Bench-Top Type Temperature (& Humidity) Chamber

SH-221 • 241 • 261 • 641 • 661
SU-221 • 241 • 261 • 641 • 661
Compact design for personal use
Ready to network with your computer.

Introducing a new lineup of our Bench-top Type Temperature (& Humidity) Chamber Series. Our latest models achieve superb performance in a compact size, and attains temperatures as low as \(-20^\circ C\) / \(-40^\circ C\) / \(-60^\circ C\), with capacity of 20L or 60L. They provide high performance and quality features with new capabilities for integration with our information network system \(\text{E-PILOT 21}\). It is useful for centralized control and data processing, as well as operating chamber control and specimen measurement at the same time. All brought to you by ESPEC.
Viewing window and stand are optional.
Small size & light weight

Chamber size is a compact 440W × 560H × 695Dmm (excluding protrusion), while its weight is only 66kg. Ensured the inside test area dimension at 300W × 300H × 250Dmm. (SU-221・241 100V AC model).

Compact design with high performance - - - SH-661

The new model SH-661 achieves -60 to +150°C/30 to 95%rh in a compact design, and shows outstanding performance than any other previous bench-top models.

Select your optimum chamber from a full variation

The series provide six variations in temperature (& humidity) range of -20°C / -40°C / -60°C to +150°C (and 30 to 95%rh), and two capacities of 20L or 60L, with a total of 10 models altogether. A wide temperature (& humidity) range is offered in a bench-top model, enabling you to choose the right chamber.
User-friendly

- **Newly developed refrigeration system that saves energy consumption up to 55%**
  
  Our exclusive refrigerator capacity variable control system saves up to 55% energy consumption compared to our previous model.

- **Optional stand for space-saving layout**
  
  For use in limited space, we provide an exclusive stand with casters for stacking up to three chambers.

  *Be sure to secure the stand onto the floor with earthquake resistant fittings for your safety when using stand.

- **Recycling**
  
  Molded resin and metal parts which can be recycled are clearly marked to make recyclable materials easier to identify during disassembly.

- **Ozone layer protection**
  
  The HFC refrigerant used is completely safe for the ozone layer.

- **Paperless Recording (optional)**
  
  The paperless recorder makes it easy record the temperatures of different components, such as the chamber temperature, on a memory card (Compact Flash).
User-friendly

- Cable ports for running in wires
  Each one 25mm diameter cable port is standard equipped on both sides of the chamber for wiring to the specimen. We also provide 50mm, 100mm diameter port and flat type cable port.

- Cartridge tank for easy water supply
  Once water is supplied into the tank, continuous operation is maintained for three days. Maintenance can be done easily from the front side. Additional water tank connection is available for further extended operation. (SH model)

- Right-opening door (optional)
  You may want to change the direction of opening the door to fit the installation space.

- Viewing window for observation (optional)
  A large window provides a clear view of your specimen during testing.
  (215W × 215Hmm for 20L model, 215W × 315Hmm for 60L model)
  *The basic specification of the chamber will be modified.

- Flexible Computer Interface
  Communication port RS-485 is equipped as standard. You can select RS-232C, GP-IB, and E-BUS communication port as option.
Control operation

- **Easy operation with 9 keys**
  Temperature & humidity setting, timer setting, and upper/lower temperature & humidity limit alarm setting can be done with simple key operation.

- **Programming operation of up to 9 steps**
  In addition to constant setting, programming instrumentation is equipped to allow programmable operation to a maximum of 9 steps per pattern and the rise and fall gradient of temperature (& humidity) to be set to meet the application requirements for temperature characteristic testing and temperature (& humidity) cycle testing. Maximum 99-time repeat function and operational setting function after program execution are just two of the various functions offered.

### Description of program function

<table>
<thead>
<tr>
<th>Program function</th>
<th>Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step program</td>
<td><img src="image1.png" alt="Step program diagram" /></td>
</tr>
<tr>
<td>Temperature gradient program</td>
<td><img src="image2.png" alt="Temperature gradient program diagram" /></td>
</tr>
<tr>
<td>Termination program</td>
<td><img src="image3.png" alt="Termination program diagram" /></td>
</tr>
</tbody>
</table>

*1 Sets a program repetition frequency between a range of 1 and 99.

*2 Selects HOLD, CONST or OFF when a program is over.*
**Communication Network of Environmental Test Chambers**

Bench-top type temperature & humidity chamber incorporates the communication port RS-485 as standard to cope with the E-PILOT 21, which is a newly developed centralized control system. E-PILOT 21 not only serves as a system for centralized control of environmental chambers, but also establishes an open network including specimen measurement function and remote chamber maintenance function.

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**E-PILOT (ERC-100S)**

The high-level of functions offered by ERC-200M is included in a non-networked package, meant for a single chamber to be interfaced with your personal computer. The RS-232C communications port option is required, but the software is free.

- **For one-to-one users**
  If you are not ready to establish a network of test chambers, this software would be an ideal trial of the capabilities of our ERC-200M package.

- **Freeware**
  ERC-100S can be downloaded from our website for free at [www.espec.co.jp/english](http://www.espec.co.jp/english).

**E-PILOT (ERC-200M)**

Control, monitoring, programming, and datalogging for up to 16 ESPEC chambers can be performed through a single PC. RS-485 from ESPEC chambers connect via a serial bus converter to RS-232C on the PC.

- **Remote operation**
  Have full control of test chambers while sitting in your office.

- **Potential savings**
  Because the ERC-200M allows program operations to be run directly from the PC, test chambers with less-expensive single-setting controllers can be used.

- **E-BUS version available**
  For existing units with E-BUS system, ERC-100M is available.

*The series of application softwares and network systems are provided on a separate basis from the chamber.

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**E-PILOT (ERC-300M)**

Set up an Intranet Web-PILOT site to allow monitoring of up to 16 chambers through one PC (possible with E-BUS communications system). Monitor the settings and operation of your chambers from any PC on the Intranet. Web-based method allows display of chamber information across many computer platform types.

**E-PILOT (LabVIEW)**

Provides an interlocking system of testing and measuring devices that allows customers currently using LabVIEW to link to ESPEC chambers, opening new horizons for environmental testing. Optional E-BUS or GP-IB (IEEE-488) communications interface is required.

- **Driver software to connect test chambers are provided for free**
  LabVIEW drivers are available to give the basic building blocks for addressing ESPEC equipment. Drivers required for connecting ESPEC products to a personal computer is provided for free. For further information, please contact your nearby ESPEC sales office.

**CMS . J30**

This is a fully customizable system that provides centralized control, centralized monitoring, remote operation and specimen data management of ESPEC products (up to 32 units of which 16 are dedicated to centralized monitoring) by the use of a PC. (E-BUS compatible)

* Please contact us for further information.
<table>
<thead>
<tr>
<th>Model</th>
<th>SH-221</th>
<th>SH-241</th>
<th>SH-261</th>
<th>SH-641</th>
<th>SH-661</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>100V AC 50/60Hz, 115V AC 50/60Hz, 220V AC 50/60Hz, 230V AC 50/60Hz</td>
<td>100V AC 50/60Hz, 200V AC 50/60Hz, 220V AC 50/60Hz, 230V AC 50/60Hz</td>
<td>230V AC 1 50Hz (Compliance with CE Marking)</td>
<td></td>
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<tr>
<td>Voltage</td>
<td>100V</td>
<td>12.5A</td>
<td>13.5A</td>
<td>18.0A</td>
<td>20V</td>
</tr>
<tr>
<td>Current</td>
<td>115V</td>
<td>12.0A</td>
<td>13.0A</td>
<td>—</td>
<td>50V</td>
</tr>
<tr>
<td>Temperature and humidity control system</td>
<td>Balanced Temperature &amp; Humidity Control system (BTHC system)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation temperature</td>
<td>+5℃ to +35℃ (+41 to +95°F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td>At 1m from front of chamber, 1.2m from floor (depending on environment)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>55dB</td>
<td>59dB</td>
<td>61dB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heat exhaust</td>
<td>3500kJ/h</td>
<td>4000kJ/h</td>
<td>5040kJ/h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature fluctuation</td>
<td>-20 to +150℃ (-4 to 302°F)</td>
<td>-40 to +150℃ (-40 to 302°F)</td>
<td>-60 to +150℃ (-76 to 302°F)</td>
<td>-40 to +150℃ (-40 to 302°F)</td>
<td>-60 to +150℃ (-76 to 302°F)</td>
</tr>
<tr>
<td>Humidity fluctuation</td>
<td>30 to 95%R.H (Refer to diagram of temperature &amp; humidity control range)</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Temperature uniformity</td>
<td>0.5℃ (-20 to +100℃)</td>
<td>0.5℃ (-40 to +22℃)</td>
<td>0.8℃ (+100.1 to +150℃)</td>
<td>0.3℃ (+60 to +100℃)</td>
<td>0.3℃ (+60 to +100℃)</td>
</tr>
<tr>
<td>Humidity uniformity</td>
<td>0.3%</td>
<td>0.3%</td>
<td>0.3%</td>
<td>0.3%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Temperature heat-up rate</td>
<td>-20 to +150℃ within 5 min</td>
<td>-40 to +150℃ within 60 min</td>
<td>-60 to +150℃ within 7 min</td>
<td>-40 to +150℃ within 60 min</td>
<td>-60 to +150℃ within 80 min</td>
</tr>
<tr>
<td>Temperature pull-down rate</td>
<td>+20 to -20℃ within 20 min</td>
<td>+20 to -40℃ within 50 min</td>
<td>+20 to -60℃ within 70 min</td>
<td>+20 to -40℃ within 60 min</td>
<td>+20 to -60℃ within 90 min</td>
</tr>
<tr>
<td>Lowest attainable temperature</td>
<td>-20℃ (-4°F)</td>
<td>-40℃ (-40°F)</td>
<td>-60℃ (-76°F)</td>
<td>-40℃ (-40°F)</td>
<td>-60℃ (-76°F)</td>
</tr>
<tr>
<td>Exterior material</td>
<td>Painted steel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interior material</td>
<td>18-8 Cr-Ni stainless steel plate (SUS 304)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation</td>
<td>Rigid polyurethane foam, Glass wool</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Door</td>
<td>One-panel door (right handle, left hinge)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrumentation panel</td>
<td>Temperature &amp; humidity indicator controller, Overheat protector, Overcool protector</td>
<td></td>
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<td></td>
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<tr>
<td>Heater</td>
<td>Nichrome-stripped wire heater 600W</td>
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<tr>
<td>Humidifier</td>
<td>18-12.25 Cr-Ni-Mo stainless steel sheeted heater 250W</td>
<td></td>
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</tr>
<tr>
<td>Refrigeration system</td>
<td>Mechanical single-stage refrigerator system</td>
<td>Mechanical cascade condenser refrigeration system</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooler</td>
<td>Plate fin cooler</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Refrigerator</td>
<td>Compressor: Air-cooled hermetically sealed compressor, Condenser: Air-cooled condenser, Expansion mechanism: Capillary tube</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigerant capacity</td>
<td>400W</td>
<td>400W + 400W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigerant</td>
<td>R404A</td>
<td>R404A, R23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fittings</td>
<td>Connecting terminal for temp &amp; humid recorder terminal, Specimen power supply control terminal, External alarm terminal, External output terminal, Cable ports, Power cord plug, Drain pipe, Water supply tank, Quick off/on plug for water drainage, Water level sensor for water supply tank/drain socket for tank</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inside dimensions (W x H x D mm/in)</td>
<td>300 x 300 x 250/11.8 x 11.8 x 9.8 (excluding protrusions)</td>
<td>400 x 400 x 400/15.7 x 15.7 x 15.7 (excluding protrusions)</td>
<td>400 x 400 x 400/15.7 x 15.7 x 15.7</td>
<td>400 x 400 x 400/15.7 x 15.7 x 15.7</td>
<td>400 x 400 x 400/15.7 x 15.7 x 15.7</td>
</tr>
<tr>
<td>Outside dimensions (W x H x D mm/in)</td>
<td>440 x 630 x 695/17.3 x 24.8 x 27.4 (730 x 28.7 x 27.4 when including protrusions)</td>
<td>460 x 680 x 748/18.1 x 26.9 x 29.5 (930 x 36.8 x 30.5 when including protrusions)</td>
<td>460 x 680 x 748/18.1 x 26.9 x 29.5 (930 x 36.8 x 30.5 when including protrusions)</td>
<td>460 x 680 x 748/18.1 x 26.9 x 29.5 (930 x 36.8 x 30.5 when including protrusions)</td>
<td>460 x 680 x 748/18.1 x 26.9 x 29.5 (930 x 36.8 x 30.5 when including protrusions)</td>
</tr>
<tr>
<td>Capacity (L)</td>
<td>22.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>71 (76 for 115, 220, 230V)</td>
<td>100</td>
<td>122</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1 At +23℃ ambient temperature, value at stable voltage application. For SH-641/661, make sure to check the capability of your power equipment in advance.

*2 At +23℃ ambient temperature, value at stable voltage application with no specimen. Lowest attainable temperature value at ambient of up to +30℃.

<table>
<thead>
<tr>
<th>Model</th>
<th>SU-221</th>
<th>SU-241</th>
<th>SU-261</th>
<th>SU-641</th>
<th>SU-661</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>100V AC 1<del>50/60Hz, 115V AC 1</del>60Hz</td>
<td>220V AC 1<del>50/60Hz, 230V AC 1</del>50Hz</td>
<td>230V AC 1~50Hz (Compliance with CE Marking)</td>
<td>100V AC 1<del>50/60Hz, 200V AC 1</del>50/60Hz</td>
<td>220V AC 1<del>50/60Hz, 230V AC 1</del>50Hz</td>
</tr>
<tr>
<td>100V</td>
<td>10.0A</td>
<td>13.5A</td>
<td>18.0A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>115V</td>
<td>9.5A</td>
<td>13.0A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum output</td>
<td>10.0V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>220V</td>
<td>6.0A</td>
<td>7.5A</td>
<td>9.0A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>230V</td>
<td>5.5A</td>
<td>7.0A</td>
<td>8.5A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature control system</td>
<td>Balanced Temperature control system (BTC system)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operation temperature</td>
<td>+5 to 35°C (+41 to +95°F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td>At 1 m from front of chamber, 1.2 m from floor (depending on environment)</td>
<td>55dB</td>
<td>59dB</td>
<td>61dB</td>
<td></td>
</tr>
<tr>
<td>Heat exhaust</td>
<td>3500kJ/h</td>
<td>4000kJ/h</td>
<td>5040kJ/h</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature range *3</td>
<td>-20 to +150°C (-4°F to +302°F)</td>
<td>-40 to +150°C (-4°F to +302°F)</td>
<td>-40 to +150°C (-4°F to +302°F)</td>
<td>-40 to +150°C (-4°F to +302°F)</td>
<td>-60 to +150°C (-76°F to +302°F)</td>
</tr>
<tr>
<td>Temperature fluctuation *3</td>
<td>[0.5°C to +100°C]</td>
<td>[0.5°C to +100°C]</td>
<td>[0.5°C to +100°C]</td>
<td>[0.5°C to +100°C]</td>
<td>[0.5°C to +100°C]</td>
</tr>
<tr>
<td>Temperature uniformity *3</td>
<td>[0.1°C to +100°C]</td>
<td>[0.1°C to +100°C]</td>
<td>[0.1°C to +100°C]</td>
<td>[0.1°C to +100°C]</td>
<td>[0.1°C to +100°C]</td>
</tr>
<tr>
<td>Temperature heat-up rate</td>
<td>-20°C to +150°C within 55 min</td>
<td>-40°C to +150°C within 60 min</td>
<td>-60°C to +150°C within 70 min</td>
<td>-60°C to +150°C within 60 min</td>
<td>-60°C to +150°C within 60 min</td>
</tr>
<tr>
<td>Temperature pull-down rate</td>
<td>+20°C to -4°C within 20 min</td>
<td>+20°C to -4°C within 20 min</td>
<td>+20°C to -4°C within 20 min</td>
<td>+20°C to -4°C within 20 min</td>
<td>+20°C to -4°C within 20 min</td>
</tr>
<tr>
<td>Lowest attainable temperature</td>
<td>-20°C (-4°F)</td>
<td>-40°C (-40°F)</td>
<td>-60°C (-76°F)</td>
<td>-40°C (-40°F)</td>
<td>-60°C (-76°F)</td>
</tr>
<tr>
<td>Exterior material</td>
<td>Painted steel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interior material</td>
<td>18-8 Cr-Ni stainless steel plate (SUS 304)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation</td>
<td>Rigid polyurethane foam, Glass wool</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Door</td>
<td>one-panel door (right handle, left hinge)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrumentation panel</td>
<td>Temperature indicator controller, Overheat protector, Overcool protector</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigeration system</td>
<td>Mechanical single-stage refrigerator system</td>
<td>Mechanical cascade condenser refrigeration system</td>
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<td></td>
</tr>
<tr>
<td>Heater</td>
<td>400W Nichrome-stripped wire heater</td>
<td>600W Plate fin cooler</td>
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</tr>
<tr>
<td>Refrigerator</td>
<td>Compressor: Air-cooled hermatically sealed compressor, Condenser: Air-cooled condenser, Expansion mechanism: Capillary tube</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigerator capacity</td>
<td>400W</td>
<td>400W + 400W</td>
<td></td>
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</tr>
<tr>
<td>Refrigerant</td>
<td>R404A</td>
<td>R404A, R23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fittings</td>
<td>Connecting terminal for temp recorder terminal, Specimen power supply control terminal, External alarm terminal, External output terminal, Cable ports, Power cord plug, Drain pipe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td>300 x 300 x 250/11,18 x 11,8 x 9,8 (excluding protrusions)</td>
<td>400 x 400 x 400/15,7 x 15,7 x 15,7 (excluding protrusions)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outside dimensions (W x H x D mm)</td>
<td>440 x 660 x 695/17,3 x 25,95 x 26,74 when including protrusions</td>
<td>448 x 790 x 767/17,3 x 30,2 x 30,3 when including protrusions</td>
<td>540 x 660 x 890/21,3 x 26,0 x 35,0 when including protrusions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacity (L)</td>
<td>22.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>66 (71 for 115, 220, 230V)</td>
<td>95</td>
<td>115</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1 At 23°C ambient temperature, value at stable voltage application. For SU-641/661, make sure to check the capability of your power equipment in advance.
*2 At 20°C ambient temperature, value at stable voltage application with no specimen. Lowest attainable temperature value at ambient up to +30°C.
### TEMPERATURE & HUMIDITY CONTROL RANGE (SH type only)

![Humidity Control Chart]

- At +23 °C ambient temperature.

### MODEL

<table>
<thead>
<tr>
<th>S</th>
<th>T</th>
<th>T</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

- Temperature range: 2: -20 to +150 °C
- 4: -40 to +150 °C
- 6: -60 to +150 °C

- Capacity: 2: 22.5L
- 6: 64.0L

- H: Low temperature & humidity chamber
- U: Low temperature chamber

### TEMPERATURE & HUMIDITY) PROGRAM INDICATOR CONTROLLER

<table>
<thead>
<tr>
<th>Model</th>
<th>ES-102</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation mode</td>
<td>Program operation, Constant operation</td>
</tr>
<tr>
<td>Display</td>
<td>7-segment LED display</td>
</tr>
<tr>
<td>Setting</td>
<td>Mechanical key input</td>
</tr>
<tr>
<td>Program capacity</td>
<td>9 steps/1 pattern (1 to 99 repetitions)</td>
</tr>
<tr>
<td>Setting and indication ranges</td>
<td></td>
</tr>
<tr>
<td>Temp:</td>
<td>-25 to +155 °C (SH-221, SU-221)</td>
</tr>
<tr>
<td>Humid:</td>
<td>0 to 100% (SH only)</td>
</tr>
<tr>
<td>Time:</td>
<td>0 to 99 hours 59 minutes, 100 to 999 hours</td>
</tr>
</tbody>
</table>

#### Setting and indication resolution
- Temp: 0.1 °C
- Humid: ± 2%rh (Typ.) (SH only)
- Time: ±1 minute (in one hour unit for over 100 hours)

#### Indication accuracy
- Temp: 0.5 °C (Typ.)
- Humid: ± 2%rh (Typ.) (SH only)
- Time: within 30 sec. per month

#### Input
- Thermocouple type T (Copper/Copper-Nickel)

#### Control
- PID control

#### Communication function
- RS-485

#### Auxiliary functions
- Input burn-out detection function
- Upper and lower temperature & humidity limit alarm function
- Self-diagnostic function (watchdog timer)
- Alarm indication function
- Power failure protection function
- Timer function (automatic start/stop)
- Refrigerator capacity automatic control function

#### Battery
- Lithium battery, 1

* At +23 °C ± 5 °C ambient temperature
**SAFETY DEVICES**
- Leakage breaker for power supply
- Thermal fuse
- Boil dry protector (SH only)
- Short circuit protection fuse for control circuit
- Overheat protector
- Overcool protector
- Air circulator temperature switch
- Specimen power supply control terminals
- Refrigerator overload relay
- Inside chamber door switch
- Upper and lower temperature & humidity limit alarms (built inside temperature & humidity controller)
- Burn-out detection function (built inside temperature & humidity controller)
- Watchdog timer (built inside temperature & humidity controller)
- Refrigerator automatic delay circuit (built inside temperature & humidity controller)

**SHELVES**
- Load capacity (uniformly distributed load)
  - SH/ SU-221, 241, 261: 500g
  - SH/ SU-641, 661: 5kg
- Number of shelves
  - SH/ SU-221, 241, 261: 5 (Shelf pitch 35mm)
  - SH/ SU-641, 661: 5 (Shelf pitch 50mm)

**ACCESSORIES**
- Shelf: 1
- Connector
  - 2P for connecting terminal for temp & humid recorder: 2 (1 for SU)
  - 6P for connecting signal terminal: 1
- Rubber plug for cable port: 2
- Glass tube fuse: 1
- Adaptor for socket: 1 (100V AC, 115V AC only) (for SH/ SU-221, 241, 261)
- Wet-bulb wick: 1 box (SH only)
- Humidifying tray drain hose 2m: 1 (SH only)
- Water level sensor tank drain hose 0.3m: 1 (SH only)
- Instruction manual: 1
- Warranty: 1

---

⚠️ **DANGER**
- Do not use specimens which are explosive or inflammable, or which contain such substances. To do so could be hazardous, as this may lead to fire or explosion.
- Do not place corrosive materials in the chamber. If corrosive substances or humidifying water is used, the life of the unit may be significantly shortened.
- Do not place life forms or substances that exceed allowable heat generation.

⚠️ **CAUTION**
Be sure to read the instruction manual before operation.
The outside dimensions of SU are indicated in the above diagrams.

Unit: mm (inch)
**OPTIONS**

### Paperless recorder

Records temperature inside the chamber. Additional inputs may also be recorded.

- **Temperature type**
  - Temperature range: -100 to +200 °C
  - Number of inputs: 6
  - Data saving cycle: 5 sec
  - External recording media: CF memory card (32MB)

### Temperature recorder

- **Portable type**
  - Temperature range: -100 to +200 °C
  - Number of inputs: 5
  - Data saving cycle: 5 sec
  - External recording media: CF memory card (32MB)

### Temperature & humidity recorder

- **SRJ14**
  - Temperature range: 0 to 100%rh (for SH)
  - Number of inputs: 5
  - Data saving cycle: 5 sec
  - External recording media: CF memory card (32MB)

- **SRJ12**
  - Temperature range: 0 to 100%rh (for SU)
  - Number of inputs: 6

### Viewing window

A window is installed on chamber door.

- **SH**: 221 × 241 × 261 W215 × H215 (mm)
- **SU**: 221 × 241 × 261 W215 × H215 (mm)
- **SH**: 641 × 661 W215 × H315 (mm)
- **SU**: 641 × 661 W215 × H315 (mm)

*The basic specification of the chamber will be modified.*

### Inner door

A glass door is provided inside the chamber door for observation.

* A wiper is equipped for the SH model.

### Wet-bulb temperature detecting terminal

Dectes wet-bulb temperature inside the chamber. Equal electromotive force as Thermocouple type T (Copper/ Copper-Nickel).

- Equipped with connector.

*Not available for SU*

### Thermocouple

- Measures the temperature of specimens
  - T (Copper/ Copper-Nickel)
  - 2, 4, 6m

### Right-opening door

Door can be exchanged to a right hinged door.

*Not available with inner glass door option.*

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*Some photographs listed in this catalog contain Japanese display.*
OPTIONS

Cable port

Additional cable ports are provided on the wall of chamber.

- 25, 50, 100mm diameter
- Flat cable port

*One silicon sponge rubber port plug is equipped per one cable port.
* Basic specification of the chamber may not be effective when equipped with a cable port.

Cable port rubber plug

The additional silicon sponge rubber port plug.

Shelf

Auxiliary shelves on request.
SH/ SU-221-241-261
- Effective size 200W 150Dmm
- Load capacity
  (uniformly distributed load) 500g
SH/ SU-641-661
- Effective size 300W 300Dmm
- Load capacity
  (uniformly distributed load) 5kg

Specimen basket

- Size 206W 40H 156D mm
- Material 18-8 Cr-Ni stainless steel, 5 mesh metal basket

Stand

This stand enhances mobility of the chamber and ease the work to load/unload the specimen. Stand for stacking two or three chambers save installation space.

* Be sure to secure the stand onto the floor with earthquake resistant fittings for your safety especially when using stand for two/three chambers.

Auxiliary water tank circuit (for SH)

Automatic water supply circuit is equipped to replenish the standard tank from the auxiliary water tank.

- Supply water quality pure water
  (electrical conductivity 0.1~10 [S/cm])
- Water supply pressure 4.9~19.6KPa (Gauge)

Auxiliary water tank (for SH)

Auxiliary tanks are provided to replenish water to the standard tank.

Tray for auxiliary water tank (for SH)

Protects water from leaking while supplying water from the auxiliary water tank.

Drain tank (for SH)

Storage tank for drain water with a full indication buzzer.

Communication functions

Computer interface
- GPIB
- RS-232C
- E-BUS

*Select one other than standard RS-485.

Communication cable

- RS-485 5, 10m
- GPIB 2, 4m
- RS-232C 1.5, 3, 5m
  1.5, 3, 5m for extension
- E-BUS 5, 10m
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