Uponor Smatrix PRO

Technical information

Contents

Subject to modifications.

Uponor Smatrix Move PRO

Uponor Smatrix Move PRO Controller X-159

The Uponor Smatrix Move PRO Controller is a flexible, „installer-friendly" and versatile multi-zone supply water controller. Designed mainly for managing Indoor Climate in commercial buildings, this controller fits different scenarios such as indoor and outdoor applications, radiant heating and cooling, domestic hot water, etc.

Two different applications may run on this controller depending on the micro-SD card inserted:
Heating only or Heating and Cooling.

Possibility to be integrated in a BMS (Building Automation System) via a Modbus or KNX interface. The X-159 controller can also be integrated with Uponor Smatrix Base PRO (room temperature controls) exchanging data such as room temperatures, supply temperatures, outdoor temperature, relative humidity, etc.
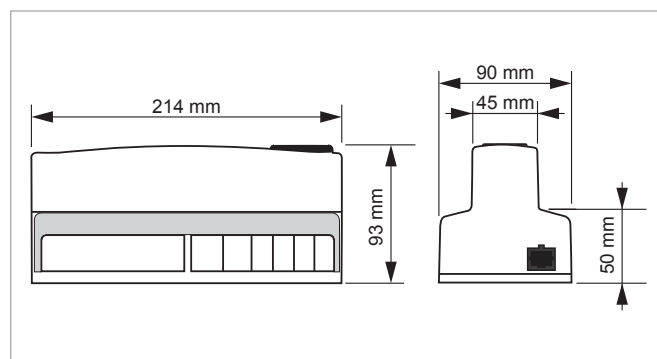
No advanced planning or programming by qualified personnel is needed as all settings can be done by means of a step-by-step wizard, which implies cost saving in the end of the day.

Additionally, the micro-SD card can be used for making system backups and clone settings from one controller to another.

Different accessories and sets are available depending on each building requirements
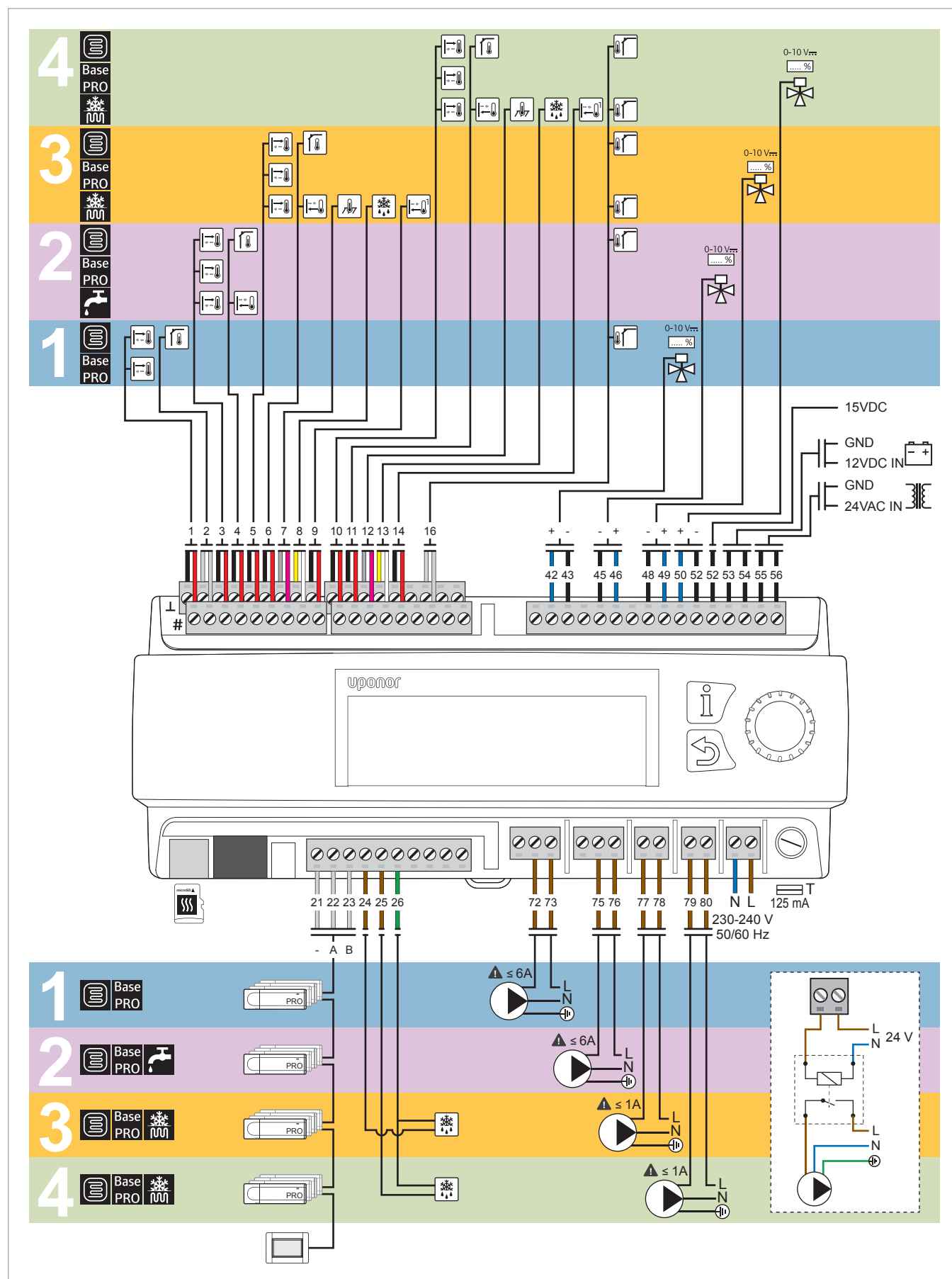
Dimensions

214 mm · 93 mm · 90 mm · 45 mm · 50 mm

Key features

- Heating, Cooling and Domestic Hot Water
- Up to 4 heating zones or 3 heating and cooling zones
- Up to 2 snowmelt zones in one controller
- Operation as stand-alone (with wired sensors) or in combination with Uponor Smatrix Base PRO (Room Temperature control bus-based system)
- Can be integrated in a BMS
- Easy installation and configuration. The micro-SD card allows backups and settings cloning

Wiring diagrams

Technical data

General	
Mark of conformity	EAC CE
IP	IP20 (IP: degree of inaccessibility to active parts of the product and degree of water)
ERP (with thermostats)	III (VII)
Operating temperature	0 °C to +50 °C
Storage temperature	-20 °C to +70 °C
Mounting standard	EN 50022, DIN 46277-3
microSD	micro SDHC, UHS/Standard ; 4...32 GB, FAT 32 ; Class 4...10 +

Power Supply	
Operating voltage	230 V AC ±10 %, 50/60 Hz (maximum 125 mA)
Battery input (UPS)	12 V DC / 125 mA
Transformer input	24 V AC / 0.7A (maximum 6 A)
Internal fuse	125 mA

Sensor inputs	
Supply temperature sensor	
Return temperature sensor	
Room temperature sensor	NTC 10
Outdoor temperature sensor	-50 °C...+100 °C, ±0.1 °C
Ground temperature sensor (Snow and ice sensor)	
Moisture sensor (Snow and ice sensor)	$R_{OFF} = \infty \ \Omega$ $R_{ON} < 2 \ M\Omega$

Outputs	
Mixing valves	$U_O = 0...10V$ $I_O < 10 \ mA$
Snow and ice sensor	$U_O = 24 \ V \ AC$ $P_O < 10 \ VA$
Circulation pumps	$U_{IN} = 230 \ V \ AC$ $I_{IN} \leq 6 \ A$ (Dry contact, electromechanical relay: 72–73, 75–76) $I_{IN} \leq 1 \ A$ (Dry contact, TRIAC: 77–78, 79–80)

Communication	
BMS	BMS, MODBUS-RTU (RS-232) RJ45
Uponor Smatrix Base PRO bus	Galvanically isolated Terminals: –, A, B

Uponor Smatrix Move PRO Snow Sensor S-158

The Smatrix Move PRO snowmelt sensor is compatible with hydronic systems based on a 0 – 10 V modulating three-way valve as well as on a heat exchanger with a two-way valve.
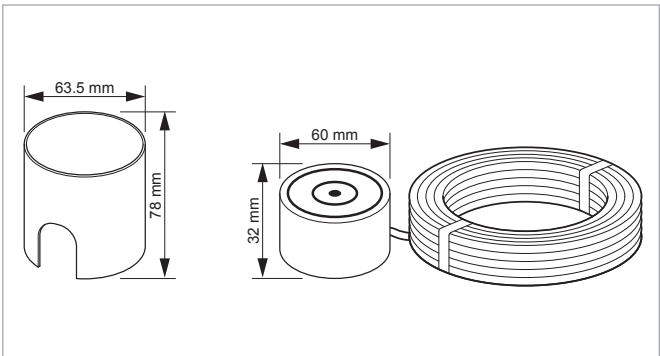
The Uponor Smatrix Move PRO snowmelt control is an energy efficient system, able to keep the ground warm enough but not more than necessary whilst in idle state thanks to an advanced algorithm based on outdoor and ground temperatures.

The Uponor Smatrix Move PRO snowmelt algorithm utilizes 3 operation states and 1 protection mode:
- Stop: no snow risk, system stopped.
- Idle: no snow or ice present but there's a risk. Keep ground warm to avoid ice creation and increase speed when turning into meltaway state.
- Meltaway: snow or ice detected.
- Security: Protects the heat exchanger against extremely low return temperatures that may damage the unit. This mode is automatically deactivated once the risk has disappeared.

The changeover between the different states is done automatically in order to enhance the system performance while keeping a high energy efficiency.

Dimensions

Technical data

Mark of conformity	EHC CE
Sensor inputs	
Supply temperature sensor	
Return temperature sensor	
Room temperature sensor	NTC 10
Outdoor temperature sensor	-50 °C...+100 °C, ±0.1 °C
Ground temperature sensor (Snow and ice sensor)	
Moisture sensor (Snow and ice sensor)	$R_{OFF} = \infty\,\Omega$ $R_{ON} < 2\ M\Omega$

Uponor Smatrix Condensation Set S-159

This accessory protects radiant cooling installations in case of high risk of condensation.

The Smatrix Move PRO controller X-159 will stop temporarily the cooling functionality in case that the integrated dew-point control was insufficient to prevent condensation.

The set includes a moisture sensor to be attached to the supply water pipe and a converter which is wired to the Uponor Smatrix Move PRO Controller X-159.

Uponor Smatrix Condensation Set Contents:
• Pipe-mounting moisture sensor
• Converter
• Short instructions including wiring diagrams.

Technical data

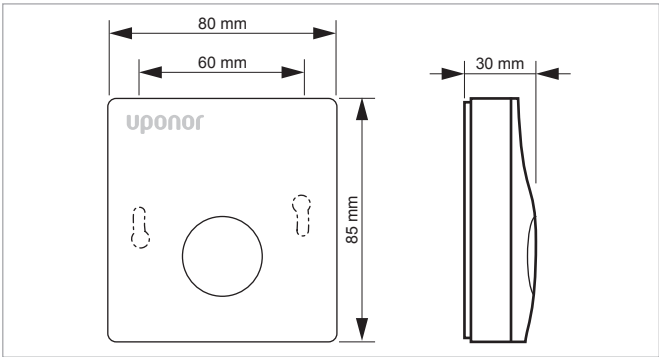|	
Mark of conformity	EHC $C\epsilon$
Sensor inputs	
Supply temperature sensor	
Return temperature sensor	
Room temperature sensor	NTC 10
Outdoor temperature sensor	-50 °C...+100 °C, ±0.1 °C
Ground temperature sensor (Snow and ice sensor)	
Moisture sensor (Snow and ice sensor)	$R_{OFF} = \infty\,\Omega$ $R_{ON} < 2\ M\Omega$

Uponor Smatrix Move PRO Sensor Room S-155

The Uponor Smatrix Move PRO Sensor Room S-155 is an optional component for Indoor Heating and Cooling zones with indoor compensation. It is used to measure the room temperature.

It needs to be connected (2 wires) directly to the Uponor Smatrix Move PRO Controller X-159.

Dimensions

Technical data

Mark of conformity	EAC CE
Sensor inputs	
Supply temperature sensor	
Return temperature sensor	
Room temperature sensor	NTC 10
Outdoor temperature sensor	-50 °C...+100 °C, ±0.1 °C
Ground temperature sensor (Snow and ice sensor)	
Moisture sensor (Snow and ice sensor)	$R_{OFF} = \infty\,\Omega$ $R_{ON} < 2\ M\Omega$

Uponor Smatrix Move PRO Sensor Humidity S-157

The Uponor Smatrix Move PRO Sensor Room + RH S-157 is a component needed for Cooling only and Heating and Cooling zones. It measures the relative humidity in the room, needed for the des point control algorithm.

It needs to be connected (3 wires) directly to the Uponor Smatrix Move PRO Controller X-159 and is powered with 24V a.c.

Technical data

Mark of conformity	EAC CE
Sensor inputs	
Supply temperature sensor	
Return temperature sensor	
Room temperature sensor	NTC 10
Outdoor temperature sensor	-50 °C...+100 °C, ±0.1 °C
Ground temperature sensor (Snow and ice sensor)	
Moisture sensor (Snow and ice sensor)	$R_{OFF} = \infty\,\Omega$ $R_{ON} < 2\ M\Omega$

Uponor Smatrix Base PRO

Uponor Smatrix Base PRO controller X-147 Bus 6x

A Wired Radiant Heating/Cooling Controller. The Controller sends and receives bus signals to and from room thermostats and sensors to control thermal actuators and other heating/ cooling equipment. Eco settings are possible by connecting the Interface I-147 for the whole installation.

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).

Functions:
- Autobalancing
- Electronic control
- 2 way communication with up to 6 room-thermostats
- Connection of max. 8 actuators 24 Volt
- Heating/Cooling function switched by external contact
- Pump relay
- Boiler Relay
- Valve exercise, pump exercise
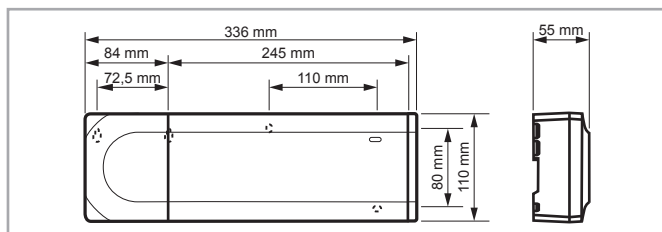- Overload protection
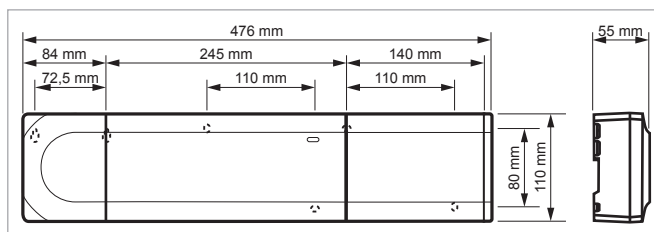- RH Control

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
- Modular placement (detachable parts)
- Cabinet or wall mounted (Din rail or Screw hole)
- Free installation orientation

Dimensions

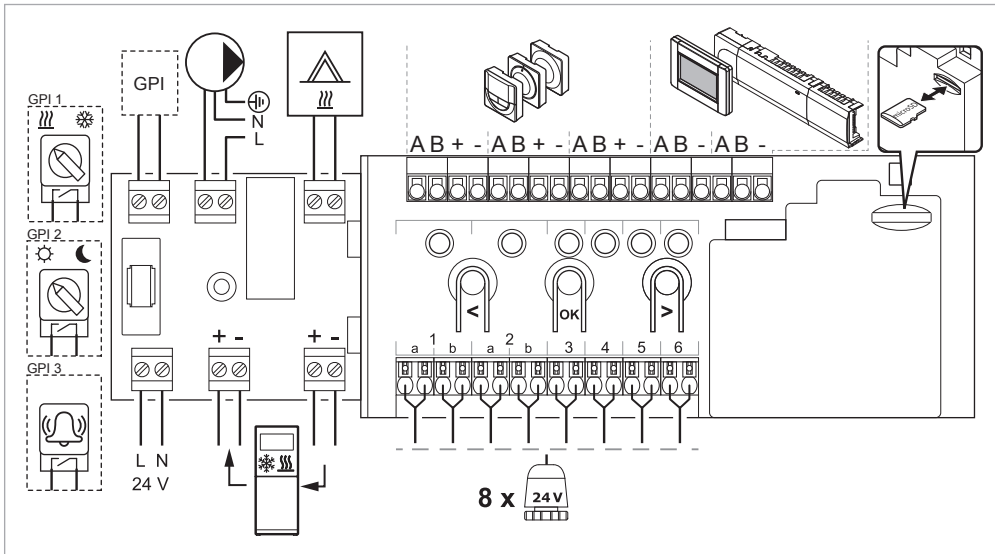**Controller with transformer and end cap**

Controller with slave module, transformer and end cap

Installation example

Wiring diagram

Technical data

Mark of conformity	EAC CE
ERP	Base: IV Base PRO: VIII
Low voltage tests	EN 60730-1* and EN 60730-2-1**
EMC (electromagnetic compatibility requirements) tests	EN 60730-1
Power supply	230 V AC +10/-15 %, 50 Hz or 60 Hz
Internal fuse	F3.15AL 250 V, 5x20 3.15 A quick acting
Internal fuse, Heat pump output	TR5-T 8.5 mm Wickmann 100 mA Time lag
Operating temperature	0 °C to +45 °C
Storage temperature	-20 °C to +70 °C
Maximum consumption (Base)	40 W
Maximum consumption (Base PRO)	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 (Base PRO only)	12 – 24 V DC / 5 – 20 mA
Heat pump output (Base PRO 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 mm² solid, or 2.5 mm² flexible with ferrules
Connection terminals for bus communication	0.5 mm² to 2.5 mm²
Connection terminals for valve outputs	0.2 mm² to 1.5 mm²

*   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.
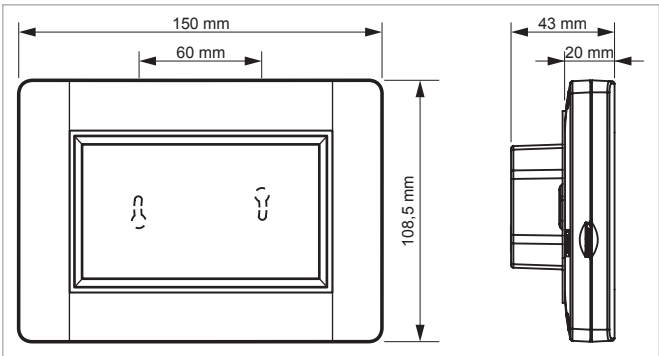
Uponor SPI Smatrix Base PRO interface I-147

A Touch Panel Interface designed for displaying system information to the end-user and for programming all relevant system settings for an UFH/C system when used in combination with the Smatrix Base PRO Controller. The modern style Touch Panel has user friendly directional navigation for simplified programming. It includes wireless communication with the Smatrix Wave PLUS Controller, and can control up to 4 Controllers installed in one system.

User Interface provides:
- Information and settings of up to 16 Controllers running in one system
- Installation wizard
- Menu in different languages
- Display, backlight, new look (intuitive and clear structure)
- Temperature setback programs for each channel
- Max/min temperature limitations
- Holiday temperature
- Automatic summer/wintertime change
- Autobalancing
- Room check function
- Room bypass function
- System diagnostic
- Trend Visualization (Set Point vs. Room Temp. etc.)
- Advanced cooling Settings
- Micro SD Card for language and Software changes

Dimensions

Technical data

Mark of conformity	CE
Low voltage tests	EN 60730-1 and EN 60730-2-1
EMC (electromagnetic compatibility requirements) tests	EN 60730-1
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

Uponor Smatrix Base PRO thermostat D+ RH T-147 Bus

A wired Digital Thermostat with Rh sensor. It measures and displays the perceived room temperature and Relative Humidity, then transmitting the values to the Smatrix Base PRO Controller.

Uponor SMATRIX control system have been tested under the umbrella of eu.bac test certification for Electronic Individual Zone controller in Water Floor Heating Systems Applications.

Uponor Smatrix controls System has got the EU-BAC certification for Wave Plus, Wave and Base systems, obtaining the highest value in European eu.bac Test Certification.

The Smatrix Base Thermostat Display Programmable RH combines 3 devices:
• Display Thermostat
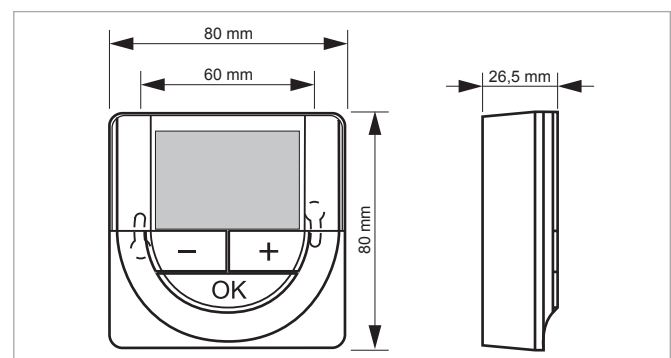• RH Sensor
• ECO/Comfort Indication I

Functions:
• Shows Software version (on power-up)
• Display with backlight, Dims 10 seconds after last button event.
• Heating or cooling demand indicatio
• RH Limit indication and RH measurement
• Comfort / ECO state changes from system devices
• ECO setback modification
• Manual H/C switchover function (not visible if linked to a controller X-14x)
• Display Celsius or Fahrenheit
• Regulation mode i.e. Room temperature (RT), internal with floor max/min(FT), remote sensor (RS), remote outdoor (RO)
• Cooling allowed (room by room, not visible if a I-147 is linked to the system)
• Set point range 5 – 35 °C
• Callibration of room temperature

eu bac european building automation controls association

• **Options:**
• Thermostat Connection by bus topology/daisy chain to the controller orto the star box
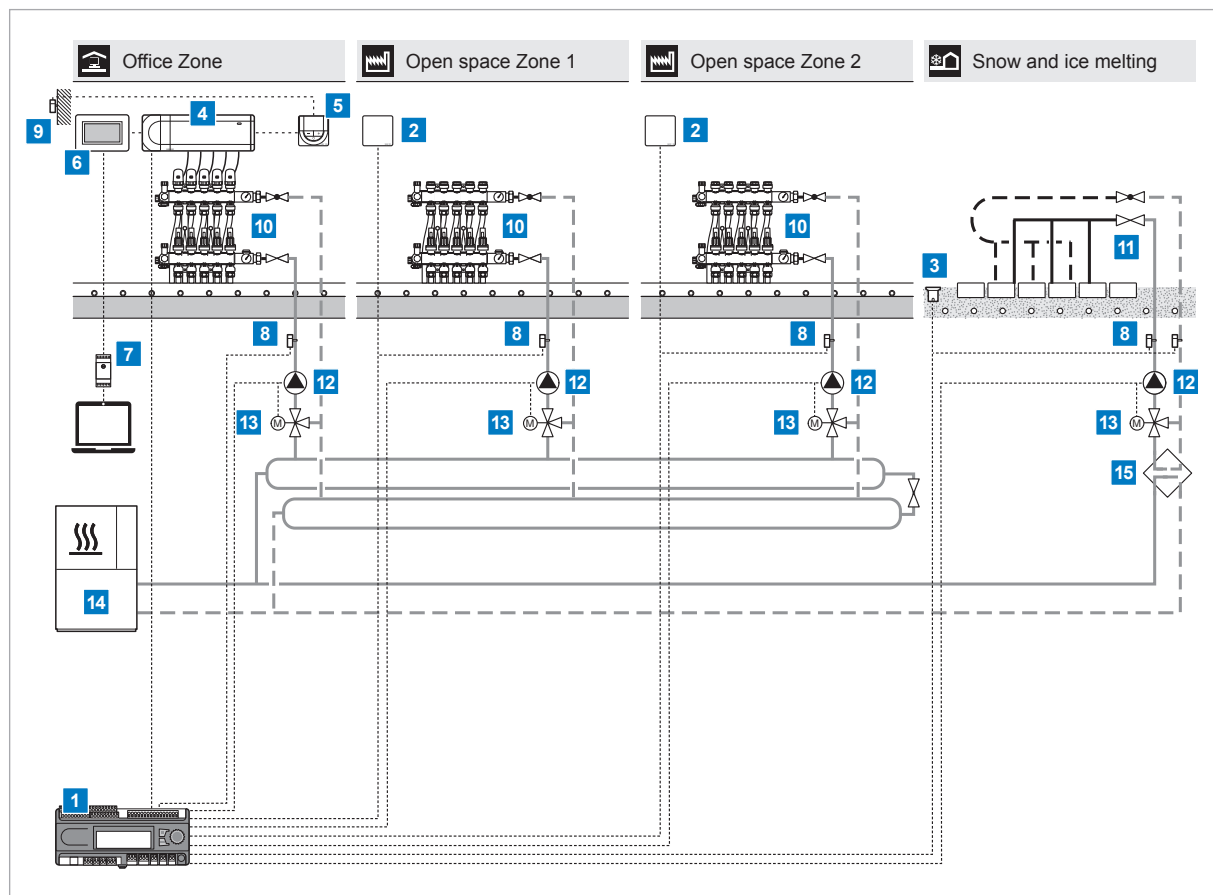• Different sensor types can be connected

Dimensions

80 mm

60 mm

26,5 mm

80 mm

OK

Technical data

Mark of conformity	EAC CE
ERP (thermostat only)	IV
Low voltage tests	EN 60730-1* and EN 60730-2-9**
EMC (electromagnetic compatibility requirements) tests	EN 60730-1
Power supply	From controller
Voltage	4.5 V to 5.5 V
Operating temperature	0 °C to +45 °C
Storage temperature	-10 °C to +70 °C
Connection terminals (thermostats only)	0.5 mm² to 2.5 mm²

*   *EN 60730-1 Automatic electrical controls for household and similar use – Part 1: General requirements.*
** *EN 60730-2-9 Automatic electrical controls for household and similar use – Part 2-9: Particular requirements for temperature sensing controls.*

Installation examples

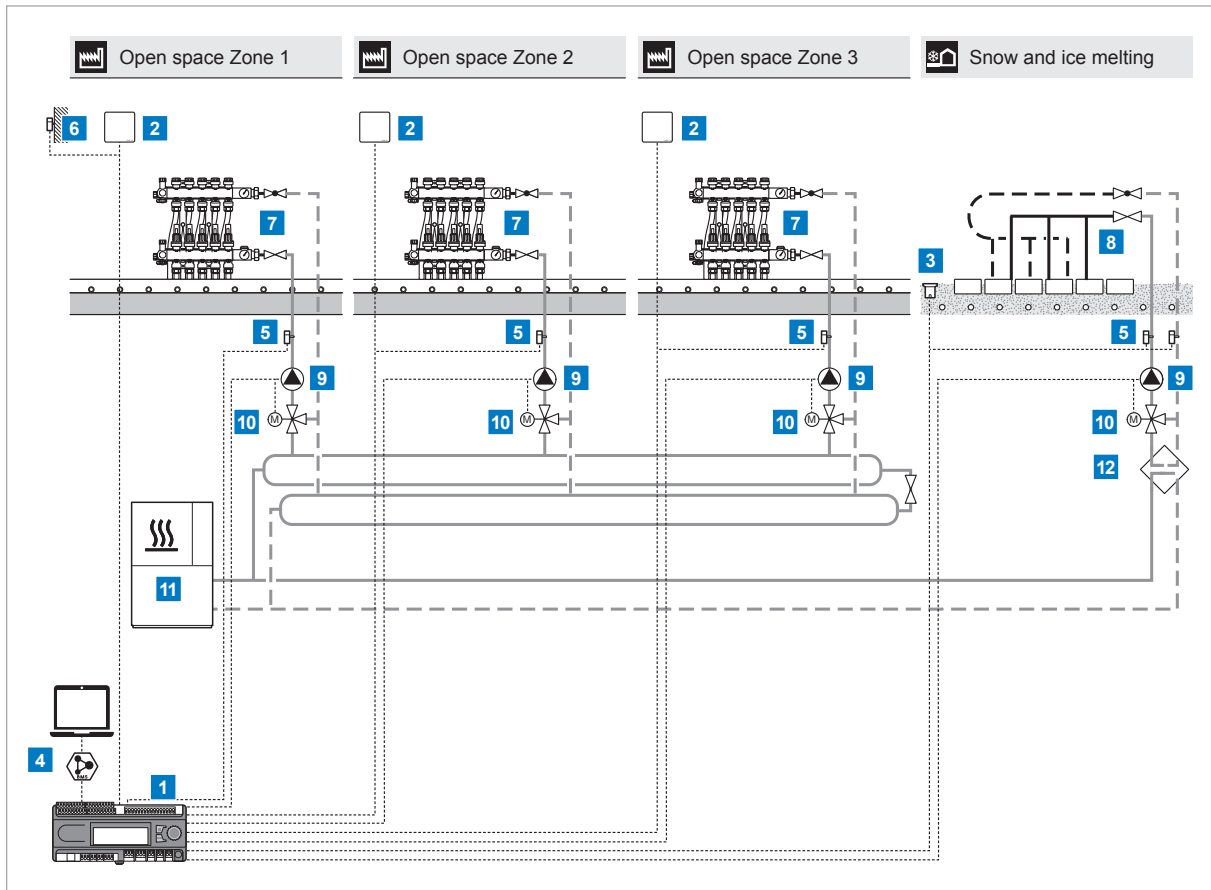**Industrial/Retail with offices and Snow/ice melting KNX**

The diagram shows a simplified illustration of the key control components for and heating application with both room and supply water temperature control.

The Connection tho the BMS system is provided from the Smatrix Base PRO Gateway module R-147 KNX. The snow and ice melting control is provided from Smatrix Move PRO detecting moisture and temperature using the Smatrix Move PRO sensors Snow S-158.

1	*Uponor Smatrix Move PRO Controller X-159*
2	*Uponor Smatrix Move PRO Room sensor S-155*
3	*Uponor Smatrix Move PRO Sensor Snow S-158*
4	*Uponor Smatrix Base PRO Controller X-147 BUS 6X*
5	*Uponor Smatrix Base PRO Thermostat D+RH T-147 BUS*
6	*Uponor Smatrix Base PRO Interface I-147 BUS*
7	*Uponor Smatrix Base PRO Gateway module R-147 KNX*
8	*Uponor Smatrix Move sensor supply/return S-152*
9	*Uponor Smatrix sensor outdoor S-1XX*
10	*Manifold with actuators TA 24/ TR 24*
11	*Tichelmann Manifold/Manifold with actuators TA 24/ TR 24*
12	*Circulation Pump*
13	*3 way mixing valve 0-10V*
14	*Heat Source*
15	*Heat exchanger*

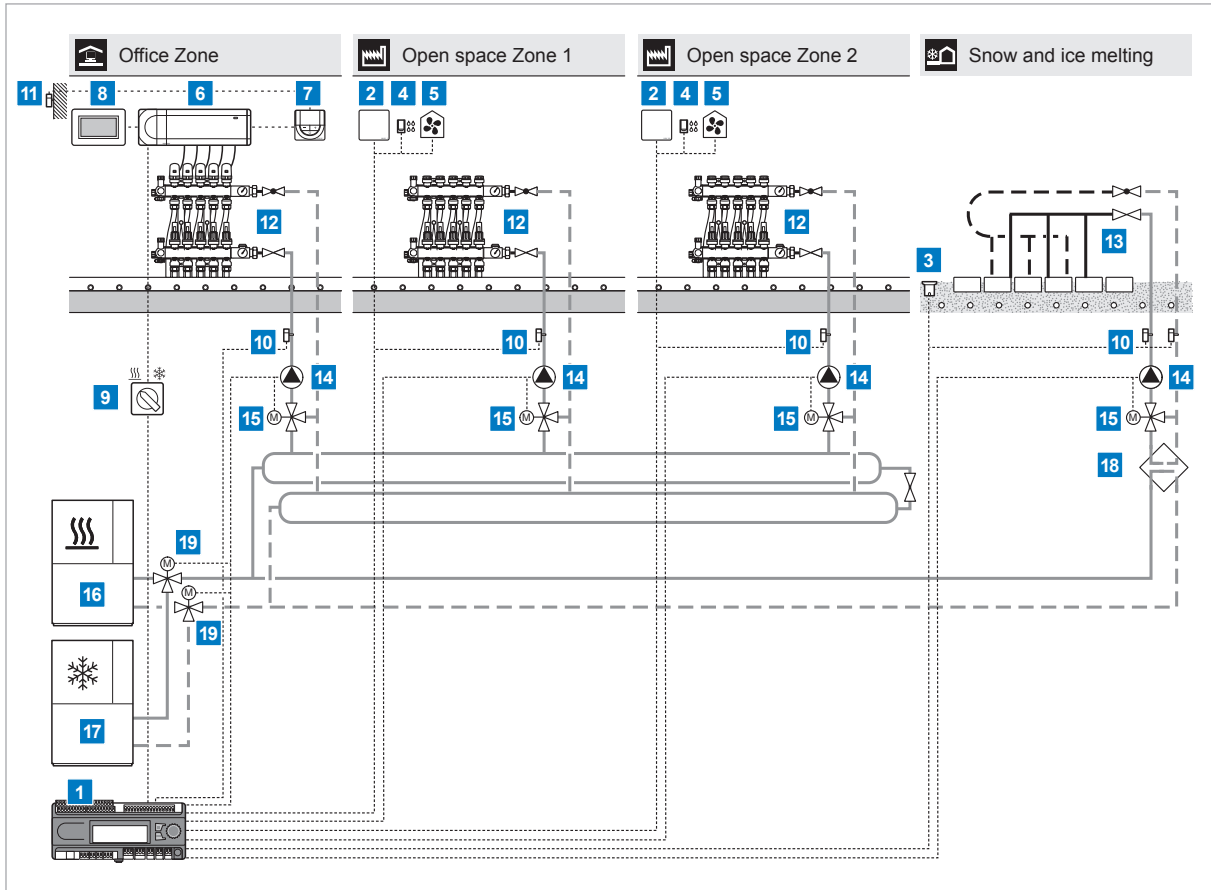## Industrial/Retail and Snow/ice melting Modbus

The diagram shows a simplified illustration of the key control components for and heating application with both room and supply water temperature control.

The Connection tho the BMS system is provided from the Smatrix MOVE PRO ModBUS port.

The snow and ice melting control is provided from Smatrix Move PRO detecting moisture and temperature using the Smatrix Move PRO sensors Snow S-158.

1	*Uponor Smatrix Move PRO Controller X-159*
2	*Uponor Smatrix Move PRO Room sensor S-155*
3	*Uponor Smatrix Move PRO Sensor Snow S-158*
4	*BMS connection*
5	*Uponor Smatrix Move sensor supply/return S-152*
6	*Uponor Smatrix sensor outdoor S-1XX*
7	*Manifold with actuators TA 24/ TR 24*
8	*Tichelmann Manifold/Manifold with actuators TA 24/ TR 24*
9	*Circulation Pump*
10	*3 way mixing valve 0-10V*
11	*Heat Source*
12	*Heat exchanger*

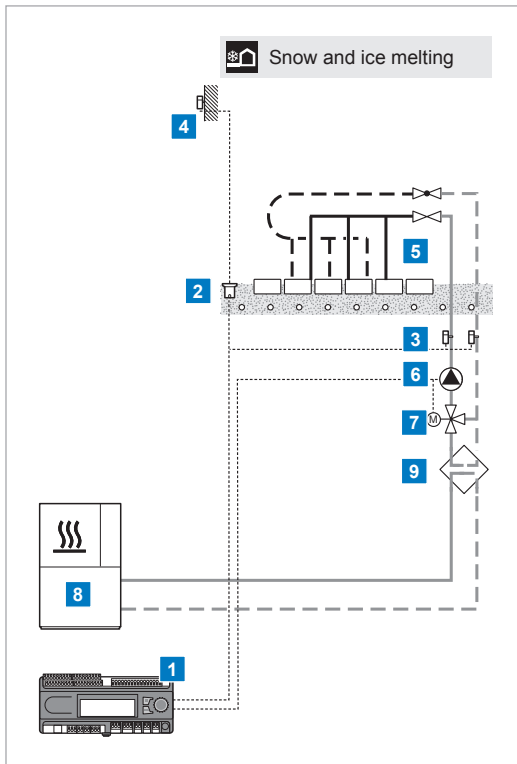## Industrial/Retail with offices and Snow/ice melting Heating and Cooling

The diagram shows a simplified illustration of the key control components for and heating and cooling application with both room and supply water temperature control.

Dehumidification control is provided by the Smatrix Move PRO controller X-159 and the heating and cooling changeover signal is sent via the X-159 using and optional H/C switching.

The snow and ice melting control is provided from Smatrix Move PRO detecting moisture and temperature using the Smatrix Move PRO sensors Snow S-158.

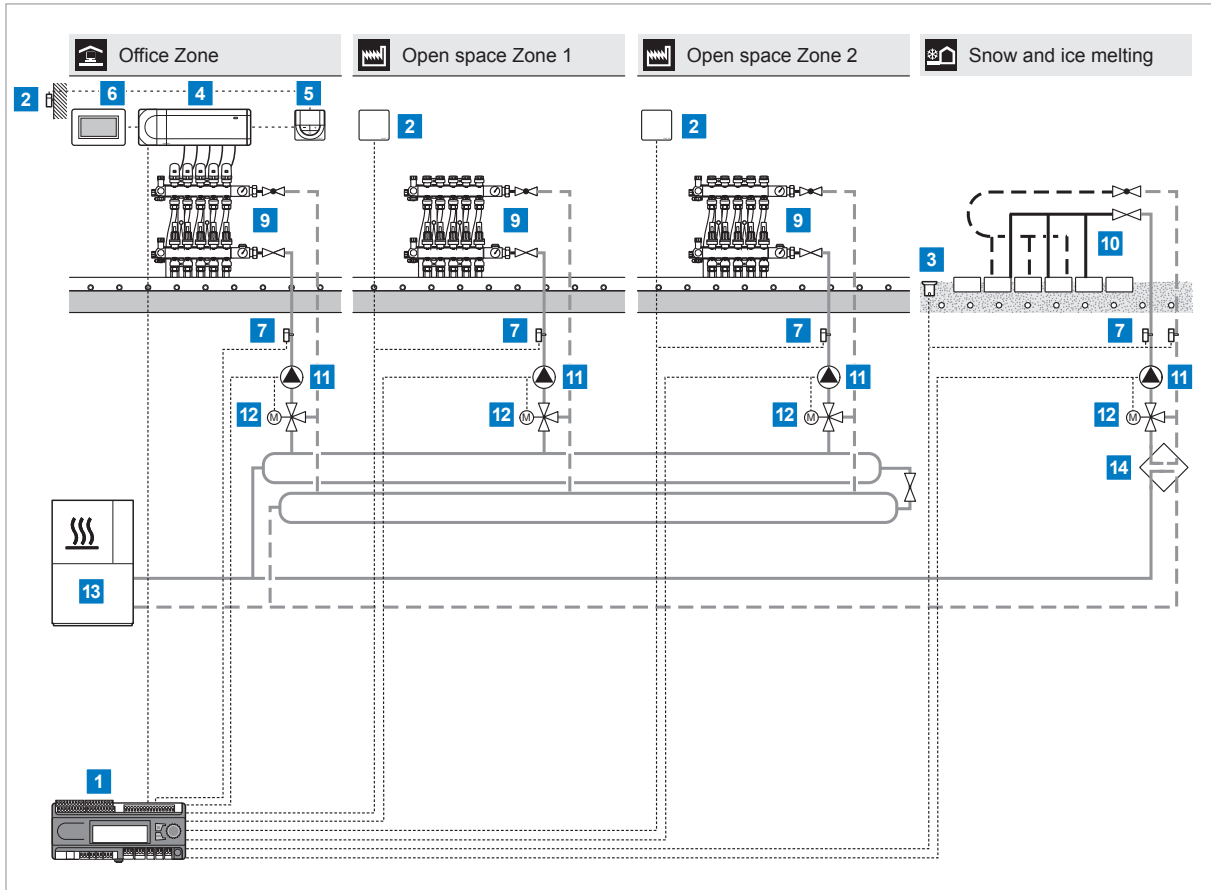|	
1	*Uponor Smatrix Move PRO Controller X-159*
2	*Uponor Smatrix Move PRO Room sensor S-155*
3	*Uponor Smatrix Move PRO Sensor Snow S-158*
4	*Uponor Smatrix Move PRO Humidity sensor S-157*
5	*Dehumidifier*
6	*Uponor Smatrix Base PRO Controller X-147 BUS 6X*
7	*Uponor Smatrix Base PRO Thermostat D+RH T-147 BUS*
8	*Uponor Smatrix Base PRO Interface I-147 BUS*
9	*H/C switching*
10	*Uponor Smatrix Move sensor supply/return S-152*
11	*Uponor Smatrix sensor outdoor S-1XX*
12	*Manifold with actuators TA 24/ TR 24*
13	*Tichelmann Manifold/Manifold with actuators TA 24/ TR 24*
14	*Circulation Pump*
15	*3 way mixing valve 0-10V*
16	*Heat Source*
17	*Cooling source*
18	*Heat exchanger*
19	*Diverting Valve*

Snow and ice melting

The diagram shows a simplified illustration of the key control components for heating supply water temperature control.

The snow and ice melting control is provided from Smatrix Move PRO detecting moisture and temperature using the Smatrix Move PRO sensors Snow S-158.

1	*Uponor Smatrix Move PRO Controller X-159*
2	*Uponor Smatrix Move PRO Sensor Snow S-158*
3	*Uponor Smatrix Move sensor supply/return S-152*
4	*Uponor Smatrix sensor outdoor S-1XX*
5	*Tichelmann Manifold/Manifold with actuators TA 24/ TR 24*
6	*Circulation Pump*
7	*3 way mixing valve 0-10V*
8	*Heat Source*
9	*Heat exchanger*

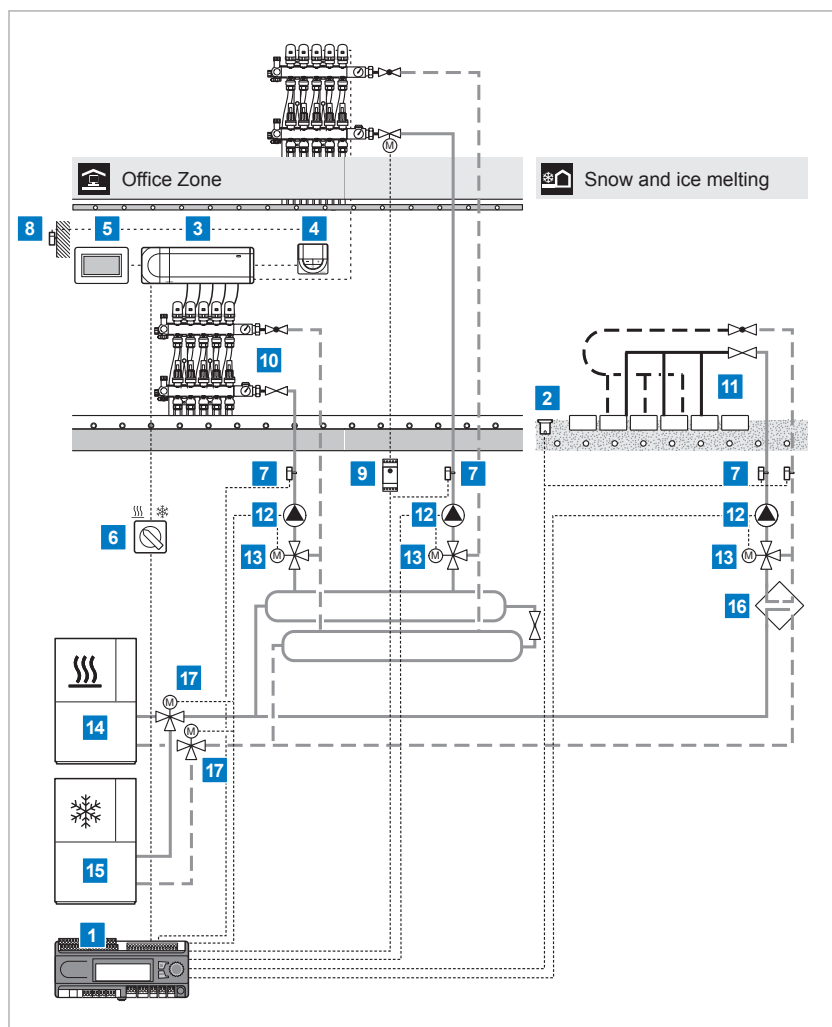## Industrial/Retail with offices and Snow/ice melting Stand alone

The diagram shows a simplified illustration of the key control components for and heating application with both room and supply water temperature control.

The snow and ice melting control is provided from Smatrix Move PRO detecting moisture and temperature using the Smatrix Move PRO sensors Snow S-158.

1	*Uponor Smatrix Move PRO Controller X-159*
2	*Uponor Smatrix Move PRO Room sensor S-155*
3	*Uponor Smatrix Move PRO Sensor Snow S-158*
4	*Uponor Smatrix Base PRO Controller X-147 BUS 6X*
5	*Uponor Smatrix Base PRO Thermostat D+RH T-147 BUS*
6	*Uponor Smatrix Base PRO Interface I-147 BUS*
7	*Uponor Smatrix Move sensor supply/return S-152*
8	*Uponor Smatrix sensor outdoor S-1XX*
9	*Manifold with actuators TA 24/ TR 24*
10	*Tichelmann Manifold/Manifold with actuators TA 24/ TR 24*
11	*Circulation Pump*
12	*3 way mixing valve 0-10V*
13	*Heat Source*
14	*Heat exchanger*

Small offices UFHC, Celing and Snow/ice melting

The diagram shows a simplified illustration of the key control components for combined floor and ceiling and heating cooling application with both room and supply water temperature control.

The heating and cooling changeover signal is sent via the X-159 using and optional H/C switching.

The snow and ice melting control is provided from Smatrix Move PRO detecting moisture and temperature using the Smatrix Move PRO sensors Snow S-158.

1	*Uponor Smatrix Move PRO Controller X-159*
2	*Uponor Smatrix Move PRO Sensor Snow S-158*
3	*Uponor Smatrix Base PRO Controller X-147 BUS 6X*
4	*Uponor Smatrix Base PRO Thermostat D+RH T-147 BUS*
5	*Uponor Smatrix Base PRO Interface I-147 BUS*
6	*H/C switching*
7	*Uponor Smatrix Move sensor supply/return S-152*
8	*Uponor Smatrix sensor outdoor S-1XX*
9	*Condensation set S-159*
10	*Manifold with actuators TA 24/ TR 24*
11	*Tichelmann Manifold/Manifold with actuators TA 24/ TR 24*
12	*Circulation Pump*
13	*3 way mixing valve 0-10V*
14	*Heat Source*
15	*Cooling source*
16	*Heat exchanger*
17	*Diverting Valve*

Notes

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