POWER AUTOMATION TECHNOLOGIES

HV Power hints and tips:
PQ-Box 100 Power Quality Recorder

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Max/Min section updated 30/3/09
General update 5/8/2010

Selecting the measuring interval (measurement cycle)

If permanent recording data is to be effectively utilised, it is recommended practice to set the measuring interval to such a length that multiple measuring intervals occur during the intended recording period. However, with the automatic max/min/average recording and correct use of RMS, Oscilloscope and event triggers, there is little advantage in using excessively short of a measuring interval (excessive file size can occur).

Note that EN 50160 standard is based on 600 second (10 minute) measuring intervals.

HV Power recommended measuring intervals:	
Monitoring duration	**Measuring interval**
Less than 12 hours	1 second*
Less than 2 days	120 seconds
Less than 1 week	600 seconds
More than a month	1800 seconds

- Pressing of the "Start/record" button does not define the start of the first full interval. The PQ-Box 100 synchronises the start of the measuring interval to multiples of the measuring interval from 00:00 hours. For example if measuring interval is set to 10 minutes and recording is started at 14:03, the first full interval will start at 14:10 (and end at 14:20). This is allows the synchronisation of multiple recorders, and for the graphed data to occur on convenient grid intervals. Note that graphical permanent record data may be limited for the initial partial interval and final partial interval.
- Triggered events such as Oscilloscope and RMS events will be faithfully recorded (with correct time stamp), even if they occur during the first partial interval or if the recording is shorter than a full interval.
- Analysis of permanent recording data can be difficult if several measuring intervals are not obtained. Use a measuring interval, or recording duration such that typically at least 10 measuring intervals are recorded.
- If at least one full measuring interval is not obtained during the recording period, the information panel will show start and end times for the recording as both 01.01.1970 14:00. Permanent recorded data will not be available.

**Flicker measurements will be recorded as zero data values if the measuring interval is set to less than 60 seconds.*

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File sizes

Firmware version (DSP V1.207) creates approximately 1 MB of permanent record data for each 170 recording intervals.

Note that additional file space is required for event data (Oscilloscope, RMS recordings and events). Upon starting the PQ-Box 100 will reserve 50 % of available memory for permanent recording and 50 % for event data. It is recommended to ensure selected measuring interval/recording duration does not exceed the 50 % limit or recorded data will be truncated. Refer Hints and Tips #7 for further information on memory management. Oscilloscope and RMS recording each require approx 100 kb of memory (assuming 50 ms and 1000 ms of pre-trigger time respectively, and 500 and 3000 ms of recorder time).

As a guide to the memory requirements for permanent recorded data (only):

Measuring interval	Time to generate 1 MB data (approx)	Time to generate 100 MB data (approx)
1 sec*	3 minutes	5 hours
10 sec*	30 minutes	2 days
30 sec*	90 minutes	6.25 days
60 sec	3 hours	12.5 days
300 sec (5 minutes)	15 hours	62 days
600 sec (10 minutes)	1 day 6 hours	125 days
1800 sec (30 minutes)	3.75 days	375 days

Downloading of recorded date from PQ-Box to PC via USB typically requires 10 minutes per 10 MB of data. Data cannot be recorded while the PQ-Box 100 is downloading.

**Flicker measurements will be recorded as zero data values if the measuring interval is set to less than 60 seconds*

Max/Min/Average recordings (frequency, voltage and current)

During recording, the PQ-Box 100 measures true RMS voltage and current every 10 ms. At the end of each measuring interval, for that interval is stored:

- The maximum 10 ms value, and time of occurrence
- The minimum 10 ms value, and time of occurrence
- The average of all 10 ms values during the interval, with the time stamp of the end of interval

The automatic recording of max/min and average data allows the user to set a relatively long measuring interval, without risk of missing important data. The RMS and oscilloscope triggers should be set appropriately to capture disturbance data.

If using the export to ASCII file, the time stamp exported is normally the end-of-interval time only. However if just max/min data is exports the time of occurrence of max/min values can be exported (s/w version dependant).

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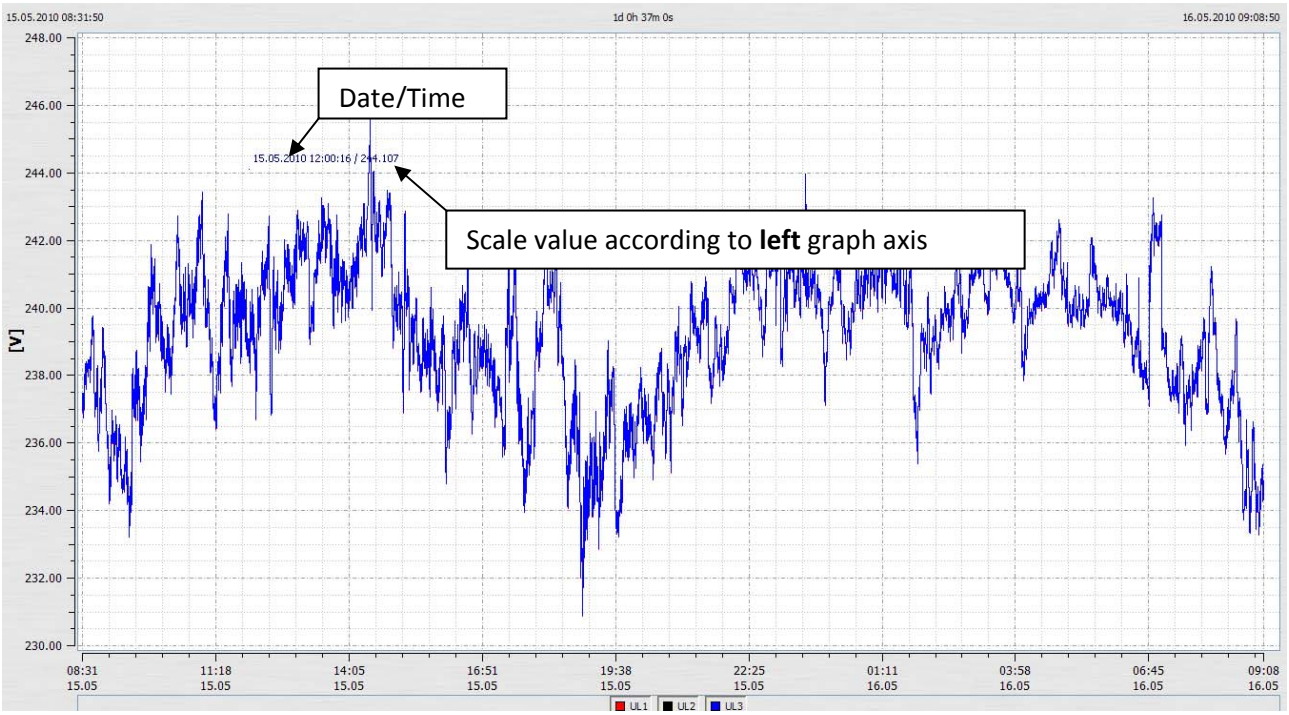
Note, it is possible to determine the exact time of data from the permanent recorded data display by using the marker functions. Also by clicking upon the graph (with the zoom icon enabled), text is displayed giving for that exact point date and time, followed by the measured value (according to the left vertical scale).



"Free PC memory" and 1 GB equipped PQ-Box 100's

From mid 2008, PQ-Box 100 units shipped from the factory with 1 GB of internal memory (compared to 512 MB). This extended memory capability is intended to allow multiple recordings to be obtained prior to downloads, rather than a single extra long/large data recording. Approximately 970 Mb of memory space is available for data storage.

To allow the PQ-Box 100 software to operate/analyse/display data, your PC must have free memory sufficient for the entire file. Not many computers currently have 1 GB of free memory available (predominately only Windows Vista and later supports 1-2 GB of free memory).

If recording for extended periods, or in situations where large amounts of data is obtained, it is recommended to periodically stop and start recording to break the file size into more manageable sizes.

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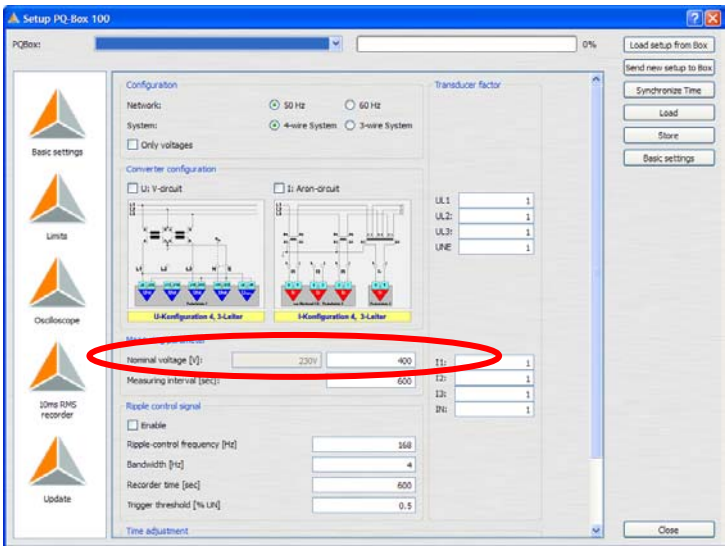
The “Nominal Voltage” setting



Screenshot from V1.515 software

The nominal voltage setting should be entered as the Line-to-Line nominal voltage of the primary measurement. For example if the PQ-Box is connected to 63.5 V (L-N) PT secondary’s of an 11 kV (L-L) system, then Nominal voltage should be set to 11,000 (Transducer factor U1, U2, U3 would be set to 100).

The nominal voltage setting is used to determine the “100 %” values of the voltage limit triggers for Limits, Oscilloscope and 10 ms RMS recorders.

(Nominal Voltage can also be set up directly on PQ-Box 100 via front panel keys and LCD display).

If measuring a single phase voltage, connect all three voltage input leads together, to avoid repeated low voltage events on the other voltage inputs. The nominal voltage setting should be the equivalent ph-ph value. For example if measuring a single phase 230 Vac supply, set the nominal voltage to 400 V.

This document was originally written referencing features of PQ-Box 100 firmware DSP 1.207/1.208 and PC software 1.40. Features and functionality may differ with other versions.

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