

PQube®3 Portable Installation Guide



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If you find information in this manual that is incorrect, misleading, or incomplete, we would appreciate your comments and suggestions.

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WARNING: Death, serious injury, or fire hazard could result from improper connection or operation of this instrument. Carefully read and understand manual before connecting this instrument.

AVERTISSEMENT: Si l'instrument est mal connecté, la mort, des blessures graves, ou un danger d'incendie peuvent s'en suivre. Lisez attentivement le manuel avant de connecter l'instrument.

WARNUNG: Der falsche Anschluß dieses Gerätes kann Tod, schwere Verletzungen oder Feuer verursachen. Bevor Sie dieses Instrument anschließen, müssen Sie die Anleitung lesen und verstanden haben.







ADVERTENCIA: Una conexión incorrecta de este instrumento puede producir la muerte, lesiones graves y riesgo de incendio. Lea y entienda el manual antes de conectar.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. Installation, service, and maintenance of your PQube 3 Portable must only be done by an expert for electrical installations.

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Symbol	Meaning
	Caution. Consult this manual in all cases where this symbol is used.
	Caution. Risk of electric shock
	Alternating current
	Alternating current (a.c.) or direct current (d.c.)
	Double or Reinforced insulation
	Functional earth terminal <u>not</u> relied on for safety

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Introduction

What is the PQube 3 Portable?

The PQube 3 Portable combines the powerful monitoring and communication capabilities of the PQube 3 Power Analyzer with the quick connectivity and convenience of a portable instrument.

It is designed for quick installation and temporary measurement campaigns. It auto-detects your frequency, nominal voltage and power configuration. It can be wired to a local LAN but has also a cell modem ready option - no communication cables needed.

The PQube3 can be configured and its measurement data extracted with a USB stick via the USB port next to the color display of PQube 3. The PQube 3 Portable holds thousands of events and years of trend data in its internal flash memory.

If you have remote communication enabled, you can receive reports from the PQube3 as soon as it is powered up. The PQube 3 Portable sends events and trends directly to the email inbox of your laptop or smartphone - no software required.



Product Highlights

- Easy to install, wire, and operate
- Ready to plug flexible CTs and fused voltage leads
- Self-powers from the measured voltage (360 to 480VAC)
- Powers from 24Vdc or with an external transformer 120 to 240Vac
- Up to 1-hour (configurable) battery power backup
- Voltage range 100 to 480Vac nominal, Current range (0 to 3000Amps)
- Power Quality Class A IEC 61000-4-30 Ed3
- Monitors AC and DC (4 additional analog inputs)
- Detects High-Frequency transients at 4MHz
- Records 2kHz~150kHz conducted emissions
- Optional 2 environment probes (temperature, humidity, barometric pressure, acceleration)

What's included - model PQ3iaB-Portable-4V8I-XXXX-XXXX

Before installation, verify the contents of your PQube 3 Portable package.



A



B



C



D



E



F



G



H



I



J



K

- a. (1) Heavy duty carrying case
- b. (1) PQube 3 Portable
- c. (1) AC/DC power supply with power cable – 100 to 240Vac input, 24Vdc output
- d. (4) Flexible current transformers (Rogowski coils)
- e. (2) Non-fused cables with shrouded banana jacks and alligator clips (white and green)
- f. (3) Fused voltage sensing leads with shrouded banana jacks and alligator clips (red, yellow, blue)
- g. (1) Split-core 5A:0.333V current transformer
- h. (1) Small flat-head screwdriver
- i. (3) Spare fuses
- j. Installation Guide and USB drive including software and its documentation
- k. (1) Hook-and-loop mounting strap

What's included - model PQ3iaB-Portable-NEO-XXXX-XXXX

Note: this model does not include a transportation case, and no current sensors.
 Before installation, verify the contents of the PQube 3 Portable:



A



B



C

D



E



F



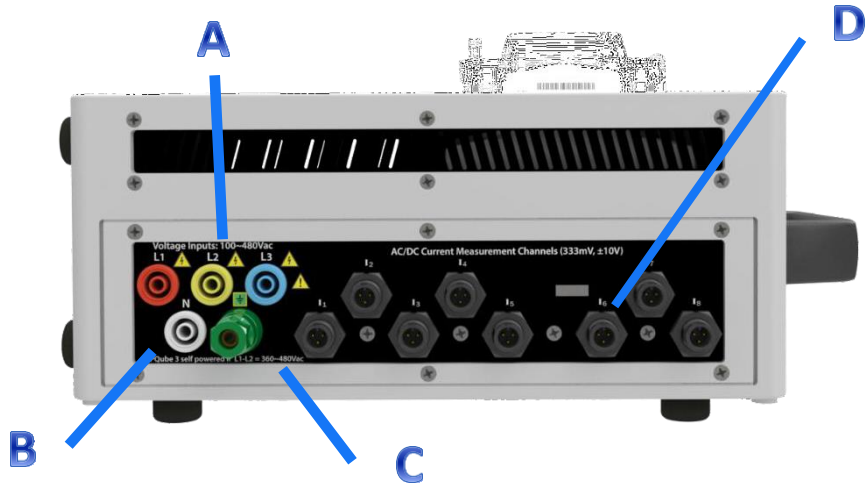
G






H

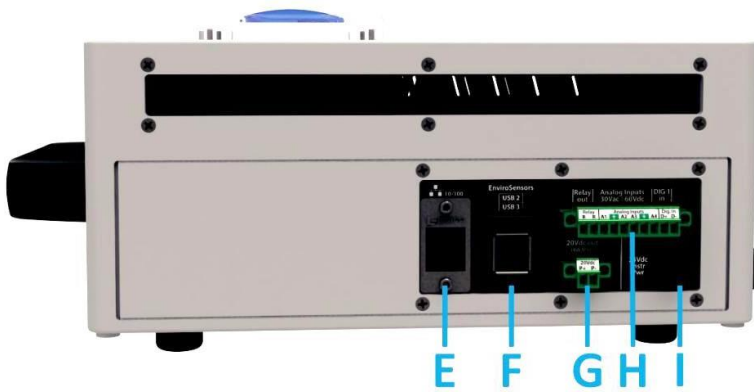
- a. (1) PQube 3 Portable
- b. (1) AC/DC power supply with power cable – 100~240Vac input, 24Vdc output
- c. (2) Non-fused cables with shrouded banana jacks and alligator clips (white and green)
- d. (3) Fused voltage sensing leads with shrouded banana jacks and alligator clips (red, yellow, blue)
- e. (1) Small flat-head screwdriver
- f. (3) Spare fuses
- g. (1) Installation Guide and USB drive including software and its documentation
- h. (1) Hook-and-loop mounting strap

Overview of Connections



Right Side – Voltage and Current Terminals

A.	 L1, L2, L3 voltage inputs. Rated for 100 to 480Vac nominal, 50/60Hz.	C.	 Earth terminal – Functional. Used as the reference point for voltage measurements.
B.	 Neutral terminal – optional depending on your power configuration.	D.	Inputs for CT sensors – nominal 0.333V RMS (LOW range) or $\pm 10V_{pk}$ (HIGH range).



Left Side – Communication and General I/O

E.	10/100 Ethernet RJ-45 port. PoE compatible only when modem is not present.	G.	20Vdc AUX power output (4W max)
F.	(2) Environment Probe USB interface: USB 1.0 ports for use ONLY with ENV2.	H.	Analog & Digital I/O terminals
		I.	24Vdc power supply input.

Portable PQube 3 Installation

Important Safety Notices



Always De-Energize the Mains Supply Before Connecting Voltage and Current Probes.

Your PQube 3 Portable is rated for 100~480VAC. Do not install it at circuits that exceed these ratings. Do not attempt to connect leads to a live circuit. This could result in damage to your equipment and/or injury. Inspect all equipment and test leads for damage prior to installation. If there is any damage, do not proceed with installation.

It is very important that installation and servicing of your PQube 3 Portable be done by a qualified person, and in accordance with the local or national electrical guidelines and codes (e.g. ANSI/NFPA 70 in the US, CSA C22.1 in Canada etc)

Installation Procedures

1. Turn off the Mains supply power at the measurement site



Before working with mains AC voltage wires, always ensure the power is first disconnected. Powerside recommends using a lock-out, tag-out system for safety.

2. Choose a suitable location to install your PQube 3

Determine where you want to install your PQube 3 Portable. Find a flat, level surface in a secure area, accessible by authorized personnel only.

Your PQube 3 Portable must be in the upright position during operation.



Optionally, you can hang it to a secure location using the included hook-and-loop strap.



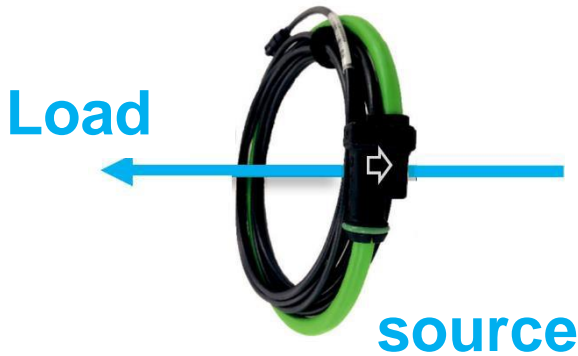
3. Install current transformers: model PQ3iaB-Portable-4V8I-XXXX-XXXX only

Note: model “PQ3iaB-Portable-NEO-XXXX-XXXX” does not include current transformers.

The PQube 3 Portable is compatible with traditional split-core current transformers (with voltage output) and flexible current transformers (Rogowski coils).

The PQube 3 Portable includes four flexible CTs with bayonet style connectors for the L1, L2, and L3 conductors. A split-core 5A CT with bayonet style connectors is included for monitoring ground current.

If using the split-core 5A CT, clamp the CT around the Neutral conductor with the (white) label facing the source.



Clamp the flexible CTs around each phase conductor. There is an arrow indicator (see in the above picture) at the junction of each Rogowski coil. Make sure the arrow points towards the source.

Connect the secondary wires of the CTs to the PQube 3 Portable to the bayonet style terminals (see picture below).

L1, L2, L3 current flexible CT output connects to terminals I1, I2, I3.

If monitored, the neutral current flexible CT output connects to I4 terminal.

If monitored, ground current CT connects to the I5 terminal



Before you continue, verify that each CT is connected to the correct terminal on the PQube 3 Portable enclosure.

4. Install the voltage sensing wires

Your PQube 3 Portable includes voltage sensing leads (wires) with fuses built into three of them (red, yellow, and blue wires). To access the fuse, twist the banana plug from the thick end of the cable. Make sure a fuse is installed inside each of the three wires before installation.

The white (Neutral) and green (Earth) wires do not include a fuse.



Use the included alligator clips to connect the voltage sensing leads to the circuit to be measured.



Plug the voltage sensing leads into the voltage terminals (banana jacks) of your PQube 3 Portable. Verify that each voltage sensing wire phase is connected to the correct voltage input terminal on the PQube 3 Portable. The wires and banana jacks are color coded.



5. Install the power supply (if applicable)

If you are monitoring a circuit with 360~480VAC L-L nominal voltage, the PQube 3 Portable will automatically self-power from the L1-L2 terminals.

If you are not measuring a circuit within this voltage range, then use the included AC/DC power supply. Connect the power cable into an outlet rated for 100~240VAC and connect the 24VDC jack into your PQube 3 Portable.

Whether you are powering from the L1-L2 measurement circuit or a dedicated 100~240VAC outlet, make sure this circuit can supply at least 100 watts.



6. Verify connections

Double check and make sure all voltage sensing leads are installed on the correct wires, and all CTs are clamped around the correct conductors. Ensure all connections to the PQube 3 Portable are secure.

7. Secure the area

After verifying all connections, close all cabinets and make sure that all hazardous circuits are protected from unauthorized access.

8. Energize the circuit



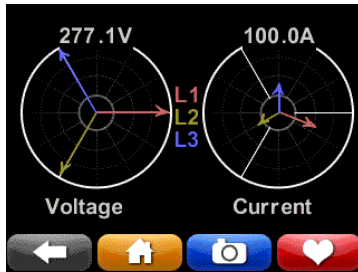
Turn on the power to your circuit and check for hazardous conditions. If there are any hazardous conditions, turn off the power immediately and contact the facility manager for further troubleshooting.

9. Verify meter readings



Check the voltage and current readings on the PQube 3 Portable using the touchscreen.

From the display, press the [Meters] button and check that the measured values are correct. If you entered PT and CT ratios into your setup file, verify that the voltage and current readings are primary units. Also verify that the values for power (watts) and power factor are correct. If you have inverted your CTs or installed the CTs on the wrong phases, your power readings will be inaccurate.



You will also want to verify that your voltage and current vectors look appropriate. Our vector convention for a balanced 3-phase system is L1 voltage at 0°, with L2 voltage at -120° and L3 voltage at +120°.

If the touchscreen display is not accessible, you can verify the meter readings by connecting your laptop to the local network, or directly into the PQube 3 Ethernet port.

10. Configure your PQube 3

Refer to the PQube 3 Reference Manual for more information. You can find a copy in the included USB drive, or you can visit the Powerside help Center <https://help.powerside.com/knowledge/pqube-3> to download the latest version.

Configuration can be done by copying the setup.ini file onto a USB stick, and inserting the stick into the USB port (the USB port is next to the color display). Configuration can also be done by connecting to the PQube 3 Ethernet port.

Service your PQube 3 Portable



Always De-Energize the Mains Supply Before disconnecting Voltage and Current Probes.

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