



Panoramic Power® System

PAN-42 User Guide

Copyright Notice

Copyright © 2014 Panoramic Power Ltd. All rights reserved.

PANORAMIC POWER® is a registered trademark of Panoramic Power Ltd. All other trademarks are the property of their respective owners

FCC Compliance Statement

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio and television reception.

However, there is no guarantee that interference will not occur in a particular installation. If this device does cause such interference, which can be verified by turning the device off and on, the user is encouraged to eliminate the interference by one or more of the following measures:

- Re-orient or re-locate the receiving antenna.
- Increase the distance between the device and the receiver.
- Connect the device to an outlet on a circuit different from the one that supplies power to the receiver.
- Consult the dealer or an experienced radio/TV technician.

WARNING! Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Declaration of Conformity

Trade Name: Panoramic Power
Product Name: Wireless Power Sensor
Product Model Number: PAN-42-US

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

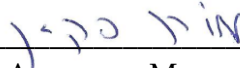
- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Responsible Party

Name: Panoramic Power Inc.
Address: 44 W. 28th Street, 8th Floor, New York, NY, 10001
Telephone: +1-646-794-4240

Manufacturer

Name: Panoramic Power Ltd.
Address: 20 Atir Yeda St., Kfar Saba 44643, Israel
Telephone: +972-9-7667600

Date: June 2 2014 Signature: 
Quality Assurance Manager of Manufacturer

Printed Name: Moran Pekin

Contents

Overview	5
Workflow	5
Safety Precautions	5
Mechanical Installation.....	6
Electrical Connections.....	8
Mapping the Site	9
Installing the Sensor.....	9
Registering the Installed Sensor	10
Monitoring Sensor Activity	10
Uninstalling a Sensor	11
Sensor Specifications.....	11
Certified CTs	12
Support	13

Overview

The PAN-42 wireless power sensor provides high-accuracy real-time power and power quality measurements for mains power monitoring, sub-metering and metering of large loads.

Designed for demanding electrical applications, supporting industry accuracy standards, PAN-42 enables the metering of power, voltage, current, power factor and power quality measurement data.

Information is sent wirelessly, through Panoramic Power's Bridge unit, to Panoramic Power's advanced cloud-based analytics platform. The data is then used to provide customers with actionable analytics and real-time dashboards and alerts.



Workflow

Sensor installation consists of the following steps:

1. Map the circuits.
See Panoramic Power Deployment Tool User Guide.
2. Physically attach the sensor and the CTs to the wires.
3. Monitors the proper functioning of the sensor. See Panoramic Power Deployment Tool User Guide.

Safety Precautions

Read the instructions in this manual before installing, and take note of the following precautions:

- Ensure that all incoming AC power and other power sources are turned OFF before performing any work or connecting the PAN-42. Failure to do so may result in serious or even fatal injury and/or equipment damage.

- Under no circumstances should PAN-42 be connected to a power source if it is damaged.
- To prevent potential fire or shock hazard, do not expose PAN-42 to rain or moisture.
- Ensure that the external current transformers are shorted (by using the recommended shorting switches) before disconnecting PAN42 from its current inputs.

The sensor and CTs should be installed and removed only by a qualified electrician. Read this manual thoroughly before connecting the device to the current-carrying circuits.

During operation of the device, hazardous voltages are present on input terminals. Failure to observe precautions can result in serious or even fatal injury, or damage to equipment.

Mechanical Installation

There are several mounting options for PAN-42:

- On a 35-mm DIN rail (see the drawing below)
- By using screws, using the slots on the back of the device
- With plastic tie-wraps, using the hooks on the back of the device

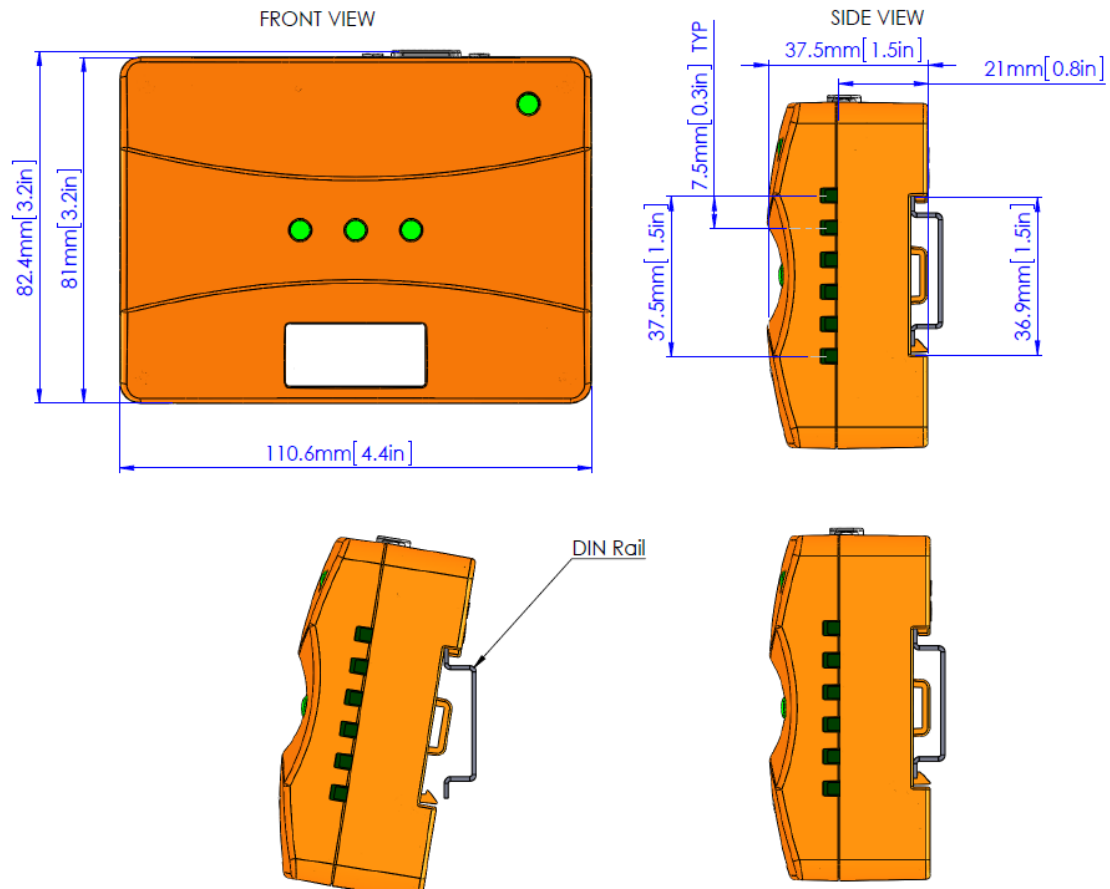


Figure 1. Hardware measurements

Electrical Connections

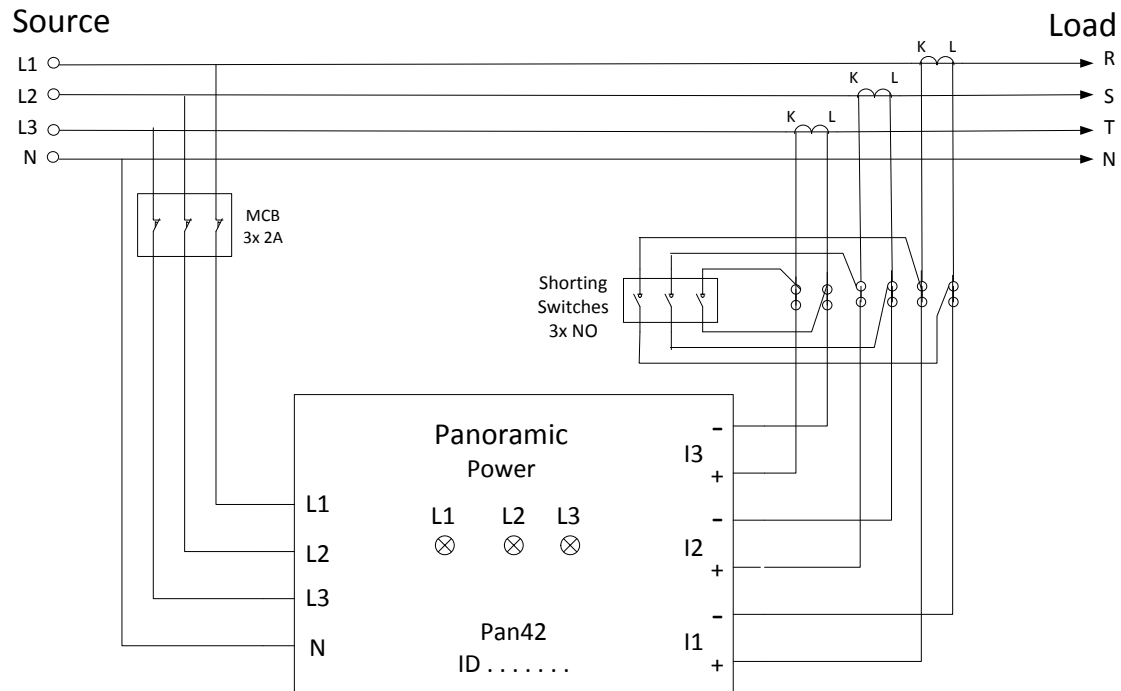


Figure 2. PAN-42 connections

Important installation notes:

The polarity of the currents are important. The current transformers (CTs) must be placed on the load wires so that current flows from the side marked "K" or "P1" to the side marked "L" or "P2". On the secondary side, "K" or "S1" must be connected to the "+" terminal on PAN-42, while "L" or "S2" must be connected to the "-" terminal.

Never leave a CT's output unconnected while primary current is flowing. In case you want to disassemble a CT from the sensor, use the shorting switches.

Mapping the Site

See Panoramic Power Deployment Guide.

Installing the Sensor

This procedure must be carried out by a certified electrician.

1. Make sure you connect the CTs through the shorting switches
2. Mount the CT(s) on the hot wire(s):
 - a. If the CT is split-core: Open the CT, and close it around the hot wire.
 - b. If the CT is solid-core: Disconnect one of the ends of the hot wire from the panel, insert it through the CT, and then reconnect it to the panel.
 - c. In both cases, make sure the CT is placed on the wire so that the direction of current flow on the wire is from the side marked "P1" or "K" on the CT, to the side marked "P2" or "L" on the CT.
3. Connect the three CTs to the inputs I1- I3, by performing the following procedure to all three CTs:
 - a. Use 1.0-4.0mm² (12-17 AWG) wires. Make sure that the wire gauge is suitable for carrying 5Amms for the length of wire required, without a significant voltage drop.
 - b. Connect the PAN-42 sensor's terminal marked as "+" to the CT's terminal marked as "S1" or "K"
 - c. Connect the PAN-42 sensor's terminal marked as "-" to the CT's terminal marked as "S2" or "L"
4. Connect the voltage inputs:
 - a. Connect one to three phases L1, L2, L3 (R, S, T) and the neutral wire to the appropriate PAN-42 inputs, making sure each phase passes through an MCB (see Figure 2).
 - b. Make sure that you use the same phase for the current and voltage inputs; that is, L1 and I1 are for the same phase, L2 goes with I2, and L3 goes with I3.

- c. Note: In order for the PAN-42 sensor to turn on, the neutral wire and at least one voltage phase must be connected.
5. After connecting the current and voltage inputs, make sure that the three-phase indication LEDs are steady green, and that the Tx LED flashes in green.
6. For each phase, the LED indications are as follows:

Connection	LED Visual indication
Both voltage and current are connected	Steady green
Only voltage is connected	Flashing green
Only current is connected	Flashing red
No voltage or current is connected	Off

7. Finalize the PAN-42 sensor and the CTs' position on the panel, maintaining a reasonable distance between the CTs and PAN-42.

IMPORTANT NOTES:

Do not mount the CT on the hot wire before you have already connected its outputs to the shorting switch (or to the PAN-42 sensor), and made sure the switch is in its closed state!

If a PAN-42 sensor needs to be replaced, put the suggested shorting switches in their closed states **before** PAN-42 is disconnected!

Do not leave the CT mounted/installed on a hot wire without being short circuited.

Registering the Installed Sensor

See Panoramic Power Deployment Guide.

Monitoring Sensor Activity

See Panoramic Power Deployment Guide.

Uninstalling a Sensor

Put the MCBs on the phase lines in their open position, and the CT shorting switches in their closed position. Then disconnect the current and voltage inputs from the PAN-42 sensor and remove it from the electrical panel.

Sensor Specifications

PAN-42 Specifications	
• 4-wire Wye, 3-wire Delta, single-phase 3-wire, single-phase 2-wire, or dual-phase 3-wire configurations • Voltage: [120V / 208V], [240V / 416V], or [277V / 480V] • Frequency: 48-62 Hz • CT current input: standard 0-5 Amms. • Current measurement range: Depending on CT ratio • Minimum current (at device input) ≤ 0.05 Arms (1% of full scale)	
• Outputs: ○ Active Energy (kWh) – accumulated ○ True RMS Voltage/Current – per phase ○ Active/Reactive Power – per phase ○ Power Factor – per phase ○ Total Harmonic Distortion (%) – per phase (Voltage and Current) ○ Frequency	
Accuracy (for Voltage, Current and Active Energy)	According to IEC687 (Class 0.5)* According to ANSI C12.20 (Class 0.5)* *Assuming CT of class 0.2 or better
Pulse output	2 optically isolated outputs for active and reactive energy (kWh)
Transmission frequency	434 MHz (EU) 915 MHz (US)
Transmission power (ERP)*	0 dBm (Max)
Transmission interval	10 seconds

PAN-42 Specifications	
*Safety and EMC certificates	USA & Canada Safety: UL-61010-1, CSA-C22.2 (ETL listed) EMC/Radio: FCC Part 15 subpart B, C Europe Safety: EN-61010-1 (CE) EMC: EN-ETSI 301489-3 Radio: EN-ETSI 300220-1
Dimensions	110.3 × 81 × 37.2 mm 4.34 × 3.19 × 1.46 inch
Weight	200 g
Mounting Options	Wall mount or DIN top hat rail EN50022 - 35x7.5
Flammability rating of external enclosure	UL94 V-0
Operating temperature	0 – 50° C (32- 122° F)
Storage temperature	-20 – 65° C -4-149 F
Display	3 LEDs for phase indications and additional LED for on line status indication.
<i>*Pending certification testing</i> <i>** Product is not available yet. Content is not final and may be changed or modified in the future</i>	

Certified CTs

General notes

- Solid core or split core CTs can be used.
- CT's accuracy class should be 0.5% or better.
- Relay CTs or CTs with included burden resistors cannot be used.

The following list includes the CTs that were already tested and approved by PanoramicPower

Dixsen CTs:

- 600A split (model DBP-58, P/N 765751)
- 600A non-split rectangular (model MES-62, P/N 764812)
- 1000A split (model DBP-58)
- 1000A non-split rectangular (model MES-60, P/N 764761)

Veris CTs:

- 600A non-split round (BL601)
- 1000A non-split round (BL102)

Magnelab CTs:

- 600A split (ICT-2000-600)
- 600A non-split rectangular (CCT-1200-600)
- 1000A split (ICT-2000-1000)

Support

More support can be obtained at support@panpwr.com.