

Thank you for purchasing this Esco Low Temperature BOD Incubator. Please read this manual thoroughly to familiarize yourself with the many unique features and exciting innovations we have built into your new equipment. Esco provides many other resources at our website, www.escoglobal.com, to complement this manual and help you enjoy many years of productive and safe use of your Esco products.



User Manual

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Isotherm

Low Temperature BOD Incubator

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Warranty Terms and Conditions

Esco products come with either a 1, 2 or 3 year limited warranty, depending on the product purchased, beginning on the date of shipment from any Esco international warehousing location. To determine which warranty applies to your product, refer to the appendix below.

Esco's limited warranty covers defects in materials and workmanship. Esco's liability under this limited warranty shall be, at our option, to repair or replace any defective parts of the equipment, provided if proven to the satisfaction of Esco that these parts were defective at the time of being sold, and that all defective parts shall be returned, properly identified with a Return Authorization.

This limited warranty covers parts only, and not transportation/insurance charges.

This limited warranty does not cover:

- Freight or installation (inside delivery handling) damage. If your product was damaged in transit, you must file a claim directly with the freight carrier.
- Products with missing or defaced serial numbers.
- Products for which Esco has not received payment.
- Problems that result from:
 - External causes such as accident, abuse, misuse, problems with electrical power, improper operating environmental conditions.
 - Servicing not authorized by Esco.
 - Usage that is not in accordance with product instructions.
 - Failure to follow the product instructions.
 - Failure to perform preventive maintenance.
 - Problems caused by using accessories, parts, or components not supplied by Esco.
 - Damage by fire, floods, or acts of God.
 - Customer modifications to the product
- Consumables such as filters (HEPA, ULPA, carbon, pre-filters) and fluorescent / UV bulbs.
- Esco is not liable for any damage incurred on the objects used on or stored in Esco equipment. If the objects are highly valuable, user is advised to have in place independent external preventive measures such as connection to a centralized alarm system.

Factory installed, customer specified equipment or accessories are warranted only to the extent guaranteed by the original manufacturer. The customer agrees that in relation to these products purchased through Esco, our limited warranty shall not apply and the original manufacturer's warranty shall be the sole warranty in respect of these products. The customer shall utilize that warranty for the support of such products and in any event not look to Esco for such warranty support.

Esco encourages all users to register their equipment online at www.escoglobal.com/warranty or complete the warranty registration form included with each product.

ALL EXPRESS AND IMPLIED WARRANTIES FOR THE PRODUCT, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES AND CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN TIME TO THE TERM OF THIS LIMITED WARRANTY. NO WARRANTIES, WHETHER EXPRESS OR IMPLIED, WILL APPLY AFTER THE LIMITED WARRANTY PERIOD HAS EXPIRED. ESCO DOES NOT ACCEPT LIABILITY BEYOND THE REMEDIES PROVIDED FOR IN THIS LIMITED WARRANTY OR FOR SPECIAL, INDIRECT, CONSEQUENTIAL OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, ANY LIABILITY FOR THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES, FOR PRODUCTS NOT BEING AVAILABLE FOR USE, OR FOR LOST WORK. ESCO'S LIABILITY WILL BE NO MORE THAN THE AMOUNT YOU PAID FOR THE PRODUCT THAT IS THE SUBJECT OF A CLAIM. THIS IS THE MAXIMUM AMOUNT FOR WHICH ESCO IS RESPONSIBLE.

These Terms and Conditions shall be governed by and construed in accordance with the laws of Singapore and shall be subject to the exclusive jurisdiction of the courts of Singapore.

Technical Support, Warranty Service Contacts

USA: 1-877-479-3726

Singapore: +65 65420833

Global Email Helpdesk: support@escoglobal.com

Visit <http://www.escoglobal.com/> to talk to a Live Support Representative

Distributors are encouraged to visit the Distributor Intranet for self-help materials.

Product Appendix, Warranty Listings

Biological Safety Cabinets, Laminar Flow Cabinets, HEPA-Filtered Cabinets (except Streamline brand)	The warranty periods for BSC may vary by country. Contact your local distributor for specific warranty details.
Laboratory Fume Hoods	1 year limited.
Ductless Fume Hoods	3 years limited for Ascent Opti's, 5 years for Ascent Max's.
Cleanroom Equipment	1 year limited.
Laboratory Ovens and Incubators	1 year limited.
CO ₂ Incubators	2 years limited.
Containment/Pharma Products	2 years limited.
Ultralow Temperature Freezer	3 years limited. 60 months on Compressor.

The warranty period starts two months from the date your equipment is shipped from Esco facility for international distributors. This allows shipping time so the warranty will go into effect at approximately the same time the equipment is delivered to the user. The warranty protection extends to any subsequent owner during the warranty period. Distributors who stock Esco equipment are allowed an additional four months for delivery and installation, providing the product is registered with Esco. User can register product online at www.escoglobal.com/warranty or complete the warranty registration form included with each product.


Policy updated on 12th Apr 2011 (This limited warranty policy does not apply to products purchased before 12th Apr 2011)

Introduction

1. Products Covered

Isotherm Low Temperature BOD Incubator (IFC)		
Electrical	110L	240L
220-240 VAC 50/60 Hz 1 Φ	IFC-110-8	IFC-240-8

2. Safety Warning

- Anyone working with, on or around this equipment should read this manual. Failure to read, understand and follow the instructions given in this documentation may result in damage to the unit, injury to operating personnel, and / or poor equipment performance.
- Any internal adjustment, modification or maintenance to this equipment must be undertaken by qualified service personnel.
- The use of any hazardous materials in this equipment must be monitored by an industrial hygienist, safety officer or some other suitably qualified individual.
- Before you process, you should thoroughly understand the installation procedures and take note of the environmental / electrical requirements.
- In this manual, important safety related points will be marked with the symbol. 
- If the equipment is used in a manner not specified by this manual, the protection provided by this equipment may be impaired.

3. Limitation of Liability

The disposal and / or emission of substances used in connection with this equipment may be governed by various local regulations. Familiarization and compliance with any such regulations are the sole responsibility of the users. Esco's liability is limited with respect to user compliance with such regulations.

4. European Union Directive on WEEE and RoHS

The European Union has issued two directives:

- **Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE)**

This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2002/96/EC. It is marked with the following symbol:

Esco sells products through distributors throughout Europe. Contact your local Esco distributor for recycling/disposal.

- **Directive 2002/95/EC on Restriction on the use of Hazardous Substances (RoHS)**

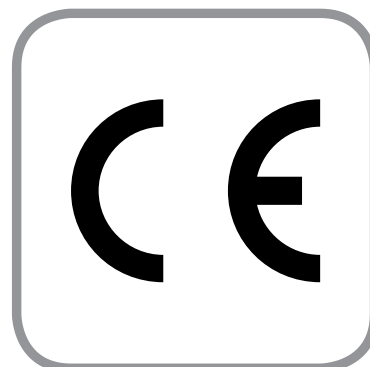
With respect to the directive on RoHS, please note that this hood falls under category 8 (medical devices) and category 9 (monitoring and control instruments) and is therefore exempted from requirement to comply with the provisions of this directive.



Declaration of Conformation

In accordance to EN ISO/IEC 17050-1:2010

We, Esco Micro Pte. Ltd.
of 21 Changi South Street 1
Singapore, 486777
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declare on our sole responsibility that the product:

Category : Low Temperature BOD Incubator
Brand : Isotherm
Model : IFC-110-8, IFC-240-8

in accordance with the following directives:

2006/95/EEC : The Low Voltage Directive and its amending directives
92/31/EEC : The Electromagnetic Compatibility Directive and its amending directives

has been designed to comply with the requirement of the following Harmonized Standard:

Low Voltage : EN 61010-1:2010
EMC : EN 61326-1:2006 Class B

More information may be obtained from Esco's authorized distributors located within the European Union. A list of these parties and their contact information is available on request from Esco.

A handwritten signature in black ink, appearing to read 'XQ Lin', is positioned above a horizontal line.

XQ Lin
Group CEO, Esco

This Declaration of Conformity is only applicable for 230V AC 50/60Hz units

Chapter 1 - Product Information

1.1 About Isotherm Low Temperature BOD Incubator

Forced Convection

Convection is a method to transfer of heat energy that involves the movement of a fluid (gas or liquid). Fluid in contact with the source of heat expands and tends to rise within the bulk of the fluid. Cooler fluid sinks to take its place, setting up convection current. However, in a forced convection device, the fluid motion is generated by an external source (like a pump, fan, suction device, etc.).

Forced Convection Laboratory Incubator

Laboratory Incubator is a device for controlling temperature and other condition in which a microbiological culture is being grown. Typical incubator are insulated boxes with an adjustable heater, going up to 60°C to 65°C (140°F to 150°F), though some can go slightly higher (generally to no more than 100°C

Incubator can vary in size from tabletop to units the size of small rooms. As for temperature, most commonly used is approximately 36°C to 37°C. Most bacteria, especially the frequently used E. Coli, grow well under such condition. For experimental organism, such as the budding yeast *Saccharomyces cerevisiae*, a growth temperature of 30°C is optimal.

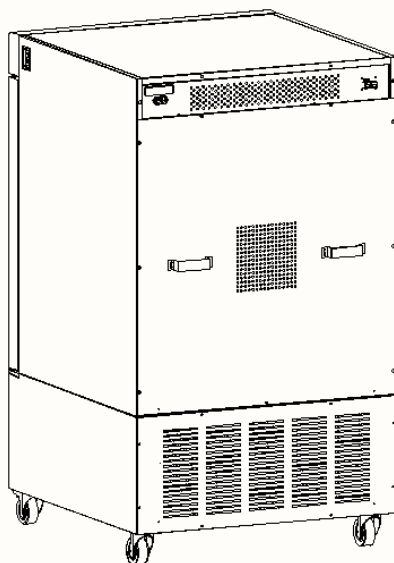
Biochemical oxygen demand (BOD)

When organic matter decomposes, it is fed upon by aerobic bacteria. In this process, organic matter is broken down and oxidized (combined with oxygen). Biochemical oxygen demand is a measure of the quantity of oxygen used by these microorganisms in the aerobic oxidation of organic matter.

The BOD level is determined by subtracting this DO level from the DO level found in the original sample taken five days previously:

$$\text{BOD} = \text{mg/LDO}(\text{original sample}) - \text{mg/LDO}(\text{after incubation})$$

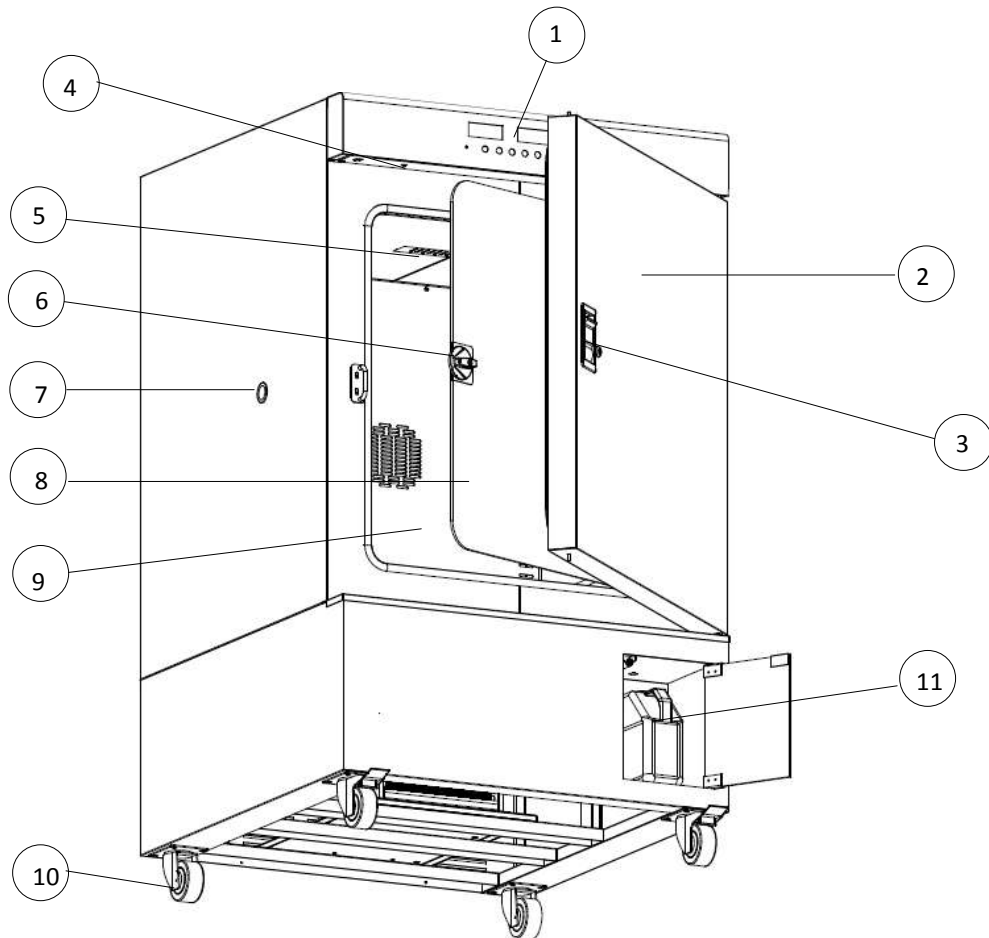
1.2 Labels



Model : The model of the unit
 Serial : The serial number of the unit.
 Power : The maximum power consumption and the electrical requirement of the unit.
 Manufacture in : The time of manufacture.

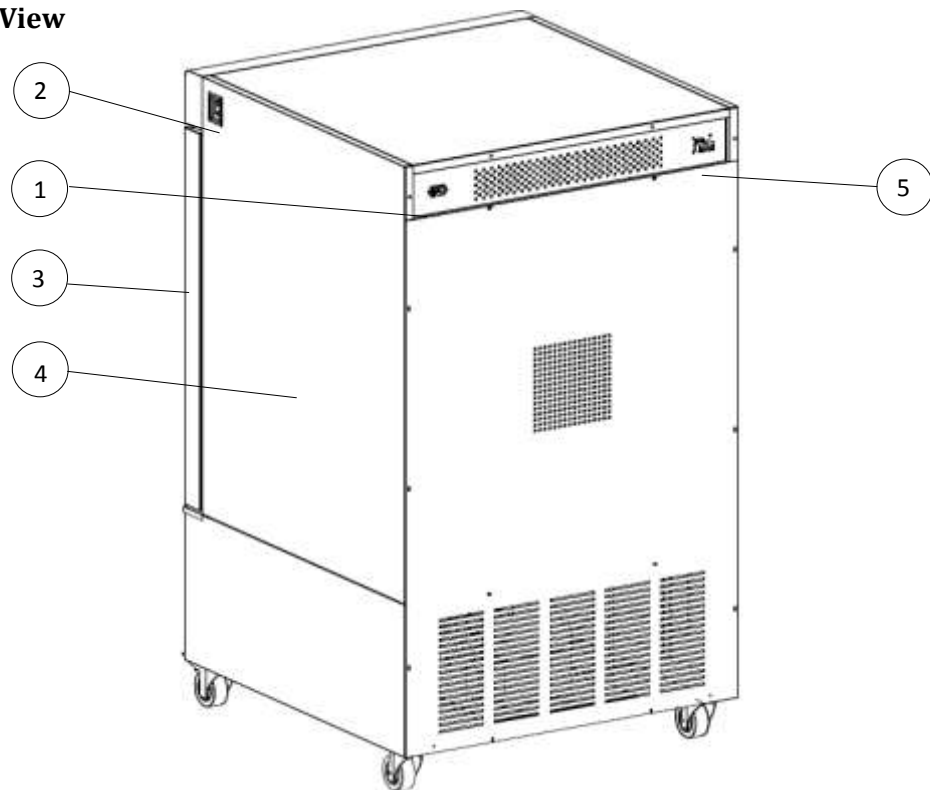
1.3 Quick View

1.3.1 Front Quick View



1. Control panel.
2. Outer door - maintains temperature inside the equipment.
3. Outer door handle.
4. Magnetic Switch -controls operation of UV lamp.
5. UV lamp - sterilizes inner chamber and loads.
6. Glass door - allows observation of loads and maintains temperature when the outer door is opened.
7. Access port
8. Glass door handle.
9. Inner chamber - maintains temperature and allows loads be put inside.
10. Castor wheel.
11. Water container -to collect the water from drain pan.

1.3.2 Back Quick View



1. Electrical inlet -connects to power supply.
2. Main switch button -turns the equipment ON/OFF.
3. Outer door -maintains temperature inside unit.
4. Outer chamber - protects parts inside.
5. RS485 Port - RS485 connection.

1.4 Applications

It is commonly used as

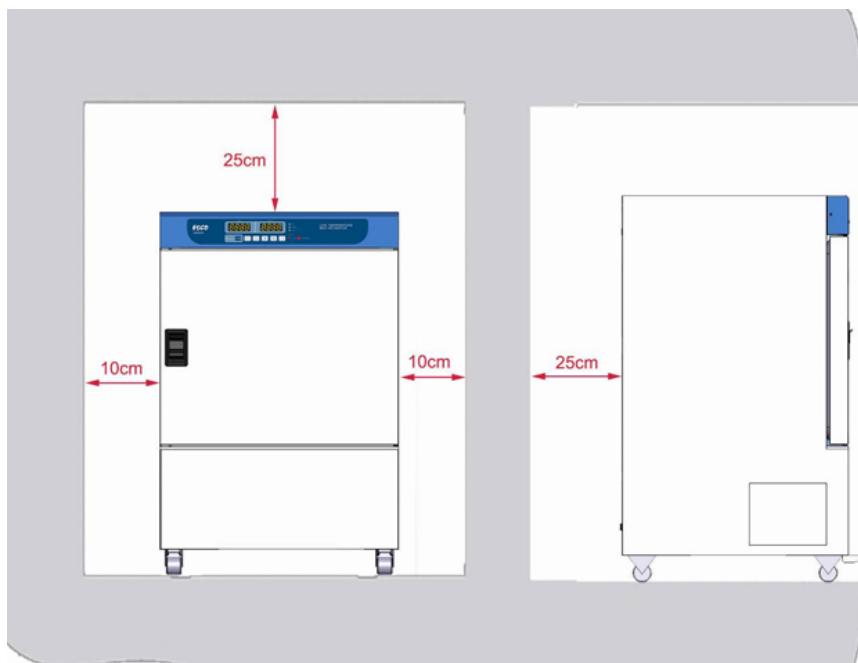
- Biochemical Oxygen Demand determinations of waste water and sewage (APHA method at 20°C)
- Plant cell growth
- Insect studies
- Fermentation studies
- Bacterial culturing
- Mycology studies
- Drug stability tests

Chapter 2 – Installation

2.1 General Requirement

2.1.1 Location Requirements

- Isotherm Low Temperature BOD Incubator (IFC) must be placed on the solid and level surface. It is important that the equipment is set up accurately horizontally and against abnormal vibration and noise. Door may have to be adjusted. (See Chapter 4 “Maintenance and Cleaning”).
- Lock the 2 front casters (by pushing down the pedals) to fix position of the equipment.
- Do not place equipment outdoors, under sunlight, where be splashed onto the equipment, heavy concentration of dust, moisture or close to inflammables!



NOTE: When the equipment is to be moved, release all the 2 front casters (by pull up the pedals) and fully support the equipment while moving.

2.1.2 Environmental Requirements

- Indoor use
- Altitudes of up to 2000 meters (6600')
- Below 80% relative humidity – non condensing
- Temperature between 15°C - 30°C (59°F - 86°F)

If ambient temperature fluctuation is more than 6°C, the control system will be reset according to its self-inspection. Therefore control on temperature may be influenced.

Ensure stability of ambient temperature as temperature set point is close to ambient temperature. Especially for temperature set point = ambient temperature+ 0~10°C, working in air-conditioning room is recommended; otherwise non-erasable temperature fluctuation may be caused.

- Technical specification for the equipment is specified for units with standard equipment at an ambient temperature +25°C and a voltage fluctuation of ±10 %.
- The temperature data are determined in accordance to factory standard following DIN 12 880.

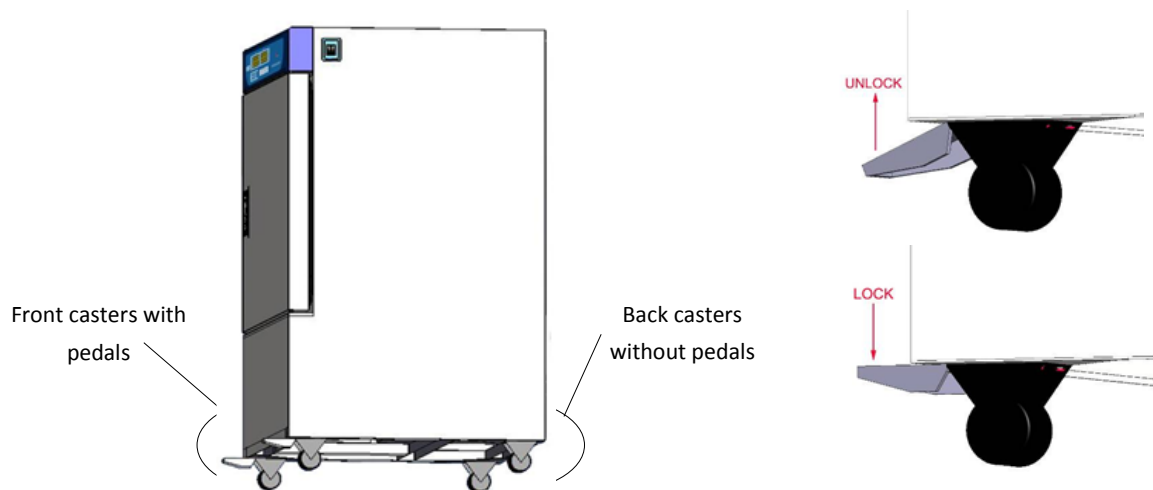
2.1.3 Power Requirements

- Designed for 230VAC 50/60Hz 1 Φ electrical rating
- An unobstructed dedicated power outlet which is not shared with other appliances.
- It is recommended that the voltage fluctuation doesn't exceed $\pm 10\%$ of the nominal voltage at all times, or else an electrical power stabilizer can be installed.
- UPS is recommended for better protection.

2.2 Installation

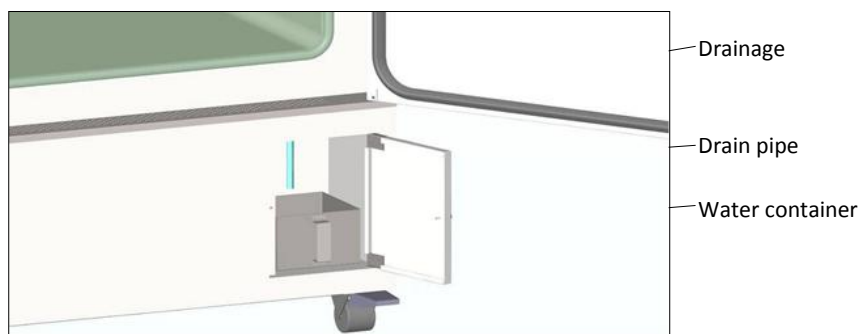
2.2.1 Caster Wheel

- Both front and back casters can be 360° turning.
- The front casters can be locked by pressing down the pedal. Therefore position of the equipment can be fixed. Release the front casters by picking up the pedal. Therefore equipment can be moved.



NOTE: It is recommended to lock the 2 front casters before starting the equipment. Otherwise, dangerous may be caused due to unexpected force as closing glass door / outer door.

2.2.2 Water Container



2.3 Disclaimer

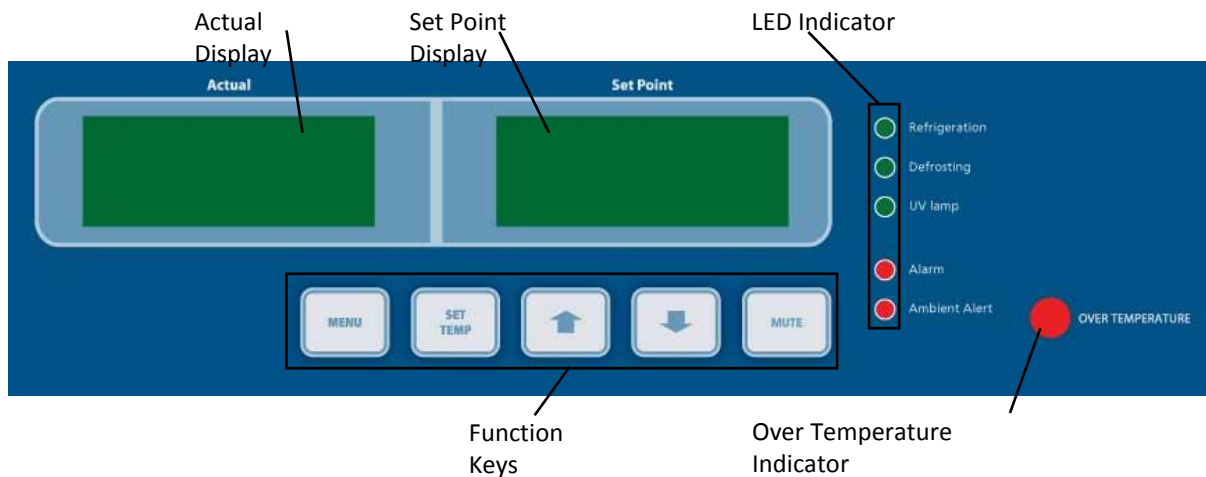
The performance and safety of the incubator, while rigorously evaluated at the factory, cannot be guaranteed once after transit and installation. Therefore the on-site testing is always recommended.

References for qualified Certifiers:

- Esco Distributor
- Esco (www.escoglobal.com)

Chapter 3 - Control System and Operation

3.1 Control System



3.1.1 Function Keys

	MENU	Enters menu options. Switches between submenus.
	SET TEMP	Enters temperature and time setting option under basic operation mode. Enters submenu/save set parameters and withdraw submenu.
	UP	Parameter value plus key.
	DOWN	Parameter value minus key.
	MUTE	Mute alarm of ambient condition

3.1.2 LED Indicators

	Refrigerating	REFRIGERATING	Electrical refrigerating output indicator
	Auto-Defrost	AUTO-DEFROST	Auto-Defrost indicator.
	UV lamp	UV LAMP	UV lamp indicator
	Alarm	ALARM	Alarm indicator
	Ambient Alert	AMBIENT ALERT	Ambient condition indicator

3.2 Unit Operation

3.2.1 Switching ON/OFF

The equipment is switched ON by pressing the main switch downward; pressing the main switch upward will turn it OFF. The power supply will cut off and the operation will stop.

3.2.2 Opening/Closing Outer Door

Pull-down the handle to open the door, and pull-up to close the door.

NOTE: As there are 2 knobs at the top and bottom of the outer door, the outer chamber may be damaged by the knobs if door handle is pulled-up during closing the door.

3.2.3 Setting Temperature (0°C – 100°C)

Step	Description	Button	Display
1	Press SET TEMP button to start the setting.	SET TEMP	8888 8888
2	Press UP/DOWN button to set the temperature set point. Press SET TEMP to save setting	UP/DOWN – SET TEMP	

NOTE:

- If the ambient temperature does not meet requirement (15°C~30°C), the AMBIENT ALERT LED will light up and a buzzer will sound every 20 sec as warning. The buzzer can be stopped by pressing the MUTE button.
- Refrigerating system's compressor will start working according to temperature set point and ambient temperature. REFRIGERATING LED will light up when the equipment is in the refrigeration process.
- UV LAMP LED will light up when the UV lamp is on.

3.2.4 Protection Devices

This is a non-adjustable temperature protection. The factory set value 110°C maximum. This electronic over-temperature protection system is monitored by Protection Class 3.1 to DIN 12 880. If temperature in inner chamber exceeds 110°C, heating within equipment will be stopped. As a warning, the OVER TEMPERATURE LED will light up.

If this happens:

- Switch off the equipment or even cut off the power supply and allow equipment to cool down.
- Rectify the fault - contact customer service for assistance.
- Re-start the device after the equipment is cooled down and fault has been rectified.

3.2.5 Auto-Defrosting

- Auto-defrosting will be operated every 6 hours as temperature set point $\leq 11^{\circ}\text{C}$ and every 24 hours as temperature set point $\geq 11^{\circ}\text{C}$. Temperature will slightly fluctuate during defrosting.
- Auto-defrosting will fail when the temperature in the inner chamber is or close to 0°C. If necessary, use manual-defrost.
- Every time user completes a test without refrigeration and next step wants to do the test with refrigeration system running, please select heating-defrost program (or set 50°C) and open the door for at least 30 minutes. Without this process, the auto-defrost performance may be affected

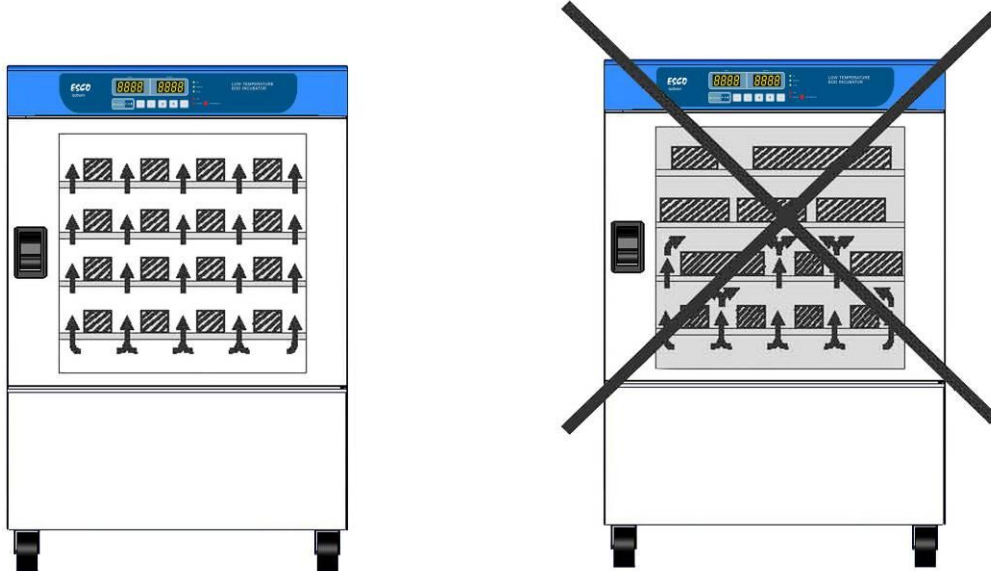
3.2.6 Placement of Loads

Full considerations must be given to physical and chemical properties of your load in order to prevent serious damage to load, equipment and surroundings.

Note:

- Isotherm Low Temperature BOD Incubator (IFC) is not explosion-proof, thus it is not suitable for drying, evaporating and burning-in of paints, enamels or similar materials whose solvents may produce an inflammable mixture with air.
- There must be no possibility of the formation of inflammable gas / air mixtures either within the equipment or in the immediate surroundings of the equipment.
- Large amount of dust or corrosive fumes inside the equipment or in the surroundings of the equipment may produce deposits within the equipment and lead to short circuits or damage of electronics. Therefore it is important that adequate precautions are taken against excessive dust or corrosive fumes.
- In order to ensure good ventilation within equipment, the space for placing loads should not exceed half volume of workroom (refer to "Technical Specification Summary Table"). Do not divide workroom into several separate parts by the loads with larger area.

- There must be sufficient spacing of the load inside the equipment to ensure proper ventilation within the equipment. Do not place any load on the floor, against the side wall or underneath the ceiling of the equipment.
- In order to ensure optimal ventilation, shelf should be inserted so that air spacing between shelves, door, load and inner chamber wall is approximately equal.
- Maximum quantity and loading of shelves can be seen in “Technical Specification Summary Table”. Improper loading may increase the time on reaching the set temperature.



3.3 Menu & Options

Basic setting	MENU SETT	Alarm setting	ALRT	10
		Timer setting	ETIM	OFF
		Password setting	PLN	0
		Address setting	ADDR	0001
		Timer setting of manual-operation on UV lamp	Uu	0000
		Timer setting of auto-operation on UV lamp	Uu1	0015
		Defrosting setting	dEFT	0000
Program operation	MENU PROG			
Calibration	MENU CAL			
System Parameter Display (Diagnostic Mode)	MENU Adin	Version number	F101	v2.0
		AD sampling value	AdC	100
		Present value	Pu	0.0
		Set value	Su	0.0
		Upper limit of measuring range	UPL	100.0
		Lower limit of measuring range	LUL	0.0
		Historic record of temperature	L090	----
	L099	----		
Factory Settings	MENU FACL			

3.3.1 Alarm Setting

The high point temperature alarm setting can be adjusted. Please note the alarm value is a relative setting. Range for alarm setting: 2°C~10°C (If the refrigeration system is active, use 2°C). In case, actual temperature in equipment is equal or higher than temperature set point + alarm value, buzzer will sound and red light of "Alarm" indicator will flash.

Step	Description	Button	Display
1	Press MENU button until the display shows Setting. Press SET TEMP to enter the menu.	MENU – SET TEMP	MENU SEtE
2	Press MENU button until the display shows Alarm.	MENU	ALrM ID
3	Press UP/DOWN button to choose the alarm value. Press SET TEMP to save setting.	UP/DOWN – SET TEMP	

3.3.2 Timer Setting

3.3.2.1 Turning the timer ON and OFF

Step	Description	Button	Display
1	Press MENU button until the display shows Setting. Press SET TEMP to enter the menu.	MENU – SET TEMP	MENU SEtE
2	Press MENU button until the display shows Timer.	MENU	tM r OFF
3	Press UP/DOWN button to set the timer ON/OFF. Press SET TEMP to save setting.	UP/DOWN – SET TEMP	

3.3.2.2 Set timer (0000 – 9999 seconds)

Time is set in normal operation, not in main menu. So exit the menu to set timer.

Step	Description	Button	Display
1	Press SET TEMP button to start the setting.	SET TEMP	8888 8888
2	Press MENU button until the display shows Timer.	MENU	tM r 0000
3	Press UP/DOWN button to set required time. Press SET TEMP to save setting.	UP/DOWN – SET TEMP	

NOTE:

- The timer starts when the actual temperature is equal/larger than the set point temperature. Do not turn off the timer, once it starts.
- The remaining time can be checked using DOWN button during normal operation.
- End is shown on "Actual" display and buzzer sounds 4 times as counting ends. All buttons are locked. Re-start the device to reactivate the buttons.
- Timer will not be saved and assumed to be 0000 as equipment is re-started.

3.3.3 Password (PIN) Setting

The PIN consists of 4 alphanumeric digits. When set to 0000, the PIN is disabled; otherwise the MENU and SET TEMP buttons functions require PIN.

3.3.3.1 Set PIN (0000 – 9999; 0000 – pin disabled)

Step	Description	Button	Display
1	Press MENU button until the display shows Setting. Press SET TEMP to enter the menu.	MENU – SET TEMP	MENU SEtE
2	Press MENU button until the display shows PIN.	MENU	Pin 0
3	Press UP/DOWN button to set the PIN's digit. Press SET TEMP to confirm the number and move to the next digit.	UP/DOWN – SET TEMP	
4	Repeat step 3 until the fourth digit. Once the fourth digit is chosen, pressing SET TEMP button will save the PIN.		

3.3.3.2 Enter PIN

Step	Description	Button	Display
1	Press MENU or SET TEMP button to enter PIN.	MENU – SET TEMP	UPi n 0
2	Press UP/DOWN button to set the PIN's digit. Press SET TEMP to confirm the number and move to the next digit.	UP/DOWN – SET TEMP	
3	Repeat step 3 until the fourth digit.		

Note: In case PIN is lost, please contact Esco after-sales service for help.

3.3.4 Address Setting (1 – 32)

Step	Description	Button	Display
1	Press MENU button until the display shows Setting. Press SET TEMP to enter the menu.	MENU – SET TEMP	MEnu SEtt
2	Press MENU button until the display shows Address.	MENU	Addr 0001
3	Press UP/DOWN button to choose the address. Press SET TEMP to save setting.	UP/DOWN – SET TEMP	

3.3.5 UV Lamp

There are 2 modes for UV lamp operation:

- Manual-operation (UV)
 - UV lamp can be turned ON for sterilization during operation as required.
 - Period of UV lamp operation can be set and UV lamp is turned ON immediately after setting is confirmed.
- Auto-operation (UV1)
 - UV lamp is ON for 15 min automatically which is factory setting as equipment is turned on.
 - Period of UV lamp operation can be set and operates as per user's request as the equipment is turned OFF and ON again.

3.3.5.1 Manual operation UV lamp (0 – 60 minutes)

Step	Description	Button	Display
1	Press MENU button until the display shows Setting. Press SET TEMP to enter the menu.	MENU – SET TEMP	MEnu SEtt
2	Press MENU button until the display shows UV.	MENU	UV 0000
3	Press UP/DOWN button to set the required UV timer. Press SET TEMP to save setting.	UP/DOWN – SET TEMP	

Note:

- UV LAMP Indicator will light up, indicating that the UV lamp is ON
- Pressing the UP button twice during normal operation will show the remaining UV time
- If the timer is re-set during operation, the timer will restart once the new setting is confirmed

3.3.5.2 Auto operation UV lamp (0 – 60 minutes)

Step	Description	Button	Display
1	Press MENU button until the display shows Setting. Press SET TEMP to enter the menu.	MENU – SET TEMP	MEnu SEtt
2	Press MENU button until the display shows UV1.	MENU	UV1 0015
3	Press UP/DOWN button to set the required UV1 timer. Press SET TEMP to save setting.	UP/DOWN – SET TEMP	

Note:

- UV1 will operate automatically every time the equipment is turned on
- When restarted, the UV timer is assumed to set to 15 minutes
- UV LAMP Indicator will light up, indicating that the UV lamp is ON
- Pressing the UP button once during normal operation will show the remaining UV1 time

3.3.6 Defrost Setting

Step	Description	Button	Display
1	Press MENU button until the display shows Setting. Press SET TEMP to enter the menu.	MENU – SET TEMP	MENU SEtE
2	Press MENU button until the display shows Defrost.	MENU	dEFt 0000
3	Press UP/DOWN button to set the defrost timer. Press SET TEMP to save the defrost timer setting.	UP/DOWN – SET TEMP	
4			dEF2 0FF
5	Press UP/DOWN to set the auto defrosts ON/OFF. Press SET TEMP to save setting	UP/DOWN – SET TEMP	

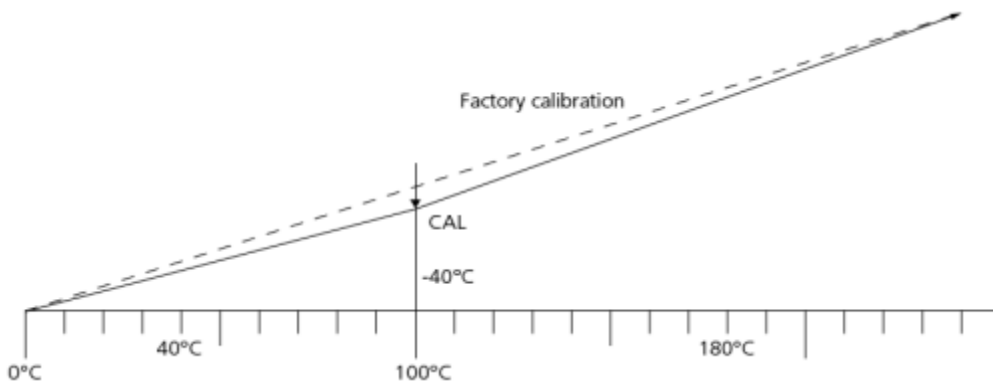
3.4 Calibration (Offset Range: -20°C – 20°C)

Step	Description	Button	Display
1	Press MENU button until the display shows Calibration. Press SET TEMP button to enter the Calibration menu	MENU – SET TEMP	MENU CAL
2			CAL 000.0
3	Press UP/DOWN button to correct temperature deviation. Press SET TEMP to save setting	UP/DOWN – SET TEMP	

General calibration instructions:

For example: set the calibration offset for correction of a temperature deviation in the load at 100°C
 Equipment set point = 100°C, equipment actual display = 100°C, actual temperature tested= 99.6°C (put the sensor of a calibrated reference instrument near to the temperature probe of the product).

- Enter the Menu and find CAL (calibration) according to the steps above.
- The default value is 0.0
- Set calibration correction according to above steps in the table --- CAL= -0.4°C
- Exit the menu, then the actual display will be 99.6°C.
- Equipment will run automatically to 100°C to achieve the set point.
- Minimum calibration value is 0.1°C.



Note: if no calibration is set, 0000 is restored as factory calibration shown on "Set Point" display.

3.5 Quick Keys (Normal Operation Mode)

	UV Timer		Timer
	UV1 Timer		Return to normal
	Return to normal		

Chapter 4 - General Maintenance

4.1 Scheduled Maintenance

Proper and timely maintenance is crucial for trouble free functioning of any device and your Esco unit is no exception to this rule. We strongly recommend that you follow the maintenance schedule suggested here under in order to obtain optimal performance from your unit.

No	Description of task to perform	Maintenance to be carried out every			
		Day	Month	Quarter	Year
1	Decontaminate the work zone	✓			
2	Clean the exterior and interior surfaces, screen frame and temperature probe		✓		
3	Inspect the equipment for any physical abnormalities or malfunction			✓	
4	Clean up stainless steel surfaces with MEK			✓	
5	Lubricate door's moving parts				✓
6	Check tightness of hinge screws on door's moving parts				✓
7	Readjustment of door				✓

4.2 Cleaning

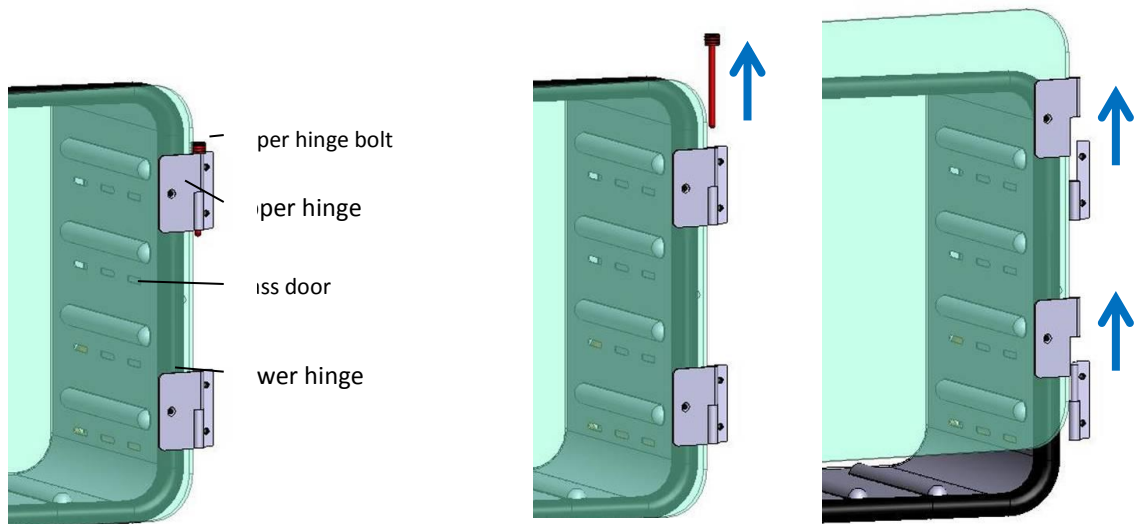
- Cut off power supply before cleaning.
- Clean and wipe exterior and interior surfaces using a wet and soft cloth.
- Don't clean the equipment with water.

4.2.1 The Glass Door

Glass door is designed to allow the user to observe loads in the equipment during operation, without opening of the door and causing temperature inaccuracy. Regular cleaning of glass door is recommended.

To clean the glass door:

1. Rotate the glass door handle less than 90°
2. Remove upper hinge bolt and remove glass door upward
3. Clean the glass door using non-corrosive (chlorine and hydrochloric acid-free) water, alcohol or surface detergent. Neutral detergent is recommended.
4. Reverse the above steps to re-assemble the glass door.



4.2.2 Control Panel, Exterior & Interior Surfaces, Screen Frame, Temperature Probe

Clean the control panel using non-corrosive (chlorine and hydrochloric acid-free) water and surface detergent. Neutral detergent is recommended.

For removing stubborn stains or spots on the stainless steel surfaces, make use of MEK (Methyl-Ethyl-Ketone). In such cases, make sure that you wash the steel surface immediately afterwards with clean water and some liquid detergent. Use a polyurethane cloth or sponge for washing. Regularly cleaning the stainless steel surface can help you retain the attractive factory finish.

Note:

- In order to achieve optimal maintenance, clean thoroughly and regularly. After cleaning, the residual detergent can be removed by slightly wet soft cloth.
- Do not clean the control panel using acidic detergent or chlorine-containing compounds.

4.2.3 Cleaning Bottom Panel

- Open both outer door and glass door.
- Remove stainless steel panel.
- Clean both stainless steel panel and sink by non-corrosive (chlorine and hydrochloric acid-free) water, alcohol or surface detergent. Neutral detergent is recommended.

4.2.4 Decontaminate the Work Zone

Thoroughly wipe the work surface, side walls, inner back walls and all other surfaces in the interior of the equipment using a disinfectant appropriate for the work being conducted in your lab.

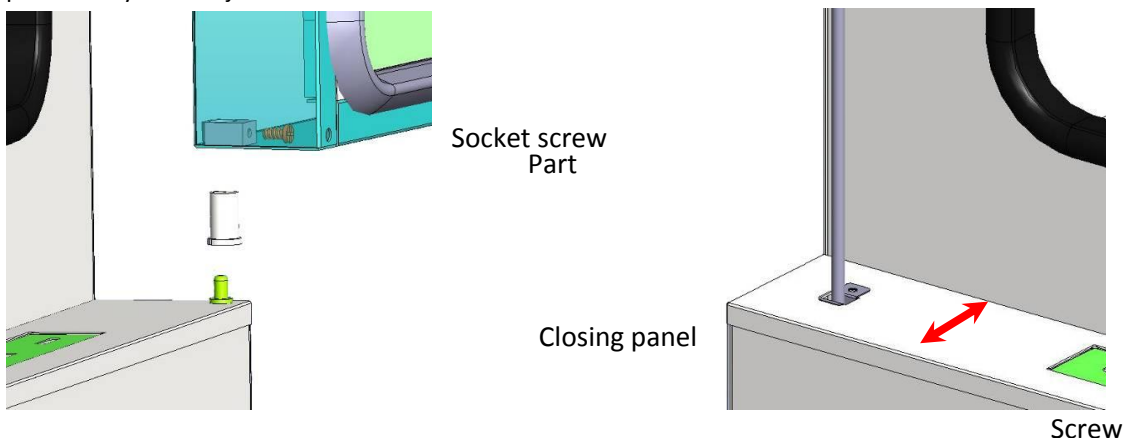
4.3 Physical Inspection

- Check the equipment to ensure that it is functioning properly and replace parts if necessary.
- Lubricate the door's moving parts annually to ensure that the parts are moving smoothly.
- Check the tightness of door's screws on moving parts annually. Ensure that the hinge screws are tight.

4.3.1 Readjustment of door

On IFC, tight closure of the door is ensured by silicone gasket on the body and door. Continuous operation reduces flexibility of the seal. Therefore, readjustment may be necessary to ensure proper closing of the door:

1. Release socket screw (1) by hexagon socket key and rotating the part (2) by means of screwdriver. Apply more locking varnish to screw (1) and tighten it.
2. Adjust closing panel (3) in the direction of the arrow after releasing the screw (4). Screw down the panel firmly after adjustment.



NOTE:

It must be conducted by qualified electrician or technician authorized by Esco.
Cut off power supply before doing maintenance works.
It is recommended that the maintenance is done annually.

4.4 Removal of deposits

Deposits can be removed by three ways, depending on the composition of loads and contacted materials.

- Automatic high temperature decontamination

Note: Take out all combustible materials and set overheat protector to maximum value beforehand.

- Spray standard acid-free disinfectant

Note: Before startup, thoroughly wipe the unit with dry cloth as explosive gases may be generated during pollutant removal.

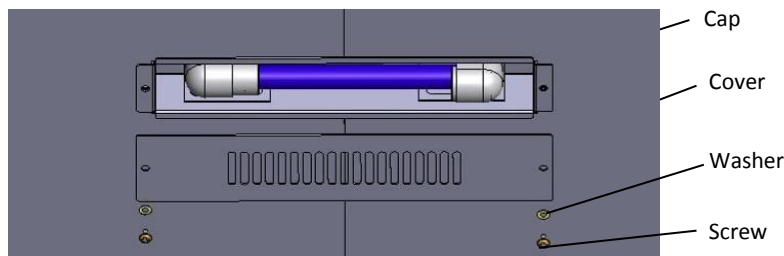
- Indoor parts can be decontaminated by high-pressure decontamination.

Note: Safety measures need to be implemented to ensure the safety during deposits removal.

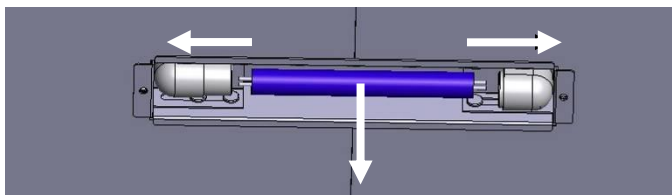
4.5 UV Lamp Replacement

If the UV lamp in inner chamber is damaged, user can replace it by following below steps:

1. Open outer door and glass door.
2. Unscrew the cover.



3. Slide the UV lamp caps (1) to aside therefore the UV lamp can be removed.



NOTE:

- Ensure the equipment is turned OFF and power supply is disconnected during UV lamp replacement.
- Pay attention as the UV lamp may drop as the caps are slide aside
- UV light is harmful to health. Don't open outer door when the UV lamp is ON.
- Don't put big loads or many loads into inner chamber that may destroy UV lamp.

4.6 Maintenance/Service Log

It is good practice (and in some cases regulatory requirement) to maintain a log of all maintenance work carried out on your freezer.

Chapter 5 - Troubleshooting

Under no circumstances should the unit be disassembled, repaired, or converted by unqualified people. Failure to follow these instructions may cause personnel injury and/or loss of property due to malfunctions, electric shocks or fire.

Should the unit malfunction, stop the operation, and then pull out the power plug or turn off the power supply at source. Continuing to operate the unit when it shows signs of malfunctioning may cause electric shocks or fire.

The following troubleshooting are some of the basic problems that can be solved by the user or operator. However if the problem persist, please contact your local distributor.

Problem 1: Unit doesn't start

Possible Cause	Corrective Action
Power Failure	<ul style="list-style-type: none"> Check if there is power at the wall/building socket. You can use voltmeter to check power on the wall/building socket. Ensure the building socket switch is at ON position Check whether power cord has been connected properly into wall/building socket and also into the unit.
Power Distribution Board Fuse has blown	<ul style="list-style-type: none"> Please check first with your electrical engineer certified Contact ESCO technical service for replace the fuse <p>NOTE: It is recommended to disconnect the main power cord from the outlet wall socket when accessing the electrical panel to prevent electric shock.</p>

Problem 2: Compressor doesn't start

Possible Cause	Corrective Action
No power to motor compressor	<ul style="list-style-type: none"> Check power to and from power distribution board. Check power and connection at compressor terminals in power distribution board.
Faulty Capacitors	<ul style="list-style-type: none"> To ensure these capacitors are working, check the capacitance across the two wire ends of the capacitor. Open the terminal connection block cover to expose the cable connections for the capacitor. <p>Note: When measuring capacitors, ensure that the power supply is off. There may be some electrical charge inside the capacitor so it is best to let it discharge itself for about 2-3 minutes right after operation. Check capacitor voltage across terminals first to ensure that it is fully discharged before measuring capacitance.</p>

Problem 3: Convection fan is not working

Possible Cause	Corrective Action
Power Failure	<ul style="list-style-type: none"> Check the connection at forced convection pin on power distribution board is connected properly Check the voltage is 220-240 volts and 50 Hz.

Problem 4: Condenser fan is not working

Possible Cause	Corrective Action
Power Failure	<ul style="list-style-type: none"> Check the connection at terminal block and check the voltage is 220-240 volts and 50 Hz. Check the connector is connected properly

Problem 5: Overshoot or under shoot temperature

Possible Cause	Corrective Action
Leak on the gasket chamber	<ul style="list-style-type: none">• Paper check : put the paper between glass door and gasket chamber than pull the paper and feels rough• If the test is failure please contact technical service
Refrigeration system is failed	<ul style="list-style-type: none">• Please contact technical service

APPENDIX

LOG RECORD

Incubator : _____
Serial Number : _____
Person in Charge : _____

1. This log record should be used by the operator to record any new agent that has been introduced to the freezer during its operation, problems encountered, etc.
2. Please also record any major maintenance procedure performed by the service technician, for example: parts replacement, recertification, etc.

Date	Event	User Signature	Supervisor Signature

In case of emergencies, please call:
Name : _____
Cell Phone Number : _____
E-mail : _____

