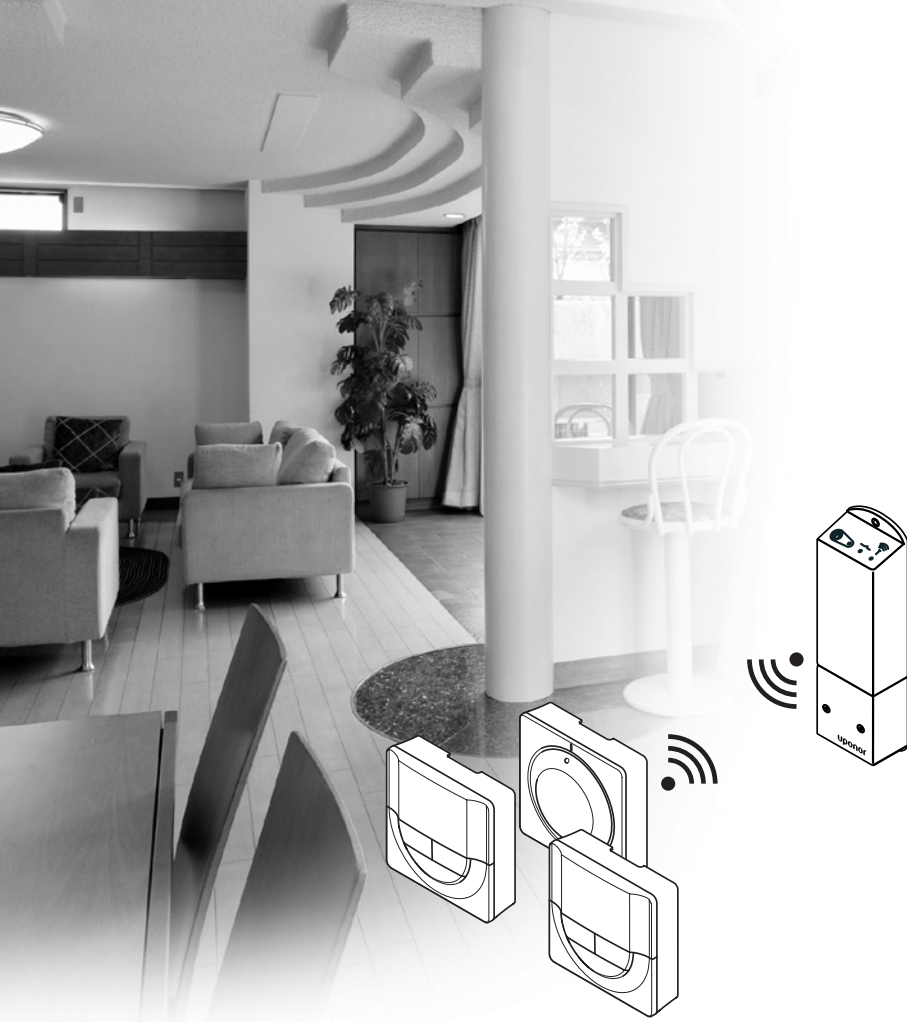


Uponor



Uponor Smatrix Space/Space PLUS

UK INSTALLATION AND OPERATION
MANUAL

Table of contents

1	Copyright and disclaimer	3
2	Preface	4
2.1	Safety instructions	4
2.2	Limitations for radio transmission	4
2.3	Correct disposal of this product (Waste Electrical and Electronic Equipment)	4
3	Uponor Smatrix Space	5
3.2	Example of a system	5
3.3	Uponor Smatrix Space components	6
3.4	Accessories	8
3.5	Functions	9
4	Install Uponor Smatrix Space	10
4.1	Installation procedure	10
4.2	Prepare for installation	10
4.3	Installation example	11
5	Install Uponor Smatrix Space controller	12
5.1	Placement of controller	12
5.2	Attach controller to the wall	12
5.3	Connect components to controller	12
5.4	Connect the controller to AC power	14
5.7	Test actuators	14
6	Install Uponor Smatrix Wave thermostats and sensors	15
6.1	Placement of thermostats	15
6.2	Label thermostats	15
6.3	Insert batteries	15
6.4	Connect external sensor to thermostat (optional) ..	15
6.5	Attach a thermostat to the wall	16
6.6	Attach to table stand	16
6.7	First startup of digital thermostats	17
6.8	First setup of digital thermostats	18
6.9	Register thermostats to controller	19
7	Finishing installation	20
8	Operate Uponor Smatrix Space controller	21
8.1	Principle of operation	21
8.2	Normal operation without optional scheduling programs	21
8.3	Operation with scheduling programs	21
8.4	Run mode	21
8.5	Reset the controller	21
8.6	Unregister a thermostat from the controller	21
9	Operate Uponor Smatrix Wave analogue thermostats	22
9.1	Thermostat layout	22
9.2	Adjust temperature	22
9.3	Replace batteries	22
9.4	Factory reset	23
10	Operate Uponor Smatrix Wave digital thermostats	24
10.1	Thermostat layout	24
10.2	Display layout	24
10.3	Operating buttons	25
10.4	Start up	25
10.5	Adjust temperature	26
10.6	Run mode	26
10.7	Control mode	27
10.8	Change control mode	27
10.9	Settings	27
10.10	Factory reset	31
10.11	Replace batteries	31
11	Maintenance	32
11.1	Manual preventive maintenance	32
11.2	Corrective maintenance	32
11.3	Controller LEDs	32
12	Troubleshooting	33
12.1	Troubleshooting after installation	34
12.2	Digital thermostats T-166 and T-168 alarms/problems	34
12.3	Analogue thermostat T-165 alarms/problems	34
12.4	Controller alarms/problems	35
12.5	Contact the installer	35
12.6	Installer instructions	35
13	Technical data	36
13.1	Technical data	36
13.2	Technical specifications	36
13.3	Controller layout	37
13.4	Wiring diagrams	37
13.5	Dimensions	37
14	Installation report	38

1 Copyright and disclaimer

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The presumption for the manual is that the safety measures have been fully complied with and, further, that Uponor Smatrix Space, including any components that are part of such system, covered by the manual:

- is selected, planned and installed and put into operation by a licensed and competent planner and installer in compliance with current (at the time of installation) installation instructions provided by Uponor as well as in compliance with all applicable building and plumbing codes and other requirements and guidelines;
- has not been (temporarily or continuously) exposed to temperatures, pressure and/or voltages that exceed the limits printed on the products or stated in any instructions supplied by Uponor;
- remain in its originally installed location and is not repaired, replaced or interfered with, without prior written consent of Uponor;
- is connected to potable water supplies or compatible plumbing, heating and/or cooling products approved or specified by Uponor;
- is not connected to or used with non-Uponor products, parts or components except for those approved or specified by Uponor; and
- does not show evidence of tampering, mishandling, insufficient maintenance, improper storage, neglect or accidental damage before installation and being put into operation.

While Uponor has made efforts to ensure that the manual is accurate, Uponor does not guarantee or warrant the accuracy of the information contained herein. Uponor reserves the right to modify the specifications and features described herein, or discontinue manufacture of Uponor Smatrix Space described at any time without prior notice or obligation. The manual is provided "as is" without warranties of any kind, either expressed or implied. The information should be independently verified before using it in any manner.

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This disclaimer and any provisions in the manual do not limit any statutory rights of consumers.

2 Preface

This installation and operation manual describes how to install and operate the components of the system.

2.1 Safety instructions

Warnings used in this manual

The following symbols are used in the manual to indicate special precautions when installing and operating any Uponor equipment:



WARNING!

Risk of injury. Ignoring warnings can cause injury or damage components.



CAUTION!

Ignoring cautions can cause malfunctions.

Safety measures

Conform to the following measures when installing and operating any Uponor equipment:

- Read and follow the instructions in the installation and operation manual.
- Installation must be performed by a competent person in accordance with local regulations.
- It is prohibited to make changes or modifications not specified in this manual.
- All power supply must be switched off before starting any wiring work.
- Do not use water to clean Uponor components.
- Do not expose the Uponor components to flammable vapours or gases.

We cannot accept any responsibility for damage or breakdown that can result from ignoring these instructions.

Power



WARNING!

The Uponor system uses 50 Hz, 230 V AC power. In case of emergency, immediately disconnect the power.

Technical constraints



CAUTION!

To avoid interference, keep installation/data cables away from power cables of more than 50 V.

2.2 Limitations for radio transmission

The Uponor system uses radio transmission. The frequency used is reserved for similar applications, and the chances of interference from other radio sources are very low.

However, in some rare cases, it might not be possible to establish perfect radio communication. The transmission range is sufficient for most applications, but each building has different obstacles affecting radio communication and maximum transmission distance. If communication difficulties exist, Uponor recommends relocating the controller to a more optimal position, and not installing Uponor radio sources too close to each other, for solving exceptional problems.

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



NOTE!

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



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

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

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

3 Uponor Smatrix Space

Uponor Smatrix Space is a single channel management system for underfloor heating, and ceiling cooling installations. It is best used when adding a new zone or ceiling cooling to an existing underfloor heating system.

3.1 System overview

Uponor Smatrix Space consists of a single channel controller and a thermostat connected to an 2-way valve actuator (230 V) and optional component producing heating/cooling. The controller manages the operation of the actuator, switching between heating and cooling when a signal is received, and start/stop optional heating or cooling when a demand is present.

An Uponor Smatrix Space system is the combination of a controller:

- Uponor Smatrix Space Controller X-161 (controller)

Together with one of the following thermostats:

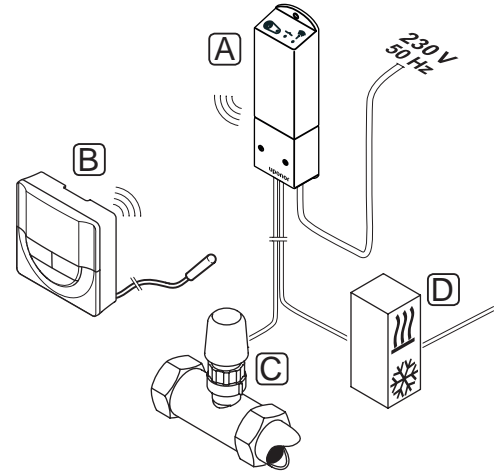
- Uponor Smatrix Wave Thermostat Standard T-165 (standard thermostat T-165)
- Uponor Smatrix Wave Thermostat Dig T-166 (digital thermostat T-166)
- Uponor Smatrix Wave Thermostat Prog.+RH T-168 (digital thermostat T-168)

Creating one of the following systems:

- **Uponor Smatrix Space Cooling**
Heating and cooling, with an internal relative humidity sensor, with an optional external sensor and scheduling (digital thermostat T-168)
- **Uponor Smatrix Space PLUS Renovation**
Heating and cooling, without a relative humidity sensor, with an optional external sensor (digital thermostat T-166)
- **Uponor Smatrix Space Renovation**
Basic heating (standard thermostat T-165)

3.2 Example of a system

The illustration below shows an example of an Uponor Smatrix Space Cooling installation.



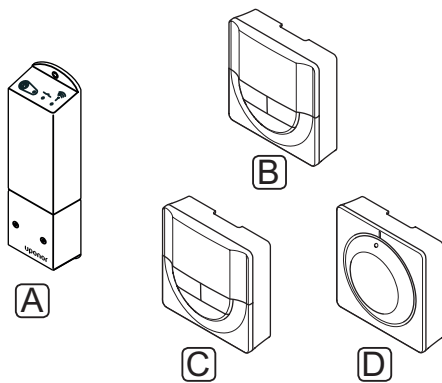
Item	Description
A	Uponor Smatrix Space Controller X-161
B	Uponor Smatrix Wave Thermostat Prog.+RH T-168 with floor sensor <i>The floor sensor is used for limitation of the floor temperature, regardless of the room temperature. The thermostat can also be used with an external sensor, such as outdoor sensor or a remote sensor</i>
C	2-way valve actuator (230 V)
D	External heating/cooling product (third-party product, just schematic example in illustration), such as a 3-way switch over valve.

! NOTE!

The floor sensor can be connected to digital thermostats T-166 and T-168. Floor temperature limitation is activated in the thermostat menu system.

For example, the maximum limitation can protect a sensitive floor covering from exposure of too high temperature when there is a high heating demand. The minimum limitation can keep a tiled floor warm even when there is a no general demand for heat supply to the room.

3.3 Uponor Smatrix Space components

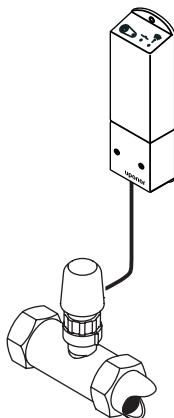


Pos.	Uponor designation	Description
A	Uponor Smatrix Space Controller X-161	Controller
B	Uponor Smatrix Wave Thermostat Prog.+RH T-168	Programmable digital thermostat with relative humidity sensor
C	Uponor Smatrix Wave Thermostat Dig T-166	Digital thermostat
D	Uponor Smatrix Wave Thermostat Standard T-165	Standard thermostat

CONTROLLER

The controller operates the actuator to a 2-way valve and a heating/cooling output, which in turn affect the flow of the supply water, to change the indoor temperature using information transmitted from a registered thermostat and system parameters.

The illustration below shows the controller with a connected 2-way valve actuator (230 V).



Uponor Smatrix Space Controller X-161

Main characteristics:

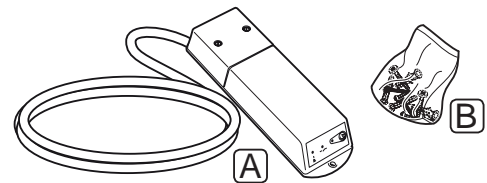
- Potential free contacts (230 V AC, 5 A).
- Electronic control of 2-way valve actuator (230 V).
- 2-way communication with a room thermostat.
- Heating/cooling relay.
- Basic relative humidity control.
- Lower indoor temperature with night set back.

Options:

- Free placement and orientation when installing the controller.

Components of the controller

The illustration below shows the controller and its components.



Item	Description
A	Uponor Smatrix Space Controller X-161 (power cable not included in UK)
B	Mounting material

THERMOSTATS

The thermostats communicate with the controller through radio transmissions and are used individually. They all use the same type of battery.

The following Uponor Smatrix thermostats can be used in the system:

- Uponor Smatrix Wave Thermostat Standard T-165
- Uponor Smatrix Wave Thermostat Digital T-166
- Uponor Smatrix Wave Thermostat Prog.+RH T-168

! NOTE!

The thermostat is affected by the temperature of the surrounding surfaces as well as the ambient air temperature.

Uponor Smatrix Wave Thermostat Standard T-165

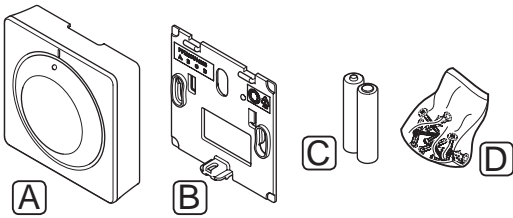
The thermostat temperature settings are adjusted using the dial. The 21 °C position is marked on the dial.

Main characteristics:

- Adjust temperature setpoint with large dial.
- LED ring indication when twisting the dial (changing temperature setpoint).
- Setpoint range is 5 – 35 °C.
- LED in lower right corner indicating, for about 60 seconds, whether a heating or cooling demand exists.
- Can be placed up to 30 meters away from the controller.

Components of the thermostat:

The illustration below shows the thermostat and its components.



Item	Description
A	Uponor Smatrix Wave Thermostat Standard T-165
B	Wall bracket
C	Batteries (AAA 1.5 V)
D	Mounting material

Uponor Smatrix Wave Thermostat Dig T-166

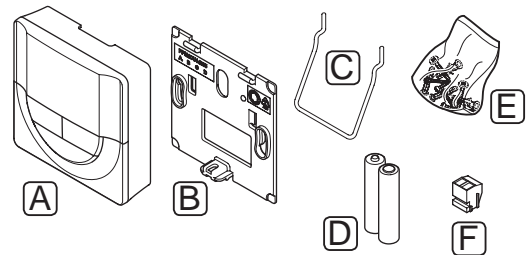
The thermostat shows the ambient or set temperature on the display. Temperature settings are adjusted using the +/- buttons on the front.

Main characteristics:

- Backlit display, dims after 10 seconds of inactivity.
- Displays Celsius or Fahrenheit.
- Heating/cooling demand as well as low battery indication in display.
- Displays software version during power up sequence.
- Setpoint range is 5 – 35 °C.
- Room temperature regulation with use of optional external temperature sensors.
- Displays optional temperature sensor values if sensors are connected and relevant room temperature regulation is activated.
- Heating/cooling changeover (menu setting).
- Can be placed up to 30 meters away from the controller.

Components of the thermostat:

The illustration below shows the thermostat and its components.



Item	Description
A	Uponor Smatrix Wave Thermostat Dig T-166
B	Wall bracket
C	Stand
D	Batteries (AAA 1.5 V)
E	Mounting material
F	Connection terminal

Uponor Smatrix Wave Thermostat Prog.+RH T-168

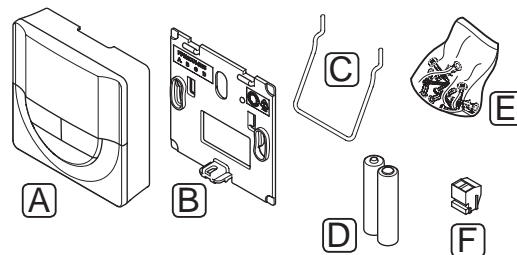
The thermostat shows the ambient, set temperature or relative humidity, and time on the display. Settings are adjusted using the +/- buttons on the front. Other programmable settings are scheduling and individual night set back (on a room by room basis) etc.

Main characteristics:

- Backlit display, dims after 10 seconds of inactivity.
- Displays Celsius or Fahrenheit.
- Heating/cooling demand as well as low battery indication in display.
- Displays software version during power up sequence.
- Setup wizard to set time and date when installed for the first time or after a factory reset.
- Option to set the clock.
- Setpoint range is 5 – 35 °C.
- Room temperature regulation with use of optional external temperature sensors.
- Displays optional temperature sensor values if sensors are connected and relevant room temperature regulation is activated.
- Programmable to switch between Comfort and ECO modes with adjustable ECO setback value in the room.
- Heating/cooling changeover (menu setting).
- Relative humidity limit indicated in display.
- Scheduling, pre-programmed and customizable schedules.
- Lower indoor temperature with night set back.
- Can be placed up to 30 meters away from the controller.

Components of the thermostat:

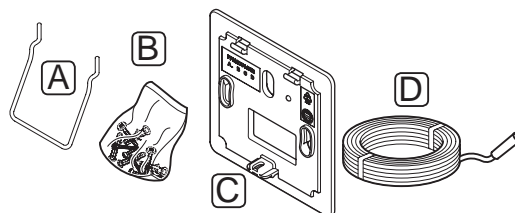
The illustration below shows the thermostat and its components.



Item	Description
A	Uponor Smatrix Wave Thermostat Prog.+RH T-168
B	Wall bracket
C	Stand
D	Batteries (AAA 1.5 V)
E	Mounting material
F	Connection terminal

3.4 Accessories

Uponor offers a wide variety of accessories for use with the standard portfolio.



! NOTE!

Some of these accessories may be included in the system.

Item	Component	Description
A	Attachment options for thermostats T-165, T-166 and T-168	Table stand
B		Screws
C	Uponor Smatrix Wallframe T-X A-1XX (wallframe T-X A-1XX)	Wall frame for covering larger area of the wall than original back plate. Used at installation of thermostats T-165, T-166 and T-168
D	Uponor Smatrix Sensor Floor/Remote S-114 (floor/remote sensor S-114)	Floor/remote sensor for use with digital thermostats T-166 and T-168

3.5 Functions

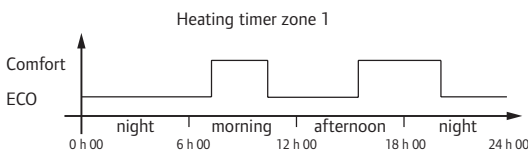
Uponor Smatrix Space is used to control a single zone in an underfloor heating and/or cooling system in a house.

The thermostat registered to the controller is used to control the actuator mounted on top of a 2-way valve controlling the flow to the zone.

As soon as the temperature measured at a thermostat is lower (heating mode) or higher (cooling mode) than the setpoint temperature, a demand to change the room temperature is created and sent to the controller. The controller will operate the actuator according to current control mode and settings. This will manage the flow to the floor loops in the room and adjust the room temperature. Once the set temperature is reached, this information is sent to the controller and the demand is met.

COMFORT AND ECO MODES (T-168 ONLY)

If the thermostat T-168 is connected to the controller, it is possible to regulate the temperature setpoint modes between three different temperatures. Available modes is **Comfort** and **ECO** (economy). See example of *Comfort and ECO mode below*.



The diagram shows that the system delivers heating in comfort mode in the morning and afternoon, but the system enters ECO mode during night and in the middle of the day, when the house normally is empty.

LOW HYSTERESIS TEMPERATURE

Uponor uses a low hysteresis temperature for best performance of the system. It is used for high control accuracy by deciding when to start and stop heating and cooling, based on information from the sensor and setpoint value.

HEATING FALL BACK

If the connection to the thermostat is lost, the loop cannot be regulated using the air temperature. The controller then activates a fall back function and the actuator is operated with a set interval.

The function is activated until the thermostat is reconnected.

HEATING/COOLING OFFSET (T-166 AND T-168 ONLY)

Uponor uses an offset temperature to adjust the setpoints when switching between heating and cooling. This improves the performance of the system and reduces the need of manual setpoint adjustments when switching between heating and cooling.

The default value is set to 2 °C and is used to increase the setpoints when switching to cooling. When switching back to heating, the value is used to reduce the setpoint.

RELATIVE HUMIDITY FUNCTION (T-168 ONLY)

To avoid condensation when having a cooling system, it is recommended measuring the relative humidity (RH) in the rooms. The relative humidity is measured with a thermostat (with internal RH sensor).

Cooling is shut off for the system if the RH reaches a "worst case level" of 80% in the thermostat.

Cooling will start again when the relative humidity falls below 76%.

REAL TIME CLOCK (T-168 ONLY)

To facilitate accurate scheduling and different timer settings, the thermostat contains a real time clock.

4 Install Uponor Smatrix Space

4.1 Installation procedure

UPONOR SMATRIX SPACE

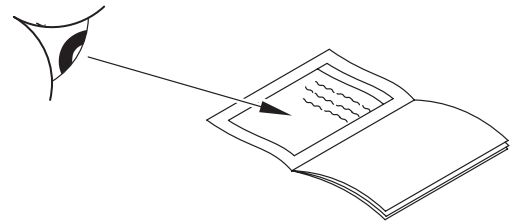
Uponor recommends following the process described below to guarantee the best possible installation results.

Stage	Procedure	Page
1	Prepare for installation	10
2	Install Uponor Smatrix Space controller	12
3	Install Uponor Smatrix Wave thermostats and sensors	15
4	Finish installation	20

4.2 Prepare for installation

Before starting the installation:

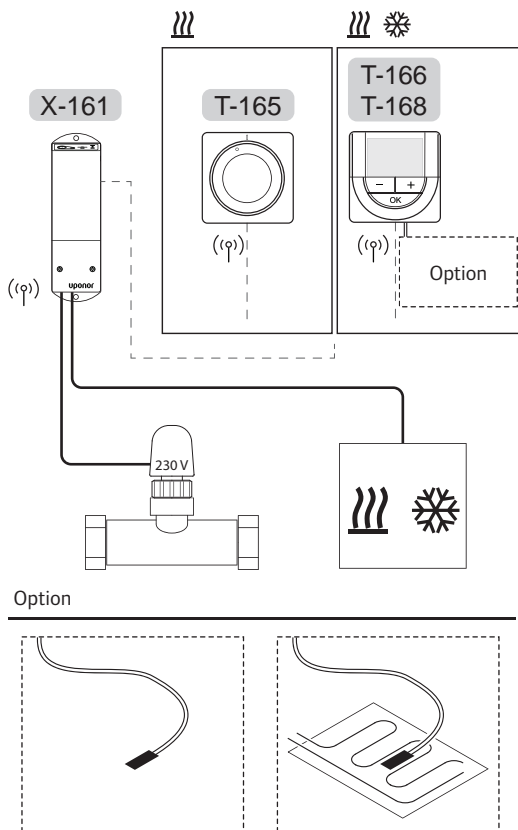
- Verify the contents of the package with the packing list.
See also section 3.3 Uponor Smatrix Space components for identification of components.
- Check whether an external temperature sensor is to be installed with a compatible thermostat.
- Study the wiring diagram in the end of this manual.



To determine where to best place the Uponor Smatrix Space components, follow these guidelines:

- Ensure that the controller can be installed close to the valve actuator. Note that each actuator must have its own controller.
- Ensure that the controller can be mounted close to a 230 V AC wall socket, or if required by local regulations, to a junction box, connected to the mains power.
- Ensure that installed Uponor Smatrix Space components are protected from running or dripping water.

4.3 Installation example



See also the wiring diagram in the end of the manual.

CAUTION!
Only 230 V actuators are compatible with the controller.

NOTE!
Only one thermostat can be registered to the controller.

UPONOR SMATRIX SPACE SYSTEM

A connection example of Uponor Smatrix Space Controller (single channel) using one of the thermostats as shown in figure.

The installation will work in a standard way with the thermostat regulating the room according to its set temperature.

Thermostat (heating) and actuator (T-165 only)

- The thermostat controls the actuator, regulating the room temperature using only the setpoint value.

Thermostat (heating and cooling) and actuator (T-166 or T-168 only)

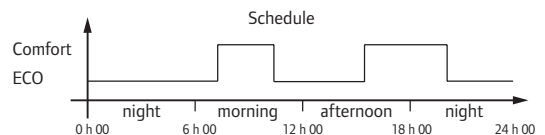
- The thermostat controls the actuator, regulating the room temperature using the setpoint value, offset temperatures and scheduling (T-168 only).
- A signal is sent to an external heating/cooling product (third-party product, just schematic example in illustration), such as a 3-way switch over valve.

Option (T-166 or T-168 only)

- External temperature sensor.
- Floor temperature sensor.

Schedules (T-168 only)

Programmable schedules can, during heating and/or cooling, switch between Comfort and ECO mode. See example below.



Heating/cooling switch (T-166 or T-168 only)

The heating/cooling switch is controlled through the menu system of the digital thermostat. It is used to switch the operation of the controller between heating and cooling modes.

5 Install Uponor Smatrix Space controller

5.1 Placement of controller

Refer to the installation preparation guidelines (see section 4.2 *Prepare for installation*), and use the following guidelines when positioning the controller:

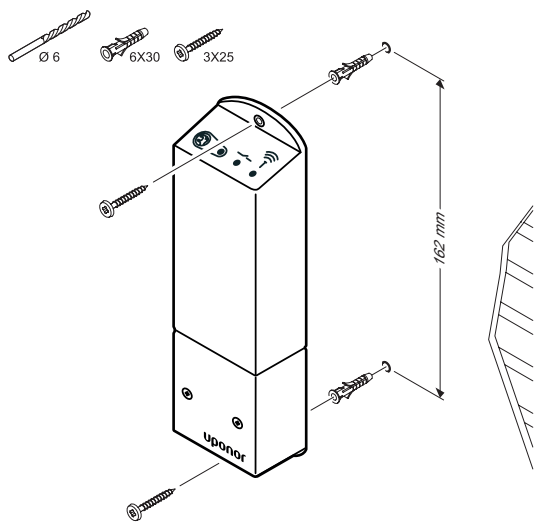
- Position the controller just above the manifold. Check the position of the 230 V AC power outlet, or if required by local regulations, the junction box.
- Check that the cover of the controller can be removed easily.
- Check that connectors and switches are easily accessible.

5.2 Attach controller to the wall

The controller is delivered in a kit including screws and wall plugs.

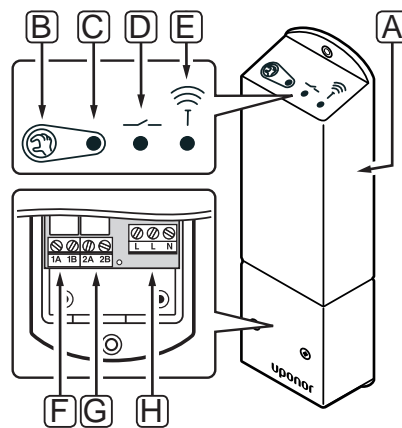
SCREWS AND WALL PLUGS

The figure below shows controller mounting hole positions and how to attach it to the wall using screws and wall plugs.



5.3 Connect components to controller

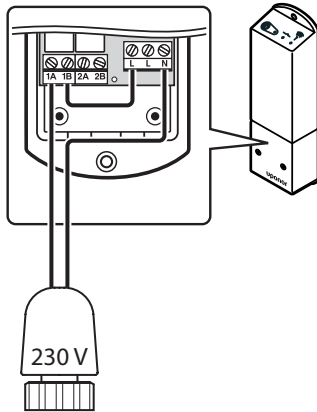
Refer to the wiring diagram found in the end of this document. The illustration below shows the inside of the controller.



Item	Description
A	Uponor Smatrix Space Controller X-161
B	Registration button
C	LED, relay 1 activity
D	LED, relay 2 activity
E	LED, radio connection
F	Relay 1 connector, actuator
G	Relay 2 connector, heating/cooling output
H	Power connector, 230 V AC 50 Hz

CONNECT ACTUATOR TO CONTROLLER

Connect the actuator to the controller as follows. Use the figure below for guidance to the instructions.



WARNING!

Electrical installation and service behind secured 230 V AC covers must be carried out under the supervision of a qualified electrician.

1. Ensure that the power is disconnected from the controller.
2. Lead the cable from the actuator through the cable entry in the bottom of the controller.
3. Connect the cable from the actuator to 1A (L) and N (N) in the controller.
4. Connect a wire between the free L connection and 1B in the controller.

The actuator is now installed.

CONNECT THERMOSTAT TO CONTROLLER

The thermostat is connected to the controller through wireless radio link.

See also section 6 Uponor Smatrix Wave thermostats and sensors for installation of thermostats.

CONNECT HEATING/COOLING OUTPUT TO CONTROLLER (OPTIONAL)

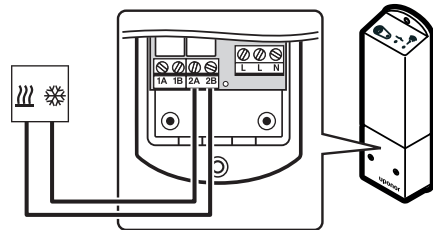
If the system is equipped with a cooling unit (requires additional products), the controller can switch between heating and cooling by using the heating/cooling output.

The heating/cooling output is connected to two-position relay.

- When the relay is open, the system is in heating mode.
- When the relay is closed, the system is in cooling mode.

To connect a heating/cooling output to the controller:

The illustration below shows components of the heating/cooling system connected to a relay module.



WARNING!

Electrical installation and service behind secured 230 V AC covers must be carried out under the supervision of a qualified electrician.

1. Ensure that the power is disconnected from both the controller and the heating/cooling relay.
2. Connect the cable to/from the component producing heating/cooling to connector **2A** and **2B** on the controller.

Heating/cooling output is now installed.

5.4 Connect the controller to AC power

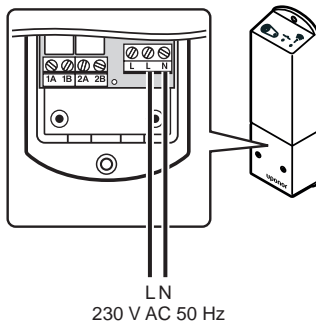
To conclude the installation of the controller:



WARNING!

Electrical installation and service behind secured 230 V AC covers must be carried out under the supervision of a qualified electrician.

1. Check that all wiring is complete and correct:
 - Actuator
 - Heating/cooling switch
2. Connect power to the controller according to the illustration below.



3. Ensure that the 230 V AC compartment of the controller is closed and the fixing screw is tightened.
4. Connect the power cable to a 230 V AC wall socket, or if required by local regulations, to a junction box.

5.7 Test actuators

The controller manages the temperature setpoint. When a temperature change occurs, the actuator opens or closes the valve to adjust the room temperature.

To test the actuators:

1. Increase the setpoint on the thermostat to the maximum setting.
The actuator should start opening and the LED, for relay 1, on the controller lights up, wait until fully opened.
2. Decrease the setpoint on the thermostat to the minimum setting.
The actuator should start closing and the LED, for relay 1, on the controller shuts off, wait until fully closed.
3. Reset the setpoint to default values.

The Uponor Smatrix Space controller is designed to be used with Uponor 230 V normally closed actuators.

6 Install Uponor Smatrix Wave thermostats and sensors

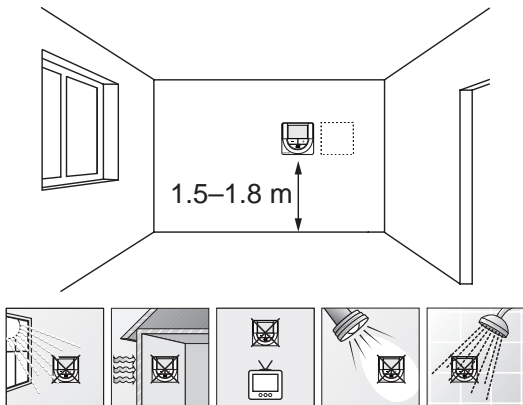
The following thermostats can be connected to the system:

- Uponor Smatrix Wave Thermostat Standard T-165
- Uponor Smatrix Wave Thermostat Dig T-166
- Uponor Smatrix Wave Thermostat Prog.+RH T-168

6.1 Placement of thermostats

Refer to the installation preparation guidelines (see section 4.2 *Prepare for installation*), and use the following guidelines when positioning the thermostats:

1. Select an indoor wall and a position 1.5 m to 1.8 m above the floor.
2. Ensure that the thermostat is away from direct solar radiation.
3. Ensure that the thermostat will not be heated through the wall from sunshine.
4. Ensure that the thermostat is away from any source of heat, for example television set, electronic equipment, fireplace, spotlights, and so on.
5. Ensure that the thermostat is away from any source of humidity and water splashes (IP20).



6.2 Label thermostats

Label the thermostats, where suitable, with the ID of the connected controller (for installations with several systems), for example, 1, 2, 3 etc.

If the thermostat can connect to an external sensor, add information about sensor type when applicable.

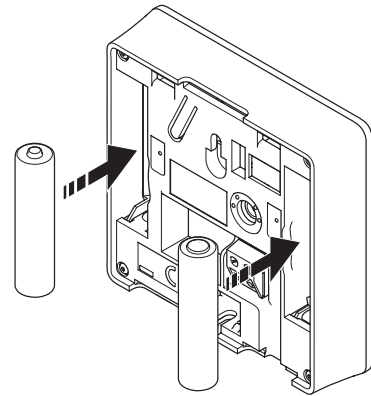
Available thermostat and sensor combinations:

- Room temperature
- Room and floor temperature
- Room and outdoor temperature
- Remote sensor temperature

6.3 Insert batteries

All thermostats use two alkaline 1.5 V AAA batteries which provides about 2 years of battery life, as long as they are positioned within radio range of the controller. Ensure that the batteries are correctly inserted in the thermostats.

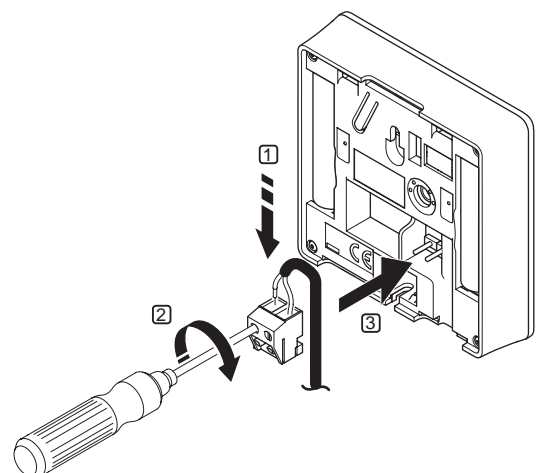
The illustration below shows where to insert them.



6.4 Connect external sensor to thermostat (optional)

An optional external sensor can be connected to the thermostats (except the standard thermostat T-165) for extra functionality.

Connect the sensor to the terminal located at the back of the thermostat, as shown in the illustration below.



1. Insert the two wires from the sensor cable (non polarized) into the removable connector.
2. Tighten the screws fixing the wires in the connector.
3. Insert the connector on the input pegs on the thermostat.

UPONOR SMATRIX WAVE THERMOSTAT DIG T-166

The external temperature sensor input can be used for either a floor or remote temperature sensor. Use the software on the thermostat to select a control mode which corresponds to the use of the sensor and thermostat.

See section 10 Operate Uponor Smatrix Wave digital thermostats for more information.

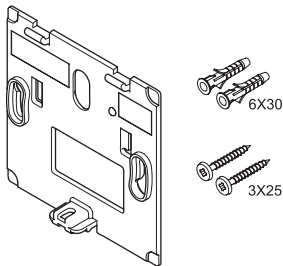
UPONOR SMATRIX WAVE THERMOSTAT PROG.+RH T-168

The external temperature sensor input can be used for either a floor or remote temperature sensor. Use the software on the thermostat to select a control mode which corresponds to the use of the sensor and thermostat.

See section 10 Operate Uponor Smatrix Wave digital thermostats for more information.

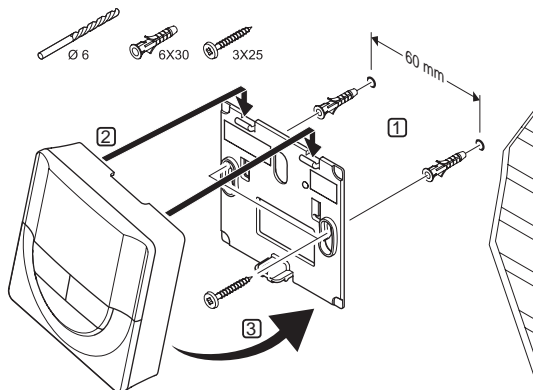
6.5 Attach a thermostat to the wall

The thermostats are delivered in kits including screws, wall plugs, and a wall bracket, presenting several options of attaching the thermostat to the wall.



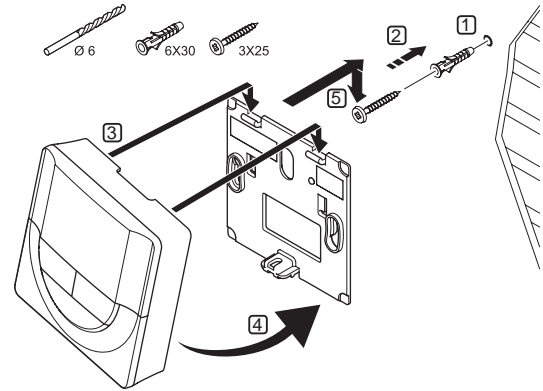
USING WALL BRACKET (RECOMMENDED)

The illustration below shows thermostat mounting hole positions and how to attach it to the wall using a wall bracket.



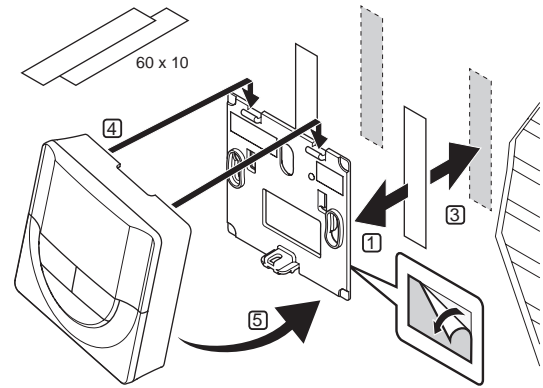
SCREW AND WALL PLUG

The illustration below shows how to attach the thermostat to the wall using one screw and wall plug.



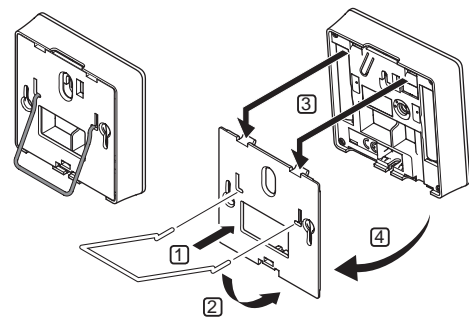
USING ADHESIVE STRIP (NOT INCLUDED)

The illustration below shows how to attach the thermostat to the wall using an adhesive strip and a wall bracket.



6.6 Attach to table stand

The illustration below shows how to attach the thermostat to a table stand.



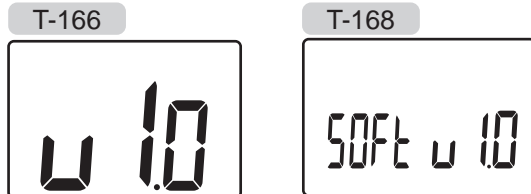
6.7 First startup of digital thermostats

At first startup, before registering, the thermostat requires some basic settings.

See section 10 Operate Uponor Smatrix Wave PLUS digital thermostats for more information.

SOFTWARE VERSION

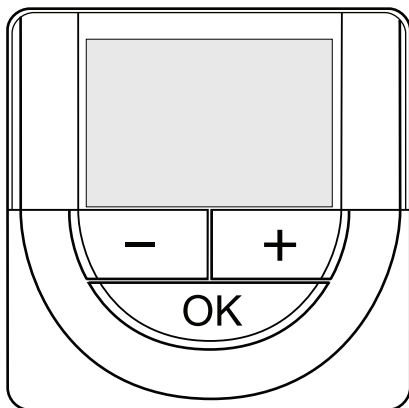
Current software version is displayed during power up.



SET TIME (T-168 ONLY)

When starting the thermostat for the first time, after a factory reset, or after its been left without batteries too long, the software requires the time and date to be set.

Use buttons - or + to change the value, press the **OK** button to set the value and move to the next editable value.



NOTE!

If no button is pressed for about 8 seconds, the current values will be saved and the software exits to control mode.

1. Set hours.



2. Set minutes.



3. Set 12 h or 24 h display of time.



4. Set day of the week (1 = Monday, 7 = Sunday).



5. Set day of the month.



6. Set month.



7. Set year.



8. Press **OK** to return to run mode.

Date and time can also be set in the settings menu.

6.8 First setup of digital thermostats

SELECT THERMOSTAT CONTROL MODE

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



NOTE!

If no button is pressed for about 8 seconds, while in a submenu, the current values will be saved and the software exits to the settings menu. About about 60 seconds later, it exits to run mode.

1. Press and hold the **OK** button until the settings icon and menu numbers is displayed in the top right corner of the display (about 3 seconds).
2. Use buttons - or + to change the numbers to **04** and press **OK**.
3. Current control mode is displayed (RT, RFT, RS or RO).
4. Use buttons - or + to change control mode (see list below) and press **OK**.

RT = Room temperature

RFT = Room temperature with external floor sensor

RS = Remote sensor

RO = Room temperature with remote outdoor sensor*

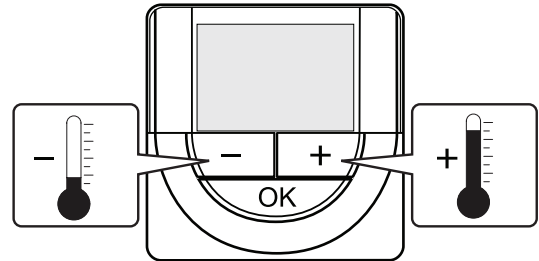
*) For display of outdoor temperature only.

5. Press and hold the **OK** button for about 3 seconds to exit the settings menu.

TEMPERATURE SETPOINT

The thermostats are delivered with a default setpoint of 21 °C (may differ depending on heating mode).

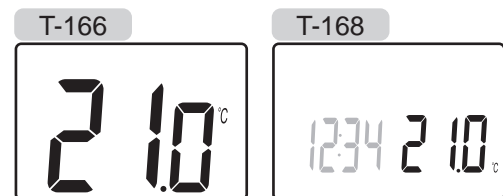
The illustration below shows how to adjust the thermostat temperature setpoint.



To adjust the thermostat temperature setpoint of the current control mode:

1. Press the - or + button once.

The screen shows the current setpoint flashing.

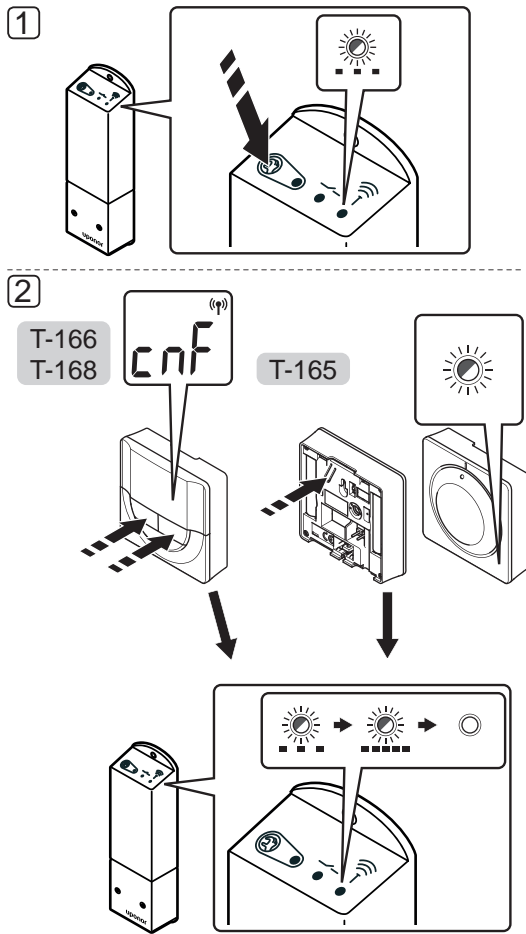


2. Press the - or + button repeatedly to adjust the setpoint temperature. It will change with increments of 0.5.

When the new setpoint is set, the screen returns to run mode after a few seconds, showing the room temperature.

6.9 Register thermostats to controller

The illustration below shows how to register one of the various room thermostats to the controller.



NOTE!

Repeating the registration process will overwrite the old registration data.

To register a room thermostat to the controller:

1. Press and hold the registration button on the controller until the LED on the module start flashing slowly.

2. Thermostat T-165

- 2.1 Gently press and hold the registration button on the thermostat, release when the LED on the front of the thermostat starts flashing. The LED on the controller starts flashing fast, to turn off a few seconds later.

Thermostats T-166 and T-168

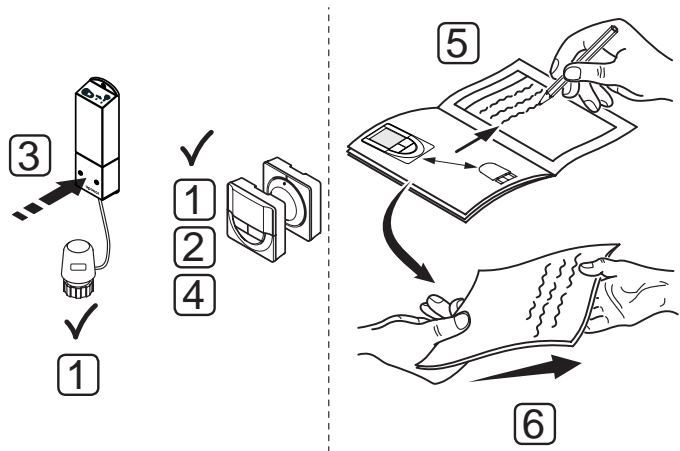
- 2.1 Press and hold both - and + buttons on the thermostat until the text **CnF** (configure) and a communication icon is displayed. The LED on the controller starts flashing fast, to turn off a few seconds later.

The registration of the thermostat is complete.

7 Finishing installation

Make a complete check up of the installation:

1. Check that the thermostat is working correctly.
Turn the thermostat setpoint to maximum to obtain a heating demand and make sure that the actuators are running.
2. Reset the thermostat to the defined operating settings.
3. Close the cover of the controller.
4. Attach the thermostat to the wall.
5. Print and fill in the "Installation report" located at the end of the manual.
6. Give the manual and all information about the system to the user.



8 Operate Uponor Smatrix Space controller

Uponor Smatrix Space controls a single underfloor heating/cooling zone according to customer needs. The temperature is adjusted with a thermostat located in the room.

8.1 Principle of operation

As soon as the temperature measured at the thermostat is lower (heating mode) or higher (cooling mode) than the setpoint temperature, a demand to change the room temperature is created and sent to the controller. The controller will open the actuator according to current operating mode and other settings. Once the set temperature is reached, this information is sent and the actuator is closed.

8.2 Normal operation without optional scheduling programs

When the system is running in normal mode:

- In **Heating mode**, the actuator is open when the room temperature is lower than the temperature set on the thermostat.
- In **Cooling mode**, the actuator is open when the room temperature is higher than the temperature set on the thermostat.

For information about operating the analogue thermostats, see section 9 Operating Uponor Smatrix Wave analogue thermostat.

For information about operating the digital thermostats, see section 10 Operating Uponor Smatrix Wave digital thermostat.

8.3 Operation with scheduling programs

Scheduling programs provide an option to switch the zone between Comfort and ECO mode using a 7-day program. This optimises the installation and conserves energy.

The use of scheduling programs requires:

- Uponor Smatrix Wave Thermostat Prog.+RH T-168

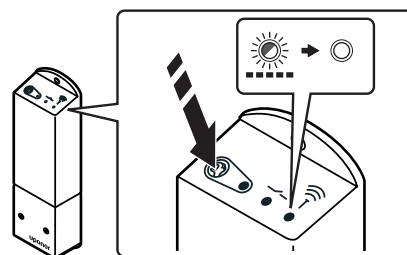
For information about operating the thermostat, see section 10 Operating Uponor Smatrix Wave digital thermostats.

8.4 Run mode

During normal operation the controller is in run mode.

EXIT TO RUN MODE

If the controller is in registration mode, exit to run mode by pressing the registration button until the LEDs stop flashing.



8.5 Reset the controller

To perform a factory reset:

1. Press and hold the registration button on the controller until all LEDs on the controller starts flashing.
2. Release the button and all LEDs turn off a couple of seconds later.

The controller is reset to factory values and thermostat registration is erased.

8.6 Unregister a thermostat from the controller

When a thermostat is inaccurately registered or if the registration needs to be redone, it is possible to remove the current registration from the controller using factory reset.

9 Operate Uponor Smatrix Wave analogue thermostats

Two types of thermostats, both analogue and digital, can be used in an Uponor Smatrix Space system.

Analogue thermostats:

- Uponor Smatrix Wave Thermostat Standard T-165

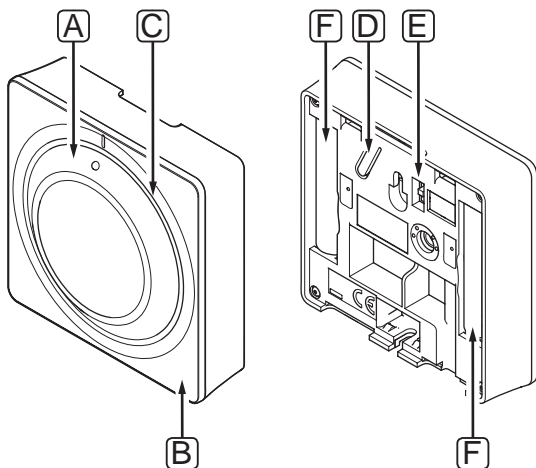
The analogue thermostat is controlled by turning a dial.

9.1 Thermostat layout

STANDARD THERMOSTAT T-165

During normal operation a discreet LED on the thermostat is lit for about 60 seconds if there is a demand for heating.

The illustration below shows the parts of the thermostat.



Item	Description
A	Room temperature setpoint dial control
B	Heating demand LED
C	Backlight
D	Registration button
E	Disable timer switch (not used in an Uponor Smatrix Space system)
F	Batteries

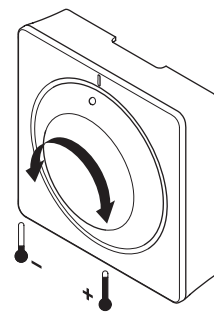
9.2 Adjust temperature

The temperature is changed by adjusting the setpoint on the thermostat to a value between 5 and 35 °C.

STANDARD THERMOSTAT T-165

Use the dial on the thermostat to adjust the temperature. A backlight will light up when twisting the dial. It dims out after about 10 seconds of inactivity.

The illustration below shows how to adjust the thermostat temperature setpoint.



To adjust the thermostat temperature setpoint:

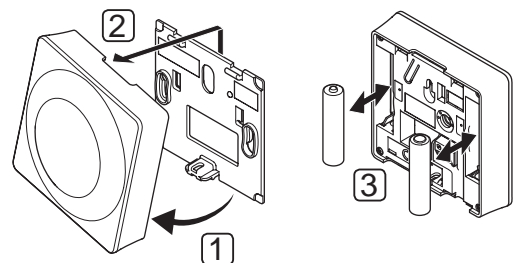
- Twist the dial clockwise for a higher temperature.
- Twist the dial counter-clockwise for a lower temperature.

9.3 Replace batteries

Replace the batteries of the thermostat when the LED inside the thermostat flashes twice during a heating or cooling demand.

The thermostat will perform a self test, for about 10 seconds, when the batteries have been inserted. The system will be blocked for input and the thermostat LED flashes during this period.

The illustration below shows how to change batteries.



1. Angle the thermostat from the bracket.
2. Remove it from the wall.
3. Replace batteries.

9.4 Factory reset

Factory reset sets all parameter values to default settings.



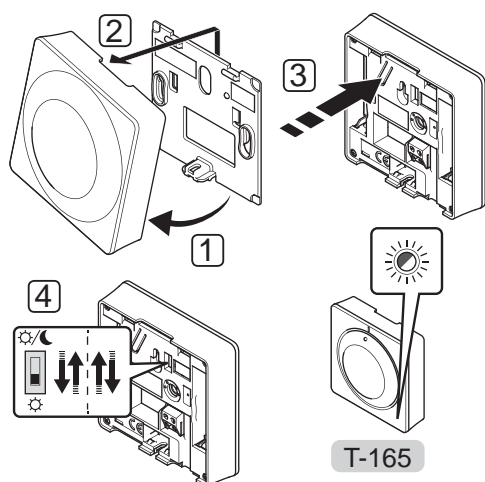
NOTE!

Do not factory reset the thermostat if not absolutely needed.



NOTE!

A factory reset removes the registration data from the thermostat.



To factory reset an analogue thermostat:

1. Angle the thermostat from the bracket.
2. Remove it from the wall.
3. Gently press and hold the registration button on the thermostat, release when the demand LED starts flashing.
4. Change the Disable timer switch twice, regardless of starting position.
5. The thermostat is now reset to factory default.

10 Operate Uponor Smatrix Wave digital thermostats

Two types of thermostats, either an analogue or a digital, can be used in an Uponor Smatrix Space system.

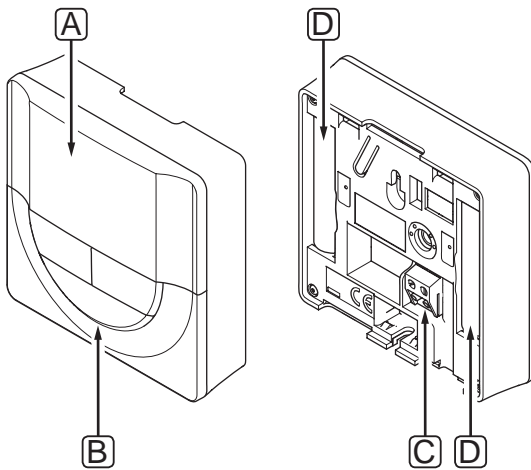
The digital thermostats have a display relaying information to the user and buttons for control.

Digital thermostats:

- Uponor Smatrix Wave Thermostat Dig T-166
- Uponor Smatrix Wave Thermostat Prog.+RH T-168

10.1 Thermostat layout

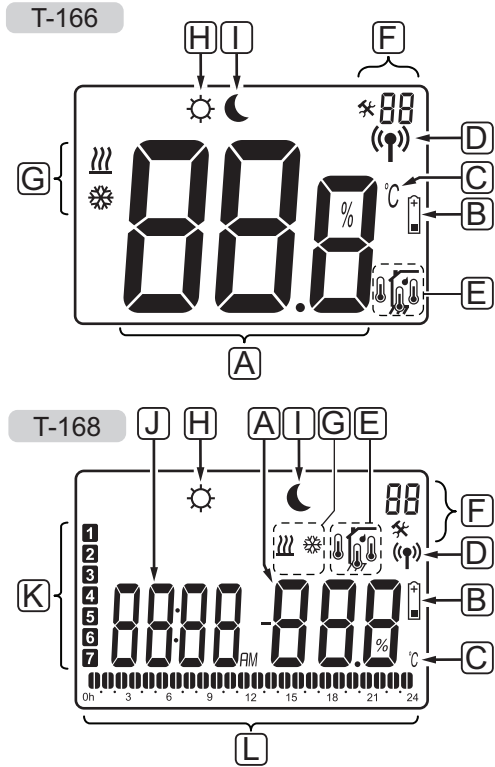
The illustration below shows the parts of the thermostat.



Item	Description
A	Display
B	Buttons
C	Terminal for external sensor (non-polarised)
D	Batteries

10.2 Display layout

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

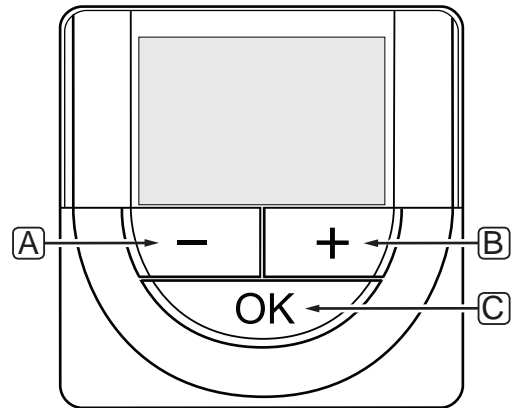


Pos.	Icon	Description
A		T-166 only Message field using three alphanumerical characters
		T-166 Temperature reading using a - or + sign, two digital characters, a decimal point and a character showing either 0 or 5
		T-168 only Relative humidity reading using two digital characters. Indicated with a “%” character
B		Low battery indicator

Pos.	Icon	Description
C	°C	Temperature unit, shown when the character group A shows a temperature
	°F	
D	(Ⓜ)	Communication indicator
E		Indoor temperature indicator
		Remote sensor temperature indicator (RS mode)
		Indoor temperature with floor temperature limitation indicator
		Flashing floor sensor icon indicates a faulty sensor
		Floor temperature indicator
		Flashing floor sensor icon indicates a faulty sensor
		<i>T-168 only</i> Relative humidity limit reached
F		Settings menu
	88	Settings menu number
G		Heating demand
		Cooling demand
H		Comfort mode
I		ECO mode
J		<i>T-168 only</i> Digital clock
		<i>T-168 only</i> Parameter name in settings menu
	AM	<i>T-168 only</i> Indicator showing AM or PM when the thermostat is set to 12 h mode
	PM	<i>T-168 only</i> Indicator showing AM or PM when the thermostat is set to 12 h mode
		No indication when the thermostat is set to 24 h mode
K		<i>T-168 only</i> Weekday selected/activated 1 = Monday 7 = Sunday
L		<i>T-168 only</i> Time selected or scheduled hour indicators, for Comfort mode, between 0:00 and 24:00
		Half = 30 minutes
		Full = 1 hour

10.3 Operating buttons

The figure below shows buttons used to operate the digital thermostats.



Pos.	Description
A	The - and + buttons are used to:
B	<ul style="list-style-type: none"> Adjust setpoint temperature Modify parameters in the settings menus
C	The OK button is used to: <ul style="list-style-type: none"> Toggle between current status data, and values of available sensors connected to the thermostat Enter and exit the settings menu Confirm a setting

10.4 Start up

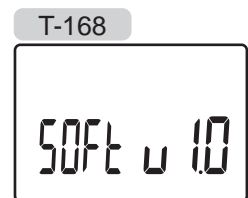
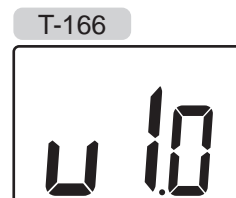
When starting up, the software version is shown in the display for about three seconds. Then the thermostat enters run mode.

The first time the thermostat is started, or after a factory reset, the software requires the time and date to be set (*T-168 only*).

SOFTWARE VERSION

Current software version is displayed when the thermostat is powered on.

Examples:



SET TIME AND DATE (T-168 ONLY)

When starting the thermostat for the first time, after a factory reset, or after its been left without batteries too long, the software requires the time and date to be set.

Use buttons - or + to change the value, press the **OK** button to set the value and move to the next editable value.

**NOTE!**

If no button is pressed for about 8 seconds, the current values will be saved and the software exits to run mode.

1. Set hours.



2. Set minutes.



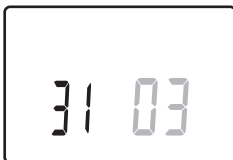
3. Set 12 h or 24 h display of time.



4. Set day of the week (1 = Monday, 7 = Sunday).



5. Set day of the month.



6. Set month.



7. Set year.



8. Press **OK** to return to run mode.

Date and time can also be set in the settings menu.

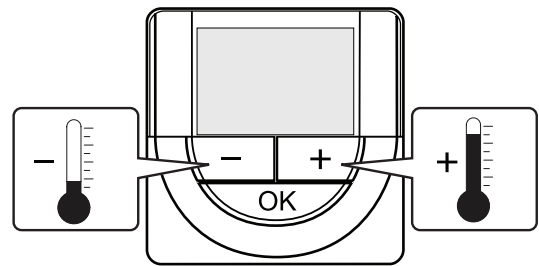
See section 10.9 Settings for more information.

10.5 Adjust temperature

The temperature is changed by adjusting the setpoint on the thermostat.

Use the buttons on the thermostat to adjust the temperature. The display will light up when pushing a button. It shuts off after about 10 seconds of inactivity.

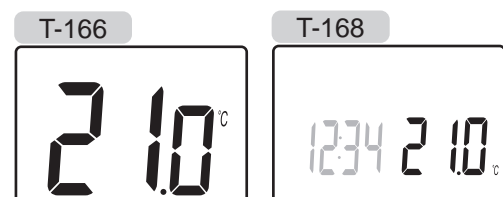
The illustration below shows how to adjust the thermostat temperature setpoint.



To adjust the thermostat temperature setpoint of the current control mode:

1. Press the - or + button once.

The screen shows the current setpoint flashing.



2. Press the - or + button repeatedly to adjust the setpoint temperature. It will change with increments of 0.5.

When the new setpoint is set, the screen returns to run mode after a few seconds, showing the room temperature.

10.6 Run mode

During normal operation the thermostat is in run mode.

While in run mode the display shows specific control mode information.

10.7 Control mode

The thermostat has four different control modes, set in the settings menu.

Control modes:

- **RT** = Room temperature
- **RFT** = Room temperature with external floor sensor
- **RS** = Remote sensor
- **RO** = Room temperature with remote outdoor sensor*

*) For display of outdoor temperature only.

Different types of information can be shown in the display when in a control mode. The digital thermostat T-168 also shows the clock and scheduled program information.

Use the **OK** button to toggle between the information available.

RT, ROOM TEMPERATURE MODE

1. Room temperature (default)
2. Relative humidity (T-168 only)

RFT, ROOM FLOOR TEMPERATURE MODE

1. Room temperature (default)
2. Relative humidity (T-168 only)
3. Floor temperature

RS, REMOTE SENSOR MODE

1. Room temperature (default)
2. Relative humidity (T-168 only)

RO, REMOTE OUTDOOR SENSOR MODE

1. Room temperature (default)
2. Relative humidity (T-168 only)
3. Outdoor temperature

10.8 Change control mode

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



NOTE!

If no button is pressed for about 8 seconds, while in a submenu, the current values will be saved and the software exits to the settings menu. About about 60 seconds later, it exits to run mode.

1. Press and hold the **OK** button for about 3 seconds.
2. The settings icon and menu numbers is displayed in the top right corner of the display.

3. Use buttons - or + to change the numbers to 04 and press **OK**.
4. Current control mode is displayed (RT, RFT, RS or RO).
5. Use buttons - or + to change control mode (see list below) and press **OK**.

RT = Room temperature

RFT = Room temperature with external floor sensor

RS = Remote sensor

RO = Room temperature with remote outdoor sensor*

*) For display of outdoor temperature only.

- Press and hold the **OK** button for about 3 seconds to exit the settings menu.

10.9 Settings

In this menu all settings regarding the operation of the thermostat is set.



NOTE!

If no button is pressed for about 8 seconds, while in a submenu, the current values will be saved and the software exits to the settings menu. About about 60 seconds later, it exits to run mode.

To enter the settings menu:

1. Press and hold the **OK** button for about 3 seconds.
2. The settings icon and menu numbers is displayed in the top right corner of the display.
3. Use buttons - or + to change the numbers to locate a submenu (see list below) and press **OK**.

00 = Program (T-168 only)

02 = Heating/cooling changeover

03 = ECO mode setback temperature

04 = Control mode

05 = High floor temperature limitation

06 = Low floor temperature limitation

07 = Cooling allowed

08 = Display unit

09 = Climatic controller integration

10 = Time and date (T-168 only)

4. Change parameters in the submenus.
5. Press and hold the **OK** button for about 3 seconds to exit the settings menu.

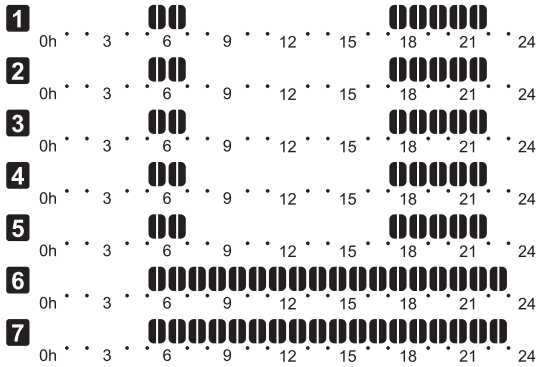
OO PROGRAM (T-168 ONLY)

In this menu, one of seven different scheduling programs for Comfort/ECO mode can be set. Program 1 to 6 is pre-programmed and the 7th is user programmable.

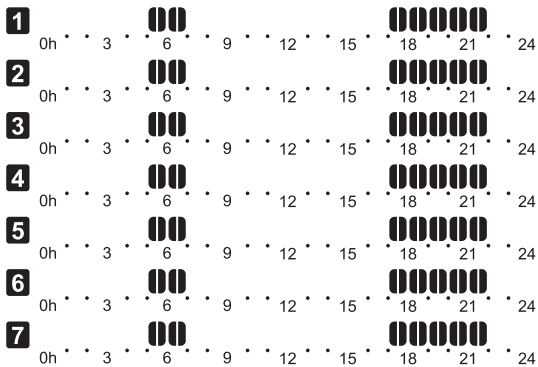
Program Off (default):

Zone is set in Comfort mode. If a timer is available in the system, the zone will use those set schedules but the thermostats own **ECO mode setback temperature.**

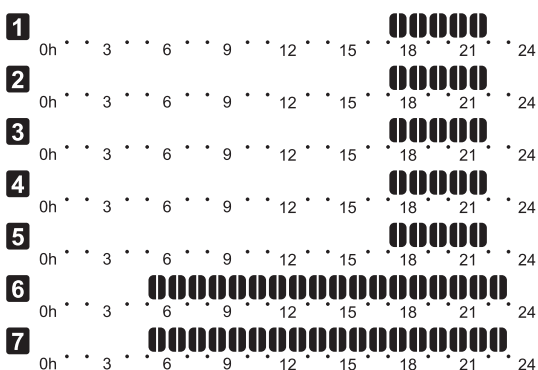
Program P1:



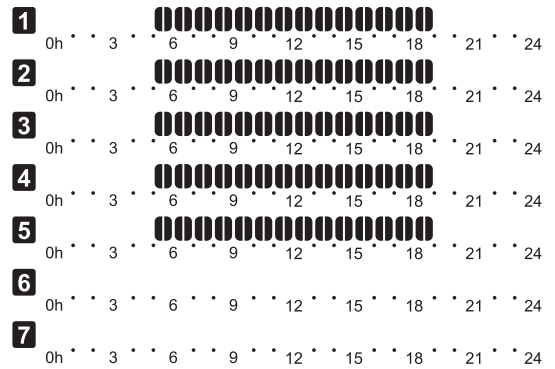
Program P2:



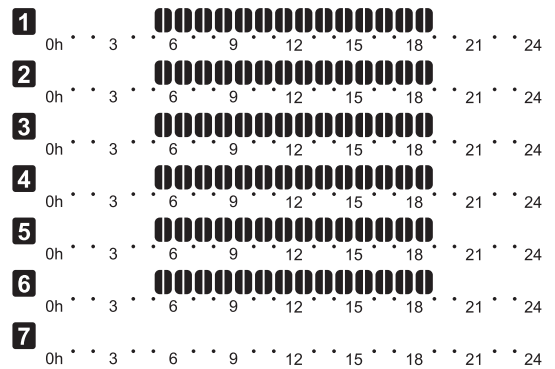
Program P3:



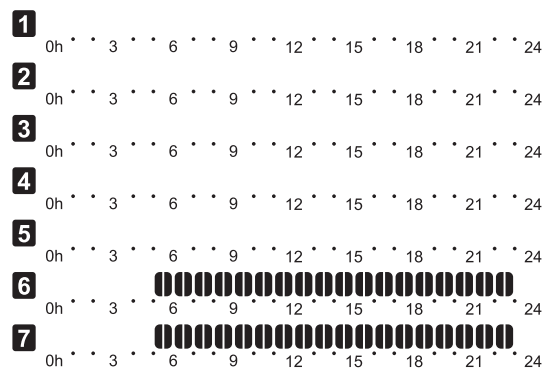
Program P4:



Program P5:



Program P6:



To change this setting:

1. Press **OK** and the parameter starts flashing.
2. Use buttons - or + to select program.

Select between: **P1–P6, U** and **Off**.

Program U

2.1 The current day starts flashing.

Decide to program a schedule in one of two ways:

Single day: Program only a single day.

Full week: Program every day in the week.

Single day programming:

- 2.1.1 Use buttons - or + to select a day for programming.
- 2.1.2 Press and hold the **OK** button until the hours appear.
- 2.1.3 The hours starts flashing. Use buttons - or + to set an interval for Comfort/ECO mode. Icons in the display show which mode is activated:

 = Comfort mode


 = ECO mode

Press **OK** to confirm each setting except when marker, at the bottom of the screen, reaches end of day, which will confirm the interval.

- 2.1.4 When the day is fully programmed, the software exits to the settings menu.
- 2.1.5 Repeat from step 1 if more days are to be programmed.

Full week programming:

- 2.1.1 Press and hold the **OK** button until the hours appear.
- 2.1.2 The hours starts flashing. Use buttons - or + to set an interval for Comfort/ECO mode. Icons in the display show which mode is activated:

 = Comfort mode

 = ECO mode

Press **OK** to confirm each setting except when marker, at the bottom of the screen, reaches end of day, which will confirm the interval.

- 2.1.3 When the day is fully programmed, the next day icon starts flashing and the text **Copy Yes** appears. (Yes is flashing).
- 2.1.4 Select **Yes** to copy the setting of the current day to the next.
Select **No** to create a new scheduling interval for the following day.
- 2.1.5 Repeat steps 2.1.2 through 2.1.4 until all available days are programmed.
- 2.1.6 Press **OK** to confirm the change and return to the settings menu.

02 HEATING/COOLING CHANGEOVER

In this menu it is manually set whether the system is in heating or cooling mode.

To change this setting:

1. Press **OK** and the parameter starts flashing.
2. Use buttons - or + to change the setting, see list below.
H = Heating (heating demand icon flashes)
C = Cooling (cooling demand icon flashes)
3. Press **OK** to confirm the change and return to the settings menu.

03 ECO MODE SETBACK TEMPERATURE

In this menu the setback temperature for whenever the channel is in ECO mode is set.

The setting adjusts the current setpoint with the set value. In heating mode the setpoint is reduced, and in cooling mode it 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 setting is only applicable to the digital thermostat T-168, which can change between Comfort and ECO mode.

To change this setting:

1. Press **OK** and the parameter starts flashing.
2. Use buttons - or + to change the parameter.
Default: 4 °C
Setting range: 0 – 11 °C, 0.5 °C increments
3. Press **OK** to confirm the change and to return to the settings menu.

04 CONTROL MODE

In this menu control mode for the thermostat is set.

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

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

To change this setting:

1. Press **OK** and the parameter starts flashing.
2. Use buttons - or + to change control mode (see list below).

RT = Room temperature

RFT = Room temperature with external floor sensor

RS = Remote sensor

RO = Room temperature with remote outdoor sensor*

*) For display of outdoor temperature only.

3. Press **OK** to confirm the change and return to the settings menu.

05 HIGH FLOOR TEMPERATURE LIMITATION

In this menu a limit on the maximum allowable floor temperature is set.

This menu is only visible if control mode RFT is activated in settings menu 04.

To change this setting:

1. Press **OK** and the parameter starts flashing.
2. Use buttons - or + to change the parameter.

Default: 26 °C

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



NOTE!

This parameter cannot be set lower than the set value in settings menu **06 Low floor** temperature limitation.

3. Press **OK** to confirm the change and return to the settings menu.

06 LOW FLOOR TEMPERATURE LIMITATION

In this menu a limit on the minimum allowable floor temperature is set.

This menu is only visible if control mode RFT is activated in settings menu 04.

To change this setting:

1. Press **OK** and the parameter starts flashing.
2. Use buttons - or + to change the parameter.

Default: 20 °C

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



NOTE!

If this parameter is set lower than 16 °C the cooling icon will start flashing, warning for risk of condensation in the system.



NOTE!

This parameter cannot be set higher than the set value in settings menu **05 High floor** temperature limitation.

3. Press **OK** to confirm the change and return to the settings menu.

07 COOLING ALLOWED

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

To change this setting:

1. Press **OK** and the parameter starts flashing.
2. Use buttons - or + to toggle between **Yes** and **No**.

Yes – shows the cooling demand icon

No – hides the cooling demand icon

3. Press **OK** to confirm the change and return to the settings menu.

08 DISPLAY UNIT

In this menu temperature display unit is set.

To change this setting:

1. Press **OK** and the parameter starts flashing.
2. Use buttons - or + to toggle between Celsius and Fahrenheit.

DEg °C – degrees Celsius

DEg °F – degrees Fahrenheit

3. Press **OK** to confirm the change and return to the settings menu.

09 CLIMATIC CONTROLLER INTEGRATION

In this menu it is set whether the thermostat also should be integrated, and share temperature data, with an Uponor Smatrix Move PLUS controller.

Default value: **no**

To change this setting:

1. Press **OK** and the parameter starts flashing
2. Use buttons - or + to toggle between **no** , **YEs** and **CnF**.

no – not integrated

YEs – Integrated (requires to be registered with the Move controller first)

CnF – register with the Move PLUS controller, confirm on the Move PLUS controller

3. Press **OK** to confirm the change and return to the settings menu.

10 TIME AND DATE (T-168 ONLY)

In this menu time and date is set. This setting is required to utilise scheduling programs for this thermostat.

Use buttons - or + to change the value. Press the **OK** button to set the value and move to the next editable value.

To change this setting:

1. Press **OK** and the parameter starts flashing.
2. Set hours.
3. Set minutes.
4. Set 12 h or 24 h display of time.
5. Set day of the week (1 = Monday, 7 = Sunday).
6. Set day of the month.
7. Set month.
8. Set year.
9. Press **OK** to confirm change and return to the settings menu.

10.10 Factory reset

Factory reset sets all parameter values to default settings.




NOTE!

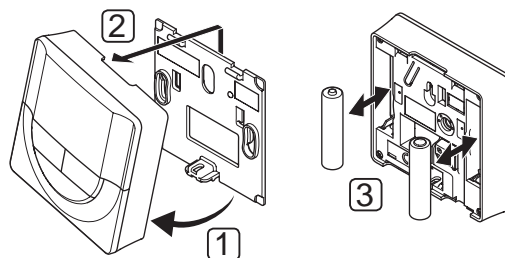
Do not factory reset the thermostat if not absolutely needed.

1. Press and hold the -, + and **OK** buttons for about 5 seconds until the screen goes blank.
2. The thermostat is now reset to factory default.

10.11 Replace batteries

Replace the batteries of the thermostat when the low battery icon  is shown in the display.

The illustration below shows how to change batteries.



1. Angle the thermostat from the bracket.
2. Remove it from the wall.
3. Replace batteries.

11 Maintenance

The maintenance of Uponor Smatrix Space includes the following:

- Manual preventive maintenance
- Automatic preventive maintenance
- Corrective maintenance
- Controller LEDs

11.1 Manual preventive maintenance

Uponor Smatrix Space requires no preventive maintenance except cleaning:

1. Use a dry soft cloth to clean the components.



WARNING!

Do not use any detergents to clean the Uponor Smatrix Space components.

11.2 Corrective maintenance

RESETTING THE CONTROLLER

If the controller does not work as expected, for example due to a hang-up, it can be reset to solve the problem:

1. Disconnect and reconnect the controller to AC power.

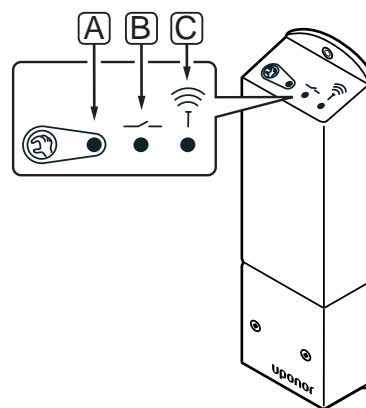
11.3 Controller LEDs

It is recommended to occasionally check the LEDs on the controller for alarms.

The relay LEDs is on when the relays are closed, during normal operation.

The radio connection LED flashes when there is radio activity, i.e. when the relays are controlled or when the thermostat sends data, and shuts off after a few seconds.

The illustration below shows the position of the controller LEDs.



Item	Description
A	LED, relay 1 activity
B	LED, relay 2 activity
C	LED, radio connection

The table below describes the status of the controller LEDs.

LED	Status
Relay 1	<ul style="list-style-type: none"> • Red, on – Heating mode, actuator activated • Green, on – Cooling mode, actuator activated • Off – no demand for heating or cooling
Relay 2	<ul style="list-style-type: none"> • Blue, on – Cooling mode activated in menu 02 on the digital thermostat • Off – Heating mode activated in menu 02 on the digital thermostat
Radio connection	<ul style="list-style-type: none"> • Orange, flashing – Communicating with the thermostat • Orange, flashing rapidly – Communication with the thermostat has lost for about 1 hour • Orange, flashing slowly – Waiting for thermostat registration • Off – Normal operation

12 Troubleshooting

The table below shows problems and alarms that can occur with Uponor Smatrix Space and describes solutions.

Problem	Indication	Probable cause	Solutions
Fluctuating floor temperature	Floor temperature is changing abnormally between hot and cold in heating mode	Supply water temperature is too high	Check boiler or shunt
	Room temperature does not match setpoint on thermostat, and the actuator shut on/off on a fixed interval	Heating fall back function is activated due to lost communication with thermostat	Check the connection of the room thermostat Check batteries in room thermostat Reconnect if the connection is lost
	Room temperature does not match setpoint on thermostat	The thermostat is placed in direct sunlight or close to other heating sources	Check placement of the thermostat according to installation instructions and change location if needed
The room is too cold (or too warm in cooling mode)	Press – or + buttons to display the temperature setpoint on the thermostat	The thermostat setting is incorrect	Change the temperature setpoint
	The temperature displayed on the thermostat changes after the thermostat is moved	The thermostat may be influenced by an external heat source	Change location of the thermostat
	White indicator cannot be seen in window of the actuator	The actuator does not open	Replace the actuator Contact the installer
	ECO icon in thermostat display (T-168 only)	ECO mode	Change ECO profile or assign another profile to the room Reduce the ECO setback value for the thermostat
	Check the chiller (boiler) information and operation mode of the digital thermostat	The system is in cooling (heating) mode	Correct signal from external device needed
The room is too warm (or too cold in cooling mode)	The loop is warm even after a long period without heat call	The actuator does not close	Contact the installer Check that the actuator is correctly installed Replace the actuator
The floor is cold	The room temperature OK but the floor is cold	No heat demand from the underfloor heating system The room is heated by another heat source	
No communication	Communication error	Registration lost	Contact the installer Register the thermostat again






12.1 Troubleshooting after installation

Problem	Indication	Probable cause	Solutions
The controller does not start	No LED indication on the controller when thermostat setpoint is changed	There is no AC power in the controller	1. Check that the controller is connected to AC power
	The actuator never opens		2. Check the wiring
			3. Check that there is 230 V AC power in the wall socket
			4. Restart the controller by disconnecting and reconnecting the power plug. The controller flashes red/green at startup
	There is 230 V AC power in the wall socket	Faulty power cable	1. Replace the fuse, for the wall socket, and/or power cable and plug
Poor radio reception	Repeated radio alarms (LED flashes rapidly)	The controller is installed inside a metal cabinet, or too close to other shielding objects Building structure unfavourable for radio transmission	Change the controller location. If the problem persists, contact the installer
The thermostats is faulty	The radio connection LED in the controller continue flashing	The controller is not correctly installed or positioned	Check the wiring

12.2 Digital thermostats T-166 and T-168 alarms/problems

An alarm is sent when more than 1 hours have elapsed since the controller received the last radio signal from the thermostat.

The table below shows problems that can occur in the digital thermostats T-166 and T-168.

Indication	Probable cause	Solutions
Battery icon  is displayed	Thermostat battery power is running low	Replace the batteries
The display is off	The batteries are discharged or wrong type of batteries is used	Replace the batteries
	The batteries are installed upside down (reverse polarity)	Install the batteries correctly
Radio transmission icon is displayed but the signals are received only when the thermostat is close to the antenna	Transmitter working with reduced signal intensity	Force the thermostat to transmit by changing the temperature setpoint Replace thermostat
	New installations in building shield radio signals (for example, metal door safe)	Try to find a new position for the thermostat and/or the antenna, or, if possible, move the shielding object
No radio transmission icon  is displayed on thermostat screen when -/+ buttons are pressed	The transmitter broken in the thermostat	Force the thermostat to transmit by changing the temperature setpoint Replace the thermostat
Relative humidity icon  is displayed (T-168 only)	The relative humidity limit is reached	Lower the humidity level by increasing ventilation, increasing the temperature setpoint, or shutting off cooling
The icon for floor temperature sensor  flashes	Faulty temperature sensor	Check the connection of the floor sensor
		Disconnect the floor temperature sensor and check it with an ohmmeter. The value must be around 10 kohms
The icon for indoor temperature sensor  flashes	Faulty temperature sensor	Contact the installer or replace the thermostat

12.3 Analogue thermostat T-165 alarms/problems

An alarm is sent when more than 1 hour have elapsed since the controller received the last radio signal from the thermostat.

The table below lists problems that can occur in standard thermostat T-165.

Indication	Probable cause	Solutions
The LED on the thermostat flashes twice	The thermostat battery power is running low	Replace the batteries

12.4 Controller alarms/problems

An alarm is sent when more than 1 hour have elapsed since the controller received the last radio signal from the thermostat.

The table below lists problems that can occur in the controller.

Indication	Probable cause	Solutions
Radio connection LED flashing rapidly on the controller	The thermostat is out of radio range	Reduce the distance between the thermostat and controller or change location of the thermostat in the room Check the thermostat batteries

12.5 Contact the installer

For installer contact information, see the installation report in the end of this document. Prepare the following information before contacting an installer:

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

12.6 Installer instructions

To determine if a problem is caused by the supply system or the control system, loosen the actuator from the manifold for the room concerned, wait a few minutes and check 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 could be the room control system.

A supply system defect can be indicated by no warm water in the manifold. Check the boiler and circulation pump.

13 Technical data

13.1 Technical data

General	
IP	IP20 (IP: degree of inaccessibility to active parts of the product and degree of water)
Max. ambient RH (relative humidity)	85% at 20 °C
Max. radio distance between controller and thermostat	30 m
Thermostat and timer	
CE marking	
Low voltage tests	EN 60730-1* and EN 60730-2-9***
EMC (electromagnetic compatibility requirements) tests	EN 60730-1 and EN 301-489-3
ERM (electromagnetic compatibility and radio spectrum matters) tests	EN 300 220-3
Power supply	Two 1.5 V AAA alkaline batteries
Voltage	2.2 V to 3.6 V
Operating temperature	0 °C to +45 °C
Storage temperature	-10 °C to +65 °C
Radio frequency	868.3 MHz
Transmitter duty cycle	<1%
Connection terminals (thermostats only)	0.5 mm ² to 2.5 mm ²
Controller	
CE marking	
Low voltage tests	EN 60730-1* and EN 60730-2-1***
EMC (electromagnetic compatibility requirements) tests	EN 60730-1 and EN 301-489-3
ERM (electromagnetic compatibility and radio spectrum matters) tests	EN 300 220-3
Power supply	230 V AC +10/-15%, 50 Hz or 60 Hz
Operating temperature	0 °C to +50 °C
Storage temperature	-20 °C to +70 °C
Maximum consumption	2 W
Relay outputs	230 V AC +10/-15%, 250 V AC 8 A maximum
Power connection	1 m cable with europlug (except UK)
Connection terminals	Up to 4.0 mm ² solid, or 2.5 mm ² flexible with ferrules

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

**) EN 60730-2-1 Automatic electrical controls for household and similar use
-- Part 2-1: Particular requirements for electrical controls for electrical household appliances

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

Usable in all Europe

CE 0682

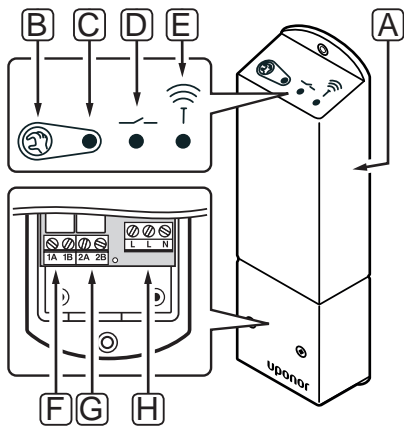
Declaration of conformity:

We hereby declare under our own responsibility that products dealt with by these instructions satisfy all essential demands linked to the R&TTE 1999/5/CE Directive dated March 1999.

13.2 Technical specifications

Cables	Standard cable length	Maximum cable length	Wire gauge
External sensor cable to thermostat	5 m	5 m	0.6 mm ²
Floor sensor cable to thermostat	5 m	5 m	0.75 mm ²

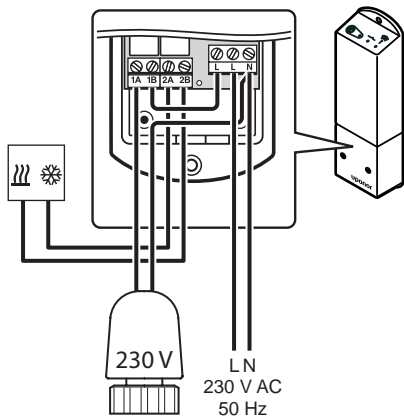
13.3 Controller layout



Item	Description
A	Uponor Smatrix Space Controller X-161
B	Registration button
C	LED, relay 1 activity
D	LED, relay 2 activity
E	LED, radio connection
F	Relay 1 connector, actuator
G	Relay 2 connector, heating/cooling output
H	Power connector, 230 V AC 50 Hz

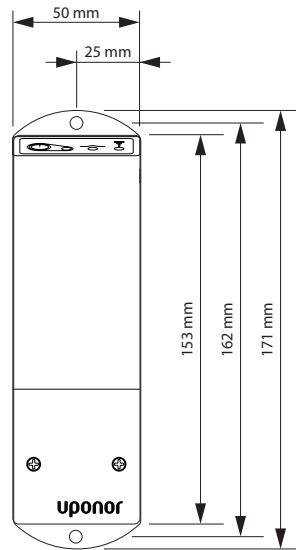
13.4 Wiring diagrams

UPONOR SMATRIX SPACE

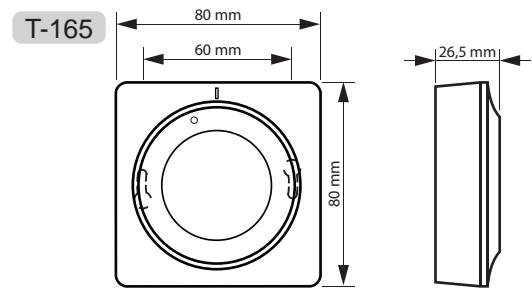
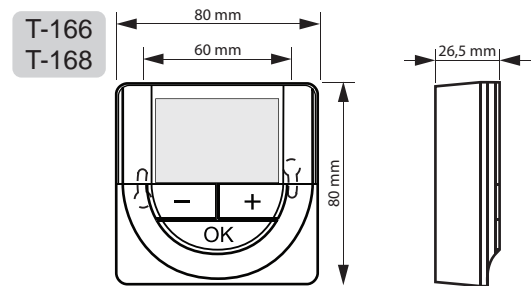


13.5 Dimensions

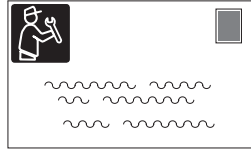
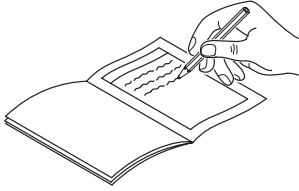
CONTROLLER

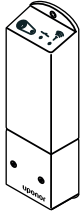


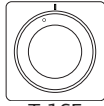

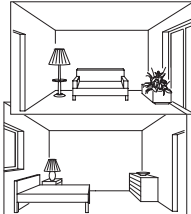


THERMOSTATS



14 Installation report



	 T-168	 T-166	 T-165	 230V	
Controller	Thermostat				Rooms
Thermostat					
Floor sensor					
Remote sensor					

Heating/cooling	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>





A series of horizontal dotted lines spanning the width of the page, providing a guide for writing notes or instructions.



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Uponor reserves the right to make changes, without prior notification, to the specification of incorporated components in line with its policy of continuous improvement and development.

Uponor