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Uponor Smatrix

Technical information





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Uponor Smatrix

Intelligent controls for radiant heating and cooling

Smatrix is Uponor's new product line of fully integrated control systems for radiant heating and cooling. Developed to fully leverage the advantages of a radiant system, Smatrix increases energy-efficiency while ensuring optimal comfort in every single room. With intelligent room controls, zone controls and supply water controls, Smatrix offers modular and expandable systems that are easy to install and meet the requirements of any building project - from new built to renovation. Key features include Uponor's autobalancing technology that can save up to 20 percent in energy, a cooling function with high protection to avoid condensation, and the option for remote access via smart phone, tablet, or PC.

Autobalancing for more comfort and efficiency

Conventional systems need to be balanced manually in order to ensure that each room receives the required output. If left unbalanced and with a uniform flow rate, some rooms can be overpowered while others underpowered. A system not balanced correctly thus requires a greater input of energy to adequately heat or cool all rooms.

The autobalancing technology of the Smatrix room controls constantly anticipates and adjusts the exact amount of energy needed to ensure optimal comfort in every single room. This saves up to 20 percent in energy compared to unbalanced systems without room by room control. The technology also eliminates the need to balance the system as part of commissioning.

In renovation projects the autobalancing function easily adapts to an existing installation. This eliminates the need for a new calculation as basis for manual balancing of the existing system, which in many cases is not even possible, because the required information is not available. Even small changes in a building's interior can affect conventional underfloor systems, as the required amount of water at a given supply temperature can change e.g. with a different floor covering. Here again, autobalancing allows Smatrix to automatically adapt to these changes, ensuring homeowners and tenants full flexibility in furnishing their home and maintaining comfort.

Cooling with high protection to avoid condensation

When required, Smatrix can effectively control the cooling process. The system then operates in reverse by opening actuators and switching the supply temperature to cooling when the room temperature rises above a certain threshold. As it is the case with heating, the autobalancing function ensures that every room receives exactly the right amount of cooling energy.

In cooled spaces relative humidity can become a problem. With humidity sensors included in the room thermostats, Smatrix provides a high protection to avoid condensation. If the humidity in a single room gets too high, the cooling process can be automatically stopped or a notification given. It is even possible to integrate a dehumidifier into the system.

Smatrix room controls, zone controls and supply water controls

The Smatrix product line includes three room control systems, all of which include the autobalancing technology and cooling function. Using predefined temperature settings, they can routinely reduce the room temperature, e. g. at night. The room controls are easy to install with minimal wiring – or even completely wireless: Smatrix Base offers a wired option; Smatrix Wave employs a wireless control; and the premium version Smatrix Wave PLUS offers wireless control with additional comfort and system functions.

The Smatrix Space and Space PLUS zone controls are designed to manage a single heating or cooling zone. Using a flexible single channel controller, they are Uponor's solution for including an additional circuit into an existing heating system, but also to manage cooling in a specific room or zone.

The Smatrix Move and Move PLUS supply water controls regulate the supply water temperature that is provided by the primary energy source. They optimise the supply water temperature by adjusting predefined setpoints in correlation to outdoor temperatures. Smatrix Move PLUS can be used for both, heating and cooling. In addition, the control can communicate with a room thermostat, thus being able to include indoor temperatures in its calculation.

In cooling, the Smatrix Move PLUS supply water control also provides a high protection to avoid condensation. The predefined cooling curve of the system is adapted according to the relative room humidity in a reference room, reducing the cooling energy as needed to prevent condensation.

Premium user comfort and system functionalities

Smatrix Wave PLUS, flagship of the Smatrix room controls, features a removable touchscreen interface and additional comfort and system functions.

- Comfort setting maintains the comfort by providing a warmed floor even if alternative heat sources are in use.
- Trend visualisation uses the touchscreen interface to display graphs and diagrams that compare temperature settings room by room.



- System diagnostics identifies difficulties in reaching comfortable temperature levels and provides respective notifications.
- Room check detects whether the thermostats are properly assigned to the heating or cooling circuits.
- All data can be stored on a microSD card, which provides the option to transfer installation and troubleshooting data, as well as to run software updates and secure backup data for the entire system.
- Room bypass ensures the necessary water flow for a heat pump even if a buffer tank is not integrated or is too small for the system.
- The integrated heat pump module is able to detect internal and external temperature changes and to communicate these directly to the heat pumps of certain manufacturers. This enables the heat pump to adapt the heat curve correspondingly.

U@home for Smatrix Wave PLUS provides an extra plus in user comfort, energy-efficiency and flexibility. Using a remote access module combined with a mobile app or web

application, U@home connects the Smatrix Wave PLUS control system with a smart phone, tablet, or PC. This offers the most comfortable way to manage room temperatures, at home or away, and can help to further optimise energy-efficiency. With U@home homeowners or tenants are able to switch the system's predefined temperature levels from "Home" to "Away" and back, whenever needed. In addition, the U@home app features status updates, alarms and notifications to closely monitor the heating and cooling system at any time, from anywhere.

Benefits for homeowners, installers and planners alike

Uponor's Smatrix line offers the ideal controls for homeowners, installers and planners alike. Homeowners benefit from optimal comfort and energy savings, installers can save time during installation and commissioning, and planners will find the right solution for any building project.

To learn more about the Smatrix product line please visit www.uponor.com/smatrix.

Room controls



	Auto balancing	Cooling functions	Modularity	U@home	SMS module	Trend visualization	Comfort setting	Data storage	System diagnostic	HP integration	Room bypass	Room check
Wave PLUS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wave	✓	✓	✓		✓							
Base	✓	✓	✓		✓							
	Basic functions			Comfort functions				Technical functions				

Uponor Smatrix Wave PLUS with U@home



Uponor Smatrix Wave PLUS is a wireless management system for underfloor heating and cooling installations. Comfort, user friendliness and temperature control for each individual room of a home can be combined through the various components.

The Uponor Smatrix Wave PLUS interface facilitates system optimization and settings for up to four controllers. The Smatrix Wave PLUS controller can function stand alone without the interface, but with reduced functionality.

Uponor Smatrix Wave PLUS is controlled by different types of thermostats. Designed for maximum comfort, the thermostats communicate with the controller by radio link. It is possible to mix the different types of Uponor Smatrix Wave thermostats in the same installation.

The Smatrix Wave PLUS control system includes auto-balancing technology as well as other energy-efficient features for radiant heating and cooling systems. Uponor Smatrix Wave PLUS also enables remote control through the U@home app. The end user has the ability to make changes to the system from anywhere in the world.

Your benefits

- Fast installation, minimal wiring
- Modularity and flexibility given by a modular system architecture
- Low maintenance
- No manual balancing on the manifold is required
- Simple intuitive end user control via interface I-167
- Software upgrade possibility via microSD card
- First class regulation gives higher comfort and lower energy consumptions
- The controller X-165 is optimized to work well with heat pumps via the patented "bypass" functionality. Configured via the interface I-167
- Ceiling cooling and floor heating
- Advance cooling and humidity configuration options
- Room trend data in the interface I-167
- Remote access possibility via U@home



Uponor Smatrix Wave PLUS product family

Main components/standard application

1
Uponor Smatrix Wave PLUS controller X-165
 A wireless radiant heating/cooling controller that sends and receives radio signals to and from room thermostats and sensors to control thermal actuators and other heating/cooling equipment. The controller can be connected as a sub-controller to expand the system to up to four controllers depending on specific installation size.

2
Uponor Smatrix Wave PLUS interface I-167
 An interface designed for displaying system information to the end user and for programming all relevant system settings for an underfloor heating/cooling system when used in combination with the Smatrix Wave PLUS controller. The modern style touch panel has user friendly directional navigation for simplified programming. The system can be expanded with up to four controllers and a U@home module linked to the Uponor Smatrix Wave PLUS interface I-167.

3
Uponor Smatrix Wave PLUS thermostat D+RH T-167
 A wireless single room temperature and relative humidity (RH) sensor. It measures and displays the perceived room temperature and relative humidity, transmitting the values to the controller. In addition, different sensors functions such as a floor sensor, remote sensor and outdoor sensor can be set via the digital display.

4
Uponor Smatrix Wave thermostat public T-163 with floor sensor
 A wireless single room temperature sensor for public buildings. In addition, different sensors functions such as a floor sensor, remote sensor and outdoor sensor can be set via dip switch. It measures the perceived temperature and transmits the values to the wireless controller.

Advanced components

5
Uponor Smatrix Wave PLUS U@home module R-167
 A device to manage the indoor climate in a building, irrespective of where you are: at home, at work, away on business, on the go or on holiday. It is acting as interface between the Uponor Smatrix Wave PLUS interface I-167 and your existing PC, smart TV or mobile devices (tablet/smartphone) via a secure internet connection for remote access or a local network if you are at home.

- Anywhere, anytime access
- User friendly interface
- Online help
- Secure access via app or web
- Real time system status
- System notifications
- Trend visualisation
- Remote adjustment
- Easily connection to a Smatrix Wave PLUS system

6
Uponor Smatrix Wave relay module M-161
 Uponor Smatrix Wave relay module M-161 is a wireless dual output receiver which can be used to switch different devices on or off. In Smatrix Wave PLUS following settings are available:

- Pump/heating and cooling switchover (default)
- Pump/dehumidifier
- Boiler/chiller

These settings are configured in the interface I-167.

As an example, it can be used for a wireless heating/cooling switchover between the Smatrix room control system and the supply water controller or heat source.

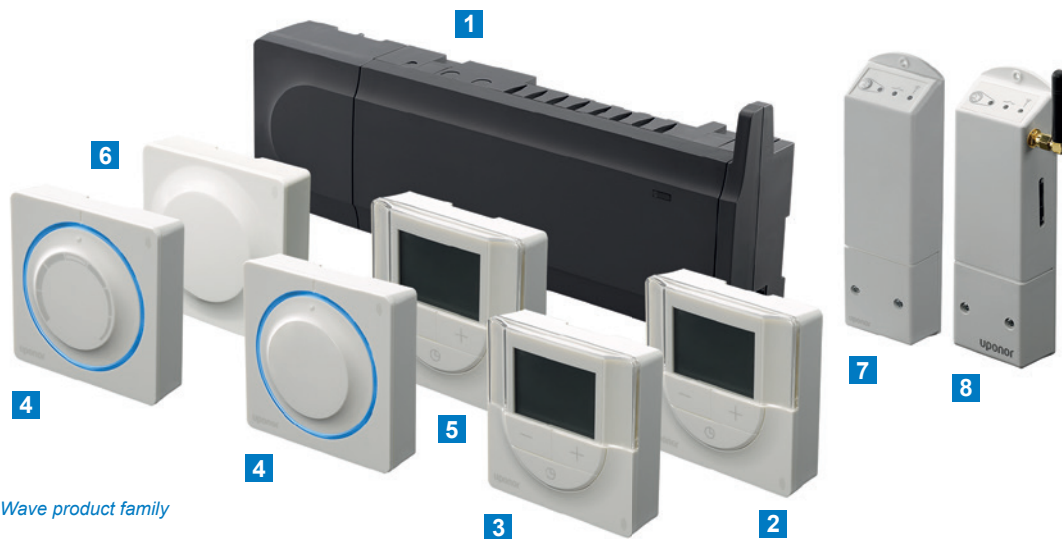
Uponor Smatrix Wave



Uponor Smatrix Wave, featuring autobalancing technology, is an easy to use, intelligent room control system. Autobalancing optimises energy use and comfort by constantly monitoring and adapting the system to changing demands. A further advantage is the wireless functionality of the thermostats adding flexibility and speed to an installation.

Your benefits

- Fast installation, minimal wiring
- Modularity and flexibility given by a modular system architecture
- Low maintenance
- No manual balancing on the manifold is required
- Simple end user control
- First class regulation gives higher comfort and lower energy consumptions
- Basic cooling and humidity default values



Uponor Smatrix Wave product family

Main components/standard application

1
Uponor Smatrix Wave controller X-163
 A wireless controller for heating and cooling. The controller sends and receives radio signals to and from room thermostats and sensors to control thermal actuators and other heating/cooling (H/C) equipment.

2
Uponor Smatrix Wave timer I-163
 A wireless timer device for Comfort/ECO time schedule communication to the Smatrix Wave controller. It provides a user-friendly menu as well as 6 pre-defined Comfort/ECO schedules and 1 freely programmable if required. Other features such as Holiday mode are also available within the timer.

3
Uponor Smatrix Wave thermostat prog.+ RH T-168
 A wireless digital programmable thermostat with relative humidity (RH) sensor. It measures and displays the perceived room temperature and relative humidity, then transmitting the values to the wireless controller.

In addition to the room temperature set point, settings such as cooling on/off and individual night set back can also be adjusted. Different sensors functions such as a floor sensor, remote sensor and outdoor sensor can also be set via the digital display.

4
Uponor Smatrix Wave thermostat standard T-165 POD/ T-165
 A wireless dial single room temperature sensor. It measures the perceived room temperature, transmitting the values to the wireless control unit.

The standard thermostat is also available without (T-165) and with a printed dial (T-165 POD).

5
Uponor Smatrix Wave thermostat dig T-166
 A wireless digital thermostat. It measures and displays the perceived room temperature, transmitting the values to the wireless controller. In addition, different sensors functions such as a floor sensor, remote sensor and outdoor sensor can be set via the digital display.

6
Uponor Smatrix Wave thermostat public T-163 with floor sensor
 A wireless single room temperature sensor for public buildings. In addition, different sensors functions such as a floor sensor, remote sensor and outdoor sensor can be set via dip switch. It measures the perceived temperature and transmits the values to the wireless controller.

7
Uponor Smatrix Wave relay module M-161
 Uponor Smatrix Wave relay module M-161 is a wireless dual output receiver which can be used to switch different devices on or off. In Smatrix Wave only pump/heating and cooling switchover is available.

8
Uponor Smatrix remote access module R-56 SMS
 The Uponor Smatrix remote access module R-56 SMS can remote control a changeover between Comfort and ECO mode.

Uponor Smatrix Base

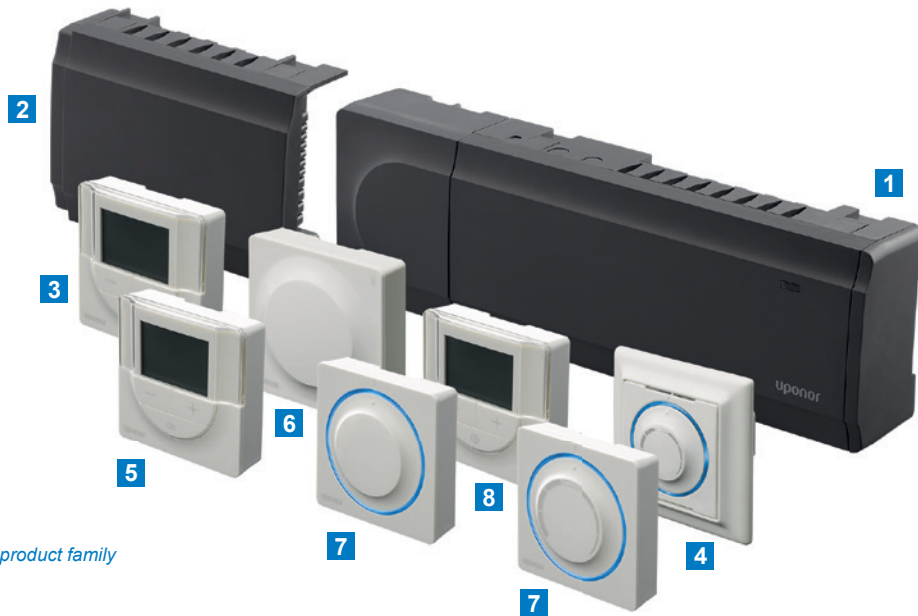


Uponor Smatrix Base is a wired management system for underfloor heating and cooling installations, controlled by different types of thermostats. The system is designed for maximum comfort. The thermostats communicate with the controller by a wired communication protocol (MODBUS). Comfort, user friendliness and temperature control for each individual room of a home can be combined through the various components.

The autobalancing function optimises energy use and comfort by constantly monitoring and adapting the system to changing demands. A further advantage is the choice of wiring options adding flexibility and speed to an installation.

Your benefits

- Modularity and flexibility given by a modular system architecture
- Low maintenance
- No manual balancing on the manifold is required
- Simple end user control
- First class regulation gives higher comfort and lower energy consumptions
- Basic cooling and humidity default values
- Any system wiring topology; bus/daisy chain or star connection
- Can be connected with the star module M-141 to make distributed wiring possible



Uponor Smatrix Base product family

Main components/standard application

- 1**
Uponor Smatrix Base controller X-145 Bus
 A wired controller for heating and cooling. The controller sends and receives bus signals to and from room thermostats and sensors to control thermal actuators and other heating/cooling equipment. There are two ways of connecting the thermostats to the controller:

 - Bus topology/daisy chain connection (controller to thermostat to thermostat etc.)
 - Star topology (each thermostat directly to controller or additional Smatrix Base star box)
- 2**
Uponor Smatrix Base star module M-141 Bus
 A connection module for up to six channels that makes a star topology installation in the Smatrix Base system easier. It also adds flexibility in case of how the wiring in a building can be done. Locate a suitable central point, install the star box, connect the thermostats and run one cable back to the controller X-145.
- 3**
Uponor Smatrix Base timer I-143 Bus
 A wired timer device for Comfort/ECO time schedule communication to the Smatrix Base controller. It provides a user friendly menu as well as six pre-defined Comfort/ECO schedules and one freely programmable if required. Other features such as Holiday mode are also available within the timer.
- 4**
Uponor Smatrix Base thermostat flush T-144 Bus
 A wired flush mounted single room temperature thermostat with scale on dial and communication by bus to the Smatrix Base controller. It is specially designed for in-wall box installations including a frame. It measures the perceived room temperature and communicates the values to the wired controller.
- 5**
Uponor Smatrix Base thermostat prog.+ RH T-148 Bus
 A wired digital programmable thermostat with relative humidity (RH) sensor. It measures and displays the perceived room temperature and relative humidity, then communicates the values to the Smatrix Base controller.

In addition to the room temperature set point, settings such as cooling on/off and individual night set back can also be adjusted. Different sensors functions such a floor sensor, remote sensor and outdoor sensor can also be set via the digital display.
- 6**
Uponor Smatrix Base thermostat public T-143 Bus
 A wired room temperature sensor for public buildings. In addition, different sensors functions can be set via dip switch such a floor sensor, remote sensor and outdoor sensor. It measures the perceived temperature and communicates the values to the wired controller.
- 7**
Uponor Smatrix Base thermostat standard T-145 Bus/ T-145 Bus POD
 A wired dial single room temperature sensor. It measures the perceived room temperature and communicates the values to the wired controller.

The standard thermostat is also available without (T-145) and with a printed dial (T-145 POD).
- 8**
Uponor Smatrix Base thermostat digital T-146 Bus
 A wired digital thermostat. It measures and displays the perceived room temperature, communicates the values to the wireless controller. In addition, different sensors functions such a floor sensor, remote sensor and outdoor sensor can be set via the digital display.

Zone controls

Uponor Smatrix Space/Space PLUS



Uponor Smatrix Space is a flexible single channel system that can be used for multiple applications, such as underfloor heating and ceiling cooling installations. Existing installations can be expanded with ease; new ones can be controlled in a simple and cost-effective way. Wireless control reduces the impact on an existing building and makes installations in new builds fast and easy.

Your benefits

- Suitable for both existing and new installations
- Easy to install
- Can be used for both heating and cooling
- It is best used when adding a new zone or ceiling cooling to an existing underfloor heating system
- Can control a pump and actuator

Renovation

Uponor Smatrix Space PLUS renovation set X-161+T-166

A wireless thermostat plus receiver (Uponor Smatrix Space controller X-161), perfect for underfloor heating renovation cases connected to an existing underfloor heating and cooling system. Single room renovations, i.e. bath rooms, or a new conservatory can be easily fixed.

The Smatrix Wave thermostat dig T-166 is connected wireless to the one channel controller and measures the room temperature. It provides two 230 V outputs for controlling actuators or pumps.

In addition it is a user-friendly device with high controls quality which will add comfort to each underfloor heating and cooling renovation – during the installation and during daily use.



Uponor Smatrix Space renovation set X-161+T-165

A wireless thermostat plus receiver (Uponor Smatrix Space controller X-161), perfect for underfloor heating renovation cases connected to an existing system. Single room renovations, i.e bath rooms, or a new conservatory can be easily fixed.

The Smatrix Wave thermostat standard T-165 is connected wireless to the one channel controller and measures the room temperature. It can control new under-floor heating loops in an installation.

In addition it is a user-friendly device with the possibility of adjusting the temperature set point via a dial and provides high controls quality.



Cooling

Uponor Smatrix Space cooling set X-161+T-168

A wireless thermostat plus receiver (Uponor Smatrix Space controller X-161), cooling pack, perfect for ceiling cooling renovations connected by a Tichelmann supply water installation. Room by room Tichelmann loops can be controlled.

The Smatrix Wave thermostat prog.+RH T-168 is connected wireless to the receiver and measures the room temperature as well as the relative humidity to avoid condensation.

In addition it is a user-friendly device with high controls quality which will add comfort to each ceiling heating/cooling installation/renovation.



Supply water controls

Uponor Smatrix Move PLUS



Uponor Smatrix Move PLUS is a supply temperature control system for heating and cooling installations utilising underfloor heating, radiators, floor cooling etc. It optimises the supply water temperature by adjusting the setpoint based on measured outdoor or indoor temperatures. The Smatrix Move PLUS controller can be connected to a Smatrix Wave/Wave PLUS thermostat to receive system or reference room data.

Comfort, user friendliness and temperature control for a home can be combined through the various components. A choice of operation and compensation modes is available to fit different applications and provide optimal performance and energy efficiency.

Your benefits

- Heating, cooling and humidity control
- Heating and cooling switchover options
- Outdoor and/or indoor compensation
- Pump logic for both stand alone and in combination with Uponor room controls
- Optional secondary heating/hot water circuit control
- Comfort and ECO programming schedule
- Real time status information
- Can be connected to a Smatrix Wave/Wave PLUS thermostat

Uponor Smatrix Move PLUS controller H/C X-158 Radio

An intelligent supply water temperature controller for an underfloor heating/cooling system. It provides three different modes which are selectable and visible in the display:

- Heating
- Heating and cooling
- Heating, cooling and humidity

According to demand and the system set up the Uponor Smatrix Move PLUS controller can control the supply water temperature based on following principles:

- Outdoor temperature compensation
- Indoor compensation
- Outdoor and indoor compensation

It is optimizing the supply water temperature for the underfloor heating/cooling system and improves the energy consumption and distribution. This is saving energy and provides comfort to the home owner.



Uponor Smatrix Move



Smatrix Move is a supply temperature control system for heating and cooling installations utilising underfloor heating, radiators, floor cooling etc. It optimises the supply water temperature by adjusting the setpoint based on measured outdoor or indoor temperatures.

Comfort, user friendliness and temperature control for a home can be combined through the various components. A choice of operation and compensation modes is available to fit different applications and provide optimal performance and energy efficiency.

Your benefits

- Heating, cooling and humidity control
- Outdoor compensation
- Stand alone pump logic
- Optional secondary heating/hot water circuit control
- Comfort and ECO programming schedule
- Real time status information

Uponor Smatrix Move controller H X-157 Wired

An intelligent supply water temperature controller for an underfloor heating system. According to demand and the system set up, the Uponor Smatrix Move controller heating can control the supply water temperature based on following principles:

- Outdoor temperature compensation

Furthermore, the radio antenna can be clicked into the controller (upgrade to Uponor Smatrix Move PLUS) to provide a wireless connection to the radio outdoor sensor and selected Uponor Smatrix Wave thermostats with display and integrated relative humidity sensor. It is optimizing the supply water temperature for underfloor heating system and improves the energy consumption and distribution. This is saving energy and provides increased comfort to the home owner.



Functions



	Auto balancing	Cooling functions	Modularity	U@home	SMS module	Trend visualization	Comfort setting	Data storage	System diagnostic	HP integration	Room bypass	Room check
Wave PLUS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Wave	✓	✓	✓		✓							
Base	✓	✓	✓		✓							
	Basic functions			Comfort functions				Technical functions				

Basic functions

Autobalancing

Automatic temperature equilibration of each room, calculating at each moment the energy needed for comfort.

Cooling functions

Smatrix Wave and Base: basic cooling and humidity functions (default values).

Smatrix Wave PLUS: additional cooling settings and combined products are increasing the possibilities, the comfort and the use of cooling functions.

Modularity

Modularity and flexibility is given by the modular system architecture. Relocate parts of the products to other places and extend the system with additional components and functions.

Comfort functions *(only Wave PLUS)*

U@home

Controls the underfloor heating and cooling installation via mobile devices at home or from a remote location. Monitor Smatrix and adjust the temperature from work, the car, a smartphone or from the comfort of home. Via Wi-Fi or an internet connection at home.

SMS module

Provides the possibility for remote control of Comfort and ECO setting via SMS communication to the underfloor heating and cooling system.

Trend visualisation

Shows and compares temperature settings with room temperature of the last week. In addition it provides an energy consumption indication for the same period.

Comfort setting

With the comfort setting, the system adapts to the ambient temperature whilst maintaining the floor temperature within the zone. When using alternative heat sources, such as a fire place, the heating supply from the system is reduced instead of shutting down completely.

Technical functions *(only Wave PLUS)*

Data storage

System settings backup and data logging is possible by a standard microSD card.

System diagnostic

The system detects if there are difficulties in reaching the comfort temperature in each room (over- or underpower):

- **Overpowered:** Supply temperature too high
 - ▶ reduce the temperature
- **Underpowered:** Supply temperature too low
 - ▶ increase temperature

Heat pump (HP) integration

A dynamic instead of a static heat curve. Calculating at each moment the energy needed for comfort and energy efficiency.

Note! Only supported by a few heat pump manufacturers.

Room bypass

Helps to increase the performance of a heat pump when a minimum flow is required or if the buffer tank is too small for the system.

Room check

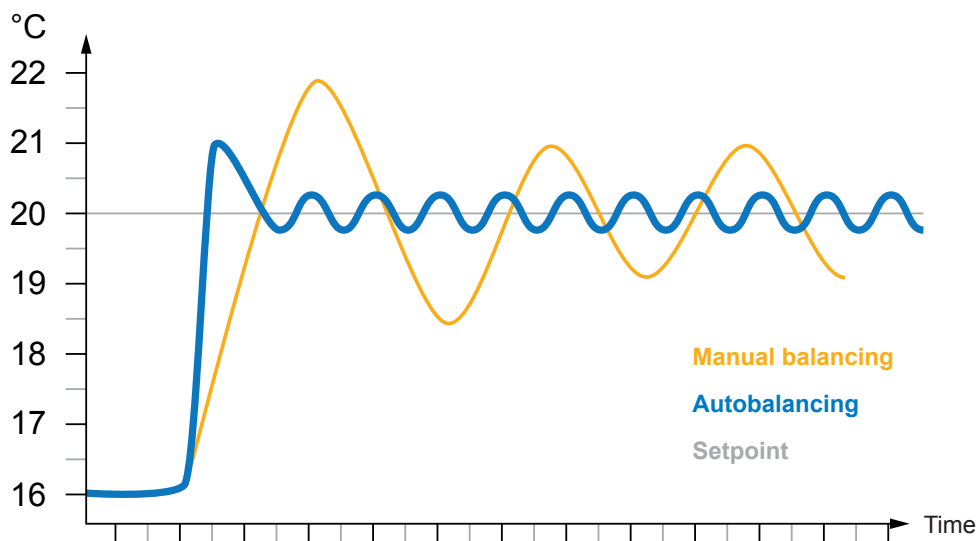
Identifies if the thermostats are properly assigned to the loops. Through the display you can check which rooms are connected to the same circuit and the temperature thereof. Identifies if the thermostats are properly assigned to the room and their corresponding circuits, informing if appear any anomaly.

Autobalancing

With traditional controls, radiant heating and cooling needs balancing to fixed design conditions. This is a manual process that needs later adjustment to suit the actual building and occupiers preferences - a time consuming trial and error procedure.

Autobalancing is a function where the system calculates the actual energy need of single rooms and adapts the output power of each loop to its length. This means a short loop might get 20 % on time while a long loop might get about 60 %. Autobalancing constantly monitors changes in conditions inside and outside the building. The Uponor Smatrix Wave, Wave PLUS and Base controllers can operate the actuator outputs by either on/off signals or by autobalancing, using pulse width modulation (PWM) signals.

By intelligently adjusting and adapting, Uponor Smatrix Wave, Wave PLUS and Base controllers ensures that just the right amount of energy is used at just the right time. Autobalancing not only eliminates this initial commissioning adjustment - periodically the system optimises the circuit of each room, continuously calculating the energy required for your comfort. Even if you change floor coverings, autobalancing will adapt



automatically to ensure the right comfort levels with the most efficient energy use.

While the manual hydraulic balancing always considers only the initial conditions, the auto-tuning the temperature constantly adapts every change in to system or space, without complicated recalculation and adjustment by an installer. The automatic balancing continues through the seasons and throughout the household's changing lifestyle and usage patterns, removing the need of manual balancing. This gives more even floor temperatures and faster system reaction times with lower energy consumption than any standard on/off system. You save time, energy and money - you gain optimal comfort.

Cooling and humidity

All Uponor Smatrix systems are "cooling ready" measurement of the relative humidity in each room, cooling curve with the Smatrix Move/Move PLUS and the autobalancing delivers the right hydraulik change between heating and cooling.

With **Uponor Smatrix Wave PLUS** controller it is possible to use the same thermostat to control the ceiling cooling or floor heating/cooling in a zone. This is configured via the interface I-167. It is also possible to configure the cooling and humidity settings in accordance with the end customer's needs. In addition, it is also possible to control the dehumidifier via the interface I-167.

Uponor Smatrix Wave and Base have basic cooling functionalities with fixed, default values.



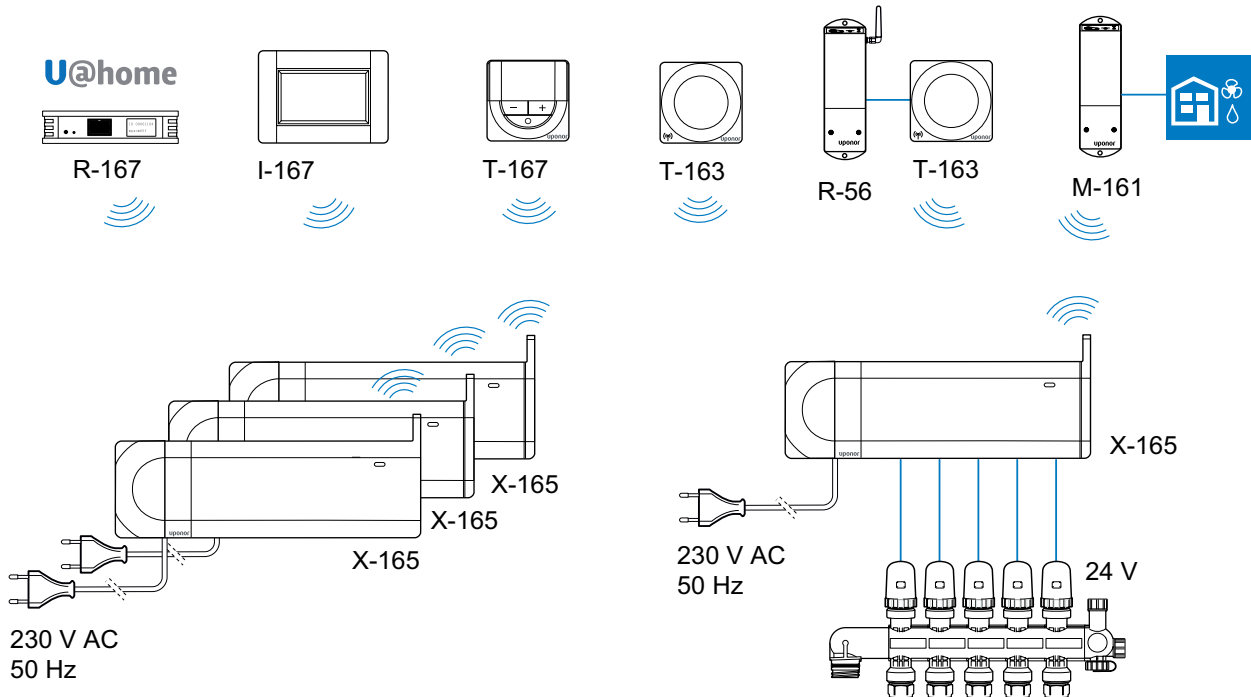
Functions – room controls

Following pages briefly describe the functions for some of the components. For more detailed information about them and how they should be installed, please see the installation and operation manuals for each system.



Application examples describing different installation possibilities are presented in the second half of this document.

Uponor Smatrix Wave PLUS



Uponor Smatrix Wave PLUS controller X-165

The functions in the controller X-165 are:

- 6 channels and 8 actuators 24 V
- 2 way communication with up to six room thermostats
- Pump and boiler relays
- Integrated heat pump module
- Autobalancing
- Valve exercise, pump exercise
- System data logging, back up and updates via microSD card
- Heating/cooling function can be switched by multi function input (GPI), the interface I-167 or a heating/cooling system device
- Comfort/ECO function can be switched by multi function input (GPI), the interface I-167 or Comfort/ECO system device



- Advanced heating/cooling and relative humidity (RH) control
- Configurable ceiling cooling
- Overload protection

Options

- System can be expanded to up to 4 controllers
- Controller can be expanded to additional 6 channels and 6 actuator outputs by a slave module M-160
- Expanded with 1 relay module M-161 per controller to control external units, i.e. pump, boiler, chiller
- Modular placement (detachable parts)
- Cabinet or wall mounted (DIN rail or screw hole)
- Free installation orientation. Note! The antenna must be placed vertically

Uponor Smatrix Wave PLUS interface I-167

The functions in the wireless interface I-167 are:



- Touch display, backlight, intuitive and clear structure
- Interface menus in different languages; i.e. time/date, display settings, system and alarm information
- Installation wizard
- Interface and settings of up to four controllers running in one system
- Temperature setback programs for each zone/room or system
- Configurable max./min. temperature limitations
- Room check function
- Trend visualization (set point vs. room temperature etc.)
- Autobalancing setting "active (default)/inactive"
- Automatic summer/winter time change
- Holiday mode
- Room bypass function
- System diagnostic
- Advanced cooling settings
- MicroSD card for language and software changes
- U@home module R-167 connectivity
- Configurable multi function input (GPI), i.e. H/C, HP Alarm, Comfort/ECO
- Configurable pump management
- Configurable relay module; pump/heating and cooling switch, pump/dehumidifier, boiler/chiller

Uponor Smatrix Wave PLUS Thermostat D+RH T-167

The functions in the digital and relative humidity thermostat T-167 are:



- Display with backlight, dims 10 seconds after last button event
- Software version (on power up)
- Heating or cooling demand indication
- RH limit indication
- Low battery indication
- Comfort/ECO indication and mode reception from timer
- Manual H/C switchover function (hidden if used in Smatrix Wave/Wave PLUS)
- ECO setback modification (hidden if an interface I-167 is linked to the system)
- Regulation mode, i.e. room temperature (RT), internal with floor max./min. (RFT), remote sensor (RS), remote outdoor (RO)
- Cooling allowed function (only information if an interface I-167 is linked to the system)
- Display Celsius or Fahrenheit
- Set point range 5-35 °C

Options

- Compatibility with Smatrix Move PLUS Controller H/C Radio X-158
- Different sensor types can be connected

Uponor Smatrix Wave thermostat public T-163 with floor sensor

The functions in the public thermostat T-163 are:

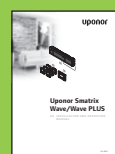


- Public thermostat with potentiometer on rear side to adjust the temperature set point
- Set point range 5-35 °C
- Alarm tamper detector
- Contact sensing input for heating/cooling and Comfort/ECO via for instance the SMS module R-56
- 4 pole dip switch for function/sensor selection
- Dip switch to enable or disable timer function

Options

- Floor sensor
- Outdoor sensor
- Remote sensor

More information about the components, installation and operation can be found in the Uponor Smatrix Wave/Wave PLUS installation and operation manual.



Other components

Uponor Smatrix Wave slave module M-160

The slave module M-160 is a 6 channel controller slave that can be added to a Smatrix Wave PLUS controller, to expand the available channels (6) and actuator outputs (6).



Functions

- Click in installation to Smatrix Wave PLUS controller
- No additional wiring needed
- Link with up to 6 additional room thermostats
- Connection of additional maximum 6 actuators 24 V

Uponor Smatrix Wave relay module M-161

A wireless dual output receiver which can be used to switch different devices on or off.

In addition it can be used for a wireless H/C switchover between the Smatrix room control system and the supply water controller or heat source.



Functions

- Smatrix Wave relay module M-161 with 2 potential free or live 230 V, 5 A outputs
 - Wireless communication with the Smatrix Wave PLUS controller
- Options: pump/heating and cooling switch, pump/dehumidifier, boiler/chiller

Uponor Smatrix Wave PLUS U@home module R-167

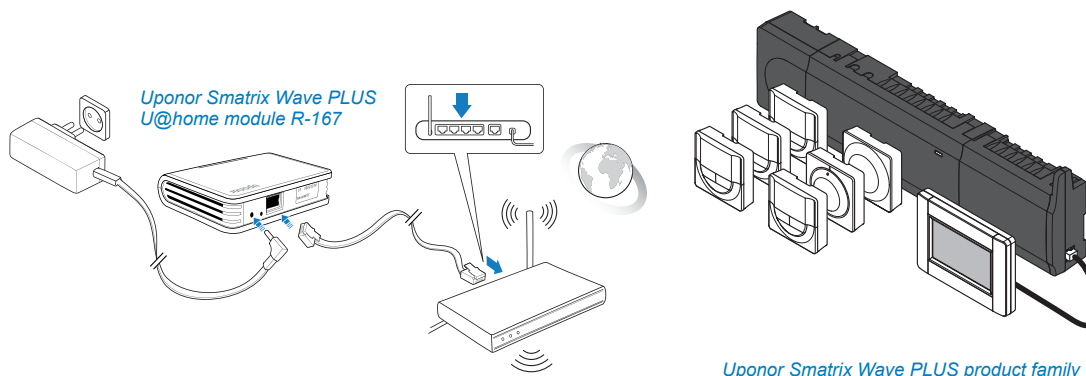
The new U@home module R-167 has been designed to be placed on a table or wall-mounted close to your home router. An attractive design highlights the many user-friendly features in U@home.



Use a local or remote access via the Uponor app "U@home" to control your underfloor heating/cooling system if you are at home or away. You only need to link the module to the Smatrix Wave PLUS interface I-167, and connect to your existing router via a standard RJ45 cable to experience a comfortable way to control your underfloor heating/cooling system.

Functions

- Control your underfloor heating/cooling system with existing devices as such your PC, smart TV, tablet or smartphone (IOS or Android)
- Remote control of your underfloor heating/cooling system if you are away or at home
- Being informed about the status of your underfloor heating/cooling system
- Being informed about energy efficiency level



U@home - app and web interface

Uponor has developed U@home to manage indoor climate in a building, regardless of where you are: at home, at work, away on business, on the go or on holiday.

To use U@home, simply download the U@home iOS or Android app for your smartphone or tablet. If you wish to use your PC or smart TV, or if your phone/tablet does not support the iOS or Android operating systems, U@home can be accessed by using web access via your web browser.

There are two service levels in U@home:

Local Access

- Access to your underfloor heating/cooling system at home. You have access to U@home when you are connected to your home LAN. It is not necessary to register in the U@home website. The only requirement is to have the U@home module installed in your home.



Remote Access

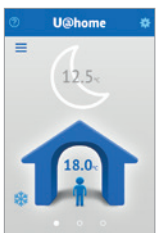
- Access to U@home wherever there is internet connectivity. The requirements for U@home remote access are as follows:

The U@home module must be correctly installed in your home.

An internet connection is needed in the U@home module as well as in the device from which you would like to access this service.

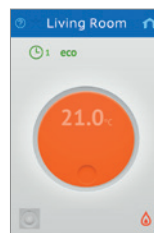
To activate remote access, you need to create your U@home user account first. Once your user account has been activated, the remote access service can be used.

Some of the available functions



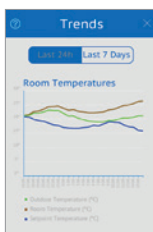
Choose between "Home"/"Away" modes

"Home" to "Away" switching, also known as "Comfort" and "ECO" respectively, is a function used to save energy by decreasing the setpoints in heating mode or increasing them in cooling mode when in "ECO" mode. This ensures that heating or cooling needs are lower.



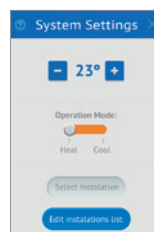
Set room temperature

Advanced settings for controlling the indoor climate room by room. It is possible to set different timings for "ECO" and "Comfort" modes for each room, if needed.



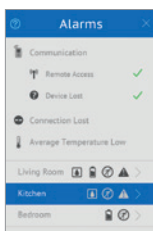
Receive alarms

U@home can save and show the temperature values of the system during the last 24 hours and 7 days, as well as other information related to system performance.



Various other settings

System setting and easy configuration of your installation.



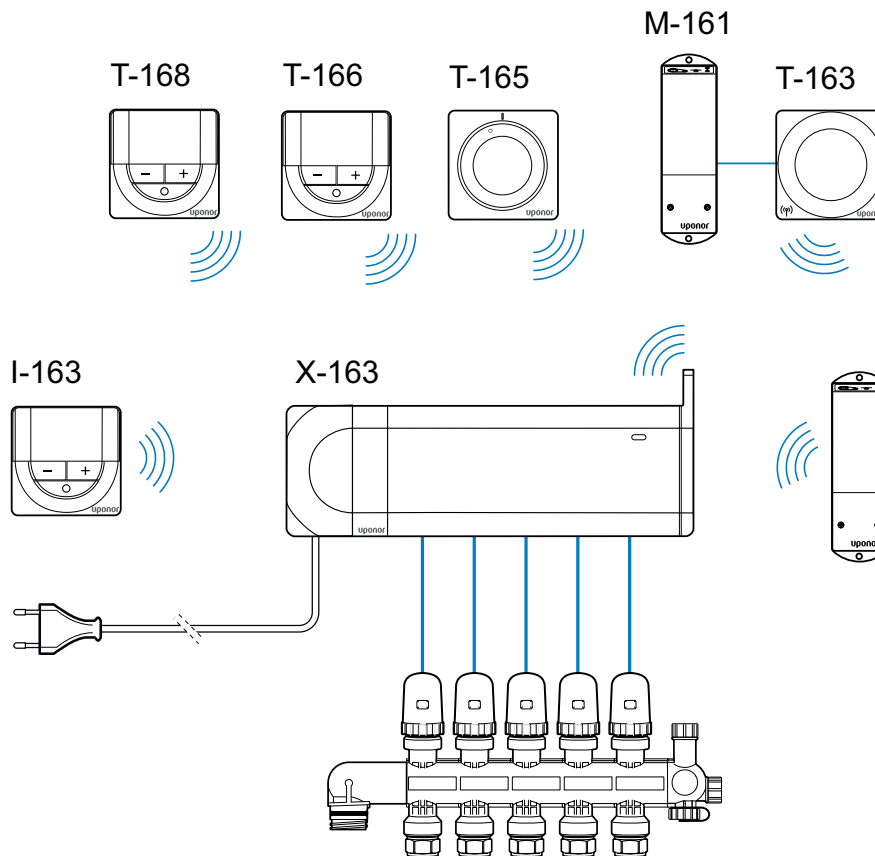
Visualise trends

When there are active alarms in the system, the alarm indicator appears on the home screen.

More information about U@home can be found in the Uponor Smatrix Wave PLUS U@home R-167 installation and operation manual; help and tutorial.



Uponor Smatrix Wave



Uponor Smatrix Wave controller X-163

The functions in the controller X-163 are:

- 6 channels and 8 actuators 24 V
- 2 way communication with up to 6 room thermostats
- Pump and boiler relays
- Autobalancing
- Valve exercise, pump exercise
- Heating/cooling function can be switched by multi function input (GPI) or a heating/cooling system device
- Comfort/ECO function can be switched by timer programs or a Comfort/ECO system device
- Basic cooling and relative humidity (RH) control
- Overload protection



Options

- Controller can be expanded to additional 6 channels and 6 actuator outputs by a slave module M-160
- Expanded with 1 relay module M-161 to control pump/heating and cooling switch
- Modular placement (detachable parts)
- Cabinet or wall mounted (DIN rail or screw hole)
- Free installation orientation. Note! The antenna must be placed vertically

Uponor Smatrix Wave timer I-163

The functions in the timer I-163 are:

- Display with backlight
- Software version display on start up
- Set time start up wizard
- Comfort/ECO indication
- Low battery indication



- 6 pre-programmed schedules + 1 freely programmable schedule
- Holiday mode
- Autobalancing setting on/off
- ECO setback value setting
- Settings, such as clock and date reset

Uponor Smatrix Wave thermostat prog.+ RH T-168

The functions in the programmable and relative humidity thermostat T-168 are:

- Display with backlight, dims 10 seconds after last button event
- Software version (on power up)
- Heating or cooling demand indication
- RH limit indication
- Low battery indication
- Comfort/ECO indication and mode reception from timer
- 6 pre-programmed schedules + 1 freely programmable schedule (hidden if an interface I-167 is linked to the system)
- Manual H/C switchover function (hidden if used in Smatrix Wave/Wave PLUS)



- ECO setback modification (hidden if an interface I-167 is linked to the system)
- Regulation mode, i.e. room temperature (RT), internal with floor max./min. (RFT), remote sensor (RS), remote outdoor (RO)
- Cooling allowed function (only information if an interface I-167 is linked to the system)
- Display Celsius or Fahrenheit
- Settings, such as clock and date reset
- Set point range 5-35 °C

Options

- Compatibility with Uponor Smatrix Move PLUS Controller H/C Radio X-158

Uponor Smatrix Wave thermostat dig T-166

The functions in the digital thermostat T-166 are:

- Display with backlight, dims 10 seconds after last button event
- Software version (on power up)
- Heating or cooling demand indication
- Low battery indication
- Comfort/ECO indication and mode reception from timer
- Manual heating/cooling switchover function (hidden if used in Smatrix Wave/Wave PLUS)
- ECO setback modification (hidden if an interface I-167 is linked to the system)



- Regulation mode, i.e. room temperature (RT), internal with floor max./min. (RFT), remote sensor (RS), remote outdoor (RO)
- Cooling allowed function (only information if an interface I-167 is linked to the system)
- Display Celsius or Fahrenheit
- Set point range 5-35 °C

Options

- Compatibility with Uponor Smatrix Move PLUS controller H/C Radio X-158

Uponor Smatrix Wave thermostat standard T-165/T-165 POD

The functions in the standard thermostat T-165/T-165 POD are:

- Blue light indication behind the dial after changing the set point
- Printed scale on dial (T-165 POD)



- Heating/cooling demand indication
- Dip switch to enable or disable timer function
- Set point range 5-35 °C

Other components

Uponor Smatrix Wave relay module M-161

The relay module M-161 is a wireless dual output receiver which can be used to switch different devices on or off.



In addition it can be used for a wireless heating/cooling switchover between the Smatrix room control system and the supply water controller or heat source.

Functions

- Smatrix Wave relay module M-161 with 2 potential free or live 230 V, 5 A outputs
- Wireless communication with the Smatrix Wave controller

Option

- Pump/heating and cooling switch

Uponor Smatrix Wave slave module M-160

The slave module M-160 is a 6 channel controller slave that can be added to a Smatrix Wave controller, to expand the available channels (6) and actuator outputs (6).



Functions

- Click in installation to Smatrix Wave controller
- No additional wiring needed
- Link with up to 6 additional room thermostats
- Connection of additional maximum 6 actuators 24 V

Uponor Smatrix remote access module R-56 SMS

The remote access module R-56 SMS is connected to the controller via a Smatrix Wave thermostat public T-163/Smatrix Base thermostat public T-143 (public thermostat T-163/T-143). The thermostat sends a message to the controller when the relay status in the SMS module is changed. A closed relay forces ECO mode. This gives the following basic remote control:



- The homeowner can set the system to ECO mode when leaving the house by sending an SMS
- The homeowner can set the system remotely by SMS to comfort or by manually pressing the button on the SMS module
- The SMS module can also be used with any other dry contact sensing input, i.e. heating/cooling, boiler on/off etc

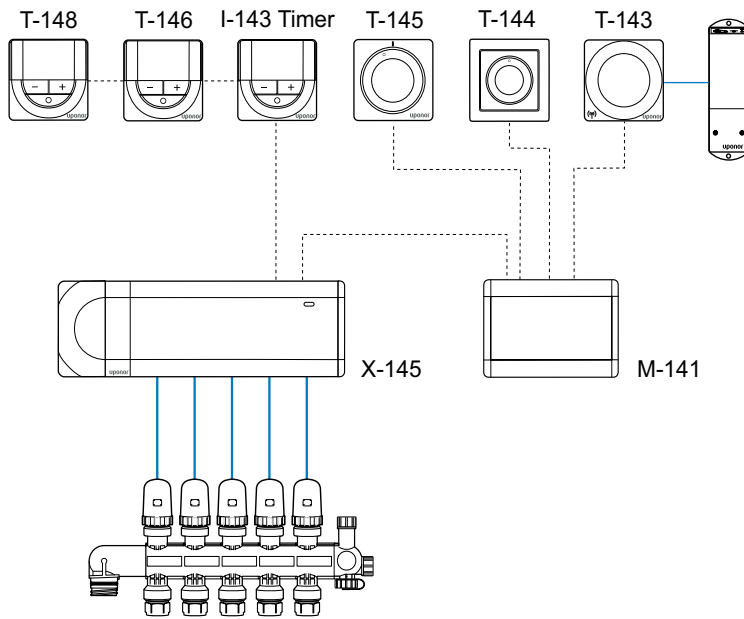
Options

- Temperature read out and alarms
- Parameter configuration

More information about the components, installation and operation can be found in the Uponor Smatrix Wave/Wave PLUS installation and operation manual.



Uponor Smatrix Base



Uponor Smatrix Base controller X-145 Bus

The functions in the controller X-145 are:

- MODBUS communication
- 6 channels and 8 actuators 24 V
- 2 way communication with up to six room thermostats
- Pump and boiler relays
- Autobalancing
- Valve exercise, pump exercise
- Heating/cooling function can be switched by multi function input (GPI) or a heating/cooling system device
- Comfort/ECO function can be switched by timer programs or a Comfort/ECO system device
- Basic cooling and relative humidity (RH) control
- Overload protection



Options

- Controller can be expanded to additional 6 thermostats and 6 actuator outputs by a slave module M-140
- Star module M-141 can be connected for a star wiring
- Timer for Comfort/ECO settings
- Modular placement (detachable parts)
- Cabinet or wall mounted (DIN rail or screw hole)
- Free installation orientation

Uponor Smatrix Base star module M-141 Bus

The functions in the star module M-141 are:

- Flexible and different wiring approaches possible
- Six thermostats can be connected but only one cable needs to be connected to the 6 channel controller
- Thermostats inputs only



Options

- Provides different wiring approaches
- As extension to a Smatrix Base controller or stand alone mounting

Uponor Smatrix Base timer I-143 Bus

The functions in the timer I-143 are:

- Display with backlight
- Software version display on start up
- Set time start up wizard
- Comfort/ECO indication
- Low battery indication



- 6 pre-programmed schedules + 1 freely programmable schedule
- Holiday mode
- Autobalancing setting on/off
- ECO setback value setting
- Settings, such as clock and date reset

Uponor Smatrix Base thermostat prog.+RH T-148 Bus

The functions in the thermostat prog.+RH T-148:

- 6 pre-programmed schedules + 1 freely programmable schedule
- Display with backlight, dims 10 seconds after last button event
- Software version (on power up)
- Heating or cooling demand indication
- RH limit indication
- Low battery indication



- Comfort/ECO indication and mode reception from timer
- Manual H/C switchover function (hidden if used in Smatrix Base)
- Regulation mode, i.e. room temperature (RT), internal with floor max./min. (RFT), remote sensor (RS), remote outdoor (RO)
- Display Celsius or Fahrenheit
- Settings, such as clock and date reset
- Set point range 5-35 °C

Uponor Smatrix Base thermostat digital T-146 Bus

The functions in the digital thermostat T-146 are:

- Display with backlight, dims 10 seconds after last button event
- Software version (on power up)
- Heating or cooling demand indication
- Low battery indication
- Comfort/ECO indication and mode reception from timer
- Manual H/C switchover function (hidden if used in Smatrix Base)



- Regulation mode, i.e. room temperature (RT), internal with floor max./min. (RFT), remote sensor (RS), remote outdoor (RO)
- Display Celsius or Fahrenheit
- Set point range 5-35 °C

Uponor Smatrix Base thermostat standard T-145 Bus/T-145 Bus POD

The functions in the standard thermostat T-145/T-145 POD are:

- Blue light indication behind the dial after changing the set point
- Printed scale on dial (only T-145 Bus POD)



- Heating/cooling demand indication
- Dip switch to enable or disable timer function
- Set point range 5-35 °C

Uponor Smatrix Base thermostat flush T-144 Bus

The functions in the flush thermostat T-144 are:

- Blue light indication behind the dial after changing the set point
- Printed scale on dial (T-POD)
- Heating/cooling demand indication
- Dip switch to enable or disable timer function
- Set point range 5-35 °C



Options

- Different frames can be used for installation in a switch rail frame

Uponor Smatrix Base thermostat public T-143 Bus

The functions in the public thermostat T-143 are:

- Public thermostat with potentiometer on rear side to adjust the temperature set point
- Set point range 5-35 °C
- Alarm tamper detector
- Contact sensing input for Comfort/ECO via for instance the SMS module R-56
- 4 pole dip switch for function/sensor selection
- Dip switch to enable or disable timer function



Options

- Floor sensor
- Outdoor sensor
- Remote sensor

Other component

Uponor Smatrix Base slave module M-140 Bus

The slave module M-140 is a 6 channel controller slave that can be added to a Smatrix Base controller, to expand the available channels (6) and actuator outputs (6).



Functions

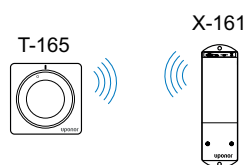
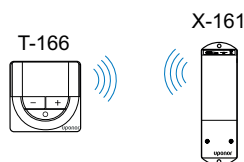
- Click in installation to Smatrix Base controller
- No additional wiring needed
- Link with up to 6 additional room thermostats
- Connection of additional maximum 6 actuators 24 V

More information about the components, installation and operation can be found in the Uponor Smatrix Base installation and operation manual.



Functions – zone controls

Uponor Smatrix Space/Space PLUS



Uponor Smatrix Space PLUS renovation set X-161+T-166

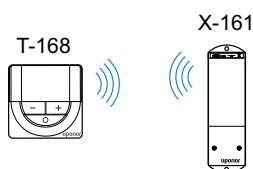
The functions in the renovation set X-161 + T-166 are:

- Display with backlight, dims 10 seconds after last button event.
- Shows software version (on power up)
- Heating or cooling demand indication
- Manual H/C switchover function
- Display Celsius or Fahrenheit
- Regulation mode i.e. room temperature (RT), internal with floor max./min. (FT), remote sensor (RS), remote outdoor (RO)
- Low battery indication
- Set point range 5-35 °C

Uponor Smatrix Space renovation set X-161+T-165

The functions in the renovation set X-161 + T-165 are:

- Blue light indication behind the dial after changing the set point
- Set point range 5-35 °C



Uponor Smatrix Space cooling set X-161+T-168

The functions in the cooling set X-161 + T-168 are:

- Shows software version (on power up)
- Display with backlight, dims 10 seconds after last button event
- Set time start up wizard
- Heating or cooling demand indication
- RH limit indication
- 6 pre-programmed schedules + 1 freely programmable schedule
- Manual H/C switchover function
- Regulation mode i.e. room temperature (RT), internal with floor max./min. (FT), remote sensor (RS), remote outdoor (RO)

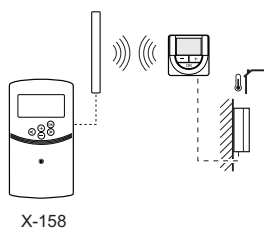
- Display Celsius or Fahrenheit
- Settings, such as clock and date reset
- Low battery indication
- Set point range 5-35 °C

More information about the components, installation and operation can be found in the Uponor Smatrix Space/Space PLUS installation and operation manual.



Functions – supply water controls

Uponor Smatrix Move PLUS



Uponor Smatrix Move PLUS controller H/C X-158 Radio

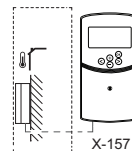
The functions in the heating/cooling controller X-158 are:

- Heating, cooling and humidity control
- H/C signal to heat source
- H/C switchover (3 way valve activation)
- Dry contact for H/C switchover to Smatrix Wave or Base controller as master signal
- H/C switchover as slave programmed in selected Smatrix Wave/Wave PLUS thermostats
- Mixing valve activation
- Weekly program with 9 pre-programmed and 4 freely programmable schedules
- Pump logic as stand alone
- Pump logic in combination with Smatrix Wave or Base controllers
- Real time information about supply temperature, outdoor temperature and room temperature
- Real time information about the status of the mixing valve
- Real time information about the current day shown in a graphic (comfort temperature and reduced temperature)

Options

- Domestic hot water (DHW) production and boiler control
- HW heating circuit
- Up to 100 °C supply water control
- 2 powered general purpose outputs
- 2 general purpose inputs
- Security contact thermostat
- 230 V mixer motor
- 3 way valve motor

Uponor Smatrix Move



Uponor Smatrix Move controller H X-157 Wired

The functions in the wired heating controller X-157 are:

- Supply water control for underfloor heating systems
- Mixing valve activation
- Weekly program with nine pre-programmed and four freely programmable schedules
- Pump logic as stand alone
- Pump logic in combination with Smatrix Wave or Base controller
- Real time information about supply temperature, outdoor temperature and room temperature
- Real time information about the status of the mixing valve
- Real time information about the current day shown in a graphic (comfort temperature and reduced temperature)

Options

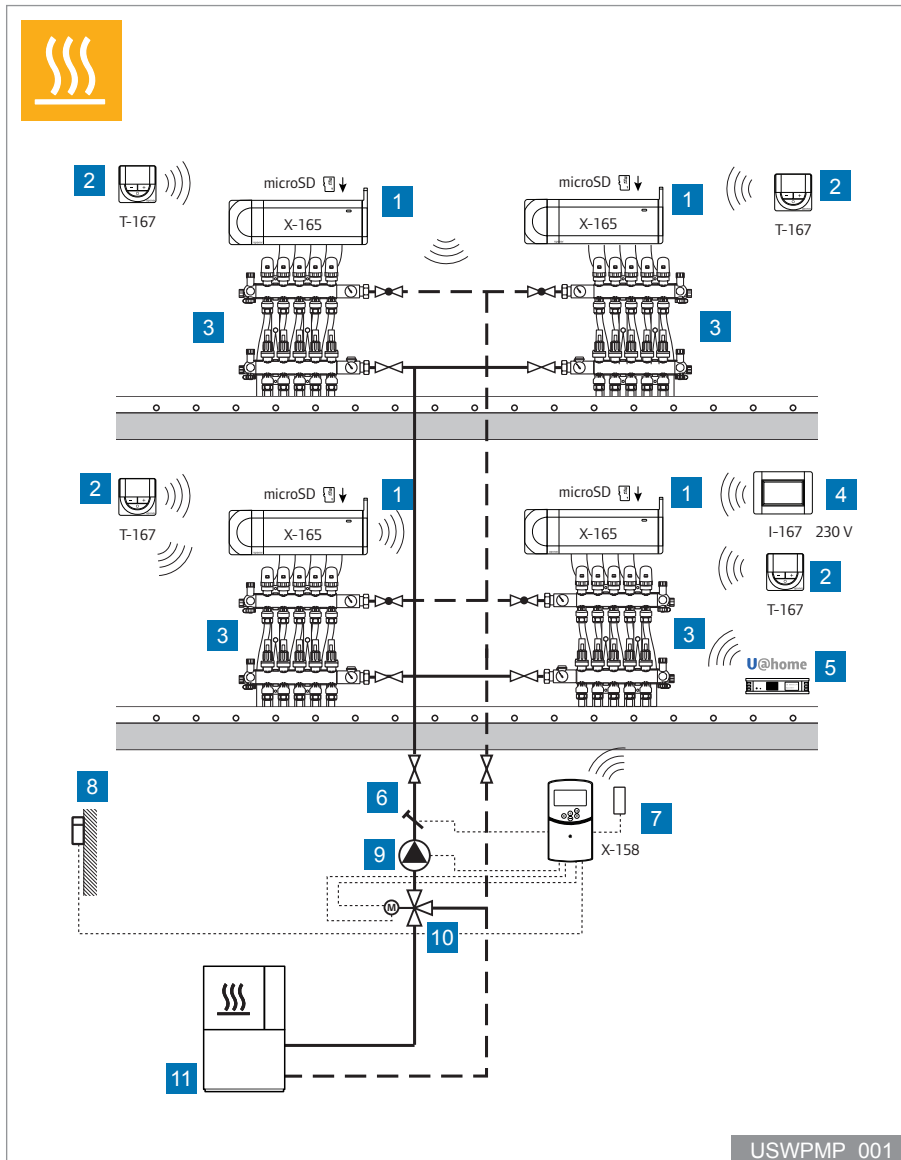
- DHW production and boiler control
- HW heating circuit
- Up to 100 °C supply water control
- 2 powered general purpose outputs
- 2 general purpose inputs
- Security contact thermostat
- 230 V mixer motor

More information about the components, installation and operation can be found in the Uponor Smatrix Move/Move PLUS installation and operation manual.



Application examples

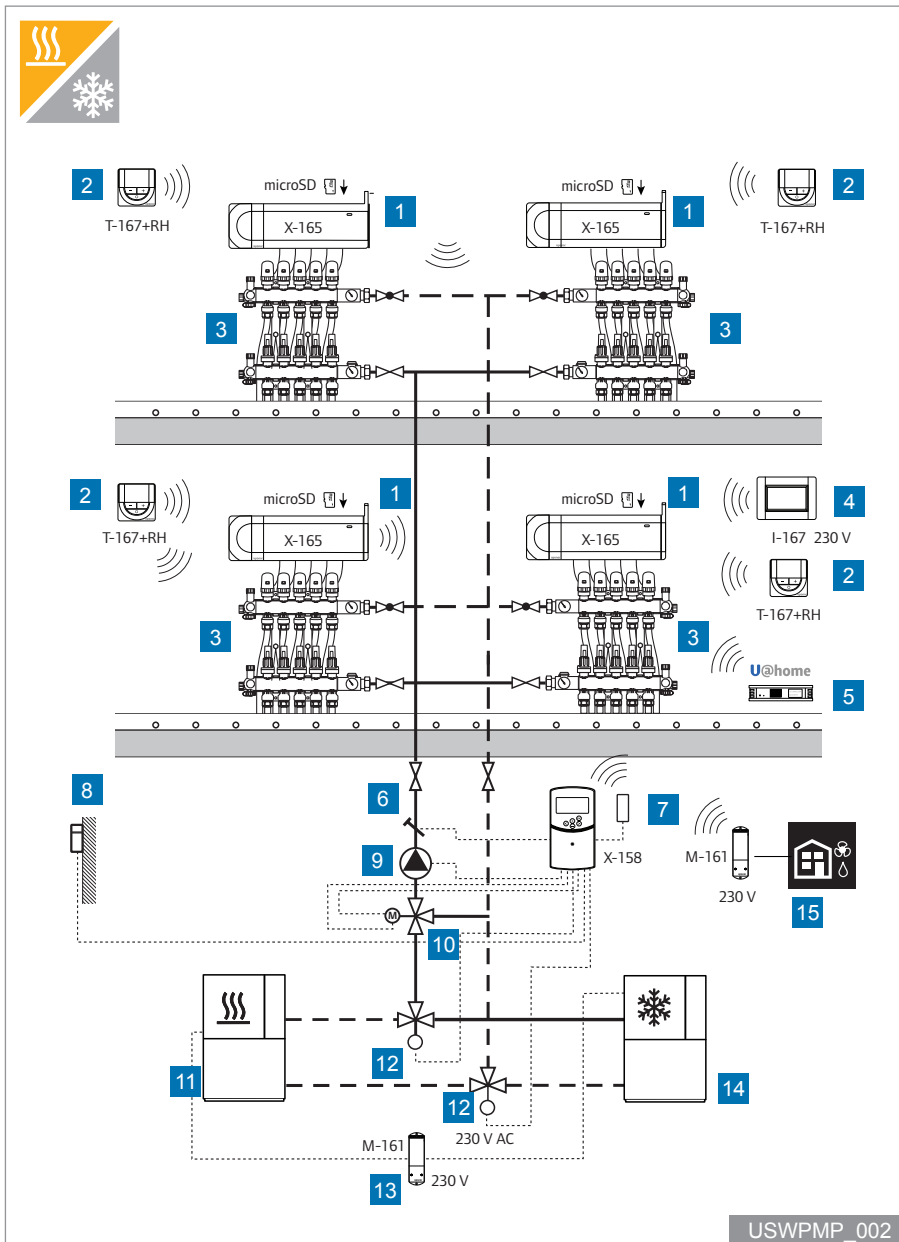
Uponor Smatrix Wave PLUS and Move PLUS; Room and supply water temperature control



- 1 Uponor Smatrix Wave PLUS Controller X-165 6x
- 2 Uponor Smatrix Wave PLUS Thermostat D+RH T-167
- 3 Manifold with actuator TA 24/TR 24
- 4 Uponor SPI Smatrix Wave PLUS Interface I-167
- 5 U@home Module R-167 (not compatible with DEM Radio 24 V)
- 6 Supply sensor
- 7 Uponor Smatrix Move PLUS Controller H/C X-158 Radio
- 8 Outdoor sensor
- 9 Circulation pump
- 10 3 way mixing valve with 230 V 3-point actuator
- 11 Heat source

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

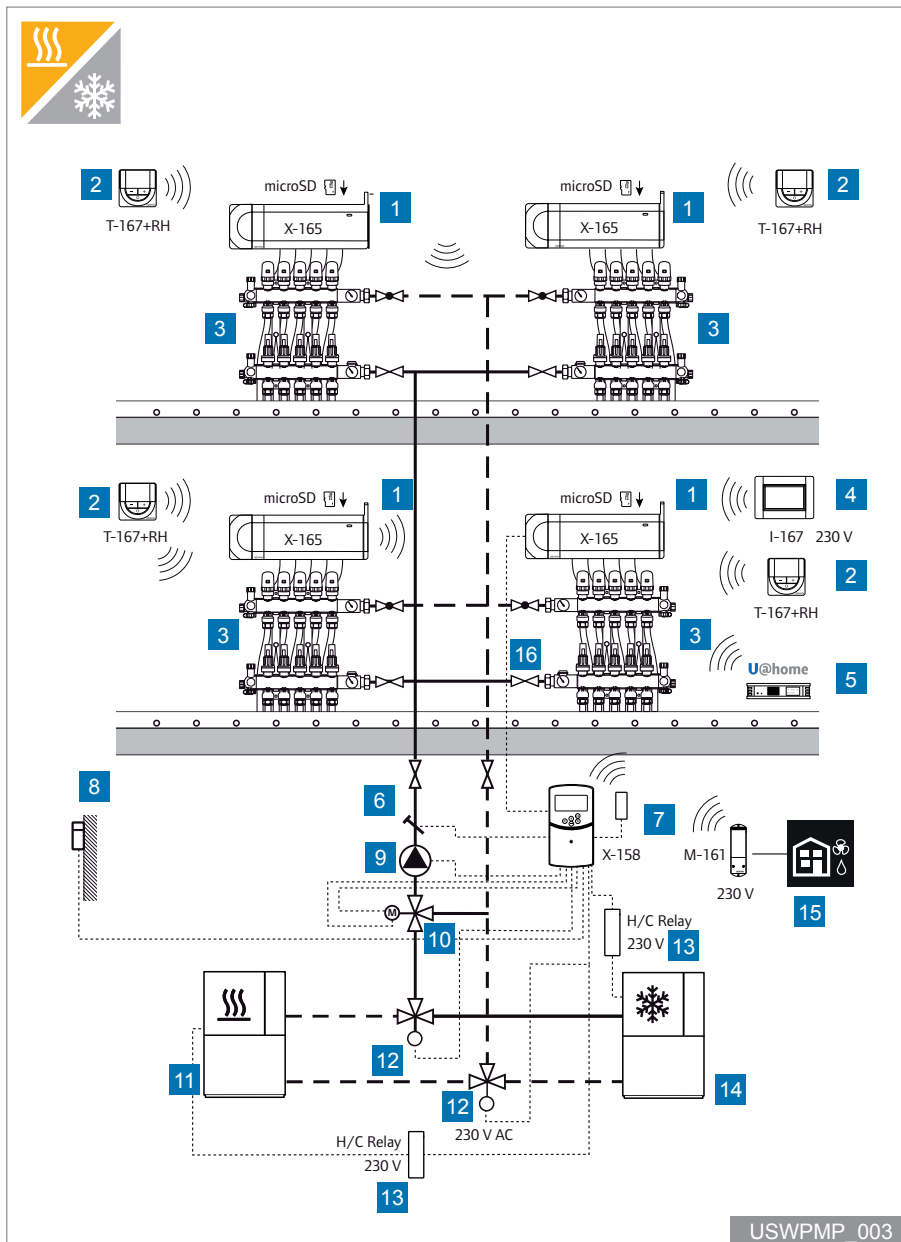
Uponor Smatrix Wave PLUS and Move PLUS; Room and supply water temperature control



- 1 Uponor Smatrix Wave PLUS Controller X-165 6x
- 2 Uponor Smatrix Wave PLUS Thermostat D+RH T-167
- 3 Manifold with actuator TA 24/TR 24
- 4 Uponor SPI Smatrix Wave PLUS Interface I-167
- 5 U@home Module R-167 (not compatible with DEM Radio 24 V)
- 6 Supply sensor
- 7 Uponor Smatrix Move PLUS Controller H/C X-158 Radio
- 8 Outdoor sensor
- 9 Circulation pump
- 10 3 way mixing valve with 230 V 3-point actuator
- 11 Heat source
- 12 H/C switchover valve with 230 V motor
- 13 Optional: boiler/chiller activation per controller; Uponor Smatrix Wave Relay Module M-161 2x
- 14 Chiller
- 15 Optional: dehumidifier activation per controller; Uponor Smatrix Wave Relay Module M-161 2x

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

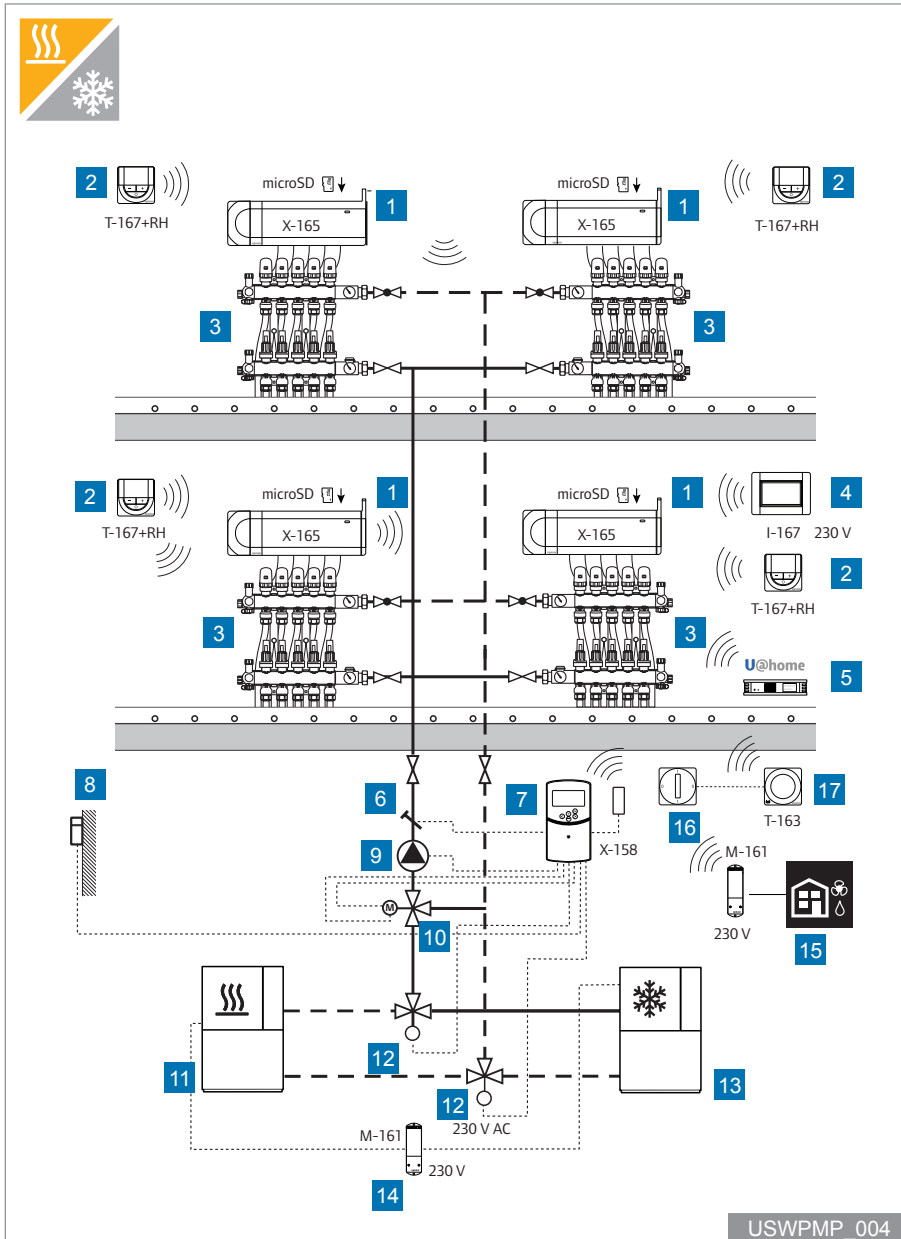
Uponor Smatrix Wave PLUS and Move PLUS; Room and supply water temperature control



- 1 Uponor Smatrix Wave PLUS Controller X-165 6x
- 2 Uponor Smatrix Wave PLUS Thermostat D+RH T-167
- 3 Manifold with actuator TA 24/TR 24
- 4 Uponor SPI Smatrix Wave PLUS Interface I-167
- 5 U@home Module R-167 (not compatible with DEM Radio 24 V)
- 6 Supply sensor
- 7 Uponor Smatrix Move PLUS Controller H/C X-158 Radio
- 8 Outdoor sensor
- 9 Circulation pump
- 10 3 way mixing valve with 230 V 3-point actuator
- 11 Heat source
- 12 H/C switchover valve with 230 V motor
- 13 H/C relay 230 V
- 14 Chiller
- 15 Optional: dehumidifier activation per controller; Uponor Smatrix Wave Relay Module M-161 2x
- 16 Pump relay output to Move PLUS meaning pump on demand

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

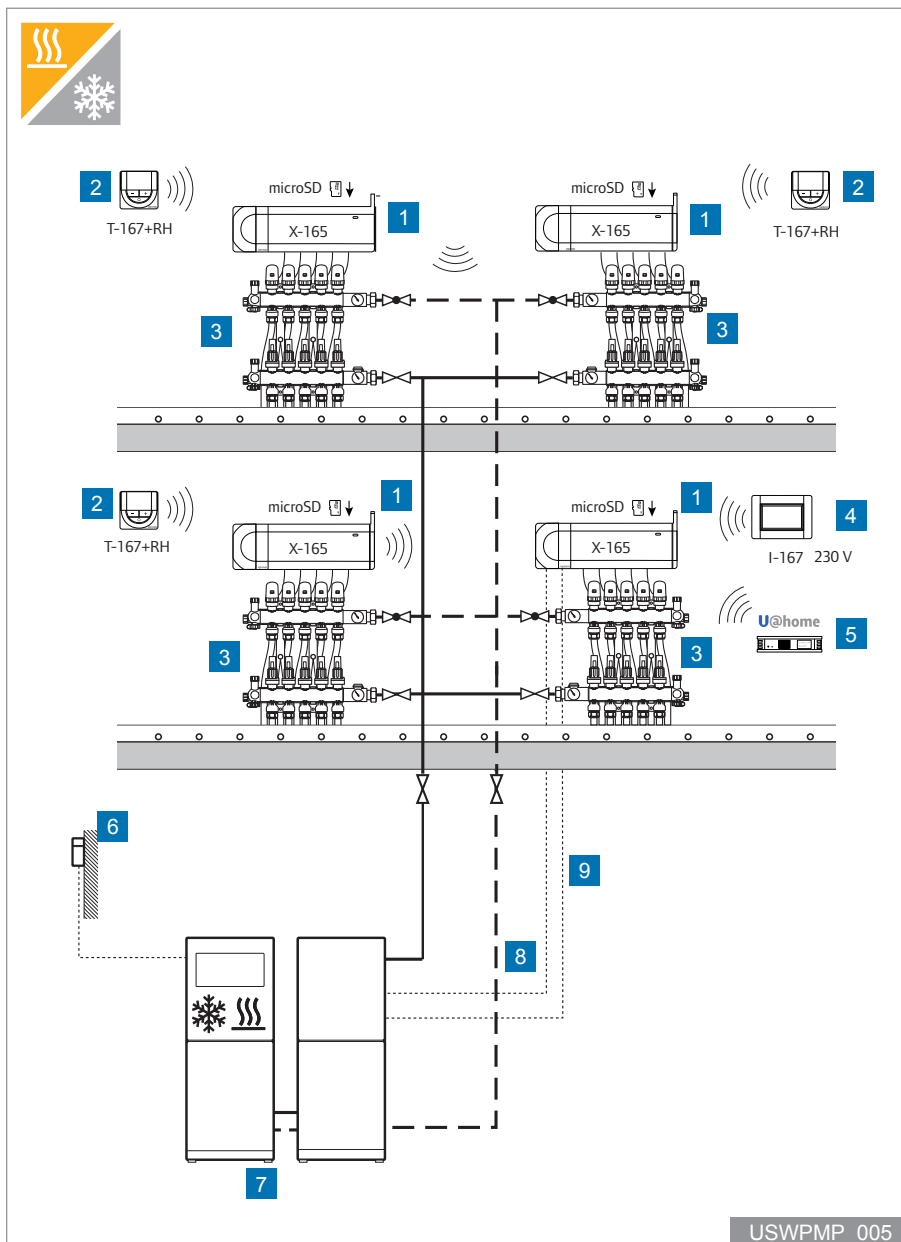
Uponor Smatrix Wave PLUS and Move PLUS; Room and supply water temperature control



- 1 Uponor Smatrix Wave PLUS Controller X-165 6x
- 2 Uponor Smatrix Wave PLUS Thermostat D+RH T-167
- 3 Manifold with actuator TA 24/TR 24
- 4 Uponor SPI Smatrix Wave PLUS Interface I-167
- 5 U@home Module R-167 (not compatible with DEM Radio 24 V)
- 6 Supply sensor
- 7 Uponor Smatrix Move PLUS Controller H/C X-158 Radio
- 8 Outdoor sensor
- 9 Circulation pump
- 10 3 way mixing valve with 230 V 3-point actuator
- 11 Heat source
- 12 H/C switchover valve with 230 V motor
- 13 Chiller
- 14 Optional: boiler/chiller activation per controller; Uponor Smatrix Wave Relay Module M-161 2x
- 15 Optional: dehumidifier activation per controller; Uponor Smatrix Wave Relay Module M-161 2x
- 16 H/C switchover via external switch
- 17 Uponor Smatrix Wave Thermostat Public T-163 (registered as a system device for H/C switchover)

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

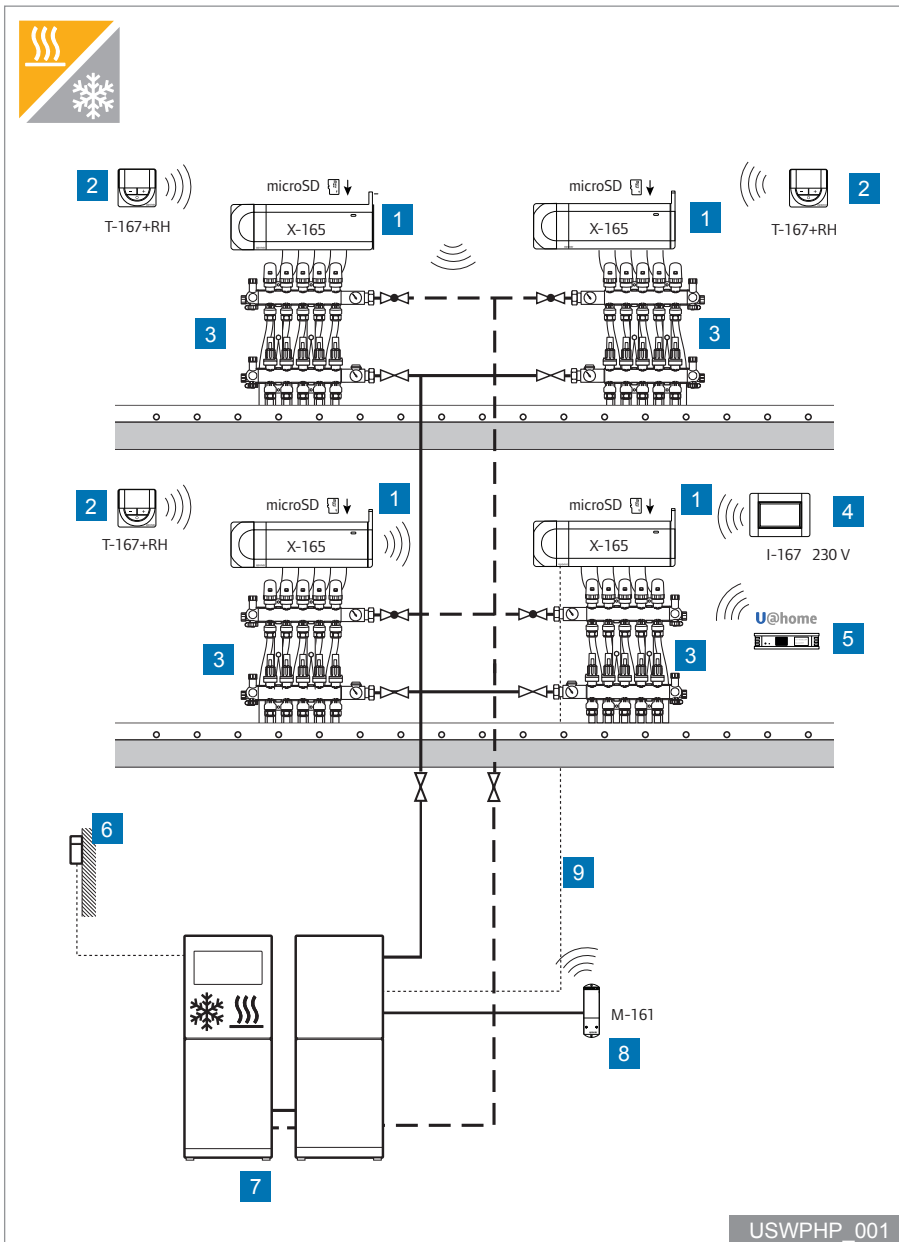
Uponor Smatrix Wave PLUS and Move PLUS; Room and heat pump integration



- 1 Uponor Smatrix Wave PLUS Controller X-165 6x
- 2 Uponor Smatrix Wave PLUS Thermostat D+RH T-167
- 3 Manifold with actuator TA 24/TR 24
- 4 Uponor SPI Smatrix Wave PLUS Interface I-167
- 5 U@home Module R-167 (not compatible with DEM Radio 24 V)
- 6 Outdoor sensor
- 7 Heating/cooling heat pump
- 8 H/C switch contact closing on HP/contact sensing by controller (optional relay if live output from HP)
- 9 Heat pump integration link including dynamic heat curve

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

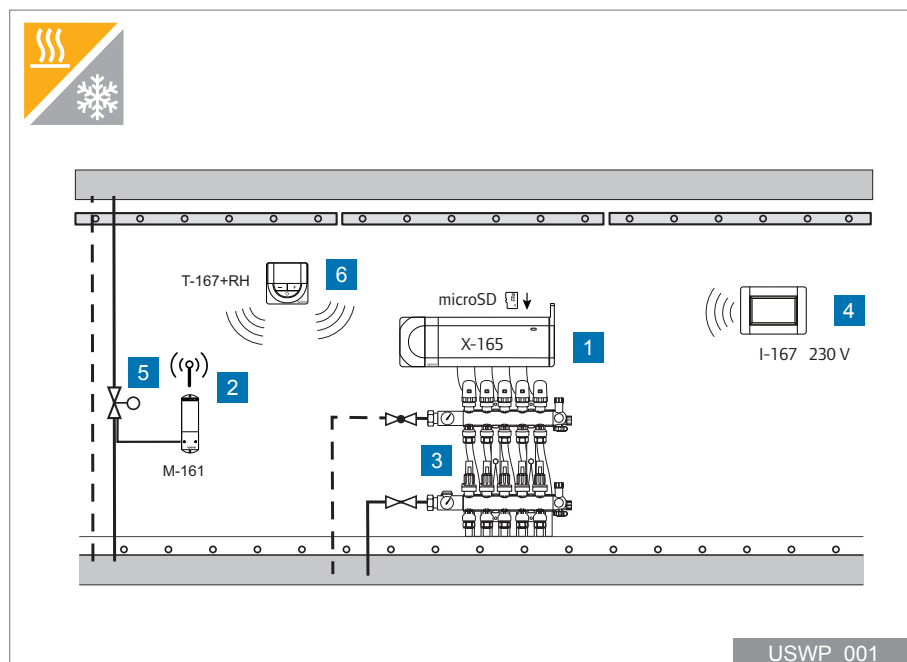
Uponor Smatrix Wave PLUS with HP integration; Room and heat pump integration



- 1 Uponor Smatrix Wave PLUS Controller X-165 6x
- 2 Uponor Smatrix Wave PLUS Thermostat D+RH T-167
- 3 Manifold with actuator TA 24/TR 24
- 4 Uponor SPI Smatrix Wave PLUS Interface I-167
- 5 U@home Module R-167 (not compatible with DEM Radio 24 V)
- 6 Outdoor sensor
- 7 Heating/cooling heat pump
- 8 Uponor Smatrix Wave Relay Module M-161 2x (H/C switchover)
- 9 Heat pump integration link including dynamic heat curve

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

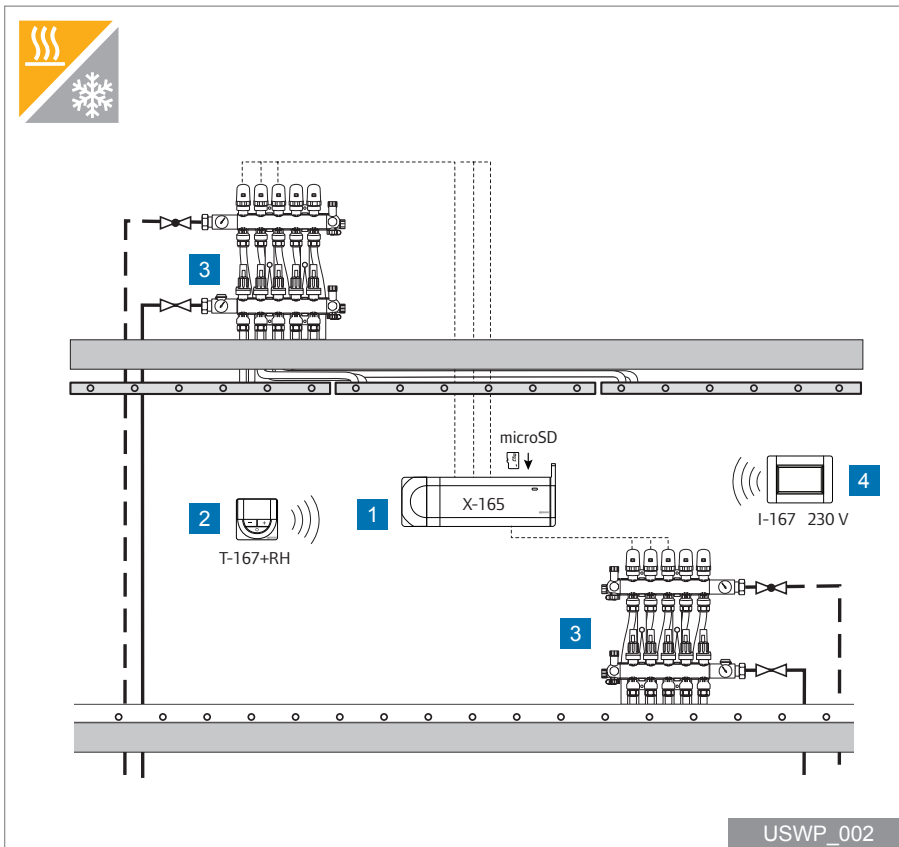
Uponor Smatrix Wave PLUS UFH with ceiling cooling



- 1 Uponor Smatrix Wave PLUS Controller X-165 6x
- 2 Uponor Smatrix Wave relay module M-161 2x (with supply distribution software update)
- 3 Manifold with actuator TA 24/TR 24
- 4 Uponor SPI Smatrix Wave PLUS Interface I-167
- 5 Supply valve with 230 V thermal actuator
- 6 Uponor Smatrix Wave PLUS Thermostat D+RH T-167

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

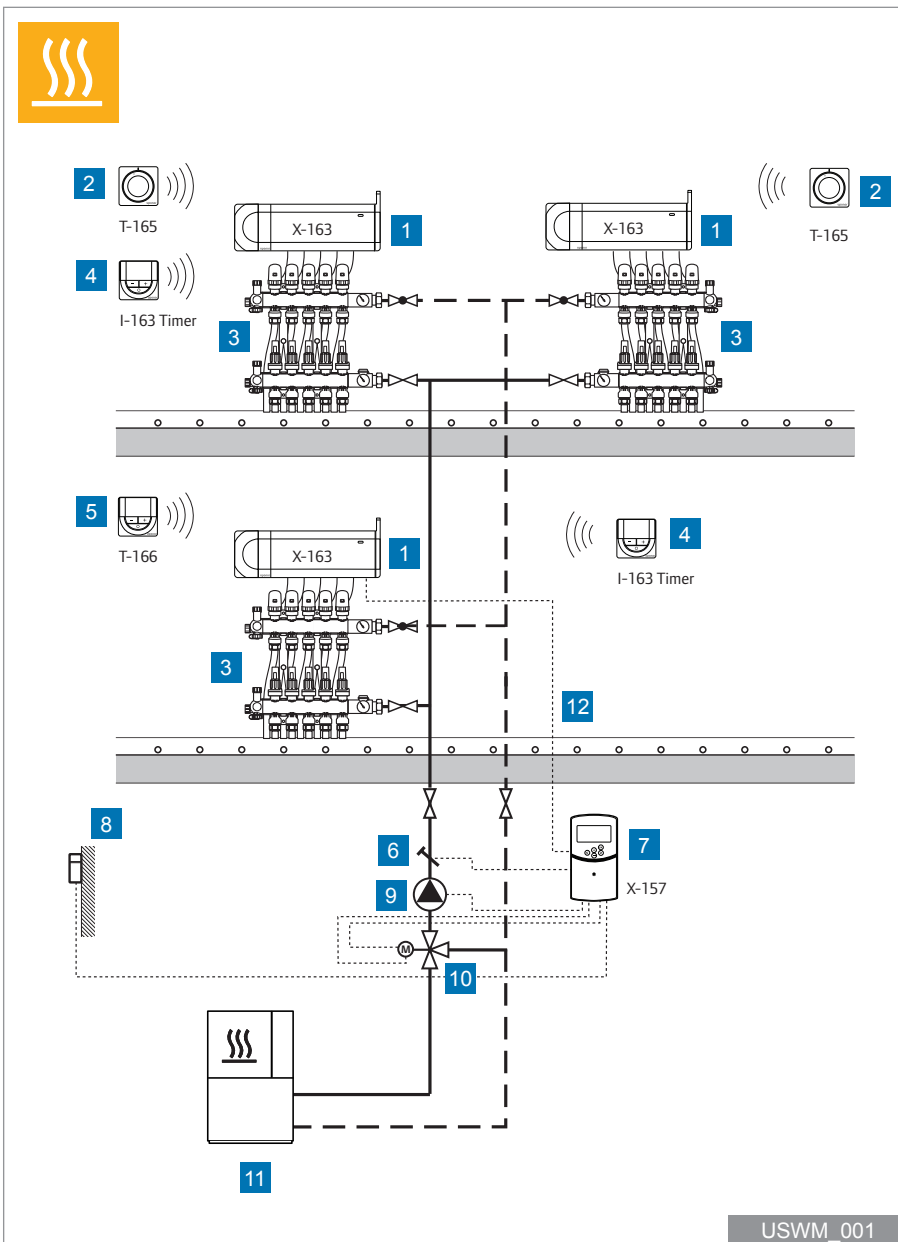
Uponor Smatrix Wave PLUS Cooling; Underfloor heating and cooling and ceiling cooling in a 4-pipe system



- 1 Uponor Smatrix Wave PLUS Controller X-165 6x
- 2 Uponor Smatrix Wave PLUS Thermostat D+RH T-167
- 3 Manifold with actuator TA 24/TR 24
- 4 Uponor SPI Smatrix Wave PLUS Interface I-167

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

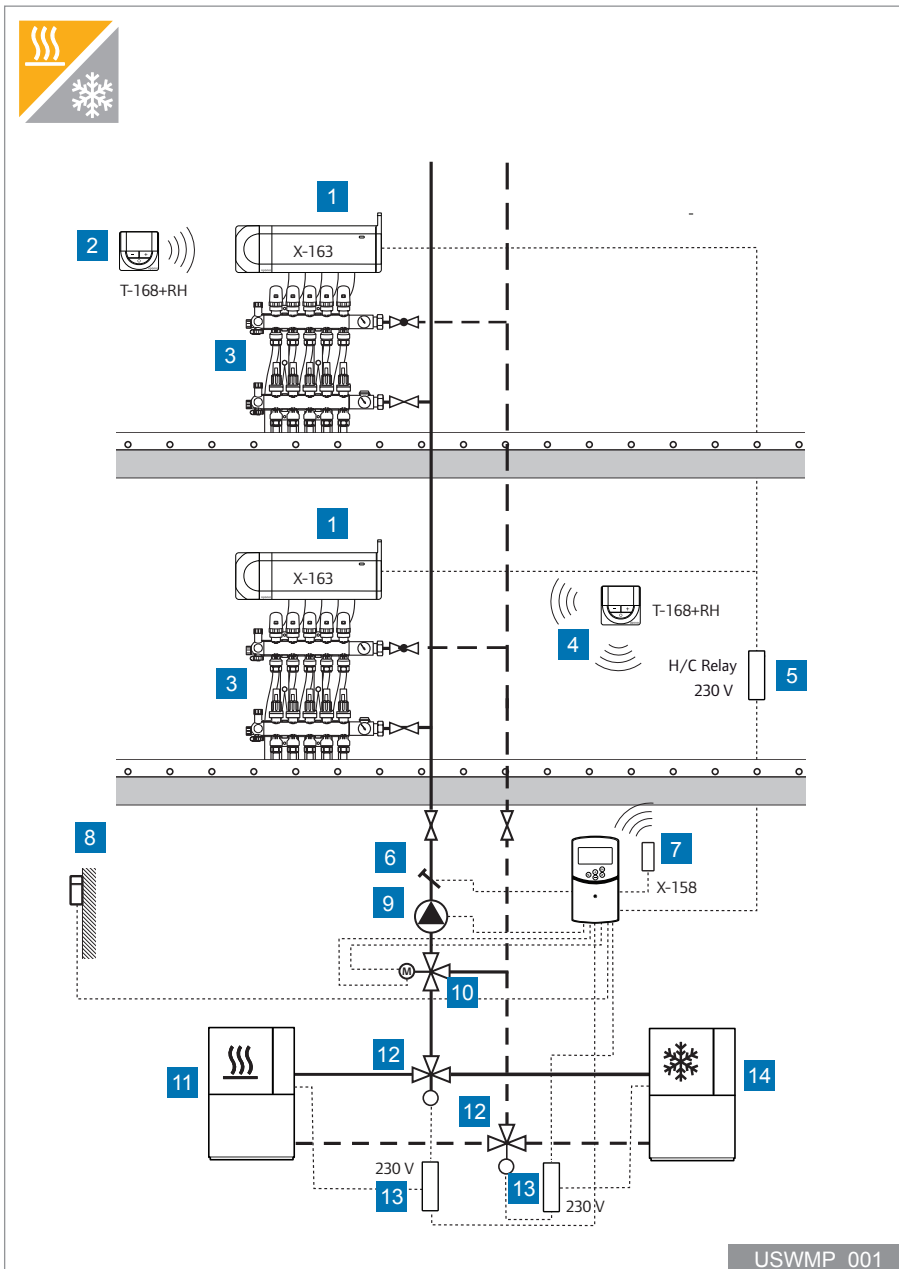
Uponor Smatrix Wave + Move; Room and supply water temperature control



- 1** Uponor Smatrix Wave Controller X-163 6x
- 2** Uponor Smatrix Wave Thermostat Standard T-165
- 3** Manifold with actuator TA 24/TR 24
- 4** Uponor Smatrix Wave Timer I-163
- 5** Uponor Smatrix Wave Thermostat Dig T-166
- 6** Supply sensor
- 7** Uponor Smatrix Move Controller H X-157
- 8** Outdoor sensor
- 9** Circulation pump
- 10** 3 way mixing valve with 230 V 3-point actuator
- 11** Heat source
- 12** Pump relay output to Smatrix Move PLUS meaning pump on demand

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

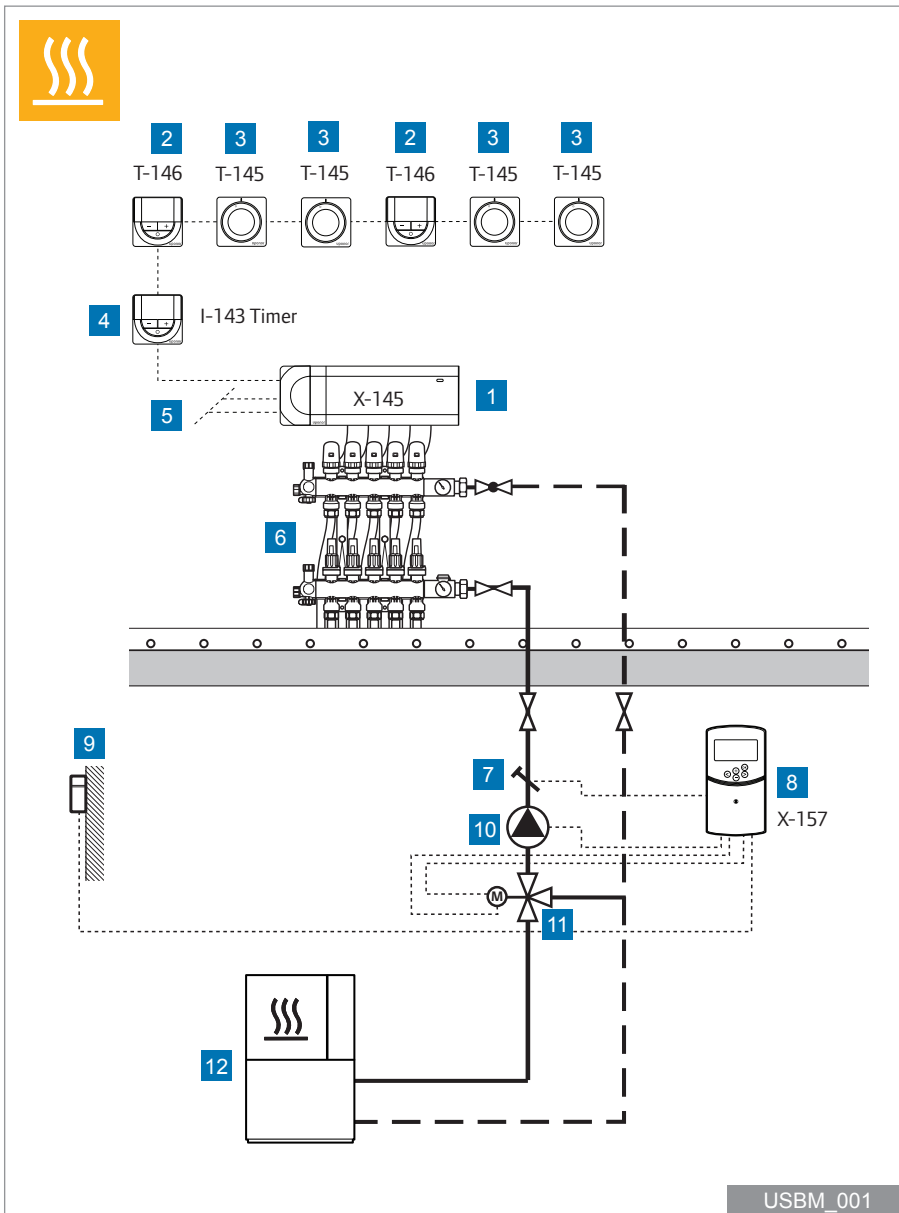
Uponor Smatrix Wave + Move PLUS; Room and supply water temperature control



- 1 Uponor Smatrix Wave Controller X-163 6x
- 2 Uponor Smatrix Wave Thermostat Prog.+RH T-168
- 3 Manifold with actuator TA 24/TR 24
- 4 Uponor Smatrix Wave Thermostat Prog.+RH T-168; reference room to X-158 + room sensor to X-163
- 5 H/C Relay 230 V
- 6 Supply sensor
- 7 Uponor Smatrix Move PLUS Controller H/C X-158 Radio
- 8 Outdoor sensor
- 9 Circulation pump
- 10 3 way mixing valve with 230 V 3-point actuator
- 11 Heat source
- 12 H/C switchover valve with 230 V motor
- 13 Relay for sensing input H/C switch 230 V
- 14 Chiller

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

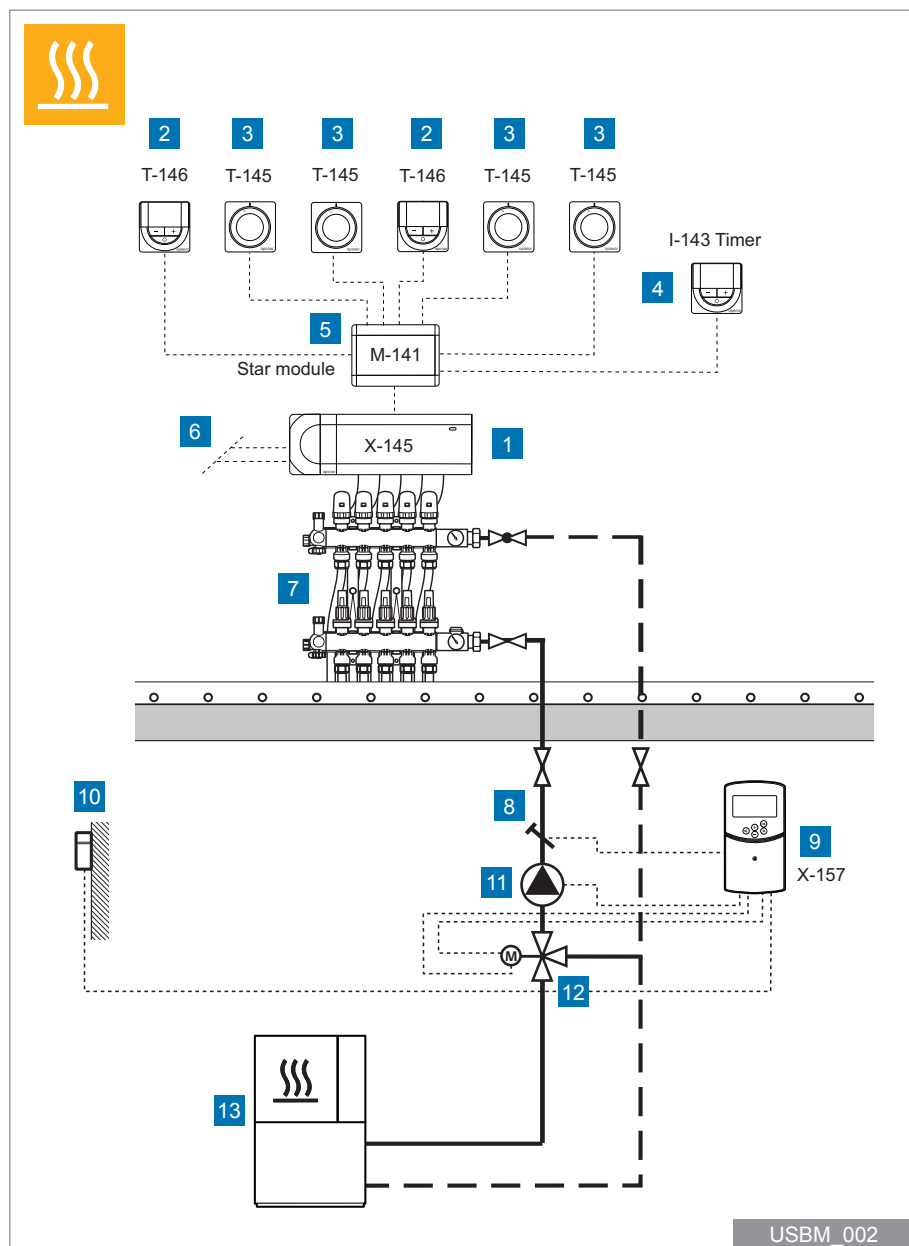
Uponor Smatrix Base + Move; Room and supply water temperature control



- 1 Uponor Smatrix Base Controller X-145 Bus 6x
- 2 Uponor Smatrix Base Thermostat Digital T-146 Bus
- 3 Uponor Smatrix Base Thermostat Standard T-145 Bus
- 4 Uponor Smatrix Base Timer I-143 Bus
- 5 Pump + boiler relay
- 6 Manifold with actuator TA 24/TR 24
- 7 Supply sensor
- 8 Uponor Smatrix Move Controller H X-157 Wired
- 9 Outdoor sensor
- 10 Circulation pump
- 11 3 way mixing valve with 230 V 3-point actuator
- 12 Heat source

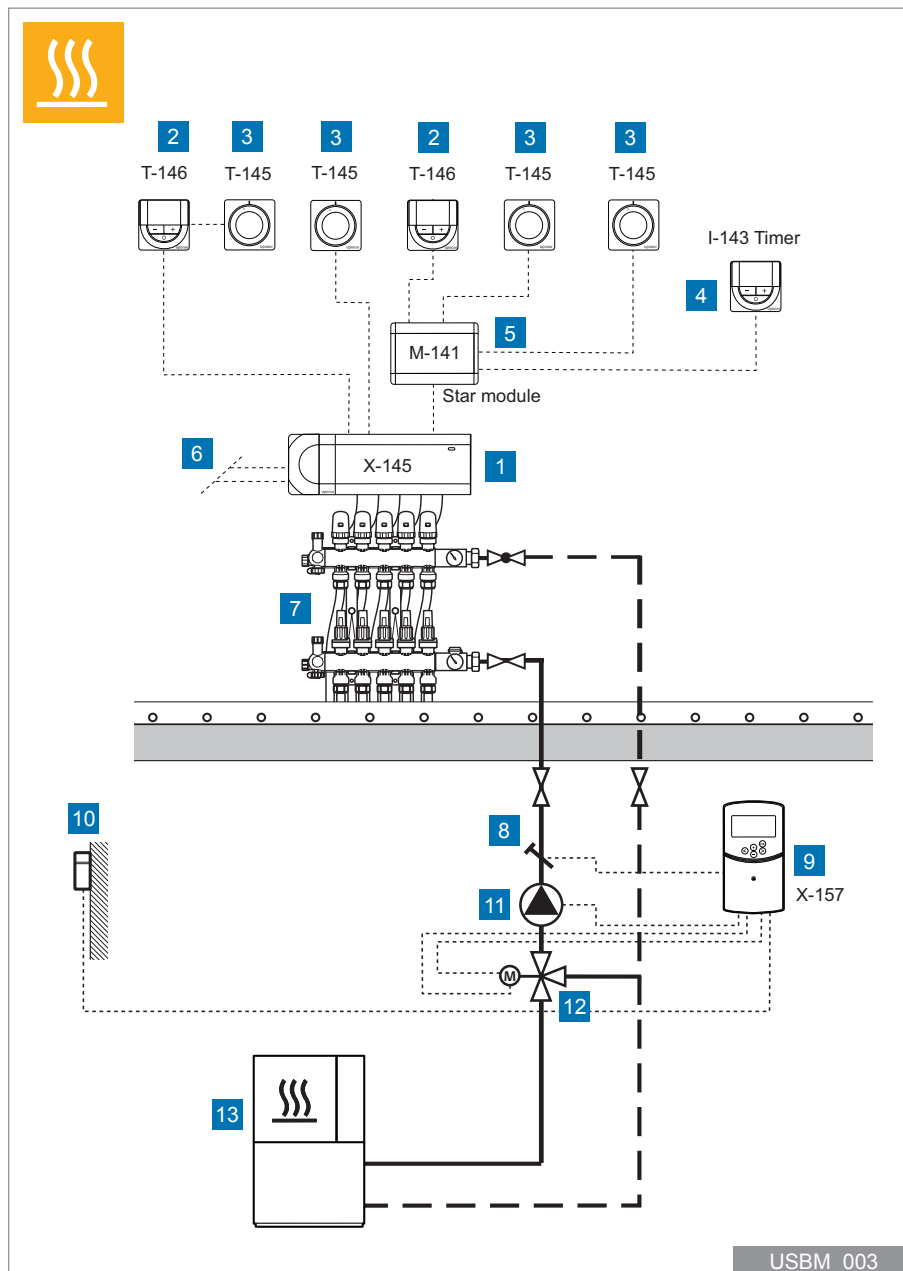
The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

Uponor Smatrix Base + Move; Room and supply water temperature control



The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

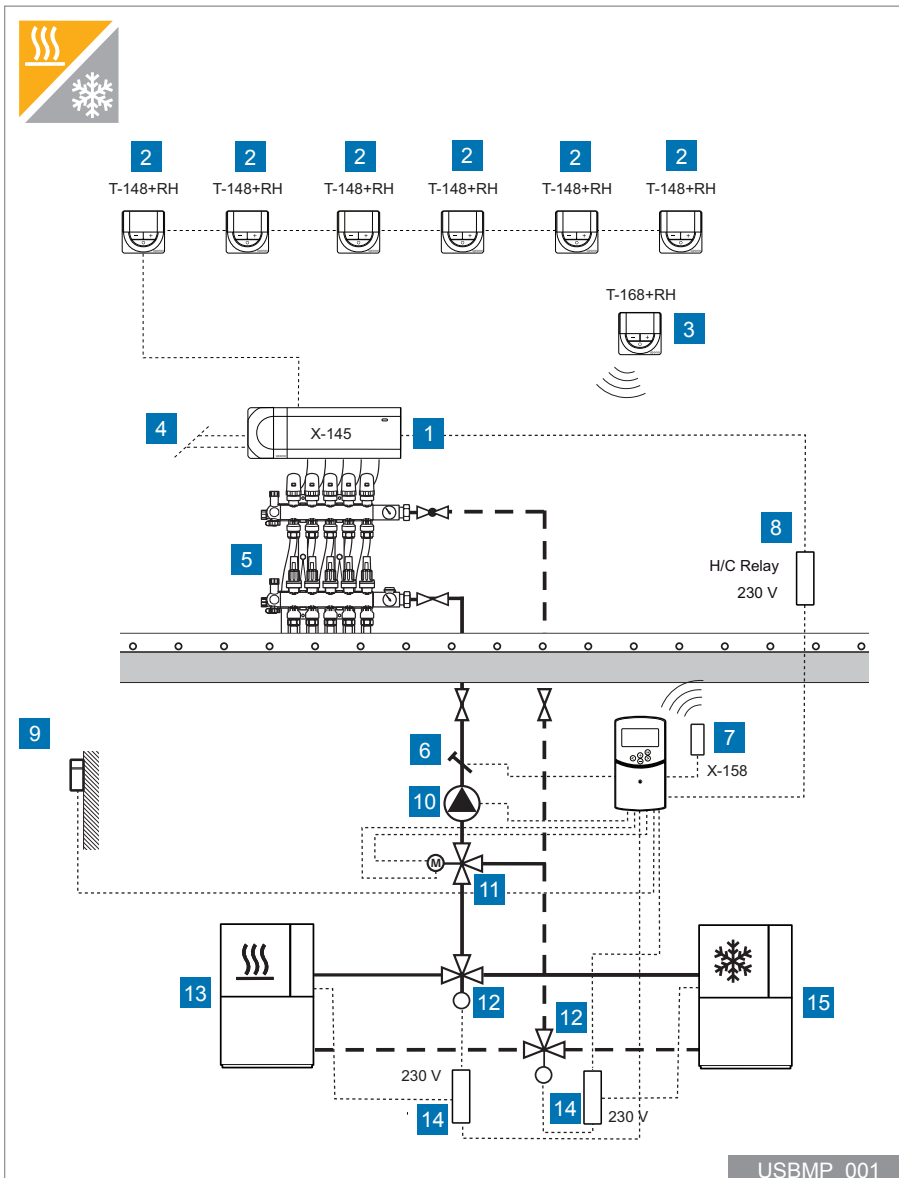
Uponor Smatrix Base + Move; Room and supply water temperature control



- 1 Uponor Smatrix Base Controller X-145 Bus 6x
- 2 Uponor Smatrix Base Thermostat Digital T-146 Bus
- 3 Uponor Smatrix Base Thermostat Standard T-145 Bus
- 4 Uponor Smatrix Base Timer I-143 Bus
- 5 Uponor Smatrix Base Star Module M-141 Bus 6x
- 6 Pump + boiler relay
- 7 Manifold with actuator TA 24/TR 24
- 8 Supply sensor
- 9 Uponor Smatrix Move Controller H X-157 Wired
- 10 Outdoor sensor
- 11 Circulation pump
- 12 3 way mixing valve with 230 V 3-point actuator
- 13 Heat source

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

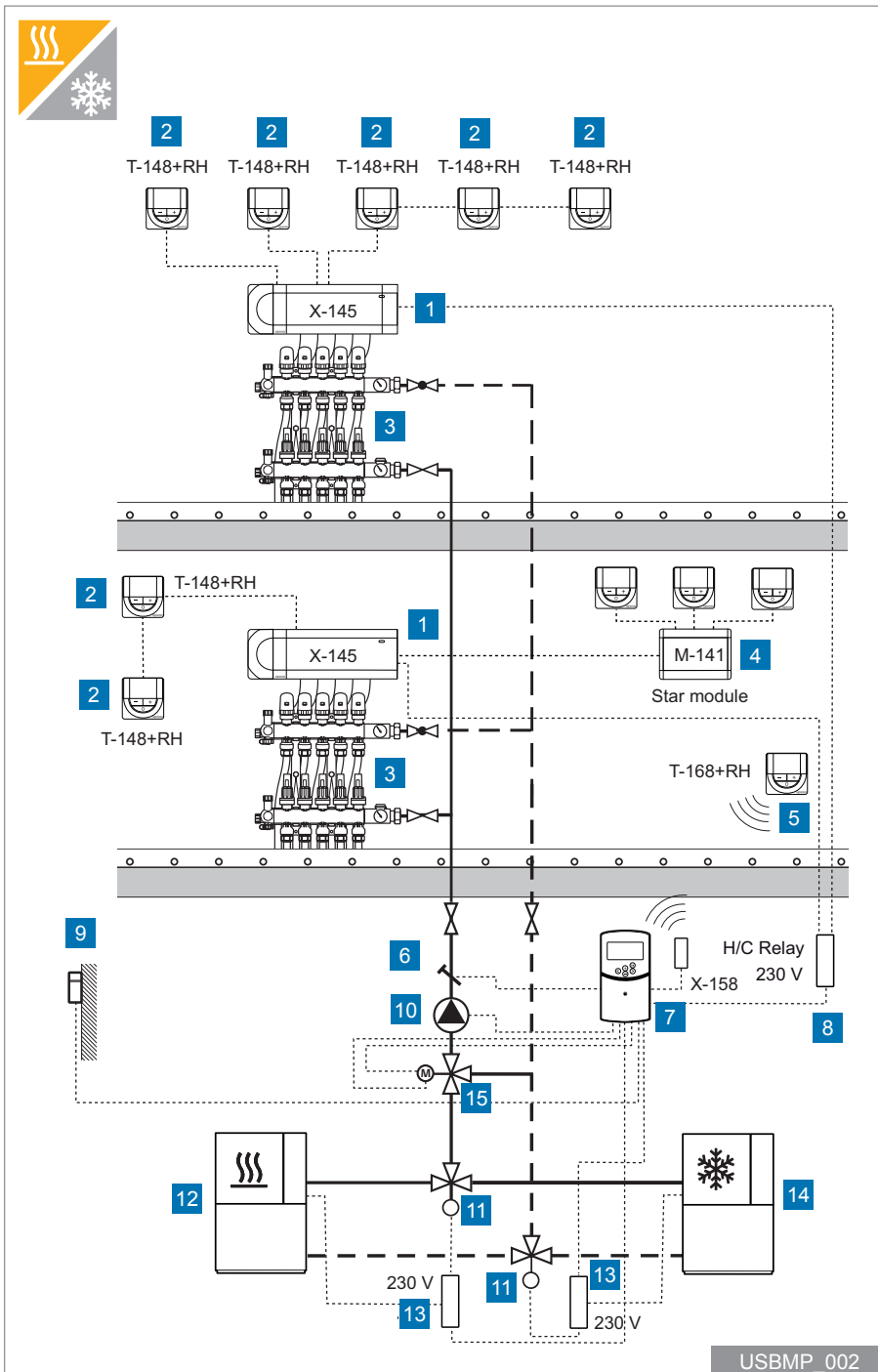
Uponor Smatrix Base + Move PLUS; Room and supply water temperature control



- 1 Uponor Smatrix Base Controller X-145 Bus 6x
- 2 Uponor Smatrix Base Thermostat Prog.+RH T-148 Bus
- 3 Uponor Smatrix Wave Thermostat Prog.+RH T-168; reference room to X-158
- 4 Pump + boiler relay
- 5 Manifold with actuator TA 24/TR 24
- 6 Supply sensor
- 7 Uponor Smatrix Move PLUS Controller H/C X-158 Radio
- 8 H/C Relay 230 V
- 9 Outdoor sensor
- 10 Circulation pump
- 11 3 way mixing valve with 230 V 3-point actuator
- 12 H/C switchover valve with 230 V motor
- 13 Heat source
- 14 Relay for sensing input H/C switch
- 15 Chiller

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

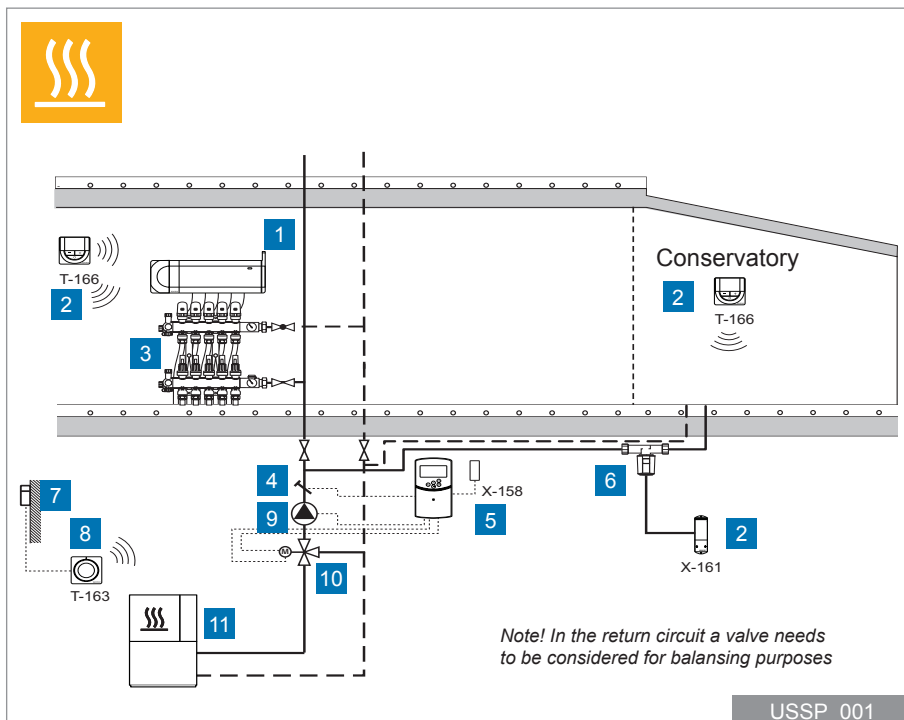
Uponor Smatrix Base + Move PLUS; Room and supply water temperature control, multi-storey



- 1 Uponor Smatrix Base Controller X-145 Bus 6x
- 2 Uponor Smatrix Base Thermostat Prog.+RH T-148 Bus
- 3 Manifold with actuator TA 24/TR 24
- 4 Uponor Smatrix Base Star Module M-141 Bus 6x
- 5 Uponor Smatrix Wave Thermostat Prog.+RH T-168 as reference room to X-158
- 6 Supply sensor
- 7 Uponor Smatrix Move PLUS Controller H/C X-158 Radio
- 8 H/C Relay 230 V
- 9 Outdoor sensor
- 10 Circulation pump
- 11 H/C switchover valve with 230 V motor
- 12 Heat source
- 13 Relay for sensing input H/C switch
- 14 Chiller
- 15 3 way mixing valve with 230 V 3-point actuator

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

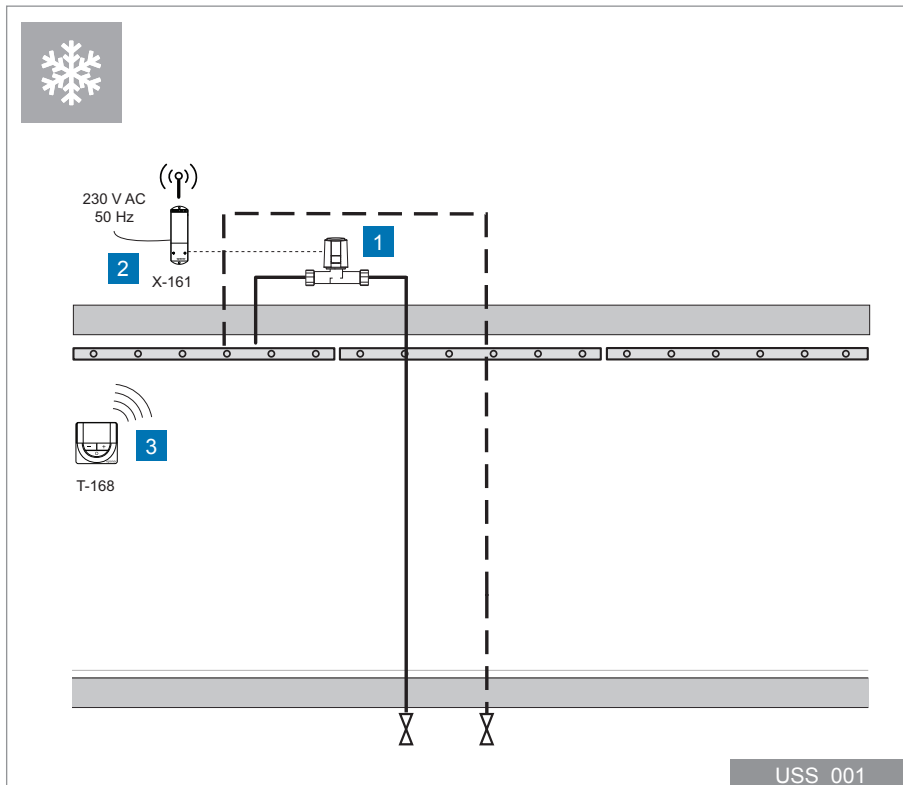
Uponor Smatrix Space PLUS renovation; Additional room temperature control



- 1 Uponor Smatrix Wave PLUS Controller X-165 6x
- 2 Uponor Smatrix Space PLUS renovation set X-161+T-166
- 3 Manifold with actuator TA 24/TR 24
- 4 Supply sensor
- 5 Uponor Smatrix Move PLUS Controller H/C X-158 Radio
- 6 Actuator 230 V + valve
- 7 Outdoor sensor
- 8 Uponor Smatrix Wave Thermostat Public T-163
- 9 Circulation pump
- 10 3 way mixing valve with 230 V 3-point actuator
- 11 Heat source

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

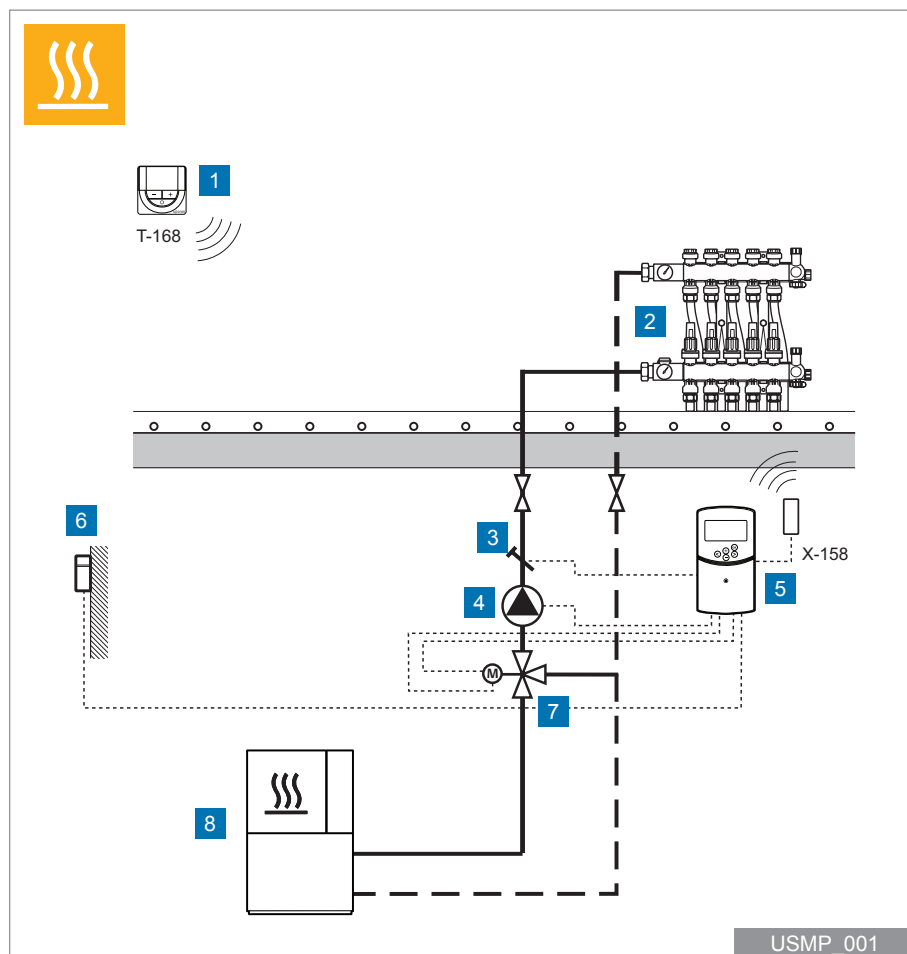
Uponor Smatrix Space cooling; Ceiling cooling control with eg. Tichelmann loops



- 1 Actuator 230 V + valve
- 2 Uponor Smatrix Space Controller X-161
- 3 Uponor Smatrix Wave Thermostat Prog.+RH T-168

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

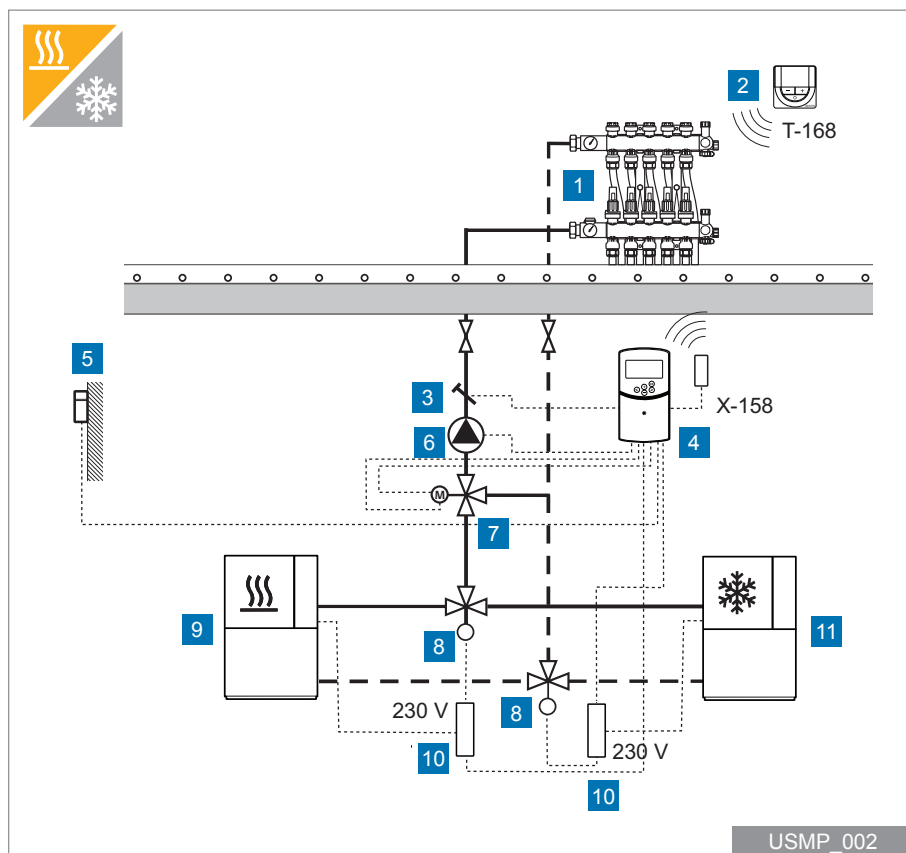
Uponor Smatrix Move PLUS; Supply water temperature control



- 1 Uponor Smatrix Wave Thermostat Prog.+RH T-168
- 2 Manifold
- 3 Supply sensor
- 4 Circulation pump
- 5 Uponor Smatrix Move PLUS Controller H/C X-158 Radio
- 6 Outdoor sensor
- 7 3 way mixing valve with 230 V 3-point actuator
- 8 Heat source

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

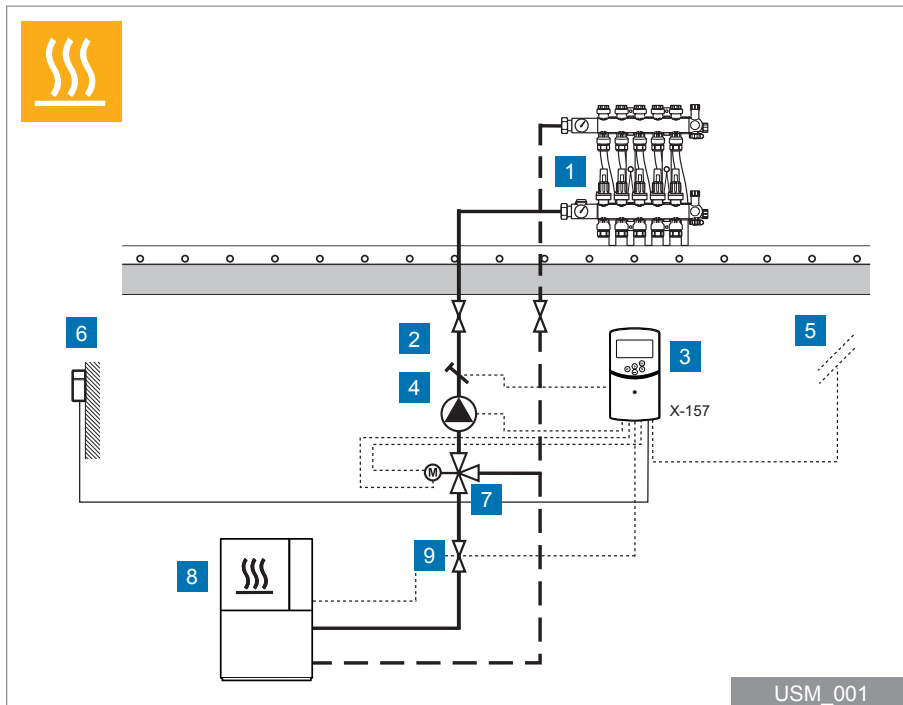
Uponor Smatrix Move PLUS; Supply water temperature control



- 1 Manifold
- 2 Uponor Smatrix Wave Thermostat Prog.+RH T-168
- 3 Supply sensor
- 4 Uponor Smatrix Move PLUS Controller H/C X-158 Radio
- 5 Outdoor sensor
- 6 Circulation pump
- 7 3 way mixing valve with 230 V 3-point actuator
- 8 H/C switchover valve with 230 V motor
- 9 Heat source
- 10 Relay for sensing input H/C switch
- 11 Chiller

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

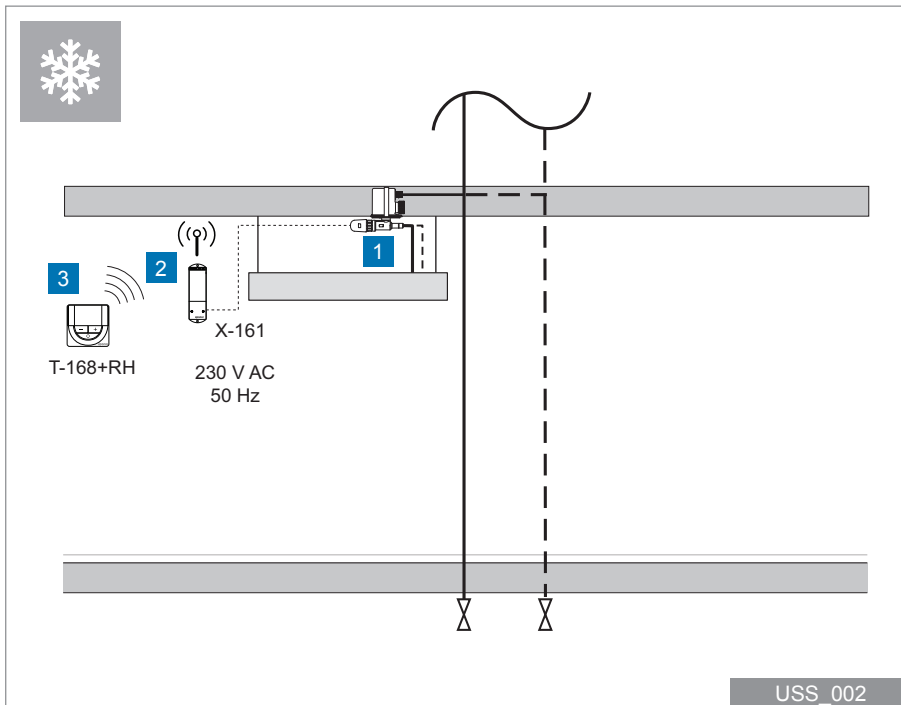
Uponor Smatrix Move controller; Supply water temperature control



- 1 Manifold
- 2 Supply sensor
- 3 Uponor Smatrix Move Controller H X-157 Wired
- 4 Circulation pump
- 5 Optional: Demand input connection
- 6 Outdoor sensor
- 7 3 way mixing valve with 230 V 3-point actuator
- 8 Heat source
- 9 2 port zone valve with boiler enable end switch

The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

Uponor Smatrix Space cooling; Ceiling cooling control 230 V



The diagram shows a simplified illustration of the key control components. For detailed instructions regarding the installation and operation of the system, refer to the manuals shipped with the components or download the relevant documents from www.uponor.com.

Technical information

Safety instructions

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.
- All power supplies 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.

Uponor 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.

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 antenna to a more optimal position, and not installing Uponor radio sources too close to each other (minimum 40 cm), for solving exceptional problems.

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.

Technical specifications

Cables	Standard cable length	Maximum cable length	Wire gauge
Cable from controller to antenna (Wave PLUS and Wave only)	0.50 m	5 m	CAT.5e or CAT.6, RJ 45 connector
Cable from relay switch to controller GPI input (Wave PLUS and Wave only)	2 m	20 m	Controller: Up to 4.0 mm ² solid, or 2.5 mm ² flexible with ferrules Relay: 1.0 mm ² to 4.0 mm ²

Technical data

General	
IP	IP20 (IP: degree of inaccessibility to active parts of the product and degree of water)
Thermostat and timer	
Power supply	Two 1.5 V AAA alkaline batteries
Radio frequency	868.3 MHz (868 MHz for Russia)
Connection terminals (thermostats only)	0.5 mm ² to 2.5 mm ²
Interface (Wave PLUS only)	
Power supply	230 V AC +10/-15%, 50 Hz in wall box or mini USB connection
Operating temperature	0 °C to +45 °C
Storage temperature	-20 °C to +70 °C
Relay module	
Power supply	230 V AC +10/-15%, 50 Hz or 60 Hz
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
Controller	
Power supply	230 V AC +10/-15%, 50 Hz or 60 Hz
Internal fuse	T5 F3.15AL 250 V, 5x20 3.15A quick acting
Maximum consumption (Wave)	40 W
Maximum consumption (Wave PLUS)	45 W
Pump and boiler relay outputs	230 V AC +10/-15%, 250 V AC 8 A maximum
General purpose input (GPI)	Only dry contact
Heat pump input (Wave PLUS only)	12 – 24 V DC /5 – 20 mA
Heat pump output (Wave PLUS only)	5 – 24 V DC /0.5 – 10 mA, current sink ≤ 100 mW
Valve outputs	24 V AC, 0.2 A average, 0.4 A peak
Power connection	1 m cable with europlug (except UK)
Connection terminals for power, pump, GPI and boiler	Up to 4.0 mm ² solid, or 2.5 mm ² flexible with ferrules
Connection terminals for valve outputs	0.2 mm ² to 1.5 mm ²

Uponor

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