



TORONTECH



BENCHTOP ENVIRONMENTAL CHAMBER

Capacity: 15L/30L/50L | Temperature: -70°C TO +150°C

The Benchtop Environmental Chamber Toron 15L/30L/50L-Series is an advanced yet cost-effective solution for precise temperature and humidity testing. Designed for benchtop applications, it is available in 15L, 30L, and 50L capacities, with an extended temperature range from -70°C to +150°C. The optional humidity function enables comprehensive climate chamber simulations, making it ideal for diverse testing needs.

This environmental chamber is widely used in third-party laboratories, R&D centers, and industrial quality control facilities across industries such as aviation, automotive, telecommunications, and medical research. It performs temperature stress tests, reliability assessments, and weather resistance evaluations on small test samples under extreme environmental conditions.

APPLICATIONS

Standard Compliance of Benchtop Environmental Chamber 15L/30L/50L Series:

- 1. IEC60068-2-1** Environmental testing - Part 2: Test methods - Tests A: Cold
- 2. IEC60068-2-2** Environmental testing for electric and electronic products Test methods - Tests B: Dry Heat
- 3. MIL-STD-810F-501.4** High temperature test
- 4. MIL-STD-810F-502.4** Low temperature test

FEATURES

Chamber Structure

Construction	The Benchtop Environmental Chamber 15L/30L/50L Series include a state-of-the-art high quality insulated chamber, a cooling unit, an air conditioning air supply device, a humidity control system, a measurement and control system, and a safety protection system.
Interior Material	Made of 1.5mm SUS304 stainless steel plate, with a mirror finish treatment on the surface. All joints are continuously TIG welded (tungsten inert gas shielded welding) to guarantee no leaks after prolonged testing. The inner wall bottom plate is designed with drainage holes to remove condensed water.
Exterior Material	The shell of our benchtop environmental test chamber 15L/30L/50L Series is made of 1.5mm cold-rolled steel plate, coated with double-sided white electrostatic spray, ensuring long-term rust resistance.
Insulation Material	The insulation layer is made of a composite PU foam (polyurethane) board and ultra-fine glass roll cotton, providing optimal heat resistance and thermal insulation effects. The thickness is approximately 80mm (3.15 inches).
Chamber Door Structure	This Benchtop Environmental Chamber Series features a single door sealed with a double-layer high and low temperature resistant silicone rubber sealing strip. Additionally, the chamber door frame and its surroundings are fitted with self-regulating heating wires to prevent condensation or frost formation during low-temperature tests. The control system activates the heating and defrosting automatically based on the working room temperature.
Viewing Window	A set of multi-layer tempered anti-fog observation windows are installed on the door. Both the inside and outside of the windows are coated with a transparent heating film to prevent condensation and frost, ensuring clear visibility during the test. The size of each window is approximately 178Å—200mm.
Lighting	One set of lighting fixtures is installed on the door, with the operation switch located on the touch screen. The touch screen includes a timing function to turn off the lights.
Cable Port	A 50mm cable port is placed on one side of the chamber, including a rubber plug.
Sample Holder	Made of two layers, with adjustable height for both upper and lower layers.

Air Heating and Conditioning System

Air Conditioning Air Supply	The benchtop environmental chamber's built-in air conditioning unit is positioned on the inner side of the chamber body, with a stainless steel centrifugal fan mounted on top of the chamber. The top side supplies air while the lower side returns air, creating forced circulation. The setup includes a stainless steel multi-wing centrifugal fan, heater, and evaporator.
Heater	Stainless steel finned heating tube.
Heating Control	PID automatic adjustment, output to heater via non-contact switch (SSR).
Air circulation System	High-temperature, low-noise motor paired with centrifugal fan blades.

Refrigeration System

Compressor	German Secop compressor is used, known for its industry-leading technology and high reliability. It provides the high-power cooling capacity necessary for effective cooling.
Cooling Way	Air-Cooling
Refrigerant	Refrigerants compliant with international environmental protection standards.
Evaporator	The high-efficiency sine corrugated aluminum fin air-cooled evaporator is suitable for harsh environments and can operate effectively even in high-temperature conditions.
Throttling System	Electronic expansion valve (Sporlan or Danfoss), solenoid valve, and capillary tube.

Refrigeration Capacity Control	The refrigeration system of our benchtop environmental test chamber line is equipped with a pressure sensor to monitor real-time operating pressure. It adjusts system pressure using multiple solenoid valves to maintain consistent refrigeration output within specific temperature ranges. This ensures more uniform distribution of refrigeration capacity throughout the cooling process, resulting in smoother temperature curves. The system uses multi-condition energy adjustment technology to accommodate various temperature requirements. Furthermore, there's a refrigerant pressure regulating tank designed to recover a portion of the refrigerant at high and constant temperatures. This reduces cold capacity output, leading to significant power consumption savings. The regulating tank, in conjunction with the pressure testing system, ensures optimal efficiency and reliable operation.

Humidity Control System

Humidity Control Way	External electric heating steam humidification, using SSR (Solid State Relay) actuator for non-contact operation.
Humidification Generator	Patented technology
Freezing and Dehumidification	Utilizing the frozen light tube dehumidification method.
Humidification Water Supply	The softened water utilized for humidification must adhere to the relevant standards of "Water for Industrial Boilers," ensuring a water resistivity of $\leq 500 \Omega \cdot \text{cm}$. Manual water addition methods are used: Manual Mode: The equipment features a self-priming water pump. Users should place the pure water meeting industrial standards behind the test box and insert the water supply pipe into the container. Pure water needs to be manually added by the user. When the water level sensor detects a low water level, the water pump activates to replenish the water.
Water Level Control	Stainless steel high-temperature resistant electronic liquid level float switch.
Supply Pump	A micro-vacuum water pump is used, capable of self-priming and operating dry.

Control System

Measure System	Temperature Measurement: Two temperature sensors are utilized, one for control purposes and one for independent over-temperature protection. Humidity Measurement: Vaisala humidity acquisition module (From Finland) is used. Refrigeration System Pressure Measurement: Two ceramic pressure transmitters are used for real-time pressure display.
Control System	1. The controller of our benchtop environmental chamber uses a Siemens PLC, with a 7-inch touchscreen for the most convenient interface. Control software is developed independently. 2. Display accuracy: Temperature: 0.1℃; Time: Seconds. 3. During testing, essential reference parameters such as current target temperature, measured temperature, target humidity, measured humidity, heating output, cooling output, running time, and program progress are displayed in real-time. 4. Two testing methods are available: fixed value setting (manual operation) or program setting (automatic operation based on preset programs). 5. The preset program function allows users to select from 20 pre-set program curves, each curve consisting of up to 99 segments. 6. An optional feature includes the ability to select a computer as an upper monitor for remote monitoring. This computer can control the operational status of the test chamber, access current and historical test data from the on-site controller or through the upper computer, and facilitate printing. Additionally, data can be automatically recorded. (Optional)(Additional fee items) 7. In case of equipment failure, an automatic alarm will sound, and the power supply will be cut off. Simultaneously, the controller will display the fault phenomenon and a brief description of the fault, enabling users to easily identify the cause. 8. The controller features a password function and clear authority settings, aimed at preventing accidental shutdowns or interruptions of tests due to mis-handling.
HMI	7-inch TFT true color touch screen (resolution 800×480)
Language	English
Interface Type	USB interface available for exporting data in Excel format.
Memory Capacity	2G

Safety Device

Safety Protection Device	- Compressor overpressure protection - Compressor overload protection - Compressor exhaust protection - Touch screen system mis-handling protection - Power phase sequence protection - Equipment leakage protection - Multi-level password protection for operating system - High and low temperature protection within the chamber - Heater overheat protection - Line fuse (fuse) protection - Fan overload and overheating protection - Observation light timing-off protection (adjustable time setting) - Independent secondary temperature protection with adjustable set temperature
Alarm Record	Internal alarms are recorded in real time, and the files can be viewed at anytime
Alarm Indication	The test chamber itself is equipped with an audible and visual alarm device. In case of the aforementioned failures, the control system will automatically stop and trigger an audible and visual alarm.

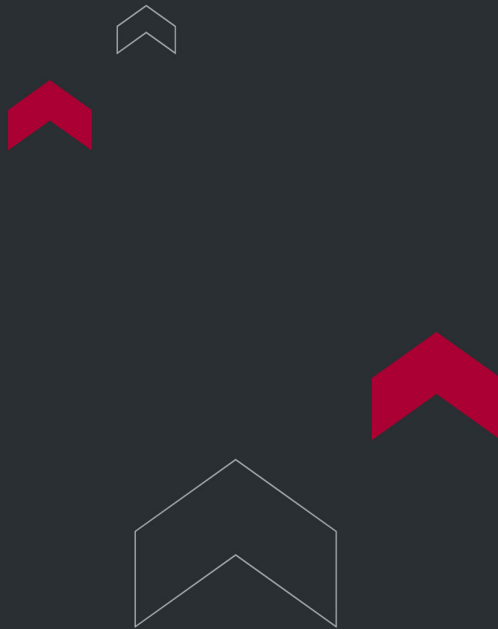
Installation Conditions

Environmental Conditions	1) Environmental conditions for equipment use: - Temperature: 0°C to +35°C - Relative humidity: 5% to 95%, without condensation - Avoid direct sunlight or radiation from other heat sources - Keep away from high-concentration dust and corrosive substances 2) Equipment power supply conditions: - Voltage: 220V (110V also available) - Frequency: 50Hz - Power Consumption: approximately 2 KW

Specification of Benchtop Environmental Chamber Toron-Series

Name	Benchtop Environmental Chamber		
Model	Toron15L	Toron30L	Toron50L
Internal Volume	15L	30L	50L
Internal Size mm W×D×H	300×200×250mm	300×300×350mm	350x350x400mm
External Size (mm) W×D×H	550×820×750mm	550×920×850mm	600×1000×1200
Temperature Range	-70℃ ~ +150℃		
Temp. Fluctuation	≤±0.3℃		
Temp. Uniformity	≤2.0℃		
Temp. Deviation	≤±2.0℃		
Heating Rate	3℃/min -40℃ ~ +85℃ no load average rate		
Cooling Rate	2℃/min +85℃ ~ -40℃ no load average rate		
Humidity Range	20% ~ 98%RH Humidity Range of Benchtop Environmental Chamber		
Refrigeration Mode	mechanical compressor refrigeration		
Cooling Method	Air cooling		
Operation Mode	fixed value control operation, program circulation operation		
Noise	≤72dB A		

Remarks	Ambient temperature is +23°C, no-load test, according to international standards.
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