

Quality is more than a word

ESPEC

Walk-In Type Temperature (& Humidity) Chamber E Series



3 YEAR WARRANTY

LOW GWP
REFRIGERANT

The Active Map System controls refrigeration capacity Can save power with high accuracy

Since its launch in 1970, we have sold more than 11,000 units.

We have implemented new functions and improved energy-saving performance while continuing model changes.

Power saving by controlling the refrigeration capacity.

The DC inverter and its own refrigeration system provide quick control even when the temperature pull down rapidly.

Large-screen controllers are easy to see and can be used for a variety of tests.

We propose a new way of using the network function to connect to the device even if it is distant.

To minimize our chambers potential environmental impact

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

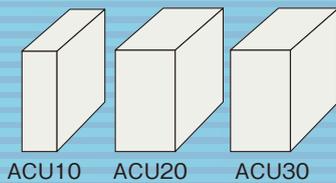


*R-449A is available on request

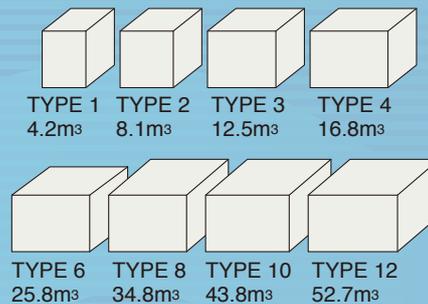


Air conditioner variations

Heater/Humidifier/Refrigerator/Condensation method



Test chamber variations

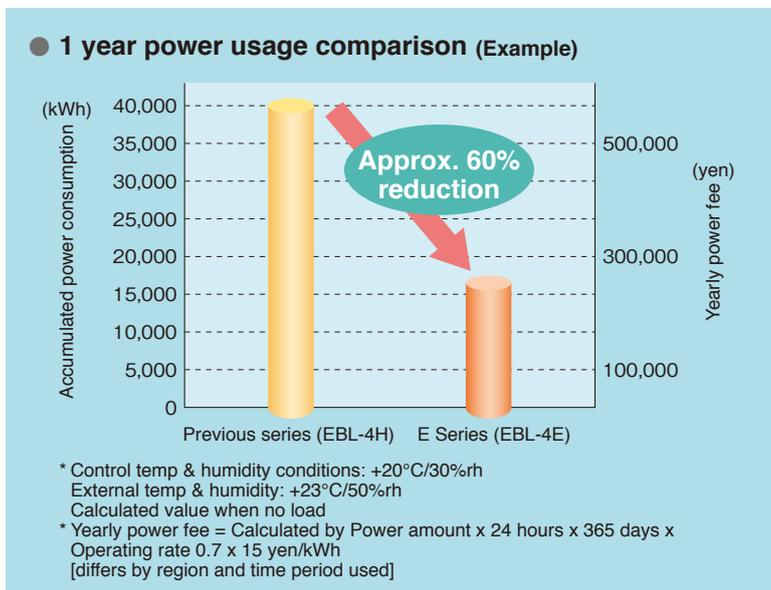
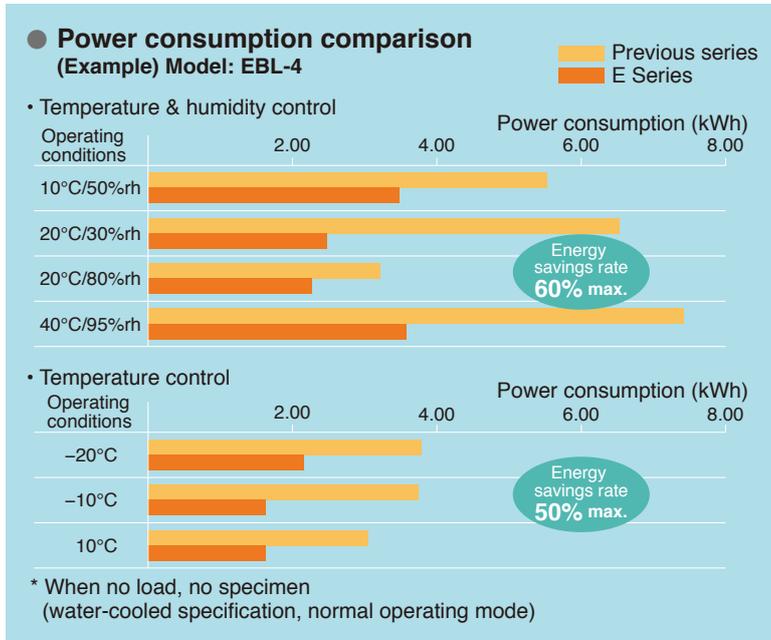


Custom-made specifications

| | |
|-----------------------------------|---|
| High temperature specification | Extend the high-temperature range up to +120°C by changing the insulation material. |
| Cryogenic specification | Extend the low-temperature range beyond -40°C by using a cascade refrigeration system. |
| Low-humidity specifications | Designed to achieve low dew point temperature conditions by using a desiccant dehumidifier. |
| Custom shape and size | A chamber that is anything different in size from 12 size variations available as standard. |
| EMI isolation | Additional shielding to eliminate any EMI coming in or out of the chamber. |
| Chamber without floor panel | The floor of the structure may become the floor of the chamber to allow heavy objects. |
| Outdoor air cooling specification | Refrigerator may be installed outside the building. |
| Low VOC specification | For VOC measurement |
| Noise-reduction specification | A sound-absorbing unit may be installed to reduce noise. |
| Increased safety specification | Pressure relief vent, fire extinguishing equipment, gas detectors, etc. |

Characteristics

Saving energy –major reduction in power consumption and power equipment capacity



● Featuring high precision cooling system with greatly reduced power consumption (Japanese patent number 5427211)

Developed unique control systems, including a wide-range refrigeration control system composed of the DC inverter and an electronic expansion valve to minimize refrigerator power, and the active map system to control and operate multiple refrigerators with minimum power consumption. The system controls the refrigeration capacity with high precision, and is compatible with power saving and large heat generation load. Quick control is also performed when the temperature pulldown rapidly.

● Cross-output control reduces power equipment capacity (EBE, EBL, EBR)

The cross-output control limits the maximum currents of the heater and the humidifier and thereby reducing the power equipment capacity. Also, this feature can also be used to prevent dew condensation through the delayed operation.

● Two modes for even more energy savings

The new E Series is eco-friendly as is, but we have an additional energy-saving mode called “Eco-Mode,” to help you further reduce your energy bill.



Eco-mode selection screen

● All-weather LED lights (Japanese patent number 5340985)

These LED lights now illuminate covering the entire temperature and humidity range. LED luminaires are known for its energy efficiency, long life and excellent response time. Compared to conventional incandescent light, it is about 2.5 times as bright, while using only 1/5th of power.



Interior LED light

Characteristics

● Improving temperature & humidity distribution performance/allowable heat load performance

By improving the airflow, the fan system, and by increasing heat exchanger efficiency, the temperature and humidity distribution have an even higher degree of precision.

● Cycle time defrost system

The standard-equipped defrost system can automatically remove frost from the evaporator when operating in the frosting range by simply setting the time via the cycle timer on the instrumentation.

● Frost-free expansion (option) (Japanese patent number 5355501)

Through the development of a low-temperature regenerative dehumidification system, the entire temperature & humidity control range is now frost-free and continuous operation time has been extended. The humidity range in the lows has been expanded.

● Continue operation with the automatic backup function when trouble occurs

If a problem occurs with a part of the chamber, the remaining devices can be flexibly run to continue its operation, making it unnecessary to stop the test. As an example, if the humidifier breaks, the system will switch to temperature operation automatically.

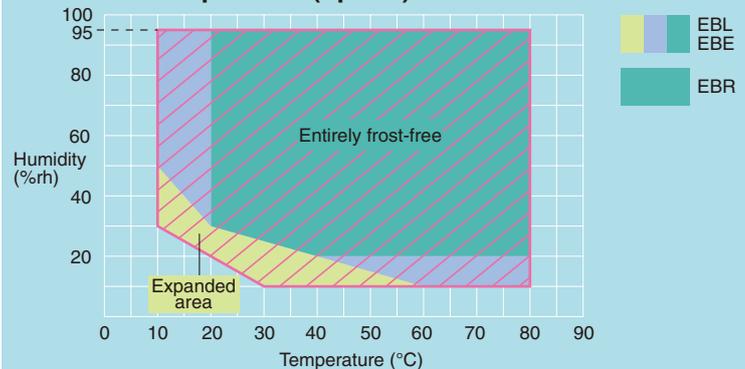
● Employs a steam humidification system for improved efficiency

The externally installed steam humidification system is scale-forming resistant by design, with a self-cleaning mechanism which is done by refreshing the humidifying water. The externally installed steam humidification system is scale-forming resistant by design, with a self-cleaning mechanism which is done by refreshing the humidifying water. The cleaning activation timing can be set through the controller, and its cleaning can be done without taking a step in the chamber.

Allowable heat generation load comparison

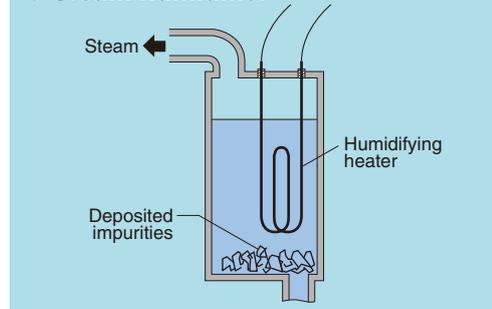
| Model | Temperature | E Series | Previous series |
|-------|-------------|----------|-----------------|
| EBL-4 | 10°C | 3.8kW | 2.1kW |
| | 20°C | 6.6kW | 3.2kW |
| | 30°C | 7.5kW | 3.8kW |
| | 40°C | 7.5kW | 4.3kW |

● Temperature & humidity control range with frost-free expansion (option)



Automatic backup function

● Steam humidifier



Characteristics



Viewing window
(W180 mm x H289 mm)



Option: Large viewing window
(W440 mm x H295 mm)



Control area



Chamber interior

● Anti-fogging viewing window

The viewing window on the door has a deposited transparent metal layer, which works as a heater to prevent it from fogging. The heater is turned ON automatically, depending on the temperature conditions. A larger window is also available as an option.

● An automatic control system to quickly respond to load changes

Simply by setting the temperature and humidity conditions, the automatic control system works at its maximum capacity up to the settings. But once it reaches the settings, it will shift its capacity to its minimum, just to maintain the set conditions. It can quickly respond to door openings and changes in heat loads during testing to create a constantly stable testing environment.

● Noise level in test area reduced by 10 dB (Traditional machine comparison: Mechanical compartment ACU10)

Improved aerodynamic design in the ducts not only enhanced its temperature and humidity performance, but it also helped its noise level in the test area.

In addition to the advance in airflow, soundproofing materials have been added to the air conditioning compartment to further reduce its noise emissions to the surrounding area.

NEW

3 YEAR WARRANTY

10.4-inch color touch panel for superior operability

● Tabbed user interface

Newly designed software with functional tabs at the bottom of the screen allows you to easily access each function.

The menu layout has been redesigned to be optimized for its 10.4-inch display.

● A variety of program settings

The program memory has a capacity for 40 programs (99 steps per program). The time for each step is set in 1-minute increments up to a total of 9999 hours and 59 minutes.

Created programs can be confirmed on the screen and operation can be started from intermediate steps.



● Trend-graph display

Both the set temperature (and humidity) and the actual are stored in the memory and can be displayed on the monitor as a trend graph. The interval of measurements can be set manually.

These data can be transferred to a USB memory.



Trend-graph

● Information notification

The INFO icon will blink when chamber information is requiring your attention.

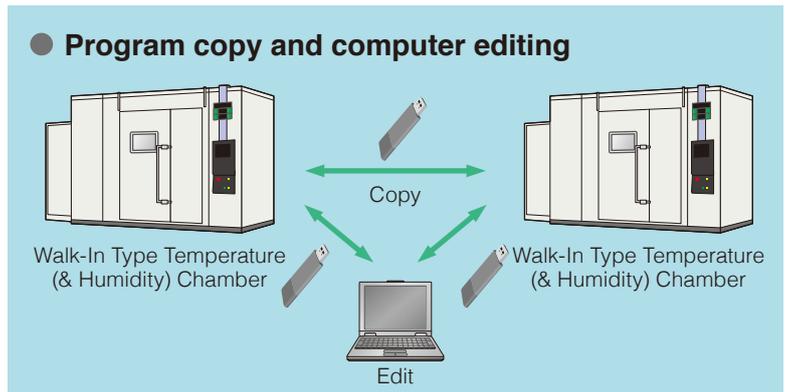
● Multi-lingual display

The controller supports:

- Japanese
- English
- Chinese (Traditional/Simplified)
- Korean

● Test profile edit and copy

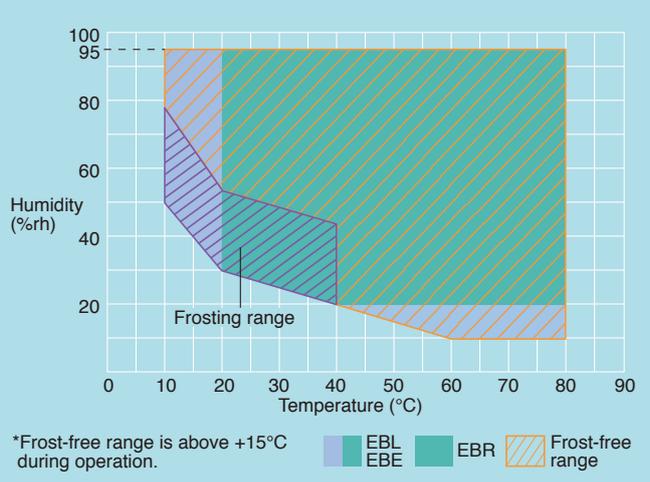
A test profile created on a computer can be copied to a chamber, and vice versa via the USB interface.



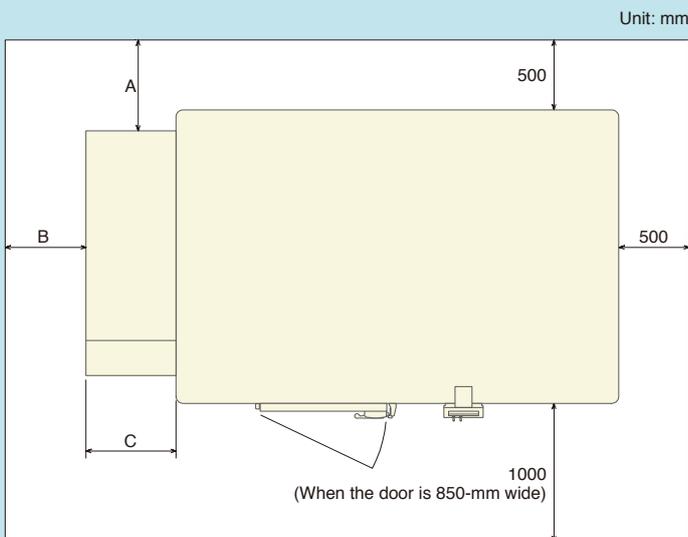
USB port

Series

| | Model | Temperature | Humidity |
|---------------------------------|-------|--------------|-------------|
| Temperature & Humidity Chambers | EBE | -40 to +80°C | 10 to 95%rh |
| | EBL | -30 to +80°C | 10 to 95%rh |
| | EBR | -10 to +80°C | 20 to 95%rh |
| Temperature Chambers | EBF | -40 to +80°C | |
| | EBU | -30 to +80°C | |
| | EBUU | -10 to +80°C | |



INSTALLATION SPACE



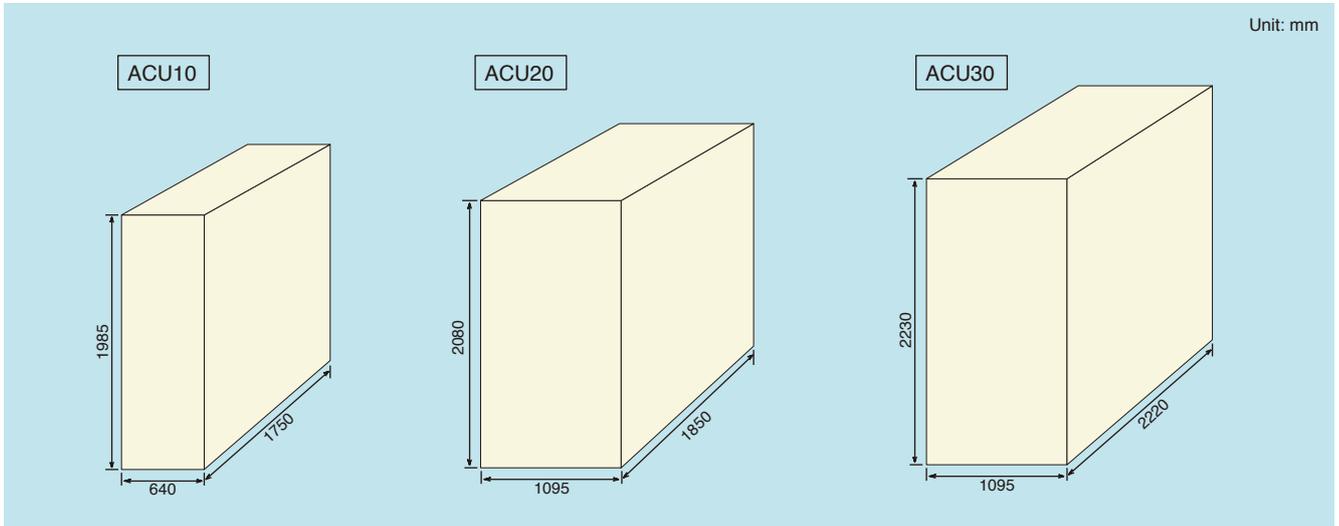
The space required for installation and maintenance is as follows.

| | A | B | C |
|--------------------|-----|-----|------|
| ACU10 Water-cooled | 0 | 600 | 640 |
| ACU10 Air-cooled | 0 | 800 | 890 |
| ACU20·30 | 700 | 800 | 1095 |

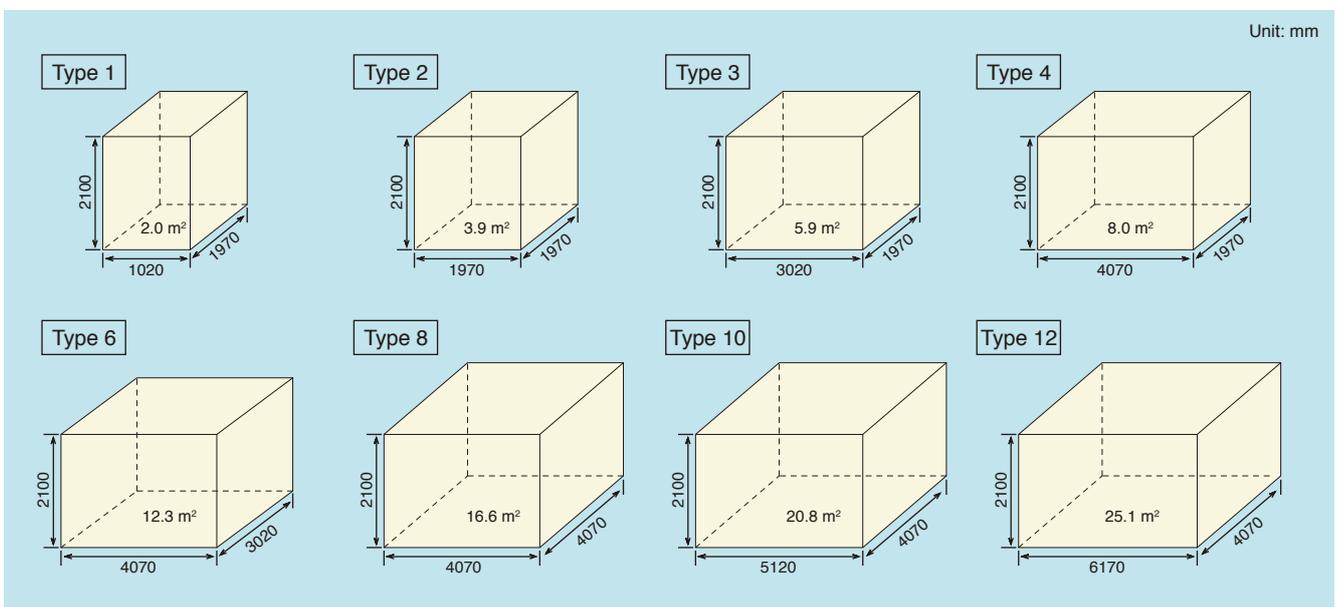
For details, please refer to the specifications.

Standard configuration

AIR CONDITIONER SIZE



TEST CHAMBER MODULE (INSIDE DIMENSIONS)



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 materials in the chamber. If corrosive substances or liquid is used, the life of the unit may be significantly shortened specifically because of the corrosion of stainless steel, resin and silicone materials.
- Do not place life forms or substances that exceed allowable heat generation.
- Be sure to read the operation manual before operation.

Please contact us for non-standard specification.

SPECIFICATIONS

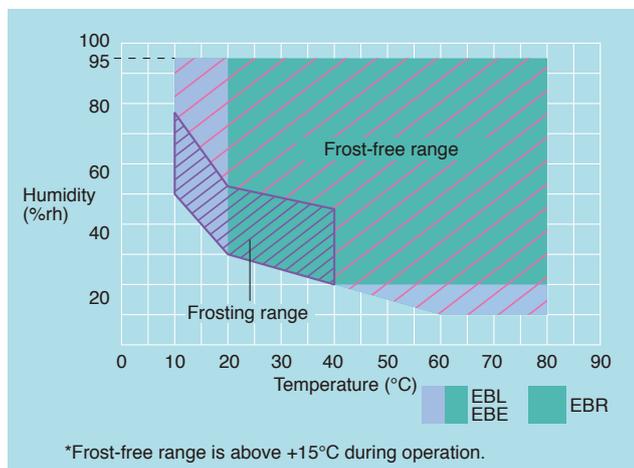
| Model | Walk-in Type Temperature & Humidity Chamber | | | Walk-in Type Temperature Chamber | | | |
|-------------------------------|---|--|---------------------------------|--|---------------------------------|---------------------------------|---------------------------------|
| | EBE | EBL | EBR | EBF | EBU | EBUU | |
| System | Balanced Temperature and Humidity Control system (BTHC system) Vapor pressure divide control system | | | Balanced Temperature Control system (BTC system) | | | |
| Allowable ambient conditions | 5 to +45°C/up to 75% rh | | | | | | |
| Performance*1 | Temp. range*2 | -40 to +80°C (-40 to +176°F) | -30 to +80°C (-22 to +176°F) | -10 to +80°C (+14 to +176°F) | -40 to +80°C (-40 to +176°F) | -30 to +80°C (-22 to +176°F) | -10 to +80°C (+14 to +176°F) |
| | Humid. range*2 | 10 to 95%rh (at +10 to +80°C) | | 20 to 95%rh (at +20 to +80°C) | — | | |
| | Temp. / Humid. fluctuation*3 | ±0.5°C/±4%rh | | | ±0.5°C | | |
| | Temp. variation in space*3 | 2.5°C | | | 2.5°C | | |
| | Temperature rate of change (Pull down)*3 | 0.4°C/min or higher | | | | | |
| | Temperature rate of change (Heat up)*3 | 1°C/min or higher | | | | | |
| Main unit (Panel assembly) | Exterior material | Color coated sheet metal | | | | | |
| | Interior material | 18-8 Cr-Ni stainless steel plate (SUS 304) | | | | | |
| | Floor load resistance | Equal load distribution: 6 kPa (600 kgf/m ²) | | | | | |
| | Door | Single opening door W850 x H1800 mm | | | | | |
| | Insulation | Hard urethane foam | | | | | |
| Refrigeration system | Single-stage refrigeration system Air-cooled condenser or water-cooled condenser | | | | | | |
| Refrigerant | R404A (R-449A is available on request.) \NEW/ | | | | | | |
| Machinery compartment | Fan motor, Humidifier, Heater, Refrigerator, Evaporator, Temperature sensor, Humidity sensor | | | Fan motor, Heater, Refrigerator, Evaporator, Temperature sensor | | | |
| Fittings | Viewing window (W180 x H289 mm), Cable port (Inside diameter 50 mm), Chamber lamp (LED), Ventilation system | | | | | | |
| Utility requirements | Power supply | 200V AC 3ø 50/60Hz (with ±5% of rated voltage) | | | | | |
| | | AC 220 V AC 3ø 50/60 Hz | | | | | |
| | | AC 380 V AC 3ø 50/60 Hz | | | | | |

*1 Performance figures are given for +5°C to +32°C ambient temperature, +25°C to +32°C cooling water temperature and no specimen inside the test area.

*2 The performance values are performances at the temperature sensor and humidity sensor (installed on the blow out of the air conditioner).

*3 The performance values are based on to IEC 60068-3-6:2001 (EBE, EBL, EBR), IEC 60068-3-5:2001 (EBF, EBU, EBUU).

TEMPERATURE & HUMIDITY CONTROL RANGE



OPTIONS

Status indicator light

Indicates three chamber states: OPERATION, PERSONNEL INSIDE, and ALARM.



Operation indicator

Indicates "OPERATION" during operation.

Personnel indicator

Indicates "PERSONNEL INSIDE" when workers have entered the temperature (humidity) chamber.

Alarm indicator

Indicates "ALARM" in red when a chamber fault occurs.

Revolving pilot lamp

In case of malfunction, the lamp connected to the safety circuit is activated, thus attracting the operator's attention even from a distance.



Emergency stop pushbutton

Stops the chamber immediately.



Operator safety mushroom

A mushroom-head button installed to protect workers who enter the temperature (humidity) chamber. When pressed, chamber operation stops and the safety buzzer issues an alarm.



Grounding terminal

A grounding terminal for test equipment used inside the temperature (humidity) chamber.



Electrical grounding in chamber

Each of the insulation panels are grounded and connected to the ground line in the power distribution board.

In-chamber work timer

The alarm lamp and buzzer is activated to inform the operators when the preset working time limit is over.

Intercom

Allows contact of personnel inside and outside the chamber.



Interior

Exterior

Cold-weather suit

We provide a set of protective clothing including headwear, a pair of gloves, a pair of boots and a two-piece suit. (For use in chamber under -40°C)

Leakage detector

Detects leakage with the leakage sensor.

Independent temperature overcooling alarm

In case of malfunction due to overcooling, operation is terminated and an alarm message is displayed, preventing freezing and damage to specimens inside the chamber.

Gas alarm

Detects concentrations of various gases in the chamber and activates a safety alarm when necessary to protect the personnel during a continuous operation.

Paperless recorder

Records the temperature of each section such as the temperature inside the chamber. The data can be transferred by USB.

Scan interval: 5 sec.

Internal recording media:

Flash memory 8MB

External recording media:

CF memory card port

(Includes a 256MB CF card)

USB memory port

Inputs: 6 channels



Temperature & humidity type

OPTIONS

Recorder (digital)

- No. 1 -50 to +100°C 100mm
6-dot system
- No. 2 -50 to 100°C / 0 to 100%rh 100mm
6-dot system



Recorder output terminal

This terminal outputs the temperature and relative humidity in the test area.

Humidity sensor (for temperature & humidity chambers only)

Eliminates the need to change wicks and can accommodate a range of measurements impossible with a dry bulb sensor, including low humidity ranges.

Thermocouple

Used for arbitrary temperature measurement points inside the temperature (humidity) chamber or measuring the specimen temperature..

Interior plug socket

To supply power inside the chamber. We provide two types of sockets according to use.



Time signal terminal

Adds additional terminals to the standard time signal terminals.

Remote control function

Test conditions can be changed and operation can be started or stopped from your PC over an Ethernet connection. (Web browser)



Run/stop operation

Interface

Communication port to connect the chamber to a PC.

- RS-485
- RS-232C
- GPIB

Communication cable

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

Additional cable port

Provided addition/replacement of the standard cable port (50 mm)

- ø25 mm
- ø50 mm
- ø100 mm
- ø150 mm



ø50 mm

Enlarged viewing window

The standard window (W180×H289 mm) can be changed to a larger type (W440×H295 mm). Tempered heat-resistant glass with defogging heater.



Large viewing window

Viewing window (installed on chamber wall)

Two viewing windows are available:

- Small (W350 × H250 mm)
- Large (W600 × H400 mm)

Heatproof reinforced glass with heat generator incorporated.

Hand-in ports (with viewing window W350 × H 250 mm)

Inner diameter: 150 mm (1 pair).

Useful when handling specimens in the chamber from outside.

Chamber lamp

- LED (adds the same as the standard accessory)
- Fluorescent lamp, ON when room temperature is +5°C to +40°C
- Incandescent lamp

Floor reinforcement

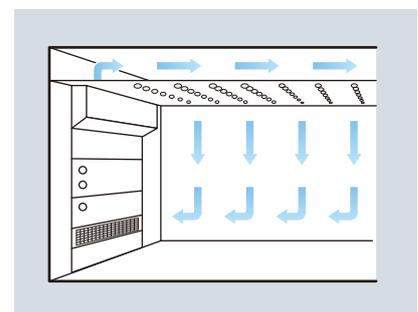
Distributes the concentrated load that occurs when specimens are carried into the chamber on a trolley, preventing distortions and dents in the floor. Additional frames to support the floor panels also enhance distributed load resistance.

Protective flooring (rubber type)

Prevents operators from slipping and prevents damage and dents.

Full-ceiling air duct

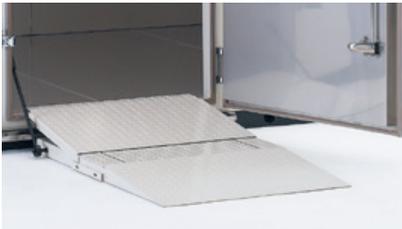
Lowers and stabilize air circulation speed to protect specimen.



OPTIONS

Insertion ramp

This ramp is used to move heavy specimens into the chamber. The ramp is available in a removable type and a lever type.



Insertion ramp (lever type)

Double swing door

The standard single door (W850 × H1800 mm) can be changed for a double swing door (W1400 × H1800 mm).



Additional door

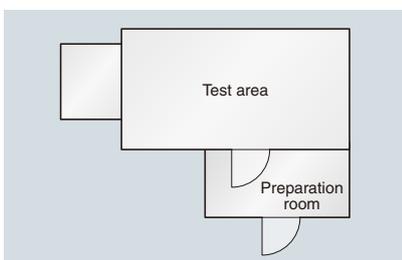
Two types are available: single-swing and double-swing doors. Both come with a viewing window (W180 × H289 mm).

Entrance curtain

Prevents atmospheric disturbance of temp. and humid. within the chamber when opening and closing the door.

Preparation room

Minimizes atmospheric disturbance of temperature and humidity when opening and closing the door. Also used as a measurement room for specimens.



Frost-free expansion (temperature & humidity chamber only)

Expands the temperature and humidity control range on the low temperature side and increases continuous operation time by preventing frost formation.

Airflow adjuster

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

Low humidity equipment (for temperature & humidity chambers only)

Expands the low-humidity range at low temperatures by using a dry-bulb dehumidifier.

Refrigerator for heat load

Refrigerators can be added to allow heat generation from the specimen during operation.

Auxiliary humidifier (for temperature & humidity chambers only)

Effective for heat load generation and high humidity specification. Pure water required.

Water purifier (for temperature & humidity chambers only)

Connects to the steam humidifier and optional auxiliary humidifiers. Improves the reliability of measurements over long periods of time and extends the life of the humidifiers.

- Reverse osmosis membrane water purifier
- Ion-exchange water purifier



Reverse osmosis membrane water purifier



Ion-exchange water purifier

Flow switch (for water-cooled models only)

This safety switch for refrigeration unit activates when the cooling water level becomes too low or cut off, and shuts down the equipment.

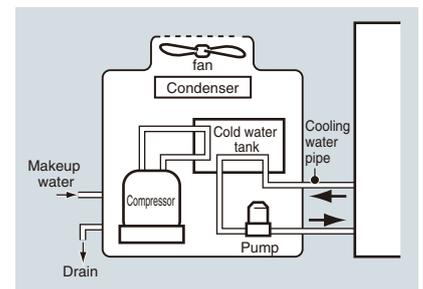
Exhaust air duct (for air-cooled type)

Exhausts hot air out of the refrigeration system. Installed on the upper part of the machinery compartment.

Air-cooled inverter chiller system

Supplies cooling water to water-cooled equipment. The system features a sealed circuit that can reduce the need to clean pipes.

- Water supply temperature 20 to 25°C



* 2year warranty

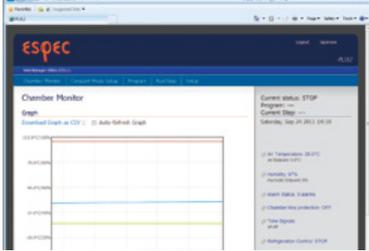
Operation Manual

- DVD
- Booklet

Water leak detection system and dew tray to catch dripping water are also available to detect and prevent water damages.

Characteristics

<Chamber monitor>



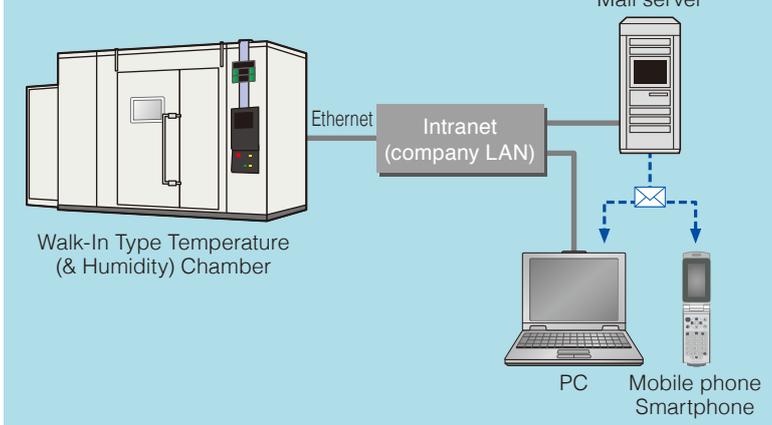
<Edit program (USB)>



Login privileges

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

Email alert



Remote monitoring

An Ethernet (LAN) port is equipped as standard, so it is possible to connect to and monitor the chamber operation conditions from a device such as a PC or a tablet. As an option, a Web browser can be used to communicate with chambers to perform tasks such as modifying test conditions, and starting and stopping its operation. Besides more, the remote communication area can be expanded by connecting to your intranet (a LAN inside your company).

Collecting chamber data

Network function or USB memory can be used to retrieve chamber data. The data can be opened as a list or graph thanks to a dedicated viewer or spreadsheet and can be used to check historical data.

Email alert

When an alarm is triggered, an email is sent to the registered PC or mobile address.
* Connection to a mail server is required to use e-mail alert.

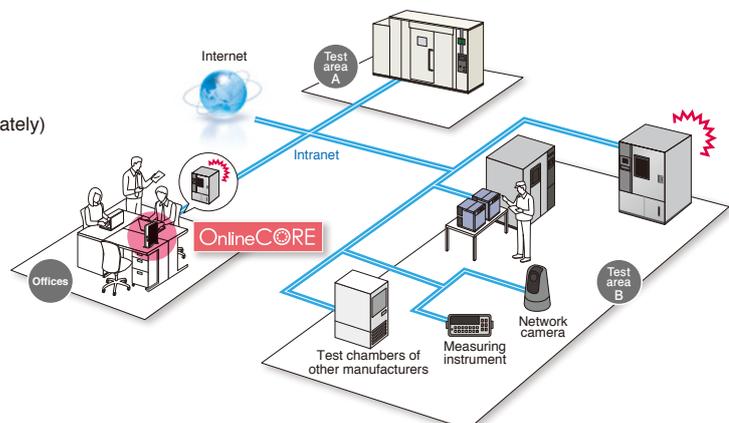
■ Copying and editing data on a computer with USB memory requires installation of the Pattern Manager Lite application software that comes with the chamber.

ESPEC OnlineCore

OnlineCORE (Sold separately)



Control system recommended for environmental chambers installations



Custom Equipments

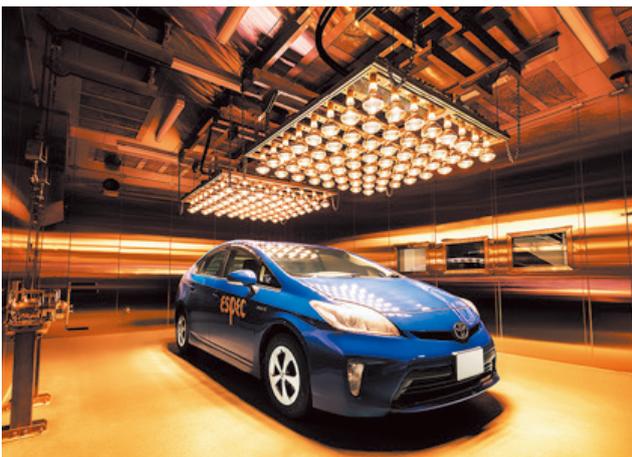
Customization is possible to suit the application. Please contact ESPEC or your distributor for details.



DRIVE-IN CHAMBER

Testing actual car in the simulated environment controlling temperature and humidity. The inspection machine automatically moves around the car to inspect the detection range of sensors that varies depending on temp. and humid. By programming conditions of temp. & humid., sensor location, and detecting method, continuous unattended operation is realized.

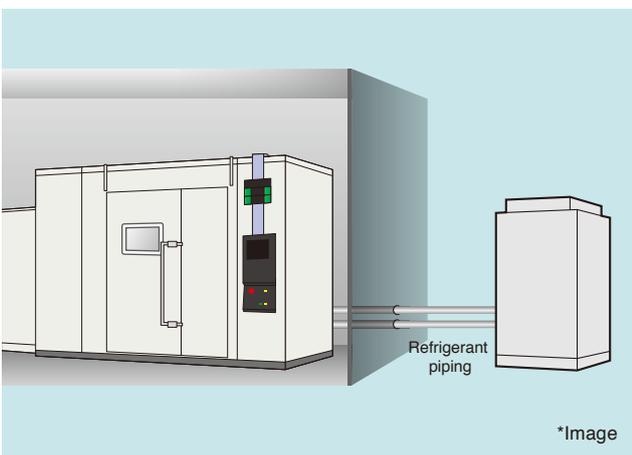
| | |
|----------------------|--------------------------|
| Temp. & Humid. range | -40 to +80°C/30 to 95%rh |
| Inside dimensions | W7000×D14000×H3000mm |



WEATHER SIMULATION CHAMBER

Testing actual car in the simulated environment controlling temperature and humidity. The inspection machine automatically moves around the car to inspect the detection range of sensors that varies depending on temp. and humid. By programming conditions of temp. & humid., sensor location, and detecting method, continuous unattended operation is realized.

| | |
|----------------------|--------------------------|
| Temp. & Humid. range | -40 to +80°C/30 to 80%rh |
| Inside dimensions | W5000×D8000×H3000mm |



OUTDOOR AIR COOLING

Change the condenser of the high-temperature side refrigeration unit to remote air cooling and install it outdoors.

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ISO 9001/JIS Q 9001

Quality Management System Assessed and Registered

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

* Registration : ESPEC CORP.
(Overseas subsidiaries not included)

ISO 14001 (JIS Q 14001)

Environmental Management System Assessed and Registered

ESPEC CORP.
(Overseas subsidiaries not included)