

TC-10 Manual

Important

Do not over load the device.

Care must always be taken when working with electricity.

Operating Instructions

The Set Point: This is the temperature you wish the unit to aim for when operating which is accessible from the main screen. It operates together with the Dead Zone, Cooling Hysteresis and the Heating Hysteresis Settings. Adjusting these last 3 settings is all done from the Settings menu which is explained later on in this Manual.

To access and change the Set Point press and hold the SET key for 6 seconds and it will start to flash. Use the UP and Down arrow keys to change the value. Once you have selected the value press the SET key to return to display the current temperature reading.

Cooling and Heating Hysteresis: These 2 settings (**HSC & HSH**) tell the unit at what temperature the heating and cooling circuits are to start operating above or below the Set Point.

Example

If the Set Point was set at 10C and the Cooling and Heating Hysteresis were both set to 2C. If the temperature went to 12C (Set Point + Cooling Hysteresis) then the cooling circuit would start to operate until it reached the Set Point of 10C again. Likewise if the temperature went to 8C (Set Point - Heating Hysteresis) then the heating circuit would operate until the Set Point of 10C was reached.

The Cooling and Heating Hysteresis can have separate values and can be thought of as the tolerance or difference you will accept until the circuits start to operate.

Dead Zone: This setting can be thought of as the padding to the Set Point and Hysteresis settings. This setting can be set to zero as it does not always have to be used as, in some cases it can make simple operations more complex than you require them to be.

Example

Set Point	10 C
Heating Hysteresis	2 C
Cooling Hysteresis	2 C
Dead Zone	5 C

For the Cooling circuit to come on using the above settings the temperature would need to reach 14.5C. This is calculated using the following formula:

$$\text{Set Point} + \text{Cooling Hysteresis} + (\text{Dead Zone} \text{ DIVIDED BY } 2) = 14.5\text{C}$$

When 14.5C was reached the cooling circuit would start to operate until the temperature reached 12.5C. The reason is that the Dead Zone setting also changes the Set Point setting by half of it's value. The new Set Point can be calculated as:

$$\text{Set Point} + (\text{Dead Zone} \text{ DIVIDED BY } 2) = 12.5\text{C}$$

Likewise the heating functions will start to operate when the temperature reaches:

$$\text{Set Point} - \text{Heating Hysteresis} - (\text{Dead Zone} \text{ DIVIDED BY } 2) = 5.5\text{C}$$

The unit will stop the heating circuit when it reaches:

$$\text{Set Point} - (\text{Dead Zone} \text{ DIVIDED BY } 2) = 7.5\text{C}$$

How to enter the Settings Menu

Press and hold the SET key and the UP arrow key together for 6 seconds to enter the setting Menu. Then to select the setting you wish to view or change press the UP & DOWN keys to scroll through them. Once you have selected the setting you require, press the SET key to display its value. Now use the UP & DOWN keys to increase or decrease its value. To accept the new value press the SET key. At this point you can select another setting to change or select the END option by press the UP and DOWN keys.

The following table explains each setting.

Code	Description	Range
Us	Upper Alarm Temperature	-39 to 60C
Ls	Lower Alarm Temperature	-40 to 59C
CAL	Temperature Calibration	-10 to 10C
HSC	Cooling Hysteresis	0 to 20C
HSH	Heating Hysteresis	0 to 20C
dbd	Dead Zone	-20 to 20C
rt	Cooling Delay	0 to 255 Min's
At	Temperature Alarm Delay	0 to 255 Min's
C-H	Operating Mode	0 or 1 or 2
C-F	Celsius or Fahrenheit	0 or 1
dFu	Default/Reset to factory settings	0 or 1

Set up Functions

Us (Upper Temperature): This setting is the highest temperature the unit will measure before displaying the high temperature alarm display of **HHA**.

Ls (Lower Temperature): This setting is the lowest temperature the unit will measure before displaying the low temperature alarm display of **LLA**.

CAL (Calibration): This allows you to adjust the current temperature reading plus or minus 10C or F. Although the TC-10 is an accurate unit you may wish to extend the cable length or use it in an area where there may be interference from other appliances. In rare occasions where this may be required the option is available to adjust the temperature reading.

HSC: The temperature to start operating the cooling circuit above the Set Point i.e. (Set Point + HSC)

HSH: The temperature to start operating the heating circuit below the Set Point i.e. (Set Point + HSH)

dbd: The padding values to be added to the Set Point and Hysteresis settings. See example above.

rt: The time delay in minutes as to when the cooling circuit will react to the request to be turned on. This is designed to safeguard the devices you have connected to the unit from being turned on and off too quickly. This on and off effect can result in greatly reduced life expectancy in most devices especially any that use a compressor. The unit remembers when the last time the cooling circuit was turned on. If this was greater than the delay value it will turn the circuit on straight away rather than having to wait for the entire delay time again.

At: The time in minutes as to when the screen will change to display the high or low temperature alarm. High: **HHA** Low: **LLA**

C-H: Select the mode: **0** Cooling & Heating, **1** Cooling Mode, **2** Heating Mode

C-F: Select with temperature mode to operate in: **0** Celsius or **1** Fahrenheit.

dFu: Reset to factory settings: **1** back to factory settings, **0** no changed

Locking the Keys

As an extra safety feature the buttons can be locked so that any time they are touched the display changes to read **OFF**. To set or unset this feature simply press the **UP & DOWN** keys together for 3 seconds or more. The display will change to read **OFF** for a couple of seconds before displaying the current temperature again, the keys are now locked. To unlock the keys simply press the **UP & DOWN** keys together for 3 seconds or more.

Display Messages

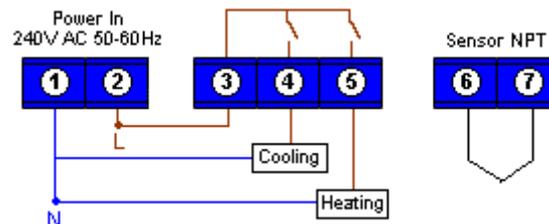
EEE: Sensor Error, **LLA**: Low Temperature, **HHA**: High Temperature, **OFF** Keys Locked

Wiring

Please use the following wiring diagram to wire your devices.

Please note that the switches (relays) only require to cut the live (hot) wire when turning the connected devices on and off. For example you can see the diagram has a live (hot) wire connected to pin 2 and 3. This means that when the unit turns the switch on, as dictated by its setting, it will join up the 2 wires and allow the power to flow to the device.

Pin 1: Natural power in, otherwise know as Negative wire
Pin 2: Live power in, otherwise know as Hot or Positive wire
Pin 3: Live power to feed the relays
Pin 4: Live output to Cooling Devices
Pin 5: Live output to Heating Devices
Pins 6 & 7: Temperature sensor



Specifications

Case Material: Fire resistance black ABS

Size: 75×38×70

Protective classification: Front, IP54

Operating temperature & Humidity: -10 to 55c RH <85%

Storage Condition & Humidity: -10 to 70C, RH <85%

Measure & Controlling Range: -40C to 60C / -40-140F

Resolution: 0.1 C/F

Power Supply: 240V AC + or -10% 50 to 60Hz

Power Consumption: no more than 2W

Relay Connection:

Heating Circuit is 240v, 10A, 2400w Max

Cooling Circuit is 240v, 16A, 3800w Max

Sensor Type: NTC