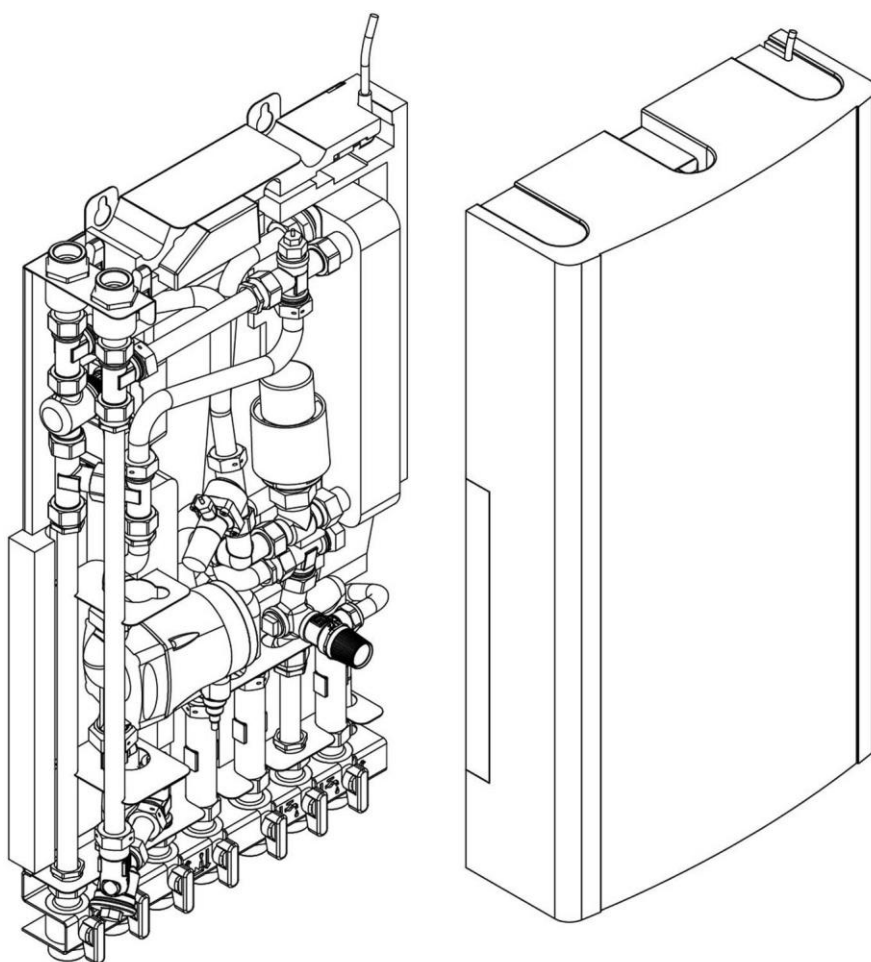




Installation, service and operating instruction Cetetherm Micro

Heating & domestic hot water substation for apartments and single family houses



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All these types of changes will be included in future release of the manual.

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General information

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1 General information

Cetetherm Micro is a complete, ready-to-install heating network substation for hot water and heating. It is designed for buildings with a connection to a heating network. Cetetherm has years of experience in heating network technology and has developed Cetetherm Micro with well-planned pipe work and with all components easily accessible for inspection and possible future servicing.

1.1 Comfort

Cetetherm Micro has fully-automatic temperature control for heating and hot water. The hot water is controlled and maintained at the desired temperature. The heating is controlled in relation to desired room temperature.

1.2 Installation

Compact dimensions, light weight, well arranged plumbing and factory-complete internal wiring – all make installation very simple. A pre-programmed control unit and a power cable already fitted with a plug make things even simpler to allow immediate start-up.

Micro is designed for hanging on wall and is mounted on an insulated frame and includes an insulated cover. Better insulation means less energy usage and better energy efficiency.

1.3 Long-term security







The heat exchanger plates and all piping are manufactured in acid-resistant stainless steel. All components are closely matched and carefully tested for function in accordance with quality assurance system ISO9001:2015

For future servicing requirements, all components are easily accessible and individually replaceable.




1.4 CE-marking

Cetetherm Micro follows the rules and legislation specified in the Declaration of Conformity. To maintain the validity of the CE marking, only identical replacement parts must be used.

1.5 General warnings

	The installation work must be carried out by an authorized installation contractor. Before the system is taken into operation, it must be pressure tested in accordance with relevant regulations.
	The temperature and the pressure of the primary heating water are very high. Only qualified technicians can work with the substation. Incorrect operation may cause serious personal injury and result in damage to the building.
	If the hot water temperature is set too high, people may be scalded. If the hot water temperature is set too low, unwanted bacteriological growth may occur in the hot water system. This can result in serious personal injury.
	Parts of the substation may get very hot and should not be touched.
	When starting up the substation: To avoid the risk of scalding, make sure that no-one draws any hot water until the hot water temperature has been adjusted.
	Start heating circulation by first opening the valves in the primary heating supply and then return lines, to avoid pollutions in the system. Open the valves slowly to avoid pressure surges.

1.6 Micro STC and Micro STC2 warnings

	Before the substation is connected to the electrical supply, make sure that the heating system is topped up with water. Starting up the system without water will damage the circulation pump.
	The substation comes prepared with an electrical plug to be connected to the main supply. The strain relief clips of the cable must be fitted so that there is no risk of damage. If necessary, the plug-and-socket connection can be replaced with a permanent installation with an all-pole isolate switch. This must be carried out by a qualified electrician.
	Do not shut of the electrical supply to the room thermostat, this will damage the circulation pump, valves, actuators etc.

2 Operating instructions

2.1 General operation

The temperature and pressure of the incoming heating network water are very high. The heat from the heating network water is transferred to the heating and hot water systems of the building in the heat exchangers. The heat is transferred through thin plates of acid-resistant stainless steel which keep the heating network water separate from the systems in the building.

Micro has automatic temperature control for hot water. This measures the temperature of the hot water in the heat exchanger and automatically controls the primary flow.

The hot water temperature is controlled by a temperature control system which is set to about 50 °C. If the temperature is set too high, there is a risk of scalding. Setting the hot water temperature too low may result in unwanted bacteriological growth in the hot water system.

After adjustment, the Micro operates completely automatically. However, in hard water areas it is advisable to be attentive and to remedy any faults in good time if the temperature of the hot water is too high; otherwise the risk of lime deposits in the heat exchanger may increase.

The energy supplier registers the use of energy. Measurement is done by recording the flow of heating network medium through the system, and by measuring the temperature difference between the medium's supply and return flow.

2.2 Heating operation Micro STC and Micro STC2

With a Micro STC or a Micro STC 2, the heating circuit is controlled in relation to outdoor temperature (option) and/or desired room temperature by means of a room thermostat and temperature sensor. When no heat is needed, the circulation pump in the heating circuit stops automatically, but is started regularly to make sure that it does not seize up during long idle periods.

Micro STC2 has an extra heating connection that can be connected to radiators or towel heating.

2.3 Heating operation Micro RTC

With a Micro RTC, the heating circuit is controlled with a desired room temperature by means of a room thermostat. When the measured room temperature is too low according to desired room temperature, the relay box sends a signal to open the relay.

2.4 Safety equipment/inspection

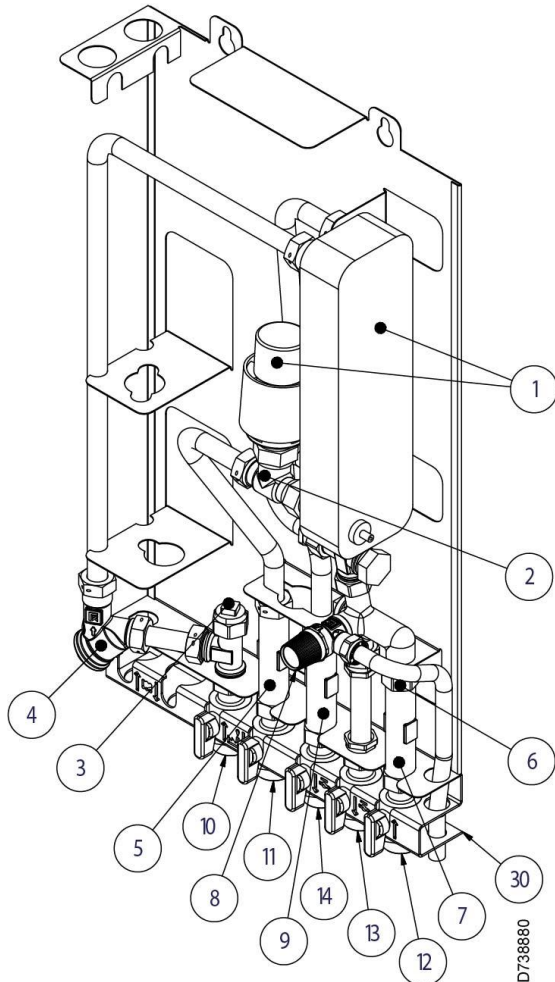
- Weekly inspection to check for leaks from pipes or components.
- Weekly inspection to make sure that the operation of the heating and hot water control systems is stable and that the temperature does not fluctuate. Temperature hunting causes unnecessary wear of valves, thermostats and heat exchangers.
- Every three months check the safety valves and the pressure in the heating system.

To check the operation of a safety valve, turn its wheel/knob until water escapes from the waste pipe of the valve, then close the wheel/knob quickly. Occasionally a safety valve may open automatically to release excess pressure. After a safety valve has been open it is important that it closes properly and does not drip.

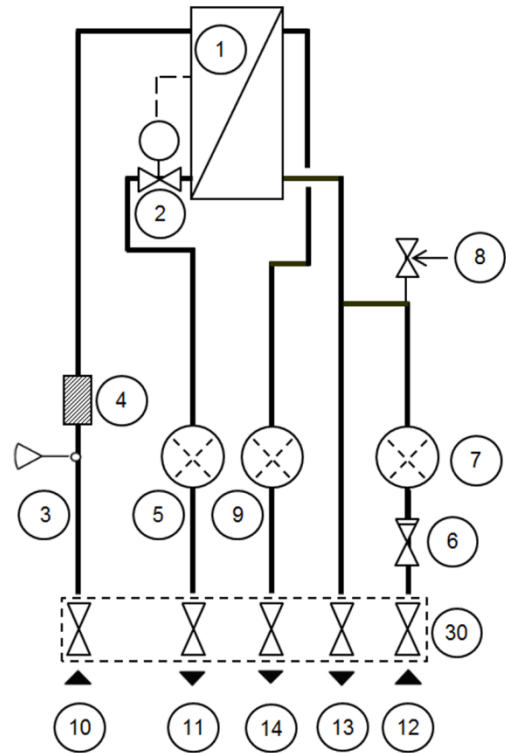
3 Product overview

Note: The product overview pictures are shown without the insulation.

3.1 Product overview AquaMicro

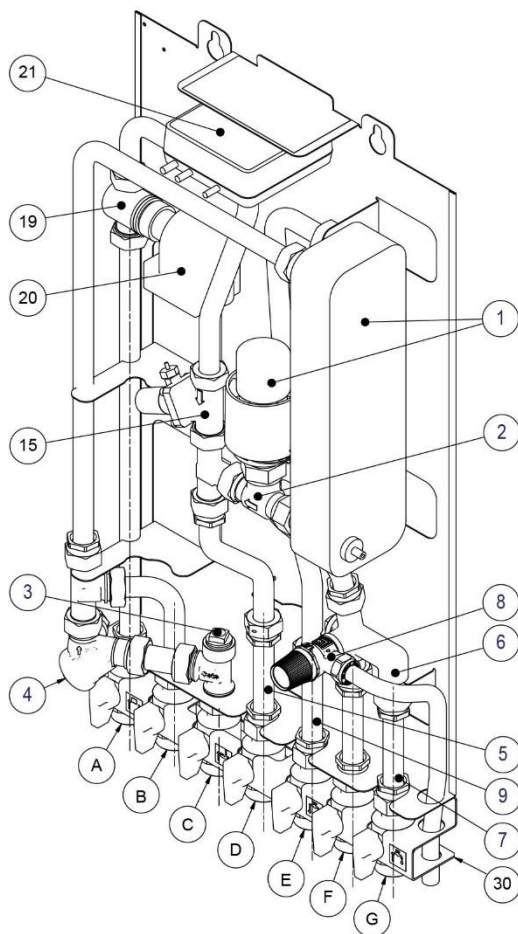


1	Heat exchanger and temperature controller for hot water
2	Control valve for hot water
3	Temperature sensor connection, heating media supply
4	Filter for heating media
5	Adapter for energy meter
6	Check valve for cold water
7	Adapter for Cold water flow meter
8	Safety valve for domestic hot water



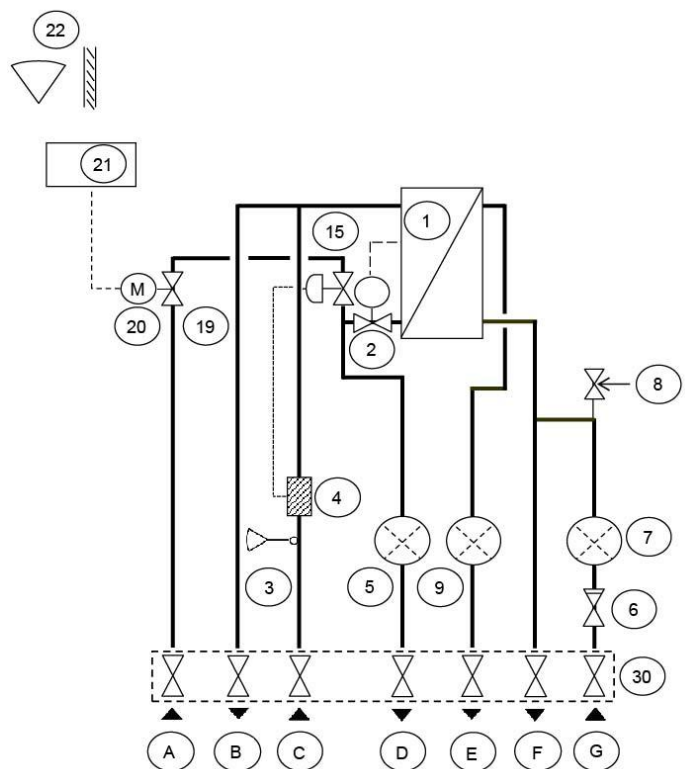
9	Adapter for Hot water flow meter
10	Heating network media, supply
11	Heating network media, return
12	Cold water (cw)
13	Cold water outlet (cw)
14	Hot water (hw)
30	First fix jig including shut-off valves (option)

3.2 Product overview Micro RTC



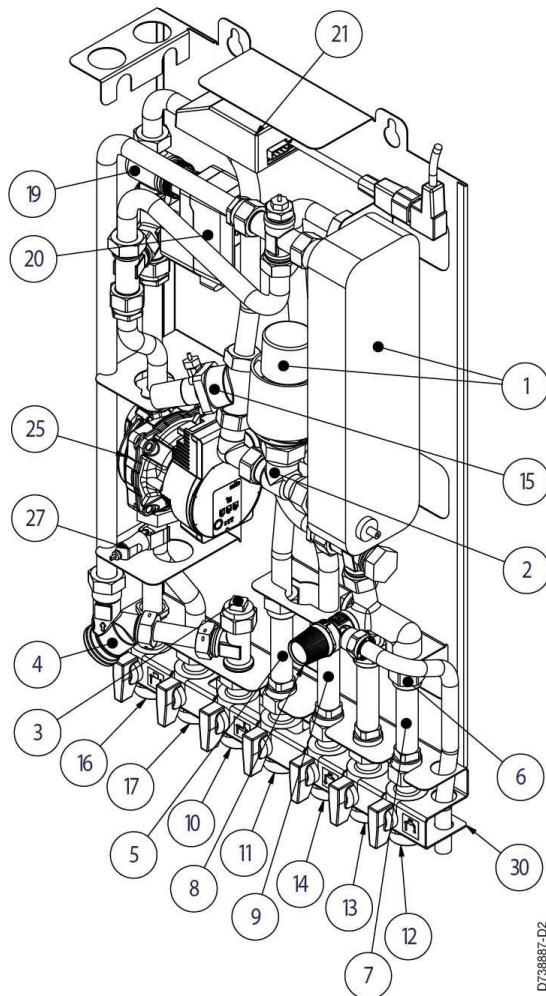
1	Heat exchanger and temperature controller for hot water
2	Control valve for hot water
3	Temperature sensor connection, heating media supply
4	Filter for heating media
5	Adapter for energy meter
6	Check valve for cold water
7	Adapter for Cold water flow meter
8	Safety valve for domestic hot water *)
9	Adapter for Hot water flow meter
C	Heating network media, supply
D	Heating network media, return

*) included depending on model, not shown in picture



G	Cold water (cw)
F	Cold water outlet (cw)
E	Hot water (hw)
15	Differential pressure controller
A	Heating circuit, return
B	Heating circuit, supply
19	Control valve, heating circuit
20	Actuator, heating circuit
21	Connection box for electric power and sensors, heating circuit
22	Room thermostat/control panel *)
30	First fix jig including shut-off valves (option)

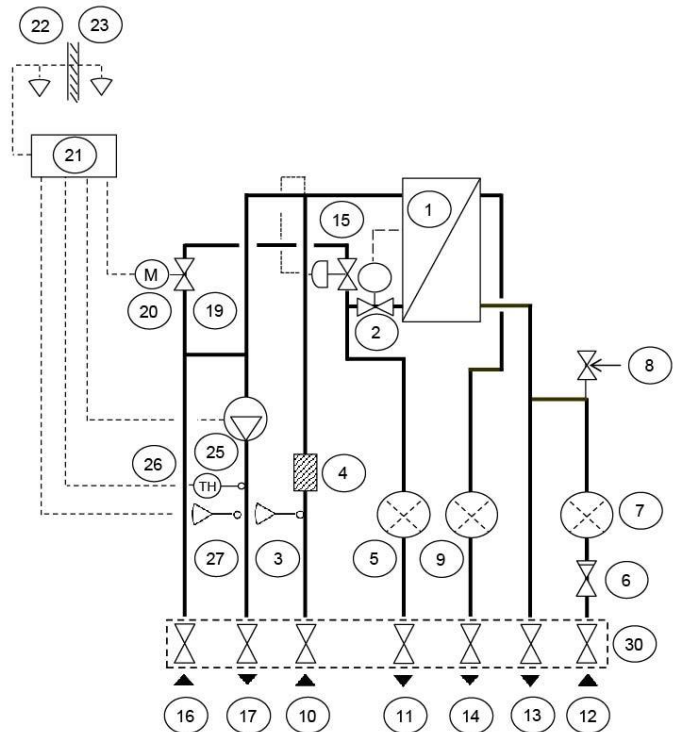
3.3 Product overview Micro STC



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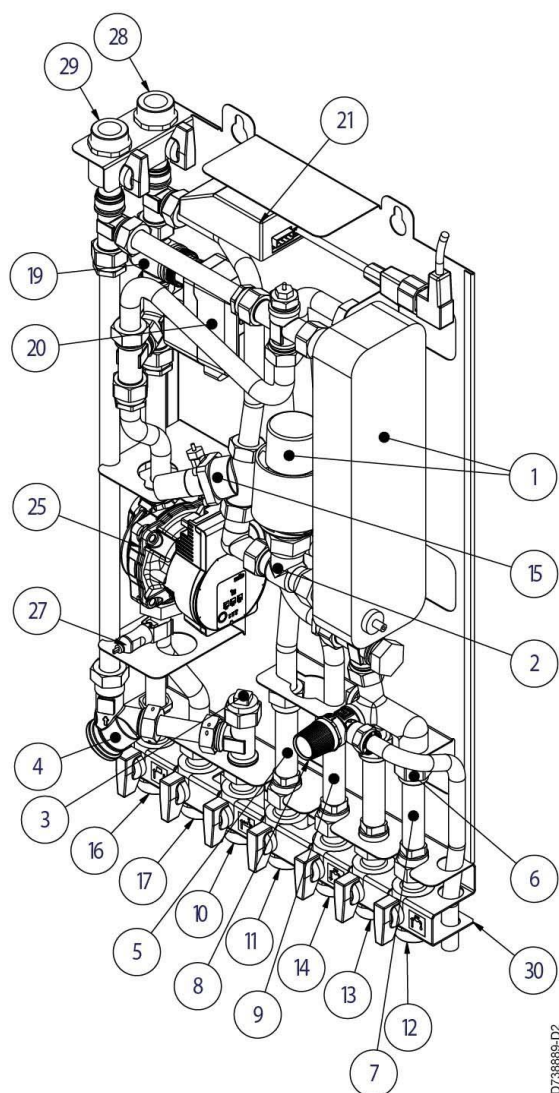
1	Heat exchanger and temperature controller for hot water
2	Control valve for hot water
3	Temperature sensor connection, heating media supply
4	Filter for heating media
5	Adapter for energy meter
6	Check valve for cold water
7	Adapter for Cold water flow meter
8	Safety valve for domestic hot water *)
9	Adapter for Hot water flow meter
10	Heating network media, supply
11	Heating network media, return
12	Cold water (cw)
13	Cold water outlet (cw)

*) included depending on model not shown in picture



14	Hot water (hw)
15	Differential pressure controller *)
16	Heating circuit, return
17	Heating circuit, supply
19	Control valve, heating circuit
20	Actuator, heating circuit
21	Connection box for electric power and sensors, heating circuit
22	Room thermostat/control panel
23	Outdoor temperature sensor *)
25	Circulation pump, heating circuit
26	Safety thermostat (option)
27	Supply temperature sensor, heating circuit
30	First fix jig including shut-off valves (option)

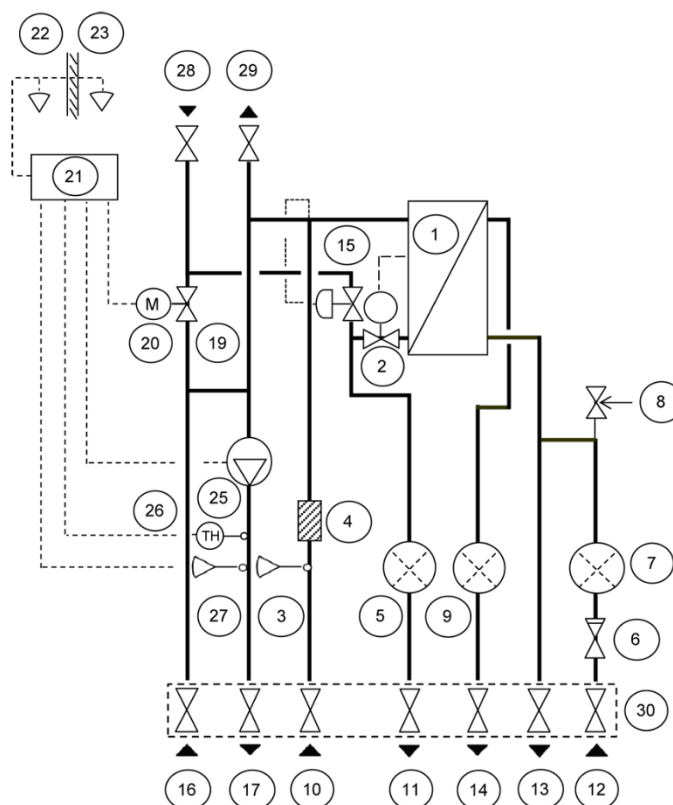
3.4 Product overview Micro STC2



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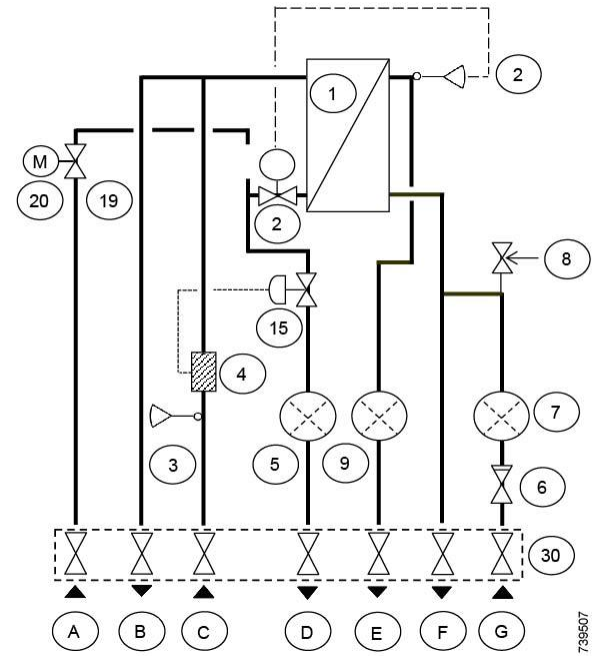
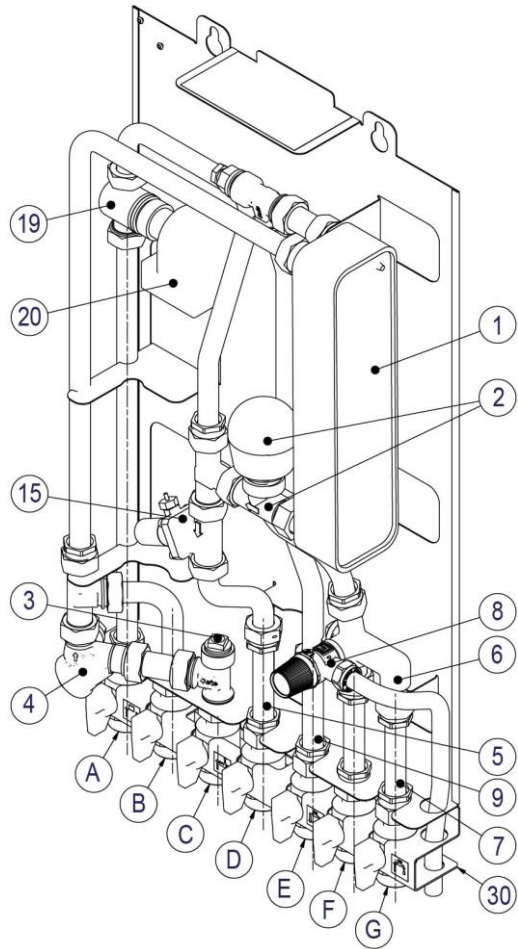
1	Heat exchanger and temperature controller for hot water
2	Control valve for hot water
3	Temperature sensor connection, heating media supply
4	Filter for heating media
5	Adapter for energy meter
6	Check valve for cold water
7	Adapter for Cold water flow meter
8	Safety valve for domestic hot water *)
9	Adapter for Hot water flow meter
10	Heating network media, supply
11	Heating network media, return
12	Cold water (cw)
13	Cold water outlet (cw)
14	Hot water (hw)

*) included depending on model



15	Differential pressure controller *)
16	Heating circuit, return
17	Heating circuit, supply
19	Control valve, heating circuit
20	Actuator, heating circuit
21	Connection box for electric power and sensors, heating circuit
22	Room thermostat/control panel
23	Outdoor temperature sensor
25	Circulation pump, heating circuit
26	Safety thermostat (option)
27	Supply temperature sensor, heating circuit
28	Heating circuit primary temp, return
29	Heating circuit primary temp, supply
30	First fix jig including shut-off valves (option)

3.5 Product overview Micro HTC



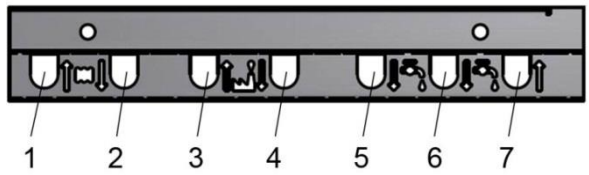
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1	Heat exchanger and temperature controller for hot water
2	Control valve for hot water
3	Temperature sensor connection, heating media supply
4	Filter for heating media
5	Adapter for energy meter
6	Check valve for cold water
7	Adapter for Cold water flow meter
8	Safety valve for domestic hot water
9	Adapter for Hot water flow meter
C	Heating network media, supply

D	Heating network media, return
G	Cold water (cw)
F	Cold water outlet (cw)
E	Hot water (hw)
15	Differential pressure controller
A	Heating circuit, return
B	Heating circuit, supply
19	Control valve, heating circuit
20	Actuator, heating circuit
30	First fix jig including shut-off valves (option)

3.6 Symbols on the first fix-jig

The first fix-jig has symbols that show which supply and return pipe that should connect to the different connection points.



1	Heating circuit, return
2	Heating circuit, supply
3	Heating network media, supply
4	Heating network media, return
5	Hot water (hw)
6	Cold water outlet (cw)
7	Cold water (cw)

4 Installation

4.1 Unpacking

- Remove the transport packaging and check that the product has not been damaged in transit and that the consignment agrees with the specifications.
- When lifting the unit take care not to apply stress to pipes and heat exchanger as this may weaken them. Avoid lifting the unit by holding the heat exchanger.

Note: Risk of injury lifting heavy objects.

4.2 Preparation

- Choose a suitable installation area in accordance with official regulations.
The system may generate sounds during operation caused by pumps, regulators systems, flows etc. This should be taken in consideration during installation of the unit so that possible operational sounds affect the surroundings as little as possible. This means that the system should be installed on well-insulated walls, such as outer walls or on concrete walls.
- Check the applicable regulations of the primary heating supplier. The available differential pressure should be for:
 - AquaMicro: at least 50kPa and at most 600 kPa
 - Micro RTC STC, STC2 and HTC at least 50 kPa and at most 400 kPa

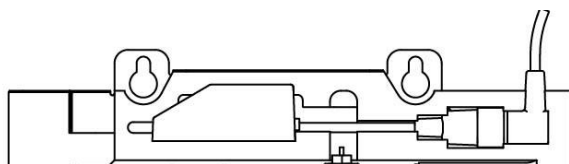
Where the differential pressure is higher, a differential pressure controller should be added to the installation.

- Flush out the heating and hot water systems.



Be careful when handling the first-fix jig, use gloves to avoid cut.

- Mount the first fix-jig (option) to the connection points. Tighten with 45 Nm.
- Carefully loosen the electrical plug from the insulation and attached it to the correct power cable. Make sure that the cable is fasten in the insulation.



4.3 Mounting

- Mount the substation on the wall using four screws or bolts suitable for the material of the wall and for the weight of the unit. The unit may be mounted at any height on the wall, but 1500 – 1800 mm from floor to keyhole fixing may be taken as a guide. The hole pattern for screws/bolts and the piping connection measures is shown in [12.3 Measure sketch](#).
- Drainage pipe from the safety valve must be taken to floor gully.
- Energy meters must be installed at a prepared location, replacing a gauge block, or following the instructions of the energy supplier.
- Retighten all connections, including those made at the factory. Tighten with 45 Nm. If connections need retightening after the installation has been taken into service, the system should be depressurised before retightening. If the system is not depressurised before retightening, gaskets will be damaged.
- Connect the pipe work to the first fix-jig (option) connection points. Tighten with 45 Nm.
- Bleed the heating system.
Start the heating circulation pump with the highest output setting. Let the heating system heat up and bleed the system again.

Cetetherm Micro Installation

- Set the pump capacity of the heating circulation pump according to the pressure head diagram. Use the lowest setting that manages the heating demand for best electrical efficiency.

4.4 Mounting options general

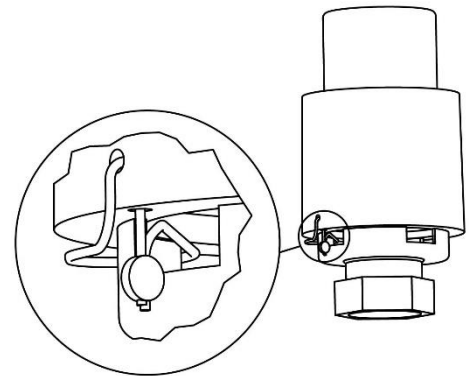
- If the substation is connected to a system sensitive to high temperature or to a low temperature system, for example floor heating, a safety thermostat must be mounted and activated before start up. See [13.1](#).
For more information; contact the supplier of the under-floor heating system.

4.4.1 Mounting options Micro STC and Micro STC2

- Install the room thermostat.
 - Room thermostat Round: see [4.9 Installing the room thermostat Round](#).
- Mount the outdoor temperature sensor (option) on the north side of the building, 2 metres above the ground, or higher. See [4.10 Installing the outdoor temperature sensor](#)

4.5 Adjustments and settings general

- Open up incoming cold water supply and fill the service water and heating circuits, bleeding off any trapped air.
- Check the operation and opening pressures of the safety valve.
- Adjust the hot water temperature by having a hot water tap open at normal flow rate for a time. Measure the temperature at the draw-off point with a thermometer. It takes about 20 seconds to get stable tap water temperature
The temperature should be approximately 50°C, this corresponds to a set point of approximately 1,5 on the actuator.
See chapter [9 Service instructions](#) for adjusting hot water temperature.



Cetetherm recommends that the tap water temperature is set to 10° less than the primary inlet temperature.

NOTE: Make sure that no cold water is mixed with the hot water while making this adjustment.

- The property owner must be instructed in the operation, setting and care of the unit. It is particularly important to provide information about the safety systems and about hazards that may arise in relation to the high pressure and temperature of the primary heating water.

4.5.1 Adjustments and settings With a Micro HTC:

Recommended set point for the actuator is 5 or 6.

Set point	2	3	4	5	6	7
°C (approx.)	20	30	40	50	60	70

Cetetherm recommends that the tap water temperature is set to 15° less than the primary inlet temperature with a Micro HTC

NOTE: Make sure that no cold water is mixed with the hot water while making this adjustment.

- The property owner must be instructed in the operation, setting and care of the unit. It is particularly important to provide information about the safety systems and about hazards that may arise in relation to the high pressure and temperature of the primary heating water.

4.6 Commissioning advice Micro STC and Micro STC2

- Set the control mode on the control panel.
Control panel Round has been pre-set at the factory to use control mode; Outside Temperature Control (OTC control). To change control mode see [5 Room thermostat Round](#).


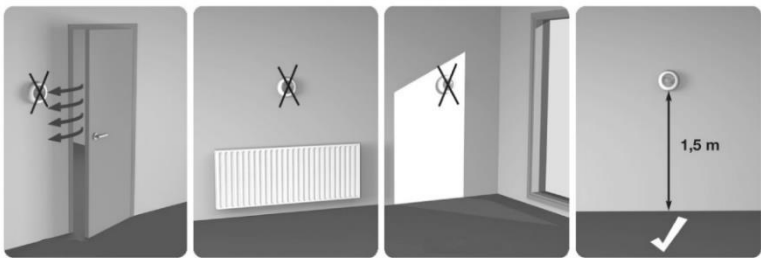


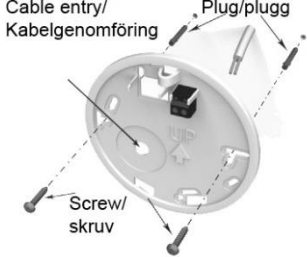
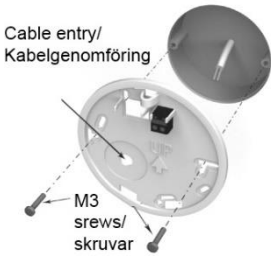
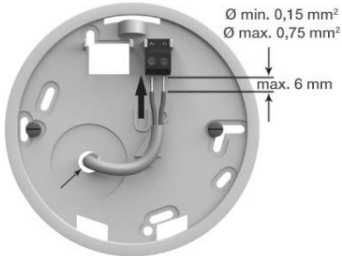
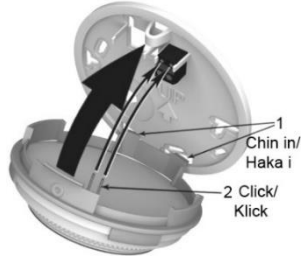

4.7 Dismantlement

When the time comes for the substation to be dismantled and scrapped it must be disposed of in the correct manner in accordance with local or national regulations.

4.8 User instruction HTC hot water actuator

Hot water temperature in apartments or one family houses can be set to about 50°C. If the temperature is set too high, there is a risk of scalding. Setting the hot water temperature too low may result in unwanted bacteriological growth in the hot water system.

4.9 Installing the room thermostat Round

1 Removing power supply	2 Placement		
			
3 Removing the dial	4 Removing the thermostat	5a Mounting direct on the wall	
			
5b Mounting in wall socket	6 Connecting the cable	7 Mounting the thermostat	
			
8 Mounting the dial			
			

4.10 Installing the outdoor temperature sensor

Connect the outdoor temperature sensor to the electric box.

With a conductor area of 0.6 mm² the maximum cable length is 50 metres, maximum 5Ω/conductor.

If the outdoor temperature sensor is connected later, for example in a construction period, the room thermostat must be restarted and configured.

Control panel Round: See [5.3 Changing control mode, OTC heating curve and max supply temperature](#).

4.11 Starting up sequence with component check



The substation must be filled with water before starting the room thermostat, if not the pump can be damaged.

- Put the electrical cable from the control panel into a wall outlet. We recommend using an earth fault breaker.
- A check of the actuator and pump function starts.
Check that the heating actuator knob turns and the pump function according to the following schedule:
 - 10s actuator closes – turns clockwise - if not already closed
 - 10s actuator opens - turns counter clockwise
 - 10s actuator closes – turns clockwise
 - 10s pump runs
 - 150s actuator closes.
- The next five minutes, the pump starts running and control begins to regulate to 37°C.

Note: Under certain operating conditions, 37°C is not reached within 5 min. The Actuator knob should however have moved counter clockwise.

When start-up sequence is completed the room thermostat returns to last set control mode.

Note: If there is no heat demand the pump stops after the start-up sequence.

5 Room thermostat Round

5.1 General

The room thermostat Round controls the supply temperature to the heating system.

First time the room thermostat is started is use default control mode Outside Temperature Control (OTC control).

The room thermostat is programmable and has five different control modes to select between.

Features

- Ergonomic user interface.
- A simple twist of the dial will adjust the temperature set point up or down.



1	LCD display
2	Dial
3	Right touch button
4	Left touch button

Display (1)

The LCD has backlight; the backlight enables to read the data on the LCD in the dusk and dark. The backlight is switched off 10 seconds after last use.

In operating mode 2 (OTC control) the set room temperature is displayed in the window.

In operating mode 1 and 3 (RTC and RTC+OTC), the current room temperature is displayed by default in the window.

The thermostat measures the room temperature continuously in the room where it hangs.

Dial (2)

Turn the dial one "click" to see the setting of room temperature, if using control mode 1 and 3.

Turn the dial to change settings. Turn clockwise to increase and counter clockwise to decrease a setting.

Right touch button (3)

Use together with the left touch button to enter setting menu.

Left touch button (4)

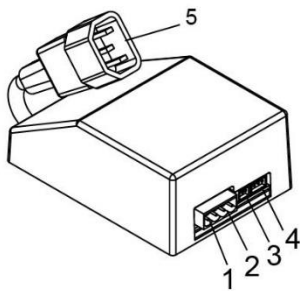
Use together with the right touch button to enter setting menu.

Press to change parameter values and settings in different menus, change control mode, set max supply temperature, change heat curve slope.

5.2 Control modes

The room thermostat has five different control modes to select between; the default mode is Outside Temperature Control (OTC control).

1. **Room temperature control RTC**
Supply setpoint is calculated based on the room temperature setpoint and the actual room temperature.
2. **OTC control**
Require a connected outdoor temperature sensor.
Supply setpoint is purely based on the outside temperature.
3. **OTC control with room temperature compensation (OTC+RTC)**
Require a connected outdoor temperature sensor.
Supply setpoint is based on the outside and room temperature.
4. **Constant supply temperature (with closed contact)**
Select a fixed supply temperature setpoint. The heat is **on** when the contact (pos 1) is **closed**.
NOTE: The heating is off when the contact is open- there are no active valves- or pump anti seizing measure.
NOTE: Does not work with an outdoor thermostat connected.
5. **Constant supply temperature (with open contact)**
Select a fixed supply temperature setpoint. The heat is **on** when the contact (pos 1) is **open**.
NOTE: The heating is off when the contact is closed -there are no active valves- or pump anti seizing measure.
NOTE: Does not work with an outdoor thermostat connected.



1	Universal input for connecting e.g. outdoor temperature sensor, flow switch, relay contact, strap
2	Room thermostat
3	Supply temperature sensor
4	Actuator, heating
5	Power cable adapter

5.3 Changing control mode, OTC heating curve and max supply temperature

Three different settings can be done:

- Control mode (1-5)
 - Heating curve (4-40)
 - Max supply temperature (30°-80°C)
- Turn the dial down to 10°C. The display starts to flash.
 - While the display is flashing it is possible to enter the setting menu by pressing both right and left touch button for 10 seconds.
 - Use the dial to choose control mode, 1-5.
Confirm the choice within 10 secs by pressing the left touch button.
 - Choose the heating curve with the dial, 4-40.
Confirm the choice within 10 secs by pressing the left touch button.
 - Choose max supply temperature with the dial, 30°-80°C.
Confirm the choice within 10 secs by pressing the left touch button.
 - When all settings are done wait a few seconds and the room thermostat automatically leaves the setting menu in 10 seconds.
 - After changing the control mode, wait at least 30 seconds and then restart the room thermostat. This is to ensure correct function.

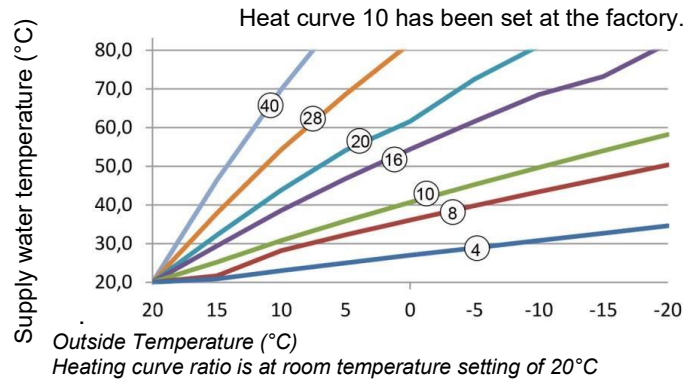
5.4 OTC control mode, default setting

The room thermostat controls the indoor temperature as a function of the measured outside air temperature.

The heat curve is the ratio between the measured outside air temperature and the calculated supply water temperature.

The ideal heating curve is dependent on the type of installation (radiators, convectors, etc.), the thermal properties and the location of the property.

A heating curve ratio of 1 to 40 can be set. The figure shows several heating curve ratios for a room temperature setting of the 20°C **without** room temperature compensation.



5.5 Viewing the room temperature

Note: Only valid with control mode 1-3.

The room temperature is displayed by default. The thermostat measures the room temperature continuously in the room where it hangs.

5.6 Viewing the set room temperature

Note: Only valid with control mode 1-3.

The set temperature is the desired temperature in the room where the thermostat is located.

Check the set temperature; by rotating the dial ring one way or tactile click clockwise.

The set temperature will flash.

After five secs, the display returns to show the room temperature.

Note: During commissioning, the standard set temperature is 17 °C.

After power failure, the last set temperature will always be active.

5.7 Changing temperature setting

Change the temperature setting by rotating the dial ring. With each click counter-clockwise decreases the set temperature with half a degree. Each click clockwise increases the temperature by half a degree.

During setting the temperature is flashing. At the desired temperature, allows the ring loose.

After five seconds, the display will show the actual room temperature or the set supply temperature, depending on set control mode.

If using control mode 1-3 the thermostat will adjust the room temperature as closely as possible to the newly set temperature.

5.8 Setback

In the absence and at night the thermostat can manually be set at a lower temperature to save energy.

In general, it is recommended a reduction of up to 5 ° C. Under the influence of the warm-up capacity of the plant and the degree of isolation of the property may be desired another temperature drop.





5.9 Summer heating

The pump should stop within 300 seconds if measured outdoor temperature is higher than the pre-set temperature *Outside Limit* (20°C).


5.10 Display symbols








Control mode	Display will show		
1 RTC		88.8°C	Shows the actual room temperature with one decimal and in 0.5 steps when the room temperature is used.
2 OTC	▲▼	88.8	Shows the room temperature setpoint with one decimal and in 0.5 steps when temperature control mode is OTC.
3 RTC+OTC		88.8°C	Shows the actual room temperature with one decimal and in 0.5 steps when the room temperature is used.
4 Constant supply temperature with closed contact	▲	88.8°C	Shows the requested supply temperature when the room temperature is not used.
5 Constant supply temperature with open contact	▼	88.8°C	Shows the requested supply temperature when the room temperature is not used.

	Heating on Means there is a requirement for some heating
	SummerHeating is active
	There is an ongoing alarm
	Connected to Gateway

5.11 Fault messages on the room thermostat

If a spanner  is visible on the display there is an ongoing alarm.

On the display	Cause
	Fault code is shown on 7-segments
	Internal fault (like sensor fault)
	There is no (valid) outside temperature
	Room thermostat not connected to a correct connection box
	Fault in the communication module in the connection box, for electric power and sensors, heating circuit

5.12 Fault codes on room thermostat Round

Fault code 0	No fault, power up
Fault code 1	Supply sensor or cable
Cause	Measured supply water temperature is below 0°C or above 100°C.
Actions	The control panel turn the pump off and enter off mode (frost protection). Check the supply sensor and its cable.
Fault code 2	Outside sensor out of operating range. This fault code can only occur after the measured outside temperature has been in range: -40°C to 60°C.
Cause	Measured outside temperature is below -40°C or above 60°C
Actions	Enter room compensation until a valid temperature has been measured. Check the outside sensor and its cable.
Fault code 3	Connection box temperature out of operating range
Cause	Measured environment temperature is below -0°C or above 60°C.
Actions	The control panel turn the pump off and enter off mode (frost protection). Make sure that the substation is mounted in a well vented room.
Fault code 4	Cannot reach the set supply water temperature
Cause	Air in the pump, low temp/ not district heating supply.
Actions	Vent the pump, check the control valve and actuator.
Fault code 7	No communication between control panel and connection box
Cause	The connection box does not communicate with the control panel (by OT) for 60 seconds.
Actions	Fault is only cleared after a power break and OT communication is working again. Check the control panel cable.
Fault code 8	Outside sensor detected and heat demand input configured.
Cause	Outside sensor detected and heat demand input configured
Actions	Heat demand input doesn't work

5.13 Factory settings, room thermostat

Setting/function	Default Value	Setting/function	Default Value
Control mode	OTC	Min Room setpoint	10.0 °C
Room Temp Setpoint	17.0 °C	Max Room setpoint	27.0 °C
Constant Supply Temp Setpoint	40 °C	Min Supply setpoint	0 °C
OTC Ratio	10	Max Supply setpoint	60 °C
Setpoint lock	unlocked	Outside Limit (summer heating)	20 °C

6 Differential pressure control valve, DPC



Adjusting the DPC must be carried out by an authorized service technician.

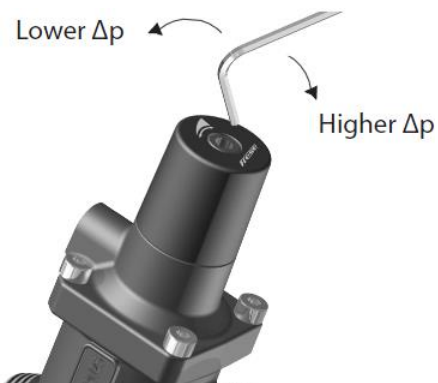
6.1 Setting the DPC valve

Set the valve to the differential pressure 25kPa.

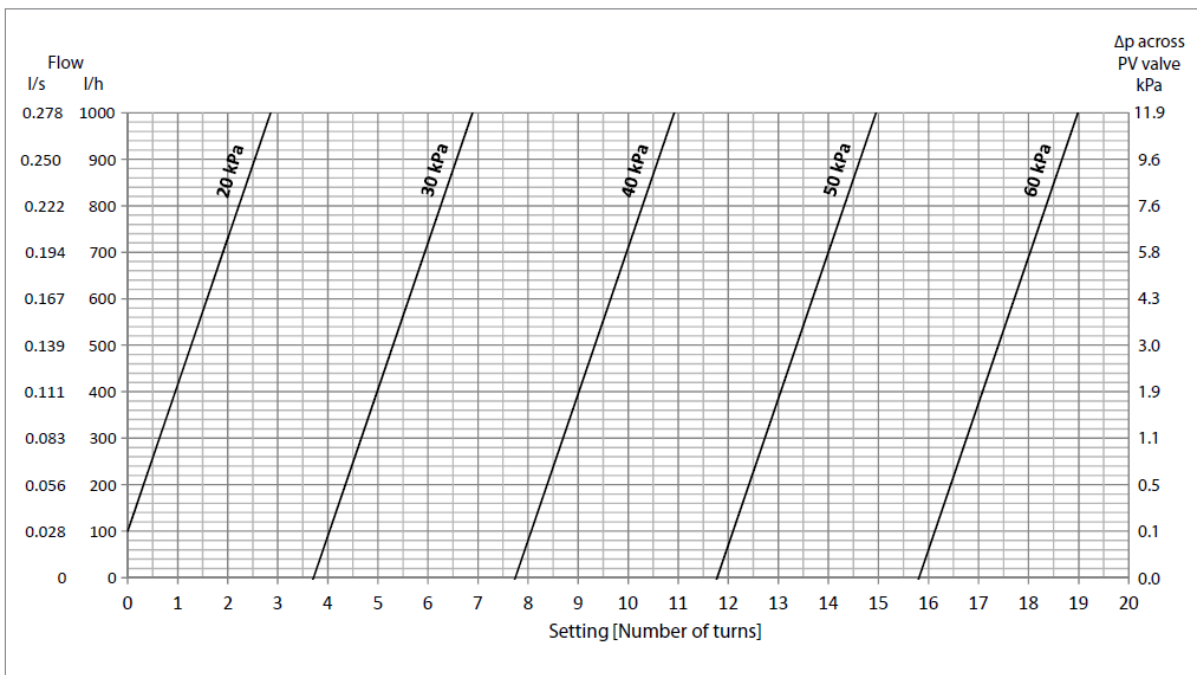
Start with the valve at minimum position and then open with 3 numbers of turns.

Use a 4mm hexagonal key.

NOTE: Always start from the minimum position of the valve, before making new settings.

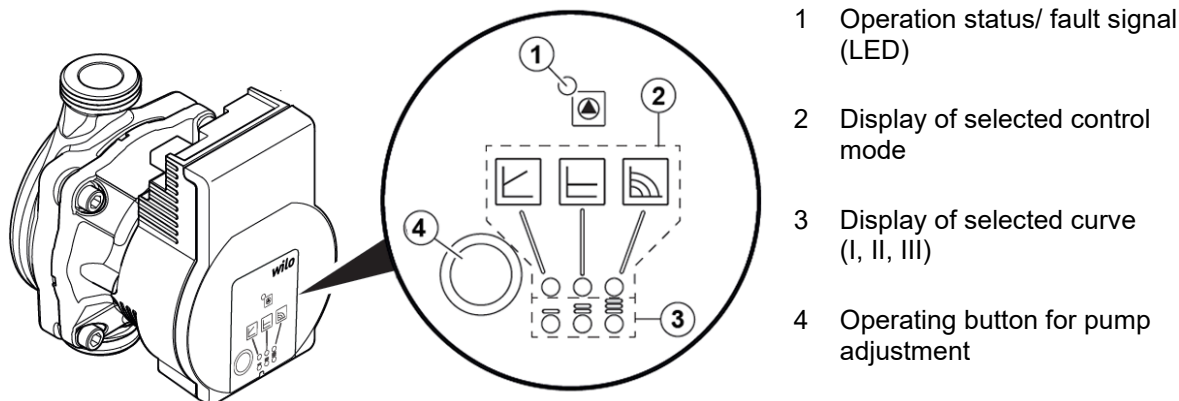


6.2 Flow rate graph of the DPC



7 Pump settings and pump performance

The Micro STC and STC2 are equipped with a heating circuit pump Wilo Para. When the pump is switched on it runs with the factory pre-setting or the last setting. The pump is pre-set to run with operation mode, constant speed, curve III. Control mode indicates with LEDs on the pump front.



7.1 Pump settings

	<p>Operation status</p> <ul style="list-style-type: none"> Green – normal operation Lights up/flashes red – error message
	<p>Display of selected control mode</p> <ul style="list-style-type: none"> Variable differential pressure $\Delta p-v$ – the pump reduces the delivery head to half in the case of decreasing the volume flow in the pipe network. Electrical saving by adjusting the delivery head to the volume flow requirement and lower flow rates. There are three pre-defined pump curves (I, II, III). Constant differential pressure $\Delta p-c$ – the control keeps the set delivery head constant irrespective of the pump volume flow. There are three pre-defined pump curves (I, II, III). Constant speed – the pump runs in three prescribed fixed speed stages (I, II, III).
	<p>Display of selected pump curve I, II, III</p>
	<p>LED indicator when</p> <ul style="list-style-type: none"> pump venting manual restart key lock

7.1.1 Venting the pump

If the pump does not vent automatically, activate the pump venting function by pressing and holding the operating button for 3 seconds.

Venting function is active for 10 minutes. To cancel, press and hold the operating button for 3 seconds.

7.1.2 Manual restart

The pump attempts an automatic restart upon detecting a blockage.

If the pump does not restart automatically, activate manual restart by pressing and holding the operating button for 5 seconds.

Manual restart is active for 10 minutes. To cancel, press and hold the operating button for 5 seconds.

7.1.3 Key lock

The keylock is activated by pressing and holding the operating button for 8 seconds.

It protects against undesired or unauthorised adjustment of the pump.

Deactivate in the same manner as it is activated.

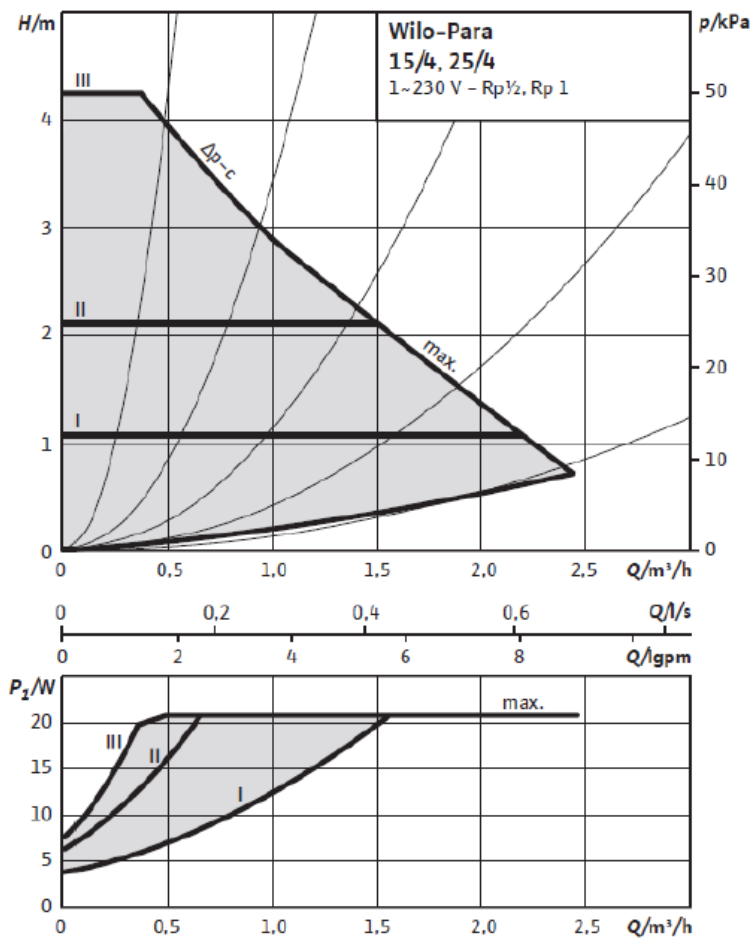
7.1.4 Activating factory setting

The factory setting is activated by pressing and holding the operating button while switching of the pump.

When the pump is switched on again it will run using the factory settings.

7.2 Pump curve

Δp -c (constant)



7.3 Setting the control mode

To change the control mode and the curve, use the button on the pump. Each press will change the pump setting. The LED display the setting.

	LED display	Control mode	Curve		LED display	Control mode	Curve
1		Constant speed	II	6		Constant differential pressure $\Delta p-c$	III
2		Constant speed	I	7		Constant differential pressure $\Delta p-c$	II
3		Variable differential pressure $\Delta p-v$	III	8		Constant differential pressure $\Delta p-c$	I
4		Variable differential pressure $\Delta p-v$	II	9		Constant speed	III
5		Variable differential pressure $\Delta p-v$	I				

7.4 Thoubleshooting the pump

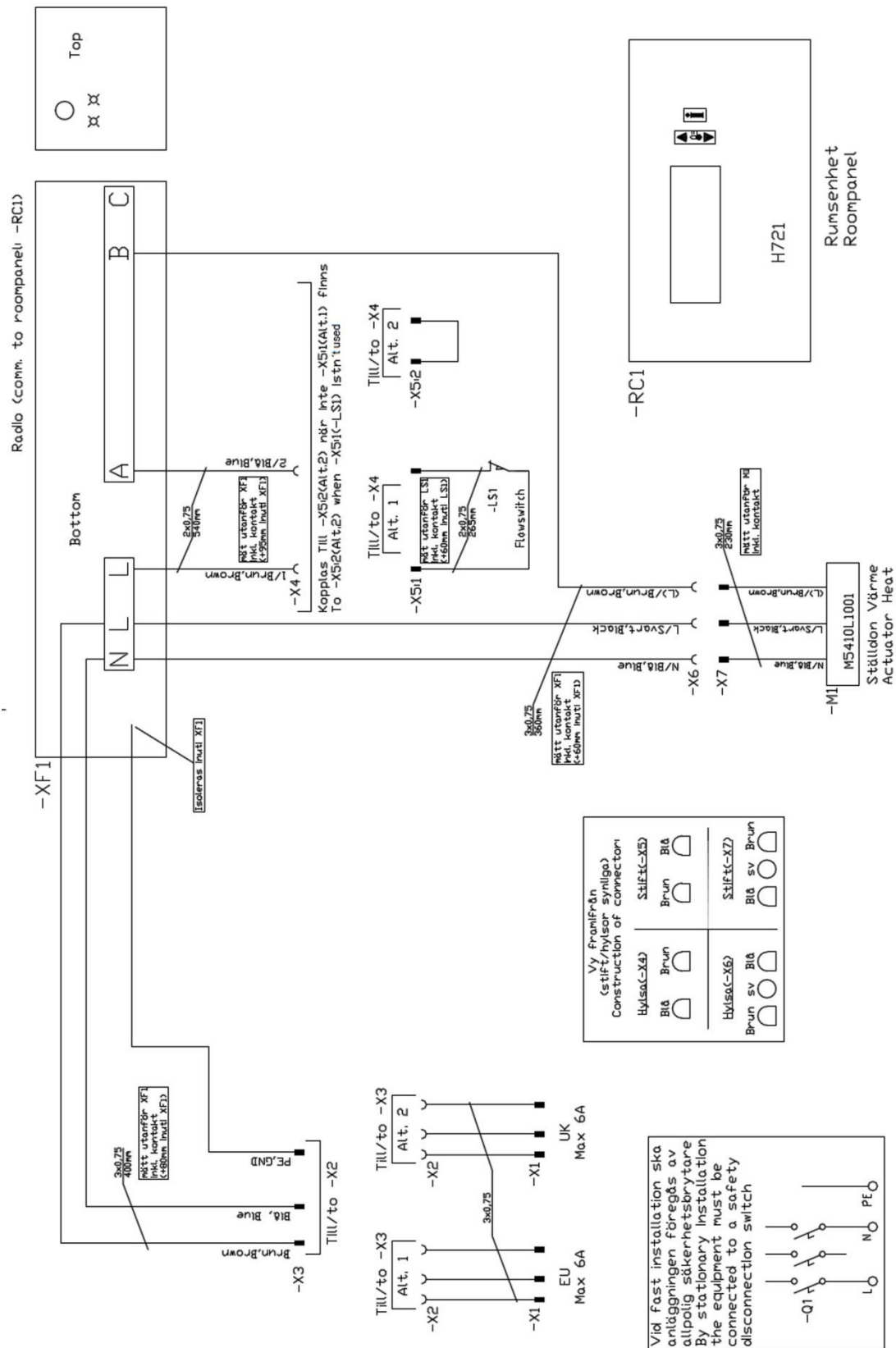


Service actions must be carried out by an authorized service technician.

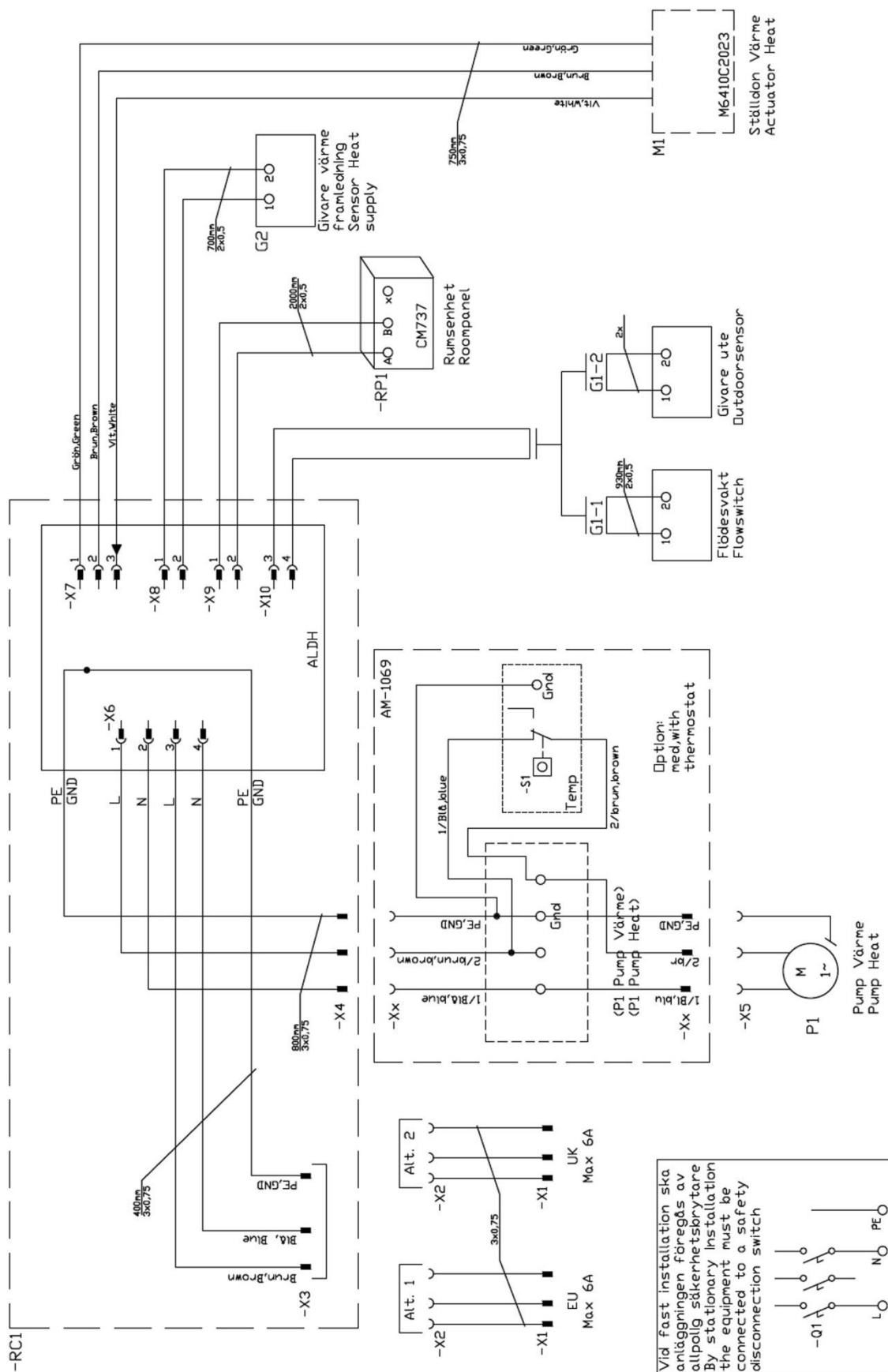
Fault	Causes	Remedy
LED -lights up red	Rotor blocked	Activate manual restart
	Winding defective	
LED- flashes red	Power supply too low or high	Check power supply and operating conditions
	Control module too warm	
	Motor current too high	
LED -flashes red/green	No power supply to the pump	Check the power supply, water quantity/pressure and the ambient conditions.
	Air in the pump	
	Sluggish motor. The pump is operated outside of its specifications. The speed is lower than during normal operation.	
Pump is not running although the power supply is switched on	Electrical fuse defective	Check the fuse
	No voltage supply at pump	Rectify the power interruption
Noisy pump	Insufficient inlet pressure	Increase the system pressure within the permissible range
		Check the delivery head/duty point and set it to a lower head if necessary
Building does not warm up	Thermal output of the heating surfaces is too low.	Increase setpoint
		Change the control mode

8 Electrical circuit diagram

8.1 Micro RTC



8.2 Micro STC and Micro STC2



9 Service instructions

Always start with the general service instruction before the specific instructions for each model.



To avoid the risk of scalding, make sure that no-one draws any water while servicing the substation.



Grey marked service actions must be carried out by an authorized service technician.

NOTE! Make sure that the substation has been correctly installed.

9.1 General service instructions

9.1.1 Tap water temperature too low

Reason	Action
Primary heating supply too low	Check the primary inlet temperature The temperature can be checked by means of the energy meter (min 65° C) or contact the primary heating medium provider.
Handle on control valve incorrectly positioned	Adjust the handle on the control valve Control the hot water temperature by turning the handle on the control valve, counter clockwise to increase and clockwise to decrease tap water temperature. Adjust the hot water temperature by having a hot water tap open at normal flow rate. Measure the temperature at the draw-off point with a thermometer. It takes about 20 seconds to get a stable tap water temperature. The temperature should be minimum 50 °C. Cetetherm recommends that the primary inlet temperature is at least 10° higher than the tap water temperature. NOTE: Make sure that no cold water is mixed with the hot water while making this adjustment. Seal the hot water actuator after setting
Filter for heating media clogged	See 11.1 <i>Cleaning the heating media filter</i>
Hot water valve does not work	See 10.1 <i>Check the function of the valve for hot water</i>

9.1.2 Tap water temperature too high

Reason	Action
Handle on control valve incorrectly positioned	<p>Adjust the handle on the control valve Control the hot water temperature by turning the handle on the control valve, counter clockwise to increase and clockwise to decrease tap water temperature. Adjust the hot water temperature by having a hot water tap open at normal flow rate. Measure the temperature at the draw-off point with a thermometer. It takes about 20 seconds to get a stable tap water temperature. The temperature should be minimum 50 °C. Cetetherm recommends that the primary inlet temperature is at least 10° higher than the tap water temperature.</p> <p>NOTE: Make sure that no cold water is mixed with the hot water while making this adjustment.</p> <p>Seal the hot water actuator after setting</p>
Hot water valve and/or actuator does not work	<p>Check the valve according to 10.1 Check the function of the valve for hot water If the water temperature is too high when the handle is in position 0, the actuator or the exchanger is damaged and requires replacing.</p>

9.1.3 Hot water temperature unstable or too low

Reason	Action
Alternating pressure on primary side	Check available differential pressure and temperature at the primary heating medium provider
Filter for heating media clogged	See 11.1 Cleaning the heating media filter.

9.1.4 Heating system temperature too high or too low

Reason	Action
Filter for heating media clogged	See 11.1 Cleaning the heating media filter.
Differential pressure control valve incorrectly adjusted (option)	See 6 Differential pressure control valve, DPC.

9.1.5 No heating

Reason	Action
Closed radiator or floor heating valves	Check that all radiator valves and floor heating valves are fully open
Filter for heating media clogged	See 11.1 Cleaning the heating media filter.
Differential pressure control valve incorrectly adjusted(option)	See 6 Differential pressure control valve, DPC

9.1.6 Heating temperature unstable

Reason	Action
Alternating pressure on primary side	Check available differential pressure and temperature at the primary heating medium provider
Filter for heating media clogged	See 11.1 Cleaning the heating media filter.
Differential pressure control valve incorrectly adjusted (option)	See 6 Differential pressure control valve, DPC

9.2 STC service instructions



Hand manoeuvre of the heating actuator

The room thermostat must be without current when manoeuvring the actuator by hand.

NOTE: if manually adjusting the actuator, the operator control panel must be restarted before use.

9.2.1 Heating system temperature too high or too low

Reason	Action
The heating control equipment may need to be adjusted	Check and adjust the heating curve If needed the set heating curve can be fine-tuned. Increase/ decrease the room temperature by parallel adjust the heating curve. Control panel Round See 5.3 Changing control mode, OTC heating curve and max supply temperature .
Heating supply temperature sensor and outdoor temperature sensor (option) does not work	Check that the heating supply temperature sensor and outdoor temperature sensor are correctly sited and working. Control panel Round: Supply temperature can only be viewed in control mode 4 and 5.
Heating valve and/or actuator does not work	See 10.2 Check the function of the heating actuator and valve

9.2.2 No heating

Reason	Action
Circulation pump not running	Check that the electrical power is on
	Check the circulation pump If the pump fails to start after stopping, try to start it at the highest setting.
	Check the heating parameters in room thermostat If measured outdoor temperature is higher than target temperature, the pump should not be operating.
Heating supply temperature sensor and outdoor temperature sensor (option) does not work	Check that the heating supply temperature sensor and outdoor temperature sensor are correctly sited and working. Control panel Round: Supply temperature can only be viewed in control mode 4 and 5.
Loss of function in the heating control unit.	See 10.3 Run the pump manually

9.2.3 Disturbing noise from the circulation pump/ Noise in the radiator system

Reason	Action
Pump capacity set too high	Reduce the pump capacity The pump has been set at a too high capacity level. Reduce the level by choosing a lower output setting on the pump. The lowest setting is the most economical.
Air in the pump	Vent the pump The pump is self-venting. Air in the pump may cause noise. This noise ceases after a few minutes run time. Quick venting of the pump see 7.1.1 Venting the pump .
Pump motor or pump component damaged	See 11.6 Change pump components or the complete pump
Differential pressure control valve set too high	See 6 Differential pressure control valve, DPC

9.2.4 Heating temperature unstable

Reason	Action
Heating supply temperature sensor and outdoor temperature sensor (option) does not work	Check that the heating supply temperature sensor and outdoor temperature sensor are correctly sited and working. Control panel Round: Supply temperature can only be viewed in control mode 4 and 5.

9.3 HTC service instructions

9.3.1 Tap water temperature too low/ hot water temperature unstable or too low

Reason	Action
Differential pressure control valve incorrectly adjusted (option)	See 6 Differential pressure control valve, DPC

9.3.2 Heating system temperature too high or too low

Reason	Action
Heating valve and/or actuator does not work.	See 10.2 Check the function of the heating actuator and valve

10 Service actions for the installer

10.1 Check the function of the valve for hot water



Service actions must be carried out by an authorized service technician.

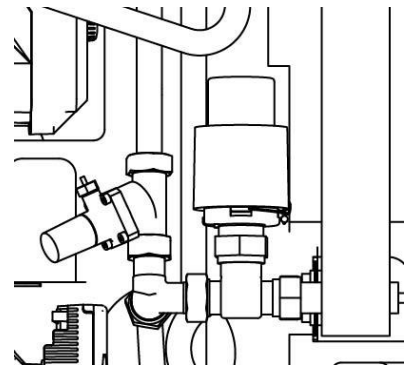


Close the shutoff valves for the **Heating network supply** and **Heating network return** together with the **cold** and **hot water**.

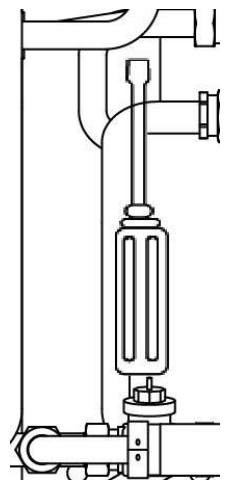


After finishing repair; open the shutoff valves. Start with **Heating network supply** and then the **return** line, to avoid pollutions in the system. Open the valves slowly to avoid pressure surges.

- Disconnect the power feed to the substation.
- Close the shut-off valves.
- Unscrew the tap water actuator from the control valve.
If the valve is working it should be fully open when the actuator is removed.
Check that hot water passes through the valve. Feel gently on a pipe after the valve.



- Carefully press the valve's spindle with a tool and check the valve's travel and spring back.
NOTE: The valve may be very hot!
- Turn the handle on the actuator; a small stem should move in and out. If the stem does not move the actuator is damaged and requires replacing.
- Connect the power feed to the substation.
- Open the shutoff valves.



10.2 Check the function of the heating actuator and valve



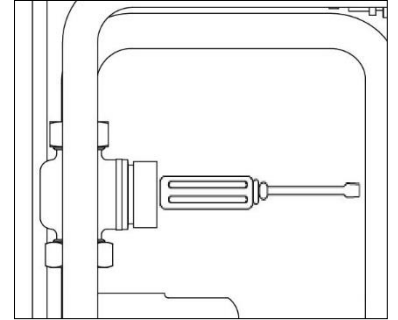
Service actions must be carried out by an authorized service technician.



The room thermostat must be without current when manoeuvring the actuator by hand.

- Check the actuator by pulling out the electrical cable and refit it again; this will start an automatic self-test off the actuator and pump.
See [4.11 Starting up sequence with component check](#).
- Check the flow using the energy meter while test-running the valve.
If no energy meter is available, disconnect the heating actuator from the valve. Close the actuator by turning the knob clockwise, this will make it easier to reattach.
- Carefully depress the valve's spindle with a tool and check the valve's travel and spring back.

Note! The valve may be very hot



10.3 Run the pump manually





Service actions must be carried out by an authorized service technician.

If it becomes necessary to run the pump and actuator manually, this can be done by disconnecting the power to the room thermostat.





Disconnect the electrical plug for the pump. Connect the replacement cable (option) to the power supply and to the circulation pump. Next, open the heating valve manually using the knob on the actuator. Open the control valve sufficiently to satisfy the heating needs.

11 Maintenance and repairs

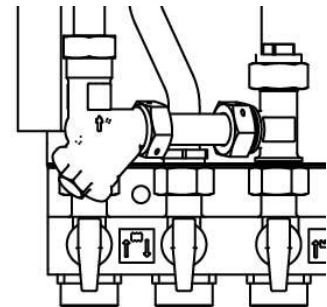
When carrying out repairs, please contact your local service partner.

	Before starting out repairs always close the correct shutoff valves.
	When dismantling a component there will be water coming out, hot and under pressure.

11.1 Cleaning the heating media filter

	Service actions must be carried out by an authorized service technician.
	The temperature and the pressure of the district heating water are very high. Only qualified technicians can work with the district heating substation. Incorrect operation may cause serious personal injury and result in damage to the building.
	Before starting out repairs close the heating network supply and heating network return shutoff valves.
	After finishing repair; open the shutoff valves. Start with heating network supply and then the return line, to avoid pollutions in the system. Open the valves slowly to avoid pressure surges.

- Disconnect the power feed to the substation.
- Close the shut-off valves.
- Use a wrench and release the filter cover and remove the cartridge.
- Clean the filter with water and refit the cartridge. Screw the filter cover with a momentum of 10-20 Nm.
- Open the shutoff valves and connect the power feed to the substation.



11.2 Change the hot water actuator and heat exchanger



The temperature and the pressure of the district heating water are very high. Only qualified technicians can work with the district heating substation. Incorrect operation may cause serious personal injury and result in damage to the building.

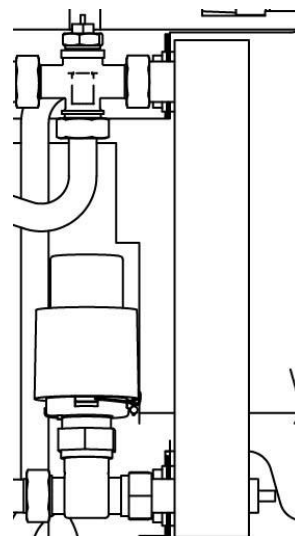


Before starting out repairs close the **heating network supply** and **heating network return** shutoff valves.



After finishing repair; open the shutoff valves. Start with **heating network supply** and then the **return** line, to avoid pollutions in the system. Open the valves slowly to avoid pressure surges.

- Disconnect the power feed to the substation.
- Close the shut-off valves.
- Unscrew the actuator from the control valve.
- Release the four nuts on the heat exchanger.
- Refit a new heat exchanger and actuator. Use new gaskets and tighten with 45Nm.
- Mount the actuator on the valve.
- Open the shutoff valves and connect the power feed to the substation.



11.3 Change the hot water valve



The temperature and the pressure of the district heating water are very high. Only qualified technicians can work with the district heating substation. Incorrect operation may cause serious personal injury and result in damage to the building.

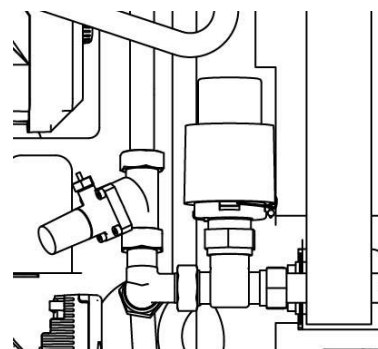


Before starting out repairs close the **heating network supply** and **heating network return** shutoff valves.



After finishing repair; open the shutoff valves. Start with **heating network supply** and then the **return** line, to avoid pollutions in the system. Open the valves slowly to avoid pressure surges.

- Disconnect the power feed to the substation.
- Close the shut-off valves.
- Unscrew the tap water actuator from the control valve.
- Use a spanner to remove the control valve.
Note the arrow direction on the valve.
- Mount a new valve; and take especially care to the arrow direction. Use new gaskets and tighten with 45Nm.
- Fasten the tap water actuator on the valve.
- Open the shutoff valves and connect the power feed to the substation.

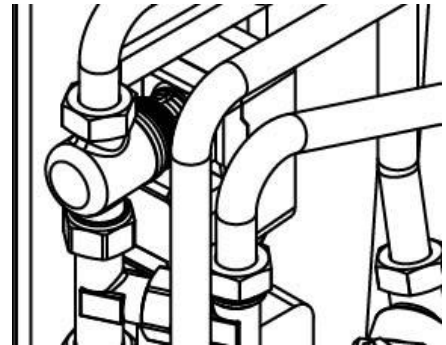


11.4 Change the heating actuator



Maintenance and repairs must be carried out by an authorized service technician.

- Disconnect the electrical power supply.
- Disconnect the cable from heating actuator in the connection box.
- Unscrew the heating actuator from the valve, the valve closes.
- Cut off all straps that holds the actuator cable.
- Make sure that new actuator is closed by turning the knob clockwise to the closing position. Fasten the actuator, use only hand power.
- Replace cable and straps.
- Connect the power feed to the substation.
- Check the function of the actuator during start up.



11.5 Change the heating valve



The temperature and the pressure of the district heating water are very high. Only qualified technicians can work with the district heating substation. Incorrect operation may cause serious personal injury and result in damage to the building.

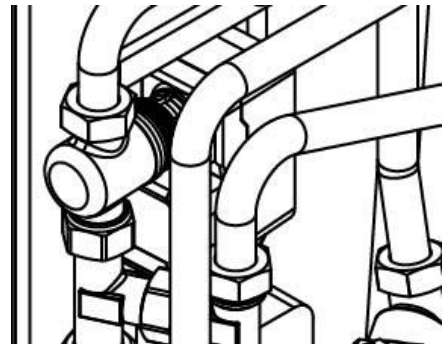


Before starting out repairs close the **heating network supply** and **heating network return** shutoff valves.



After finishing repair; open the shutoff valves. Start with **heating network supply** and then the **return** line, to avoid pollutions in the system. Open the valves slowly to avoid pressure surges.

- Disconnect the power feed to the substation.
- Close the shut-off valves.
- Unscrew the heating actuator from the control valve.
- Use a wrench to remove the control valve.
Note the arrow direction on the valve.
- Mount a new valve; and take especially care to the arrow direction.
Use new gaskets and tighten with 45Nm.
- Close the actuator by turning the knob clockwise to the closing position. Fasten the actuator, use only hand power.
- Open the shutoff valves and connect the power feed to the substation.



11.6 Change pump components or the complete pump



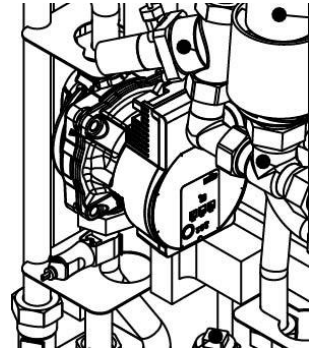
Maintenance and repairs must be carried out by an authorized service technician.



Before starting out repairs, close the shutoff valves **heating network supply**, **heating network return**, **heating supply** and **heating return**.

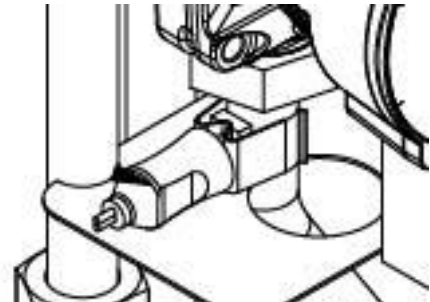
Change the complete pump or just change the pump motor.

- Disconnect the power feed to the substation, disconnect the power cable to the pump.
- Close the shut-off valves.
- Choose alternative a or b.
 - a) When changing the complete pump, release the brass nuts with a spanner and replace the pump. Connect the pump cable.
 - b) Only changing the motor, release it by unscrewing four sockets head cap screws and replace the motor. Connect the pump cable.
- Open the shut-off valves and connect the power feed to the substation.



11.7 Change the heating circuit supply temperature sensor

- Disconnect the power feed to the substation.
- Disconnect the quick-connect terminals and replace the sensor with a new one.
- Connect the power feed to the substation.
- Check the sensors value on the control panel after 5 min.



11.8 Change the outdoor temperature sensor

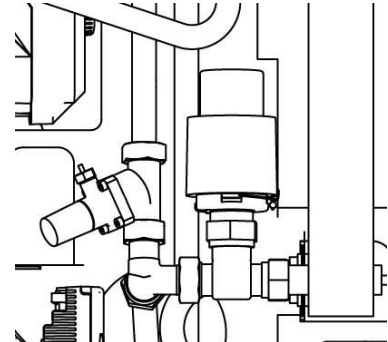
- Disconnect the power feed to the substation.
- Unscrew the lid of the outdoor temperature sensor by turning it anti-clockwise.
- Unscrew the cables and loosen the cable fitting.
- Install a new outdoor temperature sensor.
- Connect the power feed to the substation.
- Check the sensors value on the control panel after 5 min.



11.9 Change the differential pressure control valve

	The temperature and the pressure of the district heating water are very high. Only qualified technicians can work with the district heating substation. Incorrect operation may cause serious personal injury and result in damage to the building.
	Before starting out repairs close the heating network supply and heating network return shutoff valves.
	After finishing repair; open the shutoff valves. Start with heating network supply and then the return line, to avoid pollutions in the system. Open the valves slowly to avoid pressure surges.

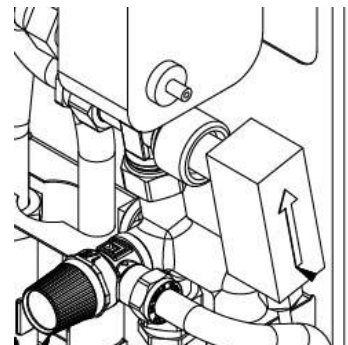
- Disconnect the power feed to the substation.
- Close the shut-off valves.
- Use a spanner to remove the differential pressure control valve.
Note the position of the P/T plugs on the valve.
- Mount a new valve; and take especially care to the P/T plugs position.
- Open the shutoff valves and connect the power feed to the substation.



11.10 Change the flow switch

	Maintenance and repairs must be carried out by an authorized service technician.
	Before starting out repairs always close the primary supply and return shutoff valves After finishing repair; open the shutoff valves. Start with primary supply and then the return lines, to avoid pollutions in the system. Open the valves slowly to avoid pressure surges.

- Disconnect the substation electrical power supply cable. Disconnect the electrical plug to the flow switch.
 - Loosen the nut that holds the flow switch.
 - Carefully mount the new flow switch.
- Note:** Hold the flow switch in position when tightening the nut by hand. The flow switch breaks if it is turned around with the nut.
- Connect the power plug and the substation electrical power supply.



12 Operating data and performance

12.1 Operating data

Operating data			
	Heating medium	Heating circuit	Hot water circuit
Design pressure, MPa	1,0 (1,6) ¹⁾	1,0	1,0
Design temperature, °C	100 (120) ¹⁾	100	100
Opening pressure, safety valve, MPa			0,9
Volume, l	0,34	---	0,36 (0,38) ²⁾
¹⁾ AquaMicro			
²⁾ Micro HTC			

12.1.1 AquaMicro

Performance at available differential pressure 50-600 kPa				
Designed temperature programme (°C)	Capacity (kW)	Primary flow (l/s)	Actual return temp. (°C)	Secondary flow (l/s)
Hot water circuit				
80-25/10-55	79	0,34	25	0,42
70-25/10-58	36	0,19	25	0,18
65-25/10-50	55	0,33	25	0,33

12.1.2 Micro RTC, Micro HTC, Micro STC, Micro STC2

Performance at available differential pressure 50-400 kPa				
Designed temperature programme (°C)	Capacity (kW)	Primary flow (l/s)	Actual return temp. (°C)	Secondary flow (l/s)
Hot water circuit				
<i>Micro RTC, (Micro HTC), Micro STC, Micro STC2</i>				
80-25/10-55	79 (66)	0,34 (0,29)	25	0,42 (0,35)
70-25/10-58	36 (29)	0,19 (0,15)	25	0,18 (0,14)
65-25/10-50	55 (46)	0,33 (0,28)	25	0,33 (0,28)
Heating Circuit 1				
<i>Micro RTC (Micro HTC)</i>				
80-50 (80-60)	10	0,08 (0,12)	50 (60)	0,08 (0,12)
Heating circuit 1				
<i>Micro STC, Micro STC2</i>				
80-50/50-70	10	0,08	50	0,12
80-60/60-70	7	0,08	60	0,16
80-45/45-60	12	0,08	45	0,19
80-30/30-35	7	0,03	30	0,33
Heating circuit 2				
<i>Micro STC2</i>				
80-50	10	0,08	50	0,08

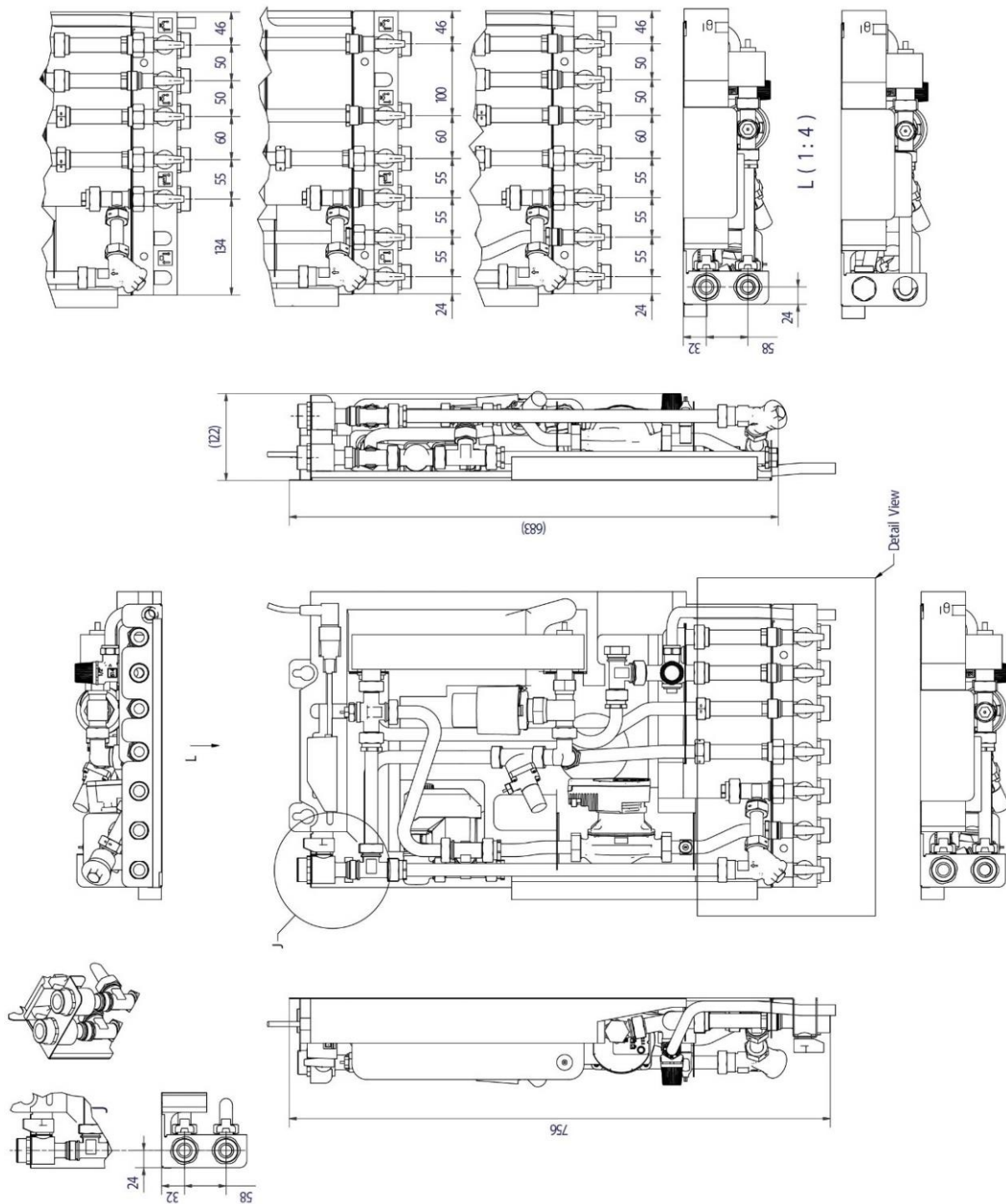
Cetetherm Micro

Operating data and performance

12.2 Technical Data

Main measures	See Measure sketch
• With cover	430x160x775 (mm, WxDxH)
• Without cover	400x120x630 (mm, WxDxH)
Weight	12-15kg, cover 2kg
Electrical connection	
• Micro STC & Micro STC2	230 V, 1-phase, 50 W
• Micro RTC	230 V, 1-phase, 25 W
• Micro HTC	230 V, single phase, 2 W
Transportation	Total weight 19-22 kg, 0.08 m ³
Sound level	<70dB (A) 1.6 m from floor, 1 m from unit

12.3 Measure sketch



13 Options

The mounting instructions are described for a new installation. If the kits are supposed to be installed on an already installed subsystem, release the water pressure and disconnect the electrical power supply before starting. The options must be installed by an authorized installation contractor.

13.1 Safety thermostat

Heating systems sensitive to high temperatures for example under-floor heating must be equipped with a safety thermostat. If the heating system is not equipped with the thermostat, the under-floor heating system and floors in general might get damaged

13.2 Installing the safety thermostat

- First disconnect the substation electrical power supply cable. Disconnect the electrical plug on the circulation pump.
- Attach the safety thermostat electrical box.
Connect the new power supply cable from the electrical box to the circulation pump.
- Reconnect the existing power supply cable to the connection on the electrical box.
- Attach the thermostat to the pipe for heating supply.
- Set the correct maximum temperature value for the thermostat.
- Attach all electrical wires with the necessary number of straps. It is important not to attach electrical wires on primary heating pipes and sharp edges.
- Change parameters and recommended settings before starting up the system with a safety thermostat

13.2.1 Parameters and recommended settings for under floor heating

The following changes must be done before starting up with a safety thermostat.

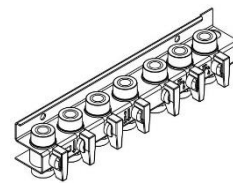
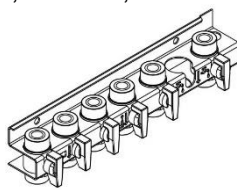
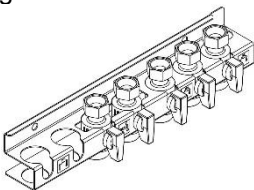
Control panel Round:

See [5.3 Changing control mode, OTC heating curve and max supply temperature](#) and

- Change the supply temperature to maximum 45 °C.
- Change room thermostat heat curve to 5.

13.3 First fix-jig

To save time and efficiency the installation, Cetetherm offers a first-fix- jig including shut-off valves. The first fix-jig is available in three different models, with five, six or seven shut-off valves.



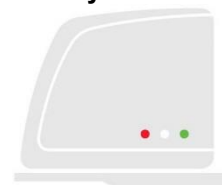
- Mount the first fix-jig to the connection points. Tighten with 45 Nm.
- Mount and connect the substation to the first fix-jig. Tighten with 45 Nm.

13.4 Connect the Round to internet via Gateway

- Connect the Gateway to power



LED status on Gateway

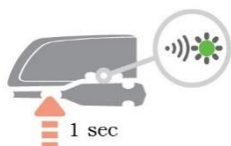


- Connect the Gateway to internet router

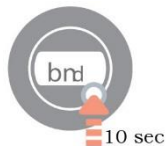


- Bind the Gateway to room thermostat Round

Put Gateway into BIND mode by pressing BIND button on base, for 1 second.



Put Round into BIND mode by pressing the right touch-button under the display for 10 seconds.



Send BIND signal from Round by pressing BIND once again on the right touch button.



LED on Gateway should turn solid green (= good signal).



Round will display binding confirmation + signal strength (5 = good signal) for a few seconds before returning to normal operation.



Cetetherm Micro Options

13.4.1 Set-up account and download the app

Visit <https://international.mytotalconnectcomfort.com/Account/Register> to create an account and register the Gateway.

NOTE! The mail with the activation information might end up in your Junk mailbox.

Chose Comfort system.

You will need the MAC ID and CRC which can be found on the base of the Gateway.

LED on Gateway should turn solid green when successfully registered.

Download the free app *Total Connect Comfort*.

Choose "Create account".

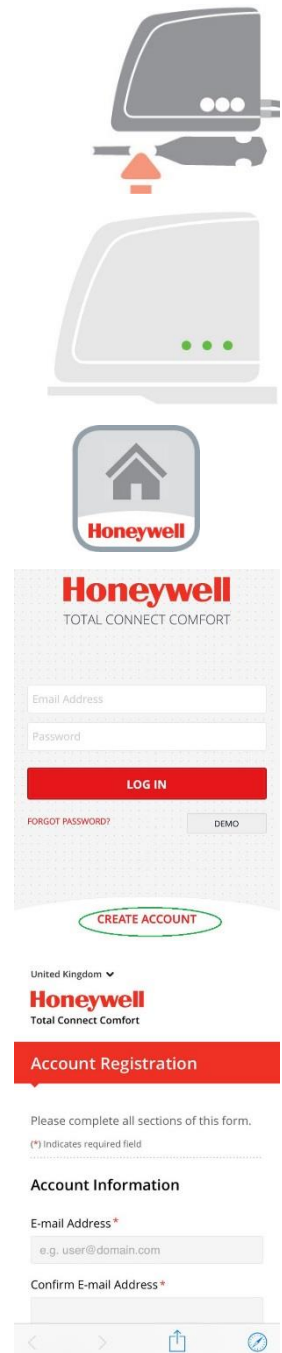
Fill in all fields.

A conformation mail is send to the mail address.





NOTE! The mail with the activation information might end up in your Junk mailbox.

Click on the link in the mail and login with your mail and password.
Lagon to the app to see all connected devices.

NOTE! If the heating has been turned off from the app it must be turned on from the app.



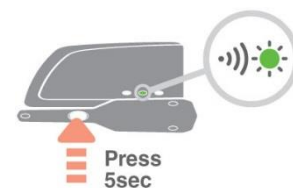
13.4.2 Troubleshooting

	Lost communication with the Round	Check that Round is powered and within RF range
	No internet connection	Check that the home internet router can access the internet
	Trying to connect to home internet router	If LED stays orange, check cables and power to home router.
	Not yet registered	Set up account on https://international.mytotalconnectcomfort.com/Account/Register

13.4.3 Clearing binding between Round and the Gateway

If Round needs to be replaced the binding must be cleared from the Gateway first. As the heating schedule is stored by the Gateway (and not by the App) it will be cleared and need to be set up again.

- Clear Gateway binding by pressing BIND button on base for 5 seconds (LED will flash during).



- LED turns OFF on Gateway and Gateway icon disappear on Round, indicating that binding has been cleared.

