

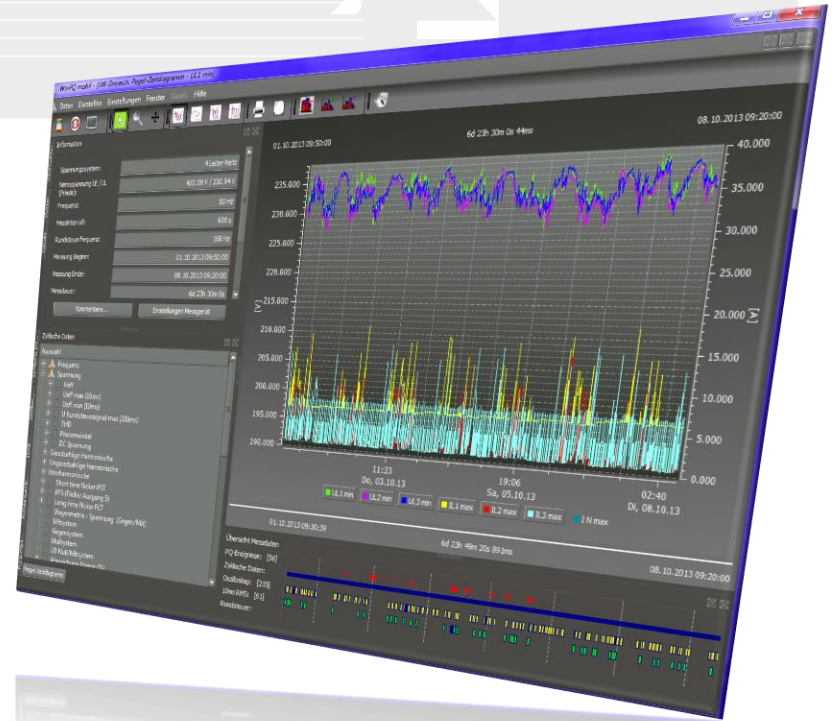
Wir regeln das.



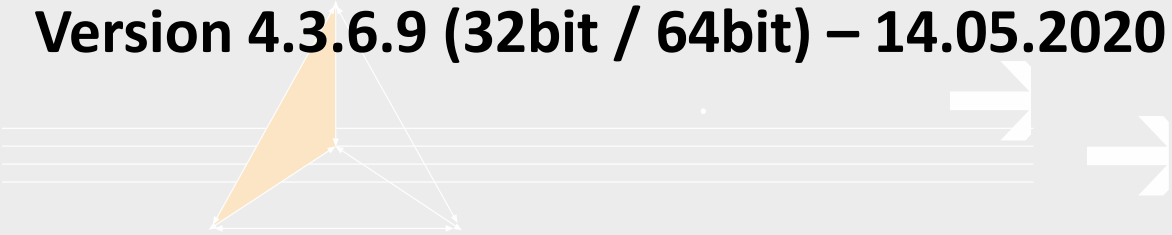
PQSys™

Release Notes

WinPQ mobil



Version 4.3.6.9 (32bit / 64bit) – 14.05.2020



Firmware PQ-Box 50:

- Boot Vers. 0.006
- DSP Vers. 4.047
- MCU Vers. 4.111

Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.416
- MCU Vers. 2.023

Firmware PQ-Box 150:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.111

Firmware PQ-Box 200:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.111
- FPGA Vers. 0.013

Firmware PQ-Box 300:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.111
- HF Vers. 0.020



Features & Bugfixes WinPQ Mobil v4.3.6.9

Features

WinPQ Mobile:

Polish version of EN50160 templates available.

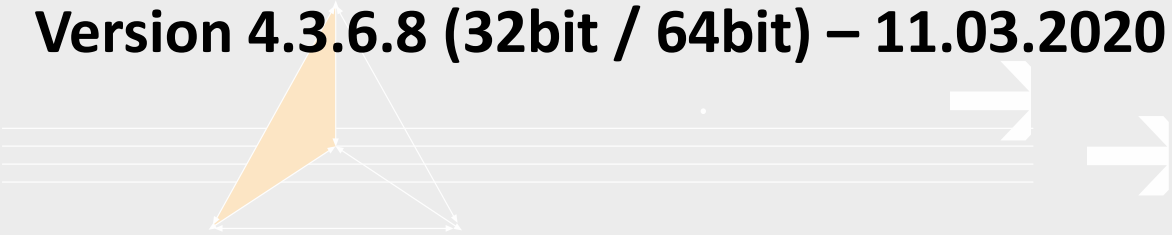
PQ-Box 50 / 150 / 200 / 300

Increase of the transmission security of measurement data between PQ-Box and PC.

PQ-Box 150 / 200 / 300

Fault record limit (300MB memory limit = On, 2GB memory limit = Off) can be completely deactivated via the display menu.

Version 4.3.6.8 (32bit / 64bit) – 11.03.2020



Firmware PQ-Box 50:

- Boot Vers. 0.006
- DSP Vers. 4.047
- MCU Vers. 4.108

Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.416
- MCU Vers. 2.023

Firmware PQ-Box 150:

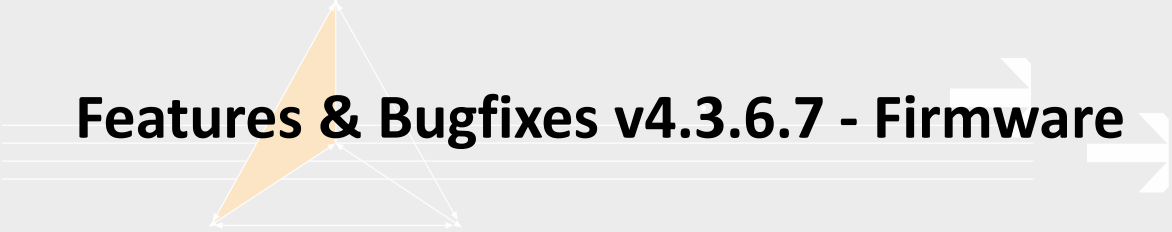
- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.108

Firmware PQ-Box 200:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.108
- FPGA Vers. 0.013

Firmware PQ-Box 300:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.108
- HF Vers. 0.020

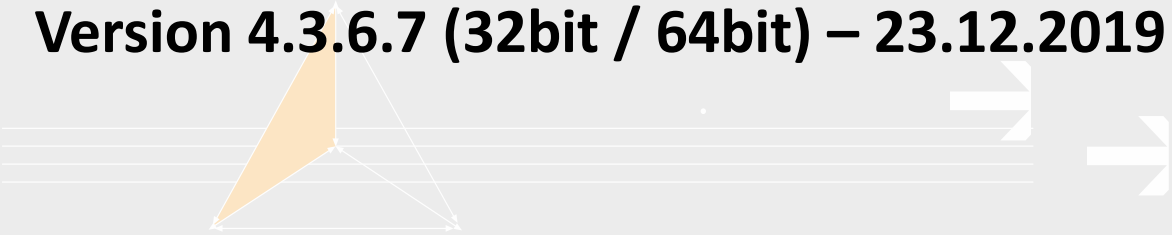


Features & Bugfixes v4.3.6.7 - Firmware

Bugfix PQ-Box 50 / 150 / 200 / 300

- Firmware fix "unique identification of the SSID" in Wifi mode.

Version 4.3.6.7 (32bit / 64bit) – 23.12.2019



Firmware PQ-Box 50:

- Boot Vers. 0.006
- DSP Vers. 4.047
- MCU Vers. 4.105

Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.416
- MCU Vers. 2.023

Firmware PQ-Box 150:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.105

Firmware PQ-Box 200:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.105
- FPGA Vers. 0.013

Firmware PQ-Box 300:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.105
- HF Vers. 0.020



Features & Bugfixes WinPQ Mobil v4.3.6.7

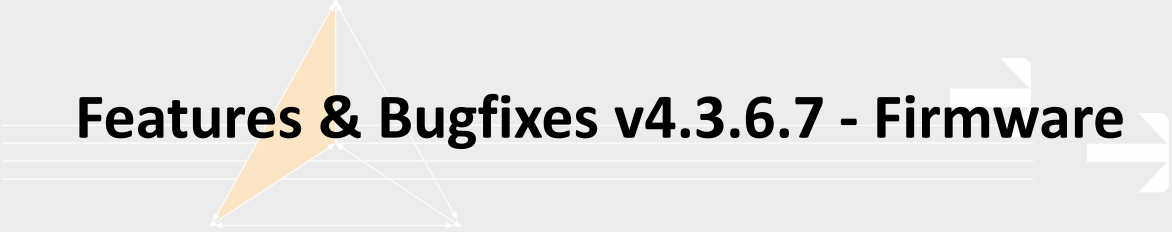
Fehlerbehebung

WinPQ Mobil:

- Error FFT-online marker displaying fixed.

Features

- Online limits Supraharmonic actualized.
- PST & PLT values can be visualised with PQ-Box 100 Basic.
- New language "Portuguese" now available.
- Language Italian actualized.



Features & Bugfixes v4.3.6.7 - Firmware

PQ-Box 200 Features

- Internal buffer size of the transient recorder increased to stabilize communication.

Version 4.3.6.6 (32bit / 64bit) – 28.11.2019



Firmware PQ-Box 50:

- Boot Vers. 0.006
- DSP Vers. 4.047
- MCU Vers. 4.104

Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.416
- MCU Vers. 2.023

Firmware PQ-Box 150:

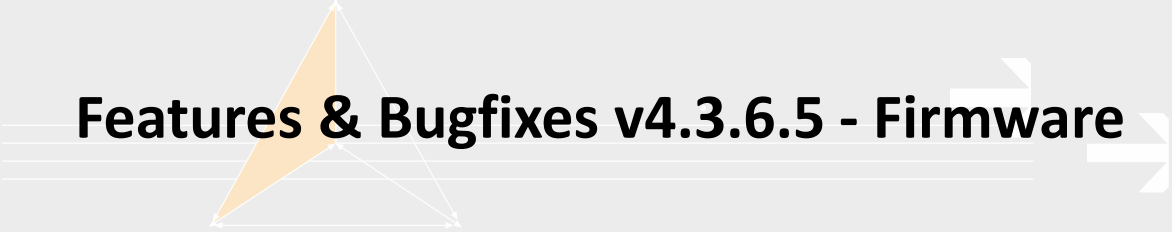
- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.104

Firmware PQ-Box 200:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.104
- FPGA Vers. 0.013

Firmware PQ-Box 300:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.104
- HF Vers. 0.020

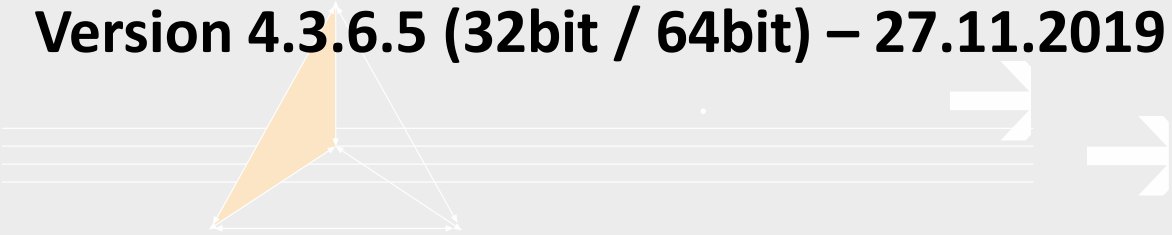


Features & Bugfixes v4.3.6.5 - Firmware

PQ-Box 50 / 150 / 200 / 300 Bugfixes

- Initialization process Start performance optimized (MCU v4_104).

Version 4.3.6.5 (32bit / 64bit) – 27.11.2019



Firmware PQ-Box 50:

- Boot Vers. 0.006
- DSP Vers. 4.047
- MCU Vers. 4.103

Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.416
- MCU Vers. 2.023

Firmware PQ-Box 150:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.103

Firmware PQ-Box 200:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.103
- FPGA Vers. 0.013

Firmware PQ-Box 300:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.103
- HF Vers. 0.020



Bugfixes WinPQ Mobil v4.3.6.5

Bugfixes

WinPQ Mobil:

- Table Interharmonics again visible in statistics of current harmonics.
- Fixed visual error of statistical limit values.
- Fix Update trigger line and marker on deactivation.
- Optimization Detailed view of the measured values.
- Correction of the comment function in the level time diagram.
- K-factor is shown again.

Features

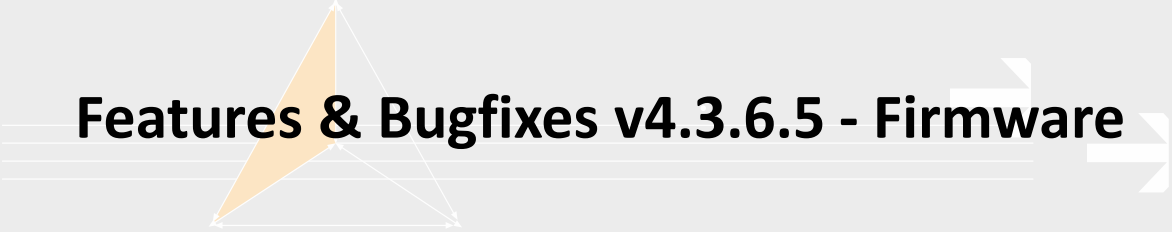
- IEEE norm templates inserted in the standard templates.

Features & Bugfixes v4.3.6.5 - Firmware

PQ-Box 50 / 150 / 200 / 300 Features



- After firmware update (MCU V4_103) all Wifi compatible PQ-Boxes can be operated via PQ-Box App.
- Allocation of internal memory for fault records =2GB when memory limitation is off.



Features & Bugfixes v4.3.6.5 - Firmware

PQ-Box 50 / 150 / 200 / 300 Bugfixes

- Improve measurement data transmission with large data volume via all USB/TCP/Wifi interfaces.

Version 4.3.5.2 (32bit / 64bit) – 06.08.2019

Bugfix version

Firmware PQ-Box 50:

- Boot Vers. 0.005
- DSP Vers. 4.047
- MCU Vers. 4.026

Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.416
- MCU Vers. 2.023

Firmware PQ-Box 150:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.026

Firmware PQ-Box 200:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.026
- FPGA Vers. 0.013

Firmware PQ-Box 300:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.026
- HF Vers. 0.020



Bugfixes v4.3.5.2

Bugfixing

WinPQ Mobil:

- Exchanged firmware packages of PQ-Box 150, 200 and 300 (names were correct in v4.3.5.1, but wrong content)
- Changed contents:
 - MCU Vers. 4.020 -> MCU Vers. 4.026
 - DSP Vers. 4.043 -> DSP Vers. 4.047

Version 4.3.5.1 (32bit / 64bit) – 30.07.2019

Bugfix version



Firmware PQ-Box 50:

- Boot Vers. 0.005
- DSP Vers. 4.047
- MCU Vers. 4.026

Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.416
- MCU Vers. 2.023

Firmware PQ-Box 150:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.026

Firmware PQ-Box 200:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.026
- FPGA Vers. 0.013

Firmware PQ-Box 300:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.026
- HF Vers. 0.020



Bugfixes v4.3.5.1

Bugfixing

WinPQ Mobil:

- Interval trigger for PQ-Box 100 again selectable.

PQ-Box 100:

- Limit values of the frequency trigger can be set in the TRMS recorder.

Version 4.3.5.0 (32bit / 64bit) – 23.07.2019

PQ-Box 50 Release

Firmware PQ-Box 50:

- Boot Vers. 0.003
- DSP Vers. 4.047
- MCU Vers. 4.026

Firmware PQ-Box 200:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.026
- FPGA Vers. 0.013

Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.416
- MCU Vers. 2.022

Firmware PQ-Box 150:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.026

Firmware PQ-Box 300:

- Boot Vers. 0.208
- DSP Vers. 4.047
- MCU Vers. 4.026
- HF Vers. 0.020



PQ-Box 50 – WinPQ mobil V4.3.5.0

Important information about WinPQ mobile version 4.3.5.0

- With this WinPQ mobile version it is possible to operate a PQ-Box 50 via USB connection for the first time.
- Via the Wifi interface of the PQ-Box 50 it is possible to communicate via the APP for Android or Apple devices.
- With the WinPQ mobile version 5.x.x.x, the PQ boxes 150 / 200 / 300 (release 3rd quarter 2019) can also be operated via the APP.
- A Wifi connection between PQ-Box 50 and the WinPQ mobile software will also be possible with version 5.x.x.x.

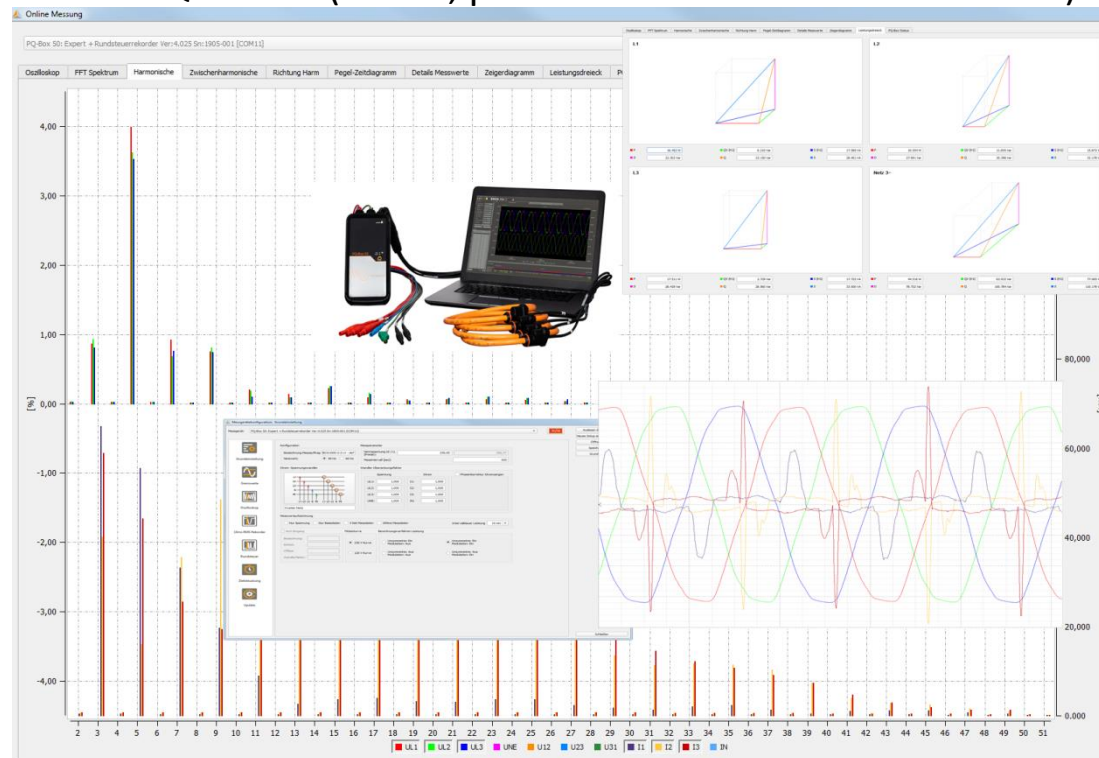


Wir regeln das.

Features & Bugfixes v4.3.5.0

WinPQ Mobil:

- Full implementation PQ-Box 50 (online, parameterization and visualization)



Features & Bugfixes v4.3.5.0

WinPQ Mobil:

- Extension of the online frequency value by 3 decimal places.
- Deleted measurements are transferred to the Windows Recycle Bin.
- New measurement value "TDD" (Total demand distortion) can be displayed as a level-time plot
- **NEW:** EN50160 Low voltage template EN50160:2010 Amd 2/3

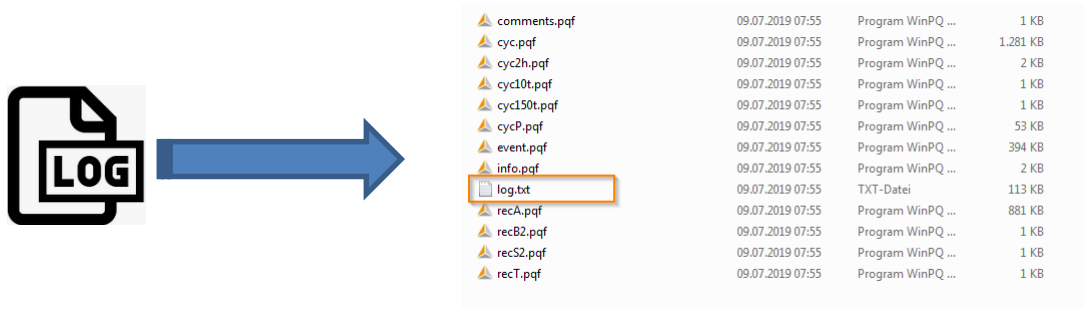
Bug Fixing:

- Improvement during the measurement period. Recorder data (Oszi, TRMS, transients, ripple control). are visualized without valid measuring interval.
- Diverse improvements in ASCII - CSV Export.
- Faster opening of measurements with a large number of flags.
- Improvements in the event matrix of older PQ-Box 100 measurements (MCU V1.xxx).
- Older PQ-Box 100 measurements can be completely visualized before license introduction.

Features & Bugfixes v4.3.5.0 - Firmware

PQ-Box 50 / 150 / 200 / 300

- During the transfer of the measurement data from the device, a complete generation of a logbook is additionally carried out, which is also stored in the measurement data folder.



- Change of the threshold value of the 15th & 21st harmonics in the EN50160 LV templates and adjusted in the factory settings.

Features & Bugfixes v4.3.5.0 - Firmware

PQ-Box 150 / 200 / 300 Bugfixing:

- THD time stamp - long-term data fixed.
- Autotrigger function checks plausibility of adjusted thresholds.

Version 4.2.3.2 (32bit / 64bit) – 13.06.2019

Bugfixversion PQ-Box Firmware

Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.416
- MCU Vers. 2.022

Firmware PQ-Box 150:

- Boot Vers. 0.208
- DSP Vers. 4.043
- MCU Vers. 4.020

Firmware PQ-Box 200:

- Boot Vers. 0.208
- DSP Vers. 4.043
- MCU Vers. 4.020
- FPGA Vers. 0.013

Firmware PQ-Box 300:

- Boot Vers. 0.208
- DSP Vers. 4.043
- MCU Vers. 4.020
- HF Vers. 0.020

Features & Bugfixes v4.2.3.2 - Firmware

PQ-Box 300

- Modification of the update mechanism of the HF card. After a successful update of this firmware version it does not happen anymore that the initialization stops during the start process.

PQ-Box 100 / 150 / 200 / 300

- Frequency calculation in recorder B (TRMS) again performed at half-period level. Significant e.g. for emergency generator measurements.

Version 4.2.3.1 (32bit / 64bit) – 08.02.2019

Bugfix + feature version

Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.413
- MCU Vers. 2.022

Firmware PQ-Box 150:

- Boot Vers. 0.208
- DSP Vers. 4.036
- MCU Vers. 4.020

Firmware PQ-Box 200:

- Boot Vers. 0.208
- DSP Vers. 4.036
- MCU Vers. 4.020
- FPGA Vers. 0.013

Firmware PQ-Box 300:

- Boot Vers. 0.208
- DSP Vers. 4.036
- MCU Vers. 4.020
- HF Vers. 0.018



Features & Bugfixes v4.2.3.1

WinPQ Mobil:

- Digital signature of drivers extended to 02/2022.

Bug Fixing:

- Cyclic data of the PQ-Box 100 (angle of the current harmonics) with the license light and Expert will be shown again.
- Color Matrix evaluation PQ-Box 300 fixed during measurement interruptions.

Features & Bugfixes v4.2.3.1 - Firmware

PQ-Box 100

- Offset problem when switching between Rogowski coils and mini current clamps fixed.

PQ-Box 300

- Communication channel DSP --> ARM optimized. Stability regarding HF card recording improved.

PQ-Box 100 / 150 / 200 / 300

- Adjustable maximum value of interval trigger extended from 4h up to 12h.

Version 4.2.2.1 (32bit / 64bit) – 13.12.2018

Bugfixversion



Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.412
- MCU Vers. 2.021

Firmware PQ-Box 150:

- Boot Vers. 0.208
- DSP Vers. 4.034
- MCU Vers. 4.017

Firmware PQ-Box 200:

- Boot Vers. 0.208
- DSP Vers. 4.034
- MCU Vers. 4.017
- FPGA Vers. 0.013

Firmware PQ-Box 300:

- Boot Vers. 0.208
- DSP Vers. 4.034
- MCU Vers. 4.017
- HF Vers. 0.017



Features & Bugfixes v4.2.2.1

WinPQ Mobil:

Bug Fixing:

- Missing units in the online function added again.
- Current values in the ripple control recorder and current/power values in the TRMS recorder are factorized again via the data converter function.
- "Cross-Trigger" flag of the PQ-Box 300 was not readable via Measurement Data - Measurement device configuration.
- Logo settings are no longer lost after an update.
- Ripple control frequencies can be entered as comma numbers.
- In D-A-CH-CZ reporting, the phase to phase value of the voltage is again entered as the default value.
- Correction of the card designation under the voltage harmonics (German language version).

Version 4.2.1.3 (32bit / 64bit) – 16.11.2018

Bugfixversion



Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.412
- MCU Vers. 2.021

Firmware PQ-Box 150:

- Boot Vers. 0.208
- DSP Vers. 4.034
- MCU Vers. 4.017

Firmware PQ-Box 200:

- Boot Vers. 0.208
- DSP Vers. 4.034
- MCU Vers. 4.017
- FPGA Vers. 0.013

Firmware PQ-Box 300:

- Boot Vers. 0.208
- DSP Vers. 4.034
- MCU Vers. 4.017
- HF Vers. 0.017



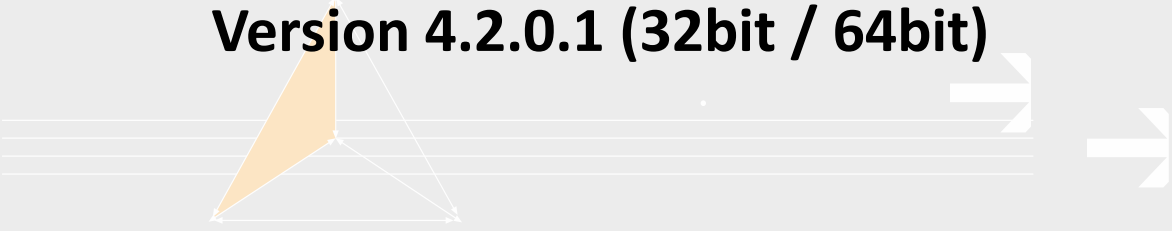
Features & Bugfixes v4.2.1.3

WinPQ Mobil:

Bug Fixing:

- Interval trigger for PQ-Box 200 oscilloscope recorder can be reactivated.
- Unit problem [V]-[A] with ripple control recorder fixed.
- Port number could not be set in the network connection settings if language was set in English - fixed.
- Manuals are opened again in the set language, if available.

Version 4.2.0.1 (32bit / 64bit)



Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.412
- MCU Vers. 2.021

Firmware PQ-Box 150:

- Boot Vers. 0.208
- DSP Vers. 4.034
- MCU Vers. 4.017

Firmware PQ-Box 200:

- Boot Vers. 0.208
- DSP Vers. 4.034
- MCU Vers. 4.017
- FPGA Vers. 0.013

Firmware PQ-Box 300:

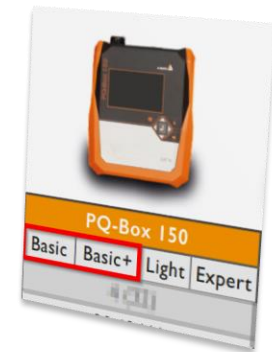
- Boot Vers. 0.208
- DSP Vers. 4.034
- MCU Vers. 4.017
- HF Vers. 0.017

Features & Bugfixes v4.2.0.1

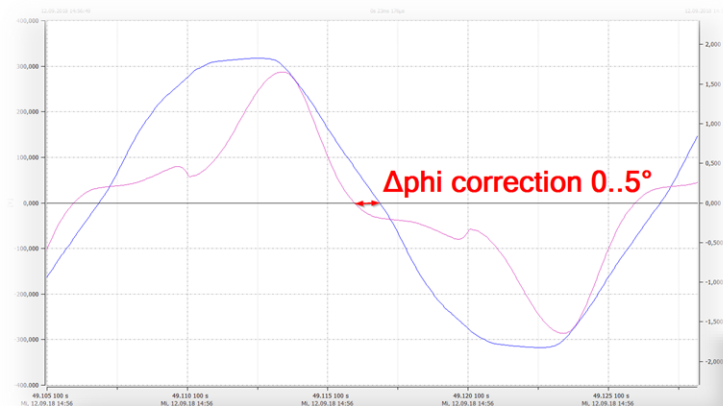
WinPQ Mobil:

- New licenses for PQ-Box 150 => Basic, Basic +
More information in the flyer:

https://www.a-eberle.de/sites/default/files/media/p_PQ_Mobil_2018_en_web.pdf



- Angle correction of the mini current clamp inputs adjustable between 0..5° by software.



Features & Bugfixes v4.2.0.1

WinPQ Mobil:

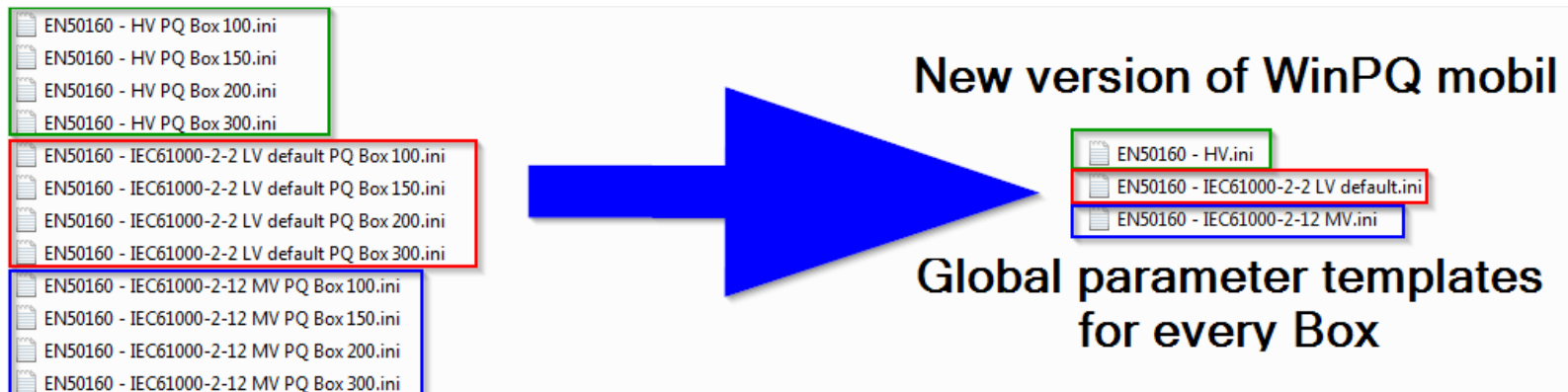
- License-dependent parameterization and online overview => You see what you get
- PQ-Box 300 with transient recorder 410kHz sampling frequency



Features & Bugfixes v4.2.0.1

WinPQ Mobil:

- Fusion of all standard templates => Previously, there was a separate template file for each individual standard for each PQ-Box. The standard templates contain all parameters of all boxes so that they can be transferred to each PQ box.



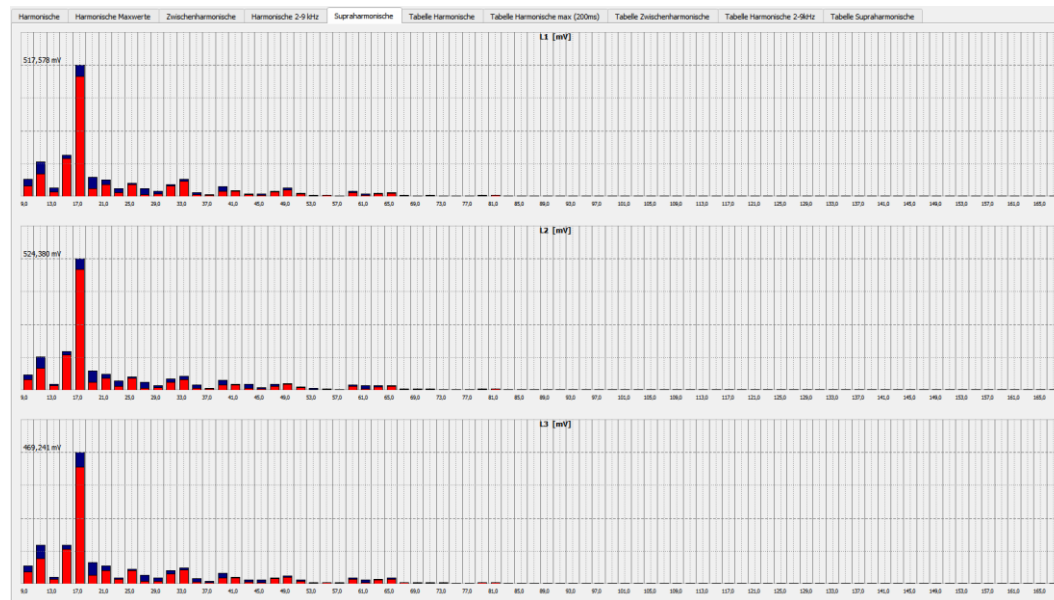
- Standard templates for Grid Code Philippines now also available.

Wir regeln das.

Features & Bugfixes v4.2.0.1

WinPQ Mobil:

- Plot of supraharmonic implemented:





Features & Bugfixes v4.2.0.1

WiPQ Mobil:

Bug fixing:

- The setting of the transient card PQ-Box 200 was not visible in the measurement file. Error was fixed.
- Phase angles of the phase-phase voltages are displayed correctly again in online mode.
- Error fixed in the input field of the nominal voltage.
- Correction of EN statistics (slow voltage change; frequency change) optimized.
- Data converter --> If a subsequent current transformer factor is entered, the max. harmonics of the currents are also adapted.
- Unit of ripple signal data in the long-term data corrected.
- Failure "Fill in gaps" in CSV export works repaired.



Features & Bugfixes v4.2.0.1

WiPQ Mobil:

Bug Fixing:

- Flagging error in the visualization corrected.
- Stabilization of the software, program crashes fixed in several places.

Version 4.1.0.1 (32bit / 64bit) (Bugfixversion)

Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.404
- MCU Vers. 2.018

Firmware PQ-Box 150:

- Boot Vers. 0.206
- DSP Vers. 4.026
- MCU Vers. 3.016

Firmware PQ-Box 200:

- Boot Vers. 0.206
- DSP Vers. 4.026
- MCU Vers. 3.017
- FPGA Vers. 0.013

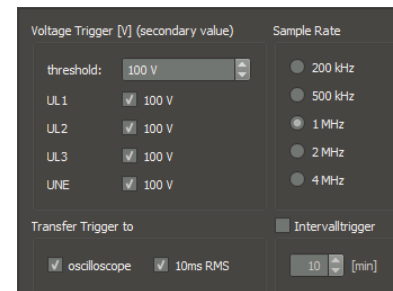
Firmware PQ-Box 300:

- Boot Vers. 0.206
- DSP Vers. 4.026
- MCU Vers. 3.935
- HF Vers. 0.010

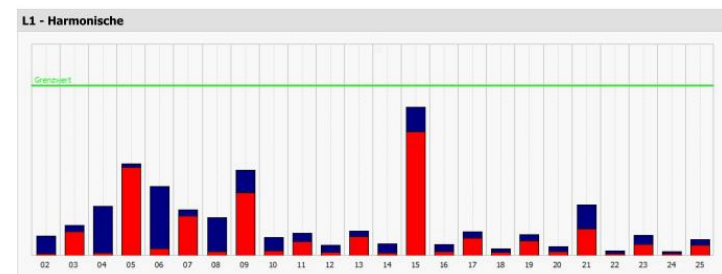
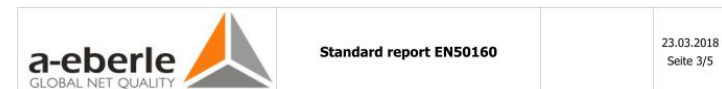
Features & Bugfixes v4.1.0.1

WinPQ Mobil:

- Sample rate transient card adjustable up to 4MHz.



- Evaluation of harmonics (25th harmonic) according to EN50160





Features & Bugfixes v4.1.0.1



WinPQ Mobil:

Bug Fixing:

- By disabled Auto synchronization the software now doesnt send the system time from the PC.
- Detail map of the Min / Medium / Max values will be updated again.
- Fixing of faulty timestamps on ASCII export (Oscilloscope recorder).
- Number of PLT values corrected in EN report.
- Fixing of the faulty frequency value in the EN print report.
- Inserted missing table „2-9kHz current harmonics“ for a PQ-Box 300 measurement.
- Fixing of visualization the ripple control signal in the "3s" data class.
- CSV export: Umax & Imax harmonics inserted.
- Cosphi (active power) scale improved.
- Fixing the manual scaling function (FFT viewing for a fix frequency range over several recorder)

Features & Bugfixes v4.1.0.1 - Firmware

PQ-Box 200

- Sample rate transient card adjustable up to 4MHz.

PQ-Box 300

- Improvement of communication in WLAN mode.
- Advanced adjustments in online mode (HF oscilloscope stream)

Version 4.0.2.1 (32bit / 64bit)

Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.404
- MCU Vers. 2.018

Firmware PQ-Box 150:

- Boot Vers. 0.206
- DSP Vers. 4.025
- MCU Vers. 3.016

Firmware PQ-Box 200:

- Boot Vers. 0.206
- DSP Vers. 4.025
- MCU Vers. 3.016
- FPGA Vers. 0.012

Firmware PQ-Box 300:

- Boot Vers. 0.206
- DSP Vers. 4.025
- MCU Vers. 3.927
- HF Vers. 0.009

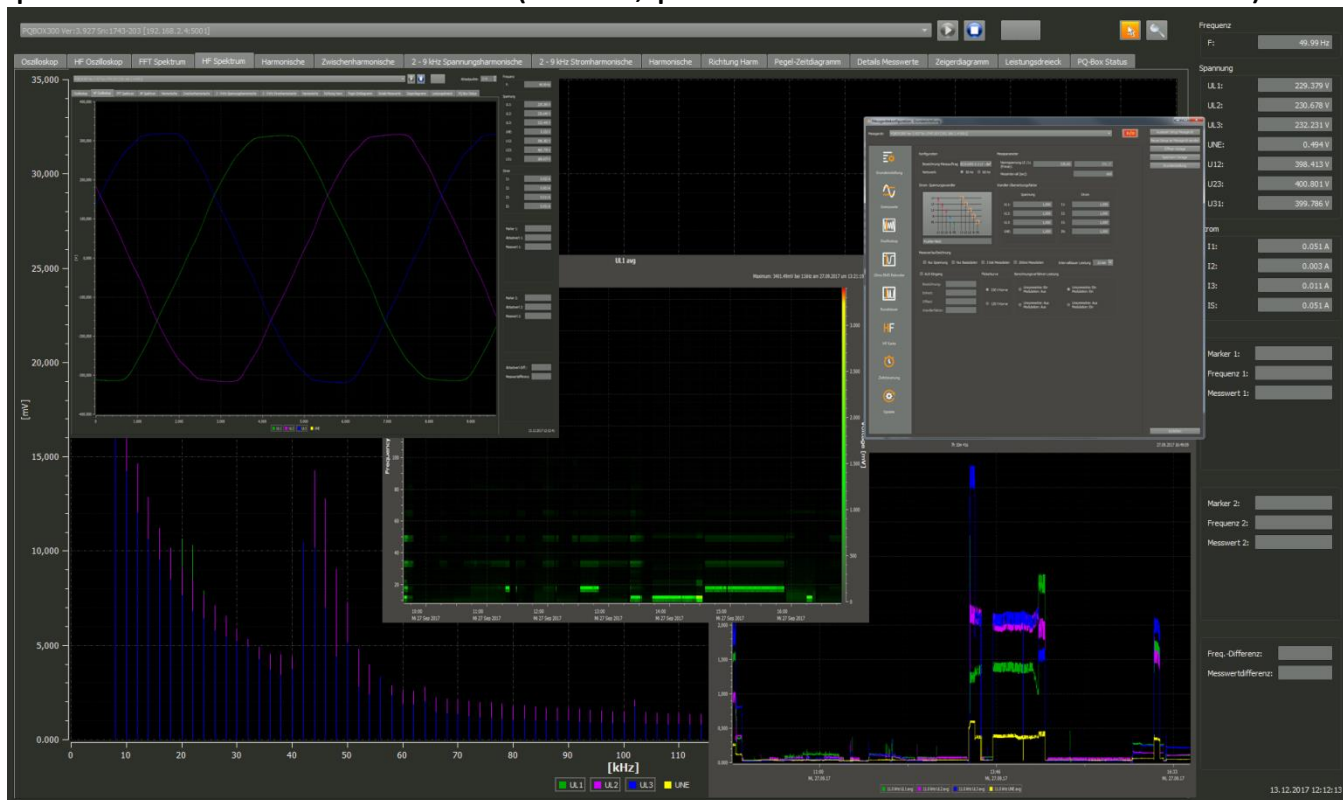


Wir regeln das.

Features & Bugfixes v4.0.2.1

WinPQ Mobil:

- Full implementation of PQ-Box 300 (online, parameterization and visualization)





Features & Bugfixes v4.0.2.1



WinPQ Mobil:

- PQ-Box 300 can be operated via USB, TCP / IP and WLAN.
- Added new online cards for PQ-Box 300 (HF oscilloscope & HF spectrum up to 170kHz).
- Colormatrix (3D overview of subharmonics).

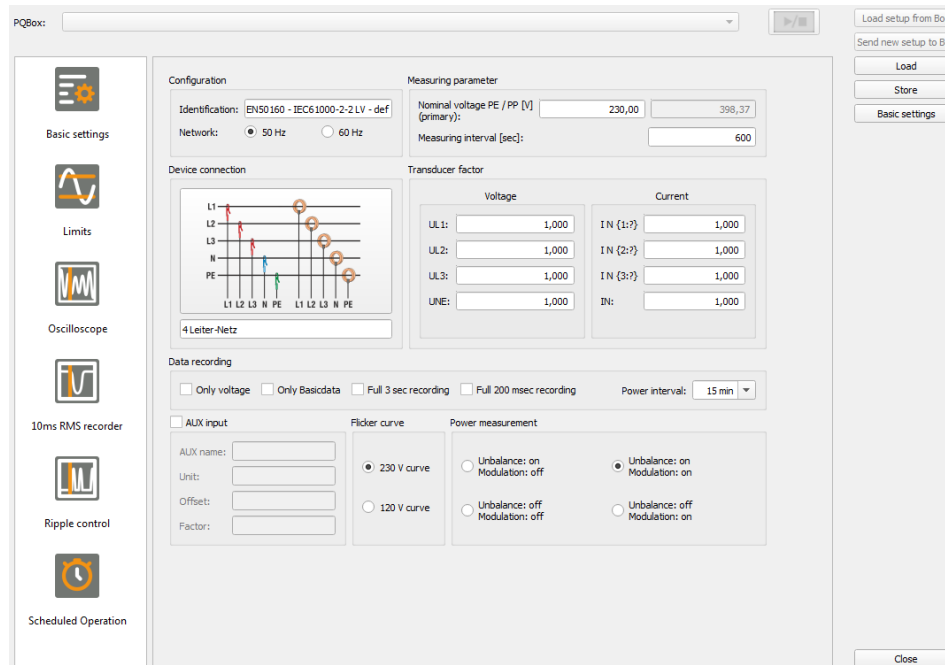
Bug fixing:

- Fixing Bug in CSV export about comma and point selection for the decimal point.
- Fixed program crashes at several points.

Features & Bugfixes v4.0.2.1

New device setup menu

- New and user friendly overview of the device configuration.

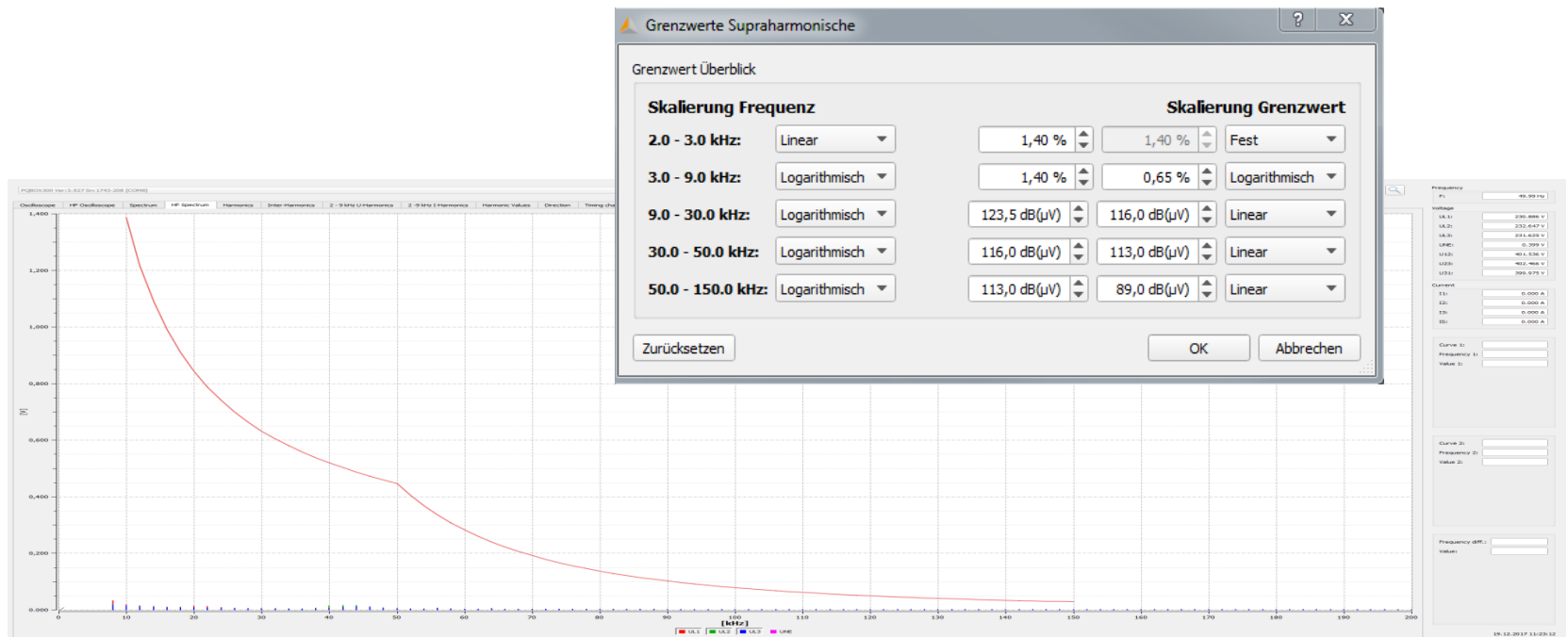


The screenshot displays the WinPQ Mobil configuration window, titled 'PQBox:'. The interface is organized into several sections:

- Left Sidebar:** Contains icons and labels for 'Basic settings' (selected), 'Limits', 'Oscilloscope', '10ms RMS recorder', 'Ripple control', and 'Scheduled Operation'.
- Configuration Section:**
 - Identification:** 'EN50160 - IEC61000-2-2 LV - def'
 - Network:** Radio buttons for '50 Hz' (selected) and '60 Hz'.
 - Device connection:** A diagram of a 4-wire network (L1, L2, L3, N, PE) with measurement points indicated by colored circles. Below the diagram is the label '4 Leiter-Netz'.
- Measuring parameter Section:**
 - Nominal voltage PE / PP [V] (primary):** Input fields for '230,00' and '398,37'.
 - Measuring interval [sec]:** Input field for '600'.
- Transducer factor Section:**
 - Voltage:** Input fields for UL1, UL2, UL3, and UNE, all set to '1,000'.
 - Current:** Input fields for IN (1:?), IN (2:?), IN (3:?), and IN, all set to '1,000'.
- Data recording Section:**
 - Checkboxes for 'Only voltage', 'Only Basicdata', 'Full 3 sec recording', and 'Full 200 msec recording'.
 - Power interval:** A dropdown menu set to '15 min'.
- AUX input Section:**
 - AUX name:** An empty text field.
 - Unit:** An empty text field.
 - Offset:** An empty text field.
 - Factor:** An empty text field.
- Flicker curve Section:**
 - Radio buttons for '230 V curve' (selected) and '120 V curve'.
- Power measurement Section:**
 - Four radio buttons for unbalance settings: 'Unbalance: on Modulation: off' (selected), 'Unbalance: on Modulation: on', 'Unbalance: off Modulation: off', and 'Unbalance: off Modulation: on'.
- Right Sidebar:** Buttons for 'Load setup from Box', 'Send new setup to Box', 'Load', 'Store', 'Basic settings', and 'Close'.

Features & Bugfixes v4.0.2.1

- Limits Supraharmonics according IEC61000-2-2 2kHz up to 150kHz



Features & Bugfixes v3.1.8.1 - Firmware

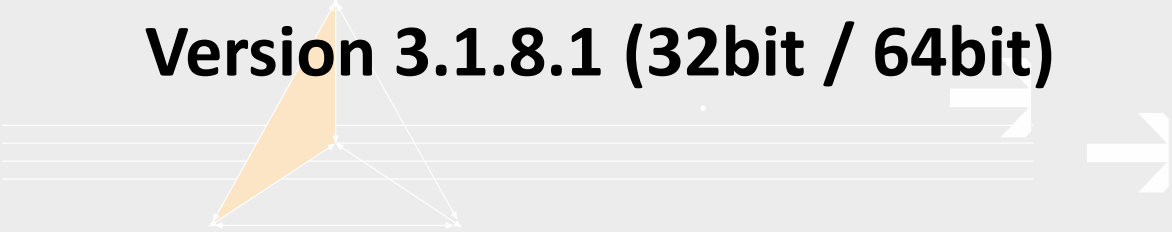
PQ-Box 150 / 200

- MCU Version ≥ 3.016 also update the bootloader by an firmware update via „on the fly“ modus. The Bootloader is important for the **PQ-Box 150** to fullfill the function „start PQ-Box without power supply“.
- *Please update the firmware in this case two times to get the newest bootloader v0206 on the box.*
- Bugfix TRMS recording - Calculation of the real and reactive power values as fundamental.
- Bugfix unbalance current was not calculated.

PQ-Box 300

- New longterm values (supraharmonics 8..170kHz).
- WIFI communication.
- FFT HF 8..170kHz and HF Oscilloskop stream with 409kHz sampling.

Version 3.1.8.1 (32bit / 64bit)



Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.404
- MCU Vers. 2.018

Firmware PQ-Box 150:

- Boot Vers. 0.197
- DSP Vers. 4.022
- MCU Vers. 3.013

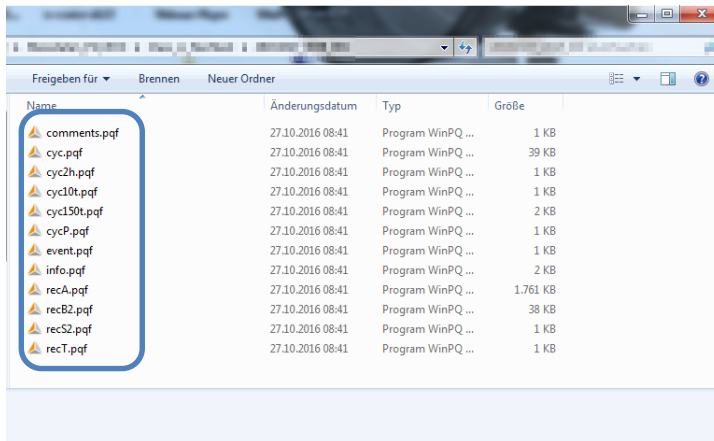
Firmware PQ-Box 200:

- Boot Vers. 0.197
- DSP Vers. 4.022
- MCU Vers. 3.013
- FPGA Vers. 0.012

Features & Bugfixes v3.1.8.1

WinPQ Mobil:

- Dataconverter current factor can be set by value <1
- Ist possible now to open the measuring data by double clicking directly from the path.



Features & Bugfixes v3.1.8.1

WinPQ Mobil:

- New CSV feature „fill gaps“ implemented. Measuring interruptions will be filled with zero values.

Datum	Zeit	'UL1 [V]'	'UL2 [V]'	'UL3 [V]'	'UL1 max [V]'	'UL2 max [V]'	'UL3 max [V]'	'UL1 min [V]'	'UL2 min [V]'	'UL3 min [V]'	'IL1 [A]'	'IL2 [A]'	'IL3 [A]'	'I Neutral [A]'	'IL1 Max [A]'	'IL2 Max [A]'	'IL3 M
01.04.2016	05:10:00.000	271.283	275.863	270.185	271.919	276.491	270.827	269.174	274.863	268.923	483.327	511.903	475.153	2.532	489.030	520.794	4
01.04.2016	05:20:00.000	271.176	275.864	270.134	272.041	276.776	270.911	266.244	271.936	264.533	483.976	512.775	476.001	2.584	507.876	540.824	4
01.04.2016	05:30:00.000	272.163	276.583	270.990	272.676	277.101	271.544	269.445	275.224	269.690	483.283	510.335	473.954	2.574	489.797	525.497	4
01.04.2016	05:40:00.000	272.324	276.556	271.203	272.900	287.965	276.910	175.906	262.996	258.264	483.457	509.221	474.873	2.559	701.583	895.008	6
01.04.2016	05:50:00.000	272.216	276.055	270.999	276.221	279.873	274.843	257.461	260.527	256.539	478.912	504.267	472.828	2.590	810.285	849.971	8
01.04.2016	06:00:00.000	274.798	279.002	273.612	275.324	279.678	274.152	273.097	277.789	272.422	367.563	385.975	359.205	2.002	382.301	402.349	3
01.04.2016	06:10:00.000	274.875	278.879	273.465	275.364	279.403	274.052	273.792	277.889	272.460	367.464	384.099	357.608	2.001	371.021	387.841	3
01.04.2016	06:20:00.000	273.572	277.434	271.984	274.937	278.942	273.517	258.707	262.495	256.860	454.392	474.790	443.088	2.428	971.944	1.011.982	9
01.04.2016	06:30:00.000	273.935	277.786	272.189	274.357	278.254	272.611	273.290	277.178	271.608	484.630	506.019	471.180	2.578	488.557	509.808	4
01.04.2016	06:40:00.000	273.603	277.804	271.985	274.187	278.434	272.504	273.104	277.079	270.531	483.665	506.959	469.497	2.573	492.795	510.591	4
01.04.2016	06:50:00.000	273.318	277.704	271.789	274.863	278.241	273.271	273.648	276.464	269.278	483.641	508.505	469.488	2.583	495.022	519.829	4
01.04.2016	07:00:00.000	272.719	277.356	271.312	274.428	279.222	273.166	267.584	274.644	265.968	483.577	510.151	470.616	2.568	503.983	532.637	4
01.04.2016	07:10:00.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
01.04.2016	07:20:00.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
01.04.2016	07:30:00.000	271.270	276.053	270.290	272.101	276.797	271.214	268.478	274.057	266.689	485.299	511.619	472.537	2.576	499.676	529.348	4
01.04.2016	07:40:00.000	271.203	275.780	269.894	271.855	276.450	270.480	269.144	274.073	268.600	486.857	511.288	472.643	2.573	492.777	524.878	4
01.04.2016	07:50:00.000	271.833	276.470	270.451	273.298	277.945	271.870	268.370	273.023	268.168	485.391	510.938	471.766	2.552	496.792	523.589	4
01.04.2016	08:00:00.000	272.188	276.863	270.839	272.829	277.586	271.501	269.882	275.163	268.022	483.957	509.124	470.683	2.516	494.502	520.687	4
01.04.2016	08:10:00.000	272.631	277.394	271.318	274.412	279.321	273.401	262.514	267.480	261.272	455.861	479.871	443.723	2.339	802.930	841.529	8
01.04.2016	08:20:00.000	273.252	278.387	272.129	274.491	279.595	273.301	270.917	276.895	269.314	365.707	386.118	354.603	1.907	373.335	390.746	3
01.04.2016	08:30:00.000	272.364	277.592	271.256	273.230	279.464	272.320	215.401	267.423	266.888	370.111	391.976	359.718	1.945	452.832	552.734	4
01.04.2016	08:40:00.000	271.453	276.559	270.260	272.904	277.958	271.591	270.356	275.560	269.245	371.568	393.983	361.710	1.974	386.928	408.464	3
01.04.2016	08:50:00.000	272.355	277.624	271.147	272.829	278.079	271.616	269.892	276.400	269.976	370.809	391.864	359.285	1.961	375.008	402.604	3
01.04.2016	09:00:00.000	272.348	277.488	271.108	272.814	277.939	271.609	271.506	274.913	270.548	371.115	391.664	359.167	1.939	373.925	394.946	3
01.04.2016	09:10:00.000	271.936	276.954	270.820	272.751	277.968	271.806	268.822	275.860	269.619	371.944	391.588	360.324	1.947	375.136	406.871	3
01.04.2016	09:20:00.000	271.860	276.784	270.721	272.351	277.231	271.250	269.976	275.709	268.667	370.965	390.672	359.837	1.939	378.106	396.025	3
01.04.2016	09:30:00.000	271.655	276.642	270.668	272.369	277.249	271.430	268.689	274.576	267.302	371.617	391.268	360.750	1.945	383.970	403.924	3
01.04.2016	09:40:00.000	271.898	276.897	270.987	276.420	281.923	275.758	264.022	269.337	263.041	353.857	372.914	343.972	1.902	605.231	636.503	6



Features & Bugfixes v3.1.8.1



WinPQ Mobil:

- Correction of program crash by generating an EN Report with one phase measurement.
- Missing text Aron circuit was added.
- Missing visualization of 3s data class improved.
- Missing measured values in CSV export supplemented.
- Adjustment EN report by the ripple control bar view.

Features & Bugfixes v3.1.8.1 - Firmware

PQ-Box 150 / 200

- Bugfix Apparent-Reactivepoer, Power-Reactivefactor in the N - Min Dataclass.

Version 3.1.7.2 (32bit / 64bit) IEC 61000-4-30 Class A Edition 3 Version!

Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.404
- MCU Vers. 2.018

Firmware PQ-Box 150:

- Boot Vers. 0.197
- DSP Vers. 4.021
- MCU Vers. 3.013

Firmware PQ-Box 200:

- Boot Vers. 0.197
- DSP Vers. 4.021
- MCU Vers. 3.013
- FPGA Vers. 0.012

Features & Bugfixes v3.1.7.2

WinPQ Mobil:

- Correction of the Firmware path PQ-Box 150
- EN50160 HV templates adapted for PQ-Box 100, 150 and 200
- Update of the Language files Polish and Turkish
- Correction of English texts
- Change of text flicker output 5 in pinst
- Bugfix language files (some fields were only shown in English in all language settings)
- Complement of the user manual German and English (Table of contents and Transient settings)

Features & Bugfixes v3.1.7.2 - Firmware

PQ-Box 100

- Ripple control longterm data implemented
- Ripple control signal recorder measuring up to 3kHz
- Correction of the calculation method frequency trigger df/s

PQ-Box 150 / 200

- Correction of the calculation method frequency trigger df/s

Version 3.1.7.1 (32bit / 64bit) IEC 61000-4-30 Class A Edition 3 Version!

Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.400
- MCU Vers. 2.015

Firmware PQ-Box 150:

- Boot Vers. 0.197
- DSP Vers. 4.018
- MCU Vers. 3.010

Firmware PQ-Box 200:

- Boot Vers. 0.197
- DSP Vers. 4.018
- MCU Vers. 3.010
- FPGA Vers. 0.012

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Institute of Electrical Power Systems and High Voltage Engineering

**COMPLIANCE TEST ACCORDING TO
IEC 61000-4-30 Ed.3 (2015)**

PQ-Box 150

Measurement accuracy and measurement methods for the following quantities were tested on conformity with IEC 61000-4-30 Ed.3 (2015). This includes all tests as required by IEC 62586-2 Ed.1 (2013) and specific additional tests.

Power Quality Parameter	Class A Compliance
Power frequency	Yes
Magnitude of supply voltage	Yes
Flicker	Yes
Voltage interruptions, dips and swells	Yes
Supply voltage unbalance	Yes
Voltage harmonics	Yes
Voltage interharmonics	Yes
Mains signalling	Yes
Flugging	Yes
Clock uncertainty	Yes
Variations due to external influence quantities	Yes
Magnitude of current	Yes
Current harmonics	Yes
Current interharmonics	Yes

One sample with serial "1643-108" and firmware "3.9" was tested with a declared input voltage and current of $U_{in} = 230\text{ V}$ and $I_{in} = 20\text{ A}$ and a nominal frequency of $f_{nom} = 50\text{ Hz}$.
The external clock synchronization was performed with an external GPS-clock (11.9024.45). The current measurement was performed with current clamps (111.7015). The manufacturer states that this sample is representative of the PQ-Box 150 series.



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**COMPLIANCE TEST ACCORDING TO
IEC 61000-4-30 Ed.3 (2015)**

PQ-Box 200

Measurement accuracy and measurement methods for the following quantities were tested on conformity with IEC 61000-4-30 Ed.3 (2015). This includes all tests as required by IEC 62586-2 Ed.1 (2013) and specific additional tests.

Power Quality Parameter	Class A Compliance
Power frequency	Yes
Magnitude of supply voltage	Yes
Flicker	Yes
Voltage interruptions, dips and swells	Yes
Supply voltage unbalance	Yes
Voltage harmonics	Yes
Voltage interharmonics	Yes
Mains signalling	Yes
Flugging	Yes
Clock uncertainty	Yes
Variations due to external influence quantities	Yes
Magnitude of current	Yes
Current harmonics	Yes
Current interharmonics	Yes

One sample with serial "1643-108" and firmware "3.9" was tested with a declared input voltage and current of $U_{in} = 230\text{ V}$ and $I_{in} = 20\text{ A}$ and a nominal frequency of $f_{nom} = 50\text{ Hz}$.
The external clock synchronization was performed with an external GPS-clock (11.9024.45). The current measurement was performed with current clamps (111.7015). The manufacturer states that this sample is representative of the PQ-Box 150 series.



Features & Bugfixes v3.1.7.1

WinPQ Mobil:

- IEC61000-4-30 Edition 3 Compliance Test with > MCU 3.009 & DSP 4.0.18 passed
- RVC according Edition 3 of IEC61000-4-30 added (PQ150 / 200)
- Poly Phase Events according Edition 3 of IEC61000-4-30 added
- Versioning of the Software WinPQ Mobil improved
- Interval trigger function of the oscilloscope recorder without function - fixed
- CSV Export the ripple control recorder faulty - fixed
- Unification of paths for Win7 systems
- New Visual C++ Redistributable for Visual Studio 2015 added (DLL Bug)
- XML Statistic Addin: Harmonic were shifted – fixed
- Working with links added again
- Readback of frequency triggering Parameters were faulty - fixed
- Layout "Factory settings" without function – fixed

Features & Bugfixes v3.1.7.1 - Firmware

PQ150 / 200

- IEC61000-4-30 Edition 3 Compliance Test with > MCU 3.009 & DSP 4.0.18 passed
- Storage of the events at maximum utilization of the box improved
- Display problems while online data display - fixed
- Time jump after DCF clock signal loss - fixed
- Error in PQ-Box screen lock on PUK - fixed

Version 3.1.5 (32bit / 64bit)



Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.400
- MCU Vers. **2.015**

Firmware PQ-Box 150:

- Boot Vers. 0.197
- DSP Vers. 4.012
- MCU Vers. 3.006

Firmware PQ-Box 200:

- Boot Vers. 0.197
- DSP Vers. 4.012
- MCU Vers. 3.006
- FPGA Vers. 0.012

Version 3.1.4 (32bit / 64bit)



Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.400
- MCU Vers. 2.013

Firmware PQ-Box 150:

- Boot Vers. 0.197
- DSP Vers. 4.012
- MCU Vers. 3.006

Firmware PQ-Box 200:

- Boot Vers. 0.197
- DSP Vers. 4.012
- MCU Vers. 3.006
- FPGA Vers. 0.012

New advanced trigger functions PQ-Box 100/150/200

Trigger frequency limit overflow, underflow and hop

Settings / current trigger

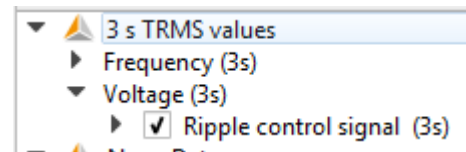
	lower threshold [%]	upper threshold [%]	step [%]	phase step [°]
UL1:	☒ 90,00	☒ 110,00	☐ 10,00	☐ 6,00
UL2:	☒ 90,00	☒ 110,00	☐ 10,00	☐ 6,00
UL3:	☒ 90,00	☒ 110,00	☐ 10,00	☐ 6,00
UNE:	☐ 0,00	☐ 30,00	☐ 10,00	☐ 0,00
U12:	☐ 90,00	☐ 110,00	☐ 10,00	☐ 6,00
U23:	☐ 90,00	☐ 110,00	☐ 10,00	☐ 6,00
U31:	☐ 90,00	☐ 110,00	☐ 10,00	☐ 6,00
	[A]	[A]	[A]	
IL1:	☐ 10,00	☐ 3000,00	☐ 300,00	☒ Auto-Trigger
IL2:	☐ 10,00	☐ 3000,00	☐ 300,00	
IL3:	☐ 10,00	☐ 3000,00	☐ 300,00	
IN:	☐ 0,00	☐ 3000,00	☐ 300,00	

frequency trigger

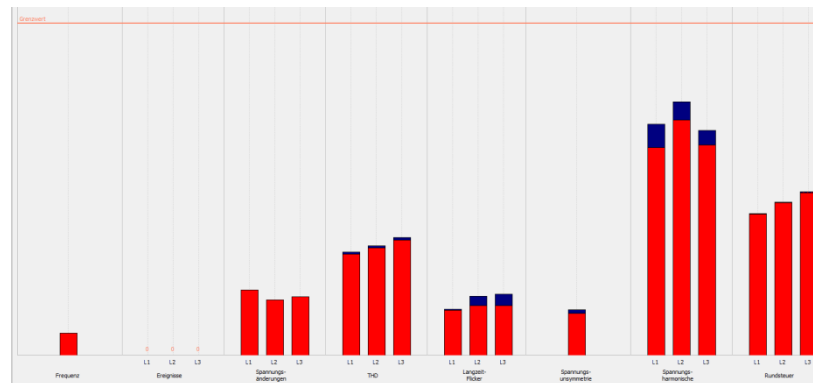
	lower threshold [Hz]	upper threshold [Hz]	frequency change [df/1s]
F:	☒ 50,50	☒ 49,50	☒ 0,50

Ripple control signal PQ-Box 100/150/200

All devices record the 3 second values of the ripple control signal and these are now available in timing diagram



In EN50160 report the 3 second values are shown as bar chart including the 100% and 99%-values.



Ripple control signal PQ-Box 100/150/200

The current measured values of the ripple control signal is now displayed in the online data. The ripple controlled value can be set between 100 Hz an 3750 Hz.

Power	Power factor	THD	Short time flicker	
P1: 10.081 W	PF1: 0.208	THD U1E: 2.62 %	Pst 1: 0.000	
P2: 18.573 W	PF2: 0.384	THD U2E: 2.82 %	Pst 2: 0.000	
P3: -28.101 W	PF3: -0.583	THD U3E: 3.03 %	Pst 3: 0.000	
P total: 0.553 W	PF total: 0.004	THD UNE: 0.00 %		
S1: 48.422 VA		THD U12: 2.47 %	Ripple control	
S2: 48.392 VA		THD U23: 2.72 %	L1: 2.20 %	
S3: 48.209 VA		THD U31: 2.63 %	L2: 2.39 %	
S total: 145.025 VA		THD I1: 131.64 %	L3: 2.54 %	
	Phase angle	THD I2: 131.65 %	Symetrie	
	PHL1: -70.41 °	THD I3: 131.67 %	UU: 0.27 %	
	PHL2: 49.46 °	THD IN: 0.00 %	AUX	
	PHL3: 169.42 °		Measured value: 1.01 mV	
	cos PHL1: 0.335			
	cos PHL2: 0.650			
	cos PHL3: -0.983			
Reactive Power fundamental	Distortion Power	Reactive power modulation	Reactive power unbalance	Reactive power total
QV1: -27.611 Var	D1: 38.473 Var	Q mod 1: 0.725 Var		Q1: 47.361 Var
QV2: 22.253 Var	D2: 38.736 Var	Q mod 2: 1.061 Var		Q2: 44.686 Var
QV3: 5.354 Var	D3: 38.779 Var	Q mod 3: 1.394 Var		Q3: 39.172 Var
Q total: -0.005 Var	D total: 115.988 Var	Q mod total: 3.199 Var	Qu: 86.996 Var	Q total: 145.024 Var

Harmonic Power

- The Harmonic Real Power, Harmonic Apparent Power, Harmonic Reactive Power and the Cosinus Phi Harmonic are now available in the long term measurement data

- Power
 - ☐ Real power
 - ☐ Real power max (200ms)
 - ☐ Real power min (200ms)
 - ☐ Apparent power
 - ☐ Apparent power max (200ms)
 - ☐ Apparent power min (200ms)
 - ☐ Reactive Power
 - ☐ Reactive power max (200ms)
 - ☐ Reactive power min (200ms)
 - ☐ Unbalance reactive power
 - ☐ Modulation Reactive Power
 - ☐ Phase angle u1E - i1
 - ☐ Power factor
 - ☐ Reactive factor
 - ☐ Distortion power D
 - ☐ cos(Phi)
 - ☐ cos(phi) - Real Power
 - ☐ Sinus Phi
 - ☐ Tangens Phi
 - ☐ Real Power fundamental
 - ☐ Apparent Power fundamental
 - ☐ Reactive Power fundamental
 - ☐ Phi fundamental Grid
 - ☐ Harmonic Real Power
 - ☐ Harmonic Apparent Power
 - ☐ Harmonic Reactive Power
 - ☐ Cosinus Phi Harmonic

New measure intervals (200ms and 3 sec) available

The PQ-Box 150 and 200 can record the 3 second and/or 200 ms measured values now in parallel with the n x second interval

Configuration

Network: ☒ 50 Hz ☐ 60 Hz

☐ Record "only" voltages ☐ Record "only" Basicdata

Identification:

☒ 3s recording ☒ 200ms recording

If these interval classes are activated, the long term data are shown in the menu tree.

- Auswahl
- ▼  200ms Daten
 - ▶ Frequenz (200 ms)
 - ▶ Spannung (200 ms)
 - ▶ Strom (200 ms)
 - ▼  3s TRMS Daten
 - ▶ Frequenz (3s)
 - ▶ Spannung (3s)
 - ▶ Strom (3s)
 - ▼  N sek Daten
 - ▶ Frequenz
 - ▶ Spannung
 - ▶ Strom
 - ▶ Leistung
 - ▶ Energie
 - ▶  N - Min Daten
 - ▶  2Std Daten

Firmware PQ-Box 150 / 200

Additional to the key lock it is possible to lock the PQ-Box 150 and 200 with a password

The following functions are locked:

- Display functions (measurement values and setup menu)
only the password input is possible
- USB- and TCP/IP links are inactive

The devices are protected against unauthorized access

- unauthorized access to the measurement data
- Thievery of the device

Version 3.0 (32bit / 64bit)

Firmware PQ-Box 100:

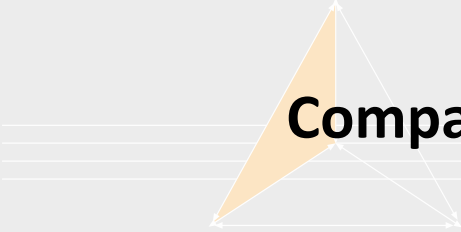
- Boot Vers. 1.202
- DSP Vers. 1.296
- MCU Vers. 2.012

Firmware PQ-Box 150:

- Boot Vers. 0.197
- DSP Vers. 3.036
- MCU Vers. 2.112

Firmware PQ-Box 200:

- Boot Vers. 0.197
- DSP Vers. 2.087
- MCU Vers. 2.112
- FPGA Vers. 0.012



Compatible with Win10



WinPQ mobil ver. 3.0 is compatible with Windows10.

We made a new manufacturer certification for the software.

Extended power calculation

The possibilities of apparant.- and reactive power calculation has been extended
In the setup menu you can choose the calculation with modulation and/or unbalance power.

Power measurement

☐ Unbalance: on Modulation: off	☒ Unbalance: on Modulation: on
☐ Unbalance: off Modulation: off	☐ Unbalance: off Modulation: on

← Basic setting

Regardless of the setting in the setup menu, the unbalance reactive power, modulation reactive power and distortion power is always calculated separately and are available in the measured data.

- Power
 - ☐ Real power
 - ☐ Real power max (200ms)
 - ☐ Real power min (200ms)
 - ☐ Apparent power
 - ☐ Apparent power max (200ms)
 - ☐ Apparent power min (200ms)
 - ☐ Reactive power
 - ☐ Reactive power max (200ms)
 - ☐ Reactive power min (200ms)
 - ☐ Unbalance reactive power
 - ☐ Moulation reactive power
 - ☐ Phase angle u1E - i1
 - ☐ Power factor
 - ☐ Reactive factor
 - ☐ D Distortion power
 - ☐ cos(Phi)
 - ☐ cos(phi) VDE-AR-N4105
 - ☐ Sinus Phi
 - ☐ Tangens Phi
 - ☐ Real Power fundamental
 - ☐ Apparent Power fundamental
 - ☐ Reactive Power fundamental
 - ☐ Phi fundamental

Extended power calculation

Extended online values.

In online values the modulation- and unbalance reactive power are available. These values are independently from the device settings and always available.

Power P1: 37.416 W P2: -13.779 W P3: -15.289 W P total: 8.348 W S1: 41.763 VA S2: 36.363 VA S3: 34.203 VA S total: 59.623 VA	Power factor PF1: 0.896 PF2: -0.379 PF3: -0.447 PF total: 0.140 Phase angle PHL1: -2.57 ° PHL2: 117.98 ° PHL3: -123.03 ° cos PHL1: 0.999 cos PHL2: -0.469 cos PHL3: -0.545	THD THD U1E: 2.32 % THD U2E: 2.54 % THD U3E: 2.72 % THD UNE: 0.00 % THD U12: 2.12 % THD U23: 2.29 % THD U31: 2.24 % THD I1: 25.93 % THD I2: 26.25 % THD I3: 26.19 % THD IN: 24.77 %	Short time flicker Pst 1: 0.121 Pst 2: 0.125 Pst 3: 0.126 Unbalance UU: 0.28 % AUX Measured value [mV]: 5.49
---	---	---	--

Reactive Power fundamental QV1: -1.685 Var QV2: 26.567 Var QV3: -23.255 Var Q total: 1.627 Var	Distortion Power D1: 18.475 Var D2: 20.656 Var D3: 19.882 Var D total: 59.013 Var	Reactive power modulation Q mod 1: 0.000 Var Q mod 2: 0.000 Var Q mod 3: 0.000 Var Q mod total: 0.000 Var	Reactive power unbalance Qu: 117.866 Var	Reactive power total Q1: 18.552 Var Q2: 33.652 Var Q3: 30.595 Var Q total: 59.036 Var
---	--	--	--	--

Automatic trigger PQ-Box 100/150/200

The „automatic trigger“ has been optimized for long term measurement

It changes independently for all enabled trigger thresholds, in case of a too sensitive threshold. This prevents the recording of unnecessarily large amounts of data.

The "automatic trigger" acts for each threshold selectively and can increase all these limits (e.g. the upper and lower threshold, the step, the phase shift or the wave shape trigger)

.

Implementation of the automatic trigger:

Three timers are implemented and work for each active trigger threshold independently:

- Expansion threshold
- Hold threshold
- Approximation threshold



Speicherverwaltung PQ Box 150/200

- **Recorder memory enlarged from 500MB to 1GB.**

If „memory limitation (680MB)“ is off, one data file can reach the maximum size of the memory card. (f.e. 4GB).

In this case all recorders are limited to 1000MByte (in older firmware the limit was 500MByte)

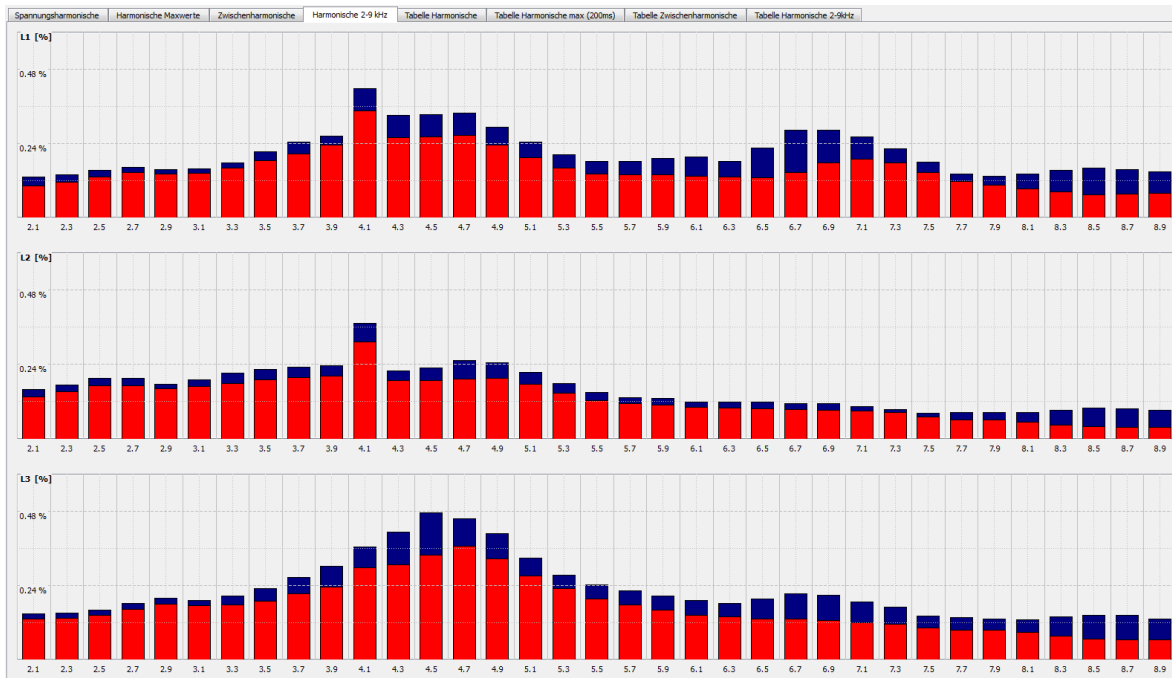
Anzeige Messgerät und Geräteoption in Software

In each measurement file you can see the device and the options of this device.

Spannungssystem:	4 Leiter-Netz
Nennspannung LE / LL (Primär):	230.00 V / 398.37 V
Frequenz:	50 Hz
Messintervall:	1 s
Rundsteuerfrequenz:	168 Hz
Messung Beginn:	06.04.2016 16:48:03
Messung Ende:	06.04.2016 17:13:46
Messdauer:	25m 43s
Anzahl Messintervalle:	1543
Messgerätetyp:	PQ-Box 150 : Expert 2-9 kHz
Seriennummer Gerät:	1544-001
Firmware:	2.112
DSP-Version:	3.36

Change between %-values and absolute values in software

There was a bug in the software during the change of the scaling of voltage harmonics 2kHz to 9kHz from %-values to absolute values.



Wir regeln das.

GB standard report China

GB-Standard power quality report for China integrated in WinPQ mobil.

If in the setup or during the first installation of the software „China“ was chosen, the GB reports are available in the menu of current harmonics. Depending of the shortcut power and voltage level, winPQ calculates the limits for current harmonics according the GB standard.



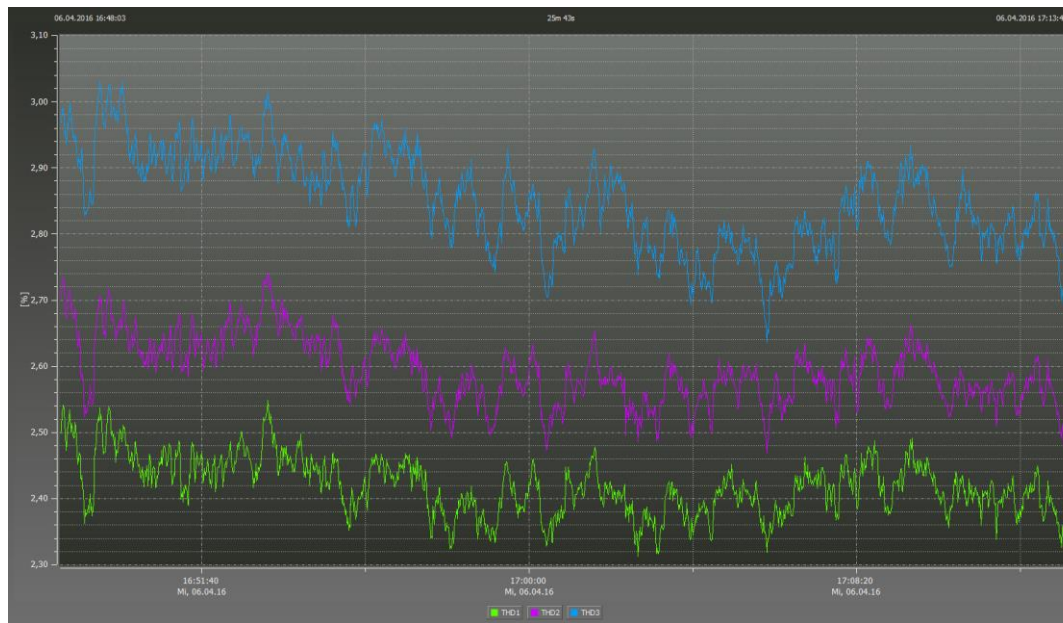
- ☐ EN50160
- ☐ Netcode
- ☐ NRS 048
- ☒ GB-China report

Stromharmonische	Harmonische Maxwerte	Zwischenharmonische	Harmonische 2-9 kHz	Tabelle Harmonische	Tabelle Harmonische max (200ms)	Tabelle Zwischenharmonische	Tabelle Harmonische 2-9kHz	GB14549-93
Kurzschlussleistung [MVA]:		10.00		Nennspannung L-L [kV]:		0.38		Normauswertung erzeugen
	Grenzwert	L1 - 95% [A]	L1 - Max [A]	L2 - 95% [A]	L2 - Max [A]	L3 - 95% [A]	L3 - Max [A]	
02	78.00	0.02	0.10	0.04	0.24	0.25	0.53	
03	62.00	0.57	0.75	0.88	1.58	0.44	0.96	
04	39.00	0.01	0.03	0.03	0.07	0.09	0.23	
05	62.00	0.50	0.63	0.61	0.85	0.35	0.54	
06	26.00	0.01	0.01	0.02	0.04	0.05	0.20	
07	44.00	0.31	0.37	0.36	0.55	0.17	0.28	
08	19.00	0.01	0.02	0.01	0.02	0.03	0.13	
09	21.00	0.25	0.30	0.23	0.31	0.16	0.20	
10	16.00	0.01	0.01	0.01	0.02	0.02	0.10	
11	28.00	0.15	0.18	0.09	0.15	0.10	0.15	
12	13.00	0.01	0.01	0.01	0.01	0.01	0.09	
13	24.00	0.09	0.12	0.08	0.11	0.05	0.10	
14	11.00	0.01	0.01	0.01	0.01	0.01	0.07	
15	12.00	0.06	0.08	0.09	0.15	0.05	0.08	
16	9.70	0.01	0.01	0.01	0.01	0.01	0.05	
17	18.00	0.05	0.07	0.06	0.09	0.04	0.07	
18	8.60	0.01	0.01	0.01	0.01	0.01	0.04	
19	16.00	0.05	0.08	0.06	0.09	0.05	0.06	
20	7.80	0.00	0.01	0.01	0.01	0.01	0.03	
21	8.90	0.04	0.05	0.04	0.06	0.04	0.05	
22	7.10	0.01	0.01	0.01	0.01	0.01	0.03	
23	14.00	0.03	0.05	0.04	0.06	0.03	0.06	
24	6.50	0.01	0.01	0.01	0.02	0.01	0.02	
25	12.00	0.02	0.03	0.03	0.04	0.02	0.03	

Wir regeln das.

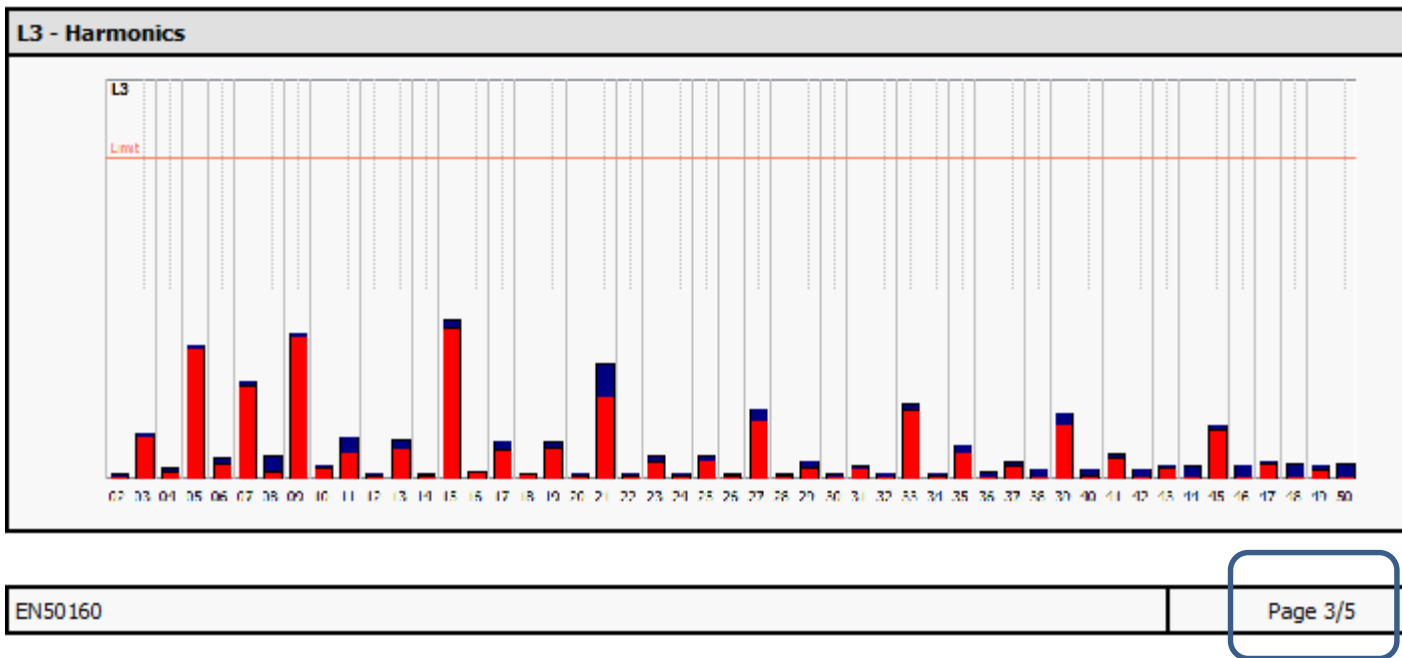
Colors in grafic

In the setting „black magic“ the colors of the legend did not suit to the colors of the diagramm.
- Bugfixing



Paging in EN50160 report

We implement paging for the EN50160/IEC61000-2-x report



Version 2.3 (32bit / 64bit)

Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.280
- MCU Vers. 2.010

Firmware PQ-Box 150:

- Boot Vers. 0.197
- DSP Vers. 3.020
- MCU Vers. 2.108

Firmware PQ-Box 200:

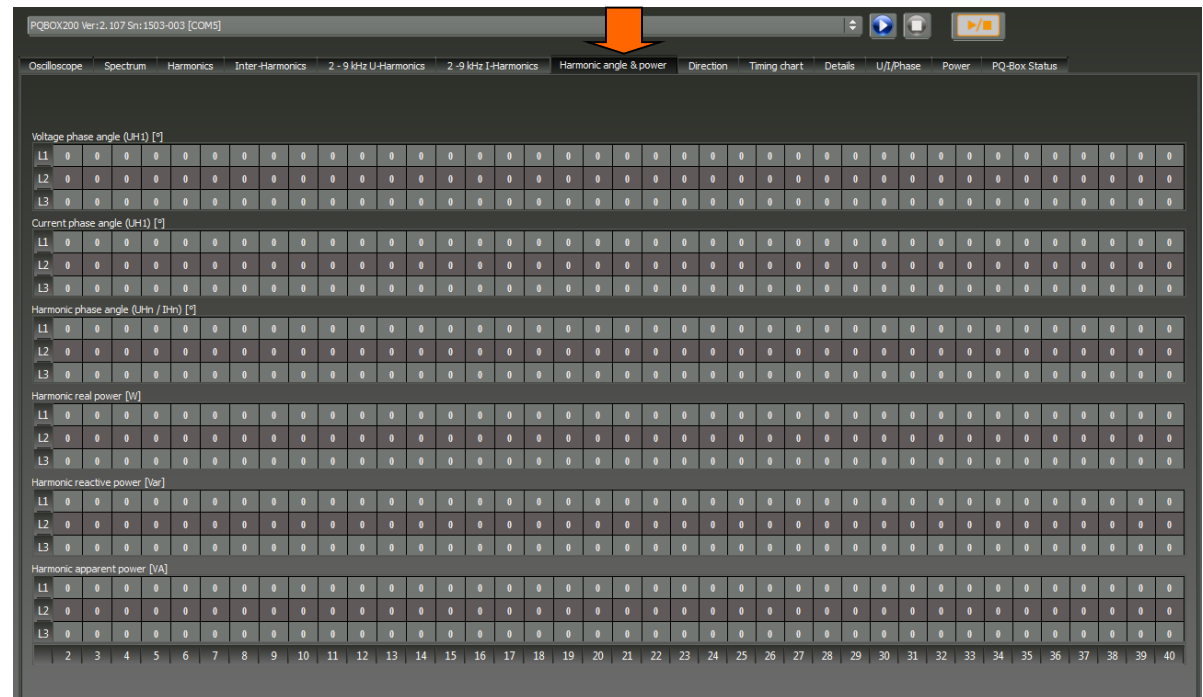
- Boot Vers. 0.197
- DSP Vers. 2.070
- MCU Vers. 2.108
- FPGA Vers. 0.012

Wir regeln das.

Harmonic power and phase angle

Additional online screen with phase angle and power values of harmonics 2nd to 40th order

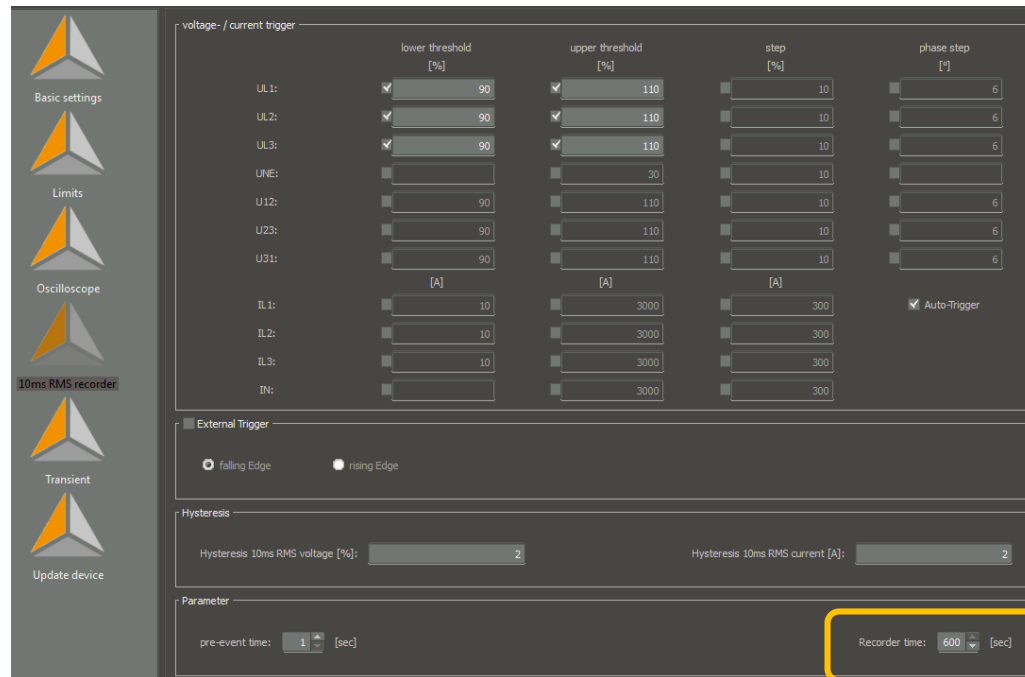
- Phase angle of the voltage harmonic relative to fundamental of the voltage
- Phase angle of the current harmonic relative to fundamental of the voltage
- Real power harmonics (W)
- Reactive power harmonics (Var)
- Apparent power harmonics (VA)



½ periode recorder 600 sec

Together with the new firmware, the devices PQ Box 100, 150 and 200 can store the rms recorder up to 600 sec. (up till now the limit was 120 sec)

Attention: Do not use this setting as default. It will produce huge recorder files!

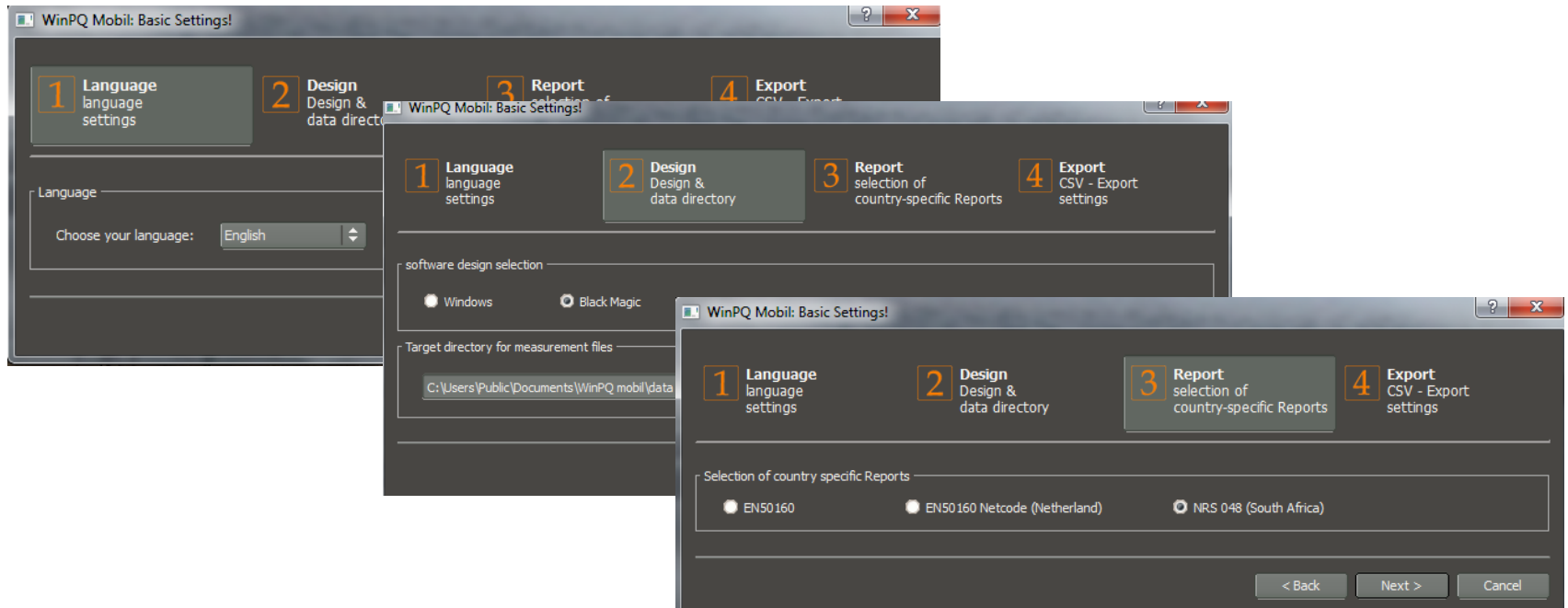


The screenshot shows the '10ms RMS recorder' settings in the WinPQ Mobil software. The interface is divided into a left sidebar with navigation icons and a main settings area. The main area is titled 'voltage- / current trigger' and contains several sections:

- Lower threshold [%]:** UL1: 90, UL2: 90, UL3: 90, UNE: 30, U12: 90, U23: 90, U31: 90, IL1: 10, IL2: 10, IL3: 10, IN: 3000.
- Upper threshold [%]:** UL1: 110, UL2: 110, UL3: 110, UNE: 30, U12: 110, U23: 110, U31: 110, IL1: 3000, IL2: 3000, IL3: 3000, IN: 3000.
- Step [%]:** UL1: 10, UL2: 10, UL3: 10, UNE: 10, U12: 10, U23: 10, U31: 10, IL1: 300, IL2: 300, IL3: 300, IN: 300.
- Phase step [°]:** UL1: 6, UL2: 6, UL3: 6, UNE: 6, U12: 6, U23: 6, U31: 6, IL1: 6, IL2: 6, IL3: 6, IN: 6.
- External Trigger:** falling Edge (selected), rising Edge.
- Hysteresis:** Hysteresis 10ms RMS voltage [%]: 2, Hysteresis 10ms RMS current [A]: 2.
- Parameter:** pre-event time: 1 [sec], Recorder time: 600 [sec] (highlighted with a yellow box).

Wizard

If you install the software the first time (not by software update) a wizard starts after first opening. Customer and country-specific settings are automatically queried and applied.



Memory limitation to 680 MB

Two possibilities to run the memory management

Setup Setup		1
Language	English	
Date	12.01.2012	
Time	02:08	
Continuous mode	off	
Memory limitation (680MB)	off	

Memory limitation = off

On single data file can get up to the maximum size of the built-in memory card. (possible up to 32 GB)

Memory limitation to 680 MB

The PQ-Box memory size for one measurement file is limited to 680 MByte, to avoid problems with Windows 32bit systems. If the data size is reached then the PQ Box automatically starts a new measurement file

Version 2.2.8 (32bit / 64bit)



Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.271
- MCU Vers. 2.009

Firmware PQ-Box 200:

- Boot Vers. 0.197
- DSP Vers. 2.060
- MCU Vers. 2.102
- FPGA Vers. 0.012

Improvements & Bugfixes v2.2.8

- The path for the firmware PQ-Box 200 is now permanently stored with each update to the correct path !
- The voltage and current transformer ratios are now correctly displayed in Setup !

Version 2.2.7 (32bit / 64bit)



Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.271
- MCU Vers. 2.009

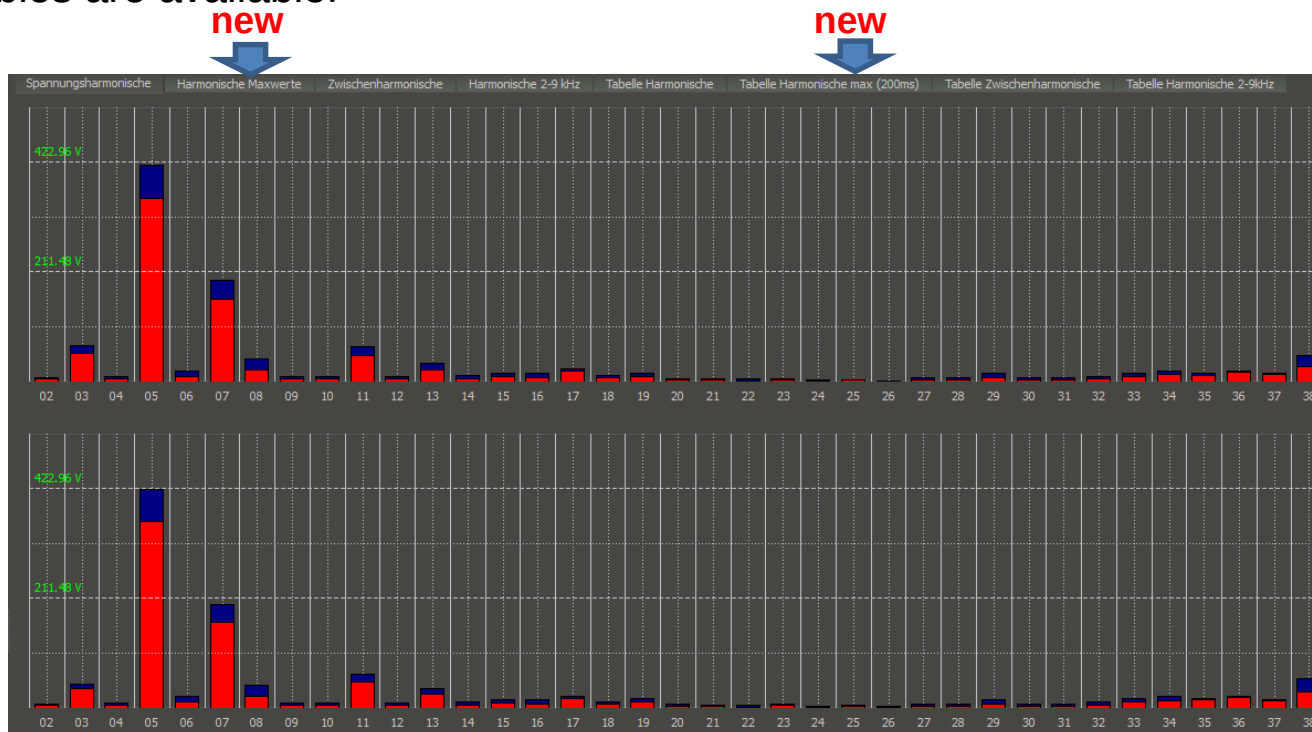
Firmware PQ-Box 200:

- Boot Vers. 0.197
- DSP Vers. 2.060
- MCU Vers. 2.102
- FPGA Vers. 0.012

Improvements & Bugfixes v2.2.7

Bar chart and tables for voltage and current harmonics

For every 200ms extreme values of voltage and current harmonics additional bar graphs and tables are available.



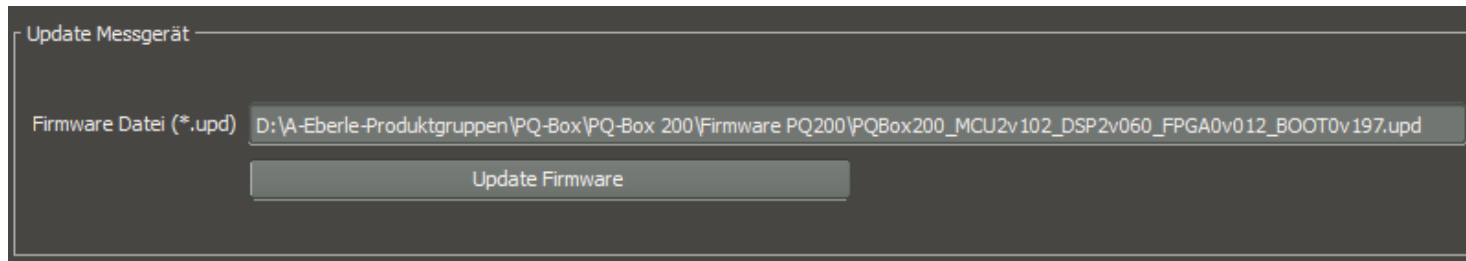
Improvements & Bugfixes v2.2.7

Firmware update

In the software WinPQ mobile the current device firmware for PQ-Box 100 and PQ-Box 200 is now always included. This does not have to be loaded separately from the website. When connecting the PQ-Box to the PC, the software automatically recognizes the instrument and suggests the appropriate firmware.

Firmware update PQ-Box 200

For the PQ-Box 200 in future it is no longer necessary to bring the device into Boot Mode. After this firmware update any update can be done via a TCP-IP remote access (f. e. UMTS modem)

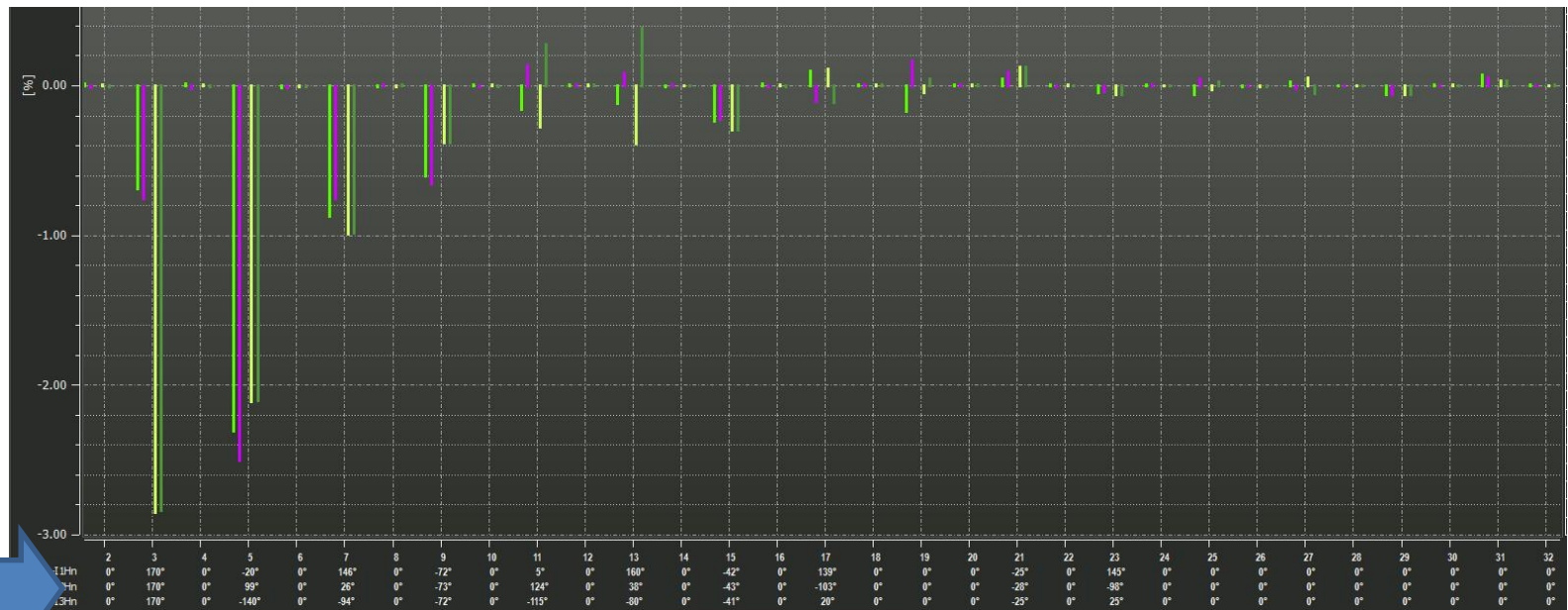


Improvements & Bugfixes v2.2.7

Online data

On the map "direction of harmonic" additional the angle of the current harmonics are displayed with respect to the fundamental of voltage fundamental as online readings.

- More information can be found in our newsletter: "direction of harmonics"



new

Improvements & Bugfixes v2.2.7

EN50160 matrix

The matrix of voltage events was revised and expanded.

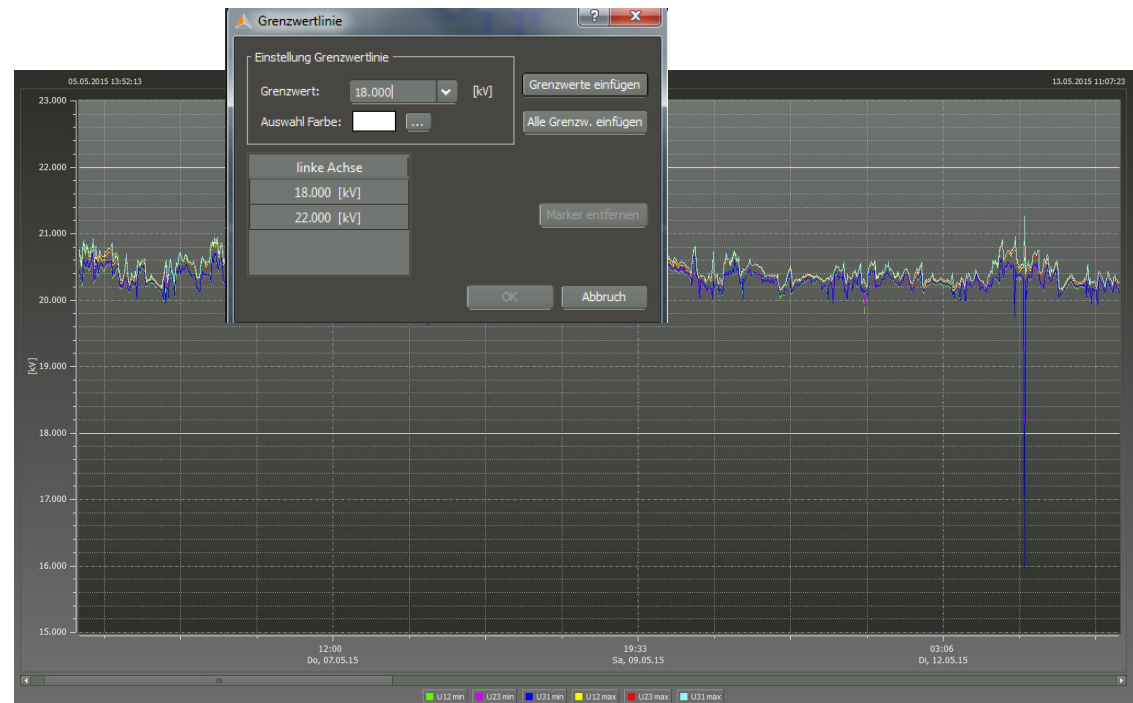
<i>Restspannung u[%]</i>	<i>Dauer t [ms]</i>					
	<i>10 ≤ t < 200</i>	<i>200 ≤ t < 500</i>	<i>500 ≤ t < 1000</i>	<i>1000 ≤ t < 5000</i>	<i>5000 ≤ t < 60...</i>	<i>t ≥ 60000</i>
<i>90 > u ≥ 80</i>	6	0	0	0	0	0
<i>80 > u ≥ 70</i>	2	0	0	0	0	0
<i>70 > u ≥ 40</i>	0	0	0	0	0	0
<i>40 > u ≥ 5</i>	0	0	0	0	0	0
<i>5 > u</i>	0	0	0	0	0	0
<i>Überspannung u [%]</i>	<i>Dauer t [ms]</i>					
	<i>10 ≤ t < 500</i>	<i>500 ≤ t < 5000</i>	<i>5000 ≤ t < 60000</i>	<i>t ≥ 60000</i>		
<i>u ≥ 120</i>	0	0	0	0		
<i>120 > u ≥ 110</i>	0	0	0	0		

Improvements & Bugfixes v2.2.7

Show limits

In addition to the voltage harmonics, the software is now in complete compliance with set standards.

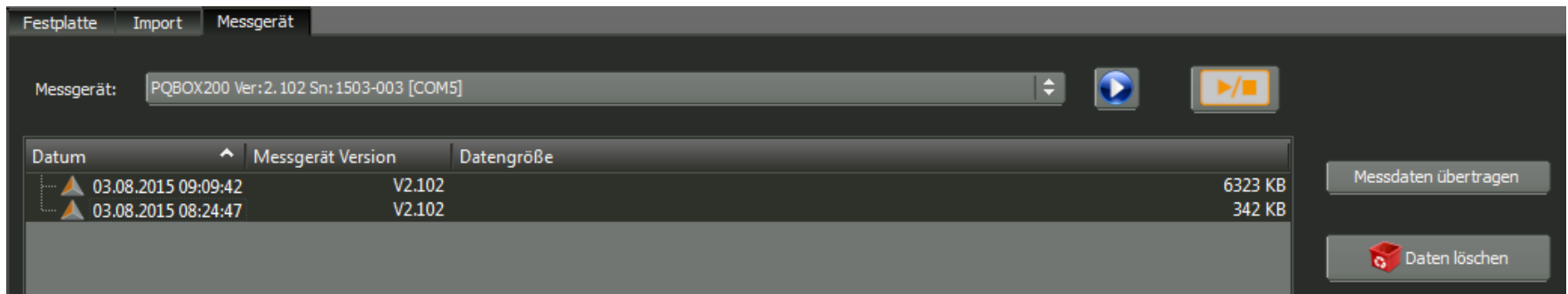
- Flicker
- Unbalance
- Dips, swells
- Frequency



Improvements & Bugfixes v2.2.7

To transfer multiple measurements at once on PC

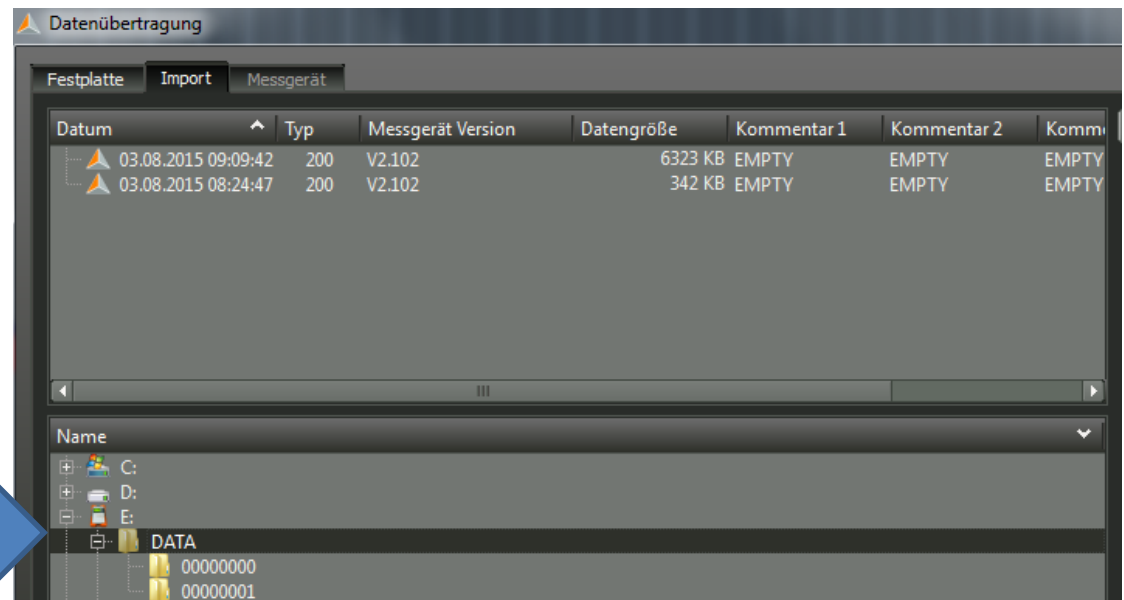
It is possible to select multiple measurements on the PQ-Box and transferred in one step to the PC.



Improvements & Bugfixes v2.2.7

PQ-Box 200 – Transmission of large measurement files

For the transfer of very large data files (> 500MB), the PQ-Box 200 can be switched to “USB-Disk mode”. If the PQ-Box is in this mode, you can use the function “Import” to transfer these large files with a very high data transfer rate.



PQ-Box 200 logs on
as a disc drive

Improvements & Bugfixes v2.2.7

CSV-data export

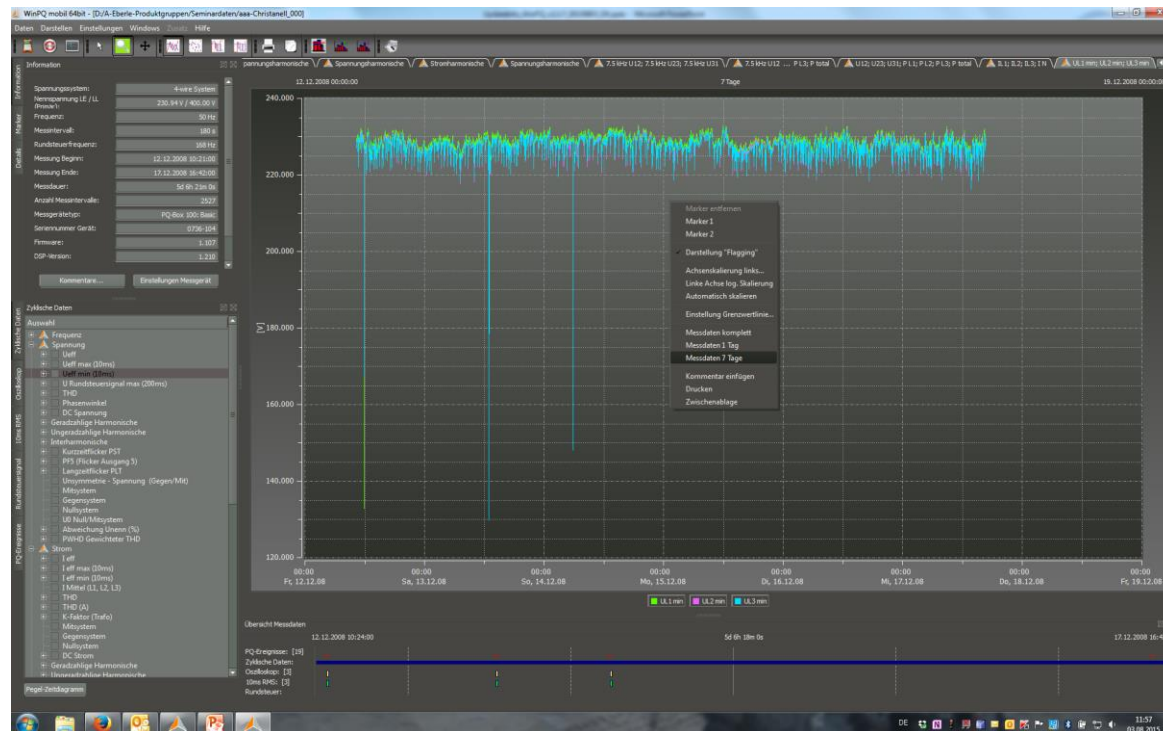
Timestamping of transient card and resolution of the voltage values have been increased for the data export.

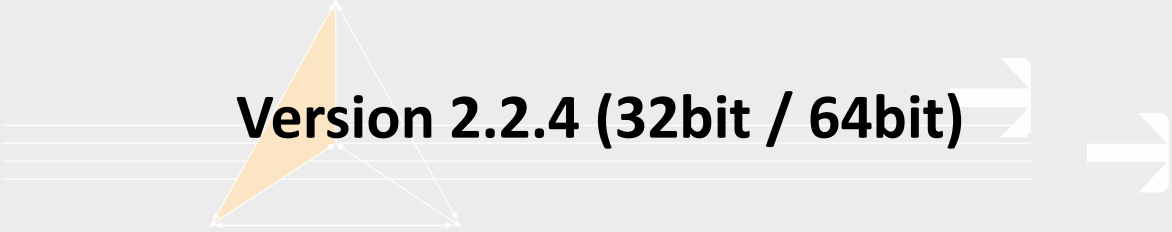
Export of 7 digits after the decimal for the transient data

Improvements & Bugfixes v2.2.7

7-day view of the long-term measurement data

To clearly identify the individual days with the respective times of day and night at a 7-day view, the menu item “measurement period 7 days” has been revised. (Right-click menu)





Version 2.2.4 (32bit / 64bit)

Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.267
- MCU Vers. 2.007

Firmware PQ-Box 200:

- Boot Vers. 0.188
- DSP Vers. 2.048
- MCU Vers. 2.008
- FPGA Vers. 0.012

Improvements & Bugfixes v2.2.4

- Stack graph view and tap display**

In WinPQ Mobil the multiple scale display has been added. With this innovation, you have the option differing measurement parameters such as the flicker PST, the voltage and the power to get shown very clearly.

Moreover, the tab view has been integrated in the software.

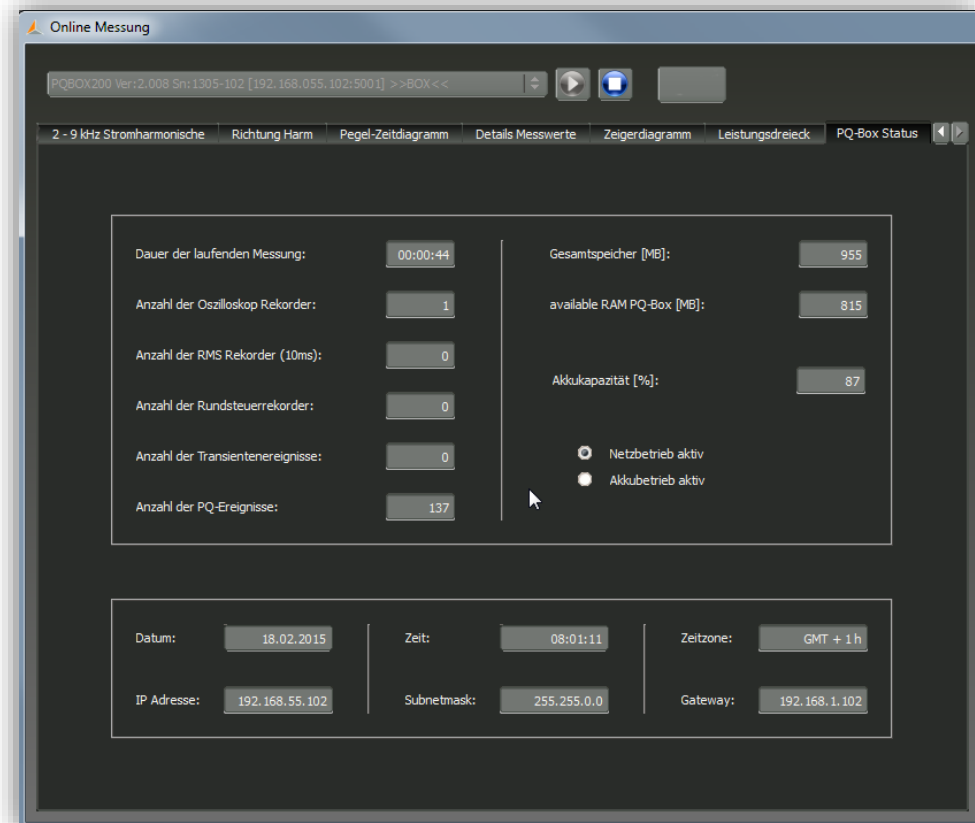
It allows the user to switch quickly and easily between the individual charts and reports .



Improvements & Bugfixes v2.2.4

- **PQ-Box – Status**

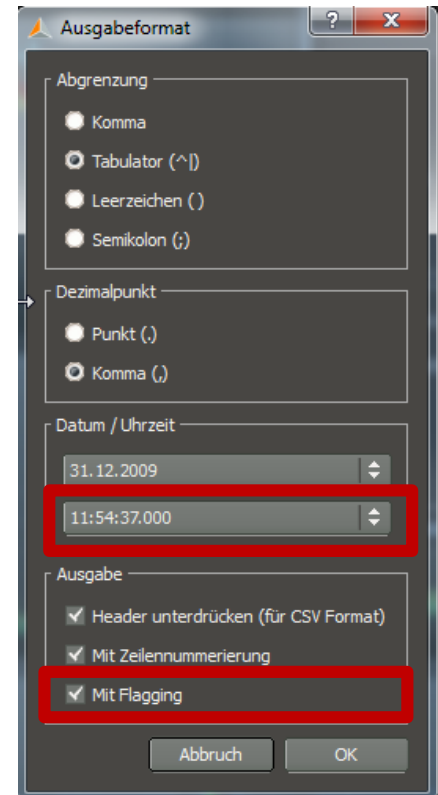
in the online measurement, a new tab "PQ-Box status" was inserted. This tab provides a quick overview of the main PQ events, the memory of the PQ-Box and other important properties of a measurement. It is very helpful especially in a UMTS modem connection of the PQ-Box!



Improvements & Bugfixes v2.2.4

- **CSV Export**

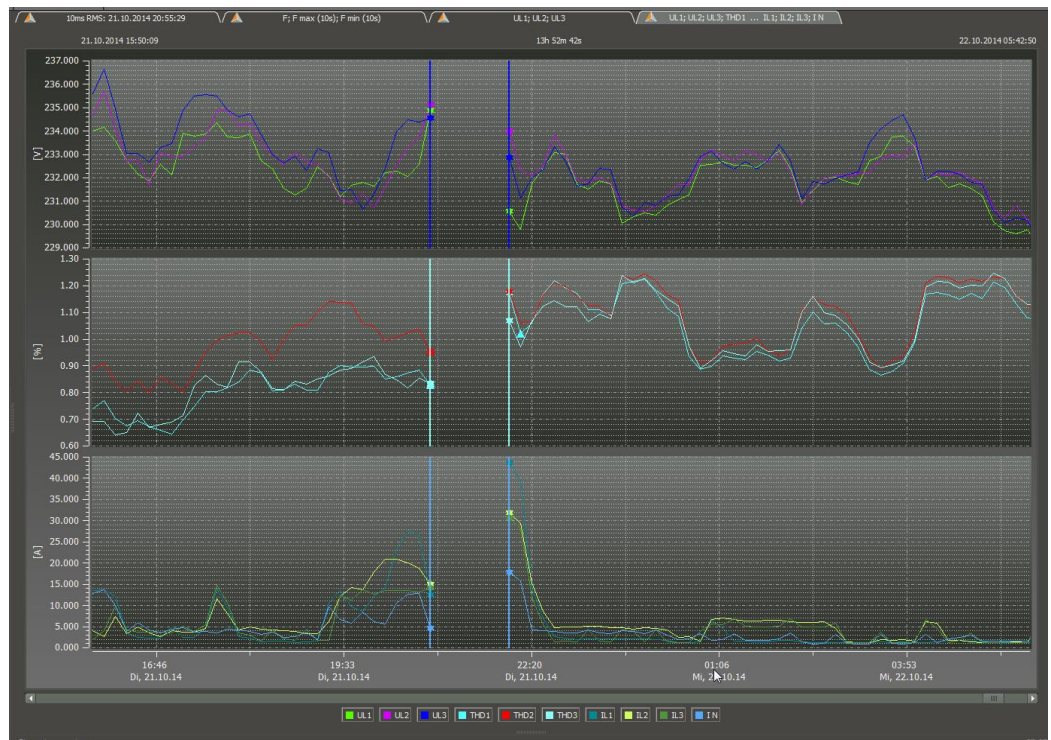
- **Flagging:**
In the CSV export a new column to filter the flagged intervals has been added.
- **Performance:**
Performance improvement in the case of large measurement
- **Zeitausgabe:**
All measured values can now be exported with time output milliseconds
- Several metrics were extended and added



Improvements & Bugfixes v2.2.4

- **Display at power interruptions**

In the mobile WinPQ v 2.2.3 .the voltage interruptions of the supply voltage will be highlighted



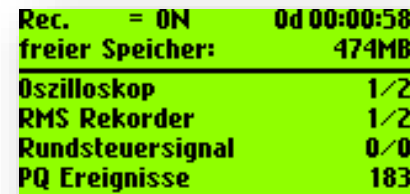
New PQBox 100 / 200 – Firmware

- **Changed display recorder pages**

For the PQ and PQ-Box 100 Box 200, the display pages of the recorder have been extended. So you now have an information about how many fault records have been triggered and how many fault records are already stored on the SD card.

e.g. 1/2: 2 fault records were triggered with 1 fault record has been stored on the SD card.

Particularly for short measurements with many triggers this function is very helpful to ensure that all recorders have been stored during the measurement.



Rec. = ON 0d 00:00:58
freier Speicher: 474MB
Oszilloskop 1/2
RMS Rekorder 1/2
Rundsteuersignal 0/0
PQ Ereignisse 183



0d00:04:01 2332MB/3780MB	
Rekorder	Anzahl
Oszilloskop Rekorder	3/4
RMS Rekorder	2/2
Rundsteuersignal	0/0
PQ Ereignisse	174
Transiente Ereignisse	0/0

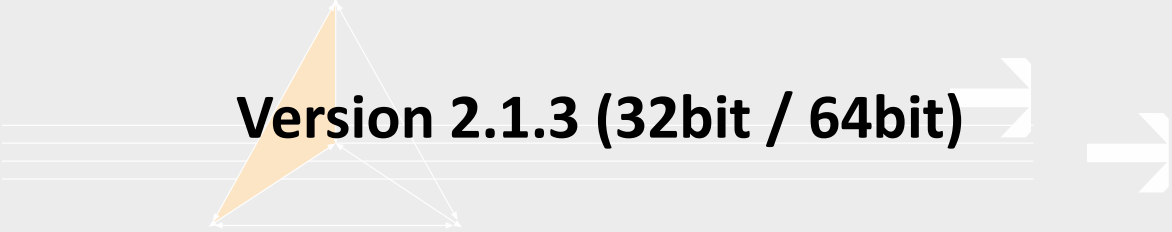
New PQBox 100 – Firmware – MCU 2.006

- **New Display page**

At MCU 2.006 there is a new page for viewing the Energy consumption since the start of the measurement.

Rec.	= 0N	0d 00:00:19
freier Speicher:		426MB
Ep1	+0357.123	kWh
Ep2	-0357.120	kWh
Ep3	+0033.123	kWh
Ep	+0004.567	kWh

Rec.	= 0FF	0d 00:00:00
freier Speicher:		426MB
Ep1	+0357.123	kWh
Ep2	-0357.120	kWh
Ep3	+0033.123	kWh
Ep	+0004.567	kWh



Version 2.1.3 (32bit / 64bit)

Firmware PQ-Box 100:

- Boot Vers. 1.202
- DSP Vers. 1.266
- MCU Vers. 2.004

Firmware PQ-Box 200:

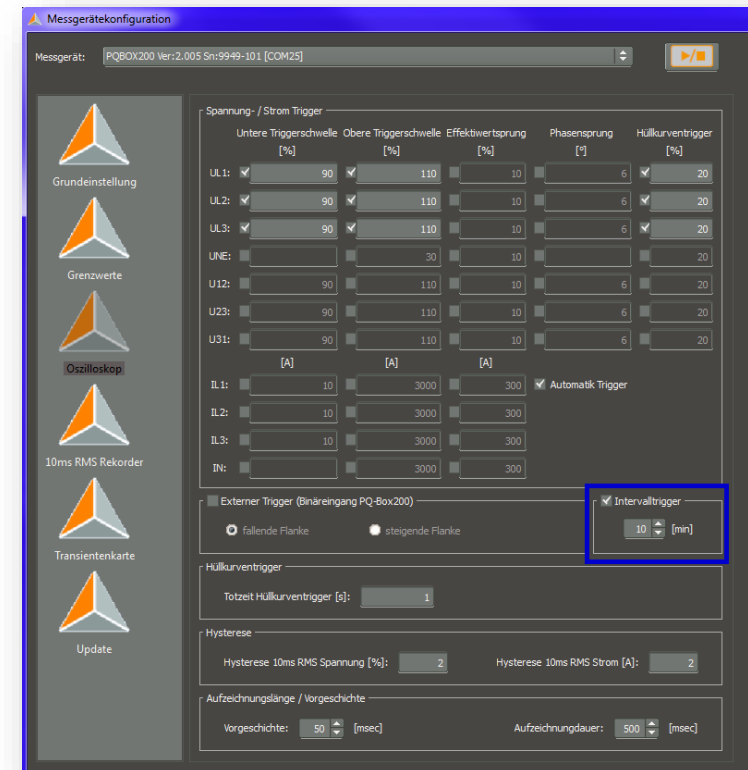
- Boot Vers. 0.188
- DSP Vers. 2.047
- MCU Vers. 2.006
- FPGA Vers. 0.012

Improvements & Bugfixes v2.1.3

- Intervaltrigger**

In the PQ-Box 100 and also PQ-Box 200 it is now possible to set an interval trigger. For the oscilloscope recorder as well as for the transient recorder (PQ200) it can be set up separately.

If enabled, a oscilloscope recorder is recorded according to the interval of time. With WinPQ Mobil it is possible to calculate the spectrum of the recorder with the integrated FFT functionality.



Improvements & Bugfixes v2.1.3

- **Calculation method of harmonics**

The calculation method for the harmonic groupings can be adjusted depending on the application (PowerQuality measurement or equipment testing).

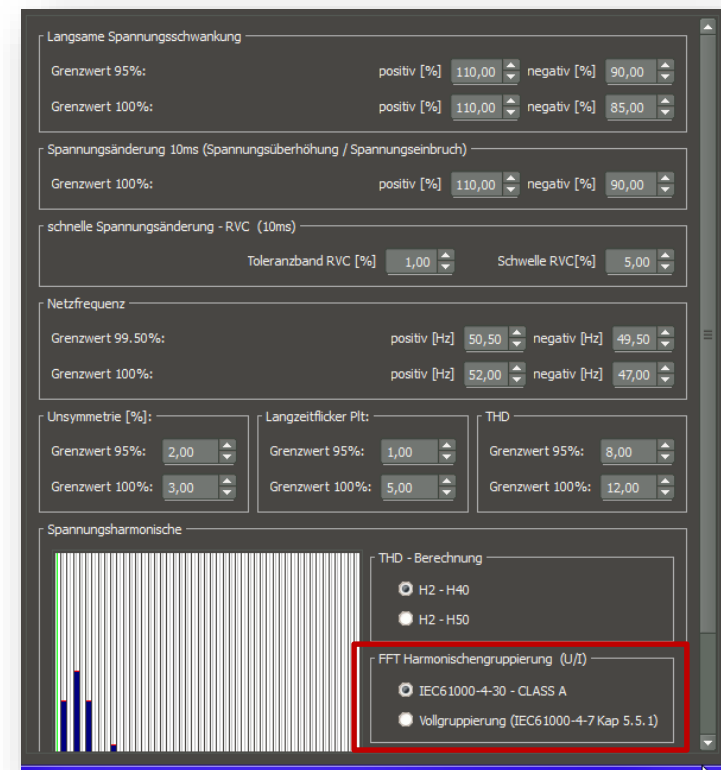
IEC61000-4-30 Class A

For EN 50160 - PowerQuality

Vollgruppierung (IEC61000-4-7 Kap 5.5.1)

For equipment tests according to IEC 61000-3-X
Harmonics are calculated fully grouped.
(2nd Harm. = 75Hz to 125Hz).

Interharmonics are calculated fully grouped.
(55Hz to 95Hz)

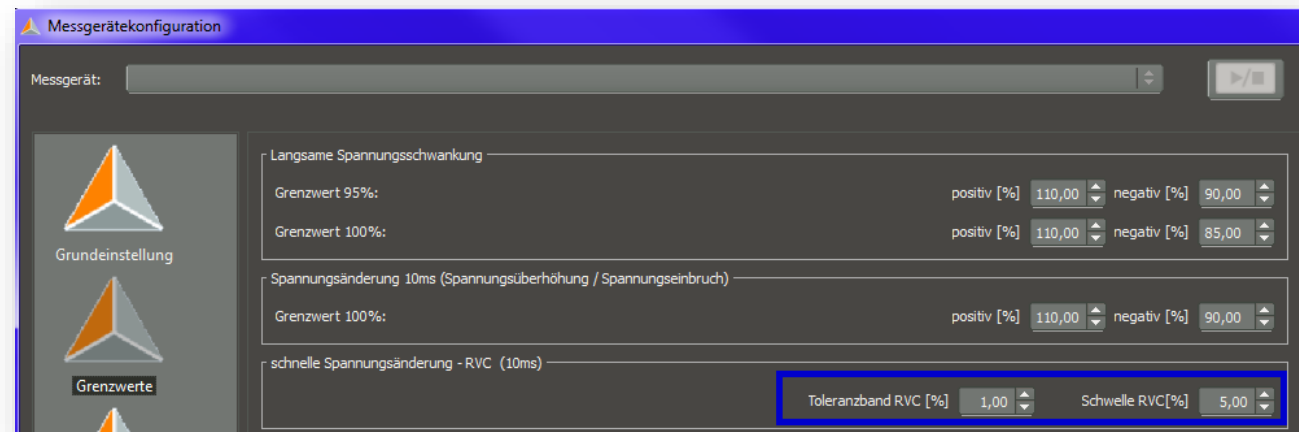


Improvements & Bugfixes v2.1.3

- **Rapid voltage changes / RVC's according IEC 61000-4-30**

In the complete software and firmware of the PQ-Box 100 and PQ-Box 200, the rapid voltage change was added as an event in according IEC 61000-4-30. For this purpose, new parameters in the instrument configuration have been added under "limits".

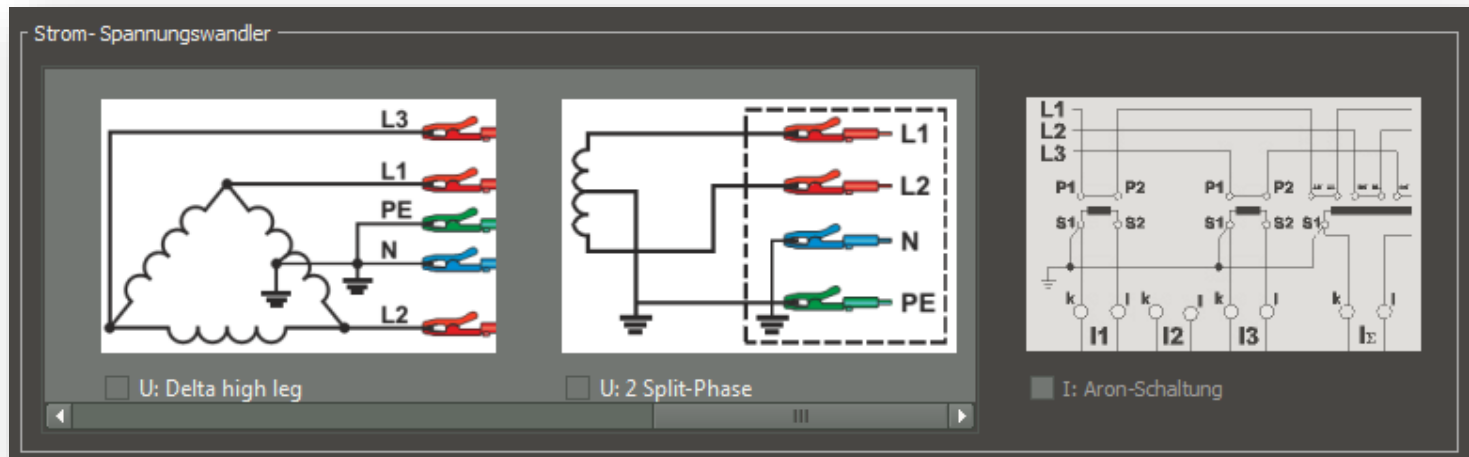
The tolerance band (here 1%) is the size in which the voltage of 10ms RMS values is referred to as "constant" (according to the standard duration 1s). If the voltage changes between two constant steady states is higher than the threshold (here 5%) , an event with the maximum variation is generated and stored by the measurement device.



Improvements & Bugfixes v2.1.3

- **Delta High Leg & Split Phase**

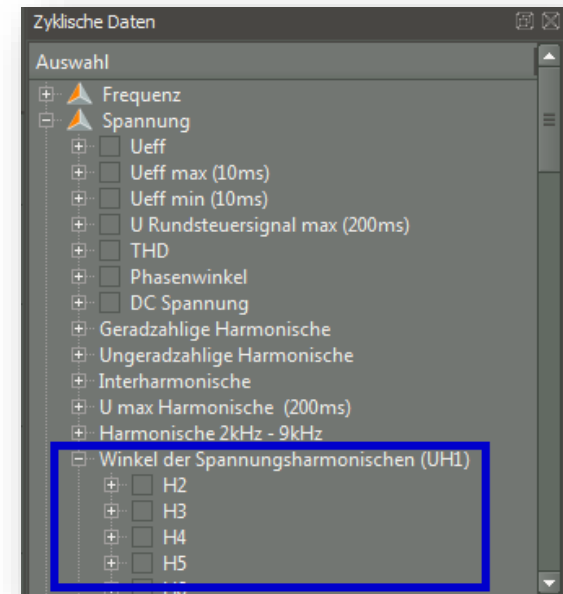
In the software and the firmware of the PQ-Box 100 and PQ-Box 200, mainly occurring in North and South American countries types of circuit "Delta High Leg" & "split phase" have been added. For this, the setup dialog has been extended to these two other types of circuits. In this context, for 3-wire and 4-wire measurements diagrams were added. The new types of circuits have been also added in the configuration screens in the PQ-boxes.



Improvements & Bugfixes v2.1.3

- **Winkel der Harmonischen**

In the PQ-Box 200 angles of the harmonic voltage (H2 - H40) were added. The angles of the harmonics are referenced in the 3-wire on the first Harmonic of the reference voltage L1/L2 and in the 4-wire measurement referenced on L1 / Earth.

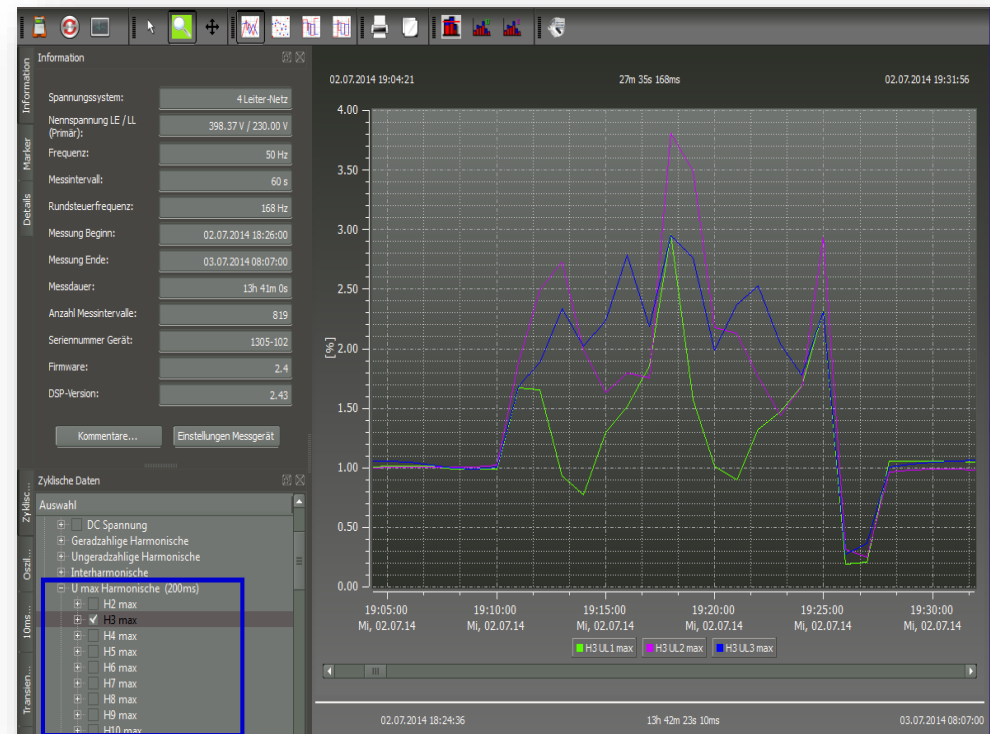


Improvements & Bugfixes v2.1.3

- **200ms extreme values of the voltage and current harmonics – PQ-box 200**

The 200msec Extremes values are now available.

Depending the settings the box now saves the extreme values of the harmonics either as phase to earth or phase to phase in the interval as 200 ms Max value.



Improvements & Bugfixes v2.1.3

- **China Standard templates**

The following Standard templates were added

- GB-T 14549-93_0,38kV
- GB-T 14549-93_6-10kV
- GB-T 14549-93_35-66kV
- GB-T 14549-93_110kV

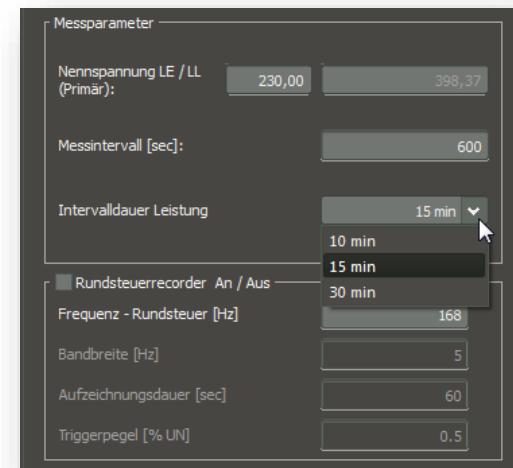


	GB-T 14549-93_0,38kV PQ Box 100
	GB-T 14549-93_0,38kV PQ Box 200
	GB-T 14549-93_6-10kV PQ Box 100
	GB-T 14549-93_6-10kV PQ Box 200
	GB-T 14549-93_35-66kV PQ Box 100
	GB-T 14549-93_35-66kV PQ Box 200
	GB-T 14549-93_110kV PQ Box 100
	GB-T 14549-93_110kV PQ Box 200

Improvements & Bugfixes v2.1.3

- **Power Interval extended to 10min**

The power interval can now be set to 10 minutes next to values for 15 minutes and 30 minutes.



Improvements & Bugfixes v2.1.3

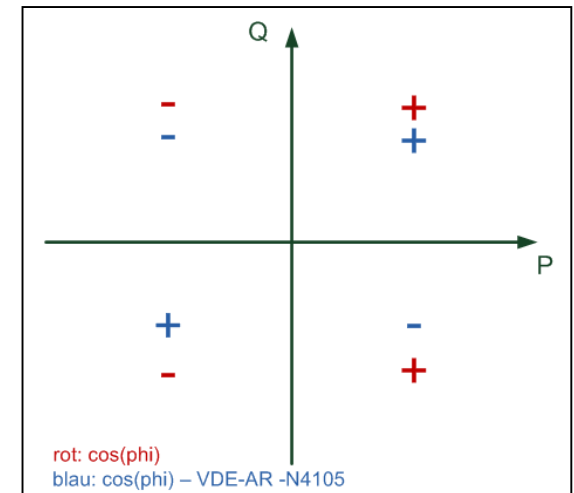
- **Automatic Scale while zooming**

In the software the functionality of the zoom has been improved. The ordinate scale is always automatically scaled to the largest value in each respective image.

- **Comtrade Export - improvements**

- **cos(phi)**

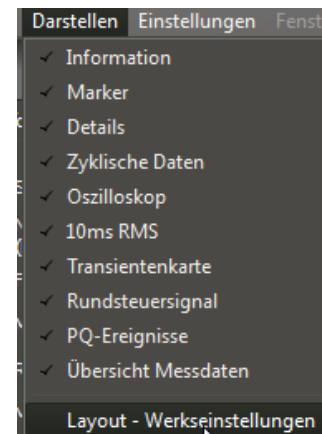
two different cos(phi) are available now. The difference is the sign, shown in the picture.



Improvements & Bugfixes v2.1.3

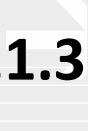
- **Werkseinstellungen Layout**

Unter „Darstellen“ → „Layout Werkseinstellungen“ wurde die Funktion an Win 8.1 und Win 7 angepasst um eine möglichst einfache Möglichkeit zu erhalten, das Layout wieder auf den auslieferzustand der Software zu bringen.





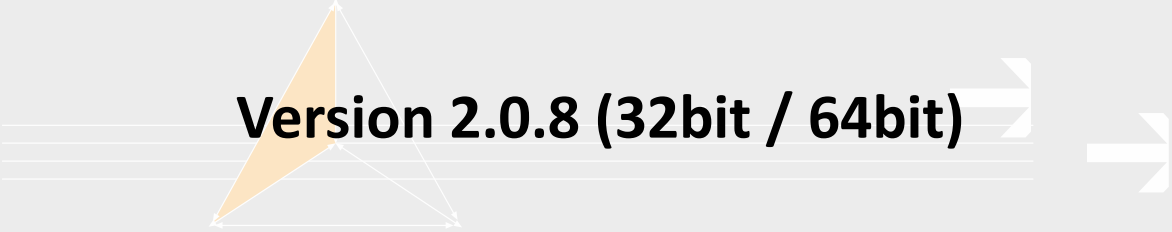
Improvements & Bugfixes v2.1.3



- **Sprachen**

The language "Portuguese" has been completely revised and added.

All other languages have been updated to the latest software version!



Version 2.0.8 (32bit / 64bit)

Enthaltene Firmware PQ-Box 100:

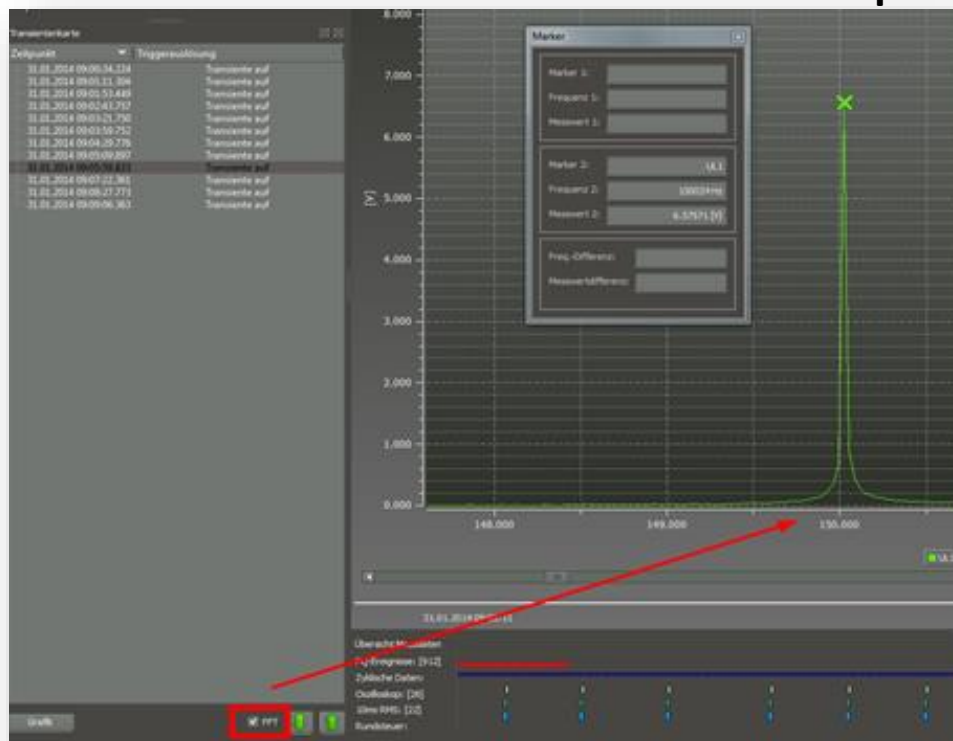
- Boot Vers. 1.201
- DSP Vers. 1.257
- MCU Vers. 1.156

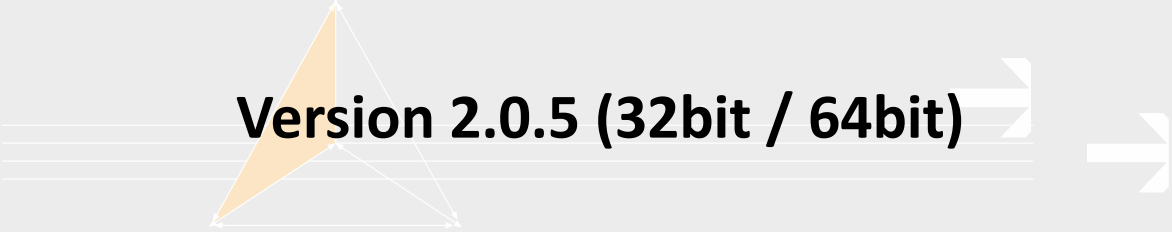
Enthaltene Firmware PQ-Box 200:

- Boot Vers. 0.188
- DSP Vers. 2.031
- MCU Vers. 1.344
- FPGA Vers. 0.012

Improvements & Bugfixes v2.0.8

- Änderung der PQ-Box Firmware auf Version 1.156
- FFT für Transienten Recorder und Oszilloskop Rekorder wieder hinzugefügt





Version 2.0.5 (32bit / 64bit)

Enthaltene Firmware PQ-Box 100:

- Boot Vers. 1.201
- DSP Vers. 1.257
- MCU Vers. 1.155

Enthaltene Firmware PQ-Box 200:

- Boot Vers. 0.188
- DSP Vers. 2.031
- MCU Vers. 1.343
- FPGA Vers. 0.012

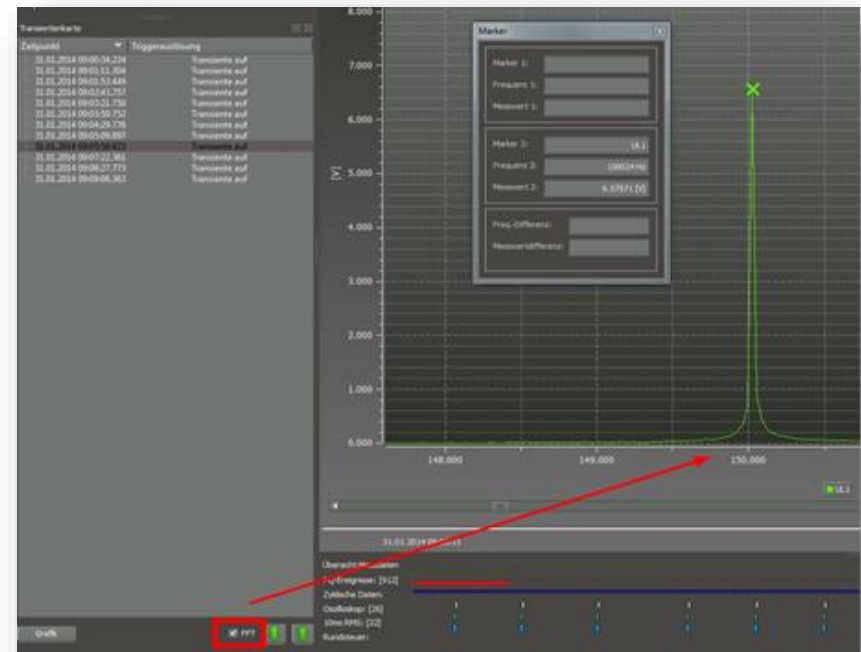
Improvements & Bugfixes v2.0.5

- Manueller Trigger der Transientenkarte - PQ-Box 200**

Mit der aktuellen Firmware der PQ-Box 200 ist es nun möglich mithilfe der manuellen Trigger Taste  direkt am Gerät einen Transienten Rekorder mit der im Setup hinterlegten Abtastrate (200KHz – 2 MHz) auszulösen.

Mithilfe der in der Software neu hinzugenommenen FFT Transienten Berechnung können somit auch Störpegel im höheren Frequenzbereich bis 1Mhz identifiziert werden.

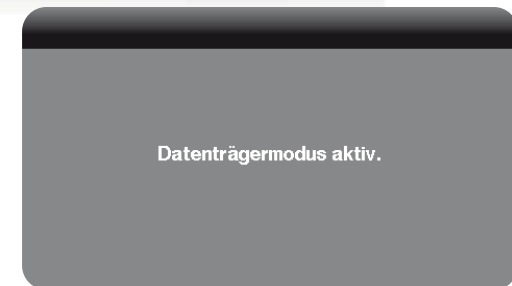
Im Beispiel ist die FFT einer Transienten mit 1Mhz Abtastung und einem Störpegel von 6V dargestellt.



Improvements & Bugfixes v2.0.5

- **Wechsel zwischen Devicemodus (CDC) und USB - Datenträgermodus (MSC)- PQ-Box 200**

Die PQ-Box 200 kann man ab der MCU Version 1.3.43 als Massenspeichermodul am PC anmelden (USB Stick). Hierzu ist ein neuer Eintrag ins Setup auf der Box hinzugekommen (USB-Datenträgermodus). Mithilfe des Datenträgermodus ist es möglich die Daten von der Box über die Import Funktion in der Software sehr schnell auszulesen.



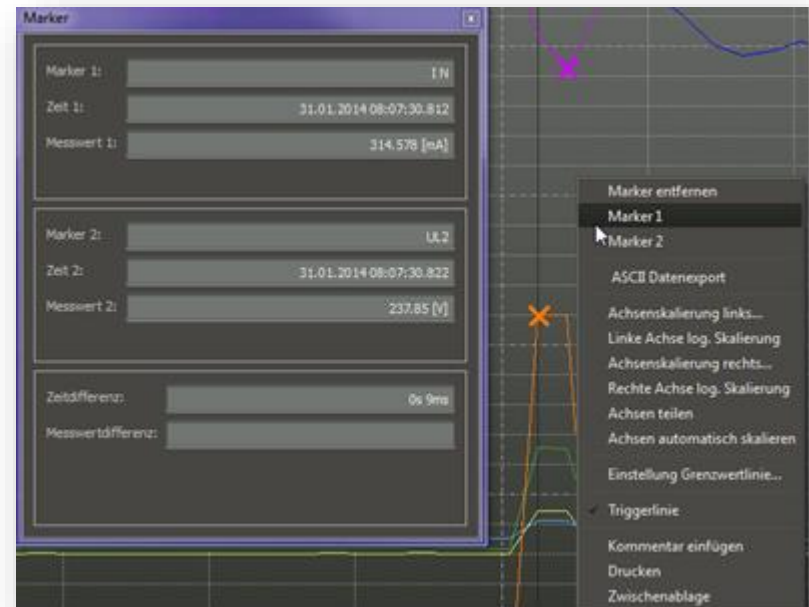
Improvements & Bugfixes v2.0.5

- **Parameteränderungen – PQ-Box 100 / PQ-Box 200**

Die PQ-Boxen werden nach wichtigen Parameteränderungen – z.B. Umstellung der Netzfrequenz oder Umstellung der Netzform (3-Leiter / 4-Leiter) neuinitialisiert. Zudem ist der Benutzer ab sofort vor Fehlparametrierung geschützt da Parameteränderungen sowohl über das Setup der Boxen als auch über die Software nur bei nicht gestarteter Messung erfolgen darf.

- **Marker über rechte Maustaste setzen**

Mithilfe der rechten Maustaste ist es nun zusätzlich möglich Marker in der Software zu setzen. Dies insbesondere auch, wenn die Lupenfunktion im Einsatz ist.



Improvements & Bugfixes v2.0.5

- Verbesserung der Kommunikation über Ethernet und über USB**

Es wurden sehr viele Improvements an den Mechanismen „Zwischenauslesen“ von Messungen und der Remotebedienbarkeit von den Boxen durchgeführt. Unter anderem ist der Status der Box nun in jeder Maske (Onlinedaten / Messgerätekonfiguration / Datenauslesen) sichtbar. Mithilfe des neu hinzugefügten Buttons  können die Messungen sowohl an der PQ-Box 100 als auch an der PQ-Box 200 nun zuverlässig über die Ferne gestartet und gestoppt werden.



Improvements & Bugfixes v2.0.5

- **Verbesserung der Geschwindigkeit beim Auslesen der Daten über USB 2.0 – PQ-Box 200**
Mit Update des zugrundeliegenden Betriebssystems auf der PQ-Box 200 konnte eine erhebliche Geschwindigkeitsverbesserung beim Auslesen der Daten über USB 2.0 erzielt werden.
- **Nennspannung in Abhängigkeit der eingestellten Netzform – PQ-Box 200**
Die Nennspannung wird in Abhängigkeit der eingestellten Netzform im Setup der Box entweder als Leiter - Leiter oder als Leiter Erde Spannung eingegeben. Zugrunde gelegt wurden die Werte der Niederspannung.
- **Einphasenmessung hinzugefügt – PQ-Box 100**
In der MCU Version 1.155 wurde die Einphasenmessung ins Setup der Box aufgenommen.
- **Längere Messung mit der PQ-Box 100 möglich**
In der MCU Version 1.155 wurde eine Funktion hinzugefügt, die es ermöglicht längere Messungen durchzuführen. Hierzu wird nach einer maximalen Dateigröße die Messung indiziert weitergeführt.
Hinweis:
 - Ab KW10/2014 wird die PQ-Box 100 standardmäßig mit einer 2GB SD ausgeliefert.
 - Daneben wird im Falle eines Servicepakets 2 ebenfalls eine 2GB SD-Karte bestückt.

Improvements & Bugfixes v2.0.5

- **Sprachen**

Alle zur Verfügung stehenden Sprachen in der Software wurden aktualisiert.

- **Bedienungsanleitungen**

Die Bedienungsanleitungen der Boxen sind nun im Softwarepaket enthalten. Unter „Hilfe“ sind diese jederzeit abrufbar.



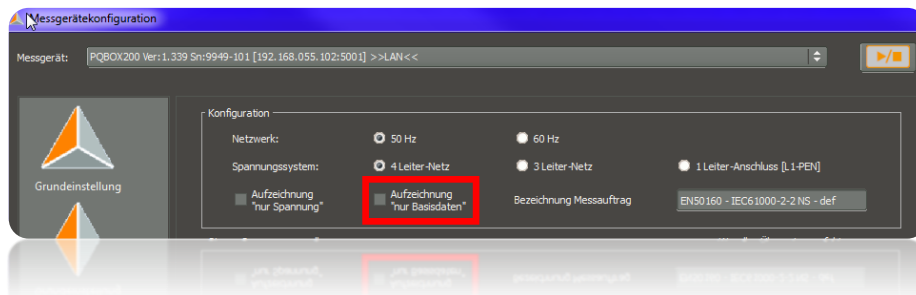
- **Geräte-Firmware PQ-Box 100/ 200**

Die Firmware für die PQ-Box 100 und 200 ist ab sofort immer im Softwarepaket der WinPQmobil enthalten. Unter C:\Users\Public\Documents\WinPQ mobil\firmware\ wird diese automatisch mitinstalliert und kann direkt in die jeweilige PQ-Box geladen werden.

Improvements & Bugfixes v2.0.5

- Aufzeichnung „Basisdaten“**

Es ist sowohl in der PQ-Box 100 als auch in der PQ-Box 200 möglich, die Anzahl der Messwerte die im eingestellten Messintervall aufgenommen werden zu reduzieren um den Speicherbedarf zu reduzieren und die Messdauer zu verlängern. Aufgenommen werden mit dem Setup folgende Messwerte und selbstverständlich auch die Rekorder



Freies Intervall (Messintervall)
Status, Events, Flagging
Netzfrequenz
Extremwerte Frequenz
Spannungsmessgrößen
Spannungsextremwerte, Flickerbemerkbarkeit
Strommessgrößen
Stromextremwerte
Leistungsmessgrößen
Extremwerte Leistungen
Rundsteuersignal
THC, K-Faktor, Phasendifferenz, Mit-, Gegen-, Nullsystem
Verzerrungsblindleistung, Leistungsflußrichtung, Phasendifferenz
Spannungsextremwerte, Rundsteuersignalextrema
Spannungsabweichung, Symmetrie, PWHD
Stromwerte, symmetrische Komponenten, Unsymmetrie, PWHD, PHC
Leistungsmesswerte, cosPhi, sinPhi, tanPhi, Grundschiebungsleistungen
Grundschiebungsverschiebungsblindleistung
Blindleistungsextremwerte
Scheinleistungsextremwerte
Leistungsmessgrößen
15-Minuten-Intervall
Verzerrungsblindleistung, Leistungsflußrichtung, Phasendifferenz
Leistungsmesswerte, cosPhi, sinPhi, tanPhi, Grundschiebungsleistungen
Grundschiebungsverschiebungsblindleistung
Spannungsmessgrößen

Improvements & Bugfixes v2.0.5

- **Aufzeichnung nur Spannung**

Die Strom und Leistungswerte werden nicht mit aufgezeichnet.



- **Neue Normvorlagen**

Es wurden weitere Normvorlagen untergliedert in die Länder (Europa, Peru, Südafrika) hinzugefügt.

Wir regeln das.



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