BOLD LINE 3

ENCLOSURES

H203-T-ENCLOSURE

H203-T-H-CO2-ENCLOSURE

H203-T-H-CO2/O2 [0-21]-ENCLOSURE

H203-T-activeH-CO2-ENCLOSURE

User Manual

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Index

1 PREFACE

Welcome to the BOLD LINE 3 (BL3) Enclosures Manual.

This manual provides comprehensive guidance on the setup, operation, and maintenance of the BL3 Enclosures. It covers essential information to ensure efficient utilization and optimal environmental control within laboratory settings.

Key Features of BL3 Enclosures:

- **Advanced Environmental Control:** Integrated CO2 and Humidity sensors enable precise monitoring and control within the enclosure.
- **Embedded Temperature Sensors:** Continuous temperature feedback enhances control accuracy and stability.
- **Error-Proof System:** Real-time monitoring triggers alarms for deviations from setpoint values, ensuring sample protection.
- **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 BL3 Enclosures feature embedded heating devices located on the rear panel, which are controlled via the Temperature Control Unit. For enclosures equipped with gas control, a Gas Control Unit is provided, which pairs with the vibration-free humidity module (HM-VF) to supply humid gas. In special cases, users can opt for the Active Humidity Module (HM-Active) for gas humidification.

Temperature Range: The BL3 Enclosures control the temperature from 3°C above ambient temperature up to 45°C, ensuring precise environmental conditions for your samples.

Compatibility: The CO2-H-IN-CHAMBER Sensor is compatible with any of the BL3 Chambers, providing seamless integration for advanced environmental monitoring and control.

Control Interface: The BL3 Enclosures are 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.

The Enclosure codes to which this manual applies are:

1. ***H203-T-ENCLOSURE***
2. ***H203-T-H-CO2-ENCLOSURE***
3. ***H203-T-H-CO2/O2 [0-21]-ENCLOSURE***
4. ***H203-T-activeH-CO2-ENCLOSURE***

We recommend carefully reading this manual to familiarize yourself with the functions and operation of the BL3 Enclosures 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.

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.

- 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.
- CO2 must be available at 1.4 barg (20 psig), with a connector for 6mm OD rigid silicon tube. Gas source must be Standard Purity CO2 (coded as 4.5 that means 99.995 % of CO2) and humidity-free gas.
- When using the Compressed Air option, please ensure that the gas is available at 1.4 barg (20 psi)

- N2 must be available at 1.4 barg, 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.
- 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 Bold Line 3 Enclosure.

Figure 1. Enclosure Components & Accessories.

Components

1. **T-Enclosure**: A microscope enclosure that creates a large volume around the microscope in which temperature is controlled by recirculating warm air by the means of the Heating boxes. It includes H203-HB-SX & H203-HB-DX (referred to as Heating Box-1 & Heating Box-2), the H203-JUNCTION-BOX which is a connection port between the Heating Boxes and the H203-T-Unit.
2. **OKO-AIR-PUMP-BL**: A pump which enables you to use the background air.
3. **HM-ACTIVE-BL3**: Active Humidity Module controls relative humidity in the range of 50-95%.
4. **CO2-UNIT-BL3**: A gas control unit which allows you to control the CO2 concentration in the range of [0-20] %, with the help of embedded sensors.
5. **CO2-O2 [0-21]-BL3 Unit**: A gas control unit which allows you to control the CO2 concentration in the range of [0-20] % and O2 in the range of [0-21] %, with the help of embedded sensors.
6. **CAB2701**: NTC Thermistor for measuring ambient temperature. (**See Note**).
7. **H203-T-UNIT**: A temperature control unit which controls the heating boxes present on the rear side of the enclosure to generate and maintain heat within the Enclosure
9. **OKO-TOUCH-BL3**: An intuitive and user-friendly touch screen interface which connects to the control unit.
10. **HM-VF**: A vibration-free gas humidifier which employees a semi-permeable membrane for humidifying the gas. The **Water Trap** is provided along with this module.

Accessories (Sold Separately)

8. **HM-ACTIVE-STANDALONE-BL3**: A Digital Humidity Controller that controls the Relative Humidity inside the chamber in the range 50-95% by controlling the HM-ACTIVE-BL3.
11. **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.
12. **TC-XC**: This is an extension cable for the TC temperature probe.
13. **H203-Chamber**: A micro-environmental chamber with an embedded Temperature sensor, that fits in the XY stage of the microscope.
14. **Calibration Insert**: This insert is provided along with the CO2-H-IN-CHAMBER-Sensor, and must be utilized during the calibration procedure of this sensor.
15. **CO2-H-IN-CHAMBER Sensor**: A miniature CO2 and humidity sensor that can be embedded inside the H203-Chamber, ensuring a real time monitoring of your sample. Continuous CO2 and Humidity feedback enhances control accuracy and assure a total sample protection.
16. **Sample Holder Inserts**: Inserts designed to house different sample holders such as 35mm petri dishes, chamber slides etc.

Note ► *The T-Enclosure and the H203-Chamber, depicted in the image are generic models and the appearance my vary as the Enclosure and the chambers are designed to be Microscope Specific.*

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

Note ► *The HM-ACTIVE-STANDALONE-BL3 is **only** compatible with the H203-T-ENCLOSURE.*

Note ► *Please refer to the manual dedicated to HM-ACTIVE-STANDALONE-BL3 controller for instruction relative to its installation and usage.*

Note ► *The CAB2701 (NTC Thermistor) is **only** provided for the H201-T-ENCLOSURE if a H203-Chamber has not been purchased.*

The following Table 1 details the different components and with which of the BL3 Enclosure codes are they included.

#	Component Name	BOLD LINE 3 Enclosures Commercial Code			
		H203-T-Enclosure	H203-T-H-CO2-Enclosure	H203-T-H-CO2/O2 [0-21]-Enclosure	H203-T-activeH-CO2-Enclosure
1	T-Enlcosure	Included	Included	Included	Included
2	OKO-AIR-PUMP-BL	Not Included	Included	Included	Included
3	HM-ACTIVE-BL3	Not Included	Not Included	Not Included	Included
4	CO2-UNIT-BL3	Not Included	Included	Not Included	Included
5	CO2/O2 [0-21]-BL3	Not Included	Not Included	Included	Not Included
6	CAB2701	Included	Included	Included	Included
7	H203-T-UNIT	*Included	Not Included	Not Included	Not Included
9	OKO-TOUCH-BL3	Included	Included	Included	Included
10	HM-VF	Not Included	Included	Included	Not Included

Table 1. Component Names and Compatibility with Enclosure codes.

Note ► *The CO2-H-IN-CHAMBER-Sensor is only compatible with the H203-T-H-CO2-ENCLOSURE, H203-T-H-CO2/O2 [0-21]-ENCLOSURE, H203-T-activeH-CO2-ENCLOSURE and cannot be purchased as a standalone.*

Included Accessories

The following Table 2 details the different supplied accessories and with which of the BL3 Enclosure codes are they included.

#	Accessory Name	BOLD LINE 3 Enclosures Commercial Code			
		H203-T-Enclosure	H203-T-H-CO2-Enclosure	H203-T-H-CO2/O2 [0-21]-Enclosure	H203-T-activeH-CO2-Enclosure
1	OKO-TOUCH-CABLE	Included	Included	Included	Included
2	OTG-Cable	Included	Included	Included	Included
3	miniUSB-USB Cable	Included	Included	Included	Included
4	H203-HEATING-BOX-CABLE	Included	Included	Included	Included
5	Power Supply-Temperature Control Unit	Included	Included	Included	Included
6	Power Supply- Gas Control Unit	Not Included	Included	Included	Included
7	ENCLOSURE POWER CORD	Included	Included	Included	Included
8	GR-4-M (Gas regulator)	Not Included	Included	Included	Included
9	TUBE-A	Not Included	Included	Included	Included
10	TUBE-G	Not Included	Included	Included	Not Included
11	TUBE-H	Not Included	Included	Included	Not Included
12	TUBE-I	Not Included	Included	Included	Not Included
13	TUBE-B	Not Included	Included	Included	Included
14	TUBE-EY	Not Included	Not Included	Not Included	Included
15	HMCM-2-HEATED TUBE	Not Included	Not Included	Not Included	Included

Table 2. Accessories list and with which Enclosures are they included.

The following list describes the accessories and what they're used for: Table 1

1. OKO-TOUCH-CABLE: Cable for connecting OKO-TOUCH-BL3 to the H203-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. H203-HEATING-BOX-CABLE: Cable for connection between the H203-JUNCTION-BOX and the H203-T-UNIT.
5. Power Supply-Temperature Control Unit: Power adapter of H203-T-UNIT.
6. Power Supply-Gas Control Unit: Power adapter of CO2-UNIT-BL or the CO2-O2 [0-21]-BL3.
7. ENCLOSURE POWER CORD: Cable for connecting the T-ENCLOSURE to the power supply.
8. GR-4-M (Gas regulator): A gas pressure regulator for regulate gas input from CO2 gas cylinder to the CO2-UNIT-BL or the CO2-O2 [0-21]-BL3.
9. TUBE-A: Tube for gas connection between the GR-4-M to the CO2 gas cylinder; the GR-4-M to the CO2-UNIT-BL; N2 gas supply to the CO2-O2 [0-21]-BL3 and; 'Gas Output' port on the gas control unit to the 'Gas Mixer' port on the Enclosure.
10. TUBE-G: Tube for gas connection between one of the Water Trap tube connectors & H203-Chamber gas input.
11. TUBE-H: Tube for gas connection between HM-VF tube connector to one of the Water Trap tube connectors.
12. TUBE-I: Tube for gas connection between the 'Gas Mixer' port in the Enclosure & The 'Push-to-Fit' connector on the HM-VF.
13. TUBE-B: Tube for gas connection between the OKO-AIR-PUMP-BL output & 'Air' Input port on the gas control unit.
14. TUBE-EY: Tube for gas connection between 'Gas Output' port on the gas control unit to the 'Input' port of the HM-ACTIVE-BL3.
15. HMCM-2-HEATED TUBE: Tube for gas connection between 'Output' port of the HM-ACTIVE-BL3 and the H203-Chamber gas Input.

6 System Assembly

In order to properly assemble the system, please follow the steps as reported on the following quick instructions guides depending on the system type you have:

1. H203-T-ENCLOSURE_Quick Instructions.
2. H203-T-H-CO2-ENCLOSURE_Quick Instructions.
3. H203-T-H-CO2/O2 [0-21]-ENCLOSURE_Quick Instructions.
4. H203-T-activeH-CO2-ENCLOSURE_Quick Instructions.

Note ► *If you have the CO2-H-IN-CHAMBER-Sensor, you can refer the CO2-H-IN-CHAMBER-Sensor _Quick Instructions for its installation.*

Note ► *If you have purchased the H203-T-Enclosure without a H203-Chamber, the CAB2701 must be connected to the port labeled as 'Chamber' on the back panel of the H203-T-Unit.*

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7 SUPPLIED GAS REQUIREMENTS

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

- CO2 must be available at 1.4 barg (20 psig) at the ***Gas Control Unit's Input Port***. Gas source must be Standard Purity CO2 (coded as 4.5 that means 99.995 % of CO2) and humidity-free gas with a push to fit connector for 6mm OD rigid polyurethane tube.
- N2 (for H203-T-H-CO2/O2 [0-21]-ENCLOSURE) must be available at 1.4 barg (20 psig) ***Gas Control Unit's Input Port***. Gas source must be Standard Purity N2 (coded as 4.5 that means 99.995 % of N2) and humidity-free gas with a push to fit connector for 6mm OD rigid polyurethane tube.

Note ► *When using the Humidity module (HM-VF or the HM-ACTIVE-BL3) please use* ***Distilled Water*** *for filling the module.*

8 SETUP CONFIGURATION & QUICK USAGE

To Once you've successfully assembled your enclosure 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 Enclosure.

8.1 Homepage Icons Description

When you're using the OKO-TOUCH-BL3 controller the homepage will demonstrate the key measurements (relative to your enclosure type), Settings Option, System Overview option. Figure 2 illustrates a generic representation of the OKO-TOUCH-BL3 Homepages, when used with the H203-T-H-CO2/O2 [0-21]-ENCLOSURE along the CO2-H-IN-CHAMBER-Sensor. Figure 2 (a) illustrates the system when it's waiting for chamber feedback and Figure 2 (b) shows when the system is In Chamber Feedback mode.

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

Note ► *Only the Parameters (T, H, CO2, O2, RH%) pertaining to your Enclosure Type will be visible to you.*

Chamber Feedback Modes

When using the CO2-H-IN-CHAMBER-Sensor the Homepage will display two of the following messages:

- Waiting for Chamber Feedback: this is the warm up phase of CO2-H-IN-CHAMBER-SENSOR, during this phase CO2 and Humidity feedback are not available and the system works by using the feedback of control unit sensors. The homepage in this state displays the CO2 and Humidity readings of the control unit sensors.
- Chamber Feedback Active: Continuous CO2 and Humidity feedback are now ready. The homepage in this state displays the CO2 and Humidity readings of the CO2-H-IN-CHAMBER-SENSOR. The Chamber Feedback icon is visible in place of the LED icon.

Table 3 provides the description of the different parameters present on the Homepage (parameters 1-10).

Parameter	Description
1	Temperature value read by the Temperature Sensor embedded in the H203-Chamber.
2	Temperature Set Point value.
3	CO2 Set Point value.
4	CO2 concentration read by the Gas Control Unit Sensor.
5	Relative humidity read by the CO2-H-IN-CHAMBER-Sensor
6	O2 concentration read by the Gas Control Unit Sensor.
7	O2 Set Point value.
8	CO2 concentration read by the CO2-H-IN-CHAMBER-Sensor.
9	Relative humidity read by the CO2-H-IN-CHAMBER-Sensor.
10	O2 concentration inside the H203-Chamber(*see note).

Table 3. 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 for different enclosure types.

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.
CO2 	CO2 Status Indicator based on its color.	Only Visible when using the CO2-H-IN-CHAMBER Sensor.
O2 	O2 Status Indicator based on its color.	Only Visible when using the CO2-H-IN-CHAMBER Sensor.
Humidity 	Humidity Status Indicator based on its color.	Only Visible when using the CO2-H-IN-CHAMBER Sensor.
Chamber Feedback 	Chamber feedback Active indicator.	Only Visible when the system is in Chamber feedback mode while using the CO2-H-IN-CHAMBER Sensor.
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
Gas Calibration 	Gas Sensor Calibration Icon.	When the Sensors Calibration, O2 zero Reset or the CO2-H-IN-Chamber Sensor calibration is in process.

Figure 3. Icons Descriptions & Visibility Condition.

Note ► *The* ***O2 icon***  *is represented with a dashed outline O2 is calculated based on O2 measurement of the control unit's sensor and the feedback received from CO2-H IN-CHAMBER Sensor.*

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).

GREEN	The GREEN color indicates that the Setpoint value has been reached and that the system is working properly. **Controller Status: NORMAL**
YELLOW	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. **Controller Status: TRANSIENT**
ORANGE	The ORANGE color indicates that the current parameter value is not correct and is out of the set tolerance. **Controller Status: ALARM**
RED	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 www.oko-lab.com for support. **Controller Status: ALARM**

Figure 4. Significance of Icons Color during use.

8.2 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.

8.3 Setting the Desired set Points

Depending on the Enclosure type you have purchased, only some or all of the parameters maybe assigned a Setpoint. The following subsections indicate how to select the desired Temperature, CO2, O2 & Humidity set points.

8.3.1 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 45°C.*

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

8.3.2 Gas Concentration (%) Set Point

This Subheading maybe referred to only if you possess the ***H203-T-H-CO2-ENCLOSURE***, the ***H203-T-H-CO2/O2 [0-21]-ENCLOSURE*** or the ***H203-T-activeH-CO2-ENCLOSURE***.

CO2 Concentration Set Point: On the Homepage click on the CO2 concentration being displayed and select the desired set point within the range of *0% up to 20%.*

O2 Concentration Set Point: This function is only available for H203-T-H-CO2/O2 [0-21]-Enclosure. In order to assign a set point value to the O2 concentration, from the Homepage click on the O2 concentration being displayed and select the desired set point within the range of 0% up to 18%. The O2 concentration Set Point above 18% can be achieved by working in air mode i.e. without the use of N2. This is further explained in the following subheading.

8.3.2.1 How to operate without N2 (Only applicable for H203-T-H-CO2/O2 [0-21] systems)

When you need to have Air/CO2 mixtures (therefore in case you don't need to regulate Oxygen too), press displayed O2 value on the homepage and click on "+" sign to increase the set point value until "Air" appears and press Set to save. On the homepage O2 will be replaced by '***AIR***'.

Note ► *When running the system without N2, keep in mind that in this operation mode Oxygen is obviously NO more a parameter that you can regulate, that's why you will see displayed AIR in place of the Setpoint on the Oxygen tab. The Oxygen % value displayed is the current Oxygen % resulting from the fact that Air is composed for c.a. 21% by Oxygen, and from the CO2 % that you have set in Air*

Note ► *When you work with Air and CO2, the N2 supply valve is automatically closed.*

Note ► *For further information on the Gas usage and settings please refer the Chapter 10*

8.3.3 Humidity (RH%) Set Point

The Humidity set point can only be changed when you have the ***H203-T-activeH-CO2-ENCLOSURE.*** 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.*

8.4 Opening & Closing the Chamber

When operating the Enclosure, you may need to open the enclosure and eventually the chamber to access the sample for either changing or micro manipulating it. When one opens the chamber, the system **needs** to be informed about the chamber being opened, doing so will ensure that the system pauses its control and doesn't overheat the enclosure to recover from the heat loss being read by the chamber's sensor due to an open chamber.

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 5 illustrates the Chamber Open and Chamber closed images.

Figure 5. 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.*

8.5 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 Enclosure. The following image (Figure 6) illustrates the view charts page, the different graphs of the values of Temperature, CO2, or Humidity (as in this example) can be viewed by clicking on the parameter on the right.

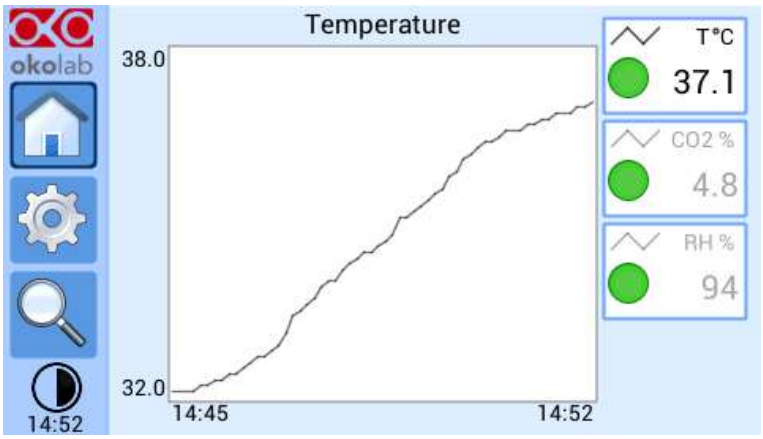


Figure 6. View Charts page.

8.6 System Overview

The Following Figure 7 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 enclosure will be the only ones visible to you during use.

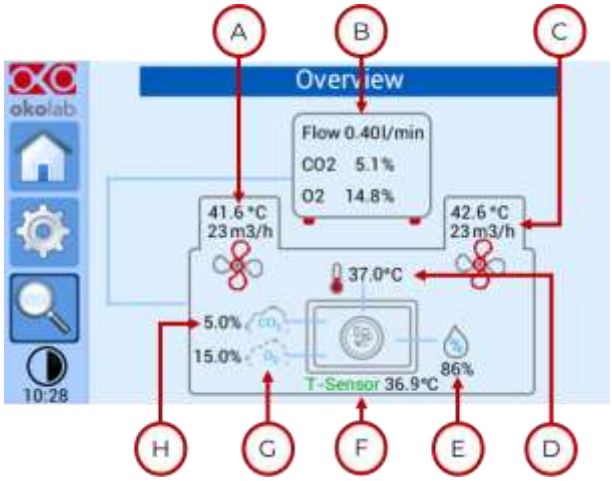


Figure 7. Generic System Overview Page.

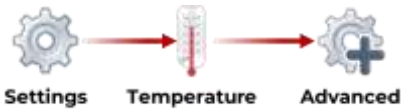
Note ► *The **RH (%)** of the HM-ACTIVE-BL3 module is also visible on the overview page for the H203-T-activeH-CO2-ENCLOSURE.*

The parameters illustrated in the Figure 7 are explained along with their display condition in Table 4.

#	Icon	Display Conditions
A	Heating Box 2- Temperature & Air Flowrate.	Displayed **at all times.**
B	Gas Control Unit- Gas concentration(s) and Flow Rate.	Displayed only for **H203-T-H-CO2-Enclosure, H203-T-H-CO2/O2 [0-21]-Enclosure** & **H203-T-activeH-CO2-Enclosures.** •
C	Heating Box 1- Temperature & Air Flowrate.	Displayed **at all times.**
D	Temperature read by the Temperature Sensor embedded in the H203-Chamber.	Displayed **at all times.**
E	Relative Humidity read by the CO2-H-IN-CHAMBER-Sensor.	Displayed **only when using the CO2-H-IN-CHAMBER Sensor.**
F	Temperature read by the T Sensor.	Displayed **only if the T sensor is connected.**
G	•O2 concentration in the chamber (calculated value).	Displayed **only when using the CO2-H-IN-CHAMBER Sensor.**
H	CO2 concentration read by the CO2-H-IN-CHAMBER-Sensor.	Displayed **only when using the CO2-H-IN-CHAMBER Sensor.**
•**O2 concentration** only visible for **H203-T-H-CO2/O2 [0-21]-Enclosure.**		

Table 4. Display Conditions for different Icons.

9 TEMPERATURE SETTINGS (ADVANCED)



This section outlines the advanced temperature settings when operating the Enclosure.

9.1 Calibration

This section offers detailed instructions for calibrating the Temperature read by the embedded sensor within the H203-Chamber using an external sensor or the T Sensor accessory. You can also find the option for calibrating T Sensor accessory. The calibration of the above-mentioned options may be suggested to you by the Okolab Technical support team if needed.

9.1.1 Cage Offset

This subheading explains the procedure for performing the calibration of the embedded Temperature sensor within the Chamber.

This procedure is carried out with respect to the temperature measured on the sample. In order to proceed with the Cage-Offset calibration you will first need to attach the tip of the External Sensor or the T Sensor (accessory) to the bottom of a petri dish, making sure that it is placed as centrally as possible (see Figure 8)

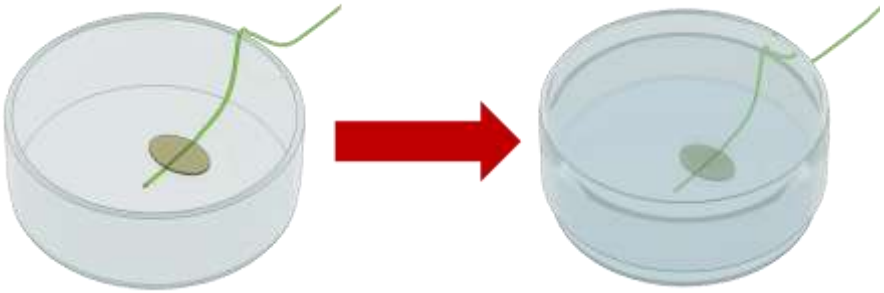


Figure 8. Petri Dish with T sensor placed centrally, filled with water and lid closed.

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). Wait for the OKO-TOUCH-BL3 to display stable temperature values for both the ***'Temperature °C'*** and the ***'Sample °C'*** readings before clicking on ***'Adjust'*** and following the on-screen instructions.

Note ► *If you use an External Sensor to perform the* ***Cage Offset Calibration****, please ensure that you use a Fine Gauge Temperature Sensor.*

Note ► *If you have the **T sensor** it should be connected to the port labelled '**T Sensor**' behind the H203-T*-UNIT as in the Figure 9 below.*

Figure 9. T Sensor connection port on the rear panel of the H203-T-UNIT.

9.1.2 T Sensor Offset

Note ► *This feature is only available if you have purchased the T Sensor accessory and is connected to the control unit.*

You can perform the T-Sensor Temperature calibration with the help of an External meter (to be used as a reference for calibrating the T-Sensor).

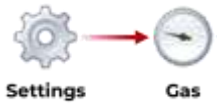
Proceed with the calibration process by clicking on the T Sensor icon, place the External meter's Sensor in vicinity of the T-Sensor and wait until the temperature being recorded by the External meter as well as the T-sensor temperature displayed by OKO-TOUCH-BL3, read a stable value. Once the stability has been achieved, insert the ***'External Probe °C'*** value by clicking on the modify icon followed by clicking on ***'Adjust'***. The system will automatically calculate the Offset value to ensure the calibration completion.

9.2 Fan Speed Modification

By clicking on this option, you can choose the desired Fan Speed for the Enclosure, the selection can be made in the range of 40 - 70 m^3/h. The default Fan Speed is set to 60 m^3/h.

Note ► *This function maybe useful to you only if suggested specifically by the Okolab Technical Support team during an assistance session, alternatively please adhere to using the Default Fan Speed at all times.*

10 GAS SETTINGS (NOT applicable for H203-T-ENCLOSURE)

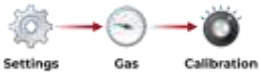


This section is dedicated for users with the gas control configuration, specifically with the H203-T-H-CO2-ENCLOSURE, H203-T-H-CO2/O2 [0-21]-ENCLOSURE & H203-T-activeH-CO2-Enclosures. The chapter details some of the settings related to gas usage such as Gas Pause, Calibrations and further Advanced Settings. The following subheadings provide details on these settings.

10.1 Gas Pause

In order to pause the gas supply, simply click on the ***'Gas Pause'*** option, and on the pop-up window that appears select yes. In order to restart the gas supply, navigate to the same path and click on the ***'Gas Pause'*** option and the pop-up will ask you to confirm restarting the gas supply.

10.2 Calibration



In order to calibrate the gas sensor pertinent to the Gas control Unit or the CO2-H-IN-CHAMBER-Sensor, please navigate to the calibration page. These calibration procedures may be useful to ensure further accuracy of the systems functioning. The Unit Sensor calibration option allows you calibrate the Gas Control Unit's embedded sensors by utilizing an external gas sensor, whereas the In Chamber Sensor calibration option allows you to calibrate the CO2-H-IN-CHAMBER-Sensor by using the Gas Control Unit's sensors as a reference.

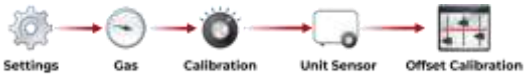
10.2.1 Unit Sensor Calibration

In this section, you will have access to the ***'Offset' calibration*** menu performed using a Certified External Gas Meter, the ***'Sensor' calibration*** menu performed using a Certified Calibration Gas and the ***'Factory Reset'*** menu.

Note ► *If you have the **H203-T-H-CO2/O2 [0-21]-ENCLOSURE** you will also have access to the **'O2 Zero Reset'** option.*

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

10.2.1.1 OFFSET Calibration



In this section, you can perform a calibration of the Unit Sensor's Offset 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 10).

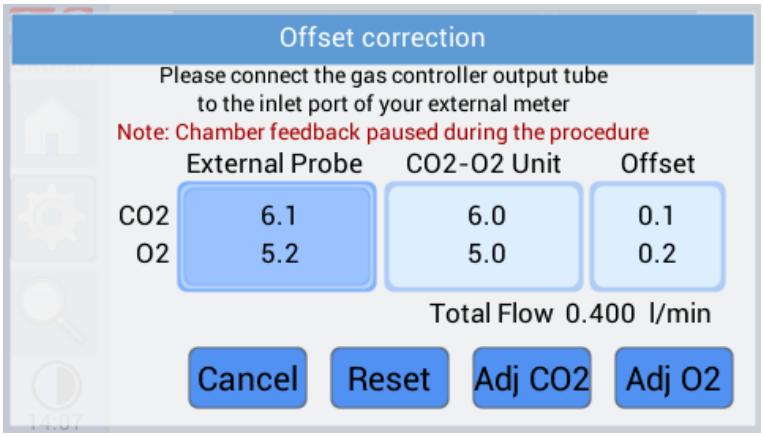


Figure 10. Gas Offset Calibration.

Note ► *The option to adjust the O2 value is available for* ***H203-T-H-CO2/O2 [0-21]-ENCLOSURE****.*

Note ► *After performing the* ***Offset Calibration*** *please perform an* ***IN-Chamber Sensor Calibration*** *(Section 10.2.2)*

10.2.1.2 SENSORS Calibration

In this section, you can perform a calibration of the Unit Sensor by utilizing a Certified Calibration gas. In order to proceed with this calibration, go to the 'Gas Settings' menu, insert the necessary details and click on 'Start Calibration'. The description of the different options present on the 'Sensor Calibration' page are as follows:

A. Gas Setting : Clicking on this option you'll be navigated to the page where you have to insert the information relative to the ***Certified Calibration*** gas being utilized. Please enter the correct CO2 and O2 concentrations as reported on the cylinder. Enable/Disable the *'Add Zero Calibration'* depending on your requirement (the zero calibration for both CO2 & O2 is performed utilizing the N2 gas).

B. Start Calibration : Once you have assigned the desired gas settings, click on the *'Start Calibration'* icon and follow the on-screen instructions.

C. View Calibration : Selecting this option will allow you to view the latest calibration details of the Unit sensor. Details such as the latest CO2 Span Correction and the CO2 Zero Offset values and if they were custom or factory performed. The same parameters for O2 are also visible if you possess the *H203-T-H-CO2/O2-ENCLOSURE*.

Note ► *After performing the* ***Sensors Calibration*** *please perform an* ***IN-Chamber Sensor Calibration*** *(Section 10.2.2)*

10.2.1.3 O2 ZERO RESET (only applicable for the H203-T-H-CO2/O2 [0-21]-ENCLOSURE)

Navigating to this option will allow you to perform a zero reset of the O2 using **N2 connected** to the **CO2/O2 [0-21]-UNIT** and view the previous O2 Zero Reset results. In order to perform the zero reset, click on the ***'Start'*** Icon and a pop-up message will warn you that the procedure requires the system to stop the control ask you to confirm if you'd like to proceed. If you'd like to view the previous O2 zero Reset results you can do so by clicking on the ***'View'*** icon.

Note ► *The system will alert you monthly to perform this O2 ZERO RESET procedure.*

10.2.1.4 FACTORY RESET

This option will allow you to perform a factory reset of the sensors of the Control Unit sensor, it will remove all the offset calibrations imposed with the help of an external meter. On selecting this option, a pop-up message will ask you to confirm this selection as this cannot be undone.

10.2.2 IN-Chamber Sensor Calibration (only applicable for CO2-H-IN-CHAMBER-Sensor)

The calibration of the CO2-H-IN-CHAMBER-Sensor can be performed by navigating to this menu. In this section, you can perform a calibration of the Unit sensor by utilizing ***the utilizing the gas supply already connected to the Gas Control Unit***. Please note that in order to proceed with this procedure you will have to utilize the provided ***'Calibration Insert'.***

Note ► *The system will alert you monthly to perform this calibration procedure.*

Note ► *The Calibration process is performed utilizing the gases* ***already connected*** *to the Gas Control Units.*

Note ► *This calibration procedure is suggested to be performed after performing the* ***Offset Calibration*** *or the* ***Sensors Calibration.***

In this section, you will have access to the following options:

A. Gas Setting ^{CO_2}: In order to perform the calibration of the IN-Chamber sensor you'll need to insert the settings of the gas (CO2) to which the sensor will be calibrated. Depending on the CO2 concentration Set Point you work with, you have the option to perform either a single point calibration or a 2 Point calibration.

The single point calibration is advisable when you always work with the same Set Point value for the CO2 concentration. If in case you work with different CO2 concentration Set Points, performing a 2 Point calibration (with the maximum and minimum values of your working Set points as the CO2 Point 1& CO2 Point 2) is advisable.

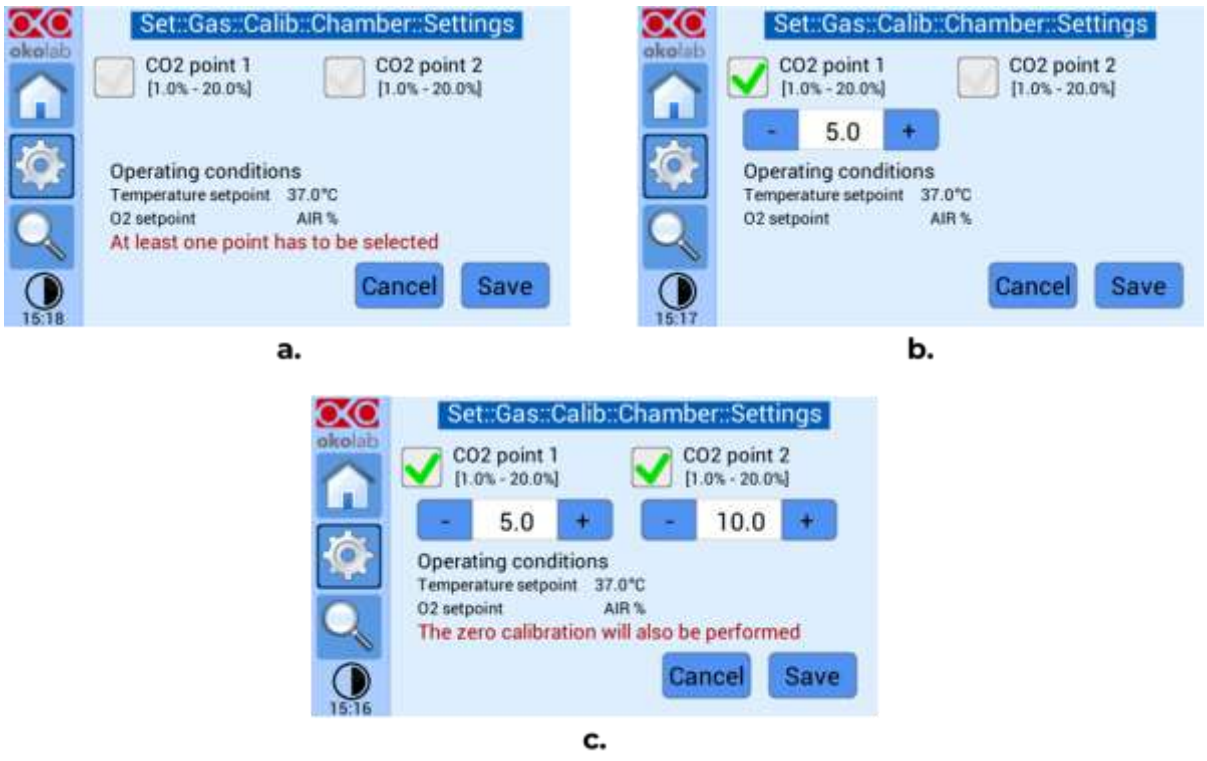


Figure 11. CO2-H-IN-CHAMBER Calibration Gas Settings.

As illustrated in Figure 11(a) at least one CO2 point for calibration must be selected. If you perform the calibration just for a single point the second CO2 point must be unflagged and no zero point calibration will be performed (Figure 11(b)).Lastly, if you perform 2 point calibration the zero calibration will be performed automatically (Figure 11(c)).

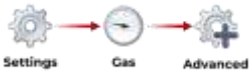
B. Start Calibration : Once you have assigned the desired gas settings, click on the ***'Start Calibration'*** icon and follow the on-screen instructions.

Note ► *The Gas with the selected Set Points will be generated by your Gas Control Unit.*

C. View Calibration : Selecting this option will allow you to view the latest calibration details of the IN-Chamber sensor. Specifically details such as the *'Last Calibration Date'*, *'Calibration Results'* and the *'Operating Conditions'* during which the calibration was performed.

D. Factory Reset : To perform the factory reset of the CO2-H-IN-Chamber sensor click on the ***'Factory Reset' option.*** A pop-up window will ask you to confirm this action, please select ok to confirm

10.3 Advanced Settings



You can access the advanced gas settings by clicking on the ***'Advanced Settings'*** icon. Under this section you can find Gas Flowrates settings, the Air source settings, and the Gas cycles settings.

10.3.1 Gas Flowrates Setting

By navigating to this menu, you can modify the flowrates of Air, CO2 & O2 (only in case of H203-T-H-CO2/O2 [0-21] system) or the total flowrate.

Note ► *Please keep in mind that only when you run the system without N2, total gas flowrate can be set to 0.1 l/min. If you were using this setting and change mode to AIR/N2/CO2 mode, the flowrate set point will be forced to the new minimum which is 0.2 Liters for minute.*

Note ► *When using the* ***CO2-H-IN-CHAMBER SENSOR*** *the* ***minimum value*** *of the flowrate that can be set is 0.2 l/min.*

10.3.2 Air Source Setting

By navigating to *the* ***'Air Source'*** menu, you can choose desired air source between a Compressed Air option or using the **OKO-AIR-PUMP-BL** provided along with your enclosure.

Note ► *When using the Compressed Air option, please ensure that the gas is available at 1.4 barg (20 psi).*

On selecting the **OKO-AIR-PUMP-BL** two more options are displayed on the screen namely:

USAGE: On clicking on the ***'Usage'*** option, you can view the total number of hours for which the pump has been utilized. If you have replaced the pump please click on the ***'Reset'*** option to reset the pump life to zero.

ADVANCED: On clicking on the ***'Adv'*** option, you can increase or decrease the Air pump Speed offset (also referred to as 'duty')

10.3.3 Humidity Setting (Only applicable for H203-T-activeH-CO2-ENCLOSURE)

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 12, 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.

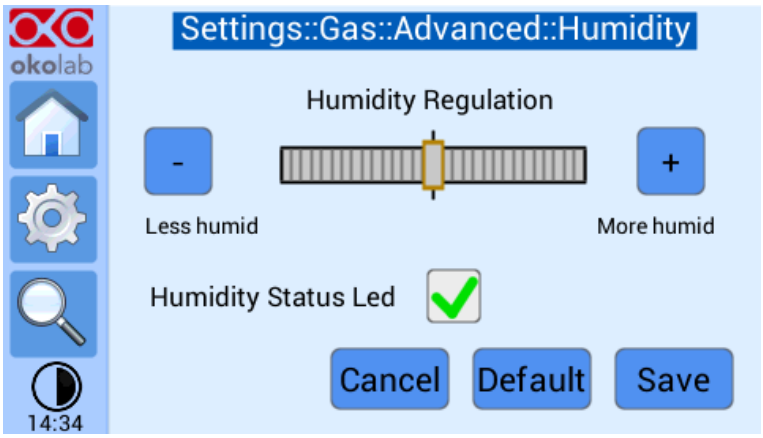


Figure 12. Humidity Regulation.

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.

10.3.4 Gas Cycles Setting

In this menu, you can choose to load an existing gas cycle or setup a new one Figure 13 (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 CO2 SP1 and SP2 (Set Point 1 & Set Point 2 Figure 13 (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 13 (c)). The page following this shows the summary of the gas cycle setup page (Figure 13 (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 13 (e)). The final page displays the option to select the time at which the gas cycle should begin (Figure 13 (f)).

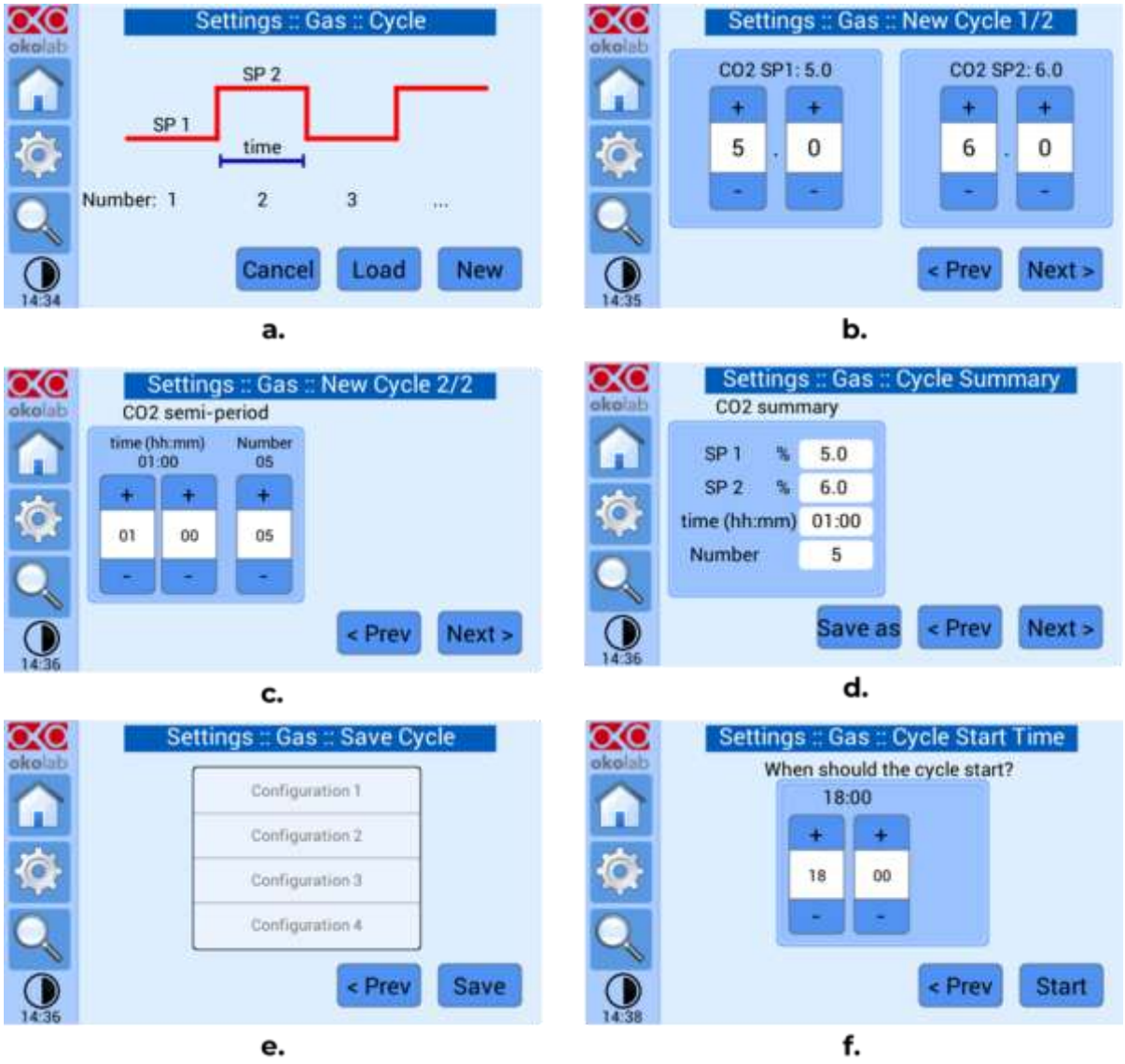
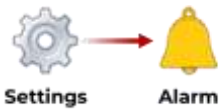


Figure 13. Gas Cycles Setup (a-f).

11 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 14 (a) starts **to change color.** On the other hand, the Status LED of the Control unit, as illustrated in Figure 14 (b), starts to **blink** corresponding to the Status indicator on the home page.

Figure 14. Status LED: (a) On the OKO-TOUCH-BL3; (b) On the Control Unit (CO2-UNIT-BL3).

Figure 15 (a & b) shows an example of an alarm Message that is displayed on clicking the '***Alarm'*** icon ⚠ on the bottom left homepage.

Figure 15. Alarm Message.

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

11.1 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 16).

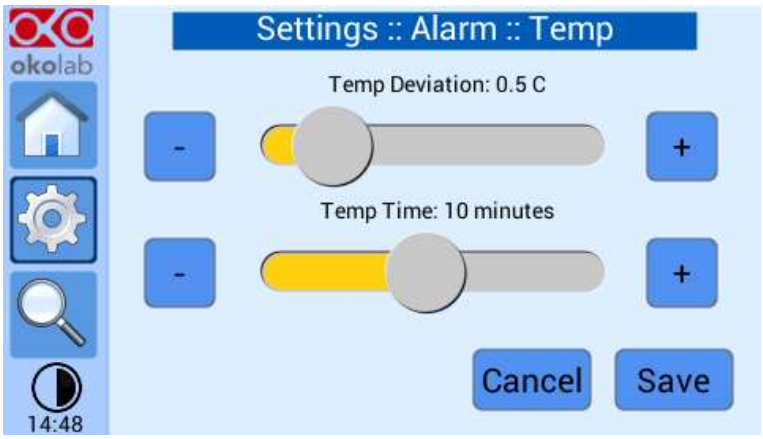


Figure 16. Temperature Alarm Settings Page.

11.2 Gas Alarm

The Gas alarm settings not available for H203-T-Enclosures. 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 17).

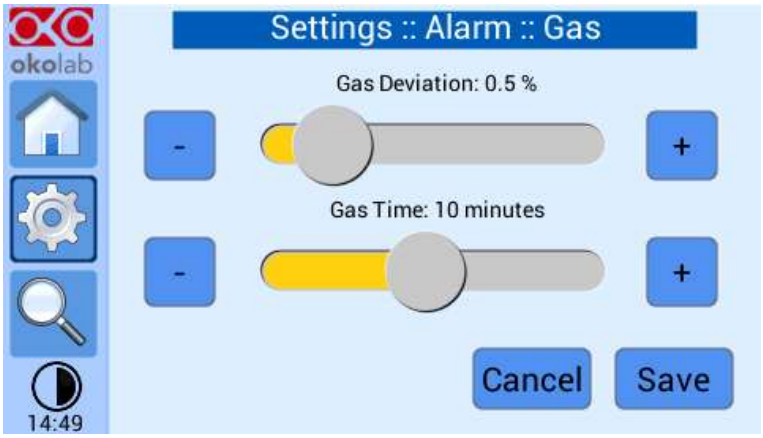


Figure 17. Gas Alarm Settings Page.

11.3 Humidity Alarm

The Humidity alarm settings not available for H203-T-Enclosure or when you don't have the CO2-H-IN-CHAMBER Sensor, and are different for the H203-T-activeH-CO2-ENCLOSURE with respect to the others.

1. For Enclosures with the CO2-H-IN-CHAMBER-Sensor and HM-VF module: For enclosures where the gas is humidified though the HM-VF Module, navigating to the Alarms settings you can set the Threshold value to the Humidity read by the CO2-H-IN-CHAMBER-Sensor, if the read value falls below this Threshold value the system will go into an Alarm state (Figure 18).

This Alarm is useful for notifying you as to when the HM-VF should be filled with water.

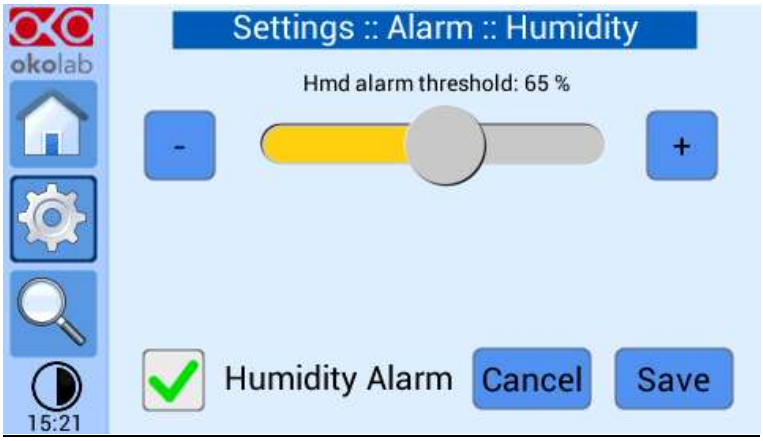


Figure 18. HM-VF Humidity Alarm Settings Page.

2. For H203-T-activeH-CO2-ENCLOSURE: For the Enclosures with Humidity from the **HM-ACTIVE-BL3**, 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 19).

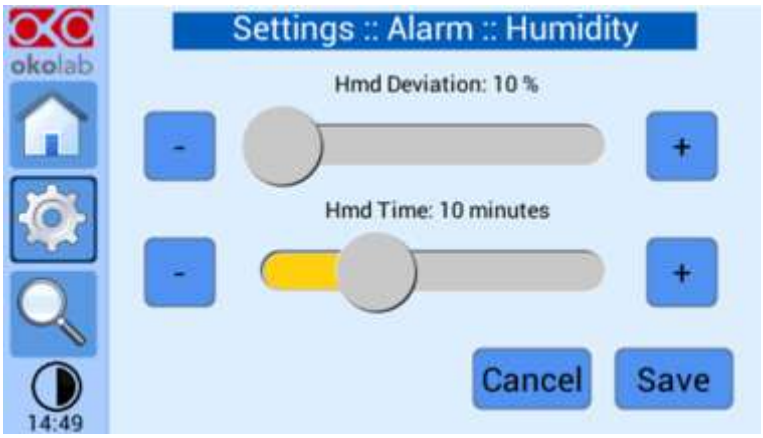


Figure 19. Active Humidity Alarm Settings Page.

12 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 20 (a)), Gas (when you have the H203-T-H-CO2/O2 [0-21]-ENCLOSURE Figure 20 (b)), Humidity (when you have the H203-T- activeH-CO2-ENCLOSURE Figure 20 (c)) and Chamber Sensor (when you have the CO2-H-IN-CHAMBER-Sensor Figure 20 (d)).

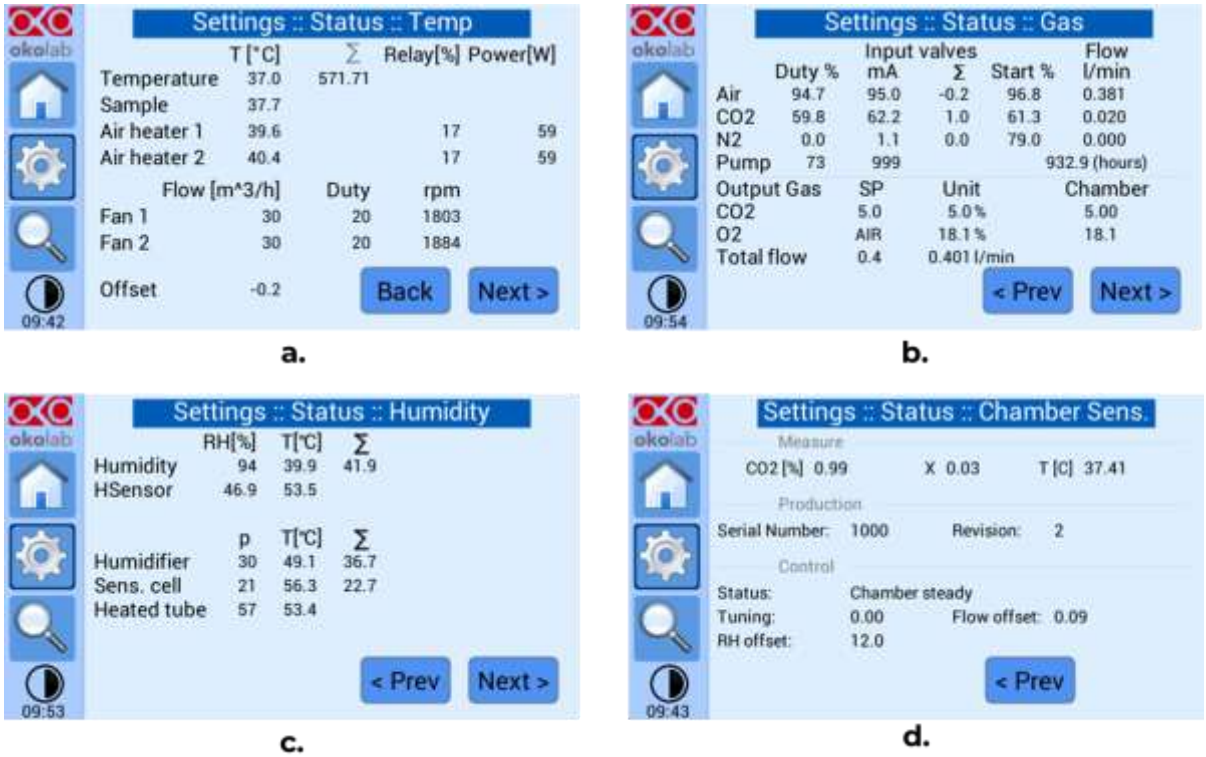


Figure 20. Status Pages for different parameters (a-d).

Note ► *The Figure 20(b) will only display the CO2 and Air parameters for the H203-T-H-CO2-ENCLOSURE.*

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 21.

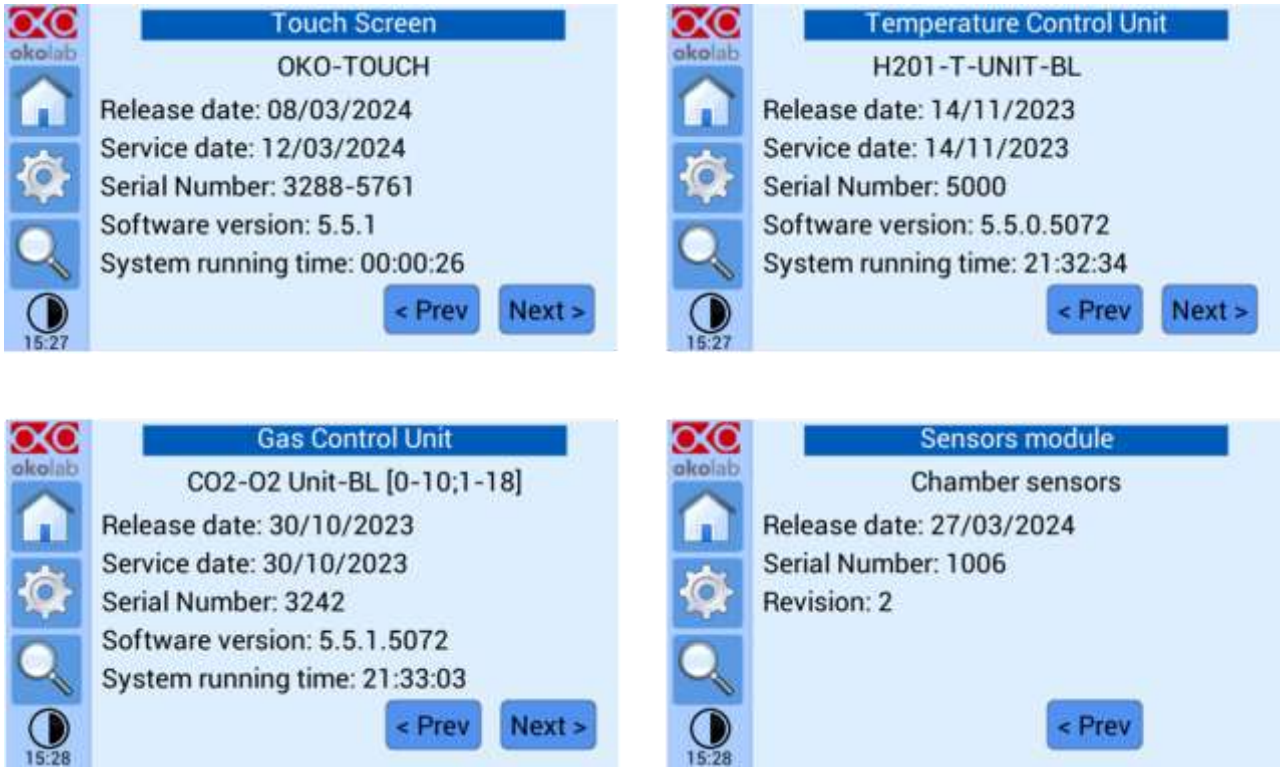


Figure 21. System Information for different devices of the Enclosure

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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.*

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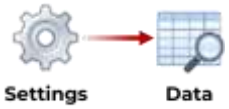
13 SYSTEM SETTINGS

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 enclosure.
- **Touch Options :** From this page you can set the Touch Sound as enabled/disabled and also manipulate the buzzer frequency as you prefer.

14 DATA SETTINGS



This section covers the settings pertinent to the Data being worked with using the Top Stage 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 22).

Figure 22. 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.

15 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 23. Performing the Touch Calibration.

16 TROUBLESHOOTING

When in the Alarm state the Status LED of the Control unit will change its color and the Alarm icon will be displayed on the Homepage of the OKO-TOUCH-BL3. Please refer to the following Alarms list for the troubleshooting.

Alarm Code & Message	Alarm Name	Remedy
Temperature Alarms		
C1.a	**Temperature far from setpoint**	Please ensure that chamber and enclosure are closed and sample insert is placed correctly; Please ensure that the heating boxes are also connected properly to the enclosure; If the problem persists, contact OKOLAB Technical Support team for further assistance.
C4.a	**Chamber sensor error**	Please ensure that the Chamber cable is properly connected to the H203-T-Unit rear panel; If the problem persists, contact OKOLAB Technical Support team for further assistance.
C4.c	**Heating Box 1 sensor error**	Please ensure that the Heating box 1 cables are properly connected to the H203-JUCNTION-BOX on the rear panel of the Enclosure; Please ensure that the H203-JUCNTION-BOX cable (Heating Box 1) are properly connected to the H203-T-Unit rear panel; If the problem persists, please contact OKOLAB Technical Support team for further assistance.
C4.d	**Heating Box 2 sensor error**	Please ensure that the H203-JUCNTION-BOX cable (Heating box 2) is properly connected to the communication panel on the rear panel of the Enclosure; Please ensure that the Heating Box 2 cable is properly connected to the H203-T-Unit rear panel;

		If the problem persists, please contact OKOLAB Technical Support team for further assistance.
C6.c	**Heater 1 relay not working**	Please ensure that the Heating box 1 cables are properly connected to the H203-JUNCTION-BOX on the rear panel of the Enclosure; Please ensure that the H203-JUNCTION-BOX cable (Heating Box 1) are properly connected to the H203-T-Unit rear panel; Contact OKOLAB Technical Support team for further assistance.
C6.d	**Heater 2 relay not working**	Please ensure that the Heating box 1 cables are properly connected to the H203-JUNCTION-BOX on the rear panel of the Enclosure; Please ensure that the H203-JUNCTION-BOX cable (Heating Box 1) are properly connected to the H203-T-Unit rear panel; Contact OKOLAB Technical Support team for further assistance.
C6.g	**Fan 1 not working**	Contact OKOLAB Technical Support team for further assistance.
C6.h	**Fan 2 not working**	Contact OKOLAB Technical Support team for further assistance.
C7.a	**Heater temp divergence**	Please ensure that the Heating box 1 and 2 cables are properly connected to the H203-JUNCTION-BOX on the rear panel of the Enclosure; Please ensure that the H203-JUNCTION-BOX cable (Heating Box 1 and 2) are properly connected to the H203-T-Unit rear panel; Contact OKOLAB Technical Support team for further assistance.

C11	**Chamber open for a long time**	Please ensure that the chamber lid is properly closed and click on the chamber icon on the homepage to select closing it.
C14	**Low Humidity detected**	Please verify that the HM-VF module is filled with sufficient water; Please verify the tube connections.
Gas Alarms		
G1.a	**CO2 far from setpoint**	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.
G1.b	**O2 far from setpoint**	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;
G1.c	**CO2 in Chamber far from setpoint**	Please ensure that the gas tubes are properly connected; Please ensure that the CO2 supply cylinder isn't empty; Please ensure that the Samples Insert doesn't have any vacant slots;
G1e	**Air Flow far from setpoint**	Please try increasing the air pump duty offset or check the pressure of the air cylinder If the problem persists, please contact OKOLAB Technical Support team for further assistance.
G4.a	**CO2 sensor error**	Contact OKOLAB Technical Support team for further assistance.
G4.b	**O2 sensor error**	Contact OKOLAB Technical Support team for further assistance.
G4.c	**CO2-H-IN-CHAMBER SENSOR error**	Please check that sensor is properly installed in the chamber

		and that the chamber is well connected; Contact OKOLAB Technical Support team for further assistance.
G6.d	**CO2 flow rate too low**	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.
G6.e	**Air flow rate too low**	Please ensure that the gas tubes are properly connected; Please check that Air pump is connected to the unit, is active and is actually vibrating; If the problem persists, please contact OKOLAB Technical Support team for further assistance.
G6.f	**N2 flow rate too low**	Please ensure that the gas tubes are properly connected; Please ensure that the N2 supply isn't empty or improperly connected; If the problem persists, please contact OKOLAB Technical Support team for further assistance.
G7.a **G7.b**	**Low CO2 detected**	Please ensure that the gas tubes are properly connected; Please verify that chamber is correctly closed, all tubes are properly connected and sample holders are correctly placed; If the problem persists, please contact OKOLAB Technical Support team for further assistance.
G8	**Air pump lifetime expired**	Please OKOLAB Technical Support team for a replacement of the pump.

G9.a	**O2 Zero reset suggested**	Please perform the O2 Zero Reset.
G9.b	**Chamber calibration suggested**	Please perform the Chamber Calibration.
G10.a	**CO2 calibration failed**	Please re-perform the calibration procedure; Ensure the proper gas connections. If the problem persists, please contact OKOLAB Technical Support team for further assistance.
G10.b	**O2 calibration failed**	Please re-perform the calibration procedure; Ensure that the N2 gas supply is not empty. If the problem persists, please contact OKOLAB Technical Support team for further assistance.
G10.c	**CO2 in chamber calibration failed**	Please re-perform the calibration procedure; Ensure that the calibration insert is placed in the chamber during the calibration procedure; Please ensure that the CO2 supply isn't empty; If the problem persists, please contact OKOLAB Technical Support team for further assistance.
G12.a	**CO2 drift too high**	Please re-perform the calibration procedure; If the problem persists, please contact OKOLAB Technical Support team for further assistance.
G12.b	**Chamber leakage too high**	Please verify that chamber is correctly closed, all tubes are properly connected and sample holders are correctly placed; Please contact Okolab, if the problem persists.
Humidity Alarms		
H1.a	**Humidity far from setpoint**	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.
H1.b	**Humidity far from setpoint**	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.
H4.a	**Humidity sensor error**	Check that the sensing cell power cable is well connected to the humidifier; Contact OKOLAB Technical Support team for further assistance.
H4.b	**HM-ACTIVE humidifier sensor error**	Contact OKOLAB Technical Support team for further assistance.
H4.c	**Sensing Cell Temperature sensor error**	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.
H4.d	**Tube T sensor error**	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.
H14	**Water Bottle Empty**	Refill the water bottle up to the indicated water level; If the problem persists, contact OKOLAB Technical Support team for further assistance.

17 CLEANING & MAINTENANCE

17.1 Cleaning

The following subheadings explain the cleaning of the different components.

17.1.1 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

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Before cleaning the unit, disconnect all the electrical connections.
Water must not enter in the system.

17.1.2 Enclosure Cleaning & Maintenance

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

1. Turn the system off and pull the main plugs out of the socket.
2. Use a clean soft and dry sterilized cloth to wipe the outer body.
3. Spray the **Disinfectant** on the cleaning cloth and rub the selected area gently.
4. If some halos are present on the enclosure body (this may be the case of **Acrylic**), dampen the cloth again and immediately wipe the area gently with the Wipe.

17.1.3 HM-VF Module Cleaning & Maintenance

In order to clean the HM-VF module please follow the steps below:

1. Disconnect the gas tubes connected to the HM-VF module.
2. Empty the water if present form the module.
3. Unscrew the upper transparent part of the Module from the lower black part.
4. Use a cleaning cloth dampened with a 70% alcohol cleaning solution and clean the internal part of the module.

Please avoid any contact physical or with alcohol with the Selemion tube present in black part of the HM-VF Module as this will cause damage to it and eventually hinder the proper functioning of the HM-VF Module.

17.1.4 Chamber Cleaning

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

1. Turn the system off and pull the mains plug out the socket
2. Wait the chamber cools down.
3. 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.

17.1.5 CO2-H-IN-CHAMBER SENSOR Cleaning

The maintenance of the CO2-H-IN-CHAMBER Sensor must be performed when suggested by the Okolab Technical Support team. The process involves the substitution of the white membrane, every six months, present within the sensor. Detailed instructions can be found in the dedicated instructions manual.

When handling (maintenance) the CO2-H-IN-CHAMBER Sensor please use electrostatic gloves at all times.

17.1.6 HM-ACTIVE-BL3 Cleaning

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

4. Turn the system off and pull the mains plug out the socket.
5. Disconnect the HM-ACTIVE-BL3 from the H203-T-UNIT.
6. Disconnect the Sensing cell from the Base.
7. Wait the bottle cools down.
8. Empty the bottle.
9. Wipe the exterior of the bottle with a 70% alcohol solution.
10. 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.

17.1.7 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* 

and click on the ***'Pump' > 'Usage' >*** *and click on* ***'Reset'***.

17.2 Maintenance

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

Spare Parts List	**Suggested Replacment Time**
Pump	At end of its Lifetime (6000h). (when you see the alarm code G8)
CO2 Valve	If suggested by Okolab Technical Support Team.
CO2 Sensor	At end of its Lifetime (5years).
Air Valve Mass flow sensor	If suggested by Okolab Technical Support Team.
O2 Sensor	At end of its Lifetime.
CO2-H-IN-CHAMBER Sensor White Membrane	Every 12 months.
VF-Membrane (for HM-VF Module)	If Damaged.
HM-ACTIVE Glass Bottle	If Damaged.
Hydrophobic PTFE (for OKO-AIR-PUMP-BL)	Every 12 months.

18 TECHNICAL SPECIFICATIONS

H203-T-ENCLOSURE - Technical Specifications	
Measurement Range	3°C above ambient temperature to 45°C
Accuracy	± 0.1°C
Step size	0.1 °C
Power Consumption	
Control Unit – Supply Voltage	24 VDC
T-Enclosure – Supply Voltage	230V AC or 120 VAC
Power Consumption	850 W max
External Environment Requirements – Indoor Use	
Temperature Range	18 – 30 °C (23 °C suggested)
Storage Temperature	-5 – 60 °C
Relative Humidity Range	0 - 70%

H203-T-H-CO2-ENCLOSURE - Technical Specifications	
Temperature Control	
Measurement Range	3°C above ambient temperature to 45°C
Accuracy	± 0.1°C
Step size	0.1 °C
CO2 Control	
Measurement Range	0-20%
Accuracy	± 0.1%
Step size	0.1%
Output Flowrate Range	0 – 0.4 l/min[1]
[1] When using Compressed air, the Output flowrate range can reach 1l/min.	
Expected Lifetime	
CO2 Sensor	5 years
OKO-AIR -PUMP-BL Lifetime	6000h
Gas Input Requirements	
CO2 Inlet Pressure	1.4 barg (20 psig)
CO2 Gas Purity	99.995%
Gas Connectors	6.0 OD Push to fit connector
Power Consumption	
Control Unit – Supply Voltage	24 VDC
T-Enclosure – Supply Voltage	230V AC or 120 VAC
Power Consumption	870 W max
External Environment Requirements – Indoor Use	
Temperature Range	18 – 30 °C (23 °C suggested)
Storage Temperature	-5 – 60 °C

Relative Humidity Range	0 - 70%

H203-T-H-CO2/O2 [0-21] -ENCLOSURE - Technical Specifications	
Temperature Control	
Measurement Range	3°C above ambient temperature to 45°C
Accuracy	± 0.1°C
Step size	0.1 °C
CO2/O2 Control	
CO2 Measurement Range	0-20%
CO2 Accuracy	± 0.1%
CO2 Step size	0.1%
O2 Measurement Range	0-21% [1]
O2 Accuracy	± 0.1%
O2 Step size	0.1%
Output Flowrate Range	0 – 0.4 l/min [2]
[1] Operating range may decrease to 0-10% after 2 years of operation [2] When using Compressed air, the Output flowrate range can reach 1l/min.	
Gas Input Requirements	
CO2 Inlet Pressure	1.4 barg (20 psig)
CO2 Gas Purity	99.995%
N2 Gas Purity	99.995%
N2 Inlet Pressure	1.4 barg (20 psig)
Gas Connectors	6.0 OD Push to fit connector
Expected Lifetime	
CO2 Sensor	5 years
O2 Sensor	3 years
OKO-AIR -PUMP-BL Lifetime	6000h
Power Consumption	
Control Unit – Supply Voltage	24 VDC
T-Enclosure – Supply Voltage	230V AC or 120 VAC
Power Consumption	870 W max
External Environment Requirements – Indoor Use	
Temperature Range	18 – 30 °C (23 °C suggested)
Storage Temperature	-5 – 60 °C
Relative Humidity Range	0 - 70%

H203-T-activeH-CO2-ENCLOSURE - Technical Specifications	
Temperature Control	
Measurement Range	3°C above ambient temperature to 45°C
Accuracy	± 0.1°C

Step size	0.1 °C
CO2 Control	
Measurement Range	0-20%
Accuracy	± 0.1%
Step size	0.1%
Output Flowrate Range	0 – 0.4 l/min
Humidity Control	
Measurement Range	• 89 – 95% @25°C • 51 – 95% @35°C • 26 – 95% @50°C
Step Size	1.0%
Accuracy	± 3.0%
Expected Lifetime	
CO2 Sensor	5 years
OKO-AIR -PUMP-BL Lifetime	6000h
Gas Input Requirements	
CO2 Inlet Pressure	1.4 barg (20 psig)
CO2 Gas Purity	99.995%
Gas Connectors	6.0 OD Push to fit connector
Power Consumption	
Control Unit – Supply Voltage	24 VDC
T-Enclosure – Supply Voltage	230V AC or 120 VAC
Power Consumption	900 W max
External Environment Requirements – Indoor Use	
Temperature Range	18 – 30 °C (23 °C suggested)
Storage Temperature	-5 – 60 °C
Relative Humidity Range	0 - 70%

CO2-H-IN-CHAMBER Sensor - Technical Specifications	
Lifetime	5 years
CO2 Measurement Range	0-20%
CO2 Measurement Accuracy	± 0.1%
Humidity Measurement Range	50-99%
Humidity Measurement Accuracy	± 3.0%

19 FIGURES LIST

20 TABLES LIST

21 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. 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
Mobile 1: +39 328 611 3451
Mobile 2: +39 347 400 2201

For COMMERCIAL SUPPORT WORLDWIDE: lanzaro@oko-lab.com
Phone +39 081 806 2624
Fax: +39 081 876 4410
Mobile: +39 348 968 0717

For COMMERCIAL SUPPORT US&CANADA: usa@oko-lab.com

For COMMERCIAL SUPPORT CHINA: tong@oko-lab.cn

WARRANTY

Okolab S.r.l. warrants “Bold Line 3 Enclosures” 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 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.