



a CooperSurgical Fertility Company

## User Manual

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# G185

## CO<sub>2</sub>/O<sub>2</sub> Incubator



**Models: Standard and SensorTech**



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## Section 1 - Preface

Thank you for choosing a K-Systems product. We hope you will be happy with your G185.

At CooperSurgical, we strive to provide the very best products and solutions for human IVF and the G185 is designed to provide optimum conditions for your embryos during long-term culture.

For optimal use of your G185, please read and follow the instructions in this User Manual.

The incubator should be operated by trained personnel only. All sections of this manual should be read and understood fully before any operation of the incubator. If you are unsure of any of the information contained in this manual then you should contact Customer Services or an appointed representative before attempting to use this equipment. Keep these instructions close to the device, as this will ensure having easy access to the safety instructions and important information.

In no event does CooperSurgical assume the liability for any technical or editorial errors of commission, or omission; nor is liable for direct, indirect, incidental, or consequential damages arising out of the use or inability for you to use this manual.

The information in this manual is current at the time of publication. Our commitment to product improvement requires that we reserve the right to change equipment, procedures and specifications at any time. This user manual belongs with the G185 incubator and should be passed on with the incubator if relocated to another facility.

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## Section 2 - Safety

### Safety and Reliability

Please read this manual carefully and follow the instructions to ensure that the system will work safely and reliably. Safety is the responsibility of the laboratory. Risk assessment and working practices should comply with local regulatory policies.

### Warnings



**WARNING:** Use only 100% pure CO<sub>2</sub> and 100% pure N<sub>2</sub> gas. Use of other gases could result in serious injury, depending on the gas connected



**DO NOT:** Disassemble or modify any part of the G185, or substitute any component for any other. Doing so may result in damage to samples. This voids the warranty and/or service contract



**WARNING:** To avoid the risk of electric shock, this equipment must only be connected to a mains supply with protective earth



**WARNING:** Not to be used in a patient environment



**WARNING:** Use of accessories, transducers and cables other than those specified or provided by the manufacturer of this equipment could result in increased electromagnetic emissions or decreased electromagnetic immunity of this equipment and result in improper operation

## Cautions

2



### CAUTION

- **DO NOT** use the incubator if ShockWatch or TipNTell has been triggered or if the package is damaged
- Read and understand the manual completely before use. Keep the manual close to the unit
- Never use or handle this unit in ways other than specified in this manual. Your safety may be at risk and the unit may get damaged
- Never try to move the unit without consulting Customer Service
- Never use the unit if the alarm system of the device has issued a failure message and the cause of the failure has not been identified
- Protect the power cord from being damaged or being restricted in any way. Unplug the power cord from the wall socket or at the rear of the instrument to disconnect the mains supply
- Make sure that CO<sub>2</sub> and N<sub>2</sub> gas supply pressures are not above 1.0 bar and not below 0.5 bar
- Always keep the red caps on unused gas inlets and the sample port at the back of the unit
- Never use the unit without an genuine Coda Inline Filter
- **DO NOT** expose the filter to liquids. Change filters that have been exposed to liquids
- **DO NOT** leave lids open for more than 10 seconds
- **DO NOT** use the unit at ambient temperatures exceeding 30°C. Ambient temperature above 30°C will compromise the incubation process. The relative humidity must not exceed 75% (non-condensing)




## Guidance and Manufacturer's Declaration - Electromagnetic Emissions

The G185 is intended for use in the electromagnetic environment specified below. The customer or the user of the G185 should assure that it is used in such an environment.		
Emissions test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR11	Group 1	The G185 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR11	Class A – Complies	
Harmonic emissions IEC 61000-3-2	Class A - Complies	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Class A - Complies	

## Guidance and Manufacturer's Declaration - Electromagnetic Immunity

The G185 is intended for use in the electromagnetic environment specified below. The customer or the user of the G185 should assure that it is used in such an environment.			
IMMUNITY Test	IEC 61326-1 Test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD)  IEC 61000-4-2	$\pm 2, 4$ kV contact $\pm 2, 4, 8$ kV air	$\pm 2, 4$ kV contact $\pm 2, 4, 8$ kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/ burst IEC 61000-4-4	Not applicable	Not applicable	
Surge IEC 61000-4-5	Not applicable	Not applicable	
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	Not applicable	Not applicable	
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical commercial environment.

The G185 is intended for use in the electromagnetic environment specified below. The customer or the user of the G185 should assure that it is used in such an environment.









IMMUNITY Test	IEC 61326-1 Test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000-4-6	Not applicable	Not applicable	<p>Portable and mobile RF communications equipment should be used no closer to any part of the G185, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter</p> <p><b>Recommended separation distance</b></p> $d = \left[ \frac{3.5}{3} \right] \sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 1000 MHz  3V/m 1400 MHz to 2000 MHz  1V/m 2000 MHz to 2700 MHz	3 V/m  3V/m  1V/m	$d = \left[ \frac{3.5}{3} \right] \sqrt{P}$ 80 MHz to 800 MHz  $d = \left[ \frac{7}{3} \right] \sqrt{P}$ 800 MHz to 2,5 GHz  <p>Where <math>P</math> is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and <math>d</math> is the recommended separation distance in metres (m).</p> <p>Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,<sup>a</sup> should be less than the compliance level in each frequency range. <sup>b</sup></p> <p>Interference may occur in the vicinity of equipment marked with the following symbol:</p> 





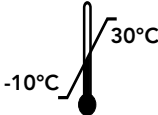
**NOTE 1** At 80 MHz and 800 MHz, the higher frequency range applies.

**NOTE 2** These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

<sup>a</sup> Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the G185 is used exceeds the applicable RF compliance level above, the G185 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the [System Name here].

<sup>b</sup> Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Symbol	Meaning
	<b>WARNING:</b> Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
	<b>CAUTION:</b> Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices
	Consult the User Manual for information needed for proper use of the device
	Manufacturer
	Date of manufacture
	<p>Waste electrical and electronic equipment</p> <ul style="list-style-type: none"> <li>CooperSurgical, and its distributors within the European Union and associated states, have taken the necessary steps to comply with the directive 2012/19/EU on waste electrical and electronic equipment (WEEE)</li> <li>The instrument, when reaching its end of life, must be collected and recycled separately from other waste according to national requirements</li> </ul> <p>Environmental implications: WEEE contains materials that are potentially hazardous to the environment and to human health (see page 50)</p>
	Serial Number
	Catalog Number
<b>WARRANTY Void IF BROKEN</b>	Warranty label

Symbol	Meaning
Sample Port	Sample port
GAS (MAX 1 BAR)	Gas Inlets CO <sub>2</sub> /N <sub>2</sub>
	Static sensitive (ESD)
	In accordance with Annex II of the European Medical Device Directive 93/42/EEC, as amended by Directive 2007/47/EC
	Authorized Representative in the European Community
	Humidity limits for storage Non-condensing
	Temperature limits for storage

## Section 3 - Installation

Installation of the G185 should be carried out by a CooperSurgical Service Technician or other authorized personnel. Incorrect installation could result in overall poor performance.

The G185 is designed as a stationary unit and, therefore, not to be moved once it has been installed. If the incubator needs to be relocated, please contact Customer Service.

### Before Installation

This incubator is transported in a crate and we recommend you inspect its delivery. If the ShockWatch or TipNTell has been triggered, inform customer service.

Check the contents to ensure all parts listed on the packing list are present.



### Placement

The G185 should be placed on a level, secure surface, away from heaters, coolers, air-conditioning outlets, mists, splash and direct sunlight. Allow 10cm of clearance on all sides to allow adequate ventilation.

Allow the G185 to acclimatize for two hours before installation.

To maintain a device setpoint between 35-40°C the preferred ambient temperature should be between 20-30°C. **DO NOT** use the incubator at ambient temperatures exceeding 30°C as this may compromise the incubation process.

This unit is designed for use at altitudes under 2,000 meters.



#### CAUTION

- Installation of the unit should only be performed by an authorized CooperSurgical Service Technician
- Never block any of the ventilation holes on the unit
- Make sure that all devices emitting electromagnetic radiation are kept at a reasonable distance from the unit in order to avoid any potential interferences
- Make sure the power circuits used are intended for medical equipment
- Make sure there is sufficient access to the device for ease of disconnection if required

### Section 4 - Intended Use

To provide an environment with controlled temperature at or near body temperature and gas level (CO<sub>2</sub>, O<sub>2</sub> and N<sub>2</sub>), for the development of human gametes and embryos during *in vitro* fertilization (IVF) treatment.

Applicable indications for use are subject to the regulations of the country into which the device is sold and also the availability of the G185 for clinical use is dependent on the regulatory approval status of the incubator within the country.

#### Applicable Part Numbers

Order Code	Description
K22400 - 110 K22400 - 230	Standard Incubator
K22200 - 110 K22200 - 230	SensorTech Incubator

#### Significant Performance Characteristics

The incubator has been developed and optimized for gametes and embryos cultured with an overlay of either paraffin or mineral oil. Each chamber is designed to contain dishes from one patient only.

#### Operation Principle

The fertilized egg (zygote) is cultured for up to 6-7 days in a growth medium in the incubator with a controlled environment (temperature and CO<sub>2</sub>/O<sub>2</sub>). It is then implanted in the same or another woman's uterus, with the intention of establishing a successful pregnancy.

#### User Profile

A trained health professional, who has the appropriate assisted reproduction technologies qualifications. Only qualified personnel trained in using the G185 should operate the incubator.



**CAUTION:** If the equipment is used in a manner not specified by this manual, the safety of the user may be at risk and the equipment may be damaged. Always use the equipment as stated in this User Manual

#### Operating Environment

To be used at ambient temperature in a medical environment, clinic or hospital laboratory under normal working conditions.

## Product Description

The G185 is composed of 10 separate culture chambers (2) and one larger warming chamber (3). The 10 culture chambers are exposed to both heat and gas mixtures while the Dry Bath Chamber is exposed only to heat.

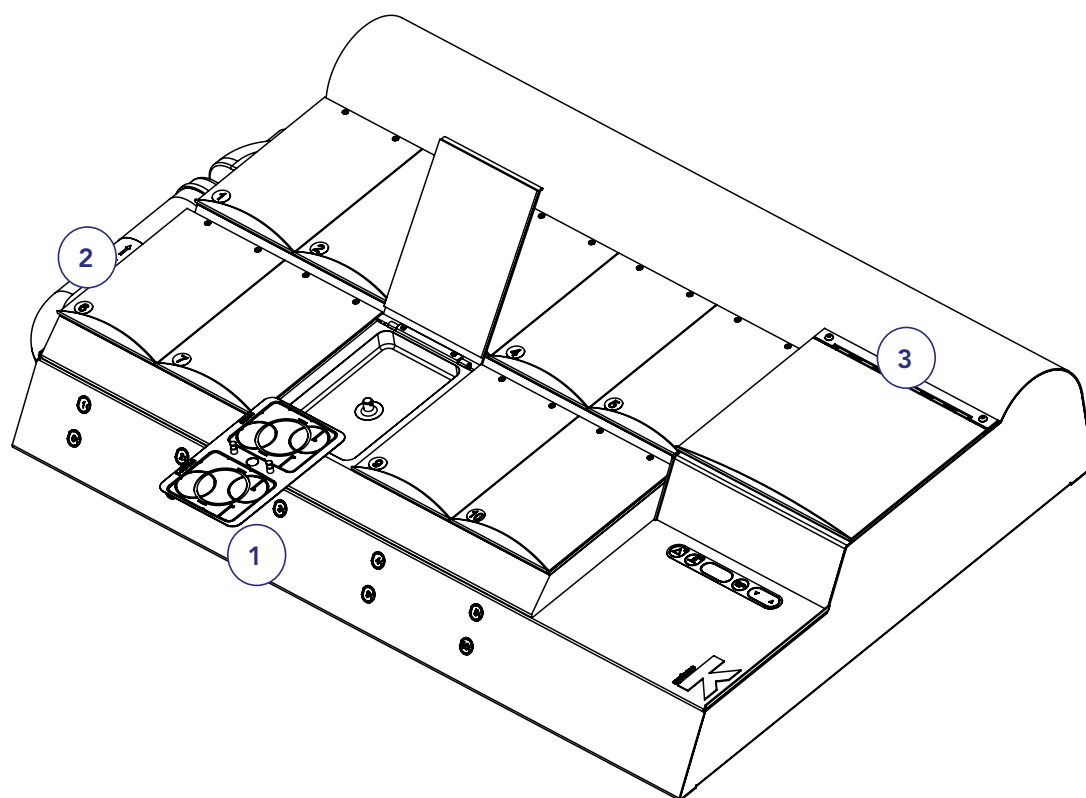
The gas is constantly cleaned for particles, volatile organic compounds and bacteria by circulation through a HEPA and VOC filter.

The CO<sub>2</sub> concentration is monitored by using a CO<sub>2</sub> sensor and the O<sub>2</sub> level is monitored by an O<sub>2</sub> sensor placed in the gas mixing chamber (built inside the incubator).

## Dish Inserts

The chambers should only be fitted with special Dish Inserts (1), that allow safe placement of standard culture dishes (Falcon, Nunc, Vitrolife).

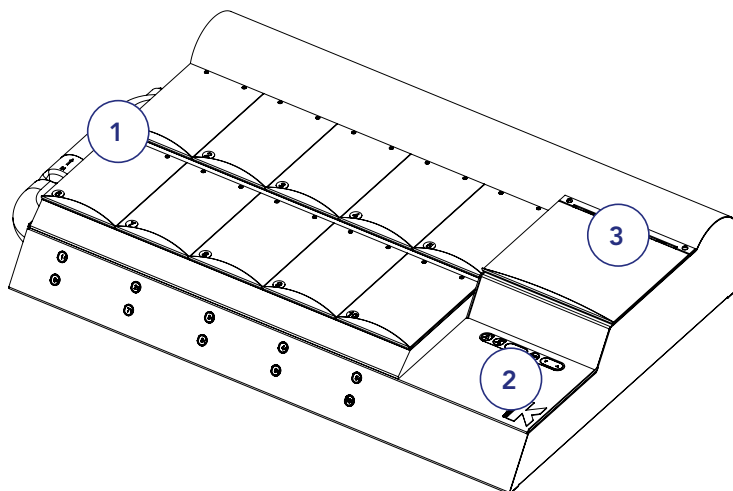
Ensure the culture dishes are placed securely in the correct milled grooves of the Dish Inserts.



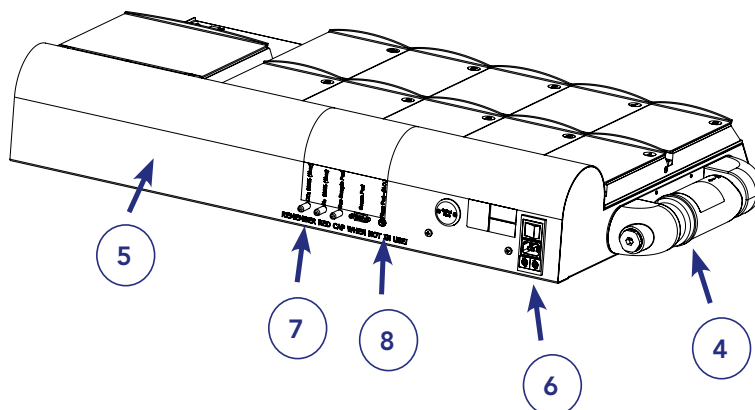
## Section 5 - Product Overview

### Main Components

	Components
1	Incubator Chambers
2	User Interface
3	Dry Bath Chamber
4	Coda Inline Filter
5	Product label
6	Mains connection with fuse
7	Gas inlet connectors
8	Alarm output



*G185 Standard and SensorTech models - front view*



*G185 Standard model - back view*



## Supplied Accessories for G185 Incubator

Quantity	Part Number	Description
1	2-02-650	Mains Cable UK Plug 230V
1	2-02-651	Mains Cable Schuko Plug 230V
1	2-02-652	Mains Cable USA Plug 115V
1	2-02-662	Mains Cable Aus/China Plug 230V
2	11066	Silicone Tube (3 metre)
4	22123	Silicone Sealing Rings
2	53830	HEPA Inline Filter
2	59549	Coda Inline Filter
10	57263	Magnetic Pads for Incubator
1	33098	USB (Datalogger Software)
1	57314	USB Converter Cable

## Accessory Order Codes

Order Code	Description
23063-1	Dish Insert Falcon 1 pc
23064-1	Dish Insert Nunc 1 pc
23069	Dish Insert Vitrolife 1 pc
23060-1	Dish Insert Nunc pH Online Sensor (SensorTech models only)
23061-1	Dish Insert Falcon pH Online Sensor (SensorTech models only)
23079	Dish Insert Vitrolife pH Online Sensor (SensorTech models only)
59549	Origio Coda Inline Filter
53830	HEPA Inline Filter
57214	Lid Seal for culture chambers
57272	Lid Seal for Dry Bath Chamber
11103	G100 Gas Analyzer
11006	Solid Temperature Sensor (use with K-Systems F100 Thermometer)
33070	User Manual

## Technical Specifications

Overall dimensions, (L x W x H)	922 x 570 x 165mm (with filter connected)	
Weight	38kg	
Ambient conditions		
Max. ambient temperature during operation	30°C	
Min. ambient temperature during operation	20°C	
Max. storage temperature	30°C	
Min. storage temperature	-10°C	
Humidity		
Max. humidity during operation	% R.H.	75, non-condensing
Max. storage humidity	% R.H.	95, non-condensing
Filters		
VOC Filter Coda Inline Filter	1 pc	high-efficiency, acid-washed, granular-activated carbon combined with HEPA
Gas Inline Filter, HEPA	2 pcs	50mm HEPA disc filter for the protection of internal circuits
Gas and Temperature		
Temperature Range	From ambient T°- 42.9°C	
CO <sub>2</sub> range	2 - 10%	
O <sub>2</sub> range	2 - 20%	
Temperature specification (zone) accuracy	Better than +/- 0.3°C deviation	
CO <sub>2</sub> gas control accuracy	Better than +/- 0.2% average	
O <sub>2</sub> gas control accuracy	Better than +/- 0.2% average	
Gas Consumption (typical)		
CO <sub>2</sub>	1.5l/h	
N <sub>2</sub>	7l/h	
Recovery time		
CO <sub>2</sub>	2 min	
O <sub>2</sub>	4 min	
Voltage		

Rated Voltage (system)	L/N/PE AC, 100-120VAC 60Hz or 220-240VAC 50Hz
<b>Current</b>	
Power consumption max.	240 VA
<b>Connecting gas</b>	
CO <sub>2</sub> inlet	1.0 bar/14.5 psi
N <sub>2</sub> inlet	1.0 bar/14.5 psi
<b>Dish Inserts</b>	
Nunc dish insert	Suitable for Nunc Ø35mm, Ø51mm and 4 well IVF dishes
Falcon dish insert	Suitable for Falcon Ø50mm, 4 well IVF dishes
Vitrolife dish insert	Vitrolife 4 well dishes
<b>Software</b>	
To monitor, record and display key performance	Data logger, including alarm functions
<b>Fuses</b>	
Supply fuses (220-240V)	2 x F 1.6AH (250V)
Supply fuses (100-120V)	2 x F 3.15AH (250V)
<b>Degree of protection</b>	
Type of protection against electric shock	Class I
Degree of protection against the ingress of water	IP30

## Section 6 - G185 SensorTech

G185 supports external and independent monitoring of the most critical parameters regarding CO<sub>2</sub> concentration, temperature and pH measurement.



**CAUTION:** Installations of external sensors must be performed by CooperSurgical or by persons authorized by CooperSurgical only

### External pH Monitoring

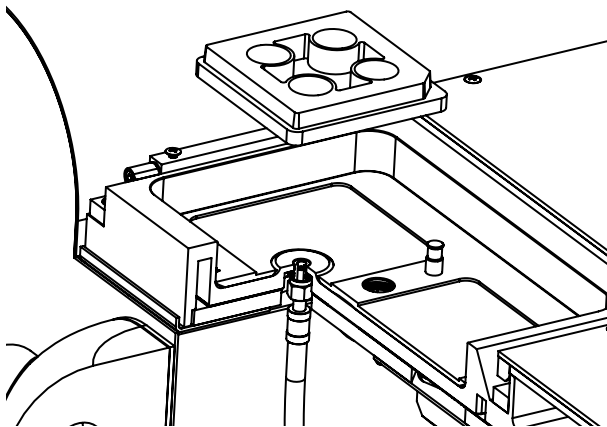
This G185 SensorTech has been designed to work with Octax pH online. These parts are available from MTG GmbH.

A fiber optic cable is built into chamber 1.

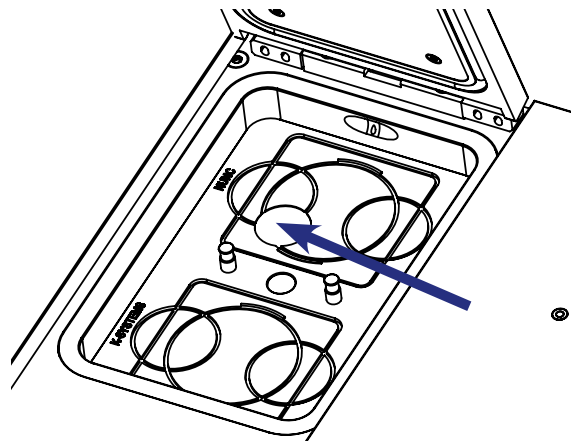
A special Dish Insert must be used in the chamber where the pH optical fiber sensor is installed. There are three different Dish Inserts available depending on the dishes used:

- Dish Insert Nunc pH Online Sensor: Order code: 23060-1
- Dish Insert Falcon pH Online Sensor: Order code: 23061-1
- Dish Insert Vitrolife pH Online Sensor: Order code: 23079

6



*Fiber Optic Cable in chamber 1*

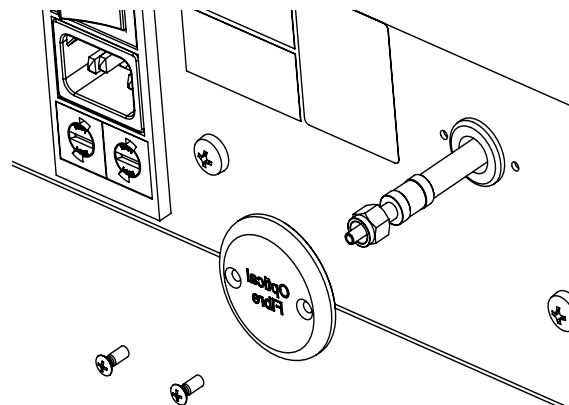


*Special dish insert hole for Optical Fiber Sensor*

The fiber optic cable is attached to a cover plate on the rear panel.

When this cover plate is removed the fiber optic cable will follow out. An O-ring in the rear panel protects the cable from scratching against metal.

A stopper is mounted on the cable inside to prevent the cable from being pulled out too far, thereby breaking the fiber.



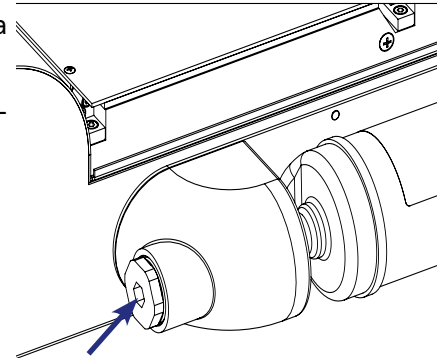
*Outlet of Fiber Optic Cable in rear panel*

## External Temperature and CO<sub>2</sub> Monitoring

The CO<sub>2</sub> sensor recommended is a widely used sensor from Vaisala (GMP 251). It is a 0-10% high precision IR CO<sub>2</sub> sensor.

Vaisala offers several devices to support this sensor; both stand-alone and built-in modules.

The sensor is placed in the rear part of the filter holder. It measures the gas circulating in the incubator. The opening is closed by use of a plug as standard.



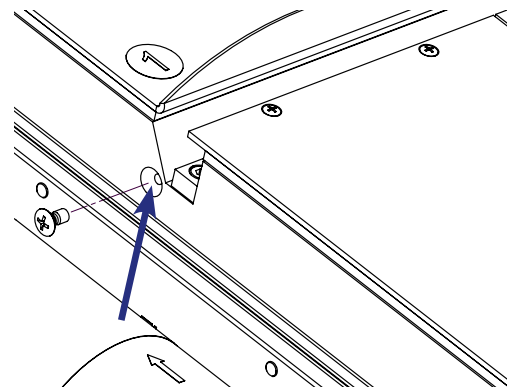
*Port for external CO<sub>2</sub> Sensor*

G185 SensorTech has a hidden hole for a pin-type temperature sensor.

The opening is in the aluminum block on the left side, between chambers 1 and 2. It is designed for a 3mm diameter sensor. A suitable sensor is available as part number 22306, which is compatible with the K-Systems F100 thermometer

The sensor can be used to detect temperature changes in the G185.

This sensor works as an addition to the sensors inside the G185 and should not be used for calibration purposes.



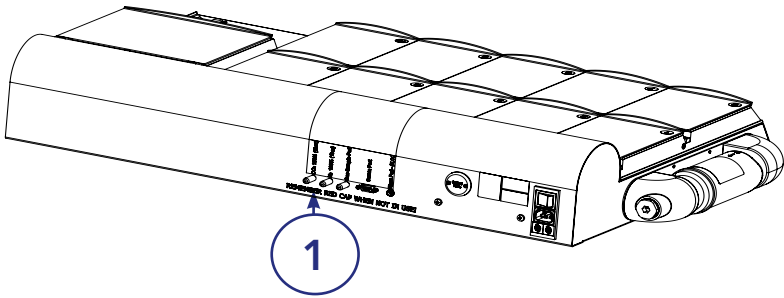
*Hole for external temperature sensor (Pin Type)*

# Section 7 - Set-up

Before use, see "Section 8 - Basic Operation" & "Section 9 - Settings"

## Gas Supply

1. The G185 is not supplied sterile and should be cleaned and or disinfected before use. Make sure the gas input and output ports at the back of the incubator are also cleaned. See "Section 12 - Maintenance" on page 43 for cleaning and disinfection protocol
2. Install the Coda Inline Filter, see "Replacing the Coda Inline Filter" on page 49
3. Connect the gas supply via the gas connectors (1) at the back of the unit
4. Turn on incubator
5. Make sure the incubation temperature, gas mixture settings etc. are as desired. See "Section 8 - Basic Operation" on page 18. After 20 minutes the unit will be at a constant working temperature and air flow



**WARNING:** Use only pure CO<sub>2</sub> and pure N<sub>2</sub> gas. Use of other gases could result in serious injury. Make sure that gas supply pressures are kept between a minimum of 0.5 bar and a maximum of 1.0 bar



**CAUTION:** Keep the red caps on unused gas inputs and outputs to prevent any possible damage to internal components

## Factory Settings

The G185 is supplied with the following factory settings

Criteria	Setting
Temperature	37.0°C
Gas concentration	CO <sub>2</sub> : 5.0% O <sub>2</sub> : 5.0%
Gas flow*	CO <sub>2</sub> : 1.5 l/h* N <sub>2</sub> : 7 l/h*

\* When G185 is stable and CO<sub>2</sub> and O<sub>2</sub> gas concentration setpoints are 5.0%

## Section 8 - Basic Operation



**CAUTION:** Do not use the incubator if the alarm system has issued a failure message and the cause of the failure has not been corrected

It is important that the appropriate dish inserts are selected for the culture dishes used (Falcon, Nunc, Vitrolife) to ensure there is direct contact between the dish and the heated surface.

Dishes which present no opportunity for an air gap between dish and heated surface can be placed directly on the heated surface with no need for a dish insert.

The use of dish inserts requires temperature calibration with the dish insert in place (see "Dish Inserts" on page 10)



1. Place the dish inserts in the chambers and close the lids
2. Wait 30 minutes for the dish inserts to heat up
3. Open the chamber lid
4. Place the culture dish containing gametes or embryos on the dish insert ensuring it is placed securely in the correct milled grooves
5. Close the lid
6. Note the patient ID as per "Writing pads for chamber lids and penholder" on page 30




### User Interface

The following will explain functions associated with the keyboard and menu items.




Main keys and their purposes.

Key	Meaning
	Alarm button
	On/Standby Turns the unit ON or OFF (standby mode)

Key	Meaning
	<b>Display panel</b> Shows information about the current status of the unit
	<b>Setpoint</b> Used to select an item in the menu in order to change its status. Also used to change temperature and gas setpoints
	<b>Arrow keys up and down</b> Used to navigate through the menu. Also changes values for temperature and gas concentrations

## System on Standby







Whenever the system is powered, the following symbol is shown to indicate the system is on standby.

Action	Display
System on Standby	

## Switching the Unit ON

To activate the heat and gas control, press and hold the On/Standby button for at least 3 seconds. The display will count down from 3 to 1 before activating the system.








8

Action	Key	Display
Press and hold the On/Standby button to activate heat and gas control		    



## Switching the Unit OFF (Standby Mode)





To switch OFF the unit (Standby mode), press and hold the On/Standby button for at least 5 seconds. The display will count down from 3 to 1 before the system enters standby mode.



Action	Key	Display
Press and hold the On/Standby button to de-activate heat and gas control and put the system on standby		     

**NOTE:** Whenever the system is in standby mode the standby symbol or clock "Caution" on page 27 shows on the display while the temperature and gas controls are disabled.

## Activating the Heat and Gas Controls

The heat and gas controls are activated using the ON/Standby button. Activation of CO<sub>2</sub> and O<sub>2</sub> controls require that the CO<sub>2</sub> regulator 'Co2.r' and O<sub>2</sub> regulator 'o2.r' have been activated within the menu. When the unit is ON, the main display will alternate the reading between the following 3 parameters:

Action	Display
<b>tp</b> Temperature in °C or °F (°C is default)	
After 'tp' is shown, the actual temperature will be displayed for a few seconds	
<b>Co2.C</b> CO <sub>2</sub> concentration in %	
After 'Co2.C' has been shown the actual CO <sub>2</sub> concentration will be displayed for a few seconds	

<b>o2.C</b> O <sub>2</sub> concentration in %	
After 'o2.C' is shown, the actual O <sub>2</sub> concentration will be displayed for a few seconds	




**NOTE:** If CO<sub>2</sub> regulation is deactivated the system will show 'oFF' right after 'CO2.C' has been displayed.

**NOTE:** If O<sub>2</sub> regulation is deactivated the system will display 'oFF' after 'o2.C' has been displayed.

## Keyboard Lock

In order to prevent any change of settings by mistake, the G185 incubator has a built-in keyboard lock that can be activated/deactivated using the keyboard buttons.



How to lock and un-lock the keyboard:




Action	Key/Display
Press the arrow up and arrow down buttons and the alarm key at the same time, to lock the keyboard	
The display will show 'LoCk', while the keyboard is locked	
To unlock the keyboard, press SP and the arrow up and down buttons at the same time	

**NOTE:** If the keyboard lock has been activated and any buttons are pressed, 'LoCk' will be shown on the display to indicate that the keyboard is locked.

## Alarms

When the G185 incubator is in alarm mode a message will be shown on the display. The following table contains a list of alarm messages with explanations:

Alarm	Display	Reason
CO <sub>2</sub> pressure alarm		CO <sub>2</sub> gas supply failure. CO <sub>2</sub> gas supply is not attached correctly, or wrong CO <sub>2</sub> gas pressure is applied to the system, or gas bottles are empty
CO <sub>2</sub> level alarm		Gas concentration is deviating by more than one percent point from set value, or CO <sub>2</sub> setpoint change is more than one percent point from the current level

Alarm	Display	Reason
N <sub>2</sub> pressure alarm		The gas supply is not attached correctly, or wrong gas pressure is applied to the system, or gas bottles are empty
O <sub>2</sub> level alarm		O <sub>2</sub> gas concentration is deviating by more than one percent point from set value or O <sub>2</sub> setpoint change is more than one percent point from the current level
Temperature alarm		If one or more heating zones is more than +/- 0.5°C from the setpoint or changing the setpoint more than +/- 0.5°C degrees from the current temperature will result in an alarm. The same goes for all calibration adjustments

**NOTE:** 'P' means pressure, 'L' means level.









The constant audible alarm can be muted by pressing the alarm button.

**NOTE:** By pressing the alarm button, the 'alarm' message on the display will also disappear, but the red LED light will stay on until correct gas pressure is applied to incubator.

## Setting the temperature

The set temperature is 37.0°C by default. The set temperature can be adjusted from ambient to 42.0°C.

Follow these instructions to change the setpoint for the temperature:

Action	Key	Display
Press the SP button, to show current setpoint on the display		
To raise the setpoint press and hold SP, then press arrow up. When the desired set-point is reached, release both keys	 + 	
To lower the setpoint press and hold SP, then press arrow DOWN. When the desired setpoint is reached, release both keys	 + 	

**NOTE:** If SP and arrow up or down are pressed continuously the setpoint will change quickly. To change the temperature slowly, press one step at a time.






# Section 9 - Settings

## Advanced Function

It is possible to access a number of advanced functions via the menu.











**NOTE:** You must have a good understanding of temperature and gas calibration before proceeding with the following operations in the menu.

Instructions for entering, exiting and navigating the menu:

Action	Key	Display
Press and hold UP and DOWN button to enter the menu The first option 'unit' will appear in the display		
Press UP or DOWN button to navigate within the menu		
While pressing the setpoint key, press either the UP or DOWN button to change values		
Press and hold UP+DOWN button again to exit the menu		

The menu automatically exits after 30 seconds of inactivity.

Overview of menu items in the order they appear. The cautions and notes referred to can be found under "Caution" on page 27

Display	Meaning	Values	Default	Buttons	Reference	Cautions	Note
	Temperature Unit	°C/°F	°C	▲ / ▼ Change unit between °C and °F			
	CO <sub>2</sub> Setpoint	2 -10 %	5 %	▲ Change setpoint up ▼ Change setpoint down			
	CO <sub>2</sub> Concentration	measured ± 10 %	measured + 0	▲ Calibrate concentration up ▼ Calibrate concentration down		1	1 & 2
	CO <sub>2</sub> Regulator	On/Off	On	▲ / ▼ Change between CO <sub>2</sub> regulator ON and OFF		4	3
	O <sub>2</sub> Setpoint	2-20 %	5 %	▲ Change setpoint up ▼ Change setpoint down			
	O <sub>2</sub> Concentration	measured ± 10 %	measured + 0	▲ Calibrate concentration up ▼ Calibrate concentration down		1	2 & 4
	O <sub>2</sub> Regulator	On/Off	On	▲ / ▼ Change between O <sub>2</sub> regulator ON and OFF		4	5
	CO <sub>2</sub> Flow	[0-10 l/h]	None	▲ / ▼ -			6 & 7
	N <sub>2</sub> Flow	[0-52 l/h]	None	▲ / ▼ -			8 & 9
	Data Logging	PC/PDA/Off	PC	▲ / ▼ Change between PC, PDA and OFF			10, 11, 12

Display	Meaning	Values	Default	Buttons	Reference	Cautions	Note
	Temperature of Zone-1	measured $\pm$ 9.9°C	None	▲ Calibrate temperature up ▼ Calibrate temperature down			13, 14, 15, 16, 17
	Temperature of Zone-2	measured $\pm$ 9.9°C	None	▲ Calibrate temperature up ▼ Calibrate temperature down			13, 14, 15, 16, 17
	Temperature of Zone-3	measured $\pm$ 9.9°C	None	▲ Calibrate temperature up ▼ Calibrate temperature down			13, 14, 15, 16, 17
	Temperature of Zone-4	measured $\pm$ 9.9°C	None	▲ Calibrate temperature up ▼ Calibrate temperature down			13, 14, 15, 16, 17
	Calibration of Zone-5	measured $\pm$ 9.9°C	None	▲ Calibrate temperature up ▼ Calibrate temperature down			13, 14, 15, 16, 17
	Calibration of Zone-6	measured $\pm$ 9.9°C	None	▲ Calibrate temperature up ▼ Calibrate temperature down			13, 14, 15, 16, 17
	Regulation factor	0-9.9	0.6	▲ Make factor bigger ▼ Make factor smaller		2	18
	Time setting clock	hours.minutes	0.0	▲ Count hours up ▼ Count minutes up	Timer, page 32		

Display	Meaning	Values	Default	Buttons	Reference	Cautions	Note
	Start set (start of timer)	hours.minutes	0.0	▲ Count hours up ▼ Count minutes up	Timer, page 32		19
	Timer heat	On/Off	Off	▲ / ▼ Set heat timer On and Off	Timer, page 32		19
	Auto set (repeat of timer)	On/Off	Off	▲ / ▼ Set repeat of timer On and Off	Timer, page 32		19
	Show clock when off	On/Off	Off	▲ / ▼ Set watch when off, On and Off	Timer, page 32		
	CO <sub>2</sub> pressure	0 - 1 bar	None	▲ / ▼ -			20
	N <sub>2</sub> pressure	0- 1 bar	None	▲ / ▼ -			21
	Decontamination	On/Off	Off	▲ / ▼ Turn the decontamination On and Off		3	21,22, 23,24
	Reset	----	None	▲ / ▼ Reset the incubator			25
	Current firmware version	x.x	None	▲ / ▼ -			26



## CAUTION

1. **CAUTION:** Changing the calibration value should only be done based on measurement performed by an experienced user or a service technician authorized by CooperSurgical
2. **CAUTION:** Changing the regulation factor should only be done by a service technician authorized by CooperSurgical
3. **CAUTION:** Remove all samples from the unit before decontamination, as the unit will be heated to more than 60°C and the gas will be turned off
4. **CAUTION:** The incubator should not be used without gas; if the gas concentration is wrong the embryos might be harmed or even perish. Gas may be turned off to reduce gas consumption if there are no samples inside

## NOTES

1. **NOTE:** The CO<sub>2</sub> regulator must be activated before concentration can be viewed or changed
2. **NOTE:** Gas concentration should be calibrated using an external precision gas analyzer through the gas sampling outlet. Only use a gas analyzer recommended by CooperSurgical
3. **NOTE:** Always connect a 100% pure CO<sub>2</sub> source to the CO<sub>2</sub> gas inlet located on the back of G185 incubator before switching the regulator on
4. **NOTE:** The O<sub>2</sub> regulator must be activated before the concentration can be viewed or changed
5. **NOTE:** Always connect a 100% N<sub>2</sub> source to the gas inlet located on the back of the incubator before switching the regulator on
6. **NOTE:** CO<sub>2</sub> gas consumption is not a fixed value and may vary from 0 l/h – 10 l/h. The necessary amount is automatically calculated and adjusted by the system
7. **NOTE:** 100% pure and dry CO<sub>2</sub> gas will be needed for controllers to operate correctly
8. **NOTE:** N<sub>2</sub> gas consumption is not a fixed value and may vary from 0 l/h – 52 l/h. The necessary amount is automatically calculated and adjusted by the system
9. **NOTE:** 100% pure and dry N<sub>2</sub> will be needed to reduce the O<sub>2</sub> level in the system
10. **NOTE:** Having the parameter set incorrectly when no PC is attached will not make any difference. Switching to "OFF" or "PDA" when the PC is attached corrupts the data
11. **NOTE:** For data logger installation, please refer to section 10 - "Section 10 - Data Logger" on page 31
12. **NOTE:** Never attempt to switch off dataflow when the PC is logging data. Stop the program on the PC first
13. **NOTE:** Calibration of temperature is done by adjusting the tn-x (where x is the zone number) according to a measurement performed in both chambers within the zone by a precision thermometer. Only use thermometers recommended by CooperSurgical
14. **NOTE:** After temperature adjustment, allow at least 15 minutes for the temperature to stabilize. Use the thermometer to verify correct temperatures in each zone
15. **NOTE:** If one warmed area is much warmer than another in its proximity, there will be cross-over heating. Calibration is performed best by starting with tn-1 and continuing to tn-2 to tn-6. Then let the system stabilize and repeat the procedure if necessary
16. **NOTE:** 'tn-1' is used to adjust the temperature of chambers 5 and 10  
'tn-2' is used to adjust the temperature of chambers 4 and 9  
'tn-3' is used to adjust the temperature of chambers 3 and 8  
'tn-4' is used to adjust the temperature of chambers 2 and 7  
'tn-5' is used to adjust the temperature of chambers 1 and 6



'tn-6' is the Dry Bath Chamber

- 17.NOTE:** Adjust according to a high precision measurement performed in a dish located in the chamber
- 18.NOTE:** The INT.T (Integral Time) option is for changing the base value of the PID controller. From the factory, it is set to a closely calculated value specific for the model
- 19.NOTE:** There are no calendar functions in the timer so all days include Saturday and Sunday
- 20.NOTE:** Inside pressure inside the incubator is always lower than that shown on the outside regulator of the gas bottle. This is because there is a built-in pressure regulator inside the incubator
- 21.NOTE:** The decontamination program heats up the whole heated area (zones 1 to 5) up to 60°C for approximately one hour in order to decontaminate the heated surfaces. Chamber 11 (Dry Bath) is not an incubation chamber, and will not be decontaminated, but it will still be heated above the setpoint
- 22.NOTE:** The decontamination system is equipped with a timer that automatically stops the decontamination process when the desired temperature has been reached, and it brings the system back to normal status
- 23.NOTE:** While the decontamination process is active all gas regulations are deactivated. An audible alarm will warn the user about rising temperatures. The actual temperature and decontamination time left will be shown on the display. The system will also warn the user about hot surface temperatures
- 24.NOTE:** After the decontamination process the incubator will cool down slowly. Do not use the device until the temperature and gas levels are back to normal. We recommend testing the temperature and gas concentrations before use, to ensure correct levels
- 25.NOTE:** This function sets all parameters back to factory default settings
- 26.NOTE:** The firmware installed on your G185 incubator can be updated. Ensure your incubator runs with the latest firmware. Your distributor or local representative is informed of all updates

## Front Chamber Keys

On the sloping front of the G185 incubator there are 10 buttons. Each button corresponds to one of the chambers.

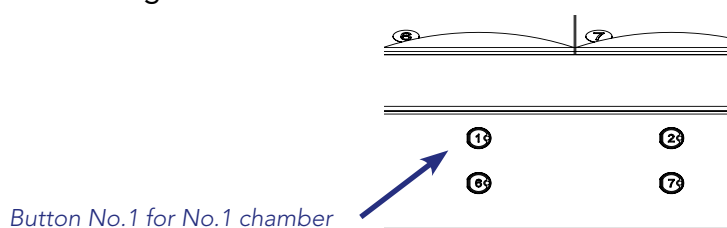
Pressing a key will toggle the light in the key on and off. This light can be used as an indication that the chamber is in use and should not be opened. Turning the light on/off has no effect on the temperature or gas control of the chamber.

**NOTE:** Never leave a chamber lid open for unnecessary periods of time. Each opening should be minimized to less than 10 seconds under normal use, otherwise it may result in an alarm.

The base of each chamber is a warmed area. The gas intake and outlet located in the middle of the the chamber must be kept free at all times.

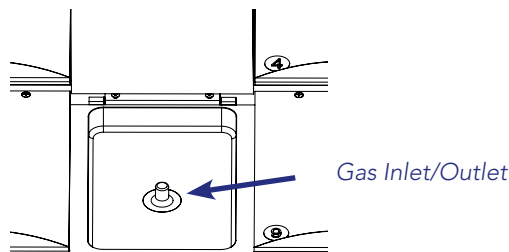
## Timer

The G185 contains a timer that can turn on the unit at a specific time. The timer is set by activating the On time and turning on the timer. The On time is set in the menu point Start Set (St.St). The hours are





**CAUTION:** Do not block the gas inlet/outlet in the middle of each chamber as this will cause incorrect gas concentration in the chamber



counted up using the down key and the minutes are counted up using the up key. The timer is turned On by setting the "heat" point in the menu to On.

The timer can be set to repeat every day by activating the Automatic Start (A-St) to On in the menu.

**NOTE:** If the Heat is set to Off when the timer function is set, nothing will be switched on when the timer engages.

**NOTE:** Timer functions should only be used with short-term culturing and are not applicable for overnight culturing.

## Clock

The clock time can be set by activating the time set (ti.St) variable. To do this, use the down key to count the hours up and the up key to count the minutes up. The clock is used with the timer and can be displayed when the unit is off; this is done by setting 'Hour' in the menu to On.

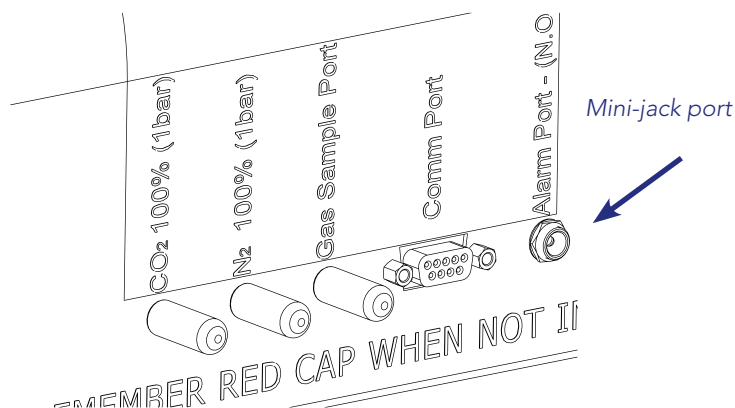
## Alarm Switch for External Monitoring System

The G185 incubator is equipped with a 3.5mm mini-jack connector (on the rear panel) which allows the incubator to be connected to an external monitoring system.

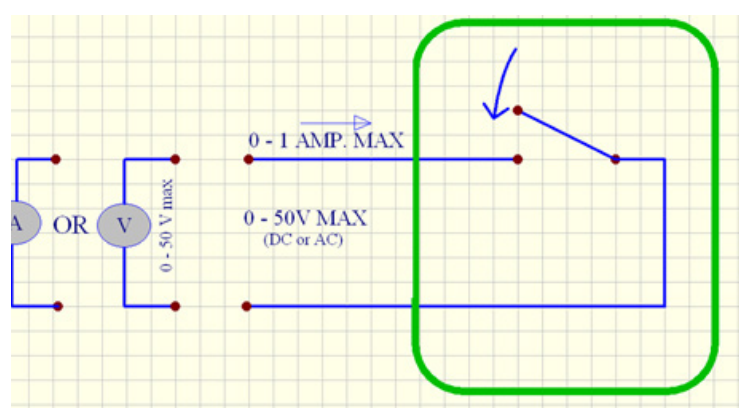
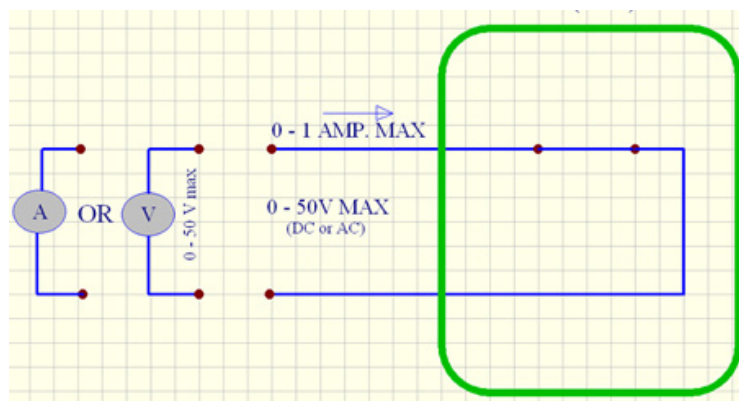
If an alarm is activated, the switch is deactivated indicating that the unit needs inspection by a user. The connector can be attached to a voltage source or to a current source.

**NOTE:** If a current source is attached to the connector, the maximum current rating is 1.0 Amp.

**NOTE:** If a voltage source is attached then the limitation is between 0 – 24V AC or DC.



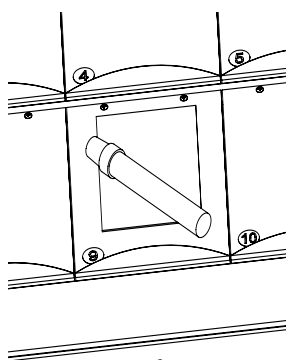
If there is no alarm, the switch will be in 'ON' position



Whenever the G185 incubator goes into alarm mode the switch will become an 'open circuit'. This means no current will run through the system.

**NOTE:** Whenever the incubator power cord is removed from the power outlet in the wall it will automatically indicate an alarm. This is an extra safety feature added to alert personnel of power cuts.

## Writing Pads for Chamber Lids and Penholder



Magnetic writing pads can be attached to each chamber lid for patient details or chamber content. Only write with a suitable nontoxic pen that allows text to be removed afterwards. Steel-bodied pens can be stuck to the magnetic pad.



**WARNING:** The embryos and gametes stored in each chamber should always be identified. Unidentified embryos and gametes can result in the use of incorrect gametes for IVF or transfer of the incorrect embryo to the patient.

## Section 10 - Data Logger

### System Requirements

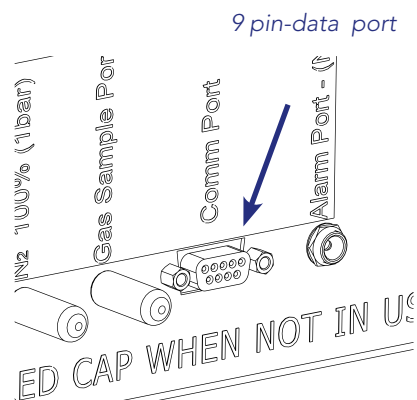
- IBM compatible PC running Windows 7 or later
- Processor speed 1 gigahertz (GHz) or faster
- Minimum 2GB RAM
- 20 GB available hard-disk space
- One available USB port
- Graphics card DirectX 9 or later with WDDM 1.0 driver
- Display 1024x768 or higher

### Software Installation

Install the K-SYSTEMS data logger software by running the "KSys\_Logv1.9.0 exe" file located on the installation media.

### Connecting To PC

Use the 9-pin data cable to connect to the data port on the back side of the G185.



Connect the other end of the data cable to the USB adapter. Plug the USB adapter to an available USB port on a PC.

## Activating Data Log Function for PC

Make sure that the communications protocol is activated in the menu. This can be checked by entering the menu and rolling down to 'r232'.



**NOTE:** The communication can be toggled between PC -> PDA ->OFF. The parameter must be set to "PC" when a PC is attached. Switching to "OFF" or "PDA" when the PC is attached corrupts the data.

Choose 'PC' and leave the menu.



10

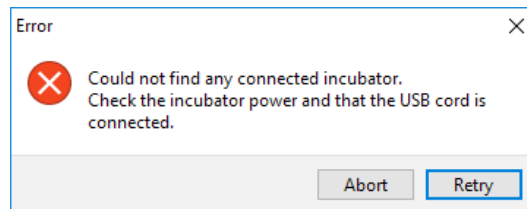


**CAUTION:** Never attempt to switch off the dataflow when the PC program is logging data, as this may cause loss of data. Stop the PC program to save all logged data before turning data off on the incubator

## Starting The Data Logger Software

Start the K-SYSTEMS data logger software from the programs list or by double-clicking the desktop icon.

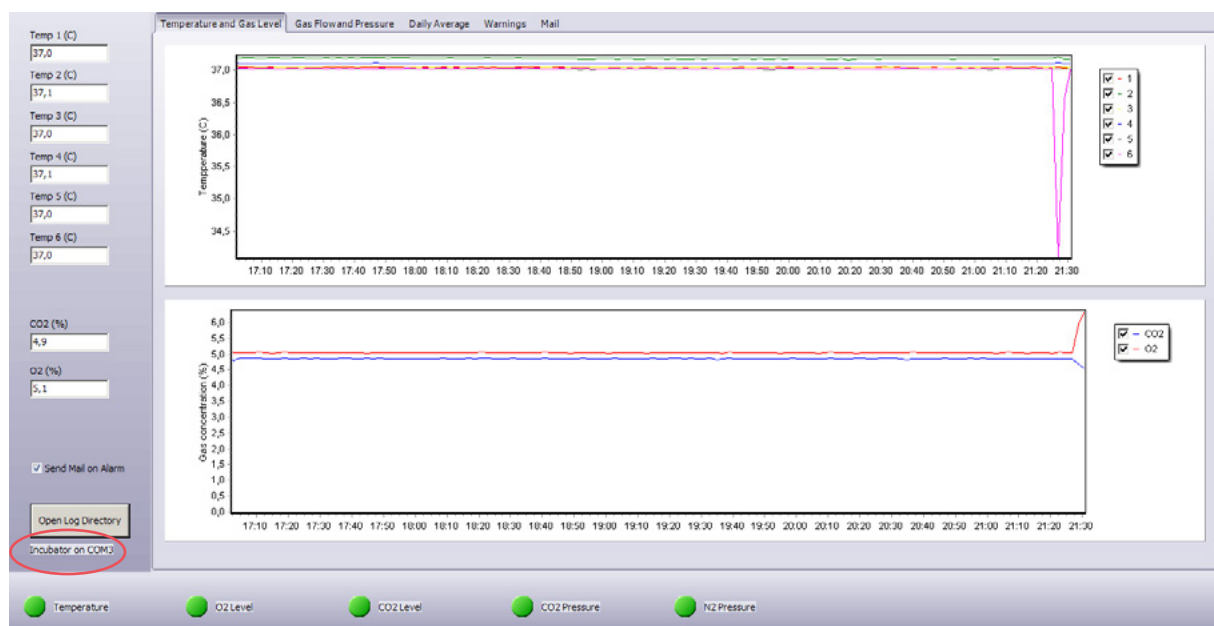
**NOTE:** If no incubator is connected, or if the incubator is switched off, the following error message is shown.



## Connecting Multiple Incubators

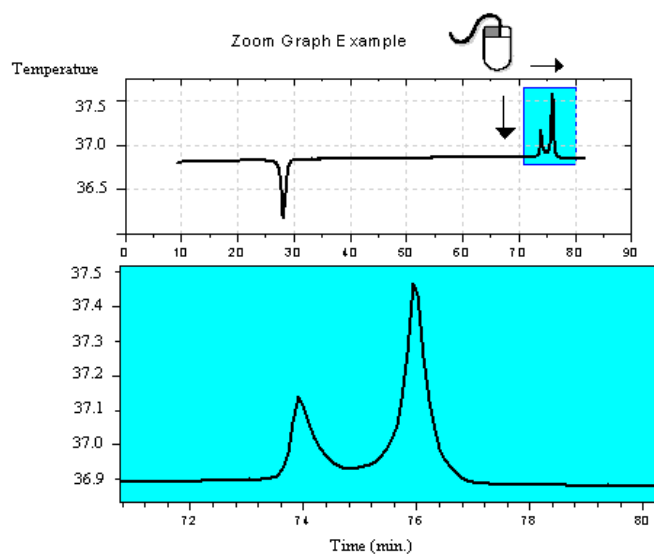
The K-SYSTEMS datalogger software version supports up to three incubators connected to a single computer.

1. Connect the first incubator to the PC and start K-SYSTEMS datalogger software. The datalogger software automatically recognizes the incubator attached and will display the port name associated with the incubator. The port name is used for identification purposes
2. Connect the second incubator to the PC and launch a new instance of K-SYSTEMS datalogger software. The datalogger software automatically recognizes the second incubator attached and displays the port name associated with the incubator
3. Repeat step 2 for connecting a third incubator



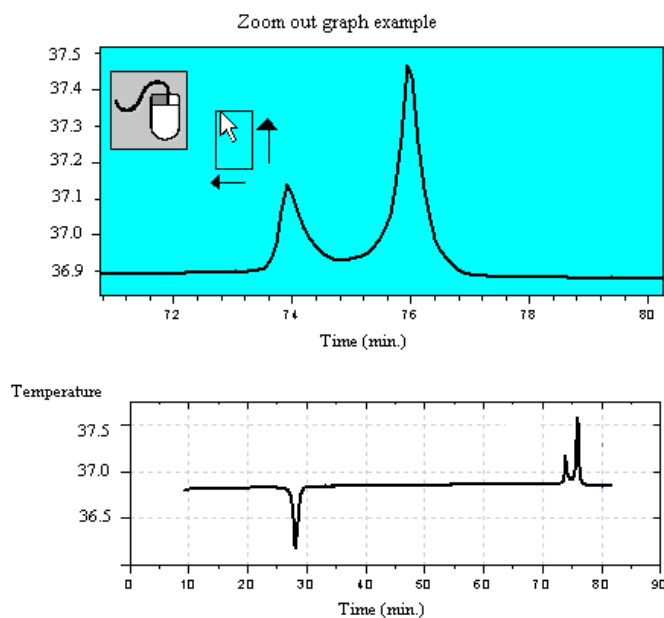
## Zoom In

Click and drag on the desired area of the screen to zoom in.



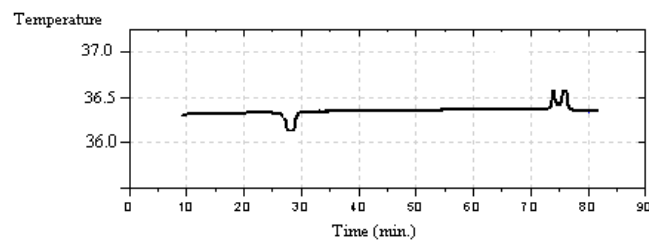
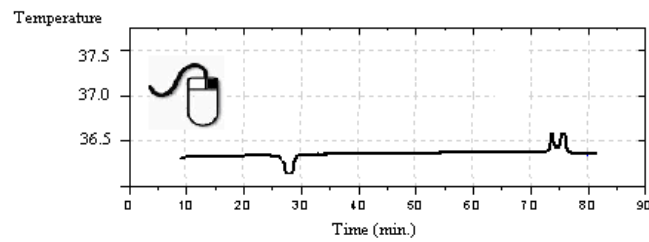
## Zoom Out

To restore the whole image, left-click on an empty area on the graph and move the cursor as shown on the graph below. The original axis scale values are then restored.



## Alignment

Move the cursor onto the graph, then click and hold the RH mouse button. Drag the graph to the desired position and release.



## Temperature and Gas level

Select the "Temperature and Gas Level" tab to monitor temperature and gas levels. The most recent temperature data is shown on the left side of the screen, as shown below.

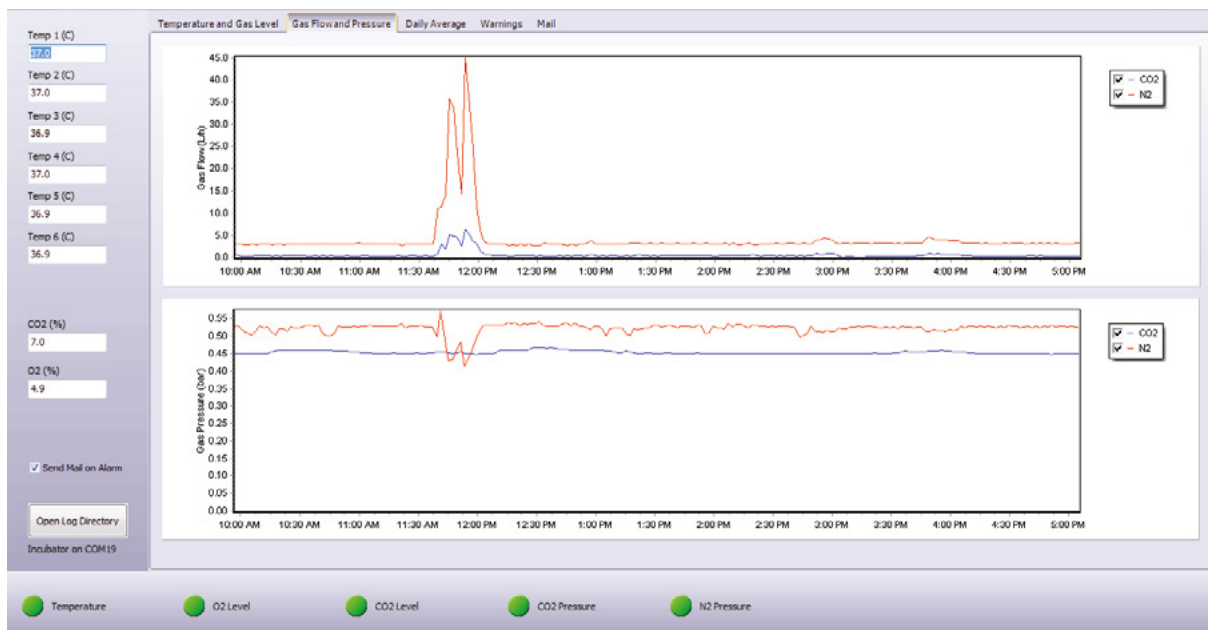


**NOTE:** The data is logged into the graphs a few moments after the software starts.



# Gas Flow and Pressure

Select the "Gas Flow" and "Pressure" tab to monitor gas consumption and pressure levels.



**NOTE:** The CO<sub>2</sub> and N<sub>2</sub> gas flow is not a static value and is automatically adjusted by the system.

## The Daily Average

Select the "Daily Average" tab to view the average temperature, gas concentrations and gas consumption for each day.

Date	Temp1	Temp2	Temp3	Temp4	Temp5	Temp6	CO2 Level	O2 Level	CO2 Flow	N2 Flow	CO2 Pres	N2 Pres
24-01-2013	37,03	37,06	37,05	37,05	37,01	37,01	4,90	19,02	1,24	0,00	0,53	0,06
25-01-2013	37,03	37,06	37,05	37,05	37,01	37,01	4,90	19,02	1,25	0,00	0,54	0,06
26-01-2013	37,03	37,06	37,05	37,05	37,01	37,00	4,90	19,02	1,24	0,00	0,53	0,06
27-01-2013	37,03	37,06	37,05	37,05	37,01	37,00	4,90	19,02	1,23	0,00	0,53	0,06
28-01-2013	37,03	37,06	37,05	37,05	37,01	37,00	4,90	19,02	1,24	0,00	0,54	0,06
29-01-2013	37,03	37,06	37,05	37,06	37,01	37,01	4,87	10,00	1,70	11,94	0,54	0,28
30-01-2013	37,03	37,07	37,05	37,06	37,01	37,01	4,85	5,07	1,92	17,80	0,54	0,47
31-01-2013	37,03	37,07	37,05	37,06	37,02	37,01	4,85	5,06	1,92	17,57	0,54	0,53
01-02-2013	37,03	37,06	37,05	37,06	37,01	37,00	1,92	5,06	0,70	18,10	0,23	0,54
02-02-2013	37,03	37,06	37,05	37,06	37,01	37,00	0,05	5,07	0,00	18,56	0,06	0,53
03-02-2013	37,03	37,06	37,05	37,06	37,01	37,00	0,05	5,06	0,00	18,68	0,06	0,52
04-02-2013	37,03	37,06	37,05	37,06	37,01	37,00	0,05	6,70	0,00	16,45	0,06	0,46
05-02-2013	37,03	37,07	37,06	37,06	37,01	37,00	0,05	18,87	0,00	0,00	0,06	0,06
06-02-2013	37,03	37,07	37,06	37,06	37,01	37,00	0,05	18,72	0,00	0,00	0,06	0,06
07-02-2013	37,03	37,08	37,06	37,06	37,01	37,00	0,05	18,73	0,00	0,00	0,06	0,06
08-02-2013	37,04	37,09	37,06	37,06	37,01	37,01	0,05	18,91	0,00	0,00	0,06	0,06
09-02-2013	37,04	37,09	37,06	37,06	37,02	37,01	0,05	19,04	0,00	0,00	0,06	0,06
10-02-2013	37,03	37,09	37,06	37,06	37,01	37,00	0,05	19,09	0,00	0,00	0,06	0,06
11-02-2013	37,03	37,09	37,06	37,06	37,01	37,00	0,05	19,06	0,00	0,00	0,06	0,06
12-02-2013	37,03	37,09	37,06	37,06	37,01	37,00	0,05	19,06	0,00	0,00	0,06	0,06
13-02-2013	37,03	37,09	37,06	37,06	37,01	37,00	0,05	19,04	0,00	0,00	0,06	0,06
14-02-2013	37,03	37,09	37,06	37,06	37,02	37,01	0,05	19,16	0,00	0,00	0,06	0,06
15-02-2013	37,03	37,08	37,06	37,06	37,02	37,01	0,05	19,07	0,00	0,00	0,06	0,06
16-02-2013	37,04	37,07	37,05	37,06	37,02	37,01	0,05	18,87	0,00	0,00	0,06	0,06
17-02-2013	37,03	37,07	37,05	37,06	37,02	37,01	0,05	19,02	0,00	0,00	0,06	0,06

**NOTE:** All data calculated by K-SYSTEMS data logger is stored in the K-Systems folder in the user's Documents folder as an XLS file. This can be opened with Microsoft Excel or similar spreadsheet software.

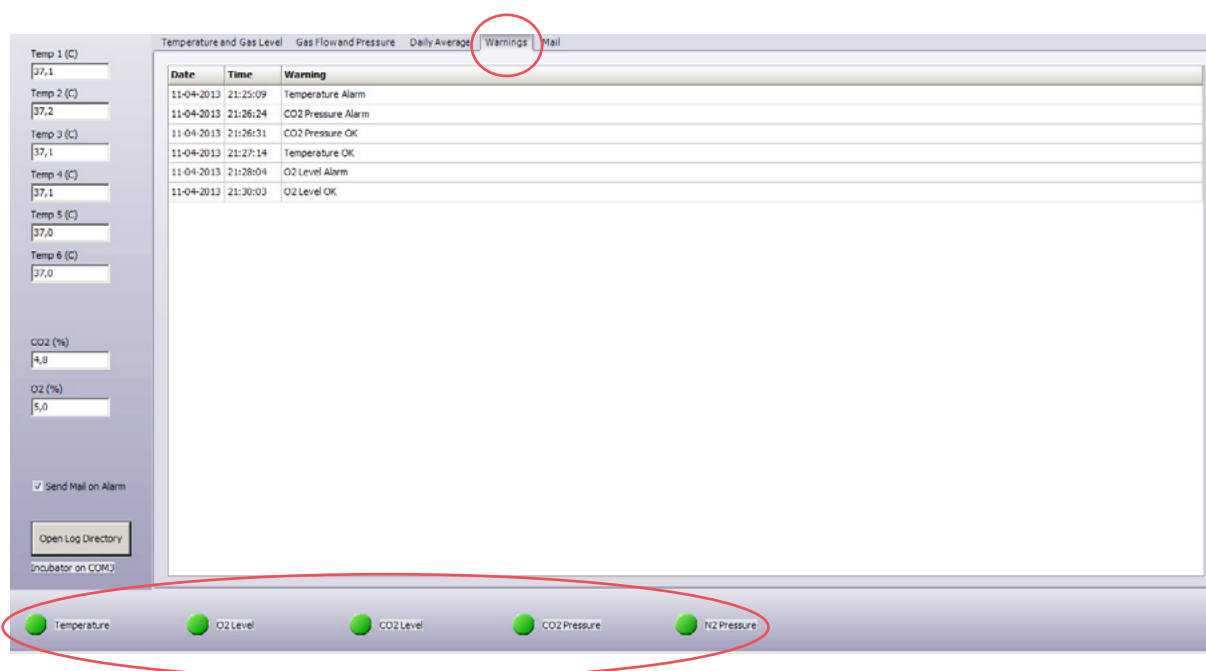
## Warnings Menu

All warnings are listed in the “Warnings” menu.

The reason for the alarm is logged i.e.

- CO<sub>2</sub> gas level alarm
- CO<sub>2</sub> gas pressure alarm
- O<sub>2</sub> gas level alarm
- N<sub>2</sub> gas pressure alarm
- Temperature alarm

These alarm conditions are also shown as green or red circles at the bottom of the datalogger window. A red circle indicates an active alarm.



All data logged by K-SYSTEMS data logger is stored in the K-SYSTEMS folder in the user's Documents folder as an XLS file.

**10 NOTE:** The log file for each day is automatically generated and saved every week.

The log files are stored in the following location: “Documents\Ksystems\Log\Incubator\_COMx” where x refers to the number of the port associated with the incubator, see “Connecting Multiple Incubators” on page 33.

## Mail

The data logger is able to send an e-mail to the user in case of any alarm. Select the "Mail" tab to set this up.

**NOTE:** In order to use this function, the user must have provided valid e-mail account and outgoing mail server settings.

The screenshot shows the 'Mail' configuration tab. On the left, there are sensor readings: Temp 1 (C) 37.1, Temp 2 (C) 37.2, Temp 3 (C) 37.0, Temp 4 (C) 37.1, Temp 5 (C) 37.0, Temp 6 (C) 37.0, CO2 (%) 4.9, and O2 (%) 5.1. Below these is a checkbox for 'Send Mail on Alarm' which is checked, and a button for 'Open Log Directory'. The main area contains the 'Mail' configuration form. At the top of the form, there are three input fields: 'In case of an alarm send e-mail to the following address (separate with ,)', 'Subject', and 'Serial Number'. Below these is the 'Mail Server' section with fields for 'Mail Server (using the SMTP protocol)' (smtp.live.com), 'Port' (25), 'Username' (kysystems.test@hotmail.com), 'Password' (masked with dots), 'Send from (e.g. nn@hotmail.com)' (kysystems.test@hotmail.com), and a 'Default Server' checkbox. There is also a checkbox for 'SSL Authentication' which is checked. A 'Test' button is at the bottom of the form. The bottom of the interface shows status indicators for Temperature, O2 Level, CO2 Level, CO2 Pressure, and H2 Pressure, all of which are green.

The 'Send Mail' on Alarm box on the left hand side can be ticked or unticked to switch the e-mail notification on and off, to avoid getting mail when opening and closing the lids during the day.

In the top of the Mail tab the e-mail address, a subject for the mail and the serial number of the unit can be entered.

- You should consult your IT Department to confirm the mail server settings
- Mail Server (using the SMTP protocol): this is the address of the outgoing mail server
- Port, this is the port used for the outgoing mail server (SMTP port)
- Username: this is typically your e-mail address
- Password: this is the password used to log on the mail server with the above mentioned username
- Send from (e.g. nn@hotmail.com): this is the 'Send From' field in the received mails. This is typically the mail address used under Username.
- SSL Authentication: SSL stands for "Secure Sockets Layer" and is a security protocol used by some mail providers; if your provider uses this protocol please tick this field

**NOTE:** It is possible to use the default server by leaving the Default server box ticked; however, this is not recommended. The default is a third-party mail host used for troubleshooting purposes and which is not recommended for normal use.

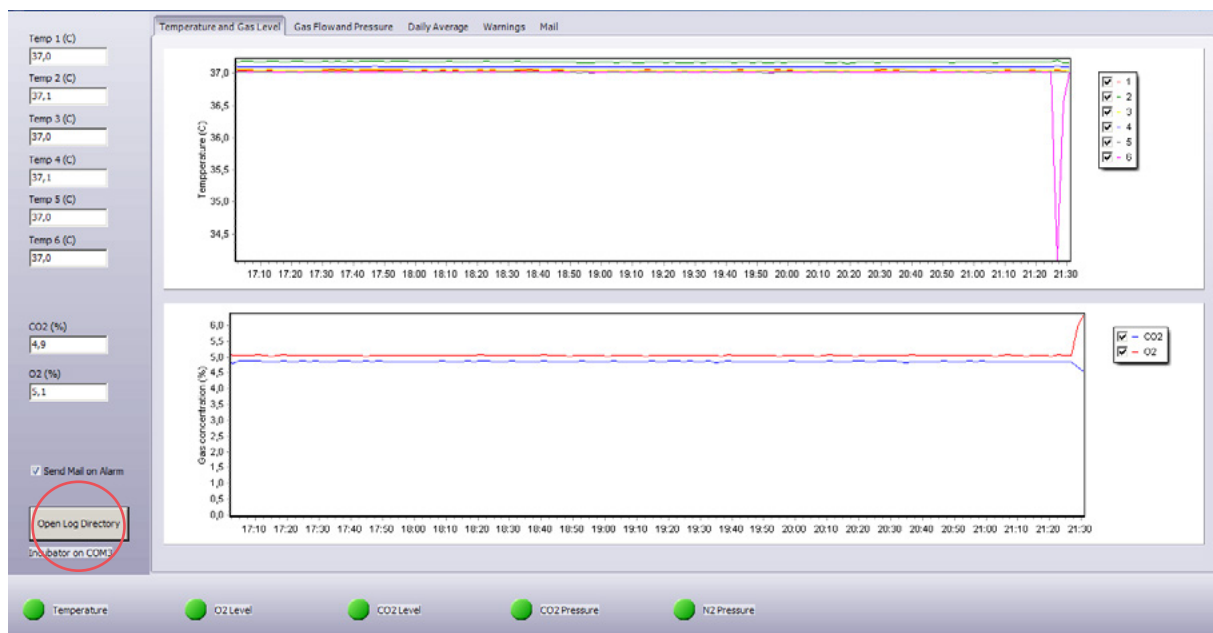
**NOTE:** It is recommended that the mail function is tested by ticking the test button after the settings have been entered to make sure that mail is being sent correctly.

E-mail(s) will be sent only if access to the mail server is available and a valid e-mail account is entered.

## Log Files

To access the log files directly, click "Open Log Directory" at the bottom left of the screen. Log files contain the following information:

- Temperature
- Gas Level
- Gas Flow
- Gas Pressure
- Daily Average
- Warnings



## Section 11 - Troubleshooting

### Heating System

Symptom	Cause	Action
Wrong temperature	The alarm is on	The temperature is more than 0.5°C from the setpoint, wait for the temperature to stabilize. Consider removing samples to a different incubator
Wrong temperature on touch screen after system has had time to stabilise	The setpoint for temperature is wrong	Check the setpoint
Heating not even	System not properly calibrated	Calibrate each zone using a high precision thermometer, see "Temperature Calibration" on page 46

### CO<sub>2</sub> Gas Regulation

Symptom	Cause	Action
Wrong CO <sub>2</sub> level measured at sample port	System not powered on	Check mains and main fuse
	System is on standby or switched off	Switch the system on
	CO <sub>2</sub> gas regulator is OFF	Activate CO <sub>2</sub> gas regulator by setting 'CO2.r' to ON in menu, see "Menu items" on page 24
	No CO <sub>2</sub> or wrong gas attached to CO <sub>2</sub> gas input	Check gas supply, make sure that 1.0 bar of gas pressure is applied
	Actual gas concentration is higher or lower than setpoint	Check CO <sub>2</sub> set point at 'CO.SP' in the menu, see "Menu items" on page 24
	Actual gas concentration is higher or lower than setpoint	Calibration of the gas concentration is needed. Contact a service technician for help if required
Poor CO <sub>2</sub> gas regulation	Lid(s) are left open	Close lid(s)
	Insulation missing or damaged on lid(s)	Check the grey insulation on every lid and replace if necessary.
'CO2.L' is shown on display	CO <sub>2</sub> gas concentration more than ± 1% from setpoint	Allow system to stabilize by closing all lids
'CO.Pr' is shown on display	No/wrong CO <sub>2</sub> gas pressure to system	Check CO <sub>2</sub> gas supply; make sure that pressure is kept stable at 0.5-1.0 bar

## O<sub>2</sub> Gas Regulation

Symptom	Cause	Action
Wrong O <sub>2</sub> level measured at sample port	System not powered on	Check mains and main fuse
	System is on standby or switched off	Switch the system on
	O <sub>2</sub> gas regulator is OFF	Activate O <sub>2</sub> gas regulator by setting 'O2.r' to on in the menu, "Caution" on page 27
	No N <sub>2</sub> or wrong gas type attached to N <sub>2</sub> gas input	Check gas supply; make sure that 1.0 bar of N <sub>2</sub> gas is applied
	Actual gas concentration is higher or lower than setpoint	Check O <sub>2</sub> set point at 'O2.SP' in the menu, "Caution" on page 27
	Actual gas concentration is higher or lower than setpoint	Calibration of the gas concentration is needed. Contact a service technician for help if required
Poor O <sub>2</sub> gas regulation	Lid(s) are left open	Close lid(s)
	Insulation missing or damaged on lid(s)	Check the grey insulation on every lid and replace if necessary
'O2.L' is shown on display	O <sub>2</sub> gas concentration more than ± 1% from setpoint	Allow system to stabilize by closing all lids
'n2.Pr' is shown on display	No/wrong N <sub>2</sub> gas pressure to system	Check N <sub>2</sub> gas supply, make sure that pressure is stable at 0.5-1.0 bar. If O <sub>2</sub> regulation is not needed set the 'O2.r' to OFF in the menu to deactivate oxygen regulation and abort the N <sub>2</sub> alarm, see "Caution" on page 27 & "Notes" on page 27

## Data Logger

Symptom	Cause	Action
No data is sent to PC	System not powered on	Check mains and main fuse
	System is on standby or switched off	Switch the system on
	The 'rs232' item in the menu is set to 'OFF' or 'PDA' mode	Change to 'PC' see "Activating Data Log Function for PC" on page 32
	Data cable between incubator and PC not properly attached	Check connection. Only use the cable and serial to USB adapter supplied with the unit
	Data logger software/USB driver not properly installed	Refer to Section 10 for instructions

## Display

Symptom	Cause	Action
Missing segment(s) in display	Failure in the PCB	Replace the PCB. Contact a service technician for help

## Keyboard

Symptom	Cause	Action
Absent or erratic function of operation buttons	Failure in the keyboard	Replace keyboard. Contact a service technician for help

## Section 12 - Maintenance

Periodic cleaning is recommended as part of routine maintenance. Disinfection is also recommended for media spills, visual accumulation of dust, and other evidence of contamination.

Clean and disinfect the G185, and when necessary sterilize the Dish Inserts, immediately after any liquid spills.

Cleaning and disinfection should be performed with no samples inside the incubator and the incubator switched off.

Gloves should be worn during cleaning, disinfecting and sterilizing.

### Periodic Cleaning

The G185 should be cleaned with sterile water.

1. Moisten a sterile cloth with sterile water and wipe all internal and external surfaces of the chambers including lids
2. Leave the lids open and allow to dry completely before use
3. Close the lids and start the unit. Let it run for a minimum of 30 minutes (with or without gas)
4. Complete validation check (page 44)

### Disinfection

Disinfect the G185 in cases of contamination and/or spillage. Cleaning should precede disinfection.

1. Promptly soak up excess liquid using a sterile cloth
2. Wipe all internal surfaces of chambers and lids with sterile wipes moistened with a disinfection solution containing 0.12% of active chlorine
3. Leave for 15 minutes. (The solution will be active even when it is dry)
4. Moisten a sterile cloth with purified or sterile water and wipe all disinfected surfaces
5. Leave the lids open and allow to dry completely before use
6. Close the lids and start the unit, and let it run for a minimum of 30 minutes (with or without gas)
7. Complete validation check (page 44)

### Sterilizing the Dish Inserts

Use this procedure in cases of contamination and/or spillage:

1. Promptly soak up excess liquid using a sterile cloth
2. Remove the dish insert from the chamber
3. Moisten a sterile cloth with sterile water and wipe all surfaces, especially all the milled grooves
4. Wrap dish inserts in steam-permeable plastic film or paper and place in autoclave
5. Autoclave for 20 min at 121°C at 2 bar (29 psi)
6. Remove and allow to cool completely before use (minimum 30 minutes)
7. Complete validation check (page 44)



## Validation Check

Perform the following gas and temperature checks after all cleaning, disinfecting and sterilizing or at least every two weeks to ensure the G185 is operating correctly.

## Gas Calibration

It is VERY important that the G185 is not emptied of gas during calibration. To do so will cause unstable gas levels and gas flow, and will result in a considerable time before the gas concentration is recovered and becomes stable again. To ensure the G185 is not emptied of gas during the gas sampling please follow these instructions. Always use a gas analyzer recommended by CooperSurgical. The calibration procedure described here assumes the use of the G100 Gas Analyzer (Order Code: 11103).

There are two methods for collecting gas samples from the incubator:

1. Via the Gas Sample Port on the back of the unit
2. Via each of the chamber lids

**DO NOT** collect more than 0.1l of gas from the chambers.

Always check the gas concentration in the setpoint menu during sampling. If the gas concentration differs more than 0.1% from the setpoint, allow the G185 to stabilize to the gas concentration setpoint before taking the next gas sample.

**Please note:** Allow the incubator to stabilize for 3 minutes after each sample collection. Ensure the gas analyser is prepared as per its user manual.

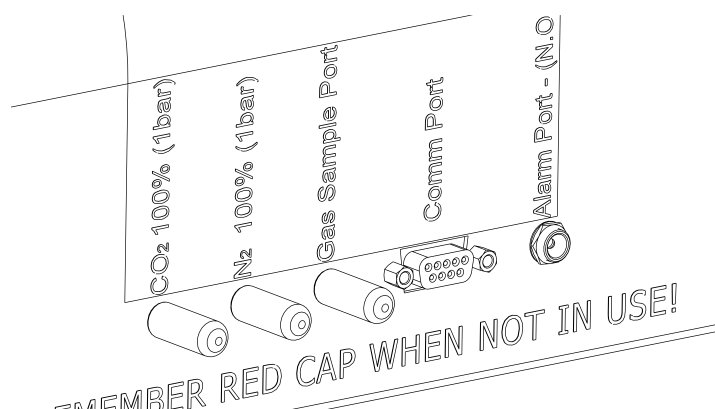
## Via the Gas Sample Port

Remove the red cap from the Gas Sample Port and attach to the inlet of your gas analyzer. Make sure

- there are no tubing leaks
- the tubing between the sample port and gas analyzer is as short as possible, never more than 20cm
- outside air is not drawn in

Compare the CO<sub>2</sub> readout with the value shown in the 'CO2.C' menu and adjust if necessary, see "Menu items" on page 24

**NOTE:** Remember to put the protective red cap back on the port.



## Via Gas Chamber Lids

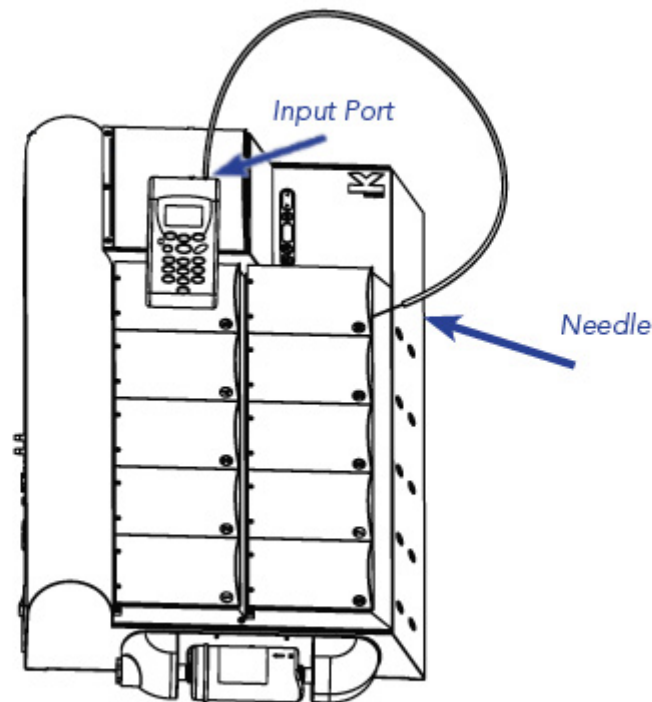
The gas level can also be validated by taking a small gas sample from each of the chambers.

Connect the input port with a short length of tubing to a hollow needle.

**NOTE:** Make sure the incubator is ON and the gas levels are stabilized before any gas measurement.

**NOTE:** Prior to any gas measurement make sure the lid has not been opened for at least 5 minutes.

Inject the needle from the gas analyzer through the foam seal under the chamber lid and make a gas measurement.



Compare the CO<sub>2</sub> readout with the value shown in the 'CO2.C' menu and adjust if necessary, see "Menu items" on page 24

Compare the O<sub>2</sub> readout with the value shown in the 'O2.C' menu and adjust if necessary, see "Menu items" on page 24

**NOTE:** There is no gas supply to the Dry Bath Chamber. All bottles kept in this chamber should be kept sealed.

## Temperature Calibration

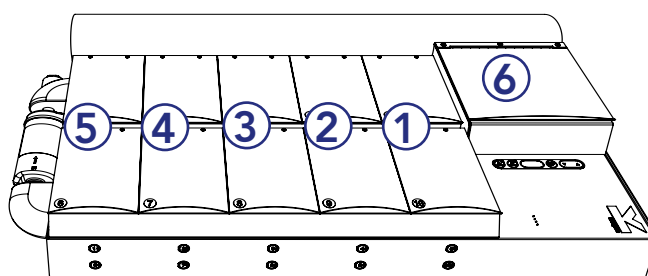
Temperature calibration can be performed with a calibrated temperature sensor inserted into each chamber. To maintain a stable temperature and to prevent ambient air from entering the chamber, it is important to use a temperature sensor with a flat cable allowing the chamber lid to be closed during calibration.

We recommend the K-Systems F100 Precision Thermometer together with the Solid Temperature Sensor for temperature calibration. If the calibration is not performed with the Solid Temperature Sensor, CooperSurgical cannot guarantee correct calibration of the device.

**NOTE:** The sensor and thermometer should be calibrated as a unit and only by an accredited test house. Refer to the Thermometer instructions.

### Regulator Zones

There are 6 different regulators in the incubator; 5 regulators for controlling the surface temperature of the chambers (tn-1 – tn-5) and 1 for the Dry Bath Cham “Menu items” on page 24.



Within each chamber zone there are two chambers. In order to make an accurate temperature validation, it is strongly recommended you measure the temperature in both chambers within the specific zone. For example, to validate the temperature of tn-1, the temperature of chamber 5 and chamber 10 must be measured, and an average value calculated.

The following table shows which chambers are associated with each zone:

Zone name	Chambers in zone
tn-1	Chambers 5 and 10
tn-2	Chambers 4 and 9
tn-3	Chambers 3 and 8
tn-4	Chambers 2 and 7
tn-5	Chambers 1 and 6
tn-6	Dry Bath Chamber

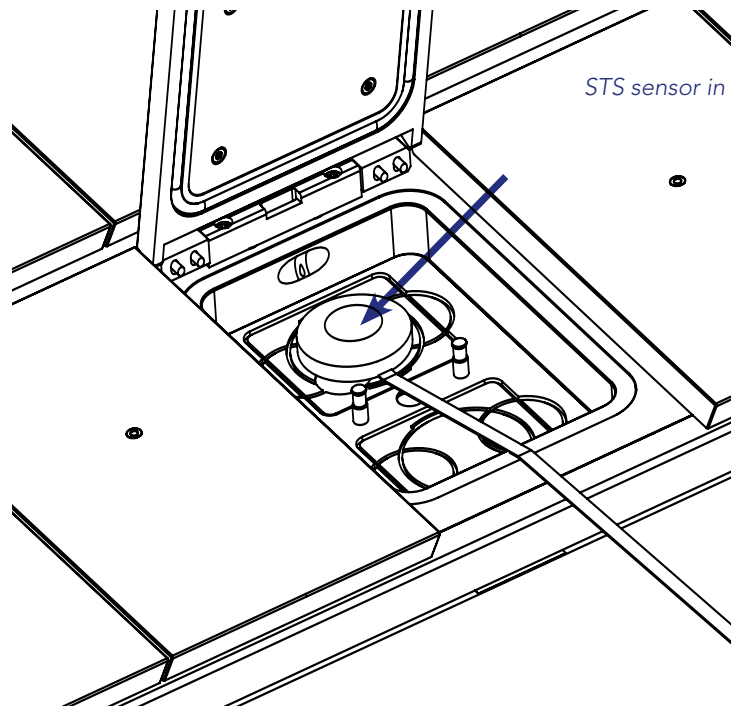
1. Place a dish insert in each chamber
2. Switch on the incubator and wait for (at least) 30 minutes for the temperature to stabilize at the setpoint (eg 37.0°C)
3. Check that your temperature setpoint is set to 37°C
4. With your calibrated external temperature sensor, first measure the Dry Bath Chamber (tn-6) and calibrate this to the setpoint temperature, see “Menu items” on page 24. Ensure that you have seen a stable temperature on your meter before you do any changes to the tn-6 settings. Adjust until you obtain a stable temperature equal to the setpoint

5. Move your temperature sensor to chamber 1 or 6 and repeat the calibration, but adjust tn-5 until you have a stable temperature in the chamber
6. Move the temperature sensor to chamber 3 or 8 and adjust tn-3
7. Move the temperature sensor to chamber 5 or 10 and adjust tn-1
8. Move the temperature sensor to chamber 2 or 7 and adjust tn-4
9. Move the temperature sensor to chamber 4 or 9 and adjust tn-2
10. Once the system has stabilized, all temperatures must be within 0.2°C of the setpoint. If not, repeat steps 2 to 9 again

If temperatures are measured at the bottom of the chamber, rather than using dish inserts, you must adjust all calibrations by + 0.1°C to compensate for the missing dish insert.



**WARNING:** Extreme care must be taken here, as any wrong changes or adjustments will have a direct effect on the temperature inside the incubator



*STS sensor in position on Dish Insert*

## Section 13 - Service



**WARNING:** DO NOT disassemble or modify any part of the G185

For the reliable and safe operation of this incubator, it is strongly recommended that inspections and services are performed as stated in the Service Plan below. Failing to follow this plan may cause the unit to stop performing as intended and cause damage to embryos etc. kept inside the incubator.

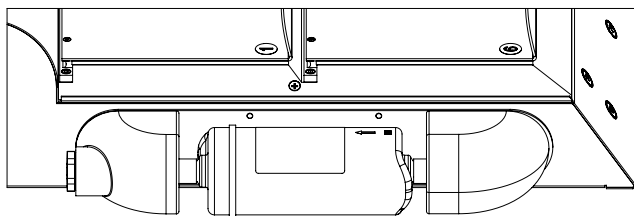
### Service Plan

Conducted by	User	Authorised Service Representative		
Service step	Every 3 months	Every year	Every 3 years	Every 6 years
Replace Coda Inline Filter Capsule	X			
Replace HEPA Inline Filter for CO <sub>2</sub> gas		X		
Replace HEPA Inline Filter for N <sub>2</sub> gas		X		
Replace O <sub>2</sub> sensor*		X		
Temperature and gas calibration		X		
Replace Ventilation filter (optional)		X		
Replace Cooling fan			X	
Replace Internal blower			X	
Replace CO <sub>2</sub> sensor*				X

\*Gas calibration should be performed after replacing O<sub>2</sub> and CO<sub>2</sub> sensors.

## Replacing the Coda Inline Filter

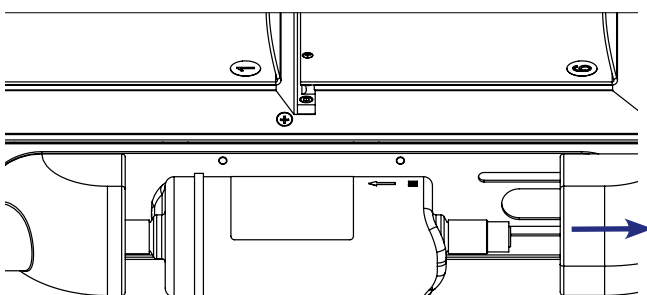
The VOC Coda Inline Filter is a combined HEPA (High Efficiency Particulate Air) and VOC (Volatile Organic Compound) filter. It is mounted on the side of the unit for easy access and replacement. The purpose of the filter is to remove airborne particles and VOCs in the air being circulated within the incubator.



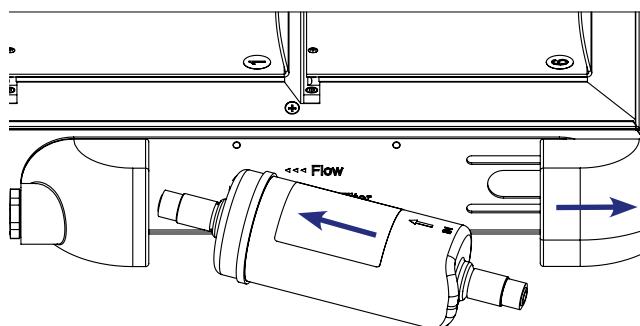
1. The HEPA/VOC filter capsule has a limited life in use of 3 months and, therefore, it is important to replace it on time in order to maintain air cleanliness

**NOTE:** Mark the date change on the filter.

**NOTE:** Do not use the filter without the correct K-Systems fittings.



2. The filter is removed by a gentle rotation of the filter element with one hand, and pulling back the sliding part of the filter holder



3. Press one end of the new filter (remember flow direction) into the stationary side of the filter holder. It should align fully with the base of the filter holder. Pull the end fitting to the side as shown
4. Then fit the other side of the filter into the sliding part of the filter holder and slide it into place. It may be necessary to twist the filter element gently to get it to connect fully

**NOTE:** The flow direction on the side of the filter element (indicated by an arrow on the label) **MUST** be the same as that shown on the side of the G185 incubator.



**CAUTION:** Never use the filter or the filter holder as “handles” for moving the system. Doing so may be hazardous as they may break off causing the system to fall to the ground causing personal injury and damage to the system.

## Section 14 - Disposal and Recycling

Information on recycling and handling of the unit as per the EU WEEE Directive (Waste Electrical and Electronic Equipment).

**CAUTION: Contamination Hazard**

As this device may have been used for processing and treating infectious substances, it might be contaminated. Prior to disposal, the whole device must be disinfected

### Environmental Protection for Disposal of the Product

The unit contains reusable materials. All components (with the exception of the Coda Inline Filter) can be discarded as electrical waste after cleaning and disinfection.

Please note that Origio Coda Inline Filters must be discarded in accordance with the applicable national regulations for special solid waste.



If any electronic component is no longer serviceable, it must be sent back to CooperSurgical to be destroyed in an environmentally safe way. Do not dispose of with 'normal' waste

The following table provides information on the recycling and handling of the product in accordance with the WEEE Directive:

### Recyclable Components

Component	Material
Lids	Aluminum
Exterior housing	Mild Steel, Aluminum, Stainless Steel
Interior housing	Aluminum and POM
Printed circuit board	Enclosed electronic components mounted on a PCB

### Section 15 - Warranty Information and Limits on Liability

15

Coopersurgical Inc, warrants that this item will be free from defects in materials and workmanship for one year from the date of installation. If Coopersurgical (CSI) determines that the product fails to conform to that warranty during the one-year period, CSI will repair or replace the product, at CSI's discretion, free of charge.

To return the product to CSI, a customer must comply with CSI's Returned Goods Policy described in this manual and the warranty requires the customer to return the product to CSI in accordance with the CSI Returns Instruction. CSI will return products (that it repaired or replaced under warranty) to the same customer who returned those products, at CSI's expense F.O.B. the customer's facility. Under all other circumstances, CSI will return products to the same customer who returned those products at the customer's expense.

CSI's warranties do not cover damage caused by misuse, improper care, improper use of chemicals or cleaning methods, loss, theft, use of non-authorized parts servicing by non-authorized personnel or negligent or intentional conduct on the part of the owner or user of the product, nor do they cover normal wear and tear or general maintenance. Any modifications or changes to a product will void that product's warranty. CSI's warranties do not apply to any single- or limited-use, disposable or consumable components or items.

CSI is not responsible for, and the owner and operator of the product shall defend, indemnify and hold harmless CSI from and against, all claims, damages, and other losses resulting from the improper servicing, maintenance, repair use or operation of the product or the owner or operator's negligence or willful misconduct, and use of inadequate packing and packaging when returning product for repair.

The above warranties are in lieu of, and CSI hereby disclaims, all other warranties, express or implied, written or oral, with respect to CSI products, including the warranties of merchantability and fitness for a particular purpose. No terms, conditions, understandings or agreements that purport to modify the above warranties or that make any additional warranties for any CSI product shall have any legal effect unless made in writing and signed by an authorized CSI corporate officer.

CSI shall not under any circumstances be liable for lost profits, damages from loss of use or lost data, or indirect, special, incidental or consequential damages under its warranties or otherwise for any claim related to CSI's products, even if CSI has been advised, knew or should have known of the possibility of such damages. CSI's liability with respect to a product covered by a warranty or otherwise shall be limited in all circumstances to the purchase price of that product.



# Section 16 - Returning Product to CSI for Repair

Please refer to the 'Troubleshooting' section in this manual before returning product to CSI. If you continue to have a problem with your device, please follow these instructions:

### Returned Goods Policy

Goods will be accepted for return for the following reasons:

- If shipment was made without the customer's authorization or order.
- If incorrect items were shipped.
- If defective items were shipped.
- If defective goods are covered by the standard warranty.

To return product, you must contact Customer Service for a Returned Merchandise Authorization (RMA) number. Items will not be accepted without an RMA number. Please have the following information:

- Reason you wish to return the goods.
- Quantity, description, part number, serial number of the goods.
- Date of receipt of order.
- Customer's purchase order and the CSI or Origio invoice number.

All used products must be cleaned and sterilized prior to shipment. A signed decontamination declaration may be required.

All products should be carefully and adequately packed, preferably in original packaging. Replacement items or additional repairs will be invoiced.

All packaging should be clearly labeled with the RMA number and statement "Urgent – Returned Items for Repair".

Return Address: Research Instruments Ltd, Bickland Industrial Park, Falmouth, Cornwall, TR11 4TA, UK.

Shipment must be sent prepaid by the customer and insured for their full value during shipping. Freight collect shipments will not be accepted, and goods will be returned to sender.

If Customer intends to return equipment ordered in error, the following restocking charges and terms will apply:

- 25 percent within 60 days from date of shipment.
- Goods must be returned unused, in the original carton, and in marketable condition.
- Refurbishing and replacement charges will be added to the restocking charges for damaged or missing items.
- No return after 60 days.
- No refund on sterile, single-use disposable products.

### **Customer Service Contact Details:**

Tel: +45 46 79 02 02

Fax: +45 46 79 03 02

E-mail: [sales@coopersurgical.com](mailto:sales@coopersurgical.com)

[coopersurgical.com](http://coopersurgical.com)

### **16 US Only Customers Contact Details:**

Tel: 800-243-2974

Fax: 800-262-0105

[coopersurgical.com](http://coopersurgical.com)



