

Incubation

CO₂ and O₂/CO₂ Incubators

Providing an ideally controlled environment
for various cell cultures



MCO-20AIC



MCO-19AIC



MCO-18AC



MCO-5M



MCO-19M



MCO-80IC



New and Exciting Possibilities for Biomedical Research



Panasonic, well known throughout the world for its high-quality biomedical equipment, now introduces a wide variety of cell culture incubators utilizing advanced technology for unprecedented temperature and CO₂ (and O₂ for some models) control in processing various cell cultures.

In order to prevent contamination, the ultimate enemy of laboratories, Panasonic incubators employ an exclusive inCu saFe (copper enriched stainless steel) interior chamber, SafeCell UV (Ultraviolet) lamp system and industry-first H₂O₂ (Hydrogen Peroxide) decontamination system.

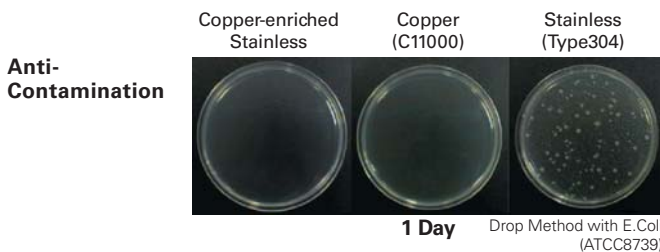
Preventive Contamination Control & Decontamination System

Contamination is the worst enemy of cell culture. Panasonic'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 Panasonic 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

Panasonic is proud to announce that InCu saFe, the copper-enriched stainless steel used in the interior of its CO₂ and O₂/CO₂ 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 Panasonic CO₂ and O₂/CO₂ incubators eliminate mycoplasma and significantly reduce the risk of contamination without emptying the incubator.



Bacteria killing rate after 24 hrs* (Drop Method)

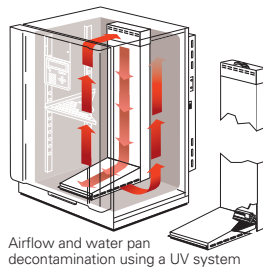
Species	Stainless (Type304)	Copper Alloy Stainless
Escherichia coli (ATCC8739)	0%	99.928%
Escherichia coli (IFO3301)	0%	99.847%
Staphylococcus aureus (ATCC6538P)	0%	99.998%
Bacillus subtilis (ATCC6633)	0%	99.997%

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

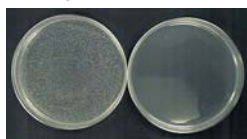
SafeCell UV
SafeCell UV system with programmable ultraviolet lamp, isolated from cell cultures, sterilizes chamber air and water in the humidifying pan to maintain contamination-free conditions within the chamber.

Completely Safe for Cell Culture

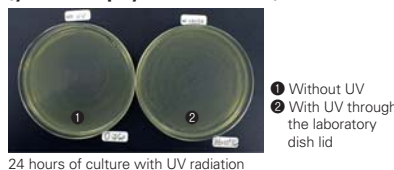
- Ozone-free UV lamp
- UV shielded from culture area by the tray cover of humidifying pan.
- UV shielding by laboratory dishes and flaskets (Laboratory dishes and flaskets are made of polystyrol with thickness of 50 mm, shielding UV 100%. (Photos below show the lid of the laboratory dish shielding UV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



UV effect on humidifying water (actual machine test)



UV shielding effect by dish (yellow staphylococci culture)



UV effect on circulating air in chamber

Time	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.

H₂O₂ Rapid, Effective and Safe H₂O₂ decontamination Cycle with minimum downtime

Industry-first, Panasonic unique high-speed decontamination system utilizing vaporized H₂O₂ offers time-saving and documented chamber decontamination with complete safety.

- Whole 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.
- After decontamination H₂O₂ vapor is decomposed to harmless water and oxygen by UV light.
- Outer door is automatically locked during the decontamination cycle by the electric interlock system to ensure operator safety.
- Unlike a high heat decontamination incubator, Panasonic's unique H₂O₂ decontamination cycle does not emit high heat. Therefore, when two MCO-19AIC are stacked, one incubator can be decontaminated without affecting the temperature in the other.

H₂O₂ Decontamination Process*

Preparation Preparation

AM9:00

- 1 Remove all interior components
- 2 Clean the chamber
- 3 Reposition the interior components to the specified positions for in situ decontamination

H₂O₂ set up

- 1 Pour a bottle of Panasonic H₂O₂ reagent into the H₂O₂ vapor generator
- 2 Position the H₂O₂ vapor generator in the chamber

Decontamination

AM9:15

The H₂O₂ decontamination cycle is monitored for safety and cycle status. A physical interlock and neutralization sequence assures total decontamination and operator safety.

1. Start Cycle: When the H₂O₂ button is pressed a confirming message prompts the user to proceed with the decontamination cycle or cancel. The outer door is automatically locked.

2. H₂O₂ Vapor Cycle: Once the door locks automatically, the cycle starts. The flashing H₂O₂ display confirms the process and counts down remaining H₂O₂ vaporization time.

3. UV Resolution: The H₂O₂ vapor generator automatically completes after a 7 minute cycle. UV lamp comes ON. The flashing UV Resolve display counts down remaining time in the UV cycle as H₂O₂ is reduced to water and trace oxygen.

4. Cycle Complete: When the cycle is complete the door lock releases automatically. The H₂O₂ vapor generator and cable can be disconnected and removed and all interior components restored to their normal position.

Finish

AM11:25

- 1 Wipe out the chamber.
- 2 Reposition the interior components to their normal positions.

Start/Resume culture

AM11:40

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

* The decontamination time shown above is a guide. Actual process time may differ depending on chamber cleaning time and set-up time.

- Decontamination requires Panasonic exclusive H₂O₂ reagent
- During decontamination, the door is locked by the electric interlock to prevent inadvertent opening.
- Above decontamination process is done by using standard interior items. Additional shelves and dishes may impair the effect of decontamination.

Environmental Improvement with High Precision

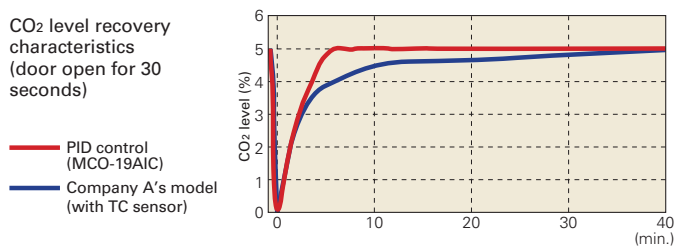
Faster CO₂ Level Recovery (MCO-19AIC/19M)

Fast recovery of the CO₂ level is due to the effective combination of an infrared CO₂ sensor and PID (Proportional, Integrated and Differential) control. This incubator offers a long-awaited performance level with a more stable CO₂ environment to reliably function for heavy usage situations that require frequent door openings.

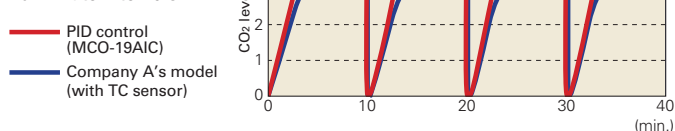
Panasonic's Infrared CO₂ sensor is not affected by changes in temperature or humidity. It utilizes a ceramic heater instead of flashing bulbs or chopper motors. The long reliable life of our sensor is achieved by not using any mechanical or moving parts.

Maintaining uniform CO₂ levels is assured even with frequent incubator door openings.

CO₂ level recovery characteristics (door open for 30 seconds)



CO₂ level fluctuations in chamber when door openings of 30-second duration are made at 10-minute intervals



Improved Temperature Stability with D.H.A. System

(Except MCO-175/80IC)



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/20AIC)

The microprocessor will automatically "Zero" the incubator using room air as a reference. This feature will maintain an accurate CO₂ control without worrying about CO₂ drift. (Dual IR sensor system used in MCO-19AIC/19M requires no zero calibration.)

Automatic Setup

By turning on the power and simply entering the temperature and CO₂ 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

Field-reversible Door

The reversible door allows right or left opening depending on the installation space and how other peripheral equipment are positioned. Each corner of the door has a special grip for easier opening.

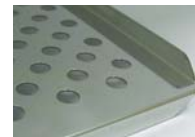


MCO-19AIC

Shelves Provide Easier Access to Culture Containers

(MCO-18AC/19AIC/20AIC/19M)

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 CO₂ Cylinder Switchover System (option)

This system automatically switches from the primary to secondary gas cylinder when a CO₂ 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.



MCO-19M

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/19AIC/20AIC/175/5M/19M

*² MCO-5AC/5M



MCO-19AIC

MCO-5AC

CO₂ Incubator with Water Jacketed System for Stable Temperature Environment

Water Jacketed System

The large size MCO-175 model incorporates a water jacketed system which takes advantage of the heat retention characteristics of water. Because there is no sudden temperature change or loss of temperature during power failure, a stable temperature environment is ensured.

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.

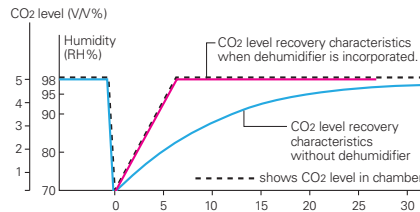
Automatic stop mechanism for fan motor and CO₂ valve

With this mechanism, the fan motor and CO₂ 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

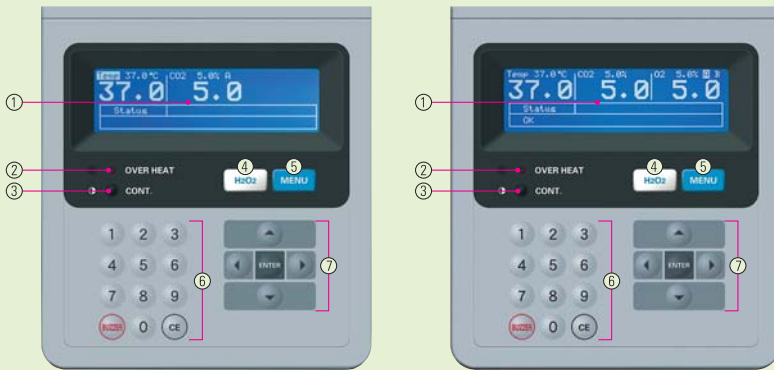
The inside door incorporates a door heater that is interlocked with the temperature adjuster for automatic control. This prevents temperature differences between the chamber and the inner door, thereby preventing dew condensation on the inner door.

Thorough pursuit of high-precision cultivation



CO₂ level recovery characteristics
 (initial value of chamber: 37°C, 99% RH, 5% CO₂ level)
 (Ambient condition: 20°C, 70% RH)
A compact electronic dehumidifier plus a thermal conductivity CO₂ sensor produces a high-precision CO₂ environment

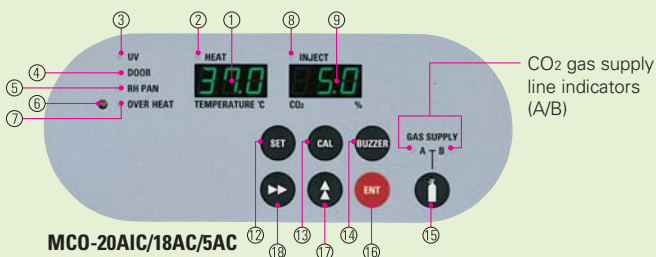
Control Panels



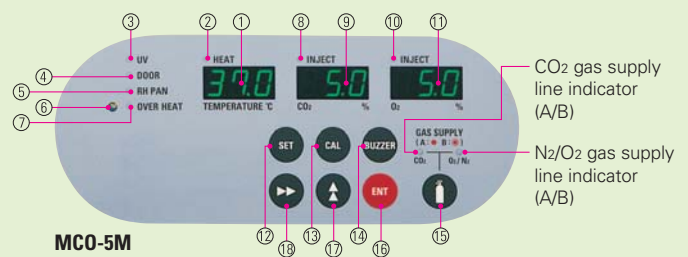
MCO-19AIC

MCO-19M

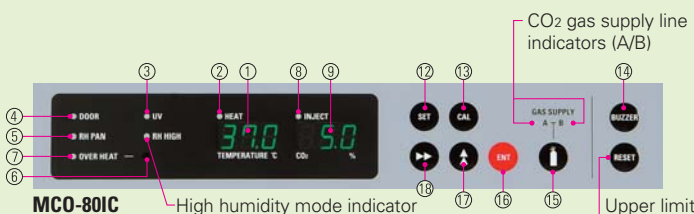
- ① Digital alphanumeric LCD display.
Message display
Pop-up menu
- ② Overheat indicator
- ③ Display contrast adjustment
- ④ H₂O₂ decontamination sequence start key
- ⑤ Menu call button
- ⑥ Positive feedback tactile input buttons
- ⑦ Positive feedback tactile entry and function keys



MCO-20AIC/18AC/5AC



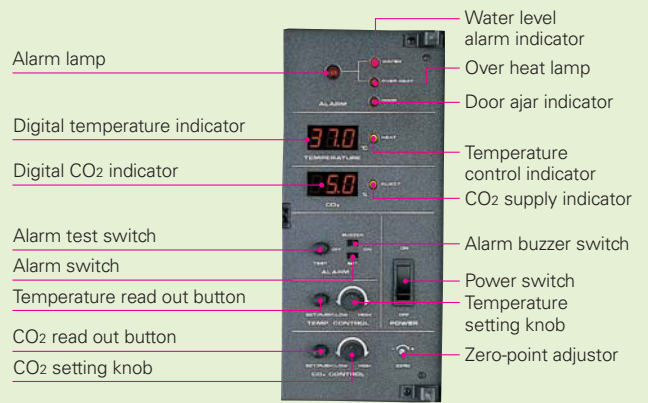
MCO-5M



MCO-80IC

- ① Digital temperature indicator
- ② Heater lamp
- ③ UV indicator
- ④ Door lamp
- ⑤ Water level alarm lamp
- ⑥ Upper limit regulator
- ⑦ Over heat lamp
- ⑧ CO₂ inject lamp
- ⑨ Digital CO₂ density indicator
- ⑩ O₂ inject lamp
- ⑪ Digital O₂ density indicator
- ⑫ Set key
- ⑬ Calibration key
- ⑭ Alarm buzzer stop key
- ⑮ Gas supply line switching key*
- ⑯ Enter key
- ⑰ Numeric shift key
- ⑱ Digital shift key

*When a changeover accessory is installed.



MCO-175

- ① Alarm lamp
- ② Digital temperature indicator
- ③ Digital CO₂ indicator
- ④ Alarm test switch
- ⑤ Alarm switch
- ⑥ Temperature read out button
- ⑦ CO₂ read out button
- ⑧ CO₂ setting knob
- ⑨ Water level alarm indicator
- ⑩ Over heat lamp
- ⑪ Door ajar indicator
- ⑫ Temperature control indicator
- ⑬ CO₂ supply indicator
- ⑭ Alarm buzzer switch
- ⑮ Power switch
- ⑯ Temperature setting knob
- ⑰ Zero-point adjustor

MCO-20AIC

Large capacity, full-function

- Continuous contamination control with inCu saFe interior and SafeCell UV technologies
- Direct Heat Air Jacket (DHA) heating system provides accurate temperature control.
- Precise CO₂ control and immediate recovery with infrared sensor.
- Double stackable
- Field-reversible door

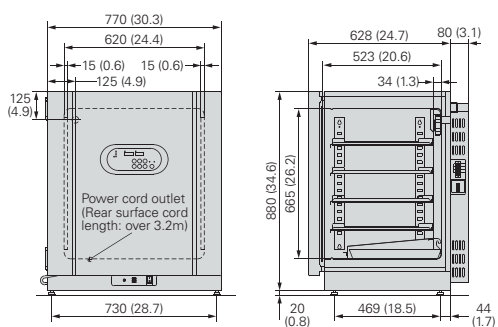


CO₂ level: **0 — 20%**

Temperature: Ambient temp. **+5°C — 50°C**

Interior volume: **215L (7.6 cu.ft.)**

Dimensions [Unit : mm (inch)]



MCO-19AIC

Most complete solution

- Continuous contamination control with inCu saFe interior and SafeCell UV (option) technologies.
- Direct Heat Air Jacket (DHA) heating system provides accurate temperature control.
- Precise CO₂ control and immediate recovery with new dual infrared sensor.
- Panasonic unique H₂O₂ Decontamination System
- LCD Graphical Controller/Display, Door Mounted
- Double stackable
- Field-reversible door

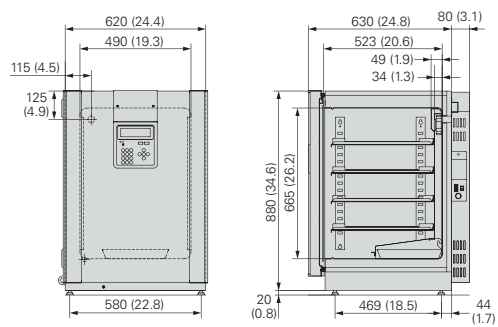


CO₂ level: **0 — 20%**

Temperature: Ambient temp. **+5°C — 50°C**

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

Dimensions [Unit : mm (inch)]



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

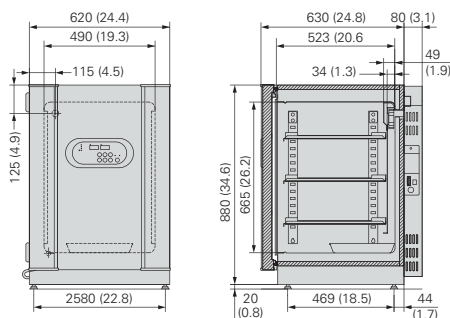


CO₂ level: **0 — 20%**

Temperature: Ambient temp. **+5°C — 50°C**

Interior volume: **170L (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 CO₂ control & recovery characteristics
- Compact, triple stackable
- Field-reversible door

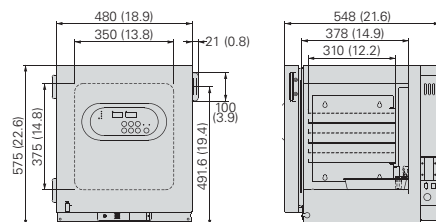


CO₂ level: **0 — 20%**

Temperature: Ambient temp. **+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 CO₂ control and immediate recovery with infrared sensor.
- Unique door heater system prevents condensation.
- Cabinet can accommodate a roller bottle apparatus.

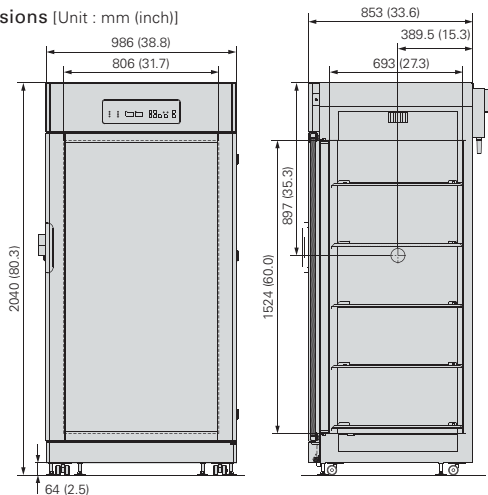


CO₂ level: **0 — 20%**

Temperature: Ambient temp. **+5°C — 50°C**

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

Dimensions [Unit : mm (inch)]



MCO-175

Water jacket type

- Water jacket heating system
- Accurate temperature and CO₂ control & recovery characteristics
- Double stackable



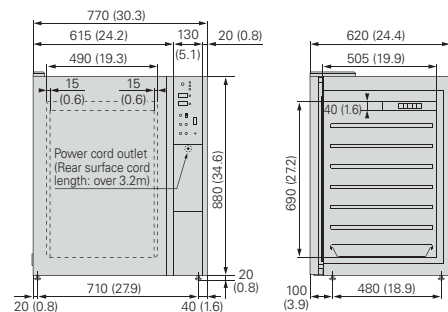
Water Jacket

CO₂ level: **0 — 20%**

Temperature: Ambient temp. **+5°C — 50°C**

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

Dimensions [Unit : mm (inch)]



MCO-19M

Most sophisticated solution

- Continuous contamination control with inCu saFe interior and SafeCell UV (option) technologies.
- Direct Heat Air Jacket (DHA) heating system provides accurate temperature control.
- Precise CO₂ control and immediate recovery with new dual infrared sensor.
- LCD Graphical Controller/Display, Door Mounted
- Easy-to-access double inner door system
- Double stackable
- Field-reversible door

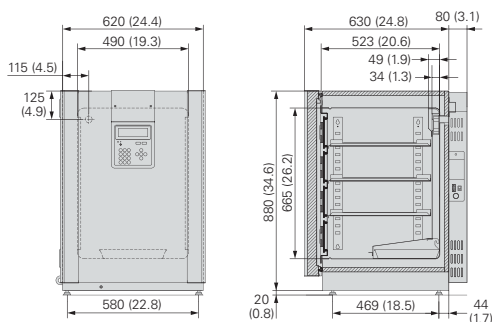


CO₂ level: **0 – 20%** O₂ level: **1 – 18%, 22–80%**

Temperature: Ambient temp. **+5°C – 50°C**

Interior volume: **170 L (6.0 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

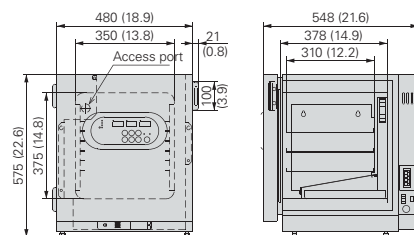


CO₂ level: **0 – 20%** O₂ level: **1 – 18%, 22–80%**

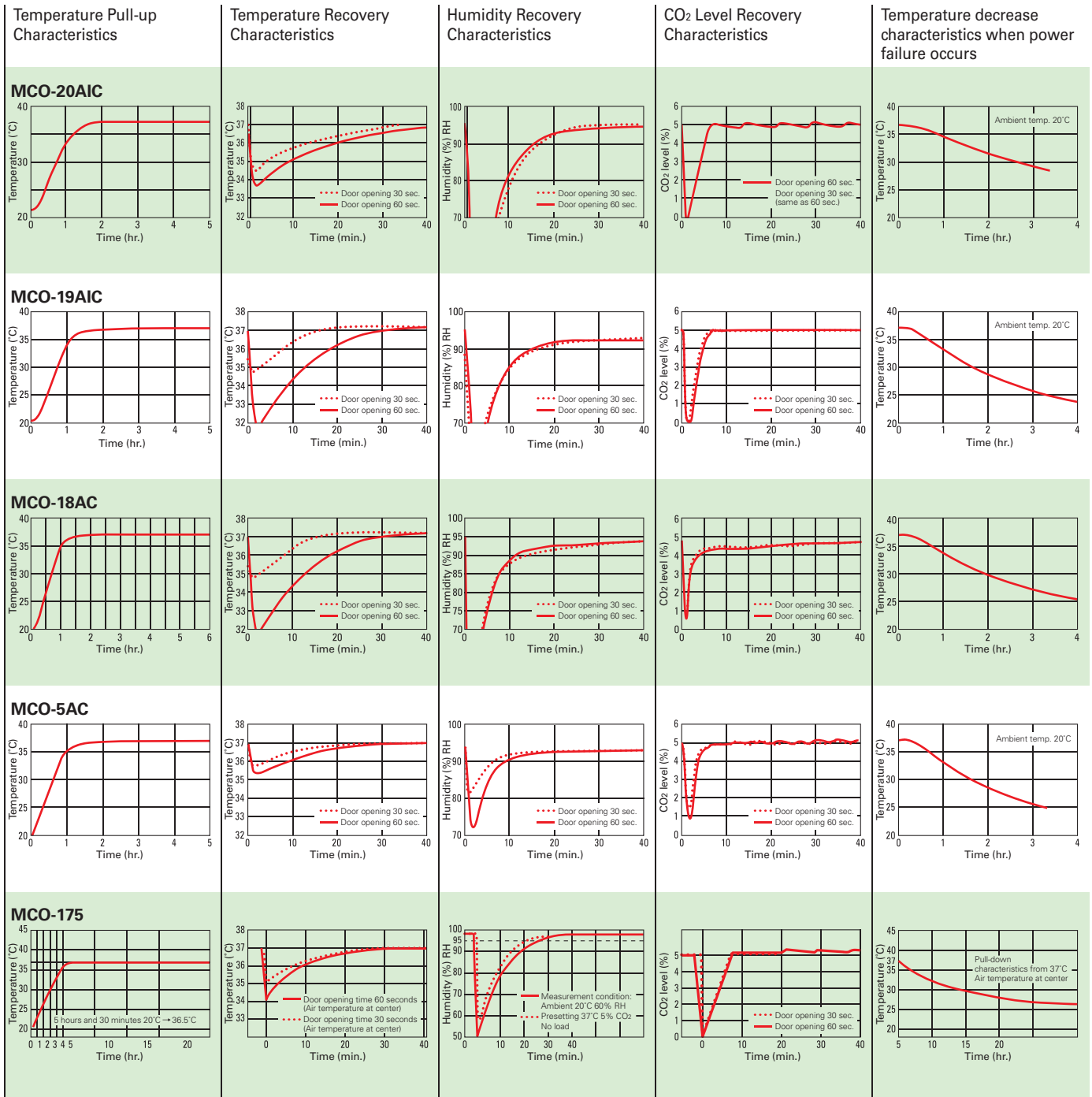
Temperature: Ambient temp. **+5°C – 50°C**

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

Dimensions [Unit : mm (inch)]



CO₂ Incubators



Optional Accessories

2 different models can be stacked* according to usage.

*Stacking kit (optional metal tool and spacer) are required. For more details, see tables on the right.



Stacking example
Top (MCO-19-AIC)
Bottom (MCO-20AIC)

Stacking Kits

Lower unit	Upper unit	MCO-175	MCO-18AC/19AIC/19M	MCO-20AIC	MCO-5AC/5M
MCO-175	MCO-175SB-PW	MCO-18SB-PW	(Standard)*1	—	—
MCO-18AC/19AIC/19M	—	—	—	(Standard)*2	—
MCO-20AIC	—	MCO-21SB-PW	—	—	—
MCO-5AC/5M	—	—	—	—	(Standard)

*1: 0.5 kit is included and fixed under rear cover of MCO-18AC/19AIC/19M.
*2: 0.5 kit is included and fixed under rear cover of MCO-20AIC.

Panasonic DAQ Systems

Monitoring Features

Integrated remote monitoring system for Panasonic biomedical products (optional)

Panasonic Data Acquisition Software MTR-5000-PW

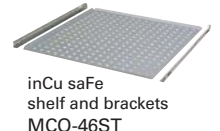
This software is fully compatible with MCO-5AC, 18AC, 19AIC, 20AIC, 80IC, 5M and 19M. It allows data transfer between these models and a PC.

Ethernet (LAN) Interface MTR-L03-PW or Interface board MTR-480-PW

Exclusive option for Panasonic biomedical products RS232C and RS485, for easy installation



Roller base
MCO-20RB-PW



inCu saFe
shelf and brackets
MCO-46ST



Half tray
MCO-25ST-PW



CO₂ gas pressure
regulator
MCO-100L-PW

Equipping an MCO-100L per unit is recommended.

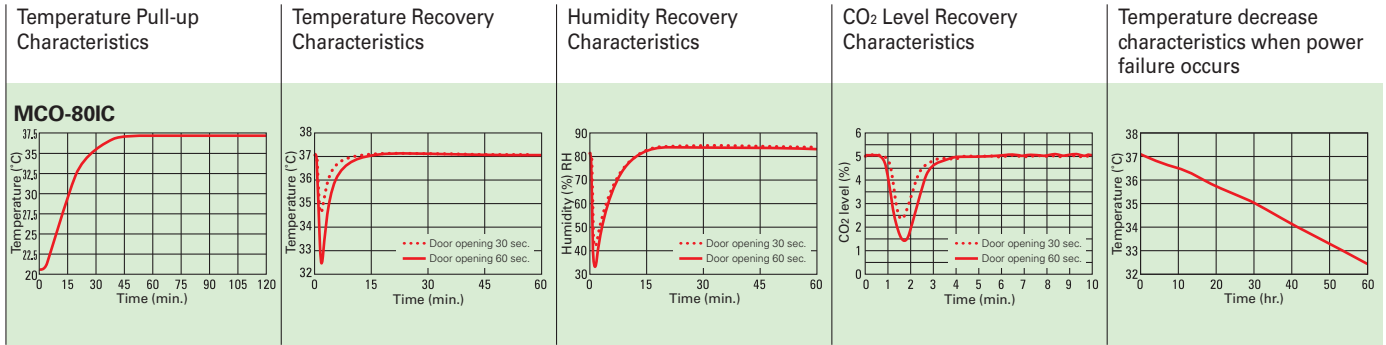


Stand
MKD-300T

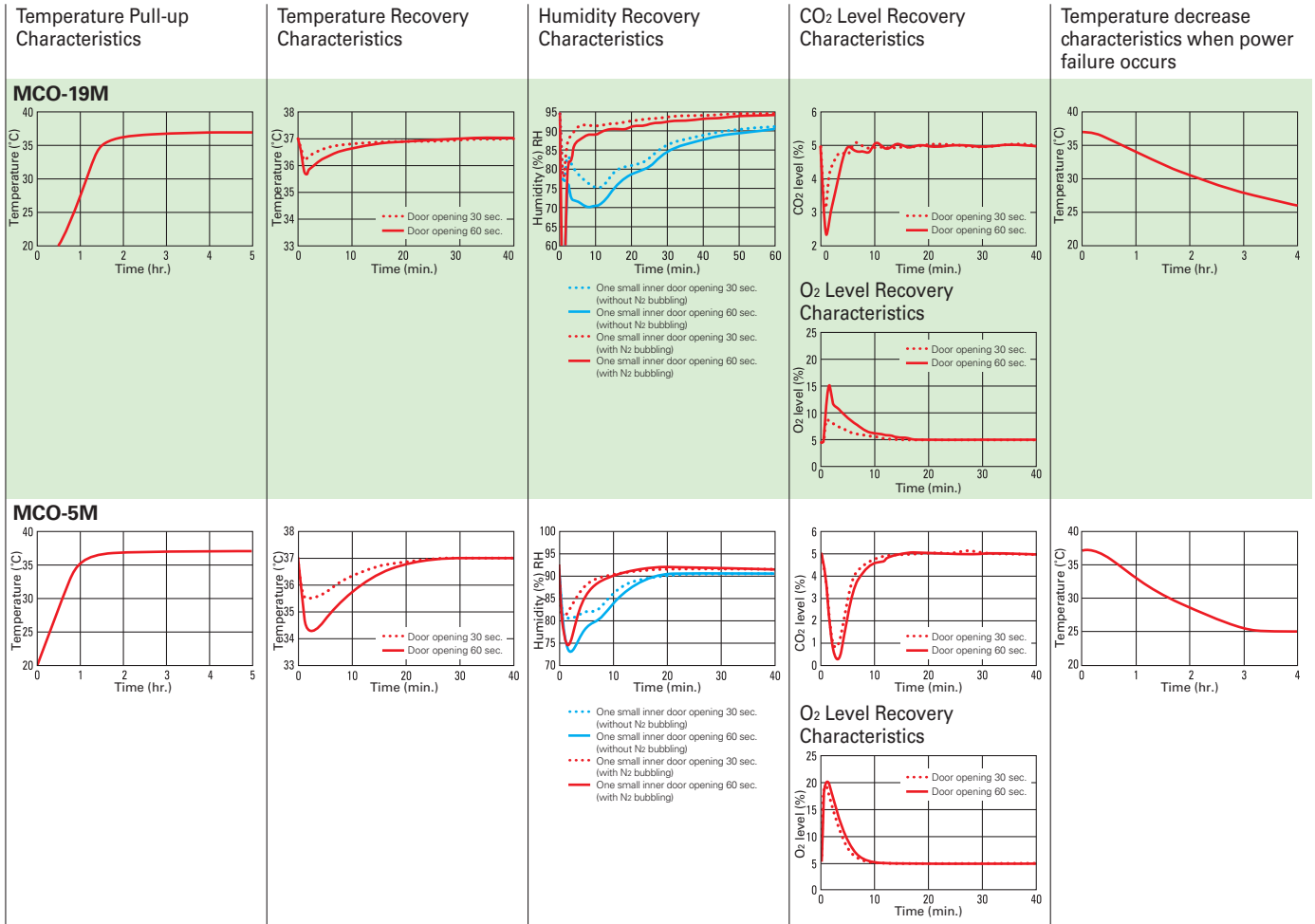


Stackable stand
for 2 units
MKD-150T

Reach-in CO₂ Incubator



O₂/CO₂ Incubators



	MCO-175	MCO-18AC	MCO-19AIC/19M	MCO-20AIC	MCO-5AC/5M	MCO-80IC
Roller base	—	—	MCO-18RB-PW	MCO-20RB-PW	MCO-5RB-PW	—
Individual small door	(Standard)	—	(Standard for 19M)	MCO-20ID-PW	—	MCO-80ID-PW
Extra shelf and brackets	MCO-46ST	—	MCO-47ST-PW	MCO-58ST-PW	MCO-30ST-PW	MCO-80ST-PW
Half tray	—	MCO-25ST-PW		MCO-35ST-PW	—	—
CO ₂ /N ₂ pressure regulator	—	MCO-100L-PW				—
Water preservative agent	MCO-100C	—	—	—	—	—
Recorder (CO ₂ & Temp.)	MCO-101TR*1	—	—	—	—	—
Panasonic DAQ system	—	MTR-5000-PW/MTR-L03-PW or MTR-480-PW				—
Automatic CO ₂ Cylinder Changeover System	—	—	MCO-21GC-PW	—	MCO-5GC-PW	MCO-80GC-PW
Semi-automatic one point Gas Calibration kit	—	—	MCO-SG-PW	—	—	—
UV system kit	—	MCO-18UVS3-PE*2/PK*3	MCO-19UVS-PE*2/PK*3	—	MCO-19UVS-PE*2/PK*3	MCO-80UVS-PE*2/PK*3
UV lamp replacement kit	—	—	MCO-20UV-PW			—
4-20mA Interface	—	—	—	MCO-420MA-PW		—
Stand	MKD-300T	—	MCO-50T-PW	MKD-300T	—	—
Stackable stand for 2 units	MKD-200T-PW	—	MKD-150T/200T-PW	MKD-200T-PW		—
Roller bottle mounting kit	—	—	—	—	—	MCO-80RBS-PW
Automated water supply system kit	—	—	—	—	—	MCO-80AS-PW
Exclusive H ₂ O ₂ Decontamination kit	—	—	MCO-HL-PE*2	—	—	—
H ₂ O ₂ Vapor Generator	—	—	MCO-HP-PW	—	—	—
Exclusive H ₂ O ₂ Decontamination Reagent	—	—	MCO-H2O2-PE*2/PV*4	—	—	—

*1 Chart paper: RP-CO, Pen: Cartridge *2 EU only [230V, 50Hz (CE)] *3 Korea only [220V, 60Hz] *4 Except for EU countries

Specifications

		CO ₂ Incubators						O ₂ /CO ₂ Incubators	
Model No.	MCO-20AIC	MCO-19AIC	MCO-5AC	MCO-18AC	MCO-175	MCO-80IC	MCO-19M	MCO-5M	
Exterior dimensions (W x D x H)	770 x 708 x 900 (mm) 30.3 x 27.9 x 35.4 (inch)	620 x 710 x 900 (mm) 24.4 x 27.9 x 35.4 (inch)	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)	770 x 620 x 900 (mm) 30.3 x 24.4 x 35.4 (inch)	986 x 853 x 2040 (mm) 38.8 x 33.6 x 80.3 (inch)	620 x 710 x 900 (mm) 24.4 x 27.9 x 35.4 (inch)	480 x 548 x 575 (mm) 18.9 x 21.6 x 22.6 (inch)	
Interior dimensions (W x D x H)	620 x 523 x 665 (mm) 24.4 x 20.6 x 26.2 (inch)	490 x 523 x 665 (mm) 19.3 x 20.6 x 26.2 (inch)	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)	490 x 505 x 690 (mm) 19.3 x 19.9 x 27.2 (inch)	806 x 693 x 1524 (mm) 31.7 x 27.3 x 60.0 (inch)	490 x 523 x 665 (mm) 19.3 x 20.6 x 26.2 (inch)	350 x 378 x 375 (mm) 13.8 x 14.9 x 14.8 (inch)	
Interior volume	215 L / 7.6 cu.ft.	170 L / 6.0 cu.ft.	49 L / 1.7 cu.ft.	170 L / 6.0 cu.ft.	170 L / 6.0 cu.ft.	851L / 30.1 cu.ft.	170 L / 6.0 cu.ft.	49 L / 1.7 cu.ft.	
Net weight	106 kg / 234 lbs.	93 kg / 205 lbs.	49 kg / 108 lbs.	92 kg / 203 lbs.	108 kg / 238 lbs.	275 kg / 606 lbs.	94 kg / 207 lbs.	50 kg / 110 lbs.	
Medical purposes	Culture of cell tissue, organs, embryos								
Temperature	Heating method	Direct Heat & Air Jacket (DHA)			Water Jacket	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*			±0.2°C*	±0.5°C*	±0.25°C*		
	Temp. controllability	±0.1°C*							
CO₂	CO₂ control system	On-Off control	Microprocessor PID	On-Off control			Microprocessor PID		
	CO₂ sensor	Infrared	Dual Infrared	Thermal conductivity			Infrared	Dual Infrared	Thermal conductivity
	CO₂ range	0 to 20%							
	CO₂ controllability	±0.15%*							
O₂	O₂ control system							Microprocessor PID	
	O₂ sensor							Zirconia	
	O₂ range							1 to 18%, 22 to 80%	
	O₂ 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)	580 x 450 x 12 (mm) 22.8 x 17.7 x 0.5 (inch)	450 x 450 x 12 (mm) 17.7 x 17.7 x 0.5 (inch)	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)	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)	450 x 450 x 12 (mm) 17.7 x 17.7 x 0.5 (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	5 kg / 11 lbs. per shelf	7 kg / 15.4 lbs. per shelf	4 kg / 8.8 lbs. per shelf	7 kg / 15.4 lbs. per shelf		30 kg / 66.1 lbs. per shelf	7 kg / 15.4 lbs. per shelf	4 kg / 8.8 lbs. per shelf
	Shelves	5 Standard, 15 Max.	4 Standard, 15 Max.	3 Standard, 6 Max.	3 Standard, 15 Max.	6 Standard, 19 Max.	5 (standard)	3 Standard, 15 Max.	3 Standard, 6 Max.
Contamination control	Interior surface	Copper-enriched Stainless Steel				Stainless Steel	Copper-enriched stainless steel (except humidifying pan)	Copper-enriched Stainless Steel	
	UV lamp (ozone-free)	Standard	Option	Option	Option	—	Option	Option	
	H₂O₂ decontamination cycle	—	Option	—	—	—	—	Option	—
Water level sensor	Optical type				—	Thermal type	Optical type		
Access port	30mm (1.2") diameter					40mm (1.6") diameter, Two locations, each on both sides		30mm (1.2") diameter	
Air filter	0.3µm, Efficiency: 99.97% (for CO ₂)								
Alarm system	<ul style="list-style-type: none"> High/low temperature CO₂ density Door ajar Water level Independent overheat protection 	<ul style="list-style-type: none"> High/low temperature CO₂ density Door ajar UV lamp failure Water level Independent overheat protection 	<ul style="list-style-type: none"> High/low temperature CO₂ density Door ajar Water level Independent overheat protection Power failure 	<ul style="list-style-type: none"> High/low temperature CO₂ density Door ajar Water level Independent overheat protection 	<ul style="list-style-type: none"> High/low temperature CO₂/O₂ density Door ajar UV lamp failure Water level Independent overheat protection 				
Remote alarm contacts	30V DC, 2A allowable								

Voltage specification by destination

Representative destination	Voltage	MCO-20AIC-PE	MCO-19AIC-PE	MCO-5AC-PE	MCO-18AC-PE	MCO-175-PE	MCO-80IC-PE	MCO-19M-PE	MCO-5M-PE
Europe	230V, 50Hz (CE)	MCO-20AIC-PE	MCO-19AIC-PE	MCO-5AC-PE	MCO-18AC-PE	MCO-175-PE	MCO-80IC-PE	MCO-19M-PE	MCO-5M-PE
Korea	220V, 60Hz	MCO-20AIC-PK	MCO-19AIC-PK	MCO-5AC-PK	MCO-18AC-PK	—	MCO-80IC-PK	MCO-19M-PK	MCO-5M-PK
Thailand	220V, 50Hz	MCO-20AIC-PB	MCO-19AIC-PB	MCO-5AC-PB	MCO-18AC-PB	—	—	MCO-19M-PB	MCO-5M-PB
Taiwan	110V/220V, 60Hz	MCO-20AIC-PT	MCO-19AIC-PT	MCO-5AC-PT	MCO-18AC-PT	—	—	MCO-19M-PT	MCO-5M-PT

* Conditions

Ambient temperature: 25°C, Temperature setting: 37°C, CO₂ 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 Panasonic 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. Panasonic guarantees the product under certain warranty conditions. Panasonic in no way shall be responsible for any loss of content or damage to content.

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