



H303-T-H-CO2/O2 [0-95] System

# User Manual

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## 1 PREFACE

Welcome to the H303-T-H-CO2/O2 [0-95] System Manual. This manual provides comprehensive guidance on the setup, operation, and maintenance of the system. It covers essential information to ensure efficient utilization and optimal environmental control within laboratory settings.

### **Key Features of H303-T-H-CO2/O2 [0-95] System:**

- **Embedded Temperature Sensors:** Continuous temperature feedback enhances control accuracy and stability.
- **User Interface:** Clear instructions cater to users at all levels, facilitating effective usage.
- **Support:** Our team is available to assist with inquiries or issues.

**Components and Configuration:** The H303-T-H-CO2/O2 [0-95] System features an electrically heated Lid and base. The system is also equipped with a Gas Control Unit is provided, which pairs with the Active Humidity Module (HM-Active) to supply humid gas.

**Temperature Range:** The H303-T-H-CO2/O2 [0-95] System controls the temperature from 3°C above ambient temperature up to 60°C, ensuring precise environmental conditions for your samples.

**Control Interface:** The Systems is operated via the OKO-TOUCH touch screen control panel. OKO-TOUCH features on-board memory for data logging and a mini-USB port for data download. Data logging is also possible via SMART-BOX, Okolab DATA-LOG software, and compatible third-party imaging software such as LASX 2.0, NIS-Elements, SlideBook, MetaMorph, and MicroManager. A macro for ZEN Black software is available upon request.

We recommend carefully reading this manual to familiarize yourself with the functions and operation of the H303-T-H-CO2/O2 [0-95] System before use. Our team is available to assist with any inquiries or issues you may encounter.

## **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.

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- The equipment must only be used as intended and as described in this Manual.
- Equipment should be operated only by technically qualified personnel.
- Do not start up the equipment if some of its parts are damaged.
- This instrument is not intended for use in locations subject to flammable or explosive gases.
- Transport the equipment with care.
- Equipment and its internal parts can be damaged by dropping and by shock.
- Not following these instructions can result in damage or breakdown of the device and its accessories.
- The products labels can be found on the bottom panel of the Main Box.
- Do not disassemble any part of the system.
- Do not use a volatile solvent such as paint thinner to clean the instrument, because deformation or discoloration may occur.
- Use a soft, dry cloth to remove stains from the instrument.
- Do not exceed voltage indicated in this manual and on the product label.
- Avoid excessive induction noise, static electricity and magnetic fields.
- Do not expose this instrument to rain or moisture.
- Do NOT go in close contact with or breathe any gas stream whose composition is different from that of ambient air.
- Prevent throttling and kinking of tubing.
- Check tubing time to time for possible material usage.
- Check that all tubing are well inserted into the connectors so they cannot slip off
- This device is not designed for use for medical applications.
- Power cord of unit should be unplugged from electrical outlet when left unused for a long period of time.
- PRESSURIZED GAS. Secure all connections with hose clamps. Never exceed the input pressure limit of 5 barg (72.5 psig). Bleed all lines before disconnecting. Wear safety goggles if needed. If pressure regulators are not within sight and reach, make sure at least one shut off valve is within reach.
- CO<sub>2</sub> must be available at 0.8 ±0.2 barg (12 ±3 psig), with a connector for 6mm OD rigid silicon tube. Gas source must be Standard Purity CO<sub>2</sub> (coded as 4.5 that means 99.995 % of CO<sub>2</sub>) and humidity-free gas.
- When using the Compressed Air option, please ensure that the gas is available at 1.4 barg (20.3 psi)



- 
- N2 must be available at 0.8 ±0.2 barg (12 ±3 psig), with a connector for 6mm OD rigid silicon tube. Gas source must be Standard Purity N2 (coded as 4.5 that means 99.995 % of N2) and humidity-free gas.
  - O2 must be available at 0.8 ±0.2 barg (12 ±3 psig), with a connector for 6mm OD rigid silicon tube. Gas source must be Standard Purity O2 (coded as 4.5 that means 99.995 % of O2) and humidity-free gas.
  - LOW OXYGEN ATMOSPHERES. Never enter a room or enclosure which has a low oxygen atmosphere because of severe danger of suffocation. Only operate in well-ventilated room. A small amount for carbon dioxide gas leaks continuously out of the instrument and should never be allowed to build up in the room.
  - Unit should be situated away from heat sources such as open flames, radiators, heat registers, stoves, or other appliances or processes that produce heat.
- 



- Do not start up the equipment if the supply cable is damaged.
  - Connect the equipment only to grounded mains power socket.
  - Do not disconnect cables while in operation.
  - Do not open the unit. Do not remove cover or back.
  - *Prevent metal fragments or lead wire scraps from falling inside instrument to avoid electric shock, fire or malfunction.*
  - No user serviceable parts inside.
  - Unit should never be used where it can fall or be pushed into water
  - When removing the CO2-H-IN-CHAMBER-Sensor the device must be disconnected from the power supply and the Sensor must be handled using electrostatic Gloves.
- 



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 variations.

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

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 & COMPONENTS COMPATIBILITY

Figure 1 illustrates the components and the different accessories for the H303-T-H-CO2/O2 [0-95] system.

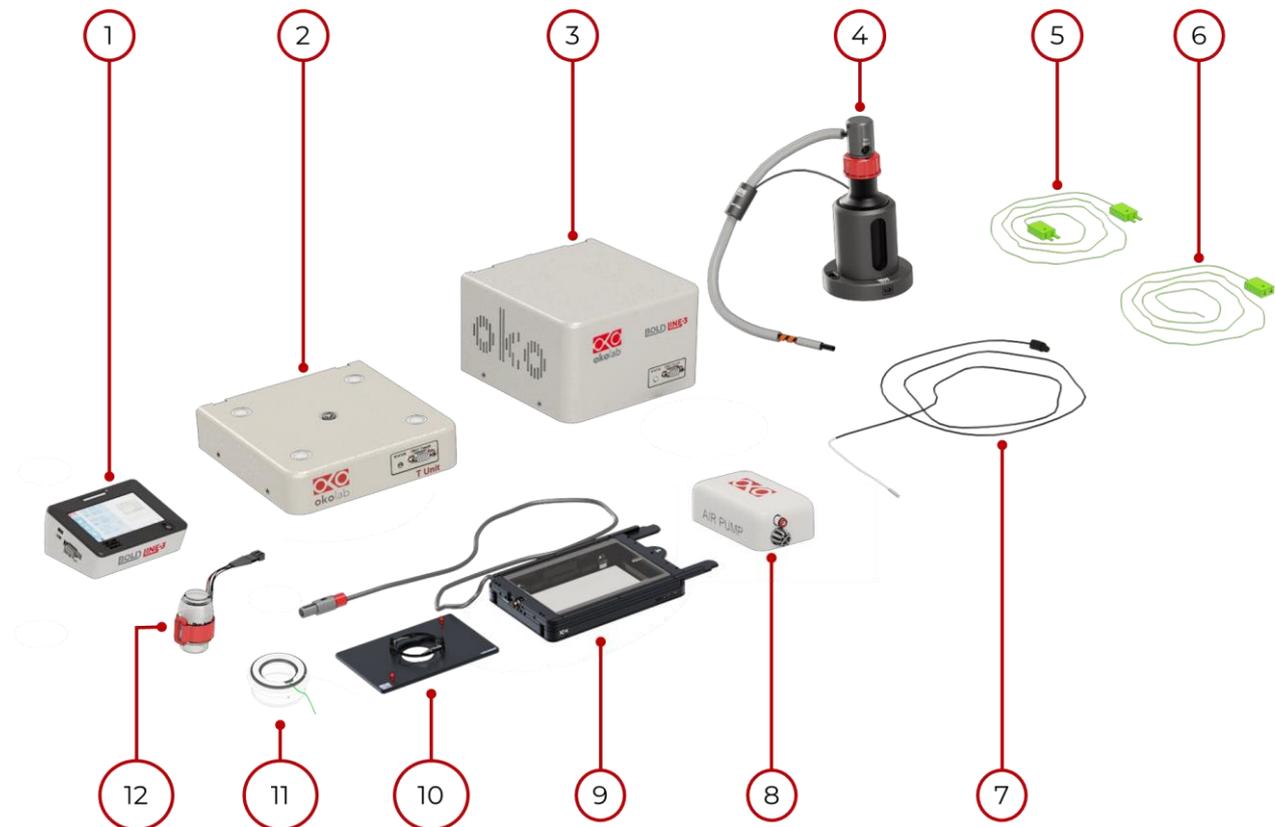


Figure 1. Top Stage System Components & Accessories.

### **Components**

1. **OKO-TOUCH-BL3**: An intuitive and user-friendly touch screen interface which connects to the control unit.
2. **H303-T-UNIT**: A temperature control unit that can operate any H303-Chamber to maintain the required thermal conditions for live cell imaging right on the microscope stage.
3. **CO2-O2 [0-95] -BL3**: A gas control unit which allows you to control the CO2 concentration in the range of [0-20] % and O2 in the range of [0-95] %.
4. **HM-ACTIVE-BL3**: Active Humidity Module controls relative humidity in the range of 50-95%.
5. **TC-XC**: This is an extension cable for the TC temperature probe.
6. **TC**: This is a reference temperature probe that can be utilized for measuring temperatures within the sample and has a female connection port to be used along with the TC-XC.
7. **TAT**: Also referred to as the NTC thermistor, this is a temperature probe for measuring the ambient temperature.



**Note** ► The TC and the TC-XC are collectively referred to as the T Sensor in this document.

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## **Accessories (Sold Separately)**

8. **OKO-AIR-PUMP-BL**: A pump which enables you to use the background air. Used only when working in the '*CO2 in Air*' mode (section 7.4.2.1).
9. **H303-Chamber**: A micro-environmental chamber with an ITO coated glass, heated base and an embedded Temperature sensor, that fits in the XY stage of the microscope and may be connected to Gas input.
10. **Sample Holder Inserts**: Inserts designed to house different sample holders such as 35mm petri dishes, chamber slides etc.
11. **Sensor lid**: This is a an Okolab SENSOR LID to secure the Fine Gauge Thermocouple in place in the Reference Well during calibration or operation in Sample Feedback Mode. This Sensor Lid is available in 3 different versions:
  - A. **SENSOR LID-35**- To be used in specimen feedback in a 35 mm Petri Dish
  - B. **SENSOR LID-60**- To be used in specimen feedback in a 60 mm Petri Dish
  - C. **SENSOR LID-GS**- To be used in specimen feedback in chamber slides and chambered cover glass
12. **OBJ-COLLAR**: Also referred to as 'Objective Heater' temperature-controlled heating band that can be placed around the objective lens with the help of the provided Velcro band. The Objective heater is available in 3 different versions:
  - D. **OBJ-COLLAR-1924**- Objective Heater for lenses with diameters ranging from 19 to 24mm
  - E. **OBJ-COLLAR-2532**- Objective Heater for lenses with diameters ranging from 25 to 32mm
  - F. **OBJ-COLLAR-3342**- Objective Heater for lenses with diameters ranging from 33 to 42mm
16. **DATA-LOG**: This is a software to log Temperature and Concentration data from any OKOLAB device further details on this software can be found in its dedicated user manual.



**Note** ► The H303-Chamber, depicted in the image is a **generic model** and the appearance may vary as the chambers are designed to be Microscope Specific.

**Note** ► Information on the **Objective Heater assembly** is explained in Heading 8.3.

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## **Included Accessories**

The following list describes the included accessories and what they're used for:

1. **OKO-TOUCH-CABLE**: Cable for connecting OKO-TOUCH-BL3 to the H303-T-UNIT.
2. **OTG-Cable**: Cable for connecting a USB pen drive to the OKO-TOUCH-BL3.
3. **Mini-USB Cable**: Cable for connecting OKO-TOUCH-BL3 to the PC.
4. **Power Supply-Control Units**: Two are provided, one for connecting H303-T-UNIT to the power supply, and the other for connecting CO2-O2 [0-95] -BL3 to the power supply.
5. **GR-4-M (Gas regulator)**: A gas pressure regulator for regulate gas input from CO2 gas cylinder to the CO2-O2 [0-95] -BL3.

6. TUBE-A: Tube for gas connection between the GR-4-M to the CO2 gas cylinder; the GR-4-M to the CO2-O2 [0-95] -BL3; N2 gas supply to CO2-O2 [0-95] -BL3.
7. TUBE-AG: Tube for gas connection between 'Gas Output' port on the gas control unit to the 'Input' port of the HM-ACTIVE-BL3.
8. TUBE-AF: Tube for gas connection between the O2 supply to the corresponding O2 input port on the rear panel of the CO2-O2 [0-95] -BL3.
9. TUBE-B: Tube containing a PTFE filter, for gas connection between the OKO-AIR-PUMP-BL output & 'N2 Input port on the gas control unit when working in CO2 in Air mode (see section 7.4.2.1).
10. HMCM-2-HEATED TUBE: Tube for gas connection between 'Output' port of the HM-ACTIVE-BL3 and the H303-Chamber gas Input.



**Note** ► *In order to properly assemble your H303-T-H-CO2/O2 [0-95] system, please follow the steps as reported on the following quick instructions guide provided along with the system.*

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## 6 SUPPLIED GAS REQUIREMENTS

Please ensure that the following Gas Supply Requirements are followed for the input to the Gas control Unit:

- CO<sub>2</sub> must be available at 0.8 ±0.2 barg (12 ±3 psig), at the ***Gas Control Unit's Input Port***. Gas source must be Standard Purity CO<sub>2</sub> (coded as 4.5 that means 99.995 % of CO<sub>2</sub>) and humidity-free gas with a connector for 6mm OD rigid silicon tube.
- N<sub>2</sub> (for H303-T-H-CO<sub>2</sub>/O<sub>2</sub> [0-95] system) must be available at 0.8 ±0.2 barg (12 ±3 psig), at the ***Gas Control Unit's Input Port***. Gas source must be Standard Purity N<sub>2</sub> (coded as 4.5 that means 99.995 % of N<sub>2</sub>) and humidity-free gas.
- O<sub>2</sub> must be available within the pressure range of 0.8 ±0.2 barg (12 ±3 psig), with a connector for 6mm OD rigid silicon tube, at the ***Gas Control Unit's Input Port***. Gas source must be Standard Purity O<sub>2</sub> (coded as 4.5 that means 99.995 % of O<sub>2</sub>) and humidity-free gas.

## 7 SETUP CONFIGURATION & QUICK USAGE

To Once you've successfully setup your system by following the detailed instructions provided in the quick assembly guide, you're ready to proceed with configuring your setup and initiating the use of the system.

### 7.1 Homepage Icons Description

When you're using the OKO-TOUCH-BL3 controller, the homepage will demonstrate the key measurements, Settings Option, and the System Overview option. Figure 2 illustrates the OKO-TOUCH-BL3 Homepage.

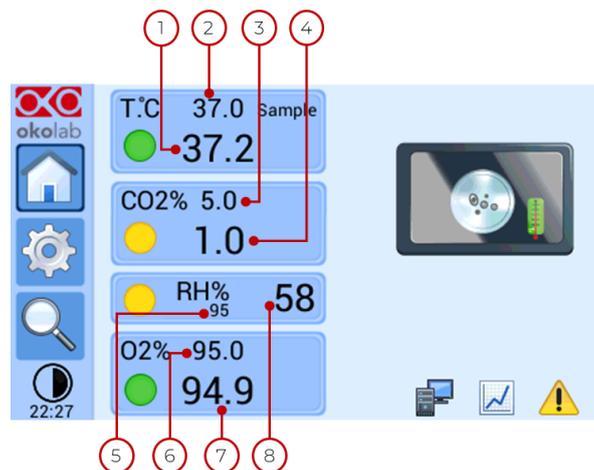


Figure 2. OKO-TOUCH-BL3 Generic Homepage with the CO2-H-IN-CHAMBER Sensor.

Table 1 provides the description of the different parameters present on the Homepage (parameters 1-11).

Parameter	Description
1	Temperature value read by the Temperature Sensor embedded in the H303-Chamber.
2	Temperature Set Point value.
3	CO2 Set Point value.
4	CO2 concentration at the Gas Control Unit output.
5	Relative humidity Set Point Value.
6	O2 Set Point value.
7	O2 concentration at the Gas Control Unit output.
8	Relative humidity read by the HM-ACTIVE-BL3.

Table 1. Description of different information displayed on the Generic Homepage.

The following Figure 3 illustrates the various icons that can be seen on the OKO-TOUCH-BL3 homepage, their descriptions and the visibility conditions.

ICON NAME	DESCRIPTION	VISIBILITY CONDITION
Status Indicator 	Indicator of the Status of the parameter it is found next to based on its color.	Always, unless the system is in Chamber feedback mode.
Temperature 	Temperature Status indicator based on its color.	Always.
Home 	Home Page icon.	Always.
Settings 	Settings Page Icon.	Always.
OKOLAB Icon 	Okolab Icon which displays the sytem's information such as release date, serial number, software version etc..	Always.
Overview 	Overview Page Icon.	Always.
Minimalislitic 	Minimalistic View Page Icon.	Always.
PC 	Connected to PC Icon.	When the OKO-TOUCH-BL3 is connected to PC.
View Data 	View Data Icon.	Always.
Alarm 	Alarm Icon.	When the system is in Alarm state
Temperature Calibration 	Temperature Sensor Calibration Icon.	When the Chamber Calibration (temperature) or the Objective Heater Calibration is in process.

Figure 3. Icons Descriptions & Visibility Condition.



**Note** ► The status LED present on the Control unit corresponds to the same colors as that of the Status indicator icon  when the system is in Steady or Alarm state.

The color relative to each icon may represent a Steady state, Transient state or an Alarm state as described below (Figure 4).

<b>GREEN</b>	<p>The GREEN color indicates that the Setpoint value has been reached and that the system is working properly.</p> <p style="text-align: center;"><b>Controller Status: NORMAL</b></p>
<b>YELLOW</b>	<p>The YELLOW color indicates that the controller is in transient regime. The Yellow light will appear after the controller is turned on and after any Setpoint change. The system is working properly, it is not in alarm and no action is needed.</p> <p style="text-align: center;"><b>Controller Status: TRANSIENT</b></p>
<b>ORANGE</b>	<p>The ORANGE color indicates that the current parameter value is not correct and is out of the set tolerance.</p> <p style="text-align: center;"><b>Controller Status: ALARM</b></p>
<b>RED</b>	<p>The RED color indicates that there is a problem and the system is in Alarm State, this may be due to a broken sensor. Turn the system off, wait for 5 minutes, and turn it back on. If the color is still red, contact Okolab at <a href="http://www.oko-lab.com">www.oko-lab.com</a> for support.</p> <p style="text-align: center;"><b>Controller Status: ALARM</b></p>

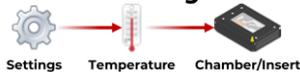
Figure 4. Significance of Icons Color during use.

## 7.2 Setting up Date & Time



In order to set the Date & Time on your system, please navigate to the settings as illustrated above. Setting these parameters will allow you to keep a track of your work when exporting recorded data.

## 7.3 Selecting the Chamber & Insert



The next step that needs to be undertaken is the selection of the Chamber and the Sample Holder Insert that you'll be utilizing. In order to select the correct chamber and insert please refer the Bill included with the shipping package to verify the correct chamber name.

The following figure illustrates the Chamber & Insert selection page (Figure 5). In order to select the correct Chamber, click on the Chamber being displayed, and choose your Chamber by navigating through the different available options by clicking the **small blue arrow** (labelled as 'See Next'). Once you find the Chamber to be selected, confirm your choice by pressing **'Next'**, this will take you to the Sample Holder Insert selection page where you have to perform the same steps for selecting the correct Sample Holder Insert.

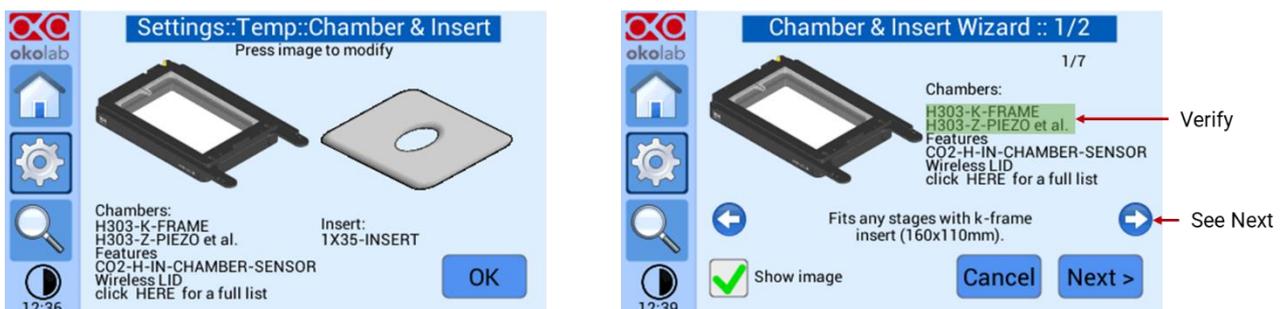


Figure 5. Chamber & Sample Insert Selection.



**Note** ► If you have not purchased a sample holder Insert or are not using one, please select the option 'NONE' from the Insert selection page. This is the Default chamber's accommodation for MW Plates.

**Note** ► Please make sure to modify the selected Sample Insert every time you change the Sample Insert to ensure the proper functioning of the system.

---

## 7.4 Setting the Desired set Points

The following subsections indicate how to select the desired Temperature, CO<sub>2</sub>, O<sub>2</sub> & Humidity set points.

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**Note** ► Each time the Set Point value is modified, the system will go into the Transient State and the Led on the OKO-TOUCH-BL3 will turn yellow. During this Transient State the system will not trigger any alarms.

---

### 7.4.1 Temperature (°C) Set Point

On the Homepage click on the Temperature being displayed and select the desired set point within the range of 25°C up to 60°C.

---



**Note** ► The minimum temperature set point value must be 3°C above the ambient temperature.

---

### 7.4.2 Gas Concentration (%) Set Point

**CO<sub>2</sub> Concentration Set Point:** On the Homepage click on the CO<sub>2</sub> concentration being displayed and select the desired set point within the range of 0% up to 20%.

**O<sub>2</sub> Concentration Set Point:** In order to assign a set point value to the O<sub>2</sub> concentration, from the Homepage click on the O<sub>2</sub> concentration being displayed and select the desired set point within the range of 0% up to 95%.

#### 7.4.2.1 Control Modes selection for the optimal Gas usage



When using the H303-T-H-CO<sub>2</sub>/O<sub>2</sub> [0-95] system, depending on the gas requirement for your experiments, you can work in two alternative modes:

- **O<sub>2</sub>/N<sub>2</sub>/CO<sub>2</sub> mode:** In this control mode CO<sub>2</sub>-O<sub>2</sub> [0-95] -BL3 is supplied with Nitrogen, Oxygen and CO<sub>2</sub> from respective tanks and you can regulate CO<sub>2</sub> in the range 0-20% and Oxygen in the range 0-95%;

- **CO2 in Air mode:** You can use this control mode when you need to simply have Air/CO2 mixtures and you don't need to regulate Oxygen as well.

You can switch from the standard '*O2/N2/CO2 mode*' to the '*CO2 in Air mode*' and back by simply navigating to the **Control Modes** page, selecting the desired mode and pressing '*Save*'.

**Note** ► The O2/N2/CO2 mode is already set by default.



**Note** ► When you work in CO2 in Air mode nothing needs to be connected to O2 Input on CO2-O2 [0-95] -BL3 rear panel. If an Oxygen tank was previously attached, no need to disconnect it because in this working mode, the Oxygen valve is automatically closed. Air has to be connected to the N2 Input, from an Air tank/compressed line, and a CO2 tank has to be connected to CO2 Input.

If you want to use OKO-AIR-PUMP-BL, make sure it is connected to the system by ensuring the air output is connected to the N2 input port and the pump is electrically connected to the '*Pump Output*' port on the rear panel of the CO2-O2 [0-95] -BL3. After connecting the pump to the system, select the '*CO2 in Air mode*', and enable the air pump and select '*OK*' to confirm.

On clicking on the '*Air Pump*' option on the **Control Modes** page (Figure 6), you can add an offset (positive or negative) to the default air pump speed in order to increase or decrease the pump speed respectively.

**Note** ► On the '*Air Pump*' page you have the option to Enable/Disable the air pump at any time. This can be useful when you need to disconnect the pump from the system.



**Note** ► The Pump usage can be also viewed on the '*Air Pump*' page. Press the Reset button to reset the usage of the Air Pump if a new Air Pump is installed

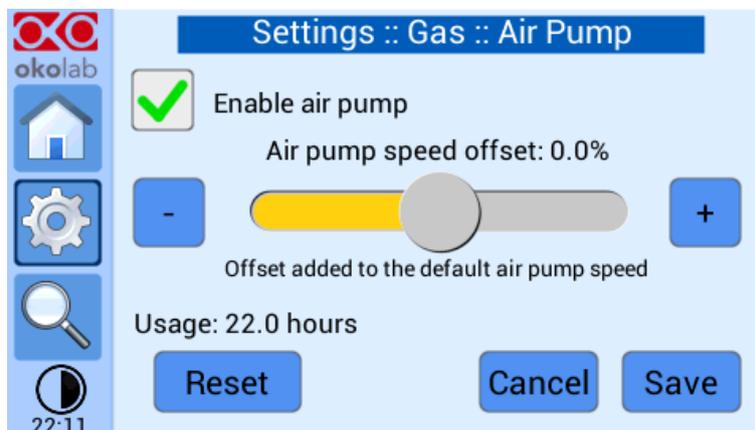


Figure 6. Air Pump Page.

Please note that the pump can be turned on/off only via the OKO-TOUCH-BL3. Thus, it is essential that you hereby set the correct Air source.



**Note** ► Reducing the air pump speed will lead to a lower emitted noise from the air pump, while rising the air pump speed will help if you cannot reach your desired flow rate Setpoint.

When running the system in *CO2 in Air Mode*, the Homepage will appear as in Figure 7.



Figure 7. Homepage when working in CO2 in Air mode.

#### 7.4.3 Humidity (RH%) Set Point

In order to modify the Humidity Set Point, from the Homepage click on the RH% being displayed and select the desired set point within the range of 50% up to 95% when working at 37°C.

#### 7.5 Opening & Closing the Chamber

When operating the Top stage system, you may need to open the H303-Chamber to access the sample for either changing or micro manipulating it. Depending on the type of Chamber you have there are two approaches to Opening/Closing the Chamber:

1. **Wireless Lid Chamber:** If you have a Chamber with a Wireless Lid, on opening the chamber, the system **automatically** displays the chamber open representation on the OKO-TOUCH-BL3 homepage. Besides the '**Chamber Open**' message and representation, the system pauses its control until the chamber is closed again, this helps in avoiding the system overheating the Lid or the Base of the chamber to recuperate for the heat loss due to an open chamber, the same applies to the paused control of the Gas and Humidity parameters.
2. **Wired Lid Chamber:** If you have a Chamber with a Wired Lid, before opening the chamber, you may simply click on the chamber being displayed and a pop-up message will ask you if would like to open the chamber, to which respond by selecting '**OK**'. After you've closed the chamber and would like the system to resume its functioning, please click the Open chamber being displayed and select '**OK**' from the following pop-up message which'll be confirming the closing of the chamber

The Figure 8 illustrates the '**Chamber Open**' and '**Chamber Closed**' representations.



Figure 8. Chamber Open & Chamber Closed representation.



**Note** ► We advise you to avoid opening the chamber during the transient state as this may slow the system's rate of reaching a stable state.

**Note** ► If the chamber is left open for a long period of time the system goes into an Alarm State. Please refer the trouble shooting section for further information.

## 7.6 Viewing Data



From the Homepage, if you click on the **chart icon** , you can view the graph pertinent to the parameters being worked with your system. The following image (Figure 9) illustrates the view charts page, the different graphs of the values of Temperature, CO<sub>2</sub>, O<sub>2</sub>, or Humidity can be viewed by clicking on the parameter on the right.

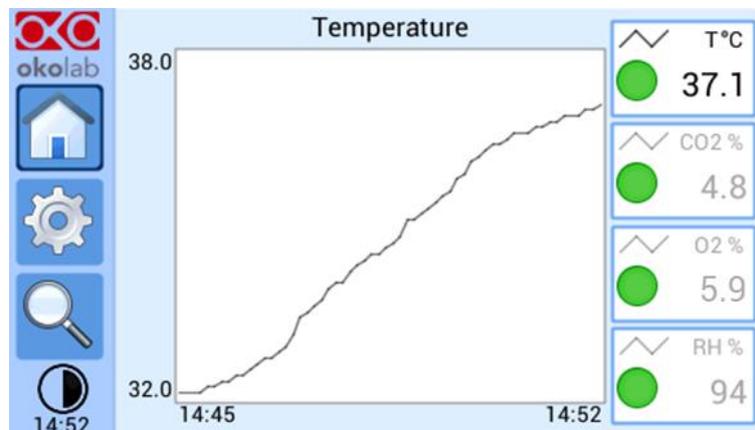


Figure 9. View Charts page.

## 7.7 System Overview



The Following Figure 10 illustrates the system Overview page which gives you the panorama of systems components and their readings. In order to see the Overview page, from the home screen click on

the **'Overview'** icon. Please note that only the parameters that are a part of your system will be the only ones visible to you during use.

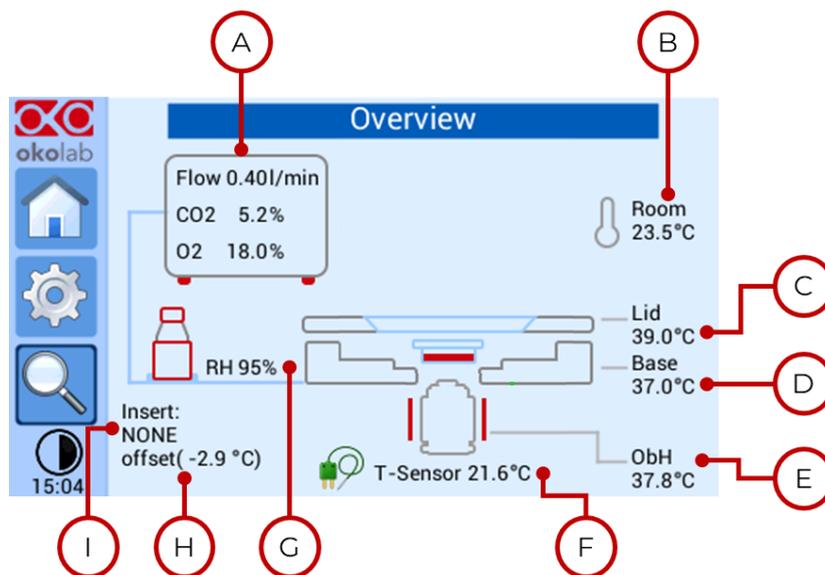


Figure 10. Generic System Overview Page.

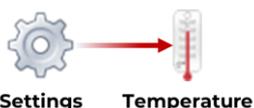
The parameters illustrated in the Figure 10 are explained along with their display condition in Table

2.

#	Icon	Display Conditions
A	Gas Control Unit- Gas concentration(s) and Flow Rate.	Displayed <b>at all times</b> .
B	Room Temperature read by the NTC Thermistor.	Displayed only if the NTC Thermistor is <b>connected to the H303-T-UNIT</b> .
C	Temperature read by the embedded sensor in the H303-Chamber Lid.	Displayed <b>at all times</b> .
D	Temperature read by the Temperature Sensor embedded in the H303-Chamber Base.	Displayed <b>at all times</b> .
E	Temperature read by the Temperature Sensor embedded in the OBJ-COLLAR.	Displayed <b>only if the OBJ-COLLAR is connected</b>
F	Temperature read by the T Sensor.	Displayed <b>only if the T sensor is connected</b> .
G	Relative Humidity read by the HM-ACTIVE-BL3.	Displayed <b>at all times</b> .
H	Type of the Insert selected by the User	Displayed <b>at all times</b> .
I	Temperature Offset value applied on both the Lid and Base of the H303-Chamber	Displayed when working in <b>CHAMBER MODE</b> .

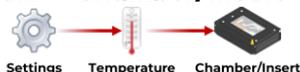
Table 2. Display Conditions for different Icons.

## 8 TEMPERATURE SETTINGS



This section outlines the temperature settings when operating the H303-T-H-CO2/O2 [0-95] system. Navigating to this menu you will have access to parameters such as the Chamber/Insert selection, Control Mode selection, Calibrations, advanced settings etc. all of which are explained in the following subheadings.

### 8.1 Chamber/Insert

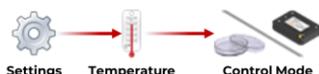


As explained in the section 7.3, navigating to this menu gives you the option to select the H303-Chamber and the Sample insert being used. The page displays the current Chamber and Insert being used, in order to modify either the selected H303-Chamber or the Sample Insert being used you can simply click on the image displayed.



**Note** ► Please note that you must always update the type of the Sample Holder Insert being used if you interchange the Sample Holder Insert.

### 8.2 Control Modes



The Temperature Control can run in two different modes, by navigating to this menu, you can choose the one in which you'd like to work.

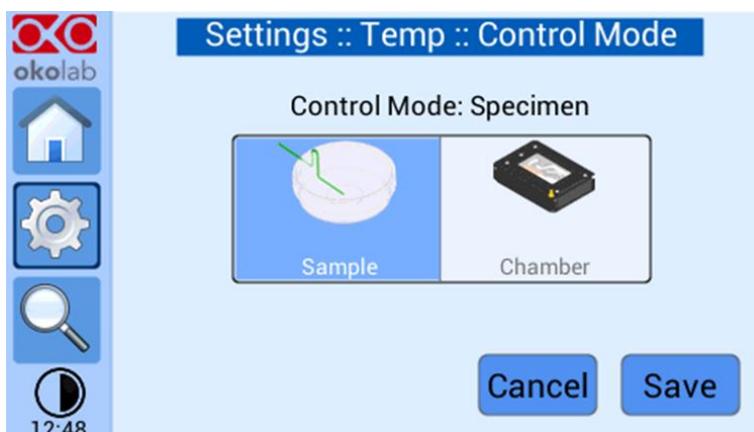


Figure 11. Control Mode selection page.

#### 8.2.1 Chamber Mode

In this configuration the temperatures of both the lid and the base of the incubating chamber are strictly controlled. A careful calibration performed in our laboratories between these temperatures and that of the sample, guarantees that sample temperature is maintained at the desired set point value. This is done by the feedback calculated in coherence to the type of sample insert being used.

The advantage of this solution is that you don't have to manually place the Fine Gauge Thermocouple into a Reference Well. The advantages of this Control Mode are: fast experiment start up and no specific action required in multi user applications. On selecting the '**Chamber Mode**', the following screen will give you a message indicating that the system has been calibrated at the factory at a Room Temperature of 23°C. In case your Room Temperature, measured by the NTC thermistor, is different from 23°C (for example 20.3°C) you have 3 options:

1. Use the Current Calibration: this means recalling the last saved calibration settings. Once you calibrate the system these settings will be automatically stored. The system saves only the last calibration performed. Using 'Current Calibration' is **NOT Recommended** in any of the following as it will yield inaccurate results:
  - G. If the recalled calibration was performed with a different sample adapter than what you intend to use
  - H. If the room temperature on the Calibration is significantly different than the current one (i.e. more than 1°C)
  - I. If the Current Calibration was performed with a different set point temperature than what you plan on using (for example, the Calibration had set point of 37°C but new experiment requires a set point temperature of 39°C).
2. Use Factory settings optimized at 23°C Room Temperature. This is acceptable if your room temperature is within 1°C from 23°C. However, for room temperature more than 1°C from 23°C this may be not acceptable depending on the sensitivity of your sample.
3. Choose to Calibrate the system in your lab at your Room Temperature, for maximum of accuracy when using "Chamber Feedback Mode". To do so follow the instructions on paragraph 7 (Chamber Self-Calibration) and then press the "Calibrate" button; the automatic calibration procedure will start.



**Note** ► The Calibrations procedure is explained in detail in [\*\*Section 8.4\*\*](#).

---

### 8.2.2 Sample Mode

This In this configuration, every time you run an experiment, you must place the provided T Sensor into a Petri dish (or your cell culture support). Fill the petri dish with distilled water to a level allowing full immersion of the T Sensor. If possible close the petri with its own plastic lid or the Sensor Lid (if you have purchased one) and place it in the appropriate holder. In case of Multiwell plates, you may assign a well to have the T sensor placed within it (this well will be referred to as the Reference Well). Using a Reference Well in close proximity to your Experimental Well provides active Sample Feedback Temperature Control. This ensures that your sample will be within 0.1°C from the temperature set point regardless the Room Temperature variations. Advantages of Sample Feedback Control Mode are:

- Direct monitoring and active control of sample temperature and,
- Independence from room temperature variations.

- The temperatures of the Lid and the Base are controlled based on the feedback of the sample so this is more accurate.

### 8.3 Objective Heater



The Objective Heater can be connected around your objective lens by the following the steps illustrated in Figure 12. The Objective Heater wire is then connected to the port labelled 'Obj Heater' behind the H303-T-Unit.

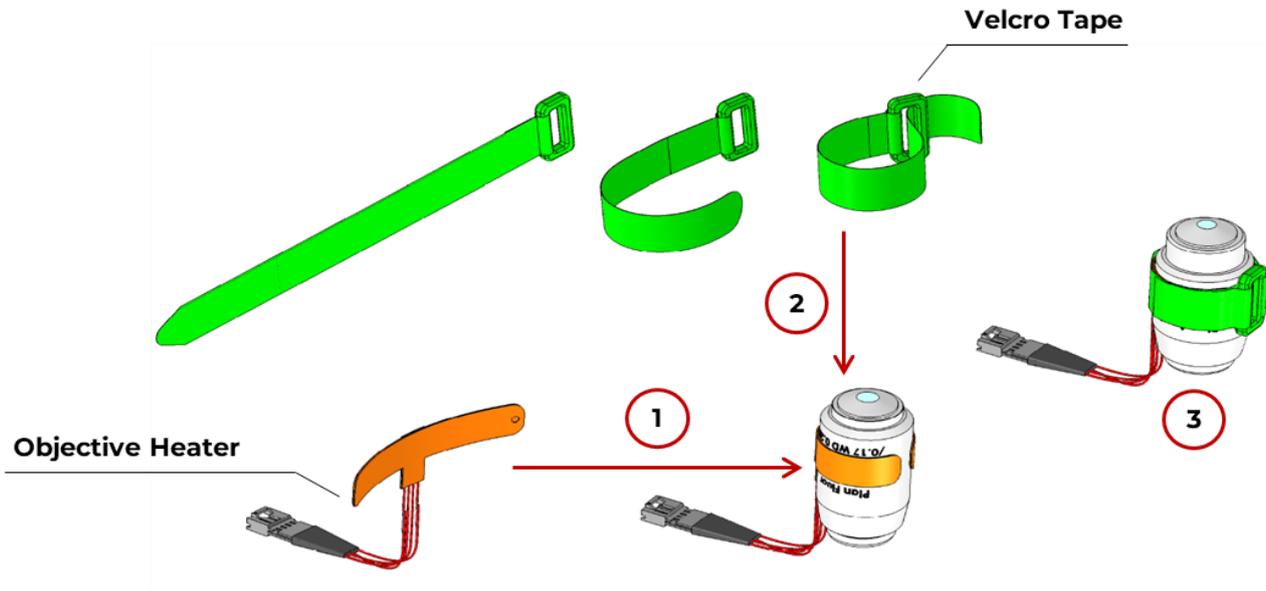


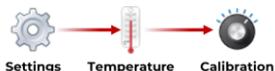
Figure 12. Fixing the Objective Heater.

By navigating to this menu, you can select the option to Enable or Disable the Objective Heater. Furthermore, you have the option to select the desired '**Ramp Rate**'; by clicking on this option, you can choose to set the rate at which the Objective heater will be heated in order to reach the desired set point temperature of the sample.



**Note** ► Please note that you have the option to set the '**Ramp Rate**' value to the maximum but this is advisable when the objective heater is still not in contact with the cell culture support as this may induce a thermal shock in your specimen.

### 8.4 Calibration



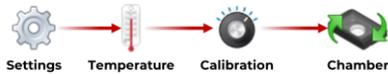
This section offers detailed instructions for calibrating the Chamber or the Objective heater. Please note that calibrations depend on:

- Temperature Set Point;
- Room Temperature;

- The type of Sample Holder Insert in use.

When the Calibration process is ongoing on the homepage, you'll be able to see the temperature calibration icon , clicking on this icon will navigate you back to the calibration page and display the progress bar of the procedure.

#### 8.4.1 Chamber Calibration



This subheading explains the procedure for performing the calibration of the H303-Chamber, this procedure calibrates the embedded Temperature sensors within the Chamber Lid and Base in order to adjust the factory offset allowing you to achieve further accuracy of your temperature Set Point in the sample. You have the option to perform either the **'Factory'** reset of the chamber's calibration or perform a new calibration by selecting the **'Calibrate'** option.

In order to proceed with the Chamber calibration you will first need to attach the tip of the T Sensor to the bottom of a petri dish or the cell culture holder which you use along with the Sample Holder Insert that you've purchased, making sure that it is placed as centrally as possible (see Figure 13)

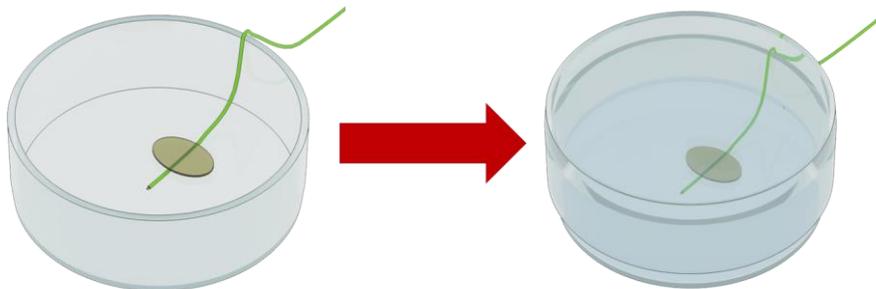


Figure 13. Petri Dish with T sensor placed centrally, filled with water and lid closed.

After placing the T sensor with in the petri dish, fill it with water and place it within the chamber (where the sample will be placed) with its top lid closed, and click on the **'Calibrate'** option on the screen.



**Note** ► Before starting the Calibration, make sure you've set the correct working Set Point as the calibration will be performed at that Temperature Set Point.

**Note** ► The Calibration procedure may take between 1–2 hours for completion.

#### 8.4.2 Objective Heater Calibration



On navigating to this menu, you will have the option to select between the **'Factory'** reset, **'Manual'** offset insertion, or the performing the system's **'Calibration'** process.

**Manual Offset Insertion:** For inserting the offset manually, you can simply click on the **'Manual'** option, go into Oil Contact of the Objective lens with the Petri dish and wait for the T sensor reading to stabilize. Once

the temperature read by the T sensor has stabilized, insert the difference of the Set-Point temperature and the Temperature read by the T Sensor.

$$\text{OFFSET } (^{\circ}\text{C}) = \text{Set Point Temperature } (^{\circ}\text{C}) - \text{Temperature read by the T Sensor } (^{\circ}\text{C})$$

**Calibration:** For performing the Calibration procedure instead, you can do so with the help of the provided T-Sensor. The process is similar to that of the Chamber calibration i.e., you will have to attach the tip of the T-Sensor to the bottom of the cell culture support (as illustrated previously in Figure 13).



**Note** ► Before proceed with the calibration of the Objective Heater, make sure that the chamber calibration ('Self Calibration' has already been performed, so that the T Sensor's reading is close to the Temperature Set Point.

---

Proceed with the calibration process by clicking on the '**Calibrate**' option **and then** go into Oil Contact of the Objective Lens with the Petri dish.

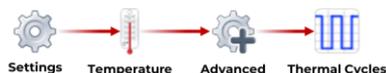


**Note** ► This feature is only available if you have purchased the Objective Heater accessory and is connected to the H303-T-UNIT control unit.

**Note** ► Similar to the Chamber Calibration, before starting the Calibration, make sure you've set the correct working Set Point as the calibration will be performed at that Temperature Set Point.

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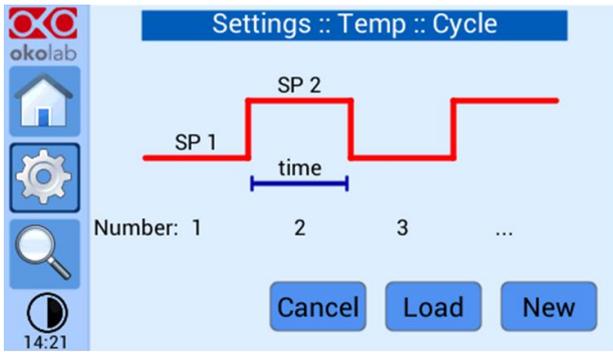
## 8.5 Advanced Temperature Settings (Temperature Cycles)



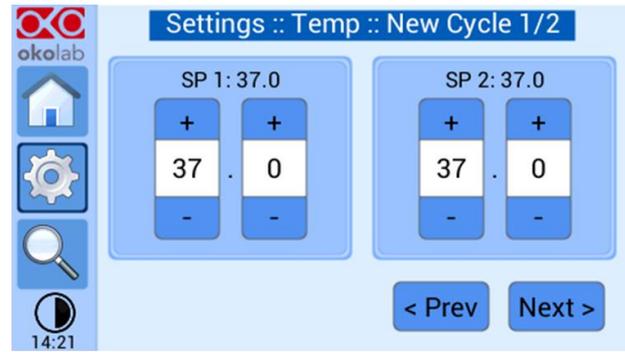
By clicking on this option, you can access the advanced temperature settings, this section allows you to set the temperature cycles.

In this menu, you can choose to load an existing gas cycle or setup a new one Figure 15Figure 14(a).

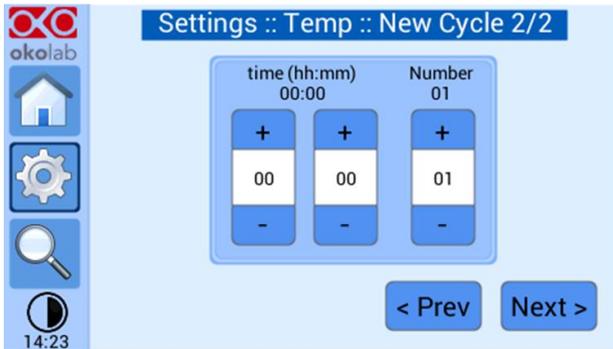
A temperature cycle is assigning two temperature set points to the system with a duration of time for which the set points will be adhered to before switching to the other set point. In order to setup a new temperature cycle, click on '**New**', this will navigate you to the page for selecting the SP1 and SP2 (Set Point 1 & Set Point 2 Figure 14 (b)), after which on clicking the '**Next**' option you can select the duration of each Set Point and the number of cycles you would like to impose (Figure 14 (c)). The page following this shows the summary of the temperature cycle setup page (Figure 14 (d)) with an option to either save the temperature cycle or proceed directly to the next step. The page allows you to save the temperature cycle as one of the configurations, the options greyed are empty configurations can be selected to save this new temperature cycle (Figure 14 (e)). The final page displays the option to select the time at which the temperature cycle should begin (Figure 14 (f)).



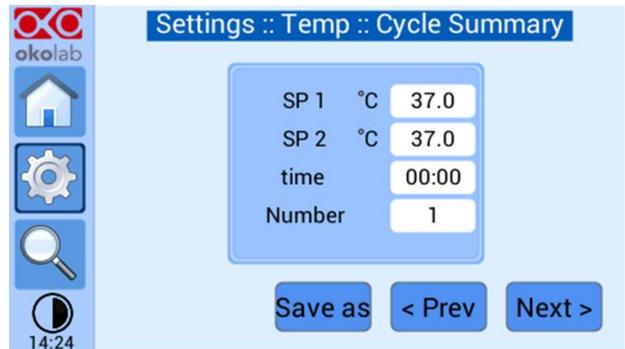
a.



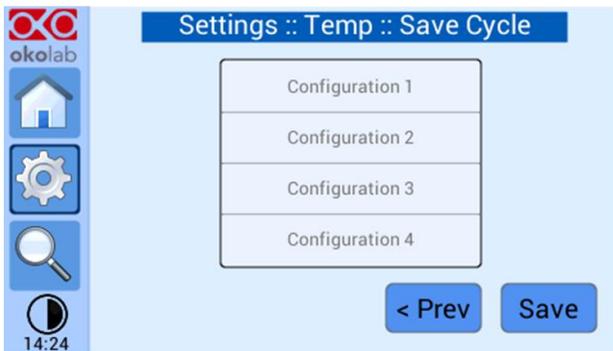
b.



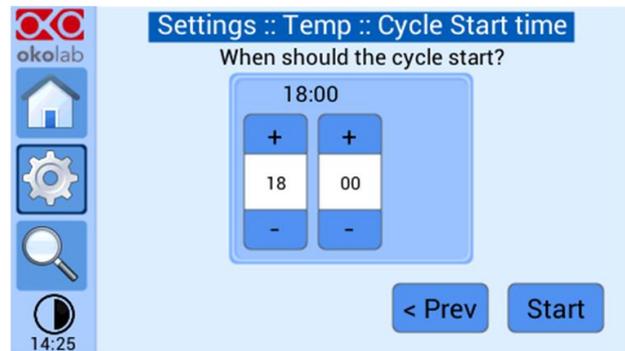
c.



d.



e.



f.

Figure 14. Temperature Cycles Setup.

## 9 GAS SETTINGS



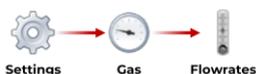
This chapter details some of the settings related to gas usage such as Control Modes, Flowrates, Gas cycles and other related Settings. The following subheadings provide details on these settings.

### 9.1 Control Modes



As previously detailed in section 8.2 this option allows you to choose between working in the CO<sub>2</sub>/O<sub>2</sub>/N<sub>2</sub> mode or the CO<sub>2</sub> in Air mode.

### 9.2 Flowrates Setting



By navigating to this menu, you can modify the total flowrates of the gas output, the flowrates of CO<sub>2</sub>, O<sub>2</sub> & N<sub>2</sub> (or CO<sub>2</sub>, O<sub>2</sub> & Air when working in the CO<sub>2</sub> in Air mode i.e., when air is connected to the N<sub>2</sub> inlet port) regulate automatically in correspondence to the setpoint values of each of the gases.



**Note** ► The flowrate can be set in the range of 0.2 – 0.4 l/min.

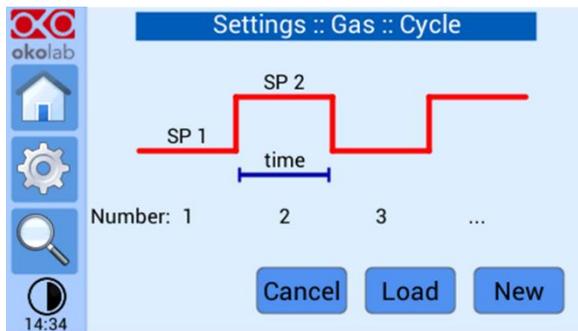
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### 9.3 Gas Cycles Setting

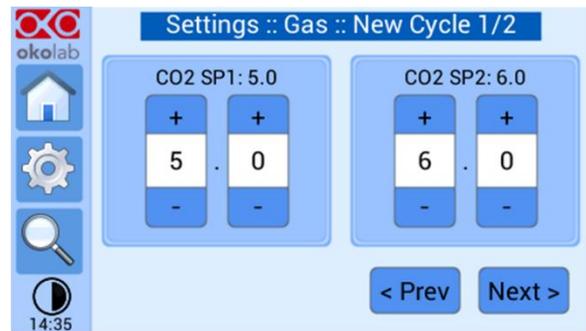


In this menu, you can choose to load an existing gas cycle or setup a new one Figure 15 (a).

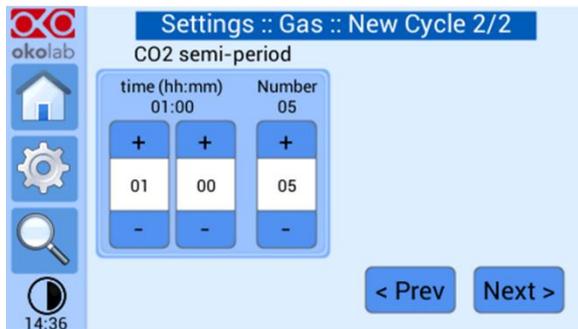
A gas cycle is assigning two gas set points to the system with a duration of time for which the set points will be adhered to before switching to the other set point. In order to setup a new gas cycle, click on '**New**'; this will navigate you to the page for selecting the CO<sub>2</sub> SP1 and SP2 (Set Point 1 & Set Point 2 Figure 15 (b)), after which on clicking the '**Next**' option you can select the duration of each Set Point and the number of cycles you would like to impose (Figure 15 (c)). The page following this shows the summary of the gas cycle setup page (Figure 15 (d)) with an option to either save the gas cycle or proceed directly to the next step. The page allows you to save the gas cycle as one of the configurations, the options greyed are empty configurations can be selected to save this new gas cycle (Figure 15 (e)). The final page displays the option to select the time at which the gas cycle should begin (Figure 15 (f)).



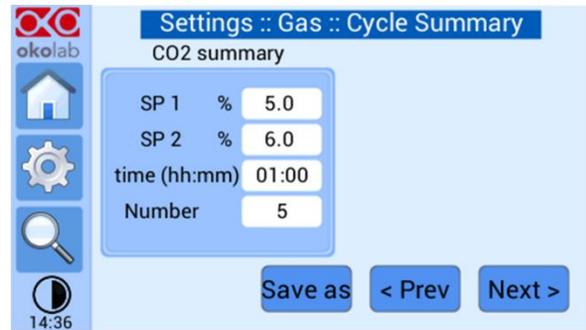
a.



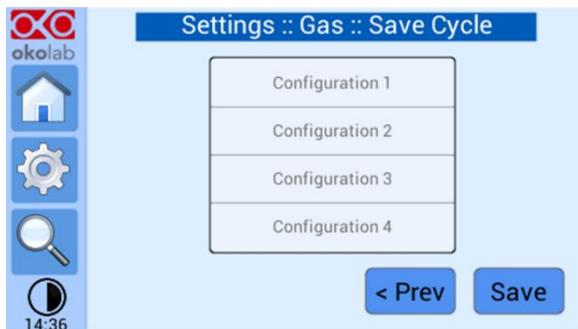
b.



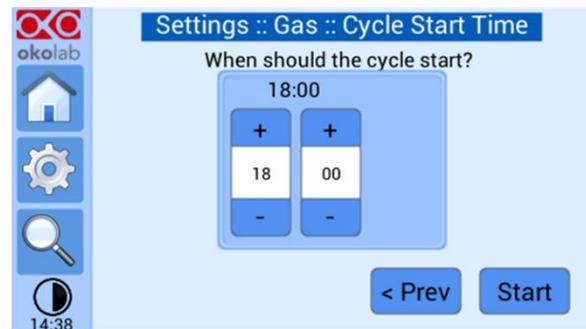
c.



d.



e.



f.

Figure 15. Gas Cycles Setup (a-f).

## 9.4 Humidity Setting



The Humidity Settings are only displayed when the RH Set Point value is 95%. By navigating to this option, you can regulate the humidity by choosing between a 'Less Humid' or a 'More Humid' option and also activate/Deactivate the 'Humidity Status Led'.

As illustrated in Figure 16, you can modify the humidity value to more or less humid by moving the regulator left or right. Each bar on the regulation bar corresponds to 1% of humidity.

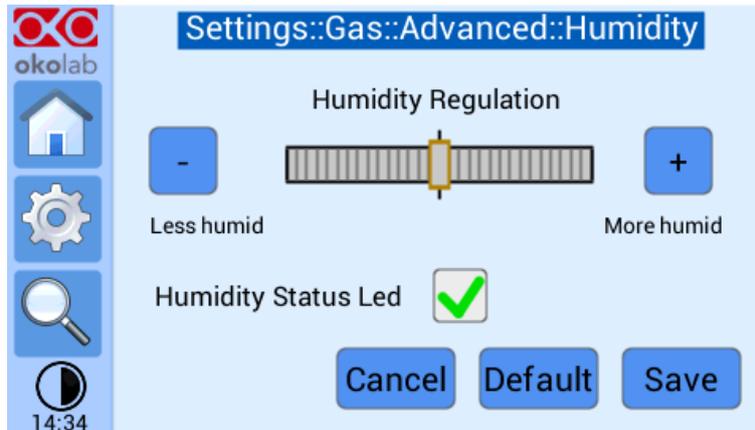
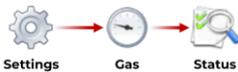


Figure 16. Humidity Regulation.

If your chamber has a humidity setpoint of 95% but see rapid evaporation of the sample medium (maybe due to constant opening closing of the chamber) you can select to provide more humidity to the chamber by moving the selector bar to the right and vice versa for the other way round.

## 9.5 Gas Status



For quick visualization of the system's gas status, you can navigate to this menu and view the details pertinent to the gas parameters and the system's functioning relative to these. Figure 17 illustrates the status page with parameters values such as the flow, humidity control etc.

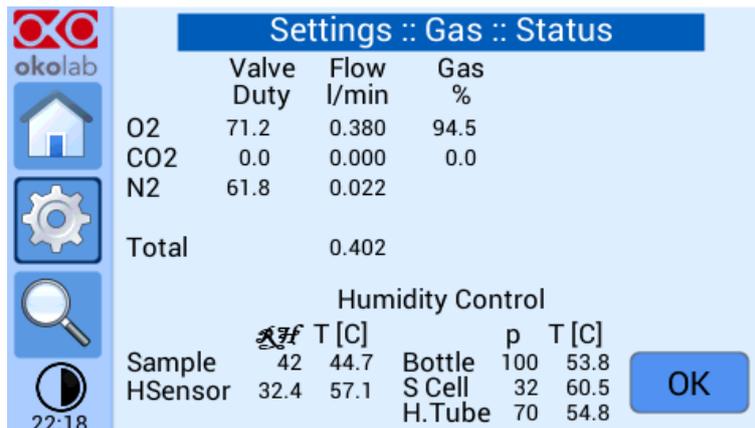


Figure 17. Gas Status page.

## 9.6 Gas Offset Correction



In this section, you can perform an Offset Correction of the Gas concentration from the Unit's output by utilizing an external meter. In order to proceed with the Offset calibration, please connect the gas controller's output tube (TUBE-A) to the inlet port of the external gas measurement meter. When the readings from the external meter reach a stable value, please click on the '*Adj CO2*' and manually enter the value measured by the external meter, once done, the system will automatically the offset which will be imposed

to calibrate the unit sensor (Figure 18). Similarly, the same steps can be performed for the Offset correction of O2 by clicking on '**Adj O2**' after measuring the O2 concentration by an external meter.

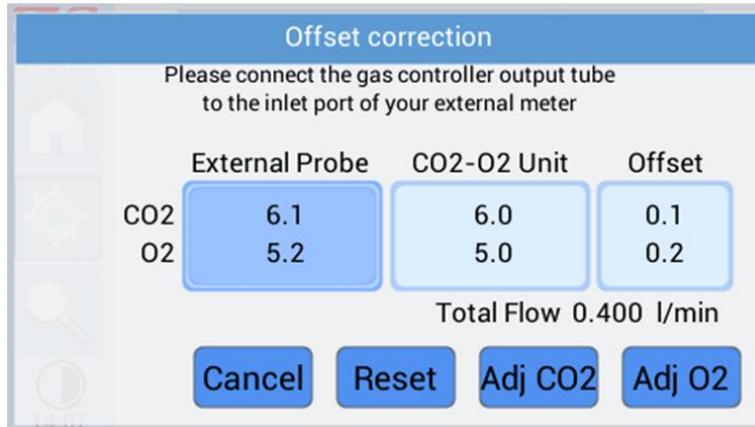


Figure 18. Gas Offset Correction.

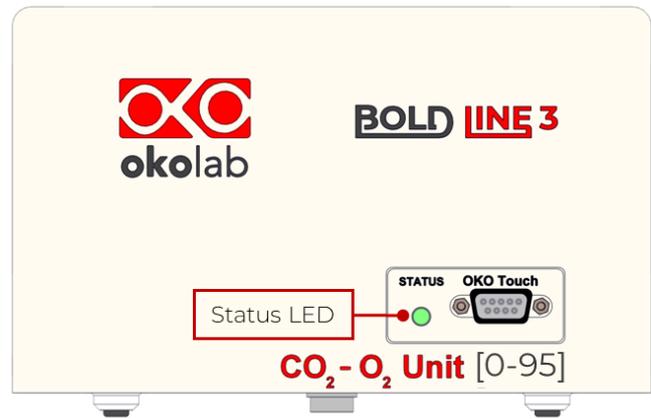
## 10 ALARM SETUP



This section details the Alarm setting for different variable being worked with. When the system goes into an Alarm state the **homepage** of the OKO-TOUCH-BL3 displays the '**Alarm**' icon  on the bottom left. The Status LED of the OKO-TOUCH-BL3 as illustrated in Figure 19 (a) starts to **change color**. On the other hand, the Status LED of the Control unit, as illustrated in Figure 19 (b), starts to **blink** corresponding to the Status indicator on the home page.



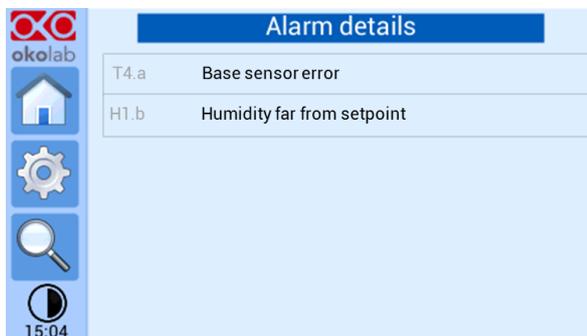
a.



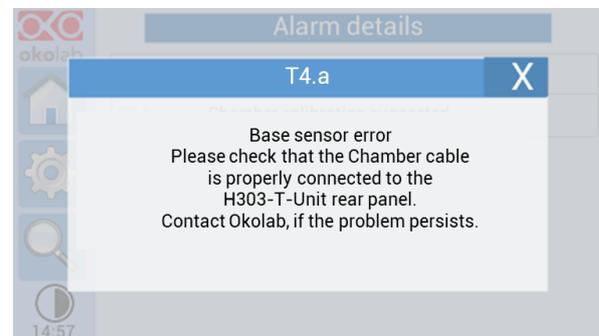
b.

Figure 19. Status LED: (a) On the OKO-TOUCH-BL3; (b) On the Control Unit.

Figure 20 (a & b) shows an example of an alarm Message that is displayed on clicking the '**Alarm**' icon  on the bottom left homepage.



a.



b.

Figure 20. Alarm Message.

The following sub headings detail the alarm setup procedures for the Temperature, Gas and Humidity.

### 10.1 Temperature Alarm



In this section, you can setup the value of the deviation (tolerance), in °C, from the temperature set point and the time for which the system has to read the measurement out of tolerance value, before going into an alarm state (Figure 21).

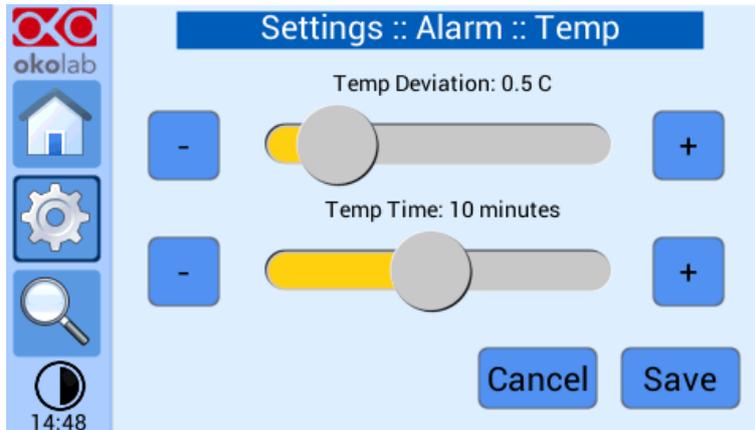


Figure 21. Temperature Alarm Settings Page.

## 10.2 Gas Alarm



In this section, you can setup the value of the deviation (tolerance), in % of concentration, from the gas set point and the time for which the system has to read the measurement out of tolerance value, before going into an alarm state (Figure 22).

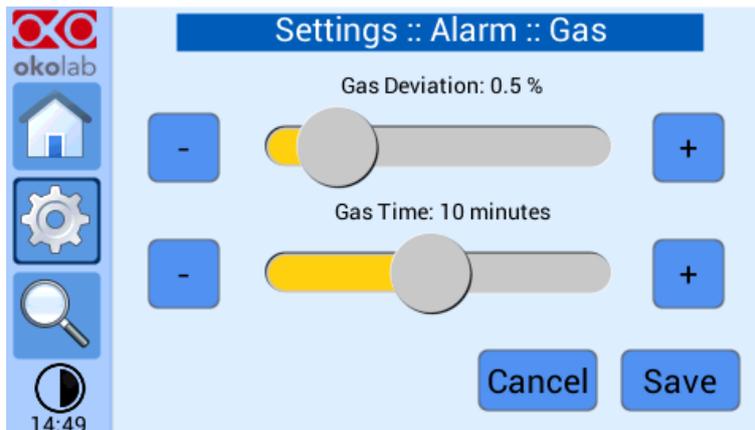


Figure 22. Gas Alarm Settings Page.

## 10.3 Humidity Alarm



From this menu, you can setup the value of the deviation (tolerance), in % of humidity, from the humidity set point and the time for which the system has to read the measurement out of tolerance value, before going into an alarm state (Figure 23).

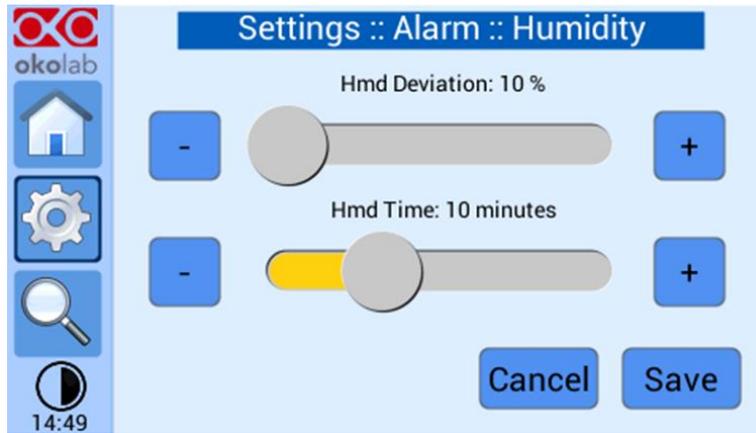
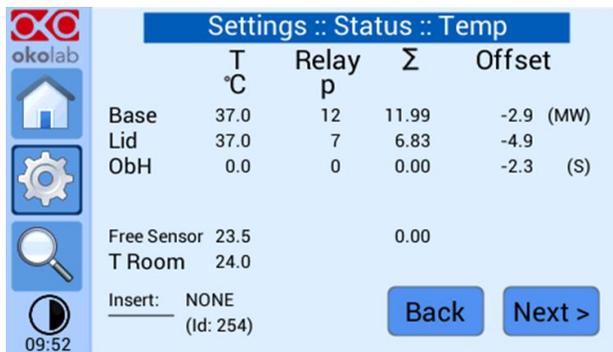


Figure 23. Humidity Alarm Settings Page.

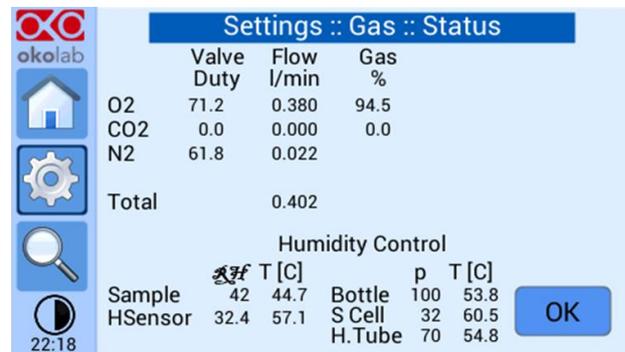
## 11 SYSTEM STATUS



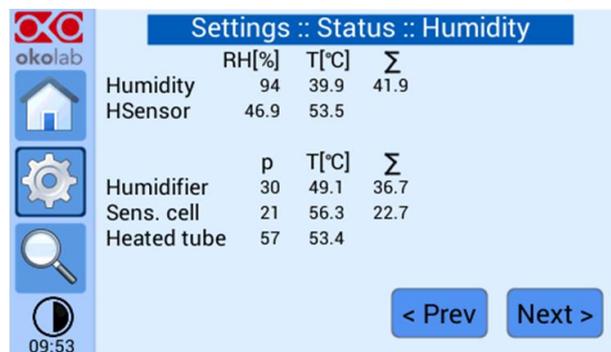
For quick visualization of the system's status, you can navigate to this menu and view the details pertinent to the system's functioning. The figure below illustrates the status pages for Temperature (Figure 24 (a)), Gas (Figure 24 (b)) and Humidity (Figure 24 (c)).



a.



b.



c.

Figure 24. Status Pages for different parameters (a-d).

On the homepage, clicking on the **OKOLAB** icon  on the top left of the screen will allow you to view system details such as the release date, serial number, software version etc. as illustrated in Figure 25.

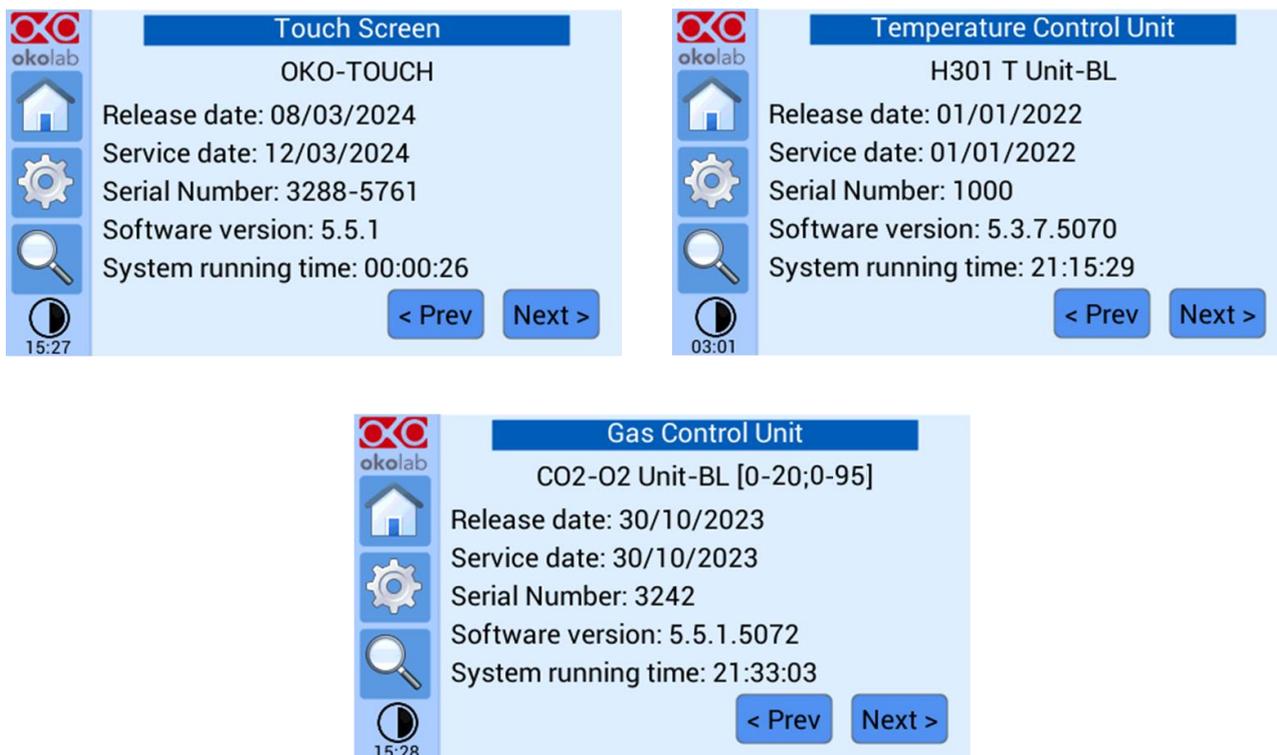
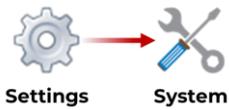


Figure 25. System Information for different devices.



**Note** ► These details such as the serial number, status pages, will be requested by the OKOLAB Technical Support team during assistance sessions. If you find yourself in need for a technical assistance, please attach images of the Status page for each of the parameters available to you relative to the Top Stage system that you possess.

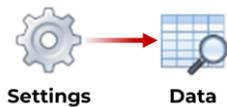
## 12 SYSTEM SETTINGS



In this menu the following system settings are available:

- **Visual Effects** 🖥️: From this page you can set the Top LED to be enabled as per your requirement, and select between setting the High contrast color as 'White' or 'Dynamic'.
- **Brightness** 💡: From this page you can set the brightness of the OKO-TOUCH-BL3's screen.
- **Date & Time** 📅🕒: From this page you can set the Date & Time on the OKO-TOUCH-BL3. Please note that we suggest to do this during the first setup of your system.
- **Touch Options** 🖐️: From this page you can set the Touch Sound as enabled/disabled and also manipulate the buzzer frequency as you prefer.

## 13 DATA SETTINGS



This section covers the settings pertinent to the Data being worked with using the H303-T-H-CO2/O2 [0-95] system. In this menu you will be able to access the following settings:

### Data Logging Settings

In the data Logging settings menu, you can choose between logging the data directly on to an external USB Pen Drive or to the device's internal memory.

**Saving data to External USB Drive:** To start logging the data directly to your external USB Pen Drive and check the box to enable the '*USB Drive*' option. The USB Pen Drive must be connected to the OKO-TOUCH-BL3 via the provided OTG cable (as shown in Figure 26).



Figure 26. OTG Cable port on the OKO-TOUCH-BL3 for attaching the USB Pen Drive.

**Saving data to Internal Memory:** To start logging the data to the device's internal memory, enable the '*Internal Memory*' option. By clicking on the screwdriver icon  , you can view the **start date** from which the logging has been active, the **Available Memory** and the **Latest Download date**. Besides you can also choose to '*ERASE*' the data in the device or download it to a USB Pen Drive by clicking on '*To USB*' option and transfer data to a USB Pen Drive connected to OKO-TOUCH-BL3.

On this page you also have access to the following functions:

- Set the Time Interval for data logging, this can be done by clicking on the *edit*  icon and manually entering the time interval on the pop-up menu.
- Select whether you'd like your data to be grouped by '*Day*', '*Week*' or '*Month*'.
- Lastly, select the '*File name suffix*' that you'd like to set to the logged data by clicking on the *keyboard*  icon.

### Data Chart Settings

In the data Chart settings menu, you can set the length (in terms of time duration) of the chart history.

## 14 TOUCH SCREEN CALIBRATION

Keep pressed the ON/OFF button on OKO TOUCH for 7 seconds to start the Touch Screen Calibration. While holding the button, the pop-up message 'Keep the button pressed for 8 seconds to calibrate the touch.' Once the calibration starts, tap blue calibration dots until the calibration is complete.



Figure 27. Performing the Touch Calibration.

## 15 TROUBLESHOOTING

Please refer to the following Alarms list for the troubleshooting.

Alarm Code	Alarm Name	Remedy
Temperature Alarms		
<b>T1.a</b>	<b>Temperature far from setpoint</b>	Please ensure that the Chamber is closed and the samples Insert is placed correctly; If the problem persists, contact OKOLAB Technical Support team for further assistance.
<b>T4.a</b>	<b>Base sensor error</b>	Please ensure that the Chamber cable is properly connected to the H303-T-Unit rear panel; If the problem persists, contact OKOLAB Technical Support team for further assistance.
<b>T4.b</b>	<b>Sample sensor error</b>	Please ensure that the T Sensor cable is properly connected to the H303-T-Unit rear panel; If the problem persists, contact OKOLAB Technical Support team for further assistance.
<b>T4.c</b>	<b>Lid sensor error</b>	Please ensure that the Chamber cable is properly connected to the H303-T-Unit rear panel; If the problem persists, contact OKOLAB Technical Support team for further assistance.
<b>T4.d</b>	<b>Objective sensor error</b>	Please ensure that the Objective Heater Cable is properly connected to the H303-T-Unit rear panel; If the problem persists, contact OKOLAB Technical Support team for further assistance.
<b>T4.f</b>	<b>Room sensor error</b>	Please ensure that the room temperature sensor is properly connected to the H303-T-Unit rear panel; If the problem persists, contact OKOLAB Technical Support team for further assistance.
<b>T6.a</b>	<b>Base relay not working</b>	Contact OKOLAB Technical Support team for further assistance.

<b>T6.c</b>	<b>Lid relay not working</b>	Contact OKOLAB Technical Support team for further assistance.
<b>T6.d</b>	<b>Objective relay not working</b>	Contact OKOLAB Technical Support team for further assistance.
<b>T9</b>	<b>Setpoint invalid near room temperature</b>	The Set Point temperature must be at least 3°C above the room temperature; Contact OKOLAB Technical Support team for further assistance.
<b>T11</b>	<b>Chamber open for a long time</b>	Incubator opened for more than 5 minutes Ignore this warning if the opening is intended. Close the incubator to cancel this alert; Contact OKOLAB Technical Support team if the problem persists.
<b>Gas Alarms</b>		
<b>G1.a</b>	<b>CO2 far from setpoint</b>	Please ensure that the gas tubes are properly connected; Please ensure that the CO2 supply cylinder isn't empty and the inlet pressure is properly set. If the problem persists, please contact OKOLAB Technical Support team for further assistance.
<b>G1.b</b>	<b>O2 far from setpoint</b>	Please ensure that the gas tubes are properly connected; Please ensure that the N2 supply cylinder isn't empty and the inlet pressure is properly set; Please ensure that the air pump is connected properly to the gas control unit; If the problem persists, please contact OKOLAB Technical Support team for further assistance.
<b>G8</b>	<b>Air pump lifetime expired</b>	Please contact OKOLAB Technical Support team for a replacement of the pump.
<b>Humidity Alarms</b>		
<b>H1.a</b>	<b>Humidity far from setpoint</b>	Low humidity read by HM-Active sensing cell, please refill the HM-Active bottle and verify that all tubes are properly connected;

		If the problem persists, contact OKOLAB Technical Support team for further assistance.
<b>H1.b</b>	<b>Humidity far from setpoint</b>	Please ensure that the chamber is properly closed and all tubes are properly connected and sample holders are correctly placed; If the problem persists, contact OKOLAB Technical Support team for further assistance.
<b>H4.a</b>	<b>Humidity sensor error</b>	Check that the sensing cell power cable is well connected to the humidifier; If the problem persists, contact OKOLAB Technical Support team for further assistance
<b>H4.b</b>	<b>HM-ACTIVE humidifier sensor error</b>	Contact OKOLAB Technical Support team for further assistance.
<b>H4.c</b>	<b>Sensing Cell Temperature sensor error</b>	Please ensure that the Sensing Cell cable is properly connected to the base of the HM-ACTIVE-BL3; If the problem persists, contact OKOLAB Technical Support team for further assistance.
<b>H4.d</b>	<b>Tube T sensor error</b>	Please ensure that the heated tube's cable is properly connected to the base of the HM-ACTIVE-BL3; If the problem persists, contact OKOLAB Technical Support team for further assistance.
<b>H14</b>	<b>Water Bottle Empty</b>	Refill the water bottle up to the indicated water level; If the problem persists, contact OKOLAB Technical Support team for further assistance.

## 16 CLEANING & MAINTENANCE

### 16.1 Cleaning

The following subheadings explain the cleaning of the different components.

#### 16.1.1 Control Units Cleaning

- Use a polishing cloth or dry cloth to wipe off dust and dirt.
- Never use thinners, benzene, solvents on or near the devices, since these could corrode their surfaces.
- To polish the Stage Incubator and the Humidifying Module, if it is present, you can use distilled water or alcohol
- Verify the status of all cables and if some cable is damaged, contact Okolab to receive assistance



Before cleaning the unit, disconnect all the electrical connections.

Water must not enter in the system.

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#### 16.1.2 Chamber Cleaning

In order to keep the Chamber clean, please follow the steps below:

4. Turn the system off and pull the mains plug out the socket
5. Wait till the chamber cools down.
6. To clean the body of the chamber, wipe with a soft micro-fiber cloth. For stubborn smudges, you can damp the soft micro-fiber cloth with ethyl alcohol (product code UN1170). Do not put any liquid directly on the chamber. While cleaning the glass lid, do not apply strong force to the surface of the glass lid because it can be damaged.

#### 16.1.3 HM-ACTIVE-BL3 Cleaning

In order to keep the HM-ACTIVE-BL3 clean please follow the steps below:

1. Turn the system off and pull the mains plug out the socket.
2. Disconnect the HM-ACTIVE-BL3 from the H303-T-UNIT.
3. Disconnect the Sensing cell from the Base.
4. Wait the bottle cools down.
5. Empty the bottle.
6. Wipe the exterior of the bottle with a 70% alcohol solution.
7. Only if needed rinse the bottle with the above-mentioned solution and wait till the bottle's interior is completely dry before reusing it.



When the system is switched off by the OKO-TOUCH-BL3, the sensing cell still remains ON to avoid the water from condensing on it.

When you disconnect the system from the power supply, or when the HM-ACTIVE-BL3 is not being utilized, we advise you to remove the sensing cell from the bottle to avoid water condensation.

#### 16.1.4 OKO-AIR-PUMP-BL Cleaning

The OKO-AIR-PUMP-BL has a lifetime of 6000 hours. When the maintenance of the embedded pump is due the system will display the alarm code **G8- "Please contact Okolab to replace OKO-AIR-PUMP-BL."** On the homepage advising you to change the pump. Contact Okolab Technical Support Team for instructions on the pump replacement procedure.



**Note** ► After replacing the pump, please navigate to   , select the '**CO2 in Air**' mode, click on '**Pump**' and lastly click on '**Reset**'.

## 16.2 Maintenance

The following table reports the list of the spare parts and when they should be replaced.

Spare Parts List	Suggested Replacement Time
Pump	At end of its Lifetime. (when you see the alarm code G8)
CO2 Valve	If suggested by Okolab Technical Support Team.
Air Valve Mass flow sensor	If suggested by Okolab Technical Support Team.
HM-ACTIVE Glass Bottle	If Damaged.
Hydrophobic PTFE (for OKO-AIR-PUMP-BL)	Every 12 months.

## 17 TECHNICAL SPECIFICATIONS

<b>Temperature Control</b>	
Measurement Range	3°C above ambient temperature to 60°C
Accuracy	± 0.1°C
Step size	0.1 °C
<b>CO2/O2 Control</b>	
CO2 Range	0-20%
CO2 Accuracy	± 0.2% <sup>1</sup>
CO2 Step size	0.1%
O2 Range	0-95%
O2 Accuracy	± 0.3% <sup>1</sup>
O2 Step size	0.1%
Output Flowrate range	0.2 – 0.4 l/min
<sup>1</sup> At 5% CO2 & 5% O2	
<b>Gas Input Requirements</b>	
CO2 Inlet Pressure	0.8 ±0.2 barg (12 ±3 psig)
CO2 Gas Purity	99.995%
N2 Inlet Pressure	0.8 ±0.2 barg (12 ±3 psig)
N2 Gas Purity	99.995%
O2 Inlet Pressure	0.8 ±0.2 barg (12 ±3 psig)
O2 Gas Purity	99.995%
Gas Connectors	6.0 OD Push to fit connector
<b>Expected Lifetime</b>	
OKO-AIR -PUMP-BL	6000h
<b>Power Consumption</b>	
Control Unit – Supply Voltage	24 VDC
Power Consumption	180 W max
<b>External Environment Requirements – Indoor Use</b>	
Temperature Range	18 – 30 °C (23 °C suggested)
Storage Temperature	-5 – 60 °C
Relative Humidity Range	0 - 70%

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## 20 SUPPORT

To contact one of our engineers please send an email to the technical support address listed below or contact us through the live chat on [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 TECHNICAL SUPPORT: [support@oko-lab.com](mailto:support@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)

## WARRANTY

Okolab S.r.l. warrants "Bold Line 3 Top Stage systems" to be free of defects in materials and workmanship for a period of three years starting from invoice date. If the units malfunction, they 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 result 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.