

# HITACHI

## COSMOPia

### ENVIRONMENTAL TESTING APPARATUSES

- Constant Temperature and Humidity Chamber
- Constant Temperature Chamber
- Thermal Shock Chamber
- Walk-in Type Constant Temperature and Humidity Chamber
- Walk-in Type Constant Temperature Chamber
- Central Control System





# Hitachi Environmental Testing Apparatuses “COSMOPIA Series” respond to the requirement with outstanding Functions and Reliability

Environmental testing apparatuses used at wide areas such as semiconductors, electronic components and biotechnology which requires high functions to reply higher development and investigation.

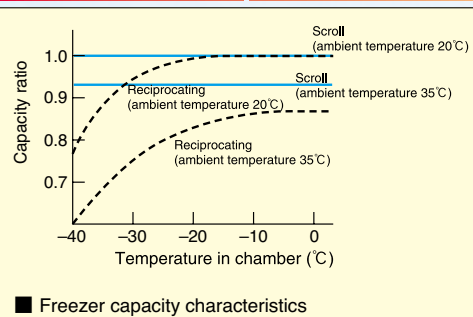
Hitachi provides a scroll compressor at the core of these apparatuses which demonstrates high efficiency and stable performance at low temperature.

These apparatuses are able to create a high-precision testing environment which is essential for improving the reliability of products and also for experiments and investigations for such as food processing, chemicals and pharmaceuticals.

## ENVIRONMENTAL TESTING APPARATUSES

### High efficiency and Stable performance of Scroll Compressor

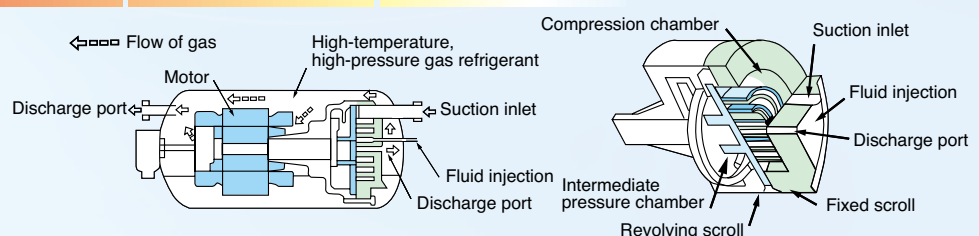
#### Stable performance even when ambient temperatures are high



In the reciprocating compressor, the refrigerant gas leaks from the high pressure to low pressure, creating a top clearance volume. The compressed gas remains here, causing re-expansion and lowering the efficiency. In contrast, in the scroll compressor, a sickle-shaped intermediate pressure section is formed between the high pressure and low pressure, so only a slight amount of gas leaks. Furthermore, all compressed refrigerant is discharged. Thus, the volume efficiency at a high pressure ratio is higher than that of the reciprocating compressor. Because of this, compared to the reciprocating compressor, the cooling capacity does not drop even at low temperatures of -40: or in high ambient temperature (Models with scroll compressor mounted).

#### Structure of scroll compressor and fluid injection

When a discharge gas temperature rises in the scroll compressor, discharge gas can be cooled by injecting a part of the liquid refrigerant of the receiver to the middle pressure region of the compressor. Then the motor, refrigerating machine oil become lower than constant temperature, so no decline of coolability will happen, and it is possible to operate efficiently.





# Cosmopia C

Constant Temperature and Humidity Chamber  
Constant Temperature Chamber



# Cosmopia S

Thermal Shock Chamber



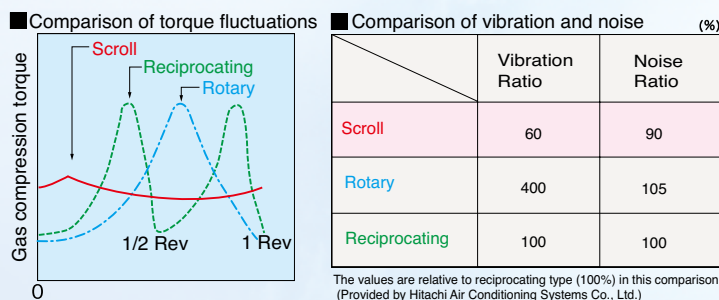
# Cosmopia R

Walk-in Type Constant Temperature and Humidity Chamber  
Walk-in Type Constant Temperature Chamber



## Vibration and noise of scroll compressor

The scroll compressor can consecutively perform suction, compression, and discharge in one rotation of the scroll. This design greatly reduces sharp fluctuations of compression torque (rotation power) and produces less vibration and noise in comparison with a reciprocating or rotary type compressor.

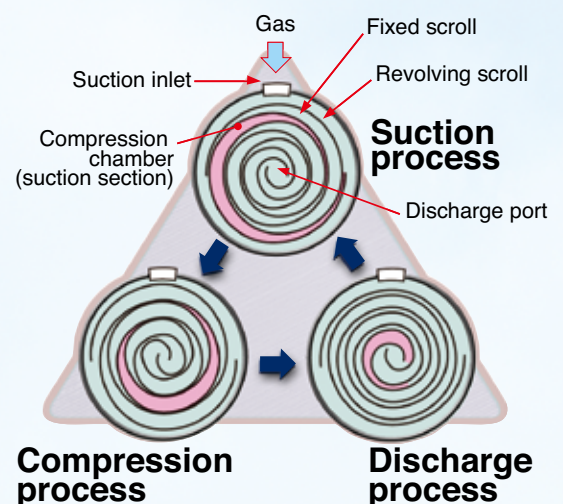


## High reliability with simple structure

Trouble with the unit is usually arising from the compressor section. With the scroll compressor, there is no suction or discharge valve, and there are only five main components in the compression mechanism (one-sixth the number compared to Hitachi reciprocating model). This simple structure reduces the risk of troubles (models with scroll compressor mounted unit).

## Theory of scroll compressor operation

The gas sealed between the sickle-shaped compressed air area formed between the fixed scroll and revolving scroll is compressed toward the center and discharged from the discharge port at the center.



# Cosmopia C

Constant Temperature and Humidity Chamber  
Constant Temperature Chamber

## Standard Series



### Low Temperature Corresponding Type



## High Performance Series



## Excellent Series

**EX**CELLENT series



## Large Size Series



## Low Temperature and Low Humidity Series



## Double Side Access Series





# Cosmopia S

Thermal Shock Chamber

Standard Series



High Performance Series



High Performance Series

Air-Cooling Remote Condenser Type



High Performance Series

High Speed Type



MIL Standard Series



High Temperature 250°C Series



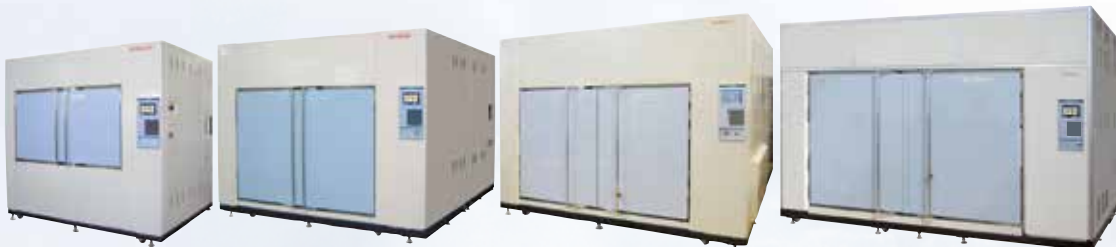
Excellent Series



Liquid Type



Large Capacity Series



# Cosmopia R

Walk-in Type Constant Temperature and Humidity Chamber  
Walk-in Type Constant Temperature Chamber

Standard Series



Excellent Series

EXCELLENT series



Integrated Walk-in Series



Central Control System



Contract Test





# Cosmopia C Constant Temperature and Humidity

## Constant Temperature and Humidity Chamber


### Standard Series

P7 to P11

	Temperature range	Humidity range	Testing Chamber Capacity	
HH Type	−20 to 100°C	20 to 98%RH	120L 227L 408L 800L 1,000L	
MH Type	−40 to 100°C			
MHH Type	−40 to 150°C			
Low Temperature Corresponding Type	Temperature range	Humidity range	Testing Chamber Capacity	
LH Type	−70 to 100°C	20 to 98%RH	306L 800L	
LHH Type	−70 to 150°C			



### High Performance Series

P12,P13

	Temperature range	Humidity range	Testing Chamber Capacity	
MH Type	−40 to 100°C	20 to 98%RH	408L	
MHH Type	−40 to 150°C		800L	



### Excellent Series **EX**CELLENT series

P14 to P20


Rapid Temperature Change Type		Temperature range	Humidity range	Testing Chamber Capacity	
EXH Type	5°C/min. 800L	-70 to 150°C	20 to 98%RH	306L 800L	
	10°C/min. 306L	-70 to 180°C		235L	
EXHH Type	15°C/min.	-70 to 180°C	20 to 95%RH	800L	
EXHH20 Type	20°C/min.	-70 to 180°C			
High Load Type 1,000W		Temperature range	Humidity range	Testing Chamber Capacity	
EX-HL Type	High Load	-70 to 150°C	20 to 98%RH	800L	

### Large Size Series

P21,P22

	Temperature range	Humidity range	Testing Chamber Capacity	
MH Type	−40 to 100°C	20 to 98%RH	1,500L	
MHH Type	−40 to 150°C			
MH Type	−50 to 100°C	20 to 95%RH	3,780L	
MHH Type	−50 to 150°C			
LH Type	−70 to 100°C			
LHH Type	−70 to 150°C			

### Low Temperature and Low Humidity Series P23

	Temperature range	Humidity range	Testing Chamber Capacity	
<b>MH</b> Type	-40 to 100°C	10 to 98%RH	800L	





# Chamber , Constant Temperature Chamber List

## Constant Temperature Chamber


### Standard Series

P7 to P11

	Temperature range	Humidity range	Testing Chamber Capacity	
<b>HT</b> Type	-20 to 100°C	—	120L	
<b>MT</b> Type	-40 to 100°C		227L	
<b>MTH</b> Type	-40 to 150°C		408L	
Low Temperature Corresponding Type			800L	
			1,000L	
	Temperature range	Humidity range	Testing Chamber Capacity	
<b>LT</b> Type	-70 to 100°C	—	306L	
<b>LTH</b> Type	-70 to 150°C		800L	





### High Performance Series

P12,P13

	Temperature range	Humidity range	Testing Chamber Capacity	
<b>MT</b> Type	-40 to 100°C	—	408L	
<b>MTH</b> Type	-40 to 150°C		800L	



### Excellent Series *EXCELLENT series*

P14 to P20

Rapid Temperature Change Type	Temperature range	Humidity range	Testing Chamber Capacity	
<b>EXT</b> Type 	-70 to 150°C	—	306L	
			800L	
<b>EXTH</b> Type 	-70 to 180°C		235L	
<b>EXTH20</b> Type 	-70 to 180°C		800L	

### Large Size Series

P21,P22

	Temperature range	Humidity range	Testing Chamber Capacity	
<b>MT</b> Type	-40 to 100°C	—	1,500L	
<b>MTH</b> Type	-40 to 150°C			
<b>MT</b> Type	-50 to 100°C	—	3,780L	
<b>MTH</b> Type	-50 to 150°C			
<b>LT</b> Type	-70 to 100°C			
<b>LTH</b> Type	-70 to 150°C			

### Double Side Access Series

P24

	Temperature range	Humidity range	Testing Chamber Capacity	
<b>MT</b> Type	-40 to 100°C	—	392L	
			784L	

# Cosmopia C Standard Series

Constant Temperature and Humidity Chamber

HH Type  
MH Type

MHH Type

Constant Temperature Chamber

HT Type  
MT Type

MTH Type

## New arrival with new design, Standard series of Constant temperature and humidity chamber.



Test chamber capacity 120L

Test chamber capacity 227L

Test chamber capacity 408L

Test chamber capacity 800L

Test chamber capacity 1,000L

(Including optional specification) Temperature and humidity recorder

### Series

Category	Temperature control range	Humidity control range	Chamber capacity				
			120L	227L	408L	800L	1,000L
Constant temperature and humidity chamber	-20°C~100°C	20~98%RH	EC-16HHP	EC-26HHP	EC-46HHP	EC-86HHP	EC-106HHP
	-40°C~100°C		EC-16MHP	EC-26MHP	EC-46MHP	EC-86MHP	EC-106MHP
	-40°C~150°C		EC-16MHPH	EC-26MHPH	EC-46MHPH	EC-86MHPH	EC-106MHPH
Constant temperature chamber	-20°C~100°C	-	EC-16HTP	EC-26HTP	EC-46HTP	EC-86HTP	EC-106HTP
	-40°C~100°C		EC-16MTP	EC-26MTP	EC-46MTP	EC-86MTP	EC-106MTP
	-40°C~150°C		EC-16MTHP	EC-26MTHP	EC-46MTHP	EC-86MTHP	EC-106MTHP

### Features

#### Newly designed appearance

Stainless steel (SUS430) was adopted for the exterior material and renewed the design by putting a clear cover in the center of device

#### Full functioned scroll compressor loaded

Our scroll compressor, proven for highly efficient performance, is installed to all the models.

#### Addition of new functions

- Defrosting function
- Humidification delay function
- USB memory saving function
- Data log function
- Operation mode selective function (for each program)

#### Digital over-heat prevention thermostat

Digital over-heat prevention thermostat was adopted as a replacement for the conventional dial over-heat prevention thermostat and improved the setting operation and temperature control system.

#### Enlargement of observation window

The capacity of 800L, 1000L models expanded the windows size to 316mm×285mm(length×width) from usual size of 270mm×190mm(length×width) with expansion rate of 175%.





## Functions

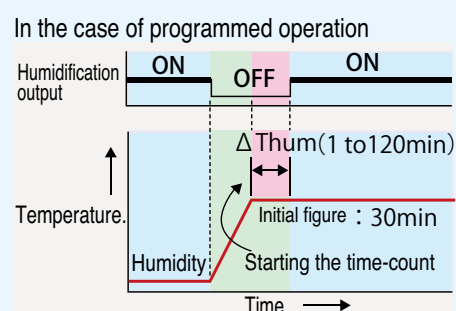
### Defrosting function

Cyclical defrosting function by setting the operation time

- When the temperature in the chamber is less than 5°C, heater will warm the inner chamber to required temperature to defrost.
- When the temperature in the chamber is over 5°C, refrigerator will suspend and defrost.

### Humidification delay function (Constant Temperature and Humidity Chamber)

Function to prevent sample from dew condensation at the temperature / humidity rising time, by delaying the humidification start for an optional set time (1 to 120 minutes) after the dry-bulb rise to the required temperature.



### USB memory saving function

Saving the trend-graph data to USB memory is available. This is the function which enables USB memory to save the data (measured temperature, measured humidity) shown on the trend-graph of LCD operation panel as CSV file format.

### Data log function

When the operation stops by alarm for abnormal detection, this feature saves the data (the operating situation just before the trouble has occurred) to USB memory. Collecting the data just before the operation-stop enabled user to do trouble analysis.



## Operation mode selective function

While operating the program, the user can choose the settings of operation mode by each step. (Choice of Energy saving mode, High load mode) For example electric conduction, a setting change of the device ability according to the test pattern is possible.

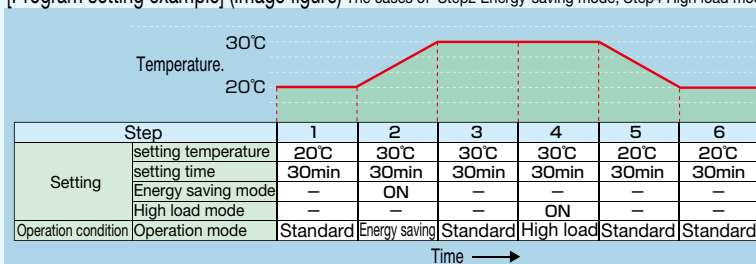
### Energy saving mode

Mode for operating with low ability when the sample is small amount or no heat load.

### High load mode

Mode for operating with high ability when the sample is large amount or with heat load.

[Program setting example] (Image figure) The cases of Step2 Energy-saving mode, Step4 High load mode

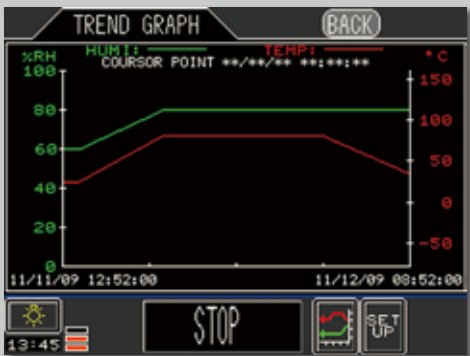


Note: When it operates in energy-saving mode and high load mode, setting temperature and relative humidity may not be reached.

# Unit Control Panel

## Color LCD Touch Panel

The color LCD touch panel is adopted so that setting and controlling of the unit will be simple only by touching the displays. The color LCD offers clear view and the system is supported for diverse functions in operation control.



Functions available in operation control:

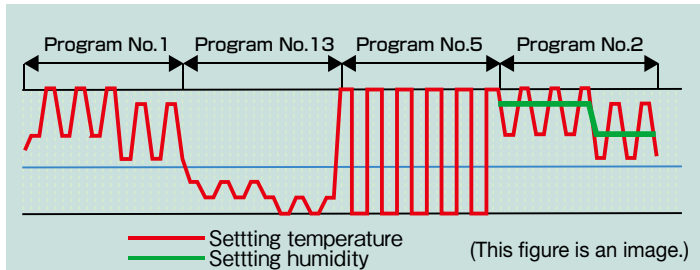
- Set-point run function
- Programmed run function
- Program name assign function
- Time signal function
- Programmed run hold function
- Programmed run jump function
- Step repeat function
- Combined-program controlled run function
- Trend graph display function
- Operation mode select function
- Wait function
- Excess temperature up/down preventive function
- Black-out action function
- Instantaneous safety function against power interruption
- Fan delay function
- Timer function
- Fault detection function
- Measured temperature/humidity offset specify function
- Defrosting function
- Humidification delay function
- USB memory saving function
- Data log function
- Operation mode selective function

### Program name input function

At this function, you may input a program name. Program name can be input by using alphabet, number, and symbols (!"#\$%&'()@:;.,=+\*/?\_) for 14 words (maximum).

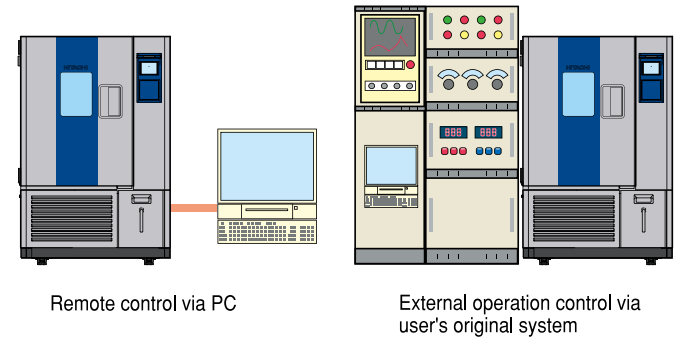
### Combined-program operate function

At this function, you may operate 2 or more programs continuously (or by combination). Up to 5 combined programs can be operated at maximum.



### Various types of communication interface

By using communication interface, unit is being enabled to external control on operations and measurements from a connected computer or user's original system unit.



Types of communication interface
RS-232C
RS-485(option)
Web interface(including Ethernet)(option)

Notes: 1. RS-232C,RS-485,Web interface(including Ethernet) are prepared as interface function.  
2. About other function, please contact us.



Constant Temperature and Humidity Chamber

LH Type  
LHH Type

Constant Temperature Chamber

LT Type  
LTH Type

New arrival with new design, Standard series of Constant temperature and humidity chamber.



EC-36LHP

Test chamber capacity 306L



EC-86LHP

Test chamber capacity 800L

(Including optional specification) Temperature and humidity recorder

### Series

Category	Temperature control range	Humidity control range	Chamber capacity	
			306L	800L
Constant temperature and humidity chamber	-70°C to 100°C	20 to 98%RH	EC-36LHP	EC-86LHP
	-70°C to 150°C		EC-36LHHP	EC-86LHHP
Constant temperature chamber	-70°C to 100°C	-	EC-36LTP	EC-86LTP
	-70°C to 150°C		EC-36LTHP	EC-86LTHP

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#### Addition of new functions

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- Operation mode selective function (for each program)

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#### Enlargement of observation window

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## Functions

### Defrosting function

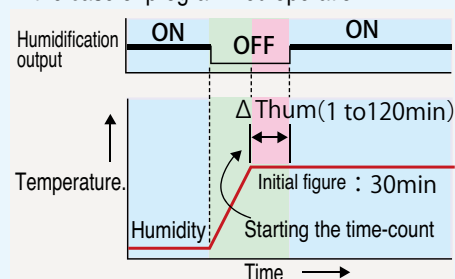
Cyclical defrosting function by setting the operation time

- When the temperature in the chamber is less than 5°C, heater will warm the inner chamber to required temperature to defrost.
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### Humidification delay function (Constant Temperature and Humidity Chamber)

Function to prevent sample from dew condensation at the temperature / humidity rising time, by delaying the humidification start for an optional set time (1 to 120 minutes) after the dry-bulb rise to the required temperature.

In the case of programmed operation



### USB memory saving function

Saving the trend-graph data to USB memory is available. This is the function which enables USB memory to save the data (measured temperature, measured humidity) shown on the trend-graph of LCD operation panel as CSV file format.

### Data log function

When the operation stops by alarm for abnormal detection, this feature saves the data (the operating situation just before the trouble has occurred) to USB memory. Collecting the data just before the operation-stop enabled user to do trouble analysis.



## Operation mode selective function

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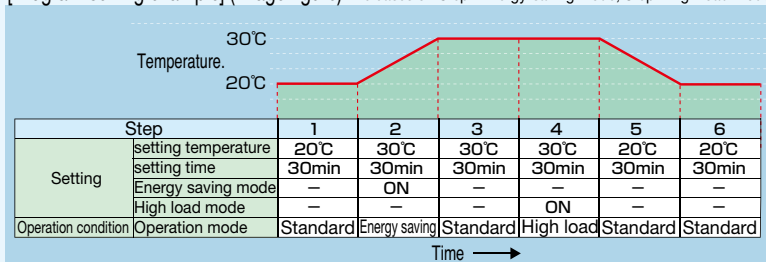
### Energy saving mode

Mode for operating with low ability when the sample is small amount or no heat load.

### High load mode

Mode for operating with high ability when the sample is large amount or with heat load.

[Program setting example] (Image figure) The cases of Step2 Energy-saving mode, Step4 High load mode



Note: When it operates in energy-saving mode and high load mode, setting temperature and relative humidity may not be reached.



# Cosmopia C High Performance Series

Constant Temperature and Humidity Chamber

MH type  
MHH type

Constant Temperature Chamber

MT type  
MTH type

## A new stage begins.

constant temperature and humidity chamber,  
constant temperature chamber.

New series are appeared with superior energy saving, temperature change performance and continuous operation function.



EC-46MHPE

EC-86MHPE

Test chamber capacity 408L

Test chamber capacity 800L

(Including optional specification) Temperature and humidity recorder

### SERIES (HIGH PERFORMANCE SERIES)

Categories	Type	Temperature control range	Humidity control range	Test chamber capacity	
				408L	800L
Constant Temperature and Humidity Chamber	MH	—40 to 100°C	20 to 98%RH	EC-46MHPE	EC-86MHPE
	MHH	—40 to 150°C		EC-46MHHPE	EC-86MHHPE
Constant Temperature Chamber	MT	—40 to 100°C	—	EC-46MTPE	EC-86MTPE
	MTH	—40 to 150°C		EC-46MTHPE	EC-86MTHPE

### Each product part



Operation part



LED Inner Light



Circuit breaker  
Over-heat prevention thermostat



Cable hole

### Water supply tank



(10L × 1) (for 408L)



(10L × 2) (for 800L)



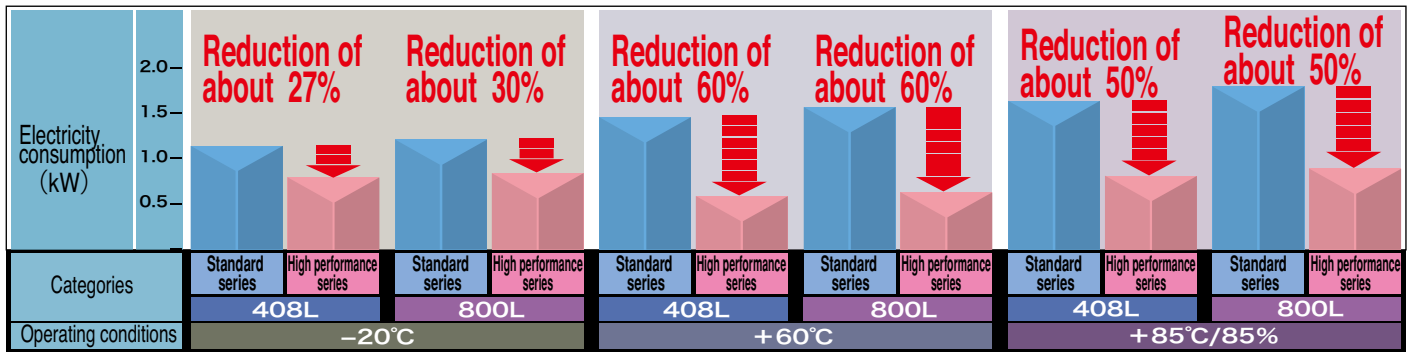
Test chamber

\* Recorder is optional specification.

## Energy saving performance

### Energy saving performance is improved by inverter control of scroll compressor.

Inverter control of scroll compressor (600W) performs great energy saving effect at all the area of temperature • temperature/humidity control range.



※ It shows that the comparison between high performance series and standard series under energy saving mode at ambient temperature 23 °C.

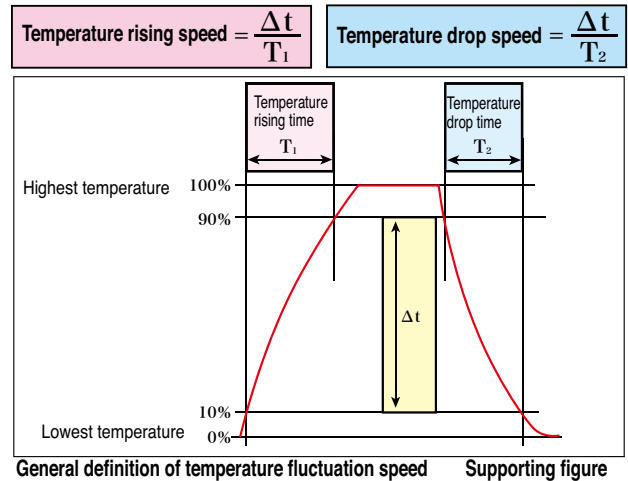
408L Standard Series : EC-46MHP High performance Series : EC-46MHP High performance Series : EC-46MHP High performance Series : EC-46MHP

## Temperature fluctuation performance

### Temperature fluctuation(drop time) performance has improved by simultaneous operation of two compressors.

During the temperature fluctuation (drop operation), compressor 1 and 2 operates simultaneously to improve the ability of refrigeration, and it realize to keep the speed of temperature fluctuation at 3°C /minute for both when the temperature rises and drops.

(Refrigerator 1 (Main) : Refrigerator for main use, which controlled by inverter.  
 (Refrigerator 2 (Sub) : Refrigerator for use of temperature fluctuation or low-temperature region.)

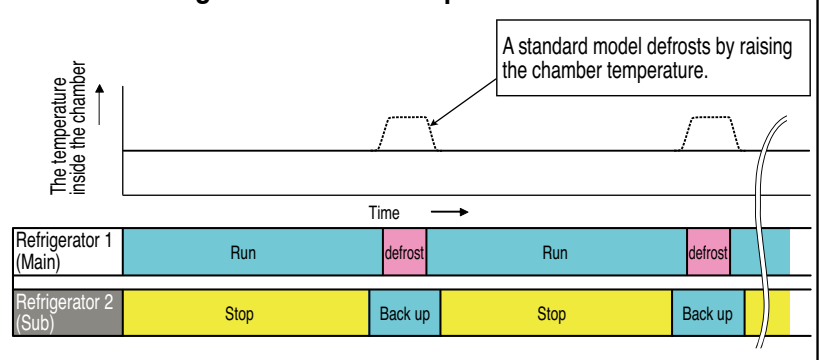


## Continuous operation performance

### Continuous operating function - which makes 2 compressors to operate in turn- was applied as standard equipment.

It is a new function which makes continuous operation possible at independent operation mode of compressor 1. By operating the compressor 2 while compressor 1 is on defrost mode (offcycle defrost by stopping the refrigeration) at solo operating mode of compressor 1. This function corresponds to the constant temperature and humidity control range of 10 to 40°C dry-bulb temperature.

#### Illustration images of continuous operation



Note: Temperature/humidity may fluctuate when the sub compressor operates for supporting the main.

Constant Temperature and Humidity Chamber

EXH type

Constant Temperature Chamber

EXT type

## 10°C/min and 5°C/min temperature changes

Class	Testing chamber capacity (L)	Constant temperature and humidity chamber	Constant temperature chamber	temperature change speed
Temperature control range (°C)		-70 to 150 <sup>*1</sup>	-70 to 150 <sup>*1</sup>	
Humidity control range (%RH)		20 to 98	—	
Rapid Temperature Change type	306	EC-35EXH	EC-35EXT	10°C/min <sup>*1</sup>
	800	EC-85EXH	EC-85EXT	5°C/min <sup>*1</sup>

Notes: 1.180°C is also available.

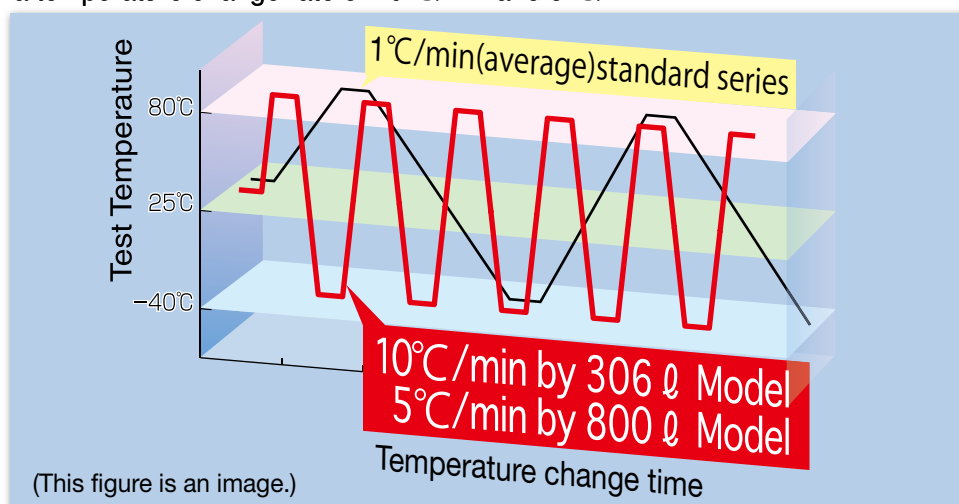
2.\*1 will be at gradient control with no sample, no load.

## EC-35EXH、EC-85EXH、EC-35EXT、EC-85EXT

## 10°C/min, 5°C/min temperature changes

## Rapid Temperature Change

The heating/cooling between -40°C to 85°C under gradient control has achieved a temperature change rate of 10°C/min and 5°C/min.



EC-35EXH

**Test chamber capacity 306L**  
(Including optional specification)  
Temperature and humidity recorder

## Shortening of the evaluation test time

Depend on the fast temperature rise / drop time, shift time to the set temperature is largely shortened.  
(Compared to Standard series / Low temperature type, 52 hours ⇒ 26 hours)

## Operation details (testing condition)

— 55°C (60 min.) ⇔ 125°C (60 min.) (for one cycle)

At 10 cycles operation.

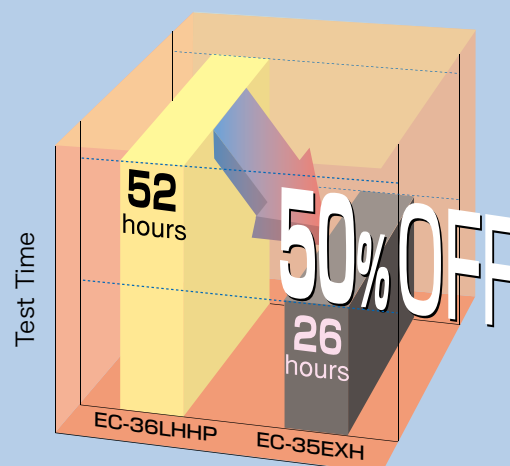
(Ability at temperature change : Maximum ability)

## Temperature rise / drop time

EC-36LHHP rise time : 41 min. drop time : 150 min.

EC-35EXH rise time : 18 min. drop time : 18 min

(Value shown above changes at the conditions of use such as ambient temperature. Please refer to the specifications of each model for the details.)





Constant Temperature and Humidity Chamber

EXHH type

Constant Temperature Chamber

EXTH type

## EC-25EXHH, EC-25EXTH

15°C/min temperature changes

**\*Realize temperature cycle of JEDEC Standard**

\*JESD22-A104C

Class	Testing chamber capacity (L)	Constant temperature and humidity chamber	Constant temperature chamber	temperature change speed
Temperature control range (°C)		-70 to 180	-70 to 180	
Humidity control range (%RH)		20 to 98	—	
Rapid Temperature Change type	235	EC-25EXHH	EC-25EXTH	15°C/min*1

Notes: 1.\*1 will be at gradient control with no sample, no load.



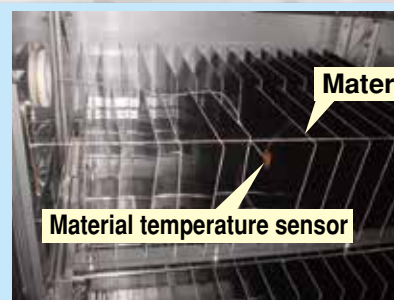
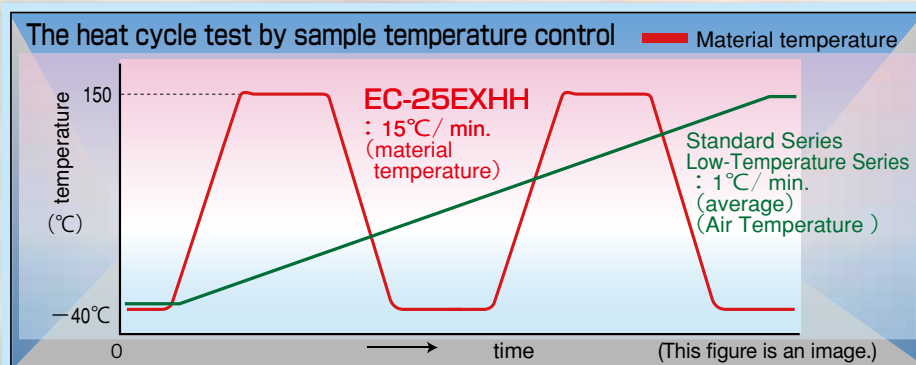
EC-25EXH

**Test chamber capacity 235L**

(Including optional specification)  
Temperature and humidity recorder

## Improved temperature change rate performance.

Improved the performance of temperature change rate of material temperature control to 15°C/min (EC-25EX Series).



(Preset temperature : -40°C to 150°C)  
(Material : Glass epoxy substrate 6kg)

## Addition of temperature cycle operation function.

"Temperature Cycle Operation Function" which are available to setup "High-temp soak", "Low-temp soak", "lamp control", or "material temperature control" are added.

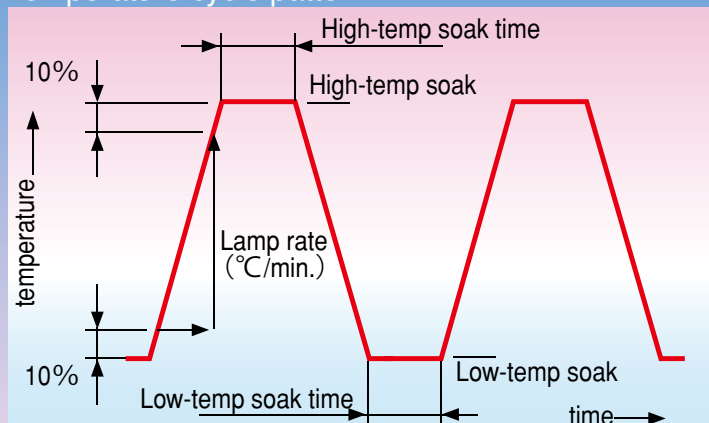
〈Setting range〉

High temperature soaked temperature	60°C to +180°C
Low temperature soaked temperature	-70°C to 0°C
soak time	1 min. to 99 hours and 59 min.
Lamp rate	5°C/min. to 15°C/min.

Setting screen  
(Temperature cycle operation)



### Temperature cycle pattern

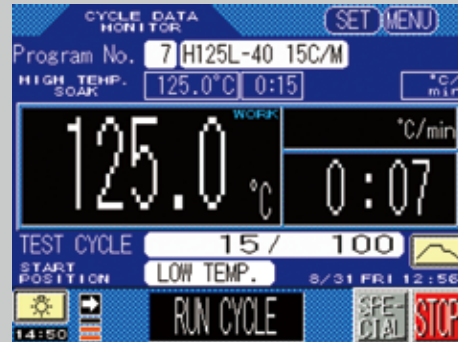


(This figure is an image.)

# Unit Control Panel

## Color LCD Touch Panel

The color LCD touch panel is adopted so that setting and controlling of the unit will be simple only by touching the displays. The color LCD offers clear view and the system is supported for diverse functions in operation control.



### Functions available in operation control:

- Temperature Cycle run function(\*only included in EC-25EX)
- Set-point run function
- Programmed run function
- Program name assign function
- Time signal function
- Programmed run hold function
- Programmed run jump function
- Step repeat function
- Combined-program controlled run function
- Trend graph display function
- Operation mode select function
- Wait function
- Excess temperature up/down preventive function
- Black-out action function
- Instantaneous safety function against power interruption
- Fan delay function
- Timer function
- Fault detection function
- Measured temperature/humidity offset specify function
- Test sample temperature controlling function (\*only included in EC-25EX)

## Program name input function

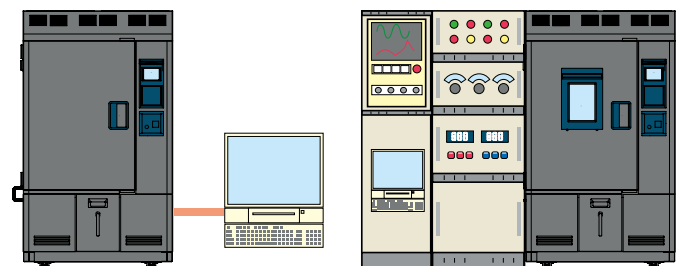
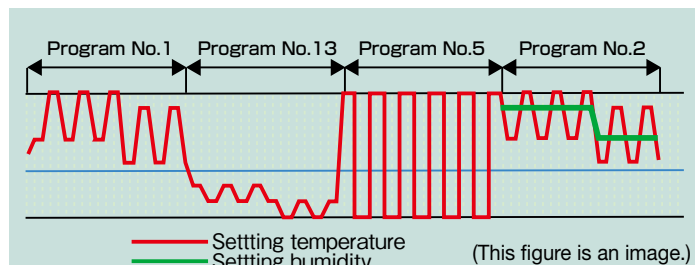
At this function, you may input a program name. Program name can be input by using alphabet, number, and symbols (!"#\$%&'()@:.,=+\*/?\_) for 14 words (maximum).

## Various types of communication interface

By using communication interface, unit is being enabled to external control on operations and measurements from a connected computer or user's original system unit.

## Combined-program operate function

At this function, you may operate 2 or more programs continuously (or by combination). Up to 5 combined programs can be operated at maximum.



Remote control via PC

External operation control via user's original system

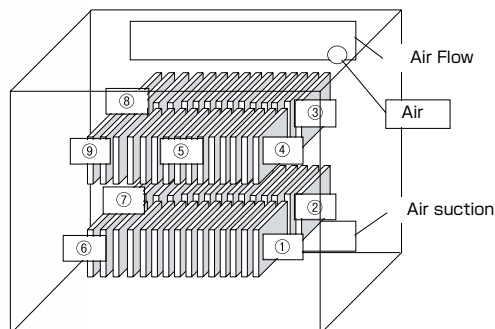
### Types of communication interface

RS-232C(option)
RS-485(option)
Web interface(including Ethernet)(option)

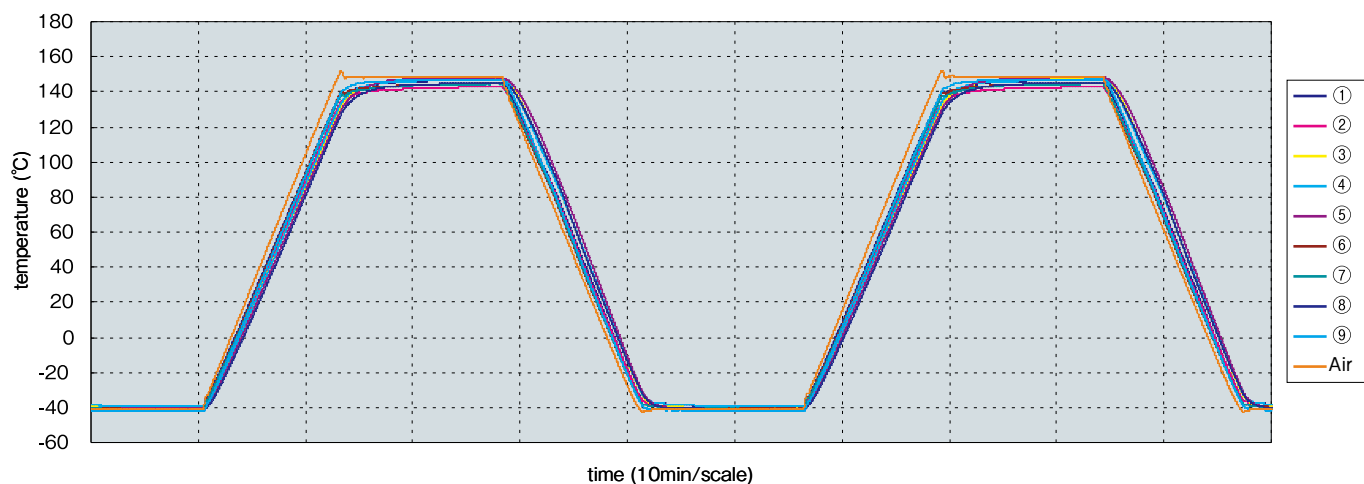
Notes: 1. RS-232C,RS-485,Web interface(including Ethernet) are prepared as interface function.  
2. About other function, please contact us.

## Operation condition

Setup temperature :  $-40^{\circ}\text{C}/15\text{min} \leftrightarrow 150^{\circ}\text{C}/15\text{min}$ .  
 Control method : air temperature control  
 Test sample : PCB 60 pieces (6kg) + jig 4kg  
 Measurement point : test sample 9 point, air flow  
 Power source : 3 phase 200V 60Hz



### 1. Ramp rate $15^{\circ}\text{C}/\text{min}$ .



Temperature change rate (rising)

( $^{\circ}\text{C}/\text{min.}$ )

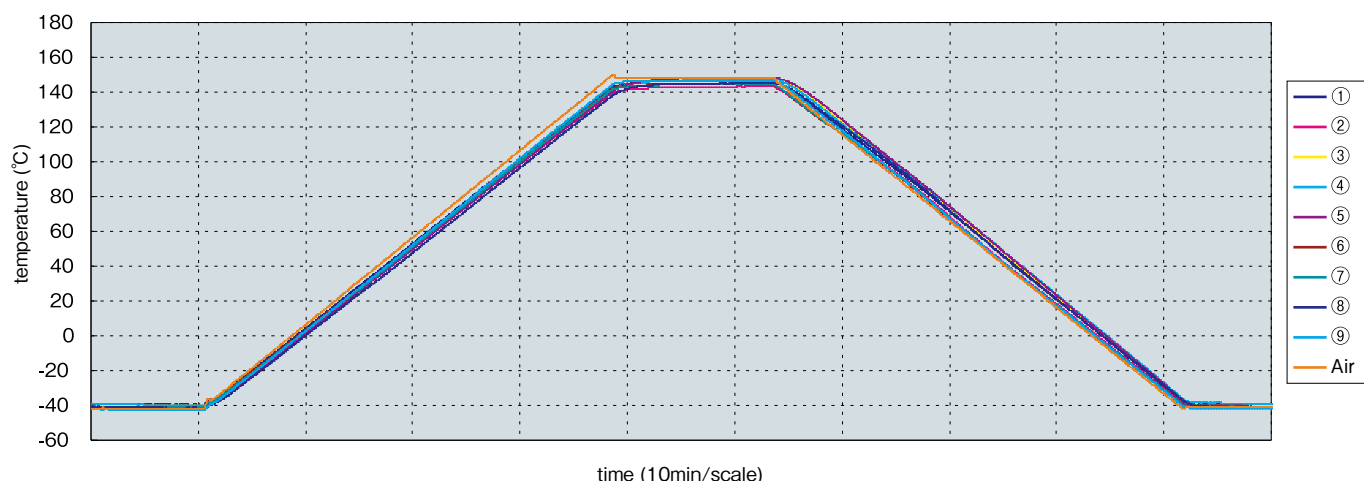
cycle number	①	②	③	④	⑤	⑥	⑦	⑧	⑨	Air
1	14.1	13.9	13.9	14.0	13.9	14.3	14.2	13.7	14.5	15.0
2	14.1	13.9	14.0	14.1	13.9	14.2	14.1	13.7	14.5	15.0
average	14.1	13.9	13.9	14.1	13.9	14.2	14.1	13.7	14.5	15.0

Temperature change rate (drop)

( $^{\circ}\text{C}/\text{min.}$ )

cycle number	①	②	③	④	⑤	⑥	⑦	⑧	⑨	Air
1	-14.5	-14.2	-15.0	-14.8	-15.2	-14.4	-14.5	-14.9	-15.0	-14.9
2	-14.6	-14.3	-15.1	-14.8	-15.3	-14.4	-14.5	-14.9	-15.0	-14.9
average	-14.5	-14.2	-15.0	-14.8	-15.2	-14.4	-14.5	-14.9	-15.0	-14.9

### 2. Ramp rate $5^{\circ}\text{C}/\text{min}$ .



Temperature change rate (rising)

( $^{\circ}\text{C}/\text{min.}$ )

cycle number	①	②	③	④	⑤	⑥	⑦	⑧	⑨	Air
1	4.9	4.8	4.9	4.9	4.9	4.9	4.9	4.8	5.0	5.0
2	4.9	4.8	4.9	4.9	4.9	4.9	4.8	4.8	4.9	5.0
average	4.9	4.8	4.9	4.9	4.9	4.9	4.9	4.8	4.9	5.0

Temperature change rate (drop)

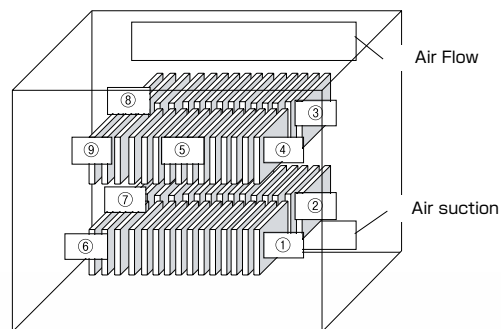
( $^{\circ}\text{C}/\text{min.}$ )

cycle number	①	②	③	④	⑤	⑥	⑦	⑧	⑨	Air
1	-4.9	-4.8	-5.0	-4.9	-5.1	-4.8	-4.9	-4.9	-5.0	-5.0
2	-4.9	-4.8	-5.0	-4.9	-5.0	-4.8	-4.9	-4.9	-5.0	-5.0
average	-4.9	-4.8	-5.0	-4.9	-5.1	-4.8	-4.9	-4.9	-5.0	-5.0

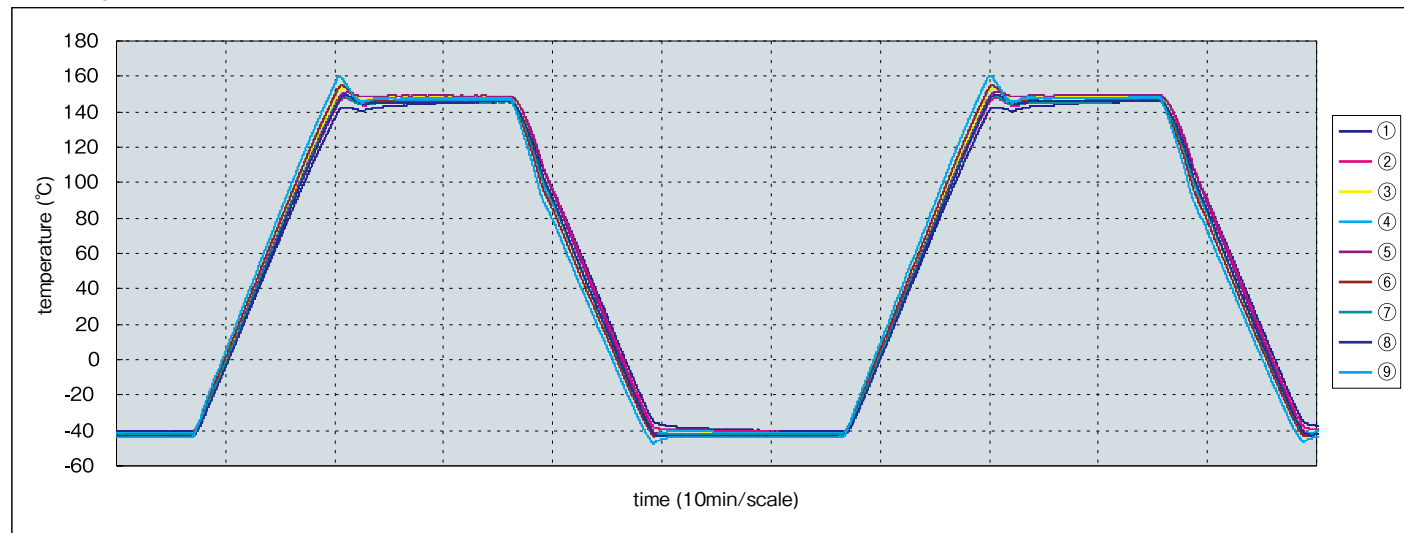


## Operation condition

Setup temperature :  $-40^{\circ}\text{C}/15\text{min.} \leftrightarrow 150^{\circ}\text{C}/15\text{min.}$   
 Control method : Test sample temperature control (control point⑤)  
 Test sample : PCB 60 pieces (6kg) + jig 4kg  
 Measurement point : test sample 9 point  
 Power source : 3 phase 200V 60Hz



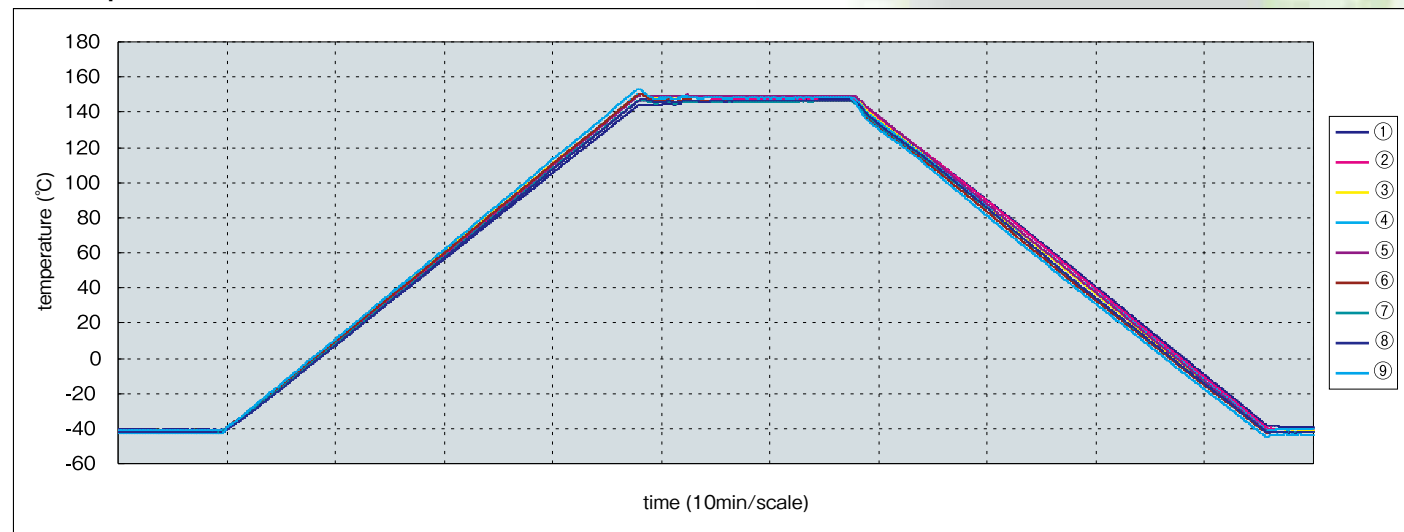
### 1.Ramp rate $15^{\circ}\text{C}/\text{min.}$



Temperature change rate (rising) (°C/min.)									
cycle number	①	②	③	④	⑤	⑥	⑦	⑧	⑨
1	14.2	14.5	15.0	15.1	14.9	15.2	14.7	14.8	15.6
2	14.2	14.6	15.1	15.3	15.0	15.3	14.7	14.9	15.8
average	14.2	14.5	15.0	15.2	14.9	15.3	14.7	14.9	15.7

Temperature change rate (drop) (°C/min.)									
cycle number	①	②	③	④	⑤	⑥	⑦	⑧	⑨
1	-14.7	-15.2	-15.4	-15.2	-15.6	-15.2	-15.2	-15.3	-15.5
2	-14.7	-15.2	-15.4	-15.2	-15.6	-15.2	-15.2	-15.3	-15.4
average	-14.7	-15.2	-15.4	-15.2	-15.6	-15.2	-15.2	-15.3	-15.5

### 2.Ramp rate $5^{\circ}\text{C}/\text{min.}$



Temperature change rate (rising) (°C/min.)									
cycle number	①	②	③	④	⑤	⑥	⑦	⑧	⑨
1	4.9	4.9	5.0	5.0	5.0	5.0	5.0	5.0	5.1
2	4.9	5.0	5.0	5.0	5.1	5.0	5.0	5.0	5.1
average	4.9	4.9	5.0	5.0	5.0	5.0	5.0	5.0	5.1

Temperature change rate (drop) (°C/min.)									
cycle number	①	②	③	④	⑤	⑥	⑦	⑧	⑨
1	-4.9	-4.9	-5.0	-4.9	-5.0	-4.9	-4.9	-4.9	-4.9
2	-4.9	-4.9	-5.0	-4.9	-5.0	-4.9	-4.9	-4.9	-4.9
average	-4.9	-4.9	-5.0	-4.9	-5.0	-4.9	-4.9	-4.9	-4.9

Constant Temperature and Humidity Chamber

EXHH type

EXHH20 type

Constant Temperature Chamber

EXTH type

EXHH20 type

## EC-85EXHH EC-85EXTH

### 15°C/min temperature changes

## EC-85EXHH20 EC-85EXTH20

### 20°C/min temperature changes

### Improved temperature change rate performance.

Improved the performance of temperature change rate of material temperature control to 15°C/min (EC-85EX Series) 20°C/min (EC-85EX20 Series).

Class	Testing chamber capacity (L)	Constant temperature and humidity chamber	Constant temperature chamber
Temperature control range (°C)		-70 to 180	-70 to 180
Humidity control range (%RH)		20 to 95	-
Rapid Temperature Change type	800	EC-85EXHH EC-85EXHH20	EC-85EXTH EC-85EXTH20

Temperature Change Rate (Set temp. from 180°C to -70°C)	drop	EC-85EXHH EC-85EXTH	<b>15°C/min.</b> (Average temp. change rate at 155°C to -45°C)
		EC-85EXHH20 EC-85EXTH20	<b>20°C/min.</b> (Average temp. change rate at 155°C to -45°C)
	rise	EC-85EXHH EC-85EXTH	<b>15°C/min.</b> (Average temp. change rate at -45°C to 155°C)
		EC-85EXHH20 EC-85EXTH20	<b>20°C/min.</b> (Average temp. change rate at -45°C to 155°C)

Notes: temperature change speed for,  
Standard Series ; drop : 2°C/min. , rise : 3°C/min.  
Low temperature(EC-86LHHP) Series ; drop : 1°C/min. , rise : 3°C/min.



EC-85EXHH

**Test chamber capacity 800L**  
(Including optional specification)  
Temperature and humidity recorder

## Addition of temperature cycle operation function

"Temperature Cycle Operation Function" which are available to setup "High-temp soak", "Low-temp soak", "lamp control", or "material temperature control" are added.

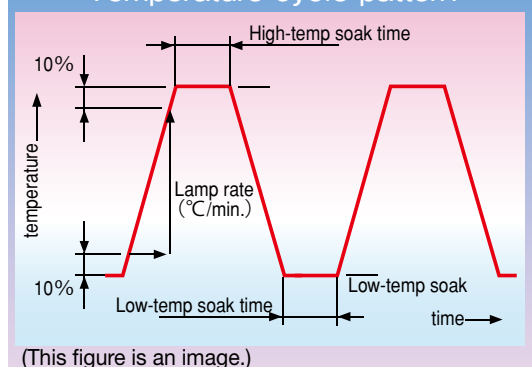
### (Setting range)

High temperature soaked temperature		60°C to 180°C
Low temperature soaked temperature		−70°C to 0°C
soak time		99 hours and 59 min.
Lamp rate	EC-85EXHH EC-85EXTH	5°C/min. to 15°C/min.
	EC-85EXHH20 EC-85EXTH20	5°C/min. to 20°C/min.

### Setting screen (Temperature cycle operation)



### Temperature cycle pattern



## Correspond to humidity control function

Line-up humidity control corresponding type . Temperature cycle test or temperature/humidity test can be corresponded by one unit.

※Humidity control operation : Effective when " Power Saving mode" or "Standard mode" is set up.

By improving of heat load correspondence performance, so to correspond for durability evaluation test such as electric conduction of LCD.

## High load correspondence

Correspond to heat load at high-temp/high-humid or low-temp condition.

Test condition	Heat load allowance
60°C/90%RH	1,000W
85°C/85%RH	1,000W
— 40°C	2,000W

Notes: operating under high load

EC-85EX-HL

Test chamber capacity 800L

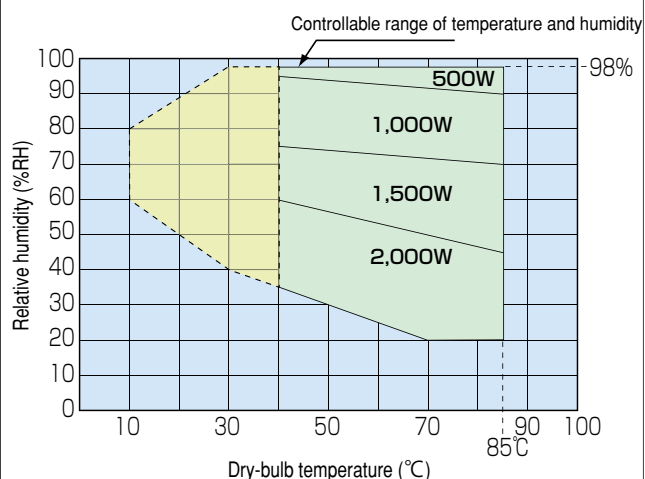
(Including optional specification) Temperature and humidity recorder



## Heat load allowance

<condition> Supply voltage: Rated voltage, Ambient temperature: 23°C, Inlet cooling-water temperature: 25°C, Operation mode: high load

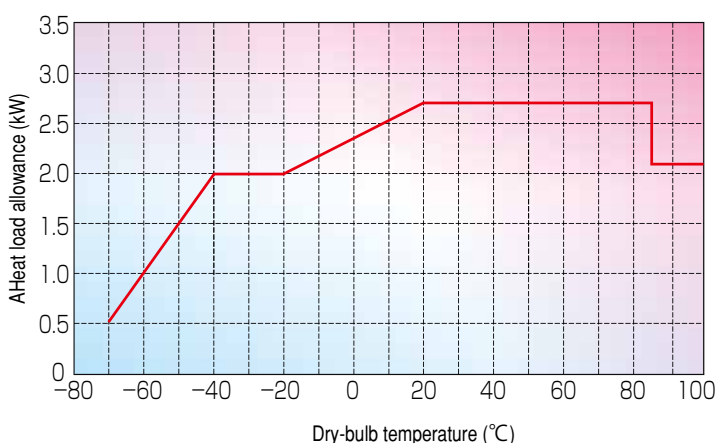
### Constant temperature and humidity operation



Notes:

1. Yellow parts continuous operation time will be limited because frost builds up on the evaporator.
2. Can not correspond to heat load at less than 40°C region.

### Constant temperature operation



## Operation mode changeable function

Standard equipped the "operation mode changeable function" which can change unit refrigerant ability by operation mode ("Energy Saving mode", "Standard mode", "High Load mode").

Energy Saving mode	Reduction of unit ability Setting when no heat load will occur.
High Load mode	Increasing the unit ability Setting with large heat load.



# Cosmopia C Large Size Series

Constant Temperature and Humidity Chamber

MH type  
MHH type

Constant Temperature Chamber

MT type  
MTH type

**Correspond to large size materials such as LCD Panels.**



EC-155MHP

(Including optional specification)  
Temperature and humidity recorder

Class	Testing chamber capacity (L)	Constant temperature and humidity chamber		Constant temperature chamber	
Temperature control range (°C)		-40 to 100	-40 to 150	-40 to 100	-40 to 150
Humidity control range (%RH)		20 to 98		-	
Lage size type	1,500	EC-155MHP	EC-155MHHP	EC-155MTP	EC-155MTHP

**Test chamber capacity 1500L**

## Correspond to large size test sample.

Expand the test chamber dimension and enabled to correspond large size sample examination such as large size display (ex. LCD panel) or solar power module.

Item	Specifications
Testing room dimension(W×D×H)	1,000mm×1,500mm×1,000mm
Testing room capacity	1,500L

## Improvement of usability

No need of wick change by adopting capacitance type humidity sensor. Also, illumination up and energy-saving is coexistence by adopting LED light.

## Electric power saving

Adopting 2 refrigerating cycles of inverter control and constant speed control.

At low load conditions, saving electric power by controlling refrigerate machine to test condition.

## Corresponding 2kW heat load

Correspondence of allowance of heat load to 2kW heat load at 40°C/90%RH testing condition (at High load mode).

Corresponding for tests with electric conduction materials or with heat load.

## Color LCD Touch Panel

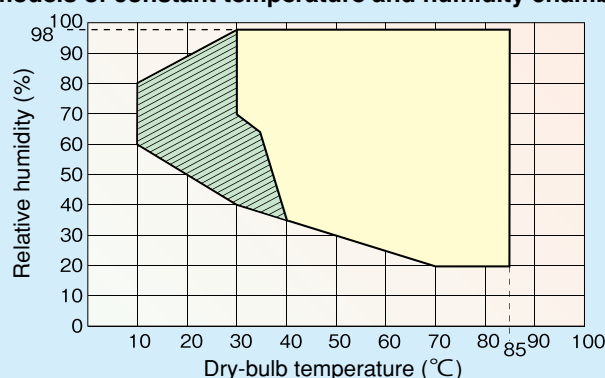
The color LCD touch panel is adopted so that setting and controlling of the unit will be simple only by touching the displays. The color LCD offers clear view and the system is supported for diverse functions in operation control.



## Temperature and humidity control range

10 to 85°C/20to98%RH(The following Graph)  
The wide range of temperature and humidity tests are possible.

**Controllable range of temperature and humidity (for all models of constant temperature and humidity chamber)**



Notes:

1. In low temperature areas where the dry bulb temperature is approx. 30 to 40°C or less, the continuous operation time will be limited because frost builds up on the evaporator.
2. The figure shows the data at ambient temperature of 5 to 35°C, inlet cooling-water temperature of 18 to 32°C, supply voltage rating are within 5%, with no load.

# Cosmopia C Large Size Series

Constant Temperature and Humidity Chamber

MH type  
MHH type

LH type  
LHH type

Constant Temperature Chamber

MT type  
MTH type

LT type  
LTH type

Correspond to large size materials such as Solar Cell Module .

Test chamber capacity 3,780L

EC-385MHP  
(Including optional specification)  
Temperature and humidity recorder



Class	Testing chamber capacity (L)	Constant temperature and humidity chamber				Constant temperature chamber			
Temperature control range (°C)		-50 to 100	-50 to 150	-70 to 100	-70 to 150	-50 to 100	-50 to 150	-70 to 100	-70 to 150
Humidity control range (%RH)		20 to 95				-			
Large Capacity type	3,780	EC-385MHP	EC-385MHHP	EC-385LHP	EC-385LHHP	EC-385MTP	EC-385MTHP	EC-385LTP	EC-385LTHP

## High capacity testing chamber

By owning chamber capacity of 3,780L to be able to correspond large size material test such as solar cell module, display, rechargeable battery, or others.

	EC-385MHP
Testing room dimension (W×D×H) (mm)	1,400×1,800×1,500
Testing room Capacity	3,780L

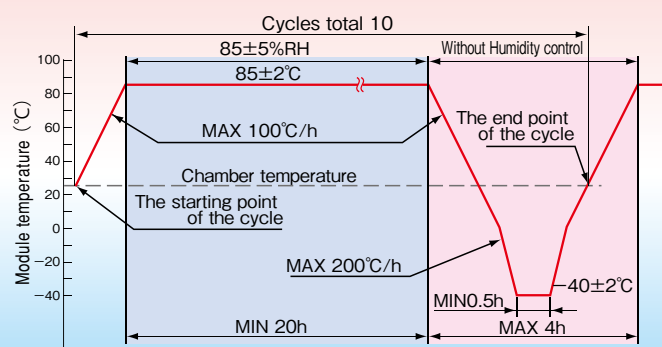
## Achieving Solar cell module evaluation test standard

Corresponding specific condensation freezing test in the IEC 61646(Edition2.0) which is the evaluation test standard for solar cell module

### < Corresponding test specific>

- IEC 61646(Edition2.0):  
Temperature cycle test, Condensation freezing test, Wet heat test
- JIS C 8917,8938:  
Temperature cycle test, Temperature-Humidity cycle test, Heat resistance test, Moisture resistance test  
(EC-385MHP・EC-385MHHP)  
(EC-385LHP・EC-385LHHP)

<IEC61646(Edition2.0) Condensation and freezing cycle>



(This figure is an image.)

## Refrigerate control

Reducing power dissipation by controlling refrigerating ability by matching refrigerating machine to operating condition at low necessary of refrigerate ability in high temperature (humidity) testing condition

operation condition		refrigerate control	
operation condition	operation sample	refrigerate cycle	refrigerate ability
at temperature rising (*1)	-40°C→85°C/85%RH	single refrigerate cycle (*2)	controlling refrigerate ability operation by inverter control
high temperature (humidity) testing condition	85°C/85%RH		
at temperature drop	85°C/85%RH→-40°C	single refrigerate cycle (*2)	rising refrigerate ability by inverter and electronic expansion valve control
		dual refrigerate cycle (*3)	rising refrigerate ability by electronic expansion valve control

Notes: 1. By setting temperature changing time at temperature rising, single refrigerate cycle operates.

2. Single refrigerate cycle equips inverter and electronic expansion valve control.

3. Dual refrigerate cycle equips electronic expansion valve control.

# Cosmopia C Low-Temperature / Low-Humidity Series

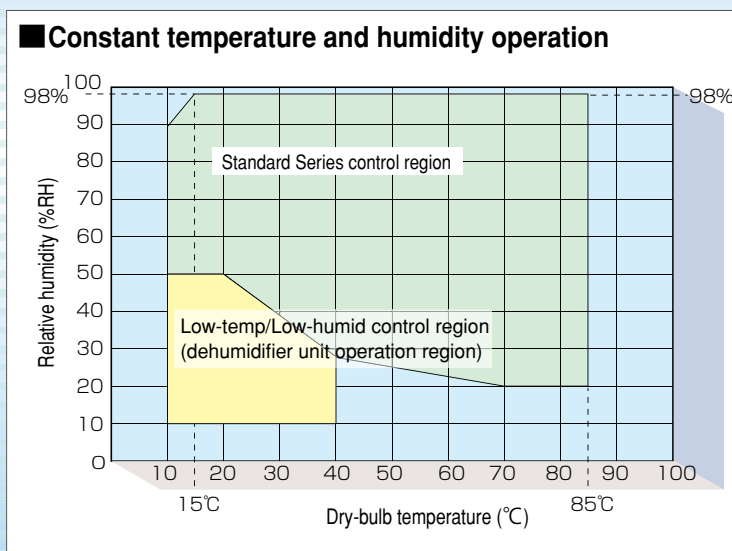
Constant Temperature and Humidity Chamber

MH type

## Correspond low-temp/low-humid test.

### Correspond to low-temp/low-humid test.

Expanded temp-humid control range to 10°C/10%RH.



EC—85MHPD

(Including optional specification)  
Temperature and humidity recorder

Test chamber capacity 800L

## Correspond continuous test

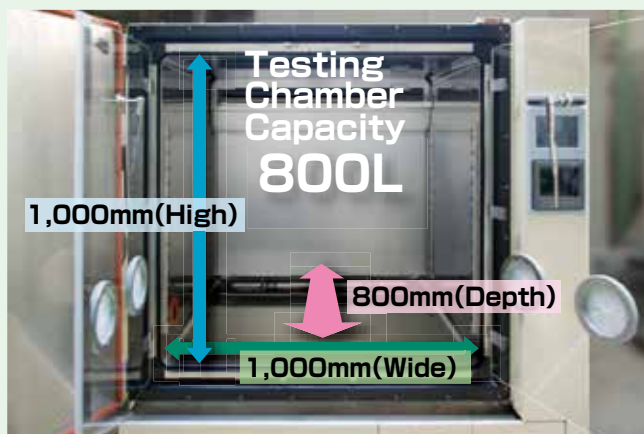
By controlling at evaporate temperatures, continuous tests (\*) are available at low-temp/low-humid control region.

\*(excluding maintenance time such as wick exchange)

## Correspond heat load

Corresponding to 500W sensible heat load by control of evaporate temperatures and compressor suction pressure. Electric conduction tests at low-temp/low-humid region are available.

### Testing Chamber Dimension



(Including optional specification)  
Inner Door, Temperature and humidity recorder

### Option

Correspond to same Optional Specification with standard Series.

Contact us about it.



Inner Door



Inner Door Cable Hole

Wiper



# Cosmopia C Double Side Access Series

Constant Temperature Chamber

MT<sub>type</sub>

**Available to eject testing material cable from either side of chamber. Correspond to evaluation system for secondary battery.**

(Secondary battery is also said as storage battery or rechargeable battery, which is a battery of charge / discharge use.)

**Test chamber capacity 392L**

EC-45MTB  
(Including optional specification)  
Cable hole



Class	Testing chamber capacity (L)	Temperature control range (°C)	Testing chamber Dimensions (mm)
EC-45MTB	392	-40 to +100	(W) 630 × (D) 720 × (H) 900
EC-85MTB	784		(W) 1,000 × (D) 800 × (H) 1,000

## Double Side Access Type

Ejecting measurement cable for evaluation test from either side are available and usability are improved (Compared with Constant Temperature Chamber/Standard Series : EC-46MTP).

### Adopting touch panel for operation panel.



**Standard equipment**

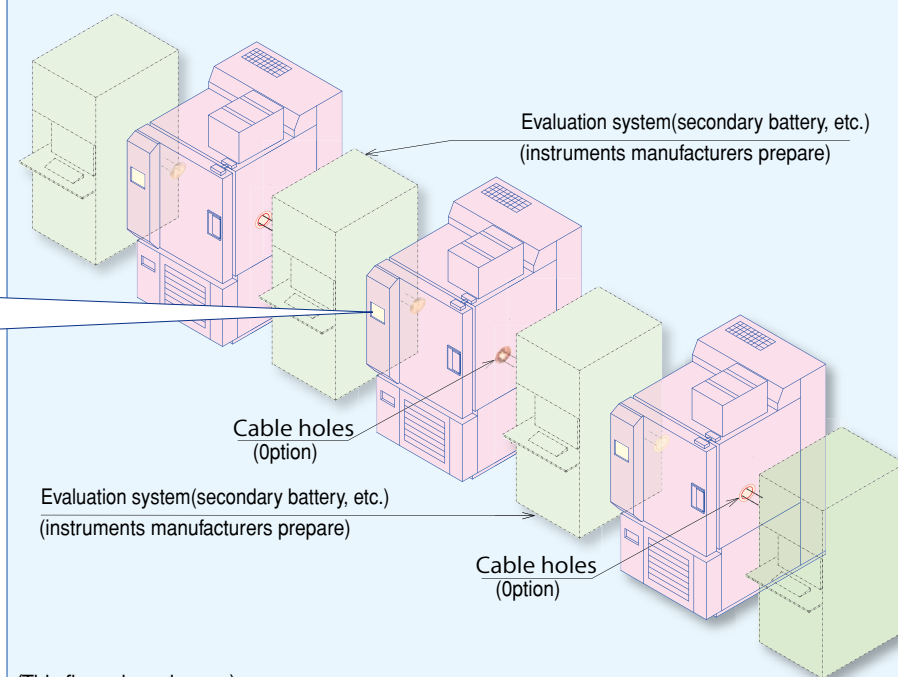
Can be used for constant temperature test by independent if not operated from evaluation system.



**Option**

Program operation is also available by using option color liquid panel.

### Connecting conceptual diagram



## Standard equipments enhancement function

Standard equipments the necessary function for evaluation system for secondary battery.

Pressure Discharge Damper

Stainless made Sheathed Type Heater

Door Rock Bolt

Emergency Stop Switch

Communication Interface (RS-485)

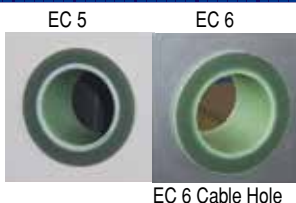
Notes: Cable Hole will be optional specification.

## Optional Specification List (Constant Temperature and Humidity Chamber) Constant Temperature Chamber

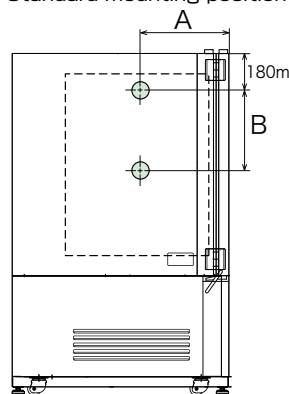
\*Some options may not be supported depending on the model. Please contact us for details.

### Cable Hole

Standard Cable Hole and optional specification hole diameter will be up to the table below. Adding Cable Hole effect to temperature rise/drop performance. Have the additional number to be less than the list shown below to satisfy the performance.



### Standard mounting position



The installation is possible any place in addition to standard mounting position. Please contact us for more information.

Standard mounting location (mm)	A	B
EC-16	280	300
EC-26	280	400
EC-36L	357	400
EC-46	447	400
EC-86-EC-86L	487	450
EC-106	587	450

Optional Specification Hole Diameter(mm)	Possible number of Optional Hole according to the Series			
	EC-16	EC-26	EC-36L,46	EC-86,86L,106
φ 50 Hole	2	2	2	3
φ 100 Hole	1	1	1	2
φ 150 Hole	NG	NG	1	1

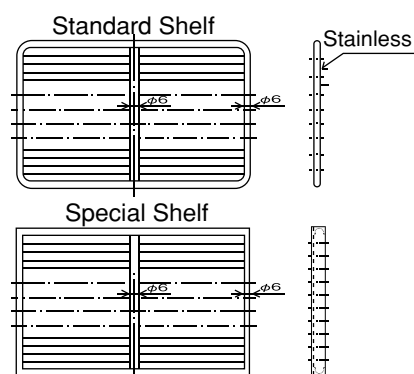
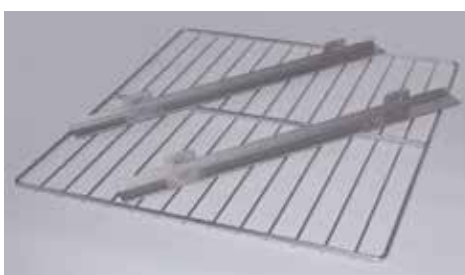
### Shelf Board, Shelf Bracket

#### Standard Shelf

One shelf's weight load capacity is 10kg at equal distribution (static load), but keep the total weight load in the chamber to less than 20kg.

#### Special Shelf

One shelf's weight load capacity is 50kg at equal distribution (static load), but keep the total weight load in the chamber to less than 100kg.



### Testing Room Weight Load Capacity

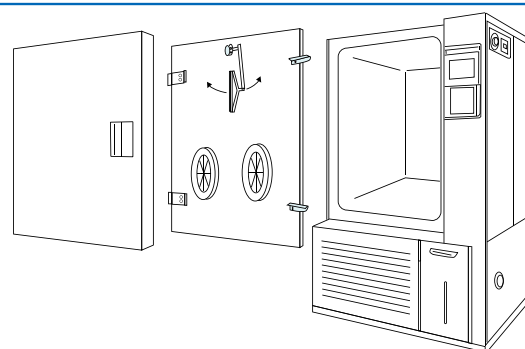
Testing chamber floor weight load capacity is 200kg at equal distribution (static load) by lying reinforcing plate. In case of using Shelf Board, floor weight load capacity will be total 200kg including weight of test sample on the shelf.

\*At this case, Caster/Level Adjuster will be non-equipped so the unit height dimension will be 45mm lower.

	Standard	Special Shelf	Special Floor
Shelf only	10kg	50kg	—
Shelf Total	20kg	100kg	—
Test Chamber Floor only	50kg	50kg	200kg
Test Chamber Floor Total	70kg	100kg	200kg

### Inner Door Specification

Inner Door specification is able to observe the testing chamber internal from the front side when necessary, compared to standard specification's structure of window.



\*Outer door window and lamp will be non-equipped at Inner Door specification.

\*\*Please select whether Handling Hole, Wiper, and Gloves(for handling hole) is needed.

### Large-scale Observation Window

Making the Observation Window larger so to observe wide area. Window equips lamp and also control glass surface temperature to avoid fog to observe easier. In addition, optional specification with Handling Hole is also available. At this case, the maximum temperature will be 120°C. Applicable model is restricted so please contact us about it.



EC-106 series (In the case of with a handling hole)



## Optional Specification List (Constant Temperature and Humidity Chamber)

※Some options may not be supported depending on the model. Please contact us for details.

### Inner Light

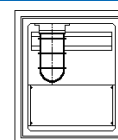
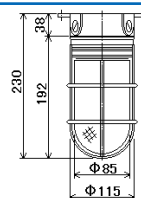
Increase the illuminance of chamber inside for easier to observe.  
Applicable model will be restricted to upper-temp:100°C to lower-temp:-40°C. (specification of -70°C and 150°C is not available)

- ※Chamber height will be 230mm lower by equipping the Inner Light.
- ※Temperature-humidity distribution performance will become  $\pm 0.8^{\circ}\text{C}/\pm 5.0\%\text{RH}$
- ※Test chamber temperature-humidity control and distribution will disturb when light is on.

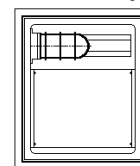
[Specification]

Quality of Materials: Body: Aluminum Alloy  
Glass: Transparent Hard Glass  
Usage Ambient Temperature: -60°C to 120°C  
Socket Rating: 250V, 5A  
Applicable Light Bulb: AC 100V/40W

※Light Bulb will be expendable supplies.



EC-16,26 Series Figure of Inner Light fitting



EC-46,86,106 Series Figure of Inner Light fitting

### Water Supply Tank

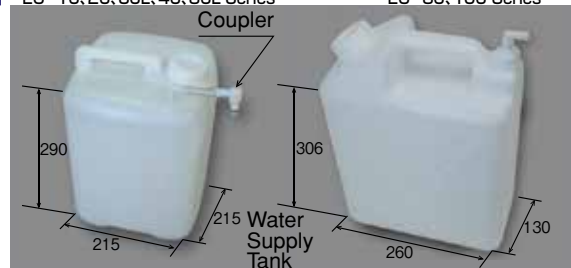
Same water supply tank as standard equipped. By preparing with full-filled spare tank, it will be easy to exchange when unit tank is empty.

- ※ For using as a reserve tank by connecting to standard equipped tank, extra remodeling is necessary.

### Water Supply Tank appearance

EC-16, 26, 36L, 46, 86L Series

EC-86, 106 Series

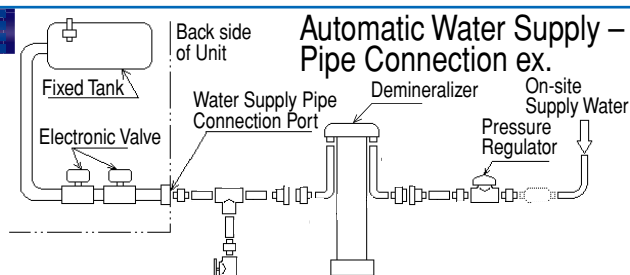


### Automatic Water Supply Specification

As for automatic water supply method for Chamber, optional specific set to supply automatically from demineralizer (customer preparation goods).

By this method, electronic valve opens automatically do to the water level of the chamber fixed tank and supply pure water.

- ※At this specification, the standard built-in tank in the unit will be non-equipped.



### Temperature (Humidity) Recorder

Two types of Recorder: Paper Type (Chart length: 100mm) or Paperless Type (contain Memory Card) are set for option.



Paper type



Paperless type

### Terminal for Temperature (Humidity) Recorder

Terminal Block to connect output terminals of chamber internal dry-bulb temperature and relative humidity for to record to External Recorder (Output: DC1 to 5V)

### Communication Interface Function

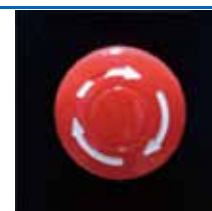
RS-232C, RS-485, Web interface (Including Ethernet) are prepared as interface function. Either function is possible for equipment.

### Water-cooling Specification

Changing unit's standard cooling method of air-cooling specification to water-cooling type is available.

### Emergency Stop Switch

Switch to stop the unit at emergency.  
Emergency Stop Switch will turn off the unit leakage breaker and cut off the power supply.



### Signal Indicator

Lamp to indicate the unit operating conditions.

- Green Light: Lights when unit operated.
- Yellow Light: Lights when Leakage Breaker is ON and waiting for operation.
- Red Light: Lights when protection device is operate and the unit went OFF.



### Automatic Water Drainage

As for automatic water drainage method for Chamber, optional specific set to drainage automatically from the humidifying pan.



# Cosmopia S

## Thermal Shock Chamber

### Standard Series



P29 to P31



**ES-L**  
Type

Temperature Range

Low-temp test

-70 to 0°C

High-temp test

+60 to +200°C

Test chamber capacity

47L  
105L

### High Performance Series



P32 to P35



**ES-LH**  
Type

Temperature Range

Low-temp test

-70 to 0°C

High-temp test

+60 to +200°C

Test chamber capacity

74L  
105L  
200L  
305L

### High Performance Series Air-cooling Remote Condenser Type



P36



**ES-LH-R**  
Type

Temperature Range

Low-temp test

-70 to 0°C

High-temp test

+60 to +200°C

Test chamber capacity

74L  
105L  
200L  
305L

### High Performance Series High Speed Type



P37



**ES-LHH**  
Type

Temperature Range

Low-temp test

-70 to 0°C

High-temp test

+60 to +200°C

Test chamber capacity

105L  
200L

### MIL Standard Type



P38



**ES-LM**  
Type

Temperature Range

Low-temp test

-70 to 0°C

High-temp test

+60 to +200°C

Test chamber capacity

70L

# High Temperature Series (250°C)

P39



**ES-LM-M**  
**ES-LM-RM**  
Type

Temperature Range		Test chamber capacity
Low-temp test	High-temp test	
-70 to 0°C	+60 to +250°C	72L



# Excellent Series

**EX**CELLENT series

P40,P41

500 hrs. without defrosting

**ES-EX**  
Type

Temperature Range		Test chamber capacity
Low-temp test	High-temp test	
-70 to 0°C	+80 to +200°C	70L 200L



**ES-EX-L**  
Type

Temperature Range		Sample Basket capacity
Low-temp test	High-temp test	
-70 to 0°C	+70 to +150°C	5.6L 9.4L



# Large Capacity Series



P42 to P44



**ES-L**  
**ES-LH**  
**ES-L-R**  
Type

Temperature Range		Test chamber capacity
Low-temp test	High-temp test	
-50 to -10°C -0 to 0°C	+60 to +120°C +60 to +200°C	1,080L 1,450L

**ES-L**  
Type

-60 to 0°C -65 to 0°C	+60to +130°C	2,448L 2,880L
-65 to 0°C	+60 to +130°C	3,130L
-50 to -10°C	+60 to +120°C	5,438L

# Cosmopia S Standard Series

Air flow Type

**100 cycle continuous operation and Stainless steel exterior design.**



**Test chamber capacity 105L** ES-107L  
(Including optional specification)  
Temperature recorder, Emergency stop switch, Cycle counter

## Series

Class	Freezer method	Test chamber capacity	
		47L	105L
Standard Series	Built in Air-Cooling	ES-57L	ES-107L

## New function

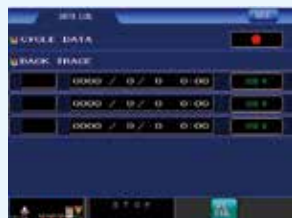
### • USB memory saving function

Saving the trend-graph data to USB memory is available. This is the function which enables USB memory to save the data (measured temperature, measured humidity) shown on the trend-graph of LCD operation panel as CSV file format.



### • Data log function

When the operation stops by alarm for abnormal detection, this feature saves the data (the operating situation just before the trouble has occurred) to USB memory. Collecting the data just before the operation-stop enabled user to do trouble analysis.



## Caster / Level adjuster

Standard equipped the caster / level adjuster for unit movement.



## 100 cycle continuous operation

Possible to operate 100 cycles (maximum) with no defrost at 2 zone (low temp ↔ high temp) operation.

**Operation condition** : Low temperature start, Not use [POWER SAVE2] function.  
(Control point Windward side)

Low temperature :  $-40^{\circ}\text{C}/30\text{min}$

High temperature :  $125^{\circ}\text{C}/30\text{min}$

Test sample : ES-57L(3.5kg)  
ES-107L(5kg)  
(plastic mold IC, including jig for test sample weight)

Ambient temperature : under  $20^{\circ}\text{C}/50\%\text{RH}$

Power supply : within standard rate  $\pm 5\%$

※ May not continuously operate 100 cycles except the examination condition above.

## Newly designed appearance

Stainless steel (hair line finish) was adopted for the exterior material and renewed the design by putting a clear cover to the both side of device.

## Signal output terminal

Standard equipped the "Time signal", "Test sample power source", "Alarm output".

## Communication Interface function

Standard equipped RS-232C interface function.



## Equipped with a large-sized LCD touch panel for easy observation and operation

All set up and switch operations are put together on the LCD panel.

### Changing Language



The language displayed on the LCD control panel can be changed on the operation panel. Available languages are Four languages, Japanese, English, Chinese (Simplified Chinese) and Korean.

### Pattern combination



Up to 3 combined test pattern can be operated at maximum.

### Timer Reservation



It is possible to set the run and stop timer for operation. According to the usage situation, Stop timer and Run timer can be reserved.

### Memo screen



This screen can be used as the memo pad. The character, the line, the picture, etc. can be written directly on the LCD panel with the finger, the pen used for the electronic note, etc. It is possible to register up to eight pages.

### Trend graph screen



The trend graph of the measurement temperature in the test chamber is displayed on this screen. The trend graph can be scrolled and reset.

### Cycle Counter screen



It is possible to set 5 cycle counter and to set number of cycle in order to interrupt the examination.

## Operation mode selective function/Setting of Operation mode and Energy saving mode.

The refrigerating capacity of the unit during the test cycle is set on this screen.

Energy saving mode	The unit is run by lower refrigerating capacity. Select this running mode when an amount of the device is a little and the temperature of the low temperature test is high.
Standard	The unit is run by normal refrigerating capacity.
High load mode	The unit is run by high refrigerating capacity. Select this running mode when an amount of the device is large and the temperature of the low temperature test is low.



### The settings of Energy-saving mode

This mode can be set without pre-heating and pre-cooling.

Power save 1	At the final test cycle, the pre-cooling in the low temperature chamber is stopped when the final low temperature test is completed, or the pre-heating in the high temperature chamber is stopped when the final high temperature test is completed. <ATTENTION> This running mode is ineffective when the stop state (AFTER TEST) is set in DRYNESS STOP or READY on CONTROL screen.
Power save 2	The refrigerating compressor is started and stopped by the measurement temperature of the low temperature chamber during the pre-cooling, and the heater in the high temperature chamber is turned on and off by the measurement temperature of the high temperature chamber during the pre-heating. <ATTENTION> The temperature return time might become long according to the drive condition. (the ambient temperature is high, etc.)

## Option



Temperature Recorder



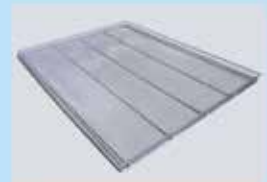
Built-in Air Compressor



Emergency Stop Switch



Cable hole



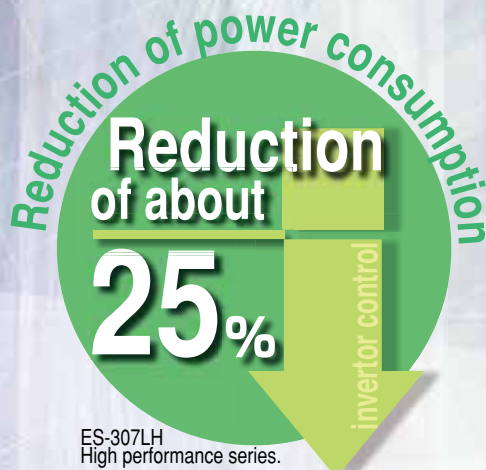
Test Sample Basket

Item	Specification
Temperature Recorder	Chart length: 100mm, 1 pen type, 6 dots type, Non-Paper Type
Emergency Stop Switch	Emergency Stop Switch will turn off the unit leakage breaker and cut off the power supply.
Communication Interface Function	One of RS-485, and Web interface (Including Ethernet) are chosen.
Interface Cable	RS-232C : 4m or 10m
Cable Hole	φ 50mm × 1、 Can be added to next to standard cable hole (on left side)
Sensor Switching Function	Function available to switch the testing chamber temperature control point to windward or leeward. (Selectable)
Built-in Air Compressor	Power output of air Compressor 0.2kW
Terminal for connecting Air Compressor	3 φ 200V, 0.2kW or 0.4kW
Cycle Counter	Indicate test cycle number. Indicates 8 digits. Reset function is available.
Signal Indicator	3 colors (green : operated, yellow : waiting for operation, red : protection device is operate)
Sample temperature monitoring system	counting start of the test time by the sample surface temperature
Test Sample Basket	—

\* We have other options as well as the above.

## Debut of High Performance series with inverter control.

Improving energy saving by inverter control adoption.  
Also to improve the usability by 100 cycle continues operation and LCD display upsizing.



**Test chamber capacity 305L**

ES-307LH  
(Including optional specification)  
Temperature recorder, Emergency stop switch, Cycle counter

## Newly designed appearance

Stainless steel (hair line finish) was adopted for the exterior material and renewed the design by putting a clear cover to the both side of device.

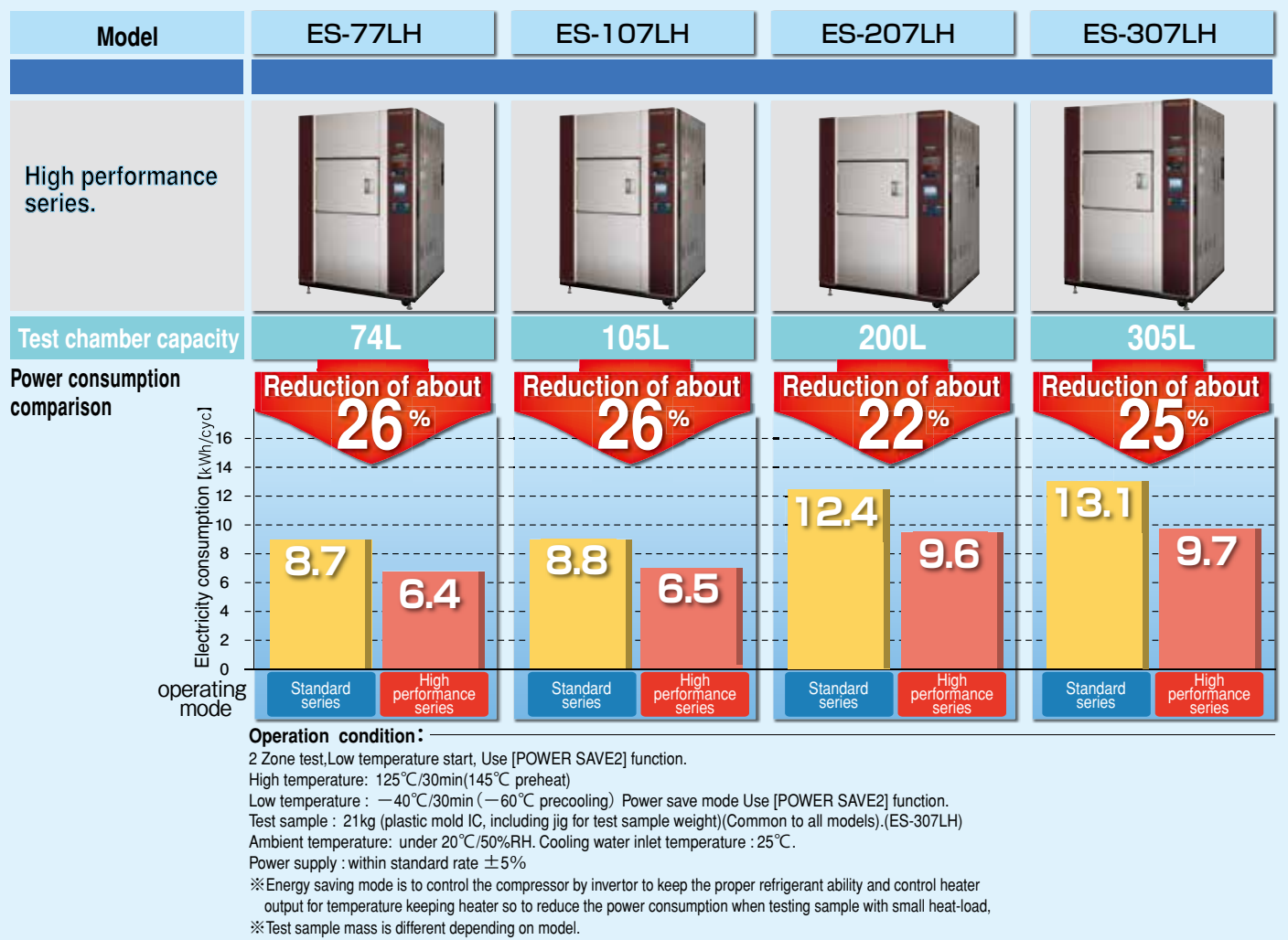
### Series

Class	Cooling method	Test chamber capacity			
		74L	105L	200L	305L
High-performance series	Water-Cooling	ES-77LH	ES-107LH	ES-207LH	ES-307LH



## Reduction of power consumption (Energy saving mode)

By adopting inverter control to High/Low compressor of the cascade cycle, reduced the power consumption compared to the conventional unit.

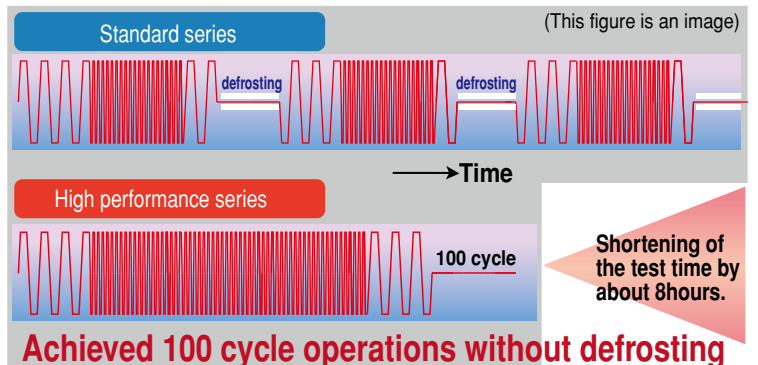


## 100 cycle continuous operation

Possible to operate 100 cycles (maximum) with no defrost at 2 zone (low temp ⇔ high temp) operation.

### Operation condition:

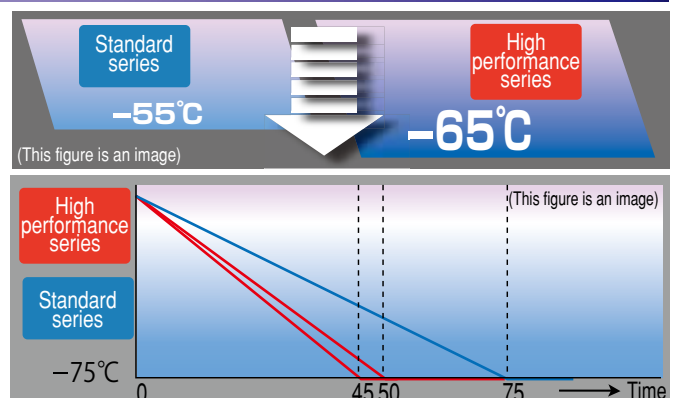
2 Zone test, Low temperature start, Not use [POWER SAVE2] function.  
 High temperature: 125°C/30min(145°C preheat)  
 Low temperature: -40°C/30min (-60°C precooling).  
 Test sample: 6.5kg (ES-77LH) 7.5kg (ES-107LH) 30kg (ES-207LH) 21kg (ES-307LH)  
 (plastic mold IC, including jig for test sample weight)(Common to all models).  
 Ambient temperature: under 20°C/50%RH. Cooling water inlet temperature: 25°C.  
 Power supply: within standard rate ±5%  
 ※ It can't sometimes be 100cycles continuous operation besides the testing condition above-mentioned.



## What is High performance series (Difference with the standard series)

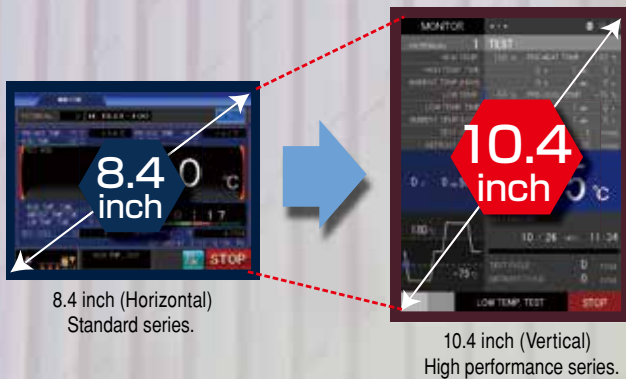
- Low temperature testing operation condition is -65°C (standard series is -55°C)
- Temperature drop time (low temperature chamber) from ambient temperature to -75°C less than 50 minutes in (ES-207LH, 307LH less than 45 minutes.) (The standard series less than 75 minutes)

\* Based on the test conditions described in the specification.



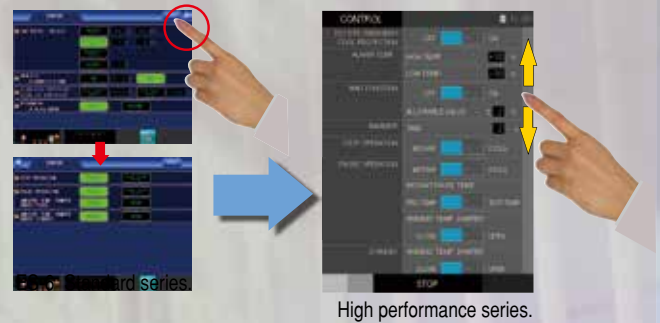
## Equipped with a large-sized LCD touch panel

A size of LCD touch panel screen is expanded from 8.4 inch to 10.4 inch.



## Scroll

The scroll bar on a screen or the main menu can be used to scroll up and down to move the display area and show the part that is hidden from the screen.



## Changing Language

The language displayed on the LCD control panel can be changed on the operation panel. Available languages are Four languages, Japanese, English, Chinese (Simplified Chinese) and Korean.



## Seconds Testing Timer

Testing time can be preset in seconds beside hours and minutes. Available for users who want to measure in seconds the testing environment in detail.



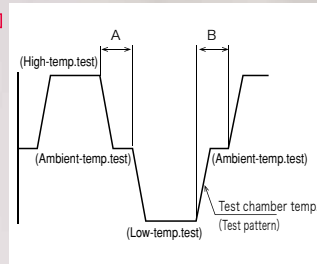
## Data log function

When the operation stops by alarm for abnormal detection, this feature saves the data (the operating situation just before the trouble has occurred) to USB memory. Collecting the data just before the operation-stop enabled user to do trouble analysis.



## Individually preset the ambient temperature testing time.

The ambient temperature testing time after a high-temperature test and low-temperature test can be separately set up. It is effective when user request to measure the ambient temperature testing time different in after High-temperature test and after Low-temperature test.



## Swipe

A swipe operation can be used to change screens between 3 different screens : MONITOR, PATTERN SETTING and TREND GRAPH. Touch the swipe area on the top of the screen and swipe your finger to the right or left to Change screens.



## Each product part

### ■ USB memory saving function

Saving the trend-graph data to USB memory is available. This is the function which enables USB memory to save the data (measured temperature) shown on the trend-graph of LCD operation panel as CSV file format.

### ■ Signal output terminal

Standard equipped the "Time signal", "Test sample power source", "Alarm output".

### ■ Interface

Standard equipped RS-232C interface function.

### ■ Caster / Level adjuster

Standard equipped with the caster / level adjuster for unit movement.



Caster/ Level adjuster

## Option



Temperature Recorder



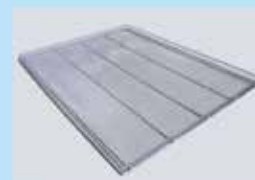
Built-in Air Compressor



Emergency Stop Switch



Cable hole



Test Sample Basket

Item	Specification
Temperature Recorder	Chart length: 100mm, 1 pen type, 6 dots type, Non-Paper Type
Emergency Stop Switch	Emergency Stop Switch will turn off the unit leakage breaker and cut off the power supply.
Communication Interface Function	One of RS-485, and Web interface (Including Ethernet) are chosen.
Interface Cable	RS-232C : 4m or 10m
Cable Hole	φ 50mm × 1、 Can be added to next to standard cable hole (on left side)
Sensor Switching Function	Function available to switch the testing chamber temperature control point to windward or leeward. (Selectable)
Built-in Air Compressor	Power output of air Compressor 0.2kW
Terminal for connecting Air Compressor	3 φ 200V, 0.2kW or 0.4kW
Cycle Counter	Indicate test cycle number. Indicates 8 digits. Reset function is available.
Signal Indicator	3 colors (green : operated, yellow : waiting for operation, red : protection device is operate)
Sample temperature monitoring system	counting start of the test time by the sample surface temperature
Test Sample Basket	—

\* We have other options as well as the above.



# Cosmopia S High Performance Series

## Air-cooling Remote Condenser Type

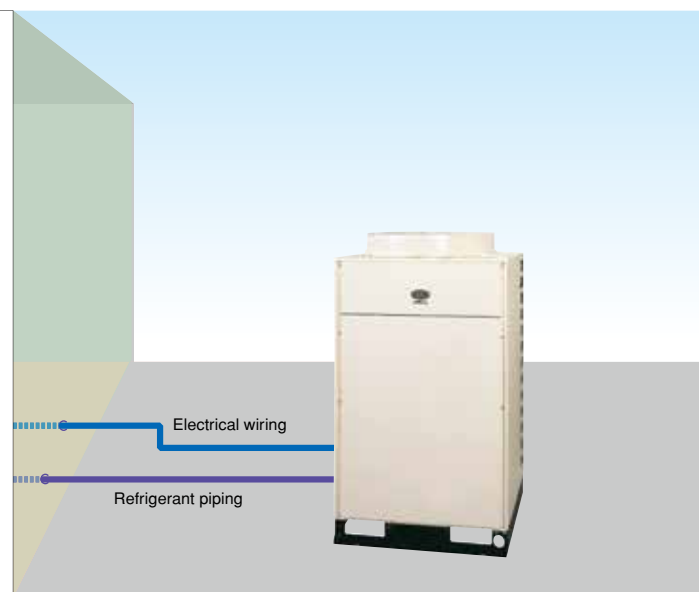
### Air flow Type

#### Connecting conceptual diagram (Air-cooling Remote Condenser Type)



Thermal Shock Chamber  
(ES-307LH-R)

(including optional specification) Temperature recorder and Emergency Stop Switch



Air cooling remote condenser series  
(RCR-R10F)

#### Series

Series	Freezer method	Test chamber capacity (L)			
		74	105	200	305
High-Performance Series Air-cooling Remote Condenser Type	Air-cooling	ES-77LH-R	ES-107LH-R	ES-207LH-R	ES-307LH-R

#### Selection of air-cooling specification became available

To existing water-cooling specification, the selection of air-cooling remote condenser specification became available. Unit dimension is same as the water-cooling specification. Selecting cooling system up to the environment of placement is available.



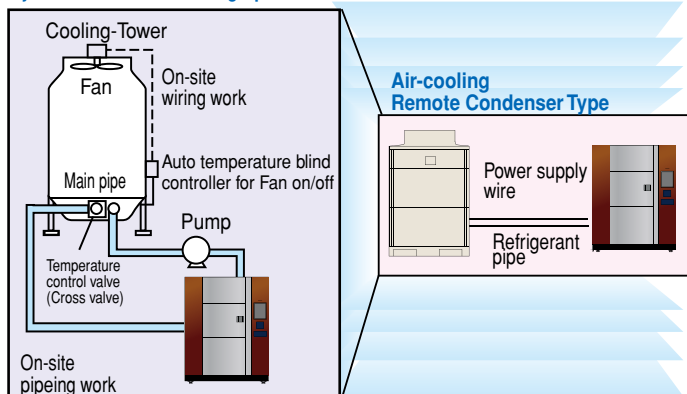
#### No need for heat rejection treatment

Air-cooling condenser will be placed outdoor because it is remote type. No need of duct and fan placing construction for treating heat rejection of condenser.

#### No need to place water source for cooling

Water-cooling specification needs cooling-tower, pump and water source. No need of placing water source and maintenance by selecting Air-cooling remote condenser specification.

#### System ex. of Water-cooling Specification



#### Power supply for condenser is by unit

Air-cooling remote condenser's power can be supplied by connecting to unit's power supply terminal block. No need to place exclusive power supply.

# Cosmopia S High Performance Series

**Air flow Type High Speed Type**

## ES-107LHH, ES-207LHH

**Correspond to temperature restore time of IEC test specific.**



ES-107LHH

**Test chamber capacity 105L**  
(Including optional specification)  
Temperature recorder

Temperature Range	
	ES-107LHH, ES-207LHH
Low-temp test	-70°C to 0°C
High-temp test	+60°C to +200°C

### Correspond to IEC test specific

Corresponds to IEC 60068-2-14 (Edition 6.0) [Test Na] with a test specific of temperature restore time.

#### Test Condition( Standard Performance)

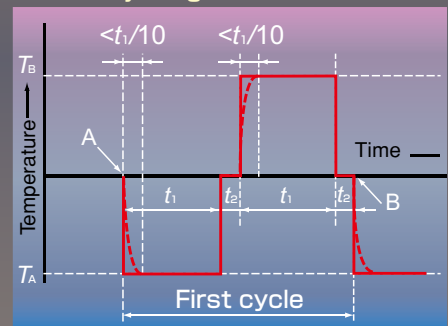
Within 3 min restore time of testing chamber windward air temperature at -55°C/30min ⇔ 125°C/30min.

#### Testing Materials

Plastic mold IC: 5kg [ES-107LHH], 10kg [ES-207LHH] (include equipping jig weight)

(There is a case of non corresponds to test specific other than standard test condition)

#### IEC 60068-2-14 (Edition 6.0) Test Na Cycle figure



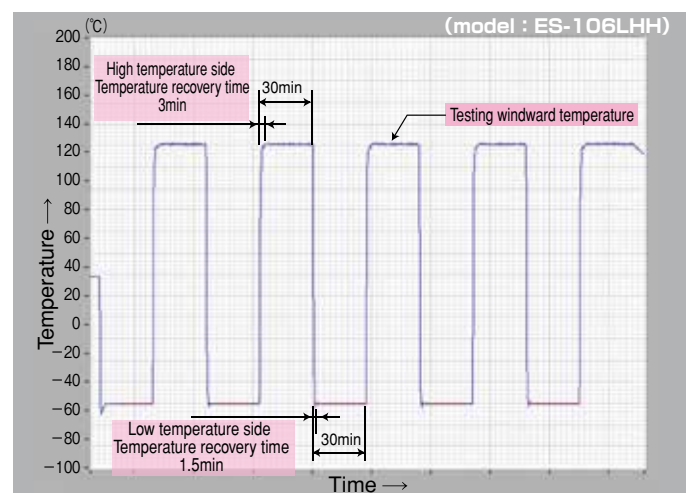
(This figure is an image.)

### Temperature Cycle Test Data

This High speed type Thermal Shock Chamber realizes heat restore time within 3 min by improving the high-temp and low-temp chamber's heat storage performance.

#### 〈ES-107LHH measured data〉

Test Condition	Test temperature	Test time
Low-temp test	-55°C	30min
High-temp test	125°C	30min
Test material weight	IC + shelf + basket = 5kg	
Cycle number	5 cycle (low-temp start)	
Windward control	2 zone test	



## Corresponds to MIL Standard test.



ES-76LM

Testing room Capacity 70L

### Series

Class	Cooling method	Test chamber capacity(L)
		70
MIL standard series	Water-Cooling	ES-76LM

※MIL Standard is used to help achieve standardization objectives by the U.S. Department of Defense.

### MIL standard test

The pattern of the temperature cycle test corresponding to MIL Standard Test is built in the product.  
Only have to choose a Pattern number, possible to operate the temperature cycle test.

Pattern number	Sources of Test standards.	High-Temp test condition			Ambient temp Test time	Low-temp test condition			Number of Test Cycle	Number of Deforest
		Test temp	Preheating temp	Test time		Test temp	Precooling temp	Test time		
31	MIL-STD-883C 1010.6 A	85℃	115℃	15min.	—	—55℃	—75℃	15min.	10times	10times
32	MIL-STD-883C 1010.6 B	125℃	155℃	15min.	—	—55℃	—75℃	15min.	10times	10times
33	MIL-STD-883C 1010.6 C	150℃	180℃	15min.	—	—65℃	—80℃	15min.	10times	10times
34	MIL-STD-883C 1010.6 D	150℃	180℃	30min.	—	—65℃	—80℃	30min.	10times	10times
46	MIL-STD-202F 107G A	85℃	115℃	4h	5min.	—55℃	—75℃	4h	5times	2times
47	MIL-STD-202F 107G B	125℃	155℃	4h	5min.	—65℃	—80℃	4h	5times	2times
48	MIL-STD-883B 1010.4 A	85℃	115℃	30min.	5min.	—55℃	—75℃	30min.	10times	10times
49	MIL-STD-883B 1010.4 A	85℃	115℃	1h	5min.	—55℃	—75℃	1h	10times	10times
50	MIL-STD-883B 1010.4 A	85℃	115℃	2h	5min.	—55℃	—75℃	2h	10times	5times
51	MIL-STD-883B 1010.4 B	125℃	155℃	30min.	5min.	—55℃	—75℃	30min.	10times	10times
52	MIL-STD-883B 1010.4 B	125℃	155℃	1h	5min.	—55℃	—75℃	1h	10times	10times
53	MIL-STD-883B 1010.4 BA	125℃	155℃	2h	5min.	—55℃	—75℃	2h	10times	5times

※There is a case of not meeting to the test specific depending on the Sample weight and the layout conditions.

The setting value can be changed and memorized according to the conditions such as sample weight, layout and the ambient temperature.

※MIL-STD-202 : Standard of electronic part

MIL-STD-883 : The standards of test method for an integrated circuit.



# Cosmopia S High Temperature Series (250°C)

## Air flow Type

Extended the upper limit of the high side testing temperature to 250°C, which is required for the evaluation test of the power semiconductor.\*



Test chamber capacity 72L

ES-76LM-M(Water-cooling type)  
(Including optional specification)  
Temperature recorder

### ※Power semiconductor

This is the generic name of semiconductor which control or supply power (electricity). This semiconductor is a unit which "operates motor" / "charge battery" or "operates microcomputer / LSI" by depressing the voltage of 5V to 3V or converting AC to DC.

### Series

Class	Freezer method	Test chamber Capacity (L)
ES-76LM-M	Water-cooling	72
ES-76LM-RM	Air-cooling	

### 10 minutes temperature restore time

Realized 10 minutes restore time for ambient to high temperature at 250°C test.

(Ambient to low-temp(-65°C) restore time is also 10 minutes)

**Test condition:** 1 cycle/per(ambient → low-temp(-65°C/30min.) → ambient(5min.) → high-temp(250°C/30min.) → ambient)  
Plastic Mold IC 6.5kg (include jig)  
5 cycles

**Temperature restore time:** within 10 minutes (air temperature measurement of testing chamber windward)

### Automatic door lock system

Standard equipped the automatic door lock system to testing chamber door.

### Caster / Level adjuster

Standard equipped the caster / level adjuster for unit movement.

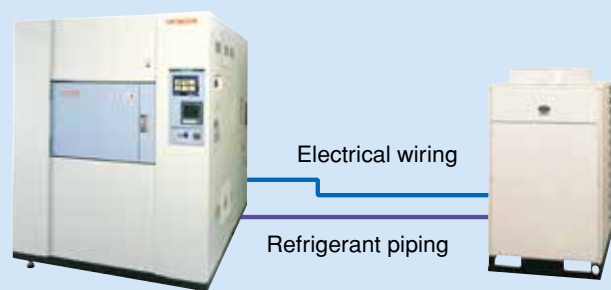


### Selecting of Air-cooling freezer type is available

Freezing type select between water-cooling or air-cooling type (Remote condenser) is available.

Select the freezing type by the setup environment condition.

### Air-cooling Specification



(Air-cooling Remote Condenser Type)

Test chamber capacity 72L

ES-76LM-RM(Air-cooling type)  
(Including optional specification)  
Temperature recorder

### 1000 Cycle operation with no defrosting (ES-76EX)

#### Large time shortening and energy saving of the development test.

Shortening 30% of testing time and 25% reduction of power consumption.

(Compared to our MIL specific model)

Achieved 1000 cycle operations without defrosting by HITACHI's original mechanism.

(2 Zone test, Low temperature and High temperature Testing time are 15 min.

When no open of the chamber door.)

※ ES-206EX with a test chamber capacity of 200 L is 500 cycles no defrosting.

#### Enhancements function for 1000 to 3000 cycle test.

Test interruption function and 5 cycle-count function are standard equipped.

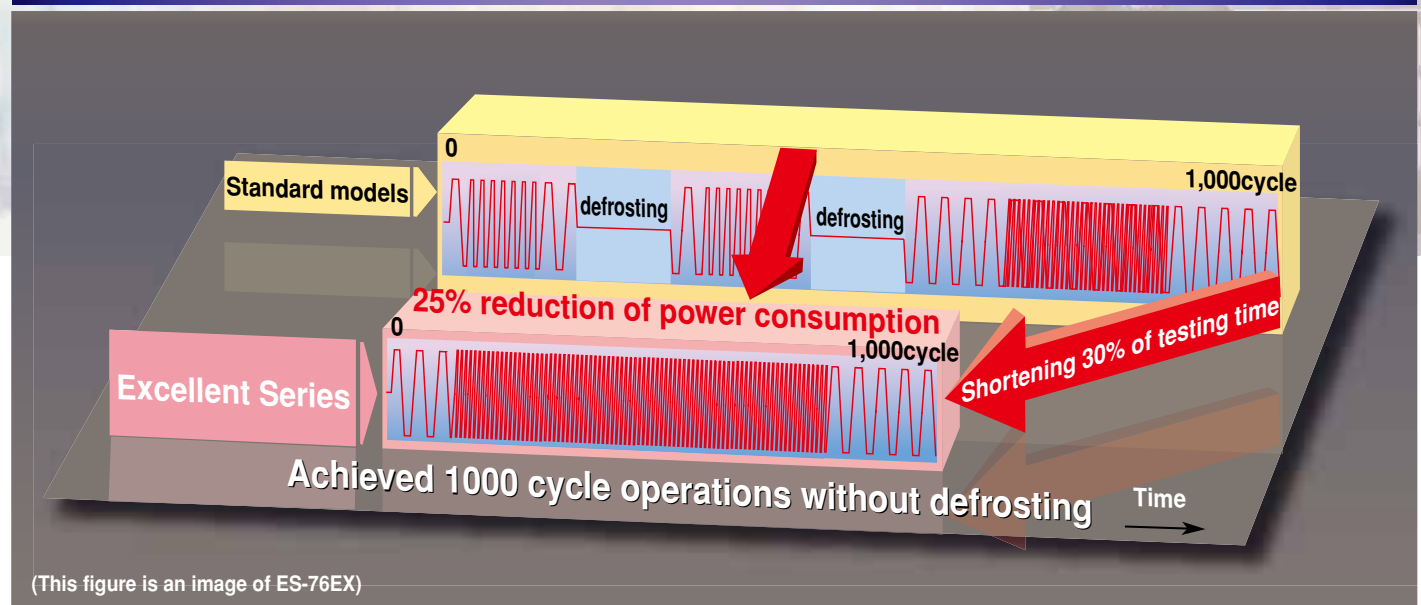
Check and material addition in the middle is made easier.



ES-206EX  
Test chamber capacity 200L

Series		
Series	Test chamber capacity (L)	
	70	200
Excellent Series	ES-76EX	ES-206EX

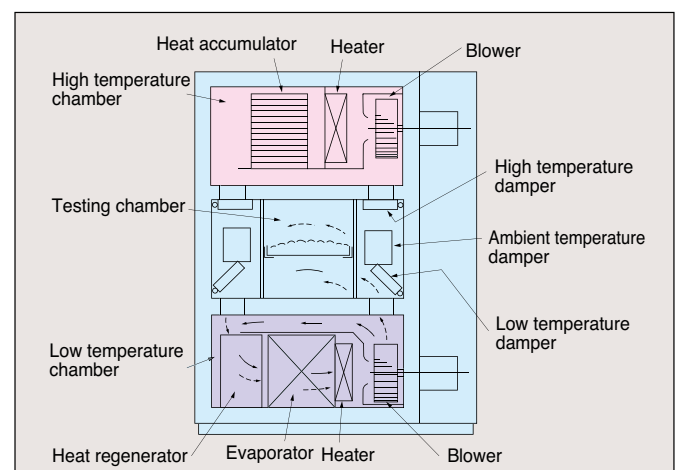
#### Large time shortening and energy saving of the development test.



#### Basic structure

High sealed damper system changes hot/cold air to blow and circulate air in the chamber. Static sample type ensure high reliability due to no complicated driving and sliding parts.

#### Configuration



# Cosmopia S Excellent Series EX<sup>CELLENT</sup> series

## Liquid Type

### Series

#### Model Range

Type	ES-66EX-L	ES-96EX-L
Sample Basket Capacity (L)	5.6L	9.4L
Maximum Sample Weight (kg)	4	4

### Largely reduction of heat transfer liquid consumption

Reducing the evaporation of heat transfer liquid by downsizing chamber, and also reducing the leak rate to the outside by airtight improvement.

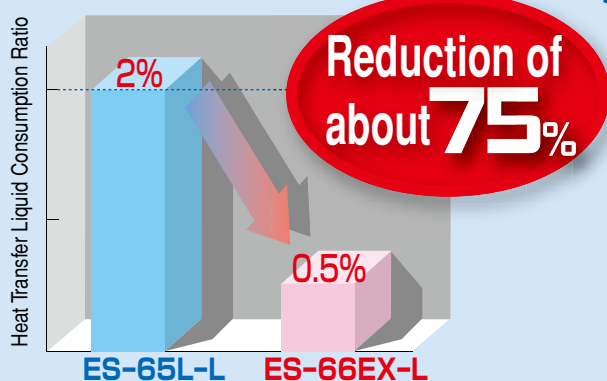
Furthermore, largely reduced the consumption of the heat transfer liquid by collecting and reusing efficiently by heat refrigerant vapor recovery system. (Compared with old type: 75% reduction・・・ES-66EX-L)



ES-66EX-L

Test chamber capacity 5.6L

### Consumption ratio at 1000-cycle operation



#### <Test Conditions>

High-temp test : 150°C/5min  
 Low-temp test : -65°C/5min  
 Test Sample : Plastic mold IC 2kg  
 Heat transfer liquid : GALDEN DO2TS 186kg (With non door opening)

Notes: Changes with door opening frequency and test conditions

### Equipped with a large-sized LCD touch panel for easy observation and operation

Easy operation with symbol marks and dialogues.

All set ups and switch operations are put together on the LCD panel.



### Function

Function	Contents
End-condition Setting	End-condition setting is possible for after the Temperature cycle operation finish •stop after chamber temperature restoring •stop after defrost operation •pre-operating condition
Trend Graph	Showing Trend Graph(with scroll function)
Test Pattern Name Input	10 alphanumeric character recording for Test pattern name is available
Time	Timer run/stop is available by 3 mode (one time / everyday / by day of the week)
Cycle Interrupt Number	Interrupting operation by specifying Cycle No. is available
Notepad	Writing in LCD Panel is available

### Original Option

Item	Specification
Water Separating System	Separate water included in Heat transfer liquid of low-temp chamber
Heat Transfer Liquid Automatic Supply System	Supplying Heat transfer liquid automatically to low-temp chamber when declined
High-temp Specification	High temperature test range: 70 to 200°C
Sample Temperature Measurement Terminal	For T type Thermocouple 1 or 5 points

\* We have other options as well as the above.



# Cosmopia S Large Capacity Series Air flow Type

## Series

Series	Freezer method	Test chamber Capacity(L)			
		1,080	1,450	2,448	2,880
High Capacity Series	Water-cooling	ES-1006L、ES-1006LH	ES-1506L	ES-2506L	ES-2906L
High Capacity Series / Air-cooling Remote Condenser Type	Air-cooling	ES-1006L-R	ES-1506L-R	—	—

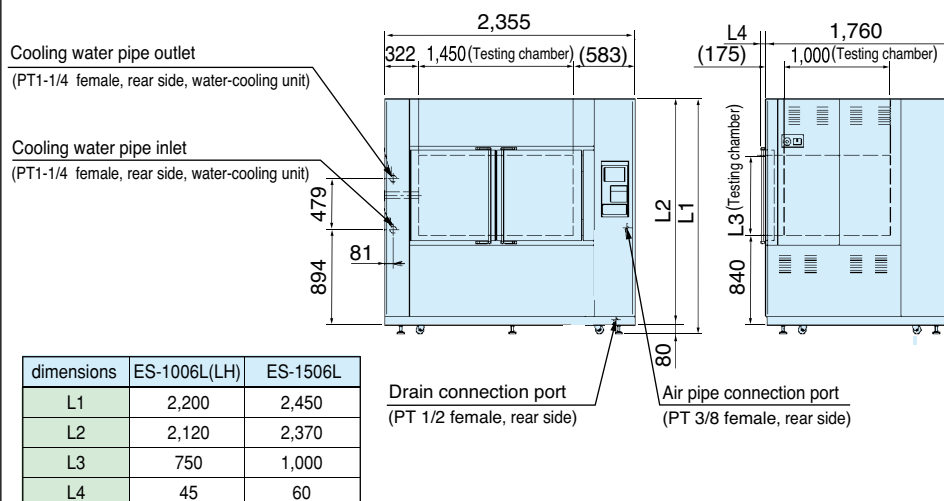
## ES-1006L(LH),ES-1506L

By expansion of testing chamber capacity, correspond to large size materials.

Testing chamber	Unit dimension	Testing chamber dimension
1,080L class	W2,355 × D1,805 × H2,200	W1,450 × D1,000 × H750
1,450L class	W2,355 × D1,820 × H2,450	W1,450 × D1,000 × H1,000

Temperature Range		
	ES-1006L,ES-1506L	ES-1006LH
Low-temp test	−50℃ to −10℃	−65℃ to 0℃
High-temp test	+60℃ to +120℃	+60℃ to +200℃

### Dimensional drawing (unit: mm)



The casters and level adjusters are amounted as standard for carrying and installation.



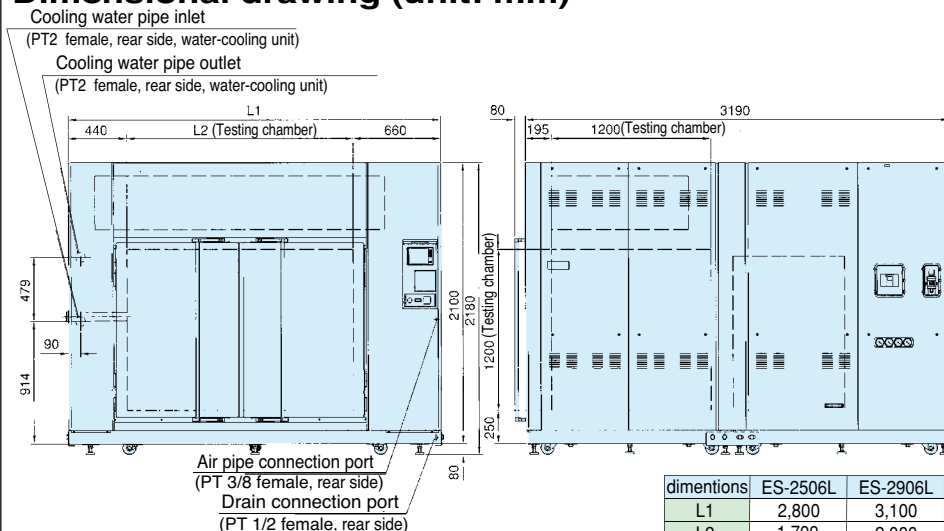
## ES-2506L,ES-2906L

Correspond to large size materials such as LCD Panels.

Testing chamber	Unit dimension	importing/installing
2,448L class	W2,800 × D3,270 × H2,180	Divide to about half of deep length
2,880L class	W3,100 × D3,270 × H2,180	

Temperature Range		
	ES-2506L	ES-2906L
Low-temp test	−60℃ to 0℃	−65℃ to 0℃
High-temp test	+60℃ to +130℃	

### Dimensional drawing (unit: mm)



The casters and level adjusters are amounted as standard for carrying and installation.



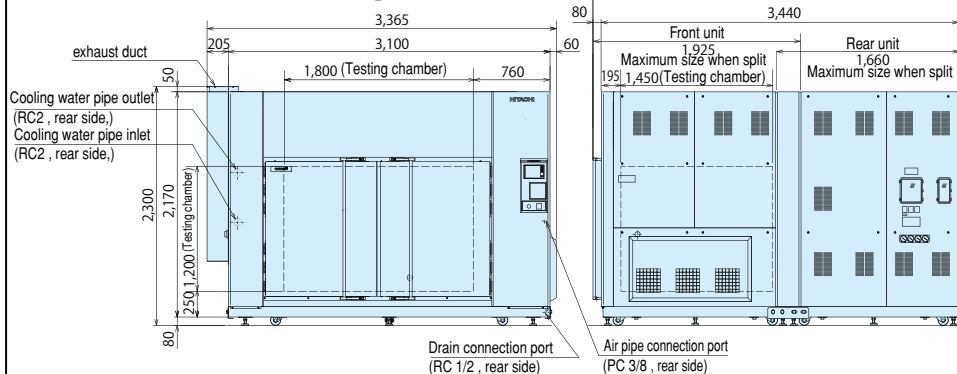
## ES-3106L

Correspond to large size materials such as Solar Cell Module or LCD Panels.

Adopting 2 blocks construction for importing and installation.

Testing chamber	Unit dimension	importing/installing
3,130L class	W3,365 × D3,520 × H2,300	Divide to about half of deep length

### Dimensional drawing (unit: mm)



The casters and level adjusters are amounted as standard for carrying and installation.

Temperature Range	
ES-3106L	
Low-temp test	-65°C to -0°C
High-temp test	+60°C to +130°C



Heat rejection operation function is standard equipped to test large size materials.

### Heat rejection operation

By rejecting heat (ventilate) of testing chamber's hot air after high-temp test finish and before low-temp test starts, the temperature restore performance of low-temp test improves without increasing refrigerate capacity.

### Explanations of heat rejection operation movement

At 2 zone operation tests, rejecting heat of high-temp testing chamber to lower heat by operating [Heat rejection operation] before low-temp test.

#### 1.Operation Setup

At 2 zone setup point, press the operation screen's [Rejection Heat] key and set the heat rejection time to make it active (available time: 1~99min).

#### 2.Testing Time

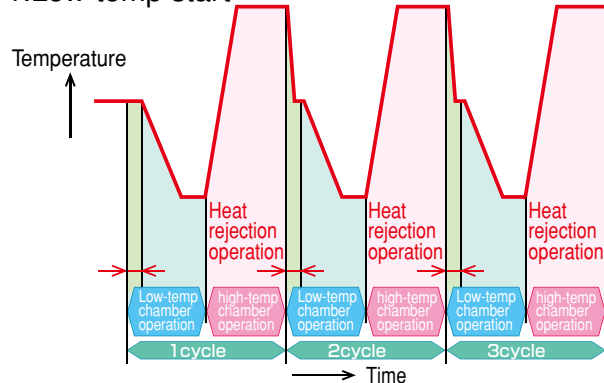
Low-temp Test time: interval of one high-temp test end to next high-temp test

High-temp Test time: interval of one low-temp test end to next high-temp test

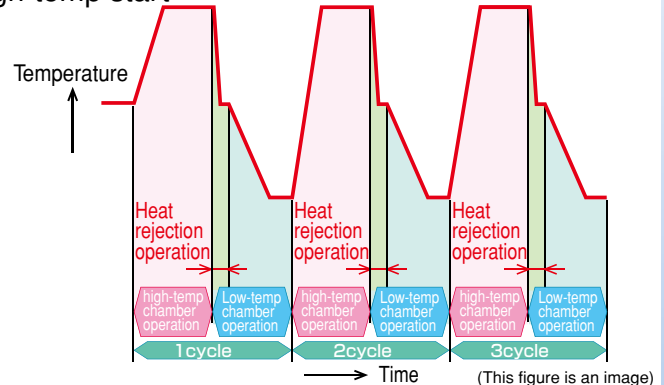
※ Low-temp test time includes heat rejection time.

### ex.Heat rejection operation function

#### 1.Low-temp start



#### 2.High-temp start



# Cosmopia S Large Capacity Series Air flow Type

## ES-5506L

Correspond to large size materials such as Solar Cell Module or LCD Panels.

Adopting 2 blocks construction for importing and installation.

Testing Chamber	Unit dimension	importing/installing
5,438L class	W4,065 × D3,620 × H2,620	Divide to about half of deep length

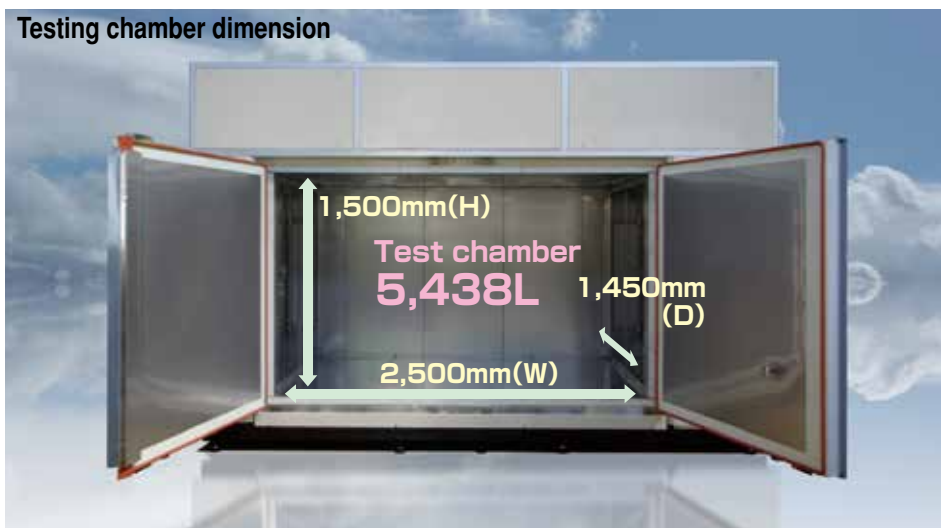
### Temperature Range

	ES-5506L
Low-temp test	-50°C to -10°C
High-temp test	+60°C to +120°C

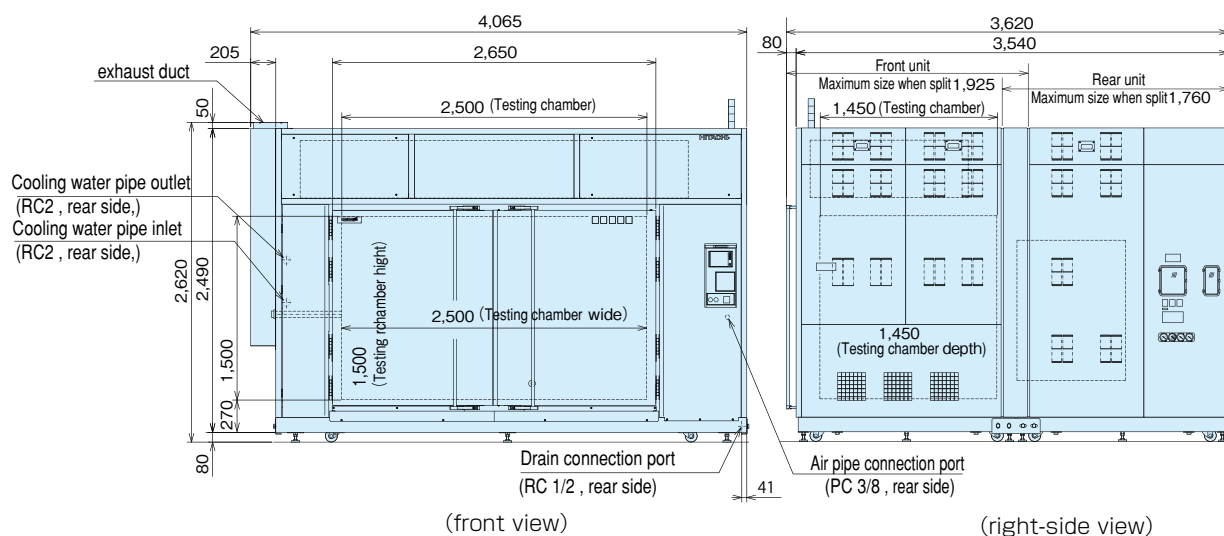


ES-5506L  
(Including optional specification)

### Testing chamber dimension



### Dimensional drawing (unit: mm)



The casters and level adjusters are amounted as standard for carrying and installation.



## Thermal Shock Chamber Optional Specification List

※Some options may not be supported depending on the model. Please contact us for details.

### Temperature Recorder

Types of Recorder specified Paper Type (Chart length: 100mm): 1 pen type (line output), 6 dots type (2 types: either using 1 dot or 3 dots) Non-Paper Type (contain Memory Card)

#### Recording Temperature

Measurement Point	Air flow Type	Liquid Type
1 point	Testing chamber	Around Sample basket
3 point	High-Temp Chamber, Low-Temp Chamber	—



Equip example show 1 pen type.

### Emergency Stop Switch (only for Air flow type)

Switch to stop the unit at emergency.  
Emergency Stop Switch will turn off the unit leakage breaker and cut off the power supply.

Notes:  
Liquid Type is standard equipped.



### Communication Interface Function

RS-232C, RS-485, Web interface (Including Ethernet) are prepared as interface function.  
Either function is possible for equipment.

### Cable Hole (only for Air flow type)

Use to insert sample electric conduction cable or/and sample surface temperature measurement thermocouple.  
Hole diameter  $\phi 50$  at left side is set for option. Silicon Rubber Plug for Cable Hole is also set.



### Sensor Switching Function (only for Air flow type)

Function available to switch the testing chamber temperature control point to windward or leeward.

### Testing Sample Monitoring System (only for Air flow type)

Measuring the surface temperature of the sample, and starts counting test time when the surface temperature reaches either high or low set temperature

### Water-cooling Specification

Changing unit's standard cooling method of air-cooling specification to water-cooling type is available.  
Affecting unit are ES-57L, 107L, 66EX-L, 96EX-L.

### Terminal for connecting Air Compressor (only for Air flow type)

Power supply wiring terminal in the control box for Air Compressor (customer preparation goods) with for supplying compressed air to drive damper.

## Thermal Shock Chamber Optional Specification List

※Some options may not be supported depending on the model. Please contact us for details.

### Built-in Air Compressor (only for Air flow type)

Option to built-in the Air-Compressor to supply compressed air to drive the damper.  
Auto drainage function is available.



### Cycle Counter

Indicate test cycle number.  
Indicates 8 digits.  
Reset function is available.



### Signal Indicator

Lamp to indicate the unit operating conditions.

- Green Light: Lights when unit operated.
- Yellow Light: Lights when Leakage Breaker is ON and waiting for operation.
- Red Light: Lights when protection device is operate and the unit went OFF.



### Test Sample Basket (only for Air flow type)

For testing small sample such as IC  
Mesh specification: 3.5 mesh.

- 1 shelf weight load capacity: less than 4kg: ES-57, 77, 107
- 1 shelf weight load capacity: less than 8kg: ES-207, 307



### Improvement of Shelf Board weight load capacity (only for Air flow type)

#### ES-57,77,107

Improving the load capacity of the sample, by strengthening the shelf bracket.

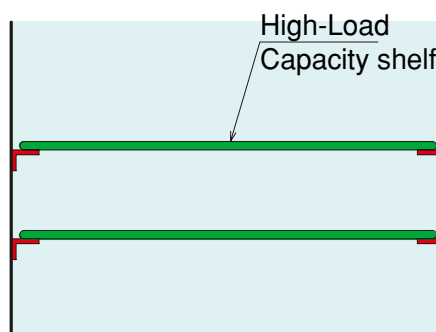
1 shelf load capacity weight less than 20kg.



#### ES-207,307

Improving the load capacity of the sample, by strengthening the shelf board, shelf bracket, and shelf pillar structure.

1 shelf load capacity weight less than 50kg.



# Thermal Shock Chamber Optional Specification List

※Some options may not be supported depending on the model. Please contact us for details.

## Water separation system (only for liquid type)

This is the function to remove water contained in heat transfer liquid in low temperature chamber. Water separate tank and pump are installed to store low temperature liquid .

## Heat Transfer Liquid Automatic Supply System (only for liquid type)

Function for supplying Heat Transfer Liquid automatically to low-temp chamber when declined.

Item	Specification
Reserve tank capacity	20 L

Notes: Heat Transfer Liquid will not be contained.

## High-temp Specification (only for liquid type)

Change upper range of High-temp to 200°C.

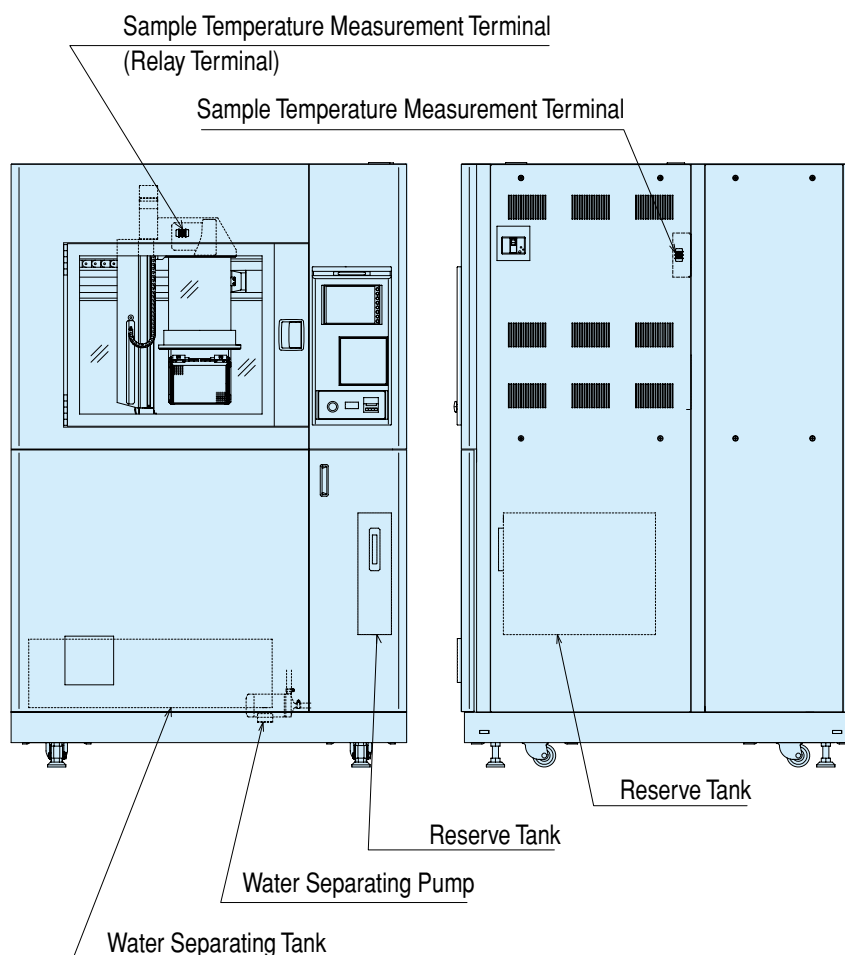
Setting Range	Specification
High-temp Test Temperature	70 to 200 °C
Pre-heat Temperature	(High-Temp test temperature) to 200°C

Notes: At the case of high-temp test temperature is over 151°C, written Heat Transfer Liquid (Galden DO2TS) in specification list is available to use.

## Sample Temperature Measurement Terminal(only for liquid type)

Equip Terminal board at testing chamber and control box for connecting Thermocouple.

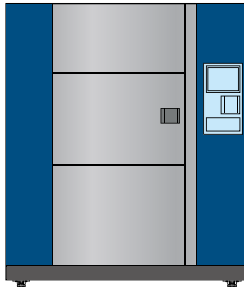
Item	Specification
Type of Thermocouple	T type Thermocouple
Terminal number	1 point or 5 points



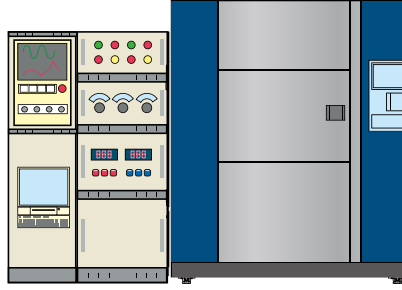


## Various types of communication interface

By using communication interface, unit is being enabled to external control on operations and measurements from a connected computer or user's original system unit.



Remote control via PC



External operation control via user's original system

communication interface function
RS-232C
RS-485
Web interface(Including Ethernet)

Notes: 1. RS-232C, RS-485, Web interface(including Ethernet) are prepared as interface function.  
2. About other function, please contact us.

## Web interface (Option board)

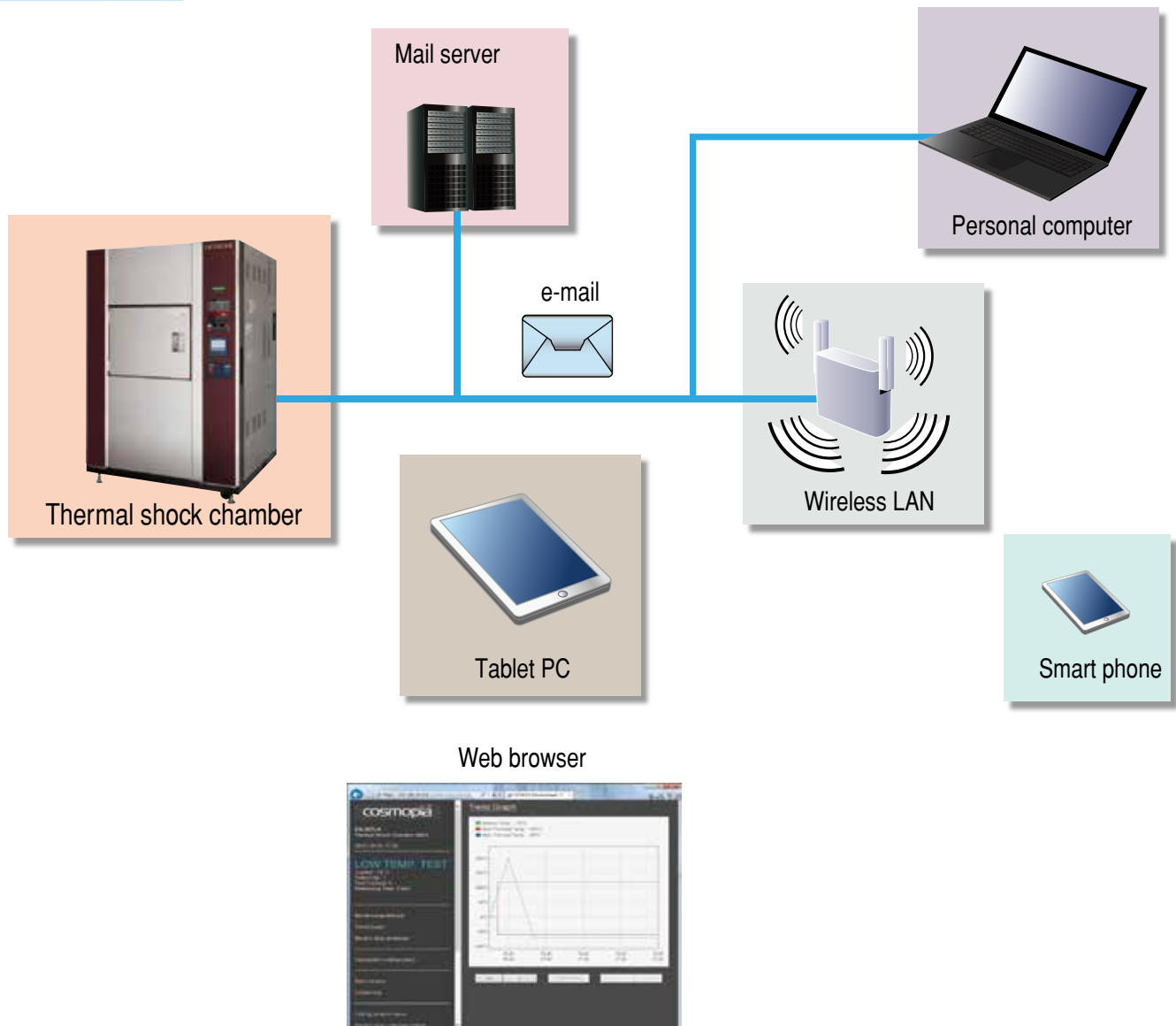
### Point

**Easy Access**

You can access your testing apparatuses from the remote location. This is an online system which does not require any special software. You can access with PCs, smartphone, and tablets.

**Email Notification**

Changes in its operation, such as alarm going off, starting a test, ending a test starting an operation, or ending an operation are notified by email.



To use this E-mail function, contract with mail server will be needed separately. When plural terminals are connected, only 1 terminal can operate the unit. Can not corresponded with liquid type heat shock testing apparatus.

## Constant Temperature and Humidity Chamber

### Standard Series

P51 to P54

Water Cooling Type	Air Cooling Type	Temperature range	Humidity range	Floor Space
<b>NH</b> Type		−10 to 80°C	20 to 95%RH	6.5m <sup>2</sup> 9.7m <sup>2</sup> 16.2m <sup>2</sup> *1
<b>HH</b> Type		−30 to 80°C		
<b>MH</b> Type		−40 to 80°C	10 to 95%RH	
<b>MHH</b> Type		−40 to 100°C 50°C		



### Excellent Series

**EXCELLENT** series

High Load Type

P55, P56

Water Cooling Type	Air Cooling Type	Temperature range	Humidity range	Floor Space
<b>EXNH</b> Type		−10 to 80°C	20 to 95%RH	9.7m <sup>2</sup> *1
<b>EXHH</b> Type		−30 to 80°C		
<b>EXMH</b> Type		−40 to 80°C	10 to 95%RH	
<b>EXMHH</b> Type		−40 to 100°C 50°C		



### Integrated Walk-in Series

P56

Water Cooling Type	Temperature range	Humidity range	Floor Space
<b>NH</b> Type	−10 to 80°C	20 to 95%RH	3.0m <sup>2</sup>
<b>MH</b> Type	−40 to 80°C	10 to 95%RH	3.3m <sup>2</sup>
<b>MHH</b> Type	−40 to 120°C		



\* 1. Standard size.

# Constant Temperature Chamber

## Standard Series

P51 to P54

Water Cooling Type	Air Cooling Type	Temperature range	Humidity range	Floor Space
<b>NT</b> Type		−10 to 80℃	—	6.5m <sup>2</sup> 9.7m <sup>2</sup> *1 16.2m <sup>2</sup>
<b>HT</b> Type		−30 to 80℃		
<b>MT</b> Type		−40 to 80℃		
<b>MTH</b> Type		−40 to 100℃ 150℃		



## Excellent Series

**EXCELLENT** series

High Load Type

P55,P56

Water Cooling Type	Air Cooling Type	Temperature range	Humidity range	Floor Space
<b>EXNT</b> Type		−10 to 80℃	—	9.7m <sup>2</sup> *1
<b>EXHT</b> Type		−30 to 80℃		
<b>EXMT</b> Type		−40 to 80℃		
<b>EXMTH</b> Type		−40 to 100℃ 150℃		



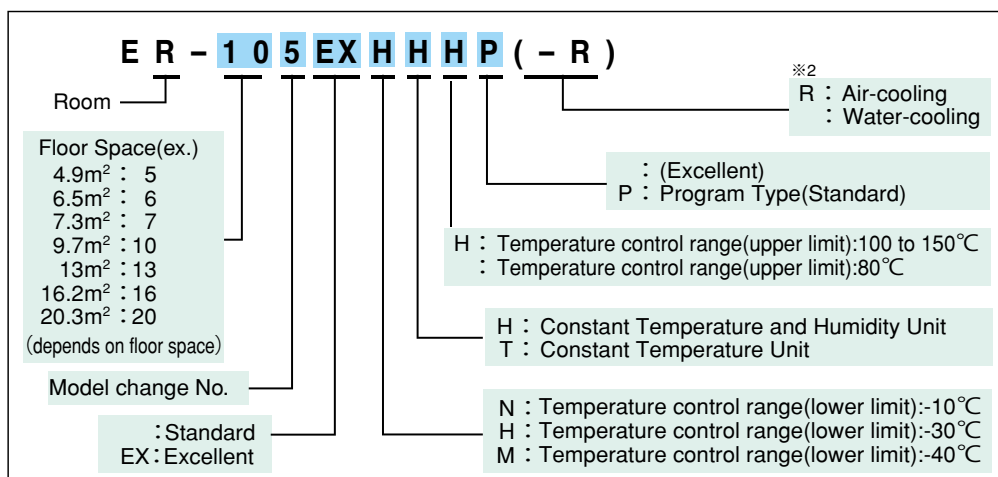
## Integrated Walk-in Series

P56

Water Cooling Type	Temperature range	Humidity range	Floor Space
<b>NT</b> Type	−10 to 80℃	—	3.0m <sup>2</sup>
<b>MT</b> Type	−40 to 80℃		
<b>MTH</b> Type	−40 to 120℃		3.3m <sup>2</sup>



\* 1. Standard size.



### Model Range

Series	Temperature Range	Humidity Range	Model	Using Unit	Page
Walk-in Type Constant Temperature and Humidity Chamber	Standard	— 10 to 80℃	ER-(※1)NHP	EU-65NH	P53
			ER-(※1)NTP	EU-65NT	
		— 30 to 80℃	ER-(※1)HHP	EU-65HH	
			ER-(※1)HTP	EU-65HT	
		— 40 to 80℃	ER-(※1)MHP	EU-65MH	
			ER-(※1)MTP	EU-65MT	
		— 10 to 100℃ 150℃	ER-(※1)NHHP	EU-65NHH	
			ER-(※1)NTHP	EU-65NTH	
		— 30 to 100℃ 150℃	ER-(※1)HHHP	EU-65HHH	
			ER-(※1)HTHP	EU-65HTH	
		— 40 to 100℃ 150℃	ER-(※1)MHHP	EU-65MHH	
			ER-(※1)MTHP	EU-65MTH	
	Excellent	— 10 to 80℃	ER-(※1)EXNH	EU-125EXNH	P55
			ER-(※1)EXNT	EU-125EXHT	
		— 30 to 80℃	ER-(※1)EXHH	EU-125EXHH	
			ER-(※1)EXHT	EU-125EXHT	
		— 40 to 80℃	ER-(※1)EXMH	EU-125EXMH	
			ER-(※1)EXMT	EU-125EXMT	
		— 30 to 100℃ 150℃	ER-(※1)EXHHH	EU-125EXHHH	
			ER-(※1)EXHTH	EU-125EXHTH	
		— 40 to 100℃ 150℃	ER-(※1)EXMHH	EU-125EXMHH	
			ER-(※1)EXMTH	EU-125EXMTH	
	Integrated	— 10 to 80℃	ER-35NHP	EU-65NH	P56
			ER-35NTP	EU-65NT	
		— 40 to 80℃	ER-35MHP	EU-65HH	
			ER-35MTP	EU-65HT	
		— 40 to 120℃	ER-35MHHP	EU-65MH	
			ER-35MTHP	EU-65MT	

※1. Depends on floor space


※2. Both Water or Air-cooling are available



## Unit Control Panel

### Color LCD Touch Panel

As the operator's panel, a color LCD touch panel is employed so that setting and control of the equipment will be simply done by touching displays in screens of the touch panel. The color LCD offers clear view and the system is supported for diverse functions in operation control.



**Functions available in operation control:**

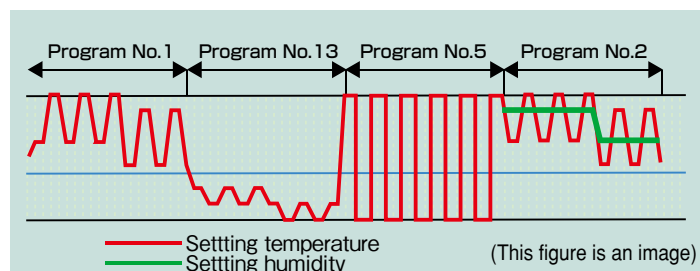
- Set-point run function
- Programmed run function
- Program name assign function
- Time signal function
- Programmed run hold function
- Programmed run jump function
- Step repeat function
- Combined-program controlled run function
- Trend graph display function
- Operation mode select function
- Wait function
- Excess temperature up/down preventive function
- Black-out action function
- Instantaneous safety function against power interruption
- Fan delay function
- Timer function
- Fault detection function
- Measured temperature/humidity offset specify function

### Program name assign function

Using this function, you may assign a program name, consisting of a maximum of 14 alpha-numeric characters (A to Z and 0 to 9) inclusive of some symbols (!"#\$%&'()\*@:;.,=+\*/?\_), to the number of the program under which the intending operation is to be controlled.

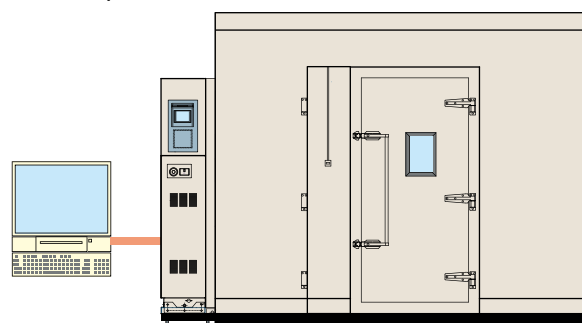
### Combined-program controlled run

Through this function, a single run may be executed under control of a combination of plurality of programs. Up to five programs can be combined to control a run, like an example given below.



### Various types of communication interface

Various types of communication interface are available to meet the demands of users. Through such communication interface, the equipment can be connected with a PC or user's original system unit, being enabled for external control on operation and measurement.



Remote control via PC

Types of communication interface
RS-232C
RS-485
Web interface(including Ethernet)

Notes: 1. RS-232C, RS-485, Web interface(including Ethernet) are prepared as interface function.

2. About other function, please contact us.

Constant Temperature and Humidity Chamber

NH Type

MH Type

HH Type

Constant Temperature Chamber

NT Type

MT Type

HT Type

- Equipped with touch panel / graphic display type color LCD control panel.
- Equipped with scroll compressor

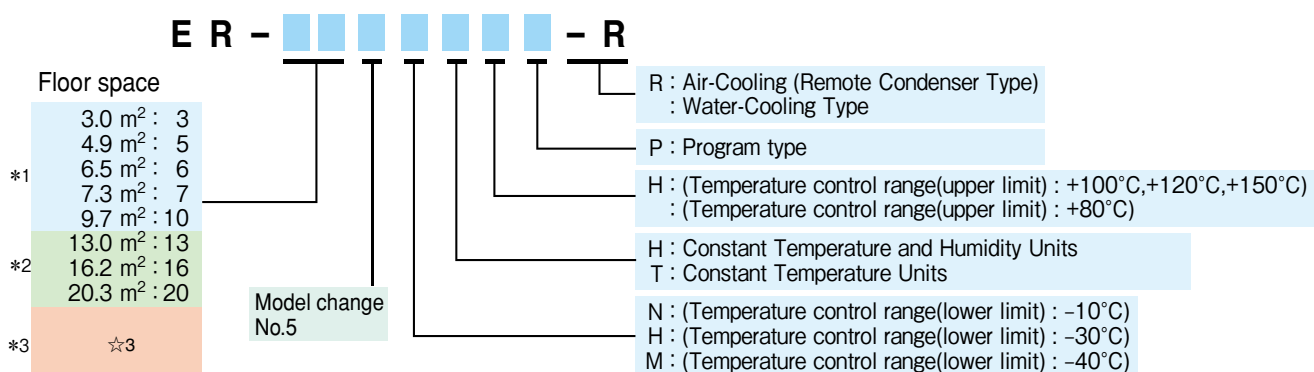
Constant Temperature and Humidity Units  
Constant Temperature Units



Prefabricated Testing Room

Temperature and humidity recorder.Cable hole.Double door (Including optional specification)

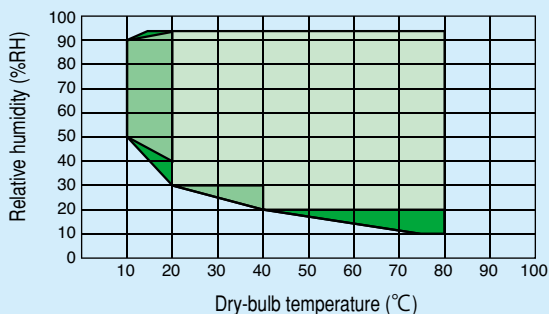
## Walk in Type Constant Temperature and Humidity Chamber,Walk in Type Constant Temperature Chamber



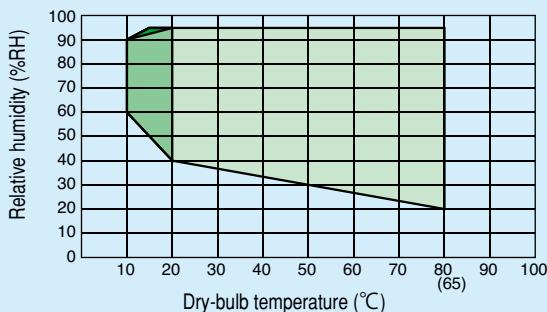
Notes: \*1: one unit for one prefab testing room  
\*2: two unit for one prefab testing room  
\*3: ☆3 size and middle size of \*1,2 is also available. Please contact us about it.

## Temperature and Humidity Control Ranges

● MHP,HHP Series



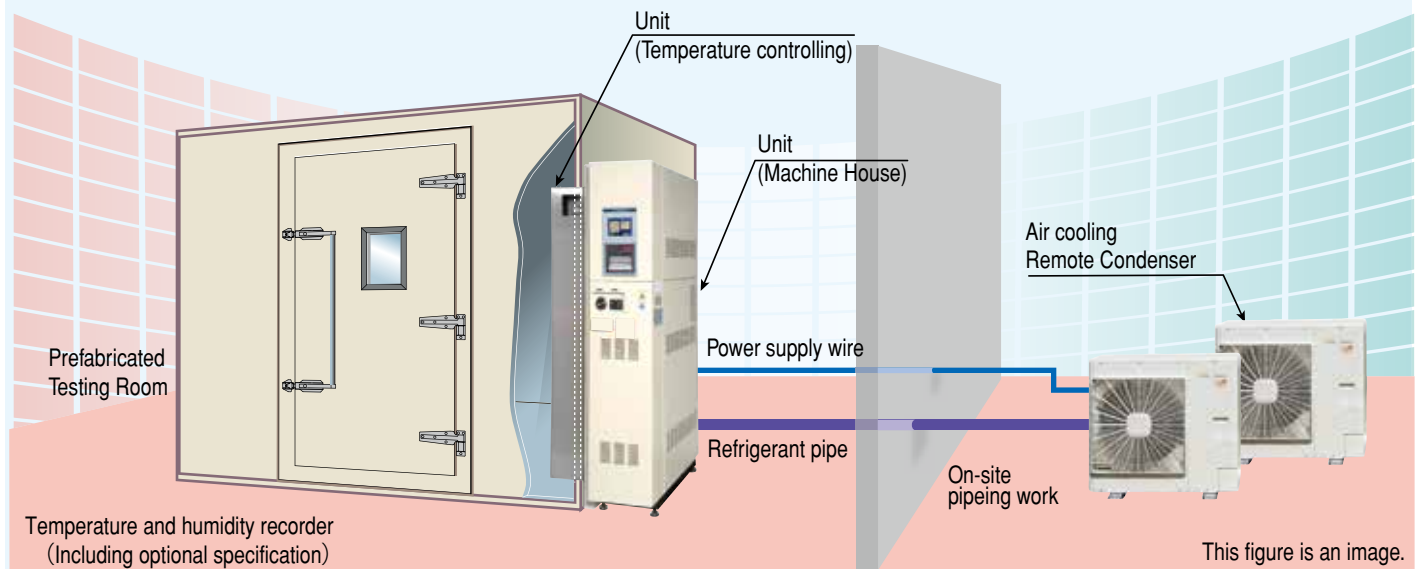
● NHP Series



□ : No-frost zone  
□ : Frost zone  
■ : Expanded control region

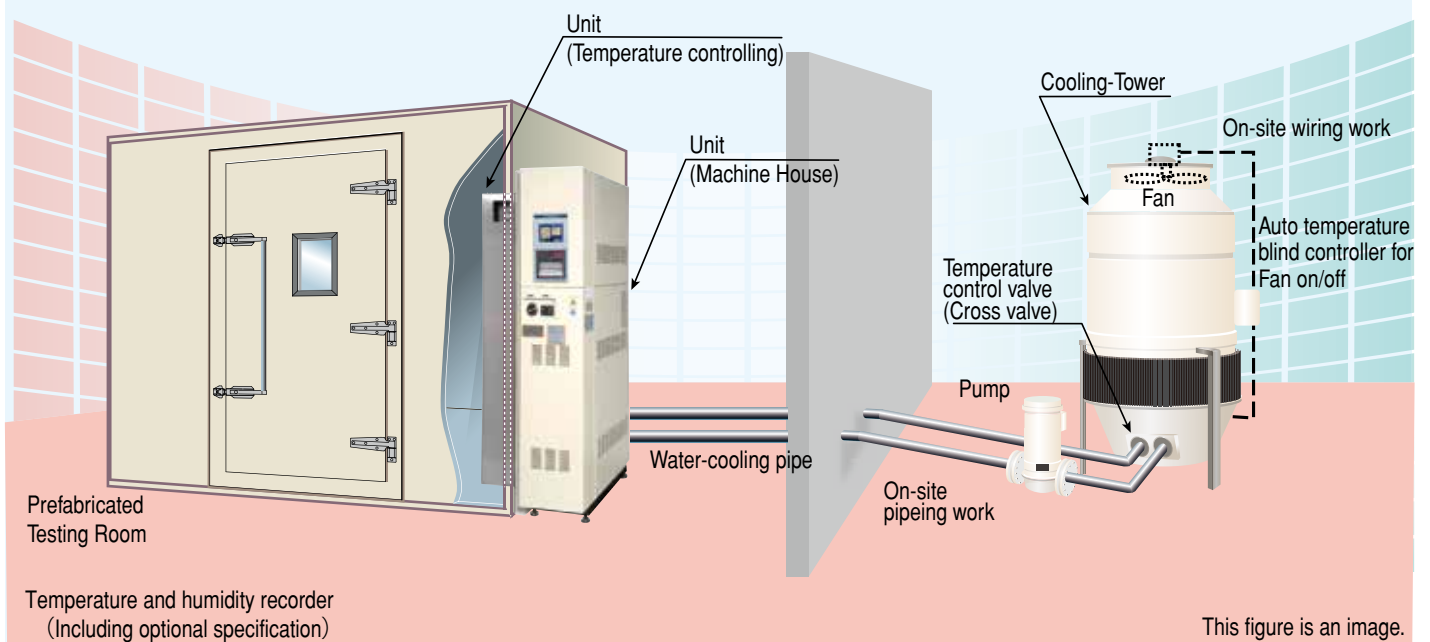
## Construction-saving by air-cooling system(Compared to water-cooling system)

### ■Connecting conceptual diagram (Air-cooling Remote Condenser Type)



## No need to place water source for cooling

### ■System ex. of Water-cooling Specification



Constant Temperature and Humidity Chamber

EXNH Type

EXMH Type

EXHH Type

Constant Temperature Chamber

EXNT Type

EXMT Type

EXHT Type

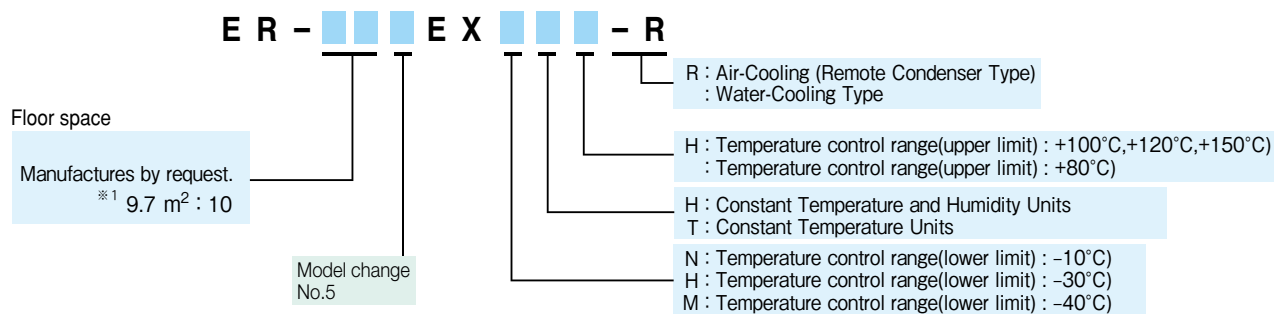
## Correspond to high load

- (Heat load 2kW : 40°C/95%RH condition)  
Constant Temperature and Humidity Chamber  
(ER-105EXNH · ER-105EXNH-R)
- (Heat load 8kW : 40°C/95%RH condition)  
Constant Temperature and Humidity Chamber  
(ER-105EXHH · ER-105EXHH-R)  
(ER-105EXMH · ER-105EXMH-R)
- (Heat load 6kW : 40°C condition)  
Constant Temperature Chamber  
(ER-105EXNT · ER-105EXNT-R)
- (Heat load 10kW : 40°C condition)  
Constant Temperature Chamber  
(ER-105EXHT · ER-105EXHT-R)  
(ER-105EXMT · ER-105EXMT-R)



(Including optional specification)  
Temperature and humidity recorder

### Walk in Type Constant Temperature and Humidity Chamber



Note : ※ 1 : Please contact us for size.

## Operation mode selective function

While operating the program, the user can choose the settings of operation mode by each step. (Choice of Energy saving mode, High load mode) For example electric conduction, a setting change of the device ability according to the test pattern is possible.

### Energy saving mode

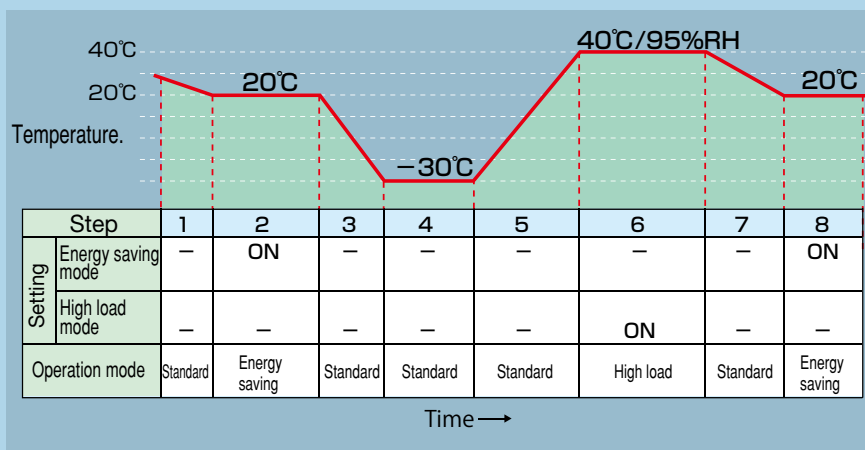
Mode for operating with low ability when the sample is small amount or no heat load.

### High load mode

Mode for operating with high ability when the sample is large amount or with heat load.

### [Program setting example] (Image figure)

The cases of Step2,8 Energy-saving mode, Step6 High load mode

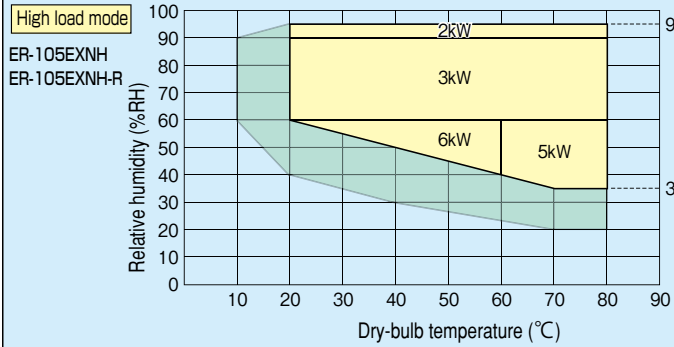


Notes: Humidity may not reach to the setting value when operating at "Energy Saving Mode" or "High Load Mode" .

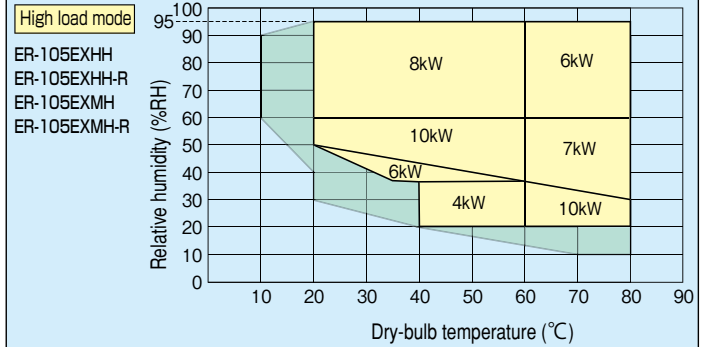


## Temperature and Humidity Control Ranges

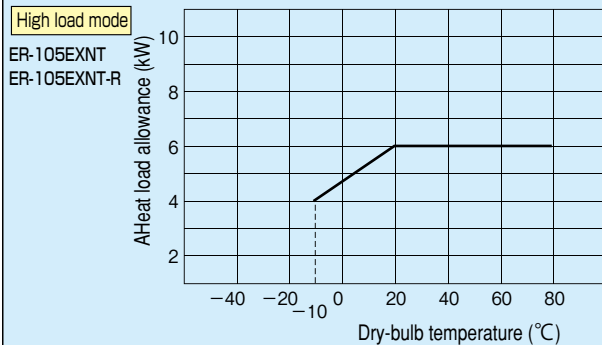
### Constant Temperature and Humidity Operation



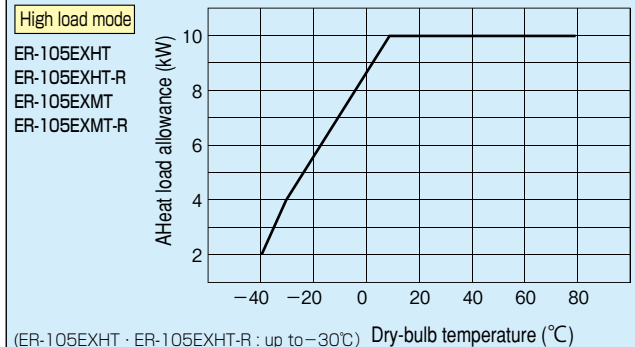
### Constant Temperature and Humidity Operation



### Constant Temperature Operation

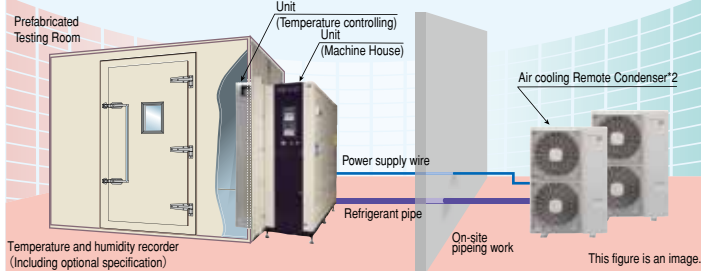


### Constant Temperature Operation

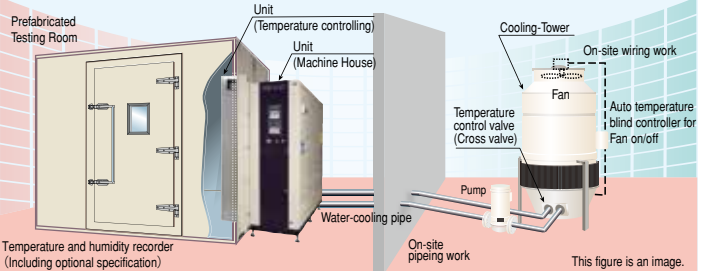


## Construction-saving by air-cooling system(Compared to water-cooling system)

### ■Connecting conceptual diagram (Air-cooling Remote Condenser Type)



### ■System ex. of Water-cooling Specification



# Cosmopia R

## Integrated Walk-in Type Constant Temperature and Humidity Chamber Constant Temperature Chamber

Constant Temperature and  
Humidity Chamber

NH Type  
MH Type

MHH Type

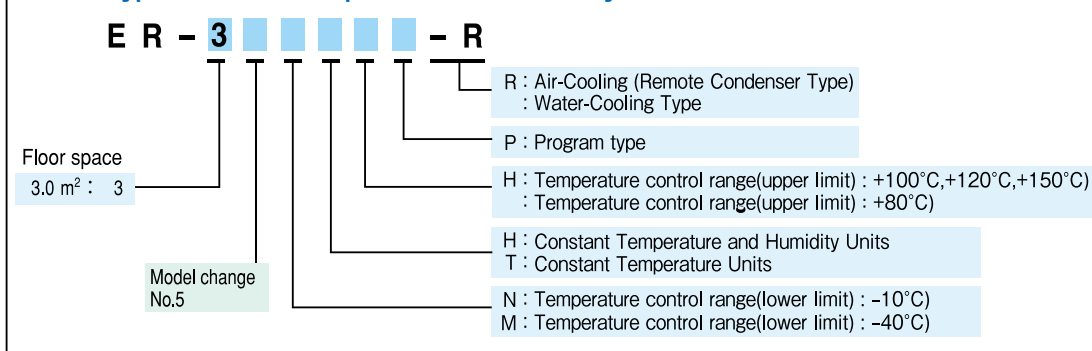
Constant Temperature  
Chamber

NT Type  
MT Type

MTH Type

For environmental test of automobile parts and large LCD, etc..  
An integrated constant temperature/humidity unit is standardized.  
No need for on-site assembly work.

### Walk in Type Constant Temperature and Humidity Chamber



(Including optional specification)  
Temperature and humidity recorder  
Large observation window

## Walk-in Type Constant Temperature and Constant Humidity Chamber Optional Specification List

※Some options may not be supported depending on the model. Please contact us for details.

### Double Doors

#### Notes

Don't correspond to Integrated type

#### Aperture Dimension

Standard	1,400(W) × 1,800(H)
Maximum	4,000(W) × 4,700(H)



### Single Doors

#### Notes

Don't correspond to Integrated type

#### Aperture Dimension

Standard	830(W) × 1,800(H)
Maximum	2,000(W) × 4,700(H)



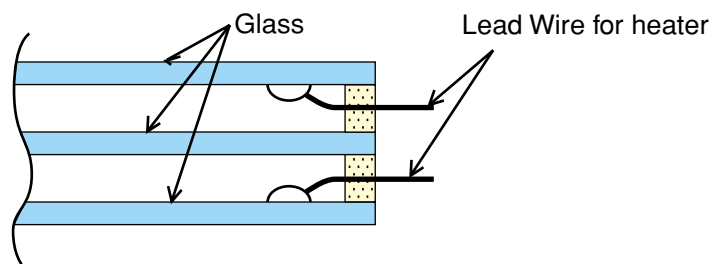
### Large Size Observation Window

Pair Glass with both side heater specification to avoid condensation.

Standard Dimension: 190mm(W) × 320mm(H)

Correspond to special order. Please contact us about the dimension.

#### Observation Window cross section



#### Caution

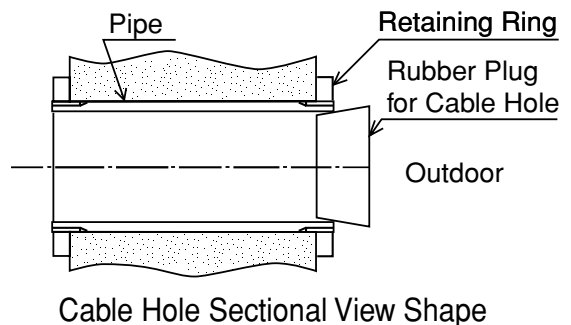
Cooling ability will be limited when Large Size Window is equipped.

\*The Window Heater electric conduction will be depended on testing room temperature. Outer side when testing room is low temperature and inner side when high temperature.

### Cable Hole

Adding Cable Hole effect to temperature rise/drop performance.

Please contact us about the additional numbers, Cable and other optional Hole diameter to satisfy the performance.



### Room Indicator

Room Entered Indicator will turn on by pressing the room indicator switch. After amount of time pass, the buzzer of control box and inner room will ring to inform alarm.

#### Notes

Changing colors of acrylic and word is available.



### Running Indicator

Running Indicator will turn on while unit is under running.

#### Notes

Changing colors of acrylic and word is available.

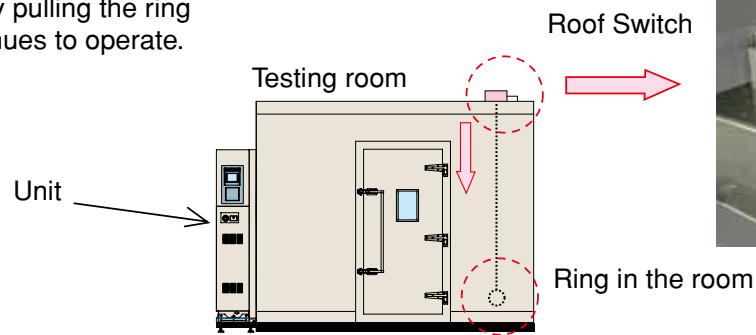


## Walk-in Type Constant Temperature and Constant Humidity Chamber Optional Specification List

\*Some options may not be supported depending on the model. Please contact us for details.

### Inside Room Safety Switch

Inform alarm to outside by pulling the ring at inside room. Unit continues to operate.



### Electrical Outlet

Please indicate us about the pole assignment, voltage and waterproof type.

#### Notes

Plug for outlet is also set for option.

Please construct the power supply for the outlet separately.

### Temperature (Humidity) Recorder

Two types of Recorder: Paper Type (Chart length: 100mm) or Paperless Type (contain Memory Card) are set for option.



Paper Type



Paperless Type

### Abnormal Indicator (Spinning Indicator)

Indicate by spinning at abnormal case.

It can be place any place, such as roof of the room.



With sound is also available.

### Signal Indicator

Lamp to indicate the unit operating conditions.

- Green Light: Lights when unit operated.
- Yellow Light: Lights when Leakage Breaker is ON and waiting for operation.
- Red Light: Lights when protection device is operate and the unit went OFF.



## Walk-in Type Constant Temperature and Constant Humidity Chamber Optional Specification List

※Some options may not be supported depending on the model. Please contact us for details.

### Oxygen Shortage Level Analyzer

Inform alarm when oxygen lever of inside room went short (under 18%).

System ex.

Alarm indicator



Analyzer



#### Notes

Please construct the power supply.

### Gas Analyzer (ex. CO<sub>2</sub>)

Dispatch alarm when CO<sub>2</sub> level in the testing room raised.

### Vantilation Fan(for aeration)

Necessary equipment for working in the room.  
Temperature and humidity may not be constant during air supply.

#### Notes

It can be covered by plug from inside when not using.

Ventilation

Drainage Pan



### Humidity Sensor

Capacitance type Humidity Sensor. (No need of wick change for wet-bulb temperature)

#### Notes

Sensor body will be set inside the unit.  
Sensor section will be set at the air outlet part of the unit.

### Demineralizer

Cartridge type Demineralizer.  
Pure water intake: about 1,900L  
Standard flow rate: 50 to 200 L / h

Raw Water

Pure Water

Pre-treatment Filter



<PF Carbon>  
Remove Turbidity, Iron Rust



Post-treatment Filter



<Micro-Boa>  
Remove Fine Particles, Iron Rust

### Dehumidifier

Option for Low-temp/Low-humid specification.  
We will choice the Dehumidifier depend on the request low-humidity.

#### Notes

Heat rejection is necessary by customer.





## Walk-in Type Constant Temperature and Constant Humidity Chamber Optional Specification List

\*Some options may not be supported depending on the model. Please contact us for details.

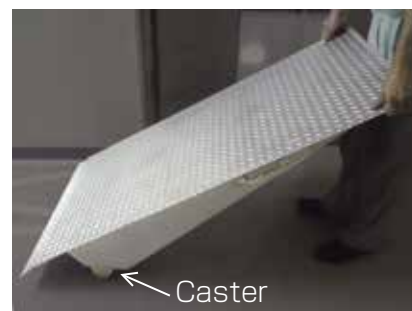
### Slope

A slope to carry in a sample in an examination room.

#### Removal type



#### Caster type

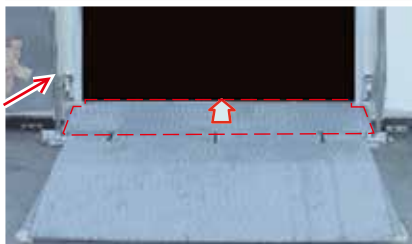
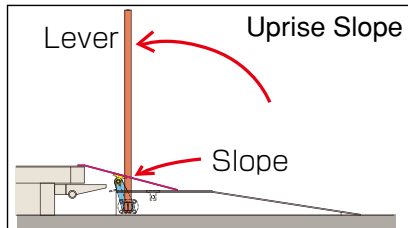
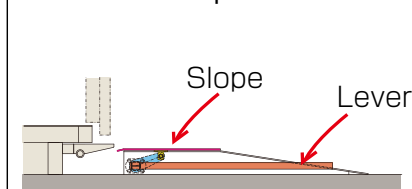


#### Notes

It can move by a caster.

### Slide system

#### Descension Slope



#### Notes

Fixed Type  
Make it to slope form by pulling down the lever when door is opened.

### Communication Interface function

RS-232C, RS-485, Web interface (Including Ethernet) are prepared as interface function. Either function is possible for equipment.

### Fire Extinguishing Equipment

It is possible to equip firefighting equipment (CO2 grade).

### Ceiling Punching

Making inside room to low wind-speed.

### Smoke detector

Attaching to the unit power board is possible.

### Floor weight load

Possible to correspond to the load of maximum 19kN/m<sup>2</sup>.

### Special Specification

#### Continuous Low-Temperature Specification

Minimize disturbance of temperature by alternating defrost operation and enable for continuous low-temp operation. (Maximum 30 days)

#### Valiant Form and Large Size

Manufacture of large size room (over 16.2m<sup>2</sup>) or high ceiling room up to 5.0m is possible.

### Independent / Multiple Switching Function

Independent operating is available by dividing the room into 2.

Operation of changing room size which is up to the test sample size or heat load. (Which connects to energy-saving)

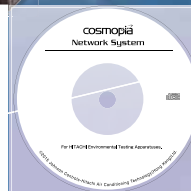
Notes: Optional Specification maybe different from the item shown because of update or model change.

For Hitachi Environmental Testing apparatus Cosmopia

# Central Control System Software (CD version)

model:ESC-50AN3

cosmopia  
Network System



Realize to control and observe maximum 50units of Environmental testing Apparatus by 3computers each 1network.



Item	COSMOPIA Network System
Accessible number of Units	Maximum 50 units
Affecting Models	Model No.5, No.6 Constant Temperature (and Humidity) Chamber Model No.6 Thermal Shock Chamber(Air fiow type,liquid type) Model No.7 Thermal Shock Chamber(Air fiow type) Model No.5 Walk-in Type Constant Temperature (and Humidity) Chamber (Can be connected master unit only)
Interface	Ethernet Interface
Feature	By using Ethernet connection, also corresponds with existing network

※The display of 5 type, 6 type, 7 type indicates the product model change number. (An example: EC-□5 MHP indicates type 5.)

## Function Software for Central Control System have function of list below

NO.	Items	Contents
1	Making, Saving, Indicating Operation (Test) Data	Inputting test data, Loading the past input save data, and Indicating by each unit numbers.
2	Sending Test Data	Sending the input test data to each unit.
3	Starting Operation	Starting operation from the computer or by timer reservation. Timer will be controlled by computer time.
4	Stopping Operation	Stopping operation from the computer or by timer reservation.
5	Monitoring Conditions	Monitor the condition of operation(can select 6,15,30 second) • Chamber: Walk in Chamber: Running/stopping/Hold/Alarm/Remaining time • Thermal Shock Chamber: Running/stopping/Warm up/Defrost/Alarm/Remaining time
6	Editing, Indicating, Saving, Outputting Measured Data	Indicating the measured data (Temperature, Humidity, Time) to computer monitor and save to HardDisk every minute. Output to printer is also available.
7	Alarm Treatment	Indicate problem occurrence to computer monitor.

## Network Corresponding System

Model	ESC-50AN3(JP)	ESC-50AN3(EN)	ESC-50AN3(CN)
Language	Japanese	English	Simplified Chinese
Component part	Software for Central Control System × 1(CD-ROM)		

Notes: 1. The LAN cable and the network hub will be local prepared items by customer side. LAN Cable is recommended STP type to keep the stable communication.  
2. External communication interface option (Ethernet or Web optional board) is required for all Environmental Testing Apparatuses.  
3. CD-ROM Driver is needed to install the software.

# Outline of Network Corresponding System

Observing the Environmental Testing Apparatus by using Network Corresponding Central Control System.



## Monitoring the operation conditions from monitor

- Enable to monitoring operation conditions of all 50 units.
- Indicating the operation conditions of all units by color. Stopping ... (Gray), Operating ... (Green), Timer Reservation ... (Blue), Unit Problem ... (Red)
- Indicate Individual operation mode, Unit Temperature (Humidity), Alarm contents (connection error, unit trouble contents)
- Can select and display the number of unit depend on the customer's requires.
- Free layout display is also available.

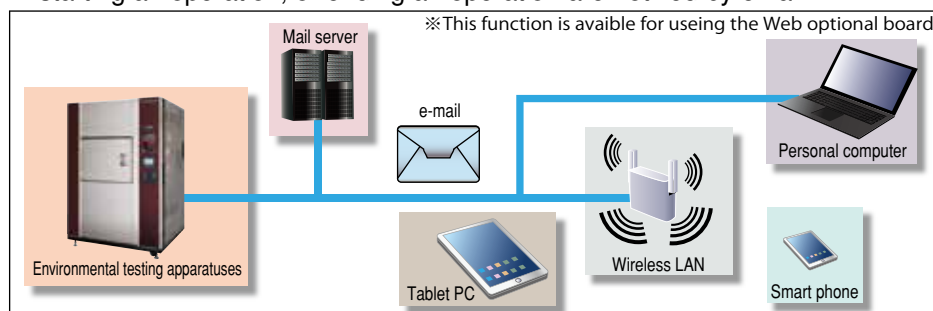
Notes: Displayed color is a few different from previous Central control system's one.

## Readable operation (measurement) data

- Saving measurement data by each unit numbers for 1 year to computer HardDisk.
- Available to indicate the past operation result only by inputting the year/month/day /hour/minutes you want.
- The displayed range is 6kinds ,30minutes to 1month.

## Email Notification

- Changes in its operation, such as alarm occurred, starting a test, ending a test, starting an operation, or ending an operation are notified by email.



### Fixed Layout

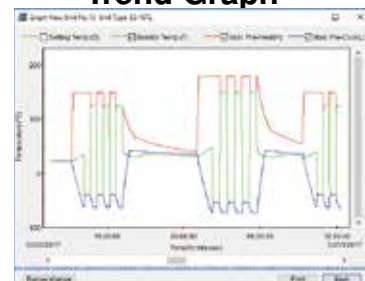


The resolution required for the total number display with 50 display layouts will be pixels (UXGA) or more (1,600 x 1,080) pixels (full HD) for standard monitors (1,600 x 1,200) pixels (UXGA).

### Free Layout



### Trend Graph



## Saving the history of unit trouble

Saving the trouble occurred time and contents by unit numbers. Indicating and printing out is available.

## Software System Requirements

- OS : Microsoft Windows 7, Windows 8.1, Windows 10 ; whichever Japanese , English or Simplified Chinese
  - CPU : more than 1.66GHz
  - HardDisk : more than 1GB required for measurement data
  - Memory : more than 1GB
  - Display Monitor : more than 1,920 x 1,080 pixel
- (Microsoft, Windows , Microsoft are registered trademark of USA Microsoft Corporation for USA and other country)

## Caution for Installation

1. Do not install the unit at the environment with corrosive gas atmospheres such as the hydrogen sulfide.
2. Do not install the unit close to either flammable, explosive material, or high-temperature heating element.
3. Do not install the unit facing directly or at least 3 meters far from the electromagnetic wave radiator unit if already installed, to avoid the effect of electromagnetic wave.



## PRECAUTIONS FOR SAFETY

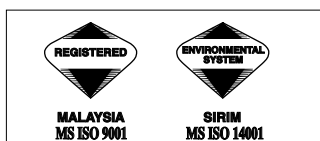
- Read the operation manual before using the unit.
  - Do not set volatility or flammable material in the testing room. Otherwise it will contain danger of explosion. Also do not use to test for carbide floating, creatures such as the animals and plants, or material which have corrosiveness to stainless steel, resin, or silicon.
  - Unit printed in this catalogue are use for indoor only. Please keep use in the place where the rainwater does not appear.
  - Do not install the unit without performing installation work, electrical work, and drain piping work.
- Please contact your service contractor or dealer of HITACHI.



ISO 9001



ISO 14001





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# SPECIFICATIONS for Constant Temperature Chamber

## [ Excellent Series ]

	Model (   ○   Mark)	
Series	E X T H	
Standard	○	EC-135EXTH20A

Note. An additional specification with the option depends on the attached paper option part list.

Item			Specification
Performance * 1 * 2 * 3 * 8 * 11	Temperature Detection method		Dry bulb Temperature Method
	Temperature Range		-50～+150℃
	Temperature Fluctuation	+100.0℃ and Under	±0.3℃
		+100.1℃ and Over	±0.5℃
	Temperature Gradient	+100.0℃ and Under	4.0℃
		+100.1℃ and Over	7.0℃
	Temperature Variation in space	+100.0℃ and Under	3.0℃
		+100.1℃ and Over	5.0℃
	Temperature Rate of Change (Set temp. from +150 ～ -50℃)	Fall	20 ℃/min for +130℃ to -40℃ (Temperature change average)
		Rise	20 ℃/min for -40℃ to +130℃ (Temperature change average)
	Achieved Time for Temperature Extremes (No load, No sample)	Fall	Within 10 min for +20℃ to -50℃
		Rise	Within 10 min for +20℃ to +150℃
Test chamber inner capacity			1260L
Test chamber dimensions (W×D×H) * 6			1,050mm×1,000mm×1,200mm
Product dimensions (W×D×H) * 6			1,520mm×3,535mm×2,048mm

### Attention

These specifications are plans.

It may be changed by a detailed design.

DWN	K.Matsushita	08-11-2017	TITLE  EC-135EXTH20A Specifications( 1 / 6 )	Hitachi-Johnson Controls Air Conditioning, Inc.	SHIMIZU WORKS DWG.NO.  <b>20171108-1A</b>	REGD
CHKD	K.Matsushita	08-11-2017				
APPD	K.Matsushita	08-11-2017				

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Item			Specification
Materials	Trim	Test chamber Control Panel Machine Compartment	Cold Rolled Steel Sheet(Paint Color: Dark gray)
	Inner	Test chamber	Stainless Steel Sheet (SUS304, 2B Polish Finish)
Structural	Heat insulator	Test chamber	Hard Polyurethane Form Glass wool
		Door	Hard Polyurethane Form Glass wool
Construction	Refrigerating		Mechanical Single Step Compression and Cascade refrigerating System
	Refrigerant	Single Step	R404A (Compressor output:7.4kW+7.4kW)
		High/Low	R404A/R23 (Compressor output: 7.4kW/6.0kW+7.4kW/6.0kW)
	Cooler and Dehumidifier		Multi Pass Cross Finned Type
	Condenser		Water Cooled Type (Plate type)
C	Heater	Type	Nichrome Strip Wire Heater (25kW × 2)
	Fan	Type	Sirocco Fan (0.75kW × 2)
D	Controller	Operation mode	Constant value mode or program mode or temperature cycle mode
		Temperature setting range	-52.0~+152.0℃
		Time setting range	Constant value mode 0~20000hr 59min
			Program mode 0~999hr 59min
		Setting resolution	Temperature 0.1℃, Time 1min
		No. of steps	20 Steps/1 Programmed pattern
		No. of program patterns	Input (RAM) pattern : Max 22 patterns
		No. of repetitions	Max 98 and infinite
		No. of overlap repetitions	Max 3 overlapped times
		Detector probe	Pt 100Ω (at 0℃), Class B (JIS C 1604-1997)

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DWN		-	TITLE	SHIMIZU WORKS DWG.NO.	REGD
CHKD		-	EC-135EX T H20A	Hitachi-Johnson Controls Air Conditioning, Inc.	
APPD		-	Specifications( 2 / 6 )	20171108-1A	

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Item				Specification	
Controller	Temperature Cycle Mode * 9	Temperature setting range	High temp. soak	+60~+150℃	
			Low temp. soak	-50~0℃	
		Time setting range		1min~99hr 59min	
		Ramp rate setting range	High temp. soak	5~25℃/min	
			Low temp. soak	5~25℃/min	
		Setting resolution		Temperature 0.1℃, Time 1min	
		No. of cycle		1~20,000	
		No. of pattern		Input (RAM) Pattern : Max 10 Pattern Included (ROM) pattern : 13 patterns	
		Detector probe	Air temp.	Pt 100Ω (at 0℃), Class B (JIS C 1604-1997)	
			Sample temp.	* 10	Pt 100Ω (at 0℃), Class B (JIS C 1604-1997)
	Indication accuracy			Temperature±0.8℃(typ.), Time±100PPM	
	Control function			Time division PID function	
Standard Function				Fast-forwarding function, Standby function, Set value maintenance function, Power failure protection function, Electric work selection function again, Drive maintenance function, Program name input function, Program drive repeat function, Program combination function, Timer reservation function, Time signal output function, Over-heating/cooling prevention function, Warning display function, External warning output function, Operation mode select function, Display function of multiplication drive time, Ramp control select function	
Control Panel	Standard Equipment		LCD Operation Panel (Touch Panel Input Type), Operation Lamp (Power, Run, Warning), Sample Power Control Terminals, External Warning Terminals, Time Signal Output Terminals, Power Supply Cord Connection		

DWN		-	TITLE EC-135EX TH20A Specifications( 3 / 6 )	Hitachi-Johnson Controls Air Conditioning, Inc.	SHIMIZU WORKS DWG.NO. <b>20171108-1A</b>	REGD
CHKD		- -				
APPD		- -				

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Item		Specification
Protection Devices	Refrigerant Cycle	Overload Protection Device, High Pressure Shutoff Device
	Heater	Over-temperature Prevention Device, Temperature Fuse
	Fan	Overload Protection Device
	Control Panel	Leakage Breaker, Fuse, Over-temperature Prevention Device(for Test Chamber Room), Overheating and Overcooling Prevention Device (for Test Chamber Room, In Microprocessor)
Equipment (Number)	Cable Hole	Inner Diameter 50mm ( 1 )
	Caster	( 8 )
	Level Adjuster	( 8 )
Accessories (Number)	Shelf Supports * 7	Made of stainless steel, Shelf Supports ( 4 )
	Y-strainer	For cooling water piping ( 2 )
	Manual	( 1 )
	Others	Rubber plug(for Cable Hole) ( 1 )
Electric Characteristics	Power Supply * 4.1	AC 3Φ 380V 50Hz
	MAX Load Current * 5	170A
	Leakage Breaker Capacity	250A
		Sensitivity Current 30mA
	Power Supply Cable Diameter	80mm <sup>2</sup> (Cabtire Cable)
	Ground Cable Diameter	22 mm <sup>2</sup>
Cooling water * 4.2	Volume of water	17,400L/h (For 32°C in water temperature)
	Hydraulic pressure	0.1~0.5MPa
	Device side piping diameter	Rc 2
Piping * 4.3	Drain hole	Rc1/2
Product Weight		2,000kg

DWN	-	TITLE	SHIMIZU WORKS DWG.NO.	REGD
CHKD	-	EC-135EX T H20A	Hitachi-Johnson Controls Air Conditioning, Inc.	
APPD	-	Specifications( 4 / 6 )	20171108-1A	

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## NOTE

## 1. Operating allowable range

Ambient temperature 0°C to 40°C、Cooling-water inlet temperature 5°C to 38°C、Power source nominal voltage  $\pm 10\%$  or less.

## 2. Performance data are comforted to JTM K09 standard at the following conditions.

(1) No load, No sample

(2) Power source nominal voltage  $\pm 5\%$  or less

(3) Ambient Temperature 5°C to 35°C, cooling-water inlet temperature 15°C to 30°C

However, note that the following conditions.

(I) Achieved time for temperature extremes and temperature rate of change are in the following conditions on 『Hi-speed』 function set、Ambient temperature is 23°C、cooling-water inlet temperature is 25°C、And waterless humidification water reservoir.

(Average heat-up/cool-down rate will not cover the entire span of the temperature rise/drop.)

『High speed heat-up/cool-down』 setting is made valid in the constant temperature run mode, in which humidity designation or control is disabled.

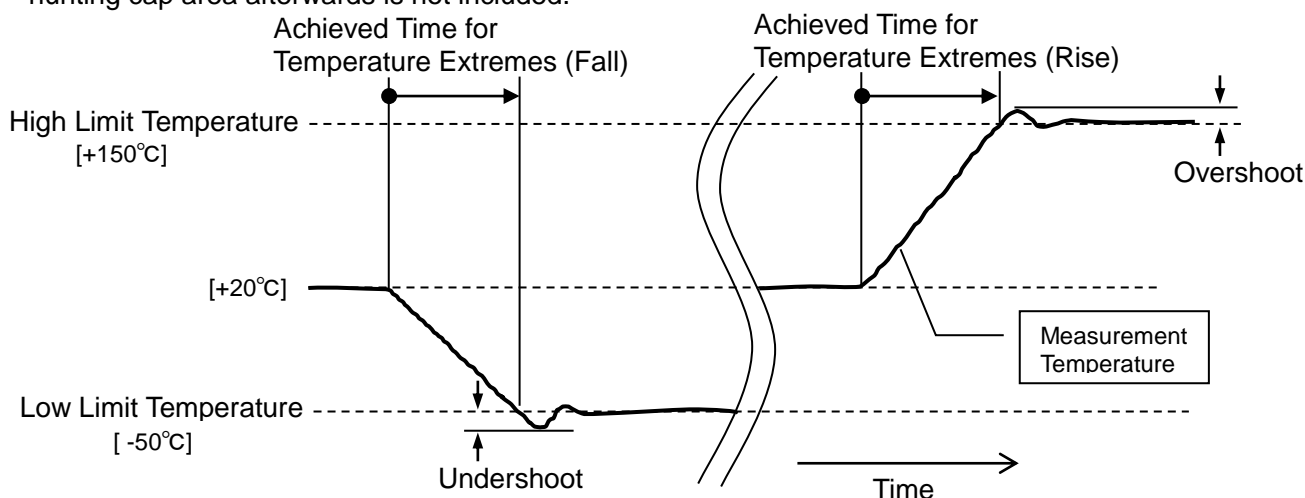
(II) The detection points of the temperature uniformity are total 9 points.

(Center and every corner of chamber).

Measurement point (total 2 points)	-50°C, +150°C
---------------------------------------	---------------

## 3. It is likely to grow by the temperature change of the overshoot and undershoot (Refer to the figure below) after a set temperature reaches fast, and to become about 8deg in the maximum.

The temperature rise time and the temperature drop time (Refer to the figure below) are assumed to be time until a set temperature is passed respectively. The overshoot and undershoot, or the temperature hunting cap area afterwards is not included.



During increasing and decreasing the temperature, the gradient is a little fluctuated on starting and stopping the cooler. (about 5°C)

DWN		-	TITLE	SHIMIZU WORKS DWG.NO.	REGD
CHKD		-	EC-135EX TH20A	Hitachi-Johnson Controls Air Conditioning, Inc.	
APPD		-	Specifications(5/6)	<b>20171108-1A</b>	

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4. Please prepare the following parts by the customer.

\*4.1 : Power source..... Power supply cable and Ground cable are not attached.

\*4.2 : Cooling water (for water cooled condenser)

\*4.3 : Drain piping

5. Maximum load current indicates the value at ambient temperature of 23°C and power supply voltage of 380V.

6. The unit and examination room dimension does not include the unit projections.

7. The shelf rest assumes it one set in two, and it is said that it is for 10 kg with one set.

8. The continuous drive time of the low temperature(-50°C or less) is 24 hours or less.

9. Sample temperature control and ramp control is effective in case of temperature cycle mode.

Ramp rate cannot be controlled at set value, in the case of sample condition. (Material, mass, other)

Temperature fluctuations become large in case of sample temperature control, in the case of sample condition.

10. Sensor for sample temperature is not attached.

11. Requirements specification

1) Sample : 4 x Desktop PC(Weight: total 40kg) or 3 x Server Computer(Weight: total 60kg)

2) Test Condition ①: High temp. 85°C, Low temp. -40°C , Dwell time 23min (High temp. and Low temp. )

• Ramp rate : 16.6~27.7°C/min ( Temp. range : -38°C~83°C , Average rate)

• The following air temperature thermocouple will meet the leading air temperature thermocouple within 3.0 minutes of reaching the target air temperature.

• Hold time : 23±3min ( High temp. range : 83~87°C , Low temp. range : -38~-42°C)

• Overshoot and undershoot temp. : 5 deg or less ( Maximum temp. : 90°C , Minimum temp. : -45°C)

Overshoot and undershoot time : within 3 minutes

(reaching the High temp. range and Low temp. range)

• Humidity at high-temp. testing : 10%RH or less

3) Test Condition ②: High temp. 65°C, Low temp. -20°C , Dwell time 23min (High temp. and Low temp. )

• Ramp rate : 15.0~27.7°C/min ( Temp. range : -18°C~63°C , Average rate)

• The following air temperature thermocouple will meet the leading air temperature thermocouple within 2.5 minutes of reaching the target air temperature.

• Hold time : 23±3min ( High temp. range : 63~67°C , Low temp. range : -18~-22°C)

• Overshoot and undershoot temp. : 5 deg or less ( Maximum temp. : 70°C , Minimum temp. : -25°C)

Overshoot and undershoot time : within 3 minutes

(reaching the High temp. range and Low temp. range)

• Humidity at high-temp. testing : 10%RH or less

4) Temperature monitor points : Air temperature of within 5cm from the sample surface.

However, note that the following conditions.

• Set mode : 『Hi-speed』 (Program mode)

• Ambient temperature and humidity : 28°C/60%RH or less

• Cooling-water inlet temperature : 32°C or less

• Power source voltage : nominal voltage ±5% within

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DWN		-	TITLE	SHIMIZU WORKS DWG.NO.	REGD
CHKD		-	EC-135EX TH20A	Hitachi-Johnson Controls	
APPD		-	Specifications( 6 / 6 )	Air Conditioning, Inc.	
				<b>20171108-1A</b>	