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Performing a Verification Check between a Radian and a Fluke 6105

Overview:

This application note details how to use a Fluke 6105 to verify a single phase Radian reference standard.

Required Cables:

To perform the test required on the single phase DUT, the following cables are required:

1. BNC to BNC Cable

2. Alligator 4mm(4 ends) to 4mm(2 ends) safety banana voltage cable (supplied from Fluke)

3. For 0 – 20A, use 4mm to 4mm safety banana current cable (supplied from Fluke)

4. Banana to O-ring wire Pair (2)

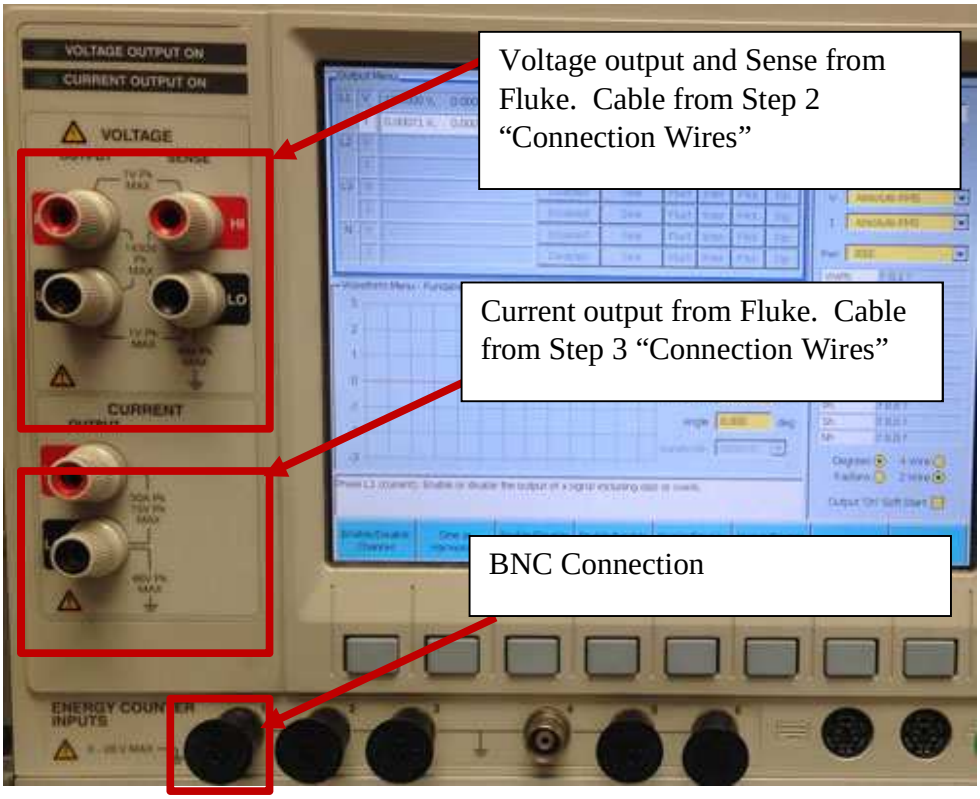
*If Fluke cables are not available, use O-ring to O-ring cables to make the connections.

5. For up to 50A, use the current cables that were provided with the 8600 for current connections.

Connections:

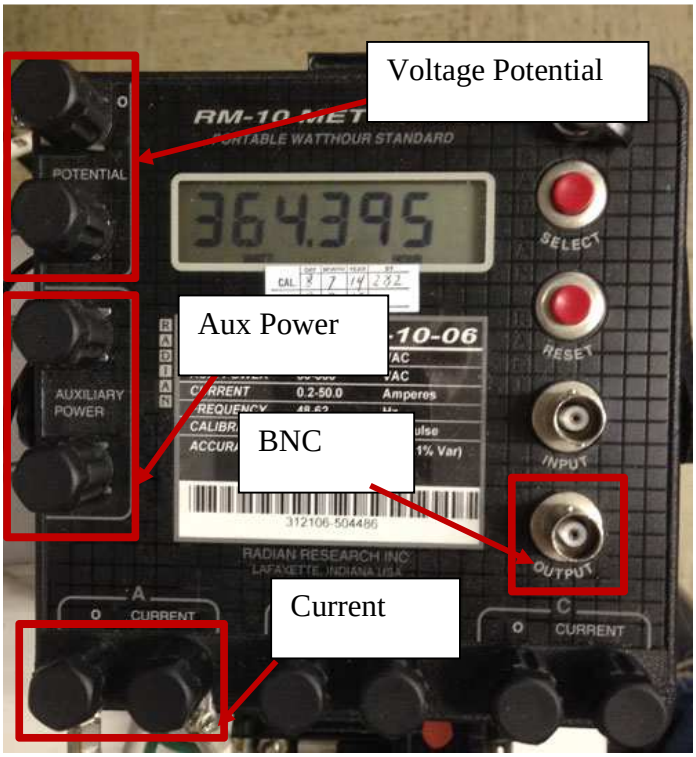
Before testing, make the below connections between the DUT and the Fluke 6105:

1. Connect the 4mm plugs to the front panel of the Fluke on the voltage output and voltage sense connections.
2. Connect the other end of the 4mm plugs to the Banana to O-ring cable
3. Connect the O-ring cable to the DUT at the “Potential Terminals”
4. For less than 20A, connect one end of the 0 – 20A banana plug to the Fluke at the “Current Output”, the other end to the banana plug with an O-Ring attached. Connect the O-ring to the DUT at the “A Current” connection.
5. For up to 50A, Connect the 6mm plug to the DUT, and the other end to the Fluke (see pic below for connection spot on Fluke)
6. Connect the BNC from the “Input Terminal” on the DUT to the “Pulse Output” terminal on the Fluke
7. Connect Aux Power to the DUT, turn on the DUT.



Fluke 6105 Front Panel

Fluke 6105 Front Panel With Connections

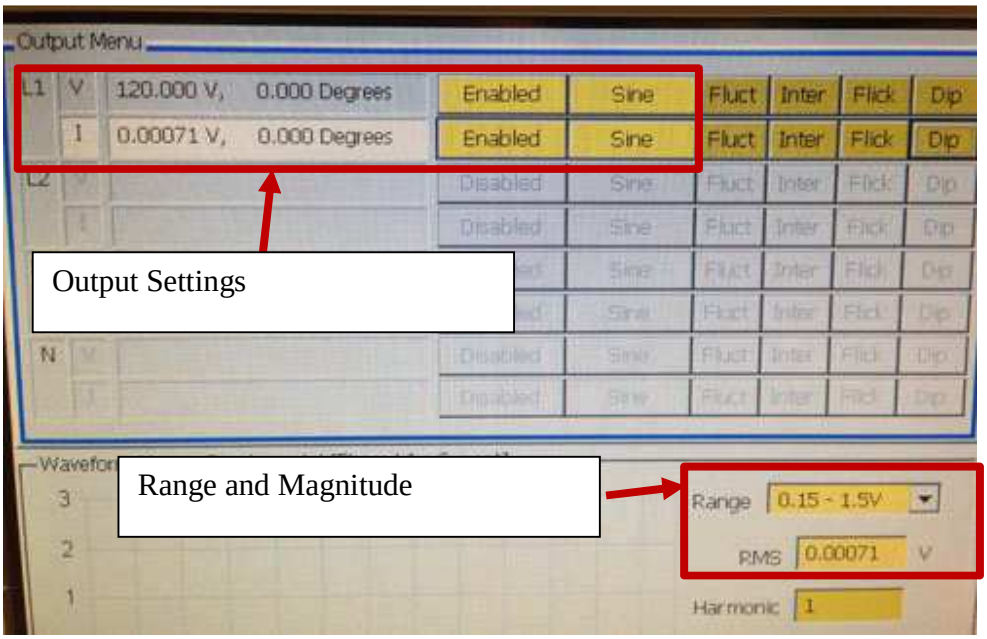


Sample DUT: RM-10

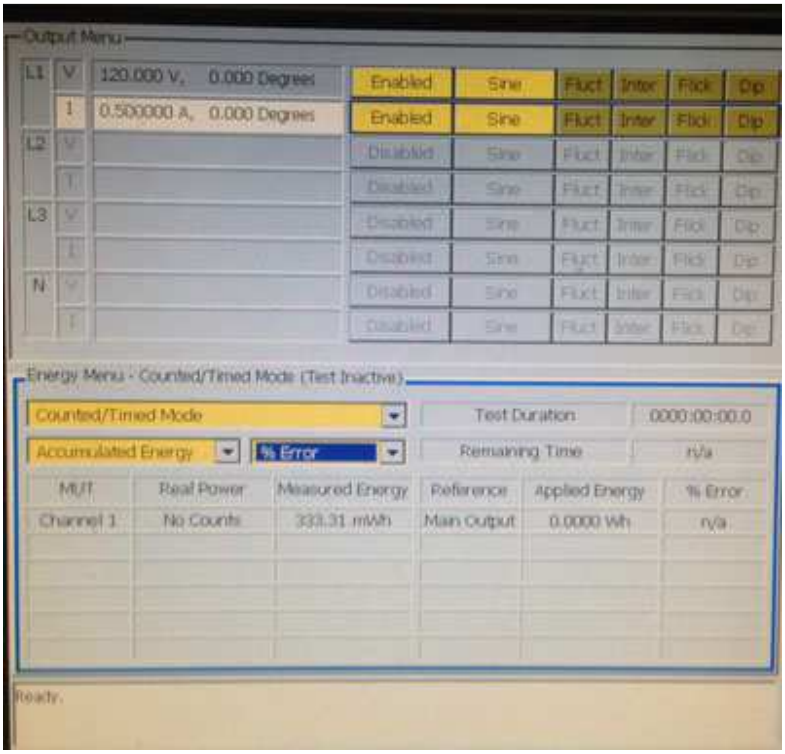
Sample DUT Connected

Settings on the Fluke:

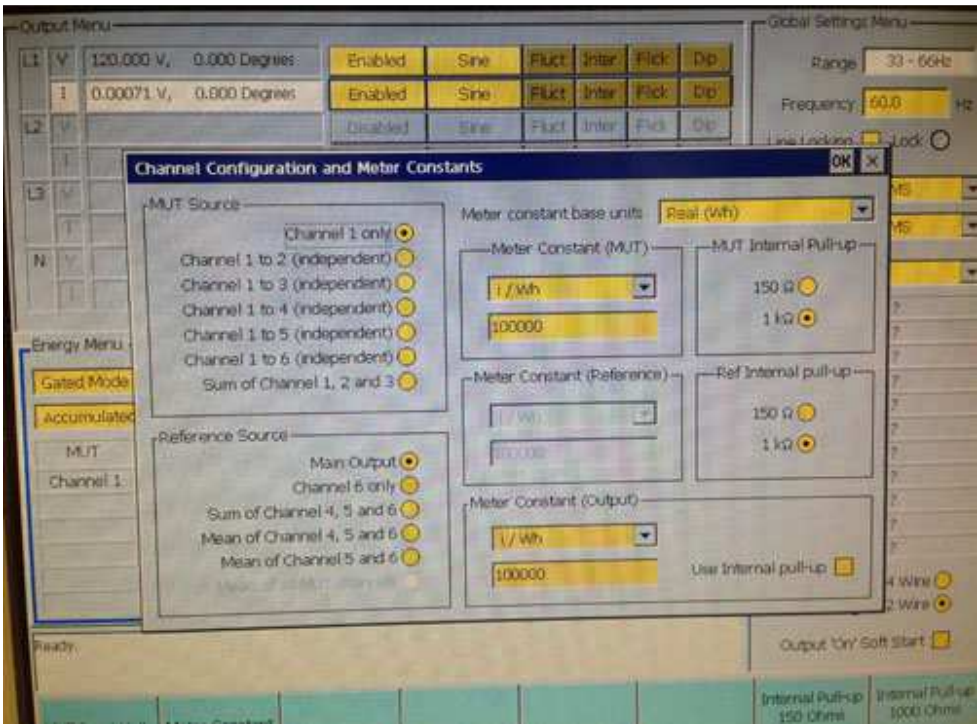
1. Turn on the Fluke, and use the Select Menu from the keypad to highlight the Output menu with the blue border.
2. Set the outputs to 120V and 0.5A. Use the dial to select a line, then use the Select Menu button to adjust down to the Waveform Menu portion of the screen.
3. Set the correct range value,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



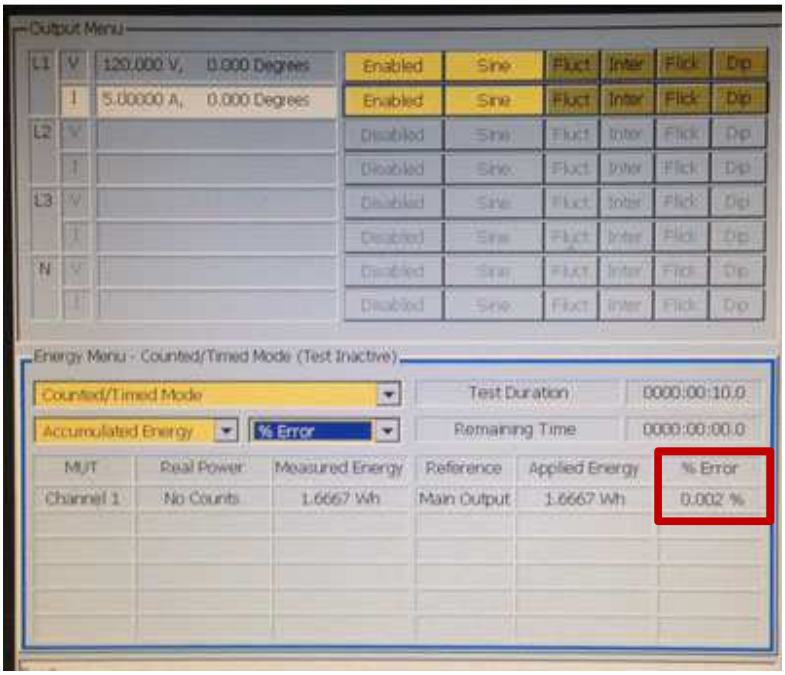
5. While the Waveform Menu is highlighted, press the ESC key on the Fluke, then Select Energy Counting from the blue menu items at the bottom of the screen. The Waveform Menu will now change to the Energy Menu.
6. Select the Configure Mode from the bottom blue buttons. The Energy Counted/Timed Mode window will appear.
7. 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.
8. Once the settings are complete, press Enter to continue.


Output Menu
L1
V
120.000 V, 0.000 Degrees
Enabled
Sine
Fluct
Inter
Flick
Dip
I
0.500000 A, 0.000 Degrees
Enabled
Sine
Fluct
Inter
Flick
Dip
L2
V
Disabled
Sine
Fluct
Inter
Flick
Dip
I
Disabled
Sine
Fluct
Inter
Flick
Dip
L3
V
Disabled
Sine
Fluct
Inter
Flick
Dip
I
Disabled
Sine
Fluct
Inter
Flick
Dip
N
V
Disabled
Sine
Fluct
Inter
Flick
Dip
I
Disabled
Sine
Fluct
Inter
Flick
Dip
Energy Menu - Counted/Timed Mode (Test Inactive)
Counted/Timed Mode
Test Duration
0000:00:00.0
Accumulated Energy
% Error
Remaining Time
n/a
MUT
Real Power
Measured Energy
Reference
Applied Energy
% Error
Channel 1
No Counts
333.31 mWh
Main Output
0.0000 Wh
n/a
Ready.

9. Select Configure Meter Constants from the bottom blue menu. Set the meter base units to Real (Wh).
10. 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 (300,000). If the value of the DUT is fixed (non-digital RM series) then set the correct values in the Fluke in both fields.



11. Once the settings are correct, the DUT is wired and powered on, press the OPER button on the Fluke.
12. 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.



Test Results

Repeat the test as needed for different voltage and current levels if required.