Quality is more than a word

ESPEC

# Platinous J Series

## Temperature & Humidity Chamber
## Low/Ultra Low/High/Low Humidity/Clean Temperature (& Humidity) Chamber

### New! Ultra-Energy-Efficient Low Temperature & Humidity Chamber

3 YEAR WARRANTY

LOW GWP REFRIGERANT

CAT.NO.E15110-S2411

# ESPEC Platinous J Series - Your best choice to cover broad reliability test applications. It offers flexible configurations to meet the needs of today and tomorrow.

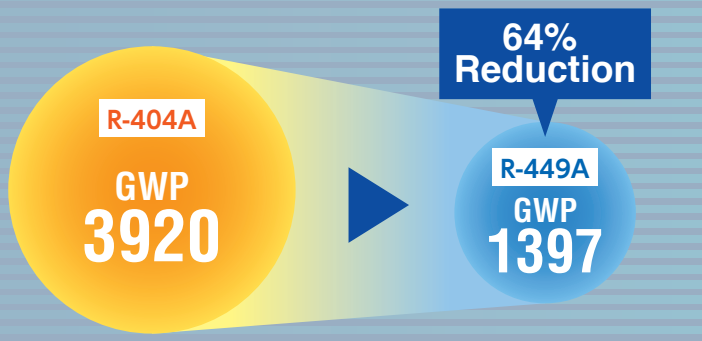
## To minimize our chambers potential environmental impact

R-449A is the best alternative to R-404A

**Low GWP Refrigerant**

LOW GWP REFRIGERANT

R-449A is available on request.
(PR/PL/PSL/PCR/PU/PG)




*R-449A is available on request

Type 1

Type 2

## Contents



Type 3


Type 4

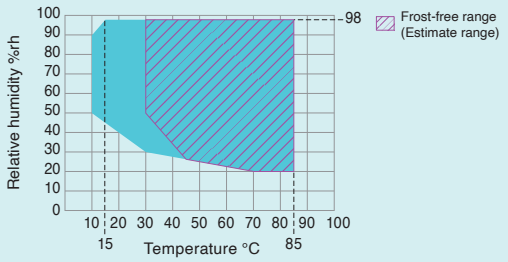
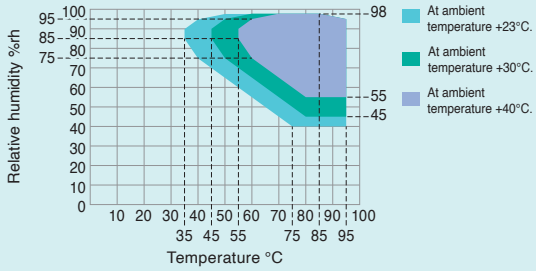
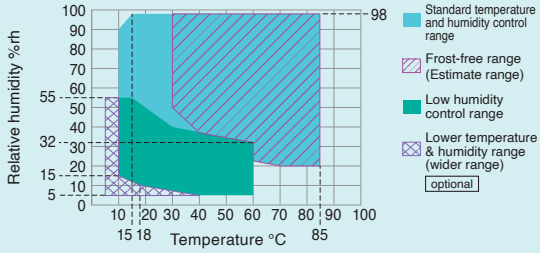
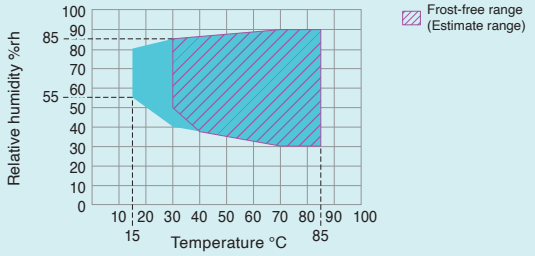
# Models Configuration

| | Model | Temperature |
|---|---|---|
| Temperature & Humidity Chambers | Temperature & Humidity Chamber<br>PR-1J / PR-2J / PR-3J / PR-4J | –20°C to +100°C<br>(–20°C to +150°C (optional)<br>–20°C to +180°C (optional))<br>On request<br>Up to +200°C |
| | ＼NEW／ Ultra-Energy-Efficient Low Temperature & Humidity Chamber<br>PL-2J-ECO / PL-3J-ECO / PL-4J-ECO | –40°C to +100°C<br>(–40°C to +150°C (optional)<br>–40°C to +180°C (optional))<br>On request<br>Up to +200°C |
| | Low Temperature & Humidity Chamber<br>PL-1J / PL-2J / PL-3J / PL-4J | –40°C to +100°C<br>(–40°C to +150°C (optional)<br>–40°C to +180°C (optional))<br>On request<br>Up to +200°C |
| | Ultra Low Temperature & Humidity Chamber<br>PSL-2J / PSL-4J | –70°C to +100°C<br>(–70°C to +150°C (optional)<br>–70°C to +180°C (optional)*)<br>On request<br>Up to +200°C |
| | High Temperature & Humidity Chamber<br>PHP-2J / PHP-3J / PHP-4J | ambient temperature +10°C to +100°C |
| | Low Humidity Type Temperature & Humidity Chamber<br>PDR-3J / PDR-4J | –20°C to +100°C |
| | Low Humidity Type Low Temperature & Humidity Chamber<br>PDL-3J / PDL-4J | –40°C to +100°C |
| | Clean Temperature & Humidity Chamber<br>PCR-3J [Cleanliness: Class5 (HEPA Filter)] | –20°C to +100°C |
| Temperature Chambers | ＼NEW／ Ultra-Energy-Efficient Low Temperature Chamber<br>PU-2J-ECO / PU-3J-ECO / PU-4J-ECO | –40°C to +100°C<br>(–40°C to +150°C (optional)<br>–40°C to +180°C (optional))<br>On request<br>Up to +200°C |
| | Low Temperature Chamber<br>PU-1J / PU-2J / PU-3J / PU-4J | –40°C to +100°C<br>(–40°C to +150°C (optional)<br>–40°C to +180°C (optional))<br>On request<br>Up to +200°C |
| | Ultra Low Temperature Chamber<br>PG-2J / PG-4J | –70°C to +100°C<br>(–70°C to +150°C (optional)<br>–70°C to +180°C (optional)*)<br>On request<br>Up to +200°C |

* Applicable only to Type 2

**RoHS Directive Compliant**

**Compliant with International Safety Standards** Safety of Machinery (ISO 12100), Low Voltage (IEC 60204-1), EMC (IEC 61000-6-2, EN 55011)

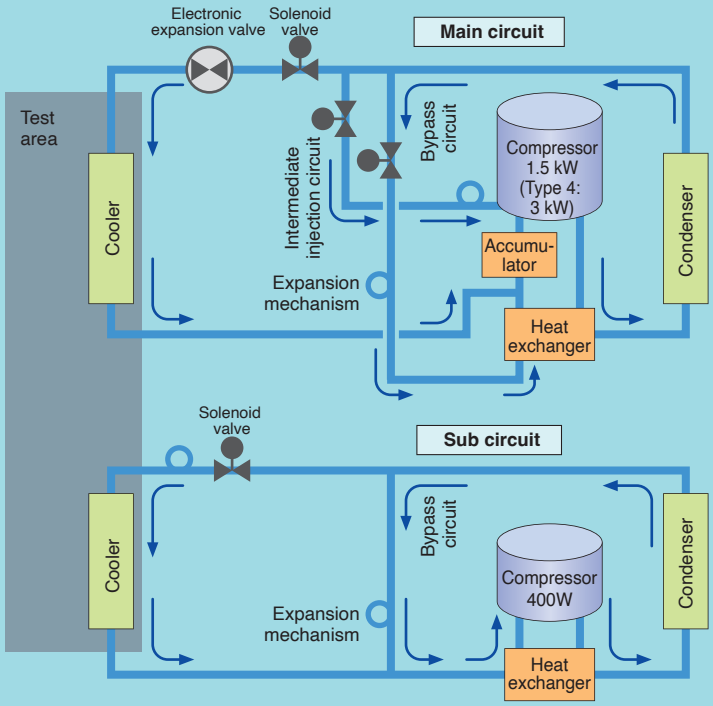
| Humidity | | Inside capacity |
|---|---|---|
| 20%rh to 98%rh<br>• With no specimen and under ambient temperature at +23°C.<br>• Restrictions on continuous humidity operation at +40°C or lower because of frost on the cooler. |  | Type 1: 120 L<br>Type 2: 225 L<br>Type 3: 408 L<br>Type 4: 800 L<br>On request 816 L 1000 L (PL,PU) |
| | | Type 2: 306 L<br>Type 4: 800 L |
| 40%rh to 98%rh<br>• With no specimen. |  | Type 2: 219 L<br>Type 3: 398 L<br>Type 4: 784 L |
| 5%rh to 98%rh*<br>• With no specimen and under ambient temperature at +23°C.<br>• Restrictions on continuous humidity operation at +40°C or lower because of frost on the cooler. |  | Type 3: 408 L<br>Type 4: 800 L |
| 30%rh to 90%rh<br>• With no specimen and under ambient temperature at +23°C.<br>• Restrictions on continuous humidity operation at +40°C or lower because of frost on the cooler. |  | Type 3: 312 L |
| | | Type 1: 120 L Type 3: 408 L<br>Type 2: 225 L Type 4: 800 L |
| | | Type 2: 306 L<br>Type 4: 800 L |

*) Low Humidity Region Operation Precautions
• Operation in the low humidity region is not possible from a high temperature above +60°C. Perform transition from temperatures below +60°C.
• Gradient programs cannot be used in the low humidity region. • Programs that require humidifier switching cannot be used. • Programs that transit from outside the low humidity region to the low humidity region cannot be used. However, the transition from the low humidity region to another region is allowed.

# Energy-Saving

## Up to 70% reduction* in power consumption. Reliable even with 24-hour full operation! *Compared to the K Series.

### Energy-efficient refrigeration utilizing multiple compressors




When the chamber operation is stable at constant ranges above 50°C / 40%rh, it switches to sub refrigeration to run at minimum energy.(PL-2•3•4, PU-2•3•4, PSL, PG, PDL, PCR)

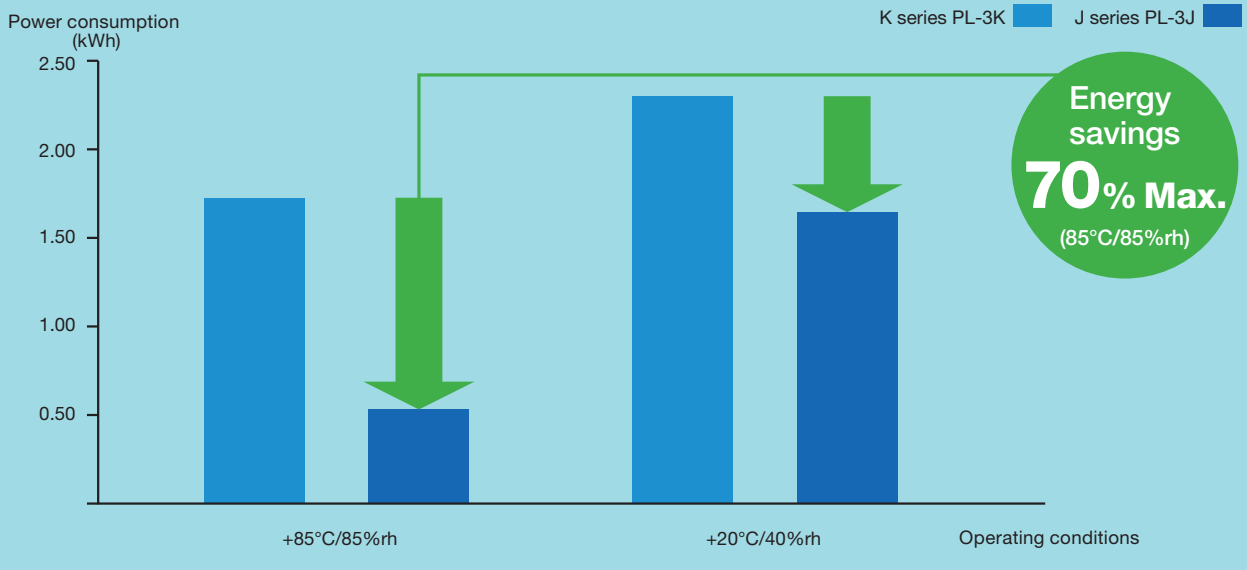
### Smart R&D System
**(Japanese patent no. 5514787)**

Smart R&D System (Smart Refrigerator & Dehumidifier System) is the ESPEC patent, which can control both cooling and heating capacity at minimum limits.
It provides highly accurate temperature / humidity environment with low energy consumption.
The system consists of PID controlled refrigerator, and N instrumentation, which delivers high speed processing.

**The Japan Machinery Federation The Energy-Efficient Machinery Award**

優秀省エネルギー機器

### Energy Consumption Comparison (Example) Per Hour



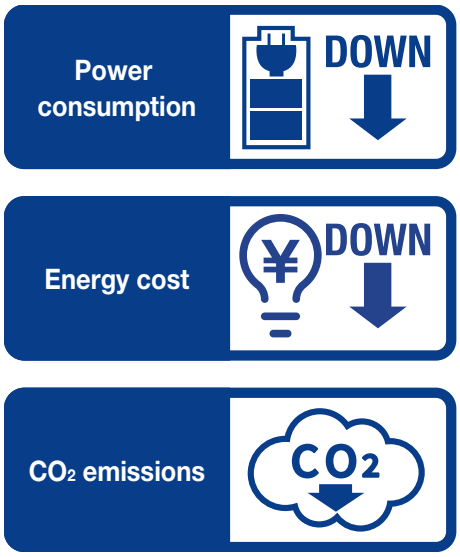
NEW

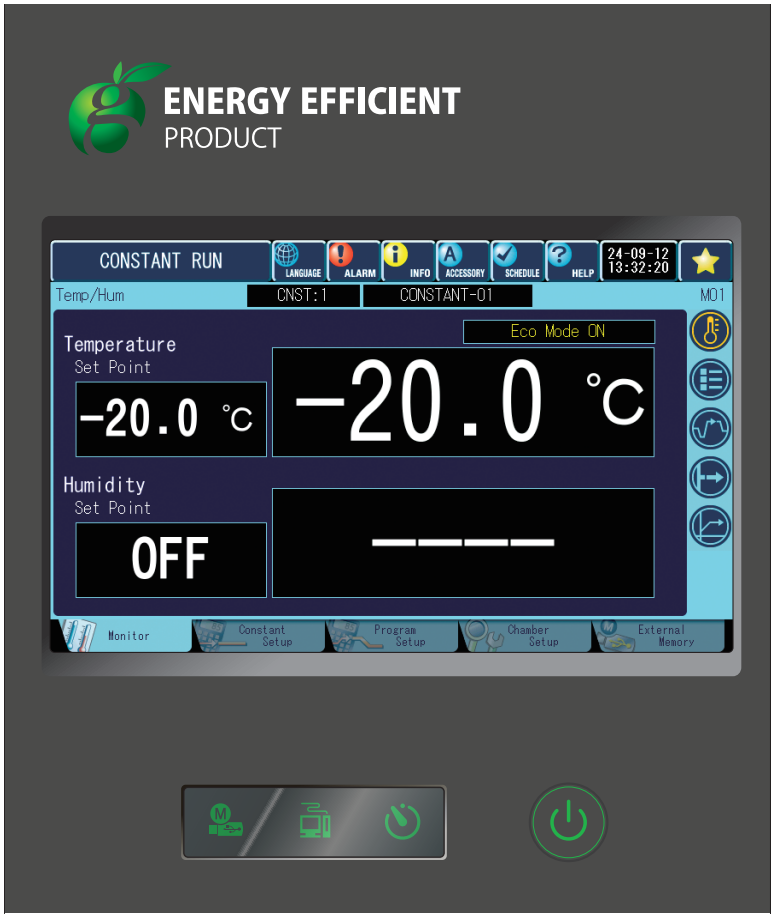
# Ultra-Energy-Efficient Low Temperature (& Humidity) Chamber (ECO Type)

## The most energy efficient! The new launched super energy-saving model!

### Energy savings of up to 70% over existing J series.

The ECO type features an advanced refrigeration control system that offers up to 70% energy savings for operations below 0°C, compared to standard J series models (based on PL-4J-ECO model).



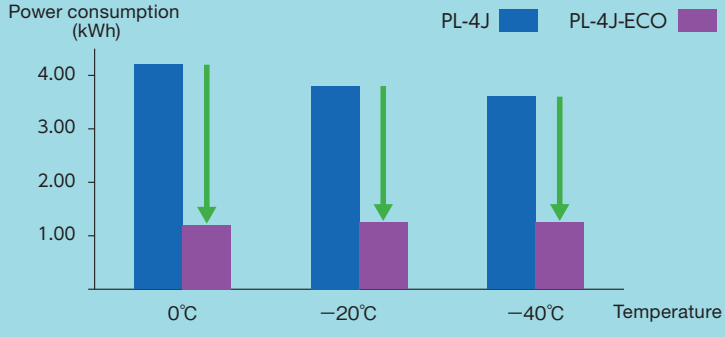




### Maximizing ECO benefits for long-term testing

Designed for long-term, continuous operation, the ECO model is ideal for various industries, including the battery market, while also serving a wide range of other applications:

- •Battery tests such as charge/discharge tests(cells, packs, etc.)
- •Storage tests
- •Performance evaluation tests

**Power consumption-PL-4J-ECO vs PL-4J standard model**




## Low GWP refrigerant R-449A

### A value-added green product

As a global leader in environmental simulation, ESPEC is committed to reducing the environmental impact of its products throughout their lifecycle. Key ECO model benefits include:

- •Low GWP refrigerant R-449A is standard

**Low GWP refrigerant R-449A**

LOW GWP
REFRIGERANT

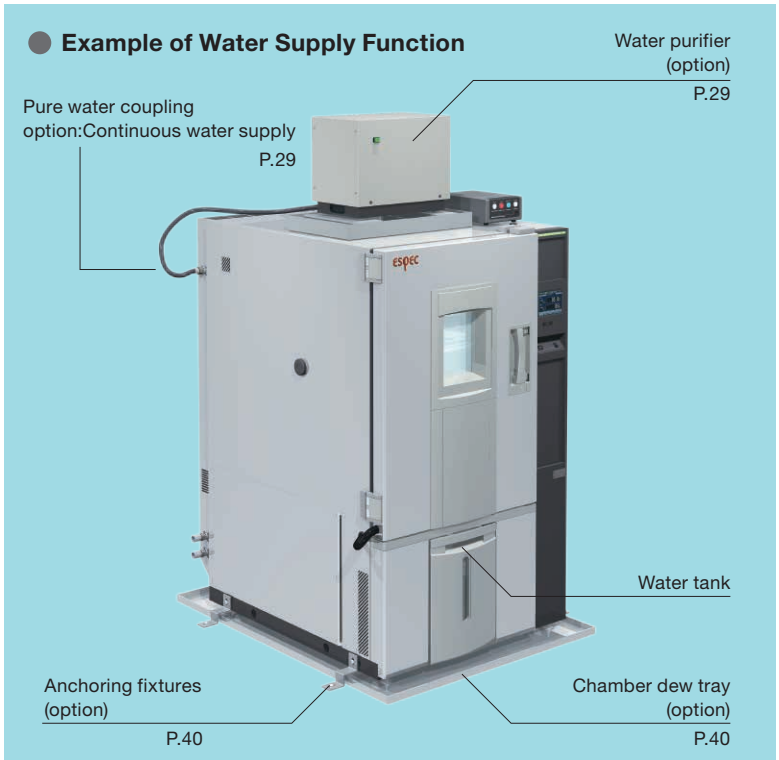
# Features

Viewing window

Wide-view door (option)

Door without viewing window (option)

### Example of Water Supply Function




## Clear observation of the test area with a viewing window and LED lighting

Standard equipped with a viewing window that includes LED lighting. This allows for consistent checking of the conditions in the test area even in dark environments, improving work efficiency and inspection accuracy.

**Standard Viewing Window Size**

Type 1 to 3 : W180 × H260mm
Type 4 : W295 × H380mm

## A Variety of Door Types

Several types of chamber doors are available for selection: a standard type with viewing window, a door without a viewing window, and a wide-view door that allows you to check the inside of the whole test area.
Furthermore, you can customize the door according to your application by, for example, adding hand-in ports to the door or installing an inner glass door to the chamber door. (Page 30-31)

## Dew condensation protection of specimen (Humidifier delay function)

Humidifier operation starts after the temperature is attained in order to reduce dew condensation on specimens.

## Humidifying water is always clean

Humidifier stagnant water contains impurities and is a cause of trouble, so the chamber now features a function that automatically replaces the water at the period set from the controller screen.

## Reliable even for long-term tests

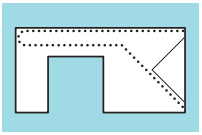
Several options to supply water to the chamber are offered, including direct tap water connection, pure water, additional tanks, etc.

# Features

## Facile Wick Replacement

**PR, PL, PSL, PHP**
**(Japanese patent no. 5571634)**

The difficulty in replacing the wet-bulb wick has been improved by changing the shape of the wick's plug part to allow smooth replacement work.



FW-5

## Easy Filter Cleaning

The condenser filter can be easily attached and removed from the chamber to make cleaning even easier.

## Door & Power Supply Locks

Door lock prevents accidental interruption during testing.
The double-lock door handle is designed to close the door more easily and safely.
As an option, a power key switch can also be equipped to control the chamber's power.

## Integration with ESPEC Evaluation Systems

Even more accurate Electro-chemical migration evaluations can be performed by integration with a Platinous J Series and an AMI System (sold separately).
If the chamber equips with an optional cable port on the right side, the cables can be accessed from both right and left sides of AMI system.

Wick inside chamber

Condenser filter

Door handle lock


Power key switch (option)

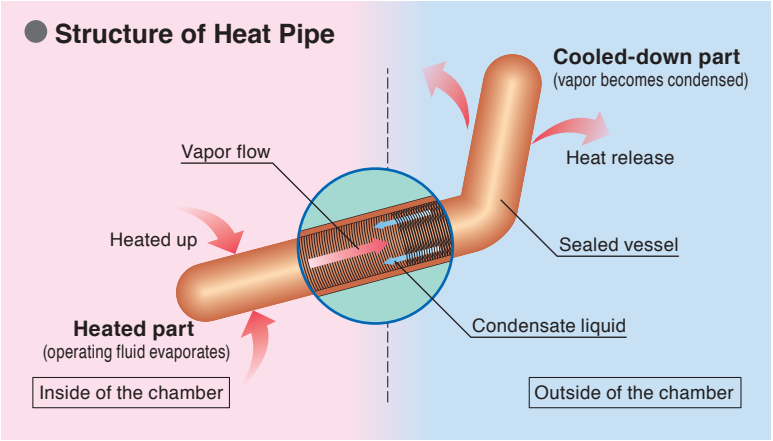

System integration with Electro-chemical Migration Evaluation System (example)

## This specialized chamber for long-term operation at 85°C/85%rh offers superior cost performance

**PHP**

- The cooling system uses a heat pipe with no compressor.
- To prevent dehumidification by the refrigerator, tests can be performed in high-temperature and high-humidity ranges (95°C/95%rh).
- Supports heating from the specimen of 600 W*1 when operating at 85°C/85%rh.
- Ideal for bypass tests and operation checks of specimens which produce large heating, such as high-brightness LEDs or power devices.

*1: PHP-4J specification value




## ISO Class 5 Cleanliness

**PCR**

PCR is equipped with a HEPA filter to realize the cleanliness class 5 (ISO 14644-1 and JIS B9920 standards compliant).

Clean Temperature & Humidity Chamber (PCR)

## Superior Low-humidity Control Performance

**PDR·PDL**

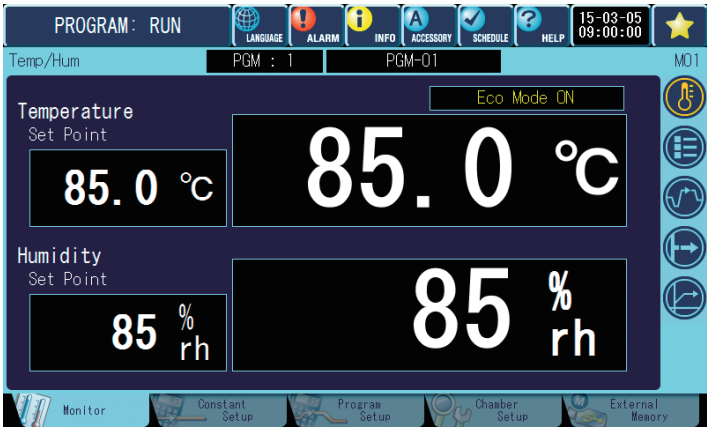
With the independently-developed rotary regenerative dehumidifier method, low-humidity control is realized such as 60°C / 5%rh. (Control range chart is on page 4.)
As an option, further low temp. & humid. range (up to 5°C / 5%rh) can be controlled (page 36.)

Low Humidity & Low Temperature Chamber (PDL)

# Easy-to-use, easy-to-read touch panel

## Tabbed Interface

High resolution 7 inch LCD. Tabs are displayed at the bottom of the screen to help access to other screens.
A touch navigation bar is also displayed along the right of the screen to access principal pages anytime.




## Multilingual support

The controller supports:
Japanese / English /Korean / Chinese (Traditional / Simplified)

## Information Function

The chamber flashes the INFO icon to notify the user of information, such as inspection intervals for the humidifying tray. Notification periods and types can be configured as desired.


Japanese

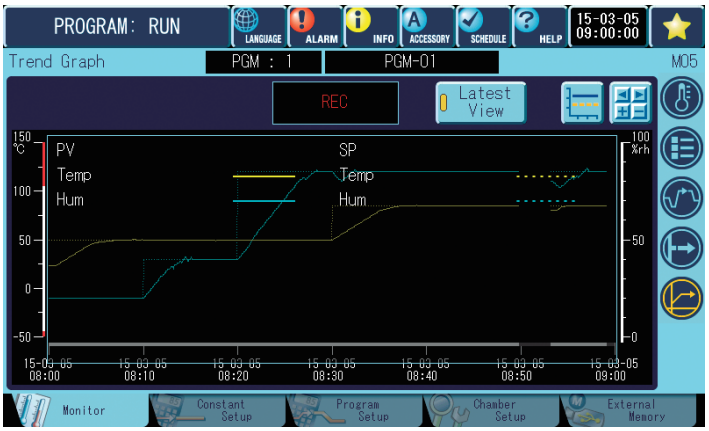

Chinese (traditional)


Korean


Chinese (simplified)

## Test Data Records & Exports

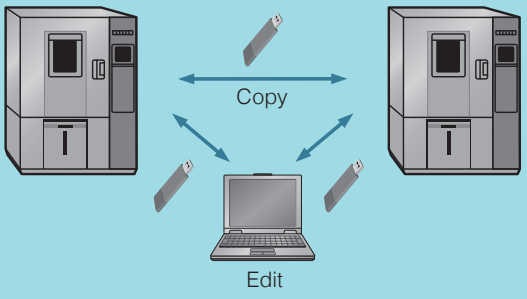
Temp. & humid. settings and measured values are recorded on controller's internal memory. The data and its graph can be exported to USB flash drives.
* Interval can be changed.




## Program Patterns Copying

Program patterns can be copied between chambers with the use of USB flash drives without using a computer.

### Program Copying and Computer Editing



# Easy Customization

Improved functionality and usability

## Various options to fit any application and test method

A variety of options can be installed to improve specimen access, such as a wide view door and cable ports, allowing for plans that improve multifunctionality and convenience.


### ❶ Left-side cable port

Standard equipment: $\phi$50 × 1

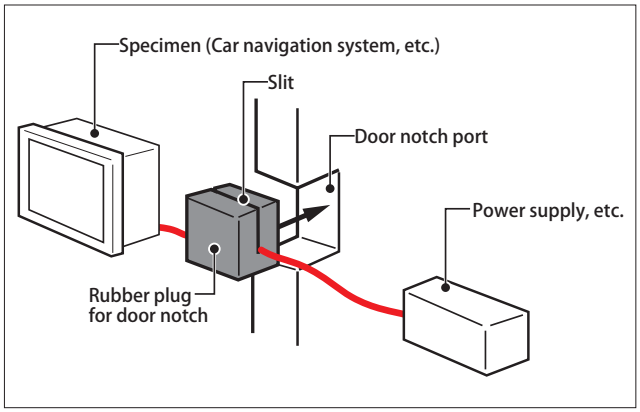
* Additions and changes are possible.

→P.33

### ❷ Door notch port

on request

Wiring work when installing the specimen in the test area is simple. Wiring power supply and measurement equipment and simultaneous wiring of multiple cables are also easy.
Door notch port : H100 × D50mm




### ❸ Wide-view door

An all-glass wide-view door provides an unrestricted view of every bit of space inside the chamber. Temperature differential with the outside of the chamber can be cont rolled to suppress the formation of condensation on the glass surface.

→P.30

**Effective view:**
Type 2 : W470 × H720 mm  Type 3 : W570 × H820 mm
Type 4 : W970 × H970 mm

### Wide-view door with hand-in ports

**(Japanese patent No.4137894)**

This option features hand-in ports on a wide-view door, to manipulate the specimen even during testing.

→P.30

### Wide-view door up to +150°C

on request

Expand temperature range up to +150°C. Hand-in ports and roller blind options are available.

# Easy Customization

Improved functionality and usability

## ❹ Sliding shelf

on request

This sliding shelf can be pulled out.
Even heavy items can be easily and safely installed in the test area.
Load capacity: 50 kg per shelf

* The load capacity is an example. The load capacity, number of shelves, and other elements can be customized to meet a variety of needs.

## ❺ Raised stand

on request

The height of the casters has been increased to 130 mm.
In order to make it easier to insert the forks (load-supporting projections) of a lifter, the caster height was changed to 130 mm.

## ❻ Paperless recorder

Records internal temperature and other temperature (and humidity). →P.37

## ❼ Specimen temperature control

A temperature sensor, which will be connected directly to specimen.
It enhances the accuracy of temperature tests. →P.36

## ❽ Power meter

Shows the chamber integral power consumption. →P.37

## ❾ 100V power sockets

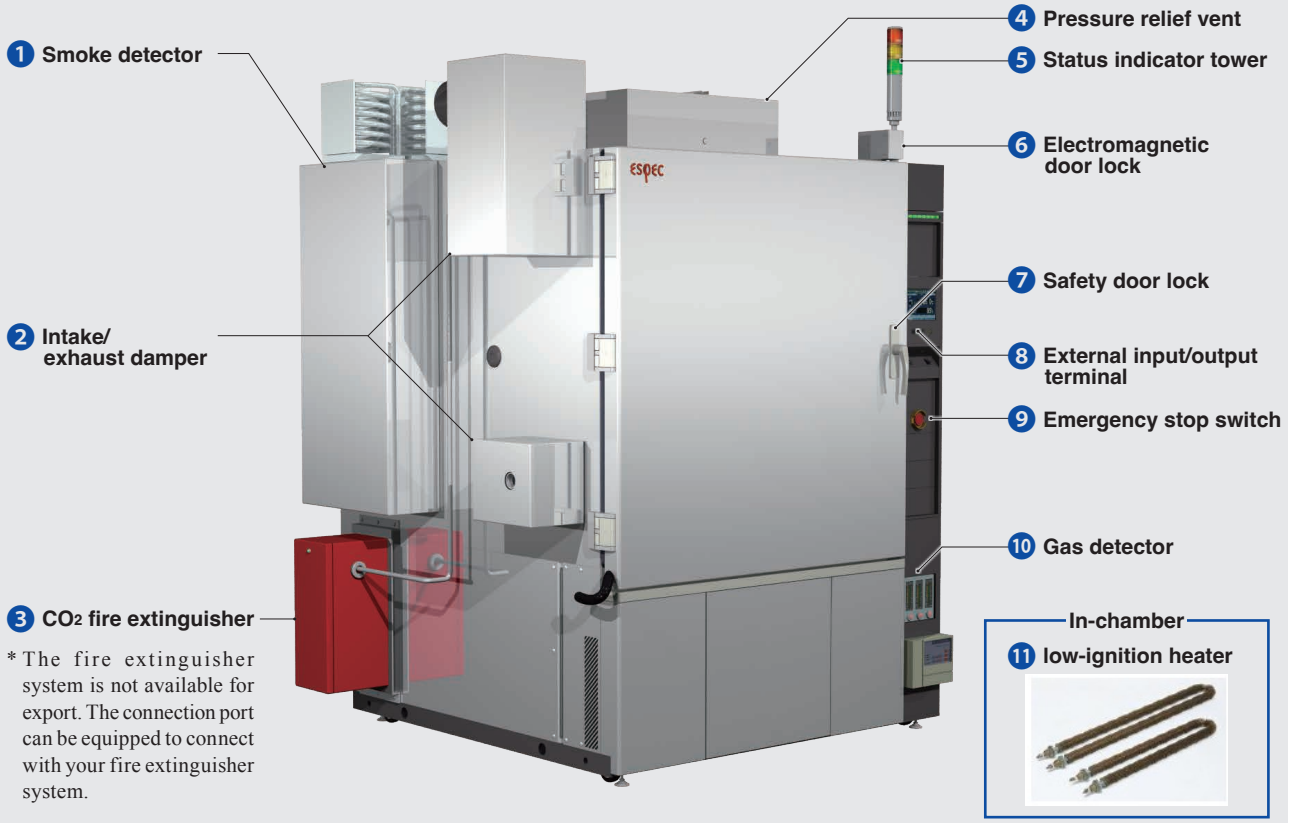
Two 100V power sockets can be used to supply power for specimen and/or measuring instruments.
One circuit protector is also equipped. →P.29

### Right-side hinge, left-side handle

The door opening direction can be changed from left to right to suit the installation location. Contact ESPEC for details.

# Safety-focused charge/discharge testing specifications that support operator safety

Secondary batteries are vital to modern life and are used in a wide variety of fields, with applications including smartphones, tablets, consumer electronics such as vacuum cleaners, and electric vehicles. Although they can store large amounts of electricity, secondary batteries pose fire and explosion hazards, making their safety an important concern. The following are some of the specifications that provide improved safety to protect operators from burns and injuries.




| | Safety device | Operation/description |
|---|---|---|
| 1 | Smoke detector | Detects smoke in the test area, causing the intake/exhaust damper and fire extinguisher to operate. |
| 2 | Intake/ exhaust damper | Ventilates the air in the test area during gas detector operation. |
| 3 | $CO_2$ fire extinguisher | Extinguishes fire with $CO_2$ gas when smoke or gas is detected. |
| 4 | Pressure relief vent | Releases pressure in the test area when the pressure increases due to an explosion or other cause. |
| 5 | Status indicator tower | Allows the status of the chamber to be checked remotely. |
| 6 | Electromagnetic door lock | Prevents the door from opening during operation and when the test area is at or above the temperature setting. |
| 7 | Safety door lock | Increases the strength of the door. |
| 8 | External input/output terminal | Allows operation to be stopped from a charge/discharge system. |
| 9 | Emergency stop switch | Allows the user to stop the chamber manually in an emergency. |
| 10 | Gas detector | Detects the gas concentration in the test area. |
| 11 | Low-ignition heater | Covers the heater in the test area with a protective tube, reducing the chance of ignition. |

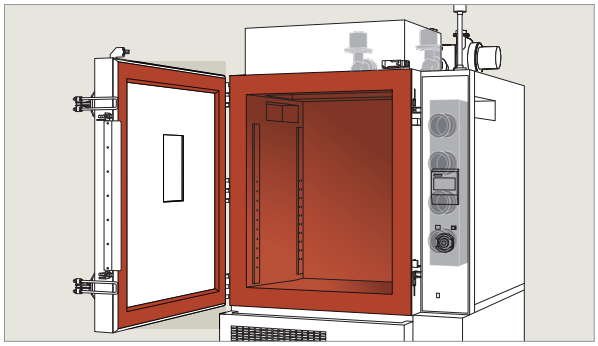
# Temperature Chamber for Charge-Discharge testing

**BTC Series**

* This is a different product from the Platinous J Series.

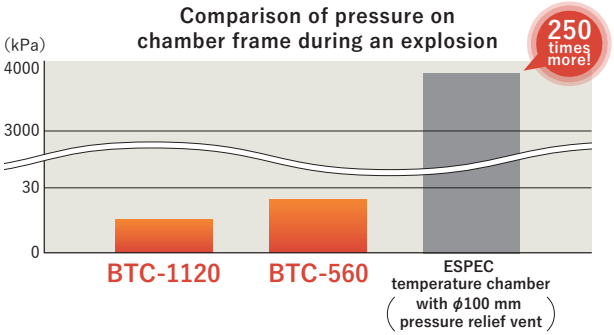
## Protects operators and laboratories from rechargeable battery explosions.

### User-friendly and designed to accommodate safety features whilst minimizing sharp edges and obstructions.



### Large pressure relief vent with high-pressure release capability

The large pressure relief vent enables pressure to be safely released through the top of the chamber in the event of an explosion, further increasing the safety of the chamber.
(Static operating pressure: 470 Pa)




* Calculated values for expected pressure on chamber frame in the event of a methane gas explosion


https://www.espec.co.jp/english/products/secondbattery/btc/

## EUCAR Hazard levels

EUCAR Hazard Levels are used to gauge the level of danger associated with handling batteries and the outcome of tests performed on the cells. Specifying the chamber to your required EUCAR level has been made easy.

| Level | Event of battery | Required functions |
|---|---|---|
| 1 | Activation of protective functions | Charge/discharge system linking (External input/output terminal) |
| 2 | Defect, damage | |
| 3 | Fluid leakage (Electrolyte weight loss: Less than 50%) | Gas/smoke detection, test area ventilation device |
| 4 | Significant fluid leakage (Electrolyte weight loss: 50% or more) | |
| 5 | Ignition, combustion | Heat detection, fire extinguisher operation, door lock, pressure relief, spatter prevention measures |
| 6 | Rupture, scattering of components | |
| 7 | Explosion | |

Reference: EUCAR (European Council for Automotive R&D) Hazard Levels

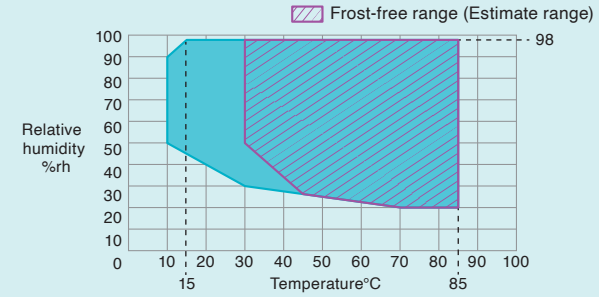
# NEW PL-ECO −40℃to +100℃(+150℃/+180℃)・20%rh to 98%rh

## Ultra-Energy-Efficient Low Temperature and Humidity Chamber

| Model | | PL–2J-ECO | PL–3J-ECO | PL–4J-ECO |
|---|---|---|---|---|
| System | | Balanced Temperature and Humidity Control system (BTHC system) | | |
| Performance*1 | Temp. & humidity range*2 | −40°C to +100°C [ +150°C/+180°C is optional ] /20%rh to 98%rh<br>Refer to diagram of temperature & humidity controllable range on this page. | | |
| | Temp. & humidity fluctuation | ±0.3°C/±2.5%rh | | |
| | Temperature variation in space | 1.5°C | | |
| | Temperature rate of change | Heat up rate: 3.0°C/min<br>Pull down rate: 2.0°C/min | | Heat up rate: 3.0°C/min<br>Pull down rate: 1.0°C/min |
| | Temperature extremes achievement time | Heat up time: from +20°C to +100°C 30 min. | | |
| | | Pull down time:<br>from +20°C to −40°C 45 min. | Pull down time:<br>from +20°C to −40°C 55 min. | Pull down time:<br>from +20°C to −40°C 115 min. |
| | Allowable heat load*3 | 1400 W | 1500 W | 1400 W |
| Allowable ambient conditions | | 0°C to +40°C/up to 75%rh | | |
| Construction | Exterior material | Stainless steel plate: 18 Cr stainless steel plate, hairline finish | | |
| | Test area material | Stainless steel plate: 18–8 Cr–Ni stainless steel plate, 2B polish | | |
| | Heater | Nichrome strip wire heater | | |
| | Humidifier | 18–12–2.5 Cr–Ni–Mo stainless steel sheathed heater (surface evaporating system) | | |
| | Cooler (dehumidifier) | Plate fin cooler, stainless steel tube cooler | | |
| | Air circulator | Cross flow fan | | Sirocco fan |
| | System | Mechanical type single-stage compression cooling | | |
| | Refrigerant Low GWP Refrigerant | R-449A | | |
| Capacity | | 225 L | 408 L | 800 L |
| Chamber total load resistance | | 100 kg | | |
| Dimensions*4 | Inside dimensions (W x H x D mm) | 500 x 750 x 600 | 600 x 850 x 800 | 1000 x 1000 x 800 |
| | Outside dimensions (W x H x D mm) | 910 x 1590 x 1073 | 1010 x 1690 x 1273 | 1410 x 1840 (1970) x 1273 |
| Weight | | 340 kg | 420 kg | 580 kg |
| **Augmented Reality**<br>Learn more ☞page 26 | | ▲Exterior view | ▲Exterior view | ▲Exterior view |

*1 The performance values are based on IEC60068-3-5:2001 and IEC60068-3-6:2001;
Performance figures are given for a +23°C ambient temperature, relative humidity of 65±20%rh, rated voltage, and no specimen inside the test area.
*2 Lowest attainable temperature in an ambient temperature of 0°C to +30°C
*3 When temperature in chamber is +20°C
*4 Excluding protrusions. Dimension indicated in ( ) includes protrusion.

### ● Temperature & Humidity Control Range




* With no specimen and under ambient temperature at +23°C.
* Restrictions on continuous humidity operation at +40°C or lower because of frost on the cooler.

**Standard**

**Low GWP Refrigerant**

LOW GWP REFRIGERANT

# NEW PU-ECO

## −40℃ to +100℃(+150℃／+180℃)

### Ultra-Energy-Efficient Low Temperature Chamber

| Model | | PU-2J-ECO | PU-3J-ECO | PU-4J-ECO |
|---|---|---|---|---|
| System | | Balanced Temperature Control system (BTC system) | | |
| Performance *1 | Temperature range *2 | −40°C to +100°C [ +150°C/+180°C is optional ] | | |
| | Temperature fluctuation | ±0.3°C | | |
| | Temperature variation in space | 1.5°C | | |
| | Temperature rate of change | Heat up rate: 3.0°C/min<br>Pull down rate: 2.0°C/min | | Heat up rate: 3.0°C/min<br>Pull down rate: 1.0°C/min |
| | Temperature extremes achievement time | Heat up time: from +20°C to +100°C 30 min. | | |
| | | Pull down time:<br>from +20°C to −40°C 45 min. | Pull down time:<br>from +20°C to −40°C 55 min. | Pull down time:<br>from +20°C to −40°C 115 min. |
| | Allowable heat load *3 | 1400 W | 1500 W | 1400 W |
| Allowable ambient conditions | | 0°C to +40°C/up to 75%rh | | |
| Construction | Exterior material | Stainless steel plate: 18 Cr stainless steel plate, hairline finish | | |
| | Test area material | Stainless steel plate: 18−8 Cr−Ni stainless steel plate, 2B polish | | |
| | Heater | Nichrome strip wire heater | | |
| | Cooler (dehumidifier) | Plate fin cooler, stainless steel tube cooler | | |
| | Air circulator | Cross flow fan | | Sirocco fan |
| | System | Mechanical type single-stage compression cooling | | |
| | Refrigerant Low GWP Refrigerant | R-449A | | |
| Capacity | | 225 L | 408 L | 800 L |
| Chamber total load resistance | | 100 kg | | |
| Dimensions *4 | Inside dimensions (W x H x D mm) | 500 x 750 x 600 | 600 x 850 x 800 | 1000 x 1000 x 800 |
| | Outside dimensions (W x H x D mm) | 910 x 1590 x 1073 | 1010 x 1690 x 1273 | 1410 x 1840 (1970) x 1273 |
| Weight | | 330 kg | 410 kg | 570 kg |
| **Augmented Reality**<br>As representation, the products displayed in AR are temperature and humidity types.<br>Learn more (☞page 26) | | ▲Exterior view | ▲Exterior view | ▲Exterior view |

*1 The performance values are based on IEC60068-3-5:2001 under the conditions of a +23°C ambient temperature, relative humidity of 65±20%rh, rated voltage, and no specimen inside the test area.
*2 Lowest attainable temperature in an ambient temperature of 0°C to +30°C
*3 When temperature in chamber is +20°C
*4 Excluding protrusions. Dimension indicated in ( ) includes protrusion.

**Standard**

**Low GWP Refrigerant**

LOW GWP REFRIGERANT

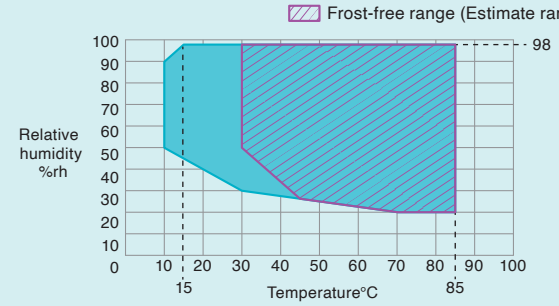
# PR

## −20℃ to +100℃ (+150℃／+180℃) • 20%rh to 98%rh
## TEMPERATURE & HUMIDITY CHAMBER

| Model | | PR–1J | PR–2J | PR–3J | PR–4J |
|---|---|---|---|---|---|
| System | | Balanced Temperature and Humidity Control system (BTHC system) | | | |
| Performance*1 | Temp. & humidity range*2 | −20°C to +100°C [ +150°C/+180°C is optional ] /20%rh to 98%rh *2<br>Refer to diagram of temperature & humidity controllable range on this page. | | | |
| | Temp. & humidity fluctuation | ±0.3°C/±2.5%rh | | | |
| | Temperature variation in space | 1.5°C | | | |
| | Temperature rate of change | Heat up rate: 3.0°C/min<br>Pull down rate: 2.0°C/min | | | Heat up rate: 3.0°C/min<br>Pull down rate: 1.0°C/min |
| | Temperature extremes achievement time | Heat up time: from +20°C to +100°C 30 min.<br>Pull down time: from +20°C to −20°C 40 min. | | | |
| | Allowable heat load*3 | 800 W | | 1100 W | 1250 W |
| Allowable ambient conditions | | 0°C to +40°C/up to 75%rh | | | |
| Construction | Exterior material | Stainless steel plate: 18 Cr stainless steel plate, hairline finish | | | |
| | Test area material | Stainless steel plate: 18–8 Cr–Ni stainless steel plate, 2B polish | | | |
| | Heater | Nichrome strip wire heater | | | |
| | Humidifier | 18-12–2.5 Cr–Ni–Mo stainless steel sheathed heater (surface evaporating system) | | | |
| | Cooler (dehumidifier) | Plate fin cooler | | | |
| | Air circulator | Cross flow fan | | | Sirocco fan |
| | System | Mechanical single-stage refrigeration system | | | |
| | Refrigerant **Low GWP Refrigerant** | R-404A〔R-449A is available on request〕 | | | |
| Capacity | | 120 L | 225 L | 408 L | 800 L |
| Chamber total load resistance | | 100 kg | | | |
| Dimensions*4 | Inside dimensions (W x H x D mm) | 500 x 600 x 400 | 500 x 750 x 600 | 600 x 850 x 800 | 1000 x 1000 x 800 |
| | Outside dimensions (W x H x D mm) | 910 x 1440 x 873 | 910 x 1590 x 1073 | 1010 x 1690 x 1273 | 1410 x 1840 (1970) x 1273 |
| Weight | | 260 kg | 305 kg | 365 kg | 480 kg |
| **Augmented Reality**<br>Learn more ☞page 26 | | ▲Exterior view | ▲Exterior view | ▲Exterior view | ▲Exterior view |

*1 The performance values are based on IEC60068-3-5:2001 and IEC60068-3-6:2001;
Performance figures are given for a +23°C ambient temperature, relative humidity of 65±20%rh, rated voltage, and no specimen inside the test area.
*2 Lowest attainable temperature in an ambient temperature of 0°C to +30°C
*3 When temperature in chamber is +20°C
*4 Excluding protrusions. Dimension indicated in ( ) includes protrusion.

### ● Temperature & Humidity Control Range




* With no specimen and under ambient temperature at +23°C.
* Restrictions on continuous humidity operation at +40°C or lower because of frost on the cooler.

**Low GWP Refrigerant**

LOW GWP REFRIGERANT

R-449A is available on request.

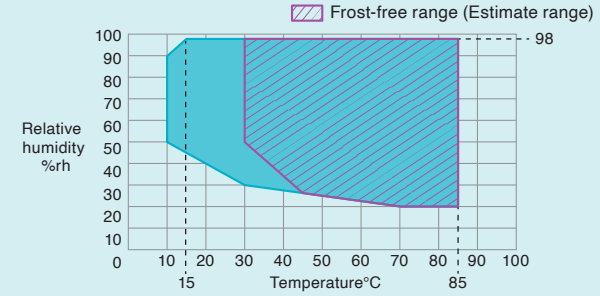
# PL −40℃to +100℃(+150℃／+180℃) • 20%rh to 98%rh

## LOW TEMPERATURE & HUMIDITY CHAMBER

| Model | | PL–1J | PL–2J | PL–3J | PL–4J |
|---|---|---|---|---|---|
| System | | Balanced Temperature and Humidity Control system (BTHC system) | | | |
| Performance*1 | Temp. & humidity range*2 | −40°C to +100°C [ +150°C/+180°C is optional ] /20%rh to 98%rh<br>Refer to diagram of temperature & humidity controllable range on this page. | | | |
| | Temp. & humidity fluctuation | ±0.3°C/±2.5%rh | | | |
| | Temperature variation in space | 1.5°C | | | |
| | Temperature rate of change | Heat up rate: 3.0°C/min<br>Pull down rate: 2.0°C/min | | | |
| | Temperature extremes achievement time | Heat up time: from +20°C to +100°C 30 min.<br>Pull down time: from +20°C to −40°C 45 min. | | | |
| | Allowable heat load*3 | 850 W | 1400 W | 1500 W | 2850 W |
| Allowable ambient conditions | | 0°C to +40°C/up to 75%rh | | | |
| Construction | Exterior material | Stainless steel plate: 18 Cr stainless steel plate, hairline finish | | | |
| | Test area material | Stainless steel plate: 18–8 Cr–Ni stainless steel plate, 2B polish | | | |
| | Heater | Nichrome strip wire heater | | | |
| | Humidifier | 18–12–2.5 Cr–Ni–Mo stainless steel sheathed heater (surface evaporating system) | | | |
| | Cooler (dehumidifier) | Plate fin cooler | Plate fin cooler, stainless steel tube cooler | | |
| | Air circulator | Cross flow fan | | | Sirocco fan |
| | System | Mechanical type single-stage compression cooling | | | |
| | Refrigerant Low GWP Refrigerant | R-404A〔R-449A is available on request〕 | | | |
| Capacity | | 120 L | 225 L | 408 L | 800 L |
| Chamber total load resistance | | 100 kg | | | |
| Dimensions*4 | Inside dimensions (W x H x D mm) | 500 x 600 x 400 | 500 x 750 x 600 | 600 x 850 x 800 | 1000 x 1000 x 800 |
| | Outside dimensions (W x H x D mm) | 910 x 1440 x 873 | 910 x 1590 x 1073 | 1010 x 1690 x 1273 | 1410 x 1840 (1970) x 1273 |
| Weight | | 270 kg | 340 kg | 420 kg | 610 kg |
| **Augmented Reality**<br>Learn more page 26 | | ▲Exterior view | ▲Exterior view | ▲Exterior view | ▲Exterior view |

*1 The performance values are based on IEC60068-3-5:2001 and IEC60068-3-6:2001;
Performance figures are given for a +23°C ambient temperature, relative humidity of 65±20%rh, rated voltage, and no specimen inside the test area.
*2 Lowest attainable temperature in an ambient temperature of 0°C to +30°C
*3 When temperature in chamber is +20°C
*4 Excluding protrusions. Dimension indicated in ( ) includes protrusion.

### Temperature & Humidity Control Range




* With no specimen and under ambient temperature at +23°C.
* Restrictions on continuous humidity operation at +40°C or lower because of frost on the cooler.

**Low GWP Refrigerant**

LOW GWP REFRIGERANT

R-449A is available on request.

# PSL

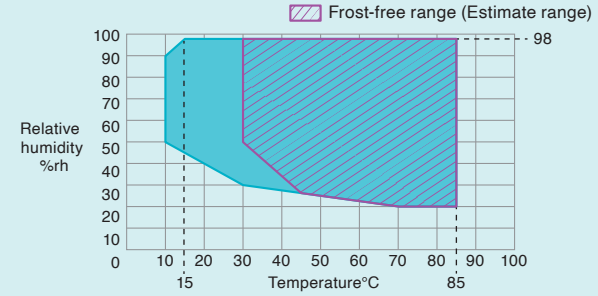
## −70℃ to +100℃ (+150℃／+180℃) • 20%rh to 98%rh

## ULTRA LOW TEMPERATURE & HUMIDITY CHAMBER

| Model | | PSL-2J | PSL-4J |
|---|---|---|---|
| System | | Balanced Temperature and Humidity Control system (BTHC system) | |
| Performance*1 | Temp. & humidity range*2 | −70°C to +100°C [ +150°C/+180°C is optional ] /20%rh to 98%rh | −70°C to +100°C [ +150°C is optional ] /20%rh to 98%rh |
| | | Refer to diagram of temperature & humidity controllable range on this page. | |
| | Temp. & humidity fluctuation | ±0.3°C/±2.5%rh | |
| | Temperature variation in space | 1.5°C | |
| | Temperature rate of change | Heat up rate: 5.0°C/min<br>Pull down rate: 2.0°C/min | Heat up rate: 5.0°C/min<br>Pull down rate: 1.0°C/min |
| | Temperature extremes achievement time | Heat up time: from +20°C to +100°C 30 min.<br>Pull down time: from +20°C to −70°C 65 min. | |
| | Allowable heat load*3 | 700 W | 2200 W |
| Allowable ambient conditions | | 0°C to +40°C/up to 75%rh | |
| Construction | Exterior material | Stainless steel plate: 18 Cr stainless steel plate, hairline finish | |
| | Test area material | Stainless steel plate: 18–8 Cr–Ni stainless steel plate, 2B polish | |
| | Heater | Nichrome strip wire heater | |
| | Humidifier | 18–12–2.5 Cr–Ni–Mo stainless steel sheathed heater (surface evaporating system) | |
| | Cooler (dehumidifier) | Plate fin cooler (Doubles as dehumidifier), stainless steel tube cooler | |
| | Air circulator | Cross flow fan | Sirocco fan |
| | System | Mechanical cascade refrigerator system | |
| | Refrigerant Low GWP Refrigerant | R-404A〔R-449A is available on request〕, R-508A | |
| Capacity | | 306 L | 800 L |
| Chamber total load resistance | | 100 kg | |
| Dimensions*4 | Inside dimensions (W x H x D mm) | 600 x 850 x 600 | 1000 x 1000 x 800 |
| | Outside dimensions (W x H x D mm) | 1010 x 1690 x 1273 | 1410 x 1853 (1983) x 1593 |
| Weight | | 470 kg | 705 kg |
| **Augmented Reality**<br>Learn more ☞page 26 | | ▲Exterior view | ▲Exterior view |

*1 The performance values are based on IEC60068-3-5:2001 and IEC60068-3-6:2001;
Performance figures are given for a +23°C ambient temperature, relative humidity of 65±20%rh, rated voltage, and no specimen inside the test area.
*2 Lowest attainable temperature in an ambient temperature of 0°C to +30°C
*3 When temperature in chamber is +20°C
*4 Excluding protrusions. Dimension indicated in ( ) includes protrusion.

### ● Temperature & Humidity Control Range




* With no specimen and under ambient temperature at +23°C.
* Restrictions on continuous humidity operation at +40°C or lower because of frost on the cooler.

**Low GWP Refrigerant**

LOW GWP REFRIGERANT

R-449A is available on request.

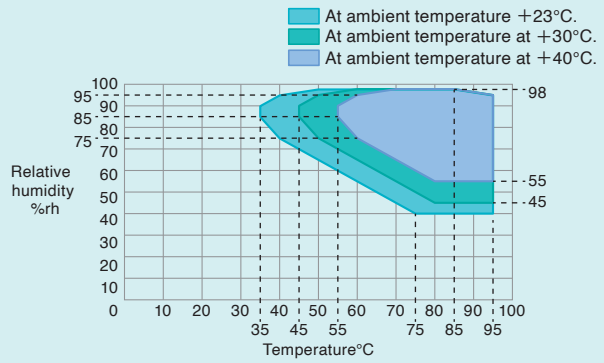
# PHP Ambient temperature +10℃ to +100℃ • 40%rh to 98%rh

## HIGH TEMPERATURE & HUMIDITY CHAMBER

| Model | | PHP–2J | PHP–3J | PHP–4J |
|---|---|---|---|---|
| System | | Balanced Temperature and Humidity Control system (BTHC system) | | |
| Performance*1 | Temp. & humidity range | Ambient temperature +10°C to +100°C/40%rh to 98%rh<br>Refer to diagram of temperature & humidity controllable range on this page. | | |
| | Temp. & humidity fluctuation | ±0.3°C/±2.5%rh | | |
| | Temperature variation in space | 1.5°C | | |
| | Allowable heat load*2 | 300 W | | 600 W |
| Allowable ambient conditions | | 0°C to +40°C/up to 75%rh | | |
| Construction | Exterior material | Stainless steel plate: 18 Cr stainless steel plate, hairline finish | | |
| | Test area material | Stainless steel plate: 18–8 Cr–Ni stainless steel plate, 2B polish | | |
| | Heater | Nichrome strip wire heater | | |
| | Humidifier | 18-12–2.5 Cr–Ni–Mo stainless steel sheathed heater (surface evaporating system) | | |
| | Cooler (dehumidifier) | Plate fin cooler (heat pipe system) | | |
| | Air circulator | Cross flow fan | | Sirocco fan |
| Capacity | | 219 L | 398 L | 784 L |
| Chamber total load resistance | | 100 kg | | |
| Dimensions*3 | Inside dimensions (W x H x D mm) | 500 x 730 x 600 | 600 x 830 x 800 | 1000 x 980 x 800 |
| | Outside dimensions (W x H x D mm) | 910 x 1590 x 1073 | 1010 x 1690 x 1273 | 1410 x 1840 (1970) x 1273 |
| Weight | | 275 kg | 335 kg | 490 kg |
| **Augmented Reality**<br>Learn more (☞page 26) | | ▲Exterior view | ▲Exterior view | ▲Exterior view |

*1 The performance values are based on IEC60068-3-5:2001 and IEC60068-3-6:2001;
Performance figures are given for a +23°C ambient temperature, relative humidity of 65±20%rh, rated voltage, and no specimen inside the test area.
*2 When temperature and humidity in chamber is +85°C and 85%rh
*3 Excluding protrusions. Dimension indicated in ( ) includes protrusion.

### Temperature & Humidity Control Range




* With no specimen.

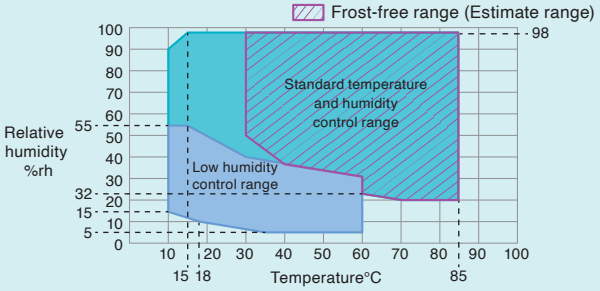
# PDR·PDL 5%rh to 98%rh·−20℃ to +100℃／−40℃ to +100℃

## LOW HUMIDITY TYPE (LOW) TEMPERATURE & HUMIDITY CHAMBER

| Model | | | PDR–3J | PDR–4J | PDL–3J | PDL–4J |
|---|---|---|---|---|---|---|
| System | | | Balanced Temperature and Humidity Control system (BTHC system) | | | |
| Performance*1 | Temp. & humidity range *2 | | −20°C to +100°C/5%rh to 98%rh | | −40°C to +100°C/5%rh to 98%rh | |
| | | | Refer to diagram of temperature & humidity controllable range on this page. | | | |
| | Temp. & humidity fluctuation | | ±0.3°C/±2.5%rh | | | |
| | Temperature variation in space | | 1.5°C | | | |
| | Temperature rate of change | | Heat up rate: 3.0°C/min<br>Pull down rate: 2.0°C/min | Heat up rate: 3.0°C/min<br>Pull down rate: 1.0°C/min | Heat up rate: 3.0°C/min<br>Pull down rate: 2.0°C/min | |
| | Temperature extremes achievement time | | Heat up time: from +20°C to +100°C 30 min.<br>Pull down time: from +20°C to −20°C 40 min. | | Heat up time: from +20°C to +100°C 30 min.<br>Pull down time: from +20°C to −40°C 50 min. | |
| | Allowable heat load *3 | | 1100 W | 1250 W | 1500 W | 2850 W |
| Allowable ambient conditions | | | Standard temperature and humidity region running: 0°C to +40°C/up to 75%rh<br>Low temperature and humidity region running: +5°C to +32°C<br>Absolute humidity no greater than 23g/kg | | | |
| Construction | Exterior material | | Stainless steel plate: 18 Cr stainless steel plate, hairline finish | | | |
| | Test area material | | Stainless steel plate: 18–8 Cr–Ni stainless steel plate, 2B polish | | | |
| | Heater | | Nichrome strip wire heater | | | |
| | Humidifier | | 18-12–2.5 Cr–Ni–Mo stainless steel sheathed heater (surface evaporating system) | | | |
| | Cooler | | Plate fin cooler (Doubles as dehumidifier) | | Plate fin cooler (Doubles as dehumidifier), stainless steel tube cooler | |
| | Air circulator | | Sirocco fan | | | |
| | System | | Mechanical type single-stage compression cooling | | | |
| | Refrigerant | | R-404A | | | |
| | Dehu-midifier | System | Rotary recovery (adsorption) dehumidification | | | |
| | | Refrigerator | Rotary compressor (R-404A), Reciprocating compressor (R-404A) | | | |
| Capacity | | | 408 L | 800 L | 408 L | 800 L |
| Chamber total load resistance | | | 100 kg | | | |
| Dimensions *4 | Inside dimensions (W x H x D mm) | | 600 x 850 x 800 | 1000 x 1000 x 800 | 600 x 850 x 800 | 1000 x 1000 x 800 |
| | Outside dimensions (W x H x D mm) | | 1885 x 1690 (1820) x 1273 | 2285 x 1840(1970) x 1273 | 1885 x 1690 (1820) x 1273 | 2285 x 1840 (1970) x 1273 |
| Weight *5 | | | 680 kg | 800 kg | 735 kg | 930 kg |
| **Augmented Reality**<br>Learn more ☞page 26 | | | ▲Exterior view | ▲Exterior view | ▲Exterior view | ▲Exterior view |

*1 The performance values are based on IEC60068-3-5:2001 and IEC60068-3-6:2001; Performance figures are given for a +23°C ambient temperature, relative humidity of 65±20%rh, rated voltage, and no specimen inside the test area.
*2 Lowest attainable temperature in an ambient temperature of 0°C to +30°C
*3 When temperature in chamber is +20°C
*4 Excluding protrusions. Dimension indicated in ( ) includes protrusion.
*5 Total weight (temperature & humidity chamber and dehumidifier)

### Temperature & Humidity Control Range




* With no specimen and under ambient temperature at +23°C.
* Restrictions on continuous humidity operation at +40°C or lower because of frost on the cooler.

Low Humidity Region Operation Precautions

- Operation in the low humidity region is not possible from a high temperature above +60°C. Perform transition from temperatures below +60°C.
- Gradient programs cannot be used in the low humidity region.
- Programs that require humidifier switching cannot be used.
- Programs that transition from outside the low humidity region to the low humidity region cannot be used. However, transitioning from the low humidity region to another region is allowed.

# PCR

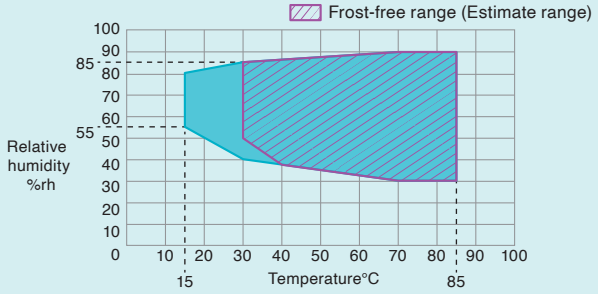
## −20℃ to +100℃ • 30%rh to 90%rh

## CLEAN TEMPERATURE & HUMIDITY CHAMBER

| Model | | PCR–3J |
|---|---|---|
| System | | Balanced Temperature and Humidity Control system (BTHC system) |
| Performance*1 | Temp. & humidity range *2 | –20°C to +100°C/30%rh to 90%rh<br>Refer to diagram of temperature & humidity controllable range on this page. |
| | Temp. & humidity fluctuation | ±0.5°C/±2.5%rh |
| | Temperature variation in space | 5.0°C |
| | Temperature rate of change | Heat up rate: 1.5°C/min<br>Pull down rate: 1.0°C/min |
| | Temperature extremes achievement time | Heat up time: from +20°C to +100°C 55 min.<br>Pull down time: from +20°C to −20°C 45 min. |
| | Cleanliness *3 | Class5 (Particle diameter: 0.5μm) |
| Allowable ambient conditions | | +5°C to +35°C/up to 75%rh |
| Construction | Exterior material | Stainless steel plate: 18 Cr stainless steel plate, hairline finish |
| | Test area material | Stainless steel plate: 18–8 Cr–Ni stainless steel plate, 2B polish |
| | Heater | Nichrome strip wire heater |
| | Humidifier | 18-12–2.5 Cr–Ni–Mo stainless steel sheathed heater (surface evaporating system) |
| | Cooler (dehumidifier) | Plate fin cooler (Doubles as dehumidifier) |
| | Air circulator | Sirocco fan |
| | System | Mechanical type single-stage compression cooling |
| | Refrigerant Low GWP Refrigerant | R-404A〔R-449A is available on request〕 |
| Required exhaust equipment | | Exhaust flow rate: 16m³ / min. (50Hz);18m³/min. (60Hz); Chamber connection port: ø123mm |
| Capacity | | 312 L |
| Chamber total load resistance | | 100 kg |
| Dimensions *4 | Inside dimensions (W x H x D mm) | 600 x 650 x 800 |
| | Outside dimensions (W x H x D mm) | 1010 x 1880 x 1273 |
| Weight | | 445 kg |
| **Augmented Reality**<br>Learn more (☞page 26 | | ▲Exterior view |

*1 The performance values are based on IEC60068-3-5:2001 and IEC60068-3-6:2001; Performance figures are given for a +23°C ambient temperature, relative humidity of 65±20%rh, rated voltage, and no specimen inside the test area.
*2 Lowest attainable temperature in an ambient temperature of 0°C to +30°C
*3 When temperature is stable, the cleanliness is according to JIS B9920:2002 (equivalent to FED-STD-209D Class 100).
The Class 5 cleanliness cannot be maintained when the door is open.
Do not open the door when operating at temperatures below 0°C
*4 Excluding protrusions.

### ● Temperature & Humidity Control Range




* With no specimen and under ambient temperature at +23°C.
* Restrictions on continuous humidity operation at +40°C or lower because of frost on the cooler.

**Low GWP Refrigerant**

LOW GWP REFRIGERANT

R-449A is available on request.

# PU

## −40℃ to +100℃(+150℃／+180℃)
## LOW TEMPERATURE CHAMBER

| Model | | PU-1J | PU-2J | PU-3J | PU-4J |
|---|---|---|---|---|---|
| System | | Balanced Temperature Control system (BTC system) | | | |
| Performance *1 | Temperature range *2 | −40°C to +100°C [ +150°C/+180°C is optional ] | | | |
| | Temperature fluctuation | ±0.3°C | | | |
| | Temperature variation in space | 1.5°C | | | |
| | Temperature rate of change | Heat up rate: 3.0°C/min<br>Pull down rate: 2.0°C/min | | | |
| | Temperature extremes achievement time | Heat up time: from +20°C to +100°C 30 min.<br>Pull down time: from +20°C to −40°C 45 min. | | | |
| | Allowable heat load *3 | 850 W | 1400 W | 1500 W | 2850 W |
| Allowable ambient conditions | | 0°C to +40°C/up to 75%rh | | | |
| Construction | Exterior material | Stainless steel plate: 18 Cr stainless steel plate, hairline finish | | | |
| | Test area material | Stainless steel plate: 18−8 Cr−Ni stainless steel plate, 2B polish | | | |
| | Heater | Nichrome strip wire heater | | | |
| | Cooler (dehumidifier) | Plate fin cooler | Plate fin cooler, stainless steel tube cooler | | |
| | Air circulator | Cross flow fan | | | Sirocco fan |
| | System | Mechanical type single-stage compression cooling | | | |
| | Refrigerant Low GWP Refrigerant | R-404A〔R-449A is available on request〕 | | | |
| Capacity | | 120 L | 225 L | 408 L | 800 L |
| Chamber total load resistance | | 100 kg | | | |
| Dimensions *4 | Inside dimensions (W x H x D mm) | 500 x 600 x 400 | 500 x 750 x 600 | 600 x 850 x 800 | 1000 x 1000 x 800 |
| | Outside dimensions (W x H x D mm) | 910 x 1440 x 873 | 910 x 1590 x 1073 | 1010 x 1690 x 1273 | 1410 x 1840 (1970) x 1273 |
| Weight | | 260 kg | 330 kg | 410 kg | 600 kg |
| **Augmented Reality**<br>As representation, the products displayed in AR are temperature and humidity types.<br>Learn more ☞page 26 | | ▲Exterior view | ▲Exterior view | ▲Exterior view | ▲Exterior view |

*1 The performance values are based on IEC60068-3-5:2001 under the conditions of a +23°C ambient temperature, relative humidity of 65±20%rh, rated voltage, and no specimen inside the test area.
*2 Lowest attainable temperature in an ambient temperature of 0°C to +30°C
*3 When temperature in chamber is +20°C
*4 Excluding protrusions. Dimension indicated in ( ) includes protrusion.

**Low GWP Refrigerant**

LOW GWP REFRIGERANT

R-449A is available on request.

# PG

## −70℃ to +100℃(+150℃／+180℃)
## ULTRA LOW TEMPERATURE CHAMBER

| Model | | PG−2J | PG−4J |
|---|---|---|---|
| System | | Balanced Temperature Control system (BTC system) | |
| Performance *1 | Temperature range *2 | −70°C to +100°C [ +150°C/+180°C is optional ] | −70°C to +100°C [ +150°C is optional ] |
| | Temperature fluctuation | ±0.3°C | |
| | Temperature variation in space | 1.5°C | |
| | Temperature rate of change | Heat up rate: 5.0°C/min<br>Pull down rate: 2.0°C/min | Heat up rate: 5.0°C/min<br>Pull down rate: 1.0°C/min |
| | Temperature extremes achievement time | Heat up time: from +20°C to +100°C 30 min.<br>Pull down time: from +20°C to −70°C 65 min. | |
| | Allowable heat load *3 | 700 W | 2200 W |
| Allowable ambient conditions | | 0°C to +40°C/up to 75%rh | |
| Construction | Exterior material | Stainless steel plate: 18 Cr stainless steel plate, hairline finish | |
| | Test area material | Stainless steel plate: 18−8 Cr−Ni stainless steel plate, 2B polish | |
| | Heater | Nichrome strip wire heater | |
| | Cooler (dehumidifier) | Plate fin cooler, stainless steel tube cooler | |
| | Air circulator | Cross flow fan | Sirocco fan |
| | System | Mechanical cascade refrigerator system | |
| | Refrigerant Low GWP Refrigerant | R-404A〔R-449A is available on request〕, R-508A | |
| Capacity | | 306 L | 800 L |
| Chamber total load resistance | | 100 kg | |
| Dimensions *4 | Inside dimensions (W x H x D mm) | 600 x 850 x 600 | 1000 x 1000 x 800 |
| | Outside dimensions (W x H x D mm) | 1010 x 1690 x 1273 | 1410 x 1853 (1983) x 1593 |
| Weight | | 460 kg | 695 kg |
| **Augmented Reality**<br>As representation, the products displayed in AR are temperature and humidity types.<br>Learn more ☞page 26 | | ▲Exterior view | ▲Exterior view |

*1 The performance values are based on IEC60068-3-5:2001 under the conditions of a +23°C ambient temperature, relative humidity of 65±20%rh, rated voltage, and no specimen inside the test area.
*2 Lowest attainable temperature in an ambient temperature of 0°C to +30°C
*3 When temperature in chamber is +20°C
*4 Excluding protrusions. Dimension indicated in ( ) includes protrusion.

**Low GWP Refrigerant**

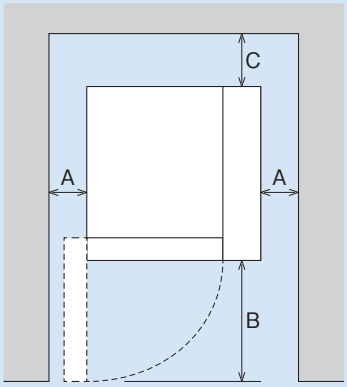
LOW GWP REFRIGERANT

R-449A is available on request.

# INSTALLATION REQUIREMENTS

| Model | PR | | | | PL | | | | PSL | | PHP | | | PDR | | PDL | | PCR | PU | | | | PG | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 2 | 4 | 2 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 1 | 2 | 3 | 4 | 2 | 4 |
| Switch fuse capacity (A) | 200V AC 3ø 50/60 Hz , 220V AC 3ø 60 Hz * | | | | | | | | | | | | | | | | | | | | | | | |
| | 20 | 20 | 30 | 40 | 30 | 30 | 30 | 50 | 40 | 60 | 20 | 30 | 40 | 40 | 50 | 40 | 50 | 30 | 20 | 30 | 30 | 40 | 30 | 60 |
| | | | | | ECO | 30 | 30 | 50 | | | | | | | | | | | ECO | 20 | 20 | 40 | | |
| | 380V AC 3ø 50 Hz * , 400V AC 3ø 50 Hz * | | | | | | | | | | | | | | | | | | | | | | | |
| | 10 | 15 | 15 | 20 | 15 | 15 | 15 | 30 | 20 | 30 | 20 | 30 | 40 | 40 | 50 | 20 | 30 | 15 | 15 | 15 | 15 | 15 | 20 | 30 |
| | | | | | ECO | 15 | 15 | 30 | | | | | | | | | | | ECO | 15 | 15 | 15 | | |
| Humidifier water supply | Use pure water with a conductivity of 0.1 to 10 μS/cm supplied from the tank. | | | | | | | | | | | | | | | | | | —— | | | | | |
| Drainage | Drain ports are positioned at the bottom of the rear panel (150 mm above the floor).<br>Prepare 1 drain hose for temperature and humidity use and 1 drain hose for continuous water supply use (option).<br>Hose outer diameter: 18 mm, inner diameter: 12 mm<br>Length: approximately 1 m | | | | | | | | | | | | | | | | | | | | | | | |

Installation space




| Model | PR、PL、PU、ECO Type | | | | PSL、PG | | PHP | | | PDR、PDL | | PCR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Type 1 | Type 2 | Type 3 | Type 4 | Type 2 | Type 4 | Type 2 | Type 3 | Type 4 | Type 3 | Type 4 | Type 3 |
| Side: A | Space to manipulate the cable port and adjuster feet, to connect the power supply and the water supply and drain pipes, and to perform maintenance is required. (We recommend 30 cm or more.) | | | | | | | | | | | |
| Front: B (cm) | 70 | | 80 | 120 | 80 | 120 | 70 | 80 | 120 | 80 | 120 | 80 |
| Rear: C | Space to pass the water drain hose through and to perform maintenance in is required. (We recommend 60 cm or more.) | | | | | | | | | | | |
| Top | 60 cm or more | | | | | | | | | | | |

* Compliance with CE marking except PL/PU-ECO
* The chamber does not come with a power cable.

## Installation Simulation Tool (AR [Augmented Reality])

Read the 2D code with a smartphone or tablet camera to start the web browser.*1

View the intended installation location (a floor) through the camera to check the installation image in the web browser.*2

Real-world information　　Digital information

**Model / View with door open*3**

| | |
|---|---|
| **PR-1J**<br>**PL-1J**<br>**PU-1J*4** | **PSL-4J**<br>**PG-4J*4** |
| **PR-2J**　**PL-2J-ECO**<br>**PL-2J**　**PU-2J-ECO*4**<br>**PHP-2J**<br>**PU-2J*4** | **PDR-3J**<br>**PDL-3J** |
| **PR-3J**　**PL-3J-ECO**<br>**PL-3J**　**PU-3J-ECO*4**<br>**PHP-3J**<br>**PU-3J*4** | **PDR-4J**<br>**PDL-4J** |
| **PR-4J**　**PL-4J-ECO**<br>**PL-4J**　**PU-4J-ECO*4**<br>**PHP-4J**<br>**PU-4J*4** | **PCR-3J** |
| **PSL-2J**<br>**PG-2J*4** | |

*1 This service is designed specifically for use on smartphones. It will also work on some tablets. Operation has been confirmed in the Safari and Google Chrome browsers.Use the camera function of your smartphone or tablet to read the 2D codes.

**Recommended environment**

- OS: iOS 14 or higher, Android 9.0 or higher
- Browser: Safari (latest version), Google Chrome (latest version)
- Even if you meet the above conditions, this service may not operate normally on your terminal.
- Not all Android terminals support AR. For details on terminals that support AR, access the following URL.
  https://developers.google.com/ar/devices?hl=en

Check available devices

*2 Precautions

- These contents can be used free of charge, but you will be charged communication fees to access them.
- Possible causes for the contents not being displayed properly include the camera capturing a location with no flat surfaces, objects being present on the flat surfaces, and insufficient brightness in the location.
- This service may not operate properly due to the communication environment.
- Before using AR to capture images, thoroughly check the surrounding area to make sure it is safe.

*3 Initially, models are displayed with roughly their actual sizes. Stretch and pinch to change the dimensions of displayed models.
Use this service only as a reference. It does not provide any guarantees for actual installation of chambers.

*4 The products displayed in AR are temperature and humidity types, which are equipped with a temperature & humidity controller and water tank.
These types are displayed as a representative image. Actual temperature types (PU and PG) are equipped with a temperature controller but are not equipped with a water tank.

## FITTINGS

- Drain hose (approx. 1 m) ····· 1
- Condenser filter ····· 1
- Cable port (I.D. ø50 mm on the left-side) ····· 1
- Chamber lamp (bulb-type fluorescent light) ····· 1
- Casters (free rolling type with leveling feet)····· 4
- Time signal terminal····· 2 contacts
- Specimen power supply control terminal····· 1
- Ethernet port (LAN port) ····· 1
- USB memory port ····· 1
- Viewing window ····· 1

  Type 1 to 3 W180 × H260 mm

  Type 4 W295 × H380 mm
- Clean meter (PCR only)
- Duct meter (PCR only)

## ACCESSORIES

- Glass fuse (7A)
- Cable port rubber plug (ø50 mm) ····· 1
- Door key····· 2
- Breaker handle stopper ····· 1
- Energy saving slit cover (PHP) ····· 1
- Fine wicks (except PU/PG) ····· 1 (24 wicks)
- Cloth wicks (PDR/PDL)····· 1 (20 wicks)
- Connection duct (PDR/PDL)····· 2
- Hose band (PDR/PDL)····· 1
- Operation Manual (CD)····· 1 set
- Warranty card ····· 1

* Shelves, shelf brackets, and power cables are not included.

# Network

## Chambers can be operated from PCs and Tablet Terminals

### Remote Monitoring and Control (Ethernet Connection)

The chambers are equipped with unique web applications that enable chamber status to be confirmed and operated from a web browser screen (PC or tablet terminal). It is also possible to start operations with a PC or other device from a remote location.

### Editing Test Profiles with software

The test program patterns stored in the chamber can be edited with PC application software "Pattern Manager Lite" which can be downloaded from Test Navi. Furthermore the various international test standard program patterns can be downloaded from Test Navi and these test patterns can be modified by "Pattern Manager Lite", too.

### Displaying Data in Graphs

Settings and measurement values saved in the testing chamber can be displayed as graphs with PC application software "Pattern Manager Lite".

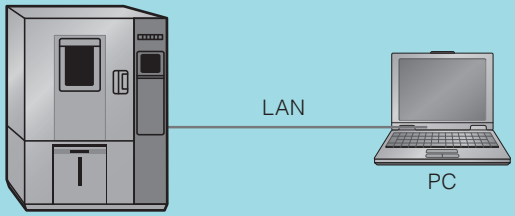
### E-mail Notifications

Details on alarms that have been triggered will be sent to pre-registered e-mail addresses. It is also possible to transmit e-mails when testing has finished.

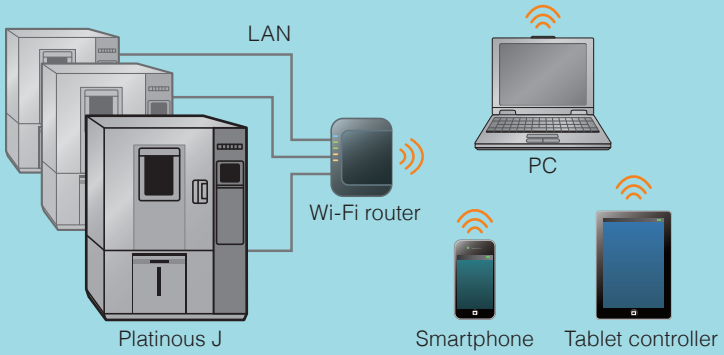
* An Intranet environment is required to transmit e-mails.

### Network Connection

・Wired




・Wireless

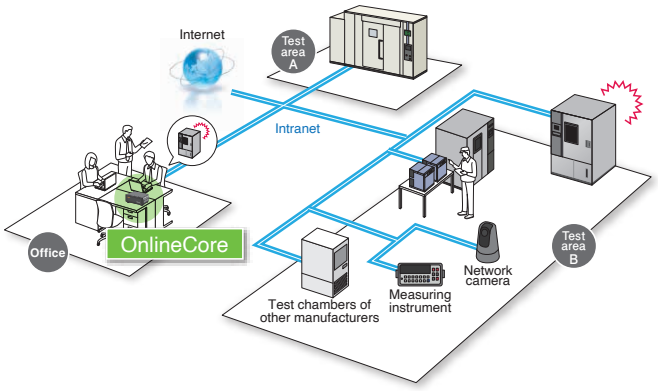



### Login Privileges of Web Browser

| Screen / Privileges | Chamber monitor | Constant/ Program setup | Run/Stop | Configuration |
|---|---|---|---|---|
| Administrator | ✓ | ✓ | ✓ | ✓ |
| Operator | ✓ | ✓ | ✓ | |
| User | ✓ | | | |

## ESPEC OnlineCore (Sold separately)

**Central control system recommended for multiple environmental test chambers installations**



# Options

Please refer to the list on pages 42-44 for the applicable model .

## Utility

### Power cable

- 2.5 m
- 5 m
- 10 m

* If this option is not specified, the chamber does not come with a power cable.

### Power plug

4P Plug

* 200V AC only.

### Power socket

| Advantage | When a malfunction occurs (such as in the overheat protector), the supply of power to the energized power supply is stopped to protect the sample. (White plug socket only) |
|---|---|

- 100 V 3 A
- 100 V 15 A (excluding Type1)

Power outlets: 2

Location: Right-side

* 200V AC only.

### Continuous water supply

A water circuit to supply pure water continuously to the chamber.

- Water supply coupling (with ion exchanger)
- Pure water coupling with pressure-reducing valve
- Pure water coupling without pressure-reducing valve

Pure water coupling (with pressure-reducing valve)

| Advantage | Eliminates the hassle of filling the fixed tank. |
|---|---|

| | Water Supply Coupling (With Ion Exchanger) | Pure Water Coupling | |
|---|---|---|---|
| | | With Pressure-Reducing Valve | Without Pressure-Reducing Valve |
| Water pressure | 0.05 MPa to 0.50 MPa (Gauge) | | 0.03 MPa (Gauge) |
| Flow rate | 1.3 L/minute or more | | |
| Conductivity | —— | 0.1μS/cm to 10μS/cm | |
| Location | Lower left rear side | | Upper left rear side |
| Connectable items | Only a steel pipe (or a PVC pipe) can be connected. | | Only a hose can be connected. |

* Connection of the chamber to the water supply equipment shall be performed by the user.
* The ion exchanger must be replaced periodically.
* Order a quick connect hose optionally as necessary.

### Water purifier (reverse osmosis)

Use to continuously supply pure water.

- WS-1

Power: AC100V 50/60Hz 0.4A
AC200V 50/60Hz 0.2A
AC220V 50/60Hz 0.2A
AC230V 50/60Hz 0.2A

Produced water capacity: 12 L/h(Water temperature: 25°C)

Size: W480 × H480 × D280 mm

Produced water (pure water) supply: One or two couplings

Location: Chamber ceiling

* Order a quick connect hose optionally as necessary.

### Water-cooled refrigeration

To reduce the effect of exhaust heat, this option changes the refrigeration system to a water-cooled condenser.

Fittings: Compressor cooling fan
Water supply and drain ports
Water suspension relay

### Quick connect hose

Continuous supply of pure water or tap water to a temperature & humidity chamber or a water purifier. The removable coupler allows for easy removal.

Hose length: 1.0m/2.0m/3.0m/3.5m/5.0m

*To prevent damage in the event of water leakage when installing the following optional products, a dew tray (P.40) and other preventive measures can be prepared.

- Continuous water supply
- Water purifier
- Water-cooled refrigeration

# Options

## Utility

### Additional water supply tank

The additional water supply tank complements the water volume of the standard-equipped tank, to allow continuous operations for long periods.

Effective water volume: Approximately 13L

* When the tank is attached, the chamber height increases by 215mm

### Water tank

For supplying water to the chamber's fixed tank.

- Water tank with cart
  Size: W600 × H920 × D348 mm
  Tank (10 L, with cock) × 3
- Water tanks 10 L × 1

Tank with cock
(cart included)

Tank with nozzle

## Observation

### Wide-view door

Almost the entire surface of the door is made of glass for test area inspection, even when testing is on process.

- Upper limit temperature +100℃
- Upper limit temperature +120℃

Effective view:

| | |
|---|---|
| Type 2 | W470 × H720 mm |
| Type 3 | W570 × H820 mm |
| Type 4 | W970 × H970 mm |

* Refer to specification sheet for temperature rate of change, extremes achievement time and allowable heat load.
* The door cannot be locked.

### Wide-view door with hand-in ports

This option features hand-in ports on a standard door, to manipulate the specimen even during testing.

Hand-in ports' inner diameter: 130mm

Number of hand-inports: One or two pairs

Accessory: Rubber gloves

* Refer to specification sheet for temperature rate of change, extremes achievement time and allowable heat load.

### Roller blind for wide-view window

Spring screen that can be attached to obscure the view of the inside of the chamber from the viewing window.

Shade grade 1 (black)

# Options

## Observation

### Door with hand-in ports

This option features hand-in ports on a standard door, to manipulate the specimen even during testing.
Number of hand-in ports:
Type 2: One pair
Type 3: One pair
Type 4: One pair or two pairs
Hand-in ports' inner diameter:
130 mm
Accessory: Rubber gloves

### Door without viewing window

Plain door ideal to test specimens affected by light.

* There is no lamp installed in the test area with this option.

### Inner glass door

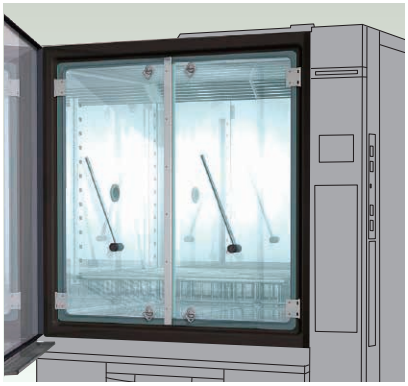
| | |
|---|---|
| Aims | Specimen observation during testing. A hand-in port can also be installed to enable access to specimens. |
| Features | Reduces temperature and humidity disturbances during specimen observation. Provides a wider effective view than a viewing window. |
| Caution | Because viewing specimens for long periods may disturb the temperature and humidity inside the chamber, we recommend using a viewing window. |

Hand- in port: ID 130mm with radial rubber seal & rubber gloves

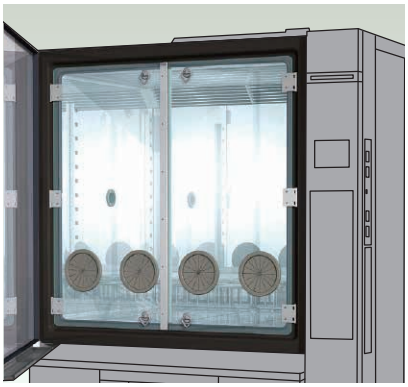
| Model | Inner Door | Wipers | Hand-in Ports |
|---|---|---|---|
| Types 1 to 3 | Single door | 1 | 1 pair |
| Type 4 | Hinged double doors | 2 | 2 pairs |
| | | | 4 pairs |
| | | —— | 6 pairs |

* Refer to specification sheet for temperature gradient, temperature rate of change, extremes achievement time and temperature variation in space.
* Wipers are not provided to chambers controlling only temperature.
* The lock release mechanism equipped as standard on the Type 4 is removed.
* A hand-in port cannot be installed in the inner door of the ECO type.

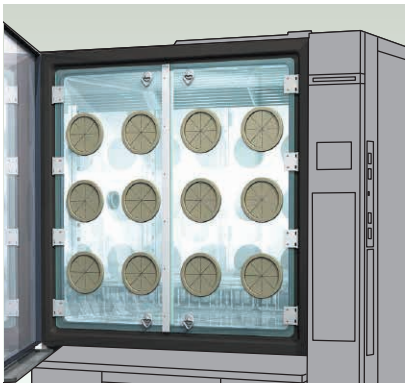
Inner glass door with a wiper (Type 1)



Inner glass door with wipers (Type 4)



Inner glass door with two pairs of hand-in ports



Inner glass door with six pairs of hand-in ports

# Options

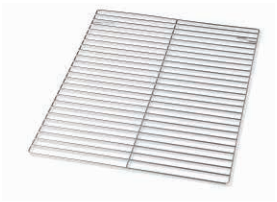
## Specimen setting

### Shelf/shelf bracket

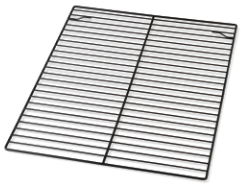
Used to place the specimen inside the chamber.

< Shelf >

• 18-8Cr-Ni
Stainless steel



• Resin-coated
* Upper limit temperature: +100°C
* PU and PG only



Dimensions & weight:
For Type 1: 350 × 467 mm, 1.0kg
For Type 2: 550 × 467 mm, 1.5kg
For Type 3: 750 × 567 mm, 2.2kg
For Type 4: 750 × 967 mm, 6.6kg
For PSL/PG-2: 550 × 567 mm, 1.6kg

[ Load capacity for the standard shelf
Type 1 to 3: 10 kg
Type 4: 30 kg ]

<Shelf bracket>
• 18-8Cr-Ni Stainless steel
1 set (2 pieces)

### Heavy-duty shelf

Used to hold heavy specimens exceeding the load capacity of the standard shelf.

* To install heavy-duty shelves from 50 kg, reinforcement of the chamber structure is necessary.

Load capacity (per shelf):
• 30kg
• 50kg
• 80kg
• 100kg

| Load Capacity per Shelf | Applicable model | Capacity of Shelf Suport Pole | Floor Load Capacity | Chamber's Total Load Capacity | Shelf Weight (Per Shelf) | Max. Qty. in Chamber |
|---|---|---|---|---|---|---|
| 30 kg | ECO type, PR, PL, PSL, PHP, PU, PG from Type 1 to Type 3 | 90 kg | 70 kg | 100 kg | Type 1: 1.8 kg<br>Type 2: 2.9 kg<br>Type 3: 4.3 kg<br>PSL/PG2: 3.4 kg | 3 |
| 50 kg<br>棚受はネジ止め | ECO type, PR, PL, PSL, PHP, PU, PG | 100 kg | 70 kg | 100 kg | Type 1: 2.3 kg<br>Type 2: 3.4 kg<br>Type 3: 5.1 kg<br>Type 4: 12.1 kg<br>PSL/PG2: 4.0 kg | 2 |
| 80 kg | PR, PL, PSL, PU, PG from Type 4 | 100 kg | 70 kg | 100 kg | 9.3 kg | 2 |
| 100 kg | PR, PL, PSL, PHP, PU, PG from Type 4 | A special rack is installed in the test area to accommodate 5 shelves.(Rack weight:56kg) | | 500 kg | 13 kg | 5 |

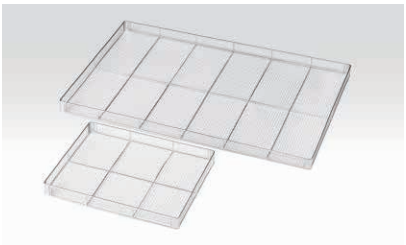
* Weight of shelf (ves) + Specimen on shelf (ves) efloor + special rack.

### Specimen basket

For small specimens that cannot be placed directly on the shelf.
Material: Stainless steel (4 mesh)

• Large
Dimensions: W700 × H35 × D450 mm
Load capacity: 5 kg (equally distributed load)
Qty. per shelf: Type 3: 1
Type 4: 2

• Small
Dimensions: W350 × H35 × D270 mm
Load capacity: 3 kg (equally distributed load)
Qty. per shelf: Type 1: 1
Type 2: 2
Type 3: 4
Type 4: 6



* Place the specimen baskets on the shelf.
* Do not use when exceeding the shelf load capacity.
* Tests may not satisfy standard performance if the air flow is blocked, so ensure sufficient space around the specimen baskets.

# Options

## Specimen setting

### Floor reinforcement

Enhances the floor load capacity inside the chamber.

- Up to 100 kg
- Up to 200 kg
- Up to 300 kg

* Standard specification: up to 70 kg

### Precision inner chamber

An aluminum box inside the chamber allows to reduce the air velocity and maintain the required temperature and humidity distribution.

Velocity: to 0.5 m/sec.

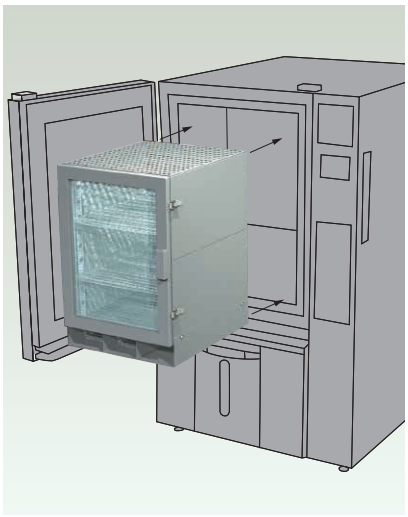
Temperature & humidity fluctuation:
±0.5°C/±2.5%rh

Effective cross section & load capacity :

Type 1 W335 × H285 mm, up to 20kg
Type 2 W335 × H435 mm, up to 20kg
Type 3 W435 × H585 mm, up to 30kg
Type 4 W835 × H685 mm, up to 30kg

Accessories: Shelves and shelf brackets (2 sets)

* Refer to specification sheet for temperature rate of change, extremes achievement time and allowable heat load.



### Additional cable port

Provided in addition/ replacement of the standard cable port (left side). Comes with a cap and a rubber plug.

- ø25 mm
- ø50 mm
- ø70 mm
- ø100 mm
- ø150 mm
- Flat cable port

* When installed on the right side, an external drip pan is also included.

Left-side (chamber interior)

Right-side

| Port type \ Model | | PR | | | | PL/PL-ECO | | | | PSL | | PHP | | | PDR | | PDL | | PCR | PU/PU-ECO | | | | PG | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 2 | 4 | 2 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 1 | 2 | 3 | 4 | 2 | 4 |
| Right | ϕ 50mm | — | ● | ● | ● | — | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | — | — | ● | ● | ● | ● | ● |
| | ϕ 50mm around wiring board inside the wall | — | ● | ● | ● | — | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | — | — | ● | ● | ● | ● | ● |
| | ϕ 100mm | — | ● | ● | ● | — | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | — | — | ● | ● | ● | ● | ● |
| | ϕ100mm around wiring board inside the wall | — | — | ● | ● | — | — | ● | ● | — | ● | — | ● | ● | ● | ● | ● | ● | — | — | — | ● | ● | — | ● |
| Left | ϕ 25mm | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | ϕ 50mm | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | ϕ 70mm | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | ϕ 100mm | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | ϕ 150mm | — | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | — | ● | ● | ● | ● | ● |
| | Flat cable port | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Ceiling | ϕ 25mm | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | — | — | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | ○ |
| | ϕ 50mm | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | — | — | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | ○ |
| | ϕ 70mm | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | — | — | — | ● | ● | ● | ● | — | ● | ● | ● | ● | ● | ● |
| | ϕ 100mm | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | — | — | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | ○ |
| | ϕ 150mm | — | — | ● | ● | — | — | ● | ● | ● | ● | — | — | — | ● | ● | ● | ● | — | — | — | ● | ● | ● | ● |
| | Flat cable port | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | — | — | — | ● | ● | ● | ● | — | ● | ● | ● | ● | ● | ● |

● Retrofit is not available. ○ Retrofit is available.

# Options

## Specimen setting

### Cable port rubber plug

Comes with the cable port.
- ø25 mm
- ø50 mm
- ø100 mm
- Spiral-wrapped plug (5 × 50 × 2000 mm)
- For the flat cable port

ø50 mm

Spiral-wrapped type
* Cut the silicone sponge so that the roll fits in the port.

For flat cable port

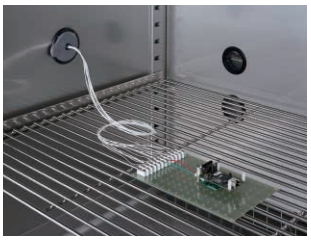
### Cable port dew tray (for left side)

Catches dew that comes out of the cable port.
Location: Left-side

| Model | Size (W×Dmm) |
|---|---|
| Type 1 | 300×50 |
| Type 2 | 510×50 |
| Type 3·4 | 700×50 |
| PDR／PDL | 600×50 |


### EZ connect cable port plug for power supply

Wires that go through this cable port plug have a terminal at both ends.
This option ease the power cable connection between specimen and external device.
Spec.: AC 6V to 24V 0.1 to 3A
DC 1.5V to 60V 0.1 to 3A
Interior terminals: Terminals on insulated jig plate, 10P
Exterior terminals: Block terminals with magnet, 10P
Temperature/ humidity range:
−70℃ to +180℃/ 20%rh to 98%rh
* Based on cable port $\phi$25mm and $\phi$50mm.

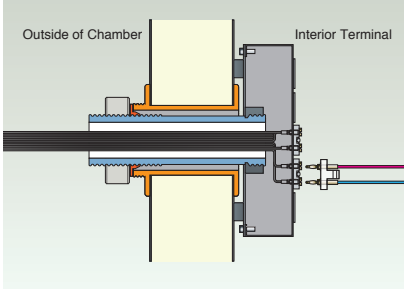


Interior terminal

Exterior terminal

### EZ connect cable port plug for measurement

This port plug equips with a terminal box on interior wall, which facilitates the wiring work inside the test area.
Spec.: DC no more than 500V, 5A
Terminals: 20ch
More than 1Ω × $10^{12}$Ω as insulation resistance
Temperature/ humidity range:
−70℃ to +150℃/ 20%rh to 98%rh



# Options

## Network

### I/O Interface

Communication ports to connect the chamber to a PC and a device and using communication commands.

- RS−485* (D-sub 9-pin × 2)
- RS−232C (D-sub 9-pin × 1)
- GPIB* (IEEE488)

* Up to 16 chambers can be connected to a single PC.

### Communication cables

- RS−485 5 m / 10 m / 30 m
- GPIB 2 m / 4 m

## Performance

### Temp. & humid. SP attainment output

When the temperature (humidity) in the chamber reaches the set values, the chamber sends out a contact signal.
It synchronizes the power supply to the specimen, the timing for measurements or to prevent dew from condensing on the specimens.

### DC inverter refrigeration

During low-temperature operation below 0°C, the combination of a DC inverter refrigeration system and an electronic expansion valve enables minimum frequency control (Japanese Patent No. 6383448), reducing power consumption and shortening the temperature extremum reaching time (cooling) by approximately 5 minutes.

- 100ºC Specification
- 150ºC Specification

* 200V AC only

### Upper limit modification

Enables tests over 100°C.

- Upper limit temperature +150°C
- Upper limit temperature +180°C

  * Refer to specification sheet for temperature rate of change, and temperature variation in space.

### Defrost circuit

Defrosts the refrigeration circuit.


| Caution | Please note that the internal temperature of the chamber will rise during defrosting. |
|---|---|

### Frost relief valve

To reduce frosting on the evaporator during continuous operation at room temperature (25°C) or at a low temperature.

### Airflow adjuster

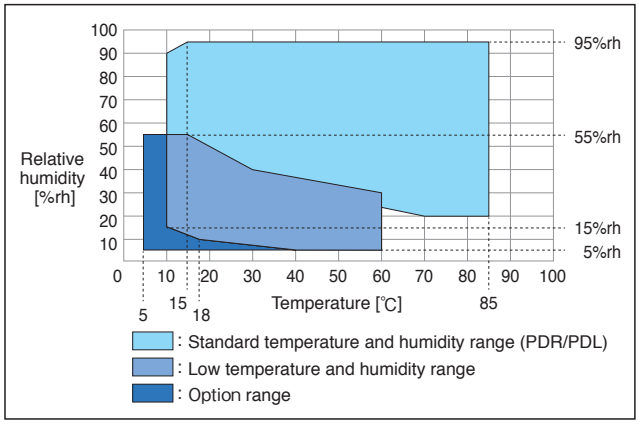
Used when tests require low airflow velocity or a certain velocity of airflow.
Setting value range: 4 levels

# Options

## Performance

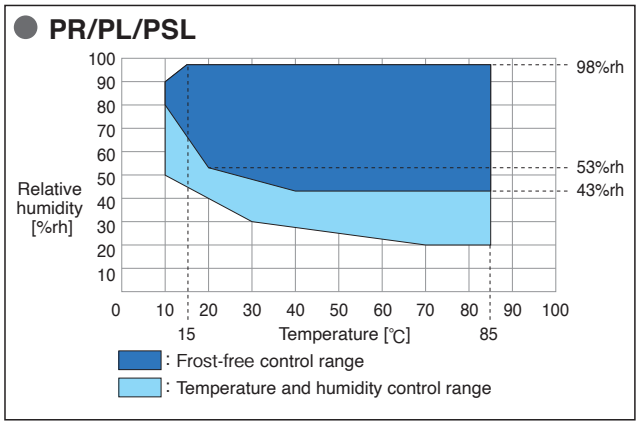
### Lower temperature & humidity range

Testing can be performed at low temperature and humidity (+5°C / 5%rh) where static electricity tends to be generated.




### Frost-free circuit

Prevents frost from accumulating on the refrigeration circuit to allow long-term continuous operation.
Operating ambient temp. range:
Approx. +10℃ to +40℃




### Specimen temperature control

Sensors are attached to the specimen to allow exposure tests that provide accurate temperature stress to the specimen.

- Insulated type
- Non-insulated type



### Capacitive humidity sensor

| Advantage | No need to replace the wick during long-term continuous operation (approximate replacement period:once a month) |
|---|---|

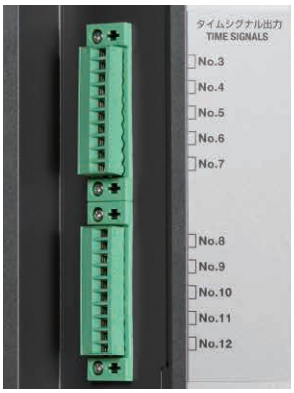
*Please calibrate approximately oncea year.
*Testing with large changes in temperature and humidity may result in condensation on the sensor that prevents accurate measurement.
*Accuracy will vary depending on the temperature and humidity range. Please check for details.

### Time up output

This option enables turning the power to the specimen ON or OFF with contact signal output when the time is up by using the timer function on the temperature (humidity) controller.


### Time signal terminal

Adds additional terminals to the standard time signal terminals.



# Options

## Measurement

### Temperature (humidity) recorder wiring

Preparation of a power cable, temperature sensor, relative humidity signal and a grounding wire for additional installation in the future.

| Advantage | A recorder owned by the customer (138 × 138 mm, DIN standard size) can be installed by the customer after purchase. |
|---|---|

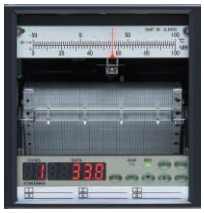
### Paperless recorder

A temperature & humidity recorder that utilizes a liquid-crystal display fitted with a touch-panel.
Display: 5.7inch color touch panel
Scan interval: 5 sec. (default)
Internal recording media:Flash memory 8MB
External recording media:CF memory card(Supplies with a 256 MB CF card)USB flash drive

< Temperature type >
No. of input channel:Temperature 1
(5 more channels can be turned ON)
< Temperature & humidity type >
No. of input channel:Temperature 1, Humidity 1
(4 more channels can be turned ON)

### Temperature (humidity) recorder

Records the temperature and humidity of each section such as the temperature inside the chamber.
Recording method: Dot
Recording paper: Effective width 100 mm
No. of inputs:
< Temperature & humidity type >
Temperature 5, Humidity 1
−50°C to +100°C/0%rh to 100%rh
−50°C to +150°C/0%rh to 100%rh
−100°C to +100°C/0%rh to 100%rh
−100°C to +150°C/0%rh to 100%rh
−100°C to +200°C/0%rh to 100%rh
< Temperature type >
Temperature 6
−50°C to +100°C
−100°C to +100°C
−100°C to +200°C



### Thermocouple

Attached to specimen to measure specimen temperature.
Thermocouple with a brass ball tip
Thermocouple type T
(Copper/Copper-Nickel)
• 2 m • 4 m • 6 m

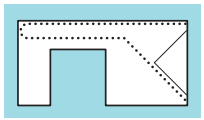
### Recorder output terminal

• Temperature, humidity, and heater output
This terminal outputs the temperature and relative humidity in the test area.

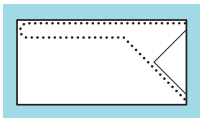
• Dry/wet bulb temperature
Terminal board for dry-bulb/wet-bulb sensors in the chamber.

### Wet bulb wick

This option contains replacement wicks.
• Fine wicks (non-woven fabric)
FW-5 (for the PR, PL, PSL, and PHP): 24 wicks
FW-6 (for the PDR, PDL, and PCR): 24 wicks



FW-5



FW-6

• Cloth wicks (gauze)
For the PDR and PDL: 20 wicks

### Power meter

This option displays the integral power consumption of the chamber.
Display range: 0 to 9999.99 kWh
External memory: SD memory card
Location: Instrumentation panel
* The SD memory card is not included.

### Folding table

A folding table is equipped on the right side of the chamber.
The table can be used when a measuring instrument, PC, or other device is connected.

Table dimensions: W410 × D300 mm
Load capacity: 20 kg

# Options

## Safety

### Overcool protector

If the temperature inside the chamber decreases excessively, the chamber stops operating to prevent the specimens from being damaged.

### Additional overheat protector

Additional preventive measures can be taken for excessive temperature rise in the chamber, in addition to the standard equipped overheat protector.

### Alarm output terminal

If the safety device of the chamber is acti-vated, external alarm terminal will notify it to a remote point.
Operation:
When connecting with N.O. contact (normally open contact), output “close” contact.
When connecting with N.C. contact (normally close contact), output “open” contact.
Current-carrying capacity: 250 V AC, 3 A
Accessory: Plug
Location: Right side or within the control board (retrofit is not available)

* Please connect the alarm circuit by customer.
* This option can also be installed inside the electrical compartment.
Please inquire for the details.

### External device alarm input terminal

| | |
|---|---|
| Example | If the charge/discharge system detects a battery abnormality during the charge/discharge testing of the secondary battery, it will stop operating the chamber to reduce any risk of the secondary battery catching fire. |

Equips the chamber with a terminal that is used to stop the operation of the chamber in the event that an external device to which the chamber is linked malfunctions.

### Door opening signal output terminal

Equips the chamber with a terminal that outputs the door open status.
Capable of controlling an external device that operates along with door operation and records the temperature disturbance history.

### Status indicator light

Select light color, lighting, and blinking or buzzer sound.
- 1 level, light: 1 color, height: 534 mm
- 2 levels, light: 2 colors, height: 574 mm
- 3 levels, light: 3 colors, height: 614 mm
- 4 levels, light: 4 colors, height: 654 mm

Pole length: 290 mm

| Color | | | | |
|---|---|---|---|---|
| Red | Yellow | Green | Blue | White |

| Chamber status |
|---|
| In operation |
| Main power on |
| Instrumentation power on |
| Main power on or instrumentation power on |
| Abnormality |

* The pole can be shortened in units of 10 mm to a minimum height of 50 mm.

# Options

## Safety

### Rotating signal light

The rotating signal lights up when an error occurs.
Color of the signal:
- Red
- Yellow

### Trouble buzzer

Buzzer notification when an error occurs.

### Emergency stop pushbutton

Stops the chamber immediately


With guard

With cover

### Power key switch

Used to manage/restrict the chamber usage.


### Power indicator

The operator can verify if the breaker is ON or OFF from the chamber front.

### Main power switch

The main power switch allows turning the power ON and OFF from the chamber front.

* 380 V AC and 400 V AC only.

### Pressure relief vent

To reduce an explosive force by eleasing pressure when the chamber pressure suddenly goes up.

Pressure relief vent: W300 × D300 mm
Outside dimension: 200 mm higher than the standard height.

* This requires the separate optional door without viewing window (P. 31).
* When a pressure rise in the test area is anticipated, it is recommended that a safety door lock also be installed.
* The pressure relief port is not intended to guarantee safety against explosion.

### Safety door lock

- Dial combination safety door lock
  The dial mechanism gives more secure door locking.
- Lever handle safety door lock
  The rotation mechanism with levers gives more secure door locking.

* When a pressure rise in the test area is anticipated, it is recommended that a pressure release vent also be installed.
* In case of Type 4, unlocking device is not equipped.


Dial combination


Lever handle

# Options

## Safety

### Anchoring fixtures

Used to fix the chamber to the floor.

* Anchoring fixtures when installing the dew tray are also available.

### Chamber dew tray

A chamber dew tray is installed below the chamber in the unlikely case there would be water leakage.

| Type | W×H×Dmm |
|---|---|
| 1 | 1010×30×1030 |
| 2 | 1010×30×1230 |
| 3 (PSL/PG-2) | 1110×30×1430 |
| 4 | 1510×30×1430 |
| PSL/PG-4 | 1510×30×1750 |
| Dehumidifier unit for PDL/PDR | 875×30×1430 |

* The chamber dew tray is a product for on-site installation. The price does not include the installation cost. Contact your distributor or ESPEC for details.

### Dew drip prevention

To prevent dew that has formed on the chamber ceiling from dripping onto specimens.

* The height is 20 mm smaller than the standard inside dimensions.
* Refer to specification sheet for temperature rate of change, extremes achievement time.

### Operation panel cover

A cover for the operation panel. (Plastic)

* Cannot be installed together with an emergency stop switch.

### Evaporator frost check window

This window is installed in the test area and is used to check whether frost has accumulated on the cooler.
Diameter: 55 mm

### Test area low-silicone

Reduces the production of silicone gas (siloxane) in the test area.

### Brake oil protection

Changes resin parts (water tank front cover, door dew tray, chamber dew tray) to stainless steel.

### Finned sheathed heater

Changes the heater to a sheathed heater with fins to lower the surface temperature of the heater, decrease corrosion, and reduce defective insulation.

### Stainless steel evaporator

Changes the plate fin cooler (also used as a dehumidifier) to stainless steel, which improves the corrosion resistance.

* Refer to specification sheet for temperature rate of change, extremes achievement time and allowable heat load.
* Contact us for availability of this option with low GWP refrigerant type product

### Air circulator removed for move-in

To prevent damage caused by height restrictions, the air circulator for type 4 chambers is not mounted on the chamber during shipment.

* The air circulator must be installed separately.

# Options

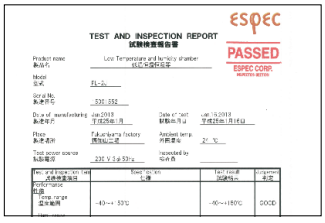
## Documents

### Operation manual

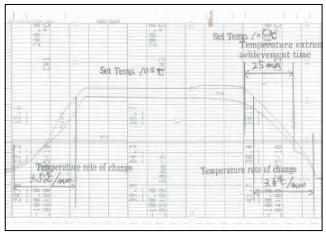
- CD
- Booklet

### Reports & certificates

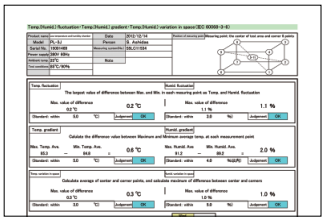
- Testing and inspection report
- Test data
- Temperature (& humidity) uniformity measurement
- Calibration report
- Calibration certificate
- Traceability certificate
- Traceability system chart



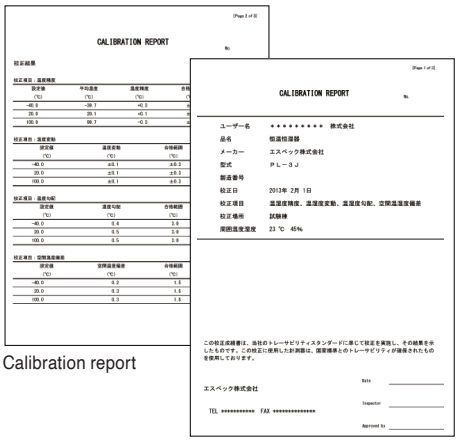

Testing and inspection report



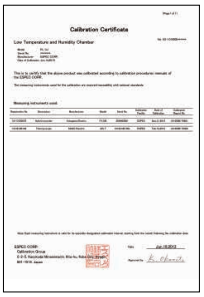
Standard test data



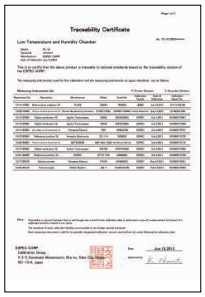
Temperature and humidity uniformity measurement data



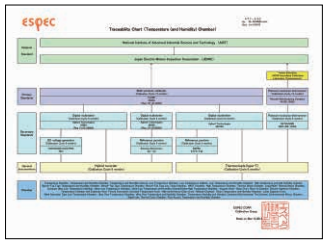

Calibration report



Calibration certificate



Traceability certificate



Traceability system chart

### Safety precautions

- 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 substances in the chamber. If corrosive substances are generated by the specimen, the life of the chamber may be significantly shortened specifically because of the corrosion of stainless steel and copper and because of the deterioration of resin and silicon. An optional stainless steel evaporator, which is designed to improve the corrosion resistance of the chamber, is available.
- Do not place life forms or substances that exceed allowable heat generation.
- Be sure to read the operation manual before operation.

# Platinous J Series Options

## Utility,Observation,Specimen setting

● Retrofit is not available. ○ Retrofit is available.

| Page | OPTION | PL-ECO | PU-ECO | PR | PL | PSL | PHP | PDR/ PDL | PCR | PU | PG |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P.29 | Power cable | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Power plug (Applicable only to 200V AC) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Power socket (Applicable only to 200V AC) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Continuous water supply | ○ | — | ○ | ○ | ○ | ○ | ○ | ○ | — | — |
| | Water purifier | ○ | — | ○ | ○ | ○ | ○ | ○ | ○ | — | — |
| | Water-cooled refrigeration | ● *1 | ● *1 | ● *1*2 | ● *1*2 | ● *2 | — | — | ● | ● *1 *2 | ● *2 |
| | Quick connect hose | ○ | — | ○ | ○ | ○ | ○ | ○ | ○ | — | — |
| P.30 | Additional water supply tank | ○ | — | ○ | ○ | ○ | ○ | ○ | ○ | — | — |
| | Water tank | ○ | — | ○ | ○ | ○ | ○ | ○ | ○ | — | — |
| | Wide-view door *2 *3 | — | — | ○ | ○ | — | — | — | — | ○ | — |
| | Wide-view door with Hand-in ports *1 *2 | — | — | ● | ● | — | — | — | — | ● | — |
| | Roller blind for wide-view window *2 *3 | — | — | ● | ● | — | — | — | — | ● | — |
| P.31 | Door with hand-in ports *3 | — | — | ● | ● | ● | ● | ● | — | ● | ● |
| | Door without viewing window | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Inner glass door | ● *4 | ● *4 | ● | ● | ● | ● | ● | — | ● | ● |
| P.32 | Shelf/shelf bracket (Stainless steel) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Shelf (Resin-coated) | — | ○ | — | — | — | — | — | — | ○ | ○ |
| | Heavy-duty shelf (30 kg) (Type 1 to Type 3) | ○ | ○ | ○ | ○ | ○ | ○ | — | — | ○ | ○ |
| | Heavy-duty shelf (50 kg) *5 | — | — | ○ | ○ | ○ | ○ | — | — | ○ | ○ |
| | Heavy-duty shelf (80 kg) (Type 4 only) | — | — | ● | ● | ● | — | — | — | ● | ● |
| | Heavy-duty shelf (100 kg) (Type 4 only) | — | — | ● | ● | ● | ● | — | — | ● | ● |
| | Specimen basket | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| P.33 | Floor reinforcement (100 kg) | — | — | ○ | ○ | ○ | ○ | — | — | ○ | ○ |
| | Floor reinforcement (200 kg/300 kg) | — | — | ● | ● | ● | ● | — | — | ● | ● |
| | Precision inner chamber | ○ | ○ | ○ | ○ | ○ | ○ | — | — | ○ | ○ |
| | Additional cable port | Please refer to the cable port table on page 33. | | | | | | | | | |
| P.34 | Cable port rubber plug | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Cable port dew tray (for left side) | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | EZ connect cable port plug for power supply | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | EZ connect cable port plug for measurement | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

*1 Type 3 and 4 only.
*2 Contact us for availability of this option with low GWP refrigerant type product.
*3 Excluding Type 1.
*4 A hand-in port cannot be installed in the inner door of the ECO type.
*5 If the chamber has been reinforced, equipment can be added.

# Platinous J Series Options

## Network,Performance,Measurement

● Retrofit is not available. ○ Retrofit is available.

| Page | OPTION | PL-ECO | PU-ECO | PR | PL | PSL | PHP | PDR/ PDL | PCR | PU | PG |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P.35 | Interface | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Communication cables | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Temp. & humid. SP attainment output | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | DC inverter refrigeration (Applicable only to 200V AC) | — | — | — | ●*1 | — | — | — | — | ●*1 | — |
| | Upper limit modification (+150°C) | ● | ● | ● | ● | ● | — | — | — | ● | ● |
| | Upper limit modification (+180°C) | ● | ● | ● | ● | ●*2 | — | — | — | ● | ●*2 |
| | Defrost circuit | ● | ● | ●*1 | ●*1 | ● | — | ● | ● | ●*1 | ● |
| | Frost relief valve | ● | ● | ● | ● | ● | — | ● | ● | ● | ● |
| | Airflow adjuster | ○ | ○ | ○ | ○ | ○ | ○ | — | — | ○ | ○ |
| P.36 | Lower temperature & humidity range | — | — | — | — | — | — | ● | — | — | — |
| | Frost-free circuit | ● | ● | ●*1 | ●*1 | ● | — | ● | ● | ●*1 | ● |
| | Specimen temperature control | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Capacitive humidity sensor | ● | — | ● | ● | ● | ● | ● | ● | — | — |
| | Time up output | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Time signal terminal | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| P.37 | Temperature (humidity) recorder wiring | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Paperless recorder | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Temperature (humidity) recorder | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Thermocouple | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Recorder output terminal (temperature, humidity, and heater output) | ○ | — | ○ | ○ | ○ | ○ | ○ | ○ | — | — |
| | Recorder output terminal (dry [wet] bulb temperature) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Wet bulb wick | ○ | — | ○ | ○ | ○ | ○ | ○ | ○ | — | — |
| | Power meter | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Folding table (Type 3 and 4 only) | ● | ● | ● | ● | ● | ● | ● | — | ● | ● |

*1 Excluding Type 1.
*2 Type 2 only.

# Platinous J Series Options

## Safety,Documents

● Retrofit is not available. ○ Retrofit is available.

| Page | OPTION | PL-ECO | PU-ECO | PR | PL | PSL | PHP | PDR/ PDL | PCR | PU | PG |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P.38 | Overcool protector | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Additional overheat protector | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Alarm output terminal | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | External device alarm input terminal | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Door opening signal output terminal | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Status indicator light | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| P.39 | Rotating signal light | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Trouble buzzer | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Emergency stop pushbutton | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Power key switch | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Power indicator | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Main power switch (Applicable only to 380 V/400 V AC) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Pressure relief vent (Excluding Type 1) | ● | ● | ● | ● | ● | — | ● | — | ● | ● |
| | Safety door lock | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| P.40 | Anchoring fixtures | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Chamber dew tray | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Dew drip prevention | ● | ● | ● | ● | ● | Standard equipment | ● | — | ● | ● |
| | Operation panel cover | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Evaporator frost check window | ● | ● | ● | ● | ● | — | — | — | ● | ● |
| | Test area low-silicone | ● | ● | ● | ● | ● | ● | — | — | ● | ● |
| | Brake oil protection (Type 3 and 4 only) | ● | ● | ● | ● | — | — | — | — | ● | — |
| | Finned sheathed heater (Applicable only to 200V AC) | ● | ● | ● | ● | ● | — | — | — | ● | ● |
| | Stainless steel evaporator | — | — | ● | ● | — | — | — | — | ● | — |
| | Air circulator removed for move-in (Type 4 only) | ● | ● | ● | ● | ● | ● | ● | — | ● | ● |
| P.41 | Operation manual | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| | Reports & certificates | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |

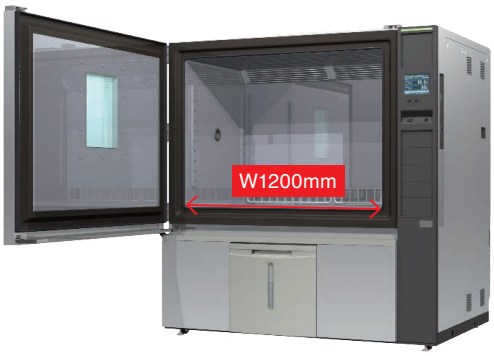
# Larger model (816L & 1000L)

The test samples are getting larger and heavier due to the changes in market needs.
The demand for assembly, module or completed product testing is increasing because individual parts testing can be checked stand alone performance only but assembly testing can be evaluated the test samples in a correct, stable and proper manner which is defined in the functional requirements provided by the customer. Therefore, the larger test area sizes are added to the lineup to meet the latest trends in testing.
Applicable models : PL, PU

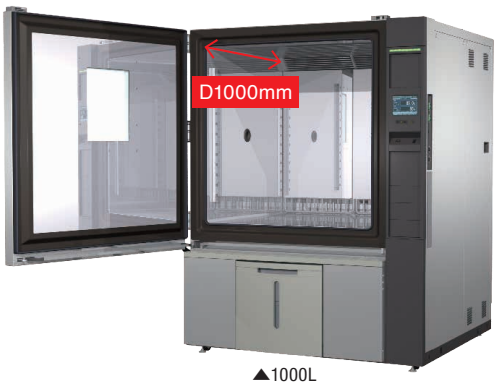
on request

## Specifications (PL)

| Capacity | 816 L | 1000 L |
|---|---|---|
| Temperature & humidity range | −40°C to +100°C<br>(+150°C/+180°C is optional) 20%rh to 98%rh<br>Refer to diagram of temperature & humidity controllable range on this page. | |
| Temperature rate of change | Heat up rate: 2.5°C/min; Pull down rate: 1.5°C/min | |
| Temperature extremes achievement time | Heat up: +20°C to +100°C: 35 minutes<br>Pull down: +20°C to −40°C: 50 minutes | Heat up: +20°C to +100°C: 40 minutes<br>Pull down: +20°C to −40°C: 55 minutes |
| Inside dimensions (W × H × D mm) | 1200 × 850 × 800 | 1000 × 1000 × 1000 |
| Outside dimensions (W × H × D mm) | 1610 × 1690 (including protrusions: 1815) × 1273 | 1410 × 1840 (including protrusions: 1965) × 1473 |

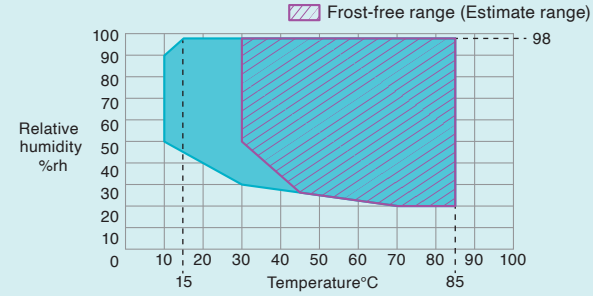


▲816L



▲1000L

### ● Temperature & Humidity Control Range




* With no specimen and under ambient temperature at +23°C.
* Restrictions on continuous humidity operation at +40°C or lower because of frost on the cooler.

# For IoT/5G

## Systems for OTA Tests/Wireless Tests in Temperature Environments

### RF Anechoic Box-Type Low Temperature Chamber

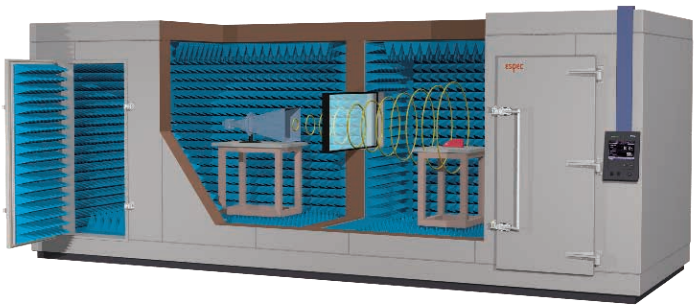
- An RF anechoic chamber and a temperature chamber combined, allowing you to execute performance tests for small communication modules under extreme temperature conditions.
- Ideal for wireless protocol tests that require shorter distance between antenna and DUT than wireless RF performance tests.
- Ensures an attenuation rate of 60dB or greater in 4.0 to 6.0GHz frequency bands.
- The interior of the RF anechoic box can be precisely controlled from low temperature to high temperature.

| Model | PUAN-4 |
|---|---|
| Frequency range / Attenuation rate | 0.7GHz to 2.4GHz/45dB~<br>2.4GHz to 4GHz/50dB~<br>4GHz to 6GHz/60dB~ |
| Temperature range | −40 °C to +100 °C |
| Inside dimensions (W × H × D mm) | 750 × 750 x 550 |
| Watch the video for more information |  |

### Constant Temperature RF Anechoic Chamber

| | |
|---|---|
| Temperature range | –40 °C to +100 °C |
| Frequency range/ Attenuation rate | 0.5~30 GHz/60 db or higher |
| Interior dimensions (W × H × D mm) | 14000×3000×7000 |

Contact us if you require specific performance other than those listed above.



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ESPEC CORP. has been assessed by and registered in the Quality Management System based on the International Standard ISO 9001:2015 (JIS Q 9001:2015) through the JSA Solutions Co.,Ltd.

**＊ The organization of these certificates is ESPEC CORP. Japan.**

JSA QMS JIS Q 9001 JSAQ 004

JAB MS CM001

### ISO 27001 (JIS Q 27001)
**Quality Management System Assessed and Registered**

**＊ The organization of these certificates is ESPEC CORP. Japan.**

JSA ISMS JIS Q 27001 JSAI 165

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