



**LEO 2.0**

**Handheld Analyzer for IVF Applications**

# **User Manual**

This page was left blank

# Index

<b>1</b>	<b>PREFACE</b>	<b>5</b>
<b>2</b>	<b>REGULATORY COMPLIANCE</b>	<b>6</b>
2.1	REGULATORY STATEMENT	6
2.2	WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT DIRECTIVE (WEEE DIRECTIVE)	6
<b>3</b>	<b>SYMBOL DESCRIPTION</b>	<b>7</b>
3.1	SYMBOLS USED IN THIS MANUAL	7
3.2	SYMBOLS ON THE PRODUCT LABEL	7
<b>4</b>	<b>SAFETY NOTES</b>	<b>8</b>
<b>5</b>	<b>SUPPLIED EQUIPMENT</b>	<b>9</b>
5.1	POWER SUPPLY	10
5.2	SODA LIME KIT	10
5.3	MOISTURE TRAP	10
5.4	CALIBRATION KIT	11
5.5	TUBE-A	11
5.6	TUBE-B	12
5.7	TUBE FITTINGS	12
5.8	ADDITIONAL TUBES	12
5.9	OTG-CABLE	12
5.10	CO2 -O2-MODULE (EMBEDDED IN LEO 2.0)	13
<b>6</b>	<b>OPTIONAL MODULES &amp; METERS</b>	<b>14</b>
6.1	T1-MODULE	14
6.2	T2-MODULE	14
6.3	HUMIDITY-MODULE	15
6.4	CO2-PPM-MODULE	15
6.5	VOC-MODULE	15
6.6	FLOW-RATE MODULE	16
<b>7</b>	<b>LEO 2.0 OVERVIEW</b>	<b>17</b>
<b>8</b>	<b>PRELIMINARY OPERATIONS</b>	<b>18</b>
8.1	CHARGING THE BATTERY	18
8.2	DATE & TIME SETTING	18
8.3	ADD DEVICES TO BE MEASURED	18
<b>9</b>	<b>SETTINGS</b>	<b>19</b>
9.1	DEVICE	19
9.2	CALIBRATION	22
9.3	ZERO RESET	23
9.4	PUMP	24
9.4.1	Pump Leak Test	25
9.5	SYSTEM	25
9.5.1	Date & Time	25
9.5.2	Power Saving	26
9.5.3	Memory	26
9.5.4	Download	27
9.5.4.1	Download all Data	27
9.5.4.2	Download a single device data	27
9.5.4.3	Data Visualization & Import in Excel	27
9.5.5	Info	28
9.6	DISPLAY	29
9.7	UNITS	29
9.8	FACTORY RESET	30

9.9	SERVICE MENU.....	30
<b>10</b>	<b>CO2-O2 MEASUREMENT PROCESS.....</b>	<b>31</b>
10.1	BASIC MODE.....	32
10.2	ADVANCED MODE.....	32
10.2.1	Update Min-Max CO2 or Temperature.....	34
<b>11</b>	<b>CO2/O2 TIME LAPSE LOGGING.....</b>	<b>35</b>
11.1	TIME LAPSE LOGGING WITH MEASURE-TYPE: 'TIME'.....	35
11.2	TIME LAPSE LOGGING WITH MEASURE-TYPE: 'AUTO'.....	36
<b>12</b>	<b>VIEWING/DELETING DATA.....</b>	<b>37</b>
<b>13</b>	<b>POWER ON/OFF, RESTART AND TOUCHSCREEN CALIBRATION.....</b>	<b>39</b>
<b>14</b>	<b>CLEANING &amp; MAINTENANCE.....</b>	<b>40</b>
<b>15</b>	<b>SUPPORT.....</b>	<b>41</b>
<b>16</b>	<b>TROUBLESHOOTING.....</b>	<b>42</b>
<b>17</b>	<b>TECHNICAL SPECIFICATION.....</b>	<b>43</b>
17.1	LEO 2.0.....	43
17.2	CO2-O2-MODULE.....	44
<b>18</b>	<b>FIGURE LIST.....</b>	<b>46</b>

## 1 PREFACE

This guide is crafted to help you seamlessly navigate the features and functionalities of LEO 2.0, ensuring a smooth and efficient experience.

LEO 2.0 is equipped to measure the CO<sub>2</sub>-O<sub>2</sub> gas composition offering precision through its integrated sensor modules. Other parameters in Culture/IVF incubators or in the laboratory area, can also be measured using LEO 2.0's external modules (sold Separately). This preface provides you with a glimpse into the key features that make LEO 2.0 a reliable companion in your laboratory.

### **Key Features:**

- Embedded CO<sub>2</sub>-O<sub>2</sub>-MODULE: Measures concentration of gases with exceptional accuracy.
- Versatile External Sensor Modules: Connect T1-MODULE, T2-MODULE, CO<sub>2</sub>-PPM-MODULE, HUMIDITY-MODULE, VOC-MODULE and FLOW-RATE-MODULE to LEO 2.0's ports for expanded capabilities.
- Calibration Assurance: All sensor modules are factory calibrated using traceable standards, and calibration data is stored in internal memory of each module. Optionally, modules can be delivered with a traceable **or** accredited calibration certificate.
- Operation Modes: LEO 2.0 operates in Diffusion Mode for pressurized gas sampling and Pump Mode for atmospheric pressure sampling, featuring a built-in pump.
- Enhanced Readings: For humidified incubators, LEO 2.0 allows you to input the incubator's temperature and relative humidity values, and compensates the CO<sub>2</sub> and O<sub>2</sub> readings.
- Logging and Organization: Perform single measurements or engage in extended time logging, with the ability to store and label data for up to 30 devices.
- User-Friendly Interface: Navigate effortlessly with the 4.3" touch screen interface, ensuring a seamless and intuitive user experience.
- This manual provides in-depth instructions on setup, operation, maintenance, and troubleshooting.



Figure 1. LEO 2.0.

## **2 REGULATORY COMPLIANCE**

### **2.1 Regulatory Statement**

The product complies with the essential requirements of the LVD Directive 2014/35/EU and the EMC Directive 2014/30/EU. The product has been tested and it complies with the requirements of the following standards:

- European standard EN 61010-1: 2010 “Safety requirements for electrical equipment for measurement, control and laboratory use”
- European standard EN 61326-1: 2013 “Electrical equipment for measurement, control and laboratory use – EMC requirements”

The product meets the technical requirement of the Directive 2011/65/EU Restriction of the use of certain hazardous substances (RoHS). The product has been tested according to European Standard EN 50581: 2012 “Technical documentation for the assessment of the electrical and electronic products with respect to the restriction of hazardous substances”.

### **2.2 Waste Electrical and Electronic Equipment Directive (WEEE Directive)**

The product must not be disposed as a general household waste. At the end of the product’s life, take the product to a collection point designed for recovering and recycling of electrical and electronic devices.

In case of doubt, please return the product to Okolab s.r.l. for proper treatment.

### 3 SYMBOL DESCRIPTION

This paragraph describes the symbols used in this manual and on the product label.

#### 3.1 Symbols used in this Manual

The following symbols identify important information:



**CAUTION or WARNING or IMPORTANT:** This symbol warns of circumstances or practices that can affect the instrument's functionality. Please refer to accompanying documents.



**Note** ► *Supplies you with important information to successfully use the instrument.*

#### 3.2 Symbols on the Product Label



**CE MARKING:** This symbol indicates the product's compliance with EU legislation.



**PRODUCT DISPOSAL:** this symbol indicates that this product must not be disposed as urban solid waste.



This symbol indicates the product production date.



This symbol indicates the Manufacturer data.



This symbol warns you to read the user manual before starting the device.



IP 40

This symbol indicates the protection degree against ingress of solids or liquids inside the product.

## 4 SAFETY NOTES

In order to achieve maximum performance and to ensure proper operation of your new equipment, please read carefully the following safety notes and the instructions. If you have any question, please contact Okolab.

---



- This equipment must be used only as intended and described in this Manual.
- This equipment should be operated only by qualified personnel.
- Do not use this equipment if any parts are damaged.
- This instrument is not intended for use in locations subject to flammable or explosive gases.
- Always transport equipment with care.
- The equipment and its internal parts may be damaged by dropping or shock.
- Do not use a volatile solvent, such as paint thinner, to clean the instrument, deformation or discoloration will occur.
- Use a soft, dry cloth to remove stains from the instrument.
- Not following these instructions could damage the device and its accessories.
- Do not exceed the voltages indicated in this manual or on the product label.
- Avoid excessive induction noise, static electricity, or magnetic fields.
- Do not expose this instrument to water or moisture.
- Avoid throttling and kinking of tubes.
- Check tubing from time to time for possible wear and tear.
- Check that all tubing is fully inserted into connectors, and secure.
- This device is not designed for use in medical applications.
- International caution symbol marks this device. It is important to read the “Safety Notes” before installing, using and commissioning this device, as the notes contain important information relating to safety and EMC. Not following these instructions can result in damage or breakdown of the device and its accessories.

---

We reserve the right to make technical upgrades and changes.

IN NO EVENT, SHALL OKOLAB S.R.L. BE LIABLE FOR ANY DIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY NATURE – INCLUDING: LOSSES OR EXPENSES RESULTING FROM ANY DEFECTIVE PRODUCT, OR THE USE OF ANY PRODUCT.

## 5 SUPPLIED EQUIPMENT

Figure 2 shows the Hard Case containing LEO 2.0's supplied equipment. The optional and spare parts can be purchased from Okolab s.r.l.



Figure 2. LEO 2.0 Hard Case.

- A. LEO 2.0.
- B. Power Supply.
- C. USB Cable.
- D. Soda Lime Kit.
- E. Moisture Trap.
- F. Calibration Kit.
- G. Tube-A.
- H. Output Tube.
- I. Tube-B.
- J. Filters.
- K. Tube Fittings.
- L. Additional tubes.
- M. OTG Cable.

## 5.1 Power Supply

LEO 2.0 is powered by a rechargeable battery. A power supply is included with the device for charging the battery from a power outlet. Connect the USB cable between the LEO 2.0 MICRO-USB port and the power adapter to charge the internal battery in LEO 2.0. Figure 3 shows the different wall adapters supplied.



Figure 3. Power Adapters supplied.



*Do not use a different power supply to recharge LEO 2.0. Do not attach a different USB cable to the power adapter.*

---

## 5.2 Soda Lime Kit

The Soda Lime Kit is used for the *CO2 Zero Reset* procedure with ambient air. It consists of a Soda Lime filter (Figure 4) generally used to remove CO<sub>2</sub> from the ambient air.



Figure 4. Soda Lime Kit.



**Note** ► *The Soda Lime kit has to be replaced when the Soda Lime filter changes color turning purple. Contact Okolab to purchase a new Soda Lime Kit.*

**Note** ► *Remove the protection cap from the Soda Lime filter before using the Soda Lime Kit and place it back on after use.*

---

## 5.3 Moisture Trap

The Moisture Trap is used for humid gas measurements. Figure 5 shows the Moisture Trap components:

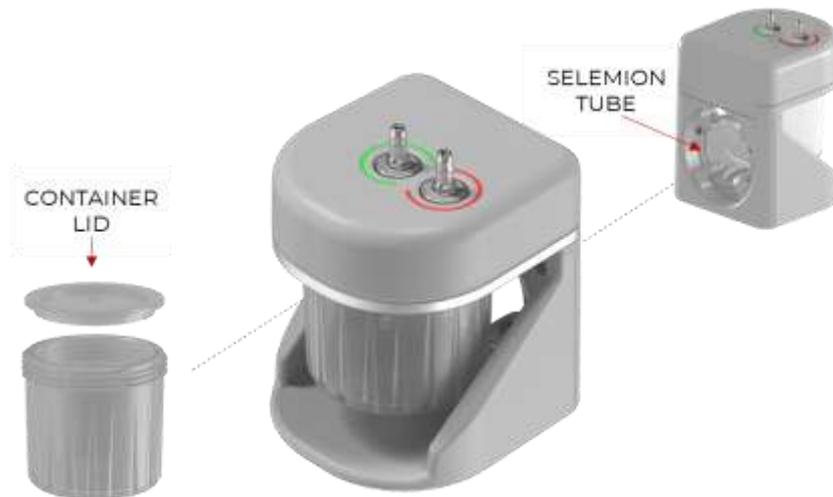


Figure 5. Moisture Trap.

1. A condensation trap for the reduction of sampled gas temperature and the collection of condensed water from the sampled gas. In case of performing many consecutive measurements or a long duration measurement (Time Lapse) the condensation container lid must be removed, whereas in the case of measurements of a shorter duration the container lid can be left closed.
2. A Selemion Tube that reduces the relative humidity of sampled gases to a value lower than 40%.

#### 5.4 Calibration Kit

The Calibration Kit allows calibration of the CO2-O2 modules (Figure 6). Please refer the Service Manual for further details on the CO2-O2 modules calibration.



Figure 6. Calibration Kit.

#### 5.5 Tube-A

Figure 7 illustrates the Tube-A, which is used to sample the gas from the incubator (further details in Section 10). It consists of tubes with a hydrophobic filter connecting them, in order to avoid water collection at the Gas Inlet. This Filter needs to be replaced every 6 months.



Figure 7. Tube-A.

## 5.6 Tube-B

Figure 8 illustrates the Tube-B, which is used along with the moisture trap to connect the sampling Gas Port to the Gas Inlet connector of the Moisture Trap if the sample gas is humid (further details in Section 10).



Figure 8. Tube B.

## 5.7 Tube Fittings

Okolab supplies 8 different types of Tube fittings allowing the compatibility of its tubes with many sampling gas ports of the incubators, also 5 black caps for the input-output port on the LEO 2.0 meter.

The provided Tube Fittings are as follows:

1. #1 Reduction Tube Fitting for 3.2 mm and 1.6 mm internal diameter tubes.
2. #2 Reduction Tube Fitting for 3.2 mm and 2.4 mm internal diameter tubes.
3. #2 Value Plastic 3040-9 Straight Through Reduction Tube Fitting with Classic Series Barbs
4. #1 Value Plastic 3050-9 Straight Through Reduction Tube Fitting with Classic Series Barbs
5. #1 Value Plastic 3060-9 Straight Through Reduction Tube Fitting with Classic Series Barbs
6. #1 Female Luer Thread Style to 500 Series Barb for 3.2mm internal diameter tubes.
7. #1 Female Luer Thread Style to 500 Series Barb for 2.4mm internal diameter tubes.
8. #1 Elbow Tube Fitting with 200 Series Barbs, 1/8" (3.2mm) ID Tubing.

## 5.8 Additional Tubes

The following additional tubes are included:

1. Tygon tube (ID = 2.4mm; OD = 4mm).
2. Silicon tube (ID = 4mm; OD = 7 mm).

## 5.9 OTG-Cable

The OTG Cable (Figure 9) can be used to download data stored on LEO 2.0 to a USB Key. USB Key is not supplied.



Figure 9. OTG Cable.

## 5.10 CO2 -O2-MODULE (embedded in LEO 2.0)

The CO2-O2-MODULE is embedded into LEO 2.0, and it is included as standard. It measures, with a high accuracy, the CO2-O2 volume concentration in the unit of %, CO2-O2-MODULE is temperature and pressure compensated thanks to dedicated temperature and pressure sensors that are included in the module.

The CO2-O2-MODULE is factory calibrated by using traceable standards, and stores the calibration data in its internal memory. The declared accuracy is guaranteed for a period of 6 months from the factory calibration date. The CO2-O2-MODULE is designed for an easy replacement. Please refer to the manufacturer or to an authorized local distributor for service and maintenance.

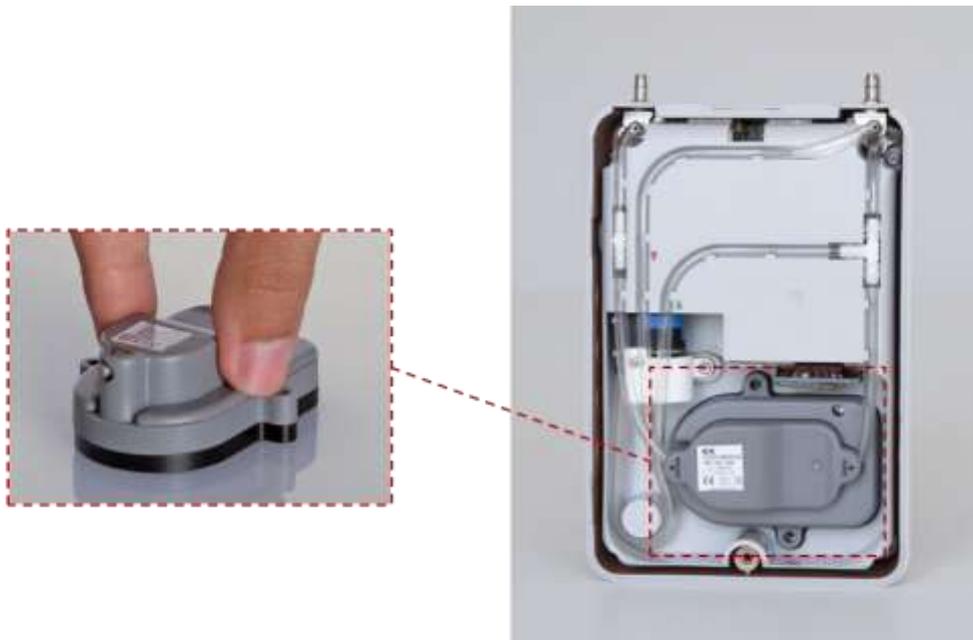


Figure 10. CO2-O2-MODULE.

## 6 OPTIONAL MODULES & METERS

### 6.1 T1-Module

The T1-Module (Figure 11) is a calibrated temperature probe that can be used with LEO 2.0. The T1-MODULE has an external diameter of 0.13 mm and a total wire length of 2m (1+1 meter). It is suitable for temperature measurements of bench-top and high-top incubators where the temperature monitoring port has a diameter smaller than 2mm. The sensor's measuring point is just the tip at the end of the wire and is immersible and suitable for in sample measurements. T1-Module stores calibration data in its own local memory.

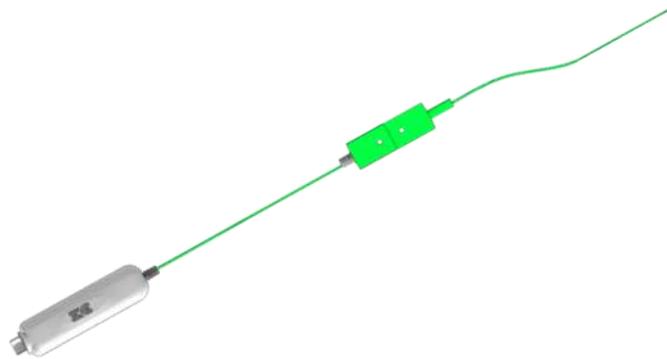


Figure 11. T1-Module.

### 6.2 T2-Module

The T2-Module (Figure 12) is a calibrated temperature probe that can be used with LEO 2.0. The measuring part of the T2-MODULE has an external diameter of 2 mm and a length of 150mm. It is suitable for temperature measurements of benchtop and box incubators where the temperature monitoring port has a diameter bigger than 2 mm. T2-Module stores calibration data in its own local memory.



Figure 12. T2-Module.

### 6.3 Humidity-Module

The Humidity-Module (Figure 13) is a portable temperature compensated humidity sensor designed for measuring humidity in chambers, incubators and laboratories. This module is capable of measuring Humidity in the range of 0-100%.



Figure 13. Humidity-Module.

### 6.4 CO2-PPM-Module

CO2-PPM-Module (Figure 14) is designed to measure carbon dioxide (CO<sub>2</sub>) at ppm wherever indoor air quality is important for the occupants' comfort and health. CO<sub>2</sub> ambient concentrations can be detected in the range 0 -10000 ppm. The sensor module is temperature and pressure compensated and can be used to adjust any fixed CO<sub>2</sub> measurement system.



Figure 14. CO2-PPM Module.

### 6.5 VOC-Module

VOC-Module (Figure 15) is designed to measure low levels of Volatile Organic Compounds (VOCs). It allows qualification of the total VOC (TVOC) level at very low concentrations (<5 ppb). The module utilizes Photoionization Detection (PID) sensor technology to perform measurements. Traceable calibration standards are used in order to ensure high accuracy in the range 0-2000 ppb. VOC-MODULE is factory

calibrated using isobutylene in air (balance). Therefore, the measured values will be expressed as the equivalent signal level of this reference.



Figure 15. VOC Module.

## 6.6 Flow-Rate Module

The Flow-Rate-Module (Figure 16) is a compact and accurate gas flow meter with short response time, designed for instantaneous gas flow rate measurements in the range 0-200 ml/min. The highly compact and lightweight design makes it ideal for many different work environments. Flow-Rate-Module is intended to be used in combination with LEO 2.0, or as a standalone sensor module thanks to the presence of a display.

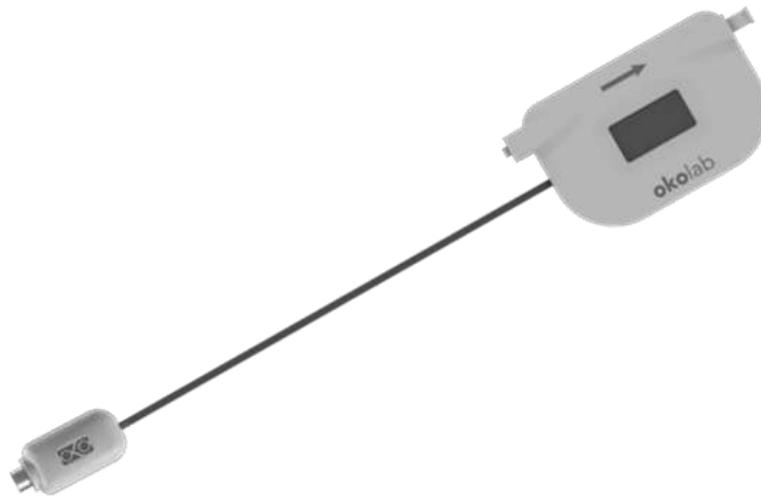


Figure 16. Flow-Rate Module.



**Note** ► Further information is detailed in the Quick Instructions Manual of each of these Modules. The Manuals are provided upon the purchase of the modules.

---

## 7 LEO 2.0 OVERVIEW

The LEO 2.0 consists of a Power Button and 6 connection ports. Figure 17 illustrates an overview of the connection ports and the Power Button.

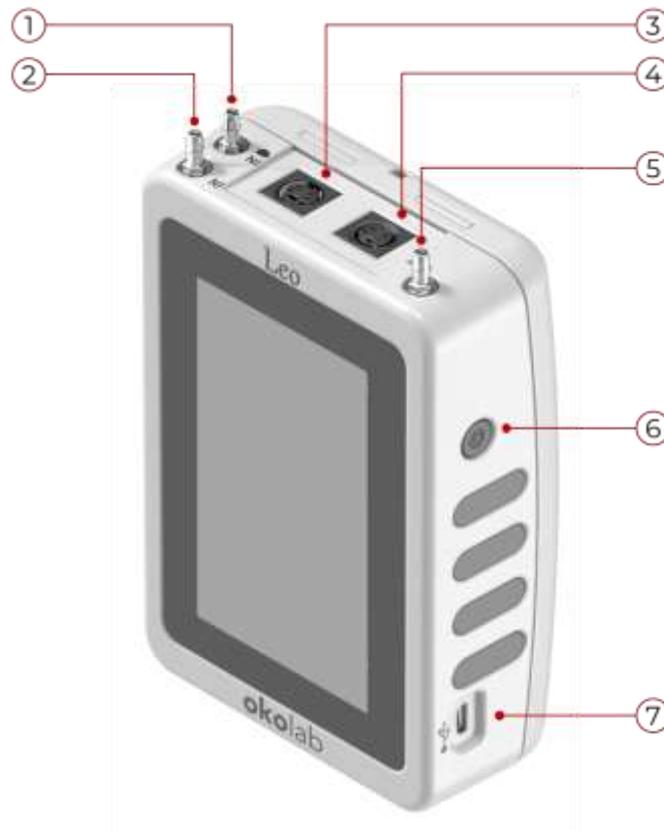


Figure 17. LEO 2.0 connection ports and power button.

LEO features the following ports:

1. Pump gas input port labelled with icon .
2. Diffusion gas input port labelled with icon **IN**
3. Probe connector 1. To connect additional external sensor modules
4. Probe connector 2. To connect additional external sensor modules
5. Gas outlet for gas return or release during the gas sampling measurement
6. Power button
7. MICRO-USB port. To charge the battery with the power adapter, download the measurements or do software updates

## 8 PRELIMINARY OPERATIONS

### 8.1 Charging the Battery

To charge the battery, connect the power adapter to the MICRO-USB port. If the battery is being charged while LEO 2.0 is turned on, the *Charging* symbol  appears at the top of the LEO 2.0 display. The percentage of battery charge is shown besides the battery symbol. When charging is complete, the *Battery full* symbol  appears at the top of display.

---

**Note** ► If you charge LEO 2.0 with computer, the screen shows a message '**Low power charger**' indicating that LEO 2.0 is not getting the proper charging power that it expects.



**Note** ► A full charge requires 4 hours. The recommended initial charging time is 6 hours.

**Note** ► Okolab suggests to use LEO 2.0 while charging the battery only if the percentage of battery charge is higher than 90%.

---

### 8.2 Date & Time Setting



When turning LEO 2.0 on for the first time, Date & Time have to be set. To change Date & Time and their format, follow the instructions below.

1. For setting the Date, press '**Change**' to enter the *Set Date* page.
2. Change the date using '**+** and **-**' buttons.
3. Press '**Save**' to confirm.
4. Perform the same steps for changing the Time.
5. Select/deselect the 24 hours checkbox to have a 24- or 12-hours style clock.
6. Press Save to confirm.

---

**Note** ► The default time format is a 24-hours style clock.



**Note** ► Okolab recommends to check the *Date & Time Settings* the first time you turn LEO 2.0 on because the current *Date & Time* values are stored with every reading.

---

### 8.3 Add Devices to be measured

To add the incubators of your laboratory which will be periodically measured, and the desired method of their measurement please refer the section 9.1. Proposed method of measurement of several incubators can be found on the Okolab website for LEO 2.0.

## 9 SETTINGS

To go to the Settings page, navigate to '**Switch to Advanced Mode**'> press the '**Settings**' icon . The settings menu has 9 options (Figure 18):

1. Device.
2. Calibration.
3. Pump.
4. Alarm.
5. System.
6. Display.
7. Units.
8. Factory reset.
9. Service.



Figure 18: Settings Page.

### 9.1 Device

#### Add a device to be measured



LEO 2.0 allows associating a name (label) and measurement parameters to each device to be measured. A maximum of 30 devices can be stored and each device has its own measurements storage memory in LEO 2.0's internal memory.

To begin, enter the device name by clicking on **'insert a name'** (the device name cannot be more than 10 characters), and finally press "Save". After saving the Device name you can proceed by selecting the measurement parameters:

1. **Auto:** Records the value of the measurement when the reading reaches a stable value.
2. **Manual:** Records the value of the measurement when you decide to stop the measurement
3. **Time:** Stops the measurement and stores the values, after a pre-defined time (duration).

If there are already saved devices on LEO 2.0, you can **'COPY'**  the existing device set-up onto a new one.



**Note ►** When performing a gas measurement, the readings of any of the modules (T1, T2, VOC etc.) connected to LEO 2.0 will be recorded as well.

---

The **'AUTO'** and **'MANUAL'** modes allow you to set the parameters as illustrated in Figure 19:

- **Pump YES/NO:** You can select between performing the measurement in the *ASPIRATION* mode (where the sampled gas is aspirated in using the pump) or the *DIFFUSION* mode (where input of sampled gas is without the pump). In case of working with the pump select **YES** (Aspiration mode), you can change the flow rate as desired (by default the flow rate will be set to 100ml/min).
- **Humid YES/NO:** If your incubator is humidified, select YES and enter the incubator's temperature (°C) and humidity (%). Leo 2.0 will then compensate for the CO<sub>2</sub>/O<sub>2</sub> values read by its sensors and display/store the actual CO<sub>2</sub>% and O<sub>2</sub>% levels inside your incubator. If you select NO, Leo 2.0 will display and store the CO<sub>2</sub>/O<sub>2</sub> values exactly as measured by its sensors.
- **Gas return YES/NO:** This option needs to be selected as YES when the sampled gas is being sent *Back* into the incubator with the output tube.
- **Tube Purge YES/NO:** The tube purge option is advised to be used (set to YES) when the *Gas return* is also used (set to YES), This function allows the incubator to recuperate the change in the concentration occurring due to the air (from inside LEO 2.0) during the initial gas return step.



**Note ►** If the 'Tube Purge' option is set to 'YES' then before the start of the measurement, the pump will run for 25sec aspirating the gas from within the incubator followed by a 3min pause allowing the incubator to recover its stability. After this the measurement procedure will begin.

---

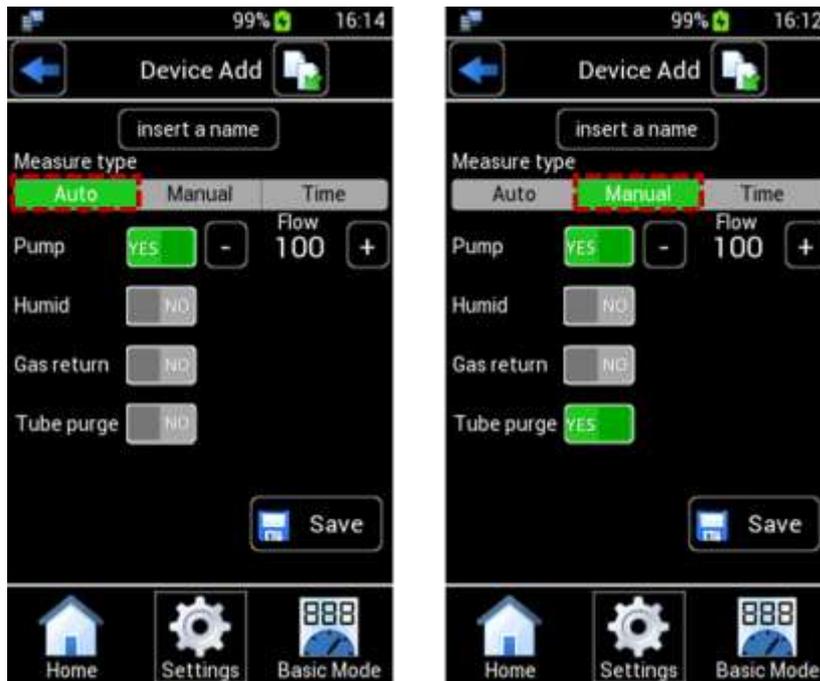


Figure 19. Adding a Device: Auto & Manual measure types.

The **TIME** mode allows you to set the same parameters as in the '**AUTO**' and '**MANUAL**' modes, as well as to set the duration of the measurement, as in the Figure 20:

**Duration:** This parameter allows you to set the duration of gas sampling after which Leo 2.0 will show and store the reading.

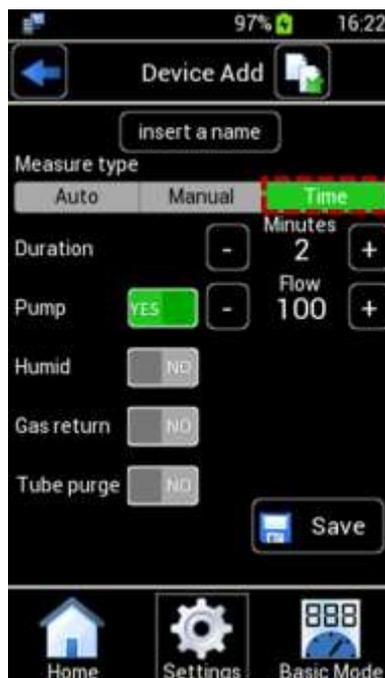
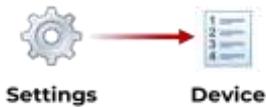


Figure 20. Adding a Device: Time measure type.

### **Edit a device.**



In order to **Edit**, navigate to '***Switch to Advanced Mode***' and follow the above path. After selecting the device, the subsequent page allows you to change the various parameters.

### **Copy or delete a device.**



In order to **Copy** or **Delete** a device, navigate to '***Switch to Advanced Mode***' and follow the above path. After selecting the device, the subsequent page allows you to copy the parameters from another device, or delete the device.



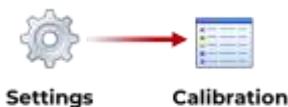
---

**Note** ► The 'COPY' function can also be used to copy the parameters of an existing device onto a newly created device.

**Note** ► When deleting a device, all its data is erased permanently.

---

## **9.2 Calibration**



By navigating to '***Switch to Advanced Mode***' and following the above path, you can select and view the calibration data of all the connected modules. when using LEO 2.0 without any external modules connected, only the CO2/O2 calibration data can be viewed.

---

**Note** ► External sensor modules' icons are automatically disabled if sensor modules are not connected to LEO 2.0.



**Note** ► The Calibration data of the external sensor modules are stored within their internal memories. **These are the calibration data shown when you select a module**

**Note** ► It is recommended that Leo 2.0 Sensor Modules should be calibrated at least once per year. Please refer to the manufacturer or to an authorized local distributor for service and maintenance.

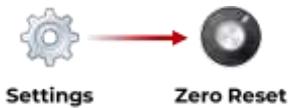
---

---

**Note ►** Okolab suggests calibrating the CO2-O2-Module at compositions similar to the ones of the gas to be measured. In this case, after the CO2/O2 Calibration you can achieve an accuracy of  $\pm 0.1\%$ .

---

### 9.3 Zero Reset



By navigating to '**Switch to Advanced Mode**' and following the above path, you can perform the Zero Reset of the CO2/O2 sensors. The first Zero Reset procedure is performed at the factory. To improve LEO reading accuracy the Zero Reset should be repeated every thirty days. LEO will also remind you every thirty days to perform the Zero Reset. The Zero Reset of the CO2/O2 offers two alternative procedures:

1. **CO2-O2 (recommended):** This Zero Reset procedure involves utilizing **Pure Nitrogen (N2)** for resetting both the CO2, as well as, the O2 sensors. In order to proceed with this method, connect the N2 gas at **1 barg** to the diffusion port on LEO 2.0 (**IN**) using the provided **Calibration Kit** (Figure 21), which guarantees a flow of 150-180 ml/min, and follow the on-screen instructions.

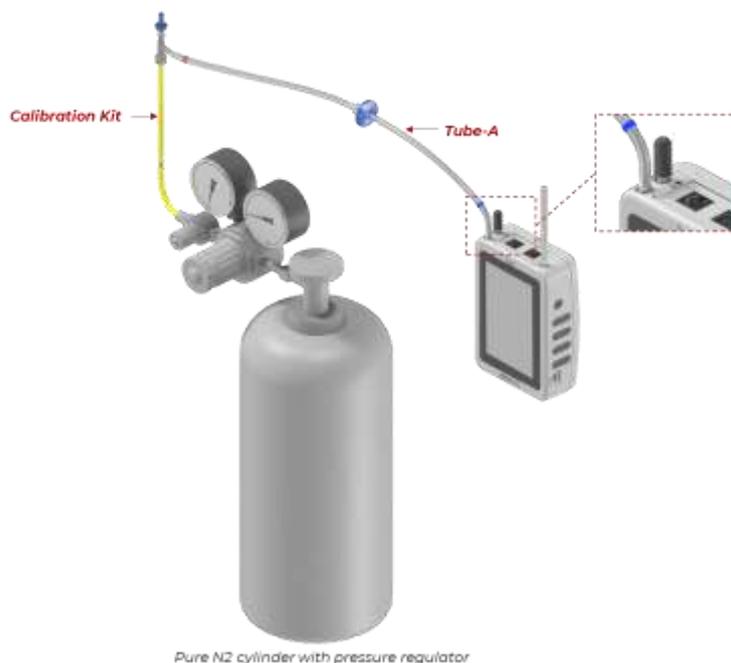


Figure 21. CO2-O2 Zero Reset using the Calibration Kit.

2. **CO2:** This Zero Reset procedure involves utilizing the provided **Soda Lime Kit** for resetting the CO2 sensor drift. In order to proceed with this method, connect the **Soda Lime Kit** to the pump gas input port on LEO 2.0 (**IN**) (Figure 22), and follow the on-screen instructions.

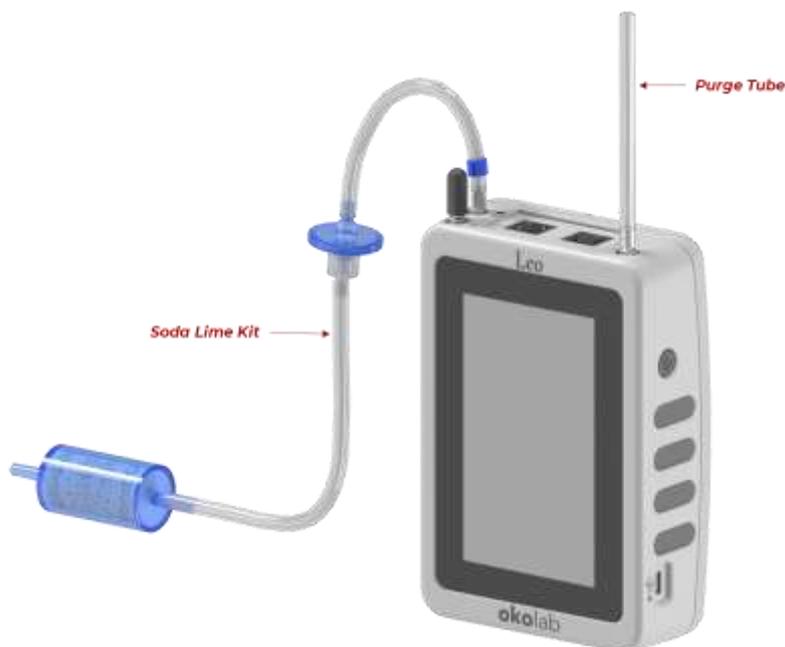


Figure 22. CO2 Zero reset using the Soda Lime Kit.

---

**Note** ► The Zero Reset procedures of the CO<sub>2</sub>-PPM and the VOC modules can be found in their respective quick instruction guides (available on the purchase of the modules).

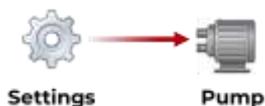


**Note** ► Zero reset every 30 days is highly recommended but not mandatory before a gas measurement.

**Note** ► If the zero reset fails then Leo 2.0 will show a fail message on the screen. Please try to perform the zero reset from the beginning before you call for service. Follow the instructions from the beginning, and verify that you use the correct tubes, check the tube's condition, and the N<sub>2</sub> cylinder purity and pressure.

---

## 9.4 Pump



By navigating to '**Switch to Advanced Mode**' and following the above path, you can change the default flow rate of the pump (from 100 ml/min to any value within the range of 60-260 ml/min), read the total lifetime of the pump, the number of hours it has been used and its current flow rate. Please note that the **Reset** option needs to be selected **only** when a replacement pump has been installed.

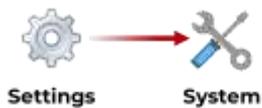


**Note** ► If the pump is near its End-of-Life please notify the Okolab Technical Support team for a replacement pump.

### 9.4.1 Pump Leak Test

The **Pump Leak-Test** can be performed by clicking the option present in the pump settings page, this test can help you verify the proper functioning of the pump. After pressing on Leak test, follow the on-screen instructions. If the Leak test is passed, the pump works properly, and the green label showing *OK* appears. If the Leak test fails, a leakage in the pump is present and a red label showing *FAILED* appears. Make sure that caps are well inserted into LEO 2.0's ports and repeat the Leak test. If the Leak test fails again, please contact your local distributor, or Okolab support at [support@oko-lab.com](mailto:support@oko-lab.com).

## 9.5 System



By navigating to '**Switch to Advanced Mode**' and following the above path you can access the system settings as illustrated in Figure 23:

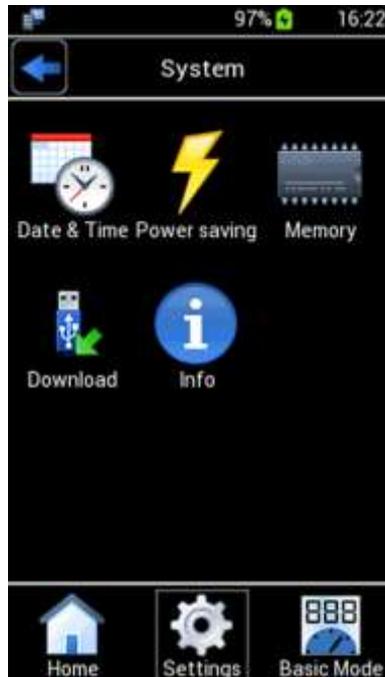


Figure 23. System page.

### 9.5.1 Date & Time



By navigating to '**Switch to Advanced Mode**' and following the above path, the Date and Time can be set on LEO 2.0. In order to change the Date or Time, press '**Change**' corresponding to the function to be edited and click on the '**+**' or '**-**' as required and '**Save**'.

---

**Note** ► The default time format is a 24-hours style clock, this can be changed by unselecting the **'24 hours'** option.



**Note** ► Okolab recommends to check the Date & Time Settings the first time you turn LEO 2.0 on because the current Date & Time values are stored with every reading.

---

### 9.5.2 Power Saving



By navigating to **'Switch to Advanced Mode'** and following the above path, you can enable a **Timer** (in minutes) to reduce the device's **brightness** or to set a **Timer** (in minutes) to make the device go into standby after the selected period of time, both these options can be selected by flagging the check box next to them, setting the required time limit and pressing **'Save'**.

---

**Note** ► Low brightness feature is enabled by default. Set the time period after which LEO 2.0 will reduce the display's brightness by 15%.



**Note** ► Display's brightness is automatically reduced when the remaining battery power is less than 5%.

**Note** ► When the device is in standby, press the power button once to turn the display back on.

---

### 9.5.3 Memory



The available and used memory in LEO 2.0 can be viewed by navigating to **'Switch to Advanced Mode'** and following the above path.

---

**Note** ► In case the Leo 2.0 memory is full, you will receive an alert after the measurement regarding this and you'll have to download the data (Section 9.5.4) to an external USB stick and click on 'Delete all' or alternatively you can download and delete the data of a single device (detailed in Section 12).

---

## 9.5.4 Download

There are two ways of downloading the data from LEO 2.0. You can either download all the device's data or the data of a single device.

### 9.5.4.1 Download all Data



Navigate to **'Switch to Advanced Mode'** and follow the above path. Connect an external USB stick via the OTG-Cable as shown in Figure 24 and click on the **'Start'** button.

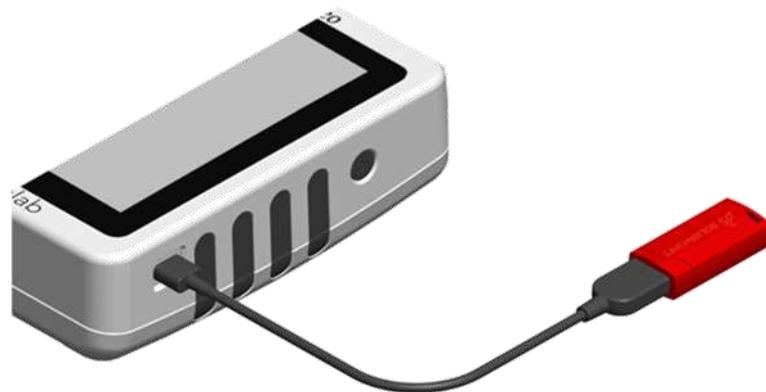


Figure 24. Connecting External USB Stick to LEO 2.0.

The data downloaded using this method comprises of the measurements of all the devices saved within LEO 2.0 internal memory. The downloaded data will contain different .txt files with their names corresponding to the device name, these .txt files can be opened in excel directly.

### 9.5.4.2 Download a single device data

Navigate to **'Switch to Advanced Mode' > 'Select a device' >** and select the device for whose data needs to be downloaded. Then follow the below path.



**Note** ► If the **'Download'** icon is highlighted as grey, please make sure that the USB stick is FAT32 formatted and connected properly to Leo 2.0.

---

### 9.5.4.3 Data Visualization & Import in Excel

After downloading the data from LEO 2.0 you can import it to excel by following the steps listed below:

1. Open Excel and create a new blank document.

2. Goto Menu > Data > From text/csv.
3. Connect the USB stick, click on the incubator name.txt file (with the incubator name) and press "Import".
4. In the window that appears press "Load" and the data will appear in the excel spreadsheet.

The data imported in Excel will report the Date & Time of each measurement for that device along with the values of the parameters recorded followed by the 'Stop Mode', 'Issue' and the 'Out of Range' factors relative to each of the readings. The following reports the significance of the numerical codes relative to the above-mentioned factors.

<b>Factors</b>	<b>Code</b>	<b>Significance</b>
<i>Stop Mode</i>	1	Single Snap
	2	Single Manual
	3	Single Auto
	4	Single Timed
	5	Timelapse
<i>Issue</i>	0	Normally Closed
	1	Aborted by User
	2	Aborted due to Low Battery
	3	Timeout (Meaningful only for Single-Auto measures)
<i>Out of Range</i>	0	All OK (no measures Out of Range)
	1	CO2 values Out of Range
	2	T1 values Out of Range
	3	CO2 and T1 values Out of Range
	4	T2 values Out of Range
	5	CO2 and T2 values Out of Range
	6	T1 and T2 values Out of Range
	7	CO2, T1 and T2 values Out of Range

### 9.5.5 Info



For visualizing the system's information, navigate to '**Switch to Advanced Mode**' and follow the above path. This page contains the information related to LEO 2.0 as illustrated in Figure 25. Click on the right arrow icon to move to sensor modules information panel.

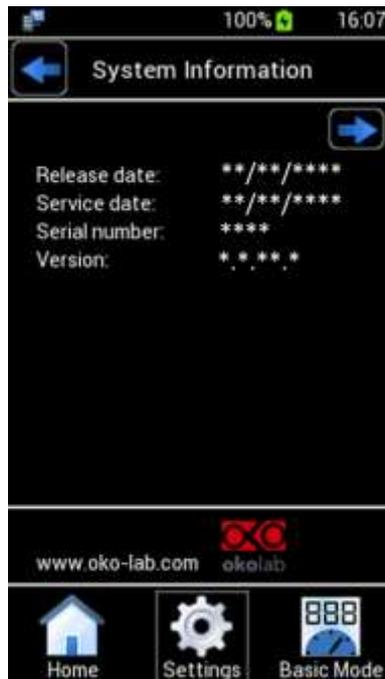


Figure 25. System information.



**Note** ► Only the CO2/O2 Sensor module information is visible when LEO 2.0 is being used without any external sensor modules connected.

**Note** ► Please have this information handy when contacting for support.

## 9.6 Display



For changing the display settings, navigate to '**Switch to Advanced Mode**' and follow the above path. In the **Display** settings page, it is possible to modify:

1. *Brightness.*
2. *Theme.*
3. *Touchscreen:* (changing the frequency of the touch buzzer, and switching it ON/OFF).

## 9.7 Units



The device's measurement units can be changed by navigating to '**Switch to Advanced Mode**' and following the above path. There are three available options to choose from for the units relative to temperature and pressure as listed below:

Temperature: °C, °F, K

Pressure: mbar, kPa, psi



**Note** ► *The default measurement units are C° for temperature and mbar for pressure.*

---

## 9.8 Factory Reset



LEO 2.0 allows you to perform a complete factory reset of the device. Doing so will restore the default factory settings. A pop-up dialog box appears indicating that all the saved data (devices, calibrations etc.) will be lost. Press *Ok* to start Factory Reset, and LEO 2.0 will ask you to enter the password which is "**okolab**" or you can press *Cancel* to cancel the procedure.



**Note** ► *Factory Reset will erase the user calibration of the CO2-O2 module, and any other sensor modules connected.*

---

## 9.9 Service Menu

This option deals with the device Diagnostics and Factory Calibrations. Please note that this option is reserved to be utilized by trained engineers. Please contact your local distributor or the Okolab Technical support for assistance regarding the Servicing.

## 10 CO<sub>2</sub>-O<sub>2</sub> MEASUREMENT PROCESS

LEO 2.0 allows measurement of the CO<sub>2</sub> and O<sub>2</sub> concentration in two main modes:

1. Basic Mode
2. Advanced Mode

In both the two measurement modes you are advised to pay close attention to the gas being sampled, and verify whether the gas being measures is Dry or Humid. Figure 26 illustrates the Tubing setup to be followed when working in **Diffusion Mode** with either dry or wet sampled gas, whereas, Figure 27 illustrates the Tubing setup to be followed when working in **Pump Mode** with either dry or humid sampled gas. The tubes to be utilized correspond to the Equipment list in Chapter 5.

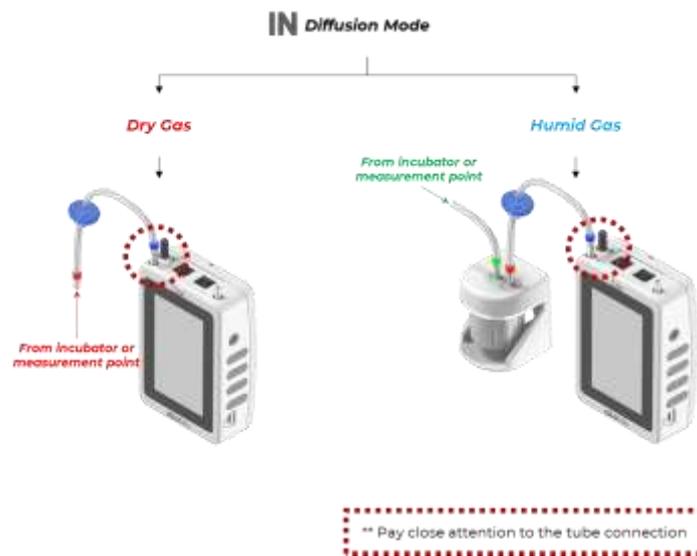


Figure 26. CO<sub>2</sub>-O<sub>2</sub> measurement setup for Diffusion Mode.

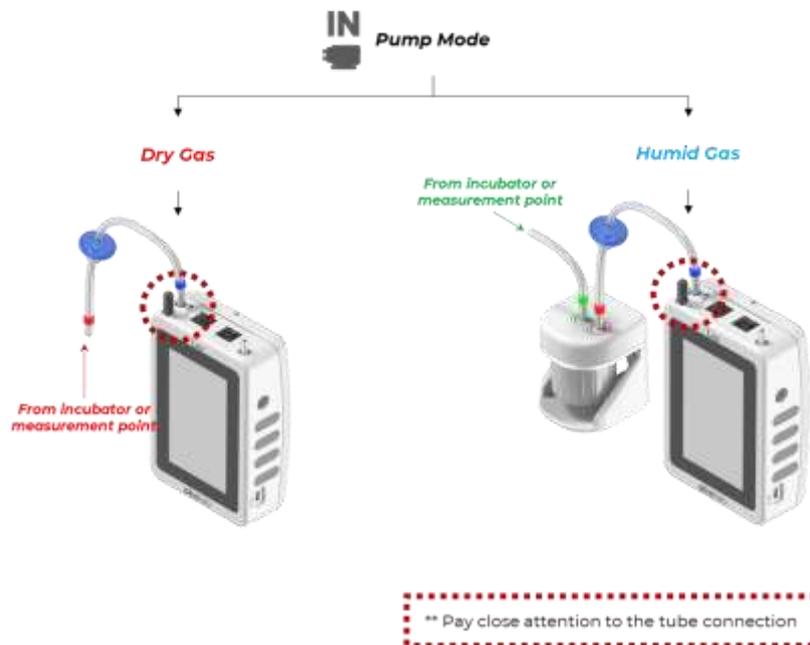


Figure 27. CO<sub>2</sub>-O<sub>2</sub> measurement setup for Pump Mode.

The following sub-headings give a detailed explanation of the two primary measurement modes.

## 10.1 Basic Mode

This is the default measurement mode, accessible as soon as the device is switched ON. In **Basic Mode**, you can quickly measure the CO<sub>2</sub>/O<sub>2</sub> % in a sampled gas, as well as any external meters connected to the device at the time of measurement, the measurements **do not get stored in the device's records**. The gas can be measured either by the Diffusion method or the Pump Mode.

1. **Diffusion Method**, without pump running. Use Diffusion Mode when the sampling gas has an overpressure higher than 10 mbarg (0.145 psig), as to be sure that you will have a flow higher than 60mL/min. In order to perform a quick measurement simply prepare the setup as indicated in Figure 26, and the display will show a real-time value of the gas being *measured*.

---

**Note** ► Do not exceed 300 mbar (4 psig) upstream of LEO 2.0.



**Note** ► LEO 2.0 can operate at maximum flow rate of 400 ml/min, for best results Okolab advises not to exceed 300 ml/min as the flowrate.

**Note** ► The optimal flow rate of the sampling gas is 150 ml/mi.

- 
2. **Pump Method**, with pump running. Use Pump Method when the sampling gas is at atmospheric pressure. In order to perform a quick measurement simply prepare the setup as indicated in Figure 27, and press the 'Pump Start' icon , the display will show a real-time value of the gas being measured.

---

**Note** ► The measurement of any of the external modules connected when working in Basic Mode are also visible.



**Note** ► The default value of the gas flow rate aspirated by LEO 2.0 is 100 ml/min. This default value can be changed by navigating to 'Switch to Advanced Mode' > 'Settings' > pressing 'Pump' icon .

---

## 10.2 Advanced Mode

The **Advanced Mode** offers you a configurable measurement. Before starting a measurement in this mode, you'll first need to choose the device (by clicking on '**Select a device**') for which the measurement is to be performed (Figure 28). In case the device isn't saved in LEO 2.0 memory, please add it following the instructions in the Section 9.1 **Devices**).

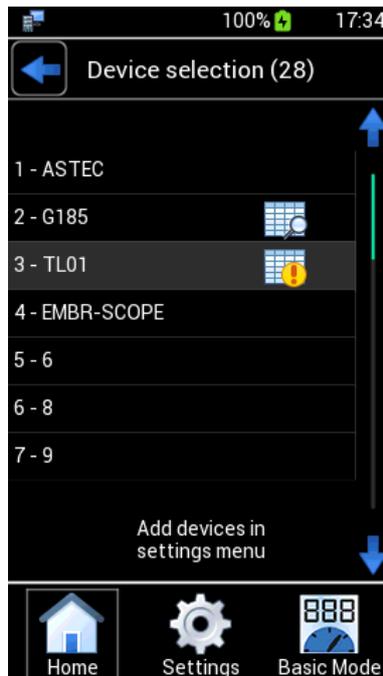


Figure 28. List of available Devices in the Device Selection Page.



**Note** ► To choose an **Existing** device, navigate to '**Switch to Advanced Mode**'> press '**Select a device**', and select a device from the list

**Note** ► To **Change** the selected device, navigate to '**Switch to Advanced Mode**'> **Click on the previously selected device** and select from the list the required device to be measured.

To start a single measurement, follow the instructions below:

1. Select the Device for which the data will be stored.
2. Press the '**Start**' icon .
3. Depending on the Measure type set for the selected device, the measurement will either stop on its own after running its course (as in the cases of **Auto** or **Time**) or may be stopped manually by pressing the '**Stop**' icon .
4. Once the measurement process comes to a stop LEO 2.0 will display the values and prompt you to save (Yes) or discard them (No).. On selecting '**yes**', the device will give a new prompt to update minimum and maximum values for CO2 values, as well as, Temperature values (if a T-Module is connected during the measurement) of the device being measured (Figure 29).
5. In order to visualize the records of all the measurements made for the selected device click on the '**View**' icon .



**Note** ► You can, at any time, save a single value of any external module connected on Leo 2.0, in the selected device memory, by just clicking on the value frame on the screen. You can find more information in each module user manual.

### 10.2.1 Update Min-Max CO2 or Temperature

The min-max update prompt will appear the very first time that you measure a device. If a T-module is connected during the measurement, the prompt will appear for updating the min/max values of the temperature as well. After the first time, the prompt will appear only if the CO2 or Temperature measured value is out of the existing min-max limits. In this way, you can dynamically specify the accepted limits of measurement per incubator and eventually, keep track of incubator precision near the set points of CO2 and Temperature. The days of current limits history are indicated in brackets near the incubators name. Figure 29 shows the update prompt after the initial measurement.

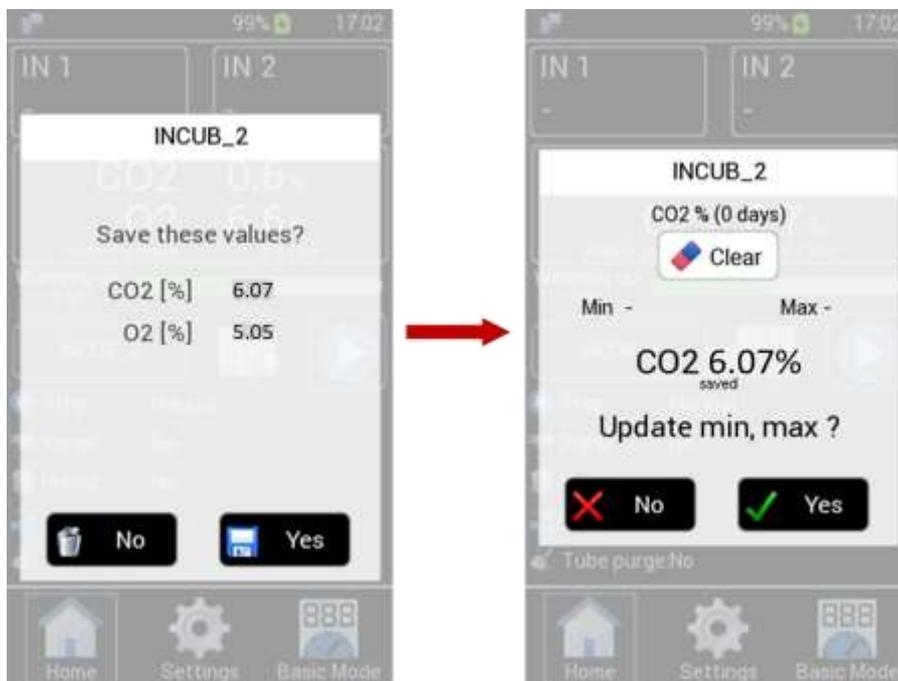


Figure 29. Saving the measurement and Updating Min, Max message.



Please note that the 'Update min, max' should only be selected when you are sure that the measured value is acceptable, and good enough for your culture. If it is not acceptable, select "NO" at the update min-max values. In this case the measurement is stored but labeled as out of acceptable min-max. This cannot be undone.

## 11 CO2/O2 TIME LAPSE LOGGING

LEO 2.0 allows you to perform a **Time Lapse logging** of the CO2-O2 measurement or any other module connected to LEO 2.0, this method allows you to set the intervals after which the measurement process will take place and the total time of the entire logging period.



**Note** ► The Time Lapse logging can only be performed for the 'AUTO' and the 'TIME' measure types. If a device has the measure type set to 'MANUAL' you will need to change this measure type in order to perform a Time Lapse logging.

The **Time Lapse logging** can be done by following the steps listed below:

1. Select the Device for which the data needs to be measured.
2. Toggle the '**Time Lapse**' option to **yes**, and set the Time-Interval ('EACH' ) at which a new measurement should be performed as well as, the Total-Time period ('FOR' ) during which the data has to be logged.
3. Press the '**Start**' icon .
4. Once the **Time Lapse logging** has begun you can see the progress bar which indicates the total time remaining for the completion of the logging process. You can also interrupt the Time Lapse logging midway by clicking the '**Stop**' icon .



**Note** ► If the Time Lapse logging has been interrupted before completion, LEO 2.0 will end the logging, and will store the values measured up until the moment of interruption.

The **Time Lapse logging** works differently depending on the device's **Measure-Type** setting ('AUTO' or 'TIME').

### 11.1 Time Lapse Logging with Measure-Type: 'TIME'

If the **Measure-Type** is 'TIME' the measurements made by LEO 2.0 will be recorded at the end of duration time as indicated in Figure 30.

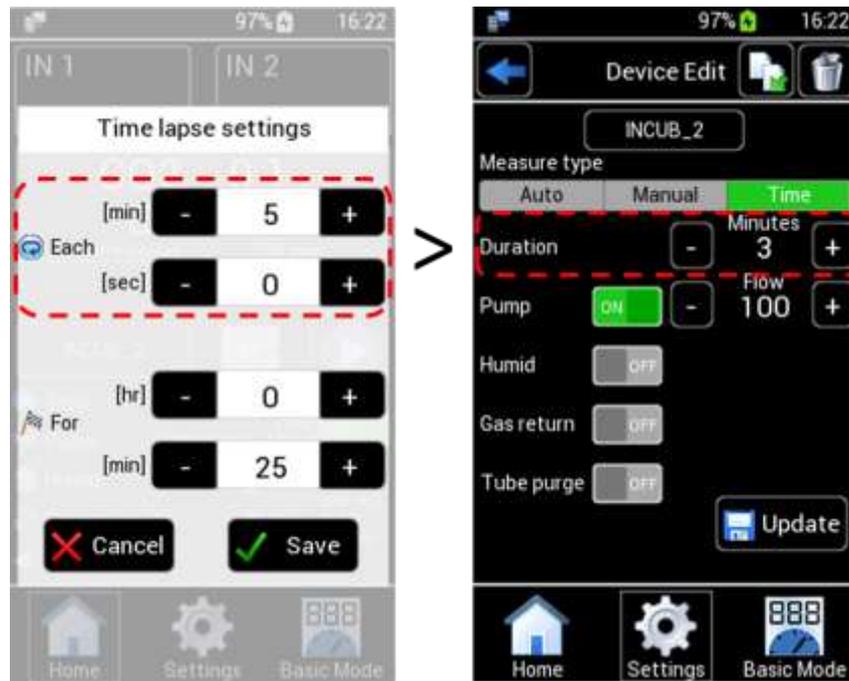


Figure 30 Time Interval > Time Duration.

Figure 31 illustrates how the measurements get recorded in this case scenario. At the end of the set Duration the measured value gets recorded, and the next cycle of measurement starts at the beginning of the next Time-Interval ('EACH').

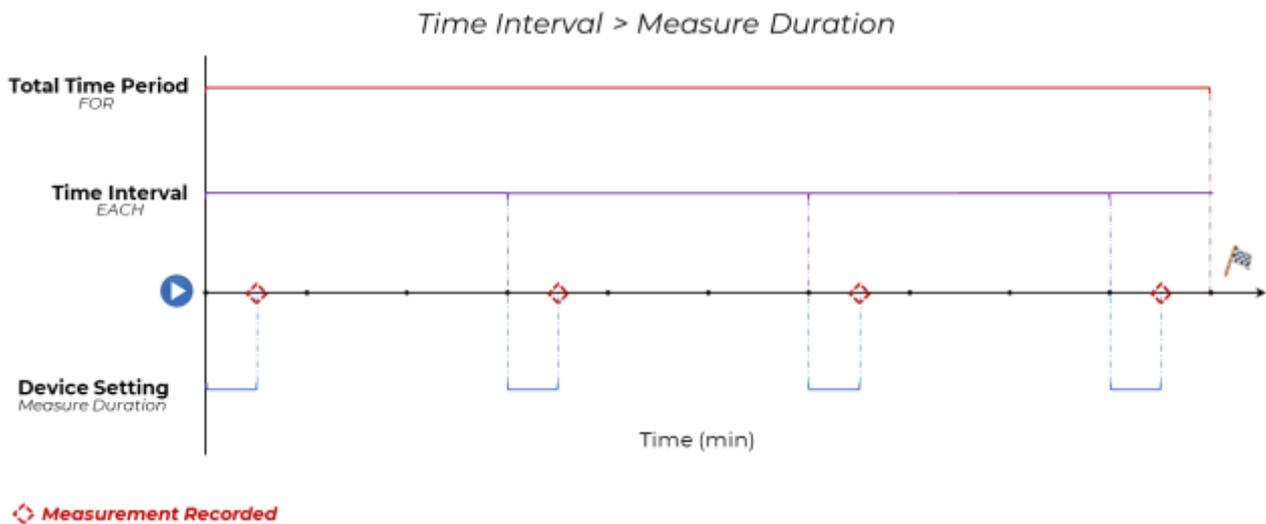


Figure 31 Time Lapse Logging when Time interval > Measure Duration.

Setting the Time-Interval ('EACH') shorter than the set Duration is not possible and will trigger a warning message.

## 11.2 Time Lapse Logging with Measure-Type: 'AUTO'

If the **Measure-Type** is 'AUTO' the measurements will start at each time interval and will record the reading as soon as a stable reading is obtained This auto stop takes between some seconds minimum up to a 10 min maximum. Please select a Time-interval keeping the auto reading time in consideration.

## 12 VIEWING/DELETING DATA

Before viewing the data for a specific device, LEO 2.0 allows you to view which of the saved devices were already measured today, which of them is not measured today and which of the measured ones had readings of CO2 (and Temperature if connected) out of normal min-max range. By navigating to **'Switch to Advanced Mode'** > **press 'Select a device'** , you can view the devices as illustrated in the Figure 32.

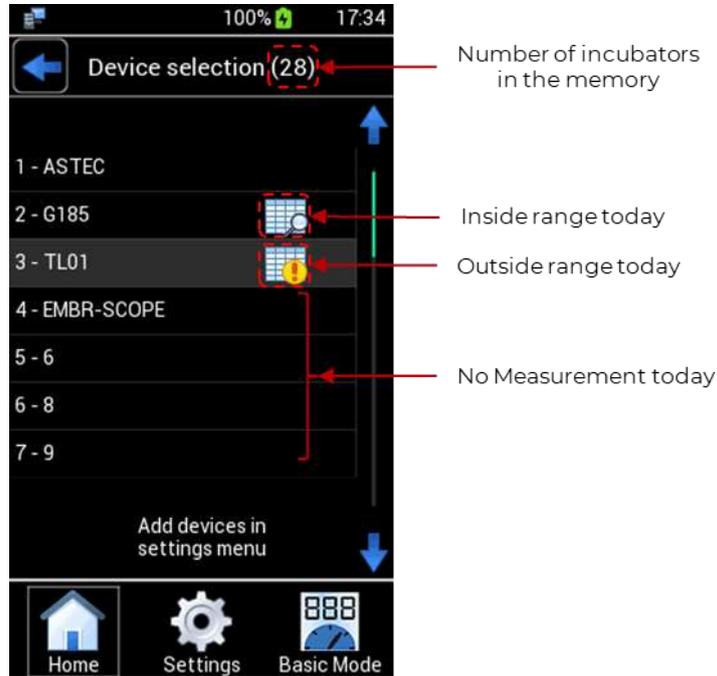


Figure 32. Select Devices Screen.

The following table gives a simple description of the icons visible next to the device name in the device selection page.

Icons	Description
	The Device was measured today and the readings were <u>WITHIN</u> the min-max range.
	The Device was measured today and the readings were <u>OUT OF</u> the min-max range.
No Icon	The Device was not measured today.

To view the recorded data for a specific device, navigate to **'Switch to Advanced Mode'** > **press 'Select a device'** , **and choose the device for which the data needs to be viewed** > **press the 'View' icon** . When viewing the data of a device some of the options (as in Figure 33) available are:

- On pressing the **'Date Filter'** icon  you can add a 'Date Start' filter, set the required date, as well as, choose to view 'Only warning measures' (measured values that result as Out-of-Range).

- b. On pressing the '**Parameter Filter**' icon  you can filter the values you want to view (CO2, O2, T, RH, CO2<sub>ppm</sub> or VOC), by flagging the options.
- c. On pressing the '**Graph**' icon  you can enter in a screen where you can select a parameter and view it's trend.
- d. On pressing the '**Download**' icon , you download the device's data (further details in **Section 9.5.4**).
- e. On pressing the '**Delete**' icon , you can delete the device's data.



Figure 33. Icons on the View Data Page.



**Note** ► You can display up to 4 variables at a time.

## 13 POWER ON/OFF, RESTART and TOUCHSCREEN CALIBRATION

The Power button on LEO 2.0 has many different press modes. Depending on the duration of pressing the following different operations can be carried out:

- To turn LEO 2.0 on: press and hold the power button for 2 seconds.
- To turn LEO 2.0 off: press and hold for 2 seconds the power button, and tap OK to confirm.
- To restart LEO 2.0: press and hold for 10 seconds the power button.
- To turn LEO 2.0 display on-off: press the power button instantly during use.
- To see the charging status with LEO 2.0 off: press the power button while charging.
- To start LEO 2.0 Touchscreen Calibration procedure: Press and hold for 5 seconds the power button. Once the process has begun just tap on the blue circles appearing on the screen in order to complete the calibration process.

## 14 CLEANING & MAINTENANCE

**CLEANING:** For a long lifetime and to take full advantage of this product, Okolab recommends cleaning the product periodically. Please, follow the instructions below to clean LEO 2.0:

- Use a polishing cloth or dry cloth to wipe off dust and dirt.
- Do not clean LEO 2.0 during the charging process.
- Liquids should not enter inside LEO 2.0.

**MAINTENANCE:** The following table reports the list of spare parts and when they should be substituted.

Spare Parts List	Suggested Replacement Time
MPF-LEO, hydrophobic filter	Every 6 months.
SODA-LIME-KIT	When the color of the Kit changes to purple.
TUBE-A-LEO	Usage dependent, change if discolored or damaged
TUBE-B-LEO	Usage dependent, change if discolored or damaged
LEO-Calibration Kit	Usage dependent, change if discolored or damaged
Moisture Trap	If Damaged



*LEO should NOT be used for gas measurement without the filter.*

- 
- The CO2-O2-MODULE should be factory calibrated every year and verified by you each month or before each important measurement. Please contact your local distributor or Okolab technical support at [support@oko-lab.com](mailto:support@oko-lab.com) for assistance regarding the calibration of the CO2-O2-MODULE.
  - When the internal pump reaches its End-of-Life, it should be replaced. Please contact your local distributor or Okolab support at [support@oko-lab.com](mailto:support@oko-lab.com) for assistance regarding the replacement.

## 15 SUPPORT

For assistance you can call your local distributor.

To contact one of Okolab engineers please write to [support@oko-lab.com](mailto:support@oko-lab.com) or contact us through the live chat in [www.oko-lab.com](http://www.oko-lab.com). You can request a remote support session anytime.

Please, do not hesitate to contact Okolab for any further commercial information or technical support.

For HARDWARE SUPPORT: [sibillo@oko-lab.com](mailto:sibillo@oko-lab.com)

Phone +39 081 806 3470

Fax: +39 081 876 4410

Mobile: +39 348 96807 18

For COMMERCIAL SUPPORT WORLDWIDE: [lanzaro@oko-lab.com](mailto:lanzaro@oko-lab.com)

Phone +39 081 806 2624

Fax: +39 081 876 4410

Mobile: +39 348 96807 17

For COMMERCIAL SUPPORT US&CANADA: [usa@oko-lab.com](mailto:usa@oko-lab.com)

For COMMERCIAL SUPPORT CHINA: [tong@oko-lab.cn](mailto:tong@oko-lab.cn)

## 16 TROUBLESHOOTING

The table below shows some frequently asked questions. Please contact Okolab if you need assistance.

Effect	Main Causes	Secondary Causes	Solution	
Auto measurement does not finish. Terms for time-out.	Gas flow rate sent to LEO 2.0 is lower than values suggested in this manual.		Sent to LEO 2.0 a gas flow rate higher than 60 ml/min in diffusion mode or 130 ml/min in Aspiration Mode.	
Data download does not start.	USB key is not correctly formatted.		Make sure that USB flash drive is FAT32 formatted.	
	USB key is damaged.		Use a new USB key	
The touch screen does not respond properly, or not at all.	The display is not calibrated.		Press and hold the power button for more than 5 seconds to calibrate the touch screen.	
The device does not log data in internal memory.	Internal memory is full (A warning icon appears on the Homepage.)		Save the data of LEO 2.0's memory and then erase the specific device, or all devices memory.	
Humidity Alarm	Possible Moisture Trap absence or wrong connections		Please verify that Moisture Trap is properly connected.	
High O2 level and low CO2 level in measurement	Possible air inflow	Wrong Connections	Verify that all the tube connections are correct and that there is no tube damage (probably near the tube ends). Cut the damaged end or replace the tube if needed.	
			Verify that Tube B is properly connected on incubator, eventually using fittings provided in the Hard case	
	Pump Leakage		Use an external mass flow meter on the output line of LEO 2.0, in order to verify if the Pump flow rate chose is correctly elaborated.	
			Leakage test is required and possibly a Pump substitution.	
	Sensing Cell out of calibration	Wrong offset CO2 and O2 value due to a possible incorrect user calibration procedure		Please restore Factory Calibration
		CO2 drift due to long term of LEO 2.0 usage		Please proceed with CO2 Zero Reset and Span Calibration
Pump stops working	Possible hydrophobic filter occlusion		Please verify that filter and inlet/outlet lines are clean	
	Possible Inlet/Outlet occlusion			

## 17 TECHNICAL SPECIFICATION

### 17.1 LEO 2.0

<b>Technical Data</b>	
Maximum pressure	1300 mbar (19 psig)
Operating flow rate	Min 30 ml/min – Max 400 ml/min
Barometric Pressure sensor Measuring range	500 – 1200 mbar
Data Storage	5952 set of measurements per device.
Data Download	Micro USB (LEO 2.0) to USB A female, with provided OTG cable adapter
Dimensions	95x155x45 mm
Weight	492 g
Power Supply (with international connector plugs)	Input: 100-240VAC 50/60Hz, 0.3A Output: 5.0VDC, 2A, 10.0W
Battery Type	Lithium Ion
Battery Nominal Capacity	6.7 Ah
<b>Environmental Conditions</b>	
Temperature range	5°C – 40°C
Relative Humidity	0 - 95%
Barometric Pressure	800 – 1200 mbar
<b>Pump</b>	
Pump type	Micro Diaphragm Pump
Pump – Flow	From 60 to 260 ml/min
Pump Life Expectancy	10,000 hours

## 17.2 CO2-O2-Module

CO2 Sensor – Technical Data	
Sensor type	A Non-Dispersive InfraRed detector (NDIR)
Measurement Range	0-20%
Accuracy	± (1% of Full Scale +2% Reading) in the range 0-10% <sup>1</sup> ± (2% of Full Scale +3% Reading) in the range 11-20% <sup>1</sup>
Response Time, T <sup>90</sup>	< 35 s
O2 Sensor – Technical Data	
Sensor type	Fluorescence-based optical sensor
Measurement Range	0-22%
Accuracy	± (1% of Full Scale) in the range 0-10% <sup>1</sup> ± (2% of Full Scale +3% Reading) in the range 11-22% <sup>1</sup>
Response Time, T <sup>90</sup>	< 35 s
<sup>1</sup> Reference Condition: 1000 mbar and 23°C	
CO2-O2-MODULE Life Expectancy	5 years <sup>2</sup>
<sup>2</sup> Several parameters of use, may in some cases result in a decrease of the range of measurement of the O2 down to 0-7% during the years 2-5.	

## WARRANTY

Okolab S.r.l. warrants "LEO 2.0" to be free of defects in materials and workmanship for a period of one year starting from invoice date. If the unit malfunctions, it must be returned to the factory for evaluation. If the equipment has to be returned to the factory, please ensure that is carefully and properly packed. Okolab S.r.l. accepts no responsibility for damage due to unsatisfactory packing. If the unit is found to be defective, it will be repaired or replaced at no charge. This warranty does not apply to defects resulting from any actions of the purchaser. Components which wear are not warranted. Okolab S.r.l. neither assumes responsibility for any omissions or errors nor assumes liability for any damage that may results from improper use of its products in accordance with information provided by Okolab S.r.l. Okolab S.r.l. warrants only the parts manufactured by Okolab S.r.l to be free of defects. Okolab S.r.l. makes no other warranties or representations of any kind whatsoever, express or implied, except that of title, and all implied warranties including any warranty of merchantability and fitness for a particular purpose are hereby disclaimed. LIMITATION OF LIABILITY: the total liability of Okolab S.r.l. shall not exceed the purchase price of the component upon which liability is based. In NO event shall Okolab S.r.l. be liable for consequential, incidental or special damage.

## 18 FIGURE LIST

Figure 1. LEO 2.0.....	5
Figure 2. LEO 2.0 Hard Case.....	9
Figure 3. Power Adapters supplied.....	10
Figure 4. Soda Lime Kit.....	10
Figure 5. Moisture Trap.....	11
Figure 6. Calibration Kit.....	11
Figure 7. Tube-A.....	11
Figure 8. Tube B.....	12
Figure 9. OTG Cable.....	12
Figure 10. CO2-O2-MODULE.....	13
Figure 11. T1-Module.....	14
Figure 12. T2-Module.....	14
Figure 13. Humidity-Module.....	15
Figure 14. CO2-PPM Module.....	15
Figure 15. VOC Module.....	16
Figure 16. Flow-Rate Module.....	16
Figure 17. LEO 2.0 connection ports and power button.....	17
Figure 18: Settings Page.....	19
Figure 19. Adding a Device: Auto & Manual measure types.....	21
Figure 20. Adding a Device: Time measure type.....	21
Figure 21. CO2-O2 Zero Reset using the Calibration Kit.....	23
Figure 22. CO2 Zero reset using the Soda Lime Kit.....	24
Figure 23. System page.....	25
Figure 24. Connecting External USB Stick to LEO 2.0.....	27
Figure 25. System information.....	29
Figure 26. CO2-O2 measurement setup for Diffusion Mode.....	31
Figure 27. CO2-O2 measurement setup for Pump Mode.....	31
Figure 28. List of available Devices in the Device Selection Page.....	33
Figure 29. Saving the measurement and Updating Min, Max message.....	34
Figure 30 Time Interval > Time Duration.....	36
Figure 31 Time Lapse Logging when Time interval > Measure Duration.....	36
Figure 32. Select Devices Screen.....	37
Figure 33. Icons on the View Data Page.....	38