Single / Dual Channel Battery Powered Transmitter

Reference Manual

Models:

DESCRIPTION	PART NUMBER
Single Channel transmitter with internal temperature sensor	P2-WS201-FREQ-R
Single Channel transmitter	P2-WS202-FREQ-R
Dual Channel transmitter	P2-WS203-FREQ-R
Single Channel transmitter, EXTERNAL antenna	P2-WS202-XANT-FREQ
Dual Channel transmitter, EXTERNAL antenna	P2-WS203-XANT-FREQ

*-FREQ: 0868, 0915 & 2400 for 868MHz, 915MHz & 2.4GHz

*-R Roaming transmitter

tek-troniks

Safety Information

⚠ WARNING

Read this manual before working with the product. For personal and system safety, and for optimum product performance, make sure to thoroughly understand the contents before installing, using, or maintaining this product.

⚠ WARNING

The battery must be disposed of in accordance with your local laws & regulations, or ship to the supplier in the new battery packaging.

Replace the battery with the same part number as the type originally installed.

CAUTION RISK OF EXPLOSION IF BATTERY IS REPLACED BY INCORRECT TYPE

Do not dispose of the battery in a fire, the battery may explode. Do not open or mutilate the battery. They contain an electrolyte which is toxic and harmful to the environment and to the skin and eyes

⚠ WARNING

Inspect the product for damage after unpacking. If the product is damaged during normal operation and you are unsure of its operational performance, switch-off by removing the battery. Contact the system supplier for assistance.

This unit contains **NO** serviceable parts and should be returned to the manufacturers or agent if inoperative.

⚠ WARNING

Service and maintenance should only be carried out by suitable qualified personnel only. Normal safety precautions and good working practice should be observed; to prevent damage or injury at all times.

⚠ WARNING

Transmitters and the D3 family of monitoring systems must not be used in life support, critical care, medical, safety equipment, or similar applications where product failure could result in loss of life or personal or physical harm. The systems can be used for environment monitoring to gain performance data but must not be used as a primary alarm system.

NOTICE

Shipping considerations for wireless products containing lithium-thionyl chloride battery.

The unit is shipped with the transmitter “Not paired” and with a battery isolation strip to prevent power to the transmitter. Each transmitter contains a single AA lithium-thionyl chloride battery (See specifications for further details).

Primary lithium batteries are regulated in transportation. It is the responsibility of the shipper to ensure compliance with these or any other local requirements. Consult current regulations and requirements before shipping.

NOTICE

Please see section 6, Certifications and Approvals for any restrictions on installations in the required territory.

NOTICE

The transmitter is shipped with a battery isolation strip to prevent the transmitter powering up during transit. Remove the isolation strip before use.

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If you have issues, comments, or questions about specific information or procedures, please include the title and, if available, the part number, the revision, the page numbers, and any other details that will help us locate the subject that you are addressing.

1. Contents

2. Introduction

2.1. Overview

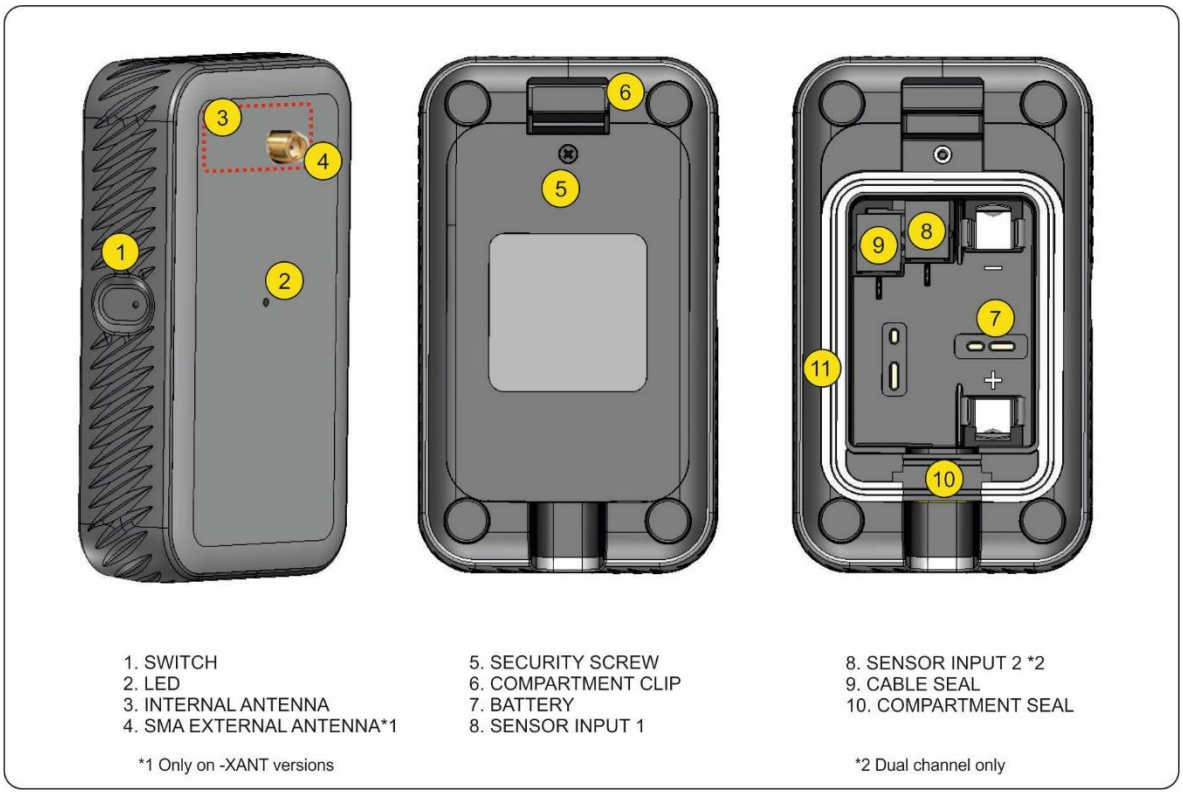
The transmitters connect to the TekTroniks wireless sensor network. Transmitters are available in both single and dual channel versions and different frequencies depending on the territory of the installation.

Transmitters are compatible with our range of intelligent sensors which connect to the internal RJ connectors. Sensors are available to measure almost any environmental condition either directly, or by using third party specialized equipment with a 4-20mA or voltage output.

The radio transmitters are battery powered and can supply power to the transmitter and sensor for in excess or five years based on normal use. Batteries are user replaceable by removing the rear cover.

Each transmitter contains a high intensity LED and test switch providing local indication of connection to the network.

The transmitters will sample the reading from the connected sensor once a minute and send to the base station for alarming and storage.



2.2. Ordering information

Transmitters can be supplied as both single or dual channel, with internal or external antenna and various frequencies. The table below lists the full part numbers for each transmitter variant.

Part Number	Description
P2-WS201-0868	Single channel transmitter with internal temperature sensor (868MHz)
P2-WS201-0868-R	Single channel transmitter with internal temperature sensor, Roaming (868MHz)
P2-WS202-0868	Single channel transmitter (868MHz)
P2-WS202-0868-R	Single channel transmitter, Roaming sensor (868MHz)
P2-WS202-XANT-0868	Single channel transmitter, External antenna (868MHz)
P2-WS203-0868	Dual channel transmitter (868MHz)
P2-WS203-XANT-0868	Dual channel transmitter, External antenna (868MHz)
P2-WS201-0915	Single channel transmitter with internal temperature sensor (915MHz)
P2-WS201-0915-R	Single channel transmitter with internal temperature sensor, Roaming (915MHz)
P2-WS202-0915	Single channel transmitter, Internal antenna (915MHz)
P2-WS202-0915-R	Single channel transmitter, Internal antenna (915MHz)
P2-WS202-XANT-0915	Single channel transmitter, External antenna (915MHz)
P2-WS203-0915	Dual channel transmitter, Internal antenna (915MHz)
P2-WS203-XANT-0915	Dual channel transmitter, External antenna (915MHz)
P2-WS201-2400	Single channel transmitter with internal temperature sensor (2.4GHz)
P2-WS202-2400	Single channel transmitter, Internal antenna (2.4GHz)
P2-WS203-2400	Dual channel transmitter, Internal antenna (2.4GHz)

Note: transmitters must operate on the same frequency band as the base station.

2.3. Roaming sensors –R

A roaming transmitter is a specific type of transmitter that is used in applications such as vehicle monitoring where the transmitter can be away from the base station for long periods (up to 30 days). When the transmitter is away (roaming), it logs the temperature internally and automatically uploads to the base station when it returns within radio distance.

The logging frequency can be set from 1 to 30 minutes allowing a maximum of 30 days of data storage.

2.4. One wire sensors

The transmitters use TekTroniks range of intelligent sensors. Each intelligent sensor integrates the sensing element, analogue front end, analogue to digital converter and digital processing to provide a linearised digital output. All of which are embedded into the sensor cable. Each sensor is provided with its own unique id.

Temperature and humidity sensors can be supplied calibrated directly from the factory.

2.5. Network Security

The data that is transmitted through the system consist of very small packets of data, typically in the region of 20-30 bytes. The data consists of network management data and sensor data. Network data is to keep the network up to date, enable devices to join while the sensor data provides real-time sensor readings together with status information such as battery usage.

The application protocol is specifically designed for low powered networks in industrial control and monitoring applications. All data in AES128 encryption to provide data security.

NOTICE

These transmitter do not use WIFI or any IP protocols and as such will only communicate with our base station. There is no network bridge, protocols or software that allows third party threats to use this network in order to gain access to the IP network connected to the base station.

2.6. Product recycling/disposal

Consider recycling equipment and packaging.

Dispose of the product and packaging in accordance with local and national legislation.

3. Operation

This section contains information on installing sensors, battery and pairing the transmitter to the base station and should be performed prior to installation.

3.1. Removal of rear cover

If the transmitter is attached to a magnetic wall mounting bracket, pull apart so that you can see the rear of the transmitter. Ensure that it is clean and wipe away any water/ surface moisture.

Removal

If the rear cover is fitted with an optional retaining screw (1) remove this first.

Hold the sensor housing firmly in one hand. Using the other hand firmly press the retaining clip (2) down and gently pull the cover away from the main body. The cover should hinge at the bottom (4) until it becomes free.

Replacement

Holding the cover at about 45degrees from the main body, insert the locating lugs (3) into the corresponding slots (4). Hinge the cover back into place while providing slight downward force to ensure the locating lugs remain in place. Once the cover is in place, hold the enclosure in both hands and use your thumbs to push firmly on the cover (5).

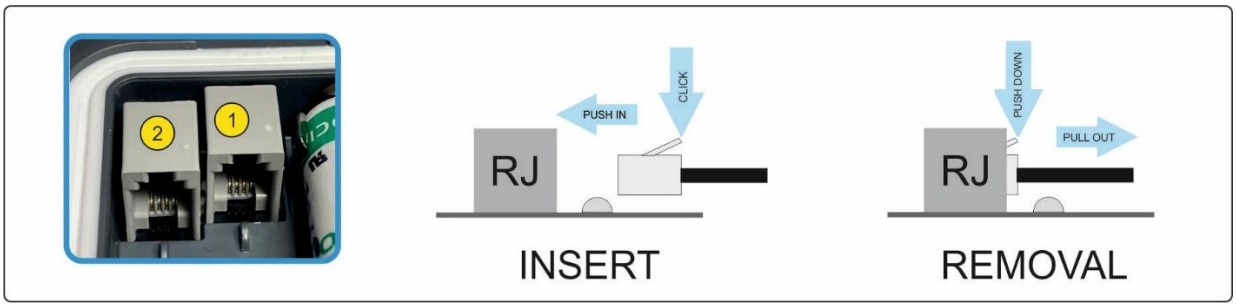
If required, insert the optional retaining screw.

3.2. Installing Sensors

The connectors for the sensors are located in the rear compartment. See section 3.1 for removal of the rear cover. The image below details a dual channel configuration, for single channel versions, RJ socket (2) is not present.

To insert the sensor simply align the plug in front of the socket and push in until a click is heard. Tug lightly on the cable to ensure that it is located correctly and held in place.

To remove the sensor simply push down on the small leaver while pulling out the cable.



Transmitters are provided with a rubber cable seal to help reduce water ingress when using external sensors.

The seals have a cut along the hole to allow it to be positioned over the cable (1). Once attached maneuver the seal into position (2) so that the ridges on the casing (3) match the ridges on the seal. Once aligned, press firmly into place.

3.3. Internal sensors (P2-WS201)

P2-WS201 transmitter variant is supplied with an internal temperature sensor. The sensor plugs in to the internal RJ socket and simply curls round into the rear compartment. The cable seal is replaced with a solid bung.

3.4. Battery Installation / Replacement

The battery is located in the rear compartment. See section 3.1 for removal of the rear cover.

With the rear cover removed carefully remove the battery from the sprung mounting clip by pulling the battery backwards away from the clip.

Once the battery is removed, leave the sensor for 60 seconds to drain any internal capacitance.

Place the new battery in the mounting clip with the positive terminal matching that shown on the image opposite.

NOTICE

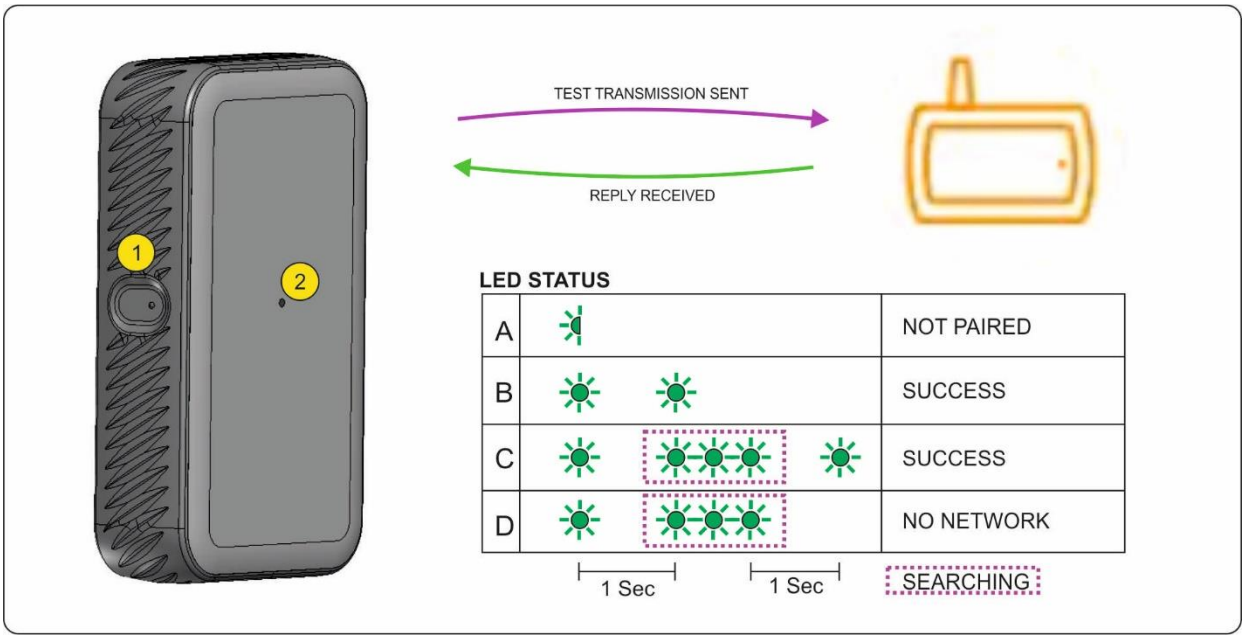
Only replace battery with the same type.

Battery details	
Manufacture	: Saft
Type	: Lithium Thionyl Chloride, 2450mAh, 3.6V, AA Cell
Part Number	: LS14500
Battery Life	: 5 years + (in normal operation)

3.5. Side button / Test mode

A button located on the left side of the transmitter (1) provides functionality for both sending a test transmission and initiating the pairing process.

A single button press initiates the test mode. The transmitter will send out a test signal and wait for a response. The status LED (2) is used to indicate the response.



A single short flash (A) indicates that the transmitter is not paired.

An initial single long flash indicates that the transmitter has sent a test signal. If this is followed by a second long flash (B) then the transmitter successfully received a reply.

If the transmitter does not receive a reply, it will start searching for a network, indicated by rapid flashing of the LED.

At the end of the rapid flashing, if the transmitter connected with a network and received a reply it will display a further single flash.

If the transmitter was unable to detect a network, move closer to the base station and retry.

NOTICE

If the button is held for 5 seconds to initiate the pairing process without initiating the pairing process on the corresponding base station, the transmitter will clear and previous pairing resulting in data not being sent to the base station.

3.6. Pairing to a base station

A transmitter has to be paired with the base station before use. The user should be familiar with the base station pairing process and will need administration rights. See the base station user manual for further information.

For the pairing to be successful, the pairing has to be initiated on both the base station and the transmitter and the transmitter needs to be within radio distance of the base station.

Follow the following steps.

1. Press and hold the side button on the transmitter. After about 5 seconds the LED will show green. **Keep the button depressed**.
2. Click the join transmitter key on the link manager. You should then see a countdown.
3. Release the side button.

The LED on the transmitter will flash as it is pairing with the base station. A series of rapid flashes indicate the transmitter is establishing a connection. After the connection is complete, a further single one second flash will indicate that the join has been successful.

NOTICE

After joining a single press of the side button will perform a network test. See section 3.5.

4. Installation

The information in this sections covers the installation considerations on mounting and siting the product for best operation.

NOTICE

Do not place device near or above a heat source or any device which could cause overheating.

NOTICE

Do not position equipment so that it is difficult to operate.

NOTICE

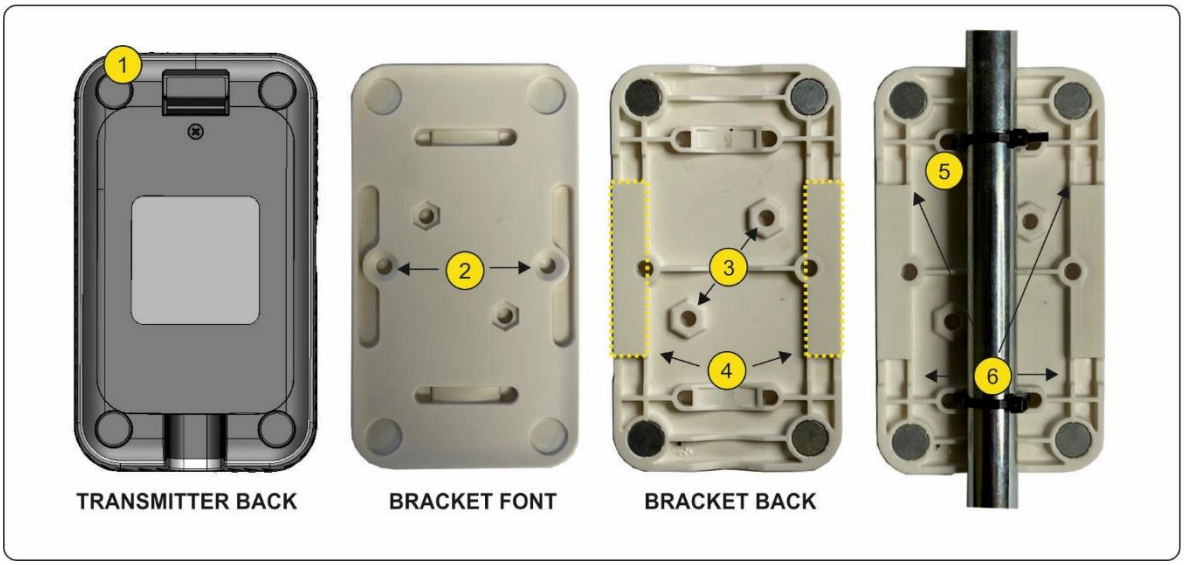
Install all equipment in conformity with the technical specifications given in this documentation.

4.1. Mounting

The transmitter has magnetic feet (1) and can be directly mounted onto a metal (ferrous) surface or magnetically onto the mounting bracket. The bracket caters for various mounting options;

- Mounting holes (2) for securing onto a wall or flat surface with screws.
- Nut holes for magnetic mounts (3).
- Flat areas (4) for double sided tape or pads for mounting onto a flat surface.
- Holes for cable tying onto poles or racking (5).

Additionally, Slots (6) to allow the transmitter to be cable tied to the bracket.



4.2. Transmitter placement

For best possible operation of the radio transmitter, consider the following placement guide when mounting a transmitter.

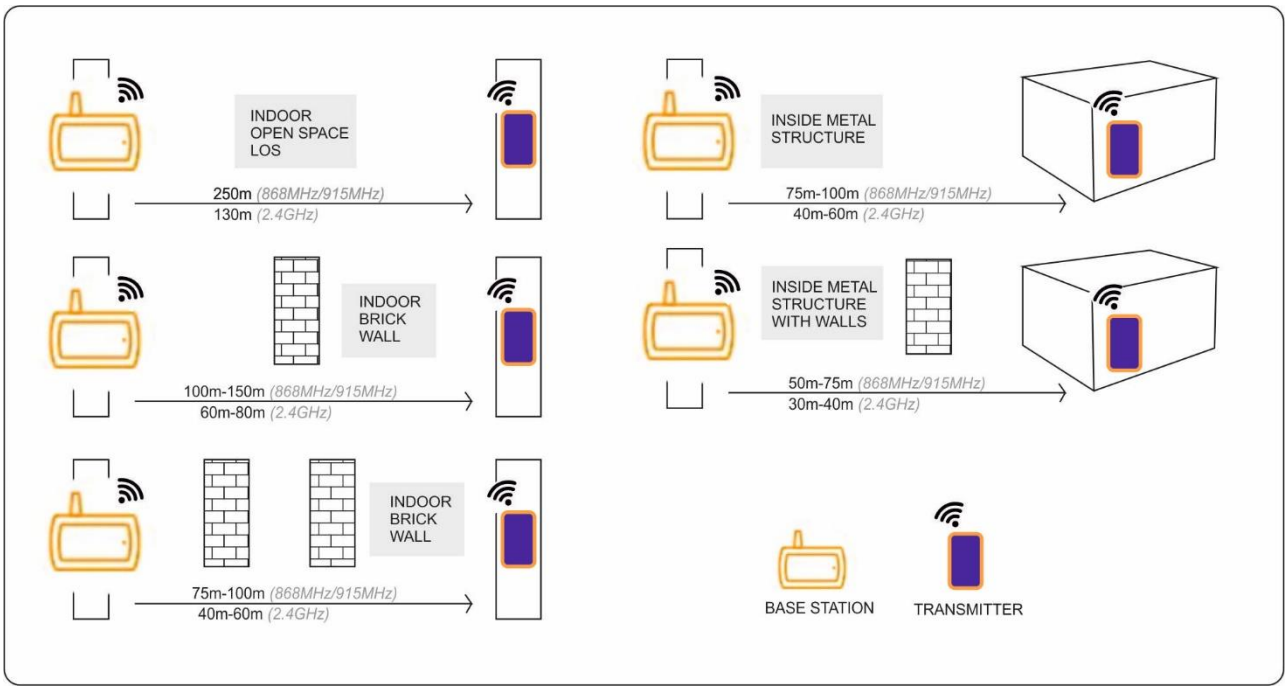
- Mount vertically
- Where possible place the transmitter with the antenna in about 20cm of free space.
- Keep the antenna away from mains cable or LAN communication cables.
- Keep away from noisy electrical items such as PC's, monitors and printers.
- If possible mount externally of metal enclosures or metal clad rooms.

NOTICE

Mounting in any of these location will not mean the transmitter will not work, it may just attenuate the signal resulting in the transmission distance being reduced.

4.3. Transmission distance

Transmission range depends on a number of factors most of which are not under the control of the installer. The following table provides a guide for the typical range to expect. Transmitters with external antennas can typically increase transmission distance by 25%.



For large installations or with lots of internal wall or structures, routers can be added to expand the operating distance of the transmitters.

4.4. Ingress Protection

The enclosure is rated to IPX5 which means it has been tested against low powered jetting water from any direction (internal antenna only).

The testing was completed with the rear cover screw in place and is necessary to achieve compliance. The screw helps maintain a constant pressure to hold the rear cover against the internal seal.

To further enhance the water ingress protection and to increase the life of the seal it is recommended to use a silicone O-ring grease around the seal of the rear compartment.

For harsh environments such as wash down areas it is always recommended to use an IP68 rated enclosure.

If the enclosure is not located within a wet environment then it is not necessary to use the screw.

5. Troubleshooting

Problem	Possible solution
Not pairing	☑ Ensure you are within 1-5m of the base station. ☑ Replace battery.
Button not responding	☑ Replace battery.
Intermittent communications	☑ Check quality and signal strength on base station and if necessary add router. ☑ Replace battery. ☑ Check transmitter placement. See 4.2.
Sensor showing FLT	☑ Ensure sensor cable is correctly attached.
Sensor showing O/C	☑ Replace sensor.
Sensor showing S/C	☑ Replace sensor.
Sensor showing No Reading	☑ Check communications. See 3.5 ☑ Check transmitter is paired. See 3.5 ☑ Ensure sensor cable is correctly attached.

6. Certifications and approvals

The transmitters are available in three different frequencies models depending on the territory they will be operated in. Ensure the correct system has been ordered to meet the approvals and radio power requirements for the territory the systems will operate within. If you are unsure please contact your supplier for assistance.

6.1. 868MHz

The 868MHz system is designed for operation in the UK and Europe.

CE UKCA

6.2. 915MHz

The 915MHz system is designed for operation in the US and Canada.

FCC

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

Contains Transmitter Module FCC ID: ZAT-1312PSIP-1

ISEDC

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference.

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence.
L'exploitation est autorisée aux deux conditions suivantes :

(1) L'appareil ne doit pas produire de brouillage;

(2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

CAN ICES-3(B)/ NMB-3(B)

Contains Transmitter Module IC: 451H-1312PSIP1

Radiation Exposure Statement

This equipment complies with FCC/IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

6.3. 2.4GHz

FCC

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.

Contains Transmitter Module FCC ID: QOQMGM12P3

ISEDC

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

(1) This device may not cause interference.

(2) This device must accept any interference, including interference that may cause undesired operation of the device.

Contains Transmitter Module IC: 5123A-MGM12P3

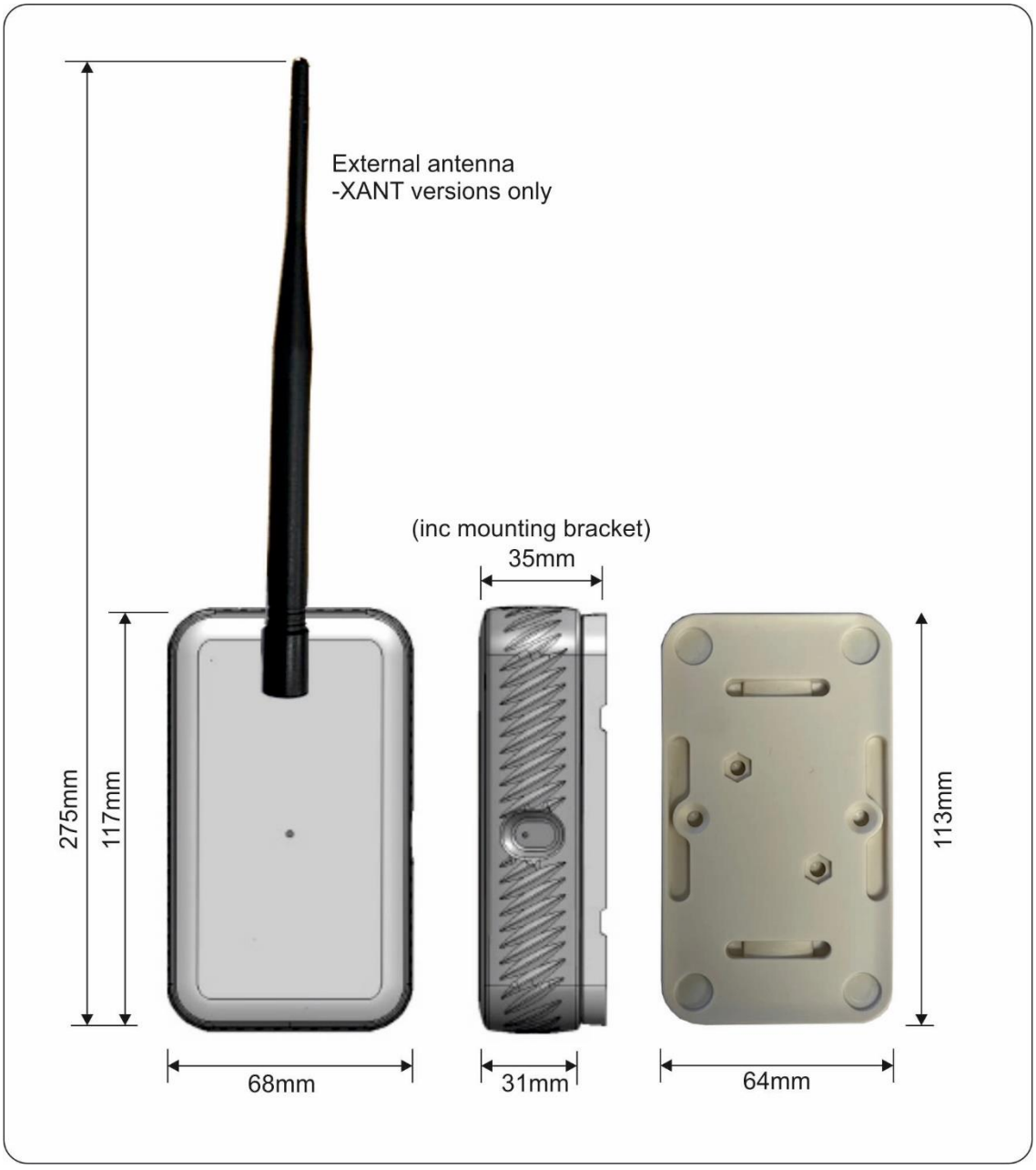
Radiation Exposure Statement

This equipment complies with FCC/IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 35mm between the radiator & your body.

7. Operational Specification

Power		
Battery operated	Replaceable Saft LS14500, 2450mAh, 3.6V, AA Cell.	
Battery life	>5 years in normal operation.	
Connections		
Sensor inputs	TekTroniks intelligent sensors.	
Wireless 868MHz		
Frequency bands	868MHz	
Output power	<14dBm	
Range	1km (outdoor LOS)	
Wireless 915MHz		
Frequency bands	915MHz	
Output power	<14dBm	
Range	1km (outdoor LOS)	
Wireless 2.4GHz		
Frequency bands	2.4GHz	
Output power	10 & 17dBm dependent upon region.	
Range	250m (outdoor LOS)	
Environment	**Internal Antenna**	**External Antenna**
Operating Temperature Range	-10°C to +55°C	-10°C to +55°C
Storage Temperature Range	-20°C to +65°C	-20°C to +65°C
Environmental Protection	IPX5 BS EN 60529	N/A
Humidity	0 … 100 %RH, non-condensing	0 … 80 %RH, non-condensing
Compliance		
868MHz	UKCA,CE	
915MHz	FCC,IC	
2.4GHz	FCC,IC	
Dimensions		
Size	117mm (L) x 68mm (W) x 31mm (D) excluding mounting bracket.	
Size with antenna	275mm (L) x 68mm (W) x 31mm (D) excluding mounting bracket.	
Weight	Internal antenna: 190g | External antenna: 210g.	

8. Dimensions



9. Cleaning

Clean the front by wiping with a lint free cloth.

10. Revision History

Revision	Date	Changes
1.0	13/08/2024	Initial