Uponor

Uponor Smatrix Base thermostat D+RH T-247 BUS

EN   Operation manual

CD0000789

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2 Preface

This operation manual explains the operation of this product and its components.

2.1 Safety instructions

Safety messages used in this document

STOP	**Warning!**
	Risk of injury and damage. Ignoring warnings can cause personal injury and/or damage to products and other property.

⚠	**Caution!**
	Risk of malfunctions. Ignoring cautions can cause the product to not operate as intended.

!	**Note**
	Important information to the section in the manual.

Uponor uses safety messages in the document to indicate special precautions required for the installation and operation of any Uponor product.

Technical constraints

⚠	**Caution!**
	To avoid interference, keep data cables away from components bearing power of more than 50 V.

Safety measures

!	**Note**
	For safe and proper use, obey the instructions given in this document. Keep them for future reference.

The installer and operator agree to comply with following measures regarding Uponor products:

- Read and obey the instructions and processes in the document.
- The installation must be performed by a qualified installer in accordance with local regulations.
- Uponor is not liable for modifications not specified in this document.
- Switch off all connected power supplies before starting any wiring work.
- Do not expose the Uponor components to flammable vapours or gases.
- Do not use water to clean electrical Uponor products/ components.

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2.2 Correct disposal of this product (Waste Electrical and Electronic Equipment)

!	**Note**
	Applicable in the European Union and other European countries with waste separation systems.

This icon on the product, or in the related documents indicates that it should not be disposed with household waste. Please, recycle responsibly to support the sustainable use of resources and prevent possible harm to human health and/or the environment.

Household users should contact the retailer where they purchased this product, or their local government office, for details on where and how they can take it for recycling.

Business users should contact their supplier and check the terms and conditions of the purchase contract. Do not dispose this product with other commercial waste.

3 System description

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The Uponor Smatrix Base thermostat D+RH T-247 BUS comes with a big LED display and capacitive keys.

The capacitive keys and the front glass make cleaning of the front of the thermostat easy.

3.1 Thermostat features

Main characteristics for the thermostat:

- Mounting
  – on wall
  – on the bigger boxes that can be used with the optional wall frame
- Optional: an external temperature sensor can be connected to the thermostat, to measure the room, floor or outdoor temperature

Software features

Main characteristics of the thermostat software:

- Heating/cooling demand indication
- Relative humidity (RH) measured value
- Comfort/ECO modes indication
- ECO setback modification
- Cooling allowed function (room by room)
- Temperature display in Celsius or Fahrenheit
- Operating modes
  – **RT**: room temperature sensor
  – **RFT**: room temperature sensor and floor temperature sensor
  – **RS**: remote sensor
  – **RO**: room temperature sensor and outdoor temperature sensor
- Room temperature calibration
- Optional: floor, remote or outdoor sensor can be connected
- Factory reset

3.2 System compatibility

> **Note**
>
> For more detailed information, product range and documentation please visit the Uponor website: www.uponor.com.
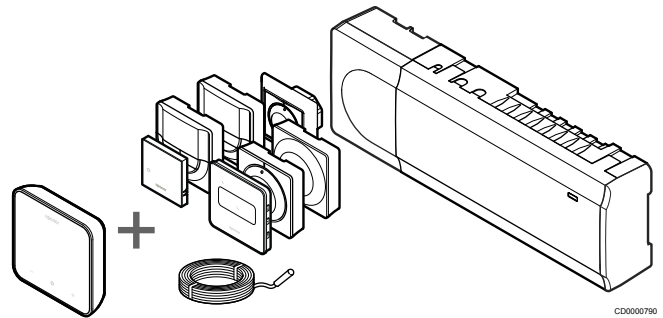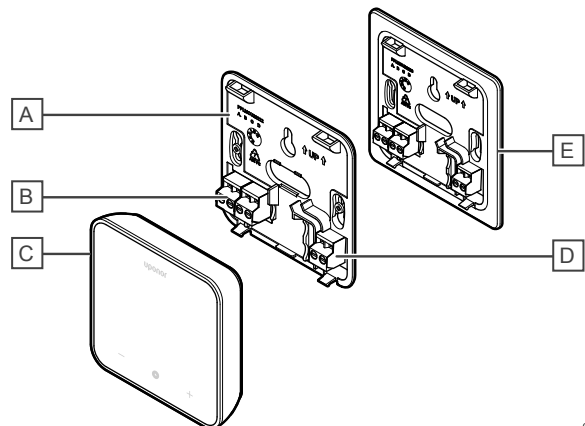

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The Uponor Smatrix Base thermostat D+RH T-247 BUS is compatible with the components listed below:

- Uponor Smatrix Base controller PULSE X-245 BUS 6X
- Uponor Smatrix Base PRO controller X-147 BUS 6X
- Uponor Smatrix Base PRO controller X-148 Modbus RTU
- Uponor Smatrix floor/remote sensor S-1XX

3.3 Components of the thermostat

The illustration below shows the thermostat and its components.

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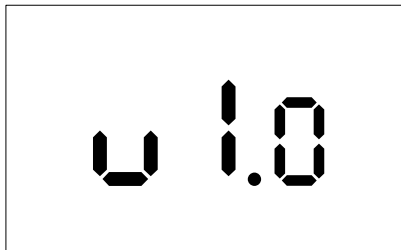| Item	Description
A	Thermostat back cover
B	Power and communication from the controller
C	Thermostat body
D	Terminal for external sensor (non-polarised)
E	Extended-size thermostat back cover (optional - not included in the box, must be ordered separately)

4 Operation

4.1 Thermostat operation

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Power on/reset display

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The software version is displayed for **3 seconds** after power on, or performing a factory reset (followed by a restart), after which it will swtich to the main screen. The LEDs will remian on for 20 seconds, and if there is no activity (no button is pressed), they will automatically turn off.

When a button is pressed, the main screen reappears, and the LEDs light up again. If there is no further activity, the LEDs will turn off again after 20 seconds.

### Register thermostat to the room controller
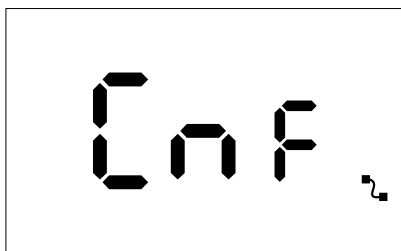
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After the Smatrix controller is set to registration mode and the required channels are selected, proceed to the thermostat and press the **+** and **-** buttons for 5 seconds to initiate the registration process.

The screen will display "CnF" and the icon ( ) will flash, indicating that the registration is in progress. After successful registration, the

icon ( ) will remain steady, and the screen will switch to run mode, displaying the main screen.

If the registration process is not completed successfully within the 20-seconds timeout period, the thermostat will display the "not paired"

icon ( ). After a few seconds, it will return to run mode, displaying the main screen.

Thermostat key descriptions
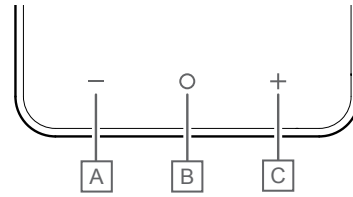
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Item	Key/icon	Description
A	**-**	Minus/decrease
B	**O**	OK
C	**+**	Plus/increase

- and + keys

The keys **–** and **+** are used to

- Activate the thermostat
- Adjust setpoint temperature
- Move from one parameter to the next/previous one in the settings menu

O (OK) key

The key **O** (OK) is used to

- Activate the thermostat
- Toggle between current status data, and values of available sensors connected to the thermostat
- Enter and exit the settings menu (holding the key for about **3 seconds**)
- Confirm a setting

4.2 Display descriptions
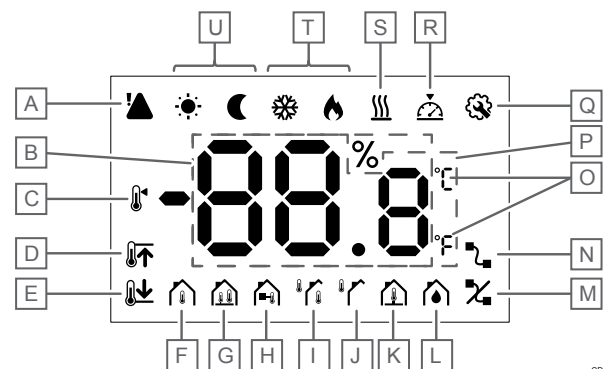
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Symbols/icons

The figure shows all possible symbols and characters that can be shown on the display:

Item	Icon	Description
A		Alarm
B		Relative humidity measured with the RH sensor

| Item	Icon	Description
C		Setpoint
D		High limitation of floor temperature
E		Low limitation of floor temperature
F		Control mode, Room temperature sensor
G		Control mode, Room temperature sensor and floor temperature sensor
H		Control mode, Remote sensor
I		Control mode, Room temperature sensor and outdoor temperature sensor
J		Outdoor temperature sensor
K		Floor temperature sensor
L		Relative humidity
M		• Pairing not ok • Communication lost
N		• Pairing ok • Active communication (flashes to indicate active communication during run mode)
O	℃ ℉	Temperature unit
P	88.8	Temperature
Q		Settings menu
R		Calibration
S		Demand
T		Heating/cooling mode
U		Comfort/ECO mode

4.3 Main screen

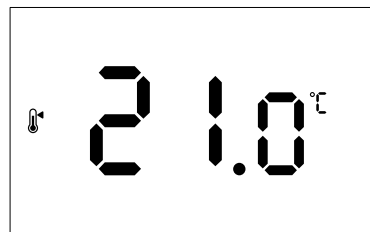The display below shows the main screen after activation:
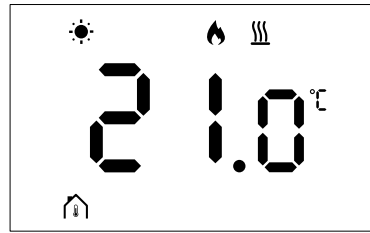
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4.4 Change setpoint

On the main screen, pressing the **–** or **+** button for the first time will switch the display from the main screen to the setpoint adjustment screen, where the current setpoint value will be shown.

The change setpoint display could show any of the symbols listed below:
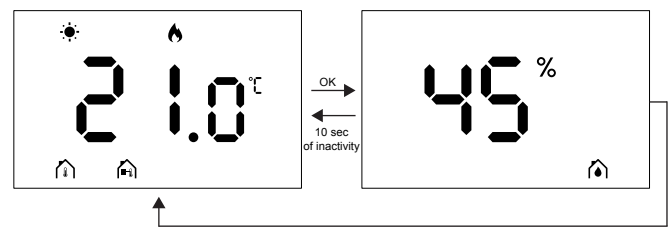

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The setpoint adjustment screen can display various icons, including those for ECO/Comfort mode, Heating/Cooling, Demand/No Demand, Regulation mode, and units. However, not all icons are shown simultaneously; they appear according to the current system status.

When the **–** or **+** buttons are pressed, the setpoint adjusts in 0,5° increments. Once the desired setpoint is selected, either pressing the OK button or waiting for 10 seconds of inactivity will cause the display to return to the main screen.

4.5 Sensor readings

This thermostat has a RH sensor that measures the room's relative humidity. When the regulation mode is set to **RFT** or **RO**, an external sensor measures a second temperature (floor temperature for **RFT** or outdoor temperature for **RO**). To see the readings from the other sensors, press the **OK** button on the main screen.
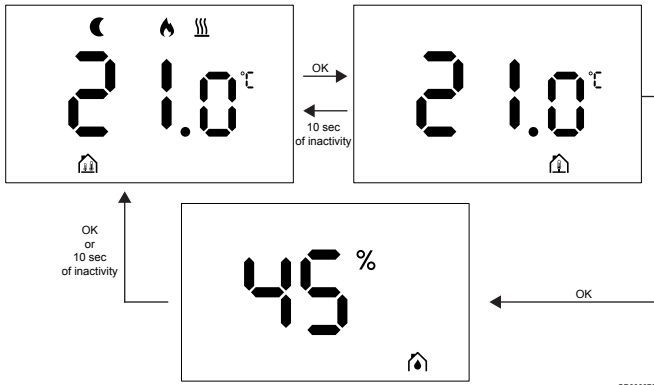
Regulation mode is RT or RS

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• Only one temperature will be measured, which is already displayed on the main screen.

• When you press the **OK** button, the display switches from the main screen to the humidity measurement screen.

• After 10 seconds of inactivity, the display will automatically return to the main screen.
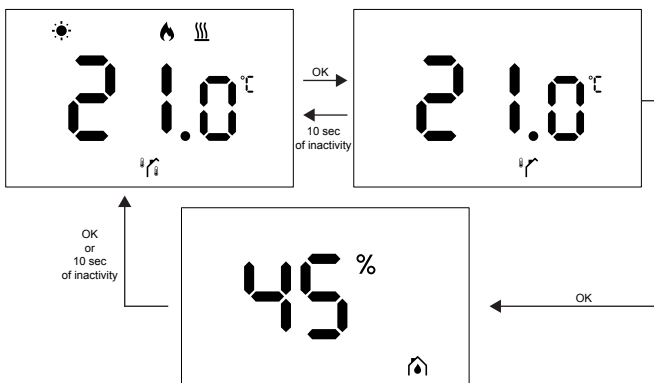
Regulation mode is RFT

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- External sensor measures the floor temperature.
- The room temperature, measured by the internal sensor, is already displayed on the main screen.
- When you press the **OK** button, the display switches from the main screen to the floor temperature screen. Pressing the **OK** button again will take you to the humidity measurement screen.
- After 10 seconds of inactivity, the display will automatically return to the main screen.

Regulation mode is RO

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- External sensor measures the outdoor temperature.
- The room temperature, measured by the internal sensor, is already displayed on the main screen.
- When you press the **OK** button, the display switches from the main screen to the outdoor temperature screen. Pressing the **OK** button again will take you to the humidity measurement screen.
- After 10 seconds of inactivity, the display will automatically return to the main screen.

4.6 Digital thermostat functions

Run mode

The thermostat is in run mode during normal operation.

The display turns off after 20 seconds of inactivity and can only be reactivated by pressing a button.

Control mode

⚠	**Caution!**
	The thermostat control mode must be set before the thermostat is registered to the room controller.
	To make subsequent changes to this setting, you must register the thermostat again.

❗	**Note**
	While in a submenu, if no button on the thermostat is pushed for approximately 10 seconds, the current values will be saved, and the software will return to the settings menu. Approximately 10 seconds later, the software will return to main screen.

The thermostat has four different control modes. These modes can be set in the settings menu.

Display	Display text	Thermostat function
rt	RT	Room temperature sensor
rF t	RFT	Room temperature sensor and floor temperature sensor
rS	RS	Remote sensor
r0	RO	Room temperature sensor and outdoor temperature sensor

Thermostat settings

❗	**Note**
	While in a submenu, if no button on the thermostat is pushed for approximately 8 seconds, the current values will be saved, and the software will return to the settings menu. Approximately 60 seconds later, the software will return to main screen.

All the parameters for thermostat operation can be set in this menu.

Change the settings

To enter the settings menu:

1. Push and hold the **OK** button for approximately 3 seconds.
2. The settings icon and menu numbers are displayed in the center of the display.
3. Use the **-** or **+** button to change the numbers to locate a submenu (see list below).

02

Heating/cooling changeover

This menu is not visible if the thermostat is registered to a Uponor Smatrix Base Pulse controller.

03

ECO mode setback temperature

This menu is not visible if a communication module is connected to the system. The setting is then available in the Uponor Smatrix Pulse app.

04

Control mode

05

High floor temperature limitation

This menu is only visible if control mode RFT is activated in settings menu 04. For systems with a communication module, this menu only shows the set value. Changes can be made in the Uponor Smatrix Pulse app.

06

Low floor temperature limitation

This menu is only visible if control mode RFT is activated in settings menu 04. For systems with a communication module, this menu only shows the set value Changes can be made in the Uponor Smatrix Pulse app.

07

Cooling allowed

This menu is not visible if a communication module is connected to the system. The setting is then available in the Uponor Smatrix Pulse app.

08

Display unit

11

Room temperature calibration

4. Push **OK** to enter parameter edit mode.
   The parameter starts to flash.
5. Change the parameters by pressing **-** or **+** button.
6. Push and hold the **OK** button for approximately 3 seconds to exit the settings menu.

02 Heating/cooling changeover

Default: 0

Setting range: Heating/Cooling

This menu is not visible if the thermostat is registered to a Uponor Smatrix Base Pulse controller.

See *Change the settings, Page 9* , for how to change the setting.

03 ECO mode setback temperature

Default: 4 ˚C

Setting range: 0 – 11 ˚C, 0.5 ˚C increments

In this menu, you can change the setback temperature for whenever the channel is in ECO mode.

The setting adjusts the current setpoint with the set value. In heating mode, the setpoint is decreased. In cooling mode, the setpoint is increased.

If the setback temperature is set to 0, the thermostat will remain unaffected if a program sets the system in ECO mode.

This menu is not visible if a communication module is connected to the system. The setting is then available in the Uponor Smatrix Pulse app.

See *Change the settings, Page 9* , for how to change the setting.
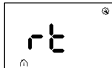
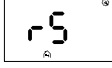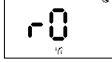## 04 Control mode

Default: 0

Setting range: 0=RT, 1=RFT, 2=RO, 3=RS

In this menu, you can set the control mode for the thermostat.

If an external sensor is connected to the thermostat, you must choose a control mode to accommodate the extra functionality of the sensor.

The current control mode is displayed (RT, RFT, RS or RO).

See *Change the settings, Page 9* , for how to change the setting.

Display	Display text	Thermostat function
rt	RT	Room temperature sensor
rFt	RFT	Room temperature sensor and floor temperature sensor
rS	RS	Remote sensor
rO	RO	Room temperature sensor and outdoor temperature sensor

05 High floor temperature limitation

> **!**
>
> **Note**
>
> This parameter must be higher than the **06 Low floor temperature limitation**.

Default: 26 ˚C

Setting range: 20 – 35 ˚C, 0.5 ˚C increments

In this menu, you can set the maximum permitted floor temperature.

This menu is only visible if control mode RFT is activated in settings menu 04. For systems with a communication module, this menu only shows the set value. Changes can be made in the Uponor Smatrix Pulse app.

See *Change the settings, Page 9* , for how to change the setting.

06 Low floor temperature limitation

> **Note**
>
> This parameter must be lower than the **05 High floor temperature limitation**.

Default: 20 ˚C

Setting range: 10 – 30 ˚C, 0.5 ˚C increments

In this menu, you can set the minimum permitted floor temperature.

This menu is only visible if control mode RFT is activated in settings menu 04. For systems with a communication module, this menu only shows the set value Changes can be made in the Uponor Smatrix Pulse app.

See *Change the settings, Page 9* , for how to change the setting.

07 Cooling allowed

In this menu it is set whether cooling is allowed in the room or not.

This menu is not visible if a communication module is connected to the system. The setting is then available in the Uponor Smatrix Pulse app.

See *Change the settings, Page 9* , for how to change the setting.

08 Display unit

In this menu, you can set the temperature unit (°C or °F) that you want to see on the display.

Display	Display text	Description
°C	°C	Degrees Celsius
°F	°F	Degrees Fahrenheit

See *Change the settings, Page 9* , for how to change the setting.

11 Room temperature calibration

Default: 0.0 ˚C

Setting range: -6.0 – 6.0 ˚C, 0.1 ˚C increments

In this menu, you can calibrate the room temperature shown on the thermostat display.

See *Change the settings, Page 9* , for how to change the setting.

4.7 Factory reset

> **Note**
>
> Do not do a factory reset of the thermostat unless it is absolutely necessary.

> **Note**
>
> A factory reset erases the registration data from the thermostat.
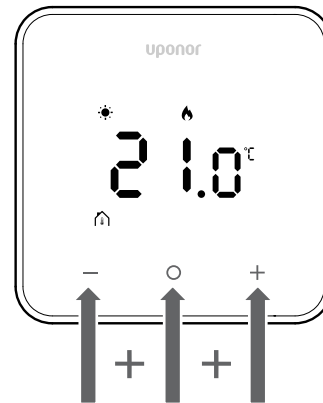
Follow the instructions below to **reset the thermostat (factory reset)**:

1. Hold all three keys **—** and **O** (OK) and **+** for **10 seconds**
2. The assignment to the controller is removed, and all parameter values are restored to their default settings
3. The thermostat initiates a restart.

5 Troubleshooting

5.1 General

This section describes general problems and alarms that can occur with the Uponor Smatrix system and gives solutions for them. Problems are frequently caused by loops that are installed incorrectly or by thermostats that are in the incorrect room or that are registered incorrectly.

> **Note**
>
> For more information, please refer to the Uponor OM Smatrix Base Pulse.

5.2 Troubleshooting after installation

> **Note**
>
> For more information, please refer to the Uponor OM Smatrix Base Pulse.

5.3 Flash-illuminated alarm symbols

Icon	Description
✕	Communication lost indicator
▲+⌂	Faulty room temperature sensor
▲+⌂	Faulty floor temperature sensor This symbol is only visible if control mode is set to **RFT**.
▲+⌂	Faulty remote temperature sensor This symbol is only visible if control mode is set to **RS**.
▲+⌂	Faulty outdoor temperature sensor This symbol is only visible if control mode is set to **RO**.
⌂	Relative humidity limit reached This symbol is only visible if cooling is active and RH control is enabled in the Uponor Smatrix Pulse app (which requires a communication module).

5.4 Digital thermostat alarms/problems

The display remains inactive after pressing a button

- The cable is not correctly positioned or a wire is damaged
    - Examine the wiring.
    - Make sure that the thermostat is connected directly to the room controller with a short bus connection.
    - If the thermostat operates correctly, examine the wiring (cable and connections). If problem continues, replace the thermostat.

Communication failure icon is displayed in the alarm list
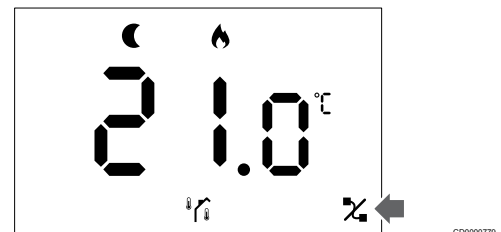

Figure 1. Example from a heating system operating in eco mode without demand, in control mode RO

- The cable is not correctly positioned or a wire is damaged
    - Examine the wiring.
    - Make sure that the thermostat is connected directly to the room controller with a short bus connection.
    - If the thermostat operates correctly, examine the wiring (cable and connections). If problem continues, replace the thermostat.
- The thermostat is defective
    - Change the temperature setpoint to cause the thermostat to transmit.
    - Replace the thermostat.

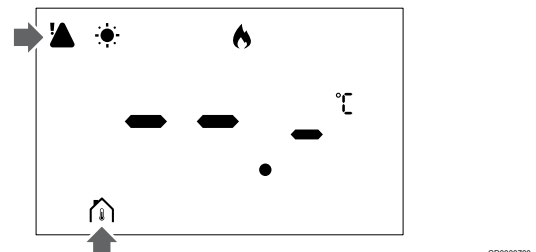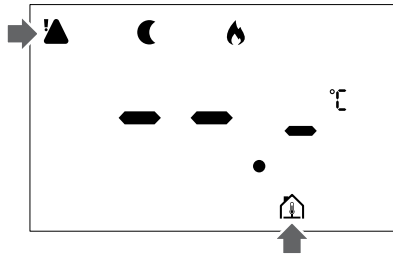### Room temperature sensor icon is displayed in the alarm list

Figure 2. Example from a heating system operating in comfort mode without demand, in control mode RT

- Defective temperature sensor
    - Speak to the installer or replace the thermostat.

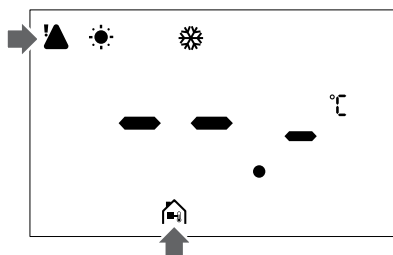## Floor temperature sensor icon is displayed in the alarm list

Figure 3. Example from a heating system operating in eco mode without demand, in control mode RFT

- Defective temperature sensor
    - Make sure that the floor sensor is connected correctly.
    - Disconnect the temperature sensor and examine it with an ohmmeter. Make sure that the value agrees with the temperature sensor diagram.
- Incorrect thermostat control mode
    - Select the correct thermostat control mode (settings menu 4).
- Temperature sensor not connected
    - Connect the temperature sensor.

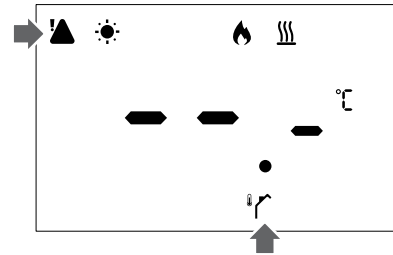## Remote temperature sensor icon is shown in the alarm list

Figure 4. Example from a cooling system operating in comfort mode without demand, in control mode RS

- Defective temperature sensor
    - Make sure that the remote sensor is connected correctly.
    - Disconnect the remote temperature sensor and examine it with an ohmmeter. Make sure that the value agrees with the temperature sensor diagram.
- Incorrect thermostat control mode
    - Select the correct thermostat control mode (settings menu 4).
- Temperature sensor not connected
    - Connect the temperature sensor.

## Outdoor temperature sensor icon is displayed in the alarm list

Figure 5. Example from a heating system operating in comfort mode with demand, in control mode RO

- Defective temperature sensor
    - Make sure that the outdoor sensor is connected correctly.
    - Disconnect the temperature sensor and examine it with an ohmmeter. Make sure that the value agrees with the temperature sensor diagram.
- Incorrect thermostat control mode
    - Select the correct thermostat control mode (settings menu 4).
- Temperature sensor not connected
    - Connect the temperature sensor.

Relative humidity icon is displayed in the alarm list
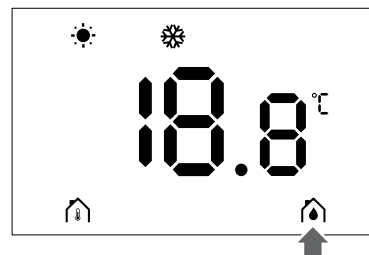
Figure 6. Example from a cooling system operating in comfort mode without demand, in control mode RT

> **Note**
>
> Relative humidity control is activated in the Uponor Smatrix Pulse app (requires communication module).

- The relative humidity limit is reached
    - Start a dehumidifier or increase the supply temperature setpoint to lower the humidity level.

5.5 Speak to the installer

For the installer's contact information, refer to the installation report. Prepare this information before you speak to an installer:

- Installation report
- Drawings of the underfloor heating system (if available)
- List of all alarms, including times and dates

5.6 Installer instructions

To determine if a problem is caused by the supply system or the control system, do these steps:

Loosen the actuators from the manifold for the applicable room. Wait few minutes. Then examine if the flow pipe of the underfloor heating loop becomes warm.

If the pipe does not become warm, the problem is in the heating system. If the loop becomes warm, the cause can be the room control system.

A supply system malfunction can be identified by no warm water in the manifold. Do a check of the boiler and circulation pump.

6 Technical data

6.1 Technical specifications

Description	Value
Product name	Uponor Smatrix Base thermostat D+RH T-247 BUS
IP	IP20, class III (IP: degree of inaccessibility to active parts of the product and degree of water)
Max. ambient RH (relative humidity)	85 % at 20 °C
Marking	CE
ERP	Class IV
Low-voltage tests	EN 60730-1* and EN 60730-2-9**
EMC (electromagnetic compatibility requirements) tests	EN 60730-1
Power supply	From room controller
Voltage	4,5 V to 5,5 V
Rated impulse voltage	2500 V
Pollution degree	2 - Normal household environment
Software class	A
Operating temperature	0 °C to +45 °C
Storage temperature	-10 °C to +65 °C
Connection terminals	13,5 A/250 V/4 kV/3/ IEC61984/0,08 – 1,5 mm²
Purpose of control	Thermostat
Construction of control	Electronic independently mounted control
Terminal method of disconnection	Type Y
Temperature for ball pressure test	75 °C

*) EN 60730-1 Automatic electrical controls for household and similar use -- Part 1: General requirements

**) EN 60730-2-9 Automatic electrical controls for household and similar use -- Part 2-9: Particular requirements for temperature sensing controls

Regulatory conformance

The Uponor Smatrix Base thermostat D+RH T-247 BUS complies with the following directives.

- CE
- UKCA

EU/UK Declaration of conformity

Hereby, Uponor declares that the Uponor Smatrix Base thermostat D+RH T-247 BUS is in compliance with the relevant Community harmonisation legislation. [1]

The full text of the EU/UK declaration of conformity is available at the following internet address:
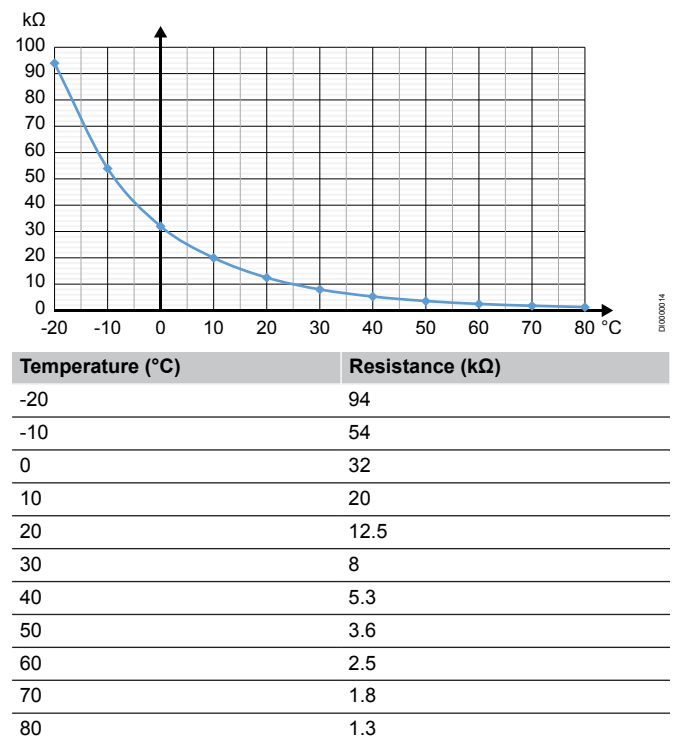
https://www.uponor.com/doc/1071651

1) Refer to the related Uponor product for the specified certification and compliance marks.

Additional product information and instructions are delivered with the Uponor product. They are available at the website www.uponor.com/services/download-centre and at the national Uponor websites in local language.

6.2 Performance curves

External temperature sensor resistance diagram
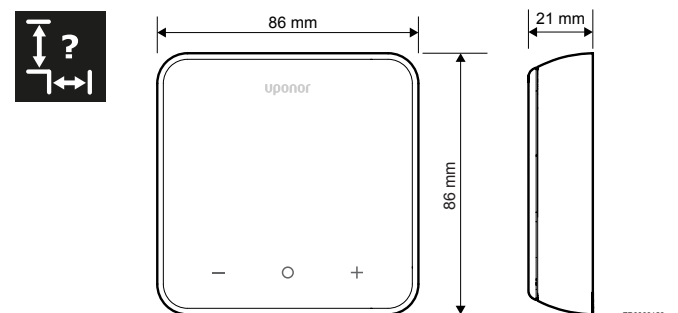
Temperature (°C)	Resistance (kΩ)
-20	94
-10	54
0	32
10	20
20	12.5
30	8
40	5.3
50	3.6
60	2.5
70	1.8
80	1.3

6.3 Dimensions

86 mm · 86 mm · 21 mm

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Uponor reserves the right to change the product portfolio and the related documentation without prior notification, in line with its policy of continuous improvement and development.

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