

Specifications	Model No.					
110 V ~ 120 V, 60 Hz ^{*2}	—	MCO-170AICUVL-PA	—	—	MCO-230AICUVL-PA	—
220 V, 60 Hz	MCO-170AIC-PK MCO-170AIC-PE	MCO-170AICUV-PK MCO-170AICUV-PE	MCO-170AICUVH-PE	MCO-230AIC-PK MCO-230AIC-PE	MCO-230AICUV-PK MCO-230AICUV-PE	—
220 V ~ 240 V, 50 Hz/60 Hz (CE) (Saudi Arabia only) ^{*5}	MCO-170AICL-PE	MCO-170AICUVL-PE	MCO-170AICUVHL-PE	MCO-230AICL-PE	MCO-230AICUVL-PE	—
Contamination control						
H ₂ O ₂ decontamination system	Optional	Optional	Standard	Standard	Optional	Optional
SafeCell UV system	Optional	Standard	Standard	Standard	Optional	Standard
inCu saFe copper-enriched stainless steel interior	—	—	Standard	Standard	—	—
Single beam, dual detector IR CO ₂ sensor	—	—	Standard	Standard	—	—
Direct Heat & Air Jacket (DHA) heating system	—	—	Standard	Standard	—	—
Environmental performance						
Temperature control range	+5°C above ambient to 50°C ^{*1} (Ambient temperature: 5°C~35°C)					
Temperature control uniformity	±0.25°C (23°C ambient, setting: 37°C, CO ₂ : 5%, no load) ^{*2}					
CO ₂ control range and deviation	0% to 20% / ±0.15% (23°C ambient, setting 37°C, 5% CO ₂ , no load)					
CO ₂ sensor platform	Ceramic based, single beam infrared sensor, with dual wavelength measurement for continuous auto-zero calibration					
CO ₂ sampling, patent pending	No moving parts; airflow passes over in/out ports to sustain continuous sampling					
CO ₂ calibration	Automatic, continuous zero reference calibration, Optional STD gas auto calibration					
Airflow	Gentle vertical airflow, continuous with inner door closed					
Interior humidity	95% ±5% R.H. at 37°C by natural evaporation with humidifying pan					
Control, monitoring, alarm						
Temperature and CO ₂ control	PLD, control system setpoint resolution 0.1°C, 0.1%					
Data acquisition	Automatic log function of temperature, CO ₂ , Door opening/closing, Alarm and CSV file output					
Communication	Remote alarm contacts standard, Optional 4-20mA connection, Optional with RS-232C/RS-485/LAN data ports (For the data acquisition system MTR-5000 user only.)					
Cabinet design and construction						
Touch panel (WVGA full color LCD)	Standard					
USB data logging	Standard					
Exterior cabinet and door	Galvanized steel with baked-on finish					
Interior and shelves	Copper-enriched stainless steel					
Inner door	Tempered glass					
Insulation	Styrene Acrylonitrile Copolymer					
Outer door	Reversible heated					
Access port	Diameter 30mm port with non-VOC silicone stoppers (1 on back side)					
Leveling feet	4, Adjustable					
Energy and CO₂ utilities						
Maximum power consumption	Max, 380 W			Max, 440 W		
Maximum heat discharge	Max, 1,070 kJ/h			Max, 1,250 kJ/h		
CO ₂ gas connection	4 mm to 6 mm inner diameter tubing					
CO ₂ gas pressure	0.03 MPa (G) ~ 0.1 MPa (G) [0.3 kgf/cm ² (G) ~ 1 kgf/cm ² (G), 4.4 psi (G) ~ 14.5 psi (G)] from two stage CO ₂ regulator					
Dimensions, weights, capacities						
Internal dimensions [W x D x H]	490 x 523 x 665 mm / 19.3 x 20.6 x 26.2 inch			643 x 523 x 700 mm / 25.3 x 20.6 x 27.6 inch		
External dimensions [W x D x H] ^{*3}	620 x 730 x 905 mm / 24.4 x 28.7 x 35.6 inch			770 x 730 x 905 mm / 30.3 x 28.7 x 35.6 inch		
Volume	165 Liters (5.8 cu.Ft.)			230 Liters (8.1 cu.Ft.)		
Shelves	4 supplies as standard (Maximum 10), Exterior dimensions: 475 (W) x 450 (D) x 12 (H) mm, maximum load 7 kg/shelf			4 supplies as standard (Maximum 10), Exterior dimensions: 628 (W) x 450 (D) x 12 (H) mm, maximum load 7 kg/shelf		
Net weight	80 kg (176 lbs.)			90 kg (198 lbs.)		

^{*1} When set temperature is 37°C, ambient temperature must be 32°C or less. Regardless of ambient temperature, the maximum of temperature control range is always 50°C.
^{*2} The measurement condition complies with PHCbi specified measuring method. ^{*3} External dimensions of main cabinet only. See dimension drawings showing handles and other external projections.
^{*4} Attaching the optional MCO-170HB and MCO-170EL to MCO-230AICUV will add the H₂O₂ decontamination function. ^{*5} Models MCO-170AICL/MCO-170AICUVL/MCO-170AICUVHL/MCO-230AICL/MCO-230AICUVL are for laboratory use. • The optimum performance may not be obtained if the ambient temperature is not above 15°C.

Double-stacking matching table

Spacer for double-stacking	Upper unit	
	MCO-230AIC	MCO-170AIC (M) MCO-170AICD
MCO-230AIC	MCO-170PS	MCO-230SB
MCO-170AIC (M)	—	MCO-170PS
MCO-170AICD	—	MCO-170PS
MCO-19AIC (M)	—	MCO-170SB
MCO-18AIC	—	MCO-170SB
MCO-20AIC	MCO-230SB	MCO-170SB
MCO-5AC (M)	—	—

^{*4} For positioning units on a roller base, please refer to "Optional Accessories".

^{*5} If configuring a double-stack, make sure the double-stacking dedicated securing hardware and spacer are used (See "Optional Accessories").

Optional Accessories

	MCO-170AIC MCO-170AICL	MCO-170AICUV MCO-170AICUVL	MCO-170AICUVH MCO-170AICUVHL	MCO-230AIC MCO-230AICL	MCO-230AICUV ^{**} MCO-230AICUVL
UV system set	MCO-170UVS	Standard equipment		MCO-170UVS	Standard equipment
H ₂ O ₂ decon board	—	MCO-170HB	—	—	MCO-170HB
Electric lock	—	MCO-170EL	—	—	MCO-170EL
H ₂ O ₂ generator	—	—	MCO-HP	—	—
Double stacking bracket	—	—	MCO-170PS	—	—
Stacking plate	—	MCO-1705B	—	—	MCO-2305B
H ₂ O ₂ reagent	—	—	MCO-H202	—	—
Gas regulator	—	—	MCO-010R	—	—
Gas auto changer	—	—	MCO-216C	—	—
STD gas auto calibration kit	—	—	MCO-5G	—	—
Tray	—	MCO-170ST (same as standard accessory)	—	—	MCO-230ST (same as standard accessory)
Half tray	—	MCO-25ST	—	—	MCO-35ST
Roller base	—	MCO-170RB	—	—	MCO-230RB
Small door	—	MCO-170ID	—	—	—

Optional Software product

Interface board ^{*1} ; for LAN	MTR-L03
Interface board ^{*1} ; for RS-232C/RS-485	MTR-480
Interface board	MCO-420MA

^{*1} For the data acquisition system MTR-5000 user only.

• Appearance and specifications are subject to change without notice.

Caution: PHC Corporation guarantees this product under certain warranty conditions. However, please note that PHC Corporation shall not be responsible for any loss or damage to the contents of the product.

Preservation (freezers, refrigerators) and Culturing (incubators) Equipment
 The management of the design, development, production, sales support, and servicing of the above.
 PHC Corporation, Biomedical Division
 1-1-1 Sakada, Oizumi-machi, Ora-gun. Gunma 370-0596, Japan



PHC Corporation, Biomedical Division is certified for:
Environmental management system: ISO14001

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PHCbi

CO₂ Incubators



Enhance your cell growth with an intelligent CO₂ incubator designed for precise temperature and CO₂ control, efficient cleaning and rapid decontamination.



^{*1} Standard for Model No. including UV. ^{*2} Standard for MCO-170AICUVH/MCO-170AICUVHL

CE
 EU only 0123

PHC Corporation, Biomedical Division
 Formerly Known as Panasonic Healthcare, Biomedical

Life Science Innovator Since 1966

Next Generation Incubators for Optimum Cell Culture

PHCbi's CO₂ incubators with touchscreen control panels deliver superior usability, rapid cleaning, and effortless maintenance while keeping the tradition of outstanding environmental stability and precise performance.



Grow results, not bacteria!

MCO-170AIC/MCO-230AIC Incubators
Optimized for high-value samples including hard-to-grow and contamination-sensitive media/reagents.

Applications:

- Stem cell research
- Autologous tissue regeneration
- Genomic and proteomic expression
- Esoteric plant and amphibian cell cultures
- Hyper-sensitive and transgenic cell cultures
- Low volume media microplate work

Easy Use & Easy Maintenance

Integrated Tray Catches minimize cleaning time while LCD Panel enhances operation



Responds to gloved finger action.

LCD Touch Panel Controller

A WVGA color LCD touch panel delivers full control over different protocols. Control can be performed with gloved fingers as the controller is equipped with a resistive touch-screen.

USB Memory Data Transfer

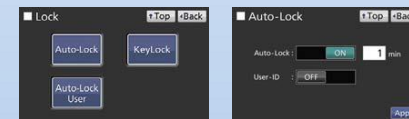
Standard USB port provides convenient log data transfer to a USB memory stick and to a PC. Data log period is 1.5 months using 2-minute intervals.



Note: It is impossible to use a USB memory device which is password-protected.

Security

Automatic door lock (electric lock) can be set on the MCO-170AICUVH (standard equipped) and other models equipped with the optional electric lock (MCO-170EL).



The Auto-Lock set up screen



User-ID setting screen

Integrated Tray Catches

Tray catches are integral parts of the chamber, opening up more space for trays, allowing the incubator to accommodate more culture containers.
(Comparison with MCO-20AIC/MCO-19AIC)



MCO-170AIC's/MCO-230AIC's tray catches (integral part of the chamber)

MCO-170AIC's Tray
Internal dimensions



Up to 20 ø100 mm dishes (92 mm) can be arrayed (6 horizontally x 4 vertically).
*In-house comparison
16 dishes (MCO-19AIC)
→ 20 dishes (MCO-170AIC)

MCO-230AIC's Tray
Internal dimensions



Up to 24 ø100 mm dishes (92 mm) can be arrayed (6 horizontally x 4 vertically).
*In-house comparison
20 dishes (MCO-20AIC)
→ 24 dishes (MCO-230AIC)

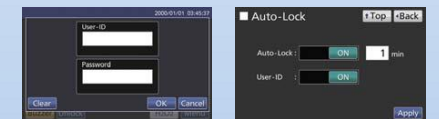
Optimal Humidity Control

Stable humidity control not influenced by environmental conditions and frequent incubator door openings.



Japan and US patents pending

- Control Panel with single-user Key Lock [All models include as standard equipment.]
- Addition of user ID function for better traceability (able to register up to 99 user-IDs and passwords) [MCO-170AICUVH includes as standard. Or optional MCO-170EL to be installed for other models.]



- Multiple detailed activity logs exported to individual CSV files.
[*User Access log downloaded for MCO-170AICUVH as standard. Or optional MCO-170EL to be installed for other models.]

MCO-230AIC NO.1	Date	Time	Temp	CO2	Door	Unlock_User	User Access log*
	2015/3/16	11:13:38	37	0	Door Open		
	2015/3/16	11:13:42	37	0	Door Close		
	2015/3/16	11:32:10	37	0	Door Open	Aa001	
	2015/3/16	11:32:25	37	0	Door Close		
	2015/3/16	13:40:58	37	0	Door Open	Bb002	
	2015/3/16	13:41:03	36.9	0	Door Close		
	2015/3/16	13:50:01	36.9	0	Door Open	Cc003	
	2015/3/16	13:51:19	36.6	0	Door Close		
	2015/3/16	13:57:40	37	0	Door Open	Aa001	



inCu-saFe Construction for Germicidal Protection

- PHCbi offers the exclusive use of inCu-saFe copper-enriched stainless steel alloy interior surfaces within a technical design created to eliminate contamination sources and to mitigate the effect of airborne contaminants introduced through normal use.
- Chart summarizes test results with four strains of mycoplasma. Results demonstrate how PHCbi inCu-saFe copper-enriched stainless steel alloy offers germicidal properties of conventional C1100 copper while maintaining both corrosion-proof and discoloration-resistant properties of conventional stainless steel 304.

Mycoplasma Stain	Positive Control	Conventional Stainless Steel 304	PHCbi inCu-saFe	Conventional Copper C1100
Mycoplasma fermentans PG18	YES	YES	NO	NO
Mycoplasma orale CH19299				
Mycoplasma arginini G230				
Mycoplasma hominis PG21				

"YES" mycoplasma strains grew on the material.
"NO" no mycoplasma strain grew on the material.

Accurate Temperature Control

- The patented Direct Heat and Air Jacket conditioning system precisely regulates temperature through three independent heating zones under microprocessor PID* control. Uniform temperatures are further enhanced by gentle fan circulation.



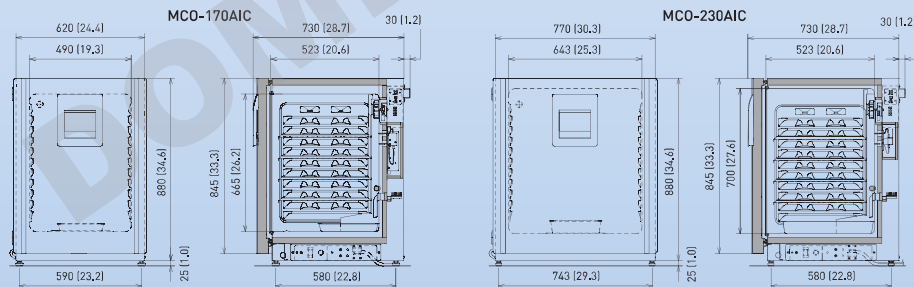
*Proportional Integral Derivative

- The main heater provides precise temperature control.
- The bottom heater warms the distilled water and controls chamber humidity.
- The outer door heater prevents condensation on the inner door and facilitates quick temperature recovery after door openings.

Direct Heat and Air Jacket Conditioning System

- To avoid cell culture desiccation, the MCO-170AIC/MCO-230AIC maintains up to 90 % RH at 37°C.
- Humidification is achieved by reliable natural evaporation and forced-air circulation.

Dimensions



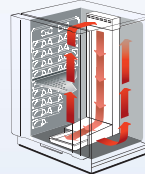
Precise CO₂ Control

- PHCbi proprietary single beam dual detector infrared CO₂ system offers unprecedented control accuracy and stability by simultaneously measuring two wavelengths for continuous zero calibration.
- Benefits include ultra-fast recovery without overshoot and accurate CO₂ averages during periods of frequent incubator access with multiple door openings.
- An optional STD gas auto calibration kit is available.

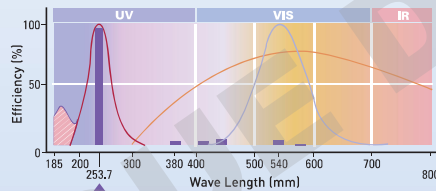


SafeCell UV Decontamination

- SafeCell UV includes a programmable ultraviolet lamp, isolated from cell cultures, that decontaminates conditioned air and humidity reservoir water to prevent contamination without affecting cell cultures in vitro.
- Contaminants trapped within the humidifying pan at the base of the plenum are destroyed by high intensity, ozone-free ultraviolet light.
- Decontaminated, humidified air is released from the lower plenum for vertical convection through and around the perforated shelves. Interior air motion is suspended when the door is opened, minimizing movement of room air contaminants into the chamber. The unique air duct system also improves temperature recovery characteristics.



Airflow and water pan decontamination using a UV system



Use of the MCO-170AICUVH/MCO-170AICUV/MCO-170AICUVL/MCO-230AICUV/MCO-230AICUVL ultraviolet lamp is a highly effective ozone-free contamination control technique.

- PHCbi Lamp
- Ozone Release
- Germicidal Effect
- Sunlight

The SafeCell UV lamp cycle is factory set for normal use, and can be re-programmed as desired by entering parameters through the central microprocessor control panel. Program parameters for the H₂O₂ decontamination cycle are non-adjustable for operator safety.



Rapid, Effective and Safe H₂O₂ Decontamination Cycle

- Industry-first PHCbi unique high-speed decontamination system utilizing vaporized H₂O₂ offers time-saving and documented chamber decontamination with complete safety.
- Full decontamination process takes less than three hours, saving valuable time. For example, if the decontamination cycle is started at 9 am, the unit will be ready for use in the afternoon.
- All interior components are decontaminated in situ. No need for time-consuming removal and autoclaving.
- No high heat emission. No sensor removal necessary.

- After decontamination H₂O₂ vapor is decomposed to harmless water and oxygen by UV light.
- Outer door is locked automatically by the electric interlock system during the decontamination cycle to ensure operator safety.
- Unlike high-heat decontamination incubators, PHCbi's unique H₂O₂ decontamination cycle does not emit high heat. Therefore, when two MCO-170AIC/MCO-230AIC units are stacked, one incubator can be decontaminated without affecting the temperature of the other.

H₂O₂ decontamination process (example)

Preparation Approx. 10 minutes

Decontamination Approx. 135 minutes

Finish Approx. 10 minutes

STEP 1 Remove all interior components >> Clean the chamber >> Reposition interior components to positions specified for in situ decontamination

STEP 2 Set up the H₂O₂ generator (MCO-HP)*

STEP 3 Only two manual control steps needed

STEP 4 Ventilation >> Wipe out the chamber >> Reposition interior components to normal positions

AM 9:25

AM 9:35

AM 11:50

PM 1:00

Chamber conditions during decontamination

Start of H₂O₂ solution vaporization
H₂O₂ solution in the H₂O₂ generator (MCO-HP) is sprayed into the chamber by the ultrasonic transducer.

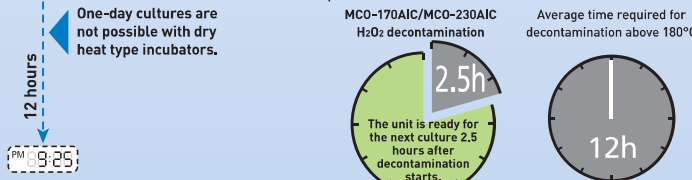
H₂O₂ fills up chamber
H₂O₂ mist is quickly gasified to thoroughly fill up the chamber.

UV radiation for H₂O₂ reduction
• UV lamp turns on.
• H₂O₂ gas is reduced to water and oxygen.

*Above H₂O₂ vaporization photos are concept images only.

Decontamination starting at 9 am allows cultures to be started or resumed by the afternoon.

Time comparison between the H₂O₂ decontamination process and sterilization at above 180°C



Performance Data MCO-170AIC / MCO-230AIC

