

Introduction

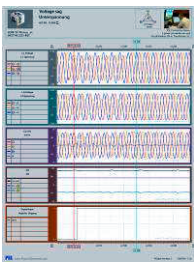
What Can Your PQube Do?

Your PQube® is an instrument for monitoring electric power systems.

It is convenient to think of it as a combination of a power disturbance monitor, a power meter, a power recorder, and a digital camera – it combines the best features of all four.

Your PQube records disturbances on the mains circuit: sags/dips, swells, interruptions, frequency variations, and disturbances on two analog input channels. It also records impulses, waveform snapshots, unbalance, RMS flicker, and THD, and trend data (strip charts and cumulative statistics).

When equipped with an optional current sensing module, your PQube also records current waveforms, RMS amps, power and carbon. It measures watts, watt-hours, VAR's, power factor, and other power-related parameters.



You don't need any software from PSL to use your PQube. It records all data on a SD memory card, which can be read by any computer. No special software is required – just open the GIF picture files with standard image programs, or even Microsoft Word® and Microsoft PowerPoint®, or open the CSV files with any spreadsheet program such as Microsoft Excel® (or OpenOffice.org Calc if you prefer something free). Configure your PQube by editing a text file on the SD card.

It can monitor single-phase or three-phase circuits, at up to 690 VAC phase-to-phase (400 VAC phase-to-earth), at 50 Hz, 60 Hz, and 400 Hz.

It includes channels for measuring auxiliary voltages – typically 24V AC or 48V DC.

It also has a general-purpose digital input, which you can control with switch contacts or a logic signal, and a relay contact output, which opens for at least 3 seconds whenever your PQube detects an event.

It can be directly powered from 24V AC or 24~48V DC, or it can be equipped with an optional PS1 power supply that operates from 100V ~ 240V, 50/60 Hz.

Your PQube also measures temperature and humidity at up to two locations, using optional TH1 temperature-humidity probes.

When equipped with an optional ETH1 Ethernet module, your PQube can automatically send you e-mails whenever it detects an event. You can send your PQube a new setup file, or even update its firmware via e-mail. The Ethernet module also includes a web server, an FTP server, and MODBUS over TCP, giving you even more ways to communicate with your PQube.

How Is Your PQube Different?

There are many power quality meters, energy meters, and energy recorders available. What makes the PQube stand out from other products?

- **No software. No rental fees. Open data.** -- You don't need any software from PSL to use the PQube. Do you have a web browser? A text editor? A spreadsheet program like Microsoft Excel®? **That's all you need!** All the data that the PQube records are in open formats that are easy to understand. You don't have to buy or lease software from Power Standards Lab, you don't have to pay us to see your data, and the files are easy to pass on to third parties.
- **Friendly data.** – When you look at information about your electric power, you don't want to spend a lot of time learning to use software to get the view that you want. You simply want your data organized and presented to you in a format you can understand. Your PQube presents power quality events, trends, and statistics in formats you can easily use and lays the data out in **a way that's understandable**. Your PQube knows **what's important**.
- **Free firmware updates** – From time to time, we offer firmware updates to add new features to your PQube. Other instrument manufacturers charge for firmware updates, **we don't**.
- **Works out of the box, or configure everything to work for you** – With our patent-pending auto configuration, you can connect your PQube to the power that you want to measure and the PQube will immediately start recording data. **If you don't like the default settings you can change almost anything by editing a text file on the SD card.**
- **Works with or without a network** – Do you have an Ethernet network? Use an optional ETH1 module and get emails when an event occurs, browse the recorded events and trends with your web browser, or integrate it into your Modbus system. **Don't have a network? No problem, just walk up to the PQube and take the SD card.** You can look at all the files on any computer (**you don't need software**). **You don't need a sophisticated centralized data collection system to get started.** Just connect a PQube and start getting data right away.
- **Store years of data on standard SD cards.** – Your PQube comes with a 2GB SD card which will store about 2 years worth of data. Need more storage? Go to www.powerstandards.com and buy a 4GB or 8GB card.
- **Small size** – The PQube is tiny (a little bit bigger than your fist), and that makes it easier to integrate into your product.
- **Low cost** – At Power Standards Lab, **we're experts at building power sensor electronics.** We know how to do it right, and we know how to do it inexpensively. The PQube costs far less than comparable instruments.
- **It's everything you need.** – Power quality data: dips, swells, frequency variation, and high-frequency impulses. Energy data: kWh, kVAh, and carbon. Trend data: daily, weekly, and monthly strip charts, cumulative probability and load duration. Why buy multiple meters when the PQube can do it all?

Applications

Your PQube is ideal for reducing your service costs on sensitive equipment, such as semiconductor manufacturing equipment and sophisticated medical scanners. By detecting and recording power disturbances, you can easily and quickly separate intermittent power problems from other intermittent problems: software bugs, user errors, supply stock problems, etc.



And your PQube is an excellent choice for monitoring the power that feeds industrial controls, such as automated machinery, robotics, and elevator/lift controls.



You can use your PQube in dozens of other applications: monitoring the power quality at key accounts, doing national surveys of power quality, safely recording power data for research projects, understanding why your wind turbine drops off line unexpectedly, and many other purposes.

Choosing Modules

Your PQube records events, trends, and statistics by monitoring your AC mains voltages. It also measures two analog input channels for additional signals (for example, the output of a power supply), a digital input channel, an output relay, and a full color display. Your PQube records all information to a standard SD memory card.

IMPORTANT: Installation, service, and maintenance of your PQube must only be done by an expert for electrical installations.¹

¹ This is a requirement for Japanese safety standard approvals.

Your PQube clicks together with several optional modules to provide extra features. To choose modules for your application, **you'll need to answer four simple questions:**

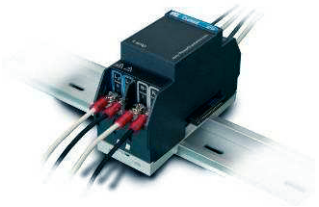
- Are you interested in measuring current, power, or energy?
- Do you want to power your PQube from 100~240Vac (50/60Hz)?
- Are you interested in any of the following: email, a web server, an FTP server, or Modbus over TCP?
- Do you want to record the temperature and humidity in addition to everything about the electric power?

Measure Current, Power, and Energy

Are you interested in measuring current, power, or energy? If so, you'll need a PQube current module. There are three versions; please pick the one that is best for you.

XCT4 – External CTs with current secondary outputs

If you already have CTs (Current Transformers) with current outputs, you can use an XCT4. This module accepts 1-Amp or 5-Amp CT secondaries. For more information, see the [XCT4 Current Module section \(page 19\)](#).



XCT5 - External CTs with voltage secondary outputs

If you already have CTs with voltage output, or you purchase them from Power Standards Lab, you can use an XCT5. This module accepts 0.333 Volt, 1 Volt, 5 Volt, or 10 Volt secondaries. This module comes with five current channels, allowing you to measure all three phase currents, neutral current, and earth current simultaneously!



CT4 – Current Sensing Module

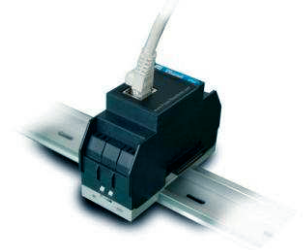
If you don't want to use CTs, the CT4 current module might be right for you. This module comes in 20Amp and 100Amp versions and has the CTs built in already. Just pass the conductors through. For more information, see the [CT4 Current Module section \(page 19\)](#).



Remote Communication

ETH1

Are you interested in any of the following: email, a web server, an FTP server, or Modbus over TCP? If you need any of these features, you need an ETH1 Ethernet module. For more information, see the [ETH1 Ethernet Module section \(page 52\)](#).



XCT5 and ETH1 combined into 1 module

CTE1

Are you interested in having network capability and measuring current, **but don't have the space for both an ETH1 module and XCT5 module?** Use a CTE1 module to take advantage of the ETH1 and XCT5 functionality in a single compact module.



Power your PQube from 100~240Vac

PS1

Do you want to power your PQube from 100~240Vac (50/60Hz)? If you **have 24~48Vdc or 24Vac, you can use your PQube's internal** power supply (just connect to the power supply screw terminals). If you want to use **100~240Vac, you'll** need an optional PS1 Power supply module.



PS2

In addition to powering your PQube from 100 ~ 240VAC (50/60Hz), you can **power external accessories with the PS2's 24VDC output.**



Measure Temperature and Humidity

TH1

Do you want to record the temperature and humidity in addition to everything about the electric power? You can use up to two TH1 Temperature/Humidity sensors. Measure the local environment or connect a second sensor with an extension cable and measure the temperature and humidity at two locations simultaneously. Just plug them into your PQube and it will start recording data immediately.



DC Monitoring

ATT1

Interested in High Voltage DC Monitoring? Use an ATT1 module. It is available with a full scale of 600VDC and 1200VDC, and can measure up to 1000VDC and 2000VDC, respectively. Measure 1 differential voltage, or 2 voltages relative to earth.

