

PiPerXS 4B Mote Installation & Configuration Guide



Safety Notice

- ⚠ Installation of TRAXX hardware must be performed by qualified technicians.
- ⚠ This device is intended for monitoring and data analytics only and must not be used as a safety or life-protection system.
- ⚠ Do not open the device enclosure or modify internal components.
- ⚠ For complete safety instructions, regulatory compliance statements, warranty limitations, and environmental specifications, see [Appendix A — Safety & Regulatory](#)

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About This Guide

This guide covers the physical installation and configuration of the PiPerXS 4B mote. It is intended for technicians performing on-site installation and commissioning.

It does not cover the TRAXX software application. For asset setup, alarm configuration, and TRAXX administration, refer to the [TRAXX Software User Manual](https://www.klatunetworks.com/docs). Available at <https://www.klatunetworks.com/docs>

Overview

The PiPerXS 4B Mote is a wireless data acquisition device that collects sensor data and transmits it to the TRAXX cloud platform over Wi-Fi. Sensors connect to the mote via KLATU SensorHubs™ or SmartCables and the mote transmits the sensor data to TRAXX.

If Wi-Fi connectivity is lost, the mote stores up to seven days of data locally and uploads it automatically when the connection is restored. The mote is powered by an external power supply via PoE and includes a battery for backup in the event of a power outage.

The mote is configured through a browser-based interface accessed by connecting a computer to the mote Ethernet interface via the PoE power supply.

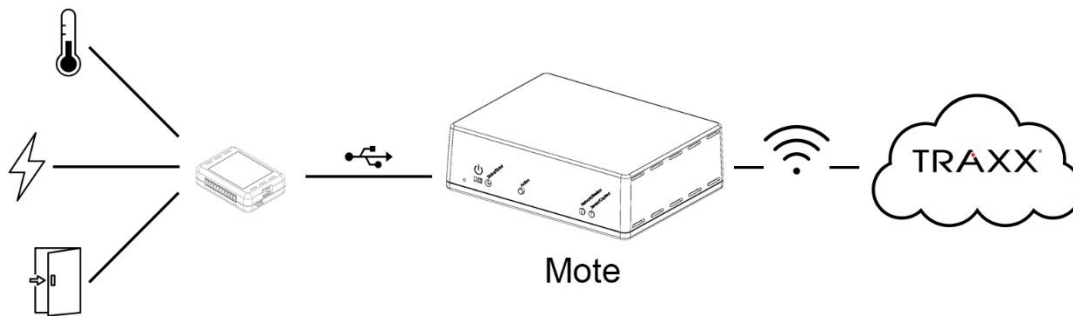


Figure 1 – Architecture Diagram

Quick Start Guide

Most configurations only require setting up the mote to connect to Wi-Fi and specifying the type of sensor connections that will be used.

Important Notes

- Sensors do not connect directly to the mote. Sensors are connected through a SensorHub or SmartCables.
- The Cloud URL is pre-configured from the factory. Only change this if instructed.
- The motes can be configured while installed on an asset with the sensors attached or they can be preconfigured without being connected to an asset or sensors. Wi-Fi connection is required.

See [What You Will Need](#) for a complete list of required materials before beginning.

Connect to the Mote

- 1) Connect the computer to the “IN” port in the PoE power adapter and connect the mote to the “OUT” port on the PoE adapter.
- 2) Turn on the power switch on the front of the mote (move switch to the right).
- 3) Set computer to static IP: 192.168.5.10
- 4) Browse to: <http://192.168.5.5:9292>
- 5) Log into the mote with:
 - a. **Username:** admin
 - b. **Password:** changeThisPassword
- 6) After the first log in, you will be forced to change the password.

⚠ Note: Make sure to keep a record of the password used.

Configure the Mote

- 1) Go to the Network page, enter your Wi-Fi credentials and click Submit. The upper-left corner should switch to “Online”.
- 2) Go to the Cloud page and click “Test Connection”. You should get “Code: 200, Message: Cloud connectivity successful”.

⚠ Note: The Cloud URL comes pre-configured from the factory. Do not change any of the cloud settings unless instructed to do so.

Sensor Configuration

The sensor setup can be configured on the mote whether or not the sensors are physically connected. We recommend configuring with the sensors connected when possible so that you can verify that each sensor is reading correctly. In some cases, it may be more convenient to configure the mote in advance, before the sensors are connected.

⚠ Note: All sensors must be connected through a SensorHub or SmartCable.

- 1) Go to the Sensors page and click "+ Add Sensor".
- 2) Use the Sensor Type dropdown to select the sensor type:
 - a. For SensorHubs, choose "Default Hub" for the serial number if you are only installing one SensorHub of that type.
 - b. Sample Frequency: in older firmware versions, if this option is present, it should be set to 'Every Minute'. (This field has been removed in current firmware.)
 - c. Door sensors should usually be set to "Normally Closed".
- 3) Click Submit.
- 4) If the sensor is physically connected to the mote (via SensorHub or SmartCable), click "Gather Sample" at the top of the page to verify that all sensors are detected.

Instructions for Replacing Older Generation Motes

If you are installing the PiPerXS 4B to replace an existing mote, follow the steps above to configure the new mote and connect the sensors to the new mote.

⚠ Note: Do not delete the existing sensors or asset from TRAXX.

Once the new mote is configured, use the "Sensor" dropdown menu in TRAXX to select the new mote/sensor to replace the existing one.

- If the existing sensors are already connected to a SmartCable or SensorHub, you can simply connect the SmartCable or SensorHub to the new mote.
- If the existing sensors are connected directly to the mote, you will need to connect the sensor wires to the new SensorHub or SmartCable on the new mote.

Once the mote is online, connected, and authorized by KLATU Support, you can configure the asset in TRAXX.

⚠ Note: If the mote is connected to the cloud but is not showing up in your TRAXX account, contact support@klatunetworks.com to authorize (or "whitelist") the mote for your account

You can download a standalone version of the [PiPerXS 4B Quick Start Guide](https://www.klatunetworks.com/docs) from <https://www.klatunetworks.com/docs>

Getting Started

About the Mote

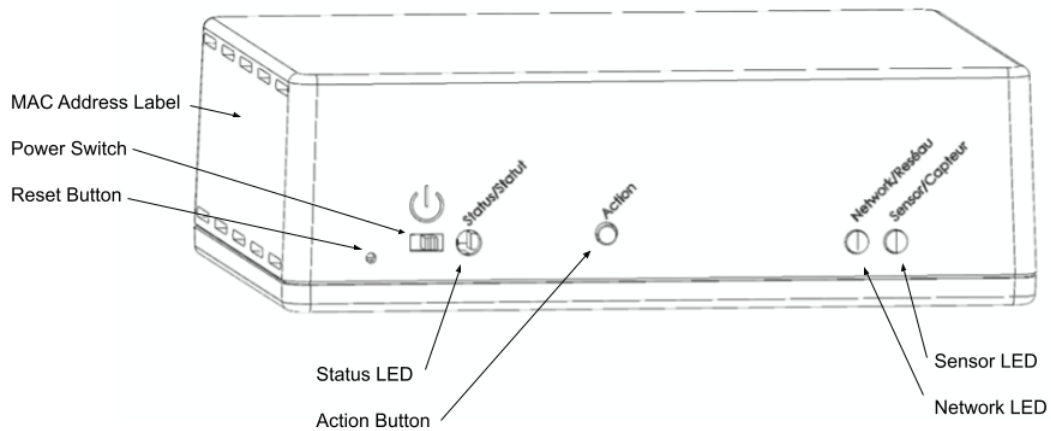


Figure 2 - Mote Features (front)

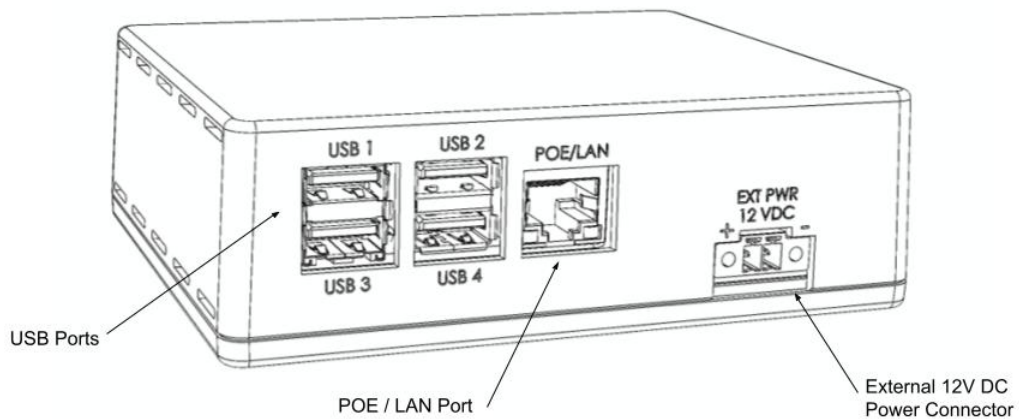


Figure 3 - Mote Features (back)

LED Status Reference

During normal operation, the status LED and Network LED will be solid green. The Sensor LED blinks every time the sensors are being sampled.

LED	State	Meaning
Status	Solid green	Mote is powered on and receiving line power
	Flashing green	Mote is online power; battery is charging
	Blinking red	Battery is dead and needs to be replaced
	Off - Flashing on once a minute	Mote is running on battery backup; check power connections
	Off	Mote is powered off; check power connections and power switch
Network	Solid green	Mote is online and connected to Wi-Fi and cloud
	Flashing green	Mote is sending a backlog of stored data; normal after an extended outage
	Alternating green/red	Mote is connected to Wi-Fi but cannot reach the cloud server
	Flashing red	Mote cannot connect to Wi-Fi; check network configuration
Sensor	Off (Status LED solid green)	Possible power loss or hardware failure
	Single periodic green flash	Normal; mote is sampling sensors

Figure 4 – LED Status Table

When external power has been lost and the mote is running on battery backup, all LEDs will shut off to conserve battery power. The LEDs will blink once a minute to indicate the status. (Status LED will blink red and the network LED will blink green if the mote is still connected to the network or red if it is no longer connected to the network.)

⚠ Note: When power cycling the mote, all LEDs must be dark before powering ON the mote. All LEDs should go dark within 10 seconds of powering the mote OFF. If the LEDs don't go dark after 10 seconds, use a paper clip to press the Reset button.

What You Will Need

- Computer with Ethernet port configured with a static IP address
- Wi-Fi credentials for network
- Mote and Power Supply
- 2 Ethernet cables
- SensorHub or SmartCables
- Sensors (CT, RTD, etc.)
- Micro-screwdriver – flat head - *required for SensorHub terminal connections and SmartCable installations*

Computer & Network Setup

The P4XS configuration interface is a web-based UI accessible by connecting a computer directly to the mote via Ethernet. The mote does not support configuration over Wi-Fi. The mote uses a fixed IP address of 192.168.5.5, so the computer must be configured with a static IP address on the same subnet. Any other address on the 192.168.5.x subnet will work. We recommend using the following:

- IP address: 192.168.5.10
- Subnet mask: 255.255.255.0
- No DNS servers or gateway address is required.

For setup instructions, see:

- Windows: [Change TCP/IP Settings \(Microsoft Support\)](#)
- macOS: [Change TCP/IP Settings \(Apple Support\)](#)

Power Connection

The mote is typically powered via the included PoE power supply. Connect the PoE power supply to an AC outlet, connect the mote to the OUT port on the power supply with an Ethernet cable. The PoE port is labeled POE/LAN on the rear of the mote. To access the configuration interface, connect your computer to the IN port.

⚠ CAUTION: The PoE supply must be 802.3af compliant. Using non-802.3af compliant PoE will void the warranty and could result in damage to the mote.

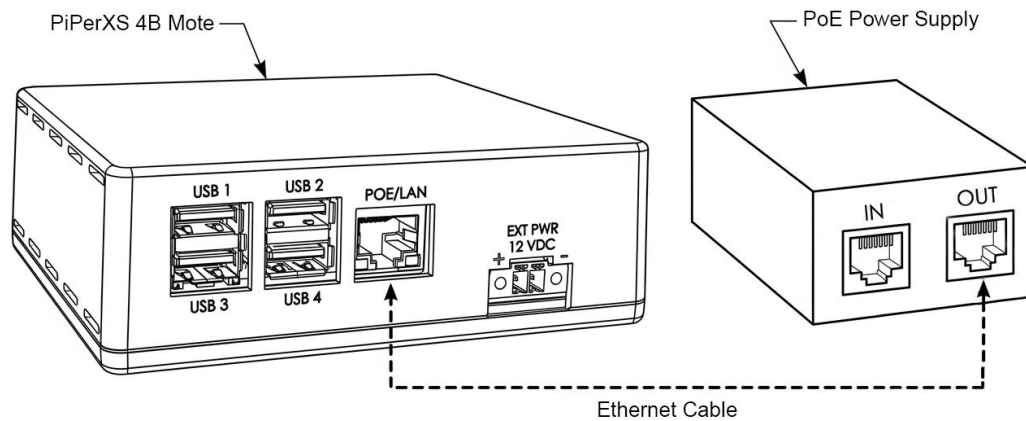


Figure 5 – Mote powered via PoE

The mote can also be powered through the EXT PWR 12 VDC terminal block on the rear panel. Connect 12VDC positive to the + terminal and negative to the – terminal. A small flat-head screwdriver is required to secure the terminal connections.

Once power is connected, turn on the mote using the power switch on the front panel. All LEDs will briefly illuminate orange during boot. The mote is ready for configuration when the Status LED turns solid green, which typically takes 20–30 seconds.

Connecting to the Mote: Configuration Interface

If powering via PoE: Connect your computer to the **IN** port on the PoE power supply and connect the mote to the **OUT** port. This allows the computer to reach the mote through the power supply's built-in switch.

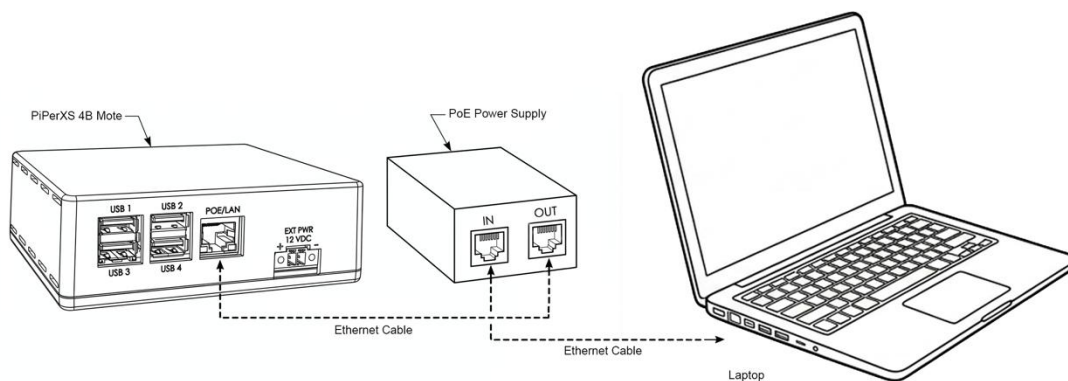


Figure 6 – Computer connected to mote through PoE Adapter

If powering via 12VDC: Connect your computer directly to the **POE/LAN** port on the rear of the mote using an Ethernet cable.

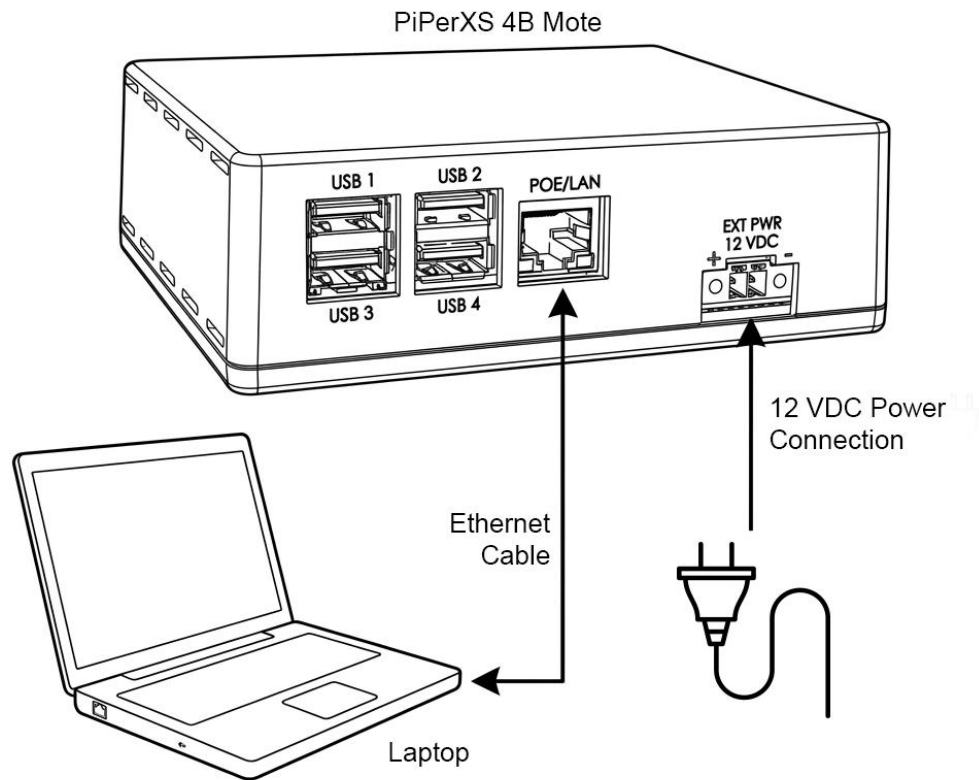


Figure 7 – Mote powered via 12VDC and Computer

The computer should already be configured with a static IP address. See Computer & Network Setup section.

Open a web browser and navigate to: <http://192.168.5.5:9292>

Log in with the following credentials:

- **Username:** admin
- **Password:** changeThisPassword

On first login you will be prompted to change the password.

⚠ Record the new password and store it securely. If you do not know what the password has been changed to, you can reset the password by restoring the factory default settings. Note: This will reset all mote settings including sensor calibration.

You can change the password any time from the User Profile page in the browser interface.

Mote Configuration

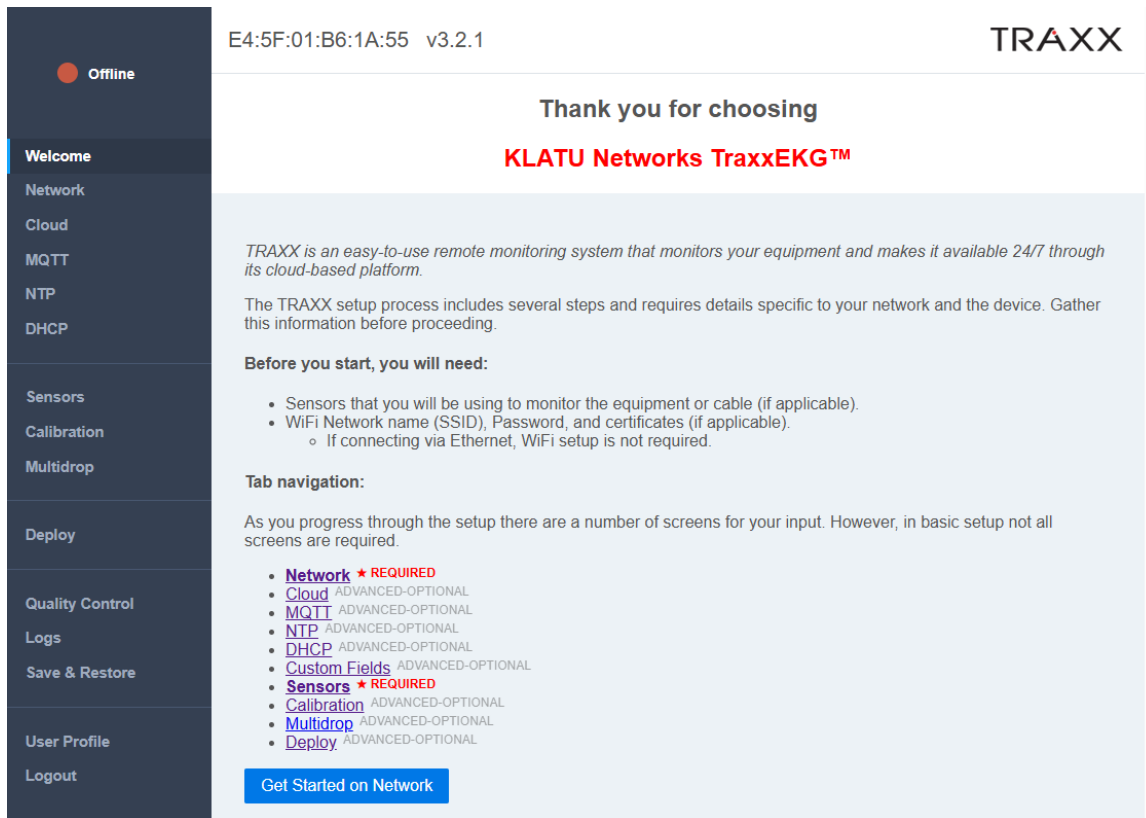


Figure 8 - Mote Configuration Interface

Wi-Fi Network Configuration

Configure the Wi-Fi credentials from the Network page in the configuration interface. After you click “Submit” the mote will attempt to connect to the Wi-Fi network. Once it is successfully connected, the dot in the upper-left corner will turn green and say “Online”. The page will display the link quality and other attributes of the Wi-Fi connection.

A link quality of 50% or better and a signal strength of -70 dBm or stronger (typically -40 to -70 dBm) are required for reliable operation. If signal strength cannot be improved to meet this threshold, an Ethernet connection should be used instead.

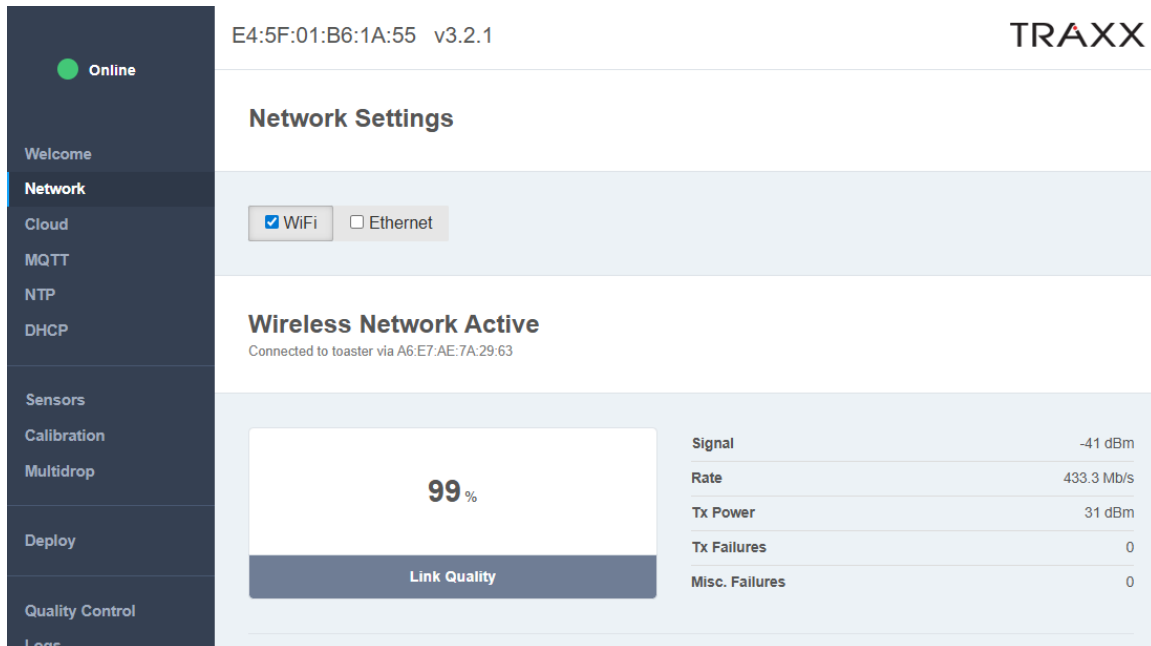


Figure 9 - Network Configuration Interface

Cloud Configuration

The mote ships with the cloud URL pre-configured from the factory. In most cases no changes are needed. Navigate to the Cloud page and click Test Connection to verify connectivity. A successful connection will return: **Code: 200, Message: Cloud connectivity successful.**

If you get an error after clicking *Test Connection*, check all configuration settings and try again. Contact your IT and/or support@klatunetworks.com if you continue to have issues.

Report Frequency should be set to 5 Minutes.

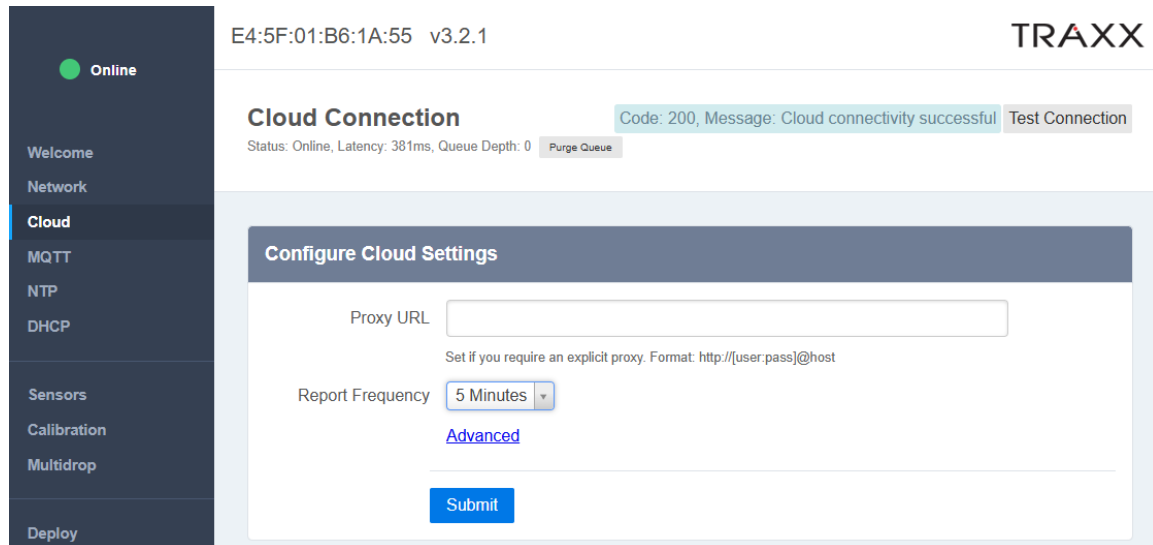


Figure 10 - Cloud Connection Page

Note: The Queue Depth displayed at the top of the Cloud page indicates how many data records are stored locally on the mote waiting to be transmitted. A large queue is normal if the mote has been offline for an extended period. It will clear automatically once the mote is connected.

⚠ Do not click Purge Queue unless instructed to do so. Purging the queue permanently deletes all stored data and cannot be undone.

Advanced Cloud Settings:

⚠ Do not change the Proxy URL or any of the values on the Advanced page unless instructed to do so

If your network requires a HTTP proxy for internet access, enter it in the 'Proxy URL' field. Only use this if a proxy is required. Entering a value here if not needed will block internet access. Your IT team should be able to provide you with the correct proxy URL if required.

If you have been provided with a custom Cloud URL by KLATU Support, Click on the "Advanced" link and enter those values on this page and test again. Do not modify these settings unless specifically instructed to do so

Sensor Configuration

Sensors cannot be connected directly to the mote. All sensors must be connected to the mote via USB through either a KLATU SensorHub or a KLATU SmartCable.

The mote also supports direct USB connections from certain incubators.

Sensors are configured through the Sensors page of the mote configuration interface. The page displays a Gather Sample button at the top and a list of configured sensors, each with its own settings.

Adding a Sensor

1. Click Add Sensor
2. Use the Sensor Type dropdown to select the type you are installing
3. Configure the fields as described below
4. Click Submit to save

⚠ All SensorHub models include built-in ambient temperature and humidity monitoring. These do not require configuration and will be reported to TRAXX automatically once the SensorHub is connected and configured.

Serial Number

Serial number selection behaves differently depending on whether you are installing a SensorHub or a SmartCable.

SensorHub: If you are installing only one SensorHub of a given type, leave the serial number set to Default Hub. If you are installing more than one SensorHub of the same type, connect them one at a time and use the dropdown to select the detected serial number of each unit. The serial number is also printed on the label on the SensorHub.

SmartCable: SmartCable configurations do not include a serial number field. This means SmartCables do not need to be physically connected to configure the sensor, and a SmartCable can be replaced without updating the mote configuration.

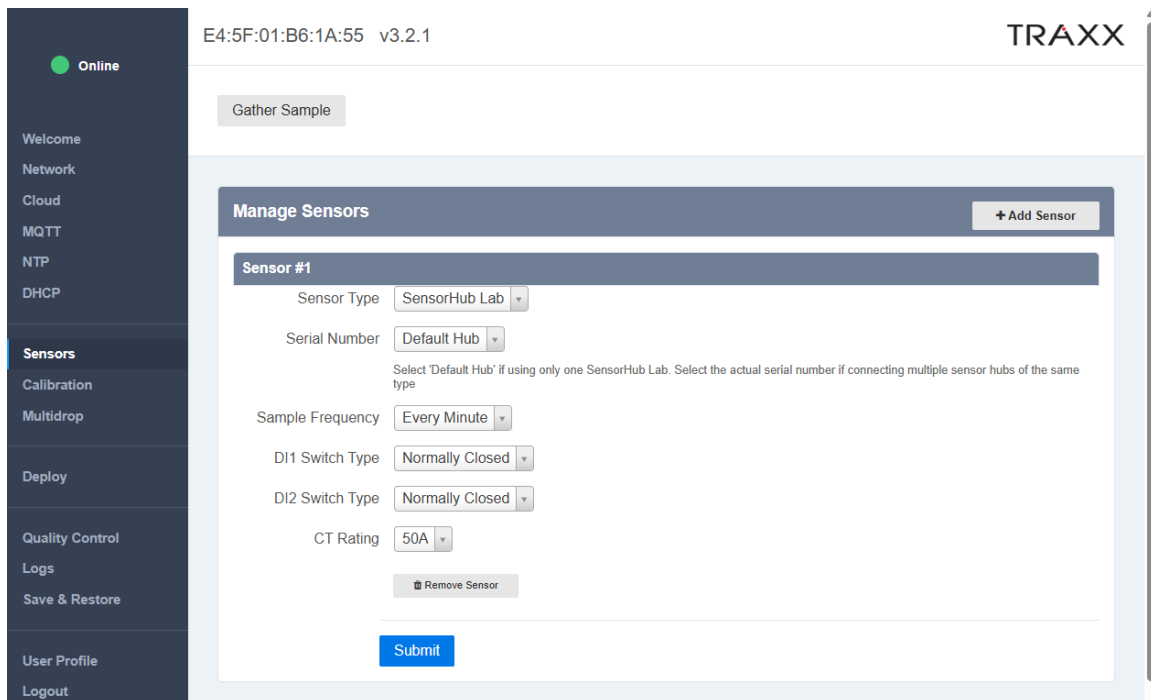
⚠ When a SmartCable is replaced, TRAXX must be updated to associate the asset's sensor with the new MAC address/SmartCable combination.

Sample Frequency

Set to **Every Minute** for all sensor types unless otherwise instructed.

SensorHub Lab

No additional configuration is required for RTD sensors. For CT sensors, set the rating to **50A** (KLATU part number SENS-SPLCT-1002). For door switches (KLATU part number SENS-DOOR-1002), set polarity to **Normally Closed**.



The screenshot shows the 'Manage Sensors' configuration screen for 'Sensor #1'. The interface includes a left sidebar with navigation options: Online, Welcome, Network, Cloud, MQTT, NTP, DHCP, Sensors (selected), Calibration, Multidrop, Deploy, Quality Control, Logs, Save & Restore, User Profile, and Logout. The main content area displays configuration fields for 'Sensor #1':

- Sensor Type:** SensorHub Lab (dropdown)
- Serial Number:** Default Hub (dropdown) with a note: 'Select "Default Hub" if using only one SensorHub Lab. Select the actual serial number if connecting multiple sensor hubs of the same type.'
- Sample Frequency:** Every Minute (dropdown)
- DI1 Switch Type:** Normally Closed (dropdown)
- DI2 Switch Type:** Normally Closed (dropdown)
- CT Rating:** 50A (dropdown)

Buttons include 'Gather Sample', '+ Add Sensor', 'Remove Sensor', and 'Submit'. The top right corner shows the TRAXX logo and the device ID 'E4:5F:01:B6:1A:55 v3.2.1'.

Figure 11 - SensorHub Lab Configuration Screen

SensorHub RS-485

Use the **Channel 1 Sensor** and **Channel 2 Sensor** dropdown menus to select the type of probe connected to each channel (CO₂ or temperature/humidity).

SensorHub 4-20mA

Enable each channel you are using with the **Channel Enabled** dropdown and set the **Output Metric**. For each active channel, define the following scaling values:

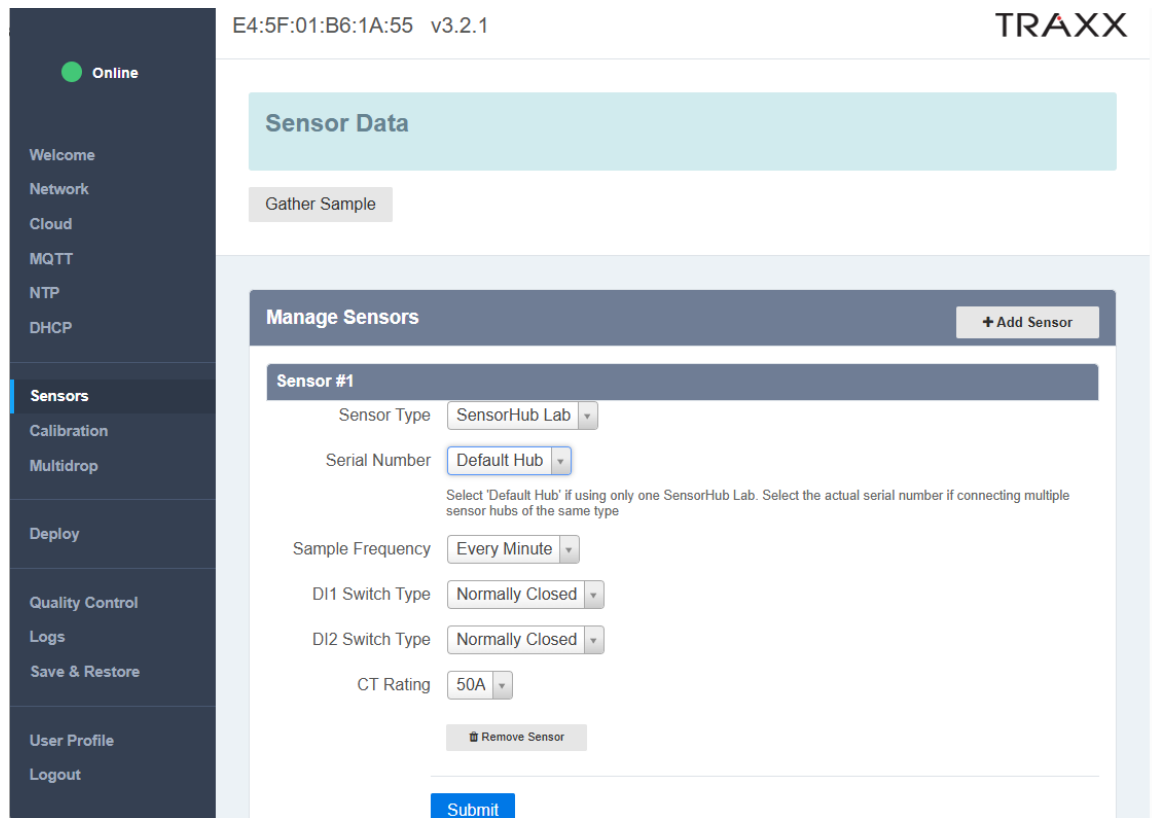
- Value when input is below 4 mA
- Value at 4 mA
- Value at 20 mA
- Value when input exceeds 20 mA

These values determine how the input current is converted into a measurement. The correct scaling values should be provided by the sensor manufacturer or the engineer who specified the installation.

Verifying Sensor Configuration

Once all sensors are configured and physically connected, click **Gather Sample** at the top of the Sensors page. Sensor readings should appear in the mote interface confirming the connection is working. If a sensor reports unexpected values, check that all wires are securely connected to the correct terminals.

Note: The SensorHub LED will not illuminate until after the first successful sample, at which point it will turn green and remain green.



The screenshot shows the TRAXX web interface for sensor configuration. On the left is a dark sidebar with navigation links: Welcome, Network, Cloud, MQTT, NTP, DHCP, **Sensors** (highlighted), Calibration, Multidrop, Deploy, Quality Control, Logs, Save & Restore, User Profile, and Logout. The main content area has a top status bar showing 'E4:5F:01:B6:1A:55 v3.2.1' and the 'TRAXX' logo. Below this is a 'Sensor Data' section with a 'Gather Sample' button. The 'Manage Sensors' section contains a form for 'Sensor #1'. The form includes dropdown menus for 'Sensor Type' (set to 'SensorHub Lab'), 'Serial Number' (set to 'Default Hub'), 'Sample Frequency' (set to 'Every Minute'), 'DI1 Switch Type' (set to 'Normally Closed'), 'DI2 Switch Type' (set to 'Normally Closed'), and 'CT Rating' (set to '50A'). A 'Remove Sensor' button with a trash icon is below the form. A blue 'Submit' button is at the bottom of the form. A '+ Add Sensor' button is in the top right of the 'Manage Sensors' section.

Figure 12 - Sensor Configuration Interface

Save & Restore

The Save & Restore function exports a mote's configuration to an encrypted .dat file that can be loaded onto other motes. The primary use case is deploying multiple motes at the same site. Configure the first mote completely, save the configuration, then load it onto each subsequent mote rather than configuring each one manually.

The configuration file includes Wi-Fi credentials, sensor settings, NTP settings, and any non-default Cloud URL or proxy settings.

The following are **not** included in the configuration file:

- Mote password
- Sensor calibration settings
- DHCP/static IP settings
- 802.1x certificate files

Note: When configuring sensors for a deployment where a .dat file will be reused across multiple motes, add sensors using **Default Hub** for the serial number rather than specifying an actual serial number. This ensures the saved configuration will work correctly on all motes regardless of which SensorHub unit is physically attached.

Saving a Configuration

1. Complete all mote configurations: Wi-Fi, Cloud, NTP, and sensors.
2. Select **Save & Restore** from the left menu.
3. Click **Save Configuration** to download the file to your computer.
4. You can rename the file to a useful name as long as you keep the .dat extension.

Restoring a Configuration

1. Connect to the new mote and log in to the configuration interface.
2. Select **Save & Restore** from the left menu.
3. Locate the previously saved .dat file on your computer.
4. Drag and drop the file into the box on the page.
5. Verify that all settings are correct before proceeding.

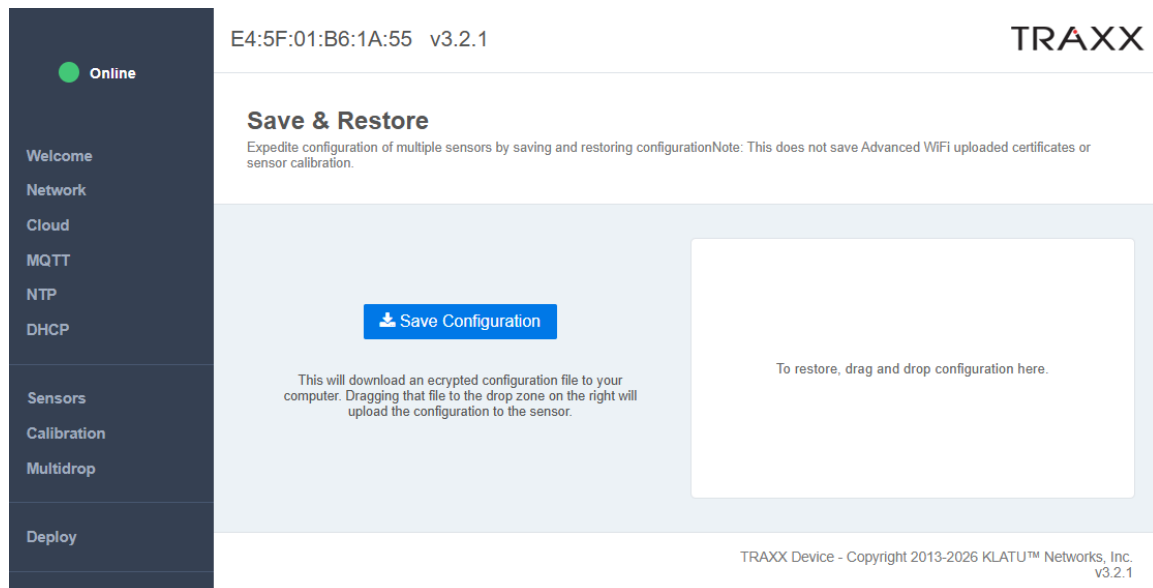


Figure 13 - Save & Restore

Device Authorization

All motes must be authorized by KLATU support in order to appear in TRAXX. If you do not see your Mote in TRAXX, send the MAC address to support@klatunetworks.com to be authorized.

The MAC address is printed on a label on the mote.

The mote must be online and communicating with the cloud. Device authorization is sometimes referred to as "whitelisting."

 Confirm the mote is online (solid green Network LED) before contacting support.

Physical Installation

Mounting the mote

There is a magnetic strip on the base of the mote intended to assist with positioning and temporary placement on any ferrous metal surface. For permanent installations, the mote should be secured with additional fasteners appropriate for the mounting surface.

When selecting a mounting location, consider the following:

- **Cable routing** — the mote should be positioned so that all cables (power, SensorHub USB, SmartCables) can reach their connections without being stretched or sharply bent
- **Wi-Fi signal** — avoid mounting inside metal enclosures or in locations where the Wi-Fi signal is obstructed
- **Access** — the mote should be accessible for LED status checks and future servicing
- **Stability** — the mote should be mounted on a stable surface where it will not be disturbed by normal activity around the asset
- **Ventilation** — The mote's battery requires sufficient airflow for proper cooling. **Do not install the mote in locations where airflow is restricted** such as enclosed spaces, against walls without clearance, or blocked by equipment or obstructions. Inadequate ventilation causes heat buildup and may result in battery failure. Motes must be positioned with clear space around them and sufficient air circulation.

Sensor Connection Methods

Sensors connect to the mote via a KLATU SensorHub or KLATU SmartCable. SensorHubs support multiple sensors on a single USB port and include built-in ambient temperature and humidity sensors, making them the preferred connection method in most installations. SmartCables connect a single RTD or CT sensor, or two DI sensors, to a mote USB port and are typically used where a SensorHub is not practical.

SensorHub



Figure 14 - SensorHub Lab

TRAXX SensorHubs are USB-connected modules that connect sensors to a PiPerXS 4B mote. Each SensorHub connects multiple sensors through a single device using Phoenix terminal connectors and is configured through the mote configuration interface.

Each SensorHub includes:

- USB port for connection to the mote
- Phoenix terminal connectors for sensor wiring
- Status LED
- Action button (triggers manual data sample)

SensorHub models are labeled to indicate terminal assignments (e.g., RTD, CT, CH1–CH4, DI).

SensorHub Types

SensorHub Lab	SensorHub RS-485	SensorHub 4-20
• RTD temperature sensors • Current transducers (CT) • Digital Inputs (DI) (e.g., door switches)	• CO₂ probes • Temperature / humidity probes • Digital Inputs (DI)	• Up to four 4-20mA input channels • Digital Inputs (DI)

Figure 15 – SensorHub Types

Sensors are wired to the SensorHub using Phoenix terminal connectors. Each connector on the SensorHub is labeled to indicate the function of each terminal.

SensorHub Wiring

Pin diagrams show the connector viewed from the wire entry side.

RTD

The two red wires are interchangeable. Connect the red wires to terminals 1 and 2 and connect the white wire to terminal 3.

Caution:

The Phoenix connector wiring order for the RTD differs from the Gen2 mote.

If replacing a Gen2 mote with a SensorHub, the wires must be removed and reconnected in the correct order.



Pin	Wire
1	Red
2	Red
3	White

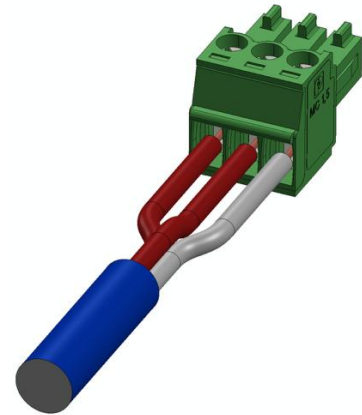


Figure 16 – RTD Wiring

CT

2-wire configuration.

The second wire may be red or black depending on the unit; in either case, connect it to pin 2.



Pin	Wire
1	White
2	Red or Black

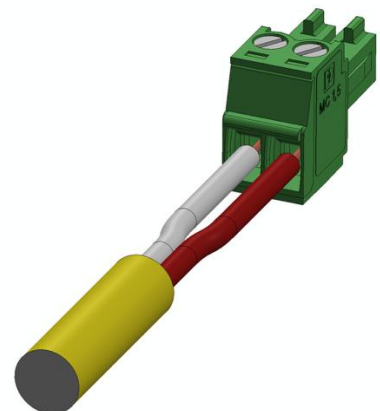


Figure 17 – CT Wiring

DI

Supports 1 or 2 DI sensors.

Terminal 2 is common between both sensors.

If using two DI sensors, connect both brown wires into terminal 2.



Pin	Wire
1	White (sensor 1)
2	Brown (common between sensor 1 and sensor 2)
3	White (sensor 2)

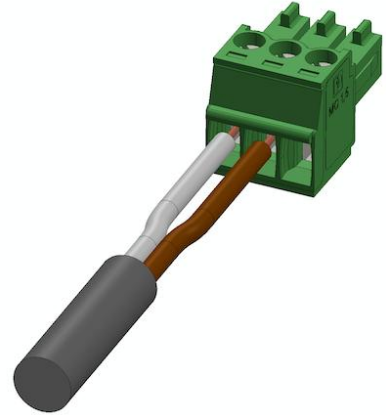


Figure 18 – DI Wiring

4-20mA

Supports up to four 4-20mA connections on a single 8-pin Phoenix connector.

Each channel uses two adjacent pins: positive (+) followed by negative (-), and the pattern repeats across all four channels (pins 1-2, 3-4, 5-6, 7-8).



Channel	Pin	Wire
1	1	+
1	2	-
2	3	+
2	4	-
3	5	+
3	6	-
4	7	+
4	8	-

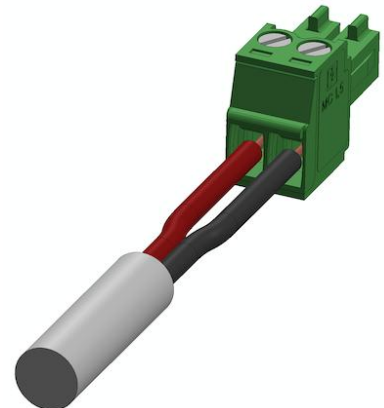


Figure 19 – 4-20mA Wiring

RS-485

Supports up to two Vaisala Probes: GMP251 (CO₂) or HMP (Temperature and Humidity).

Connect each probe to one of the two 4-pin RS-485 terminals (485-1 or 485-2).



Pin	Wire
1	Brown
2	White
3	Black
4	Blue

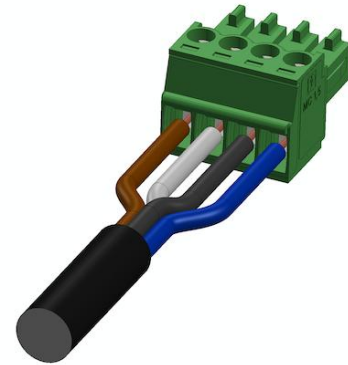


Figure 20 – RS-485 Wiring

Wiring Guidelines

- Fully insert the conductor into the terminal on the Phoenix connector before tightening
- Tighten terminal screws securely. Recommended torque: 0.25 N·m (2.212 in-lb)
- Gently tug each wire after tightening to confirm it is secure
- Ensure no exposed conductor is visible outside the terminal
- Follow the labeling printed on the SensorHub for terminal identification

For more information about SensorHub, see the [SensorHub Install Guide](https://www.klatunetworks.com/docs). Available at <https://www.klatunetworks.com/docs>

SmartCables

KLATU SmartCables are USB-connected sensor cables that connect a single sensor to a PiPerXS 4B mote USB port. SmartCables are color-coded by sensor type:

Color	Sensor Type	Terminals
Blue	RTD	3
Yellow	CT	2
Green	DI (x2)	4

Figure 21 – SmartCables Table



Figure 22 –
SmartCable RTD

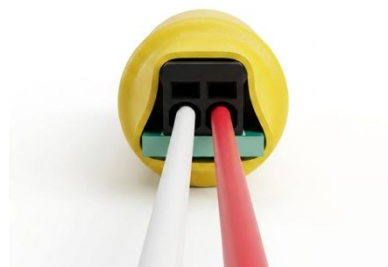


Figure 23 –
SmartCable CT



Figure 24 –
SmartCable DI

Each SmartCable is identified by a serial number on a label affixed to the cable. The USB end can connect to any available mote USB port.

SmartCable Wiring

Sensor wires connect to a push-in terminal block at the sensor end of the SmartCable. Terminal assignments are labeled on the cable body.

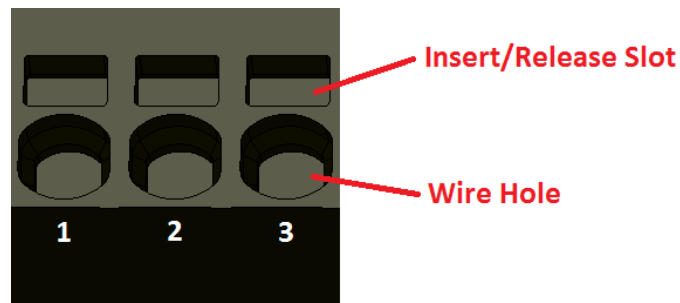


Figure 25 - SmartCable RTD Terminal Block

SmartCable RTD (Blue)

Terminal	Wire
1	Red
2	Red
3	White

SmartCable CT (Yellow)

Terminal	Wire
1	White
2	Red or Black

SmartCable DI (Green)

Terminal	Sensor
1	DI 1
2	DI 1
3	DI 2
4	DI 2

SmartCable DI (Green)

Supports up to two door switches. Wire polarity does not matter within each pair. Either wire can go in either hole. When two door switches are installed, each will be identified separately in TRAXX by sensor number (DI 1 or DI 2). Note which sensor number corresponds to which physical door.

Wire Insertion

1. Insert the wire fully into the Wire Hole. The wire should seat to approximately 7/16 inch depth with hand pressure only.
2. Tug lightly on the wire to confirm it is retained.

⚠ Caution: If using stranded wire, ensure all strands are fully inserted. Loose strands can short to adjacent terminals.

Wire Removal

1. Insert a micro-screwdriver into the Insert/Release Slot above the terminal. Apply light downward pressure until the clamp releases (the tool will penetrate slightly deeper when the clamp opens).
2. Pull the wire out. No significant force should be required.

⚠ Caution: Do not apply excessive force or twist the screwdriver in the Insert/Release Slot. The slot can be damaged.
Do not insert the screwdriver or any other object into the wire slot other than the wire. This will damage the connection and may prevent the sensor from working.

Sensor Installation

Temperature Sensor Installation for ULT Freezers. The P4XS is compatible with 3-wire RTD PT100 sensors. RTD sensor wires are wrapped in blue heat shrink for identification.



Figure 26 – RTD Probe: Rubber Cap Not Yet Removed

⚠ Sensor installation in ULTs may require the unit to be emptied. Make arrangements with the facility prior to beginning work.

⚠ Use appropriate PPE when working inside cold storage cabinets.

⚠ Do not route the sensor wires through the door.

⚠ Avoid routing the sensor wire anywhere it may be damaged by product sliding in and out of the cabinet.

⚠ When positioning the probe, ensure the tip is not resting against or in contact with any exposed metal surfaces inside the cabinet. Contact with exposed metal can cause false readings.

Installation

1. Locate the sensor access port on the cabinet exterior (typically on the back, side, or top of the unit). Remove the plug or grommet.
2. Route the RTD probe through the access port and into the cabinet interior.
3. Locate the cabinet's internal control sensor, typically mounted in a protective bracket or guard near the center of the cabinet. Position the RTD probe tip as close as possible to the control sensor tip.
4. Secure the RTD probe wire to the control sensor wire using zip ties. Ensure the probe is not in contact with any exposed metal surfaces inside the cabinet.
5. Remove the protective rubber cap from the RTD probe tip.
6. Reinsert the access port plug or grommet around the wire and reseal as needed to maintain the cabinet's thermal integrity.
7. Route any excess wire down the exterior of the cabinet and secure it so it will not be damaged during normal use.
8. Connect the sensor wire to the SensorHub or SmartCable. See SensorHub or SmartCables for instructions.

If No Dedicated Access Port Is Available

Some units do not have a dedicated sensor access port. In this case, the RTD wire can be routed through the control sensor penetration — the sealed port where the cabinet's own control sensor wire enters the cabinet.

⚠ Warning: This procedure requires disconnecting the unit from power. Since thawing may be required, water may drip near electrical components. Do not restore power until the penetration is fully resealed and all moisture has been cleared.

1. Disconnect the unit from power.
2. Use a heat gun to soften the Permagem or sealant at the control sensor penetration. Use caution not to damage existing sensor wires.
3. Once the sealant is softened, remove it from the penetration and route the RTD probe wire into the cabinet alongside the existing control sensor wire.
4. Follow steps 3–6 of the main procedure above to position and secure the probe inside the cabinet.
5. Reseal the penetration with Permagem cord.
6. Clear any moisture that resulted from thawing. Restore power and restart the unit.
7. Connect the sensor wire to the SensorHub or SmartCable. See [SensorHub Wiring](#) or [SmartCable Wiring](#) for instructions.

⚠ The sensor should always be positioned near the cabinet's internal control sensor to ensure accuracy.

⚠ Temperature sensor–mote pairs are not factory calibrated. Calibration is typically not required in non-validated environments.

Current Transducer (CT) Sensor Installation

The CT sensor is an amperage sensor that monitors the electrical current drawn by an asset. The mote is compatible with 2-wire split core CT sensors with built-in transient voltage suppression.

The color coding for CT is YELLOW.

⚠ CAUTION: The CT sensor must be installed by qualified technicians only. All units must be powered off, locked out, and disconnected from any power source before installation of the CT sensor.

⚠ Note: While the asset is powered off and disconnected, this is a convenient time to measure the outlet voltage using a multimeter. This voltage value should be added to the asset in TRAXX, where it is combined with the CT amperage readings to calculate energy usage. Record the voltage and enter it in the Volts field on the Edit Asset screen in TRAXX (see TRAXX User Manual at <https://www.klatunetworks.com/docs>).

1. Determine if the asset is rated for 115V or 208V.
2. Remove any panel(s) on the asset required to access the incoming power cord.
3. Find the area where the individual wires of the power cord have been exposed, immediately after the power cord enters the asset. The CT must be attached to the hot wire after it enters the asset, but before it interfaces with the control board of the equipment.
 - a. For 115V systems- there will be one ground wire (green), one neutral wire, and one 'hot' wire (colors vary). Install the CT clamp on the hot wire.
 - b. For 208V systems- there will be one ground wire (green) and two 'hot' wires (colors vary). The CT clamp can be installed on either hot wire.
4. To attach the CT:
 - a. Unlock the clasp and open the CT.
 - b. Carefully slide the CT around the hot wire.
 - c. Close the CT around the wire.
 - d. Make sure the clasp is securely closed.
5. Connect the CT wires to the SensorHub or SmartCable. See [SensorHub Wiring](#) or [SmartCable Wiring](#) for instructions.



Figure 27 – CT Clamp Installation Example

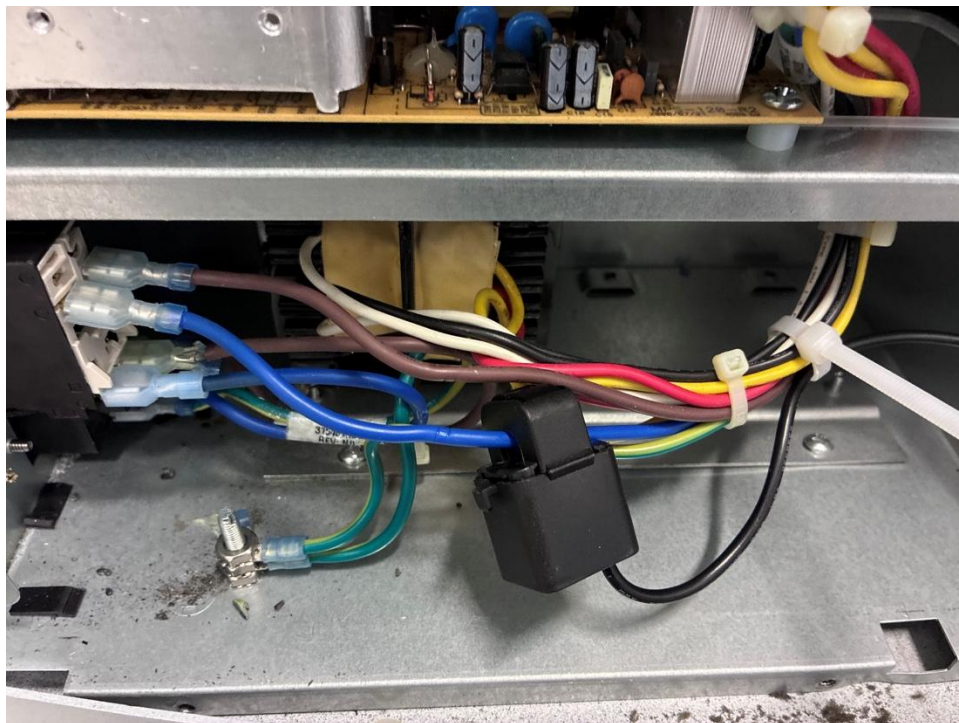


Figure 28 – Installed CT Clamp Example

Magnetic Door Switch Installation

The door switch assembly includes a magnetic sensor body (with lead wires), a threaded magnet, four locking nuts, and two sensor brackets with adhesive tape backing. For a more permanent installation, use Loctite® Epoxy Plastic Bonder in addition to the tape.

You will need alcohol prep pads to clean the surface before mounting.

⚠ CAUTION: Clean and dry all mounting surfaces thoroughly before affixing brackets. Dirty or wet surfaces will cause the adhesive to fail.

⚠ CAUTION: When the door is closed, the two magnet faces must be separated by no more than 0.1 inch (2.54 mm) and must never touch.

1. Determine a mounting location that does not interfere with normal operation.
2. Before removing the tape backing, simulate the installation and verify magnet alignment:
 - Brackets should face each other if possible, but can be mounted perpendicular as long as the magnet gap requirement is met.
 - Adjust horizontal gap by threading the nuts in or out. Adjust vertical position using the bracket slot.
3. Hand-tighten the locking nuts to secure the magnets. Do not overtighten.
4. Clean and dry the mounting surfaces with alcohol.
5. Mount one bracket to the asset door — press firmly for 30 seconds. Top of door is recommended.
6. Mount the second bracket to the asset body — press firmly for 30 seconds.
6. Run the door switch wire to the mote and connect to the SensorHub or SmartCable-DI. Wire polarity does not matter. See [SensorHub Wiring](#) or [SmartCable Wiring](#) for instructions.

⚠ Note: Up to two door switches can be connected to a single SensorHub or SmartCable-DI. Note which sensor number (1 or 2) corresponds to which door, as this will be reflected in TRAXX

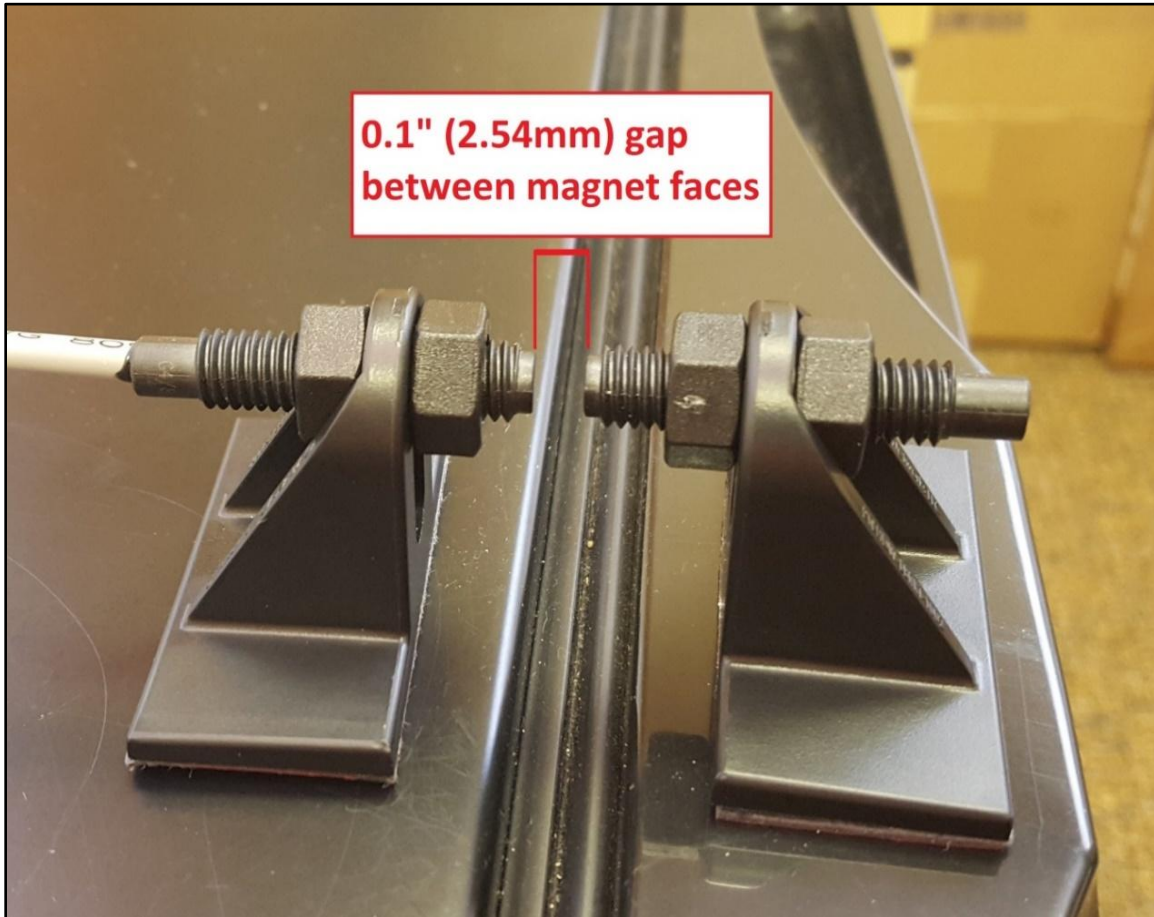


Figure 29 – Magnetic Door Switch

Vaisala Probe Installation

TRAXX supports two Vaisala RS-485 probe types:

- **Vaisala GMP251** — CO₂ probe (CARBOCAP® technology, 0–20% CO₂ range)
- **Vaisala HMP** — Temperature and humidity probe (reported as two separate sensor channels in TRAXX)

Vaisala probes connect to the mote via a **SensorHub RS-485**. Each SensorHub RS-485 supports up to two probes across its two channels. The channel assignment for each probe type is configured in the mote UI and either probe type can be connected to either channel.

Probe Placement

For probe placement guidelines — including positioning recommendations, mounting accessories, and environmental considerations — refer to the Vaisala probe documentation supplied with the probes.

⚠ Do not route the probe cable through the door of the cabinet.

⚠ Avoid routing the probe cable anywhere it may be pinched or damaged by product movement inside the cabinet.

Wiring

Vaisala probe cables terminate in bare wires. Connect the cable wires to the appropriate channel terminals (485-1 or 485-2) on the SensorHub RS-485. See [SensorHub](#) for terminal pin assignments.

Route any excess cable down the exterior of the cabinet and secure it so it will not be disturbed during normal operation.

The Vaisala probe gets power from the SensorHub via RS-485. No need for an independent power source.

Verification

Once the mote is physically installed, sensors are connected, and the mote has been authorized by KLATU Support, verify that data is reporting correctly in TRAXX.

- Confirm the mote appears in TRAXX and its status is online.
- Confirm that all expected sensors are listed and reporting readings.

Once data is confirmed, the asset is ready to be configured in TRAXX. Be sure to make note of the mote MAC address that will be associated with the asset. See the [TRAXX Software User Manual](#) for instructions.

Contacting KLATU Support

You can reach KLATU customer support via:

- support@klatunetworks.com
- (206)420-6614
- klatunetworks.com/support

Appendix A — Safety & Regulatory

⚠ TRAXX hardware and software must be installed by qualified technicians only.

⚠ It is recommended that all AC powered devices be connected to a UPS backup power supply, in addition to any backup power sources that may already be in place.

⚠ Safety Instructions:

Do not use this product for protection or as part of an automated emergency system or for any other application that involves protecting people and/or property. Customers and users of KLATU Networks products are responsible for making sure that the product is fit for the intended usage. Do not open the product enclosure except when performing an approved battery replacement procedure. There are no user-serviceable components inside the device other than the battery. Do not disassemble, modify, or attempt to repair internal components. If the device shows signs of improper operation, disconnect it immediately from its power source and contact KLATU Networks technical services.

⚠ Electrical warning for devices with AC adapter:

When using a TRAXX product with a PoE (Power Over Ethernet) or AC/DC adapter, always use the specific adapter provided by your supplier (same brand, same product reference). Do not open the adapter yourself and do not dismantle internal components or modify them in any manner. The adapter does not contain any user-reparable parts. If the adapter shows any sign of malfunction, unplug it immediately and contact KLATU Networks for repair or replacement. Do not connect the adapter to a device or peripheral other than the TRAXX product for which it was intended. Unplug the power cable from the electrical outlet when the adapter is not in use. Do not cause a short circuit with the electrical plug. Do not force either the AC or DC plug. Before removing the connector from any TRAXX hardware devices or unplugging power cables, first unplug the cable from the power outlet. Do not subject the adapter to physical shock, which could cause serious malfunction or damage. Do not use or place the adapter in a wet or humid location. This adapter is not waterproof.

⚠ Intended Use:

- The system will collect, store, and provide analytical data. The data analytics collected from multiple assets (fleet) will provide the operator with supporting data for efficiency and cost reduction recommendations.
- To monitor the performance of the asset to meet the asset's intended use and assess overall health using trending analysis from baseline and other comparable units.
- Temperature alarm feature is for reference only and it is not intended for specific application requirements for critical sample protection, nor can it be used as a substitute for monitoring the critical temperature performance.

⚠ For reference only:

- The system will monitor overall asset health, detect and alarm on asset malfunction and degradation.
- Service vs. buy decisions
- Remote system health monitoring and troubleshooting for service providers.
- It is not stated nor implied that the system will uplift the intended use of the asset.

Battery Warning:

Some TRAXX products contain a lithium battery. Make sure you observe polarity (+/-) when inserting batteries into TRAXX devices. Reversing polarity by inserting the batteries incorrectly can cause the product to heat up and may lead to a battery liquid leak. Use only batteries recommended by KLATU Networks. Do not change battery types, such as alkaline and magnesium, or use batteries of different brands or even different types of batteries of the same brand. Incorrect batteries may cause the device to heat up and may result in a fire or battery liquid leakage. Please properly dispose of batteries. Never dispose of batteries in a fire. Do not charge regular batteries that are not specifically rechargeable. When batteries are low, or if the battery-operated device in question remains unused for a long period of time, remove the batteries from the device to avoid any risk of battery liquid leakage. Never leave batteries within reach of children. In case of a battery leak, avoid all contact with the liquid present on the batteries. Rinse with clear water immediately if the battery liquid comes into contact with the eyes, mouth or skin. Contact a doctor or emergency service immediately. Battery liquid is corrosive and can damage vision, or cause blindness or chemical burns.

- The TRAXX PiPerXS 4B Mote contains a Li-Ion battery which IATA regulations require be shipped via ground.
- As an additional safety precaution, the battery charge is limited to 40% - 65% of its capacity for shipment.
- Charging cycles and charge current are managed by a Power Management System (PMS). The charge rate is determined by system load, ambient temperature, battery temperature and battery charge state.

Battery Operating Temperatures

- Operating Temperature: Min 0°C; Typical 25°C; Max 40°C
- Storage and Shipping Temperature: Min -20°C; Typical 25°C; Max 45°C

Recommended maintenance and PM intervals for Li battery:

- Recommended to change the mote's back-up battery two (2) calendar years after installation.

Environmental operating limits:

- The mote is designed and intended for reliable operation at normal indoor ambient temperature and humidity.
- Motes and sensors shall not be placed in environmental conditions beyond recommended specifications.
- Neither the mote nor any sensors are submersible.
- Operating temperature range: 0°C to +40°C

- Operating humidity range: 0 - 85%RH, non-condensing

⚠ Environmental protection:

- Please respect local regulations concerning disposal of packaging, unused wireless devices and their accessories, and promote their recycling.

⚠ Disclaimer and limitation of liability:

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**FCC Compliance
Supplier's Declaration of Conformity
47 CFR § 2.1077 Compliance Information**

Unique Identifier: PiPerXS 4B Mote

Authorized Components Used in Assembly: Raspberry Pi 4B Module, FCC ID: 2ABCB-RPI32, IC ID: 20953-RPI4B

FCC Compliance Statement:

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:

KLATU Networks, Inc.

PO Box 315

Poulsbo, WA 98370

(619) 684-3115

www.klatunetworks.com

This product contains a Raspberry Pi 4 Model B (FCC ID: 2ABCB-RPI4B).

For compliance information, visit <https://www.raspberrypi.com/for-industry/compliance/>