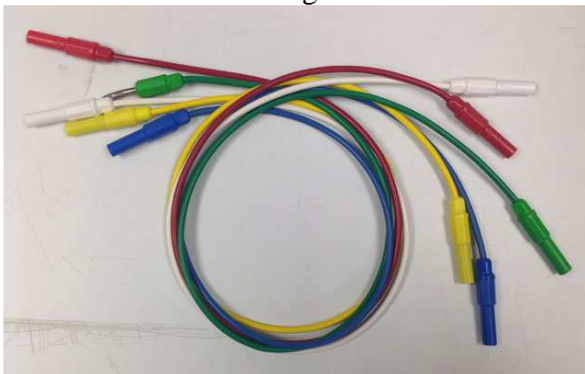
Currently, there is no way to automate the testing, so the test will need to be performed manually.

#### **Required Cables:**

1. BNC-BNC



2. 5 Banana to Banana Plugs

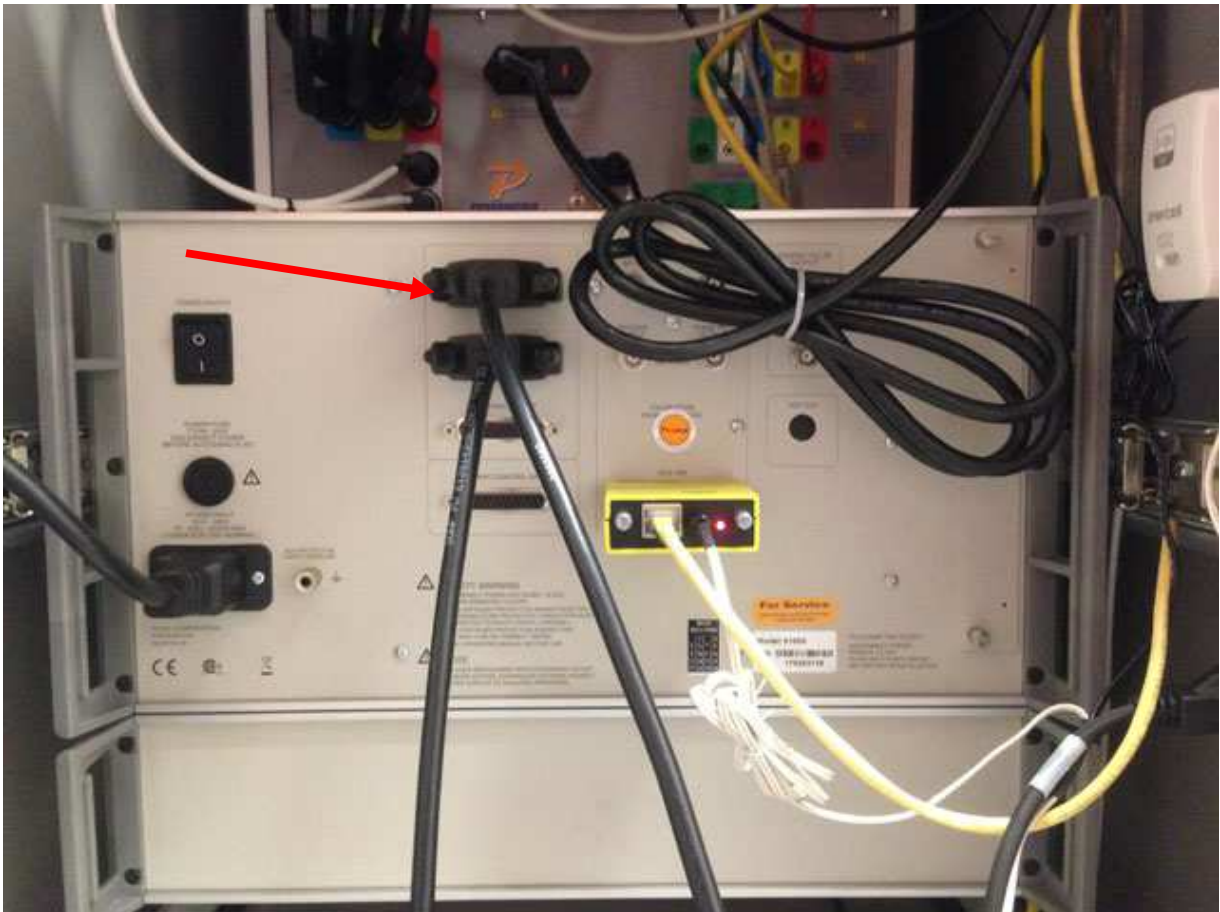


### 3. 6-6MM to 6MM Current Plugs



#### **Connections:**

Before connecting the RD-3X, verify all connections on the Fluke and 8903 are correct and as pictured below. There should be three Fluke 6105's, connected together via parallel port in the back of the unit.



On the front side, all the Fluke should have their voltage and current connected to the front of the 8603.



This configuration should already be performed as this is the standard configuration for these units.

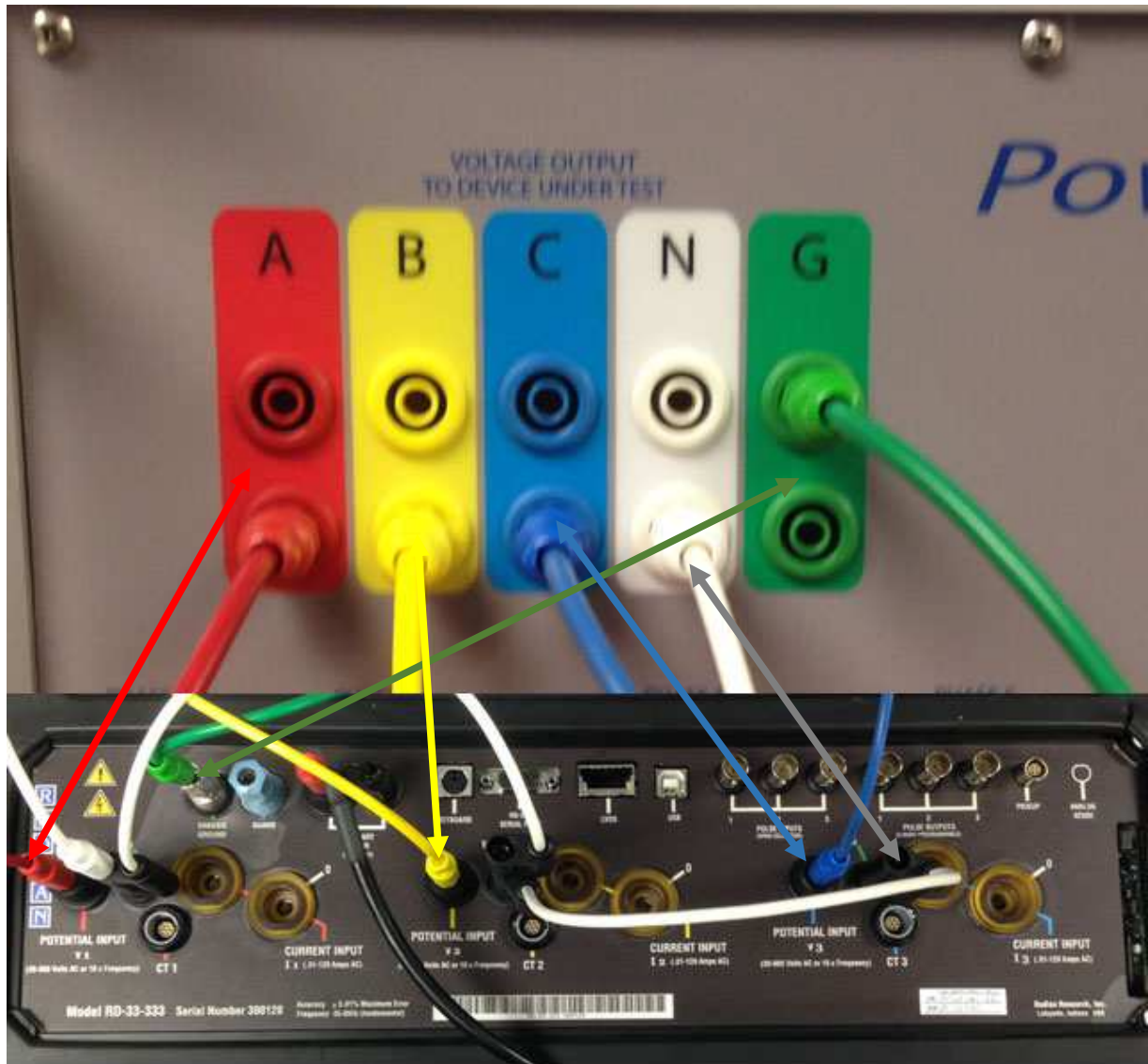
Take the Radian and lay it face down to expose the connections on the back side as shown below.



The connections are as follows

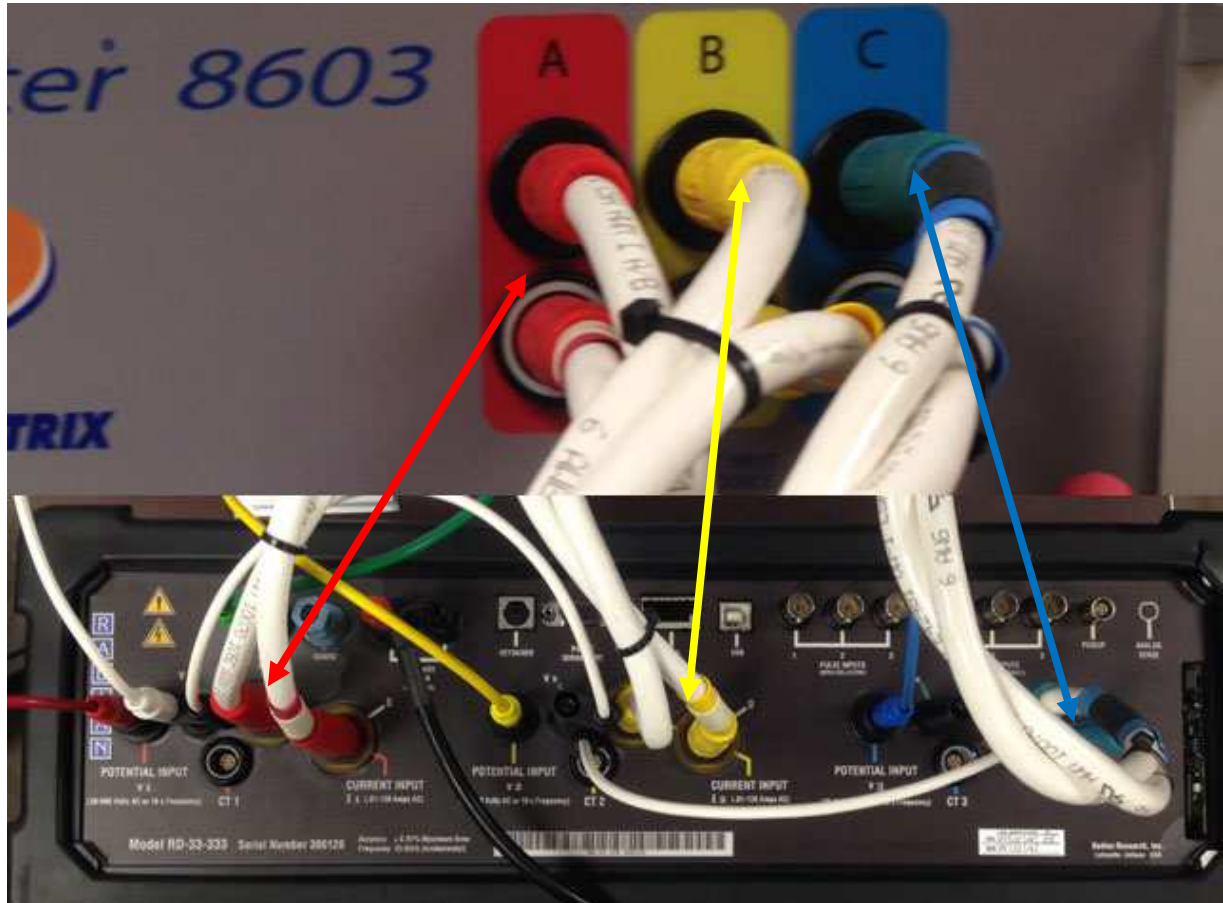
1. Red Circles: Phase Voltages
2. Green Circles: Neutrals (Which will be jumpered together) and Chassis ground
3. Blue Circles: Current input and returns, using 6mm locking plugs.

Using standard banana to banana cables, connect the RD-33 to the 8603 as shown below



Verify the commons are jumped together, and the correct phase voltages are connected to the correct locations.

Next, locate the 6mm locking current cables and connect them to the appropriate connections as shown below.



Once done, the final connections on the 8603 should look like below. In essence, there are 3 6105s, connected as master-slave-slave, connected to the 8603, and the RD-33 connected to the same point.



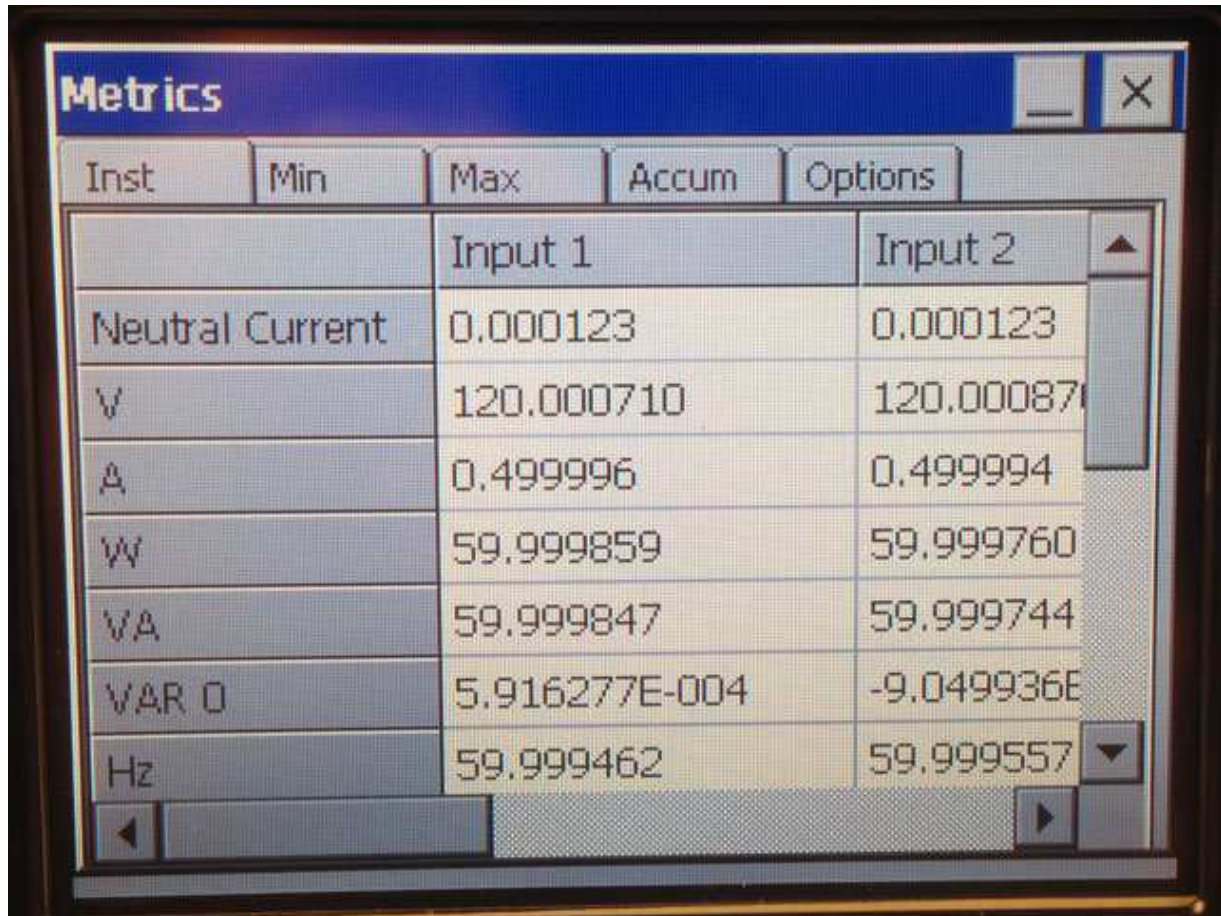
Turn on the Fluke, and use the Select Menu from the keypad to highlight the Output menu with the blue border. Set the outputs to 120V and 0.5A. Use the dial to select a line, then use the Select Menu button to adjust down to the Waveform Menu portion of the screen. Set the correct range value, and then set the correct RMS value. Verify the Enabled and Sine Functions are enabled (bright yellow) for L1, L2, and L3, and the Inter, Flick, and Dip options are disabled. Verify the voltages are 120° apart.

Output Menu				Enabled	Sine	Fluct	Inter
L1	V	120.0000 V,	0.000 deg	Enabled	Sine	Fluct	Inter
	I	0.500000 A,	0.000 deg	Enabled	Sine	Fluct	Inter
L2	V	120.0000 V,	-120.000 deg	Enabled	Sine	Fluct	Inter
	I	0.500000 A,	0.000 deg	Enabled	Sine	Fluct	Inter
L3	V	120.0000 V,	120.000 deg	Enabled	Sine	Fluct	Inter
	I	0.500000 A,	0.000 deg	Enabled	Sine	Fluct	Inter
N	V			Disabled	Sine	Fluct	Inter
	I			Disabled	Sine	Fluct	Inter

Once connected, turn the RD-33 on, and touch the “metrics” option.



Observe and verify the correct voltage and current values. Change values on the Fluke as desired.

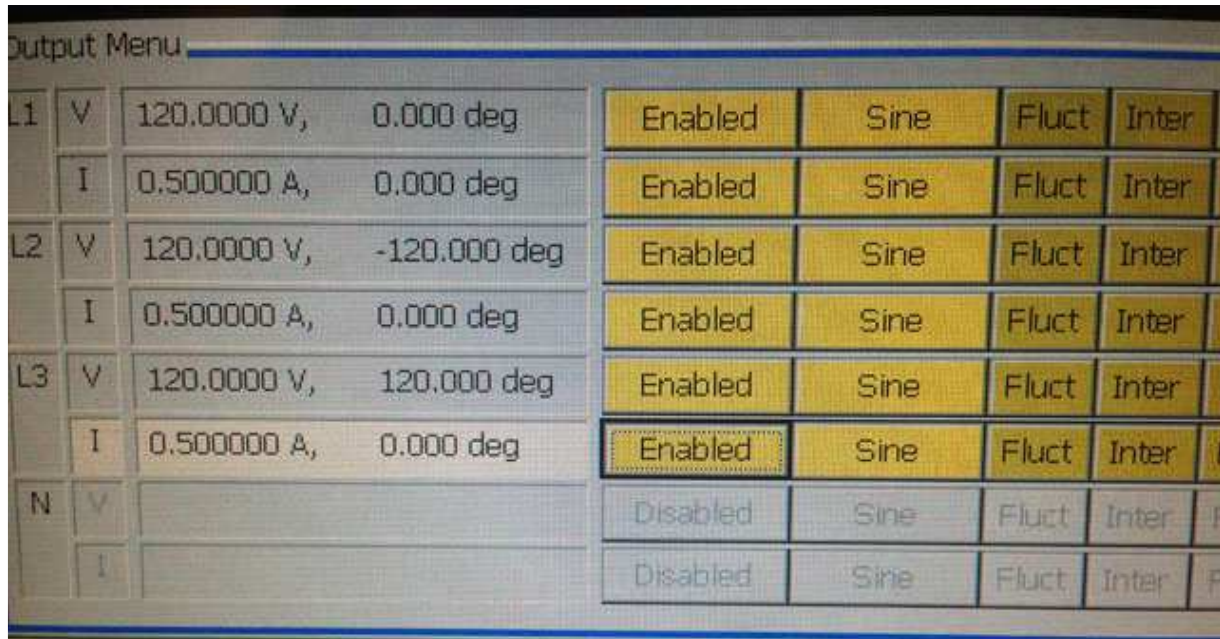


The image shows a screenshot of a software window titled "Metrics". The window contains a table with columns for "Inst", "Min", "Max", "Accum", and "Options". The table is organized into two main sections: "Input 1" and "Input 2". The rows represent different electrical metrics: Neutral Current, V (Volts), A (Amperes), W (Watts), VA (Volt-Amperes), VAR (Reactive Power), and Hz (Frequency). The values for each metric are displayed in the "Max" column for both inputs. The "Options" column contains a small triangle icon pointing up for the first row and a small triangle pointing down for the last row.

Inst	Min	Max	Accum	Options
		Input 1		Input 2
Neutral Current		0.000123		0.000123
V		120.000710		120.000870
A		0.499996		0.499994
W		59.999859		59.999760
VA		59.999847		59.999744
VAR		5.916277E-004		-9.049936E
Hz		59.999462		59.999557

### Pulse Counting Test:

Turn on the Fluke, and use the Select Menu from the keypad to highlight the Output menu with the blue border. Set the outputs to 120V and 0.5A. Use the dial to select a line, then use the Select Menu button to adjust down to the Waveform Menu portion of the screen. Set the correct range value, and then set the correct RMS value. Verify the Enabled and Sine Functions are enabled (bright yellow) for L1, L2, and L3, and the Inter, Flick, and Dip options are disabled. Verify the voltages are 120° apart.

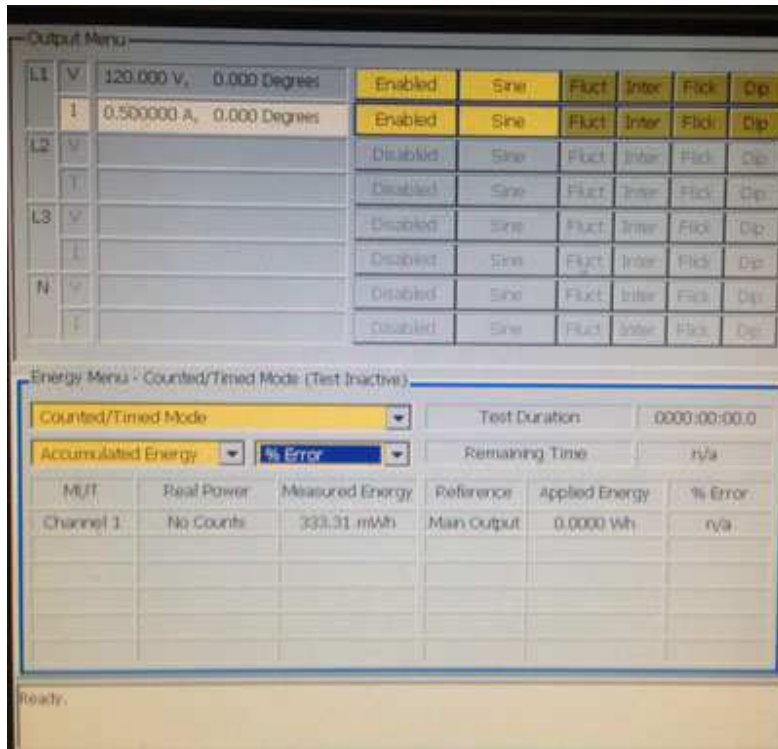


The screenshot shows the 'Output Menu' on a device. It displays settings for three lines (L1, L2, L3) and a neutral line (N). Each line has voltage (V) and current (I) settings, along with phase angle (deg). The 'Enabled' status is shown in bright yellow for L1, L2, and L3, and in grey for N. The 'Sine' function is also highlighted in yellow for all lines, while 'Fluct' and 'Inter' are in grey.

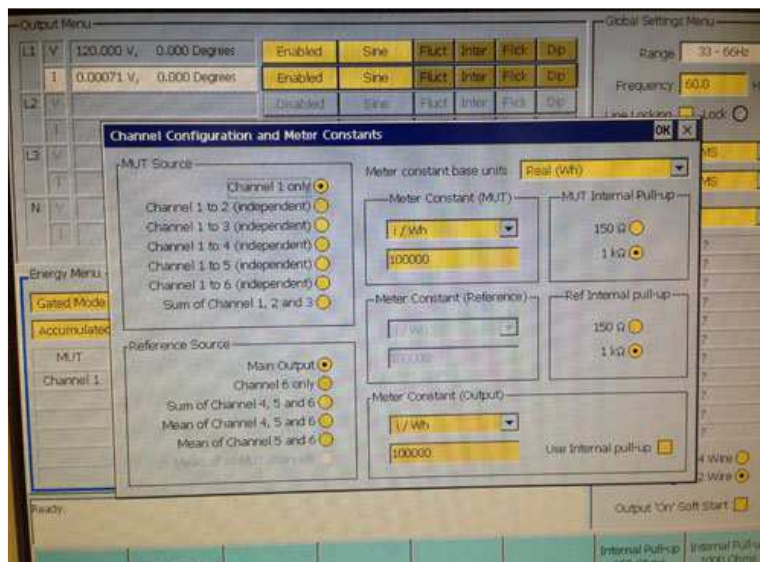
Line	Type	Value	Phase (deg)	Enabled	Sine	Fluct	Inter
L1	V	120.0000 V,	0.000 deg	Enabled	Sine	Fluct	Inter
	I	0.500000 A,	0.000 deg	Enabled	Sine	Fluct	Inter
L2	V	120.0000 V,	-120.000 deg	Enabled	Sine	Fluct	Inter
	I	0.500000 A,	0.000 deg	Enabled	Sine	Fluct	Inter
L3	V	120.0000 V,	120.000 deg	Enabled	Sine	Fluct	Inter
	I	0.500000 A,	0.000 deg	Enabled	Sine	Fluct	Inter
N	V			Disabled	Sine	Fluct	Inter
	I			Disabled	Sine	Fluct	Inter

While the Waveform Menu is highlighted, press the ESC key on the Fluke, then Select Energy Counting from the blue menu items at the bottom of the screen. The Waveform Menu will now change to the Energy Menu.

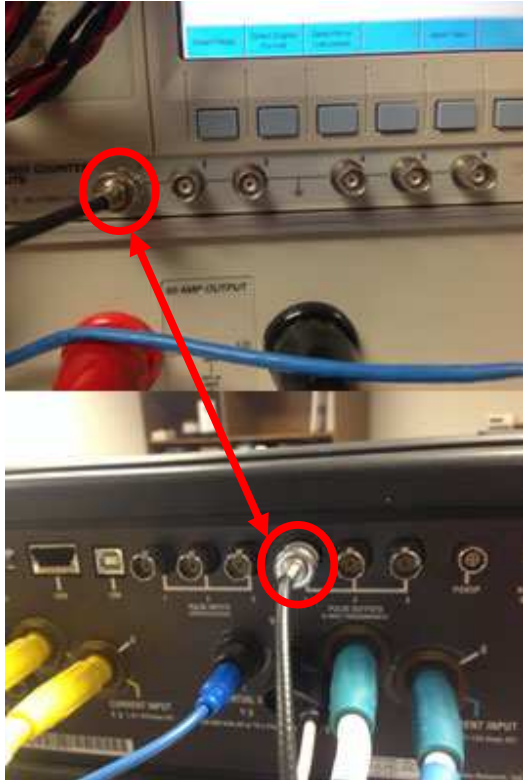
Select the Configure Mode from the bottom blue buttons. The Energy Counted/Timed Mode window will appear. Set the warm-up period to 10 seconds, and the test duration to 60 seconds. Make sure Enable Gate out is enabled, if not, choose the Output Gating button on the bottom of the screen and Enable it. Once the settings are complete, press Enter to continue.



Select Configure Meter Constants from the bottom blue menu. Set the meter base units to Real (Wh). Set the MUT (Meter Constant) and the Meter Constant Output to i/Wh and the required value of the DUT. If the DUT's i/Wh value can be edited, verify that the DUT and the Fluke are set the same to a value of choosing (100,000). If the value of the DUT is fixed (non-digital RM series) then set the correct values in the Fluke in both fields.



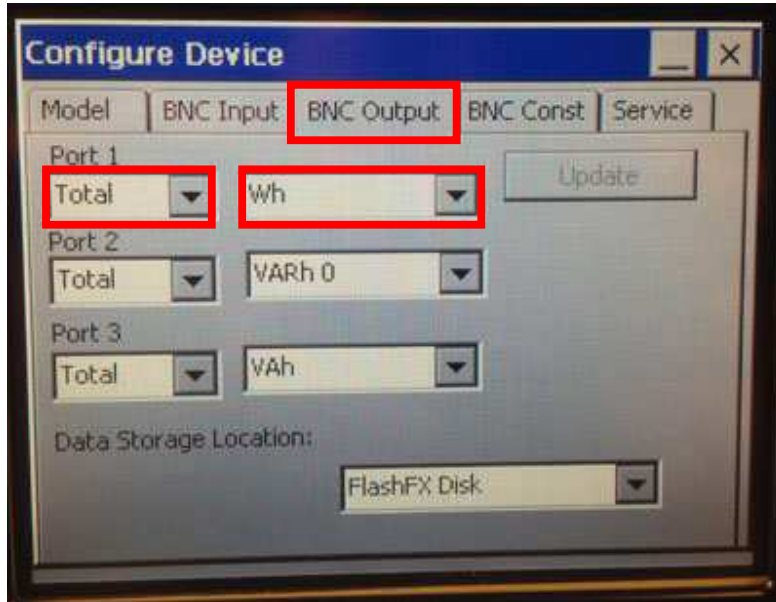
Take the BNC-BNC cable, and connect it from pulse output 1, on the radian, to channel 1 on the fluke, as shown below.



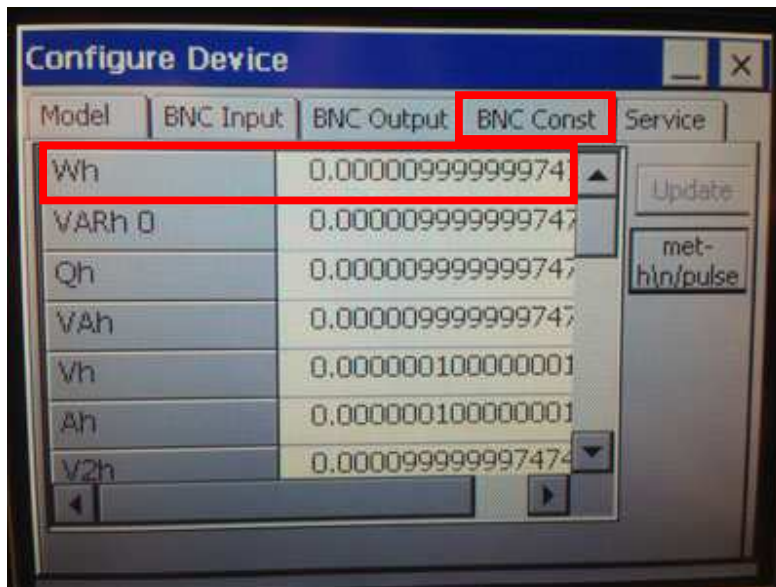
On the Radian, select Configure device.



Select the tab labeled BNC output and verify that Port 1 is set to Total, and WH, as shown below.



Next, select the tab labeled “BNC Const” and verify it is the same as the “i/WH” setting on the Fluke.



Once the settings are correct, the DUT is wired and powered on, press the OPER button on the Fluke. After 70 seconds has passed (10 seconds of warm-up time, 60 seconds of test time) the % error will appear on the Fluke. Verify it is within the manufacture specifications for the DUT.