HUMIDITY AND TEMPERATURE GENERATOR

MODEL: HCAL 1104U v3.3

INSTRUCTION MANUAL

CAUTION

SAFETY PRECAUTIONS

1. HCAL 1104U must be generate 5 to 95 % RH, 5 to 60°C

2. Allow sufficient air circulation by leaving at least 12 inches(30cm) of clearance around the HCAL 1104U.

3. Overhead clearance is required. Do not place the HCAL 1104U under a cabinet or other structure. Always leave enough clearance to allows for safe and easy working environment.

4. Wear goggles, gloves & safety shoes, when handling HCAL 1104U during placing test equipments inside test chamber.

5. Do not overfill the water in humidifier, after “High” level indication appears.

6. Do not modify cabinet construction or associated equipment assemblies.

7. Do not remove labelling or information supplied with the unit.

8. Do Not Remove any side cover. Contact a qualified service representative.

9. In the event of a water leak, disconnect power and repair leak.

10. Never operate HCAL 1104U with Front door open, water damage could occur.

11. Do not add disinfectants or anticorrosive chemicals to the supply water as these are potential irritants. The use of un-treated well water, industrial water and or water from cooling circuits and in general any potentially chemically or bacteriologically contaminated water is prohibited. Use DM water only.

12. Calibration points must be increasing in steps of 10%RH / 5°C.(Ex. 20%, 30%, ...95%. / 10°C, 15°C,.....60°C).

1. SAFETY INSTRUCTIONS

Use the HCAL 1104U only as specified in this manual. Otherwise, the protection provided by the HCAL 1104U may be impaired.

The following definitions apply to the terms “Warning” and “Caution”.

“Warning” identifies conditions and actions that may pose hazards to the user.
“Caution” identifies conditions and actions that may damage the HCAL 1104U being used.

Warnings

To avoid personal injury, follow these guidelines.

DO NOT use the HCAL 1104U for any application other than calibration work. The HCAL 1104U was designed for Humidity calibration. Any other use of the unit may cause unknown hazards to the user.

DO NOT use the unit in environments other than those listed in the Instruction Manual.

Follow all safety guidelines listed in the Instruction Manual.

HCAL 1104U should only be used by Trained Personnel.

DO NOT operate high temperature baths near HCAL 1104U. Extreme temperatures could ignite the flammable material.

Always leave enough clearance to allow for safe and easy insertion and removal of probes.

The HCAL 1104U is intended for indoor use only.

Cautions

To avoid possible damage to the HCAL 1104U, follow these guidelines.

DO NOT change the Factory setting values of the MAIN CONTROL UNIT. The correct setting of these parameters is important to the safety and proper operation of the HCAL 1104U.

Always operate this instrument at room temperature between 73.4°F and 80.6°F (23°C to 27°C). Allow sufficient air circulation by leaving at least 12 inches (30 cm) of clearance around the HCAL 1104U.

The HCAL 1104U is a precision instrument. Although it has been designed for optimum durability and trouble free operation, it must be handled with care.

2. SPECIFICATIONS

MODEL	HCAL 1104U
Display	7" multi colour TFT touch screen display
Control Range*	5 to 60°C / 3 to 95* % RH
Dew point Temperature range (psychometric calculated)	-30°C to 45°C
Psychometric calculated indication	Dew / Frost point (Dp / Fp) Wet Bulb Temperature (Tw) Vapour partial pressure (E) Vapour Saturation pressure (Ew) Mixing ratio by weight (dry) (g / kg) Enthalpy (H) (KJ / kg) Specific Humidity (moisture) (g / kg) Absolute Humidity (moisture) (g / m^3) Volume mixing ratio (dry) (ppm)
Calculation method	WMO method
Resolution	0.01 % RH / 0.01 °C
Display stability	± 0.2 % RH / ± 0.05 °C @ 25°C
Chamber stability @25°C **	Temperature: ± 0.1°C & Humidity: ± 0.3 % RH
Chamber Uniformity @25°C **	Temperature: ± 0.2°C & Humidity: ± 0.5 % RH
Test sensor Insert Port	Inter changeable Acrylic door is provided on front side of the chamber with pg21 gland (cable or sensor size range from 13 to 18mm) x 3nos
External Humidifier Water tank capacity	6 liters (approx.) (NOTE : 3 liter filling is enough for our application)
Humidifier Liquid	Distilled water
Humidifying Time	2 %RH / sec (50 to 90 % RH)
Dehumidifying Time	6 %RH / sec (50 to 10 % RH)
Power Supply	230V AC ± 10% / 50Hz (Optional 110V AC)
Power Consumption	1000 watts (Approx.)
Construction	Inner chamber SS310 / outer MS Powder Coated
Test chamber area	230mm DIA x 170mm D(Approx)
Over all Dimension (with bottom leg)	436mm L x 676mm W x 368mm H(Approx)
Weight	44 kg (without Accessories) + 6 kg (standard accessories) (Approx.)

Note:

* 1. Temperature range applicable @ ambient Temperature of 25°C.

2. Refer the Humidity range chart on page no: 13. It may vary depends on ambient Temperature and water Temperature of the external Humidifier.

** Stability & Uniformity are evaluated @ ambient Temperature of 25°C.

Due to continuous product improvements, Published specifications may change with out notice

Standard Delivery & Accessories

1. Basic Instrument
2. External Humidifier system
3. Desiccant cells – 2nos
4. Molecular sieve desiccant – 2kg
5. Inter changeable Acrylic door (clear)
6. Spare Fuses
7. Instruction Manual
8. Traceable Calibration Certificate
9. Mains Card

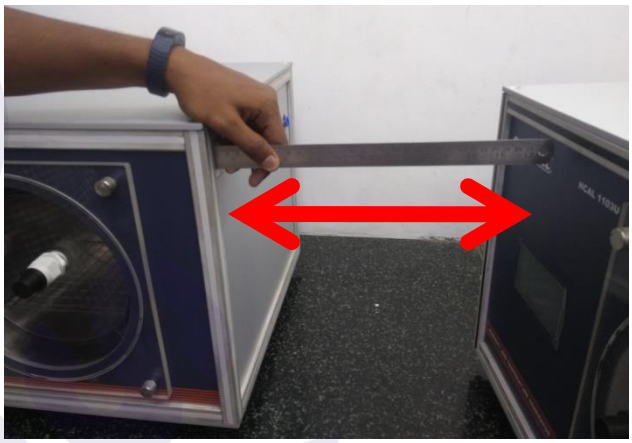
Optional

1. Master Hygrometer with sensor
2. Additional Molecular sieve Desiccant
3. Additional Interchangeable Acrylic door (custom special holes)
4. Carrying case
5. PC Interface software

3. INSTALLATION

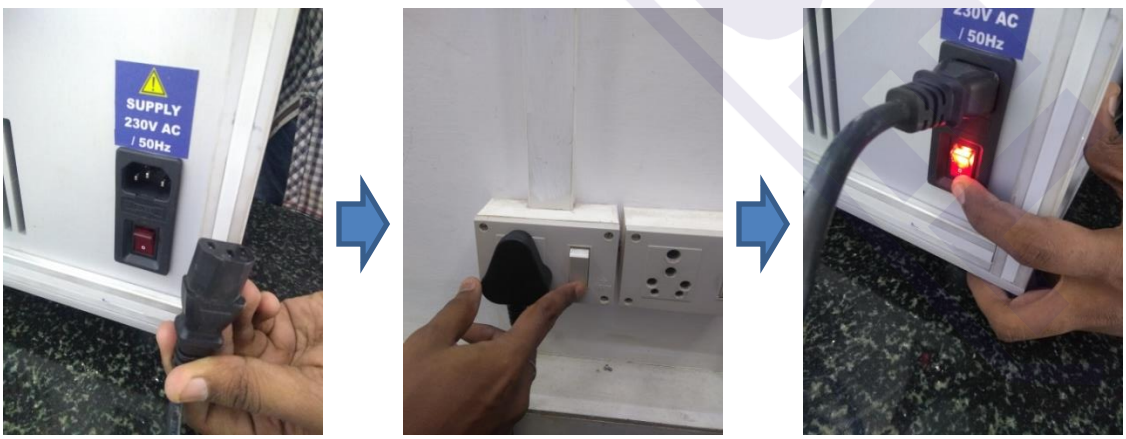
3.1. Install

Allow sufficient air circulation by leaving at least 12 inches (30 cm) of clearance around the HCAL 1104U.



3.2. Electrical

For electrical requirements see data information located near power card. Check the proposed external power supply to be used to ensure that the voltage, phase and current carrying capacity of the circuit from the electrical panel correspond to the requirements of the cabinet. NEVER use an extension cord to wire any unit. Refer to the serial tag for all pertinent electrical information.



3.3. Water in the Chamber

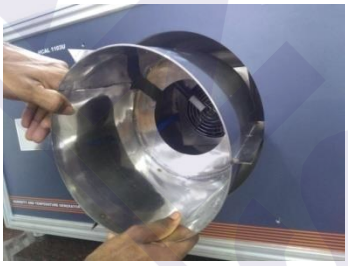
Before using the HCAL 1104U, check that there is no visible water inside the chamber. If the last condition run by the HCAL 1104U was at high humidity and the unit was not correctly shut down, condensation may have formed. Remove excess water using absorbent tissue paper and initially run the HCAL 1104U at an elevated temperature (40 °C) and low RH set-point to dry the system before calibrations are performed.

STEP – 1 : Switch OFF the HCAL 1104U

STEP – 2 : Open all 4 knobs

STEP – 3 : Remove the Acrylic door

STEP – 4 : Remove the Inner grill plate



STEP – 5 : Remove the Inner Chamber

STEP – 6 : Clean chamber surface thoroughly using tissue paper

STEP – 7 : Clean inner chamber thoroughly using tissue paper

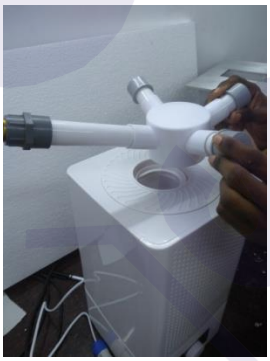
STEP – 8 : Replace the inner chamber & grill plate

STEP – 9 : Replace the Front acrylic door and close using 4 knobs

3.4. Humidifier Water filling

Always use distilled water to fill according to the following steps.

Important: Do not add disinfectants or anticorrosive chemicals to the supply water as these are potential irritants. The use of un-treated well water, industrial water and or water from cooling circuits and in general any potentially chemically or bacteriologically contaminated water is prohibited.



STEP – 1 : Remove the top of external Humidifier Outlet port

STEP - 2 : Carefully lift the Humidifier tank.

STEP - 3 : Place the Tank upside down and open the cover by rotating it anticlockwise.

STEP - 4 : Fill 1 liter of distilled water and close the cover by rotating clock wise. Then carefully reassemble the tank to Humidifier setup.

3.5. Humidifier preparation and installation

STEP – 1 : Place the humidifier near the HCAL 1103U and fix the Humidifier outlet on top.

STEP – 2 : Connect the given hose one end to Humidifier outlet port and another end to given Humidifier inlet port on right side of HCAL 1103U.

STEP – 3 : Connect the given humidifier power connector to HCAL 1104U & switch ON the Humidifier Power by rotation the knob clock wise & set the knob position to maximum as per above image.

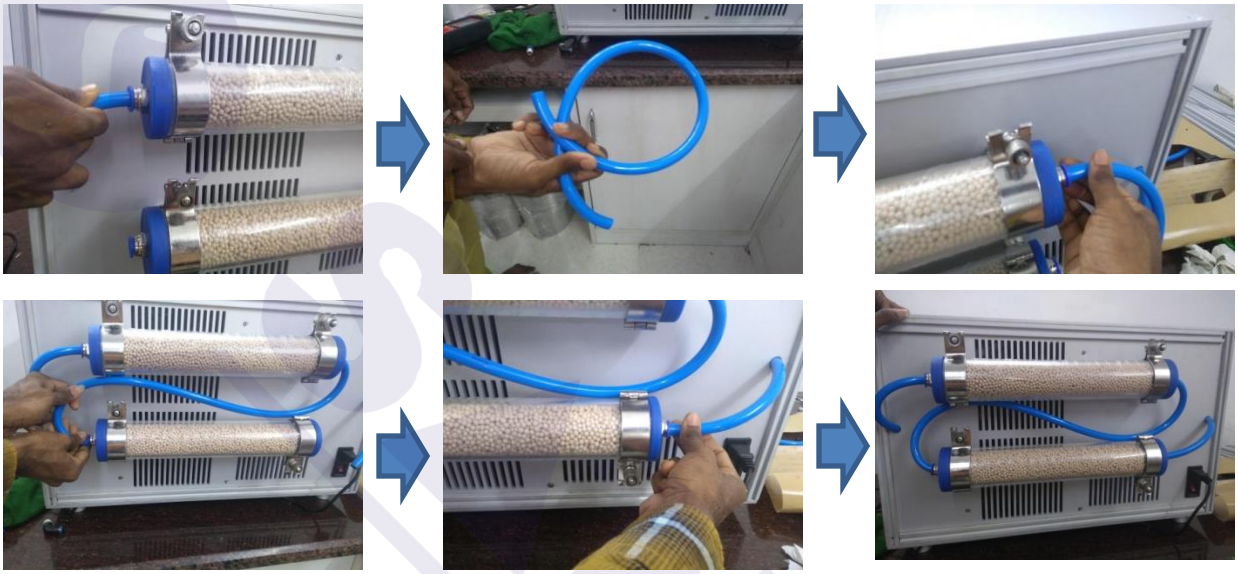
3.6. De Humidifier Preparation and Installation

STEP – 1 : Take the two set Dehumidifier tubes with filter and place the filter on one end of tube and close it by cover.

STEP – 2 : Fill the fresh molecular sieves and gently tight in clock wise.

STEP – 3 : Fill another desiccant tube as per above procedure.

STEP – 4 : Fix both the Desiccant on rear side of clamps and tight it.



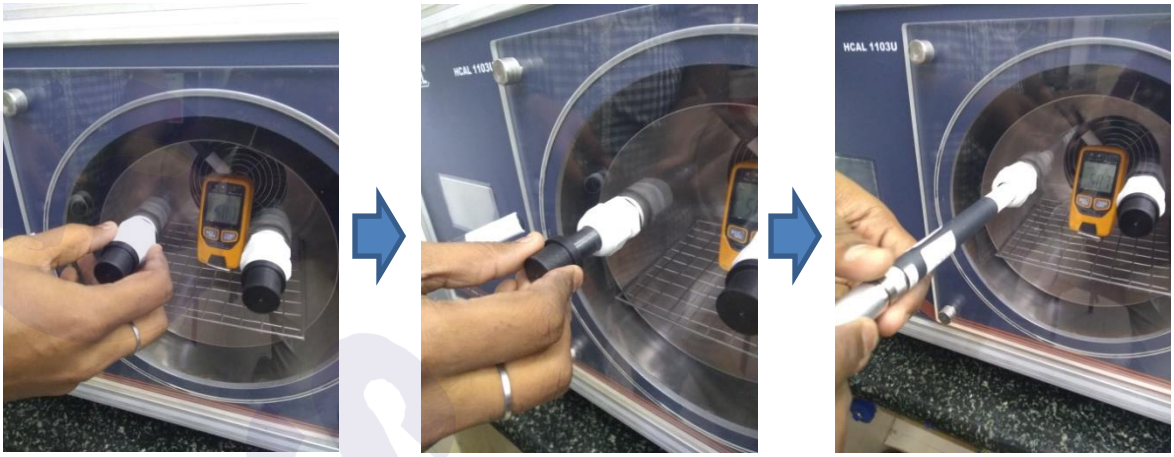
STEP – 5 : Push to connect the hose as per the above connection on rear side of the HCAL 1104U.

3.7. Instrument Calibration

Portable Humidity Indicators are keep inside on grill plate of the chamber and close the door tightly. Now the HCAL 1104U is ready for Calibration.

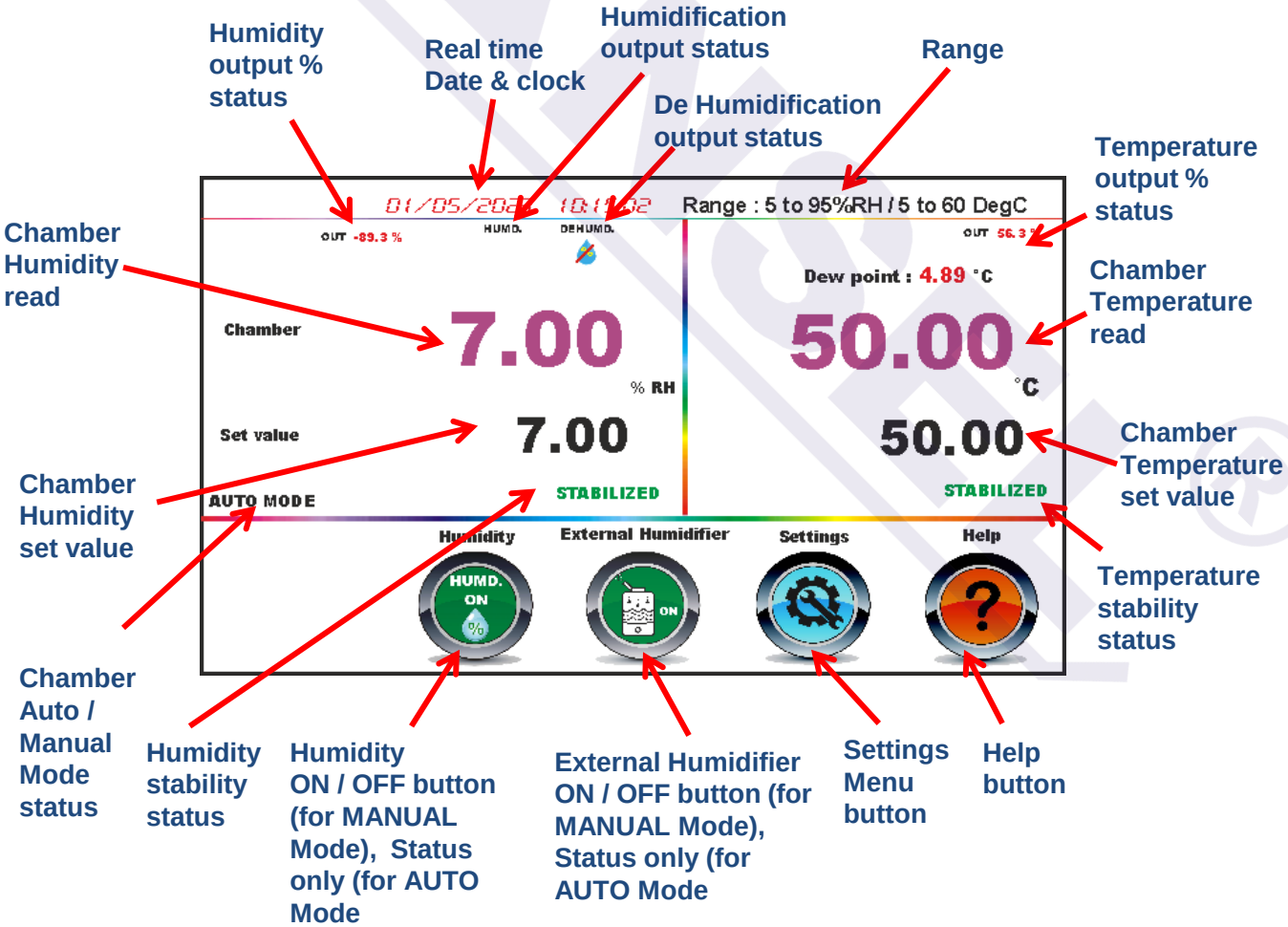
3.8. Sensor Calibration

Insertion port is on right side of the HCAL 1104U.
Put the test sensor to the chamber and air tight with the gland.



4. TFT DISPLAY DESCRIPTION

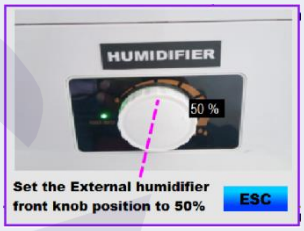
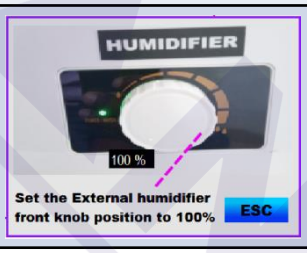
4.1. Parts Description



4.2. Humidity & Temperature Set value setting

4.2.1. External Humidifier Control Band

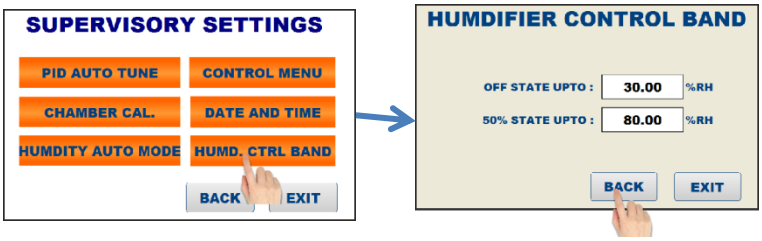
This advanced feature is used to intimate user with the help of popup screen every time during setting humidity setvalue for fixing the knob position of external humidifier based on setvalue as following table.

Humidity Setvalue	Popup window	Humidifier knob position
From 0 to 30%RH		Switch OFF the knob
From 30.1 to 80%RH		Switch ON & set knob to 50% position
From 80.1 to 100%RH		Switch ON & set knob to 100% position

The External humidifier control band was user selectable to change factory default follow below steps

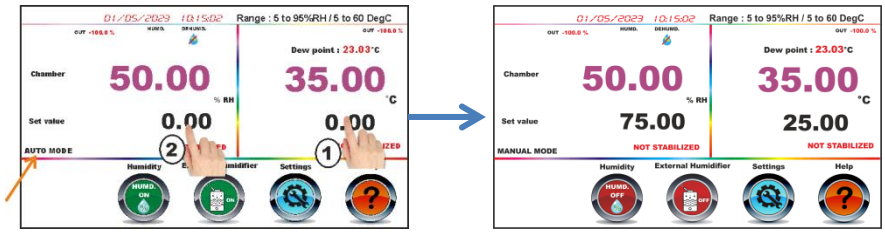
STEP – 1 : In main screen click on Settings button the supervisory menu will appear.
STEP – 2 : Click on “SUPERVISORY” button the password entry popup appear.
STEP – 3 : Enter the supervisory password = 3579 and click on “Ent” button.

STEP – 4 : The Supervisory menu will appear. In supervisory menu click on “HUMD CTRL BAND” button the HUMIDIFIER CONTROL BAND window appear.
STEP – 5 : Now set the required “OFF STATE UPTO” value & “ 50% STATE UPTO” value for external humidifier and exit to mail menu.

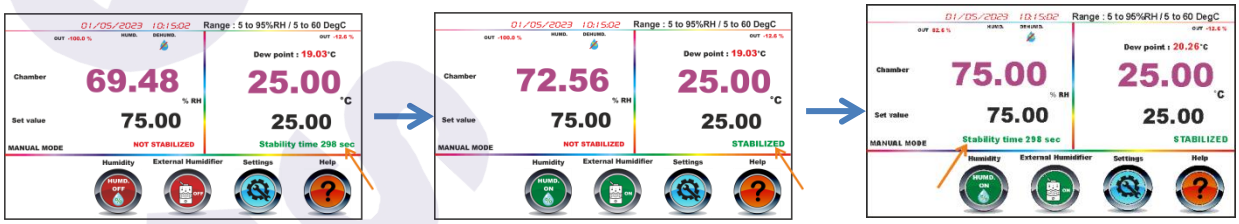


4.2.2. Auto Mode

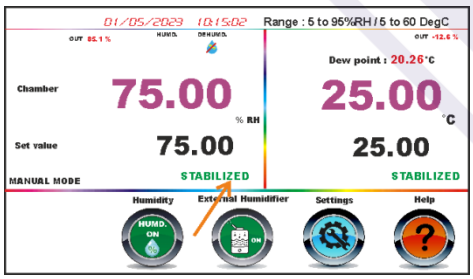
STEP – 1: Switch ON the HCAL 1104U



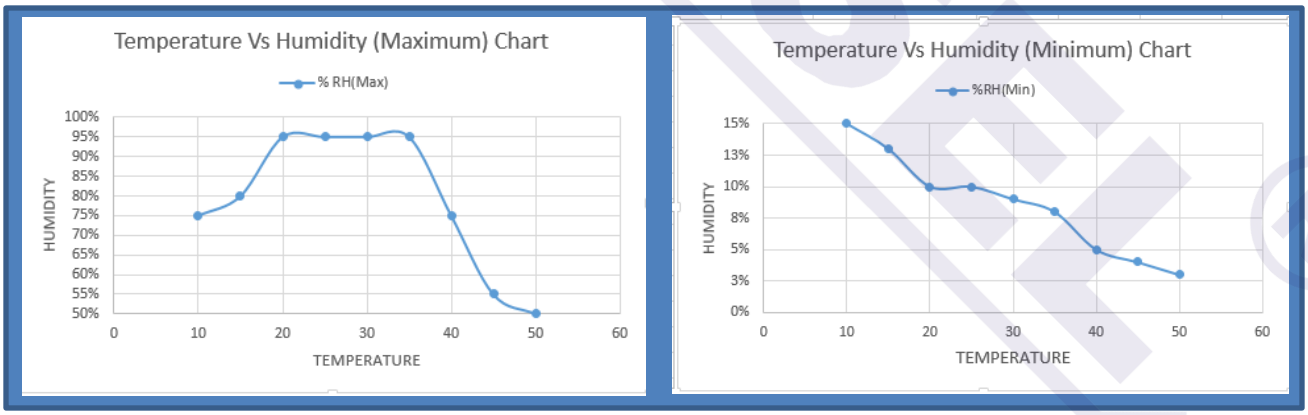
STEP - 2 : Set the required temperature & humidity set values one by one at the same time, the Humidity & External Humidifier mode will automatically switch ON or OFF based on stabilisation of temperature and humidity setvalue (refer 4.2.1)



STEP - 3 : After "STABILIZED" status appears on Temperature stage, the HCAL automatically Switch ON the humidity mode & based on requirement of external humidifier switch ON or OFF it automatically.



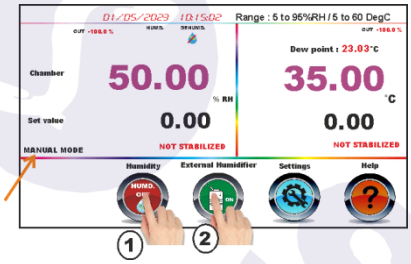
STEP - 4 : After stabilization of Set Humidity the "STABILIZED" status appears, Calibrate the UUC (Unit Under Calibration). Also repeat the STEPs 2 & 3 for different calibration points as below range chart.



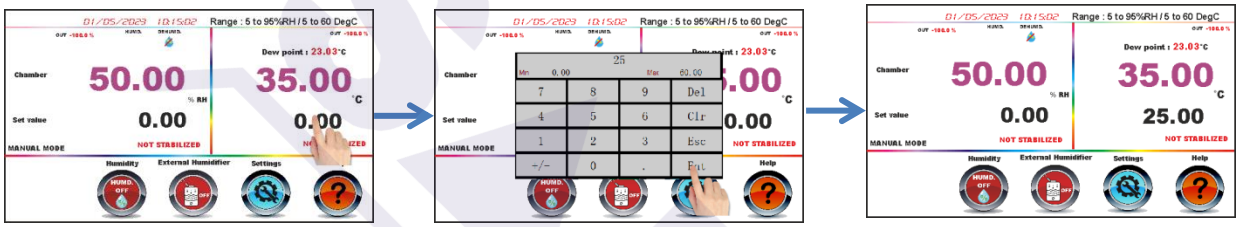
NOTE : Must always desire the test points in incremental steps and proceed to avoid unnecessary non achievement interrupt due to condensation.

4.2.3. Manual Mode

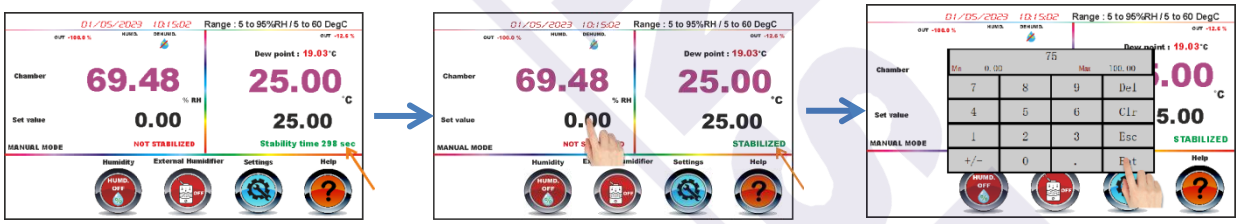
STEP – 1: Switch ON the HCAL 1104U



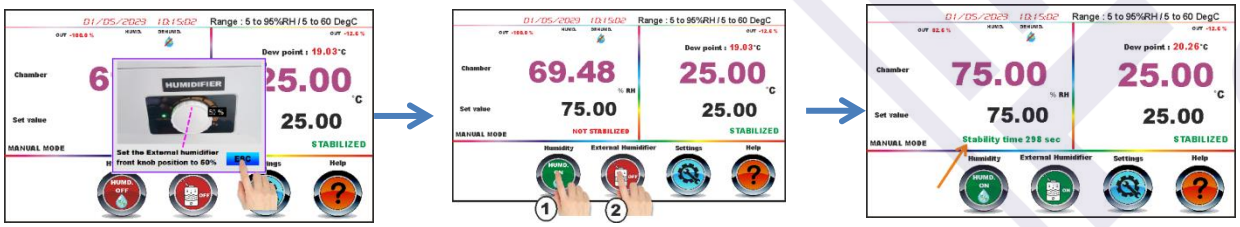
STEP - 2 : Switch OFF the Humidity by pressing "Humd ON"  **& "External Humidifier"**  **button on TFT display.**



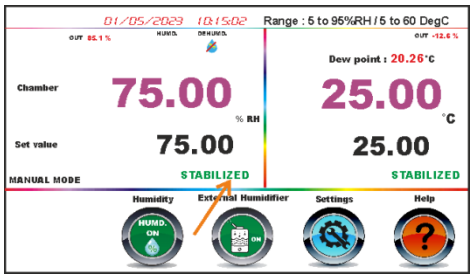
STEP - 3 : Set the required temperature set value by pressing set value area on TFT display



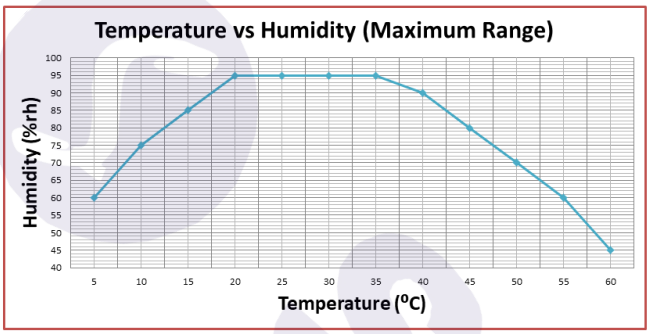
STEP - 4 : Wait for stability time end & after "STABILIZED" status in temperature, Set the required Humidity set value by pressing set value area on TFT display

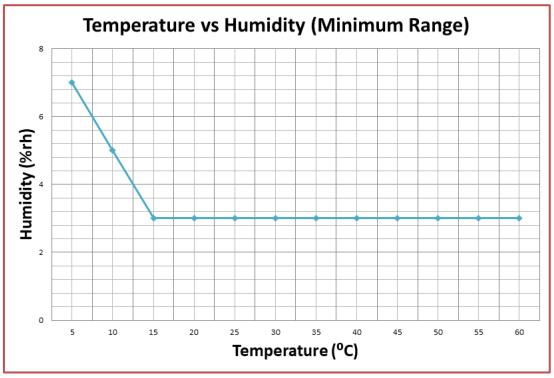


STEP - 5 : Based on humidity set value band popup window info(refer 4.2.1), manually switch ON or OFF the Humidity by pressing "Humd ON"  **& "External Humidifier"**  **button on TFT display.**



STEP - 6 : After stabilization of Set Humidity the "STABILIZED" status appears, Calibrate the UUC (Unit Under Calibration). Also repeat the STEPs 2 to 5 for different calibration points as below range chart.





5. OPERATION INSTRUCTIONS

5.1. Important Notes

1) If the condensation is formed inside the chamber, remove the excess water by manually using an absorbent tissue paper and initially run the HCAL 1104U at an elevated temperature of 40 °C and low Humidity set point of 10 %RH approximately 10 minutes to dry the HCAL 1104U & ensure the proper performance.

2) To operate smooth and efficient transition between temperature set point, the humidity control output should be in "OFF" state and switch "ON" the humidity output, when the chamber temperature in nearing to 0.5 °C of before the set point.

Humidity output "ON" condition

Humidity output "OFF" condition

5.2. Recommended calibration sequences

To ensure fast and reliable calibration,

1) **Do the lower Humidity (% RH) calibration first and ramp up to the higher level on each subsequent calibration steps.**

2) **Do the lower Temperature (°C) calibration first and ramp up to the higher level to minimize the probability of water vapor condensing inside the chamber.**

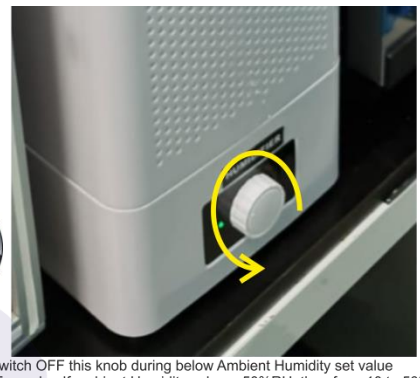
5.3. Operation procedure below ambient temperature

When operating the HCAL 1104U at high Humidity and chamber temperature of more than a few degrees below ambient, the following procedure will minimize condensation in the chamber during stabilization.

1) **Set the set point temperature to ambient.**

2) **Set the set point humidity to 10 % RH and allow the HCAL 1104U to stabilize.**

3) **Set the Humidity control output to "OFF"**



Switch OFF this knob during below Ambient Humidity set value
(Example : If ambient Humidity value = 50%RH, then from 10 to 50%RH)

4) **Apply the Temperature set point to that desired level and allow the HCAL 1104U to stabilize.**

5) **Set the Humidity control output to "ON" . It is recommended that, under these conditions, the desired Humidity level is achieved in incremental steps, allowing stabilization at each step.**

Switch ON this knob during above Ambient Humidity set value
(Example : If ambient Humidity value = 50%RH, then from 51 to 95%RH)

6) **Wait for the Humidity reading to stabilize (it will take 20 mins(approx.))**

IMPORTANT NOTES : That the chamber door is not opened when the chamber temperature is below the ambient temperature as water vapour from the ambient air introduced will condense in the chamber. Dehumidification of the chamber takes longer at lower temperature.

5.4. Operation procedure above ambient temperature

When operating the HCAL 1104U at higher temperature and high relative Humidity, it is necessary to allow the HCAL 1104U to stabilize to ensure minimal condensation. It is recommended that, for making measurements over 45 °C and higher Humidity, the temperature to be allowed to stabilize for 20 mins(approx.). It is recommended that, under these conditions, the desired Humidity level is achieved in incremental steps, allowing stabilization at each step.

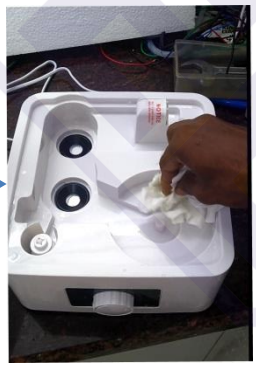
6. INSTRUCTIONS FOR EXTERNAL HUMDIFIER

6.1. Maintenance and Cleaning

STEP - 1 : After completion of calibration, Switch OFF the HCAL 1104U.

STEP - 2 : Remove the HCAL 1104U side humidifier supply Out connector as above image

Remove the Humidifier (refer. 3.5. Humidifier preparation and installation)



STEP - 3: Remove the Humidifier tank (Refer. 3.5.), drain the water and dry the humidifier area carefully as per above image.

STEP - 4 : Clean the tank, one time in two to three weeks.

STEP - 5 : If it is has scale after unscrewing the tank, use a soft cloth dipped in white vinegar or detergent to scrub and rinse with water.

STEP - 6 : For external cleaning of Humidifier, use a soft cloth in warm water which is below 40 °C to rinse, wipe the stains in surface, spray nozzle can be rinsed directly with water.

STEP - 7 : When the long-term no need, clean it, then dry it back into the original packaging in a dry place.

6.2. Warning

1) **Please note that never to use a sharp instrument to touch the hard oscillation transducer only can be cleaned with a soft cloth.**
2) **You can not use stained with chemical solvents, gasoline, kerosene to wipe the surface.**
3) **Do not use detergent to clean. Best with clean water.**
4) **When cleaning, to avoid the water body, in order to avoid internal electrical parts wet, failure.**
5) **Do not use and dissemble the body element.**

7. CONTACT US

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