

PQube® 3 Portable 480V Installation Guide



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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 must only be done by qualified personnel for electrical installations.

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Manufactured in the United States of America.

Symbol	Meaning
	Caution. Consult this manual in all cases where this symbol is marked to find out the nature of the potential hazards and any actions which have to be taken to avoid them.
	Caution. Risk of Electric Shock.
	Alternating current
	Alternating current (AC) or direct current (DC)
	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 480V?

The PQube 3 Portable 480V 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 that enables remote communications (no communication cables needed).

The PQube3 can be configured with a USB drive via connection to the USB port next to the color display of PQube 3. The PQube 3 Portable 480V holds thousands of events and trends data in its internal flash memory and can be extracted via USB drive or microSD card.

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



Product Highlights

- Easy to install, wire, and operate
- Plug and play flexible CTs and fused voltage leads
- Self-powers from the measured voltage at nominal 360 to 480 Vac
- Powers from 24 Vdc with the provided power supply (120 to 240 Vac)
- Up to 1-hour (configurable) battery power backup
- Measured voltage range up to 480 Vac nominal
- Measure current range up to 3000 A
- Power Quality Class A IEC 61000-4-30 Ed3
- Monitors AC and DC (4 additional analog inputs)
- Detects High-Frequency transients up to 4 MHz
- Records 2 kHz to 150 kHz conducted emissions
- Optional 2 ENV2 environment probes (temperature, humidity, barometric pressure, acceleration)

What's Included - Model PQ3iaB-Portable-4V8I-480V-000-XXXX

Before installation, verify the contents of your PQube 3 Portable 480V package. Please note variations in model number may reflect a variation in the supplied components.



A



B



C



D



E

F



G



H



I



J

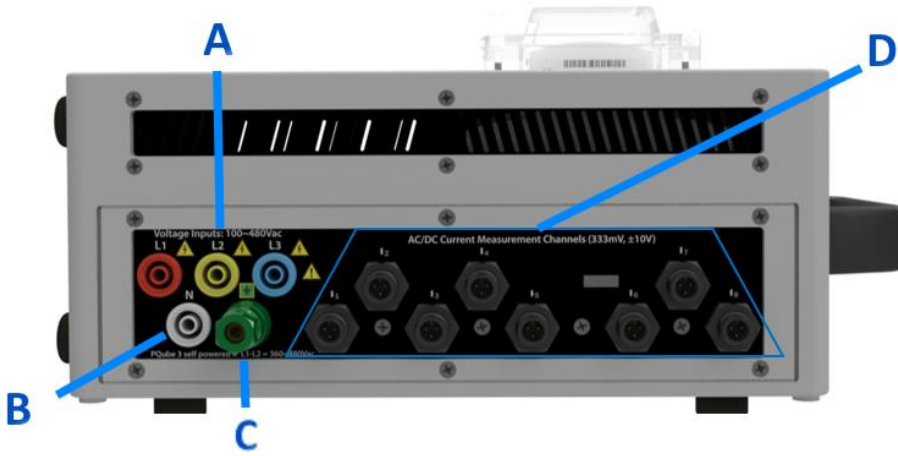




K


- A. (1) Heavy duty carrying case
- B. (1) PQube 3 Portable 480V
- C. (1) AC/DC power supply with power cable – 100 to 240 Vac input, 24 Vdc output
- D. (4) Flexible Rogowski coil current sensors
- E. (2) Non-fused 6.5 ft test leads with shrouded banana jacks and (1) alligator clip (white) with max jaw opening: 0.96 in (25mm) and (1) dolphin clip (green) with max jaw opening: 1.26 in (32mm)
- F. (3) Fused 6.5 ft voltage sensing test leads with shrouded banana jacks and (3) alligator clips (red, yellow, blue) with max jaw opening: 0.96 in (25mm)
- G. (1) Split-core 5A:0.333V current transformer
- H. (1) Small flat-head screwdriver
- I. (3) Spare fuses (2 A, 1000 Vac/Vdc, Fast-acting)
- J. (1) Installation Guide and USB drive including software and its documentation
- K. (1) Hook-and-loop mounting strap 48 in x 2 in

Overview of Connections

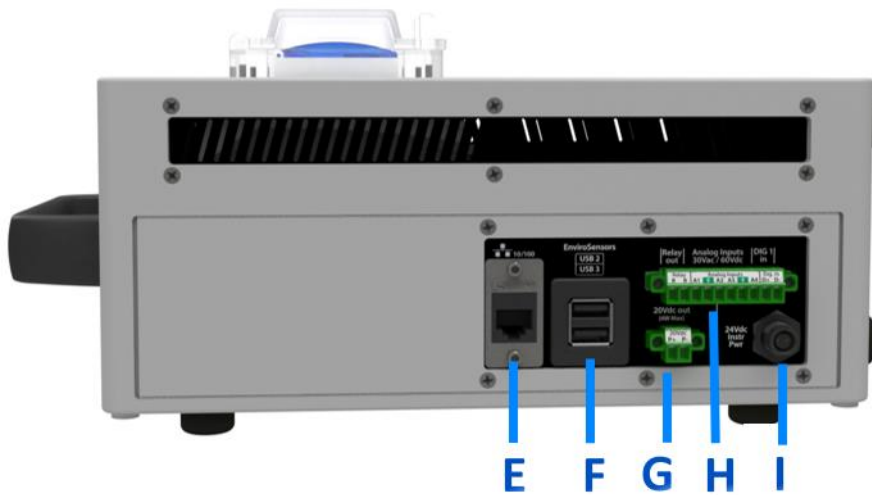
Right Side – Voltage and Current Terminals



A.	 L1, L2, L3 voltage inputs. Rated for 100 to 480 Vac nominal, 50/60Hz.
B.	 Neutral terminal – optional depending on your power configuration.

C.	 Earth terminal – Functional. Used as the reference point for voltage measurements.
D.	Inputs for CT sensors – nominal 0.333 V RMS (LOW range) or ± 10 V _{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.
F.	(2) Environment Probe USB interface: USB 1.0 ports for use ONLY with ENV2.
G.	20 Vdc AUX power output (4 W max)

H.	Analog & Digital I/O terminals
I.	24 Vdc power supply input.

Portable PQube 3 480V Installation

Important Safety Notices

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



Your PQube 3 Portable 480V is rated for up to 480 VAC. 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 480V 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 Portable 480V

Determine where you want to install your PQube 3 Portable 480V. Find a flat, level surface in a secure area, accessible by authorized personnel only.

Your PQube 3 Portable 480V 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-480V-000-XXXX

The PQube 3 Portable 480V is compatible with traditional split-core current transformers (with 333 mV voltage output) and flexible current transformers (Rogowski coils with 333 mV voltage output).

The PQube 3 Portable 480V includes four flexible CTs with bayonet style connectors for the L1, L2, L3 and N 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 ground conductor with the (white) label facing the source.



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

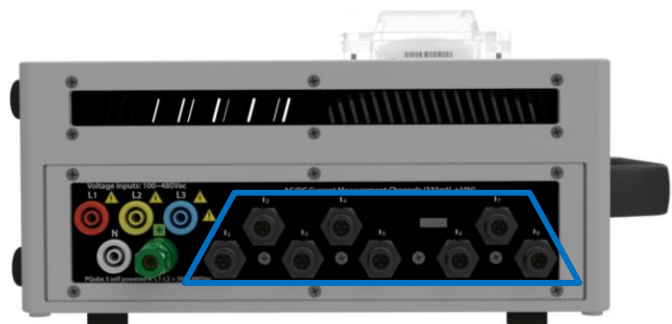


Connect the secondary wires of the CTs to the PQube 3 Portable 480V to the bayonet style terminals (see picture below).

L1, L2, L3 current flexible CT outputs connect to terminals I1, I2, I3.

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

If monitored, the ground current CT connects to the I5 terminal



Before continuing, verify that each CT is connected to the correct terminal on the PQube 3 Portable 480V enclosure.



4. Install the voltage sensing wires

Your PQube 3 Portable 480V includes voltage sensing leads (wires) with built in fuses on the red, yellow, and blue leads. To access the fuse, twist the banana plug from the thick end of the cable. Ensure a fuse is installed inside each of the three wires before installation.

The white (Neutral) and green (Earth) leads 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 480V. Verify that each voltage sensing lead is connected to the correct voltage input terminal on the PQube 3 Portable 480V. The wires and banana jacks are color coded.



5. Install the power supply (if applicable)

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

If you are not measuring a circuit within this voltage range, use the included AC/DC power supply. Connect the power cable into an outlet rated for 100 to 240 Vac and connect the 24 Vdc jack into the 24 Vdc power supply input on the PQube 3 Portable 480V.

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



6. Verify connections

Double check and ensure 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 480V are secure.

7. Secure the area

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

8. Energize the circuit



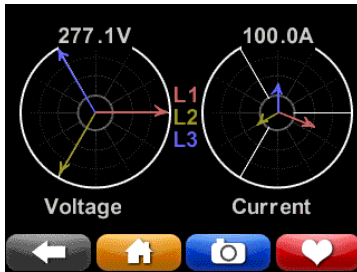
Turn on the power to your circuit and check for hazardous conditions. If there are any hazardous conditions, turn off the power immediately and contact the facility manager for further troubleshooting.

9. Verify meter readings



Check the voltage and current readings on the PQube 3 Portable 480V 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 the voltage and current readings are primary units. Also verify 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.



Verify the voltage and current vectors are correct. The vector convention for a balanced 3-phase system is L1 voltage is 0° , L2 voltage is -120° and L3 voltage is $+120^\circ$.

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

10. Configuration

Refer to the PQube 3 Installation and Operation manuals for more information. You can find a copy in the included USB drive or visit the Powerside Help Center website <https://help.powerside.com/knowledge/pqube-3> to download the latest version.

Configuration can be done by copying the PQube 3 setup.ini file onto a USB drive and inserting into the USB port (next to the color display). Configuration can also be done remotely by connecting to the PQube 3 Ethernet Port and configuring via the PQube 3 Configurator software. The latest version of this software can be downloaded at the Powerside Help Center website <https://help.powerside.com/knowledge/pqube-3#pqube-3-configurator>.

Maintenance on the PQube 3 Portable 480V



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

Refer to the PQube 3 Installation manual, maintenance section, for more information.

END OF DOCUMENT