



(Photos are for reference only, please in kind prevail)

## Specification for Temperature Test Chamber

**Model:** KMH--100R(air cooled)

**Manufacturer:** KOMEG Technology Ind Co., Limited

**Issued By:** Engineering Department



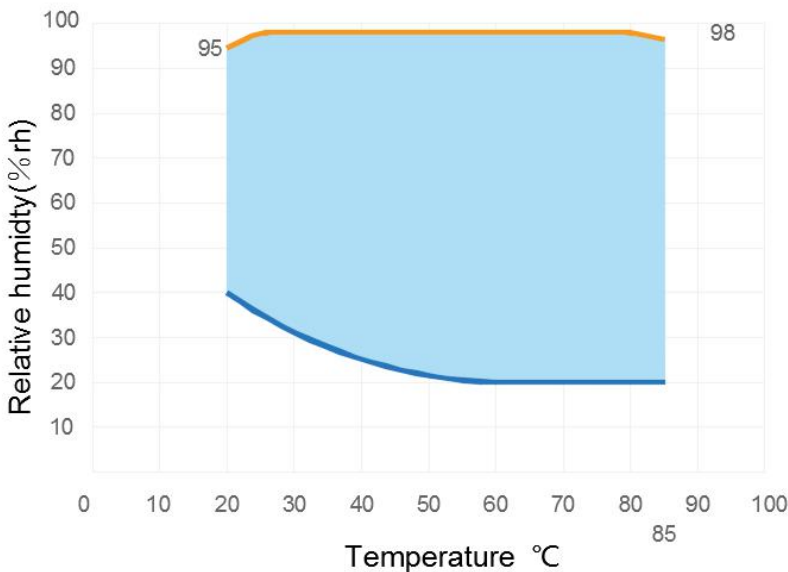
## 1. Use and sample restrictions

- 1.1 Product Usage Able to accurately simulate a wide range of complicated natural environments, and is suitable for reliability test in industrial products.  
Meet GB5170.1.2.5.18-2017 standard requirements of environmental testing equipment and test methods for the basic parameters of electric and electronic products under the condition of humidity, low temperature, high temperature, and constant heat.  
\*Note that other uses may result in personal injury and damage to the equipment!
- 1.2 Sample limit Testing and storage of samples of flammable, explosive and volatile substances  
Testing and storage of corrosive substance samples  
Testing or storage of biological samples  
Test and storage of strong electromagnetic emission source samples
- 1.3 Sample requirements In order to make your test data more realistic and effective, the test chamber should be used reasonably while satisfying the following principles:  
The total mass of the load is not more than 80Kg per cubic meter of studio volume  
The total volume of the load is not more than 1/5 of the working chamber volume  
In any section perpendicular to the dominant wind direction, the sum of the load areas should be no more than 1/3 of the cross-sectional area of the working chamber. Do not block the flow of airflow when the load is placed

## 2. Volume and size

- 2.1 Volume About 100L
- 2.2 Inner size W400mm\*H500 mm\*D500 mm
- 2.3 Outer size W 600 × H 1650 × D 1320 mm((Not including the protruding part))  
Tips: For external dimensions, please confirm the three views according to the final design!
- 2.4 Floor area About 0.74m<sup>2</sup> (Confirm after signing the contract)

## 3. The main technical parameters

3.1 Test Conditions	Equipment cooling method: Air-cooled Measured at water temperature +25 °C, Temperature measurement comply with related regulation of GB/T2424.5 /IEC60068 -3-5 standard; Sensors placed in the air outlet.
3.2 Temp. range	-20°C ~ +150°C
3.3 Temp deviation	±2.0°C
3.4 Temp Uniformity	±2.0°C
3.5 Temp fluctuation	≤±0.5°C
3.6 Heating and cooling rate	Heating rate: -20°C ~ +100°C, full range average approx 45 min (no load ) Cooling rate: From +20°C ~ -20°C, full range average approx 60 min (no load )
3.7 Max load	No
3.8 Humidity range	20~98%R.H
3.9 Temperature&Humidity range	
3.10 Humidity accuracy	±3.0%RH (>75%RH) ±5.0%RH (≤75%RH)
3.11 Humidity uniformity	±3.0%RH (no load)
3.12 Humidity fluctuation	±2.0%RH
3.13 Noise	≤75 (dB) (The noise detection device is measured 1m away from the door of the device)



- 3.14 Meet the test standard GB-2423.1-2008(IEC68-2-1) Test A: Low Temperature Test  
GB-2423.2-2008(IEC68-2-2) Test B: High Temperature Test  
GB2423.3-2008 (IEC68-2-3) Test CA: Constant damp heat test method.  
GB2423.4-2008 (IEC68-2-30) Test DB: Alternating damp heat test method.  
GJB360.8-2009(MIL-STD.202F) High Temperature Life Test  
GJB150.3-2009(MIL-STD-810D) High Temperature Test  
GJB150.4-2009(MIL-STD-810D) Low Temperature Test

#### 4. Chamber Structure

- 4.1 Structural features [Overall whole structure](#)  
The test chamber was composed of three parts as below:  
Insulation box, separate refrigeration units, and electrical control cabinet.
- 4.2 Thermal insulation structure  
Outer spray plastic anti-corrosion electrolysis plate - intermediate insulation layer is temperature resistant foam insulation material - inner chamber SUS304 stainless steel plate
- 4.3 Outer chamber material  
High-quality anti-corrosion electrolytic board, surface electrostatic powder baking paint, color is KOMEG standard color
- 4.4 Inner chamber material  
SUS304 stainless steel plate, thickness = 1.0 mm; the inner liner is fully welded.
- 4.5 Insulation  
Hard polyurethane foam insulation layer, thickness = 100mm, flame retardant grade B2
- 4.6 Door  
Single door full size open, left open ,[The door frame is equipped with two silicone rubber sealing strips and anti-condensation electric heating device to prevent external dew condensation;](#)
- 4.7 Observation window  
Observation window on the door (size W380\*500MM)  
Multilayer vacuum glass window with electronic anti-fog film for heat and sweat prevention, and prevent condensation.
- 4.8 Control panel  
Temperature (wet) control touch screen display, start switch, emergency stop switch, buzzer
- 4.9 Unit part  
include: Refrigeration unit, drain pipe, cooling fan, power distribution control cabinet; Humidification and hydration waterway control system

4.10 Distribution Cabinet	Switchboard ; Cooling fan Total power leakage circuit breaker
4.11 Standard configuration	Lead hole: 2pcs $\phi$ 50mm on left and right side of chamber with silicone plug and stainless steel cover (confirm after contract signing) Sample rack: 2 layers of stainless steel sample rack, bearing 30kg / layer Window lamp: 1 type(DC 24v led lamp) (installed on the window, the switch is set on the external PLC touch screen, and has the function of delay and automatic closing) Mobile caster (with foot cup): 4pcs

## 5. Air conditioning system

5.1 Feature	Adjustment and control: forced convection temperature regulation and humidity adjustment; independent cold end and hot end PID regulation, heat and cooling can be continuously adjusted to avoid energy waste caused by cooling capacity and heating amount
5.2 Air circulation	High-power fan driven by an external motor with a stainless steel shaft, fan motor place external ; The air is driven by the motor and flows through the heater and the refrigerating evaporator. After being fully heated/cooled to the required temperature value, the air circulates inside the chamber and heat exchanges the test piece by convection
5.3 Fan motor	Low-voltage asynchronous high temperature long axis motor 
5.4 Centrifugal wind wheel	Multi-blade centrifugal circulation fan, aluminum alloy blade 
5.5 Heater	Skid-mounted heater, SSR control, with independent over-temperature protection temperature switch

When the heater is energized, the surface temperature will rise.

After the convective air passes through the heating wire, the temperature rises, and the heat is extended to the air in the box and the test piece to play the role of heating and heating.

The heating power is precisely controlled by the PID algorithm and the output power is regulated by a solid state relay.



## 5.6 Cooling method

### Direct cooling

The refrigeration system provides sufficient low temperature refrigerant to the heat exchanger so that the temperature of the heat exchanger is lower than the air temperature. The heat in the air is absorbed by the heat exchanger and taken out of the chamber, causing the air temperature to drop and cooling.

The cooling power is precisely controlled by the PID algorithm, and the flow rate and cooling capacity of the refrigerant are regulated by a solenoid valve.

## 5.7 Humidifier

Stainless steel humidification electric heating, liquid water in the humidifier is added with pressure saturated steam (high temperature and humidity), the steam is injected into the tank, thus increasing the humidity in the tank.

The humidification power is precisely controlled by PID algorithm, and the flow and cooling capacity of steam are regulated by copper tube solenoid valve.

## 5.8 Dehumidifier

It is completed by dehumidification evaporator coil. The refrigeration system provides sufficient low-temperature refrigerant for the heat exchanger, so that the temperature of the heat exchanger is lower than the dew point temperature of the box air.

The water in the air will condense on the surface of the heat exchanger, and the water will separate out from the air, which will reduce the overall humidity of the air.

Dehumidification is precisely controlled by PID algorithm, and the refrigerant flow and cooling capacity are regulated by solenoid valve

## 6. Cooling System

- 6.1 Characteristics This machine is a mechanical compression refrigeration method  
Intelligent cooling control: PID control solenoid valve output cooling capacity or  
PID control heater according to temperature and load demand inside the  
chamber (cooling is not heated, heating is not cooling).

Traditional refrigeration control method

This machine intelligent energy saving control method

Refrigeration compressor start and stop control temperature (temperature fluctuations, seriously affecting compressor life, technology has been eliminated) refrigeration compressor constant operation + heating output balance control (causing cooling capacity and heating phase offset to achieve temperature dynamic balance, wasting a lot of Electric energy);

According to the temperature demand inside the chamber, PID control solenoid valve switch output cooling capacity or PID control heating beeper (cooling is not heated, heating is not cooling) In the low temperature working state, the heater does not participate in the work, and the refrigerant supply amount is adjusted by PID, and the three-way flow regulation of the refrigeration pipeline, the cold bypass pipeline, and the hot bypass pipeline is realized, and the temperature of the working chamber is automatically constant.

- 6.2 The refrigerant Environmentally friendly refrigerant R404A

- 6.3 Cooling Air cooled condenser

method

- 6.4 Compressor Copeland Compressor or Taikang Compressor



- 6.5 Air condenser Air-cooled high-efficiency shell and tube or tank condenser





- 6.6 Evaporator      Efficient multi-stage hydrophilic membrane fin evaporator



- 6.7 Auxiliary device      High-precision expansion valves, solenoid valves, oil separators, desiccants and other components are imported from internationally renowned brands.



- 6.8 Refrigeration process      The refrigeration system is designed with fully automatic protection measures. The super heating of the compressor during the high temperature cooling phase is prevented by injecting the liquid refrigerant into the compressor suction line. Fully implement nitrogen protection welding, double-stage rotary vane pump vacuum to ensure clean and reliable inside the refrigeration system. The bottom of the compressor is designed with a water tray, and the condensed water is discharged to the outside of the tank through the drain pipe at the rear of the tank.

## 7. Control System

- 7.1 Feature      Adjustment and control: forced convection temperature regulation and humidity adjustment; independent cold end and hot end PID regulation, heat and cooling can be continuously adjusted to avoid energy waste caused by cooling capacity and heating amount

- 7.2 Controller      KOMEG 7 inch color touch screen intelligent fuzzy controller  
\*Operating system: KOMEG KM-5166 cold output version





### 7.3 Display

Temperature and humidity settings (SV) Actual (PV) value can be displayed directly,  
Execution of the program can display numbers, Paragraphs, remaining time and cycles, running time display,  
Program editing and graphic curve display,  
Fixed or program operation status display,  
7-inch TFT display screen.

### 7.4 Resolution

Temperature: + 0.01℃; Humidity: + 0.1%; Time: 0.01min

### 7.5 Setting range

Temperature: - 100 ~ 200 °C (note that it is not the performance range of equipment);

Temperature can be adjusted based on the working temp of the equipment(the upper limit +5℃, the lower limit -5℃)

Humidity: 0~100 %RH.

### 7.6 Program capacity

The operating time can be set up to 9999 h 59 m(Set 0 to constant operation without time limit)

Available program capacity: max 269 groups ,13450steps

Available memory capacity: 50step/group

Repeatable command: Each command can be cycles to 32000.

### 7.7 Communication interface

Data collection when connected to a computer

Can be used as monitoring and remote control system,

Multiple machines synchronization control available.

RS-232、RS-485 and network port LAN

### 7.8 Control switch

1) Emergency stop switch

2) Start (power) switch

## 8. Security system

### 8.1 Over temperature protection

The test chamber is independently adjustable electronic over-temperature protection device

### 8.2 Cooling System

Compressors overload overheating, high voltage protection, motor over current

protection.

8.3 Circulation fan Overheat protection relay, overload protection.

8.4 Heater Air conditioning channel over temperature protection



8.5 Humidification system Humidification heating tube over-temperature protection (dry burning), abnormal water supply, and abnormal drainage protection.

8.6 Main power switch Phase sequence protection, phase loss protection, equipment leakage protection, overload and short circuit protection

8.7 Control circuit Overload and short circuit protection

8.8 Alarm action When the above protection occurs, the device stops running and an audible and visual alarm is issued, and the fault location, its cause and solution are displayed on the meter.

## 9. Use site conditions

- 9.1 Use environment
1. Ambient temperature: 5°C-35°C;
  2. Relative humidity:  $\leq 85\%R.H$
  3. Atmospheric pressure: 80kPa~106kPa
  4. Flat, vibration-free ground;
  5. Choose good ventilation, no direct sunlight or direct radiation from other heat sources;
  6. There is no strong airflow around: when the surrounding air needs to flow, the airflow should not be blown directly onto the cabinet.;
  7. No strong electromagnetic field around;
  8. No high concentration of dust and corrosive substances around

- 9.2 Power Specifications
1. **Power supply: 380V AC ( $\pm 10\%$ )**  
Three-phase + ground wire, grounding resistance  $\leq 4 \Omega$  ;  
Power switch use 4P+N 40A air switch
  2. Power frequency:  $50 \pm 0.5\text{Hz}$
  3. Maximum machine power: about **6 KW**

4. Maximum working current: about 20A

9.3 Ground protection

Grounding resistance  $\leq 4 \Omega$

9.4 Drainage interface

Pagoda connector plug  $\phi 10$  inner diameter silicone hose

Note: Guide the condensate out of the chamber.

9.5 Power wiring

- 1.The power cord of the machine is guided by the customer;
2. The customer needs to prepare a special fuseless switch for this device;

## 10. Main Material List

Compressor USA Copeland compressor /Hitachi



Oil separator American Emerson



Condenser Guangzhou Yongqiang



Evaporator Guangzhou Yongqiang



Dry filter Denmark DANFOSS



Capillary tube KOMEG



Expansion valve Denmark DANFOSS



Magnetic valve USA SPORLAN or Italy Castel



Controller KOMEG



Circuit breaker France Schneider



AC contactor France Schneider



Thermal relay France Schneider



Phase sequence relay Carlo Gavazzi



Intermediate relay Omron or Carlo Gavazzi



Solid-state relay Carlo Gavazzi



