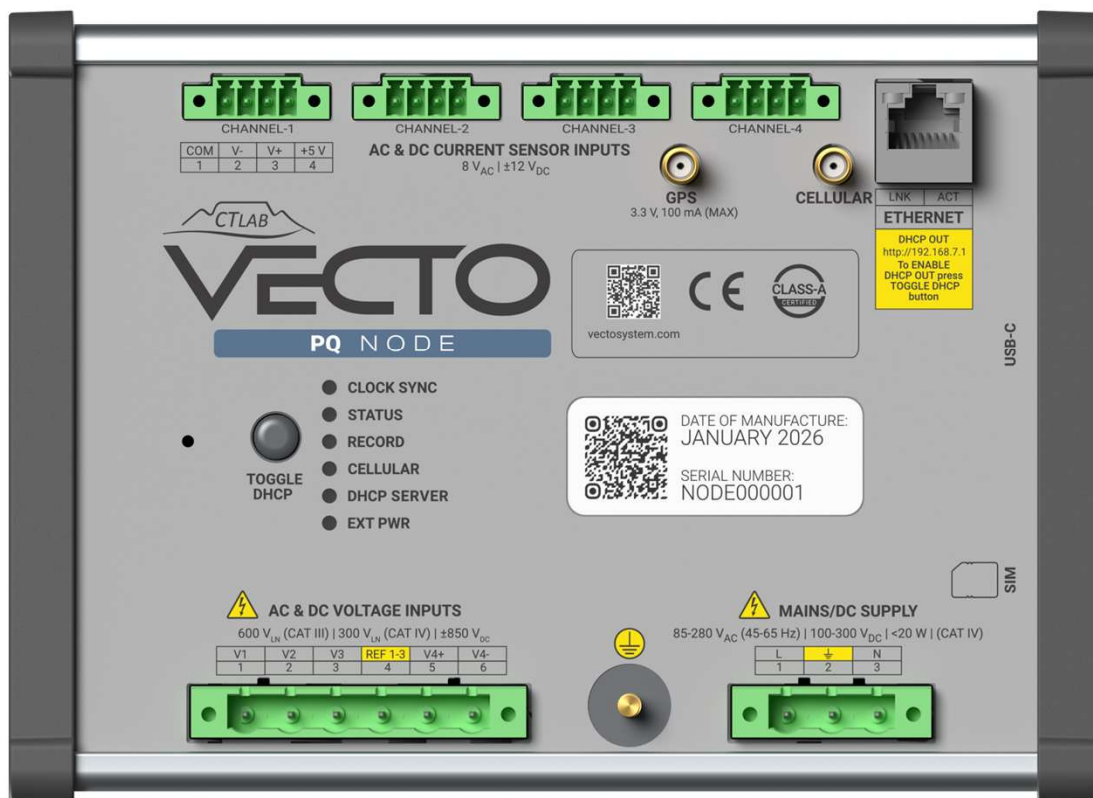


VECTO

PQ NODE

Quick Start Guide



What's in the Box?

VECTO

1 VECTO PQ NODE Instrument



2 Connector Blocks and Screwdriver



3 Ethernet Cable



4 Flash Drive

NB: Contains Meter Security Key and Manuals



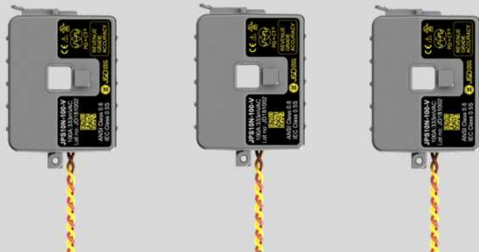
5 Cellular Antennae



6 GPS Antenna, Mounting Bracket, and Extension Cable



7 Split-Core Transducers (optional on order)



8 19" Rack Mount Plate (optional on order)



9 Installation Kit (optional on order)



10 Other optional items

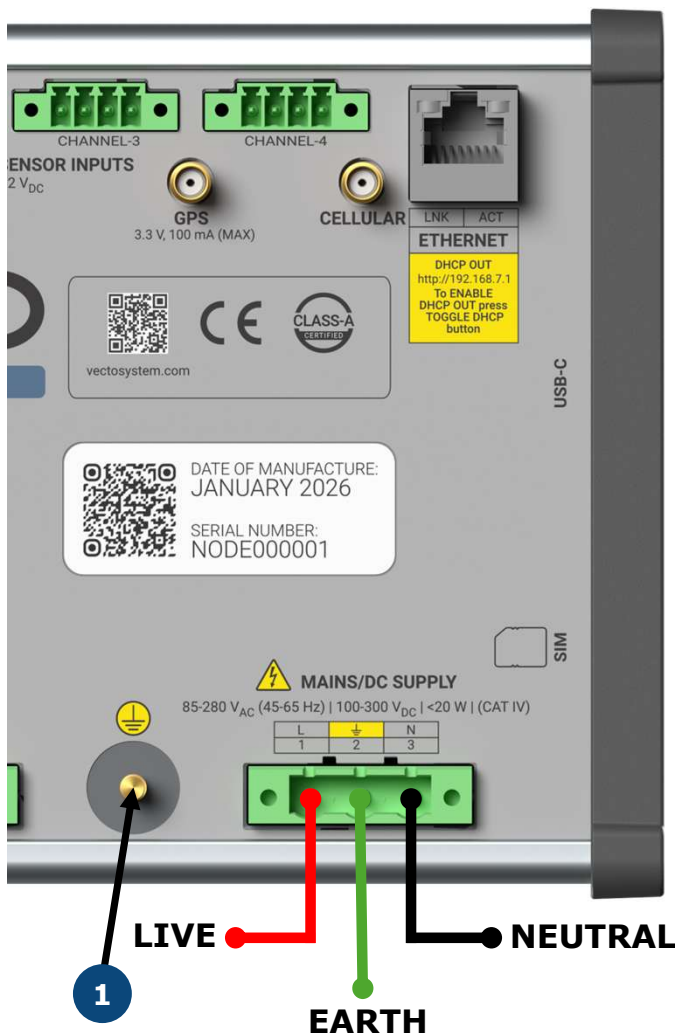


1 Mounting

- 1 Flip over the instrument for the DIN rail mounting plates



2 Connect Power Supply and Earth

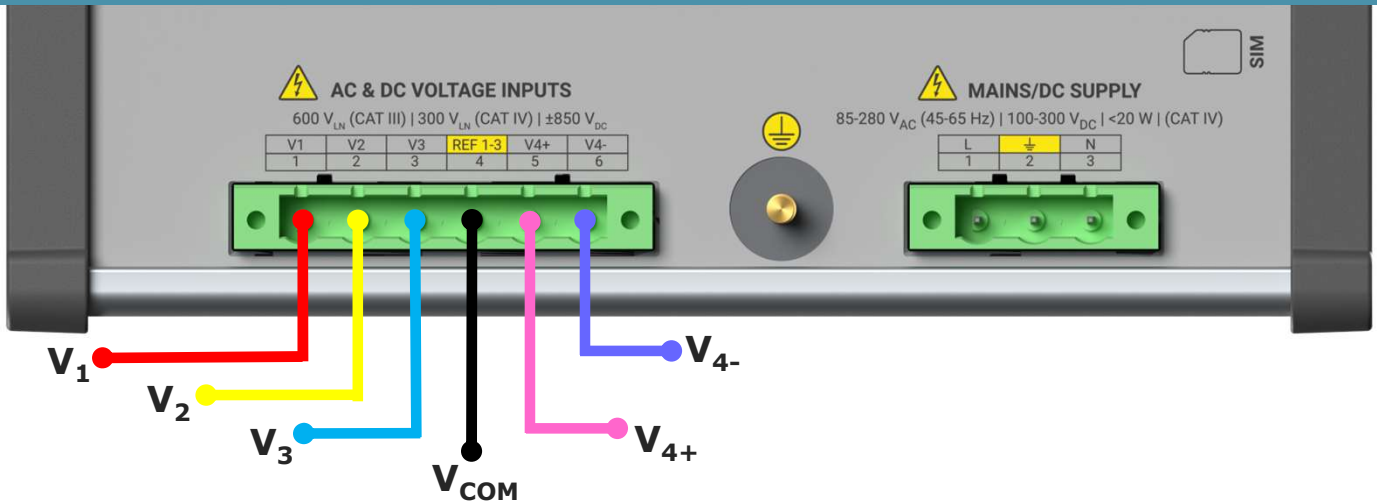


- 1 Connect the safety earth first, and always connect the VECTO PQ NODE to a grounded earth connection.
- 2 Connect power to the 3-way connector block
- 3 The device will boot once power is present. The **STATUS** LED will flash orange while booting and turn green once it is booted.
- 4 The **EXT PWR** LED will flash green if external power is present, flash orange if the internal capacitor is charging and red if it is discharging.

Three-way connector Input Options:

- AC: 85V - 280V
- DC: 100V - 300V
- 20 VA (max)

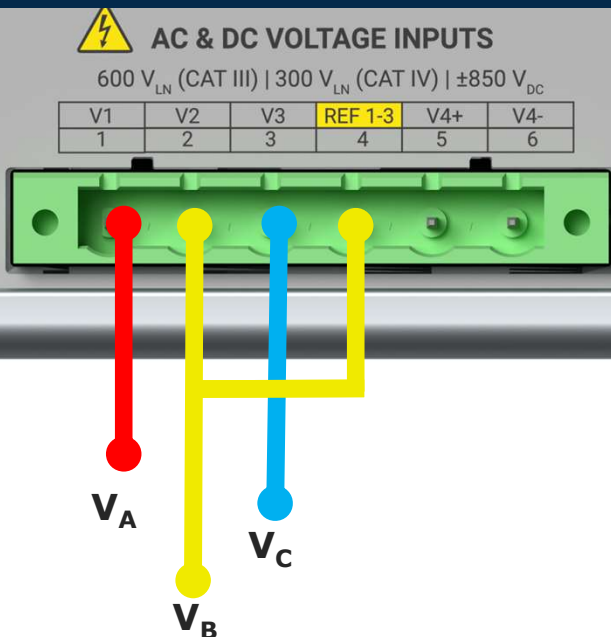
3 Connect the Voltage Inputs



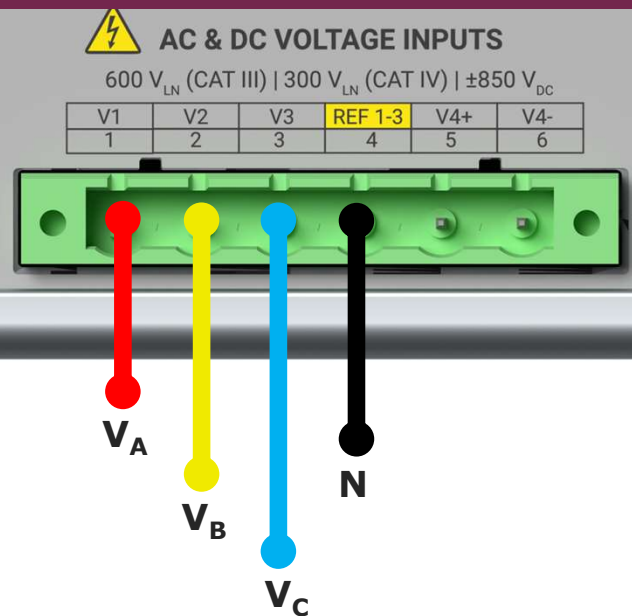
- **High Impedance Inputs**
(with high input impedance reference)
 - **Line to Neutral Voltage Limit: $600 V_{LN}$**
 - **Line to Line Voltage Limit: $1000 V_{L-L}$**
 - **DC Voltage: $\pm 850 V_{DC}$**
- Input range is user adjustable

Voltage Connection Topologies

Delta Connection



Star (WYE) Connection



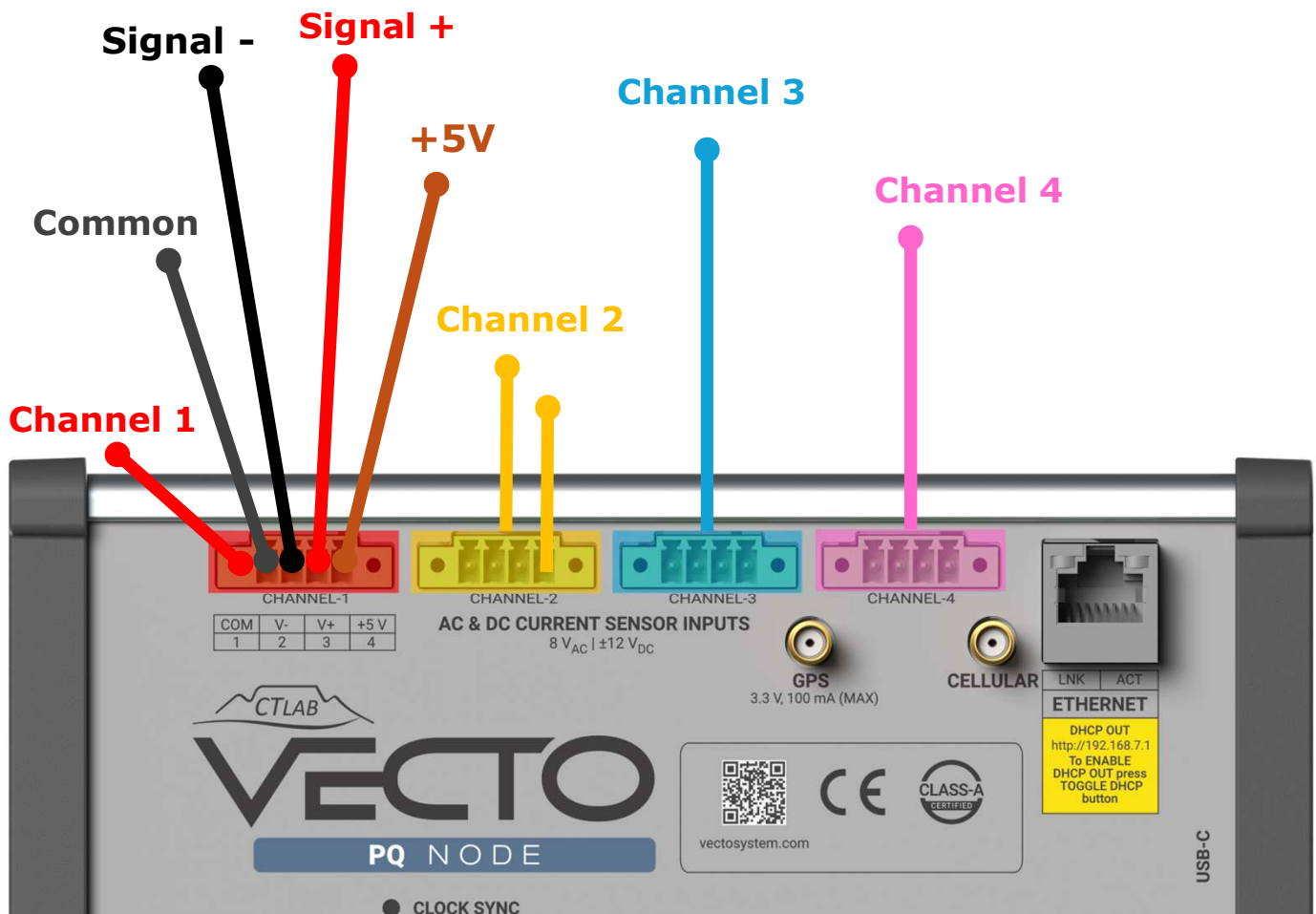
4 Connect the Current Inputs

Current Sensor Inputs (Transducers)

- Galvanically Isolated Current Inputs
 - Input Range AC: **8 V AC RMS**
 - Input Range DC: **±12 V DC**
 - 5V DC available (1W maximum)
- Input range is user adjustable

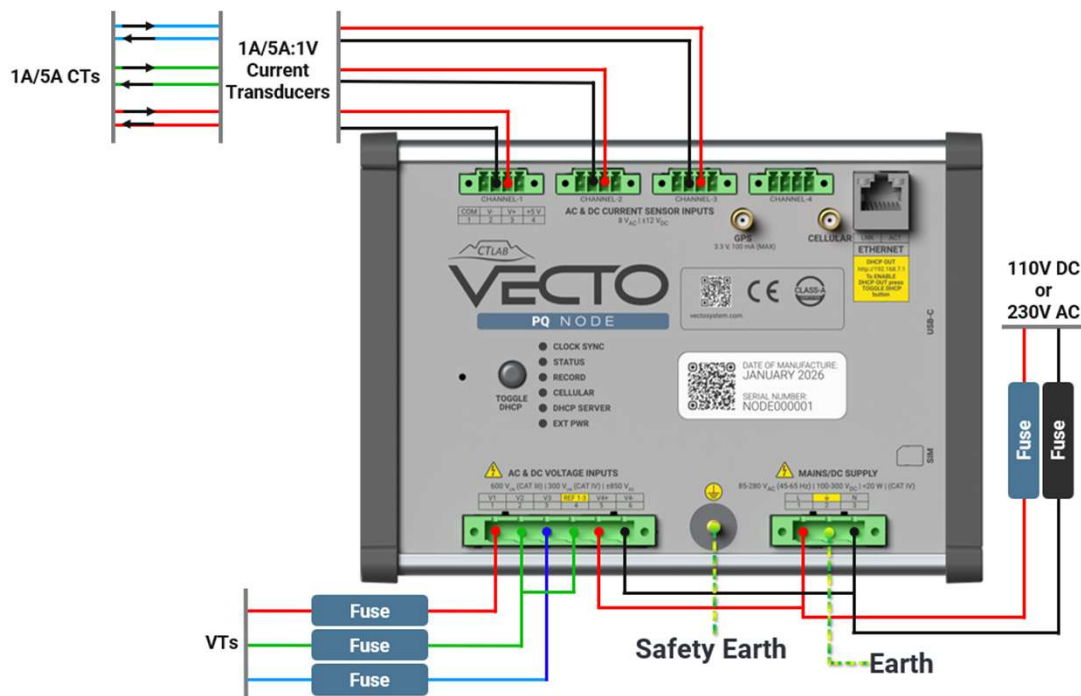


NB! Bridge "Signal -" and "Common" to ground the sensor inputs.



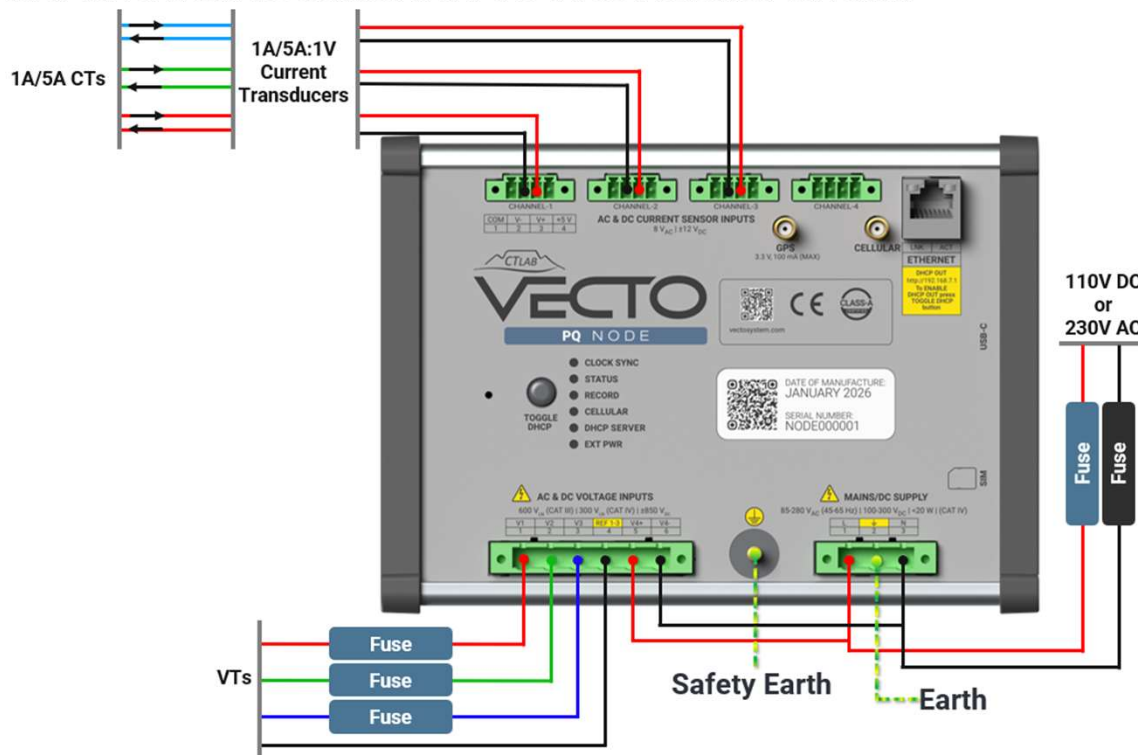
3-Wire (Delta) with Current Sensors and DC/AC Supply

In a case where there is only two current signals available, the 3rd current can be derived from the two supplied currents.



4-Wire (Star) with Current Sensors and DC/AC Supply

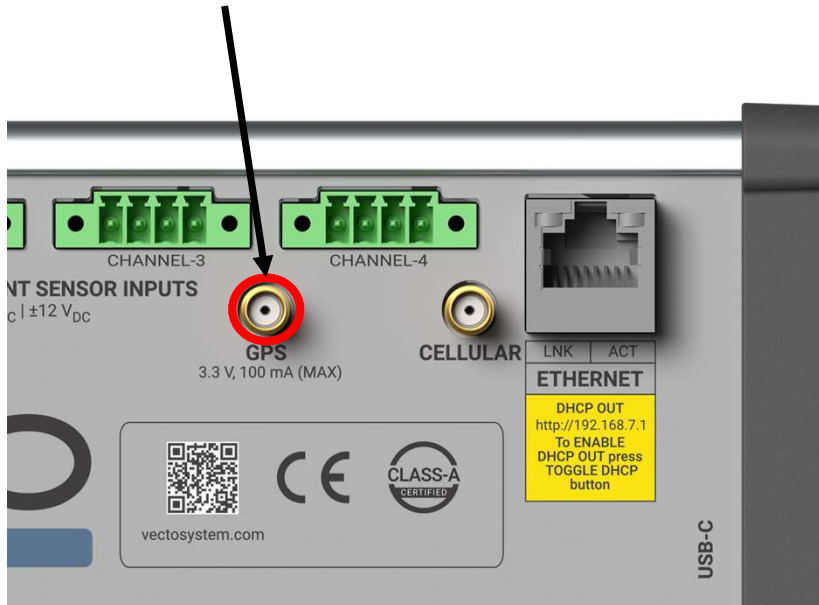
Neutral current can be derived from the three measured currents.



5 Connect GPS (highly recommended)

Connect the GPS directly or via the extension cable to the GPS SMA connector on top of the instrument next to the cellular port.

Make sure the GPS antenna has a predominantly clear sky view.



- GPS is needed to measure time (<100ns time accuracy)
- Maximum of 100m extension for the GPS

6 SIM Card and Cellular Antenna (optional)

- Connect the Cellular whip Antenna to the **CELLULAR** port.

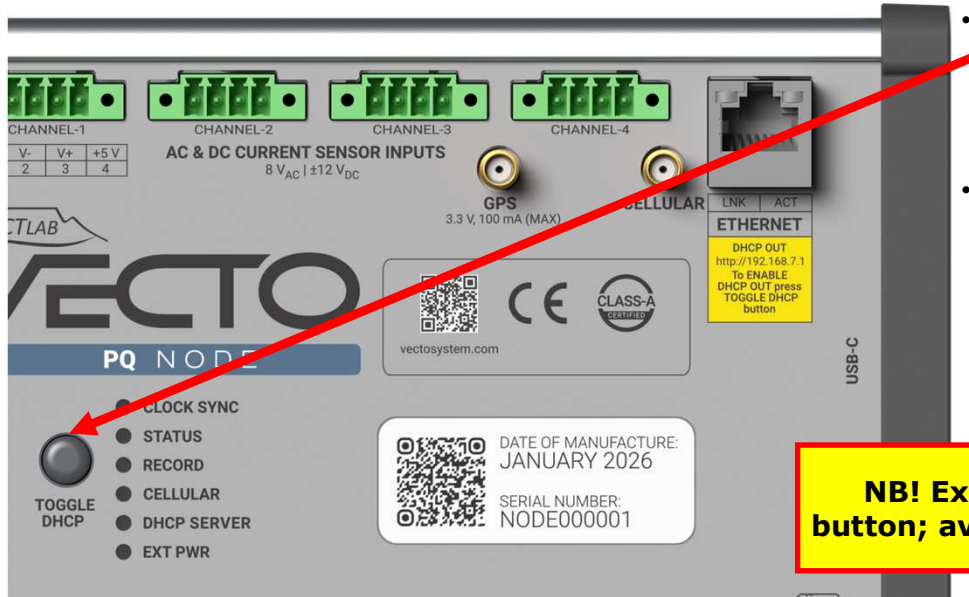


- Insert SIM card
- For communications setup, please see the VECTO PQ NODE manual



7 Toggle DHCP

One Ethernet port facilitate local and networked external communication. The Ethernet port can operate either as a corporate network interface (DHCP Client or fixed IP) or as a local network interface with an onboard DHCP server.



- Press and hold the "Toggle DHCP" button for 15 seconds to toggle the DHCP Server state.
- The **DHCP SERVER** LED will flash green if the DHCP mode is enabled and the instrument functions as a DHCP server.

NB! Exercise caution with the button; avoid using excessive force.

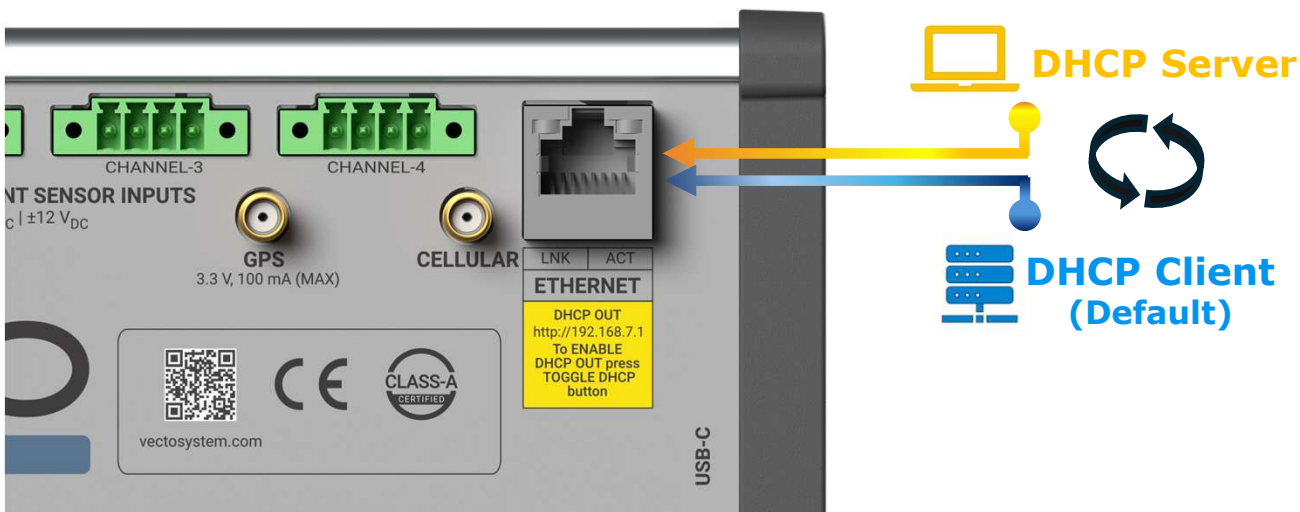
8 Connect Networking (Optional)

DHCP CLIENT (Default)

- Corporate Networks
- DHCP Client
- Fixed IP (configurable)
- Encrypted

DHCP SERVER

- Direct to Laptop Connection
- DHCP Server (establish a local network)
- Fixed IP (configurable)
- Encrypted



1a Connect device to a corporate network (DHCP CLIENT)

This is the default mode of the ethernet port. This option should be used when connecting the device to an existing corporate network.

VECTO Devices supports both fixed IP or DHCP addressing.



You can obtain the IP address from the IT department, or you may look up the IP address using the built-in HMI (Web Interface).

1b Connect to a local PC/Laptop (DHCP SERVER)

Press and hold the "TOGGLE DHCP" button to toggle the DHCP mode from infrastructure to DHCP server mode.

This option should be used when connecting to remotely installed devices using a PC/Laptop that is not connected to any existing network.



The instrument will assign an IP address to your PC/Laptop. The default gateway IP is:

192.168.7.1

Please Note:

Disconnect your PC/Laptop from any other Wi-Fi or cellular networks unless your Network routing is properly configured.

The ethernet mode will return to its default mode within 1 hour of being toggled to DHCP server mode.

Activate the HMI (Web Interface)

VECTO

2 Activate the HMI using the supplied flash drive

For security reasons, the HMI is not enabled in factory default state.

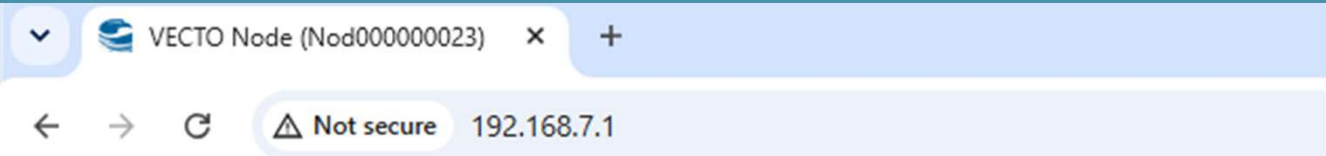
The Flash key contains a directory and a key-file. Once mounted, the VECTO device will look for the key-file and instructions on the disk. If found, it will activate the HMI.



1 Power on the VECTO PQ NODE and ensure the instrument has booted and is operational (**STATUS** LED will flash green).

2 To enable the HMI, insert the USB key shipped with the device into the VECTO'S USB-C port and wait 30 seconds before attempting to connect.

3 Access Web Interface (HMI)



1 Type in the default IP Address (**192.168.7.1**) into your web browser of choice. When prompted by your web browser, allow the insecure connection.



2 Click the **LOGIN** button on the top right of the window

3 Enter the default username and password in the table below and click **LOGIN**

Default Username	Default Password
super	Stellenbosch:7600

! Change the password upon login to avoid unauthorized access.

Device Configuration

Measurement Point Setup

VECTO

4

Navigate to the Measurement Point Tab

Click on the **Measurement Point** tab on the top of the HMI to navigate to the measurement point setup page.



VECTO Web Interface (HMI)

Logged in user: **Super User (super)**, with role **Super User**
Serial Number: **Nod000000023**
Hardware version: **Vecto Node**
Software version: **10.6.1** ⓘ
Calibration Date: **2026-07-06**

This instrument is insecure because the super user is activated and has the (well-known) default password.

Please change this at the earliest opportunity by navigating to Users, selecting the super user and clicking on Change Password.

Documentation

- [User Manual \(Local\)](#)
- [SCADA Interface Manual](#)
- [IEC61850 ICD](#)

5

Populate the Details section

Measurement Point Setup ⓘ [Commissioning]

Details Supply Interface Digital IO

Overview ⓘ

Name

Example Measurement Point Name

Description

Example: This is the main incomer of the plant on the 11 kV side.
This measurement point is located in panel A-51 in Sub A.
contact Emile Raad for more information.

☒ Commissioning Mode

Next

Revert

Load Previous Config...

Select a name for your measurement point.

Enter a description of the measurement point.

Remain in **Commissioning Mode** until you are satisfied with the measurement point configuration.

Click the **Next** button to proceed.

Device Configuration

Measurement Point Setup

VECTO

6 Populate the Supply Details

Measurement Point Setup ?

[Details](#)[Supply](#)[Interface](#)[Configuration](#)[Digital IO](#)

Example Measurement Point Name

Supply Configuration ?

Topology 1

☐ 3 Phase L-N (Star/Wye) ☒ 3 Phase L-L (Delta) ☐ Single Phase AC ☐ Single Phase DC ☐ 3 Phase L-L Voltage and Phase Current

Wiring 2

☐ 4-Wire Voltage Connection (Neutral Connected to V_Ref / V_Common)
☒ 3-Wire Voltage Connection (L2 connected to V_Ref / V_Common)

Frequency 3

50Hz

Voltage Level Options 4

11kV

Voltage Level

11000

V

Declared Voltage 5

11200

V

2% difference to voltage level

Next

Back

Revert

Revert to Previous...

1 Select your network topology

This is the type of topology you want to measure in.

2 Select your wiring topology

This is how you instrument is installed. You can measure in delta while you are connected in star, but not the other way around.

3 Select your frequency

Nominal frequency of your network.

4 Select your voltage level

The voltage level in your network.

5 Specify the declared voltage

This is the declared (contractually agreed) voltage of your system.

6 Click the 'Next' button

Configuration

Measurement Point Setup

VECTO

7 Populate the Voltage Measurement Interface Parameters

VT Ratio 1

Channel 1 - 3

100

V: 1 V

Maximum Voltage Reading ? 2

Channel 1 - 3

15000



Channel 4

150



Voltage Channel Mapping ?

Physical Meter Input

One

Two

Three

Four

Logical Phase Colour

Red (1)



Green (2)



Blue (3)



Black (4)



Unconnected Channels (Force to Zero) 3

☐ Channel 1 ☐ Channel 2 ☐ Channel 3 ☐ Channel 4

1

Enter your VT Ratio

This is the ratio of any VT connected to the voltage inputs. Ex: An $11\text{kV}/\sqrt{3}:110\text{V}/\sqrt{3}$ is equal to $100\text{V}:1\text{V}$

2

Select the maximum voltage that will be measured

Select the maximum voltage that will be measured to optimize the dynamic range of the measurement

3

Mark if there are any unconnected channels

Configuration

Measurement Point Setup

VECTO

8 Populate the Current Measurement Interface Parameters

Current Measurement ?

Enabled 

Link Channels  1 - 3

Derived Channel **1** Select if you are deriving any channels

None

Channel 1 - 3

Primary Current at Full Load ? **2** Enter the primary current at full load.
(used to calculate TDD and % of full-scale current)

1

A

Interface **3** Choose current measurement interface: Current Transducer, A:V (Option 1)
or Current Transformer into Transducer, A:A – A:V(Option 2)

Transducer (A:V)

Transducer **4** Enter the transducer ratio or the CT and transducer ratio depending on the
interface selection.

CT02 - Split Core (J) - 5A:333mV

Transducer Primary

5

A:

Transducer Secondary

0.333

V

Maximum Current Reading ?

Channel 1 - 3

8.5

Invert Current Polarity **5** Invert any of the current measurement channels if required.

☐ Channel 1 ☐ Channel 2 ☐ Channel 3 ☐ Channel 4

Current Channel Mapping **6** Change the current channel mapping if required.

Physical Meter Input

One

Two

Three

Four

Logical Phase Colour

Red (1)

Green (2)

Blue (3)

Black (4)

Configuration

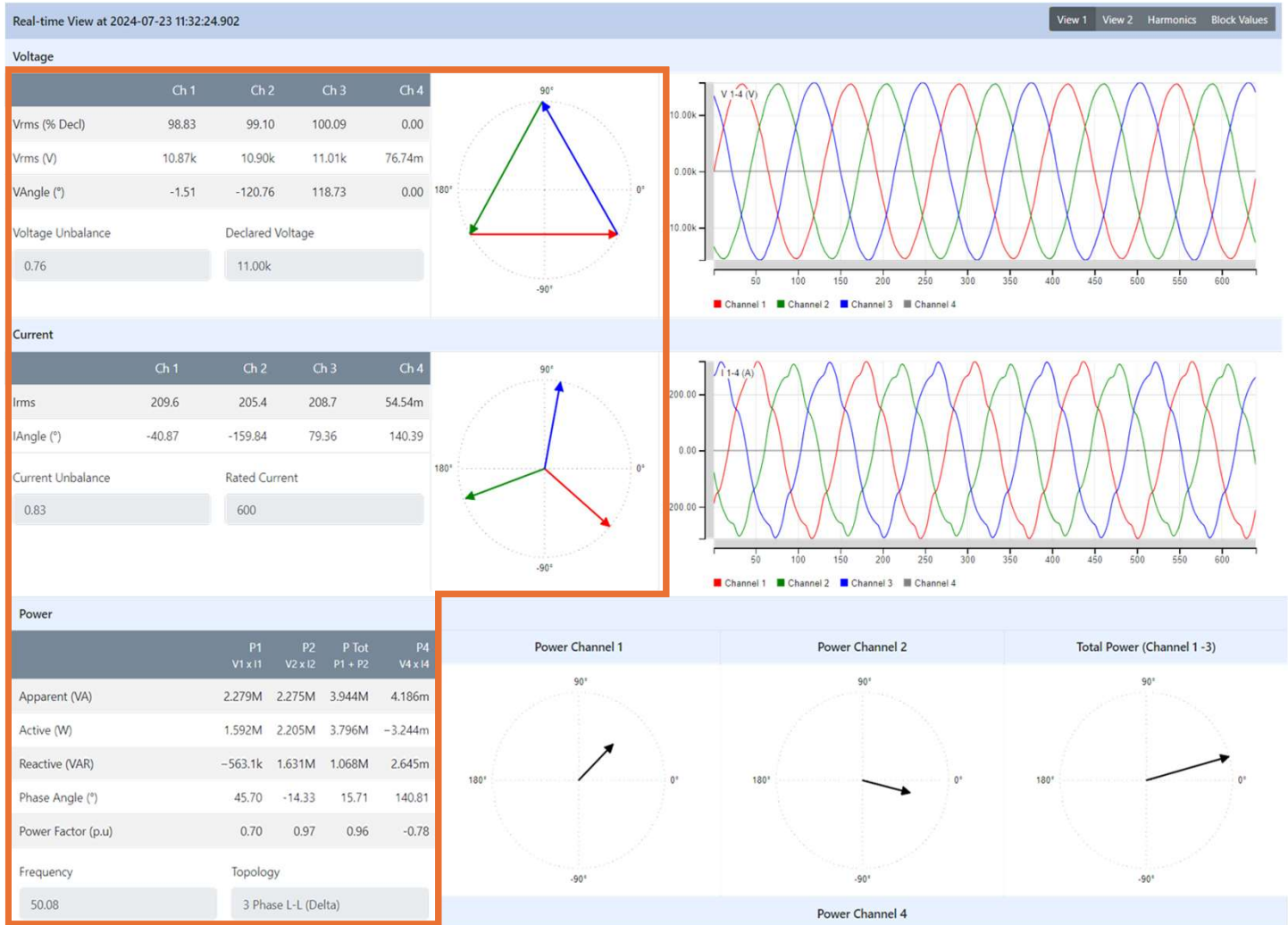
Measurement Point Setup

VECTO

9 Real-Time View



Click on the **Real-Time** tab to go to the real-time view page



Verify that the voltage, current, power, and phasors are correct according to expectation.

If there are any errors, return to the **Measurement Point** page and review the setup.

If everything is correct, return to the **Measurement Point** page and deselect the **Commissioning Mode** check box. Proceed to the **Configuration** Tab.

Configuration

Measurement Point Setup

10 Recording Configuration

Measurement Point Setup ?

[Details](#) [Supply](#) [Interface](#) [Configuration](#) [Digital IO](#)

Example Measurement Point Name ?

Ten Minute Trends

☒ Enable
☒ Enable Harmonics
☒ Enable Min/Max Values
Min/Max RMS calculated over 1 cycle ☒ 200 ms ?

Specialized Trends

☐ Enable 10s Frequency
☐ Enable Billing

On-board statistics computation ?

Time Zone
Please select
☐ Enable on-board daily 10 min stats computation

Advanced Settings ?

1/6th Cycle Interval Monitors ?

☒ Three-Phase Voltage Dip/Swell
☐ Current Exceedance
☐ Level Detection (Volt Channel 4)

Synchrophasor Monitors ?

☐ Synchrophasor Over/Under Frequency

10/12 Cycle Block Interval Monitors ?

☐ Voltage Distortion (THD) Exceedance
☐ Voltage Unbalance Exceedance
☐ Mains Signaling
☐ Over/Under Frequency
☐ Rate of Change of Frequency (ROCOF) Exceedance

50kHz Monitors ?

☐ Digital IO
☐ Voltage Transient

Ten Minute Interval Monitors

☐ Voltage Distortion (THD) Exceedance
☐ Voltage Unbalance Exceedance
☐ Voltage Regulation Exceedance

Extensions ?

Maximum number of events to capture per hour
☐ Enable Time Sync Loss Events

Next

Back

Revert

Revert to Previous...

The default configuration is set to the NRS048 (South African Quality of Supply) directive. The configuration can be left on default. Otherwise select all the required data streams and monitors to be activated in this window. Click the **Next** button when done. See VECTO PQ NODE user manual for advanced settings.

10 Setup Digital IO

Please see the User Manual (on the included flash drive) for more details about the setup of the digital IO.

Click the **Next** button when done.

11 Save the Measurement Point Configuration

Save

Back

Revert

Revert to Previous...

Click the **Save** button when done.

Frequently Asked Questions **VECTO**

How do I power ON the device

Apply external power — the **EXT PWR** LED will flash green, and the device will start to boot. The **STATUS** LED will flash orange while the instrument boots and turn green once the instrument has booted successfully. If a measurement points is attached to the instrument, the instrument will record and the **RECORD** LED will turn green.

I lost my Meter-Key - now what?

CT LAB offers robust device security. We can only send you a key-file once we have identified ownership of the device. Send an email to info@ctlab.com with your name, instrument serial number, contact details, and company. If ownership is established, then CT LAB will issue the meter key.

Why do I need a Meter-key?

No key-file is required when using the built-in web interface; however, the key-file is required to activate the interface. All IP-based communication is encrypted—the 128-bit key-file is required to decode the device data.

What do the LEDs mean?

CLOCK SYNC	Off — no external time source found yet. Orange — NTP time locked. Green — GPS or PTP time locked.
STATUS	Flashing Orange — Device booting or shutting down Toggle Orange > Green > Orange — Device has lost external power, and the capacitor is discharging. Flashing Green — Device has successfully booted.
RECORD	Off — no measurement point attached. Orange — device is recording an event. Green — measurement point attached.
CELLULAR	Orange — SIM and network found. Green — connected to cellular network.
DHCP Server	Off — Instrument operating as a DHCP Client. Green — Instrument operating as a DHCP Server.
EXT PWR	Off — No External Power Detected. Green — External Power Detected and capacitor is fully charged. Orange — Capacitor charging. Red — Capacitor Discharging, Instrument will soon shut down.

Will the VECTO PQ NODE power on by itself after a power failure?

Yes, the VECTO PQ Node devices are powered as soon as external power is available. When external power is lost, the device is powered by the capacitor for approximately 15 seconds. Thereafter, it will shut down.

How do I change the IP Address when the instrument is operating as a DHCP Client?

On the HMI go to the **Comms** tab and see the **IP Version 4**, **IP Version 6**, or **Local/DHCP Port** sections to change or configure a static or DHCP IP for the ethernet port in DHCP Client mode.

How to enable the Cellular Modem?

On the HMI, go to the **Comms** tab and see the **IP Version 4**, **IP Version 6**, or **Local/DHCP Port** sections to change or configure a static or DHCP IP.

How do I see if the instrument is GPS/PTP locked?

On the HMI go to the **Status** tab and click the **Read** button. Check if the **Time Source** field shows *GPS* or *PTP*. Check the **Time Subsystem** output for the GPS line if the GPS has a time (most right column).

For more information:
vectosystem.com

For technical support:
+27 (21) 880 9915
info@ctlab.com