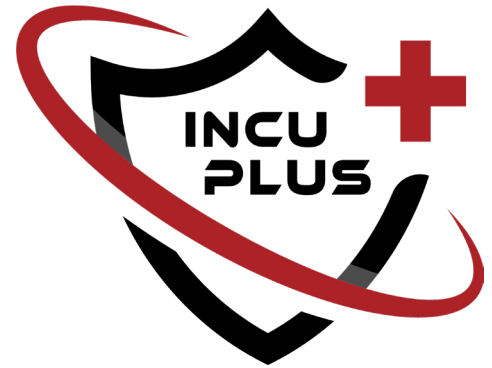


# ESBE CO2 Incubator



## ESB-ECO2170LH

-  EZ Sterilization Process
-  Fuzzy Logic Temperature Uniformity
-  Anti-Condensation Heating System
-  Intelligent Airflow Control
-  Precise CO2 Concentration with IR Sensor
-  Comprehensive Alarm System
-  Seamless Interior 304 Stainless Steel
-  Gasline Filter
-  EZ Touch

Temperature Range: **3°C Above Ambient to 55°C**

Capacity: **170L (6 cu ft)**



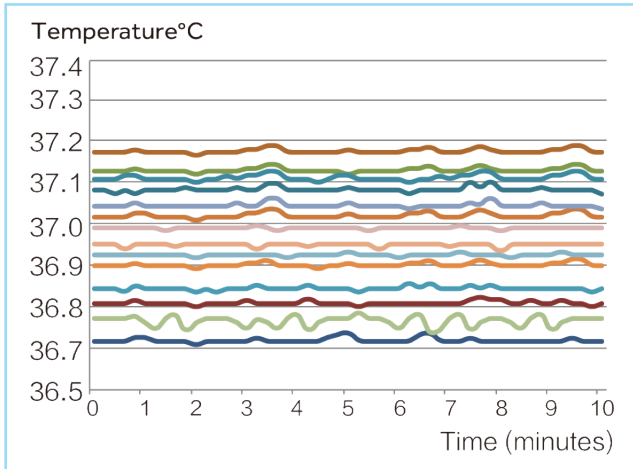
**5** YEARS WARRANTY  
PARTS & LABOUR

The ESBE Incu Plus CO2 Incubator delivers concise test results with accurate temperature control and 180°C dry-heat Sterilization. **Experience the cutting-edge IR sensor technology for precise CO2 concentration.**

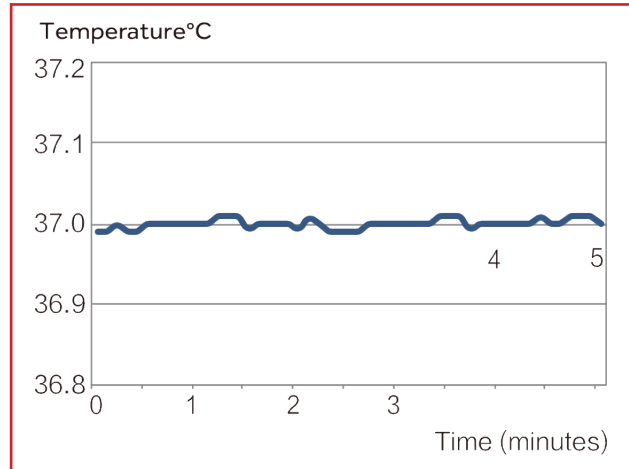
# Precise & Accurate Temperature Control

The ESBE CO2 incubator has exceptional temperature control accuracy of  $\pm 0.1^{\circ}\text{C}$ . Utilizing a six-sided heating system and advanced fuzzy PID control technology, the incubator provides a stable and uniform environment for normal cell growth throughout their entire life cycle. This meticulous temperature regulation ensures optimal conditions for your valuable cell cultures.

## Uniformity of 27 measuring points $< \pm 0.3^{\circ}\text{C}$

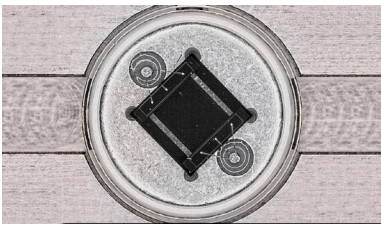


## Central consistency point $< \pm 0.1^{\circ}\text{C}$

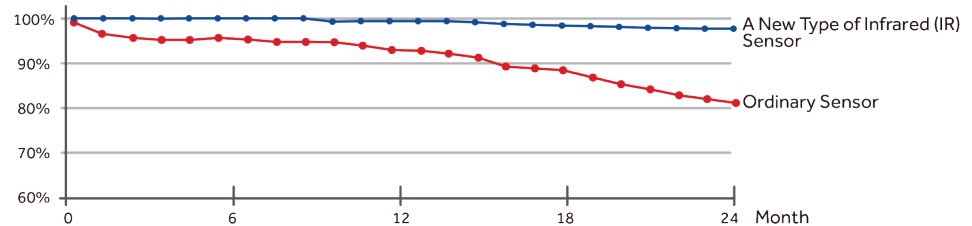


## Precise CO2 Concentration Using New IR Sensor Control Technology

ESBE Scientific's innovative IR Sensor technology utilizes NDIR (Non-Dispersive Infrared) principles for precise CO2 measurement. Engineered to withstand high temperatures up to  $190^{\circ}\text{C}$  during sterilization cycles, the sensor boasts a durable silicon MEMS transmitter capable of exceeding 300 cycles, translating to a remarkable 15-year lifespan. Additionally, integrated temperature and humidity compensation technology automatically adjusts for environmental fluctuations, eliminating the need for post-sterilization calibration. This advanced sensor design enhances accuracy and sensitivity with minimal drift thanks to its five-point calibration system.



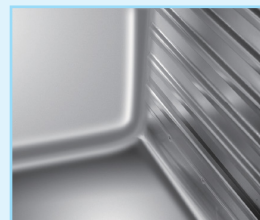
Silicon-based mems transmitter



Sketch of drift less than 0.3%

## Easy to Clean Interior

The working chamber is crafted from plasma electro-polished, stamped stainless steel. This advanced treatment yields a smooth, non-porous surface for easy cleaning and minimized contamination risk. The wide-arc, laser-welded corners enhance hygiene, while the bracketless shelving design allows for swift removal and cleaning.



## Anti-Condensation Heating System

### Eliminate Condensation, Minimize Pollution Risk

The ESBE CO2 Incubator door features an innovative anti-condensation heating system that radiates heat to the inner glass door. This effectively prevents condensation from forming on the door, eliminating the potential for microbial contamination caused by condensate water. Enjoy peace of mind knowing your cell cultures are protected from this common threat.

## Intelligent Airflow Control

### Consistent Conditions

An intelligent air circulation system automatically adjusts the airflow circulation for optimal uniformity. This avoids air volatilization of samples while ensuring consistent uniformity throughout the chamber, creating a perfect environment for your valuable cell cultures.

## Comprehensive Alarm System

### Multi-Level Safeguards

For ultimate peace of mind, this incubator features a multi-level alarm system. Independent temperature alarms with audible and visual alerts, alongside remote notifications, ensure you're aware of any potential issues. Additional alarms for CO2 concentration, door ajar, and water shortage provide comprehensive protection for your experiments and valuable samples.

# 180°C Dry-Heat Sterilization Technology to Minimize Contamination

The ESBE CO2 Incubator offers a convenient and efficient sterilization process, eliminating bacteria, fungi, and even highly resistant microplasma. A simple press of the "sterilization key" initiates a fully automated 12-hour cycle at 180°C, achieving a sterility level within the chamber that meets stringent WS/T367-2012 standards. Notably, all internal components, including CO2 sensors, are sterilized during this process, eliminating the need for disassembly and separate decontamination, thus minimizing the risk of secondary contamination.



### Ultraviolet Disinfection

Cells exposed to bacterial environment



### 90°C Hygrothermal Disinfection

Cells exposed to bacterial environment



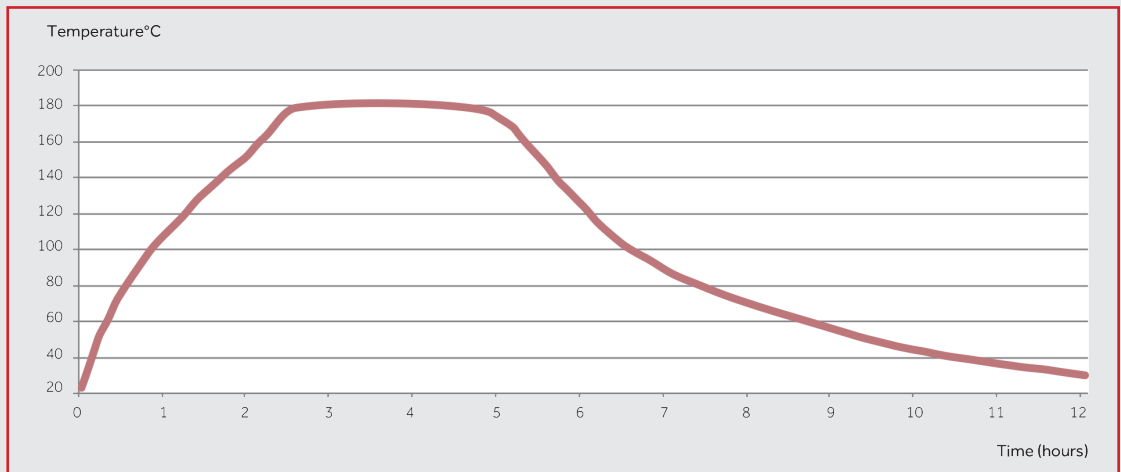
### 180°C Dry-Heat Sterilization

Pollution-free cell growth environment



### Sterilization Temperature Profile

Forty-seven points were tested in the working chamber, including glass inner doors and partitions. All regions reached 180°C and maintained for 2 hours.



## High Efficiency Microbial Filter

The ESBE CO2 incubator features a high-efficiency microbial filter at the CO2 inlet with a 99.99% filtration efficiency for particles as small as 0.2 microns in diameter. This effectively removes bacteria and dust contaminants from the CO2 gas line, ensuring a sterile environment and protecting your experimental results.

# Fast Environment Recovery for Optimal Cell Growth

The ESBE CO2 Incubator prioritizes optimal cell growth through rapid environment recovery. Adopting advanced active air flow control based on the fuzzy PID control principle, the parameters can be restored without overshoot. The system restores temperature and CO2 concentration within just 4 minutes after a 30-second door opening, minimizing disruption and ensuring consistent conditions even in high-use labs.

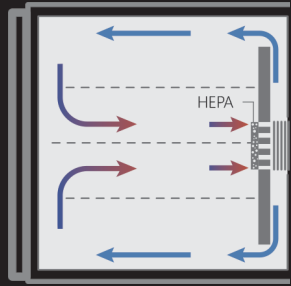
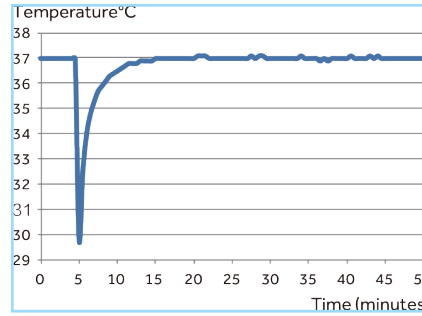
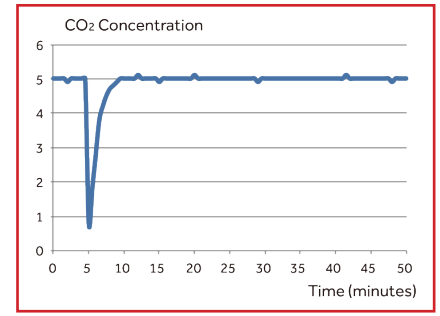


Illustration of Purified Airflow



Temperature Recovery Curve  
Door open for 30s



CO2 Concentration Recovery Curve  
Door open for 30s

# Intuitive Interface with Easy Touch Control

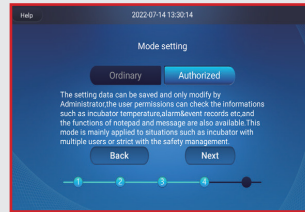
A responsive touchscreen provides effortless operation even while wearing rubber gloves. Colour-coded displays simplify data interpretation. Green indicates normal operational parameters, and red warns for abnormal conditions (e.g., low water level is indicated with a red warning and an audible alarm).



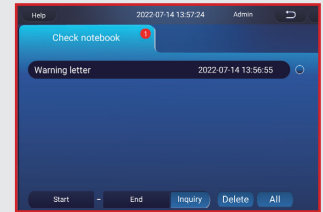
Red warning display on home screen for immediate attention



Monitor real-time operation data like temperature, CO2 & O2 concentration, & culture cycle progress



User access with a three-level authority system for data security.



Announcement function & clear communication designed for multiple people to use the incubator

# Smart Design for Exceptional Results

From intuitive controls to a carefully crafted chamber, this CO2 incubator prioritizes user experience and optimal cell growth. Every detail is meticulously considered to ensure a stable environment and simplified workflow for your research.



Perforated, Adjustable Shelving



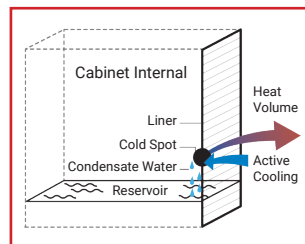
Seamless Interior



Secure, anti-slip design of pull-out shelves for optimal stability



Convenient Drainage Design for effortless clean-up



Active heat pipe condensation technology (condensate water directly returns to reservoir)



Unmatched data traceability for 15 years with a large storage capacity (data exportable via USB)

# Advanced Technology, Integrated Design



## CO2 Concentration Control with Advanced IR Sensor Technology

A cutting-edge infrared (IR) sensor for exceptional precision and long-term reliability. Engineered to withstand high temperatures (up to 190°C) and endure over 300 dry heat sterilization cycles with a service lifespan of up to 15 years. The IR sensor is based on the NDIR measurement principle and uses a silicon MEMS transmitter to replace the traditional light source. Features an accuracy of  $\pm 0.1\%$ , advanced German IR sensing technology and zero drift (drift less than 0.3% within 2 years). Ensures consistent and reliable CO2 control, eliminating the need for calibration and maximizing cell culture success.

## Inner Door

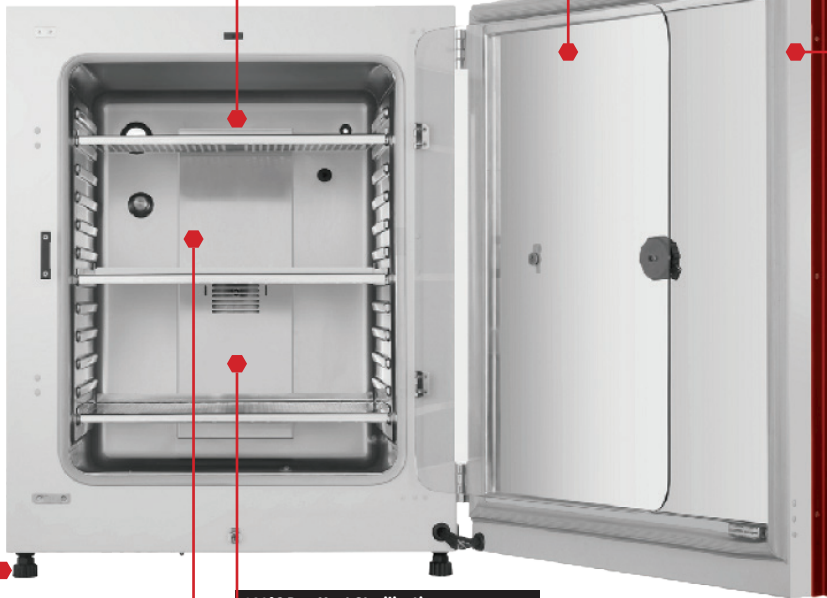
Features an inner glass door that helps maintain a stable and consistent environment within the chamber. The inner door acts as an additional barrier, minimizing temperature fluctuations and CO2 loss when accessing the incubator.

## Outer Door

The heated outer door is specifically designed to prevent condensation from forming on the inner glass door. This ensures clear visibility into the chamber without compromising temperature or CO2 levels, allowing you to monitor your cell cultures effortlessly.

## 7-inch Touchscreen

A user-friendly 7-inch touchscreen for real-time monitoring of CO2 concentration and temperature data. For comprehensive record-keeping, it allows data export of the past 15 years via USB, providing valuable insights for your research.



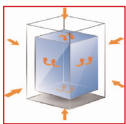
## Adjustable Feet

Allows you to level the unit on uneven surfaces, and also facilitate double stacking with a compatible stacking kit.

## 180°C Dry-Heat Sterilization

This incubator eliminates the need for disassembly and separate autoclave sterilization of internal components. This one-click sterilization process minimizes the risk of secondary contamination and eliminates the need for additional consumables. The German infrared CO2 sensor utilizes NDIR light source technology, ensuring exceptional stability with drift of  $<0.3\%$  within two years. It can withstand 180°C sterilization cycles without disassembly or manual calibration.

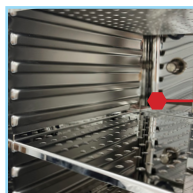
## Precise Temperature Control



Six-sided heating based on fuzzy PID control. Utilizes dual internal PT1000 high-precision sensors for accurate readings.

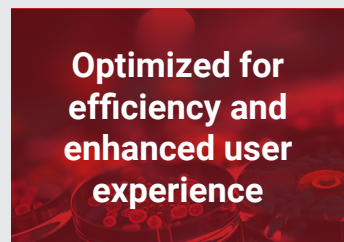
## 304 Stainless Steel Interior

Resists corrosion and contamination, promoting a hygienic environment.



## Internal Partition

Safety anti-slip design to ensure secure handling.



## OPTIONAL ACCESSORIES

### HEPA Assembly

HBM-270702522

### Gas Inlet Filter

HBM-0270702254

### Reducing/Relief Valve

HBM-RDCVAL

### Water Tray

HBM-INCWATR

### Roller Base

HBM-HCP168ROLLERBASE

### Stacking Frame

HBM-0270104673

HBM-0270104674

### Internal Partition

HBM-0270104233

### O2 Module

HBM-O2MOD

### 6 Inner Doors

HBM-HCP6DOOR

### 3 Inner Doors

HBM-HCP3DOOR

# Features & Specifications



<b>ESBE Item ID</b>	ESB-ECO2170LH	
<b>Type</b>	Air Jacket	
<b>Construction</b>	Chamber Volume (L)	170
	Interior Chamber	Stainless Steel
	Exterior Chamber	Cold-rolled Steel Powder Coated
	Access Port	35mm Diameter
	Data Outputs	Remote Alarm Contacts, USB, and Optional 4-20mA
<b>Dimensions</b>	Net / Gross Weight (approx)	110 / 140 kg 242.5 / 308.6 lbs
	Interior Dimensions (W x D x H)	490 x 560 x 650 mm 19.3 x 22 x 25.6 in
	Exterior Dimensions (W x D x H)	714 x 812 x 887 mm 28.1 x 32 x 34.9 in
	Packing Dimensions (W x D x H)	760 x 840 x 1050 mm 29.9 x 33.1 x 41.3 in
	Dimensions (W x D)	470 x 434 mm
<b>Shelves</b>	Number Standard / Maximum	3 / 11
	Max load Per Shelf / Total Load	10 / 30
	Construction	Perforated, Adjustable
<b>Electrical</b>	Rated Voltage Power Supply	220V / 50Hz
	Nominal Consumption	0.095 kw (1.4 Steri-run)
<b>Control</b>	Controller	Microprocessor
	Display	7" LCD Screen
<b>CO2</b>	Control	±0.1%
	Range	0-20%
	Alarm Range	±0.5%
	Inlet Pressure	12-17 Psi (0.8-1.2 Bar)
	Gas Purity %	Min 99.5 or Medical Quality
	Sensor	IR
	Recovery Time at 5 vol.-% / CO2 for a 30 Second Door Opening	4 min
	CO2 Inlet Filter (µm)	<0.2
	High/Low Temperature	Y
	Remote Alarm	Y
<b>Alarms</b>	Excessive CO2 Concentration	Y
	Water Shortage	Y
	Door Ajar	Y
	Control	±0.1°C
<b>Temperature Parameter</b>	Range	3°C Above Ambient to 55°C
	Uniformity	±0.3°C
	Ambient Range	18-32°C
	Sensor	PT1000
	Recovery Time at 37°C for a 30 Second Door Opening	4 min
<b>Sterilization Cycle</b>	Cycle Temperature	180°C on all Internal Surfaces
	Cycle Duration	Under 12 Hours
<b>Humidity</b>	RH (Relative Humidity)	Setting 37°C ≥ 90%
	Humidity Reservoir	Max 3L / Min 0.5L
	HEPA Filter	Y
<b>Optional</b>	Pressure Reducing Valve	Y
	RS485	Y
	4-20mA	Y
	Cylinder Switch	Y
<b>Certification</b>		

# Advanced Hardware & Software Systems



## EZ Sterilization Process

Sterilization process is simple and easy. No need to remove the sensor during sterilization, and no need to recalibrate the sensor after process is finished.



## Fuzzy Logic Temperature Uniformity

Temperature uniformity is assured with a precision of ±0.3°C and central point fluctuation of ±0.1°C. Fuzzy logic ensures accurate temperature control in a complex environment.



## Anti-Condensation Heating System

Condensation is prevented through heating of the exterior door. Warmth from the exterior door evaporates any condensation formed on the inner door, reducing the chance for microbial growth.



## Intelligent Airflow Control

Air is distributed evenly throughout the unit. Recirculated air is filtered prior to redistribution within the incubator.



## Precise CO2 Concentration with IR Sensor

New IR sensor technology allows for precise CO2 measurements, with an accuracy of ±0.1%. Sensor can withstand temperatures of 190°C, extending the service life of the sensor for up to 15 years of use.



## Comprehensive Alarm System

Alarms for high and low temperature, excessive CO2, low water level, and extended door openings. Ensures users are aware of the internal conditions of the incubator.



## Seamless Interior 304 Stainless Steel

Interior of the unit is a continuous 304 stainless steel, with no gaps or seams. Reduces the chance of microbial contamination and allows for an easier disinfection procedure.



## Gasline Filter

A separate HEPA filter is included for the gas inlet, purifying the air that is supplied to the unit.



## EZ Touch

Large 7" LCD touchscreen offers a smooth user experience. Vital information is easily viewed on the home screen, with more information available in an easy-to-navigate menu.

Contact your local ESBE representative for more information.

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