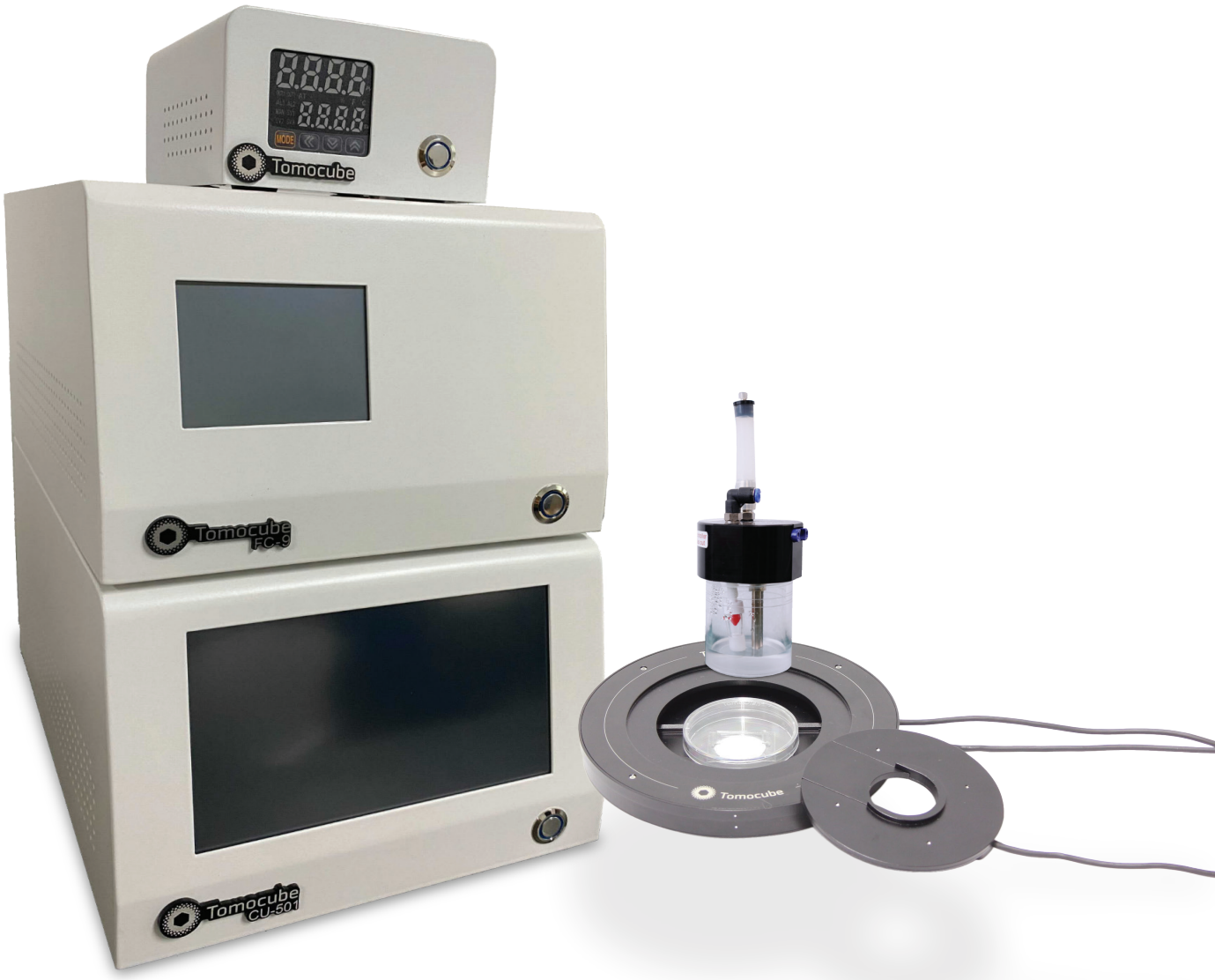
TomoChamber

User's Manual

Incubator system for Holotomographic microscope
TomoChamber

2021. Nov.
TPM-TC-01 TomoChamber_User_Manual (Rev.02)



CE RoHS compliant

- Made in Korea -

Table of Contents

1 Introduction

Thank you for purchasing TomoChamber. The following instructions are for your own protection and safety. Please read carefully to prevent any property damage or personal injuries. Make sure to keep this manual handy so it can be referred to when required.

⚠ Caution

tConnect the instrument to an electrical outlet according to local or country standard.

- Do not use the instrument for purposes other than those shown by the manufacturer.
- Do not turn on the instrument for 20 seconds if you turned off the instrument.
- Do not use the instrument before reading the service conditions described in the manual.
- Follow the instructions contained in the manual when changing any consumables.
- Do not use this instrument outdoors.
- The instrument should be kept stable and level.
- Do not leave this instrument in humid or wet conditions. It could cause an electrical short.
- Use the recommended volume of water for water reservoir.
- Before Installing the "lens warmer", check to keep focused objectives on completely.
- Be careful not to overflow the reservoir while pouring water.

Note

Please read the Instruction Manual before using the equipment. If the equipment is used in manner other than specified in this manual, safety is not guaranteed and equipment may be damaged which in this case will not be covered under warranty. Please make sure to follow the instructions. When encountered with any unexpected problems, please report immediately to your service representative or Tomocube support : support@tomocube.com / info@tomocube.com

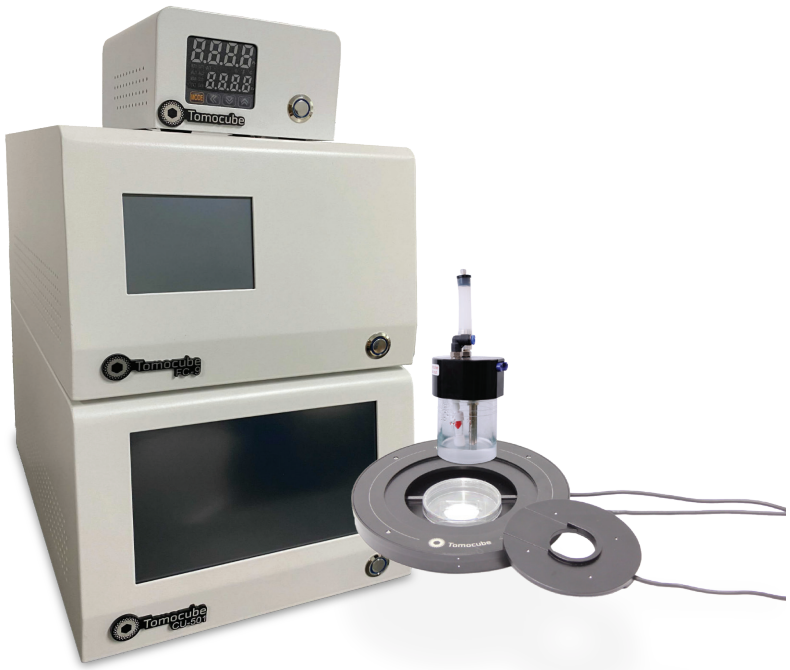
Environmental Conditions for Operation

Parameter	Description
Input power	AC 100 – 200V, 50/60Hz
Installation site	Indoor use only
Operating temperature	21~23℃

Check up

- Room temperature should be constant.
- Make sure the instrument is set to the correct voltage.

2 Components and Specification



- Usable on Holotomography microscope. (it requires an incubator holder)
- Water reservoir inside the incubator to maintain optimal humidity.
- According to the user's request, perfusion port can be made on the incubator.
- Temperature and the amount of gas influx can be controlled by computer software.
- 5-channel controller provided (4-channel temperature windows with an external temperature sensor.)
- Optimum mixed gas provided from FC-5N or FC-9.
- Touch screen control panel for all control functions.
- 1-channel controller and humidifier can be added optionally.
- Digital flow meter for pre-mixed gas.
- Real-time graph for all parameters.
- Automatic screen off function.
- Able to change internal parameter such as PID values in the setup mode.
- Alarm system alerts the undesired parameter changes.
- Able to check the operating state of the equipment via real-time graphic visualizations of all control parameters. (i.e. temperature, and the amount of gas flux)

2.1 Incubator (Incubating parts & warmer)

The name of the parts

Features

- Only for Holotomography microscope.
- Maintains the state within the incubator (37°C, 5% CO_2).
- Installation options such as Hypoxia type for low oxygen, perfusion type for media exchange.

Components

Component	Quantity
Incubator cover	1 unit
Incubator body	1 unit
Condenser Lens warmer	1 unit
Objective Lens warmer	1 unit
Water reservoir	1 unit
External temperature sensor	1 unit
Gasket	3 units

Note

The components of this product are subject to change without any notice in order to improve its performance.

Specification

Parameter	Description
Material	Black anodized aluminum alloy
Heating method	Cover: Thin layer heater
	Bottom plate: Thin layer heater
	Condenser Lens warmer: Thin layer heater
	Objective Lens warmer: Thin layer heater
Gas requirement	Premixed gas, typically 1 – 20% CO_2, air

CU-501 (5-ch temperature controller)

The name of the parts

[Front panel of the CU-501]

1 Touch screen panel

2 On/off switch

> **Note**
>
> Image can be different according to the version of the controller.

[Rear panel of the CU-501]

1 Gas outlet port

Connect it when you use it with the pre-mixed gas.

2 Gas inlet port

Connect it when you use it with the pre-mixed gas.

3 Ports for heating

Port for incubator cover / Main body / Objective Lens warmer/ Condensor Lens warmer/ External temperature sensor.

4 RS-232 communication cable

Connect it with PC for using CCP software.

5 RS-485 communication cable

Connect it with FC-5N (automatic gas mixer).

6 Cooling fan

Dissipates heat produced within the machine to the outside environment.

7 Earth plate

8 AC power cable inlet port

AC 100 - 200V, 50/60Hz.

9 Fuse box and Power socket (220V)

Features

- PID control system for precise temperature control of all electrical parts.
  (Incubator cover, Main body, Objective Lens warmer, Condensor Lens warmer and External temperature sensor)
- Detects ambient temperature and performs temperature variation. (Ambient +3°C ~ 45°C)
- CO_2 concentration can be adjusted without a gas mixer if 5% CO_2, 95% air gas is injected.

Components

Component	Quantity
CU-501 main unit	1 unit
Spare fuse	2 units
AC power cable	1 unit

Note

The components of this product are subject to change without notice in order to improve its performance.

Specification

Parameter	Description
Size	210 mm (X) x 290 mm (Y) x 145 mm (Z)
Weight	3.84kg
Material	Steel, powder coating
Temperature sensor	PT 100 ohm
Temperature control method	Continuous current control
Temperature range	Ambient +3°C ~ 45°C
Flow rate range	Up to 200ml/min
Flow meter	Digital mass flow control
Input Power	AC 100 - 200V, 50/60Hz

Caution

Please do not place CU-501 in a room where the temperature is not controlled or vibration is generated. And keep CU-501 out of the direct rays of the sun or don't expose it directly to the sun. CU-501 is working well in an air-conditioned room where the temperature is around 25°C.

2.2 FC-5N (Automatic CO_2 gas mixer)

The name of the parts

[Front panel of the FC-5N]

1 **Touch screen panel**

2 **On/off switch**

Note

Image can be different according to the version of the controller.

[Rear panel of the FC-5N]

1 **Gas outlet port (4Ø poly urethane tubing)**

2 **Gas inlet port (4Ø poly urethane tubing)**

3 **Filter**

Prevents foreign particles when external air enters.

4 **RS-232 communication cable**

Connect it with PC for using CCP software.

5 **RS-485 communication cable**

Connect it with CU-501. (Temperature controller)

6 **Cooling fan**

Dissipates heat produced within the machine to the outside environment.

7 **Fuse box and power socket (220V)**

8 **AC power cable inlet port**

AC 100 - 200V, 50/60Hz.

Features

- Automatic CO_2 gas mixing and supply system. (Maximum flow rate: 200ml/min)
- PID control system for precise control of CO_2 concentration.
- Produces CO_2 / air mixed gas from 100% gas cylinder and ambient air.
- Solenoid valve and a reservoir for gas ripening.
- Internal air pump to provide a large flow.
- Fuse inside the power needs replacement every 2 years.

Components

Component	Quantity
FC-5N main unit	1 unit
Gas control speed valve for 4Ø tubing	1 unit
Filter	1 unit
4Ø (O,D) tubing	1 unit
6Ø (O.D) tubing	1 unit
Spare fuse	2 units
AC power cable	1 unit

Note

The components of this product are subject to change without any notice in order to improve its performance.

Specification

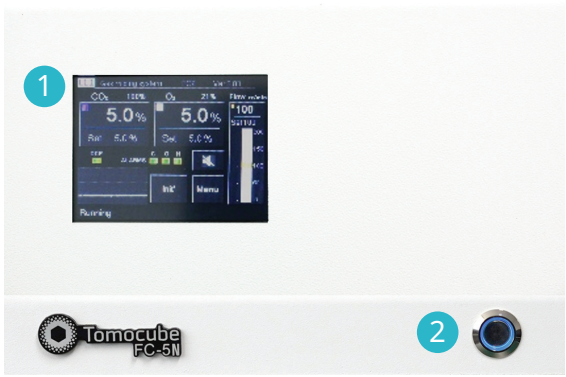
Parameter	Description
Size	210 mm (X) x 270 mm (Y) x 145 mm (Z)
Weight	4.77 kg
Material	Steel, powder coating
CO_2 control method	PID voltage continuous control, solenoid valve
Sensor	NDIR CO_2 sensor
Control range	1 – 20%
Flow rate range	Max.200ml/min
Software	CCP ver.7
Input Power	AC 100 – 200V, 50/60Hz

Note

Suggested to use Harris gas regulator on your gas cylinder.

2.3 FC-9 (Automatic hypoxia gas mixer)

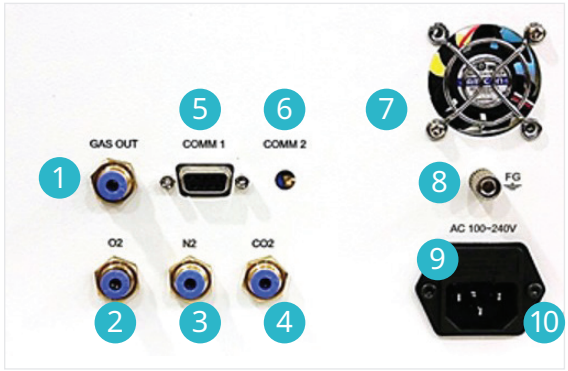
The name of the parts



[Front panel of FC-9]

1. **Touch screen panel**
2. **On/off switch**

> **Note**
>
> Image can be different according to the version of the controller.



[Rear panel of the FC-9]

1. **Gas outlet port (4Ø poly urethane tubing)**
2. **O_2 gas inlet (4Ø poly urethane tubing)**
3. **N_2 gas inlet (4Ø poly urethane tubing)**
4. **CO_2 gas inlet (4Ø poly urethane tubing)**
5. **RS-232 communication cable**
   Connect it with PC for using CCP software.
6. **RS-485 communication cable**
   Connect it with CU-501 (Temperature controller).
7. **Cooling fan**
   Dissipates heat produced within the machine to the outside environment.
8. **Earth plate**
9. **Fuse box and power socket (220V)**
10. **AC power cable inlet port**
    AC 100 - 200V, 50/60Hz.

Features

- Automatic CO_2 / O_2/ N_2 gas mixing and supply system. (Maximum flow rate: 200ml/min)
- PID control system for precise control of CO_2 / O_2/ N_2 concentration.
- Produces CO_2 / O_2/ N_2 mixed gas from 100% gas cylinder and ambient air.
- Solenoid valve and a reservoir for gas ripening.
- Internal air pump to provide a large flow.
- Fuse inside the power needs replacement every 2 years.

Components

Component	Quantity
FC-9 main unit	1 unit
Gas control speed valve for 4Ø tubing	1 unit
4Ø (O,D) tubing	1 unit
6Ø (O.D) tubing	1 unit
Spare fuse	2 units
AC power cable	1 unit

Note

The components of this product are subject to change without any notice in order to improve its performance.

Specification

Parameter	Description	
Size	210mm (W) x 270mm (D) x 145mm (H)	
Material	Steel, powder coating	
Weight	4.77kg	
Control	CO_2 concentration control	
	O_2 concentration control	
	Flow rate control	
Sensor	O_2	Thermal conductive flow sensor
	N_2	Thermal conductive flow sensor
	CO_2	NDIR CO_2 sensor
Control range	O_2	0 ~ 21 %
	CO_2	1 ~ 20 %
	Flow rate	Max. 200 ml/min
Control method	O_2	PID, dynamic orifice control valve
	CO_2	PID, solenoid valve
	N_2	PID, dynamic orifice control valve
Input power	AC 220V / 3A , AC 240V / 3A or AC110V / 5A	

2.4 CU-101 (1-ch temperature controller) and Humidifier

The name of the parts

[Front Panel of CU-101]

1. Screen panel
2. On/off switch

[Rear Panel of CU-101]

1. AC power port
2. AC 24V adapter cable

[Humidifier]

1. Humidifier bottle
2. Cap (Humidifier heater)
3. CO_2 gas inlet (4Ø Polyurethane tubing)
4. Overflow preventing tubing (6Ø silicone tubing)
5. AC cable port
6. Air stone
7. Sensor

Features

- PID control system for precise temperature control of humidifier.

Components

Component	Quantity
CU-101 main unit	1 unit
Humidifier	1 unit
Overflow preventing tubing	1 unit
4Ø (O.D) tubing	1 unit
2Ø (O.D) tubing	1 unit
AC power cable	1 unit
AC 24V adapter cable	1 unit

Note

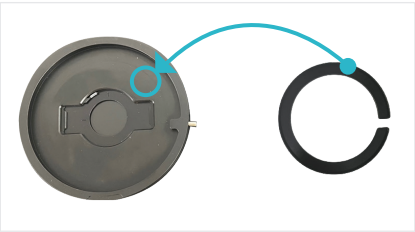
The components of this product are subject to change without any notice in order to improve its performance.

Specification

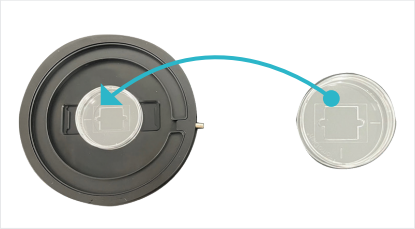
Parameter	Description	
Temperature range	Ambient +3°C ~ 70°C	
Recommended 5% CO_2/95% Air flow rate	40 ml/min	
Incubator physical dimension	159.5mm (W) x 109.5 (D) x 28.5 (H)	
Heating method	Glass cover	Built-in heater glass
	Main body	Thin layer heater
	Humidifier	Cartridge heater
Sensor	Thermo-couple	
Incubator material	Aluminum, black anodized cap, glass jug	
Input Power	AC 100 – 200V, 50/60Hz	

3 Parts name and Installation

3.1 Incubator (Incubating parts & warmer)

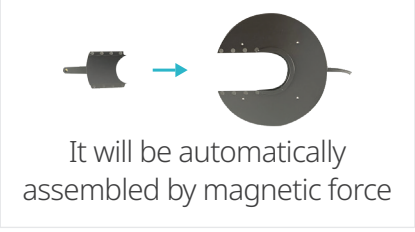


1 Place the water reservoir inside the incubator main body and pour water inside the water reservoir.



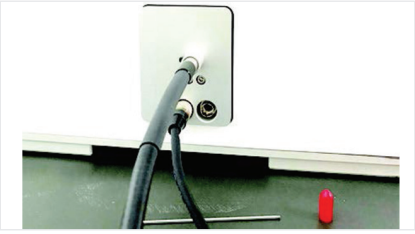
2 Place the Tomodish inside the incubator main body.

3 Close the incubator cover.

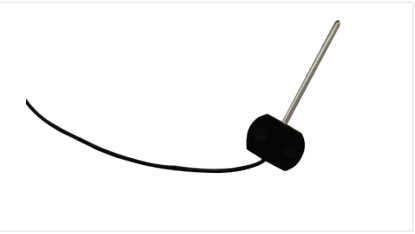


It will be automatically assembled by magnetic force

4 Place the incubator onto the microscope's stage. After adjusting lens's focus, assemble the lens warmer onto the condenser lens.



5 Connect the objective lens warmer which is installed within the objective lens of microscope.

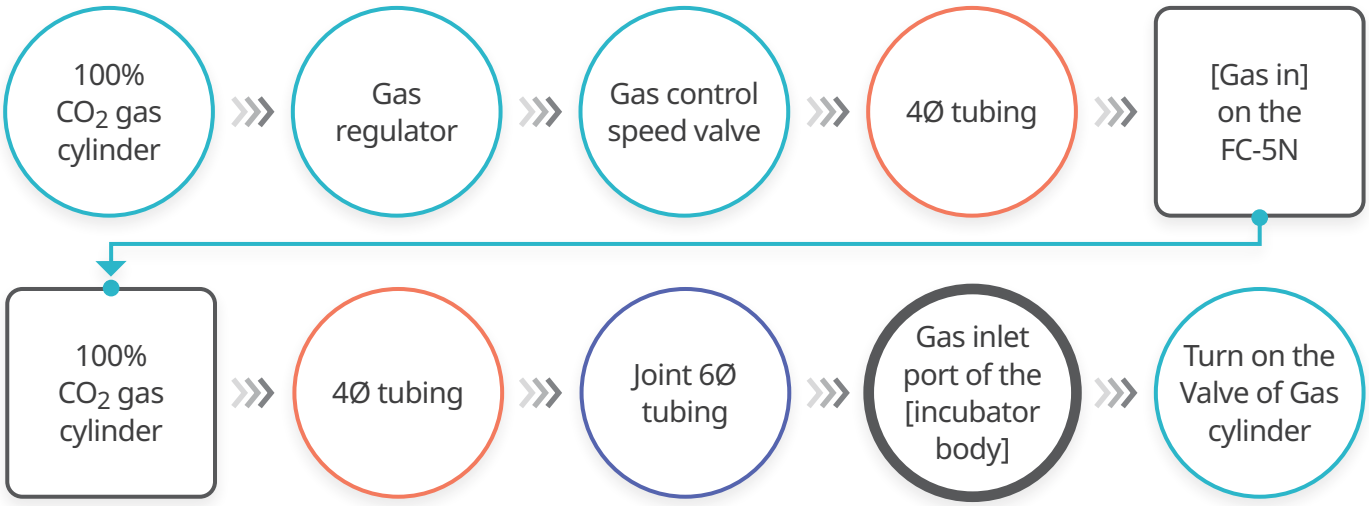


6 Magnetically attach external temperature sensor onto the main body of CU-501 (temperature controller).

7 If the humidifier is used, connect to 1-ch temperature controller (CU-101). (As guided in 19p.)

3.2 FC-5N (Automatic CO_2 gas mixer)

Connect all systems as the above figure

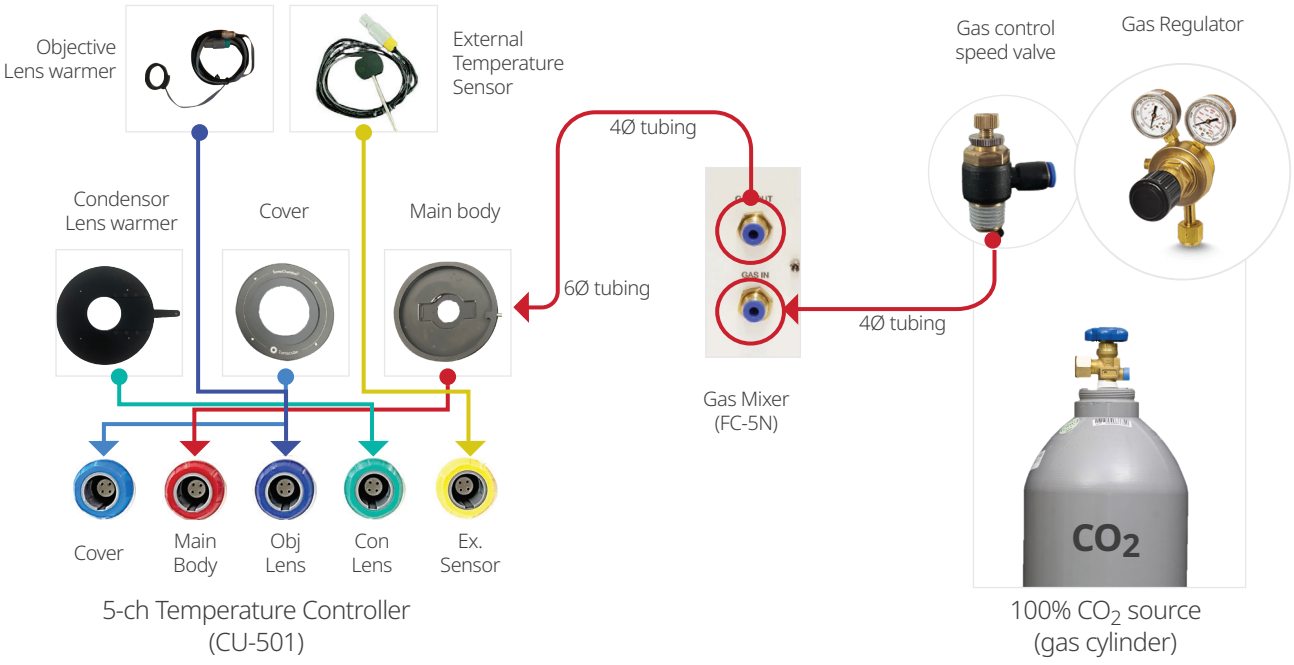


Note

Please turn on the TomoChamber 30 minutes before use. It will take several minutes to increase CO_2 value. It will go up to 6-7% and slowly comedown to 5% CO_2.

Gas pressure for regulator

0.3 bar 4.3 psi (50 cc/min)	0.5 bar 7.2 psi (100 cc/min)	0.8 bar 11.6 psi (150 cc/min)	1.1 bar 15.9 psi (200 cc/min)



Installation of the FC-5N

1. Connect a gas regulator with 100% CO_2 gas cylinder.
2. Remove the outlet fitting from the regulator and connect the “Gas control speed valve” with the regulator.
3. Using the provided 4Ø tubing, connect the "Gas control speed valve" and the FC-5N. (inlet port which have written as [gas in] on the rear panel).
4. Using the provided 4Ø tubing, connect the outlet port of the FC-5N and the inlet port of the incubator with 6Ø tubing.

> **Note**
> Using the provided 6Ø tubing, put 4Ø tubing in 6Ø tubing inside and connect 6Ø tubing and the inlet port of the incubator body (as guided in 32p).

5. If you want to connect the humidifier, use the provided 4Ø tubing inlet port of humidifier which is written as [GAS IN] and using the provided 6Ø tubing, connect outlet port of the humidifier.
6. Open the main valve of the 100% CO_2 gas cylinder and set the gas pressure to 1.5 kg/cm^2.
7. Rotate a wheel of the “Gas control speed valve” about one and a half turn.
8. Turn on the main switch of the FC-5N and CU-501 and set the gas flow rate on the FC-5N around 150 – 200ml.

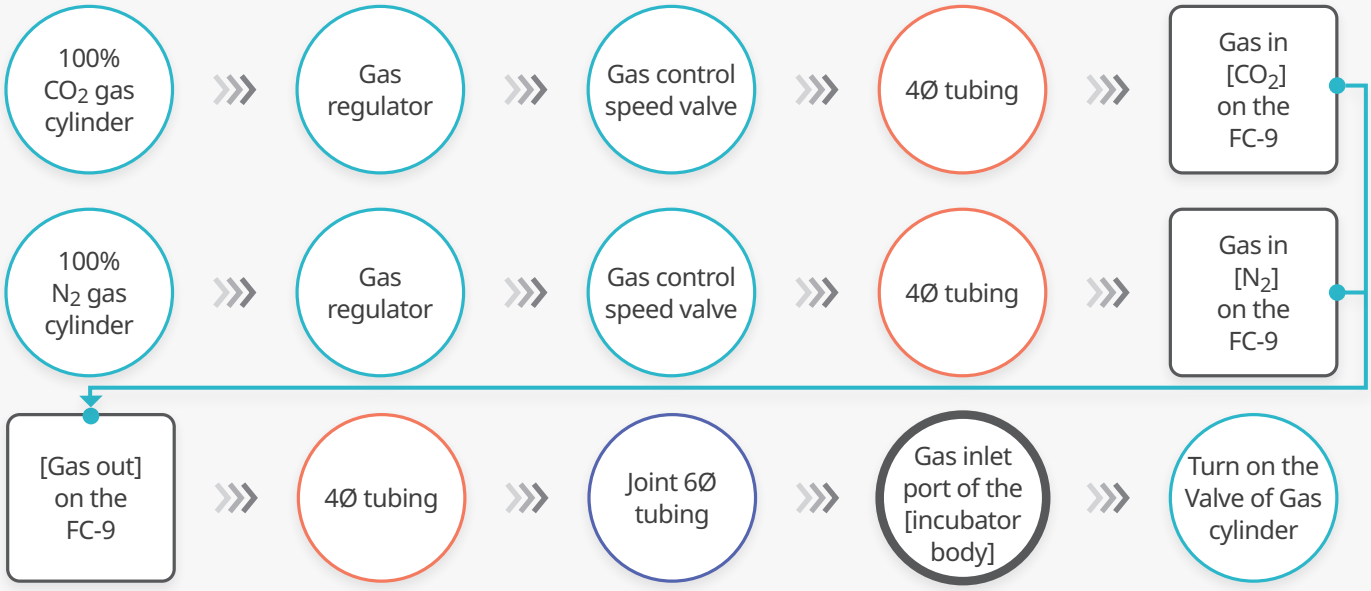
> **Note**
> If you connect the humidifier, please turn on CU-101.

9. After few minutes, please confirm whether the flow rate and the gas pressure are correct or not. If not, please try to adjust the controller again.

> **Important note**
> Do not misconnect the outlet and inlet of gas port.

3.3 FC-9 (Automatic hypoxia gas mixer)

Connect all systems as the above figure

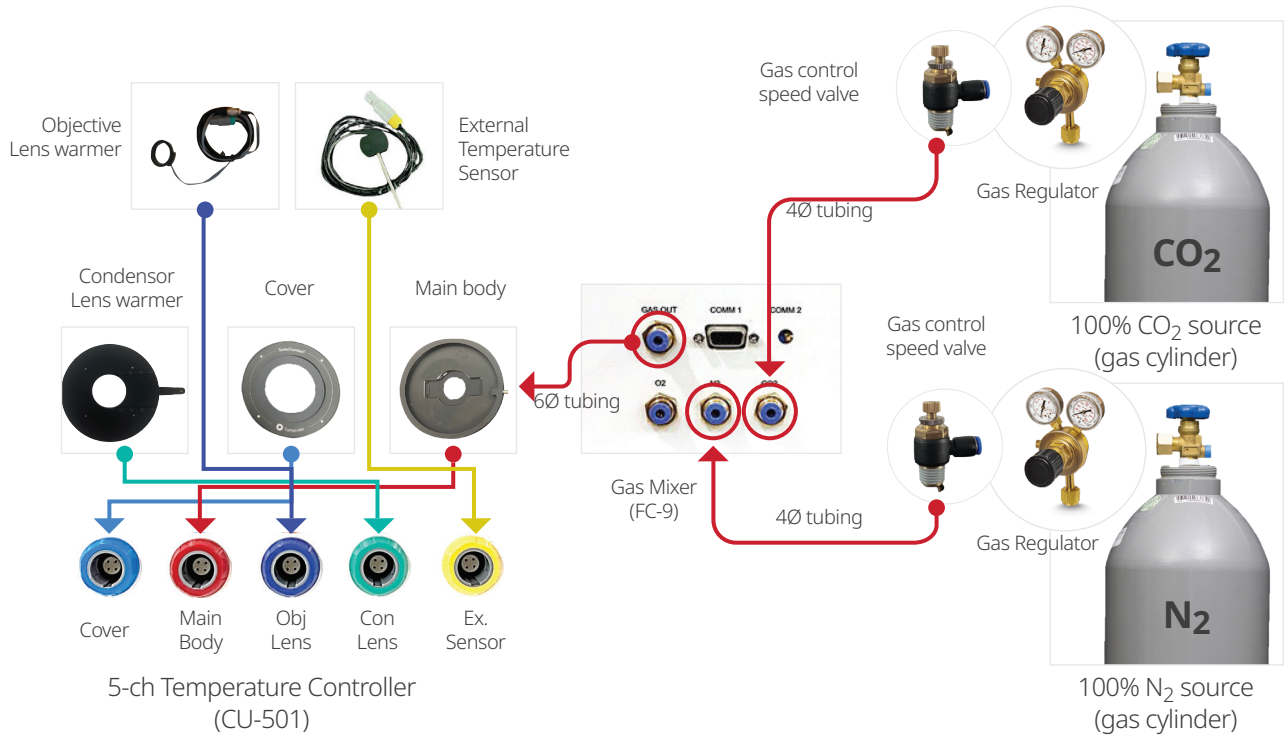


Note

Please turn on the TomoChamber 30 minutes before use. It will take several minutes to increase CO_2 Value. It will go up to 6-7% and slowly comedown to 5% CO_2.

Gas pressure for regulator

0.3 bar 4.3 psi (50 cc/min)	0.5 bar 7.2 psi (100 cc/min)	0.8 bar 11.6 psi (150 cc/min)	1.1 bar 15.9 psi (200 cc/min)



Installation of the FC-9

1. Connect the gas regulator to the 100% N2 / CO_2 gas cylinder.
2. Remove the outlet fitting from the regulator and connect to the "Gas control speed valve" with the regulator.
3. Using the provided 4Ø tubing, connect the "Gas control speed valve" and FC-9. (inlet ports which have written as [N_2] and [CO_2] on the rear panel).
4. Using the provided 4Ø tubing, connect the outlet port of the FC-9 (outlet port which has written as [GAS OUT] on the rear panel).

> **Note**
> Using the provided 6Ø tubing, put 4Ø tubing in 6Ø tubing inside and connect 6Ø tubing and the inlet port of the incubator (as guided in 32p)v.

5. If you want to connect the humidifier, use the provided 4Ø tubing inlet port of humidifier which is written as [GAS IN] and using the provided 6Ø tubing, connect outlet port of the humidifier.
6. Open the main valve of the 100% N_2 / CO_2 gas cylinder, and set the gas pressure to 1.5kg/cm^2. (around 11.4 psi, 0.8 bar)
7. Rotate a wheel of the "Gas control speed valve" about one and a half turn.
8. Turn on main switch of the FC-9 and CU-501, set the FC-9's gas flow rate on the FC-9 around 150 ~ 200ml.

> **Note**
> If you connect the humidifier, please turn on CU-101.

9. After a few minutes, please confirm whether the flow rate and the gas pressure are correct or not. If not, please try to adjust controller again.

> **Important note**
> Do not misconnect the outlet and inlet of the gas port.

3.4 Installation of the CU-101 and Humidifier

This is available to maintain the humidity inside incubator.

1. Fill the 1 Humidifier bottle with deionized warm water 90ml ~100ml.

2. Screw the 2 cap (Humidifier heater) down tight on the bottle.

3. Put 4Ø tubing into the 3 CO_2 gas inlet.

> **Note**
> When tubes are taken off the tubes holder, pull the tubes while pressing the tube holder. (color: blue)

4. Connect the 6Ø tubing with the 4 Overflow preventing tubing.

5. Connect the humidifier blue power cable to its 5 cap (Humidifier heater)

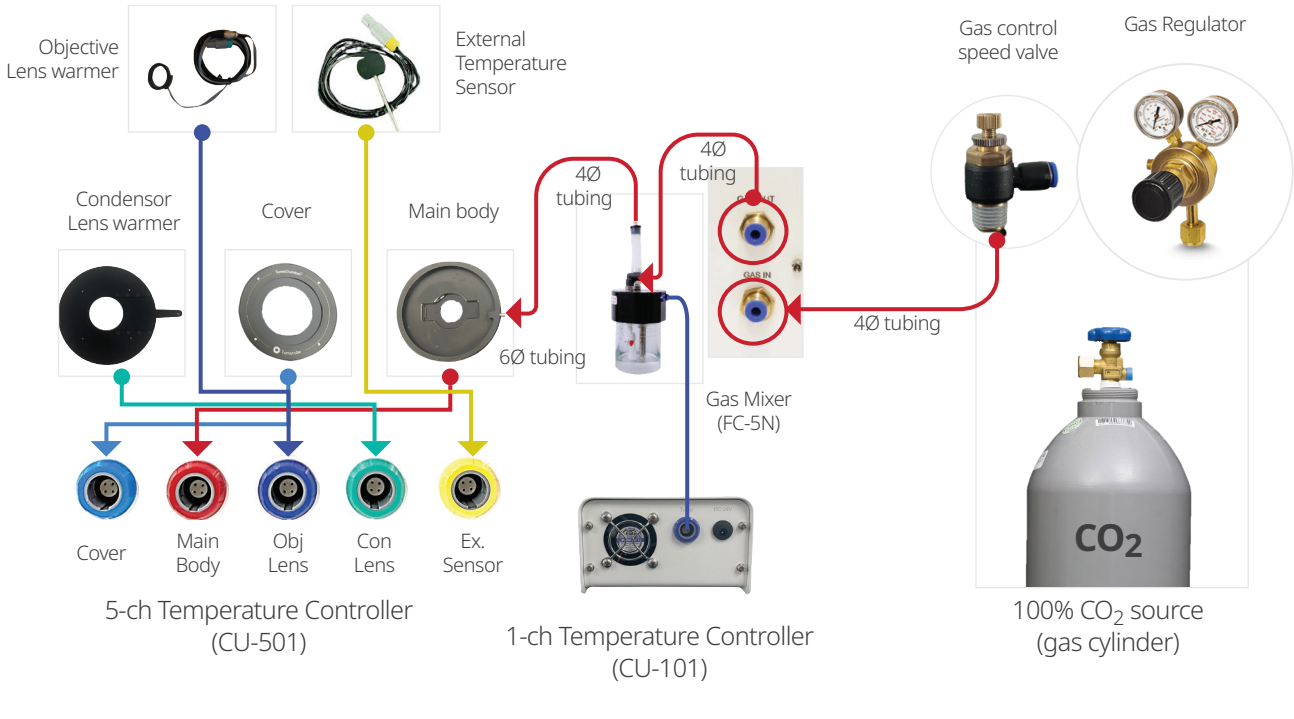
6. 1 AC power port in the rear panel of the controller.

7. Connect the AC adaptor and AC power, and then turn on the 2 On/Off switch located at the front.

Connect all systems as the above figure

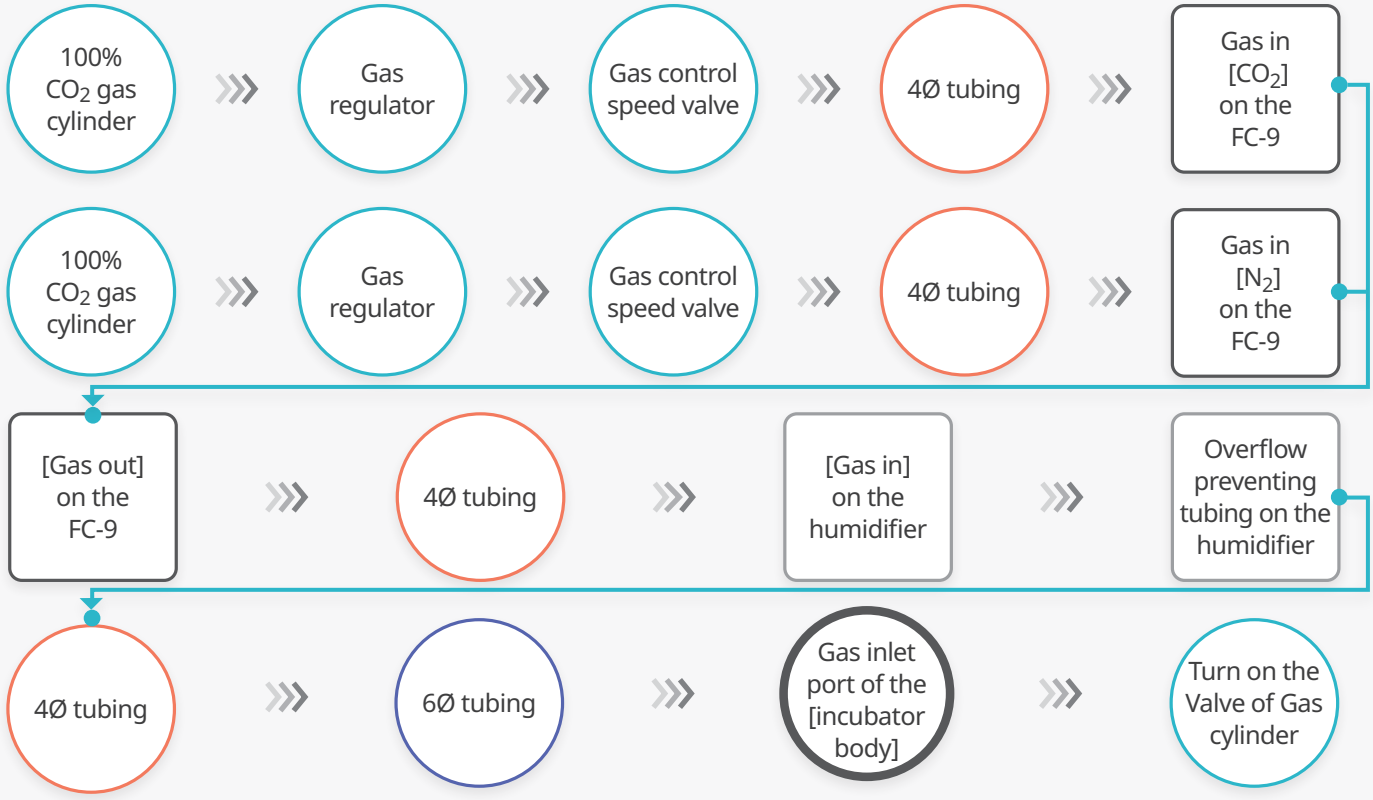
FC-5N (With CU-101 and Humidifier)

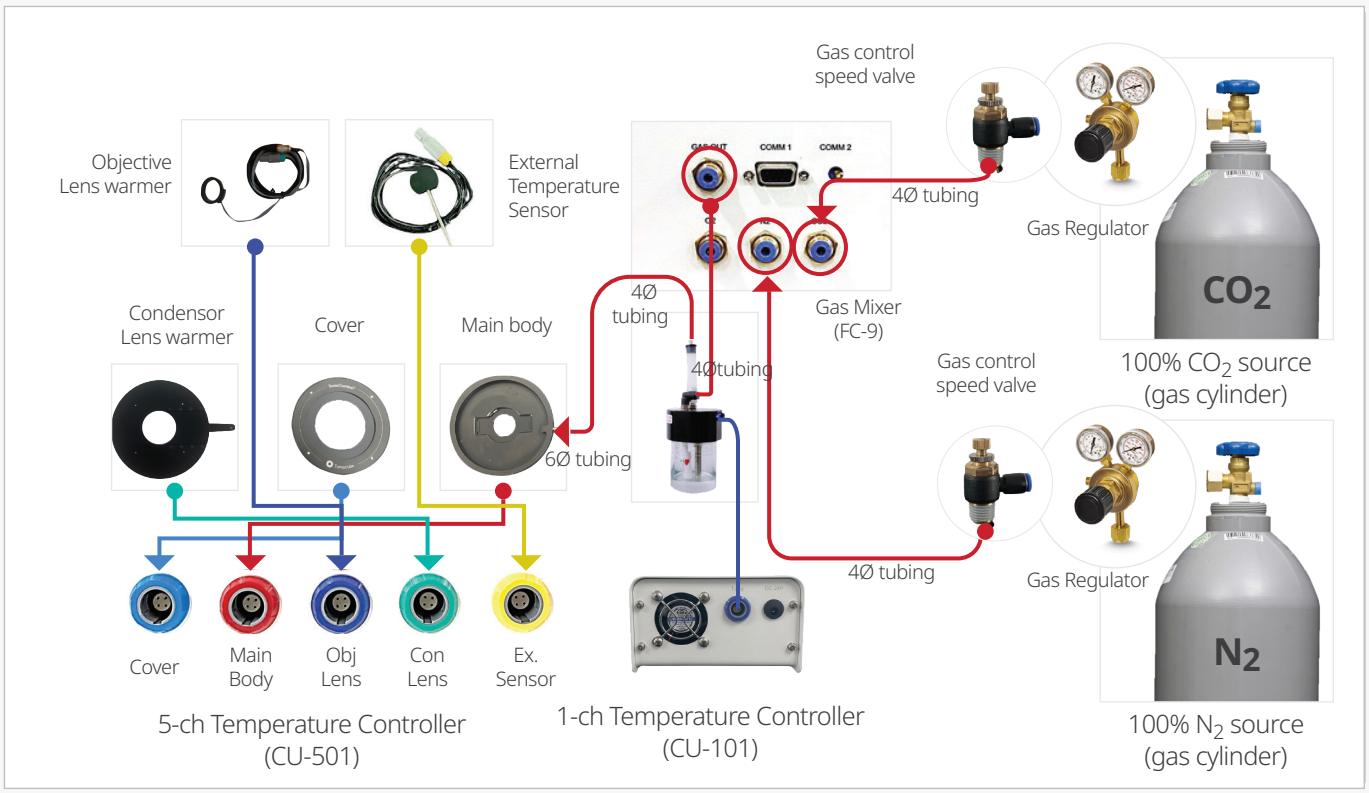
100% CO_2 gas cylinder → Gas regulator → Gas control speed valve → 4Ø tubing → [Gas in] on the FC-9 → [Gas out] on the FC-9 → 4Ø tubing → [Gas in] on the humidifier → Turn on the Valve of Gas cylinder → Gas inlet port of the [incubator body] → 6Ø tubing → Overflow preventing tubing on the humidifier



Connect all systems as the above figure

FC-9 (With CU-101 and Humidifier)





4 Turn on/ off the TomoChamber

To turn on

1. Using the provided power cable, please connect the controller to its power source.
   (CAUTION : Check AC voltage before connecting)
2. Face down the arrow on the connector, and then connect each connectors with compatible serial ports which have same colors with connectors. please turn on the main power switch located on the rear of the controller.
3. Pile up 3 yellow ground wires which are for main body, cover and condenser lens warmer and then insert their bezel into FG screw and fixing them by tightening the screw.
4. On the front panel, please push the on/off switch to turn on the controller.
5. Warm up for more than 30 minutes.

Installation on the stage

1. Apply water on the objective lens.
   (Caution : Do not click the focus button.)
2. Place the incubator body with the Tomodish onto the stage.
3. Put the incubator cover on to the body.
4. Click the focus button, then the stage will move down for more space.
5. Put the gasket on the center of Tomodish and condenser lens down.
6. Buckle up the condenser lens warmer.

To turn off

1. Please push the on/off switch to turn on the controller.
2. Remove the incubator from the stage of HT.
3. Wipe off the water on the humidifier.
4. Remove the water and tissue from the reservoir.

⚠ Caution

- **When the controller is not in use for a longer period of time, please turn off the power switch.**
- Do not wash the equipment with water.
- After use, make sure the remove all water completely, If some water remains, this can result in molting, breeding of bacteria and erosion.
- Do not use volatile materials such as benzene or thinner for cleaning. Use of such materials will discolor or damage key device surface.

5 Operation and set up

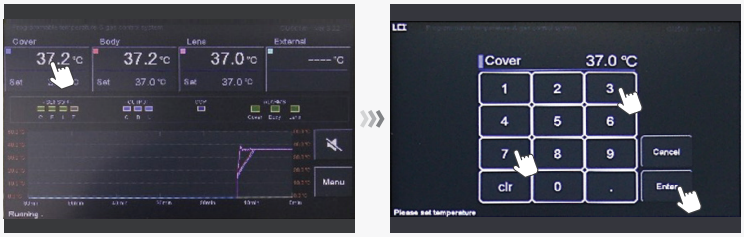
5.1 CU-501 (5-ch temperature controller)

Control panel configuration

In the main screen the button can be pressed to mute the alarm.

Temperature Setting (SV)

1. Click the [Temperature] button in the main window and keypad will appear.
2. Using the key pad, enter the temperature value you want and click [Enter] button.



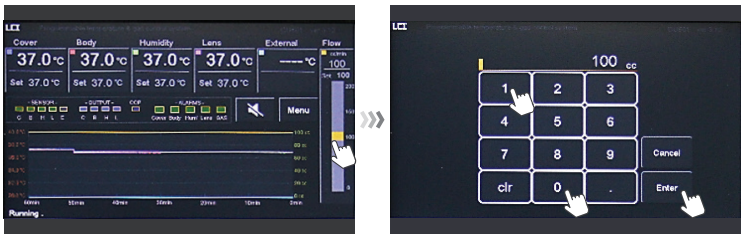
Note

Temperature range; ambient +3℃ ~ 45℃.

Flow Rate Setting

Instead of a fault-prone analog flow meter, CU-501 use a digital flow meter.

1. Touch the [Flow] button on the main window and keypad will appear.
2. Using the keypad, enter the flow rate you want and click [Enter] button.

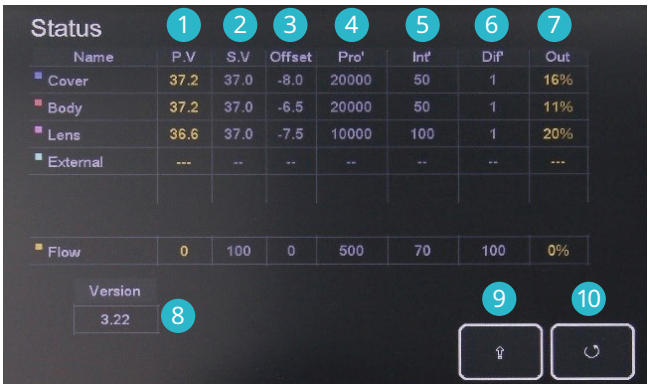


Note

Flow rate range; Up to 200 ml/min
If you use FC-5N or FC-9 with CU-501, please delete flow meter.

Setup Menu - Status

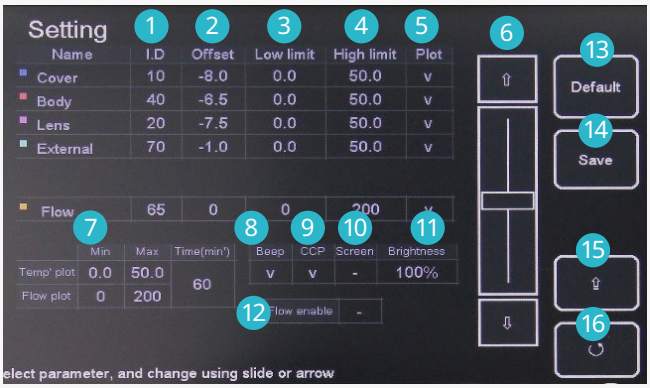
Status displays the present value of each parameter. Click [Menu] > Click [Status]



1. PV: Process value
2. SV: Set value
3. Offset: Present offset value
4. Pro': Proportional control value
5. Int': Integral control value
6. Dif': Differential control value
7. Out: Amperage
8. Version of software
9. Back to the menu
10. Back to the main display

Setup Menu – User setup

Defined values can be entered/ changed here. Click [Menu] > Click [Setup] > enter 1234 for access



Default User password : **1234**

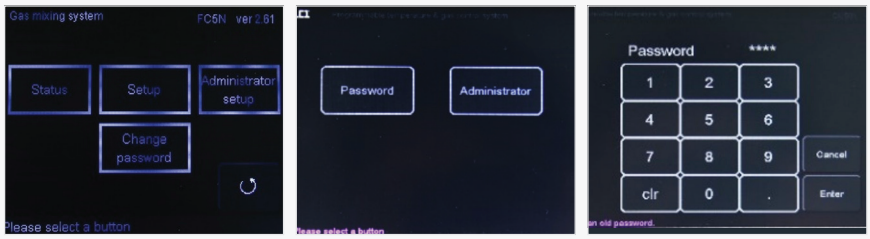
1. ID: The address of each channel
2. Offset: Uniformly control each channel's temperature
3. Low limit: Adjust the low limit of the temperature
4. High limit: Adjust the high limit of the temperature
5. Plot: Viewing particular parameters on the graph.
6. Scroll bar: Adjust each value slightly by moving the scroll bar
7. Temp. & Flow plot min/max/time: Set the graph interval and time of the main display
8. Beep: Turn on/off the beep
9. CCP: Communication with CCP software
10. Screen: Auto screen on/off
11. Brightness: Adjust the brightness of screen
12. Flow enable: the use of digital flow meter. Deselect it when you use the CU-501 with the FC-5N
13. Default: Reset the all changed setting value
14. Save: Save the changes
15. Back to the Menu
16. Back to the main display

Setup Menu – Administrator setup

Administrator setup mode to prevent a mechanical failure.
Please contact your service representative or Tomocube : support@tomocube.com /info@tomocube.com

Setup Menu - Change password

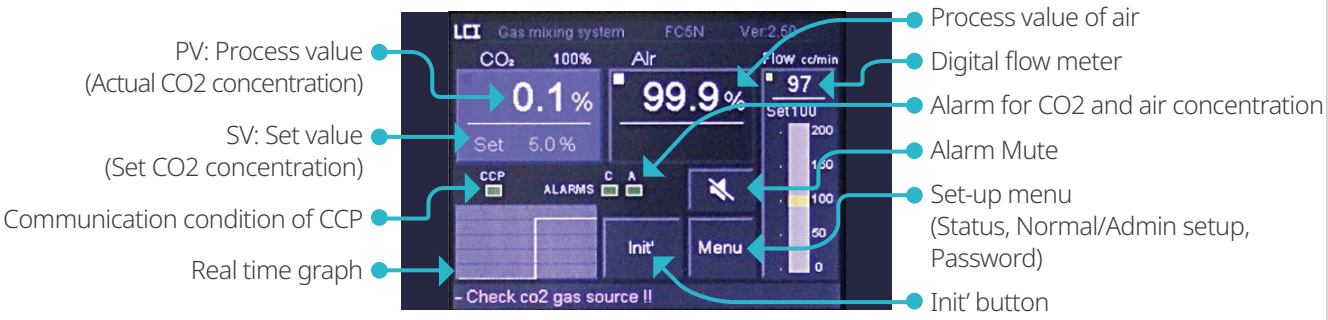
In the change password setting, the password of administrator setting and user setting can be changed.



Click [Menu] > Click [Change password] > Select either Password or Administrator > Enter new password > Click [Enter]

5.2 FC-5N (Automatic CO_2 gas mixer)

Control panel configuration



Concentration Setting (SV)

1. Click the [CO2 concentration] button. keypad will appear.
2. Enter the CO2 concentration value you want and then click the [Enter] button.

CO2 control range: 1~20%

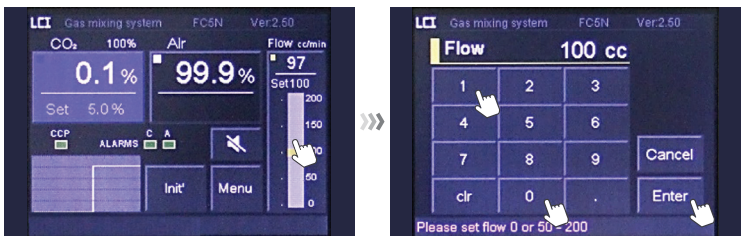
Flow Rate Setting

Ver. 2.70

Instead of a fault-prone analog flow meter, FC-5N use a digital flow meter.

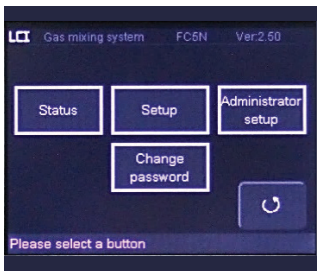
1. Click the [Flow] button in the main window. keypad will appear.
2. Enter the CO2 Flow value you want and then click the [Enter] button.

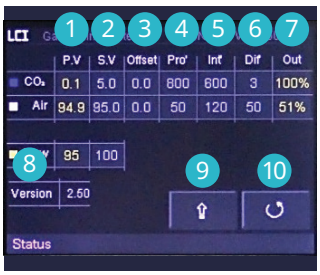
Flow rate control range: Max. 200ml/min



Setup Menu - Status

Status displays the present value of each parameter. Click [Menu] > Click [Status]

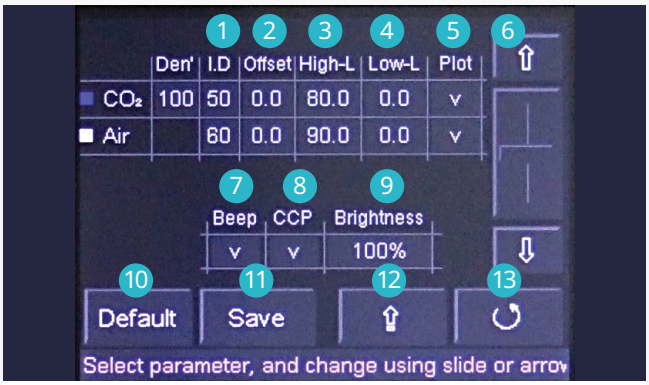




1. PV: Process value
2. SV: Set value
3. Offset: Present offset value
4. Pro': Proportional control value
5. Int': Integral control value
6. Dif': Differential control value
7. Out: Amerage
8. Version of software
9. Back to the menu
10. Back to the main display

Setup Menu – User Set up

Defined values can be entered/changed here. Click [Menu] > Click [Setup] > enter 1234 for access



Default User password : **1234**

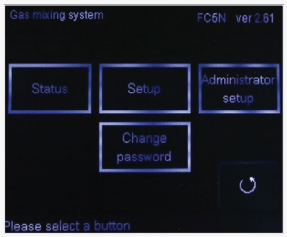
1. ID: The address of each channel
   (Usually do not need to change ID)
2. Offset: Offset value
3. High limit: Adjust the high limit of the concentration
4. Low limit: Adjust the low limit of the concentration
5. Plot: Viewing particular parameters on the graph.
6. Scroll bar: Adjust each value slightly by moving the scroll bar
7. Beep: Turn on/off the beep that making sound
8. CCP: Communication with CCP software
9. Brightness: Adjust the brightness of the screen
10. Default: Reset all changed value
11. Save: Save all changed value
12. Back to the Menu
13. Back to the main display

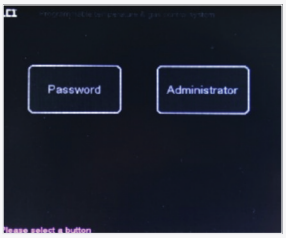
Setup Menu – Administrator setup

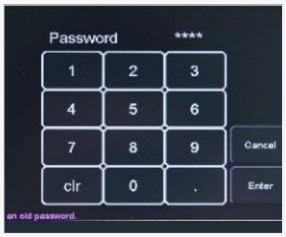
Administrator setup mode to prevent a mechanical failure.
Please contact your service representative or Tomocube : support@tomocube.com /info@tomocube.com

Setup Menu - Change password

In the change password setting, the password of administrator setting and user setting can be changed.



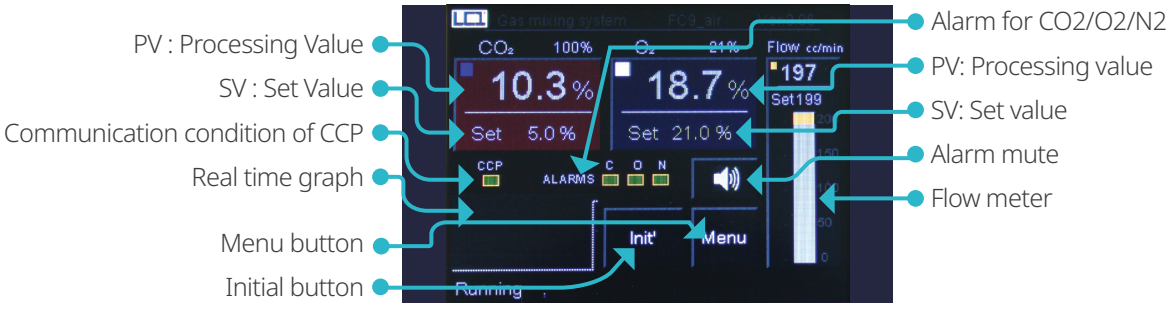




Click [Menu] > Click [Change password] > Select either Password or Administrator > Enter new password > Click [Enter]

5.3 FC-9 (Automatic hypoxia gas mixer)

Control panel configuration



CO2 Concentration Setting (SV)

1. Click the [CO2 concentration] button. Key pad will appear.
2. Enter the CO2 concentration value you want and then click the [Enter] button.

CO2 control range: 1~20%

O2 Concentration Setting (SV)

1. Click the [O2 concentration] button. keypad will appear.
2. Enter the O2 concentration value you want and then click the [Enter] button.

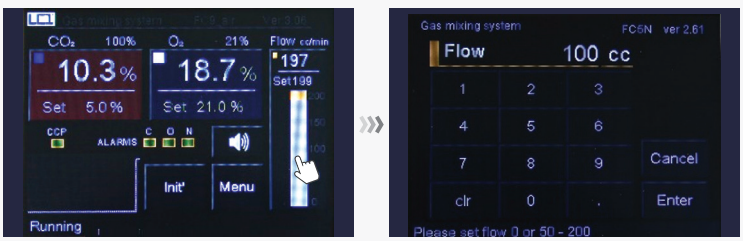
O2 control range: 0~21%

Flow Rate Setting

Instead of a fault-prone analog flow meter, FC-5N use a digital flow meter.

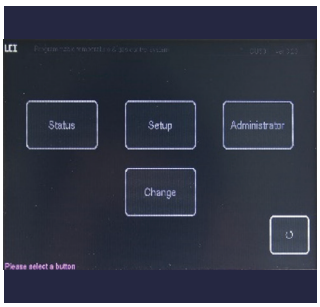
1. Click the [Flow] button in the main window. keypad will appear.
2. Enter the CO2 Flow value you want and then click the [Enter] button.

Flow rate control range: Max. 200ml/min



Setup Menu - Status

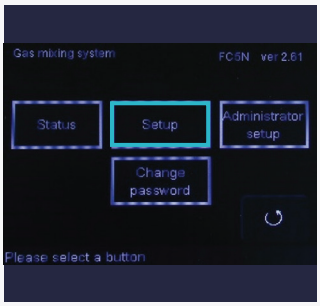
Status displays the present value of each parameter. Click [Menu] > Click [Status]

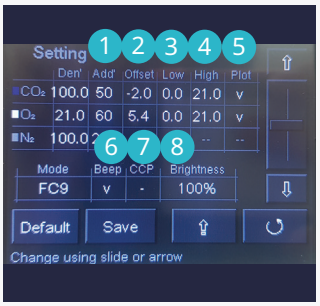


1. PV: Process value
2. SV: setting value
3. Offset: Offset value
4. Pro': Proportional control value
5. Int': Integral control value
6. Dif': Derivative control value
7. Out: Amperage
8. Version of software
9. Back to the menu
10. Back to the main display

Setup Menu – User Set up

Defined values can be entered and changed here. Click [Menu] > Click [Setup] > enter 1234 for access





Default User password : **1234**

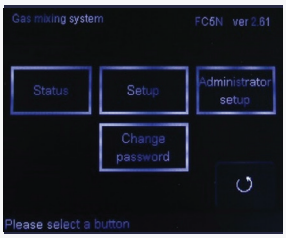
1. Add': ID of each parameter for CCP software
2. Offset: Offset value
3. High limit: Adjust the high limit of the concentration
4. Low limit: Adjust the low limit of the concentration
5. Plot: Viewing particular parameters on the graph
6. Mode: Product name
7. CCP: Check the box before using CCP with FC-9
8. Brightness: Adjust the screen brightness.

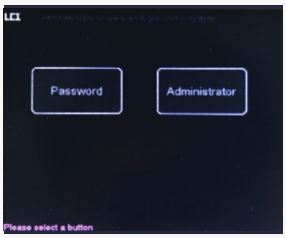
Setup Menu – Administrator setup

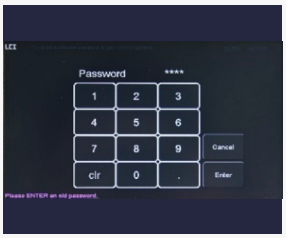
Administrator setup mode to prevent a mechanical failure.
Please contact your service representative or Tomocube : support@tomocube.com /info@tomocube.com

Setup Menu - Change password

In the change password setting, the password of administrator setting and user setting can be changed.







Click [Menu] > Click [Change password] > Select either Password or Administrator > Enter new password > Click [Enter]

5.4 CU-101 (1-ch temperature controller)

Control panel configuration

1. PV: Process value
   - Setting mode: It displays the parameter.
2. SV: setting value
   - Setting mode: It displays the set value of the parameter.
3. Unit (°C/°F/%) indicator: It displays the unit set at display unit [unit] in parameter 3 group.
4. Manual control indicator: It turns ON during manual controlling.
5. Multi SV indicator: One of SV 1 to 3 lamps will turn ON in case of selecting multi SV function.
6. Auto tuning indicator: It flashes by 1 sec. when executing auto tuning.
7. Alarm output (AL1, AL2) indicator: It turns ON when the alarm output is ON.
8. Control output (OUT1, OUT2) indicator: It turns ON when the control output is ON.
   - XDuring cycle/phase controlling in SSRP function model (TK4040480), when MV is over 5.0%, it turns ON.
   - X To use current ouput, when MV is 0.0% in manual control, it turns OFF. Otherwise, it always turns ON.
   - When MV is over 3.0% in auto control, it turns ON and when MV is below 2.0%, it turns OFF.
9. MODE : It is used when entering parameter groups, returning to RUN mode, moving parameter, saving the set value.
10. ◀ , ▼ , ▲ : It is used when entering the set value changing mode and moving or changing up/down digit.
11. Digital input key: When pressing + keys for 3 sec. It will operate the function at the same time (RUN/STOP, alarm clear, auto tuning) set at digital input key (di) in parameter 5 group.

Temperature Setting

1. Click ◀ to select the wanted number of digits of temperature
2. Click ▼, ▲ to reach the desired temperature value
3. Click [MODE] button again to confirm the SV value

⚠ Caution

- Fill it with water and connect the power. If the amount of water is insufficient, the machine may become damaged.
- Be careful not to bend the 6Ø tubing since it can cause backflow.
- Do not touch the humidifier cap and water bottle after putting the power on due to a risk of being burned.
- The limits of temperature ; Ambient +3°C ~ 70°C
- When you observe the cells less than 48 hour, It is recommended to set the temperature of the humidifier to 50~60 degree.
- When using the incubator system more more than 48 hour or the chamber without the cover, It is recommended to set its temperature to 70°C for preventing the evaporation of the medium.

6 Trouble shooting guide and additional equipment

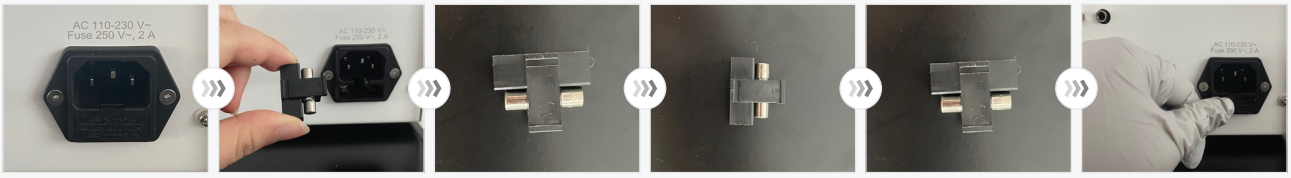
If the TomoChamber does not function properly, take appropriate action as described below.
If the problem is still not resolved after referring to troble shooting, please contact your service representative or Tomocube : support@tomocube.com /info@tomocube.com

Trouble shooting guide

6.1 All fuse replacement

Fuse is a safety device to prevent from overcurrent by snapping itself. If the fuse snapped due to overcurrent or its life has ended, you could use spare fuse that we provided. The way of re-placing fuse is as follows.

1. Turn off the main power on the front panel of the controller.
2. Open the fuse box using a wrench, and then take out the fuse box which contains a snapped fuse.
3. Take out the snapped fuse from the fuse box, and then replacing spare fuse that we provided.
4. Push the fuse box by hand.

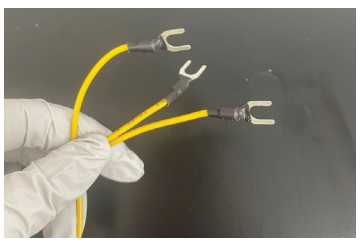


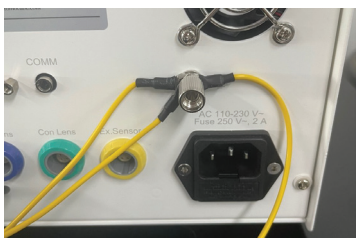
6.2 The way of installing earth plate of CU-501

1. The way of installing earth plate of CU-501.

2. Every channel has written their own name and distinguished by 5 different colors. Face down the arrow on the connector, and then connect each connectors with compatible serial ports which have same colors with connectors.

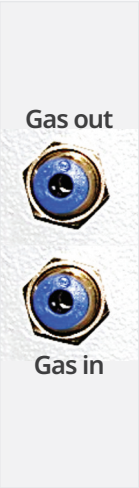
3. Pile up yellow ground wires which are for main body, cover and condenser lens warmer and then insert theirs bezel into FG screw and fixing them by tightening the screw.

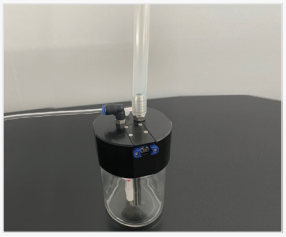




6.3 The way of connecting gas mixer and humidifier

Upper part is a gas outlet port, and lower part is a gas inlet port.





outlet port

Using a 4Ø tubing, connect gas outlet port of gas mixer and gas inlet port of humidifier or incubator

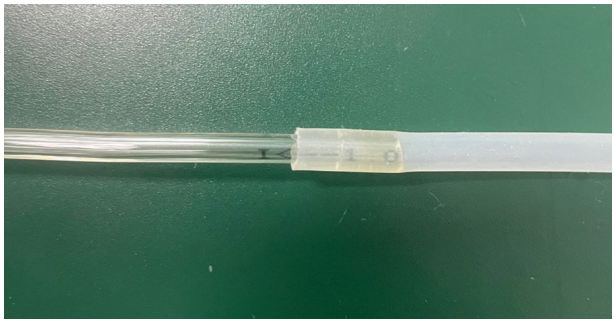
inlet port

Using a 4Ø tubing, connect pre-mixed gas cylinder and gas inlet port of CU-501 on the rear panel.

> **Note**
> DO NOT connect outlet port of CU-501 with intlet port of our gas mixer series such as FC-5N or FC-9, CU-501 is for pre-mixed gas and FC-5N and FC-9 is for 100% gas, our gas mixer only can directly connect with humidifier or incubator body.

6.4 The way of connecting 4Ø tubing into the 6Ø tubing

Incubator body does not have an inlet port for connecting 4Ø tubing
1. Cut the 6Ø tubing to 3 cm .
2. Put it in where 4Ø tubing connect with gas outlet port of gas mixier (FC-5N or FC-9).
3. Put in the incubator body 6Ø tubing.



> **Note**
> When the input gas running out or has any problem such as tubing disconnected during the experiment, It will appear Warning sign with sound as below letter.
> "Please check the gas source! Please try to connect the tubing again."

Additional Equipment

6.5 Water Reservior and Gasket

During long term time-lapse, water on the reservior may evaporate quickly and hence affect cells. Therefore, the water resorvior is filled with water to keep the humidity inside the incubator moist. (Using wet tissues and water will increase duration.)

Gasket : Maintains CO2 concentration within incubator

It is needed during long term time-lapse experiments to prevent evaporation of media. Before making condenser lens down, put on to center position of Tomodish. It will fit in to the condenser lens when it comes down.

6.6 Objective Lens warmer: Temperature controller of the objective lens in direct contact with Tomodish.

Connect the objective lens warmer which is installed within the microscope, and keep the lens temperature at 37°C.

Tomocube

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