PROFESSIONAL AIR MONITORING SYSTEMS

TURTLE

COD. 801589

PM10 - PM2,5 - TEMPERATURE- HUMIDITY

USER'S MANUAL

Table of Contents

1. Intended Purpose

The Turtle Station is an outdoor air quality sensor unit. It was developed to be a robust and safe device for measuring air quality and detection of fine particulate matter. Collected data is sent via WiFi into the residential home network and transmitted through the internet to the main servers. The Turtle Monitoring Station was developed in collaboration with the national research council of Italy.

Please read and follow all instructions in this manual with great care.

2. Classification of Equipment

ABS Enclosure (Protection of Harmful Ingress of Water)	IP44 Classification (outdoor use)
Optional Power Supply (as backup to photovoltaic panel)	IP20 Classification (indoor use)
Mode of Operation	Continuous

3. Warnings

General Warnings
CAUTION: To avoid the risk of electric shock.
CAUTION: No modification of this equipment is allowed.
CAUTION: Do not restrict the air flow of the product.
CAUTION: Not to be used by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction. Children should be supervised to ensure that they do not play with the appliance.
CAUTION: Avoid deploying the device in a soot environment, with excessive dust particles or high humidity.
CAUTION: The module should avoid contact with organic solvents (including silica gel and other adhesives), coatings, pharmaceuticals, oils and high-concentration gases.
CAUTION: The module cannot be used in the environment containing corrosive gas for a long time. Corrosive gas will damage the sensor.
CAUTION: Do not use this module in systems involving personal safety.

4. Contents of the box

- open and unpack with care
- check contents for transport damages
- read the whole manual before starting sensor

Turtle Station

Optional Charger

QR code with link to onboarding guide

Items shown here may differ from the original provided in this package. Due to the production process the appearance and colors of images in the manual may differ within reasonable boundaries from the original .

5. Instructions for placement and setup

Keep away from any direct source of smoke, dust, heat and water.

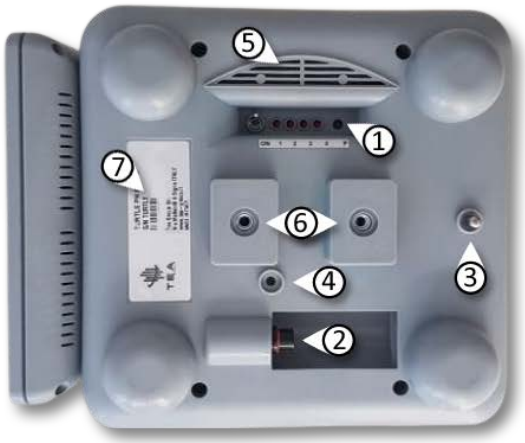
Install on a level surface that is stable and where there is no risk of the sensor being pushed over. Do not place it on soft materials and make sure the bottom airflow is never blocked.
Make sure the solar panel is well illuminated by sunlight during the day and faces the direction of the sun. You can find guidance on the internet about which is the best direction (depending on your geolocation and time of the year) to face any solar panel to get the maximum amount of sun hours covered during the day.
Clean the glass surface of the photovoltaic solar panel with a soft damp cloth every month or if you notice any dirt on it. Handle the panel with care and make sure to not leave any scratches.

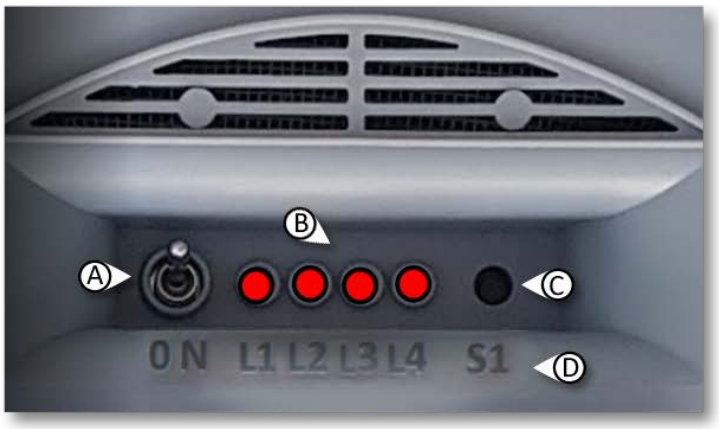
Do not expose the sensor to risk and place it stable

Do not put it directly on plants or the airflow gets blocked

6. Instructions for Installation and starting

Turtle overview and controls on bottom side :





1) Control panel (see details on right)
2) Plug connector for power supply (optional)
3) Temperature sensor
4) Air intake for AQ sensor
5) Air outtake
6) Optional mounting arm sockets
7) Sensor label with identification serial

A) Power switch (ON-OFF)
B) 4 Status LEDs (see table below)
C) Push-button (to get Provisioning)
D) Orientation Legend

START

1. Switch the Power switch to ON. (make sure sensor is fully charged by sun or power supply)
2. Onboard Turtle and set up the WiFi connection (Use provided link or QR code)

*To Provision the sensor press and hold the button “P” and switch the Power switch to ON.

1. LED L1 is on when charging with the external power supply.
2. LED L2 + L3 + L4 will flash synchronously (2 flashes per sec), during the first start-up, with the sensor not configured.
3. After configuration LED L2 + L3 + L4 will flash synchronously (1 flash per second for a short time) during boot phase. Then only LED L2 will flash (1 flash every 5 seconds) and the LED L3 & L4 will remain off.
4. Approximately every 15 minutes LED L3 will flash with LED L2 at L1 flash per second, indicating sensor data acquisition.
5. Every 24 hours, LED L4 will flash with LED L2, about one flash per second , indicating GPS data acquisition.
6. In some cases the acquisition of GPS data may coincide with the acquisition of sensor data, in this case we will see: LED L2 + L3 + L4 flash synchronously at one flash per second.
7. In the fail condition, L2 will flash, about 5 flashes per second, the status of L3 or L4 is irrelevant to the signal.

LED Status Table. Error codes and Flashing patterns explanations

LED 2	LED 3	LED 4	flashing per second	Time laps	STATUS	solution
yes	NO	NO	5x per second	infinity	FAIL condition	Restart
yes	yes	yes	2x per second	Until APP “ON”	In provisioning	Wait...
yes	yes	yes	1x per second	15-30 sec	In acquisition	Wait...
yes	NO	NO	1x per 5 seconds	15 min	working	/

7. Technical specifications

Power Requirements: Solar panel included

Internal lead acid battery (Optional: a backup charger with Input: 100/240V ~ 50/60Hz 0,85A
Output 6,0 V = 2,4A 14,4 W IP20

SENSORS	Type	Units	Range#1	Resolution#3	Accuracy#4
Particles PM10#5	Optical particle counter	µg/m3	0-1000 µg/m3	1.0	10%
Particles PM2.5#5	Optical particle counter	µg/m3	0-1000 µg/m3	1.0	10%
Air temperature	Solid state	°C	-20 / + 70	0.3	5%
Air humidity	Solid state	%	0 – 100	1.0	5%

Enclosure	Environmental	Mounting	Size & weight
ABS, protection IP44	Temperature range: -20°C to +70°C Humidity range: 0 to 100% RH Tested	Outdoor Mounting:	Length: 210 mm Height: 220mm Weight: 3,4kg Mount: 350mm x 120 mm x 0,4 Kg

Communications	Measurement period	Transmission frequency	Server software	Data access
Raw data sent to remote server via WiFi Connection	30 seconds	15 minutes	Web browser based, processing of sensor output to give reading, database storage on secure server	Tables, graphs, data download, multi-user access, optional API data access

8. Maintenance

Turtle stations were tested in extreme environment and harsh conditions and resulted to be a robust and reliable outdoor sensor unit. The sensor requires periodical maintenance, periodical recalibration and periodical cleaning procedure is suggested.

Clean the glass surface of the photovoltaic solar panel with a soft damp cloth every month or if you notice any dirt on it. Handle the panel with care and make sure to not leave any scratches.

For calibration procedures it is necessary to use a certified laboratory. Standard maintenance and cleaning procedures can be operated by the users.

Never open or manipulate the device, it will render the guarantee void and is dangerous.

9. Guarantee

The Turtle sensor device is covered by legal guarantee as described in the European directive (EU) 2019/771

DIRECTIVE (EU) 2019/771 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

10. Optional parts

External battery charger for Turtle Input: 100/240V ~ 50/60Hz 0,85A
Output 6,0 V = 2,4A 14,4 W IP20 ; Wire 3500 mm .

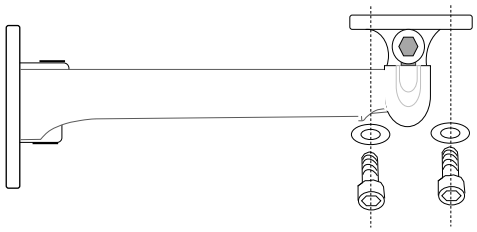
(To order: choose plug and relative code)

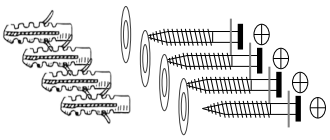
802066-1 Eur

802066-2 US

802066-3 UK

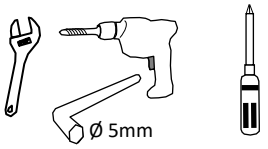
801070 METAL MOUNT ARM WITH ACCESSORIES



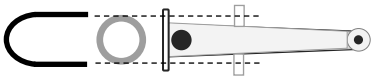


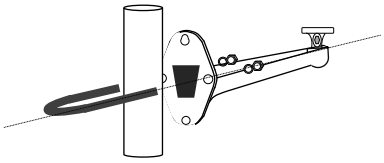
Optional support mount and fixture accessories for on wall or on pole installation instead of regular stand-alone installation on flat surface.

TOOLS REQUIRED



MAX DIAMETER Ø55mm

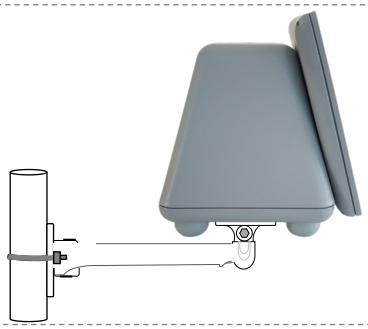


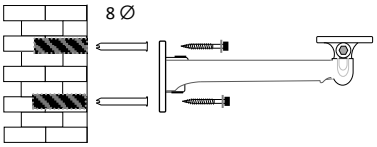


MOUNTING TURTLE ON VERTICAL POLE

use level

1. TIGHTEN METAL BRAKET TO VERTICAL POLE
2. ASSEMBLE TURTLE ON METAL BRAKET

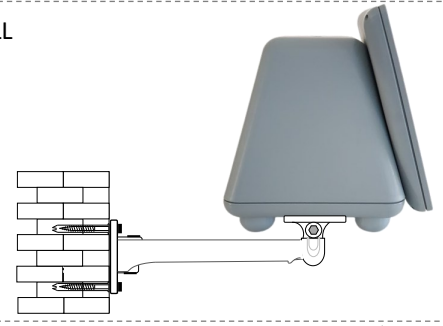




MOUNTING TURTLE ON THE WALL

use level

1. DRILL HOLES WITH THE PACKAGING CARDBOARD TEMPLATE
2. ASSEMBLE TURTLE ON METAL BRAKET



ORIENTATION

1. LOOSEN HEX SCREW
2. ORIENT TOWARDS THE MAJOR SUNLIGHT SOURCE
3. TIGHTEN HEX SCREW