

APPLICATION NOTE - 013

Single Phase AC-DC Efficiency Measurements with the Newtons4th PPA1520 Power Analyzer




In light of industry demand for single phase power efficiency testing of AC – DC power supplies, Newtons4th have released new firmware that supports this application. The instrument is configured so that PH1 will monitor the power incoming from the mains supply (e.g. 230V @ 50Hz) and PH2 will monitor the DC output (e.g. 12V). Computation is then performed inside the instrument to display the efficiency of PH2/PH1, i.e. the total efficiency of the Power Supply, this can be output to data logging software if desired.

This application note will take you through the setup process and illustrate how simple the PPA1520 Power Analyzer is to setup and take accurate efficiency measurements.

Setup Process

To begin we will check the firmware revision of the unit to ensure the unit is ready,

Press   then

This will take you to the instrument information screen below

```

PPA1520
serial number      00214
manufacturing code KQ4610
main release       2.16
DSP release        2.16
FPGA release       2.06
boot release       2.01
phase 1            00043
last calibration   10 MAR 2011 1554 AMW
phase 2            00044
last calibration   10 MAR 2011 1554 AMW

return >
  
```

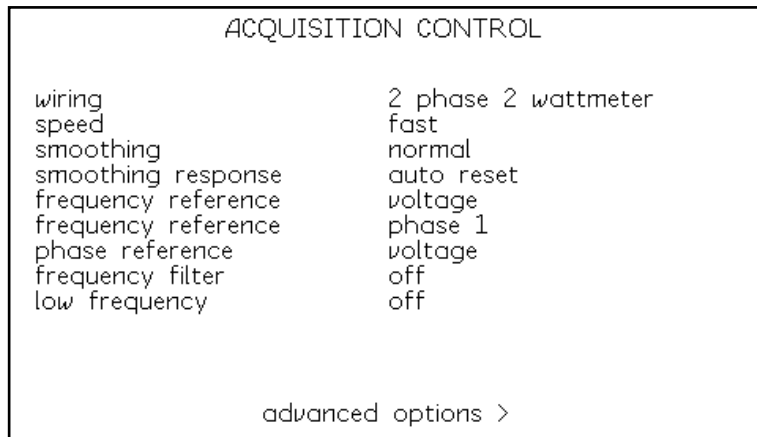
Here we can see a main release of 2.16 and FPGA release of 2.06, this firmware level includes the efficiency functions required for the single phase AC – DC measurements. If you have an earlier firmware revision, please visit the support section on the Newtons4th website which provides free firmware upgrade files.



Now we press

Here you need to set up the following

Wiring: 2 Phase 2 Wattmeter

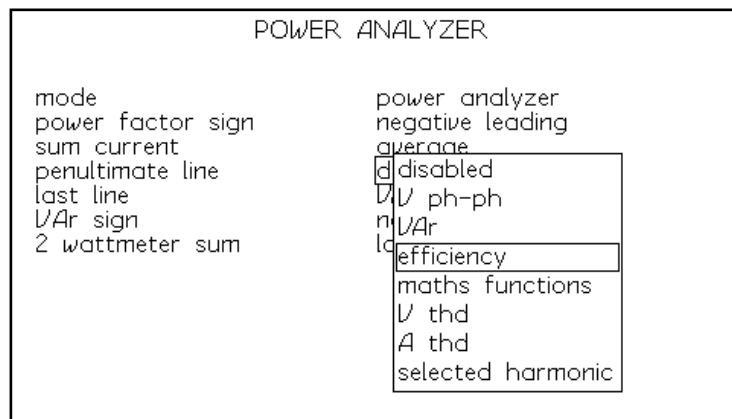


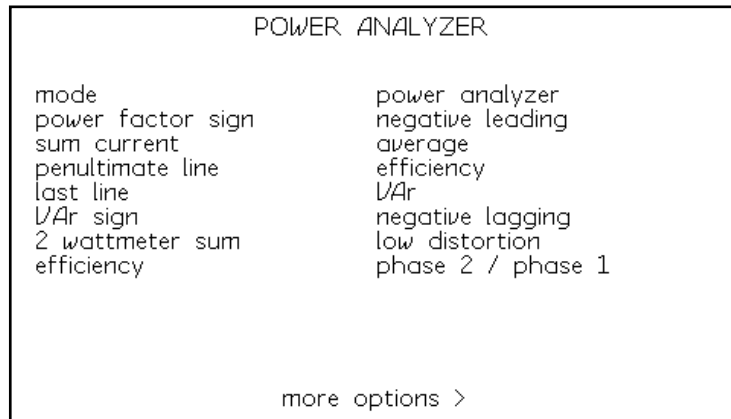
Now Press:

Here you need to set the following

Penultimate Line: Efficiency

Efficiency: Phase 2 / Phase 1 (I.e. DC Output Phase 2 / AC Mains Phase 1)





The instrument is now set up to perform efficiency measurements on the power supply. In the below picture the instrument was connected up to a 5V 50W DC power supply, the power supply was loaded with only 3.2 Watts which is outside the operating parameters of the power supply. This results in an efficiency of around 40%, which illustrates the need for correct power supply selection to suit the load as 40% would be unacceptable to a consumer.

POWER ANALYZER				
	phase 1	phase 2	SUM	
watts	7.7515	3.2425	10.994	W
V/A	14.843	3.2426	16.782	V/A
pf	0.5223	1.0000	0.6551	
Vrms	239.15	5.6917	244.84	V
Arms	62.065m	569.70m	315.88m	Arms
frequency	50.091Hz			
efficiency	41.83%	-0.000%		
VAr	12.658	21.351m	12.679	VAr

Please find more information on the Newtons4th Power Analyzer Range on our website
<http://www.newtons4th.com/products/power-analyzers>

12th August 2019

Newtons4th Ltd