

## INSTALLATION AND OPERATING INSTRUCTIONS

### FRG3020-W

#### **⚠ CAUTION!**

Before starting work and commissioning, the fitter or operator must read, understand and comply with these installation and operating instructions.

FRG3020-W manifold control units must only be installed, adjusted, serviced and maintained by trained personnel. Trainee personnel must only work on the product under the supervision of an experienced person. Only under the above conditions is there any possible legal liability on the part of the manufacturer.

All instructions for the installation and operation of this equipment must be complied with when using the control unit. Any other use whatsoever is not in accordance with the intended use.

The manufacturer is not responsible for any damage which results from misuse of the control unit. Conversions or modifications are not permitted for safety reasons. The control unit must only be repaired by a repairer approved by the manufacturer.

The scope of supply of the device varies according to the type and fitments. These installation and operating instructions, accompanying documents and other components are part of the product and must be observed and kept in a safe place.

#### **Subject to technical change without notice**



Fig. 1

|                                                   |          |
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## **1. INTENDED USE**

- The FRG3020-W manifold control unit is used for load-dependent control of the supply temperature in floor and panel heating/cooling systems.
- The supply temperature is controlled by the integrated HEAT/COOL controller dependent on the outside temperature using a selectable heating/cooling curve. The steepness of the curve can be selected according to local conditions (→ Controller installation and operating instructions).
- The FRG3020-W can operate a heating system which is set to suit the individual requirements of an apartment or individual domestic or business areas. The integrated CC-HC climate controller has a 7 day program with 9 ex-works fixed integrated standard programs as well as 4 programs which can be set as required by the user.
- A room temperature controller can optionally be connected to the CC-HC climate controller. Suitable cable based or radio-controlled programmable room thermostats are available as accessories. These enable heating system operation to be optimised based on the usage pattern of a reference room.
- The control unit can be mounted directly onto the right or left hand side of the round pipe heating circuit manifold with a 1" male thread with a centre-to-centre dimension of 210 mm. It is provided with G 1" union nuts for this purpose.
- The control unit is intended for use in dry areas in either domestic or business premises. It is normally installed in the boiler room or in a manifold cabinet.
- Check in the relevant regulations for improper use before commissioning.

## 2. INSTRUCTIONS, SYMBOLS AND ABBREVIATIONS

Instructions in these documents use symbols and abbreviations for ease of understanding as follows:

- ➔ Reference to further documentation
- ❗ Important information and tips on use
- ⚠ Hazard warning or important point on operation
- Piping closed
- Piping open, in flow direction

|             |                            |            |                                      |            |                                 |
|-------------|----------------------------|------------|--------------------------------------|------------|---------------------------------|
| <b>AG</b>   | Male thread                | <b>HK</b>  | Heating circuit unit                 | <b>SKB</b> | Gravity flow stop/gravity break |
| <b>EUKO</b> | Male thread with euro cone | <b>HKM</b> | Heating circuit unit with mixer      | <b>TB</b>  | Temperature limiter             |
| <b>FBH</b>  | Floor heating              | <b>HKV</b> | Heating circuit manifold             | <b>UM</b>  | Union nut                       |
| <b>FH</b>   | Panel heating              | <b>IG</b>  | Female thread                        | <b>UWP</b> | Circulating pump                |
| <b>FH/K</b> | Panel heating/cooling      | <b>MuB</b> | Installation /operating instructions | <b>WDS</b> | Heat insulation box             |
| <b>FK</b>   | Panel cooling              | <b>RV</b>  | Check valve                          | <b>WE</b>  | Heat generator                  |
| <b>FRG</b>  | Panel control set          | <b>SBE</b> | Flushing, filling, draining devices  | <b>WP</b>  | Heat pump                       |

## 3. SAFETY INSTRUCTIONS



Before starting work pull out the mains plug and ensure there is no power supply to the unit.  
All installation and wiring work on the control unit must only be carried out when it is switched off and no power is connected.

Connection and commissioning of the unit must only be carried out by trained personnel. The applicable safety regulations, in particular VDE 0100, must be observed.

⚠ The control unit is not spray proof or protected against dripping water. Therefore the unit must be installed in a dry location.

## 4. ASSEMBLY

- 1: Supply panel heating/cooling (1" union nut)
- 2: Return panel heating/cooling (1" union nut)
- 3: Primary supply (1" male thread)
- 4: Primary return (1" male thread)
- 5: Circulating pump
- 6: 3-point actuator
- 7: 3-way mixing valve
- 8: Check valve (RV)
- 9: Supply temperature thermometer
- 10: Temperature limiter (optional)
- 11: Eccentric thread with interface with supply temperature sensor
- 12: Interface return temperature sensor (optional)
- 13: Climate controller CC-HC
- 14: Outside temperature sensor

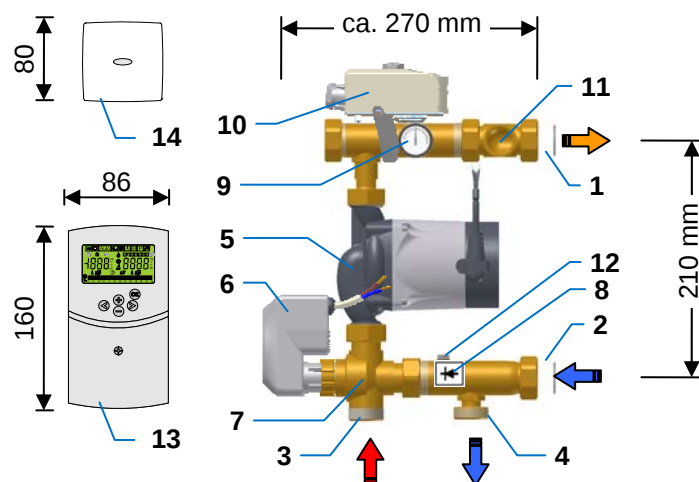


Fig. 2

## 5. INSTALLATION AND ELECTRICAL CONNECTION

### 5.1. INSTALLATION OF THE MANIFOLD UNIT

The control unit is designed for direct mounting on a heating circuit manifold with a flat gasket 1" (male thread) and a centre-to-centre dimension of 210 mm.

When installing ensure that the pump cable, temperature limiter and the sensor are not damaged or buckled. Any tensile stress in the cables must also be avoided. Correct connection of both supply and return must be ensured (Fig. 2 and 3.1 - 3.4).

### Layout radiators and panel heating

One heat generator  
Common riser

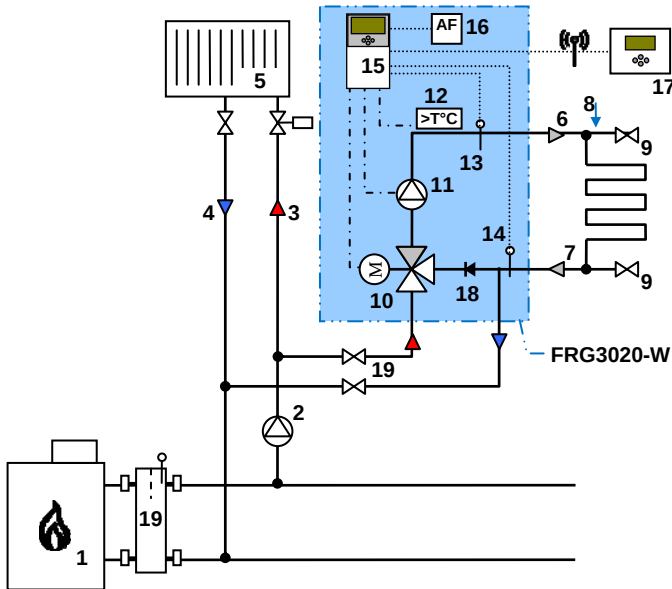


Fig. 3.1

### Layout radiators and panel heating/cooling

Separate heat and cooling generators  
Separate risers

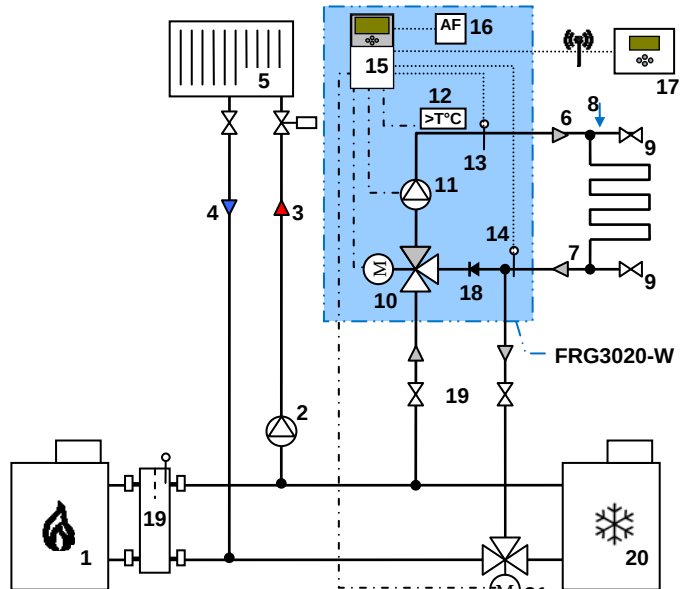


Fig. 3.2

### Layout panel heating/cooling

Separate heat and cooling generators

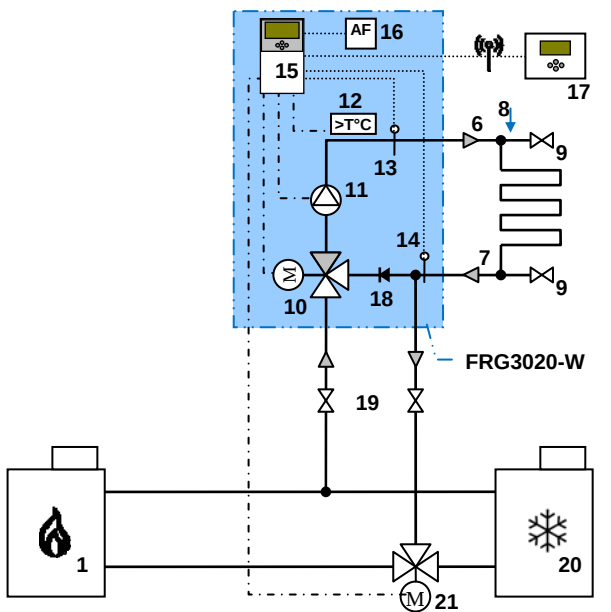


Fig. 3.3

### Layout panel heating/cooling

Reversible heat pump

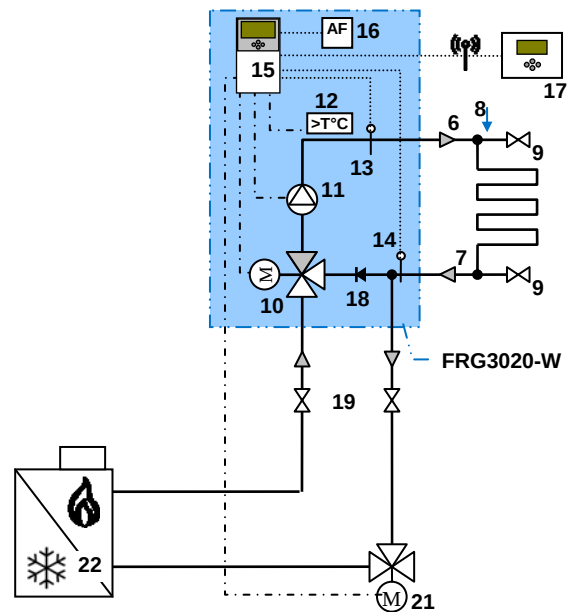
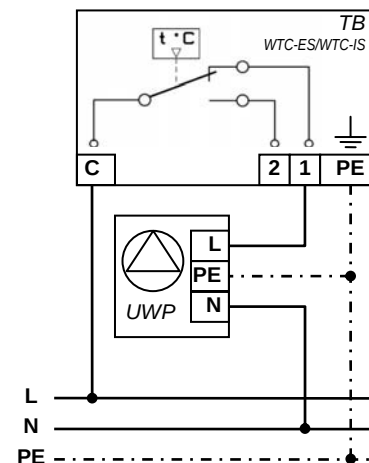


Fig. 4

- 1 Heat generator
- 2 Primary circulating pump boiler/radiator circuit
- 3 Primary circuit supply
- 4 Primary circuit return
- 5 Heater/radiator
- 6 FH/K supply
- 7 FH/K return
- 8 Heating/cooling circuit manifold (HKV)
- 9 Flushing, filling, draining device (SBE)
- 10 3-way mixing valve with 3-point actuator
- 11 Circulating pump FH/K
- 12 Temperature limiter (optional)
- 13 Supply temperature sensor FH
- 14 Return temperature sensor
- 15 HEAT/COOL controller
- 16 Outside temperature sensor
- 17 Room temperature and humidity sensor (optional)
- 18 Check valve
- 19 Shut-off device (recommended)
- 20 Cooler/chiller
- 21 Switch/zone valve
- 22 Heat pump, reversible (heat/cool)
- 23 Hydraulic switch



## 5.2. ELECTRICAL CONNECTIONS

All electrical connections are to be carried out only by an authorised specialist according to the local electrical installation regulations. The electrical wiring must not come into contact with any hot parts or components.

The circulating pump, the 3-point actuator as well as the temperature limiter (if supplied) are supplied already wired ex-works. The supply temperature sensor is also already connected to the controller. The outside temperature sensor is to be connected on site.

To ensure that the pump only runs when heat is required, the manufacturer recommends connecting the pump to a pump relay (e.g. the pump logic of an electric control manifold which also controls the actuators). Alternatively the pump can be controlled by a timer or through the room thermostat in a reference room. Details of electrical wiring can be found in the climate controller documents.

- ➔ Climate controller installation and operating instructions; ➔ Pump installation and operating instructions;
- ➔ Temperature limiter installation and operating instructions

Connection options for temperature limiter (TB) or pump logic (PL) of a control manifold (optional).  
The connection is supplied ex-works with a cable bridge.  
This is to be removed if a TB or PL is to be connected.

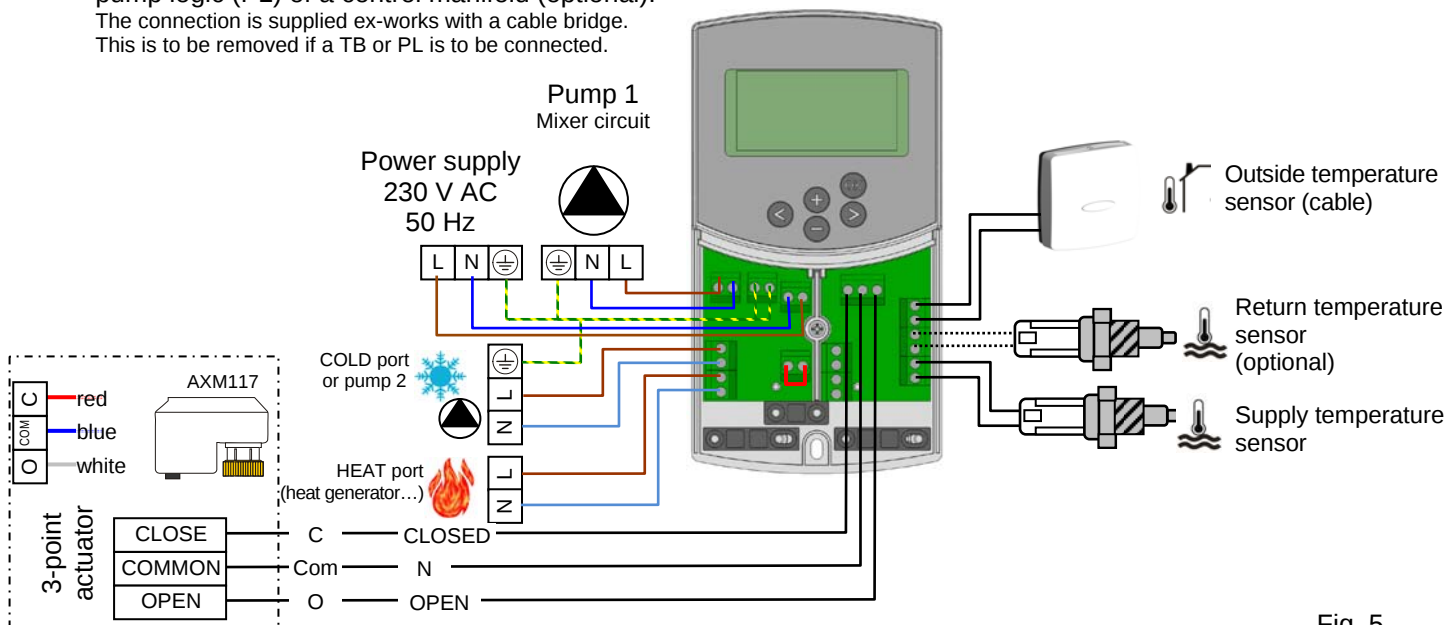


Fig. 5

## 5.3. TEMPERATURE LIMITER (IF INCLUDED IN SUPPLY)

In case of a fault the TB switches off the circulating pump and prevents overheating. To avoid unintentional triggering, the temperature of the TB should be set a few degrees above the required supply temperature. In common practice, the maximum temperature is around 55 °C. This corresponds to the works setting of the TB. The maximum temperature should, if required, be adjusted to suit local conditions. ➔ 6.3

❗ Where all heating circuits are fitted with actuators and no pump relay is used, the TB should be installed on the supply of the heating circuit manifold. Depending on the equipment and mainly with HKV with 2 to 4 outlets, the TB is installed on the collective return pipe.

❗ The maximum supply temperature can also be set through the controller (➔ Heating controller installation and operating instructions).

## 6. COMMISSIONING

### 6.1. FLUSHING THE HEATING CIRCUITS

Connect the control unit to the pipe network and shut it off from network (using ball valves (15) from the heating circuit manifold HKV delivery or a shut-off device fitted on site). Switch the pump off and shut all heating circuits and manifolds. It suffices to shut off only the valves in the return collector of the HKV using the protective caps.

Then fill the manifold and the control unit with heating water (Fig. 5a) in accordance with VDI 2035, connecting the filler hose to the SBE return (9b) and the draining hose to the SBE supply (9a). Heating circuits are closed. Open the SBE and fill the control unit until water comes out of the SBE supply. Close both SBEs.

To fill and flush the heating circuits (Fig. 5b), connect the filler hose to the SBE supply (9a) and the drain hose to the SBE return (9b). Open the heating circuit to be flushed. Open the SBE and flush the heating circuit in flow direction until air and any contaminants are completely cleared from the circuit.

The check valve (14) in the mixer bypass precludes any short circuit route when flushing.

Repeat procedure for all heating circuits.

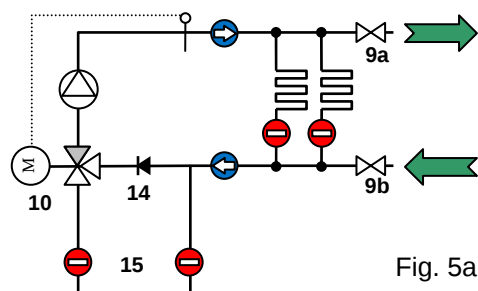


Fig. 5a

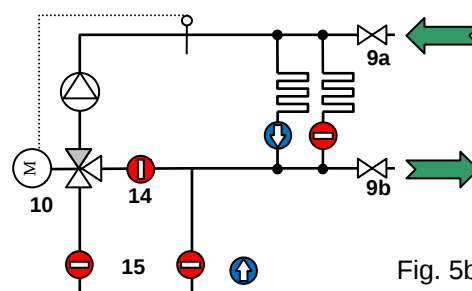


Fig. 5b

**Important:** The heating circuits must only be flushed in the flow direction, i.e. the water must enter through the supply manifold and exit through the return.

Draining must always be open as otherwise the high water pressure could damage the heating unit. The instructions for flushing as described in the installation and operating instructions must also be observed.

## 7. MANIFOLD CONTROL UNIT MODE OF OPERATION

The control unit mixing valve is designed as a proportional controller and is controlled through a thermostatic head with a capillary tube and a sensor element in the heating circuit supply. Deviations from the set point value immediately trigger a valve setting change so that the flow of hot water from the boiler circuit changes according to the amount of water injected. The injected water mixes with the return water from the heating circuit and thus maintains a constant supply temperature within a narrow temperature range.

The respective heating circuit supply temperature can be read directly from the thermometer.

A check valve is located between the supply and return flow sockets which prevents any short circuit of the primary circuit. Any short circuiting is also prevented when filling and flushing the heating circuit.

## 8. TECHNICAL DATA/MATERIALS

|                                      |                                                                                                                   |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Max. ambient temperature:            | 0 - 50 °C                                                                                                         |
| Max. media operating temperature:    | 0 - 80 °C                                                                                                         |
| Max. operating pressure:             | 6 bar                                                                                                             |
| Control range of supply temperature: | 5 - 100 °C <sup>1)</sup>                                                                                          |
| Nominal thermal rating:              | ca. 14 kW                                                                                                         |
| Operating voltage:                   | 230 V – 50 Hz                                                                                                     |
| Pump capacity:                       | Depending on pump type, for details see name plate and → Circulating pump installation and operating instructions |
| Fittings:                            | Brass Ms 58                                                                                                       |
| Pipe parts:                          | Brass Ms 63                                                                                                       |
| Plastic:                             | Impact and temperature resistant                                                                                  |
| Flat gaskets:                        | AFM 34 or EPDM                                                                                                    |
| O-rings:                             | EPDM                                                                                                              |

1) The control range of the supply temperature is determined by the selection from the heating/cooling curve.

## 9. TROUBLESHOOTING

| X.         | FAULT                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| X.X        | Possible cause                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Remedy                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>1.</b>  | <b>FBH heating circuits do not get warm; pump not running</b>                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>1.1</b> | Temperature limiter (TB) switches the control unit pump off.<br><u>Reason:</u> TB set too low.                                                                                                                                                                                                                                                                                                                                                                            | Set TB about 10 K higher than the FBH supply temperature.<br>⚠ Pay attention to the permissible FBH maximum temperature!<br>⚠ The switch difference of the TB is about 5 K.<br>❗ The control unit is ready for operation again more quickly if the TB is set at the switch on temperature for a short while to cool down.                                                                                                                     |
| <b>1.2</b> | TB switches the control unit pump off.<br><u>Reason:</u> The pump remains switched on despite closed FBH heating circuit. The water inside the control unit can be warmed by waste heat from the pump. The TB switches off when the maximum pump temperature is reached.                                                                                                                                                                                                  | Take the TB off the control unit and install it on the heating circuit manifold supply or on the return if necessary.<br><br>Use the electric control manifold with pump logic (relay). The pump logic ensures that the pump only runs if at least one FBH heating circuit is open.                                                                                                                                                           |
| <b>1.3</b> | The pump is connected to a room thermostat or electric control manifold.<br>The pump switches off when all actuators are being shut. When it has been standing for some time the FBH supply cools down. The controller therefore causes the 3-way mixing valve to open. Hot water is injected from the primary circuit. This causes the control unit to heat up. When the maximum temperature of the TB is reached, the contact opens. The pump does not switch on again. | Take the TB off the compact control unit and install on the heating circuit manifold or on the return if necessary.<br>➔ 1.1                                                                                                                                                                                                                                                                                                                  |
| <b>2.</b>  | <b>FBH supply temperature will not set to the required value or the supply temperature fluctuates heavily</b>                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>2.1</b> | Supply and return have been crossed, i.e. incorrectly connected.                                                                                                                                                                                                                                                                                                                                                                                                          | Check all connections on the control unit to ensure they are correctly connected. ➔ Fig. 2 and 3                                                                                                                                                                                                                                                                                                                                              |
| <b>2.2</b> | The lift/pump level has been set too low.                                                                                                                                                                                                                                                                                                                                                                                                                                 | Increase speed or lift/pump stage of the pump.                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>2.3</b> | The heat load is too great for the control unit i.e. the heat consumption exceeds the nominal capacity of the control unit. This situation may occur temporarily, for example, when heating up a "cold" floor.                                                                                                                                                                                                                                                            | Determine the maximum heat requirement and compare with the nominal capacity. Possibly the heating circuits will have to be split with a second control unit with an appropriate heating circuit manifold.<br>If the cause is the initial heating up of a floor, then after an initial heating up period (2 to 3 days) operation may revert to normal. This is particularly the case when operating at the upper end of the nominal capacity. |