



ENVIRONMENTAL SIMULATION CHAMBERS (H-XSC35 UL10)

Key Specifications



Dimensions

Volume	35 cft.	1000 ltrs.
Internal dimension Width x Depth X Height	40" x 26" x 31" 1020 x 1000 x 980mm	
Weight	3,086 lbs 1,400 kg	
No. of shelves	1 Included	
Cable Ports	3" x 5" on either side	

Performance Data

Low Temperature	-94°F	-70°C
High Temperature	356°F	180°C
Humidity		10-98%
Avg. Rate of change As per IEC 60068-3-5 With Dead Load		10°C/min
Dead Load (kg) considered for structural design		50
Live Load (W)		N/A

Utilities and other info

Power requirement	480V, 3p, 60Hz
System Type	Air Cooled
Nominal Power (kW)	35
Nominal Power (A)	62
Compressor capacity	4 X 4 HP Cascade

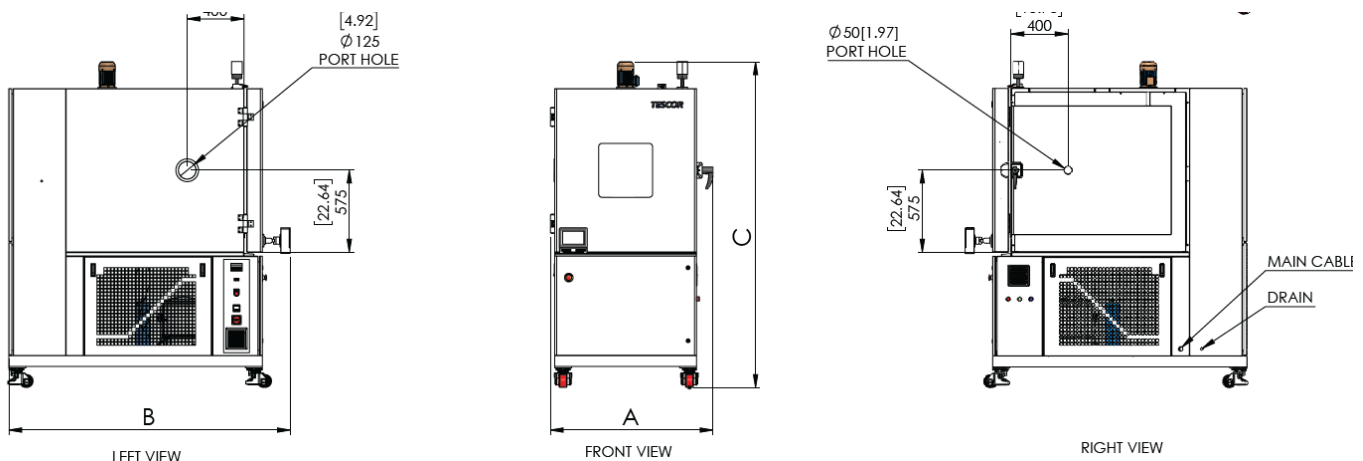
Temperature + Humidity



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Construction

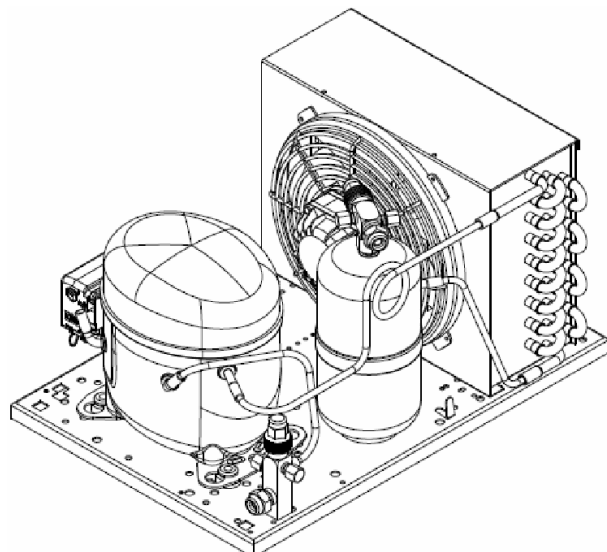
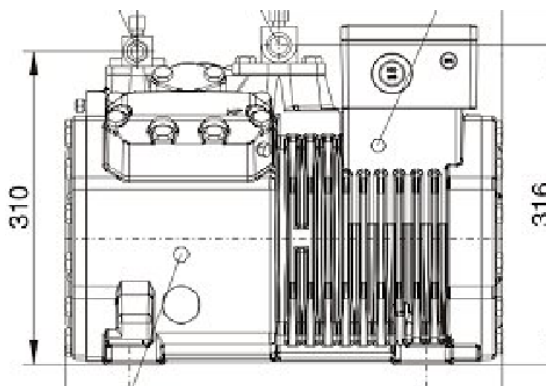
Interior Cabinet	The inner cabinet is constructed using 304 grade of stainless steel. The entire test space is continuously welded and reinforced. Channels for adjustable shelving are provided where each shelf has a loading capacity of maximum of 5 lb/sqft uniformly distributed.
Exterior Cabinet	The exterior of the chamber is constructed of 14-gauge welded galvanized steel chassis, with 14 and 16-gauge galvanized steel panels and access doors. The surface is phosphatized and finished with an epoxy-based powder coating. The color of the exterior shall be RAL-7035 light grey. The test space shall be insulated using multi layered mineral wool. This mineral wool shall have a low 'k' factor and high density of up to 48Kg/m ³ . This insulation shall be non hygroscopic in nature and asbestos free. The chamber will be provided with a front main door. The main door shall have full access to the test space and shall be hinged to the left of the chamber. The main door shall be fitted with a limit switch and when ajar shall indicate "door open" in the controller and be interlocked with the air circulation.
Mounting	The chamber will be mounted on levelling casters. These casters are a combination of wheels for mobility, locking and adjustable rubber mounts for levelling the chamber.
Cable Ports	Non-conducting silicone entry ports with a non-conducting silicone plug shall be provided to access cables or any other connections that may be required for the unit under test.



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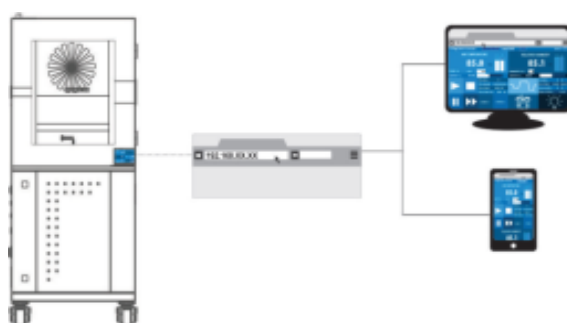
Refrigeration

Refrigeration System	The cooling in the chamber shall be accomplished by a cascade system for -70°C systems and a single stage refrigeration system for -40°C systems. This system shall provide cooling to the chamber interior through a finned evaporator coil, which is located in the air plenum. In the -70C system, cascade condenser is a heat exchanger that has one circuit which is the evaporator of the high-stage, and another circuit which is the condenser of the low-stage.
Refrigerant	The refrigerants used in the chamber shall be CFC free eco-friendly. R-404a – In the single stage systems. R-404a & R-508b in the cascade systems.
Dehumidification	The dehumidification shall be done using the refrigeration system. This output shall be enabled in ramp up mode after a low temperature cycle, to avoid condensation on the test specimen
Pressure Monitoring	The suction and discharge pressures of the high stage and the low stage shall be monitored using electronic pressure sensors. These pressures will be indicated on the controller. High pressure and low-pressure mechanical cut-out switches shall be provided for high stage and low stage compressors. These cut-outs are factory set and shall be manually reset.
Air Cooled Condenser [If Applicable]	The condenser coil shall be 3/8" copper tubes mechanically bonded to configured aluminium plate fin as standard. Factory pressure and leak tested to 420psig minimum air pressure and design working pressure shall be 376psig.
Water Cooled Condenser [If Applicable]	The condenser shall be stainless brazed plate heat exchanger construction with a waterside working pressure of maximum 350psig and refrigerant side working pressure of 300psig. A water flow switch shall be provided to ensure adequate flow to the condenser. The water quality shall be as per the water quality guidelines.

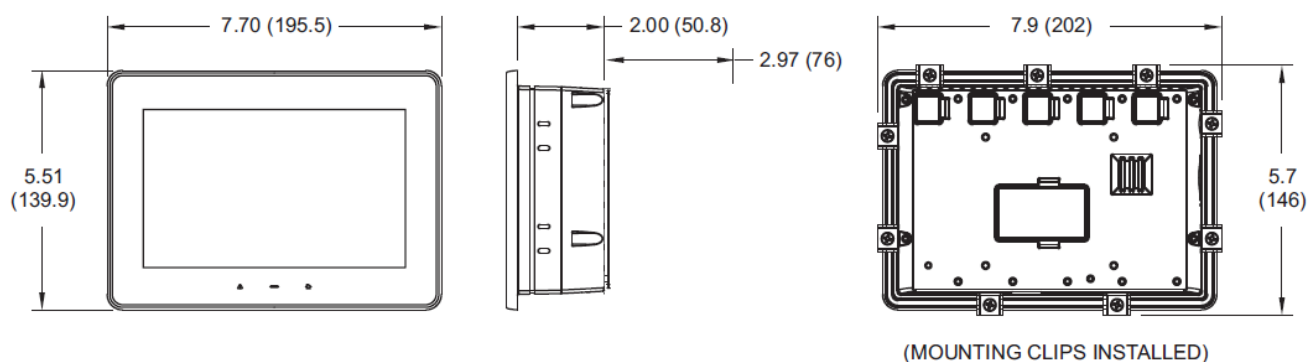


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Controller



Hardware:	Enhanced with modular controller integrating multi-zone PID control and data acquisition. SIMATIC programmable logic controller. Touch screen controller, PLC and other controller components are of a generic make with an OEM software. Capable of integrating with NI LabView.
Ethernet	Ethernet capability to remotely monitor and control the chamber.
USB	USB Type-A host port to connect a keyboard or mouse or download CSV data via pen drive [max 2GB] USB Type-B data port for connection to PC for software upgrade and access memory card storage
Digital Events	1 digital output for switching test specimen via potential free contacts, load max. 24 VDC, 5A
Web Server	Built-in web server allows remote view or control from any internet connected PC, tablet or smart phone
Power Resumption Modes	In case of a power failure, option of conditional restart based on temperature/time or continuous
Trend Graph	Real time trend graph for temperature set value, temperature process value, humidity set value and humidity process value. Options of zoom in/out, pan and individual plot selection
Delay Start	Real time clock based, delayed start function



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Electrical Specifications

Circuit Breakers	Motor protection circuit breakers shall be used to protect the motors of the compressor and the air circulation system from over current conditions. Miniature circuit breakers shall be used for the protection of control circuit and heaters.
Emergency Stop	A mushroom head emergency stop switch shall be provided on the side of the chamber for immediate shutdown of all chamber operations. An alarm shall popup on the controller to indicate this event
Single Phase/ Over/Under Voltage Protection Device	A single phase protection device shall be used to protect against single phase and phase reversal at input power supply. This device is set to protect the chamber at $\pm 10\%$ of the rated voltage. An alarm shall popup on the controller to indicate any of the above failures.
High Temperature Fuse	A high temperature safety fuse shall be provided which is a one time fusible link. This fuse cannot be reset and is a single use device. In a rare occurrence of overheating this device must be replaced. This fuse shall cut off at 214°C/ 417°F for safety of the chamber.
Heaters	Heaters shall be mounted in the conditioning space below the air circulation fan. Low static ni-cr wire heaters shall be used with stainless steel sheathing. There shall be no direct radiation onto the test space. The heater outputs shall be controlled either through solid state relays and thyristors for high ramp models
Door Limit Switch	A snap action switch shall be provided on top of the door to stop all chamber operations if the door is opened.
Product Safety Temperature Protection	Specimen temperature sensor is placed in the test space and connected to a temperature indicator. This indicator has independent adjustable temperature limits of tmin and tmax. Based on the limits of the unit under test, these independent temperature limits can be set and the sensor can be placed on or around the unit. An alarm shall popup on the main controller to indicate this event.
Power Supply	The power supply to the chamber shall be connected through the 5mtr cable crimped with terminal lugs which is provided with the chamber. The power supply shall be as per the equipment label by the side of the chamber. A control / isolation transformer shall be provided to the instrumentation circuit to protect and isolate the single phase. A regulated power supply shall also be provided for the low voltage devices through EMI filter. This combination of regulated power supply with EMI filter shall ensure protection against power surge and spikes.

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Humidity Specifications

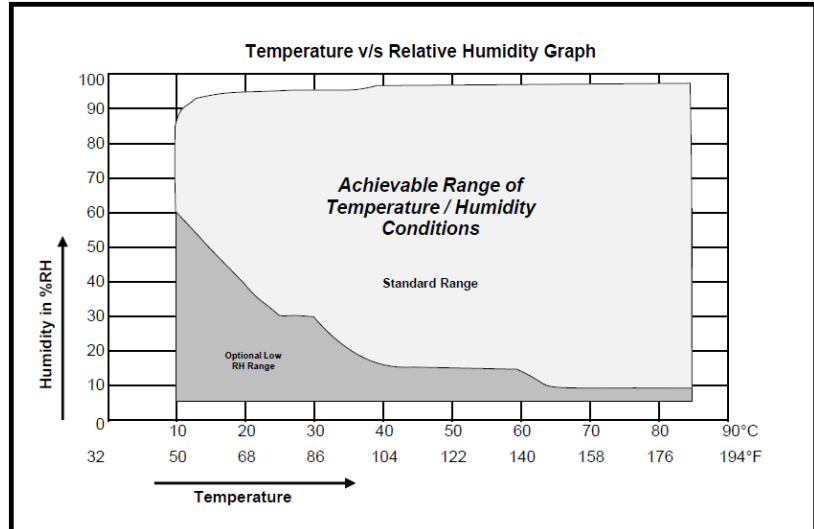
Performance Details

Climatic Range +10°C to +85°C
50°F to 185°F

Humidity range Standard Range: 10% to 95%
Optional Range: 5% to 95%

Humidity control ±3%RH

Display Resolution 1.0% RH



Humidification
[If Applicable]

An external low pressure humidity generator shall be used to increase the relative humidity levels inside the test space.
This humidity generator shall use a cartridge heaters suitable for recirculated water. The heater surface shall be mounted with a thermostat to cut-off the electrical supply in case the surface temperature reaches critical limit. The automatic level control shall ensure adequate reservoir of water in the generator and avoid dry runs. This unit will be provided with a water recirculation and filtration system.

Dehumidification

A refrigeration based de-humidification system shall be provided in the chamber. This system shall reduce the relative humidity levels in the test space by maintaining the dew point temperature of the dehumidification coil. The test space drain shall drain out the condensed moisture.
This dehumidification output shall be enabled in the controller during ramp up cycles. This feature shall be used after a low temperature cycle, to avoid condensation on the unit under test.

Capacitive Measurement
[If Applicable]

. For measurement of relative humidity, a capacitive type polymer sensor shall be used.
This sensor shall be used in place of the RTD wet bulb sensor. This sensor shall be maintenance free and shall not require the wick water to be maintained.

Water Quality Guidelines

Ph Level	Alkalinity H-CO3 content	Chloride	Sulphate	Nitrate	
7-9	60-300mg/l	Under 20 ppm	Under 100mg/l	Under 100mg/l	