

## Installation, service and operating instruction Cetetherm Mini Plus CM737

District heating substation for single-family houses and multi-family buildings (1 to 12 apartments)



### For additional online information and manual:

URL address: http://www.alfalaval.com/mini-plus





This manual is published by Cetetherm.

Cetetherm can without further notice make changes and improvements to the content in this manual if it is necessary due to printing mistakes, wrong information or changes in the hardware or software.

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

# Contents

| 1              | General information                                | 3          |
|----------------|--|------------|
| 1.1            |  | 3          |
| 1.2            | Installation                                       | 3<br>2     |
| 1.3            | CF-marking   | 3          |
| 1.5            | Information about the document                     | 3          |
| 1.6            | General warnings                                   | 4          |
| 2              | Operating instructions                             | 5          |
| 2.1            | Operation  | 5          |
| 2.2            | Safety equipment/inspection                        | 5          |
| 3              | Product overview                                   | 6          |
| 4              | Installation                                       | 7          |
| 4.1            | Unpacking  | 7          |
| 4.2            | Preparation  | 7          |
| 4.3            | Mounting   | 1          |
| 4.4<br>4.5     | Adjustments and settings                           | ס<br>פ     |
| 4.6            | Dismantlement.                                     | 8          |
| 4.7            | Commissioning advice                               | 8          |
| 5              | Measure sketch Mini Plus                           | 9          |
| 6              | Control panel with room thermostat CM737           | 10         |
| 6.1            | General  | . 10       |
| 7              | Installing and start up the control panel          | .11        |
| 7.1            | Using the control panel as a room thermostat       | . 11       |
| 7.2            | Installing the outdoor temperature sensor          | . 13       |
| 7.3            | Starting up and component control of control panel | . 13       |
| 7.4            | Configure the control panel after installation     | . 13       |
| 7.5<br>7.6     | Setting the time                                   | . 14<br>17 |
| o.             | Operating the room thermostat CM727                | 15         |
| <b>0</b><br>81 | Choosing the operating mode                        | 15         |
| 8.2            | Temperature Enquiry with the Info-button (7)       | . 15       |
| 8.3            | Holiday function                                   | . 16       |
| 8.4            | OTC heating curve                                  | . 16       |
| 8.5            | Parallel adjustment of heating curve               | . 16       |
| 8.6            | Operating mode Auto                                | . 17       |
| 862            | Reviewing the Heating Program                      | . 17<br>17 |
| 8.6.3          | Temperature Override                               | . 17       |
| 8.6.4          | Disabling/enabling time periods                    | . 17       |
| 8.6.5          | Modifying the heating program                      | . 18       |
| 9              | Activation of installer parameters                 | .19        |
| 9.1            | Entering the installer set-up mode                 | 19         |
| 9.2            | Category 1 parameters: Control panel settings      | . 20       |
| 9.3<br>Q /     | Category 2 parameters: ECO-functions               | . 20<br>21 |
| 9.5            | Category 4 parameters: Heating actuator settings   | 21         |
| 9.6            | Category 5: Fault History                          | 21         |
| 10             | Troubleshooting the control panel                  | .22        |
| 10.1           | Fault codes on the control panel                   | . 23       |
| 11             | Electrical circuit diagram                         | .24        |
| 12             | Schematic diagram, main components                 | .25        |
| 13             | Pump settings and pump performance                 | .26        |
|                |  |            |

## Cetetherm

## Cetetherm Mini Plus CM737

Installation, service and operating instruction

| 13.1   | General   |    |
|--------|---|----|
| 13.2   | DHWC-pump Grundfos UPSO 15-55   |    |
| 13.3   | Heating circuit pump Grundfos UPM3 Auto L 50-70 130                       | 27 |
| 13.3.1 | Pump curve proportional pressure mode 2, PP2                              | 28 |
| 13.3.2 | Change pump operating mode  | 28 |
| 13.3.3 | Key lock function   |    |
| 13.4   | Heating circuit pump Grundfos UPML 25-105 180 Auto, settings and capacity | 29 |
| 13.4.1 | Changing pump curve setting   | 30 |
| 14     | Fault finding pump  |    |
| 14.1   | Fault finding UMP3 pump   | 31 |
| 15     | Service instructions  |    |
| 15.1   | Tap water service instructions  |    |
| 15.1.1 | Tap water temperature too low   |    |
| 15.1.2 | Tap water temperature too high  |    |
| 15.1.3 | Hot water temperature unstable  | 32 |
| 15.1.4 | Noise in the DHWC system  | 33 |
| 15.2   | Heating system service instructions                                       | 33 |
| 15.2.1 | Heating system temperature too high or too low                            | 33 |
| 15.2.2 | No heating  | 34 |
| 15.2.3 | Heating system often needs topping up                                     | 35 |
| 15.2.4 | Heating temperature unstable  | 35 |
| 15.2.5 | Noise in the radiator system  | 36 |
| 16     | Service actions for the installer   |    |
| 16.1   | Check the function of the valve for hot water                             | 37 |
| 16.2   | Check the heating actuator and valve function                             | 38 |
| 16.3   | Check the circulation pump Grundfos UPS                                   | 38 |
| 16.4   | Run the pump manually   | 39 |
| 16.5   | Check the volume take-up and pressure equalizing of the expansion vessel  | 39 |
| 17     | Maintenance and repairs   |    |
| 17.1   | Cleaning the district heating filter                                      | 40 |
| 17.2   | Cleaning the heating circuit filter                                       | 40 |
| 17.3   | Change the complete DHWC pump or pump components                          | 41 |
| 17.4   | Change the complete heating pump or pump components                       | 42 |
| 17.5   | Change the heating supply temperature sensor                              | 42 |
| 17.6   | Change the outdoor temperature sensor                                     | 43 |
| 17.7   | Change the heating actuator   | 43 |
| 17.8   | Change the heating valve  | 44 |
| 17.9   | Change the hot water valve  | 44 |
| 17.10  | Change the hotwater actuator and sensor                                   | 45 |
| 17.11  | Change the DHWC check valve   |    |
| 17.12  | Change the expansion vessel   | 46 |
| 18     | Options   | 47 |
| 18.1   | Safety thermostat   | 47 |
| 18.1.1 | Parameters and recommended settings for under floor heating               | 47 |
| 19     | Operating data and performance  |    |
| 19.1   | Operating data Mini Plus CB30-60H   | 48 |
| 19.2   | Operating data Mini Plus CB18-54H   | 48 |



# 1 General information

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

## 1.1 Comfort

Mini Plus has fully-automatic temperature control for heating and hot water. The heating is controlled in relation to outdoor temperature and/or desired room temperature. The hot water is controlled and maintained at the desired temperature.

### 1.2 Installation

Well planned pipe work and readymade electrical wiring make installation very simple. A pre-programmed controller and plug-and-socket connection provide further simplification, so that the substation can be started without delay. The Mini Plus is designed for hanging on the wall.

Mini Plus is supplied fully wired. The wiring conforms to the applicable rules for CE marking and has undergone electrical safety testing and function testing. For permanent installation, the substations must be connected via an all-pole isolator switch.

The substation must be connected to a grounded wall socket.

### 1.3 Long-term security

All the plates and pipes in the heat exchanger are made of acid-resistant stainless steel for long life. All components are adjusted together and undergo thorough function testing in accordance with Alfa Laval's ISO 9001:2008 quality assurance system. For future servicing requirements, all components are easily accessible and individually replaceable.

## 1.4 CE-marking

Mini Plus is CE-marked to certify that the substation conforms to international safety regulations. To maintain the validity of the CE marking, only identical replacement parts must be used.

### **1.5** Information about the document

All pictures in this document are general images. Mini Plus is available in different models and levels of equipment.



Installation, service and operating instruction

## 1.6 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 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.  |
| 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.  |
| Before the substation is connected to the electrical supply, make sure that the secondary 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. |
| When starting up the district heating substation, to avoid the risk of scalding, make sure that no-<br>one draws any hot water until the hot water temperature has been adjusted.  |
| Start district heating circulation by first opening the valve in the <b>district heating supply</b> and then <b>return</b> lines, to avoid pollutions in the system. Open the valves slowly to avoid pressure surges. Do the same way with the heating circuit, first open the valve for <b>heating return</b> then <b>supply</b> .                                |
| Do not shut of the electrical supply to the operator control panel. This will damage the circulation pump, valves, actuators etc.  |



# 2 Operating instructions

## 2.1 Operation

The temperature and pressure of the incoming heating network water from the culvert network are very high. For this reason, only the heat from this water is used. The heating network water does not enter the heating and hot water systems of the building.

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.

Mini Plus has automatic temperature control for heating and hot water. The heating circuit is controlled in relation to outdoor temperature and/or desired room temperature by means of a controller 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.

The hot water temperature is controlled by a temperature control system which is set to about 55 °C.

After adjustment, the Mini Plus 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.

### 2.2 Safety equipment/inspection

- Daily 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 variation causes unnecessary wear of valves, actuators 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 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.

The heating system is topped up via the heating filler valves, see <u>15.2 Heating system service instructions</u>. Be sure to close the valves when the correct pressure is reached. The water used to top up the system contains oxygen and may cause corrosion in the system. For this reason, the system should be topped up as seldom as possible, at most once a year, when the heating system has been thoroughly bled and balanced.

Hot water temperature in apartments or one family houses can be set to about 55°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.

For setting and (if necessary) fine adjustment of the heating and hot water temperatures, see chapter 8.



Cetetherm Mini Plus CM737 Installation, service and operating instruction

## 3 Product overview



| 1  | Heat exchanger for heating                       |
|----|--|
| 2  | Heat exchanger for domestic hot water            |
| 3  | Connection box for electric power and<br>sensors |
| 4  | Control valve, heating circuit                   |
| 5  | Actuator, heating circuit                        |
| 6  | Supply temperature sensor, heating circuit       |
| 7  | Outdoor temperature sensor (not in picture)      |
| 8  | Operator control panel with room thermostat      |
| 9  | Control valve for domestic hot water             |
| 10 | Actuator and sensor for domestic hot water       |
| 11 | Temperature sensor connection, DH supply         |
| 12 | Filter for district heating supply               |
| 13 | Adapter for energy meter                         |
| 14 | Temperature sensor connection, DH return         |
| 15 | Check valve for cold water                       |
| 16 | Safety valve for domestic hot water              |
| 17 | Valve to top up the heating circuit              |

| Pict | ure 1 |                                    |
|------|-------|------------------------------------|
|      | 18    | Balancing valve DHWC               |
|      | 19    | Circulation pump DHWC              |
|      | 20    | Check valve for DHWC               |
|      | 21    | Safety valve for heating circuit   |
|      | 22    | Filter for heating circuit         |
|      | 23    | Pressure gauge for heating circuit |
| )    | 24    | Circulation pump heating           |
| at   | 25    | Safety thermostat (option)         |
|      | 26    | Shutoff valves                     |
|      | Α.    | District Heating Supply            |
| /    | В.    | District Heating Return            |
|      | C.    | CW                                 |
|      | D.    | DHW                                |
|      | E.    | Heat, Return                       |
|      | F.    | Heat, Supply                       |
|      | G.    | DHWC                               |

valve to top up the heating circuit



## 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 exchangers as this may weaken them. Avoid lifting the unit by holding the heat exchangers.

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 into 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 district heating supplier. The available differential pressure should be at least 100 kPa and at most 600 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.

## 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, 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 <u>5 Measure sketch Mini Plus</u>.
- Install enclosed check valve for cold water in cold water pipe.



Picture 2; Installation of check valve in cold water pipe.

- Connect the pipe work to the connection points. Use the enclosed shutoff valves with flat contact face.
- Drainage pipes from safety valves 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. 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.
- Mount the outdoor temperature sensor on the north side of the building, 2 metres above the ground, or higher. For installation of the outdoor temperature sensor, see <u>7.2 Installing the outdoor temperature</u> <u>sensor</u>.
- For installation of the operator control panel see 7.1 Using the control panel as a room thermostat.



Installation, service and operating instruction

## 4.4 Mounting options

 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 chapter <u>18.1 Safety thermostat.</u>

### 4.5 Adjustments and settings

- Open incoming cold-water supply and fill the service water and heating circuits, bleeding off any trapped air.
- Allow 5 minutes for the controller start up sequence and to regain functionality after a power cut. See <u>7.3 Starting up and component control of control panel</u>.
- Check the operation and opening pressures of the safety valves.
- Now 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. The temperature should be approximately 55°C. It takes about 20 seconds to get stable tap water temperature. See <u>15.1 Tap water service instructions</u> for adjusting hot water temperature.

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

- Start the heating circulation pump with the highest output setting. Let the heating system heat up and bleed the system again, see <u>15.2 Heating system service instructions</u>. After final bleeding, the pressure should not be less than 1.0 bar in winter and not less than 0.6 bar in summer.
- 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.
- Activate the outdoor sensor (needed for heating curve control) and/or room temperature sensor via the room panel. Se <u>7.4 Configure the control panel after installation</u>.
- Set the day and time on the operator control panel. See <u>7.5 Setting the day</u> and <u>7.6 Setting the time</u>.
- Set the operating mode on control panel. See <u>8.1 Choosing the operating mode</u>.
- 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 district heating water.

## 4.6 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.

## 4.7 Commissioning advice

The controller has been set at the factory. If any function needs tuning, values can be changed regarding this manual for parameter setting. Initially, the commissioning process should be carried out with the factory settings. To activate Eco function or summer heating, see <u>9.3 Category 2 parameters: ECO-functions.</u>



# 5 Measure sketch Mini Plus













C MIN HUN H

# 6 Control panel with room thermostat CM737

## 6.1 General

The rom thermostat CM737 controls the supply temperature to the heating system. When connecting unit to the power supply, the room thermostat verifies the connected sensors and then automatically chooses to control by room or outdoor temperature sensor or both.

### Features:

- Ergonomic user interface.
- Large LCD (Liquid Crystal Display) Screen.
- Four independent temperature levels per day, from 5°C to 35°C.
- Built-in Memory holds the user program indefinitely.
- Holiday button saves energy by letting you reduce the temperature for 1 to 99 days.
- 7- days heating program to match your lifestyle, and maximizing energy savings.



#### Picture 4

| 1 | LCD display         | 6  | Temperature change buttons | 11 | Program buttons     |  |  |  |
|---|---------------------|----|----------------------------|----|---------------------|--|--|--|
| 2 | Time display        | 7  | Temperature enquiry button | 12 | Copy day button     |  |  |  |
| 3 | Heating indicator   | 8  | Operating mode buttons     | 13 | Day select button   |  |  |  |
| 4 | Day indicator       | 9  | OK button, green           | 14 | Time change buttons |  |  |  |
| 5 | Temperature display | 10 | Holiday function button    |    |                     |  |  |  |

### **OK-button (9)**

When changing settings/values in room thermostat, the numbers in the display is flashing. Confirm the new settings with the green OK-button (9) and the new setting will be confirmed.



## 7 Installing and start up the control panel

## 7.1 Using the control panel as a room thermostat

The control panel can be used as a room thermostat. Before installation make sure that the electrical power supply is disconnected.



Picture 5

Install the room thermostat in the living space according to following:

- A suitable installation is about 1.5 meters above floor and on an inner wall.
- The room thermostat must not be combined with other thermostats in the same control zone.

Use a suitable 2-conductor cable between the connection box and the operator control panel. With a conductor area of 0.6 mm<sup>2</sup>, the maximum cable length is 50 metres. Maximum  $5\Omega$ /conductor. Install the cable ends in the terminal, marked A and B, located in the operator control panel. Connect the plug to the connection box again. The unit can now be connected to the electrical power.

After starting up, choose configuration and operating mode, see <u>7.4 Configure the control panel after</u> *installation*.



Cetetherm Mini Plus CM737

Installation, service and operating instruction



Picture 6



### 7.2 Installing the outdoor temperature sensor

Connect the outdoor temperature sensor to the terminal strip in accordance with the electrical diagram, remove any resistor.

With a conductor area of 0.6 mm<sup>2</sup> the maximum cable length is 50 metres and maximum  $5\Omega$ /conductor. When the outdoor temperature sensor cable is connected to a terminal strip, the connecting cable must be long enough for the controller and its mounting plate to be lifted off.

If the outdoor temperature sensor is connected later, for example in a construction period, the current must be disconnected for a few minutes.

Set parameter 14 according to requested compensation; see <u>7.4 Configure the control panel after installation</u>.

The installation must be connected to a grounded wall socket.

### 7.3 Starting up and component control of control panel

**Note:** The substation must be filled with water before starting the room thermostat, if not the pump can be damage.

- 1. Put the electrical cable from the control panel into a wall outlet.
- 2. Check the heating actuator (knob turns) on and pump function. In start-up mode, the components manoeuvre by the following schedule:
  - 10s actuator clockwise, if not closed at start
  - 10s actuator counter clockwise
  - 10s actuator clockwise
  - 10s pump runs
  - 150s actuator closes

After approximately another 4 minutes the room thermostat changes from start up to normal regulation.

- 3. Press the **MAN** (8) button for a fixed set point (no reduction) of the room temperature.
- 4. Adjust the room temperature with the increase/decrease buttons on the right (6).

By outdoor compensation this change represents a standard parallel shift of the heat curve, recalculated for room temperature. For more details see chapter <u>8.5 Parallel adjustment of heating curve</u>.

### 7.4 Configure the control panel after installation

The room thermostat can be configured in three different ways. All installation parameters can be found in the parameter list, see <u>9 Activation of installer parameters</u>. The control panel is pre-set to Outdoor compensation.

- Outdoor compensation, require a connected outdoor temperature sensor, see <u>7.2 Installing the outdoor temperature sensor</u>. Set parameter 14:rC to 1.
- Room compensation, require a mounted room thermostat, see <u>7.1 Using the control panel as a room thermostat</u>. Set parameter 14:rC to 0.
- Outdoor and room compensation, require a connected outdoor temperature sensor and a mounted room thermostat see <u>7.2 Installing the outdoor temperature sensor</u> and <u>7.1 Using the control panel as a</u> <u>room thermostat</u>. Set parameter 14:rC to 2.



### 7.5 Setting the day

 Press the DAY button to begin setting the day, (1-7=mon-sun). Each press will move the day indicator one step forward. After 7 it will start over again at 1. Press the green OK button to confirm.



### 7.6 Setting the time

1. Press either of the <sup>(2)</sup> ⊕ or <sup>(=)</sup> buttons once to enter timer setting mode. The LCD screen flashes the time digits. When the unit is powered for the first time the display shows 12:00.



Use the e ⊕ f or 
 buttons to set the correct time then press the green o w button to confirm.

Each press of the buttons will change the time by one minute and holding them down will change the time slowly at first and get progressively quicker.

NOTE: to leave this mode, press the AUTO, MAN or OFF buttons.



# 8 Operating the room thermostat CM737

## 8.1 Choosing the operating mode

The room thermostat can operate in three different modes; Automatic, Manual or Off. To set the operating mode press either of the **AUTO**, **MAN** or **OFF** buttons. The screen indicates which mode is currently active.

NOTE: Cetetherm recommends the mode MAN.

• MAN (manual) the room thermostat acts with a fixed set point throughout the day.

The set point can be adjusted from 5°C to 35°C by using the <sup>I</sup> buttons. The thermostat will continue to maintain this temperature until another operating mode or temperature is selected.

• AUTO (automatic) the room thermostat follows the built-in temperature program, default or modified.

A manually adjustment of the temperature with arrow "up" or "down" is only valid until next programmed temperature change.

**NOTE:** The built-in heating program has been designed to provide normal comfort requirements, but to customise the settings please see <u>8.6 Operating mode Auto</u>.

• **OFF** the room thermostat controls to a minimum temperature. Default setting of 5°C acts as a frost protection for your home.

### 8.2 Temperature Enquiry with the Info-button (7)

Each value will be displayed for 3 second before returning to show the initial screen.

**NOTE!** The initial screen shows different temperatures depending on if the outdoor temperature sensor is connected and the setting of parameter 14:rC in the room thermostat.

- Target room temperature with outdoor compensation.
- Current room temperature with room compensation.

Press ones on the info-button I, the display will show one of following three:

1. EXT above the clock and a temperature.

The outdoor temperature sensor is installed correct and the controls the heating.

Displayed temperature is present outside temperature, according to the sensor.

Press ones more on the **Info**-button, in 3 seconds, to show the supply temperature. Check that the temperature is reasonable buy carefully touching the supply pipe.

- Flashing temperature and no EXT above the clock. The temperature flashing is the set point according to room compensation and the room thermostat controls the heating without the outdoor temperature sensor. Press ones more on the Info-button, within 3 seconds, to see the value of the outdoor sensor.
- 3. EXT above the clock and ---- instead of the outdoor temperature.

This means that the outdoor sensor or its cable is damaged or not connected.

Press ones more on the **Info**-button, in 3 seconds, to show the supply temperature. Check that the temperature is reasonable buy carefully touching the supply pipe.







## Cetetherm Mini Plus CM737

Installation, service and operating instruction

### 8.3 Holiday function

The holiday function allows you to set a constant temperature (default =  $10^{\circ}$ C) for a specified number of days (from 1 - 99 days). This saves energy and related costs when the house is empty, but resumes normal operation on the day of return.

### To set the Holiday function:

- 1. Ensure the room thermostat is running in AUTO or MAN operating modes.
- 2. Press the holiday **I** button to display the holiday day's counter and temperature setting, along with the holiday indicator **I**.
- 3. Press the ℓ ⊕ er <sup>□</sup> time buttons to set the holiday time (1-99 days) and press the green <sup>OK</sup> button to confirm.
- 4. Press the 𝑘 𝔤 or 𝔍 buttons to set the holiday temperature (5°C 35°C) and press the green 𝕨 button to confirm.

The room thermostat will now control to the new temperature for the set number of days that the home is vacant. At midnight, the holiday counter will be reduced by one until the selected number of days have passed. The room thermostat will then return to former operation as set by the **MAN** or **AUTO** mode.

Supply water temperature (°C)

To cancel the HOLIDAY function or to exit the function at any time: press the **I** button a second time.

## 8.4 OTC heating curve

The CM737 controls the indoor temperature as a function of the measured outside air temperature. The heating 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.

## 8.5 Parallel adjustment of heating curve

If any other room temperature set point than 20°C is used the selected curve will be parallel compensated.

Every change of the room temperature set point from 20°C will change the supply temperature with approximately 3°C. If the room temperature set point is increased from 20°C to 21°C the supply temperature will increase with approximately 3°C.

This example shows parallels of curve 10 by 19°C and 21°C.



Heating curve ratio is at room temperature setting of 20°C *Picture 7*.





Supply water temperature (°C)

### 8.6 Operating mode Auto

### 8.6.1 The Built-in Heating Program

The built-in heating program has four temperature level changes per day that can be set between 3.00am and 2.50am the following day - allowing the evening temperature to maintain after midnight. Each temperature level can be set between 5°C and 35°C, and adjusted in 0.5°C increments.

The factory default program for heating is as:

### Monday to Friday (Day 1 to 5)

| Period      | 1     | 2     | 3     | 4     |
|-------------|-------|-------|-------|-------|
| Time        | 6:30  | 8:00  | 18:00 | 22:30 |
| Temperature | 21 °C | 18 °C | 21 °C | 16 °C |

### Saturday & Sunday (Day 6 & 7)

| Period      | 1     | 2     | 3     | 4     |
|-------------|-------|-------|-------|-------|
| Time        | 6:30  | 8:00  | 18:00 | 22:30 |
| Temperature | 21 °C | 18 °C | 21 °C | 16 °C |

### 8.6.2 Reviewing the Heating Program

To review or edit the heating program use the **PROGRAM**  $\bigcirc$  or  $\bigcirc$  buttons to navigate between the four individual programming periods.

Use the **DAY** button to step through each day of the week, so the complete 7-day heating program can be reviewed or edited.

### 8.6.3 Temperature Override

During AUTO mode, the programmed temperature can be adjusted manually. The 'target' temperature will be

displayed and flash for 5 seconds - during this time the  $\mathbb{I}$  or  $\mathbb{V}$  or buttons can be used to modify the set value.

**NOTE***:* This temperature override is cancelled at the next programmed temperature change.

### 8.6.4 Disabling/enabling time periods

Any of the heating period from 2 to 4 can be removed from (or returned to) the heating program profile.

To disable or enable time periods:

1. To disable unwanted periods, go to the desired period (2 to 4) using the **PROGRAM** (C) or (D) buttons to navigate, ensure the correct period is highlighted with the flashing square symbol.

Press and hold the **u** button for at least 2 seconds and the display will indicate the period has been removed from the program.

2. To enable periods again, follow the same procedure as above, navigating to the already disabled period. To enable this period again, press and hold the **i** button for at least 2 seconds.



Installation, service and operating instruction

### 8.6.5 Modifying the heating program

### To change the heating program:

a) Press either of the **PROGRAM** (C) or buttons to enter the programming mode.

programming mode. The time /temperature settings for period ① on Monday day 1 will be flashing. The active period is highlighted by a flashing square around the numbers at the bottom of the screen and the selected day is shown with the day indicator.

b) To adjust the period, start time use the  $\bigcirc \oplus \odot$  buttons, the 'OK?' indicator will be displayed to confirm the change. Holding the button down will change the time quickly.

**Note:** If you are pressing the  $\bigcirc \bigoplus$  or  $\boxdot$  buttons and the display flashes the next period, it means the next period will be pushed forward.

c) Once the required time is reached press the green OK button to confirm.

**Note:** If the original time setting did not require adjustment press the green **(DK)** button to move to step 'd'.

- e) The next time and temperature period will now be active. Adjust this by repeating steps b d above until all four periods are set or press the **AUTO** button to run the program as set, at any time.

### Chose how to set the program for the next day:

f) Press the COPY DAY button to copy Monday's program into Tuesday. The display will go blank apart from the 'non-flashing' day indicator, which indicates the day copied and the 'flashing' target day to copy the program to. To accept this day, press the green OK button. To select a different target day press the DAY button until the 'flashing' day indicator is under the required day, and then accept it by pressing the green OK button.

**Note:** Once the target day is confirmed it becomes the day that is copied if the **COPY DAY** button is pressed again.

Or

Press the **DAY** button to move the day indicator to Tuesday (Day 2). The program for that day can then be adjusted by following steps **b** to **e**. Programs for the remaining days can be set in the same way, using the **DAY** button to move to the next day.

To exit the programming mode, select the desired operating mode by pressing the **AUTO**, **MAN** or **OFF** buttons.

Note: To run the adjusted program; select the AUTO mode.



## 9 Activation of installer parameters

Installer Mode is used to alter the system settings for specific applications, to use the special features of the room thermostat in a different way or to alter the factory present parameters. Parameters are divided into groups:

- Category 1 parameters: Control panel settings
- Category 2 parameters: ECO-functions
- Category 3 parameters: Setting and displaying sensor values
- Category 4 parameters: Heating actuator settings
- Category 5: Fault History

### 9.1 Entering the installer set-up mode

- 1. Press the **OFF** button.
- 2. Press and hold the **button** and the two **PROGRAM** ( ) and buttons together.
- 3. The unit will display the first parameter of installer parameter group category 1.
- Press the <sup>I</sup> a or <sup>I</sup> button to change the factory setting. The display will flash indicating that a change has been made.
- 5. Press the green **OK** button to confirm the change. The display will stop flashing.
- 6. Press the <sup>(2)</sup> ⊕ button to go to the next parameter.
- 7. Press the **PROGRAM button** to go to the next parameter category.
- 8. To exit installer mode, press the **AUTO**, **MAN** or **OFF** button.





| Parameter                               | Para<br>meter<br>N:o | Factory Default Setting |  | Optional Setting |   |
|---|----------------------|-------------------------|--|------------------|---|
|   |                      | Display                 | Description  | Display          | Description   |
| AM-PM / 24hr<br>Display                 | 1:CL                 | 24                      | 24 hr. clock display format  | 12               | 12 hr. – AM/PM clock display<br>format  |
| Reset Time/ Temp<br>Program             | 2:rP                 | 1                       | Time/temperature<br>profile set to factory<br>default. Changes to<br>0 when one of the<br>time/temp profiles<br>are changed. | 0                | Factory Time / Temperature<br>profile has been modified<br>To restore the factory profile<br>set to 1   |
| Upper Temp Limit                        | 6:uL                 | 35                      | 35°C Upper Temp.<br>Limit  | 21 to 34         | 21°C to 34°C, adjustment in<br>1°C steps  |
| Lower Temp Limit                        | 7:LL                 | 5                       | 5°C Lower Temp.<br>Limit   | 6 to 21          | 5°C to 21°C, adjustment in<br>1°C steps   |
| Temperature Offset                      | 12:tO                | 0                       | No temperature offset  | -3 to +3         | -3°C to +3°C, adjustment in<br>0.1°C steps  |
| Proportional Band<br>Width              | 13:Pb                | 1.5                     | Proportional band of 1.5 degree  | 1.6 to 3.0       | 1.6°C to 3.0°C, adjustment<br>in 0.1°C steps  |
| Room control / OTC                      | 14:rC                | 0                       | Room temperature control (thermostat)  | 1 or 2           | <ul> <li>1 – OTC control without room</li> <li>temperature compensation</li> <li>2 – OTC control with room</li> <li>temperature compensation</li> </ul> |
| OTC heat curve                          | 15:OC                | 10                      |  | 1 to 40          | 1 to 40, adjustment in<br>steps of 1  |
| Reset Parameters<br>to Factory Defaults | 19:FS                | 1                       | All settings at factory<br>defaults Changes to<br>0 when one of the<br>parameter is<br>changed                               | 0                | Settings are as modified<br>above. To restore the factory<br>parameters set to 1  |

## 9.2 Category 1 parameters: Control panel settings

### 9.3 Category 2 parameters: ECO-functions

| Parameter                  | Para<br>meter<br>N:o | Factory Default Setting |   | Optional Setting |  |  |
|----------------------------|----------------------|-------------------------|---|------------------|--|--|
|                            |                      | Display                 | Description   | Display          | Description  |  |
| Summer heating in OTC mode | 1:SH                 | 0                       | Summer heating disabled   | 1 to 40          | Minimum set point for the<br>heating and the pump will be<br>held on.  |  |
| Summer reduction           | 2:SL                 | 20                      | The outside<br>temperature at which<br>the heating will switch<br>off | 10 to 30         | The economy function will be disabled if the setting for summer heating is not 0   |  |
| Economy function           | 3:Pd                 | 10                      | Diff between outside<br>and calculated water<br>supply temperature    |                  | If the calculated water supply<br>temperature is not greater<br>than the outside temperature<br>by this amount the heating<br>will switch off. |  |



| 3.4 Category 5 parameters. Setting and displaying sensor values |                      |                         |  |                  |  |  |  |
|---|----------------------|-------------------------|--|------------------|--|--|--|
| Parameter   | Para<br>meter<br>N:o | Factory Default Setting |  | Optional Setting |  |  |  |
|   |                      | Display                 | Description  | Display          | Description                                      |  |  |
| Maximum central heating set point <sup>2)</sup>                 | 1:CH                 | 90                      | 90°C or obtained from the boiler   | 40 to 90         | 40°C to 90°C adjustment in<br>1°C steps          |  |  |
| DHW set point <sup>2)</sup>                                     | 2:HS                 | 55                      | 55°C or obtained from the boiler   | 40 to 80         | 40°C to 80°C adjustment in<br>1°C steps          |  |  |
| Supply water<br>temperature <sup>3)</sup>                       | 3:St                 | Actual<br>temp          | Temperature obtained<br>from the connection<br>box (between 0°C and<br>99°C) | N/A              | Not applicable                                   |  |  |
| Return water<br>temperature <sup>3)</sup>                       | 4:rt                 | Actual<br>temp          | Temperature obtained<br>from the connection<br>box                           | N/A              | Not applicable                                   |  |  |
| DHW temperature <sup>3)</sup>                                   | 5:Ht                 | Actual<br>temp          | Temperature obtained<br>from the connection<br>box                           | N/A              | Not applicable                                   |  |  |
| Outside<br>temperature 4)                                       | 6:Ot                 | Actual<br>temp          | Between -30°C and 99°C   | N/A              | Not applicable                                   |  |  |
| Water pressure <sup>3)</sup>                                    | 7:Pr                 | Actual press            | Between 0.0 bar and 4.0 bar  | N/A              | Not applicable                                   |  |  |
| DHW storage<br>overnight  | 8:HO                 | 1                       | DHW storage enabled after last period of day                                 | 0                | DHW storage disabled after<br>last period of day |  |  |
| DHW storage<br>during HOLIDAY                                   | 9:HH                 | 0                       | DHW storage disabled<br>during HOLIDAY                                       | 1                | DHW storage enabled during<br>HOLIDAY            |  |  |
| Low capacity control  | 10:LD                | 1                       | Not applicable   | 0                | Not applicable                                   |  |  |

## 9.4 Category 3 parameters: Setting and displaying sensor values

### 9.5 Category 4 parameters: Heating actuator settings

| Parameter Para<br>meter<br>N:o |   | Factory Default Setting |   | Optional Setting |              |
|--------------------------------|---|-------------------------|---|------------------|--------------|
|                                |   | Display                 | Description   | Display          | Description  |
| P_heat                         | 1 | 0                       | Proportional band                                   |                  | 1K           |
| I_heat                         | 2 | 1                       | Integral factor                                     |                  | 0.1 / minute |
| Run time valve                 | 3 | 15                      | Time needed to open<br>or close valve<br>completely |                  | 10 seconds   |

### 9.6 Category 5: Fault History

| Parameter | Para<br>meter<br>N:o | Factory Default Setting |             | Optional Setting |             |
|-----------|----------------------|-------------------------|-------------|------------------|-------------|
|           |                      | Display                 | Description | Display          | Description |

In this category, the occurred errors can be viewed, beginning with the most recent error.

<sup>1)</sup> Only if the setting is allowed by the heating appliance. Standard settings and limits can be set by the heating appliance.

<sup>2)</sup> Only available if supported by the heating appliance.

<sup>3)</sup> Only available if the outside temperature sensor is mounted.

<sup>4)</sup> Category 4 & 5 parameters are only available if supported by the heating appliance. This will depend on the type of boiler electronics in the heating appliance connected with the control panel.

Notes: Always remember to press the green () button to confirm new Installer Set-Up setting. To exit the Installer Set-Up Mode press the AUTO or MAN button.



# 10 Troubleshooting the control panel

| Symptom   | Possible Cause  | Remedy  |
|---|---|---|
| A flashing symbol<br>appears on the display within<br>one minute after the control<br>panel being powered on. | The control panel receives<br>power supply from the<br>connection box, but no<br>information.   | The control panel is not<br>connected to the correct<br>terminals of the connection box.  |
| A <b>symbol</b> appears<br>permanently (no flashing) on<br>the display.                                       | Communication error due to an<br>interrupt or short circuit in the<br>link between the connection box<br>and the control panel.                   | The control panel is not<br>connected to the correct<br>terminals of the connection box.<br>Contact Cetetherm.  |
| Display is blank  | No power feed after the installation of the control panel.  | Check that the power supply cable of the connection box is connected.   |
|   |   | The control panel is not<br>connected to the correct<br>terminals of the connection box   |
|   | The power supply or the<br>communication link between the<br>control panel and the<br>connection box has been<br>interrupted for more than 8 hrs. | Check that the power supply<br>cable of the connection box is<br>connected.<br>After the power is restored the<br>time and day may need to be<br>adjusted – otherwise contact<br>your service technician. |
| A flashing symbol<br>appears on the display after the<br>control panel being operating<br>for a period        | The control box is showing an error   | Press the button, to see the error code. See <u>10.1 Fault</u> codes on the control panel.  |
| A flashing symbol<br>appears on the display and the<br>room temperature is replaced<br>by "—"                 | Internal fault in the temperature measuring circuit.  | Contact your service technician.  |



### 10.1 Fault codes on the control panel

If a spanner is visible on the display, there is an on ongoing alarm. Press the Info-button to view the fault code.

| Error source  |   | Error code                         |
|---|---|------------------------------------|
| No fault (power-up) 0   |   | 0                                  |
| Supply water te   | mperature sensor or cable   | 1                                  |
| Outside air tem   | perature sensor out of range  | 2                                  |
| Temperature in  | the connection box out of range   | 3                                  |
| Cannot reach th   | ne set supply temperature   | 4                                  |
| No communicat   | tion between control panel and connection box   | 7                                  |
| Fault code 0  | This fault code can just be seen in the fault history, parameter settings Not via the Info- button.   | category 5.                        |
| Fault code 1  | Supply sensor or cable  |                                    |
| Cause<br>Actions  | Measured supply water temperature is below 0°C or above 100°C.<br>The control panel turn the pump off, and enter off mode (frost protection<br>Check the supply sensor and its cable. | n).                                |
| 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<br>Actions  | Measured outside temperature is below -40°C or above 60°C<br>Enter room compensation until a valid temperature has been measured.<br>Check the outside sensor and its cable.          |                                    |
| Fault code 3  | Connection box temperature out of operating range   |                                    |
| CauseMeasured environment temperature is below -0°C or above 60°C.ActionsThe control panel turn the pump off, and enter off mode (frost protection).Make sure that the substation is mounted in a well vented room. |   | n).                                |
| Fault code 4  | Cannot reach the set supply water temperature   |                                    |
| Cause<br>Actions  | Air in the pump, low temp/ not district heating supply.<br>Vent the pump, check the control valve and actuator.   |                                    |
| Fault code 7  | No communication between control panel and connection box   |                                    |
| Cause<br>Actions  | The connection box does not communicate with the control panel (by C<br>Fault is only cleared after a power break and OT communication is wor<br>Check the control panel cable.       | )T) for 60 seconds.<br>king again. |



### Cetetherm Mini Plus CM737

Installation, service and operating instruction



Picture 11



12 Schematic diagram, main components



Picture 12



# 13 Pump settings and pump performance

## 13.1 General

Mini Plus is equipped with two circulation pumps, one for the hot water circulation, DHWC-pump, and one for the heating circuit.

The DHWC pump is a traditional three speed circulation pump. The DHWC pump has a switch where the speed/capacity can be set.

Mini Plus can be equipped with two different circulation pumps for heating circuit. Both are a pressure controlled pump.



### 13.2 DHWC-pump Grundfos UPSO 15-55



### Cetetherm Mini Plus CM737 Installation, service and operating instruction

### 13.3 Heating circuit pump Grundfos UPM3 Auto L 50-70 130

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, proportional pressure mode 2, PP2.

Operation mode indicates with LEDs on the pump front.



| Settings | Pump curve | Function  |
|----------|------------|---|
| PP1      |            | Proportional-pressure curve<br>The head (pressure) is reduced at falling heat demand                          |
| PP2      |            | The duty point of the pump will move up or down on the selected proportional-pressure curve, depending on the |
| PP3      |            | heating demand.   |
| CP1      |            | <b>Constant-pressure curve</b><br>The head (pressure) is kept constant, irrespective of the                   |
| CP2      |            | The duty point of the pump will move out or in on the selected  |
| CP3      |            | constant-pressure curve, depending on the heating demand in the system.                                       |
| CC1      |            | <b>Constant curve</b><br>The circulator runs on a constant curve, which means that it                         |
| CC2      |            | The duty point of the circulator moves up or down on the  |
| CC3      |            | selected constant curve, depending on the heat demand in the system.  |
| CC4      |            | _   |



Installation, service and operating instruction



## 13.3.1 Pump curve proportional pressure mode 2, PP2

### 13.3.2 Change pump operating mode

The display shows the current operation status.

- Press the button for more than 2 seconds and the circulator switches to "setting selection". The LEDs flash and show the current setting mode.
   Please note that if the key lock is disabled, the circulator will not switch to "setting selection". In this case, unlock the key lock by pressing the button for more 10 seconds.
- To select between the settings, instantly press the button until you find the setting you want. If you pass a setting, you need to continue until the setting appears again as it is not possible to go back in the settings menu.
- Release the button for more than 10 seconds and the user interface switches back to the performance view and the last setting is stored.

### 13.3.3 Key lock function

The purpose of the key lock function is to avoid accidental change of settings and misuse. When the key lock function is enabled, all long key presses will be ignored.

Lock and unlock by pressing the key for more than 10 seconds.





13.4 Heating circuit pump Grundfos UPML 25-105 180 Auto, settings and capacity

The heating pump is internally controlled via digital pulse-width modulation.

The user interface allows to select between six control curves in two control modes:

- three proportional pressure curves (PP)
- three constant pressure/power curves (CP).

The pump is factory preset to Proportional pressure curve, PP2.

| Flashing fast | PP1 |
|---------------|-----|
| Flashing fast | PP2 |
| Flashing fast | PP3 |
| Flashing slow | CP1 |
| Flashing slow | CP2 |
| Flashing slow | CP3 |

**Picture 15,** LED indication of the curve setting

# Cetetherm

## Cetetherm Mini Plus CM737

Installation, service and operating instruction

#### 13.4.1 Changing pump curve setting



Picture 16, Serial curve setting

- Push the button for two seconds Pump goes to setting mode - LED starts flashing.
- With each push, the setting changes: LED 1-2-3 are permanently on, and then the control curve and mode is changed.
- 3. Flashing mode:
  - Fast: Proportional pressure
  - Slow: Constant pressure/power
- 4. After ten seconds not pushing the button:
  - Setting is adapted.
  - Pump returns to operating mode
- 5. LED 1 or 2 or 3 is permanently on.
  - Pump is running with the selected curve and mode.



## 14 Fault finding pump



# Before starting any work at the pump, switch off the power supply. Make sure that the power supply cannot be switched on accidentally.

Be aware that capacitors will be live up to 30 seconds after the power supply has been switched off.

| Fault  | Cause  | Remedy  |
|--|--|---|
| Pump is not running.                         | System is switched off.  | Check the system controller.  |
| No power supply                              | • A fuse in the installation is blown.                         | Replace the fuse.   |
|  | • The circuit breaker has tripped.                             | Check the power connection and switch on the circuit breaker.                                   |
|  | Power supply failure.  | Check the power supply.   |
| Pump is not running.<br>Normal power supply. | Controller is switched off.                                    | Check the controller and its settings.  |
|  | Pump is blocked by impurities.                                 | Remove impurities. Deblock the<br>pump from the front of the control<br>box with a screwdriver  |
|  | Pump is defective.   | Replace the pump.   |
| Noise in the system.                         | Air in the system.   | Vent the system.  |
|  | • Differential pressure is too high.                           | Reduce the pump performance at the pump or external controller.                                 |
| Noise in the pump.                           | • Air in the pump.   | Let the pump run. The pump vents itself over time.  |
|  | Inlet pressure is too low.                                     | Increase the system pressure or<br>check the air volume in the<br>expansion tank, if installed. |
| Insufficient flow.                           | Pump performance is too low.                                   | Check the external controller and the pump settings.  |
|  | Hydraulic system is closed or system pressure is insufficient. | Check the non-return valve and filter. Increase the system pressure.                            |

### 14.1 Fault finding UMP3 pump

| Fault   | Cause   | Remedy   |
|---|---|--|
| Pump LED5 is on. Pump tries to restart every 1.5 sec. | Rotor shaft is blocked  | Deblock the rotor shaft by<br>pushing it with a screwdriver from<br>the front of the pump. |
| Pump LED4 is on.                                      | Pump is running.  | Check the supply voltage.  |
| Pump LED3 is on. Pump stops.                          | <ul><li>Supply voltage is too low.</li><li>Serious failure.</li></ul> | <ul><li>Check the supply voltage.</li><li>Exchange the pump.</li></ul>                     |





## Service instructions

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 Mini Plus had been correctly installed.

## **15.1** Tap water service instructions

### 15.1.1 Tap water temperature too low

| Reason                          | Action  |
|---------------------------------|---|
| District heating supply too low | Check the primary inlet temperature                                       |
|                                 | The temperature can be checked by means of the energy meter (min 65°      |
|                                 | C) or at the district heating medium supply.                              |
| Handle on control valve         | Adjust the handle on the control valve                                    |
| incorrectly positioned          | The hot water temperature can be controlled by turning the handle, on     |
|                                 | the control valve for domestic hot water, counter clockwise for increased |
|                                 | tap water temperature. To decrease tap water temperature, turn the        |
|                                 | handle clockwise, until the desired tap water temperature is reached (55° |
|                                 | C approx.). The stabilisation time for the hot water temperature is about |
|                                 | 20 seconds.   |
| District heating filter clogged | See <u>17.1 Cleaning the district heating filter</u>                      |
| Hot water valve does not work   | See 16.1 Check the function of the valve for hot water.                   |
| Balancing valve DHWC may        | Check and adjust the DHWC balancing valve                                 |
| need to be adjusted             | Check that the balancing valve is open enough                             |

### 15.1.2 Tap water temperature too high

| Reason                          | Action   |
|---------------------------------|--|
| Handle on control valve         | Adjust the handle on the control valve   |
| incorrectly positioned          | The hot water temperature can be controlled by turning the handle, on<br>the control valve for domestic hot water, counter clockwise for increased<br>tap water temperature. To decrease tap water temperature, turn the |
|                                 | C approx.). The stabilisation time for the hot water temperature is reached (55°   |
|                                 | 20 seconds.  |
| Hot water valve and/or actuator | Check the valve according to   |
| does not work                   | 16.1 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.  |

### 15.1.3 Hot water temperature unstable

| Reason                          | Action  |
|---------------------------------|---|
| Alternating pressure on primary | Check available differential pressure and temperature at the district     |
| side                            | heating medium supply.  |
| District heating filter clogged | See   |
|                                 | 17.1 Cleaning the district heating filter                                 |
| DHWC pump is not running        | Check that the electrical power is on                                     |
|                                 | If the pump fails to start after stopping, try to start it at the highest |
|                                 | setting.  |
|                                 | See <u>16.3 Check the circulation pump Grundfos UPS.</u>                  |
| Balancing valve DHWC may        | Check and adjust the DHWC balancing valve                                 |
| need to be adjusted             | Check that the balancing valve is open enough                             |
| Check valve DHWC is damaged     | Check and change if required, see <u>17.11 Change the DHWC check</u>      |
|                                 | <u>valve</u> .  |



### 15.1.4 Noise in the DHWC system

| Reason                            | Action   |
|-----------------------------------|--|
| The pump capacity is 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  |
|                                   | Set the pump to speed III. Loosen the pump motor end nut to and    |
|                                   | let it stay opened until the air in the pump is released. When the |
|                                   | pump has been vented, i.e. when the noise has ceased, set the      |
|                                   | pump according to the recommendations.                             |
| The pump motor or pump component  | See <u>17.3 Change the complete DHWC pump or pump</u>              |
| damaged                           | <u>components.</u>   |

## 15.2 Heating system service instructions

### 15.2.1 Heating system temperature too high or too low

| Reason                                   | Action   |
|--|--|
| The pressure in the system is to low or  | Check the pressure on the manometer and top up the system          |
| there is not enough water in the heating | with water   |
| system                                   | The pressure should not be below 1.0 Bar in winter time or below   |
|  | 0.6 Bar in summer. The circuit should only be topped up with fresh |
|  | water when necessary. The water used for topping up contains       |
|  | oxygen which can lead to corrosion in the system. The circuit      |
|  | should therefore be topped up as seldom as possible. Fill up by    |
|  | opening the top up valves until the pressure meter shows desired   |
|  | value, or up to maximum 2.0 Bar.                                   |
|  | Then close the top up valve.                                       |
|  | The safety valve opening pressure is 2.5 Bar.                      |
| Air in the heating system                | Bleed the heating system   |
| 3,7                                      | Bleed the heating system at highest point in the heating system.   |
|  |  |
|  | The pump is self-venting. Air in the pump may cause noise. This    |
|  | noise ceases after a few minutes run time.                         |
|  | Bleed the radiators.   |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  | Picture 17   |
| Heating supply temperature sensor and    | Check the heating supply temperature sensor and outdoor            |
| outdoor temperature sensor does not      | temperature sensor   |
| work                                     |  |
|  | Check that they are correctly sited and working. To confirm that   |
|  | sensors are connected and operating, press the info button on the  |
|  | operator control panel, check that the specified temperatures are  |
|  | reasonable.  |
|  |  |
| Heating circuit filter clogged           | See <u>17.2 Cleaning the heating circuit filter.</u>               |
|  |  |



| Reason  | Action   |
|---|--|
| The heating control equipment may need to be adjusted | <b>Check and adjust the heating curve</b><br>See <u>9.2 Category 1 parameters: Control panel</u> settings and change<br>the selected heating curve with parameter 15 category 1.<br>If needed the set heating curve can be fine-tuned. Increase/<br>decrease the room temperature to parallel adjust the heating<br>curve. |
|   | Also see section <u>8.4 OTC heating curve</u> and <u>8.5 Parallel</u><br>adjustment of heating curve.  |
| Heating valve and actuator does not                   | See <u>16.2 Check the heating actuator and valve function</u> .  |

## 15.2.2 No heating

| Reason  | Action  |
|---|---|
| Circulation pump not running  | Check that the electrical power is on   |
|   | Check the heating circulation pump<br>If the pump fails to start after stopping, try to start it at the highest<br>setting.<br>If a UPM3 pump see <u>14 Fault finding pump.</u>   |
|   | <b>Check the heating parameters in operator control panel</b><br>Summer reduction, parameter 2, category 2: If measured outdoor<br>temperature is higher than target temperature, the pump should<br>not be operating.  |
|   | Economy function, parameter 3, category 2:<br>If the calculated water supply temperature is not greater than the<br>outside temperature by this amount the heating will switch off.<br>If parameter 3 is 0, the pump operation will not be affected by this<br>parameter.   |
| The pressure in the system is to low or<br>there is not enough water in the heating<br>system | Check the pressure on the manometer and top up the system<br>with water<br>The pressure should not be below 1.0 Bar in winter time or below<br>0.6 Bar in summer. The circuit should only be topped up with fresh<br>water when necessary. The water used for topping up contains<br>oxygen which can lead to corrosion in the system. The circuit<br>should therefore be topped up as seldom as possible. Fill up by<br>opening the top up valves until the pressure meter shows desired<br>value, or up to maximum 2.0 Bar. |
|   | Then close the top up valve.<br>The safety valve opening pressure is 2.5 Bar.   |



| Reason                                  | Action  |
|---|---|
| Air pockets in the substation or in the | Bleed the heating system  |
| heating circuit                         | Bleed the heating system at highest point in the heating system.  |
|   | The pump is self-venting. Air in the pump may cause noise. This noise ceases after a few minutes run time. Bleed the radiators. |
|   | Ficture 18  |
| Heating supply temperature sensor and   | Check the heating supply temperature sensor and outdoor   |
| outdoor temperature sensor does not     | temperature sensor  |
| work                                    | Check that they are correctly sited and working. To confirm that  |
|   | sensors are connected and operating, press the info button on the   |
|   | operator control panel, check that the specified temperatures are reasonable.   |
| Loss of function in the heating control | See 16.4 Run the pump manually.   |
| unit.                                   |   |
| Heating circuit filter clogged          | See 17.2 Cleaning the heating circuit filter  |

### 15.2.3 Heating system often needs topping up

| Reason                                   | Action  |  |  |  |  |
|--|---|--|--|--|--|
| Leaks in the substation or in the system | Check the substation and the system for leaks                       |  |  |  |  |
|  | Leaks from the substation or the heating system cause pressure      |  |  |  |  |
|  | drop.   |  |  |  |  |
|  | Contact your service technician if finding any leaks.               |  |  |  |  |
| The heating system safety valve is       | Check the heating system safety valve                               |  |  |  |  |
| leaking or does not work                 | Check that the heating system safety valve is not leaking and that  |  |  |  |  |
|  | it works properly. Check the safety valves' function by turning the |  |  |  |  |
|  | red wheel/knob until water runs out of the valve's waste pipe and   |  |  |  |  |
|  | then close the valve quickly.                                       |  |  |  |  |
| The expansion vessel cannot handle       | See 16.5 Check the volume take-up and pressure equalizing of the    |  |  |  |  |
| the changes in the system                | expansion vessel  |  |  |  |  |

### 15.2.4 Heating temperature unstable

| Reason                                | Action  |
|---------------------------------------|---|
| Alternating pressure on primary side  | Check available differential pressure and temperature at the district heating medium supply.  |
| District heating filter clogged       | See <u>17.1 Cleaning the district heating filter</u> .  |
| Heating supply temperature sensor and | Check the heating supply temperature sensor and outdoor   |
| outdoor temperature sensor does not   | temperature sensor  |
| work                                  | Check that they are correctly sited and working. To confirm that<br>sensors are connected and operating, press the info button on the<br>operator control panel, check that the specified temperatures are<br>reasonable. |



## Cetetherm Mini Plus CM737

Installation, service and operating instruction

## 15.2.5 Noise in the radiator system

| Reason                            | Action   |
|-----------------------------------|--|
| The pump capacity is set too high | Reduce the pump capacity   |
|                                   | Reduce the level by choosing a lower output setting on the pump. |
| 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.                       |
| The pump motor or pump component  | See <u>17.4 Change the complete heating pump or pump</u>         |
| damaged                           | components.  |



## 16 Service actions for the installer

## 16.1 Check the function of the valve for hot water



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



Close the shutoff values for the **DH supply** and **DH return** together with the **cold** and **hot wate**r.



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

- 1. Disconnect the power feed to the substation.
- 2. Close the shut-off valves.
- 3. Unscrew the tap water actuator from the control valve.

4. Carefully press the valve's spindle with a tool and check the valve's travel





Picture 20

- 5. Turn the handle on the actuator; a small dip should move in and out. If the dip does not move the actuator is damaged and requires replacing.
- 6. Connect the power feed to the substation.

NOTE: The valve may be very hot!

7. Open the shutoff valves.

and spring back.



## 16.2 Check the heating actuator and valve function



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



The control panel must be without current when maneuvering the actuator by hand.

Check the actuator by pulling out the electrical cable and refit it again; this will start an automatic self-test for the actuator. See <u>7.3 Starting up and component control of control panel</u>. 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!



If the pump fails to start after stopping, try to start it at the highest setting.



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

Disconnect the power feed to the pump by pulling off the connecter before carrying out this task. If the current is on when you use a screwdriver to assist the pump to start, the screwdriver may be wrenched out of your hand when the pump starts.

If the pump does not start, the pump normally can be started by removing the pump motor end nut and helping the pump to start with the aid of a screwdriver in the notch on the engine shaft.

If possible, use a short screwdriver. If the pump is difficult to access, disconnect the heating actuator.

Connect the power feed to the pump and try to start again.



Picture 21



38

### 16.4 Run the pump manually



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

Hand maneuver of the heating actuator

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

If it necessary to run the pump and actuator manually, this can be done by disconnecting the power to the operator control panel.

- 1. Disconnect the power feed to the substation and the power cable to the pump.
- 2. Connect the replacement cable (option) to the circulation pump.
- 3. Open the heating valve manually by turning the actuator knob counter clockwise. Open the control valve sufficiently to satisfy the heating needs.
- 4. Connect the power feed to the substation.

Note! This is a temporary solution until the control unit problem is solved.

### 16.5 Check the volume take-up and pressure equalizing of the expansion vessel

Check the expansion vessel for possible leakage.

The cause may be that the expansion vessel cannot manage the volume changes on the heating side. The expansion vessel may have to be replaced. See <u>17.12 Change the expansion vessel</u>.

Alternatively, the system's total volume of water may be too high, i.e. the volume changes are too large for the expansion vessel. If so, add extra expansion volume.



Installation, service and operating instruction

# 17 Maintenance and repairs

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



Before starting out repairs always close the correct shutoff valves.

When dismounting a component there will be water coming out, hot and under pressure.

## 17.1 Cleaning the district heating 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 DH supply and DH return shutoff valves.



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

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



Picture 23

## 17.2 Cleaning the heating circuit filter





#### Cetetherm Mini Plus CM737 Installation, service and operating instruction

- 1. Disconnect the power feed to the substation.
- 2. Close the shut-off valves.
- 3. Use a wrench and release the filter cover and remove the cartridge.
- 4. Clean the filter with water and refit the cartridge. Screw the filter cover with a momentum of 10-20 Nm.
- 5. Fill up the heating circuit using the toping up valve, vent the heating circuit.
- 6. Open the shutoff valves and connect the power feed to the substation.
- 7. After final bleeding, the pressure should not be less than 1.0 bar in winter and not less than 0.6 bar in summer.

### 17.3 Change the complete DHWC pump or pump components



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

Before starting out repairs, close the shutoff valves **DH supply**, **DH return**, **cold-water** and **hot water**.

Note the setting of the balancing valve, then close it. Release the pressure using the DHWC safety valve.

After finishing repair; fill up the hot water circuit and vent. Open the shutoff valves, start with **DH Supply** and then **DH return,** to avoid pollutions in the

system. Open the valves slowly to avoid pressure surges.

Check the DHWC circulation.

Change the complete pump or just the pump motor.

- 1. Disconnect the power feed to the substation, disconnect the power cable to the pump.
- 2. Close the shut-off valves and the balancing valve.
- 3. Choose alternative a or b.
  - a) <u>When changing the complete pump</u>, release the brass nuts with a wrench and replace the pump. Connect the pump cable.
  - b) <u>Only changing the motor</u>, release it by unscrewing four socket head cap screws and replace the motor. Connect the pump cable.
- 4. Open the shut-off valves cold-water and hot water.
- 5. Open and adjust the balancing valve.
- 6. Vent the circuit by opening a hot water tap.
- 7. Connect the power feed to the substation.
- 8. Open the shutoff valves DH Supply and then DH return.



Picture 25





Picture 24

## 17.4 Change the complete heating pump or pump components



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

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

Release the pressure using the heating safety valve.



After finishing repair; fill up the **heating circuit** and vent. Open the shutoff valves, start with **heating return** and then **heating supply**, then **DH Supply** and **DH return**, to avoid pollutions in the system. Open the valves slowly to avoid pressure surges.

Change the complete pump or just the pump motor.

- 1. Disconnect the power feed to the substation, disconnect the power cable to the pump.
- 2. Close the shut-off valves.
- 3. Choose alternative a or b.
  - c) <u>When changing the complete pump</u>, release the brass nuts with a wrench and replace the pump. Connect the pump cable.
  - <u>Only changing the motor</u>, release it by unscrewing four socket head cap screws and replace the motor.
     Connect the pump cable.
- 4. Fill up the heating circuit using the top up valves. Vent the heating circuit.
- 5. Open the shut-off valves and connect the power feed to the substation.
- 6. After final bleeding, the pressure should not be less than 1.0 bar in winter and not less than 0.6 bar in summer.

### 17.5 Change the heating supply temperature sensor

- 1. Disconnect the power feed to the substation.
- 2. Close the heating actuator by turning the knob clockwise to its closing position.
- 3. Disconnect the quick-connect terminals and replace the sensor with a new one.
- 4. Connect the power feed to the substation.
- 5. Check the sensors value on the control panel after 5 min.



Picture 26





### Cetetherm Mini Plus CM737 Installation, service and operating instruction

### 17.6 Change the outdoor temperature sensor

- 1. Disconnect the power feed to the substation.
- 2. Close the heating actuator by turning the knob clockwise to its closing position.
- 3. Unscrew the lid by turning it anti-clockwise.
- 4. Unscrew the cables.
- 5. Loosen the cable fitting.
- 6. Install a new outdoor temperature sensor.
- 7. Connect the power feed to the substation.
- 8. Check the sensors value on the control panel after 5 min.

### 17.7 Change the heating actuator



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

- 1. Disconnect the power feed to the substation.
- 2. At the connection box, disconnect the power cable to the actuator.
- 3. Unscrew the heating actuator from the valve, the valve closes.
- Picture 29

- 4. Cut off all straps that holds the actuator cable.
- 5. Make sure that new actuator is closed by turning the knob clockwise to the closing position. Fasten the actuator, use only hand power.
- 6. Replace cable and straps.
- 7. Connect the power feed to the substation.
- 8. Check the function of the actuator during start up.





Picture 28

Installation, service and operating instruction

## 17.8 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 **DH supply** and **DH return** shutoff valves.

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

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

### 17.9 Change the hot water valve



The temperature and the pressure of the district heating water are very high. Only gualified 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 **DH supply** and **DH return** shutoff valves.

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

- 1. Disconnect the power feed to the substation.
- 2. Close the shut-off valves.
- 3. Unscrew the tap water actuator from the control valve.

- 4. Use a wrench to remove the control valve. Note the arrow direction on the valve.
- 5. Mount a new valve; and take especially care to the arrow direction.
- 6. Fasten the actuator.
- 7. Open the shutoff valves and connect the power feed to the substation.



Picture 33





### 17.10 Change the hotwater actuator and sensor



- 8. Disconnect the power feed to the substation.
- 9. Close the shut-off valves.
- 10. Unscrew the tap water actuator from the control valve.



Bild 1



Bild 2

- 11. Disconnect the sensor in the heat exchanger.
- 12. Mount a new actuator and sensor.
- 13. Open the shutoff valves cold and hot water.
- 14. Open and adjust the balancing valve.
- 15. Vent the circuit by opening a hot water tap.
- 16. Connect the power feed to the substation.
- 17. Open the shutoff valves DH Supply and then DH return.



## 17.11 Change the DHWC check valve



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



Before starting out repairs, close the shutoff valves **DH supply**, **DH return**, **cold-water** and **hot water**.

Note the setting of the balancing valve, then close it. Release the pressure using the DHWC safety valve.



After finishing repair; fill up the hot water circuit and vent.

Open the shutoff valves, start with **DH Supply** and then **DH return**, to avoid pollutions in the system. Open the valves slowly to avoid pressure surges.

- 1. Disconnect the power feed to the substation.
- 2. Close the shut-off valves.
- 3. Use a wrench and unscrew the pipe between the pump and T-connection.
- Remove the old check valve and mount a new. NOTE! Make sure that the check valve is mounted in the correct way.

Flow direction





5. Mount the pipe again.

- 6. Open the shutoff valves cold and hot water.
- 7. Open and adjust the balancing valve.
- 8. Vent the circuit by opening a hot water tap.
- 9. Connect the power feed to the substation. Open the shutoff valves DH Supply and then DH return.

## 17.12 Change the expansion vessel



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



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

Release the pressure using the heating circuit safety valve.

After finishing repair, fill up the circuit and vent.

Then open the shutoff values, start with **DH supply** and then the **return** line, to avoid pollutions in the system.

Then open heat return and then supply. Open the valves slowly to avoid pressure surges.

- 1. Disconnect the power feed to the substation.
- 2. Close the shut-off valves.
- 3. Replace the expansion vessel.
- 4. Fill up the heating circuit using the toping up valve, vent the heating circuit.
- 5. Open the shutoff valves and connect the power feed to the substation.
- 6. After final bleeding, the pressure should not be less than 1.0 bar in winter and not less than 0.6 bar in summer.



## 18 Options

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

## 18.1 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.

- 1. First disconnect the substation electrical power supply cable. Disconnect the electrical plug on the circulation pump.
- 2. Attach the electrical box for under floor heating on the mounting plate.
- 3. Connect the new power supply cable from the electrical box to the circulation pump.
- 4. Reconnect the existing power supply cable to the connection on the electrical box.
- 5. Attach the thermostat to the pipe for heating supply.
- 6. Set the correct maximum temperature value for the thermostat.
- 7. 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.

Picture 34

SIEMENS

### 18.1.1 Parameters and recommended settings for under floor heating

Set recommended settings for under floor heating systems. Instructions regarding installation parameters see chapter <u>9 Activation of installer parameters</u>.

| Parameter   | Parameter<br>N:o | Factory D   | efault Setting   | Optional    | Setting   |  |
|---|------------------|-------------|--|-------------|---|--|
|   |                  | Display     | Description  | Display     | Description   |  |
| Category 1 Parameters -   | Programmabl      | e Thermos   | tat Settings   |             |   |  |
| OTC heat curve  | 15:OC            | 5           |  | 1 to 40     | 1 to 40 adjustment in<br>steps of 1   |  |
| Category 2 Parameters - System Settings (press PROGRAM to access this category) |                  |             |  |             |   |  |
| Economy function  | 3:Pd             | 0           | Diff between<br>outside and<br>calculated water<br>supply<br>temperature | 0 to 20     | If the calculated water<br>supply temperature is not<br>greater than the outside<br>temperature by this<br>amount the heating will<br>switch off. |  |
| Category 3 parameters –   | Boiler setting   | js (press P | ROGRAM to access   | this categ  | Jory)   |  |
| Maximum central heating set point   | 1:CH             | 45          | 90°C or obtained from the boiler   | 40 to<br>90 | 40°C to 90°C adjustment<br>in 1°C steps   |  |



# 19 Operating data and performance

## 19.1 Operating data Mini Plus CB30-60H

|                              | Primary side | DHW      |  |
|------------------------------|--------------|----------|--|
| Design pressure PS           | 16 Bar       | 10 bar   |  |
| Design temperature TS        | 120°C        | 90°C     |  |
| Relief pressure safety-valve | -            | 9/10 Bar |  |
| Volume Heat exchanger, L     | 1,57 L       | 1,62 L   |  |

| Temperature        |          |    |        |            |             |        |     |        |            |
|--------------------|----------|----|--------|------------|-------------|--------|-----|--------|------------|
| Heating            | Capacity | CB | Plates | Plates     | Plates      | Flow P | dPp | Flow S | dPs<br>kPa |
| 80-25/10-55 (15,5) | 113      | 30 | 60     | 1*9H+2*10H | 1*10H+2*10H | 0,42   | 24  | 0,60   | 46         |
| 80-22/10-55 (15,5) | 113      | 30 | 60     | 1*9H+2*10H | 1*10H+2*10H | 0,42   | 24  | 0,60   | 46         |
| 70-25/10-58 (20,2) | 100      | 30 | 60     | 1*9H+2*10H | 1*10H+2*10H | 0,48   | 32  | 0,50   | 32         |
| 70-25/10-58        | 128      | 30 | 60     | 1*9H+2*10H | 1*10H+2*10H | 0,68   | 61  | 0,60   | 45         |
| 65-22/10-55        | 113      | 30 | 60     | 1*9H+2*10H | 1*10H+2*10H | 0,63   | 52  | 0,60   | 45         |
| 65-22/10-55 (19,7) | 82       | 30 | 60     | 1*9H+2*10H | 1*10H+2*10H | 0,43   | 26  | 0,43   | 25         |

### 19.2 Operating data Mini Plus CB18-54H

|                              | Primary side | Heating |  |
|------------------------------|--------------|---------|--|
| Design pressure PS           | 16 Bar       | 6 bar   |  |
| Design temperature TS        | 120°C        | 90°C    |  |
| Relief pressure safety-valve | -            | 2,5 Bar |  |
| Volume Heat exchanger, L     | 1,01 L       | 1,05 L  |  |

| Tomporatura          |          |      |        |         |           |        |     |        |         |
|----------------------|----------|------|--------|---------|-----------|--------|-----|--------|---------|
|                      |          |      |        |         |           |        |     |        |         |
| program (°C)         |          |      |        |         |           |        |     |        | 100.004 |
| Heating              | Capacity | СВ   | Plates | Plates  | Plates    | Flow P | dPp | Flow S | dPs     |
| UPML 25-95           | kW       | type | no     | primary | secondary | l/s    | kPa | l/s    | kPa     |
| 115-65/60-80 (61,48) | 60,42    | 18H  | 54     | 1*26 H  | 1*27 H    | 0,28   | 3,0 | 0,74   | 20      |
| 115-45/40-70 (43,4)  | 90,1     | 18H  | 54     | 1*26 H  | 1*27 H    | 0,32   | 3,7 | 0,73   | 20      |
| 115-35/30-35 (30,01) | 15       | 18H  | 54     | 1*26 H  | 1*27 H    | 0,04   | 0,1 | 0,72   | 20      |
| 115-35/30-36 (30,01) | 18       | 18H  | 54     | 1*26 H  | 1*27 H    | 0,05   | 0,1 | 0,72   | 20      |
| 115-35/30-37 (30,02) | 21       | 18H  | 54     | 1*26 H  | 1*27 H    | 0,06   | 0,2 | 0,72   | 20      |
| 100-63/60-80         | 58,2     | 18H  | 54     | 1*26 H  | 1*27 H    | 0,39   | 5,7 | 0,71   | 18,6    |
| 100-53/50-70 (52,1)  | 60,3     | 18H  | 54     | 1*26 H  | 1*27 H    | 0,31   | 3,7 | 0,73   | 20      |
| 100-48/45-60 (45,68) | 45,1     | 18H  | 54     | 1*26 H  | 1*27 H    | 0,21   | 1,7 | 0,73   | 20      |
| 100-43/40-60 (41,55) | 60,1     | 18H  | 54     | 1*26 H  | 1*27 H    | 0,26   | 2,5 | 0,73   | 20      |
| 100-43/40-70         | 50       | 18H  | 54     | 1*26 H  | 1*27 H    | 0,22   | 1,9 | 0,40   | 6,4     |
| 100-43/40-80         | 20,38    | 18H  | 54     | 1*26 H  | 1*27 H    | 0,09   | 0,3 | 0,12   | 0,6     |
| 100-33/30-35 (30,01) | 15       | 18H  | 54     | 1*26 H  | 1*27 H    | 0,05   | 0,1 | 0,72   | 20      |
| 100-33/30-36 (30,02) | 18       | 18H  | 54     | 1*26 H  | 1*27 H    | 0,06   | 0,2 | 0,72   | 20      |
| 100-33/30-37 (30,03) | 21       | 18H  | 54     | 1*26 H  | 1*27 H    | 0,07   | 0,2 | 0,72   | 20      |
| 80-55/50-70          | 43,2     | 18H  | 54     | 1*26 H  | 1*27 H    | 0,43   | 6,9 | 0,52   | 10,5    |
| 80-63/60-70 (61,65)  | 30,2     | 18H  | 54     | 1*26 H  | 1*27 H    | 0,41   | 6,3 | 0,74   | 20      |

#### UPM3 15-70

| 115-65/60-80 (61,2)  | 52,53 | 18H | 54 | 1*26 H | 1*27 H | 0,25 | 2,3 | 0,64 | 15,3 |
|----------------------|-------|-----|----|--------|--------|------|-----|------|------|
| 115-45/40-70 (42,9)  | 79,42 | 18H | 54 | 1*26 H | 1*27 H | 0,28 | 2,9 | 0,64 | 15,6 |
| 115-35/30-35 (30,01) | 13,3  | 18H | 54 | 1*26 H | 1*27 H | 0,04 | 0,1 | 0,64 | 15,9 |
| 115-35/30-36 (30,01) | 15,96 | 18H | 54 | 1*26 H | 1*27 H | 0,05 | 0,1 | 0,64 | 15,9 |
| 115-35/30-37 (30,01) | 18,62 | 18H | 54 | 1*26 H | 1*27 H | 0,06 | 0,1 | 0,64 | 15,9 |
| 100-63/60-80 (62,7)  | 52,53 | 18H | 54 | 1*26 H | 1*27 H | 0,35 | 4,6 | 0,64 | 15,3 |
| 100-53/50-70 (51,8)  | 52,73 | 18H | 54 | 1*26 H | 1*27 H | 0,27 | 2,8 | 0,64 | 15,4 |
| 100-48/45-60 (45,56) | 39,62 | 18H | 54 | 1*26 H | 1*27 H | 0,18 | 1,3 | 0,64 | 15,5 |
| 100-43/40-60 (41,3)  | 52,94 | 18H | 54 | 1*26 H | 1*27 H | 0,23 | 2   | 0,64 | 15,6 |
| 100-43/40-70         | 49,63 | 18H | 54 | 1*26 H | 1*27 H | 0,22 | 1,8 | 0,40 | 6,3  |
| 100-43/40-80         | 19,86 | 18H | 54 | 1*26 H | 1*27 H | 0,09 | 0,3 | 0,12 | 0,6  |
| 100-33/30-35 (30,01) | 13,3  | 18H | 54 | 1*26 H | 1*27 H | 0,05 | 0,1 | 0,64 | 15,9 |
| 100-33/30-36 (30,01) | 15,96 | 18H | 54 | 1*26 H | 1*27 H | 0,06 | 0,1 | 0,64 | 15,9 |
| 100-33/30-37 (30,02) | 18,62 | 18H | 54 | 1*26 H | 1*27 H | 0,07 | 0,2 | 0,64 | 15,9 |
| 80-55/50-70          | 42,84 | 18H | 54 | 1*26 H | 1*27 H | 0,42 | 6,8 | 0,52 | 10,3 |
| 80-63/60-70 (61,45)  | 26,25 | 18H | 54 | 1*26 H | 1*27 H | 0,35 | 4,7 | 0,64 | 15,2 |



Cetetherm AB Fridhemsvägen 15 372 38 Ronneby – Sweden www.cetetherm.com

