



Climatic Environmental Chamber

Available Variants

45 × 45 × 45 cm — 92 Liters

50 × 50 × 50 cm — 125 Liters

70 × 50 × 50 cm — 175 Liters

90 × 60 × 60 cm — 324 Liters

65 × 60 × 80 cm — 300 Liters

125 × 60 × 60 cm — 450 Liters

125 × 70 × 70 cm — 612 Liters

125 × 80 × 80 cm — 800 Liters

125 × 90 × 90 cm — 1000 Liters

Salient Features

Heat proof and electrical shock resistant design

Automatic cycle commencement on press of a button

Digital display of humidity and temperature data

Ramp & soak profile controller

Capacitance type humidity sensor enables direct display of RH and temperature

Highly ergonomic door handle with unique key lock

Precise Temperature/Relative Humidity Accuracies Providing Reliable Test Results for Any Variety of Test Specimens

Internal work-space is made with stainless steel material with LED illumination

Door mounted programmable HMI for easy access

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GST TIN No. : 24AABCE4018L1ZU
I.T. PAN No. : AABCE 4018L
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Door mounted controller with internal routed harness cables for supply and communication

Imported heavy duty di-casted hinges for friction free easy swing-over of the door

Multilayer vacuumized insulated large viewing window with defog heaters

Large process digital display indication of Temperature and Humidity on the door

Ethernet, USB and serial communication ports

Online graphical trend display of the test graph

Adjustable shelf provision for placing the DUT at the desired height

Turbulent design stainless steel hub with axil rust free blade for uniform air circulation and better temperature gradient in the working space

Imported heavy duty castor wheels with inbuilt manual level adjuster for mobility and levelling of test chamber

Variant Details

Heating System

Easily removable U-shaped jacketed air heaters connecting with Teflon wires. Interlocking is provided for preventing operation of the heating system without air circulation. The heaters are placed in the conditioning plenum such that there is no direct radiation from the heaters on to the test specimen.

For the 300 Liter variant, Inconel material sheathed/bare nichrome air heaters are provided. The heaters are placed in the conditioning section to avoid radiation of heat onto the test specimen. Heater outputs are controlled through zero-crossing relay/Thyristor for superior stability and control of temperature. Heaters are isolated with high insulation resistance isolators from chamber body to heater in order to avoid the earth leak.

Refrigeration System

Air-cooled semi-sealed refrigeration system with ozone-friendly refrigerant. The system is provided with adequate safety protection against excessive and low pressure and temperature. Pressure gauges indicate suction and head pressure. HP/LP cutoff switch and overload protection are provided. Oil separators with oil return and hot gas defrost system are provided. Refrigeration components include expansion valve, driers, oil separators, pressure gauges and vibration eliminators. Reputed company makes such as Danfoss Denmark and Wika Germany are specified.

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For the 300 Liter variant, the refrigeration system includes mechanical single-stage refrigeration with hermetic/semi-hermetic compressor/s, R-404a air-cooled refrigeration system, oxidize-free evaporator heat exchanger coils, automatic bypass control based on suction pressure and temperature, efficient oil return management and additional anti-vibration suspension.

Door & Gasket

Robust type hinges fitted on the right hand side of the chamber with front opening single door. Leak-proof double-lined silicon gasket is provided. The inner surface of the door is provided with pre-polished stainless steel and mounted such that conduction is avoided.

The 300 Liter variant additionally specifies imported heavy-duty di-casted hinges and a 120-degree swing friction-free step-open heavy-duty door hinge.

Viewing Window

Separate observation door or multilane viewing window incorporated within the chamber door.

For the 300 Liter variant, multilayer vacuumized insulated large viewing window with defog heaters is provided.

For the 450 Liter variant, heater facility is provided between the toughened glasses to avoid condensation of generated steam and water droplets.

Validation Port Hole

40 mm diameter port hole provided with removable silicon sealed cap.

The 324 Liter variant specifies 1 port hole of 120 mm with removable sealed cap.

The 300 Liter variant specifies 115 mm diameter access ports with removable silicon sealed cap.

Electrical Controls

Relays, contactors, SSR, MCB, mains switch, fan control switch, compressor ON/OFF switch with indicator, dry heater switch with indicator and trip indicators with alarming buzzer system for safe and easy operation.

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Electrical Circuitry Wires

Inner circuitry wires with individual number tags for ease of servicing and maintenance.

Temperature Sensor

PT-100 Sensor

Humidity Sensor

Capacitance type RH sensor

Communication

RS-232 or RS-485 communication port provided to operate the chamber through PC as well as to log and modify data. Tubular display and graphical display are provided with complete history printing and storing facility.

For specified variants, the communication system includes 21-CFR Compliance software.

The 300 Liter variant additionally provides Ethernet, USB and serial communication ports.

Manual

Operating instructions and service manuals provided with complete schematic diagrams of refrigeration, electrical and mechanical components.

Humidity System

For the 450 Liter variant, humidity is created by steam injection method. The boiler tank is fitted at the back side of the chamber for better servicing. Electromagnetic switch is provided for controlling the wet heater from burning off if water level is not adequate. Float valve is provided to control water level in the boiler tank. The boiler tank is fabricated from stainless steel material and covered with wooden insulation to avoid thermal loss.

Construction Details

For the 300 Liter variant, mono-block construction with I-section base frame is provided. The body is impervious with thermally isolated blocks capable of resisting high-low temperatures. The test chamber has easy-access sections with removable panels for easy maintenance and a compact structure with minimized footprint.

Exterior material is made of minimum 2 mm thick CRCS with powder-coated panels/door.

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Internal test chamber is manufactured with stainless steel material.

Test chamber is welded with X-Ray automated machine for high quality, warp-free and 100% air/water-tight leak-tested construction.

Internal test chamber and outer body are isolated using mineral wool ensuring no air pockets and zero conduction and heat losses.

Multi-level diagonally joined airlock silicone rubber sealing is provided for the door and chamber with conduction-free isolation mounts.

LED illumination with pre-set cut-off timings is provided.

Multi-layer vacuumized air gaps with nitrogen-filled insulated window and inbuilt thermal control defog heater are provided.

Sensors are provided for detection of open door and safety shut-down of chamber operation with alert message on the screen.

Right and left side 115 mm diameter feed-through holes are provided to connect the product during active test conditions.

The chamber is mounted on 4-inch heavy-duty castor wheels and levelling pads.

Default chamber configuration includes adjustable rod-type SS shelf provision for loading the specimen.

Conditioning Section

Easy-to-access conditioning plenum for maintenance.

Single-molded lightweight high-CFM co-axial fan for uniform air circulation.

Vibration-free stainless-steel joint-free extended shaft external flange-mounted induction motor.

Modular conditioning unit consisting of heat exchangers, air circulation system and heating system.

Humidification & De-Humidification

Self-pressurized fine-control condensation-free humidity generator.

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Automatic humidity purge system based on humidity set point.

Humidity generator equipped with water-level float, over-temperature protection thermostat and Inconel immersion heater for vapor generation.

Water level automatically controlled through water-in solenoid valve.

Refrigeration-based de-humidification control system for achieving desired lower RH levels with precise maintenance of dew point temperature.

Independent automatic control of dew point temperature.

High-accuracy electronic humidity sensor for direct measurement of humidity and operation over the specified temperature range.

Inbuilt condensation protection features during thermal transfer for electronics active testing.

Automation Control System

7-inch resistive analog colour touch screen with WVGA 16M colour capabilities, 800 × 480 pixels and LED backlight.

Up to 4 fully isolated serial communication ports including RS-232 and RS-422/485.

10 Base / 100 Base-TX Ethernet port for external device communication and remote operation.

Dual USB host ports for USB mouse, keyboard and external storage devices.

3 user-programmable soft keys with LED indication.

On-board 256 MB user memory and extender SD card memory up to 2 GB.

Programming capability up to 99 programs, each with 99 segments and 999 repeat cycles.

Nested looping within programs and segments.

Graphical program editing.

Auto PID configuration for full operating ranges of temperature depending on profile requirement.

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Real-time trend display with user scaling.

3-level security for different user access.

Digital pressure monitoring for refrigeration compressor gas.

Subsystem/component life-cycle status and run-hour display.

Calibration due warning.

Compressor individual diagnostics including oil level, discharge temperature, winding temperature, suction temperature and run-hour status with automatic compressor status report generation.

Shelves

03 shelves specified for the 450 Liter variant.

Adjustable shelf provision for placing the DUT at the desired height is specified for the 300 Liter variant.

Default 300 Liter configuration includes one adjustable rod-type SS shelf.

Safety & Control

High and low temperature safety with audio-visual warning signal for protection of the specimen.

Overload protection for all electrical components used in the chamber and control panel.

Complete electrical and refrigeration system conforming to statutory regulatory requirements against safety, hazards, accidents and pollution.

Over-temperature thermostat and thermal fuses for heating system.

Pressure gauges for measuring refrigerant and service manifolds in the refrigeration system.

For the 300 Liter variant, additional safety and control provisions include incoming supply electromagnetic interference filter, surge protection, MPCB protection for individual three-phase power devices, MCB protection for individual single-phase power devices, phase reversal protection, under-voltage and over-voltage protection, high and low temperature mechanical and software protection, heater over-temperature protection, mechanical and

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software high/low pressure protection, compressor winding thermal protection, compressor oil-level protection and compressor high discharge temperature protection.

Utilities Requirement

For the 300 Liter variant:

415 VAC $\pm$ 5%, 3 Phase, 50/60 Hz, 4 wire + E

Other voltage options are available on request

Space around the chamber 600–1000 mm on three sides except front for air cooled

Drain connection 1/2" BSP

Warranty

Unconditional warranty against faulty workmanship for 1 year at site from the date of installation of the equipment.

Specifications

Specification	Details
Chamber Size	45 × 45 × 45 cm (H × W × D); 50 × 50 × 50 cm (H × W × D); 70 × 50 × 50 cm (H × W × D); 90 × 60 × 60 cm (H × W × D); 65 × 60 × 80 cm (W × D × H); 125 × 60 × 60 cm (H × W × D); 125 × 70 × 70 cm (H × W × D); 125 × 80 × 80 cm (H × W × D); 125 × 90 × 90 cm (H × W × D)
External Body Size	900 × 1700 × 1975 mm (W × D × H) for 300 Liter variant
Chamber Volume	92 Liters; 125 Liters; 175 Liters; 300 Liter; 324 Liters; 450 Liters; 612 Liters; 800 Liters; 1000 Liters
Inner Chamber	Stainless steel S.S. - 304 Grade
Exterior Body	Mild steel
Exterior Body Paint	Powder coated in attractive shades
Insulation	High density bonded glass wool insulation
Insulation Thickness	75 mm

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Specification	Details
Additional Insulation	120 mm high density low K factor bonded rock-wool & puff insulation specified for the 324 Liter variant
Illumination	LED Light for lesser power consumption
Temperature Range	-40°C to 150°C for standard variants; -40°C to +180°C for 300 Liter variant
Temperature Sensor	PT-100 Sensor
Temperature Accuracy	±1.0°C for standard variants; ±0.1°C to ±1.2°C measured at control sensor as per IEC 60068-3-5 between +85°C to -40°C for 300 Liter variant
Temperature Uniformity	2.0°C for 324 Liter variant; ≤1.5°C for 300 Liter variant
Temperature Resolution	0.1°C for 324 Liter and 300 Liter variants
No. of Temperature Sensors	01 No
RH Sensor	Capacitance type RH Sensor
Humidity Range	20% RH to 95% RH for standard variants; 10% to 98% in climatic range of 10°C to +85°C for 300 Liter variant
Humidity Accuracy	±3% RH
No. of RH Sensors	01 No for standard variants
Controlling System	Ramp & Soak Profile Controller
Average Heating Rate	1.5°C/min; 1.5°C/min user defined for specified variants; 3°C/min average as per IEC 60068-3-5 in an empty chamber for 300 Liter variant
Average Cooling Rate	1.0°C/min user defined for specified variants; 3°C/min average as per IEC 60068-3-5 in an empty chamber for 300 Liter variant
Uniformity	Through forced air circulation blower

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Specification	Details
No. of Blower	01 Number
Compressor Watts	1.0 kW for standard variants
Dry Heater Watts	1.5 kW for standard variants
Wet Heater Watts	3.0 kW for standard variants
Noise Level	68 to 72 dBA measured at 1-meter distance for 300 Liter variant
Heat Dissipation in Air Cooled	25000–105000 BTU/hr @ peak depending on chamber model
Communication Port	RS-232 or RS-485; Ethernet, USB and serial communication ports for 300 Liter variant
Validation Port Hole	40 mm standard; 120 mm for 324 Liter variant; 115 mm for 300 Liter variant
Shelves	03 shelves for 450 Liter variant; adjustable shelf provision for 300 Liter variant
Power Supply	230 volts, 50 Hz, single phase, AC Supply for standard variants; 440 volts, 50 Hz, three phase, AC Supply for 324 Liter and 300 Liter variants
Customer-End Supply	415 VAC $\pm 5\%$, 3 Phase, 50/60 Hz, 4 wire + E for 300 Liter variant
Drain Connection	1/2" BSP for 300 Liter variant
Warranty	1 year unconditional warranty against faulty workmanship at site from date of installation

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