Invisible Systems

Installation Guide: T-Series - Precision Temperature Sensor

2024

T-SERIES: Precision Temperature Sensor Installation Guide for Internal & External Installations

ISL-PRO-015-IG16

Introduction

This installation guide will walk you through the process of installing T-Series precision temperature devices both externally and internally into refrigerators. T-series sensors are commonly used for accurate temperature measurement, and this guide will provide a visual representation of a professional and tidy installation as well as ensuring essential software is set up such as customer dashboards on Realtime Online aka RTO.

ESSENTIAL SOFTWARE CHECKLIST:

Before starting the installation, the first port of call is to ensure that the customer's dashboard has been set up correctly on www.realtime-online.com. This will be carried out by the real-time online experts at Invisible Systems in advance of arrival on site. RTO feeds from IoT, or the Internet of Things, which refers to the collective network of connected devices and the technology that facilitates communication between devices and the cloud, as well as between the devices themselves. In short, the customer can view their temperature devices live from anywhere in the world without the need to refresh internet pages for the latest data.

Essential tools & consumables checklist:

Please ensure you have the following tools and consumables before arriving at a site, we use Screwfix for consumables so please see product codes for fast ordering in-store.

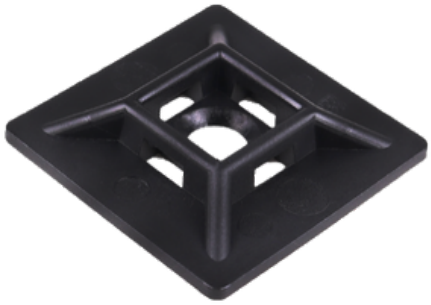
Velcro stick on tape 5M x 50mm (4419P)

Bosch cordless screwdriver (218PX)

Side cutters ‘Snips’ (9330V)

Sharp Scissors (1316V)

Cable ties Small (31536) & Large (96830)



Cable tie base 25mm x 25mm (80760)

Powering on unit

Upon arrival to a site, you must power on all the units, all T-series are sent out in sleep mode to save battery life and avoid alarms being sent based on the alarm configuration. To do this please remove the four screws on the rear of the unit and carefully remove the lid. Press the button shown below and you will see the LED flash Green located next to the battery as shown, it is good practice to press this a few times and see the LED pulse. Should the LED flash amber or not at all, the unit has not woken up correctly therefore a couple of checks need to be done which we discuss in the troubleshooting section next.

Troubleshooting

In the rare event of the LED not flashing or issues with connecting with RTO use this section for basic troubleshooting on simple fixes to the most common issues.

During transit sometimes batteries can become loose or come away from the terminal connectors due to poor handling of parcels.

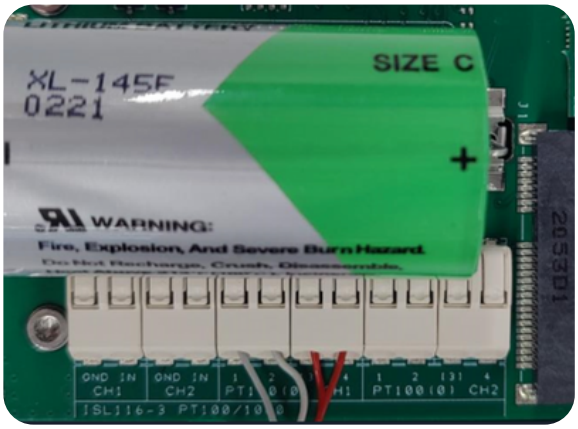
Check the battery is firmly inserted into the terminal block by gently manipulating the battery, if a poor connection is established the LED will flash. Check that the silver terminal block is undamaged on the PCB board and the wiring coming from the battery is firmly inserted into the connectors.

If you have a positive flash of the LED but on RTO the unit is still showing “invalid Date” after ten minutes as shown below then proceed to the next section for some basic checks.

Troubleshooting Cont.

Sometimes the probe's wiring is not making a firm connection into the connector gate. Firstly, visually check this area and ensure the wires are wired in “CH1” and that no exposed wiring can be seen.

Gently pull at the wires to ensure they have been gripped by the gates and if any doubt use a precision flat blade and press down the gate to release the wiring as shown below. These blocks are extremely delicate and extreme care must be taken as shown below to prevent breakage.



When these checks have been carried out, please repress the rest button as shown above (NB the button located at the bottom of the PCB is to program the unit and should not be pressed, only the reset button located at the top left-hand side of the PCB should be used) you should now see the LED flash green.If the LED flashes amber or not at all then the unit will need to be returned to Invisible Systems for investigation and possible replacement.

External installation

For external installs the T-series will have either a 2MTR or 4MTR probe cable, this will be identified by a site survey carried out by Invisible Systems. We recommend working backwards and installing the probe in its final position first as this means at the end you can wind the excess flex of the cable easily and tidy the job leaving a professional finish.

Start by placing the probe inside the fridge shelving rack as close to the centre as possible, bend the probe into the position shown below and secure using cable ties.

Then proceed to secure using more cable ties so it looks as follows, use cable bases to keep the internal wiring professional.

Cut and affix a small section of the heavy-duty Velcro and attach it to the T-series ensuring the serial number sticker is not impeded to either the side of the top of the fridge.

As you pull the probe wiring outside ensure the cable is kept tight so the finish has little to no slack. Our preferred set-up is the side of the fridge, but in some cases, the side is too close to an adjacent cupboard, in this instance please similarly mount to the top.

Preferred installation

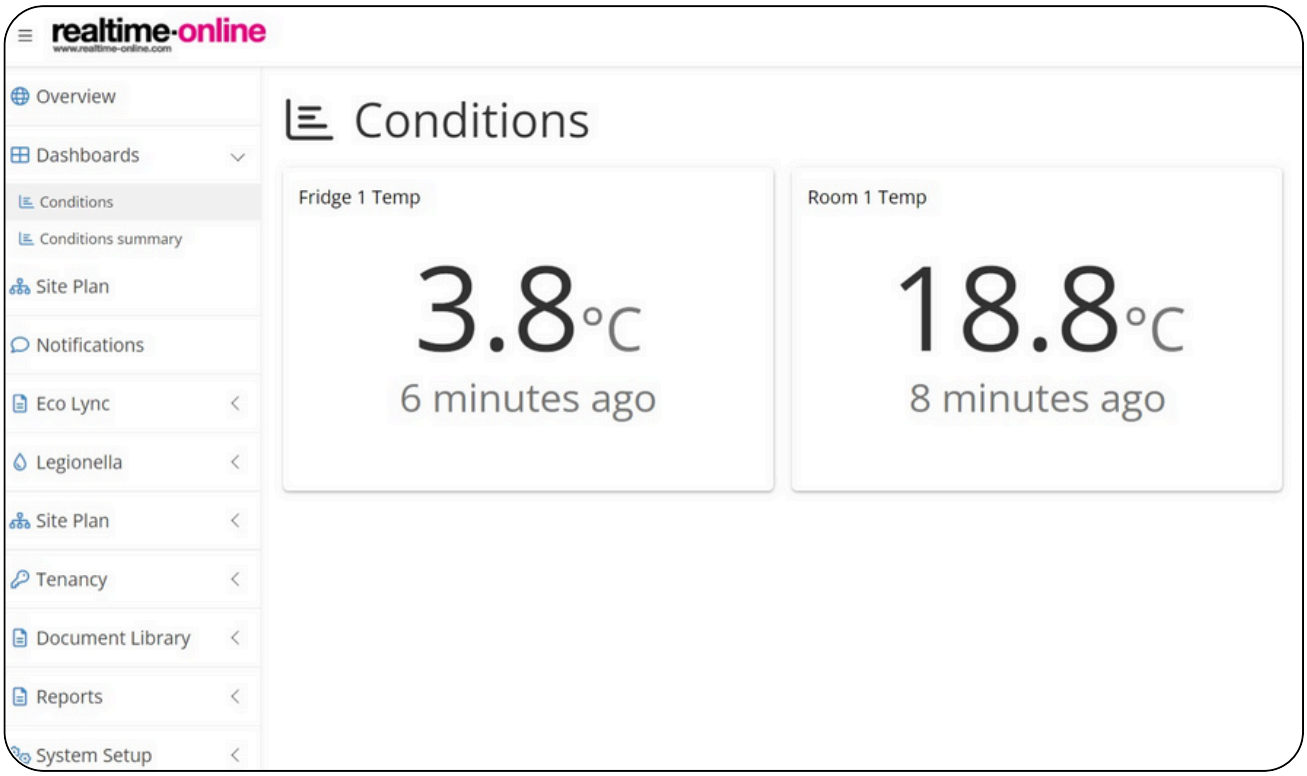
Top Installation

Following this hardware installation guide will ensure a fast and Professional installation for all installs on-site. If you have any questions or encounter any issues not shown, then please contact either Chris Body (Senior Engineer) or Andy Pickering (Field Engineer) for on-site troubleshooting and fault finding. The final section of this guide centres around the correct operations of our IoT reporting software called “Real-Time Online“.

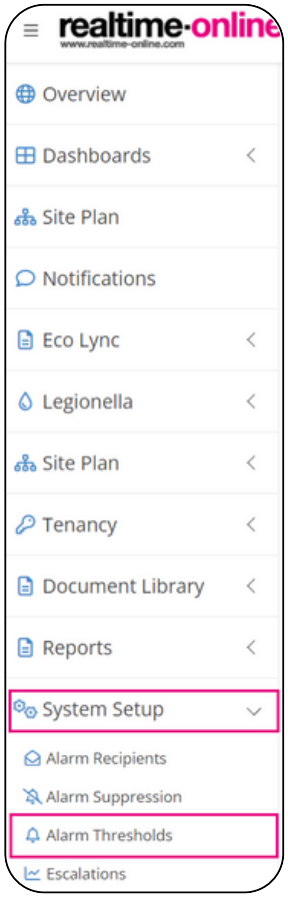
Real-Time Online final checks

Upon completion of the installation of the T-Series hardware, please head over to the client's dashboard using your Real-Time Online login to check that data is being received. In the examples below we will show you some basic troubleshooting and how the dashboard should look if correctly populated.

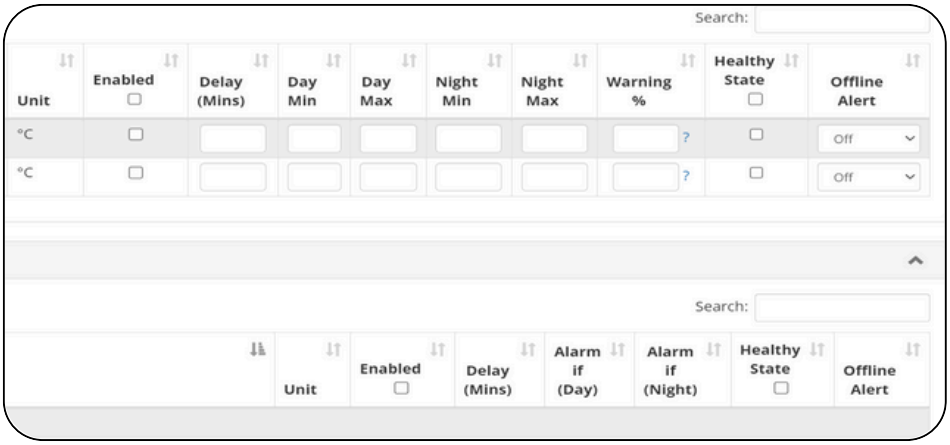
If you see the temperature readings shown below in white with no colours on the reading boxes, in this example “Fridge 1 Temp” and “Room 1 Temp” then this means the minimum and maximum alarm thresholds have not been set correctly and will need adjusting



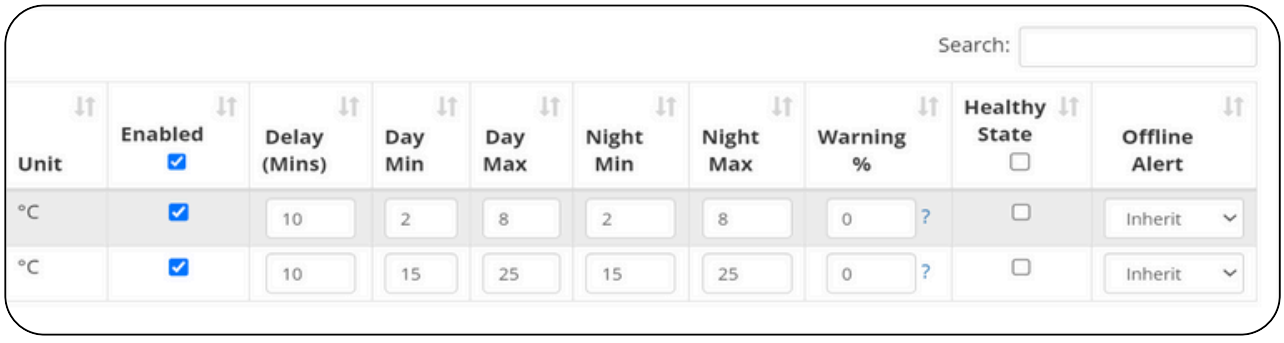
Real-Time Online final checks



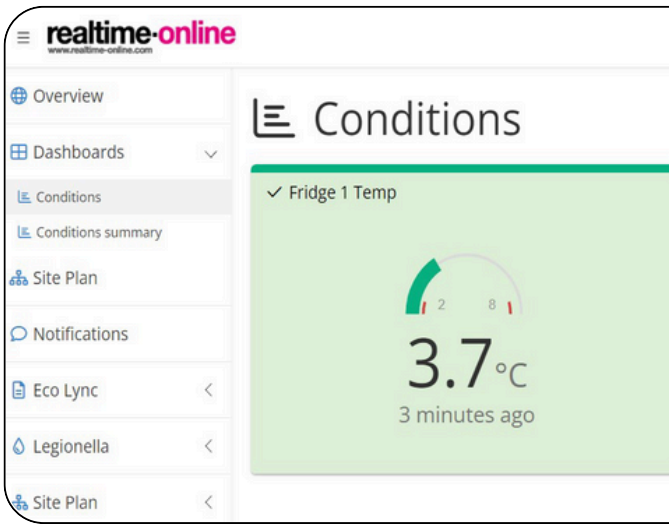
From the menu, select “System setup” and then select “Alarm thresholds” from the popup menu to be taken to the setup page. On this page, you will see that the following section is not populated with any data and is causing the issue from the above step.



Alarms should be enabled, shown by the blue tick boxes, the “Delay” is set to a default time of 10 mins, Fridges by default are set to a minimum of 2°, maximum of 8°, and Rooms are set to 15° min and 25° Max. Repeat for Day & Night. Add “0” to the “warning %” field and set “Offline Alert” to “Inherit” in the dropbox, then hit “Save All”

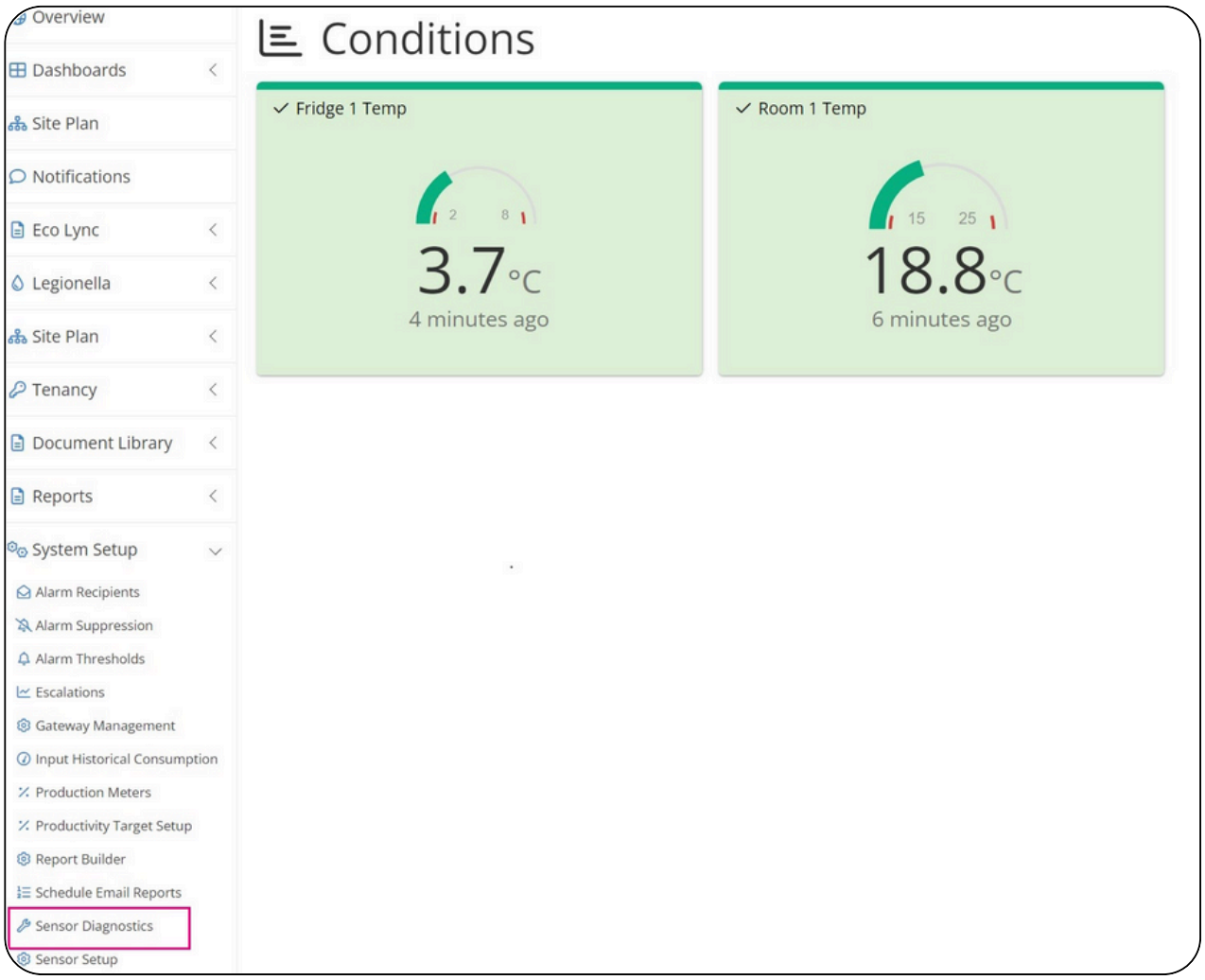


From here you can click conditions on the top left of the menu inside of the “Alarm Thresholds” page to return to the conditions page where you will see the T-series sensors installed, fully populated with colours signifying the alarm thresholds are now set correctly. NB the only sensor you will never do alarm thresholds for is any sensor named “External”, as this sensor is simply to monitor the weather for companies who require this condition as a part of their installation.

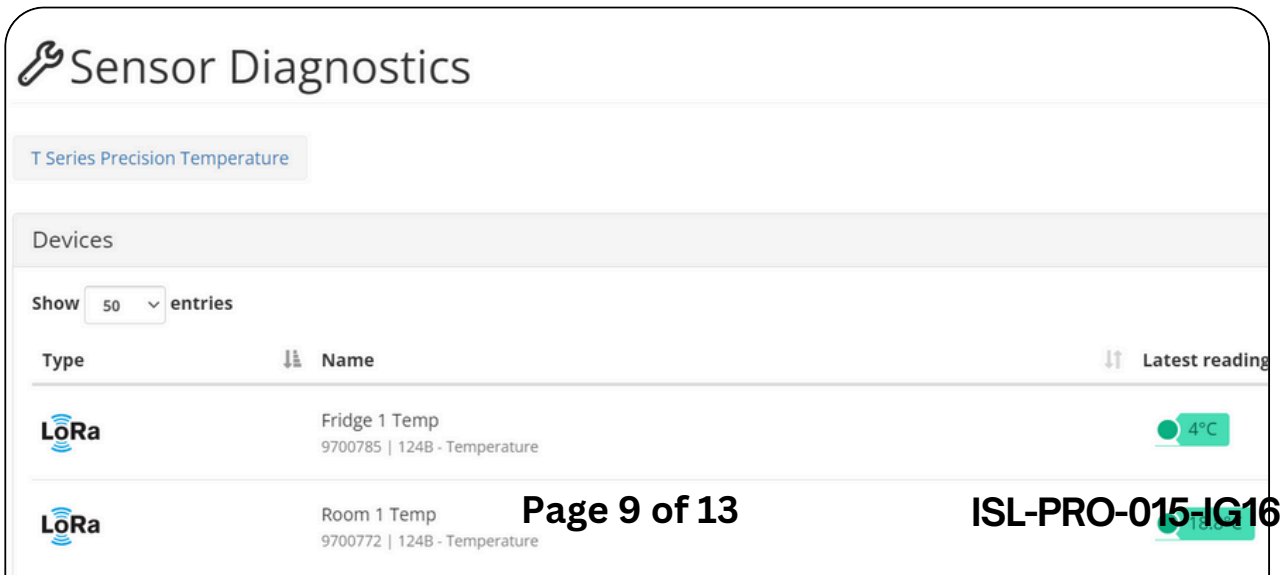


Real-Time Online final checks

Signal issues can arise from time to time on site and they can range from environmental, density of building contents, and in some rare cases units that have become faulty during transit. To check for this, the fastest way would be to head to the sensor diagnostics page, select “System Setup” then “Sensor diagnostics”

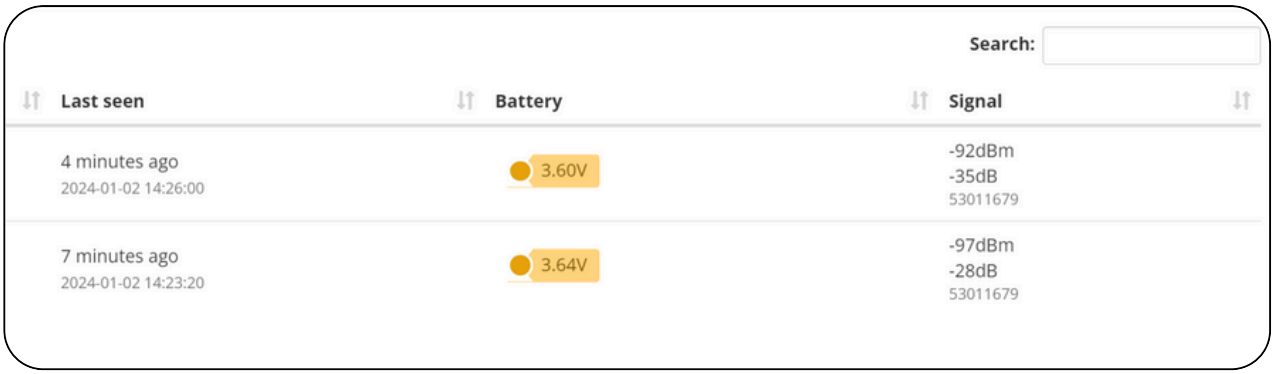


On the first section of the page, you will see RF Type “LoRa” or it could be “LoRaWAN”, Device name, serial number, Type of Device in this example “124B Temp” and the latest reading posted.



Real-Time Online final checks

And the second section you will see the last posted time, Battery level (This should always be above 3.5V) and the signal strength. As a rule of thumb the signal strength should never be above 100dBm, above this threshold will cause issues with lost data packets due to poor signal. If you see this above 100dBm we could need to install an additional Gateway or move an existing one, if the site is large and or dense with contents and this should be flagged to ISL during the installation for technical assistance.



Gateway installation

ISL uses two gateways for our sensors and we now show you both units and brief to ensure operation and how to identify these units. We have mains powered, and mains with battery backup.

LORA ULTRA RF GATEWAY

This is the Lora Gateway the ISL supplies to clients, ISL has moved towards the more modern LoraWan, so these types of gateways will slowly to start phase out for instals. When you arrive at a site please ensure that you explain that the unit will be taking a plug socket permanently and that it cannot be unplugged.

When plugged in the underside LED will illuminate green to show it has power and is now operational. If you have connectivity issues, then you can remove the screws on the front and find the GSM module, where you will see a LED next to GSM, please ensure this is a solid green light.

Next, we have the modern MultiTech LoraWan Gateway, which is the commonly installed Gateway for new ISL installations. The range and collection of data from all of our devices are greatly improved with a seven-minute data collection rate compared to ten minutes on the previous version.

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When you arrive at a site please ensure that you explain that the unit will be taking a plug socket permanently and that it cannot be unplugged. On the rear of the unit, 3 LEDs will illuminate green in series. 1) “Status” will flash and then become a solid LED. 2) “Lora” will flash and then become a solid LED and finally 3) “Cell” will pulse. When you see the first two LEDs solid and the final LED pulsing you will know the unit is ready for operation.

Revision No.	Revision history	Approval & Role	Date
1	Original issue	Barry Felton Quality & Compliance Manager	8/4/24