

# Bold Line Top Stage Incubator



Electrically heated top stage incubator with heated glass lid

**bold line**



## Bold Line Top Stage Incubator

Temperature, Humidity, CO<sub>2</sub>/O<sub>2</sub> Control, Touch Screen and Web server

The systems comprises:

- Incubating chamber (model available for any XY stage or piezo insert)
- Multichannel Temperature Controller
- Gas controller (CO<sub>2</sub>, O<sub>2</sub> or dual CO<sub>2</sub>/O<sub>2</sub>)
- Humidity module
- Oko-Touch
- Smart Box (*optional*)



The **Bold Line** Top Stage Incubator is the latest release from OKOLAB in terms of Top Stage incubation. It delivers superior temperature stability, humidity, CO<sub>2</sub> and Oxygen control in a fully integrated fashion.

## Incubating Chamber

Advanced mechanical and thermal design of the incubating chambers delivers superior performance and great operation flexibility.

- Chambers available for any XY stage / piezo insert
- Heated glass cover with embedded T sensor
- Magnetic interchangeable inserts with magnetic sample fixing tools
- Removable chamber riser to allow positioning of the condenser close to the specimen
- Sliding lid for easy access to the sample
- Koehler Lid available when slim chamber profile is necessary to perform Koehler illumination
- Perfusion holes for inlet and outlet of tubes



## Temperature Controller – H301 T UNIT BL

H301 T UNIT BL is the temperature controller used in the Bold Line Top Stage Incubator. It is operated via OKO-Touch, it can be equipped with Smart Box and controls the temperature of the following equipment:

- Chamber main body
- Heated Glass Cover
- Humidity Module

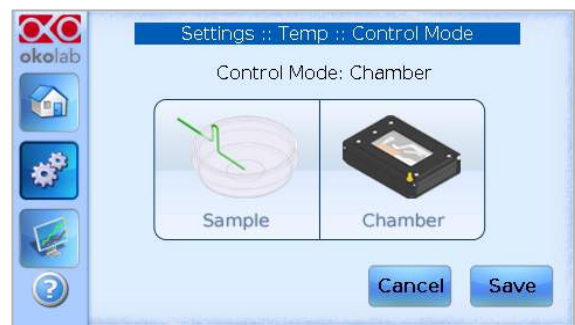
**T accuracy: 0.1 °C ; T range: from 3° above ambient to 50 °C.**



### Specimen / Chamber feedback operation

There are two ways to operate the system, depending on which Temperature sensor is used to provide feedback to H301 - T UNIT BL. Selection is performed with Oko-Touch.

- **Specimen feedback mode:** In this configuration, feedback is provided by an external temperature sensor that reads the temperature of a reference well, placed in the incubating chamber very close to the specimen. The advantage of this configuration is in the accuracy of the temperature control. Simple manipulation is required to stick the thermocouple into the reference well with some adhesive tape.
- **Chamber feedback mode:** In this configuration, feedback is provided by a temperature sensor embedded into the incubating chamber. A careful calibration performed in our laboratories guarantees that specimen temperature is maintained at the desired value. The advantage of this solution is its simplicity of use
- **Self Calibration Routine:** this routine improves the accuracy of the chamber feedback operation mode. It employs the two external temperature sensors of the T-Unit. One sensor measures the temperature of the lab, while the other one is introduced into a reference well, placed in the same position of sample. The routine is easily launched via Touch Screen and calculates controller parameters to ensure best accuracy on the position of the sample.



# Incubating Chamber

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- Perfusion holes for inlet and outlet of tubes
- Embedded Temperature sensors in glass cover, chamber body and humidity collar

## Models available for any XY stage / piezo insert

The shape of the incubating chamber depends on the XY stage or piezo insert. Therefore, to ensure a perfect and tight fit, several chambers are available. Please, refer to [www.oko-lab.com](http://www.oko-lab.com) for an up to date list of the available incubating chambers. Here follow some examples:



*H301-K-FRAME - for k frame opening*



*H301-K-FRAME - side view - remove screws to open perfusion channels*



*H301-EC-LG-BL - for Leica Super Z Galvo Stage*



*H301-MINI - fits in any Multi Well Holder*

# Incubating Chamber

## Dimensions and Specimen Holders

All the incubating chambers are made by the following components:

- Chamber main body and heated glass lid with embedded temperature sensors
- Sliding lid for easy access to the sample
- Magnetic interchangeable inserts with magnetic sample fixing tools
- Removable Chamber Riser to reduce the height of the chamber
- Perfusion holes for inlet and outlet of tubes
- Optional Lids available

The following images refer to incubating chamber H301-K-FRAME. Detailed info on dimensions, available specimen holders, condenser working distance and perfusion holes, please refer to [www.oko-lab.com](http://www.oko-lab.com).



Ordering Info
H301-K-FRAME
GS35-M

H301-K-FRAME - 3D drawing



Magnetic interchangeable specimen holders - partial list



Optional Lids



Sample Magnetic Locks

## CO<sub>2</sub> – O<sub>2</sub> – Humidity Control

The Bold Line Cage Incubator can be equipped with Bold Line gas controllers and with the Active Humidity Controller.

### Bold Line gas controllers:

- 0.1% Accuracy and Repeatability
- Digital CO<sub>2</sub>, O<sub>2</sub> sensors
- Operated via OKO-Touch
- Compatible with Smart Box

Digital Gas controllers	CO <sub>2</sub> %	O <sub>2</sub> %
CO <sub>2</sub> UNIT BL	0 - 18	-
O <sub>2</sub> UNIT BL [1-20]	-	1 - 20
CO <sub>2</sub> - O <sub>2</sub> UNIT BL [0-10;1-18]	0 - 10	1 - 18
CO <sub>2</sub> - O <sub>2</sub> UNIT BL [0-20;1-95]	0 - 20	1 - 95
CO <sub>2</sub> - O <sub>2</sub> UNIT BL - CP2 - centralized	4 - 8	3 - 7



## ACTIVE HUMIDITY CONTROLLER

H301-HM-ACTIVE controls the relative humidity of the gas inside the chamber in the range 50-95%. The system features:

- Humidity Sensor with 1% resolution
- Water Permeable Membrane
- Water Heater
- Tube Heater
- Three Temperature controllers, to control the temperature of:
  - Humidity Sensor cell
  - Water
  - Connection tube with the Stage Top Chamber

The dry gas flows through a water permeable membrane immersed in water, kept at controlled temperature by the water heater. The Humidity Sensor regulates water temperature in order to achieve the desired relative humidity inside the chamber.

To prevent water condensation between the humidity module and the chamber, a temperature controlled tube is employed.



# CO<sub>2</sub> UNIT BL

## CO<sub>2</sub> UNIT BL



### Technical Specifications

Operation mode	Adds CO <sub>2</sub> in Air or in N <sub>2</sub>
Concentration Range	0-18 %
Accuracy	± 5% of CO <sub>2</sub> concentration, i.e. ± 0.25% at 5% CO <sub>2</sub>
Set point resolution	0.1%
Repeatability	Better than 0.1%
Total Flow rate, NI/m	0.4 constant
Outlet Pressure	ambient
CO <sub>2</sub> Consumption (at 5% CO <sub>2</sub> ) NI/min	0.02
CO <sub>2</sub> Sensor	Non Dispersive InfraRed (NDIR) dual wave length detector
Sensor Life	10 years
Dimensions, mm	319x230x117
Compatible with:	any other Bold Line Controller and Okolab Incubator
SDK	Available
Web Operation	With Smart Box
Filtering device	PTFE membrane with 0.2 µm pores

### Accessories and Codes

CO <sub>2</sub> UNIT BL	<b>CO<sub>2</sub> Controller - Bold Line.</b> It controls both Air and CO <sub>2</sub> . CO <sub>2</sub> can be regulated in the range 0-18%. Operated by the OKO-Touch. Can be equipped with the Smart Box for data-logging, remote operation and remote support
SM-BL	<b>Smart Box.</b> Data logger and web server. It allows operation via web/smart phone/tablet and to receive remote support
OKO-AIR-PUMP-BL	<b>Air pump - Bold Line.</b> Plug and play solution for Air inlet. Convenient alternative to 100% Air tanks/compressed Air lines. It directly connects to Air input of Okolab Bold Line gas controllers and it is operated by the OKO-Touch. Maximum outlet pressure 300 mbar.

# O<sub>2</sub> UNIT BL [1-20]

## O<sub>2</sub> UNIT BL [1-20]



### Technical Specifications

Operation mode	Adds N <sub>2</sub> to Air
Concentration Range	0-20%
Accuracy	± 0.1% at 5% O <sub>2</sub>
Set point resolution	0.1%
Repeatability	0.05% of O <sub>2</sub> concentration
Total Flow rate, NI/m	0.4 constant
Outlet Pressure	ambient
N <sub>2</sub> Consumption (at 5% O <sub>2</sub> ), NI/min	0.3
O <sub>2</sub> Sensor	zirconium oxide
Sensor Life	10 years
Dimensions, mm	319x230x117
Compatible with:	any other Bold Line Controller and Okolab Incubator
SDK	Available
Web Operation	With Smart Box
Filtering device	PTFE membrane with 0.2 µm pores

### Accessories and Codes

O <sub>2</sub> UNIT BL [1-20]	<b>Oxygen Controller - Bold Line.</b> Operated by the OKO-Touch. Can be equipped with the Smart Box for data-logging, remote operation and remote support
SM-BL	<b>Smart Box.</b> Data logger and web server. It allows operation via web/smart phone/tablet and to receive remote support
OKO-AIR-PUMP-BL	<b>Air pump - Bold Line.</b> Plug and play solution for Air inlet. Convenient alternative to 100% Air tanks/compressed Air lines. It directly connects to Air input of Okolab Bold Line gas controllers and it is operated by the OKO-Touch. Maximum outlet pressure 300 mbar.



# CO<sub>2</sub> - O<sub>2</sub> UNIT BL [0-10;1-18]

## CO<sub>2</sub> -O<sub>2</sub> UNIT BL [0-10;1-18]



### Technical Specifications

Operation mode	Adds CO <sub>2</sub> and N <sub>2</sub> to Air
Concentration Range	CO <sub>2</sub> : 0-10%; O <sub>2</sub> 1-18%
CO <sub>2</sub> Accuracy	± 5% of CO <sub>2</sub> concentration, i.e. ± 0.25% at 5% CO <sub>2</sub>
O <sub>2</sub> Accuracy	0.1% at 5% O <sub>2</sub>
Set point resolution	0.1%
CO <sub>2</sub> Repeatability	Better than 0.1%
O <sub>2</sub> Repeatability	0.05% of O <sub>2</sub>
Total Flow rate, NI/m	0.4 constant
Outlet Pressure	ambient
CO <sub>2</sub> Consumption (at 5% of CO <sub>2</sub> ): NI/min	0.02
N <sub>2</sub> Consumption (at 5% of O <sub>2</sub> ): NI/min	0.3
CO <sub>2</sub> Sensor	Non Dispersive InfraRed (NDIR) dual wave length detector
O <sub>2</sub> Sensor	zirconium oxide
Sensors Life	10 years
Dimensions, mm	348x290x140
Compatible with:	H201 T UNIT BL and H301-T UNIT BL
SDK	Available
Web Operation	With Smart Box
Filtering device	PTFE membrane with 0.2 µm pores

### Accessories and Codes

CO <sub>2</sub> - O <sub>2</sub> UNIT BL [0-10;1-18]	<b>Combined CO<sub>2</sub>/Oxygen Controller for Hypoxia - Bold Line.</b> Operated by the OKO-Touch. Can be equipped with the Smart Box for data-logging, remote operation and remote support
SM-BL	<b>Smart Box.</b> Data logger and web server. It allows operation via web/smart phone/tablet and to receive remote support
OKO-AIR-PUMP-BL	<b>Air pump - Bold Line.</b> Plug and play solution for Air inlet. Convenient alternative to Air tanks/compressed Air lines. It directly connects to Air input of Okolab Bold Line gas controllers and it is operated by the OKO-Touch. Maximum outlet pressure 300 mbar.

# CO<sub>2</sub> - O<sub>2</sub> UNIT BL [0-20;1-95]

## CO<sub>2</sub> -O<sub>2</sub> UNIT BL [0-20;1-95]



### Technical Specifications

Operation mode	Mixes CO <sub>2</sub> , O <sub>2</sub> and N <sub>2</sub>
Concentration Range	CO <sub>2</sub> : 0-20%; O <sub>2</sub> 1-95%
CO <sub>2</sub> Accuracy	± 0.3% at CO <sub>2</sub> =5% CO <sub>2</sub> and O <sub>2</sub> =5%
O <sub>2</sub> Accuracy	± 0.2% at CO <sub>2</sub> =5% CO <sub>2</sub> and O <sub>2</sub> =5%
Set point resolution	0.1%
Total Flow rate, NI/m	0.35 constant
Outlet Pressure	ambient
CO <sub>2</sub> Consumption (at 5% of CO <sub>2</sub> ): NI/min	0.0175
O <sub>2</sub> Consumption (at 5% of O <sub>2</sub> ): NI/min	0.0175
Sensors	Digital flow meters, CMOS Sensors
Dimensions, mm	348x290x140
Compatible with:	H201 T UNIT BL and H301-T UNIT BL
SDK	Available
Web Operation	With Smart Box
Filtering device	PTFE membrane with 0.2 µm pores

### Accessories and Codes

CO <sub>2</sub> - O <sub>2</sub> UNIT BL [0-20;1-95]	<b>Combined CO<sub>2</sub>/Oxygen Controller for both Hypoxia and Hyperoxia - Bold Line.</b> Mixes N <sub>2</sub> , O <sub>2</sub> and CO <sub>2</sub> .. Operated by the OKO-Touch. Can be equipped with the Smart Box for data-logging, remote operation and remote support
SM-BL	<b>Smart Box.</b> Data logger and web server. It allows operation via web/smart phone/tablet and to receive remote support
OKO-AIR-PUMP-BL	<b>Air pump - Bold Line.</b> Plug and play solution for Air inlet. Convenient alternative to 100% Air tanks/compressed Air lines. It directly connects to Air input of Okolab Bold Line gas controllers and it is operated by the OKO-Touch. Maximum outlet pressure 300 mbar.

# Centralized Controller

## CO<sub>2</sub> – O<sub>2</sub> UNIT BL CP2 – Centralized controller

- It supplies the desired Air-CO<sub>2</sub> or N<sub>2</sub>-O<sub>2</sub>-CO<sub>2</sub> mixture at controlled pressure in the range 1-4 atm
- It replaces pre-mixed vessels or compressed gas lines
- One unit supplies up to 10 microscope incubators
- Mixes two or three gas, according to operator's need
- Pressurized vessel: 2 lt



### Technical Specifications

Operation mode	Adds CO <sub>2</sub> and Air to N <sub>2</sub>
Concentration Range	CO <sub>2</sub> : 4-8%; O <sub>2</sub> 3-7%
CO <sub>2</sub> Accuracy	± 5% of CO <sub>2</sub> concentration, i.e. ± 0.25% at 5% CO <sub>2</sub>
O <sub>2</sub> Accuracy	0.1% at 5% O <sub>2</sub>
Set point resolution	0.1%
CO <sub>2</sub> Repeatability	Better than 0.1%
O <sub>2</sub> Repeatability	0.05% of O <sub>2</sub> concentration
Total Flow rate, NI/m	0.5, at 4 atm
Outlet Pressure	1-4 atm (absolute pressure)
CO <sub>2</sub> Consumption (at 6% of CO <sub>2</sub> ), NI/min	0.042
N <sub>2</sub> Consumption (at 5% of O <sub>2</sub> ), NI/min	0.5
CO <sub>2</sub> Sensor	Non Dispersive InfraRed (NDIR) dual wave length detector
O <sub>2</sub> Sensor	zirconium oxide
Dimensions, mm	444x290x208
SDK	Available
Web Operation	With Smart Box
Filtering device	PTFE membrane with 0.2 µm pores

### Accessories and Codes

CO <sub>2</sub> - O <sub>2</sub> UNIT BL-CP2	Multi-user Bold Line CO <sub>2</sub> /O <sub>2</sub> controller.
SM-BL	Smart Box. Data logger and web server. It allows operation via web/smart phone/tablet and to receive remote support
SFM	Single floating ball flowmeter. Must use one for each incubator



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