USER MANUAL

WT1 – V1.3

Updates

INDEX	DATE (MM/YYYY)	MODIFIED PAGES	NOTES
A	06/2020	All pages	WT1 V1.3 initial release
B	04/2022	All pages	Certification adaptation + rebranding

TABLE OF CONTENTS

1 INTRODUCTION

This User Manual is intended to help users install and use their WT1 – V1.3 device.
It has been designed to answer all your questions and advise you about the device, its features and functionalities.
This guide does not concern the use of the Ellonasoft platform and the visualization and processing of the data collection. For that, please, refer to the Ellonasoft user manual.

2 SAFETY INFORMATIONS

Used symbols

I	Device on
O	Device off
	Attention, refer to the user manual
	Caution, risk of electric shock (high voltage)
	Caution, hot or high temperature surface
	Caution, electrostatically sensitive equipment
	Warning, risk of explosion
	Warning, risk of fire
	Warning, toxic products
	Caution, corrosive
	Attention, biological risk
	Warning, harmful or irritating
	See the documentation
	Wear protective goggles
	Wear protective gloves
	Unplug the device.
	Do not dispose of this electronic equipment with household waste, contact a sorting center.

Each analytical instrument has specific hazards, so be sure to read and observe the following precautions. They will help you ensure the safe and long-term use of your WT1 system.

The user must be warned that the use of this equipment in a different manner than the one specified by the manufacturer may impair the protection of the equipment and result in the loss of the guarantee of this equipment.

Changes or modifications made to this unit that are not expressly approved by the conformity department may void the user's authorization to use the equipment and cause the loss of warranty of the device.

When using the WT1 system, follow the generally accepted procedure in the field of quality control and method development.

It is the user's responsibility to inform Ellona maintenance personnel before any intervention when the instrument has been used in air containing harmful, toxic, radioactive or biological products.

Electrical hazards

Before connecting the AC power to this instrument, make sure that the voltage/power corresponds to those to which the device is intended. Make sure that you are able to provide a connection in accordance with the local regulations.
Check the identification plate on the instrument's power supply. When using an extension cord, make sure that its characteristics (cable section, power supported) are sufficient.

The supplied power cord must be inserted into an outlet without the need for protective grounding contact as the power supply box operates in a double-insulated fashion. Any attempt to tamper with or disconnect these connections could endanger you and/or damage the WT1 system. You do not need to modify the electrical connections or the instrument chassis to ensure safe operation.

The power supply of the instrument is connected to an AC power source and some of its internal components are subject to dangerous voltages.
These components (such as circuit boards, wiring) are protected by lids, making accidental

contact impossible.
Unless otherwise indicated, never operate the instrument without the lids and do not drop them when the power is plugged in or switched on.

If the power cord or the power unit are damaged, it represents a risk of electrical insulation and a fire hazard. Prohibit the use of the device until the cable / unit is replaced by a regulation-compliant model. Replace the power cord / unit with a model of the same type / size / characteristics.
If necessary, contact your ELLONA representative to obtain a new cord or unit.
If a cord / unit is different from the original must be used, make sure that it complies with the applicable safety standards and that its characteristics (nominal powers) are sufficient.

Do not turn on the instrument if you think it has suffered electrical damage. Instead, unplug the power cord and contact a ELLONA representative for a product evaluation. Do not attempt to use the instrument until it has been evaluated.
Electrical damage may have occurred if the WT1 system exhibits visible signs of damage, exposure to liquids, or has been transported under severe stress.
Damage may also result if the instrument is stored for prolonged periods under unfavorable conditions (e.g. heat, water, etc.).

To avoid damaging electrical components, do not disconnect the device when switched on. After switching the power off, wait about 30 seconds before disconnecting the power outlet.
Never attempt to repair or replace any components of the instrument that are not described in this manual without the assistance of a ELLONA representative.

To avoid any injury, adopt safe laboratory practices when handling solvents. Know the physical and chemical properties of the solvents you use, refer to the manufacturer's safety data sheets.

Cleaning:

- Only maintenance personnel authorized by ELLONA is allowed to clean the inside of the unit.

To clean the external surfaces of the instrument:

- Unplug the power supply.

- Use a soft (neither harsh or abrasive) and dry brush to remove dust.
- Do not use compressed air or solvents that may damage the surface.
- Be careful not to spill liquids inside the device.

3 COPYRIGHT

The information contained in this manual may be modified without notice.

INSTRUMENT SERIAL NUMBER: this one is indicated on a label at the bottom of the instrument manufactured by ELLONA.

4 WARRANTY

ELLONA warrants this product, parts and labor, for one year from the date of dispatch.
If the product appears defective during the warranty period, ELLONA, at its discretion, undertakes either to repair the parts with free labor or to exchange the defective part.

To obtain the application of the warranty, the customer must inform ELLONA of the defect before the expiration of the warranty period and arrange the appropriate provisions for the repair of the product/part.

This warranty does not apply to the defect, failure or damage caused by improper use or failure to comply with the instructions given by ELLONA.

ELLONA is not obliged to repair the damage in the following cases:

- People who do not represent the company ELLONA and are trying to repair the product.
- Improper use or connection incompatible with the equipment.
- product modification or integration with another device increases the time and/or difficulty of the repair.

Warning: Opening the device for any reason will cause the loss of its warranty.

The warranty of this product, which is given by ELLONA, replaces any other warranties, express or implied. ELLONA disclaims all implied warranties of merchantability and fitness for a particular purpose.

ELLONA and its representatives cannot be held responsible for any incidental or consequential damage caused by failure to comply with the prior warnings regarding the possibility of such damage.

5 UTILITES AND FEATURES

5.1 General view of the ELLONA WT1

The ELLONA WT1 is an outdoor device for the monitoring of odors, particles, air pollutants and gases. The instrument is based on a network of sensors: it is equipped with 4 MOS sensors and several electrochemical cells to choose according to the need. It can be equipped with optional sensors for measuring particles rate, noise, and volatile organic compounds.

The ELLONA WT1 allows you to:
- Monitor emissions of gases, fine particles and volatile organic compounds 24/7
- Receive real-time online alerts
- Identify and monitor odor nuisances

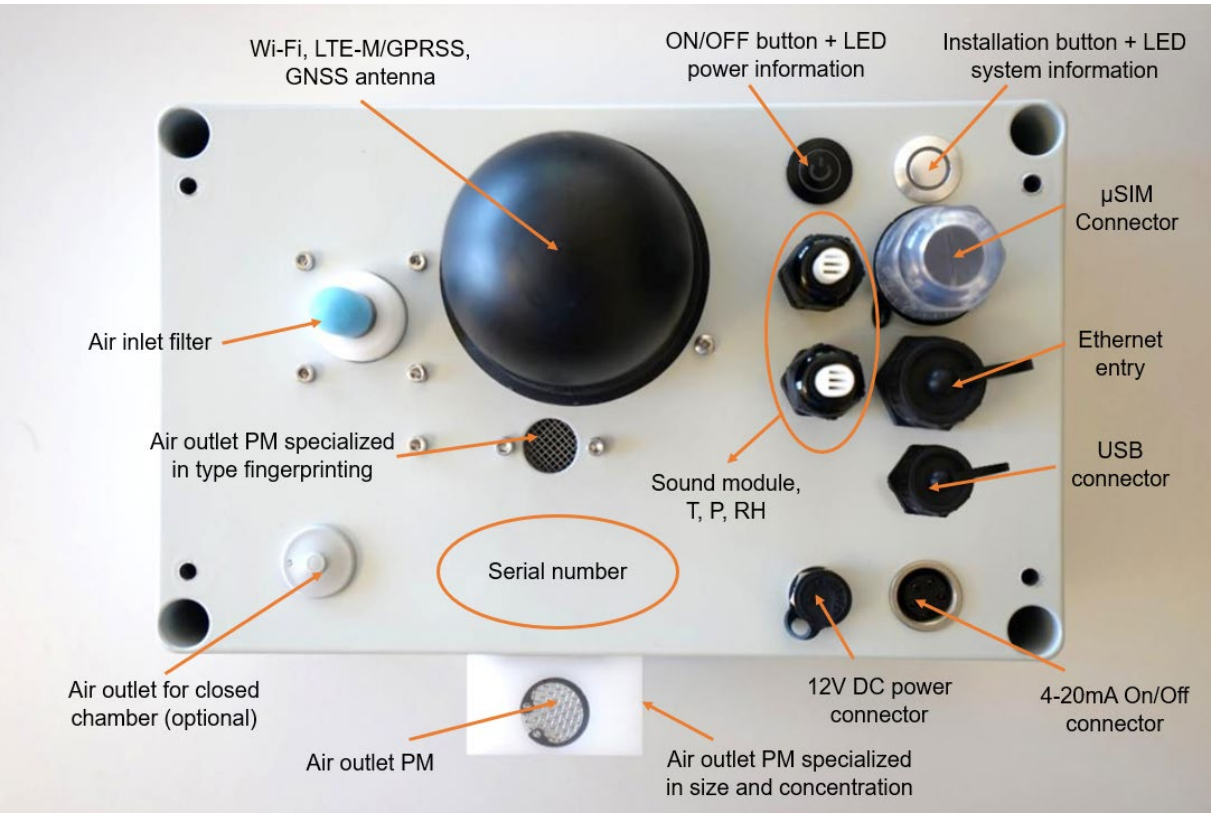


Figure 1

For maximum measurement quality, we strongly advise you to change the air filter every 2 months. The WT1 is originally delivered with another filter.

ELLONA WT1 specifications

- Alarm mode on all measuring channels (trigger thresholds)
- Online measurement and data storage for 2 years
- Software on secure servers and online updates

5.2

- Communication via Ethernet, LTE-M (GPRS if LTE-M fallback) or WIFI
- Odor data banks (musty, solvents, cigarette, sewage system, etc.)
- 4 MOS micro-sensors for perimeter line monitoring and source identification
- Electrochemical sensors for different gases (contact us for the selection of sensors and the list of available ones)
- Optional solar version with an autonomous rechargeable battery

Electrical specifications:

	Min	Typical	Max	Unit	Commentaries
Power consumption		4.5	6	W	6W at start up, then 4.5W means
Main Supply Input voltage	9	12	15	V_{DC}	Not exceed 15V
Relay voltage			24	V_{DC}	Recommendation to use a certified supply for relay
Relay current			2	A	
“4-20 output” voltage	7.5	12	24	V_{DC}	Recommendation to use a certified source for 4-20 mA signal
“4-20 output” current	0.2		25	mA	-

Environmental specifications

	Min	Typical	Max	Unit	Commentaries
Optimal operating temperature	-10	-	40	°C	See optimal temperature range in 6.2.1
Optimal humidity conditions	10	-	90	%RH	See optimal humidity range in 6.2.1
Altitude			4000	m	

ELLONA WT1 diagram and dimensions

Note: dimensions are measured in mm. Also, depending on the version of the WT1, the position of the air outlet, sockets and modules may vary.

5.3

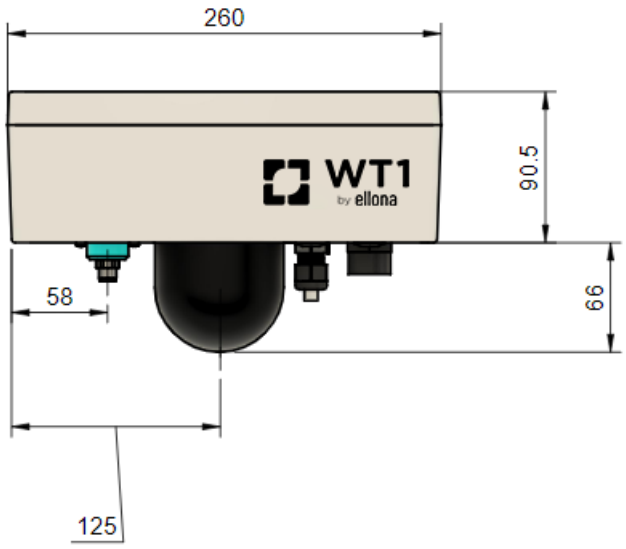


Figure 2

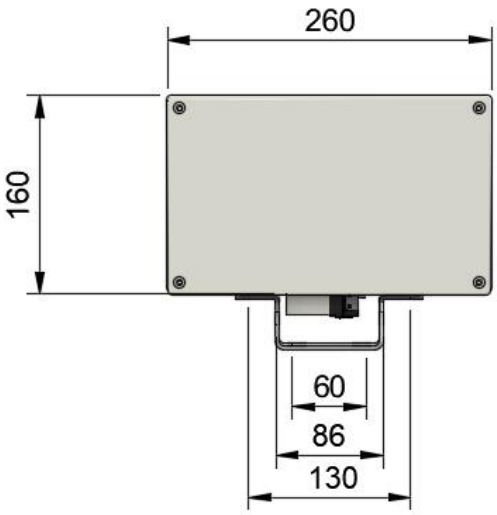


Figure 3

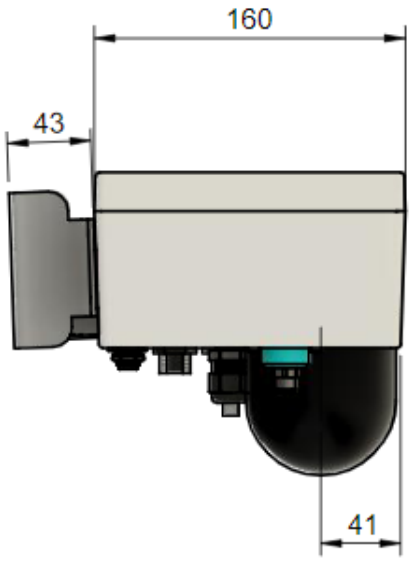


Figure 4

5.4 Assistance

You can download and print the WT1 user guide (PDF) from the Partners Repository.

For any questions, we invite you to contact us by e-mail: service@ellona.io or via our website: www.ellona.io/contact.

6 INSTALLATION PROCEDURE

6.1 Unboxing the system

The Ellona WT1 system is delivered in a single box.

Carefully unpack the unit and make sure you have all the required parts and tools for the installation. Use the list provided to make sure that everything is available.

6.2 Installation

Before starting the installation of the Ellona WT1, verify that the safety standards, rules and procedures are well respected. This includes obtaining permissions to install the device and viewing the safety data sheets.

Do not open the device.

6.2.1 Preparation before installation

To determine the installation location of the device, use the following criteria:

- EMC certification, when necessary
- Classification of the area, specified by the customer
- Extreme temperatures, exposure to corrosive gases

Exposure to extreme temperatures and humidity can cause board and sensor malfunction through oxidation and corrosion. Exposure to corrosive gases also degrades sensor response and board electronics

Temperature operating range		
Critical	-30 °C to +60 °C	≤1h per 24h
Bearable	-20 °C to +50 °C	≤3h per 24h
Optimal	-10 °C to +40 °C	Continuously

Humidity operating range		
Critical	0% to 100%	≤1h per 24h (no condensation)
Bearable	5% to 95%	≤3h per 24h (no condensation)
Optimal	10% to 90%	Continuously (no condensation)

Cooling and environment

Even if the instrument does not produce smoke during normal use and does not require any ventilation ducts, adequate ventilation is still important.

The allowed temperature range is from -30 °C to +60 °C.

6.2.1

6.2.2 Installation of the device

On a wall type support

6.2.2.1

There are 4 fixing screws with a maximum diameter of 6 mm.
See figures (Figure 5 to Figure 8).
First screw the fixing piece onto the wall and then mount the WT1 on it (using 4 5mm Allen head screws).

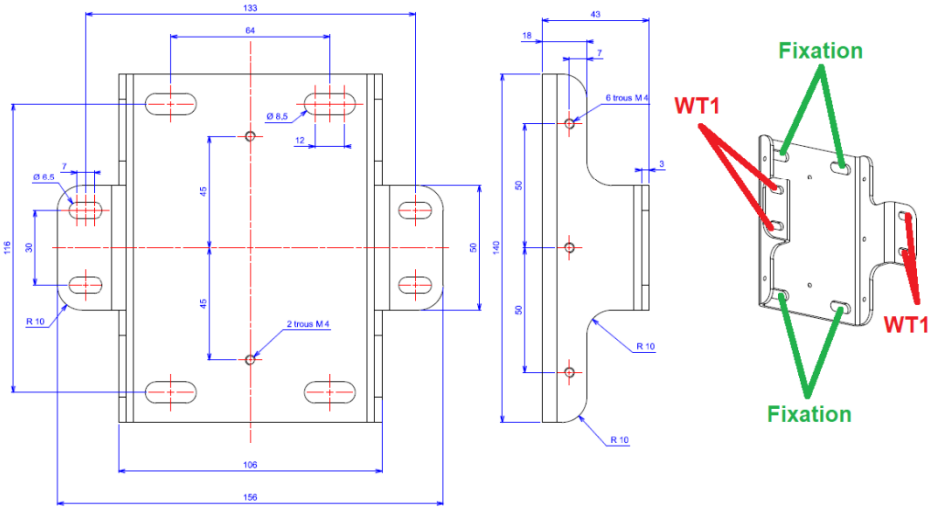


Figure 5

Figure 6

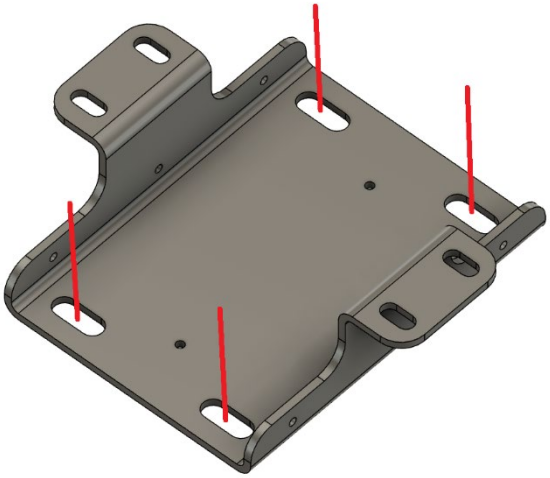


Figure 7

6.2.2.2

On a « pole » type support

Use flanges of 55 or 60 mm wide and 6mm in diameter with appropriate washers.
It is advisable to first install the flanges and the support on the pole and then the WT1 on the support.

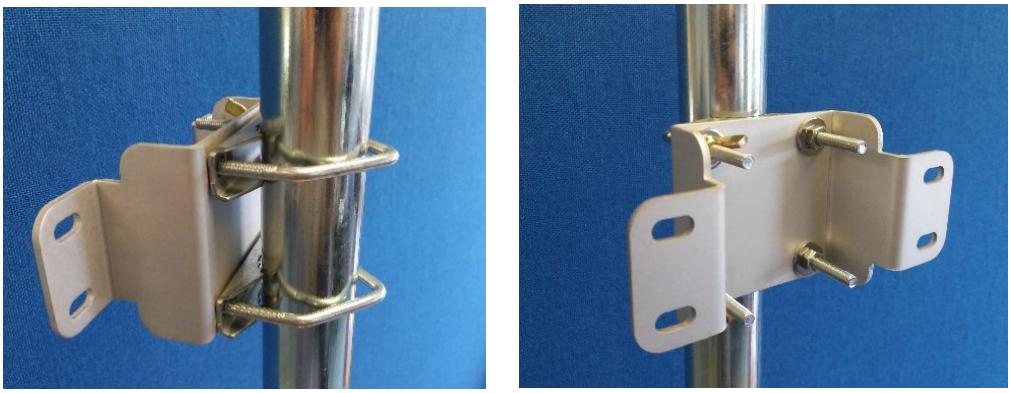


Figure 8

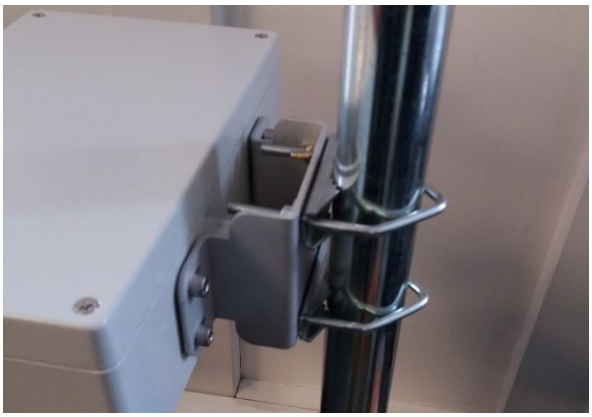


Figure 9

6.2.2.3

Use of the protective shelter

A protective shelter for the WT1 is available as an option. Ellona recommends its use.
The protective shelter must be fastened directly to a wall or pole and then the WT1 is mounted inside (see figures 11 and 12).
It also allows the fixing of the solar panel (see paragraph 6.3.3).
The front of the shelter is removable to access the device. It will be necessary to use 3- and 8-mm Allen keys.

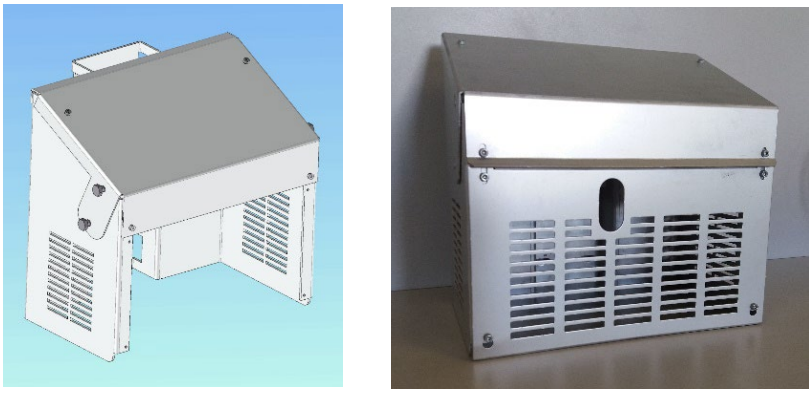


Figure 10

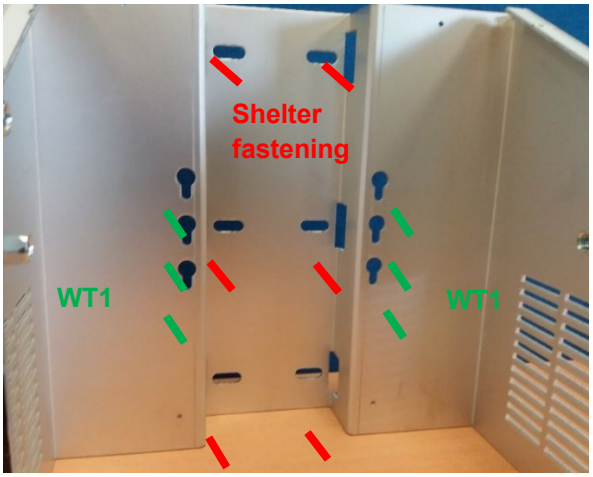
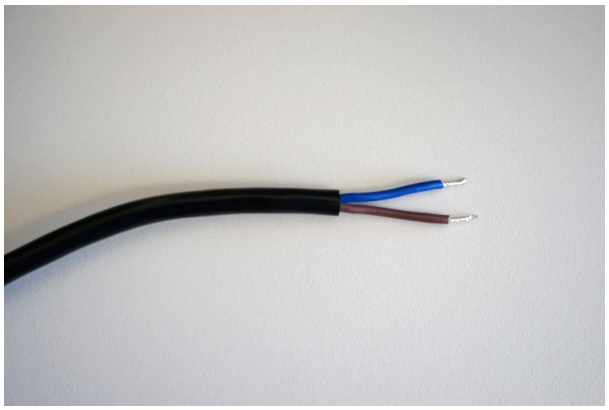


Figure 11

6.3 Electrical supply of the device

The module is supplied with an AC/DC transformer to plug to both the device and the sector. Do not open the device. If you want to install a longer power cable, use an extension cable outside of the unit.

6.3.1 Color code of the power cables



Neutral: Blue

Phase/Line: Brown

Figure 12

6.3.2 Main power supply

The default ELLONA WT1 uses a power adapter that must be connected to an electrical source.

The following features are required:

- Voltage: 100 to 240V AC
- Power: > 6W
- Frequency: 50-60 Hz

Ellona recommends using only the power supply unit to supply the WT1. Its reference is 59RKPO-UK1201000CD-2 from IdealPower.

You can directly connect the WT1 to your own 12V source, you need to connect it with the following reference: 761KS15 from Switch craft as the following pictures explain.

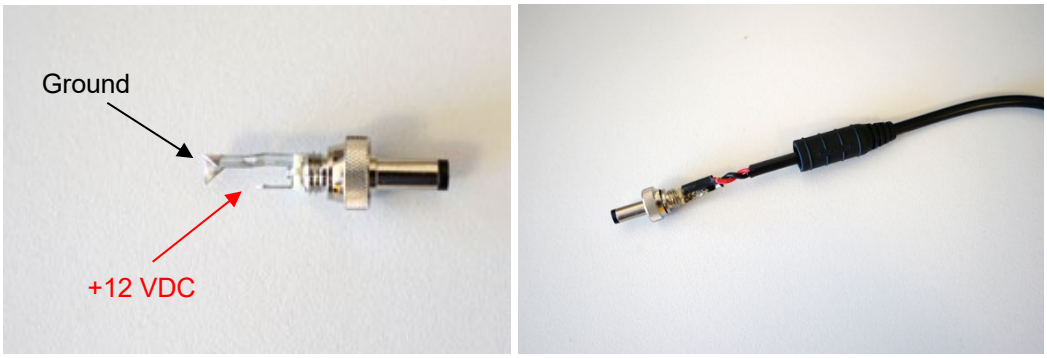


Figure 13

- Put the nut around the cable before soldering the wires
- Connect the +12VDC wire to the little connector and the ground wire to the large connector. We advise you to use a thermal sheath around the +12V solder.
- Screw the protection around the connector.

6.3.3 Solar power supply

The WT1 also exists as a solar powered version if no power outlet is available, and the area has sufficient sunlight:

Figure 14

The solar panel is installed directly on the protective shelter of the WT1 (see paragraph 6.2.2.3) with 4 8mm Allen head screws.
The shelter has been previously fixed on a pole (see paragraph 6.2.2.2).
The angle of the solar panel is adjustable using the two lower screws:

Figure 15

Once the solar panel is installed, connect the wires as shown in figure 16:

- Connect the solar panel to the charger
- Connect the Y-cable (supplied with the unit) to the charger
- Connect the charger to the battery

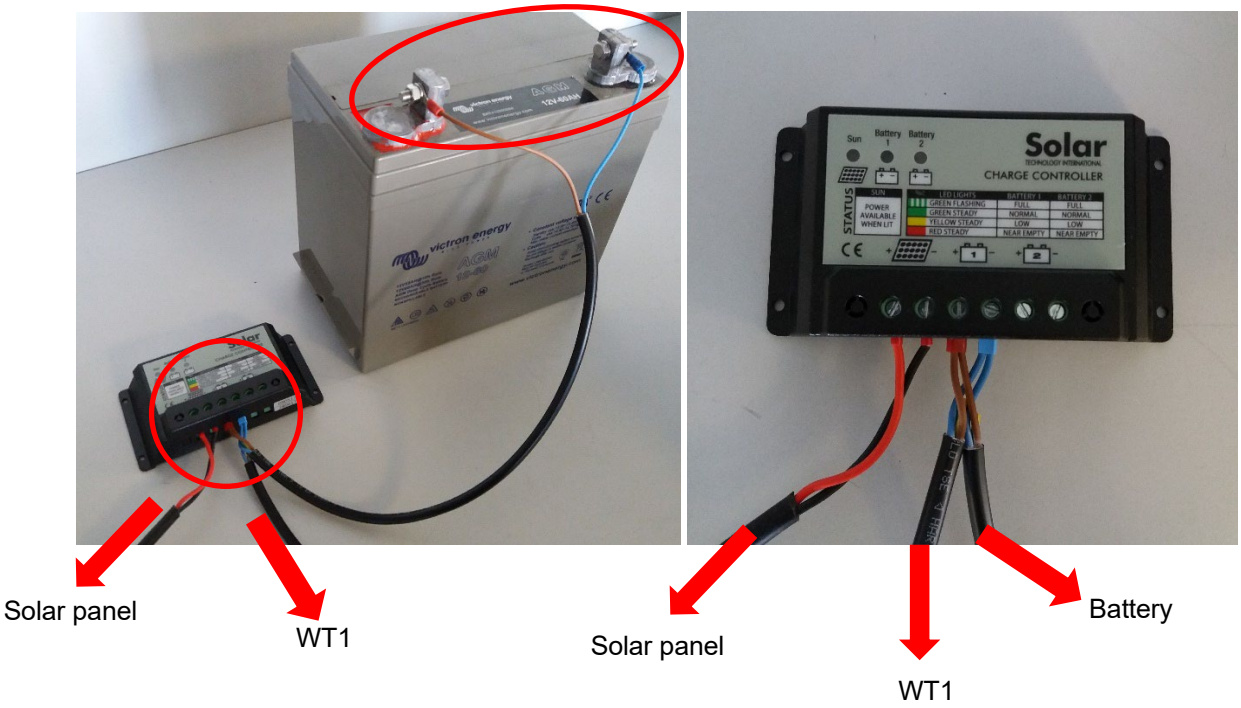


Figure 16

Install the battery and its charger in the provided protection box:

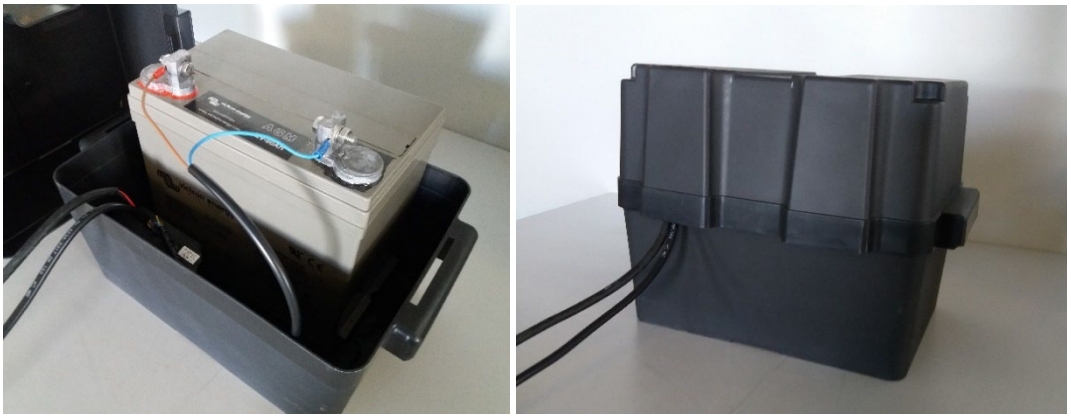


Figure 13

Finally, you need to plug the wires to the wt1 in connecting it to the Switch craft connector as explained in the 6.3.2.

Your system is ready to be used.

BATTERY LIFE

- We currently recommend two battery types: 60Ah & 110Ah
- 60Ah: 6 days battery life
- 110Ah: 10 days battery life

- To note: we include a voltage controller which allows, when voltage at battery terminals is too low, to protect the battery (when a battery charge level goes below a certain threshold, its lifetime gets damaged). The WT1 power supply by the battery is then put on hold.

RECHARGING CAPACITY

- Two simulations have been performed with 60W & 120W solar panels
- Results are indicated in number of daily sunshine hours needed to compensate for the WT1 daily power consumption.
- The seasonal factor necessary for the simulations depends on the geographical location. Our reference: Limoges (France)

60W	Daily minimum number of sunshine hours
Winter	5,4
Fall	4,2
Spring	4,2
Summer	2,5

120W	Daily minimum number of sunshine hours
Winter	3,4
Fall	2,2
Spring	2,2
Summer	1,3

6.4 Starting and stopping the device

6.4.1 Starting procedure

Figure 18

- Take off the cap on the female DC connector on the case
- Plug in the supplied power supply to the mains and connect the DC plug to the DC connector Screw the nut of the male connector onto the female connector
- Connect the Ethernet cable on the RJ45 connector unscrewing the cap (if using Ethernet communication mode) To choose the communication mode, refers to 6.5

Figure 19

Press the black button. If the circle lights up, the WT 1 is powered. If not, press it again, or check if the power supply is connected. A Second information LED located on the grey button next to it should light up in light blue then turn into another color (see 6.5.4.4). This process may take several minutes depending on the communication coverage.

6.4.2 Switching off the device

Press the black button. If the circle around it is turned off after pressing, the device is turned off.

6.5 Communication of the WT1

The WT1 requires Internet access to communicate the results obtained to the EllonaSoft platform. Different types of connection are possible: by Ethernet cable, by Wi-Fi, or by LTE-M/GPRS (if LTE-M fallback). These following steps explain how to choose the communication way of the WT1.

6.5.1 Commissioning

Press the installation button, keep it pressed and start the WT1. When the system information LED is turning blue, you can stop pressing the installation button.

Figure 20

6.5.2 Network connection

- Use a computer, tablet, or phone to display the list of WIFI networks.
- Locate the serial number of the WT1 you want to install on the identification plate on the bottom of the unit.
- In the list of available networks select the network that starts with «R-WT1-» followed by the serial number.
- Fill in the following password « ellonawt1 ».

6.5.3 Opening the configuration page

When connecting to the WIFI network, a web page is opened to configure the WT1. If this is not the case, enter the following IP address in the address bar of an internet browser (Chrome, Firefox, Edge etc...): 192.168.4.1

6.5.4 Selecting the network configuration

The page that appears allows the selection of the network configuration. All the following

options, which you can choose from according to your liking, are available on your WT1 device.

WI-FI:

WI-FI configuration

6.5.4.1

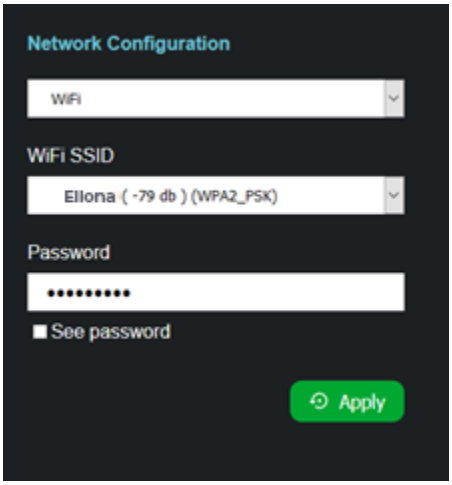


Figure 21

To connect to the network:

- Select the WIFI network in the drop-down list entitled « WIFI SSID».
- Fill in the password field that appears.
    - Click on « Apply ».
    - Choose « OK » in the window that appears to confirm the configuration and restart in WIFI mode.

6.5.4.2

LTE-M (option):

SIM card specifications

- Network coverage must be good at the place of installation
- SIM card package: 2 GB of data per month (minimum). The user must verify that the SIM card package allows such data volume.
- M2M SIM cards are not compatible with such data flow (1 pt./10 sec). This type of card can only be used for lower frequencies (approx. 1pt/5min).

SIM card installation

To install a new SIM card:

- Switch off the device
- Unscrew the µSIM card connector cap
- Remove the µSIM card connector cap
- Apply a slight pressure on the µSIM card to remove it
- Install the new µSIM with the small connector indicator on the right and the copper part of the card at the bottom
- Reinstall the µSIM card connector cap
- Turn on the unit as referred to in part 6.4.1

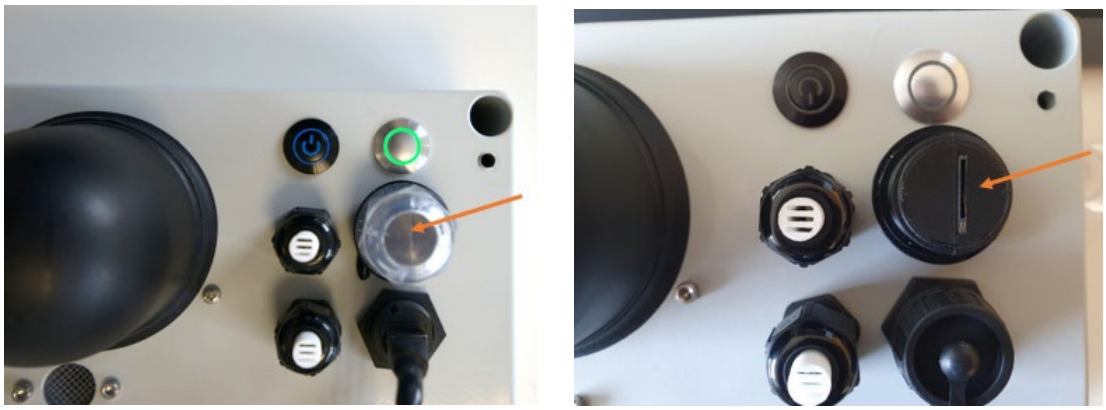


Figure 22

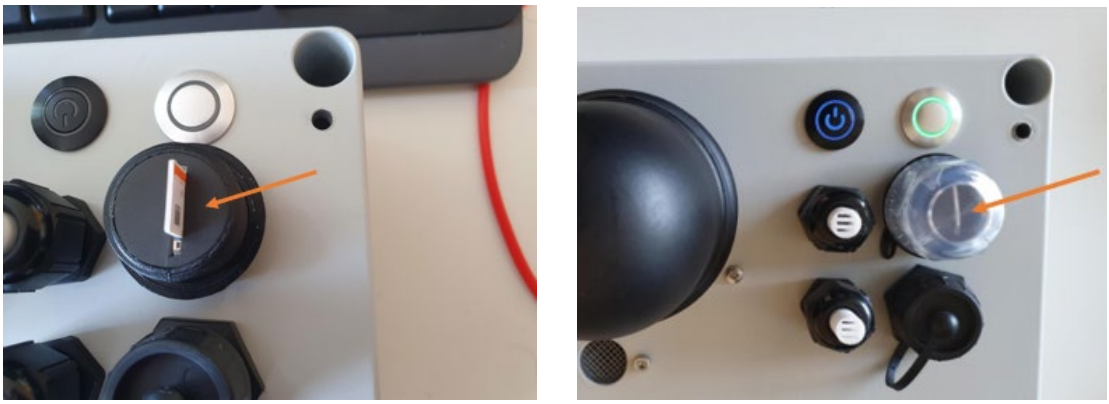


Figure 23

LTE-M Configuration

If the WT 1 is equipped with the LTE-M option, you can choose to select the WIFI mode or the LTE mode from the drop-down list.

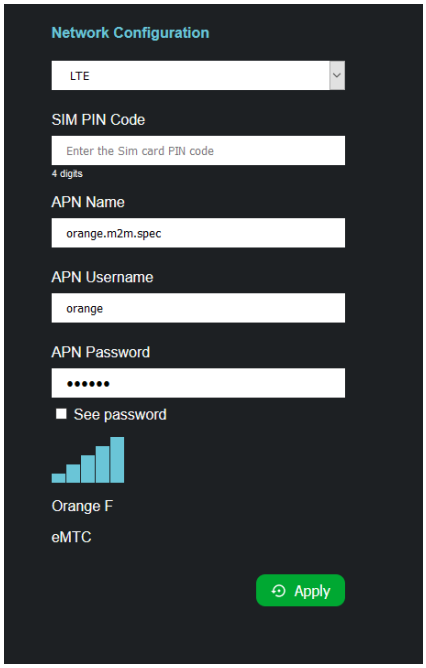


Figure 24

Select the « LTE » option from the drop-down list. The options to manage access to the LTE-M network will be displayed.

If the SIM card is provided by ELLONA, there is no need to modify these fields. Otherwise, use the information provided by the operator to fill them out.

- PIN code: the pin code of the SIM card can be left blank if there is no code.
- APN name: provided by the SIM card operator.
- APN login: also called « APN User », provided by the SIM card operator.
- APN password: enter the password provided by the operator.

Select « Apply » to validate the changes. A window will offer you to restart in the selected network configuration.

GSM3

Ethernet:

Ethernet connection

An Ethernet socket is available on the bottom of the WT1 device.
To use an Ethernet cable for communication with the platform, remove the protection cap of the socket and plug your cable into the device.

Ethernet configuration

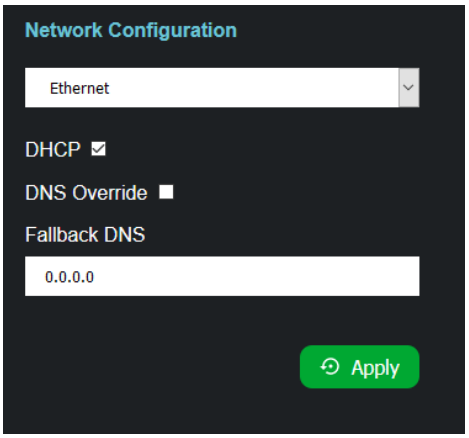


Figure 28: Configuration Ethernet IP DHCP mode

There is a possibility to enter IP address, subnet mask and gateway parameters.

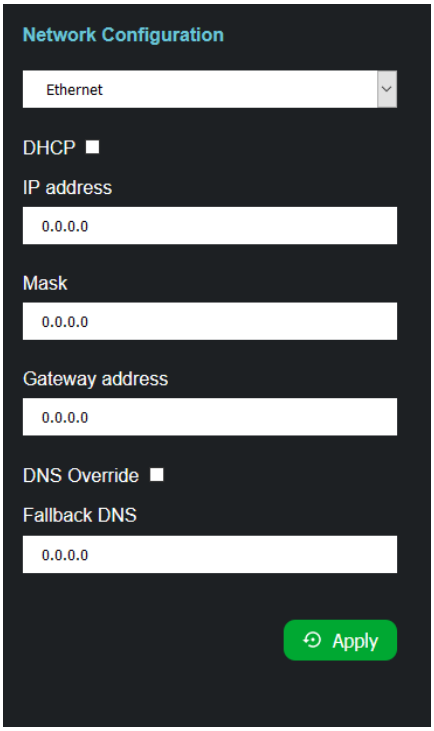


Figure 29: Ethernet IP manual mode configuration

6.5.4.4

Select « Apply » to validate the changes. A window will offer you to restart in the selected network configuration.

Notifications

The WT 1 is equipped with a status notification LED. The displayed color represents the status of the WT 1 or an alert level according to the following table:

State		Color
Start		Light blue flashing
Alert: Normal		Green
Alert: Info		Yellow
Alert: Warning		Orange
Alert: Critical		Red
Installation Mode		Blue flashing
Error		Purple

Figure 30

Troubleshooting

6.5.4.5

If the error signal occurs permanently, it is a network connection error.

Activate the installation mode and check the network configuration.

If the problem is not solved after this intervention according to your connection mode:

- Wi-Fi: contact your network administrator if you use a WIFI connection.
- LTE-M: if you are using LTE mode, check with the line operator.
- Ethernet: check your cable's connection or contact your network administrator.

During network disconnection, a data logger will store the data until the network returns and then upload the data to the Ellonasoft platform.

7 TEDLAR BAG SAMPLES

7.1 Installation

A Tedlar bag can be connected to the WT1 with an adaptor (not included as a standard). All bag sizes are usable.

You will locate the air inlet at the bottom of the WT1:

Figure 31

Remove the filter by hand:

Figure 32

Install the adaptor:

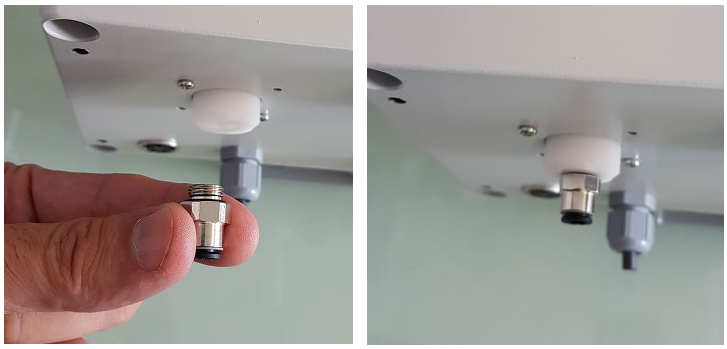


Figure 33

Connect the Tedlar bag to the inlet tube and link the bag to the module:

Figure 34

To remove the tube from the adaptor, simply press the black plastic ring while you pull on the tube.

7.2

Use of the Tedlar bag

The WT1 works with a dynamic air flow, pumping 250mL/min (with blue air inlet protective filter or Restek 10L Tedlar bag with Polypropylene Valve & Septum Fitting).

The Tedlar bag will start to deflate just after it is plugged in.
10 min are required to empty a 10 L bag and it takes 5 min to reach a balance on the WT1.

The analysis results of the Tedlar bag will be automatically and directly displayed on the EllonaSoft software. The data can be viewed at any time, you just need the precise time at which the Tedlar bar was plugged in.

8 USE OF AN EXTERNAL DEVICE

8.1 Lumberg Connector

The WT1 has a specific 4-pin DIN connector. It is located at the bottom of the box.

Figure 35

IMPORTANT: the male connector described below must be adapted by the customer during the installation. It is not provided as standard equipment.

As described in the "safety information" section of this guide:
The user must be warned that the use of this equipment in a different manner than the one specified by the manufacturer may impair the protection of the equipment and result in the loss of the guarantee of this equipment.

Changes or modifications made to this unit that are not expressly approved by the conformity department may void the user's authorization to use the equipment and cause the loss of warranty of the device.

ELLONA is not responsible for the cable used to connect the 4 pins to an external device except for a single cable connected to a ELLONA sampling device.

Supplier: Lumberg
Reference N°: 0332 04:

Figure 36

On/Off signal

8.2

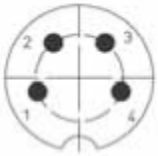
Pin 1: current loop -	Pin 3: Relay COM
Pin 2: current loop +	Pin 4: Relay NO

Pins 3 and 4 are dedicated to the remote control of the sampling box or any other device using a single ON/OFF signal.

The ON/OFF signal is provided by the software by programming an alarm.

8.3

Analog 4-20 mA output signal



Pin 1: current loop -	Pin 3: Relay COM
Pin 2: current loop +	Pin 4: Relay NO

Voltage to be applied: 7.5 – 24 Vdc

Pins 1 and 2 are dedicated to the analog 4-20 mA output signal, knowing that the voltage applied for the current loop must be between 7.5 and 24 VDC. (Do not forget that this voltage must be supplied by the user).

In the software, the analogue output will be applied to all available parameters of the WT1 (T°, electrochemical sensor, PM, CO_2...) as well as the parameters of the odor unit (OU).