New features in PQ-Box 100/200 Software "WinPQ mobil" V2.1.3

28/08/2014

This document details the main changes made in WinPQ mobil release V2.1.3 compared to V2.0.8

Software V2.1.3 should be used with PQ-Box 100 firmware:

- *Boot 1.202*
- *DSP 1.266*
- *MCU 2.004*

To access some new features, the firmware in the PQ-Box 100/200 must also be updated. Refer to Section 6.5 (page 89) of the latest User Manual (02/04/2014) for instructions on how to update firmware.

As a precaution, please back-up user recording & data files on your PC & PQ-Box 100/200 before updating WinPQ mobil, and PQ-Box 100/200 firmware.

Compatibility:

- *This latest version of software is able to open data files downloaded with earlier versions.*
- *After updating the firmware of the PQ-Box 100/200 to above, you should use WinPQ mobil V2.1.3 (or later) to download data from the PQ-Box 100/200. While earlier version of WinPQ mobil may appear to permit downloading of data and uploading of new settings, the* ***use of earlier versions of WinPQ mobil will not be supported*** *as these do not use/set the full parameters of the latest PQ-Box firmware.*

New Features:

1) Interval Trigger

An interval trigger is available for the Oscilloscope recorder. The interval duration can be set between 1 and 240 minutes, in 1 minute increments. The interval starts at the time the PQ-Box 100 recording is started - it is not sync'd to the measuring interval.

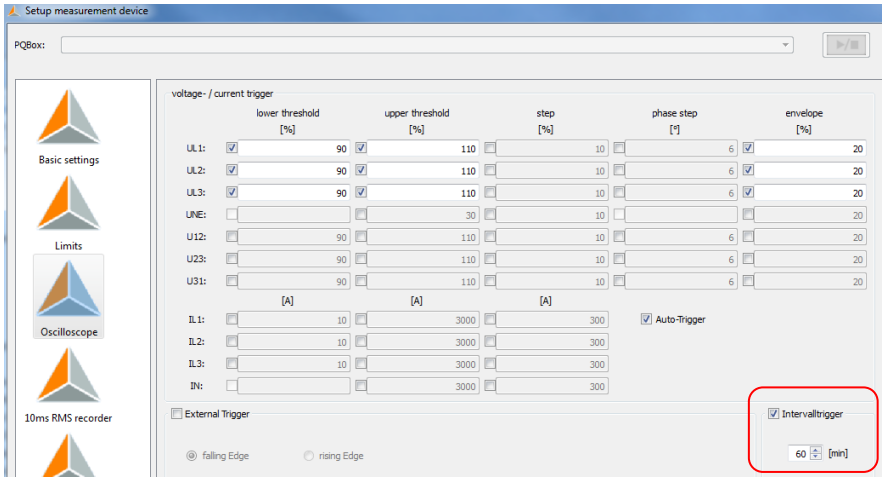

Figure 1. Oscilloscope Interval Trigger.

2) Network Type Connection selection method improved

The method for selecting the network power system type has been improved, and Delta High Leg and Split–phase system support have been added.

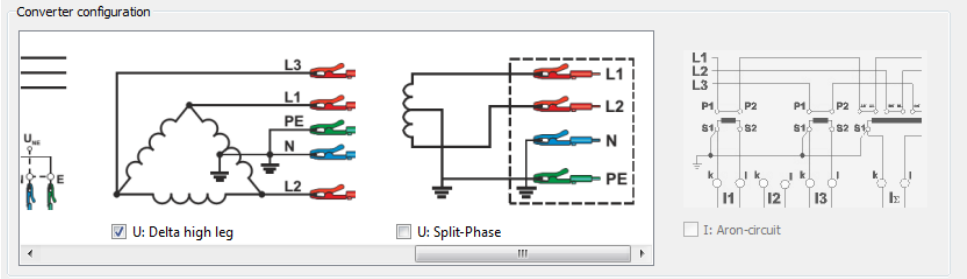

Figure 2. Improved network selection.

The Aron-current-circuit selection is only able to be selected (if required) for 3-wire systems.

3) Phase Rotation

The PQ-Box 100 LCD display has been updated to indicate the voltage phase rotation. On the display screen that shows the THD% information, phase sequence in the form of 'L1—L2—L3' is indicated to show the phase rotation. *Note that for single phase circuits (with L1-L2-L3 connected together), the indication of 'L1—L2—L3' still occurs.*

4) Rapid Voltage Changes

Rapid Voltage Change (RVC) according to IEC 61000-4-30 has been added to the Limits setting.

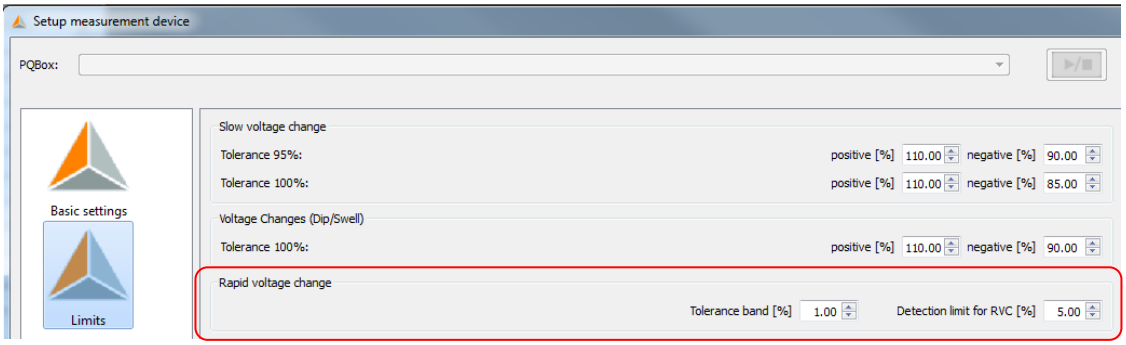

Figure 3. 'Rapid Voltage Change' added.

A Rapid Voltage Change is a voltage change that occurs between two steady states. The 'Tolerance band' defines the acceptable voltage range permissible to be considered 'steady state'. The voltage must be within this range for at least 1 second. The 'Detection limit for RVC' sets the trigger threshold limit that must be exceeded between two sequential steady state conditions for the event to be classified as a RCV event.

The typical settings for rapid voltage change are:

- Tolerance Band = 1 %
- Detection Limit for RVC (%) = 5 % (Normally in range of 5-10 %, but less than Dip/Swell limits)
- Note that any voltage excursion beyond the Dip/Swell limits will not be a RVC, but rather a Dip/Swell event.

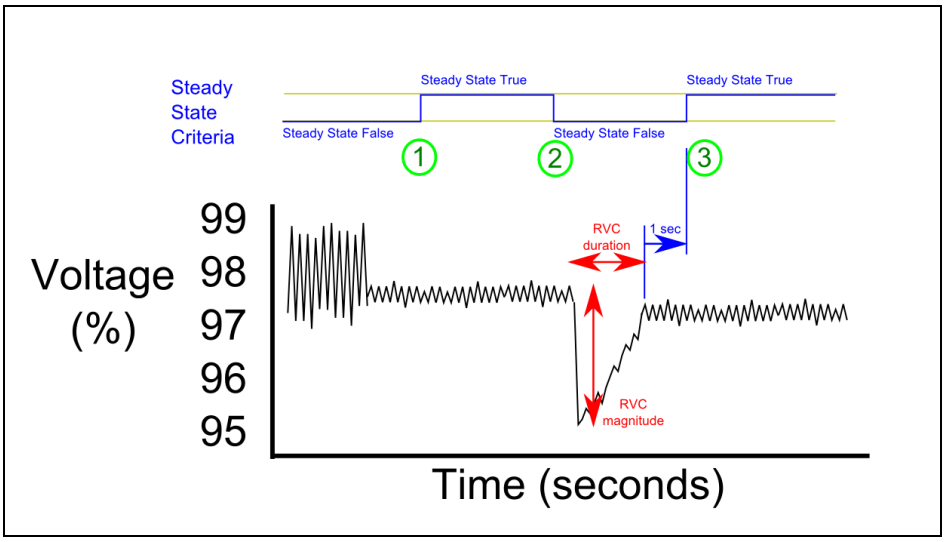

Figure 4. 'Rapid Voltage Change' defined.

Figure 4 is provided to give an illustration of a RVC event. The first steady state true condition (1) occurs after nominal voltage variations have been within the 1 % tolerance for 1 second. This steady state ends (2) when voltage variation exceeds the 1 % setting. A second steady state condition occurs at (3) as voltage variations returned to within 1 % tolerance for at least 1 second. As the maximum magnitude of the change occurring between the two steady states was a) greater than the 5 % detection limit and b) less than the dip/swell setting, this event is classified as a RVC, with its duration and magnitude being recorded.

As RVC's are not an EN 50160 evaluation criteria, the RVC data is only available via the PQ-events tab. In Figure 5, and example RVC event shows a negative 15.5334 voltage change has occurred, with 200 ms duration.

	Event	Start Time	Max. Value	Harmonic	End Time	Duration
1	Rapid voltage change UL1	17.08.2014 15:14:05	-15.5334	---	17.08.2014 15:14:05	0s 200ms
2	Rapid voltage change UL1	17.08.2014 19:40:54	-11.5433	---	17.08.2014 19:40:54	0s 80ms

Figure 5. Example 'Rapid Voltage Change' event report.

5) Harmonic Grouping

The method of harmonic grouping offers an alternative calculation method to better suit equipment testing, rather than power quality measurement

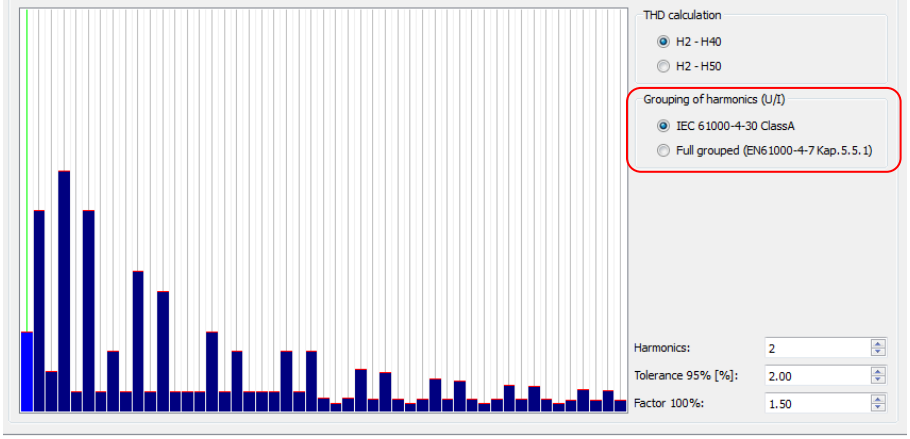

Figure 6. "Harmonic Grouping.

Method	2nd Harmonic	2nd Interharmonic
	5 Hz bands monitored	
IEC 61000-4-30 Class A	95 – 105 Hz	55 – 95 Hz
Fully grouped EN 61000-4-7 Kap.5.5.21	75 – 125 Hz	55 – 95 Hz

Table 1. Measurement difference example showing 2nd harmonic values.

Prior method and default – IEC 61000-4-30 Class A:

- For power quality testing to EN 50160

New method "Full grouped" – EN 61000-4-7 Kap.5.5.21

- For equipment tests according to IEC 61000-3-X
- For the measurement of harmonics, this 'fully grouped' method includes a larger range of frequency values centering each harmonic.
- Interharmonic measurement is the same for both methods

6) 10 minute Power Interval

The option of a 10 minute power interval (in addition to the 15 minute and 30 minute choices) has been provided.

Note:

- Recently the range of permanently recorded values available in the 'Power(15 min)' selection were expanded and now includes 'Ueff (15 min).
- While values are labelled xxx(15 min), these are 10, 15 or 30 minute values depending upon the interval selected.

7) Cos Phi

An additional cos(Phi) permanent recording data class is now available. The new 'cos(phi VDE-AR-N4105)' provides different signs, as shown in Figure 7. This new data is provided to support VDE-AR-N4105, a German application guide concerning decentralised power generation infeed.

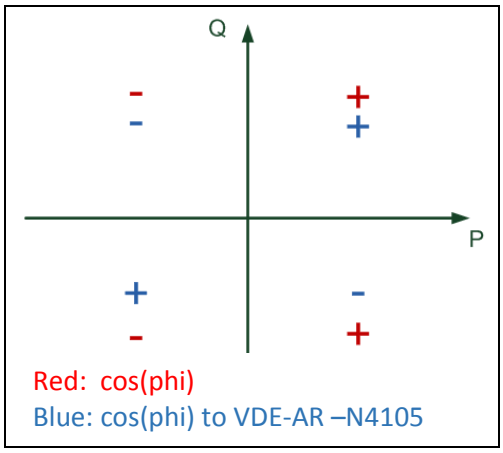

Figure 7. cos(phi) sign for normal and VDE-AR-N4105 values.

8) Other

- Automatic scaling while zooming has been improved, with the screen now scaling automatically to the extreme values of each view.
- The COMTRADE export has been improved.

9) Harmonic voltage angles (PQ-Box 200 only)

New permanent recording data is available for the PQ-Box 200. "Harmonic phase angle H1" provides information on the angles of the harmonic voltages H2-to-H40.

For four-wire setups, the reference of the reading is to the fundamental L1-to-Earth voltage.
For three-wire setups, the reference of the reading is to the fundamental L1-to-L2 voltage.

10) 200 ms extreme values of voltage and current harmonics (PQ-Box 200 only)

The PQ-Box 100 and 200 record the individual voltage and current harmonic values (H1-H50) based on averaging each 200 ms value over the user defined measuring interval.

The PQ-Box 200 (only) now also records the maximum 200 ms value during each interval. When loading data files from PQ-Box 200, the following Permanent Recording values become available:

- U Max (200ms) harmonics [H1-to-H50]
- I Max (200ms) harmonics [H1-to-H50]

Phase-to-Earth values are recorded for 4 wire setups and Phase-to-Phase values are recorded for three wire setups.