SM-BL

Smart Box

Manual

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1 Preface

Bold Line gas mixers and incubators can be controlled through a Web browser running on your PC, notebook or smartphone. This is done via **Smart Box**, an integrated web server system: no additional software needs to be installed on your PC. The only software needed from the user side is a common web browser with JavaScript enabled.

2   Symbol description

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

2.1   Symbols used in this manual

The following symbols identify important information to note:

CAUTION or WARNING: this symbol warns you about the risk of electrical shock.

CAUTION or WARNING or IMPORTANT: this symbol warns you of circumstances or practices that can affect the functionality of the instrument.

Tip ► *Supplies you with helpful suggestions.*

Note ► *Supplies you with important information to successfully use the instrument.*
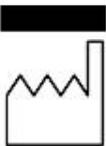
2.2   Symbols on the product label

CE MARKING: this symbol indicates product 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.

3   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.
- 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.
- 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.
- 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.

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.

4   Supplied equipment

1. **SM-BL.** Smart Box.
2. **5V-DC Power Adapter**
3. **MINI-USB Cable**
4. **Webcam**

5   Compatibility

SM-BL Smart Box is compatible with:

- **CO2-UNIT-BL**
- **CO2-O2-UNIT-BL [0-10;1-18]**
- **H201-T-UNIT-BL**
- **H301-T-UNIT-BL**
- **H101-T-UNIT-BL**
- **CO2-O2-UNIT-BL [0-20;1-95]**
- **CO2-O2-UNIT-BL [0-10;0-1]**
- **CO2-O2-UNIT-BL-ES**
- **CO2-UNIT-BL-ES**
- **HM-ACTIVE ***
- **HM-ACTIVE-REFILL**
- **HM-ACTIVE-STANDALONE**
- **H201-T-UNIT-BL-CRYO**
- **H201-T-UNIT-BL-DUAL**

* This is the actual humidity smart controller. It requires a gas unit to be connected to the Bold Line stack. Supported gas units are: CO2-UNIT-BL, CO2-O2-UNIT-BL [0-10;1-18], CO2-O2-UNIT-BL [0-20;1-95], CO2-O2-UNIT-BL [0-10;0-1] and with the Humidity Controller included in HM-ACTIVE-STANDALONE. All parameters related to humidity will be still requested by master program to the unit connected to OKO-TOUCH. The gas unit will answer for the humidity controller. HM-ACTIVE-REFILL still contains all parameters related to HM-ACTIVE.

6   Equipment Description

Figure 1 illustrates Smart Box upper panel:

1. **Power Led**.

2. **Status Led**.

Figure 1. Smart Box upper panel.

Figure 2 illustrates Smart Box front panel:

Figure 2. Smart Box front panel.

1. **Power Supply**; MICRO-USB input port.

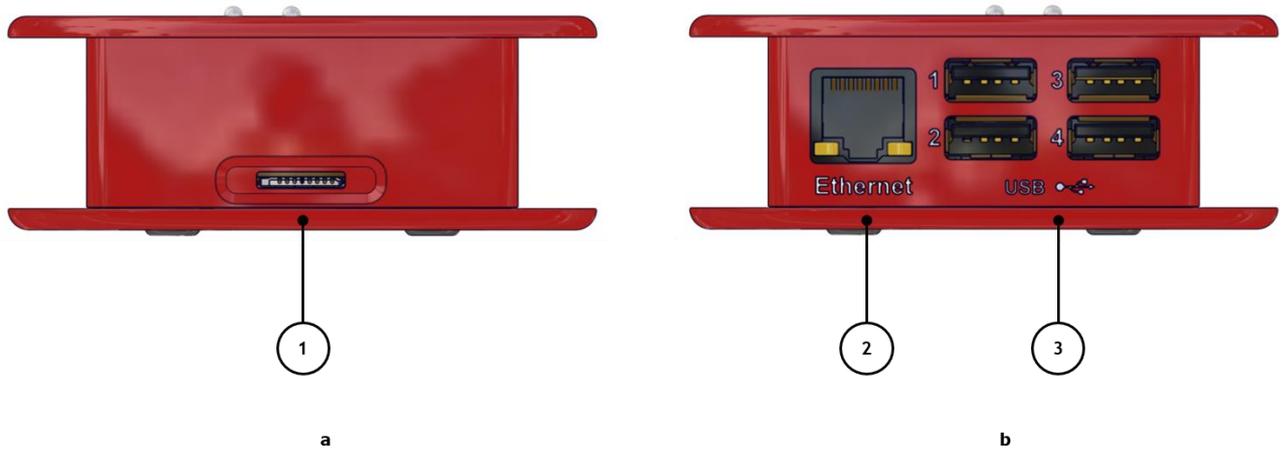Figure 3 illustrates Smart Box left and right panel:

a

b

Figure 3 Smart Box - left and right side (a – b).

1. **SD Card** port.

2. **Ethernet Connection.**

3. **USB connectors**

7   Installation

To properly install Smart Box, please follow the instructions below:

1. Connect Power Supply input port to the main power supply, using the 5V-DC Power Adapter.

2. Connect the USB connector of Smart Box (3 in Figure 3) to USB connector on the rear panel of controller using the MINI-USB cable (see Figure 4).
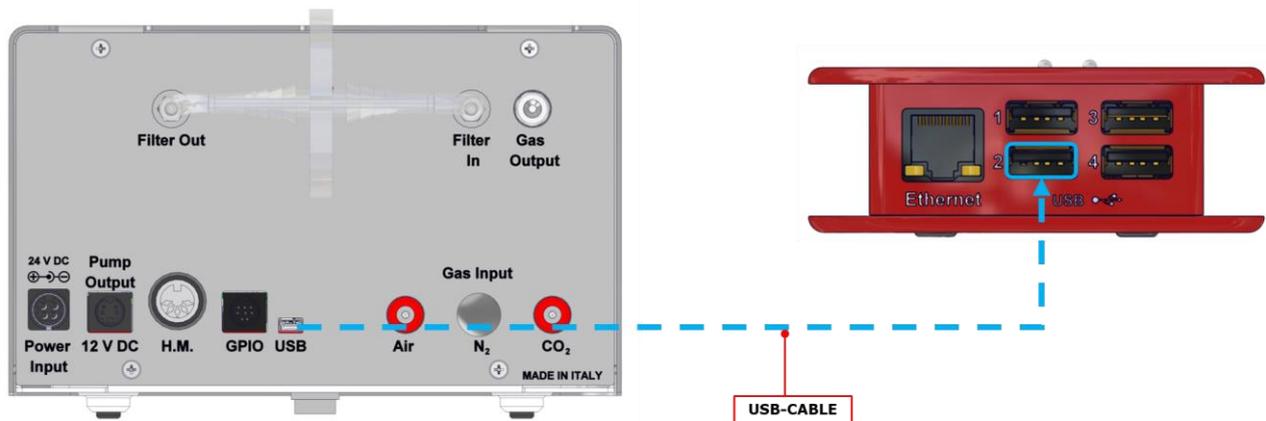

Figure 4. How to connect Smart Box to controller

Note ► USB ports can be used to connect USB flash drives or a Webcam. Flash drives have to be formatted as FAT32.

Tip ► If you want to monitor the lab remotely you can connect a webcam to the USB connector.

Tip ► You can connect a USB pen drive to the USB connector. This is used to update the Smart Box firmware.

3. Connect a network cable from Ethernet port (2 in Figure 3) to your local router. Smart Box is equipped with a standard Ethernet RJ45 socket, which can be connected through any commercially available network cable. If no internet connection is available, only local access is possible, either through the PC or router.

8.1   **Network Connection**

Please, make sure that your network has a DHCP server and that any device can be connected with no request to the network administrator. If so, the Smart Box should get a dynamic IP from the DHCP server.

Moreover, if your network has a WINS service, the Smart Box web application can be started simply entering http://smartbox/ in any web browser. Alternatively, you can access the Smart Box via its IP address.

If the host-name *smartbox* cannot be found, please ask to your network administrator if there is any special procedure to perform when connecting a new device to your internal network.

Please don't hesitate to contact Okolab if you cannot reach the Smart Box, or if you need further information.

> *Note ► MAC-ADDRESS is printed on the label on the bottom of the Smart Box. This information is on a row labeled as* MAC: *and it is in the format* B8:27:EB:38:XX:XX *This address may be useful to your network administrator to recognize/authorize the Smart Box inside the internal network.*

8.2   **Host-to-host connection**

If network connection cannot be performed, the Smart Box can be directly connected to a PC. Usually, an end user's PC should have no DHCP server running; in this case, the Smart Box will have its own static IP address set to **192.168.1.69**. The only needed setting on the PC side, is to use a static IP address which has to be in the same subnet (e.g. 192.168.1.*15*).

So, wait until the Smart Box is fully started (both LED turned on solid, not blinking), then simply point your web browser to this address:

http://smartbox/

9   Operations

9.1   **Start**

When the Smart Box is powered up, the LED power is turned on. The STATUS led starts blinking after almost 20 seconds. The system is ready when the STATUS led is solid.

9.2   **Main Page**

To open the main page of Smart Box, start the web browser, enter http://smartbox/ in the browser address bar and press the enter key. Alternatively, you can access the Smart Box via its IP address. The browser will load the main page or Control page: here all the main variables are shown, each inside its own widget.
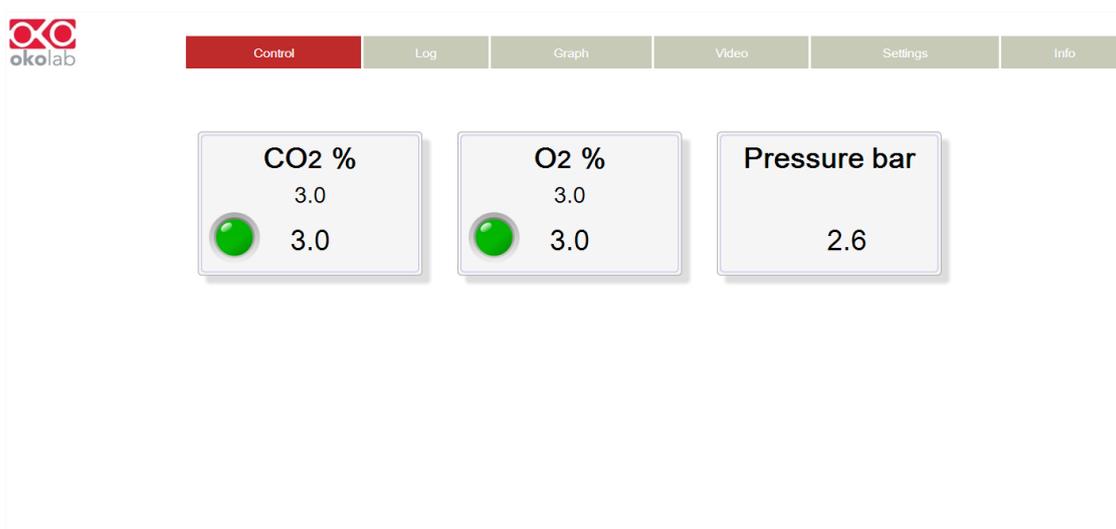

Figure 5. Main page or control page of Smart Box.

If you want to modify one of the parameters, you can click on the corresponding widget. The page will change, disabling all the widgets and showing a single dialog on top of the desired variable. Here you can input the new desired setpoint value. The dialog box also displays the available input range for this particular setpoint (i.e. 0.0% – 10.0 % for CO2), as it is shown in Figure 6.
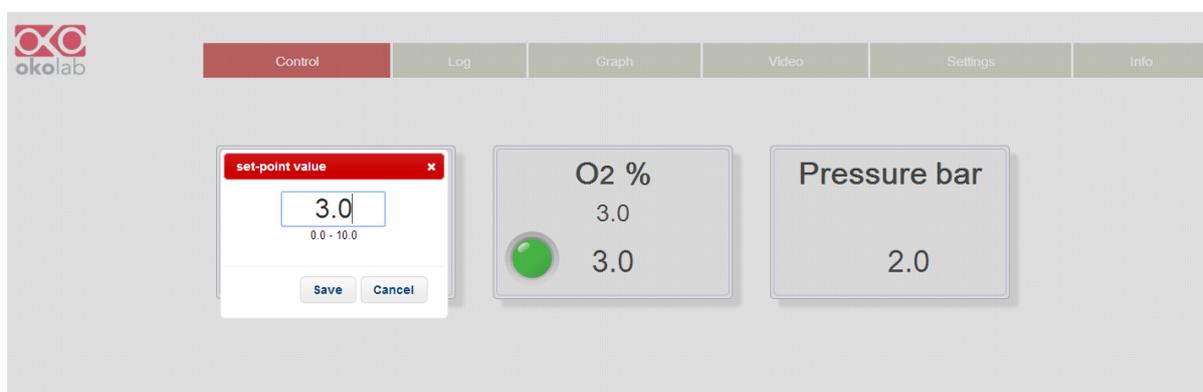

Figure 6. CO2 Setpoint modification.

9.3   **Log Page**

This page is used to export the data logged by the Smart Box while powered up; the default logging time is set to 1 minute. In the first dialog box you can download experimental data, choosing the desired *Start date* or the *End date*. The system will generate a .csv (comma separated file) which can be opened with a spreadsheet

program such as MS Excel. The file will contain 500 minutes of data starting from the chosen Start Date. The system will automatically adjust the *Start date* when you input the *End Date* to maintain the limit of 500 maximum rows number and vice versa: if you input the *End date* parameter it will change *Start date* accordingly.

If you want to export the whole database (especially when it is very large), you can click the *Export New File* button. A background procedure will start, in order to create a local file which can be downloaded at any time without interfering with the Smart Box current operations.
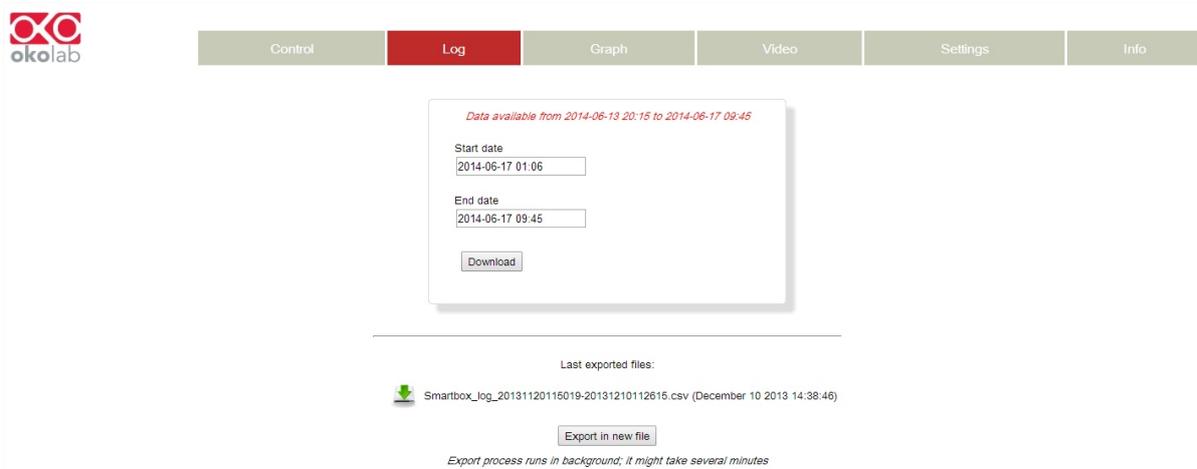

Figure 7. Log Page

9.4 Graph Page

This page is used to view logged data in graphical or table format. You can choose up to four variables to be monitored, each one will be displayed with a different colour coding. By default, the Smart Box shows you the last hour recordings (i.e. 60 points logged at 1-minute interval). You can click on the fields numbered from 1 to 4 and choose the variable to be plotted from a drop-down menu. On the left of each variable name you can see another drop-down menu; this one let you choose if the current variable must share its *Y-Axis* with another one, in order to make a comparison or if it can have its own autoscaling *Y-Axis*.

The bottom part can be used to input a specific date and time to display, or the arrow buttons can be used to move forward/backward in time while refreshing the graph.

The option named Chart Mode can be used to make the graph refresh when another data point is logged.

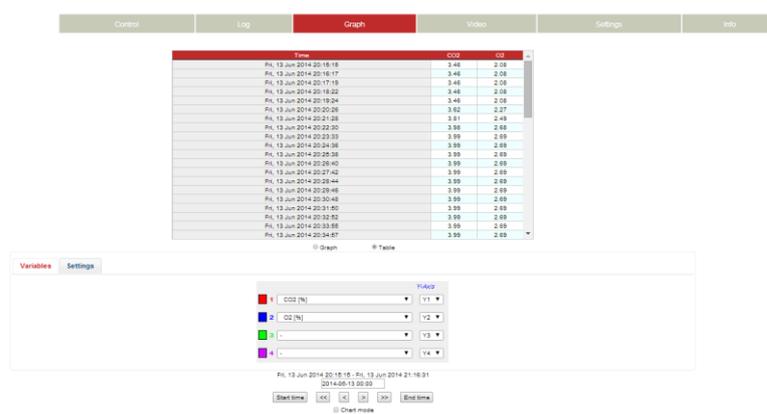*Figure 8. Graph Page in Graph mode.*

Figure 9. Graph Page in Table mode.

9.5 Info Page

This page displays some information about the Smart Box. In particular it shows the system date and time and the disk space used for the data currently stored inside the Smart Box.
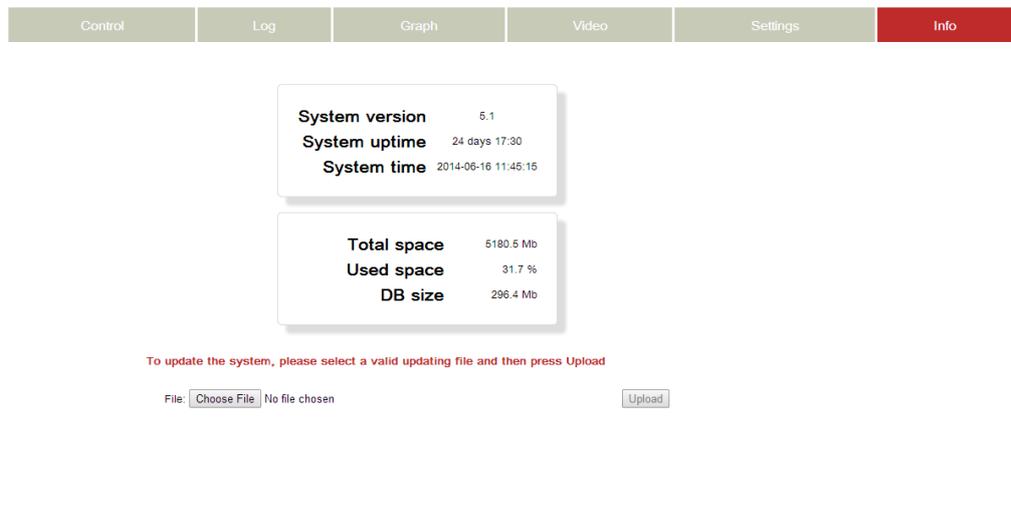

Figure 10. Info Page

9.6 Email Settings

In this page you may set one or more e-mail addresses which will be alerted during an alarm event.

Note ►In order for this functionality to be available, Smart Box has to be connected to the Internet. Please check with your network administrator if there is any special procedure to let the Smart Box connect with your SMTP Server.

You must insert a 'Sender e-mail address' in the section SMTP server and at least one 'Destination email address'. Sender and Destination addresses may be the same.

The section SMTP Sever has to be filled with the parameter of your e-mail address and SMTP Server. If you are not sure about what data has to be used in those fields, please refer to your network administrator or to your e-mail provider (e.g. Gmail).
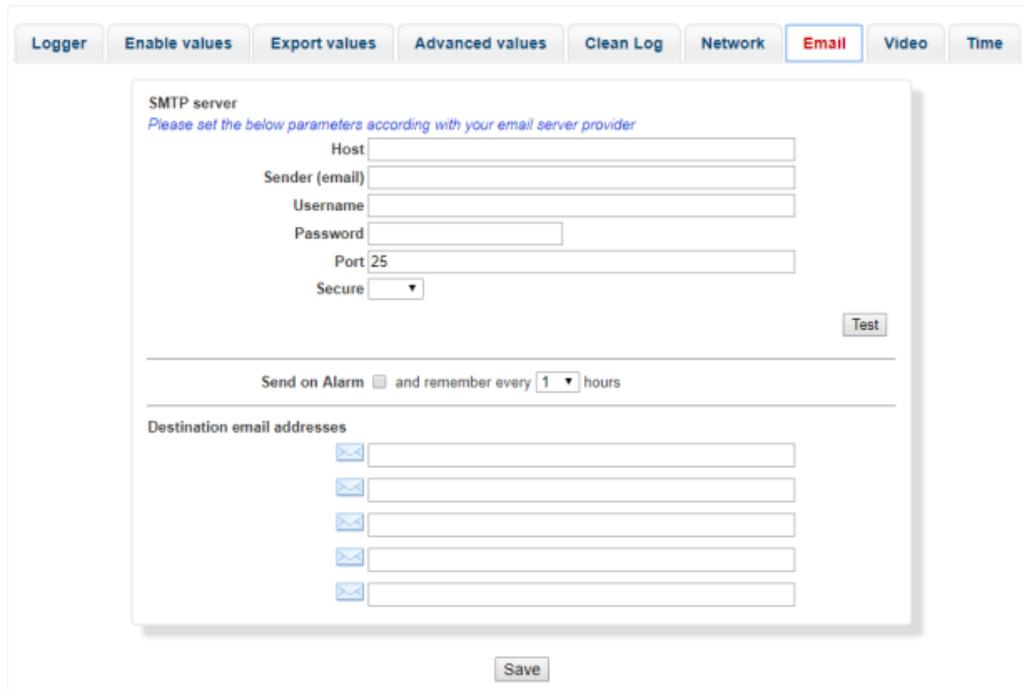
Figure 11. Email Settings

Test button is available to check if all the parameters in the SMTP server are correct. If everything is setup correctly, a Test Pass message will appear.

9.7 **Update**

Please contact Okolab to receive the update file as a compressed archive. The update procedure can be executed using a USB pen drive.

1. Copy the update file to a folder called "okolab" inside a USB pen drive.

2. Turn on the system and wait until the Smart Box is fully started: both LEDs must be solid, not blinking.

3. Insert the pen drive into one of the two USB ports of the Smart Box.

4. After at most 1-2 minutes, the STATUS LED starts blinking. After less than 10 minutes, the Smart Box is automatically restarted so STATUS LED turns off.

5. Wait for the Smart Box to be fully started: the STATUS led turns solid.

6. Go to the Info Page as described in Chapter 9.5 and check that the version has changed.

10 Support

To contact one of our engineers please write to support@oko-lab.com or contact us through the live chat in www.oko-lab.com. You can request a remote support session anytime.

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

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11 Technical Specifications

SM-BL Smart Box – Technical Specifications	
LAN connector	10/100 Mbps Ethernet port
USB connectors	#4 USB 2.0 ports
Memory	16GB Micro SD for Operating System, Okolab software and data storage.
External Environment Requirements – Indoor Use	
Temperature range	0°C ~ +55°C (23°C suggested)
Relative Humidity range	0-70%
Storage Temperature	-10°C +70°C
Physical Characteristics	
Dimensions (LxWxH)	110.0x86.0x31.3mm
Weight	200 g
Power Supply	
Supply voltage	5V up to 2.5A DC via micro USB connector
Power consumption	Average: 480mA (2.4W)
	Max: related to the peripherals. A webcam can draw up to 750 mA peak.

Table 1. Technical specifications.

12 Figure List

13 Manual Revision Table

Revision Number	Additions or changes	Date
01	First emission	Sept 2018
02	Minor Revision	Nov 2018
03	Format and product revision	May 2019
04	Compatibility added	December 2021

WARRANTY

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

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