Technical Specification

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SMC-340B ENERGY-SAVING TEMPERATURE & HUMIDITY TEST CHAMBER

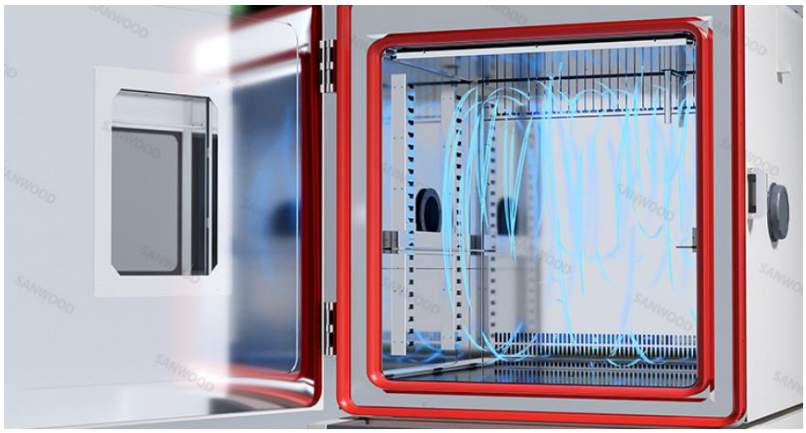


Image Only for Reference

1.Description

1) Application

This machine is widely used in scientific research, research institutes, quality inspection institutes and other industries to do warm and humid heat tests of electronic and electrical products, materials, parts, equipment, etc., alternating heat test and constant temperature test, etc. Also could do high and low temperature routine tests, low temperature storage, in order to evaluate the performance of the sample under given environmental conditions.

2) Positioning

Apply to aerospace, aviation, electronics, automotive, battery and other products and quality inspection institutes, research institutes, universities and other test units, providing virtual space to simulate the real environment, verify product inspection, research and development results, test chamber is a powerful assistant to shorten the development cycle and improve product quality and reliability.

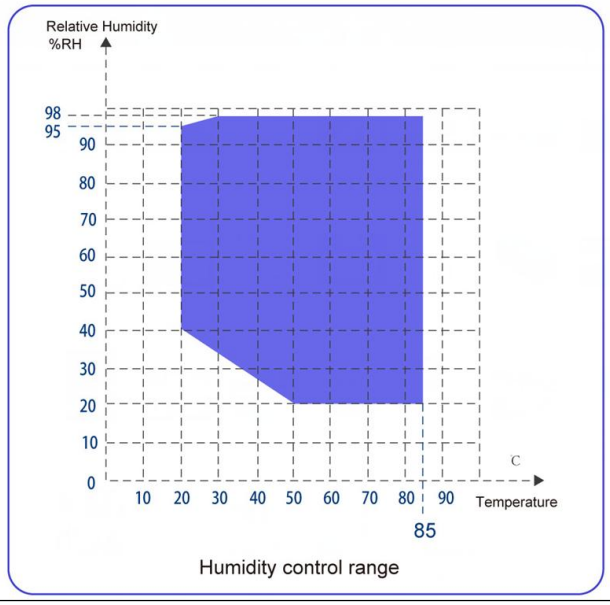
2.Sample Limitation & Test Standard

Prohibition	1) Testing and storage of explosive, flammable, volatile materials 2) Testing and storage of corrosive substances 3) Testing and storage of biological samples 4) Testing and storage of strong electromagnetic emission source samples 5) Testing and storage of radioactive material samples 6) Testing and storage of samples of highly toxic substances 7) Testing and storage of samples that may produce highly toxic substances during testing or storage
Test Standard	1) ISO 16750: The International Organization for Standardization (ISO) standards for automotive electronic equipment include testing requirements for environmental conditions. 2) MIL-STD-810: The military standards developed by the US Department of Defense cover various methods of environmental testing, including high temperature and high humidity testing. 3) IEC 60068-2-1 "Environmental testing - Part 2: Test methods - Test A: Low temperature" specifies the methods and requirements for low temperature testing. 4) ASTM D 2247: The American Society for Testing and Materials (ASTM) standard involves testing the performance of coatings in high humidity environments. 5) IEC68-2-3 Test Ca: Constant damp heat test method. 6) IEC68-2-30 Test Db: Alternating Damp Heat Test Method. This chamber also complies with testing standards such as IEC 60068, ANSI/TIA/EIA 455-162, BS EN 61300-2-48,JSZ0202, etc.

3.Technical Specification

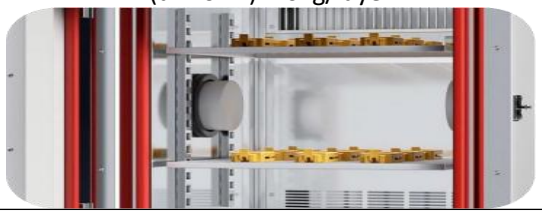
Model		SMC-340B
Temp.	Temp. Range	-20℃～180℃
	Temp. Fluctuation	±0.5℃
	Temp. Deviation	≤±2.0℃
	Temp. Resolution	0.01℃
	Cooling Rate	2.0～3.0℃/min (from 180℃～25℃) 1.0～2.0℃/min (from 25℃～-20℃)
	Heating Rate	3.0～5.0℃/min
	Temp. Uniformity	≤1.5℃ (from -20℃～100℃)
		≤2.0℃ (from 100℃～180℃)
Humidity	Humidity Range	20%～98%RH
	Humidity Deviation	≤±3.0%RH
	Humidity Fluctuation	±2.0%RH
	Humidity Uniformity	≤3.0%RH
	Humidity Resolution	0.1%RH
Material	Internal Material	SUS#304 stainless steel (1.2mm)
	External Material	cold-rolled plate (1.2mm) with powder coating
	Heat Insulation	polyurethane foam (100mm) + glass wool (10mm)
	Fan	centrifugal fan (impeller Fan)
	Refrigeration Compressor	hermetic compressor (Tecumseh)
	Cooling Mode	air cooling
	Refrigerant	R449A
	Evaporator	finned-tube exchanger
	Heater	nickel chrome strip heater
	Humidifier	steam humidifier
Size & Weight	Volume	340L
	Internal Size	580*765*750mm (W*D*H)

	External Size	approx. 780*1610*1920mm (W*D*H)
	Weight	approx. 560kg
Working Temp.		5～35℃
Power Supply		three-phase AC400V/50Hz, approx. 7.5kW
Controller		Sanwood customized controller
Temp. & Humidity Chart		



4.Structure

Structure	assemble type
Material of Inner Chamber	SUS#304 heat-resistant and cold-resistant stainless steel plate (1.2mm) inner box structure full seamless welding
Strengthening of Internal Structure	SUS#304 (2mm) stainless steel reinforcement
Material of Outer Chamber	cold-rolled steel sheet with powder coating
Insulation Material	Germany Bayer refractory grade high strength PU polyurethane foam insulation insulation material + ultra-fine glass fiber
Door Edge	double-layer high-tension silicone rubber seal, temperature resistant -90~180°C, lifespan up to 15 years
Observation Window	The observation window is a multi-layer hollow tempered glass belt with automatic defrosting function, which can guarantee the frost-free and condensation of the glass surface during any test. 

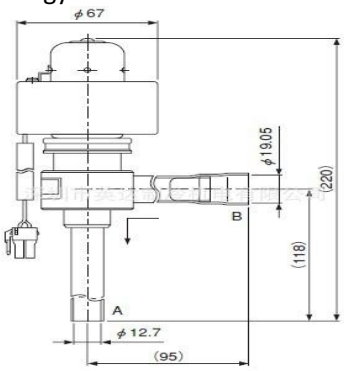
Fixing Bracket for Test Wire	For the convenience of user wiring organization, cable fixing brackets are designed on the side of the equipment. 
File Holder	The device is designed with a file holder on the side, which facilitates user maintenance and placement of test files, etc. 
Water Collection Tray	The outlet hole for the condensed water in the chamber and the condensed water of the unit. A stainless steel water tray is added to the bottom of the refrigeration unit, and an overflow water hole is provided at the lower end of the water tray for the outflow of condensed water. The whole machine is equipped with a 12mm diameter drain port, which is installed on the rear side of the equipment. 
Sample Rack	stainless steel sample holder 2 layers, height is adjustable, load-bearing (uniform): 20kg/layer 
Moving & Positioning Mode	4 high load-bearing pulleys and PU horizontal angle wheels at the bottom for moving and fixing the equipment 
Cable Port	one on each side, with stainless steel hole cover, silicone plug, aperture Φ100mm 

Floor Bearing	≤ 100kg/m2 (uniform load)
Circulating Motor	stainless steel extended shaft circulating motor ensures long-term operation and sufficient air volume operation
Circulating Wind Wheel	The multi-wing centrifugal circulating wind wheel is used to strengthen the shaft and aluminum alloy to make high and low temperature resistant rotating blades, so as to achieve forced convection and effectively avoid looping dead angles.
Circulating Air Duct	The temperature-adjusting and conditioned air duct is designed as a double air duct, which is connected to the studio but isolated. The wind path is in the form of a wind returning from the wind. The partition plate is formed by cold-bending processing of high-quality stainless steel plates, and adjustable louvers are used at the air outlet. Indirect heater, saturated humid air inlet, refrigeration dehumidification evaporator and circulating blast wind wheel are arranged in the temperature regulation air passage.

5.System Introduction

Heating Wire	high-quality explosion-proof nickel-chromium alloy heating wire (high resistivity, small temperature coefficient of resistance, small deformation at high temperature and not easy to embrittlement, self-heating temperature up to 1000-1500 °C, long service life) rapid heat exchange, no hysteresis
Control of Heating Wire	The solid-state relay is used as a heating actuator, and there is no large current fluctuation and impact phenomenon, and the operation is stable.
Protection of Heating Wire	The heating wire is provided with anti-dry protection to prevent the heater from continuously burning after the circulation fan stops for some reason, causing the heater itself to burn out or other accidents.
Humidification Mode	Steam humidification method: using electronic parallel mode micro-motion humidification system.
Humidifying Heating Pipe	All stainless-steel embedded humidification tube with anti-dry explosion protection protector.
Advantage of Humidification System	Humidification is rapid, saves water, saves electricity, and allows test products to heat up. The humidification and dehumidification system are completely independent, no need for extra drainage, faster than traditional surface humidification (water tray), high control precision, no scale pollution such as scale and scale, good low humidity performance, water level observation window, and easy cleaning.
External Water Supply	distilled water, pure water, deionized water (resistivity greater than 500 Ω·m) (provided by the user, manually added water)
Water Storage Device	drawer type water tank, located in front of the machine, under the door
Capacity of Water-Storage Tank	15L

6.Refrigeration System

Compressor	France Tecumseh fully enclosed compressor
Evaporator	High-efficiency components adopts a slope type evaporator (AC&R compound s poiler aluminum fins).
Condenser	Air-cooled system for equipment easy movement, etc.
Heat Exchanger	SWEP plate type refrigerant cold and heat exchange design, making higher effici ency compared with traditional internal spiral
Energy-Saving Device	1) The active control of the refrigeration system is realized, and the fixed proportional adjustment of the original thermal expansion valve is not controllable. The output can be adjusted in advance and optimized for different modes and operating conditions. 2) Due to the cyclic control feedback of the electronic expansion valve, the front end is a temperature-plus-pressure dual-sensor high-response direct control, which can provide the best evaporator liquid supply, so that the refrigeration system can achieve excellent cooling capacity in a wider working range. Output. 3) Energy saving: the full range of electronic expansion valve self-adjustment + active adaptation to adjust the cooling capacity output, making the system more energy efficient.   4) Energy-saving design: Adopting PID + PWM principle of VRF (refrigerant flow control) technology to achieve low-temperature energy-saving operation (electronic expansion valve according to thermal energy conditions refrigerant flow servo control technology) low temperature working state, the heater does not participate in the work, through PID + The PWM regulates the flow rate and flow direction of the refrigerant, and regulates the three-way flow of the refrigerant pipe, the cold bypass pipe, and the hot bypass pipe to achieve automatic constant temperature to the working chamber. This method can reduce energy consumption by 30% under low temperature conditions. The technology is based on Danish Danfoss' ETS series of electronic expansion valves, which can be used to smoothly adjust the cooling capacity for different cooling capacity requirements, that is, to achieve the compressor cooling capacity adjustment when different cooling rate requirements are met.
Refrigerant	R449A  (the above photo can only for reference)

7.Control System

Controller	Sanwood customized controller
Display	TFT color LCD display
Running Mode	program mode, fixed value method
Setting Mode	English & Chinese menu (free choice), touch screen input
Program Capacity	Editable program Quantity: Max 120 Steps: Max 100 Number of cycles: Max 999 Program can be linked (link program serial number can be selected).
Setting Range	Temp.: adjust according to the operating temperature range of the equipment (upper limit +5℃, lower limit -5℃). Humidity: (0～100) %RH
Display Resolution	Temp.: 0.01℃ Time: 0.01min Humidity: 0.1%RH
Communication Function	Ethernet, RS485, RS232 interface to choose two of them (Standard unit will equip one Ethernet interface and one RS485 interface.)
Control Mode	BTC balance temperature control mode + DCC (Intelligent Cooling Control) + DEC (Smart Electrical Control) (Temperature Test Equipment) BTHC balance temperature regulation and humidity control mode + DCC (smart cooling capacity control) + DEC (smart electrical control) (temperature and humidity test equipment)
Function of Curve Recording	With battery-protected RAM, it can save the set value, sampling value and sampling time of the device; the maximum recording time is 350 days (when the sampling period is 1.5min).
Subsidiary Function	1) fault alarm and cause, processing prompt function 2) power failure protection 3) upper and lower temperature protection 4) calendar timing function (automatic start and automatic stop operation) 5) self-diagnostic function

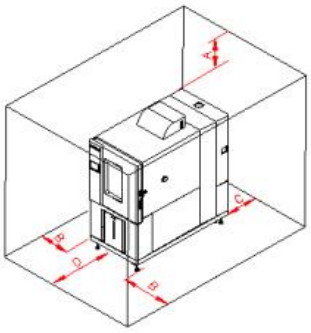
8.Main Parts

Name	Brand	Note
Controller	SANWOOD customized	
Compressor	France Tecumseh	
Oil Separator	American Emerson	
Heat Exchanger	SANWOOD customized	
Condenser	SANWOOD customized	
Evaporator	SANWOOD customized	
Drying Filter	Denmark Danfoss	
Non-return Valve	Denmark Danfoss	
Solenoid Valve	Denmark Danfoss	
Condensing Pressure Switch	Denmark Danfoss	
Leakage Protection Switch	France Schneider	
AC Relay	France Schneider	
Thermal Relay	France Schneider	
Phase Sequence Relay	Switzerland Carlo Gavazzi	
Solid State Relay	Switzerland Carlo Gavazzi	
Temp. & Humidity Sensor	Taiwan Thermoway	
Circulating Motor	Taiwan Yuzheng	
Over-Temp. Protection Device	South Korea RAINBOW	
Note: The above parts may use other brands with same quality.		

9.Protection Device

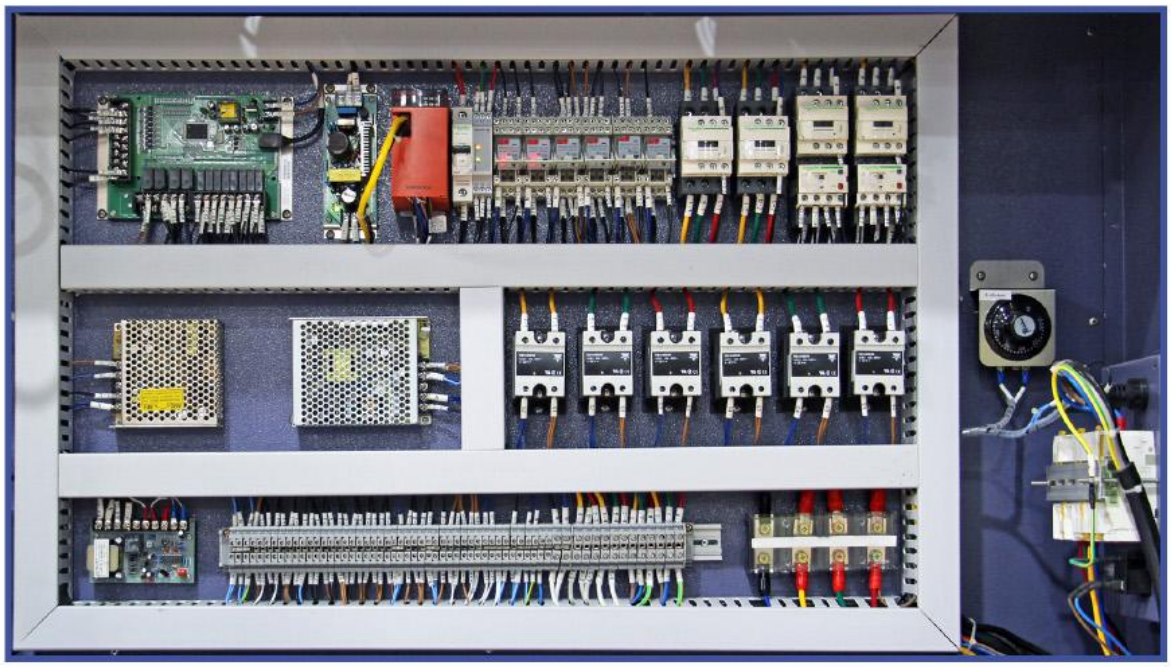
Refrigeration System	1) compressor over-pressure protection 2) compressor motor over-heat protection 3) over-current protection of compressor motor 4) cooling water supply under pressure protection (for water cooled type)
Humidifying System	1) humidification tube dry burning protection 2) abnormal water supply protection 3) abnormal drainage protection 4) water shortage abnormal protection
Test Chamber Protection	1) adjustable test product over temperature protection 2) test space temperature fuse protection 3) air-conditioning channel limit over temperature protection 4) ultra-high temperature protection inside the controller 5) fan motor overheat protection 6) chamber inside and outside pressure balance protection
Other Protections	1) total power phase sequence and phase loss protection 2) whole-machine leakage protection 3) load short-circuit protection

10.Use Condition

Site	1) leveled ground, good ventilation,no flammable,explosive or aggressive gas and powder 2) no strong electromagnetic radiation source with drainage near the machine (within 2 meters) 3) ground load-bearing capacity: not less than 800kg/m2 4) leave space around the machine for maintenance A：not less than 30cm B：not less than 50cm C：not less than 70cm D：not less than 90cm 
Power Supply	1) Voltage allowable fluctuation range: AC (1 ± 10%) 380V. 2) Frequency allowable fluctuation range: (1 ± 1%) 50Hz. 3) Protective earthing wire grounding resistance is less than 4Ω. 4) Users are required to configure a device with a considerable capacity of air or power switch at the installation site, and this switch must be used exclusively for this device.
Requirements for Storage Environment	1) When the equipment is not working, the ambient temperature should be kept within 0～35°C (without freezing) 2) When the ambient temperature is lower than 0 °C, the water remaining in the equipment should be drained to prevent the water in the pipeline from freezing and damaging the pipeline.
Others	1) Opening the door of the test chamber during the test will cause temperature or humidity fluctuations inside the box. 2) If the door is opened several times during the test or the door is opened for a long time or the test sample emits moisture, the heat exchanger of the refrigeration system may freeze and may not work properly.

SANWOOD
Environmental Test Chambers

电路系统--核心配件
Circuit System - Core Accessories



交流接触器（施耐德--法国）
AC contactor
Schneider-France

温控开关(rainbow-韩国)
Temperature Detect Switch (TDS)
RAINBOW-South Korea

漏电开关(施耐德--法国)
Leakage switch
Schneider-France

电源供应器(明纬-台湾)
Power supply
Mingwei-Taiwan

继电器(佳乐-瑞士)
Relay
Carlo Gavazzi - Switzerland

继电器(佳乐-瑞士)
Relay
Carlo Gavazzi - Switzerland

SANWOOD
Environmental Test Chambers

冷冻系统--核心配件
Refrigeration System - Core Accessories

全封闭式压缩机(泰康--法国)
Fully enclosed compressor
Tecumseh-France

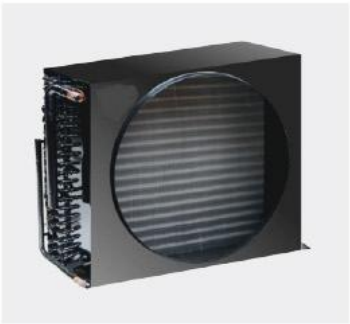
压缩机(比泽尔-德国)
Compressor
Bitzer-Germany

过滤器(丹佛斯-丹麦)
Filter
Danfoss-Denmark

膨胀阀(丹佛斯-丹麦)
Expansion valve
Danfoss-Denmark

压力开关(丹佛斯-丹麦)
Pressure switch
Danfoss-Denmark

油分离器(艾默生-美国)
Oil seperator
Emerson - American



冷凝器
Condensor

电磁阀(丹佛斯-丹麦)
Solenoid valve
Danfoss-Denmark