Product Manual

KNX RF Multi radiator thermostat

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KNX RF Multi radiator thermostat Product Manual
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If you have any questions regarding our products, please contact us via e-mail at sales@ise.de. We would be pleased to receive your ideas, suggestions for improvements and criticism via e-mail at support@ise.de.

Contents

1 About this documentation

This documentation will accompany you through all phases of the product life cycle of KNX RF Multi radiator thermostat. You will learn for example how to assemble, install, commission and configure the device.

All descriptions in this documentation relating to configuration in the ETS refer to the variant "ETS Professional" in the version 6.

Explanations for the concepts of KNX do not form part of this documentation.

1.1 Target group

This documentation is aimed at qualified electricians and KNX processors.

Anyone may configure the KNX RF Multi radiator thermostat. We recommend that configuration is done by a system integrator with sound specialist knowledge of KNX and using the ETS.

1.2 Symbols and typographical conventions

Symbol / label	Meaning
	Warning of possible material damage
	General warning

Table 1: Symbols and safety notes

Symbol / label	Meaning
[F1]	PC button
<<Inscription>>	Text on software interface
	Troubleshooting tip
	Important additional information

Table 2: Special symbols and typographical conventions

2 About KNX RF Multi radiator thermostat

2.1 Proper use

The KNX RF Multi radiator thermostat is used for controlling the radiator valves via KNX. The connection to the KNX installation and the transmission of the KNX telegrams is done using the radio standard KNX RF Multi.
The device is exclusively intended for installation on radiators in the interior.
The device is compatible with radiator valves with a thread M30 x 1.5 mm.
Use the adapters included in the delivery when using it with Danfoss valves.

The KNX RF Multi radiator thermostat is a KNX system device and complies with the KNX guidelines.

Important

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Configuration: Compatible ETS versions

Simple integration into the KNX System (can be completely configured via ETS):

- ETS6.2 or higher,
- Product database entry: Download the product database entry from our website www.ise.de or from the ETS online catalogue free of charge.

KNX Secure

The KNX RF Multi radiator thermostat is KNX Secure.

The device is compatible with KNX Secure. KNX Secure offers protection against manipulation in building automation and can be configured in the ETS project.

- The required KNX Secure certificate or the included FDSK (Factory Default Setup Key) can be found on a sticker in the battery cover and is also delivered with the device.
- For maximum security, we recommend removing the sticker from the device.
- Keep the certificate in a safe place.
- You cannot restore the certificate yourself.
- Please contact our support team if you should lose the certificate despite utmost care.
- Only use KNX Secure for safe communication. The BCU key has no function.

2.2 System

The KNX RF Multi radiator thermostat is used for controlling the radiator valves via KNX. The connection to the KNX installation and the transmission of the KNX telegrams is done using the radio standard KNX RF Multi. The radiator thermostat communicates via radio with other devices of a KNX RF domain and via a KNX RF Multi media coupler with the KNX TP installation.

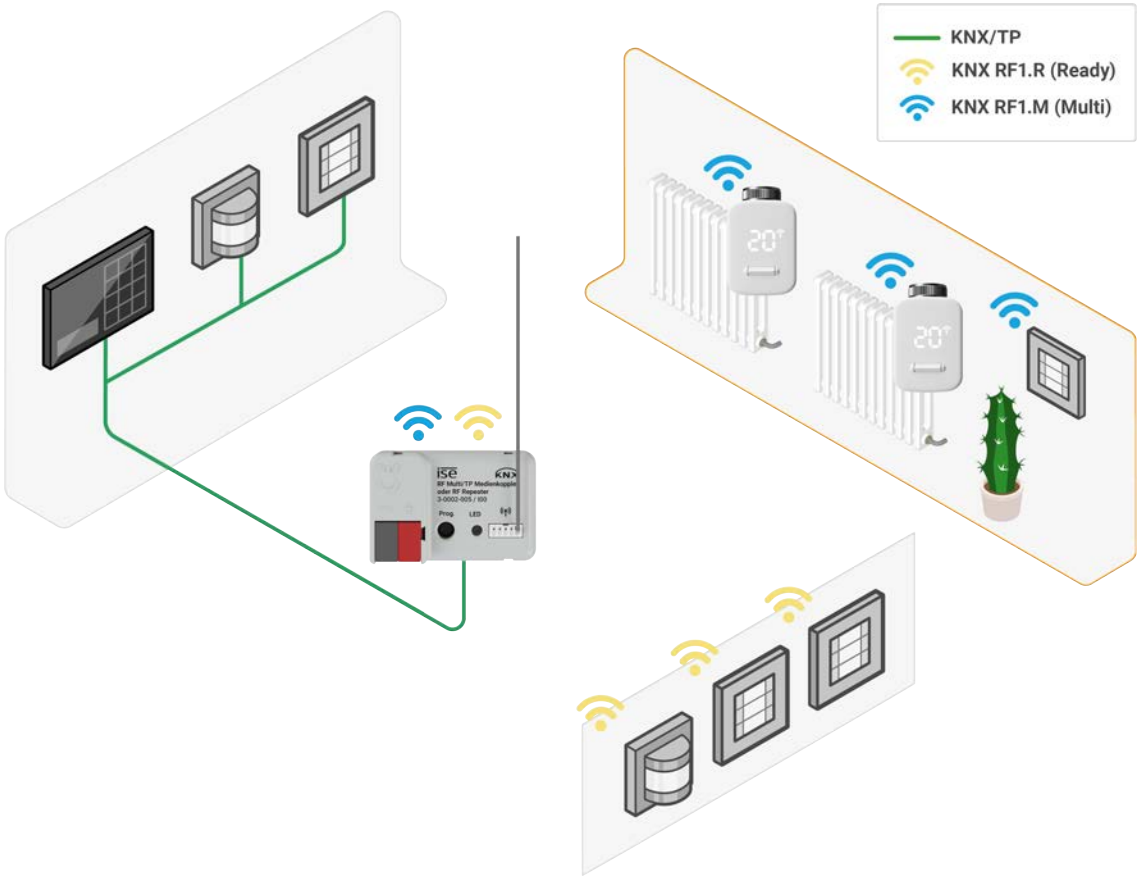


Figure 1: System integration

2.3 Functions

Integration in the KNX system using radio technology

The KNX RF Multi radiator thermostat communicates via KNX RF Multi with the KNX system.

Changing the setpoint value

Change the temperature setpoint via KNX command or manual operation.

Preset of setpoint values

ETS offers you the possibility to assign the KNX RF Multi radiator thermostat setpoint temperatures for the different KNX HVAC operating modes, ► see HVAC operating modes, p. 33

Display of the setpoint values

The KNX RF Multi radiator thermostat is provided with a 7-segment display to show the setpoint temperature.

Configuring the setpoint values

Configuration of the temperature setpoints to either a relative (derived from basic setpoint value) or absolute (independent setpoint temperatures for each operating mode) value, ► see Setpoints, p. 34

The actual and setpoint temperatures can be output (also cyclically) to the KNX when a parameterisable deviation is reached.

Grouping the radiator thermostats

Combine several radiator thermostats into a group in order to optimally control several radiators in a room.
Define a leader to be used for temperature control and setpoint output to the followers,
► see Several radiator thermostats in the room, p. 29

Activating the boost function

Put the KNX RF Multi radiator thermostat into boost mode via a KNX command or manual operation. For this, the heating valve is completely opened for a time that can be parameterised,
► see Boost function, p. 40

Activating the comfort extension

The nominal temperature is maintained for the time preset in the ETS parameters.
The comfort extension can be activated via KNX command or manual operation,
► see Presence detection, p. 39

Bringing the heating valve to forced position

For maintenance work or checks, the KNX RF Multi radiator thermostat can be set to a previously specified forced position (in increments of 10 from 0 to 100%).

Using the service mode

With the help of a 2-bit object, the command value in the service mode is set to 0 or 100%. The KNX RF Multi radiator thermostat is moved to the selected value in a prioritised manner to be able, for example, to flush the heating system.

Automated valve flushing

Every seven days, the KNX RF Multi radiator thermostat performs an automated valve flushing. The cycle of 7 days starts by inserting the batteries. Fully open the thermostat valve to prevent it from getting stuck or from calcification. Otherwise, the KNX RF Multi radiator thermostat does not need any maintenance.

Processing the temperature values

The KNX RF Multi radiator thermostat can receive and process an externally measured temperature via KNX. Additionally, the KNX RF Multi radiator thermostat is equipped with an internal temperature sensor.

Displaying the battery status

The battery status of all connected radiator thermostats can be read via the KNX bus.

Diagnostic messages

Errors are directly output at the device or/and via KNX telegram, ► see Troubleshooting, p. 69

Configuring of up to 16 scenes

Configure up to 16 scenes, for example, to couple the heating requirements to other functions, ► see Scenes, p. 42

Changeover summer/winter operation

Switch the radiator thermostat to summer operation in order to adapt the utilisation to the heating mode and to save the batteries. In summer operation, the radiator thermostat is set to the HVAC mode “Frost protection”. It is not possible to change the HVAC mode via manual operation or KNX, ► see Summer/ winter operation, p. 42

Functional enhancements from updates

You can obtain functional enhancements for the KNX RF Multi radiator thermostat with a new version of the firmware, ► see Updating firmware, p. 25.

The current firmware, the corresponding product database entry and the corresponding product manual can be downloaded from our website www.ise.de.

Priority control

In the event that several functions are activated at the same time, KNX RF Multi radiator thermostat is provided with an integrated priority control (1 = highest priority):

1. Valve flushing
2. Battery power is low
3. Service mode
4. Forced position
5. Block controller
6. Boost function
7. Normal operation (control via KNX)

Blocking the manual operation

Block the KNX RF Multi radiator thermostat against unauthorised access.

Integration of door/window contact

Link the KNX RF Multi radiator thermostat with a door and/or window contact switch. If an open window is detected, the HVAC mode “Frost protection“ is activated, ► see Frost protection, p. 41

Temperature drop detection

You can parameterise the threshold value for the detection of a temperature drop, ► see Frost protection, p. 41

3 Important notes

3.1 General safety instructions

Warning

Danger from incorrect use

Incorrect use can result in damage to the device, fire or other dangers.

- Follow the instructions in this product manual.
- This product manual is part of the product and must remain with the customer.

Warning

Risk of explosion

Improper handling of the batteries can trigger an explosion.

Warning

Risk of chemical burns

Leaking battery acid may cause chemical burns.
The provided batteries cannot be recharged.

3.2 Storage and transport

Store the device in its original packaging. The original packaging provides optimum protection during transport. Store the device in a temperature range of -25 °C to +70 °C.

3.3 Cleaning and maintenance

The KNX RF Multi radiator thermostat is maintenance-free.

Remove the batteries when the device is not in use.

If necessary, clean the device with a dry cloth.

Caution

Device damage due to improper opening

- Never open the housing.
- If you suspect that the device is damaged, contact our Support.
- We provide a warranty in accordance with statutory requirements.
- Send the device back to us postage free with a detailed error description only if our support team asks you to.

4 Technical data

Power supply and connections	
Power supply:	2 × 1.5 V (DC), AA/LR6

Ambient conditions	
Installation environment temperature:	0 °C to +50 °C
Storage temperature:	-20 °C to +70 °C
Water temperature heating:	0 °C to +80 °C

Device properties	
Device width:	53 mm
Device height:	70 mm
Device depth:	85 mm
Weight:	176 g (incl. batteries)
Connection thread:	M30 × 1.5
Set force:	max. 120 N
Control range:	5 °C to +30 °C
Battery life:	typically 2 heating periods The battery life depends on several factors (e.g. storage times, temperature fluctuations, spatial conditions, flow temperature) and may vary as a result.

KNX	
Communication:	KNX RF Multi
Radio frequencies:	868.3 MHz, 868.950 MHz, 869.525 MHz; 839.850 MHz
Transmission power:	max. 25 mW
Installation method:	S-Mode

Approvals and protection type	
Approvals / certifications:	CE, KNX
Protection type:	IP20 (compliant with EN 60529)
Protection class:	III (compliant with IEC 61140)
Degree of contamination:	2 (according to IEC 60664-1)

5 Device design

No.	Description
1	Union nut
2	Display
3	Status LED
4	Rocker switch

Figure 2: Device design

5.1 Battery compartment

No.	Description
1	Programming button

Figure 3: Battery compartment

5.2 Operating elements

5.2.1 Rocker switch

The rocker switch is located on the upper side of the device and has three operating intervals:

- Short single press
- Long single press (> three seconds)
- Press and hold

The rocker switch can be pressed upward and downward.

5.2.2 Programming button

The programming button is located in the battery compartment and has two operating intervals:

- Short single press
- Press and hold (while another action is carried out)

5.3 Display

The KNX RF Multi radiator thermostat is equipped with a 7-segment display and a display for radio interferences. In the ETS, the switch-on behaviour and the switch-off delay of the display can be parameterised.

The following is required for the display of messages:

- The manual operation is activated in the ETS.
- In the <<Display>> tab of the ETS, the parameter <<Display active>> → <<Only for manual operation>> has been selected.
- The display has been activated by an operating procedure, e.g. by pressing the rocker switch briefly up or down.

Figure 4: Display

5.3.1 Installation display

Symbol	Abbreviation	Name	Function
	Pr	Preparation	The plunger (transmission pin) is moved to installation position.
	In	Installation	The plunger is in installation position. The device is ready for being installed.
	Ad	Adaptation	An adaptation run is carried out.

Table 3: Shown display during installation

5.3.2 Temperature and radio display

Symbol	Name	Meaning
	Temperature	Temperature in °C Example: 20.5 °C
	Radio interference	State of the radio connection The symbol lights up if the radio connection is disturbed.

Table 4: Temperature and radio display

5.3.3 Display during operation

The following display texts are shown as soon as a value has been received from the corresponding group object.

Symbol	Abbreviation	Name	Meaning
	bo	Boost function	Boost function active
	Fo	Forced	Forced position active
	OP	Open	Service mode active/ Command value 100%
	CL	Closed	Service mode active/ Command value 0% or Room temperature controller locked by group object 46.
	P1	Presence 1	Comfort extension has been activated.
	P0	Presence 0	Comfort extension has been deactivated.
	St	Setpoint operation	The operating mode Setpoint operation is parameterised.

Table 5: Status messages

5.3.4 Diagnostics/error messages

Symbol	Abbreviation	Name	Meaning
	E1	Error 1	An error with the number 1 is active. Errors in the number range from 1 to 9 are possible.
	EA	Error 10	Error 10 with the code EA is active.
	- -	- -	Manual operation locked
	Lo	Low	Low battery voltage warning The battery voltage has reached a critical value. The batteries must be replaced.
	r5	Reset 5	Countdown during reset to factory settings. The device counts down from r5 to r0 as long as the programming button is pressed.
	UP	Update	A firmware update is carried out.

Table 6: Display text error display

6 Installation

6.1 Scope of supply

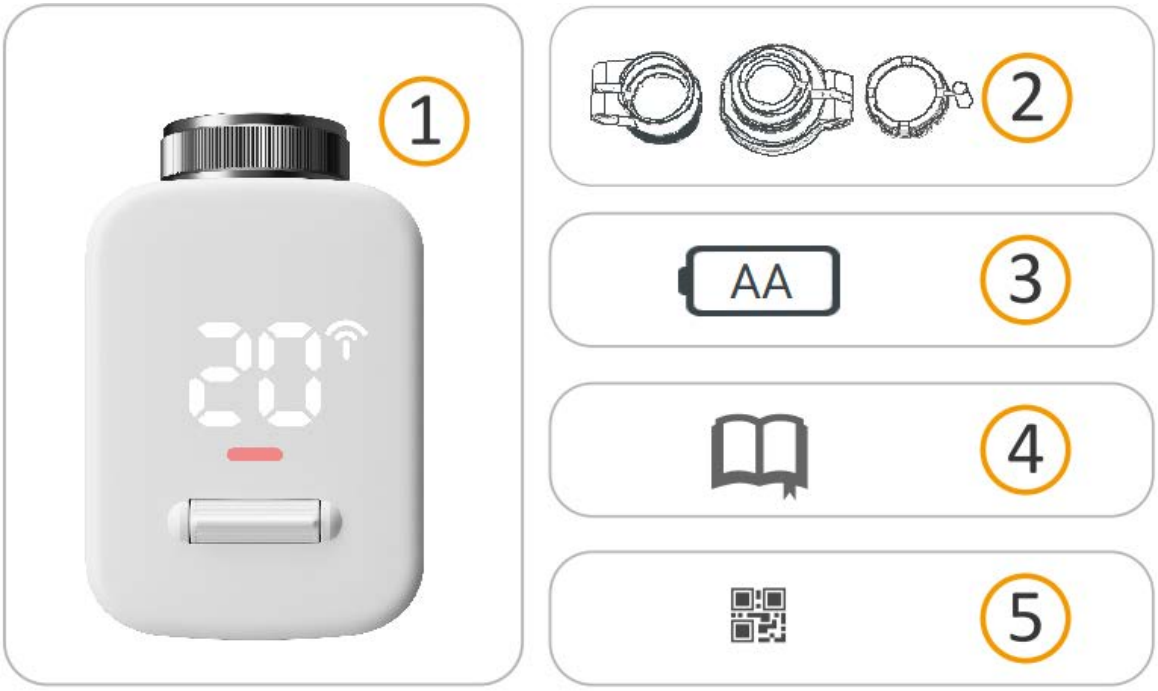


Figure 5: Scope of supply

No.	Objects supplied	Explanation
1	Device	KNX RF Multi radiator thermostat
2	Adapter set	Danfoss RA, RAV and RAVL plastic adapters and screw with nut.
3	Batteries	2× batteries (AA)
4	Installation instructions	This product manual also provides you with the information from the installation instructions, but with additional details, application examples and configuration instructions.
5	Sticker set	Additional set of stickers with data for KNX Secure. The same stickers are attached inside the battery cover.

The installation instructions are part of the product.
Give these instructions to your customer.

6.2 Selecting the heating adapter

The KNX RF Multi radiator thermostat is equipped with a connection thread M30 x 1.5 mm.
Heating valves with this thread size are compatible without an adapter.

Suitable adapters for Danfoss RA/RAV/RAVL and a screw with nut and a pin (only for RAV) are included.
These can be mounted between the heating valve and the radiator thermostat.

6.3 Installing the device

Before starting the installation process, check that the requirements for the planned installation environment have been met.

Caution

Device functional fault due to incorrect installation environment

- Pay attention to the temperature of the installation environment: min. 0 °C to max. +50 °C.
- For installing the device and for removing the battery cover a clearance of approx. 150 mm has to be taken into account.
- Do not use a radiator cover made of metal.
- The KNX RF Multi radiator thermostat is designed for the use inside buildings.
- The KNX RF Multi radiator thermostat may only be used in a dry and dust-free place without direct sunlight.
- If the thread of the heating valve is damaged, consult a heating specialist.
- To reach the optimum radio range and to avoid possible interferences, we recommend to read the KNX RF Multi Guide.

Warning

Risk of chemical burns

Leaking battery acid may cause chemical burns.

- Only use leak-proof batteries of the type AA 1.5 V (LR6).
- Avoid any contact of battery acid with skin, eyes and mucous membranes.
- In the event of contact with battery acid, rinse the affected areas immediately with clean water and consult a doctor.

Inserting the batteries

1. Remove the battery cover at the top edge with your finger.
2. Insert the batteries. Make sure that the polarity is correct.
3. Close the battery cover by pressing it slightly down.

Installing the device

Note: The order must be strictly adhered to.

1. After having inserted the batteries, the display shows <<Pr>>.
2. The plunger of the KNX RF Multi radiator thermostat moves to installation position.
3. Once the plunger has reached the installation position, the display shows <<In>>.
4. The KNX RF Multi radiator thermostat is now ready for installation:
   a. Place the KNX RF Multi radiator thermostat in upright position on the heating valve or on the screwed-on adapter.
   b. Tighten the union nut by hand.
   c. Press the rocker switch up or down for a long time (> 3 sec.) to start the adaptation run.
5. During the adaptation run, the display shows <<Ad>>.
6. After the end of the adaptation run, the KNX RF Multi radiator thermostat is ready for commissioning.

6.4 Replacing the battery

Warning

Risk of chemical burns

Leaking battery acid may cause chemical burns.

- Only use leak-proof batteries of the type AA 1.5 V (LR6).
- Avoid any contact of battery acid with skin, eyes and mucous membranes.
- In the event of contact with battery acid, rinse the affected areas immediately with clean water and consult a doctor.

After a battery replacement, the configuration of the KNX RF Multi radiator thermostat remains unchanged. However, a new adaptation run must be carried out.

1. Remove the battery cover at the top edge with your finger.
2. Insert the batteries. Make sure that the polarity is correct.
3. Close the battery cover by pressing it slightly down.
4. Wait until <<In>> is shown on the display.
5. Press the rocker switch up or down for a long time (> 3 sec.) to start the adaptation run.

6.5 Configuring the device without installation

Depending on the infrastructure, it may be necessary to configure the KNX RF Multi radiator thermostat before the installation. Carry out the following steps to prepare the configuration.

Caution

Device error due to commissioning without prior installation

If the adaptation run is carried out without having screwed the KNX RF Multi radiator thermostat onto the heating valve, the display shows the error code E1. Carry out the steps specified under Adaptation run without prior installation, p. 70.

Warning

Risk of chemical burns

Leaking battery acid may cause chemical burns.

- Only use leak-proof batteries of the type AA 1.5 V (LR6).
- Avoid any contact of battery acid with skin, eyes and mucous membranes.
- In the event of contact with battery acid, rinse the affected areas immediately with clean water and consult a doctor.

Inserting the batteries

1. Remove the battery cover at the top edge with your finger.
2. Insert the batteries. Make sure that the polarity is correct.

Preparing the device for commissioning

Note: The order must be strictly adhered to.

1. After having inserted the batteries, the display first shows <<Pr>> and then <<In>>.
2. Press the programming button briefly. The status LED lights up red.
3. Close the battery cover by pressing it slightly down.
4. The device is ready for configuration.

Start immediately to configure and program the device.
If the device remains in the installation mode for a longer period of time, this can lead to a fast discharge of the batteries.

7 Manual operation

The KNX RF Multi radiator thermostat offers the following manual operation options.
Requirement: The manual operation is not blocked.

7.1 Displaying the setpoint temperature/activating the display

- Press the rocker switch briefly up or down to activate the display.
- Either the setpoint temperature or the active function is displayed.

7.2 Changing the nominal temperature

Requirement: The display must be activated by pressing the rocker switch briefly once.

- Press the rocker switch briefly up to increase the nominal temperature.
- Press the rocker switch briefly down to reduce the nominal temperature.

7.3 Activating/deactivating the boost function

Requirement: The display must be activated by pressing the rocker switch briefly once.

- Press the rocker switch up for a long time to enable of disable the boost function.
- The KNX RF Multi radiator thermostat opens the heating valve for the time defined in the ETS and switches to the previous mode when disabled.

7.4 Enabling/disabling the comfort extension

Requirement: In the ETS parameters, <<Presence key>> must have been selected in the presence detection and the display must be activated by pressing the rocker switch briefly once.

- Press the rocker switch down for a long time to enable or disable the comfort extension.
- The KNX RF Multi radiator thermostat remains in the comfort mode for the time defined in the ETS and the setpoint temperature is maintained.

7.5 Enabling/disabling the programming mode

1. Remove the battery cover at the top edge with your finger.
2. Press the programming button briefly.

The lit red status LED shows you that the programming mode is active.

7.6 Carrying out a factory reset

Information on carrying out a factory reset ►“Resetting to factory settings” on page 72.

8 Commissioning and configuration

The device can be configured before or after the installation in the ETS (Engineering Tool Software).

If you want to configure the device before installation, follow the instructions under
► Configuring the device without installation, p. 20

The ETS is available with a different range of functions from the KNX Association (www.knx.org).

All descriptions in this documentation on configuration in the ETS refer to the ETS Professional version 6.

Help on the ETS is available in the integrated ETS Online Help.

- Press the [F1] button.

Requirement

The PC used for the ETS setup must be connected to the KNX installation via a suitable interface.

The KNX RF Multi radiator thermostat must be connected to the KNX installation via KNX RF Multi, for example via the ise KNX RF Multi/TP media coupler.

In the project details of the ETS under <<Compatibility>>, the parameter <<Use low bus communication rate>> must be disabled.

Work steps

1. Create the KNX RF Multi radiator thermostat as a device in the ETS,
   ► see Creating the device in the ETS, p. 23.
2. In the ETS, assign the device and its individual address according to the KNX topology,
   ► see Programming an individual address, p. 25.
3. Set the general parameters, ►see Configuring parameters, p. 26.
4. Link the group addresses to the group objects.
5. The KNX RF Multi radiator thermostat is now ready for commissioning using <<Program ETS>>.

Re-programming of the media coupler
If the group communication should take place from or in the TP line and if links of group objects of the radiator thermostats have been changed, the RF/TP media coupler must be re-programmed.

8.1 Creating the device in the ETS

Depending on whether the product database entry already exists in the ETS catalogue or whether the device is already being used in your existing project, different work steps are required in order to use the current version.

Work steps	
Device already exists in the ETS catalogue?	
Yes	No
Update product database. During an update, the old product database entry is replaced by the new one.	Importing product database entry. There are numerous possibilities for importing a new product database entry. Below we will assume that you have downloaded the product database entry yourself. ► see Importing a new product database entry, p. 23
Device in existing project should be updated?	
Yes	No
You must update the device properly so that the existing links to group addresses are maintained. ► see Updating a product in the existing project, p. 24	Add the device to your topology in the usual way.

Table 7: Work steps – creating the device in the ETS

Importing a new product database entry

Requirement: You have now downloaded the product database entry (product file) from our website at www.ise.de.

1. Start the ETS and select the <<Catalogue>> tab on the Start page.
2. Select the <<Import>> button in the toolbar.
3. In the <<Open product file>> window, open the product file and press on the <<Open>> button to confirm your selection.
4. Follow the further instructions in the ETS. If necessary, call up the Online Help with the [F1] button.

Updating a product in the existing project

Requirement: New product database entry exists in the catalogue.

1. In the ETS, open the project for which the device is to be updated.
2. Search for the new product database entry in the catalogue and add the new version of the device to the devices in your project.
3. Select the old version of the device in your topology.
4. Under <<Properties>>, select the <<Information>> → <<Application program>> tab.
5. Select the <<Update>> button under the item <<Update application program version>> (see figure 6, pos. 2).

   If you change the value under <<Change application program>> (see figure 6, pos. 1), user-defined settings such as links to group addresses will be lost.

6. Select the newly added device and delete it again from your topology.

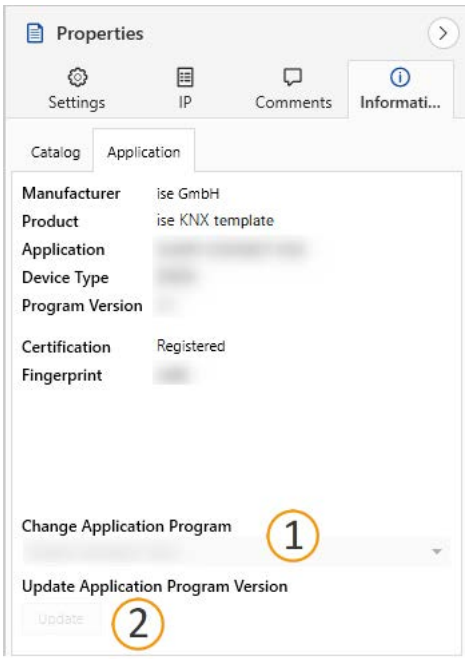


Figure 6: Updating the application program

8.2 Programming an individual address

The individual address that you issued in the ETS must be assigned to the device. We refer here to "programming". To do this you must put the device into programming mode.

Requirement

There is a KNX RF radio connection to the KNX RF Multi radiator thermostat.

If a RF/TP media coupler is used for commissioning, the media coupler must be programmed first in the ETS.

If the radiator thermostat is integrated in an RF segment, the media coupler must be programmed again.

Assigning the individual address

1. Press the programming button briefly. The status LED lights up red.

2. In the ETS, assign the individual address to the device in accordance with the KNX topology and execute programming in the ETS.

How to recognise successful assignment of the individual address

The completed transfer is indicated on the ETS <<History>> tab by a green marking. Programming flag <<Adr>> is set and <<Cfg>> is not set. More information about this and other flags is available from the ETS documentation.

8.3 Updating firmware

You can obtain functional enhancements for the KNX RF Multi radiator thermostat with a new version of the firmware. Use the ise service app to load the current firmware to the device. The service app can be downloaded via the ETS <<Settings>> → <<ETS apps>> → <<ETS App Store>>. During the update process, the status LED is lit red and <<UP>> appears on the display.

9 Configuring parameters

The parameters to be configured depend on your specific application.
The context help of the ETS explains the parameters.

Calling up the context help in the ETS

1. Enable the <<Context Help>> button in the <<Parameter>> tab in the toolbar.
2. Click on the desired parameter.
3. The corresponding explanation appears in the lower area of the parameter dialogue.

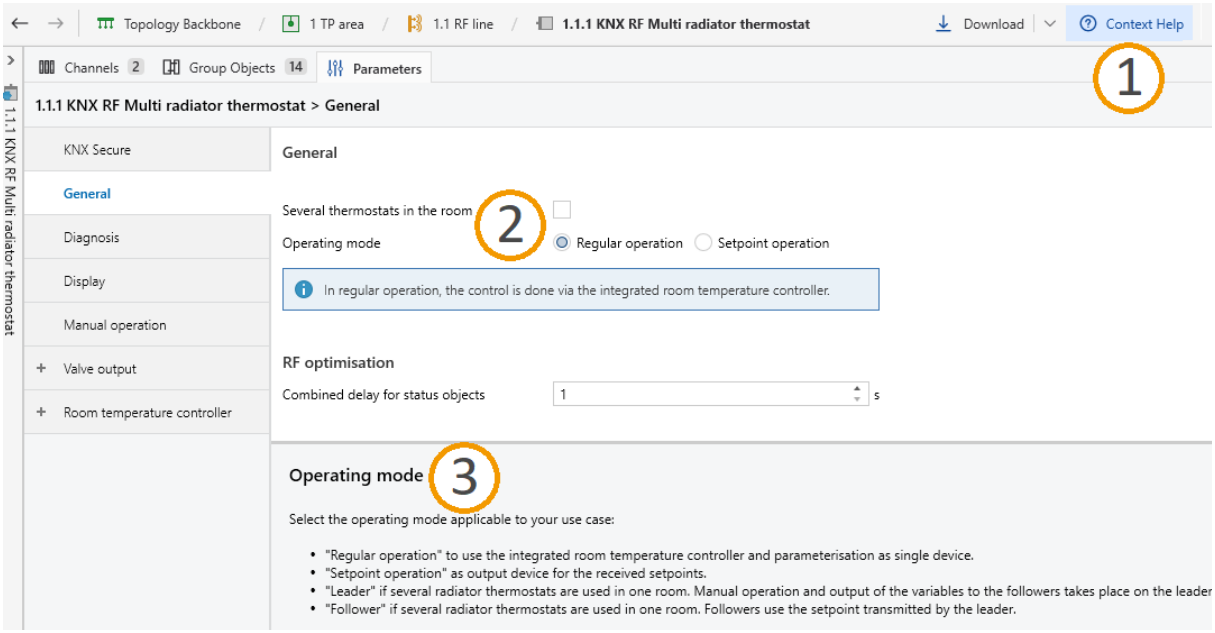
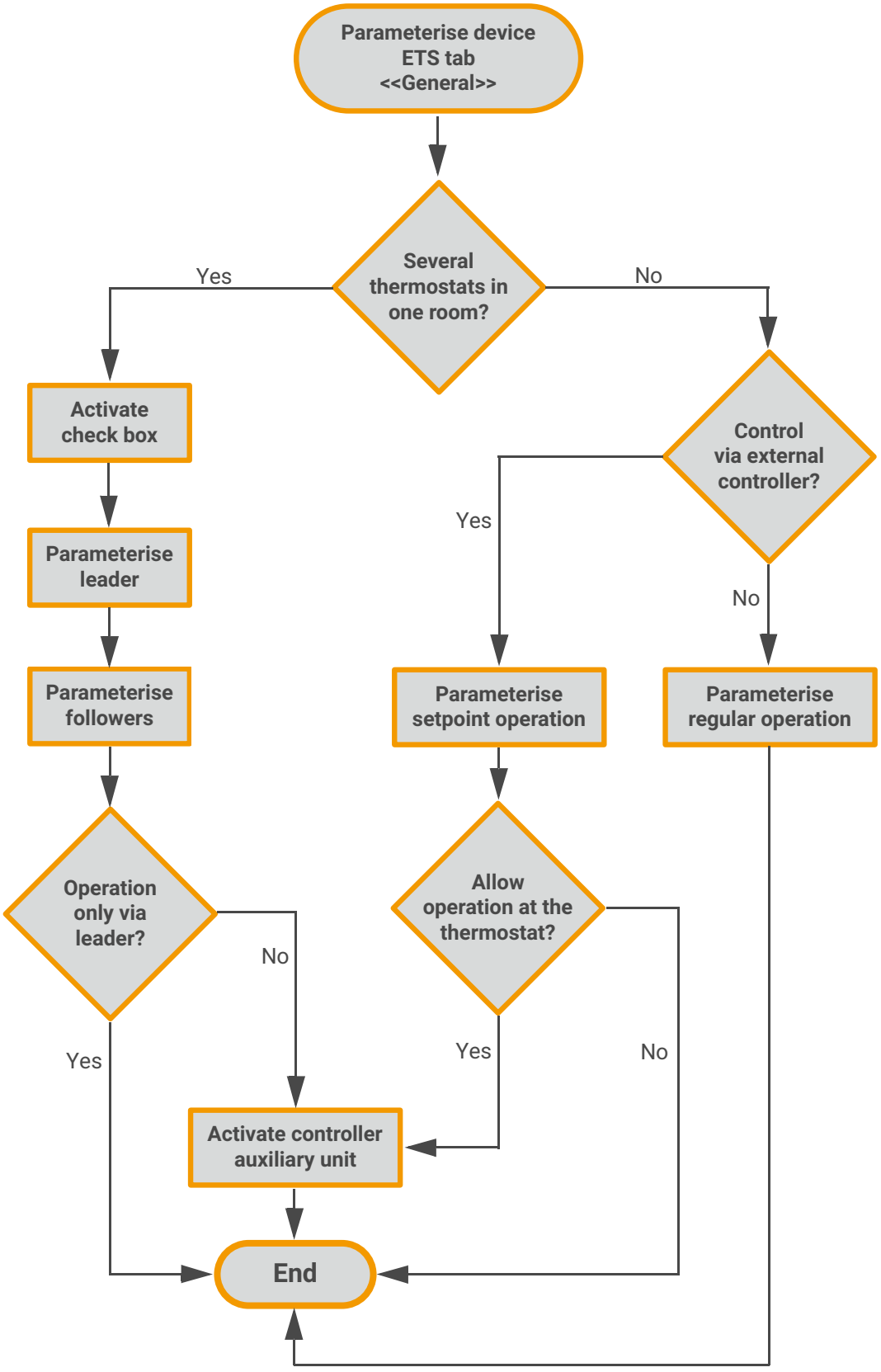


Figure 7: ETS context help

9.1 Selecting the operating mode

First of all, define the operating mode of the KNX RF Multi radiator thermostat. The following diagram helps with the selection. Click the rectangular boxes to jump to the respective description.



9.2 Regular operation

Use this function if only one KNX RF Multi radiator thermostat is installed in a room.

- The device is controlled via manual operation and/or via the KNX bus.
- The integrated room temperature controller and functions such as boost, comfort extension and summer/winter operation are available.
- An internal or external temperature sensor can be used for the regulation.
- Select in the ETS tab <<General>> the operating mode <<Regular operation>>.

9.3 Setpoint operation

Use this function if you want to control the device via an external controller of the KNX installation.

- The regulation takes place by receiving the command value via KNX telegram, e.g. via the central heating control of a Smart Home server. For this, connect the group object 35 <<Receive command value>> to the corresponding group address of the external controller.
- Functions such as manual operation, boost or comfort extension are only available on a device with setpoint operation if it is additionally parameterised as controller auxiliary unit, see Controller auxiliary unit, p. 30.
- Select in the ETS tab <<General>> the operating mode <<Setpoint operation>>.

9.4 Several radiator thermostats in the room

Use this function if several KNX RF Multi radiator thermostats are installed in a room.

- This prevents the devices from adversely affecting each other.
- The connected followers are controlled by a leader. This also includes the activation of the service mode and the switch-off of the room temperature controller via a group object.
- The parameterisation as a follower allows the receipt of the command value from the leader. Functions such as manual operation, boost or comfort extension are only available on the follower if it is additionally parameterised as controller auxiliary unit, see Controller auxiliary unit, p. 30

Requirement:

- You have several KNX RF Multi radiator thermostats in your ETS project.
- In the ETS tab <<General>>, the parameter <<Several radiator thermostats in the room>> is activated.

Parameterising the leader

1. Define a KNX RF Multi radiator thermostat as leader. For this, select a device with appropriate requirements for a good radio connection to the KNX installation.
2. Select the operating mode <<Leader>> in the ETS tab <<General>> of the device.
3. Create a group address according to your topology, e.g. “1/0/0 command value”.
4. Connect this group address with the group object 36 <<Send command value – state>>.

> If the group object 36 is not visible in the list of group objects, tick in the ETS tab <<Valve output/Enable functions>> the check box <<Status>> and in the ETS tab <<Valve output/Status>> the check box <<Status object send command value>>.

> Tick in the ETS tab <<Valve output/Status>> the check box <<Transmission in case of modification>> and/or the check box <<Cyclical transmission>> so that the leader can transmit the command value to the followers.

Parameterising the followers

For all followers, proceed as follows:

1. Select in the ETS tab <<General>> the operating mode <<Follower>>.
2. Connect the above mentioned group addresses to the group object 35 <<Receive command value>>.

9.5 Controller auxiliary unit

In a device configured as controller auxiliary unit, the actual range of functions is reduced to the manual operation. The functions Boost and Comfort extension are carried out in the connected leader or by the external controller and the resulting command values are transmitted to the controller auxiliary unit.
To configure these functions, please refer to:
► Configuring the boost function, p. 32
► Configuring the comfort extension, p. 32

Requirement:
You have already carried out the Selecting the operating mode, p. 27.

Open the <<General>> tab in the ETS parameters of a follower or a device in the setpoint operation. Activate the check box <<Controller auxiliary unit>> to parameterise and use the following functions:

- Modification of the setpoint temperature
- Display of the current setpoint temperature
- Boost function
- Comfort extension with presence button

The configuration of a controller auxiliary unit of a follower is described below. The group addresses are connected to the group objects of a radiator thermostat that has been parameterised as a leader. The parameterisation of the controller auxiliary unit in the setpoint operation is performed in a similar way. The group addresses are connected to the group objects of an external controller.

Configuring the modification of the setpoint temperature (relative specified setpoint)

1. Open the tab <<Controller auxiliary unit/Enable functions>> in the parameters of the follower and tick the check box <<Setpoint offset>>.
2. Go to the tab <<Controller auxiliary unit/setpoint values>> and select the specified setpoint <<relative>>.
3. Create a group address according to your topology, e.g. “1/0/1 setpoint offset preset”.
4. Connect this group address to the group object 152 <<Setpoint offset – preset>>.
5. Create another group address according to your topology, e.g. “1/0/2 setpoint offset state”.
6. Connect this group address to the group object 151 <<Setpoint offset – state>>.
7. Go to the group objects of the leader and connect the first group address (1/0/1 setpoint value preset) to the group object 63 <<Setpoint offset – preset>>.
8. Connect the second group address (1/0/2 setpoint value state) to the group object 64 <<Setpoint offset – state>>.

The parameters <<Offset up/down>>, <<Offset type via>> and <<Offset increment>> in the leader and in the controller auxiliary unit must be parameterised in the same way.

Configuring the modification of the setpoint temperature (absolute specified setpoint)

1. Open the tab <<Controller auxiliary unit/Enable functions>> in the parameters of the follower and tick the check box <<Setpoint offset>>.
2. Go to the tab <<Controller auxiliary unit/setpoint values>> and select the specified setpoint <<absolute>>.
3. Create a group address according to your topology, e.g. “1/0/4 specified setpoint”.
4. Connect this group address to the group object 153 <<Setpoint value of current operating mode>>.
5. Go to the group objects of the leader and connect the group address specified above (1/0/4 specified setpoint) to the group object 61 <<Setpoint value of current operating mode>>.

> Carry out the instructions in the following section to be able to use the absolute specified setpoint. The value from the group object 150 <<Setpoint temperature – state>> is used as a basic value for the specified setpoint.

Configuring the display of the current setpoint temperature

1. Create a group address according to your topology, e.g. “1/0/5 setpoint temperature”.
2. Connect this group address to the group object 150 <<Setpoint temperature – state>>.
3. Go to the group objects of the leader and connect the group address specified above (1/0/5 setpoint temperature) to the group object 60 <<Setpoint temperature – state>>.

Configuring the boost function

1. Open the tab <<Controller auxiliary unit/Enable functions>> in the parameters of the follower and tick the check box <<Boost function>>.
2. Create a group address according to your topology, e.g. “1/0/6 boost activation”.
3. Connect this group address to the group object 155 <<Boost function – activate/deactivate>>.
4. Create another group address according to your topology, e.g. “1/0/7 boost state”.
5. Connect this group address to the group object 154 <<Boost function – state>>.
6. Go to the group objects of the leader and connect the first group address (1/0/6 boost activation) to the group object 100 <<Boost function – activate/deactivate>>.
7. Connect the second group address (1/0/7 boost status) to the group address 101 <<Boost function – state>>.

Configuring the comfort extension

1. Open the tab <<Controller auxiliary unit/Enable functions>> in the parameters of the follower and tick the check box <<Presence button>>.
2. Create a group address according to your topology, e.g. “1/0/8 presence”.
3. Connect this group address to the group object 157 <<Presence button>>.
4. Create another group address according to your topology, e.g. “1/0/9 presence state”.
5. Connect this group address to the group object 156 <<Presence button – state>>.
6. Go to the group objects of the leader and connect the first group address (1/0/8 presence) to the group object 90 <<Presence button>>.
7. Connect the second group address (1/0/9 presence status) to the group object 91 <<Presence button – state>>.

9.6 HVAC operating modes

The KNX RF Multi radiator thermostat is provided with the operating modes Comfort mode, Standby mode, Night mode and Frost protection.
The temperature values of the different operating modes are parameterised in the <<Setpoints>> tab.

The operating modes are changed using the following group objects:

- Group object 40 <<Operating mode changeover – preset>>
- Group object 41 <<Operating mode changeover – priority>>

There is a common 1-byte object (GO 40) for all HVAC operating modes. The received value specifies the operating mode.
In addition, a second 1-byte object (GO 41) is also available, which sets an operating mode under force control and with a higher priority. This priority results in a hierarchy in conjunction with the window status, whereby a distinction is made between presence detection by presence button (Figure 8) or presence detector (Figure 9).

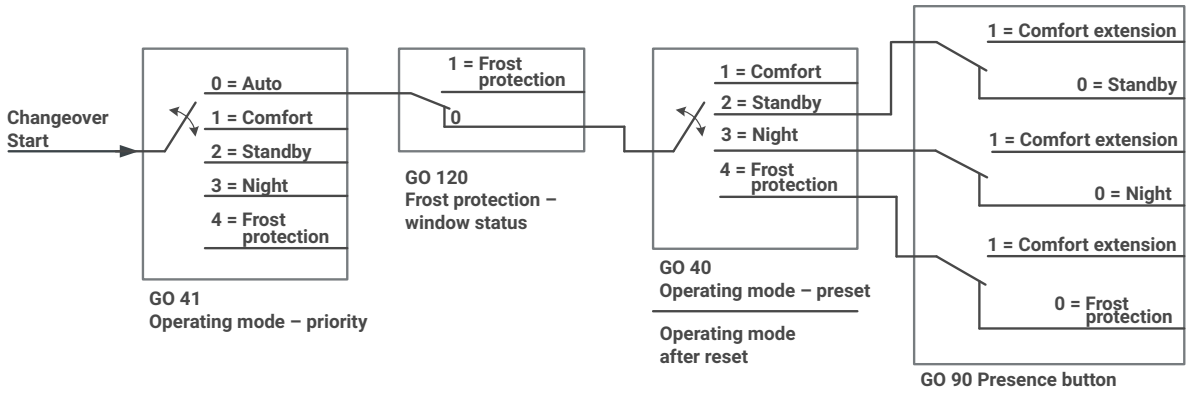


Figure 8: Changeover by KNX object with presence button

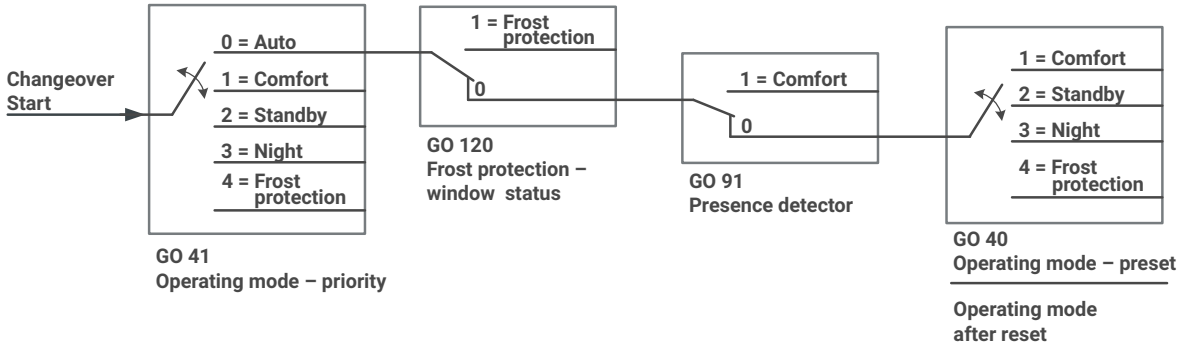


Figure 9: Changeover by KNX object with presence detector

9.7 Setpoints

An information specifying the HVAC operating mode to be activated is send to the KNX RF Multi radiator thermostat by the KNX bus. Each HVAC operating mode is connected to a temperature setpoint defined in the ETS parameters. The setpoint can be specified as relative or absolute value.

9.7.1 Relative specified setpoint

1. Select in the ETS tab <<Room temperature controller/setpoints>> the specified setpoint <<relative>>.

2. Assign a temperature value in the <<Basic setpoint value>> parameter.
   This value corresponds to the temperature in the comfort mode.

3. The values of the parameters <<Reduction in standby mode>> and <<Reduction in night mode>> are difference values with regard to the basic setpoint value.

4. In the <<Setpoint offset>>, the maximum possible offset of the setpoint value upwards or downwards is determined.
   The offset affects the basic setpoint temperature and the values for standby and night mode.
   Example: The basic setpoint temperature has been set to 21.5 °C. An upward offset of 3 Kelvin has been defined. 1 Kelvin has been defined for the downward offset.
   This means that the basic setpoint temperature can be changed by manual operation or KNX telegram to a maximum of 24.5 °C and a minimum of 20.5 °C.

5. In addition, you can define the data point type which is to be used for changing the setpoint temperature using <<Offset type via>>.

9.7.2 Absolute specified setpoint

1. Select in the ETS tab <<Room temperature controller/setpoints>> the specified setpoint <<absolute>>.

2. Assign a temperature value to each operating mode. The operating modes are independent of each other.

3. Using the group object 61 <<Setpoint value of current operating mode>> you can change the temperature value of an active HVAC mode (with the exception of Frost protection).

9.8 Room temperature measurement

In the parameter dialogue <<Room temperature measurement>>, you have the possibility to select between the use of the internal temperature and a transmitted temperature.

The KNX RF Multi radiator thermostat is equipped with a temperature sensor that transmits the measured temperature internally to the room temperature controller (parameter setting <<internal temperature>>). Depending on the mounting situation, e.g. in a niche, trapped heat may influence the measurement result.

Alternatively, the temperature can be transmitted to the device via the KNX bus, for example by an external temperature sensor (parameter setting <<received temperature>>.
If the radiator thermostat does not receive an external temperature within 12 hours, an attempt is made to request a temperature value. If no response is received, the system switches to internal measurement until an external temperature is received again.

For both types of use, you can enter a temperature correction in the <<Balance>> parameter to compensate for possible deviations from the actual room temperature.

Example:
The temperature output via the group object 70 <<Actual temperature>> is 22.5 °C. The temperature measured by an external thermometer in the room, however, is 21.5 °C.
Enter the value -1 Kelvin into the <<Balance>> parameter to adapt the temperature of the radiator thermostat.

9.9 Status

9.9.1 Status object operating mode – preset

The status object operating mode – preset uses a 1-byte object.
As soon as the KNX RF Multi radiator thermostat boots up or the operating mode is changed, the status is sent.

Bit	Meaning
0	Not used
1	Comfort mode active
2	Standby mode active
3	Night mode active
4	Frost protection active

Table 8: Operating mode – preset – state

9.9.2 Status object operating mode – priority

The status object operating mode – priority uses a 1-byte object. As soon as the KNX RF Multi radiator thermostat boots up or the operating mode is changed via the group object 41 <<Operating mode – priority>>, the status is sent.

Bit	Meaning
0	The operating mode set in GO 40 is active
1	Comfort mode active
2	Standby mode active
3	Night mode active
4	Frost protection active

Table 9: Operating mode – priority – state

9.9.3 Status object RHCC

The status object RHCC uses a 16-bit field. As soon as the KNX RF Multi radiator thermostat boots up or at least one bit in the bit field is changed, the status is sent.

Bit	Meaning for “1”	Meaning for “0”
0	Error is active	No error is active
1	Not used (permanently “0”)	
2	Not used (permanently “0”)	
3	Not used (permanently “0”)	
4	Not used (permanently “0”)	
5	Not used (permanently “0”)	
6	Not used (permanently “0”)	
7	Not used (permanently “0”)	
8	Heating mode (permanently “1”)	
9	Not used (permanently “0”)	
10	Not used (permanently “0”)	
11	Not used (permanently “0”)	
12	Room temperature controller blocked	Room temperature controller blocked
13	Anti-freeze temperature reached or fallen below	Anti-freeze temperature reached or fallen below
14	Not used (permanently “0”)	
15	Not used (permanently “0”)	

Table 10: 16-bit field RHCC

9.9.4 Status object RTSM

The status object RTSM uses a 8-bit field. As soon as the KNX RF Multi radiator thermostat boots up or at least one bit in the bit field is changed, the status is sent.

Bit	Meaning for “1”	Meaning for “0”
0	Window opened	No window opened
1	Presence (presence detector)	No presence (presence detector)
2	Presence (presence button)	No presence (presence button)
3	Comfort extension active	Comfort extension inactive
4	Operating mode changeover active via forced object	Operating mode changeover inactive via forced object
5	Not used (permanently “0”)	
6	Not used (permanently “0”)	
7	Not used (permanently “0”)	

Table 11: 8-bit field RTSM

9.10 Presence detection

Parameterise this function for the

- extension of the comfort mode via KNX command (e.g. push button) and/or manual operation directly on the KNX RF Multi radiator thermostat

or

- Activation of the comfort mode by a presence detector.

Observe the prioritisation of the group objects, ► see HVAC operating modes, p. 33.

Requirement:

1. Open the tab <<Controller auxiliary unit/Enable functions>> and tick the check box <<Presence detection>>.
2. Go to the <<Presence detection>> tab.

Configuring the presence button

1. Select the <<Presence button>> parameter under Presence detection.
2. Define the duration of the comfort extension.
3. Create a group address according to your topology, e.g. “1/0/20 receive presence”.
4. Connect this group address to the group object 90 <<Presence button>>.
5. Go to the group object of the device that is to send the switch-on command.
6. Connect the above mentioned group address to the corresponding group object, e.g. switch output of a push button.

Configuring the presence detector

1. Select the <<Presence detector>> parameter under Presence detection.
2. Create a group address according to your topology, e.g. “1/0/21 receive presence”.
3. Connect this group address to the group object 93 <<Presence detector>>.
4. Go to the group objects of the presence detector.
5. Connect the above mentioned group address to the corresponding group object, e.g. switch output of the presence detector.

> Please note that the frequent change between presence and absence leads to frequent receipt of telegrams. This telegram load in turn leads to the batteries discharging more quickly.

9.11 Boost function

By activating the boost function, the heating valve is completely opened. The duration is defined in the ETS parameters.
The boost function can be disabled by manual operation or KNX telegram before the set duration has elapsed.

Requirement:

1. Open the tab <<Controller auxiliary unit/Enable functions>> and tick the check box <<Boost function>>.

2. Go to the <<Boost function>> tab.

Configuring the boost function

1. Define the duration of the boost function.

2. Create a group address according to your topology, e.g. “1/0/22 receive boost”.

3. Connect this group address to the group object 100 <<Boost function – activate/deactivate>>.

4. Go to the group object of the device that is to send the switch-on command.

5. Connect the above mentioned group address with the corresponding group object, e.g. switch output of a push button.

9.12 Frost protection

Use the <<Frost protection>> parameter to connect a window contact or to use the temperature drop detection.

Requirement:

1. Open the tab <<Controller auxiliary unit/Enable functions>> and tick the check box <<Frost protection>>.
2. Go to the <<Frost protection>> tab.

Configuring the window contact

1. Select under Frost protection/activation the <<via window contact>> parameter.
2. Define the delay time after which the frost protection is activated.
3. Create a group address according to your topology, e.g. “1/0/23 window state”.
4. Connect this group address to the group object 120 <<Frost protection – window state>.
5. Go to the group object of the contact switch that is to send the switch-on command.
6. Connect the above mentioned group address to the corresponding group object of the contact switch.

Configuring the temperature drop detection

1. Select under Frost protection/activation the <<via temperature drop detection>> parameter.
2. Define the delay time after which the frost protection is disabled and the last operating mode is enabled again.
3. Define the threshold value for the temperature drop detection.
   Once the threshold value is reached, the frost protection is activated.

> Please note that the detection of temperature drops highly depend on the position of the radiator thermostat and the physical conditions at the installation site.
> It is possible that the threshold value for temperature drop detection is not detected by the device even if the windows are tilted or completely open.

9.13 Summer/winter operation

Use the summer operation to switch the KNX RF Multi radiator thermostat to the frost protection mode outside the heating period. By doing this, it is not possible to change the HVAC mode via manual operation or KNX. A HVAC mode received during summer operation is saved and not executed until winter operation is activated.

Requirement:

Open the tab <<Controller auxiliary unit/Enable functions>> and tick the check box <<Summer/winter operation>>.

Configuring the summer operation

1. Create a group address according to your topology, e.g. “1/0/24 summer operation”.
2. Connect this group address to the group object 130 <<Summer/winter operation – activate/deactivate>>.
3. Go to the group object of the device that is to send the switch-on command.
4. Connect the above mentioned group address to the corresponding group object, e.g. output of a switching actuator.

9.14 Scenes

Use the <<Scenes>> parameter to configure the KNX RF Multi radiator thermostat as a scene auxiliary unit.

Requirement:

1. Open the tab <<Controller auxiliary unit/Enable functions>> and tick the check box <<Scenes>>.
2. Go to the <<Scenes>> tab.

Configuring scenes

1. Define the number of scenes and assign a scene number and a HVAC mode to each scene. The scene number serves for the control of an external device by means of the data type “18.001 scene control”.
2. Create a group address according to your topology, e.g. “1/0/25 trigger scene”.
3. Connect this group address to the group object 140 <<Scene auxiliary unit>>.
4. Go to the group object of the device that is to trigger the scene.
5. Connect the above mentioned group address to the corresponding group object, e.g. output of scene auxiliary unit of a push button.
6. Parameterise the respective scene number in the scene auxiliary unit of the push button.

10 Group objects

The KNX RF Multi radiator thermostat provides the following group objects to connect group addresses.

10.1 Diagnosis

Group object 10 |	
Object function	Low remaining battery capacity
Details	If a remaining capacity of 3% is reached, an alarm is triggered. This corresponds to a remaining battery runtime of approx. three weeks.
Possible values	0: No alarm 1: Alarm
Data width	1 bit
Data point type / data type	NON-DPT
Direction	Read
Flags (CRWTUI)	CR-T--

Table 12: Low remaining battery capacity

Group object 11 |	
Object function	Remaining battery capacity – state
Details	Displays the current battery capacity as a percentage. Updating the state can take up to six hours.
Possible values	Integer or floating point number between 0 and 100
Data width	1 byte
Data point type / data type	5.001/percent (0 to 100%)
Direction	Read
Flags (CRWTUI)	CR-T--

Table 13: State of remaining battery capacity

Group object 12 |	
Object function	RF interference
Details	Shows whether there is an RF interference (see RF interference on p. 70).
Possible values	0: No RF interference 1: RF interference
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Read
Flags (CRWTUI)	CR-T--

Table 14: RF interference

Group object 13 |	
Object function	Fault
Details	Shows whether there is a fault (see Troubleshooting on p. 69).
Possible values	0: No fault 1: Fault
Data width	1 bit
Data point type / data type	1.005/alarm
Direction	Read
Flags (CRWTUI)	CR-T--

Table 15: Fault

Group object 14 |	
Object function	Last fault
Details	Shows information about the last or current fault (see Troubleshooting on p. 69).
Possible values	Up to 14 characters
Data width	14 bytes
Data point type / data type	16.001/character (ISO 8859-1)
Direction	Read
Flags (CRWTUI)	CR-T--

Table 16: Last fault

Group object 15 |	
Object function	Deactivate status LED
Details	Upon receipt of a 1, the status LED is deactivated for the time set in the ETS. After a restart, the setting is reset.
Possible values	0: Allow message via status LED 1: Deactivate message via status LED
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Write
Flags (CRWTUI)	C-W--

Table 17: Deactivate status LED

Group object 16 |	
Object function	Deactivate status LED – state
Details	Shows whether messages via status LED are deactivated. This group object is not resent after a restart.
Possible values	0: Message via status LED allowed 1: Message via status LED deactivated
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Read
Flags (CRWTUI)	CR-T--

Table 18: Deactivate LED messages – state

Group object 17 |	
Object function	In operation
Details	Shows by sending a “1” every 24 hours whether the device is available.
Possible values	0: Device not available 1: Device available
Data width	1 bit
Data point type / data type	1.017/trigger
Direction	Transfer
Flags (CRWTUI)	C--T-

Table 19: In operation

10.2 Manual operation

Group object 20 |	
Object function	Disabling function
Details	Blocks or allows the manual operation via the rocker switch on the device. After a restart, the setting is reset.
Possible values	0: Enable 1: Disable The polarity can be reversed in the parameter dialogue of the ETS.
Data width	1 bit
Data point type / data type	1.002/Boolean
Direction	Write
Flags (CRWTUI)	C-W--

Table 20: Disabling function

Group object 21 |	
Object function	Disabling function – state
Details	Indicates whether the manual operation is disabled or enabled. This group object is not resent after a restart.
Possible values	0: Enabled 1: Disabled The polarity can be reversed in the parameter dialogue of the ETS.
Data width	1 bit
Data point type / data type	1.002/Boolean
Direction	Read
Flags (CRWTUI)	CR-T--

Table 21: Disabling function – state

10.3 Valve output – service mode

Group object 25 |	
Object function	Service mode – activate/deactivate
Details	Activates or deactivates the service mode with the first bit. The second bit defines the command value.
Possible values	Bit 1 0: Deactivate (no priority) 1: Activate (priority) Bit 2 0: Command value 0% 1: Command value 100%
Data width	2 bit
Data point type / data type	2.001 prioritised switching
Direction	Write
Flags (CRWTUI)	C-W--

Table 22: Service mode – activate/deactivate

Group object 26 |	
Object function	Service mode – state
Details	Indicates whether the service mode is currently activated or deactivated.
Possible values	0: Deactivated 1: Activated
Data width	1 bit
Data point type / data type	1.002/Boolean
Direction	Read
Flags (CRWTUI)	CR-T--

Table 23: Service mode – state

10.4 Valve output – forced position

Group object 30 |	
Object function	Forced position – activate/deactivate
Details	Enables or disables the forced position.
Possible values	0: Deactivate 1: Activate
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Write
Flags (CRWTUI)	C-W--

Table 24: Forced position – activate/deactivate

Group object 31 |	
Object function	Forced position – state
Details	Indicates whether the forced position is currently activated or deactivated.
Possible values	0: Deactivated 1: Activated
Data width	1 bit
Data point type / data type	1.002/Boolean
Direction	Read
Flags (CRWTUI)	CR-T--

Table 25: Forced position – state

10.5 Valve output – state

Group object 35 |	
Object function	Receive command value
Details	Receives the current command value as a percentage.
Possible values	0…100 % (100 % = valve open)
Data width	1 byte
Data point type / data type	5.001/percent (0 to 100 %)
Direction	Write
Flags (CRWTUI)	C-WTU- L flag editable

Table 26: Receive command value

Group object 36 |	
Object function	Send command value – state
Details	Sends the current command value as a percentage.
Possible values	0…100 % (100 % = valve open)
Data width	1 byte
Data point type / data type	5.001/percent (0 to 100 %)
Direction	Read
Flags (CRWTUI)	CR-T--

Table 27: Send command value – state

Group object 37 |	
Object function	Heating – state
Details	Sends a message if the device switches to the heating mode.
Possible values	0: Command value = 0 % 1: Command value > 0 %
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Read
Flags (CRWTUI)	CR-T--

Table 28: Heating – state

10.6 Room temperature controller

Group object 40 |	
Object function	Operating mode – preset
Details	Sends the HVAC mode.
Possible values	0: No modification 1: Comfort mode 2: Standby mode 3: Night mode 4: Frost protection
Data width	1 byte
Data point type / data type	20.102/HVAC mode
Direction	Write
Flags (CRWTUI)	C-W-- C-WTUI (when “Read status from bus“ is selected) L flag editable

Table 29: Operating mode — preset

Group object 41 |	
Object function	Operating mode – priority
Details	Sends the HVAC mode with priority with regard to group object 40.
Possible values	0: Value set in GO 40 is used 1: Comfort mode 2: Standby mode 3: Night mode 4: Frost protection
Data width	1 byte
Data point type / data type	20.102/HVAC mode
Direction	Write
Flags (CRWTUI)	C-W--

Table 30: Operating mode — priority

Group object 46 |	
Object function	Switch off controller
Details	Sets the command value to 0 % and prevents the sending of telegrams to the room temperature controller.
Possible values	0: Enable 1: Switch off
Data width	1 bit
Data point type / data type	1.002/Boolean
Direction	Write
Flags (CRWTUI)	C-W--

Table 31: Switch off controller

10.7 Setpoints

Group object 60 |	
Object function	Setpoint temperature – state
Details	Sends the current setpoint temperature.
Possible values	5 to 30 °C
Data width	2 bytes
Data point type / data type	9.001/temperature
Direction	Read
Flags (CRWTUI)	CR-T--

Table 32: Setpoint temperature – state

Group object 61 |	
Object function	Setpoint value current operating mode
Details	Receives and changes the setpoint temperature of the current operating mode. The temperature of the “Frost protection” operating mode can only be changed via the ETS parameterisation.
Possible values	5 to 30 °C
Data width	2 bytes
Data point type / data type	9.001/temperature
Direction	Write
Flags (CRWTUI)	C-W--

Table 33: Setpoint value current operating mode

Group object 62 |	
Object function	Basic setpoint value
Details	Receives a new basic setpoint value.
Possible values	5 to 30 °C
Data width	2 bytes
Data point type / data type	9.001/temperature
Direction	Write
Flags (CRWTUI)	C-W--

Table 34: Basis setpoint value

Group object 63 |	
Object function	Setpoint offset – preset
Details	Receives the value of the setpoint offset.
Possible values	-10 … 10
Data width	1 byte| 2 bytes
Data point type / data type	6.010/meter pulses | 9,002 temperature difference The data point type can be modified in the parameter “Offset type via”.
Direction	Write
Flags (CRWTUI)	C-W-- C-WTUI (when “Read status from bus“ is selected) L flag editable

Table 35: Setpoint offset – preset

Group object 64 |	
Object function	Setpoint offset – state
Details	Sends the value of the setpoint offset
Possible values	-10 … 10
Data width	1 byte | 2 bytes
Data point type / data type	6.010/meter pulses | 9,002 temperature difference The data point type can be modified in the parameter “Offset type via”.
Direction	Read
Flags (CRWTUI)	CR-T--

Table 36: Setpoint offset – state

10.8 Room temperature measurement

Group object 70 |	
Object function	Actual temperature
Details	Depending on the parameter setting <<Input temperature>>: Internal temperature = Sends the temperature measured by the device Received temperature = Sends the received temperature
Possible values	0 °C … 40 °C
Data width	2 bytes
Data point type / data type	9.001/temperature
Direction	Read
Flags (CRWTUI)	CR-T--

Table 37: Actual temperature

Group object 71 |	
Object function	Received temperature
Details	Provides the received temperature
Possible values	0 °C … 50 °C
Data width	2 bytes
Data point type / data type	9.001/temperature
Direction	Write
Flags (CRWTUI)	C-WTUI

Table 38: Received temperature

10.9 Room temperature controller – state

Group object 80 |	
Object function	Operating mode – preset – state
Details	During booting up or operating mode change, the current operating mode is sent.
Possible values	0: Not used 1: Comfort mode active 2: Standby mode active 3: Night mode active 4: Frost protection active
Data width	1 byte
Data point type / data type	20.102/HVAC mode
Direction	Read
Flags (CRWTUI)	CR-T--

Table 39: Operating mode – preset – state

Group object 81 |	
Object function	Operating mode – priority – state
Details	During booting up or operating mode change, the prioritised operating mode is sent.
Possible values	0: The operating mode set in GO 40 is active 1: Comfort mode active 2: Standby mode active 3: Night mode active 4: Frost protection active
Data width	1 byte
Data point type / data type	20.102/HVAC mode
Direction	Read
Flags (CRWTUI)	CR-T--

Table 40: Operating mode – priority – state

Group object 84 |	
Object function	RHCC – state
Details	During booting up or operating mode change, the current state of the room temperature controller is sent.
Possible values	See Status object RHCC on p. 37.
Data width	2 bytes
Data point type / data type	22.101/RHCC state
Direction	Read
Flags (CRWTUI)	CR-T--

Table 41: RHCC – state

Group object 85 |	
Object function	RTSM – state
Details	Is sent as soon as the device boots up or at least one bit is changed in the bit field.
Possible values	See Status object RTSM on p. 38.
Data width	1 byte
Data point type / data type	21.107/combined state RTSM
Direction	Read
Flags (CRWTUI)	CR-T--

Table 42: RTSM – state

10.10 Presence detection

Group object 90 |	
Object function	Presence button
Details	Receives the command to enable the comfort extension.
Possible values	0: Off 1: On
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Write
Flags (CRWTUI)	C-W--

Table 43: Presence button

Group object 91 |	
Object function	Presence button – state
Details	Sends the state of the presence button.
Possible values	0: Off 1: On
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Read
Flags (CRWTUI)	CR-T--

Table 44: Presence button – state

Group object 92 |	
Object function	Feed back end comfort extension
Details	Sends a message one minute before the comfort extension expires.
Possible values	1: Comfort extension ends in one minute
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Read
Flags (CRWTUI)	CR-T--

Table 45: Feed back end comfort extension

Group object 93 |	
Object function	Presence detector
Details	Receives the command to enable the comfort mode.
Possible values	0: Device remains in the current operating mode 1: Device switches to the comfort mode
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Write
Flags (CRWTUI)	C-W--

Table 46: Presence detector

10.11 Boost function

Group object 100 |	
Object function	Boost function – activate/deactivate
Details	Receives the command to activate or deactivate the boost function.
Possible values	0: Deactivate 1: Activate
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Write
Flags (CRWTUI)	C-W--

Table 47: Boost function – activate/deactivate

Group object 101 |	
Object function	Boost function – state
Details	Sends a message as soon as the boost function is activated or deactivated.
Possible values	0: Deactivated 1: Activated
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Read
Flags (CRWTUI)	CR-T--

Table 48: Boost function – state

10.12 Frost protection

Group object 120 |	
Object function	Frost protection – window status
Details	Receives a message if the connected window contact opens or closes.
Possible values	0: Closed 1: Open
Data width	1 bit
Data point type / data type	1.019/window/door
Direction	Write
Flags (CRWTUI)	C-W--

Table 49: Frost protection – window status

Group object 121 |	
Object function	Frost protection – state
Details	Indicates whether the frost protection operating mode is active or inactive.
Possible values	0: Inactive 1: Active
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Read
Flags (CRWTUI)	CR-T--

Table 50: Frost protection – state

10.13 Summer/winter operation

Group object 130 |	
Object function	Summer/winter operation – activate/deactivate
Details	Receives the command to activate or deactivate the summer or winter operation
Possible values	0: Activate winter operation 1: Activate summer operation
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Write
Flags (CRWTUI)	C-W-- C-WTUI (when “Read status from bus“ is selected)

Table 51: Summer/winter operation – activate/deactivate

Group object 131 |	
Object function	Summer/winter operation – state
Details	Sends a message as soon as the summer or winter operation is activated or deactivated.
Possible values	0: Winter operation activated 1: Summer operation activated The polarity can be reversed in the parameter dialogue of the ETS.
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Read
Flags (CRWTUI)	CR-T--

Table 52: Summer/winter operation – state

10.14 Scenes

Group object 140 |	
Object function	Scene auxiliary unit
Details	Receives a scene number to enable the operating mode assigned to it. The assignment between scene number and operating mode is made in the ETS. In addition, the group object is used to teach in scenes during operation.
Possible values	Bit 1 0: Run scene 1: Learn scene Bit 2 Scene number between 1 and 64
Data width	1 byte
Data point type / data type	18.001/scene control
Direction	Write
Flags (CRWTUI)	C-W--

Table 53: Scene auxiliary unit

The scene numbers between 1 and 64 are physically transmitted on the bus with the values 0 to 63.

10.15 Controller auxiliary unit

Group object 150 |	
Object function	Setpoint temperature – state
Details	Receives the current setpoint temperature from a leader or from a device in regular operation.
Possible values	5 to 30 °C
Data width	2 bytes
Data point type / data type	9.001/temperature
Direction	Write
Flags (CRWTUI)	C-WTUI

Table 54: Setpoint temperature – state

Group object 151 |	
Object function	Setpoint offset – state
Details	Receives the setpoint offset value from a leader or from a device in regular operation.
Possible values	-10… 10
Data width	1 byte| 2 bytes
Data point type / data type	6.010/meter pulses | 9,002 temperature difference The data point type can be modified in the parameter “Offset type via”.
Direction	Write
Flags (CRWTUI)	C-WTUI

Table 55: Setpoint offset – state

Group object 152 |	
Object function	Setpoint offset – preset
Details	Sends the setpoint offset value to further receiving devices, e.g. the leader.
Possible values	-10… 10
Data width	1 byte| 2 bytes
Data point type / data type	6.010/meter pulses | 9,002 temperature difference The data point type can be modified in the parameter “Offset type via”.
Direction	Transfer
Flags (CRWTUI)	C--T-

Table 56: Setpoint offset – preset

Group object 153 |	
Object function	Setpoint value current operating mode
Details	Sends the setpoint temperature of the active operating mode to further receiving devices e.g. the leader.
Possible values	5 to 30 °C
Data width	2 bytes
Data point type / data type	9.001/temperature
Direction	Read
Flags (CRWTUI)	C--T-- L flag editable

Table 57: Setpoint value current operating mode

Group object 154 |	
Object function	Boost function – state
Details	Receives the status of the executing device as soon as the boost function is activated or deactivated.
Possible values	0: Deactivated 1: Activated
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Write
Flags (CRWTUI)	C-WTUI

Table 58: Boost function – actual value

Group object 155 |	
Object function	Boost function – activate/deactivate
Details	Sends the command to activate or deactivate the boost function to further receiving devices e.g. the leader.
Possible values	0: Deactivate 1: Activate
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Transfer
Flags (CRWTUI)	C--T--

Table 59: Boost function – activate/deactivate

Group object 156 |	
Object function	Presence button – state
Details	Receives the status of the executing device as soon as the comfort extension is activated or deactivated.
Possible values	0: Deactivated 1: Activated
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Write
Flags (CRWTUI)	C-WTUI

Table 60: Presence button – state

Group object 157 |	
Object function	Presence button
Details	Sends the command to activate or deactivate the comfort extension to further receiving devices or followers.
Possible values	0: Deactivate 1: Activate
Data width	1 bit
Data point type / data type	1.001/switch
Direction	Transfer
Flags (CRWTUI)	C--T--

Table 61: Presence button

11 Troubleshooting

Error messages are displayed on the device and sent with the group object 13 to the KNX bus. The associated error description is sent with the group object 14.
As soon as an error occurs, the status LED flashes red for 20 seconds. After briefly pressing the rocker switch up or down, the last registered error is shown on the display.
If the display has been disabled in the ETS parameters, only the status LED flashes.

You will find solutions for displayed error codes in the following table:

Error description	Explanation / troubleshooting
E1 – MechanicalFail	Check the correct placement of the device on the bottom of the valve. Dismount the device, if necessary, remove the batteries, insert the batteries again and carry out the steps specified under Installing the device on p. 17. If you have carried out an adaptation run without prior installation, follow the steps under Adaptation run without prior installation on p. 70.
E2– TravelTooShort	The stroke travel of the valve is too short. Dismount the device and check the valve pin of the heating for dirt and ease of movement. Remove the batteries and repeat the steps Installing the device on p. 17.
E3 – AdaptInvalid	The adaptation has failed. Carry out the steps specified under Resetting the device on p. 71.
E4 – IntTempInvalid	The temperature range of the internal temperature is outside the admissible range (0 to 40 °C) Check the installation conditions of the device.
E5 – ExtTempInvalid	The temperature range of the received temperature is outside the admissible range (0 to 50 °C) Check the installation conditions of the device.
E6 – BatteryEmpty	The batteries are completely discharged. Insert new batteries into the device, see Inserting the batteries on p. 18.
E7 – AuxTimeout	The device is parameterised as a controller auxiliary unit and does not receive a corresponding response to an outgoing telegram. Check the parameterisation and the connection of the group addresses in the ETS.
E8 – IPCError	Internal error. Carry out the steps specified under Resetting the device on p. 71.
E9 – UpdateRequired	A firmware update is required.
EA – ExtTempTimeout	The radiator thermostat does not receive an external temperature. Check the external temperature sensor. Additional information can be found on page 35.

Table 62: Error display and troubleshooting

11.1 RF interference

An RF interference is present if the symbol on the display lights up and group object 12 <<RF interference>> sends a 1. An RF interference is signalled in two cases:

Case 1: Three consecutive transmission attempts to a group address have failed.

- Check whether the device is in the radio range of the RF installation.
- Check whether the programming of the device in the KNX installation is missing.

Case 2: The device detects a reduced battery life due to radio interferences.

- Check whether other devices interfere with the radio connection.

Important

Reduction of the battery life due to permanent RF interferences

Search for the reasons of the RF interferences. Frequent telegram losses lead to a higher telegram load which in turn consumes more energy. The device can also be switched to receive mode unnecessarily often due to radio interference. This will have a negative effect on the battery life.

11.2 Adaptation run without prior installation

Warning

Risk of chemical burns

Leaking battery acid may cause chemical burns.

- Only use leak-proof batteries of the type AA 1.5 V (LR6).
- Avoid any contact of battery acid with skin, eyes and mucous membranes.
- In the event of contact with battery acid, rinse the affected areas immediately with clean water and consult a doctor.

If an adaptation run is performed without having screwed the KNX RF Multi radiator thermostat onto the heating valve, the plunger is pushed out of its guidance.
Carry out the following measures to eliminate the error:

1. Open the battery compartment and remove the batteries.
2. The plunger is guided in three grooves. Position the plunger in a way that the guiding pins are located above the corresponding grooves.
3. Apply light pressure to the plunger with one finger.
4. In the meantime, reinsert the batteries. Make sure that the polarity is correct.
5. Wait until the plunger has moved to its correct position.

11.3 Resetting the device

Warning

Risk of chemical burns

Leaking battery acid may cause chemical burns.

- Only use leak-proof batteries of the type AA 1.5 V (LR6).
- Avoid any contact of battery acid with skin, eyes and mucous membranes.
- In the event of contact with battery acid, rinse the affected areas immediately with clean water and consult a doctor.

1. Remove the battery cover at the top edge with your finger.
2. Remove the batteries from the device.
3. Wait for > 15 seconds.
4. Reinsert the batteries. Make sure that the polarity is correct.
5. Close the battery cover by pressing it slightly down.
6. Wait until <<In>> is shown on the display.
7. Press the rocker switch up or down for a long time (> 3 sec.) to start the adaptation run.

11.4 Resetting to factory settings

Warning

Risk of chemical burns

Leaking battery acid may cause chemical burns.

- Only use leak-proof batteries of the type AA 1.5 V (LR6).
- Avoid any contact of battery acid with skin, eyes and mucous membranes.
- In the event of contact with battery acid, rinse the affected areas immediately with clean water and consult a doctor.

1. Remove the battery cover at the top edge with your finger.
2. Remove the batteries from the device. Wait for > 15 seconds.
3. Hold the programming button down.
4. Reinsert the batteries. Make sure that the polarity is correct.
5. Wait until the display countdown has finished.
6. Release the programming button.
7. Close the battery cover by pressing it slightly down.

When you reset the device to the factory settings, it behaves as it does in the state of delivery.

The device is then unconfigured:

- The device remains in the existing projects.
- The device keeps the version of the application program in the ETS.
- The entire parametrisation is rejected.
- The individual KNX address of the device returns to: 15.15.255.
- The domain address is reset to FFFF:FFFFFFFF.

11.5 Contacting Support

If you have a problem with your KNX RF Multi radiator thermostat and require support, contact us:

- E-mail to support@ise.de
- Call us on tel.: +49 441 680 06 12
- Fax us: +49 441 680 06 15

We will need the following data in order to help you:

- To identify the device: Product name or order number
- Version of the firmware
- ETS version
- A meaningful error description including the error code (if there is one)

11.6 FAQs - Frequently asked questions

What do I do if the radiator thermostat cannot be screwed onto the heating valve or is not positioned correctly on the heating valve?

1. Loosen the union nut and remove the radiator thermostat from the heating valve.
2. Check whether the thread of the radiator thermostat matches the thread of the heating valve or whether an adapter has to be used.
3. Check whether the thread of the heating valve is damaged.
4. If it is damaged, have the heating valve replaced by a professional.
5. Restart the installation mode and the adaptation run by repeating the installation, ► Installing the device on p. 17

Why does the radiator thermostat not perform an adaptation run?

The battery voltage may be too low. Replace the batteries.

If the problem persists, a blocked valve pin may be the reason.

1. Loosen the union nut and remove the radiator thermostat from the heating valve.
2. Check the valve pin of the heating valve for ease of movement.
3. Restart the installation mode and the adaptation run by repeating the installation, ► Installing the device on p. 17

What can cause the batteries to discharge quickly?

- Frequent sending of KNX telegrams can cause the batteries to discharge more quickly.
- Cyclical transmission in small intervals and unnecessary status queries should be avoided.
- Check the parameterisation of the display and reduce the interval for switching off the display, if necessary.
- An external device may interfere with the radio connection.
- Do not use rechargeable batteries.

How many group addresses can be created and/or connected?

512 group addresses can be created per radiator thermostat. The number of links between group address and group object is limited to 1024.

Are there software updates for my KNX RF Multi radiator thermostat?

Use the service app to search for the latest firmware ► Updating firmware on p. 25

12 Disassembly and disposal

Disassembly

To facilitate the disassembly, there are three options:

- To activate the boost function, press the rocker switch upward for a long time or
- remove the batteries and reinsert them or
- press the rocker switch briefly upward to increase the setpoint value.

Afterwards

1. loosen the union nut on the KNX RF Multi radiator thermostat.
2. Disconnect the device from the heating valve.
3. Remove the batteries if you will not be using the device for a longer period of time.

Further use of KNX secure devices
To be able to use the device safely in another ETS project, carry out the function see Resetting to factory settings, p. 72.

Disposal

Make an active contribution to protecting the environment by disposing of all materials in an environmentally-responsible way.

Packaging and box

Dispose of the packaging material appropriately, in a card, paper or plastic recycling bins.

Device

Old devices must not be disposed of with domestic refuse!

You can dispose of your old device free of charge at designated collection facilities or, if necessary, you can hand it in to your specialist dealer. Contact your local authority for recycling details.

Device

Batteries must not be disposed of with domestic refuse!

You can return batteries free of charge at designated collection facilities or at the retailer. Contact your local authority for recycling details.

13 Glossary

Absolute specified setpoint

An individual temperature value is defined for each HVAC mode. These setpoint values are independent of each other.

Basic setpoint temperature

The basic setpoint temperature is used as reference value for the relative specified setpoint. This value corresponds to the temperature value of the comfort mode. The temperature values for standby mode and night mode are derived from the basic setpoint temperature.

Catalogue

Abbreviated name for “KNX online product catalogue”. The catalogue is a product database. The catalogue contains all KNX-certified or -registered devices. The device data are saved as a product database entry.

Controller auxiliary unit

The definition as a controller auxiliary unit extends the range of functions and the possibility of manual operation as well as the display of a follower or a device in setpoint operation.

Control value, command value

Current value of the opening of the heating valve in percent:

- Valve completely open = 100%
- Valve completely closed = 0%

ETS (Engineering Tool Software)

The device is configured in the ETS software. The ETS is available with a different range of functions from the KNX Association (www.knx.org).

FDSK (Factory Default Setup Key)

The FDSK is an integral part of the KNX Secure certificate and is used to ensure secure communication between devices in the "KNX IP Secure Device" category. The combination of FDSK and the device’s serial number can provide each device with a unique identification. Together, they form the device certificate.
Depending on the use case, the certificate may be required for initial authentication in the ETS or for encryption of communication.

The KNX Secure certificate is printed on a sticker in the battery cover. A second sticker is enclosed with the product.

Firmware

Software which is embedded in the device hardware and is used to operate the device.
Functional enhancements for the device are available with a new firmware version.

Flags (CRWTUI)

Every group object has flags with which the group object obtains methods: C=Communication, R=Read, W=Write, T=Transfer, U=Update, I=Initialise.

Follower

The operating mode of the KNX RF Multi radiator thermostat for parameterisation of a subordinate device which receives the commands of the superordinate device (leader).

Forced position

Predefined command value of the KNX RF Multi radiator thermostat. The command value can be parameterised in the ETS.

HVAC mode

Heating **V**entilation **A**ir **C**onditioning
The HVAC modes are defined by the KNX via the data type 20.102.

1 = Comfort ≙ comfort mode
2 = Standby ≙ standby mode
3 = Economy ≙ night mode
4 = Building Protection ≙ frost protection

The terms HVAC mode and operating mode are used as synonyms.

In operation / Heartbeat

Sign of life of the KNX RF Multi radiator thermostat which signals the operability of the device every 24 hours.

Leader

The operating mode of the KNX RF Multi radiator thermostat for parameterisation of a superordinate device which is used for the control of the subordinate devices (followers).

Product database entry (also catalogue entry)

Data relating to a device in the "Online KNX Product Catalogue" of the ETS. The product database entry contains all data to allow the device to be configured in the ETS. The product database entry is provided in the form of a file by the device manufacturer. The latest version of product data entries for the ise Individuelle Software und Elektronik GmbH can be downloaded free of charge from our website www.ise.de.

The product database entry is often also called the "catalogue entry".

Room temperature controller (RTC)

The room temperature controller included in the KNX RF Multi radiator thermostat is used to control the parameterised temperature values and/or the selected HVAC modes.

Relative specified setpoint

The temperature values for standby mode and night mode are in relation to the basic setpoint temperature. If the basic setpoint temperature is modified, the temperatures for standby mode and night mode are also changed according to the parameterised values.

RTSM status

The status object RTSM (room temperature and setpoint module) is used for the transmission of the current status values of the integrated room temperature controller, ► see Status object RTSM, p. 38.

Service mode

The service mode is used to set the KNX RF Multi radiator thermostat to a fixed command value (0% or 100%).

Setpoint offset

When the relative specified setpoint is used, the temperature modification is reached by changing the setpoint temperature by a defined value. An offset of -2 K, for example, corresponds to a temperature reduction of 2 °C. The maximum permissible offset can be set in the ETS parameters, ▶ see Relative specified setpoint, p. 34.

Setpoint value, setpoint temperature

Temperature value which is defined by parameterisation, manual operation or the KNX bus and compared with the current room temperature by the KNX RF Multi radiator thermostat. Therefore, the integrated room temperature controller defines the command value to adapt the current room temperature to the setpoint value. The terms setpoint value and setpoint temperature are used as synonyms.

Updates

You will find information on the new firmware version under Updating firmware on p. 25.

Valve output (VO)

Includes all functional units of the KNX RF Multi radiator thermostat, which can be used to change the command value or the valve position.

Valve flushing

Every seven days, the KNX RF Multi radiator thermostat performs an automated valve flushing in order to prevent calcification. The cycle of 7 days starts by inserting the batteries.

14 Licence Agreement KNX RF Multi radiator thermostat

The following outlines the contract terms for your use of the software as the "licensee".

On accepting this agreement and installing the KNX RF Multi radiator thermostat software or putting the KNX RF Multi radiator thermostat into use, you conclude an agreement with ise Individuelle Software und Elektronik GmbH and agree to abide by the terms in this agreement.

14.1 Definitions

Licensor: ise Individuelle Software und Elektronik GmbH, Oldenburg (Oldb), Osterstraße 15, Germany

Licensee: The legal recipient of the KNX RF Multi radiator thermostat software.

Firmware: Software which is embedded into the KNX RF Multi radiator thermostat hardware and is used to operate the KNX RF Multi radiator thermostat.

KNX RF Multi radiator thermostat: The KNX RF Multi radiator thermostat software designates all of the software provided for the KNX RF Multi radiator thermostat product, including the operating data. This includes, in particular, the firmware and the product database.

14.2 Object of the agreement

The object of this agreement is the KNX RF Multi radiator thermostat software provided on data storage devices or through downloads and the associated documentation in written or electronic format.

14.3 Software usage rights

The licensor grants the licensee the non-exclusive, non-transferable right to use the KNX RF Multi radiator thermostat software for an unlimited time in accordance with the following conditions for the purposes and applications specified in the valid version of the documentation (which shall be provided in printed format or also as online help or online documentation).

The licensee is obliged to ensure that each person who uses the program only does so as part of this license agreement and observes this license agreement.

14.4 Restriction of rights of use

14.4.1 Copying, modification and transmission

The licensee is not authorised to use, copy, modify or transfer the KNX RF Multi radiator thermostat software in whole or in part in any way other than as described herein. Excluded from this is one (1) copy produced by the licensee exclusively for archiving and backup purposes.

14.4.2 Reverse engineering and conversion technologies

The licensee is not authorised to apply reverse-engineering techniques to the KNX RF Multi radiator thermostat software or to convert the KNX RF Multi radiator thermostat software into another type. Such techniques include, in particular, disassembly (conversion of the binary-coded computer instructions of an executable program into an assembler language which can be read by humans) or decompilation (conversion of binary-coded computer instructions or assembler instructions into source code in the form of high-level language instructions).

14.4.3 Firmware and hardware

The firmware may only be installed and used on the hardware (KNX RF Multi radiator thermostat) approved by the licensor.

14.4.4 Transfer to a third party

The KNX RF Multi radiator thermostat software must not be transferred or made accessible to third parties.

14.4.5 Renting out, leasing out and sub-licensing

The licensee is not authorised to rent or lease the KNX RF Multi radiator thermostat software or grant sub-licenses to the program.

14.4.6 Software creation

The licensee requires written approval from the licensor to create and distribute software which is derived from the KNX RF Multi radiator thermostat software.

14.4.7 The mechanisms of license management and copy protection

The mechanisms of the license management and copy protection of the KNX RF Multi radiator thermostat software must not be analysed, published, circumvented or disabled.

14.5 Property and confidentiality

14.5.1 Documentation

The KNX RF Multi radiator thermostat software and its documentation (which shall be provided in printed format or also as online help or online documentation) are business secrets of the licensor and/or the object of copyright and/or other rights and shall continue to belong to the licensor. The licensee shall observe these rights.

14.5.2 Transfer to a third party

Neither the software, the data backup copy nor the documentation (which shall be provided in printed format or also as online help or online documentation) may be passed on to third parties at any point in time, in whole or in part, for a fee or free of charge.

14.6 Modifications and subsequent deliveries

The KNX RF Multi radiator thermostat software and the documentation (which shall be provided in printed format or additionally as online help or online documentation) shall be subject to possible changes by the licensor. You will find the latest software and documentation versions at www.ise.de.

14.7 Warranty

14.7.1 Software and documentation

The KNX RF Multi radiator thermostat software and the documentation (which shall be provided in printed form or additionally as online help or online documentation) shall be provided to the licensee in the respective valid version. The warranty period for the KNX RF Multi radiator thermostat software is 24 months. The licensor shall provide the following warranty during this time:

- The software shall be free of material and manufacturing defects when handed over to the customer.
- The software shall function as described in the documentation enclosed with it in its respective valid version.
- The software shall be executable on the computer stations specified by the licensor.

The warranty shall be fulfilled with the supply of spare parts.

14.7.2 Limitation of warranty

No warranty is given for the freedom from errors of the KNX RF Multi radiator thermostat software and its data structures. Similarly, the warranty does not cover defects due to improper use or other causes beyond the control of the licensor. Any additional warranty claims shall be excluded.

14.8 Liability

The licensor is not liable for damages due to loss of profit, data loss or any other financial loss resulting from the use of the KNX RF Multi radiator thermostat software, even if the licensor is aware of the possibility of such damage.

This limitation of liability is valid for all the licensee's damage claims, regardless of the legal basis. In any case, liability is limited to the purchase price of the product.

The exclusion of liability does not apply to damage caused due to wilful intent or gross negligence on the part of the licensor. Furthermore, claims based on the statutory regulations for product liability shall remain intact.

14.9 Applicable law

This agreement is subject to the laws of the Federal Republic of Germany.
The place of jurisdiction is Oldenburg (Oldb).

14.10 Termination

This agreement and the rights granted herein shall end if the licensee fails to fulfil one or more provisions of this agreement or terminates this agreement in writing. The supplied KNX RF Multi radiator thermostat software and its documentation (which is provided in printed format or also as online help or online documentation), including all copies, shall be returned immediately in such a case without the licensor specifically requesting their return. No claim to reimbursement of the price paid shall be accepted in such a case.

The license to use the KNX RF Multi radiator thermostat software shall expire upon termination of the agreement. In this case, the KNX RF Multi radiator thermostat product must be taken out of operation. Further use of the KNX RF Multi radiator thermostat without a licence is forbidden.

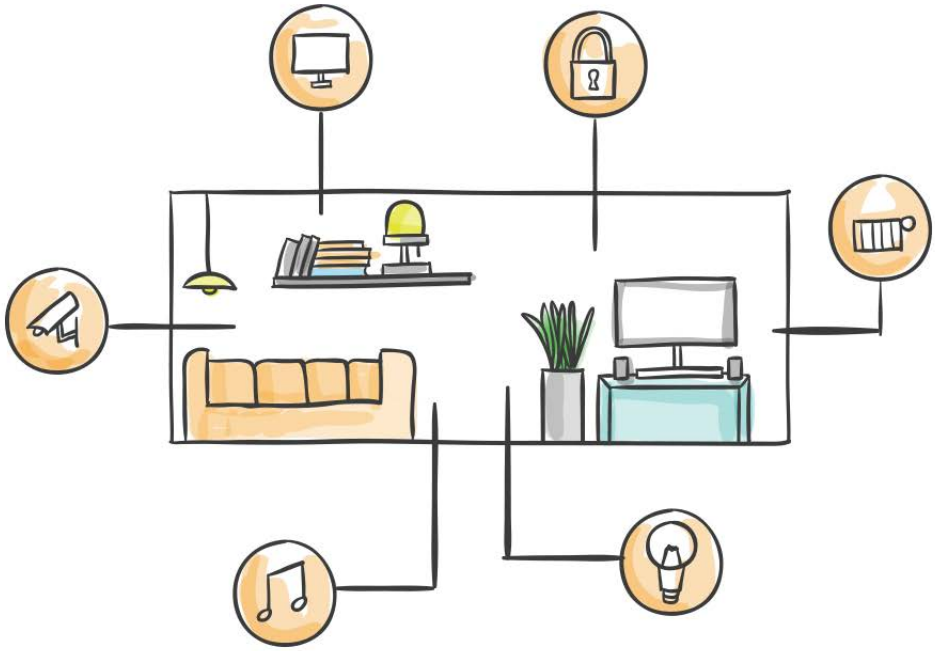
The commissioning and visualisation software must be uninstalled and all copies must be destroyed or returned to the licensor.

14.11 Subsidiary agreements and changes to the agreement

Subsidiary agreements and changes to the agreement shall only be valid in writing.

14.12 Exception

All rights not expressly mentioned in this agreement are reserved.



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