

PQube[®] 3 / PQ Edge[®] Firmware 3.10.6 Release Notes

IMPORTANT NOTE:

This Firmware is applicable to PQube 3 (PQube 3/3e/3v/3r/3LV) and PQ Edge Power Analyzers. If you are running 3.9.9 firmware, do not use the USB to perform the update. Instead update the firmware using the web page.

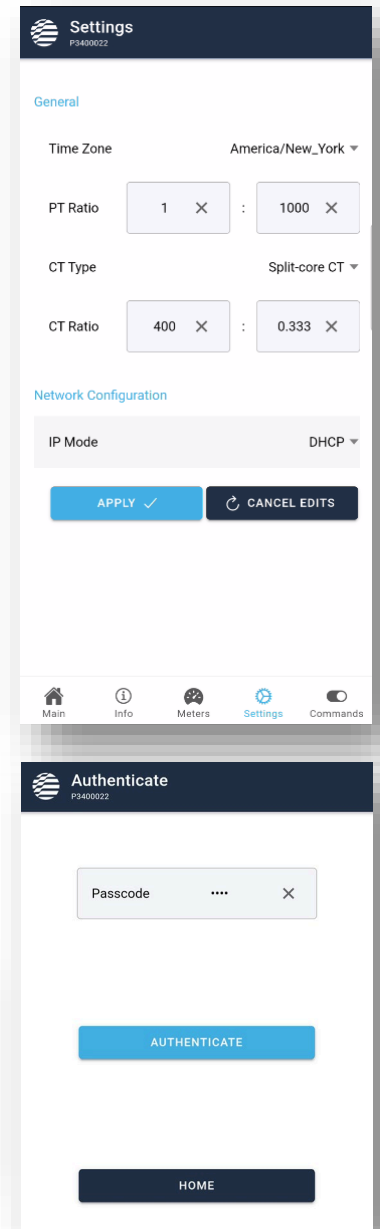
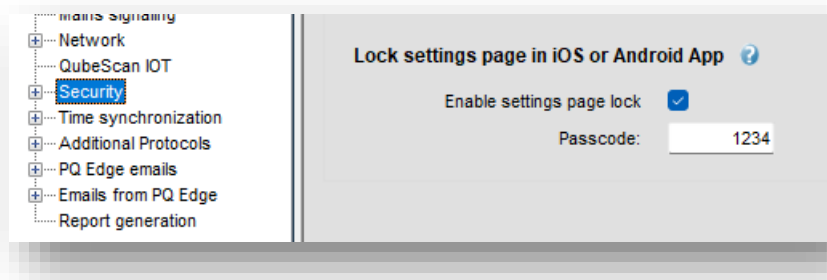
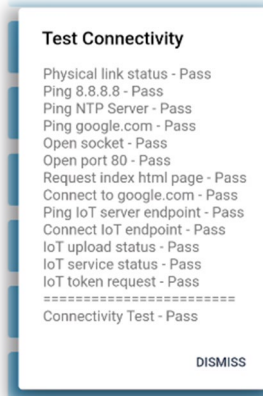
The list of bug fixes is found in the second part of this document.

Firmware 3.10.0 ~ 3.10.6 NEW FEATURES

Firmware 3.10.6

○ New Features

- **New iOS and Android App for PQ Edge:** A newly launched application for both iOS and Android platforms designed to streamline the setup process for PQ Edge users. The app enables quick configuration of essential parameters such as Time Zone, PT Ratio, CT Type, CT Ratio, and Network Configuration, facilitating a more efficient initiation process.
- **Network Connectivity Troubleshooting in the iOS and Android App:** Advanced features now assist IT teams in quickly diagnosing and resolving network connectivity issues, ensuring reliable communication with QubeScan and access to the device's webpage.
- **Settings and Commands Page Authentication Feature:** The iOS or Android app now includes an option to secure the settings page with a passcode, which can be configured via the configurator. This adds an extra layer of security, preventing unauthorized adjustments to the device settings.

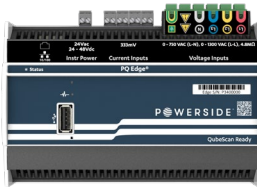


See [Firmware 3.10.6 / Software Bug Fixes](#).

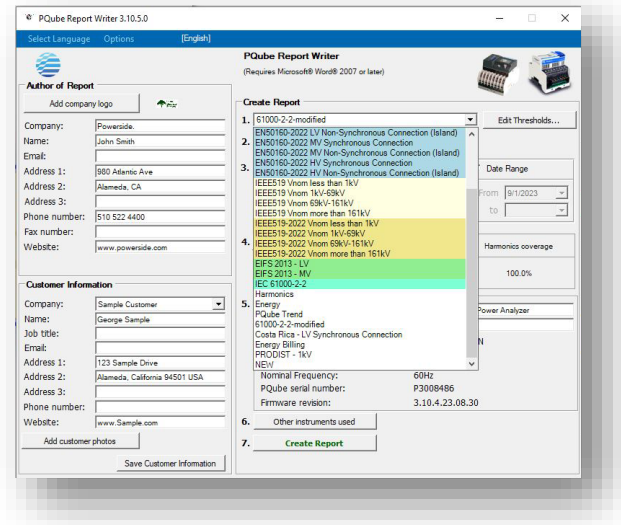
Firmware 3.10.5

○ **New Features**

- **Enhanced Support for QubeScan:** Improved performance and new features.
- **Report Writer 3.10.5.5 - Advanced Reporting:** Now supports EN50160:2022 and IEEE 519 2022 standards.
- **Improved PQ Edge Support:** Offering increased support for the newest member of the family.



See [Firmware 3.10.5 / Software Bug Fixes](#).



Firmware 3.10.4

○ **New Features**

- **The newly released PQ Edge** joins the group of devices served with Firmware 3.10.4.

Click [here](#) to learn more.

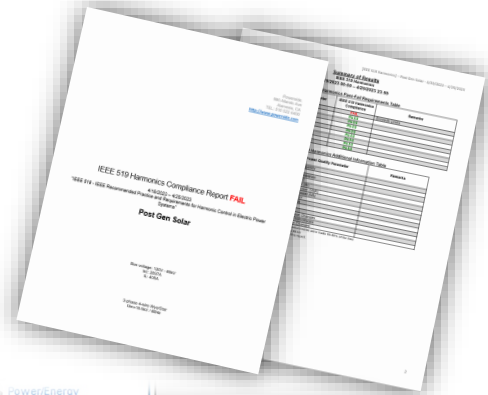


- The PQube 3 and PQ Edge now support the generation of IEEE 519 compliance reports

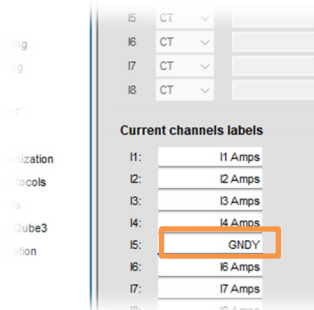


This enhancement has been introduced in response to the increasing prevalence of non-linear loads, which are a primary contributor to harmonics in today's grid. With PQube 3, you can now seamlessly generate all the essential data required for a compliance assessment.

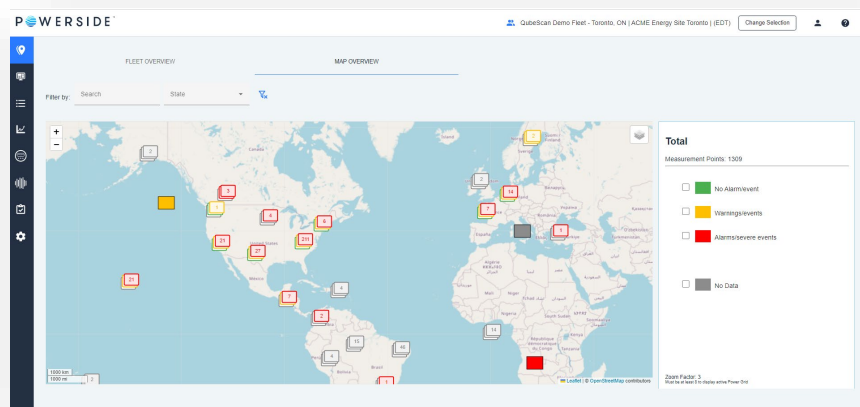
The necessary 3-second harmonic data for these reports can be accessed both locally and remotely. Data retrieval options include USB Drive, FTP, FTPS through the webpage via HTTP and HTTPS. Learn more about IEEE 519 [here](#).



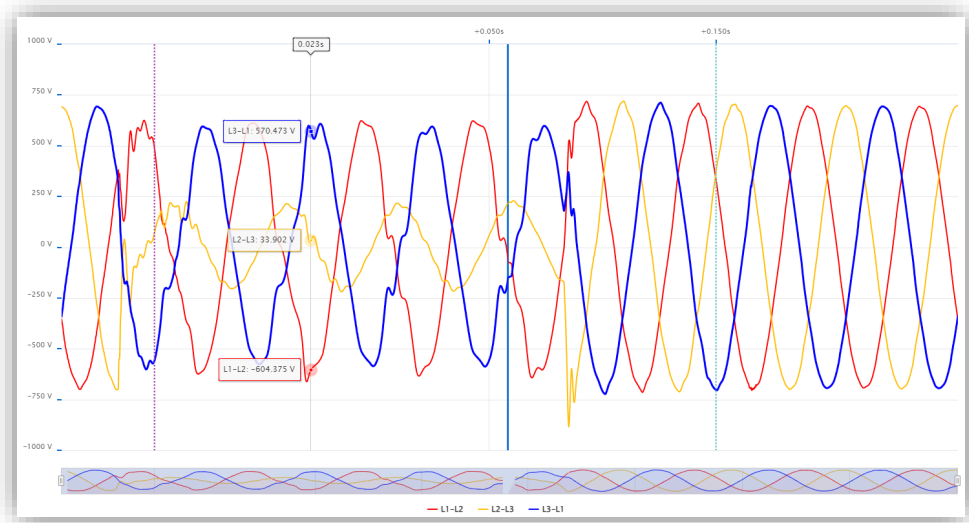
- You can now customize the current channel labels for I4 and I5 for display on meter pages and in trends GIF.



○ New Features – Enhanced Fleet Management with QubeScan



- Measurement Points can now be localized on the map using longitude and latitude (LON/LAT) coordinates.
- Measurement Points can be deactivated or archived once the measurement campaign has concluded or if the device is removed from the site.
- For PQube 3's with a GPS module (e.g., GPS-R module), you can now monitor the lock status and the number of satellites directly within QubeScan.

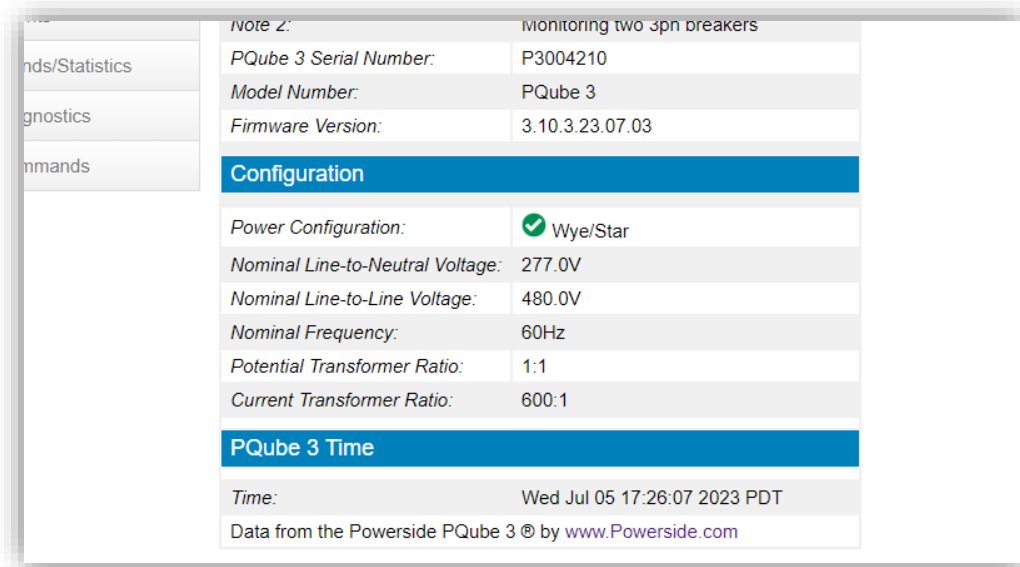


- With the Event Dashboard, you can now easily zoom in to assist with troubleshooting and expedite diagnosis.
See [Firmware 3.10.4 / Software Bug Fixes](#).

Firmware 3.10.3

○ **New Features**

- **The PQube 3 webpage now displays live detected Power Configuration information**



✔ Denotes Power Configuration has been detected and the device is measuring.

⚠ Denotes that the Power Configuration has not been detected and the device is not measuring.

- **New: Improved IoT connectivity test to troubleshoot onboarding your device to QubeScan**
Click Test Connectivity from the Commands page.

See [Firmware 3.10.3 / Software Bug Fixes](#).

Firmware 3.10.2

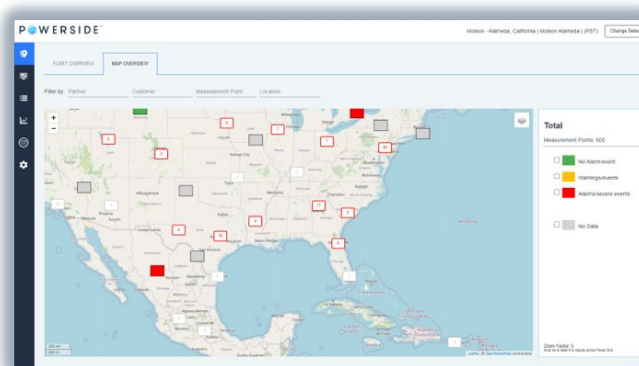
See [Firmware 3.10.2 / Software Bug Fixes](#).

Firmware 3.10.1

○ **New Features : QubeScan**

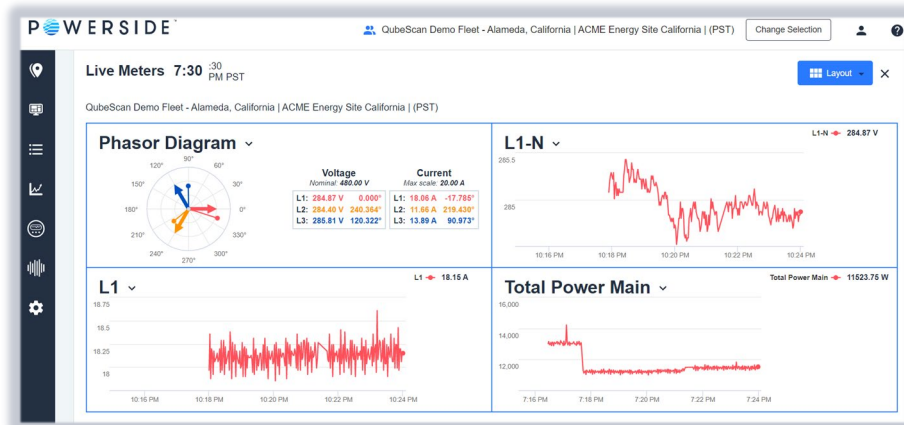
- **If your PQube 3 is networked and connected to the Internet: join QubeScan!**

The PQube 3 is now “QubeScan ready” and you can access all your measurements via the secure Powerside Cloud. Sign up to see how you can connect your fleet of PQube 3 units and access measurement data 24/7 from anywhere via desktop, tablet, or smartphones.



To learn more and sign up for QubeScan, click [here](#).

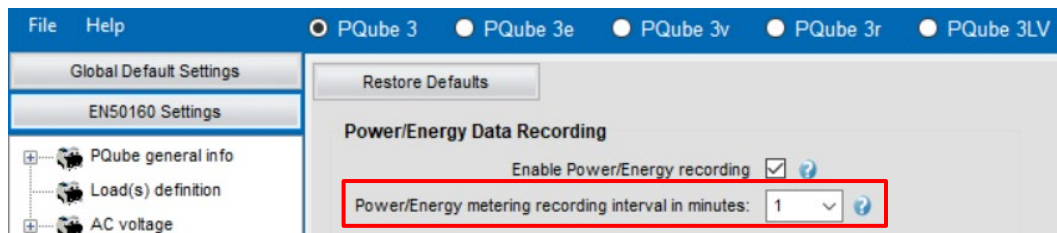
Geolocate your fleet and get powerful dashboard oversight of your fleet and real time data.



Firmware 3.10.0

○ **New Features**

- You can now configure your PQube 3 to **capture more detailed power/energy profiles at a 1-minute interval for each defined load in the PQube 3.**



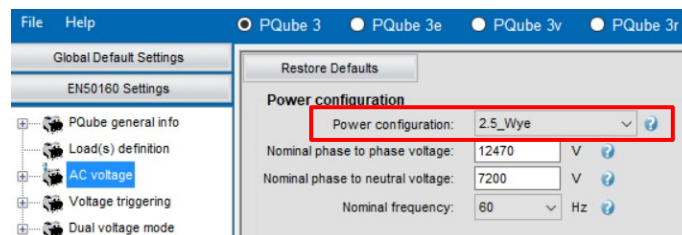
New Power Energy Recording with 1-minute intervals

Note 1: The PQDIF 1-minute recorded files now contain additional parameters including per phase current, voltage, power, energy, flicker, and THD. Additionally, minimum and maximum values for voltage and current magnitude, as well as unbalance are now available in the 1-minute power/energy recordings.

Note 2: This feature supports recording 1-minute data to PQDIF and CSV files and can be applied for each 3-phase circuit the PQube 3 is monitoring (up to 2 circuits with the PQube 3 and up to 4 circuits with the PQube 3e).

- You can now **configure the PQube 3 for 2.5 Wye metering applications** (a 4 wire Wye system with 2 PTs and 3 CTs connected, Form 36 meter). The “2.5 Wye element” mode was added to the PQube 3 power configuration options.

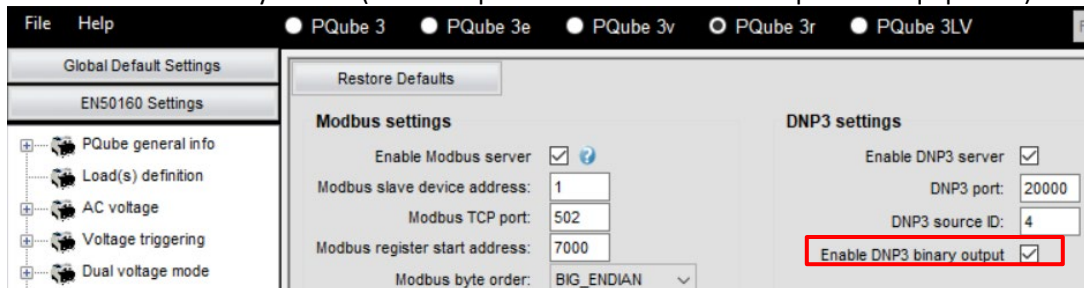
Note: Inherent to the 2.5 Wye application, the missing voltage potential (Phase B) is then calculated for a balanced system and this may result in an impact to voltage and power accuracy.



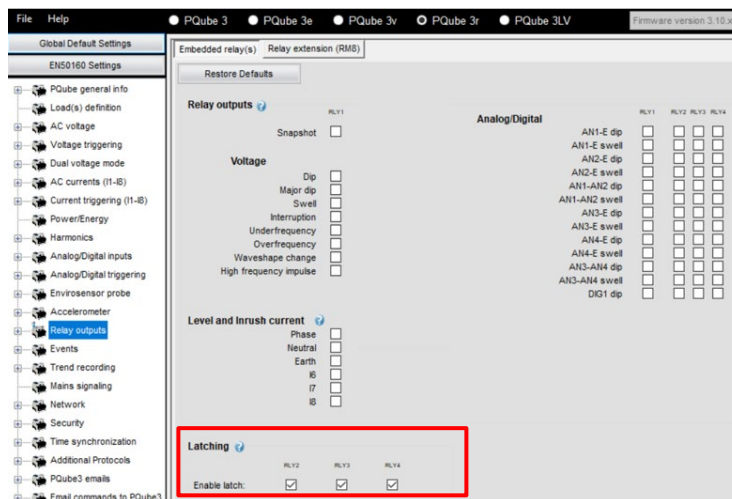
New “2.5 Wye” Power Configuration

- You can now operate **remote trip and close commands to PQube 3r relays via DNP3.0 protocol.**
Note: The PQube 3r model is required for the latching relay feature.

This feature enables sending a remote trip or close command to PQube 3r latching relays to control an auxiliary device (such as upstream circuit breaker or process equipment).



New DNP3 binary output option



Enable Latching on the relay outputs

- You can now download locally **up to 6 months of historical data to the USB drive or microSD card**. The selection choice of previous months has been extended from 2 previous months to 6 months in the past.

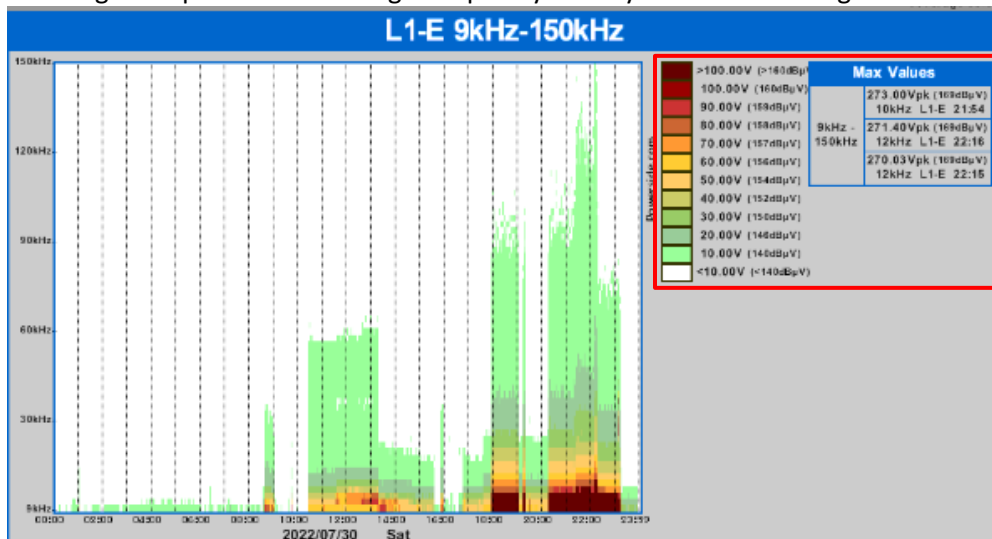


Firmware 3.9.0 ~ 3.9.13 NEW FEATURES

Firmware 3.9.13

○ **New Features**

- We now support medium voltage applications with high frequency conducted emissions measurements. You can scale these measurements based on the potential transformer ratio, enabling an improved view of high frequency activity in medium voltage.



High Frequency Scaling Applied

- You can now invert the analog inputs for DC measurement applications. For example, applications requiring the DC positive to be connected to analog ground and DC ground to be connected to analog positive can now be accurately monitored.
- The Trends CSV file for 2-9kHz and 2-150kHz measurements now has a header with the time zone.

○ **Software Enhancements**

- PQube 3 Configurator: A new Gmail email support feature was introduced with password authentication.
- PQube 3 Configurator: When load definition is applied for I6 to I8 and I9 to I14 current channels, recording will now be automatically enabled for the respective loads.
- PQube 3 Modbus Client: Now supports measurements THDi and temperature in degrees Fahrenheit.
- Report Writer: Now has descriptions of all parameters in the file header.

Firmware 3.9.12

○ **New!**

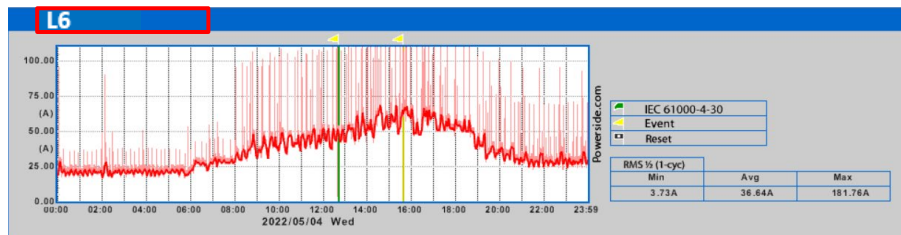
- You can now take control of naming the current channels displayed in the web meter pages and GIF files. For example, you can rename the “L6” current channel to “I1 Amp Mains” and the web meters and current trending GIF files will update as shown below.

Meter	Value
L1-N	119.1V
L2-N	119.4V
L3-N	122.0V
N-E	0.04V
L1-L2	206.1V
L2-L3	209.0V
L3-L1	209.3V
E Amp	0.0000A
L6	46.01A
L7	47.75A
L8	54.94A

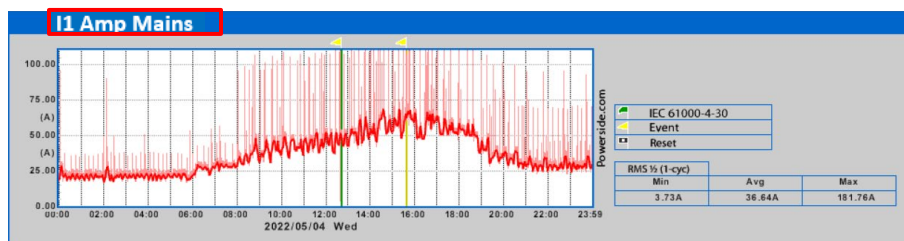
Web Meters: Before

Meter	Value
L1-N	118.8V
L2-N	119.0V
L3-N	121.1V
N-E	0.04V
L1-L2	205.8V
L2-L3	207.8V
L3-L1	208.1V
E Amp	0.0000A
I1 Amp Mains	45.87A
I2 Amp Mains	49.49A
I3 Amp Mains	55.44A

Web Meters: After



“Individual Current Trends” GIFs Naming: Before



“Individual Current Trends” GIFs Naming: After

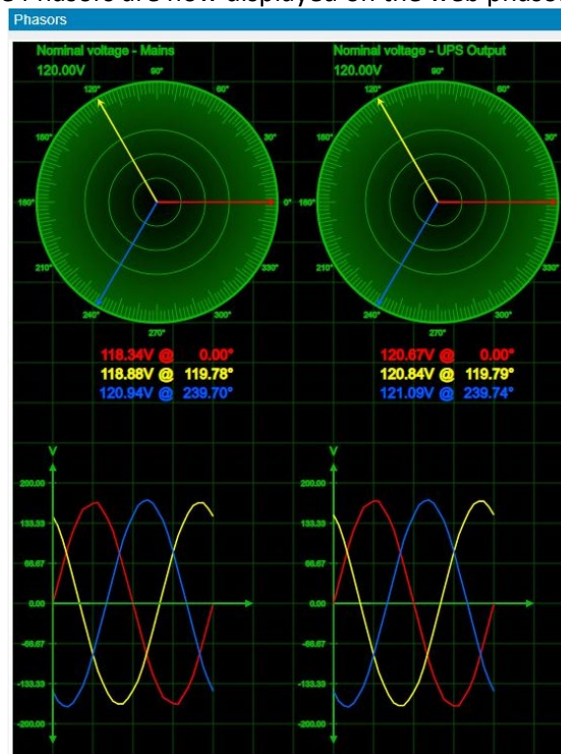
- Enhancements made to the PQube 3 dual voltage and dual power mode:
 - You can take control of naming the current channels when using dual voltage and dual power mode. For example, you can rename your current channels associated with the Source 1 voltage (SRC 1) and Source 2 voltage (SRC 2) to “I1 Amp”, “I2 Amp”, and “I3 Amp” respectively, and the web meters will update as shown below.

SRC 1 Meters	
Meter	Value
L1-N	118.8V
L2-N	119.0V
L3-N	121.1V
N-E	0.04V
L1-L2	205.8V
L2-L3	207.8V
L3-L1	208.1V
E Amp	0.0000A
I1 Amp	45.87A
I2 Amp	49.49A
I3 Amp	55.44A

SRC 2 Meters	
Meter	Value
L1-N	121.1V
L2-N	120.9V
L3-N	121.3V
N-E	0.00V
I1 Amp	42.94A
I2 Amp	43.16A
I3 Amp	43.67A
L1-N Voltage Fundamental	121.09V
L1 Voltage Fundamental Angle	0.00deg
L2-N Voltage Fundamental	120.95V
L2 Voltage Fundamental Angle	119.81deg

Web Meters: User Defined Current Channel Naming on Dual Voltage Sources

- Dual Voltage Phasors are now displayed on the web phasors page.



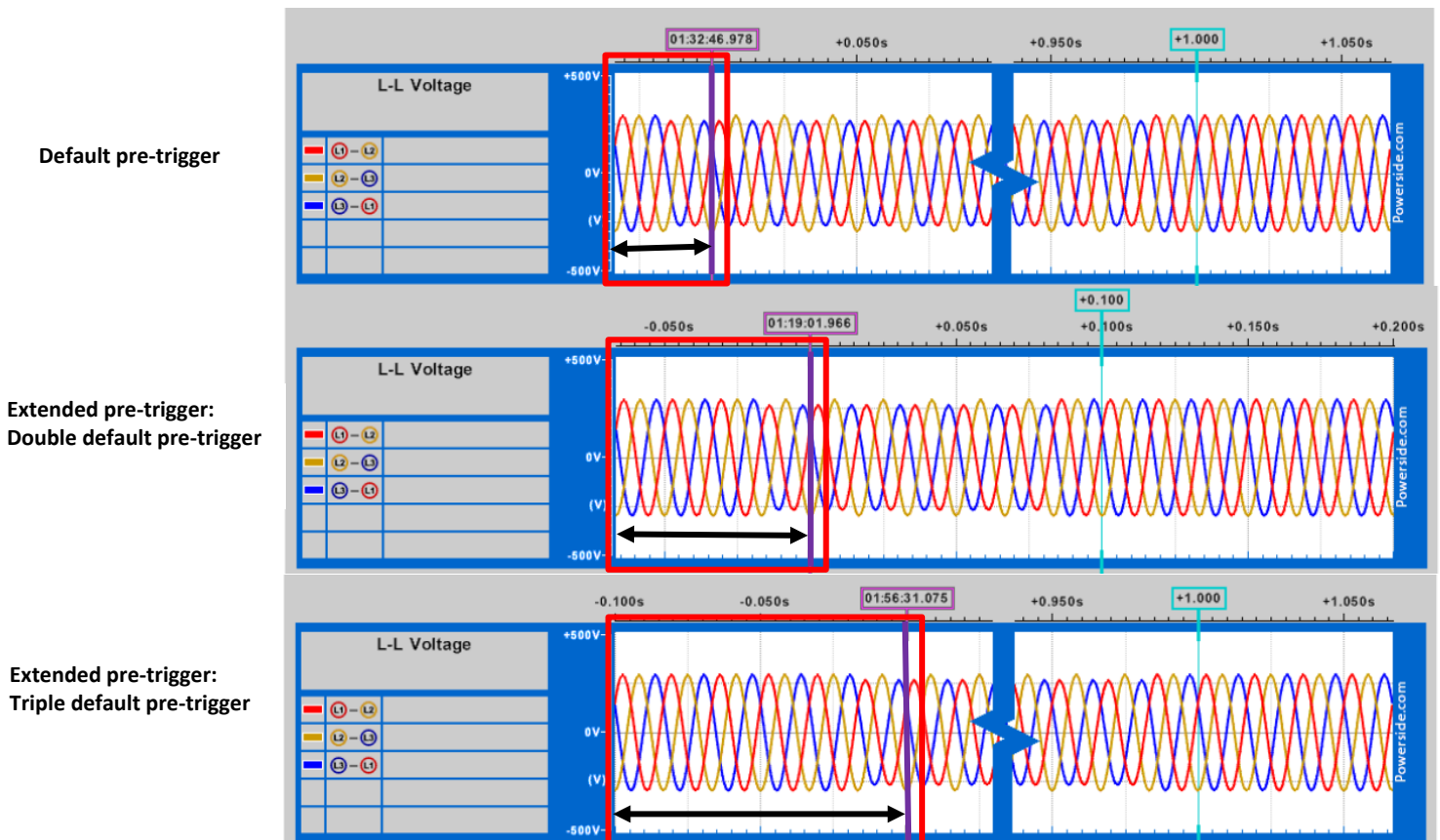
Dual Voltage Phasors Now Displayed

- You can now generate a snapshot while an event is in progress to further enhance your power quality data accessibility.
- Improved overall robustness of the firmware update process:
 - Firmware update function is disabled when the PQube 3 power supply is operating on UPS battery backup.

Firmware 3.9.10

○ **New!**

A new pre-trigger feature enables extending detection of the pre-fault/pre-trigger recording by double or triple of the default pre-trigger duration. This applies for both RMS and waveform recordings. The figure below shows the default and extended pre-fault recordings for RMS envelope. This feature can be enabled in the PQube 3 configurator software as shown below.



Example of Default, Double, and Triple Pre-Fault Trigger Duration for the Waveform Recording

Firmware 3.9.9

○ **New!**

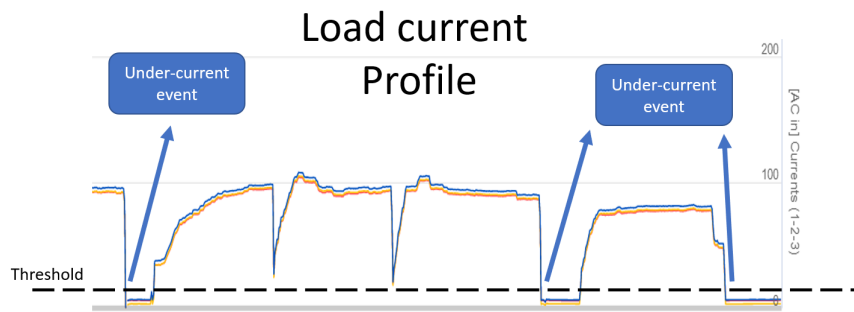
A new function was added to prevent uploading previous versions of firmware to the PQube 3 locally from the screen display using the USB stick.

Firmware 3.9.8

➤ **New!**

A new type of current trigger to detect a **loss of load** or detect reduced load consumption conditions. Whenever the load current magnitude falls below a configurable threshold, your PQube 3 triggers an event, records an RMS envelope and waveform.

This new event trigger can be configured on top of existing over-current or inrush-current triggers for the current channel. Each of the 8 channels for PQube 3 (14 channels for PQube 3e) can be assigned with an under-threshold with their own individual thresholds.

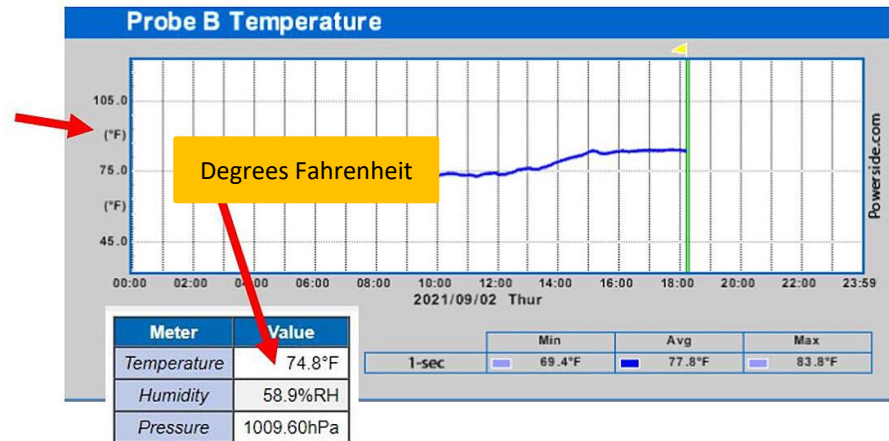


Firmware 3.9.7

➤ 8-150kHz spectrum is now available via MODBUS.

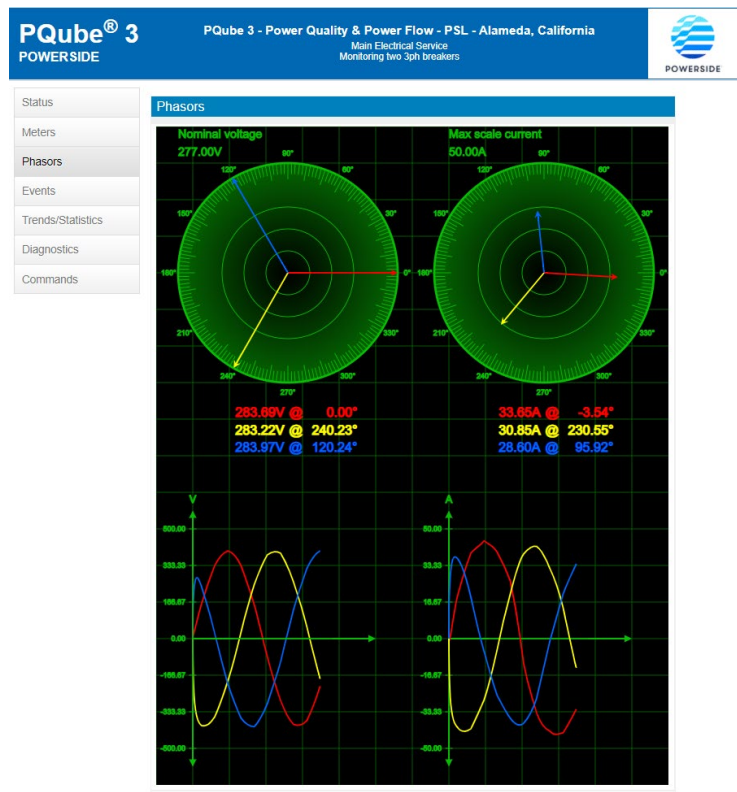


- ENV2 probe temperature channels Fahrenheit support is added for temperature measurements.

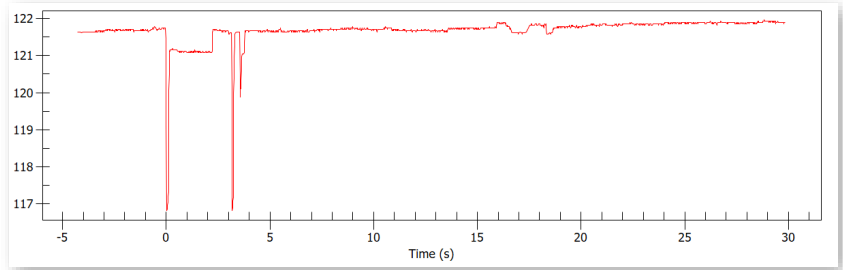


Firmware 3.9.2

- PQube 3 web pages now display a phasor diagram and a single cycle waveform shape. It is now very easy to verify wiring and/or commission a PQube 3 remotely from the PQube 3 web pages.



- **New!** The PQube 3 now offers an option to extend the RMS recording length to 4 times the default length. With this option, 4 currents (3 phases +neutral) and 3 (L-N and L-L) voltage, and frequency channels are recorded. The pre-trigger is approximately 3 to 4 sec @60Hz.



New Extended RMS recording option: ~34 sec @60Hz, ~40sec @50Hz

- **New!** FTP Push: The PQube 3 can now push event data records to a distant FTP server. This is a BETA version of the functionality.

Firmware 3.9.0

- Better diagnostic for technical assistance: added additional log availability for troubleshooting via the downloads page.
- PQDIF file improvement: the PQube 3 now generates a PQDIF file when the event does not contain a waveform recording. (MAGDUR PQDIF tags for this type of event file)

Firmware 3.10.6 / Software Bug Fixes and Enhancements

PQube 3 / PQ Edge Firmware

- Addressed the limitation where large email attachments failed to send.

PQube 3 Configurator

- Enhanced the ATT2 module support for additional DC Sensors with PQube 3, broadening the range of DC monitoring capabilities.
- Fixed a configuration issue that caused AC signal input into analog channels to incorrectly report as 0, ensuring precise measurement of AC signals.

Report Writer

- Resolved an issue in Report Writer indicating an unlicensed version of Word or inability to access local files and drives when installed with an administrator account, improving software usability.

Firmware 3.10.5 / Software Bug Fixes and Enhancements

PQube 3 / PQ Edge Firmware

- Improved support for PQ Edge iOS or Android App.

Report Writer

- Fixed a bug in the Report Writer program where an error was generated when data is flagged in IEEE 519 reports.

QubeScan

- Improved robustness of communication of events to QubeScan.
- Enhanced device fleet health ex. online / offline, monitoring capabilities from the cloud.
- Fixed bug where firmware version on QubeScan was incorrect for some users.
- Improved behavior of device post restart.
- Fixed issue with rare occurrence of trends not being sent to QubeScan on device restart.

Firmware 3.10.4 / Software Bug Fixes and Enhancements

PQube 3 / PQ Edge Firmware

- Reintroduced the summary email feature to provide high-level details to a select group of individuals such as senior leadership. Additionally, this feature can be utilized to receive updates via text message when emails are directed to a mobile network's email gateway address. For further information or assistance in setting up event text messages, please contact either your mobile service provider or Powerside support.
- Fixed a randomly occurring issue where events were not being sent to QubeScan.
- Resolved bug where data was missing for secondary voltage channels in CSV files for PQube 3s in dual voltage mode.
- Renewed SSL certificate for device webpage.

- Updated PQube 3 time zone and daylight savings information with the latest IANA Time Zone Database. For changes to time zone and daylight savings time policies, see the following link: [Time Zone Database \(iana.org\)](http://Time Zone Database (iana.org))
- 10-minute inter-harmonic data now has corrected column names.

PQube 3 Configurator

- Enhanced user interface and consistency checking in the configurator for PQube 3 units paired with ATT1 modules.
- Resolved bug where the configurator would not show that an ATT2 was selected in a previously saved configuration.

Report Writer

- Fixed an issue where the report writer would encounter an error when the power factor was selected.

QubeScan

- Resolved bug where the device undergoes a reset when synchronizing with QubeScan following extended network outages.
- Resolved bug where QubeScan page refresh would show error 504.

Key Information and Considerations for Downloading 3-Second Data for IEEE 519 Compatibility Report:

- The 3-second data file is approximately 70 MB per day. Opting to capture this data will limit the historical data storage capacity on your device.
- When using a cellular modem, 3-second data cannot be downloaded via FTPS.

Firmware 3.10.3 / Software Bug Fixes and Enhancements

PQube 3 Firmware

- Resolved bug that caused incorrect timescale for RMS PQDIF event triggers.
- Added columns for secondary voltage channels in Power_Energy.csv for PQube 3 units configured in Dual Voltage mode.
- Resolved bug that caused the trends to stop generating when GPS loses satellite lock.

Configurator

- Enhanced consistency checks in the “AC Voltage” and “Load(s) definition” pages of the PQube 3 Configurator.
- Fixed issue where voltage readings on analog channels were incorrect when ATT1 module was used.

Modbus Client

- Fixed issue with dates appearing as “0000-00-00” in the Modbus client tool CSV.
- Fixed bug where Modbus client disconnects after selecting AN1-E.

Report Writer

- Resolved a cosmetic bug that caused the EN 50160 report to incorrectly display "Setup.ini not available" when the file was present.
- Fixed typo with units on axis of graph in IEEE 519 report.

Improvements in QubeScan

- Improvement in visualizing 4th load in QubeScan.
- Improvement in visualizing additional loads in Dual Power monitoring mode in QubeScan.
- Improved the accuracy of 15-minute energy visualization on QubeScan.

Firmware 3.10.2 / Software Bug Fixes

- GPS-R module improvements
 - Improvement to handle poor GPS signal coverage.
 - Improved latitude and longitude display on PQube 3 webpage.
 - Added indication for active time sync source (GPS/RTC) on PQube 3 webpage.
- Resolved an issue on the QubeScan Energy dashboard where the 4th load was not being displayed.
- Reduced the minimum voltage threshold for initiating measurements on the PQube 3LV to 0.5 V.
- Fixed issues where 4th load is not recorded in Power/Energy CSV and PQDIF files.
- Fixed SNMP traps for missing Over and Under Frequency trips, and other event type trap mislabeling.
- Enhanced the stability of the PQube 3 webpage in Dual Voltage/Dual Power configurations, addressing rare cases of instability issues.
- Added warning message in the Configurator to enable TLS, required when using PSL mail server.

Known facts, important notes on current harmonic measurements:

- *By default, individual current harmonics are computed and recorded in Amps. Some standards like IEEE 519 evaluate current harmonics in %IL (percent of load current). It is strongly recommended to select an appropriate value of IL (not leaving the tag set to AUTO) if recording of harmonics in %IL is required.*

Note: the ReportWriter tool can generate an IEEE 519 report from the recording performed in Amps. ReportWriter will let you enter the IL value at time of report generation.

Firmware 3.10.1 / Software Bug Fixes

- Fixed an issue with PQube 3 occasionally restarting due to internal watchdog timeout.
- Fixed an issue specific to events “extended recording duration to 30s” where the trigger channel identified is L-L instead of L-N in GIF files and webserver list of events.
- Fixed an issue with Dual Power mode where primary and secondary power readings are incorrect when set with Delta power configuration.
- Fixed an issue where event relays were not working correctly for major dip events.
- Load definitions (associations in configurator software) : enabled CT location between phases (L-L) in Wye/Star and Single Phase L1_L2 power configurations.
- The 2.5Wye power configuration option has been removed in this release.
- Incoming email (emails to the PQube) is no longer supported with the “PSL mail” server and is now only available from GMAIL or OTHER (your company email server) as the email provider.

Firmware 3.10.0 / Software Bug Fixes

- Fixed the ATT1-600 ratio to 10:1 in the Configurator software.
- Fixed issue with missing daily/weekly trends recording when “AUTO” is selected for voltage and frequency in the Configurator software in Trend Recording “Scaling graphs”.
- Fixed issue with missing GIFs when analog channel names are duplicated. Analog channels with duplicated names are now automatically renamed in the Configurator software.
- Fixed issue that caused distortion / screen artifacts on the local PQube 3 display screen when inserting the USB key.

Firmware 3.9.13 / Software Bug Fixes

- Fixed ENV2 vibration sensor GIFs and Statistics trends files (acceleration min showing -32000 values).
- Fixed ENV2 vibration sensor to display the correct acceleration parameter after switching OFF and ON (was always displaying m/s²).
- Fixed issue with relay triggering as a major sag (3s) when any major sag is configured.
- Fixed an issue with GIF file event reporting L-L and L-N on 3-phases when AUTO detecting single phase configuration.
- Fixed language translation issues on SEMI F47 major sag GIFs.
- Fixed several items in the display of the load definitions page in the Configurator software.
- Fixed Fahrenheit temperature range values in Trends Recording page in the Configurator software.

Firmware 3.9.12 Bug Fixes

- Fixed ENV2 probe mechanical shock events causing “event in progress” displayed on the PQube 3 web server status page and an “!” icon events list on screen display.
- Fixed scaling the analog channel GIF event files when negative values are being measured.

Firmware 3.9.10 Bug Fixes

- Fixed clearing an invalid message “event in progress” displayed on the PQube 3 status page and Events list on screen display.
- Improved the dual power mode web meter page, screen, and GIFs.
- Fixed waveform recording PQDIF output when voltage or current channel swapping is configured.
- Fixed a 30-degree secondary phase offset issue when in dual voltage delta configuration.
- Fixed TDD values in when “TDD demand current IL” is configured to the AUTO setting.
- Fixed false temperature and humidity events when Fahrenheit mode is selected.

- Identified an issue with wiping the daily trend data from PQube 3 memory when upgrading firmware versions from 3.8.x to 3.9.x. Recommend saving the trending data prior to upgrading firmware.

Note: Upgrading firmware versions from 3.9.x to 3.9.10 will not wipe the daily trend data.

Firmware 3.9.9 Bug Fixes

- Fixed an issue with the under-current trigger event hysteresis parameter.
- Improved the phasor screen waveform view on the webserver.
- Improved the sensitivity of the touch screen display.

Firmware 3.9.8 Bug Fixes

- Fixed a timestamp issue on the 2kHz~150kHz output files.
- Fixed a problem where certain value shows up as “inf” in csv files.
- Corrected some PQDIF file tag names based on TDD setting.
- Fixed an issue with splash.gif uploading on the commands page.
- Fixed an issue with DNP3 not working properly during certain events.
- Fixed an issue with statistics when temperature unit is set to Fahrenheit.

Firmware 3.9.7 Bug Fixes

- Fixed certain inaccurate labelling and recording options under Delta Configuration.
- Fixed an issue where past Power Loss events were not persisting on the Events page.
- Fixed an issue with I14 current events not working properly.

Firmware 3.9.6 Bug Fixes

- Fixed a rare case where THD and Harmonic values can sometimes be inaccurate.
- Fixed an issue where in some cases firmware updates cannot be uploaded.
- Added additional support for multi-circuit PQDIF files.
- Fixed an issue where the daily emails does not send due to size constraints.
- Added some additional PQVIEW compatibility options.

Firmware 3.9.4 Bug Fixes

- Improved shutdown behavior and reliability due to power loss.
- Automatically clean out outdated links when data is deleted due to storage concerns.
- Fixed an issue with phase inconsistencies in PQDIF files in some cases.

Firmware 3.9.2 Bug Fixes

- Fixed an issue where individual phases were missing for Flicker in certain output files.
- Fixed an issue with missing certain channels in PQDIF files for Delta configurations.

Firmware 3.9.0 Bug Fixes

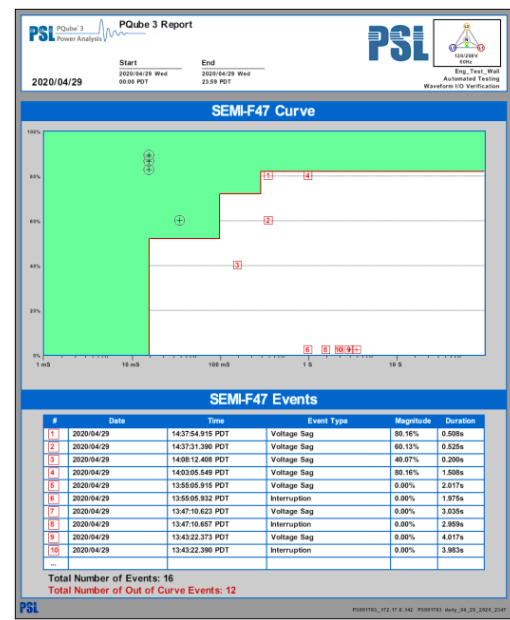
- Fixed a calculation error on TDD for the 10 minutes class A value.
- Fixed a rare occurring bug that could cause the system to crash, mostly observed on 50Hz systems.
- Fixed an issue with power factor display.
- Fixed an issue affecting the automatic importing of certain PQDIF files using PQVIEW.
- Fixed an issue tracking peak power values under certain conditions.

Firmware 3.8.1 - 3.8.4 NEW FEATURES

- PQube 3 now supports communications via the BACnet/IP protocol.
ANSI/ASHRAE 135-2016 BACnet is a data communication protocol for building automation and control networks.
All of the PQube3 meters are available as Data Objects.



- PQube 3 can now generate sag immunity overviews charts - daily, weekly or monthly. Several standard reference curves are available: SEMI F47 (semiconductor industry), MIL-STD-1399 (shipboard equipment), MIL-STD-704E (aircraft electric power), CBEMA (Information Technology), Samsung Power Vaccine...
You can also configure your own curve with 4 control points!



- PQube 3 complies with the IEC 61000-4-30 Ed3 corrigendum 1. Corrigendum 1 clarifies details of the method to compute RVC events (Rapid voltage changes).

- Improved compatibility with PQView V4: option for PQube 3 PQDIF files to be time-tagged in UTC with time zone information, vs. local time.

New in 3.8.4:

- Added an option to restrict access to the screen display with a lock code.
- PQDIF file support for multiple load “power-energy files” with PQube 3 (up to 2 loads), and PQube 3e (up to 4 loads).
- Recording of harmonic power flow direction (H2 ~ H50) during snapshot recording (CSV files).

Firmware 3.8.4 Bug Fixes

- Updated a few security patches.
- Fixed column names on 2kHz ~ 150kHz CSV files.
- Fixed a bug with ejecting removable drives (USB /microSD card).

Firmware 3.8.3 Bug Fixes

- Fixed an issue with weekly trends not being accessible on the web server.
- Fixed an issue where sometimes daily trend emails would fail to send.
- Fixed several PQDIF related issues related to PQVIEW.
- Fixed an issue with 2-150khz not calculating correctly in single phase mode.
- Fixed an issue where some command buttons appear not functional when configured with certain languages.
- Fixed an issue with an inaccurate SEMI-F47 curve.

Firmware 3.8.1 Improvements

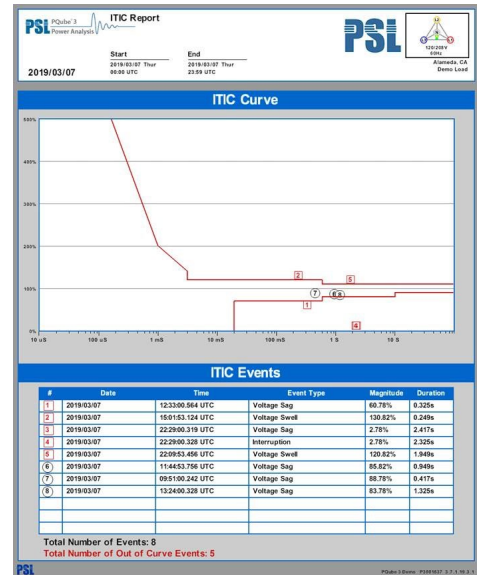
- Added more diagnostic information.
- Added ability to download diagnostic information from the web page.
- Improved robustness in configuration update and firmware update internal process.

Firmware 3.8.1 Bug fixes

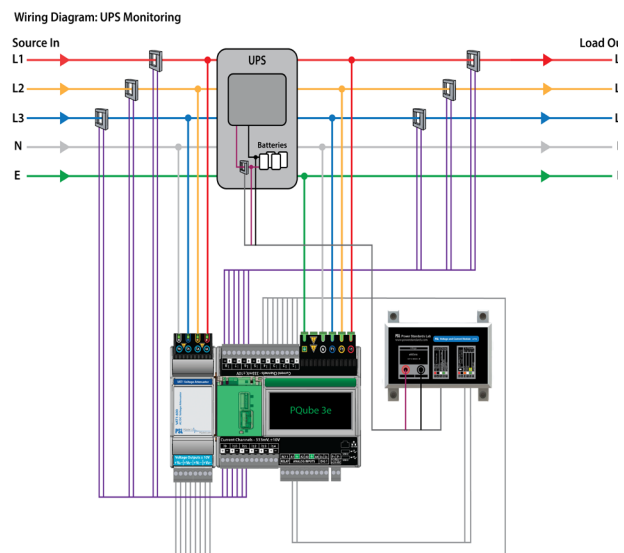
- Corrected Power factor values trends (1min daily trends) with firmware 3.8.0.
- Missing daily embedded EN50160 reports, embedded ITIC reports with firmware 3.8.0.

Firmware 3.7.0 thru 3.7.9 FEATURES

- Your PQube 3 now delivers a daily, weekly or monthly sag/swells graphic summary: the embedded ITIC graph summary.
The ITIC graph is a 2D magnitude/duration plot of the sag/swell/interruption events that occurred during the period. Events plotted outside the 2 curves are typically considered as impacting equipment, so considered as a problem.
You also get a list of events (up to the 10 most recent ones) below the ITIC graph.



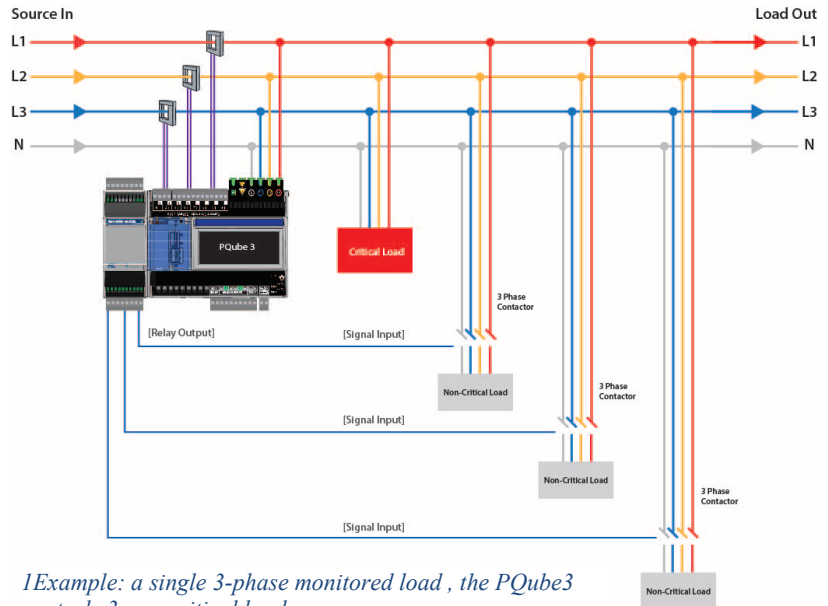
- Your PQube 3e* now has a new “Dual power” mode:
With this mode, you can simultaneously monitor the input and the output power of a UPS, or the primary and secondary side of a transformer.
As a result, the PQube 3e will also monitor in real time the efficiency of the equipment. The efficiency is defined as the ratio of output active power to the input active power.
(*) this feature requires a PQube 3e and a VAT1 module.



- You can now use your PQube 3 as a controller to limit consumption by shedding non-critical loads of your monitored circuit.

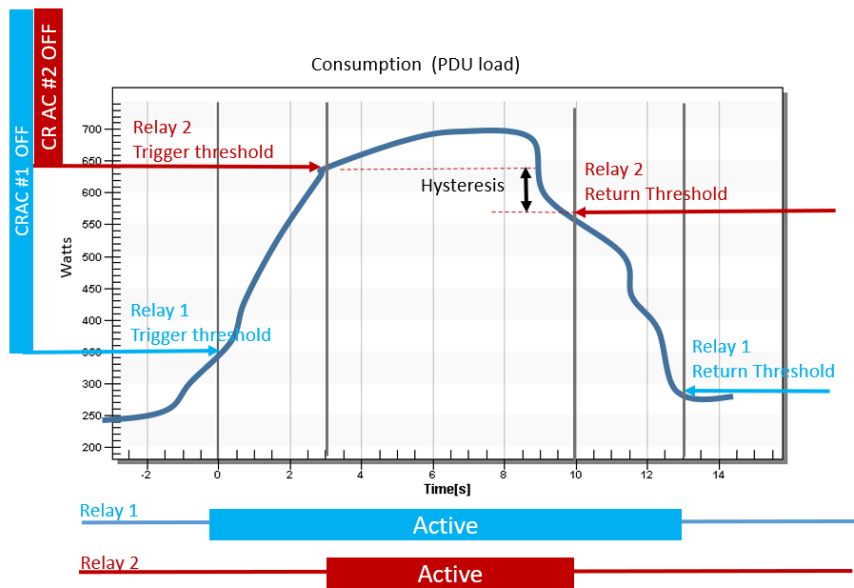
With this new function (RM8, 8-relay extension module required) you can define a load shedding scheme to prevent your circuit protection from tripping because of overconsumption. To do this, you define the power threshold(s) above which the (RM8) relays that will shed the non-critical loads.

With a PQube 3, you can monitor and have up to 2 (3-phase) circuit shedding schemes. A PQube 3e lets you have shedding schemes for up to 4 (3-phase) circuits.



Example: a single 3-phase monitored load, the PQube3 controls 3 non-critical loads

- The PQube 3 can now detect and signal low (or loss of) power. The 'low' condition threshold can be set in the configuration (this function requires an RM8 module).
- The PQube 3 can also detect and signal reverse power flow (import to export power) if the threshold is set to 0.0, the power monitored will go from positive to negative and vice versa (crossing the zero threshold)



Example of a 2-threshold load shedding.

It is possible to monitor up to four 3-phase loads (PQube 3e) with up to 8 thresholds

- **Note1: firmware 3.7 or higher is required to operate PQube 3r (PQube 3 model with 3 additional relays) or a PQube 3 with the RM8 module**

Firmware 3.7.9 Improvements

- All of the PQube 3 pages (including the Command page) are accessible on the same port.
- Improved compatibility of PQube 3 PQDIF files with PQView, including PQView v4.
- Improved the EN50160 embedded report to better represent the standard (harmonic ranks>25).
- Fixed some string inconsistencies between various output files of the PQube 3.
- Improved reliability and behavior on the UPS3 module to reduce downtime when the battery is being charged.
- Clarified return error message when setup.ini cannot be updated in certain cases.

Firmware 3.7.5 Improvements

- Option to record individual current harmonics in %IL, or in Amps. The rated current (IL) can be defined in the PQube3 configuration.

Firmware 3.7.4 Improvements

- PQDIF file for 10sec frequency measurements is now available.
- PQDIF trends phase identifier adapted for DELTA configuration.
- PQDIF event RMS recording compatibility with PQView improved

Firmware 3.7.3 Improvements

- Improvement of the behavior of the PQube3 shutdown procedure (upgrade to 3.7.3 is recommended if PQube3 is operating with a UPS1, UPS2, or UPS3 module)
- Improved compatibility of PQDIF harmonic files for viewing with PQView V3 software

Firmware 3.7.1 Improvements

- Present week “weekly trend”, and present month “monthly trend” can be generated remotely using the Web command page. (This can also be used to generate trends in the past that were not generated previously).
- Configuration of PQube 3 current input channel range (333mv/10V) on each individual channel (I4 through I14)
- Language support for the 3.7.0 new features in Spanish(South America), Portuguese(Brazil), Portuguese(Portugal), Italian, German, Polish, Danish, Swedish, French, Dutch.

Firmware 3.7.0 Improvements

Web interface:

- Compatibility with Microsoft Edge (Internet Browser)
- You have a faster Web page interface: especially faster response for the diagnostic page and faster response when in secure HTTP mode (HTTPs).
- The remote firmware upgrade via the web page is simplified (single step [send] button).

- Upload configuration file: you may now have any name with extension "INI".
- Upload location and splash logo GIF files: you may now use any file name with extension "GIF"
- PQube 3 status page, displays "Event capture in progress" as long as an event is being recorded. This matches the exclamation mark on the PQube 3 screen display.
- The email result on the command page after completion...
- Counter of events refreshes automatically on the web page
- The diagnostic page now displays the result code of the (last) test email

Synchronization:

- Synchronization: NTP and SNTP faster acquisition at startup, or when the Ethernet cable is connected.
- The screen displays a "lock" symbol when SNTP/NTP synchronization is active, and no symbol displayed when synchronization is lost.

Mains signaling:

- Mains signaling (ripple control signal) is now available as a CSV triggered recording (as per IEC 61000-4-30)

Miscellaneous:

- The overcurrent trigger event summary now reports the trigger threshold
- Power factor meters now displayed and recorded with 3 digits after decimal
- Differential analog AN1-AN2 and AN3-AN4 names can now be defined in configuration
- Vertical zoom limited for current channels to avoid auto zooming in on noise (event GIF files)

PQDIF:

- PQDIF file generation speed performance improved (events and trends)
- Improved compatibility of PQDIF files for viewing with PQView V3 software
- PQDIF files generated for the power/energy files
- PQDIF: sag and interruption events without recording are now generated as MAGDUR types events
- PQDIF trends generated (separate files) when using dual voltage and dual power measurements mode

Firmware 3.7.9 Bug fixes

- Fixed a rare issue which caused emails to stop working.

Firmware 3.7.8 Bug fixes

- Production related correction for PQube 3r

Firmware 3.7.7 Bug fixes

- Production related correction

Firmware 3.7.6 Bug fixes

- Corrected PQDIF channel label “voltage magnitude” to reflect Phase -to neutral (L-N) or Phase to Phase (L-L).

Firmware 3.7.3 Bug fixes

- correction of an issue with PQube3 and microPMU synchronization by GPS (GPS1-MS1).

Firmware 3.7.1 Bug fixes

- DNP3 “Source_Id” can now be changed by configuration
- Dual power mode: fixed efficiency meter jumping from 200% to 0.00% (when no voltage applied to input or output)
- Fixed a specific issue in a rare scenario with AUTO power configuration, AUTO nominal voltage , and fixed nominal frequency.

Firmware 3.7.0 Bug fixes

- Fixed rare issue with trends or events missing (internal memory filling up)
- Trends do not generate after the data is cleared.
- Fixed an issue with the screen diagnostic displaying a “Counter clockwise” rotation, whatever the setting defined in the configuration.
- 10-minute trends now record voltage inter-harmonics in “% of fundamental” when the option is selected in the configuration.
- In single phase mode, the CSV columns for L2-N, L3-N, L1-L2, L2-L3, L3-L1 are now not populated.
- Negative and zero sequence (voltage and current) were swapped in daily/weekly statistical tables
- Weekly and Monthly GIF trends showed min/avg/max table value as "0" if only weekly and monthly trends are enabled.
- “Power_energy” CSV files now use the field separator defined as per the configuration.
- Fixed miscellaneous PQDIF channel definition issues
- Trends may not generate (rare) after the data is cleared from memory
- Daily trends did not generate after Jan 6th (when weekly trends are enabled) until they are reset. The daily trends can be recovered with this firmware.

Known issues:

- 2kHz-150kHz emission CSV file always uses “,” as separator independently of the option set in the configuration.
- 10 sec frequency daily trends CSV separators cannot be changed from “;”

- 2-hour daily trend CSV separators cannot be changed from “;”
- GIF trends Apparent Power kVA scale wrong for Rogowski coils and split-core CTs
- Partial translations (e.g. dual power mode),
- Command page Korean not translated.
- Display screen freezes after auto config (rare)
- When 2 ENV2 probes are connected and (each of) their serial number are not declared in config, the ENV2 (probe A) only will trigger.

Firmware 3.6 series FEATURES

- Firmware versions 3.6.x and higher support models: PQube 3, PQube 3e and PQube 3v. This includes the PQube 3 instruments shipping in 2018, featuring a **32 GB** internal memory.



- Your PQube 3 generates daily and weekly **embedded EN 50160 reports**. Those reports come as GIF files, and show at a glance how the electrical network complies with the EN 50160 power quality standard.

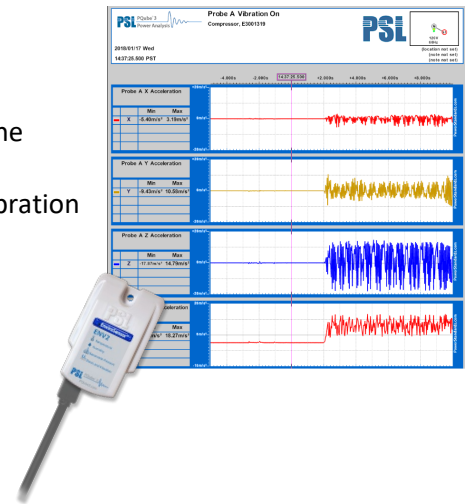


- Parameters measured are RMS magnitude, frequency, flicker PLT, THD, harmonics and unbalance. Each parameter is checked against compliance thresholds over the measurement period (day or week).
- PQube 3 Firmware versions 3.6.0 and higher support communication via the DNP 3.0 protocol (level 1 and 2). DNP 3.0 is an industry standard protocol used

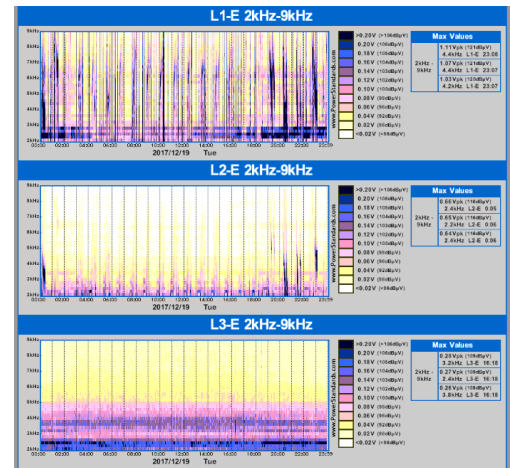


by utilities for SCADA applications.

- The PQube 3 now supports vibration detection and recording with the ENV2 probe. Events are generated at the transition (vibration ON, vibration OFF). Sensitivity thresholds, and minimum duration of a vibration event can also be configured.



- More detailed 2 kHz – 150 kHz conducted emissions color maps:
 - Phase by phase color maps, allows you to visualize which specific phases are contributing the most to creating conducted emissions
 - Distinct color map scale for the low and high range of conducted emissions: one for 2 kHz – 9 kHz, and another one for 8 kHz – 150 kHz.



- It is now possible to declaring the offset voltage of a sensor output that is connected to the PQube 3 analog channels. The offset declared can be specific to each individual analog channel.

Firmware 3.6.0 (and higher) Improvements

- Dual voltage mode VAT1-600 improvements:
The firmware now takes into account the VAT1 4th voltage output. It is interpreted as Neutral-to-Earth voltage (N-E) channel of the second voltage group. This N-E channel can trigger events and is trended in GIF files.
- SNTP-NTP lock/unlock sign
- In Event GIF graphs, the Neutral to Earth channels auto-zooming will be limited to avoid showing quantization noise (max zoom in limit on the waveform graph)
- The PQube 3 now displays model names (e.g. “PQube 3v”) instead of the production part number) in screen, web pages, files, emails
- PQube 3 now shows the firmware update is in progress by having the main status LED blinking in light blue color.
- Norwegian missing translations added.
- The 10 min interval trends CSV file now includes (besides the average value) the maximum values over that 10 min period. This is for each individual harmonics from H2 to H50.
- PQube 3 will now accept configuration file names with or without capital: Setup.ini or setup.ini
- Option to clear all emails from the pending email queue after the PQube 3 has restarted.
- Version 3.6.3: diagnostic web page now displays hardware revision number of the ENV2 EnviroSensor
- Version 3.6.3: when there is an event in progress, the exclamation mark (!) shows up in the bottom of all of the PQube 3 screens



- Version 3.6.4: The weekly EN50160 embedded report (GIF) was taking up to 40 mins. Now optimized and generated in a few minutes.
- Version 3.6.4: added “clear measurement data” button in the PQube 3 command page. This has the same behavior as the screen [Clear] button. It erases all events and trends from internal memory. IT does not erase the configuration, calibration
- Version 3.6.4: Increased touch screen function reliability – fixes rarely observed “screen frozen” symptoms.

Firmware 3.6.4 Bug fixes

- Fixed a rare occurrence where the HF impulse waveform recording is wrong.
- Fixed a threshold mistake in EN50160 embedded report. The positive threshold of the “RMS voltage 100%” limit was set to 15% instead of 105% as per the standard.
- Fixed a rare occurrence with handling of burst of HF impulses or mechanical shocks/seismic events, that caused PQube 3 to stop generating HF impulse and EnviroSensor probe events.
- Fixed an issue where the PQDIF file containing the shape of the HF impulse form is missing.
- Fixed a rare occurrence of an issue where PQube 3 does not regenerate the previous day trend, after restart, if it was off at the time of the trend generation (midnight).

Firmware 3.6.3 Bug fixes

- Fixed a rare occurring bug which can sometimes result in excessive status logging into the PQube 3 log files. When this happens, over time it reduces the capacity of PQube 3 to keep older measurement data. If you suspect you have a reduced amount of measurement in memory, contact technical support.
- Fixed the amplitude of HF impulses in GIF graphs (previously displayed in units multiplied by the transformer ratio, although it should not).
- Fixed time tagging of events when using a time zone with time offset not a integer number (e.g. India offset GMT + 5h 30 mins)
- Firmware now accepts ‘auto’ as well as ‘AUTO’ for tags in setup.ini
- Minor drawing improvements of the embedded EN50160 Report GIF file
- Screen display duration instead of counts of events (event overflow mode ON)
- Seismic trigger threshold (in g units) now displays with 4 digits after decimal (previously displayed 2 digits).Fixed an malformed XML format for summary events (P300XXXX_Event.xml)
- Specific to PQube 3e:
When selecting different current channel ranges (HIGH/LOW) for I1~I8 and I9~I14 (rare case), the current magnitude was inaccurate. This has been fixed.

Firmware 3.6.2 Bug fixes

- Fixed an issue in the 2 kHz – 150 kHz CSV file (max values are replaced by average values in the file). The 2 kHz – 9 kHz CSV file was not affected by this issue. Upgrading to the new firmware version is strongly recommended.

Firmware 3.6.1 Bug fixes

- Fixed an issue (rare occurrence) with ENV2 EnviroSensor probe issue: crashes or stops responding. Upgrade firmware is strongly recommended,
- Fixed (event) SNMP trap indexing issue: trap OID were not correct.

Firmware 3.6.0 Bug fixes

- Modbus battery voltage and current, charge registers are now correct
- In some cases, events and trend files cannot be accessed via the Web page (“error 404 file not found”)
- Fixed some rare and random occurrences of frequency max value recorded at an abnormally high level in daily/weekly/monthly trends. This can cause triggering over-frequency events.
- Fixed the following issue: PQube 3e displays load currents for I6, I7 and I8 although their recording tag is set to OFF.
- Wrong format for field separator with PowerEnergy CSV files, and 2 kHz – 150 kHz CSV files when the separator is not set to “;” (default).
- PQube 3 does not calculate the neutral current correctly unless you enter CT ratio on I4
- Split-phase mode power incorrect if the third current channel is connected

Firmware 3.6.x (3.6 version series) Known issues

- 3.60 through 3.6.2 : PQube 3e:
When selecting different current channel ranges (HIGH/LOW) for I1~I8 and I9~I14 (rare case), the current magnitude will be inaccurate. Present workaround: select the same range for both groups I1~I8, and I9~I14.
- Split-phase wiring configuration: although this does not apply, the I3 channel is displayed in GIF graphs, screen display. Although this does not apply, L3-N power is displayed. total power takes into account connected load on I3.
- Split-phase wiring configuration:
Imbalance (negative and positive) are displayed /recorded although this does not apply

Firmware 3.5.x features and improvements

- Support for PQube 3v (version 3.5.6)
- Power/energy computed on all 8 (or 14*) current channels
 - up to 8 X single phase loads, or up to 2 x 3-phase loads with PQube 3
 - up to 14 X single phase loads, or up to 4 x 3-phase loads with PQube 3e
 - 4-Quadrant energy metering for each load:
kW, kVA, kVARs, CosPHI (DPF) or TPF.
kWh (net, import, export), kVARh (net, positive, negative)
 - real time meters on web meter page, and display screen
 - all accessible via Modbus registers
 - User defined (3, 5, 10, 15, 30 mins) interval power/energy recording file
- PQube 3 can record up to 4 events with RMS and waveform, simultaneously or back to back
- PQube 3 supports up to 8 (or 14*) PSL flexible CT's (Rogowski coils), no integrator, no power supply needed! (*)14 channels for PQube 3e
- Automatic Daylight Saving Time management, easy configuration with the PQube 3 configurator
- PQube 3 records 4MHz HF impulses and shows their position in the waveform (RMS also recorded)
- RVC (Rapid Voltage change) events now have a RMS and waveform recording
- Current harmonic distortion : TDD or THDi, user selectable
- Weekly and monthly statistics added
- Nightly measurement data backup (files copied every day) to USB drive or external micro SD card.
Option is enabled by default
- Uploading of PQube 3 Screen logo (splash.GIF) remotely via Web command page
- Uploading of PQube 3 GIF graph and Web page logo (location.GIF) remotely via Web command page
- New 2kHz-150kHz conducted emission with separate 2kHz-9kHz spectrum and 8kHz-150kHz spectrum – with each their own color map
- Separate 2kHz-9kHz Max emission meter, and 8kHz-150kHz Max emission meter (screen display and web meter page)
- Ultra-precise CT's and CTI-1A/5A harmonic frequency response (up to H50) compliant to IEC 61000-4-30 Ed3
- The HF impulse 4MHz single channel trigger mode allows to choose between L1-N or N-E in single phase mode
- Both fundamental voltage amplitude AND angle displayed on the Web meter page
- Peak demand/ peak load current registers can be reset separately from energy accumulators
- CSV files may be excluded from email attachments (option)
- Daily statistics for THD and frequency added
- Improved graph vertical scaling for ENV2 Accelerometer – mechanical shock/seismic disturbance
- The user can define the vertical scaling of the accelerometer recording in daily/weekly/monthly trends
- EnviroSensor probes names (user defined) are displayed in the daily/weekly/monthly trend graphs
- Company logo (splash.gif) can be seen on the main screen display by pushing on the PSL blue banner

- Auto-detection of the power configuration at 50Hz and 100VAC (e.g. in Japan)
- More user friendly definition of the digital input parameters
- PQDIF files compatibility with PQVIEW improved (e.g. harmonics), also includes the PQDIF index file
- Slovakian, Croatian, Hebrew, Portuguese, Russian, Korean language translations improved
- Implemented SNMP registers and traps for PQube 3e current channel parameters I9 ~ I14.
- Addressed network security vulnerability issue (Dropbear v2017.75)
- Improved application stability – (fixes some rare cases of sudden restart)
- Added support for VAT1 module.
Firmware 3.5.2 must be installed to operate with a VAT1 module!
- Added a **visual verification of the L1-L2-L3 phase wiring**. If the wiring sequence is correct, the display screen shows a green check mark, if the sequence is incorrect, the screen shows a RED cross. It is possible to define the rotation convention (counter-clockwise =default, or clockwise with a configuration tag “*Rotation_Convention_On_Vectors_Screen*” (see configurator for more information).
- **PQube 3e**: event recording are now showing all 14 current channels (if they are configured to be displayed).
- Added **fundamental currents** amplitude and angle for on the Web meter page
- **PQube 3 relay**: relay operation behavior is aligned with PQube Classic relay operation. Relay is normally Closed (NC), and opens on event occurrence. Firmware 3.5.0 and lower implement a normally open behavior.
- **PQube 3e**: all 14 currents min/max tables reported in daily trends tables

Firmware 3.5.x Bug fixes

- Power Energy CSV file (power and energy at a user defined interval) – the values recorded in the CSV file are wrong since the last Daylight saving time date (March 2017).
- For measurements at 400Hz nominal frequency, the PQube 3 does not lock on signal.
- (Rare) Harmonic snapshot GIFs are incomplete or not generated in the Wye configuration, if the tag “Record_Phase_To_Phase_Channels ” is set to ON.
- Miscellaneous PQDIF bug fixes
- When the monthly email CSV attachment exceed 16 MB, the CSV file is split in several CSV files to remain under that size limit.
- 10 sec frequency recording file is not generated (with firmware 3.5.0)
- Chinese, Korean (non ASCII character) language translations do not work after upgrading from 3.4.0 to 3.5.0.
- When using flexible CT’s (large ratio), power units show MW although the value should be in kW.
- When using Analog channels with large ratios, the vertical scale is wrong (e.g. 1000kV vs. 1000V)
- Digital channel does not show in trends after a setup change that enables the digital channel recording, until the next day
- Analog channel GIF in trends do not show the user configured label
- Daily trends are not generated if the configuration tags “region of interest” are set to AUTO

- Removed debug file in the HF impulse event file folder
- Analog channel min/max are incorrect in daily trends (rare occurrence)
- RVC events now show as an exclamation mark on the screen display , event counter is now incremented with RVC events
- 'AN1-AN2' or 'AN3-AN4' waveforms displayed inverted in the event GIF graphs
- Web meter angles are now all relative to Voltage phase L1-N

Firmware upgrade from 3.4.x: important information



This firmware implements some changes in the PQube 3 internal recording structure.
After firmware upgrade from version 3.4.x:

(1) the first daily trend file after firmware upgrade will contain only a partial day : from the time of the firmware upgrade to the end of the day. The previous part of the day trend measurements are lost.

(2) the first weekly and monthly trend files after firmware upgrade will also contain partial measurements: from the time of upgrade to the end of week, or month.

(3) PQube 3 resets to zero the PQube 3 energy accumulators.