Bench-Top Type Temperature (& Humidity) Chamber

SH·SU

Specifications are subject to change without notice due to design improvements.

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Compact design for personal use, to network with your computer.

The bench-top type temperature and humidity chamber series feature environmental testing performance in a compact design. Available in 20 liters and 60 liters capacities, these models offer a temperature range from −20°C, −40°C, or −60°C, to +150°C or +180°C, while achieving excellent performance. The chamber comes with user-friendly touch panel display, allows three-way access to the chamber, and offering a broader range of options for superior expandability.
To minimize our chambers potential environmental impact

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

R-404A
GWP 3920

R-449A
GWP 1397

64% Reduction

*R-449A is available on request

22.5L model  64L model

* Shown are equipped with options. (Standard: ø 50mm cable port on the right (not shown))
Characteristics

High performance in a box

- **Wide Variations**
  With three temperature range patterns (−60°C, −40°C, or −20°C), two-volume selections (22.5L or 64L), and with or without humidity, the Bench-top chamber offers a total of 12 models to fulfill customers’ needs.

- **Full-size chamber performance in a compact design**
  All our models now have a temperature range that extends up to 180°C, with a humidity range running from 30% to 95%rh, in a small and lightweight structure that can even fit on a desk (22.5L model).

- **Rapid temperature changes of 5k/min.**

- **Utilizing unused space (Japanese patent No.5906225)**
  The top of the chamber has space, which was unused previously. But now it is redesigned as a storage space to store running cables neatly, store measuring instrument, or to store whatever equipment you feel necessary close to the chamber. (not available on 242-5 models & 115V AC & 200V AC with NEC spec.)

  **Top storage box**
  Size: W310xD250mm (SH/SU-222, 242, 262)
  W410xD400mm (SH/SU-642, 662)
  Inside load capacity: 5kg

- **3 YEAR WARRANTY**
Characteristics

- **Viewing window with LED light**
  The viewing window (option) for observing the test area now comes with an LED light. The window also comes with a transparent metal deposited thin film heater for easy viewing without condensation problem.

- **Various ways to “observe,” “touch,” and “operate.”**
  A hand-in port can be installed to either the right or left side of the chamber. The chamber with both the viewing window and hand-in port allows you to operate the specimen while viewing the inside of the chamber without opening the door.

- **Various stands to optimize chambers’ footprint**
  Equipped with casters, you can use the stand (option) to arrange your equipment and save space by stacking chambers and moving them whenever necessary.

- **Stands with additional features**
  The stands come in various styles including a stand with shelves for integration with other test equipment, a stand with an option box to accommodate paperless recorder or output terminal, a stand with additional humidifier water tank, and a stand with 19-inch rack mount.
  (See page 16 for details)

- **Convenient water supply method**
  You can access the standard water tank from the front of the chamber (Type SH). However, if you wish to execute a long or continuous humidity test, you can accommodate by adding a continuous water supply option or a roof top water tank option.
User-friendly touch-screen operation

- **Color LCD touch panel**
  N-Instrumentation with 4.3-inch touch panel display comes with originally designed human-machine-interface that allows easy navigation throughout its functions. The touch panel is pressure sensitive resistive type which allows you to operate even with gloves on.

- **Quick access icon**
  The star (★) mark on the top-right corner is a short-cut or quick access button, which you can assign by yourself. Once you assign it, you can access the function with a single push, instead of navigating through layers of menus.

- **Test data recording**
  The instrumentation comes with internal memory, to store sampling data such as temperature and humidity settings, and measured values. You can set recording ON and OFF, and its interval manually.

- **Trend-graph display**

- **Information notification**
  The INFO icon will blink when chamber information is requiring attention. By pressing the icon, you will find notifications such as “Check Humidity Tray” and “Check Wet Bulb Wick.”

- **Test profile registration**
  The controller allows you to register three constant test profiles, and eight program test profiles with a maximum of 99 steps per program.

- **Multilingual support**
  The controller supports:
  - Japanese / English / Korean
  - Chinese (Traditional / Simplified)

- **Copy test profiles**
  Share the test profiles among chambers via USB memory* instead of PC.
  * USB memory not included.
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>System</td>
<td>Balanced Temperature &amp; Humidity Control system (BTHC system)</td>
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<td></td>
</tr>
<tr>
<td>Temp. range</td>
<td>−20 to +150°C (−4 to +302°F)</td>
<td>−40 to +150°C (−40 to +302°F)</td>
<td>−60 to +150°C (−76 to +302°F)</td>
<td>−40 to +150°C (−40 to +302°F)</td>
<td>−60 to +150°C (−76 to +302°F)</td>
<td>−40 to +150°C (−40 to +302°F)</td>
</tr>
<tr>
<td>Temp. fluctuation</td>
<td>±0.3°C (−20 to +100°C) ±0.5°C (+100.1 to +150°C)</td>
<td>±0.3°C (−40 to +100°C) ±0.5°C (+100.1 to +150°C)</td>
<td>±0.3°C (−60 to +100°C) ±0.5°C (+100.1 to +150°C)</td>
<td>±0.3°C (−40 to +100°C) ±0.5°C (+100.1 to +150°C)</td>
<td>±0.3°C (−60 to +100°C) ±0.5°C (+100.1 to +150°C)</td>
<td>±0.3°C (−40 to +100°C) ±0.5°C (+100.1 to +150°C)</td>
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<tr>
<td>Temp. variation in space</td>
<td>2.5°C (−20 to +100°C) 4.0°C (+100.1 to +150°C)</td>
<td>2.5°C (−40 to +100°C) 4.0°C (+100.1 to +150°C)</td>
<td>2.5°C (−60 to +100°C) 4.0°C (+100.1 to +150°C)</td>
<td>2.5°C (−40 to +100°C) 4.0°C (+100.1 to +150°C)</td>
<td>2.5°C (−60 to +100°C) 4.0°C (+100.1 to +150°C)</td>
<td>2.5°C (−40 to +100°C) 4.0°C (+100.1 to +150°C)</td>
</tr>
<tr>
<td>Temp. performance</td>
<td>Heat up rate</td>
<td>3.2°C /min.</td>
<td>2.9°C /min.</td>
<td>5.0°C /min.</td>
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<tr>
<td></td>
<td>Pull down rate</td>
<td>2.1°C /min.</td>
<td>1.7°C /min.</td>
<td>5.0°C /min.</td>
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</tr>
<tr>
<td>Temp. extreme achievement time</td>
<td>Heat up time</td>
<td>From −20 to +150°C within 55 min.</td>
<td>From −40 to +150°C within 70 min.</td>
<td>From −60 to +150°C within 70 min.</td>
<td>From −40 to +150°C within 70 min.</td>
<td>From −60 to +150°C within 80 min.</td>
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<tr>
<td>Temp. extreme achievement time</td>
<td>Pull down time</td>
<td>From +20 to −20°C within 20 min.</td>
<td>From +20 to −40°C within 50 min.</td>
<td>From +20 to −60°C within 70 min.</td>
<td>From +20 to −60°C within 90 min.</td>
<td>From +20 to −40°C within 20 min.</td>
</tr>
<tr>
<td>Lowest attainable temp.</td>
<td>−20°C</td>
<td>−40°C</td>
<td>−60°C</td>
<td>−40°C</td>
<td>−60°C</td>
<td>−40°C</td>
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<tr>
<td>Hard part</td>
<td>Humid. range</td>
<td>30 to 95% rh (Refer to diagram on page 12)</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>Humid. fluctuation</td>
<td>±3.0% rh</td>
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<tr>
<td></td>
<td>Heater</td>
<td>Nichrome strip wire heater</td>
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<tr>
<td></td>
<td>Humidifier</td>
<td>Stainless steel cartridge heater</td>
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<tr>
<td></td>
<td>System</td>
<td>Mechanical single-stage refrigeration system</td>
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<td></td>
<td></td>
<td>Mechanical cascade refrigeration system</td>
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<tr>
<td></td>
<td>Construction</td>
<td>Refrigeration unit</td>
<td>Plate fin cooler</td>
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<td></td>
<td>Refrigerator</td>
<td>Hermetically sealed compressor, Air-cooled condenser, Expansion mechanism: Capillary tube system</td>
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<tr>
<td></td>
<td>Refrigerator capacity</td>
<td>400W</td>
<td>[Unit 1: 400W × 1, Unit 2: 400W × 1]</td>
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<tr>
<td></td>
<td>Refrigerant</td>
<td>R404A</td>
<td>R508A (R23 for 100V type), R404A</td>
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<tr>
<td></td>
<td></td>
<td>R-449A is available on request. (222-262=642-662 only)</td>
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<tr>
<td></td>
<td>Capacity</td>
<td>22.5 L</td>
<td>64 L</td>
<td>22.5 L</td>
<td></td>
<td></td>
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<tr>
<td>Chamber total load resistance</td>
<td>20 kg</td>
<td></td>
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<tr>
<td>Inside dimensions mm (inch)</td>
<td>W300×H300×D250 (W11.8×H11.8×D9.8)</td>
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<td></td>
<td></td>
<td>W400×H400×D400 (W15.7×H15.7×D15.7)</td>
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<td></td>
<td></td>
<td>W300×H300×D250 (W11.8×H11.8×D9.8)</td>
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<tr>
<td>Outside dimensions mm (inch)</td>
<td>W440×H690×D696 (W17.3×H27.1×D27.4)</td>
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<tr>
<td></td>
<td></td>
<td>W440×H690×D786 (W17.3×H27.1×D30.9)</td>
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<tr>
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<td></td>
<td>W540×H730×D921 (W21.2×H28.7×D36.2)</td>
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<tr>
<td></td>
<td></td>
<td>W440×H690×D786 (W17.3×H27.1×D30.9)</td>
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<td></td>
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<tr>
<td>Weight</td>
<td>83 kg (78 for 100V type)</td>
<td>105 kg</td>
<td>130 kg</td>
<td>106 kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allowable ambient conditions</td>
<td>+5 to +35°C (+41 to +95°F)</td>
<td></td>
<td></td>
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<tr>
<td>Power supply</td>
<td>100V AC 1p 50/60Hz</td>
<td>11.3 A</td>
<td>15.0 A</td>
<td>17.5 A</td>
<td>16.7 A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>115V AC 1p 60Hz (NEC)</td>
<td>12.8 A</td>
<td>——</td>
<td>——</td>
<td>——</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200V AC 1p 50/60Hz</td>
<td>——</td>
<td>14.0 A</td>
<td>14.5 A</td>
<td>10.6 A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>220V AC 1p 50/60Hz</td>
<td>5.4 A</td>
<td>13.5 A</td>
<td>14.0 A</td>
<td>9.3 A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>230V AC 1p 50/60Hz</td>
<td>5.3 A</td>
<td>13.5 A</td>
<td>14.0 A</td>
<td>9.2 A</td>
<td></td>
</tr>
<tr>
<td>Noise level</td>
<td>Between 42 and 50 dB</td>
<td>Between 42 and 54 dB</td>
<td>Between 48 and 53 dB</td>
<td>Between 42 and 54 dB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exhaust heat quantity</td>
<td>3500 kJ/h (836 kcal/h)</td>
<td>4000 kJ/h (955 kcal/h)</td>
<td>5040 kJ/h (1204 kcal/h)</td>
<td>5700 kJ/h (1361 kcal/h)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1 The performance values are based on IEC 60068-3-5:2001 for the temperature chamber, IEC 60068-3-6:2001 for the humidity chamber. Performance figures are given for a +23°C ambient temperature, 65% rh, rated power supply and no specimens inside the test area. However, the lowest attainable temperature is given for a max. ambient temperature of +30°C. Heat-up time is the achieved time from lowest temperature to highest temperature within temperature range.

*2 Excluding protrusions.

*3 At ambient temperature +23°C.

*4 200V AC available with or without NEC specifications. SH-242-5 not available with NEC specification.

*5 Compliance with CE Marking.

*6 Measurements are to be taken in an anechoic room at a height of 1.2m from the floor and a distance of 1m from the chamber front panel (ISO 1996-1:2003 _ A-weighted sound pressure level)
**TEMPERATURE & HUMIDITY CONTROL RANGE (SH)**

- **Relative Humidity (%)**
  - 0 to 100

- **Temperature (°C)**
  - 10 to 85

- 95%rh

*At ambient temperature +23°C

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**DIMENSIONS (SH)**

- **SH-222·242**
  - Unit: mm
  - Dimensions: 440 x 696 x 34

- **SH-642·662**
  - Dimensions: 540 x 921 x 5

- **SH-242·5·262**
  - Dimensions: 440 x 786 x 31

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**DIMENSIONS (SU)**

- **SU-222·242**
  - Unit: mm
  - Dimensions: 440 x 696 x 34

- **SU-642·662**
  - Dimensions: 540 x 921 x 5

- **SU-242·5·262**
  - Dimensions: 440 x 786 x 31

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**Low GWP Refrigerant**

- R-449A is available on request.

(Sh/SU-222, 262, 642, 662 only)

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*Low GWP Refrigerant*
### System

<table>
<thead>
<tr>
<th>Model</th>
<th>SU-222</th>
<th>SU-242</th>
<th>SU-262</th>
<th>SU-642</th>
<th>SU-662</th>
<th>SU-242-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>System</td>
<td>Balanced Temperature Control system (BTC system)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temp. range</td>
<td>−20 to +150°C (−4 to +302°F)</td>
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<td>−60 to +150°C (−76 to +302°F)</td>
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</tr>
<tr>
<td>Temp. fluctuation</td>
<td>±0.3°C (−20 to +100°C)</td>
<td>±0.5°C (+100.1 to +150°C)</td>
<td>±0.3°C (−60 to +100°C)</td>
<td>±0.5°C (+100.1 to +150°C)</td>
<td>±0.3°C (−60 to +100°C)</td>
<td>±0.5°C (+100.1 to +150°C)</td>
</tr>
<tr>
<td>Temp. variation in space</td>
<td>2.5°C (−20 to +100°C)</td>
<td>4.0°C (+100.1 to +150°C)</td>
<td>2.5°C (−60 to +100°C)</td>
<td>4.0°C (+100.1 to +150°C)</td>
<td>2.5°C (−60 to +100°C)</td>
<td>4.0°C (+100.1 to +150°C)</td>
</tr>
<tr>
<td>Temp. performance</td>
<td>Heat up rate</td>
<td>3.2°C /min.</td>
<td>2.9°C /min.</td>
<td>5.0°C /min.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pull down rate</td>
<td>2.1°C /min.</td>
<td>1.7°C /min.</td>
<td>5.0°C /min.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temp. rate of change</td>
<td>Heat up time</td>
<td>Between 42 and 54 dB</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>Pull down time</td>
<td>Between 42 and 50 dB</td>
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</tbody>
</table>

### Construction

- **Heater**: Nichrome strip wire heater
- **System**: Mechanical single-stage refrigeration system
- **Cooler**: Plate fin cooler
- **Refrigerator**: Hermetically sealed compressor, Air-cooled condenser, Expansion mechanism: Capillary tube system
- **Refrigerator capacity**: R404A (R23 for 100V type), R404A
- **Refrigerant**: R449A is available on request. (222-262-642-662 only)
- **Capacity**: R23, R404A
- **Chamber total load resistance**: 20 kg
- **Inside dimensions (mm) (inch)²**: W300×H300×D250 (W11.8×H11.8×D9.8)
- **Outside dimensions (mm) (inch)²**: W440×H625×D696 (W17.3×H24.6×D27.4)
- **Weight**: 78 kg (73 for 100V type) 100 kg 123 kg 101 kg
- **Allowable ambient conditions**
  - 100V AC 1φ 50/60Hz: 9.3 A 15.0 A 17.5 A 16.7 A
  - 115V AC 1φ 60Hz (NEC): 11.0 A
  - 200V AC 1φ 50/60Hz: 14.0 A 14.5 A 10.6 A
  - 220V AC 1φ 50/60Hz: 4.5 A 13.5 A 14.0 A 9.3 A
  - 230V AC 1φ 50Hz: 4.4 A 13.5 A 14.0 A 9.2 A
- **Noise level**: Between 42 and 50 dB
  - 42 and 50 dB
  - 48 and 53 dB
  - 42 and 54 dB
- **Exhaust heat quantity**: 3500 kJ/h (836 kcal/h) 4000 kJ/h (955 kcal/h) 5040 kJ/h (1204 kcal/h) 5700 kJ/h (1361 kcal/h)

- ¹ The performance values are based on IEC 60608-3-5:2001 for the temperature chamber, IEC 60608-3-6:2001 for the humidity chamber. Performance figures are given for a +23°C ambient temperature, 65% rh, rated power supply and no specimens inside the test area. However, the lowest attainable temperature is given for a max. ambient temperature of +30°C. Heat-up time is the achieved time from lowest temperature to highest temperature within temperature range.
- ² Excluding protrusions.
- ³ At ambient temperature +23°C.
- ⁴ 200V AC available with or without NEC specifications. SU-242-5 not available with NEC specification.
- ⁵ Compliance with CE Marking.
- ⁶ Measurements are to be taken in an anechoic room at a height of 1.2m from the floor and a distance of 1m from the chamber front panel (ISO 1996-1:2003 _ A-weighted sound pressure level)
SAFETY DEVICES

- Control circuit overcurrent protection (except SH/SU-222, 242)
- Cartridge fuse for control circuit short-circuit protection
- System error (Error)
- Room temperature compensation burnout detection circuit
- Dry bulb temperature burnout detection circuit
- Absolute upper/lower temperature limit alarm (w/ built-in T/H controller)
- Expansion analog board sensor burnout detection circuit (SH/SU-242-5 only)
- Temperature switch for air circulator
- Thermal fuse
- Temperature switch for condenser fan
- Overheat protector
- Wet bulb temperature burnout detection circuit (SH only)
- Refrigerator-1 error detection
- Refrigerator-2 error detection (except SH/SU-222, 242)
- Humidifier dry heat protector (SH only)
- Humidifier water level detection (SH only)
- Temperature upper limit deviation alarm (w/ built-in T/H controller)
- Absolute upper/lower humidity limit alarm (SH only) (w/ built-in T/H controller)
- System error (Alarm)
- Water tank drought switch (SH only)
- Chamber door switch
- Water tank low-level switch (SH only)
- Specimen power supply control terminal

FITTINGS

- Temperature (Humidity) recorder terminal
- Specimen power supply control terminal
- Alarm output terminal
- External output terminal
- Cable port (φ 50 mm × 1)
- Power cable (except 222, 242 model)
- Water supply tank (SH only)
- Humidifying tray drain plug (SH only)
- Drain hose
- Drain socket for water sensor box (SH only)
- Ethernet port (LAN)
- USB memory port
- Instrumentation interlock output terminal
- Instrumentation interlock input terminal

ACCESSORIES

- Shelf (Stainless steel)
  Load capacity (evenly distributed)
  SH/SU-222, 242, 262, 242-5 .......................... 0.5kg
  SH/SU-642, 662 ........................................... 5kg
  Max. number of shelves
  SH/SU-222, 242, 262, 242-5 .......................... 5 stages (pitch 35mm)
  SH/SU-642, 662 .......................... 5 stages (pitch 50mm)
- Connector (For temperature/humidity recorder terminals)
  SH: 2/ SU: 1
- Cable port plug (rubber) ........................... 1 (φ 50 mm)
- Cartridge fuse
  SH/SU-222, 242, 262 (B type, 250V 7A) .......................... 1
  SH/SU-642, 662, 242-5 (B type, 250V 7A, 6A) .......................... 1 of each
- Wet-bulb wick .............................................. 1 box (SH only)
- Humidifying tray drain hose 2m .......................... 1 (SH only)
- Drain hose for water sensor box (0.3m) .............. 1
- Stylus pen (For touch panel operation) ............ 1
- Operation manual ........................................ 1 set

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.
- Do not place life forms or substances that exceed allowable heat generation.
- Be sure to read the user's manual before operation.
Options

Utility

Power plug (220V AC only)

- C type
- O type
  * For SH/SU-222, 242, 262 only

Continuous water supply

Equips the chamber with a connection for purifying water supply system. There are 2 types available:
- Connection port with pressure-reducing valve
- Connection port without pressure-reducing valve

Roof top water tank

An additional tank that supplements the volume of the standard cartridge tank is provided to carry out continuous operation.
Effective water volume: 5L
Location: Chamber ceiling
* The connection port without pressure-reducing valve is required when selecting this option.

Automatic water refill

Automatically refill water to the humidifying tray and the wick pan periodically.

Wet-bulb wick

Same as the standard accessory.
1 box (24 wicks, 1 dropper)

Observation

Door with viewing window

The door is equipped with an LED light so that the chamber can be more easily observed during testing.

22.5L type: W215 × H190 mm
64L type: W215 × H290 mm
* Standard performance may not be met under certain conditions. Inquire for details.

[Example]
- SH/SU-242 Temp. extreme achievement time (Pull down time)
  From +20 to −35°C (Setting: −40°C)
  Within 60 min.
- SH/SU-242-5 Temp. rate of change (Heat up rate)
  From −21 to +131°C  4.0°C/min.
- SH/SU-242-5 Temp. rate of change (Pull down rate)
  From +131 to −21°C  4.0°C/min.

Roof top viewing window

Effective view: W181 × D107 mm
* Not available on SH/SU-242-5
* Standard performance may not be met under certain conditions. Inquire for details.

[Example]
- SH/SU-242 Temp. extreme achievement time (Pull down time)
  From +20 to −35°C (Setting: −40°C)
  Within 60 min.

Inner glass door

A glass door is provided between the test area and the chamber door to observe specimens.
The glass door is equipped with a wiper for models with humidity.
* Standard performance may not be met under certain conditions. Inquire for details.
[Example]
- SH/SU-242-5 Temp. rate of change (Heat up rate)
  From +21 to +131°C  4.0°C/min.
- SH/SU-242-5 Temp. rate of change (Pull down rate)
  From +131 to −21°C  4.0°C/min.

Hand-in port

Equip the chamber with hand-in port to operate specimen under test.
<For inner glass door>
φ 130mm × 1, at the center of the inner glass door.
<For chamber side wall>
φ 130mm × 1 (select left or right side)
Any hand-in port selected comes with radial rubber seal.

*To prevent damage in the event of water leakage when installing the following optional products, a dew tray (page 15) and other preventive measures can be prepared.
- Continuous water supply
Specimen setting

**Additional cable port**

Provided in addition/ replacement of the standard cable port (right side, φ 50mm).

Available location:
- Left side, right side
- Ceiling

Available dimensions:
- φ 25 mm
- φ 50 mm
- φ 100 mm
- Flat cable port (W100 × H25 mm)

* Comes with a rubber plug and a cap.
* Standard performance may not be met under certain conditions. Inquire for details.

**EZ connect cable port plug**

Cable port plug w/ embedded terminals for power supply.

Cable port plug with embedded terminals (inside and outside) to ease specimen connection to an external device.

Spec.: AC 6 to 24V 0.1 to 3A
- DC 1.5 to 60V 0.1 to 3A

Connector Type: Block 10P (+5P, −5P)

Enclosure: Magnetized box with isolator

Temperature Range:
- −70 to +180℃
- 30 to 95%rh

---

**Cable port rubber plug**

Comes with the cable port.
- for φ 25 mm
- spiral-wrapped plug (5 × 50 × 2000 mm)
- for φ 50 mm
- For flat cable port
- for φ 100 mm
- For φ 50 mm with slits
- For φ 100 mm with slits

---

*Top not available on SH/SU-242-5*

*Standard equipped*
Specimen setting

**Shelf**
Same as standard shelf. 18-8 Cr-Ni Stainless steel

**Cable organizer kit**
The kit includes:
- cable ties
- magnetic cable cover
- dew tray

**Noise reduction rear cover**
A cover is added on the rear side of the chamber to help:
- lower further chamber noise
- direct exhaust air toward the ceiling
- store wires in order inside the cover

**Specimen basket**
For small specimens that cannot be placed on the shelf.
Material: 18-8 Cr-Ni Stainless steel
Dimensions: W206 × H40 × D156 mm

* Place the specimen on the shelf.
* Do not use when exceeding the shelf load capacity.

<table>
<thead>
<tr>
<th>20L type</th>
<th>60L type</th>
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</thead>
<tbody>
<tr>
<td><strong>Effective dimensions</strong></td>
<td><strong>Effective dimensions</strong></td>
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<tr>
<td>W284</td>
<td>W392</td>
</tr>
<tr>
<td>H34</td>
<td>H21</td>
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<tr>
<td>D231 mm</td>
<td>D378 mm</td>
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<tr>
<td><strong>Load capacity</strong></td>
<td><strong>Load capacity</strong></td>
</tr>
<tr>
<td>0.5 kg</td>
<td>5 kg</td>
</tr>
</tbody>
</table>

Network

**Interface**
Communication ports to connect the chamber to a PC.
- RS-485
- RS-232C
- GPIB

**Communication cables**
- RS-485 5m / 10m / 30m
- GPIB 2m / 4m
Options

Measurement

**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 port
(Includes a 256 MB CF card)
USB memory port

*Options*<br>
<br>
< Temperature & humidity type >
No. of inputs:
Temperature 1, Humidity 1
(4 more channels can be turned ON)

< Temperature type >
No. of inputs:
Temperature 1
(5 more channels can be turned ON)

- Portable type
- Installed on the option box

**External output terminal set (× 3)**

The following contact signals are installed on the option box, or stand with option box.
- Time up output terminal
  Enables power supply and/or temperature measurement of the specimen synchronised with the timer.
- Time signal terminal
  Add up to 10 signal terminals to the 1 equipped as standard.
- Temp. & humid. SP attainment output
  Sends out a contact signal when the chamber reaches temperature (humidity) set values.

**Temperature recorder output terminal (Wet-bulb temperature)**

This terminal outputs the test area wet bulb temperature.
* SH type only.

**Thermocouple**

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

**Applying DC power supply**

Capable of applying voltage to the specimen, used for bias testing. The DC power supply unit synchronizes with constant program operations, and can be set for each temperature and humidity program step.
- 5V
- 12V
- 15V
- 24V
- 48V
* Not available on SH/SU-242-5

**Option box**

Box prepared to install additional options such as:
- Paperless recorder (stand embedded)
- External output terminal set (x3)
- Specimen temperature control
- Program-synched DC power supply
The option box can be embedded on a stand (Refer to stand configuration page 20), or standalone (for example, put on the chamber top free space, etc.)
**Performance**

**Specimen temperature control**
Sensors are attached to the specimen to allow exposure tests that provide temperature stress to the specimen.
- Insulated type
* Not available on SH/SU-242-5

**Electrostatic capacitance-type humidity sensor control**
Attached in place of the wet bulb wick.
Measurement range: 0 to 100%rh
Accuracy: ± 2%rh
(-20°C to +40°C and 0 to 90%rh)

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

**Safety**

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

**External device alarm input terminal**
Equips the chamber with a terminal that is used to stop operation of the chamber in the event that an external device linked to the chamber 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**
Please select lighted or blinking, and requirement of buzzer sound.
Displayed levels: up to level 4
Pole length: 226mm
* The length can be reduced by 10mm (up to 56mm)
* With stand or stacking chamber, please contact us.

**Emergency stop pushbutton**
Stops the chamber immediately.
Available with or without guard.

**Chamber dew tray**
Prevents water leaks from the chamber onto the floor.

**Document**

**Operation manual**
- CD
- Booklet

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

Stand variation

Stand equipped with casters for easy transfer or transportation. (leveling feet provided)
Choose among 3 sizes: C (Dolly type), L (Low type) or H (High type)

Dimensions : mm  For SH/SU-642-662 (For 222-242.262-242-5)

H type

The C type stand fits on the lower part.

- **With shelf**
  Move the shelf to install instrumentation or measurement devices.

- **With option box**
  Following options can be installed.
  - Paperless recorder
  - Output terminal set
  - Specimen temperature control
  - Program-synched DC power supply

- **With 19 inch rack**
  19 inch size instrumentation or controller can be set to the rack.

M type

- **With shelf**
  shelf : adjustable 3 pitches

- **With water tank**
  With water capacity : 20L (10L)
  Drainage capacity : 20L (10L)

- **With option box**

L type

- **With shelf**
  shelf : adjustable 3 pitches

- **With water tank**
  Capacity : 18L

- **With option box**

C type

- **With 19 inch rack and C type**

- **H type and L type with option box**

* For safety reasons, make sure to secure the chamber and the stand together with anchoring fixtures. We also recommend to fix the stand itself to the floor.
* Please inquire for 2-stage stacked chambers.
<table>
<thead>
<tr>
<th>Page</th>
<th>OPTION</th>
<th>SH 222</th>
<th>SH 242</th>
<th>SH 262</th>
<th>SH 642</th>
<th>SH 242-5</th>
<th>SU 222</th>
<th>SU 242</th>
<th>SU 262</th>
<th>SU 642</th>
<th>SU 242-5</th>
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<td>Stand variation</td>
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</tbody>
</table>

*1 except 115V AC NEC, 200V AC NEC
*2 The option box is required when selecting these options.
*3 C type only

Chamber performance may not satisfy specifications depending on the combination of options.
Chambers can be operated from PC and tablet

- **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 through a browser**

  It is possible to edit the test profiles registered in the chamber through a web browser.

- **Displaying data in trend-graph**

  Settings and measured data saved in the chamber can be displayed in graphs on a web browser.

- **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.

### Login privileges

<table>
<thead>
<tr>
<th>Privileges</th>
<th>Screen</th>
<th>Chamber monitor</th>
<th>Constant/Program setup</th>
<th>Run/Stop</th>
<th>Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
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<tr>
<td>Operator</td>
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<td>User</td>
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</tbody>
</table>

### Email alert

- **Email alert**

  - Ethernet
  - Intranet (company LAN)
  - Mail server
  - PC
  - Mobile phone
  - Smartphone

### ESPEC OnlineCore

**OnlineCORE**

(Sold separately)

Central control system recommended for multiple environmental test chambers installations

* Requires an intranet

Supported browser: Internet Explorer 11
Instrumentation Interlock I/O Terminals
The chamber comes with I/O terminals as a standard, which allows the chamber to work in synchronization with external measuring instrumentation such as a multimeter.

Three-way access
Chamber comes with a φ 50mm cable port on the right side as a standard, but you can enlarge it and or add more cable ports on the right, left and the top.

EZ connect cable port plug (option)
The easier connection between a device under test (DUT) and external peripheral requires less time for a test preparation.

International standards
Complies with the following standards:
- ISO 12100 Safety of Machinery
- IEC 60204 Low Voltage
- IEC 61000-6-2 EMC
- IEC 61000-6-4 EMC

Custom-made Equipment
Safety package for Battery charge / discharge testing
- Options prepared for battery testing, like safety doorlock, pressure relief vent, heat detector, gas detector, etc.
- All necessary features are prepared as one package for all units, offering a reduced total cost.