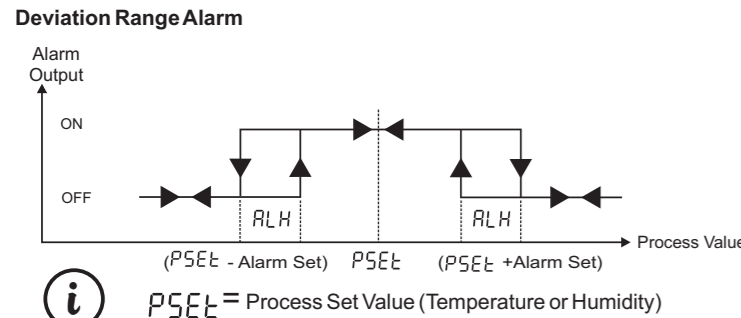
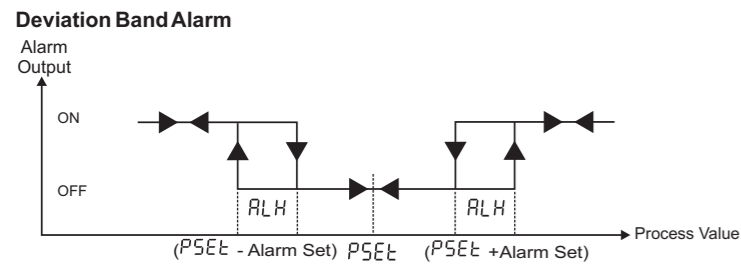
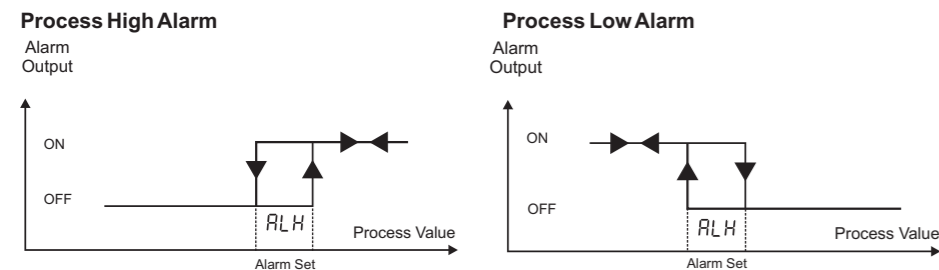


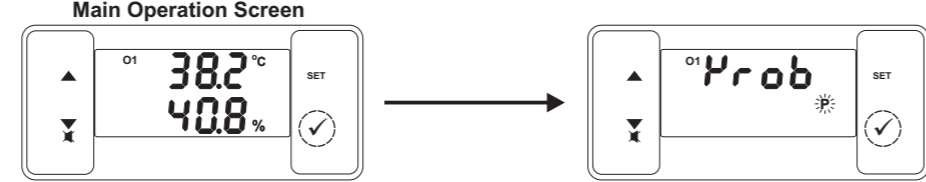
5.2 Alarm Output Graphics



5.3 Failure Messages

- Screen Blinking Temperature Sensor failure. Sensor connection is wrong or there is no sensor connection. While this message shown on this display, if buzzer function selection [b_u_f] is 3, 5, 7 or 8 internal buzzer starts to operate.
- Screen Blinking Humidity Sensor failure. Sensor connection is wrong or there is no sensor connection. While this message shown on this display, if buzzer function selection [b_u_f] is 4, 6, 7 or 8 internal buzzer starts to operate.
- In main operating screen if the upper display is blinking, it means that temperature alarm exits and alarm output is active. If buzzer function selection [b_u_f] is 1, 5 or 8 internal buzzer starts to operate.
- In main operating screen if the lower display is blinking, it means that humidity alarm exits and alarm output is active. If buzzer function selection [b_u_f] is 2, 6 or 8 internal buzzer starts to operate.

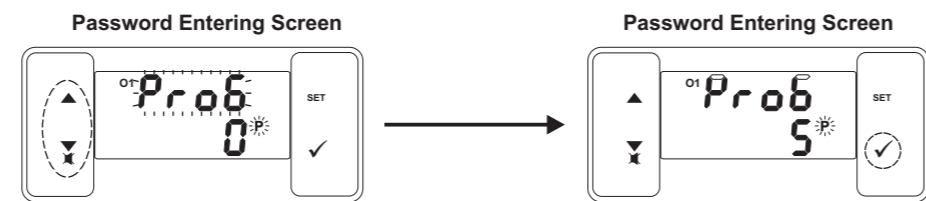
5.5 Entering To The Programming Mode, Changing and Saving Parameter



When SET button is pressed for 3 seconds, "P" led turn. If programming mode entering password is different from 0, programming mode entering screen [P_r] will be observed.

Note1: If programming mode accessing password is 0, Temperature Unit screen [C-F] is observed instead of programming screen [P_r].

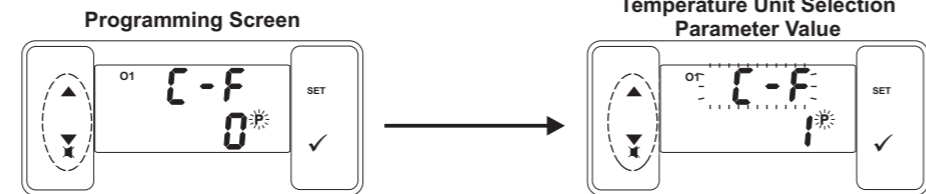
Programming Mode Entering Screen
Press SET button for accessing to the password entering screen.



Enter programming mode accessing password with increment and decrement buttons.

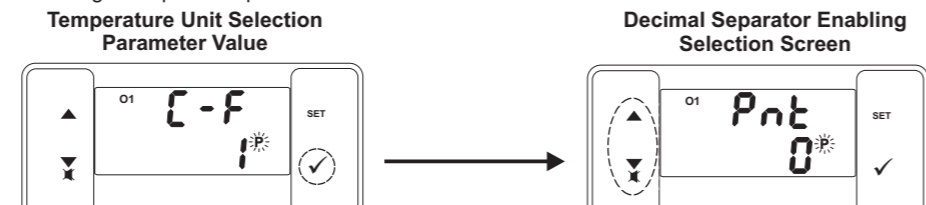
Press SET/OK button for entering the password.

Note2: If programming mode accessing password is 0, only three parameters are accessible, and the parameter values can be changed.



Press SET button for accessing to the parameter value. Press increment button for accessing to the next parameter, press decrement button for accessing to the previous parameter.

Change the value with increment and decrement buttons.



Press set button for saving the parameter.

Press increment button for accessing to the next parameter, press decrement button for accessing to the previous parameter.

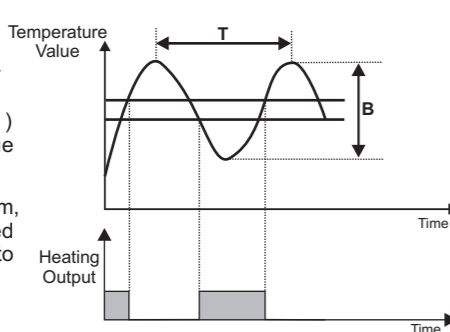
i If no operation is performed in programming mode for 20 seconds, device turns to main operation screen automatically.

6. Auto Tune Method

Auto Tune method is used for determining PID parameters used by the device.

Starting Auto Tune (Limit Cycle Tuning) Operation by the user:

- Adjust temperature control on/off or PID parameter (P=0)
- Adjust auto tune selection parameter (P_tun=0)
- In the main screen "Atun" and Temperature value are should alternately.



If Auto Tune operation is finished without any problem, the device saves the new PID coefficients, calculated using the previously found "T" and "B" values, to memory and continue to run. P_tun parameter is adjusted automatically.

Cancelling Auto Tune (Limit Cycle Tuning) operation:

- If sensor breaks;
- If auto tune operation can not be completed in 8 hours;
- If user adjusts P_tun parameter;
- During auto tune operation if the user changes the temperature control from pid to on/off;
- If process set value is changed while auto tune operation is being performed;

Auto tune is canceled. "Atun" is not displayed. Then, without doing any changes in PID parameters, device continues to run with previous PID parameters.

7. Specifications

DeviceType	: Temperature+Humidity Controller
Housing&Mounting	: 76 mm x 34.5 mm x 71 mm Plastic housing for panel Panel cut out is 71 x 29 mm.
ProtectionClas	: Ip65 at front, Ip20 at rear.
Weight	: Approximately 0.2 Kg
Environmental Ratings	: Standart, indoor at an altitude of less than 2000 meters with none condensing humidity.
Storage / Operating Temperature	: -40 °C to +80 °C / -30 °C to +80 °C
Storage / Operating Humidity	: 90 % max. (None condensing)
Installation	: Fixed installation
Overvoltage Category	: II
Pollution Degree	: II, office or workplace, none conductive pollution
Operating Conditions	: Continuous
Voltage and Power	: 115V~ (±15%) 50/60Hz - 1.5VA
Temperature Sensor Input	: 0/4...20mA
Humidity input type	: 0/4...20mA
Accuracy	: 1 % of full scale
Sensor Break Protection Control Form	: Upscale : PID or ON / OFF

Relay Outputs

- 5 A@250 V ~ at Resistive Load (Heating Output)
- 3 A@250 V ~ at Resistive Load ((Heating , (Heating Alarm), (Humidifier), (Humidifier Alarm))
- 8 mm Red 4 digit LED Display
- 8 mm Green 4 digit LED Display
- P (Green), % (Green), °C (Red), °F (Red), Humidifier Output (Red), Humidifier Alarm Output (Red) Heating Output (Red), Heating Alarm (Red)

Internal Buzzer Approvals

- >83dB
- UL, CE

8. Ordering Information

Model Number	Description
mL-HTC	Humidity / Temperature Controller 115 VAC (±15%) 50/60Hz - 1.5VA 0/4 to 20 mA Humidity Sensor Input Heating Output: Relay Output (5A @ 250VAC with Resistive Load) (1 NO, 1NC) Humidifier Output: Relay Output (3A @ 250VAC with Resistive Load) (1 NO) Heating Alarm Output: (3A @ 250VAC with Resistive Load) (1 NO) Humidifier Alarm Output: (3A @ 250VAC with Resistive Load) (1 NO)
Accessories	
mL-HS	Temperature & Relative Humidity Transmitter with 4-20mA Outputs
LCN4X	NEMA 4X/IP65 Housing, Compact Size: 5.03"(H) x 7"(W) x 5.02"(D)
MS821	NEMA 4X/IP65 Enclosure, Large Size: 16"(H) x 14"(W) x 8"(D)
115-24	115VAC to 24VDC Power Supply
ML30-100	24VDC Power Supply with 100 to 240 VAC Input
MDR-20	24VDC, 20W Single Output Industrial DIN Rail Power Supply

mL-HTC



mL-HTC 77 x 35 DIN Size Digital Temperature+Humidity Controller

- 4 Digits for Temperature Display
- 4 Digits for Humidity Display
- Temperature Sensor Input 0/4...20mA
- Humidity Sensor Input 0/4...20mA
- 4 Relay Output
Heating Control Output
Heating Alarm Output
Humidification Control Output
Humidification Alarm Output
- Selectable Temperature Control (PID or ON / OFF)
- Auto-Tune PID
- Set value boundaries
- Alarm parameters
- Adjustable internal buzzer according to the alarm situations
- Password protection for programming mode,
- Having CE mark according to European Norms

TEMPERATURE / HUMIDITY CONTROLLER - 4-20MA INPUTS

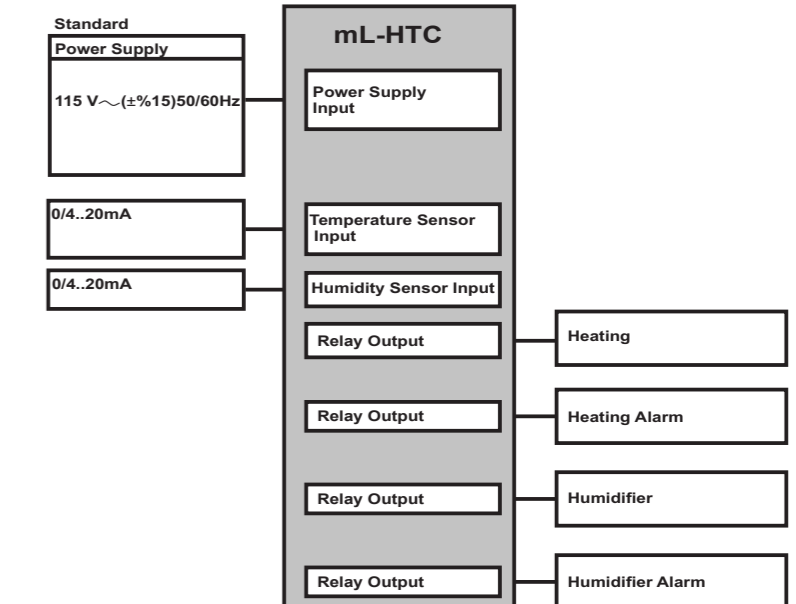
1. Preface

mL-HTC series Temperature + Humidity control devices, are designed for the control of industrial processes. PID or On / Off control form under the control of the process is a device that can respond to your special needs.

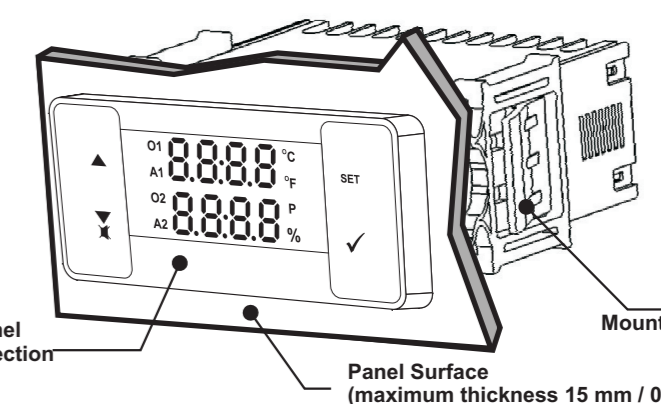
1.1 Environmental Ratings

- Operating Temperature** : 0 to 50 °C
- Max. Operating Humidity** : 90% Rh (non-condensing)
- Altitude** : Up to 2000 m.
- Forbidden Conditions:**
Corrosive atmosphere
Explosive atmosphere
Home applications (The unit is only for industrial applications)

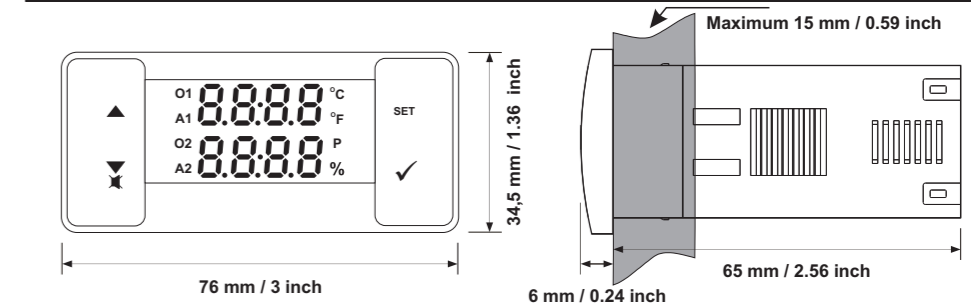
1.2. General Specifications



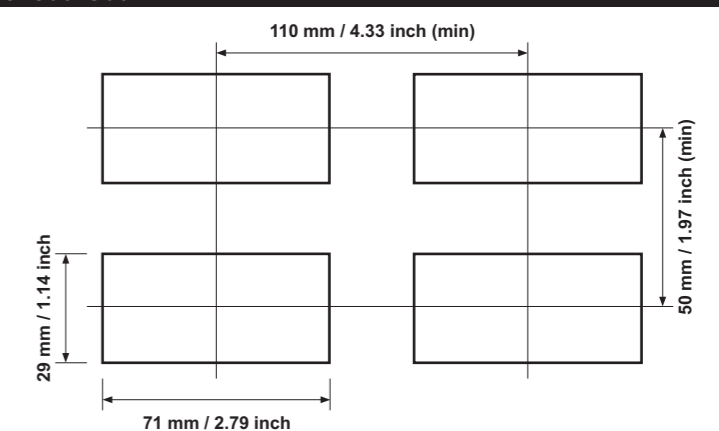
2. General Description



2.1 Front View and Dimensions



2.2 Panel Cut-Out

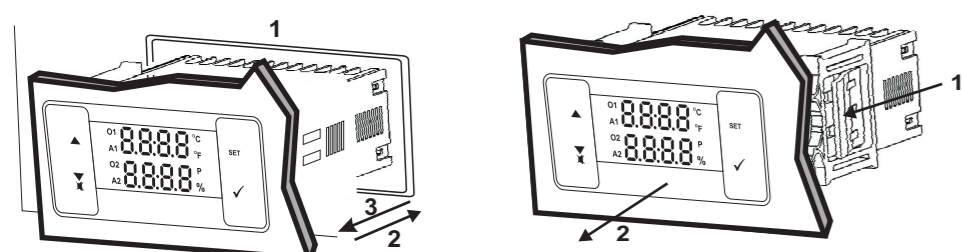


1.3 Installation
A visual inspection of this product for possible damage occurred during shipment is recommended before installation. It is your responsibility to ensure that qualified mechanical and electrical technicians install this product.
If there is danger of serious accident resulting from a failure or defect in this unit, power off the system and separate the electrical connection of the device from the system.
The unit is normally supplied without a power supply switch or a fuse. Use power switch and fuse as required.
Be sure to use the rated power supply voltage to protect the unit against damage and to prevent failure.
Keep the power off until all of the wiring is completed so that electric shock and trouble with the unit can be prevented.
Never attempt to disassemble, modify or repair this unit. Tampering with the unit may results in malfunction, electric shock or fire.
Do not use the unit in combustible or explosive gaseous atmospheres.
During installation in a metal panel some metal burrs can cause injury on hands, you must be careful.
Mounting of the product on a system must be done with its fixing clamps. Do not perform the mounting of the device with inappropriate fixing clamp. Be sure that device will not fall while mounting.
It is your responsibility if this equipment is used in a manner not specified in this instruction manual.

1.4 Warranty
This product is warranted against defects in materials and workman-ship for a period of two (2) years from the date of shipment to Buyer.
The Warranty is limited to repair or replacement of the defective unit at the option of the manufacturer. This warranty is void if the product has been altered, misused, dismantled, or otherwise abused.
ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, ARE EXCLUDED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

1.5 Maintenance
Repairs should only be performed by trained and specialized personnel. Cut power to the device before accessing internal parts.
Do not clean the case with hydrocarbon-based solvents (Petrol, Trichlorethylene etc.). Use of these solvents can reduce the mechanical reliability of the device. Use a cloth dampened in ethyl alcohol or water to clean the external plastic case.

2.3 Panel Mounting and Removing

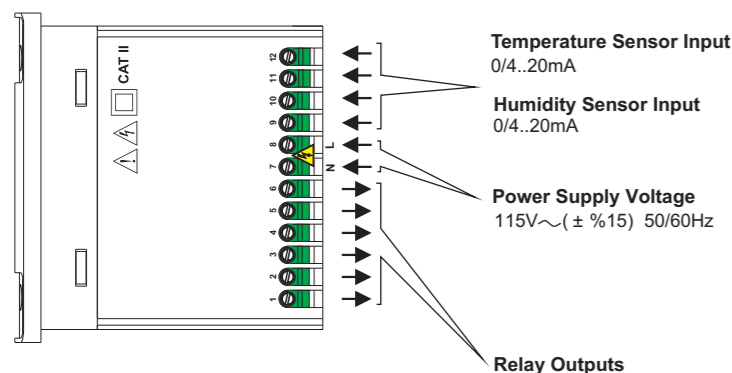


1-Before mounting the device in your panel, make sure that the cut-out is of the right size.
2-Insert the device through the cut-out. If the mounting clamps are on the unit, put out them before inserting the unit to the panel.
3- Insert the mounting clamps to the fixing sockets that located left and right sides of device and make the unit completely immobile within the panel.

1-Pull mounting clamps from left and right fixing sockets.
2-Pull the unit through the front side of the panel

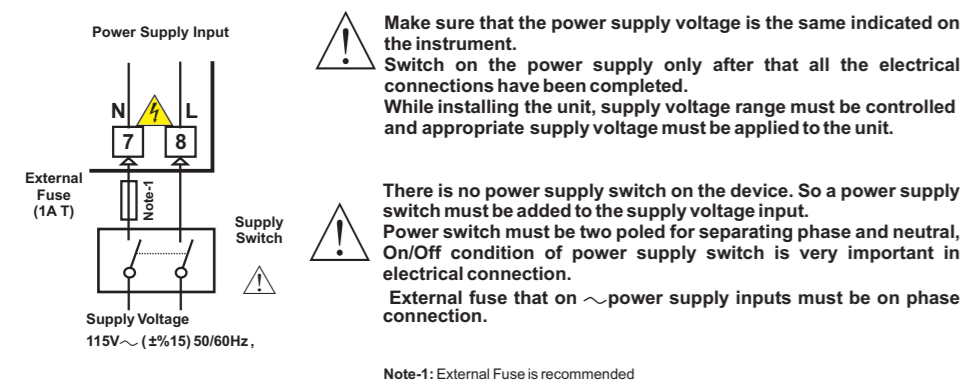
Before starting to remove the unit from panel, power off the unit and the related system.

3. Electrical Wiring Diagram



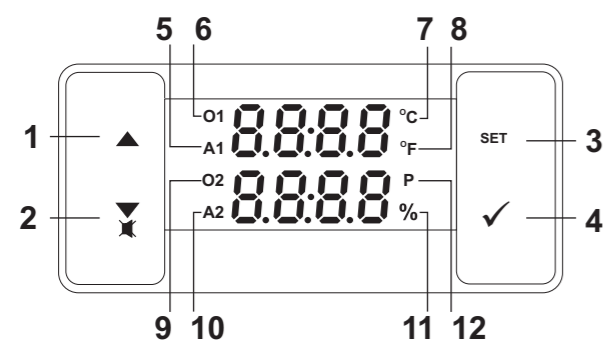
Temperature Sensor Input
0/4...20mA
Humidity Sensor Input
0/4...20mA
Power Supply Voltage
115V~(±15%) 50/60Hz
Relay Outputs

3.1 Supply Voltage Input Connection of the Device



Make sure that the power supply voltage is the same indicated on the instrument.
Switch on the power supply only after that all the electrical connections have been completed.
While installing the unit, supply voltage range must be controlled and appropriate supply voltage must be applied to the unit.
There is no power supply switch on the device. So a power supply switch must be added to the supply voltage input.
Power switch must be two poled for separating phase and neutral, On/Off condition of power supply switch is very important in electrical connection.
External fuse that on ~power supply inputs must be on phase connection.
Note-1: External Fuse is recommended

4. Front Panel Definition and Accessing to the Menus



BUTTON DEFINITIONS

1. Increment Button:
** In main operation screen, press this button to change display temperature and humidity sensor value.
2. Decrement, Silencing Buzzer Button:
** It is used to increase the value in the Temperature and Humidity Set screens and Programming mode.
** It is used to decrease the value in the Set screen and Programming mode.
** It is used to silence the buzzer.
3. Set Button:
** In the main operation screen; if this button pressed for the first time, Temperature set value will be displayed. Value can be changed using increment and decrement buttons. When Enter button is pressed again, value is saved and Humidity set value will be displayed next. Value can be changed using increment and decrement buttons. When Enter button pressed again, value is saved and returns back to main operation screen.
4. Enter Button:
** To access the programming screen; in the main operation screen, press and hold this button for 5 seconds.
** It is used to save value in the Set screens (Temperature or Humidity) and programming screen.

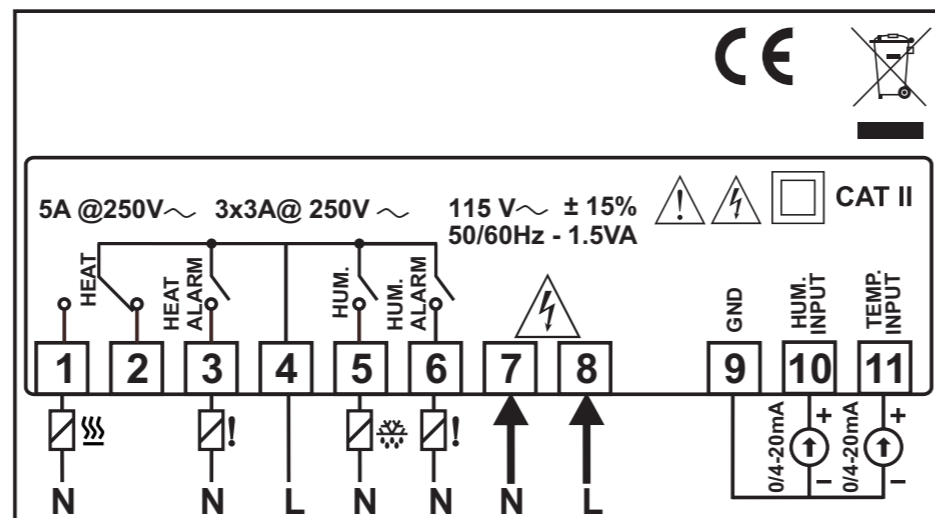
LED DEFINITIONS

5.A1 led:
** It is active when Temperature alarm statuses.
6. O1 Led:
** This led indicates that heating output is active.
7.Celcius led:
** Indicates that device is in °C mode.
8.Fahrenheit led:
** Indicates that device is in °F mode.
9. O2 Led:
** This led indicates that Humidifier output is active.
10.A2 Led:
** This led indicates that HumidifierAlarm is active.
11.Precent Sign led:
** Indicates that device is in Humidity Set screen or Humidifier output is active.
12.Program led:
** Indicates that device is in programming mode.

3.2 Device Label and Connection Diagram

115VAC CONNECTION DIAGRAM

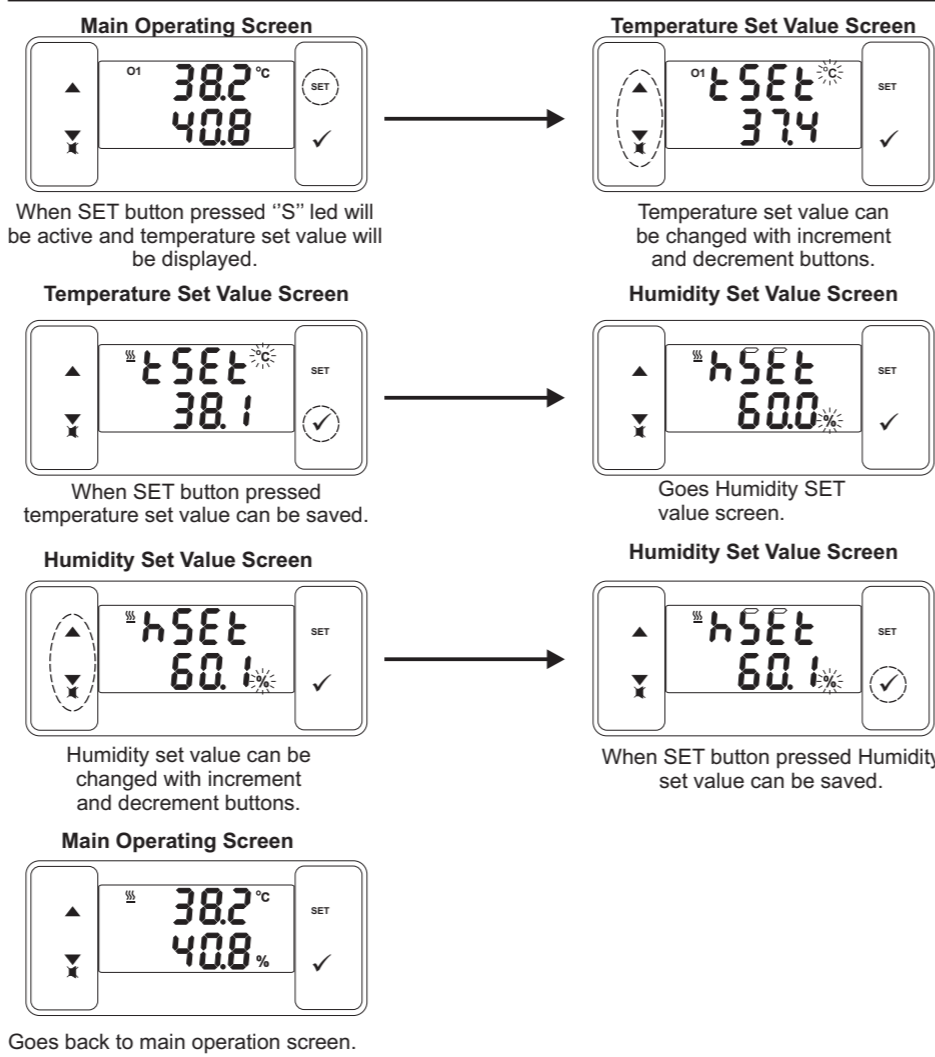
0/4...20mA Humidity & Temperature Sensor Input connection



5A @250V~ 3x3A@ 250V~ 115V~ ±15% 50/60Hz - 1.5VA CAT II

HEAT HEAT HEAT HUM HUM HUM GND HUM TEMP
ALARM ALARM ALARM INPUT INPUT INPUT
1 2 3 4 5 6 7 8 9 10 11
N N L N N N N

5. Changing and Saving Temperature and Humidity Set Value



Temperature set value parameter (Default =50 °C)
Temperature set value, can be programmed between minimum temperature set value $\overline{k5UL}$ and maximum temperature set value $\overline{k5UH}$.
Nem Set Parametresi (Default = 60%)
Humidity set value, can be programmed between minimum Humidity set value $\overline{k5UL}$ and maximum temperature set value $\overline{k5UH}$.
If no operation is performed in Humidity set value changing mode and temperature set value changing mode for 20 seconds, device turns to main operation screen automatically.

5.1 Programming Mode Parameter List

C-F Temperature Unit Selection Parameter (Default = 0)
0 °C selected.
1 °F selected.

Pnt Decimal Separator Enabling Parameter (Default=0)
0 None.
1 Only Temperature parameters with decimal separator.
2 Only Humidity parameters with decimal separator.
3 Only Temperature and Humidity parameters with decimal separator.

Note: When value of $\overline{C-F}$ or \overline{Pnt} parameters are changed, the values of $\overline{k5UL}$, $\overline{k5UH}$, $\overline{k5UL}$, $\overline{k5UH}$, $\overline{k5UL}$, $\overline{k5UH}$, $\overline{k5UL}$, $\overline{k5UH}$ and $\overline{k5UL}$ parameters should be changed accordingly.

Note: $\overline{k5SL}$, $\overline{k5PL}$ and $\overline{k5OL}$ parameters are shown, if the Temperature sensor analogue input type (0/4...20mA) is selected.

k5SL Temperature Sensor Scale Selection Parameter (Default = 0)
Analogue (Temperature) input range is determined with this parameter.
0 0...20mA==
1 4...20mA==

k5LOL Temperature Sensor Scale Low Limit Parameter : (Default = 0)
It can be adjusted from -1999 to ($\overline{k5PL}$ -1). At this value analogue input becomes:
If $\overline{k5SL}$ =0, according to the device type 0V $\frac{10}{100}$ or 0mA $\frac{10}{100}$
If $\overline{k5SL}$ =1, according to the device type 2V $\frac{10}{100}$ or 4mA $\frac{10}{100}$

k5UPL Temperature Sensor Scale High Limit Parameter : (Default = 100)
It can be adjusted from ($\overline{k5LOL}$ +1) to 9999. At this value analogue input becomes:
According to the device type 10V $\frac{10}{100}$ or 20mA $\frac{10}{100}$

Note: $\overline{k5LOL}$, $\overline{k5UPL}$ parameters are shown, if the Temperature sensor analogue input type is selected.

P-o Temperature Control Selection Parameter On/Off or PID (Default = 0)
0 On - Off selected.
1 PID selected.

Note: If this parameter is select 0, PID parameters (\overline{RtUN} , \overline{P} , \overline{I} , \overline{D} , \overline{t}) will be not observed. If this parameter select 1, $\overline{k5St}$ parameter will be not observed.

RtUN Auto Tune (Limit Cycle Tuning) Selection Parameter (Default = 0)
0 Device does not do(Limit cycle Tuning) operation.
1 Device does operation.

P PID -Proportional Control Parameter (Default =50)
This parameter value can be adjusted form 0 to 100.

I PID -Integral Parameter(Default =1000)
This parameter value can be adjusted form 0 to 3600.

D PID -Derivative Parameter (Default =250)
This parameter value can be adjusted form 0 to 3600.

t PID -Period Time Parameter (Default = 1)
This parameter value can be adjusted form 1 to 50 second.

k5St Hysteresis Parameter for Temperature (Default = 0.1 °C)
From 1 to 10°C for NTC, PTC, PT-100 (0°C, 100°C)
From 1 to 18°F for NTC, PTC, PT-100 (32°F, 212°F)
From 0.1 to 10.0°C for NTC, PTC, PT-100 (0.0°C, 100.0°C)
From 0.1 to 18.0°F for NTC, PTC, PT-100 (32.0°F, 212.0°F)
From 1 to 10°C for ProNem Mini PMI-P (-20°C, 80°C), From 1 to 18°F for ProNem Mini PMI-P (-4°F, 176°F), From 0.1 to 10.0°C for ProNem Mini PMI-P (-20.0°C, 80.0°C)
From 0.1 to 18.0°F for ProNem Mini PMI-P (-4.0°F, 176.0°F).

In ON/OFF control algorithm, temperature value is tried to keep equal to set value by opening or closing the last control element. ON/OFF controlled system, temperature value oscillates continuously. Temperature value's oscillation period or amplitude around set value changes according to controlled system. For reducing oscillation period of temperature value, a threshold zone is formed below or around set value and this zone is named hysteresis.

k5UL Minimum Temperature Set Value Parameter (Default = 10.0°C)
Temperature set value can not be lower than this value. This parameter value can be adjusted from minimum value of device scale to maximum temperature set value parameter $\overline{k5UH}$.

k5UH Maximum Temperature Set Value Parameter (Default = 40.0 °C)
Temperature set value can not be greater than this value. This parameter value can be adjusted from minimum temperature set value parameter $\overline{k5UL}$ to maximum value of the device scale.

k5oFt Temperature Sensor Offset Parameter (Default = 0)
From -10 to 10°C, NTC, PTC, PT-100 (0°C, 100°C)
From -18 to 18°F, NTC, PTC, PT-100 (32°F, 212°F)
From -10.0 to 10.0°C, NTC, PTC, PT-100 (0.0°C, 100.0°C)
From -18.0 to 18.0°F, NTC, PTC, PT-100 (32.0°F, 212.0°F)
From -10 to 10°C, ProNem Mini PMI-P (-20°C, 80°C), From -18 to 18°F, ProNem Mini PMI-P (-4°F, 176°F), From -10.0 to 10.0°C, ProNem Mini PMI-P (-20.0°C, 80.0°C), From -18.0 to 18.0°F, ProNem Mini PMI-P (-4.0°F, 176.0°F)

k5SL Humidity Sensor Scale Selection Parameter (Default = 0)
Humidity input range is determined with this parameter.
0 0...20mA==
1 4...20mA==

Note: $\overline{k5SL}$ parameter ProNem Mini PMI-P type device are not observed.

k5hSt Hysteresis Parameter for Humidity (Default = 1)
From 1 to 10 for Humidity Sensor (0%RH, 100%RH)
From 0.1to 10.0 for Humidity Sensor (0.0%RH, 100.0%RH)

In ON/OFF control algorithm, Humidity value is tried to keep equal to set value by opening or closing the last control element. ON/OFF controlled system, temperature value oscillates continuously. Temperature value's oscillation period or amplitude around set value changes according to controlled system. For reducing oscillation period of temperature value, a threshold zone is formed below or around set value and this zone is named hysteresis.

k5UL Minimum Humidity Set Value Parameter (Default = Minimum Value of Device Scale)
Humidity set value can not be lower than this value. This parameter value can be adjusted from minimum value of device scale to maximum Humidity set value parameter $\overline{k5UH}$.

k5UH Maximum Humidity Set Value Parameter (Default = Maximum Value of Device Scale)
Humidity set value can not be greater than this value. This parameter value can be adjusted from minimum humidity set value parameter $\overline{k5UL}$ to maximum value of the device scale.

k5oFt Humidity Sensor Offset Parameter (Default = 0.0)
From -10 to 10%RH for Humidity Sensor (0%RH-100%RH)
From -10.0 to 10.0%RH for Humidity Sensor (0.0%RH-100.0%RH)

k5RtS Temperature Alarm Function Selection Parameter (Default = 0)
0 Temperature Alarm is inactive.
1 Process High alarm selected.
2 Process Low alarm selected.
3 Deviation Band alarm selected.
4 Deviation Range alarm selected.

Note: If this parameter is select 0, Temperature Alarm parameters $\overline{k5RtS}$, $\overline{k5RtL}$, $\overline{k5RtU}$, $\overline{k5RtD}$ and $\overline{k5RtP}$ will be not observed.

k5RtS Temperature Alarm Set Parameter (Default = 50.0 °C)
This parameter value can be programmed between temperature minimum alarm set $\overline{k5RtL}$ parameter and temperature alarm set maximum $\overline{k5RtU}$ parameter.

k5RtL Temperature Alarm Hysteresis Parameter (Default = 0)
This parameter value can be adjusted form 0 to %50 of the device scale.

k5RtU Alarm Set Minimum Parameter (Default = Minimum Value of Device Scale)
if temperature alarm is active, this parameter value can be adjusted from minimum value of device scale to temperature alarm set maximum parameter value, $\overline{k5RtU}$.

k5RtH Alarm Set Maximum Parameter (Default = Maximum Value of Device Scale)
if temperature alarm is active, this parameter value can be adjusted from temperature alarm set value parameter $\overline{k5RtL}$ to maximum value of the device scale.

k5RtD Temperature Alarm On Delay Time Parameter (Default = 0)
Temperature Alarm On Delay Time can be defined with this parameter. It can be adjusted from 0 to 99 minutes.

k5RtP Temperature Alarm Delay After Power On Parameter (Default = 0)
When power is first applied to the device, this time delay must be expired for activation of temperature alarm. It can be adjusted from 0 to 99 minutes.

k5RtS Humidity Alarm Function Selection Parameter (Default = 0)
0 Humidity Alarm is inactive.
1 Process High alarm selected.
2 Process Low alarm selected.
3 Deviation Band alarm selected.
4 Deviation Range alarm selected.

Note: If this parameter is select 0, Humidity Alarm parameters $\overline{k5RtS}$, $\overline{k5RtL}$, $\overline{k5RtU}$, $\overline{k5RtH}$, $\overline{k5RtD}$ and $\overline{k5RtP}$ will be not observed.

k5RtS Humidity Alarm Set Parameter (Default = 60)
This parameter value can be programmed between humidity minimum alarm set $\overline{k5RtL}$ parameter and humidity alarm set maximum $\overline{k5RtU}$ parameter.

k5RtL Humidity Alarm Hysteresis Parameter (Default = 0)
This parameter value can be adjusted form 0 to %50 of the device scale.

k5RtU Humidity Alarm Set Minimum Parameter (Default = Minimum Value of Device Scale)
if humidity alarm is active, this parameter value can be adjusted from minimum value of device scale to humidity alarm set maximum parameter value, $\overline{k5RtU}$.

k5RtH Humidity Alarm Set Maximum Parameter (Default = Maximum Value of Device Scale)
if humidity alarm is active, this parameter value can be adjusted from humidity alarm set minimum parameter $\overline{k5RtL}$ to maximum value of the device scale.

k5RtD Humidity Alarm On Delay Time Parameter (Default = 0)
Humidity Alarm On Delay Time can be defined with this parameter. It can be adjusted from 0 to 99 minutes.

k5RtP Humidity Alarm Delay After Power On Parameter (Default = 0)
When power is first applied to the device, this time delay must be expired for activation of Humidity alarm. It can be adjusted from 0 to 99 minutes.

bvF Buzzer Function Selection Parameter (Default = 0)
0 Buzzer is inactive.
1 Buzzer is active during temperature alarm
2 Buzzer is active during humidity alarm
3 Buzzer is active during Temperature sensor failures.
4 Buzzer is active during Humidity sensor failures.
5 Buzzer is active during Temperature sensor failures or temperature alarm.
6 Buzzer is active during Humidity sensor failures or Humidity alarm.
7 Buzzer is active during Temperature sensor failures or Humidity sensor failures
8 Buzzer is active during Temperature sensor failures or Humidity sensor failures or temperature alarm or Humidity alarm.

bon Buzzer Active Time (Default = - - - -)
If buzzer function selection parameter value \overline{bvF} = 0, this parameter is not observed. Buzzer active time can be define with this parameter. It can be adjusted from 1 to 99 minutes. When this parameter is 1, if decrement button is pressed, - - - - is observed. In this condition buzzer is active till buzzer silence button is pressed.

Prt Button Protection Parameter (Default = 0)
0 There is no protection.
1 Temperature set value can not be changed.
2 Humidity set value can not be changed.
3 Temperature set value and Humidity set value can not be changed

PR5 Programming Mode Accessing Password (Default = 0)
It is used for accessing to programming mode. It can be adjusted from 0 to 9999. If it is 0, password is not entered for accessing to the parameters. When the password screen is not set as "12", If the user enters "12" in password screen $\overline{k5St}$ and $\overline{k5hSt}$ parameters are accessed and they can be changed.