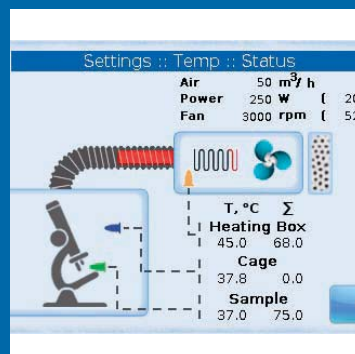# Integrated Components
for Live-Cell Imaging

microscope incubators,

gas controllers, and

thermal plates

WARNER INSTRUMENTS

A Harvard Apparatus Company

Gas Controllers CO_2 - O_2

Warner Instruments is pleased to present the complete line of gas controllers from Okolab. This family of controllers includes the basic manual mixers, featuring floating ball flow meters to mix the gas streams and the DGT Line offers digital control of CO_2 or O_2 and floating ball meters to set the airflow rate. The Bold Line controllers offer full digital control over the gas mixtures, are fully intergraded with the Bold Line temperature controllers, and can be operated via touch screen interface, OKO-Control 2.0 software, or Nis Elements software.

Bold Line CO_2/O_2 Multi-User

DGT Line Digital CO_2/O_2 Manual Air

Touch Controller

Bold Line Digital CO_2

Manual Mixers

Two Gas Mixer (2GF-MIXER)

• Set point resolution 1%
• Works with any microscope incubator
• CO_2 concentrations in the 0-15% range
• Reusable PTFE membrane filter (0.2 mm pores)

Description

The 2GF MIXER is a two-gas mixer used to generate CO_2-Air mixtures with an adjustable CO_2 concentration in the range of 0-15%. The mixer can be used as a stand-alone device or in combination with any microscope incubator. Air and CO_2 flows are regulated using dual floating ball flow meters that operate in the range of 0.2 -1.7 Nl/min and 0.013 - 0.13 Nl/min, respectively.

Manual Mixers Manual CO_2/O_2 Manual Air

Three Gas Mixer / (3GF Mixer-Hypoxia)
Manual CO_2 - Manual N_2 - Manual Air

• CO_2 range 0 - 15%
• O_2 range 2 - 20%
• Set point resolution 1%
• PTFE membrane filter (0.2 mm pores)

Description

The 3GF Mixer-Hypoxia is a 3-gas mixer (Carbon Dioxide, Nitrogen, Air) that employing floating ball flow meters.

Manual Mixers 3GF-Mixer

Three Gas Mixer / (3GF Mixer-Hyperoxia)
Manual CO_2 - Manual N_2 - Manual Air

• CO_2 range 0 - 15%
• O_2 range 40 - 85%
• Set point resolution 1%
• PTFE membrane filter (0.2 mm pores)

Description

The 3GF Mixer-Hyperoxia is a 3 gas mixer (Carbon Dioxide, Nitrogen, Air) which employs floating ball flow meters. Gas connectors and valves are cleaned for use with oxygen.

Order #	Model	Product
Manual Mixers		
64-1996	2GF-Mixer	2 Gas mixer, Air and CO2 0-15%
64-1997	3GF-Mixer-Hypoxia	3 Gas mixer, Air Nitrogen and CO2, O2-2-20%
64-1998	3GF-Mixer-Hyperoxia	3 Gas mixer, Air Nitrogen and CO2, O2-40-85%
Accessories		
64-1999	OKO-AP	Air pump max pressure 300 mbar

Digital Gas / Manual Air Mixers

DGT Gas Controllers / (CO₂ DGT-BX)

Digital CO₂ / Manual Air

- Adds CO_2 to Air or N_2
- CO_2 Range 0-20%
- Accuracy ± 5% of CO_2 concentration
- Repeatability better than 0.1%
- Floating ball air flow meter 0-1 Nl/min
- Total flow rate (at 5% CO_2) 0.5 Nl/min
- Outlet pressure: Ambient
- CO_2 consumption (at 5% and air flow rate 0.5 Nl/min): 0.027 Nl/min
- CO_2 sensor Non Dispersive infrared (NDIR) dual wave length detector
- Software control with OKO Control 2012 or NIS-Elements
- Filtering device PTFE membrane with 0.2 µm pores
- Can work in series with O_2 DGT BX HYPOXIA

DGT **CO2 DGT-BX**

Description

An infrared sensor continuously measures CO_2 levels in the mixed gas stream and a PID closed loop controller provides feedback to a fine valve regulating CO_2 flow. Air flow is manually regulated with a floating ball flow meter.

A serial RS-232 interface and OKO-Control 2.0 Software allow the user to control the unit using a personal computer and to acquire concentration data stored in computer memory.

The CO_2 controller is supplied with the following: gas filter, pressure gauge for CO_2 with regulator, two white rigid tubes: 6mm O.D. 3m length one blue rigid tube: 6mm O.D. 2 m length
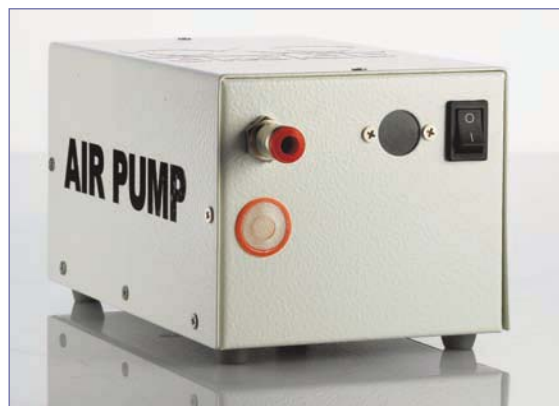
Optional Air Pump is a good choice for labs lacking a source of clean air.

DGT **CO2 DGT-BX rear panel**

Optional Air Pump

Order #	Model	Product
DGT Mixers		
64-1991	DGT-CO2BX-PLUS	Digital CO_2 / manual Air CO_2 0-20%
Accessories		
64-1999	OKO-AP	Air pump max pressure 300 mbar

Digital Gas / Manual Air Mixers

DGT Gas Controllers / (O$_2$ DGT-BX Hypoxia)

Digital O$_2$ / Manual Air

- Adds N2 to Air
- O$_2$ Range 1-19%
- Accuracy: ± 0.1% at 5% O$_2$
- Repeatability: Better than 0.05% of [O$_2$]
- Floating ball air flow meter 0-0.4 Nl/min
- Total flow rate (at 5% O$_2$) 0.5 Nl/min
- Outlet pressure: Ambient
- N2 consumption (at 5% O$_2$) 0.5 Nl/min
- O$_2$ sensor Zirconium oxide with 10-year life
- Software control with OKO Control or NIS-Elements
- Filtering device PTFE membrane with 0.2 µm pores
- Works in series with CO$_2$ DGT BX
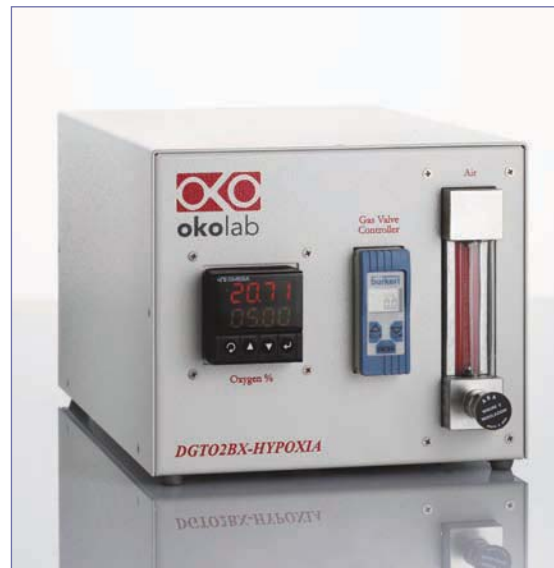
DGT O$_2$ DGT-BX Hypoxia

Description

Technology

The O$_2$ DGT-BX HYPOXIA controls O$_2$ concentration by mixing Air with Nitrogen. Air flow is set to 0.1 liter per minute by means of a floating ball flowmeter. When combined with the Digital CO$_2$ Controller, control over 3 gas Mixtures (Nitrogen-Carbon Dioxide-Oxygen) is achieved.

The long life zirconium oxide sensor lasts up to 10-years if continuously used and considerably longer if used intermittently.

Data Storage

The serial RS-232 interface and Oko-control software allow the user to control the unit and to acquire and store data on a PC compatible computer.

Accessories

The O$_2$ controller is supplied with the following: Gas filter, pressure gauge for N2 with regulator, two white rigid tubes: 6mm O.D. 3m length

DGT O2 DGT-BX Hypoxia rear panel

Order #	Model	Product
DGT Mixers		
64-1992	DGT-CO2BX-ES	Digital CO$_2$ w/ external sensor
64-1993	DGT-O2BX-PLUS	Digital O$_2$ / manual Air O$_2$ - 3-19%
Accessories		
64-1999	OKO-AP	Air pump max pressure 300 mbar

Bold Line CO$_2$ Controller

Description

The Bold Line CO$_2$ controller mixes Air or N$_2$ with CO$_2$, and controls the concentration with digital accuracy. Operation is via an easy to use touch screen interface, OKO-Touch. An optional Smart Box data logger and web server allows operation via any web-enabled device. The system may also be operated via a PC using OKO-Control 2.0 software or Nis Elements software.

Sensor calibration is made using an external meter or calibration gas. The controller can be attached to O$_2$ Unit-BL [1-20] to control both CO$_2$ and O$_2$ within the range 0-10% and 0-18%, respectively.

Technical Specifications

Operating mode	Adds CO$_2$ to Air or 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	0.4 Nl/min - constant
Outlet pressure	Ambient
CO$_2$ consumption (at 5%)	0.02 Nl/min
CO$_2$ sensor	10 year-life Non Dispersive infrared (NDIR) dual wave length detector
Filtering device	PTFE membrane with 0.2 μm pores

Optional Bold Line Air Pump

Order #	Model	Product
Bold Line Controllers		
64-2000	CO2 Unit-BL	CO$_2$/ Air - CO$_2$ 0-18%
64-2007	Oko-Touch	Touch screen display
Accessories		
64-2008	SM-BL	Smart Box, data logger, web server
64-2001	O2 Unit-BL[1-20]	O$_2$ 1 - 20.5%
64-2006	OKO-AP_BL	Bold Line Air Pump max pressure 300 mbar

Bold Line O$_2$ Controller

Description

The Bold Line O$_2$ unit controls the oxygen concentration over the range of 1-20% by mixing Air with Nitrogen. Gas flow rates are digitally controlled. A long life zirconium oxide sensor precisely measures the O$_2$ concentration with high precision.

Operation is via an easy to use touch screen interface, OKO-Touch. An optional Smart Box data logger and web server allows operation via any web-enabled device. The system may also be operated via a PC using OKO-Control 2.0 software or Nis Elements software.

Sensor calibration is made with an external meter or calibration gas. The controller can be attached to CO$_2$ Unit-BL to control both CO$_2$ and O$_2$.

Technical Specifications

Operating mode	Adds N$_2$ to Air
Concentration range	0-20%
Accuracy	± 0.1% @ 5% of O$_2$
Repeatability	0.05% of O$_2$
Set Point Resolution	0.1%
Total flow rate	0.4 Nl/min - constant
Outlet pressure	Ambient
N2 consumption (at 5% of O$_2$)	0.03 Nl/min
O$_2$ sensor	10 year-life zirconium oxide sensor
Filtering device	PTFE membrane with 0.2 µm pores

A typical complete system

Order #	Model	Product
Bold Line Controllers		
64-2001	O2 Unit-BL[1-20]	O$_2$ 1 - 20.5%
64-2007	Oko-Touch	Touch screen display
Accessories		
64-2008	SM-BL	Smart Box, data logger, web server
64-2000	CO2 Unit-BL	CO$_2$ / Air - CO$_2$ (0-18%)
64-2006	OKO-AP_BL	Bold Line Air Pump max pressure 300 mbar

Bold Line CO$_2$ - O$_2$ Controllers

Description
CO$_2$-O$_2$ UNIT-BL [0-10;1-18] and [0-20;1-95]

The Bold Line combination CO$_2$ - O$_2$ gas controllers are ideal for hypoxia and hyperoxia experiments. Two versions are available, CO$_2$; 0-10% and O2; 1-18%, and CO$_2$; 0-20% and O$_2$; 1-95%.

Gas flow rates are digitally controlled. A long life zirconium oxide sensor precisely measures the O$_2$ concentration, a non dispersive infrared (NDIR) dual wave length detector sets the CO$_2$ concentration.

Operation is via an easy to use touch screen interface, OKO-Touch. An optional Smart Box data logger and web server allows operation via any web-enabled device. The system may also be operated via a PC using OKO-Control 2.0 software or Nis Elements software.

Sensor calibration is made using an external meter or calibration gas.

Technical Specifications CO$_2$-O$_2$ UNIT-BL [0-10;1-18]

Operating mode	Adds CO$_2$ and N$_2$ to Air
Concentration range	CO$_2$ range: 0-10%, O$_2$ range: 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	0.4 Nl/min - constant
Outlet pressure	Ambient
CO$_2$ consumption (at 5%)	0.02 Nl/min
N2 consumption (at 5% of O2)	0.3 Nl/min
CO$_2$ sensor	10 year-life Non Dispersive infrared (NDIR) dual wave length detector
O$_2$ sensor	10 year-life zirconium oxide sensor
Filtering device	PTFE membrane with 0.2 μm pores

Technical Specifications CO$_2$-O$_2$ UNIT-BL [0-20;1-95]

Operating mode	Mixes CO2, O$_2$, and N$_2$
Concentration range	CO$_2$ range: 0-20%, O$_2$ range: 1-95%
CO$_2$ Accuracy	± 0.3 % at 5% CO$_2$ and 5% O$_2$
O$_2$ Accuracy	± 0.2% at 5% CO$_2$ and 5% CO$_2$
Set Point Resolution	0.1%
Total flow rate	0.35 Nl/min - constant
Outlet pressure	Ambient
CO$_2$ consumption	(at 5% of CO$_2$): 0.0175 Nl/min
O$_2$ consumption	(at 5% of O$_2$): 0.0175 Nl/min
N2 consumption	(at 5% of CO$_2$ and at 5% of O$_2$): 0.315 Nl/min
Digital Flow Meters	CMOS Sensors
CO$_2$ sensor	10 year-life Non Dispersive infrared (NDIR) dual wave length detector
O$_2$ sensor	10 year-life zirconium oxide sensor
Filtering device	PTFE membrane with 0.2 μm pores

Order #	Model	Product
Bold Line Controllers		
64-2002	CO2-O2 Unit-BL[1-10:1-18]	Combined CO2 / O2
64-2003	CO2-O2 Unit-BL[1-20:1-95]	Combined CO2 / O2
64-2007	Oko-Touch	Touch screen display
Accessories		
64-2008	SM-BL	Smart Box, data logger, web server
64-2006	OKO-AP_BL	Bold Line Air Pump max pressure 300 mbar

Bold Line Three Gas Mixer Multi-user

Description
CO$_2$-O$_2$ UNIT-BL CP

Designed supply desired Air-CO$_2$ or N$_2$-O$_2$-CO$_2$ mixture at controlled pressure

The CO$_2$ O$_2$ Unit BL CP replaces pre-mixed tanks or compressed gas lines, a single unit supplies up to 10 microscope incubators.
The device mixes two or three gases, according to the operator's need.

A long life zirconium oxide sensor precisely measures the O$_2$ concentration and a non dispersive infrared (NDIR) dual wave length detector sets the CO$_2$ concentration. Operation is via an easy to use touch screen interface, OKO-Touch.

An optional Smart Box data logger and web server allows operation via any web-enabled device. The system may also be operated via a PC using OKO-Control 2.0 software or Nis Elements software.

Sensor calibration is made using an external meter or calibration gas.

Note: Order Single floating ball flowmeters along with the Multi-user controller, one for each incubator to be connected.

Technical Specifications CO$_2$-O$_2$ UNIT-BL [0-20;1-95]

Output pressure	1-4 atm (absolute pressure)
Pressurized Vessel	5 liter
Operating mode	Adds CO$_2$ and Air to N$_2$
Concentration range	CO$_2$ range: 4-8%, O$_2$ range: 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$_2$
Total flow rate	0.5 Nl/min (at 4 ata)
CO$_2$ consumption	(at 6% of CO$_2$): 0.042 Nl/min
Air consumption	(at 6% of CO$_2$ and 5% O$_2$): 0.167 Nl/min
N2 consumption	(at 5% of O$_2$): 0.5 Nl/min
CO$_2$ sensor	10 year-life Non Dispersive infrared (NDIR) dual wave length detector
O$_2$ sensor	10 year-life zirconium oxide sensor
Filtering device	PTFE membrane with 0.2 μm pores

Order #	Model	Product
Bold Line Controllers		
64-2004	CO2-O2 Unit-BL CP	Multi-user combined CO2 / O2
64-2007	Oko-Touch	Touch screen display
Accessories		
64-2008	SM-BL	Smart Box, data logger, web server
64-2006	OKO-AP_BL	Bold Line Air Pump max pressure 300 mbar

Bold Line Stage Top Incubator System

Complete systems include
- Incubating chamber
- Multichannel temperature controller
- Gas controller (CO_2, O_2, or dual CO_2/O_2)
- Humidity module
- Touch screen interface
- Smart box (optional)

Optional Smart Box

Oko-Touch

Stage Top Incubation

The Bold Line stage top incubator system offers complete control over the temperature, humidity, CO_2/O_2, with an easy-to-use touch screen interface. Add an optional Smart Box and you have the ability to control and monitor system performance via any web enabled device.

The advanced mechanical and thermal design of the incubating chambers deliver superior performance and tremendous operational flexibility. The **H301- T UNIT BL** is the temperature controller used with the Bold Line Stage Incubator. The controller maintains control of the chamber main body, heated glass cover, and humidity module. Temperature is accurately maintained within 0.1°C from 3°C above ambient to 50°C.

Specimen / Chamber Feedback Operation

There are two ways to operate the system depending on which temperature sensor is selected. In the specimen feedback mode, an external temperature sensor is placed close to the sample in a reference well in the incubating chamber . The advantage of this configuration is the precision of the temperature control. In the chamber feedback mode, temperature control is provided by a temperature sensor embedded in the incubation chamber. Careful calibration at the factory insures that the sample is maintained at the set temperature. The advantage of this second approach is ease of use.

The H301 controller includes a self calibration routine, this is designed to improve the accuracy of the chamber feedback mode. The calibration routine uses two external temperature sensors, one measures the temperature of the lab while the other is introduced into a reference well near the sample. The calibration routine is easily launched via the touch screen interface.

Bold Line Stage Top Incubator System

A typical, complete system includes the following components:

1. H301-T-UNIT-BL Bold Line Multichannel Temperature controller

2. H301-HMTC-BL Heating collar for H301-BC

3. H301-BC Glass Bubbling Column

4. 2GF MIXER Manual CO2 - Manual Air

5. OKO-AP Air Pump

6. H301-EC-BL Climate Chamber universal

7. Specimen Holder

H-301-EC-BL Incubation Chamber

Fits in standard XY stages by replacing the universal 110 x 160 mm (K frame) insert

Incubating Chambers

The Bold Line stage top incubators are available for any xy / piezo insert. The shape of the incubating chamber depends on the xy stage or piezo insert. To ensure a perfect fit, several chambers are available. A cross reference guide is available on page 13 to aid in selecting the right incubating chamber for your stage.

Chamber features include:

- Heated glass cover

- Removable riser to allow positioning of the condenser close to the specimen

- Interchangeable specimen holders

- Perfusion holes for inlet and outlet of tubes

- Embedded Temperature sensors in glass cover, chamber body, and humidity collar.

Gas Controller Options

Okolab Microscope Incubators can be used with Bold Line gas controllers or with Manual gas mixers. Bold Line gas controllers are the most advanced solution for gas control.

The Bold Line is an integrated system of modular controllers which communicate with each other through built-in connectors. User interface is via the OKO Touch a high-resolution color touch screen.

The Bold Line Controllers can be enriched with the Smart Box to operate/monitor the system via web application and to log and manage the data.
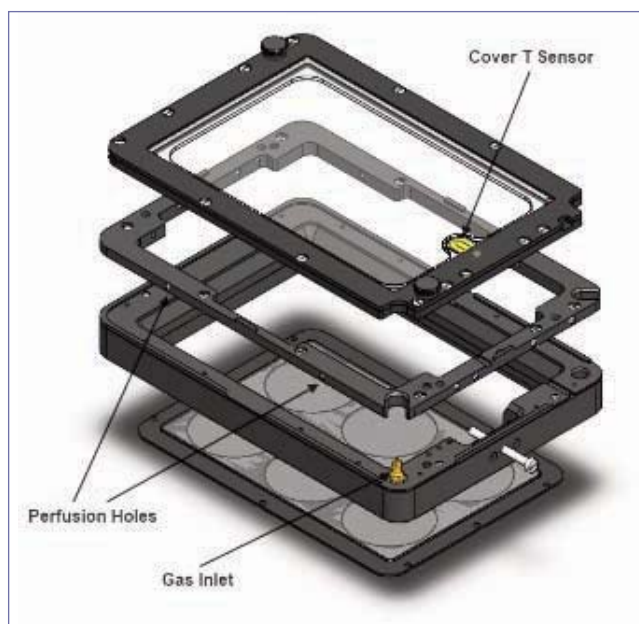
Manual mixers

Manual gas mixers employ floating ball flow meters to mix gas streams. No feedback is present on gas concentration.

H-301-EC-ROUND-BL Incubation Chamber

Fits in XY stages with circular opening (ie Nikon T/Ti-S(S)R - and Olympus IX2-SFR)

Bold Line Stage Top Incubator System

Humidity Module

Humidifying the gas mixture before delivery to the climate chamber is an important step. Pre-heating the gas helps prevent medium evaporation and avoids water condensation on glass and plastic surfaces.

Heating collar with bubbling column

OKO-Touch

User interface to the Bold Line Controllers is via the OKO Touch, a high-resolution color touch screen.

OKO-Touch connects to any one of the Bold Line Controllers, detects the equipment available, and displays the pages and functions supported by the equipment.

Smart Box (SM-BL)

The Smart Box enhances the Bold Line family by adding the following features:

- Data logger
- Web server
- Video streaming server
- Remote assistant

Data logger

The Smart Box acquires the status from the integrated bold line controllers and stores them in a local, non volatile memory.

Examples of acquired and stored data are: set point temperature, specimen temperature, base, cover and humidifying module temperature, CO_2 / O_2 concentration and set point, gas flow rate, etc.

Smart Box also stores maximum temperature and gas concentration deviation within a certain time interval.

Data can be recalled via a web application (through internet connection of Smart Box or direct Ethernet connection of Smart Box to PC).

Web Server

The Smart Box is a web server and can be connected to the internet via Wi-Fi, USB, or via Ethernet. Once connected, it is possible to view the current status, as well as control the integrated control units. For instance the set point can be remotely modified.

Video Streaming Server

A standard Webcam can be connected to the Smart Box to send streaming images in. This is particularly useful for online support and to monitor the lab remotely.

Remote Assistant

Okolab supports its customers with online video assistance. Via the Smart Box, the support team can be enabled to access the integrated controller units to perform maintenance and trouble shooting.

Stage Top Incubating Chambers

A typical complete system

Order #	Model Number	Description
64-1995	H301-T-UNIT-BL	Thermal controller, operates in both chamber and specimen feedback
64-2000	CO2 Unit-BL	CO_2 Controller, controls both Air and CO_2
64-2010	H301-BC	Bubbling column
64-2011	H301-HMTC-BL	Humidifying Module Temperature
64-2012	H301-EC-BL	Universal electrically heated chamber. Fits into K-frame inserts
64-2015	H301-EC-6MW	6-well plates holder
64-2007	Oko-Touch	Touch screen display
64-2008	SM-BL	Smart Box, data logger, web server
64-1999	OKO-AP	Air pump

Select the chamber that fits your XY stage or piezo insert

Order #	Mfr.	Model or Stage Opening	Incubating Chamber - Fixing tool
64-2012	**Leica**	k-frame opening (110x160mm)	H301-EC-BL
64-2012 + 64-2061		m-frame	H301-EC-BL + MANSA
64-2012 + 64-2060		150x150 mm opening	H301-EC-BL + DMSA
64-2041		Super Z Galvo Stage SP5	H301-EC-BL
64-2012 +64-2063	**Nikon**	Ti-S-E / Ti-S-ER	H301-EC-BL + TIPA
64-2014		Ti-S-E / Ti-S-ER + MCL Nano-Z100	H301-EC-MCLTi-BL
64-2012 + 64-2066			H301-EC-BL + IC-VICE-TI-SR (*)
or 64-2046 + 64-2065		T/Ti-S(S)R or TE300	H301-EC-ROUND-BL + H301-ECS-IX2SFR-TIS-SI-LT
64-2012 + 64-2067		T/Ti-SP+T/Ti-SAM	H301-EC-BL + SAMPA
64-2012 + 64-2067		Ti-SM (TS100)	H301-EC-BL + SAMPA
64-2012	**Olympus**	k-frame opening (110x160mm)	H301-EC-BL
64-2012 + 64-2072 or		IX2-SFR	H301-EC-BL + IC-VICE-IX-SUSP (*)
64-2046 + 64-2070			H301-EC-ROUND-BL + H301-ECS-IX2SFR-TIS-SI-LT
64-2012 + 64-2071		CK40-MVR/ IX-MVR	H301-EC-BL + MVR-SA
64-2012	**Zeiss**	k frame opening (110x160mm)	H301-EC-BL
64-2012 + 64-2061		m-frame	H301-EC-BL + MANSA
64-2012	**ASI**	MS-2000	H301-EC-BL
64-2012		MS-2000 FT	H301-EC-BL
64-2012		PZ-2000	H301-EC-BL
64-2012		PZ-2000FT	H301-EC-BL
64-2012	**Ludl**	BioPrecision2 - Biopoint 2 series	H301-EC-BL
64-2012 + 64-2077		96A602 Piezo stage	H301-EC-BL + XCR-FRAME-1
64-2012	**Marzhauser**	Scan IM series	H301-EC-BL
64-2012 + 64-2078	**Phiab**	M3 Stage	H301-EC-BL + PHIPA
64-2051	**Physik Instrumente**	P-737.2SL piezo	H301-EC-PI-BL
64-2012	**Prior**	H107 /ES 107	H301-EC-BL
64-2012 + 64-2079		H117	H301-EC-BL + XCR-FRAME
64-2040		NZ 100 and NZ 200	H301-EC-NZ100-BL
64-2013		NZ 250 and NZ 500	H301-EC-NZ500-BL
64-2012 + 64-2081	**Thorlabs**	Thorlabs MLS203-1 /MLS203-2	H301-EC-BL + THORPA
64-2055	**Upright Microscopes**	Stages for any upright microscope	H301-EC-UP-BL

(*) select this chamber if you plan to use MW plates

Stage Top Multiwell Plate Specimen Holders

**Specimen holders for motorized stages, compatible with
H301-EC-BL, H301-EC-NZ500-BL and H301-EC-MCLTi-BL**

Order #	Model Number	Description
64-2015	H301-EC-6MW	6-well plate holder
64-2016	H301-EC-12MW	12-well plate holder
64-2017	H301-EC-24MW	24-well plate holder
64-2018	H301-EC-24MW-NUNC	24-well NUNC plate holder
64-2019	H301-EC-48MW	48-well plate holder
64-2020	H301-EC-96MW	96-well plate holder

Stage Top Petri and Slide Specimen Holders

Specimen holders for motorized stages, compatible with H301-EC-BL, H301-EC-NZ500-BL and H301-EC-MCLTi-BL

Order #	Model Number	Description
64-2021	H301-EC-1x35	One 35mm Petri-dish holder
64-2022	H301-EC-2x35	Two 35mm Petri-dish holder
64-2023	H301-EC-4x35	Four 35mm Petri-dish holder
64-2024	H301-EC-1xGS	One standard chamber slide holder
64-2025	H301-EC-2xGS	Two standard chamber slides holder
64-2026	H301-EC-1x[57mm]GS	One 57mm chambered coverglass holder
64-2027	H301-EC-2x[57mm]GS	Two 57mm chambered coverglass holder
64-2028	H301-EC-1x60	One 60mm Petri-dish holder
64-2029	H301-EC-2x60	Two 60mm Petri-dish holder
64-2030	H301-EC-GS35	One standard chamber slide and two 35mm Petri-dish holder
64-2031	H301-EC-[57mm]GS35	One 57 mm chambered coverglass and two 35mm Petri-dis holder
64-2032	H301-EC-3560	One 35mm and one 60 mm Petri-dish holder
64-2033	H301-EC-GS60	One standard chamber slide and one 60mm Petri-dish holder
64-2034	H301-EC-[57mm]GS60	One 57 mm chambered coverglass and one 60mm Petri-dish holder

H301-EC-1x35-ROUND
For #1 35mm petri dishes for stages with circular insert.

H301-EC-1xGS-ROUND
For #1 1"x3" chamber slide for stages with circular insert.

H301-EC-GS35-ROUND
For #1 1"x3" chamber slide and #1 35mm Petri-dish for stages with circular insert.

H301-EC-1x60-ROUND
For #1 60mm petri dishes for stages with circular insert.

H301-EC-1x[57mm]GS-ROUND
For #1 1"x2" chambered coverglass for stages with circular insert.

Specimen holders for motorized stages, compatible with H301-EC-BL, H301-EC-NZ500-BL and H301-EC-MCLTi-BL

Order #	Model Number	Description
64-2035	H301-EC-GS35-ROUND	One standard chamber slide and one 35mm Petri-dish holder for flat stages with circular insert
64-2036	H301-EC-1x35-ROUND	One 35mm Petri-dish holder. Suitable for flat stages with circular insert
64-2037	H301-EC-1xGS-ROUND	One standard chamber slide holder. Suitable for flat stages with circular insert
64-2038	H301-EC-1x[57mm]GS-ROUND	One 57mm chambered coverglass holder. Suitable for flat stages with circular insert
64-2039	H301-EC-1x60-ROUND	One 60mm Petri-dish holder. Suitable for flat stages with circular insert
64-2042	H301-EC-LG-1x35	One 35mm Petri-dish holder
64-2043	H301-EC-LG-1xGS	One standard chamber slide holder
64-2044	H301-EC-LG-1x[57mm]GS	One 57mm chambered coverglass holder
64-2045	H301-EC-LG-1x60	One 60mm Petri-dish holder
64-2047	H301-EC-ROUND-1x35	One 35mm Petri-dish holder
64-2048	H301-EC-ROUND-1xGS	One standard chamber slides holder
64-2049	H301-EC-ROUND-1x[57mm]GS	One 57mm chambered coverglass holder
64-2050	H301-EC-ROUND-1x60	One 60mm Petri-dish holder
64-2052	H301-EC-PI-1x35	One 35mm Petri-dish holder
64-2053	H301-EC-PI-1xGS	One standard chamber slides holder
64-2054	H301-EC-PI-1x[57mm]GS	One 57mm chambered coverglass holder
64-2056	H301-EC-UP-1x35	One 35mm Petri-dish holder
64-2057	H301-EC-UP-1xGS	One standard chamber slides holder
64-2058	H301-EC-UP-1x[57mm]GS	One 57mm chambered coverglass holder
64-2059	H301-EC-UP-1x60	One 60mm Petri-dish holder

Fixing Tools

Order #	Model Number	Description
64-2060	DMSA	Required for 150 x150mm opening XY stages adapts H101-WJC, H101-WJC-SLIM, H201-MEC-SLIM and H301-EC-BL into 150 x150mm opening stages.
64-2061	MANSA	Required for M-frame stages, adapts H101-WJC, H201-MEC-SLIM and H301-EC-BL into M-frame stages.
64-2062	H301-EC-LG-DMIRE2-SI	Adapts H301-EC-LG-BL into 150 x150mm opening XY stages. Convenient if you have two different microscopes, one equipped with the SP5 Super Z galvo stage and the other one equipped with the 150 x150mm opening stage and want to use the same incubator on both set-ups.
	NIKON	
64-2063	TIPA	Required for TI-S-E(-R) motorized XY stages, allows H101-WJC, H101-WJC-SLIM, H201-MEC-SLIM and H301-EC-BL to fit into TI-S-E(-R) motorized XY stages.
64-2064	H201-MEC-FST-SI-L	Required for T/Ti-S(S)R rectangular stages with circular opening, allows H201-MEC-ROUND to fit on T/Ti-S(S)R rectangular stages.
64-2065	H301-ECS-IX2SFR-TIS-SI-LT	Required for T/Ti-S(S)R rectangular stages with circular opening, allows H301-EC-ROUND-BL to fit on T/Ti-S(S)R rectangular stages.
64-2066	IC-VICE-TI-SR	Adapts H101-WJC, H101-WJC-SLIM, H201-MEC-SLIM, H301-EC-BL and UNO on T/Ti-S(S)R rectangular stages with circular opening.
64-2067	SAMPA	Required for TI-SM and T/Ti-SP+T/Ti-SAM mechanical stages. Adapts H301-EC-BL on TI-SM stages and H201-MEC-SLIM and H301-EC-BL on T/Ti-SP+T/Ti-SAM stages.
64-2068	SAMPA-2	Required for T/Ti-SP+T/Ti-SAM mechanical stages. Adapts H101-WJC on T/Ti-SP+T/Ti-SAM stages.
64-2069	H301-EC-PZ100-CI-108	Adapts H301-EC-NZ100-BL or H201-MEC-NZ100 on T/Ti-S(S)R rectangular stages. Convenient if you have two different microscopes, one equipped with the Prior NZ100/NZ200 Nano Scan Z stage and the other one equipped with the T/Ti-S(S)R rectangular stage with circular opening and want to use the same incubator on both set-ups.
	OLYMPUS	
64-2070	H301-ECS-IX2SFR-TIS-SI-LT	Required for IX2-SFR cross stages. Adapts H301-EC-ROUND-BL on IX2-SFR cross stages.
64-2071	MVR-SA	Required for IX2-KSP+CK40-MVR/IX2-SP+IX-MVR mechanical stages. Adapts H201-MEC-SLIM and H301-EC-BL on IX2-KSP+CK40-MVR/IX2-SP+IX-MVR mechanical stages.
64-2072	IC-VICE-IX-SUSP	Adapts H101-WJC, H101-WJC-SLIM, and H301-EC-BL on IX2-SFR cross stages.
64-2073	H501-IX-SUSP	Adapts UNO on IX2-SFR cross stages.
64-2074	H301-EC-PZ100-CI-110	Adapts H301-EC-NZ100-BL on IX2-SFR or IX-SVL2 cross stages. Convenient if you have two different microscopes, one equipped with the Prior NZ100/NZ200 Nano Scan Z stage and the other one equipped with the IX2-SFR or IX-SVL2 cross stage and want to use the same incubator on both set-up.
	ZEISS	
64-2075	MANSA	Required for M-frame stages. It allows to fit H101-WJC, H201-MEC-SLIM and H301-EC-BL into M-frame stages.
	APPLIED PRECISION	
64-2076	H201-MEC-FST-DV-SI	Required for 51-603288-000 Deltavision Stage. Adapts H201-MEC-ROUND into 51-603288-000 Deltavision Stages.
	LUDL	
64-2077	XCR-FRAME-1	Required for 96A602 large aperture Piezo stages. Adapts H301-EC-BL into 96A602 large aperture Piezo stages.
	PHIAB	
64-2078	PHIPA	Required for M3 stages. Adapts H301-EC-BL into M3 stages.
	PRIOR	
64-2079	XCR-FRAME	Required for H117 motorized XY stages, fits H101-WJC and H301-EC-BL into H117 motorized XY stages.
64-2080	XCR-FRAME-WS	Required for H117 motorized XY stages, fits H101-WJC-SLIM into H117 motorized XY stages
	THORLABS	
64-2081	THORPA	Required for MLS203-1 and MLS203-2 motorized XY stages. Adapts H301-EC-BL into MLS203-1 and MLS203-2 motorized XY stages.
64-2082	THORPA-2	Required for MLS203-1 and MLS203-2 motorized XY stages. Adapts H201-MEC-SLIM into MLS203-1 and MLS203-2 motorized XY stages.
	OTHERS	
64-2083	PZ100-SA	Adapts H301-EC-NZ100-BL or H201-MEC-NZ100 on all XY stages that mount K-frame inserts. Convenient if you have two different microscopes, one equipped with the Prior NZ100/NZ200 Nano Scan Z stage and the other one equipped with a K-frame XY stage and want to use the same incubator on both set-ups.

Bold Line Cage Incubator

Complete systems include

- Microscope enclosure
- Stage top climate chamber
- Temperature controller with air heater
- Gas controller (CO_2, O_2, or dual CO_2/O_2)
- Humidity module
- Touch screen interface
- Smart box (optional)
- Obscuring panels (optional)
- Filter box (optional)

Bold Line Microscope Enclosure

A controlled environment all around the microscope.

The CO_2 Microscope Cage Incubator is designed to maintain the required environmental conditions for cell culture around your microscopy workstation, enabling prolonged observations on biological specimens and allowing space for other equipment.

Cells cultured within the microscope cage incubator have been shown to proliferate as well as in a regular bench-top incubator.

Models for any inverted and upright microscope are available. A wide choice of chambers and interchangeable plate adapters allow the use of any cell culture support (petri, glass slides, multiwell plates, and others). Compatible with manual and digital CO_2 / O_2 gas controllers.

Easy 'turn-to-open' assembly

'Turn-to-open' hinges permit direct removal of both the front and upper panel. Once these panels have been removed, the rest of the cage incubator can be easily moved backwards. When needed, the cage incubator can be reassembled in five minutes.

Full accessibility

Several doors on the front and side panels allow full and easy access to the microscope. In particular, two openings on the bottom of the front panel provide unrestricted access to the focus knob.

Additional doors can be added upon request.

Obscuring Panels

Obscuring panels can be assembled with the cage by means of turn to open hinges to create a darkeded environment for fluorescence experiments.

Bold Line Cage Incubator

Touch Screen, Temperature Controller and Optional Smart Box

Air Heater with filter

Temperature Controller - H201 T UNIT BL

The **H201 T UNIT BL** is the temperature controller used with the cage incubator, it includes the air heater, and requires the Oko-Touch for operation.

The controller keeps the specimen at the desired temperature by maintaining the temperature of the air blown into the enclosure. A filter box can be attached to the air heater to guarantee that the recycled air is dust and bacteria free. Temperature precision is 0.1°C from 3°C above ambient to 40°C.

The air heater has a double inlet and outlet to recycle the heated air. Flow rate and temperature sensors are continuously monitored and allow fast start- up and stable gradient free operation during the experiment. Air flow rate and temperature are set using the 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 the **H201 - T UNIT BL.**

In the specimen feedback mode, feedback is provided by a sensor placed inside the climate chamber near the specimen. Simple manipulation is required to attach the thermocouple into the reference well with adhesive tape.

In the enclosure feedback mode the sensor is measuring the temperature of the air inside the enclosure.
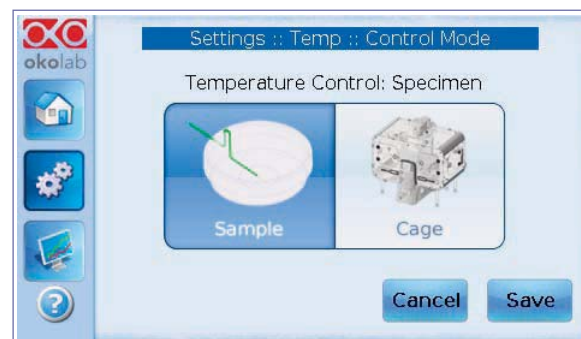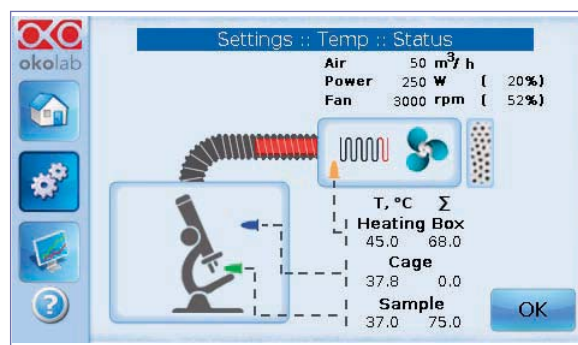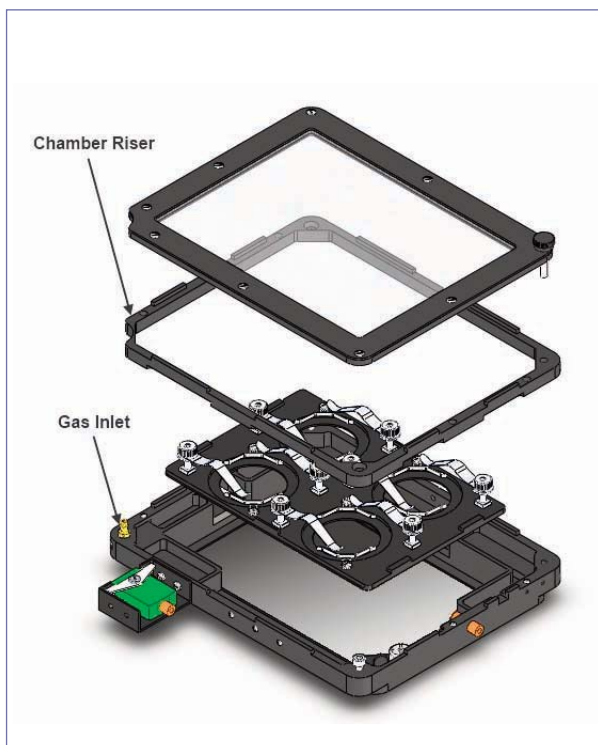
Cage Incubator Climate Chamber

Climate Chamber for local CO_2 and humidity conditioning

A controlled environment all around the microscope.

The climate chamber fits into the microscope XY stage or piezo inserts and hosts the sample. It creates a small volume inside the cage enclosure in which the pre-mixed and pre-humidified stream of air and CO_2 is continuously fed.

- Chambers available for any XY stage / piezo insert
- Slim profile allows proper placement of the condenser
- Interchangeable specimen holders
- Perfusion holes for inlet and outlet of tubes
- External temperature sensor

H-201-MEC-SLIM

Chamber Riser

Gas Inlet

H201-MEC-3xGS
For #3 1"x3" chamber slides

H201-MEC-1xGS-2x[57mm]GS
For #1 1"x3" chamber slide and #2 1"x2" chambered coverglass

H201-MEC-GS35
For #2 1"x3" chamber slides and #2 35mm petri dishes

H201-MEC-1xGS
For #1 1"x3" chamber slide

H201-MEC-GS60
For #1 1"x3" chamber slide and #1 60mm petri dish

H201-MEC-1x[57MM]GS
For #1 1"x2" chambered coverglass

H201-MEC-1x60
For #1 60mm petri dish

H201-MEC-4x35
For #4 35mm petri dishes

H201-MEC-1x35
For #1 35mm Petri-dish

H201-MEC-2x60
For #2 60mm petri dishes

H201-MEC-3560
For #2 60mm petri dishes and #1 60mm petri dish

Cage Incubator CO$_2$ - O$_2$ - 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 CO$_2$ and Air / N$_2$ controller
- Operated via OKO-Touch
- Compatible with Smart Box

Digital gas mixers	CO2 %	O2 %
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

- Set point resolution 1%
- Works with any microscope incubator
- CO$_2$ concentrations in the 0-15% range

Manual gas mixers	CO2 %	O2 %
2GF-Mixer	0-20	-
3GF-Mixer-Hypoxia	0-15	2-20
3GF-Mixer-Hyperoxia	0-15	40-85

Humidity Module

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

Bold Line Cage Incubator

Order #	Model Number	Description
64-2101	H201	Lexan Microscope Enclosure. Suitable for both inverted and upright microscopes. Same part number and price for all microscopes. Details and photos to specify the exact configuration of your scope will be needed at time of order
64-2102	H201-OP	Obscuring panels. They can be added to the lexan enclosure to create a dark environment
64-2103	H201-T-UNIT-BL	Temperature contol unit - Bold Line. Operated by the OKO-Touch. Can be equipped with the Smart Box for data-logging, remote operation and remote support
64-2007	Oko-Touch	Touch screen display
64-2008	SM-BL	Smart Box, data logger, web server
64-2104	H201-T-FILTER-BOX	HEPA filtering unit
64-2105	H201-FILTER KIT	Filter Kit (spare part)
64-2106	H201-BC	Bubbling column. Humidifies the gas stream before the inlet into the chamber.
64-2107	H201-MEC-SLIM	Universal Climate chamber. Fits into K-frame inserts. Check Fixing Tools sheet for the compatibility with other XY stages, accommodates 6-12-24-48-96 multiwell plates. For other supports, add the corresponding specimen holder
64-2108	H201-MEC-XCR	Climate chamber for Prior H117 motorised XY stage, accommodates 6-12-24-48-96 multiwell plates. For other supports, add the corresponding specimen holder
64-2109	H201-MEC-NZ500	Climate chamber for Prior NanoScan Z-stage NZ250 and NZ500, accommodates 6-12-24-48-96 multiwell plates. For other supports, add the corresponding specimen holder
64-2110	H201-MEC-ASI	Climate chamber for ASI stage, accommodates 6-12-24-48-96 multiwell plates. For other supports add the corresponding specimen holder
64-2111	H201-MEC-A602	Climate chamber for Ludl 96A602 Large Aperture Piezo stage, accommodates 6-12-24-48-96 multiwell plates. For other supports, add the corresponding specimen holder

Specimen holders compatible with H201-MEC-SLIM; H201-MEC-XCR; H201-MEC-NZ500, H201-MEC-ASI and H201-MEC-A602

Order #	Model Number	Description
64-2112	H201-MEC-1xGS2x[57mm]GS	One standard chamber slide and two 57mm chambered coverglass holder
64-2113	H201-MEC-GS35	Two standard chamber slide and two 35mm Petri-dish holder
64-2114	H201-MEC-GS60	One standard chamber slide and One 60mm Petri-dish holder
64-2115	H201-MEC-6035	One 60mm Petri-dish and two 35mm Petri-dish holder
64-2116	H201-MEC-4x35	Four 35mm Petri-dish holder
64-2117	H201-MEC-3xGS	Three standard chamber slide holder
64-2118	H201-MEC-2x60	two 60mm Petri-dish holder
64-2119	H201-MEC-1x35	One 35mm Petri-dish holder
64-2120	H201-MEC-1xGS	One Standard chamber slide holder
64-2121	H201-MEC-1x[57MM]GS	One 57mm chambered coverglass holder
64-2122	H201-MEC-1x60	One 60mm Petri-dish holder

Bold Line Cage Incubator

Order #	Model Number	Description
64-2123	H201-MEC-ROUND	Climate chamber for mechanical flat XY stage with circular opening (i.e. Nikon T/Ti-SR and T/Ti-SSR & Olympus IX2-SFR), accomodates 6-12-24-48-96 multiwell plates. For other supports, add the corresponding specimen holder
64-2124	H201-MEC-ROUND-2x35	Two 35mm Petri-dish holder. Circular bottom shape
64-2125	H201-MEC-ROUND-2xGS	Two standard chamber slides holder. Circular bottom shape
64-2126	H201-MEC-ROUND-2x[57mm]GS	Two 57mm chambered coverglass holder. Circular bottom shape
64-2127	H201-MEC-ROUND-1x35	One 35mm Petri-dish holder. Circular bottom shape
64-2128	H201-MEC-ROUND-1xGS	One standard chamber slide holders. Circular bottom shape
64-2129	H201-MEC-ROUND-1x[57MM]GS	One 57mm chambered coverglass holder. Circular bottom shape
64-2130	H201-MEC-ROUND-1x60	One 60mm Petri-dish holder. Circular bottom shape
64-2131	H201-MEC-NZ100	Climate chamber for Prior NanoScan Z-stage NZ100 and NZ200, accommodates one 35mm Petri-dish or one chamber slide
64-2132	H201-MEC-MCLTi	Climate chamber for Mad City Labs Nano-Z100-N Piezo stage on Nikon TI-S-E(-R) XY stage and for Physik Instrumente P-736K003 on Nikon TI-S-E(-R) XY stage. It does NOT require Okolab specimen holder since it uses same holders provided with the piezo
64-2133	H201-MEC-LG	Climate chamber Leica SP5 Super Z Galvo Stage. It requires at least one specimen holder
64-2134	H201-MEC-LG-MW	Multiwell plate holder
64-2135	H201-MEC-LG-GS35	Two standard chamber slide and two 35mm Petri-dish holder
64-2136	H201-MEC-LG-[57mm]GS35	Two chambered coverglass and two 35mm Petri-dish holder
64-2137	H201-MEC-LG-4x35	Four 35mm Petri-dish holder
64-2138	H201-MEC-LG-3xGS	Three standard chamber slide holder
64-2139	H201-MEC-LG-2x[57mm]GS	Two 57mm chambered coverglass holder
64-2140	H201-MEC-LG-1x35	One 35mm Petri-dish holder
64-2141	H201-MEC-LG-1x60	One 60mm Petri-dish holder
64-2142	H201-MEC-SP2	Climate chamber Leica SP2 Galvo Stage
64-2143	H201-MEC-SP2-2x35	Two 35mm Petri-dish holder
64-2144	H201-MEC-SP2-2xGS	Two standard chamber slide holder
64-2145	H201-MEC-SP2-2x[57mm]GS	Two 57mm chambered coverglass holder
64-2146	H201-MEC-SP2-2x60	Two 60mm Petri-dish holder
64-2147	H201-MEC-PI	Climate chamber for Physik Instrumente P-737.2SL piezo
64-2148	H201-MEC-PI-GS35	Two 35mm Petri-dish and Two standard chamber slide holder
64-2149	H201-MEC-PI-GS60	One 60mm Petri-dish and one standard chamber slide holder
64-2150	H201-MEC-PI-1x35	One 35mm Petri-dish holder
64-2151	H201-MEC-PI-1x60	One 60mm Petri-dish holder
64-2152	H201-MEC-UP	Climate chamber for upright microscopes. Allows the use of dipping lens. Requires at least one LID and one specimen holder
64-2153	H201-MEC-UPRIGHT-LID-F	Flat lid for long distance objectives.
64-2154	H201-MEC-UPRIGHT-LID-WIMM	Lid for immersion objectives. Made up of two parts: one part rests on the main body, while the upper part has a hole for objective insertion. The top part can slide on the fixed part, allowing movement of the H201-MEC-UPRIGHT.
64-2155	H201-MEC-UPRIGHT-LID-MM	Flat sliding lid. Suitable to use H201-MEC-UPRIGHT along with MicroManipulators.
64-2156	H201-MEC-UP-1x35	One 35mm Petri-dish holder
64-2157	H201-MEC-UP-1xGS	One standard chamber slide holder
64-2158	H201-MEC-UP-1x[57mm]GS	One 57mm chambered coverglass holder
64-2159	H201-MEC-UP-1x60	One 60mm Petri-dish holder

T Plates

Flat surface at controlled temperature - models available for any microscope

- Suitable for inverted microscopes
- Ideal for short term experiments
- Glass and metal versions available
- Touch screen interface temperature controller

T GLASS PLATE

A round heated plate with built-in temperature sensor fits into microscope XY stages with circular openings and provides a transparent surface at controlled temperature.

The conductive glass has a built in temperature sensor and when coupled with the PID temperature controller provides precise control of specimen temperature.

CONTROLLER

Controller features

- External Temperature Sensor (for Self Calibration Routine)

- Self Calibration Routine

- Two Temperature Channels (Built in Temperature Sensor and External Temperature Sensor)

- Zero Footprint, if attached with supplied suspension brackets

Self Calibration Routine

The self calibration is performed by placing the External Temperature Sensor into a Petri placed on the Plate and by selecting Self Calibration from the Touch Screen. The controller will adjust the temperature of the Plate in order to keep the specimen at 37°C.
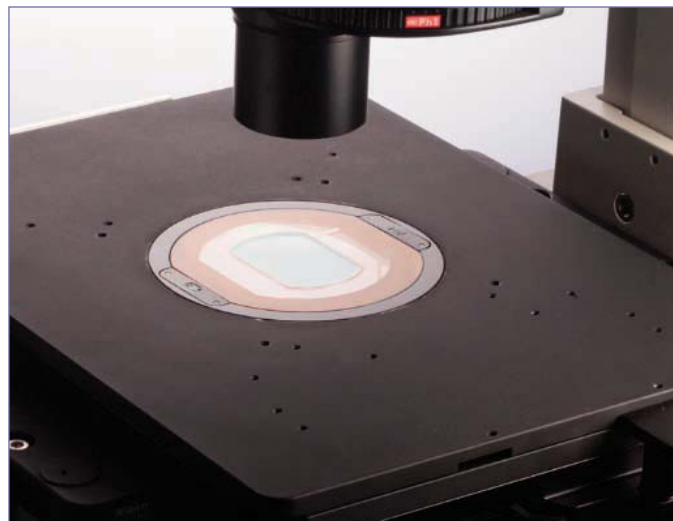
Technical Specifications

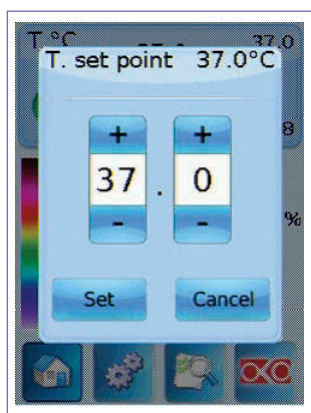|	
Glass thickness	1 mm
Temperature range	ambient to 40°C
Temperature sensor accuracy	±0.1°C
Temperature accuracy on specimen	±0.3°C
Plate Diameter	108 or 110 mm
Sensor	External Sensor for Calibration
Calibration routine	Auto
User interface	3, 2'' Touch Screen Controller
(Optional)	
Data Logger	RS232

T Plates

H401-HG-R108 on Nikon stage

H401-HG-R108 in self calibration

Set point page
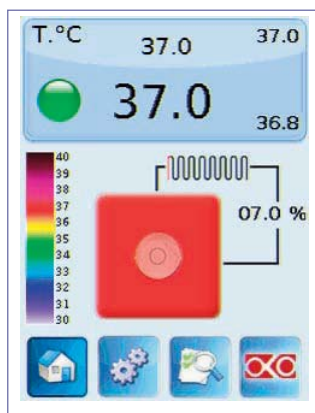
Home page

Settings page

Warm metal plate for Zeiss Primo Star

K-Frame Heated Insert

T Glass Table

Transparent flat surface at controlled temperature for stereo microscopes

- Suitable inverted microscopes
- Ideal for short term experiments
- Glass and metal versions available
- Touch screen interface temperature controller

Glass Table

The Heated Table fits on any stereomicroscope and provides a temperature controlled, transparent, and flat surface where the specimen can be placed. The built-in temperature sensor measures glass surface temperature and provides feedback to the PID controller.

The Table has two sets of supports, each with adjustable height. The 2 mm thick heated surface can be positioned from the bench top from 33 to 46 mm (with short supports) or from 80 to 110 mm (with tall supports).

Controller

The system is equipped with a modern PID controller with a 3.2" Touch Screen interface that offers accuracy and ease of use.

Controller features

- External Temperature Sensor (for Self Calibration Routine)

- Self Calibration Routine

- Two Temperature Channels (Built in Temperature Sensor and External Temperature Sensor)

- Zero Footprint, if attached with supplied suspension brackets

Self Calibration Routine

Self calibration is performed by placing the External Temperature Sensor into a Petri placed on the plate and by selecting Self Calibration from the Touch Screen. The controller will adjust the temperature of the Plate in order to keep the specimen at 37°C.

Options

Data Logger

The Data Logger logs up to four T GLASS PLATES via RS232. It is equipped with a Ethernet port for internet connection. Data are stored in local memory and can be downloaded via a Web Application or via direct connection of the data logger with a PC.
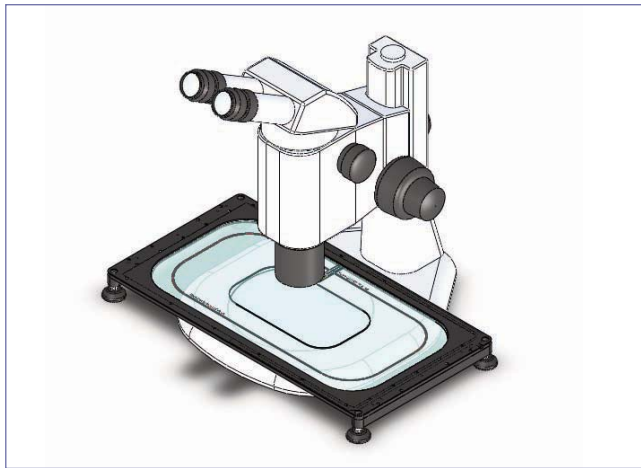
Gas Conditioning

CO_2/O_2 and humidity control can be achieved by using the Conditioning Jar and one of the Okolab Gas Controllers.

A small amount of gas at the desired CO_2 and O_2 level will be blown by the Gas Controller in the Jar to create a microenvironment at the desired temperature and gas concentration. A water reservoir can be inserted into the jar to reduce medium evaporation.

Technical Specifications

Glass thickness	2 mm
Temperature range	ambient to 40°C
Temperature sensor accuracy	±0.1°C
Temperature accuracy on specimen	±0.3°C
Table Dimensions	400 x 225 mm
Observation area	180 x 100 mm
Table height	adjustable in the ranges 30 - 46 mm or 80 – 110 mm
Sensor	External Sensor for Calibration
Calibration routine	Auto
User interface	3, 2" Touch Screen Controller
(Optional)	
Data Logger	RS232

T Glass Table

H401-HG-SMU with stereomicroscope

H401-HG-SMU with short supports height 30-46 mm
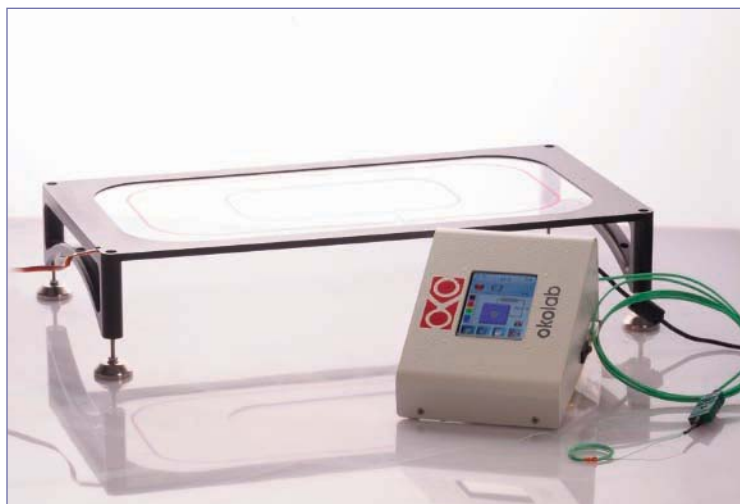

H401-HG-SMU with tall supports height 80-110 mm

Gas Conditioning Jar
H401-GCC -3019 &SFM

T Plates

Order #	Model Number	Description
		Controller
64-2084	H401-T	Warm Plate Temperature Controller. This unit controls warm plate temperature. Operating range: 3°C above ambient to 50°C. 24 V DC.
		Metal Plates
64-2085	H401-KF	Warm plate for K-frame inserts. It fits in microscope stages with 160x110mm XY stage insert
64-2087	H401-R110	Round Warm Plate. For stages with R110mm insert (OLYMPUS).
64-2088	H401-PZ100	Warm Plate for Prior Piezo Stage. It fits in Prior Nanoscan NZ100 and NZ200. It hosts one 35mm Perti.
64-2089	H401-CZPS	Warm Plate for Zeiss Primo Star. It fits on the manual stage of Zeiss Primo Star. It hosts one 35mm Perti or one glass slide.
64-2090	H401-DMIL	Warm Plate for Leica DMIL. It fits into the Leica DMIL manual stage and hosts one 35mm Perti.
64-2091	H401-R80	Round Warm Plate. It fits in microscope stages with 80mm circular central hole.
64-2092	H401-SA	Stage adapter to accommodate H401-R80 in microscope stages with rectangular insert (160x110mm).
64-2093	H401-CA88	Adapter to accommodate H401-R80 in stages with 88mm circular central hole.
64-2094	H401-CA110	Adapter to accommodate H401-R80 in stages with 110mm circular central hole.
		Glass Plates
64-2095	H401-HG0.5-R108	Heated Glass Round insert for mechanical stages with 108mm circular insert (Nikon). Glass Thickness 0.5 mm. Includes glass round insert and temperature controller.
64-2096	H401-HG1-R108	Heated Glass Round insert for mechanical stages with 108mm circular insert (Nikon). Glass Thickness 1 mm. It Includes: glass round insert and temperature controller.
64-2097	H401-HG0.5-R110	Heated Glass Round insert for mechanical stages with 110mm circular insert (Olympus). Glass Thickness 0.5 mm. Includes: glass round insert and temperature controller.
64-2098	H401-HG1-R110	Heated Glass Round insert for mechanical stages with 110mm circular insert (Olympus). Glass Thickness 1 mm. It Includes: glass round insert and temperature controller.
64-2099	H401-HG-KF	Heated Glass insert for XY stages with K-frame insert. Includes: glass rectangular 160x110mm insert and temperature controller.
		Heated Glass Table
64-2100	H401-HG-SMU	Heated Glass Universal Table for stereomicroscopes. Includes: glass table and temperature controller.

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UNO CO$_2$ Microscope Stage Incubator

- *Long term experiments at low cost*
- *Fits microtitre plate holders*
- *Designed for high magnification microscopy*
- *Temperature control from ambient (+3°C) to 50°C*
- *Support for 35 mm dishes and slides*

Versatile Design

The UNO Microscope Stage Incubator uses interchangeable plate adapters to accept a single 35 mm Petri dish, a glass slide, or chambered 57 mm cover glass.
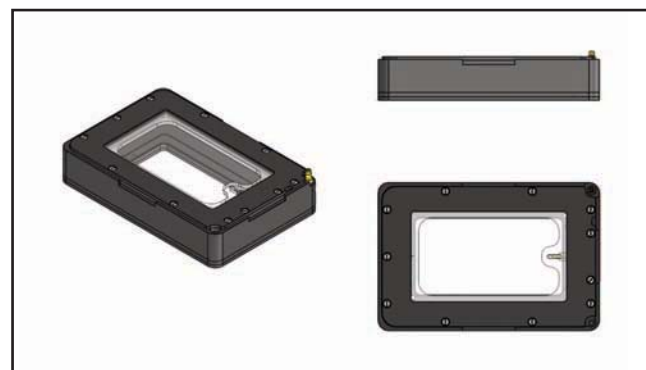
Temperature Regulation

Specimen temperature is regulated by the combined action of dual controllers embedded in the base and the lid of the incubating chamber. Operation is simple: Just select the desired plate adapter and the desired sample temperature.

Humidity Regulation

An improperly humidified gas stream will quickly evaporate the media surrounding the sample. The UNO controller automatically adjusts the temperature in the humidifier to correct for evaporative losses.

CO2 Regulation

The built-in, manual CO$_2$ controller continuously mixes air and CO$_2$, this stream is fed into the incubating chamber to control the pH of the media.
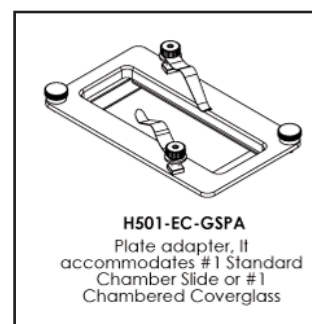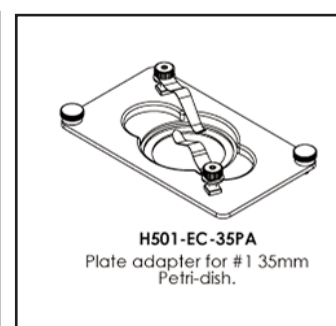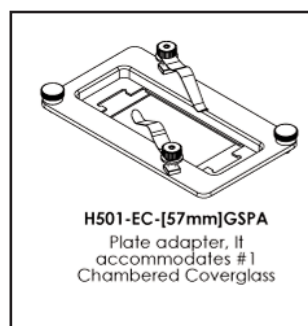

Technical Specifications

Temperature Range	Ambient (+3°C) to 45°C
Accuracy	±0.3°C
Heating Technology	Electric
Type of Controller	Hardware
Temperature feedback	Chamber temperature feedback
CO$_2$ range	0 to 15%

Physical Dimensions:

(L x W x H)	85.5 x 127.5 x 25.0 mm
Weight	310 g
Minimum condenser working distance	23 mm
Perfusion ports	12 (I.D. 2.5 mm)

H501-EC-[57mm]GSPA
Plate adapter, It accommodates #1 Chambered Coverglass

H501-EC-35PA
Plate adapter for #1 35mm Petri-dish.

H501-EC-GSPA
Plate adapter, It accommodates #1 Standard Chamber Slide or #1 Chambered Coverglass

Ordering Information

Cat. No.	Model	Product
64-2196	UNO	Complete CO2 stage incubator
64-2197	UNO -EC-1X35	35 mm Petri dish plate adapter
64-2198	UNO -EC-1XGS	1x3" chamber slide plate adapter
64-2199	UNO -EC-1X[57mm]GS	1x2" chamber slide plate adapter
64-2200	UNO -TS	Software
64-1999	OKO-AP	Air Pump

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