High-performance Clean Oven

PVHC-231MS・331MS・PV(H)C-211・231・331

CAT.No.E87197-V507

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Ideal for heat treatment requiring air condition of Class 100 cleanliness. The high cleanliness is assured during the temperature heat-up and pull-down.

ESPEC's Clean Ovens are used extensively for heat treatment of specimens and drying components in stringent clean air requirements of Class 100 cleanliness. A space-saving upright design, and a large LED display for improved visibility are some of the user-friendly features.
Eight models to choose from, including high-performance models which ensure automated operation and dedicated cleanliness even throughout temperature heat-up or cooling procedures.

PVHC-331

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PVHC-231

PVHC-211

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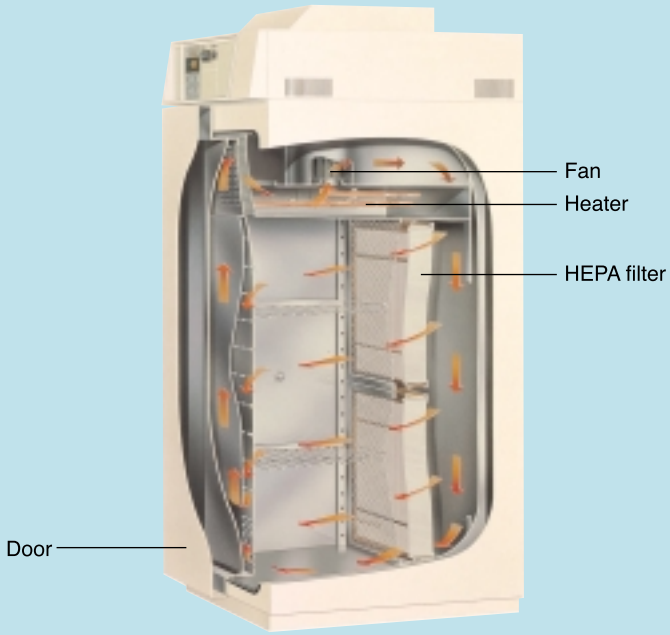
Utility

Horizontal laminar circulation system



Two Types of Easy-to-Use Instrumentation

Standard instrumentation for two-step programmed operation and M instrumentation for programmed operation with three patterns and a total of 18 steps are provided.
A large LED display is employed for improved visibility.

Total Safety Design

The temperature controller automatically prevents the temperature rising by +10℃ above the set temperature, and includes a warning function for user-defined upper and lower temperature limits. The chamber also features an independent device for preventing abnormal temperature increases. If a malfunction occurs, an alarm number is displayed on the instrumentation panel and a warning buzzer sounds.

Class 100 Cleanliness Level

Class 100 cleanliness level is achieved by employing HEPA filters and a back-to-front horizontal laminar circulation system which produces uniform high-temperature airflow.
Distance of airflow in the chamber is shortened, resulting in smooth air delivery in between specimens and uniform heat treatment. Additionally, it prevents dust generated from specimens placed upstream from flowing downstream.
The upright design with instrumentation, heater, and other mechanisms gathered on the upper side saves installation space.

Airtight Structure Ensures Zero Contamination

All internal seams are welded to create an airtight structure. This prevents leakage of insulation materials from joints which would lead to chamber contamination. Vibration is also eliminated from affecting the specimens.

Installation in a clean room

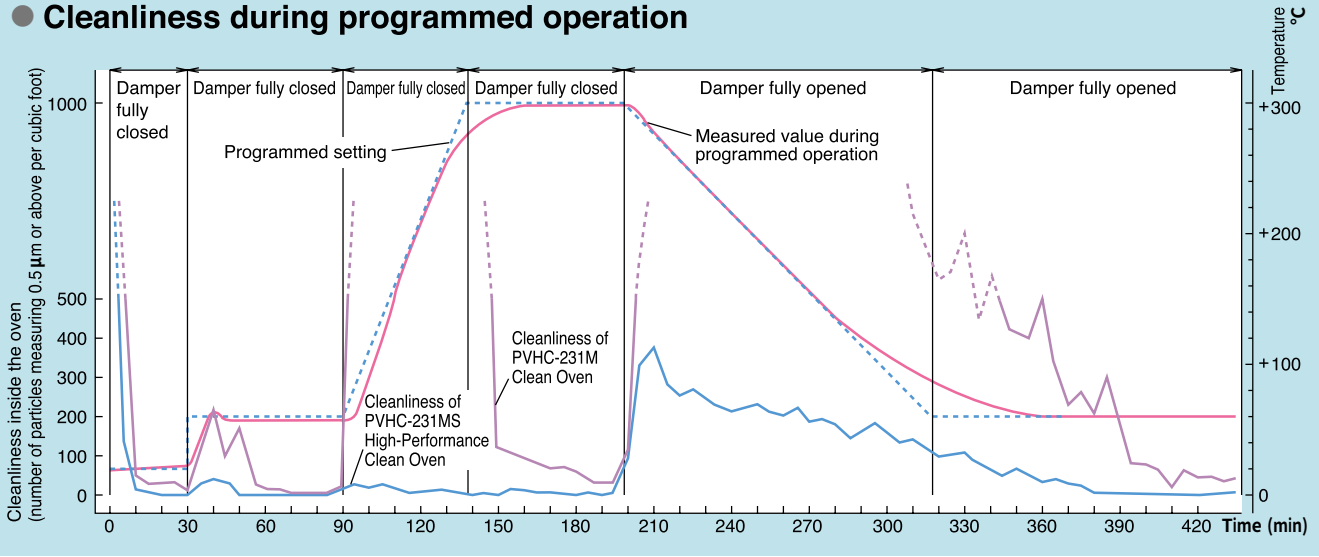
Any dust generated by the oven mechanism is expelled via exhaust duct to prevent accidental infiltration into the clean room. (optional/ please be prepared with your own exhaust duct)
The exterior material of the chamber can also be exchanged with an optional stainless steel material.

Highly Precise Non-Oxidative Environment

Heat treatment and temperature characteristic tests in any desired non-oxidized environment are possible thanks to an O_2 concentration indication adjuster with oxygen sensor (optional) and an N_2 gas injector (optional).

Control operation

Cleanliness during programmed operation



*The performance levels are given as representative examples.

Automated Operation throughout Heat Treatment Process (High-performance model)

An automatic damper is provided as standard for automation in all processes from temperature heat-up to heat treatment and temperature pull-down. To reduce pull-down time, an optional external atmosphere introducing blower forces air into the chamber to supplement cooling.

Supports a Centralized Control System for Environmental Testing CMS-J30 (sold separately)

This is a fully customizable system that provides remote operation, monitoring, and alarm control of up to 32 ESPEC chambers (of which 16 are dedicated to monitoring) by the use of a PC.

Environmental Testing Centralized Control Software ERC-100M (sold separately)

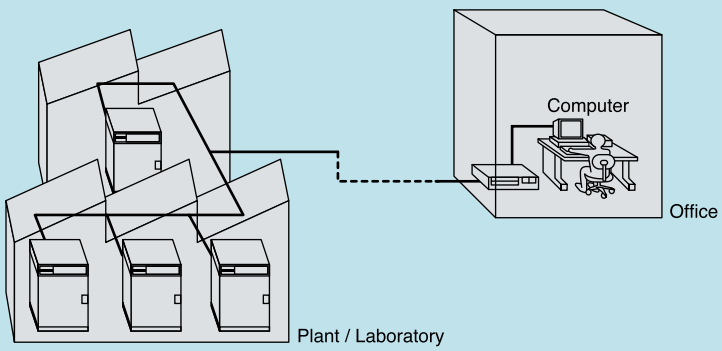
The application software makes it easy to set test parameters, monitor operations, program, and datalog up to 16 ESPEC test chambers with a single PC by remote control.

*Software: English/Chinese (in simplified)/Japanese .

High Level of Cleanliness During Temperature heat-up and pull-down (High-performance model)

The high-performance model delivers dedicated cleanliness throughout wide temperature ranges by employing HEPA filters which provide stable filtering even during temperature changes above +150°C. Useful for heat treatment in liquid crystal production lines.

Control, monitor, and data management is performed via personal computer.



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Standard Instrumentation

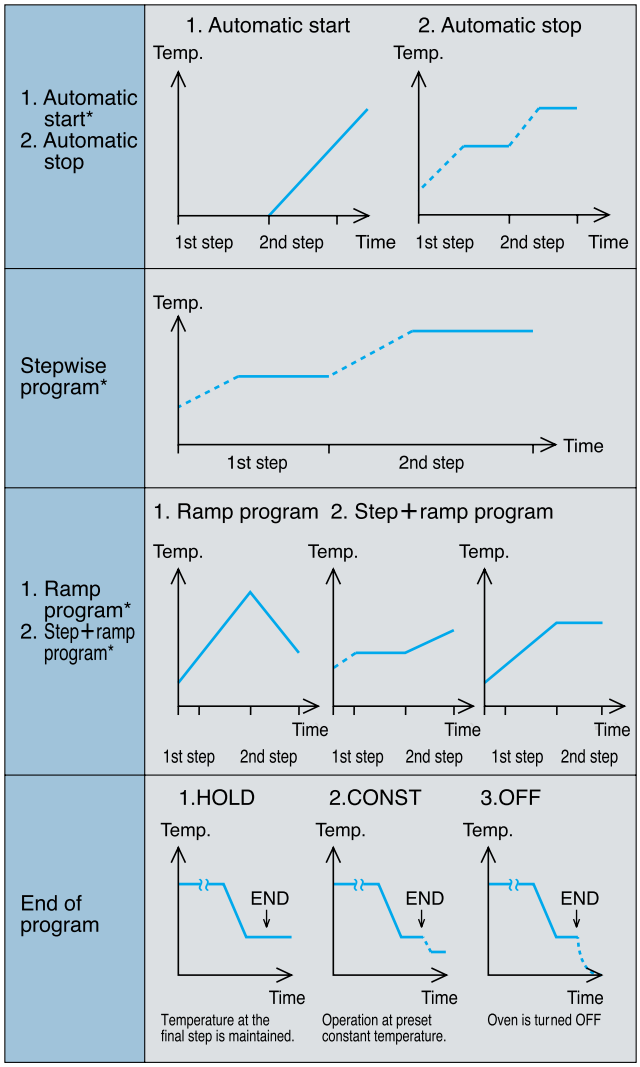
The instrumentation features four programmed operation modes: fixed operation, automatic start/stop programmed operation, two-step programmed operation, and a ramping operation that allows temperature increase gradient to be specified.
A large display with touch keys is employed for improved operation.
The ovens can also be used with centralized control systems involving high-level programmed operation, remote operation and central control using a personal computer. Ideal for use in production lines and research development.

Standard Instrumentation Specifications

Operation mode	Constant operation, programmed operation and remote operation through E-BUS system
Setting and indication ranges	temperature: 0 to +210℃ (PVC) 0 to +360℃ (PVHC) time: 0 to 99 hours 59 minutes 100 to 999 hours (in 1 hour increments)
Setting and indication resolution	temperature: 1℃ time: 1 minute
Indication accuracy*	temperature: within ±(2℃+1 digit) time: ±300 ppm of readout value
Programming function	Two-fixed-step program entry is possible. ● Ramp setting Stepwise temperature ramp setting is possible. ● Automatic start Timed start-up is possible by setting the first step to 0℃ (i.e. OFF mode). ● Automatic stop Timed termination is possible by setting the oven to turn OFF upon completion of a program. ● OFF mode The oven can be turned off during programmed operation. ● Completion The operating status upon completion of a program can be set to HOLD, CONST or OFF. ● Repetition A program can be repeated automatically up to 999 times.
Communications	E-BUS system compatible.
Auxiliary functions	Input burnout detection Upper and lower temperature limit alarm Buzzer alarm Automatic overheat prevention Fault indication Automatic number indication Self diagnosis Guarantee soak testing Operation mode switching from failure to power recovery Power failure/recovery operation selection

*At ambient temperature +23℃±5℃

Example of programmed operation



* The number of repetitions of a program can be preset between 1 and 999.
Stepwise damper setting is possible. (optional automatic damper required for PVC/PVHC).
Guarantee soak function can be set, whereby the timer is activated upon achieving set temperature.

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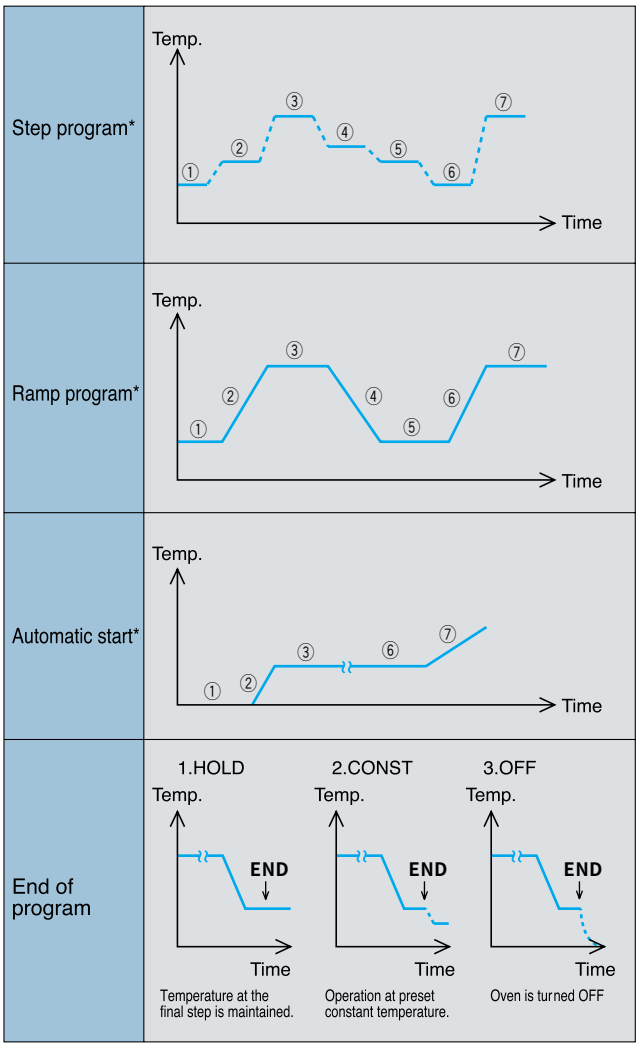
M-Instrumentation

The M-instrumentation allows programmed operations up to three patterns with 18 steps in total for temperature characteristics testing, heat treatment, and drying. Its advanced functions include temperature heat-up and pull-down temperature gradient settings, repeated operations (up to 999 cycles), setting of operation status on completion of a program (HOLD, CONST or OFF), and automatic program start/stop at any chosen time.
Compatible with centralized control system to allow construction of PC-based network of temperature chambers.

Example of programmed operation



∗ The number of repetitions of a program can be preset between 1 and 999.
① to ⑦ stepwise damper setting is possible. (optional automatic damper required for PVC/PVHC).
Guarantee soak function can be set, whereby the timer is activated upon achieving set temperature.

M-Instrumentation Specifications

Operation mode	Constant operation, programmed operation and remote operation through E-BUS system
Setting and indication ranges	temperature: 0 to +210℃ (PVC) 0 to +310℃ (PVHC-MS) 0 to +350℃ (PVHC) time: 0 to 99 hours 59 minutes 100 to 999 hours (in 1 hour increments)
Setting and indication resolution	temperature: 1℃ time: 1 minute
Indication accuracy*	temperature: within ±(2℃+1 digit) time: ±300 ppm of readout value
Programming function	Three-pattern, 18-step program entry is possible. ● Ramp setting Stepwise temperature ramp setting is possible. ● Automatic start Timed start-up is possible by setting the first step to 0℃ (i.e. OFF mode). ● Automatic stop Timed termination is possible by setting the oven to turn OFF upon completion of a program. ● OFF mode The oven can be turned off during programmed operation. ● Completion The operating status upon completion of a program can be set to HOLD. CONST or OFF. ● Repetition A program can be repeated automatically up to 999 times.
Communications	E-BUS system compatible.
Auxiliary functions	Input burnout detection Upper and lower temperature limit alarm Buzzer alarm Automatic overheat prevention Fault indication Alarm number indication Self diagnosis Guarantee soak testing Power failure/recovery operation selection Power failure protection

*At ambient temperature +23℃±5℃

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SPECIFICATIONS

Model		PVC-211	PVC-231	PVC-331	PVHC-211	PVHC-231	PVHC-331	PVHC-231MS	PVHC-331MS
System		Back-to-front horizontal laminar circulation system							
Power supply		200/220/230V AC, 3φ, 3W, 50/60Hz 380V AC, 3φ, 4W, 50/60Hz							
Max. power consumption		4.1kVA	6.4kVA	7.0kVA	4.1kVA	6.8kVA	9.0kVA	6.8kVA	9.0kVA
Operating temperature		0 to +40℃							
Performance*1	Temperature range	(Ambient temp +60)℃ to +200℃			(Ambient temp +60)℃ to +350℃			(Ambient temp +60)℃ to +350℃	
	Temperature constancy	±0.5℃							
	Temperature uniformity	±1.5℃ at +100℃ ±2.0℃ at +200℃			±1.5℃ at +100℃ ±2.0℃ at +200℃ ±4.0℃ at +300℃ ±5.0℃ at +350℃			±1.5℃ at +100℃ ±2.0℃ at +200℃ ±4.0℃ at +300℃	
	Temperature heat-up rate	Ambient temp to +200℃ within 60 min			Ambient temp to +350℃ within 90 min			Ambient temp to +300℃ within 80 min	
	Cleanliness*2	At stable temp: Class 100						At stable temp: Class 100 At temp change: Class 500 at 5℃/ min	
Construction	Exterior matterial	**Painted steel (Melamine resin coating)**							
	Interior material	**Stainless steel plate**							
	Insulation material	**Glass wool**							
Filter		Heat-resistant HEPA filter						High-temperature HEPA filter	
Heater		Sheathed heater							
Air circulator		Iron sirocco fan with heat resistant finish							
Damper		Circulation/ Ventilation (manual switching)*3						Circulation/ Ventilation (automatic switching)	
Fittings		Power cord 2m, specimen power supply control terminal, pressure margin gauge (indicates life of filter), cable port φ25mm (one on left panel)							
Inside dimensions W×H×Dmm		580×530×580	580×1130×580	800×1130×750	580×530×580	580×1130×580	800×1130×750	580×1130×530	800×1130×700
Outside dimensions*4 W×H×Dmm		770×1280×1025	770×1880×1025	1030×1880×1210	770×1280×1025	770×1880×1025	1030×1880×1210	770×1880×1025	1030×1880×1210
Inside capacity (L)		178	380	678	178	380	678	347	633
Weight (kg)		220	300	400	220	300	400	300	400

*1 PV(H)C-211, 231, 331—Based on no-load circulation operation at +20℃ ambient temperature.
PVHC-231MS, 331MS—Based on no-load circulation operation at +20℃ ambient temperature, in class 1000 clean room.

*2 When the chamber door is open, class 100 cleanliness cannot be maintained.
Temperature constancy and temperature uniformity are in accordance with JTM K01. (Japan Testing Machinery Association)

*3 PVC and PVHC can be provided without a damper.

*4 Excluding protrusions.

SAFETY DEVICES

- Leakage breaker for power supply
- Circuit breaker for SSR overload shortcircuit protection
- Electrical compartment door switch
- Short circuit protection fuse for control circuit
- Ovenheat protector
- Oven door switch
- Thermal fuse

ACCESSORIES

- Shelves (stainless steel wire) 2
- Shelf bracket (stainless steel plate) 2sets
- Fuse (glass tube typeA 3A) 2
- Connectors (for specimen power supply control terminal) 1
- Instruction manual (Basic/ Reference) ..... 1 each
- Warranty 1

DANGER

●Do not use specimens which are explosive or inflammable, or which contain such substances. To do so could be hazardous, as this may lead to fire or explosion.

●Do not place corrosive materials in the chamber. If corrosive substances or humidifying water is used, the life of the unit may be significantly shortened.

CAUTION

Be sure to read the instruction manual before operation.

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OPTIONS

Modification for Clean-room Compatibility

Prevention of particle and dust scattering from control console and heater vents.

- Flange diameter φ90mm
- Air discharge system:
  Forced discharge

*Please be prepared with your own facility for exhaust fan.

Pre-filter

Removes large particles from external air. Recommended when installing the oven in a location other than a clean room. (for oven with damper)

Exhaust Port Flange

Flange for discharging hot air from the oven. Installed on rear of chamber.
(for oven with damper)

- Material Cold rolled steel plate
  Unichrome plated finish
- Diameter dimension 90mm

*When connecting to exhaust duct, the length of duct must be less than 4m.

Exhaust Duct

Exhausts hot air toward the ceiling.
Installed on rear of chamber.
(for oven with damper)

- Diameter dimension: 90mm

Exhaust Duct and Exhaust Port Flange

When the exhaust port flange is connected to the exhaust duct.

O_2 Concentration Indication Adjuster

This controls the oxygen concentration inside the oven.

- Oxygen concentration range
  5%-15% oxygen concentration (v/u)

* Without damper

- Injection gas
  N_2 gas (Normal temperature, dry gas)

* Except PVHC-231MS/331MS

Nitrogen Gas Injector

Used for reducing specimen oxidation and saving temperature pull-down time.

- Input pressure:
  0.05MPa (max flow rate 30L/ min)
  0.10MPa (max flow rate 100L/ min)
  0.20MPa (max flow rate 200L/ min)

*Photo shows max flow rate 30L/min

- Flow meter:
  Floating flow meter

Automatic Damper

Automatically provides ventilation according to the open/ close pattern determined by programmed operation.
Standard on PVHC-231MS/ 331MS

- Damper opening and closing range
  0% (fully closed) to 99% (fully opened)
- Minimum graduation 1%

External Atmosphere Introducing Blower

Used to supplement cooling, for ventilation, etc. (for oven with damper)

OPTIONS

Paperless recorder

Records temperature inside the chamber. Additional inputs may also be recorded.
Temperature range: 0 to +200°C
0 to +300°C
0 to +400°C
Number of inputs:
Temperature 1 (5 more but turned OFF*)
Data saving cycle: 5 sec
External recording media:
CF memory card (32MB)
Language: English
* Settings may be modified.


Paperless recorder

Temperature Recorder

- Temp range 0 to +200°C
  0 to +300°C
  0 to +400°C
- Recording system
  Pen recorder (1 pen)
  or multi-point recorder (6 dots)
- Recording speed
  30・60mm/ hr
  (two-speed switching)

Temperature Detection Terminal

Outputs chamber temperature through thermocouple type K.

Thermocouple

Measures the temperature of specimens.
2m/ 4m / 6m

Time-up Output Signal

Outputs contact signals at the end of programmed operation.
- Power supply capacity 250V AC 1A
- Contact output at" close "
  at program time-up.
- Installed at rear of chamber.

Calendar timer

Automatically sets the chamber on and off every day. Installed on operating panel.
- Setting range:
  Sunday to Saturday (one week)
  0:00am to 11:59am
  0:00pm to 11:59pm
- Margin of error per month ±15sec

Integrating Hour Meter

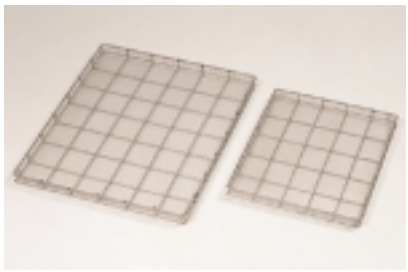
Integrates and indicates running hours.
Comes with or without reset, installed on operating panel.
(Does not integrate prior to automatic start or after automatic stop of oven during programmed operation, nor during chamber stop due to failure)
- Measuring time
  99999.9hr
  (without reset, does not return to zero)
  9999.9hr (with reset)
- Rotational indication 1mpr (without reset)
  2mpr (with reset)


(with reset)


(without reset)

Mesh Shelf

For testing small specimens
Material: 18-8 Cr-Ni stainless steel



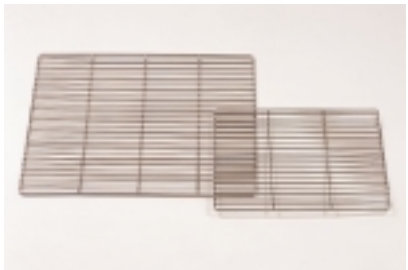
Model	Material	Max load capacity*
PV(H)C-211•231 PVHC-231MS	φ5 wire φ0.85 mesh	10kg (18kg)
PV(H)C-331 PVHC-331MS		15kg (35kg)

*Uniformly distributed load
Number in parenthesis indicate capacity when set on standard shelf.

Load Resistant Shelf and shelf Bracket

Used to test specimens exceeding weight of the maximum allowable for standard shelves.

- Material
  18.8 Cr-Ni stainless steel plate
- Total allowable shelf load Max 200kg



Model	Max load capacity (uniformly distributed load)
PV(H)C-211•231 PVHC-231MS	40kg
PV(H)C-331 PVHC-331MS	80kg

Shelf and Shelf Bracket

Equivalent to those supplied as accessories.

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OPTIONS

Stand

・Exterior
Cold rolled and rust-proof steel plate with melamine baked finish.

＜for PV(H)C-211＞

Model	Outside dimension W×H×Dmm
MVC-23	770×300×960
MVC-23C	770×321×960
MVC-26	770×600×960
MVC-26C	770×621×960

*MCV-23C/ 26C are equipped with casters with adjusters. Also equipped with door.

Caster

Installed on main unit stand.
・With level adjuster
Free wheel (4 casters)

External Alarm Terminal

Outputs alarm signals. Installed on rear of chamber.
・Output point 1 point
・Power supply capacity 250V AC 1A
・Contact output at“ close ”
in an emergency.
・Installed at rear of chamber.

Emergency Stop Switch

Operation is shut down in case of emergency.

E-BUS Cable

5m/ 10m

Power Cord

If the standard 2m is not long enough, 5m and 10m cords are available.

■Some photographs listed in this catalog contain Japanese display.

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JAB EMS Accreditation RE 009

EC99J2046

051

ISO 9001/JIS Q 9001
Quality Management System Assessed and Registered

ESPEC CORP. has been assessed by and registered in the Quality Management System based on the International Standard ISO 9001:2000 (JIS Q 9001:2000) through the Japanese Standards Association (JSA).

ISO 14001 (JIS Q 14001)
Environmental Management System Assessed and Registere

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