aircom

Mini

WTP03

User Manual

Aircom User Manual

Document Information

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Important Symbols


Information relating to hazardous areas


Electrical Hazard


General Hazard


Information

Table of Contents

Part I Welcome

1.1 About this document

Welcome to the Aircom mini user manual. This manual will guide you through the hardware and software configuration of an Aircom mini and other important technical information.

1.2 Hazards

Handling of Aircom products should be done by competent persons only. Incorrect use by non-qualified personnel may result in damage, injury or death. Prior to handling the equipment this manual should be reviewed and correct safety precautions taken.

Certain Aircom products are designed for use in hazardous (explosive) environments. Prior to use in any hazardous environment the supplied ATEX / UL certificate should be reviewed by a competent person to ensure the device is safe for use in the specific application.

The Aircom mini is an electrical device which is powered by an internal battery source. Care should be taken and the instructions in this manual / ATEX certificate should be observed to ensure safe operation.

1.3 Intended use

This product is designed to monitor and control instruments for use in ATEX defined hazardous areas.

DO:

- Carefully read all manuals and certification prior to use.
- Use this product for its intended use.
- Use this product for the certified hazardous area as per the current ATEX certificate see 7.1 ATEX certificate.
- Follow the correct installation and wiring for appropriate instruments as per 2.5 Electrical Installation.

DO NOT:

- Misuse or use for unintended purposes.
- Use this device in hazardous areas not within its certification.
- Wire incorrectly.
- Use any battery other than the official Aircom battery.

1.4 Responsibility of the user

It is the responsibility of the user to use Aircom products only within the scope it has been designed for. Prior to installation and operation, it is imperative to observe all the relevant documentation and ensure only competent personnel operate the equipment. Should any assistance be required please contact YZ Systems, *see page 2*.

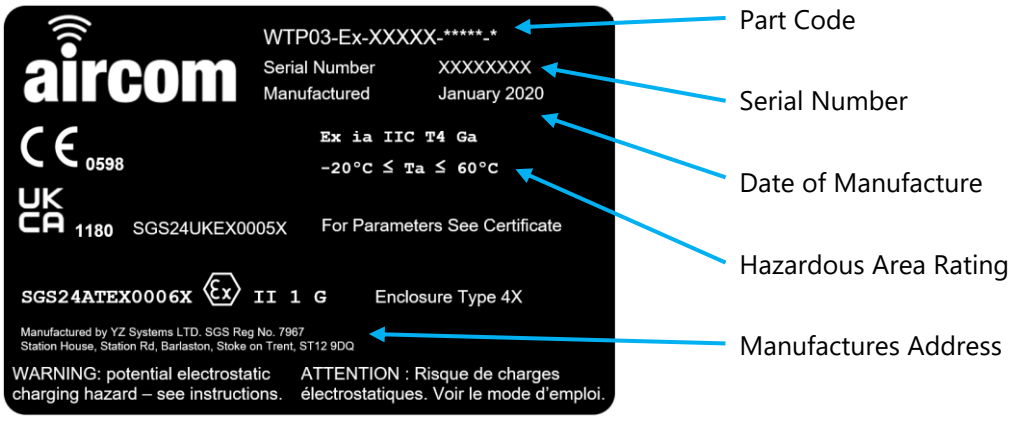
Part II Hardware

2.1 About The Aircom Mini

The **Aircom™** mini is a self-contained, battery-powered communications device capable of collating data from various instruments. With its powerful ARM microprocessor, it can act as a data logger, RTU for monitoring and control applications. It has been designed to withstand harsh environments and transmit data from the asset to any Command Centre globally. It's easy to install and configure with its Mobile Bluetooth App and can be left to operate without the need for human intervention.

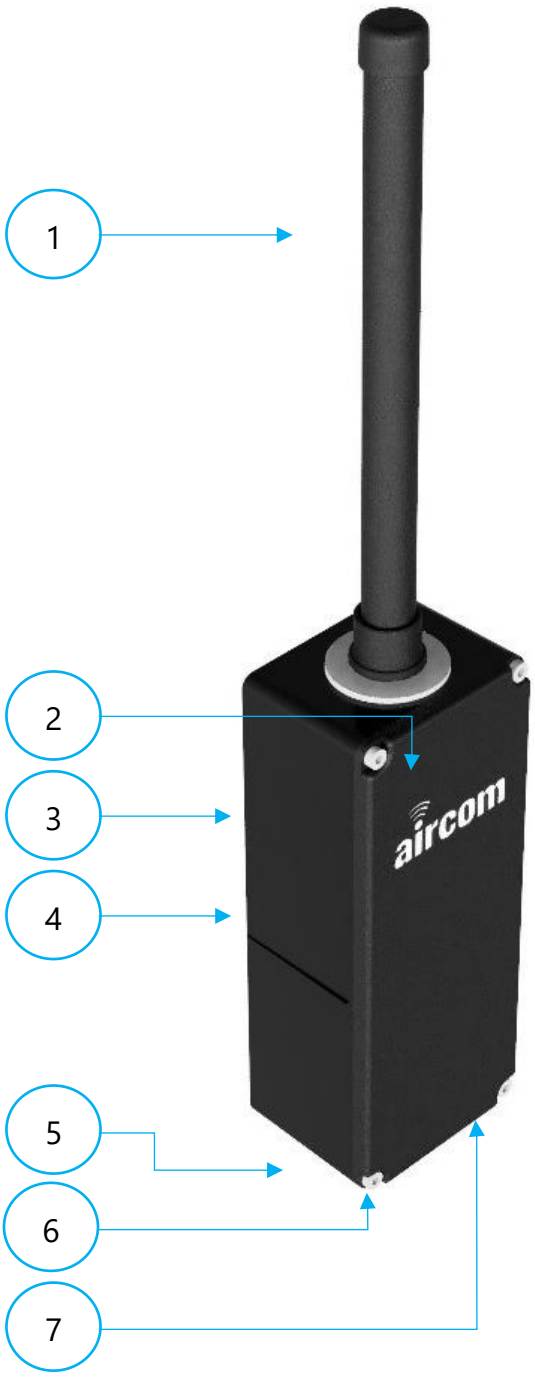
2.2 Manufacturer's label

Every mini supplied will have a manufacturer's label attached to the left-hand side of the enclosure. The label will be depicted as below:



2.3 Constituent parts

Your new Aircom device should arrive assembled, tested, and ready for installation. Each standard unit should be supplied with all the following components:



Item	Qty	Part No.	Material	Description
1	1	ZC-0010	ABS	3+dBi Antenna (868Mhz **Or** 915-923Mhz)
2	1	CG-0016	ABS	Enclosure Lid
3	1	CG-0015	ABS	Enclosure
4	1	DA-0050	Polyester Metal Film	Product Label
5	1	CD-7000	Nylon 6 (Polyamide 6)	IP68, M20x1.5 Blanking Plug
5	2	CD-7008	Nylon 6 (Polyamide 6)	IP68, M16 Blanking Plug
6	4	CE-0035	304 SS	M4 x 16mm Socket Cap Screw
7	1	CD-7001	Nylon 6 (Polyamide 6)	IP68, M20x1.5 Cable Gland
7	2	CD-7009	Nylon 6 (Polyamide 6)	IP68, M16 Cable Gland

2.4 Product range

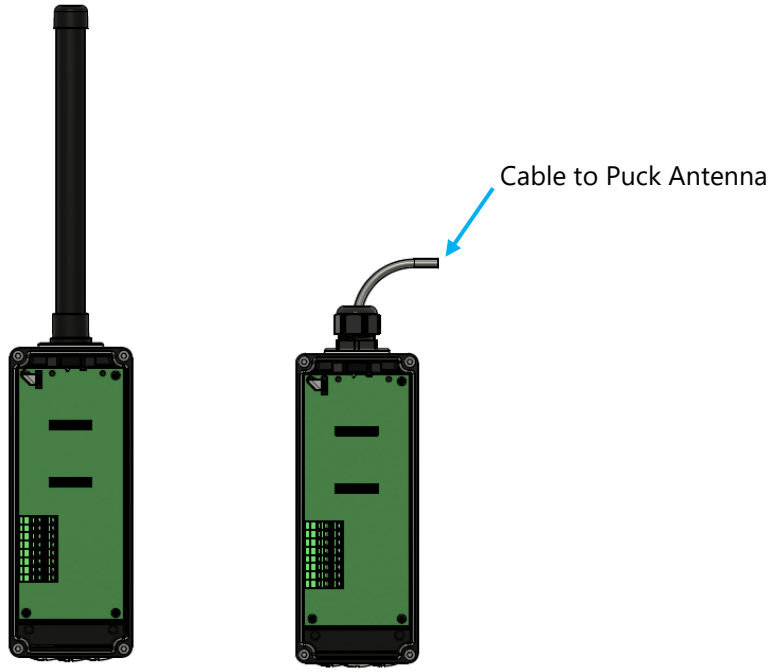
2.4.1 Part code builder

Part Code Builder										
Example Code	**WTP03**	**-**	**Ex**	**-**	**LDA00**	**-**	**EU868**	**-**	**S**	
Product Code										
Aircom Mini	WTP03									
Hazardous Area Certification										
Safe Area Only	00									
Hazardous Area	Ex									
Inputs & Outputs – *See Power and I/O Options Table*										
x3 AI, + HART, x2 DO, x2 DI	LD000									
x3 AI, x2 DO, x2 DI	LDA00									
Communications										
LoRaWAN EU868-870MHz	EU868									
LoRaWAN US902-928MHz	US915									
LoRaWAN AU915-928MHz	AU915									
LoRaWAN AS920-923MHz	AS1									
LoRaWAN AS923-925MHz	AS2									
LoRaWAN IN865-867MHz	IN865									
Antenna – *See Antenna Options Image*										
Standard External Fixed	S									
Puck Antenna	P									

Power and I/O Options		
Power	**LD000**	**LDA00**
3.6V, 19Ah Lithium Thionyl Chloride Replaceable Battery	☑	☑
Digital Inputs	**Max 2***	**Max 2***
0-24VDC Voltage Inputs	x2	x2
Pulse Inputs	x2	x2
Volt-Free Inputs	x2	x2
Digital Outputs	**Max 2***	**Max 2***
120mA @ 16.4VDC	x2	x2
Analogue Inputs	**Max 3***	**Max 3***
4-20mA 2-wire Passive	x2	x2
HART 2-wire Passive	x2	-
4-20mA 2-wire Active	x2	x2
4-20mA 3-wire Passive	x2	x2
PT100 3 or 4-wire	x1	x1
Thermocouple Type J or K	x1	x1
0-10k Resistance or Potentiometer Inputs	x1	x1

There is a maximum number of I/O that can be utilised from each variant. Example LD000 has Max x3 Analogue Channels. Only 3 of the available analogue inputs can be used at one time such as x2 4-20mA and x1 PT100 at once or any other combination of the input options.

Antenna Options:



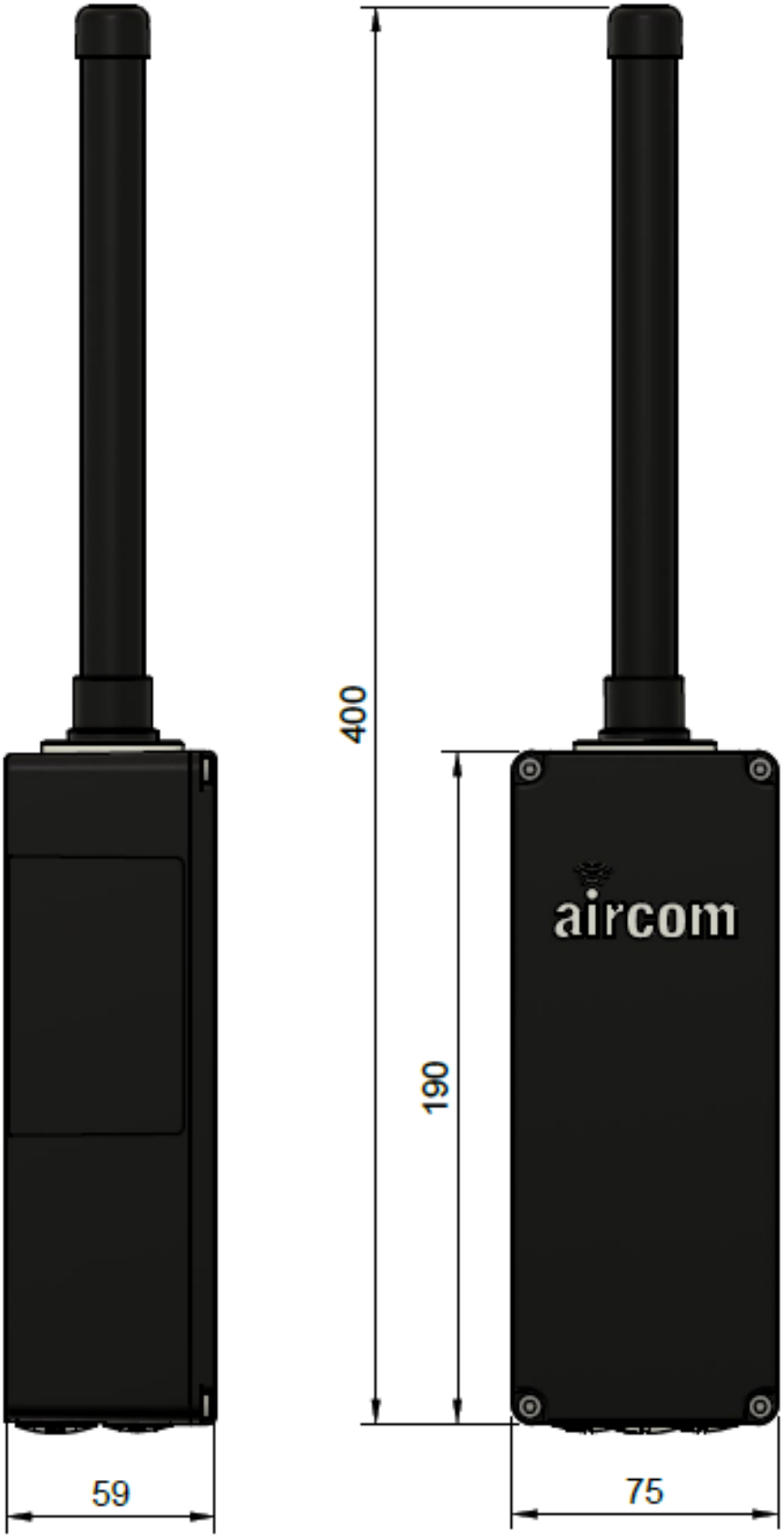
Standard – S Puck - P

2.4.2 Accessories

Code	Description	
ZC-0011	Mini Battery-ATEX	
ZC-0017	Wall Mount, includes: ▪ X1 304SS wall brackets ▪ x8 304SS thread forming screws.	
ZC-0018	Post Mount, includes: ▪ x1 304SS post brackets ▪ x2 304SS jubilee clips ▪ x8 304SS thread forming screws	
DD-0002	Terminal Tool	
CD-7001	IP68 M20x1.5 Cable Gland	
CD-7009	IP68 M16 Cable Gland	
CD-7000	IP68 M20x1.5 Plug	
CD-7008	IP68 M16 Plug	

Part III Mechanical installation

3.1 Dimensions



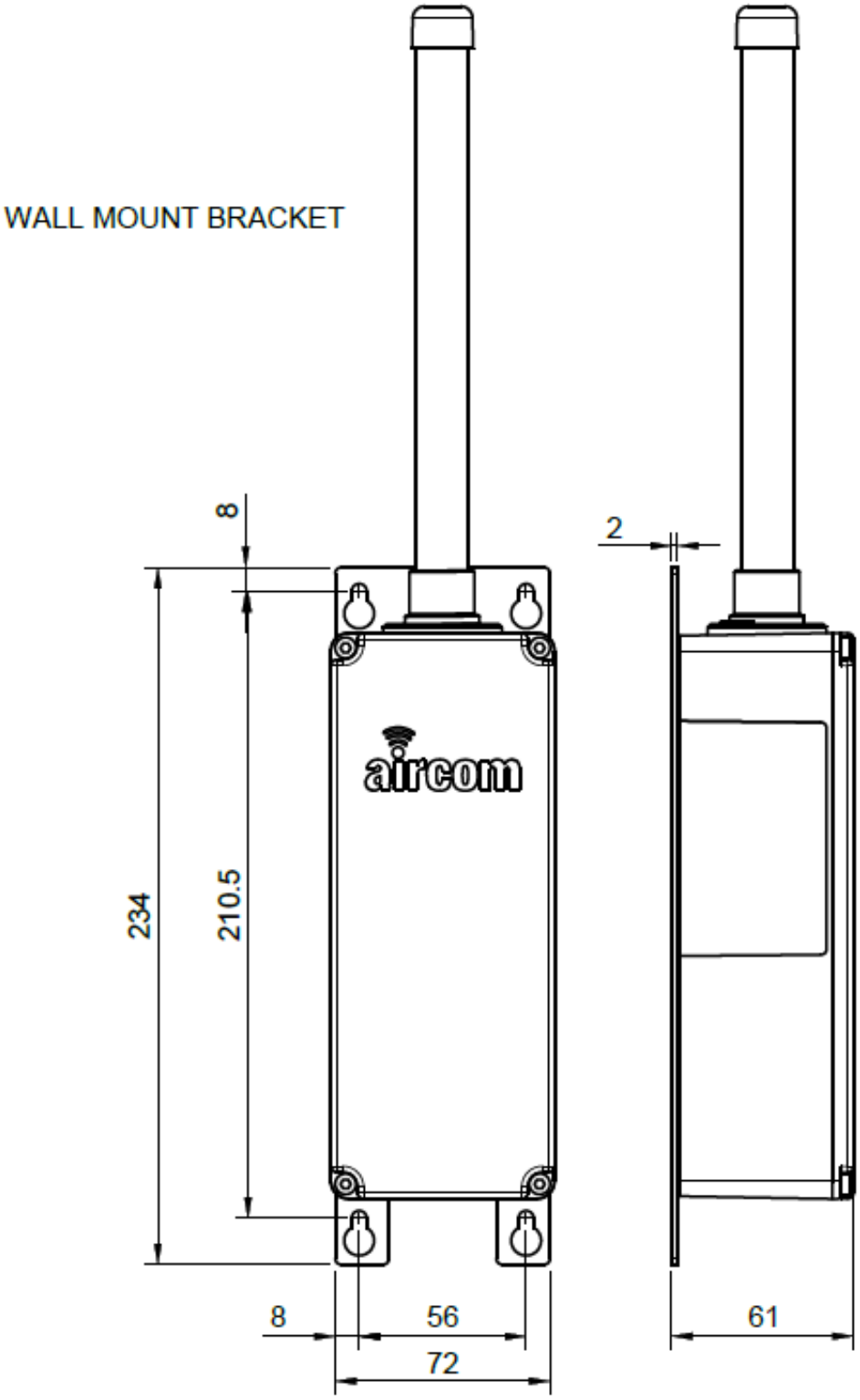
3.2 Mounting brackets

The Aircom mini has two brackets available:

ZC-0017:

Wall mount bracket includes:

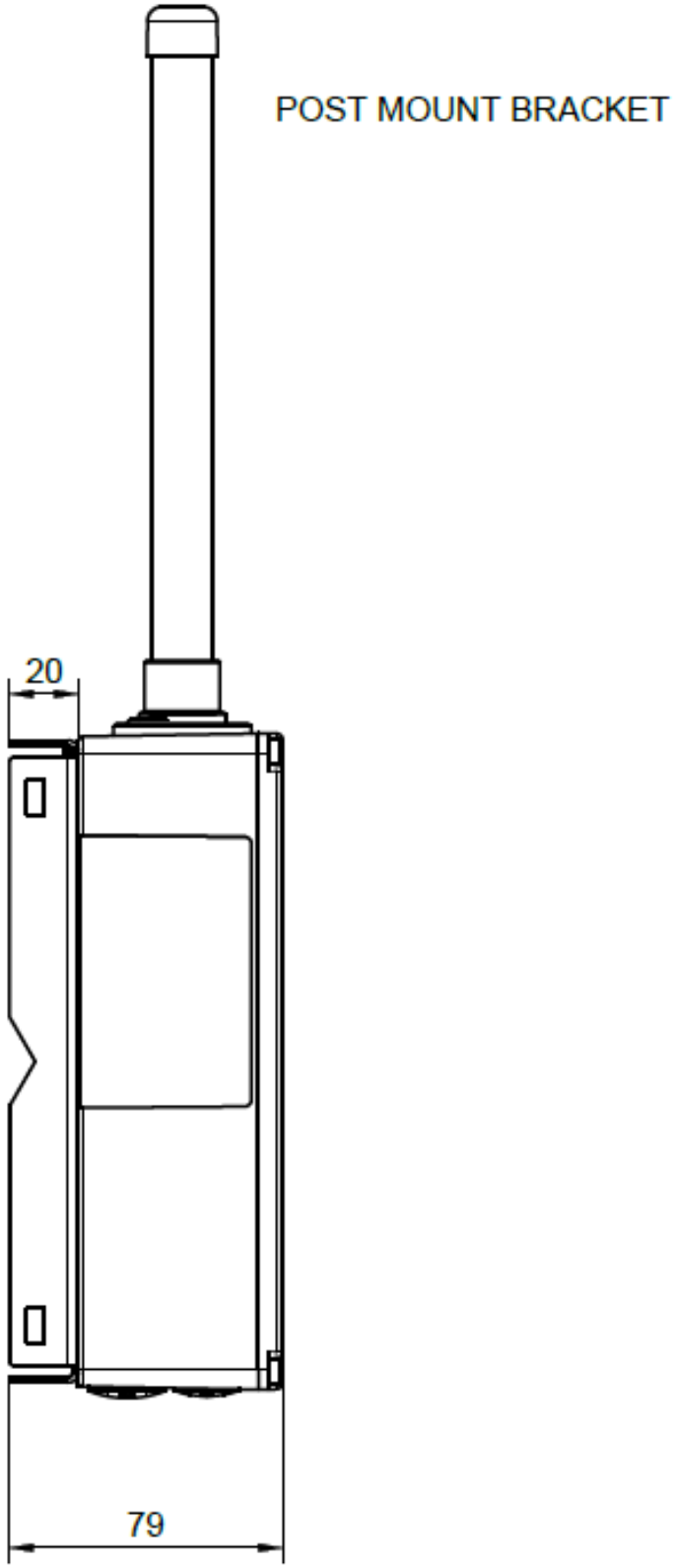
- x1 304SS mounting plates
- x8 304SS thread forming screws, 3x16mm, Pozi



ZC-0018:

Post mount bracket includes:

- x1 304SS post bracket
- x2 304SS jubilee clips
- x8 304SS thread forming screws, 3x14mm, Pozi



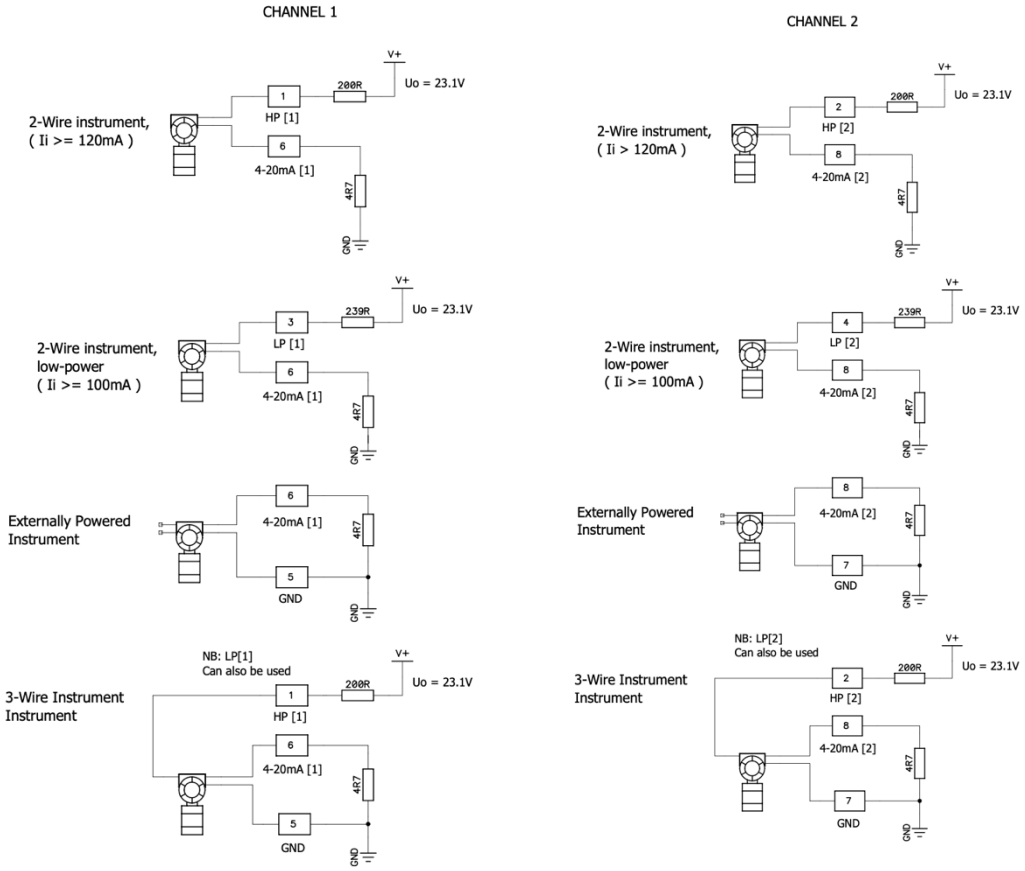
Part IV Electrical installation

Certain Aircom products are designed for use in hazardous (explosive) environments. Prior to use in any hazardous environment the supplied ATEX certificate should be reviewed by a competent person to ensure the device is safe for use in the specific application.

The Aircom RTU is an electrical device which is powered by an internal battery. Only use with the official Aicom mini battery **ZC-0011.**

The terminals are spring type and require the use of a flat head screwdriver to install / remove wires. It is recommended that the Aircom accessory WTP03-Tterm, terminal tool be utilised.

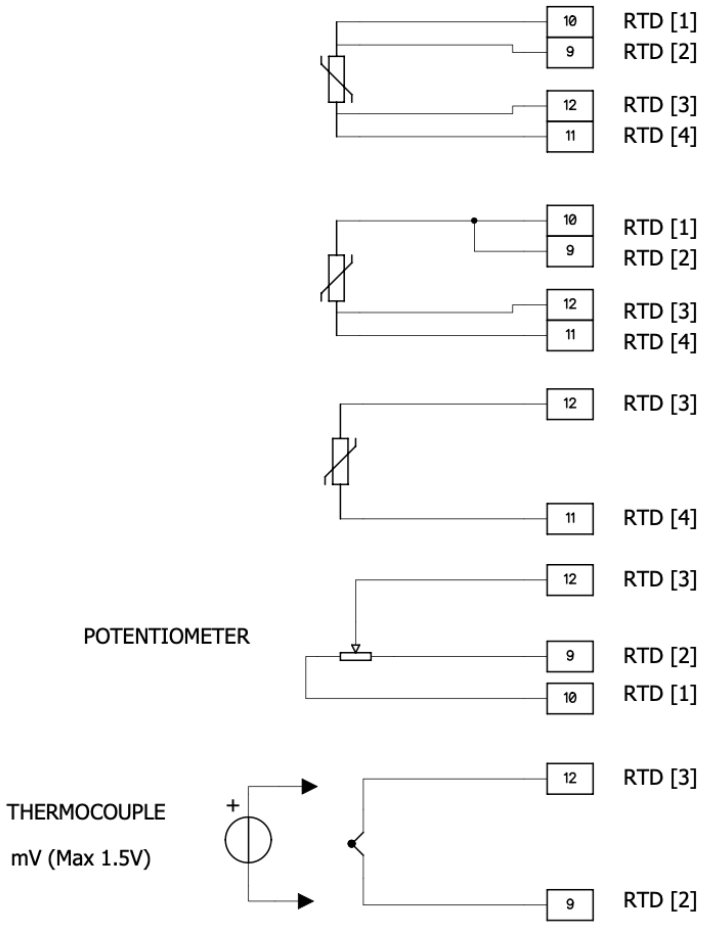
4.1 Electrical Connections Analog



Notes:

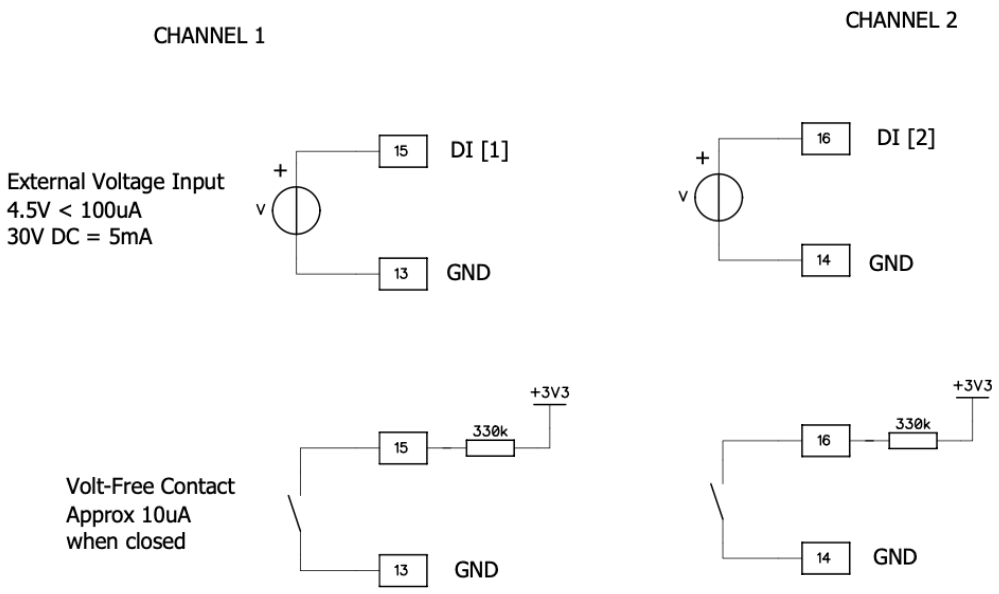
1. Resistance values shown are nominal internal.
2. Channels 1&2 for configuration see section 6.7.1

4.2 Electrical Connections RTD Thermocouple and Resistance.



Note: Channel 3 for configuration see section 6.7.1

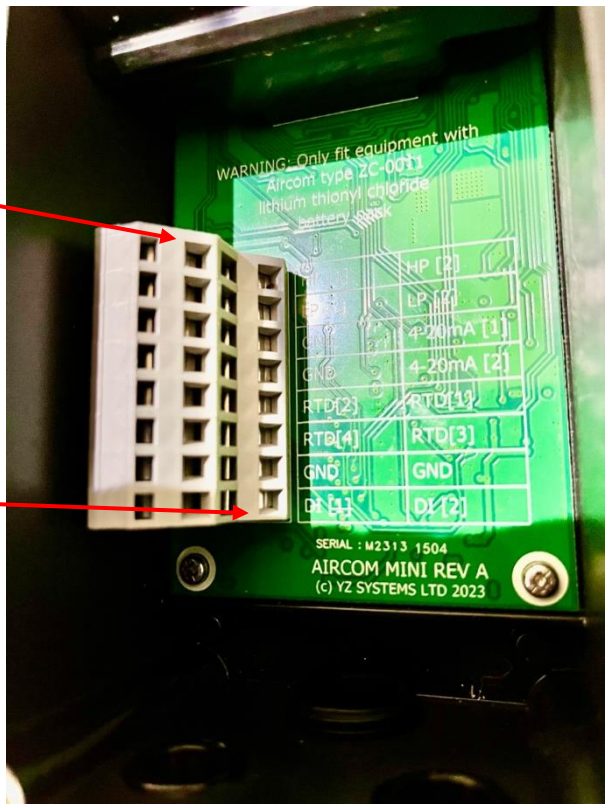
4.3 Electrical Connections Digital



Note: See section 6.7.2 for configuration.

4.4 Terminal Identification

There is a single terminal block inside the Aircom Mini. The Numbering sequence is odd numbers on the top and row and even at the bottom.



4.5 Battery

All Aircom units will be supplied with a battery.

For applications in explosive environments ensure the battery is replaced with a ZC-0011and appropriate for the rated hazardous area.

Specification:

Voltage	3.6V
Capacity	19Ah
Chemistry	Lithium Thionyl Chloride
Material	ABS
Certification	Ex II 1G Ex ia IIC T4 Ga (-20 ≤ Ta ≤ +60°C)
Dimensions	66mm H x 45mm D
Weight	0.190kg

Installing/removing the battery:

To install the battery, open the Aircom transmitter by removing the four M4 Hex screws and lid. Once the lid is removed insert the battery into the terminals by pushing firmly downwards.

To remove the battery simply pull upward. If a new battery is to be installed after removing the old, the Aircom will have the last configuration stored, this can be kept, edited or deleted. If the old configuration is kept, transmissions will be disabled until you update the clock time and re-join the network.

A full battery voltage is around 3.2V under load, at 2.6V the battery will typically have between 1-4 weeks charge left and 2.2V is a dead battery. (Under load voltage is reported in the app.). Note the open circuit voltage is typically 3.6V and is not representative of battery condition.

Storage. The batteries have a 10 year storage life and typically have a 1% loss of charge per year at 20DegC.

Part V Installing the configuration app

All Aircom devices are configured via a Bluetooth (BLE) mobile app. The app is free to download on both the Google Play Store and Apple App Store.

Configuration App Icon

5.1 System requirements

Minimum requirements for a device to successfully use the Aircom configuration app are as follows:

Android Devices:

- Android 5.0 Lollipop or later.
- Bluetooth Low Energy (BLE).

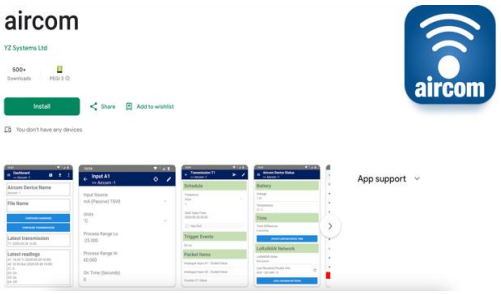
iOS Devices (iPhone/iPad):

- iOS 12.0 or later.
- Bluetooth Low Energy (BLE).

5.2 Installing the app on an Android device

On your Android phone or tablet:

- Open Google Play Store.
- Search for Aircom by YZ Systems Limited.
- Tap **Install**.



You can also navigate directly to the app on Google Play Store using the following link: play.google.com/store/apps/details?id=com.aircom

Manually

The main steps required to install the app manually are:

- Obtain a link or email copy of the Aircom app installation file. The file name should be "aircom-2.0.apk" or similar. (The version number, e.g. "2.0", may be different.) *For security, it is important that you obtain this installation file directly from the manufacturer.*
- Download the installation file to your device. Make a note of the folder you saved the file to.
- Use a file manager app or your device's "Downloads" app to browse to the folder you saved the installation file to. If your device does not have a file manager app, you can download a free one from the Google Play Store.
- Tap the installation file to install the app. If this is the first time you are manually installing an app, you will be prompted to enable installation of "unknown apps" or similar. Follow the instructions to enable installation. Then return to your file manager or Downloads app and tap the installation file to install it. Tap OK to any prompts if you are happy to proceed. The app should now be installed and can be opened.

Please note that you may need to adjust these procedures depending on the make and Android version of your device.

5.3 Installing the app on an iOS device

On your iOS phone or tablet:

- Open the App Store.
- Search for Aircom by YZ Systems Limited.
- Tap **Install**.

You can also navigate directly to the app on the App Store using the following link:
https://apps.apple.com/gb/app/aircom/id1463034584?mt=8

Note: You will need to grant the Aircom app the requested permissions to connect to the device.

Part VI Using the configuration app

6.1 Getting Started

With the battery installed as section 4.4 you will now need to switch on the Aircom Mini.

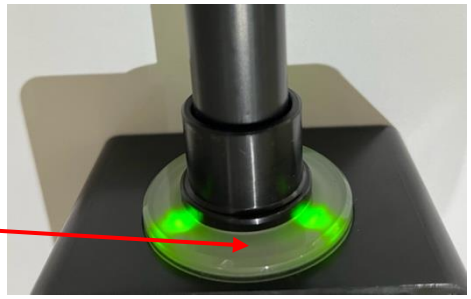
With the lid removed the on switch is located at the top right-hand side of the enclosure.

Push the switch to the right as indicated to the on position.

After approximately 5 seconds the Indicator LEDs below the antenna will start to flash.

Wait for the indicator lights to stop flashing, the Aircom processor has initialised and is ready for operation.

To start Bluetooth you need to activate it with a magnet. Tap the Aircom 3 times in the indicated location. Each time the magnet tap is detected the LED's will illuminate.



6.2 Connecting to an Aircom

Open the Aircom app to see the start page. There are two options.

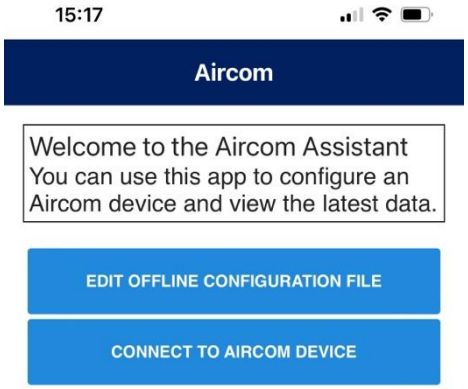
The first is used for offline editing of configurations which can later be downloaded to a device.

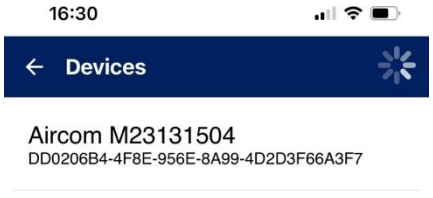
The second is for connecting to a device to view and configure it directly.

Tap "Connect to Aircom Device" and a list of available units will be displayed by serial number.

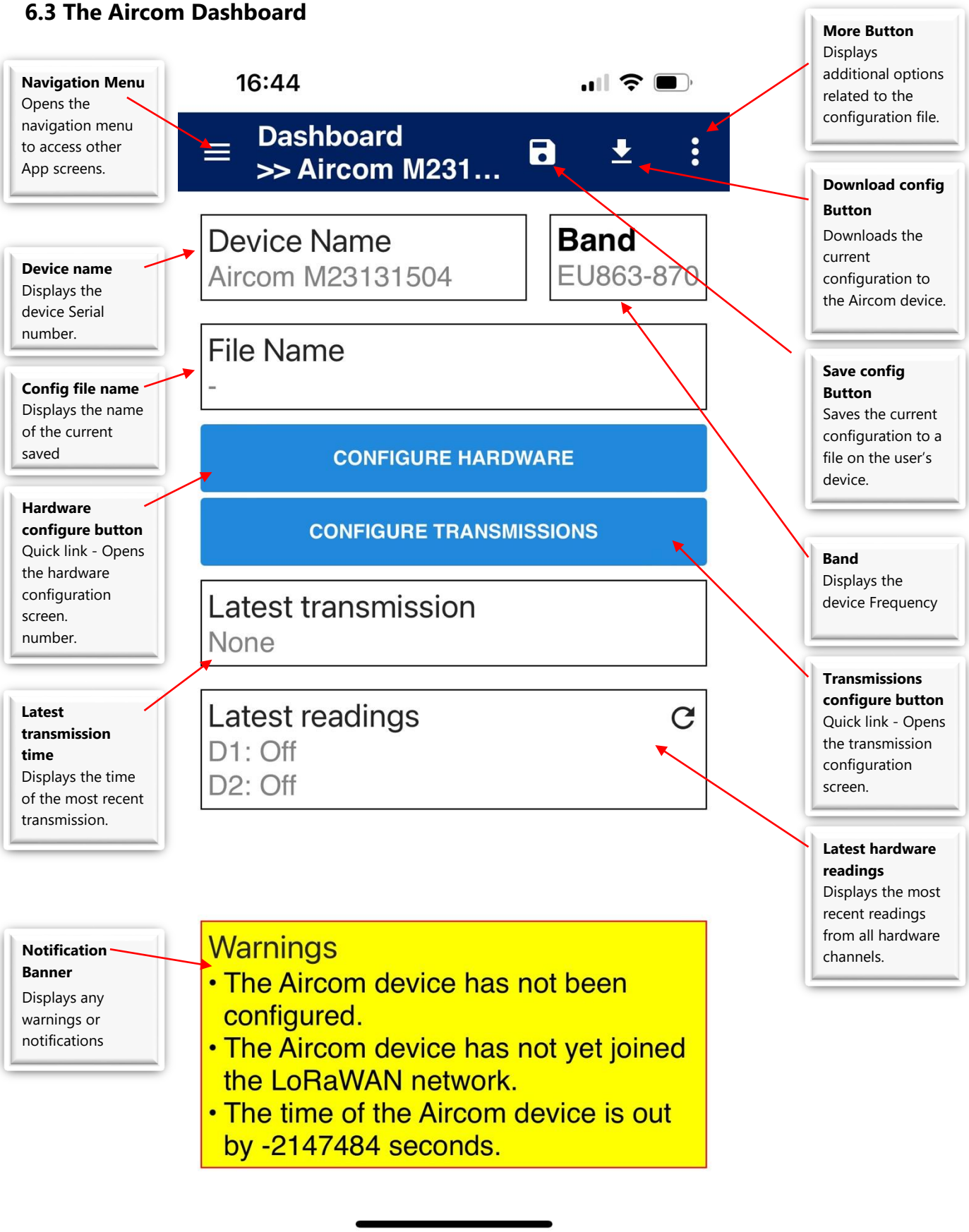
The serial number of the device can be found on the product label.

Tap the serial number of the device you wish to connect to, and it will take to you to the configuration dashboard.





6.3 The Aircom Dashboard



6.4 Navigation Menu

Once selected the navigation menu will open:

Dashboard
Returns to the main dashboard screen.

Files
Opens the files screen to retrieve current configuration files.

Hardware
Opens the hardware configuration dashboard.

Transmissions
Opens the transmissions configuration screen.

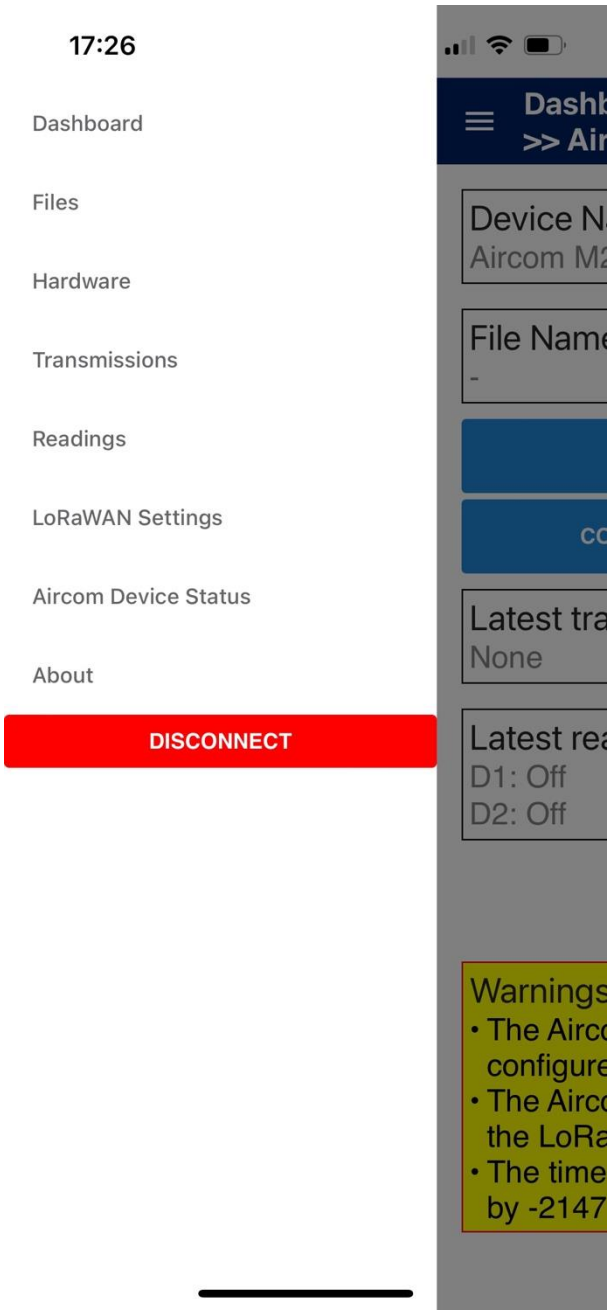
Readings
Opens the readings screen which displays readings from connected hardware.

LoRaWAN Settings
Opens LoRaWAN settings screen.

Aircom Device Status
Opens the device status screen which displays general device status (e.g. battery level, clock time, network connectivity).

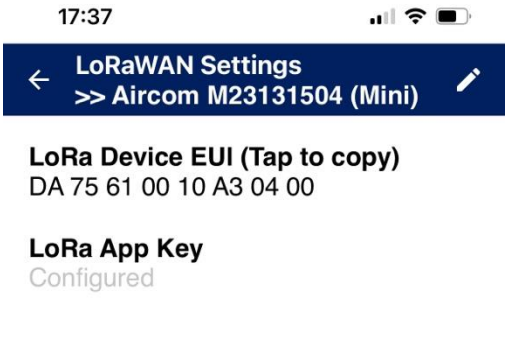
About
Opens the about screen which displays general device information (e.g. firmware version)

Disconnect
Disconnects from the Aircom and turns off the transmitter's Bluetooth.

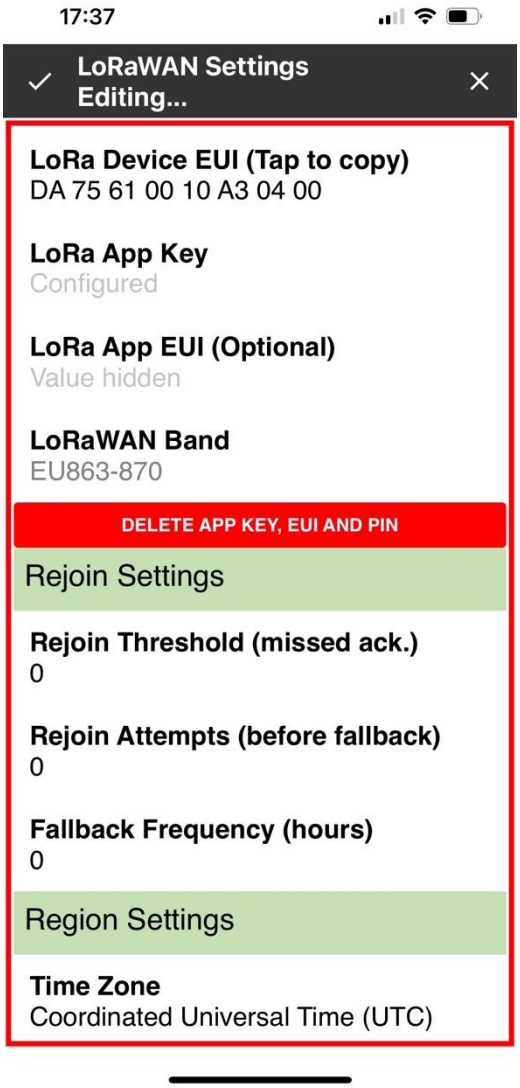


6.5 LoRaWAN Settings

The LoRaWAN settings screen allows you to view the transmitter's LoRaWAN device EUI and to set the App Key and App EUI. Please note that for security reasons the LoRaWAN EUI and APP key cannot be read from the transmitter and will show on the screen as "Value hidden". To access the LoRaWAN settings screen, tap the navigation menu button on the main dashboard and then select "LORAWAN SETTINGS". At the top of the screen tap the pencil to enter the APP key.



As With all Aircom screens the header changes from blue to black and the page is boarder in red when editing is enabled. This is to highlight to the user that parameters and setting can now be changed, and care must be taken.



6.5.1 Rejoin and Region Settings

When connected to an Aircom, rejoin and region settings can be configured. Rejoin settings allow the Aircom to detect when communication with the network server may have been lost. In such cases, when configured, the device enters "Rejoin" mode and attempts to rejoin the server. If such steps fail, it enters "Rejoin Fallback" mode and, if configured, makes periodic attempts to rejoin the server.

Rejoin Threshold

When acknowledgement has not been received for the specified number of transmissions, the device will enter "Rejoin" mode. This indicates that communication with the server may have been permanently lost, such as when the server was restarted without retaining the required "join" information for the device.

If the rejoin threshold is set to zero, the device will not enter rejoin mode unless a transmission has the "Initiate Rejoin on Failure" option set. In that case "Rejoin mode" will be entered as soon as the specified transmission fails without receiving an acknowledgment.

Rejoin Attempts

After entering "Rejoin" mode, the specified number of scheduled transmissions will include a request to join the server. If any of these rejoin attempts is successful, the device will exit "Rejoin" mode and scheduled transmissions will continue as normal. If all attempts are unsuccessful or rejoin attempts are set to zero, the device will enter "Rejoin Fallback" mode.

Fallback Frequency

If the fallback frequency is greater than zero, after entering "Rejoin Fallback" mode the device will attempt to rejoin the network server at the specified frequency. If a rejoin attempt is successful, the device will resume normal operation, sending scheduled transmissions.

When the fallback frequency and LoRaWAN settings are configured and the Aircom is powered up, such as after changing the battery, it will attempt to join the server immediately. If successful, the normal transmission schedule will resume. If not, rejoin attempts will be made periodically as described in the paragraph above.

Time Zone

By default, the transmission schedule operates according to Coordinated Universal Time (UTC) and ignores any local daylight savings adjustments. If another time zone is specified, transmission times will be adjusted to allow for any daylight savings arrangements in the time zone. For example, if the time zone is set to "United Kingdom (GMT/BST)", a transmission scheduled for 6am in winter (GMT) will be also be sent at 6am in summer (BST). (Using UTC, the transmission would be sent at 6am in winter and 7am in summer, local time.)

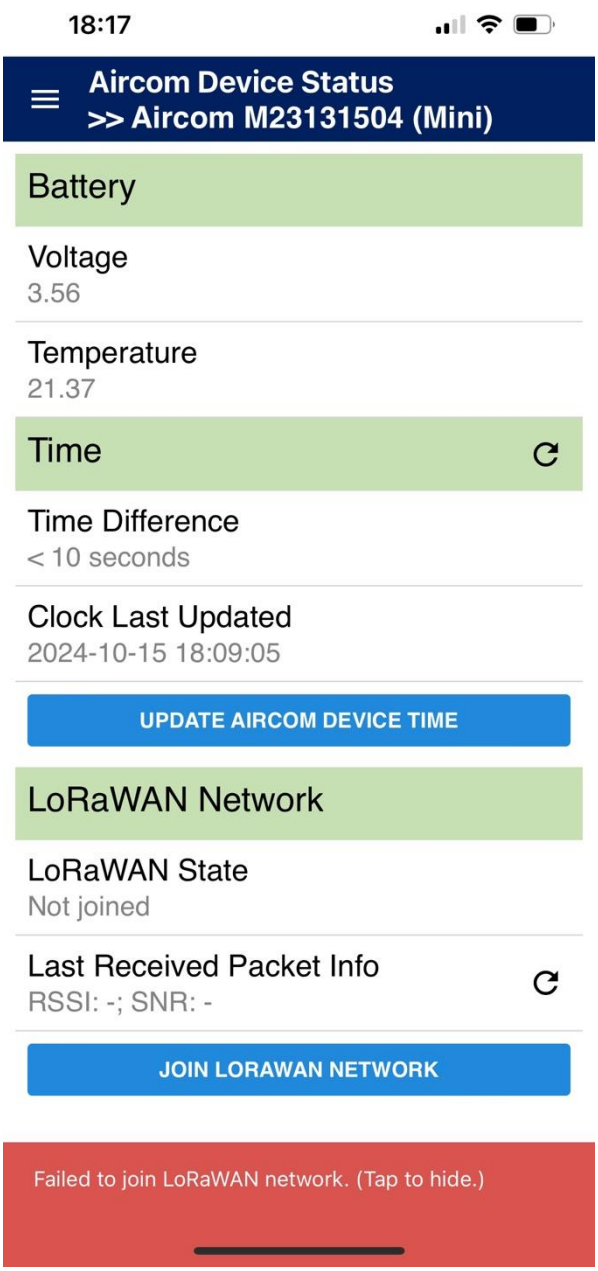
When programming transmission times, the times shown on the screen are for the current region and time zone of the phone or tablet being used to configure the Aircom. (Please note: If you have set the time zone to "United Kingdom (GMT/BST)" and it is currently summer (BST), add one hour to the scheduled time. For example, to set a transmission to occur at 8am each day, enter it as 9am, local time.)

6.6 Aircom device status screen & joining a LoRaWAN network

The device status screen displays status information such as battery voltage, time and network status. Using the blue buttons it also allows you join the LoRaWAN network and to update the transmitter time. To access the device status screen, tap the navigation menu button on the main dashboard and then select "AIRCOM DEVICE STATUS".

Once the clock has been updated a green banner will appear to confirm.

Tapping the blue "join" button will initiate a join sequence. An orange banner will update progress and then a green or red banner will appear to indicate a successful join or a fail.



6.6.1 Failure to join a network.

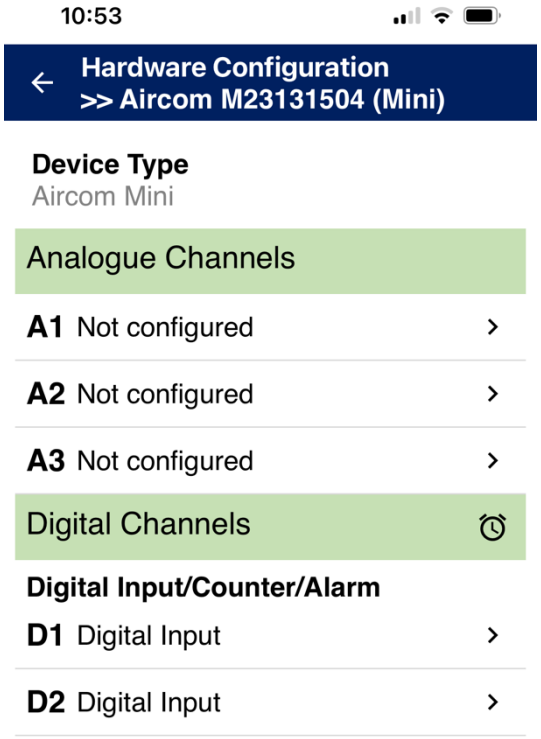
If the join fail is seen check the App key has been entered correctly as it is easy to miss key a digit.

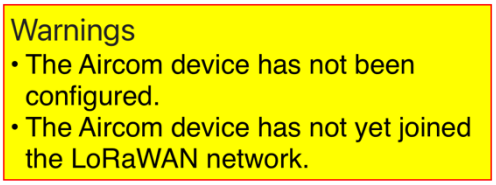
If the App Key is correct check that your device is in-range of a connected gateway. For more information contact your LoRa network provider.

6.7 Configuring Hardware

The hardware configuration screen provides access to the configuration pages for the three Analog channels and two Digital channels. See sections 4.1 to 4.3 for correct connection / wiring details. The configurations pages are intuitive but the following needs to be understood.

Note: The configuration must be downloaded to the Aircom once complete. See section 6.3.





6.7.1 Analog Channels

There are three analog channels available for connection of instruments and sensors. Channels 1&2 allow the connection of:

1. Active Instruments (with separate power)
2. Passive Instrumets (Powered by the Aircom)
3. HART capable instruments (Powered by the Aircom)

The selection of active or passive instrument is made by setting the supply voltage in the configuration screen.

- For active instruments set the voltage to 0V.
- For passive instruments set the voltage to the lowest voltage recommended by the instrument manufacturer. (This will increase battery life).

Channel 3 Allows connection of:

1. mV signals in the range of -1.5 to +1.5 Volts.
2. Resistance in the range of 0 to 20000 ohms.
3. 3 Wire PT100 sensors.
4. 4 Wire PT100 sensors.
5. 2 Wire PT1000 sensors.
6. Type J or K thermocouple.
7. A potentiometer. Range 4K7 to 47K ohms.

The Aircom must be correctly configured to match the connected devices.

6.7.2 Digital Channels

There are two digital channels. Both can be connected to volt free contacts or 4.5 to 30 VDC digital outputs. Note for correct connection see section 4.3. No configuration is required for the volt free or voltage input as the system senses the change of state.

The inputs in either arrangement can be configured as inputs only or as a counter. (Up to 5KHz)

When configured as an input only the channel can be configured to transmit on change of state or on scheduled transmission. (this page is accessed by tapping the timer icon on the green header).

6.8 Checking Readings

When all the required devices are connected to the Aircom and the hardware configuration has been downloaded (See section 6.3. Download button) it is good practice to check everything is functioning as expected.

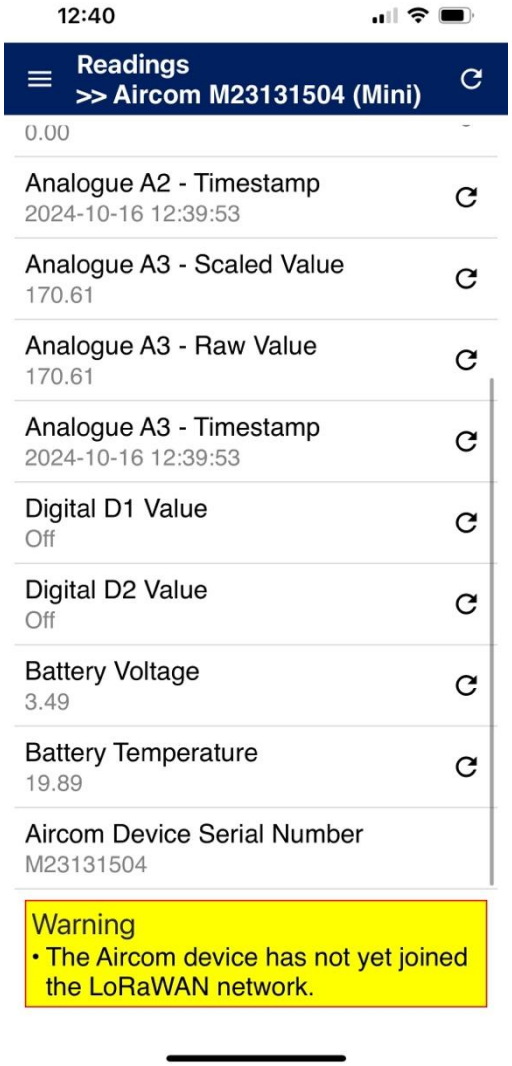
The readings page shows the last values recorded from each connected instrument or sensor.

All readings can be refreshed by taping the refresh button on the blue banner.

Note: Refreshing all reading will take a little time as each are sequenced in turn.

Alternatively taping the refresh button for an individual channel will refresh only that reading.

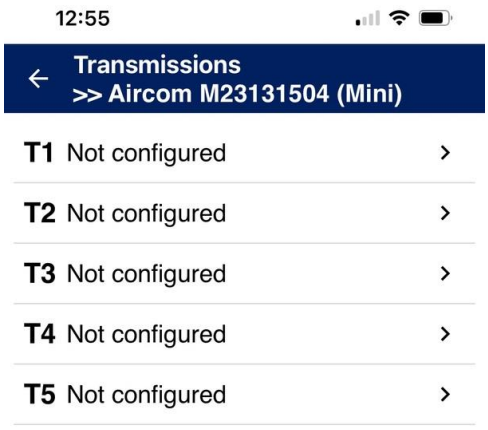
Check the timestamp has updated to confirm you are looking at the latest reading.



6.9 Configuring Transmissions

Notes:

1. Transmissions will only be possible once the Aircom has Joined the Network.
2. The configuration must be downloaded to the Aircom once complete. See section 6.3.

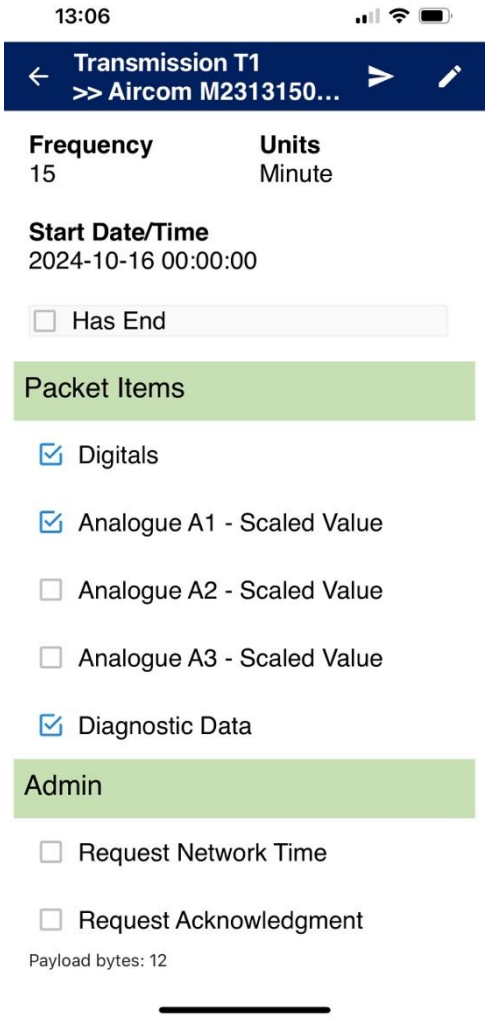


The transmission configuration screen provides access to the configuration pages for each individual transmission. Up to five separate transmissions can be scheduled. This allows the user to send data from connected devices at different frequencies. Care must be taken to avoid schedule clashes as only one transmission can be made at a specific time. This can be achieved by offsetting start times.

If a scheduled clash occurs the lower number will be sent. I.e. if T1 and T2 are set to the same time, only T1 will be sent.

Another strategy can be to set lower frequency transmissions to the lower number (e.g. T1) then set higher frequency transmissions in subsequent pages.

The transmission page is intuitive, a frequency for the transmission should be set, (note the minimum frequency may depend on the size of the packet) and then the content of the packet is set by checking the required boxes.



It is also possible to request the network time or an acknowledgement in a specific Transmission.

Notes:

1. It is not recommended to configure either of these requests in packets with a high frequency. They could typically be set once or twice per day.
2. If the rejoin feature is needed, then the request acknowledgment must be configured in at least one transmission.

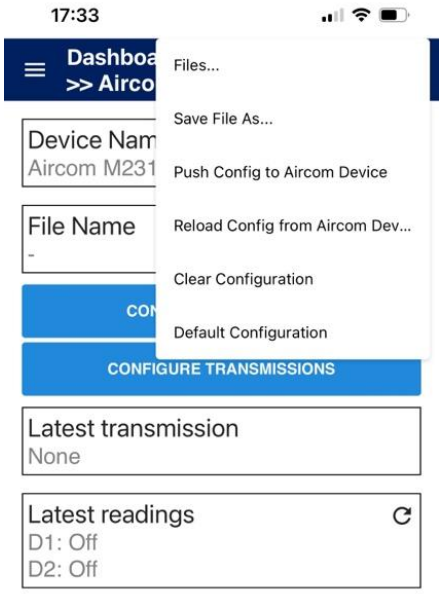
6.10 More Button

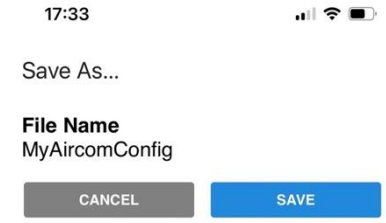
When a configuration is complete it can be saved to the mobile device. This allows the user to easily download identical configurations to multiple Aircoms.

By tapping the more button, a menu is revealed with options to save and load files. Tapping the save file as button allows the user to give a configuration file a specific name.

The files saved on the mobile device can be viewed by tapping Files… These can then be loaded to the mobile device and downloaded to the Aircom.

Important Note: Following any download it is good practice to reload the Config from the Aircom and check it. This confirms the download has been made correctly by the mobile device.



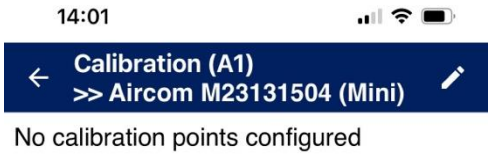


Part VII Calibration

7.1 Calibrating an Analog input

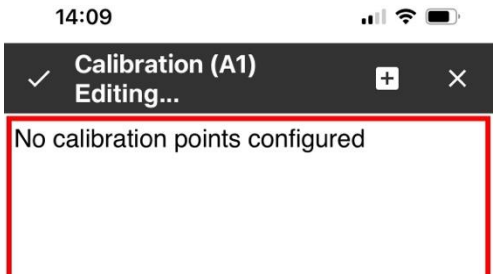
The Aircom unit is ***not*** factory calibrated. It should be calibrated in the field in two possible ways:

1. The loop only using a 4-20mA calibrator. (Assuming the instrument or sensor is pre calibrated)
2. The loop and instrument using a suitable reference calibration unit. e.g. a pressure calibrator.

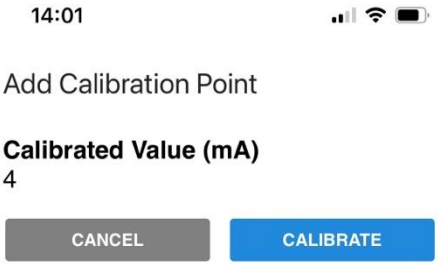


Note: When using a reference calibration unit, the set point will need to be converted into mA to carry out the calibration on the Aircom. E.g. if a setpoint of 25% of the instruments range was used 8mA would be entered into the Aircom.

To calibrate the Aircom connect the reference device to the instrument or a 4-20mA calibrator to the correct terminals. Then carry out the following steps:



1. In Hardware select the channel to be calibrated. (either 1 or 2)
2. Tap the pencil button to enter the calibration page.
3. Tap the pencil again to start the calibration.
4. Tap the + button to add a calibration point.
5. Type in the mA value corresponding to the calibrator setpoint.
6. Tap the calibrate button and wait until a corresponding value is seen.
7. Compare the two values as they should be reasonably close.
8. If the values are not close delete the point and resolve the issue. Check in readings that the value is as expected before continuing.
9. If the values are acceptable then add another point.
10. Once completed exit the calibration screen and the points will be stored on the Aircom.



Notes:

1. It is recommended to use a minimum of 5 calibration points
2. The maximum number of points that can be saved is 20.
3. The calibration points are not stored in the configuration as they are specific to the individual Aircom and instrument.
4. Calibration points can be deleted individually and the re- stored as the procedure.
5. To completely erase a calibration set the channel to not configured and download to the Aircom. Then set up the channel again and re-download.

Part VIII Troubleshooting

8.1 Common problems

Transmitter Not Detected
If you have tapped the "CONNECT TO AIRCOM DEVICE" button but no transmitter is detected, one of the following may be the cause:

- **The transmitter was not switched on or has automatically entered sleep mode.** The transmitter automatically enters sleep mode if no connection is made within a certain time.
  SOLUTION:
  (1) Press the back button to return to the Connection screen.
  (2) Switch on the transmitter. (See 6.1 Getting Started)
  (3) Tap "CONNECT TO AIRCOM DEVICE". (See 6.2 Connecting to an Aircom)
- **The configuration app does not have location access.** When your app has been installed and is opened for the first time, it requests permission to access your device's location. If permission is not granted, no devices will be detected.
  SOLUTION:
  (1) Uninstall the app.
  (2) Install the app following the instructions. (See Part V)
- **The device running the app does not have the necessary Bluetooth functionality or has a Bluetooth issue.** (See 5.1 System requirements)
  SOLUTION: Try restarting the device. (For many mobile devices this can be done by keeping the "Power" button pressed for several seconds.) If the problem continues, it may be best to use a different mobile device.
- **When tapping the magnet location the Aircom doesn't wake up.** If the Aircom is running a schedule or has just recently been turned on it may not respond to magnet taps to turn on the Bluetooth. This is because the Aircom needs time to finish is current operations before acknowledging the magnet taps.
  SOLUTION:
  (1) Wait 5-10 seconds for the Aircom to finish its process then re-try tapping the magnet.
  (2) Remove and re-insert the battery, wait a few seconds then re-try tapping the magnet.

8.2 Warnings

Here is some further information about warnings and how to resolve them.

Warning	Screen(s)	Comments
Bluetooth is off.	Welcome Screen	To connect to an Aircom transmitter, you need to switch on Bluetooth on your phone or tablet.
Config needs to be saved to file.	Various	You have made configuration changes in the app that have not yet been saved to file. Navigate to the Dashboard screen and click the "Save" button.
Config needs to be written to Aircom device.	Various	You have made configuration changes in the app that have not yet been downloaded to the connected transmitter. Navigate to the Dashboard screen and click the "Download" button.
If two or more packets become due at the same time, only one will be transmitted.	Transmission Summary Screen	Two or more transmission packets are scheduled. If, in the future, two packets are due to be sent at exactly the same time, only one will be transmitted. If possible, try to arrange schedules so that collisions do not occur. For example, you could set an hourly transmission to be transmitted on the hour (start time 00:00); a daily transmission could be sent at 10 past the hour (e.g. start time 05:10). This way you can be sure both transmissions will always be sent. (The warning will still show.)
Location permission has not been granted.	Welcome Screen (Android only)	To use Bluetooth on an Android phone or tablet, location permission must be granted. If you deny permission when running the app for the first time you will see this message.
Storage permission has not been granted.	Welcome Screen (Android only)	To access the file system on an Android phone or tablet, storage permission must be granted. If you deny permission when running the app for the first time you will see this message.
The Aircom device has not been configured.	Various	No configuration details are held in the connected transmitter. It is either a brand new transmitter or the configuration has been cleared.
The frequency of one/some packets is higher than recommended.	Transmission Summary Screen	One or more packets may be too big to be transmitted at the configured frequency. Try to reduce the size of packets or make them less frequent.
The LoRaWAN App Key of the Aircom device has not been set.	Various	The LoRaWAN App Key has not been set on the Aircom transmitter. The key is needed for the device to transmit packets.
The time of the Aircom device is out by n seconds.	Various	The date and time held by the Aircom transmitter differ from that of the phone or tablet by the specified number of seconds. To correct the time held on the transmitter navigate to the Aircom Device Status Screen and tap UPDATE AIRCOM DEVICE TIME.
Two or more packets have same frequency. Consider merging them.	Transmission Summary Screen	Two or more of the packets are scheduled with the same frequency. It is more efficient to send one larger packet than several smaller packets.

Part IX Certification

9.1 Atex

Certificate Number
SGS24ATEX0006X

Issued 30 July 2024
Page 1 of 5

1 **EU - TYPE EXAMINATION CERTIFICATE**

2 **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU**

3 EU - Type Examination Certificate Number: **SGS24ATEX0006X**

4 Product: **Aircom Ex Mini**

5 Manufacturer: **YZ Systems Limited**

6 Address: **Station House, Station Road, Barlaston, Stoke-on-Trent, ST12 9DQ United Kingdom**

7 This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 SGS Fimko Oy, Notified Body number 0598, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential Report No. **23(C)0422**

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN IEC 60079-0: 2018 EN 60079-11: 2012

except in respect of those requirements listed at item 18 of the Schedule.

10 If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

11 This EU - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of the product shall include the following :

⟨Ex⟩ II 1 G Ex ia IIC T4 Ga (-20 °C ≤ Tamb ≤ +60 °C)

SGS Fimko Oy Customer Reference No. **7967** Project File No. **23/0422**

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Tuomas Hänninen
SGS Fimko Oy

BAS-CERT-070 SGS Baseefa Limited is an associate of SGS Fimko OY Issue 2

13 **Schedule**

14 **Certificate Number SGS24ATEX0006X**

15 Description of Product

Aircom Ex Mini is a self-contained battery-powered communication device capable of collating data from suitably certified equipment located in the hazardous area and transmitting the data via LoRaWAN Radio communication link to a command centre located in the non-hazardous area.

Aircom Ex Mini provides two configurable digital inputs, two configurable 4 – 20 mA loop inputs, four supplies to 4 – 20 mA supplies to external equipment and four RTD connections for connection to the suitably certified equipment located in the hazardous area. The equipment can be configured via a Bluetooth communication link.

The equipment comprises a single printed circuit board encapsulated in an ABS enclosure with an antenna mounted on top. Cable gland entries are provided in the base of the equipment to permit external connections to be made via spring clamp terminals located inside the enclosure.

The equipment is designed to be powered by an Aircom Type ZC-0011 Lithium Thionyl Chloride Replaceable Battery Pack mounted inside the enclosure, that can be changed in the hazardous area.

The equipment may be fitted with or without a HART modem depending on the model selected. The presence of the HART modem is identified as part of the equipment part number allocated to the device. The following part numbers identify how the part number identifies whether the HART Modem is fitted or not.

WTP03-Ex-LDA00-*****-*	Aircom Ex Mini without HART Modem.
WTP03-Ex-LD000-*****-*	Aircom Ex Mini with HART Modem.

Note: The characters identified with a "*" identify parameters that do not or are not impacted by the intrinsically safe assessment.

The input / output and load parameters of the various interfaces are defined below:

Input / Output Parameters

I/O Description	Terminal	Pin No's.	U_o (V)	I_o (mA)	P_o (mW)	C_i (µF)	L_i (µH)	U_i (V)	I_i (mA)	P_i (mW)
Volt-Free Digital I/P 1*[4]	X1	15 w.r.t. 13, 14	7.14	1.53	2.74	0	0	30.00	---	---
Volt-Free Digital I/P 2*[4]	X1	16 w.r.t. 13, 14	7.14	1.53	2.74	0	0	30.00	---	---
RTD / Thermocouple / mV I/P Ports 1, 2, 3 and 4*[1]	X1	Port 1: 10 Port 2: 9 Port 3: 12 Port 4: 11	4.00	10.16	10.16	0	0	9.00	---	---
4-20mA Analogue O/P Port A*[3]	X1	1 w.r.t 5, 7, 13 and 14	23.10	117.20	674.28	0	0	---	---	---
4-20mA Analogue O/P Port B*[3]	X1	2 w.r.t 5, 7, 13 and 14	23.10	117.20	674.28	0	0	---	---	---
4-20mA Analogue O/P Port AL*[3]	X1	3 w.r.t 5, 7, 13 and 14	23.10	98.16	564.34	0	0	---	---	---
4-20mA Analogue O/P Port BL*[3]	X1	4 w.r.t 5, 7, 13 and 14	23.10	98.16	564.34	0	0	---	---	---
4-20mA Analogue I/P Port A*[2]	X1	6 w.r.t 5, 7, 13 and 14	4.00	0.400	0.400	0	0	30.00	188.00	---

I/O Description	Terminal	Pin No's.	U_o (V)	I_o (mA)	P_o (mW)	C_i (µF)	L_i (µH)	U_i (V)	I_i (mA)	P_i (mW)
4-20mA Analogue I/P Port B*2	X1	8 w.r.t 5, 7, 13 and 14	4.00	0.400	0.400	0	0	30.00	188.00	---

Notes:

Where the above terminals permit the connection of a separate intrinsically safe source, the capacitance, and either the inductance or inductance to resistance ratio (L/R) of the hazardous area cable attached must not exceed the values specified on the certificate associated with the separate intrinsically safe source.

*1 The output parameters for the four RTD / Thermocouple / mV I/P Ports are specified for the four ports combined.

*2 The 4-20mA Analogue I/P Port A & Port B are not isolated and therefore must be fed from the same intrinsically safe source.

*3 Functionally only one of the two 4-20mA Analogue O/P's can be normally be energised at one time.

*4 The U_o specified for the Digital I/P Port A & B (Supplied from Ext. IS Source) does not contribute to the spark ignition risk but must be considered for the calculation of load capacitance.

Load Parameters

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the hazardous area load connected to the various I/O connections must not exceed the following values:

Load Parameters 1 – SUPP_420A and SUPP_420B (Pins 1 and 2) Connectors			
	Capacitance, µF	Inductance, mH	Lo/Ro, µH/Ω
Group IIC	0.140	10.35	52.29
Group IIB	1.02	41.42	209.17
Group IIA	3.67	82.83	418.35

Load Parameters 2 – SUPP_420AL and SUPP_420BL (Pins 3 and 4) Connectors			
	Capacitance, µF	Inductance, mH	Lo/Ro, µH/Ω
Group IIC	0.140	14.76	6.01
Group IIB	1.02	59.04	24.04
Group IIA	3.67	118.08	48.08

Load Parameters 3 – RTD Output (Pins 9, 10, 11, 12) Connectors			
	Capacitance, µF	Inductance, mH	Lo/Ro, mH/Ω
Group IIC	100	1377.78	3.50
Group IIB	1000	5511.12	14.00
Group IIA	1000	11022.24	28.00

Load Parameters 4 – Volt Free Digital Input Connections (Pins 15 and 16)			
	Capacitance, µF	Inductance, mH	Lo/Ro, mH/Ω
Group IIC	13.5	59,968.89	12.89
Group IIB	240	239,875.56	51.55
Group IIA	1000	479,751.70	103.11

Load Parameters 5 – 4-20 mA Inputs (Pins 6 and 8)Connectors			
	Capacitance, µF	Inductance, mH	Lo/Ro, mH/Ω
Group IIC	100	888,888.89	88.90
Group IIB	1000	3,555,555.56	355.59
Group IIA	1000	7,111,111.11	711.18

Notes:

1) The above load parameters apply when one of the two conditions below is given:
- the total L_i of the external circuit (excluding the cable) is < 1% of the L_o value or
- the total C_i of the external circuit (excluding the cable) is < 1% of the C_o value.

2) The above parameters are reduced to 50% when both of the two conditions below are given:
- the total L_i of the external circuit (excluding the cable) is ≥ 1% of the L_o value and
- the total C_i of the external circuit (excluding the cable) is ≥ 1% of the C_o value.

The reduced capacitance of the external circuit (including cable) shall not be greater than 1µF for Groups IIB & IIA and 600nF for Group IIC.

The values of L_o and C_o determined by this method shall not be exceeded by the sum of all of the L_i plus cable inductances in the circuit and the sum of all of the C_i plus cable capacitances respectively.

16 Report Number

23(C)0422

17 Specific Conditions of Use

1. Only replace battery with Aircom Type ZC-0011 Lithium Thionyl Chloride Replaceable Battery Pack.
2. The plastic enclosure may constitute a potential electrostatic ignition risk and must not be rubbed or cleaned with a dry cloth or installed in an environment that could generate an electrostatic charge on the surface of the enclosure.
3. When a 4-20 mA loop is supplied from the equipment, the loop shall be a passive device only. The Aircom Ex Mini is not intended to supply active 4-20 mA loop circuits.
4. Inspect the shrouded connections on the ZC-0011 and the equipment prior to installation of a new cell for damage. Seek advice if damage to the shrouding observed.

18 Essential Health and Safety Requirements

In addition to the Essential Health and Safety Requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product, and conformity is demonstrated in the report:

Clause	Subject
1.2.7	LVD type requirements
1.2.8	Overloading of equipment (protection relays, etc.)
1.4.1	External effects
1.4.2	Aggressive substances, etc.

19 Drawings and Documents

Number	Sheet	Issue	Date	Description
WTP03-DRG-0201	1 to 2	A	28/02/24	Aircom Mini Main Assembly Drawing
WTP03-DRG-0205	1 of 1	A	23/04/24	Aircom Mini Battery Assembly
WTP03-DRG-0216	1 to 4	J	13/05/24	Aircom Mini – Transmitter Case
WTP03-DRG-0217	1 to 2	F	13/05/24	Aircom Mini – Transmitter Lid
WTP03-DRG-0213	1 to 2	E	13/05/24	Aircom Mini Battery Enclosure Top
WTP03-DRG-0214	1 to 2	D	13/05/24	Aircom Mini Battery Enclosure Bottom
WTP03-DRG-0215	1 to 2	O	23/07/24	Aircom Mini – PCB Potting Detail

Number	Sheet	Issue	Date	Description
WTP03-DRG-0247	1 of 1	C	30/01/24	Aircom Mini Antenna Bush
WTP03-DRG-0255	1 of 1	E	20/03/24	Aircom Mini Antenna Washer
WTP03-DRG-0252	1 of 1	A	29/02/24	Aircom Mini Gasket
WTP03-DRG-0262	1 of 1	A	17/10/23	Aircom Mini Ribbon Cable Assembly
WTP03-DRG-0613	1 of 9	D	01/05/24	LoRaWAN and Bluetooth (Circuit)
WTP03-DRG-0613	2 of 9	D	01/05/24	Universal Digital Inputs (Circuit)
WTP03-DRG-0613	3 of 9	D	01/05/24	3V3 Supply and Limiting (Circuit)
WTP03-DRG-0613	4 of 9	D	01/05/24	20 V Boost Circuit (Circuit)
WTP03-DRG-0613	5 of 9	D	01/05/24	ADC Inputs (Circuit)
WTP03-DRG-0613	6 of 9	D	01/05/24	Terminal Connections (Circuit)
WTP03-DRG-0613	7 of 9	D	01/05/24	4 – 20 mA Supplies (Circuit)
WTP03-DRG-0613	8 of 9	D	01/05/24	4 – 20 mA Input Circuit (Universal) (Circuit)
WTP03-DRG-0613	9 of 9	D	01/05/24	Boost Circuit Power Limiter (Circuit)
WTP03-DRG-0601	1 of 1	O	22/07/2024	Main PCB: Top Layer
WTP03-DRG-0602	1 of 1	O	22/07/2024	Main PCB: Inner Ground Layer
WTP03-DRG-0603	1 of 1	O	22/07/2024	Main PCB: Inner Power Plane
WTP03-DRG-0604	1 of 1	O	22/07/2024	Main PCB: Bottom Layer
WTP03-DRG-0607	1 of 1	O	22/07/2024	Main PCB: Top Silkscreen
WTP03-DRG-0608	1 of 1	O	22/07/2024	Main PCB: Bottom Silkscreen
WTP03-DRG-0611	1 of 1	O	22/07/2024	Main PCB: Aircom Mini – PCB Construction
WTP03-DRG-0615	1 of 1	C	09/04/2024	LED and Magnet Sensor PCB (Circuit)
WTP03-DRG-0616	1 of 1	O	22/07/2024	LED PCB Layout
WTP03-DRG-0263	1 of 1	---	23/10/23	Aircom Mini LED PCB
WTP03-DRG-0264	1 of 1	A	23/10/23	LED PCB Assembly
WTP03-DRG-0612	1 to 8	C	22/07/24	Parts List
WTP03-DRG-0206	1 of 1	B	22/07/2024	Label Drawing
WTP03-DRG-0208	1 of 1	A	15/07/2024	Aircom Mini Battery Label Drawing

20 Certificate History

Certificate No.	Date	Comments
SGS24ATEX0006X Issue 0	30 July 2024	**Prime Certificate** **Report Number:** 23(C)0422 **Project Number:** 23/0422 **Original issue of the certificate**
For drawings applicable to each issue, see original of that issue.		

9.2 UKCA

Certificate Number
SGS24UKEX0005X
Issue 0

Issued 30 July 2024
Page 1 of 5

1 **UK-TYPE EXAMINATION CERTIFICATE**

2 **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres**
UKSI 2016:1107 (as amended) – Schedule 3A, Part 1

3 UK-Type Examination Certificate Number: **SGS24UKEX0005X Issue 0**

4 Product: **Aircom Ex Mini**

5 Manufacturer: **YZ Systems Limited**

6 Address: **Station House, Station Road, Barlaston, Stoke-on-Trent, ST12 9DQ United Kingdom**

7 This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 SGS Baseefa (a division of SGS United Kingdom Limited), Approved Body number 1180, in accordance with Regulations 42 and 43 of the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016, UKSI 2016:1107 (as amended), certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Schedule 1 of the Regulations.

The examination and test results are recorded in a confidential report identified in the revision table at item 20.

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN IEC 60079-0: 2018 **EN 60079-11: 2012**

except in respect of those requirements listed at item 18 of the Schedule.

10 If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

11 This UK-TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Regulations apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of the product shall include the following:

Ex II 1 G Ex ia IIC T4 Ga (-20 °C ≤ Tamb ≤ +60 °C)

SGS Customer Reference No. **7967** Project File No. **23/0422**

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Registered address: Rossmore Business Park, Ellesmere Port, Cheshire, CH65 3EN

UKAS PRODUCT CERTIFICATION 0191

P OATES
CERTIFICATION MANAGER
On behalf of SGS United Kingdom Limited

BAS-CertUKEX-002 Issue 2

Part X Declaration of Conformity

EU DECLARATION OF CONFORMITY

Name of Manufacturer: YZ Systems Ltd
Address: Station House, Station Road, Barlaston, Stoke on Trent, ST12 9DQ

This declaration of conformity is issued under the sole responsibility of the manufacturer

Object of the declaration: **Aircom Ex Mini – Models: WTP03-Ex-LDA00 and WTP03-EX-LD000**
Aircom Ex is a self-contained battery-powered communication device capable of collating data from suitably certified equipment located in the hazardous area and transmitting the data via LoRaWAN Radio communication link to a command centre located in the non-hazardous area.

The object of the declaration described above is in conformity with:

- Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment
- Directive 2014/30/EU
- Directive 2014/34/EU
- Directive 2014/53/EU

The notified body SGS Fimko Oy, Notified Body number: 0598, has certified the object of the declaration and issued certificate: SGS24ATEX0006X

Applicable Standards:

Reference	Description
EN IEC 60079-0: 2018 EN IEC 60079-11: 2012	Equipment or Protective System Intended for use in Potentially Explosive Atmospheres.
EN 300 386 V1.6.1 EN 301 489-1 V1.9.2	Protection requirements with respect to electromagnetic compatibility.
EN 300 220-2 V3.1.1	Means of the efficient use of the radio frequency spectrum

Signed for and on behalf of: YZ Systems Ltd

Place and date – YZ Systems Ltd, Station House Station Road, ST12 9DQ, UK – *2024-07-31*

Name, function (Signature)

Adam Ryder – QEHS manager

CE

Declaration Number: WTP03-EDC-002, V1.0

USER MANUAL

WTP03

YZ SYSTEMS

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