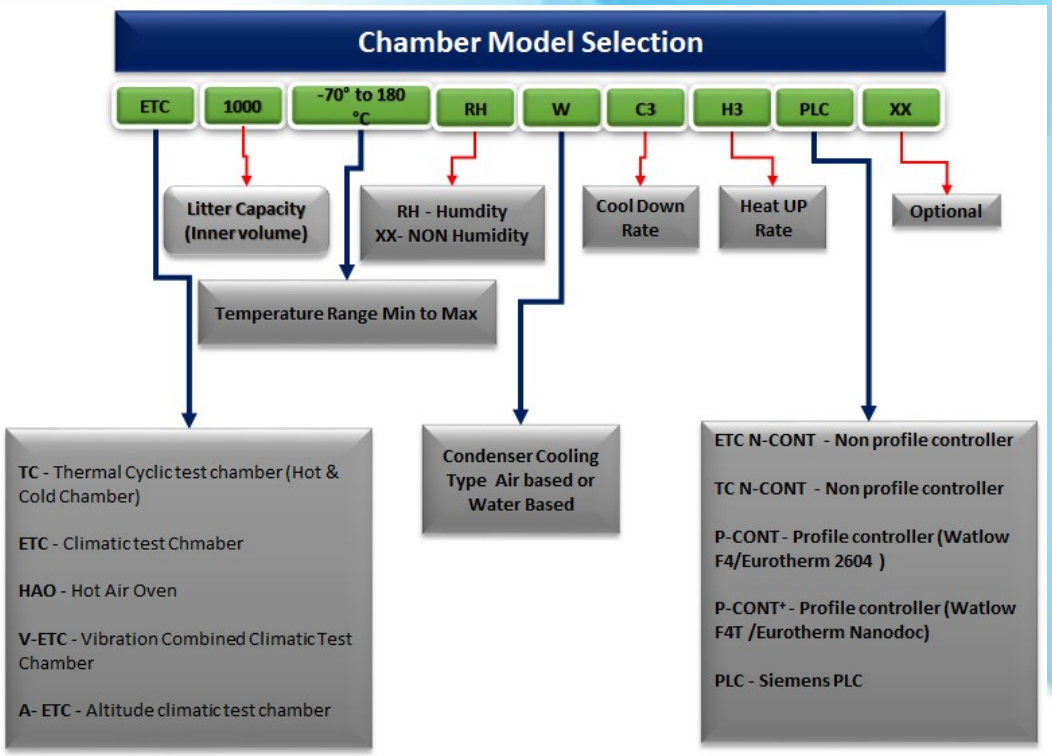
CLIMATIC TEST CHAMBER / THERMAL CYCLIC TEST CHAMBER

ETC - XXXX/XXX to XXX /XX/X/CX/HX/XXX/XX

Technical specification

Model Nomenclatures



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According to IEC 60068-3-5 and IEC 60068-3-6

a) ___ °C /min (empty chamber) as per IEC 60068-3-5. Averaged between chamber Maximum Range temp ___ °C to chamber minimum range temp _____°C with sensor in discharge of air of blower.

b) ___ °C /min (empty chamber) as per IEC 60068-3-5. Averaged between chamber Minimum Range temp ___ °C to chamber Maximum range temp _____°C with sensor in discharge of air of blower

Work Space	Inner size 50 Litter	Inner size 100 Litter	Inner size 180 Litter	Inner size 250 Litter	Inner size 340 Litter
Internal dimensions approx. (mm)	Inner size 50 Litter - 400mm W x 300mm D x 500mm H	Inner size 100 Litter - 500mm W x 400mm D x 600mm H	Inner size 180 Litter - 580 mm W x 450mm D x 750mm H	Inner size 250 Litters - 600mm W x 600mm D x 750mm H	Inner size 340 Litter - 580mm W x 765mm D x 750mm H
Temperature Range different model	UL -70 °C to 180 °C / ± 1 °C				
	UM Basic -50 °C to 180 °C / ± 1 °C				
	UN Basic -35 °C to 180 °C / ± 1 °C				
	L Basic -70 °C to 130 °C / ± 1 °C				
	M Basic -50 °C to 130 °C / ± 1 °C				
	N Basic -35 °C to 130 °C / ± 1 °C				
Humidity range (%) (τ=10/+85°C) [2]	: 20 to 98% /± 3% (PH Basic Model only RH 40 to 95%)				
Temperature range for climatic test (°C)	10.....85 deg c (PH Basic Model only temp 10 to 60 deg c)				
Deviation in temperature with respect to space	: ± 1 ° C to 2° C				
Display resolution	: 0.1 ° C for temperature / 0.1% for RH				
Temperature accuracy	: ± 1 ° C				
Temperature changing rate Cooling [4+5]	Based on customer request				
Temperature changing rate Heating [4+5]	Based on customer request				
Controller	: N-CONT = Non profile controller PPI make single set point only				
	: P-CONT = Profile controller Make Watlow or Eurotherm (20 profiles)				
	: PLC = Siemens PLC with 7" Weintek 7" HMI (In HMI 20 profiles/ In PC multiple profile)				
Optional Fan Motor Drive	Based on customer request				
Construction Features	: Interior SS 304 Sheet thickness – 1.2/ 1.5 mm Stainless Steel arc welded				
Exterior	: Exterior Sheet thickness 1.5 mm CRCA sheet with powder coated				
Tray	: 1 Number - Adjustable horizontal SS grill racks				
Side Cable Access port	75 mm Diameter - 1 no				
Chamber inspection lamp will be provided	20 w			60 w	
Insulation	: 125 mm thick Glass wool insulation				
Door	Full front opening door, double walled insulated and interior stainless steel				
	Optional -View glass window				
	100 mm x 200 mm Front Inspection glass window in door		300 mm x 400 mm Front Inspection glass window in door		
Gasket	: Silicon Double gasket, one on the chamber and one on the door.				
Hinges & Latches	: Heavy duty door hinges with toggle type locking arrangement.				
Mounting	Floor Mounting Type		Wheel mounting type.		
Power Supply	230 VAC +/- 5% + N+G, single Phase, 50 Hz, A.C.	415 VAC +/-5% + N+G, Three Phase, 50 Hz, A.C.			
Noise level	: 75 DB	: 82 DB			

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Work Space	Inner size 380 Litter	Inner size 550 Litter	Inner size 600 Litter	Inner size 800 Litter	Inner size 1000 Litter
Internal dimensions approx. (mm)	Inner size 380 Litter - 600 mm W x 800 mm D x 800 mm H	Inner size 550 Litter - 850mm W x 730mm D x 900mm H	Inner size 600 Litter - 800mm W x 800mm D x 950mm H	Inner size 800 Litter - 1100mm W x 800mm D x 950 mm H	Inner size 1000 Litter - 1000mm W x 1000mm D x 1000mm H
Temperature Range different model	UL -70 °C to 180 °C / ± 1 °C				
	UM Basic -50 °C to 180 °C / ± 1 °C				
	UN Basic -35°C to 180 °C / ± 1 °C				
	L Basic -70 °C to 130 °C / ± 1 °C				
	M Basic -50 °C to 130 °C / ± 1 °C				
	N Basic -35 °C to 130 °C / ± 1 °C				
Humidity range (%) (τ=10/+85°C) [2]	: 20 to 98% /± 3% (PH Basic Model only RH 40 to 95%)				
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Optional Fan Motor Drive	Based on customer request				
Construction Features	: Interior SS 304 Sheet thickness – 1.2/ 1.5 mm Stainless Steel arc welded				
Exterior	: Exterior Sheet thickness 1.5 mm CRCA sheet with powder coated				
Tray	: 1 Number - Adjustable horizontal SS grill racks				
Side Cable Access port	75 mm Diameter - 1 no				
Chamber inspection lamp will be provided	60 w		60 w x 2		
Insulation	: 125 mm thick Glass wool insulation				
Door	: Full front opening door, double walled insulated and interior stainless steel				
	Optional -View glass window				
	• 300 mm x 400 mm Front Inspection glass window in door				
Gasket	: Silicon Double gasket, one on the chamber and one on the door.				
Hinges & Latches	: Heavy duty door hinges with toggle type locking arrangement.				
Mounting	Wheel mounting type.				
Power Supply	415 VAC +/-5% + N+G, Three Phase, 50 Hz, A.C.				
Noise level	: 82 DB				

Note: XXX*+*

1	a) For Hot and cold test chamber (Model TC) Single loop control system – Temperature controller will be provided with PT 100 as temperature sensor for indication and control of Temperature direct display. b) For Climatic chamber (Model ETC) Dual loop control system Temperature / Humidity controller will be provided with PT 100 as temperature sensor for indication and control of Temperature/Humidity with direct display
2	τ= +5°C/+85°C for continuous test
3	measured at 1 m distance in front of the unit in 1,6 m height, free field measurement
4	According to IEC 60068-3-5 and IEC 60068-3-6 a) ___ °C /min (empty chamber) as per IEC 60068-3-5. Averaged between chamber Maximum Range temp ___ °C to chamber minimum range temp _____°C with sensor in discharge of air of blower. b) ___ °C /min (empty chamber) as per IEC 60068-3-5. Averaged between chamber Minimum Range temp ___ °C to chamber Maximum range temp _____°C with sensor in discharge of air of blower
5	The performance data refer to +22°C ambient temperature, 410V nominal voltage, without specimen
6	Ramp rate available Heating and cooling for 0.5 deg c / min to 20 deg c /min
7	Ramp rate available Heating and cooling with LN2 Injection for 0.5 deg c / min to 100 deg c /min

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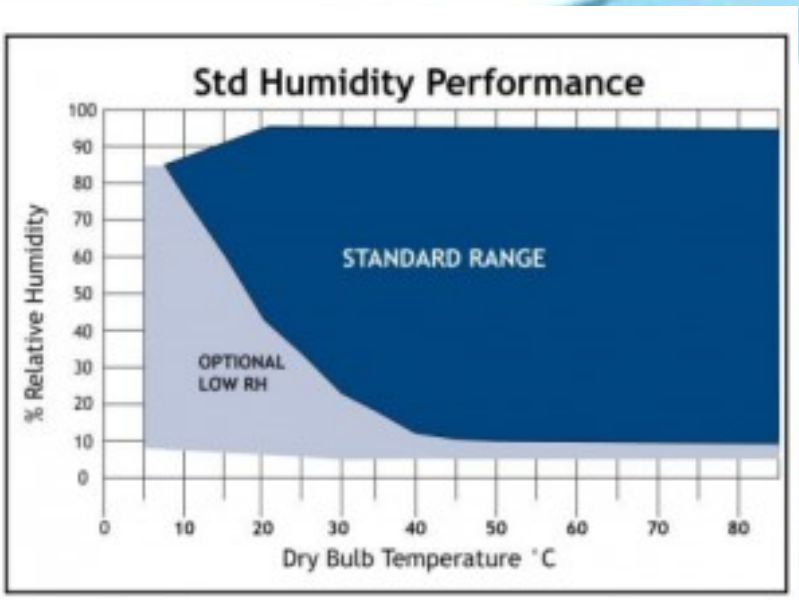


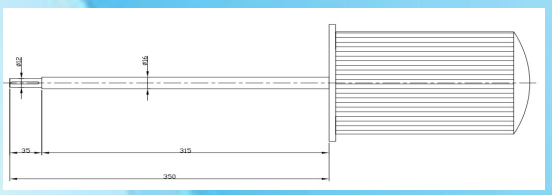
DESCRIPTION

• **Chamber Construction:** The chamber is with double walled insulated construction with argon arc welded thickness of the sheet 1.2/1-6 mm. SS 304 interior / outer sheet thickness 1.6 mm. with Powder coated. The chamber is of vertical trolley mounting configuration. Full front opening double walled insulated door is provided with silicone rubber gasket with hinges and toggle type locking arrangement.

• **Air Circulation:** Fan/blower will be provided with continuous duty rated motor for air circulation. Conditioning space will be provided in the main chamber, which is baffled, and the heaters and cooling coil etc. will be located in the conditioning space. Conditioned air will be admitted in the main chamber to maintain uniform temperature in the chamber workspace and Air circulation Internal Fan with synchronized door lock system.

H – Class winding 71F-B5 flange mounted

C R Motors Pvt. Ltd.
ISO 9001 : 2008 Certified Company



• **Heating system:** Low surface loading sealed tube heaters will be provided to add heat in the chamber to maintain uniform temperature. The heat input will be controlled by solid-state relays through microprocessor programmer. The heaters will be located in the conditioning space and there will not be any direct radiation of heat on the item under test.

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• **Humidity system:** Low-pressure moisture generator will be provided to generate moisture and add humidity in the chamber for uniform humidity conditions. The humidity system will be provided with moisture generator with water level controller. You will provide DM water 50 liters Overhead tank or online water connection with 2 bar pressure and connect the same to the chamber. It is recommended to use soft water for the moisture generator.

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• **Refrigeration System Based on model selected:**

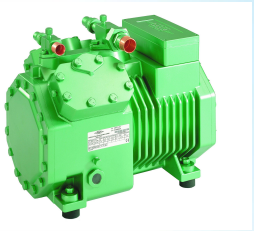
Single stages **Air or water** cooled refrigeration system will be provided with Hermetic - Embarco / Danfoss, semi Hermetic - Bitzer / Dorin/Emerson make compressor working on environmental friendly refrigerant R404A. The refrigeration system will be provided with HP/LP cut off switch, air inlet condenser / Temperature Protector, back up fuse protection, expansion valve etc. and the system will be designed for continuous and trouble free operation.

Double stages cascade **Air or water** cooled refrigeration system will be provided with Hermetic - Embarco / Danfoss, semi Hermetic - Bitzer / Dorin/Emerson make compressor working on environmental friendly refrigerant R404A/R23. The refrigeration system will be provided with HP/LP cut off switch, air inlet condenser / Temperature Protector, back up fuse protection, expansion valve etc. and the system will be designed for continuous and trouble free operation.

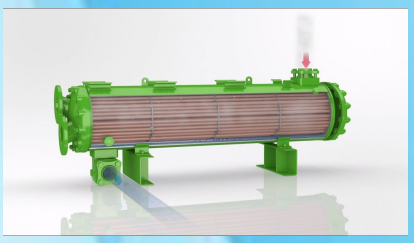
Hermetic Embarco / Danfoss




Semi Hermetic - Bitzer / Dorin / Emerson



• **Condenser: Air or Water** cooled condenser (water cooled system required chiller customer scope & Air cooled system Room Temperature need maintain below 30 Deg c)

• **Optional Instrumentation:**

a) For Hot and cold test chamber (Model TC) Single loop control system – Temperature controller will be provided with PT 100 as temperature sensor for indication and control of Temperature direct display.

TC Series Model = Temperature SV/PV

b) For Climatic chamber (Model ETC) Dual loop control system Temperature / Humidity controller will be provided with PT 100 as temperature sensor (wet /dry blub) for indication and control of Temperature/Humidity with direct display.

ETC Series Model = Temperature SV/PV, Humidity SV/PV

c) **Optional** PC software – Unlimited Profile through PC software

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Option 1 - Non profile controller (Suitable for ETC, Non profile Control Series)

HumiTherm-cS Advanced Temperature + Humidity

Highlights

- Universal Inputs (RTD/mA/V for Temperature & %RH) with Selection for Dry/Wet Configuration
- Independent Self Tune PID or On-Off Control Loops for Temperature & %RH
- Compressor Control Output with Time Delay
- Programmable Alarms & Retransmission Outputs for Temperature & %RH

Features

- 24V or 12V or 5V DC Excitation Voltage for Transmitters
- Relay or SSR Drive Outputs for Heating, Humidification & Compressor Control
- Relay Output for Alarm
- DC Volts / Current Retransmission Outputs
- Standby Mode for Use as Indicator with Alarms
- Optional RS485 MODBUS/RTU Serial Communication Port
- Universal Supply Voltage : 85~264 VAC, 50/60 Hz
- DIN Standard Dimensions (mm) : 96(H) X 96(W) X 100(D)

Non profile controller (Suitable for TC, Non profile Control Series)

3216 PID Temperature Controller

Specifications:

Input Type	**TC, RTD, mV, mA, CT**
PV Accuracy	**<0.25%**
IP Rating	**IP65, NEMA12**
Display Type	**Main: 4 digits Lower: 5 character starburst (3216/08/04) 9 character starburst (32h8)**
Control Types	**On/Off. PID, VP**
Alarm Types	**Hi, Lo, Dev, Sensor break, Event, Heater fail**
Supply Voltage	**24V dc/ac 85-264V ac**
SP Programmer	**4 Ramp + 4 Dwell**
Real Time Clock	**none**

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Option 2 - Profile controller (Suitable for ETC & TC profile Control Series)

P-CONT Series

	**Eurotherm Make Model 2604** Advanced Process Controller / Programmer. The 2604 is a 1/4 DIN plug-in high stability temperature and process controller designed to be used in demanding applications. It has a dual five digit display and a two line LCD panel for alarm, status and user defined messages. Description ✓ High stability, precision and functionality ✓ One, two or three control loops ✓ PID, valve, ratio, cascade and override control ✓ Set point programming ✓ High speed ModBus®, DeviceNet™ and Profibus® communications ✓ Test chambers, autoclaves, kilns, furnaces, fore hearths ✓ Melt Pressure, Carbon Potential
	**Watlow F4** - The SERIES F4 ¼ DIN industrial ramping temperature controller meets the requirements of the most demanding ramp soak controller processing applications. Easy to set up and operate, the ramp soak controller's programming features and proven performance capabilities are ideally suited for environmental chamber or furnace and oven applications. Single and dual channel versions are available. Competitively-priced, the SERIES F4 ramping temperature controller features a four line, high-definition LCD interface display for quick and easy profile programming and controller configuration. Its 16-bit microprocessor ensures accuracy and delivers performance advantages you can count on from a Watlow controller **Features** • Guided 100 step, 20 profile ramp and soak programmable memory supports a wide range of processing applications • High-definition, four line LCD controller interface display simplifies setup and operation • Menu customization for enhanced process monitoring • High-performance, 16-bit microprocessor provides precise process control • Application versatility with universal inputs

P-CONT + Series

	**Eurotherm Make** Nanodac - Chart Recorder The nanodacTM recorder/controller offers the ultimate in graphical recording combined with PID control for a box of its size. This secure data recording device with accurate control is enhanced by a full colour, VGA display to bring a crystal clear operator interface to even the smallest of machines. The 3.5" TFT display offers incredibly clear visualization of process parameters with a wide selection of configurable views to best suit the application. The views include: Horizontal and vertical trends, Horizontal and vertical bar graphs, Numeric, Alarm panel, Alarm status, and control loops. The unit also provides user wiring from the front of the product for detailed configuration without the need to connect to a PC.
	**Watlow F4T** with INTUITION® The F4T with INTUITION® temperature process controller offers a wide range of field removable I/O modules for maximum design flexibility. Configurations can be custom tailored to meet the scaling needs of a tremendous range of equipment and applications while providing exactly the hardware types required for compatibility. The F4T controller also features a 4.3 inch, color, graphical touch panel. Combining power, flexibility and functionality, this new controller offers unmatched versatility, and its best-in-class ease of use could very well make user manuals a thing of the past.

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Option 3 - PLC with HMI control system

- ✓ **PID**

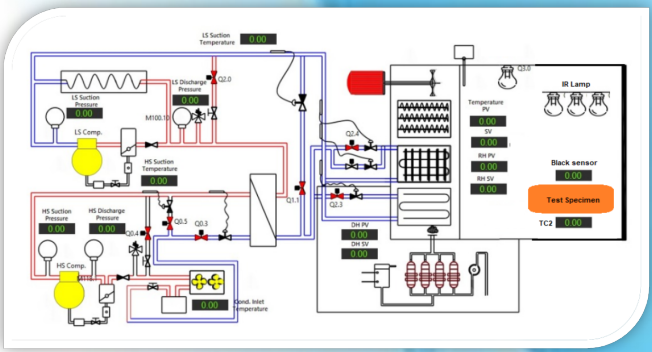
Temperature PID parameters will take care of our control system Siemens S7-1200 CPU 1415C based PLC. Each of these PID's shall be set by using the auto tune feature or manually entered values. Based on a Price Selection Few models of chamber we have providing without HMI, only with all in one Desktop PC (HP/DELL) + SESS climatic Viewer PC software

- ✓ **Power Resumption**

Various power resumption modes shall be provided in case of a power failure. The break mode shall stop the program on resumption of power. The hot mode shall resume the program from the point of break and complete the program. The cold mode shall restart the program from the point of break and ensure the program has run without any break

- ✓ **Process Mimic**

A graphical representation of the working of the chamber Refrigeration Components shall be provided in the form of a process mimic screen. The live status of all major components are displayed. The components include heaters, valves, motors etc.

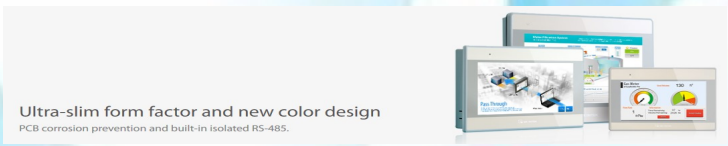


- ✓ **Ethernet**

A 10 Base T/100 Base-TX Ethernet connection shall be able to connect to an unlimited number of devices via ten protocols simultaneously. The Ethernet port is accessible through the controller by using a RJ45 port. The IP settings can be set in dynamic or static modes for access through LAN/WAN or the internet.

- ✓ **Touch Screen**

The chamber shall be operated using a 7-inch TFT active matrix resistive analog touch screen. The screen shall have a 256 color, with a screen resolution of 320 x 240 pixel. The screen is mounted on the operating panel of the chamber.



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- ✓ **Programs**

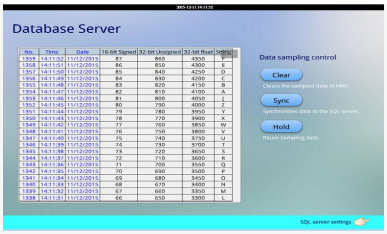
The chamber shall have a program mode in the controller which shall have 20 independent programs and through PC software unlimited programs. These programs can be stored with a name and number. Each of these programs shall have 50 segments where different modes such as Ramp Up/Down, dwell, dry cycle, high humidity cycle, and air inlet can be set through Event output.

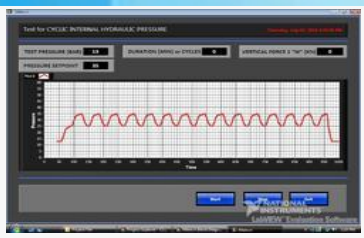
- ✓ **Diagnostics**

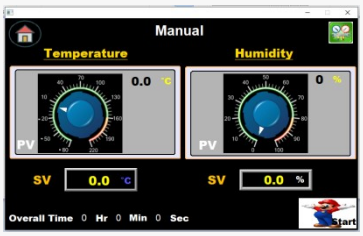
An event viewer shall display a log of all errors and actions with a date and time stamp. These events are also logged in a csv file which can be accessed using the USB or Ethernet ports available in the controller. The PLC's digital inputs and outputs statuses shall be indicated to analyses the working of all the electrical components in the chamber. A csv file of every test program shall be created and stored in the internal memory of the controller. The values that are logged, temperature, humidity, will be recorded.

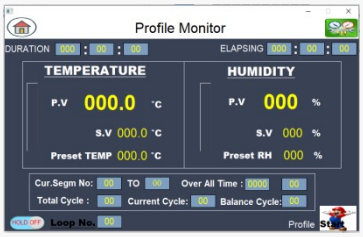
- ✓ **HMI Trend Graph**

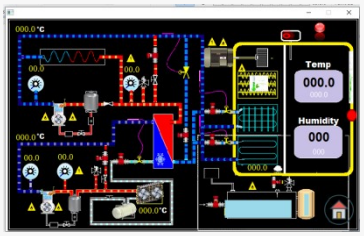
A real time trend shall be provided to view the test program in a graphical view. The parameters that shall be provided are include test space temperature process value, test space temperature set value, saturator temperature process value, saturator temperature set value humidity process value, humidity set value .







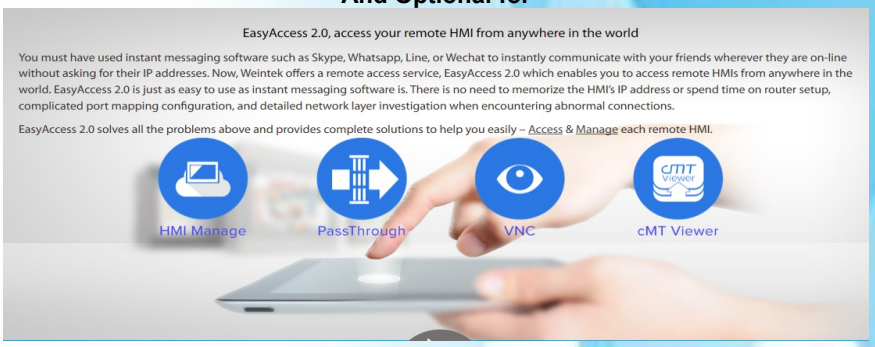




- ✓ **Remote viewer**

A built-in web server shall be provided which allows remote view or control from any LAN, WAN or internet connected PC, tablet or smart phone. Any standard web browser shall allow access to the controller screens using the pre-configured IP address. The screens on the web browser and the touch screen shall be duplicated to offer the same user interface / experience on PC or touchscreen.

And Optional for



- ✓ **Memory**

Flash Memory 128MB and Ram memory 128MB capacity. The memory shall store test program data and diagnostic data in csv format. This memory shall be accessed using the USB and Ethernet ports.

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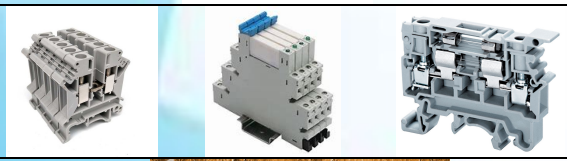
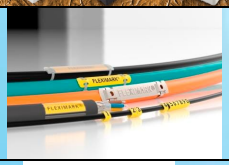
✓ **Control Panel & Wiring**

Separate control panel attached to the main chamber will be provided which will house the programmer, on/off switches, fuses, contactors, indicating lamps etc. Channel type wiring will be done with suitable current rated copper wires with marking ferrules, crimped dowel terminals, elmex connectors etc.

Major Components below

ABB contactors / MCB / Motor Protection Circuit Breaker (MPCB) ABB	
OMRON SMPS	
connectwell THE RIGHT CONNECTION Connectors / 3-5Amps Relay base / fuse Holders	
ERI® SSR - Solid State Relays	
LAPP INDIA Wires & cables	
MAX	

✓ **• Safety protection:**

1. Back up fuse protection for mains and individual circuit.
2. Over temperature safety cut off thermostat with audiovisual alarm.
3. Overload protector for motor.
4. MCB for heaters.
5. Water level controller for level in boiler.

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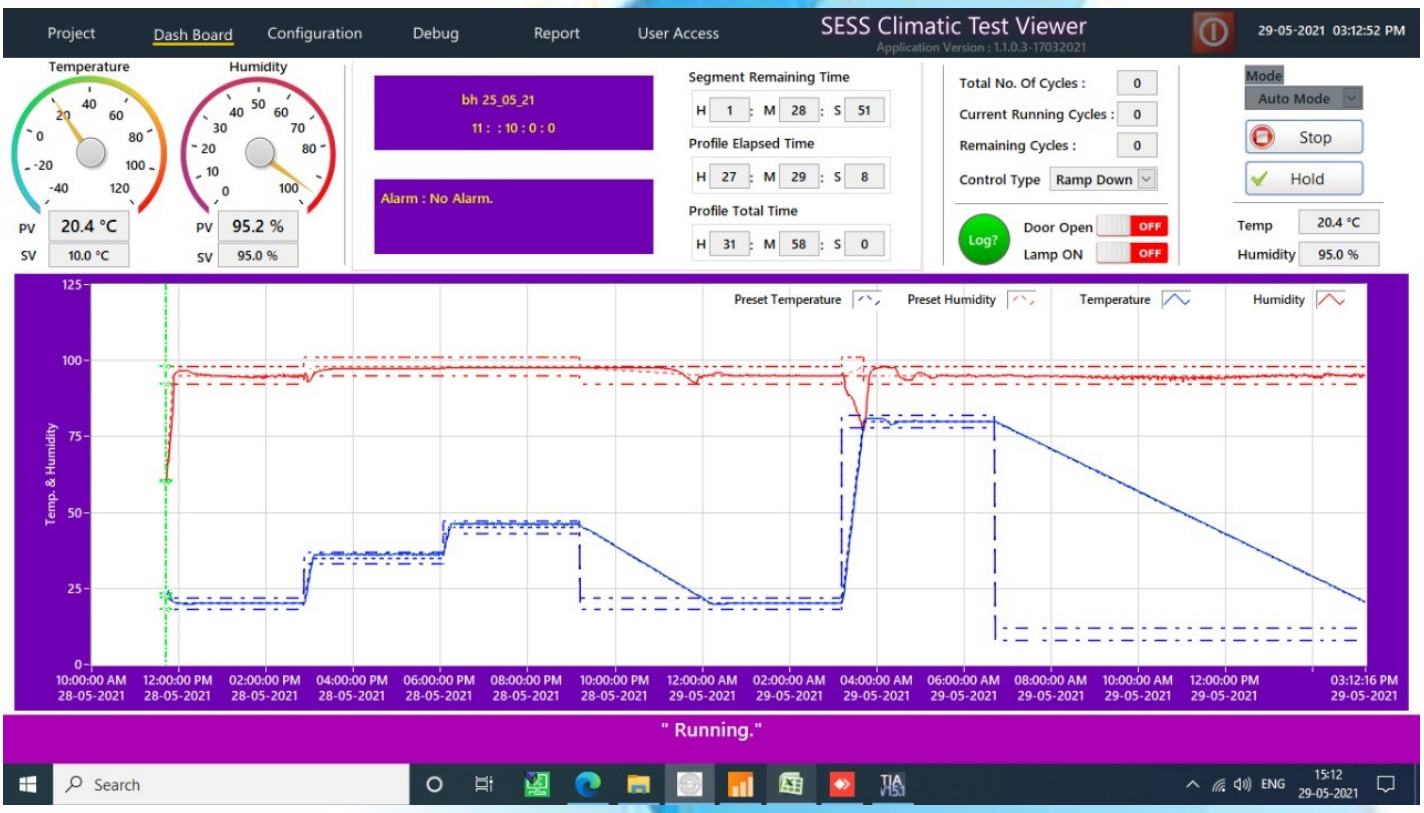
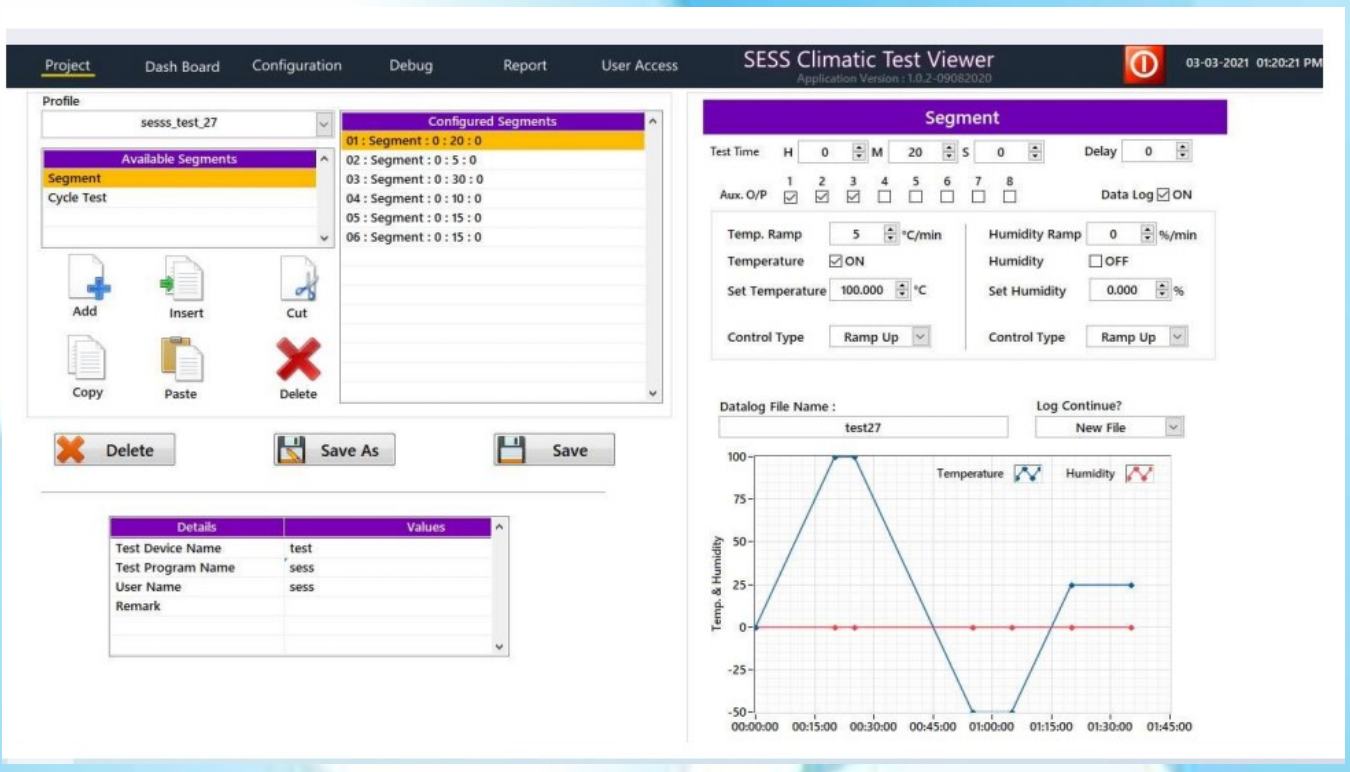
Optional for PC software

Main screen



Profile edit with graphical trend



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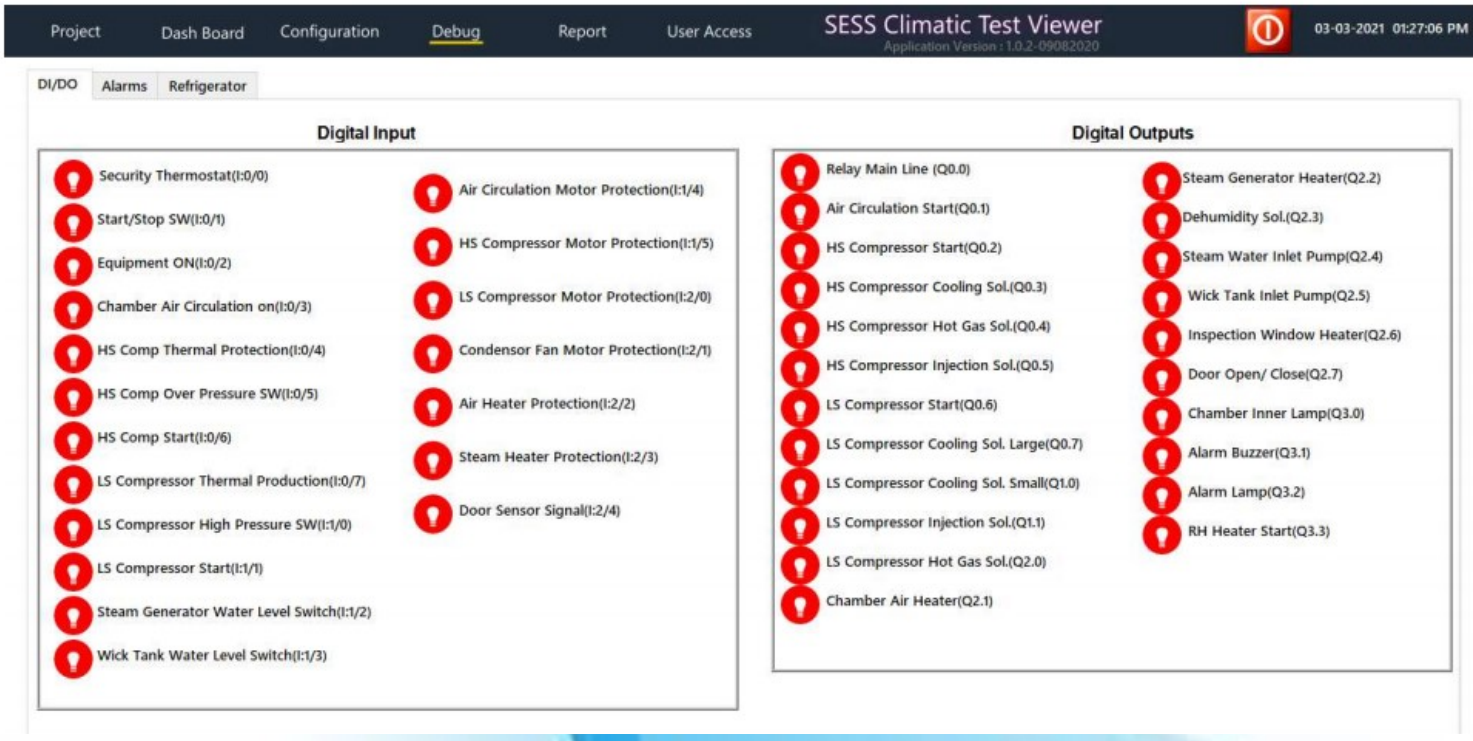
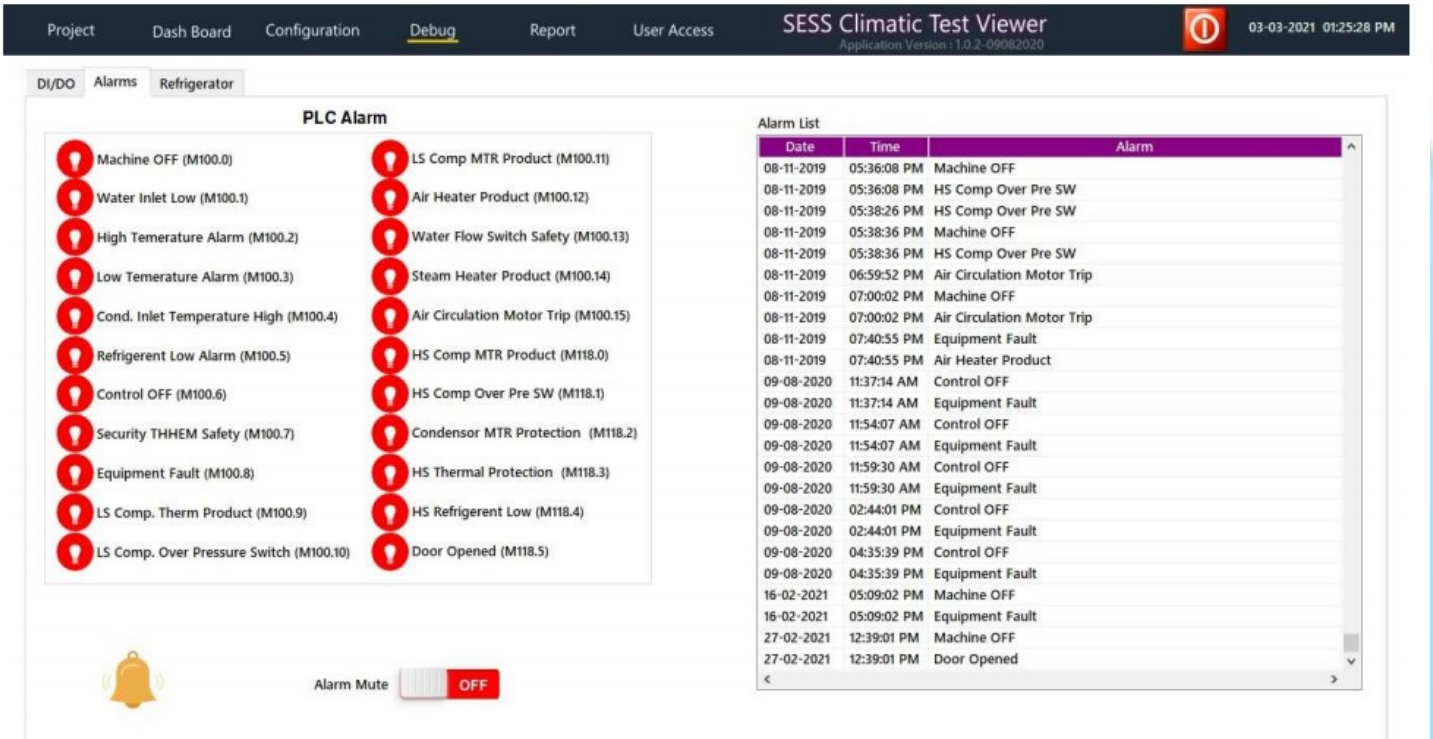
PLC - IO's status window



Alarm log screen



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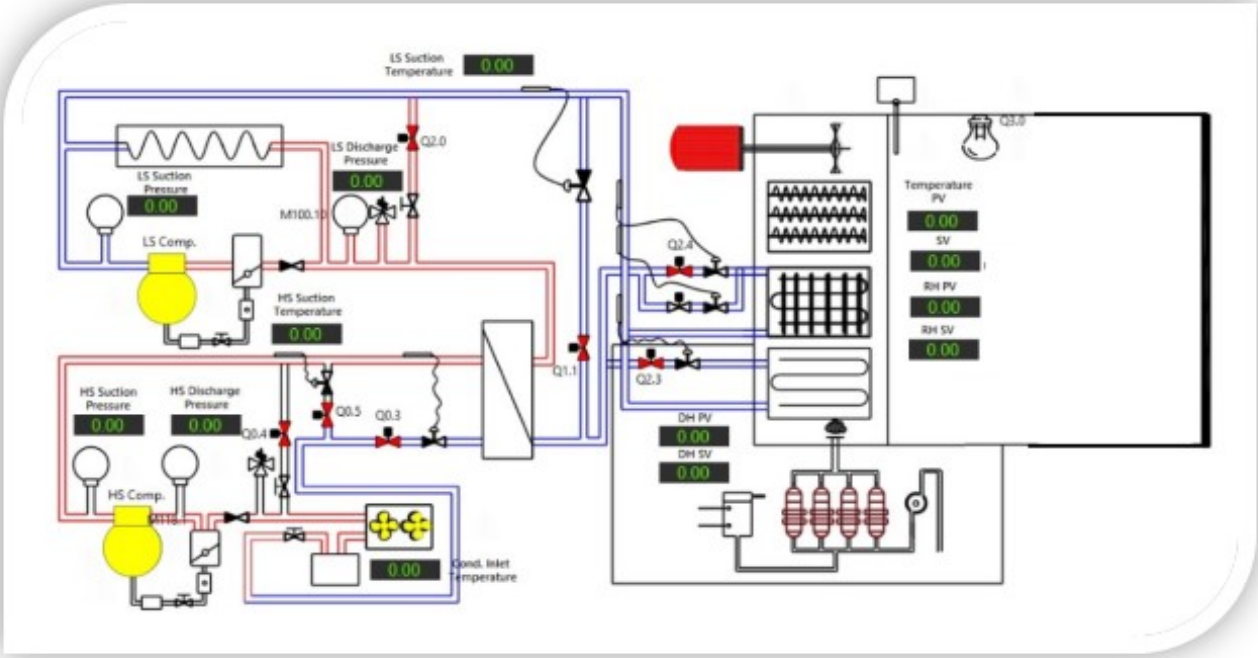
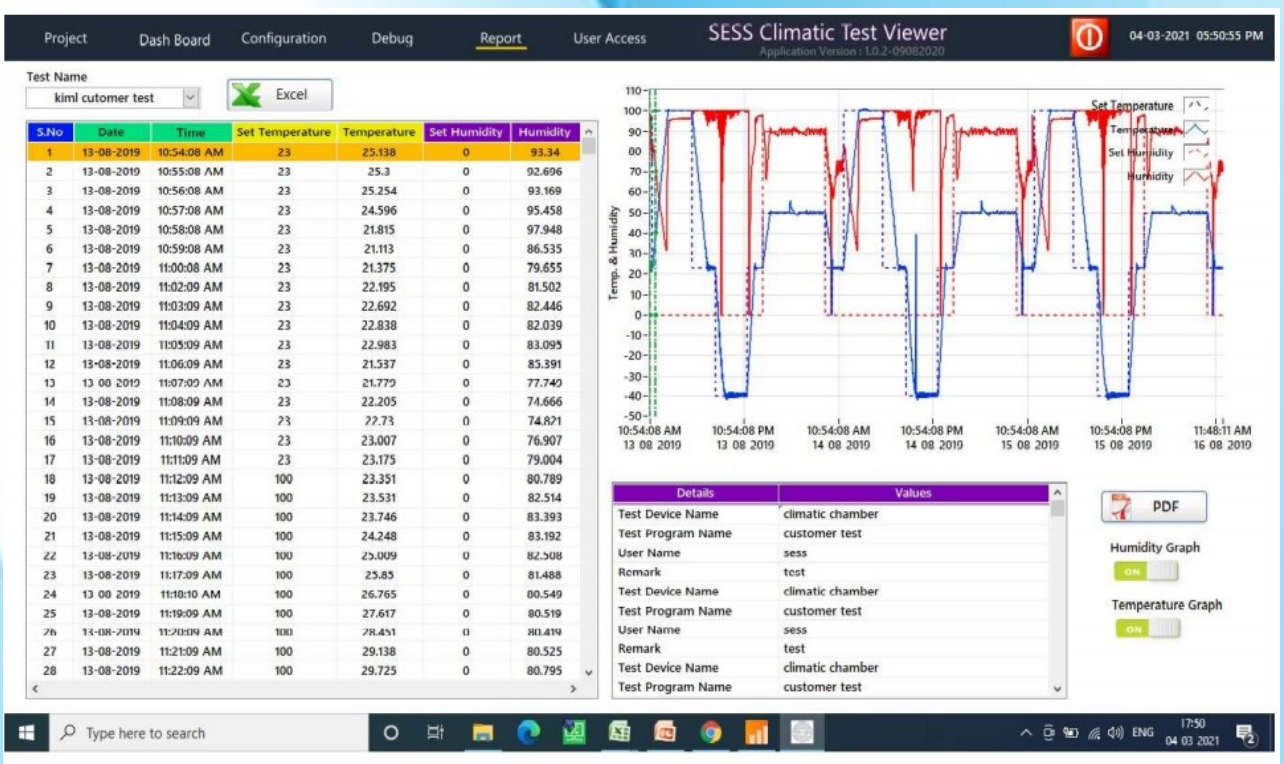
Mimic View
Refrigeration master component operation status



Completed Test report's viewing window



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