

Service Manual

Danfoss Icon2™

Zone controls for hydronic floor heating



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Select your **Icon2™** solution

Connect up to **four Master Controllers** wirelessly



Description: Icon2™ Master Controller

Part number: 088U2110

Specifications: Number of actuator outputs for floor heating groups:
Actuator supply voltage for floor heating groups:
Suitable for floor cooling:
Water temperature control:
Smartphone control by end user:
Connection to thermostats:

*15 channels
230V thermal actuators (convertible to 24V control)
Yes, advanced applications for 2, 3 and 4-pipe systems
Yes, depending on selected application
Yes, with addition of optional Ally™ Gateway
Both wired and wireless; wireless communication included as standard*

Wireless thermostats



Description: Icon2™ standard thermostat

Part number:
088U2121



Description: Icon2™ thermostat with infrared floor sensor

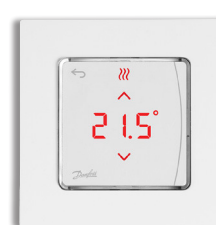
Part number:
088U2122



Description: Icon2™ thermostat
No settings or display

Part number:
088U2120

2-wire 24V thermostats



Description: Icon2™ surface-mounted thermostat

Part number:
088U2128



Description: Icon2™ flush-mounted thermostat

Part number:
088U2125



Description: Optional floor sensor

Part number:
088U1110

Thermal actuators

New installation

The Icon2™ Master Controller actuator outputs use 230V



Description:
TWA-A 230V NC thermal actuator with connection for Danfoss valves/floor heating manifolds

Part number:
088H3112



Description:
TWA-K 230V NC thermal actuator with M30 connection for valves and floor heating manifolds with M30

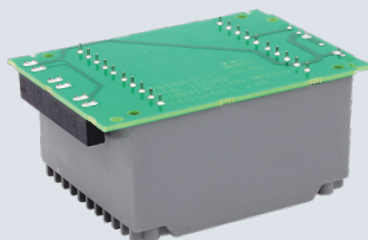
Part number:
088H3142

Replacing an existing installation

Do you need to replace existing controls that already use 24V actuators for each floor heating group? This optional converter transformer allows you to convert the 230V actuator outputs on the Icon2™ Master Controller to 24V outputs.

Description:
Converter Transformer
230V □ 24V
Insert into Icon2™ Master Controller

Part number:
088U2140



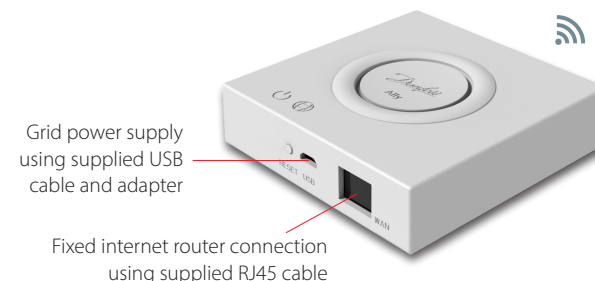
Wireless connectivity

Optional **smartphone control**

If the Icon2™ Master Controller is wirelessly connected to the Ally™ Gateway, the system can be controlled from inside or outside the home using an App.

Description:
Danfoss Ally™ Zigbee Gateway

Part number:
014G2400



Extending the **wireless range**

A wireless signal gets weaker as it travels. Metal surfaces and metal in constructions in particular can block the signal. The Danfoss Icon2™ Zigbee repeater can help you improve your thermostats' connection. If the Icon2™ Master Controller is installed in an enclosure, you can add an external antenna.

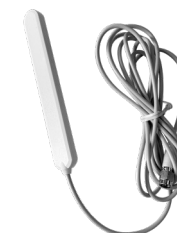
Description:
Danfoss Icon2™ Zigbee Repeater

Part number:
088U1131



Description:
Danfoss Icon2™ External Antenna

Part number:
088U2141



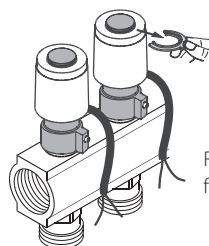
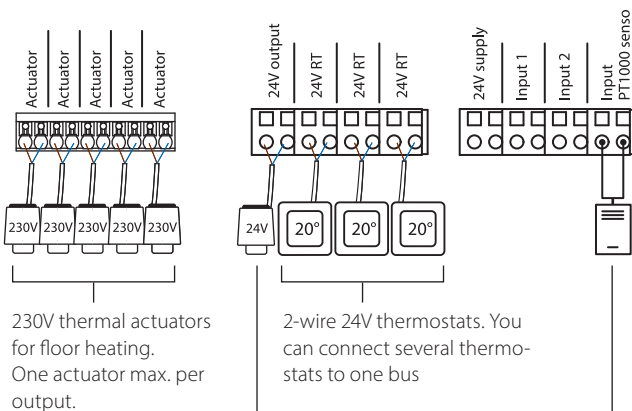
Rapid commissioning

Step 1:

Always be sure to connect actuators, thermostats and any accessories first



Inputs and outputs on the connected devices will instantly be detected when you insert the plug into an electrical outlet. Never connect devices with the plug already in an outlet.



Remove the red tabs from the actuators

Step 2:

Download the Icon2™ commissioning App and turn on Bluetooth on your smartphone

To set up the Icon2™ Master Controller, you will need to use the App on your smartphone or tablet. It will connect to the Icon2™ Master Controller using Bluetooth.



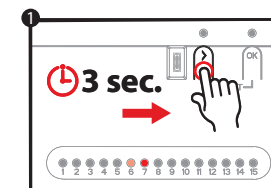
- Install the App on your smartphone or tablet.



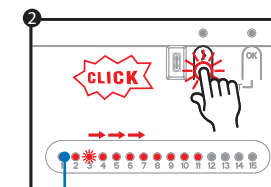
- Make sure Bluetooth is turned on on your smartphone or tablet.
- Give the Danfoss App permission to access Bluetooth.

Optional:

Linking of thermostats to actuator outputs using pushbuttons on Master Controller

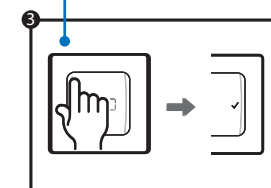


- Press > until the LED starts flashing green. Every actuator output connected to an actuator will light up.



- Use > to select the actuator output you want to pair with the thermostat and confirm with OK. The LED for the selected output will light up dimly.

Repeat steps 2 and 3 for each thermostat



Repeat for each actuator output you want to pair with the thermostat.

- Once you have selected all the actuator outputs, activate the thermostat by pressing its display screen. When the checkmark lights up, this means the thermostat is now linked to the selected actuator outputs.



Once each actuator output has been assigned to a thermostat, you will exit installer mode automatically

Re-pairing or replacing a device

When to reset a thermostat


You may reset a thermostat if you want to remove it from the system.

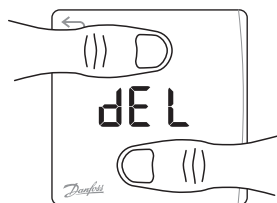
This can be the case because:

- The actuator outputs were paired incorrectly

OR

- The entire system requires resetting

1. Activate the thermostat by pressing on the screen.
2. Use both thumbs to press the temperature adjustment arrow keys  until **DEL ALL** appears, as shown in the adjacent image.
3. Press the **✓** checkmark next to **DEL ALL**.
The thermostat has now been removed from the system.



When to reset the Master Controller

Reset the Master Controller to return to the factory settings.

This will cause all data to be deleted. Do this if you want to recommission the installation.



If you reset the Master Controller, you will also need to reset all linked thermostats and any App or Zigbee modules.

This is necessary to be able to pair these devices again.

Hold down '**>**' and then press the '**OK**' button until both LEDs start flashing blue, then release the buttons immediately.

What to do if the thermostat cannot be reset

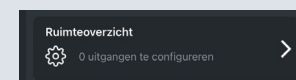
If a wireless thermostat was reset without the regulator being plugged into an outlet or in case of a faulty thermostat, you can use the Icon2™ App to clear the actuator outputs.

Procedure

Once you are within Bluetooth range of the regulator, start up the Icon2™ App.

Choose:

1. 'Connect to existing system.'
2. Once a connection has been made, select 'Room Overview.'
3. Select one of the thermal actuators that require clearing.
4. Press the three dots at the top right on the thermostat.
5. Now select 'Remove thermostat'.
You can now reassign the actuator outputs.



Danfoss Icon2™ Room Thermostat **installer settings menu**

Open the **installer menu**

Activate the thermostat. Press and hold **↩** to open the basic menu (ME. 1 to 3). Then press and hold **↩** *again* to access the **installer menu ME. 4 to 7**.

Use **▲** or **▼** to change menus and **✓** to confirm. Press **↩** to go back one step in the menu.



The ME.4 and ME.5 menu settings will only be available if the thermostat has a floor sensor. Menu settings ME.6 and ME.7 will only be available if a cooling application was selected.

ME.1 : Set limits for room temperature setpoint adjustments

ME.2 : Information/version number used to identify the product

ME.3 : Perform a link test to test the connection with the Master Controller.
Test results are 0–100%, with 80% or higher indicating a strong connection.

ME.4 : Floor sensor mode:

CO = Comfort mode. Uses both air and floor sensors.

FL = floor sensor mode. Desired floor temperature set by end user.

DU = dual mode. Thermostat controls one radiator and one or more floor heating circuit(s).

Floor heating circuits maintain a comfortable set floor temperature and radiator is used for peak loads.

ME.5 : Minimum and maximum floor temperatures for use with **CO** and **DU** modes.

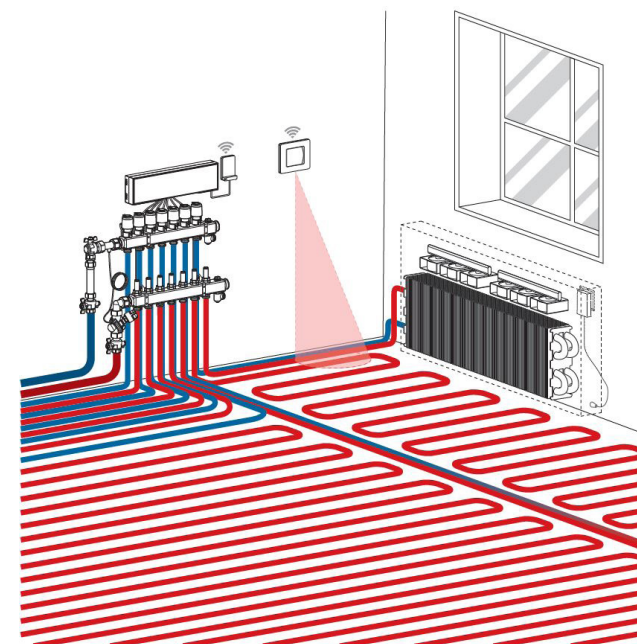
ME.6 : Reference room. Set to **ON** to use this room's thermostat as the reference for the changeover between cooling and heating modes.

ME.7 : Cooling **ON/OFF**. This setting is used to disable cooling, for example in a bathroom.

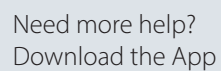
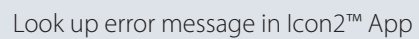
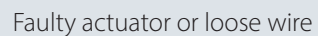
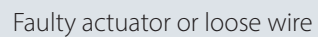
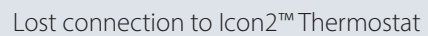
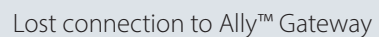
Explanation of dual mode

In rooms with a combination of floor heating and convectors, one thermostat can be used to control both individually.

For this to be possible, the wireless or wired thermostat must have a floor sensor. On the Master Controller, the actuator outputs for the floor heating must be configured to SLOW and those for the convectors to FAST. Then the system will maintain a comfortable, consistent floor temperature and activate the convector actuator outputs if the desired room temperature isn't being achieved.



Notes



Application 00

Floor heating system

Application description

This basic Icon2™ application controls thermal actuators by group based on heating demand for the linked room thermostats.

The pump and heat demand signal will activate whenever there is a heating demand for at least one circuit. Both the pump (PWR1) and the heat demand signal (RELAY) are set to have a switch-on delay of 3 minutes by default.

In PWM+ mode, the Danfoss Icon2™ makes use of automatic balancing. During periods with a greater need for heat, this decreases the time spent 'on' for shorter pipes in small rooms and prioritizes longer pipes in large rooms within the system. The process is automatic and continuous. It ensures more efficient energy consumption and greater comfort.

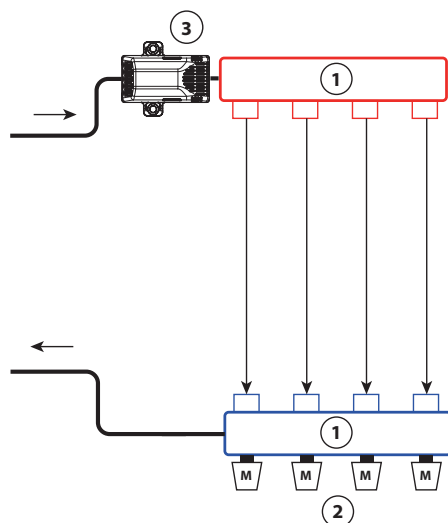
Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	
PWR1 switch-on delay of 3 minutes		<input type="checkbox"/>
RELAY switch-on delay of 3 minutes		<input type="checkbox"/>
IN2 input for changeover to cooling*	<input type="checkbox"/>	

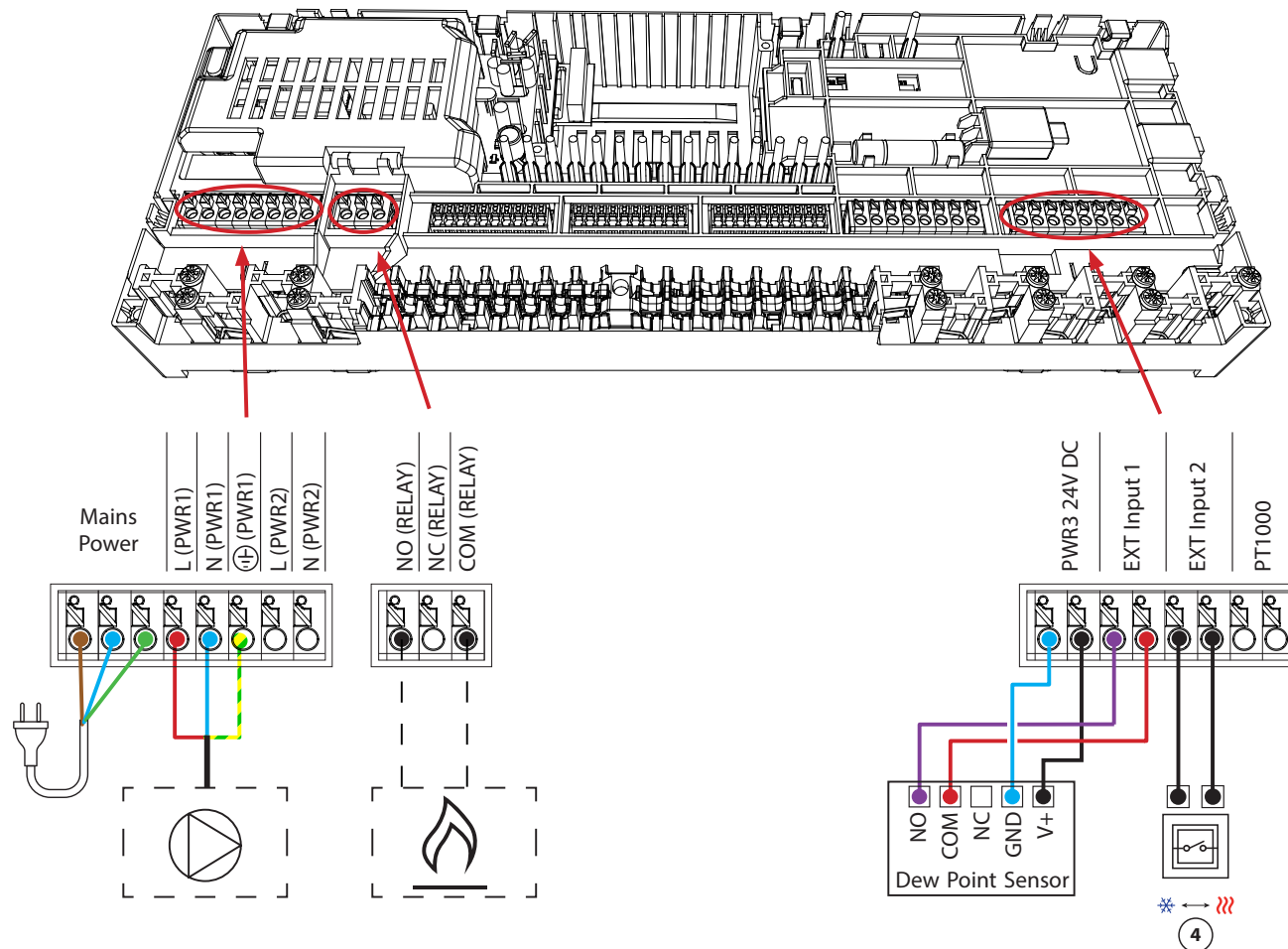
* If you enable IN2, the system will function according to Application 04

Required accessories

1	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
2	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
3	Dew point sensor CF-DS	088U0251
4	External NO contact for changeover to cooling mode	External



- ① 1 set Danfoss Manifold (types FHF or BasicPlus or SSM)
- ② Thermal actuators, 230V / 24V* TWA-A
* Requires TWA conversion module
- ③ Dew Point Sensor CF-DS
- ④ External switch for manual changeover between heating and cooling



Application 01

2-pipe heating system with fixed supply temperature control

Application description

Floor heating system with electronically controlled supply temperature. The supply temperature is set to a fixed value. The system uses a PT1000 sensor to detect and control the supply temperature. This sensor also ensures that the maximum allowable supply temperature is not exceeded.

The pump and heat demand signal will activate whenever there is a heating demand for at least one circuit. Both the pump (PWR1) and the heat demand signal (RELAY) are set to have a switch-on delay of 3 minutes by default.

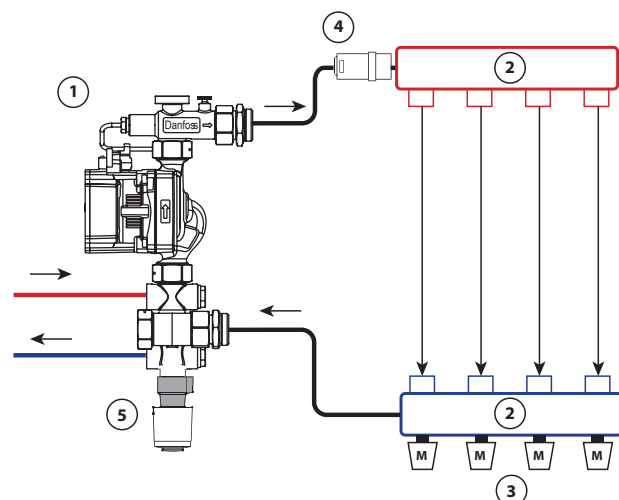
In PWM+ mode, the Danfoss Icon2™ makes use of automatic balancing. During periods with a greater need for heat, this decreases the time spent 'on' for shorter pipes in small rooms and prioritizes longer pipes in large rooms within the system. The process is automatic and continuous. It ensures more efficient energy consumption and greater comfort.

Installer App settings

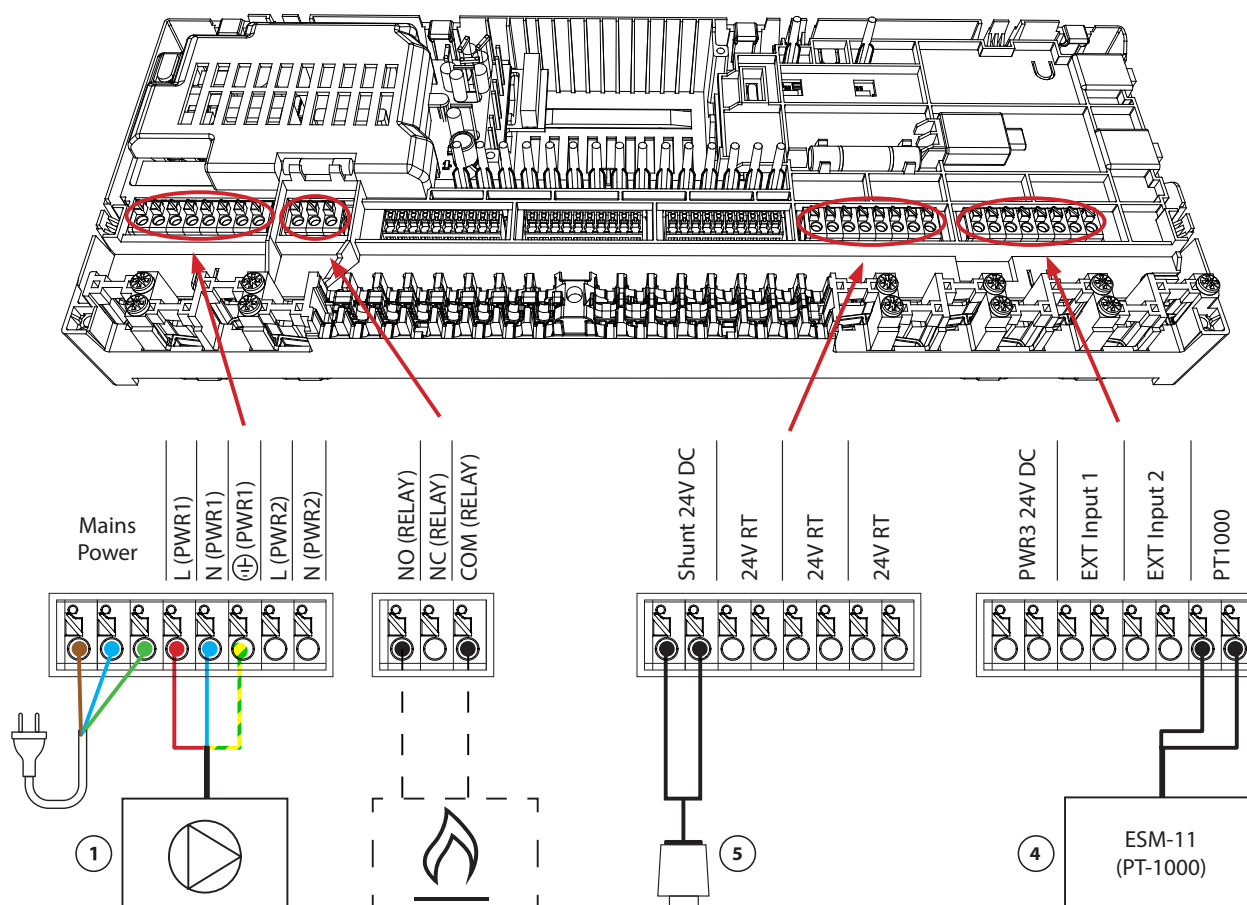
Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	
PWR1 switch-on delay of 3 minutes		<input type="checkbox"/>
RELAY switch-on delay of 3 minutes		<input type="checkbox"/>
Safety temperature	50.0 °C	
Desired supply temperature	40.0 °C	

Required accessories

1	Mixing shunt FHM-C1 with circulation pump UPM3 15-70	088U0094
2	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
3	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
4	PT1000 temperature sensor ESM-11	087B1165
5	Thermal actuator TWA-A 24V NC suitable for mixing shunt FHM-C1	088H3110



- ① Circulation pump
- ② 1 set Danfoss Manifold (types FHF or BasicPlus or SSM)
- ③ Thermal actuators, 230V / 24V* TWA-A
* Requires TWA conversion module
- ④ ESM-11 (PT-1000)
- ⑤ Thermal actuator 24V TWA-A



Application 02

2-pipe heating system with demand-controlled supply temperature

Application description

Floor heating system with electronically controlled supply temperature. An optimum supply temperature is determined based on the rooms' need for heat.

The system uses a PT1000 sensor to detect the supply temperature. This sensor also ensures that the temperature does not exceed the maximum allowable temperature set as the safety temperature. If this sensor is connected, the system will control the circulation pump and heat demand signal for a boiler or heat pump, for example.

The pump and heat demand signal will activate whenever there is a heating demand for at least one circuit. Both the pump (PWR1) and the heat demand signal (RELAY) are set to have a switch-on delay of 3 minutes by default.

In this application, the Danfoss Icon2™ makes use of automatic balancing. During periods with a greater need for heat, this decreases the time spent 'on' for shorter pipes in small rooms and prioritizes longer pipes in large rooms within the system. The process is automatic and continuous. It ensures more efficient energy consumption and greater comfort.

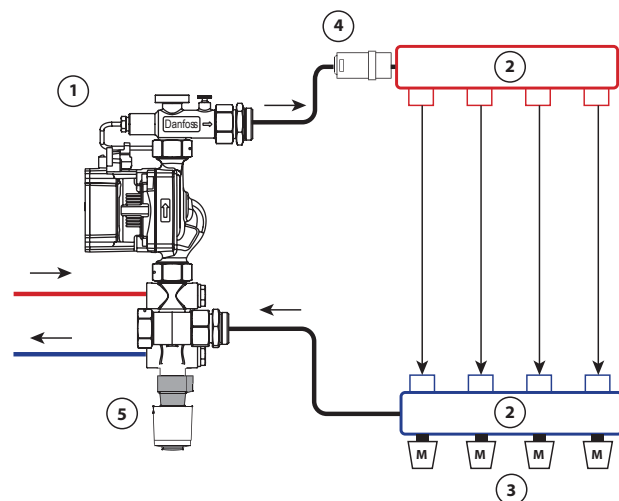
Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs*		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	
PWR1 switch-on delay of 3 minutes		<input type="checkbox"/>
RELAY switch-on delay of 3 minutes		<input type="checkbox"/>
Temperature range	25.0–40.0 °C	
Safety temperature	50.0 °C	

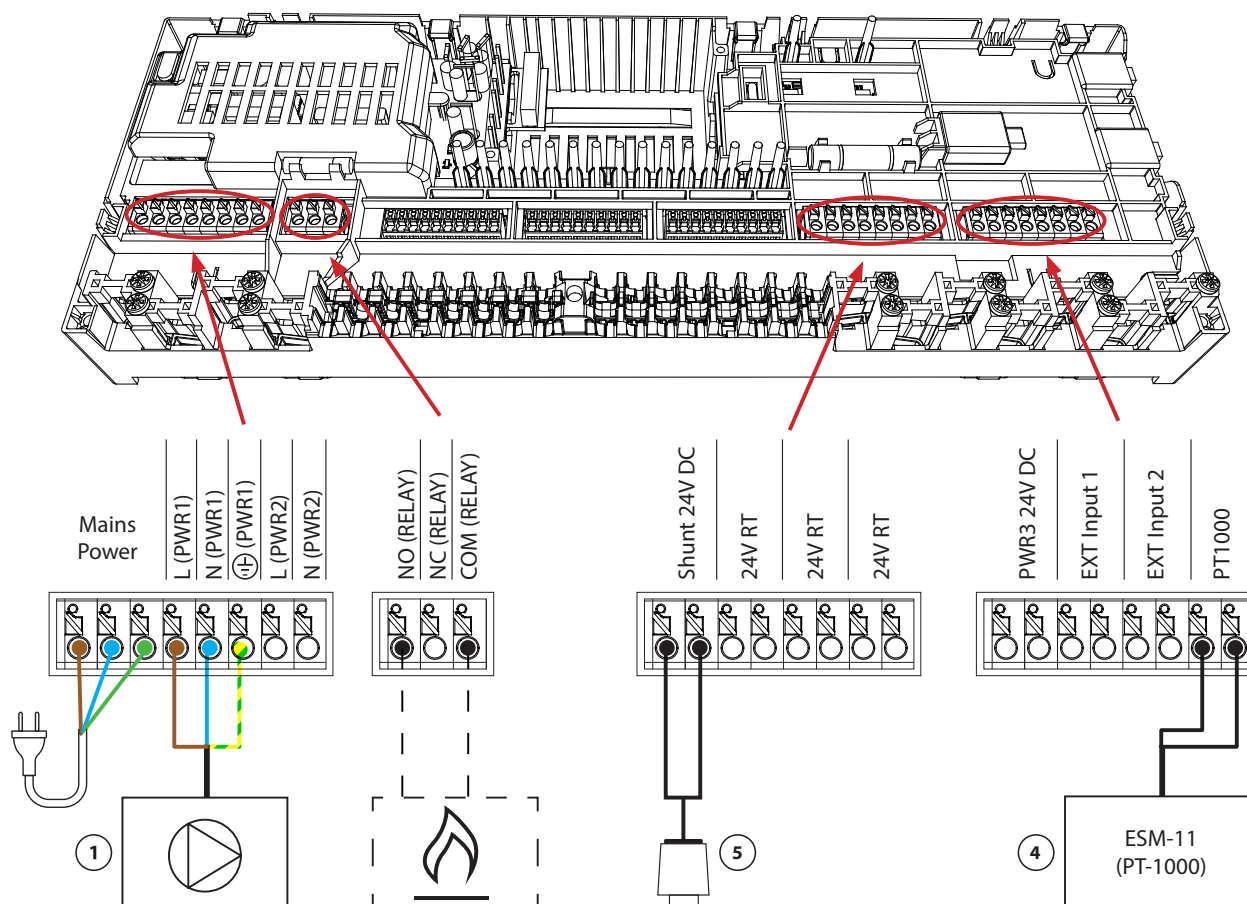
*Non-adjustable

Required accessories

1	Mixing shunt FHM-C1 with circulation pump UPM3 15-70	088U0094
2	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
3	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
4	PT1000 temperature sensor ESM-11	087B1165
5	Thermal actuator TWA-A 24V NC suitable for mixing shunt FHM-C1	088H3110



- ① Circulation pump
- ② 1 set Danfoss Manifold (types FHF or BasicPlus or SSM)
- ③ Thermal actuators, 230V / 24V* TWA-A
* Requires TWA conversion module
- ④ ESM-11 (PT-1000)
- ⑤ Thermal actuator 24V TWA-A



Application 03

2-pipe heating/cooling system, changeover to cooling based on supply temperature

Application description

Floor heating system with automatic changeover to cooling based on supply temperature input. A PT1000 sensor is used to monitor the supply temperature. The system will change over to heating or cooling based on this measurement. If the sensor is connected, the system will control the circulation pump, activating it if there is a need for heat or cooling in at least one room. The PT1000 sensor must be mounted to a pipe where flow will be assured at all times.

The heating signal for e.g. a boiler or heat pump will only be activated if the system is in heating mode and there is a heating demand in at least one room.

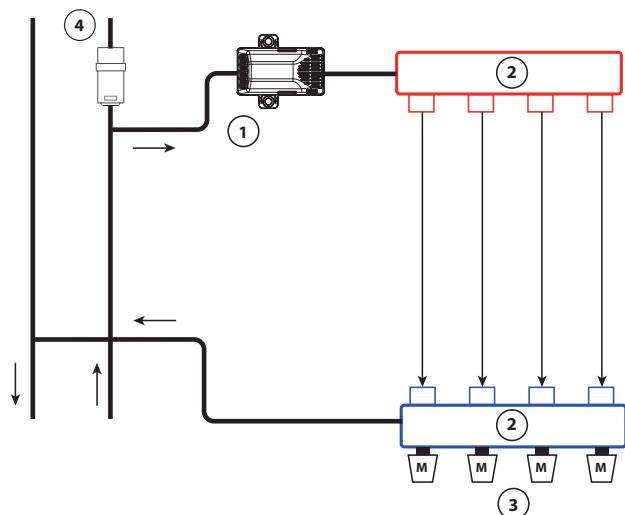
If it is not possible to prevent the supply temperature from dropping below the dew point in cooling mode, it is strongly recommended that you add a dew point sensor. Condensation can result in permanent damage to the floor's construction and finish.

Installer App settings

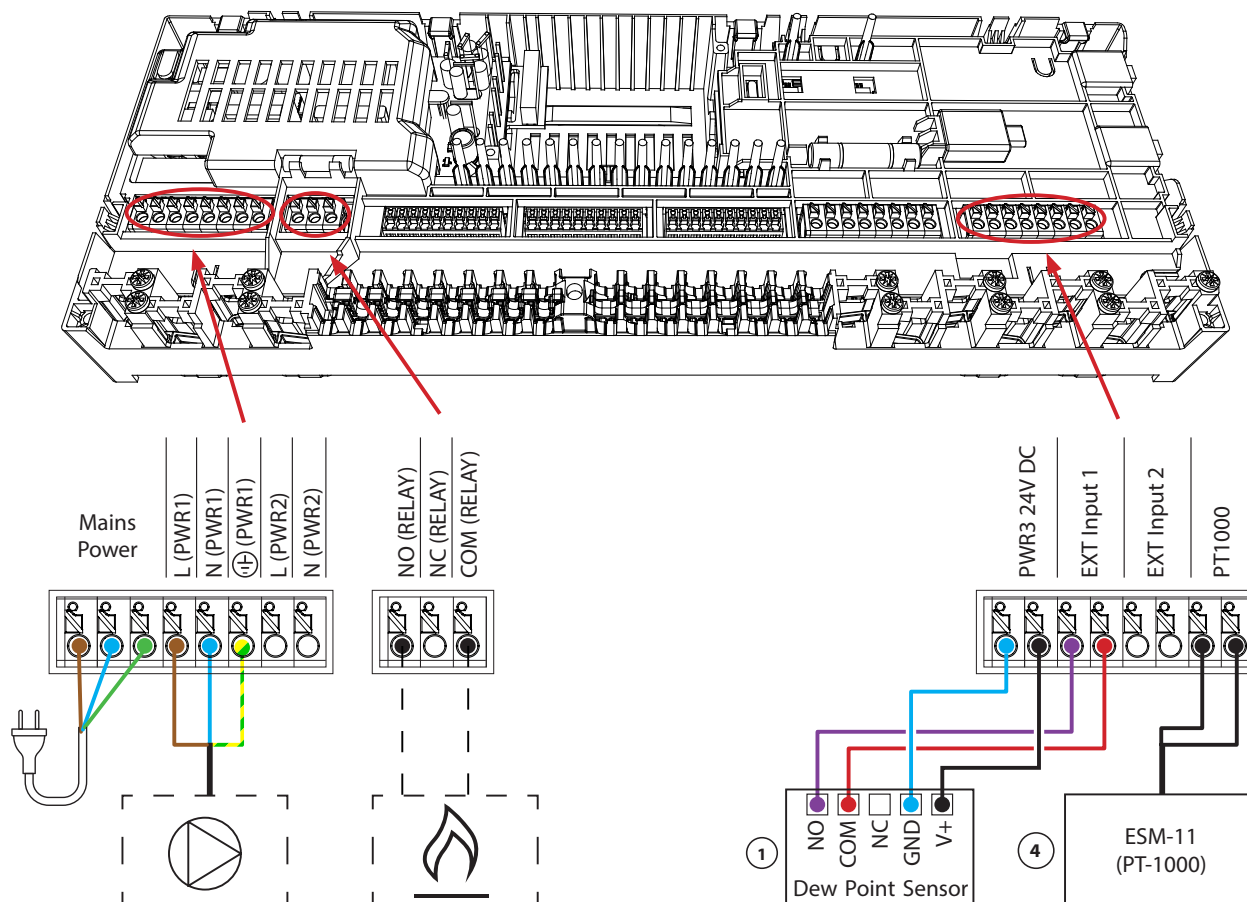
Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	
PWR1 switch-on delay of 3 minutes		<input type="checkbox"/>
RELAY switch-on delay of 3 minutes		<input type="checkbox"/>
Change water temperature to heating	25.0 °C	
Change water temperature to cooling	19.0 °C	

Required accessories

1	Dew point sensor CF-DS	088U0251
2	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
3	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
4	PT1000 temperature sensor ESM-11	087B1165



- ① Dew Point Sensor CF-DS
- ② 1 set Danfoss Manifold (types FHF or BasicPlus or SSM)
- ③ Thermal actuators, 230V / 24V* TWA-A
* Requires TWA conversion module
- ④ ESM-11 (PT-1000)



Application 04

2-pipe heating/cooling system, changeover to cooling based on heat pump/external potential-free NO contact

Application description

Floor heating system with automatic changeover to cooling mode, controlled by a heat pump or other heating and cooling source. The heat pump signals the Danfoss Icon™ Master Controller to start cooling using a potential-free NO contact connected to IN2.

The PWR1 circulation pump will activate whenever there is at least one room with a heating or cooling demand. The RELAY (heat source control) will activate whenever there is at least one room with a heating demand.

If it is not possible to prevent the supply temperature from dropping below the dew point in cooling mode, it is strongly recommended that you add a dew point sensor. Condensation can result in permanent damage to the floor's construction and finish.

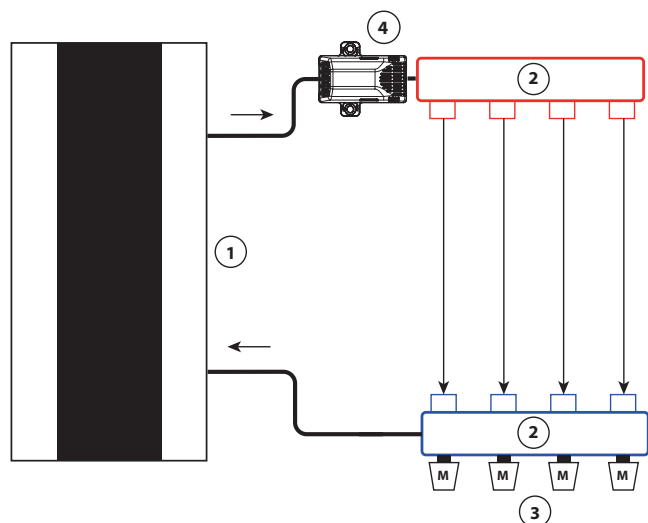
If dew point monitoring is active, the pump and all actuator outputs will be inactive.

Installer App settings

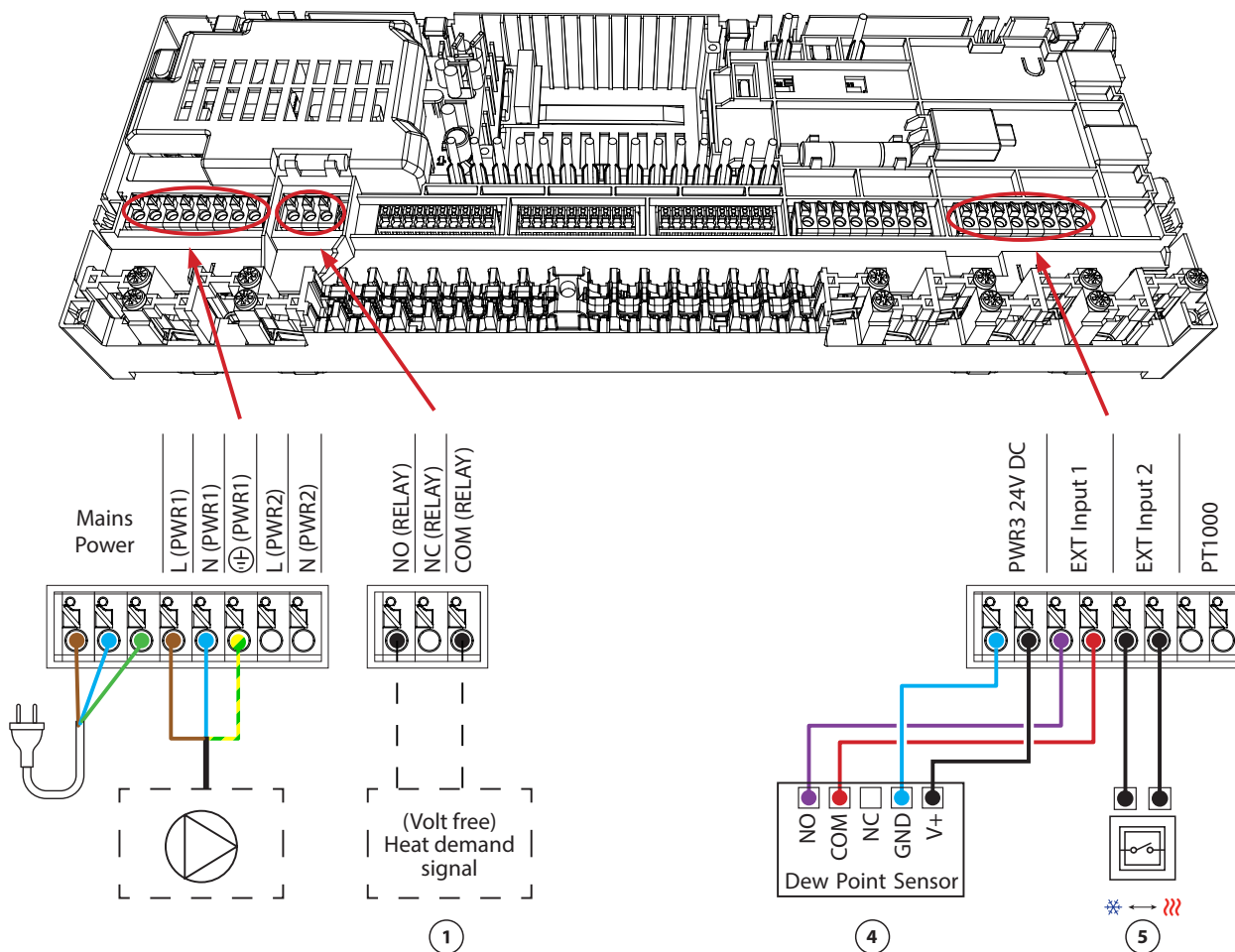
Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	
PWR1 switch-on delay of 3 minutes		<input type="checkbox"/>
RELAY switch-on delay of 3 minutes		<input type="checkbox"/>
IN2 input for changeover to cooling		<input type="checkbox"/>

Required accessories

1	Heat pump or hybrid system	External supplier
2	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
3	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
4	Dew point sensor CF-DS	088U0251
5	External NO contact for changeover to cooling mode	External



- ① Heat pump
- ② 1 set Danfoss Manifold (types FHF or BasicPlus or SSM)
- ③ Thermal actuators, 230V / 24V* TWA-A
* Requires TWA conversion module
- ④ Dew Point Sensor CF-DS
- ⑤ External voltage free contact from heatpump for changeover between heating and cooling



Application 05

2-pipe heating/cooling system with (hybrid) heat pump, changeover to cooling based on reference thermostat

Application description

This application makes it possible to send separate control signals for both heating and cooling demands to a heat pump or hybrid system. The PWR1 (230V output) is active when there is a heating demand and the RELAY (potential-free contact) is used for cooling.

To enable the PWR1 230V output to control the heat pump based on heating demand, the AMZ connection box converts the signal to a potential-free NO contact.

If it is not possible to prevent the supply temperature from dropping below the dew point in cooling mode, it is strongly recommended that you add a dew point sensor. Condensation can result in permanent damage to the floor's construction and finish.

The changeover between heating and cooling is controlled based on a reference thermostat. In nearly all cases, the living room is used as the reference.

To prevent excessive switching between heating and cooling modes, the following conditions must be met for the system to change over to cooling mode:

- The room temperature measured by the reference thermostat must exceed the set room temperature + dead band (adjustable from 0–4K).
- The reference thermostat did not have a heating demand during the time delay (adjustable from 0–24 hours).
- If present, dew point monitoring must be inactive
- The room thermostat must have cooling enabled (default = enabled).

Setting one thermostat as the reference thermostat

In this application, one thermostat is set up as a reference thermostat. The temperature in this room determines whether the system is in heating or cooling mode.

There are two ways to set up a reference thermostat:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.6** setting to **ON**

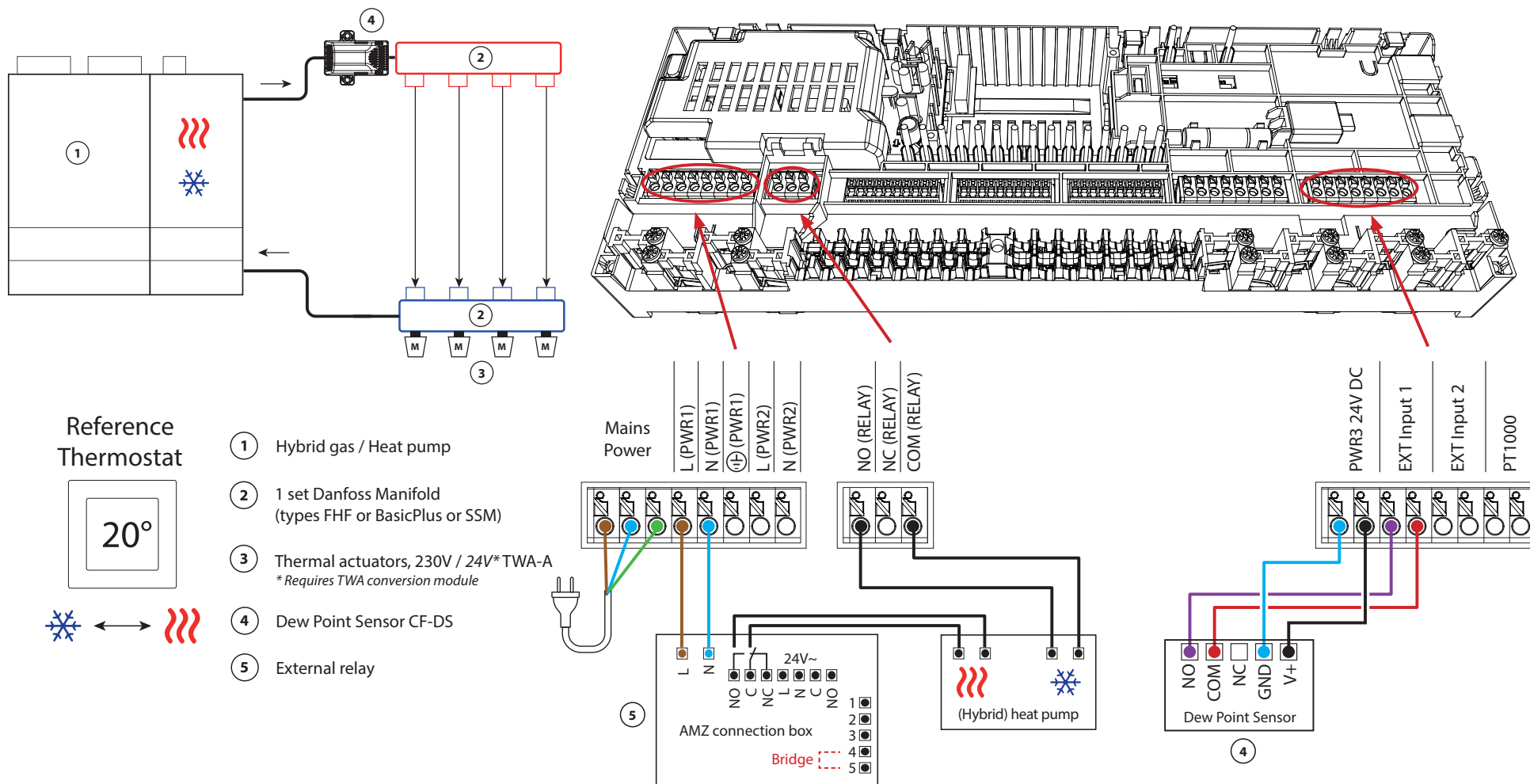
Disabling cooling (Bathroom)

If there is a bathroom with underfloor heating and an Icon2™ room thermostat, you may want to disable cooling for this room. Cooling a bathroom will cause condensation to form on the floor.

There are two ways to disable cooling mode for a room:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.7** setting to **OFF**



Application 05 *Continued*

Explanation of heating and cooling for end user

No cooling will occur ❄️ until the reference room temperature has exceeded the set temperature + dead band for the set time delay. For example, after the room's temperature has been over 25 °C (21 °C + 4K) for six hours.

A room will never be cooled further than two degrees above the set temperature. If the temperature is set to 21 °C, for example, the room will be cooled to 23 °C. Heating 🔥 will activate as soon as the room temperature drops below the set temperature.

Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	
Dead band heating/cooling changeover	4K	
Time delay for changeover to cooling mode	6h	

Required accessories

1	Heat pump or hybrid system	External supplier
2	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
3	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
4	Dew point sensor CF-DS	088U0251
5	External relay - AMZ connection box	082G1636

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Application 06

3-pipe heating/cooling system with 3-way motorized ball valve, changeover to cooling based on reference thermostat

Application description

In this application, a 230V 3-way motorized ball valve is used to change over between heating and cooling modes.

The PWR1 230V output activates when the system is in cooling mode. If it is not possible to prevent the supply temperature from dropping below the dew point in cooling mode, it is strongly recommended that you add a dew point sensor. Condensation can result in permanent damage to the floor's construction and finish.

The changeover between heating and cooling is controlled based on a reference thermostat. In nearly all cases, the living room is used as the reference.

To prevent excessive switching between heating and cooling modes, the following conditions must be met for the system to change over to cooling mode:

- The room temperature measured by the reference thermostat must exceed the set room temperature + dead band (adjustable from 0–4K).
- The reference thermostat did not have a heating demand during the time delay (adjustable from 0–24 hours).
- If present, dew point monitoring must be inactive
- The room thermostat must have cooling enabled (default = enabled).

Setting one thermostat as the reference thermostat

In this application, one thermostat is set up as a reference thermostat. The temperature in this room determines whether the system is in heating or cooling mode.

There are two ways to set up a reference thermostat:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.6** setting to **ON**

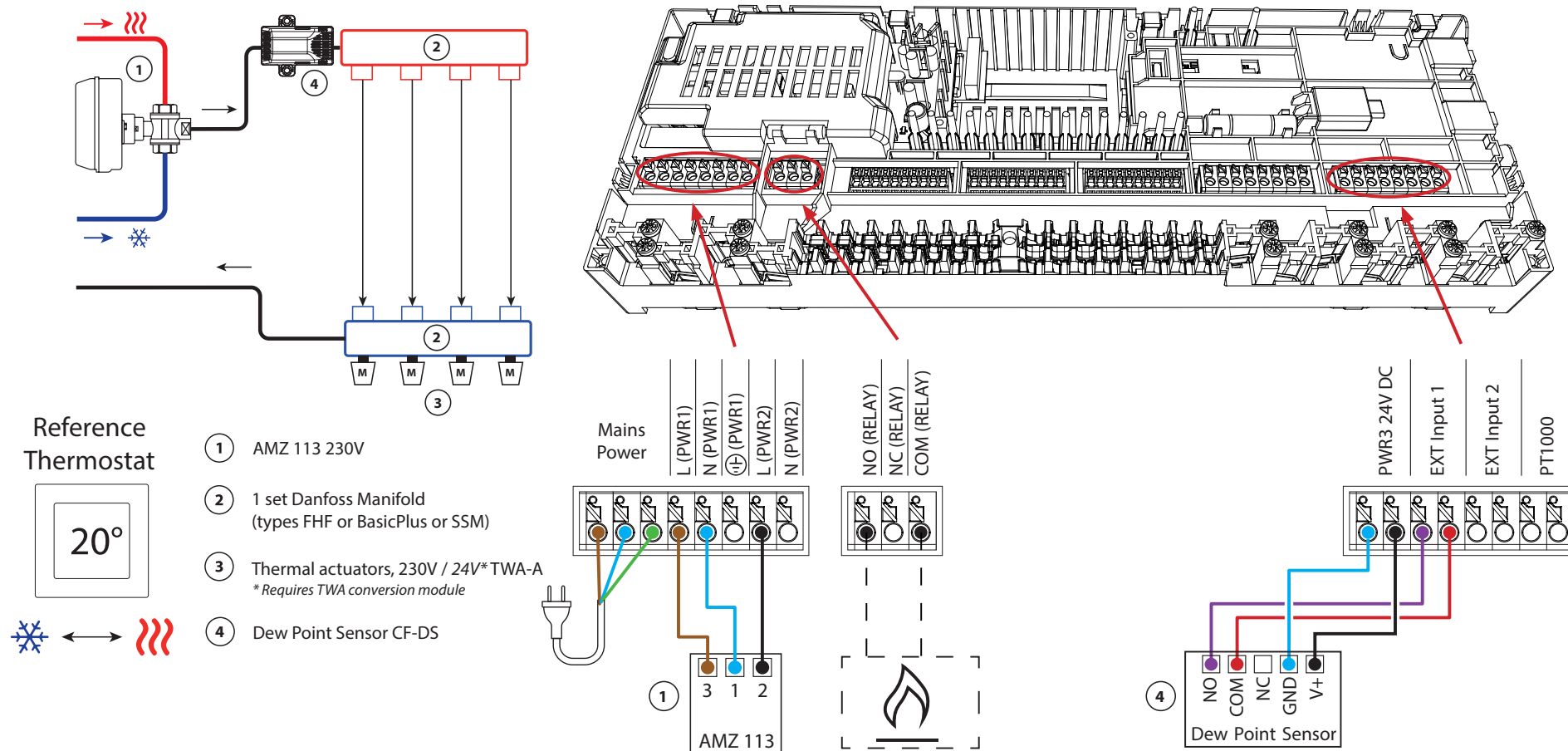
Disabling cooling (Bathroom)

If there is a bathroom with underfloor heating and an Icon2™ room thermostat, you may want to disable cooling for this room. Cooling a bathroom will cause condensation to form on the floor.

There are two ways to disable cooling mode for a room:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.7** setting to **OFF**



Application 06 *Continued*

Explanation of heating and cooling for end user

No cooling will occur ❄️ until the reference room's temperature has exceeded the set temperature + set dead band for longer than the set time delay. For example, after the room's temperature has been over 25 °C (21 °C + 4K) for six hours.

The room's temperature will never be cooled further than 2 degrees above the set temperature. If the temperature is set to 21 °C, for example, the room will be cooled to 23 °C. Heating 🔥 will activate as soon as the room temperature drops below the set temperature.

Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	
Dead band heating/cooling changeover	4K	
Time delay for changeover to cooling mode	6h	

Required accessories

1	3-way motorized ball valve 230V AMZ 113 DN20	082G5419
2	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
3	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
4	Dew point sensor CF-DS	088U0251

[illegible]

Application 07

3-pipe heating/cooling system with two 2-way control valves with thermal actuators, changeover to cooling based on reference thermostat

Application description

In this application, two 2-way motorized control valves are used to change over between heating and cooling modes. The thermal actuator on the 2-way cooling control valve will stay open as long as the system is in cooling mode. The thermal actuator for heating will stay open as long as the system is in heating mode.

Optionally, you can use the 230V pump control PWR1 and RELAY heat source control.

If it is not possible to prevent the supply temperature from dropping below the dew point in cooling mode, it is strongly recommended that you add a dew point sensor. Condensation can result in permanent damage to the floor's construction and finish.

The changeover between heating and cooling is controlled based on a reference thermostat. In nearly all cases, the living room is used as the reference.

To prevent excessive switching between heating and cooling modes, the following conditions must be met for the system to change over to cooling mode:

- The room temperature measured by the reference thermostat must exceed the set room temperature + dead band (adjustable from 0–4K).
- The reference thermostat did not have a heating demand during the time delay (adjustable from 0–24 hours).
- If present, dew point monitoring must be inactive
- The room thermostat must have cooling enabled (default = enabled).

Setting one thermostat as the reference thermostat

In this application, one thermostat is set up as a reference thermostat.

The temperature in this room determines whether the system is in heating or cooling mode.

There are two ways to set up a reference thermostat:

1. Using the Installer App on a smartphone
2. Using the Installer menu on the thermostat itself

To do so, set the **ME.6** setting to **ON**

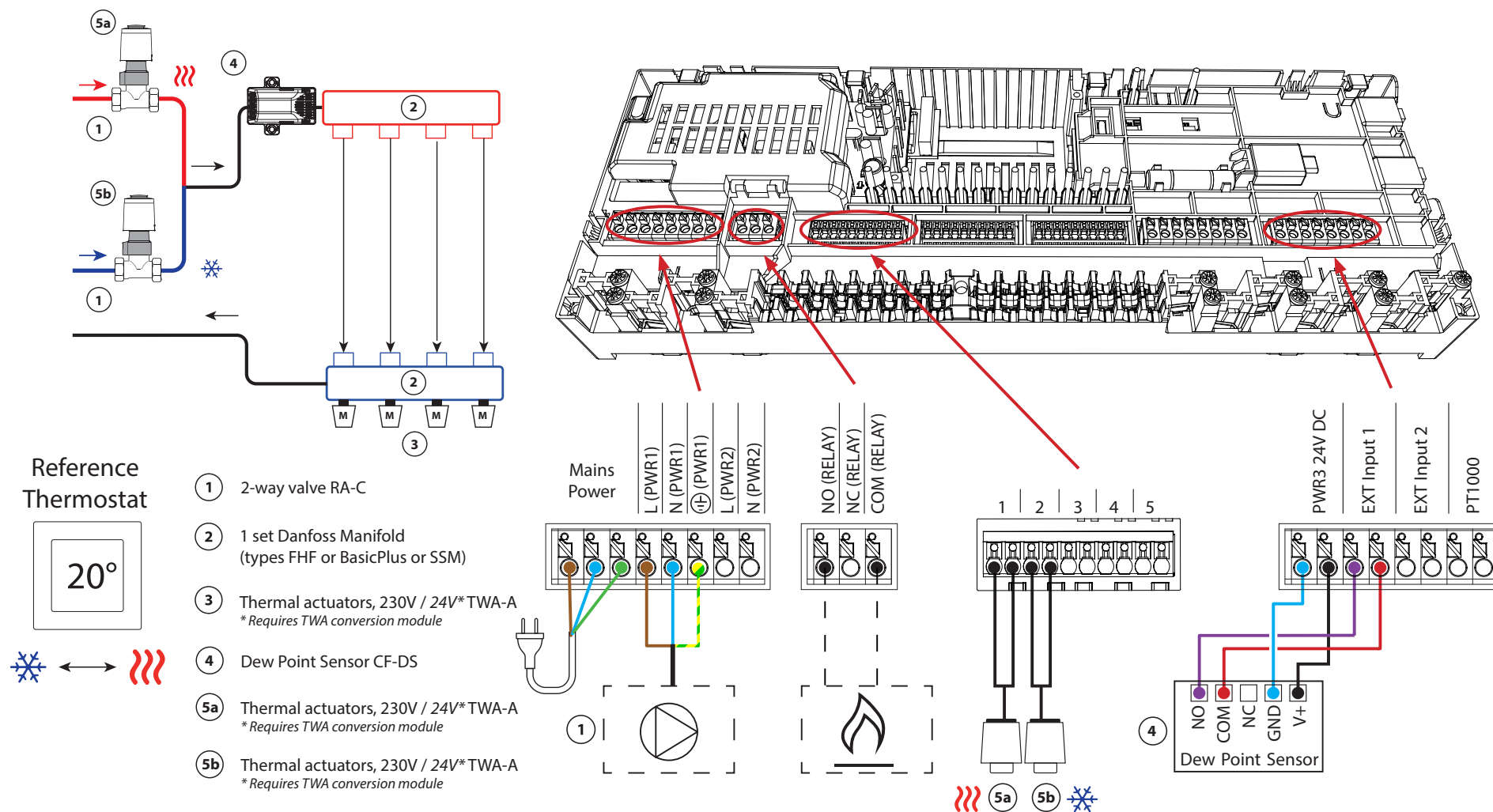
Disabling cooling (Bathroom)

If there is a bathroom with underfloor heating and an Icon2™ room thermostat, you may want to disable cooling for this room. Cooling a bathroom will cause condensation to form on the floor.

There are two ways to disable cooling mode for a room:

1. Using the Installer App on a smartphone
2. Using the Installer menu on the thermostat itself

To do so, set the **ME.7** setting to **OFF**



Application 07 *Continued*

Explanation of heating and cooling for end user

No cooling will occur ❄️ until the reference room temperature has exceeded the set temperature + set dead band for longer than the set time delay. For example, after the room's temperature has been over 25 °C (21 °C + 4K) for six hours.

The room's temperature will never be cooled further than 2 degrees above the set temperature. If the temperature is set to 21 °C, for example, the room will be cooled to 23 °C. Heating 🔥 will activate as soon as the room temperature drops below the set temperature.

Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	
Dead band heating/cooling changeover	4K	
Time delay for changeover to cooling mode	6h	

Required accessories

1	2-way control valve RA-C DN20	013G3096
	Compression ferrule set 22mm x 1" for RA-C 20	013U0135 (x4)
2	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
3	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
4	Dew point sensor CF-DS	088U0251
5a/b	Thermal actuator TWA-A 230V NC suitable for RA-C DN20	088H3112 (x2)

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Case	Age	Sex	Occupation	Duration of symptoms	Onset	Course	Associated symptoms	Associated diseases	Associated treatments	Associated outcomes	Associated comments
1	25	Male	Student	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
2	35	Female	Teacher	6 months	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
3	45	Male	Engineer	3 months	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
4	55	Female	Homemaker	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
5	65	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
6	75	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
7	85	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
8	95	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
9	105	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
10	115	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
11	125	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
12	135	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
13	145	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
14	155	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
15	165	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
16	175	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
17	185	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
18	195	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
19	205	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
20	215	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
21	225	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
22	235	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
23	245	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
24	255	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
25	265	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
26	275	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
27	285	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
28	295	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
29	305	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
30	315	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
31	325	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
32	335	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
33	345	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
34	355	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
35	365	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
36	375	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
37	385	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
38	395	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
39	405	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
40	415	Female	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
41	425	Male	Retired	1 year	Gradual	Chronic	Headache, dizziness, fatigue	None	None	None	None
42	435	Female	Retired	1 year	Gradual						

Application 08

3-pipe heating/cooling system with 2 ball valves with actuators, changeover to cooling based on reference thermostat

Application description

In this application, two 230V two-way motorized ball valves are used to change over between heating and cooling modes. The ball valve for cooling will open if one or more rooms require cooling. The ball valve for heating will open if one or more rooms require heating.

If it is not possible to prevent the supply temperature from dropping below the dew point in cooling mode, it is strongly recommended that you add a dew point sensor. Condensation can result in permanent damage to the floor's construction and finish.

The changeover between heating and cooling is controlled based on a reference thermostat. In nearly all cases, the living room is used as the reference.

To prevent excessive switching between heating and cooling modes, the following conditions must be met for the system to change over to cooling mode:

- The room temperature measured by the reference thermostat must exceed the set room temperature + dead band (adjustable from 0–4K).
- The reference thermostat did not have a heating demand during the time delay (adjustable from 0–24 hours).
- If present, dew point monitoring must be inactive.
- The room thermostat must have cooling enabled (default = enabled).

Setting one thermostat as the reference thermostat

In this application, one thermostat is set up as a reference thermostat.

The temperature in this room determines whether the system is in heating or cooling mode.

There are two ways to set up a reference thermostat:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.6** setting to **ON**

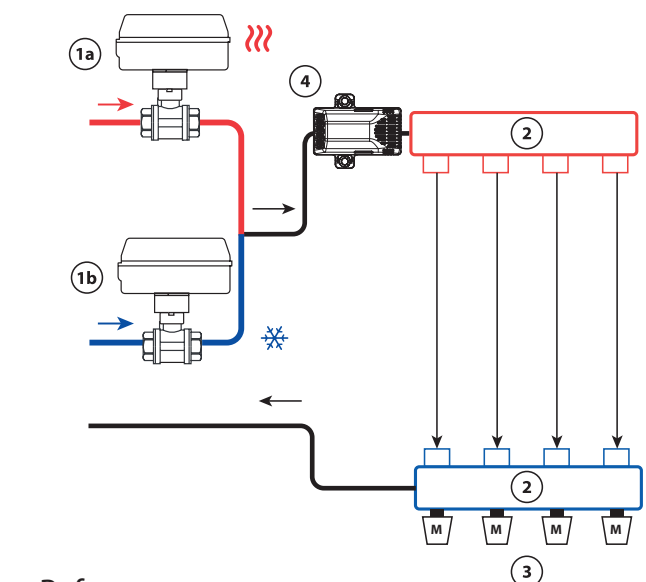
Disabling cooling (Bathroom)

If there is a bathroom with underfloor heating and an Icon2™ room thermostat, you may want to disable cooling for this room. Cooling a bathroom will cause condensation to form on the floor.

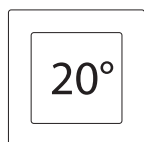
There are two ways to disable cooling mode for a room:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

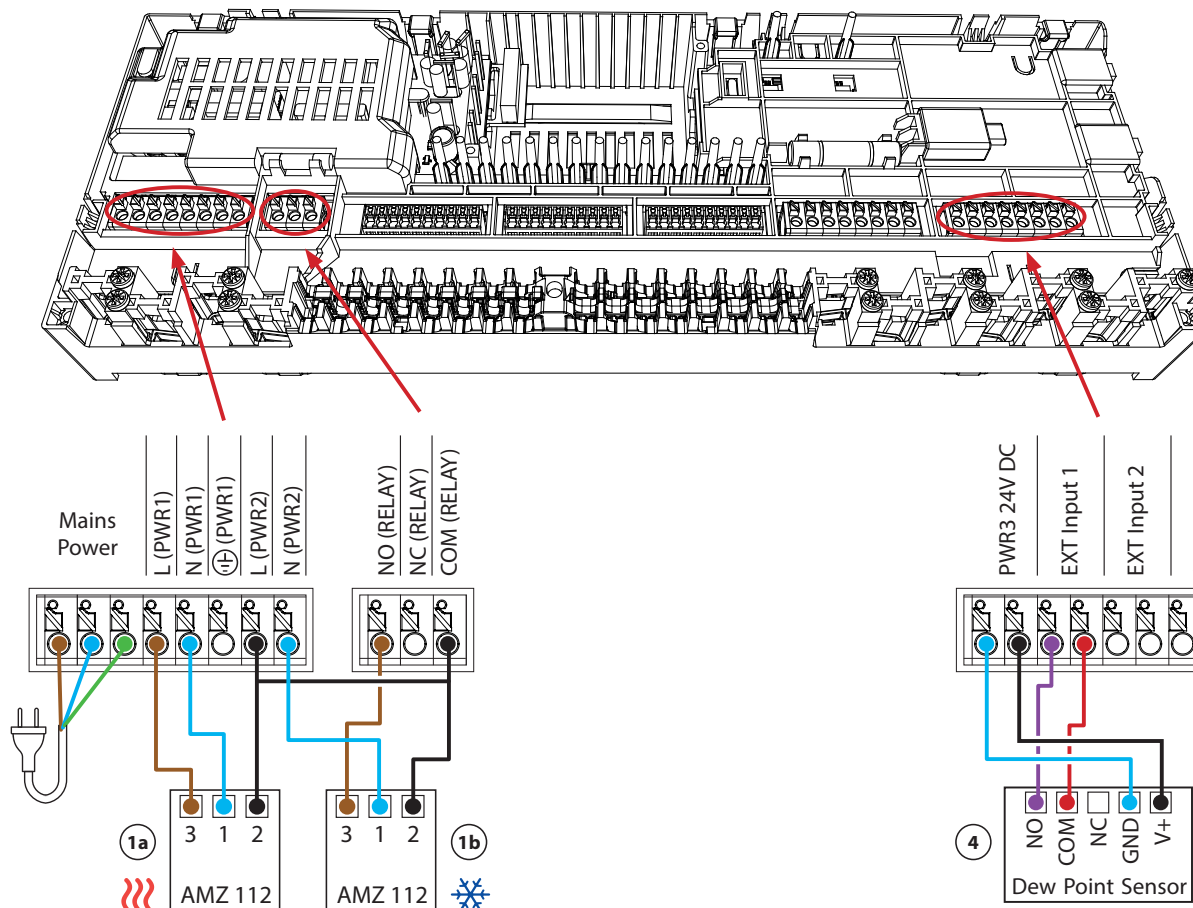
To do so, set the **ME.7** setting to **OFF**



Reference
Thermostat



- ①a AMZ 112 230V
- ①b AMZ 112 230V
- ② 1 set Danfoss Manifold (types FHF or BasicPlus or SSM)
- ③ Thermal actuators, 230V / 24V* TWA-A
* Requires TWA conversion module
- ④ Dew Point Sensor CF-DS



Application 08 *Continued*

Explanation of heating and cooling for end user

No cooling will occur ❄️ until the reference room's temperature has exceeded the set temperature + set dead band for longer than the set time delay. For example, after the room's temperature has been over 25 °C (21 °C + 4K) for six hours.

The room's temperature will never be cooled further than 2 degrees above the set temperature. If the temperature is set to 21 °C, for example, the room will be cooled to 23 °C. Heating 🔥 will activate as soon as the room temperature drops below the set temperature.

Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	
Dead band heating/cooling changeover	4K	
Time delay for changeover to cooling mode	6h	

Required accessories

1a/b	2-way motorized ball valve 230V AMZ 112 DN20	082G5407 (x2)
2	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
3	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
4	Dew point sensor CF-DS	088U0251

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Application 09

4-pipe heating/cooling system with 6-way motorized ball valve, changeover to cooling based on reference thermostat

Application description

In this application, a 230V 6-way motorized ball valve is used to change over between heating and cooling modes.

The RELAY activates when the system is in heating mode and is used to control the 6-way ball valve. The PWR1 output is active in both heating and cooling mode. It can optionally be used to operate a 230V 2-way control valve. This acts as an additional shut-off valve when there is no need for heat or cooling, reducing unnecessary consumption.

If it is not possible to prevent the supply temperature from dropping below the dew point in cooling mode, it is strongly recommended that you add a dew point sensor. Condensation can result in permanent damage to the floor's construction and finish.

The changeover between heating and cooling is controlled based on a reference thermostat. In nearly all cases, the living room is used as the reference.

To prevent excessive switching between heating and cooling modes, the following conditions must be met for the system to change over to cooling mode:

- The room temperature measured by the reference thermostat must exceed the set room temperature + dead band (adjustable from 0–4K).
- The reference thermostat did not have a heating demand during the time delay (adjustable from 0–24 hours).
- If present, dew point monitoring must be inactive
- The room thermostat must have cooling enabled (default = enabled).

Setting one thermostat as the reference thermostat

In this application, one thermostat is set up as a reference thermostat.

The temperature in this room determines whether the system is in heating or cooling mode.

There are two ways to set up a reference thermostat:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.6** setting to **ON**

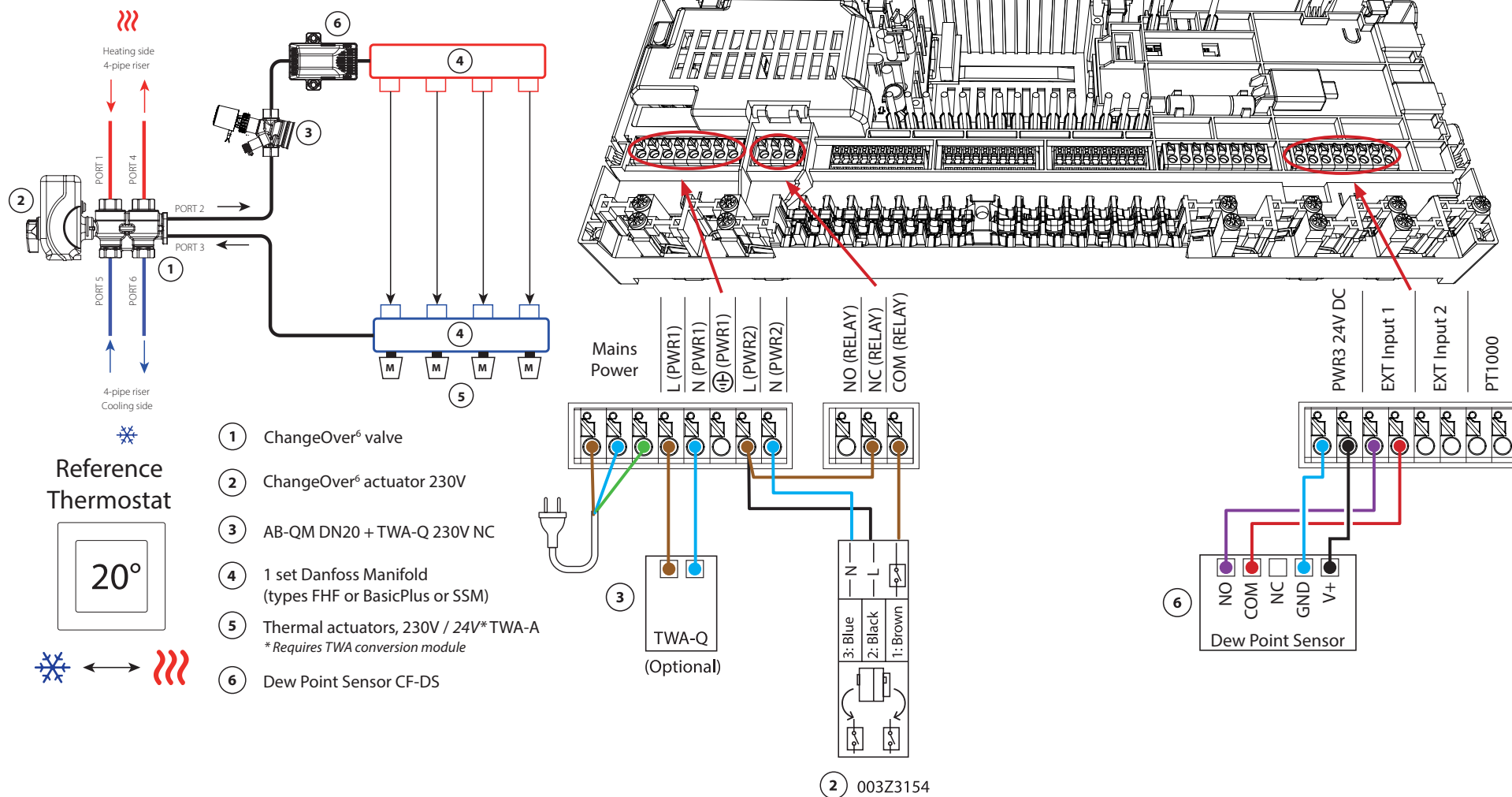
Disabling cooling (Bathroom)

If there is a bathroom with underfloor heating and an Icon2™ room thermostat, you may want to disable cooling for this room. Cooling a bathroom will cause condensation to form on the floor.

There are two ways to disable cooling mode for a room:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.7** setting to **OFF**



Application 9 *Continued*

Explanation of heating and cooling for end user

No cooling will occur ❄️ until the reference room's temperature has exceeded the set temperature + set dead band for longer than the set time delay. For example, after the room's temperature has been over 25 °C (21 °C + 4K) for six hours.

The room's temperature will never be cooled further than 2 degrees above the set temperature. If the temperature is set to 21 °C, for example, the room will be cooled to 23 °C. Heating 🔥 will activate as soon as the room temperature drops below the set temperature.

Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	
Dead band heating/cooling changeover	4K	
Time delay for changeover to cooling mode	6h	

Required accessories

1	6-way ball valve ChangeOver6 DN20	003Z3151
2	Actuator 230V suitable for ChangeOver6 DN20	003Z3154
3	2-way control valve with flow regulator AB-QM DN20	003Z8203
	Thermal actuator TWA-Q 230V NC suitable for AB-QM DN20	082F1600
	Threaded fittings R3/4" suitable for AB-QM DN20	003Z0233 (x2)
4	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
5	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
6	Dew point sensor CF-DS	088U0251

[illegible]

Application 10

4-pipe heating/cooling system with four 2-way control valves with thermal actuators, changeover to cooling based on reference thermostat

Application description

In this application, four 2-way motorized control valves are used to change over between heating and cooling modes. The thermal actuators on the 2-way control valves for cooling will stay open as long as the system is in cooling mode. The thermal actuators for heating will be open as long as the system is in heating mode.

Optionally, you can use the 230V pump control PWR1 and RELAY heat source control.

If it is not possible to prevent the supply temperature from dropping below the dew point in cooling mode, it is strongly recommended that you add a dew point sensor. Condensation can result in permanent damage to the floor's construction and finish.

The changeover between heating and cooling is controlled based on a reference thermostat. In nearly all cases, the living room is used as the reference.

To prevent excessive switching between heating and cooling modes, the following conditions must be met for the system to change over to cooling mode:

- The room temperature measured by the reference thermostat must exceed the set room temperature + dead band (adjustable from 0–4K).
- The reference thermostat did not have a heating demand during the time delay (adjustable from 0–24 hours).
- If present, dew point monitoring must be inactive.
- The room thermostat must have cooling enabled (default = enabled).

Setting one thermostat as the reference thermostat

In this application, one thermostat is set up as a reference thermostat.

The temperature in this room determines whether the system is in heating or cooling mode.

There are two ways to set up a reference thermostat:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.6** setting to **ON**

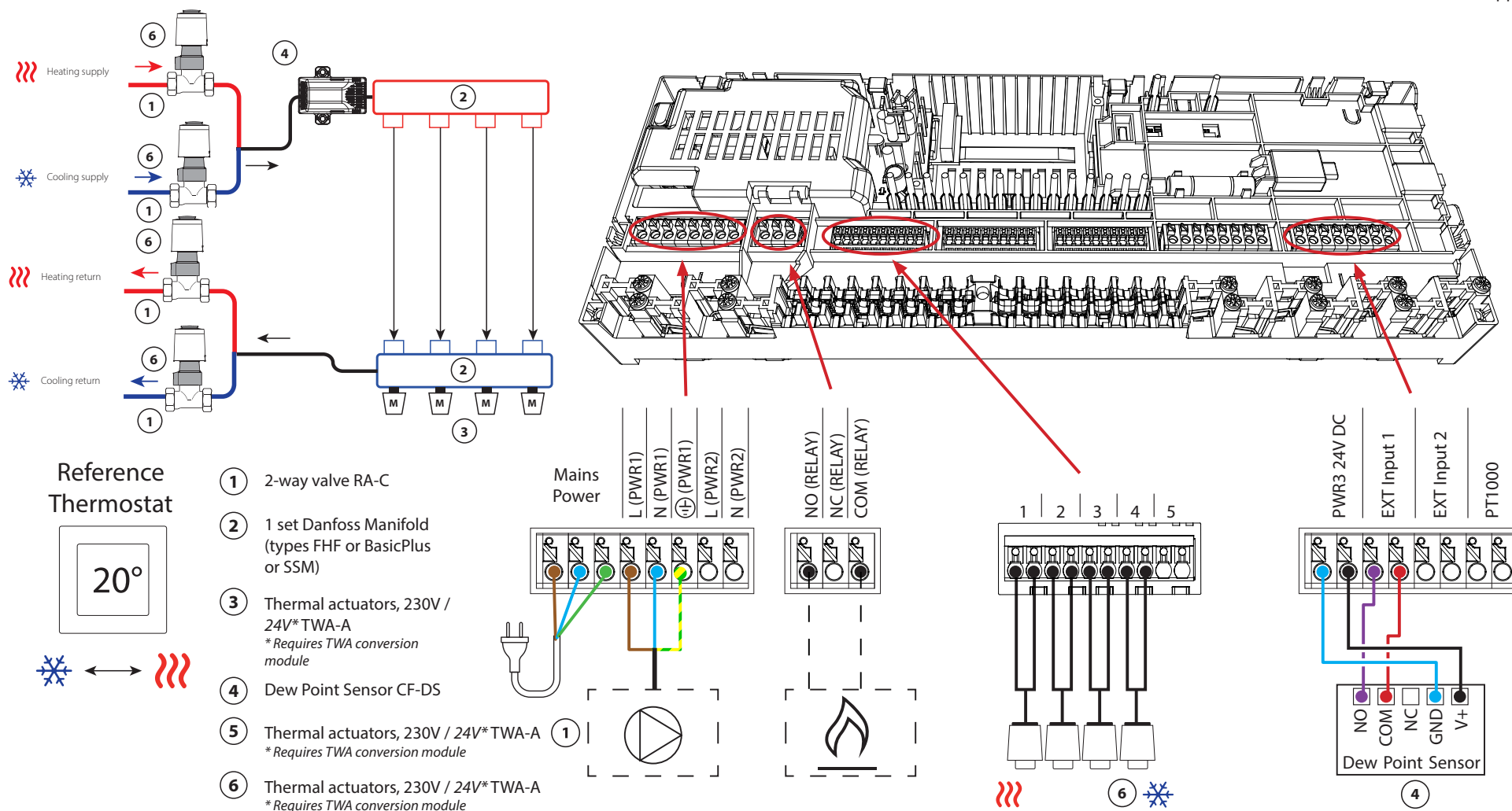
Disabling cooling (Bathroom)

If there is a bathroom with underfloor heating and an Icon2™ room thermostat, you may want to disable cooling for this room. Cooling a bathroom will cause condensation to form on the floor.

There are two ways to disable cooling mode for a room:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.7** setting to **OFF**



Application 10 *Continued*

Explanation of heating and cooling for end user

No cooling will occur ❄️ until the reference room temperature has exceeded the set temperature + set dead band for longer than the set time delay. For example, after the room's temperature has been over 25 °C (21 °C + 4K) for six hours.

The room's temperature will never be cooled further than 2 degrees above the set temperature. If the temperature is set to 21 °C, for example, the room will be cooled to 23 °C. Heating 🔥 will activate as soon as the room temperature drops below the set temperature.

Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	
Dead band heating/cooling changeover	4K	
Time delay for changeover to cooling mode	6h	

Required accessories

1	2-way control valve RA-C DN20	013G3096
	Compression ferrule set 22mm x 1" for RA-C 20	013U0135 (x8)
2	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
3	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
4	Dew point sensor CF-DS	088U0251
5/6	Thermal actuator TWA-A 230V NC suitable for RA-C DN20	088H3112 (x4)

Drawings

[illegible]

Case	Age	Sex	Occupation	Duration of symptoms	Onset	Course	Treatment	Outcome	Comments
1	45	M	Teacher	10 years	1975	Chronic	None	Stable	First case in the series
2	52	F	Homemaker	5 years	1978	Chronic	None	Stable	Second case in the series
3	38	M	Engineer	3 years	1980	Chronic	None	Stable	Third case in the series
4	60	F	Retired	15 years	1965	Chronic	None	Stable	Fourth case in the series
5	42	M	Manager	8 years	1972	Chronic	None	Stable	Fifth case in the series
6	55	F	Homemaker	12 years	1968	Chronic	None	Stable	Sixth case in the series
7	35	M	Engineer	4 years	1982	Chronic	None	Stable	Seventh case in the series
8	48	F	Homemaker	7 years	1976	Chronic	None	Stable	Eighth case in the series
9	50	M	Teacher	11 years	1969	Chronic	None	Stable	Ninth case in the series
10	40	F	Homemaker	6 years	1981	Chronic	None	Stable	Tenth case in the series
11	58	M	Engineer	14 years	1966	Chronic	None	Stable	Eleventh case in the series
12	44	F	Homemaker	9 years	1974	Chronic	None	Stable	Twelfth case in the series
13	32	M	Engineer	2 years	1983	Chronic	None	Stable	Thirteenth case in the series
14	53	F	Homemaker	13 years	1967	Chronic	None	Stable	Fourteenth case in the series
15	41	M	Manager	7 years	1977	Chronic	None	Stable	Fifteenth case in the series
16	56	F	Homemaker	11 years	1970	Chronic	None	Stable	Sixteenth case in the series
17	36	M	Engineer	5 years	1980	Chronic	None	Stable	Seventeenth case in the series
18	49	F	Homemaker	8 years	1975	Chronic	None	Stable	Eighteenth case in the series
19	51	M	Teacher	10 years	1969	Chronic	None	Stable	Nineteenth case in the series
20	43	F	Homemaker	6 years	1981	Chronic	None	Stable	Twentieth case in the series

Application 11

4-pipe heating/cooling system with 6-way ball valve with fixed heating and cooling supply temperature control, changeover to cooling based on reference thermostat

Application description

The RELAY activates when the system is in heating mode and is used to control the 230V 6-way ball valve. The 230V pump control PWR1 is active in both heating and cooling mode.

The supply water temperature set for both heating and cooling is controlled by the TWA-Q thermal actuator connected to the 'Shunt 24V DC' output.

The PT1000 temperature sensor on the supply line measures the supply temperature. If there is no demand for heat or cooling in one or more rooms, the actuator will remain closed.

The AB-QM can also be used to set the desired maximum volumetric flow rate. To prevent damage to the floor's construction and finish, add a dew point sensor.

The changeover between heating and cooling is controlled based on a reference thermostat. The living room is set as the reference.

To prevent excessive switching between heating and cooling modes, the following conditions must be met for the system to change over to cooling mode:

- The room temperature measured by the reference thermostat must exceed the set room temperature + dead band (adjustable 0–4K).
- The reference thermostat did not have a heating demand during the time delay (adjustable from 0–24 hours).
- If present, dew point monitoring must be inactive.
- The room thermostat must have cooling enabled (default = enabled).

Setting one thermostat as the reference thermostat

In this application, one thermostat is set up as a reference thermostat.

The temperature in this room determines whether the system is in heating or cooling mode.

There are two ways to set up a reference thermostat:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.6** setting to **ON**

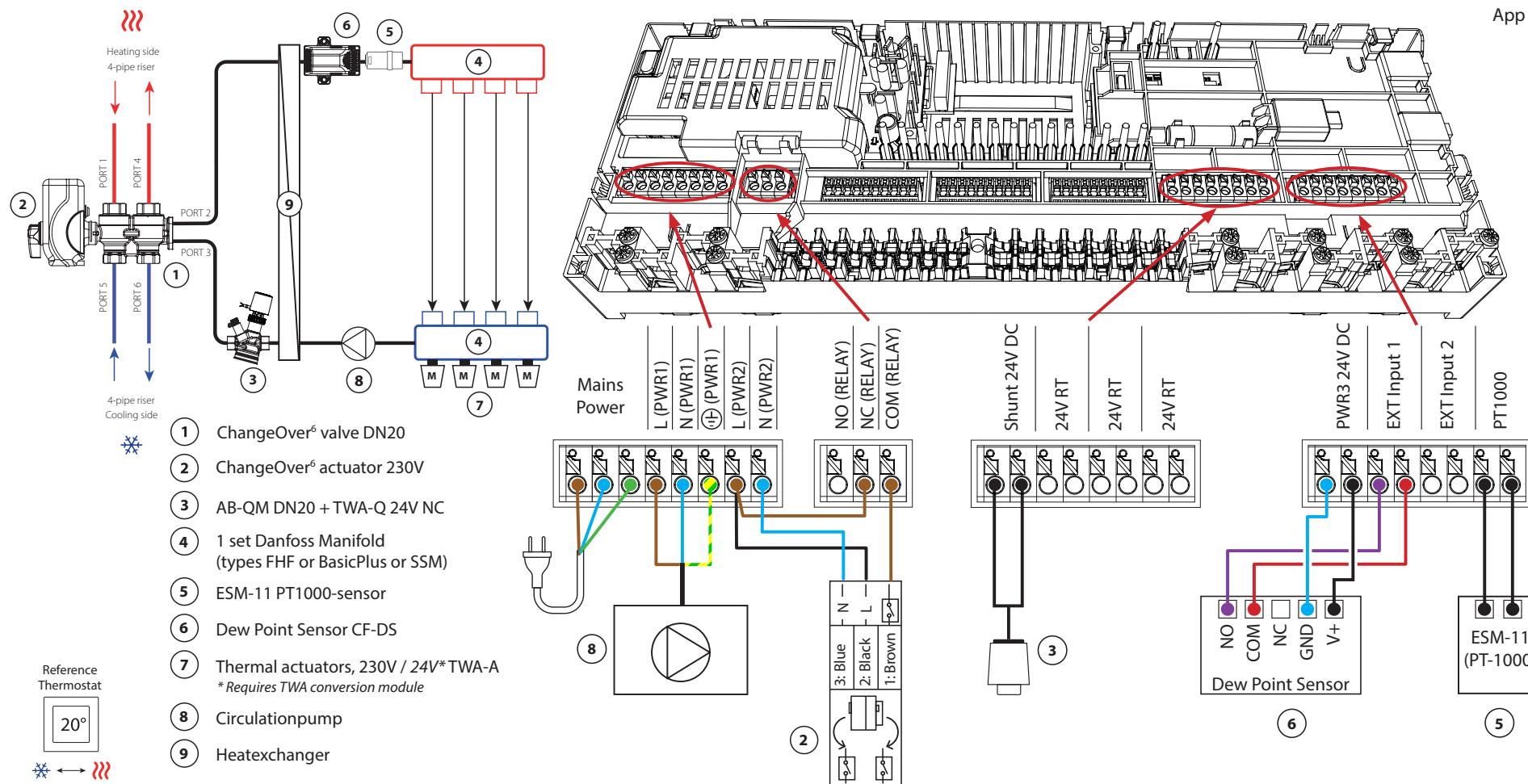
Disabling cooling (Bathroom)

If there is a bathroom with underfloor heating and an Icon2™ room thermostat, you may want to disable cooling for this room. Cooling a bathroom will cause condensation to form on the floor.

There are two ways to disable cooling mode for a room:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.7** setting to **OFF**



Application 11 *Continued*

Explanation of heating and cooling for end user

No cooling will occur ❄️ until the reference room temperature has exceeded the set temperature + set dead band for longer than the set time delay. For example, after the room's temperature has been over 25 °C (21 °C + 4K) for six hours.

The room's temperature will never be cooled further than 2 degrees above the set temperature. If the temperature is set to 21 °C, for example, the room will be cooled to 23 °C. Heating 🔥 will activate as soon as the room temperature drops below the set temperature.

Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	
PWR1 switch-on delay of 3 minutes		<input type="checkbox"/>
Dead band heating/cooling changeover	4K	
Time delay for changeover to cooling mode	6h	
Heating supply temperature	40.0 °C	
Cooling supply temperature	18.0 °C	
Heating safety temperature	50.0 °C	
Cooling safety temperature	17.0 °C	

Required accessories

1	6-way ball valve ChangeOver6 DN20	003Z3151
2	Actuator 230V suitable for ChangeOver6 DN20	003Z3154
3	2-way control valve with flow regulator AB-QM DN20	003Z8203
	Thermal actuator TWA-Q 24V NC suitable for AB-QM DN20	082F1602
	Threaded fittings R3/4" suitable for AB-QM DN20	003Z0233 (x2)
4	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
5	PT1000 temperature sensor ESM-11	087B1165
6	Dew point sensor CF-DS	088U0251
7	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
8	"Circulation pump Wilo Para 15-130/6"	145H4269
9	Heat exchanger XB06H-1-26	145H3671

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Application 12

4-pipe heating/cooling system with 6-way ball valve with demand-controlled heating supply temperature and fixed cooling supply temperature, changeover to cooling based on reference thermostat

Application description

The RELAY activates when the system is in heating mode and is used to control the 230V 6-way ball valve. The 230V pump control PWR1 is active in both heating and cooling mode.

The water temperature for heating and cooling is controlled by the TWA-Q thermal actuator connected to output 'Shunt 24V DC'. The optimum supply temperature in heating mode is calculated based on the heating demand for the home. The PT1000 sensor on the supply line measures the temperature of the water. If there is no demand for heat or cooling in one or more rooms, the actuator will remain closed. The AB-QM can also be used to set the desired maximum volumetric flow rate. To prevent damage to the floor's construction and finish, add a dew point sensor.

The changeover between heating and cooling is controlled based on a reference thermostat. The living room is set as the reference.

To prevent excessive switching between heating and cooling mode, the following conditions must be met for the system to change over to cooling mode:

- The room temperature measured by the reference thermostat must exceed the set room temperature + dead band (adjustable 0–4K).
- There was no heating demand for the reference thermostat during the time delay (adjustable 0–24 hours).
- If present, dew point monitoring must be inactive.
- The room thermostat must have cooling enabled (default = enabled).

Setting one thermostat as the reference thermostat

In this application, one thermostat is set up as a reference thermostat.

The temperature in this room determines whether the system is in heating or cooling mode.

There are two ways to set up a reference thermostat:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.6** setting to **ON**

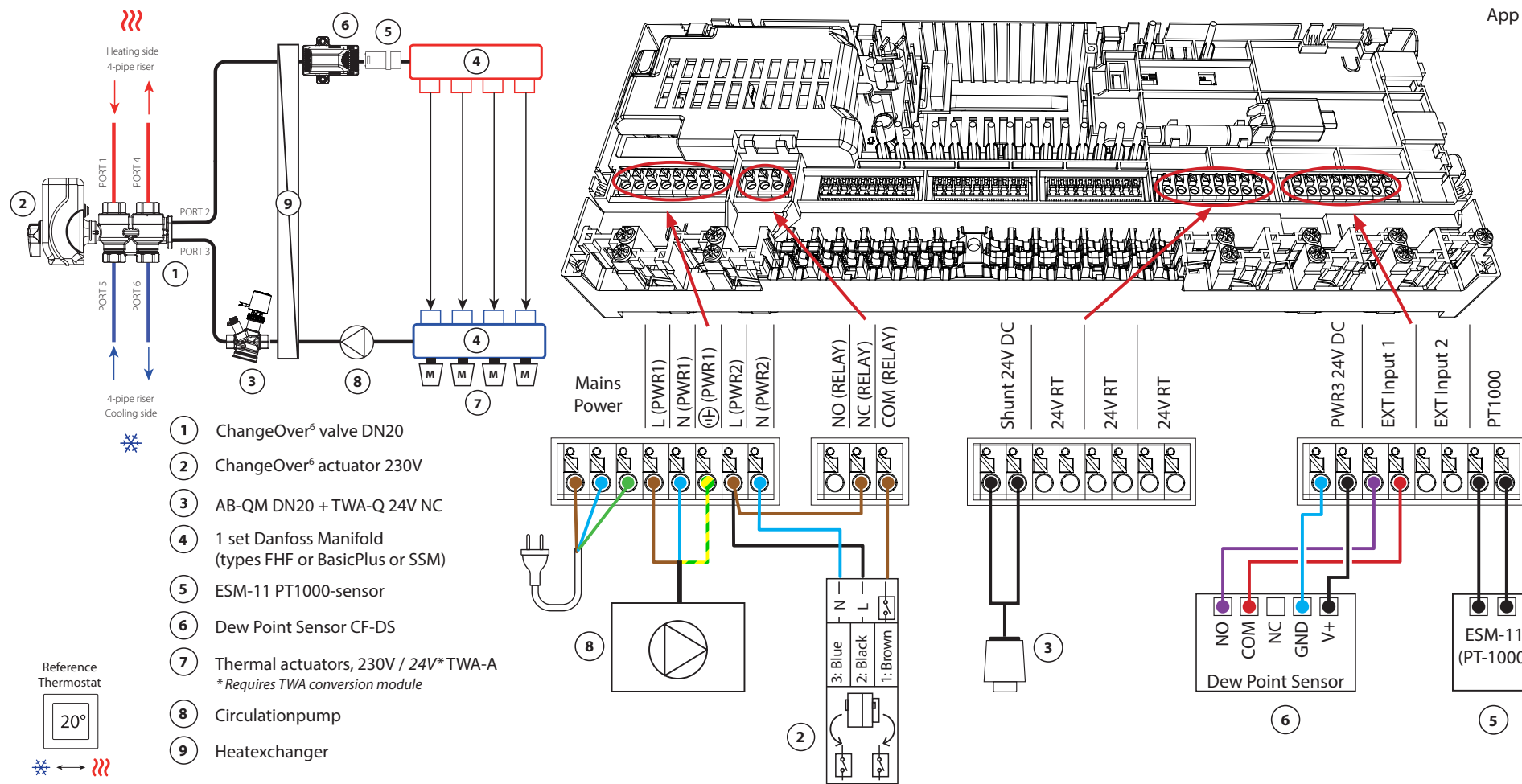
Disabling cooling (Bathroom)

If the bathroom has underfloor heating and has an Icon2™ room thermostat, you can disable cooling for this room. Cooling a bathroom will cause condensation to form on the floor.

There are two ways to disable cooling mode for a room:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.7** setting to **OFF**



Application 12 *Continued*

Explanation of heating and cooling for end user

No cooling will occur ❄️ until the reference room temperature has exceeded the set temperature + set dead band for longer than the set time delay. For example, after the room's temperature has been over 25 °C (21 °C + 4K) for six hours.

The room's temperature will never be cooled further than 2 degrees above the set temperature. If the temperature is set to 21 °C, for example, the room will be cooled to 23 °C. Heating 🔥 will activate as soon as the room temperature drops below the set temperature.

Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	
PWR1 switch-on delay of 3 minutes		<input type="checkbox"/>
Dead band heating/cooling changeover	4K	
Time delay for changeover to cooling mode	6h	
Heating supply temperature range, demand-controlled	25.0–40.0 °C	
Heating safety temperature	50.0 °C	
Cooling supply temperature	18.0 °C	
Cooling safety temperature	17.0 °C	

Required accessories

1	6-way ball valve ChangeOver6 DN20	003Z3151
2	Actuator 230V suitable for ChangeOver6 DN20	003Z3154
3	2-way control valve with flow regulator AB-QM DN20	003Z8203
	Thermal actuator TWA-Q 24V NC suitable for AB-QM DN20	082F1602
	Threaded fittings R3/4" suitable for AB-QM DN20	003Z0233 (x2)
4	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
5	PT1000 temperature sensor ESM-11	087B1165
6	Dew point sensor CF-DS	088U0251
7	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
8	"Circulation pump Wilo Para 15-130/6"	145H4269
9	Heat exchanger XB06H-1-26	145H3671

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Application 13

4-pipe heating/cooling system with 6-way ball valve with fixed heating and cooling supply temperature control, changeover to cooling based on external (manual) potential-free NO contact

Application description

The RELAY activates when the system is in heating mode and is used to control the 230V 6-way ball valve. The 230V pump control PWR1 is active in both heating and cooling mode.

The supply water temperature set for both heating and cooling is controlled by the TWA-Q thermal actuator connected to the 'Shunt 24V DC' output. The PT1000 temperature sensor on the supply line measures the supply temperature. If there is no demand for heat or cooling in one or more rooms, the actuator will remain closed. The AB-QM can also be used to set the desired maximum volumetric flow rate. To prevent damage to the floor's construction and finish, add a dew point sensor.

A relay or potential-free contact is connected to input IN2 to control the changeover between heating and cooling modes. When the external contact is closed, the system will change over to cooling mode.

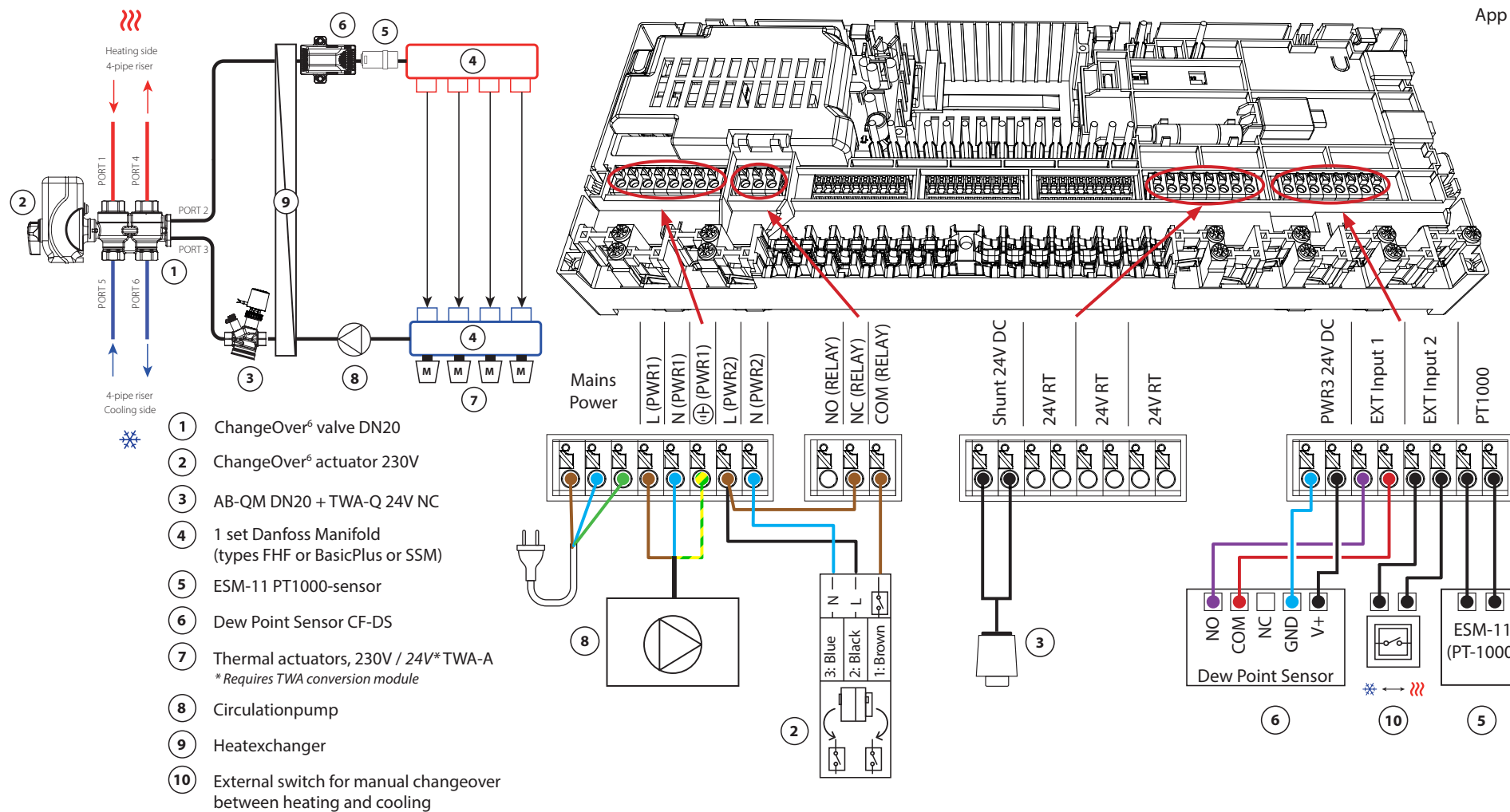
Disabling cooling (Bathroom)

If there is a bathroom with underfloor heating and an Icon2™ room thermostat, you may want to disable cooling for this room. Cooling a bathroom will cause condensation to form on the floor.

There are two ways to disable cooling mode for a room:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.7** setting to **OFF**



Application 13 *Continued*

Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	
PWR1 switch-on delay of 3 minutes		<input type="checkbox"/>
Heating supply temperature	40.0 °C	
Cooling supply temperature	18.0 °C	
Heating safety temperature	50.0 °C	
Cooling safety temperature	17.0 °C	

Required accessories

1	6-way ball valve ChangeOver6 DN20	003Z3151
2	Actuator 230V suitable for ChangeOver6 DN20	003Z3154
3	2-way control valve with flow regulator AB-QM DN20	003Z8203
	Thermal actuator TWA-Q 24V NC suitable for AB-QM DN20	082F1602
	Threaded fittings R3/4" suitable for AB-QM DN20	003Z0233 (x2)
4	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
5	PT1000 temperature sensor ESM-11	087B1165
6	Dew point sensor CF-DS	088U0251
7	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
8	"Circulation pump Wilo Para 15-130/6"	145H4269
9	Heat exchanger XB06H-1-26	145H3671
10	Wall switch for manual changeover to cooling	External supplier

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Application 14

4-pipe heating/cooling system with 6-way ball valve with demand-controlled heating supply temperature and fixed cooling supply temperature, changeover to cooling based on external (manual) potential-free NO contact

Application description

The RELAY activates when the system is in heating mode and is used to control the 230V 6-way ball valve. The 230V pump control PWR1 is active in both heating and cooling mode.

The water temperature for heating and cooling is controlled by the TWA-Q thermal actuator connected to output 'Shunt 24V DC'. The optimum supply temperature in heating mode is calculated based on the heating demand for the home. The PT1000 sensor on the supply line measures the temperature of the water. If there is no demand for heat or cooling in one or more rooms, the actuator will remain closed.

The AB-QM can also be used to set the desired maximum volumetric flow rate.

To prevent damage to the floor's construction and finish, add a dew point sensor.

A relay or potential-free contact is connected to input IN2 to control the changeover between heating and cooling modes. When the external contact is closed, the system will change over to cooling mode.

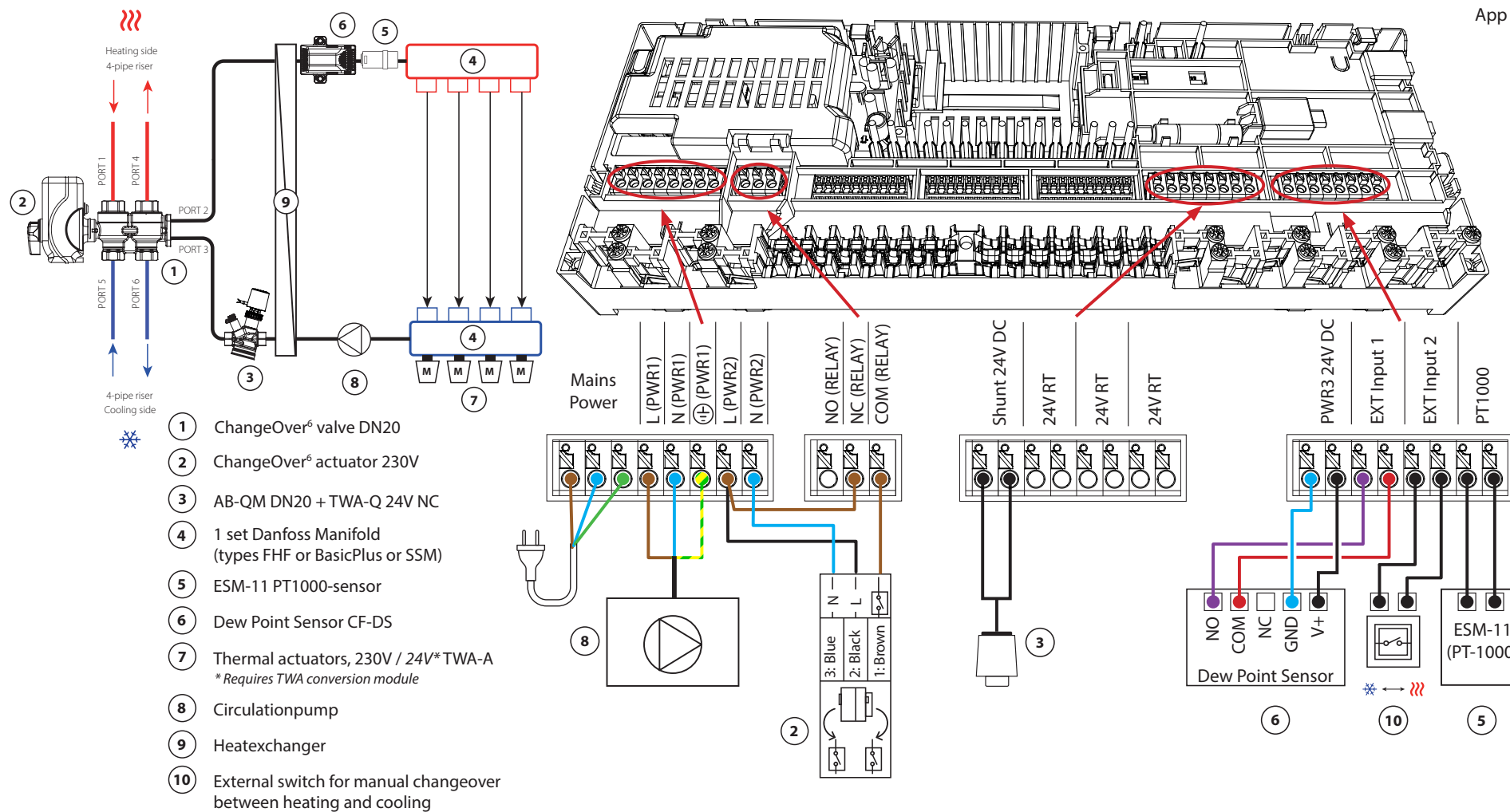
Disabling cooling (Bathroom)

If there is a bathroom with underfloor heating and an Icon2™ room thermostat, you may want to disable cooling for this room. Cooling a bathroom will cause condensation to form on the floor.

There are two ways to disable cooling mode for a room:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.7** setting to **OFF**



Application 14 *Continued*

Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	
PWR1 switch-on delay of 3 minutes		<input type="checkbox"/>
Heating supply temperature range, demand-controlled	25.0–40.0 °C	
Heating safety temperature	50.0 °C	
Cooling supply temperature	18.0 °C	
Cooling safety temperature	17.0 °C	

Required accessories

1	6-way ball valve ChangeOver6 DN20	003Z3151
2	Actuator 230V suitable for ChangeOver6 DN20	003Z3154
3	2-way control valve with flow regulator AB-QM DN20	003Z8203
	Thermal actuator TWA-Q 24V NC suitable for AB-QM DN20	082F1602
	Threaded fittings R3/4" suitable for AB-QM DN20	003Z0233 (x2)
4	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
5	PT1000 temperature sensor ESM-11	087B1165
6	Dew point sensor CF-DS	088U0251
7	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
8	"Circulation pump Wilo Para 15-130/6"	145H4269
9	Heat exchanger XB06H-1-26	145H3671
10	Wall switch for manual changeover to cooling	External supplier

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Application 15

2-pipe heating/cooling system with (hybrid) heat pump, changeover to cooling based on external (manual) potential-free NO contact

Application description

This application makes it possible to send separate control signals for both heating and cooling demands to a heat pump or hybrid system. The PWR1 (230V output) is active when there is a heating demand and the RELAY (potential-free contact) is used for cooling.

To enable the PWR1 230V output to control the heat pump based on heating demand, the AMZ connection box converts the signal to a potential-free NO contact.

If it is not possible to prevent the supply temperature from dropping below the dew point in cooling mode, it is strongly recommended that you add a dew point sensor. Condensation can result in permanent damage to the floor's construction and finish.

A relay or potential-free contact is connected to input IN2 to control the changeover between heating and cooling modes. When the external contact is closed, the system will change over to cooling mode.

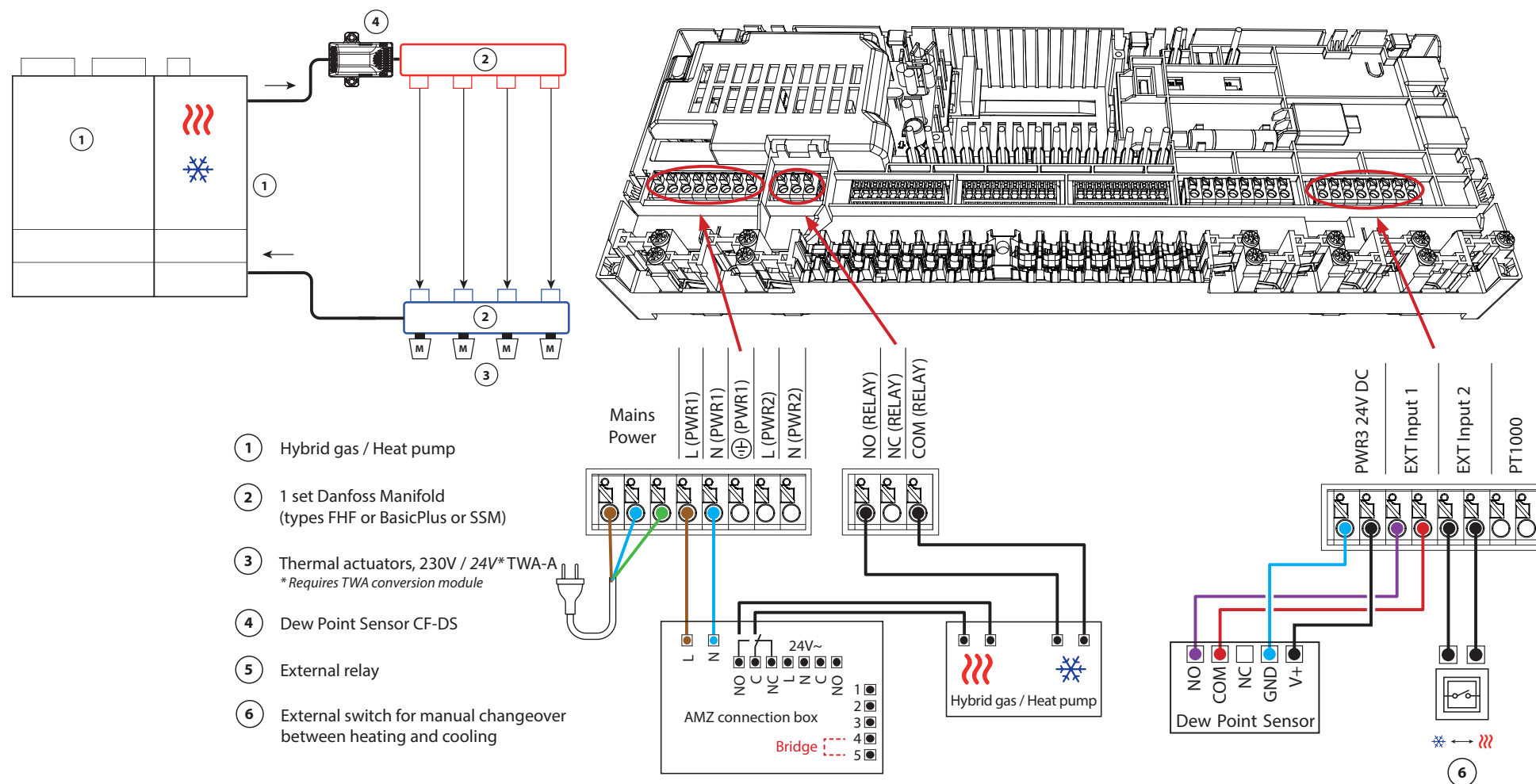
Disabling cooling (Bathroom)

If there is a bathroom with underfloor heating and an Icon2™ room thermostat, you may want to disable cooling for this room. Cooling a bathroom will cause condensation to form on the floor.

There are two ways to disable cooling mode for a room:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.7** setting to **OFF**



Application 15

Continued

Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	

Required accessories

1	Heat pump or hybrid system	External supplier
2	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
3	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
4	Dew point sensor CF-DS	088U0251
5	External relay - AMZ connection box	082G1636
6	Wall switch for manual changeover to cooling	External supplier

[illegible]

Application 16

3-pipe heating/cooling system with 3-way motorized ball valve, changeover to cooling based on external potential-free NO contact

Application description

In this application, a 230V 3-way motorized ball valve is used to change over between heating and cooling modes.

The PWR1 230V output activates when the system is in cooling mode.

If it is not possible to prevent the supply temperature from dropping below the dew point in cooling mode, it is strongly recommended that you add a dew point sensor. Condensation can result in permanent damage to the floor's construction and finish.

A relay or potential-free contact is connected to input IN2 to control the changeover between heating and cooling modes. When the external contact is closed, the system will change over to cooling mode.

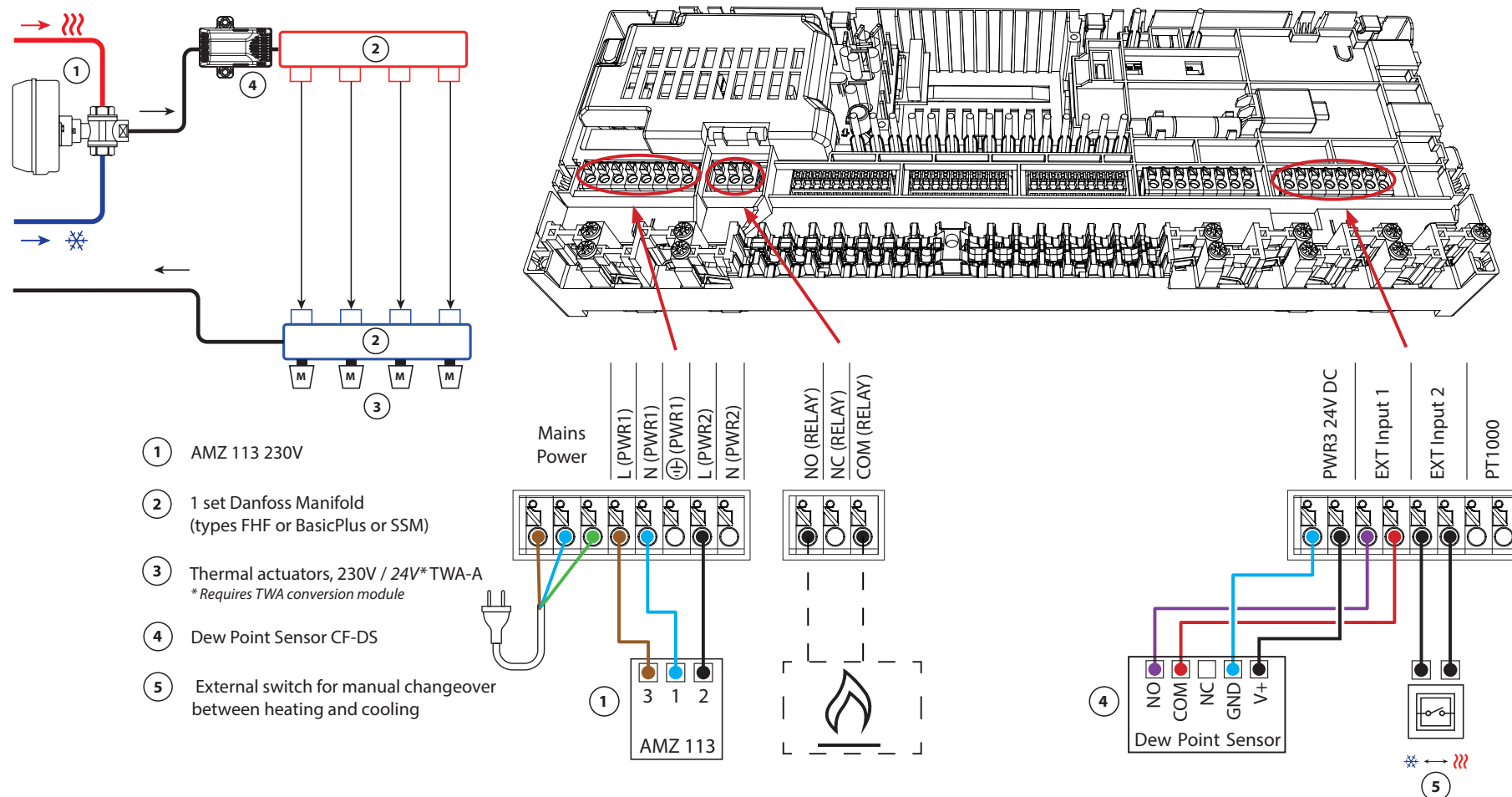
Disabling cooling (Bathroom)

If there is a bathroom with underfloor heating and an Icon2™ room thermostat, you may want to disable cooling for this room. Cooling a bathroom will cause condensation to form on the floor.

There are two ways to disable cooling mode for a room:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.7** setting to **OFF**



Application 16

Continued

Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	

Required accessories

1	3-way motorized ball valve 230V AMZ 113 DN20	082G5419
2	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
3	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
4	Dew point sensor CF-DS	088U0251
5	Wall switch for manual changeover to cooling	External supplier

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Application 17

3-pipe heating/cooling system with two 2-way control valves with thermal actuators, changeover to cooling based on external potential-free NO contact

Application description

In this application, two 2-way motorized control valves are used to change over between heating and cooling modes. The thermal actuator on the 2-way cooling control valve will stay open as long as the system is in cooling mode. The thermal actuator for heating will stay open as long as the system is in heating mode.

Optionally, you can use the 230V pump control PWR1 and RELAY heat source control.

If it is not possible to prevent the supply temperature from dropping below the dew point in cooling mode, it is strongly recommended that you add a dew point sensor. Condensation can result in permanent damage to the floor's construction and finish.

A relay or potential-free contact is connected to input IN2 to control the changeover between heating and cooling modes. When the external contact is closed, the system will change over to cooling mode.

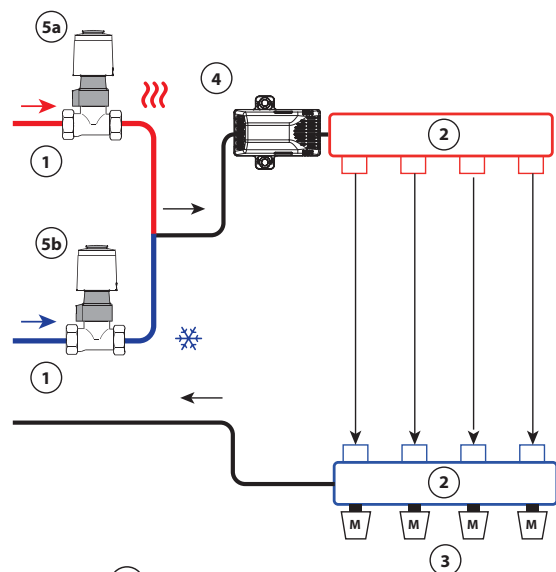
Disabling cooling (Bathroom)

If there is a bathroom with underfloor heating and an Icon2™ room thermostat, you may want to disable cooling for this room. Cooling a bathroom will cause condensation to form on the floor.

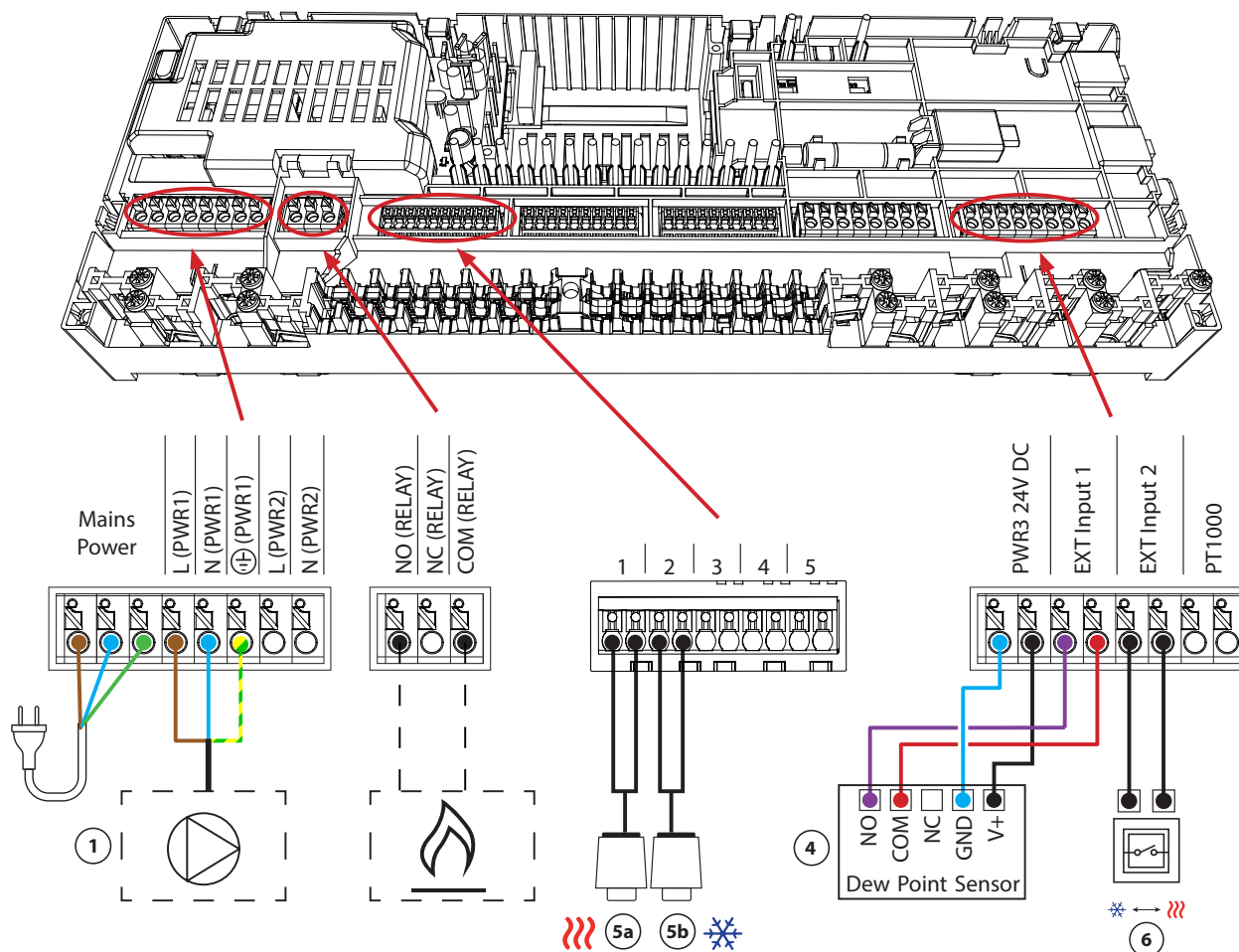
There are two ways to disable cooling mode for a room:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.7** setting to **OFF**



- ① 2-way valve RA-C
- ② 1 set Danfoss Manifold (types FHF or BasicPlus or SSM)
- ③ Thermal actuators, 230V / 24V* TWA-A
* Requires TWA conversion module
- ④ Dew Point Sensor CF-DS
- ⑤a Thermal actuators, 230V / 24V* TWA-A
* Requires TWA conversion module
- ⑤b Thermal actuators, 230V / 24V* TWA-A
* Requires TWA conversion module
- ⑥ External switch for manual changeover between heating and cooling



Application 17

Continued

Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	

Required accessories

1	2-way control valve RA-C DN20	013G3096
	Compression ferrule set 22mm x 1" for RA-C 20	013U0135 (x4)
2	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
3	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
4	Dew point sensor CF-DS	088U0251
5a/b	Thermal actuator TWA-A 230V NC suitable for RA-C DN20	088H3112 (x2)
6	Wall switch for manual changeover to cooling	External supplier

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Application 18

3-pipe heating/cooling system with two ball valves with actuators, changeover to cooling based on external potential-free NO contact

Application description

In this application, two 230V two-way motorized ball valves are used to change over between heating and cooling modes. The ball valve for cooling will open if one or more rooms require cooling. The ball valve for heating will open if one or more rooms require heating.

If it is not possible to prevent the supply temperature from dropping below the dew point in cooling mode, it is strongly recommended that you add a dew point sensor. Condensation can result in permanent damage to the floor's construction and finish.

A relay or potential-free contact is connected to input IN2 to control the changeover between heating and cooling modes. When the external contact is closed, the system will change over to cooling mode.

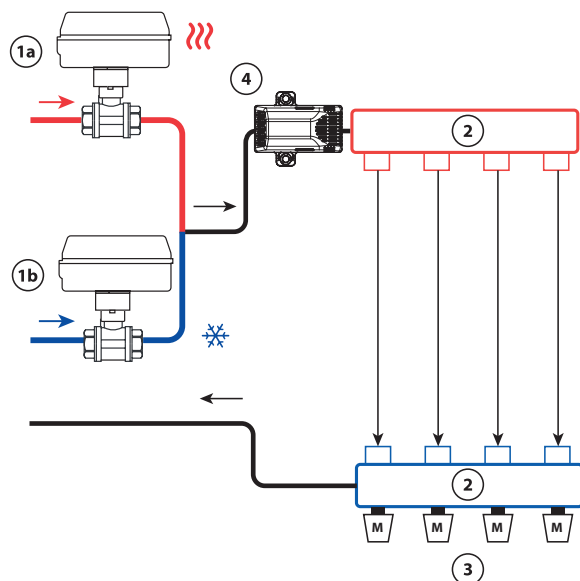
Disabling cooling (Bathroom)

If there is a bathroom with underfloor heating and an Icon2™ room thermostat, you may want to disable cooling for this room. Cooling a bathroom will cause condensation to form on the floor.

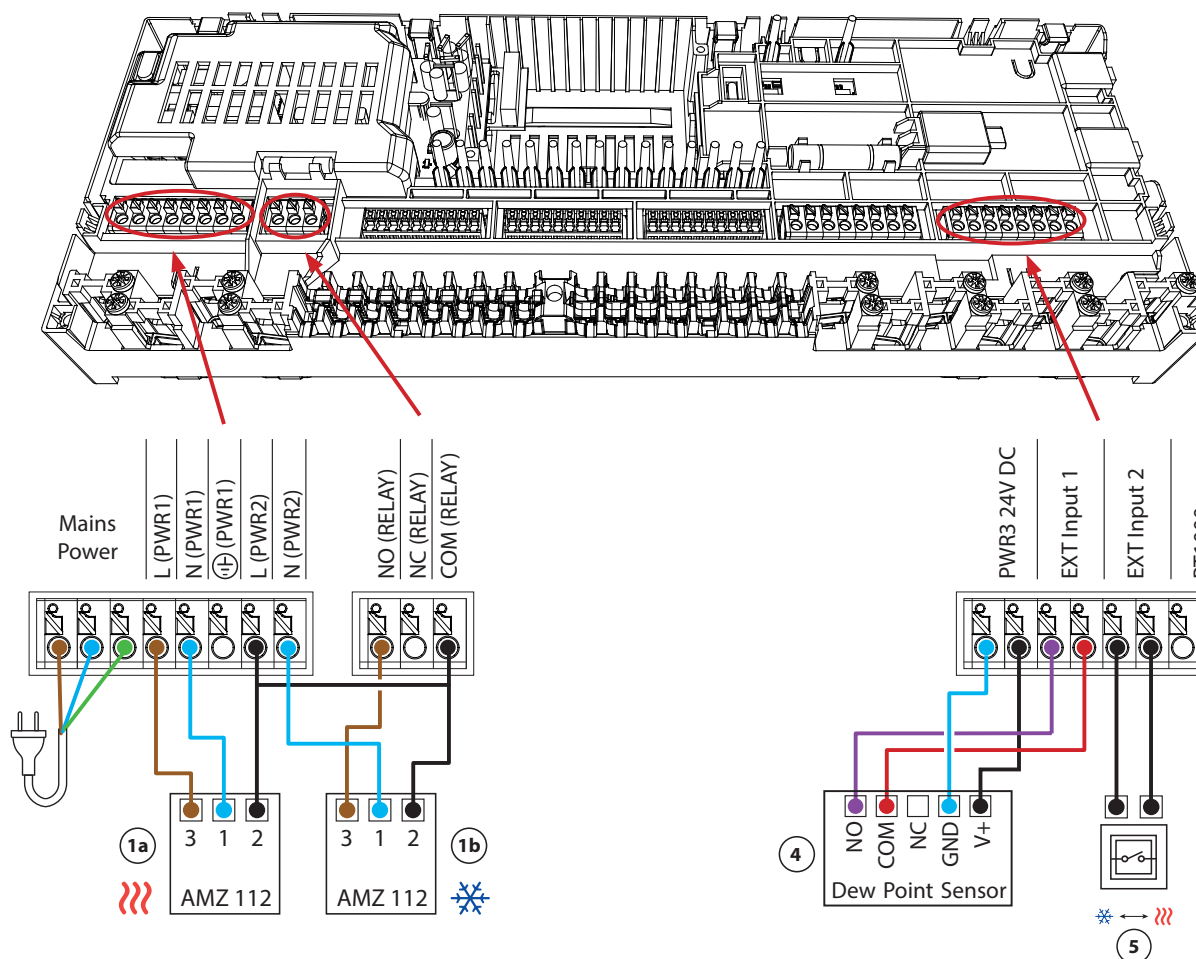
There are two ways to disable cooling mode for a room:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.7** setting to **OFF**



- ①a AMZ 112 230V
- ①b AMZ 112 230V
- ② 1 set Danfoss Manifold (types FHF or BasicPlus or SSM)
- ③ Thermal actuators, 230V / 24V* TWA-A
* Requires TWA conversion module
- ④ Dew Point Sensor CF-DS
- ⑤ External switch for manual changeover between heating and cooling



Application 18

Continued

Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	

Required accessories

1a/b	2-way motorized ball valve 230V AMZ 112 DN20	082G5407
2	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
3	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
4	Dew point sensor CF-DS	088U0251
5	Wall switch for manual changeover to cooling	External supplier

[illegible]

Application 19

4-pipe heating/cooling system with 6-way motorized ball valve, changeover to cooling based on external potential-free NO contact

Application description

In this application, a 230V 6-way motorized ball valve is used to change over between heating and cooling modes.

The RELAY activates when the system is in heating mode and is used to control the 6-way ball valve. The PWR1 output is active in both heating and cooling mode. It can optionally be used to operate a 230V 2-way control valve. This acts as an additional shut-off valve when there is no need for heat or cooling, reducing unnecessary consumption.

If it is not possible to prevent the supply temperature from dropping below the dew point in cooling mode, it is strongly recommended that you add a dew point sensor. Condensation can result in permanent damage to the floor's construction and finish.

A relay or potential-free contact is connected to input IN2 to control the changeover between heating and cooling modes. When the external contact is closed, the system will change over to cooling mode.

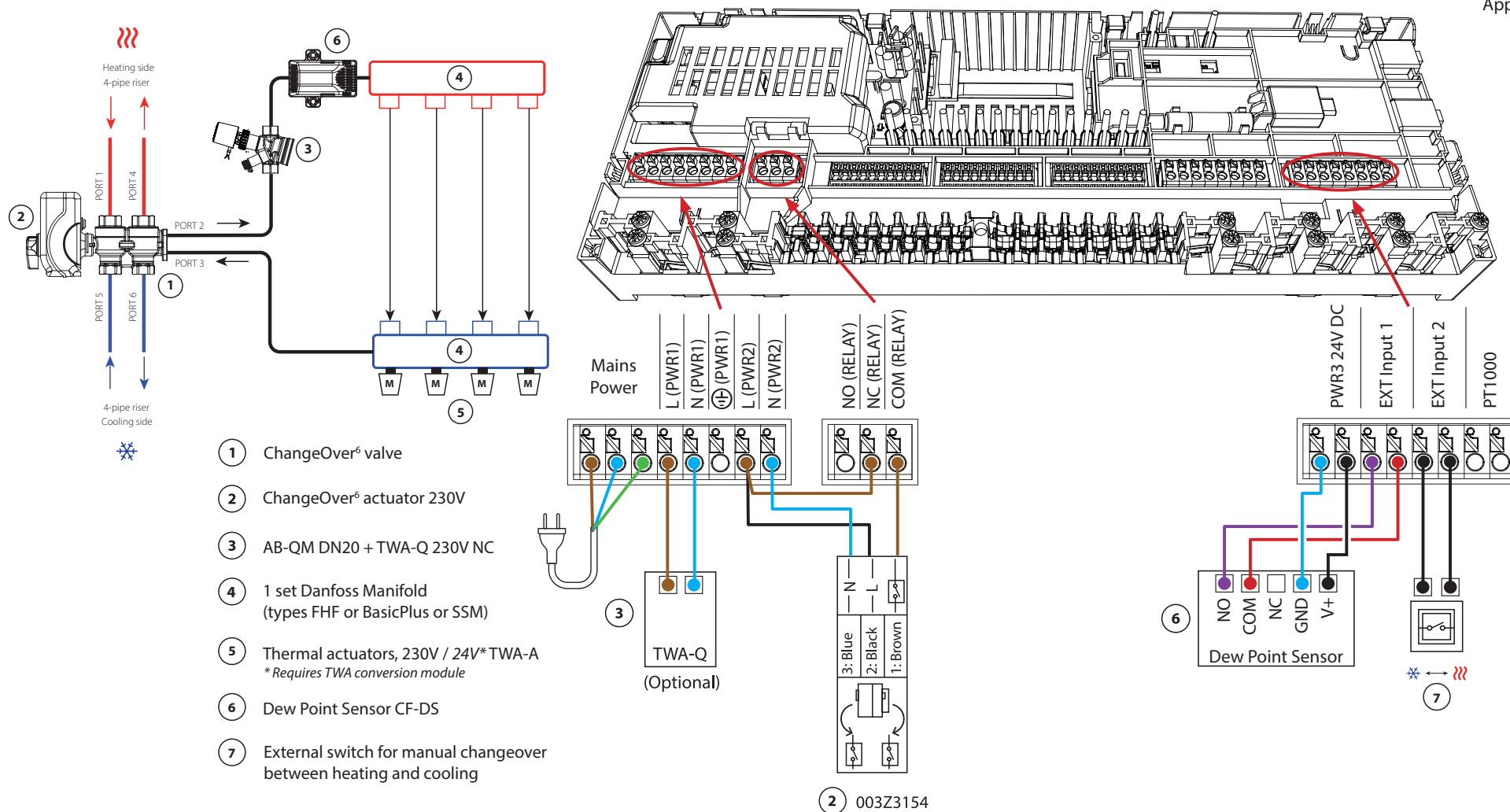
Disabling cooling (Bathroom)

If there is a bathroom with underfloor heating and an Icon2™ room thermostat, you may want to disable cooling for this room. Cooling a bathroom will cause condensation to form on the floor.

There are two ways to disable cooling mode for a room:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.7** setting to **OFF**



Application 19 *Continued*

Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	

Required accessories

1	6-way ball valve ChangeOver6 DN20	003Z3151
2	Actuator 230V suitable for ChangeOver6 DN20	003Z3154
3	2-way control valve with flow regulator AB-QM DN20	003Z8203
	Thermal actuator TWA-Q 230V NC suitable for AB-QM DN20	082F1600
	Threaded fittings R3/4" suitable for AB-QM DN20	003Z0233 (x2)
4	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
5	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
6	Dew point sensor CF-DS	088U0251
7	Wall switch for manual changeover to cooling	External supplier

[illegible][illegible]

Application 20

4-pipe heating/cooling system with four 2-way control valves with thermal actuators, changeover to cooling based on external potential-free NO contact

Application description

In this application, four 2-way motorized control valves are used to change over between heating and cooling modes. The thermal actuators on the 2-way control valves for cooling will stay open as long as the system is in cooling mode. The thermal actuators for heating will be open as long as the system is in heating mode.

Optionally, you can use the 230V pump control PWR1 and RELAY heat source control.

If it is not possible to prevent the supply temperature from dropping below the dew point in cooling mode, it is strongly recommended that you add a dew point sensor. Condensation can result in permanent damage to the floor's construction and finish.

A relay or potential-free contact is connected to input IN2 to control the changeover between heating and cooling modes. When the external contact is closed, the system will change over to cooling mode.

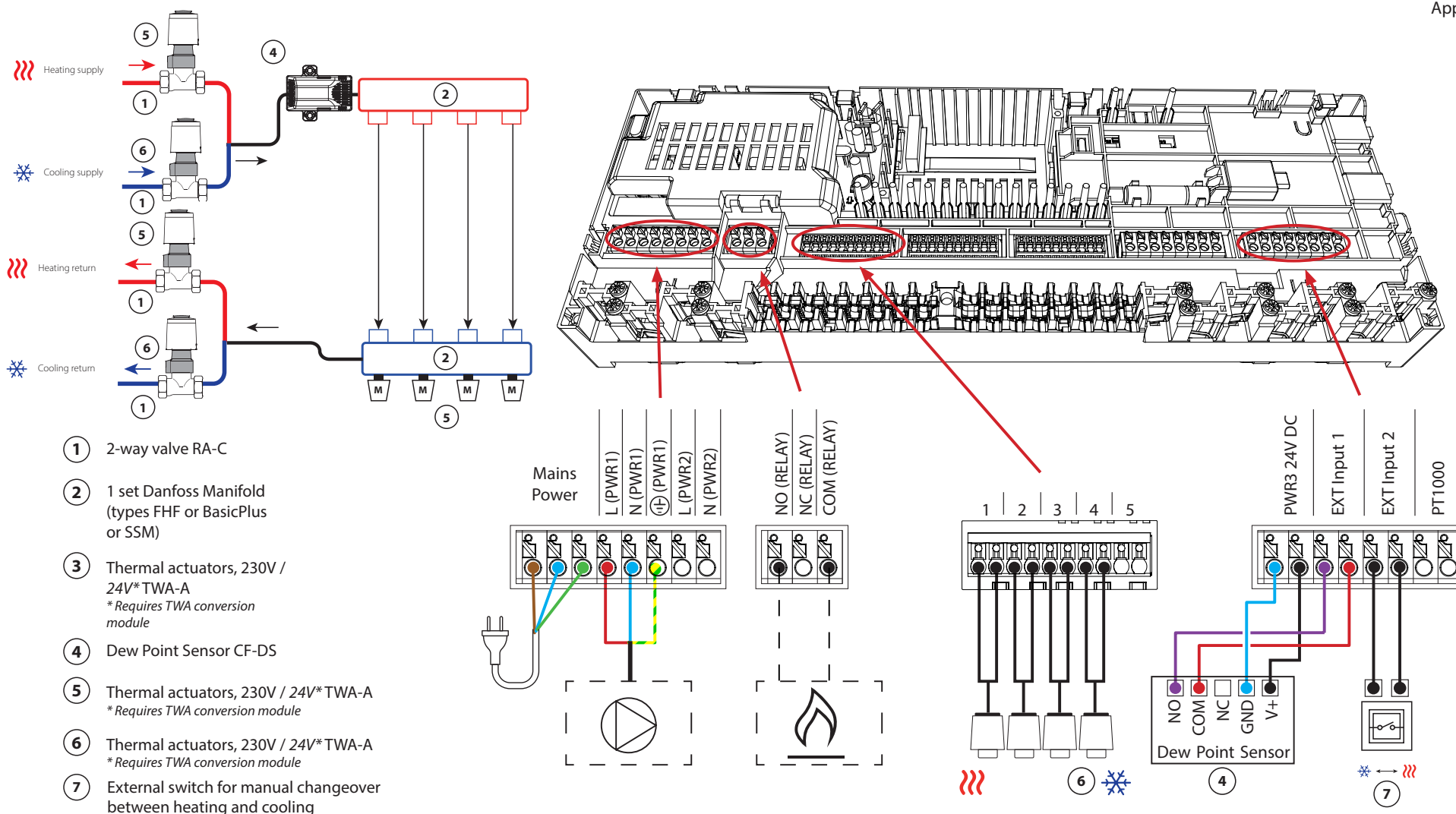
Disabling cooling (Bathroom)

If there is a bathroom with underfloor heating and an Icon2™ room thermostat, you may want to disable cooling for this room. Cooling a bathroom will cause condensation to form on the floor.

There are two ways to disable cooling mode for a room:

1. Using the Installer App on a smartphone
2. Using the installer menu on the thermostat itself

To do so, set the **ME.7** setting to **OFF**



Application 20

Continued

Installer App settings

Function	Factory setting	
	Off	On
PWM+ proportional control of actuator outputs		<input type="checkbox"/>
Heat pump optimizer – maintenance of minimum flow	<input type="checkbox"/>	

Required accessories

1	2-way control valve RA-C DN20	013G3096
	Compression ferrule set 22mm x 1" for RA-C 20	013U0135 (x8)
2	Stainless steel floor heating manifold SSM-F, 2–12 groups	088U0752 to 088U0762
	Set of 2 mounting brackets	088U0585
	Set of 2 ball valves 1"	088U0822
3	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
4	Dew point sensor CF-DS	088U0251
5	Thermal actuator TWA-A 230V NC suitable for SSM-F manifold	088H3112
6	Thermal actuator TWA-A 230V NC suitable for RA-C DN20	088H3112 (x4)
7	Wall switch for manual changeover to cooling	External supplier

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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