REXGEAR

Technical Specification

Temperature and Humidity Test Chamber

Model: **RTH-2500RF1A0(Air Cooling)**

1. Application and sample limits

1.1 Application	This series of temperature test chamber is suitable for the reliability test of industrial products. It has the characteristics of temperature and humidity control precision and wide control range. The performance index conforms to GB5170.1.2.5.18-2017 "Electrical and electronic products environmental test equipment basic parameters verification method low temperature, high temperature, constant damp heat, alternating wet heat test equipment requirements. *Note that other uses may result in personal injury and damage to the equipment!
1.2 Sample limits	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 chamber 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
1.4 Attention	The following conditions are necessary for normal installation and use. Unless otherwise specified, they are all provided or guaranteed by the customer *For the specific supplementary requirements of the venue, please see item 10 below!

1.5 Client site requirements	Name	Description of requirements
	Truckage channel	Please confirm whether it can be passed according to the external dimensions of the chamber, especially please pay attention to the corner, the size of the entrance and the internal size of the elevator, etc.
	Floor bearing	For the placement site of the chamber, the ground bearing capacity≥500kg/m2

1.6 Power Cords and Switches	Name	Description of requirements
	Power cord	1, Power supply: 480V AC(±10%) Three-phase line + protective ground wire, grounding resistance ≤ 4Ω; 2. Power frequency: 60±1.0Hz 3. Without power cord
	Chamber switch	1. All customers need to prepare a special leakage circuit breaker for this equipment as the main power switch outside the equipment (in order to facilitate the maintenance and relocation of equipment power failure), 2. Suggestions on the specific location of the main power switch: 2.1 When equipped with a 5-meter power cord In the vicinity of the device, generally within 3 meters of the wall 2.2 When there is no power cord left for the device In vertical distribution cabinets nearby or at other suitable locations *Customer distribution box circuit breaker (air switch) specifications meet the maximum current of the equipment.

2. Standard model configuration list

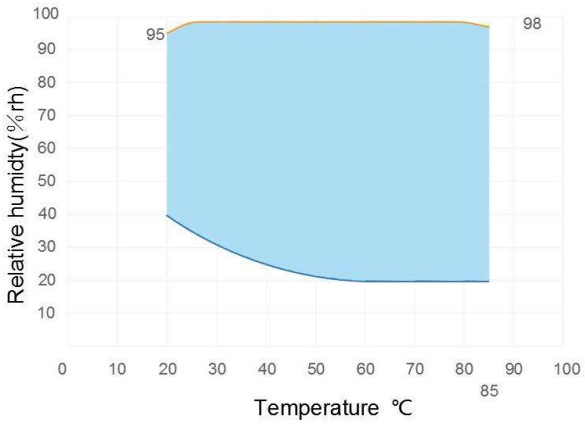
*illustrate	J--structural configuration, D--electrical configuration, Z--refrigeration and other configurations *The standard configuration is described in the items at the back of the specification. (The same series of models are the same as standard)
J1 Chamber color	☼REXGEAR standard color
J2 Observation window	Size according to final design
J3 Shelf (sample Shelf)	Without
J4 Test cable	Diameter：： 100 mm quantity：2 pcs Location： Each 1 cable hole on the left and right sides
J5 Sensor	Electronic humidity sensor*1pcs
D1 Controller	7 inch color touch screen
J6 Automatic water replenishment device	With multi-stage filtration water treatment device*1set, used to supply humidifier water. The special water treatment device specially equipped for the equipment humidification system can effectively filter solid impurities and chlorine-containing substances. (Please provide 1~2kg/cm2 tap water source)
D3 Communication Interface	Equipped with RS485 and Ethernet interface (RJ45)

3. Volume and dimension

3.1 Volume	About 2500L
3.2 Interior size	W1000mm*H1000mm*D2500mm
3.3 Exterior size	W1200mm*H1910mm*D3250mm(Excluding the protruding part of the machine!) Tips: For external dimensions, please confirm the three views according to the final design!
3.1 Volume	About 3.9m^2；(confirm after signing the contract)

4. The main technical parameters

4.1Cool method	Air-cooled	
4.2 Temperature range	-20℃～+150℃	Test Conditions: 1) Air-cooled at room temperature <+25°C 2) The temperature performance is measured at no load 3) The temperature rise and fall performance test is measured according to the relevant regulations of GB/T2424.5 (correspondin
4.3Temp. fluctuation	±0.5℃	
4.4Temp. uniformity	≤2.0℃	
4.5Temp. deviation	≤±2.0℃	
4.6 Temperature change rate	Heat up rate: -20℃～+100℃, full range average speed approx. 3℃/min；（no-load）	
	Cooling rate: +20℃～-20℃,full range average speed approx. 1℃/min；（no-load）	
4.7 Load	No-load acceptance *Note: The load weight includes the weight of all items in the box, such as related fixtures, etc.!	
4.7 Humidity range	20～98%R.H	

4.8 Temperature & Humidity Control	 *When operating at a temperature and humidity point below 40°C, there is frost on the evaporator (also a dehumidifier), so continuous operation will be limited. *Under humidity conditions, no heat load is allowed.	g to IEC60068-3-5) or GB/T 5170.2, GB/T 5170.5 (constant) standards; *The control sensor is placed at the air outlet of the air handling unit
4.9 Humidity Deviation	±3.0％RH（＞75％RH） ±5.0％RH（≤75％RH）	
4.10 Humidity Uniformity	±3.0％RH	
4.11 Humidity Fluctuation	±2.0％RH	
4.12 Noise	≦75 (dB) (The noise detection device is measured 1m away from the door of the chamber)	
4.13Meet the test standard	GB/T 2423.1-2008 (IEC68-2-1) Test Ab: Low temperature test method. GB/T 2423.2-2008 (IEC68-2-2) Test Bb: High temperature test method. GB/T 2423.3-2008 (IEC68-2-3) Test Cab: Constant Damp Heat Test Method. GB/T 2423.4-2008 (IEC68-2-30) Test Db: Test method for alternating damp heat. GJB360.8-2009 (MIL-STD.202F) high temperature life test. GJBl50.3-2009 (MIL-STD-810D) high temperature test method. GJBl50.4-2009 (MIL-STD-810D) low temperature test method. GJBl50.9-2009 (MIL-STD-810D) Damp heat test method. *Reminder: If there is a need for low wind speed (≤0.5m/s, this function is not available as standard), please follow the additional agreement!	

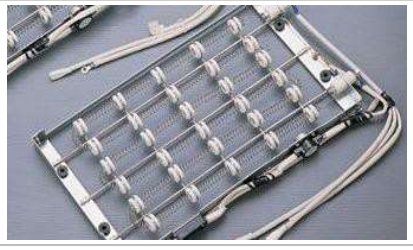
5. Chamber construction

5.1 Construction type	One-piece structure The test chamber consists of three parts: the main insulation box, the independent refrigeration unit, and the electrical control cabinet.
5.2 Thermal insulation structure	Outer spray plastic anti-corrosion electrolysis plate - intermediate insulation layer is temperature resistant foam insulation material - inner box SUS304 stainless steel plate
5.3 Exterior material	High-quality anti-corrosion electrolytic board, surface electrostatic powder baking paint.
5.4 Interior material	SUS304 stainless steel; inner wall full-welded
5.5 Insulation	Rigid polyurethane foam insulation layer, thickness 100mm, flame retardant class B2
5.6 Chamber tightness	1) The door seal of this chamber adopts a special high and low temperature resistant silicone rubber sealing strip, which does not condense or freeze at low temperature. The door frame anti-condensation electric heating device prevents external condensation and frost; at the same time, it adopts a convenient and detachable design, which is convenient for later maintenance. 2) Pressure balance system (balance tube type) The pressure balance system automatically works under normal pressure to balance the internal and external pressures.
5.7 Chamber drain	The bottom of the test inner box has a good drainage design, and the drainage flows along the drainage port.
5.8 Door	Full-size single door, opens to the left; The door frame is equipped with silicone rubber sealing strips and anti-condensation electric heating device to prevent external condensation；
5.9 Observation window	Observation window on the door(size by final design) Multi-layer vacuum glass window with electronic defogging film for heat and sweat protection, and prevents condensation.

5.10Window light	Window light: 2 ea (DC 24V LED light) (installed on the window, the switch is set on the external PLC touch screen, and has a delay automatic shutdown function)
5.11Moving casters	Mobile casters (with foot cup)*4pcs

6. Air conditioning system

6.1 Characteristics	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
6.2 Air circulation	High-power fan driven by an external motor with a stainless steel shaft, external to the fan motor; 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 tank and heat exchanges the test piece by convection
6.3 Fan motor	Low-voltage asynchronous high temperature long axis motor
6.4 Centrifugal rotor	Multi-blade centrifugal circulation fan, aluminum alloy blade
6.5 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. The heating power is precisely controlled by the PID algorithm and the output power is regulated by a solid state relay.

	
6.6 Cool method	Direct cooling The refrigeration system provides sufficient low temperature refrigerant to the heat exchanger such 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 tank, 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.
6.7 Chamber Sensors (temperature humidity type)	1) Temperature sensor: device temperature main control sensor*1pcs, located at the air outlet 2) Humidity sensor: Electronic humidity sensor, no need to replace wet cloth.

6.9 Humidifier	The liquid water is added to the pressurized steam (high temperature and high humidity) in the humidifier, and the steam is sprayed into the tank to increase the humidity inside the tank. The humidification power is precisely controlled by the PID algorithm, and the copper tube solenoid valve regulates the flow and cooling capacity of the steam.
6.10 Dehumidifier	This is accomplished by a dehumidification evaporator coil that provides sufficient low temperature refrigerant to the heat exchanger such that the temperature of the heat exchanger is lower than the dew point temperature of the cabinet air. The moisture in the air will condense on the surface of the heat exchanger, and moisture will be released from the air, causing the overall humidity of the air to drop. Dehumidification is precisely controlled by the PID algorithm, and the flow rate and cooling capacity of the refrigerant are regulated by a solenoid valve.

7. Refrigeration system

7.1 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 box (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 box, 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.
7.2 Refrigerant	Environmentally friendly refrigerant
7.3 Compressor	The compressor is the core component of the refrigeration system, and the leading international first-line brand compressor is selected Hermetic compressors are suitable for equipment capacity ranges below 10KW 1) Select different types of hermetic compressors according to the design conditions, such as rotors, pistons, scrolls, etc. 2) The selected hermetic compressor is designed to provide excellent operating performance for low-temperature applications. It adopts the latest environmentally friendly refrigerant models and has a wide operating range. The evaporation temperature is as low as -40°C 3) Fully enclosed has the characteristics of compact structure, small size, low noise and small vibration
7.4 Condenser	Air-cooled high efficiency copper tube fin type forced convection heat exchange condenser
7.5 Evaporator	Efficient multi-stage hydrophilic membrane fin evaporator
7.5 Auxiliary device	High-precision expansion valves, solenoid valves, oil separators, desiccants and other components are imported from internationally renowned brands.  
7.6 Refrigeration	The refrigeration system is designed with fully automatic protection measures.

technology	The superheating 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.

8. Control system

8.1 Characteristics	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
8.2 Controller	7 inch color touch screen intelligent fuzzy controller
8.3 Operation mode	Program operation, fixed value operation
8.4 Set mode	Human-machine dialogue mode, using touch input, control .
8.5 Screen display	The temperature and humidity setting value (SV) and practical (PV) value is directly displayed; It can display the execution program number, the number of times, the remaining time and the number of cycles, and the running time display; Program editing and graphic curve display; Fixed point or program action status display;
8.6 Resolution	Temperature: + 0.1 ℃;
8.7 Program capacity	Constant value running time can be set to unlimited time or timing mode is 99 h 59 m Available program capacity: 50 groups at most;

	Usable memory capacity: 30 steps per group (step); Commands can be executed repeatedly: each command can reach 999 cycles.
8.8 Data recording method	1) Save the set value, actual value and sampling time of the device; the curve recording period can be set to 30-300 sec, and the maximum memory time is stored for 90 days of continuous storage of historical curves and historical data (when the sampling time is 1min). The test program is compiled through the PC special software and saved to the USB flash drive, and then the test program is transferred from the USB flash drive and stored in the controller; the program in the controller can also be transferred to the USB flash drive, and then stored in the PC for analysis and management. . 2) Standard USB function The test curve data stored in the controller can be transferred to a USB flash drive. Directly display and print test data/curve through PC-specific software (the print data is marked with an unmodifiable mark); or convert the recorded data into an Access data file that can be read by Microsoft Office
8.9 Power-off memory function	The power failure recovery mode can be set as: warm start/cold start/stop.
8.10 Scheduled power-on function	The start-up time can be set at will, and the machine will run automatically after the power is turned on.
8.11 Troubleshooting	Fault alarm code prompt function (the screen displays fault solutions or location prompts) Fault power-off protection function, self-diagnosis function

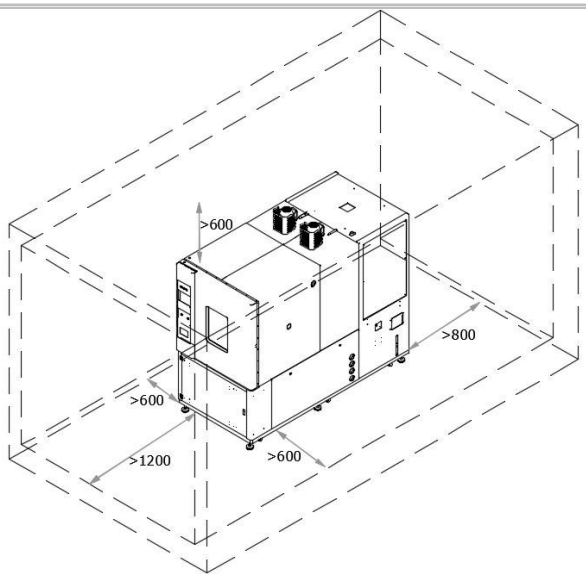
9. Safety protection system

9.1 Over temperature protection	Electronic over-temperature protection device.
9.2 Cooling System	Compressor motor overload and overcurrent protection Compressor motor short circuit protection Compressor motor overheat protection High pressure protection for refrigeration systems

9.3 Circulation fan	Overheat protection relay, overload protection.
9.4 Heater	Air conditioning channel limit over temperature protection: mechanical double metal sheet principle of over temperature protector 
9.5 Humidity system	Humidification heating tube over-temperature protection (dry burning), abnormal water supply, and abnormal drainage protection.
9.6 Main switch	Phase sequence protection, phase loss protection, equipment leakage protection, overload and short circuit protection
9.7 Control circuit	Overload and short circuit protection
9.8 Alarm action	When the above protection occurs, the device stops running and an audible and visual alarm is issued, and the fault and its cause and solution are displayed on the screen.

10. Use site requirements

10.1 Operation environment	1. Ambient temperature: 5℃-35℃; 2. Relative humidity: not more than 85%R.H 3. Atmospheric pressure: 86kPa~106kPa 4. Flat and vibration-free ground; 5. Choose well-ventilated, no direct sunlight or direct radiation from other heat sources; 6. There is no strong airflow around: when the surrounding air needs to be forced to flow, the airflow should not be directly blown onto the box; 7. There is no strong electromagnetic field around; 8. There is no high concentration of dust and corrosive substances around 9. Reserve space around the device, as shown in the figure below

	 10. About transport size The customer should pay attention to the outside dimension of the largest part of the equipment to be able to pass through, pay attention to the corner, the size of the door, the size of the elevator, etc.
10.2 Ground protection	Ground resistance≦4Ω。

11. Main material list

Compressor	Tecumseh,Highly, Lynda or Sanyo	
Dry filter	DANFOSS	
Expansion valve	Danish DANFOSS or Honeywell	
Electron Magnetic valve	US SPORLAN or DANFOSS or SAGLNOMIYA	
Touch screen	REXGEAR	
Breaker	Schneider or ABB	
AC contactor	Schneider or ABB	
thermal relay	Schneider or ABB	
Phase sequence relay	CARLO GAVAZZI or ABB	
Intermediate relay	OMRON or ABB	
solid state relay	CARLO GAVAZZI or ABB	

12. Equipment outline drawing