MOUNTING AND OPERATING INSTRUCTIONS

Translation of original instructions

TROVIS 5573 Heating and District Heating Controller

CE

Old > New	Firmware revisions
1.80 > 1.82	Internal revisions
1.82 > 1.90	In the configuration level CO1, the 'Four-point characteristic' function can also be configured for systems Anl 3.x. See CO1 > F11.
	The demand for the maximum flow set point issued by a 0 to 10 V signal can be made with an adjustable boost. See CO1 > F18 - 1.
	The controller can be connected to an optional Modbus gateway.
1.90 > 1.95	The priority operation (reverse control or set-back operation) can be set independently from the time and temperature course of the plant (see sections 7.8.1 and 7.8.2).
	The setting CO1 > F20 - 1 allows an external demand for heat to be made when insufficient heat is supplied (see section 8.18).
1.95 > 2.00	The limit switch for creep feed rate limitation can also be connected to input RüF1. In previous versions, it could only be connected to terminals 04/12 (see section 8.12).
2.00 > 2.12	New hydraulic system Anl 11.6 (see page 50).
	New cooling control function (see section 6.11) The cooling control function causes a reversal of the operating direction and a minimum limitation of the return flow temperature in HC1/HC2.
	The demand processing using a 0 to 10 V signal can be applied variably to the 0 to 130 °C transmission range (see section 8.11).
2.12 > 2.13	The priority operation (**reverse control** and **set-back operation**) can be activated for system Anl 4.5 either for one heating circuit (HC1 or HC2) or for both heating circuits (HC1 and HC2). See section 7.8.
	New function to **control the speed of the charging pump** based on the charging progress (see section 7.7).
2.13 > 2.14	Error messages can be issued over binary inputs BI1 and/or BI2 when the binary input is a made or break contact (see section 13.1).
2.14 > 2.20	New hydraulic systems Anl 16.x (buffer tank systems). See page 52.
	The drying of jointless floors is **not** canceled due to a deviation in the flow temperature (see section 6.3).
2.20 > 2.24	Internal revisions
2.24 > 2.26	Function to **receive outdoor temperature as 0 to 10 V signal** extended (CO5 > F23) Outdoor temperatures can be received or sent using a 0 to 10 V signal.
2.26 > 2.28	New system Anl 11.5 (see page 49)
2.28 > 2.30	It is possible to connect PTC and Ni 1000 sensors (Pt 1000 sensors only possible below this firmware version)

Old > New	Firmware revisions
2.30 > 2.41	New functions and parameters for buffer tank systems (see section 6.5) – CO1 > F22: SLP depending on return flow temperature – CO5′ > F01: AA1 reverse – CO5′ > F07: Zero shift New parameters in PA1 parameter level: – Minimum set point to charge buffer tank – Stop charging of the buffer tank – Charging temperature boost – Lag time for storage tank charging pump New parameters in PA4 parameter level: – Maximum buffer tank temperature
	New differential temperature control function (CO1 > F23) in systems Anl 1.0 and 16.0 (see section 6.12)
	Restrictions when a mini module (order no. 1400-7436) is used (see section 10.2)

ℹ️ *Note*

These Mounting and Operating Instructions EB 5573 are valid for firmware versions 2.40 to 2.49. The latest edition of EB 5573, detailing the firmware version and modifications compared to the previous version, is available on our website.

Note on these mounting and operating instructions

These mounting and operating instructions assist you in mounting and operating the device safely. The instructions are binding for handling SAMSON devices.

➔ For the safe and proper use of these instructions, read them carefully and keep them for later reference.

➔ If you have any questions about these instructions, contact SAMSON's After-sales Service Department (aftersalesservice@samson.de).

The mounting and operating instructions for the devices are included in the scope of delivery. The latest documentation is available on our website at *www.samson.de > Service & Support > Downloads > Documentation*.

Definition of signal words

⚠ DANGER

Hazardous situations which, if not avoided, will result in death or serious injury

⚠ WARNING

Hazardous situations which, if not avoided, could result in death or serious injury

❶ NOTICE

Property damage message or malfunction

ℹ Note

Additional information

☼ Tip

Recommended action

Contents

Contents

1   Safety instructions

For your own safety, follow these instructions concerning the mounting, start up and operation of the controller:

– The device is to be mounted, started up or operated only by trained and experienced personnel familiar with the product.

– For electrical installation, you are required to observe the relevant electrotechnical regulations of the country of use as well as the regulations of the local power suppliers. Make sure all electrical connections are installed by trained and experienced personnel! Before performing any such work on the controller, disconnect it from the power supply.

– The device is designed for use in low voltage installations. For wiring and maintenance, you are required to observe the relevant regulations concerning device safety and electromagnetic compatibility.

To avoid damage to any equipment, the following also applies:

– Proper shipping and storage are assumed.

– Before start-up, wait until the controller has reached the ambient temperature.

1.1   Disposal

Waste electrical and electronic equipment may still contain valuable substances. They may also, however, contain harmful substances which were necessary for them to function. For this reason, do not dispose of this kind of equipment together with your household waste. Select a suitable disposal method. Instead, dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment.

2 Operation

The controller is ready for use with the default temperatures and operating schedules. On start-up, the current time and date need to be set at the controller (see section 2.5).

2.1 Operating controls

The operating controls are located in the front panel of the controller.

2.1.1 Rotary pushbutton
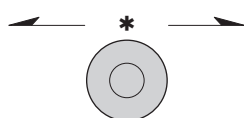
Rotary pushbutton

Turn [○]:
Select readings, parameters and function blocks.

Press [✳]:
Confirm adjusted selection or settings.

2.1.2 Rotary switch

The rotary switch is used to set the operating mode and the relevant parameters for each control circuit.
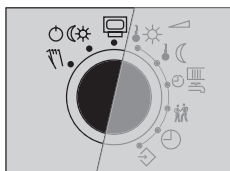
🖳   Information level, normal switch position

○☾✱   Operating modes

🖑   Manual level
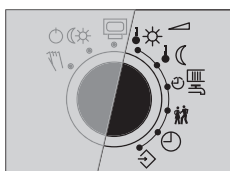
🌡☀   Day set point (rated room temperature, DHW temperature)

🌡☾   Night set point (reduced room temperature, DHW temperature sustaining value)

⊕🔥   Times-of-use for heating/DHW

👫   Party mode

🕐   Controller time

◈   Parameter and configuration level

2.2 Operating modes

Day mode (rated operation): regardless of the programmed times-of-use and summer mode, the set points relevant for rated operation are used by the controller. Icon: ☼

Night mode (reduced operation): Regardless of the programmed times-of-use, the set points relevant for reduced operation are used by the controller. Icon: ☾

Control operation deactivated: regardless of the programmed times-of-use, control operation remains deactivated. The frost protection is activated, if need be. Icon: ☉

Automatic mode: during the programmed times-of-use, the controller works in day mode (rated operation). Outside these times-of-use, the controller is in night mode (reduced operation), provided control operation has not been deactivated due to the outdoor temperature. The controller switches automatically between both operating modes. Icon: ◷

Manual mode: valves and pumps can be controlled manually (see section 4). Icon: ✍

Select the operating mode

1. Turn the rotary switch to ○☾☼ (operating modes).

   ◢ blinks.
   In systems with only one control circuit (e.g. system Anl 1.0), steps 2 and 3 (to select the control circuit) are not required.

2. Select the control circuit for which the operating mode is to be set [◌]:

   1: Heating circuit 1
   2: Heating circuit 2
   3: DHW heating/circulation pump
   Only those control circuits are available for selection which can be controlled by the selected system.

3. Confirm the selected control circuit [✳].

4. Select operating mode [◌]: ☼, ☾, ☉ or ◷.

5. Confirm the selected operating mode [✳].

6. Turn the rotary switch back to normal switch position ▭ (information level).

ℹ️ *Note*

In automatic operation, the current phase of the time program (◷ for day mode or ☼ for night mode) is displayed in the information level together with the ☾ icon.

2.3 Display

In the normal switch position ▢ (information level), the time as well as information on the controller are indicated on the display. Turn the rotary knob to read the times-of-use together with the temperature values of the various control circuits. The times-of-use and temperature values are represented by black squares below the row of numbers. Icons indicate the operating status of the controller.

Heating circuit 1

🕐	Automatic mode
☾	Night mode
☼	Day mode
≈	Manual mode
☉	Control operation deactivated
⊘	Circulation pump (heating) UP1 [1]
⧖	Valve HC1 OPEN
⧖	Valve HC1 CLOSED

Heating circuit 2

🕐	Automatic mode
☾	Night mode
☼	Day mode
≈	Manual mode
☉	Control operation deactivated
⊘	Circulation pump (heating) UP2 [1]
⧖	Valve HC2 OPEN
⧖	Valve HC2 CLOSED

DHW circuit

🕐	Automatic mode
☾	Night mode
☼	Day mode
≈	Manual mode
☉	Control operation deactivated
⊘	Pump output TLP/CP [1]
⊘	Storage tank charging pump SLP [1]
⊘	Circulation pump (DHW) ZP [1]

[1] UP1, UP2, TLP, CP, SLP and ZP indicate possible choices for pump selection in manual mode.

Fig. 1: *Icons*

The controller status can be displayed in the information level (see section 2.4).

2.4   Activate the information level

In the normal switch position ⊟ (information level), the time, date, public holidays and vacation periods as well as the temperatures of connected sensors and their set points can be displayed.

---

i *Note*

The data can also be read in the operating level ✍ (manual mode). In this case, select and confirm **InFo** *on the display and proceed as described below.*

Proceed as follows:

1. Select value [○].

   Depending on how the controller is configured, the current values of the following data points appear one after the other on the display:

__:__	Time
⌂	Room temperature of heating circuit 1, 2
⌂	Outdoor temperature
▥	Temperature at flow sensor VF, heating circuit 1, 2
⊘	Temperature at flow sensor VF1, primary heat exchanger circuit
⊘⌁	Temperature at flow sensor VF2, VF4, DHW circuit
⌂	Temperature at solar collector sensor VF3
⊘	Temperature at return flow sensor RüF
⌁	Temperature at storage tank sensor SF1
⌁	Temperature at storage tank sensor SF2
⌁	Temperature at storage tank sensor of solar circuit

2. Confirm a data point [✳] to read the associated set point/limit. The date is displayed when the time reading appears.

2.5 Setting the time and date

The current time and date need to be set immediately after start-up and after a power failure lasting more than 24 hours. This is the case when the time blinks on the display.

Proceed as follows:
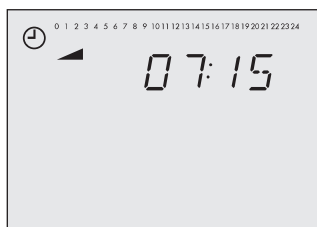
<table>
<tr><td>

🕐
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

◢   *07:15*

</td><td>

1. Turn the rotary switch to 🕐 (controller time).
   Reading: Time, 🕐 and ◢ blink.
2. Change the time [◌].

</td></tr>
<tr><td>

🕐
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

◢   *2008*

</td><td>

3. Confirm the time setting [✳].
   Reading: Year
4. Change year [◌].

</td></tr>
<tr><td>

🕐
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

◢   *01.03*

</td><td>

5. Confirm year [✳].
   Reading: Date (day.month)
6. Change date [◌].
7. Confirm the date setting [✳].
   Reading: Time
8. Turn the rotary switch back to normal switch position 🖥 (information level).

</td></tr>
</table>
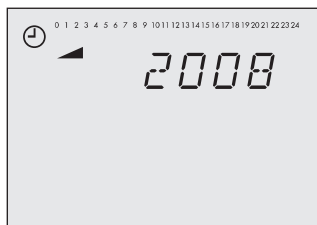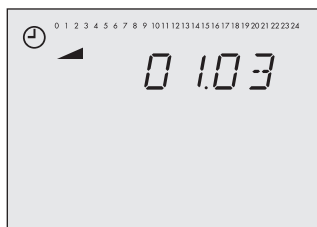
ℹ **Note**

The correct time is guaranteed after a power failure of 24 hours. Normally, the correct time is still retained at least 48 hours after a power failure.

2.6 Setting the times-of-use

Three times-of-use can be set for each day of the week.

Parameters	Default [1]	Value range
Period/day	1-7	1-7, 1, 2, 3, 4, 5, 6, 7 with 1-7 daily, 1 = Monday, 2 = Tuesday, …, 7 = Sunday
Start first time-of-use	06:00	00:00 to 24:00 h; in steps of 15 minutes
Stop first time-of-use	22:00	00:00 to 24:00 h; in steps of 15 minutes
Start second time-of-use	22:15	00:00 to 24:00 h; in steps of 15 minutes
Stop second time-of-use	22:15	00:00 to 24:00 h; in steps of 15 minutes
Start third time-of-use	--:--	00:00 to 24:00 h; in steps of 15 minutes
Stop third time-of-use	--:--	00:00 to 24:00 h; in steps of 15 minutes

[1] Default settings applicable to the heating circuits

Proceed as follows:

1. Turn the rotary switch to ⏱🖥 (times-of-use).

   ◢ blinks.
   In systems with only one control circuit (e.g. system Anl 1.0), steps 2 to 5 (to select the control circuit and configure the DHW circuit) are not required.
   In systems Anl 1.5 and 1.9, only the DHW circuit is controlled. As a result, steps 2 and 3 (to select the control circuit) are not required.

2. Select the control circuit for which the time-of-use is to be programmed.

   1: Heating circuit 1
   2: Heating circuit 2
   3: DHW heating/circulation pump
   Only those control circuits are available for selection which can be controlled by the selected system.

3. Confirm the selected control circuit [✶].

   If control circuit 1 or 2 has been selected, steps 4 and 5 are not required.

4. Configure DHW circuit [↻]:

   ⏀ DHW heating   ⏀ Circulation pump (DHW)

5. Confirm setting [✶].
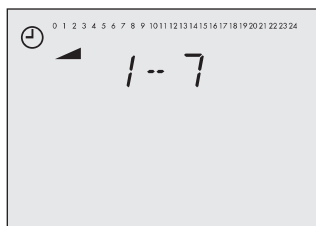
6. Select period/day for which the times-of-use are to be valid [○].

    1-7 = daily
    1 = Monday, 2 = Tuesday, …, 7 = Sunday
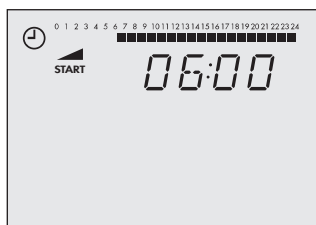
7. Activate editing mode for the period/day [✳].
    Reading: **START**, ○ and ◢ blink.
8. Change start time [○].
    The time is set in steps of 15 minutes.
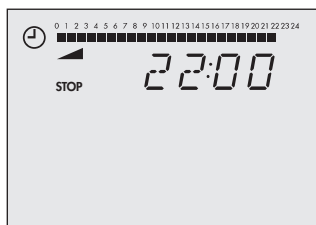
9. Confirm the start time setting [✳].
    Reading: **STOP**
10. Change stop time [○].
    The time is set in steps of 15 minutes.
11. Confirm the stop time setting [✳].
    Reading: **START**
    The displayed time is the stop time of the first time-of-use period plus 15 minutes.

→ To set the second and third times-of-use periods, repeat steps 8 to 11.

→ If no further times-of-use are to be programmed for the selected time period/day, exit the menu by confirming the indicated start time twice (2x [✳]).

→ For programming every day separately, repeat steps 6 to 11.

12. Once you have programmed all times-of-use: Turn the rotary switch back to normal switch position 💻 (information level).

---

i *Note*

Do not use the 1–7 menu to check the programmed times-of-use. If this menu is opened after the times-of-use have been programmed, the schedule programmed for Monday is also adopted for all other days of the week.

2.7   Setting the party mode

Using the **Party mode** function, the controller continues or activates the rated operation of the controller during the time when the party timer is active, regardless of the programmed times-of-use. After the party timer has counted down, the party time function is reset to 00:00

Parameters	WE	Value range
Continue/activate rated operation	0 h	0 to 48 h

Proceed as follows:

1. Turn the rotary switch to 👫 (party mode).

   ◢ blinks.
   In the systems Anl 1.0, 1.9 and 3.5, 00:00 or the remaining time of the party time are displayed. The following steps 2 and 3 (to select the control circuit) are not required.

2. Select the control circuit in which day mode is to be activated or continued [◖]:

   1: Heating circuit 1
   2: Heating circuit 2
   3: DHW circuit
   Only those control circuits are available for selection which can be controlled by the selected system.

3. Confirm the selected control circuit [✳].

   Reading: **00:00** or the remaining time of the party time

4. Extend day mode as required [◖].

   The time is set in steps of 15 minutes.

5. Turn the rotary switch back to normal switch position 🖳 (information level).

ℹ️ *Note*

The party timer runs down in steps of 15 minutes.

2.8   Activating extended information level

After activating the extended information level, the following information can be read after the listed data points:

– Capacity

– Flow rate V̇

– Public holidays ∿ (can be changed, see section 2.8.1)

– Vacations ⊤̇ (can be changed, see section 2.8.2)

– Valve positions

– Switching states of the binary inputs

– InFo 2: After confirmation [✷] the following values are shown one after the other:

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	Controller ID
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	Memory left in data logging module (see section 10.3)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	255
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	Operating hours of solar circuit pump (see section 7.4)

Opening the extended information level

1. Turn the rotary switch to ⟐ (parameter and configuration level).
   Reading: **0 0 0 0**, ◢ blinks.

2. Enter key number 1999 [↻].

3. Confirm key number [✷].
   Reading: **0 0 0 0**

4. Turn the rotary switch back to normal switch position ▣ (information level).

---

i *Note*

– The additional information is hidden when the key number 1999 is entered again.

– The key number 1999 cannot be used to change the controller configuration and parameterization. A separate key number exists for configuration and parameterization (see section 3).

2.8.1 Setting public holidays

On public holidays, the times-of-use specified for Sunday apply. A maximum of 20 public holidays may be entered.

Parameters	WE	Level: value range
Public holidays	–	Extended information level: 01.01 to 31.12

Proceed as follows:

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
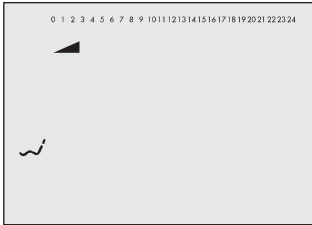
1. In the extended information level (normal switch position 🖳) select the data point for public holidays [○].
   Reading: ⌀
2. Open data point for public holidays.
3. Select **– –.– –** on the display [○] (if applicable).

4. Activate editing mode for public holidays [✳].
   ⌀ and ◢ blink.
5. Select public holiday [○].
6. Confirm the public holiday setting [✳].

➜ To enter additional public holidays, re-select **– –.– –** and repeat the steps 4 to 6.

ℹ️ *Note*

Public holidays can also be entered in PA5 parameter level (see section 3.3).

Deleting a public holiday

1. Under data point for public holidays, select the holiday you wish to delete [○].
2. Confirm setting [✳].
3. Select **– –.– –** on the display [○].
4. Confirm setting [✳].
   The public holiday is deleted.

ℹ **Note**

We recommend deleting public holidays that are not assigned to a specific date by the end of the year so that they are not carried on into the following year.

2.8.2 Entering vacations

The system runs constantly in reduced mode during vacation periods. A maximum of ten vacation periods can be entered. Each vacation period can be separately assigned to the heating circuits HC1, HC2 and/or the DHW circuit.

Parameters	WE	Level: value range
Vacation period (START, STOP)	–	Extended information level: 01.01 to 31.12

Proceed as follows:
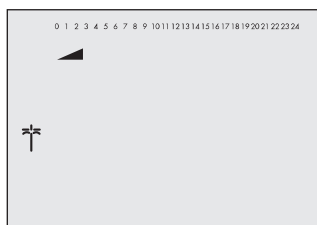
1. In the extended information level (normal switch position 🖳) select the data point for vacations [○].
   Reading: 🕇

2. Open data point for public holidays [＊].
   Reading: **START**

3. Select – –.– – on the display [○] (if applicable).

4. Activate editing mode for the start date of the vacation [＊].
   🕇 and ◢ blink.

5. Set the start date of the vacation [○].

6. Confirm the start date setting [＊].
   Reading: **STOP, – –.– –**

7. Set the end date of the vacation [○].

8. Confirm the end date setting [＊].
   Black squares at the top of the display indicate the assignment of the vacation periods to the individual control circuits.

---

9. Select the control circuit to which the current vacation period is to apply [○]:

   ■¹: Current vacation period applies to heating circuit 1

   ■²: Current vacation period applies to heating circuit 2

   ■³: –

   ■⁴: Current vacation period applies to DHW circuit

   The vacation period can be assigned to a single control circuit or any combination of all three control circuit (HC1 and HC2, DHW circuit).

➔ To enter additional vacation periods, re-select **– –.– –** and repeat the steps 4 to 9.

---

i Note

Vacations can also be entered in PA5 parameter level (see section 3.3).

Deleting vacations

1. Under data point for vacations, select the start date of the vacation period you wish to delete [○].

2. Confirm setting [✳].

3. Select **– –.– –** on the display [○].

4. Confirm setting [✳].

   The vacation period is deleted.

---

i Note

We recommend deleting vacation periods by the end of the year so that they are not carried on into the following year.

2.9   Entering day and night set points

For the heating circuits, the desired room temperatures during the day ('Day set point') and during the night ('Night set point') can be entered into the controller. In the DHW circuit, the temperature you wish the DHW to be heated to can be set.

Switch position ↓☼

Parameters	WE	Value range
Day set point HC1, HC2	20 °C	−5.0 to +150.0 °C
DHW temperature set point	60 °C	Min. to max. DHW temperature

Switch position ↓☾

Parameters	WE	Value range
Night set point HC1, HC2	15 °C	−5.0 to +150.0 °C
DHW temperature set point	40 °C	Min. to max. DHW temperature

Proceed as follows:

1. Turn the rotary switch to the required data point.

    ↓☼ for the day set point and DHW temperature set point
    ↓☾ for the night set point and DHW temperature sustaining value
    ◄ blinks.

    In systems Anl 1.0, 1.9 and 3.5, the current set point is directly displayed. The following steps 2 and 3 (to select the control circuit) are not required.

2. Select the control circuit for which the set point is to be set [○]:

    1: Heating circuit 1
    2: Heating circuit 2
    3: DHW circuit
    Only those control circuits are available for selection which can be controlled by the selected system.

3. Confirm the selected control circuit [✳].

    Reading: Current set point

4. Adjust the set point [○].

5. Turn the rotary switch back to normal switch setting ▣ (information level).

3 Start-up

Fig. 2: *Level structure of TROVIS 5573*

The diagram contains the following boxes and labels:

Information level

✳ ⇒ & key number

Anl End PA1 PA2

PA4

PA5

PA6

Configuration and parameter level
(Start-up)

CO6

CO5 CO4 CO2 CO1

PA1/CO1:   HC1 (heating circuit 1)
PA2/CO2:   HC2 (heating circuit 2)
PA4/CO4:   DHW circuit
PA5/CO5:   System-wide
PA6/CO6:   Modbus communication
Anl: System code number
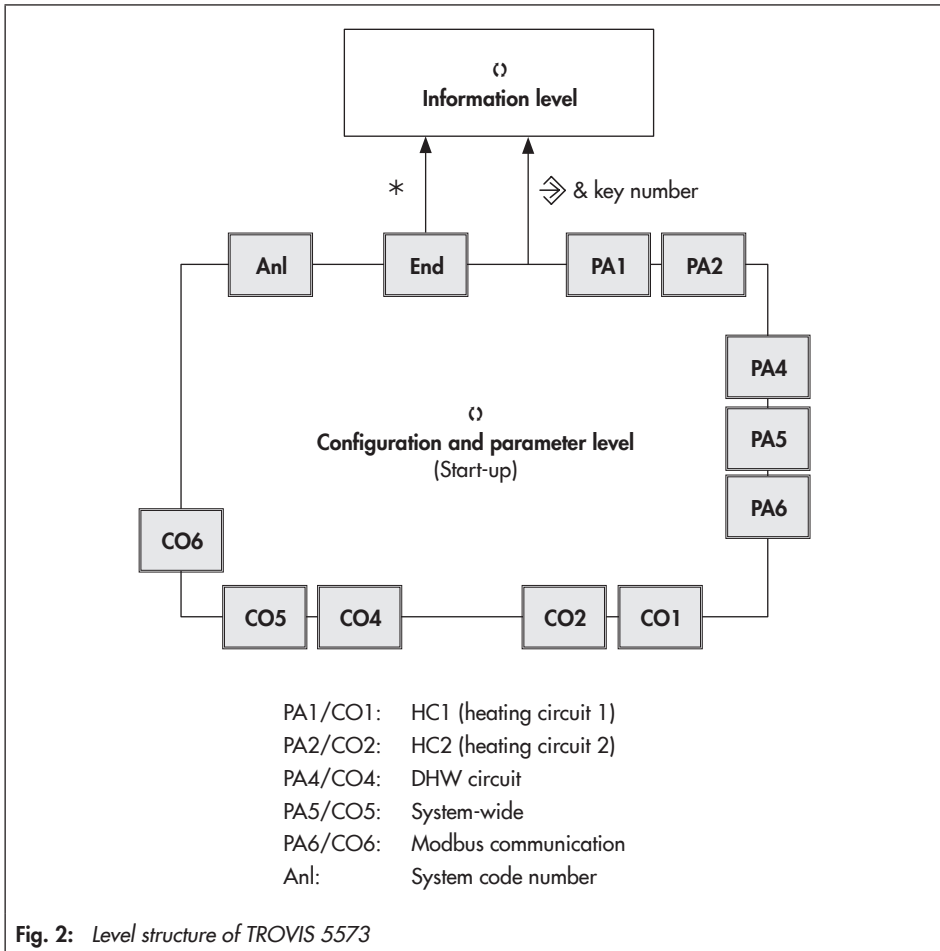
The modifications of the controller configuration and parameter settings described in this section can only be performed after the valid key number has been entered.

The key number that is valid on the first start-up can be found on page 144. To avoid unauthorized use of the service key number, remove the page or make the key number unreadable. In addition, it is possible to enter a new, customized key number (see section 8.19).

3.1 Setting the system code number

Different hydraulic schematics are available. Each system configuration is represented by a system code number. The different schematics are dealt with in section 5. Available controller functions are described in sections 6, 7 and 8.

Changing the system code number resets previously adjusted function blocks to their default settings (WE). Function block parameters and parameter level settings remain unchanged.

The system code number is set in the configuration and parameter level.

Proceed as follows:

1. Turn the rotary switch to ⬦ (parameter and configuration level).
   Reading: **0 0 0 0**
2. Enter valid key number [◡]
3. Confirm key number [✳]
   Reading: **PA_**
4. Select **Anl** on the display.
5. Activate editing mode for the system code number [✳]
   ◢ blinks.
6. Select system code number [◡]
7. Confirm system code number [✳]
   Reading: **End**
8. Turn the rotary switch back to normal switch setting ⬚ (information level).

3.2   Activating and deactivating functions

A function is activated or deactivated in the associated function block. 0 to 24 at the top of the display represent the function block numbers. When a configuration level is opened, the activated function blocks are indicated by a black square on the right-hand side below the function block number. For more details on function blocks, see section 13.1.

The functions are grouped by topics:

– CO1:   HC1 (heating circuit 1)
– CO2:   HC2 (heating circuit 2)
– CO4:   DHW circuit
– CO5:   System-wide
– CO6:   Modbus communication

1. Turn the rotary switch to ⬦ (parameter and configuration level).
    Reading: **0 0 0 0**

2. Enter valid key number [⟳].

3. Confirm key number [✳].
    Reading: **PA_**

4. Select configuration level [⟳].

5. Open configuration level [✳].

6. Select function block [⟳].
    Activated function blocks are marked '- 1'.
    Deactivated function blocks are marked '- 0'.

7. Activate editing mode for the function block [✳].
    ◢ blinks.

8. Activate function block [⟳].
    Reading: **F__ - 1**
    An activated function block is indicated by a black square below (right) the function block number at the top of the controller display.

    or:

    Deactivate function block [⟳].
    Reading: **F__ - 0**

9. Confirm setting [✳].

   If the function block is not closed, further function block parameters can be adjusted.
   a) Set function block parameter [↻].
   b) Confirm function block parameter [✳].
   If applicable, the next function block parameter is displayed.
   Confirm all parameters to exit the opened function block.

➔ To set further function blocks, repeat the steps 6 to 9.

10. Select **End** [↻].

11. Exit configuration level [✳].

➔ To set further function blocks in other configuration levels, repeat steps 4 to 9.

12. Turn the rotary switch back to normal switch setting ▭ (information level).

ℹ️ *Note*

All function block settings are saved in a non-volatile memory in the controller.

3.3 Changing parameters

Depending on the system code number selected and the activated functions, not all parameters listed in the parameter list in the appendix (see section 13.2) might be accessible.

The parameters are grouped by topics:

- PA1: HC1 (heating circuit 1)
- PA2: HC2 (heating circuit 2)
- PA4: DHW circuit
- PA5: System-wide
- PA6: Communication parameters

1. Turn the rotary switch to ⬦ (parameter and configuration level).
   Reading: **0 0 0 0**
2. Enter valid key number [◌].
3. Confirm key number [✳].
   Reading: **PA_**

4. Select parameter level [◌].
5. Open parameter level [✳].
6. Select parameter [◌].
7. Activate editing mode for the parameter [✳].
   ◢ blinks.
8. Change parameter [◌].
9. Confirm parameter [✳].
➔ To set further parameters in the opened parameter level, repeat the steps 6 to 9.

10. Select **End** [◌].
11. Exit parameter level [✳].
➔ To set further parameters in another parameter level, repeat the steps 4 to 9.
12. Turn the rotary switch back to normal switch setting ▣ (information level).

ℹ **Note**

All parameter settings are saved in a non-volatile memory in the controller.

3.4   Calibrating sensors

The controller is designed for connection of Pt 1000, PTC and Ni 1000 sensors.

– CO5 -> F01 - 1, F02 - 0: Pt 1000
– CO5 -> F01 - 0, F02 - 0: PTC
– CO5 -> F01 - 1, F02 - 1: Ni 1000

The resistance values of the sensors can be found in section 13.3.

If the temperature values displayed at the controller differ from the actual temperatures, the measured values of all connected sensors can be recalibrated. To calibrate a sensor, the currently displayed sensor value must be changed such that it matches the temperature (reference temperature) measured directly at the point of measurement.

➔ Activate calibration in CO5 with F20.

➔ Delete the incorrectly performed calibration with F20 - 0.

Proceed as follows:

1. Turn the rotary switch to ⬦ (parameter and configuration level).
   Reading: **0 0 0 0**
2. Enter valid key number [◐].
3. Confirm key number [✳].
   Reading: **PA_**
4. Select CO5 configuration level [◐].
5. Open CO5 configuration level [✳].
6. Select function block F20 [◐].
7. Activate editing mode for function block F20 [✳].
8. Select sensor symbol [◐]:

⌂	Room sensor RF, heating circuit 1 and 2
⌂	Outdoor sensor AF1
▥	Flow sensor VF, heating circuit 1 and 2
⌀	Flow sensor VF1, primary heat exchanger circuit
⌀ ⊓	Flow sensor VF2 and VF4, DHW circuit
⌂	Solar collector sensor VF3

← ⊠	Return flow sensor RüF
⊟	Storage tank sensor SF1
⊡	Storage tank sensor SF2
→ ⊡	Storage tank sensor of solar circuit SF2

9. Display measured value [✴].

   "°C" blinks.

10. Correct measured value [〇].

   Read the actual temperature directly from the thermometer at the point of measurement and enter this value as the reference temperature.

11. Confirm corrected measured value [✴].

   Proceed in the same manner to calibrate further sensors.

12. Select **End** [〇].

13. Turn the rotary switch back to normal switch setting ⊡ (information level).

3.5   Resetting to default settings

All parameters set over the rotary switch as well as parameters in the PA1, PA2 and PA5 parameter levels can be reset to their default settings (WE) except for the maximum flow temperature and the return flow temperature limits in PA1 and PA2.

1. Turn the rotary switch to ✥ (parameter and configuration level).

   Reading: **0 0 0 0**

2. Enter key number 1991 [〇].

3. Confirm key number [✴].

   The controller loads the default settings.
   Reading: **0 0 0 0**

4 Manual mode

Switch to manual mode to configure all outputs (see section 12).

---

❶ NOTICE

Risk of damage of the heating circuit through low temperatures.
The frost protection does not function when the controller is in manual mode.

Proceed as follows:

1. Turn the rotary switch to ⑂ (manual level).
2. Select output depending on the control circuit [↻]:

   POS_   Correction value adjusted in percent
   UP_   Switching of the circulation pump (heating)
   SLP   Switching of the storage tank charging pump
   TLP   Switching of the heat exchanger charging pump
   CP   Switching of the solar circuit pump
   ZP   Switching of the circulation pump (DHW)

3. Confirm output [✳].

   The reading blinks.
4. Change the positioning value/switching state [↻].
5. Confirm change [✳].

   The modified values remain active as long as the controller is in manual mode.
6. Turn the rotary switch back to normal switch setting ▢ (information level).

   The manual mode is deactivated.

ℹ Note

The outputs of the controller are not affected by merely turning the rotary switch to ⑂ (manual level). The outputs are only changed by entering or changing the positioning values or switching states.

---

5 Systems

Different hydraulic schematics are available.

The plants can be designed as primary or secondary systems. The main hydraulic differences between the primary and second systems are shown in Fig. 3.

1. A mixing valve replaces the heat exchanger in the heating circuit/DHW circuit.
2. A storage tank charging pump replaces the solenoid valve/thermoelectric valve in the primary system.

Do not change the controller settings.

Fig. 3: *Differences between primary and second systems*
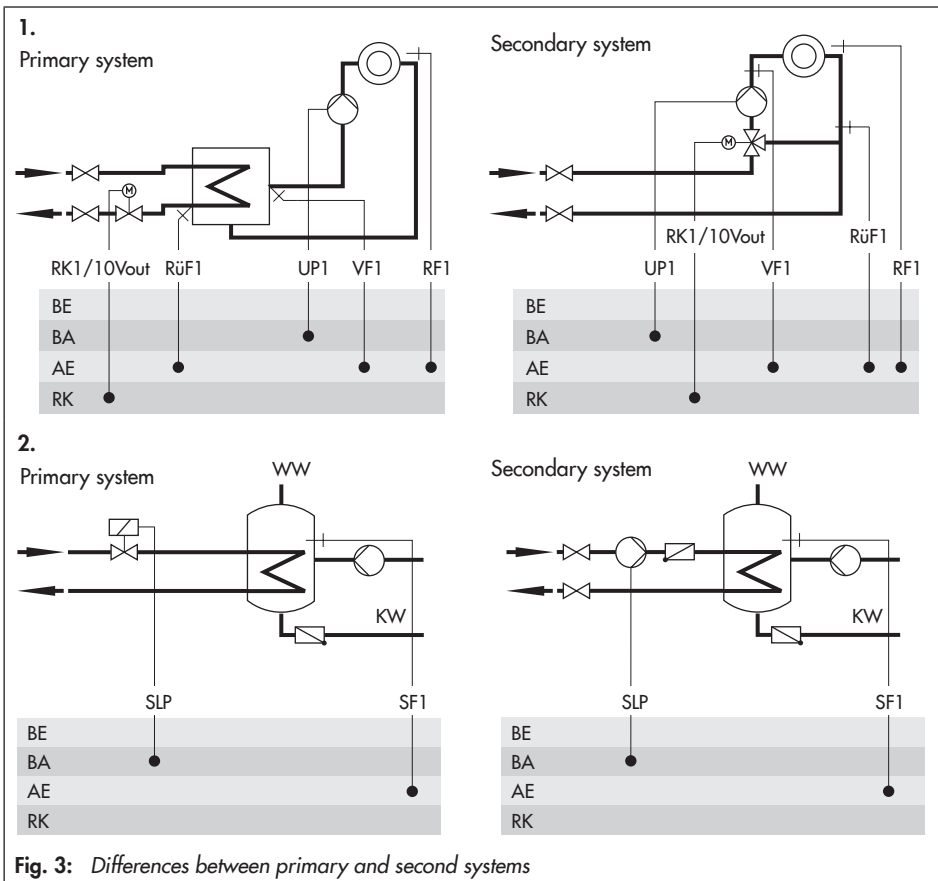
Boiler plants

Single-stage boiler systems can be configured to include any system whose heating circuits and DHW circuit include just one heat exchanger. These systems are Anl 1.0, 1.5, 1.6, 2.x, 3.0, 3.5, 4.0, 4.1 and 16.x.

The boiler can be controlled by an on/off output (CO1 > F12 - 0).
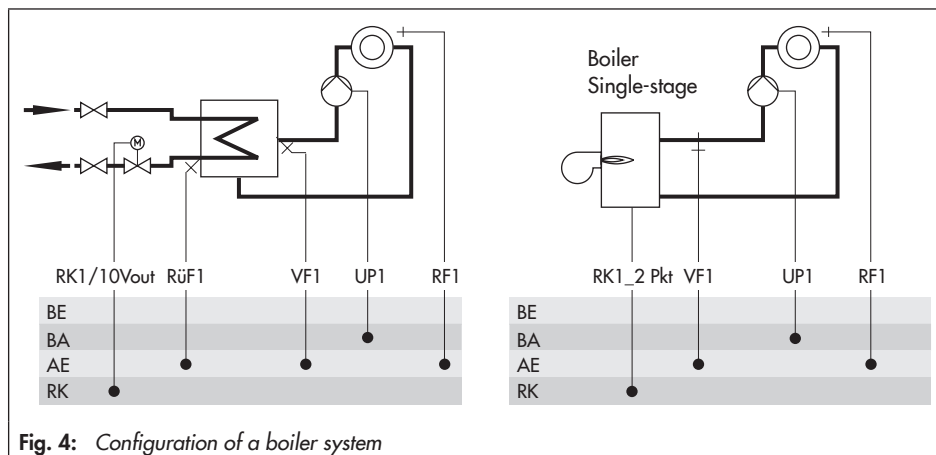
Fig. 4: *Configuration of a boiler system*

System Anl 1.0
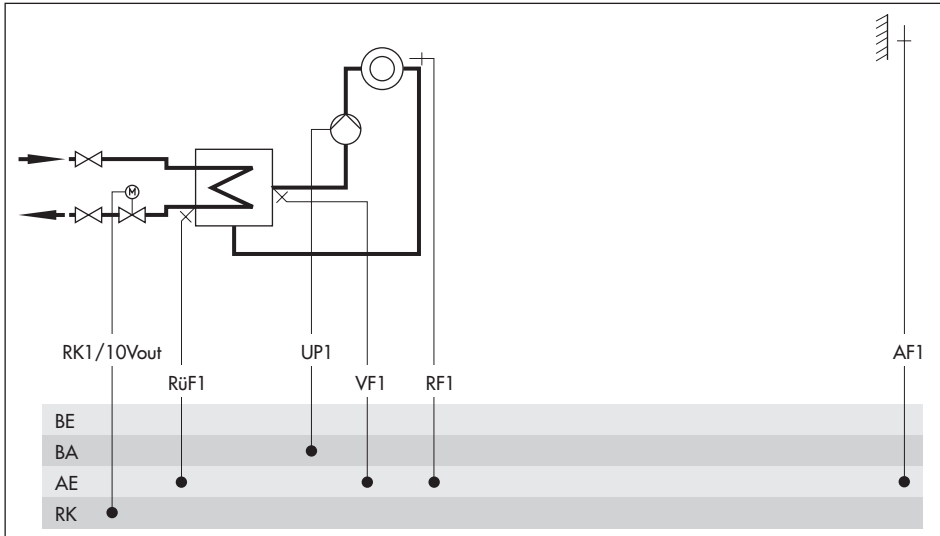
Default settings	
CO1 > F01	- 0 (without RF1)
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)

Systems Anl 1.1 to 1.3

DHW heating
Fold open back cover.
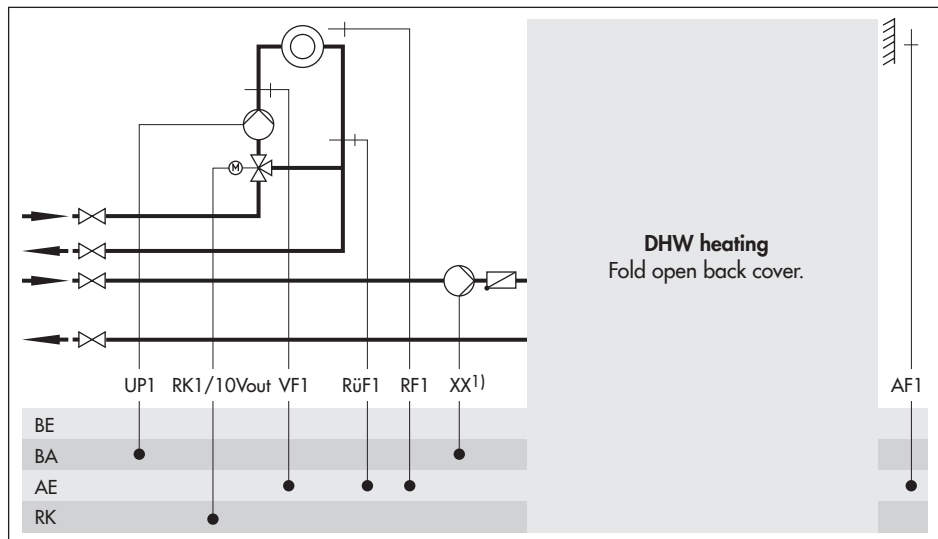
System	System Anl 1.1	System Anl 1.2	System Anl 1.3
Type of DHW heating	Type 1	Type 2	Type 3
[1] XX =	SLP	TLP	SLP
Integration of VF4	Possible	Possible	–
ZP integration (broken line) with CO4 > F10 - 1	–	Not possible	–
Note	–	Secondary system **only**	–
Default setting			
CO1 > F01	- 0 (without RF1)	- 0 (without RF1)	- 0 (without RF1)
CO1 > F02	- 1 (with AF1)	- 1 (with AF1)	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)	- 0 (without RüF1)	- 1 (with RüF1)
CO4 > F01	- 1 (with SF1)	- 1 (with SF1)	- 1 (with SF1)
CO4 > F02	- 0 (without SF2)	- 1 (with SF2)	- 0 (without SF2)
CO4 > F05	- 0 (without VF4)	- 0 (without VF4)	- 0 (without VF4)

System Anl 1.5
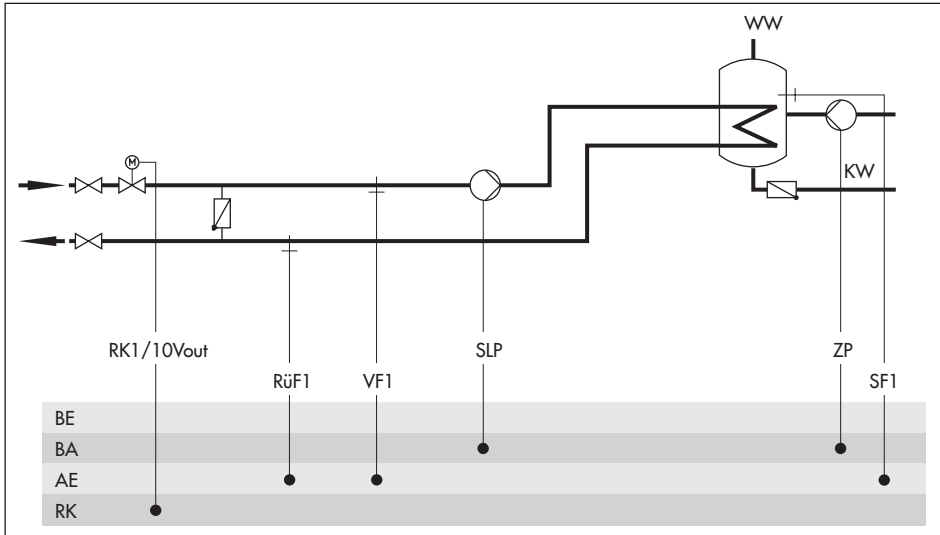
Default settings	
CO1 > F03	- 1 (with RüF1)
CO4 > F01	- 1 (with SF1)
CO4 > F02	- 0 (without SF2)

System Anl 1.6
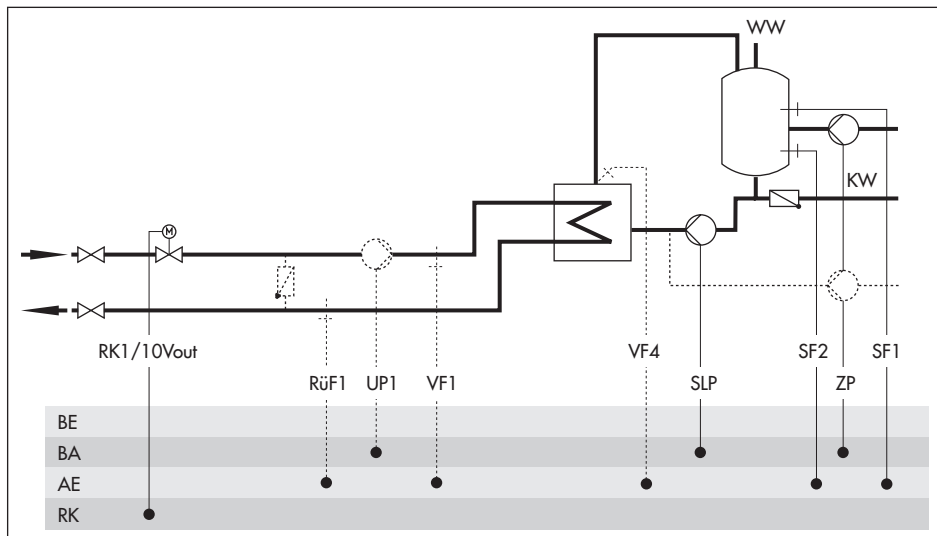
System	System Anl 1.6 With pre-control	System Anl 1.6 Without pre-control
Integration of VF4, UP1	Possible	Not possible
ZP integration (broken line) with CO4 > F10 - 1	Possible	Possible
Note	–	VF1 takes on the position of VF4. Install RüF1 in the heat exchanger.
Default setting		
CO1 > F03	- 1 (with RüF1)	
CO4 > F01	- 1 (with SF1)	
CO4 > F02	- 1 (with SF2)	
CO4 > F05	- 0 (without VF4)	

System Anl 1.9

Default settings	
CO4 > F01	- 0 (without SF1)
CO4 > F03	- 0 (without RüF2)

System Anl 2.0
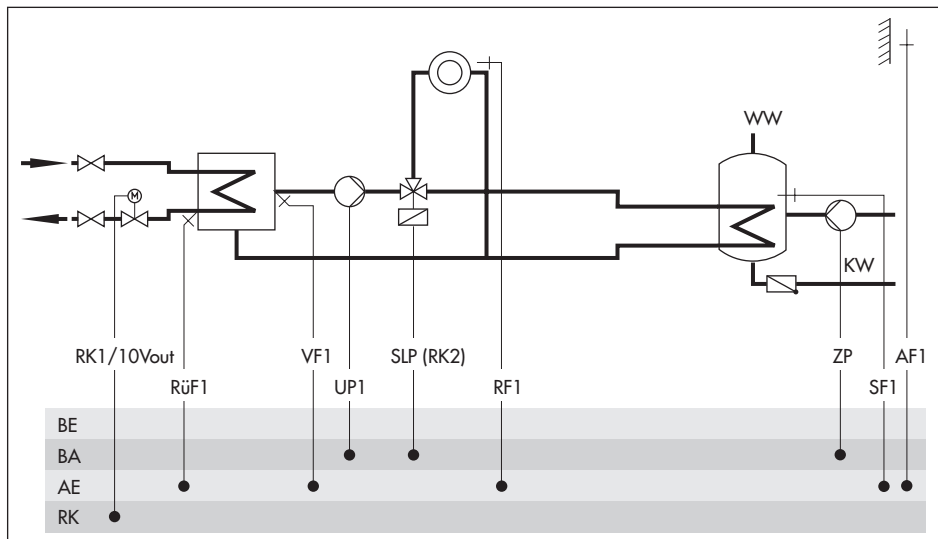
Default settings	
CO1 > F01	- 0 (without RF1)
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)
CO4 > F01	- 1 (with SF1)
CO4 > F02	- 0 (without SF2)

Systems Anl 2.1 to 2.3
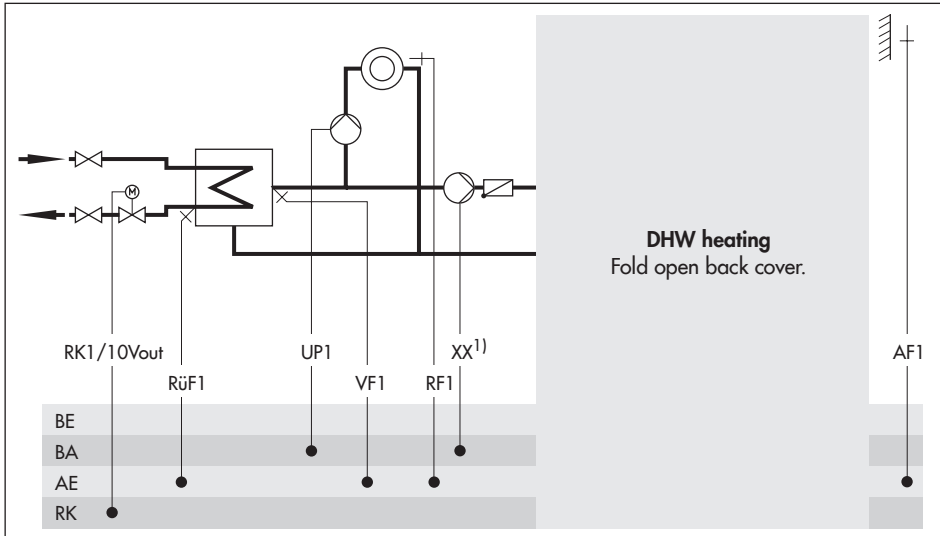
System	System Anl 2.1	System Anl 2.2	System Anl 2.3
Type of DHW heating	Type 1	Type 2	Type 3
[1] XX =	SLP	TLP	SLP
Integration of VF4	Not possible	Possible	–
ZP integration (broken line) with CO4 > F10 - 1	–	Not possible	–
Default setting			
CO1 > F01	- 0 (without RF1)	- 0 (without RF1)	- 0 (without RF1)
CO1 > F02	- 1 (with AF1)	- 1 (with AF1)	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)	- 1 (with RüF1)	- 1 (with RüF1)
CO4 > F01	- 1 (with SF1)	- 1 (with SF1)	- 1 (with SF1)
CO4 > F02	- 0 (without SF2)	- 1 (with SF2)	
CO4 > F05		- 0 (without VF4)	

System Anl 3.0
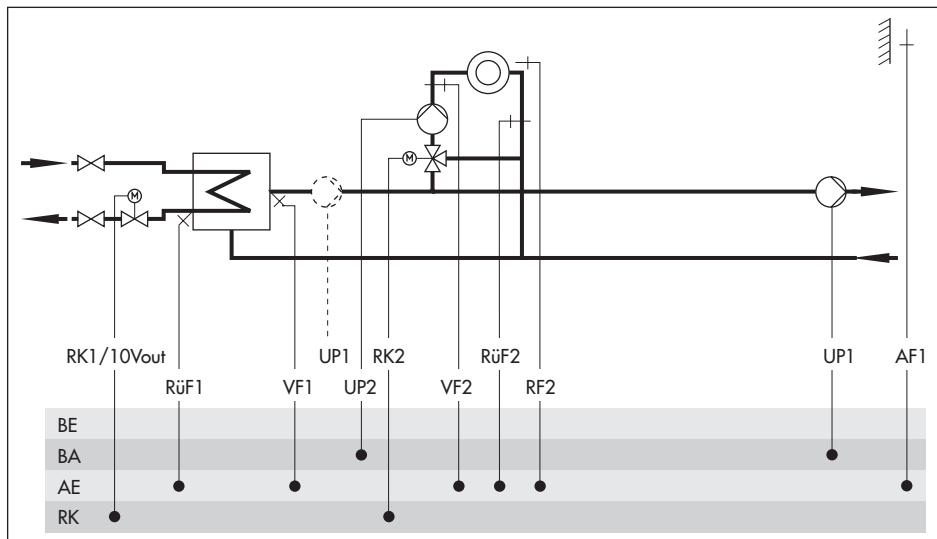
Default settings	
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)
CO2 > F01	- 0 (without RF2)
CO2 > F03	- 0 (without RüF2)

System Anl 3.5
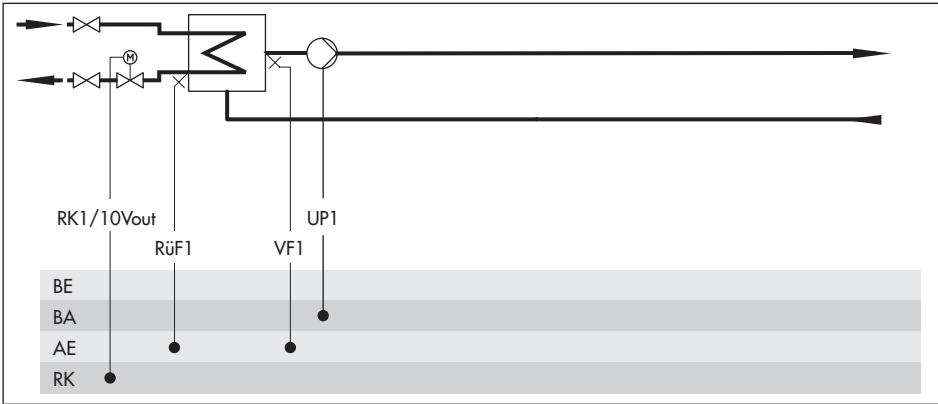
Note	Closed control circuit and UP1 are only active during the processing for an external demand
Default settings	
CO1 > F03	- 1 (with RüF1)

System Anl 4.0
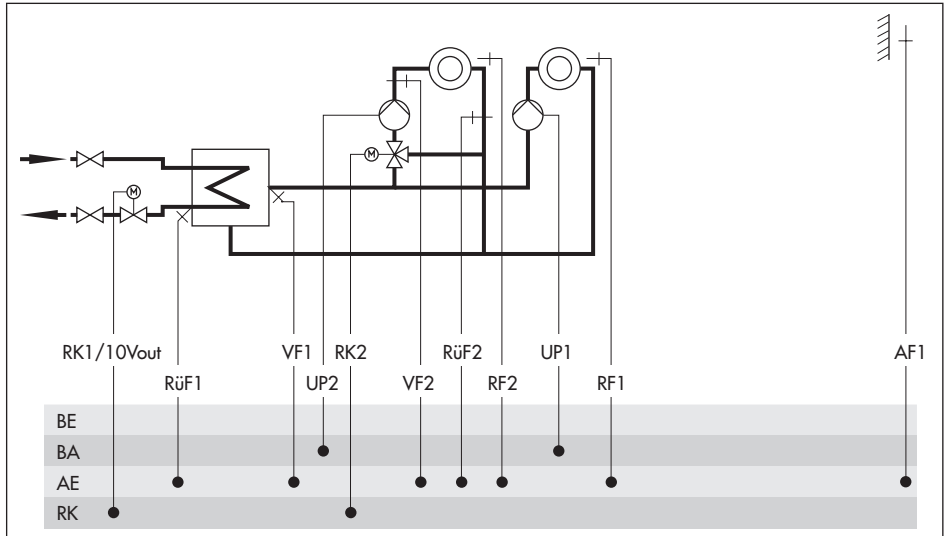
Default settings	
CO1 > F01	- 0 (without RF1)
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)
CO2 > F01	- 0 (without RF2)
CO2 > F03	- 0 (without RüF2)

System Anl 4.1
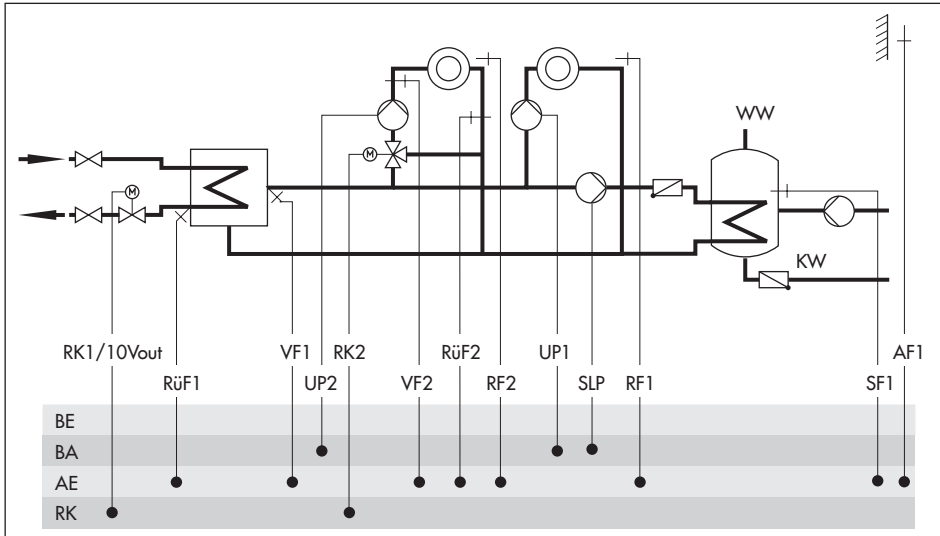
Default settings	
CO1 > F01	- 0 (without RF1)
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)
CO2 > F01	- 0 (without RF2)
CO2 > F03	- 0 (without RüF2)
CO4 > F01	- 1 (with SF1)
CO4 > F02	- 0 (without SF2)

System Anl 4.5
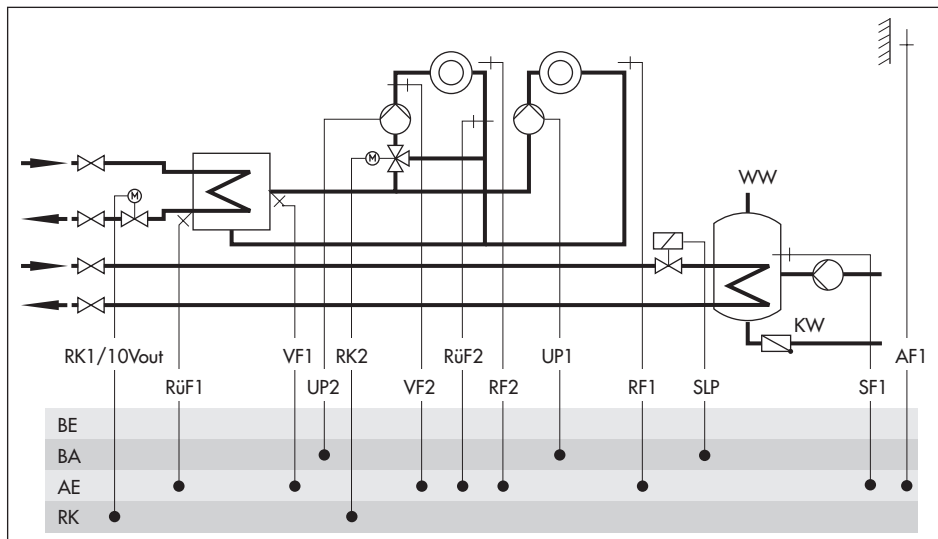
Default settings	
CO1 > F01	- 0 (without RF1)
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)
CO2 > F01	- 0 (without RF2)
CO2 > F03	- 0 (without RüF2)
CO4 > F01	- 1 (with SF1)
CO4 > F02	- 0 (without SF2)

System Anl 10.0
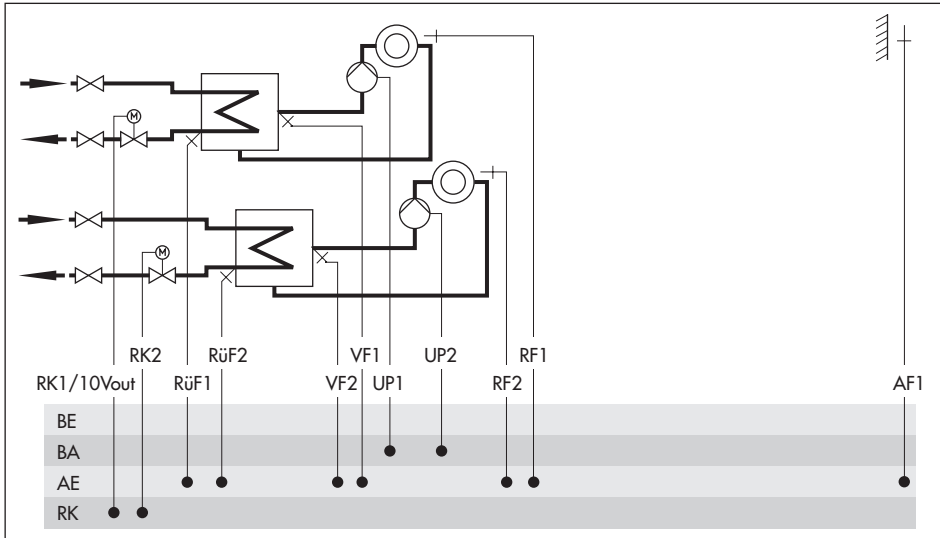
Default settings	
CO1 > F01	- 0 (without RF1)
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)
CO2 > F01	- 0 (without RF2)
CO2 > F03	- 1 (with RüF2)

System Anl 11.0
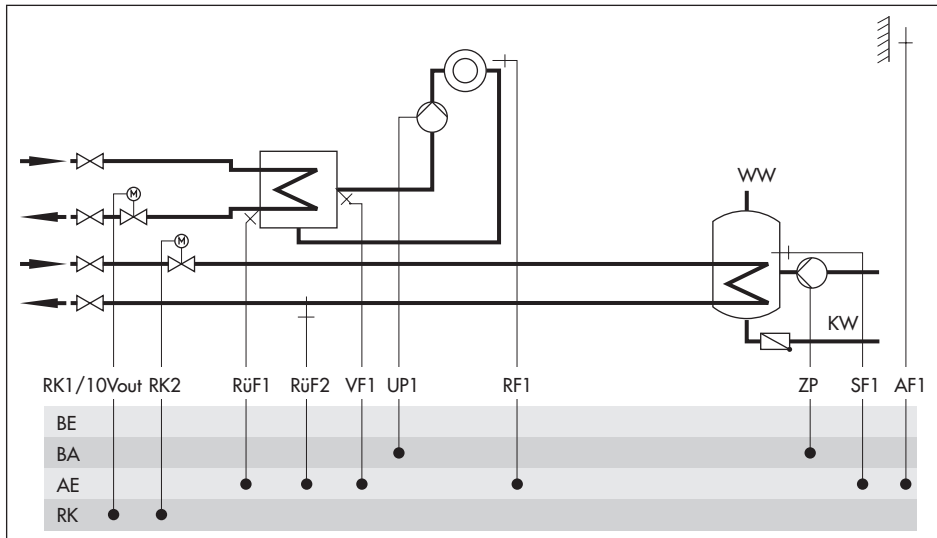
Default settings	
CO1 > F01	- 0 (without RF1)
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)
CO4 > F03	- 0 (without RüF2)

System Anl 11.1
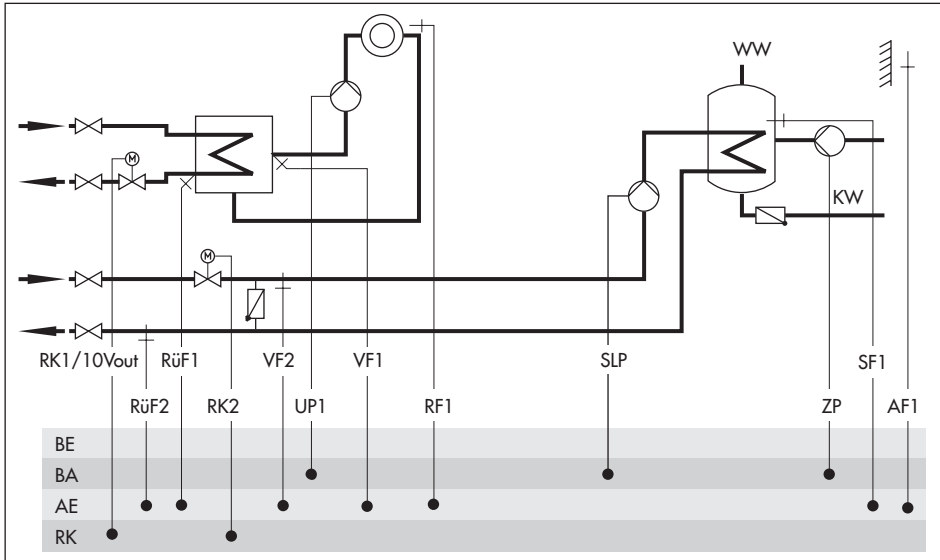
Default settings	
CO1 > F01	- 0 (without RF1)
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)
CO4 > F01	- 1 (with SF1)
CO4 > F02	- 0 (without SF2)
CO4 > F03	- 0 (without RüF2)

The system code number Anl 11.1 can also be used for systems with buffer tank (see page 48).

System Anl 11.2
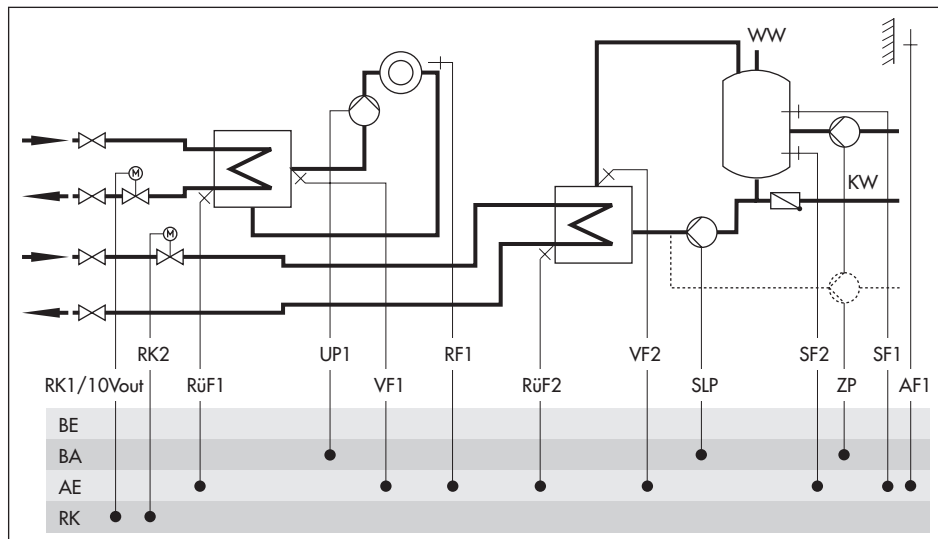
Default settings	
CO1 > F01	- 0 (without RF1)
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)
CO4 > F01	- 1 (with SF1)
CO4 > F02	- 1 (with SF2)
CO4 > F03	- 0 (without RüF2)

The system code number Anl 11.2 can also be used for systems with buffer tank (see page 48).

System Anl 11.1/11.2 with buffer storage tank
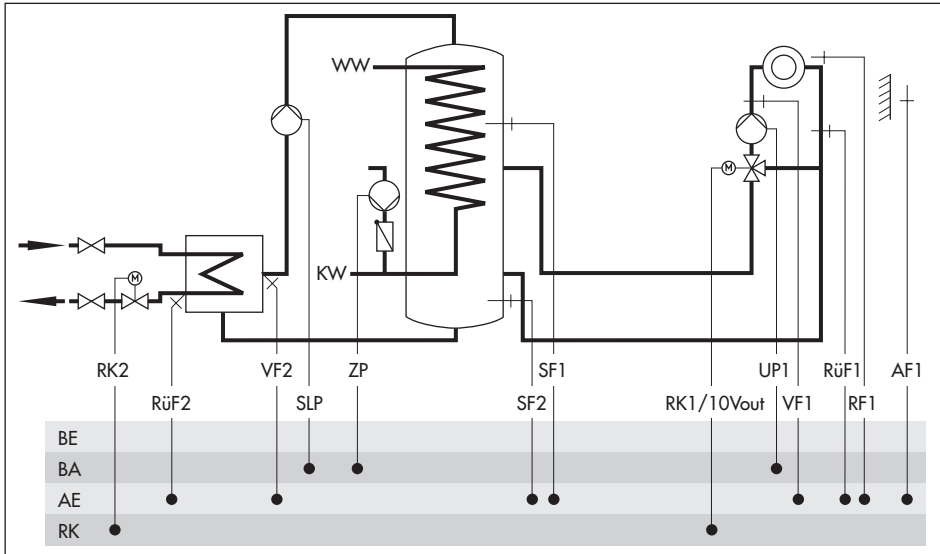
Default setting		
CO1 > F01		- 0 (without RF1)
CO1 > F02		- 1 (with AF1)
CO1 > F03		- 1 (with RüF1)
CO4 > F01		- 1 (with SF1)
CO4 > F02	System Anl 11.1	- 0 (without SF2)
	System Anl 11.2	- 1 (with SF2)
CO4 > F03		- 0 (without RüF2)

System Anl 11.5
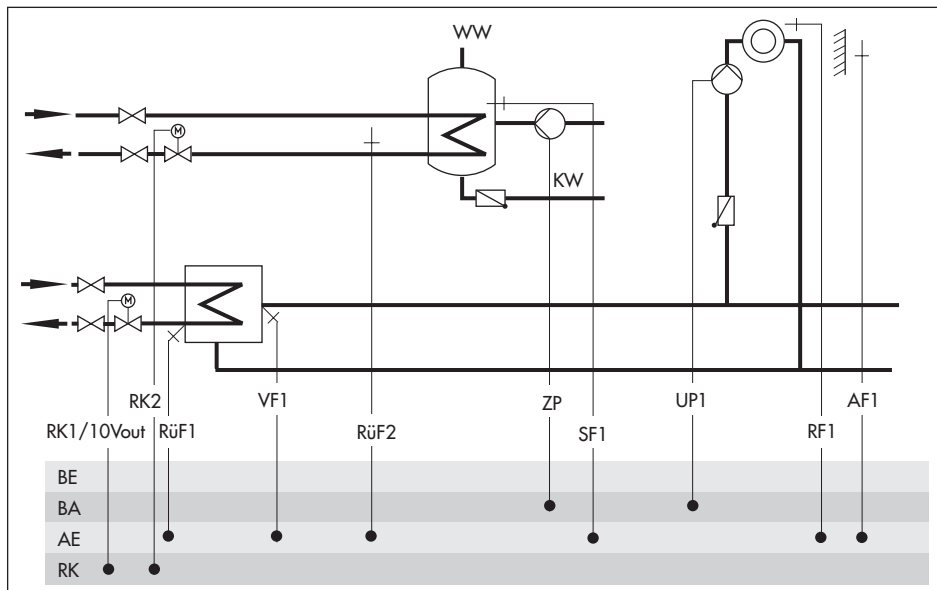
Note	DHW circuit with adjustable valve position for storage tank charging in absolute priority operation. By using RüF2, the ready-adjusted valve position is subject to the return flow temperature limitation.
Default setting	
CO1 > F01	- 0 (without RF1)
CO1 > F02	- 1 (with AF1)
CO4 > F02	- 0 (without SF2)
CO4 > F03	- 1 (with RüF2)

Systems

System Anl 11.6
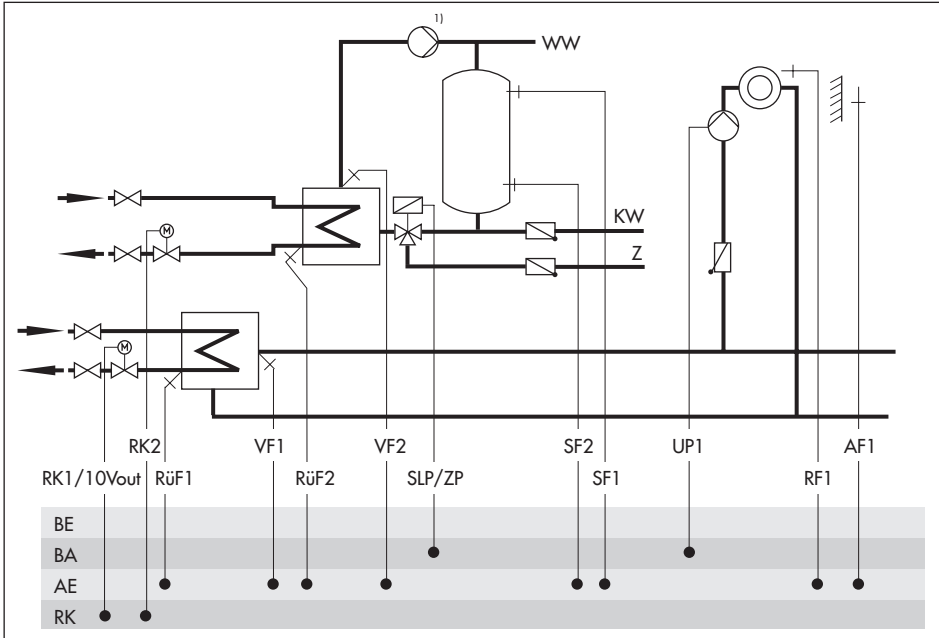
*Note	Install a continuously running pump in the DHW circuit and connect it directly to the main power supply.
Default setting	
CO1 > F01	- 0 (without RF1)
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)
CO4 > F01	- 1 (with SF1)
CO4 > F02	- 1 (with SF2)
CO4 > F03	- 0 (without RüF2)

System Anl 11.9

Default settings	
CO1 > F01	- 0 (without RF1)
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)
CO4 > F01	- 0 (without SF1)
CO4 > F03	- 0 (without RüF2)

System Anl 16.0
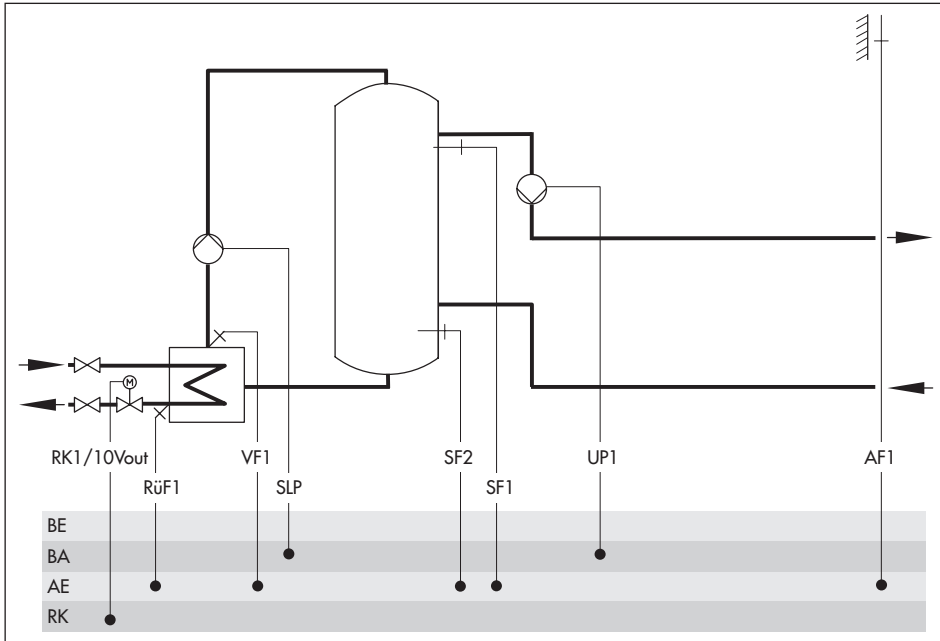
Default settings	
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)

System Anl 16.1
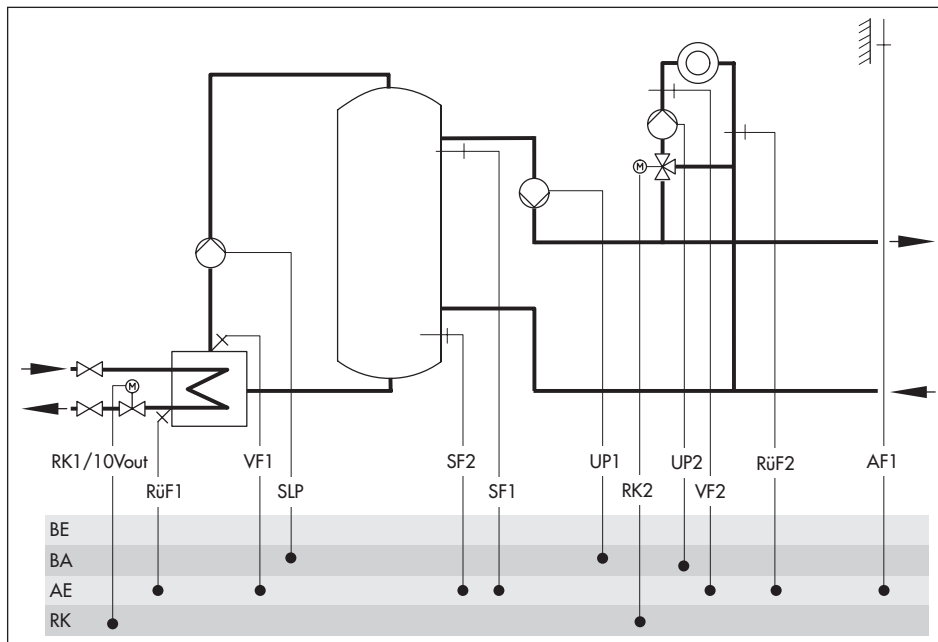
Default settings	
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)
CO2 > F03	- 0 (without RüF2)

System Anl 16.2
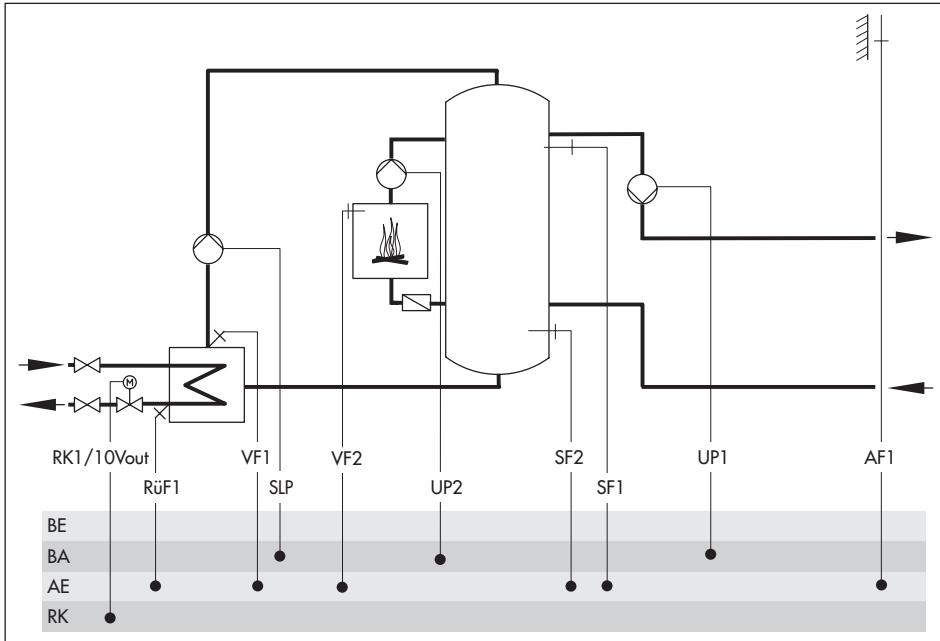
Default settings	
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)

System Anl 16.3
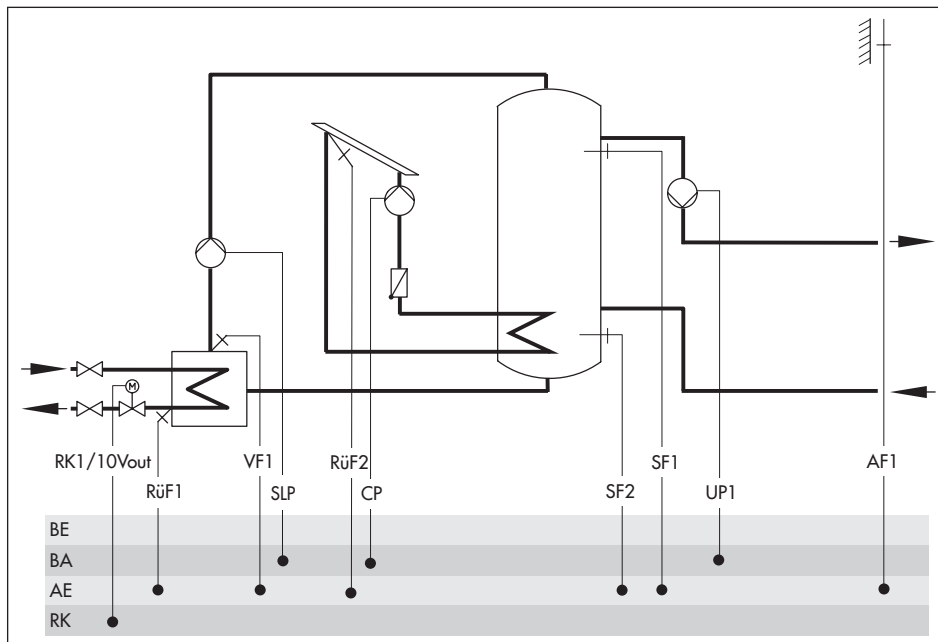
Default settings	
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)

System Anl 16.4
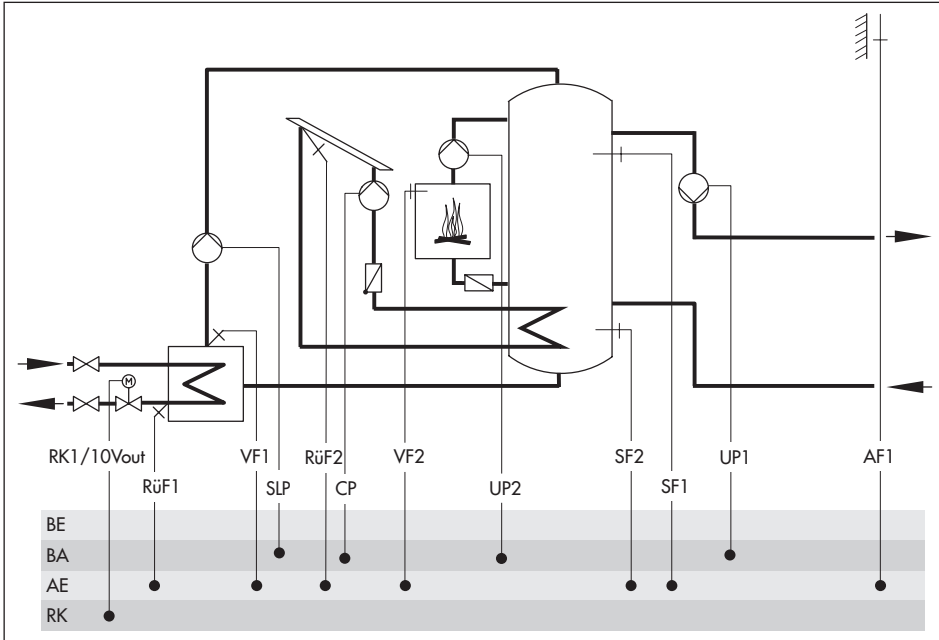
Default settings	
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)

System Anl 16.6
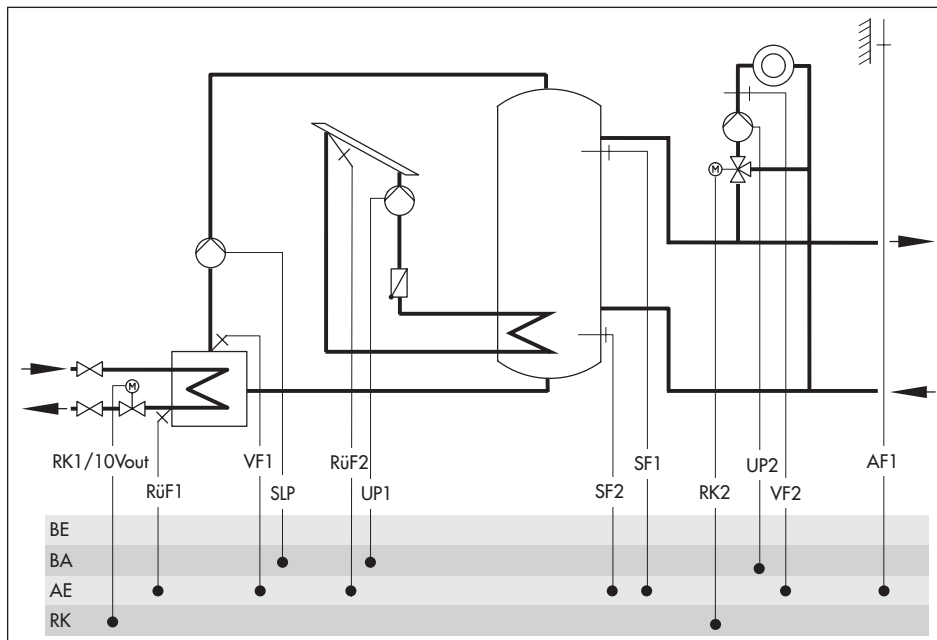
Default settings	
CO1 > F02	- 1 (with AF1)
CO1 > F03	- 1 (with RüF1)
CO2 > F02	- 0 (without AF2 for HC2)
CO2 > F03	- 0 (without RüF2)

6 Functions of the heating circuit

Which controller functions are available depends on the selected system code number (Anl). See section 5.

6.1 Outdoor-temperature-controlled control

When outdoor-temperature-compensated control is used, the flow temperature is controlled based on the outdoor temperature. The heating characteristic in the controller defines the flow temperature set point as a function of the outdoor temperature (see Fig. 5). The outdoor temperature required for outdoor-temperature-compensated control can either be measured at an outdoor sensor or received over the 0 to 10 V input.

Fig. 5: *Gradient characteristics*

t_{VL}: Flow temperature
t_A: Outdoor temperature
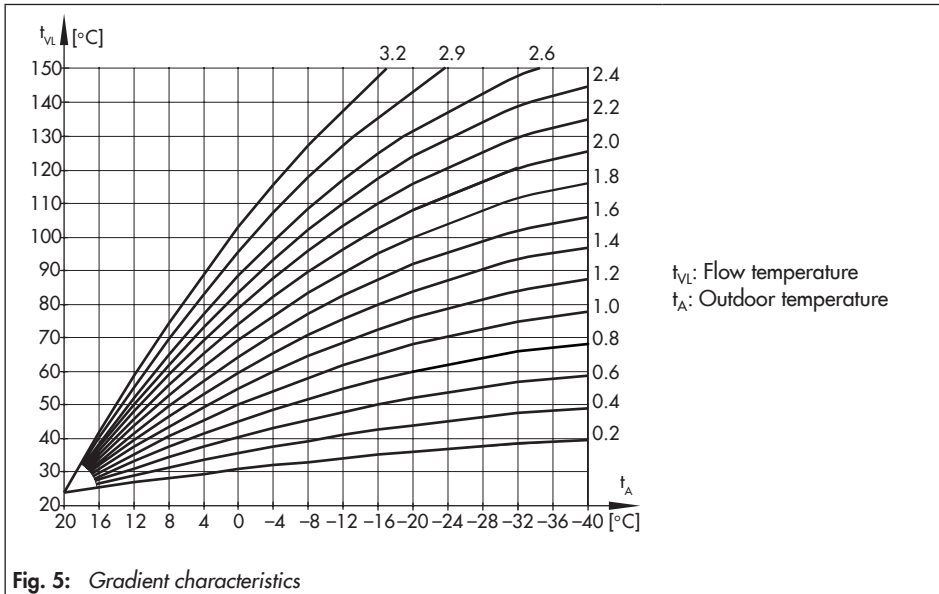
Functions	WE	Configuration
Outdoor sensor AF1	1	CO1 > F02 - 1
Outdoor temperature received as 0 to 10 V signal	0	CO5 > F23 - 1
	AE	Direction: AE (receive)
	−20 °C	Lower transmission range: −50 to +100 °C
	+50 °C	Upper transmission range: −50 to +100 °C

EB 5573 EN

6.1.1　Gradient characteristic

Basically, the following rule applies: a decrease in the outdoor temperature causes the flow temperature to increase in order to keep the room temperature constant. By varying the 'Gradient' and 'Level' parameters, you can adapt the characteristic to your individual requirements:
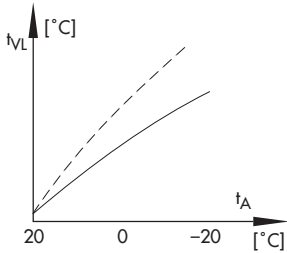
The gradient needs to be increased if the room temperature drops when it is cold outside.
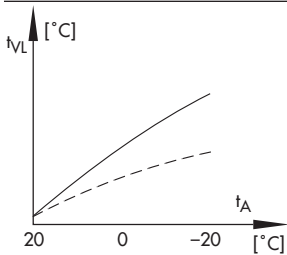
The gradient needs to be decreased if the room temperature drops when it is cold outside.
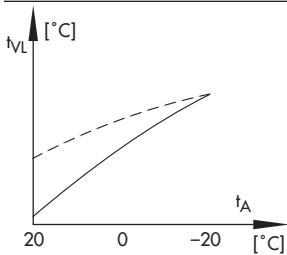
The level needs to be increased and the gradient decreased if the room temperature drops when it is mild outside.
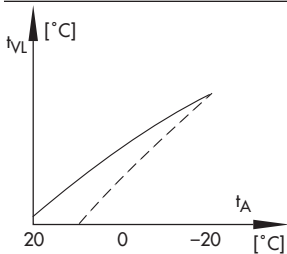
The level needs to be decreased and the gradient increased if the room temperature rises when it is mild outside.

Functions of the heating circuit

Outside the times-of-use, reduced set points are used for control: the reduced flow set point is calculated as the difference between the adjusted values for 'Day set point' (rated room temperature) and 'Night set point' (reduced room temperature). The 'Max. flow temperature' and 'Min. flow temperature' parameters mark the upper and lower limits of the flow temperature. A separate gradient characteristic can be selected for the limitation of the return flow temperature.

Examples for adjusting the characteristic

– Old building, radiator design 90/70:   Gradient approx. 1.8

– New building, radiator design 70/55:   Gradient approx. 1.4

– New building, radiator design 55/45:   Gradient approx. 1.0

– Underfloor heating depending on arrangement: Gradient smaller than 0.5

> **i Note**
>
> *Particularly for control operation without room sensor, the room temperatures set for day ('Day set point') and night ('Night set point') only become effective satisfactorily when the heating characteristic has been adapted to the building/heating surface layout.*

Functions	WE	Configuration
Four-point characteristic	0	CO1, 2 > F11 - 0

Parameters	WE	Switch position: value range
Day set point	20.0 °C	↓☼: 0.0 to 40.0 °C
Night set point	15,0 °C	↓☾: 0.0 to 40.0 °C

Parameters	WE	Parameter level: value range
Flow gradient	1.8 [1]	PA1, 2: 0.2 to 3.2
Flow level	0.0 °C	PA1, 2: −30.0 to +30.0 °C
Min. flow temperature	20.0 °C	PA1, 2: −5.0 to +150.0 °C
Max. flow temperature	90.0 °C [1]	PA1, 2: 5.0 to 150.0 °C
[1] With CO1, 2 > F05-1 the following applies:		Flow gradient: 0.2 to 1.0 (1.0) Max. flow temperature: 5.0 to 50.0 °C (50.0 °C)

6.1.2   Four-point characteristic

The four-point characteristic allows you to define your own heating characteristic. It is defined by four points for the outdoor temperature, flow temperature, reduced flow temperature and return flow temperature. The 'Max. flow temperature' and 'Min. flow temperature' parameters mark the upper and lower limits of the flow temperature.

Fig. 6: *Four-point characteristic*
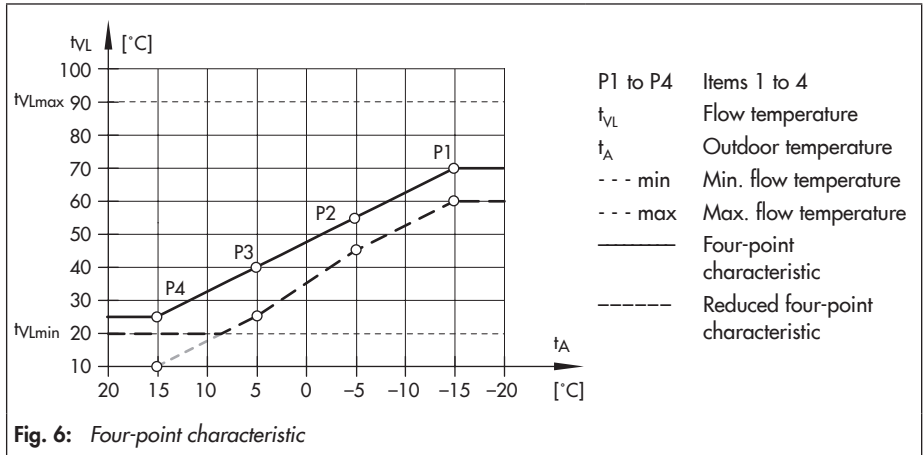
ℹ️ *Note*

– *The 'Day set point' and 'Night set point' parameters are no longer available when the four-point characteristic has been selected when no additional functions (e.g.* **optimization**, **flash adaptation***) have been selected.*

– *The four-point characteristic function can only be activated when the* **adaptation** *function is not active (CO1, 2 > F08 - 0).*

Functions	WE	Configuration
Adaptation	0	CO1, 2 > F08 - 0
Four-point characteristic	0	CO1, 2 > F11 - 1

Parameters		WE	Parameter level: value range
Outdoor temperature	Point 1	−15.0 °C	PA1, 2: −50.0 to +50.0 °C
	Point 2	−5.0 °C	
	Point 3	5.0 °C	
	Point 4	15.0 °C	

Parameters		WE	Parameter level: value range
Flow temperature	Point 1	70.0 °C	PA1, 2: −5.0 to +150.0 °C
	Point 2	55.0 °C	
	Point 3	40.0 °C	
	Point 4	25.0 °C	
Reduced flow temperature	Point 1	60.0 °C	PA1, 2: −5.0 to +150.0 °C
	Point 2	40.0 °C	
	Point 3	20.0 °C	
	Point 4	20.0 °C	
Return flow temperature	Points 1 to 4	65.0 °C	PA1, 2: 5.0 to 90.0 °C
Min. flow temperature		20.0 °C	PA1, 2: −5.0 to +150.0 °C
Max. flow temperature		90.0 °C [1]	PA1, 2: 5.0 to +150.0 °C

[1] With CO1, 2 > F05-1 the following applies: Max. flow temperature: 5.0 to 50.0 °C (50.0 °C)

6.2 Fixed set point control

During the times-of-use, the flow temperature can be controlled according to a fixed set point. Outside the times-of-use, the controller regulates to a reduced flow temperature. Set the desired rated flow temperature as 'Day set point' and the reduced flow temperature as 'Night set point'.

Functions	WE	Configuration
Outdoor sensor AF1	1	CO1 > F02 - 0

Parameters	WE	Switch position: value range
Day set point	50.0 °C	↓☀: Min. to max. flow temperature
Night set point	30.0 °C	↓☾: Min. to max. flow temperature

Parameters	WE	Parameter level: value range
Min. flow temperature	20.0 °C	PA1, 2: −5.0 to +150.0 °C
Max. flow temperature	90.0 °C	PA1, 2: 5.0 to 150.0 °C

> **i Note**
>
> *A fixed set point control in heating circuit HC2 can only be configured with CO2 > F02 - 0 when CO1 > F02 - 0 is also configured since heating circuit HC2 configured with CO2 > F02 - 0 only uses the measured outdoor temperature provided by heating circuit HC1.*

6.3 Underfloor heating/drying of jointless floors

Using function block setting CO1, 2 > F05 - 1, the respective heating circuit is configured as an underfloor heating circuit. In doing so, the controller at first only limits the value ranges of the heating characteristic gradient and the maximum flow temperature in PA1, 2 parameter levels:

– Value range of the gradient: 0.2 to 1.0

– Value range of the maximum flow temperature: 5 to 50 °C

In addition, it is possible to activate the **drying of jointless floors** function. In connection with this, the function block parameters are listed which appear after activating this function block. They determine the drying process: the first heating up phase starts at the entered 'Start temperature', which has a flow temperature of 25 °C in its default setting. The start temperature is held constant for the days entered in 'Hold (days)'. Afterwards, this temperature is raised by the value entered in 'Temp. rise/day' within 24 hours, i.e. the default setting causes the flow temperature set point to rise to 30 °C 24 hours after the holding phase. If the 'Maximum temperature' is reached, it is kept constant for the number of days entered in 'Max. temperature sustaining time'. The 'Temp. reduction/day' parameter determines the temperature reduction downwards. If the 'Temp. reduction/day' is set to 0, the temperature maintaining phase moves directly to automatic mode. If the function block parameter 'Start temperature' is set to 25 °C and 'Temp. rise/day' to 0.0 °C, the drying functions runs as specified in Part 4 of DIN EN 1264: the drying of jointless floors function starts with a flow temperature of 25 °C, which is kept constant for three days. Afterwards, the controller switches to the maximum adjusted temperature. The further process remains unchanged. The drying of jointless floors function is activated by changing the default setting 'STOP' to 'START' (display: ■STArT). The restarting phases 'START temperature build-up phase' (display: ■■STArT), 'START maximum temperature hold phase' (display:■■■STArT) and 'START temperature reduction phase' (reading:■■■■STArT) can be selected to continue an interrupted drying process. The course of the drying process can be monitored in the operating level in the reading of the flow temperature reading (⬆▥) of the associated heating circuit. For example:
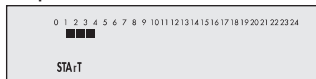
Maximum temperature hold phase

When the additional reading in the flow temperature reading disappears after the last phase, this indicates that the drying process has been completed. Any power failure that occurs while the function is running automatically restarts the drying function.

In systems in which the drying function had to be interrupted due to DHW heating (e.g. system Anl 2.1, see section 5), storage tank charging does not occur while the drying function is active, provided it is not used for frost protection of the storage tank.

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i Note

The function block parameters can only be accessed after after starting the function by deactivating and activating the function block again.

Functions	WE	Configuration
Underfloor heating/drying of jointless floors	0	CO1, 2 > F05 - 1
	25.0 °C	Start temperature: 20.0 to 60.0 °C
	0	Hold (days): 0 to 10 days
	5.0 °C	Temp. rise/day: 0.0 to 10.0 °C
	45.0 °C	Maximum temperature: 25.0 to 60.0 °C
	4	Hold (days): 0 to 10 days
	0.0 °C	Temp. reduction/day: 0.0 to 10.0 °C
	SToP	∎STArT, ∎∎STArT, ∎∎∎STArT, ∎∎∎∎STArT

6.4 Deactivation depending on outdoor temperature

6.4.1 OT deactivation value in rated operation

The associated heating circuit is immediately switched off when the outdoor temperature exceeds the limit 'OT deactivation value in rated operation'. The valve is closed and the pump is switched off after t = 2 x Valve transit time. The heating is immediately switched on again when the outdoor temperature falls below the limit (minus 0.5 °C hysteresis).

The default setting causes the system to be switched off during warm weather at an outdoor temperature of 22 °C.

Parameters	WE	Parameter level: configuration
OT deactivation value in rated operation	22.0 °C	PA1, 2: 0.0 to 50.0 °C

6.4.2 OT deactivation value in reduced operation

The associated heating circuit is immediately switched off when the outdoor temperature exceeds the limit 'OT deactivation value in reduced operation'. The valve is closed and the pump is switched off after t = 2 x Valve transit time. The heating is immediately switched on again when the outdoor temperature falls below the limit (minus 0.5 °C hysteresis).

The default setting causes the system to be switched off at night time at an outdoor temperature of 15 °C to save energy. However, be aware when this setting is used that the system takes awhile in the morning to warm up the building.

Parameters	WE	Parameter level: configuration
OT deactivation value in reduced operation	15,0 °C	PA1, 2: −50.0 to +50.0 °C

6.4.3 OT activation value in rated operation

If a heating circuit is in reduced operation (automatic mode), this circuit is switched to rated operation whenever the outdoor temperature falls below 'OT activation value in rated operation'. Reduced operation restarts after the outdoor temperature rises above the limit (plus 0.5 °C hysteresis).

This function is activated at very low temperatures to avoid that the building cools down excessively outside the times-of-use when low outdoor temperatures occur.

Parameters	WE	Parameter level: configuration
OT activation value in rated operation	−15.0 °C	PA1, 2: −50.0 to +5.0 °C

6.4.4 Summer mode

Summer mode is activated depending on the mean daytime temperature (measured between 7.00 h and 22.00 h) during the adjusted period.

If the mean daytime temperature exceeds the 'Outdoor temperature limit for summer mode' on the n number of successive days, summer mode is activated on the following day. This means that the valves in all heating circuits are closed and the circulation pumps are switched off after t = 2 x 'Valve transit time'. If the mean daytime temperature falls below the 'Outdoor temperature limit for summer mode' on the m number of successive days, summer mode is deactivated on the following day.

Functions	WE	Configuration
Summer mode	0	CO5 > F04 - 1
	01.06	Start date for summer mode: 01.01 to 31.12
	2	No. days until activation (n): 1 to 3
	30.09	End date for summer mode: 01.01 to 31.12.
	1	No. days until deactivation (m): 1 to 3
	18.0 °C	Outdoor temperature limit for summer mode: 0.0 to 30.0 °C

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i *Note*

Summer mode only becomes effective when the controller is in automatic mode (☉).

6.5 Buffer tanks systems Anl 16.x

A heating characteristic based on a gradient or four entered points can be set in PA1 for the buffer tanks in systems Anl 16.x. A buffer tank set point for day operation and a buffer tank set point for night operation can be set without outdoor sensors in the customer level. An external demand transmitted from secondary controlled heating circuits, DHW circuit or an external request (over device bus, 0 to 10 V or binary signal) can override the current buffer tank set point. The maximum demand is indicated as the buffer tank set point for SF1. If the temperature falls below the buffer tank set point at SF1, charging of the buffer tank is started.

The set point of the charging temperature is determined by the 'Minimum set point to charge buffer tank' parameter setting in the PA1 level. The automatic adaptation ('OT' setting) causes the set point of the charging temperature to always be above the current buffer tank set point by the value entered in 'Charging temperature boost'. Every other value entered in 'Minimum set point to charge buffer tank' is used as the minimum set point for the charging temperature which first starts to be variable at higher buffer tank set points. When a return flow temperature sensor RüF1 is used, the charging pump SLP (CO1 > F22 - 1) is first released to avoid cold charging when the temperature measured at RüF1 has reached the same temperature measured at SF1. The 'Stop charging of the buffer tank' parameter (PA1, default = OT) determines under which conditions the charging of the buffer tank is stopped. The automatic adaptation ('OT' setting) causes the buffer tank charging to be stopped when the temperature in the buffer tank reaches the value ('Buffer tank set point' + 'Hysteresis of buffer tank'. Every other value entered for 'Stop charging of the buffer tank' is rated as a fixed switch-off temperature for the buffer tank charging. When SF2 (CO1 > F06 - 1) is configured, SF2 is always used to stop the charging of the buffer tank. The storage tank charging pump is not switched off until the lag time (entered 'Valve transit time Ty' for HC1 multiplied by 'Lag time of charging pump') has elapsed. The operation of the feeder pump UP1 is either determined by the ZP time schedule or prompted over an external demand. For systems with downstream control circuits, either only this external demand or the demand of the downstream control circuits causes the feeder pump UP1 to be activated, depending on the CO5 > F14 setting.

In systems Anl 16.3, 16.4 and 16.6, a solar circuit is integrated, which uses sensor SF2 for control. The collector circuit pump CP is activated when the temperature at the collector sensor RüF2 is higher than that at storage tank sensor SF2 by the value entered in 'Solar circuit

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pump ON'. It is deactivated when the temperature difference falls below the valve entered in 'Solar circuit pump OFF', when the temperature at the storage tank sensor SF2 reaches 'Max. storage tank temperature' or when the collector temperature rises above 120 °C.

Functions	WE	Configuration
Storage tank sensor SF2	1	CO1 > F06 - 1
SLP depending on return flow temperature	0	CO1 > F22 - 1

Parameters	WE	Parameter level: value range
Minimum set point to charge buffer tank	AT	PA1: AT to 90.0 °C
Stop charging of the buffer tank	AT	PA1: AT to 90.0 °C
Charging temperature boost	6.0 °C	PA1: 0.0 to 50.0 °C
Lag time of charging pump	1.0	PA1: 0.0 to 10.0

6.6 Delayed outdoor temperature adaptation

The calculated outdoor temperature is used to determine the flow temperature set point. The heat response is delayed when the outdoor temperature either increases or decreases or both. If the outdoor temperature varies by, for example 12 °C within a very short period of time, the calculated outdoor temperature is adapted to the actual outdoor temperature in small steps ('Delay per hour' of 3 °C/h) over a time period of $t = \frac{12\,°C}{3\,°C/h} = 4\,h$.

ℹ️ *Note*

The delayed outdoor temperature adaptation helps avoid unnecessary overloads of central heating stations in combination with either overheated buildings occurring, for example due to warm winds or temporarily insufficient heating due to the outdoor sensor being exposed to direct sunshine.
In the information level, the outdoor temperature blinks on the display while delayed outdoor temperature adaptation is active. The calculated outdoor temperature is displayed.

Functions	WE	Configuration
Delayed outdoor temperature adaptation as the temperature falls	0	CO5 > F05 - 1
Delayed outdoor temperature adaptation as the temperature rises	0	CO5 > F06 - 1
	3.0 °C	Delay per hour: 1.0 to 6.0 °C

6.7 Remote operation

Apart from measuring the room temperature, the Types 5257-5 and 5257-21 Room Panels (Pt 1000 sensor) as well as Type 5244 Room Panel (PTC sensor) provide the following opportunities of influencing the control process:

–   Selecting the operating mode: –   ☉ Automatic mode

–   ☼ Day mode

–   ☾ Night mode

–   Set point correction: during rated operation, the room temperature set point can be increased or reduced by up to 5 °C using a continuously adjustable rotary knob.

With an activated room sensor, the measured room temperature is displayed when the remote operation is connected and activated. Nevertheless, it is not used for control when either the optimization, **adaptation** or **flash adaptation** function is activated.

Type 5257-5 Type 5257-51	TROVIS 5573	
	HC1	**HC2**
Terminal 1	Terminal 5	Terminal 3
Terminal 2	Terminal 12	Terminal 12
Terminal 3	Terminal 9	Terminal 10

Fig. 7:   *Wiring plan for Types 5257-5 and 5257-51 Room Panels to TROVIS 5573 for HC1 and HC2*

Functions	WE	Configuration
Room sensor RF1/RF2	0	CO1, 2 > F01 - 1

6.8 Optimization

This function requires the use of a room sensor. Depending on the building characteristics, the controller determines and adapts the required advance heating time (maximum 8 hours) to ensure that the desired 'Day set point' (rated room temperature) has been reached in the reference room when the time-of-use starts. During the advance heating period, the controller heats with the max. flow temperature. This temperature is built up in steps of 10 °C. As soon as the 'Day set point' has been reached, outdoor-temperature-compensated control is activated.

Depending on the room sensor, the controller switches off the heating system up to one hour before the time-of-use ends. The controller chooses the deactivation time such that the room temperature does not drop significantly below the desired value until the time-of-use ends.

During the advance heating period and the premature deactivation of the heating system, the ☼ or ☾ icon blink on the display.

Outside the times-of-use, the controller monitors the 'Night set point' (reduced room temperature). When the temperature falls below the night set point, the controller heats with the max. flow temperature until the measured room temperature exceeds the adjusted value by 1 °C.

ℹ Note
– *Direct sunshine can cause the room temperature to increase and thus result in the premature deactivation of the heating system.*
– *When the room temperature decreases while the heating system is shortly outside its times-of-use, this can prematurely cause the controller to heat up to the 'Day set point'.*

Functions	WE	Configuration
Room sensor RF1/RF2	0	CO1, 2 > F01 - 1
Outdoor sensor AF1	1	CO1 > F02 - 1
Optimization	0	CO1, 2 > F07 - 1
Parameters	**WE**	**Switch position: value range**
Day set point	20.0 °C	↓☼: 0.0 to 40.0 °C
Night set point	15,0 °C	↓☾: 0.0 to 40.0 °C

6.9 Flash adaptation

To ensure that the controller reacts immediately to room temperature deviations during rated or reduced operation, the function block setting CO1, 2 > F09-1 needs to be made. The heating is then always switched off as soon as the room temperature exceeds the 'Day set point' or 'Night set point' by 2 °C.

Heating first starts again when the room has cooled off and the room temperature is 1 °C above the 'Set point'. The flow temperature set point is corrected if the 'Cycle time' or 'Gain KP' are set to a value other than 0. The 'Cycle time' determines the intervals at which the flow temperature set point is corrected by 1 °C. A 'Gain KP' set to a value other than 0 causes a direct increase/decrease in flow temperature set point when a sudden deviation in room temperature arises. We recommend a 'Gain KP' setting of 10.0.

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i Note

– Cooling loads, such as drafts or open windows, affect the control process.
– Rooms may be temporarily overheated after the cooling load has been eliminated.

Functions	WE	Configuration
Room sensor RF1/RF2	0	CO1, 2 > F01 - 1
Flash adaptation	0	CO1, 2 > F09 - 1
	20 min	Cycle time: 0 to 100 min
	0.0	KP (gain): 0.0 to 25.0

Parameters	WE	Switch position: value range
Day set point	20.0 °C	↓☼: 0.0 to 40.0 °C
Night set point	15,0 °C	↓☾: 0.0 to 40.0 °C

6.9.1   Flash adaptation without outdoor sensor (based on room temperature)

The flow temperature control starts with 'Day set point' for flow in rated operation or with 'Night set point' for flow in reduced operation as no set points calculated using characteristics exist without an outdoor sensor. The 'Cycle time' determines the intervals at which the flow temperature set point is corrected by 1 °C. The heating is then always switched off as soon as the room temperature exceeds the 'Day set point' or 'Night set point' by 2 °C. Heating first starts again when the room has cooled off and the room temperature is 1 °C above the set point. A 'Gain KP' set to a value other than 0 causes a direct increase/decrease in flow temperature set point when a sudden deviation in room temperature arises. We recommend a 'Gain KP' setting of 10.0.

Functions	WE	Configuration
Room sensor RF1/RF2	0	CO1, 2 > F01 - 1
Outdoor sensor AF1/AF2	1	CO1, 2 > F02 - 0
Flash adaptation	0	CO1, 2 > F09 - 1
	20 min	Cycle time: 1 to 100 min
	0.0	KP (gain): 0.0 to 25.0

Parameters	WE	Switch position: value range
Day set point	20.0 °C	↓☼: 0.0 to 40.0 °C
Night set point	15,0 °C	↓☾: 0.0 to 40.0 °C

Parameters	WE	Parameter level: value range
Flow set point, day	50.0 °C	PA1, 2: −5.0 to +150.0 °C
Flow set point, night	30.0 °C	PA1, 2: −5.0 to +150.0 °C

6.10 Adaptation

The controller is capable of automatically adapting the heating characteristic to the building characteristics. A gradient characteristic must be set in this case (CO1, 2 > F11 - 0). The reference room, where the room sensor is located, represents the entire building and is monitored to ensure that the room set point ('Day set point') is maintained. When the mean measured room temperature in rated operation deviates from the adjusted set point, the heating characteristic is modified accordingly for the following time-of-use. The corrected value is displayed in PA1, 2 ('Flow gradient').

Functions	WE	Configuration
Room sensor RF1/RF2	0	CO1, 2 > F01 - 1
Outdoor sensor AF1/AF2	1	CO1, 2 > F02 - 1
Adaptation	0	CO1, 2 > F08 - 1
Four-point characteristic	0	CO1, 2 > F11 - 0

Parameters	WE	Switch position: value range
Day set point	20.0 °C	↓☼: 0.0 to 40.0 °C
Night set point	15,0 °C	↓☾: 0.0 to 40.0 °C

ℹ Note

If the **flash adaptation** *function is already configured with a small cycle time, the* **adaptation** *function should not be configured as well.*

6.11 Cooling control

6.11.1 Cooling control with outdoor sensor

When the cooling control function is activated in a control circuit with outdoor sensor, the four-point characteristic of the corresponding control circuit is automatically activated and the operating direction of the control output is reversed. In PA1 and/or PA2 the four points for the course of the set point based on the outdoor temperatures can be adjusted separately for day and night mode. The 'Base point for return flow temperature' that can be adjusted with an active return flow sensor determines the point at which a minimum limitation of the return flow temperature starts: if the measured return flow temperature falls below this value, the flow temperature set point is raised. The four return flow temperature values in the four-point characteristic function have no effect.

Functions		WE	Configuration
Cooling control		0	CO1, 2 > F04 - 1
Four-point characteristic		0	CO1, 2 > F11 - 1
Parameters		**WE**	**Parameter level: value range**
Outdoor temperature	Point 1	5.0 °C	PA1, 2: −50.0 to +50.0 °C
	Point 2	15,0 °C	
	Point 3	25.0 °C	
	Point 4	30.0 °C	
Flow temperature	Point 1	20.0 °C	PA1, 2: −5.0 to +150.0 °C
	Point 2	15,0 °C	
	Point 3	10.0 °C	
	Point 4	5.0 °C	
Reduced flow temperature	Point 1	30.0 °C	PA1, 2: −5.0 to +150.0 °C
	Point 2	25.0 °C	
	Point 3	20.0 °C	
	Point 4	15,0 °C	
Base point for return flow temperature:		65.0 °C	PA1, 2: 5.0 to 90.0 °C

ℹ️ *Note*

The limiting factors of the **return flow sensor RüF1/RüF2** *(CO1, 2 > F03) functions apply during cooling control as well.*

Cooling control without outdoor sensor

When the cooling control function is activated in a control circuit without outdoor sensor, only the adjustment limits for the day and night set points at the rotary switch as well as the 'Base point for return flow temperature' can be adjusted in PA1 and/or PA2.

Functions	WE	Configuration
Outdoor sensor AF1		CO1 > F01 - 0
Cooling control	0	CO1, 2 > F04 - 1

Parameters	WE	Switch position: value range
Day set point	20.0 °C	↓☀: −5.0 to +150.0 °C
Night set point	15,0 °C	↓☾: −5.0 to +150.0 °C

Parameters	WE	Parameter level: value range
Min. flow temperature	20.0 °C	PA1, 2: −5.0 to +150.0 °C
Max. flow temperature	90.0 °C	PA1, 2: 5.0 to 150.0 °C
Base point for return flow temperature:	65.0 °C	PA1, 2: 5.0 to 90.0 °C

ℹ️ *Note*

– *The limiting factors of the* **return flow sensor RüF1/RüF2** *(CO1, 2 > F03) functions apply during cooling control as well.*
– *The request for a signal by downstream control circuits or externally (when a pre-control circuit is used) is based on the maximum selection. Therefore, systems (e.g. system Anl 3.0) or systems in which the demand is requested using a 0 to 10 V signal are not suitable for transmitting the signal for required cooling. The 'Set point boost (pre-control circuit)' parameter can only generate higher and not lower set points in the pre-control circuit.*

6.12 Differential temperature control

In systems Anl 1.0 and 16.0, the differential temperature control causes the delivery rate of pump UP1 to be adapted through the 0 to 10 V output depending on the difference between the secondary flow temperature and the secondary return flow temperature. In system Anl 1.0 the sensor input RüF2 is automatically activated for this purpose with the setting CO1 > F23 - 1. In system Anl 16.0, the sensor inputs VF2 and RüF2 are automatically activated. The KP (influence factor) determines how strongly the controller responds when the temperature deviates from the set point of the differential temperature control.

Functions	WE	Configuration
Differential temperature control	0 20.0 °C 1.0 20 %	CO1 > F23 - 1 Set point of differential temperature control: 0.0 to 50.0 °C KP (influence factor): 0.1 to 10.0 Minimum speed: 0 to 100 %

7 Functions of the DHW circuit

7.1 DHW heating in the storage tank system

Start storage tank charging
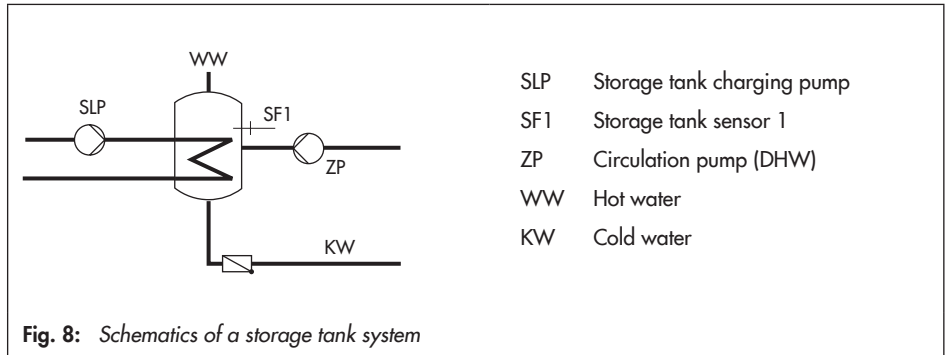
SLP	Storage tank charging pump
SF1	Storage tank sensor 1
ZP	Circulation pump (DHW)
WW	Hot water
KW	Cold water

Fig. 8: *Schematics of a storage tank system*

The controller begins charging the storage tank when the water temperature measured at sensor SF1 falls below the 'DHW temperature set point' by 0.1 °C. If the flow temperature in the system exceeds the desired charging temperature, the controller tries to reduce the flow temperature in the heating circuit for up to three minutes before the storage tank charging pump is activated. When there is no heating operation or when the flow temperature in the system is lower, the storage tank charging pump is switched on immediately.

If the function CO4 > F15 - 1 (**SLP ON depending on return flow temperature**) is activated, the primary valve is opened without simultaneously operating the storage tank charging pump. The storage tank charging pump is first switched on when the primary return flow temperature has reached the temperature currently measured at storage tank sensor SF1. This function enables storage tank charging when the heating system is switched off, e.g. in summer mode, without cooling down the storage tank first by filling it with cold flow water. The storage tank charging pump does not start operation before a sufficiently high temperature has been reached at the heat exchanger.

ℹ️ *Note*

When a storage tank thermostat is used, the 'Charging temperature' parameter can be adjusted at the rotary switch as the absolute value instead of the 'DHW temperature' parameter.

Time-controlled switchover of storage tank sensors

By configuring a second storage tank sensor SF2, it is possible to determine by setting the function block CO4 > F19 -1 that the storage tank sensor SF1 is used for day mode in the DHW circuit and storage tank sensor SF2 for night mode. As a result, different storage tank volumes can be kept at a constant temperature according to a time schedule and also at different temperatures if the 'DHW temperature set point' and 'DHW sustaining differ from one another.

Stop storage tank charging

The controller stops charging the storage tank when the water temperature measured at sensor SF1 has reached the temperature T = 'DHW temperature' + 'Hysteresis'. When there is no heating operation or when the flow temperature demand in the system is lower, the corresponding valve is closed. The storage tank charging pump is switched off after t = 'Lag time of storage tank charging pump' x 'Valve transit time'.

With the default settings, the temperature in the storage tank is increased by 5 °C to reach 60 °C when the storage tank temperature falls below 55 °C. The charging temperature is calculated from the 'DHW temperature' (55 °C) plus the 'Charging temperature boost' (10 °C), which equals 65 °C. When the storage tank has been charged, the heating valve is closed and the charging pump continues to run for the time t. Outside the times-of-use, the storage tank is only charged when the temperature falls below 40 °C ('DHW temperature sustaining value'). In this case, the tank is charged with a charging temperature of 50 °C until 45 °C is reached in the tank.

Functions	WE	Configuration
Storage tank sensor SF1	1	CO4 > F01 - 1
Storage tank sensor SF2		CO4 > F02 (-1 with CO4 > F19 - 1)
SLP ON depending on return flow temperature	0	CO4 > F15
Time-controlled changeover of storage tank sensors	0	CO4 > F19 (-1 only when CO4 > F02 - 1)

Parameters	WE	Switch position: value range
DHW temperature set point or charging temperature with CO4 > F01 - 0 setting	60.0 °C	↓☼: Min. to max. DHW temperature
DHW temperature sustaining value	40.0 °C	↓☾: Min. to max. DHW temperature

Parameters	WE	Parameter level: value range
Min. DHW temperature [1]	40.0 °C	PA4: 5.0 to 90.0 °C
Max. DHW temperature [1]	60.0 °C	PA4: 5.0 to 90.0 °C
Hysteresis [2]	5.0 °C	PA4: 0.0 to 30.0 °C
Charging temperature boost [3]	10.0 °C	PA4: 0.0 to 50.0 °C
Lag time for storage tank charging pump	1.0	PA4: 0.0 to 10.0

[1]   Parameters serve as limitation of the adjustment range for the DHW temperature to be set at the rotary switch

[2]   Deactivation value T = 'DHW temperature' + 'Hysteresis'

[3]   Charging temperature T = 'DHW temperature' + 'Charging temperature boost'

7.1.1   DHW circuit additionally controlled by a globe valve

In system Anl 11.1, the following version with globe valve can be configured instead of the three-way valve control in the DHW circuit:

HC2/Y2	Control circuit/valve 2
SLP	Storage tank charging pump
SF1	Storage tank sensor 1
VF2	Flow sensor 2
ZP	Circulation pump (DHW)
WW	Hot water
KW	Cold water

Fig. 9: *Schematics of a storage tank system with a globe valve for return flow temperature limitation*
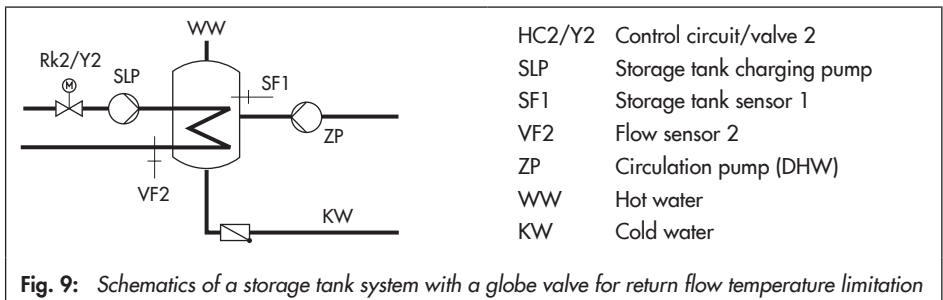
Globe valve and flow sensor VF2 are used exclusively for return flow temperature limitation in the schematics shown above. The pre-control circuit provides at least the same flow temperature as in the standard schematic version which is calculated from 'DHW temperature set point' + 'Charging temperature boost' + 'Boost set point of pre-control circuit'.

The functions and parameters of the DHW heating in the storage tank system are upgraded by the following settings:

Functions	WE	Configuration
DHW circuit additionally controlled by a globe valve	0	CO4 > F20 - 1
Parameters	**WE**	**Parameter level: value range**
Max. return flow temperature	65.0 °C	PA4: 20.0 to 90.0 °C

7.2 DHW heating in the storage tank charging system

Start storage tank charging
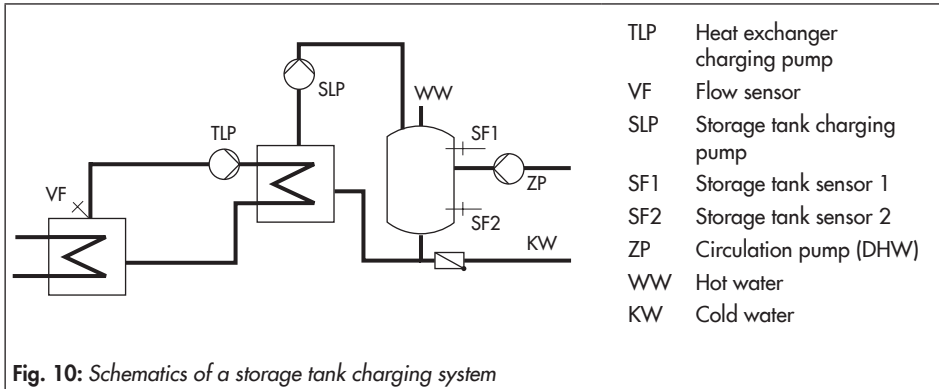
TLP	Heat exchanger charging pump
VF	Flow sensor
SLP	Storage tank charging pump
SF1	Storage tank sensor 1
SF2	Storage tank sensor 2
ZP	Circulation pump (DHW)
WW	Hot water
KW	Cold water

Fig. 10: *Schematics of a storage tank charging system*

The controller begins charging the storage tank when the water temperature measured at sensor SF1 falls below the 'DHW temperature set point' by 0.1 °C. If the flow temperature in the system exceeds the desired charging temperature, the controller tries to reduce the flow temperature in the heating circuit for up to three minutes before the exchanger charging pump is activated together with the storage tank charging pump.

When there is no heating operation or when the flow temperature in the system is lower, the exchanger charging pump is switched on immediately. If the temperature currently measured at sensor SF1 is reached at the sensor VF or after three minutes at the latest, the storage tank charging pump is switched on.

If a storage tank thermostat is used, the storage tank charging pump is switched on when the temperature T = 'Charging temperature' − 5 °C is reached at the sensor VF.

---

i Note

When a storage tank thermostat is used, the 'Charging temperature' parameter can be adjusted at the rotary switch as the absolute value instead of the 'DHW temperature' parameter.

When the flow sensor VF4 is activated, the set point in the heat exchanger circuit is influenced by the system deviation in the storage tank charging circuit upon activation of the storage tank charging pump: if the temperature measured at flow sensor VF4 is lower than the desired 'Charging temperature', the set point in the heat exchanger circuit is increased in

steps of 1 °C. When the set point in the heat exchanger charging circuit reaches the 'Max. charging temperature', the set point is no longer increased. An "Err 4" error message is generated.

ℹ️ *Note*

The set point in the heat exchanger circuit which is valid at the end of the charging cycle will be used again at the beginning of the next cycle.

If times-of-use have been programmed for DHW heating, the 'DHW temperature set point' adjusted at the rotary switch is applied during these times-of-use. Outside the times-of-use, the 'DHW temperature sustaining value' parameter is used as the basis. This function does not apply when a storage tank thermostat is used.

Time-controlled switchover of storage tank sensors

By configuring a second storage tank sensor SF2, it is possible to determine by setting the function block CO4 > F19 -1 that the storage tank sensor SF1 is used for day mode in the DHW circuit and storage tank sensor SF2 for night mode. As a result, different storage tank volumes can be kept at a constant temperature according to a time schedule and also at different temperatures if the 'DHW temperature set point' and 'DHW temperature sustaining value' differ from one another.

Stop storage tank charging

The controller stops charging the storage tank when the water temperature measured at sensor SF2 has reached the temperature T = 'DHW temperature' + 'Hysteresis'. To do so, the heat exchanger charging pump is immediately switched off.

When there is no heating operation or when the flow temperature demand in the system is lower, the corresponding valve is closed. The storage tank charging pump is switched off after t = 'Lag time of storage tank charging pump' x 'Valve transit time'.

Functions	WE	Configuration
Storage tank sensor SF1	1	CO4 > F01 - 1
Storage tank sensor SF2	1	CO4 > F02 - 1
Flow sensor VF4	0	CO4 > F05
Time-controlled changeover of storage tank sensors	0	CO4 > F19

Parameters	WE	Switch position: value range
DHW temperature set point or charging temperature with CO4 > F01 - 0 setting	60.0 °C	↓☼: Min. to max. DHW temperature
DHW temperature sustaining value	40.0 °C	↓☾: Min. to max. DHW temperature

Parameters	WE	Parameter level: value range
Min. DHW temperature 1)	40.0 °C	PA4: 5.0 to 90.0 °C
Max. DHW temperature [1]	60.0 °C	PA4: 5.0 to 90.0 °C
Hysteresis [2]	5.0 °C	PA4: 1.0 to 30.0 °C
Charging temperature boost [3]	10.0 °C	PA4: 0.0 to 50.0 °C
Max. charging temperature	80.0 °C	PA4: 20.0 to 150.0 °C (only with VF4)
Lag time for storage tank charging pump	1.0	PA4: 0.0 to 10.0

[1]   Parameters serve as limitation of the adjustment range for the DHW temperature to be set at the rotary switch

[2]   Deactivation value T = 'DHW temperature' + 'Hysteresis'

[3]   Charging temperature T = 'DHW temperature' + 'Charging temperature boost'

7.2.1   Cold charging protection

In system Anl 1.1(-1), the **cold charging protection** function causes a storage tank charging to be started first when the primary flow temperature is sufficiently high enough. The CO4 > F22 - 1 setting automatically activates the input FG2 to measure the primary flow temperature. If the measured primary flow temperature is lower than the measured storage tank temperature (e.g. due too a supply line that has cooled down at the start of a storage tank charging), the heating circuit valve is only opened 10 % at first. The storage tank charging is not released in absolute priority operation until the primary flow temperature has risen enough as a result. Parallel operation must be additionally configured if it is required.

Functions	WE	Configuration
Cold charging protection	0	CO4 > F22 - 1
Parallel pump operation	0	CO4 > F06 - 1
	10 min	Cancel: 0 to 10 min
	40.0 °C	Temperature limit: 20.0 to 90.0 °C

7.3 DHW heating in instantaneous heating system

VF	Flow sensor
ZP	Circulation pump (DHW)
WW	Hot water
KW	Cold water

Fig. 11: *Schematics of an instantaneous heating system*
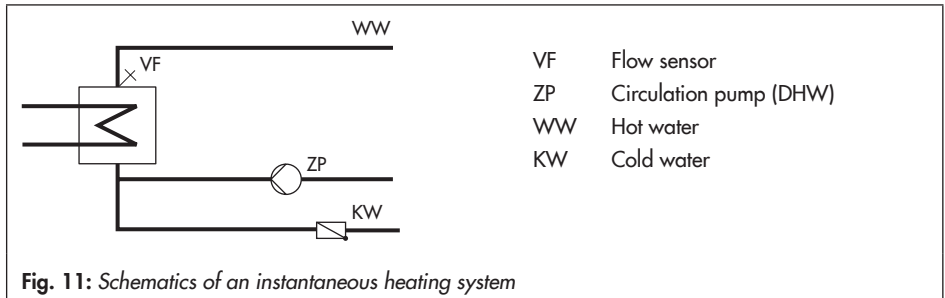
The control of the required 'DHW temperature' at the flow sensor VF is only active during times-of-use of the circulation pump ZP.

Parameters	WE	Switch position: value range
DHW temperature set point	60.0 °C	↓☀: Min. to max. DHW temperature
DHW temperature sustaining value	40.0 °C	↓☾: Min. to max. DHW temperature

Parameters	WE	Parameter level: value range
Min. DHW temperature	40.0 °C	PA4: 5.0 to 90.0 °C
Max. DHW temperature	60.0 °C	PA4: 5.0 to 90.0 °C

7.4 Domestic hot water heating with solar system

The systems Anl 1.3 and 2.3 are fitted with a solar system for DHW heating. In these systems, the difference between the temperatures measured at storage sensor SF2 and the sensor at the solar collector VF3 is determined. The 'Solar circuit pump ON' parameter determines the minimum temperature difference between sensors VF3 and SF2 required to activate the solar circuit pump. If the temperature difference falls below the value of 'Solar circuit pump OFF', the solar circuit pump is switched off. Basically, the solar circuit pump is also switched off when either the water temperature measured at sensor SF2 has reached the 'Max. storage tank temperature' or when the solar collector temperature rises above 120 °C.

ℹ️ **Note**

The times-of-use of the DHW circuit do not affect the operation of the solar system.

After the key number 1999 has been entered, the operating hours of the solar pump are displayed in extended information level.

Parameters	WE	Parameter level: value range
Solar circuit pump ON	10.0 °C	PA4: 1.0 to 30.0 °C
Solar circuit pump OFF	3.0 °C	PA4: 0.0 to 30.0 °C
Max. storage tank temperature	80.0 °C	PA4: 20.0 to 90.0 °C

7.5 Intermediate heating

This function can only be activated in systems Anl 2.x, 4.1 and 4.5.

With the setting CO4 > F07 - 1, heating operation of the UP1 heating circuit is reactivated for a period of ten minutes after 20 minutes of priority operation (heating deactivated during DHW heating). By setting CO4 > F07 - 0, storage tank charging is given unlimited priority over the heating operation in the UP1 heating circuit.

Functions	WE	Configuration
Intermediate heating	1	CO4 > F07 - 1

7.6 Parallel pump operation

This function can only be activated in systems Anl 2.1 to 2.1, 4.1 and 4.5.

With the setting CO4 > F06 - 1, the circulation pump UP1 remains activated during DHW heating.

This does not include operating situations during which the current flow temperature demand of the pump circuit is lower than the adjusted 'Flow temperature limit for parallel operation'. In this case, the controller applies priority operation, if necessary with intermediate heating. Once a parallel pump operation cycle has been activated and the time period set in 'Stop parallel pump operation in the event of a system deviation' has elapsed, system deviations greater than 5 °C cause the controller to suspend parallel operation for 10 minutes and to apply priority operation.

Setting 'Stop parallel pump operation in the event of a system deviation' to 0 min leads to a parallel operation once initiated remaining regardless of a deviation.

Functions	WE	Configuration
Parallel pump operation	0	CO4 > F06 - 1
	10 min	Stop parallel pump operation in the event of a system deviation: 0 to 10 min
	40.0 °C	Flow temperature limit for parallel operation: 20.0 to 90.0 °C

7.7 Circulation pump during storage tank charging
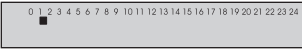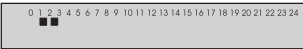
With the setting CO4 > F11 - 1, the circulation pump (DHW) continues operation according to the programmed time schedule even during storage tank charging. With the setting CO4 > F11 - 0, the circulation pump is switched off as soon as the storage tank charging pump is activated. The circulation pump starts to operate again according to the time schedule when the storage tank charging pump has been switched off again.

Functions	WE	Configuration
Circulation pump operation during storage tank charging	0	CO4 > F11

7.8 Priority circuit

In many district heating systems with primary DHW heating, the allotted amount of water cannot meet DHW heating and heating operation demands when they are required at the same time. As a result, the capacity required for DHW heating needs to be taken from the heating system when great heating loads occur; and this, until DHW demand has been concluded. Nevertheless, heating operation is not to be interrupted simply. Only the amount of energy required for DHW heating is to be deducted. This can be achieved by using the priority functions: **reverse control** and set-**back operation**.

The priority functions (reverse control and priority operation) can be activated for each heating circuit separately in system Anl 4.5.

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	HC1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	HC2
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	HC1+HC2

7.8.1 Reverse control

In all systems with DHW heating and at least one heating circuit with a control valve, DHW heating can be given priority by applying reverse control. With the setting CO4 > F08 - 1, the temperature is monitored at sensor VFx.

In systems without sensor VFx in the DHW circuit (e.g. Anl 4.5, 11.0), the temperature is monitored directly at storage tank sensor SF1. If system deviations still occur after the time set in 'Activate priority in the event of a system deviation' has elapsed, the set point of the heating circuit with the control valve is gradually reduced each minute until the flow temperature

set point has reached 5 °C at the minimum. How strongly the controller responds is determined by the 'Influence factor KP'.

When 'Activate priority in the event of a system deviation' is set to 0, the priority operation is started regardless of the time and temperature in the system. The control valve of the corresponding heating circuit is closed.

Functions	WE	Configuration
Priority through reverse control	0 2 min 1.0 HC2	CO4 > F08 - 1 Activate priority in the event of a system deviation: 0 to 10 min KP (influence factor): 0.1 to 10.0 Control circuit selection: HC1, HC2, HC1+HC2
Priority through set-back operation	0	CO4 > F09 - 0

7.8.2 Set-back operation

In all systems with DHW heating and at least one heating circuit with a control valve, DHW heating can be given priority by applying set-back operation. With the setting CO4 > F09 - 1, the temperature is monitored at sensor VFx in the DHW circuit.

In systems without sensor VFx in the DHW circuit (e.g. Anl 4.5, 11.0), the temperature is monitored directly at storage tank sensor SF1. If system deviations still occur after the time set in 'Activate priority in the event of a system deviation' has elapsed, the selected heating circuit with the control valve is set to reduced operation.

When 'Activate priority in the event of a system deviation' is set to 0, the priority operation is started regardless of the time and temperature in the system. of all heating circuits.

Functions	WE	Configuration
Priority through reverse control	0	CO4 > F08 - 0
Priority through set-back operation	0 2 min HC2	CO4 > F09 - 1 Activate priority in the event of a system deviation: 0 to 10 min Control circuit selection: HC1, HC2, HC1+HC2

7.9 Forced charging of DHW storage tank

To provide the full network performance for room heating when the time-of-use of the heating circuits begins, any storage tanks are charged one hour before the time-of-use of the heating circuits starts. For the individual controller, this means that storage tank charging is activated when the water temperature in the storage tank falls below the adjusted deactivation value of T = 'DHW temperature' + 'Hysteresis'.

The forced charging of the storage tank does not take place when the DHW circuit is not used at the beginning of the time-of-use set for the heating circuit(s).

ℹ️ *Note*

This function is not available when a storage tank thermostat is used.

7.10 Thermal disinfection of DHW storage tank

In all systems with DHW heating, a thermal disinfection is performed on the selected 'Day of the week' or daily.

–   In systems with DHW storage tank, it is heated up, taking into account the 'Charging temperature boost' parameter (or 'Set point boost', depending on the system) to the adjusted 'Disinfection temperature'. The process starts the adjusted 'Start time' and ends at the 'Stop time' at the latest.

–   In systems with DHW heating in instantaneous heating system, the function remains active taking into account the 'Set point boost' parameter until the circulation pipe, measured at storage tank sensor SF1, has reached the adjusted 'Disinfection temperature', provided disinfection has not been terminated prematurely after reaching the 'Stop time'.

The 'Disinfection temperature sustaining time' determines how long the disinfection temperature must be maintained within the adjusted time period to rate the process successful. If the 'Disinfection temperature sustaining time' is set to a value other than 0, no intermediate heating operation takes place during thermal disinfection.

When 'Start time' and 'Stop time' are set to the time, disinfection is controlled depending on the switching state of the binary input (terminals 03/12) to be performed daily or on the programmed day of the week: disinfection starts optionally with a break contact (BI = 0) or a make contact (BI = 1). The process stops at the latest when the switching state of the binary input next changes.

Functions of the DHW circuit

When the 'Disinfection temperature' has not been reached before the end of the thermal disinfection cycle, an "Err 3" error message is generated. This error message can also be generated prematurely if the remaining time until the disinfection temperature is reached is shorter than the adjusted 'Disinfection temperature sustaining time'. The error message is automatically reset when the disinfection temperature is properly reached during the following thermal disinfection cycle. The thermal disinfection setting for preventing legionella infection has the following impacts:

– High return flow temperatures during the disinfection cycle (return flow temperature limitation suspended)
– High DHW temperatures after thermal disinfection has been concluded
– Possibly lime scale, which can have a negative effect on heat exchanger performance.

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i Note

This function is not available when a storage tank thermostat is used.

Functions	WE	Configuration
Storage tank sensor SF1	1	CO4 > F01 - 1
Thermal disinfection	0	CO4 > F14 - 1
	3	Day of the week: 1-7, 1, 2, …, 7, with 1-7 = daily, 1 = Mondy, …, 7 = Sunday
	00:00	Start time: 00:00 to 23:45 h; in steps of 15 minutes
	04:00	Stop time: 00:00 to 23:45 h; in steps of 15 minutes
	70.0 °C	Disinfection temperature: 60.0 to 90.0 °C
	10.0 °C	Set point boost: 0 to 50 °C
	0 min	Disinfection temperature sustaining time: 0 to 255 min
	bE = 1	BI = 1, BI = 0 (start of disinfection with terminal 03/12 = ON, OFF; only applies when Start time = Stop time)

8 System-wide functions

8.1 Automatic summer/standard time switchover

The time is automatically changed on the last Sunday in March at 2.00 h and on the last Sunday in October at 3.00 h.

Functions	WE	Configuration
Summer time	1	CO5 > F08 - 1

8.2 Frost protection

Frost protection measures are taken when the outdoor temperature falls below 'Frost protection limit'. The switching differential to cancel the frost protection measures is always 1 °C.

Frost protection program I (restricted frost protection)

Frost protection measures are taken only when all heating circuits in the system are in stand-by mode. The circulation pumps are automatically switched on and their flow temperature set points are adjusted to 10 °C. The circulation pump in the DHW circuit is automatically switched on only when the stand-by mode has been adjusted at the rotary switch in all heating circuits. Nevertheless, the storage tank is always recharged to 10 °C if the storage tank temperature falls below 5 °C.

Frost protection program II:

The heating circuit circulation pumps are always switched on automatically. The flow temperature set points of all heating circuits currently in stand-by mode are set to +10 °C. In the DHW circuit, the circulation pump is always activated. If the storage tank temperature falls below +5 °C, the storage tank is recharged to +10 °C.

Functions	WE	Configuration
Frost protection program I		CO5 > F09 - 0
	3.0 °C	Frost protection limit: −15 to +3.0 °C
Frost protection program II		CO5 > F09 - 1
	3.0 °C	Frost protection limit: −15 to +3.0 °C

---

i *Note*

Frost protection operation of a pump, a heating circuit or the DHW circuit is only active when the ❄ frost protection icon is displayed. In the stand-by mode (☾) fixed set point control without outdoor temperature sensor does not include frost protection.

8.3   Forced pump operation

When the heating circuit pumps have not been activated for 24 hours, forced operation of the pumps is started between 12.02 h and 12.03 h. This is done to avoid that the pumps get stuck when they are not operated for long periods of time. In the DHW circuit, the circulation pump is operated between 12.04 h and 12.05 h, the other pumps between 12.05 h and 12.06 h.

8.4   Return flow temperature limitation

The temperature difference between the flow and return flow in a network indicates how well the energy is used: the greater the difference, the higher the efficiency. A return flow sensor is sufficient to evaluate the temperature difference when the flow temperatures are predefined. The return flow temperature can be limited either to a value depending on the outdoor temperature (variable) or to a fixed set point. When the return flow temperature measured at return flow sensor exceeds the limit, the flow temperature set point is reduced. When the temperature measured at return flow sensor RüF exceeds the return flow temperature limit, the set point of the flow temperature (flow temperature of the heating system, charging temperature) is reduced. This causes the primary flow rate to be reduced and the return flow temperature to drop. In systems Anl 2.x and 4.1, the 'Max. return flow temperature' parameter (PA4 level) is used for limitation in the primary circuit during DHW heating if it is greater than the parameter valid for the primary circuit. The 'Limiting factor KP' determines how strongly the controller responds when the limits are exceeded in either direction (PI algorithm).

If just the proportional component is to be implemented, set CO5 > F16-1. This allows the integral-action component in the return flow temperature limitation algorithm of all control circuits of the controller to be deactivated. The set point reading (flow temperature of the heating, charging temperature) blinks to indicate that a return flow limitation is active in the control circuit concerned.

ℹ️ *Note*

When outdoor-temperature-compensated control with gradient characteristic is used, the return flow temperature is limited to a fixed value by equating the 'Base point for return flow temperature' and 'Max. return flow temperature' (PA1, 2) parameters.

Functions	WE	Configuration
Return flow sensor RüF1/RüF2	1 1.0	CO1, 2, 4 > F03 - 1 KP (limiting factor): 0.1 to 10.0
Return flow temperature limitation with P algorithm [1]	0	CO5 > F16

[1]   If the controller indicates CO5 > F00 - 1, any access to the return flow, flow rate and capacity settings is locked.

Parameters	WE	Parameter level: value range
Return flow gradient	1.2	PA1, 2 : 0.2 to 3.2
Return flow level	0.0 °C	PA1, 2: −30.0 to +30.0 °C
Base point for return flow temperature:	65.0 °C	PA1, 2: 5.0 to 90.0 °C
Max. return flow temperature	65.0 °C	PA1, 2, 4: 5.0 to 90.0 °C

or

Parameters	WE	Parameter level: value range
Return flow temperature, points 1 to 4	65.0 °C	PA1, 2: 5.0 to 90.0 °C

❗ *NOTICE*

To ensure the preset return flow temperature limit can be kept, make sure that the following conditions are met:
– The heating characteristic is not adjusted to ascend too steeply.
– The speed of the circulation pumps is not set too high.
– The heating systems have been balanced.

8.5 Condensate accumulation control

Activate the **limitation of set point deviation for OPEN signal** function to start up condensate accumulation plants, in particular to avoid problematic excess temperatures. The controller response to set point deviations which cause the primary valve to open is attenuated. The controller response to set point deviations which cause the control valve to close remains unaffected.

---

i *Note*

The **condensate accumulation control** *function can only be activated when the control circuit concerned is controlled using a PI algorithm (three-step control).*

Functions	WE	Configuration
Control mode	1	CO1, 2, 4 > F12 - 1
Limitation of set point deviation for OPEN signal	0 3.0 °C	CO1, 2, 4 > F13 - 1 Max. system deviation: 3.0 to 10.0 °C

8.6 Three-step control

The flow temperature can be controlled using a PI algorithm. The valve reacts to pulses that the controller sends when a system deviation occurs. The length of the first pulse, in particular, depends on the extent of the system deviation and the selected 'Gain KP' (the pulse length increases as KP increases). The pulse and pause lengths change continuously until the system deviation has been eliminated. The pause length between the single pulses is greatly influenced by the 'Reset time Tn' (the pause length increases as Tn increases). The 'Valve transit time TY' specifies the time required by the valve to travel through the range of 0 to 100 %.

Functions	WE	Configuration
Control mode	1 2.0 120 s 0 s 35 s	CO1, 2, 4 > F12 - 1, HC_ KP (gain): 0.1 to 50.0 Tn (reset time): 1 to 999 s TV (derivative-action time): **do not change the value.** TY (valve transit time): 15, … , 240 s

8.7 On/off control

The flow temperature can be controlled, for example by activating and deactivating a boiler. The controller switches on the boiler when the flow temperature falls below the set point by T = 0.5 x 'Hysteresis'. When the set point is exceeded by T = 0.5 x 'Hysteresis', the boiler is switched off again. The greater the value you choose for 'Hysteresis', the less frequent switching on and off will be. By setting the 'Minimum ON time', an activated boiler remains switched on during this period regardless of the flow temperature fluctuations. Similarly, a deactivated boiler will remain switched off regardless of the flow temperature fluctuations if the Min. OFF time has been specified.

Functions	WE	Configuration
Control mode	1	CO1, 2, 4 > F12 - 0
	5.0 °C	Hysteresis: 1.0 to 30.0 °C
	2 min	Min. ON time: 0 to 10 min
	2 min	Min. OFF time: 0 to 10 min

8.8 Continuous control in control circuit HC1

The flow temperature in the control circuit HC1 can be controlled using a PID algorithm. The valve in HC1 control circuit receives an analog 0 to 10 V signal from the controller. When a system deviation occurs, 'Proportional-action coefficient KP' immediately causes the 0 to 10 V signal to change (the greater the KP, the greater the change). The integral component becomes effective with time: 'Reset time Tn' represents the time which elapses until the integral component has changed the output signal to the same extent as the immediate change performed by the proportional component (the greater Tn is, the slower the rate of change will be). Due to the derivative component, any change of the system deviation is incorporated into the output signal with a certain gain (the greater 'Derivative-action time TV' is, the stronger the change will be).

Functions	WE	Configuration
Control mode	1	CO1 > F12 - 1
	2.0	KP (gain): 0.1 to 50.0
	120 s	Tn (reset time): 1 to 999 s
	0 s	TV (derivative-action time): 0 to 999 s
	35 s	TY (valve transit time): 15, … , 240 s

8.9 Releasing a control circuit/controller with binary input

The release of an individual control circuit or the controller with the binary input only becomes effective when the respective control circuit is in automatic mode (☉ icon). The released control circuit always works in automatic mode; the deactivated control circuit behaves as if it were transferred to stand-by mode (⏻). Control operation remains active, however, in any case for processing an external demand. The control circuit can be released by the binary input when the binary input is either a make contact (BI = 0) or a break contact (BI = 1).

---

i Note

– In systems with downstream heating circuit without a valve (Anl 2.x, 4.x), BI1 only influences the operation of this heating circuit.
– In system Anl 3.0, BI1 influences the operation of the entire controller (except for processing an external demand).

Functions	WE	Configuration
Release HC1 at input BI1	0 bE = 1	CO1 > F14 - 1 bE = 1, bE = 0
Release controller HC2 at input BI2	0 bE = 1	CO2 > F14 - 1 bE = 1, bE = 0
Release controller at input BI1	0 1	CO5 > F15 - 1 bE = 1, bE = 0

8.10 Speed control of the charging pump

This function allows the delivery rate of the charging pump in systems with buffer tank (CO1 > F21-1) and in systems with DHW storage tank (CO4 > F21-1) to be varied based on the temperature. When this function is activated, the input SF2 is automatically activated. In combination with CO1 > F06 - 0 or CO4 > F02 - 0, this input is only used for speed control and not to stop the storage tank charging.

All storage tank charging actions start with the minimum delivery rate of the charging pumps. As soon as the charging temperature is nearly reached, the delivery rate of the charging pump is increased and the valve controls the flow rate. If the charging temperature drops 5 °C below its associated set point, the delivery rate is reduced again. At the latest when the temperature at SF2 has reached the 'Start' value to reduce the delivery rate, the linear reduction of the delivery rate based on the temperature at SF2 starts. If the temperature at SF2 reaches the 'Stop' value to reduce the delivery rate, the charging pump runs again at

the minimum delivery rate. Following the lag time, the charging pump is finally deactivated when the storage is fully charged.

Functions	WE	Configuration
Speed control of the charging pump	0 40.0 °C 50.0 °C 20 %	CO1 > F21 - 1 or CO4 > F21 - 1 Start speed reduction - SF2 limit: 5.0 to 90.0 °C Stop speed reduction - SF2 limit: 5.0 to 90.0 °C Min. speed signal: 0 to 50 %
AA1 reverse	0 0 %	CO5´ > F01 - 1 Zero: 0 to 50 %

8.11 External demand processing

The controller can process binary or analog requests for an externally required signal by a more complex secondary system. A binary request can only be processed when the input SF2/RF2 is not assigned to a sensor.

❗ NOTICE

Risk of damage of the heating circuit through overheating.
Overheating may occur in the heating circuits of the primary controller without control valve.

Excessive charging temperatures in DHW circuits without control valve controlled by the primary controller are excluded when the default settings of the controller are used: while storage tank charging is active, no flow temperature higher than the charging temperature is used by the primary controller. Nevertheless, if the **Priority for external demand** function is activated, the external demand is also processed during storage tank charging.

Functions	WE	Configuration
Priority for external demand	0	CO4 > F16 - 1

Binary demand processing

Regardless of the operating mode set for control circuit HC1, except for manual mode, the controller regulates the flow temperature when either the binary input (terminals 03/12) is a make contact (BI = 0) or a break contact (BI = 1) in control circuit HC1 to at least the adjusted flow temperature adjusted in 'Set point for binary demand processing'.

Functions	WE	Configuration
Demand processing in HC1	0	CO1 > F15 - 1

Functions	WE	Configuration
Demand processing, 0 to 10 V	0	CO1, 2 > F16 - 0
	0 °C	Lower transmission range: 0 to 150 °C
	120 °C	Upper transmission range: 0 to 150 °C
Binary demand processing	0	CO1 > F17 - 1
	bE = 1	bE = 1, bE = 0

Parameters	WE	Parameter level: value range
Set point for binary demand processing	40.0 °C	PA1: 0.0 to 150.0 °C

Demand processing, 0 to 10 V

Regardless of the operating mode set for the control circuit concerned (except for manual mode), the controller regulates the flow temperature at least to the temperature corresponding with the 0 to 10 V signal connected to terminals 11/12.

Functions	WE	Configuration
Demand processing in HC1	0	CO1 > F15 - 1
Demand processing, 0 to 10 V	0	CO1, 2 > F16 - 1
Binary demand processing	0	CO1 > F17 - 0

Parameters	WE	Parameter level: value range
Set point boost (primary exchanger control)	5.0 °C	PA1, 2: 0.0 to 50.0 °C

8.12 Requesting a demand by issuing a 0 to 10 V signal

The controller can request a demand for the maximum flow set point (with boost, if need be) by issuing an analog 0 to 10 V signal for external demand. For this purpose, the 0 to 10 V output is used as an alternative to issuing the control signal.

Analog or binary demand processing can be integrated into the analog request for an external demand.

Functions	WE	Configuration
External demand	0	CO1 > F18 - 1
	0.0 °C	Lower transmission range: 0.0 to 150.0 °C
	120.0 °C	Upper transmission range: 0.0 to 150.0 °C
	0.0 °C	Boost: 0.0 to 30.0 °C

8.13 Connecting potentiometers for valve position input

The FG1 and FG2 inputs can be used to connect potentiometers, for example to input valve positions when a resistance room sensor is not configured in the control circuit concerned. The measured values (in the measuring ranges from 0 to 2000 Ω) do not appear on the controller display. They are only available as Modbus data points.

Functions	WE	Configuration
Room sensor RF1, 2	0	CO1, 2 > F01 - 0

8.14 Creep feed rate limitation with a binary input

It is possible to report to the controller when the creep feed rate has fallen below a certain level by using a limit switch of the primary valve connected to the terminals 04/12 or to input RüF1. Either the open (BI = 0) or closed binary input (BI = 1) can be configured at terminals 04/12 to indicate that the creep feed rate has fallen below a certain level. Only the closed binary input at RüF1 can be processed. Shortly after the alert, the controller closes the valve HC1. As soon as the flow temperature falls below the set point by more than 5 °C after the valve has been closed, control operation is started again.

Functions	WE	Configuration
Creep feed rate limitation	0 bin bE = 1	CO5 > F12 - 1 bin (terminals 04/12), AnA (RüF1) When 'bin' is selected: BI = 0, BI = 1

8.15 Locking manual level

To protect the heating system, this function can be used to lock the manual level. When this function has been activated, automatic mode is started when the rotary switch is set to in automatic mode.

Functions	WE	Configuration
Lock manual level	0	CO5 > F21 - 1

8.16 Locking the rotary switch

When this function has been activated, the controller remains in automatic mode regardless of the rotary switch position. The rotary switch can no longer be used to adjust the controller settings. It is still possible to enter the key number.

Functions	WE	Configuration
Lock the rotary switch	0	CO5 > F22 - 1

8.17 Feeder pump operation

In system Anl 3.0, the feeder pump UP1 only starts to operate in the default setting when a flow temperature demand of a secondary controller exists. If CO5 > F14 - 1 is configured, this is also the case when the control circuit HC2 requires heat.

Functions	WE	Configuration
Operation UP1	0	CO5 > F14 - 1

8.18 External demand for heat due to insufficient heat supply

An external heat source can be demanded using the 0 to 10 V output. The function block for a request for external demand CO1 > F18 - 1 is automatically set. The function block parameters allow the transmission range to be determined. When a system deviation in HC1 greater than 10 °C lasts longer than 30 minutes, a voltage signal corresponding to the actual demand is issued. At the same time, the HC1 valve is forced to close. The HC1 valve icon blinks to indicate that the operating situation has changed as long as the external heat source is released. After 30 minutes, the external demand for heat is canceled (0 V issued) and the control signal output in HC1 is enabled again.

Functions	WE	Configuration
External demand for heat due to insufficient heat supply	0	CO1 > F20 - 1

8.19 Entering customized key number

To prevent the function and parameter settings being changed by unauthorized users, a customized key number can be added to the fixed service key number. You can set the customized key number to be between 0100 and 1900.

Proceed as follows:

1. Turn the rotary switch to ✧ (parameter and configuration level).

   Reading: **0 0 0 0**

2. Enter key number 1995 [↺].

3. Confirm key number [✱].

4. Enter valid key number [↺].

5. Confirm key number [✱].

6. Enter customized key number [↺].

7. Confirm customized key number [✱].

   This number is the new key number.

8. Turn the rotary switch back to switch position 🖳 (information level).

9 Error during operation

The ⌐ icon blinks on the display when a sensor fails. Additionally, the display is illuminated for one second every 10 seconds upon sensor failure. 'Error' is immediately indicated. Press the rotary pushbutton to open the error level. Turn the rotary knob to read the error or possibly more. As long as an malfunction exits, the error message is included in the reading loop, even when it has not been opened by pressing the rotary pushbutton.

In the error level, the error message is displayed as specified in the following list (section 9.1).

---

i *Note*

After the system code number has been changed or after restarting the controller, any error messages are suppressed for approx. three minutes.

9.1 Error list

Err 1 = Sensor failure (see section 9.2)

Err 2 = Reserved

Err 3 = Disinfection temperature not reached (see section 7.10)

Err 4 = Max. charging temperature reached (see section 7.2)

Err 5 = Reserved

Err 6 = Temperature monitor alarm (see section 9.3)

Err 7 = Unauthorized access occurred

Err 8 = Error message of a binary input

All error messages, except for Err 1 can be confirmed in the error level.

Confirming error messages

1. Select **Clr** [⟨⟩].
2. Confirm error message [✷].

9.2 Sensor failure

As described in the error list, sensor failures are indicated by displaying Err 1 error message in the error level. For detailed information, exit the error level and view the different temperature values in the information level: each sensor icon displayed together with three dashes instead of the measured value indicates a defective sensor. The following list explains how the controller responds to the failure of the different sensors.

– **Outdoor sensor AF1:** when the outdoor sensor fails, the controller uses a flow temperature set point of 50 °C or the 'Max. flow temperature' when the max. flow temperature (set in PA1, 2) is lower than 50 °C. With the setting CO1, 2 > F05 - 1 (underfloor heating), the flow temperature set point is 30 °C in the event of a malfunction.

– **Flow sensor(s) in heating circuit(s):** when the flow sensors in the heating circuits are defective, the associated valve moves to 30 % travel. DHW heating using such a sensor to measure the charging temperature is suspended.

– **Flow sensors in the DHW circuit with control valve:** when the flow sensor VF4 fails, the controller behaves as if VF4 has not been configured. As soon as the control of the charging temperature/DHW temperature becomes impossible (VF2 defective), the associated valve is closed.

– **Return flow sensors RüF1/2:** when the return flow sensor fails, the controller continues operation without return flow temperature limitation.

– **Room sensors RF1/RF2:** when the room sensor fails, the controller uses the settings for operation without room sensor. The controller, for example switches from optimizing mode to reduced operation. The adaptation mode is canceled. The last determined heating characteristic remains unchanged.

– **Storage tank sensors SF1/SF2:** when one of the two sensors fails, the storage tank is no longer charged (exception: solar system).

– **Solar circuit sensors SF3, VF3:** When one of the two sensors fails, the storage tank in the solar circuit is no longer charged.

9.3   Temperature monitoring

When a system deviation greater than 10 °C persists in a control circuit for 30 minutes, an Err 6 message (temperature monitoring alarm) is generated.

Functions	WE	Configuration
Temperature monitoring	0	CO5 > F19 - 1

9.4   Error status register

The error status register is used to indicate controller or system errors.

Error message	Meaning	Decimal value	
Err 1	Sensor failure	1	1
Err 2	–	2	
Err 3	Disinfection temperature not reached	4	
Err 4	Max. charging temperature reached	8	
Err 5	–	16	
Err 6	Temperature monitor alarm	32	32
Err 7	Unauthorized access occurred	64	
Err 8	Error message of a binary input	128	
Err 9	–	256	
			Total
	Example: Value of error status register when a sensor fails and a temperature monitoring alarm =		33

10 Communication

Using the optional RS-485 communication module (Modbus RTU interface for two-wire bus networks), the TROVIS 5573 Heating Controller can communicate with a control system. In combination with a suitable software for process visualization and communication, a complete control system can be implemented.

ℹ Note

The operating software can be updated over a data cable, provided Modbus has been activated (CO6 > F01 - 1).

RS-232C

RS-232

RS-485

RS-485

TROVIS 5578

1 Optional RS-485 communication module
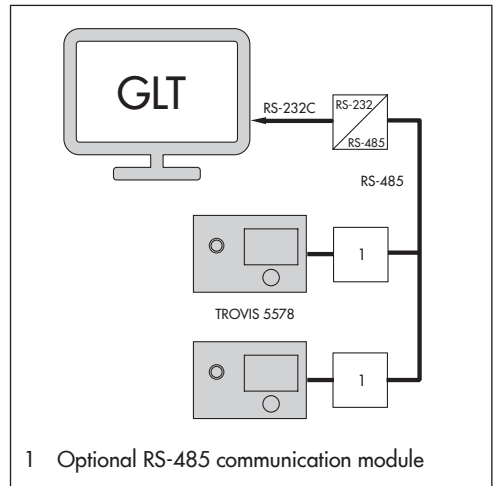
10.1 RS-485 communication module

When looking onto the controller front, the connection for the optional communication module (icon, order no. 8812-2002) is located on the left side of the controller housing (RJ-45 connector socket). The bus line links the control units/devices in an open ring. At the end of the bus line, the data cable is connected to the control station using an RS-485/RS-232 converter (e.g. CoRe02, see Data Sheet ʊ T 5409).

The maximum range of the bus connection (cable length) is 1200 meters. For greater distances, repeaters (e.g. CoRe02) must be used to regenerate the signal level. A maximum of 246 devices with 8-bit addressing can be connected to a bus.

If no communication is established between the control system and controller, the time of access by the control system can be restricted to dynamic process by the **monitoring** function. The controller resets the monitoring function, provided the valid Modbus requests are registered. However, in case of an error, all level bits are initialized back to "autonomous" after 30 minutes have elapsed.

> ❶ *NOTICE*
>
> *Risk of damage of the heating circuit due to lightning or overvoltage.*
> *Upon installation, observe the relevant standards and regulations governing lightning and overvoltage protection.*

Functions	WE	Configuration
Modbus	1	CO6 > F01 - 1
16-bit address	0	CO6 > F02
Monitoring	0	CO6 > F07

Parameters [1]	WE	Parameter level: value range
Station address (ST)	255	PA6: 1 to 247 With CO6 > F02 - 1: 1 to 32000

Description of communication parameter settings

– Station address (ST)
  This address is used to identify the controller in bus or modem mode. In a system, each controller needs to be assigned a unique address.

10.2 Memory module/mini module

The use of a memory module (order no. 1400-9379) or a mini module (order no. 1400-7436) is particularly useful to transfer all data from one TROVIS 5573 Controller to several other TROVIS 5573 Controllers.

> ℹ️ *Note*
>
> *In contrast to the memory module, the mini module is not suitable for transferring the pro-grammed vacations to the individual control circuits or a data logging configuration pro-grammed in TROVIS-VIEW.*

The memory module/mini module is plugged into the RJ-45 connector socket located at the side of the controller. Once the module has been connected, '73 SP' appears on the controller display. If the memory module already contains data from a different TROVIS 5573 Controller, turn the rotary pushbutton until 'SP 73' is displayed.

– Pressing the rotary pushbutton to confirm '73 SP' causes the controller settings to be transferred to the memory module/mini module.

– Pressing the rotary pushbutton to confirm 'SP 73' causes the controller settings to be transferred from the memory module/mini module.

While the data is being exchanged, bars run across the display. When the transfer is completed, 'I.O.' is displayed. After that, the connection between controller and memory module/mini module can be terminated.

Using TROVIS-VIEW (order no. 6661-1014), it is possible to configure all controller settings on a convenient user interface at the computer and to document these settings.

10.3 Data logging

A data logging module (order no. 1400-9378) saves the following controller data every two minutes:

– Temperatures measured by the sensors

– Control signals [%]

– Switching states of the pump outputs

The data logging module is plugged into the RJ-45 connector socket located at the side of the controller.

The controller starts to write over the oldest data as soon the memory of the data logging module is full after approximately eight days. The current memory capacity of the data logging module can be read in the extended information level under InFo 2 as the second value in the sequence (range of values: 0 to 6035). Directly after inserting the data logging module, data can be first read after the first scanning cycle has been performed.

The data log viewer software allows the data to be viewed in graph format. The USB converter 3 (order no. 1400-9377) is required to connect the data logging module to a computer. The data log viewer software is supplied together with the USB converter 3.

11 Installation

The controller can be fitted with a standard base or with a high housing base.

Dimensions in mm (W x H x D)

– Controller with standard base: 144 x 98 x 54

– Controller with high base: 144 x 98 x 75

The controller consists of the housing with the electronics and the back panel with the terminals. The device is suitable for panel, wall and top hat rail mounting (see Fig. 12).

Panel mounting

1. Undo the two screws (1).

2. Pull apart the controller housing and the base.

3. Make panel cut-out with the dimensions 138 x 92 mm (W x H).

4. Push the controller housing through the panel cut-out.

5. Tighten the two screws (2) to clamp the controller housing against the control panel.

6. Perform electric wiring on the base as described in section 12.

7. Remount the controller housing.

8. Tighten the two screws (1).

Wall mounting

1. Undo the two screws (1).

2. Pull apart the controller housing and the base.

3. If necessary, drill holes with the specified dimensions in the appropriate places.

4. Fasten the base with four screws.

5. Perform electric wiring on the base as described in section 12.

6. Remount the controller housing.

7. Tighten the two screws (1).

Panel mounting

2

1

2

Wall mounting

62

15

57 — 41

Rail mounting

5

5

4

3
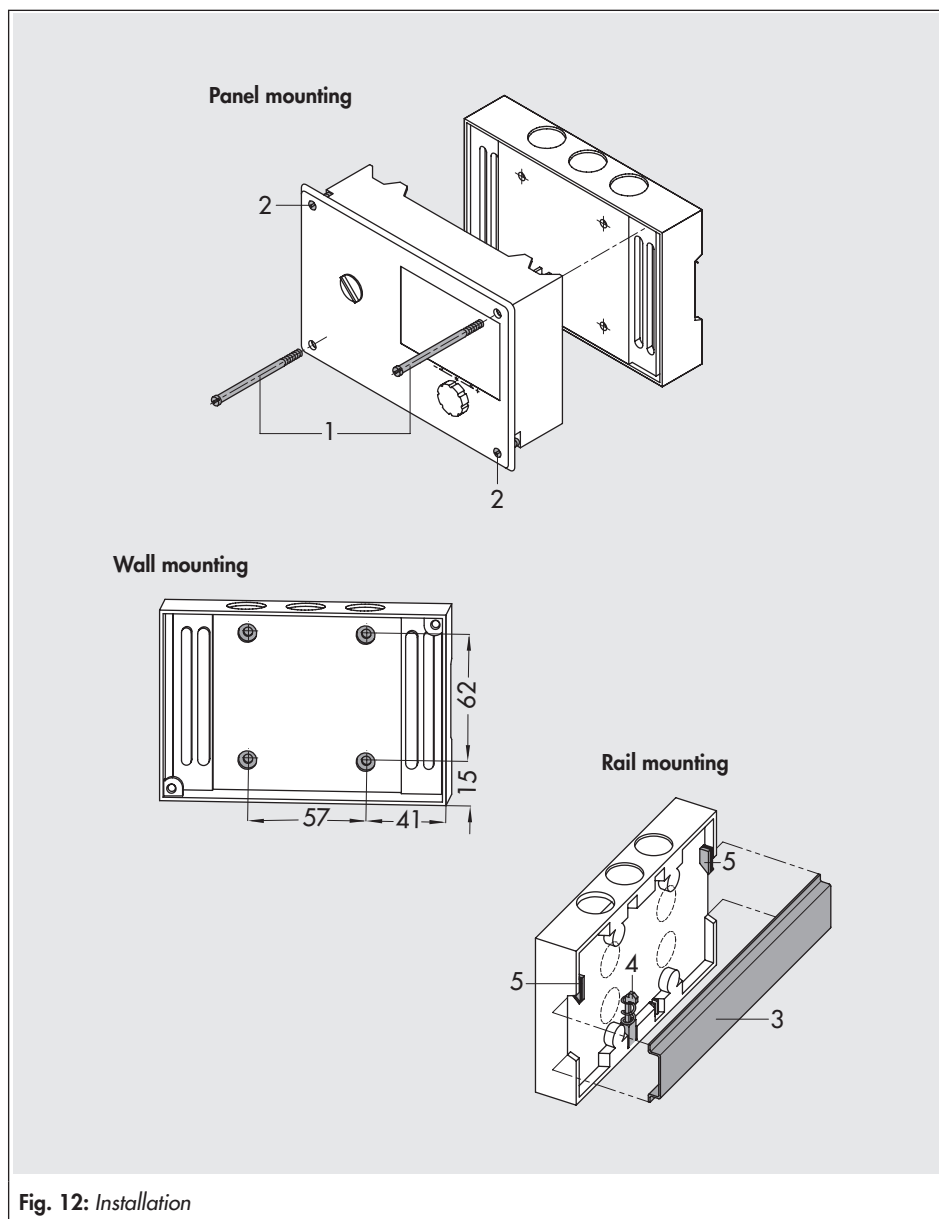
Fig. 12: *Installation*

Rail mounting

1. Fasten the spring-loaded hook (5) at the bottom of the top hat rail (3).
2. Slightly push the controller upwards and pull the upper hook (5) over the top hat rail.
3. Undo the two screws (1).
4. Pull apart the controller housing and the base.
5. Perform electric wiring on the base as described in section 12.
6. Remount the controller housing.
7. Tighten the two screws (1).

12 Electrical connection

⚠ DANGER

Risk of electric shock!

– *For electrical installation, you are required to observe the relevant electrotechnical regulations of the country of use as well as the regulations of the local power suppliers. Make sure all electrical connections are installed by trained and experienced personnel.*

– *The terminals 25 and 28 allow safety equipment which have a direct influence on individual electric actuators to be integrated. If an internal power supply is to be used, connect a jumper from terminal 18 to terminals 25 and 28. Do not connect ELV wiring (according to VDE 0100) to these terminals.*

– *Before performing any work on the controller, disconnect it from the power supply.*

Notes on electric wiring

– Install the 230 V power supply lines and the signal lines separately! To increase immunity, keep a minimum distance of 10 cm between the lines. Make sure the minimum distance is also kept when the lines are installed in a cabinet.

– The lines for digital signals (bus lines) and analog signals (sensor lines, analog outputs) must also be installed separately!

– In plants with a high electromagnetic noise level, we recommend using shielded cables for the analog signal lines. Ground the shield at one side, either at the control cabinet inlet or outlet, using the largest possible cross-section. Connect the central grounding point and the PE grounding conductor with a 10 mm² cable using the shortest route.

– Inductances in the control cabinet, e.g. contactor coils, are to be equipped with suitable interference suppressors (RC elements).

– Control cabinet elements with high field strength, e.g. transformers or frequency converters, must be shielded with separators providing a good ground connection.

Overvoltage protection

– If signal lines are installed outside buildings or over large distances, make sure appropriate surge or overvoltage protection measures are taken. Such measures are indispensable for bus lines.

– The shield of signal lines installed outside buildings must have current conducting capacity and must be grounded on both sides.

– Surge diverters must be installed at the control cabinet inlet.

Connecting the controller

The controller is connected as illustrated in the following wiring diagrams.

➔ Open the housing to connect the cables.

➔ To connect the feeding cables, make holes in the marked locations at the top, bottom or back of the base of the housing and fit suitable grommets or cable glands.

Connecting sensors

Cables with a minimum conductor cross-section of 0.5 mm² can be connected to the terminals at the base of the housing.

Connecting actuators

➔ 0 to 10 V control output: use cables with a minimum conductor cross-section of 0.5 mm².

➔ Three-step or on/off outputs: connect cables with at least 1.5 mm² suitable for damp locations to the terminals of the controller output. We recommend checking the direction of travel at start-up.

Connecting pumps

➔ Connect all cables with at least 1.5 mm² to the terminals of the controller as illustrated in the wiring diagram.

ℹ️ *Note*

The electric actuators and pumps are not automatically supplied with a voltage by the controller. They can be connected over terminals 20, 22, 25 and 28 to an external voltage source. If an internal power supply is to be used, connect a jumper from terminal 18 to terminals 20, 22, 25 and 28.

01	AF1		L1	18
02	SF1		N	19
03	SF2/RF2		L1	20
04	RüF2		UP1	21
05	RF1		L1	22
06	RüF1		SLP	23
07	VF1		ZP/UP2	24
08	VF2/3/4		L1	25
09	BE1/FG1		Rk1_3-Pkt	26
10	BE2/FG2			27
11	+ 10 V$_{in}$/ 10 V$_{out}$ −		Rk1_2-Pkt / L1	28
12	Fühler COM		Rk2_3-Pkt	29
13				30
14			Rk2_2-Pkt/TLP/CP	31
15				32
16	M-Bus (TROVIS 5573-110x)			33
17	M-Bus (TROVIS 5573-110x)			34

AF	Outdoor sensor	CP	Solar circuit pump
BE	Binary input	RK	Control circuit
FG	Potentiometer	UP	Circulation pump (heating)
RF	Room sensor	SLP	Storage tank charging pump
RüF	Return flow sensor	TLP	Heat exchanger charging pump
SF	Storage tank sensor	ZP	Circulation pump (DHW)
VF	Flow sensor		

Fig. 13: *Connection of TROVIS 5573 Controller with standard base*

Electrical connection
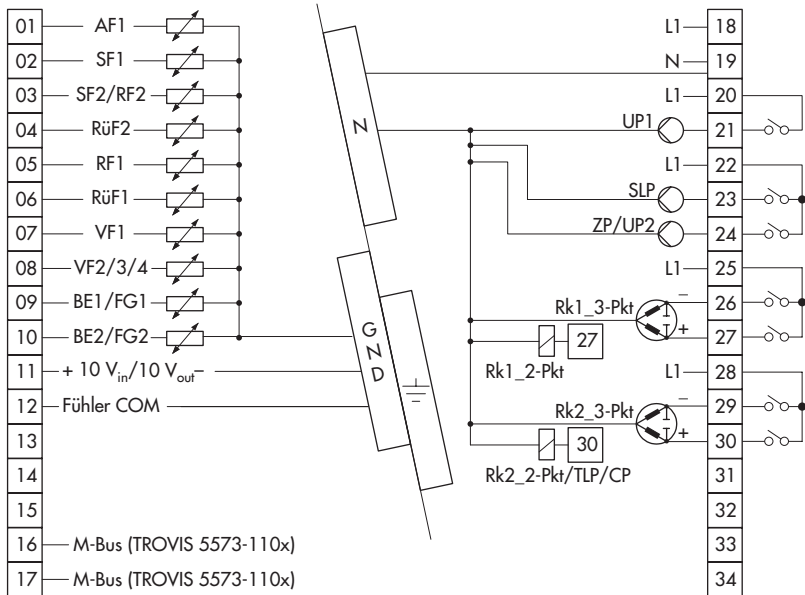
01	AF1	
02	SF1	
03	SF2/RF2	
04	RüF2	
05	RF1	
06	RüF1	
07	VF1	
08	VF2/3/4	
09	BE1/FG1	
10	BE2/FG2	
11	+ 10 V_{in}/10 V_{out} −	
12	Fühler COM	
13		
14		
15		
16	M-Bus (TROVIS 5573-110x)	
17	M-Bus (TROVIS 5573-110x)	

L1 — 18
N — 19
L1 — 20
UP1 — 21
L1 — 22
SLP — 23
ZP/UP2 — 24
L1 — 25
Rk1_3-Pkt — 26
— 27
Rk1_2-Pkt
L1 — 28
Rk2_3-Pkt — 29
— 30
Rk2_2-Pkt/TLP/CP
31
32
33
34

AF	Outdoor sensor	CP	Solar circuit pump
BE	Binary input	RK	Control circuit
FG	Potentiometer	UP	Circulation pump (heating)
RF	Room sensor	SLP	Storage tank charging pump
RüF	Return flow sensor	TLP	Heat exchanger charging pump
SF	Storage tank sensor	ZP	Circulation pump (DHW)
VF	Flow sensor		

Fig. 14: *Connection of TROVIS 5573 Controller with high base*

EB 5573 EN

13 Appendix

13.1 Function block lists

CO1: HC1 · Heating circuit 1 (not system Anl 1.9)*

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
01	Room sensor RF1	0	Not systems Anl 1.5, 1.6, 3.x, 16.x	CO1 > F01 - 1: Temperature reading and FG1 input for Types 5244 and 5257-5 or 5257-51 Room Panels active
02	Outdoor sensor AF1	0 1	1.5, 1.6 Not Anl 1.5, 1.6	CO1 > F02 - 1: Outdoor-temperature-compensated control active
03	Return flow sensor RüF1	0 1	1.2 Not Anl 1.2	CO1 > F03 - 1: Sensor and limitation function active **Function block parameters:** KP (limiting factor): 0.1 to 10.0 (1.0)
04	Cooling control	0	All*	CO1 > F04 - 1: Cooling control, only with CO1 > F11 - 1 The cooling control function causes a reversal of the operating direction and a minimum limitation of the return flow temperature in HC1.
05	Underfloor heating Drying of jointless floors	0	Not systems Anl 1.5, 1.6, 3.x, 16.x	CO1 > F05 - 1: Restriction of the adjustment ranges **Function block parameters:** Start temperature: 20.0 to 60.0 °C (25 °C) Hold (days): 0 to 10 days (0) Temp. rise/day: 0.0 to 10.0 °C (5.0 °C) Maximum temperature: 25.0 to 60.0 °C (45.0 °C) Hold (days): 0 to 10 days (4) Temp. reduction/day: 0.0 to 10.0 °C (0.0 °C) SToP, ▪STArT, ▪▪STArT, ▪▪▪STArT, ▪▪▪▪STArT
06	Storage tank sensor SF2	1	System Anl 16.x only	CO1 > F06: Activate SF2 to switch off charging of the buffer tank
07	Optimization	0	Not systems Anl 1.5, 1.6, 3.x, 16.x	CO1 > F07 - 1: only with CO1 > F01 - 1 and CO1 > F02 - 1
08	Adaptation	0	Not systems Anl 1.5, 1.6, 3.x, 16.x	CO1 > F08 - 1: only with CO1 > F01 - 1, CO1 > F02 - 1 and CO1 > F11 - 0

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
09	Flash adaptation	0	Not systems Anl 1.5, 1.6, 3.x, 16.x	CO1 > F09 - 1: only with CO1 > F01 - 1 **Function block parameters:** Cycle time: 0 or 1 to 100 min (20 min) KP (gain): 0.0 to 25.0 (0.0)
10	Reserved			
11	Four-point characteristic	0	Not Anl 1.5, 1.6	CO1 > F11 - 1: Four-point characteristic, only with CO1 > F08 - 0 CO1 > F11 - 0: Gradient characteristic
12	Control mode	1	All*	CO1 > F12 - 1: Three-step control **Function block parameters:** KP (gain): 0.1 to 50.0 (2.0) Tn (reset time): 1 to 999 s (120 s) TV (derivative-action time): 0 to 999 s (0 s) TY (valve transit time): 15, …, 240 s (35 s) CO1 > F12 - 0: On/off control **Function block parameters:** Hysteresis: 1.0 to 30.0 °C (5.0 °C) Min. ON time: 0 to 10 min (2 min) Min. OFF time: 0 to 10 min (2 min)
13	Limitation of set point deviation for OPEN signal	0	All*	CO1 > F13 - 1: only with CO1 > F12 - 1 **Function block parameters:** Max. system deviation: 3.0 to 10.0 °C (3.0 °C)
14	Release HC1 at input BI1	0	All*	CO1 > F14 - 1: FG1 has no function **Select:** BI = 1, BI = 0 (BI = 1)
15	Demand processing in HC1	0	All*	How the demand is processed in HC1 depends on the configuration of CO1 -> F16, CO1 > F17 and CO7 > F15.
16	Demand processing, 0 to 10 V Input terminals 11/12	0	All*	CO1 > F16 - 1: only with CO1 > F15 - 1 and CO1 > F17 - 0 **Function block parameters:** Lower transmission range: 0 to 150 °C (0 °C) Upper transmission range: 0 to 150 °C (120 °C) The standardized signal output (terminals 11/12) is not available anymore as a control output.
17	Binary demand processing Input terminals 03/12	0	Not for systems with SF2/RF2	CO1 > F17 - 1: only with CO1 > F15 - 1 and CO1 > F16 - 0 **Select:** BI = 1, BI = 0 (BI = 1)

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
18	Request max. flow set point using 0 to 10 V Output terminals 11/12	0	All*	CO1 > F18 - 1: the standardized signal output (terminals 11/12) is not available anymore as a control output. The maximum flow set point (with boost, if applicable) is demanded as a 0 to 10 V signal at the standardized signal output. **Function block parameters:** Lower transmission range: 0.0 to 150.0 °C (0.0 °C) Upper transmission range: 0.0 to 150.0 °C (120.0 °C) Boost flow temperature demand: 0 to 30.0 °C (0 °C)
20	External demand for heat due to insufficient heat supply	0	All	CO1 > F20 - 1: Demand of an external heat source
21	Speed reduction of charging pump	0	16.x	CO1 > F21 - 1: Temperature-based adaptation of the delivery rate of the charging pump **Function block parameters:** Start speed reduction - SF2 limit: 5.0 to 90.0 °C (40.0 °C) Stop speed reduction - SF2 limit: 5.0 to 90.0 °C (50.0 °C) Minimum speed: 0 to 50 % (20 %)
22	SLP depending on return flow temperature	0	16.x	CO1 > F22 - 1: Storage tank charging pump not ON unless return flow hot
23	Differential temperature control	0	System Anl 1.0, 16.0 only	CO1 > F23 - 1: Activation of differential temperature control **Function block parameters:** Set point of differential temperature control: 0.0 to 50.0 °C (20.0 °C) KP (influence factor): 0.1 to 10.0 (1.0) Minimum speed: 0 to 100 % (20 %)

F Function block number, WE Default setting, Anl System code number

CO2: HC2 · Heating circuit 2 (systems Anl 3.x, 4.x, 10.0, 16.6)*

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
01	Room sensor RF2	0	All*	CO2 > F01 - 1: Temperature reading and FG2 input for Types 5244 and 5257-5 or 5257-51 Room Panels active
03	Return flow sensor RüF2	1	10.x	CO2 > F03 - 1: Sensor and limitation function active **Function block parameters:** KP (limiting factor): 0.1 to 10.0 (1.0)
		0	3.0, 4.x, 16.6	

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
04	Cooling control	0	All*	CO2 > F04 - 1: Cooling control, only with CO2 > F11 - 1 The cooling control function causes a reversal of the operating direction and a minimum limitation of the return flow temperature in HC2.
05	Underfloor heating Drying of jointless floors	0	All*	CO2 > F05 - 1: Restriction of the adjustment ranges **Function block parameters:** Start temperature: 20.0 to 60.0 °C (25 °C) Hold (days): 0 to 10 days (0) Temp. rise/day: 0.0 to 10.0 °C (5.0 °C) Maximum temperature: 25.0 to 60.0 °C (45.0 °C) Hold (days): 0 to 10 days (4) Temp. reduction/day: 0.0 to 10.0 °C (0.0 °C) SToP, ▪STArT, ▪▪STArT, ▪▪▪STArT, ▪▪▪▪STArT
07	Optimization	0	All*	CO2 > F07 - 1: only with CO2 > F01 - 1 and CO1 > F02 - 1
08	Adaptation	0	All*	CO2 > F08 - 1: only with CO2 > F01 - 1, CO1 > F02 - 1 and CO2 > F11 - 0
09	Flash adaptation	0	All*	CO2 > F09 - 1: only with CO2 > F01 - 1 **Function block parameters:** Cycle time: 0 or 1 to 100 min (20 min) KP (gain): 0.0 to 25.0 (0.0)
11	Four-point characteristic	0	All*	CO2 > F11 - 1: Four-point characteristic, only with CO2 > F08 - 0 CO2 > F11 - 0: Gradient characteristic
12	Control mode	1	All*	CO2 > F12 - 1: Three-step control **Function block parameters:** KP (gain): 0.1 to 50.0 (2.0) Tn (reset time): 1 to 999 s (120 s) TV (derivative-action time): 0 s, do not change the value. TY (valve transit time): 15, …, 240 s (35 s) CO2 > F12 - 0: On/off control **Function block parameters:** Hysteresis: 1.0 to 30.0 °C (5.0 °C) Min. ON time: 0 to 10 min (2 min) Min. OFF time: 0 to 10 min (2 min)
13	Limitation of set point deviation for OPEN signal	0	All*	CO2 > F13 - 1: only with CO2 > F12 - 1 **Function block parameters:** Max. system deviation: 3.0 to 10.0 °C (3.0 °C)

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
14	Release HC2 at input BI2	0	All*	With CO2 > F14 - 1 setting: FG2 has no function **Select:** BI = 1, BI = 0 (BI = 1)
16	Demand processing 0 to 10 V Input terminals 11/12	0	All*	CO2 > F16 - 1: demand processing in HC2 **Function block parameters:** Lower transmission range: 0 to 150 °C (0 °C) Upper transmission range: 0 to 150 °C (120 °C)

F Function block number, WE Default setting, Anl System code number

CO4: DHW circuit (systems Anl 1.1–1.3, 1.5, 1.6, 1.9, 2.x, 4.1, 4.5, 11.x)*

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
01	Storage tank sensor SF1	1	1.1–1.3, 1.5, 1.6, 2.x, 4.1, 4.5, 11.0, 11.2	CO4 > F01 - 0 (not system Anl 11.0): storage tank thermostat, only when CO4 > F02 - 0
		0	1.9, 11.9	
02	Storage tank sensor SF2 with stop storage tank charging function (not assigned to the solar circuit)	0	1.1, 1.3, 1.5, 2.0, 2.1, 2.3, 4.1, 4.5, 11.0, 11.1, 11.5	CO4 > F02 - 1 (not systems Anl 1.3, 1.9, 2.3, 11.0 and 11.9): only when CO4 > F01 - 1
		1	1.2, 1.6, 2.2, 11.2	
03	Return flow sensor RüF2	0	1.9, 11.x	CO4 > F03 - 1: Sensor and limitation function active **Function block parameter:** KP (limiting factor): 0.1 to 10.0 (1.0)
05	Flow sensor VF4	0	1.1, 1.2, 1.6, 2.2	CO4 > F05 - 1: Flow sensor to measure storage tank charging temperature active
06	Parallel pump operation	0	2.1–2.3, 4.1, 4.5	CO4 > F06 - 1 **Function block parameters:** Stop parallel pump operation in the event of a system deviation: 0 to 10 min (10 min) Flow temperature limit for parallel operation: 20.0 to 90.0 °C (40.0 °C) CO4: F06 - 0: UP1 switched off during DHW heating

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
07	Intermediate heating	1	2.x, 4.1, 4.5	CO4 > F07 - 1: after 20 minutes of DHW heating, heating operation in UP1 circuit reactivated for 10 minutes CO4 > F07 - 0: storage tank charging is given unlimited priority concerning UP1 circuit
08	Priority through reverse control	0	1.1–1.3, 4.1, 4.5, 11.x	CO4 > F08 - 1: only with CO4 > F09 - 0 **Function block parameters:** Start: 0 to 10 min (2 min) KP (influence factor): 0.1 to 10.0 (1.0) System Anl 4.5 only: control circuit HC1, HC2, HC1+HC2 (HC2)
09	Priority through set-back operation	0	1.1–1.3, 4.1, 4.5, 11.x	CO4 > F09 - 1: only with CO4 > F08 - 0 **Function block parameters:** Start: 0 to 10 min (2 min) System Anl 4.5 only: HC1, HC2, HC1+HC2 (HC2)
10	Circulation pump (DHW) integrated into the heat exchanger	0 1	1.6, 11.2 11.6	CO4 > F10 - 1: Control of DHW circuit active while circulation pump (ZP) is running
11	Circulation pump operation during storage tank charging	0	1.1–1.3, 1.5, 1.6, 2.x, 4.1, 4.5, 11.1, 11.2	CO4 > F11 - 1: Circulation pump (ZP) runs according to time schedule during storage tank charging CO4 > F11 - 0: Circulation pump (ZP) switched off during storage tank charging
12	Control mode	1	1.9, 11.x	CO4 > F12 - 1: Three-step control **Function block parameters:** KP (gain): 0.1 to 50.0 (2.0; system Anl x.9: 0.6) Tn (reset time): 1 to 999 s (120 s; system Anl x.9: 12 s) TV (derivative-action time): 0 s, do not change the value. TY (valve transit time): 15, …, 240 s (35 s; system Anl x9: 20 s) CO4 > F12 - 0 (systems Anl 11.0, 11.1 only): On/off control **Function block parameters:** Hysteresis: 1.0 to 30.0 °C (5.0 °C) Min. ON time: 0 to 10 min (2 min) Min. OFF time: 0 to 10 min (2 min)
13	Limitation of set point deviation for OPEN signal	0	1.9, 11.x	CO4 > F13 - 1: only with CO4 > F12 - 1 **Function block parameters:** Max. system deviation: 3.0 to 10.0 °C (3.0 °C)

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
14	Thermal disinfection	0	All*	CO4 > F14 - 1: only with CO4 > F01 - 1 **Function block parameters:** Day of the week: 1, 2, ..., 7, 1-7 (3) Start time: 00:00 to 23:45 (00:00) Stop time: 00:00 to 23:45 (04:00) Disinfection temperature: 60.0 to 90.0 °C (70.0 °C) Set point boost: 0 to 50 °C (10 °C) Disinfection temperature sustaining time: 0 to 255 min (0 min) When the start time is set to the same time as the stop time **Selection:** BI = 1, BI = 0 (BI = 1), input terminals 03/12 (only possible without SF2/RF2)
15	SLP ON depending on return flow temperature	0	1.5, 1.6, 2.0, 2.1, 2.3, 4.1, 11.1, 11.2	For systems Anl 1.5, 1.6, 2.0, 2.1, 2.3, 4.1: CO4 > F15 - 1: only when CO1 > F03 - 1 For systems Anl 11.1 and 11.2: CO4 > F15 - 1: only when CO4 > F03 - 1
16	Priority for external demand	0	1.5, 1.6, 2.x, 4.1	When CO4 > F16 - 1 is configured, a high external demand causes correspondingly excessive charging temperatures in DHW circuits without control valve.
19	Time-controlled changeover of storage tank sensors	0	1.1–1.3, 1.5, 1.6, 2.x, 4.1, 4.5, 11.1, 11.2	CO4 > F19 - 1: only when CO4 > F02 - 1 SF1 applies for day mode and SF2 for night mode.
20	DHW circuit additionally controlled by a globe valve	0	11.1	CO4 > F20 - 1: Return flow temperature limitation using the globe valve with VF2 in the heating register return flow of the storage tank
21	Speed reduction of charging pump	0	1.1–1.3, 1.5, 1.6, 2.x, 4.1, 11.1, 11.2	CO4 > F21 - 1: Temperature-based adaptation of the delivery rate of the charging pump **Function block parameters:** Start speed reduction: 5 to 90 °C (40 °C) Stop speed reduction 5 to 90 °C (50 °C) Min. signal: 0 to 50 % (20 %)
22	Cold charging protection	0	1.1	CO4 > F22 - 1: Storage tank charging started when the primary flow temperature is high enough

F Function block number, WE Default setting, Anl System code number

CO5: System-wide functions (all systems)

If the controller indicates CO5 > F00 - 1, any access to the return flow, flow rate and capacity settings is locked.

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
01 02 03	Sensor initialization	1	All	CO5 > F01 - 1, F02 - 0: Pt 1000 CO5 > F01 - 0, F02 - 0: PTC CO5 > F01 - 1, F02 - 1: Ni 1000
04	Summer mode	0	Not systems Anl 1.5, 1.6, 1.9, 3.5	CO5 > F04 - 1: Activation of time-dependent summer mode **Function block parameters:** Start date for summer mode: 01.01 to 31.12 (01.06) No. days until activation: 1 to 3 (2) End date for summer mode: 01.01 to 31.12 (30.09) No. days until deactivation: 1 to 3 (1) Outdoor temperature limit for summer mode: 0.0 to 30.0 °C (18.0 °C)
05	Delayed outdoor temperature adaptation as the temperature falls	0	Not Anl 1.9	CO5 > F05 - 1 **Function block parameters:** Delay per hour: 1.0 to 6.0 °C (3.0 °C)
06	Delayed outdoor temperature adaptation as the temperature rises	0	Not Anl 1.9	CO5 > F06 - 1 **Function block parameters:** Delay per hour: 1.0 to 6.0 °C (3.0 °C)
08	Summer/ standard time switchover	0	All	
09	Frost protection program II	1	Not systems Anl 1.5, 1.6, 1.9, 3.5	CO5 > F09 - 0: Frost protection program I (restricted frost protection) **Function block parameters:** Frost protection limit: −15.0 to +3.0 °C (3.0 °C)
		0	1.5, 1.6, 1.9, 3.5	CO5 > F09 - 1: Frost protection program II **Function block parameters:** Frost protection limit: −15.0 to +3.0 °C (3.0 °C)

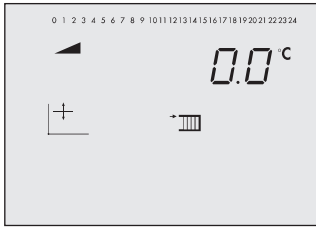| F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
12	Creep feed rate limitation	0	Not Anl 1.9	CO5 > F12 - 1: Creep feed rate limitation **Selection:** bin (input terminals 04/12), AnA (input RüF1) **Function block parameters when 'bin' is selected:** bE = 1, bE = 0 (bE = 1)
14	Operation UP1	0	3.0, 16.x	CO5 > F14 - 1: feeder pump UP1 also starts to operate to cover the demand of HC2.
15	Release controller at input BI1	0	All	With CO5 > F15 - 1 setting: FG1 has no function **Select:** BI = 1, BI = 0 (BI = 1)
16	Return flow temperature limitation with P algorithm	0	All	CO5 > F16 - 1: Return flow temperature limitation only with proportional component
19	Temperature monitoring	0	All	CO5 > F19 - 1: Temperature monitoring active
20	Sensor calibration	1	All	CO5 > F20 - 1: Set all sensor calibration values CO5 > F20 - 0: Delete all sensor calibration values
21	Lock manual level	0	All	CO5 > F21 - 1: controller runs in automatic mode in ⛄ switch position
22	Lock the rotary switch	0	All	CO5 > F22 - 1: Rotary switch without any function. It is still possible to enter the key number.
23	Outdoor temperature as 0 to 10 V signal	0	All	CO5 > F23 - 1: Outdoor temperature received as 0 to 10 V signal (AE) or sent (AA), terminals 11/12 **Function block parameters:** Direction: AE, AA (AE) Lower transmission range: −50.0 to +100.0 °C (−20.0 °C) Upper transmission range: −50.0 to +100.0 °C (50.0 °C)

F Function block number, WE Default setting, Anl System code number

CO5′: System-wide functions (all systems)

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
01	AA1 reverse	0	All	CO5′ > F01 - 0: 0 V/0 % = Valve CLOSED/pump OFF CO5′ > F01 - 1: 0 V/0 % = Valve OPEN/pump with max. delivery rate **Function block parameters:** Zero: 0 to 50 % (0 %)
07	AI1 Zero shift	0	All*	CO5′ > F07 - 0 **Function block parameters:** Zero: 5 to 20 % (5 %)

F Function block number, WE Default setting, Anl System code number

CO6: Modbus (all systems)

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
01	Modbus	1	All	CO6 > F01 - 1: Modbus active
02	16-bit address	0	All	CO6 > F02 - 1: Modbus 16-bit addressing (only with CO6 > F01 - 1) CO6 > F02 - 0: 8-bit addressing
03	Modem function	0	All	CO6 > F03…F06 is required to configure the error message transfer to a connected Modbus/GPRS gateway (1402-0701).
04	Automatic modem configuration	0	All	
05	Lock dial-up to building automation system	0	All	
06	Dial-up to building automation system also to indicate that an error has been remedied	0	All	
07	Monitoring	0	All	CO6 > F07 - 1: Reset all even bits to 'autonomous' when there is no communication (only when CO6 > F01 - 1)
08	Text message	0	All	CO6 > F08 is required to configure the error message transfer to a connected Modbus/GPRS gateway (1402-0701).

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
20	Modbus without building automation system	0	All	CO6 > F20 - 1: Various Modbus specifications do not have any effect on the collective level/building automation system reading

F Function block number, WE Default setting, Anl System code number
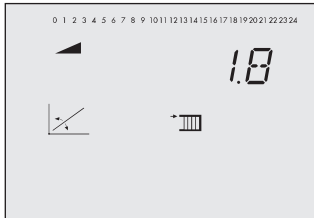
CO8: Initialization of BI1 and BI2 (all systems)
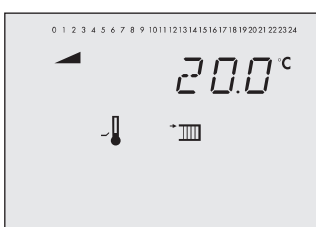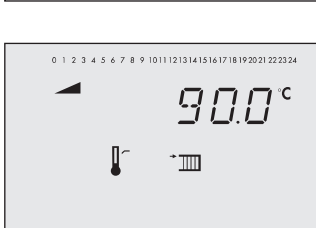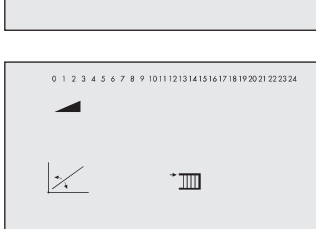
F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
01	Analysis of BI1	0	All	CO8 > F01 - 1: analysis active **Function block parameters:** Error message when BI = 0, BI = 1, none (1)
02	Analysis of BI2	0	All	CO8 > F02 - 1: analysis active **Function block parameters:** Error message when BI = 0, BI = 1, none (1)

13.2 Parameter lists

PA1: PA1 parameters (heating circuit 1)

PA2: PA2 parameters (heating circuit 2)

Display reading	Parameter name Value range (default setting)
	Flow gradient 0.2 to 3.2 (1.8) (when CO1, 2 > F05 - 1, 0.2 to 1.0 (1.0) applies)

Appendix

Display reading	**Parameter name** Value range (default setting)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 *0.0* °C	Level (parallel shift) −30.0 to +30.0 °C (0.0 °C)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 *20.0* °C	Min. flow temperature −5.0 to +150.0 °C (20.0 °C)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 *90.0* °C	Max. flow temperature 5.0 to 150.0 °C (90.0 °C) When CO1, 2 > F05 - 1: 5.0 to 50.0 °C (50.0 °C)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	Four-point characteristic
	
	Press rotary pushbutton [✳] to set the following parameters:
	  Outdoor temperature
	  Flow temperature
	  Reduced flow temperature
	  Return flow temperature
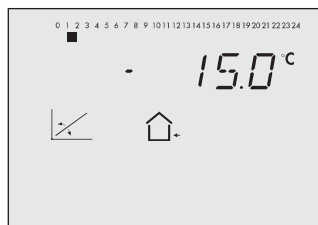
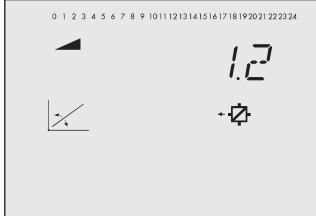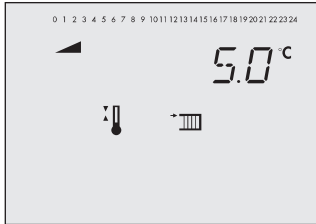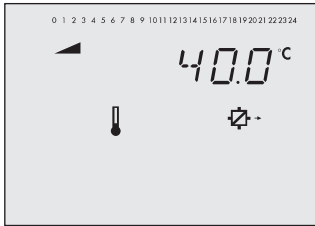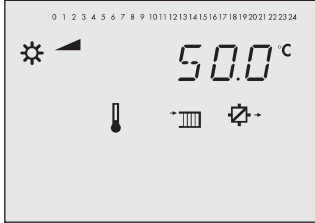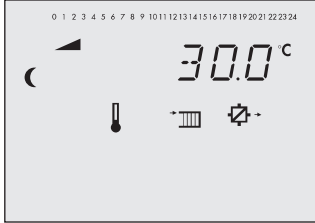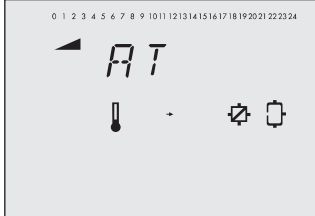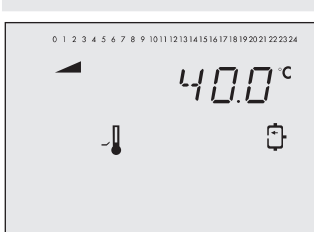| Display reading	**Parameter name** Value range (default setting)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 - 15.0 °C	Four-point characteristic Point 1: outdoor temperature Outdoor temperatures of points 2, 3 and 4 are marked by squares under the numbers 2, 3 and 4. −50.0 to +50.0 °C (pt. 1: −15.0 °C, pt. 2: −5.0 °C, pt. 3: 5.0 °C, pt. 4: 15.0 °C) When CO1, 2 > F04 - 1 (pt. 1: 5.0 °C, pt. 2: 15.0 °C, pt. 3: 25.0 °C, pt. 4: 30.0 °C)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 70.0 °C	Four-point characteristic Point 1: flow temperature Flow temperatures of points 2, 3 and 4 are marked by squares under the numbers 2, 3 and 4. −5.0 to +150.0 °C (pt. 1: 70.0 °C, pt. 2: 55.0 °C, pt. 3: 40.0 °C, pt. 4: 25.0 °C) When CO1, 2 > F04 - 1: (pt. 1: 20.0 °C, pt. 2: 15.0 °C, pt. 3: 10.0 °C, pt. 4: 5.0 °C)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 60.0 °C	Four-point characteristic Point 1: reduced flow temperature Reduced flow temperatures of points 2, 3 and 4 are marked by squares under the numbers 2, 3 and 4. −5.0 to +150.0 °C (pt. 1: 60.0 °C, pt. 2: 40.0 °C, pt. 3: 20.0 °C, pt. 4: 20.0 °C) When CO1, 2 > F04 - 1: (pt. 1: 30.0 °C, pt. 2: 25.0 °C, pt. 3: 20.0 °C, pt. 4: 15.0 °C)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 65.0 °C	Four-point characteristic Point 1: return flow temperature Return flow temperatures of points 2, 3 and 4 are marked by squares under the numbers 2, 3 and 4. 5.0 to 90.0 °C (points 1 to 4: 65.0 °C)
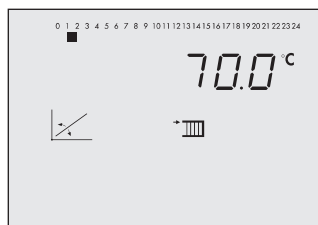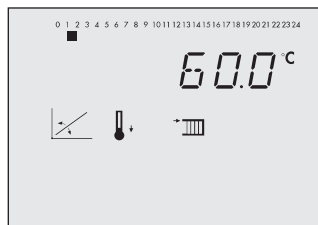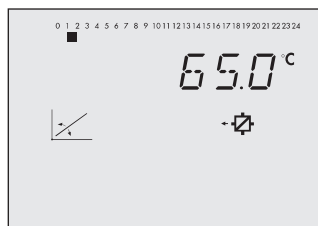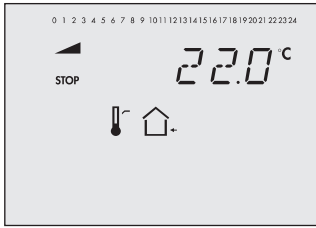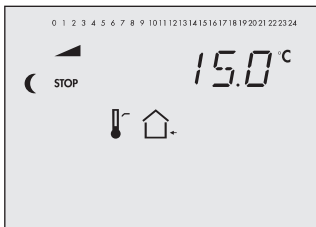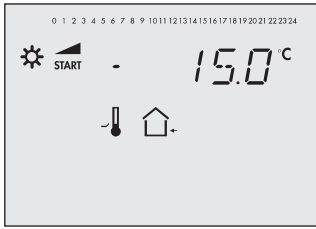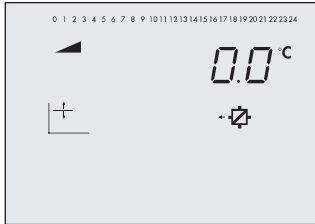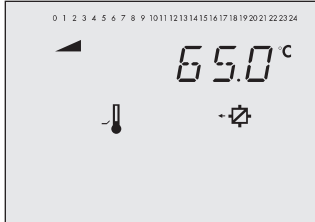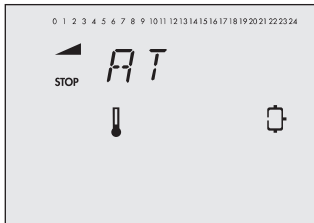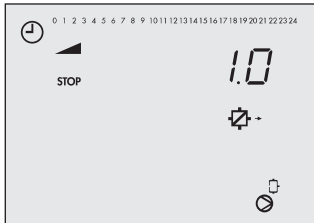
Appendix

Display reading	Parameter name Value range (default setting)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 STOP `22.0` °C	OT deactivation value in rated operation 0.0 to 50.0 °C (22.0 °C)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 STOP `15.0` °C	OT deactivation value in reduced operation −50.0 to +50.0 °C (15.0 °C)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 START - `15.0` °C	OT activation value in rated operation −50.0 to +5.0 °C (−15.0 °C)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 `1.2`	Return flow gradient 0.2 to 3.2 (1.2)

Display reading	**Parameter name** Value range (default setting)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 **0.0** °C	Return flow level −30.0 to +30.0 °C (0.0 °C)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 **65.0** °C	Base point for return flow temperature: 5.0 to 90.0 °C (65.0 °C)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 **65.0** °C	Max. return flow temperature 5.0 to 90.0 °C (65.0 °C)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 **5.0** °C	Set point boost (primary exchanger control) 0.0 to 50.0 °C (5.0 °C)

Display reading	**Parameter name** Value range (default setting)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 40.0 °C	Set point for binary demand processing 0.0 to 150.0 °C (40.0 °C) Only in PA1 parameter level
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 50.0 °C	Flow set point, day −5.0 to +150.0 °C (50.0 °C) Only with flash adaptation without outdoor sensor
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 30.0 °C	Flow set point, night −5.0 to +150.0 °C (30.0 °C) Only with flash adaptation without outdoor sensor
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 AT	Minimum set point to charge buffer tank OT to 90.0 °C (AT) In PA1 only

Display reading	Parameter name Value range (default setting)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 STOP *AT* 🌡 ⬚	Stop charging of the buffer tank OT to 90.0 °C (AT) In PA1 only
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 *6.0* °C 🌡 ⌀·⬚	Charging temperature boost 0.0 to 50.0 °C (6.0 °C) In PA1 only
🕐 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 STOP *1.0* ⌀· ⊘	Lag time of charging pump 0.0 to 10.0 (1.0) In PA1 only

PA4: DHW circuit parameters

Display reading	Parameter name Value range (default setting)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 *40.0* °C 🌡 ⬚	Min. DHW temperature 5.0 to 90.0 °C (40.0 °C)

Appendix

Display reading	Parameter name Value range (default setting)
60.0 °C	Max. DHW temperature 5.0 to 90.0 °C (60.0 °C)
5.0 °C	Hysteresis 1.0 to 30.0 °C (5.0 °C)
10.0 °C	Charging temperature boost 0.0 to 50.0 °C (10.0 °C)
80.0 °C	Max. charging temperature (only with VF4) 20.0 to 150.0 °C (80.0 °C)

Display reading	Parameter name Value range (default setting)
	Lag time for storage tank charging pump 0.0 to 10.0 (1.0)
	Max. return flow temperature 20.0 to 90.0 °C (65.0 °C)
	Solar circuit pump ON 1.0 to 30.0 °C (10.0 °C)
	Solar circuit pump OFF 0.0 to 30.0 °C (3.0 °C)
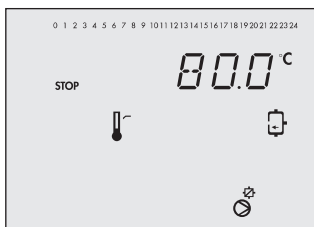
Appendix
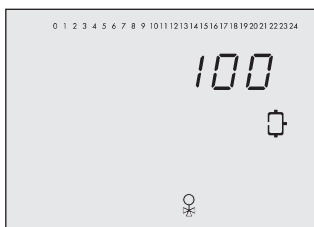
Display reading	**Parameter name** Value range (default setting)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 STOP *80.0* **c**	Max. storage tank temperature 20.0 to 90.0 °C (80.0 °C)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 *100*	Control signal DHW for storage tank charging 5 to 100 % (100 %)

PA5: System-wide parameters (all systems)
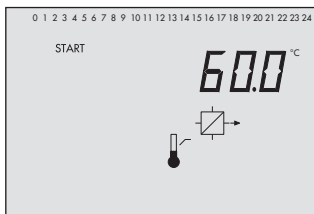
Display reading	**Parameter name** Value range (default setting)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 START *60.0* °c	Boiler pump ON 20 to 90 °C (60 °C) System Anl 16.x only
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 *5.0* °c STOP	Hysteresis 0 to 30 °C (5 °C) System Anl 16.x only
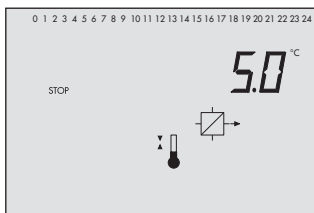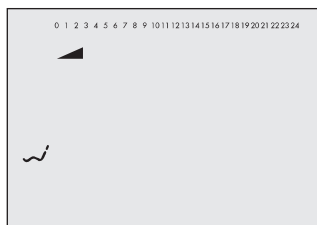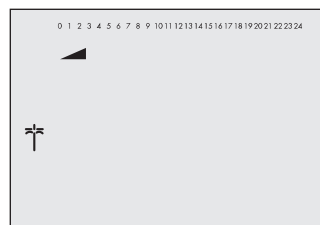
Display reading	Parameter name Value range (default setting)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	Public holidays (01.01 to 31.12, see section 2.8.1)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	Vacations (01.01 to 31.12, see section 2.8.2)

PA6: Modbus parameters
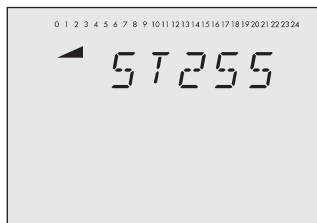
Display reading	Parameter name Value range (default setting)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 ST255	Station address 1 to 247 (255) (when CO6 > F02 - 1: 1 to 32000 applies)

13.3 Resistance values

Resistance values with PTC resistors

Type 5224 Outdoor Temperature Sensor, Type 5264 and Type 5265 Sensor for flow and return flow temperature, Type 5264 Storage Tank Temperature

Temperature °C	−20	−10	0	10	20	25	30	40	50
Resistance Ω	694	757	825	896	971	1010	1050	1132	1219
Temperature °C	60	70	80	90	100	110	120		
Resistance Ω	1309	1402	1500	1601	1706	1815	1925		

Type 5244 (remote control unit)

Switch position ⏲, terminals 1 and 2

Temperature °C	10	15	20	25	30
Resistance Ω	679	699	720	741	762

Resistance values with Pt 1000 resistors

Type 5227-2 Outdoor Temperature Sensor, Type 5277-2 Sensor for flow, return flow and storage tank temperature (thermowell required) and Type 5267-2 Contact Sensor

Types 5257-5 and 5257-51 Room Temperature Sensors (room panels)

Temp. °C	−35	−30	−25	−20	−15	−10	−5	0	5	10	15	20
Resistance Ω	862.5	882.2	901.9	921.6	941.2	960.9	980.4	1000.0	1019.5	1039.0	1058.5	1077.9
Temp. °C	25	30	35	40	45	50	55	60	65	70	75	80
Resistance Ω	1097.3	1116.7	1136.1	1155.4	1174.7	1194.0	1213.2	1232.4	1251.6	1270.8	1289.9	1308.9
Temp. °C	85	90	95	100	105	110	115	120	125	130	135	140
Resistance Ω	1328.0	1347.0	1366.0	1385.0	1403.9	1422.9	1441.7	1460.6	1479.4	1498.2	1517.0	1535.8
Temp. °C	145	150										
Resistance Ω	1554.5	1573.1										

Resistance values with Ni 1000 resistors (according to DIN 43760)

Temp. °C	−35	−30	−25	−20	−15	−10	−5	0	5	10	15	20
Resistance Ω	816.2	841.5	867.0	893.0	919.2	945.8	972.7	1000.0	1027.6	1055.5	1083.8	112.4
Temp. °C	25	30	35	40	45	50	55	60	65	70	75	80
Resistance Ω	1141.3	1170.6	1200.2	1230.1	1260.4	1291.1	1322.0	1353.4	1385.1	1417.2	1449.7	1482.5
Temp. °C	85	90	95	100	105	110	115	120	125	130	135	140
Resistance Ω	1515.7	1549.3	1583.4	1617.8	1652.6	1687.9	1723.6	1759.7	1796.3	1833.3	1870.9	1908.9
Temp. °C	145	150										
Resistance Ω	1947.4	1986.3										

13.4 Technical data

Inputs	8 inputs for Pt 1000, PTC or Ni 1000 temperature sensors and 2 binary inputs, terminal 11 as 0 to 10 V input (e.g. for external demand or outdoor temperature signal)
Outputs	2x three-step signal: load max. 250 V AC, 2 A [1] Alternatively 2x on/off signal: load max. 250 V AC, 2 A [1] 3x pump output: load max. 250 V AC, 2 A [1], all outputs are relay outputs with varistor suppression Terminal 11 as 0 to 10 V output (e.g. for continuous closed loop control, outdoor temperature, signal for external demand or pump speed control), load >5 kΩ
For systems with one control circuit, a maximum of four pumps are available	
Optional interfaces	1x Modbus RS-485 interface for two-wire bus using RS-485 communication module (Modbus RTU protocol, data format 8N1, RJ45 connector socket at the side)
Supply voltage	85 to 250 V, 48 to 62 Hz, max. 1.5 VA
Ambient temperature	0 to 40 °C (operation) −10 °C to +60 °C (storage and transport)
Degree of protection	IP 40 according to EN 60529
Class of protection	II according to EN 61140
Degree of contamination	2 according to EN 61010
Overvoltage category	II according to EN 60664
Noise immunity	According to EN 61000-6-1
Noise emission	According to EN 61000-6-3
Weight	Approx. 0.5 kg
Compliance	CE · EHL

[1] Inrush current, max. 16 A

13.5 Customer setting

Station	
Operator	
SAMSON office	
System code number	

Function block settings in configuration levels

	CO1	CO2	CO4	CO5	CO5`	CO6	CO8
F01							
F02							
F03							
F04							
F05							
F06							
F07							
F08							
F09							
F10							
F11							
F12							
F13							
F14							
F15							
F16							
F17							
F18							
F19							
F20							
F21							
F22							
F23							

HC1 (heating circuit 1) and HC2 (heating circuit 2)

Levels 1 and 2 parameters	PA1	PA2	Value range
Flow gradient			0.2 to 3.2
Flow level			−30.0 to +30.0 °C
Min. flow temperature			−5.0 to +150.0 °C
Max. flow temperature			5.0 to 150.0 °C
Four-point characteristic			
Outdoor temperature, point 1			−50.0 to +50.0 °C
Outdoor temperature, point 2			−50.0 to +50.0 °C
Outdoor temperature, point 3			−50.0 to +50.0 °C
Outdoor temperature, point 4			−50.0 to +50.0 °C
Flow temperature, point 1			−5.0 to +150.0 °C
Flow temperature, point 2			−5.0 to +150.0 °C
Flow temperature, point 3			−5.0 to +150.0 °C
Flow temperature, point 4			−5.0 to +150.0 °C
Reduced flow temperature, point 1			−5.0 to +150.0 °C
Reduced flow temperature, point 2			−5.0 to +150.0 °C
Reduced flow temperature, point 3			−5.0 to +150.0 °C
Reduced flow temperature, point 4			−5.0 to +150.0 °C
Return flow temperature, point 1			5.0 to 90.0 °C
Return flow temperature, point 2			5.0 to 90.0 °C
Return flow temperature, point 3			5.0 to 90.0 °C
Return flow temperature, point 4			5.0 to 90.0 °C
OT deactivation value in rated operation			0.0 to 50.0 °C
OT deactivation value in reduced operation			−50.0 to +50.0 °C
OT activation value in rated operation			−50.0 to +5.0 °C
Return flow gradient			0.2 to 3.2
Return flow level			−30 to +30.0 °C
Base point for return flow temperature:			5.0 to 90.0 °C
Flow set point, day			−5.0 to +150 °C
Flow set point, night			−5.0 to +150 °C
Minimum set point to charge buffer tank			OT to 90.0 °C
Stop charging of the buffer tank			OT to 90.0 °C
Charging temperature boost			0.0 to 50.0 °C
Lag time for storage tank charging pump			0.0 to 10.0
Set point boost (primary exchanger control)			0.0 to 50.0 °C
Set point for binary demand processing			0.0 to 150 °C

Appendix

F	Function block parameters	CO1	CO2	Value range
03 - 1	KP (limiting factor)			0.1 to 10.0
05 - 1	Start temperature			20.0 to 60.0 °C
05 - 1	Hold (days)			0 to 10 days
05 - 1	Temp. rise/day			0.0 to 10.0 °C
05 - 1	Maximum temperature			25.0 to 60.0 °C
05 - 1	Hold (days)			0 to 10 days
05 - 1	Temp. reduction/day			0.0 to 10.0 °C
09 - 1	Cycle time			0/1 to 100 min
09 - 1	KP (gain)			0.0 to 25.0
12 - 1	KP (gain)			0.1 to 50.0
12 - 1	Tn (reset time)			1 to 999 s
12 - 1	TV (derivative-action time)			0 to 999 s
12 - 1	TY (valve transit time)			15 to 240 s
12 - 0	Hysteresis			1.0 to 30.0 °C
12 - 0	Min. ON time			0 to 10 min
12 - 0	Min. OFF time			0 to 10 min
13 - 1	Max. system deviation			3.0 to 10.0 °C
14 - 1	Binary input			bE = 1, bE = 0
16 - 1	Lower transmission range			0.0 to 150.0 °C
16 - 1	Upper transmission range			0.0 to 150.0 °C
17 - 1	Binary input		–	bE = 1, bE = 0
18 - 1	Lower transmission range		–	0.0 to 150.0 °C
18 - 1	Upper transmission range		–	0.0 to 150.0 °C
18 - 1	Boost flow temperature demand		–	0.0 to 30.0 °C
21 - 1	Start speed reduction			5 to 90 °C
21 - 1	Stop speed reduction			5 to 90 °C
21 - 1	Min. speed signal			0 to 10 V
23 - 1	Set point of differential temperature control			0.0 to 50.0 °C
23 - 1	KP (influence factor)			0.1 to 10
23 - 1	Minimum speed			0 to 100 %

DHW circuit

Level 4 parameters	PA4	Value range
Min. DHW temperature		5.0 to 90.0 °C
Max. DHW temperature		5.0 to 90.0 °C
Hysteresis		1.0 to 30.0 °C
Charging temperature boost		0.0 to 50.0 °C
Max. charging temperature		20.0 to 150.0 °C
Lag time for storage tank charging pump		0.0 to 10.0
Max. return flow temperature		0.0 to 90.0 °C
Solar circuit pump ON		1.0 to 30.0 °C
Solar circuit pump OFF		0.0 to 30.0 °C
Max. storage tank temperature		20.0 to 90.0 °C
Control signal DHW for storage tank charging		5 to 100 %

F	Function block parameters	CO4	Value range
03 - 1	KP (limiting factor)		0.1 to 10.0
06 - 1	Stop parallel pump operation in the event of a system deviation		0 to 10 min
06 - 1	Flow temperature limit for parallel operation		20.0 to 90.0 °C
08 - 1	Activate priority in the event of a system deviation		0 to 10 min
08 - 1	KP (influence factor)		0.1 to 10.0
09 - 1	Activate priority in the event of a system deviation		0 to 10 min
12 - 1	KP (gain)		0.1 to 50.0
12 - 1	Tn (reset time)		1 to 999 s
12 - 1	TV (derivative-action time)		0 s, do not change the value.
12 - 1	TY (valve transit time)		15 to 240 s
12 - 0	Hysteresis		1.0 to 30.0 °C
12 - 0	Min. ON time		0 to 10 min
12 - 0	Min. OFF time		0 to 10 min
13 - 1	Max. system deviation		3.0 to 10.0 °C
14 - 1	Day of the week		1-7, 1 to 7
14 - 1	Start time		00:00h to 23:45h
14 - 1	Stop time		00:00h to 23:45h

F	Function block parameters	CO4	Value range
14 - 1	Disinfection set point		60.0 to 90.0 °C
14 - 1	Set point boost		0.0 to 50.0 °C
14 - 1	Disinfection temperature sustaining time		0 to 255 min
21 - 1	Start speed reduction		5 to 90 °C
21 - 1	Stop speed reduction		5 to 90 °C
21 - 1	Min. signal		0 to 50 %

Level 5 parameters		PA5						Value range
Boiler pump ON								20 to 90 °C
Hysteresis								0 to 30 °C
Public holidays								01.01 to 31.12
Vacation periods, Start								01.01 to 31.12
Vacation periods, Stop								01.01 to 31.12
Control circuit assignment								**1, 2, 3**
Vacation periods, Start								01.01 to 31.12
Vacation periods, Stop								01.01 to 31.12
Control circuit assignment								**1, 2, 3**

F	Function block parameters	CO5	Value range
04 - 1	Start date for summer mode		01.01 to 31.12
04 - 1	No. days until activation		1 to 3
04 - 1	End date for summer mode		01.01 to 31.12
04 - 1	No. days until deactivation		1 to 3
04 - 1	Outdoor temperature limit		0.0 to 30.0 °C
05 - 1 06 - 1	Delay per hour		1.0 to 6.0 °C
09 - 0 09 - 1	Frost protection limit		−15.0 to +3.0 °C
12 - 1	Input		bin, AnA
12 - 1, bin	Binary input		bE = 1, bE = 0
15 - 1	Binary input		bE = 1, bE = 0
23 - 1	Direction		AE, AA
23 - 1	Lower transmission range		−50 to +100 °C

F	Function block parameters	CO5	Value range
23 - 1	Upper transmission range		−50 to +100 °C

F	Function block parameters	CO5´	Value range
F01 - 1	Zero point		0 to 50 %
F07 - 1	Zero point		5 to 20 %

Level 6 parameters	PA6	Value range
Station address (ST)		1 to 247 1 to 32000

F	Function block parameters	CO8	Value range
01 - 1	Error message when		BI = 0, BI = 1, none
10 - 1	Error message when		BI = 0, BI = 1, none

Settings at the rotary switch

Heating circuit 1 · Reading on display: **1**

Parameters		Value range
↓☼ Day set point		−5.0 to +150.0 °C
↓☽ Night set point		−5.0 to +150.0 °C

⏱🖳 **Times-of-use**	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Start first time-of-use							
Stop first time-of-use							
Start second time-of-use							
Stop second time-of-use							
Start third time-of-use							
Stop third time-of-use							

Heating circuit 2 · Reading on display: **2**

Parameters		Value range
↓☼ Day set point		−5.0 to +150.0 °C
↓☽ Night set point		−5.0 to +150.0 °C

⏱🖳 **Times-of-use**	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Start first time-of-use							
Stop first time-of-use							
Start second time-of-use							
Stop second time-of-use							
Start third time-of-use							
Stop third time-of-use							

DHW circuit · Reading on display: **3**

Parameters		Value range						
❄☀ DHW temperature set point		Min. to max. DHW temperature						
❄☽ DHW temperature sustaining value								
⏱🗒 **Times-of-use for DHW**	Mon	Tue	Wed	Thu	Fri	Sat	Sun	
Start first time-of-use								
Stop first time-of-use								
Start second time-of-use								
Stop second time-of-use								
Start third time-of-use								
Stop third time-of-use								
🚰 **Times-of-use for DHW circulation pump**	Mon	Tue	Wed	Thu	Fri	Sat	Sun	
Start first time-of-use								
Stop first time-of-use								
Start second time-of-use								
Stop second time-of-use								
Start third time-of-use								
Stop third time-of-use								

13.6 Abbreviations

AF	Outdoor sensor	RF	Room sensor
Anl	System	RK	Control circuit
AT	Outdoor temperature	RüF	Return flow sensor
BA	Binary output	SF	Storage tank sensor
BE	Binary input	SLP	Storage tank charging pump
CO	Configuration level	t	Time
CP	Solar circuit pump	T	Temperature
EB	Mounting and operating instructions	TLP	Heat exchanger charging pump
F	Function block	TWE	DHW heating
GLT	Building control station	UP	Circulation pump (heating)
Kl	Terminal	VF	Flow sensor
KW	Cold water	WE	Default setting
PA	Parameter level	WW	Hot water
		ZP	Circulation pump (DHW)

13.7 EU declaration of conformity

SMART IN FLOW CONTROL.

SAMSON

EU Konformitätserklärung / EU Declaration of Conformity / Déclaration UE de conformité

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller/
This declaration of conformity is issued under the sole responsibility of the manufacturer/
La présente déclaration de conformité est établie sous la seule responsabilité du fabricant.
Für das folgende Produkt / For the following product / Nous certifions que le produit

**Heizungsregler / Heating Controller / Régulateur de chauffage
Typ / Type / Type TROVIS 5573**

wird die Konformität mit den einschlägigen Harmonisierungsrechtsvorschriften der Union bestätigt /
the conformity with the relevant Union harmonisation legislation is declared with/
est conforme à la législation d'harmonisation de l'Union applicable selon les normes:

EMC 2014/30/EU	EN 61000-6-1:2007, EN 61000-6-3:2007 +A1:2011, EN 55022:2010
LVD 2014/35/EU	EN 60730-1:2016, EN 50344:2001
RoHS 2011/65/EU	EN 50581:2012

Hersteller / Manufacturer / Fabricant:

SAMSON AKTIENGESELLSCHAFT
Weismüllerstraße 3
D-60314 Frankfurt am Main
Deutschland/Germany/Allemagne
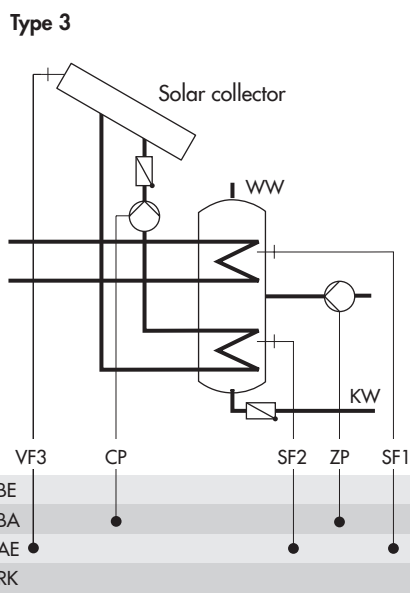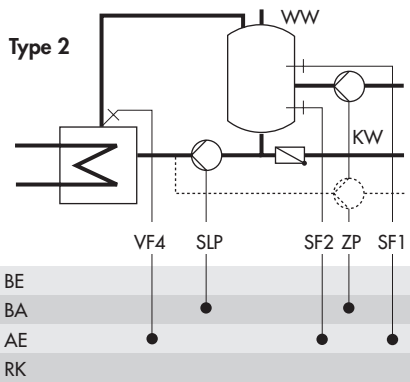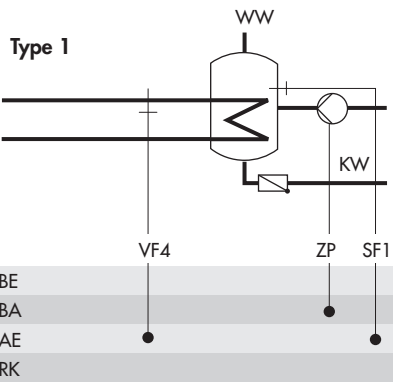
Frankfurt / Francfort, 2017-07-29
Im Namen des Herstellers/ On behalf of the Manufacturer/ Au nom du fabricant.

i.V. Gert Nahler
Zentralabteilungsleiter/Head of Department/Chef du département
Entwicklung Automation und Integrationstechnologien/
Development Automation and Integration Technologies

i.v. H. Zager
Hanno Zager
Leiter Qualitätssicherung/Head of Quality Managment/
Responsable de l'assurance de la qualité

ce_5573-0_de_en_fra_rev07.pdf

Key number: 1732

Type 1

Type 2

Type 3

Solar collector

EB 5573 EN