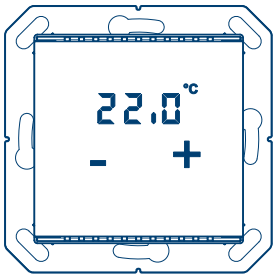
Application description

KNX building management system

KNX temperature control



KNX Secure thermostat

81582005

systemlink easylink

Berker

EN

Product overview

	Order number	Product designation	Application programme	TP product Radio product
	8158 2005	Thermostat with integrated bus coupling unit, KNX Secure	S81582005	■

Table 1: Product overview

We reserve the right to make changes of a technical nature.

1 Document Contents

This document describes the configuration and commissioning of the KNX thermostats listed in the product overview (see Product overview , page 2), as well as tips for using the KNX application software. It does not contain information or instructions on the mounting and installation of the devices or on the general principles of KNX programming.

Information

The corresponding operating and assembly instructions must be observed for the mounting and installation of the described devices. This guide is included with the product or is available for download online.

The illustrations and descriptions in this document are for clarification purposes only and may differ from the actual state of the software due to regular product optimisations.

- For general information on KNX building system technology, see hager.com

2 Information about programming software

2.1 ETS compatibility

The application programmes are compatible with ETS6 or higher and are always available in their latest version on our Internet website.

ETS version	File extension of compatible products	File extension of compatible projects
ETS4	*.knxprod	*.knxproj
ETS5	*.knxprod	*.knxproj
ETS6	*.knxprod	*.knxproj

Table 2: ETS compatibility

2.2 Application designation

Application	Item number	Product designation
S81582005	8158 2005	Thermostat with integrated bus coupling unit, KNX Secure

Table 3: Application designation

3 Function and device description

3.1 Device overview

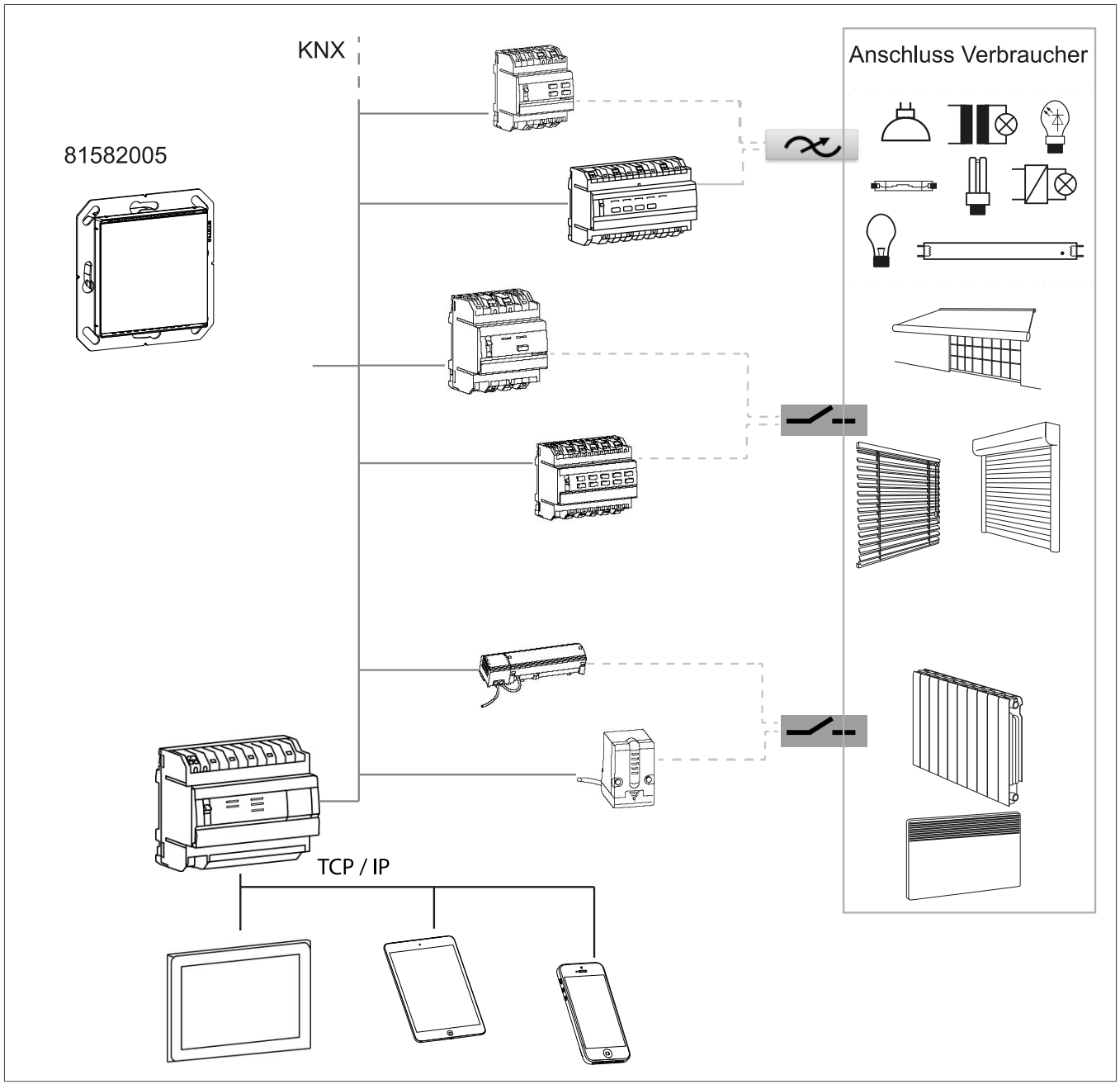


Fig. 1: Device overview

3.2 Functional description

The room thermostat measures the room temperature and displays the current value in white illuminated figures. Via the bus, the device can receive an external measured value and process it with own data to overall temperature value (mixed value).

The room thermostat has got an integrated PI controller for a heating and a cooling system (one or two step). The room temperature is adjusted by means of the **+** and **-** touch buttons.

The device is complemented by a frame of the switch series used in the building, thus fitting seamlessly into the interior design.

3.3 Physical addressing

The device is delivered ex works with the bus address 15.15.255. A different address can be programmed using ETS.

The physical address, group address and setting of the parameters is assigned by the ETS. The device is fitted with an integrated bus coupling unit and has a programming button for assigning the physical address and a red programming LED for display. The application software can be loaded directly into the bus coupling unit with the assignment of the physical address. If this has not taken place, it is also possible to program later. The red programming LED lights up by pressing the programming button. After assignment of the physical address by the ETS, the programming LED goes out. To check whether the bus voltage is present, press the programming button briefly; the red LED lights up. Press the button once again to exit the programming mode.

Note

If a device in an existing system is to be programmed, only one device can be in programming mode.

Page break

3.4 Functional overview

- Measurement of temperature. Mixed value from own measured value and external values (proportions can be set in percentage), output of minimum and maximum values
- Displays the actual value or the target value/basic setpoint shift
- 2 touch buttons (+/-) for adjustment of the room temperature
- PI controller for heating (one or two step) and cooling (one or two step) depending on temperature. Control according to separate setpoints or basic target temperature

Setpoint selection for room thermostat (RT)

The setpoint selection for room thermostat (RT) function allows automatic switching between the heating operating modes Comfort, Standby, Night -time mode, Frost/heat protection.

The following operating modes must first be created and configured in the room temperature controller:

Comfort

- The Comfort operating mode sets the room temperature to a temperature value pre-defined in the thermostat (Comfort temperature 21°C, for example) for comfort (presence).

Standby

- The Standby operating mode reduces the room temperature after leaving the room (brief absence) to a value predefined in the thermostat, e.g. 19°C.

Frost/heat protection

- The frost/heat protection operating mode (Building protection), depending on the circumstances, reduces the heat supply or activation of cooling appliances in automatic mode in order to protect the building from heating or cooling damage.

Eco

- The Eco operating mode turns down the room temperature during long absence (e. g. holiday) to a value defined in the thermostat, e.g. 17 °C.

4 Display and operation on the device

4.1 Adjust room temperature

Depending on the setting of the **LEDs temperature display** in the device application, the room temperature controller displays the current room temperature value (or mixed value), the setpoint or the offset from the basic setpoint. The display can be dimmed and also switched off via the bus, so that **no** value is displayed.

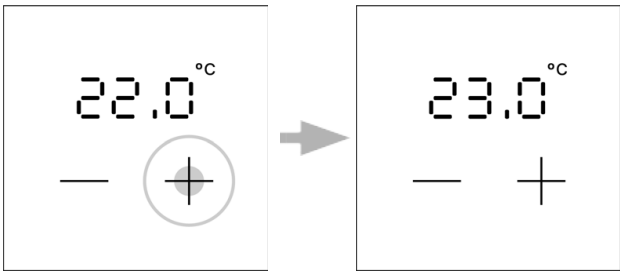
Option A: Display actual value (room temperature)

The current room temperature is displayed.

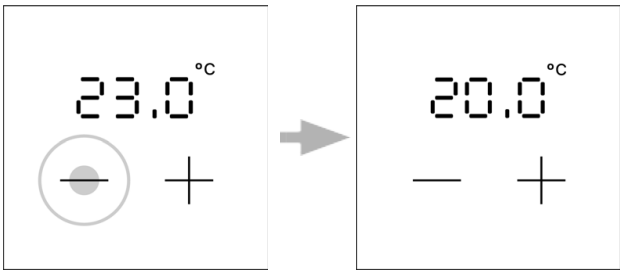
Option B: Display setpoint or base shift

Depending on the setting, the current setpoint or the offset relative to the basic setpoint is displayed. The temperature can be changed by touching the +/- buttons.

Setpoint display (absolute value):

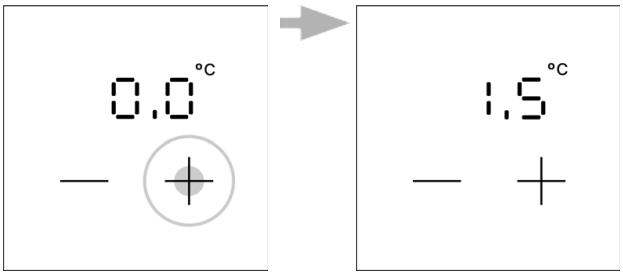


Tap +: Increase room temperature (set temperature is increased)

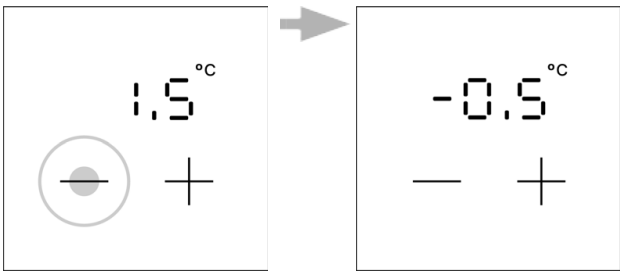


Tap -: Lower room temperature (set temperature is lowered)

Display of the basic setpoint shift (change from the basic setpoint of the controller):



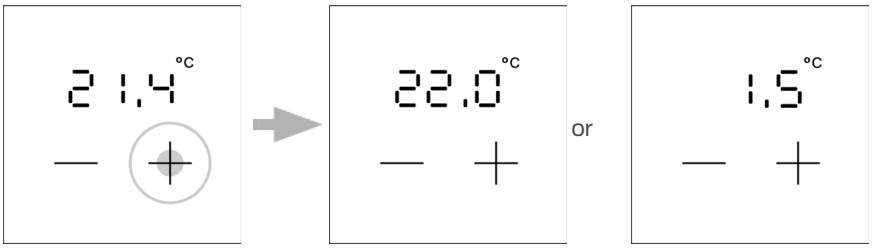
Tap +: Increase room temperature (basic setpoint shift in PLUS direction)



Tap -: Lower room temperature (basic setpoint shift in MINUS direction)

Option C: Show actual value and setpoint/base shift

During normal operation, the current room temperature is displayed. By touching the buttons, the display jumps to the target temperature or to the basic setpoint shift, depending on the presetting. Changes with + or - are visible. The display returns to room temperature if no button is touched for 7 seconds.



Touch + or - touch briefly:
The current set temperature (or the basic setpoint shift) is displayed.

Tap +:
Increase room temperature (set temperature/basic setpoint shift is increased).

Tap -:
Lower room temperature (set temperature/basic setpoint shift is lowered).

General

The step size for the change and the possible setting range are defined in the device application (ETS). There you can also define whether the manually changed values are retained after a mode change (e.g. Eco mode overnight) or reset to the stored values.

The button functions can be locked due to operating mode with priority 1. In Frost/Heat Protection mode, the setpoint cannot be changed.

5 Transmission protocol

Units →*Temperatures in degrees Celsius*

5.1 List of all communication objects

Abbreviation flags:

C Communication *R Read* *W Write* *T Transmit* *U Update*

No.	Name	Function	Flags	DPT	Size
1	Software version	Output	R-CT	[217.1] DPT_Version	2 byte
20	Temperature sensor: Malfunction	Output	R-CT	[1.1] DPT_Switch	1 bit
21	Temperature sensor: External reading	Input	-WCT	[9.1] DPT_Value_Temp	2 byte
22	Temperature sensor: Total reading	Output	R-CT	[9.1] DPT_Value_Temp	2 byte
23	Temperature sensor: Total measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 byte
24	Temperature sensor: Min/max. measured value request	Input	-WC-	[1.17] DPT_Trigger	1 bit
25	Temperature sensor: Minimum measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 byte
26	Temperature sensor: Maximum measured value	Output	R-CT	[9.1] DPT_Value_Temp	2 byte
27	Temperature sensor: Min/max. measured value reset	Input	-WC-	[1.17] DPT_Trigger	1 bit
50	Temp. controller: HVAC Mode (Priority 1)	Input / Output	RWCT	[20.102] DPT_HVACMode / [1.1] DPT_Switch	1 byte
51	Temp. controller: HVAC Mode (Priority 2)	Input / Output	RWCT	[20.102] DPT_HVACMode / [1.1] DPT_Switch	1 byte
52	Temp. controller: Frost/heat protection mode activation	Input	-WCT	[1.1] DPT_Switch	1 bit
53	Temp. controller: Block (1 = Blocking)	Input	-WC-	[1.1] DPT_Switch	1 bit
54	Temp. controller: Current setpoint	Output	R-CT	[9.1] DPT_Value_Temp	2 byte
55	Temp. controller: Change-over (0: Heating | 1: Cooling)	Input	-WC-	[1.1] DPT_Switch	1 bit
56	Temp. controller: Setpoint for Comfort heating	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 byte
57	Temp. controller: Setpoint for Comfort heating (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
58	Temp. controller: Setpoint for Comfort cooling	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 byte
59	Temp. controller: Setpoint for Comfort cooling (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit

No.	Name	Function	Flags	DPT	Size
60	Temp. controller: Basic 16-bit setpoint shift	Input	-WC-	[9.1] DPT_Value_Temp	2 byte
61	Temp. controller: Setpoint for Standby heating	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 byte
62	Temp. controller: Setpoint for Standby heating (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
63	Temp. controller: Setpoint for Standby cooling	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 byte
64	Temp. controller: Setpoint for Standby cooling (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
65	Temp. controller: Setpoint for Eco heating	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 byte
66	Temp. controller: Setpoint for Eco heating (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
67	Temp. controller: Setpoint for Eco cooling	Input / Output	RWCT	[9.1] DPT_Value_Temp	2 byte
68	Temp. controller: Setpoint for Eco cooling (1:+ | 0:-)	Input	-WC-	[1.1] DPT_Switch	1 bit
69	Temp. controller: Actuating variable, heating (1st Stage)	Output	R-CT	[5.1] DPT_Scaling	8 bit
70	Temp. controller: Actuating variable, heating (1st Stage)	Output	R-CT	[5.1] DPT_Scaling	8 bit
71	Temp. controller: Actuating variable, cooling (1st Stage)	Output	R-CT	[5.1] DPT_Scaling	8 bit
72	Temp. controller: Actuating variable, cooling (1st Stage)	Output	R-CT	[5.1] DPT_Scaling	8 bit
73	Temp. controller: Act. variable for 4/6-way valve	Output	R-CT	[5.1] DPT_Scaling	8 bit
74	Temp. controller: Status heater stage 1 (1:ON | 0:OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
75	Temp. controller: Status heater stage 2 (1:ON | 0:OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
76	Temp. controller: Status cooler stage 1 (1:ON | 0:OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
77	Temp. controller: Status cooler stage 2 (1:ON | 0:OFF)	Output	R-CT	[1.1] DPT_Switch	1 bit
78	Temp. controller: Comfort extension status	Input / Output	RWCT	[1.1] DPT_Switch	1 bit
79	Temp. controller: Comfort extension time	Input	RWCT	[7.5] DPT_TimePerioodSec	2 byte
80	Temp. controller: Fan coil level 0 to 3	Output	R-CT	[5.1] DPT_Scaling	8 bit
81	Temp. controller: Fan coil level 1	Output	R-CT	[1.1] DPT_Switch	1 bit

No.	Name	Function	Flags	DPT	Size
82	Temp. controller: Fan coil level 2	Output	R-CT	[1.1] DPT_Switch	1 bit
83	Temp. controller: Fan coil level 3	Output	R-CT	[1.1] DPT_Switch	1 bit
86	All LEDs ON/OFF	Input	-WC-	[1.1] DPT_Switch	1 bit
87	All LEDs brightness	Input	-WC-	[5.1] DPT_Scaling	1 bit

6 Setting the parameters

6.1 Behaviour in the event of a power failure/return

Behaviour in the event of bus voltage failure

The device is not transmitting anything. The device is out of service.

Behaviour when the bus voltage returns, after programming or reset:

The device sends all outputs according to their transmission behaviour set in the parameters. Delays defined in the ‘General settings’ parameter block are taken into account.

6.2 General settings

Basic parameters for the data transmission

These parameters are used to set the basic properties of data transmission.

Transmission delay in seconds after reset and bus voltage recovery	**5** ... 7200 s
Maximum message rate	1 message per second ... **10 messages per second** ... 50 messages per second

Basic properties of the LED

Set the initial value for LED brightness. It is also necessary to specify whether the LED display should be controlled via objects. This activates input objects for the LED brightness, and it must be set whether the LEDs should switch off automatically after pressing a button.

Brightness	0 ... 10 ...**100**%
Use objects	**No** Yes
Object value on/off after reset	0 **1**
Use automatic switch-off after pressing a button	**No** Yes
Switch off after	1 ... **30** ... 255 sec. after operation

Actual value and setpoint/base shift

– Displays the actual value in normal functioning conditions. If the + or - buttons are touched, the setpoint or basic setpoint shift are displayed. The setpoint/basic shift display closes after 7 seconds of inactivity and the display jumps back to the actual value.

Temperature display	only display actual value display only setpoint/base shift **display actual value and setpoint/base shift**

6.3 Temperature measured value

Malfunction object

This parameter specifies whether a malfunction object is to be used. This activates output object 7 for the error message.

Use malfunction object	**No** Yes

Table 4: Malfunction object

When measuring the temperature, the self-heating of the device is taken into account by the electronics. The heating is compensated in the device.

Offset

You can use the offset to adjust the measured value to be sent. This allows permanent deviations in measured values to be corrected.

Offset in 0.1°C	-50 ... **0** ...50

Table 5: Offset

Use external measured values

The device unit can calculate a mixed value from its own measured value and an external value. If desired, set the mixed value calculation.

If an external component is used, all the following settings refer to the overall measured value. The display of the room temperature controller then also shows the total measured value.

Use external reading	**No** Yes
Ext. measured value proportion of the total reading	5% 10 % ... **50 %** ... 95 % 100%
All of the following settings refer to the total measured value.	
Transmission behaviour for internal and total measured values	never periodically **upon change** upon change and periodically
upon change of (if sent on modification)	0.1°C 0.2°C **0.5°C** 1.0°C 2.0°C 5.0°C
Transmission cycle (if send periodically)	5 s **10 s** ... 1.5 h ... max. 2 h

Table 6: Use external measured values

Min/max. measured value

The minimum and maximum measured values can be stored and sent to the bus. Use the ‘Reset temperature min/max. value’ object to reset the values to the current readings. The values are not retained after a reset.

Use minimum and maximum values	**No** Yes

Table 7: Min/max. measured value

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6.4 Temperature PI controller

Activate this parameter if you would like to use the PI controller.

Use controller	No **Yes**

6.4.1 General rules

Use these parameters to determine in which cases setpoint values and delay times received per object are to be kept. The parameter is only taken into account if the setting per object below is enabled.

Caution

Please note that the setting **After power recovery and programming** should not be used for initial commissioning, as the factory settings are always used until the first communication. Setting via objects is ignored.

The setpoints and delay times received via the communication object should remain:	never **after power recovery** after power recovery and programming

To control the room temperature according to need, the Comfort, Standby, Eco and building protection modes should be used.

- Comfort when present,
- Standby when absent,
- Eco as night-time mode and
- Frost/heat protection (building protection) e.g. when the window is open

In the thermostat settings, the set temperatures are defined for the individual modes. The mode to be executed is determined via objects. A change of modes can be triggered manually or automatically (e.g. through a timer, window contact).

The mode can be switched via two 8-bit objects of different priority. Objects

... **HVAC mode (Prio 2)** - for switching in everyday operation and

... **HVAC mode (Prio 1)** - for central switching with higher priority. The objects are encoded as follows:

0	1	2	3	4
Auto (only for Prio 1)	Comfort	Standby	Eco	Building protection

Alternatively, three objects can be used, whereby one object then switches between Eco mode and Standby mode and the two other objects activate the Comfort mode or frost/heat protection mode. The Comfort object then blocks the night-time/Standby object, and the frost/heat protection objects have the highest priority. Objects

- Mode (1: ECO, 0: Standby)
- Comfort mode activation
- Frost/heat protection mode activation

Switch mode via	**two 8-bit objects (HVAC modes)** three 1-bit objects

Select the mode to be activated after reset (e.g. power failure, reset of the line via the bus) (default).

Then configure a temperature control block using the blocking object.

Mode after reset	**Comfort** Standby Eco Building protection
Behaviour of the blocking object with value	**1 = Block | 0 = Release** 0 = Block | 1 = Release
Value of the blocking object after reset	**0** 1

Specify when the current control variables are to be sent to the bus. Periodic transmission is safer if a telegram does not reach the recipient. Periodical monitoring by the actuator can also be configured with this setting.

Send control variable	**upon change** upon change and periodically
upon change greater than (in absolute %)	1... **2** ...10
Cycle *(if sent periodically)*	5 s ... **5 min** … 2 h

The status object reports the current status of the output (0% = OFF, >0% = ON) and may for example be used for visualisation, or to switch off the heating pump as soon as the heating is switched off.

Send status objects	**upon change** upon change to 1 upon change to 0 upon change and periodically upon change to 1 and periodically upon change to 0 and periodically
Cycle *(if sent periodically)*	5 s ... **5 min** … 2 h

Then define the type of control. Heating and/or cooling may be controlled in two stages.

Type of control	Single-stage heating Dual-stage heating Single-stage cooling **Single-stage heating + single-stage cooling** Dual-stage heating + single-stage cooling Dual-stage heating + dual-stage cooling

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6.4.2 General setpoints

You may enter a separate setpoint value for each mode or use the Comfort setpoint as a basic value.

If you are using the controls for both heating **and** cooling, the setting 'separately with switching object' can also be selected. Systems used for cooling in the summer and for heating in the winter can thus be switched from one to the other.

If no switching object is selected, the actual temperature determines whether heating or cooling is used. If the actual value is between the heating and cooling setpoint, the existing operating mode is retained. If previously the heating mode was activated, the system remains in this mode and continues to target this setpoint. Only when the cooling setpoint is reached does the operating mode switch to cooling.

If previously the cooling mode was activated, the system remains in this mode and continues to target this setpoint. Only when the heating setpoint is reached does the operating mode switch to heating.

If the actual temperature is above the cooling setpoint, cooling sets in, if it is below the heating setpoint, heating sets sin. The difference between the heating setpoint and the cooling setpoint or the dead zone should be at least 1°C. This prevents the control system from switching between heating and cooling too often in the event of minor temperature fluctuations.

If you are using the basic value, only the deviation from the Comfort setpoint is listed for the other modes (e. g., 2°C less for Standby mode).

Keep modified setpoints after mode change	**No** Yes
Setting the setpoints	**with separate setpoints, with switching object** with separate setpoints, without switching object With Comfort setpoint as a basic, with switching object With Comfort setpoint as a basic, without switching object

If a heating/cooling switching object is used, define the behaviour and value after reset.

Behaviour of the switching object *(with switching object)*	0 = Heating | 1 = Cooling **1 = Heating | 0 = Cooling**
Value of the switching object after reset *(with switching object)*	0 **1**

The grades for the setpoint changes are predefined.

Grading for setpoint changes (in 0.1°C)	1 ... **10** … 50

From Eco mode, i.e. night-time mode, the controller can be switched to Comfort mode via the Comfort extension. This allows the user to maintain the nominal Comfort set point for a longer time, e.g. when having guests. The duration of this Comfort extension time is set here. After the Comfort extension period has elapsed, the system returns to the Eco mode.

Comfort extension time in seconds (can only be activated in Eco mode)	1 ... **3600** … 36000

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6.4.3 Setpoint for Comfort

The Comfort mode is usually used for daytime operation in the case of presence. A starting value is defined for the Comfort setpoint and a temperature range, in which the setpoint can be modified.

Initial heating/cooling set point (in 0.1 °C) valid until first communication	-300 … **210** ... 800

If setpoints are entered separately:

Min. object value heating/cooling (in 0.1°C)	-300 ... **160** … 800
Max. object value heating/cooling (in 0.1°C)	-300 ... **280** … 800

If the comfort setpoint is used as a basis:

If the comfort setpoint is used as a basis, the deviation from this value is specified.

Heating start setpoint (in 0.1 °C) valid until first communication	-300 ... **210** … 800
Minimum base setpoint (in 0.1 °C)	-300 ... **160** … 800
Maximum base setpoint (in 0.1 °C)	-300 ... **280** … 800
Reduction by up to (in 0.1°C)	1 ... **50** … 100
Increase by up to (in 0.1°C)	1 ... **50** … 100

f the comfort set point is used as the basis, but no switching object is used, a dead zone is determined for the control mode ‘heating **and** cooling’ to avoid direct switching from heating to cooling.

Dead zone between heating and cooling (in 0.1 °C) (only if both, heating and cooling are used without switching object)	1 ... **50** … 100

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6.4.4 Setpoint for Standby

The standby mode is usually used for daytime operation in case of absence.

If setpoints are entered separately:

A starting setpoint is defined as well as a temperature range in which the setpoint may be changed.

Heating start setpoint (in 0.1 °C) valid until first communication	-300 ... **180** … 800
Start setpoint for cooling (in 0.1 °C) valid until first communication	-300 ... **240** … 800
Min. object value heating/cooling (in 0.1°C)	-300 ... **160** … 800
Max. object value heating/cooling (in 0.1°C)	-300 ... **280** … 800

If the comfort setpoint is used as a basis:

If the comfort setpoint is used as a basis, the deviation from this value is specified.

Reduce heating setpoint (in 0.1°C) (for heating)	0 ... **30** … 200
Increase cooling setpoint (in 0.1°C) (for cooling)	0 ... **30** … 200

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6.4.5 Setpoint for Eco

The Eco mode is usually used for night-time operation.

If setpoints are entered separately:

A starting setpoint is defined as well as a temperature range in which the setpoint may be changed.

Heating start setpoint (in 0.1 °C) valid until first communication	-300 ... **160** … 800
Start setpoint for cooling (in 0.1 °C) valid until first communication	-300 ... **280** … 800
Min. object value heating/cooling (in 0.1°C)	-300 ... **160** … 800
Max. object value heating/cooling (in 0.1°C)	-300 ... **280** … 800

If the comfort setpoint is used as a basis:

If the comfort setpoint is used as a base, the deviation from this value is specified.

Reduce heating setpoint (in 0.1°C) (for heating)	0 ... **50** … 200
Increase cooling setpoint (in 0.1°C) (for cooling)	0 ... **60** … 200

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6.4.6 Setpoints for frost/heat protection (building protection)

The building protection mode is used, for example, when windows are opened for ventilation. Setpoints for frost protection (heating) and heat protection (cooling) are determined which cannot be modified from outside (no access via operating devices etc.). The building protection mode may be activated with delay, which allows to leave the building before the controller switch to frost/heat protection mode.

Nominal value frost protection (in 0.1°C)	-300 ... **70** … 800
Activation delay	**none** 5 s ... 5 min … 2 h
Nominal value heat protection (in 0.1°C)	-300 ... **350** … 800
Activation delay	**none** 5 s... 5 min … 2 h

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6.4.7 General acutating variables (setpoints)

This setting only appears for the ‘heating **and** cooling’ control types. This is where you can decide whether to use a shared variable for heating and cooling. If the 2nd Stage has a common variable, this is also where you determine the control mode of the 2nd stage.

For heating and cooling	**sparate actuating variables are used** cmmon variables used for Stage 1 common variables are used for Stage 2 common variables are used for Stage 1+2
Use actuating variable for 4/6-way valve (only for shared actuating variable on Stage 1)	**No** Yes
Control type (for Stage 2 only)	**2-point control** PI controller
Regulating variable of the 2nd stage is on *(for Stage 2 with 2-point control only)*	1-bit object **8-bit object**

When using the actuating variable for a 4/6-way valve, the following applies:

0%...100% heating = 66%...100% acuating variable

OFF = 50% actuating variable

0%...100% cooling = 33%...0% actuating variable

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6.5 Heating control Stage 1/2

If a heating control mode is configured, one or two setting sections for the heating stages are displayed.

In the 1st Stage, heating is controlled by a PI controller which allows to either enter control parameters or select predetermined applications. For explanations of the parameters, see sections **PI control with controller parameters** and the **application specified**.

Setting of the controller by	Controller parameter **Specified applications**

In the 2nd Stage (thus only in the case of 2-stage heating), heating is controlled via a PI or a 2-point-controller. For explanations of the parameters, see the corresponding sections.

On Stage 2, the set point deviation between the two stages must also be specified, i.e. beyond which setpoint shortfall the second stage is switched on.

Setpoint difference between 1st and 2nd Stage (in 0.1°C) (for Stage 2)	0 ... **40** ...100
Control type (for Stage 2, no shared actuating variables)	**2-point control** PI control
Control variable is on (for Stage 2 with 2-point control, no shared actuating variables)	**1-bit object** 8-bit object

Page break

6.5.1 PI control with controller parameters

This setting allows the parameters to be put in individually for PI control.

Control type	PI control
Setting of the controller by	Controller parameter Specified applications

Specify the deviation from the setpoint at which the maximum control variable value is reached, i.e. the point at which maximum heating power is activated.

Reset time shows how quickly the controller responds to deviations from the setpoint. In the case of a short reset time, the control responds with a fast increase of the control variable. In the case of a long reset time, the control responds slower and needs longer until the necessary control variable for the setpoint deviation is reached.

You should set the time appropriate for the heating system at this point (observe the manufacturer's instructions).

Maximum control variable is reached at set point/actual difference of (in °C)	1 ... **5**
Reset time (in min.)	1 ... **30** ... 255

Now specify what should be sent when the control is blocked. Set a value greater than 0 (=OFF) to get a basic heating stage, e.g. for floor heating.

Upon release, the control variable follows the rule again.

When blocked, the control variable should	**not be sent** send a specific value
Value (in %) *(only if a value is sent)*	0 ...**100**

In the case of a common control variable for heating and cooling, 0 is always transmitted as a fixed value.

Page break

6.5.2 PI control with predetermined application

This setting provides fixed parameters for frequent applications.

Control type	PI control
Setting of the controller by	Controller parameter
Application	Warm water heating Floor heating Convection unit Electric heating
Maximum control variable is reached at set point/actual difference of (in °C)	Warm water heating: 5 Floor heating: 5 Convection unit: 4 Electric heating: 4
Reset time (in min.)	Warm water heating: 150 Floor heating: 240 Convection unit: 90 Electric heating: 100

Now specify what should be sent when the control is blocked. Set a value greater 0 (=OFF) to receive a basic heating level, e.g. for floor heating.

Upon release, the control variable follows the rule again.

When blocked, the control variable should	not be sent send a specific value
Value (in %) (only if a value is sent)	**0** ...100

In the case of a common control variable for heating and cooling, 0 is always transmitted as a fixed value.

Page break

6.5.3 2-point control (only Stage 2)

The 2-point control is used for systems that are only switched ON and OFF.

Control type (is determined for shared variables above)	2-point control

Enter the switching distance (hysteresis) that prevents frequent on/off switching of temperatures within the threshold range.

Switching distance (in 0.1°C)	0 ... **20** ...100

If separate actuating variables are used, the choose if the actuating variable of the 2nd Stage is a 1-bit object (on/off) or an 8-bit object (on with percentage/off).

Control variable is on	**1-bit object** 8-bit object
Value (in %) (with 8-bit object)	0 ...**100**

Now specify what should be sent when the control is blocked. Set a value greater 0 (=OFF) to receive a basic heating level, e.g. for floor heating. Upon release, the control variable follows the rule again.

When blocked, the control variable should	**not be sent** send a specific value
Value (in %) only if a value is sent	0 ...**100**

Page break

6.6 Cooling control Stage 1/2

If a cooling control is configured, one or two sections for the cooling stages are displayed.

In the 1st Stage, cooling is controlled by a PI controller in which either control parameters or predetermined applications can be selected. For explanations of the parameters, see sections **PI control with controller parameters** and the **application specified**.

Setting of the controller by	Controller parameter **Specified applications**

In the 2nd Stage (thus only in the case of 2-stage cooling), cooling is controlled via a PI or a 2-point-control. For explanations of the parameters, see the corresponding sections.

On stage 2, the setpoint deviation between the two stages must also be specified, i.e. beyond which setpoint value shortfall the second stage is switched on.

Setpoint difference between 1st and 2nd Stage (in 0.1°C) (for Stage 2)	0 ... **40** ...100
Control type (for Stage 2, no shared actuating variables)	2-point control PI control
Control variable is on (for Stage 2 with 2-point control, no shared actuating variables)	**1-bit object** 8-bit object

Page break

6.6.1 PI control with controller parameters

This setting allows the parameters to be put in individually for PI control.

Control type	PI control
Setting of the controller by	Controller parameter Specified applications

Specify the deviation from the setpoint value which reaches maximum variable value, i.e. the point at which maximum cooling power is activated.

Reset time shows how quickly the controller responds to deviations from the setpoint. In the case of a short reset time, the control responds with a fast increase of the control variable. In the case of a long reset time, the control responds slower and needs longer until the necessary control variable for the setpoint deviation is reached. You should set the time appropriate for the cooling system at this point (observe the manufacturer's instructions).

Maximum control variable is reached at set point/actual difference of (in °C)	1 ... **5**
Reset time (in min.)	1 ... **30** ...255

Now specify what should be sent when the control is blocked. Upon release, the control variable follows the rule again.

When blocked, the control variable should	**not be sent** send a specific value
Value (in %) (only if a value is sent)	**0** ... 100

In the case of a common control variable for heating and cooling, 0 is always transmitted as a fixed value.

Page break

6.6.2 PI control with predetermined application

This setting provides fixed parameters for a cooling ceiling.

Control type	PI control
Setting of the controller by	Controller parameter Specified applications

Application	Cooling ceiling
Maximum control variable is reached at set point/actual difference of (in °C)	Cooling ceiling: 5
Reset time (in min.)	Cooling ceiling: 30

Now specify what should be sent when the control is blocked. Upon release, the control variable follows the rule again.

When blocked, the control variable should	not be sent send a specific value
Value (in %) (only if a value is sent)	**0** ... 100

Page break

6.6.3 2-point control (only Stage 2)

The 2-point control is used for systems that are only switched ON and OFF.

Control type *is determined for shared variables above*	**2-point control**

Specify the switching distance preventing the frequent switching on and off at temperatures within the threshold range.

Switching distance (in 0.1°C)	0 ...100; **20**

If separate actuating variables are used, the choose if the actuating variable of the 2nd Stage is a 1-bit object (on/off) or an 8-bit object (on with percentage/off).

Control variable is on	**1-bit object** 8-bit object
Value (in %) *(with 8-bit object)*	0 ...**100**

Now specify what should be sent when the control is blocked. Upon release, the control variable follows the rule again.

When blocked, the control variable should	**not be sent** send a specific value
Value (in %) *(only if a value is sent)*	**0** ...100

In the case of a common control variable for heating and cooling, 0 is always transmitted as a fixed value.

Page break

6.7 Fan coil control

The fan coil control allows the blower fan of convector heaters/coolers to be controlled.

Activate the fan coil control.

Use the fan coil control	**No** Yes

In fan coil control, the blower fan is automatically controlled by one or, in multi-stage systems, by several control variables for heating or cooling. Select which control value(s) should control the output. The selection depends on the type of heating/cooling control and the settings made for the control values.

Output is controlled by control value	**Heating 1** Heating 2 Cooling 1 Cooling 2 Heating 1 and Cooling 1 Heating 2 and Cooling 1 Heating 1 and Cooling 2 Heating 2 and Cooling 2

Select whether the first blower fan stage should also be switched on when the second and third stage are running and whether the second blower fan stage should also be switched on when the third stage is running.

Switch on stage 1 also for stages 2 and 3	**No** Yes
Switch on stage 2 also at stage 3	**No** Yes

Set which mode should be active after a reset.

Mode after reset	**Manual** Automatic (as controller actuating variable)

7 Master reset

Performing a local factory reset

The local factory reset is carried out as follows:

1. When you connect the KNX bus and press and hold the programming button, the device switches between different options in the display:
   After 5 seconds: ‘MR’ = Master Reset - deletes the application program (ETS download)
   After 10 seconds: ‘FR’ = Factory Reset - additionally resets the firmware version to the factory settings
   After 15 seconds: ‘BTL’ = boot loader - switches to boot loader mode (serial recovery option, internal use)

The required process is triggered by releasing the programming button. This may take a few seconds. The process can be interrupted by switching off the device or by disconnecting a bus terminal.

The factory reset can also be triggered via the ETS Service Tool. Both methods have the same outcome.

8 Firmware update

The device is updatable. Firmware updates can be easily implemented with the Hager ETS app. This app is free and can be used on site or via remote access.

How do I perform an update?

- Log in to my.knx.org.
- Create a new account or log in with your existing account.
- Look for the **Hager/Berker firmware update app**.
- Add to shopping cart.
- Go to the shopping cart and click Order.
- Select the billing and shipping address.
- Click **To Payment** to proceed.
- Confirm the payment (free of charge).

  The app is now visible in your account.
- Download the app and license to perform the update.
- Install the app and license in your ETS software.

In the ETS project:

- Launch the app from the **Apps** tab.
- Select the device you want to update.
- Select the latest available firmware version.
- Load the device with the firmware.
- When the loading is complete, activate the firmware.

  The device is updated and then restarted.

9 Appendix

9.1 Technical data

KNX Medium	TP1-256
Configuration mode	S-Mode, E-Controller
KNX supply voltage	21 ... 32 V ⎓ SELV
Current consumption	≤ 19 mA
Temperature measuring range	-5 ... +60 °C
Energy efficiency class	IV (2%)
Operating height	Max. 2000 m
Contamination level	2
Overvoltage category	III
Degree of protection	IP20
Air humidity	0 ... 95 %, non-condensing
Operating temperature	-5 ... +45 °C
Storage/transport temperature	-25 ... +70 °C
Dimensions (W x H x D)	55 x 55 x 35 mm

9.2 Accessories

Optional accessories

KNX bus connection terminals, 2-pole, red/black	TG008
Floor temperature sensor	EK090
KNX system line Y(ST)Y, 2x2x0.8	TG01x

9.3 List of Figures

9.4 List of Tables

9.5 Disposal note

Correct Disposal of this product (Waste Electrical & Electronic Equipment).

(Applicable in the European Union and other European countries with separate collection systems).

This marking shown on the product or its documentation indicates that it should not be disposed of with other household waste at the end of its working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate this device from other types of waste. Recycle the device responsibly to promote the sustainable reuse of material resources.

Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take this device for environmentally safe disposal.

Business users should contact their supplier and check the terms and conditions of the purchase contract. This product should not be mixed with other commercial waste for disposal.

9.6 Warranty

We reserve the right to implement technical and formal changes to the product in the interest of technical progress.

Our products are under guarantee within the scope of the statutory provisions.

If you have a warranty claim, please contact the point of sale.

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