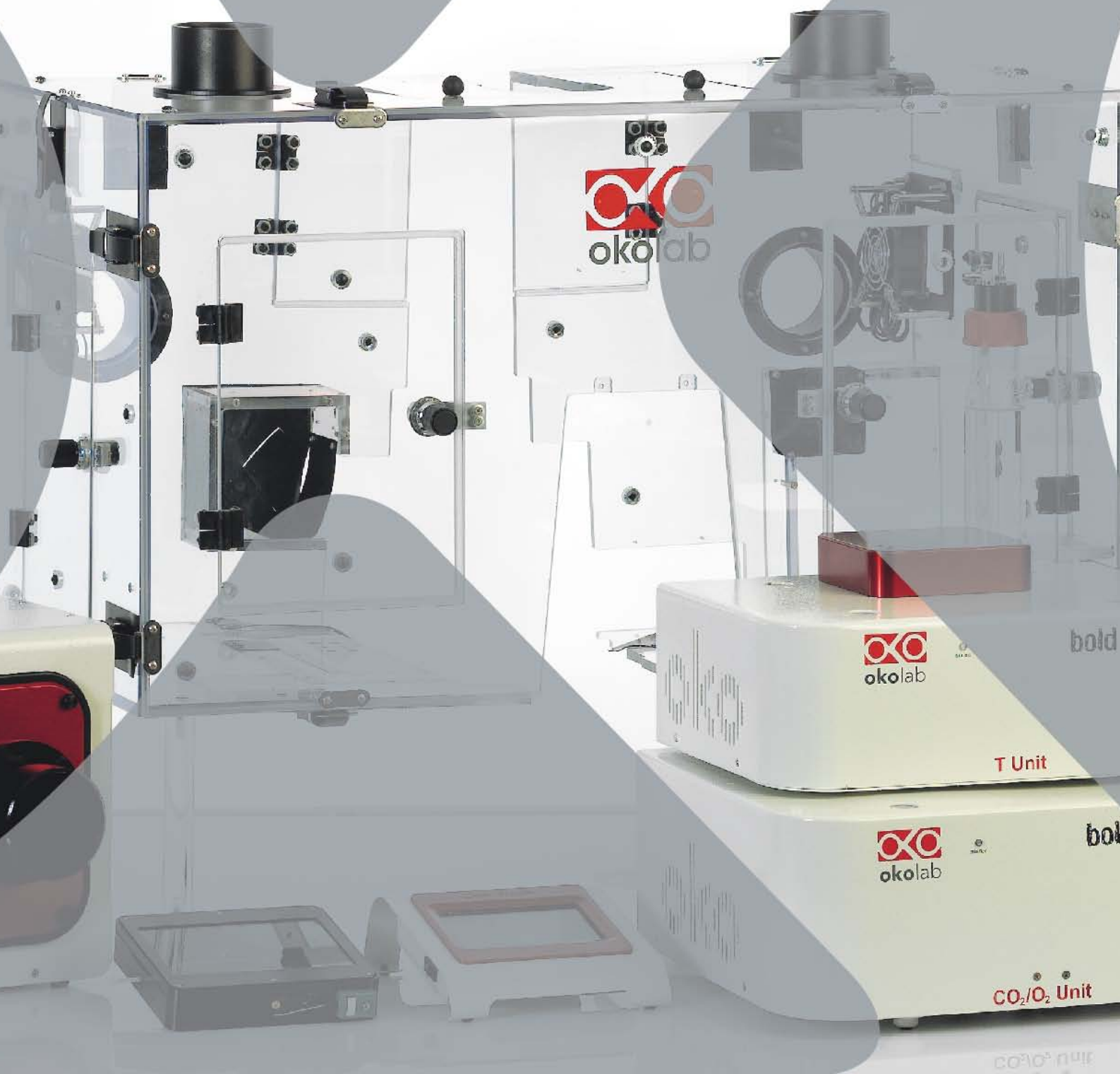


Bold Line Cage Incubator



Large volume incubator with local
CO₂/O₂ climate chamber

bold line



Bold Line Cage Incubator

Large volume incubator with local CO₂/O₂ climate chamber

The systems comprises:

- Microscope enclosure
- Obscuring panels (*optional*)
- Temperature Controller (includes Air Heater)
- Filtering Box (*optional*)
- Top stage Climate chamber
- Gas controller (CO₂, O₂ or dual CO₂/O₂)
- Humidity module
- Oko-Touch
- Smart Box (*optional*)



The **Bold Line Cage Incubator** maintains all the required environmental conditions for cell culture all around the microscopy workstation, thus enabling to carry out prolonged observations on biological specimens and allowing at the same time enough space for other equipment.

Microscope Enclosure

The enclosure is designed to allow maximum accessibility of the microscope. Several windows on the front and side panels allow full and easy access to the microscope. Additional windows can be realized upon request.

Turn to open hinges allow an easy and fast removal both of the front and of the top panel.

This allows free access to any part of the microscope. When needed, the cage incubator can be reassembled and placed again around the microscope in few seconds.

Black Panels can be added to the transparent enclosure to create a dark environment for fluorescence imaging. Easy and quick mounting/removal of the black panels is ensured by turn-to-open hinges.



Temperature Controller – H201 T UNIT BL (Includes Air Heater)

H201 T UNIT BL is the temperature controller used in the Cage Incubator. It keeps the specimen at the desired temperature by controlling the temperature of the air blown in the enclosure by the Air Heater. A filtering box can be attached to the Air Heater to guarantee that the recycled air is dust and bacteria free. T accuracy: 0.1°C ; T range: from 3° above ambient to 40°C.

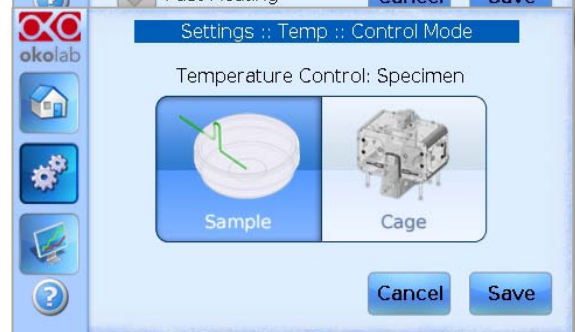
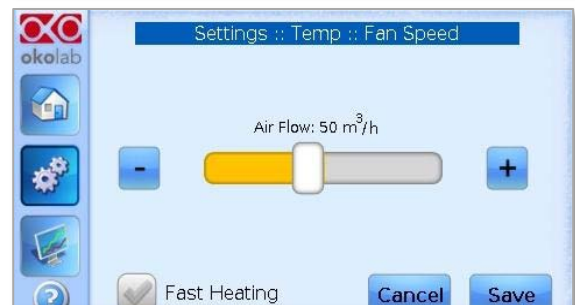
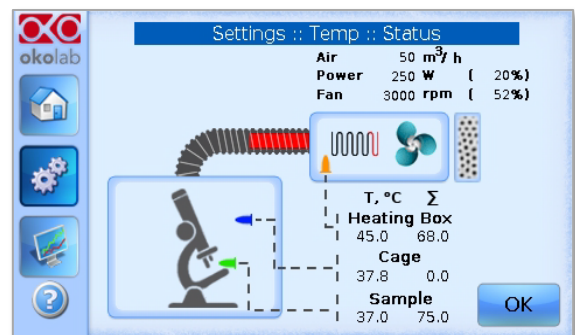


The Air Heater has double inlet and double outlet to recycle the heating air. A flow rate sensor and a temperature sensor allow to measure and control the flow rate and the temperature of the air that is employed to heat up the enclosure. This allows to combine fast start up of the system with smooth operation during the experiment. Definition of the desired flow rate is performed via OKO-Touch.

Specimen / Cage Temperature feedback operation

There are two ways to operate the system, depending on which Temperature sensor is used to provide feedback to H201 - T UNIT BL. Selection is performed with Oko-Touch.

- Specimen feedback mode: in this configuration, feedback is provided by a sensor placed inside the climate chamber, near the specimen. Simple manipulation is required to stick the thermocouple into the reference well with some adhesive tape.
- Enclosure feedback mode: in this configuration, feedback is provided by a sensor measuring the temperature of the air inside the enclosure



Climate Chamber

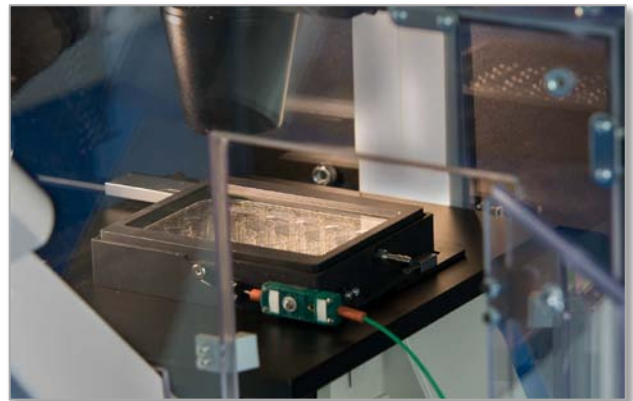
Climate Chamber for local CO₂ and Humidity Conditioning

The Climate Chamber fits into the microscope XY stage or piezo inserts and hosts the sample. It creates a small volume inside the enclosure in which the pre-mixed and pre-humidified stream of air and CO₂ is continuously fed.

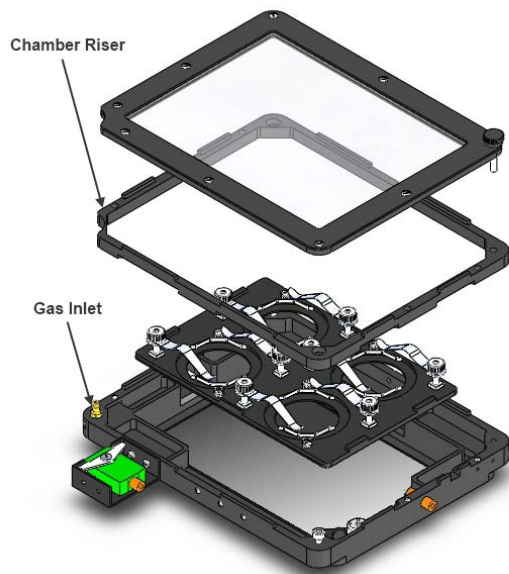
- Chambers available for any XY stage / piezo insert (please, see www.oko-lab.com)
- Slim profile allows to position the condenser very close to the specimen
- Interchangeable specimen holders
- Perfusion holes for inlet and outlet of tubes
- External Temperature sensor



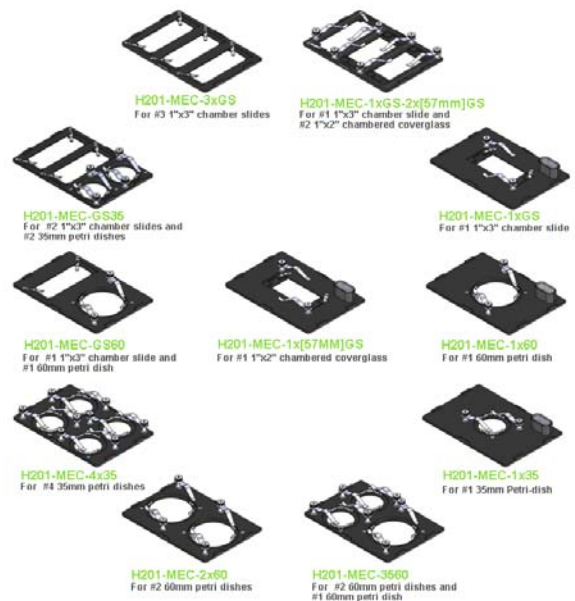
Climate Chamber-models available for any XY stage



Climate Chamber inside microscope enclosure



Climate Chamber -3D drawing



Interchangeable specimen holders

CO₂ – O₂ – Humidity Control

The Bold Line Cage Incubator can be equipped with Bold Line gas controllers or with Manual gas mixers.

Bold Line gas controllers:

- Highest Accuracy and Repeatability
- Digital CO₂, O₂ and Air/N₂ Controller
- Operated via OKO-Touch
- Compatible with Smart Box



Manual Gas Mixers:

- Set point resolution 1%
- Manual Floating ball flow meters
- Excellent Price to Quality ratio



Digital Gas Controllers

Digital Gas controllers	CO ₂ %	O ₂ %
CO ₂ UNIT BL	0 - 18	-
O ₂ UNIT BL [1-20]	-	1 - 20
CO ₂ - O ₂ UNIT BL [0-10;1-18]	0 - 10	1 - 18
CO ₂ - O ₂ UNIT BL [0-20;1-95]	0 - 20	1 - 95
CO ₂ - O ₂ UNIT BL - CP	4 - 8	3 - 7

Manual Gas Mixers

Manual Gas Mixers	CO ₂ %	O ₂ %
2 GF MIXER	0 - 20	-
3GF MIXER - HYPOXIA	0 - 15	2 - 20
3GF MIXER - HYPEROXIA	0 - 15	40 - 85

Humidity Module

The Mixed gas is humidified by bubbling through a glass column containing bi-distilled water. The bubbling column is placed inside the temperature controlled enclosure to saturate the gas stream at the same temperature as the specimen.



CO2 UNIT BL



Technical Specifications

Operation mode	Adds CO ₂ in Air or in N ₂
Concentration Range	0-18 %
Accuracy	± 5% of CO ₂ concentration, i.e. ± 0.25% at 5% CO ₂
Set point resolution	0.1%
Repeatability	Better than 0.1%
Total Flow rate, NI/m	0.4 constant
Outlet Pressure	ambient
CO ₂ Consumption (at 5% CO ₂) NI/min	0.02
CO ₂ 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

CO2 UNIT BL	CO2 Controller - Bold Line. It controls both Air and CO ₂ . CO ₂ 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	Smart Box. Data logger and web server. It allows operation via web/smart phone/tablet and to receive remote support
OKO-AIR-PUMP-BL	Air pump - Bold Line. 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.

O₂ UNIT BL [1-20]

O₂ UNIT BL [1-20]



Technical Specifications

Operation mode	Adds N ₂ to Air
Concentration Range	0-20%
Accuracy	± 0.1% at 5% O ₂
Set point resolution	0.1%
Repeatability	0.05% of O ₂ concentration
Total Flow rate, NI/m	0.4 constant
Outlet Pressure	ambient
N ₂ Consumption (at 5% O ₂), NI/min	0.3
O ₂ 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 ₂ UNIT BL [1-20]	Oxygen Controller - Bold Line. Operated by the OKO-Touch. Can be equipped with the Smart Box for data-logging, remote operation and remote support
SM-BL	Smart Box. Data logger and web server. It allows operation via web/smart phone/tablet and to receive remote support
OKO-AIR-PUMP-BL	Air pump - Bold Line. 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.

CO₂ - O₂ UNIT BL [0-10;1-18]

CO₂ -O₂ UNIT BL [0-10;1-18]



Technical Specifications

Operation mode	Adds CO ₂ and N ₂ to Air
Concentration Range	CO ₂ : 0-10%; O ₂ 1-18%
CO ₂ Accuracy	± 5% of CO ₂ concentration, i.e. ± 0.25% at 5% CO ₂
O ₂ Accuracy	0.1% at 5% O ₂
Set point resolution	0.1%
CO ₂ Repeatability	Better than 0.1%
O ₂ Repeatability	0.05% of O ₂
Total Flow rate, NI/m	0.4 constant
Outlet Pressure	ambient
CO ₂ Consumption (at 5% of CO ₂): NI/min	0.02
N ₂ Consumption (at 5% of O ₂): NI/min	0.3
CO ₂ Sensor	Non Dispersive InfraRed (NDIR) dual wave length detector
O ₂ 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 ₂ - O ₂ UNIT BL [0-10;1-18]	Combined CO₂/Oxygen Controller for Hypoxia - Bold Line. Operated by the OKO-Touch. Can be equipped with the Smart Box for data-logging, remote operation and remote support
SM-BL	Smart Box. Data logger and web server. It allows operation via web/smart phone/tablet and to receive remote support
OKO-AIR-PUMP-BL	Air pump - Bold Line. 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.

CO₂ - O₂ UNIT BL [0-20;1-95]

CO₂ -O₂ UNIT BL [0-20;1-95]



Technical Specifications

Operation mode	Mixes CO ₂ , O ₂ and N ₂
Concentration Range	CO ₂ : 0-20%; O ₂ 1-95%
CO ₂ Accuracy	± 0.3% at CO ₂ =5% CO ₂ and O ₂ =5%
O ₂ Accuracy	± 0.2% at CO ₂ =5% CO ₂ and O ₂ =5%
Set point resolution	0.1%
Total Flow rate, NI/m	0.35 constant
Outlet Pressure	ambient
CO ₂ Consumption (at 5% of CO ₂): NI/min	0.0175
O ₂ Consumption (at 5% of O ₂): 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 ₂ - O ₂ UNIT BL [0-20;1-95]	Combined CO ₂ /Oxygen Controller for both Hypoxia and Hyperoxia - Bold Line. Mixes N ₂ , O ₂ and CO ₂ . Operated by the OKO-Touch. Can be equipped with the Smart Box for data-logging, remote operation and remote support
SM-BL	Smart Box. Data logger and web server. It allows operation via web/smart phone/tablet and to receive remote support
OKO-AIR-PUMP-BL	Air pump - Bold Line. 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.

CO₂ – O₂ UNIT BL CP - Multi User System

- It supplies the desired Air-CO₂ or N₂-O₂-CO₂ 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: 5 lt



Technical Specifications

Operation mode	Adds CO ₂ and Air to N ₂
Concentration Range	CO ₂ : 4-8%; O ₂ 3-7%
CO ₂ Accuracy	± 5% of CO ₂ concentration, i.e. ± 0.25% at 5% CO ₂
O ₂ Accuracy	0.1% at 5% O ₂
Set point resolution	0.1%
CO ₂ Repeatability	Better than 0.1%
O ₂ Repeatability	0.05% of O ₂ concentration
Total Flow rate, NI/m	0.5, at 4 atm
Outlet Pressure	1-4 atm (absolute pressure)
CO ₂ Consumption (at 6% of CO ₂), NI/min	0.042
N ₂ Consumption (at 5% of O ₂), NI/min	0.5
CO ₂ Sensor	Non Dispersive InfraRed (NDIR) dual wave length detector
O ₂ 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 ₂ - O ₂ UNIT BL-CP	Multi-user Bold Line CO ₂ /O ₂ 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

2 GF MIXER

2GF MIXER is a two gas mixer, used to generate CO₂-Air mixtures with an adjustable CO₂ concentration in the range 0-15%. It can be used as a stand-alone device as well as in combination with any kind of microscope incubator. Air and CO₂ flows are regulated by two floating ball flow meters in the range 0.2 1.7 NI/min and 0.013 0.13 NI/min, respectively.



Technical Specifications

Operation mode	Mixes CO ₂ and Air with manual floating ball flow meters
Concentration Range	CO ₂ : 0-15%;
Set point resolution	1%
Dimensions, mm	220x128x178
Filtering device	PTFE membrane with 0.2 mm pores

3 GF MIXER – HYPOXIA and HYPEROXIA

3GF Mixer- is a 3 gas mixer (Carbon Dioxide, Nitrogen, Air/Oxygen) which employs floating ball flowmeters to generate CO₂/O₂/N₂ mixtures. It can be used as a stand-alone device as well as in combination with any kind of microscope incubator. The flow rate of the three gases is regulated by three floating ball flow meters.



Technical Specifications

Operation mode	Mixes CO ₂ Air (or O ₂) and N ₂ with manual floating ball flow meters
CO ₂ Concentration Range	CO ₂ : 0-15%;
O ₂ Concentration Range	2-20% (HYPOXIA); 40-85% (HYPEROXIA)
Set point resolution	1%
Dimensions, mm	220x178x178
Filtering device	PTFE membrane with 0.2 mm pores



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