Specifications

		CO_2 Incubators			O_2/CO_2 Incubators
Model No.	220 V–240 V, 50 Hz (CE)	MCO-5AC-PE	MCO-18AC-PE*1	MCO-80IC-PE*1	MCO-5M-PE*1
	220 V, 60 Hz	MCO-5AC-PK	MCO-18AC-PK	MCO-80IC-PK	MCO-5M-PK
	110 V–120 V, 60 Hz	MCO-5AC-PT	MCO-18AC-PT	—	MCO-5M-PT
Exterior dimensions (W x D x H)*2		480 x 548 x 575 (mm) 18.9 x 21.6 x 22.6 (inch)	620 x 710 x 900 (mm) 24.4 x 27.9 x 35.4 (inch)	986 x 853 x 2040 (mm) 38.8 x 33.6 x 80.3 (inch)	480 x 548 x 575 (mm) 18.9 x 21.6 x 22.6 (inch)
Interior dimensions (W x D x H)		350 x 378 x 375 (mm) 13.8 x 14.9 x 14.8 (inch)	490 x 523 x 665 (mm) 19.3 x 20.6 x 26.2 (inch)	806 x 693 x 1524 (mm) 31.7 x 27.3 x 60.0 (inch)	350 x 378 x 375 (mm) 13.8 x 14.9 x 14.8 (inch)
Interior volume		49 liters / 1.7 cu.ft.	170 liters / 6.0 cu.ft.	851 liters / 30.1 cu.ft.	49 liters / 1.7 cu.ft.
Net weight		49 kg / 108 lbs.	92 kg / 203 lbs.	275 kg / 606 lbs.	50 kg / 110 lbs.
Temperature	Heating method	Direct Heat & Air Jacket (DHA)		Heater with fan air circulation, Cross shelf laminar air flow	Direct Heat & Air Jacket (DHA)
	Temp. control system	Microprocessor PID			
	Temp. range	5˚C above ambient temperature to +50˚C (Ambient temperature: 5˚C to 35˚C)			
	Temp. uniformity	±0.25˚C*		±0.5˚C*	±0.25˚C*
	Temp. controllability	±0.1˚C*			
CO_2	CO_2 control system	On-Off control		Microprocessor PID	
	CO_2 sensor	Thermal conductivity		Infrared	Thermal conductivity
	CO_2 range	0 % to 20 %			
	CO_2 controllability	±0.15 %*			
O_2	O_2 control system	—	—	—	Microprocessor PID
	O_2 sensor	—	—	—	Zirconia
	O_2 range	—	—	—	1 % to 18 %, 22 % to 80 %
	O_2 controllability	—	—	—	±0.2 %*
Humidity	Humidifying system	Natural vaporization with water in humidity pan		*Normal mode: Natural evaporation with humidifying water High humidity mode: heated evaporation with humidifying water	Natural vaporization with water in humidity pan
	Chamber humidity	95 ±5 % RH		Normal mode: Over 80 % RH High humidity mode: Over 90 % RH	95 ±5 % RH
Shelves	Shelf dimensions (W x D x H)	310 x 310 x 12 (mm) 12.2 x 12.2 x 0.5 (inch)	450 x 450 x 12 (mm) 17.7 x 17.7 x 0.5 (inch)	776 x 659 x 10 (mm) 30.6 x 25.9 x 0.4 (inch)	310 x 310 x 12 (mm) 12.2 x 12.2 x 0.5 (inch)
	Shelf material	Copper-enriched stainless steel		Copper alloy stainless steel	Copper-enriched stainless steel
	Maximum load	4 kg / 8.8 lbs. per shelf	7 kg / 15.4 lbs. per shelf	30 kg / 66.1 lbs. per shelf	4 kg / 8.8 lbs. per shelf
	Shelves	3 Standard, 6 Max.	3 Standard, 15 Max.	5 (standard)	3 Standard, 6 Max.
Contamination control	Interior surface	Copper-enriched Stainless Steel		Copper-enriched stainless steel (except humidifying pan)	Copper-enriched Stainless Steel
	UV lamp (ozone-free)	Option			
Water level sensor		Optical type		Thermal type	Optical type
Access port		30 mm (1.2") diameter		40 mm (1.6") diameter, Two locations, each on both sides	30 mm (1.2") diameter
Air filter		0.3 µm, Efficiency: 99.97 % (for CO_2)			0.3 µm, Efficiency: 99.97 % (for $CO_2/N_2/O_2$)
Alarm system		• High/low temperature • CO_2 density • Door ajar • UV lamp failure • Water level • Independent overheat protection		• High/low temperature • CO_2 density • Door ajar • Water level • Independent overheat protection	• High/low temperature • CO_2/O_2 density • Door ajar • UV lamp failure • Water level • Independent overheat protection
Remote alarm contacts		30 V DC, 2 A allowable			

Optional Accessories

Stacking Kits

Upper unit / Lower unit	MCO-18AC	MCO-5AC / MCO-5M
MCO-18AC	(Standard)*	—
MCO-5AC / MCO-5M	—	(Standard)

* 0.5 kit is included and fixed under rear cover of MCO-18AC.

*** Conditions**

Ambient temperature: 25˚C, Temperature setting: 37˚C, CO_2 level setting: 5%, no load

Caution: For using the equipment at altitudes higher than 1,000m, the standard outer glass door must be replaced with a specific glass door. Please consult your PHCbi sales representative or agent for more information and to arrange airfreighting if required. Use of equipment in the chamber will require AC power from an external outlet. PHC Corporation guarantees the product under certain warranty conditions. PHC Corporation is in no way shall be responsible for any loss of content or damage to content.

• Appearance and specifications are subject to change without notice.

*1 Without Saudi Arabia

*2 Exterior dimensions of main cabinet only. See dimension drawings showing handles and other external projections.

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

EC97J1224 051

DISTRIBUTED BY:

PHC Corporation

https://www.phchd.com/global/biomedical/

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Professional CO_2 and O_2/CO_2 Incubators

Providing an ideally controlled environment for various cell cultures

PHC Corporation, Biomedical Division

Life Science Innovator Since 1966

Preventive Contamination Control & Decontamination System

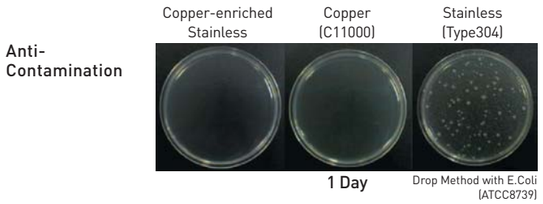
Contamination is the worst enemy of cell culture. PHCbi's solution to the problem is Preventive Contamination Control powered by Exclusive inCu-saFe copper-alloyed stainless steel interior and patented SafeCell UV sterilization system that significantly reduce the risk of contamination while cell culture protocols are in process.

inCu-saFe

inCu-saFe copper-enriched stainless steel is PHCbi proprietary solution against contamination that combines the bacteria-killing property of copper with the corrosion resistance of stainless steel.

Copper-enriched Stainless Steel Kills Mycoplasma

PHCbi is proud to announce that inCu-saFe, the copper-enriched stainless steel used in the interior of its CO_2 and O_2/CO_2 incubators, kills mycoplasma. Mycoplasma is one of the most common causes of contamination found in cell culture and the source can often be traced back to contaminated laboratory apparatus. The inCu-saFe walls and shelves inside PHCbi CO_2 and O_2/CO_2 incubators eliminate mycoplasma and significantly reduce the risk of contamination without emptying the incubator.



Bacteria killing rate after 24 hrs* (Drop Method)

Species	Stainless (Type304)	Copper Alloy Stainless
Escherichia coli (ATCC8739)	0 %	99.928 %
Escherichia coli (IFO3301)	0 %	99.847 %
Staphylococcus aureus (ATCC6538P)	0 %	99.998 %
Bacillus subtilis (ATCC6633)	0 %	99.997 %

(N=3) *Bacteria killing rate=(1-Test Sample Colony No./Control Colony No.) x 100

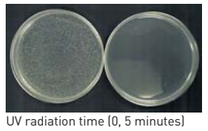
SafeCell UV

SafeCell UV system with programmable ultraviolet lamp, isolated from cell cultures, sterilizes chamber air and water in the humidifying pan to maintain contamination-free conditions within the chamber.

Completely Safe for Cell Culture

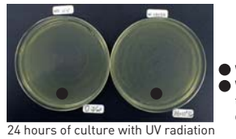
- Ozone-free UV lamp
- UV shielded from culture area by the tray cover of humidifying pan.
- UV shielding by laboratory dishes and flaskets (Laboratory dishes and flaskets are made of polystyrol with thickness of 50 mm, shielding UV 100 %. (Photos below show the lid of the laboratory dish shielding UV without preventing proliferation of culture.)

UV effect on humidifying water (actual machine test)



UV radiation time (0, 5 minutes)

UV shielding effect by dish (yellow staphylococci culture)



24 hours of culture with UV radiation

● Without UV
● With UV through the laboratory dish lid

UV effect on circulating air in chamber		Colony number
30 minutes after door opening (without UV)		11
2 minutes after UV radiation		0
5 minutes after UV radiation		0

*Bacteria not detected after 2 minutes of UV radiation.

Environmental Improvement with High Precision

Improved Temperature Stability with D.H.A. System

(Except MCO-80IC)

Direct Heat and Air Jacket Heating System
U.S. Patent 5519188

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.

- 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.

Easy Maintenance

Auto Calibration (MCO-18AC)

The microprocessor will automatically"Zero"the incubator using room air as a reference. This feature will maintain an accurate CO_2 control without worrying about CO_2 drift.

Automatic Setup

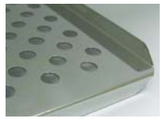
By turning on the power and simply entering the temperature and CO_2 setpoints into the unit you can walk away while the microprocessor takes over. The unit will attain setpoint and adjust itself to your required parameters.

Rounded Corners

The interior chamber is constructed of Copper Alloy stainless steel with rounded corners. All plenums, shelves, brackets and standard humidity pan are removable without the use of tools. These design features provide an interior that is easily cleaned to reduce chances of contamination.

For Superior Usability

Shelves Provide Easier Access to Culture Containers (MCO-18AC)



Much more convenience has been obtained by slanting downward the bending direction of the front of the shelves. As a result, putting in and taking out culture containers like dishes and micro plates have become extremely easy.

Water Level Sensor

The humidity pan has an optical water level sensor to warn of a low water level.

Automatic CO_2 Cylinder Switchover System (option)

This system automatically switches from the primary to secondary gas cylinder when a CO_2 gas level drop in the chamber is detected. The in-use gas cylinder is confirmed on the control panel.

Inner Door and Gasket

The inner design is critical to successful contamination control technique. The inner gasket body forms an effective thermal transition between the ambient air and warm, humidified incubator atmosphere, minimizing condensation and eliminating moisture traps which can harbor contaminants.

Stackable Design Takes Up Less Space

By simply using the fixing metal supplied as a standard accessory, two*1 or three*2 units can be stacked according to available space and usage. This configuration is also cost-effective.

*1 MCO-5AC/18AC/5M
*2 MCO-5AC/5M

CO_2 Incubator with Water Jacketed System for Stable Temperature Environment

PID control plus chamber direct sensing system maintains a high-precision temperature environment.

Through the combination of a PID (Proportional, Integrated and Differential) control system for ultra-precise temperature control and a cabinet-air sensing system which accurately monitors inside temperature, this model exhibits exceptional precision within ±0.1 degree of the preset temperature. For the temperature sensor, a durable, ultra-precise PT sensor (Pt 100W) is used.

Automatic stop mechanism for fan motor and CO_2 valve

With this mechanism, the fan motor and CO_2 valve are automatically stopped when the door is opened. This prevents air flow from the chamber and prevents air contamination due to the mixing of air.

Automatic control door heater

The inside door incorporates a door heater that is interlocked with the temperature adjuster for automatic control. This prevents temperature differences between the chamber and the inner door, thereby preventing dew condensation on the inner door.

MCO-18AC

Accurate & Reliable

- Continuous contamination control with inCu-saFe interior and SafeCell UV (option) technologies
- Direct Heat Air Jacket (DHA) heating system provides accurate temperature control.
- Double stackable
- Field-reversible door

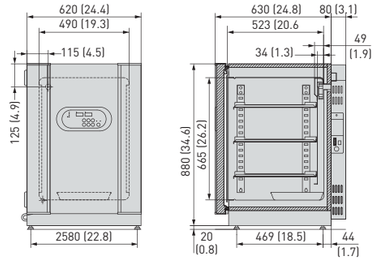
inCu saFe | SafeCell UV (option)

CO_2 level: **0 — 20 %**

Temperature: Ambient temperature **+5˚C — 50˚C**

Interior volume: **170 L (6.0 cu.ft.)**

Dimensions [Unit : mm (inch)]



MCO-5AC

Personal type

- Continuous contamination control with inCu-saFe interior and SafeCell UV (option) technologies.
- Direct Heat Air Jacket (DHA) heating system provides accurate temperature control.
- Accurate CO_2 control & recovery characteristics
- Compact, triple stackable
- Field-reversible door

Triple-stack configuration

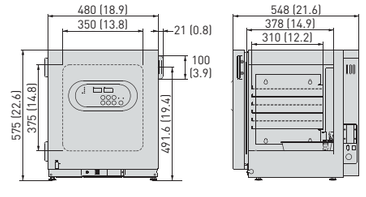
inCu saFe | SafeCell UV (option) | IR sensor

CO_2 level: **0 — 20 %**

Temperature: Ambient temperature **+5˚C — 50˚C**

Interior volume: **49 L (1.7 cu.ft.)**

Dimensions [Unit : mm (inch)]



MCO-80IC

Reach-in design

- Continuous contamination control with inCu-saFe interior and SafeCell UV (option) technologies.
- Large capacity cabinet allows flexibility in usage.
- Full view, double paned glass door allows easy observation of cultured samples.
- Forced air surrounding chamber allows uniform temperature distribution with no temperature gradients.
- Precise CO_2 control and immediate recovery with infrared sensor.
- Unique door heater system prevents condensation.
- Cabinet can accommodate a roller bottle apparatus.

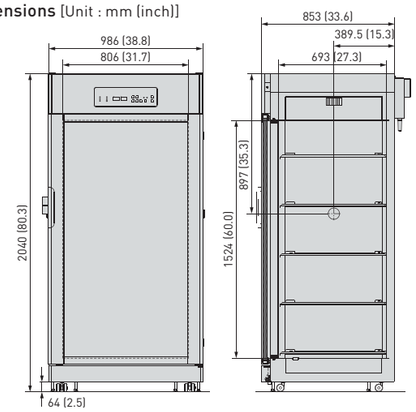
inCu saFe · IR sensor · SafeCell UV (option)

CO_2 level: **0 — 20 %**

Temperature: Ambient temperature **+5˚C — 50˚C**

Interior volume: **851 L (30.1 cu.ft.)**

Dimensions [Unit : mm (inch)]



MCO-5M

Personal type

- Continuous contamination control with inCu-saFe interior and SafeCell UV (option) technologies
- Direct Heat Air Jacket (DHA) heating system provides accurate temperature control.
- Preventive contamination control
- Compact design
- Triple stackable
- Field-reversible door

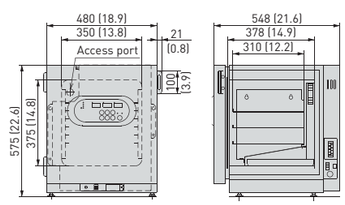
inCu saFe · SafeCell UV (option)

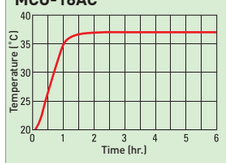
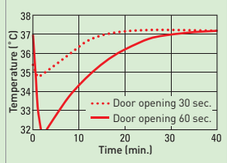
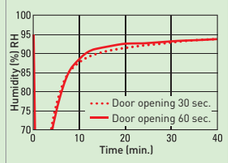
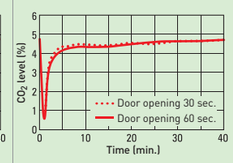
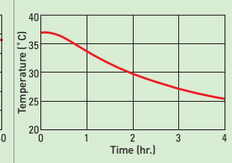
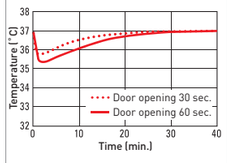
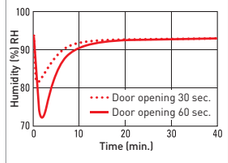
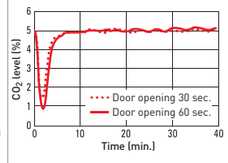
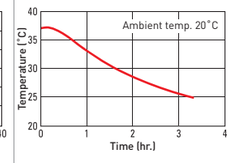
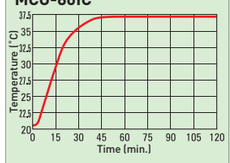
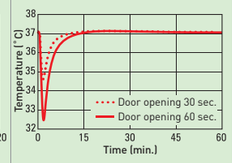
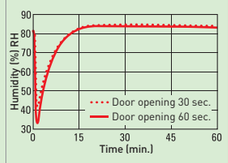
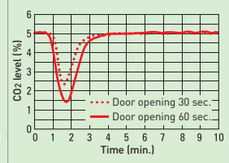
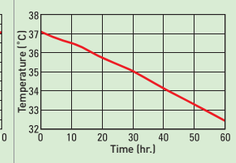
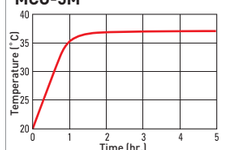
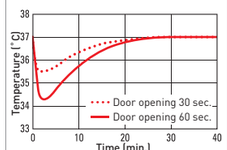
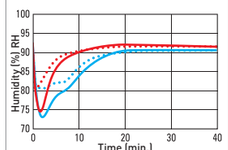
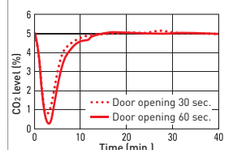
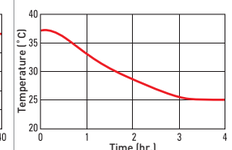
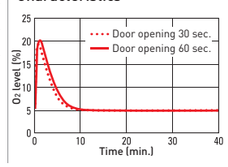
CO_2 level: **0 — 20 %** O_2 level: **1 – 18 %, 22–80 %**

Temperature: Ambient temperature **+5˚C — 50˚C**

Interior volume: **49 L (1.7 cu.ft.)**

Dimensions [Unit : mm (inch)]



Temperature Pull-up Characteristics	Temperature Recovery Characteristics	Humidity Recovery Characteristics	CO_2 Level Recovery Characteristics	Temperature decrease characteristics when power failure occurs
CO_2 Incubators				
MCO-18AC				
				
MCO-5AC				
				
Reach-in CO_2 Incubator				
MCO-80IC				
				
O_2/CO_2 Incubator				
MCO-5M				
				
		One small inner door opening 30 sec. (without N_2 bubbling) One small inner door opening 60 sec. (without N_2 bubbling) One small inner door opening 30 sec. (with N_2 bubbling) One small inner door opening 60 sec. (with N_2 bubbling)	**O_2 Level Recovery Characteristics** 	

Optional Accessories

	MCO-5AC/MCO-5M	MCO-80IC	MCO-18AC
UV system set	MCO-19UVS-PE/PA/PK	MCO-80UVS-PE/PA/PK	MCO-18UVS3-PE/PA/PK
Gas regulator	MCO-010R-PW	—	MCO-010R-PW
Gas auto changer	MCO-5GC-PW	MCO-80GC-PW	MCO-21GC-PW
Tray (same as standard accessory)	MCO-30ST-PW	MCO-80ST-PW	MCO-47ST-PW
Half tray	—	—	MCO-25ST-PW
Roller base	MCO-5RB-PW	—	MCO-170RB-PW
Small door	—	MCO-80ID-PW	—
Interface board*	MTR-L03-PW or MTR-480-PW	MTR-L03-PW or MTR-480-PW	MTR-L03-PW or MTR-480-PW
Roller bottle rack mount	—	MCO-80RBS-PW	—
Auto water supply system	—	MCO-80AS-PW	—

* Only for MTR-5000 (data acquisition system) users.