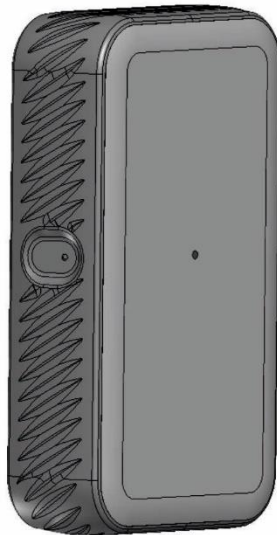


Router



Reference Manual

DESCRIPTION

Router with integrated antenna

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

PART NUMBER

P2-WS204-[FREQ](#)

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

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, routers 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

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

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1. Contents

2. INTRODUCTION	5
2.1. OVERVIEW	5
2.2. ORDERING INFORMATION	6
2.3. NETWORK SECURITY	6
2.4. PRODUCT RECYCLING/DISPOSAL	6
3. OPERATION	7
3.1. REMOVAL OF REAR COVER	7
3.2. INSTALLING POWER SUPPLY	8
3.3. SIDE BUTTON / TEST MODE	9
3.4. NETWORK TERMINOLOGY	10
3.5. PAIRING TO A BASE STATION	10
4. INSTALLATION	11
4.1. MOUNTING	11
4.2. ROUTER PLACEMENT	12
4.3. TRANSMISSION DISTANCE	12
4.4. INGRESS PROTECTION	13
5. TROUBLESHOOTING	13
6. CERTIFICATIONS AND APPROVALS	13
6.1. 868MHz	13
6.2. 915MHz	13
6.3. 2.4GHz	14
7. OPERATIONAL SPECIFICATION.....	15
8. DIMENSIONS	16
9. CLEANING.....	16
10. REVISION HISTORY	16

2. Introduction

2.1. Overview

Routers are used to strengthen the network and forward messages from wireless sensors when they are not within radio distance of the base station. Routers are mains powered and can route the message between other routers to adapt to the local environment to find the best path back to the base station. Routers are available in different frequencies depending on the territory of the installation.

A router is mains powered and has an integrated antenna. Similar to a transmitter, it has a side button and front status LED.



2.2. Ordering information

The table below lists the full part numbers for each variant.

Part Number	Description
P2-WS204-0868	Router (868MHz)
P2-WS204-0915	Router (915MHz)
P2-WS204-2400	Router (2.4GHz)

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

2.3. 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.

2.4. 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 and pairing the router to the base station and should be performed prior to installation.

3.1. Removal of rear cover

If the router is attached to a magnetic wall mounting bracket, pull apart so that you can see the rear of the router. 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 router 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 power supply

⚠ WARNING

Before removing or inserting the power jack disconnect the 5V power supply from the mains.

Power is supplied via a 2.1mm jack socket. The connector for power supply is located in the rear compartment. See section 3.1 for removal of the rear cover.

To insert the jack simply align the plug in front of the socket and push in.

To remove the power jack, hold the cable between your fingers and thumb and gently pull.

Router are provided with a rubber cable seal to help reduce dust ingress.

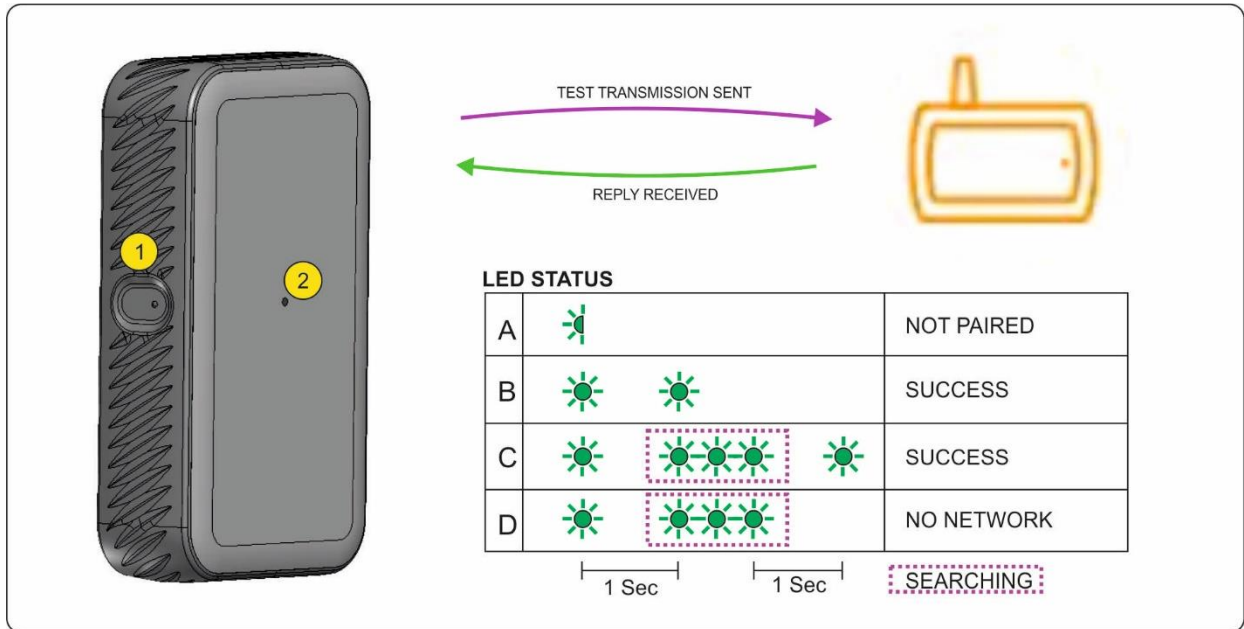
The seal has a cut along the hole to allow it to be positioned over the cable (2). Once attached maneuver the seal into position (2) so that the ridges on the casing (3) match the ridges on the seal. Once aligned, press firmly into place (4).



3.3. 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 router is not paired.

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

If the router 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 router is connected with a network and received a reply it will display a further single flash.

If the router 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 router will clear and previous pairing resulting in data not being sent to the base station.

3.4. Network Terminology

Routers are used to both strengthen a network and extend the radio distance.

Our system uses many to one routing. This is a common routing mechanism in wireless networking where all of the transmitters need to communicate with a centralized unit, in our case the base station.

In most scenarios the system would comprise of a base station and wireless transmitters. The transmitters would be paired with the base station and send the real time data from the attached sensor directly to the base station. In this scenario the transmitters are children of the base station and the base station is the parent of the transmitter.

When a transmitter is not within range of a base station you would need a router. The router is paired with the base station and then placed between the transmitter and the base station. In this scenario the transmitter would send its data to the router, the router would store the information and very shortly after send it to the base station. The transmitter's parent is now the router, and the router is now the child of the base station.

The routers can connect directly to another router and dynamically change route based on network conditions.

3.5. Pairing to a base station

A router 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 router and the router 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 router will flash as it is pairing with the base station. A series of rapid flashes indicate the router 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 3.3.

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

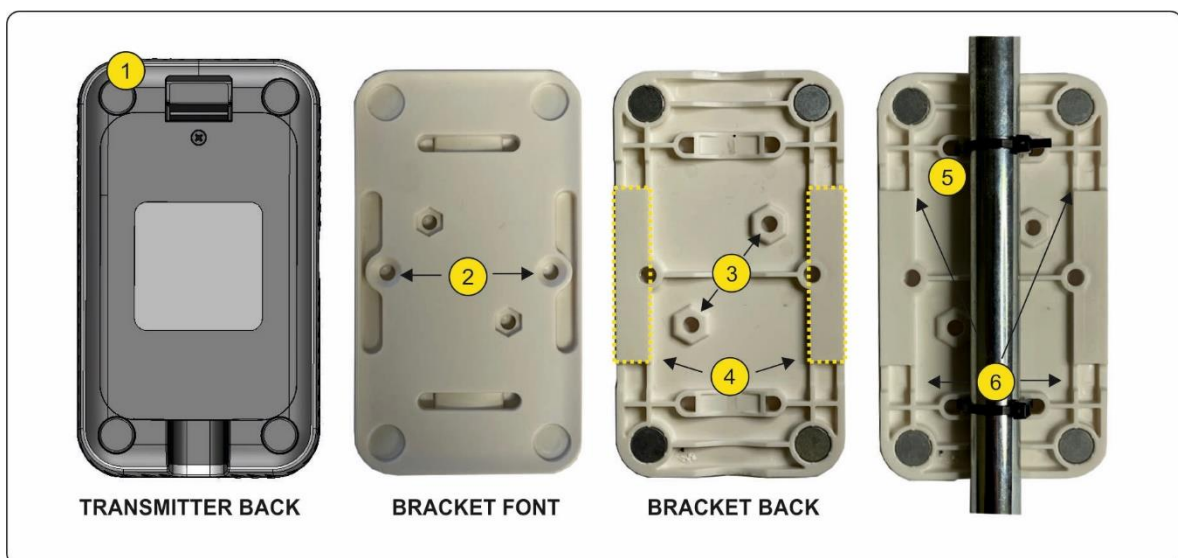
Install all equipment in conformity with the technical specifications given in this documentation.

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. Router placement

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

- Mount vertically
- Where possible place the router 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.

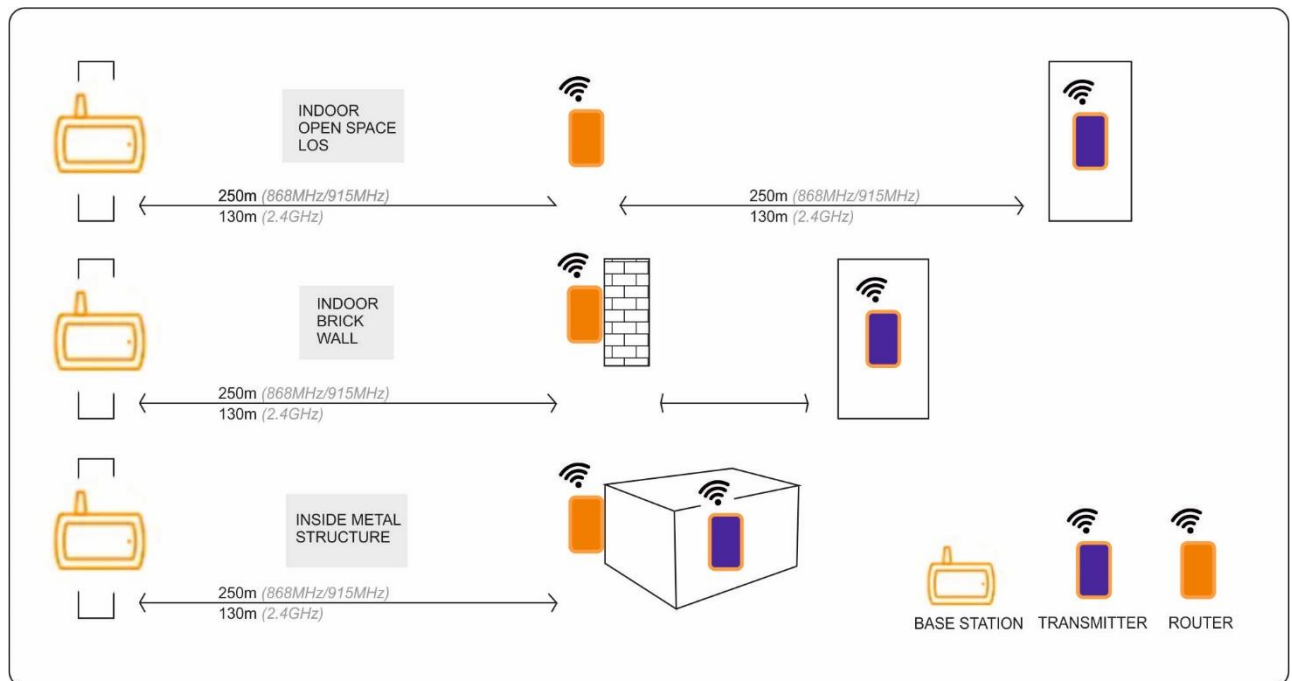
NOTICE

Mounting in any of these location will not mean the router 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. In an open space, line of sight, a router will typically double the transmission distance.

It can also be used strategically. So for instance if there are a number of transmitters behind a structure, walls or metal fabrication, the router can be placed the other side of the structure. This allows for a fairly short distance from the transmitters to the router, where the signal may be attenuated through the structures, and then a longer distance from router to the base station.



For large installations, it is possible to have a number of routers so that the transmission is sent from the transmitter to router, to router, to the base station.

4.4. Ingress Protection

The router is designed to be used in dry environments. If the router needs to be mounted within a wet environment or externally then it is required to be mounted in an IP rated enclosure.

5. Troubleshooting

Problem	Possible solution
Not pairing	☒ Ensure you are within 1-5m of the base station. ☒ Check power supply is attached and turned on.
Button not responding	☒ Check power supply is attached and turned on.
Intermittent communications	☒ Check quality and signal strength on base station and if necessary add router. ☒ Check transmitter placement. See 0.

6. Certifications and approvals

The transmitters are available in three different frequencies 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.



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

ISED

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

ISED

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

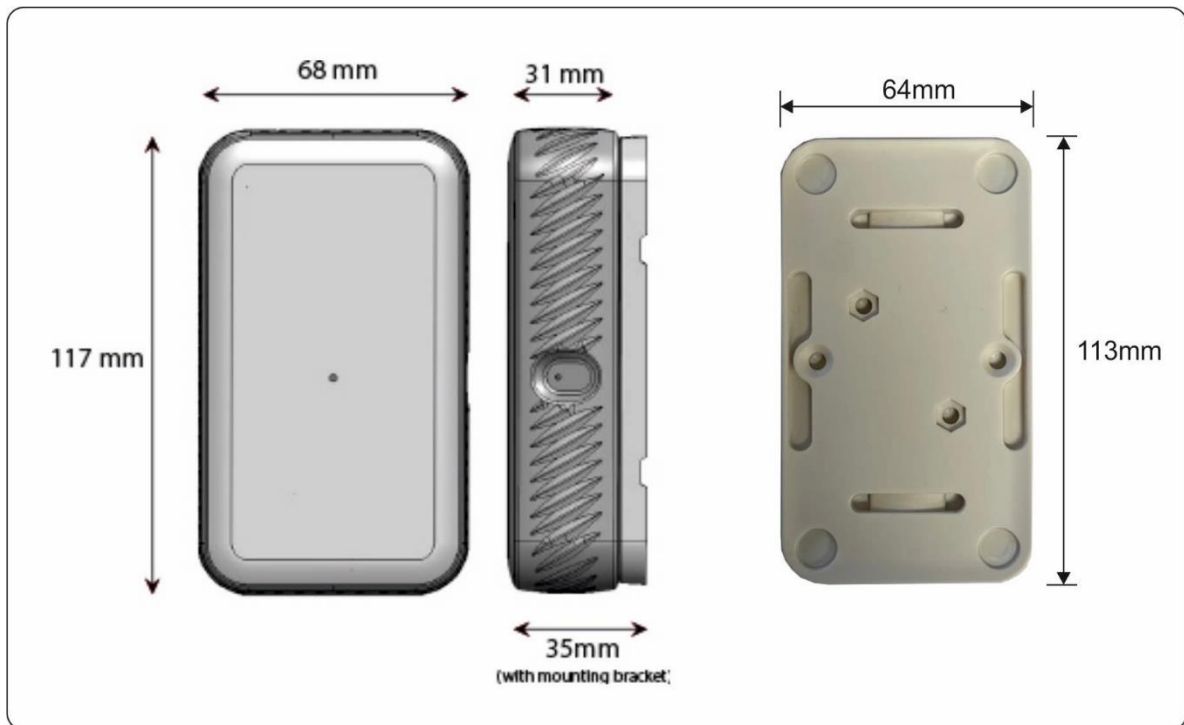
Radiation Exposure Statement

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	
5VDC	<100mA, 5Vdc
Connector	2.1mm Jack, center positive.
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 & 17 dBm dependent upon region.
Range	250m (outdoor LOS)
Environment	
Operating Temperature Range	5°C to +55°C
Storage Temperature Range	-20°C to +65°C
Humidity	0 ... 80 %RH, non-condensing
Compliance	
868MHz	UKCA,CE
915MHz	FCC,IC
2.4GHz	FCC,IC
Dimensions	
Size (Maximum)	117mm (L) x 68mm (W) x 31mm (D) excluding mounting bracket.
Weight	190g

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