SpaceLogic KNX

4” Touch Unit

Touch panel 1950/2.1

Application description

MTN6215-0410

04/23-1950/2.1

www.se.com

Schneider Electric

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Open source package	Link to website
zlib	https://github.com/madler/zlib.git
libjpeg	http://www.ijg.org/files/
linux_kernel	https://github.com/torvalds/linux/tree/v4.9-rc8
ncurses	http://ftp.gnu.org/pub/gnu/ncurses/
u-boot	ftp://ftp.denx.de/pub/u-boot/

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Safety information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this manual or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that accompany this symbol to avoid possible injury or death.

⚠ ⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

Failure to follow these instructions will result in death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

NOTICE

NOTE is used to address practices not related to physical injury.

Symbols

ETS settings

Additional information

The information provided must be complied with, otherwise program or data errors may occur.

ETS operation

Requirements for safe operation

The ETS is the **software for the KNX system.** It is not manufacturer-specific. Knowledge of ETS operation is required. This also includes selection of the correct sensor or actuator, transferring it to the line and commissioning it.

Appropriate ETS version

The application is suitable for ETS5 or higher version (hereinafter referred to as “ETS”).

ETS tabs, parameters and values

Overview - setting functions

The following overview helps you to understand how to access the functions.

Button		Select button function	Scene
		Select scene function	Extended
		Number of objects	Two
Scene extended		...	...

Example

Meaning:

1. Go to the *Button* tab and set the *Select button function* parameter to value *Scene*.
2. Further parameters then appear in the tab. You can use them to change settings.
3. A new tab also opens.

Special features of the ETS software

Restoring defaults

Default Parameters button

You can use the *Default* and *Default parameters* service buttons to switch all parameters back to the **settings on delivery** (following consultation). The ETS will then permanently delete all manual settings.

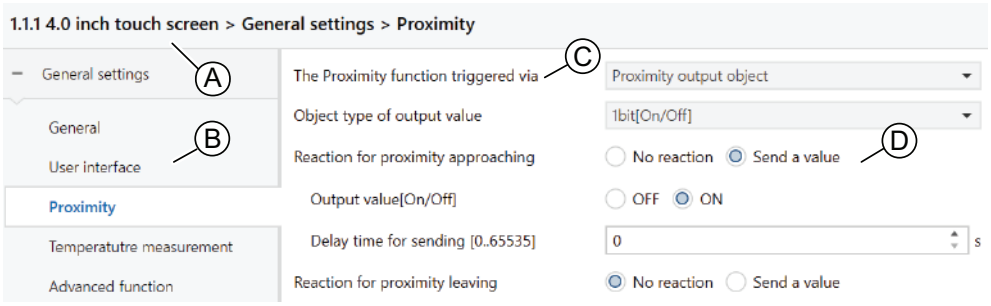
Dependent functions and parameters

Many functions are affected by how other functions are set. This means that dependent functions can only be seen and selected in the ETS **when the upstream function is enabled**.

- If you de-select functions or change parameters, **previously connected group addresses may be removed** in the process.
- The values of some parameters only become active once the functions influenced by these parameters are activated.

User interface

In the ETS, the device parameters are opened using the *Parameters* service button. The user interface is divided into 2 sections: The tabs are on the left and the parameters on the right, together with their values.



A Name of the device
B Tab
C Parameter
D Input fields for parameter values

Components and programming environment

The device is commissioned using KNX-certified software. The application and the technical descriptions are updated regularly and can be found on the Internet.

This application can be run in conjunction with the ETS software.

Group objects in the ETS

No.	Name	Object function	Length	Properties	DPT ETS
1	Function 1	Scene	1 byte	Sends	18.001 scene control
41	Function 1	Status feedback object	1 bit	Sends, Receives, Updates	1.001 switch

The data point types (DPT) in this application are pre-set.

Group addresses

As the group address only consists of a **sequence of numbers**, it is very important to briefly describe it in the ETS, to assign a name (usually the designation of the device and the basic function of the device.

No.	Name	Object function	Description	Group Addresses
1	Input A	Switch telegram	Central ON	11/2/2

Table of contents

1 For your safety

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, OR ARC FLASH.

Safe electrical installation must be carried out only by skilled professionals.
Skilled professionals must prove profound knowledge in the following areas:

- Connecting to installation networks
- Connecting several electrical devices
- Laying electric cables
- Connecting and establishing KNX networks
- Safety standards, local wiring rules and regulations

Failure to follow these instructions will result in death or serious injury.

1.1 Qualified personnel

This document is aimed at personnel who are responsible for setting up, installing, commissioning and operating the device and the system in which it is installed.

Detailed expertise gained by means of training in the KNX system is a prerequisite.

2 Overview of functions

Channel	Level 2	Level 3
General settings	General	
	User interface	
	Proximity	
	Temperature measurement	
	Advanced function	
Screen settings		Parameter settings
	Customized icons	
Express settings	Screen 1 – 9	Function icons setting
	Function 1 – 6	Function parameters
HVAC controller	Controller settings	
	FCU controller	Setpoint
		Heating control Cooling control Heating/Cooling control
		Fan
	Floor heating controller	
	Ventilation controller	
Logic	Logic function settings	
	1st – 8th Logic	
Scene Group	Scene Group settings	
Scene group	Group 1 – 8	Output 1 – 8 Function

Group addresses, group objects

Nr. of group addresses	2000
Nr. of maximum assignments	2000
Group objects	1060

Overview of group objects → 73.

3 General settings

General settings apply to all the buttons. You can set general properties such as:

- Bus behavior after voltage recovery
- Display user interface
- Proximity function
- Temperature measurement parameters

In addition, you can choose which **advanced functions** you want to enable.

3.1 General

You can set the **delay time** for sending telegrams to the bus after the device power up and reset. The device initialization time is not included. Bus messages received during the delay period are recorded.

Send delay after voltage recovery

The delay setting prevents the bus from being overwhelmed by telegrams when the power is on again. The function also informs you that the bus is ready for communication and the devices are powered at the same time.

Cyclic sending live signal

You can set up **cyclic sending** of signals from individual devices. When there is no signal received, the device either does not work or is missing.

General settings		
General	Send delay after voltage recovery	0 – 15 s
	Cyclic sending live signal	1 – 240 s, 0 = inactive
	Delay time for exiting setting status	s
	Long operation for screen after	s
	Day/Night mode switchover	Via object/Depend on certain time
	Time for switch to night/day at	hh:mm

Delay time for exiting setting status

You can also set the time interval after the setting is completed: For example, between the temperature of the set values and the current measurement temperature.

Example

You want to set the 3-second return time to the function page after you complete the advanced settings of the temperature controller.

Set the *Delay time for exiting setting status* parameter to 3 seconds.

When you finish with settings, the setting page automatically switches to the function page 3 seconds after the idle starts.

Long and short operation

You can set the length of the short and the beginning of the long press of the button. By default long operation starts after 0,5 s.

Day and night mode

You can set the day and night mode switching either via the object or to the exact time.

3.2 Icons, backgrounds, screensaver, firmware update

You can update the device icons, backgrounds, screensavers, and firmware via a USB interface.

A system integrator prepares the upgrade package with the icons, backgrounds, screensaver, and firmware and uploads it to an external storage device (USB flash drive).

Make sure your USB flash drive meets the following criteria:

- Volume: Not more than 32 GB and enough space to store firmware, customized backgrounds, screensavers, icons, etc.
- File system: FAT32.

You can format the USB drive to FAT32 in your Windows File Explorer:

Click *This PC* > right mouse click on your USB drive > select *Format...* > select *FAT32* in the *File System* drop-down menu.

To connect your USB drive to the device, you need an OTG USB cable with a micro USB port on one side and a USB 2.0 port on the other.

For using the USB interface for updates and activating micro USB port of the device, set a secure four-digit PIN code. The preset PIN code combination is 1234. USB interface becomes disabled if you set an invalid PIN code.

See more here: User interface → 13.

Device update procedure

If you want to update your device firmware, backgrounds, screensavers, and import customized icons, proceed as follows:

1. Copy firmware and customized PNG files to the following directories of the USB drive like this:

- Firmware: root directory
- Background: \background
- Screensaver: \screensaver
- Customized icons: \icon

The system can detect your files only if they are correctly named as follows:

Background pictures:

File format: PNG

Size: 480 × 480 pixels

Name: <1.png>, <2.png>, or <3.png>

Screen saver pictures:

File format: PNG

Size: 480 × 480 pixels

Name: 00.png

Icons:

File format: PNG

Size: 58 × 58 pixels

Name: Refer to ETS configuration - 01_G.png (green icon nr. 01), 01_W.png (white icon nr. 01), 30_G.png (green icon nr. 30). After import, you can select them accordingly in the ETS application.

2. To avoid the update being interrupted by unwanted screen events, the following is recommended:

Disable the screensaver and delay time temporarily.

- *General settings* > *User interface* > set *Turn off screen after* to “0”.

- *General settings* > *User interface* > *Screen Access* > click *Deactivation*

Remove unnecessary files from the root directory of your USB drive.

3. Connect the USB drive and device with an OTG USB cable and wait for the device to detect the import package.

If there is no response, check the following:

- The device has a micro USB port activated.
- There are no files in the root directory of the USB drive except for the firmware.
- USB drive and the device are well connected by micro USB cable.

4. When the import package is recognized, a pop-up message appears:

System upgrade pack detected

Update version:

Current version:

upgrade version?

cancel

confirm

5. For upgrading, click *confirm* > enter your PIN code.
6. If the PIN code is valid, the firmware update starts. Once done, the device reboots automatically.
7. The device automatically checks the background, screensaver, and icon files in your USB drive. Choose which folders you want to import. The system asks you about each detected folder. Click *cancel* or *confirm*.

The system starts importing the files. Once the file import is complete, the device restarts within 10 seconds.

Group objects

The *Live signal* object sends cyclically 1 to the bus to indicate that the device application layer is operating properly. The sending interval is set by parameters. The date and time information comes from the bus.

Group objects for *General* setting

No.	Name	Object function	Length	Properties	DPT ETS
1	General	Live signal	1 bit	Sends	1.001 switch
2	General	Date	3 byte	Receives	11.001 date
3	General	Time	3 byte	Receives	10.001 time of day

3.3 User interface

User interface function allows you to customize the appearance of the display and displayed parameters.

You can choose:

- Temperature units
- Language and PIN code
- Theme and screensaver
- Brightness level
- Type and brightness of the screensaver

User interface	Temperature units	Celsius/Fahrenheit

	Interface language	Chinese English French German Spanish Swedish Norwegian
	UI theme style is	1, 2, 3
	Brightness in normal/night mode	10 – 100 %
	Turn off screen after	0 – 255 s, 0 = inactive
	Use screen saver	✓
	Screen Access	Deactivation

Make sure that you set the code page option in the project properties to UTF-8. Otherwise, the Chinese display (and/or special characters) will not be compatible.

Turn off screen after

You can set the time for the screen to turn off when idle. If you set the value to “0 s”, you can turn the screen on and off through a 1-bit object.

If you do not want the screen to be just dark when off, enable the **screen saver** function.

User interface	Use screen saver	Check (Yes)
	Type of screen saver	Clock
		Album
		User defined text
	Brightness in screen saver	10 – 100 %
		Unchange
	Call screen saver after	5 – 255 s

The screensaver interface displays an electronic clock, images, or custom text with a maximum of 18 English or 6 Chinese characters. If there are cedillas or other special characters in the description that consist of more than one-byte character, the maximum number of characters depends on the number of cedillas or special characters.

You can also set the back light percentage and the delay time for activating the screen saver.

Screen access function

PIN code

If you activate the screen access function, you can set a four-digit security password and select the output object value sent to the bus after entering the password. You can set up sending with a delay. Once you input the correct password, the device exits from the screen saver to normal mode.

The preset PIN code combination is 1234. Screen access becomes disabled if you set an invalid PIN code (for example, 1234, 1111, or 2222).

User interface	Use screen access pin code	Check (Yes)
	Password setting	4 digits: 0 – 9
	Output object type when input pin code	No reaction
		1 bit (On/Off)
		1 byte (scene control): 1 – 64
		1 byte: 0 – 255
		1 byte: 0 – 100 %
	Delay time for sending	0 – 255 s

Screen lock

The screen lock protects the device against unauthorized use. The lock is set using the bus. An activated lock continues even after the device is restarted.

General screen lock

You activate or deactivate the screen lock for ongoing operation. When activated, you can lock the screen pages of the device. You lock with the value “1” and release with the value “0”.

Once the screen is locked via bus, you can NOT unlock it locally.

Group objects

If you select **Fahrenheit** as the unit, there is no object for this option. The sensor always measures in degrees Celsius, but the temperature in degrees Fahrenheit is displayed.

Group objects for *User interface*

No.	Name	Object function	Length	Properties	DPT ETS
1053	Screen	Screen locking	1bit	C,W	1.003 enable
1054	Screen	Screen on/off	1bit	C,W	1.001 switch
1055	Screen	Screen brightness	1byte	C,W	5.001 percentage (0..100%)
1056	Night mode	Night mode input	1bit	C,W,T,U	1.024 day/night
1057	Security	Password trigger, 1bit value/ 1 byte value/ scene NO.	1bit/1byte	C,T	1.001 switch 5.010 counter pulses 5.001 percentage 17.001 scene number

3.4 Proximity function

If you come within 12 cm of the push-button, the *Proximity function* triggers. The display switches on and switches off again after off delay elapses.

The *Proximity function* is activated by default. You can adjust the proximity triggering (default: built-in proximity sensor):

Proximity	The Proximity function triggered via	Never
		Proximity output object
		Proximity input object
		Proximity output or Proximity input object

Value: *Never*

The function is deactivated.

The display is not affected.

Value: *Proximity output object*

The proximity function is triggered via the internal proximity sensor. The internal sensor sends a 1bit or 1-byte signal to the bus.

The **Proximity** and **No proximity** states control the status indication.

Value: *Proximity input object*

The proximity function is triggered via the *Proximity input* object.

The proximity object has the same function as the internal proximity sensor.

- An On telegram activates the **Proximity** state.
- An Off telegram activates the **No proximity** state.

Value: *Proximity output or Proximity input object*
The proximity function is triggered via the internal sensor or the external input object.

The sensor and the proximity object are linked to each other. The result of the link corresponds to an OR link.

If the proximity sensor detects **No proximity**, it sends a “0” telegram to the bus.

Output object type

The **proximity** and **no proximity** states control the *Proximity output* object.

The proximity output can be set as:
- 1 bit object - sends values “1” or “0”.
- 1 byte object - sends an adjustable value.

Proximity	The Proximity function triggered via	Sensor /or Proximity object
	Object type of output value	1 bit (On/Off)
		1 byte (scene control): 1 – 64
		1 byte: 0 – 255
		1 byte: 0 – 100 %

Example
Proximity function triggered via: *Sensor*
Object type of output value = *1 bit*
Reaction for proximity approaching: *Send a value*
Output value: *proximity*
Delay time for sending = *0 s*

Reaction for proximity leaving: *Send a value*
Output value: *no proximity*
Delay time for sending = *10 s*

The sensor detects you and the device sends an “ON” telegram immediately. 10 seconds after you leave the room, the device sends an OFF telegram.

Group objects

Group objects for *Proximity*

No.	Name	Object function	Length	Properties	DPT ETS
1058	Proximity function	Disable/Enable Proximity function	1bit	C,W	1.003 enable
1059	Proximity function	Proximity input	1bit	C,W	1.001 switch
1060	Proximity function	Proximity output	1bit 1byte	C,T	1.001 switch 5.010 counter pulses 17.001 scene number 5.001 percentage

3.5 Temperature measurement

The device has a built-in internal temperature sensor. You can set parameters for measuring and sending telegrams.

Temperature measurement	*Internal temperature*	
	Temperature calibration	- 5 – + 5 °C
	Send temperature when the result changes by	0 – 10 °C
	Cyclically send temperature	0 – 255, 0 = inactive
	Send alarm/telegram for low/high temperature	Do not send
		Send on read only
		Send on a change

Temperature calibration

You can set a **correction value** for the sensor. This is useful, for example, if the controller is mounted at an unfavorable position in the room. The temperature recording is different when exposed to a drought or close to sources of heat, for example, compared to other places in the room.

The following applies:

Actual temperature = measured temperature + correction value

You can set two parameters for sending the measured temperature to the bus:

Send temperature when the result change by

- **Temperature difference:**
  The sensor compares the current temperature with the last value transmitted. If the current measured temperature is higher or lower than the selected deviation, the sensor sends the value to the bus.

Cyclically send temperature

- **Time interval:**
  The sensor transmits temperature values cyclically after the preset time interval. (e.g. to visualization software).

You can use one or a combination of both parameters.

In the last setting you can define a feedback method in case of a **temperature sensor alarm** (if the sensor sends a temperature that exceeds the preset threshold detection range).

The *High/Low temperature alarm* object sends the alert always when the temperature is below or above the threshold.

After restarting the device or powering it on, it may take approximately 20 minutes for the device to stabilize, calibrating the built-in temperature sensor. It is recommended not to change the brightness or screen state during this time.

It is also recommended not to change the *1054 Screen on/off* and *1055 Screen brightness* group objects frequently to avoid interfering with the temperature compensation function of the device.

Group objects

Group objects for *Temperature measurement*

No.	Name	Object function	Length	Properties	DPT ETS
4	Internal sensor	Temperature value	2 byte	Sends, Receives	9.001 temperature
5	Internal sensor	Low temperature alarm	1 bit	Sends, Receives	1.005 alarm
6	Internal sensor	High temperature alarm	1 bit	Sends, Receives	1.005 alarm

3.6 Advanced function

In the *Advanced functions* tab, you can extend the device functionality with HVAC, Logic, and Scene group controllers. You check the appropriate box and then set the required parameters in the main menu. See more in HVAC controller → 42.

Advanced function	HVAC controller	✓
	Logic function	✓
	Scene group function	✓

4 Screen settings

In the *Screen settings*, you choose how many screens you want to use to control the device. You can access the room functions via up to 9 function pages and configure each of them in the *Express settings* menu.

Screen position

Sort the screens by preference. If you enable *Use main screen* function, you can set one of the screens as the main screen.

Call main screen after

The following setting is the no-action delay. After it elapses, the device switches back to the main screen. You can adjust the delay time as needed (default = 5 s).

Screen settings	How many screens do you use	1 – 9
	Screen position 1 – 9	Screen 1 – Screen 9
	Use main screen	✓
	Select main screen	Screen 1 – Screen 9
	Call main screen after	5 – 255 s

Customized icon

In the *Customized icon* sub-menu, you can select the number of icons and describe their function.

Screen settings	Number of customized icons	None – 30
Customized icon	Icon 1 – 30 ID	01 – 30
	Description	20 bytes allowed

5 Express settings

In *Express settings*, you can configure individual screens. You choose the number of function icons and functions of each screen. You can also name them. The name you choose will appear in the left sub-menu under *Express settings*.

Later, you simply connect group addresses to the functions.

Express settings		
Screen X	Number of function icons	1, 4, 6
	Interface preview	
	Icon X & X set as	1 function / 2 functions
	Screen name	≤20 English or 6 Chinese characters

The function menu depends on the number of function icons selected and the button configuration for each screen. The following table provides an overview of possible combinations.

Icons	Functions
1 icon	No function Brightness dimming RGB dimming RGBW dimming Colour temperature dimming Venetian blind position and slat Air conditioner Room temperature unit Ventilation system Audio control
4 icons 2 icons = 1 function	No function Switch Brightness dimming RGB dimming RGBW dimming Colour temperature dimming Curtain step/move Roller blind step/move Curtain position Roller blind position Venetian blind position and slat Scene Value output Loop operation Multiple operation Weather information Energy monitoring Air conditioner Room temperature unit Ventilation system Audio control

Icons	Functions
4 icons 2 icons = 2 functions	No function Switch Scene Value output Loop operation Multiple operation Weather information Energy monitoring Air quality display
6 icons 2 icons = 1 function	No function Switch Brightness dimming Curtain step/move Roller blind step/move Scene Value output Loop operation Multiple operation Weather information Energy monitoring
6 icons 2 icons = 2 functions	No function Switch Scene Value output Loop operation Multiple operation Weather information Energy monitoring Air quality display

5.1 Switch

With *Express settings*, you can switch the lighting or other consumers.

Express settings	Function	Switch
Screen 1	Function name	≤20 English or 6 Chinese characters
Function 1	Icon preview	
	Function icon	
	Colour of function icon indication when status ON	Green/White
	Colour of function icon indication when status OFF	Green/White

Group objects

The *Switching* function is carried out via the *Switch* object or external object.

Group objects for *Switch* express setting

No.	Name	Object function	Length	Properties	DPT ETS
244	Function 1	Switch	1 bit	Sends, receives, updates	1.001 switch
249	Function 1	Switch, status	1 bit	Sends, receives, updates	1.001 switch

5.2 Scene

It is possible for a device to act as a scene controller. It sends a value to each channel that needs to be controlled and it can receive a scene command from another device or Scene group module (see Scene group → 68).

Assign a number (1 to 64) to the scene, name it and select an icon.

Express settings	Function	Scene
Screen 1	Function name	1 – 8 characters (≤20 English or 6 Chinese characters)
Function 1	Icon preview	
	Function icon	
	Colour of function icon indication when scene active	Green/White
	Colour of function icon indication when scene inactive	Green/White
	Scene number	1 – 64
	Storage scene via long operation	✓
	Object with status feedback	✓

You can configure a **long press** of the button (≥ 2 s) to initiate a save scene command. This stores the current setting into the scene.

If you enable *Object with status feedback* option, *Scene* object gets *Write* flag (Receive).

There are two ways how to set up the status feedback:

1. Simple feedback: User gets feedback about the scene when they push the button. The actuator stays out of this.
2. Status of the actuator is linked with icon status feedback: Icon status and status of the actuator are synchronized.

Group objects

The range of properties depends on whether you enable *Object with status feedback* function.

Group objects for *Scene*

No.	Name	Object function	Length	Properties	DPT
244	Screen 1 Function 1	Scene	1byte	Sends Sends, Receives	18.001 scene control

5.3 Value output

Value output function allows you to send values for different data types, specific data types and values defined by parameters.

Express settings	Function	Value output
Screen 1	Function name	1 – 8 characters
Function 1	Icon preview	
	Function icon	
	Colour of function icon indication	Green/White

You can set a different output telegram for each operation. There are always five options for setting the value:

- 1 bit - 1.001 switch
- 2 bit - 2.001 switch control
- 4 bit - 3.007 dimming control
- 1 byte - 5.010 counter pulses (0..255)
- 2 bytes - 7.001 pulses

Group objects

Group objects for *Value output* function

No.	Name	Object function	Length	Properties	DPT ETS
244	Screen 1 Function 1	Output 1bit value	1bit	Sends	1.001 switch
		Output 2bit value	2bit		2.001 switch control
		Output 4bit value	4bit		3.007 dimming
		Output 1byte value	1byte		5.010 counter pulses
		Output 2byte value	2byte		7.001 pulses

5.4 Loop operation

With the *Loop operation*, you can send values stepwise or step-less. There are two modes, fixed step adjustment and preset value.

Express settings	Function	Loop operation
Screen 1	Function name	1 – 8 characters
Function 1	Icon preview	
	Function icon	
	Colour of function icon indication	Green/White

Shift by step value

You can set the start/end value of the shift and the size of the step. Short button press then triggers the whole cycle of steps.

Function x	Shift type	Shift by step value
	Lowest value with	0 - 240
	Highest value with (must be larger than lowest value with)	1 - 250
	Step size	0 - 240

Shift direction

The shift direction can be set from highest to lowest (decreases) or from lowest to highest (increases). It changes by the size of the step you choose.

In the default setting, the object value is raised by the value “2” if you release the button before the long operation time elapses.

Shift without step value

If you choose the option *Shift without step value*, you can set up to 10 different values for each shift (*Shift value*). You send a value with each button action (short press). If, for example, you want to send 5 values with the button, press the button 5 times.

Function 1	Shift type	Shift without step value

	Shift number	1 - 10
	Value 1	0 - 255
	..Value 10	

Shift direction

The values are sent one after the other in the order you choose (increase or decrease).

Reset function

By default, a short press starts a cycle of steps or sends individual values. If you enable the *Reset function*, you can reset the Loop operation with a long press.

Group objects

Group objects for *Loop operation*

No.	Name	Object function	Length	Properties	DPT ETS
244	Screen 1 Function 1	Register value	1 byte	Sends, receives	5.010 counter pulses (0..255)

5.5 Multiple operation

The *Multiple operation* function allows you to send up to 4 different objects at the same time with a single button operation.

You can set the following:

- Distinction between short and long operation
- Reaction on short/long and press/release operation
- Number of objects (1 – 4)

Object functions for *Multiple operation* function

Multiple operation supports these object functions:

- Switch – on/off - sends telegram depending on settings (Toggle/On/Off)
- Blind – up/down - sends telegram depending on the settings
- Recall/Store scene – sends call/save scene telegram (Nr. 1 – Nr. 64)
- Percentage/Unsigned value – sends percentage/raw telegram

Each function has the enable or disable sending option (*No reaction*/*Send value*).

Group objects

Group objects for *Multiple operation*

No.	Name	Object function	Length	Properties	DPT ETS
244	Screen 1 Function 1	Output 1-On/Off	1bit	Sends, Receives	1.001 switch
		Output 1-Up/Down	1bit	Sends, Receives	1.008 up/down
		Output 1-SceneControl	1byte	Sends	18.001 scene control
		Output 1-Percentage	1byte	Sends	5.001 percentage(0..100%)
		Output 1-Unsigned value Object x - Up/Down	1byte	Sends	5.010 counter pulses

5.6 Weather information

You can set the weather information as either wind speed (in km/h or m/s) or 1-bit sunny/rainy information.

Express settings	Function	Weather information
Screen 1	Function name	1 – 8 characters

Function 1	Icon preview	
	Function icon	
	Colour of function icon indication	Green/White

You can also set the time interval for requesting the external sensor.

Group objects

2-byte Wind speed object receives the wind speed status from the bus. After the device restarts, a read request status is sent to the bus.

1-bit Rainy/Sunny object receives the rainy or sunny weather information from the bus. After the device restarts, a read request status is sent to the bus.

Group objects for *Weather information*

No.	Name	Object function	Length	Properties	DPT ETS
244	Screen 1 Function 1	Wind speed	2 byte	Sends, Receives, Updates	9.005 speed 9.028 wind speed
244	Screen 1 Function 1	Rainy/Sunny	1 bit	Sends, Receives, Updates	1.022 scene

5.7 Energy monitoring

The *Energy monitoring* function monitors electricity consumption in kWh. Data is retrieved from the bus and displayed on the screen (max. 999 999 KWh).

Express settings	Function	Loop operation
Screen 1	Function name	1 – 8 characters
Function 1	Icon preview	
	Function icon	
	Colour of function icon indication	Green/White

You can set the time interval for requesting the external sensor.

Express settings	Object datatype of energy display	Value in kWh (DPT 13.013)
	Text for unit	5 bytes allowed
	Time period for request external sensor	0 – 255 (min)

After the device restarts, a read request status is sent to the bus.

Group objects

Energy data is received from the bus and displayed on the screen, 4 bytes, kWh (DPT 13.013).

Group objects for *Energy monitoring*

No.	Name	Object function	Length	Properties	DPT ETS
244	Screen 1 Function 1	Active energy value	4 byte	Sends, Receives, Updates	13.013 active energy (kWh)

5.8 Brightness dimming

You can increase and reduce the dimming with values and switch the lighting on and off.

Tapping the button sends dimming values from 0 – 100 %. You can restrict the dimming range by changing the maximum dimming value. The minimum brightness is set to 0 % and the maximum to 100 percent by default.

Express settings	Function	Brightness dimming
Screen 1	Function name	1 – 8 characters
Function 1	Min. brightness value	0 – 50 %
	Max. brightness value	51 – 100 %

Short and long operation

A **short button action** switches on or off. Drag the bar on the screen to dim darker or brighter.

Hold the button down until you reach the required level of brightness. When you release the button, the dimming object sends a stop telegram and ends the dimming process.

If the object *Switch, status* has the value “0”, a *brighter* telegram is always sent. This ensures that the lighting gets brighter when dimming up without a previous switching on by a short operation of the push button.

Object value Switching	Value of the last dimming telegram	Reaction of the dimming actuator
OFF	Darker	Brighter
OFF	Brighter	Brighter
ON	Darker	Brighter
ON	Brighter	Darker

Group objects

Switching is carried out via the *Switch* object or the *Brightness dimming* object. Dimming is carried out via the *Brightness dimming* object.

A dimming function requires minimal 2 group addresses. The first group address links the switching objects of the device with the switching objects of the dimmer channel. The second group address links the dimming objects of the device with the dimming objects of the dimmer.

The status indication is controlled via the *Switch, status* and *Brightness, status* objects.

Group objects for *Brightness dimming*

No.	Name	Object function	Length	Properties	DPT ETS
244	Screen 1 Function 1	Switch	1 bit	Sends	1.001 switch
246	Screen 1 Function 1	Brightness dimming	1 byte	Sends	5.001 percentage (0..100%)
249	Screen 1 Function 1	Switch, status	1 bit	Sends, Receives, Updates	1.001 switch
251	Screen 1 Function 1	Brightness, status	1 byte	Sends, Receives, Updates	5.001 percentage (0..100%)

5.9 RGB/W dimming

The *RGB/W dimming* function is an extended dimming function for KNX devices that supports color control.

The user calls up the set lighting color by pressing the button (for example via an RGB/W KNX actuator or a KNX DALI-Gateway). In ETS, you set the RGB/W value, download the setting to the device and connect it to a specific button.

Express settings	Function	RGB dimming	RGBW dimming
Screen 1	Function name	1 – 8 characters	1 – 8 characters
Function 1	Object datatype	1 x 3 byte / 3 x 1 byte	1 x 6 byte / 4 x 1 byte

Group objects

Switching is carried out using one bit or one byte. You can dim each color with separate bytes or you can dim all colors together through one group object.

Group objects for *RGB dimming*

No.	Name	Object function	Length	Properties	DPT ETS
244	Screen 1 Function 1	Switch	1 bit	Sends	1.001 switch
245	Screen 1 Function 1	RGB dimming value	3 bytes	Sends	232.600 RGB value 3 x (0..255)
245	Screen 1 Function 1	RGBW dimming value	6 bytes	Sends	251.600 RGBW value 4x(0..100%)
245	Screen 1 Function 1	Red dimming value	1 byte	Sends	5.001 percentage (0..100%)
246	Screen 1 Function 1	Green dimming value	1 byte	Sends	5.001 percentage (0..100%)
247	Screen 1 Function 1	Blue dimming value	1 byte	Sends	5.001 percentage (0..100%)
248	Screen 1 Function 1	White dimming value	1 byte	Sends	5.001 percentage (0..100%)
249	Screen 1 Function 1	Switch, status	1 bit	Sends, Receives, Updates	1.001 switch
250	Screen 1 Function 1	RGB brightness, status	3 bytes	Sends, Receives, Updates	232.600 RGB value 3x(0..255)
250	Screen 1 Function 1	RGBW brightness, status	6 bytes	Sends, Receives, Updates	251.600 DPT Colour RGBW
250	Screen 1 Function 1	Red brightness, status	1 byte	Sends, Receives, Updates	5.001 percentage (0..100%)
251	Screen 1 Function 1	Green brightness, status	1 byte	Sends, Receives, Updates	5.001 percentage (0..100%)
252	Screen 1 Function 1	Blue brightness, status	1 byte	Sends, Receives, Updates	5.001 percentage (0..100%)
253	Screen 1 Function 1	White brightness, status	1 byte	Sends, Receives, Updates	5.001 percentage (0..100%)

5.10 Color temperature dimming

The *Color temperature dimming* function transmits values for setting the color temperature in Kelvin via the external device.

Pressing the button transmits 2 bytes of absolute color temperature values. You can set the **minimum** and **maximum** values and the **step width** by which you increase or decrease temperature.

Express settings	Function	Colour temperature dimming
Screen 1	Function name	1 – 8 characters
	Increase/Decrease step width	100, 200, 500, 1000 K
	Min. color temperature	1000 – 10000 K
	Max. color temperature	1000 – 10000 K

Group objects

Switching is carried out via the *Switch* object or the *Brightness value* object. Color temperature dimming is carried out via the *Color temperature value* object.

The status indication is controlled via the *Switch, status* and *Color temperature, status* objects.

Group objects for *Color temperature dimming*

No.	Name	Object function	Length	Properties	DPT
244	Screen 1 Function 1	Switch	1 bit	Sends	1.001 switch
245	Screen 1 Function 1	Color temperature value	2 byte	Sends	7.600 absolute color temperature
246	Screen 1 Function 1	Brightness value	1 byte	Sends	5.001 percentage (0..100%)
249	Screen 1 Function 1	Switch, status	1 bit	Sends, Receives, Updates	1.001 switch
250	Screen 1 Function 1	Color temperature, status	2 byte	Sends, Receives, Updates	7.600 absolute color temperature
251	Screen 1 Function 1	Brightness, status	1 byte	Sends, Receives, Updates	5.001 percentage (0..100%)

5.11 Curtain, roller blind

With modes *Curtain/Roller blind step/move*, you can open and close curtains and move roller blinds up and down continuously or in steps.

Express settings	Function	Roller blind/Curtain step/move
Screen 1	Function name	1 – 8 characters
Function 1	Icon preview	
	Function icon	
	Colour of function icon indication	Green/White

Move curtain/roller

Drag the bar on the screen to move the curtain or roller up or down to a certain level and the slat angle.

For complete closing/moving down, the *Open/Close* or *Up/Down* object sends the value “1”, and it sends the value “0” for opening/moving up.

Group objects

Group objects for *Curtain*

No.	Name	Object function	Length	Properties	DPT
244	Screen 1 Function 1	Open/Close	1 bit	Sends	1.009 open/close
245	Screen 1 Function 1	Stop	1 bit	Sends	1.007 step
246	Screen 1 Function 1	Curtain position	1 byte	Sends	5.001 percentage
249	Screen 1 Function 1	Curtain position, status	1 byte	Sends, Receives, Updates	5.001 percentage

Group objects for *Roller blind*

No.	Name	Object function	Length	Properties	DPT
244	Screen 1 Function 1	Up/Down	1 bit	Sends	1.008 up/down
245	Screen 1 Function 1	Stop	1 bit	Sends	1.007 step

Group objects for *Roller blind*

No.	Name	Object function	Length	Properties	DPT
246	Screen 1 Function 1	Blind position	1 byte	Sends	5.001 percentage
249	Screen 1 Function 1	Blind position, status	1 byte	Sends, Receives, Updates	5.001 percentage

5.12 Venetian blind position and slat

With the *Venetian blind position and slat* function, you can raise and lower a blind and adjust the slats.

Express settings	Function	Venetian blind position and slat
Function 1	Function name	1 – 8 characters

Move the blinds

Drag the bar on the screen to move the blind either up or down and adjust the slats. When you release the bar, the moving process stops (via *Stop/slat adj.* object).

The blind is moved up or down via the 1-bit *Up/Down* object. If the *Up/Down object* has the value of “1” (down), the value after the next long press is “0” (up) and vice versa. With *Blind position* function, in addition to opening and closing, you can adjust the position of the curtains/blinds to the certain value (0 to 100 %).

Position of slats

You can adjust blind to various opening angles. However, the symbol for the slat position does not reflect the actual opening angle.

The slat position reached with a position value depends on the particular blind.

There are blinds with an **opening angle** of 180° which move up and down when the slats are positioned vertically. When the position value is 50%, the slats are horizontal.

Other blinds have an opening angle of 90° and move up when the slats are positioned horizontally, and down when the slats are positioned vertically. These blinds turn to the horizontal position with the value 0% and to the half-opened position with the value 50%.

Pause for change slat direction

You can adjust the slats in the same direction in multiple steps. To do so, briefly press the button repeatedly until you reach the desired position. The slats keep adjusting in the same direction only if you press the button within an adjustable pause time. Once this pause elapses, the slat direction of rotation changes.

Group objects

The blinds are moved via the *Up/Down, moving* object. The blinds are stopped and adjusted via the *Stop/Slat, adj.* object. The status indication is controlled via *Slat position, status* and *Blind position, status* object.

The *Blind position* and *Slat position* object send the value to the bus when you drag the bar on the screen to set the position level.

Group objects for *Venetian blind*

No.	Name	Object function	Length	Properties	DPT
244	Screen 1 Function 1	Up/Down	1 bit	Sends	1.008 up/down
245	Screen 1 Function 1	Stop/Slat adj.	1 bit	Sends	1.007 step
246	Screen 1 Function 1	Blind position	1 byte	Sends	5.001 percentage (0..100%)
247	Screen 1 Function 1	Slat position	1 byte	Sends	5.001 percentage (0..100%)
249	Screen 1 Function 1	Blind position, status	1 byte	Sends, Receives, Updates	5.001 percentage (0..100%)
250	Screen 1 Function 1	Slat position, status	1 byte	Sends, Receives, Updates	5.001 percentage (0..100%)

5.13 Air conditioner control panel

With *Air conditioner* function you can regulate the air temperature (heating/cooling, fan speed) and humidity.

Express settings	Function	Air conditioner
Screen 1	Function name	1 – 8 characters
Function 1	Icon preview	
	Function icon	
	Colour of function icon indication when status ON	Green/White
	Colour of function icon indication when status OFF	Green/White

The *Interface display temperature* function shows setpoint or actual temperature values on one screen.

Internal and external temperature sensor

Internal and external temperature sensor

The device has a built-in internal temperature sensor. However, you can also select an external sensor that sends values to the controller via the bus. The bus then evaluates the current temperature.

Function 1	Interface display temperature	Setpoint temperature	
		Actual temperature	
		Room temperature reference from	Internal/Internal sensor
		Time period for request external sensor	0 – 255 min

You can set the **time interval** for the device to send a temperature read request to an external temperature sensor (after the bus is reset or programmed). All the past temperature data get erased. The device works with new data received from the bus during the time interval.

Object datatype of the setpoint

Object datatype of setpoint

Set the adjustment method of the setpoint temperature. You can choose whether to send 1-byte offset (*Value in °C*, DPT 5.010) or absolute temperature value (*Float value in °C*, DPT 9.001).

Function 1	Object datatype of setpoint	Value in °C	Float value in °C
	Setpoint temperature adjustment step	1 °C	0,5 °C 1 °C

You should always set the minimum setpoint value below the maximum. Available range is 16°C to 32°C.

Swing

Swing

If you want the fan slats to swing, check the *Swing* function.

Function 1	Swing	✓

Then you get the 1-bit *Wind swing* object (1 = on, 0 = off) and *Wind Swing, status* object that displays the swing status on screen.

Modes

The device provides the setpoint and current room temperature to the AC unit. AC unit compares the setpoint and current temperature and switches between operation modes:

Modes

- Auto mode
- Heating mode
- Cooling mode
- Fan mode
- Dehumidification mode

Function 1	Function	Air conditioner
Mode	Auto mode	
	Heating mode	
	Cooling mode	
	Fan mode	
	Dehumidification mode	

Output/Status value

For each operation mode, you can specify the **output** and **status values** (range 0 – 255). The output value is the one you send to the gateway (KNX to RS485/IR) and the status value is the one visible on the screen (via *Control mode, status* group object).

Mode	Function	Air conditioner
	Auto mode	Output value for auto (0 – 255) ✓ Status value for auto (0 – 255)
	Heating mode	Output value for heating (0 – 255) ✓ Status value for heating (0 – 255)
	Cooling mode	Output value for cooling (0 – 255) ✓ Status value for cooling (0 – 255)
	Fan mode	Output value for fan (0 – 255) ✓ Status value for fan (0 – 255)
	Dehumidification mode	Output value for dehumidification (0 – 255) ✓ Status value for dehumidification (0 – 255)

Fan

In the *Fan* tab, you can set values for the fan speed. You can check the *Automatic operation function* however, you can still control the fan speed manually on the screen.

You can choose from 2 formats for 1byte object:

- Number between 0 and 255
- Percentage value 0 – 100 %

There are values set as default in the ETS. You can use them or change them later as needed.

The value you set as the **output value for each speed** is shown on the display via *Fan speed, status* object.

Group objects

Power on/off group object controls switching on and off. *Power on/off, status* object displays on/off status on the screen.

Group objects for *Air conditioner*

No.	Name	Object function	Length	Properties	DPT
244	Screen 1 Function 1	Power on/off	1 bit	Sends	1.001 switch
245	Screen 1 Function 1	Current setpoint adjustment	2 byte 1 byte"	Sends	9.001 temperature 5.010 counter pulses
247	Screen 1 Function 1	Fan speed	1 byte	Sends	5.001 percentage 5.100 fan stage
248	Screen 1 Function 1	Wind swing (1-swing, 0-stop)	1 bit	Sends	1.010 start/stop
250	Screen 1 Function 1	Control mode	1 byte	Sends	20.105 HVAC control mode
251	Screen 1 Function 1	Power on/off, status	1 bit	Receives	1.001 switch
252	Screen 1 Function 1	External tempera-ture sensor	2 byte	Sends, Receives, Updates	9.001 temperature
253	Screen 1 Function 1	Current temperature setpoint, status	2 byte 1 byte	Receives, Updates	9.001 temperature 5.010 counter pulses
254	Screen 1 Function 1	Fan speed, status	1 byte	Receives	5.001 percentage 5.100 fan stage
255	Screen 1 Function 1	Wind swing, status	1 bit	Receives	1.010 start/stop
257	Screen 1 Function 1	Control mode, status	1 byte	Receives	20.105 HVAC control mode

5.14 Room temperature control panel

Room temperature control panel function offers the possibility of regulating the room temperature of a single room regardless of the temperature in other rooms.

The setting is very similar to the *Air conditioner* setting.

See also Air conditioner → 30.

Express settings	Function	Room temperature unit
Screen 1	Function name	1 – 8 characters
Function 1	Controller from	Local (FCU controller)
		Local (Floor heating controller)
		External

If you select Local controller (FCU or Floor heating), a warning appears to activate the corresponding function in the HVAC controller menu.

If you select an external controller, you can set the required parameters directly in the *Room temperature control panel* menu.

Internal and external temperature sensor

Internal and external temperature sensor

The device has a built-in internal temperature sensor. However, you can also select an external sensor that sends values to the controller via the bus. The bus then evaluates the current temperature.

Function 1	Controller from	External	
	Interface display temperature	Setpoint temperature	
		Actual temperature	
		Room temperature reference from	Internal/Internal sensor
		Time period for request external sensor	0 – 255 min

You can set the **time interval** for the device to send a temperature read request to an external temperature sensor (after the bus is reset or programmed).

Power on/off after download/voltage recovery

Power on/off after download/ voltage recovery

If the bus voltage fails but the power supply is running, the device continues to operate normally and saves the internal values. If the power failure exceeds the backup time, the device shuts down safely. When power has been restored, the device restarts. You can define the status of the Air conditioner function on voltage recovery and after download.

Object datatype of the setpoint

Object datatype of setpoint

Set the adjustment method of the setpoint temperature. You can choose whether to send 1-byte offset (*Value in °C*, DPT 5.010) or absolute temperature value (*Float value in °C*, DPT 9.001).

Function 1	Object datatype of setpoint	1 bit	2 bytes
	Setpoint temperature adjustment step	(1 °C)	0,5 °C
			1 °C

You should always set the minimum setpoint value below the maximum. Available range is 5°C to 37°C.

Control mode

You can choose from three control modes.

Function 1	Control mode	Heating
		Cooling
		Heating and Cooling
		Heating and Cooling (with auto mode)

The device provides the setpoint and current room temperature to the heating/cooling unit.

Modes

If you choose the *Heating/Cooling* option, you can manually switch between heating and cooling via *Heating/Cooling mode* group object and see the status on the screen (via *Heating/Cooling mode, status* group object).

Operation mode

Four operating modes (comfort, ECO, night and frost/heat protection), each with programmable setpoints, are available for differentiated control with different requirements. During ongoing operation, you can temporarily move the setpoints within adjustable limits, or move them jointly for several operation modes. Optionally, the basis for the setpoints can also be moved. On the user interface, you can activate the comfort mode temporarily and set its duration.

Function 1	Operation mode	✓

Fan

With *Room temperature unit* function, you can also control a KNX HVAC actuator.

Function 1	Fan	✓
Fan	Fan speed setting	
	Output value for fan speed	
	Status feedback for fan speed	
	Automatic operation function	

See more in Fan → 31.

Group objects

Group objects for *Room temperature control panel and External controller*

No.	Name	Object function	Length	Properties	DPT
244	Screen 1 Function 1	Power on/off	1 bit	Sends	1.001 switch
245	Screen 1 Function 1	Current setpoint adjustment	2 byte	Sends	9.001 temperature
246	Screen 1 Function 1	Current setpoint adjustment(1bit)	1 bit	Sends	1.007 step
247	Screen 1 Function 1	Fan speed	1 byte	Sends	5.001 percentage 5.100 fan stage"
248	Screen 1 Function 1	Fan automatic operation	1 bit	Sends	1.003 enable
249	Screen 1 Function 1	Heating/Cooling mode	1 bit	Sends	1.100 cooling/heating
249	Screen 1 Function 1	Switch Control mode	1 byte	Sends	20.107 DPT ChangoverMode
250	Screen 1 Function 1	Operation mode	1byte	Sends	20.102 HVAC mode
251	Screen 1 Function 1	Power on/off, status	1 bit	Receives	1.001 switch
252	Screen 1 Function 1	External temperature sensor	2 byte	Sends, Receives, Updates	9.001 temperature
253	Screen 1 Function 1	Current temperature setpoint, status	2 byte	Receives, Updates	9.001 temperature
254	Screen 1 Function 1	Fan speed, status	1 byte	Receives	5.001 percentage 5.100 fan stage"
255	Screen 1 Function 1	Fan automatic operation, status	1 bit	Receives	1.003 enable
256	Screen 1 Function 1	Heating/Cooling mode, status	1 bit	Receives	1.100 cooling/heating

Group objects for *Room temperature control panel and External controller*

No.	Name	Object function	Length	Properties	DPT
256	Screen 1 Function 1	Control mode, status	1 byte	Receives	20.107 DPT ChangeoverMode
257	Screen 1 Function 1	Operation mode, status	1 byte	Receives	20.102 HVAC mode

5.15 Ventilation system

A ventilation system adjusts ventilation rates in time or by location in a building to be responsive to selected parameters.

In addition to the baseline values, the values for the room temperature, air humidity, and CO_2 and $PM_{2,5}$ content can be transferred via the KNX interfaces to the ventilation system and taken into account during the control.

Ventilation systems can also have sensors to detect airflow, system pressure, or fan energy use in such a way that systems failures can be detected and repaired, as well as when system components need maintenance, such as filter replacement.

Express settings	Function	Ventilation system
Screen 1	Function name	1 – 8 characters
Function 1	Icon preview	
	Function icon	
	Colour of function icon indication when status ON	Green/White
	Colour of function icon indication when status OFF	Green/White

Power on/off after download/ voltage recovery

You can define the status of the Ventilation system on **bus voltage recovery** and **after download** and choose the **default fan speed** after the ventilation is back on.

Function 1	Power on/off after download	OFF/OF
	Power on/off after voltage recovery	OFF
		ON
		Before voltage failure
	Default fan speed after ventilation on	Low
		Medium
		High
		Last status

Fan speed object datatype

Object datatype of 1-byte fan speed

You can choose from 2 formats for 1byte fan speed object:

- Number between 0 and 255
- Percentage value 0 – 100 %

There are values set as default in the ETS. You can use them or change them later as needed.

The value you set as the **output value for each speed** is shown on the display via *Fan speed, status* object.

Automatic operation

If you check *Automatic operation function*, the fan coil actuator takes over control of the fan steps. You can still control the fan speed manually on the screen.

Function 1	Automatic operation function	✓

Automatic operation is controlled by *Fan automatic operation* object and displayed via *Fan automatic operation, status* group object.

Heat recovery

With active monitored ventilation, a ventilation blows fresh air into the building and extracts the consumed air. The goal of the heat recovery process is to extract **thermal energy** of the discharged air (e.g. via a cross-flow heat exchanger) in order to warm up the “fresh” air with it.

Heat sources inside a building (e.g. lighting, computers) can also help with heating which contributes to an increase in **energy savings**.

Function 1	Heat recovery function	✓

Heat recovery function is controlled by KNX fan coil actuator/controller via 1-bit *Heat recovery* object. The screen displays the status of heat recovery process via 1-bit *Heat recovery, status* object (on/off).

Filter time counter

You can set the operating time in hours, after which the fan **filter change alarm** should trigger. Enable *Filter time counter* and choose the change time.

Function 1	Filter time counter	✓
	Evaluation time	100 – 1000 h

An audible alarm sounds when the filter change time has elapsed.

You can extend or reset the exchange time at any time in the ETS.

Scenes

You have the option of linking the ventilation with up to five scenes, for which you can set the parameters independently. To do this, use the 1-byte *Scene* object.

If you enable the *Heat recovery* function in *Function* menu, you can adjust the *Heat recovery* parameters in the *Scene* sub-menu.

Function 1		
Scene	1 – 5 → Assign scene NO.	1– 64, 0 = inactive
	Fan	Unchange
		OFF
		Low
		Medium
		High
	Heat recovery	Unchange
		OFF
		ON

Group objects

Power on/off group object controls switching the *Ventilation system* on and off. *Power on/off, status* object displays on/off status on the screen.

Group objects for *Ventilation system*

No.	Name	Object function	Length	Properties	DPT
244	Screen 1 Function 1	Power on/off	1 bit	Sends	1.001 switch

Group objects for *Ventilation system*

No.	Name	Object function	Length	Properties	DPT
245	Screen 1 Function 1	Filter timer counter	2 byte	Sends	7.007 time (h)
246	Screen 1 Function 1	Filter alarm	1 bit	Sends	1.005 alarm
247	Screen 1 Function 1	Fan speed	1 byte	Sends	5.001 percentage 5.100 fan stage
248	Screen 1 Function 1	Fan automatic operation	1 bit	Sends	1.003 enable
249	Screen 1 Function 1	Heat recovery	1 bit	Sends	1.003 enable
251	Screen 1 Function 1	Power on/off, status	1 bit	Receives	1.001 switch
252	Screen 1 Function 1	Filter timer counter change	2 byte	Receives	7.007 time (h)
253	Screen 1 Function 1	Filter timer reset	1 bit	Receives	1.015 reset
254	Screen 1 Function 1	Fan speed, status	1 byte	Receives	5.001 percentage 5.100 fan stage
255	Screen 1 Function 1	Fan automatic operation, status	1 bit	Receives	1.003 enable
256	Screen 1 Function 1	Heat recovery, status	1 bit	Receives	1.003 enable
257	Screen 1 Function 1	Scene	1 byte	Receives	18.001 scene control

5.16 Audio control

Audio control function allows you to control music playback. You connect device group objects to a KNX music server and set the function parameters in ETS.

Express settings	Function	Audio control
Screen 1	Function name	1 – 8 characters
Function 1	Icon preview	
	Function icon	
	Colour of function icon indication when status ON	Green/White
	Colour of function icon indication when status OFF	Green/White

You can set the volume control method and play mode, enable the *Mute* and *Track name* function.

Function 1	Control mode of volume adjustment	1 bit (relative control) 1 byte (absolute control)
	Mute	
	Track name	
	Play mode	

Volume

You can select either a 1-bit or a 1-byte object datatype to control the volume.

Function 1	Control mode of volume adjustment	1 bit (relative control)

	Object datatype	1 byte (absolute control) Percentage (DPT 5.001) Percentage (DPT 5.004)
	Max. volume value	10 – 100 %

With a 1-bit object (*Volume + = 1/Volume – = 0*), you can change the volume one **step up or down** (relative control):

1 = one step up

0 = one step down

Absolute control means that you adjust the volume level on a **scale by dragging the bar on the screen**. You can choose whether the volume is transmitted as a percentage (DPT 5.001) or as a percentage (DPT 5.004) from 0 – 100 %.

Play mode

Output/Status value

For each play mode, you can specify the **output** and **status values** (range 0 – 255). The output value is the one you send to the actuator and the status value is the one visible on the screen (via *Play mode, status* group object).

Function 1		Play mode	✓
		Play in single cycle mode	✓ Output value for play in single cycle mode (0 – 255) Status value for play in single cycle mode (0 – 255)
		Play in order mode	✓ Output value for play in order mode (0 – 255) Status value for play in order mode (0 – 255)
		Play in random mode	✓ Output value for play in random mode (0 – 255) Status value for play in random mode (0 – 255)

Group objects

Power on/off group object controls switching the *Audio control* on and off. *Power on/off, status* object displays on/off status on the screen.

Group objects for *Audio control*

No.	Name	Object function	Length	Properties	DPT
244	Screen 1 Function 1	Power on/off	1 bit	Sends	1.001 switch
245	Screen 1 Function 1	Play=1/Pause=0	1 bit	Sends	1.010 start/stop
246	Screen 1 Function 1	Next track=1/Previous track=0	1 bit	Sends	1.007 step
247	Screen 1 Function 1	Volume+=1/Volume-=0 Absolute volume	1 bit 1 byte	Sends	1.007 step 5.001 percentage 5.004 percentage
248	Screen 1 Function 1	Mute	1 bit	Sends	1.003 enable
250	Screen 1 Function 1	Play mode	1 byte	Sends	5.010 counter pulses
251	Screen 1 Function 1	Power on/off, status	1 bit	Receives	1.001 switch
252	Screen 1 Function 1	Play=1/Pause=0, status	1 bit	Receives	1.010 start/stop
254	Screen 1 Function 1	Volume, status	1 byte	Receives	5.001 percentage 5.004 percentage

Group objects for *Audio control*

No.	Name	Object function	Length	Properties	DPT
255	Screen 1 Function 1	Mute, status	1 bit	Receives	1.003 enable
256	Screen 1 Function 1	Play mode, status	1 byte	Receives	5.010 counter pulses
257	Screen 1 Function 1	Track name	14 byte	Receives	16.001 character string (ISO 8859-1)

5.17 Air quality display

With *Air quality display* function, you can choose which air characteristic you want to display on the screen. The information comes from the sensor or KNX gateway or another KNX device that can send it to the KNX bus in a specified data point.

Express settings	Function	Air quality display
Screen 1	Function name	1 – 8 characters
Function 1	Icon preview	
	Function icon	
	Colour of function icon indication	Green/White

It can be temperature, humidity, or degree of pollution. You can also monitor the brightness (of the room or outside, depending on the type of your sensor).

Function 1	Type of air quality display	Int. temperature
		Ext. temperature
		Humidity
		$PM_{2,5}$
		PM_{10}
		VOC
		CO_2
		Brightness (lux)

Each characteristic has its own unit. Either it is fixed (temperature – ° C, humidity – %). For other characteristics, you can name the unit yourself ($PM_{2.5}$, PM_{10}, VOC, CO_2).

Internal temperature

The internal temperature is displayed based on the value from the **internal temperature sensor**. There is no special internal temperature group object for the Air quality display.

Function 1	Type of air quality display	Int. temperature
	Text for unit	°C

External temperature

External temperature is displayed based on values from the **external temperature sensor**. You can set the interval for requesting values via the bus.

Function 1	Type of air quality display	Ext. temperature
	Text for unit	°C
	Time period for request external sensor	0 – 255 min

Humidity

The relative humidity values (in percent) come from the **external humidity sensor**. You can set the requesting time interval.

Function 1		Type of air quality display	Humidity
		Text for unit	%
		Time period for request external sensor	0 – 255 min

$PM_{2,5}$

To display the concentration of the fine particulate matter, you can select either the value in **µg/m³** or the concentration expressed as a **floating value**.

You can set the requesting time interval and name the unit.

Function 1		Type of air quality display	$PM_{2,5}$
		Object datatype	Value in µg/m³ (DPT 7.001)
			Float value in µg/m³ (DPT 9.030)
		Text for unit	“5 bytes allowed”
		Time period for request external sensor	0 – 255 min

PM_{10}

To display the concentration of the particulate matter, you can select either the value in **µg/m³** or the concentration expressed as a **floating value**.

You can name your unit and set the requesting time interval.

Function 1		Type of air quality display	PM_{10}
		Object datatype	Value in µg/m³ (DPT 7.001)
			Float value in µg/m³ (DPT 9.030)
		Text for unit	“5 bytes allowed”
		Time period for request external sensor	0 – 255 min

VOC

You can select either the value in **µg/m³** or the concentration expressed as a **floating value** to display the concentration of the volatile organic compounds (VOC).

You can name your unit and set the requesting time interval.

Function 1		Type of air quality display	VOC
		Object datatype	Value in µg/m³ (DPT 7.001)
			Float value in µg/m³ (DPT 9.030)
		Text for unit	“5 bytes allowed”
		Time period for request external sensor	0 – 255 min

CO_2

The carbon dioxide content values in the air come from the external sensor. You can select from two types of units to display on the screen: Either a **value in ppm** or a **floating value in ppm**.

You can name your unit and set the requesting time interval.

Function 1	Type of air quality display	CO_2
	Object datatype	Value in ppm (DPT 7.001)
		Float value in ppm (DPT 9.008)
	Text for unit	“5 bytes allowed”
	Time period for request external sensor	0 – 255 min

Brightness

To display the brightness level, you can select either the **value in lux** or as a **floating value in lux**.

You can name your unit and set the requesting time interval.

Function 1	Type of air quality display	Brightness (lux)
	Object datatype	Value in lux (DPT 7.013)
		Float value in lux (DPT 9.004)
	Text for unit	“5 bytes allowed”
	Time period for request external sensor	0 – 255 min

Group objects

Group objects for *Air quality display*

No.	Name	Object function	Length	Properties	
244	Screen 1 Function 1	Ext. temperature value	2 byte	Sends, Receives, Updates	9.001 temperature
244	Screen 1 Function 1	Humidity value	2 byte	Sends, Receives, Updates	9.007 humidity
244	Screen 1 Function 1	$PM_{2.5}$ value	2 byte	Sends, Receives, Updates	7.001 pulse 9.030 concentration (µg/m³)
244	Screen 1 Function 1	PM_{10} value	2 byte	Sends, Receives, Updates	7.001 pulse 9.030 concentration (µg/m³)
244	Screen 1 Function 1	VOC value	2 byte	Sends, Receives, Updates	7.001 pulse 9.030 concentration (µg/m³)
244	Screen 1 Function 1	CO_2 value	2 byte	Sends, Receives, Updates	7.001 pulse 9.008 parts/million (ppm)
244	Screen 1 Function 1	Brightness value	2 byte	Sends, Receives, Updates	9.004 lux (lux) 7.013 brightness (lux)

6 HVAC controller

The device integrates the **Heating, Ventilation and Air-Conditioning** to a coherent and efficient climate control. Measured temperature values in the rooms are recorded and supplied to the heating/cooling and ventilation control to generate the optimum temperature and air quality, using fresh air from outdoors.

General settings		
Advanced function	HVAC controller	✓
HVAC controller		

Function configuration

The HVAC module supports room temperature and ventilation control.

HVAC controller	FCU controller	✓
Controller settings	Floor heating controller	
	Ventilation controller	

Turn off the thermostat before ETS download, reset, or micro-USB update. This is to prevent the HVAC system from being driven by a not stabilized built-in temperature sensor.

You can deactivate the thermostat by the ON/OFF icon on the respective screen.

It is also recommended to set *Power on/off after download* to *OFF* in FCU and Floor Heating controller in ETS before download.

- *HVAC controller* > *FCU controller* > *Power on/off after download* > *OFF*
- *HVAC controller* > *Floor heating controller* > *Power on/off after download* > *OFF*

6.1 FCU controller

In the FCU controller sub-menu you can set the parameters for measuring and evaluating the temperature, select the function mode (heating/cooling) and you can even link the FCU module with a bus presence detector or sensors in the windows.

The actual temperature can be registered using various **temperature sensors**:

- Internal sensor of the controller
- External sensor, the values of which are received by the *External temperature sensor* object
- Internal sensor combined with external

The controller can evaluate 2 temperatures proportionately from 0-100 %.

You can also set the **control mode and interval for sending** the measured values and the control value in case of a measurement error.

Power on/off status

With this setting, you can choose how the FCU controls the status after the download is complete and the device is powered on (again).

Function configuration	Power on/off after download	Off/On
FCU controller	Power on/off status after voltage recovery	Off/On/Before voltage failure

Control modes

You can select the *Heating*, *Cooling* or *Heating and cooling* control modes. Modes can be switched automatically, via an object or with a button. The transition takes place automatically via the button or *Heating/Cooling control value* object.

Both heating and cooling are controlled by comparing the setpoint and the actual temperature.

The controller can control the connected **heating/cooling systems** via corresponding switch telegrams or continuous correcting variables. In this way, both PI controls and 2-step controls can be parametrized.

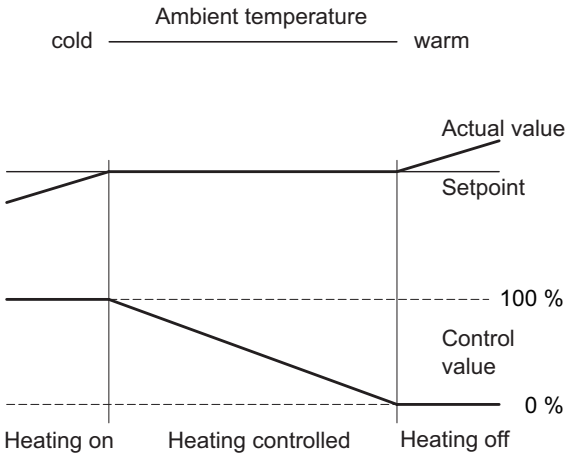
There are four **operating modes** for differentiated control with different requirements. Each mode has **programmable setpoints**. During ongoing operation, you can temporarily move the setpoints within adjustable limits, or move them jointly for several operation modes. Optionally, the basis for the setpoints can also be moved.

Additional functions of the room temperature control unit are:

- Selection of the operation mode after the bus voltage returns
- Status information

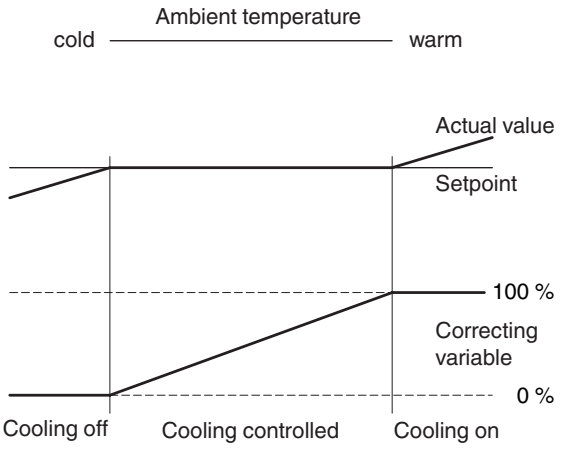
Heating

In the heating control mode, the current actual temperature is compared with the current setpoint temperature. If the actual temperature is **below** the setpoint temperature, this control difference is counteracted by issuing a setpoint which does not equal “0”.



Cooling

In the cooling control mode, the current actual temperature is compared with the current setpoint temperature. If the actual temperature goes **above** the setpoint temperature, this control difference is counteracted by issuing a setpoint which does not equal “0”.



Heating and cooling

You can set how the change between heating and cooling takes place using the *Heating/Cooling switchover* parameter.

- Automatically by the controller
- Set externally via the *Heating/cooling mode* object
- Via button
- Via both button and object

Automatic changeover

If you select the *Automatic changeover* between Heating and Cooling, the controller decides which mode is suitable based on the parametrized setpoints, the insensitive zone and the current actual temperature.

If you select the **external switchover** using *Heating/cooling mode* object, the controller can only be forced into heating or cooling mode by the **object value**.

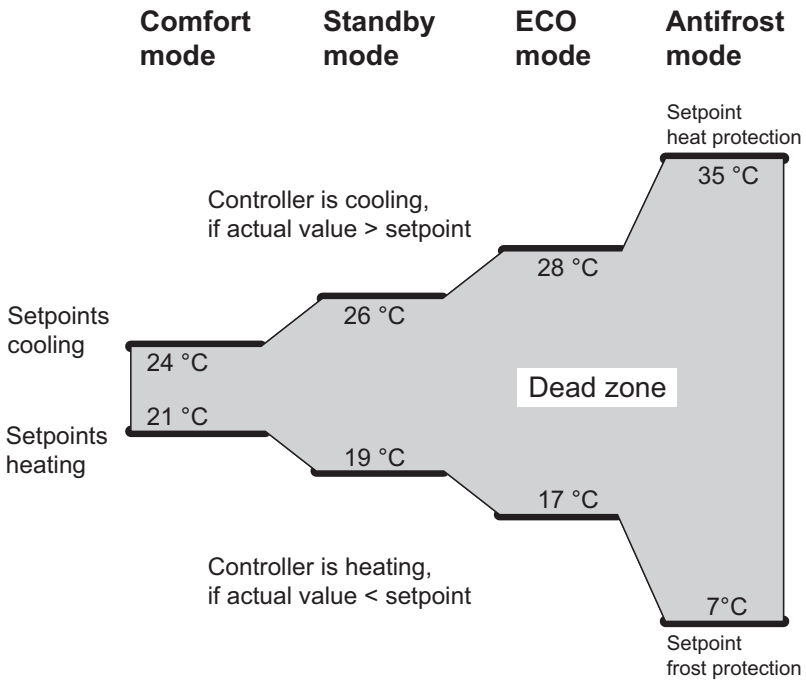
The status of an external device for changing over between heating and cooling can be interrogated.

To do this, set the *Read on init* flag on the *Heating/cooling value* object.

Note that the external unit is operational after a reset and supports the read request. Also set **cyclical sending** on the external device.

Dead zone

The **insensitive zone** prevents the controller from switching frequently between heating and cooling. For example, if a heater is used for heating, it has sufficient thermal energy after the valve has been closed to continue to heat the room above the setpoint temperature.



Example

If you have project the same value for the heating and cooling setpoints, the insensitive zone is set to “0 K”. After a delay time that can be set has elapsed, the air conditioning system cools because the setpoint for cooling has been exceeded. If there is a short delay time, the controller switches the controller mode particularly frequently.

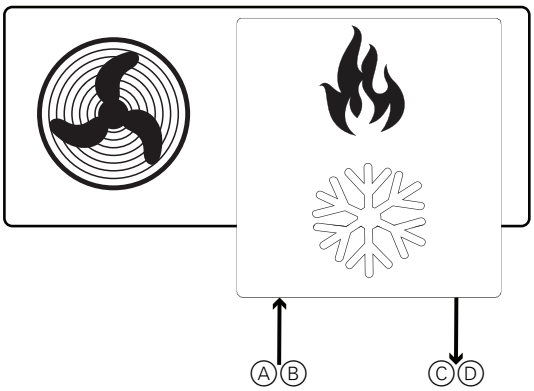
Make sure that the heating setpoint is always less than the cooling setpoint.

Status after power on/download

You define the mode to which the controller changes after download (Heating or Cooling) or reset (Heating/Cooling/As before voltage failure).

Finally, you choose between a **2-pipe** and a **4-pipe** system. In the 2-pipe system, heating and cooling mediums (depending on the season) are lead through the same lines and controlled via the same valve.

2-pipe HC system

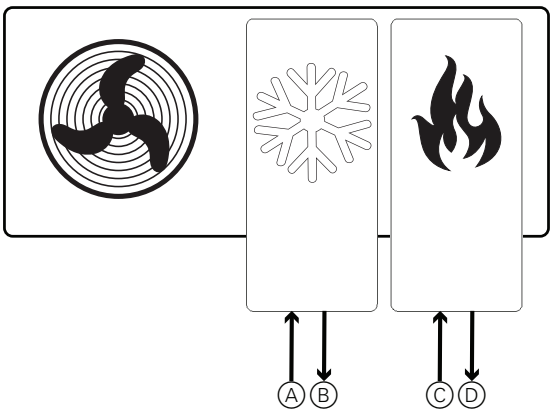


A Cooling supply
B Heating supply
C Cooling return
D Heating return

The changeover between heating and cooling medium is performed by the system, and must therefore be passed on to the controller.

The *Heating/cooling mode* object sends “0” for heating mode and a 1 for cooling mode to the actuator.

4-pipe HC system



A Cooling supply
B Cooling return
C Heating supply
D Heating return

Room temperature operation mode

This function allows you to set the **initial setpoint temperature**, the upper and lower value of the **dead zone** and switch operating modes.

If this function remains deactivated, you can only set the initial setpoint temperature and dead zone values (this only applies to Heating and/or Cooling with **Automatic changeover**).

FCU controller	Operation mode	Enable
	Controller status after download	Standby/Comfort/Economy mode
	Controller status after power on	As before voltage failure/1 of 4 modes
	Extended comfort mode	0 – 255 min
	1 bit object function for operation mode	Disable/Enable
	1 bit object function for standby mode	Disable/Enable

Extended comfort mode

You can temporarily **extend the Comfort mode** by 1 to 255 minutes using the timer. If you set the timer to zero, this function remains inactive. The comfort extension operation mode is largely the same as the comfort mode. However, the comfort extension is exited automatically after a time period that you can set. It temporarily suppresses the night operation mode when the room is used for longer during the evening, for example.

If you set the thermostat to Economy mode and extend Comfort mode, after the temporary timer expires, the thermostat returns to Economy mode. The temporary timer function is aborted whenever a new setting is made via the bus or via the operation mode button.

The user may want to interrupt the timer of the extended comfort mode and switch to another mode or simply switch between the individual modes as needed. To enable it, you need a 1-bit object and a 1-bit status feedback object for each operating mode.

1-bit object function for operation mode

When you enable the 1-bit object function for operation mode, in addition to the two existing 1-byte objects (Operation mode and Operation mode status), you get another six 1-bit objects (3 for operation modes and 3 for status feedback).

The 1-bit objects works like this:

Setting “1” to any of the four 1-bit objects, the corresponding control mode is activated. The “0” has no function.

1-bit object function for Standby mode

If you tick the 1-bit object for Standby mode, you get two more 1-bit objects (Standby mode and Standby mode status) and you can send only the ‘1’ signal via the Standby object to activate the Standby mode. If you do not tick this function, you need to send ‘0’ signal to all the three objects (Comfort mode, Economy mode and Frost/heat protection mode) to activate the Standby mode.

Bus window contact and presence detector

You can also include the value from the **window open** detector and the **presence detector** as a parameter in the operating mode changeover settings.

FCU controller	Window contact input function	Enable
	Delay for window contact	0 – 65535 s
	Controller mode for open window	Economy mode
		Frost/heat protection
	Use bus presence detector	Enable/Disable

Window contact

Use bus window contact function is useful when the heating or air conditioning is on and the user leaves the window open. This commonly happens in hotels, for example. A *Window contact* object can also inform you in the event of an unusual situation - for example, if a window is broken.

The setting *Delay for window contact* allows you to set the **delay interval** after which the window is considered open.

Example

A user needs to call someone on the street from a window or release an insect. That's usually a matter of a few seconds.

If they manage to open and close the window during the preset delay interval, nothing changes.

However, if the **opening time exceeds** the delay interval, the window is considered open and the the *Window contact* object sends "1" which activates preset mode (ECO mode, antifreeze mode or power off).

Bus presence detector

You can set that comfort mode triggers when somebody enters the room. When the person leaves, the original mode is restored. If there is a bus/manual **mode adjustment** during the presence period, it does not return to the previous mode state after leaving.

Example

Room setting: Economy mode

Person enters the room → Comfort mode

Person leaves the room → Economy mode

Person enters the room → Comfort mode

Person manually switches to Standby

Person leaves the room → Device remains in Standby → Timer triggers Economy mode → Device switches to Economy mode.

Temperature settings

You can set **temperature limits** and the **step value** for temperature adjustment. Tapping on a button increases or decreases the setpoint in increments of 0.5°C or 1°C.

To be able to increase and decrease the temperature in this way, you must link the following objects to the appropriate group address:

146 FCU – Current setpoint adjustment

164 FCU – Current temperature setpoint

The setpoint can only be changed up to the limits that apply to the room temperature control unit in question.

FCU controller	Setpoint temperature adjustment step	0,5 / 1°C
	Min. set temperature	5 – 37°C
	Max. set temperature	5 – 37°C

The minimum temperature has to be set lower than the maximum.

If the user sets a temperature that exceeds the original minimum/maximum, this temperature is considered the new minimum/maximum.

FCU setpoints and operation modes

Four operation modes are available for controlling room temperature:

- **Comfort**: Controls the room temperature when the room is being used.
- **Economy**: Slight reduction in temperature if the room is not used or the reduced temperature is sufficient for the current room usage.
- **Standby**: Lowers temperature significantly, e.g. at night or during the weekend.
- **Frost/heat protection**: Heating/cooling is switched off. To prevent the heating freezing or the room overheating, heating or cooling is switched back on if adjustable temperature setpoints are undershot or exceeded.

FCU controller	Setpoint method for operating mode	Relative/Absolute
Setpoint	Base setpoint temperature/ —	
	Automatic H/C mode changeover dead zone/ —	
	Heating	
	Cooling	
	— /Automatic H/C mode changeover minimum zone	

The operation mode is selected using the bus or the user interface with:

- Button on the user interface
- *Operation mode* object
- 1-bit objects of each mode

For each operation mode, you can specify **setpoints**. When changing the operation mode, the relevant setpoint for continued room temperature control is used. You can adjust operation mode setpoints manually using the user interface or objects.

Relative and absolute setpoints

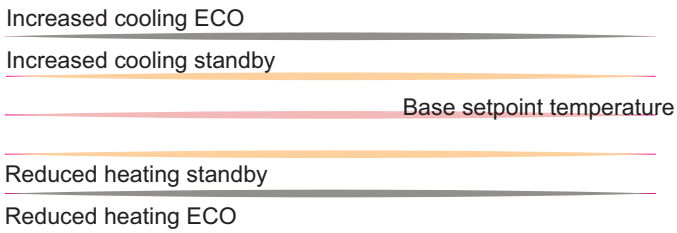
Relative setpoint method

If you choose relative setpoint method, set the *Base setpoint temperature* first.

Base setpoint temperature represents your Comfort mode (2-byte *Current temperature setpoint* object). Adjust the remaining setpoints as **relative offsets** with respect to this base reference.

If you change the relative setpoint value, the relative temperature of each mode stays the same. Unless you change them as well.

Antifreeze mode is defined in absolute values. Bus saves the setpoint temperature value when power off.



Example

Parameters:

Base setpoint temperature: **21°C**

Reduced heating in standby mode: **5°C**

21°C - 5°C » » » Heating in standby heats up to **16°C**

Base setpoint temperature: **23°C**

Reduced heating in standby mode: **5°C**

23°C - 5°C » » » Heating in standby heats up to **18°C**

Dead zone setting

You can set the upper and lower limit for dead zone to prevent switching frequently between heating and cooling. See more in Dead zone → 44.

Example

Parameters:

Upper dead zone: **2°C**

Lower dead zone: **2°C**

Base setpoint temperature

Base setpoint temperature: **21°C**

Heating

Actual temperature ≥ Base setpoint temperature + Upper limit dead zone

25°C ≥ 21°C + 2°C → Too warm » » » Heating switches over to cooling

Cooling

Actual temperature ≤ Base setpoint temperature - Lower limit dead zone

18°C ≤ 21°C - 2°C → Too cold » » » Cooling switches over to heating

Absolute setpoint method

The setpoints for cooling or heating can be defined as **absolute values**. Total control over the desired temperature in the room is achieved, since the thermostat regulates the room temperature based on the temperature setpoint set every moment.

You set the temperature via the 2-byte object *Current temperature setpoint*. Depending on the set value and the parameterized setpoints for each special mode, one mode or another is established.

Minimum zone between heating and cooling setpoint

The parameter *Minimum zone between heating and cooling setpoint* means the minimum temperature interval between the temperature setpoint for cooling and heating comfort mode.

The heating/cooling automatically switches according to the temperature setpoint of comfort mode.

The cooling switches on automatically when the current temperature is higher than the temperature setpoint of the cooling comfort mode.

When the current temperature is lower than the temperature setpoint of the heating comfort mode, the heating automatically switches on.

Heating and cooling control

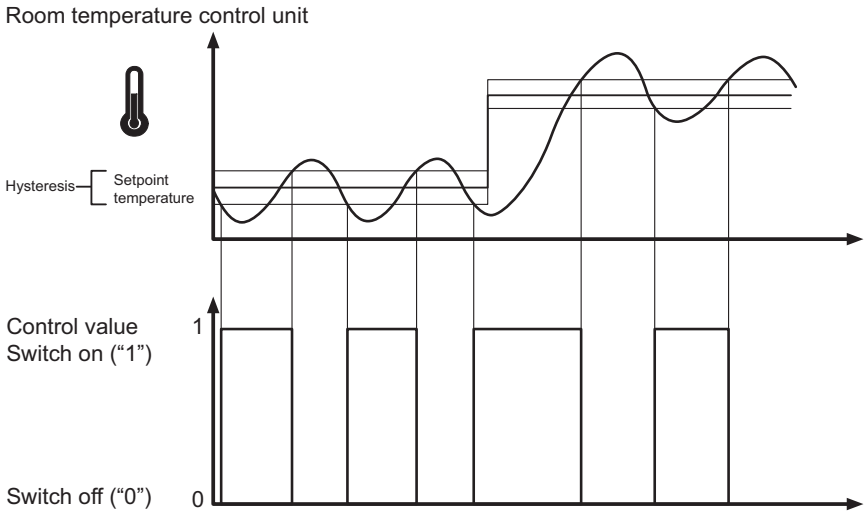
The room temperature control unit transmits values to the bus via various group objects, which you can use to control different controller types with switching commands or by specifying percentage values:

- Switching on/off (use 2-point control)
- Switching PWM (use PI control)
- Continuous control (use PI control)

Switching on/off (2-point control)

It is a simple control method, widely used in conventional thermostats, where the setpoint temperature and two values of hysteresis around the setpoint are required. It prevents a continuous switching between the two modes.

The same behavior applies with cooling systems.



Features

The disadvantage of simple control, in contrast to its advantage, is that the room temperature is not constant but **changes continuously**, reducing comfort particularly when heating and cooling systems are slow to react. To counteract this effect, you can set a sufficiently small hysteresis. However, this leads to an increase in switching frequency, and therefore to increased wear of the drives.

The **temperature overshoot** above or below the hysteresis apparent in the diagram is caused when the heating/cooling system continues to emit heat or cold into the room after it has been switched off.

Setting hysteresis

Small hysteresis: leads to small fluctuations, but frequent switching

Large hysteresis: leads to big fluctuations, but infrequent switching

Sending values

You can select the interval (0 – 255 min) for cyclically sending the control value to the bus. You can send this value as standard or inverted.

Continuous and switching PI control

For the PI control, the control value is calculated from a proportional and an integral share. The calculation is governed by the following parameters:

- Temperature difference between actual value and setpoint
- Proportional range
- Reset time

In this way, the controller can correct the room temperature accurately. The corresponding control value is transferred via a 1 bit/1 byte value to the bus.

The standard control parameters for the most common system types are already installed in the controller:

Heating/Cooling speed

- Hot water heating (5K/150 min)
- Underfloor heating (5K/240 min)
- Electrical heating (4K/100 min)
- Cooling ceiling (5K/240 min)
- Split unit (4K/90 min)

- Fan coil unit (4K/90 min)
- User defined

You can also set the control parameters for the **proportional range** and the **reset time** manually, but you should know exactly which actuators are connected and the control conditions in the room.

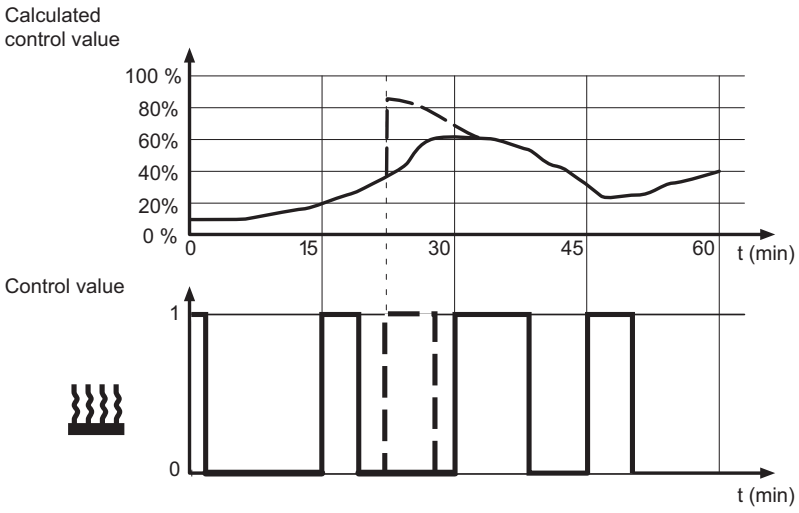
Continuous PI control

For the continuous PI control, the corresponding 1-byte control value is transmitted 0-100 % directly via the bus to the heating actuator or a valve drive, which convert the control value directly to a degree of opening. However, this is only transmitted when the newly calculated control value has changed by a specified percentage.

Switching PI control (PWM)

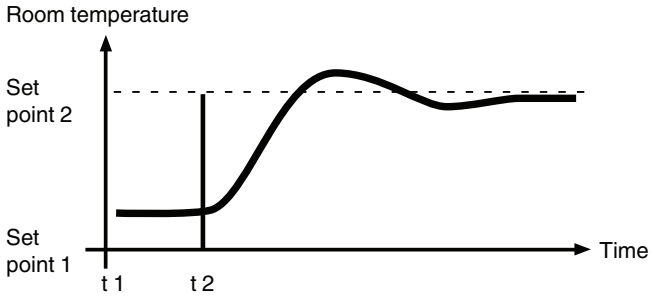
With the switching PI control, also known as the PWM control, the control values calculated by the controller (0-100 %) are converted into a pulse-width modulation (PWM). Within a constant, defined cycle time, the control actuator is opened (“1”) and then closed again (“0”) for the calculated percentage period.

For example, when a control value of 25 % is calculated for a cycle time of 12 minutes, a “1” is transmitted at the beginning of the cycle time, and a “0” is transmitted after three minutes (= 25 % of 12 minutes)



When the setpoint temperature changes, the controller recalculates the required control value and transmits it in the actual cycle (broken line).

Setting rules for the PI control



In general

- Large system increases (e.g. high heating output, steep characteristic curves for valves) are controlled with large proportional ranges.
- Slow heating systems (e.g. underfloor heating) are controlled with high-level reset times.

Adjustment via control parameter

If no satisfactory control result is achieved by selecting an appropriate heating or cooling system, you can improve the adaptation via control parameters.

- Low proportional range
  - Large overshoot for setpoint changes (also continuous oscillation under certain circumstances), rapid adjustment to the setpoint.
- Large proportional range
  - No (or little) overshooting, but slow adjustment.
- No reset time
  - Rapid correction of control deviations (ambient conditions), risk of continuous oscillation.
- Long reset time
  - slow correction of control deviations.

The framework conditions for setting the cycle time

- For small values, the switching frequency and the bus load are increased.
- For large values, temperature fluctuations are created in the room.
- Short cycle time for rapid heating systems (e.g. electric heating)
- Long cycle time for slow heating systems (e.g. underfloor warm water heating)

Examples

Warm water radiator heating with motorized valve drives

Properties	Parameter	Settings
Heating only	Controller type	Heating
	Control value output	Continuous PI control
	Adjusting the controller to the heating system	Hot-water heating (5 K / 150 min)
	Send control value on change by	4 %
	Cyclically send control value	10 min

Cooling ceiling with motorised valve drives

Properties	Parameter	Settings
Cooling only	Controller type	Cooling
	Control value output	Continuous PI control;
	Adjusting the controller to the cooling system	Adjustment via control parameter
	Cooling proportional range	Appr ox. 30°C(depending on the application)
	Reset time for cooling	Approx. 240 min. (depending on the application)
	Send control value on change by	4 %
	Cyclically send control value	10 min

Switching electric radiator heating

Properties	Parameter	Settings
Heating only	Controller type	Heating
	Control value output	Switching PI control
	Adjusting the controller to the heating system	Electric heating (4 K / 100 min)
	Send control value on change by	4 %
	Cyclically send control value	10 min

Air conditioning with 4-duct (2-circuit) air convector system (e.g. switching valve drives)

Properties	Parameter	Settings
Heating or cooling as required, with automatic switching	Controller type	Heating and cooling
	Control value output - heating	E.g. switching PI control
	Adjusting the controller to the heating system	Split unit (4 K / 90 min)
	Control value output - cooling	E.g. switching PI control
	Adjusting the controller to the cooling system	Electric heating (4 K / 100 min)
E.g. automatically switch between heating and cooling	Switch between heating and cooling	Automatically via the controller

Temperature limitation using shading facility

Properties	Parameter	Settings
Cooling only	Controller type	Cooling
	Control value output - heating	Switching 2-step control
	Hysteresis	Large (e.g. 10°C)

FCU Fan function

Selecting *FCU controller* as the room temperature control function, you can also control a KNX Fan Coil actuator.

Function configuration	Fan level	1/2/3
FCU controller	Fan speed output setting	
Fan	1-bit object function for fan speed	Enable/Disable
	1-bit object for fan speed off	Enable/Disable
	Fan speed auto. control function	Disable Local controller External controller

In addition to control, you set a fan speed during ongoing operation for manual mode and change between automatic and manual mode. In automatic mode, the fan coil actuator takes over control of the fan speed.

You define the thresholds for display of a fan step. In addition, you select the value for changing over between manual and automatic mode.

Speed levels

This setting allows you to select the fan speed parameters. You can choose from three options:

- 1 level - only one constant speed and OFF
- 2 level - two speed levels and OFF
- 3 level - three speed levels and OFF

You can select 2 formats for 1-byte fan speed object:

- 1-byte number between 0 and 255
- percentage value 0 – 100 %

The value you set as the **output value for each speed** is shown on the display via *Fan speed, status* object.

In ETS, practical values are set as default. You can use them or change them later as needed.

1-bit fan speed control

If you enable the *1-bit object function for fan speed*, the 1-bit objects of each fan speed appear in the ETS settings.

1-bit object	Sends a “1” if
180 FCU - Fan speed 1	the fan is switched to speed 1
181 FCU - Fan speed 2	the fan is switched to speed 2
182 FCU - Fan speed 3	the fan is switched to speed 3

The fan turns off when all the objects are “0”.

Example

The fan coil actuator receives a telegram from the local thermostat and switches the fan to speed 3.

If you link each 1-bit fan speed object to the respective 1-bit fan speed status feedback object of another device, all the linked devices then display fan speed 3 icons on their LCD.

1-bit fan speed off

1-bit object for fan speed off function allows you to turn the fan speed on and off via a 1-bit object. A value of “0” switches off the fan.

Automatic speed control

You can set up automatic fan speed control by a local or external controller. If you select local, you can further set the parameters for switching as follows.

Setting for PI control

When using PI control, the control value is calculated by the PI algorithm and then transmitted to the controller. The controller switches the fan or switch the fan speed according to the preset threshold range.

Setting thresholds

Threshold value OFF < — > speed 1

Control value ≥ Threshold value → Fan speed = 1

Control value < Threshold value → Fan turns off

Threshold value speed 1 < — > speed 2

Control value ≥ Threshold value → Fan speed = 2

Control value < Threshold value → Fan speed = 1

Threshold value speed 2 < — > speed 3

Control value ≥ Threshold value → Fan speed = 3

Control value < Threshold value → Fan speed = 2

Hysteresis threshold value

It is practical to set hysteresis around the threshold value. This prevents a continuous switching between the fan speed levels.

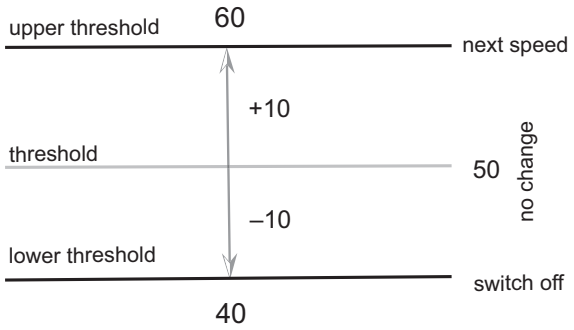
However, if you do not want to use this function, set the hysteresis to “0”. The fan then switches when the threshold value is reached.

Example

Parameter	Setting
Hysteresis threshold value	+/–10
Threshold value	50
Upper threshold	50 + 10 = 60
Lower threshold	50 – 10 = 40

If the control value is between 60 and 40 → no change

Control value ≥ 60 / < 40 → change of speed / fan off



Condition setting 2-point control

When using 2-point control, the controller compares the actual temperature and the setpoint temperature as follows:

Cooling

Temperature difference = Actual temperature – Setpoint temperature

Heating

Temperature difference = Setpoint temperature – Actual temperature

Temperature difference setting

Temperature difference OFF < — > speed 1

Temperature difference ≥ Set temperature difference → Fan speed = 1

Temperature difference < Set temperature difference → Fan turns off

Temperature difference 1 < — > speed 2

Temperature difference ≥ Set temperature difference → Fan speed = 2

Temperature difference < Set temperature difference → Fan speed 1

Temperature difference 2 < — > speed 3

Temperature difference ≥ Set temperature difference → Fan speed = 3

Temperature difference < Set temperature difference → Fan speed 2

Temperature difference hysteresis

You can set the hysteresis value of the temperature difference (0 = no hysteresis). Once the temperature difference is greater than the defined temperature difference and hysteresis, the fan switches the speed.

Minimum time in fan speed

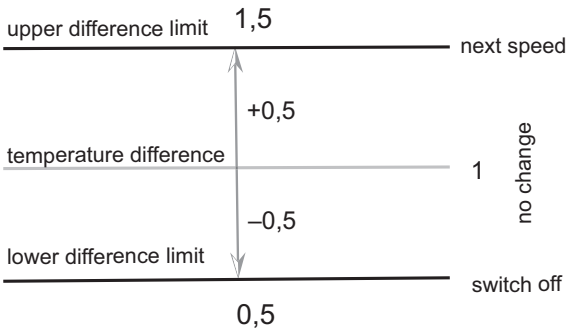
You can set a minimum time for the fan to stay at speed when the fan speed is controlled automatically.

Example

Parameter	Setting
Hysteresis temperature difference	+/–0,5
Temperature difference	1
Upper temperature difference limit	1 + 0,5 = 1,5
Lower temperature difference limit	1 – 0,5 = 0,5

If the control value is between 1,5 and 0,5 → no change

Control value ≥ 1,5 / < 0,5 → change of speed / fan off



Group objects

FCU controller group objects

No.	Name	Object function	Length	Properties	DPT ETS
144	FCU controller	Power on/off, status	1 bit	Receives	1.001 switch

FCU controller group objects

No.	Name	Object function	Length	Properties	DPT ETS
145	FCU controller	External temperature sensor	2 byte	Sends, Receives, Updates	9.001 temperature
146	FCU controller	Current setpoint adjustment, status Base setpoint adjustment, status"	2 byte	Receives	9.001 temperature
150	FCU controller	Switch Heating/Cooling mode	1bit	Receives	1.100 cooling/ heating
150	FCU controller	Switch Control mode	1 byte	Receives	20.107 DPT Changover Mode
151	FCU controller	Operation mode, status	1 byte	Receives	20.102 HVAC mode
152	FCU controller	Comfort mode, status	1 bit	Receives	1.003 enable
153	FCU controller	Economy mode, status	1 bit	Receives	1.003 enable
154	FCU controller	Frost/Heat protection mode, status	1 bit	Receives	1.003 enable
155	FCU controller	Standby mode, status	1 bit	Receives	1.003 enable
156	FCU controller	Extended comfort mode	1 bit	Receives	1.016 acknowl-edge
157	FCU controller	Fan speed, status	1 byte	Sends, Receives, Updates	5.001 percentage 5.100 fan stage"
158	FCU controller	Fan On/Off, status	1 bit	Sends, Receives, Updates	1.001 switch
158	FCU controller	Fan speed 1, status	1 bit	Sends, Receives, Updates	1.001 switch
159	FCU controller	Fan speed 2, status	1 bit	Sends, Receives, Updates	1.001 switch
160	FCU controller	Fan speed 3, status	1 bit	Sends, Receives, Updates	1.001 switch
161	FCU controller	Fan speed off, status	1 bit	Sends, Receives, Updates	1.001 switch
162	FCU controller	Fan automatic operation, status	1 bit	Sends, Receives, Updates	1.003 enable
163	FCU controller	Window contact	1 bit	Sends, Receives, Updates	1.019 Window/ door
164	FCU controller	Presence detector	1 bit	Sends, Receives, Updates	1.018 occupancy
165	FCU controller	Power on/off	1 bit	Sends	1.001 switch
166	FCU controller	Actual temperature	2 byte	Sends	9.001 temperature
167	FCU controller	Base temperature setpoint	2 byte	Sends	9.001 temperature
169	FCU controller	Current temperature setpoint	2 byte	Sends	9.001 temperature
170	FCU controller	Heating/Cooling mode	1 bit	Sends	1.100 cooling/ heating
171	FCU controller	Control mode	1 byte	Sends	20.107 DPT Changover Mode
172	FCU controller	Operation mode	1 byte	Sends	20.102 HVAC mode
173	FCU controller	Comfort mode	1 bit	Sends	1.003 enable
174	FCU controller	Economy mode	1 bit	Sends	1.003 enable

FCU controller group objects

No.	Name	Object function	Length	Properties	DPT ETS
175	FCU controller	Frost/Heat protection mode	1 bit	Sends	1.003 enable
176	FCU controller	Standby mode	1 bit	Sends	1.003 enable
177	FCU controller	Heating control value	1 bit/ 1 byte	Sends	1.001 switch/5.001 percentage
178	FCU controller	Cooling control value	1bit/ 1 byte	Sends	1.001 switch/ 5.001 percentage
179	FCU controller	Fan speed	1 byte	Sends	5.001 percentage, 5.100 fan stage
180	FCU controller	Fan On/Off	1 bit	Sends	1.001 switch
180	FCU controller	Fan speed 1	1 bit	Sends	1.001 switch
181	FCU controller	Fan speed 2	1 bit	Sends	1.001 switch
182	FCU controller	Fan speed 3	1 bit	Sends	1.001 switch
183	FCU controller	Fan speed off	1 bit	Sends	1.001 switch
184	FCU controller	Fan Automatic operation	1 bit	Sends	1.003 enable

6.2 Floor heating controller

The settings for underfloor heating are the same as for the heating of the FCU controller. See FCU controller → 42.

The *Interface display temperature* parameter displays the actual indoor temperature by default. The *Default set temperature* parameter represents the initial temperature value you set.

Group objects

Group objects for *Floor heating controller*

No.	Name	Object function	Length	Properties	DPT
185	Floor heating controller	Power on/off, status	1 bit	C,W,U	1.001 switch
186	Floor heating controller	External temperature sensor	2 byte	C,W,T,U	9.001 temperature
187	Floor heating controller	Current setpoint adjustment, status Base setpoint adjustment, status"	2 byte	C,W,U	9.001 temperature
190	Floor heating controller	Power on/off	1 bit	C,R,T	1.001 switch
191	Floor heating controller	Actual temperature	2 byte	C,R,T	9.001 temperature
192	Floor heating controller	Current temperature setpoint	2 byte	C,R,T	9.001 temperature
193	Floor heating controller	Heating control value	1 bit/1 byte	C,R,T	1.001 switch/5.001 percentage

6.3 Ventilation controller

With HVAC module, you can also control a ventilation. In addition to the control, you can set a fan step for manual mode in ongoing operation and change between automatic and manual mode. In automatic mode, the fan coil actuator takes over control of the fan steps.

HVAC controller		
Controller settings	Description	Max. 30 characters
Ventilation controller	Controller 1	Ventilation controller

The setting of the ventilation parameters is practically identical to the fan setting in the room temperature control section. See more in Ventilation system → 35 and FCU Fan function → 54.

You can set up automatic fan speed control via 1-bit *Fan automatic operation* object. You set the **message value** for activating the automatic control (“1” or “0”).

Ventilation controller	Auto. operation on object value	Auto = 1/Man. = 0 Auto = 0/Man. = 1
	State of Auto. operation after startup	Disable/Enable

You can select the source of the **control values** ($PM_{2.5}$,CO_2 or VOC).

Ventilation controller	Control value reference from	$PM_{2,5}$ CO_2 VOC

The control values are obtained from the bus. The fan turns off by default when an error occurs in the control value.

Threshold evaluation algorithm

Control value = CO_2 / $PM_{2,5}$ / VOC

Control value < Threshold value OFF → Fan off

Control value ≥ Threshold value OFF → Low speed

Control value ≥ Threshold value low → Medium speed

Control value ≥ Threshold value medium → High speed

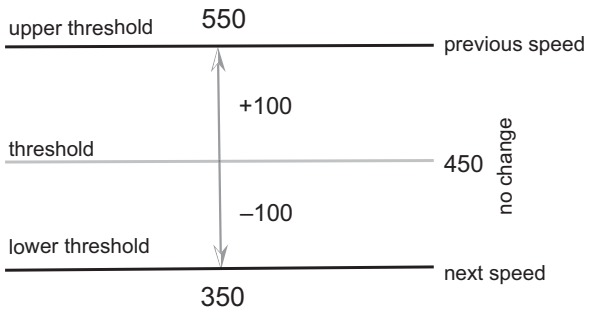
Example

Control value = CO_2

Parameter	Setting
Hysteresis value is threshold value in	+/– 100
Threshold value	450
Upper threshold	450 + 100 = 550
Lower threshold	450 – 100 = 350

If the control value is between 350 and 550 → no change

Control value ≥ 550 / < 350 → previous / next speed



Minimum time in fan speed

The *Minimum time in fan speed* setting represents the time interval after which it is possible to switch to the next/previous speed. The mode changes after time elapses.

If you set “0 s”, there is no minimum run time.

Group objects

Group objects for *Ventilation controller*

No.	Name	Object function	Length	Properties	DPT
210	Ventilation controller	Fan automatic operation	1 bit	Receive	1.003 enable
211	Ventilation controller	PM 2.5 value VOC value CO2 value	2 byte	Sends, Receives, Updates	7.001 pulse 9.030 concentration(µg/m³) 9.008 parts/million (ppm)
238	Ventilation controller	Fan speed, status	1 byte	Sends	5.001 percentage 5.100 fan stage

7 Logic function

In complex KNX installations, the logic function serves to establish special logic operations between sensors and actuators. There is a wide range of possible settings for executing numerous logic functions for controlled KNX devices (e.g. dimming or switch actuators, various sensors etc).

The logic function is particularly suitable for summarizing messages (e.g. the lighting status in rooms), linking conditions (e.g. rain or wind sensor activates a safety function) or programming an additional toggle between manual and automatic (e.g. disabling brightness-dependent lighting control for a video presentation).

Due to the large number of possible settings, the logic module is particularly well suited to the areas of security, comfort or energy saving.

The outputs can also be shown on the visualization device.

By default, all 8 possible logic functions/blocks are deactivated. You have to enable the required amount of the functions.

Logic Logic functions 1st Logic	1st Logic function	Enable

You can choose from one of the following logic operations for each logic block.

1st Logic	Function of channel	AND OR XOR Threshold comparator Format convert

The gate has either the value 1 or 0. The behavior can also be inverted.

Always set all parameters on the first block before parametrising the next block.

Never connect the output and the input of the same logic block to one another, as this can cause the device to malfunction.

7.1 AND, OR, XOR

AND

The logic AND operation output is only **true** when **all of its inputs are true**, otherwise the output is false.

A	B	AND
0	0	0
0	1	0
1	0	0
1	1	1

OR

The logic OR operation output is only **true** if **one or more of its inputs** are true, otherwise the output is false.

A	B	OR
0	0	0
0	1	1
1	0	1
1	1	1

XOR

The logic exclusive-OR or XOR operation gives a true output when the number of true inputs is odd.

A	B	XOR
0	0	0
0	1	1
1	0	1
1	1	0

The difference between OR and XOR

The difference between the OR and XOR logic operations is that the output from the XOR operation is logical “1” if and only if there is an unequal number of “1” and “0” inputs.

In the simple case of an XOR operation with two inputs, this means that the inputs must be different to one another to obtain the output “1”. “1” must be present at precisely one of the two inputs.

A	B	OR	XOR
0	0	0	0
0	1	1	1
1	0	1	1
1	1	1	0

In contrast to a simple OR logic operation, the condition is deemed not to be met if a “1” is present at both inputs.

With an XOR operation, the result in this case is a “0”. Each additional input at the gate alters the behavior accordingly

A	B	C	OR	XOR
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	1	0
1	0	0	1	1
1	0	1	1	0
1	1	0	1	0
1	1	1	1	1

Setting

The first block of functions is described together, because all three operations have the same parameters and values.

Input behaviour

The gate is either open (all telegrams are let through) or closed (no telegram is let through). The behavior can be inverted.

You can use up to 8 inputs (a - h). By default, all the inputs are disconnected.

The input telegrams can be inverted for each input. In addition, a fixed value (0 or 1) can be assigned.

1st Logic	Function of channel	AND
	Input a-h	Disconnected Normal Inverted
	Default value	0 1

Output behavior

Criteria for the sending behavior at the output can be defined.

1st Logic	Result is inverted	No/Yes
	Read input object value after bus voltage recovery	No/Yes
	Output send when	Receiving a new telegram (on the input)
		Every change of output object
	Send delay time: Base	None - 25 s
	Factor: 1..255	1 -255

If you click *Yes* for *Read input object value after bus voltage recovery*, the logic module sends a read telegram to all inputs asking about their values.

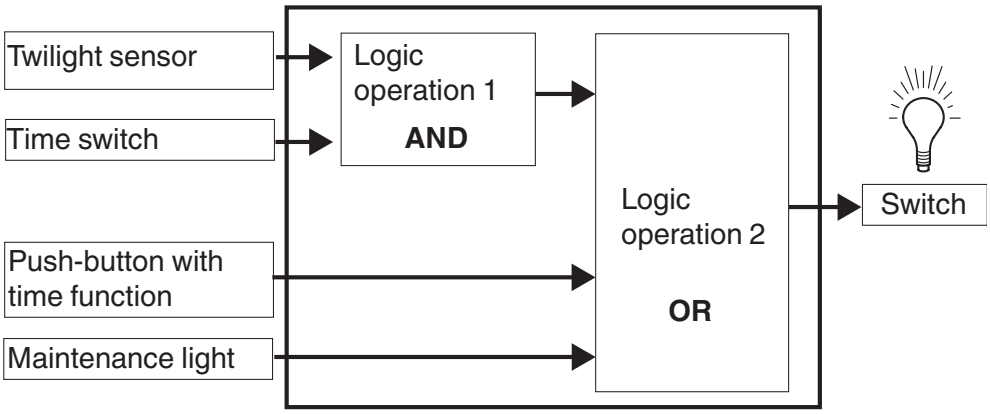
If one or more inputs do not respond, the bus keeps on trying to collect missing responses.

Output send when option allows you to set whether the output should be sent after receiving a new telegram at the input or at every change of the output object.

This setting is wise if a rapid response is expected (e.g. weather alarm at the blind actuator). This function also helps to prevent bus overload.

Example

- A light-sensitive switch switches the lighting on automatically.
- The light is switched off between 23:00 and 06:00.
- In the morning, the light switches on from 06:00 when it is dark.
- In addition, the light can be switched on for 5 minutes at any time via a push-button.
- A continuous light function is possible for maintenance purposes.



Group objects

Group objects for *Logic functions*
AND
OR
XOR

No.	Name	Object function	Length	Properties	DPT ETS
53-60	1st Logic	Input a - h	1 bit	Sends, receives, updates	1.002 boolean
61	1st Logic	Logic result	1 bit	Sends	1.002 boolean

7.2 Threshold comparator

Threshold comparator compares the input value with the threshold.

1st Logic	Function of channel	Threshold comparator
	Threshold value data type	4 bit, 1/2/4 byte
	Threshold value	0..4294967295
	If Object value < Threshold value	Do not send telegram/Send value 1/0
	If Object value = Threshold value	
	If Object value != Threshold value	
	If Object value > Threshold value	
	If Object value ≤ Threshold value	
	If Object value ≥ Threshold value	

You can set a threshold, select its comparison and choose which value to send after comparison:

- 0
- 1
- Do not send telegram

Output send when option allows you to set whether the output should be sent after receiving a new telegram at the input or at every change of the output object.

This setting is wise if a rapid response is expected. It also helps to prevent bus overload.

Group objects

Group objects for *Threshold comparator*

No.	Name	Object function	Length	Properties	DPT ETS
7	1th Logic	Threshold value input	4bit 1byte 2byte 4byte	C,W,U	3.007 dimming 5.010 counter pulses 7.001 pulses 12.001 counter pulses
15	1th Logic	Threshold value input	4bit 1byte 2byte 4byte	C,W,U	1.002 boolean

7.3 Format convert

The format converter allows you to decompose or combine different data types. It is typically used when a sender and receiver do not support the same data format or when you need to solve special requirements.

1st Logic	Function of channel	Format convert
	Function	2 × 1 Bit → 1 × 2 Bit
		8 × 1 Bit → 1 × 1 Byte
		1 × 1 Byte → 1 × 2 Byte
		2 × 1 Byte → 1 × 2 Byte
		2 × 2 Byte → 1 × 4 Byte
		1 × 1 Byte → 8 × 1 Bit
		1 × 2 Byte → 2 × 1 Byte
		1 × 4 Byte → 2 × 2 Byte
		1 × 3 Byte → 3 × 1 Byte
		3 × 1 Byte → 1 × 3 Byte

Basic application

1 × 1 byte → 8 × 1 bit: This function can be used to decompose bit-oriented information sent as 1 byte to individual bits, for example:

- Controller status of room temperature controllers
- Failure status of DALI groups and ECGs

1 × 3 byte → 3 × 1 byte

Converts RGB 3 byte combined value to three separate 1 byte values for red, green and blue.

3 × 1 byte → 1 × 3 byte

Combines three 1 byte values (red, green, blue) to one RGB 3 byte combined value.

Group objects

Group objects for *Logic functions*
Format convert
2 × 1 Bit → 1 × 2 Bit

No.	Name	Object function	Length	Properties	DPT ETS4/5
53	1st Logic	Input 1 bit - bit 0	1 bit	Receives, Updates	1.002 boolean
54	1st Logic	Output 2bit	2 bit	Sends	2.001 switch control

Group objects for *Logic functions*
Format convert
8 × 1 Bit → 1 × 1 Byte

No.	Name	Object function	Length	Properties	DPT ETS4/5
53 - 60	1st Logic	Input 1 bit - bit 0-7	1 bit	Receives, Updates	1.002 boolean
61	1st Logic	Output 1 byte	1 byte	Sends	6.010 counter pulses (-128..127)

Group objects for *Logic functions*
Format convert
1 × 1 Byte → 1 × 2 Byte

No.	Name	Object function	Length	Properties	DPT ETS4/5
53	1st Logic	Input 1 byte	1 byte	Receives, Updates	5.010 counter pulses (0..255)
61	1st Logic	Output 2 byte	2 bytes	Sends, Receives, Updates	7.001 pulses

Group objects for *Logic functions*
Format convert
2 × 1 Byte → 1 × 2 Byte

No.	Name	Object function	Length	Properties	DPT ETS4/5
53	1st Logic	Input 1 byte-low	1 byte	Receives, Updates	5.010 counter pulses (0..255)
54	1st Logic	Input 1 byte-high	1 byte	Receives, Updates	5.010 counter pulses (0..255)
61	1st Logic	Output 2 byte	2 bytes	Sends, Receives, Updates	7.001 pulses

Group objects for *Logic functions*
Format convert
2 × 2 Byte → 1 × 4 Byte

No.	Name	Object function	Length	Properties	DPT ETS4/5
53	1st Logic	Input 2 byte-low	2 bytes	Receives, Updates	7.001 pulses
54	1st Logic	Input 2 byte-high	2 bytes	Receives, Updates	7.001 pulses
61	1st Logic	Output 4 byte	4 bytes	Sends	12.001 counter pulses (unsigned)

Group objects for *Logic functions*
Format convert
1 × 1 Byte → 8 × 1 Bit

No.	Name	Object function	Length	Properties	DPT ETS4/5
53	1st Logic	Input 1 byte	1 byte	Receives, Updates	5.010 counter pulses (0..255)
54 - 61	1st Logic	Output 1 bit - bit 0-7	1 bit	Sends	1.002 boolean

Group objects for *Logic functions*
Format convert
1 × 2 Byte → 2 × 1 Byte

No.	Name	Object function	Length	Properties	DPT ETS4/5
53	1st Logic	Input 2 byte	2 bytes	Receives, Updates	7.001 pulses
60	1st Logic	Output 1 byte-low	1 byte	Sends	5.010 counter pulses (0..255)
61	1st Logic	Output 1 byte-high	1 byte	Sends	5.010 counter pulses (0..255)

Group objects for *Logic functions*
Format convert
1 × 4 Byte → 2 × 2 Byte

No.	Name	Object function	Length	Properties	DPT ETS4/5
53	1st Logic	Input 4 byte	4 bytes	Receives, Updates	12.001 counter pulses (unsigned)
60	1st Logic	Output 2 byte-low	2 bytes	Sends	7.001 pulses
61	1st Logic	Output 2 byte-high	2 bytes	Sends	7.001 pulses

Group objects for *Logic functions*
Format convert
1 × 3 Byte → 3 × 1 Byte

No.	Name	Object function	Length	Properties	DPT ETS4/5
53	1st Logic	Input 3 byte	3 bytes	Receives, Updates	11.001 date
59	1st Logic	Output 1 byte-low	1 byte	Sends	5.010 counter pulses (0..255)

Group objects for *Logic functions*
Format convert
1 × 3 Byte → 3 × 1 Byte

No.	Name	Object function	Length	Properties	DPT ETS4/5
60	1st Logic	Output 1 byte-middle	1 byte	Sends	5.010 counter pulses (0..255)
61	1st Logic	Output 1 byte-high	1 byte	Sends	5.010 counter pulses (0..255)

Group objects for *Logic functions*
Format convert
3 × 1 Byte → 1 × 3 Byte

No.	Name	Object function	Length	Properties	DPT ETS4/5
53	1st Logic	Input 1 byte-low	1 byte	Receives, Updates	5.010 counter pulses (0..255)
54	1st Logic	Input 1 byte-middle	1 byte	Receives, Updates	5.010 counter pulses (0..255)
55	1st Logic	Input 1 byte-high	1 byte	Receives, Updates	5.010 counter pulses (0..255)
61	1st Logic	Input 3 byte	3 bytes	Sends	232.600 RGB value 3 x (0..255)

8 Scene group

The scene module allows you to set a wide number of combinations to control large units (e. g. switch off all lamps in huge public areas, move up all the blinds in office buildings).

If you enable the *Scene group* function, you can set up to 8 scene groups, each of which you can independently assign different values and set specific parameters.

Scene group		
Scene group settings	Scene group function	Enable
	Scene group 1 function	Disable/Enable

Each scene group has 8 outputs. For each of them, you can define 6 scene numbers. Within each Scene group, you can define 48 scenes. You can assign a scene number 384 times in total.

Scene group settings		Enable
Scene group 1		
G1: Output 1 – 8 function	Object type of output	1 bit / 1 byte / 2 byte
	1 – 6 output 1 trigger scene NO. is	1 – 64 (0 = inactive)
	Object value of output 1	1 / 0
	Delay time for sending	0 – 63 * 0,1 s

Scene group output values

Setting the *Scene group* output values

You can select the **object type** of the output value - 1 bit (switch), 1 byte (counter pulses) or 2 bytes (pulses), **object value** (0 is the default) and assign each output valve (1 - 6) a **scene number** to recall. If you select 0, the valve remains inactive.

The *Delay time for sending* function allows you to set the required sending delay for each output valve so that you can set up specific scene recall sequences for each group output.

Scene group x		
Gx: Output x function	Object type of output x	1 bit / 1byte / 2byte
	1 – 6 → output x trigger scene NO. is	1 – 64, 0 = inactive
	Object value of output x	0 – 65535
	Delay time for sending	0 – 63 * 0,1

Group objects

The *Main scene trigger* object receives the scene number (1 – 64) from one of the buttons or another sensor. Then all outputs with that specific scene number send out the object (1 bit, 1 byte, 2 bytes).

Group objects for *1st Scene group*

No.	Name	Object function	Length	Properties	DPT ETS
6	Scene Group	Main scene trigger	1byte	Sends, Receives	17.001 scene number

Group objects for *1st Scene group*

No.	Name	Object function	Length	Properties	DPT ETS
7	1st Scene Group	Sub scene output 1	1bit 1byte 2byte	Sends	1.001 switch 5.010 counter pulses 7.001 pulses
8		Sub scene output 2			
9		Sub scene output 3			
10		Sub scene output 4			
11		Sub scene output 5			
12		Sub scene output 6			
13		Sub scene output 7			
14		Sub scene output 8			

9 Power down

The current values of the group objects are not saved except for the group objects related to the functions below.

- Key tone
- Screen brightness
- Date and time
- AC control
- External FCU
- FCU
- Floor heating controller
- Ventilation controller (except Heat recovery object)
- Audio control
- Function icon for locking
- Screen locking

10 Open source software used in the 4 inch Touch Unit

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Open source package	Link to the website
zlib	https://github.com/madler/zlib.git
libjpeg	http://www.ijg.org/files/
linux_kernel	https://github.com/torvalds/linux/tree/v4.9-rc8
ncurses	http://ftp.gnu.org/pub/gnu/ncurses/
u-boot	ftp://ftp.denx.de/pub/u-boot/

11 Overview of group objects

This list provides the numbers for uniquely identifying a group object. The data point types (DPT) in this application are preset.

General

Nr.	Name	Object function	Length	Properties	Function description	DPT
1	General	Live signal	1 bit	C, T	Visible when *Cyclic sending live signal parameter* > 0. Sends value 1 to the bus cyclically to indicate that the application layer of the device operates normally. The sending cycle is set by parameters.	1.001 switch
2		Date	3 byte	C, W	Date and time are modified by the bus.	11.001 date
3		Time	3 byte	C, W		10.001 time of day

Temperature sensor

Nr.	Name	Object function	Length	Properties	Function description	DPT
4	Internal sensor	Temperature value	2 byte	C,R,T	Sends a temperature detection value	9.001 temperature
5		Low temperature alarm	1 bit	C,R,T	Low/high temperature alarm = 1. No alarm = 0. Sends read-only information or sends on a change	1.005 alarm
6		High temperature alarm	1 bit	C,R,T		1.005 alarm

Logic function

Nr.	Name	Object function	Length	Properties	Function description	Note	DPT
7	1th Logic	Input a	1bit	C,W,T,U	AND OR or XOR displayed		1.002 boolean
8	1th Logic	Input b	1bit	C,W,T,U			
9	1th Logic	Input c	1bit	C,W,T,U			
10	1th Logic	Input d	1bit	C,W,T,U			
11	1th Logic	Input e	1bit	C,W,T,U			
12	1th Logic	Input f	1bit	C,W,T,U			
13	1th Logic	Input g	1bit	C,W,T,U			
14	1th Logic	Input h	1bit	C,W,T,U			
15	1th Logic	Logic result	1bit	C,T			
7	1th Logic	Threshold value input	4bit 1byte 2byte 4byte	C,W,U	Displayed according to parameters	*Threshold comparator*	3.007 dimming 5.010 counter pulses 7.001 pulses 12.001 counter pulses
15	1th Logic	Logic result	1bit	C,T			1.002 boolean
7	1th Logic	Input 1bit-bit0	1bit	C,W,U	2x1Bit-->1x2Bit	*Format convert*	1.002 boolean
8	1th Logic	Input 1bit-bit1	1bit	C,W,U			1.002 boolean
15	1th Logic	Output 2bit	2bit	C,T			2.001 switch control

Nr.	Name	Object function	Length	Properties	Function description	Note	DPT
7	1th Logic	Input 1bit-bit0	1bit	C,W,U	8x1Bit-->1x1Byte	*Format convert*	1.002 boolean
8	1th Logic	Input 1bit-bit1	1bit	C,W,U			
9	1th Logic	Input 1bit-bit2	1bit	C,W,U			
10	1th Logic	Input 1bit-bit3	1bit	C,W,U			
11	1th Logic	Input 1bit-bit4	1bit	C,W,U			
12	1th Logic	Input 1bit-bit5	1bit	C,W,U			
13	1th Logic	Input 1bit-bit6	1bit	C,W,U			
14	1th Logic	Input 1bit-bit7	1bit	C,W,U			
15	1th Logic	Output 1byte	1byte	C,T			5.010 counter pulses
7	1th Logic	Input 1byte	1byte	C,W,U	1x1Byte-->1x2Byte		5.010 counter pulses
15	1th Logic	Output 2byte	2byte	C,T			7.001 pulses
7	1th Logic	Input 1byte-low	1byte	C,W,U	2x1Byte-->1x2Byte		5.010 counter pulses
8	1th Logic	Input 1byte-high	1byte	C,W,U			5.010 counter pulses
15	1th Logic	Output 2byte	2byte	C,T			7.001 pulses
7	1th Logic	Input 2byte-low	2byte	C,W,U	2x2Byte-->1x4Byte		7.001 pulses
8	1th Logic	Input 2byte-high	2byte	C,W,U			
15	1th Logic	Output 4byte	4byte	C,T			12.001 counter pulses
7	1th Logic	Input 1byte	1byte	C,W,U	1x1Byte-->8x1Bit		5.010 counter pulses
8	1th Logic	Output 1bit-bit0	1bit	C,T			1.002 boolean
9	1th Logic	Output 1bit-bit1	1bit	C,T			
10	1th Logic	Output 1bit-bit2	1bit	C,T			
11	1th Logic	Output 1bit-bit3	1bit	C,T			
12	1th Logic	Output 1bit-bit4	1bit	C,T			
13	1th Logic	Output 1bit-bit5	1bit	C,T			
14	1th Logic	Output 1bit-bit6	1bit	C,T			
15	1th Logic	Output 1bit-bit7	1bit	C,T			
7	1th Logic	Input 2byte	2byte	C,W,U	1x2Byte-->2x1Byte		7.001 pulses
14	1th Logic	Output 1byte-low	1byte	C,T			5.010 counter pulses
15	1th Logic	Output 1byte-high	1byte	C,T			
7	1th Logic	Input 4byte	4byte	C,W,U	1x4Byte-->2x2Byte		12.001 counter pulses
14	1th Logic	Output 2byte-low	2byte	C,T			7.001 pulses
15	1th Logic	Output 2byte-high	2byte	C,T			
7	1th Logic	Input 3byte	3byte	C,W,U	1x3Byte-->3x1Byte		232.600 RGB value 3x (0..255)
13	1th Logic	Output 1byte-low	1byte	C,T			5.010 counter pulses
14	1th Logic	Output 1byte-middle	1byte	C,T			
15	1th Logic	Output 1byte-high	1byte	C,T			
7	1th Logic	Input 1byte-low	1byte	C,W,U	3x1Byte-->1x3Byte		5.010 counter pulses
8	1th Logic	Input 1byte-middle	1byte	C,W,U			
9	1th Logic	Input 1byte-high	1byte	C,W,U			
15	1th Logic	Output 3byte	3byte	C,T			232.600 RGB value 3x (0..255)
16 – 78	2nd – 8th Logic						

Scene group

Nr.	Name	Object function	Length	Properties	Note	DPT
79	Scene group	Main scene trigger	1byte	C,W	Scene group feature visible when enabled	17.001 scene number
80	1st Scene group	Sub scene output 1	1bit 1byte 2byte	C,T	Displayed according to parameter options	1.001 switch 5.010 counter pulses 7.001 pulses
81		Sub scene output 2				
82		Sub scene output 3				
83		Sub scene output 4				
84		Sub scene output 5				
85		Sub scene output 6				
86		Sub scene output 7				
87		Sub scene output 8				
88 – 143	2nd – 8th Scene group					

FCU controller

Nr.	Name	Object function	Length	Properties	Function description	Note	DPT
144	FCU controller	Power on/off, status	1bit	C,W	Controller switch	Switch status is displayed on the screen	1.001 switch
145		External temperature sensor	2byte	C,W,T,U	Receives the external sensor temperature value. Periodically sends read requests.	The temperature option is visible when an external sensor is available.	9.001 temperature
146		Current setpoint adjustment, status Base setpoint adjustment, status	2byte	C,W	Modifies the current setpoint temperature value by bus. Modifies the base setpoint temperature by bus.	Current setpoint adjustment visible when *Operating mode* is not enabled or when *Absolute setpoint method* is enabled Base setpoint adjustment visible when *Relative setpoint method* is enabled	9.001 temperature
150		Switch Heating/ Cooling mode	1bit	C,W	Heating/cooling via object		1.100 cooling/ heating
150		Switch Control mode	1byte	C,W	Heating/cooling via both object and the button		20.107 DPT Changeover-Mode
151		Operation mode, status	1byte	C,W	Control HVAC's operation mode via bus 1-bit object receives a value "1" → the corresponding mode activates 1-bit standby object disables comfort, economy and protection mode. All three = 0.	Sends HVAC operation mode messages to the bus When a particular mode is activated, only the corresponding object sends 1 *1-bit object for standby mode* not enabled: The other objects for comfort, energy-saving, and protection mode send 0 together when standby mode is activated. A 1-bit object for *standby mode* enabled: Only the standby object sends 1 when the standby mode is activated. When switching via the bus, there is no need to send the mode status to the bus.	20.102 HVAC mode
152		Comfort mode, status	1bit	C,W			1.003 enable
153		Economy mode, status	1bit	C,W			
154		Frost/Heat protection mode, status	1bit	C,W			
155		Standby mode, status	1bit	C,W			

Nr.	Name	Object function	Length	Properties	Function description	Note	DPT
156		Extended comfort mode	1bit	C,W	“1” triggers the extension of the comfort mode time		1.016 acknowledge
157		Fan speed, status	1byte	C,W,U,T	The object datatype of 1byte fan speed is displayed according to the parameters	Sends automatic control fan speed value to the bus. *1-bit object function for fan speed* enabled: When a particular fan speed is activated, only the corresponding 1-bit fan speed status object sends 1 *1-bit object for fan speed off* not enabled: When the fan speed is off, all the other fan speed status objects send 0 *1-bit object for fan speed off* enabled: When the wind speed is switched to off, only the *Fan speed off, status* object sends the message 1	5.001 percentage 5.100 fan stage
158		Fan On/Off, status	1bit	C,W,U,T	Visible when the fan is enabled. 1 speed level/ 1 bit status		1.001 switch
158		Fan speed 1, status	1bit	C,W,U,T	“1” switches the corresponding fan speed. Fan multilevel/ 1 bit status Displays when *1-bit object function for fan speed* is enabled		
159		Fan speed 2, status	1bit	C,W,U,T			
160		Fan speed 3, status	1bit	C,W,U,T			
161		Fan speed off, status	1bit	C,W,U,T	Fan multilevel/ 1 bit status off Displays when *1-bit object for fan speed off* is enabled		
162		Fan automatic operation, status	1bit	C,W,U,T	The fan speed is displayed when it is automatically controlled and enabled.	Receives status feedback for automatic fan speed control: 1 - Automatic control, 0 - Exit automatic control After the device restarts, the fan speed automatically sends a read request to the bus	1.003 enable
163		Window contact	1bit	C,W,U,T	Displays when *Window contact* input function is enabled	1 - Window open, 0 - Window closed After the device restarts, the window contact object sends a read request to the bus	1.019 Window/door
164		Presence detector	1bit	C,W,U,T	Displays when you enable the presence detector input.	1 = presence, 0 = no presence After the device restarts, the presence detection object sends a read request to the bus.	1.018 occupancy
165		Power on/off	1bit	C,R,T	The temperature switch is controlled via the screen		
166		Actual temperature	2byte	C,R,T	The option is visible when the you choose the combination of internal and external sensor.	Sends the actual combined temperature to the bus.	9.001 temperature
167		Base temperature setpoint	2byte	C,R,T	Visible only with *Relative setpoint method* selected.	Sends the current reference temperature setpoint to the bus	9.001 temperature
169		Current temperature setpoint	2byte	C,R,T		Sends the current temperature setpoint to the bus	9.001 temperature
170		Heating/Cooling mode	1bit	C,R,T	Switches between heating and cooling via bus		1.100 cooling/heating
171		Control mode	1byte	C,R,T	Switching of heating, cooling, and automatic modes via bus	0 = Auto 1 = Cooling only 2 = Heating only 3 – 255 unused	20.107 DPT Changover-Mode

Nr.	Name	Object function	Length	Properties	Function description	Note	DPT
172		Operation mode	1byte	C,R,T	Control HVAC's operation mode via bus	Visible when the *Operation mode* function enabled	20.102 HVAC mode
173		Comfort mode	1bit	C,R,T	1-bit object receives a value "1" → the corresponding mode activates		1.003 enable
174		Economy mode	1bit	C,R,T			
175	FCU controller	Frost/Heat protection mode	1bit	C,R,T			1.003 enable
176		Standby mode	1bit	C,R,T	1-bit standby object disables comfort, economy and protection mode. All three = 0.		
177		Heating control value	1bit/ 1byte	C,R,T	Sends control values for heating or cooling functions.	Displays according to control options.	1.001 switch 5.001 percentage
178		Cooling control value	1bit/ 1byte	C,R,T			
179		Fan speed	1byte	C,R,T	The object datatype of 1-byte fan speed is displayed according to the parameters.	Sends automatic control fan speed value to the bus *1-bit object function for fan speed* enabled: When a particular fan speed is activated, only the corresponding 1-bit fan speed status object sends 1 *1-bit object for fan speed off* not enabled: When the fan speed is off, all the other fan speed status objects send 0 *1-bit object for fan speed off* enabled: When the wind speed is switched to off, only the *Fan speed off, status* object sends the message 1	5.001 percentage 5.100 fan stage
180		Fan On/Off	1bit	C,T	1 level		1.001 switch
180		Fan speed 1	1bit	C,T			1.001 switch
181		Fan speed 2	1bit	C,T			
182		Fan speed 3	1bit	C,T			
183		Fan speed off	1bit	C,T			
184		Fan Automatic operation	1bit	C,R,T	This object displays when you choose automatic fan operation.	Sends automatic control telegrams for the fan speed to the bus 1 = Auto 0 = Exit automatic operation	1.003 enable

Floor heating controller

Nr.	Name	Object function	Length	Properties	Function description	DPT
185	Floor heating controller	Power on/off, status	1bit	C,W,U	Displays the switch status feedback.	1.001 switch
186		External temperature sensor	2byte	C,W,T,U	Receives the external sensor temperature value. Periodically sends read requests. After the device restarts, the external sensor sends a read request to the bus.	9.001 temperature
187		Current setpoint adjustment, status Base setpoint adjustment, status	2byte	C,W,U	Modifies the current setpoint temperature value by bus. Modifies the base setpoint temperature by bus.	9.001 temperature
190		Power on/off	1bit	C,R,T	Controller switch (on the screen)	1.001 switch
191	Floor heating controller	Actual temperature	2byte	C,R,T	Sends the actual temperature after the combination of internal and external sensor values. The object is visible when the temperature reference is taken from both sensors (internal and external).	9.001 temperature
192		Current temperature setpoint	2byte	C,R,T	Sends the current temperature setpoint to the bus.	9.001 temperature
193		Heating control value	1bit/ 1byte	C,R,T	Sends the control value of the heating or cooling function.	1.001 switch/5.001 percentage

Ventilation controller

Nr.	Name	Object function	Length	Properties	Function description	Note	DPT
210	Ventilation controller	Fan automatic operation	1 bit	C,W	Automatic control of the fan is activated by the bus	Displayed when the *Ventilation controller* enabled	1.003 enable
211		$PM_{2.5}$ value VOC value CO_2 value	2 byte	C,W,T,U		Datatype displayed according to parameter setting	7.001 pulse 9.030 concentration (µ /m3) 9.008 parts/million (ppm)
238		Fan speed, status	1 byte	C,T		Displayed according to the parameter *Object datatype of 1byte fan speed* setting	5.001 percentage 5.100 fan stage

Screen – Locking

Nr.	Name	Object function	Length	Properties	Function description	Note	DPT
243	Screen 1 Function 1	Locking object	1 bit	C,W	For all of the following screen functions, except *Air quality display*, *Weather information* and *Energy monitoring*	Lock/unlock icon	1.003 enable

Screen – Switching

Nr.	Name	Object function	Length	Properties	Function description	DPT
244	Screen 1 Function 1	Switch	1 bit	C,T	1-bit switch for control and status feedback	1.001 switch
249		Switch, status	1 bit	C,W,T,U	Switch values alternate during operation	1.001 switch

Screen – Brightness dimming

Nr.	Name	Object function	Length	Properties	Function description	DPT
244	Screen 1 Function 1	Switch	1 bit	C,T	1. Switch: 1-bit control and status feedback, switch values alternates during the operation 2. 1-byte brightness dimming: control and status feedback	1.001 switch
246		Brightness dimming	1 byte	C,T		5.001 percentage (0..100%)
249		Switch, status	1 bit	C,W,T,U		1.001 switch
251		Brightness, status	1 byte	C,W,T,U		5.001 percentage (0..100%)

Screen – RGB/W dimming

Nr.	Name	Object function	Length	Properties	Note	Function description	DPT
244	Screen 1 Function 1	Switch	1 bit	C,T		Controls brightness of multi-color lamps Color temperature adjustment is also supported	1.001 switch
245		RGB dimming value	3 byte	C,T	RGB 3-byte		232.600 RGB value 3 x (0..255)
245		RGBW dimming value	6 byte	C,T	RGBW 6-byte		251.600 DPT_Colour_RGBW
245		Red dimming value	1 byte	C,T	RGB or RGBW: 1-byte type	1. Switch: 1-bit type, control and status feedback Switch values alternate during the operation	5.001 percentage (0..100%)
246		Green dimming value	1 byte	C,T			
247		Blue dimming value	1 byte	C,T			
248		White dimming value	1 byte	C,T	RGBW 1-byte type		
249		Switch, status	1 bit	C,W,T,U			1.001 switch
250		RGB brightness, status	3 byte	C,W,T,U	RGB 3-byte	2. Color adjustment: 3-byte or 3 x 1-byte control and status feedback	232.600 RGB value 3x(0..255)
250		RGBW brightness, status	6 byte	C,W,T,U	RGBW 6-byte		251.600 DPT_Colour_RGBW
250		Red brightness, status	1 byte	C,W,T,U	RGB or RGBW 1-byte type	3. White light brightness adjustment: 1-byte control and status feedback	5.001 percentage (0..100%)
251		Green brightness, status	1 byte	C,W,T,U			
252		Blue brightness, status	1 byte	C,W,T,U			
253		White brightness, status	1 byte	C,W,T,U	RGBW 1-byte type		

Screen – Color temperature dimming

Nr.	Name	Object function	Length	Properties	Function description	DPT
244	Screen 1 Function 1	Switch	1 bit	C,T	Color temperature and brightness adjustment of monochrome lamps 1. Switch: 1-bit control and status feedback Switch values alternate during the operation 2. Color temperature adjustment: 2-byte control and status feedback. You can set upper and lower thresholds for color temperature 3. Brightness adjustment: 1-byte control and status feedback	1.001 switch
245		Color temperature value	2 byte	C,T		7.600 absolute color temperature
246		Brightness value	1 byte	C,T		5.001 percentage (0..100%)
249		Switch, status	1 bit	C,W,T,U		1.001 switch
250		Color temperature, status	2 byte	C,W,T,U		7.600 absolute color temperature
251		Brightness, status	1 byte	C,W,T,U		5.001 percentage (0..100%)

Screen – Roller/Venetian blind, Curtain position

Nr.	Name	Object function	Length	Properties	Function description	DPT
244	Screen 1 Function 1	Open/Close	1 bit	C,T	Curtain step/move. Open and close. On, off, stop	1.009 open/close
245		Stop	1 bit	C,T		1.007 step
244		Up/Down	1 bit	C,T	Roller blind step/move function. Roll-up, down, stop	1.008 up/down
245		Stop	1 bit	C,T		1.007 step
244		Open/Close	1 bit	C,T	Curtain position Open and close On, off, stop Position, position status feedback	1.009 open/close
245		Stop	1 bit	C,T		1.007 step
246		Curtain position	1 byte	C,T		5.001 percentage (0..100%)
249		Curtain position, status	1 byte	C,W,T,U		
244		Up/Down	1 bit	C,T	Roller blind position feature Roll-up, open, close, stop Position adjustment, position status feedback	1.008 up/down
245		Stop	1 bit	C,T		1.007 step
246		Blind position	1 byte	C,T		5.001 percentage (0..100%)
249		Blind position, status	1 byte	C,W,T,U		
244		Up/Down	1 bit	C,T	Venetian blind position and slat. Blinds, on, off, stop Position and angle adjustment, position and angle status feedback	1.008 up/down
245		Stop/Slat adj.	1 bit	C,T		1.007 step
246		Blind position	1 byte	C,T		5.001 percentage (0..100%)
247		Slat position	1 byte	C,T		
249		Blind position, status	1 byte	C,W,T,U		
250		Slat position, status	1 byte	C,W,T,U		

Screen – Scene

Nr.	Name	Object function	Length	Properties	Function description	Note	DPT
244	Screen 1 Function 1	Scene	1 byte	C,T C,W,T	Short press calls a scene Long press (2 s optional) saves the scene	Enabled *Object with status feedback* function gives the *Scene* object (in addition to the C and T) the W property	18.001 scene control

Screen – Air quality display

Nr.	Name	Object function	Length	Properties	Function description	DPT
244	Screen 1 Function 1	Ext. temperature value	2 byte	C,W,T,U	Data received from the bus Optional functions: 1. Temperature: 2-byte floating point value 2. Humidity: 2-byte, floating point value 3. $PM_{2.5}$: 2-byte unsigned integer or floating point value (µg/m³) 4. PM_{10}: 2-byte unsigned integer or floating point value (µg/m³) 5. CO_2: 2-byte (ppm) 6. VOC: 2-byte unsigned integer or floating point value (µg/m³) 7. Brightness: 2-byte integer or floating point value (lux)	9.001 temperature
244		Humidity value	2 byte	C,W,T,U		9.007 humidity
244		$PM_{2.5}$ value	2 byte	C,W,T,U		7.001 pulse 9.030 concentration (µg/m3)
244		PM_{10} value	2 byte	C,W,T,U		
244		VOC value	2 byte	C,W,T,U		7.001 pulse 9.008 parts/million (ppm)
244		CO_2 value	2 byte	C,W,T,U		
244		Brightness value	2 byte	C,W,T,U		9.004 lux (lux) 7.013 brightness (lux)

Screen – Air conditioner

Nr.	Name	Object function	Length	Properties	Function description	DPT
244	Screen 1 Function 1	Power on/off	1 bit	C,T	Switches the Air conditioner via the bus	1.001 switch
245		Current setpoint adjustment	2 byte 1 byte	C,T	Adjusts current temperature setpoint. Datatype according to the *Object datatype of setpoint* setting	9.001 temperature 5.010 counter pulses
247		Fan speed	1 byte	C,T	Controls the fan speed. Datatype according to the parameter *Object datatype of 1byte fan speed* setting	5.001 percentage 5.100 fan stage
248		Wind swing (1-swing, 0-stop)	1 bit	C,T	Controls the swing. Visible when *Swing* function is enabled	1.010 start/stop
250		Control mode	1 byte	C,T	Controls the mode of the air conditioning (Auto, Heating, Cooling, Fan, Dehumidification)	20.105 HVAC control mode
251		Power on/off, status	1 bit	C,W	Displays switch status on the screen	1.001 switch
252		External temperature sensor	2 byte	C,W,T,U	External sensor object is visible. Receives room temperature from the bus. Periodically sends read requests.	9.001 temperature
253		Current temperature setpoint, status	2 byte 1 byte	C,W,U	Displays the current set temperature on the screen. Datatype according to the *Object datatype of setpoint* setting.	9.001 temperature 5.010 counter pulses"
254		Fan speed, status	1 byte	C,W	Displays the fan speed on the screen. Datatype according to the parameter *Object datatype of 1byte fan speed* setting	5.001 percentage 5.100 fan stage
255		Wind swing, status	1 bit	C,W	Displays swinging status on the screen	1.010 start/stop
257		Control mode, status	1 byte	C,W	Displays current control mode on the screen	20.105 HVAC control mode

Screen – Room temperature control and External controller

Nr.	Name	Object function	Length	Properties	Function description	Note	DPT
244	Screen 1 Function 1	Power on/off	1 bit	C,T	Controls the RTU switching via the screen		1.001 switch
245		Current setpoint adjustment	2 byte	C,T	Displays when the *Object datatype of setpoint adjustment* parameter is set to 2-byte DPT	Adjust the set temperature value on the screen Usually 2-byte object is for absolute adjustment, 1-bit object is for relative adjustment	9.001 temperature
246		Current setpoint adjustment (1bit)	1 bit	C,T	Displays when the *Object datatype of setpoint adjustment* parameter is set to 1-bit DPT		1.007 step
247		Fan speed	1 byte	C,T	Displayed according to the parameter *Object datatype of 1-byte fan speed* setting	Controls fan speed via the screen	5.001 percentage 5.100 fan stage
248		Fan automatic operation	1 bit	C,T	Controls the fan speed when *Automatic operation function* is enabled	Activates the automatic control of the fan speed via the screen 1=active, 0=inactive	1.003 enable
249		Heating/Cooling mode	1 bit	C,T	Switches heating/cooling via the screen		1.100 cooling/heating
250		Operation mode	1 byte	C,T	Visible when the *Operation mode* is enabled	Controls HVAC operation mode via screen	20.102 HVAC mode
251		Power on/off, status	1 bit	C,W	Displays the switch feedback status on the screen		1.001 switch
252		External temperature sensor	2 byte	C,W,T,U	Visible when the *External sensor* is allowed for a reference	Receives room temperature from the bus Periodically sends read requests Displayed on the screen	9.001 temperature
253	Screen 1 Function 1	Current temperature setpoint, status	2 byte	C,W,U	Displays current temperature setpoint on the screen		9.001 temperature
254		Fan speed, status	1 byte	C,W	Properties according to the parameter *Object datatype of 1byte fan speed* setting	Fan speed status displayed on the screen	5.001 percentage 5.100 fan stage
255		Fan automatic operation, status	1 bit	C,W	Automatic fan speed status control displayed screen	1 = activated, 0 = inactive	1.003 enable
256		Heating/Cooling mode, status	1 bit	C,W	Displays the current control mode on the screen		1.100 cooling/heating
256		Control mode, status	1 byte	C,W	Heating and Cooling (with auto mode)	Heating and Cooling (with auto mode)	
257		Operation mode, status	1 byte	C,W			20.102 HVAC mode

Screen – Ventilation control panel

Nr.	Name	Object function	Length	Properties	Function description	DPT
244	Screen 1 Function 1	Power on/off	1 bit	C,T	Switch control of the Ventilation system	1.001 switch
245		Filter timer counter	2 byte	C,T	Available when the *Filter timer counter* function is allowed. Counts filter usage hours. Sends the value to the bus every time the value changes	7.007 time (h)
246		Filter alarm	1 bit	C,T	If the filter is used for longer than the set time, the filter sounds an alarm	1.005 alarm
247		Fan speed	1 byte	C,T	Controls fan speed via the screen DPT is displayed according to the parameter *Object datatype of 1-byte fan speed* setting	5.001 percentage 5.100 fan stage
248		Fan automatic operation	1 bit	C,T	Available when *Automatic operation function* is enabled Activates the automatic control of fan speed via the screen 1 = active, 0 = inactive	1.003 enable
249		Heat recovery	1 bit	C,T	Available when *Heat recovery function* is enabled Controls the heat recovery mode via the screen 0 - inactive, 1 - active	1.003 enable
251		Power on/off, status	1 bit	C,W	Switch status	1.001 switch
252		Filter timer counter change	2 byte	C,W	Available when the *Filter timer counter* function is allowed. Changes the filter usage time via the bus	7.007 time (h)
253		Filter timer reset	1 bit	C,W	Resets the filter usage time	1.015 reset
254		Fan speed, status	1 byte	C,W	Feedback on the currently controlled fan speed to the screen DPT is displayed according to the parameter *Object datatype of 1-byte fan speed* setting	5.001 percentage 5.100 fan stage
255		Fan automatic operation, status	1 bit	C,W	Available when *Automatic operation function* is enabled Feedback on the automatic control fan speed to the screen 1 = active, 0 = inactive	1.003 enable
256		Heat recovery, status	1 bit	C,W	Available when *Heat recovery function* is enabled Feedback on heat recovery status to the screen 0 - inactive, 1 - active	1.003 enable
257		Scene	1 byte	C,W	Visible when *Scene* function is enabled	18.001 scene control

Screen – Audio control

Nr.	Name	Object function	Length	Properties	Function description	DPT
244	Screen 1 Function 1	Power on/off	1 bit	C,T	Switch control via the screen	1.001 switch
245		Play = 1/Pause = 0	1 bit	C,T	Play/pause the track	1.010 start/stop
246		Next track = 1/Previous track = 0	1 bit	C,T	Previous/next song	1.007 step
247		Volume+ = 1/ Volume- = 0 Absolute volume	1 bit 1 byte	C,T	Volume increase/decrease 1-bit relative control 1-byte absolute control Displayed according to the data point type	1.007 step 5.001 percentage 5.004 percentage
248		Mute	1 bit	C,T	Displayed when *Mute* parameter is enabled	1.003 enable
250		Play mode	1 byte	C,T	The play mode parameters are displayed when *Play mode* function is enabled	5.010 counter pulses
251		Power on/off, status	1 bit	C,W	Switch control status on the screen	1.001 switch
252		Play = 1/Pause = 0, status	1 bit	C,W	Play/Pause status feedback on the screen	1.010 start/stop
253		Volume, status	1 byte	C,W	1-byte volume status on the screen	5.001 percentage 5.004 percentage
255		Mute, status	1 bit	C,W	Displayed when *Mute* parameter is enabled	1.003 enable
256		Play mode, status	1 byte	C,W	The play mode status is displayed when *Play mode* function is enabled	5.010 counter pulses
257		Track name	14 byte	C,W	Displays the track name	16.001 character string (ISO 8859-1)

Screen – Functions

Nr.	Name	Object function	Length	Properties	Function description	Note	DPT
272	Screen 1 Function 2						
287	Screen 1 Function 3						
302	Screen 1 Function 4						
317	Screen 1 Function 5						
332	Screen 1 Function 6						
347	Screen 2 Function 1						
362	Screen 2 Function 2						
377	Screen 2 Function 3						
392	Screen 2 Function 4						
407	Screen 2 Function 5						
422	Screen 2 Function 6						
437	Screen 3 Function 1						
452	Screen 3 Function 2						
467	Screen 3 Function 3						
482	Screen 3 Function 4						
497	Screen 3 Function 5						
512	Screen 3 Function 6						
527	Screen 4 Function 1						
542	Screen 4 Function 2						
557	Screen 4 Function 3						
572	Screen 4 Function 4						
587	Screen 4 Function 5						
602	Screen 4 Function 6						
617	Screen 5 Function 1						
632	Screen 5 Function 2						

Nr.	Name	Object function	Length	Properties	Function description	Note	DPT
647	Screen 5 Function 3						
662	Screen 5 Function 4						
677	Screen 5 Function 5						
692	Screen 5 Function 6						
707	Screen 6 Function 1						
722	Screen 6 Function 2						
737	Screen 6 Function 3						
752	Screen 6 Function 4						
767	Screen 6 Function 5						
782	Screen 6 Function 6						
797	Screen 7 Function 1						
812	Screen 7 Function 2						
827	Screen 7 Function 3						
842	Screen 7 Function 4						
857	Screen 7 Function 5						
872	Screen 7 Function 6						
887	Screen 8 Function 1						
902	Screen 8 Function 2						
917	Screen 8 Function 3						
932	Screen 8 Function 4						
947	Screen 8 Function 5						
962	Screen 8 Function 6						
977	Screen 9 Function 1						
992	Screen 9 Function 2						
1007	Screen 9 Function 3						
1022	Screen 9 Function 4						
1037	Screen 9 Function 5						
1052	Screen 9 Function 6						

User interface

Nr.	Name	Object function	Length	Properties	Function description	DPT
1053	Screen	Screen locking	1 bit	C,W	Locks the screen. The screen can not be operated. It only processes the received.	1.003 enable
1054		Screen on/off	1 bit	C,W	When *Turn off screen after [0...255,0=inactive]* function is set to 0 s, the screen does not turn off. However, the screen can be turned on/off via this object.	1.001 switch
1055		Screen brightness	1 byte	C,W	Adjusts the screen brightness in the current mode without affecting the screen brightness of other modes. The brightness has to be adjusted for each mode separately.	5.001 percentage (0..100%)
1057	Security	Password trigger,1bit value/1byte value/scene NO.	1 bit 1 byte	C,T	Displayed according to the *Output object type for pin code* setting	1.001 switch 5.010 counter pulses 5.001 percentage 17.001 scene number

Night mode

Nr.	Name	Object function	Length	Properties	Function description	DPT
1056	Night mode	Night mode input	1bit	C,W,T,U	Receives day/night messages from the bus	1.024 day/night

Proximity

Nr.	Name	Object function	Length	Properties	Function description	DPT
1058	Proximity function	Dis/En Proximity function	1bit	C,W	Visible when the *Proximity function triggered via* is not set to *Never*	1.003 enable
1059		Proximity input	1bit	C,W	Visible when the *Proximity function triggered via* is set to *Proximity object*	1.001 switch
1060		Proximity output	1bit 1byte	C,T	Displayed according to the *Object type of output value* setting	1.001 switch 5.010 counter pulses 17.001 scene number 5.001 percentage

12 Index

Symbols

A

B

C

D

E

F

G

H

I

L

M

N

O

P

R

S

T

U

V

W

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