bettair®
Mapping Air Quality

bettair® Static Node (MK2 Series)

Installation Manual

Contents

Introduction

This document details the procedure to install and power on the *bettair*® static nodes. The *bettair*® static nodes are shipped in sleep mode, that means that only the electrochemical sensors are powered on. This is done to reduce the warmup time once all the electronics is powered on. In this mode the battery last around 30 days.

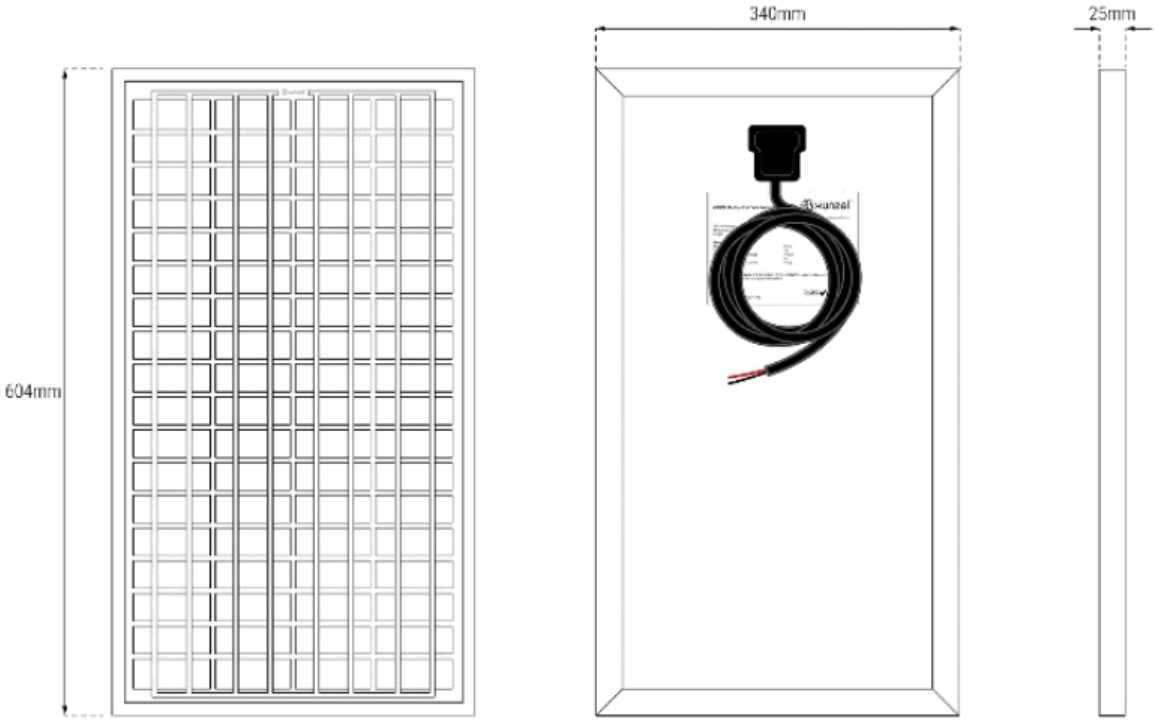
Mechanical installation

Bettair® Nodes

The nodes are provided with a pole/mast attachment for horizontal or vertical mounting to a sign/lamp posts, communication masts, etc. Bettair Cities will provide support for the installation and commissioning of the nodes.

Node must be placed optimally at 3.5m height and at a maximum of 5m height.

Solar Panel (optional)



The optional provided solar panel generates electric power at 20W/12V. Its main features are:

- Monocrystalline solar cells
- Contains Bypass diode (reduces performance loss during shady periods
- Cable + plug to directly connect it to *bettair*® Node or Xunzel® external battery box
- Frame made of anodized aluminium
- Hardened ESG-solarglass
- 10 years performance guarantee
- Dimensions (LxWxD) = 604 x 340 x 25 mm
- Weight = 2,8Kg

Together with the solar panel, a robust wall-mast mounting kit *Xunzel SOLPOlEWALL-M1®* is provided, with all assembly pieces included. This set includes a holder and bolts, which can also be screwed to a brick or concrete wall directly. Main features are

- Anodized aluminum
- Recommended mast diameter: 60mm *

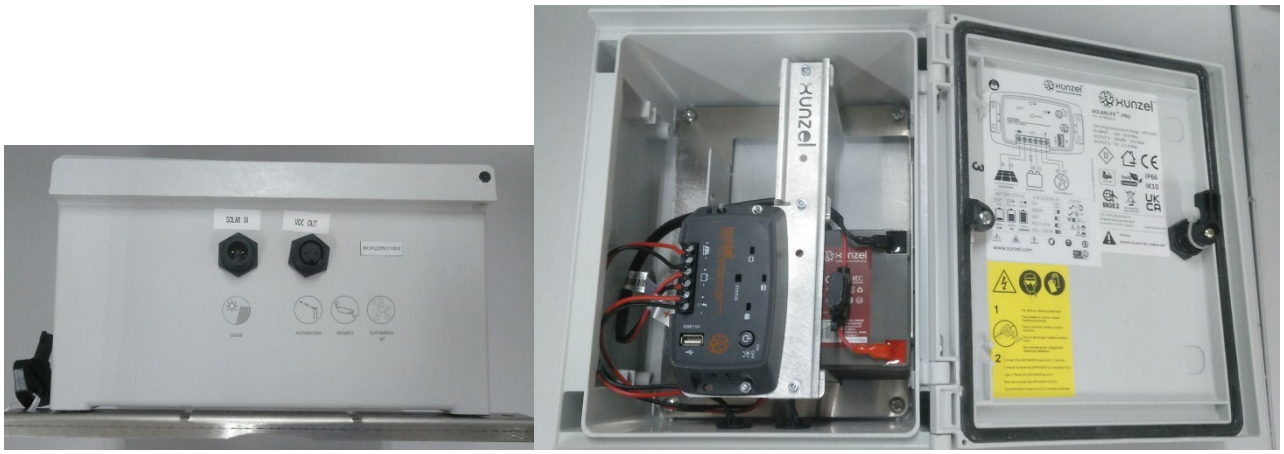
⚠ **For greater diameters (e.g. street light) ask Bettair Cities for recommendations on how to assemble.**

⚠ **Use available tools or ask Bettair Cities for optimal orientation and tilt of the solar panel based on your location. It is a very critical point to make the node work properly.**

External auxiliar battery box (optional)

B*ettair*® MK2.5 nodes can be powered with Solar supply. As an optional accessory, an external auxiliar battery box with it charger can be supplied when node is powered by Solar. The idea of this external box is to get an auxiliar battery, to increase the working time, when the efficiency of solar panel is not enough

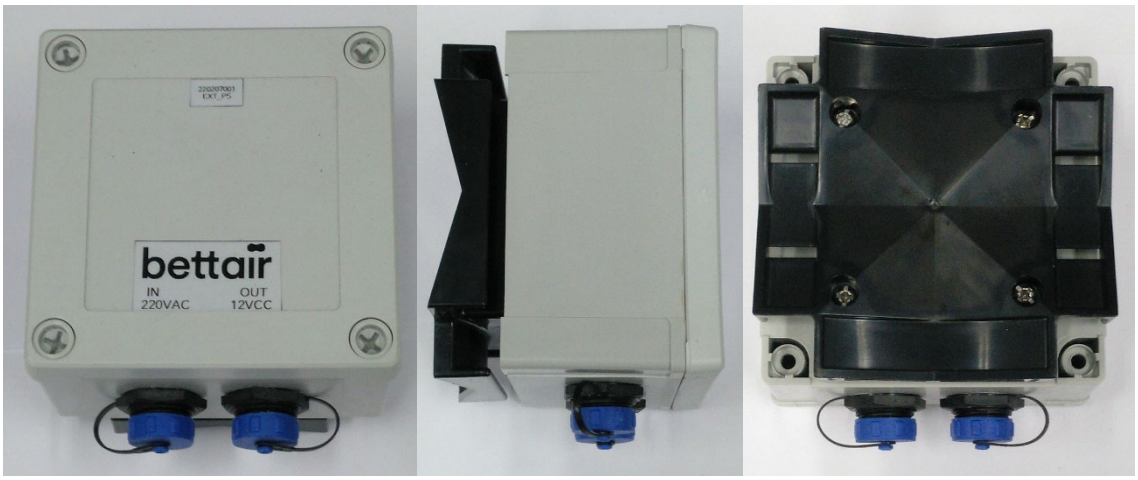
This external box is provided with a pole/mast attachment for horizontal or vertical mounting.
The connectors on box can change in function of the optional accessories f.e. anemometer. All connectors are identified with labels to make easy it installation
There are two connector that always be present on box, these connectors are Solar Panel connector and Direct Voltage out to powered node, other connectors will change in function the accessories demanded. With the box is provided connections wires and installation manual to use the battery charger



External AC power box (optional)

By default, *bettair*® MK2.5 nodes can only be powered with AC **OR** DC/Solar supply. As an optional accessory, an external AC power box could be supplied to power a DC/Solar model with AC mains. The idea of this external box is to let prepared a Solar/DC node to power via AC mains just in case installation scenario is not good enough in terms of solar powering.

This external box is provided with a pole/mast attachment for horizontal or vertical mounting (the same that is included in the node) and is fixed in the same way than the node.



⚠ **External AC box is only used for DC/Solar nodes. If the node is already an AC power model, no DC/Solar box should be used!**

Anemometer (optional)

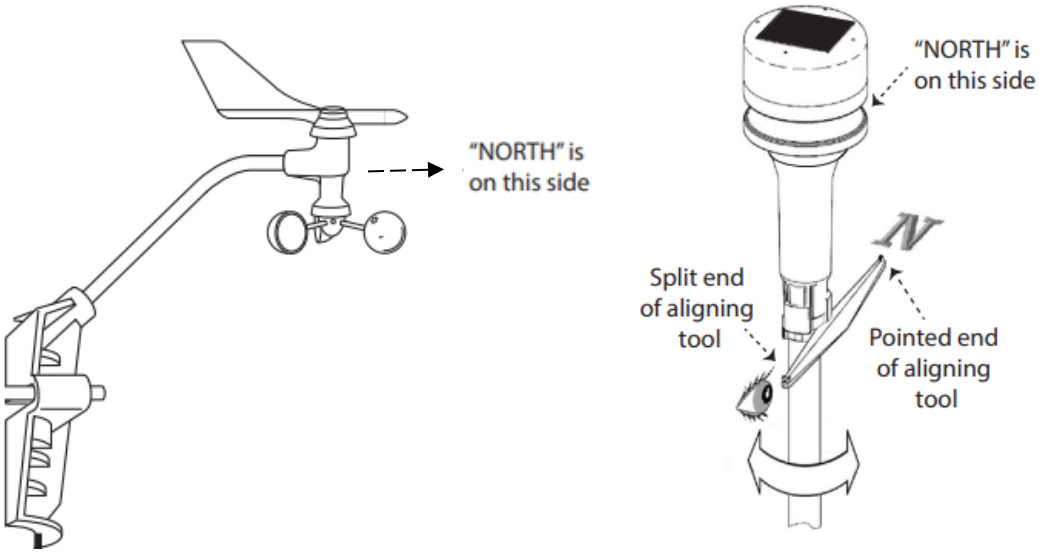
The *bettair*® MK2 series can be used with an option anemometer to measure wind speed and direction). Two options of anemometers are available. The wind vane or sonic anemometer both from Davis Instrument:

Vantage Pro 2 sonic

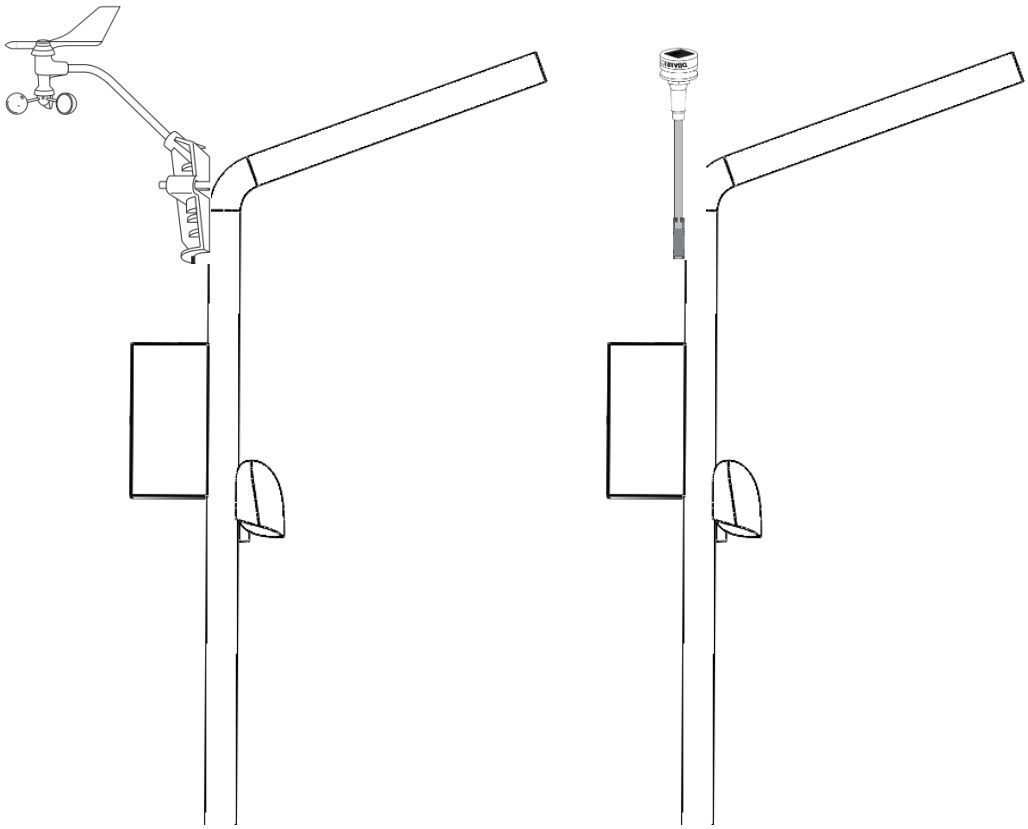
Vantage Pro 2

The assembly of the anemometers will be done following the assembly instructions supplied within it packaging. For the correct operation of the anemometer, it must be positioned accordingly (north).

- For the wind vane anemometer, the arm should be oriented to the north
- For the sonic anemometer, using the orientation tool supplied with the Anemometer



Additionally, for the correct operation of the anemometer it should be installed as high as possible, normally in the highest part of the street light or the elbow (if that is the case). The area must be clear so there is no objects that could block the wind flow on any direction.



Electrical connection of *bettair*® Static Node

The nodes come with two options [1] to power them.

A female connector will be provided with the node for either option. The wiring instructions for the connector can be found here:

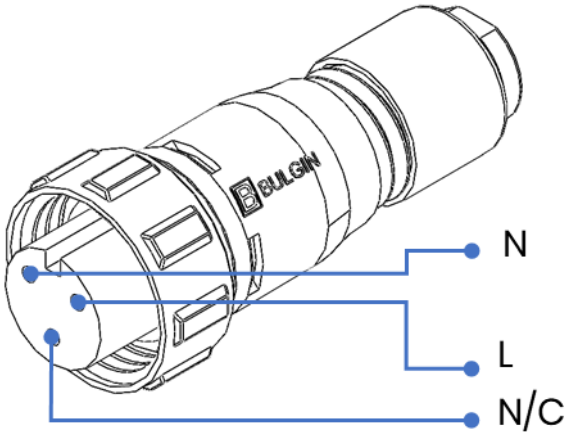
https://www.bulgin.com/products/pub/media/bulgin/data/400SeriesWiring.pdf

To assemble the connector, we recommend soldering the pins.

Connectors

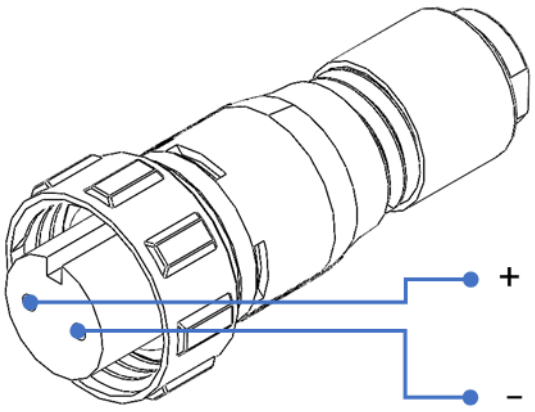
For VAC

The connector part number is PX0410/03S/3035 from Bulgin. The pin out is as follows:



For VDC/Solar Panel

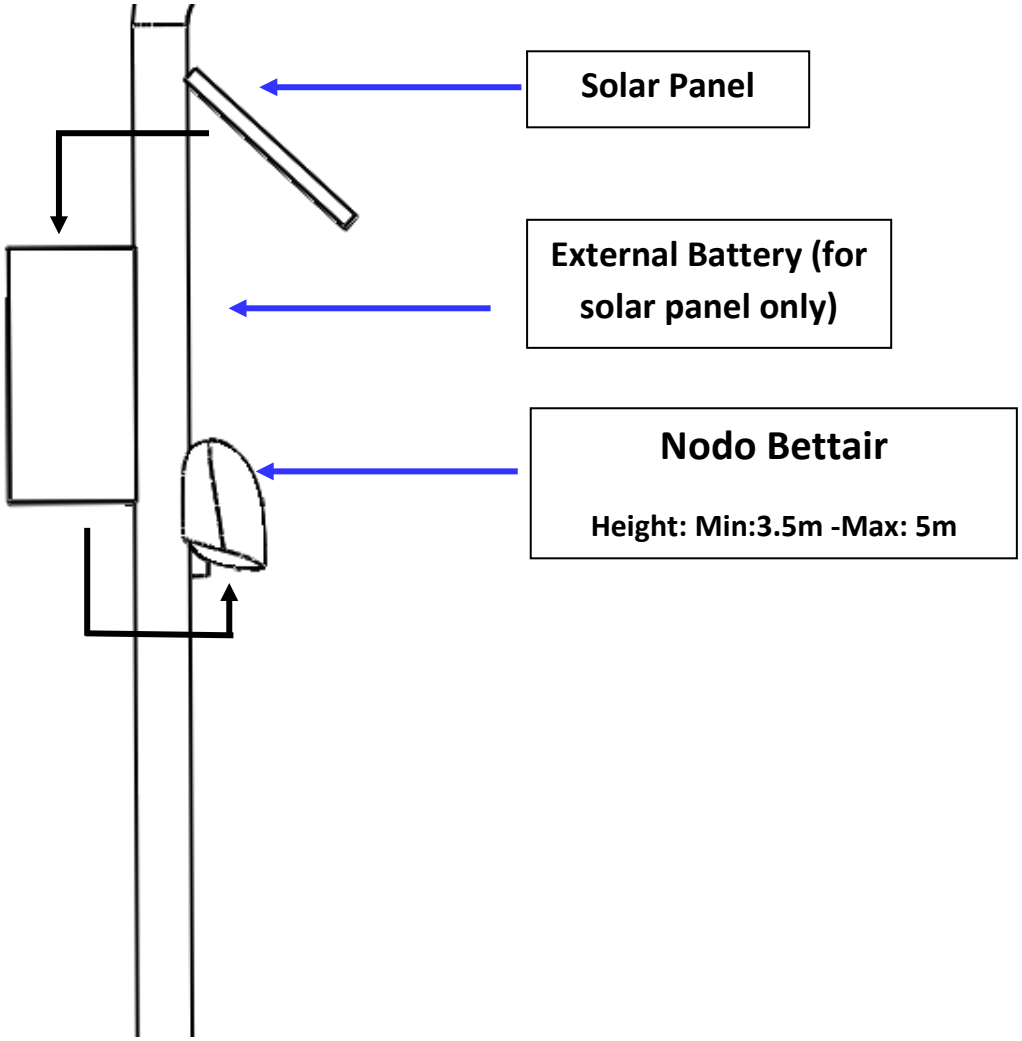
The connector part number is PX0410/02S/3035 from Bulgin. The pin out is as follows:



1 See the "Technical Specifications" document for more details on power options

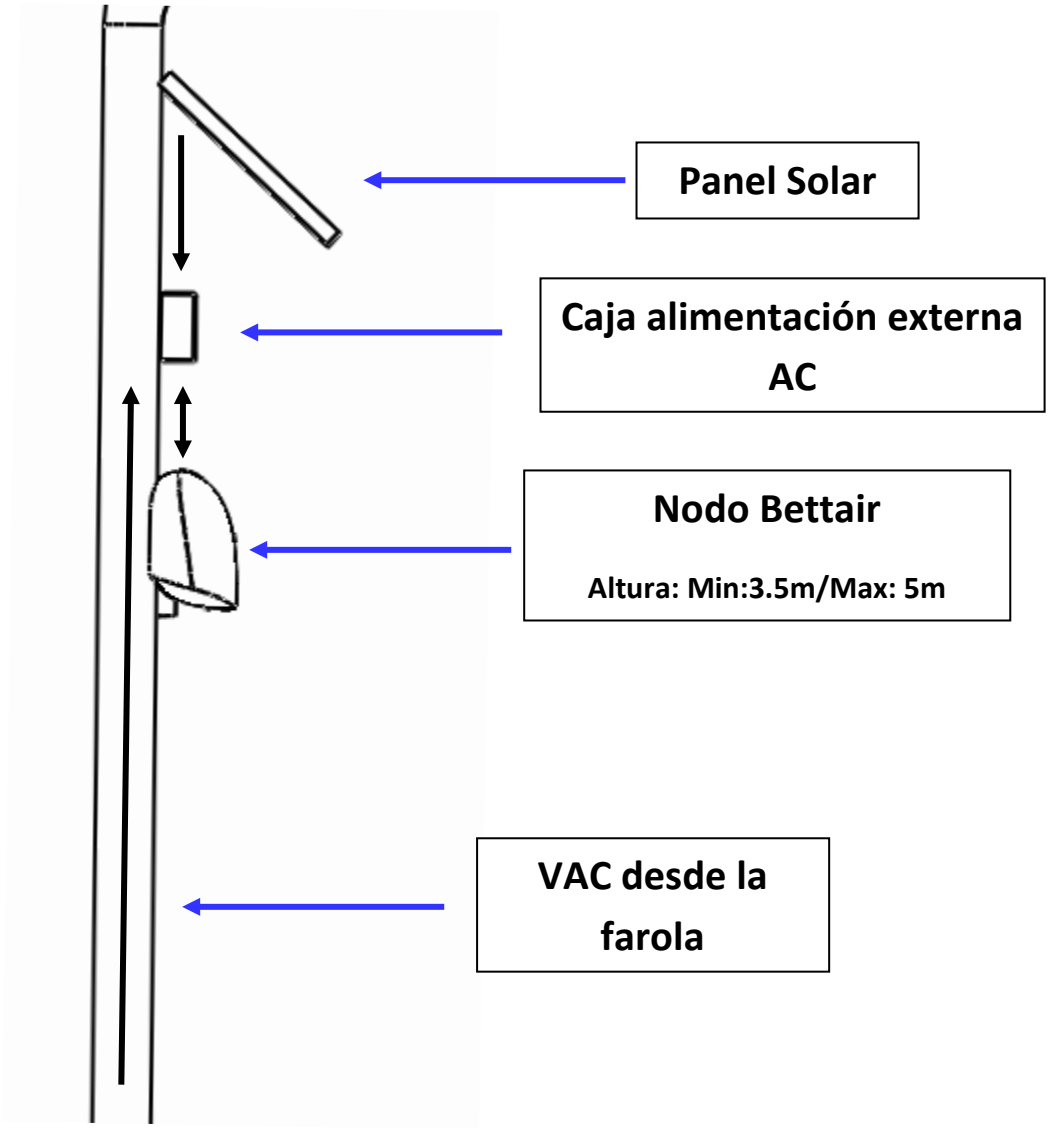
For VDC/Solar Panel + external AC box

Below is the connection diagram of the installation with a solar panel.



For VDC/Solar Panel + optional external AC box

Below is the connection diagram of the installation if using the optional external AC box.

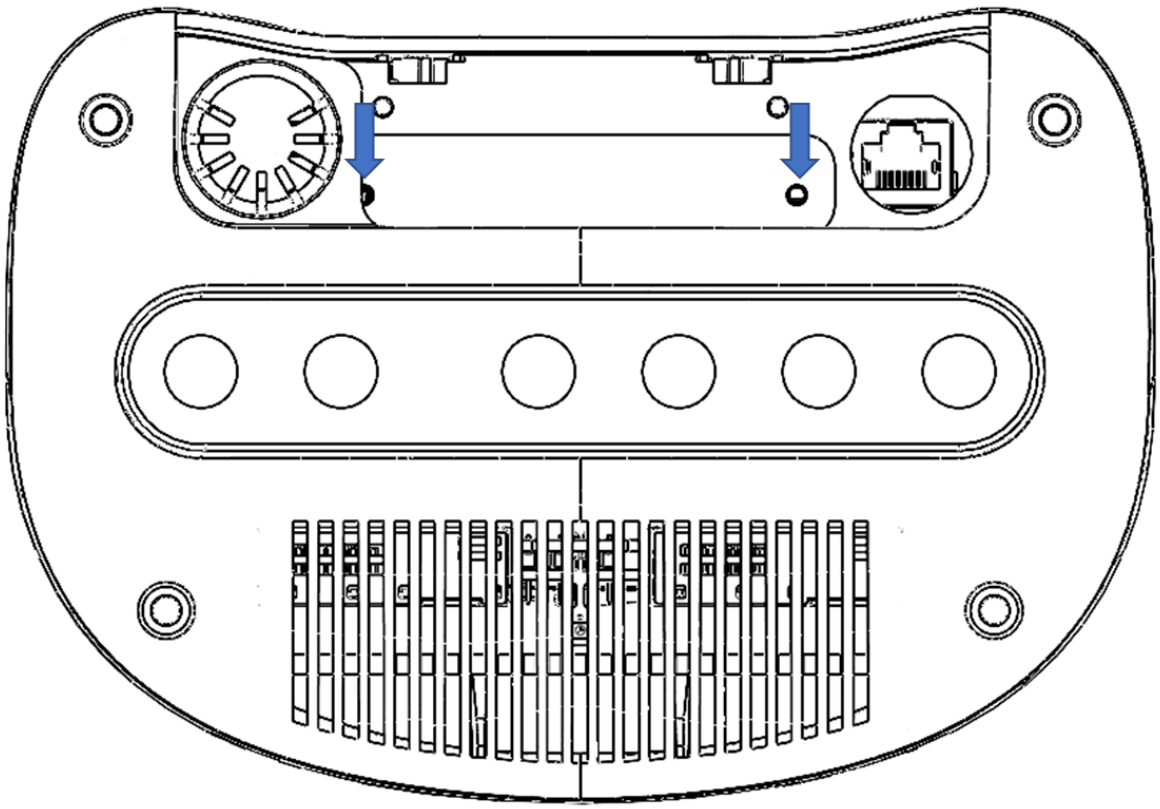


⚠ **Only one powering method is allowed at the same time when using the external AC box the node**

Powering on the *bettair*® nodes

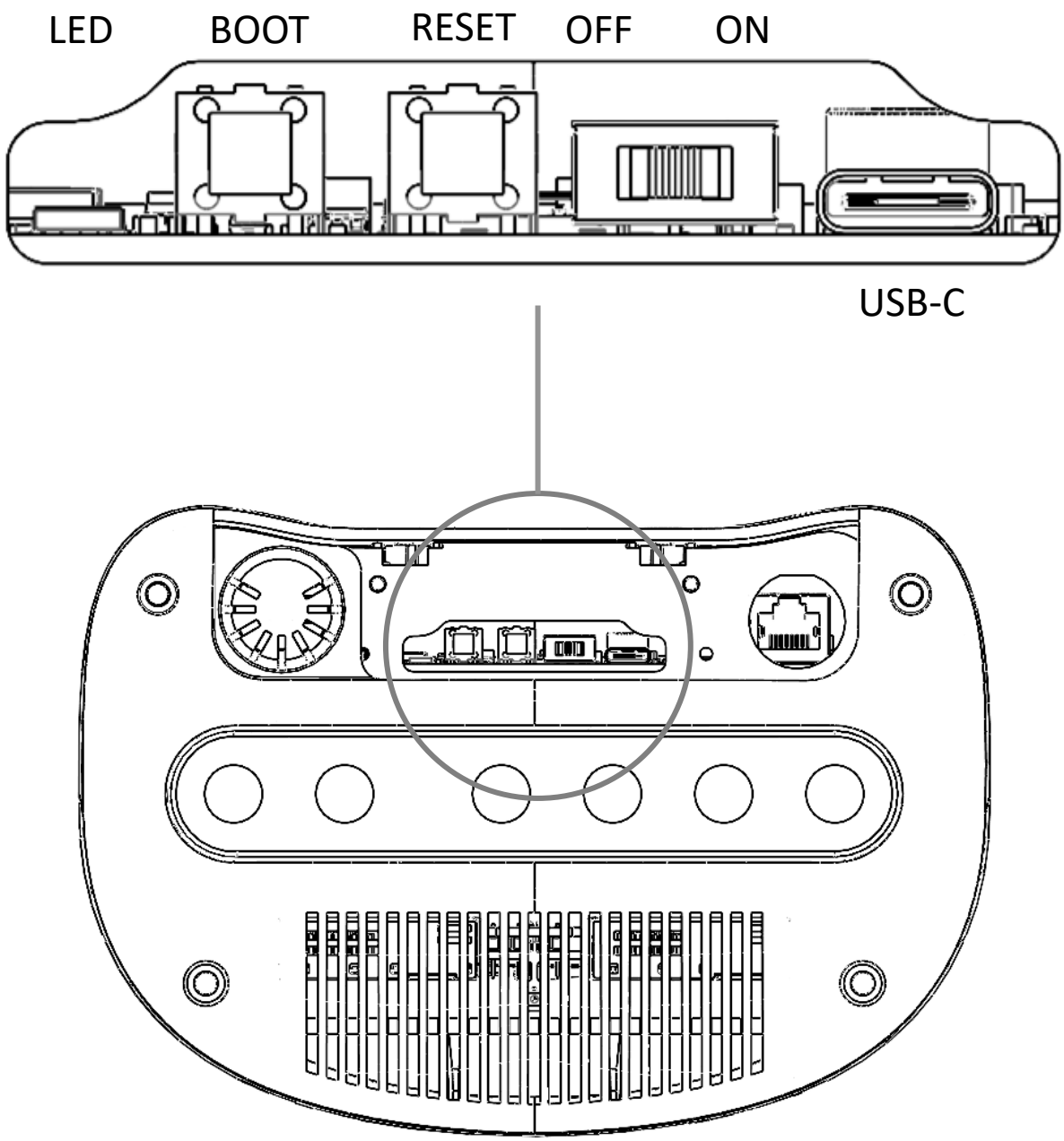
Removing the Port Cover

The first step is to remove the port cover at the bottom of the node. You need to remove 2 screws using an Allen key.



Once the port cover has been removed, you have access to:

1. The Power Switch (to turn on and off the node)
2. USB-C port (for debugging and local firmware upgrade)
3. Boot button (only used for local firmware upgrade purposes)
4. Reset button.



Turning On the Node

Nodes are sent with power switch turned Off by default, just keeping the minimum power to maintain the internal gas sensors in "standby" mode thus avoiding a long warmup when installing the node. All other electronic systems are powered off just to maximize shelf time. If the Power Switch is in the Off position (see image above) just switch it to the ON position.

Verify Node

Immediately after turning on, the integrated RGB LED (visible from bottom of the node) will start blinking red/green for a couple of seconds. Then they will turn off and after some minutes, if the node connects successfully with the server, LEDs will blink periodically blue/green.

Accessing our dashboard with the provided credentials, verify communication coverage. A periodic report could be generated upon request (ask *bettair*® for details)

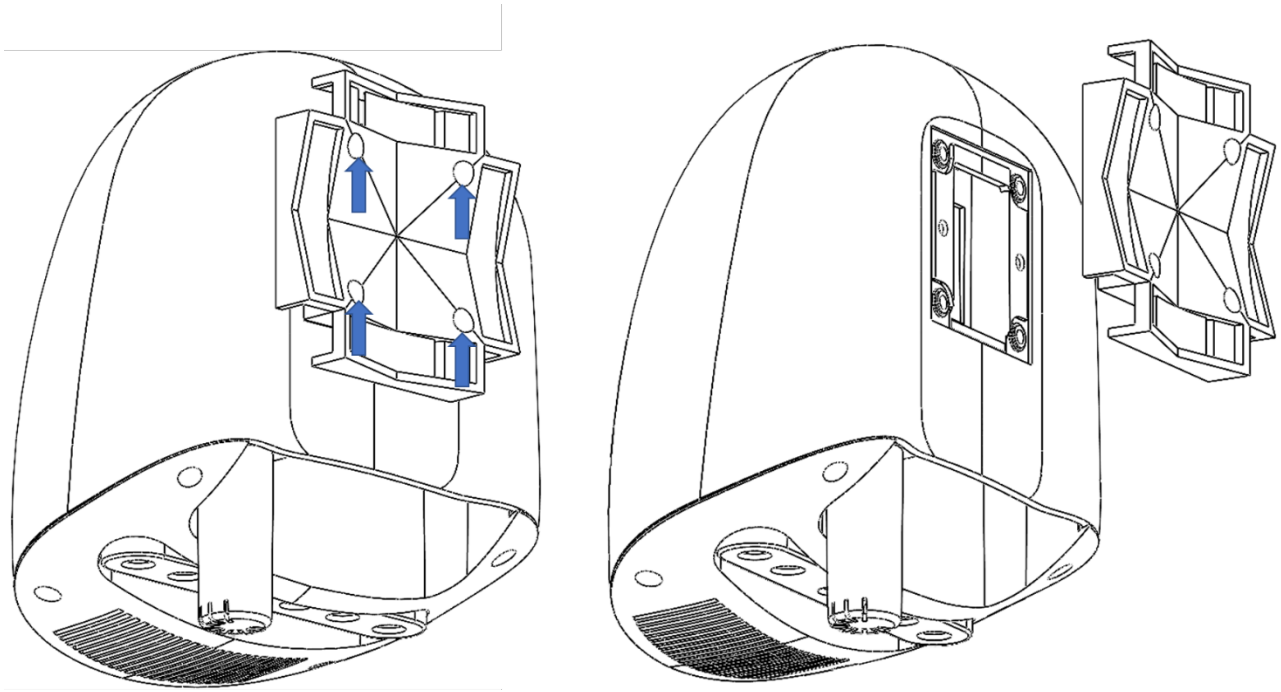
⚠ **It is highly recommended that the coverage verification is also done before the final installation of the node.**

SIM Card Replacement

The Bettair® Node comes with a multi-operator SIM card, nevertheless if the final user wants to use their own SIM card it is possible to change it.

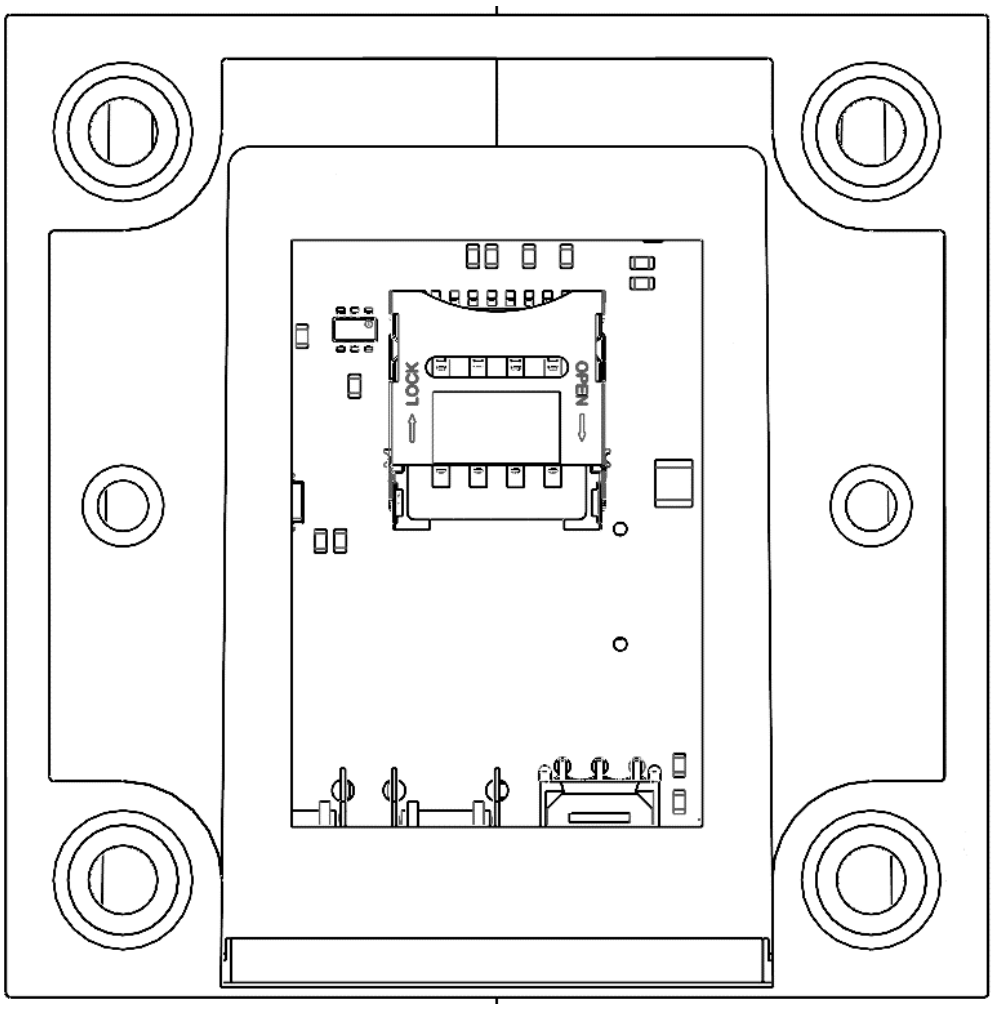
Removing the SIM Card Cover

The first step is to remove the SIM Card cover located at the back of the node. Four screws must be removed as shown in the image below:



Replacing the SIM Card

To replace the SIM card, the metallic part of the SIM Card holder must be push down. This will allow to lift it up to remove the old SIM card and insert the new one. The new SIM card must be placed in the same way (facing down) as the old one. Once the SIM card is in place, the metallic part can be place it back down and then pushed up to lock it.



About Bettair Cities

Bettair is a Platform as a Service (PaaS) that permits, for the first time, to map air pollution in cities on a previously unimaginable scale based on a large deployment of outstandingly accurate gas sensors by using an advanced post-processing algorithm. This information allows applying appropriate urban plans for enhancing air quality and to make smart and better decisions to mitigate air pollution. Bettair is a network of autonomous devices that are installed in streetlights (or in city furniture) in a dense matrix distanced between 0.5-1 km allowing a high spatial and temporal resolution.
https://bettaircities.com/

Title	*bettair*® static node (MK2 Series) – Installation Manual	
Document type	User procedure	
Document number		
Revision and date	V1.3	2022/09/10