powered by lifely

Lifely Agrumino Lemon

Dev Guide

UNIONE EUROPEA
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POR FESR
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SARDEGNA RICERCHE

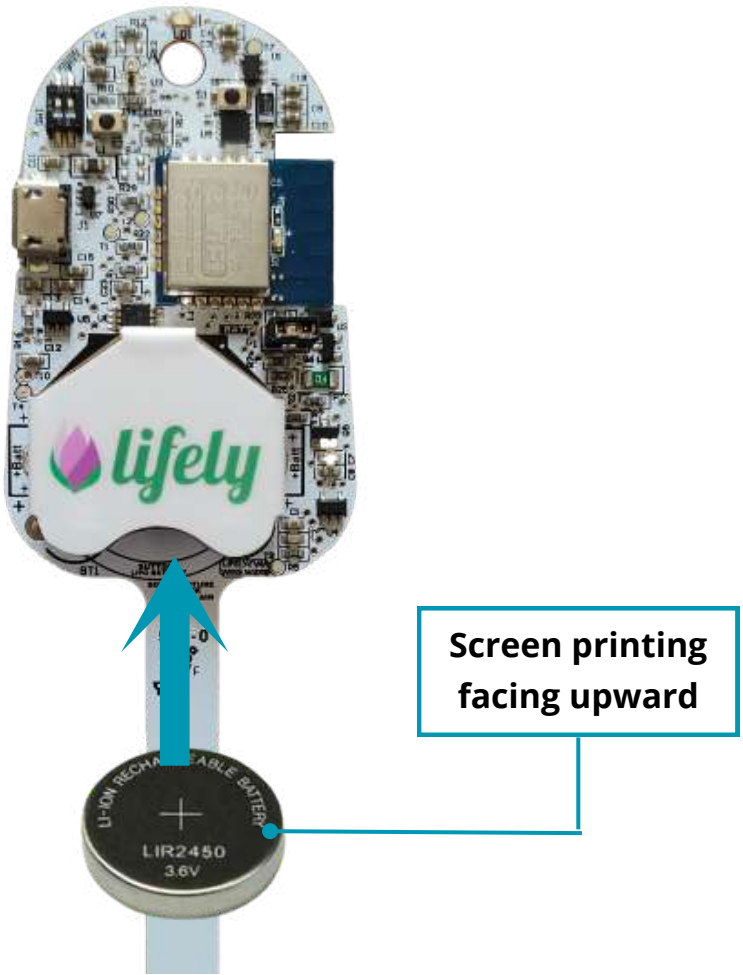
Table of contents

1 Introduction

This document is intended to provide help in installing and using **Lifely Agrumino Lemon**. In addition, some example sketches will be illustrated, which can be found in the "Examples in Arduino IDE" category, subject to installation of the Lifely Agrumino Lemon library **(we recommend always using the latest version)**.

IMPORTANT! Correct battery insertion

When using the battery, pay attention to its insertion: insert the battery in the correct way, that is, with the silkscreen facing up **(see figure below)**. Incorrect insertion of the battery by reversing the polarities would cause a short circuit.



IMPORTANT! Activation/Deactivation of the charging circuit.

If you use **rechargeable batteries**, the charging circuit should always be set to ON **(see Figure 1)**.
If, however, you use **non-rechargeable batteries**, the charging circuit must, of necessity, be set to OFF **(see Figure 2)**. Failure to set it to OFF would cause the device to short-circuit.

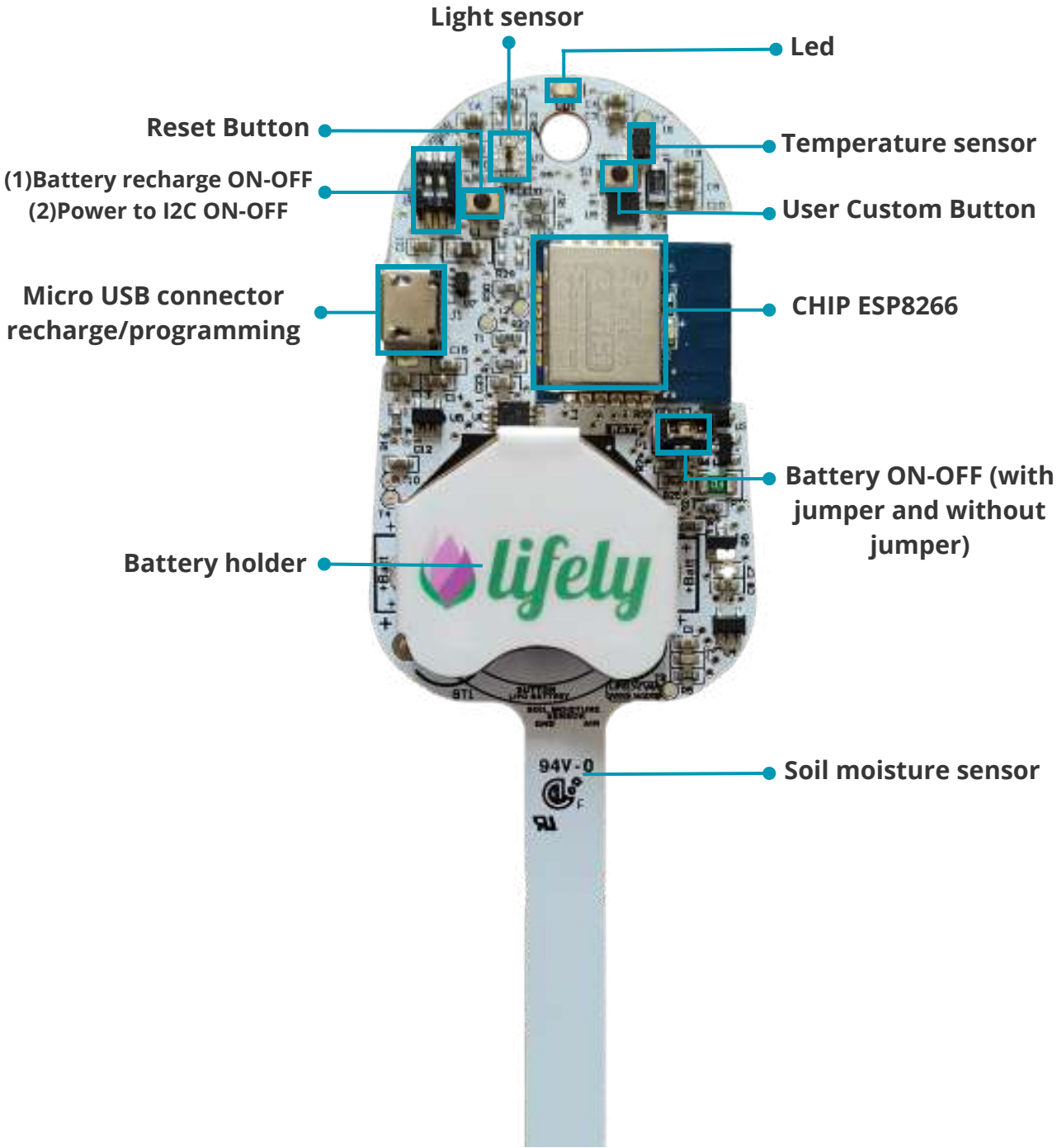
Figure 1
RECHARGEABLE BATTERY

Figure 2
NON-RECHARGEABLE BATTERY

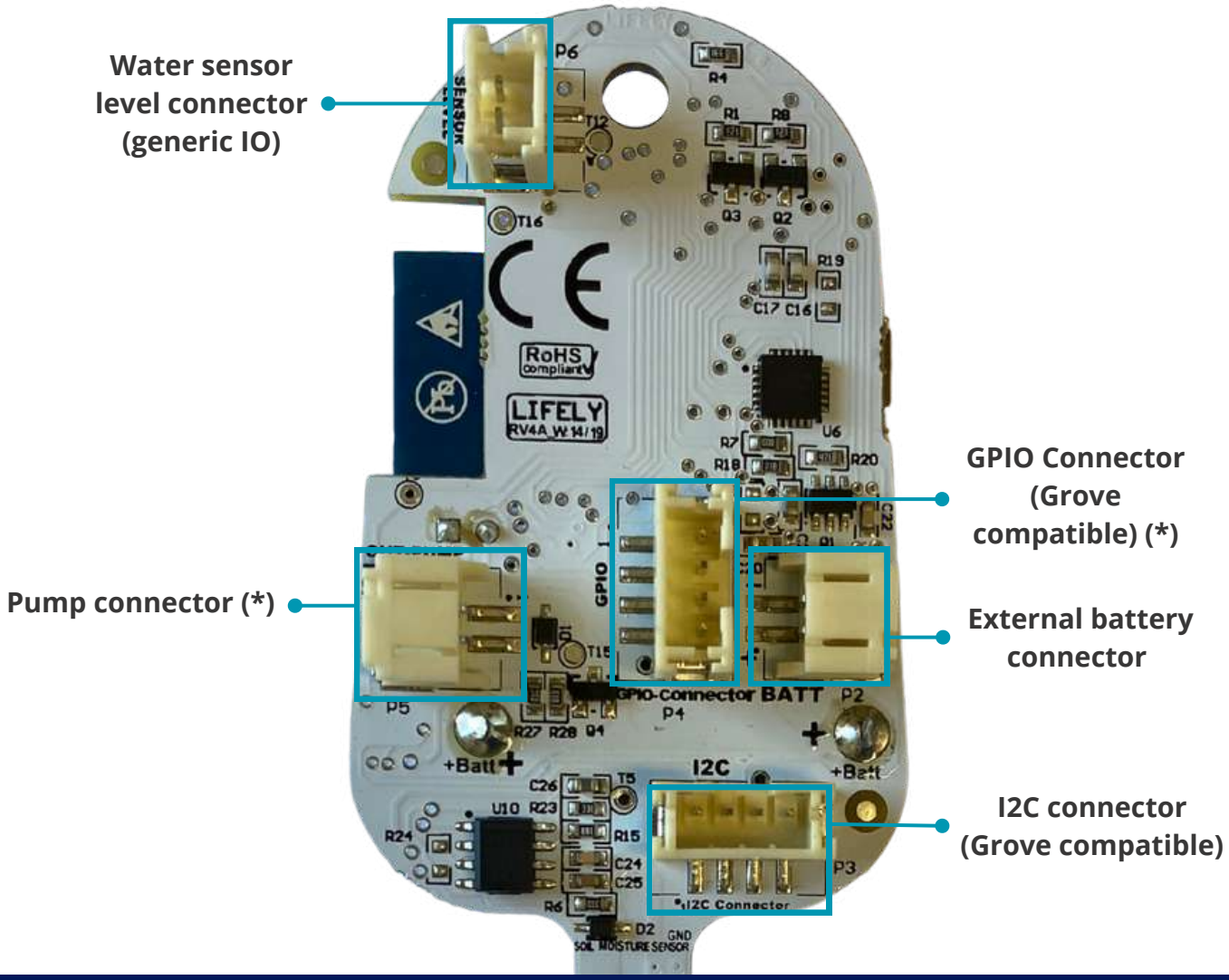
2 Hardware

2.1 Lifely Agrumino Lemon rev4 (front-board)

This section highlights **the main components** of the Lifely Agrumino Lemon device.



2.2 Lifely Agrumino Lemon rev4 (back-board)

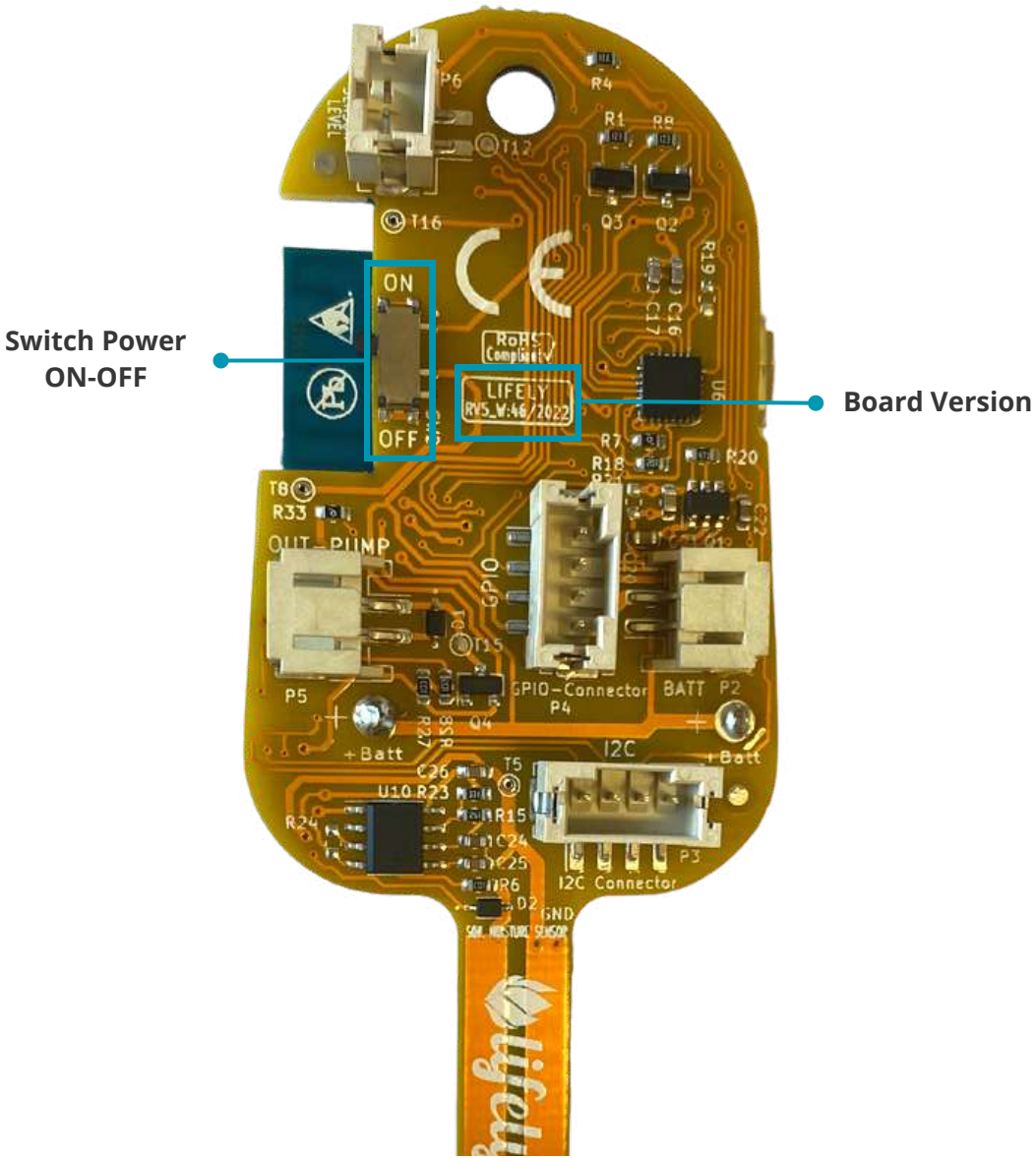


The I2C connector and GPIO connector are compatible with Grove Systems.
Grove I2C e Grove Digital sono supportati out-of-the-box mentre Grove Analog può essere utilizzato con un esterno Grove-I2C-ADC.

2.3 Lifely Agrumino Lemon rev5

The rev5 version of the Lifely Agrumino Lemon device is perfectly the same as the rev4 version, the only difference being that there is no jumper. The latter is replaced by a toggle located in the back-board, with an ON-OFF switch **(see figure below)**.
We specify that the color is not indicative of the model version.

Back-board

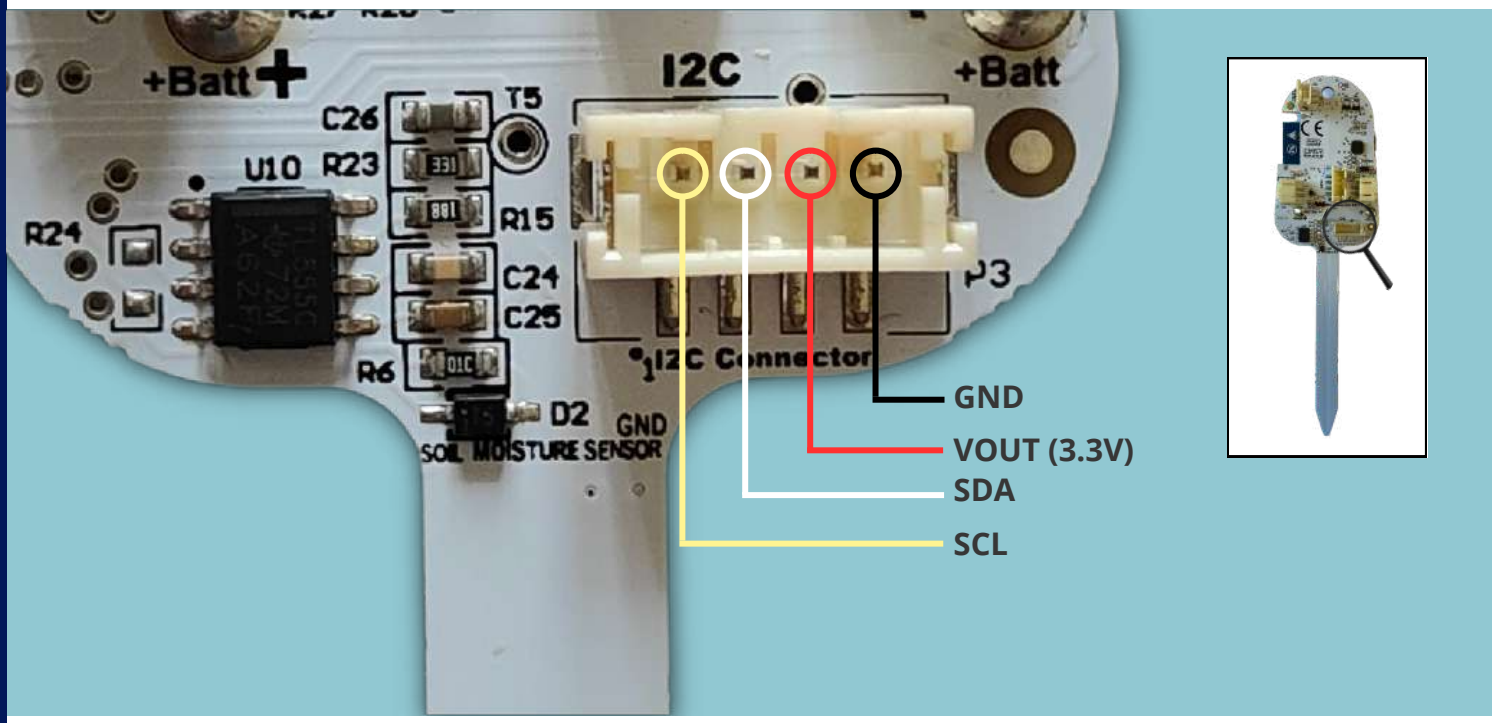


3 Pinout and Connector

In this section we are going to analyze, in more detail, the connectors present in the back-board of Lifely Agrumino Lemon (in the image below we have used a rev4 but it is identical to the rev5). The connectors are as follows:

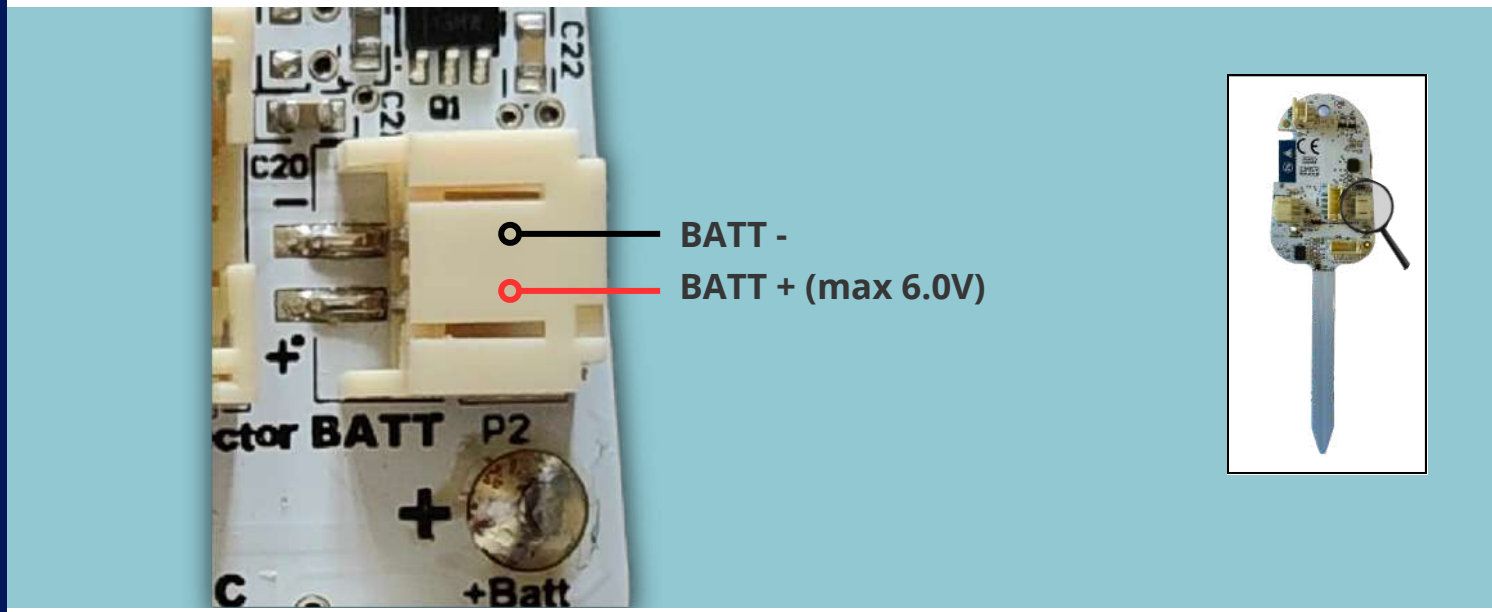
1. I2C connector (Grove compatible)
2. External battery connector (*)
3. Pump connector max. 3.3 V (*)
4. Water sensor level connector (generic IO)
5. GPIO Connector (Grove compatible) (*)

3.1 I2C connector (Grove compatible)



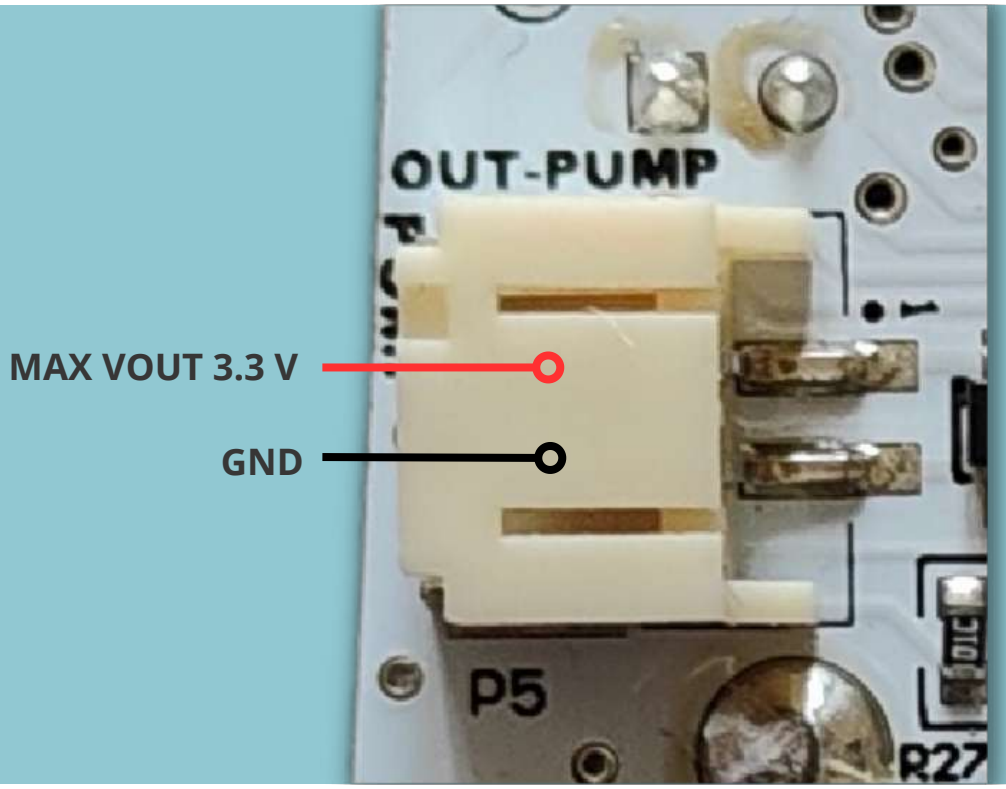
3.2 External battery connector (*)

Connection of non-rechargeable battery is possible **after disabling charging circuit** (see page 4).

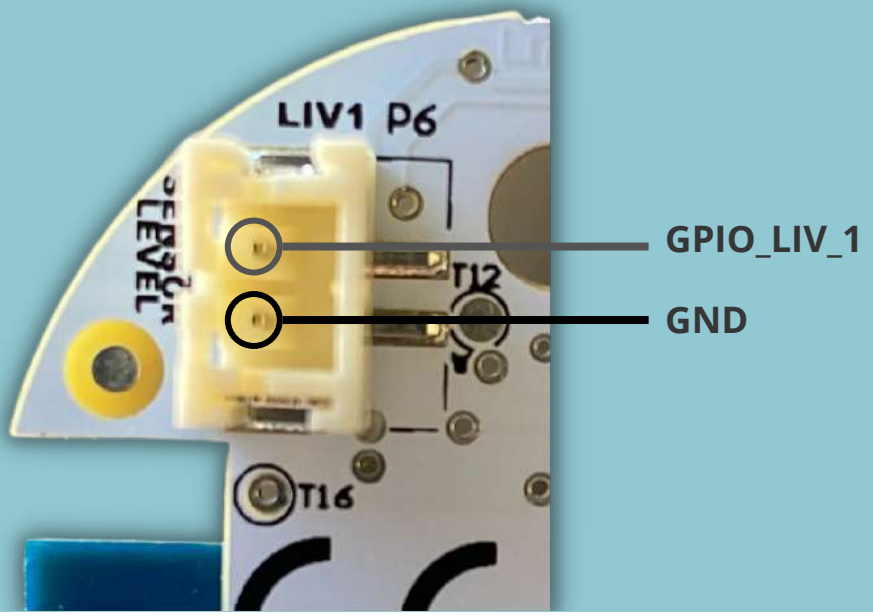


3.3 Pump connector max. 3.3 V (*)

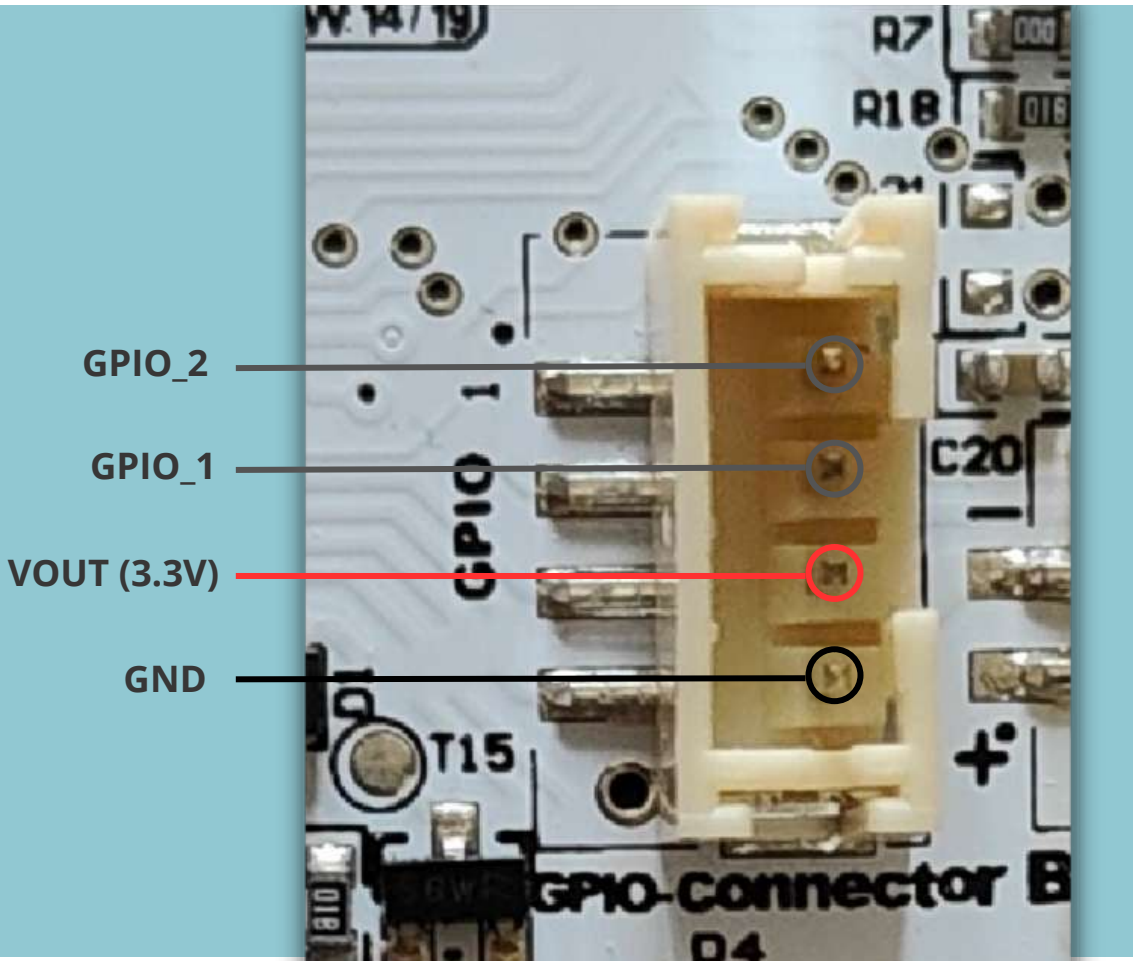
Software-activated irrigation pump connector.



3.4 Water sensor level connector (generic IO)



3.5 GPIO Connector (Grove compatible) (*)



4 Installations and configurations

4.1 CP210x USB Driver Installation

Modern Windows installations already have USB drivers for its operation. On other platforms, such as Mac OS/Linux and Android, if the serial device is not automatically recognized, you can download the latest version of the official driver from this link: **CP2102 Driver**.

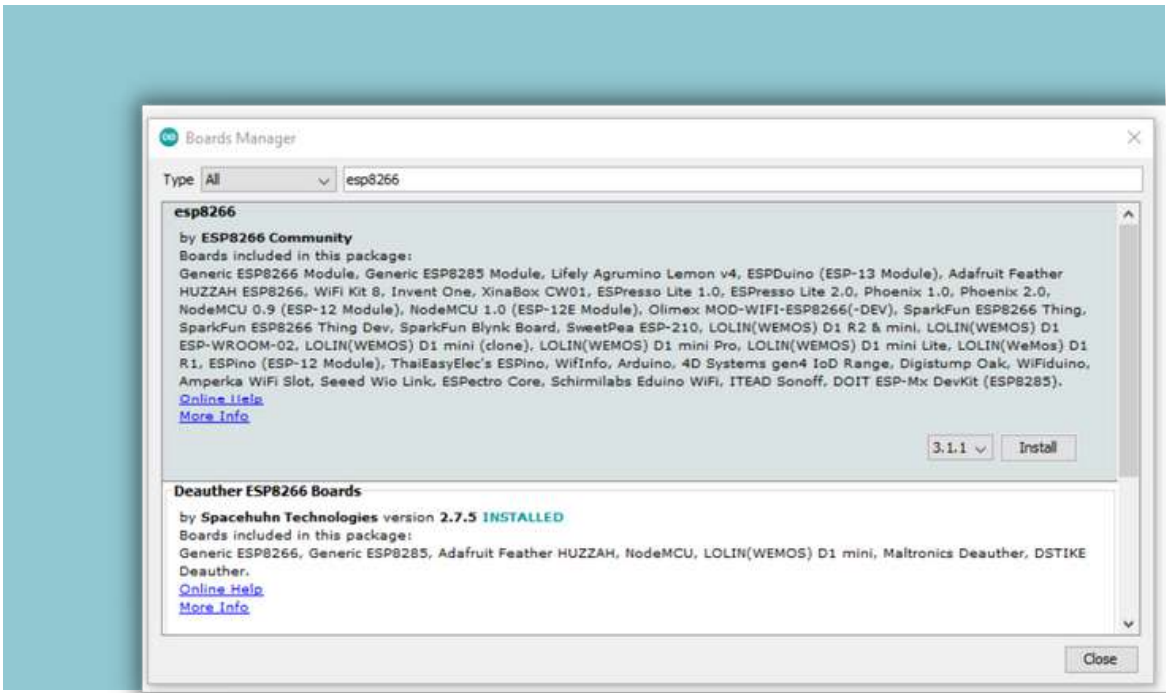
4.2 Install Lifely Agrumino Lemon on Arduino IDE - procedure valid for Arduino IDE versions lower than version 2.0

If you have the Arduino IDE version 1.8.19 please follow this procedure.
The Lifely Agrumino Lemon Core is an **ESP8266 WiFi**. The official programming IDE is Arduino, thanks to the **ESP8266 Core for Arduino** project. In addition, it is also possible to use other IDEs, such as VSCode, using the Platformio extension. Lifely Agrumino Lemon is officially part of Arduino's ESP8266 Core. Arduino allows installation of packages using the Board Manager. The package is available for Windows, Mac OS, and Linux (32- and 64-bit). Follow the following steps to proceed with the installation:

1. Install the latest version of Arduino IDE lower than 2.0 available in the official Arduino website at the following link: https://www.arduino.cc/en/software

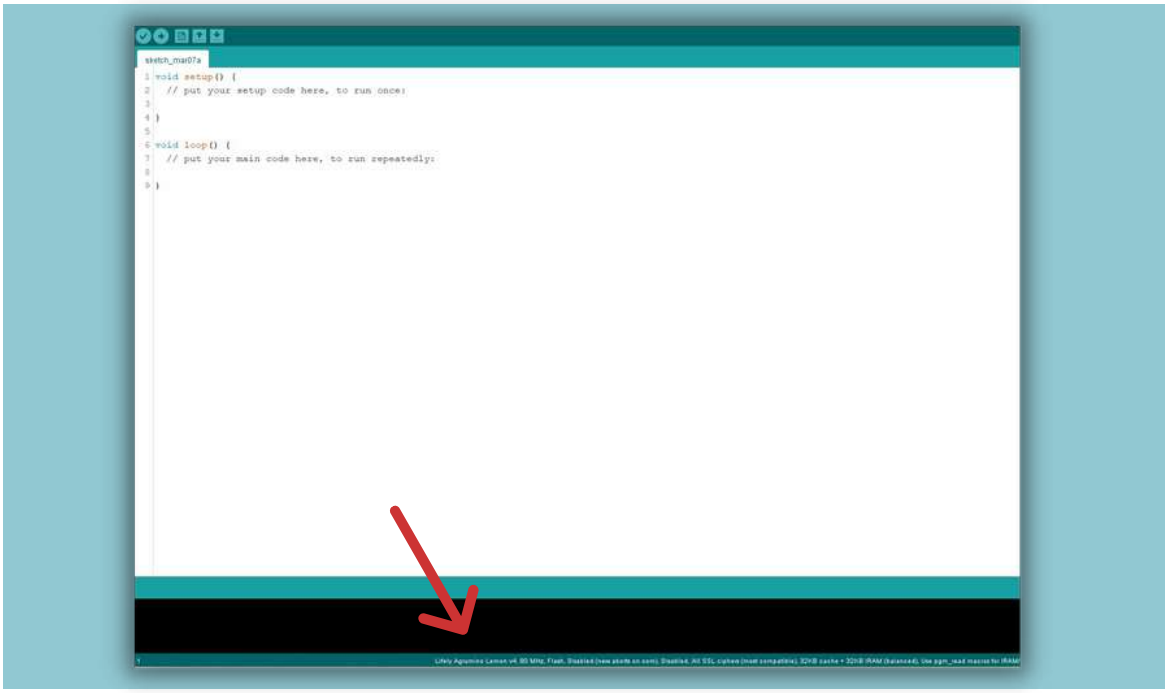
2. Next, open Arduino Ide and click on
File → **Preferences** and in the URLs text box enter the following url:
http://arduino.esp8266.com/stable/package_esp8266com_index.json

3. If there are additional configuration URLs of other tabs, simply separate them with a comma. Open **Tab Manager** (**Tools** → **Tab** → **Tab Manager** and type Esp8266). At this point a screen like the one in the image below will be visible.



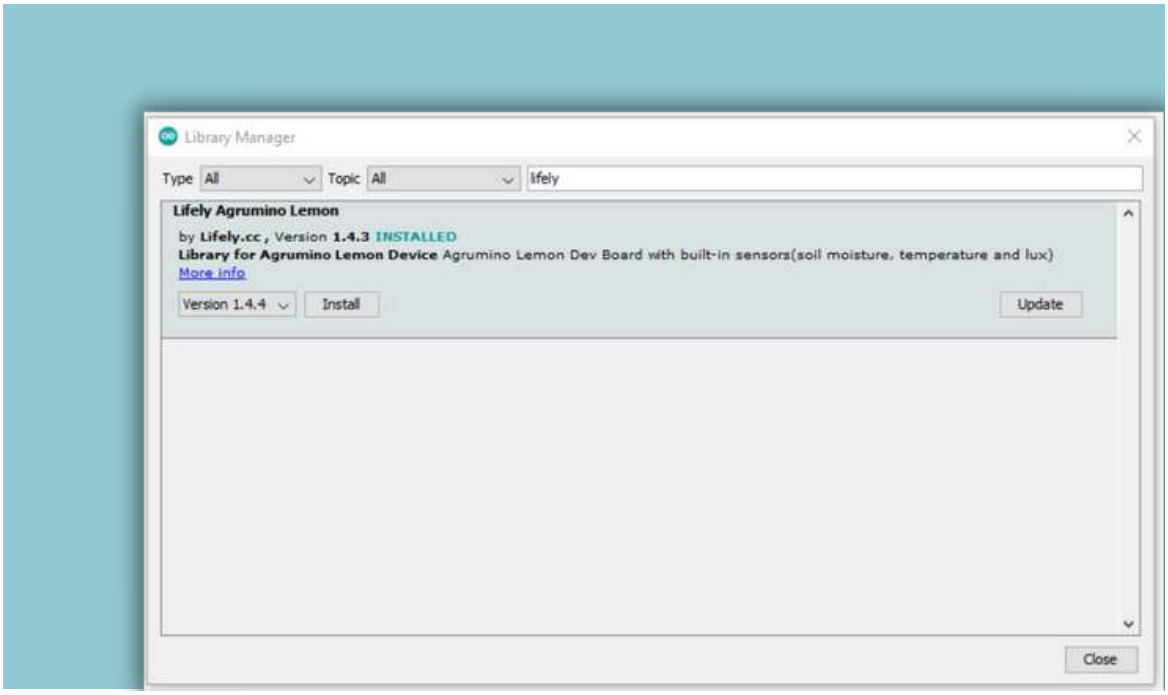
Having reached this point, we install **version 3.0.0 or later.**

4. Select "Lifely Agrumino Lemon" via the menu **Tools** → **Tab** → **ESP8266 Boards** and select **Lifely Agrumino Lemon v4** (selection also valid for rev5).
If you have done everything correctly, at the bottom of the Arduino IDE you should see **Lifely Agrumino Lemon v4**, as in the spot highlighted in the following image.


sketch_mar07a
void setup() {
// put your setup code here, to run once:
}
void loop() {
// put your main code here, to run repeatedly:
}

4.3 Installation of Lifely Agrumino Lemon libraries on Arduino IDE

To use Lifely Agrumino Lemon, you must **install the Official Library**. You must do this directly from the library manager in Arduino IDE.
To do this go to **Tools** → **Library Management** and then type in "Lifely."



A screen like the one in the figure will appear. Now you need to install the latest library release, for example as in this case 1.4.4, by simply pressing the **Install button**.
Always install the latest release of the library.

Installing the library will install **some sample sketches**, which are useful to start using Lifely Agrumino Lemon without having to write a single line of code.

5 Lifely Agrumino Lemon Program

The Lifely Agrumino Lemon board can be easily programmed: you simply select an example sketch found in the examples folder and then upload it by pressing the **Upload button** on the Arduino IDE. In addition, you can freely write code to create your own sketches.
From the Arduino IDE menu (**Tools** → **Board**) verify that you have selected the correct **"Lifely Agrumino Lemon v4"** board.

6 Using the Lifely library with Arduino IDE

This section will briefly present some **Example Sketches**. Note that they are divided into the following folders: **QuickStart**, **Cloud**, **Advances examples**, **OTA** and **Diagnostics**.
(File → Examples → Lifely Agrumino Lemon).

6.1 Examples in "QuickStart"

These Sketches display basic Agrumino data, such as **reading sensor data**, **saving data to flash memory**, and **controlling the wifi connection**.

- **AgruminoSample**

  Simple sketch to read every 30 seconds (configurable parameter) all values from Lifely Agrumino Lemon and display them in the serial monitor of Arduino IDE.

- **AgruminoBringUp**

  Sketch to test Lifely Agrumino Lemon and its FLASH memory of the ESP8266 module. Specifically, it is possible to read all sensor values and print them in the serial monitor, as well as clean, read, write, and commit to the memory to verify its integrity.

- **WifiClient (ESP8266 example)**

  Sample sketch to connect Lifely Agrumino Lemon to a WiFi connection. You need to write STASSID and STAPSK with a personal WiFi SSID and password.

6.2 Examples in "Cloud"

With these Sketches it is possible to send sensor data from the Agrumino board to various Cloud platforms. All Sketches use "deep sleep," a special power-saving mode.

- **AgruminoDweet**

  Sketch that reads all values from Lifely Agrumino Lemon every hour and transmits them to the Dweet.io service every 4 hours. It integrates FLASH management to collect all data before transmitting it.

- **AgruminoThingSpeakHttpPost**

  Like the AgruminoDweet Sketch, but in this case the data is sent to the cloud via Post Http.

- **AgruminoThingSpeakJsonPost**

  In this case all data are sent with one Json file.

- **AgruminoThingSpeakVeryEasy**

  Similar to the sketch in which data is sent to the server with a direct connection.

- **AgruminoThingCloudWithPump**

  Sketch that sends all sensor data from the Lifely Agrumino Lemon at the Thinger.io platform. Through the Thinger.io Dashboard and this firmware, it will be possible to enable or disable irrigation directly from the pump connector.

6.3 Advanced examples

Example sketch with Lifely Agrumino Lemon, using other sensors, actuators, third-party boards such as OLED display, water pump, etc.

- **AgruminoOledSample**

  Data visualization by connecting an oled display.

6.4 OTA flashing to update firmware examples

Sketches that send sensor data to the cloud and at the same time use Over The Air (OTA) updates.

- **AgruminoDweetWebOTA**

  This sketch is the same as AgruminoDweet, but integrates, in addition, firmware updating via OTA using a web page. Users can choose an update file from PC and upload it to the board using the Lifely Agrumino Lemon address.

- **AgruminoDweetHttpOTA**

  This sketch is the same as AgruminoDweet, but it integrates firmware updating via OTA using a remote HTTP server. Whenever a binary file (.bin) is uploaded to the server, the board automatically downloads it and the device is updated totally autonomously.

6.5 Diagnostics

- **AgruminoLemonTesting**

  This sketch can be used to verify the operation of all connectors and integrated sensors. Within the sketch folder is an illustrative image of its use **(fritzing diagram)**. The path to the images is as follows:

  \Arduino\libraries\Lifely_Agrumino_Lemon\examples\Diagnostics\AgruminoLemonTesting

7 FAQ and common errors

1. Error: Agrumino not connected

Check from the Arduino IDE menu (**Tools** → **Port**) that the selected port is the one for your Lifely Agrumino Lemon. In case of other usb peripherals connected, check the one corresponding to Agrumino Lemon. On Windows systems, device management can be used. Verify that the cable used is a data cable.

2. Error: espncom sync error

Press the Lifely Agrumino Lemon reset switch (screen-printed "S2" in the upper left) and try again.
If the error recurs disconnect Lifely Agrumino Lemon from the Usb cable, remove and re-insert jumper P1. Then try the procedure again.
In case of persistent errors not found in FAQ write an email to support@lifely.cc, having as subject **"Support request via link on Dev Guide"**.

3. Problem: Windows 11 can't find the Lifely device

Absence of the CP210X driver in the operating system. Perform as indicated in the section "Installations and configurations."

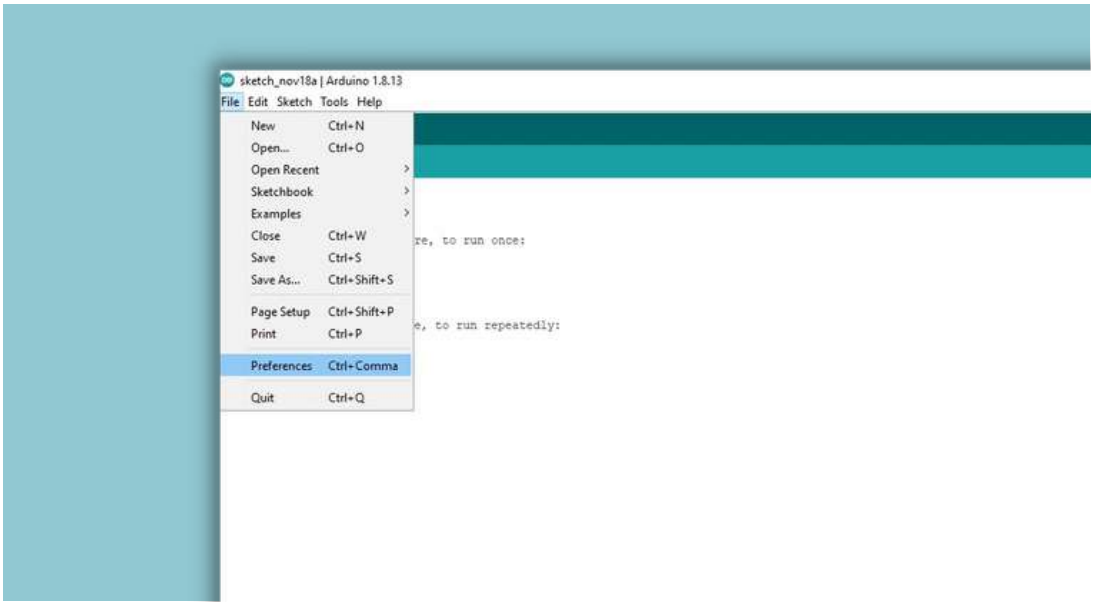
8 Tutorial with Arduino IDE (classic version)

Up to Arduino IDE version 1.8.19.

Before proceeding, you need to install Arduino IDE from this link: https://www.arduino.cc/en/software

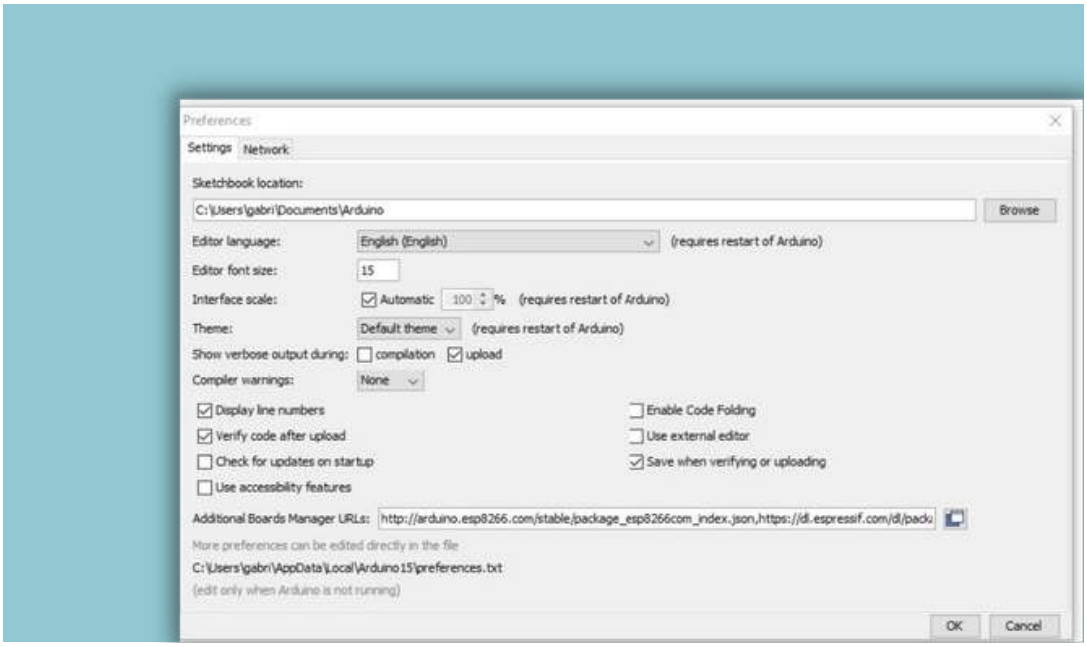
After installing Arduino Ide, connect Lifely Agrumino Lemon to your PC/MAC with micro usb cable.

Now open the Arduino IDE, go to **File** and click on **Preferences**.

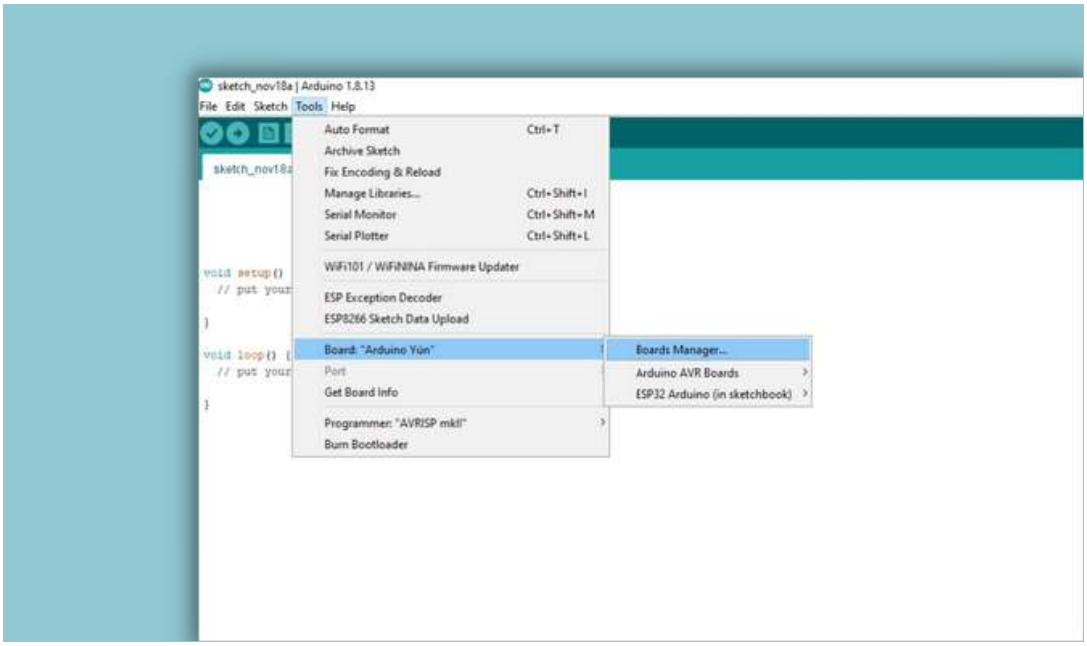


Now in the text box **"Additional tab management URL"** copy and paste this link and then click **OK**:

http://arduino.esp8266.com/stable/package_esp8266com_index.json



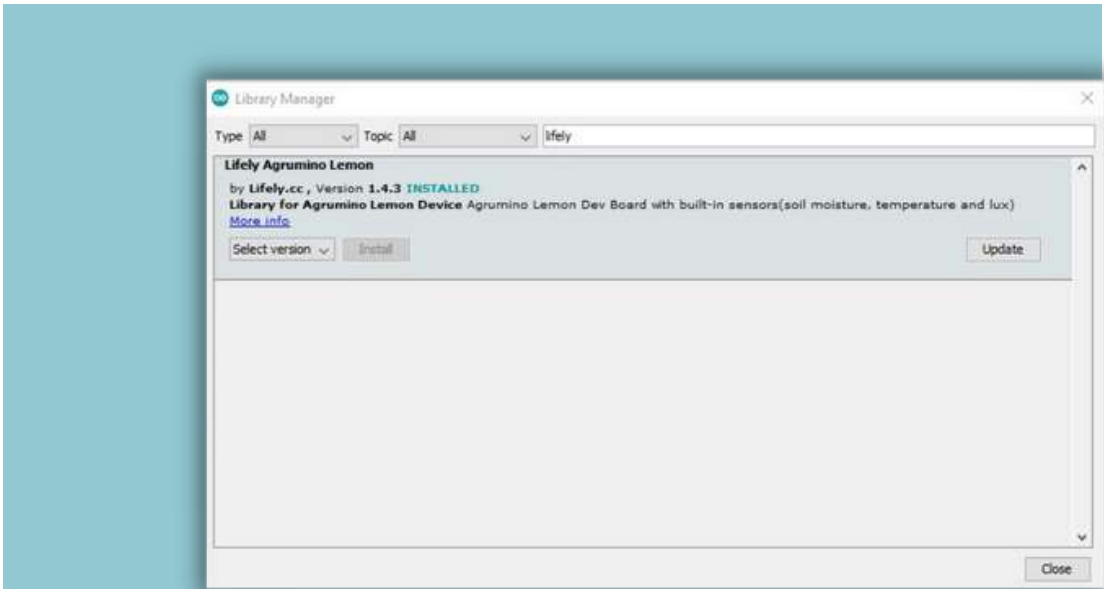
Now go to **Tools** → **Tab** → Click on **Tab Manager**.



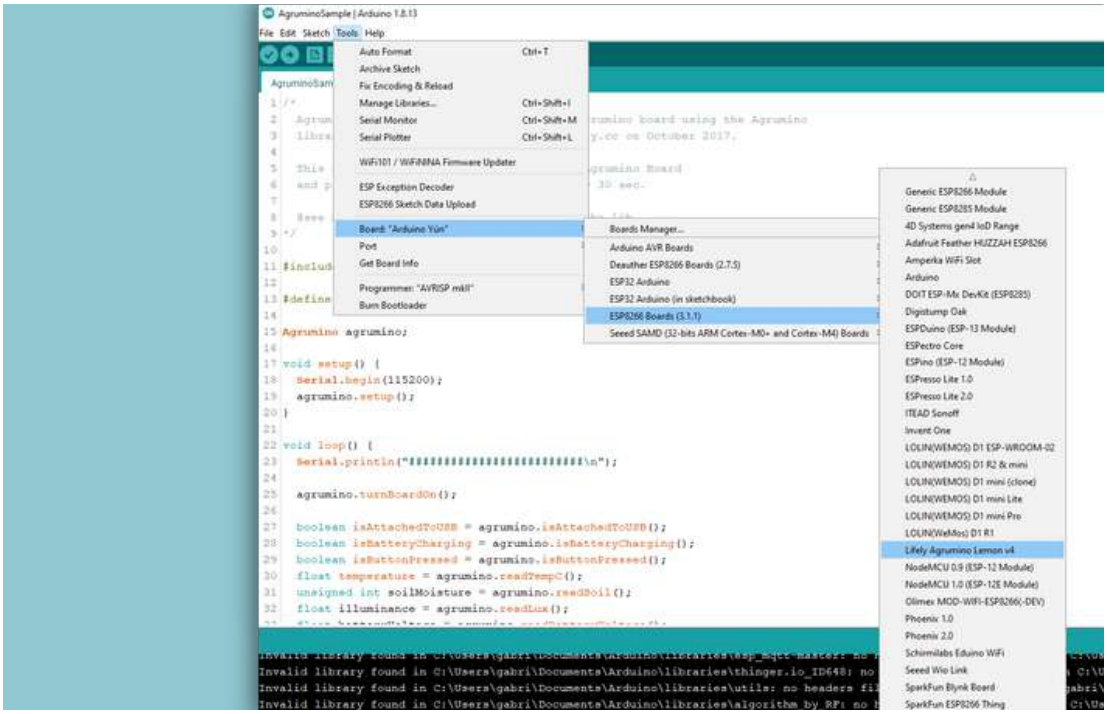
In the text box type **"ESP8266"**, you will immediately find ESP8266 and click **Install**.

Important! Install only versions 3.0.0 or later.

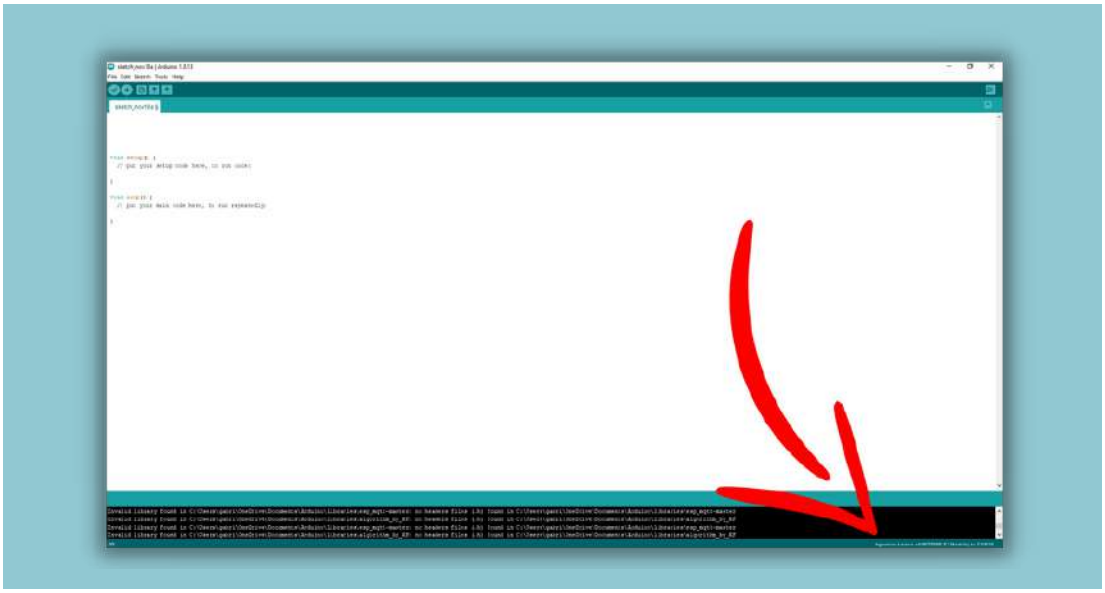
After completing the installation click **Close**.



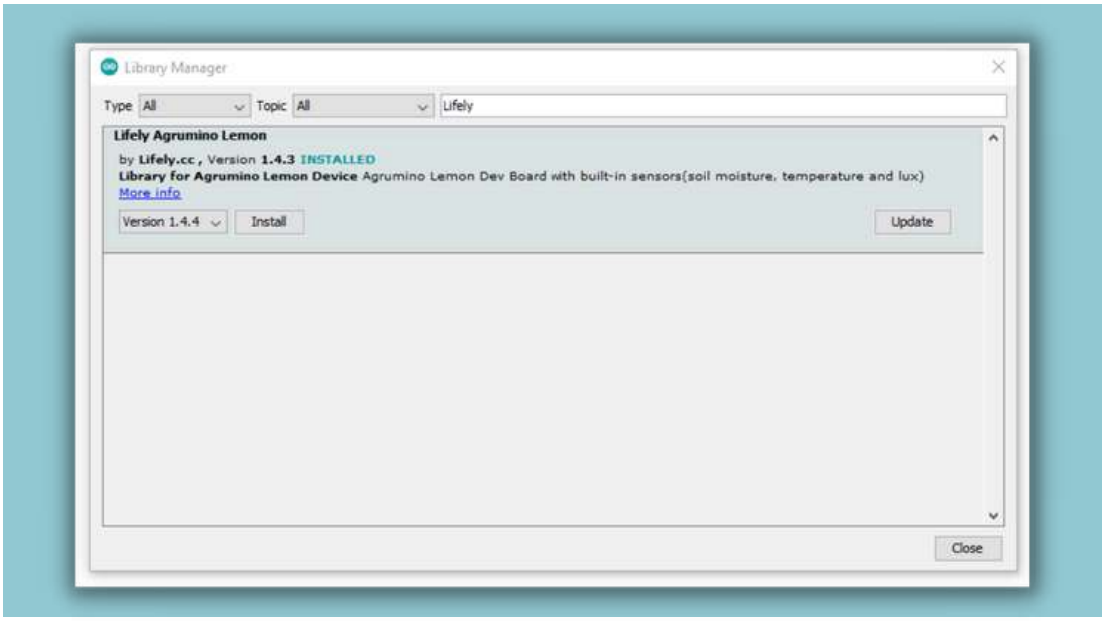
Now go to **Tools** → **Tab** → **Esp8266 Boards (3.0.0)** and with one click select **Lifely Agrumino Lemon v4.**



If you made the choice correctly, you should see the words **"Lifely Agrumino Lemon v4"** in the lower right corner, as highlighted in the image below.

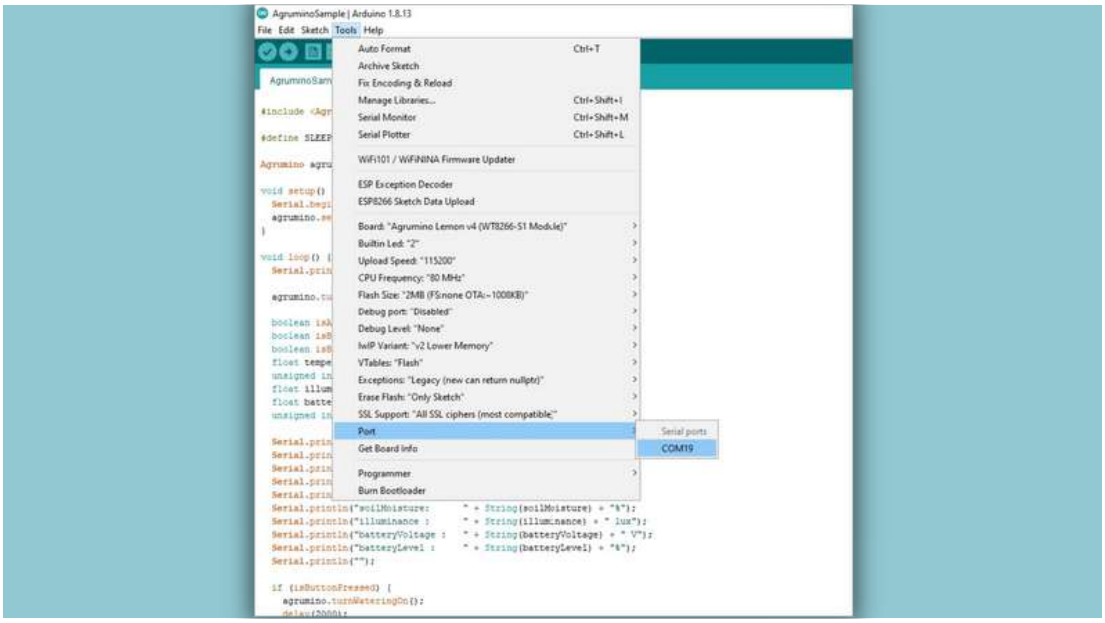


Now you need to install the official library, so go to:
Tools → **Library Manager** and type in **"Lifely"** (see image below).

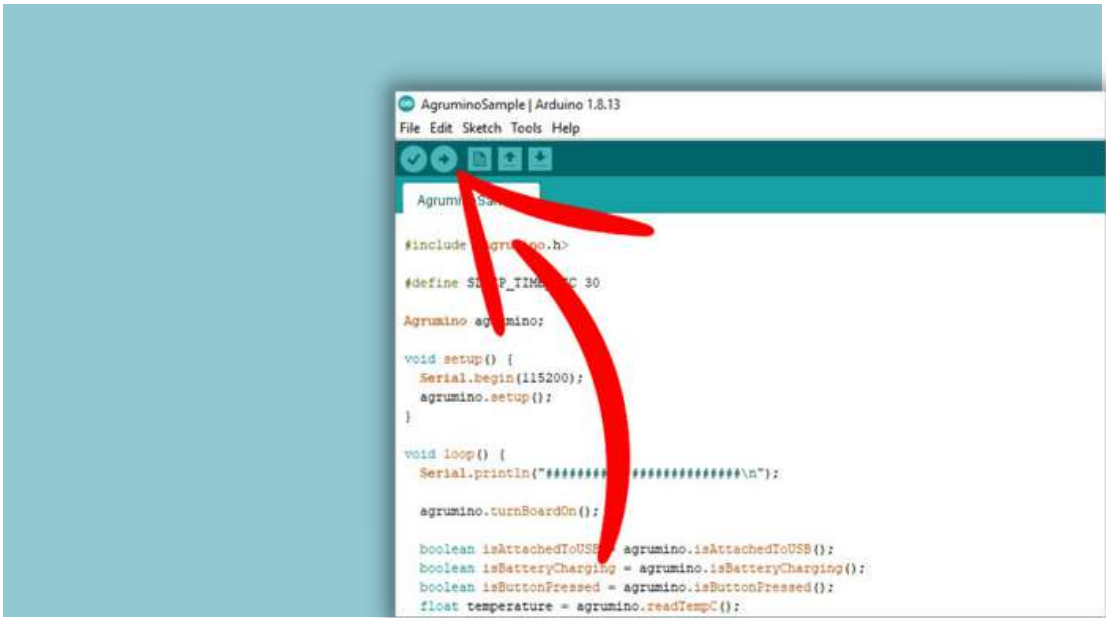


Now you need to click on **Install** (always install the latest release). By installing the library, all the example sketches will also be installed.

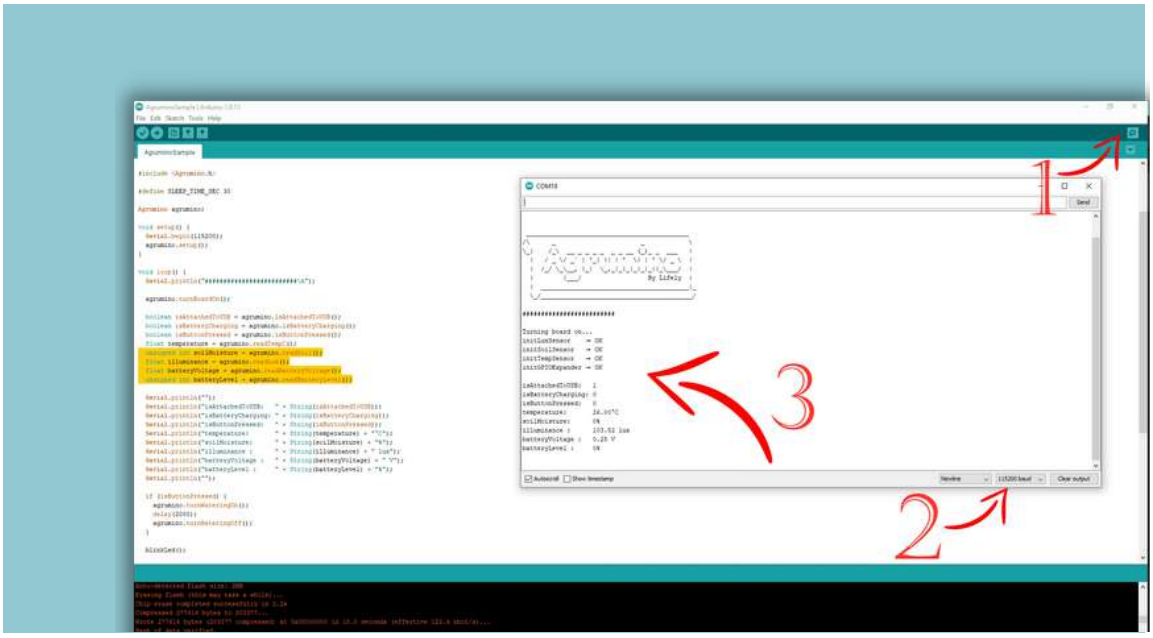
Now connect the Agrumino to the Pc and go to **Tools** → **Port** and choose the correct port **(COM19)** related to your Lifely Agrumino Lemon. To figure out which port is used by your device see Section 7 FAQ 1.



Now select the base sketch, to find it you need to go to: **File** → **Examples** → **Lifely Agrumino Lemon** → **QuickStart** → **AgruminoSample** and then upload the sketch by pressing the button highlighted in the figure:



Now that you have loaded the sketch on Agrumino, to view the data acquired by the sensors click on this button  to open the serial monitor **(arrow 1)** next, change the "baud rate" to 115200 **(arrow 2)** and now you can finally view the data acquired by your Agrumino Lemon **(arrow 3)**.



From now on, you can better manage your device. Also try the other sketches in the examples folder of Lifely Agrumino Lemon.

9 Tutorial with Arduino IDE 2.0

Coming soon!

You can contact us at the following email address for more information:

support@lifely.cc

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