DTH2S-F www.thermomart.com

Please check your controller label. Depends on your order the power supply (operating voltage) could be either 110V or 12V (12v controller does not need ground wire)

① Specification and size:

Product size: 180L x 100W x 55D (mm)

Mounting size: 168L x 88W (mm)

② wiring diagram:

Terminals 1 & 2: Temperature Output relay contact switch

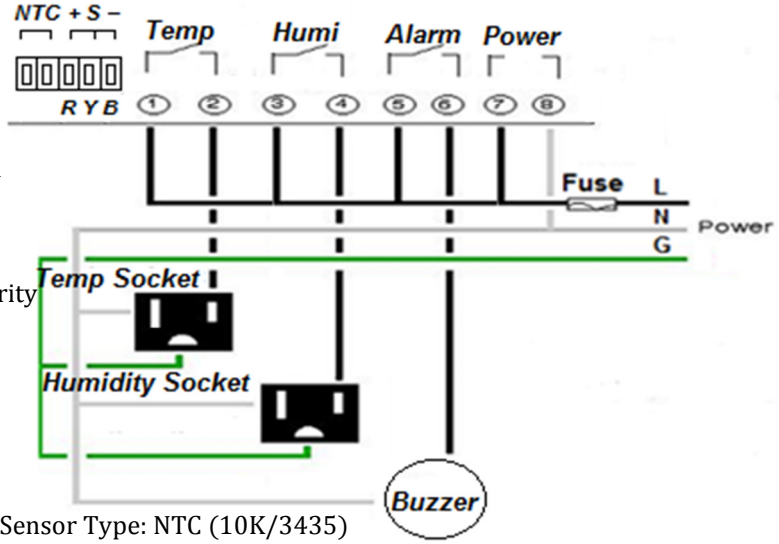
Terminals 3 & 4: Humidity Output relay contact switch

Terminals 5 & 6: Alarm Output relay contact switch

Terminals 7 & 8: Power supply connection

NTC temperature Sensor: (2 black wire) doesn't have polarity

Humidity sensor: Red is positive, Yellow is between R & B and Black is negative



Temperature Controller:

③ Temperature controller Technical Parameters:

- Temperature measurement range: -58 °F ~ 230 °F
- Temperature measurement error: ± 1 °F
- Control accuracy & Resolution: 1 °F
- Maximum power consumption: 2W
- Sensor Type: NTC (10K/3435)
- Relay contact current: Max15A (for temperature output) and 3A (for Alarm output)

④ Button Description:

1. Power 1: To turn the temperature controller ON press the Power1 key. To turn the controller OFF press and hold the Power1 key for 3 seconds.
2. SET1:

A: To set the temperature (the set point), press the SET1 key once and the controller will go to the "temperature setting" mode. By pressing ▲ or ▼ keys you can adjust the temperature to your required set point. When the set point is adjusted you can exit the "temperature setting" mode by pressing the SET1 key again.

B: To set the controller parameters, press and hold the SET1 and Up keys together more than 3 seconds and the controller will go to the "parameter setting menu". By pressing ▲ or▼ keys you can select the required parameter from the menu. When the required parameter is found, press the SET1 key once and the controller will go to the required parameter setting mode. By pressing ▲ or ▼ keys, you can adjust the parameter that you need. When the parameter is set, you can exit the "parameter setting mode" by pressing the Power1 key (or wait for 5 seconds and the controller automatically exit this mode).

3. ▲: Increasing Up key
4. ▼: Decreasing Down key

⑤ Operating Instructions:

LED Status (light) (light display):

- When the red light beside the "Work1" is ON it shows that the output (heating or cooling) is working.
- If the light beside the "Work1" flashes, it shows that the controller is on delay.
- If the light beside the "Set1" is ON, it shows that the controller is on setting mode.

◆ Cooling / Heating functions:

- Cooling mode: When the current temperature is equal or higher than the set point temperature (+ hysteresis), the relay turns the cooling source ON and when it is less than the set point temperature, the relay turns it OFF.
- Heating mode: When the current temperature is equal or lower than the set point temperature (- hysteresis), the relay turns the heating source ON and when it is higher than the set point temperature, the relay turns it OFF.

◆ Cooling / Heating setting ("HC" parameter):

To set the controller on Heating or Cooling mode, press and hold the "SET1 and Up" keys for more than 3 seconds to enter the "parameter setting menu". Find the "HC" parameter by pressing ▲ or▼ keys. Press the "SET1" key when you find the "HC" and then by pressing "▲" or " ▼ " adjust it to "C" for cooling or to "H" for heating mode.

◆ Hysteresis (Temperature Band) function:

To prevent the frequent ON/OFF action of the output a temperature band (called hysteresis or differential set value) is created between the ON and OFF operations. The controller will use a range (a maximum and minimum) for process control action, which is between 1°F to 25°F. For example when the hysteresis is set on 5 and the set point on 50°F, the output ON/OFF action would be when the temperature goes lower than 45°F and higher than 55°F.

◆ Hysteresis setting ("d" parameter):

Press and hold the "SET1 & Up" keys for more than 3 seconds to enter the "parameter setting menu". Find the "d" parameter by pressing "▲" or " ▼" keys. Press the "SET1" key when you find "d" and then by pressing "▲" or " ▼" adjust it to any number from 1 to 25.

◆ **Temperature calibration:**

You can calibrate the temperature reading with this function. Correction value can be positive, negative or 0.

◆ **Temperature calibration setting (" CA" parameter):**

Press and hold the "SET1 & Up" keys for more than 3 seconds to enter the "parameter setting menu". Find the "CA" parameter by pressing "▲" or " ▼" keys. Press the "SET1" key when you find "CA" and then by pressing "▲"or"▼" adjust this parameter.

◆ **Delay Protection:**

In the cooling mode, you can use this parameter to set the controller on the state of compressor boot delay protection. It prevents breaking the compressor as a result of frequent boot . It also protects the compressor in the state of power cut and then power on. You can define the delay time for starting of your cooling machine.

◆ **Delay setting ("PT" parameter):**

Press and hold the "SET1 & Up" keys for more than 3 seconds to enter the "parameter setting menu". Find the "PT" parameter by pressing "▲" or "▼" keys. Press the "SET1" key when you find "PT" and then by pressing "▲" or "▼" adjust this parameter.

◆ **Higher and lower temperature functions:**

By adjusting the higher and lower temperatures you will define the display range of your controller. Narrowing this range will add to the accuracy of the controller.

◆ **Higher and lower temperature setting ("HS" and "LS" parameters):**

Press and hold the "SET1 & Up" keys for more than 3 seconds to enter the "parameter setting menu". Find the "HS" or "LS" parameters by pressing "▲" or "▼" keys. Press the "SET1" key when you find "HS" or "LS" and then by pressing "▲" or "▼" adjust this parameter. Please note that your set point has to be always between the HS and LS values.

◆ **High and low temperature alarm functions:**

- If the temperature exceeds the higher alarm temperature "set point temperature + AH" the alarm output relay will be opened, the controller makes beeping sound and the display will alternately flash between "H" and the current temperature. By pressing any key the buzzer alarm will stop and alarm relay output will be closed.
- If the temperature drops to lower than the lower alarm temperature "set point temperature - AL" the alarm output relay will be opened, the controller makes beeping sound and the display will alternately flash between "L" and the current temperature. By pressing any key the buzzer alarm will stop and alarm relay output will be closed.

Setting AL and AH parameters on zero will turn the alarm function off.

◆ **High and low temperature alarm settings ("AH" and "AL" parameters):**

Press and hold the "SET1 & Up" keys for more than 3 seconds to enter the "parameter setting menu". Find the "AL" or "AH" parameters by pressing "▲" or "▼" keys. Press the "SET1" key when you find "AL" or "AH" and then by pressing "▲" or "▼" adjust the temperature. "Set point temperature - AL" is for lower temperature alarm and "Set point temperature + AH" is for higher temperature alarm. Setting AL and AH parameters on zero will turn the alarm function off.

◆ **Parameters setting and definition:**

Symbol	Details	Setting range	Factory settings	Units
HC	Heating / cooling	H / C	C	
d	Hysteresis or Differential Set Value(temperature band)	1 to 25	1	°F
LS	Lower temperature setting	-58 ~ HS	-58	°F
HS	Higher temperature setting	LS ~ 230	230	°F
CA	Temperature Calibration	-9 To +9	0	°F
PT	Delay Protection time	0 ~ 30	1	Minutes
AH	High temperature Alarm Hysteresis	0 ~ 25	1	°F
AL	Low temperature Alarm Hysteresis	0 ~ 25	1	°F

⑥ **Error messages and troubleshooting:**

1) When the controller displays --- it shows that the sensor is disconnected.
2) When the controller displays LLL it shows that the measured temperature by sensor is lower than -58 °F.
3) When the controller displays HHH it shows that the measured temperature by sensor is higher than 230 °F.

⑦ **Caution:**

◆ The maximum current load of the heating or cooling source must not exceed the output relay contact capacity. It will damage the unit and may cause fire.

◆ Check the wiring diagram before wiring the unit. Wrong wiring will damage the controller and may cause fire.

◆ Applying extra force on the screws of controller terminals will break the base. Please tighten the screws gently.

◆ Turn the power supply off when you are wiring relays, sensors, .. Otherwise it will damage the unit and may cause fire.

NTC Sensor

- Measurement range: -58 to 230 °F
- Cable length (L): 10 ft (3m)
- Sensor type: Water proof Negative Temperature Coefficient sensor 10K

Humidity Controller:

Humidity controller Technical Parameters:

- *Humidity Measuring Range: 5% ~ 99% RH*
- *Humidity controlling range: 5% ~ 95% RH*
- *Resolution: 1 % RH*
- *Accuracy: ±5%RH（10%RH~95%RH，25℃）*
- *Relay contact output: Max 15A / 110 ,*
- *Alarm output: 3A/110V*
- *Temperature coefficient: ±0.2%RH/℃*
- *Sensor operating temperature range: -30℃~+80℃*

Button (key) Description:

1. **Power2**: To turn the controller ON press the Power2 key. To turn the controller OFF press and hold the RST key for 3 seconds.
2. **SET2**:

A: To set the humidity set point, press the SET2 key once and the controller will go to the "humidity setting" mode. By pressing ▲ or ▼ keys you can adjust the humidity to your required set point. When the set point is adjusted you can exit the "humidity setting" mode by pressing the SET2 key again.

B: To set the controller parameters, press and hold the SET2 & Up keys together for more than 3 seconds and the controller will go to the "parameter setting menu". By pressing ▲ or▼ keys you can select the required parameter from the menu. When the required parameter is found, press the SET2 key once and the controller will go to the required parameter setting mode. By pressing ▲ or ▼ keys, you can adjust the parameter that you need. When the parameter is set, you can exit the "parameter setting mode" by pressing the Power2 key (or wait for 5 seconds and the controller automatically exit this mode).

3. ▲: Increasing Up key
4. ▼: Decreasing Down key

Operating instructions

LED Status (light display):

- When the red light beside the "Work2" is ON it shows that the output (humidifying or dehumidifying) is working.
- If the light beside the "Work2" flashes, it shows that the controller is on delay.
- If the light beside the "Set2" is ON, it shows that the controller is on setting mode.

Humidification/Dehumidification functions:

- Dehumidification mode: When the measured humidity is equal or higher than the (set point humidity + hysteresis), the relay turns the dehumidifier ON and when it is less than the (set point humidity - hysteresis), the relay turns it OFF.

- Humidification mode: When the measured humidity is equal or lower than the (set point humidity - hysteresis), the relay turns the humidifier ON and when it is higher than the (set point humidity + hysteresis), the relay turns it OFF.

Delay protection

This is a safety feature to protect the device that is connected to the unit, from continual switching. It prevents breaking the humidifier/dehumidifier as a result of frequent turning On and Off.

For example if this parameter is set to "3 minutes", when the measured humidity is equal or lower than the (set point humidity - hysteresis), the working indictor will flash to indicate that the relay action is being delayed (for 3 minutes) and after 3 minutes the light will become solid and the relay will switch the humidifier ON. If this parameter is set to "0" there will be no time delay.

Delay Protection setting

Press and hold the "SET2 & Up" keys for more than 3 seconds to enter the "parameter setting menu". Find the "PT" parameter by pressing "▲" or "▼" keys. Press the "SET2" key when you find "PT" and then by pressing "▲" or "▼" adjust this parameter. By setting it on "0" there will be no time delay.

Higher and lower humidity function

By adjusting the higher and lower humidity, you will define the display range of your controller. Narrowing this range will add to the accuracy of the controller.

Higher and lower humidity setting ("HS" and "LS" parameters):

Press and hold the "SET2 & Up" key for more than 3 seconds to enter the "parameter setting menu". Find the "HS" or "LS" parameters by pressing "▲" or "▼" keys. Press the "SET2" key when you find "HS" or "LS" and then by pressing "▲" or "▼" adjust this parameter.

Please note that your set point has to be always in between the HS and LS values.

Humidification /Dehumidification functions:

- Dehumidification mode: When the current humidity is equal or higher than the set point humidity (+ hysteresis), the relay turns the dehumidification source ON and when it is less than the set point humidity, the relay turns it OFF.
- Humidification mode: When the current humidity is equal or lower than the set point temperature (- hysteresis), the relay turns the humidification source ON and when it is higher than the set point humidity, the relay turns it OFF.

Humidification / Dehumidification setting ("HC" parameter):

To set the controller on Humidification or Dehumidification mode, press and hold the "SET2 & Up" keys for more than 3

seconds to enter the “parameter setting menu”. Find the “HC” parameter by pressing ▲ or▼ keys. Press the "SET2" key when you find the “HC” and then by pressing "▲" or " ▼ " adjust it to “C” for dehumidification or to “H” for humidification mode.

Hysteresis or Differential Set Value (Humidity Band) function:

To prevent the frequent ON/OFF action of the output a humidity band (called hysteresis or differential set value) is created between the ON and OFF operations. The controller will use a range (a maximum and minimum) for the process of controlling action, which is between 1% to 25%. For example when the hysteresis is set on 5% and the set point on 50%, the output ON/OFF action would be when the humidity goes lower than 45% and higher than 55%.

Hysteresis setting (“d” parameter):

Press and hold the “SET2 & Up” keys for more than 3 seconds to enter the “parameter setting menu”. Find the “d” parameter by pressing "▲" or " ▼" keys. Press the “SET2” key when you find “d” and then by pressing "▲" or " ▼" adjust it to any number from 1 to 25.

Humidity calibration:

You can calibrate the humidity reading with this function. Correction value can be positive, negative or 0.

Humidity calibration setting (“ CA” parameter):

Press and hold the “SET2 & Up” keys for more than 3 seconds to enter the “parameter setting menu”. Find the “CA” parameter by pressing "▲" or " ▼" keys. Press the “SET2” key when you find “CA” and then by pressing "▲"or"▼" adjust this parameter.

◆ **High and low Humidity alarm functions:**

- If the Humidity exceeds the higher alarm humidity “set point humidity + AH” the alarm output relay will be opened, the controller makes beeping sound and the display will alternately flash between ”H” and the current humidity. By pressing any key the buzzer alarm will stop and alarm relay output will be closed.
- If the humidity drops to lower than the lower alarm humidity “set point humidity - AL” the alarm output relay will be opened, the controller makes beeping sound and the display will alternately flash between ”L” and the current humidity. By pressing any key the buzzer alarm will stop and alarm relay output will be closed.

Setting AL and AH parameters on zero will turn the alarm function off.

◆ **High and low temperature alarm settings (“AH” and “AL” parameters):**

Press and hold the “SET2 & Up” keys for more than 3 seconds to enter the “parameter setting menu”. Find the “AL” or “AH” parameters by pressing "▲" or "▼" keys. Press the “SET2” key when you find “AL” or “AH” and then by pressing "▲" or "▼" adjust the humidity. “Set point humidity - AL” is for lower humidity alarm and “Set point humidity + AH” is for higher humidity alarm. Setting AL and AH parameters on zero will turn the alarm function off.

Parameter Menu and Settings

Symbol	Details	Setting range	Factory Setting
HC	Humidification/Dehumidification	H/C	H
d	Hysteresis or Differential Set Value(Humidity band)	1-25 %	1 %
LS	Lower humidity setting	1% - HS	0 %
HS	Higher humidity setting	LS - 99 %	100 %
CA	Humidity calibration	-9 to +9	0 %
PT	Delay protection time	0 - 30	1 minute
AH	High temperature Alarm Hysteresis	0 ~ 25	1%
AL	Low temperature Alarm Hysteresis	0 ~ 25	1%

Error messages and troubleshooting:

1) When the controller displays EEE, it shows that the sensor is disconnected.
2) When the controller displays LLL it shows that the measured humidity is lower than LS.
3) When the controller displays HHH it shows that the measured humidity is higher than HS.
4) If the LCD doesn’t light up the connections to power supply terminals and the humidity sensor connections need to be checked.

Caution:

- Avoid using the controller and the sensors in dusty environments.
- Do not submerge the humidity sensor in water or liquid.
- The temperature sensor (NTC sensor) is for calculating the humidity more precisely. The temperature sensor should be installed in the vicinity of the humidity probe.
- The maximum current load of the humidification or dehumidification sources must not exceed the output relay contact capacity. It will damage the unit and may cause fire.
- Check the wiring diagram before wiring the unit. Wrong wiring will damage the controller and may cause fire.
- Applying extra force on the screws of controller terminals will break the board base. Please tighten the screws gently.
- Turn the power supply off while wiring the relays, sensors, … Otherwise it’ll damage the unit and may cause fire.