# Climate Curve

## USER MANUAL

Translation of the original instructions

Version: **1.0**

Date: **28/04/2026**

# Contents



| VERSION | DATE | CHANGES |
|---|---|---|
| **1.0** | **27/Apr/2026** | - |

Any information inside this manual can be changed without advice.

This handbook can be download freely from the website: www.eelectron.com

Exclusion of liability:
Despite checking that the contents of this document match the hardware and software, deviations cannot be completely excluded. We therefore cannot accept any liability for this.
Any necessary corrections will be incorporated into newer versions of this manual.

Symbol for relevant information 

Symbol for warning 

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# 1. Climate Curve

## Description

Climate curve is an advanced method for temperature regulation used to set the delivery temperature, i.e. the temperature of water/ air of the HVAC system, depending on the external temperature.

## CO objects and general parameters

Communication objects involved:

| | | |
|---|---|---|
| “<Climate Curve> Heat / Cool” | 1 Bit | CW |
| “<Climate Curve> External Temperature” | 2 Bytes | CW |
| “<Climate Curve> Nominal Temperature Heating” | 2 Bytes | CW |
| “<Climate Curve> Coefficient Heating” | 2 Bytes | CW |
| “<Climate Curve> Max Delivering Temperature Heating” | 2 Bytes | CW |
| “<Climate Curve> Nominal Temperature Cooling” | 2 Bytes | CW |
| “<Climate Curve> Coefficient Cooling” | 2 Bytes | CW |
| “<Climate Curve> Min Delivering Temperature Cooling” | 2 Bytes | CW |
| “<Climate Curve> Calculated Delivery Temperature” | 2 Bytes | CRT |
| “<Climate Curve> Delivery Temperature Setpoint” | 2 Bytes | CW |
| “<Climate Curve> Ambient Temperature” | 2 Bytes | CW |
| “<Climate Curve> Ambient Humidity” | 2 Bytes | CW |
| “<Climate Curve Control> Enable Heating” | 1 Bit | CW |
| “<Climate Curve Control> Enable Cooling” | 1 Bit | CW |
| “<Climate Curve Control> Measured Delivering Temperature” | 2 Bytes | CWTU |
| “<Climate Curve Control> Heating / Cooling Valve” | 1 Byte | CRT |
| “<Climate Curve Control> Heating Valve” | 1 Byte | CRT |
| “<Climate Curve Control> Cooling Valve” | 1 Byte | CRT |
| “<Climate Curve Control> PWM Heating / Cooling Valve” | 1 Bit | CRT |
| “<Climate Curve Control> PWM Heating Valve” | 1 Bit | CRT |
| “<Climate Curve Control> PWM Cooling Valve” | 1 Bit | CRT |

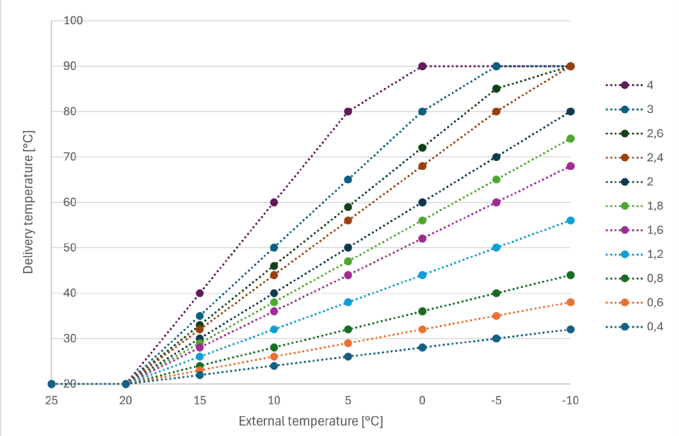
The “Climate Curve” functionality is activated by setting the parameter “Climate Curve” to “enable” option within the device’s “General Parameter Configuration” in the ETS® software.

| KNX PARAMETER | SETTINGS |
|---|---|
| **System** | heating<br>cooling<br>heating / cooling |
| This parameter defines the heat/cool configuration to apply the control for. | |
| **Delivery temperature source** | algorithm output / BUS object |
| This parameter determines whether the delivery temperature value (the temperature of the water entering the heating or cooling circuit) is internally calculated or its value is obtained by external source. | |

## State after download

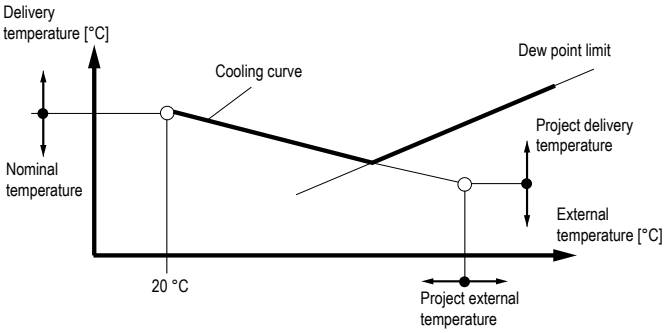
| KNX PARAMETER | SETTINGS |
|---|---|
| **Heat/Cool mode** | 0 = cooling / 1 = heating |
| This parameter defines the heat/cool state after download. | |

| | |
|---|---|
| **Heat/Cool - nominal temperature** | 0 ÷ 50 |
| This parameter defines the nominal temperature after download. Nominal temperature is the external temperature limit value to start applying the control. | |
| **Heat/Cool - coefficient** | 0 ÷ 10 |
| This parameter defines the coefficient to apply to the difference between external temperature an the nominal one.<br>Suggested values:<br>0.3 ÷ 0.5 good insulation, floor heating<br>1.0 ÷ 1.2 good insulation, radiator heating<br>1.4 ÷ 1.6 bad insulation, radiator heating | |
| **Heat - max delivery temperature** | 0 ÷ 100 |
| This parameter sets the absolute highest temperature limit that the heating medium (typically hot water) flowing through the fancoil, or the air blown out by the fancoil, is permitted to reach during heat mode. | |
| **Cool - min delivery temperature** | 0 ÷ 100 |
| This parameter establishes the absolute lowest temperature limit that the cooling medium (typically chilled water) flowing through the fancoil, or the air discharged by the unit, is permitted to reach during cool mode. | |




## Dew point control

| KNX PARAMETER | SETTINGS |
|---|---|
| **Dew point control** | disabled / enabled |
| This parameter is used to enable or disable the dew point control. | |
| **Altitude (tens of meters above sea level)** | 0 ÷ 255 |
| This parameter is used to input the installation height of the device or the entire building relative to sea level. The value is entered in increments of ten meters (e.g., a value of 5 means 50 meters above sea level). | |



## Adjustment tips

To reach the desired temperature here are some suggestions, heat mode:
1) if temperature is too low, increase nominal temperature
2) if temperature is too low especially in cold days, increase coefficient
3) if temperature is too low in autumn/spring but enough during cold days, increase nominal temperature and decreasse coefficient
4) if temperature is too high in autumn/spring but enough during cold days, decrease nominal temperature and increase coefficient

## Proportional-integral control

| KNX PARAMETER | SETTINGS |
|---|---|
| **Heat / Cool control type** | proportional<br>integral<br>proportional & integral |
| This parameter defines the specific control algorithm used to manage the heating and cooling valves to maintain the desired room temperature (setpoint). It determines how the controller reacts to temperature deviations.<br>**Proportional:**<br>The control output is directly proportional to the current the difference between the actual room temperature and the setpoint.<br>**Integral:**<br>The control output adjusts based on the accumulation of the error over time.<br>**Proportional & Integral:**<br>The control output combines the fast response of the proportional control with the accuracy of the integral control. | |
| **Heat / Cool - status after download** | disabled / enabled |
| This parameter defines the initial state of the heating / cooling control after a download. | |
| **Heat / Cool - proportional band [°C]** | 0 ÷ 50 |
| This parameter defines the range of temperature deviation around the heating / cooling setpoint within which the proportional control action takes place. | |
| **Heat / Cool - integral mode** | integral coefficient [Ki]<br>integral time [Ti] |
| Only in case of proportional & integral control, this parameter defines the integral parametrization mode. | |
| **Heat / Cool - integral coefficient [Ki]** | 0 ÷ 670760 |
| This parameter defines the gain, or weighting, applied to the integral control. | |
| **Heat / Cool - integral time [min] [Ti]** | 1 ÷ 600 |
| This parameter defines the integration time constant (Ti). | |
| **System type** | 2 pipes / 4 pipes |
| This parameter defines the hydraulic configuration of the HVAC system. This setting is crucial as it determines the fundamental capability and control logic the device will employ for heating and cooling. | |
| **Algorithm time [min]** | 0 ÷ 30 |
| This parameter defines the cycle time or period, measured in minutes, to calculate the PI value. | |
| **Algorithm time [s]** | 0 ÷ 59 |
| This parameter defines the cycle time or period, measured in seconds, to calculate the PI value. | |
| **Minimum period is 10s! PWM period will be synchronized to algorithm time (algorithm output)**<br>**Minimum period is 10s! (BUS object)** | |
| **Minimum PWM pulse width** | 0.5, 1.0, 1.5, 2.0, 2.5 sec. |
| This parameter sets the minimum duration for which the control signal must remain ON within one full PWM period. | |
| **Enable delay [period]** | 0 ÷ 255 |
| This parameter defines the number of algorithm cycles that must pass before activating control. | |
| **Automatic read request of delivery temperature feedback** | no / yes |
| This parameter, when enabled, instructs the device to automatically send a read request telegram on the object "<Climate Curve Control> Measured Delivering Temperature" onto the KNX BUS to retrieve the current temperature feedback from athe system; requests are done sychronically to algorithm time/PWM period start. | |

## Parameter optimization

To optimize parametrization of the system, 2 values must be determined: critical proportional band ($B_{cr}$) and critical period ($P_{cr}$).
To calculate $B_{cr}$, set the system as proportional and reduce the proportional band until output goes to constant oscillation; this value is $B_{cr}$. In this configuration the $P_{cr}$ can be determined as the time in which the output completes a single oscillation.

Use the following formulas to calculate values for parameters:
Proportional band = $B_{cr}$ * 2.22
Integration time = $P_{cr}$ * 0.83

Here are additional information for fine tuning

| Proportional band | | | | |
|---|---|---|---|---|
| | Gain | Stability | Response speed | Oscillation risk |
| Wide (e.g. 50°C) | Low | High | Slow | Minimal |
| Thin (e.g. 5°C) | High | Low | Fast | High |

| Integration time | | | | |
|---|---|---|---|---|
| | Integration action | Stability | Recovery speed | Oscillation risk |
| Long (e.g. 90 min) | "Patient" | High | Slow | Low |
| Short (e.g. 2 min) | "Aggressive" | Low | Fast | High |

| Examples | | |
|---|---|---|
| **Application** | **Proportional band [°C]** | **Integration time [min]** |
| 3-way mixing valve (plant delivery) | 15 ÷ 30 | 1 ÷ 2 |
| Floor heating with moderate thermal inertia | 2 ÷ 5 | 30 ÷ 60 |
| Floor heating with great thermal inertia | 2 ÷ 5 | 60 ÷ 120 |
| Radiators | 40 ÷ 60 | 1 ÷ 2 |
| Electric heaters | 20 ÷ 40 | 10 ÷ 20 |