

Room climate sensor Standard

Art. no. 2004 ..



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1 Information on the product

1.1 Product catalogue

Product name	Room climate sensor Standard
Art. no.	2004 ..
Use	Sensor
Design	FM (flush-mounted)

1.2 Function

General

The product can support energy-efficient, user-friendly and reliable control of modern heating control systems with an integrated room temperature controller.

In this configuration, the device itself is not involved in temperature control.

The structured and intuitive presentation of the display and control surfaces enables user-friendly operation without the need for instruction. At the same time, the device can support efficient control and monitoring of comfort functions in the room climate area, both in hotels and in general building applications.

Display

The device is used for the clear visualisation and control of room climate functions via an integrated display. The indicator is segment-based and provides the user with all relevant information to quickly and clearly record the current operating status.

Among other things, operating mode display, main and secondary display, humidity display are available. In addition, special statuses such as window status, operating lock, boost function, heating and cooling mode are displayed. Even when switched off, the display ensures clear status feedback.

Controller extension

The device can be used for extension unit operation, allowing central heating control devices with an integrated room temperature controller to be controlled.

Room temperature controllers generally offer different ways of influencing the room temperature control. These include the operating mode switchover and setpoint temperature shift options.

In extension unit mode, the device is operated via the control panels.

The operating elements can be used to control a room temperature controller by changing the operating mode and adjusting the setpoint temperature.

Sensor

The device is used to record and transmit central room climate parameters to support precise and energy-efficient room temperature control. The integrated temperature sensor reliably measures and provides the local room temperature. Optionally, the temperature measurement can be supplemented via a receiving object to increase the accuracy of the measurement result.

ETS

The device is KNX Data Secure capable. KNX Data Secure offers protection against manipulation in building automation and can be configured in the ETS project. Detailed technical knowledge is a prerequisite. A device certificate, which is attached to the device, is required for safe commissioning. During mounting, it is recommended to remove the certificate from the device and to store it securely.

The device can be updated. Firmware can be easily updated with the Gira ETS Service App (additional software).

1.3 Device components

1.3.1 Front view

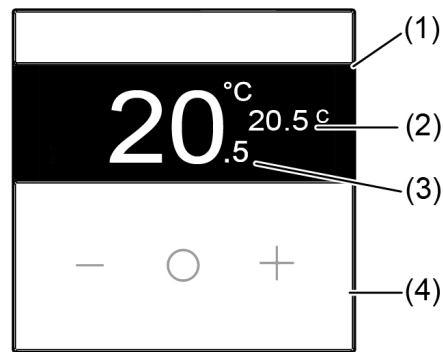


Figure 1: Front view

- (1) Display
- (2) Target temperature / humidity
- (3) Actual-temperature
- (4) Operating element (operating buttons 1 - 3)

1.3.2 Rear view

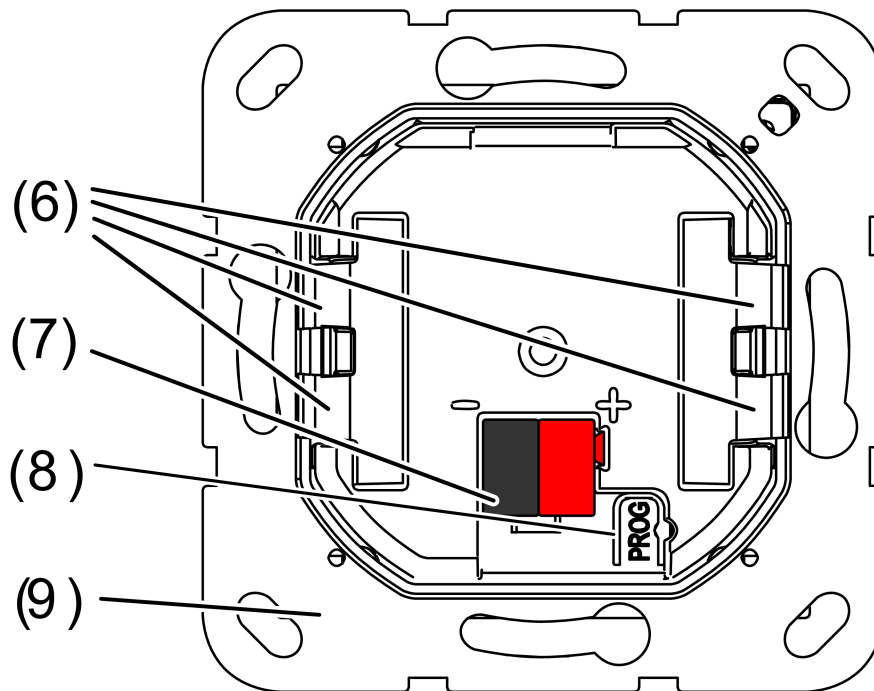


Figure 2: Rear view

- (6) Retaining clips for device fixation at the supporting frame
- (7) Device connection terminal, bus
- (8) Programming button with programming LED
- (9) Supporting frame

1.3.3 Icons of the operating element

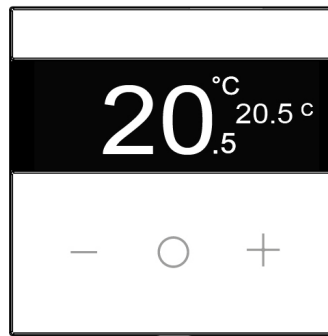


Figure 3: Icons of the operating element



Pressing the button leads to an increase in the setpoint value.



Pressing the button leads to a reduction in the setpoint value.



ON / OFF: The device is switched on/off with a long press of the button.

Change operating mode and display of measured values: A short press of the button switches between the operating modes and the display of measured values.

1.3.4 Icons in the display

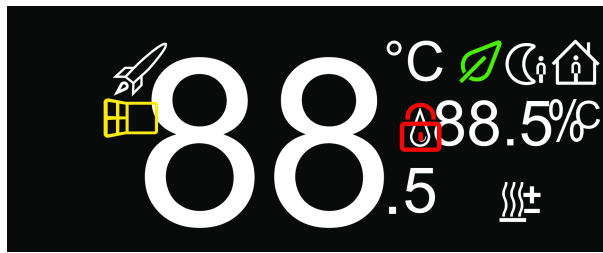











Figure 4: Icons in the display

- 
Comfort operating mode is active
- 
Reduction temperature operating mode is active
- 
Night setback operating mode is active
- 
Eco operating mode is active
- 
Operating lock is activated
- 
Air humidity
- 
Heating/cooling
- 
The boost function is active
- 
Window status (open window was recognised)

1.4 As-delivered state

On delivery, the device only shows two "-" in the main segment of the display. All other segments of the display are hidden. The display backlight is set to 100 % brightness.

In the state as delivered, the device does not send any telegrams to the KNX bus. The application is also unloaded, which means that the device is in a neutral basic state.

This preconfigured delivery status remains unchanged until the device has been parameterised and configured for the specific project.

1.5 Technical data**Ambient conditions**

Ambient temperature -5 ... +45 °C

Storage/transport temperature -20 ... +70 °C

Relative humidity 5 ... 95% (no moisture condensation)

Protection class III

Installation dimensions (see figure 5)

Construction height A = 10 mm

Installation depth B = 19 mm

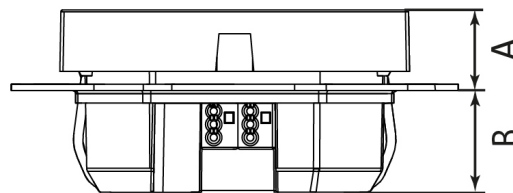


Figure 5: Installation dimensions

KNX

KNX medium TP256

KNX commissioning mode S mode

Rated voltage DC 24 ... 30 V SELV

Current consumption KNX 8 ... 14 mA

Connection mode KNX Standard device connection terminal

Connecting cable KNX EIB-Y (St)Y 2x2x0.8

Information according to ErP 2009/125/EC

Electronic room temperature controller yes

Power consumption

- In networked standby mode < 0.5 W

- In standby mode with information or status indication yes

Control accuracy yes (0.5 K)

This controller fulfils the following control functions HP(1/2/3/0/0/0/8)

1.5.1 Product information in accordance with the Ecodesign Directive (ErP 2009/125/EC)

1.5.1.1 Ecodesign Table 6

Contact details: Gira Giersiepen GmbH & Co. KG, Dahlienstraße, 42477 Radevormwald, Germany			
Model identifier: Room climate sensor Standard, 2004 .. Room climate sensor Komfort, 2005 ..			
Specification	Icon	Value	Unit
Power consumption			
In the off state	P_0	-	W
In standby mode	P_{sm}	-	W
In idle state	P_{idle}	-	W
In networked standby mode	P_{nsm}	< 0.5	W
In standby mode with information or status display		yes	
Type			
Single-stage heat output, no room temperature control		no	
Two or more manual levels, no room temperature control		no	
Room thermostat with mechanical thermostat		no	
Electronic room temperature controller		yes	
Electronic room temperature controller with time-of-day control		no	
Electronic room temperature controller with weekday regulation		no	
Other control options			
Presence detection		yes	
Detection of open windows		yes	
Remote control option		yes	
Adaptive control of the start of heating		no	
Operating time limit		no	
Black ball sensor		no	
Self-learning function		no	
Control accuracy		yes (0.5 K)	

1.5.1.2 Ecodesign Table 7

Codes of the control functions

The format of the code is TC (f1/f2/f3/f4/f5/f6/f7/f8), where TC is the code for temperature control and f1 to f8 are the codes for the respective control functions, if available; otherwise "0" must be specified.

		(TC)*	Control functions							
			f1	f2	f3	f4	f5	f6	f7	f8
Type of temperature control	Single-stage heat output, no room temperature control	NC								
	Two or more manual levels, no room temperature control	TX								
	Room thermostat with mechanical thermostat	TM								
	Electronic room temperature controller	HP								
	Electronic room temperature controller with daytime control	TD								
	Electronic room thermostat with weekday control	TW								
Control functions	Presence detection		1							
	Detection of open windows			2						
	Remote control option				3					
	Adaptive control of the start of heating					4				
	Operating time limit						5			
	Black ball sensor							6		
	Self-learning function								7	
	Control accuracy with CA < 2 Kelvin and CSD < 2 Kelvin									8

* Temperature control code

2 Safety instructions



Electric devices may only be mounted and connected by electrically skilled persons.

To avoid potential damage, read and follow the following instructions:

Danger of electric shock. Comply with the regulations and standards that apply to SELV circuits during the installation and cable routing.



Touch-sensitive surfaces can be damaged. Do not operate the device with sharp or pointed objects.

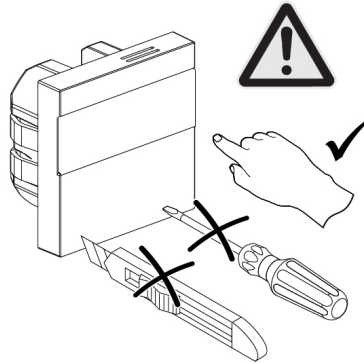


Figure 6: Damage to appliances due to sharp or pointed objects

3 Mounting and electrical connection



DANGER!

Danger of electrical shock when mains voltage 230 V or other external voltages are connected!

Electric shocks can be fatal.

Device may be destroyed.

Only connect potential-free push-buttons, switches or contacts.

3.1 Installation position

The device (see figure 7) is installed horizontally.

- i** When installing the appliance, read the TOP labelling at the top Mounting and connecting the device.



Figure 7: Room climate sensor

3.2 Mounting and connecting the device

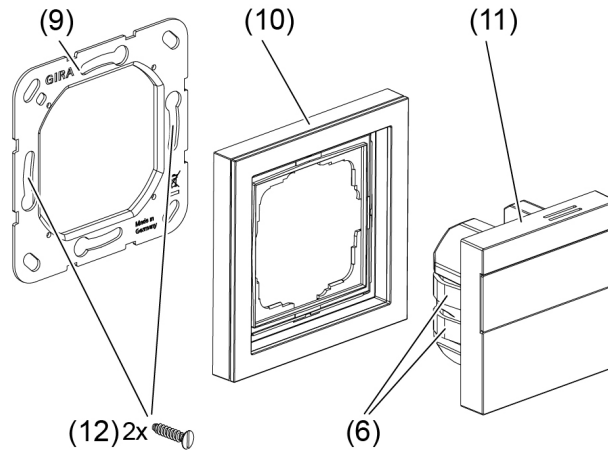


Figure 8: Mount device

- (6) Retaining clips for device fixation at the supporting frame
- (9) Supporting frame
- (10) Cover frame (accessory)
- (11) Device
- (12) Box screws

The device should be used in an air-tight appliance box. Otherwise temperature and humidity reading can be negatively influenced by draughts.

- Mounting in suitable appliance box. Observe cable routing and spacing.
- Mount supporting frame on an appliance box.

i Note the TOP marking.

i Use the enclosed box screws.

- Connect bus line with device connection terminal observing the correct polarity (red = +, black = -).
- In secure mode: Enter or scan the device certificate and add it to the project. A high resolution camera should be used to scan the QR code.

i The matching cover frame for the device must be ordered separately.

- Fit the cover frame flush. The cover frame is fixed by the device.
- Attach the device with cover frame onto the supporting frame.

The device can be put into operation.

i Make sure the that the retaining clips properly fit in the supporting frame.

The physical address is programmed (see chapter "Commissioning" ▶ Page 18) in the next work step.

3.3 Dismantling

- Carefully pull the device forwards together with the cover frame.

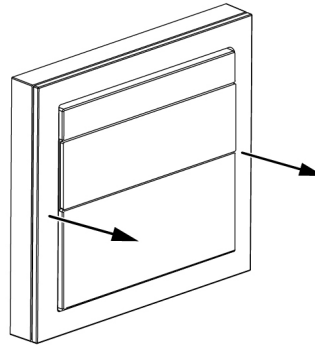


Figure 9: Dismantling the device

4 Commissioning

Programming the physical address and application program

i Project design and commissioning with ETS version 5.7.7 and higher or 6.3.0.

In secure operation (prerequisites):

- Secure commissioning has been activated in the ETS.
- Device certificate entered/scanned or added to the ETS project. A high resolution camera should be used to scan the QR code.
- Document all passwords and keep them safe.

The programming button is located on the back of the appliance Rear view.

Precondition: The device is connected and ready for operation.

- Activating Programming mode: push the programming button.

The programming LED lights up red. Programming mode is activated.

- Programming the physical address.

The programming LED goes out. Physical address is programmed.

- Programming the application program.

The device is for use.

i The display can be switched off temporarily while the application program is being programmed. As soon as the programming process has been successfully completed, the device switches on.

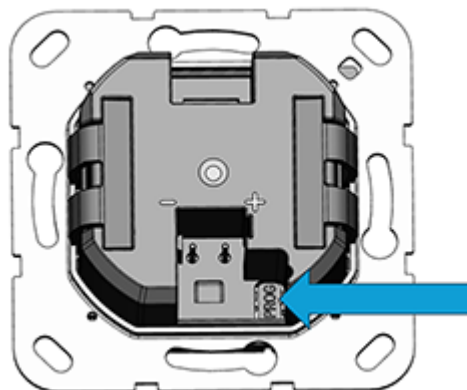


Figure 10: Programming button

4.1 Safe-state mode

The safe-state mode stops the execution of the loaded application program.

If the device does not work properly - for instance as a result of errors in the project design or during commissioning - the execution of the loaded application program can be halted by activating the safe-state mode. The device remains passive in safe-state mode, since the application program is not being executed (state of execution: terminated).

Only the system software of the device is still functional. ETS diagnosis functions and programming of the device are possible.

Activating safe-state mode

- Switch off the voltage.
- Press and hold down the programming button.
- Switch on voltage.

Safe-state mode is activated. The programming LED flashes slowly (approx. 1 Hz).

Release the programming button only after the programming LED starts flashing.

Deactivating safe-state mode

- Switch off the voltage or carry out ETS programming.

4.2 Master reset

The master reset restores the basic device settings (physical address 15.15.255, firmware remains in place). The device must then be recommissioned with the ETS.

- i** In secure operation: A master reset deactivates device security. The device can then be recommissioned with the device certificate.
- i** Devices can be reset to factory settings with the ETS Service App. This function uses the firmware contained in the device that was active at the time of delivery (delivery state). Restoring the factory settings causes the devices to lose their physical address and configuration.

If the device - for instance as a result of errors in the project design or during commissioning - does not work properly, the loaded application program can be deleted from the device by performing a master reset. The master reset resets the device to delivery state. Afterwards, the device can be put into operation again by programming the physical address and application program.

Performing a master reset

Precondition: The safe-state mode is activated.

- Press and hold down the programming button for > 5 seconds until the programming LED starts flashing quickly.
- Release the programming button.

The device performs a master reset. The programming LED is switched on.

The device restarts and is in delivery state.

5 Operation

- i** Touch-sensitive surfaces can be damaged. Do not operate the device with sharp or pointed objects.

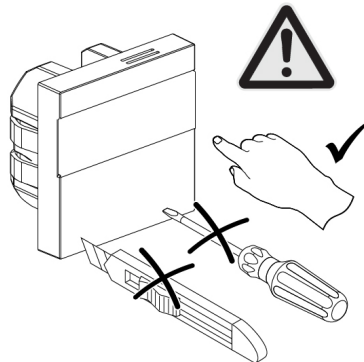


Figure 11: Damage to appliances due to sharp or pointed objects

The device is operated by pressing the buttons for a short, medium-long or long time, which depends on the specific functions configured.

Status	Min. length of time the button is pressed	Max. length of time the button is pressed
no keystroke recognised	0	≤ 50 ms
Brief pressing of a button	> 50 ms	≤1 s
Button press medium long	> 1 s	≤4 s
Pressing and holding a button	> 4 s	≤10 s

5.1 Examples for operating various standard applications

Increasing or decreasing the target temperature

- Short press(>50 ms) of the - or + button

With every brief press of a button the setpoint temperature changes by 0.5 °C. The set value is retained in manual mode; in automatic mode it is retained until the next switching time is reached.

If no operation is performed within a previously defined period of time (1 second) or if the O button is pressed briefly, the setpoint temperature is temporarily adopted. This is signalled by the device flashing twice.

In cooling mode, the – or + buttons cannot be used to change the setpoint temperature.

If the display is switched off, it is necessary to press the - or + button a second or further time before changing the setpoint.

- Medium-long press(>1 s) of the - or + button

Each time the button is pressed for a medium length of time, the setpoint temperature changes by 0.5 °C at a faster rate. The set value is retained in manual mode; in automatic mode it is retained until the next switching time is reached.


If no operation is performed within a previously defined period of time (1 second) or if the O button is pressed briefly, the setpoint temperature is temporarily adopted. This is signalled by the device flashing twice.

- Long press(>4 s) on the - or + button

In heating mode, the stored setpoint temperature is retrieved:

– = reduction temperature

+ = comfort temperature

-  During a detected temperature drop, changing the setpoint temperature is not possible.

Window detector active

If a window is recognised as open, the window symbol is displayed and operation is blocked.

- Button press of any combination or duration

When the window is open, the window symbol flashes twice to show that the device is locked.

When the window is closed, the window symbol disappears and the operating lock is cancelled.

Activating the operating lock

- Simultaneous medium-long(>1 s) press of the – and + buttons

Pressing both buttons for a medium length of time activates the operating lock and the lock symbol appears on the display. The lock symbol flashes twice to show that the device has been locked.

If both buttons are pressed again for a medium length of time, the lock symbol disappears and the operating lock is cancelled.

Switch off display

- Long press(>4 s) of the O button

If you press and hold the O button, the device displays OFF for 3 seconds and then switches off the display.

If the O button is pressed and held again, the device switches back to the initial state (as specified by the actuator).

Activating the boost function

With the boost function, the output is switched on for a maximum of 5 minutes without temperature control action in order to obtain a temporary increase in temperature.

i The boost function can be activated only in heating mode and if no temperature drop has been detected.

- Simultaneous medium-long(>1 s) press of the – and O buttons

The boost function is active. The display counts down from 300 seconds and then switches back to normal mode.

To end the boost function prematurely, press the - and O buttons simultaneously for a medium length of time(>1 s).

6 Application programs

ETS search paths: - Indication / Room climate sensor Standard

Configuration: S-mode standard

Application program available for Room climate sensor Standard

Name Room climate sensor Standard 502121

Version 2.1 for ETS versions 5.7.7 and 6.3.0 and higher

from mask version 07B0

Summarized description Multifunctional ETS application programme for the Room climate sensor Standard.

The application program enables the parameterisable control of heating control systems via KNX. It includes configuration options for temperature, operating modes and boost.

KNX Data Secure and the update capability via the ETS Service app ensure secure and future-proof commissioning.

7 Scope of functions

- Support for energy-efficient and reliable heating control
- No separate temperature control in the device
- Intuitive operation via structured display and control surfaces

Segment-based display with:

- Operating mode indication
- Main and secondary display
- Humidity and air quality display
- Display of window status, operating lock, boost function, heating/cooling mode, ventilation, automatic, ventilation, dehumidification

Operating function:

- Operating lock either automatically by time or via object
- On/off function

Heartbeat function:

- Check whether the application is running correctly.

Controller extension:

- Control of central heating control units with integrated room thermostat
- Operation via the operating elements
- Changing the operating mode of the room temperature controller
- Adjusting the setpoint temperature of the room temperature controller

Sensors:

- Integrated temperature sensor

KNX functions:

- KNX Data Secure capable
- Updateable by ETS service app
- Device certificate required for safe commissioning

8 General settings

The "Information" parameter page provides information about topics "ETS compatibility" and "KNX Secure". No parameterisation is performed on this parameter page.

General settings of the device are configured and general functions enabled on the "General" parameter page.

8.1 Basic settings

General

The application area enables the use of recommended parameterisations for the current scenario, which can be individually adapted. Please note that all changes made in relation to this parameter setting will be lost when the application area is changed.

The following parameter settings are directly dependent on the parameterised application area:

- Show operating mode on the display
- Operating mode switchable at the touch of a button
- Main display
- Secondary display
- Indication of actual temperature

The "Application area" parameter is preset to "Private area (e.g. at home, holiday flat)". The following parameters are preset as follows for the private area:

- Show operating mode on the display = active
- Operating mode can be switched by touching a button = active
- Main display = target temperature
- Secondary display = actual temperature
- Actual temperature indicator = internal sensor

The "Application area" parameter can be changed to "Public area (e.g. office, hotel)". The following parameters are preset as follows for the public area:

- Show operating mode on the display = inactive
- Operating mode can be switched by touching a button = inactive
- Main display = target temperature
- Secondary display = no temperature

Enabled functions

The following functions can be enabled on the "General" parameter page:

- Temperature measurement
- Operating lock
- On/off function
- Heartbeat function

 These functions are configured on separate parameter pages.

Table of parameters

The following parameters are available on the "General" parameter page under the "General" heading.

Area of application	Private area (e.g. at home, holiday flat) Public area (e.g. office, hotel)
The application area enables the use of recommended parameterisations for the current scenario, which can be individually adapted. Please note that all changes made in relation to this parameter setting will be lost when the application area is changed.	
The following parameter settings are directly dependent on the parameterised application area:	
<ul style="list-style-type: none"> - Show operating mode on the display - Operating mode switchable at the touch of a button - Main display - Secondary display - Indication of actual temperature 	

The following parameters are available under the heading "Enabled -> Sensor system" heading on the "General" parameter page.

Temperature measurement	Active Inactive
The temperature measurement of the device can be centrally enabled at this point. If "Active", the ETS shows further communication object and parameters.	

The following parameters are available under the "Enabled functions -> Control functions" heading on the "General" parameter page.

Operating lock	Active Inactive
The operating lock of the device can be enabled centrally at this point. When "Active", the ETS displays further communication objects and other parameters on the "Display -> Display settings" parameter page.	

On/off function	Active Inactive
The on/off function of the device can be enabled centrally at this point. If "Active", the ETS shows further communication object and parameters on the "Controller extension" parameter page.	

The following parameters are available under the "Enabled functions -> Additional functions" heading on the "General" parameter page.

Heartbeat function	Active Inactive
The heartbeat function of the device is enabled centrally at this point.	
Cycle time for transmission of device status	0 ... 23 h 0... 2 ... 59 min
This parameter defines the interval at which the condition of the device is transmitted to the bus. The cycle time can be configured between 1 minute and 23 hours and 59 minutes.	

9 Sensor

The following subchapters provide a description of the device functions. Each subchapter consists of the following sections:

- Functional description
- Table of parameters
- Object list

Functional description

The functional description explains the function and provides helpful tips on project design and usage of the function. Cross references support you in your search for further information.

Table of parameters

The table of parameters lists all parameters associated with the function. Each parameter is documented in a table as follows.

Name of the parameter	Parameter values
Parameter description	

Object list

The object list specifies and describes all communication objects associated with the function. Each communication object is documented in a table.

Function	This column contains the function of the communication object.
Name	This column contains the name of the communication object.
Type	This column contains the length of the communication object.
DPT	This column assigns a datapoint type to a communication object. Datapoint types are standardized in order to ensure interoperability of KNX devices.
Flag	This column assigns the communication flags in accordance with the KNX specification.
C-Flag	activates / deactivates the communication of the communication object
R-Flag	enables externally triggered reading of the value from the communication object
W-Flag	enables externally triggered writing of the value to the communication object
T-Flag	enables transfer of a value
U-Flag	enables updating of an object value in case of feedback
I-Flag	enforces updating of the communication object value when the devices is switched on (reading at init)

9.1 Room temperature

Basic principles

The device has an integrated temperature sensor, which can be used to measure the room temperature.

A second external sensor connected via bus telegrams can be used to determine the actual value. This external sensor can also be combined with the temperature measurement by the internal sensor, for example in large rooms or halls.

Temperature measurement is activated on the "General" parameter page and configured on the "Sensors -> Room temperature" parameter page. The device offers a temperature measurement depending on the configuration of the "Temperature measurement by" parameter.

The following points should be considered when choosing the installation location for the device or the external sensors:

- The device or temperature sensor should not be integrated in multiple combinations, especially together with flush-mounted dimmers.
- Do not install the temperature sensor in the area of large electrical consumers (avoid heat influences).
- Installation in the vicinity of radiators or cooling systems is not advisable.
- The temperature sensor should not be exposed to direct sun.
- The installation of sensors on the inside of an outside wall might have a negative impact on the temperature measurement.
- Temperature sensors should be installed at least 30 cm away from doors, windows or ventilation devices and at least 1.5 m above the floor.

Temperature measurement and measured value determination

The device has an integrated temperature sensor. This temperature sensor can be used to measure the ambient temperature and forward it to a room temperature controller by means of the 2-byte object "Room temperature - Actual temperature - Status".

The room temperature measurement can optionally be supplemented with an external sensor. The external sensor is linked to the device (for example an additional push-button sensor or a KNX room temperature controller) via the bus by means of the additional 2-byte communication object "Room temperature - External value".

The "Temperature measurement by" parameter on the parameter page "Sensors -> Room temperature" specifies the sensors used to measure the room temperature. The following settings are possible:

- "Internal sensor"
The temperature sensor integrated in the device is activated. Thus, the actual temperature value is determined only locally on the device.
- "Internal sensor and ext. value via bus"

In this setting the internal and external temperature sensor are active. The external sensor must either be a KNX room temperature controller coupled by means of the 2-byte object "Room temperature - External value" or another bus device with temperature detection.

When evaluating the internal and the external sensors, the real actual temperature is made up from the two measured temperature values. The weighting of the temperature values is defined by the parameter "Weighting of measured values". It is thus possible to calibrate the actual temperature measurement, depending on the different installation locations of the sensors or possibly uneven heat distribution inside the room. Often, those temperature sensors that are subject to negative external influences (for example, unfavourable location because of exposure to sun or heater or door / window directly next to it) are weighted less heavily.

Example:

The device has been installed next to the entrance door of the room (internal sensor). An additional external temperature sensor has been mounted on an inner wall in the middle of the room below the ceiling.

Internal sensor: 21.5 °C

External sensor: 22.3 °C

Determination of measured value: 30% to 70%

-> TResult internal = T internal · 0.3 = 6.45 °C,

-> TResult external = Texternal = 22.3 °C · 0.7 = 15.61 °C

-> TResult actual = TResult internal + TResult external = 22.06 °C

Transmission of the temperature

The determined temperature can be transmitted to the bus by means of the 2-byte object "Room temperature - Actual temperature - Status".

The parameter Send actual temperature "On change by" defines the temperature value by which the actual value of the temperature measurement must change so that the actual value is automatically sent via the "Room temperature - Actual temperature - Status" object. Possible temperature value changes lie within a range of 0.1 K and 25.5 K.

In addition, the temperature determined by the room temperature measurement can be transmitted cyclically. The "Cycle time" parameter defines the time rhythm (10 seconds to 24 hours).

- i** It is possible to read out the current actual values at any time via the bus by setting the "read" flag on the object "Room temperature - Actual temperature - Status".
- i** It has to be pointed out that with deactivated cyclical transmission and deactivated automatic transmission, no more temperature telegrams will be transmitted in case of changes.

Calibrating the measured values

In some cases during room temperature measurement, it may be necessary to adjust the single temperature values. Adjustment becomes necessary, for example, if the temperature measured by the sensors stays permanently below or above the actual temperature in the vicinity of the sensor. To determine the temperature deviation, the actual room temperature should be detected with a reference measurement using a calibrated temperature measuring device.

The "Temperature calibration" parameters can be used to configure the positive (temperature increase between 0.1 and 12.7 K) or negative (temperature decrease between -12.8 and -0.1 K) temperature calibration in 0.1 K increments. Thus, the calibration is only set statically once.

- i** The measured value has to be increased, if the value measured by the sensor lies below the actual room temperature. The measured value has to be decreased, if the value measured by the sensor lies above the actual room temperature.
- i** The calibrated temperature value is transmitted to the bus by means of the object "Room temperature - Actual temperature - Status".
When determining the measured value with combined sensors, the two adjusted values are used to calculate the actual value.

9.1.1 Table of parameters

"General" parameter page

Temperature measurement	Active Inactive
This parameter activates the temperature measurement. Additional parameters and objects become visible.	

Parameter page "Sensors -> Room temperature"

Temperature measurement by	internal sensor internal sensor and external value via bus
The "Temperature measurement by" parameter specifies the sensors used to measure the room temperature.	
"Internal sensor": The integrated temperature sensor is activated. Thus, the actual temperature value is determined only locally on the device. In this configuration, the feedback control will start directly after a device reset.	
"Internal sensor and ext. value via bus": The selected temperature sources are combined. The integrated temperature sensor is activated. The "Room temperature - External value" communication object is enabled. The actual temperature value is therefore determined locally on the device and with temperature values received via the bus.	

Weighting of the measured values	10% to 90%
	20% to 80%
	30% to 70%
	40% to 60%
	50% to 50%
	60% to 40%
	70% to 30%
	80% to 20%
	90% to 10%
The weighting of the temperature values measured by the internal sensor and the external value is specified via the bus here. That results in an overall value, which will be used for the further interpretation of the room temperature.	

Sensor calibration	Factory setting Object with separately measured temperature value
<p>Factory setting: The internal sensor works with the factory settings supplied and can be adjusted via a parameter.</p> <p>Object with separately measured temperature value: The internal sensor works after a sensor calibration via the communication object "Room temperature - Sensor calibration - Internal sensor" according to the sensor calibration. Temperature equalisation is then no longer necessary.</p>	
Temperature calibration Internal sensor (0 = inactive)	-12.8...0...12.7
Determines the value in Kelvin by which the internal sensor's measured value is adjusted.	
Temperature calibration External value via bus (0 = inactive)	-12.8...0...12.7
Determines the value in Kelvin by which the external value is calibrated via the bus.	
Transmit actual temperature	on change cyclical On change and cyclical
This parameter defines when the actual temperature is sent to the bus via the "Room temperature - Actual temperature - Status" communication object. Depending on the parameterisation carried out here, further parameters become visible.	
On change	0.1... 3 ...25.5
Determines the extent the value of the room temperature is changed in Kelvin after which the current value is automatically transmitted to the bus by means of the object "Room temperature - Actual temperature - Status".	
Cycle time	0... 15 ...255
<p>This parameter defines the interval at which the determined actual temperature is transmitted to the bus.</p> <p>The cycle time can be parameterised between 10 seconds and 24 hours.</p>	

Actual temperature without calibration	activated deactivated
<p>This parameter determines whether the actual temperature is also sent to the bus without calibration. The actual temperature without calibration is sent to the bus via the "Room temperature - Actual temperature without calibration - Status" communication object.</p> <p>i If no temperature calibration has been parameterised, the communication objects "Room temperature - Actual temperature - Status" and "Room temperature - Actual temperature without calibration - Status" send the same values to the bus.</p>	
Behaviour if sensor has not been calibrated	Do not send temperature value send invalid temperature value (0x7FFF)
<p>After successful ETS commissioning, the device either sends no temperature values or an invalid temperature value (0x7FFF) to the bus if sensor calibration is parameterised via an object with a separately measured temperature value. The behaviour of the device is defined by this parameter.</p>	

9.1.2 Object list

Function	Name	Type	DPT	Flag
Room temperature - Actual temperature - Status	Room temperature - output	2-byte	9,001	C, R, -, T, A
<p>2-byte object for the output of the actual temperature determined by the device (room temperature). Possible value range: -99.9 °C to +99.9 °C / Measuring range of internal temperature sensor: -40 °C to +125 °C.</p> <p>The temperature value is always output in the format "°C".</p>				

Function	Name	Type	DPT	Flag
Room temperature - Actual temperature without calibration - Status	Room temperature - output	2-byte	9,001	C, R, -, T, A
<p>2-byte object for the output of the actual temperature determined by the device without calibration (room temperature). Possible value range: -99.9 °C to +99.9 °C / Measuring range of internal temperature sensor: -40 °C to +125 °C.</p> <p>The temperature value is always output in the format "°C".</p>				

Function	Name	Type	DPT	Flag
Room temperature - Sensor calibration - Internal sensor	Room temperature - Input	2-byte	9,001	C, -, W, -, U
<p>2-byte object for sensor calibration of the internal sensor. Possible range of values: -99.9 °C to +99.9 °C.</p> <p>The temperature value must always be specified in the format "°C".</p>				

Function	Name	Type	DPT	Flag
Room temperature - External value	Room temperature - Input	2-byte	9,001	C, -, W, -, U
<p>2-byte object for coupling an external KNX room temperature sensor or a controller extension. Thus cascading of multiple temperature sensors for room temperature measurement. Possible range of values: -99.9 °C to +99.9 °C.</p> <p>The temperature value must always be specified in the format "°C".</p>				

10 Operating functions

10.1 Operating lock

The device has a separately configurable operating lock. The operating lock can be activated on the "General" parameter page under "Operating functions".

When the operating lock is activated, the ETS enables further parameters for configuring the operating lock under "Automatic operating lock" on the "Display -> Display settings" parameter page.

An operating lock on the operating element can be activated and used as a child safety lock or to prevent operating errors. The operating lock for the device can be switched on and off during operation.

The active operating lock is signalled by the lock symbol icons of the operating element. If the operating element of the appliance is touched when the operating lock is switched on, the lock symbol flashes. This shows that the device is locked. At the same time, the display brightness changes to the value "During operation" for 20 seconds.

- i** If the operating lock is switched on and humidity is measured at the same time, only the lock symbol is shown on the display. The drop symbol is not displayed.

Switching on the operating lock

Operation of the operating element can be disabled by pressing and holding the "v" and "+" control buttons simultaneously (> 1 second).

- i** When the operating lock is switched on, all other operations on the operating element are ignored.

Automatic operating lock

The operating lock can switch on automatically after a certain period of inactivity. This time can be set from 10 seconds to 59 minutes and 59 seconds.

Operating lock via object

The operating lock can be switched on and off via the communication object.

Switching off the operating lock

The operating element can be unlocked by pressing and holding the "v" and "+" control buttons simultaneously (> 1 second).

Behaviour after an ETS programming operation or after the bus voltage returns

The operating lock can be active or inactive after an ETS programming operation or after bus voltage return. The operating lock can also assume the state before the ETS programming process or before the bus voltage failure.

10.1.1 Table of parameters

"General" parameter page

Operating lock	Active Inactive
<p>The operating lock blocks operation of the appliance via the operating element. An operating lock on the operating element can be activated and used as a child safety lock or to prevent operating errors.</p> <p>This parameter activates the operating lock for the device and can be switched on and off during operation.</p> <p>When the operating lock is activated, the ETS enables further parameters for configuring the operating lock under "Automatic operating lock" on the "Display -> Display settings" parameter page.</p> <p>Additional parameters and objects become visible.</p>	

Parameter page "Display -> Display settings"

Automatic operating lock	Active Inactive
<p>The operating lock can switch on automatically after a certain period of inactivity. This parameter activates the automatic operating lock.</p>	

Automatic operating lock after	0 ... 59 min 0 ... 20 ... 59 s
<p>The automatic operating lock switches on after a certain period of inactivity. This time can be set from 10 seconds to 59 minutes and 59 seconds.</p>	

Operating lock via object	Active Inactive
<p>The operating lock can be switched on and off via the communication object. This parameter enables the "Operating lock - Default" communication object.</p>	

After an ETS programming operation or after the bus voltage returns	Behaviour as before Operating lock active Operating lock inactive
<p>The operating lock can be active or inactive after an ETS programming operation or after bus voltage return. The operating lock can also assume the state before the ETS programming process or before the bus voltage failure.</p>	

10.1.2 Object list

Function	Name	Type	DPT	Flag
Operating lock - Status	Display - Output	1-bit	1,003	C, R, -, T, A
<p>1-bit object for outputting the current status of the operating lock (0 = operating lock switched off / 1 = operating lock switched on).</p>				

Function	Name	Type	DPT	Flag
Operating lock - default	Display - Input	1-bit	1,003	C, -, W, T, U
1-bit object for switching the operating lock on and off via object (0 = switch off operating lock / 1 = switch on operating lock).				

10.2 On/off function

The device has a separately configurable on/off function. The switch-on/switch-off function can be activated on the "General" parameter page under "Operating functions".

When the switch-on/switch-off function is activated, the ETS enables further parameters for configuring the switch-on/switch-off function on the "Controller extension" parameter page.

- i** The device can also be switched on or off with a long press (> 4 seconds) on the centre buttons when the on/off function is inactive.

The switch-on/switch-off function can optionally be used to send value telegrams to the bus when the device is switched on or off. 1-bit values, 1-byte values or scene numbers can be sent to the bus.

When the device is switched off, the current actual temperature can optionally be shown in the main segment of the display.

The secondary display shows "OFF" when the device is switched off.

Depending on the application, the value telegrams can be sent to the bus only when switching off, only when switching on or when switching on and off.

- i** If the product is in the "Off" state and a lock is activated by object, this is tracked in the background.
- i** If the device is switched to the "Off" state, the "Automatic operating lock according to time setting" is updated in the background with the corresponding time.
- i** If the product is set to "Off" mode, the display brightness changes to the brightness value in idle mode after 20 seconds.

10.2.1 Table of parameters

"General" parameter page

On/off function	Active Inactive
<p>The switch-on/switch-off function can optionally be used to send value telegrams to the bus when the device is switched on or off. 1-bit values, 1-byte values or scene numbers can be sent to the bus</p> <p>This parameter is used to activate the on/off function for the device.</p> <p>When the switch-on/switch-off function is activated, the ETS enables further parameters for configuring the switch-on/switch-off function on the "Controller extension" parameter page.</p> <p>i The device can also be switched on or off with a long press (> 4 seconds) on the centre buttons when the on/off function is inactive.</p> <p>Additional parameters and objects become visible.</p>	

Parameter page "Controller extension"

Indicator of actual temperature in the main segment after switching off	Active Inactive
<p>When the device is switched off, the current actual temperature can optionally be shown in the main segment of the display. This parameter activates or deactivates this indicator when switched off.</p>	

When switching off the display	Switchover to frost/heat protection maintain current operating mode
<p>This parameter defines the switchover behaviour of the operating mode when the display is switched off. It can be switched to frost/heat protection when switched off or the current operating mode can be retained.</p>	

Function	No reaction send 1-bit object send 1-byte object Activate scene
<p>This parameter defines the function of the switch-on/switch-off function when the switch-on/switch-off function is activated.</p> <p>no reaction: The device does not send any value telegrams to the bus when it is switched on or off.</p> <p>send 1-bit object: The device sends 1-bit value telegrams to the bus when it is switched on or off.</p> <p>send 1-byte object: The device sends 1-byte value telegrams to the bus when it is switched on or off.</p> <p>Activate scene: the device sends scene number telegrams to the bus when it is switched on or off.</p>	

Send to	Switch off Switch on Switching the device on or off
This parameter defines for the on/off function whether value telegrams are only sent to the bus when switching off, only when switching on or when switching on and off.	
When switching off	Off On
This parameter defines the 1-bit value that is sent to the bus when switching off (0 = Off / 1 = On).	
When switching on	Off On
This parameter defines the 1-bit value that is sent to the bus when switching on (0 = Off / 1 = On).	
When switching off	0...255
This parameter defines the 1-byte value that is sent to the bus when switching off.	
When switching on	0...255
This parameter defines the 1-byte value that is sent to the bus when switching on.	
When switching off	1...64
This parameter defines the scene number that is sent to the bus when switching off.	
When switching on	1...2...64
This parameter defines the scene number that is sent to the bus when switching on.	

10.2.2 Object list

Function	Name	Type	DPT	Flag
On/off function	Display - Output	1-bit	1,001	C, R, -, T, A
1-bit object for outputting the 1-bit value telegram of the switch-on/switch-off function (0 = Off / 1 = On) to the bus.				
Function	Name	Type	DPT	Flag
On/off function Status	Display - Input	1-bit	1,001	C, -, W, T, U
1-bit object for receiving the 1-bit value status of the switch-on/switch-off function (0 = Off / 1 = On) via the bus.				
Function	Name	Type	DPT	Flag
On/off function	Display - Output	1-byte	5,001	C, R, -, T, A
1-byte object for outputting the 1-byte value telegram of the switch-on/switch-off function (0...255) to the bus.				

Function	Name	Type	DPT	Flag
On/off function	Display - Output	1-byte	17,001	C, R, -, T, A
1-byte object for outputting the scene number telegram of the switch-on/switch-off function (1...64) to the bus.				

11 Controller extension

Introduction

The device can be used for extension unit operation, allowing central heating control devices with an integrated room temperature controller to be controlled.

In this configuration, the device itself is not involved in temperature control.

Room temperature controllers typically allow the room temperature control to be influenced in different ways. These include the operating mode switchover and setpoint temperature shift options.

In extension unit mode, the device is operated via the control panels. Device components.

The operating elements can be used to control a room temperature controller by changing the operating mode and adjusting the setpoint temperature.

11.1 Setpoint temperature

In extension unit mode, the device offers the option of specifying a setpoint value for the setpoint temperature.

The setpoint can be specified either via an absolute temperature value specification or via a relative temperature value shift.

Operation

With the setpoint temperature shift, the setpoint value is specified using the "-" and "+" buttons. If the "+" or "-" button is pressed and held (>1 s), the setpoint is set with 3 increments per second.

If the setpoint is not adjusted again within 3 seconds of the last operation or if the menu button is pressed, the changed setpoint temperature is sent to the controller via the bus.

Status feedback

As soon as the change is confirmed to the device via the status object, the confirmation of the setpoint change is confirmed by a double flashing setpoint temperature in the display. If a different setpoint temperature is reported back via the status object, this different setpoint temperature is adopted in the device and confirmed with a double flash in the display.

If the setpoint temperature is adjusted on the device in such a way that there is no change in the setpoint specification, confirmation of the setpoint setting is confirmed by a double flashing setpoint temperature in the display, but is not sent to the bus. This means that there is no change in the setpoint temperature at the start of operation.

After specifying a setpoint using the "-" and "+" buttons and sending the new setpoint temperature to the bus, the device expects feedback via the status setpoint object. If this feedback does not occur automatically within 10 seconds, the device sends a read request for the setpoint temperature to the bus. If there is again no response after 10 seconds, the display shows an error "--" in the secondary segment instead of the setpoint temperature.

In the event of an error, each time the "-" and "+" buttons are pressed again, the device sends the last setpoint temperature sent, but not yet confirmed, to the bus. Only after the setpoint temperature has been confirmed can it be adjusted again using the "-" and "+" buttons.

In the event that a new setpoint temperature is received without prior operation of the "-" and "+" buttons on the device, this new setpoint temperature is shown in the secondary segment of the display. For example, the desired temperature can change when the operating mode is changed.

Absolute temperature value specification

With absolute temperature value specification, the setpoint is specified using the "-" and "+" buttons in fixed increments of 1 °C. If the "+" or "-" button is pressed and held (>1 s), the setpoint is set with 3 increments per second (= 3 °C).

- i** The secondary segment of the display shows setpoint temperatures in 0.5 °C increments. In the case of setpoint specifications via the bus, the displayed setpoint temperature is rounded if changes to the setpoint temperature are made elsewhere in 0.1 °C increments.

Relative temperature value shift

With the relative temperature value shift, the shift takes place according to the parameterisation via count value x step value or via relative temperature values.

The device supports the setpoint shift via count value function (count value x step value). The communication objects for the temperature shift are then of data point type 6.010.

When a temperature difference is received, the device always calculates from the "Setpoint temperature - active operating mode". If the "Setpoint temperature - active operating mode" is 21 °C, for example, a value of "-2" is sent to the bus via the communication object when the "-" button is pressed twice. This results in a setpoint temperature of 19 °C. Accordingly, the indicator shows the setpoint values of 20 °C -> 19 °C during operation.

The device supports the setpoint shift function using temperature differences (relative temperature values). The communication objects for the temperature shift are then of data point type 9.002.

When a temperature difference is received, the device always calculates from the "Setpoint temperature - active operating mode". If the "Setpoint temperature - active operating mode" is 21 °C, for example, a value of "-2 K" is sent to the bus via the communication object when the "-" button is pressed twice. This results in a setpoint temperature of 19 °C. Accordingly, the indicator shows the setpoint values of 20 °C -> 19 °C during operation.

The increment results from the operation.

- i** The correct setpoint temperature of the active operating mode is required for the relative temperature value shift function. This must be transmitted to the device via the "Setpoint temperature - Active operating mode" communication object when changing operating mode, among other things.

11.2 Operating mode switchover

The device can switch between different operating modes at the touch of a button or via the bus.

Different operating modes are switched, each of which is assigned different setpoint temperatures and properties in the controller.

The following table shows the available operating modes.

DPT 20.102
Comfort
Standby
Night

The ETS provides suitable communication objects and parameters.

- i** The prerequisite for the device to be able to switch between different operating modes is that the "Show operating mode on display" parameter is parameterised as active and the active operating mode is therefore shown on the display.

Operating mode switchover by pressing a button

The current operating modes are shown on the display. These operating modes can be switched using the menu button. If an operating mode is selected, the device sends the change to the bus three seconds after switching via the menu button.

Switching via the menu button takes place according to the parameterised switching behaviour.

Operating mode switchover by means of object

The operating mode to be set is specified via the central 1-byte communication object.

11.3 Controller extension parameters

Parameter page "Controller extension"

Setpoint presetting	absolute temperature value specification relative temperature value shift
<p>It is possible to configure the setpoints directly (absolute setpoint presetting) or relatively (derivation from basic setpoint). This parameter defines the way the setpoint temperature is preset.</p> <p>With "relative", all temperature setpoints are derived from the basic temperature (basic setpoint).</p> <p>With "Absolute": The setpoint temperatures are independent of each other. Different temperature values can be specified for each operating mode and heating/cooling mode.</p>	
Type of shift	Counting value x increment relative temperature value
<p>Depending on the setting of the parameter "Type of shift", the shift takes place via a 2-byte communication object according to KNX DPT 9.002 or via a 1-byte communication object according to KNX DPT 6.010.</p>	
Show operating mode on the display	Active Inactive
<p>This parameter enables the active operating mode to be shown on the indicator.</p> <p>This parameter enables the communication objects for switching the operating mode.</p> <p>When active: The device can switch the operating mode via communication objects and shows the currently active operating mode on the display.</p> <p>When inactive: The operating mode switchover by the device is deactivated. The device does not show the currently active operating mode on the display.</p>	
Operating mode switchable at the touch of a button	Active Inactive
<p>This parameter enables the operating mode to be switched on the device.</p> <p>When active: The operating modes can be switched using the menu button. If an operating mode is selected, the device sends the change to the bus three seconds after switching via the menu button.</p> <p>When inactive: The operating modes cannot be switched using the menu button.</p>	

Switch-over behaviour	Comfort / Standby / Night Comfort/Standby Comfort/Night Standby/Night
This parameter changes the behaviour of the operating modes via the menu button. The device switches through the operating modes in sequence according to the selected values.	
Temporarily store setpoints with delayed feedback signals	Active Inactive
This parameter decides whether setpoints are temporarily stored in the device in the event of delayed feedback.	
Extended parameters	Active Inactive
This parameter enables extended configuration options for the operating mode switchover function. If the extended parameters are deactivated, the display does not show any additional symbols. When the advanced parameters are activated, the ETS shows the following parameters.	
Additionally display eco symbol in standby/night mode	Active Inactive
An additional eco symbol is shown on the display during operation if the controller is operating in standby or night operating mode.	
Heating/cooling process indicated by symbol	Active Inactive
An additional symbol is shown on the display during operation if the controller is actively heating or cooling.	
Enable boost function	Active Inactive
This parameter enables the boost function.	

11.4 Controller extension objects

Function	Name	Type	DPT	Flag
Setpoint temperature - Active operating mode	Display - Input	2-byte	9,001	C, -, W, T, U
2-byte object for external specification of the basic setpoint temperature. The controller rounds the temperature values received via the object to 0.1 K. The temperature value must always be specified in the format "°C".				

Function	Name	Type	DPT	Flag
Setpoint temperature specification	Display - Output	2-byte	9,001	C, R, -, T, A
2-byte object for specification of the setpoint temperature. The temperature value is specified in the format "°C".				

Function	Name	Type	DPT	Flag
Setpoint temperature - Shift	Display - Output	2-byte	9,002	C, R, -, T, A
2-byte object for presetting a basic setpoint shift. The value of a counter value in the communication object is 0.5 Kelvin. The value "0" means that no shift is active . The value is depicted in a double complement in the positive and negative direction.				

Function	Name	Type	DPT	Flag
Setpoint temperature - Shift status	Display - Input	2-byte	9,002	C, -, W, T, U
2-byte object used to feed back the current basic setpoint shift from the main controller. The value "0" means that no shift is active . The value is depicted in a double complement in the positive and negative direction.				

Function	Name	Type	DPT	Flag
Setpoint temperature shift	Display - Output	1-byte	6,010	C, R, -, T, A
1-byte object for presetting a basic setpoint shift. The value of a counter value in the communication object is 0.5 Kelvin. The value "0" means that no shift is active . The value is depicted in a double complement in the positive and negative direction.				

Function	Name	Type	DPT	Flag
Setpoint temperature shift status	Display - Input	1-byte	6,010	C, -, W, T, U
1-byte object used to feed back the current basic setpoint shift from the main controller. The value of a counter value in the communication object is 0.5 Kelvin. The value "0" means that no shift is active . The value is depicted in a double complement in the positive and negative direction.				

Function	Name	Type	DPT	Flag
Boost - Activate / Deactivate	Display - Output	1-bit	1,010	C, R, -, T, A
1-bit output object for requirement-orientated activation and deactivation of the boost function. The telegram polarity is fixed: "0" = boost inactive, "1" = boost active.				

Function	Name	Type	DPT	Flag
Boost - Status	Display - Input	1-bit	1,011	C, -, W, T, U
1-bit object via which the controller main unit outputs the current status of the boost function to the device. When the boost function is activated, the status object is set to the value "1". When the boost function is deactivated, the status object is set to the value "0".				

Function	Name	Type	DPT	Flag
Heating status indication	Display - Input	1-bit	1,001	C, -, W, T, U
<p>A main controller can usually signal via a separate object whether the controller is currently requesting heating energy and is therefore actively heating.</p> <p>The device can receive the message for active heating from the controller main unit via this object. The device shows the heating symbol on the display as soon as heating is active.</p>				

Function	Name	Type	DPT	Flag
Cooling status indication	Display - Input	1-bit	1,001	C, -, W, T, U
<p>A main controller can usually signal via a separate object whether the controller is currently requesting cooling energy and is therefore actively cooling.</p> <p>The device can receive the message for active cooling from the controller main unit via this object. The device shows the cooling symbol on the display as soon as cooling is active.</p>				

12 Display

The device has a display (see chapter "Front view" ▶ Page 6).

The display contains various segments that can be used to show different information (see chapter "Icons in the display" ▶ Page 9).

The brightness of the display is adjustable







Figure 12: Icons in the display

12.1 Display indicators

Operating mode indication

The device can show the currently active operating mode in the top right-hand display if this indication is activated in the ETS on the "Controller extension" parameter page.

The following operating modes can be shown on the display:

-  Comfort operating mode is active
-  Reduction temperature operating mode is active
-  Night setback operating mode is active
-  Eco operating mode is active

Main display and secondary display

The display is divided into a main display and a secondary display, corresponding to the red frames.



Figure 13: Main display of the display



Figure 14: Secondary display of the display

The main display can show the actual temperature or the set temperature in large letters in the centre of the display.

If the main display shows the current actual temperature according to the parameterisation, the secondary display simultaneously shows the set target temperature.

If the main display shows the setpoint temperature, you can set in the ETS whether the secondary display shows the actual temperature in small form in the right-hand display area or whether no temperature is shown at this point in the display.

- i** The temperature is displayed in the secondary segment in 0.5 °C increments. The display shows rounding values when the temperature is changed via the bus in 0.1 °C increments.

Humidity display

A humidity value in per cent can be shown in the secondary display if this indicator is activated in the ETS on the "Display -> Display settings" parameter page. In this case, a drop symbol in the main display indicates that the secondary display is showing the humidity value.



Air humidity

- i** The humidity value is shown in the secondary display in automatic alternation with the actual or target temperature for 5 seconds if the secondary display is to show one of these temperatures.
- i** When the operating lock is active, the drop symbol of the humidity display is not shown in the main display because the lock symbol is shown with higher priority.
- i** If the display is inactive and the display is activated for the first time using the menu button, this has no effect on the alternating display of temperature and humidity values.
- i** If the operating modes are changed using the menu button, the change to the humidity display is suspended during operation and then for 10 seconds in the secondary display.
- i** If the setpoint temperature is shown and changed in the secondary display, the change to the humidity display is suspended during operation and then for 10 seconds in the secondary display.

Indication in switched-off state

The secondary display shows "OFF" when the device is switched off.

In the ETS, parameters can be used to select whether the actual temperature should also be displayed in the main segment (see chapter "On/off function" ▶ Page 41).

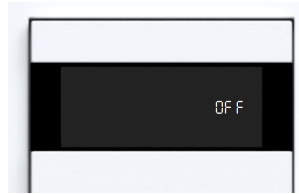


Figure 15: Display in switched-off state

Window status display

The device can show an open window in the centre-left display area if this indicator is activated in the ETS on the "Display -> Display settings" parameter page. By activating the "Show warning message" parameter under Window status when window is open, the ETS offers the "Window contact - default" communication object, which can be used to show or hide the "open window" symbol in the display.



Window status (open window was recognised)

In addition, operation can be blocked on the device when the window is open. If a window is signalled as open, operation of the control surfaces of the appliance is blocked. Any operations are not analysed and processed. The device signals that operation is blocked when the window is open by flashing the window symbol. At the same time, the display brightness changes to the value "During operation" for 20 seconds.

Show operating lock

The device can show a lock symbol in the main display if the operating lock is activated in the ETS on the "General" parameter page and the operating lock is active. When the operating lock is activated, the device shows the lock symbol in the main display when locked (see chapter "Operating lock" ▶ Page 38).



Operating lock is activated

If the operating element of the appliance is touched when the operating lock is switched on, the lock symbol flashes. This shows that the device is locked. At the same time, the display brightness changes to the value "During operation" for 20 seconds.

- i** When the operating lock is active, the drop symbol of the humidity display is not shown in the main display because the lock symbol is shown with higher priority.

Display boost function

While the boost function is switched on, the display shows a rocket symbol in the top left-hand display area (see chapter "Controller extension" ▶ Page 45).



The boost function is active

Indicating heating and cooling

For the "Heating" or "Cooling" duration, the display shows the corresponding symbol in the bottom right-hand display area (see chapter "Controller extension" ▶ Page 45).



Heating/cooling

12.1.1 Table of parameters

Parameter page "Display -> Display settings"

Main display	Actual-temperature Setpoint temperature
<p>This parameter defines which temperature value is shown on the main display. The setting of this parameter influences the parameterisability of the "Secondary display" parameter.</p> <p>For "Actual temperature": The main display shows the actual temperature. The secondary indication of the display indicates the setpoint temperature.</p> <p>For "Set temperature": The main display shows the set temperature. The secondary display can be parameterised.</p>	
Secondary display	Actual-temperature no temperature
<p>This parameter defines whether the actual temperature is shown on the secondary display or whether the secondary display does not show any temperature. The availability of this parameter depends on the parameterisation of the "Main display" parameter.</p> <p>For "Actual temperature": The secondary display shows the actual temperature. With "no temperature": The secondary display does not show any temperature.</p> <p>i The temperature is displayed in the secondary segment in 0.5 °C increments. The display shows rounding values when the temperature is changed via the bus in 0.1 °C increments.</p>	
Indication of actual temperature	internal sensor external value via bus
<p>The source for displaying the actual temperature can either be the internal sensor in the device or an external value received via the bus.</p> <p>i For the display of the actual temperature from the internal sensor to work, the temperature measurement of the device must first be activated and parameterised.</p> <p>With "internal sensor": The display shows the actual temperature of the device's internal temperature measurement, including weighting of the measured values if necessary. The value corresponds to the value of the "Room temperature - Actual temperature - Status" communication object.</p> <p>With "external value via bus": The display shows the temperature value "Actual temperature display (external sensor)" received via the communication object.</p>	

Display humidity value (%)	Active Inactive
The display will show a humidity value in per cent in the secondary display if this indicator is activated. In this case, a drop symbol in the main display indicates that the secondary display is showing the humidity value.	
Display warning message	Active Inactive
The device shows an open window in the centre left of the display when this indicator is activated. By activating the "Show warning message" parameter, the ETS offers the "Window contact - default" communication object, which can be used to show or hide the "open window" symbol in the display.	
Disable operation	Active Inactive
In addition, operation can be blocked on the device when the window is open. If a window is signalled as open, operation of the control surfaces of the appliance is blocked. Any operations are not analysed and processed. The device signals that operation is blocked when the window is open by flashing the window symbol. At the same time, the display brightness changes to the value "During operation" for 20 seconds.	

12.1.2 Object list

Function	Name	Type	DPT	Flag
Window contact - default	Display - Input	1-bit	1,019	C, -, W, T, U
<p>1-bit object for specifying and evaluating a window contact.</p> <p>The received value "1 = Open" or "0 = Closed" specifies whether the "open window" symbol is shown or hidden in the display.</p> <p>The object is offered in the ETS when the "Display warning message" parameter is activated under Window status when window is open.</p> <p>In addition, operation can be blocked on the device when the window is open. If a window is signalled as open, operation of the control surfaces of the appliance is blocked. Any operations are not analysed and processed.</p>				
Function	Name	Type	DPT	Flag
Operating lock - Status	Display - Output	1-bit	1,003	C, R, -, T, A
<p>1-bit object for outputting the current status of the operating lock (0 = operating lock switched off / 1 = operating lock switched on).</p>				
Function	Name	Type	DPT	Flag
Operating lock - default	Display - Input	1-bit	1,003	C, -, W, T, U
<p>1-bit object for switching the operating lock on and off via object (0 = switch off operating lock / 1 = switch on operating lock).</p>				

Function	Name	Type	DPT	Flag
External humidity (external sensor)	Display - Input	2-byte	9,007	C, -, W, T, U

2-byte object for coupling an external KNX humidity sensor or a controller extension. This enables cascading of several humidity sensors for humidity measurement.

The temperature value must always be specified in the format "%".

Function	Name	Type	DPT	Flag
Actual temperature display (external sensor)	Display - Input	2-byte	9,001	C, -, W, T, U

2-byte object used to connect an external KNX room temperature sensor or a controller extension unit for indication on the display.

The temperature value must always be specified in the format "°C".

12.2 Display brightness

The brightness of the display is adjustable. Up to four brightness values for a day and night mode can be parameterised for the display in the ETS.

The display can operate in a continuous mode with one brightness value "During operation" and one brightness value "In idle state" or it can optionally operate in a day and night mode, each with two different brightness values for "During operation" and "In idle state". Switching between day and night mode takes place via an object, whereby the object polarity can be parameterised.

The brightness is set in the ETS via 10 levels. Each level corresponds to a brightness level stored in the device as a percentage.

Brightness level in the ETS	Brightness of the display
1	2 per cent
2	20 per cent
3	30 per cent
4	40 per cent
5	50 per cent
6	60 per cent
7	70 per cent
8	80 per cent
9	90 per cent
10	100 per cent

The brightness can be set during operation via a communication object. After enabling via the "Brightness setting via object" parameter, a brightness value of 0 to 100 per cent can be specified for the display via the "Brightness" communication object via the bus.

- i** If brightness values of less than 10 per cent are received via the bus, the device sets the brightness of the display to brightness level 1 = 2 per cent.

The display brightness after bus voltage return can be set in the parameters. The brightness settings via the communication object remain stored in the device in the event of a power failure, for example, and can be set again automatically by the device after bus voltage return.

After an ETS programming operation, the device sets the brightness levels defined in the parameters for the various modes and statuses.

12.2.1 Table of parameters

Parameter page "Display -> Display settings"

Day and night mode	Active Inactive
<p>With "Active": The display operates in a day and night mode, each with two different brightness values for "During operation" and "In idle state".</p> <p>With "Inactive": The display operates in a continuous mode with a brightness value "During operation" and a brightness value "In idle state".</p> <p>Switching between day and night mode takes place via an object, whereby the object polarity can be parameterised.</p>	
During operation	1...7...10
<p>This parameter defines the brightness of the display in continuous mode and during operation. The brightness remains set for 20 seconds after the last operation.</p> <p>The brightness is set in the ETS via 10 levels. Each level corresponds to a brightness level stored in the device as a percentage (1 = 2 %, 2 = 20 %, 3 = 30 %, 4 = 40%, 5 = 50 %, 6 = 60 %, 7 = 70%, 8 = 80 %, 9 = 90 %, 10 = 100 %).</p>	
In idle state	1...3...10
<p>This parameter defines the brightness of the display in continuous mode and in idle mode, which is activated by the device 20 seconds after the last operation.</p> <p>The brightness is set in the ETS via 10 levels. Each level corresponds to a brightness level stored in the device as a percentage (1 = 2 %, 2 = 20 %, 3 = 30 %, 4 = 40%, 5 = 50 %, 6 = 60 %, 7 = 70%, 8 = 80 %, 9 = 90 %, 10 = 100 %).</p>	
During operation, by day	1...7...10
<p>This parameter defines the brightness of the display in day and night mode, during the day and during operation. The brightness remains set for 20 seconds after the last operation.</p> <p>The brightness is set in the ETS via 10 levels. Each level corresponds to a brightness level stored in the device as a percentage (1 = 2 %, 2 = 20 %, 3 = 30 %, 4 = 40%, 5 = 50 %, 6 = 60 %, 7 = 70%, 8 = 80 %, 9 = 90 %, 10 = 100 %).</p>	
During operation, at night	1...4...10
<p>This parameter defines the brightness of the display in day and night mode, at night and during operation. The brightness remains set for 20 seconds after the last operation.</p> <p>The brightness is set in the ETS via 10 levels. Each level corresponds to a brightness level stored in the device as a percentage (1 = 2 %, 2 = 20 %, 3 = 30 %, 4 = 40%, 5 = 50 %, 6 = 60 %, 7 = 70%, 8 = 80 %, 9 = 90 %, 10 = 100 %).</p>	

In idle state, by day	1...3...10
<p>This parameter defines the brightness of the display in day and night mode, during the day and in idle mode, which is activated by the device 20 seconds after the last operation.</p> <p>The brightness is set in the ETS via 10 levels. Each level corresponds to a brightness level stored in the device as a percentage (1 = 2 %, 2 = 20 %, 3 = 30 %, 4 = 40%, 5 = 50 %, 6 = 60 %, 7 = 70%, 8 = 80 %, 9 = 90 %, 10 = 100 %).</p> <p>x</p>	
In idle state, at night	1...1...10
<p>This parameter defines the brightness of the display in day and night mode, at night and in idle mode, which is activated by the device 20 seconds after the last operation.</p> <p>The brightness is set in the ETS via 10 levels. Each level corresponds to a brightness level stored in the device as a percentage (1 = 2 %, 2 = 20 %, 3 = 30 %, 4 = 40%, 5 = 50 %, 6 = 60 %, 7 = 70%, 8 = 80 %, 9 = 90 %, 10 = 100 %).</p>	
Brightness setting via object	Active Inactive
<p>The brightness can be set during operation via a communication object. After enabling via this parameter, the display can be given a brightness value of 0 to 100 per cent via the bus using the "Brightness" communication object.</p> <p>i If brightness values of less than 10 per cent are received via the bus, the device sets the brightness of the display to brightness level 1 = 2 per cent.</p>	
After the bus voltage returns	State as before bus voltage failure Query current status No reaction
<p>The display brightness after bus voltage return is set by this parameter.</p> <p>With "Status as before bus voltage failure": The device sets the display to the same brightness as before the bus voltage failure.</p> <p>With "Query current status":</p> <p>"No reaction":</p>	
Object - Polarity	0 = day / 1 = night 1 = day / 0 = night
<p>This parameter defines the object polarity of the "Day and night mode" communication object.</p>	

12.2.2 Object list

Function	Name	Type	DPT	Flag
Day and night mode	Display - Input	1-bit	1,024	C, -, W, T, U
1-bit object for switching between day and night mode. The object polarity can be configured.				

Function	Name	Type	DPT	Flag
Brightness	Display - Input	1-byte	5,001	C, -, W, T, U
1-byte object for specifying the display brightness via object. Brightness values from 0 to 100 per cent can be specified via the bus.				
<p>i If brightness values of less than 10 per cent are received via the bus, the device sets the brightness of the display to brightness level 1 = 2 per cent.</p>				

13 Heartbeat function

The heartbeat function makes it easy to check whether the application is running error-free in a device. For this purpose, the communication object Heartbeat sends a corresponding heartbeat telegram with a settable cycle time. The heartbeat function is enabled on the "General" parameter page.

13.1 Parameters for heartbeat

General - Enabled functions

Heartbeat function	Checkbox (yes / no)
If the parameter is activated, the heartbeat functions and thus the "Heartbeat" object are enabled.	

General -> Heartbeat

Cycle time for transmission of device status	0 ... 23 h 0 ... 2 ... 59 min
This parameter defines the time with which the device sends a telegram with the value "1" when the application is running. To limit the bus load, times shorter than 1 minute are excluded.	

13.2 Object list for heartbeat

Function	Name	Type	DPT	Flag
Heartbeat	Device - Output	1-bit	1,002	C, R, -, T, A
1-bit object for cyclical signalling of the device function. When the application of the device is running, the communication object transmits the value "1" at the set cycle time.				

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