Comfort Thermostat Function

Introduction

The Thermostat function in Comfort allows Comfort to control up to 8 sets of heating and cooling valves by means of temperature setpoints and temperature readings. Control of heating and cooling shall be using two outputs to switch relays for the heating and cooling valves.
The Thermostat function assigns Outputs for Heating and Cooling control, Counters for Heating and Cooling Setpoints, a Flag for On and Off, and a Sensor for Temperature. Once the Parameters are set, Comfort will take care of all the logic without any Response programming.
Hence Setpoints can be changed by loading values into counters. The thermostat can be enabled or disabled by setting and clearing the assigned flag.
The status of the setpoints, temperature and on/off mode can be known by the Comfort counters, sensors and flags which can be shown on the Comfort apps, KT03, Wizcomfort or heard on the voice control menu.
The KT03 display example illustrates a HVAC control user interface.

Main Applications for Comfort

1. Time Programs to turn on and off the heating or cooling and to change setpoints
2. When Comfort is armed to different security modes or disarmed, turn on and off the heating or cooling or to change setpoints
3. Control heating and cooling by iPad/iPhone or android apps or telephone voice menu.

Minimum Requirements

Comfort Ultra or Logic Engine Firmware 7.039 and above
Comfigurator 3.7.6 and above

Comfigurator Settings

Go to Functions > Thermostats
8 Thermostats can be seen

Common Thermostat properties
The common properties for all thermostats are

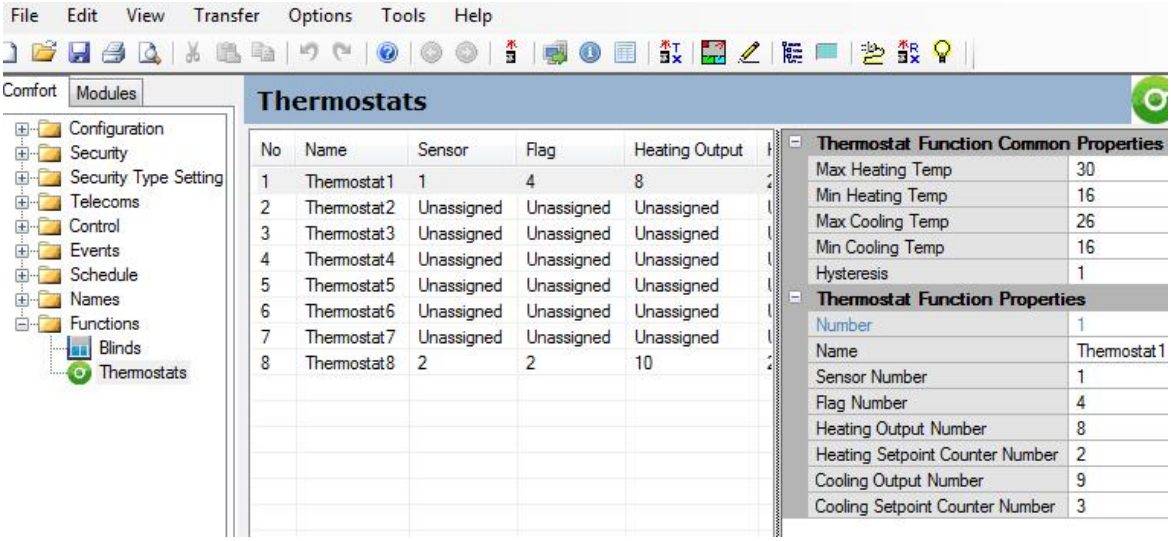
Maximum Heating Temperature
This is the maximum heating setpoint temperature. If a higher value is put into the Heating Setpoint counter, the setpoint will be limited to this maximum value

Minimum Heating Temperature
This is the minimum heating setpoint temperature. If a lower value is put into the Heating Setpoint counter, the setpoint will be limited to this minimum value

Maximum Cooling Temperature
This is the maximum cooling setpoint temperature. If a higher value is put into the Cooling Setpoint counter, the setpoint will be limited to this maximum value

Minimum Cooling Temperature
This is the minimum cooling setpoint temperature. If a lower value is put into the Cooling Setpoint counter, the setpoint will be limited to this minimum value

Hysteresis
This is the Hysteresis temperature value used in the comparison between actual temperature and setpoint.



Thermostat Function Properties
Each of the 8 Thermostat has the following settings

Sensor Number
This is the Comfort sensor assigned to the Temperature of the Thermostat.
Sensors assigned to Thermostats must be unique, i.e. they can be assigned to only 1 Thermostat
The temperature reading can be from TCS01 or external temperature sensor like Heatmiser, Zwave or Velbus

Flag Number
This is the Comfort Flag assigned to the Thermostat.
Assign a flag to a thermostat to enable and disable the thermostat. When the flag is off, the heating and cooling outputs will turn off. When the flag is on, the heating and cooling setpoints will operate the outputs based on comparison between the temperature and the heating/cooling setpoints. Flags assigned to thermostats must be unique, i.e. they can be assigned to only 1 Thermostat.
Note that Flags are not reset by Comfort Reset in firmware 7.039 and above but cold Reset (power off without battery) will reset the Flags to 0

Heating Output Number
This is the Comfort Output number for Heating control. If the Heating Output is Unassigned then the heating function will not work. Heating and Cooling cannot be on at the same time but they can both be off. Outputs must be uniquely assigned to one heating or cooling only and cannot be also assigned to security outputs, blinds function, Responses or other purposes

Heating Setpoint Counter Number
This is the Comfort Counter number which holds the Heating Setpoint. The counter value is limited by the Minimum Heating Setpoint and Maximum heating Setpoint and cannot be set to any values outside this range.
Setting the heating counter value= 0 will disable the heating function and turn off the heating output
The same counter number can be used in more than 1 thermostat so the same setpoints can be used
Note that Counters are not reset by Comfort Reset in firmware 7.039 and above but cold Reset (power off without battery) will reset the counters to 0

Cooling Output Number
This is the Comfort Output number for Cooling control. If the Cooling Output is Unassigned then the cooling function will not work. Heating and Cooling cannot be on at the same time but they can both be off. Outputs must be uniquely assigned to one heating or cooling only and cannot be also assigned to security outputs, blinds function, responses or other purposes

Cooling Setpoint Counter Number
This is the Comfort Counter number which holds the Cooling Setpoint. The counter value is limited by the Minimum Heating Setpoint and Maximum heating Setpoint and cannot be set to any values outside this range.
Setting the cooling counter value= 0 will disable the Cooling function and turn off the cooling output.
The same counter number can be used in more than 1 thermostat so the same setpoints can be used
Note that Counters are not reset by Comfort Reset in firmware 7.039 and above but cold Reset (power off without battery) will reset the counters to 0

Principle of Operation

If the Flag assigned to the thermostat is ON, then the thermostat is enabled. If it is off, then Heating and Cooling outputs will be off and the thermostat is disabled.
This works by comparing the setpoint with the actual temperature for each Thermostat.
In cooling mode, if the actual temperature is higher than the setpoint + hystereris, the cooling is turned on (and heating off) using an output. If the temperature is lower than setpoint -

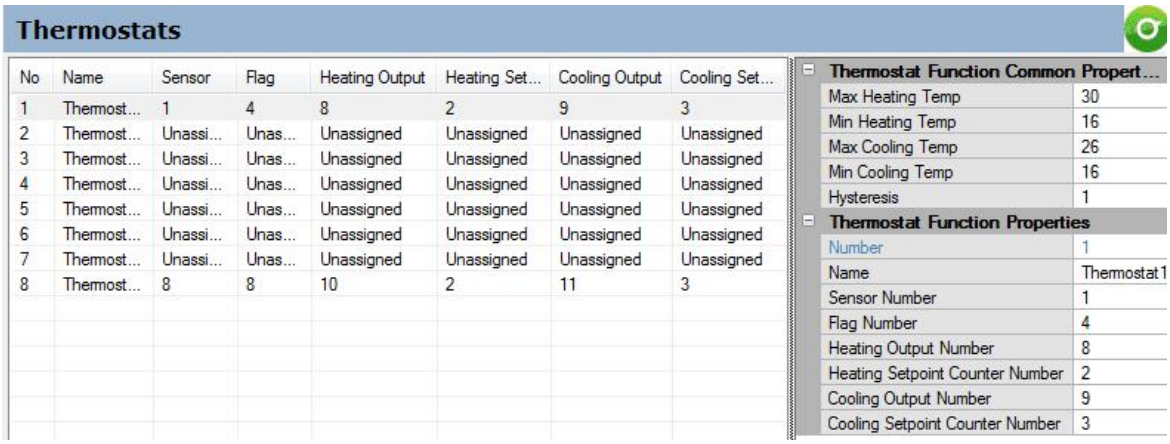
hysteresis, the cooling is turned off. The hysteresis prevents constant switching between on and off.
In heating mode, the opposite applies. If the temperature is lower than the setpoint, the heating is turned on (and cooling off) until the temp rises to the setpoint. When the temp falls below the setpoint - hysteresis, the heating is turned on again
Heating and cooling cannot be switched on at the same time (interlocking)

The flowchart is shown below. The sequence is triggered by a change in Sensor value (Temperature), a change in the setpoint (counter) value or a change in state of the Flag (on/off).

Sample Configuration

The cclx file blindshvactest.cclx has the configuration described here.
Thermostats 1 and 8 are programmed for this example
The common parameters by default are;
Max Heating Temp = 30

Min Heating Temp = 16
Max Cooling Temp = 26
Min Cooling Temp = 16
Hysteresis = 1

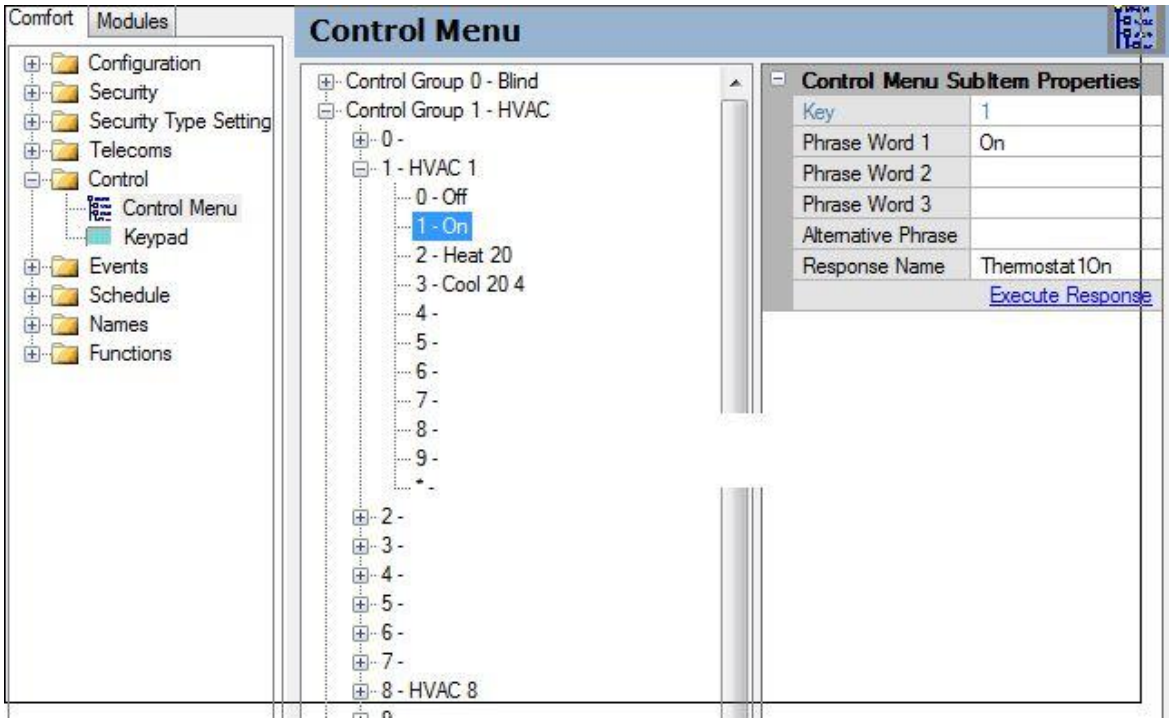


Thermostat 1
Sensor = 1
Flag = 1
Heating Output 8
Heating Setpoint Counter 2
Cooling Output 9
Cooling Setpoint Counter 3

Thermostat 8
Sensor = 8
Flag = 8
Heating Output 10
Heating Setpoint Counter 2
Cooling Output 11
Cooling Setpoint Counter 3

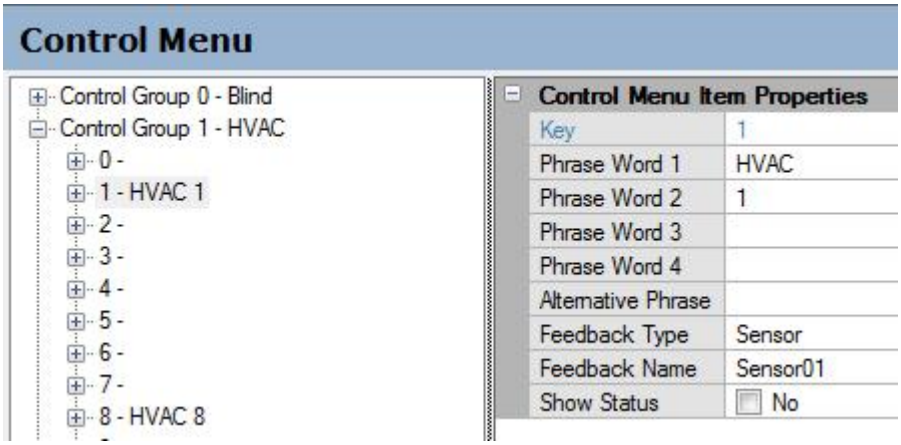
Note that you are not allowed to select any Outputs that are used for other purposes like Security Status Outputs, Blinds, and Responses

The Home Control Menu shows how it can be used to set temperature setpoints turn the thermostats on and off and read the temperature of the Thermostats 1 and 8

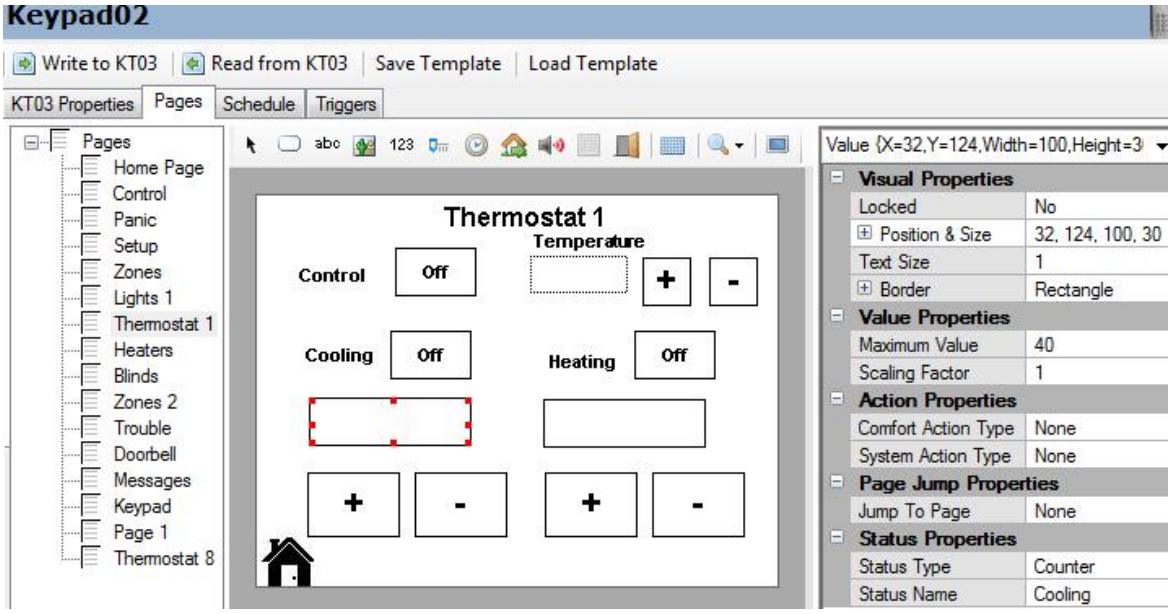


The “Execute Response” link on each control menu action key allows the programmed response to be activated for testing. Execute Responses is also available in the Responses page.

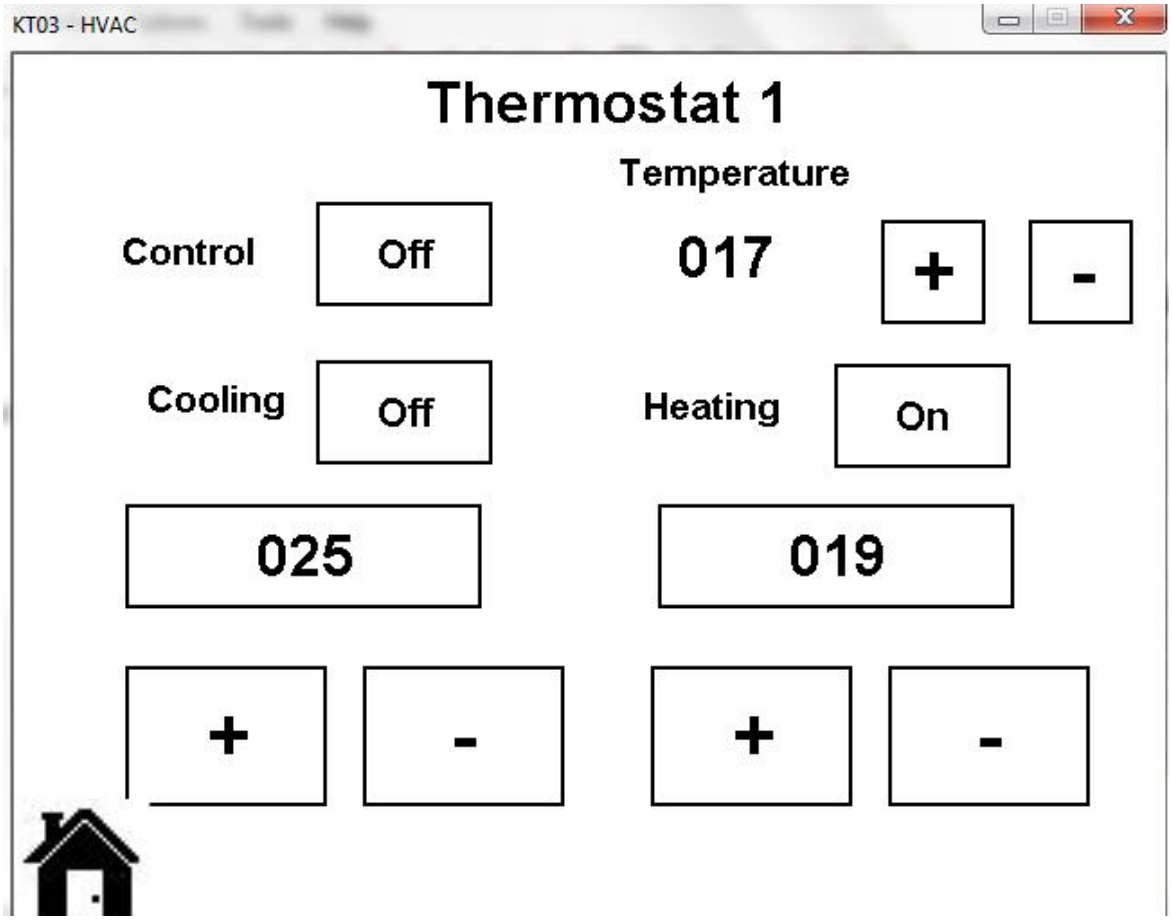
The Feedback is programmed as Sensor 1 so that the temperature can be heard or seen



KT03 is also programmed in this example to allow the temperature and setpoints to be seen and the cooling and heating setpoints to be controlled



The KT03 Thermostat 1 page is seen below(in simulation Mode)



Touching the On/Off button will toggle the On/Off state by toggling the assigned flag
The temperature box shows the value of Sensor 1

The Cooling and Heating Setpoints (counter values) are shown. The + and - buttons below the heating and cooling setpoints increment and decrement the heating and cooling setpoint counters.
The Heating and Cooling Boxes show the state of the respective Outputs.
The + and - buttons next to the temperature display is to simulate the temperature to see the effect on the heating and cooling. Use this to increment and decrement the sensor holding the temperature and see the heating and cooling outputs turn on and off accordingly. These boxes can be deleted in the final configuration.

If only heating is required set the cooling setpoint counter value to 0.
If only cooling is required, set the heating setpoint counter value to 0.

Document History

5 October 2013 - Initial Release