MOUNTING AND OPERATING INSTRUCTIONS

EB 5578 EN

Translation of original instructions

TROVIS 5578 Heating and District Heating Controller

With graphics display

Firmware version 2.51

Edition June 2021

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. The images shown in these instructions are for illustration purposes only. The actual product may vary.

➔ 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 (aftersalesservice@samsongroup.com).

Documents relating to the device, such as the mounting and operating instructions, are available on our website at ***www.samsongroup.com > 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

NOTICE

Property damage message or malfunction

Note

Additional information

Tip

Recommended action

1 Safety instructions and measures

Intended use

The TROVIS 5578 Heating and District Heating Controller is used to control up to three control circuits:

- Control of a primary heat exchanger or boiler with up to two mixing heating circuit and one non-mixing heating circuit (both outdoor-temperature-compensated) or control of DHW heating in the secondary circuit
- Outdoor-temperature-compensated buffer storage tank control with up to two mixing heating circuits and continuous-flow hot water module
- Control of two outdoor-temperature-compensated heating circuits and a DHW heating with three valves in the primary circuit
- Control of three outdoor-temperature-compensated heating circuits with three valves in the primary circuit
- Applications with up to 6 control circuits are possible using optional TROVIS I/O expansion modules (linked by device bus).

The controller is designed to operate under exactly defined conditions. Therefore, operators must ensure that the controller is only used in operating conditions that meet the specifications used at the ordering stage. In case operators intend to use the controller in other applications or conditions than specified, contact SAMSON.

SAMSON does not assume any liability for damage resulting from the failure to use the device for its intended purpose or for damage caused by external forces or any other external factors.

➔ Refer to the technical data for limits and fields of application as well as possible uses.

Reasonably foreseeable misuse

The controller is not suitable for the following applications:

- Use outside the limits defined during sizing and by the technical data

Furthermore, the following activities do not comply with the intended use:

- Use of non-original spare parts
- Performing service and repair work not described

Qualifications of operating personnel

The controller must be mounted, started up, serviced and repaired by fully trained and qualified personnel only; the accepted industry codes and practices must be observed. According to these mounting and operating instructions, trained personnel refers to individuals who are able to judge the work they are assigned to and recognize possible hazards due to their specialized training, their knowledge and experience as well as their knowledge of the applicable standards.

Personal protective equipment

No personal protective equipment is required for the direct handling of the controller.

Revisions and other modifications

Revisions, conversions or other modifications of the product are not authorized by SAMSON. They are performed at the user's own risk and may lead to safety hazards, for example. Furthermore, the product may no longer meet the requirements for its intended use.

Warning against residual hazards

The controller has direct influence on controlled components of the heating system (e.g. control valves and pumps). To avoid personal injury or property damage, plant operators and operating personnel must prevent hazards that could be caused in the plant components by the process medium, the operating pressure, the signal pressure or by moving parts by taking appropriate precautions. Plant operators and operating personnel must observe all hazard statements, warning and caution notes in the referenced documents.

Responsibilities of the operator

Operators are responsible for proper use and compliance with the safety regulations. Operators are obliged to provide these mounting and operating instructions as well as the referenced documents to the operating personnel and to instruct them in proper operation. Furthermore, operators must ensure that operating personnel or third parties are not exposed to any danger.

Responsibilities of operating personnel

Operating personnel must read and understand these mounting and operating instructions as well as the referenced documents and observe the specified hazard statements, warnings and caution notes. Furthermore, operating personnel must be familiar with the applicable health, safety and accident prevention regulations and comply with them.

Referenced standards, directives and regulations

The TROVIS 5578 Heating and District Heating Controller fulfills the requirements of the Directives 2014/30/EU, 2014/35/EU and 2011/65/EU. The declaration of conformity includes information about the applied conformity assessment procedure.

The controller is designed for use in low voltage installations.

➔ For wiring, maintenance and repair, observe the relevant safety regulations.

1.1 Notes on possible severe personal injury

⚠ DANGER

Risk of fatal injury due to electric shock.

➔ Before connecting wiring, performing any work on the controller or opening the controller, disconnect the supply voltage and protect it against unintentional reconnection.

➔ Only use power interruption devices that can be protected against unintentional reconnection of the power supply.

➔ Do not remove any covers to perform adjustment work on live parts.

1.2 Notes on possible property damage

❗ *NOTICE*

Risk of damage to the controller due to the supply voltage exceeding the permissible tolerances.

The controller is designed for use in low voltage installations.

➔ Observe the permissible tolerances of the supply voltage.

Malfunction due to a configuration that does not meet the requirements of the application.

The controller is configured for specific applications by setting functions and parameters. Function and parameter settings have an direct effect on final control elements.

➔ Perform the configuration for the specific application.

Manipulation of the configuration due to unauthorized access.

The controller can be protected against unauthorized access through entering a key number. The key number for first start-up can be found at the back of these mounting and operating instructions.

➔ Do not pass the key number on to unauthorized persons. Keep it in a safe place inaccessible to unauthorized persons.

Risk of controller damage due to large differences in temperature.

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

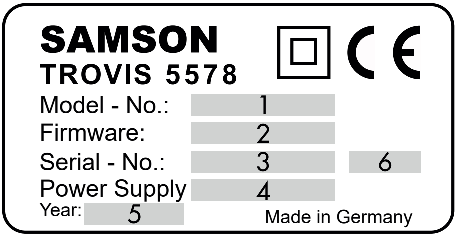
System damage caused by frost.

Frost protection is deactivated in the manual mode.

➔ Do not run the heating during cold weather in the manual mode for long periods of time.

2 Markings on the device

2.1 Nameplate



1 Model number
2 Firmware version
3 Serial number
4 Supply voltage
5 Date of manufacture: Month Year
6 Fuse

2.2 Firmware versions

Firmware revisions	
Old	**New**
2.20	**2.24**
	New systems Anl 1.9-1 and 1.9-2
2.24	**2.26**
	New function: **Error message** (CO5 -> F07)
	OT with 0-10 V function (CO5 -> F23) extended Outdoor temperatures can be received or sent using a 0 to 10 V signal.

<table>
<tr><th colspan="2">Firmware revisions</th></tr>
<tr><th>Old</th><th>New</th></tr>
<tr><td rowspan="3">2.26</td><td>2.28</td></tr>
<tr><td>New system Anl 11.5</td></tr>
<tr><td>Alarm and event lists each with the last 100 entries</td></tr>
<tr><td rowspan="2">2.28</td><td>2.30</td></tr>
<tr><td>It is possible to connect PTC or Ni 1000 sensors (Pt 1000 sensors only possible below this firmware version)</td></tr>
<tr><td rowspan="7">2.30</td><td>2.41</td></tr>
<tr><td>Connected sensor inputs not relevant for closed-loop control are displayed on the 'Special values' screen in the controller's operating level</td></tr>
<tr><td>New buffer tank systems 3.9, 5.9, 17.1 and 17.8</td></tr>
<tr><td>New functions and parameters for buffer tank systems:
– CO1 -> F22: SLP depending on return flow temperature
– CO4 -> F23: Electric heating cartridge
– CO5 -> F25: AA1 reverse
– CO5 -> F26: AA2 reverse
– CO5 -> F31: AE1 zero shift
– PA1 -> P16: Minimum set point to charge buffer tank
– PA1 -> P17: Stop charging of the buffer tank
– PA1 -> P18: Charging temperature boost
– PA1 -> P19: Lag time of charging pump
– PA4 -> P13: Maximum buffer tank temperature
– PA4 -> P21: Return flow temperature limit, layering at top</td></tr>
<tr><td>New differential temperature control function (CO1 -> F23) in systems Anl 1.0 and 16.0</td></tr>
<tr><td>TROVIS 5570 Room Panel no longer available.</td></tr>
<tr><td>Restrictions when a mini module (order no. 1400-7436) is used</td></tr>
<tr><td rowspan="2">2.41</td><td>2.45</td></tr>
<tr><td>An active cold charging protection function allows the valve position to be determined between 1 and 100 % (default 10 %).</td></tr>
</table>

Firmware revisions	
Old	**New**
2.45	**2.48**
	Internal revisions
2.48	**2.51**
	New systems Anl 6.1 und 18.1 implemented
	Systems Anl 9.1 and 9.2 now with feeder pump UP1
	Configuration of up to three TROVIS I/O expansion modules possible
	Operating status reading of DHW circuit in the operating level
	Only the values that are not assigned to a partial plant scheme are shown the overall plant scheme: this now includes the demand to be processed.
	Meaning of CO1, CO2, CO3 -> F02 F02 - 1 = Outdoor-temperature-controlled control active
	Buffer tank systems: the measured value SF1 is now also relevant to end charging
	Discharging protection for DHW tank and buffer tank
	Separate boost adjustable for underfloor heating circuits
	No restart, instead the drying of jointless floors continues after a power supply failure
	Heating circuits can be configured to be circuits only processing demand with the settings CO1 -> F24 - 1, CO2 -> F24 - 1, CO3 -> F24 - 1
	Transmission range setting for 0 to 10 V signal to process external demand changed to CO5 -> F31
	Default setting of heating characteristic 1.2 (0.5 for underfloor heating)
	Default setting of the maximum flow temperature: 70 °C
	Delayed outdoor temperature adjustable in steps of 0.1 °C
	Return flow temperature limitation based on capacity configurable
	Default setting of heat meter mode: 'Continuous'

3 Design and principle of operation

The TROVIS 5578 Heating and District Heating Controller is used to control max. three control circuits.

- Control of a primary heat exchanger or boiler with up to two mixing heating circuit and one non-mixing heating circuit (both outdoor-temperature-compensated) or control of DHW heating in the secondary circuit
- Outdoor-temperature-compensated buffer storage tank control with up to two mixing heating circuits and continuous-flow hot water module
- Control of two outdoor-temperature-compensated heating circuits and a DHW heating with three valves in the primary circuit
- Control of three outdoor-temperature-compensated heating circuits with three valves in the primary circuit
- Applications with up to 6 control circuits are possible using optional TROVIS I/O expansion modules (linked by device bus).

The TROVIS 5578 Heating and District Heating Controller is adapted to the specific system by setting the appropriate system code number. Additional sensors and/or functions which are not part of the system's basic configuration can be selected over function blocks. The switch positions and entry of the key number allow access to the corresponding levels. For trained staff, the configuration levels used to set function blocks are indicated by “CO” and the parameter levels are indicated by “PA”. Data is retrieved and entered at the controller using a rotary pushbutton. This process is facilitated by icons and plain text displayed on the LCD. The rotary switch is used to set the operating mode and the parameters required for each circuit.

M-bus interface

A maximum of three meters conforming to EN 1434-3 can be connected for data transfer. In addition, heat meters for each control circuit are available for flow rate and/or capacity limitation. Various limits can be adjusted for the different operating modes “Heating control only”, “Heating control with DHW heating” and “DHW heating only” in control circuit RK1. Outdoor-temperature-compensated flow rate or capacity limitation can also be implemented.

3.1 Configuration using TROVIS-VIEW

The controller can be configured with the TROVIS-VIEW software.

In this case, the TROVIS 5578 Heating and District Heating Controller is connected to the computer at the RJ-45 jack on the side of the controller.

The TROVIS-VIEW software enables the user to easily configure the controller as well as view process parameters online.

Note

TROVIS-VIEW provides a uniform user interface that allows users to configure and parameterize various SAMSON devices using device-specific database modules. The device module can be downloaded free of charge from our website at ▶ www.samsongroup.com > SERVICE & SUPPORT > Downloads > TROVIS-VIEW . Further information on TROVIS-VIEW (e.g. system requirements) is available on our website and in the Data Sheet ▶ T 6661.

Note

SAM DISTRICT ENERGY is a web-based solution for managing, controlling and optimizing heating systems in the local heat supply and district heating networks.
You can find more information and test SAM DISTRICT ENERGY using a demo account on our website at ▶ www.samsongroup.com > Products & Applications > Digital solutions > SAM DISTRICT ENERGY.

3.2 Connection to SAM DISTRICT ENERGY

The controller can be configured and operated on a computer, smartphone or tablet computer using the SAM DISTRICT ENERGY business application.

The controller is connected to SAM DISTRICT ENERGY over the Modbus interface using a communication gateway.

SAM DISTRICT ENERGY allows remote start-up and set-up of the controllers. Key information of the controller and entire heating system is clearly visualized at one central location.

3.3 Technical data

Inputs	17x Pt 1000, PTC or Ni 1000 sensor inputs, alternatively configurable for binary inputs 1x 0 to 10 V input (e.g. for external demand or outdoor temperature signal) Input 17 for a pulse signal (3 to 800 pulses/h) of a heat meter for capacity limitation in RK1
Outputs	3x three-step signal: rating max. 250 V AC, 2 A, alternatively 3x on/off signal: rating max. 250 V AC, 2 A 5x pump output: rating max. 250 V AC, 2 A; all outputs are relay outputs with varistor suppression 1x 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 1x 0 to 10 V output for PWM signal for pump speed control
Interfaces	M-bus for max. 3 M-bus units, protocol according to EN 1434-3 Device bus interface (RS-485) for max. 32 bus devices (two-wire bus, reverse polarity protection)
Optional interfaces	Modbus RS-485 interface for two-wire bus using RS-485 communication module (Modbus RTU protocol, data format 8N1, RJ-45 connector socket at the side)
Supply voltage	165 to 250 V, 48 to 62 Hz, max. 1.5 VA
Permissible ambient temperature range	0 to 40 °C (operation), –10 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 61010-1
Overvoltage category	II according to EN 60664
Noise immunity	According to EN 61000-6-1
Noise emission	According to EN 61000-6-3
Conformity	CE
Weight	Approx. 0.5 kg

3.4 Dimensions

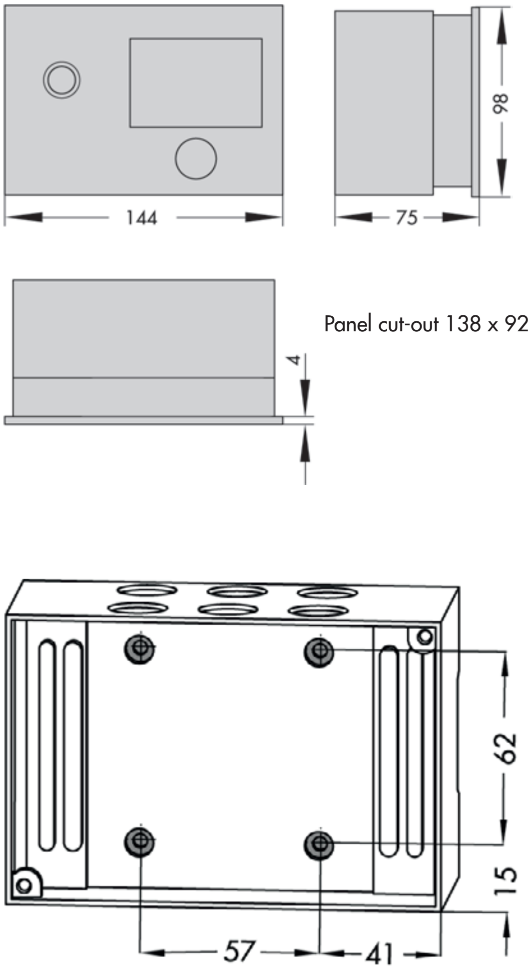


Fig. 3-1: *Dimensions in mm*

3.5 Values for resistance thermometers

Pt 1000 sensors

Temperature °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

Temperature °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	1309.0

Temperature °C	+85	+90	+95	+100	+105	+110	+115	+120	+125	+130	+135	+140
Resistance Ω	1328.1	1347.1	1366.1	1385.1	1404.0	1422.9	1441.8	1460.7	1479.5	1498.3	1517.1	1535.8

Temperature °C	+145	+150	+155	+160	+165	+170	+175	+180	+185	+190	+195	+200
Resistance Ω	1554.6	1573.3	1591.9	1610.5	1629.1	1647.7	1666.3	1684.8	1703.3	1721.7	1740.2	1758.6

PTC sensor

Temperature °C	–20	–10	0	+10	+20	+30	+40	+50
Resistance Ω	693	756	824	896	971	1050	1133	1220

Temperature °C	+60	+70	+80	+90	+100	+110	+120
Resistance Ω	1311	1406	1505	1606	1713	1819	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

Ni 1000 sensors

Temperature °C	–60	–50	–40	–30	–20	–10	0	+10	+20	+30	+40
Resistance Ω	695	743	791	841	893	946	1000	1056	1112	1171	1230

Temperature °C	+50	+60	+70	+80	+90	+100	+110	+120	+130	+140	+150
Resistance Ω	1291	1353	1417	1483	1549	1618	1688	1760	1833	1909	1986

Temperature °C	+160	+170	+180	+190	+200	+210	+220	+230	+240	+250
Resistance Ω	2066	2148	2232	2318	2407	2498	2592	2689	2789	2892

4 Shipment and on-site transport

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

4.1 Accepting the delivered goods

After receiving the shipment, proceed as follows:

1. Compare the shipment received with the delivery note.
2. Check the shipment for transportation damage. Report any damage to SAMSON and the forwarding agent (refer to delivery note).

4.2 Removing the packaging from the controller

Note

Do not remove the packaging until immediately before mounting and start-up.

1. Remove the packaging from the controller.
2. Check scope of delivery (see Fig. 4-1).
3. Dispose and recycle the packaging in accordance with the local regulations.

1x	TROVIS 5578 Heating and District Heating Controller
1x	Document IP 5578 (Important Product Information)

Fig. 4-1: *Scope of delivery*

4.3 Transporting the heating controller

Transport instructions

– Protect the controller against external influences (e.g. impact).

– Protect the controller against moisture and dirt.

– Observe transport temperature depending on the permissible ambient temperature (see the 'Design and principle of operation' section).

4.4 Storing the controller

NOTICE

Risk of controller damage due to improper storage.

➔ *Observe the storage instructions.*

➔ *Avoid long storage times.*

➔ *Contact SAMSON in case of different storage conditions.*

Note

We recommend regularly checking the controller and the prevailing storage conditions during long storage periods.

Storage instructions

- Protect the controller against external influences (e.g. impact).
- Protect the controller against moisture and dirt. Store it at a relative humidity of less than 75 %. In damp spaces, prevent condensation. If necessary, use a drying agent or heating.
- Make sure that the ambient air is free of acids or other corrosive media.
- Observe transport temperature depending on the permissible ambient temperature (see the 'Design and principle of operation' section).
- Do not place any objects on the controller.

5 Installation

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

5.1 Installation conditions

Work position

The work position for the controller is the front view onto the operating controls on the controller seen from the position of operating personnel.

Operators must ensure that, after installation of the controller, the operating personnel can perform all necessary work safely and easily access the device from the work position.

5.2 Preparation for installation

Before installation, make sure the following conditions are met:

– The controller is not damaged.

Proceed as follows:

➔ Lay out the necessary material and tools to have them ready during installation work.

5.3 Mounting the controller

The controller consists of the housing with the electronics and the base with the terminals. It is suitable for panel, wall and rail mounting (see Fig. 5-1).

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 5.4.
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. Fasten the base with four screws.
4. Perform electric wiring on the base as described in section 5.4.
5. Remount the controller housing.
6. Tighten the two screws (1).

Rail mounting

1. Fasten the spring-loaded hook (4) at the bottom of the top hat rail (3).
2. Slightly push the controller upwards and pull the top hook (5) over the top hat rail. Undo the two screws (1).

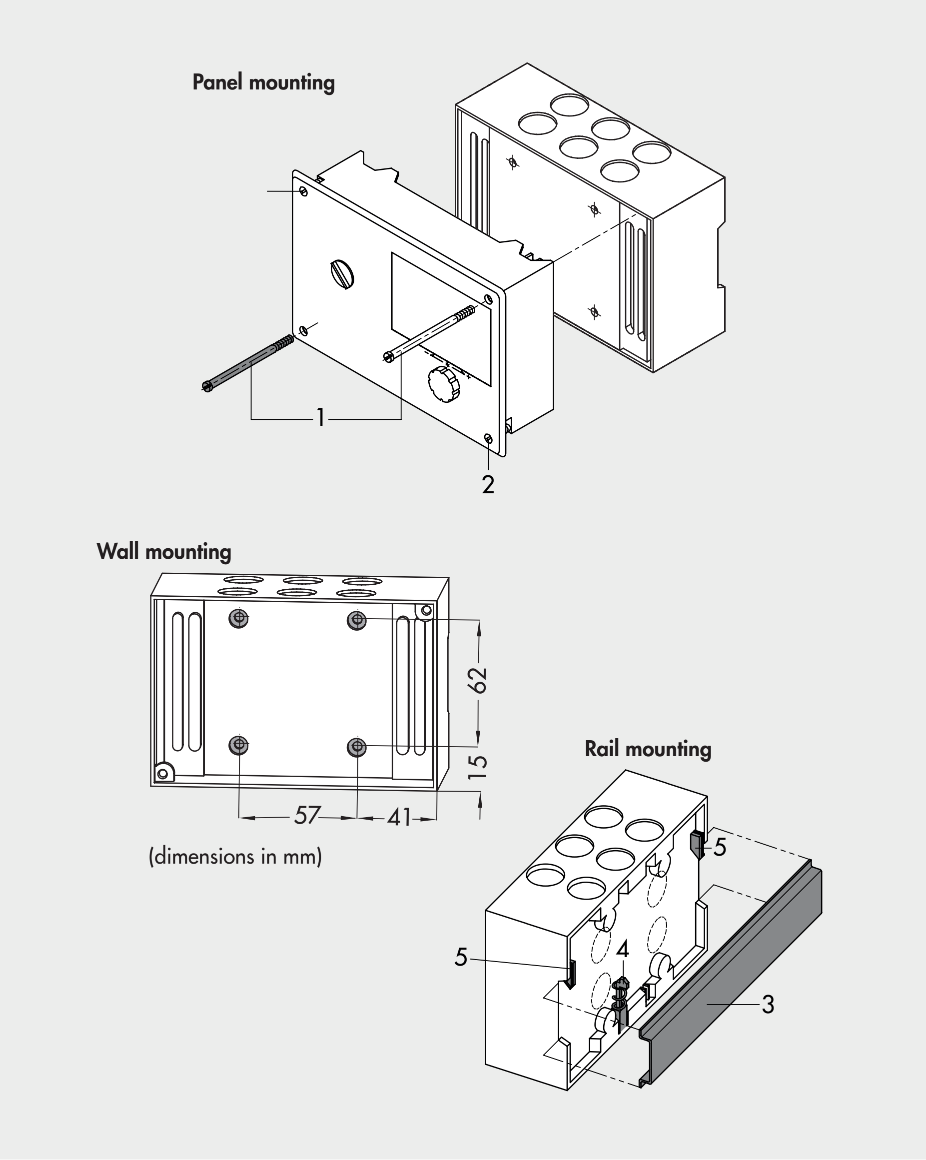


Fig. 5-1: *Installation*

3. Pull apart the controller housing and the base.
4. Perform electric wiring on the base as described in section 5.4.
5. Remount the controller housing.
6. Tighten the two screws (1).

5.4 Electrical connection

⚠ DANGER

Risk of fatal injury due to 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. Therefore, such work must be performed by trained and experienced personnel.

– The terminals 33, 39, 42 and 45 allow the integration of safety equipment which have a direct influence on individual electric actuators and pumps. If this is not the case, connect a jumper from terminal 31 to terminals 33, 39, 42 and 45. Do not connect ELV cables (according to VDE 0100) to these terminals.

➔ *Before performing any work on the terminals, disconnect the voltage supply from the heating controller.*

Notes on electric wiring

➔ Install the 230 V power supply lines and the signal lines separately and away from each other.

➔ 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.

➔ Install the lines for digital signals (bus lines) and analog signals (sensor lines, analog outputs) separately and away from each other.

➔ 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 cable with at least 10 mm^2 wire cross-section using the shortest route.

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

➔ Shield control cabinet elements with high field strength, e.g. transformers or frequency converters, with separators providing a good connection to the PE grounding conductor.

➔ Use wires with wire cross-sections as listed in Table 5-1 for terminals.

Overvoltage protection

– If the 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 heating controller

➔ If the controller housing and the base have not yet been separated: unscrew the screws on the bottom left and top right of the housing to open it to connect the wiring.

➔ To feed through 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.

➔ For wall mounting: ensure that the lines are not subject to torsion or bending by taking suitable precautions, e.g. a cable duct, before inserting them into the base.

➔ Connect as shown in Fig. 5-2.

Connecting sensors

The wire cross-section of the sensor cables must not be smaller than 0.5 mm^2.

Wiring of a room panel

➔ Connect as shown in Fig. 5-3.

Connecting the water flow sensor

➔ Connect as shown in Fig. 5-4.

Connecting actuators

- 0 to 10 V control output: use cables with a minimum wire cross-section of 0.5 mm^2.
- Three-step or on/off outputs: connect cables with a minimum wire cross-section of 1.5 mm^2 suitable for damp locations to the terminals of the controller output. We recommend checking the operating direction on start-up.

Connecting pumps

Connect all cables with a minimum 1.5 mm^2 wire cross-section to the terminals of the heating controller as illustrated in the wiring diagram.

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i *Note*

The electric actuators and pumps are not automatically supplied with a voltage by the heating controller. They can be connected over terminals 33, 39, 42 and 45 to an external voltage source. For an internal power supply, place a jumper from terminal 31 to terminals 33, 39, 42 and 45.

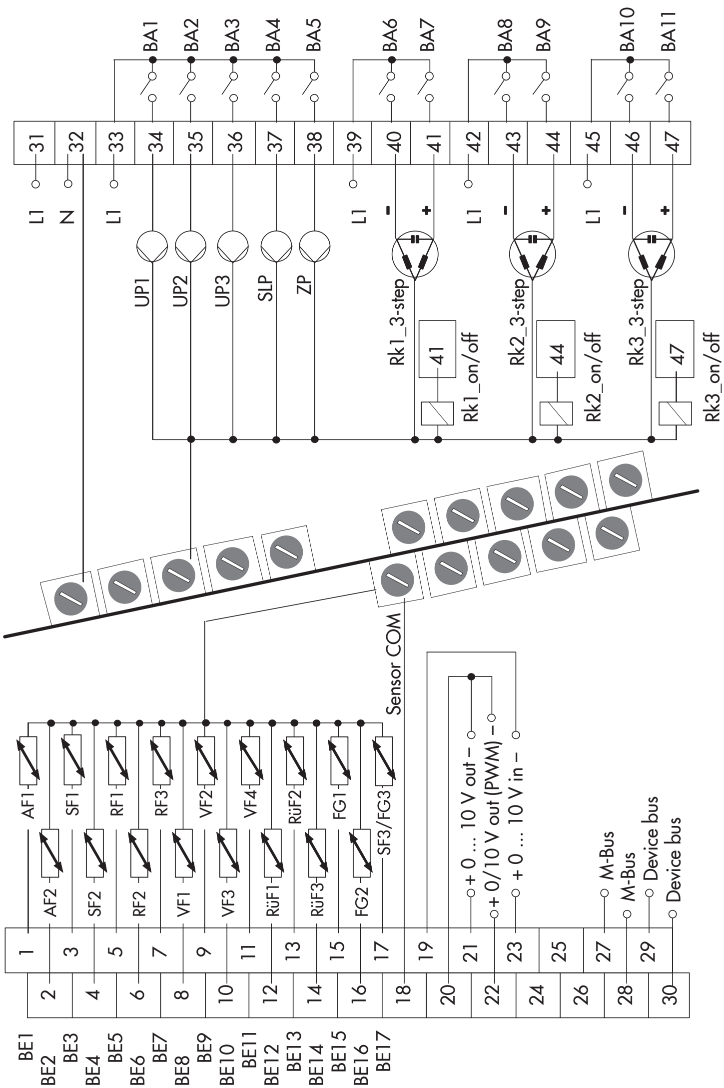
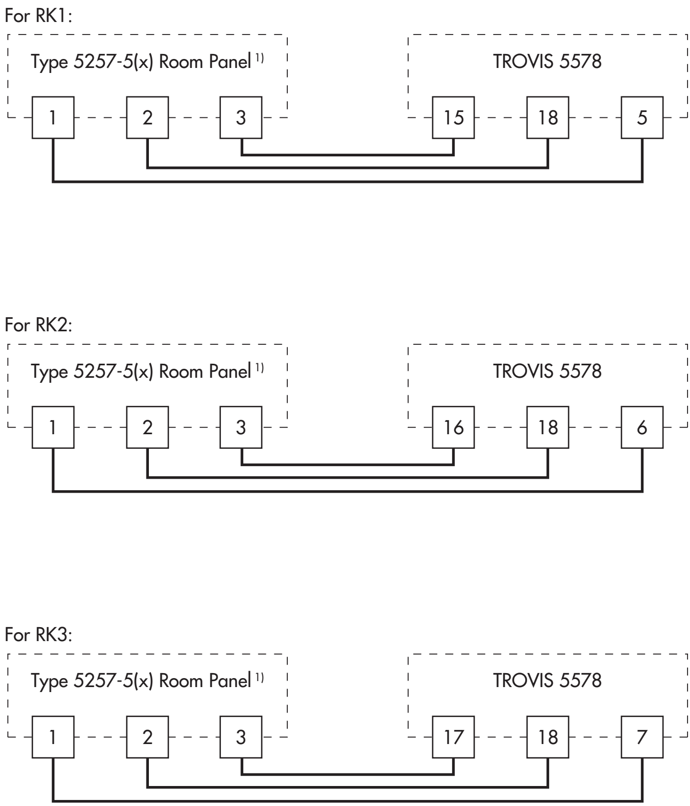


Fig. 5-2: *Electrical connection of the TROVIS 5578 Heating Controller*

Legend for Fig. 5-2:

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



1) Type 5244 no longer available

Fig. 5-3: *Wiring of a room panel for RK1, RK2 or RK3*

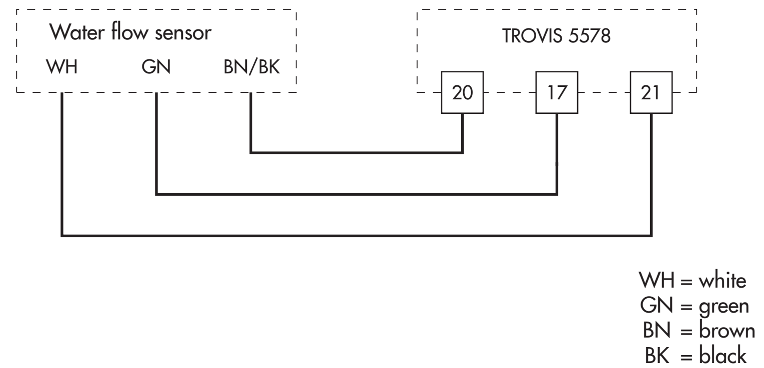


Fig. 5-4: *Connection of a water flow sensor*

Table 5-1: *Permissible wire cross-section for terminals*

Cable	Wire cross-section
Single-wire	0.33 to 2 mm^2
Multi-wire	0.33 to 2 mm^2

Length of insulation to be stripped off wire ends: 6 mm

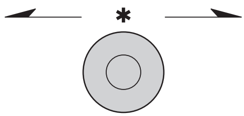
6 Operation

The heating controller is operated on site using the operating controls on the front.

6.1 Operating controls

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

Rotary pushbutton

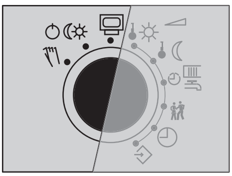


Turn [↻]:
Select readings, parameters and function blocks

Press [∗]:
Confirm adjusted selection or settings

Rotary switch

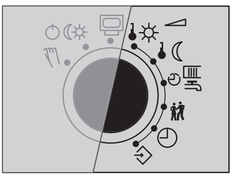
The rotary switch is used to set the operating mode and the relevant parameters for each control circuit.



Operating level

Operating modes

Manual level



Day set point (rated room temperature)

Night set point (reduced room temperature)

Times-of-use for heating/DHW

Special time-of-use

Time/date

Settings

6.2 Interfaces

6.2.1 M-bus interface

Data transmission of max. three meters according to EN 1434-3. See Annex A (configuration instructions).

6.2.2 Device bus interface RS-485

Connection of max. 32 bus devices (two-wire bus)

6.2.3 Optional interfaces

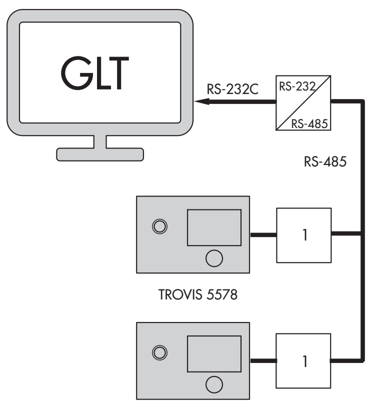
Modbus interface RS-485

Communication module

Using the optional RS-485 communication module (Modbus RTU interface for two-wire bus networks), the TROVIS 5578 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.

Note

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



1: Optional RS-485 communication module

Fig. 6-1: *Network structure*

Two-wire bus system

The optional RS-485 to computer communication module (order no. 8812-2002) is required to connect the controller to a two-wire bus network for Modbus RTU communication with a process control system.

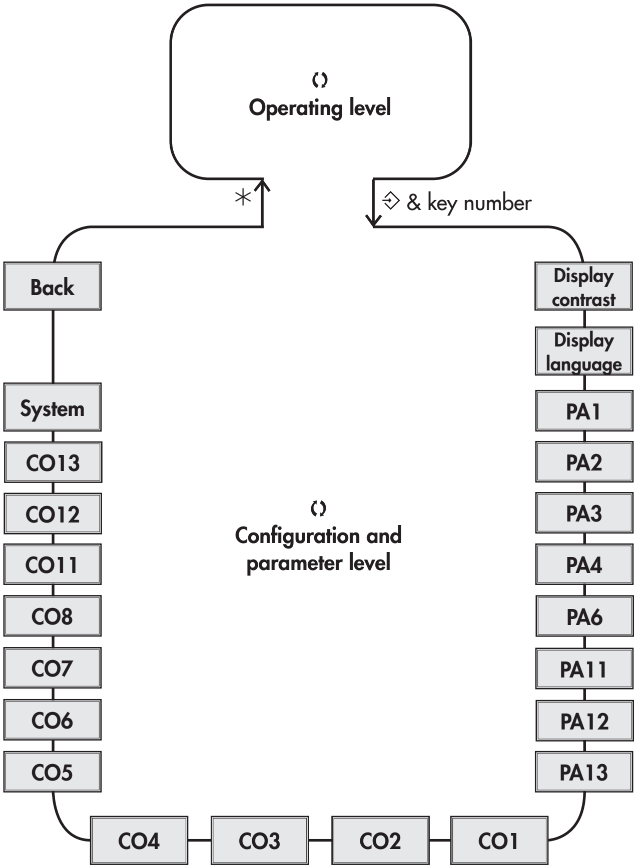
Modbus-TCP/IP communication and SAM DISTRICT ENERGY web application

The SAM MOBILE, SAM LAN or SAM HOME Gateway is required for Modbus-TCP/IP communication and for connection to the SAM DISTRICT ENERGY web application.

6.2.4 Accessories

TROVIS I/O (expansion module)	Order no. 1000062999
Memory module	Order no. 1400-9379
Mini module	Order no. 1400-7436
Data logging module	Order no. 1400-9378
USB converter 3 together with data log viewer software	Order no. 1400-9377
TROVIS-VIEW software (free of charge)	Link to download at: ▶ www.samsongroup.com > SERVICE & SUPPORT > Downloads > TROVIS-VIEW
RS-485 communication module	Order no. 8812-2002
Surge arrester SA 5000	Order no. 1400-9868
▶ SAM HOME Gateway for communication over Ethernet	Type 5660
▶ SAM MOBILE Gateway for communication using mobile phone networks	Type 5655
▶ SAM-LAN Gateway for communication using unlicensed radio frequency bands	Type 5650

7 Start-up and configuration



PA1/CO1:	HC1 (heating circuit 1)	PA13/CO13	HC13 (heating circuit 13)
PA2/CO2:	HC2 (heating circuit 2)	CO5:	System-wide
PA3/CO3:	HC3 (heating circuit 3)	PA6/CO6:	Communication
PA4/CO4:	DHW circuit	CO7:	Device bus
PA11/CO11	HC11 (heating circuit 11)	CO8	Binary inputs
PA12/CO12	HC12 (heating circuit 12)	Anl:	System code number

Fig. 7-1: *Level structure of TROVIS 5578*

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

Before start-up, make sure the following conditions are met:

– The controller is properly mounted according to the instructions.
– The electrical connection is properly performed.

The controller is adapted to its control task by performing start-up. Start-up usually involves performing several steps:

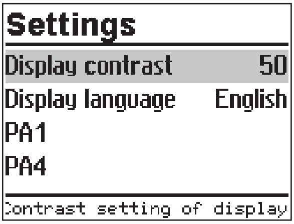
1. Change the contrast of the display to adapt it to the installation conditions (see section 7.1).
2. Change the display language as required for the operating personnel (see section 7.2).
3. Select the hydraulic system (see section 7.3).
4. Change functions and parameters to adapt the system (see sections 7.4 and 7.5).
5. Calibrate the sensors (see section 7.6).

The settings during start-up can only be performed after the valid key number has been entered.

The valid key number for first start-up can be found at the back of these mounting and operating instructions. 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 7.7).

7.1 Altering the display contrast

The contrast of the display can be changed to adapt it to the installation conditions.



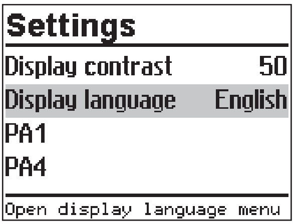
Turn the rotary switch to (settings).

- ↻ Enter the currently valid key number.
- ✳ Confirm key number.
- ↻ Select 'Display contrast'.
- ✳ Activate editing mode for the display contrast.
  The current setting is shown inverted on the display.
- ↻ Set the display contrast
- ✳ Confirm setting.

Turn the rotary switch back to (operating level).

7.2 Changing the display language

The default display language is German. The setting can be changed to English.



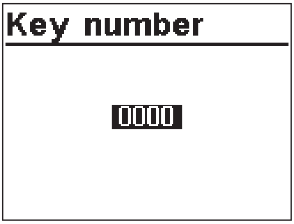
Turn the rotary switch to (settings).

- ↻ Enter the currently valid key number.
- ✳ Confirm key number.
- ↻ Select 'Display language'.
- ✳ Activate editing mode for the language setting.
  The currently valid language is selected.
- ↻ Change the language setting accordingly.
- ✳ Confirm setting.

Turn the rotary switch back to (operating level).

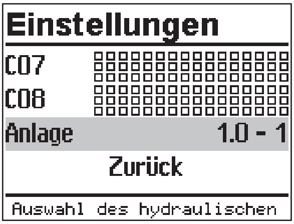
7.3 Setting the system code number

Different hydraulic schematics are available. Each hydraulic schematic is represented by a system code number. The systems together with their ready-configured functions are shown in Annex A (configuration instructions). A system is adapted to individual requirements by setting the functions and parameters. 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.

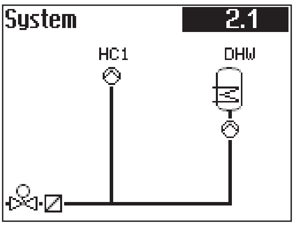


Turn the rotary switch to (settings).

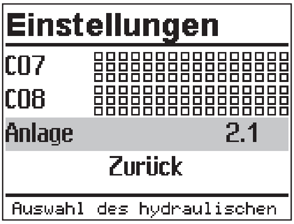
- Enter the currently valid key number.
- ✳ Confirm key number.



- Select 'System'.
- ✳ Open 'System'.



- Select the required system (see Annex A).



✳ Confirm the system selected.

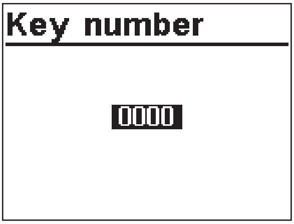
⟲ Select 'Back'.

✳ Exit menu.

Turn the rotary switch to ⟡ (settings).

7.4 Activating and deactivating functions

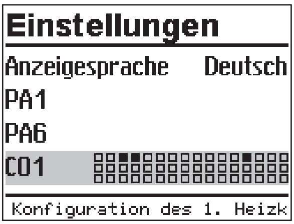
A function is activated or deactivated in the associated function block. Annex A (configuration instructions) contains a detailed description of all functions.



Turn the rotary switch to ⟡ (settings).

⟲ Enter the currently valid key number.

✳ Confirm key number.

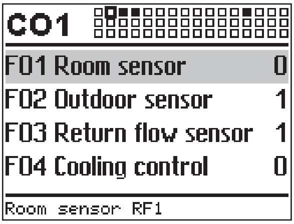


⟲ Select the required configuration level.

- CO1: Heating circuit HC1
- CO2: Heating circuit HC2
- CO3: Heating circuit HC3
- CO11: Heating circuit HC11
- CO12: Heating circuit HC12
- CO13: Heating circuit HC13
- CO4: Domestic hot water heating (DHW)
- CO5: System-wide functions
- CO6: Modbus communication

Active function blocks are indicated by the black squares.

➔ Only those configuration levels are available for selection which can be controlled by the selected system.



∗ Open configuration level.
The first function block is selected (marked gray).

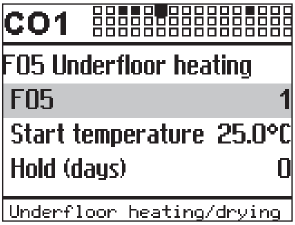
↻ Select the required function.

Functions without function block parameters:

∗ Activate editing mode for the function.
The currently active configuration '0' or '1' is shown inverted on the display.

↻ Activate function (1) or deactivate function (0).

∗ Confirm configuration.



Functions with function block parameters:

∗ Open function.

↻ Select configuration.

∗ Activate editing mode for configuration.
The currently active configuration '0' or '1' is shown inverted on the display.

↻ Activate function (1) or deactivate function (0).

∗ Confirm configuration.

↻ Select function block parameter.

∗ Activate editing mode for function block parameter.
The current setting is shown inverted on the display.

↻ Set function block parameter.

Proceed in the same manner to set further function blocks.

Exit configuration level:

↻ Select 'Back'.

↻ Exit configuration level.

To adjust further function blocks in other configuration levels, repeat steps with gray background.

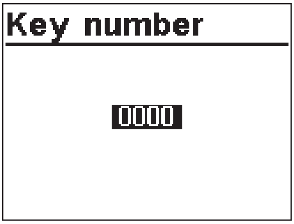
Turn the rotary switch back to (operating level).

Note

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

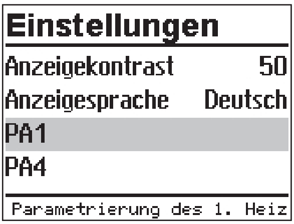
7.5 Changing parameters

Depending on the system code number selected and the activated functions, not all parameters might be available. Annex A (configuration instructions) contains a detailed description of all parameters.



Turn the rotary switch to (settings).

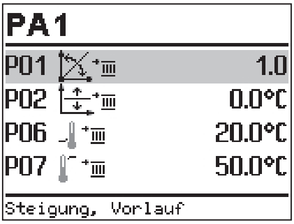
- Enter the currently valid key number.
- ✳ Confirm key number.



Select the required parameter level.

- PA1: Heating circuit HC1
- PA2: Heating circuit HC2
- PA3: Heating circuit HC3
- PA11: Heating circuit HC11
- PA12: Heating circuit HC12
- PA13: Heating circuit HC13
- PA4: Domestic hot water heating (DHW)
- PA5: Boiler circuit of buffer tank systems
- PA6: Modbus communication

➔ Only those parameter levels are available for selection which can be controlled by the selected system.



∗ Open parameter level.
The first parameter is selected (marked gray).

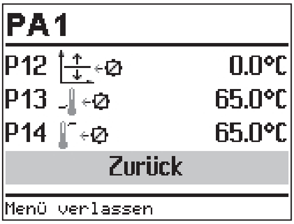
↻ Select parameter.

∗ Activate editing mode for the parameter.
The current setting is shown inverted on the display.

↻ Set the parameter.

∗ Confirm setting.

∗ Proceed in the same manner to change further parameters.



Exit parameter level.

↻ Select 'Back'.

↻ Exit configuration level.

To adjust further function blocks in other configuration levels, repeat steps with gray background.

Turn the rotary switch back to (operating level).

i Note

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

7.6 Calibrating sensors

Various temperatures are measured by temperature sensors which are connected to the controller. The controller is designed for connection of Pt 1000, PTC and Ni 1000 sensors.

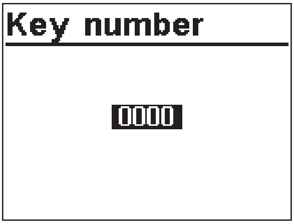
– CO5 -> F01 - 1, F02 - 0: Pt 1000

– CO5 -> F01 - 0, F02 - 0: PTC

– CO5 -> F01 - 1, F02 - 1: Ni 1000

➔ The sensor resistance values are listed in the 'Design and principle of operation' section.

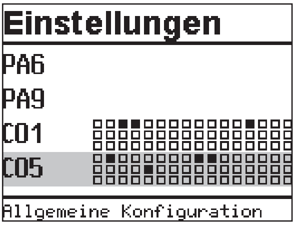
If the temperature values displayed at the controller differ from the actual temperatures, the measured values of all connected sensors can be recalibrated. To calibrate a sensor, the currently displayed sensor value must be changed such that it matches the temperature (reference temperature) measured directly at the point of measurement. Sensor calibration is activated in CO5 in F20 function block. An incorrect sensor calibration can be deleted by setting F20 - 0.



Turn the rotary switch to ⟐ (settings).

↻ Enter the currently valid key number.

✳ Confirm key number.

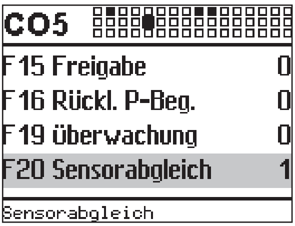


✳ Select CO5 configuration level.

✳ Open CO5 configuration level.

✳ Select function block F20.

✳ Activate editing mode for F20 function block.

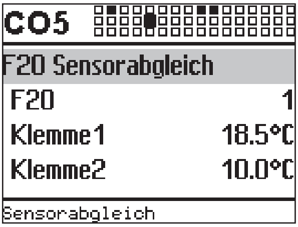


↻ Select F20 configuration.

✳ Activate editing mode for configuration.
The currently active configuration '0' or '1' is shown inverted on the display.

↻ Activate function block ('1').

✳ Confirm activation.



✳ Select the temperature that you want to calibrate.

✳ Open calibration.
The temperature is shown inverted on the display.

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

✳ Confirm corrected measured value.

✳ Proceed in the same manner to calibrate further sensors.

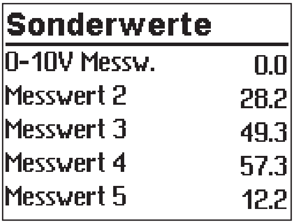
Exit configuration level:

↻ Select 'Back'.

↻ Exit configuration level.

Turn the rotary switch back to (operating level).

7.6.1 Special values



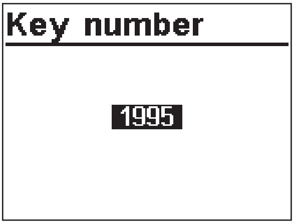
If sensor inputs not relevant for closed-loop control are connected, the 'Special values' screen is automatically displayed in the controller's operating level. A maximum of five measured values (sensor inputs or 0 to 10 V input) can be displayed. These readings are displayed without a unit. '°C' is the unit for all sensor inputs. The value originating from the 0 to 10 V input with the CO5 -> F25 - 1 setting is displayed as a percentage.

Measured value number	Terminal number
1	1
2	2
3	3
4	4
5	5
6	6
7	8
8	9
9	10

Measured value number	Terminal number
10	11
11	12
12	13
13	15
14	16
15	17
16	7
17	14

7.7 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.



Turn the rotary switch to ⟐ (settings).

↻ Enter key number 1995.

∗ Confirm key number.

↻ Enter valid key number.

∗ Confirm key number.

↻ Enter customized key number.

∗ Confirm customized key number.
This number is the new key number.

Turn the rotary switch back to 🖵 (operating level).

8 Operation

8.1 Select the operating mode

The controller can be operated in the following modes:

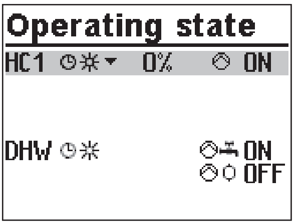
Day mode (rated operation): regardless of the programmed times-of-use and summer mode, the set points relevant for rated operation are used by the controller. Icon:

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 of the heating circuits and DHW heating remains deactivated. The frost protection is activated, if need be. Icon:
Icons when the frost protection is activated: HC , DHW

Automatic mode: During the programmed times-of-use, the controller works in day mode. Outside these times-of-use, the controller is in night mode, unless control operation is deactivated depending on the outdoor temperature. The controller switches automatically between both operating modes. Icon within the times-of-use: , icon outside the times-of-use:

Manual mode: valves and pumps can be controlled manually. For further details, see section 8.6.

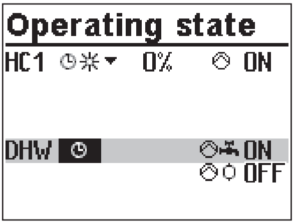


Turn the rotary switch to (operating modes). The operating states of all system control circuits are displayed:

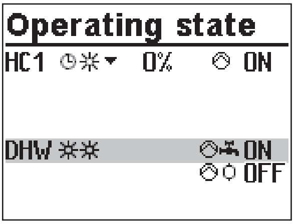
- Heating circuit HC1
- Heating circuit HC2
- Heating circuit HC3
- Heating circuit HC11
- Heating circuit HC12
- Heating circuit HC13
- DHW heating

➔ Only those control circuits are available for selection which can be controlled by the selected system.

Select the control circuit.



- Activate editing mode for the control circuit. The operating mode is shown inverted on the display.
- Select the operating mode:
  Automatic mode
  Day mode
  Night mode
  System deactivated



- Confirm the operating mode.

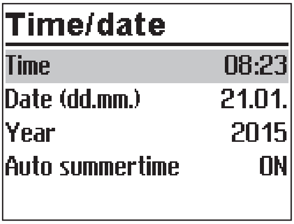
The controller is usually in automatic mode.

8.2 Schedules

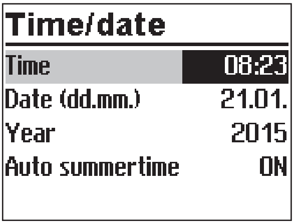
The controller operates according to the schedules in automatic mode.

8.2.1 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.



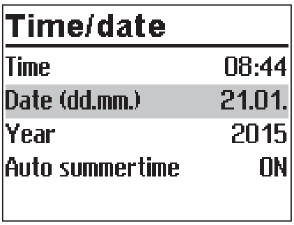
Turn the rotary switch to ◷ (time/date). The current time is selected (gray background).



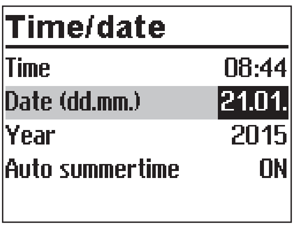
✳ Activate editing mode for the time. The time reading is inverted.

↻ Change the time.

✳ Confirm the time setting.



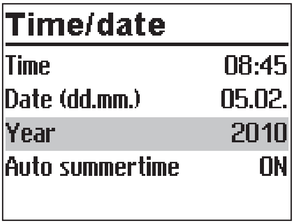
↻ Select 'Date' (dd.mm) [↻].



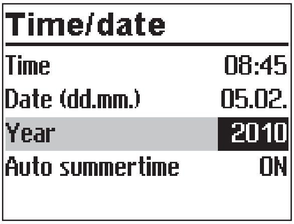
✳ Activate editing mode for the date. The date reading is inverted.

↻ Change date (day.month).

✳ Confirm the date setting.



⟲ Select 'Year'.

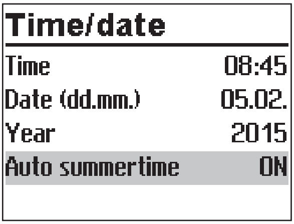


✳ Activate editing mode for the year. The year reading is inverted.

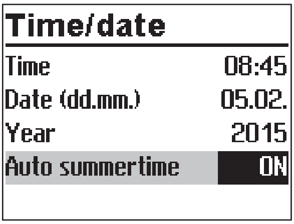
⟲ Change the year.

✳ Confirm the year setting.

Deactivate or activate the automatic summer/standard time switchover as required.



⟲ Select 'Auto summertime'.



✳ Activate the editing mode for automatic summer/standard time switchover. The current setting is shown inverted on the display:
ON = Summer/standard time switchover active
OFF = Summer/standard time switchover not active

⟲ Deactivate or activate the automatic summer/standard time switchover.

✳ Confirm deactivation/activation.

Turn the rotary switch back to 🖵 (operating level).

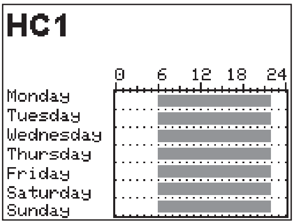
i *Note*

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.

8.2.2 Setting the times-of-use

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

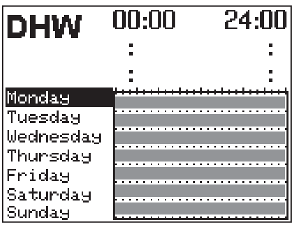
Parameters	WE		Value range
	HC1, HC2, HC3, HC11, HC12, HC13	DHW, CP	
Start first time-of-use	06:00	00:00	
Stop first time-of-use	22:00	24:00	
Start second time-of-use	--:--	--:--	00:00 to 24:00 h in steps of 15 minutes
Stop second time-of-use	--:--	--:--	
Start third time-of-use	--:--	--:--	
Stop third time-of-use	--:--	--:--	



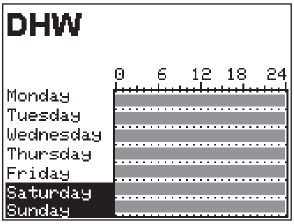
Turn the rotary switch to (times-of-use). The first control circuit is displayed together with its programmed times-of-use.

↻ Program the times-of-use of another control circuit, if required:
- Heating circuit HC2
- Heating circuit HC3
- Heating circuit HC11
- Heating circuit HC12
- Heating circuit HC13
- DHW heating
- Circulation pump ZP

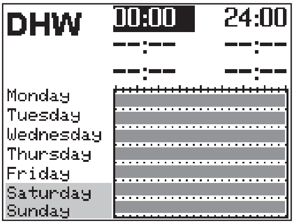
➔ Only those control circuits are available for selection which can be controlled by the selected system.



✱ Activate editing mode for the control circuit. The times-of-use for Monday are displayed.



⟲ Select period/day for which the times-of-use are to be valid. The times-of-use can be programmed for individual days or for a block of days, e.g. Monday to Friday, Saturday and Sunday or Monday to Sunday. The selected days are shown inverted on the display.

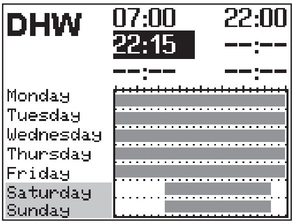


✳ Activate editing mode for the period/day.
The start time of the first time-of-use period can now be edited (inverted reading).

⟲ Change start time.
The time is set in steps of 15 minutes.

✳ Confirm the start time.
The stop time of the first time-of-use period can now be edited.

⟲ End stop time.
The time is set in steps of 15 minutes.

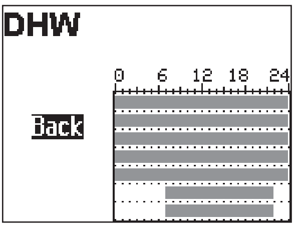


✳ Confirm the stop time.
The start time of the second time-of-use period can now be edited.

To set the second and third times-of-use periods, repeat steps with gray background. 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 ✳).

Proceed in the same manner to program further periods/days.

After setting all times-of-use:



⟲ Select 'Back'.

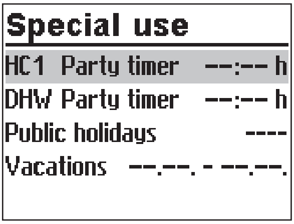
✳ Exit the times-of-use setting.

Turn the rotary switch back to 🖵 (operating level).

8.2.3 Setting the party timer (special time-of-use)

Rated operation in the corresponding control circuit (HC1, HC2, HC3 or DHW) is started or continued for the time period set in the party mode. When the party timer has elapsed, the party timer returns to **--:--**.

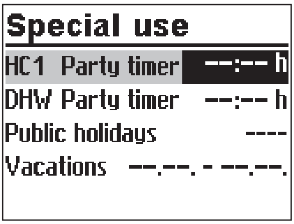
Parameters	WE	Value range
HC1 party timer	--:-- h	0 to 48 h; in steps of 15 minutes
HC2 party timer	--:-- h	0 to 48 h; in steps of 15 minutes
HC3 party timer	--:-- h	0 to 48 h; in steps of 15 minutes
DHW party timer	--:-- h	0 to 48 h; in steps of 15 minutes



Turn the rotary switch to (special times-of-use). The party timer for the first control circuit is now selected.

↻ Set time for party mode of another control circuit, if required:
– Heating circuit HC2
– Heating circuit HC3
– DHW heating

➔ Only those control circuits are available for selection which can be controlled by the selected system.



✳ Activate editing mode for the party timer. The party timer is now in the editing mode (inverted display).

↻ Extend day operation as required.
The time is set in steps of 15 minutes.

✱ Confirm setting.

After setting the party timer:

Turn the rotary switch back to ▭ (operating level).

i Note

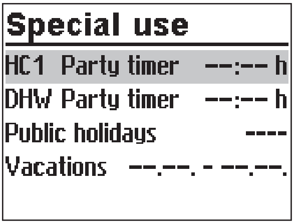
The party timer runs down in steps of 15 minutes.

8.2.4 Programming public holidays (special times-of-use)

On public holidays, the times-of-use specified for Sunday apply.

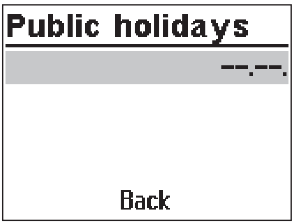
A maximum of 20 public holidays may be entered.

Parameters	WE	Value range
Public holidays	--:--	01.01 to 31.12



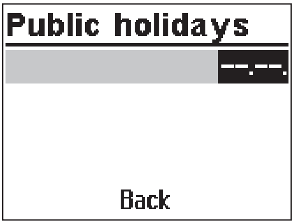
Turn the rotary switch to 👫 (special times-of-use). The party timer for the first control circuit is now selected.

↻ Select 'Public holidays'.



✱ Start the public holiday setting. The first public holiday setting is now selected. --:-- is displayed if no public holidays (default setting) have been programmed.

↻ Select --:--, if applicable.



∗ Activate editing mode for public holidays.

⟲ Set the date of the public holiday.

∗ Confirm the date.

Proceed in the same manner to program further public holidays.

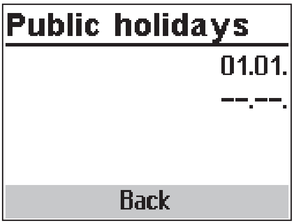
Deleting a public holiday:

⟲ Select the holiday you wish to delete.

∗ Confirm the date.

⟲ Select '--:--' setting

∗ Confirm setting.
The public holiday is deleted.



After programming all public holidays:

⟲ Select 'Back'.

∗ Exit the public holiday setting.

Turn the rotary switch back to (operating level).

Note

Public holidays that are not assigned to a specific date should be deleted by the end of the year so that they are not carried on into the following year.

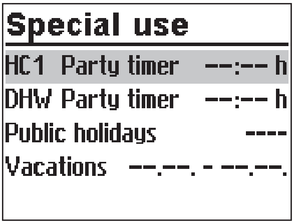
8.2.5 Programming vacation periods (special times-of-use)

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, HC3 and DHW circuit or to all control circuits.

Note

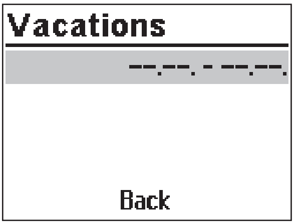
If a vacation period is programmed to apply to all control circuits, it also applies to control circuits HC11, HC12 and HC13.

Parameters	WE	Value range
Vacation period	--.-- - --.--	01.01 to 31.12

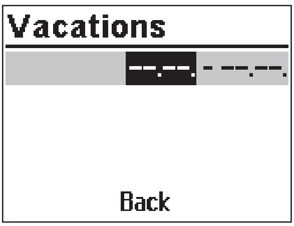


Turn the rotary switch to (special times-of-use). The party timer for the first control circuit is now selected.

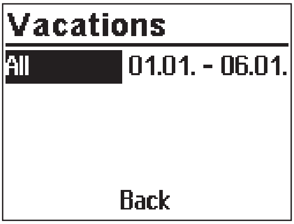
- Select 'Vacations'.



- Start the vacations setting. The first vacations setting is now selected. --.-- - --.--.is displayed if no vacations (default setting) have been programmed.
- Select --.-- - --.--.



- Activate editing mode for vacations.
  The start date can now be edited (inverted reading).
- Set the start date.
- Confirm the start date.
  The end date can now be edited.
- Set the end date.



- ◌ Confirm the year setting. 'All' is selected. The vacation period then applies to all control circuits.
- ◌ If the vacation period is to be only valid for one control circuit, select the required control circuit:
  – Heating circuit HC1
  – Heating circuit HC2
  – Heating circuit HC3
  – DHW heating
- ➔ Only those control circuits are available for selection which can be controlled by the selected system.

  The control circuits HC11, HC12 and HC13 are not available.
- ✳ Confirm the control circuit.

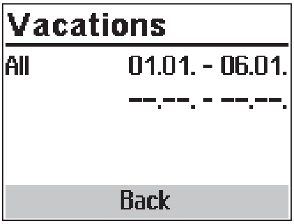
Note

An active vacation period is indicated on the display by the ✈ icon.

Proceed in the same manner to program further vacations.

Deleting vacation periods:

- ◌ Select the start date of the period you wish to delete.
- ✳ Confirm vacation period.
- ◌ Select --.-- - --.--.
- ✳ Confirm setting.
  The vacation period is deleted.



After programming all vacation periods:

↻ Select 'Back'.

✱ Exit the vacations setting.

Turn the rotary switch back to 🖵 (operating level).

i Note

Vacations should be deleted by the end of the year so that they are not carried on into the following year.

8.3 Entering day and night set points

The day set points apply during day mode (rated operation) and during times-of-use programmed for automatic mode.

The night set points apply during night mode (reduced operation) and outside the times-of-use programmed for automatic mode.

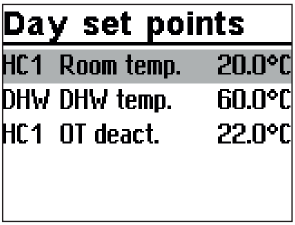
The desired room temperature for the day and night set points can be programmed.

Switch position 🌡☼

Parameters	WE	Value range
HC1 room temperature	20.0 °C	0.0 to 40.0 °C
HC2 room temperature	20.0 °C	0.0 to 40.0 °C
HC3 room temperature	20.0 °C	0.0 to 40.0 °C
HC11 room temperature	20.0 °C	0.0 to 40.0 °C
HC12 room temperature	20.0 °C	0.0 to 40.0 °C
HC13 room temperature	20.0 °C	0.0 to 40.0 °C
DHW temperature	60.0 °C	Min. to max. DHW temperature
HC1 OT deactivation value	22.0 °C	0.0 to 50.0 °C
HC2 OT deactivation value	22.0 °C	0.0 to 50.0 °C
HC3 OT deactivation value	22.0 °C	0.0 to 50.0 °C
HC11 OT deactivation value	22.0 °C	0.0 to 50.0 °C
HC12 OT deactivation value	22.0 °C	0.0 to 50.0 °C
HC13 OT deactivation value	22.0 °C	0.0 to 50.0 °C

Switch position 🌡☾

Parameters	WE	Value range
HC1 room temperature	15.0 °C	0.0 to 40.0 °C
HC2 room temperature	15.0 °C	0.0 to 40.0 °C
HC3 room temperature	15.0 °C	0.0 to 40.0 °C
HC11 room temperature	15.0 °C	0.0 to 40.0 °C
HC12 room temperature	15.0 °C	0.0 to 40.0 °C
HC13 room temperature	15.0 °C	0.0 to 40.0 °C
DHW temperature	40.0 °C	Min. to max. DHW temperature
HC1 OT deactivation value	15.0 °C	–50.0 to 50.0 °C
HC2 OT deactivation value	15.0 °C	–50.0 to 50.0 °C
HC3 OT deactivation value	15.0 °C	–50.0 to 50.0 °C
HC11 OT deactivation value	15.0 °C	–50.0 to 50.0 °C
HC12 OT deactivation value	15.0 °C	–50.0 to 50.0 °C
HC13 OT deactivation value	15.0 °C	–50.0 to 50.0 °C



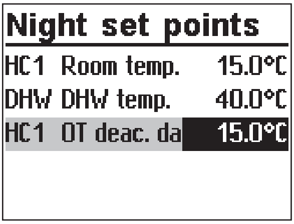
Turn the rotary switch to 🌡☼ (day set point) or 🌡☾ (night set point). The day or night set points appear on the display one after the other.

➔ Only those day and night set points are available for selection which can be controlled by the selected system.

i Note

The deactivation values are located in a separate menu (deactivation values) for systems with three control circuits.

⟲ Select the set point.



✳ Activate editing mode for set point.

⟲ Adjust the set point.

✳ Confirm setting.

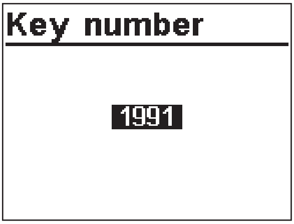
Proceed in the same manner to adjust further set points.

After adjusting all the set points:

Turn the rotary switch back to (operating level).

8.4 Reset to default settings

All parameters set over the rotary switch as well as parameters in the PA1 and PA2 parameter levels can be reset to their default settings (WE). This does not apply to the maximum flow temperature and the return flow temperature limits in PA1 and PA2.



Turn the rotary switch to (settings).

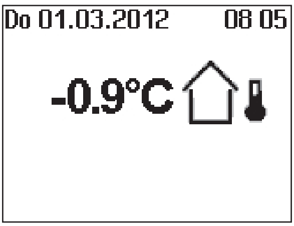
⟲ Enter key number 1991.

✳ Confirm key number.
The settings are reset when the following icon appears on the controller display:

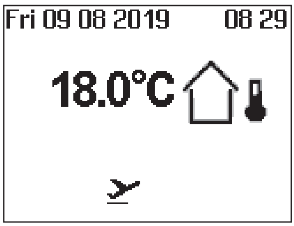
8.5 Reading information

Different kinds of information can read off the controller display during operation. The controller display usually shows the date, time and the actual temperature when the rotary switch is switched to the 'Operating level' position.

Outdoor-temperature-compensated control · Current temperature = outdoor temperature

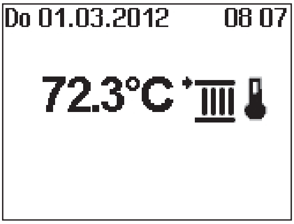


Deactivation depending on outdoor temperature active)

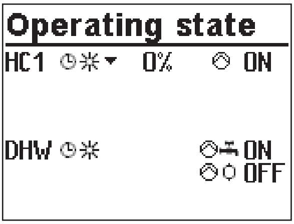


Vacations active

Fixed set point control · Current temperature = Flow temperature

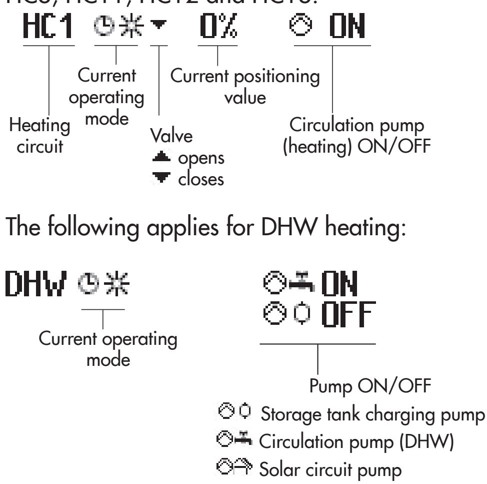


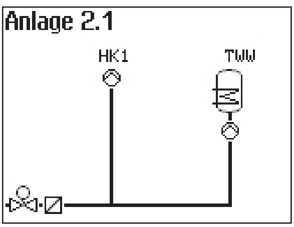
Further information can be obtained by turning the rotary pushbutton:



Operating state

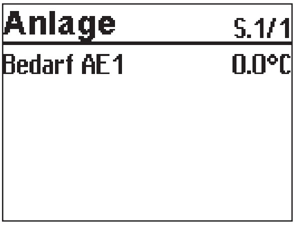
The following applies for heating circuits HC1, HC2, HC3, HC11, HC12 and HC13:



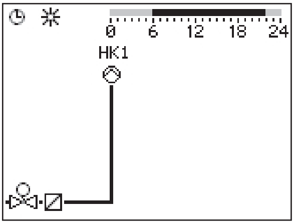


Selected system code number

See Annex A (configuration instructions) for further information.



∗ Key measured values for the entire system (e.g. measured values and limits of a flow rate or capacity limitation or the demand to be processed) are shown, if activated.

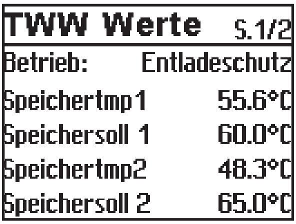


⟲ Times-of-use (depending on system code number)

– Heating circuit HC1
– Heating circuit HC2
– Heating circuit HC3
– Heating circuit HC11
– Heating circuit HC12
– Heating circuit HC13
– DHW heating

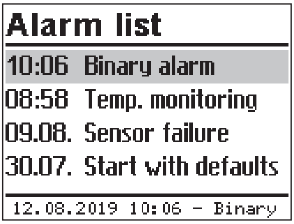
The day mode times is highlighted in black on the time chart.
Night mode and deactivation times are highlighted in gray on the time chart.

∗ Measured values, set points and limits of the system section shown are displayed.



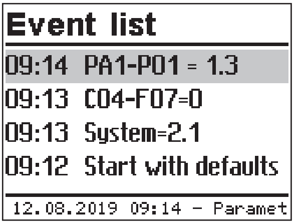
The 'DHW values' page also includes information on the operating state of the DHW heating.
The following messages are generated:

– 'Standby'
– 'Monitoring'
– 'Circulation' (= circulation losses are compensated for)
– 'Demand'
– 'Charging'
– 'Lag time'
– 'Intermediate heating'
– 'Discharging protection'



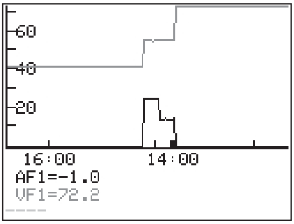
⟳ Alarm list
The last four alarm entries are listed.

∗ Open the alarm list and select further alarm entries (⟳). Further information on an alarm (including time and date when it occurred) runs across the display.



⟳ Event list
The last four event entries are listed.

∗ Open the event list and select further event entries (⟳). Further information on an event (including time and date when it occurred) runs across the display.



⟳ Trend-Viewer
The standard graph shows the data measured at the outdoor sensor AF1 and flow sensor VF1 plotted over time.

Extended operating level

Information	
Modbus ID	5578
Serial number	4378
Software version	2.50
Hardware version	1.75

Information	p.1/3
Modbus station	255
Logging memory	OFF
Solar operation	0 h
Flow rate 1	0
Special flags	3840

Information	p.2/3
VF1-RüF1	--.-°C
Y1 avg mth bfr lst	10240
Y1 avg last month	0
Y1 avg this month	0
Binary inputs	

Information	p.3/3
Reason for reset	--

The following details on the controller version (device identification, serial number, software and hardware versions) and meter bus are displayed in the extended operating level.

Turn the rotary switch to (settings).

Enter code number 1999.

∗ Confirm key number.

Turn the rotary switch to (operating level).

Select 'Information'.

The additional "meter" page is displayed with connection status and further meter data for meters 1 to 3 in the "extended operating level" mode when the meter bus is activated (see Annex A). In addition, the respective measuring and limit values are displayed after confirming the plant scheme when the flow rate and/or capacity limitation is active.

i Note

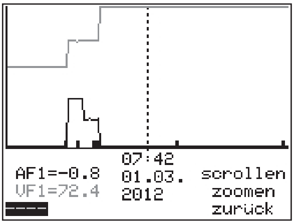
– The additional information is hidden when the key number 1999 is entered again.

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

8.5.1 Adapting the Trend-Viewer

The standard graph shows the data measured at the outdoor sensor AF1 and flow sensor VF1 plotted over time.

✳ Open the Trend-Viewer.



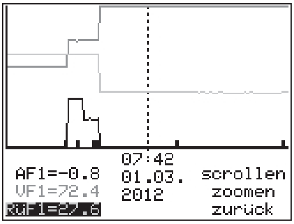
Adding measuring data

↻ Select – – – – on the display.

✳ Activate editing mode for sensor selection.

↻ Select the sensor.

✳ Confirm setting.



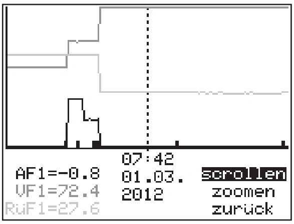
Deleting measured data:

↻ Select the sensor whose measured data are no longer to be displayed.

✳ Activate editing mode for sensor.

↻ Select – – – – on the display.

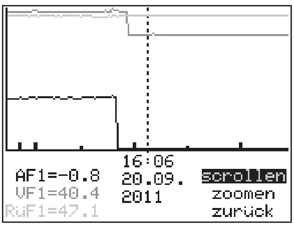
✳ Confirm deletion.



Shifting the time line:

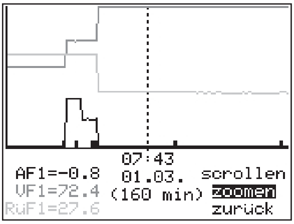
↻ Select 'Scroll'.

✳ Activate editing mode for scroll function.



↻ Shift the time line.

✳ Confirm time display.



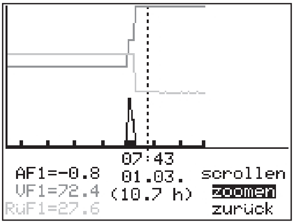
Zooming in/out

↻ Select 'Zoom'.

∗ Open zoom function.

↻ Zoom in or out.

∗ Confirm display.



Closing the Trend-Viewer

↻ Select 'Back'.

∗ Close the Trend-Viewer

8.6 Operating the controller in manual mode

Switch to manual mode to configure all controller outputs.

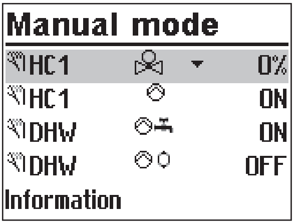
NOTICE

System damage caused by frost when manual operating mode is active!

The frost protection function is deactivated in the manual operating mode.

➔ *Do not run the heating during cold weather in the manual mode for long periods of time.*

Manually changing the positioning value/switching state:



Turn the rotary switch to (manual mode). The outputs of the configured system are listed on the display.

- Select the output
  - Positioning value
  - Circulation pump (heating)
  - Storage tank charging pump
  - Circulation pump (DHW)
  - Solar circuit pump
- Activate editing mode for the output.
- Change the positioning value/switching state.
- Confirm the positioning value/switching state.
  The modified values remain active as long as the controller is in manual mode.

Turn the rotary switch to (operating level). The manual mode is deactivated.

Note

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

---

9 Malfunctions

A malfunction is indicated by the blinking ⚠ icon on the display. Additionally, the display is illuminated for one second every 10 seconds upon sensor failure. Press the rotary pushbutton to open the error level. 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 (see section 9.1).

⚠ DANGER

Risk of electric shock while performing electrical connection.

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.

➔ *Only allow properly trained and qualified personnel to perform the work.*

NOTICE

Risk of damage to the heating controller due to incorrectly performed work.

➔ *Only properly trained personnel appropriately qualified to carry out such tasks must be allowed to perform corrective action.*

Note

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

9.1 Error list

Sensor failure	=	Sensor failure (see section 9.2)
Err TROVIS I/O	=	TROVIS I/O communication error
Disinfection	=	Disinfection temperature not reached. See 'Thermal disinfection of DHW storage tank' function in Annex A (configuration instructions).
Max. charging temp.	=	Max. charging temperature reached. See 'DHW heating in the storage tank charging system' function in Annex A (configuration instructions).
External	=	Error message from device bus
Temp. monitoring	=	Temperature monitor alarm
Unauthorized access	=	Unauthorized access occurred (see section 9.4)
Binary alarm	=	Error message of a binary input
Meter bus	=	Meter bus communication error
Heat meter	=	Heat meter error registered

i Note

If the error messages or indications that can be confirmed are included in the list shown, you can decide whether you want to confirm these error messages on exiting the error list.

9.2 Sensor failure

As described in the error list, sensor failures are indicated by the 'Sensor failure' 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 heating controller responds to the failure of the different sensors.

– **Outdoor sensor AF1/2:** 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 (PA1, 2, 3 -> P07) is lower than 50 °C. With the setting CO1, 2, 3 -> 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 which use such a sensor to measure the charging temperature is suspended. DHW heating which use such a sensor to measure the charging temperature is suspended.
- **Flow sensors in the DHW circuit with control valve:** when the DHW circuit has two charging temperature sensors VF2 and VF4, the controller behaves as if VF4 sensor has not been configured if it is defective. As soon as the control of the charging temperature using the VF2 sensor or the DHW temperature becomes impossible, the associated valve is closed.
- **Return flow sensor:** when the return flow sensor fails, the controller continues operation without return flow temperature limitation.
- **Room sensor RF:** 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 SF1/2:** when one of the two sensors fails, the storage tank is no longer charged (exception: solar system).
- **Solar circuit sensors SF, VF/RüF:** 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, the 'Temp. monitoring' message is generated.

Functions	WE	Configuration
Monitoring	0	CO5 -> F19 - 1

9.4 Fault alarm output

With the setting CO5 -> F07 - 1, the output at terminals 37, 38, 43 or the output at terminal 46 is used for fault indication (specific terminals listed in the table of each system). The fault alarm output is activated (bA = 1 setting) or deactivated (bA = 0 setting) when at least one of the errors from the error list (bold) occurs.
This function is not available for systems Anl 5.1, 5.2, 5.9, 6.1, 9.1, 9.2, 9.5, 9.6, 12.1, 12.2, 13.1, 13.2, 13.6, 15.1, 15.2, 15.3, 17.8, 21.1 and 21.2.

Functions	WE	Configuration
Fault alarm output at terminal 37, 38, 43 or 46 (depending on the system selected)	0 1	CO5 -> F07 - 1 bA = 1, 0

9.5 Error status register

The error status register is used to indicate controller or system errors. The error messages which cause a change in the state of the configured fault alarm output (CO5 -> F07 - 1) are highlighted in the following table (bold).

The function blocks in the CO8 configuration level allow single controller inputs that are not used to be added to the error status register as binary inputs. Either an open or closed binary input can be configured to indicate an error. The controller indicates 'Binary alarm' when at least one of the inputs configured in this way registers an error.

Note

If free inputs are to issue binary signals to a building control station without affecting the error status register, activate the corresponding function block in the CO8 configuration level and select 'None' as the function block parameter.

Error message	Decimal value	
Sensor failure	1	1
TROVIS I/O failure	2	
Disinfection	4	
Max. charging temp.	8	
External	16	
Temp. monitoring	32	32
Unauthorized access	64	
Binary alarm	128	
Meter bus	256	
Heat meter	512	
		Total
Example: Value of error status register when a sensor fails and a temperature monitoring alarm =		33

10 Servicing

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

We recommend inspection and testing according to Table 10-1.

Table 10-1: *Recommended inspection and testing*

Inspection and testing	Action to be taken in the event of a negative result
Check the markings, labels and nameplates on the controller for their readability and completeness.	➔ Immediately renew damaged, missing or incorrect nameplates or labels.
	➔ Clean any inscriptions that are covered with dirt and are illegible.
Check the electric wiring.	➔ If any wires are loose, open the controller housing and tighten the terminal screws (see the 'Installation' section).
	➔ Renew damaged wires.
Compare the temperature values displayed at the controller with the actual temperatures at the point of measurement.	➔ If the displayed and actual temperatures differ, calibrate the sensors (see the' Start-up and configuration' section).

11 Decommissioning

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

⚠ DANGER

Risk of fatal injury due to electric shock.

➔ *Before disconnecting live wires, switch off the supply voltage at the controller and protect it against unintentional reconnection.*

To put the controller out of operation, the controller must be disconnected from the voltage supply:

➔ Controller connected to a control station: log the controller off from the control station and remove the communication module from the RJ-45 jack.

➔ Controller connected to TROVIS-VIEW: remove the connecting cable from the RJ-45 jack.

➔ If a memory module/mini module or logging module is used: save data and remove the memory module/mini module or logging module from the the RJ-45 jack.

➔ Disconnect the supply voltage and protect it against unintentional reconnection.

➔ Unscrew the top left and right screws on the front of the controller to open the controller housing.

➔ Disconnect the electrical wires from the terminals.

➔ Pull the wires out of the cable ducts.

12 Removal

The work described in this section is only to be performed by personnel appropriately qualified to carry out such tasks.

Panel mounting

1. Put the controller out of operation (see the 'Decommissioning' section).
2. Unscrew the top left and bottom right screws to unfasten the controller housing from the control panel.

Wall mounting

1. Put the controller out of operation (see the 'Decommissioning' section).
2. Unscrew the fastening screws and remove the back of the housing from the wall.

Rail mounting

1. Put the controller out of operation (see the 'Decommissioning' section).
2. Unscrew the top left and bottom right screws to unfasten the controller housing from the top-hat rail.

13 Repairs

A defective controller must be repaired or replaced.

NOTICE

Risk of controller damage due to incorrect service or repair work.

➔ *Do not perform any repair work on your own.*

➔ *Contact SAMSON's After-sales Service for repair work.*

13.1 Returning devices to SAMSON

Defective controllers can be returned to SAMSON for repair.

Proceed as follows to return devices to SAMSON:

1. Put the controller out of operation (see the 'Decommissioning' section).
2. Remove the controller (see the 'Removal' section).
3. Proceed as described on the Returning goods page of our website
   ▶ www.samsongroup.com > Service & Support > After-sales Service > Returning goods

14 Disposal

We are registered with the German national register for waste electric equipment (stiftung ear) as a producer of electrical and electronic equipment,
WEEE reg. no.: DE 62194439

➔ Observe local, national and international refuse regulations.

➔ Do not dispose of components, lubricants and hazardous substances together with your other household waste.

Tip

On request, we can appoint a service provider to dismantle and recycle the product.

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15 Certificates

The following certificate is shown on the next page:

– EU declaration of conformity

The certificate shown was up to date at the time of publishing. The latest certificates can be found on our website:

▶ www.samsongroup.com > Products & Applications > Product selector > Automation Systems > 5578

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

Heizungs- und Fernheizungsregler / Heating and District Heating Controller / Régulateur de chauffage et de chauffage à distance
Typ / Type / Type TROVIS 5578

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
LVD 2014/35/EU	EN 60730-1:2016
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

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

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SAMSON AKTIENGESELLSCHAFT
Weismüllerstraße 3 60314 Frankfurt am Main
Telefon: 069 4009-0 · Telefax: 069 4009-1507
E-Mail: samson@samson.de
Revison 07

16 Annex A (configuration instructions)

This annex contains information on the configuration of the controller.

16.1 Systems

Different hydraulic schematics are available. The system images on the display show the structure of the hydraulic system.

Boiler systems:

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 1.0-1, 1.5-1, 1.6-1, 1.6-2, 1.7-1, 1.8-1, 1.8-2, 1.9, 2.x, 3.x, 4.x, 5.x, 6.0, 7.x, 8.x, 9.x, 11.1-3, 14.x, 15.x, 16.x and 17.x.

The boiler can be controlled by an on/off output (CO1 -> F12 - 0).

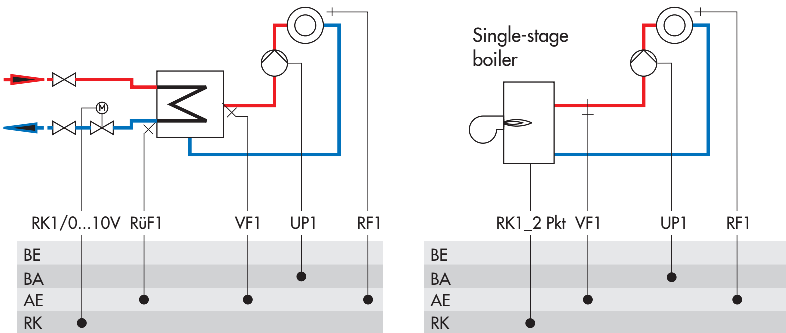
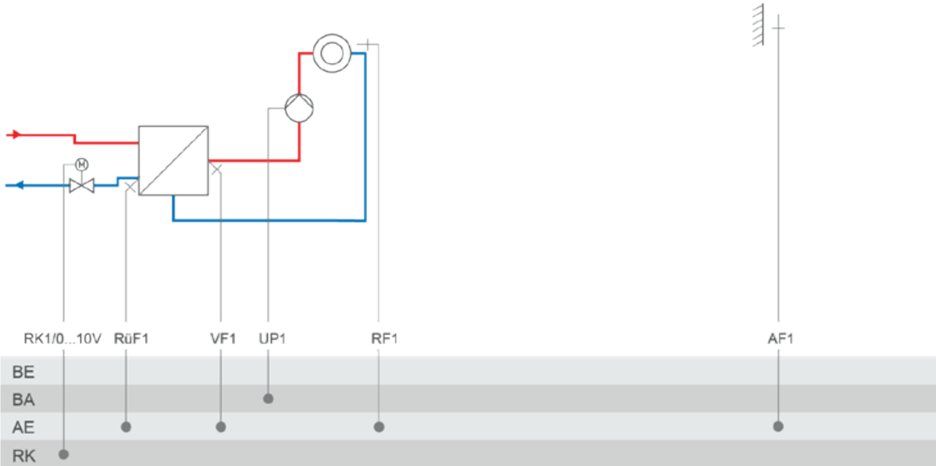


Fig. 16-1: *Configuration of a boiler system*

System Anl 1.0-1



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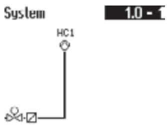
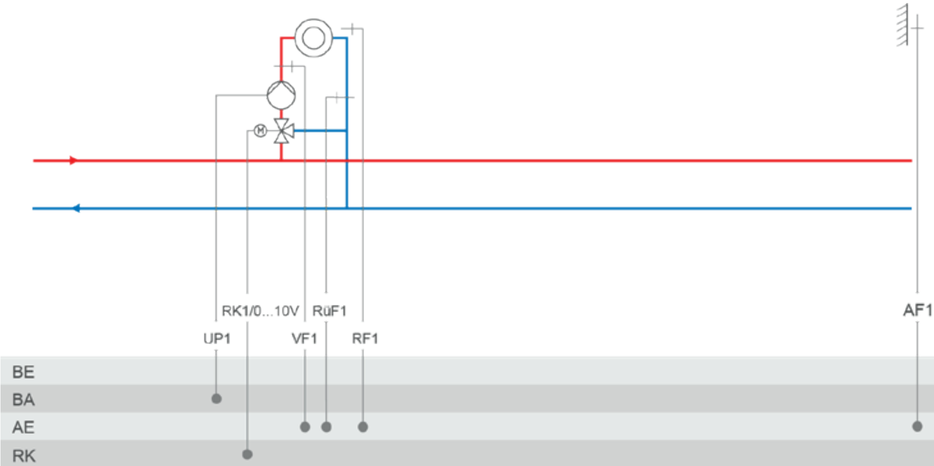
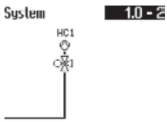
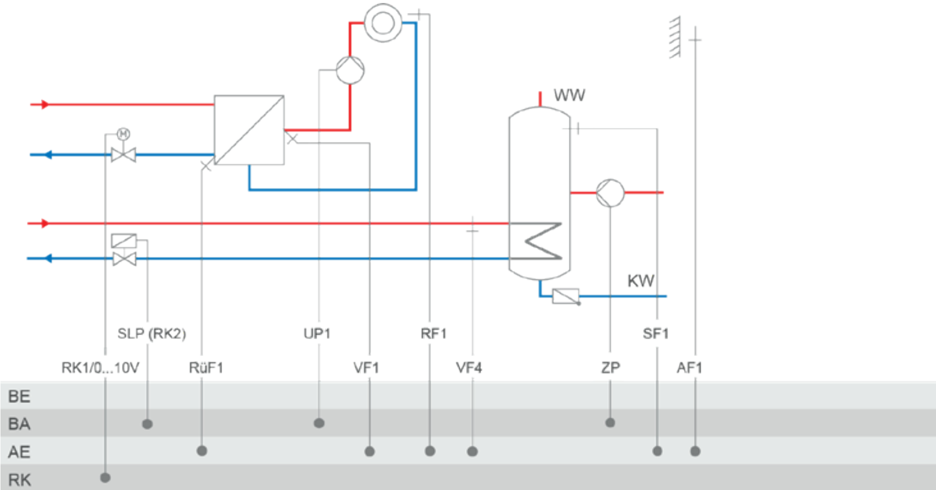
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO5 -> F07	- 0 (without error message at terminal 43)

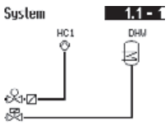
System Anl 1.0-2



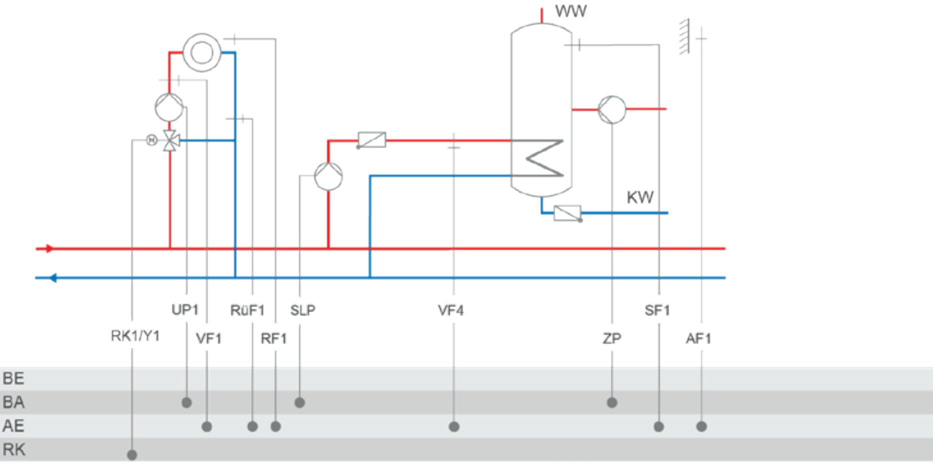
System	1.0-2
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO5 -> F07	- 0 (without error message at terminal 43)

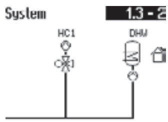
System Anl 1.1-1



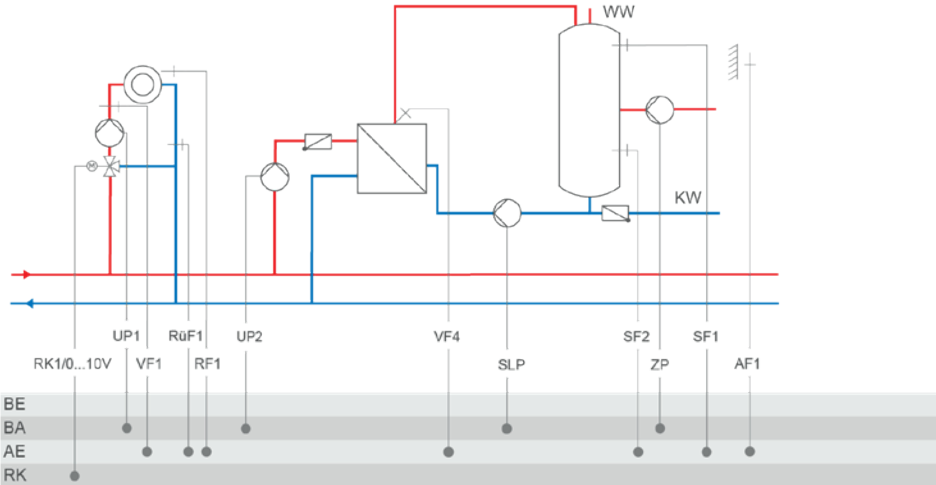
System	1.1-1
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 0 (without RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F05	- 0 (without VF4)
CO5 -> F07	- 0 (without error message at terminal 43)

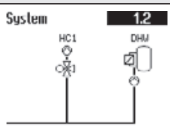
System Anl 1.1-2



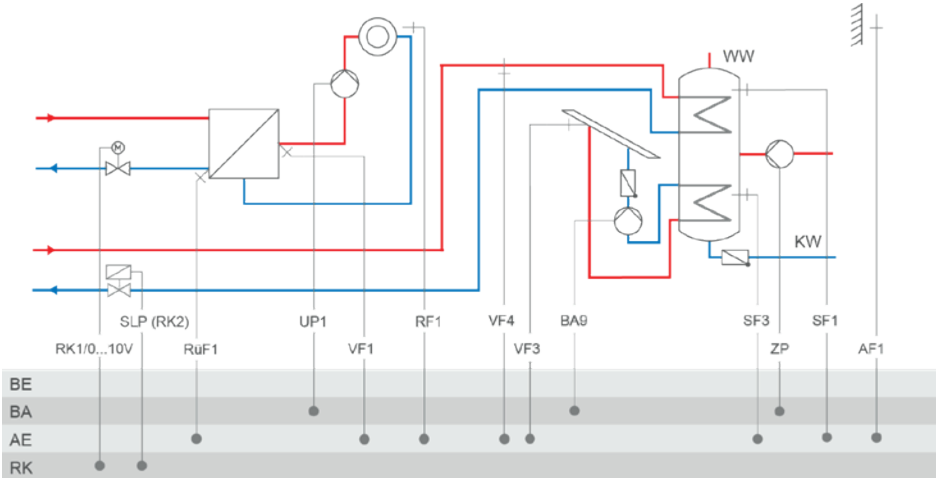
System	1.1-2
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 0 (without RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F05	- 0 (without VF4)
CO5 -> F07	- 0 (without error message at terminal 43)

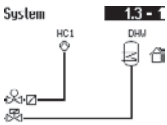
System Anl 1.2



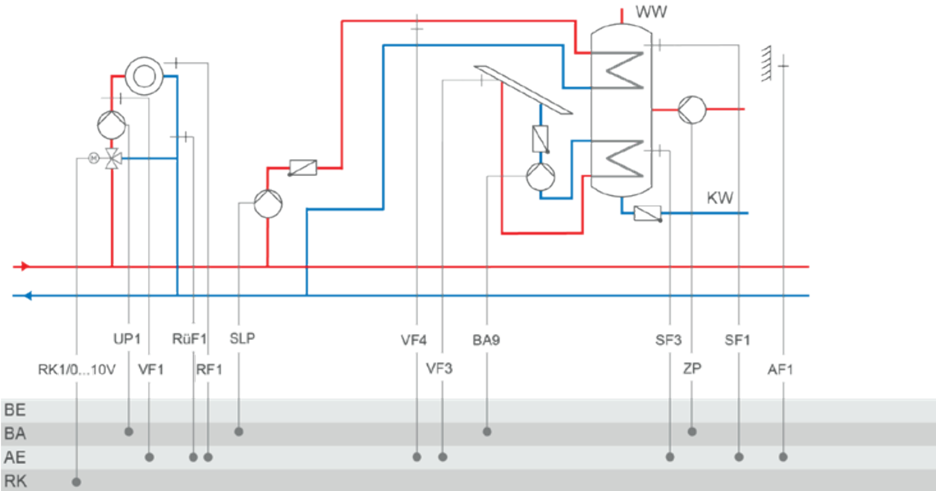
System	1.2
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 0 (without RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F05	- 0 (without VF4)
CO5 -> F07	- 0 (without error message at terminal 43)

System Anl 1.3-1



System	1.3-1
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 0 (without RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F05	- 0 (without VF4)
CO5 -> F07	- 0 (without error message at terminal 43)

System Anl 1.3-2



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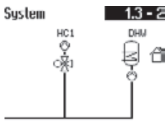
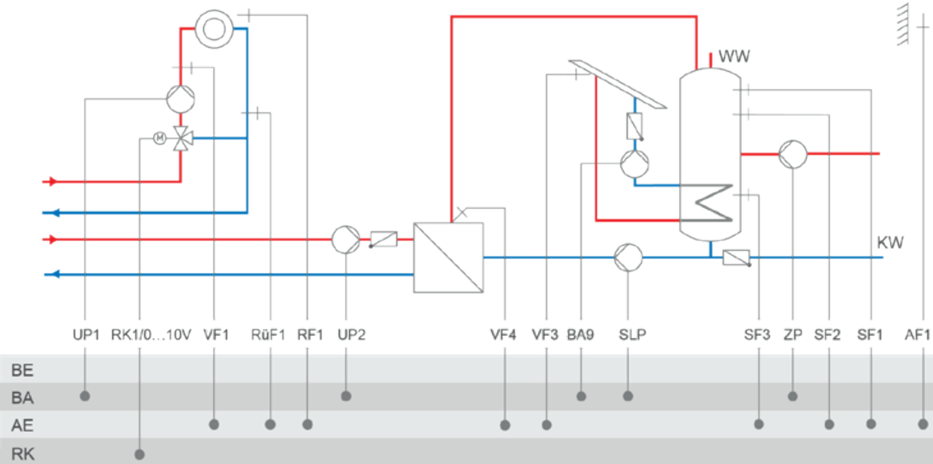
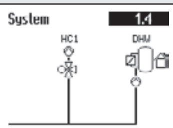
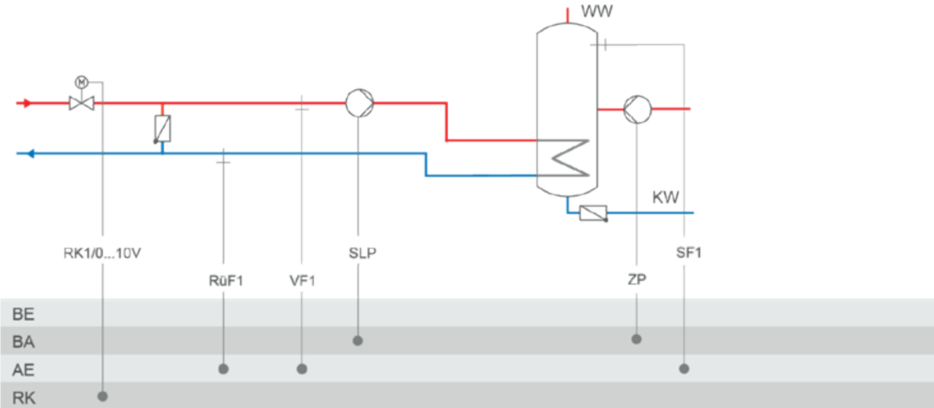
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 0 (without RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F05	- 0 (without VF4)
CO5 -> F07	- 0 (without error message at terminal 43)

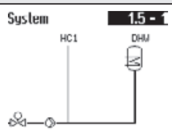
System Anl 1.4



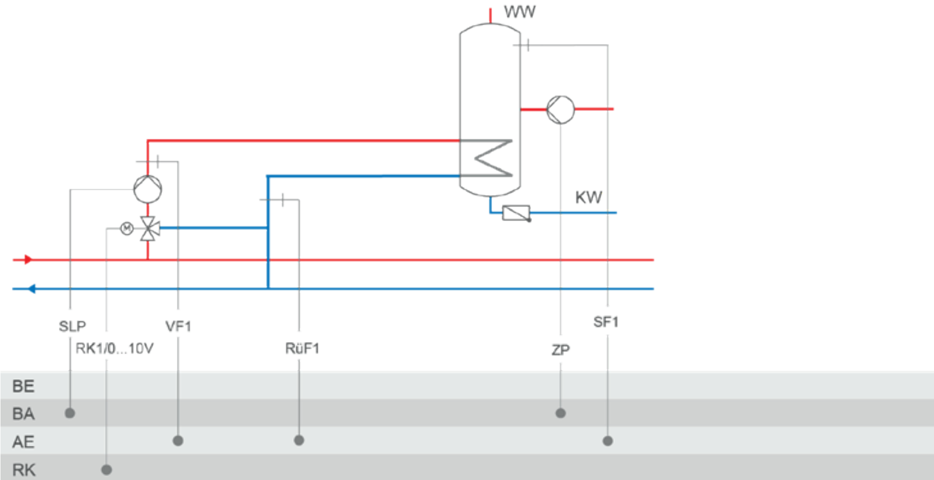
System	1.4
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 0 (without RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F05	- 0 (without VF4)
CO5 -> F07	- 0 (without error message at terminal 43)

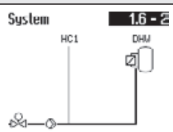
System Anl 1.5-1



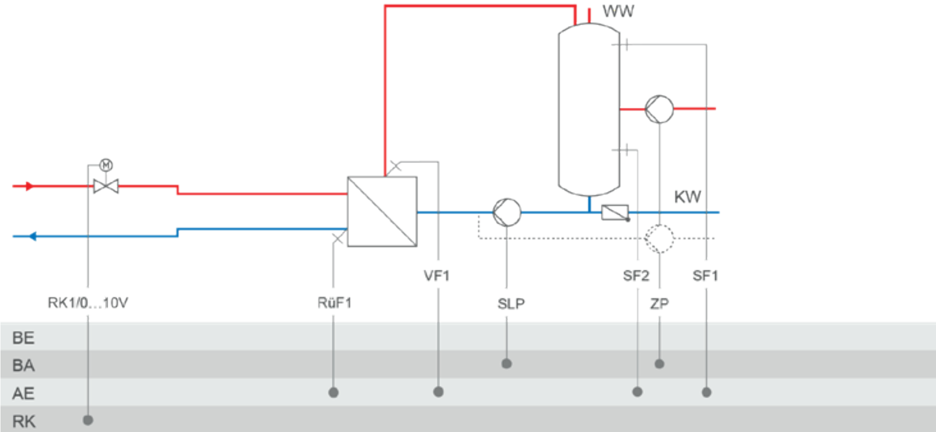
System	**1.5-1**
	
Default setting	
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO5 -> F07	- 0 (without error message at terminal 43)

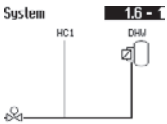
System Anl 1.5-2



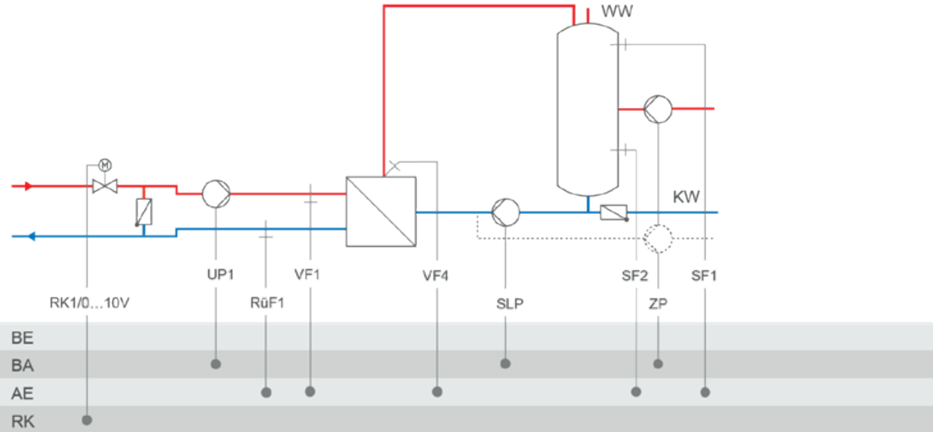
System	1.5-2
	
Default setting	
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO5 -> F07	- 0 (without error message at terminal 43)

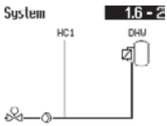
System Anl 1.6-1



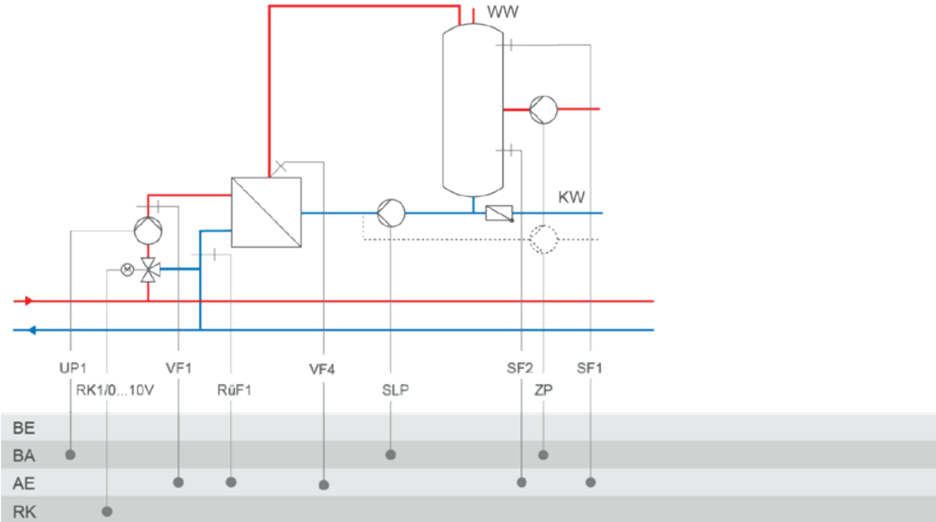
System	1.6-1
	
Default setting	
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)
CO5 -> F07	- 0 (without error message at terminal 43)

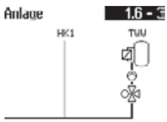
System Anl 1.6-2



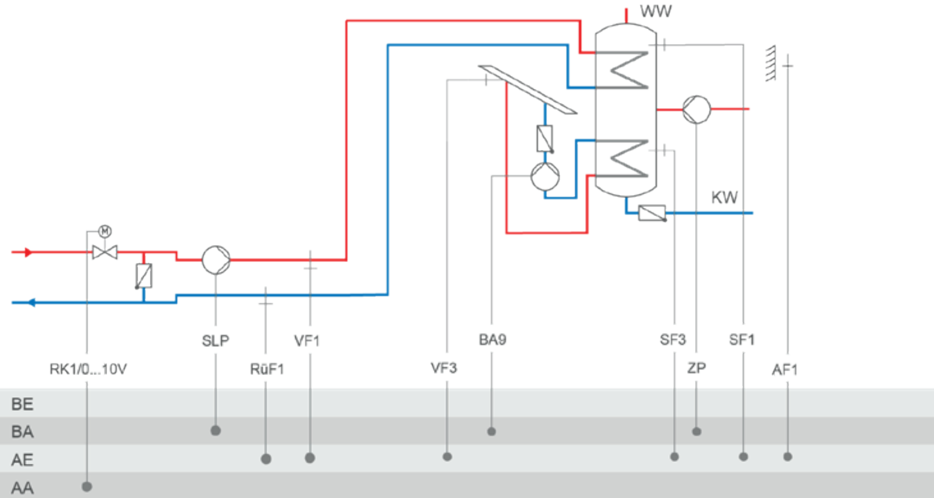
System	1.6-2
	
Default setting	
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F05	- 0 (without VF4; in this case, VF1 usually installed at the point of measurement of VF4)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)
CO5 -> F07	- 0 (without error message at terminal 43)

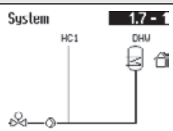
System Anl 1.6-3



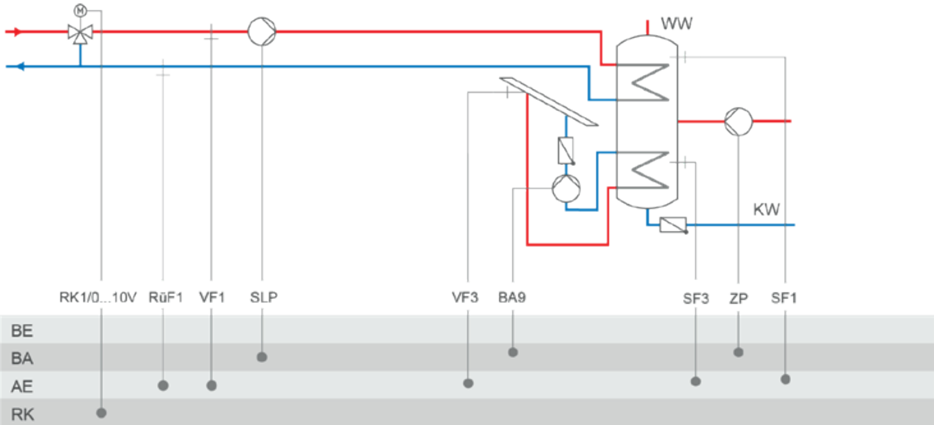
System	1.6-3
	
Default setting	
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F05	- 0 (without VF4; in this case, VF1 usually installed at the point of measurement of VF4)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)
CO5 -> F07	- 0 (without error message at terminal 43)

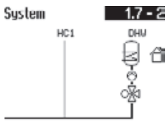
System Anl 1.7-1



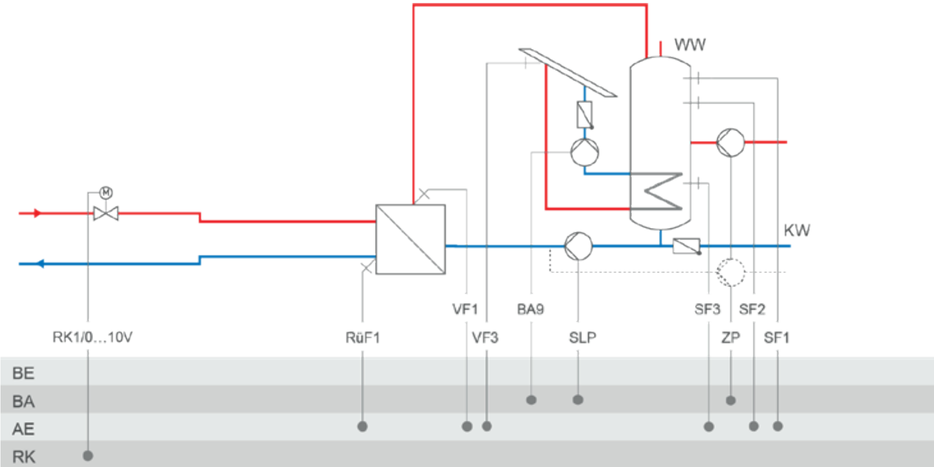
System	1.7-1
	
Default setting	
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO5 -> F07	- 0 (without error message at terminal 43)

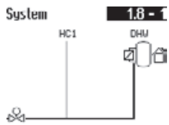
System Anl 1.7-2



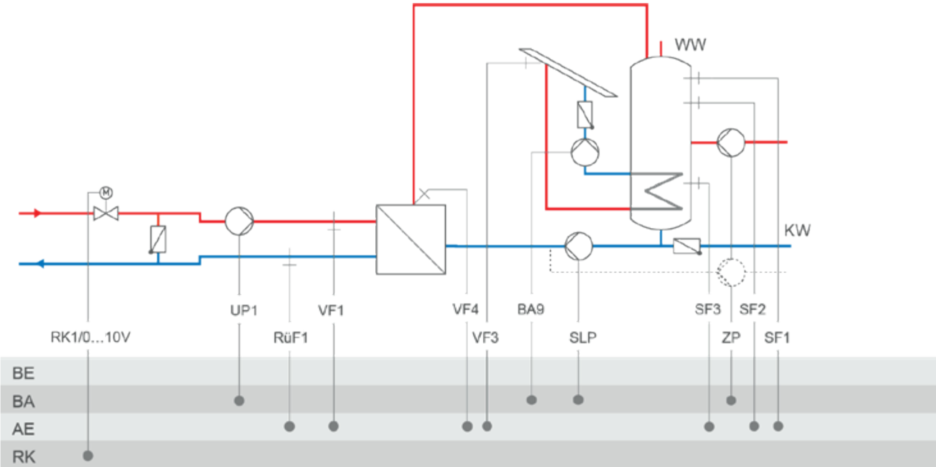
System	1.7-2
	
Default setting	
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO5 -> F07	- 0 (without error message at terminal 43)

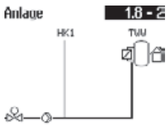
System Anl 1.8-1



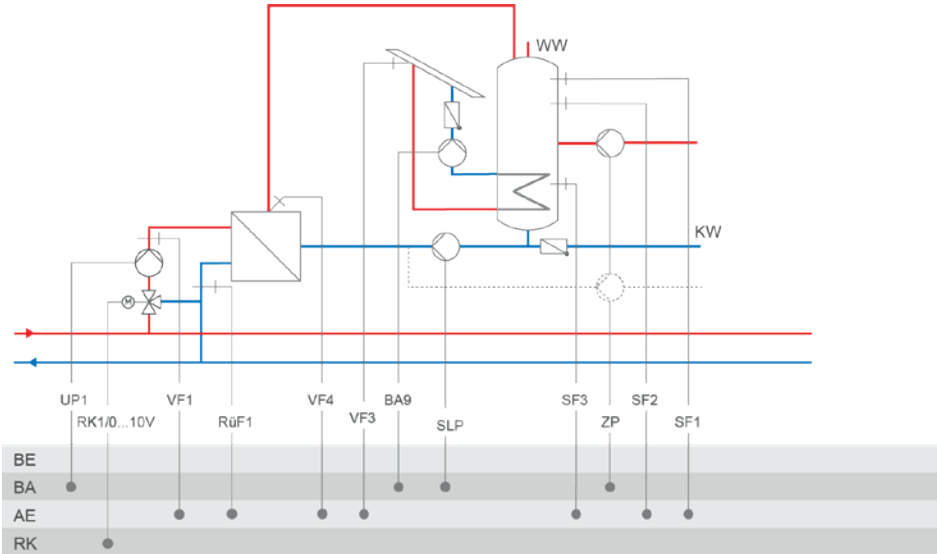
System	1.8-1
	
Default setting	
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)
CO5 -> F07	- 0 (without error message at terminal 43)

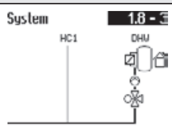
System Anl 1.8-2



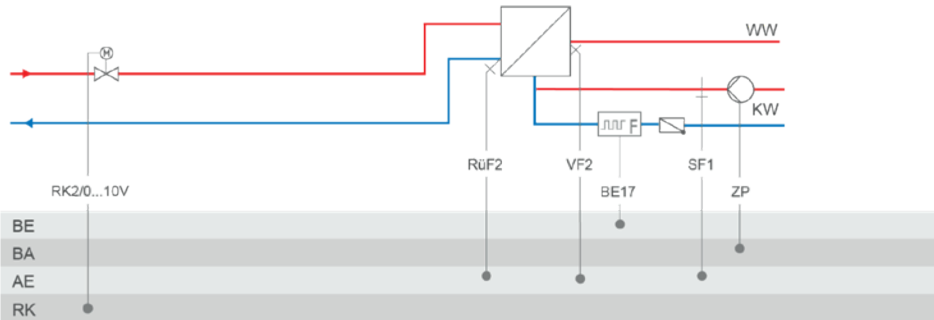
System	1.8-2
	
Default setting	
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F05	- 0 (without VF4; in this case, VF1 usually installed at the point of measurement of VF4)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)
CO5 -> F07	- 0 (without error message at terminal 43)

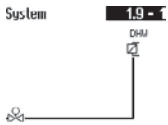
System Anl 1.8-3



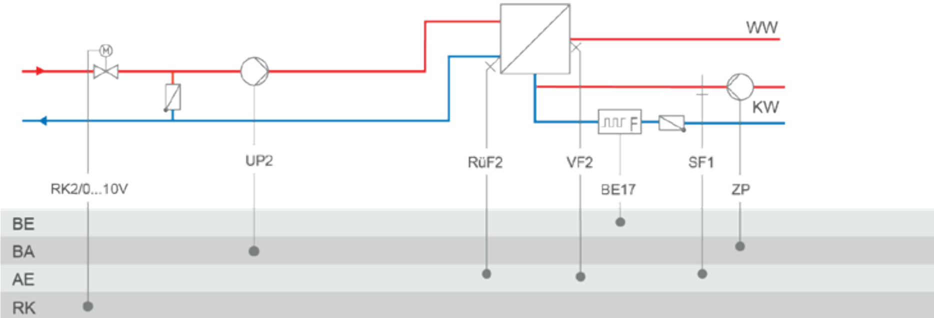
System	1.8-3
	
Default setting	
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F05	- 0 (without VF4; in this case, VF1 usually installed at the point of measurement of VF4)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)
CO5 -> F07	- 0 (without error message at terminal 43)

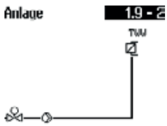
System Anl 1.9-1



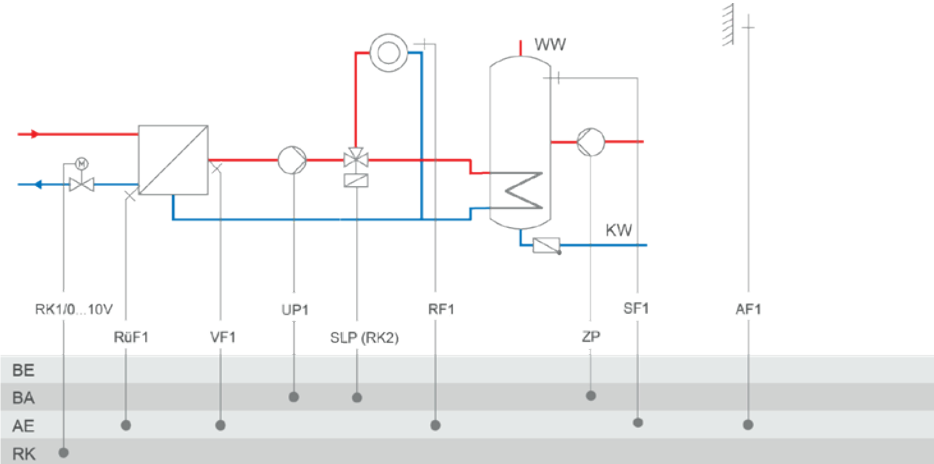
System	1.9-1
	
Default setting	
CO4 -> F01	- 0 (without SF1)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F04	- 0 (without flow rate sensor)
CO5 -> F07	- 0 (without error message at terminal 37)

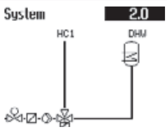
System Anl 1.9-2



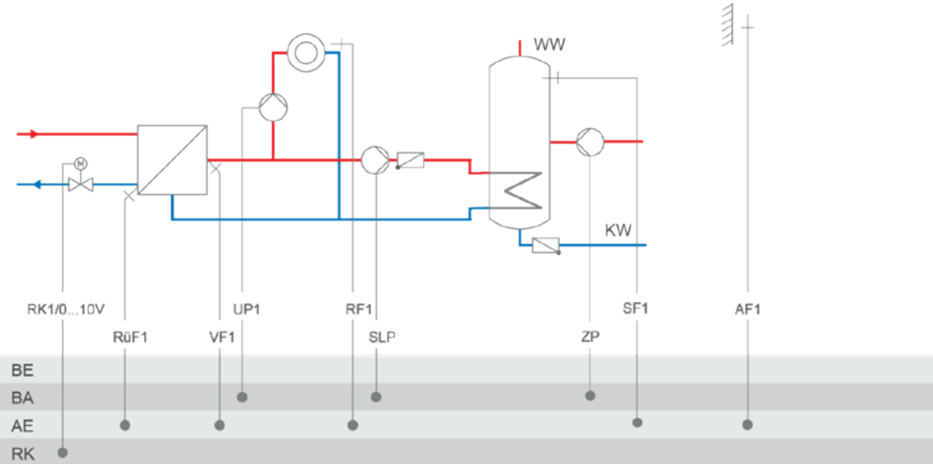
System	1.9-2
	
Default setting	
CO4 -> F01	- 0 (without SF1)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F04	- 0 (without flow rate sensor)
CO5 -> F07	- 0 (without error message at terminal 37)

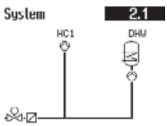
System Anl 2.0



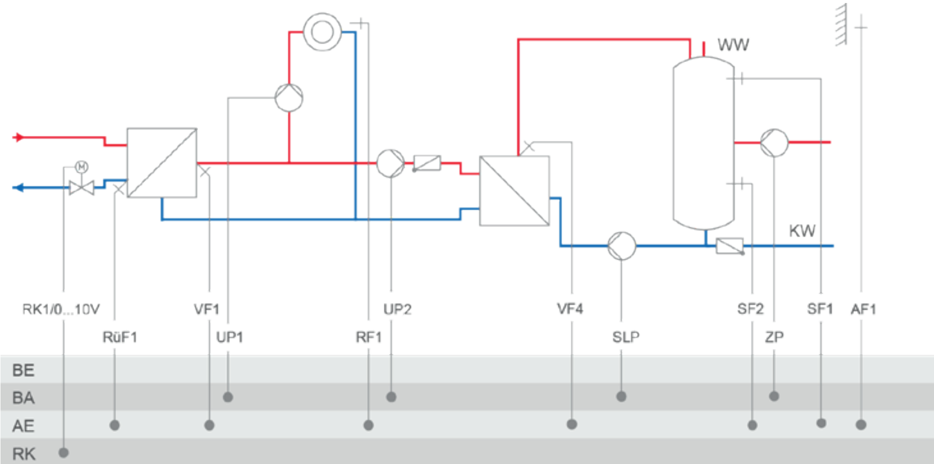
System	2.0
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO5 -> F07	- 0 (without error message at terminal 43)

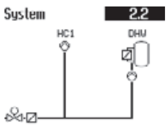
System Anl 2.1



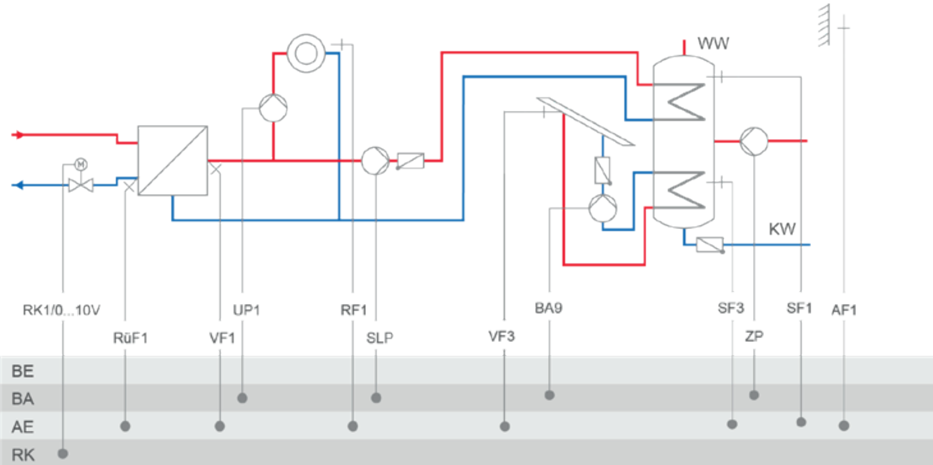
System	2.1
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO5 -> F07	- 0 (without error message at terminal 43)

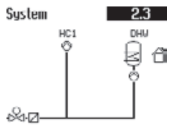
System Anl 2.2



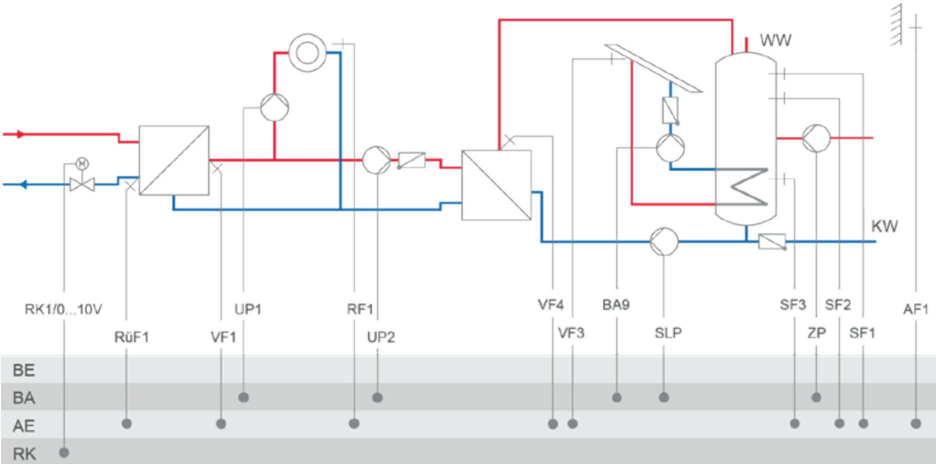
System	2.2
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F05	- 0 (without VF4)
CO5 -> F07	- 0 (without error message at terminal 43)

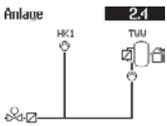
System Anl 2.3



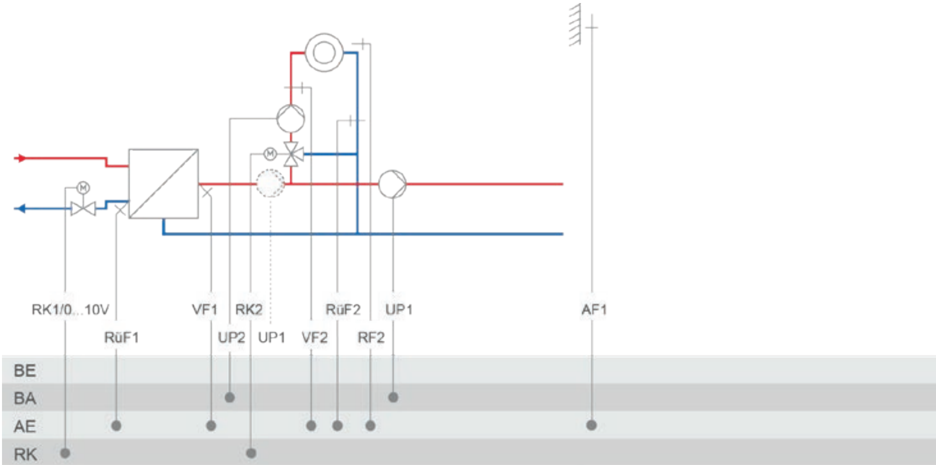
System	2.3
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO5 -> F07	- 0 (without error message at terminal 43)

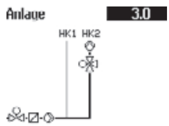
System Anl 2.4



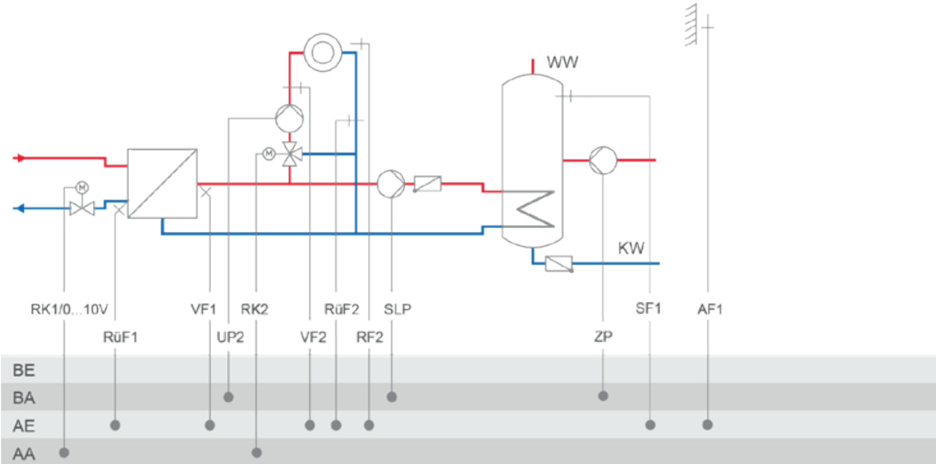
System	2.4
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F05	- 0 (without VF4)
CO5 -> F07	- 0 (without error message at terminal 43)

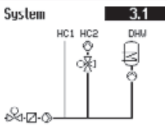
System Anl 3.0



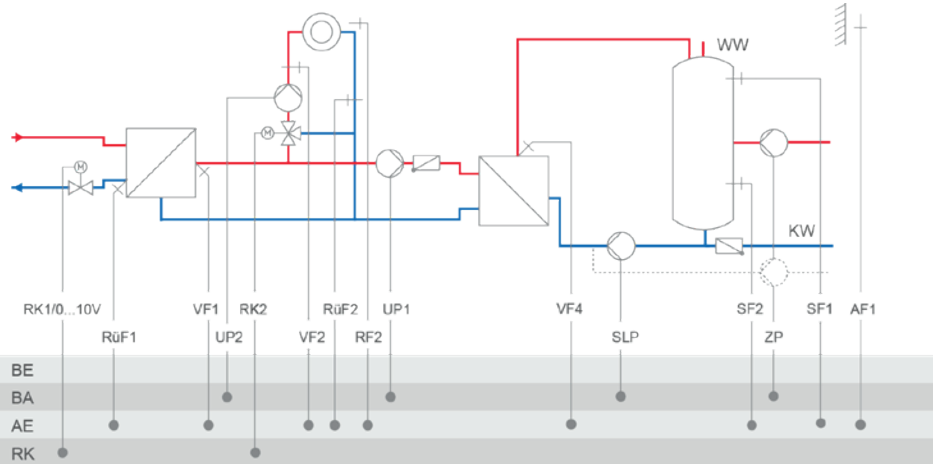
System	3.0
	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO5 -> F07	- 0 (without error message at terminal 37)
CO5 -> F14	- 0 (UP1 only active during the processing for an external demand)

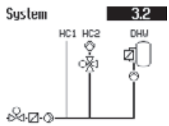
System Anl 3.1



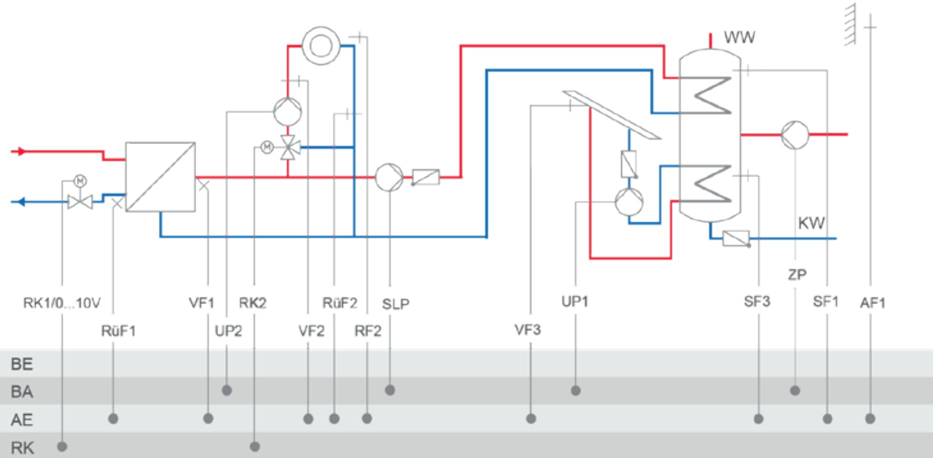
System	3.1
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO5 -> F07	- 0 (without error message at terminal 46)

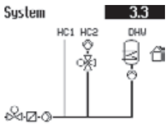
System Anl 3.2



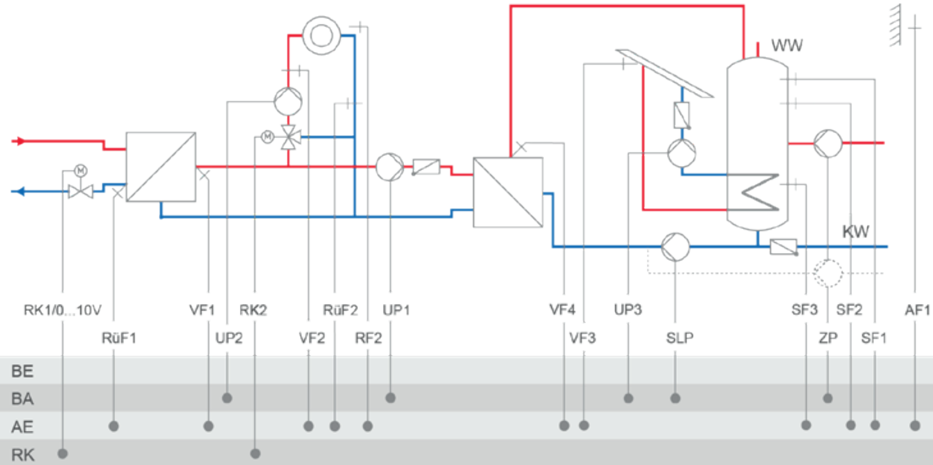
System	3.2
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F05	- 0 (without VF4)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)
CO5 -> F07	- 0 (without error message at terminal 46)

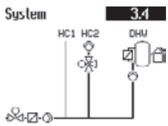
System Anl 3.3



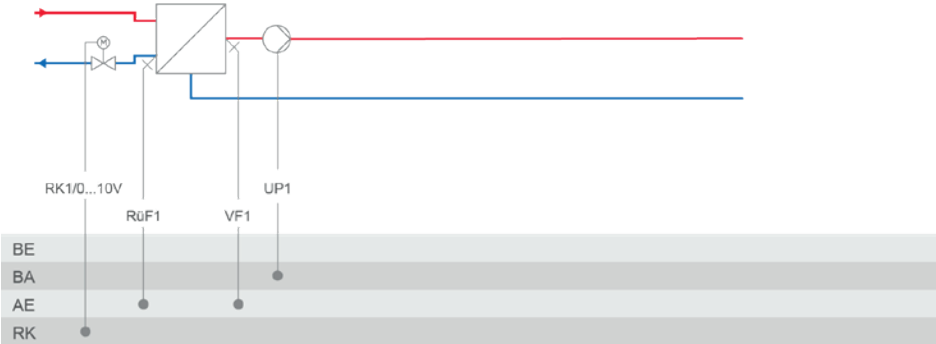
System	3.3
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO5 -> F07	- 0 (without error message at terminal 46)

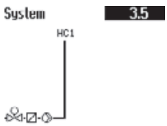
System Anl 3.4



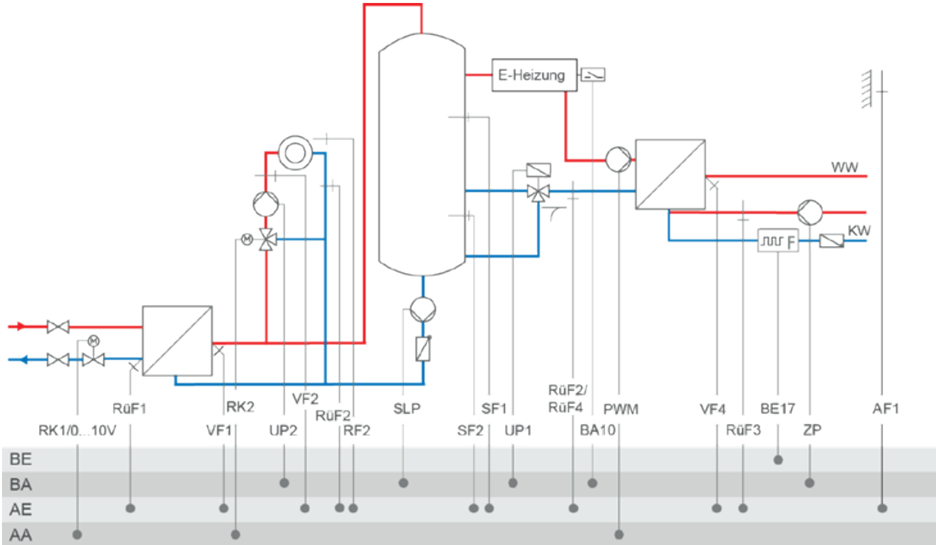
System	3.4
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F05	- 0 (without VF4)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)
CO5 -> F07	- 0 (without error message at terminal 46)

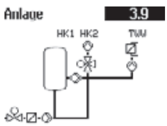
System Anl 3.5



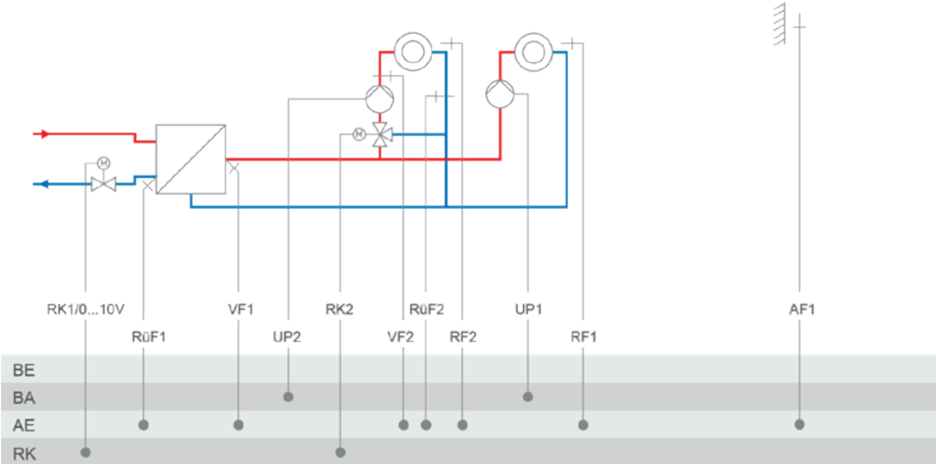
System	**3.5**
	
Note:	Closed control circuit and UP1 are only active during the processing for an external demand
Default settings	
CO1 -> F03	- 1 (with RüF1)
CO5 -> F07	- 0 (without error message at terminal 43)

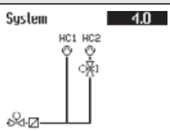
System Anl 3.9



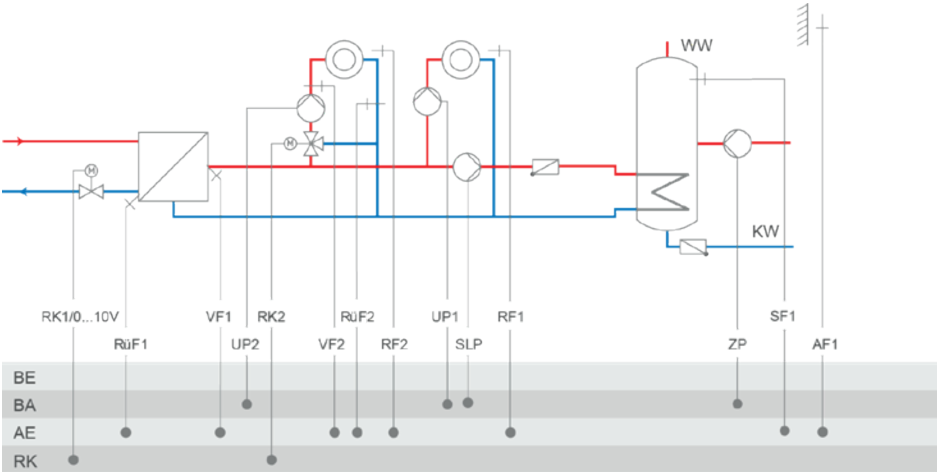
System	3.9
	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO1 -> F06	- 1 (with SF2)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2 in RK2)
CO4 -> F03	- 0 (without RüF2/RüF4)
CO4 -> F04	- 0 (without flow switch)
CO4 -> F14	- 0 (without RüF3)
CO5 -> F07	- 0 (without error message at terminal 46)

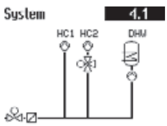
System Anl 4.0



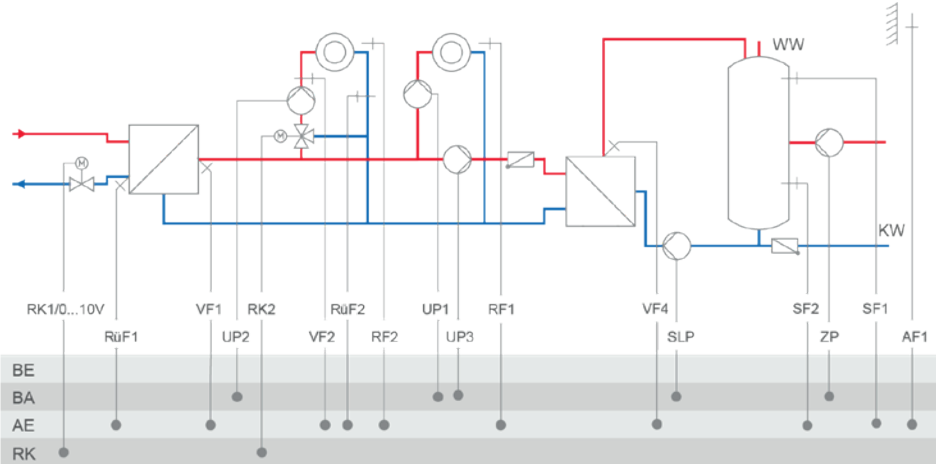
System	4.0
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO5 -> F07	- 0 (without error message at terminal 37)

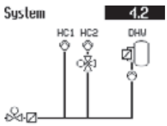
System Anl 4.1



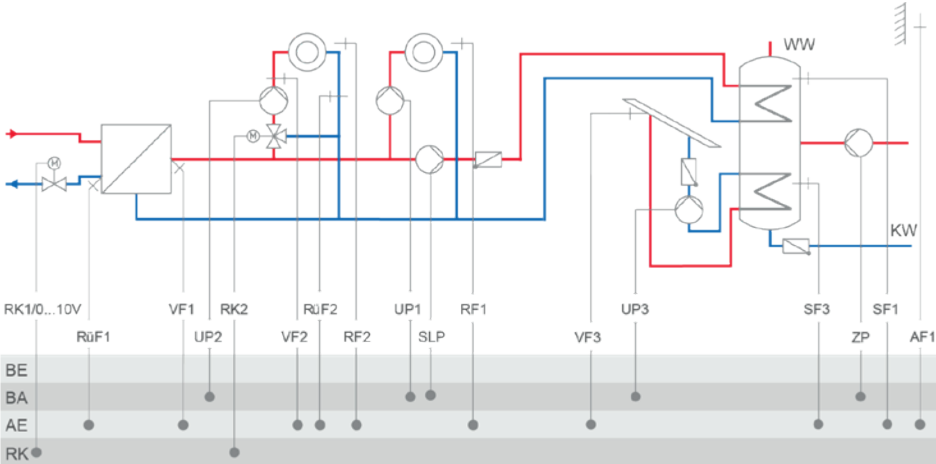
System	4.1
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO5 -> F07	- 0 (without error message at terminal 46)

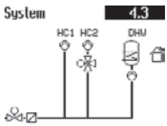
System Anl 4.2



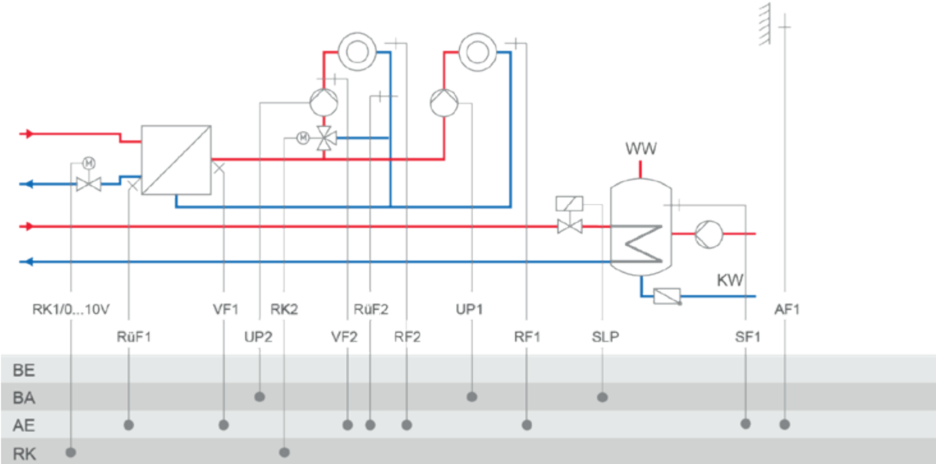
System	4.2
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F05	- 0 (without VF4)
CO5 -> F07	- 0 (without error message at terminal 46)

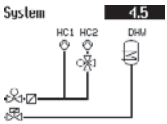
System Anl 4.3



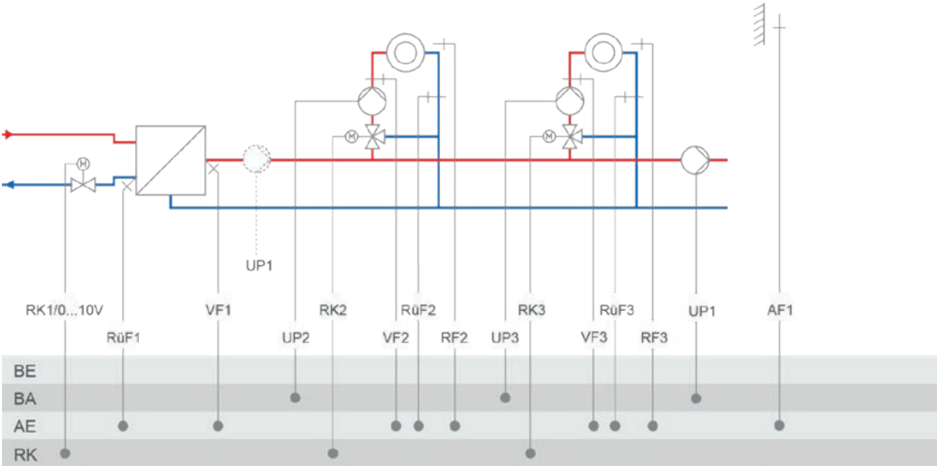
System	4.3
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO5 -> F07	- 0 (without error message at terminal 46)

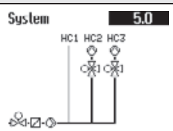
System Anl 4.5



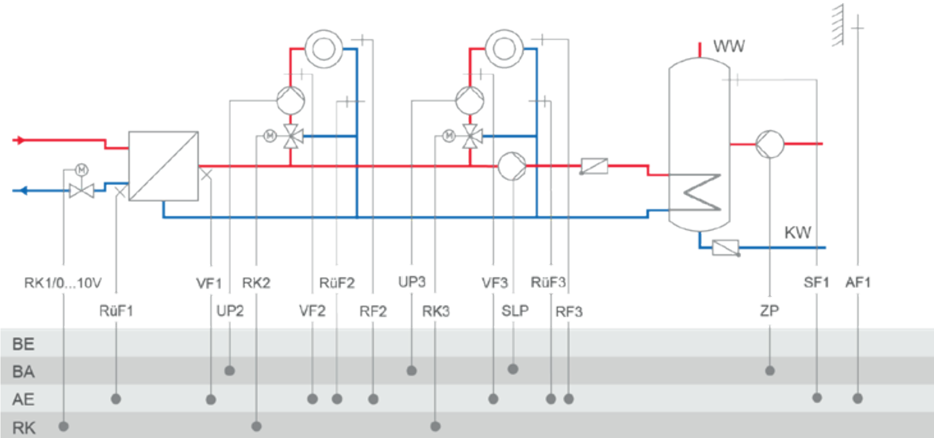
System	4.5
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO5 -> F07	- 0 (without error message at terminal 46)

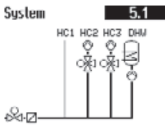
System Anl 5.0



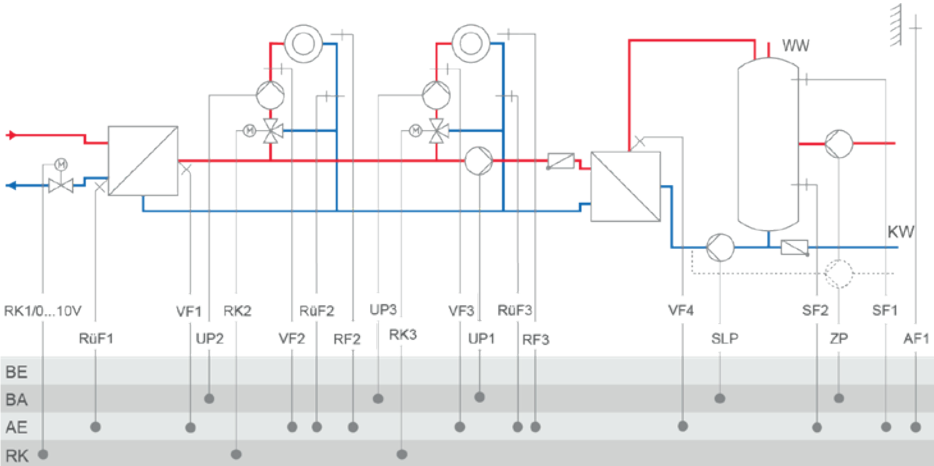
System	**5.0**
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2 RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO5 -> F07	- 0 (without error message at terminal 37)
CO5 -> F14	- 0 (UP1 only active during the processing for an external demand)

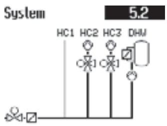
System Anl 5.1



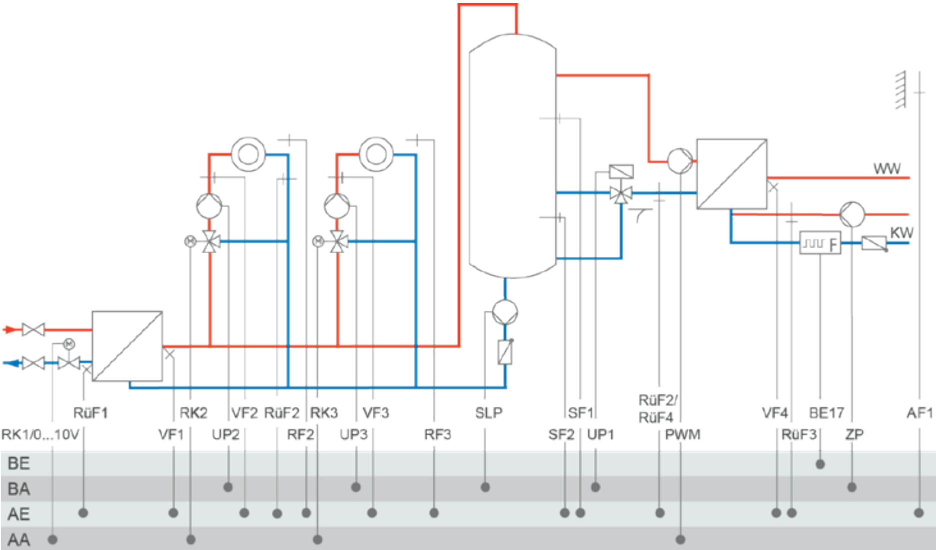
System	5.1
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2 RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO3 -> F01	- 0 (without RF2)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF2)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)

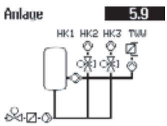
System Anl 5.2



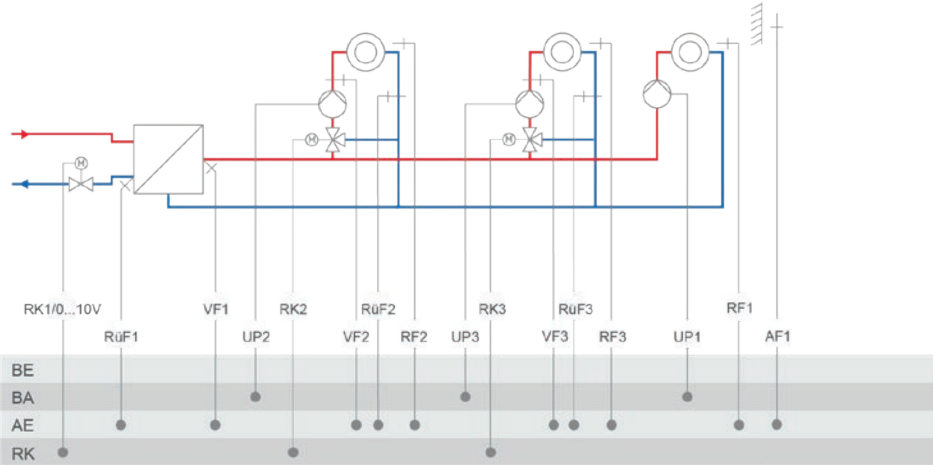
<table>
<tr><th>System</th><th>5.2</th></tr>
<tr><td></td><td>
</td></tr>
<tr><td colspan="2">RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2</td></tr>
<tr><th colspan="2">Default setting</th></tr>
<tr><td>CO1 -> F01</td><td>- 0 (without RF1)</td></tr>
<tr><td>CO1 -> F02</td><td>- 1 (with AF1)</td></tr>
<tr><td>CO1 -> F03</td><td>- 1 (with RüF1)</td></tr>
<tr><td>CO2 -> F01</td><td>- 0 (without RF2)</td></tr>
<tr><td>CO2 -> F02</td><td>- 1 (with AF1)</td></tr>
<tr><td>CO2 -> F03</td><td>- 0 (without RüF2)</td></tr>
<tr><td>CO3 -> F01</td><td>- 0 (without RF3)</td></tr>
<tr><td>CO3 -> F02</td><td>- 1 (with AF1)</td></tr>
<tr><td>CO3 -> F03</td><td>- 0 (without RüF3)</td></tr>
<tr><td>CO4 -> F01</td><td>- 1 (with SF1)</td></tr>
<tr><td>CO4 -> F02</td><td>- 1 (with SF2)</td></tr>
<tr><td>CO4 -> F05</td><td>- 0 (without VF4)</td></tr>
<tr><td>CO4 -> F10</td><td>- 0 (DHW circulation return flow in storage tank)</td></tr>
</table>

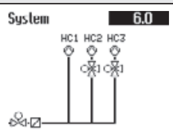
System Anl 5.9



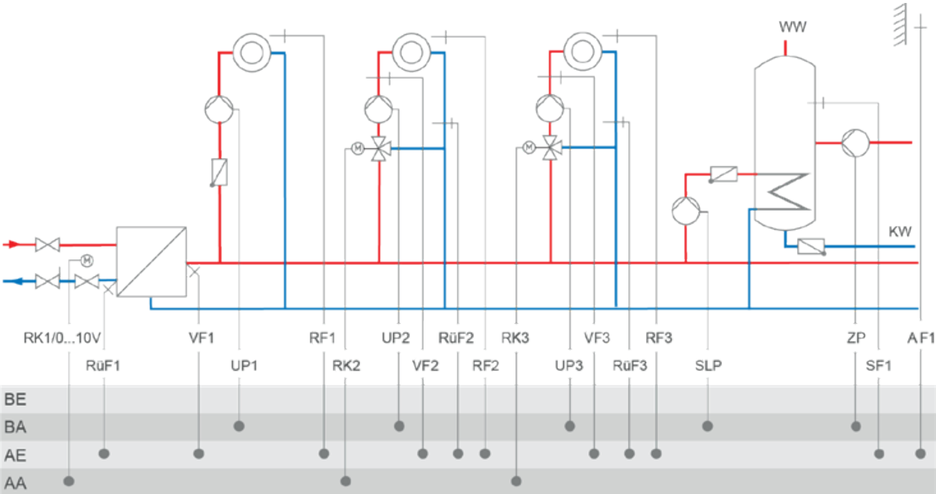
System	5.9
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2 RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO1 -> F06	- 1 (with SF2)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2 in RK2)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO4 -> F03	- 0 (without RüF2/RüF4)
CO4 -> F04	- 0 (without flow switch)
CO4 -> F14	- 0 (without RüF3)

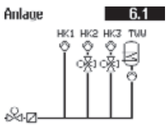
System Anl 6.0



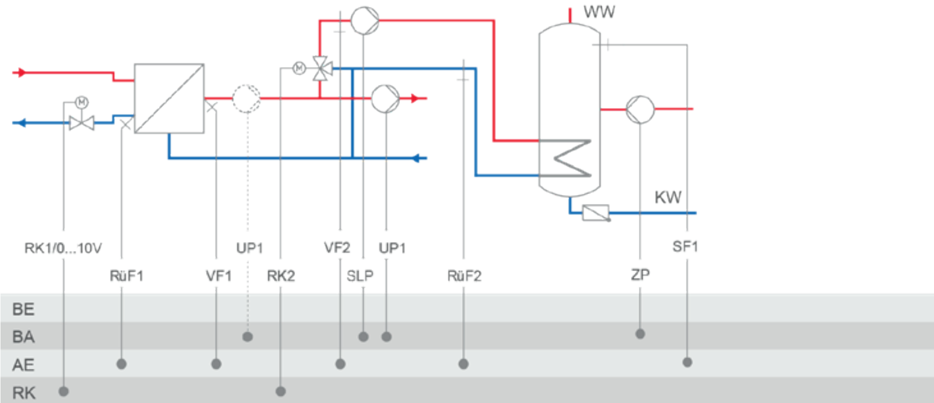
System	6.0
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2 RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO5 -> F07	- 0 (without error message at terminal 37)

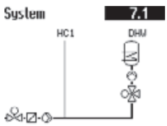
System Anl 6.1



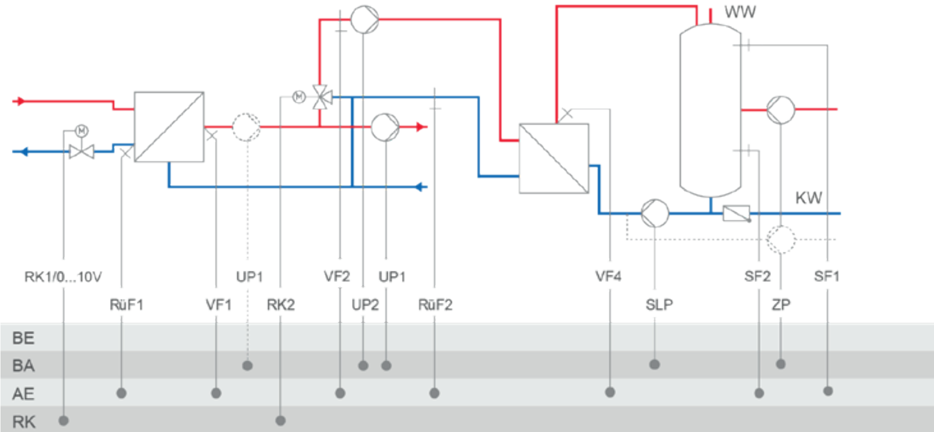
System	**6.1**
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2 RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)

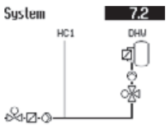
System Anl 7.1



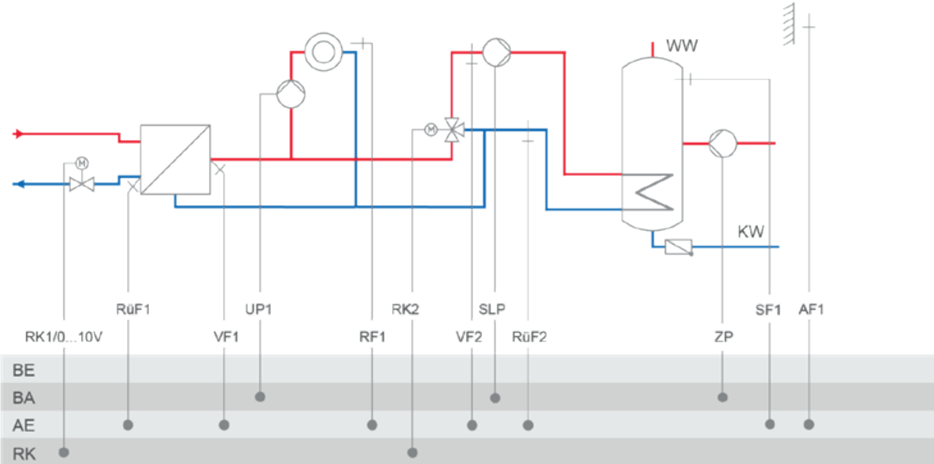
System	7.1
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 0 (without AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F03	- 0 (without RüF2)
CO5 -> F07	- 0 (without error message at terminal 46)
CO5 -> F14	- 0 (UP1 only active during the processing for an external demand)

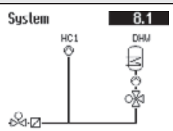
System Anl 7.2



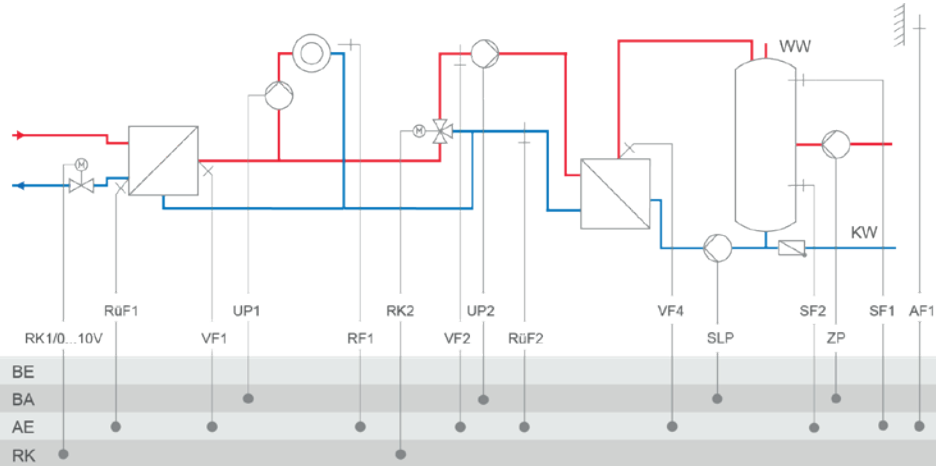
System	7.2
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 0 (without AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F05	- 0 (without VF4; in this case, VF2 usually installed at the point of measurement of VF4)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)
CO5 -> F07	- 0 (without error message at terminal 46)
CO5 -> F14	- 0 (UP1 only active during the processing for an external demand)

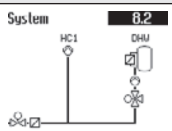
System Anl 8.1



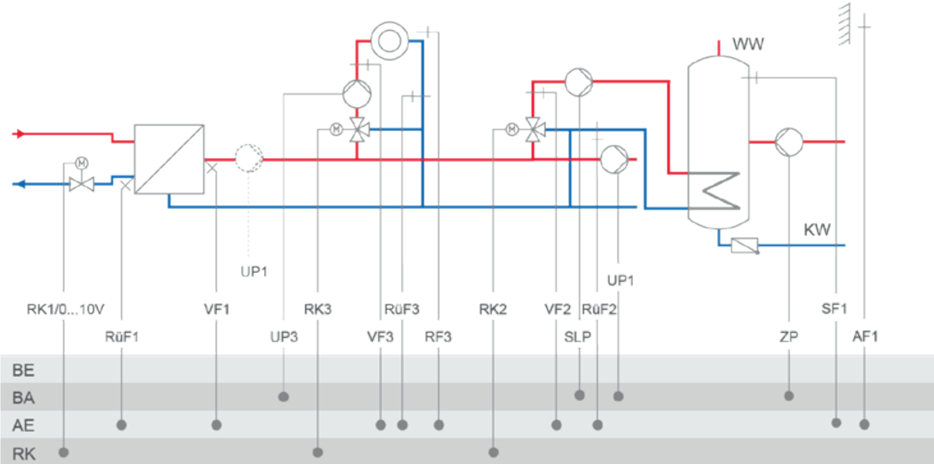
System	8.1
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F03	- 0 (without RüF2)
CO5 -> F07	- 0 (without error message at terminal 46)

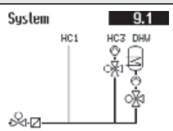
System Anl 8.2



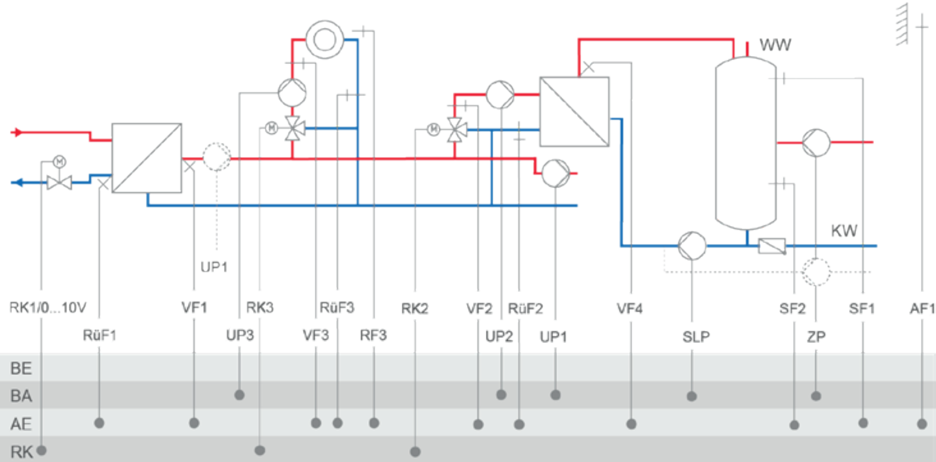
System	8.2
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F05	- 0 (without VF4; in this case, VF2 usually installed at the point of measurement of VF4)
CO5 -> F07	- 0 (without error message at terminal 46)

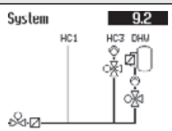
System Anl 9.1



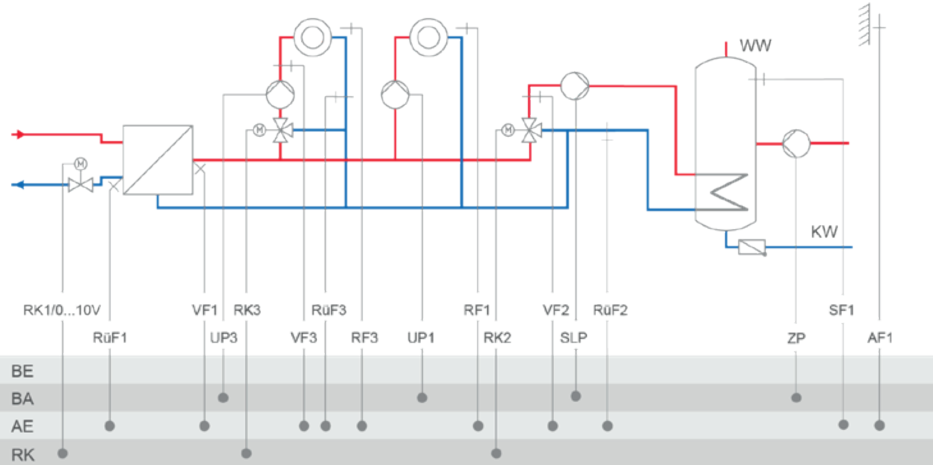
System	**9.1**
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F03	- 0 (without RüF2)
CO5 -> F14	- 0 (UP1 only active during the processing for an external demand)

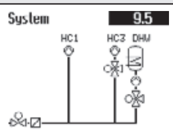
System Anl 9.2



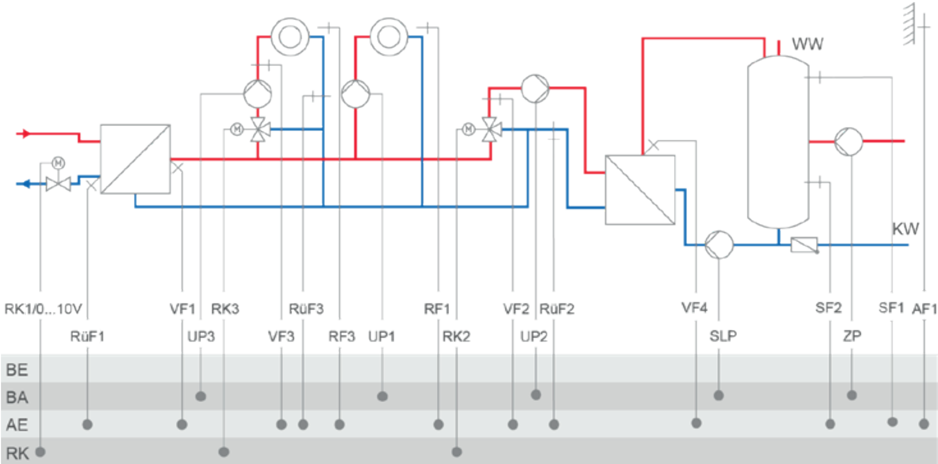
System	9.2
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F05	- 0 (without VF4; in this case, VF2 usually installed at the point of measurement of VF4)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)
CO5 -> F14	- 0 (UP1 only active during the processing for an external demand)

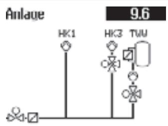
System Anl 9.5



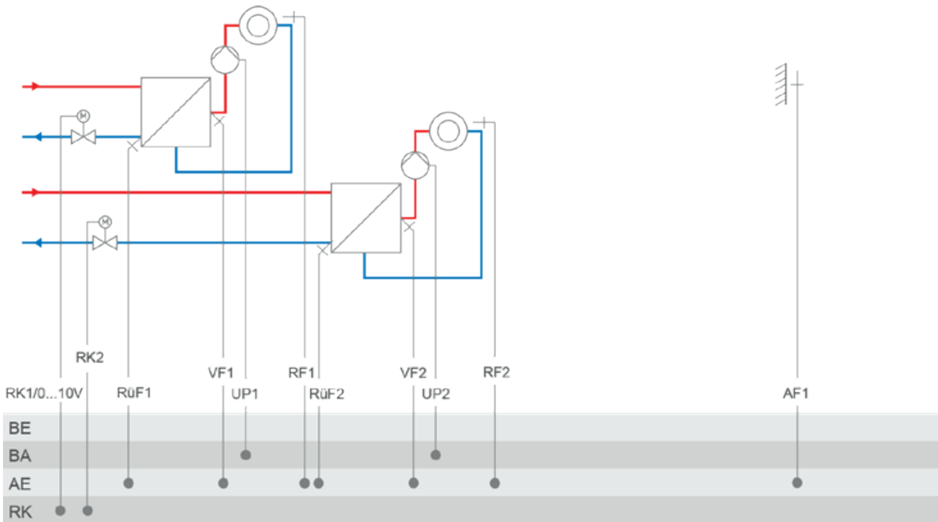
System	**9.5**
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	-1 (mit AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F03	- 0 (without RüF2)

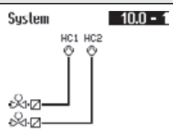
System Anl 9.6



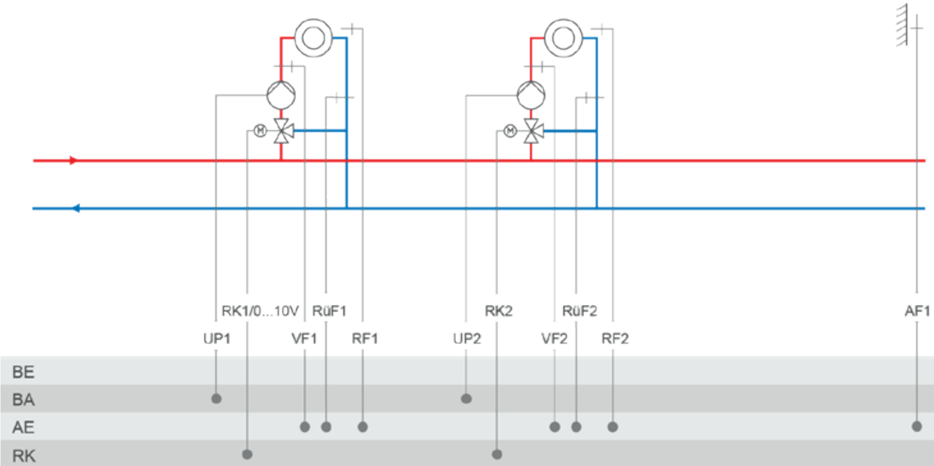
System	9.6
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F05	- 0 (without VF4; in this case, VF2 usually installed at the point of measurement of VF4)

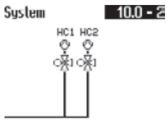
System Anl 10.0-1



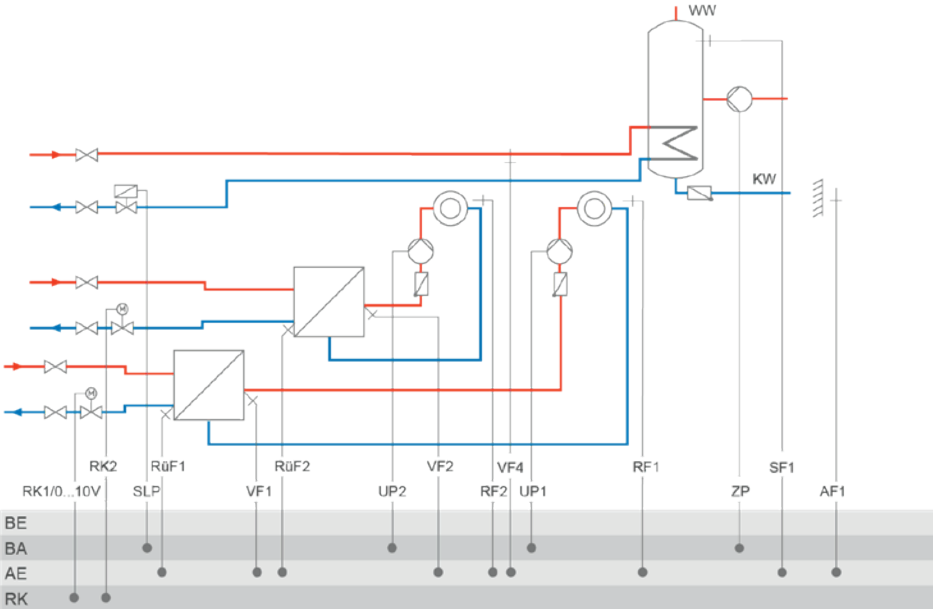
System	**10.0-1**
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 1 (with RüF2)
CO5 -> F07	- 0 (without error message at terminal 37)

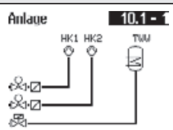
System Anl 10.0-2



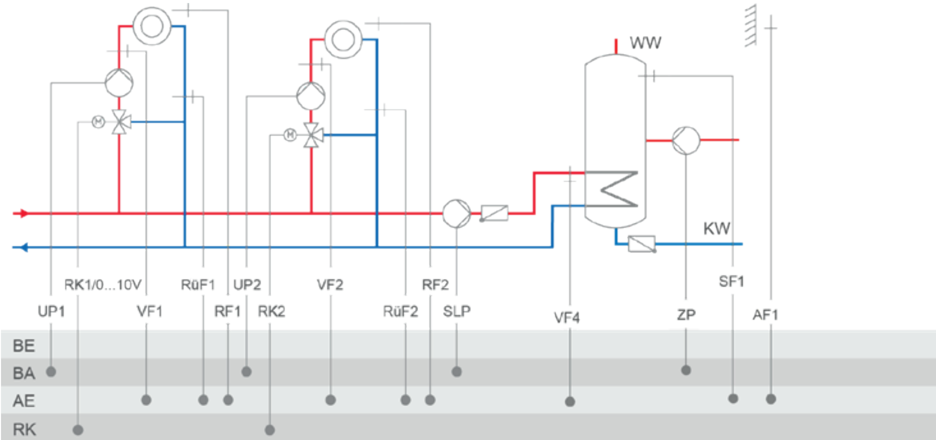
System	10.0-2
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 1 (with RüF2)
CO5 -> F07	- 0 (without error message at terminal 37)

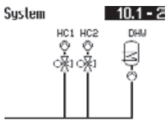
System Anl 10.1-1



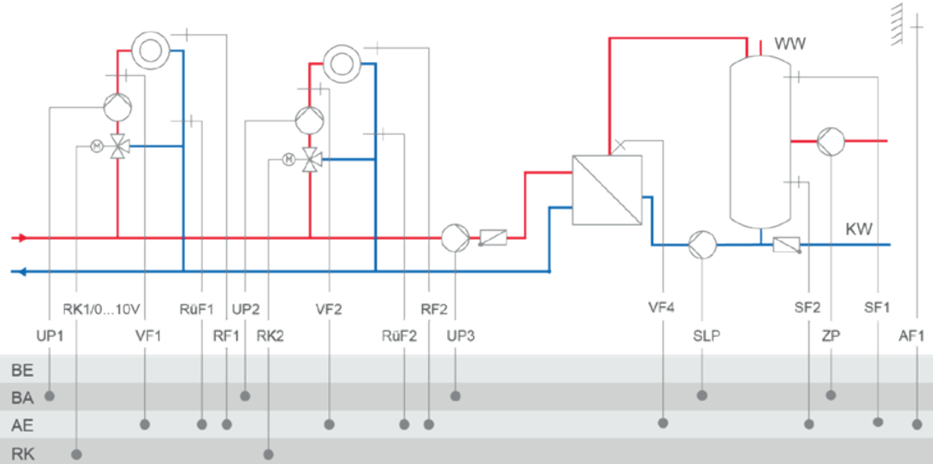
System	10.1-1
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 0 (without RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F05	- 0 (without VF4)
CO5 -> F07	- 0 (without error message at terminal 46)

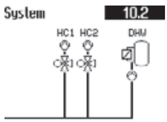
System Anl 10.1-2



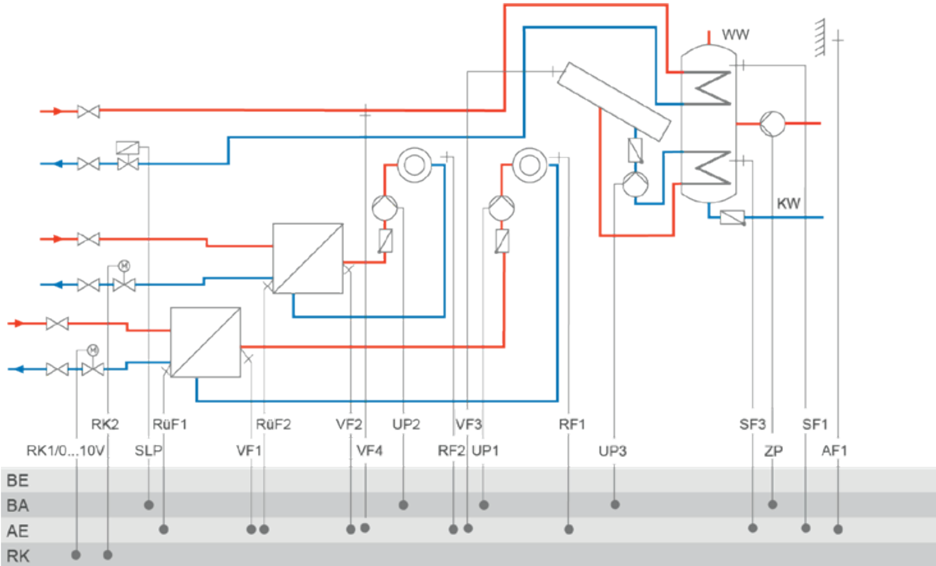
System	10.1-2
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 0 (without RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F05	- 0 (without VF4)
CO5 -> F07	- 0 (without error message at terminal 46)

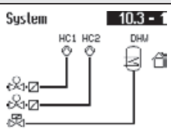
System Anl 10.2



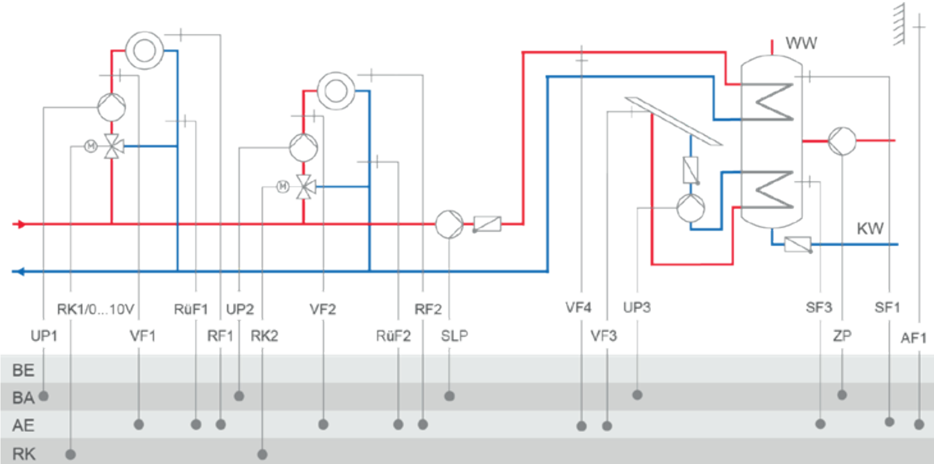
System	10.2
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 0 (without RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F05	- 0 (without VF4)
CO5 -> F07	- 0 (without error message at terminal 46)

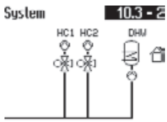
System Anl 10.3-1



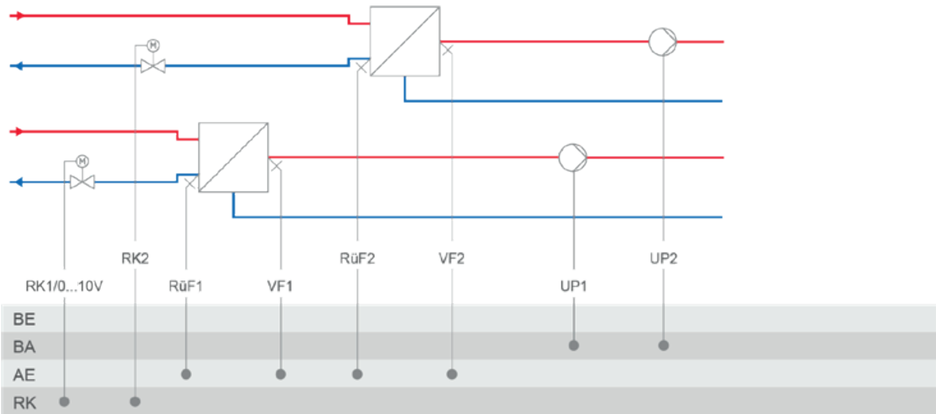
System	10.3-1
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 0 (without RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F05	- 0 (without VF4)
CO5 -> F07	- 0 (without error message at terminal 46)

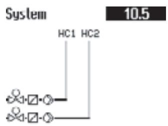
System Anl 10.3-2



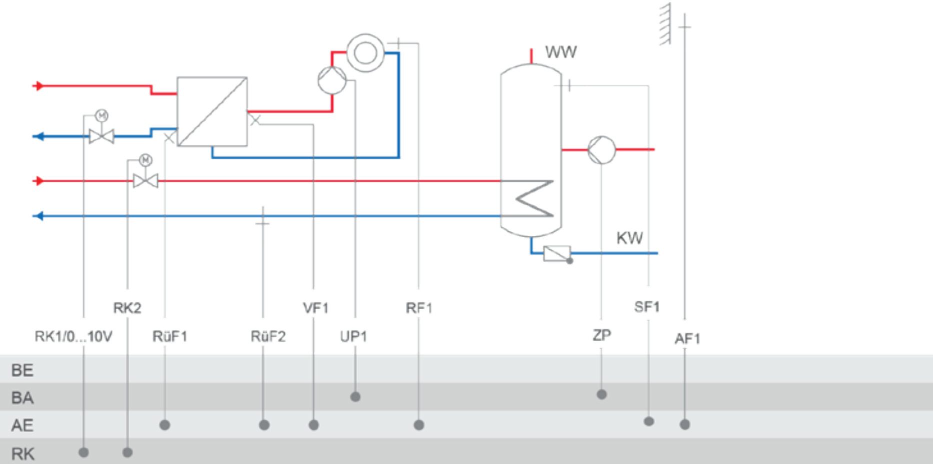
System	10.3-2
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 0 (without RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F05	- 0 (without VF4)
CO5 -> F07	- 0 (without error message at terminal 46)

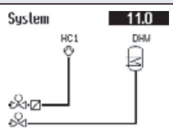
System Anl 10.5



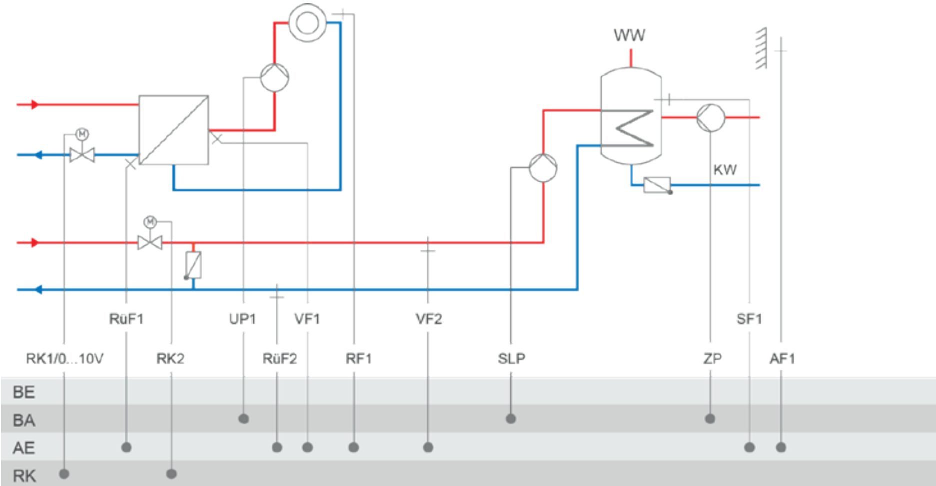
System	10.5
	
Default setting	
CO1 -> F02	- 0 (without AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F02	- 0 (without AF1)
CO2 -> F03	- 1 (with RüF2)
CO5 -> F07	- 0 (without error message at terminal 37)

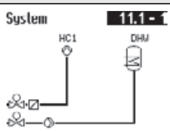
System Anl 11.0



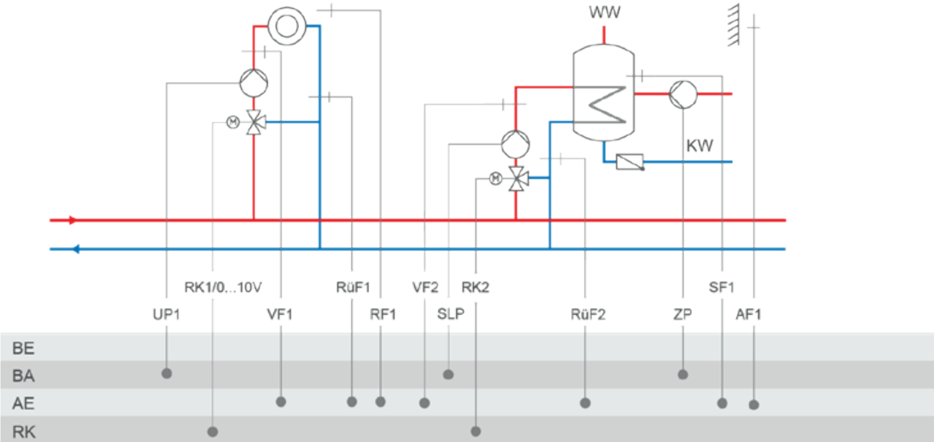
System	11.0
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F03	- 0 (without RüF2)
CO5 -> F07	- 0 (without error message at terminal 46)

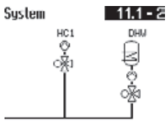
System Anl 11.1-1



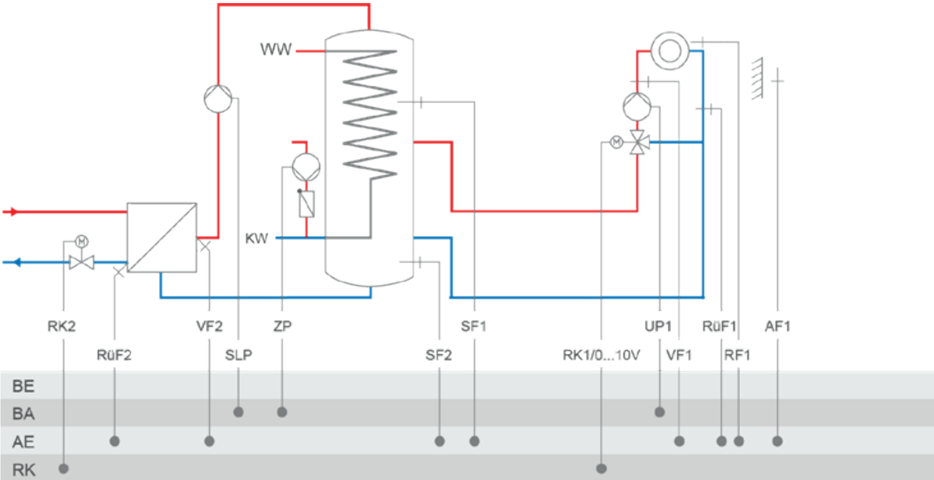
System	11.1-1
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F03	- 0 (without RüF2)
CO5 -> F07	- 0 (without error message at terminal 46)

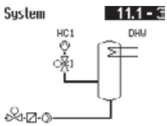
System Anl 11.1-2



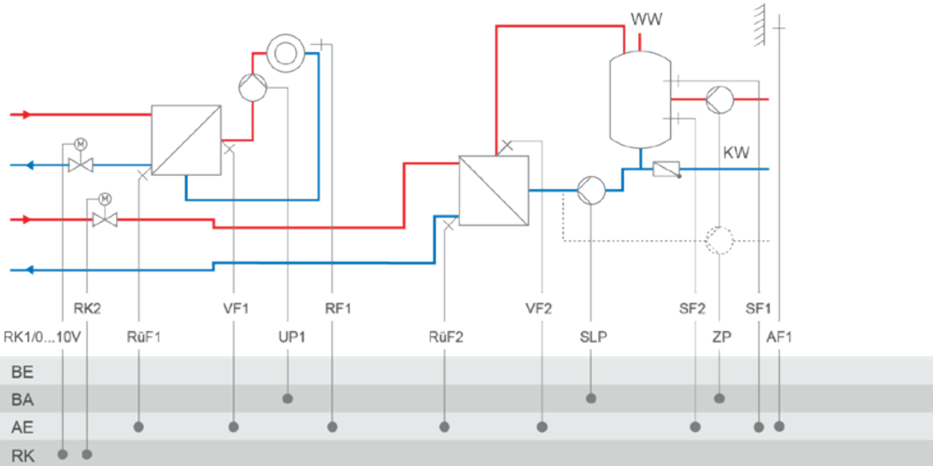
System	11.1-2
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F03	- 0 (without RüF2)
CO5 -> F07	- 0 (without error message at terminal 46)

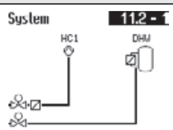
System Anl 11.1-3



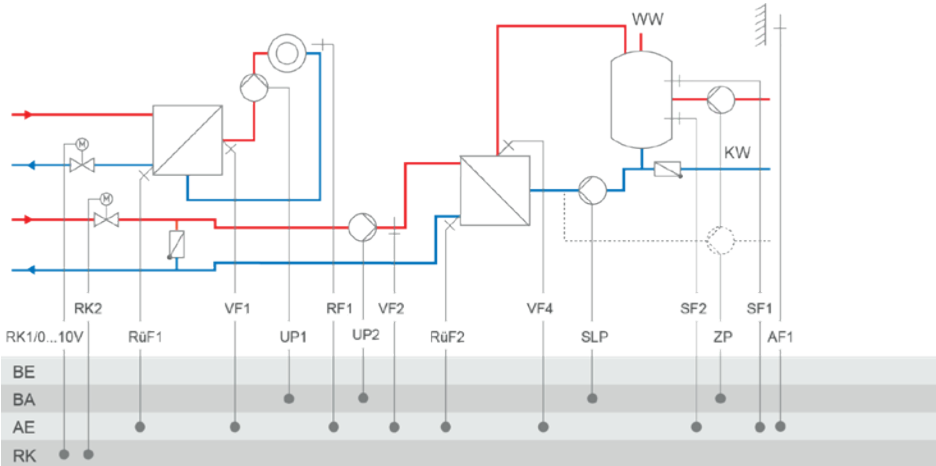
System	11.1-3
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F03	- 0 (without RüF2)
CO5 -> F07	- 0 (without error message at terminal 46)

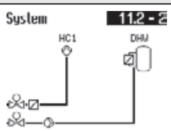
System Anl 11.2-1



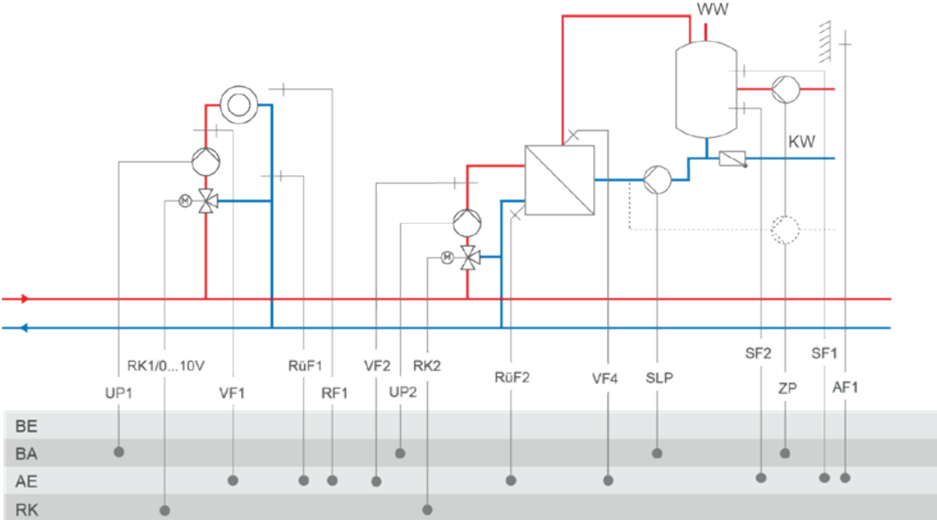
System	11.2-1
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)
CO5 -> F07	- 0 (without error message at terminal 46)

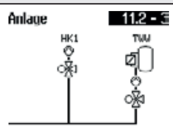
System Anl 11.2-2



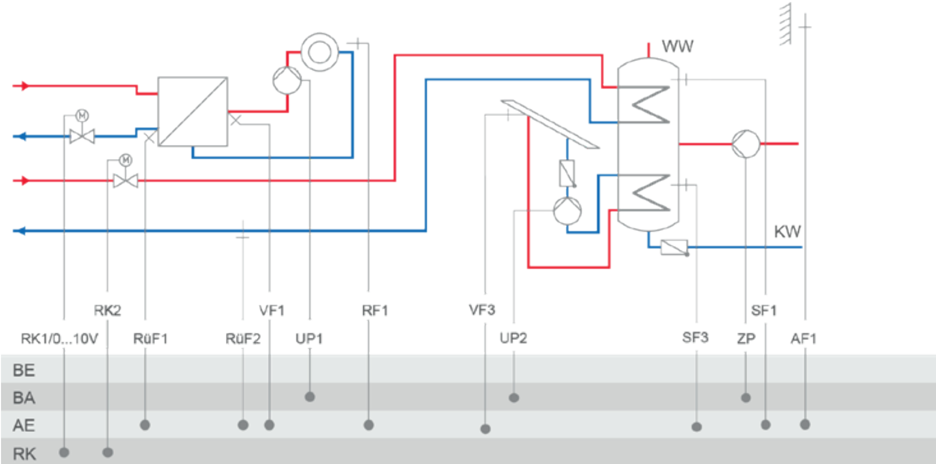
System	11.2-2
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F05	- 0 (without VF4; in this case, VF2 usually installed at the point of measurement of VF4)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)
CO5 -> F07	- 0 (without error message at terminal 46)

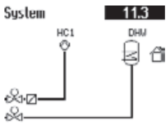
System Anl 11.2-3



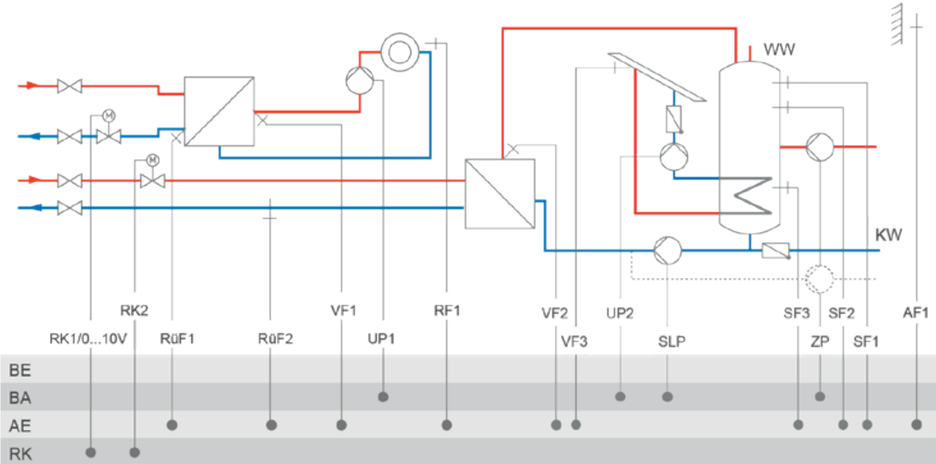
System	11.2-3
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F05	- 0 (without VF4; in this case, VF2 usually installed at the point of measurement of VF4)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)
CO5 -> F07	- 0 (without error message at terminal 46)

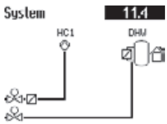
System Anl 11.3



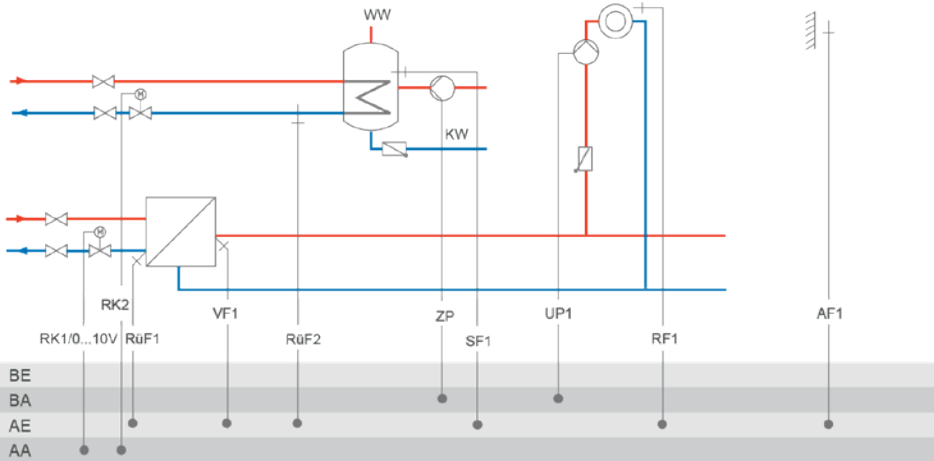
System	11.3
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F03	- 0 (without RüF2)
CO5 -> F07	- 0 (without error message at terminal 46)

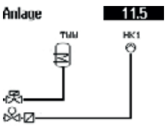
System Anl 11.4



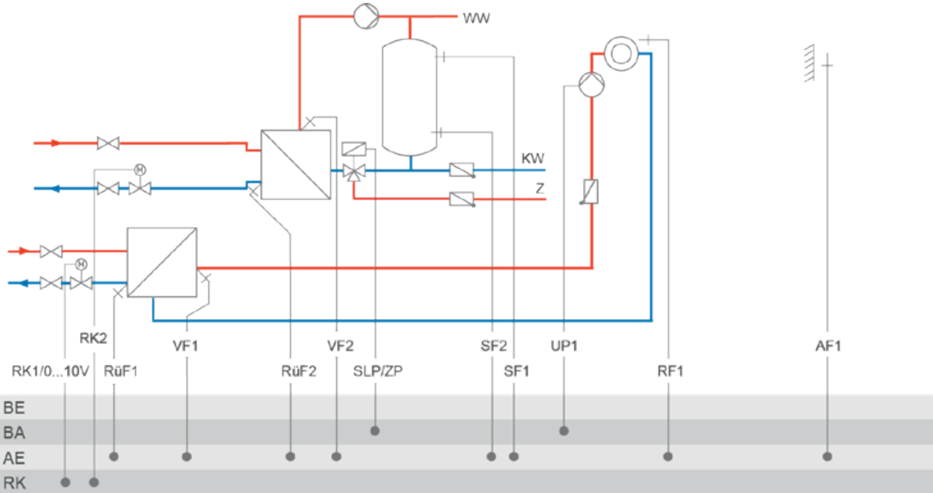
System	11.4
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)
CO5 -> F07	- 0 (without error message at terminal 46)

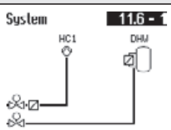
System Anl 11.5



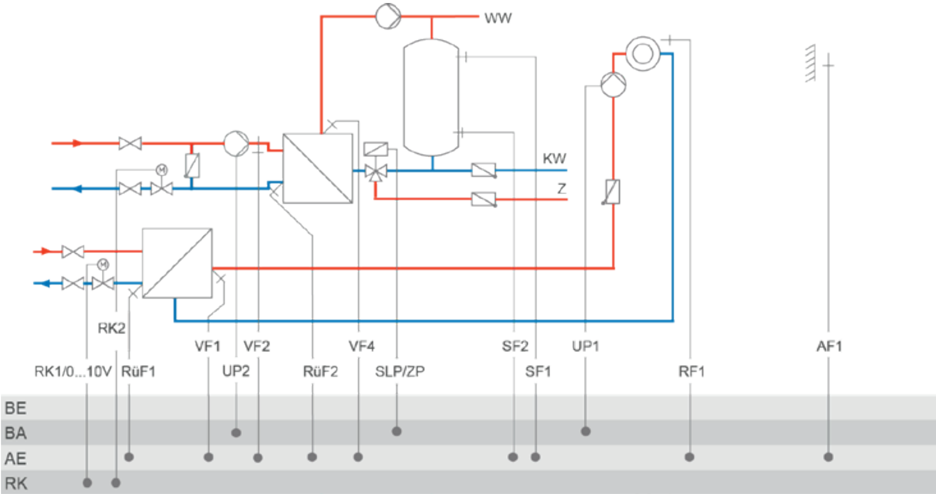
System	11.5
	
Note:	DHW circuit with adjustable valve position for storage tank charging in absolute priority operation. By using RüF2, the ready-adjusted valve position is subject to the return flow temperature limitation.
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F03	- 1 (with RüF2)
CO5 -> F07	- 0 (without error message at terminal 46)

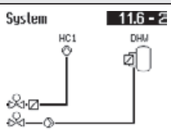
System Anl 11.6-1



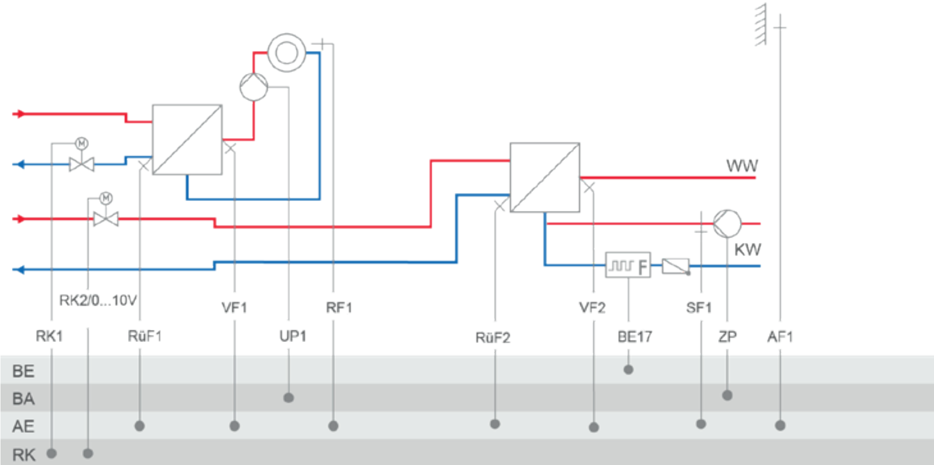
System	11.6-1
	
Note:	Install a continuously running pump in the DHW circuit and connect it directly to the supply voltage.
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO5 -> F07	- 0 (without error message at terminal 46)

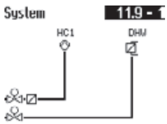
System Anl 11.6-2



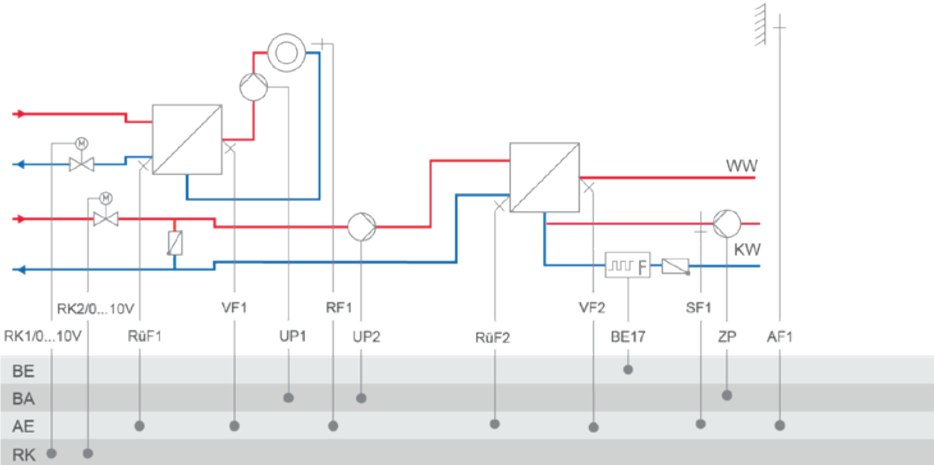
System	11.6-2
	
Note:	Install a continuously running pump in the DHW circuit and connect it directly to the supply voltage.
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F05	- 0 (without VF4; in this case, VF2 usually installed at the point of measurement of VF4)
CO5 -> F07	- 0 (without error message at terminal 46)

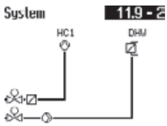
System Anl 11.9-1



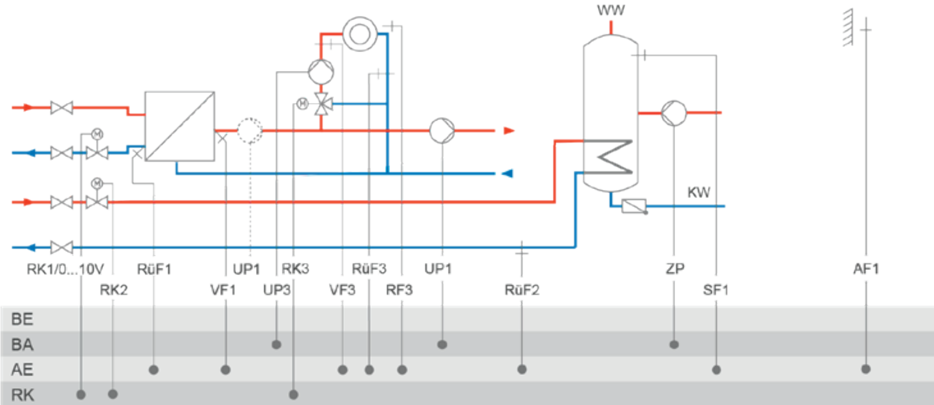
System	11.9-1
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 0 (without SF1)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F04	- 0 (without flow rate sensor)
CO5 -> F07	- 0 (without error message at terminal 37)

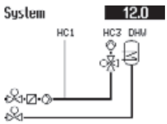
System Anl 11.9-2



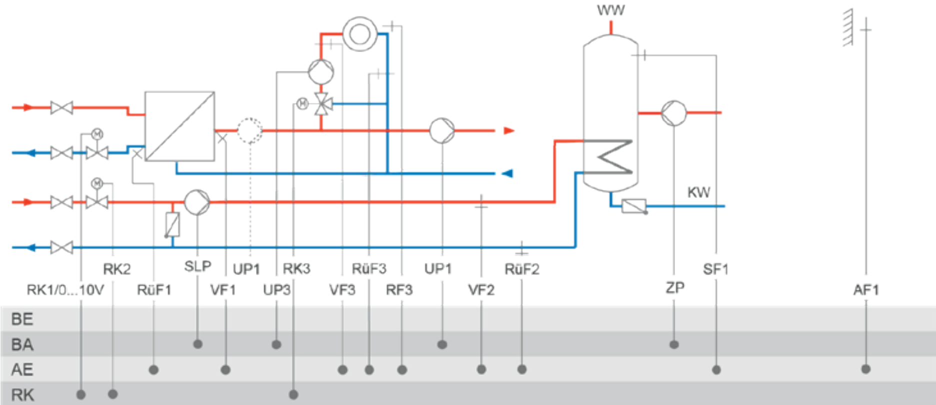
System	11.9-2
	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 0 (without SF1)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F04	- 0 (without flow rate sensor)
CO5 -> F07	- 0 (without error message at terminal 37)

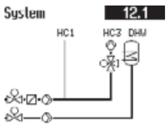
System Anl 12.0



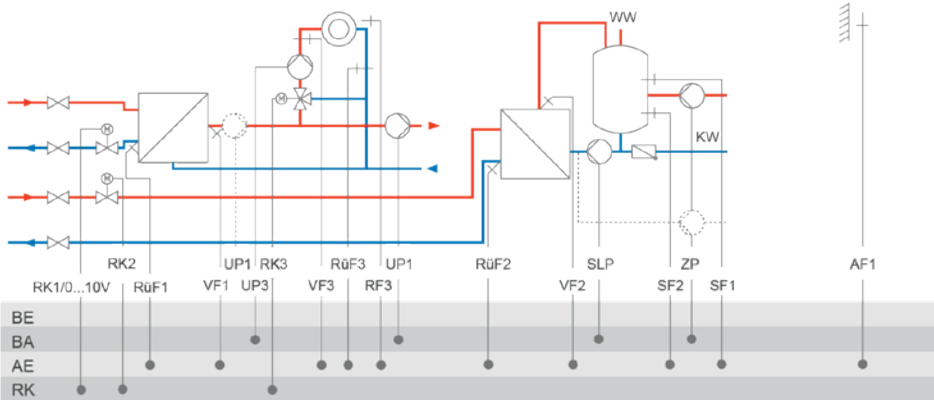
System	12.0
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F03	- 0 (without RüF2)
CO5 -> F07	- 0 (without error message at terminal 37)
CO5 -> F14	- 0 (UP1 only active during the processing for an external demand)

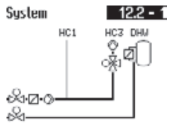
System Anl 12.1



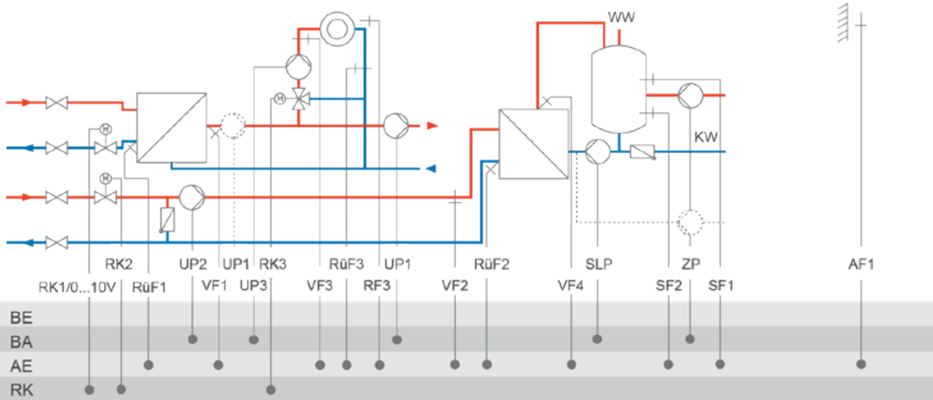
System	12.1
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F03	- 0 (without RüF2)
CO5 -> F14	- 0 (UP1 only active during the processing for an external demand)

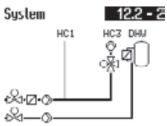
System Anl 12.2-1



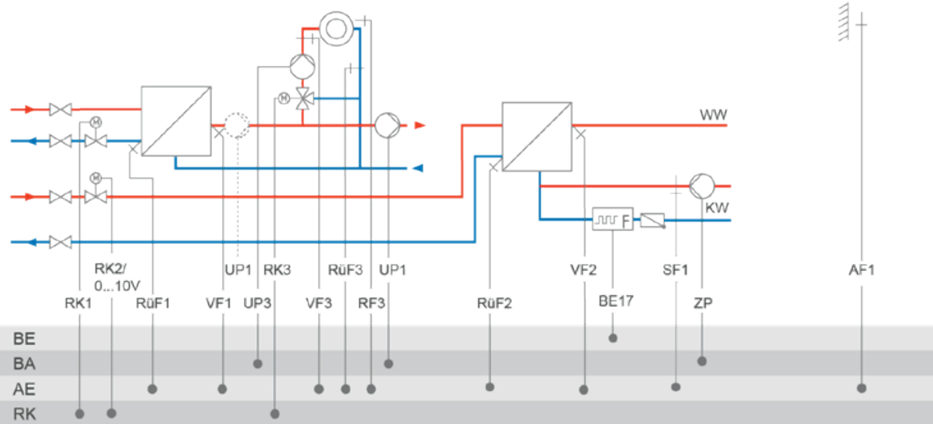
System	12.2-1
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)
CO5 -> F14	- 0 (UP1 only active during the processing for an external demand)

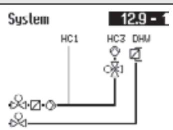
System Anl 12.2-2



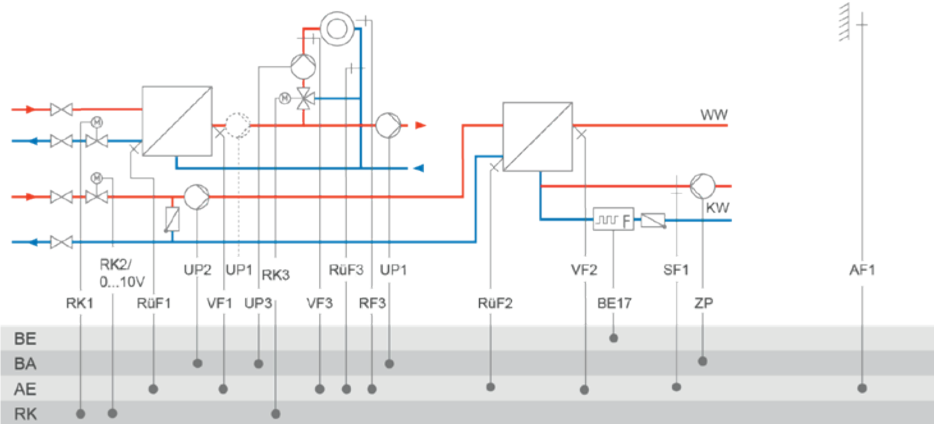
System	12.2-2
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F05	- 0 (without VF4; in this case, VF2 usually installed at the point of measurement of VF4)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)
CO5 -> F14	- 0 (UP1 only active during the processing for an external demand)

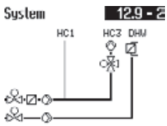
System Anl 12.9-1



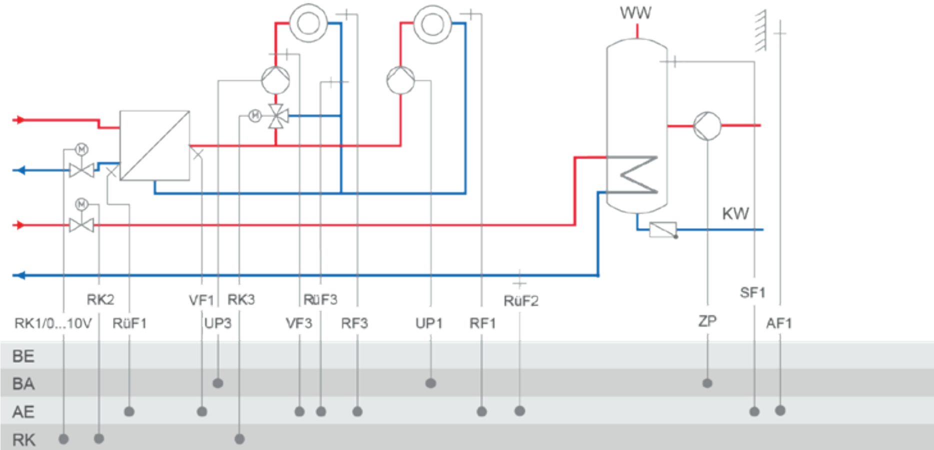
System	12.9-1
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 0 (without SF1)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F04	- 0 (without flow rate sensor)
CO5 -> F07	- 0 (without error message at terminal 37)
CO5 -> F14	- 0 (UP1 only active during the processing for an external demand)

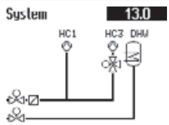
System Anl 12.9-2



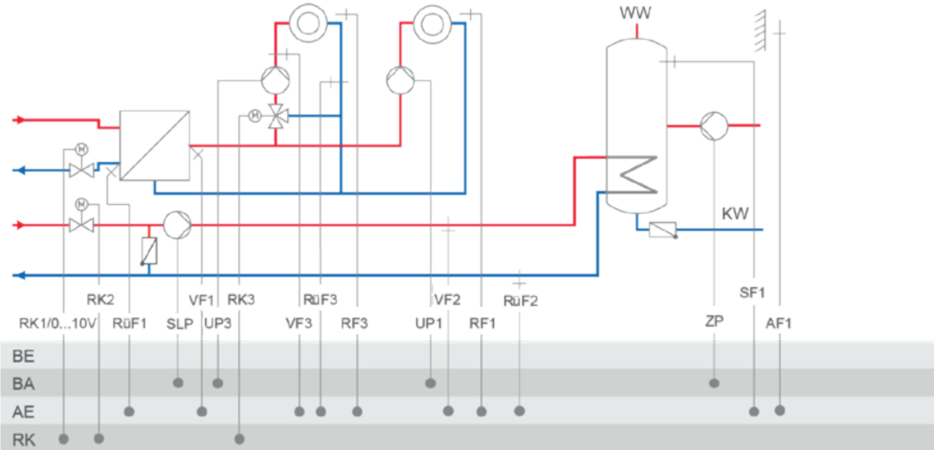
System	12.9-2
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 0 (without SF1)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F04	- 0 (without flow rate sensor)
CO5 -> F07	- 0 (without error message at terminal 37)
CO5 -> F14	- 0 (UP1 only active during the processing for an external demand)

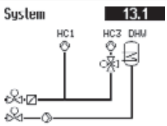
System Anl 13.0



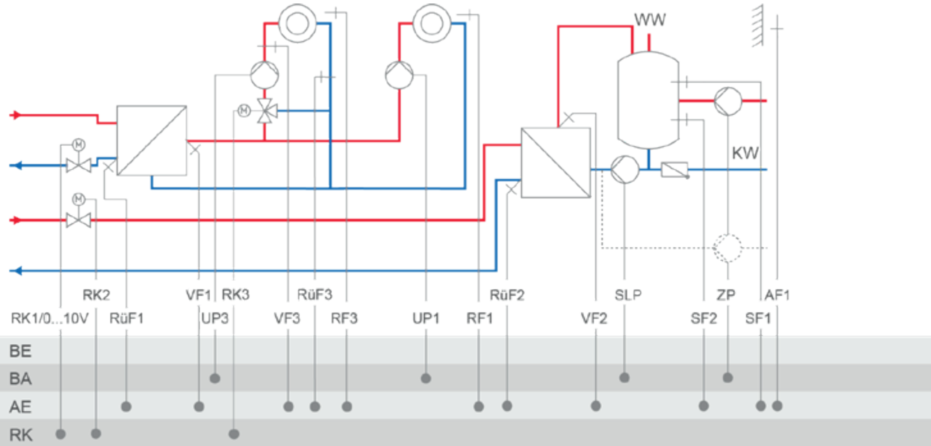
System	13.0
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F03	- 0 (without RüF2)
CO5 -> F07	- 0 (without error message at terminal 37)

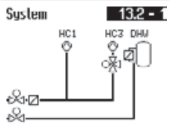
System Anl 13.1



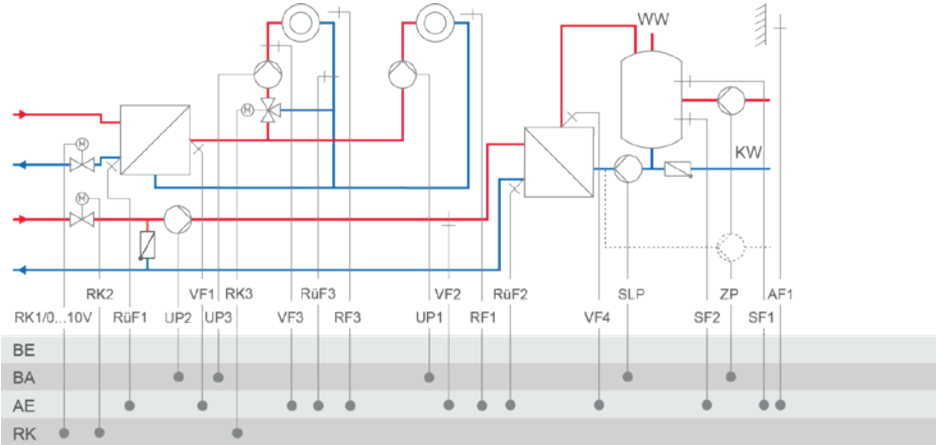
System	13.1
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F03	- 0 (without RüF2)

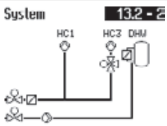
System Anl 13.2-1



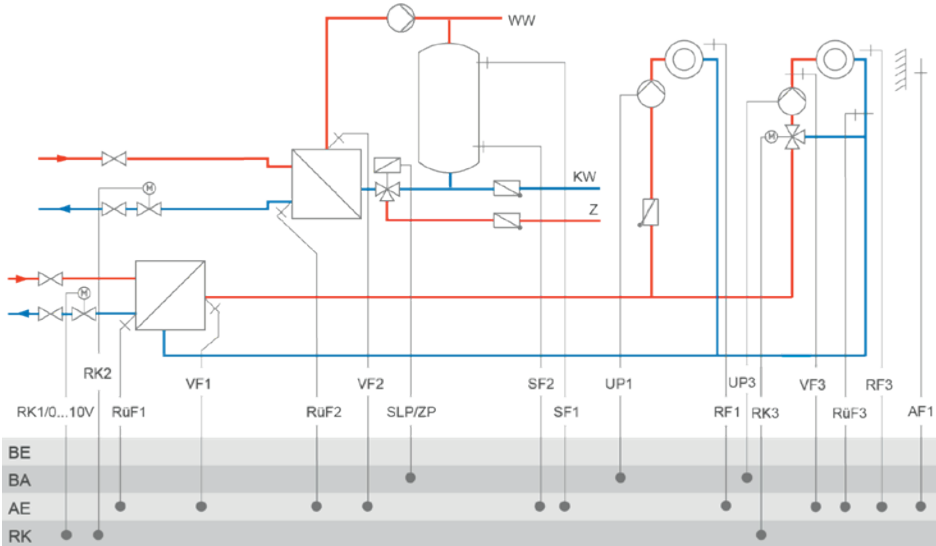
System	13.2-1
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F04	- 0 (without flow rate sensor)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)

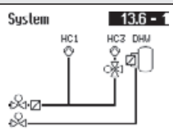
System Anl 13.2-2



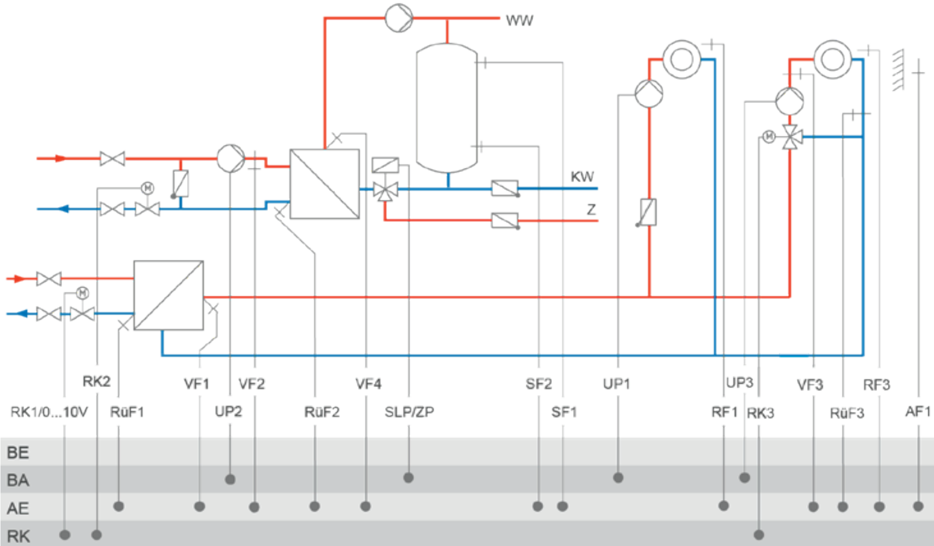
System	13.2-2
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F04	- 0 (without flow rate sensor)
CO4 -> F05	- 0 (without VF4; in this case, VF2 usually installed at the point of measurement of VF4)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)

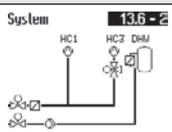
System Anl 13.6-1



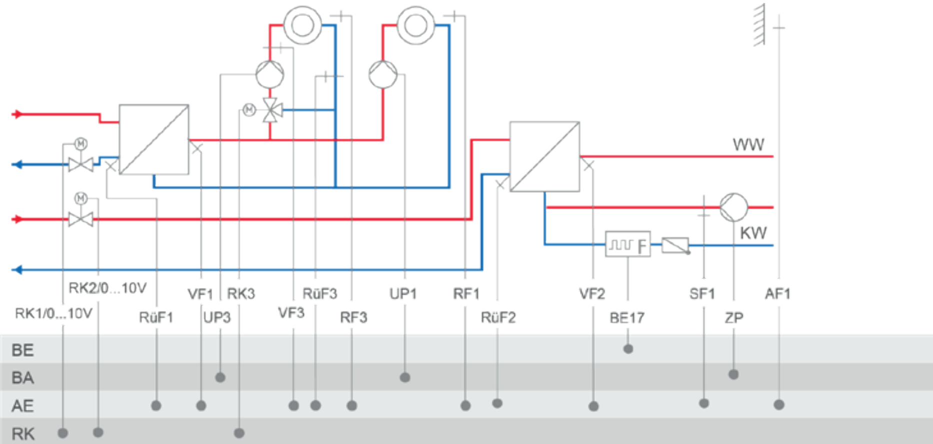
System	**13.6-1**
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Note:	Install a continuously running pump in the DHW circuit and connect it directly to the supply voltage.
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)

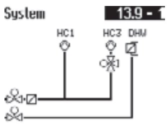
System Anl 13.6-2



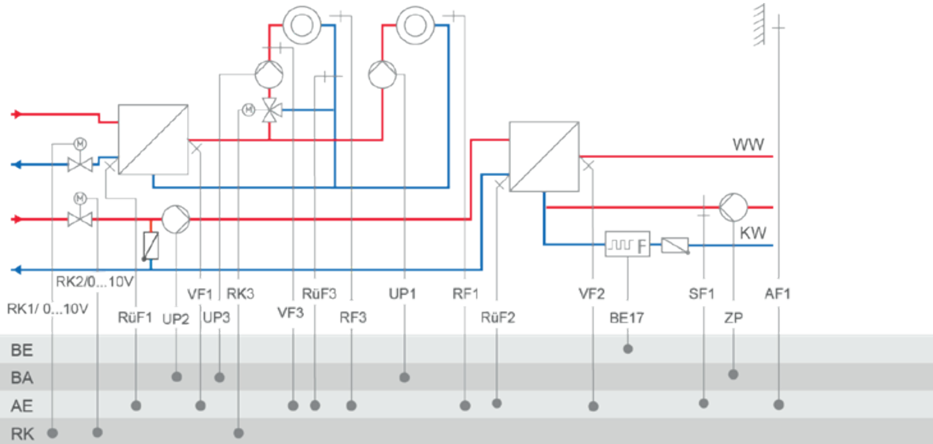
System	13.6-2
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Note:	Install a continuously running pump in the DHW circuit and connect it directly to the supply voltage.
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F05	- 0 (without VF4; in this case, VF2 usually installed at the point of measurement of VF4)

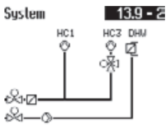
System Anl 13.9-1



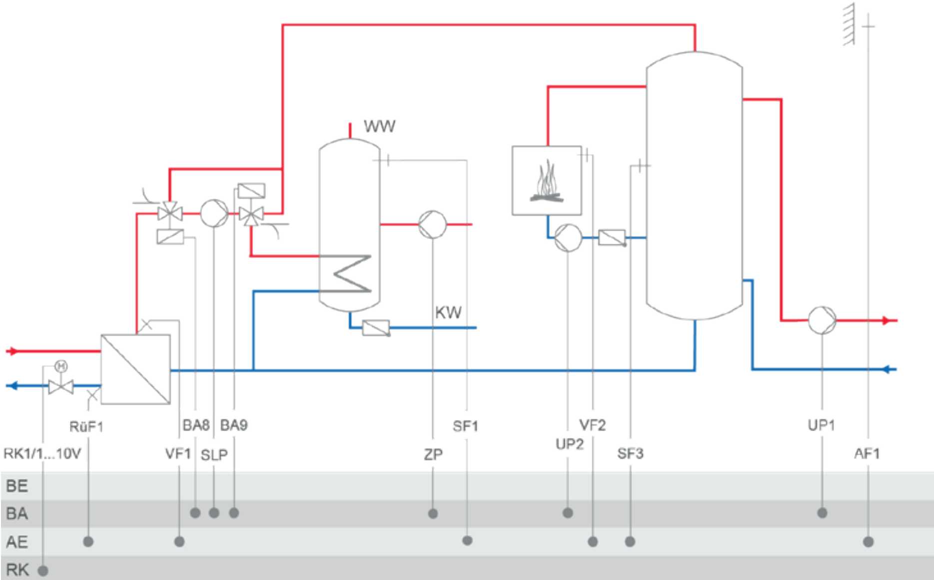
System	13.9-1
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 0 (without SF1)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F04	- 0 (without flow rate sensor)
CO5 -> F07	- 0 (without error message at terminal 37)

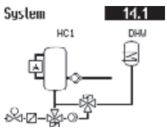
System Anl 13.9-2



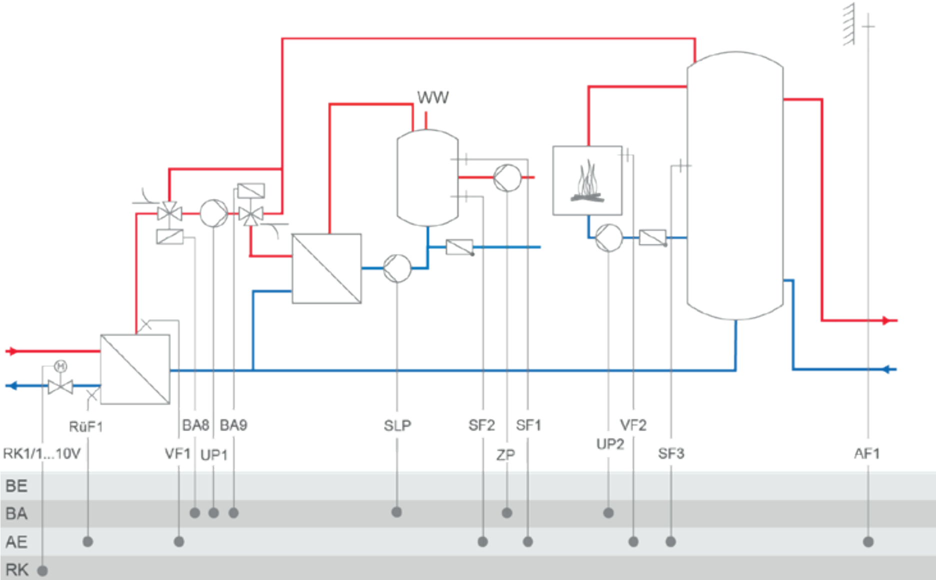
System	13.9-2
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 0 (without SF1)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F04	- 0 (without flow rate sensor)
CO5 -> F07	- 0 (without error message at terminal 37)

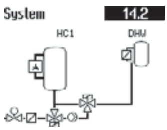
System Anl 14.1



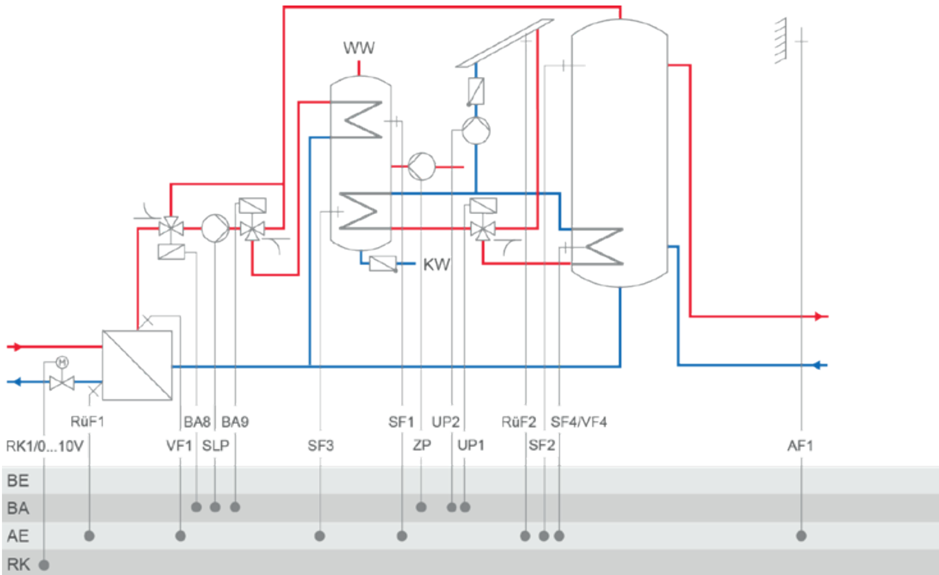
System	14.1
	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO5 -> F07	- 0 (without error message at terminal 46)

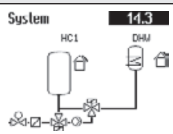
System Anl 14.2



System	14.2
	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO5 -> F07	- 0 (without error message at terminal 46)

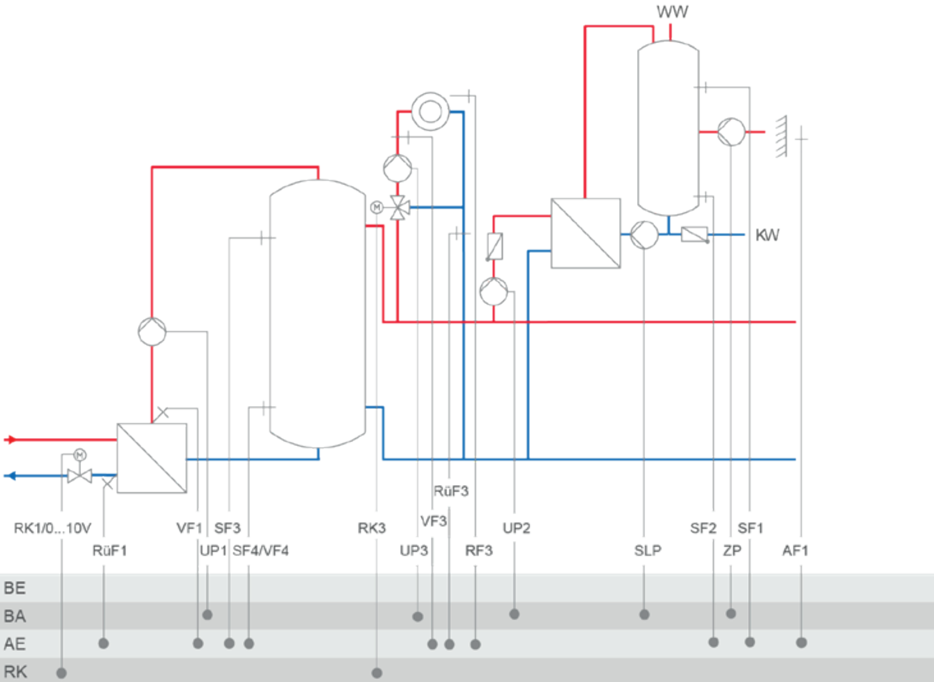
System Anl 14.3

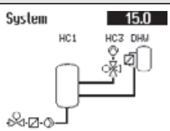


System	14.3
	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO4 -> F01	- 1 (with SF1)
CO5 -> F07	- 0 (without error message at terminal 46)

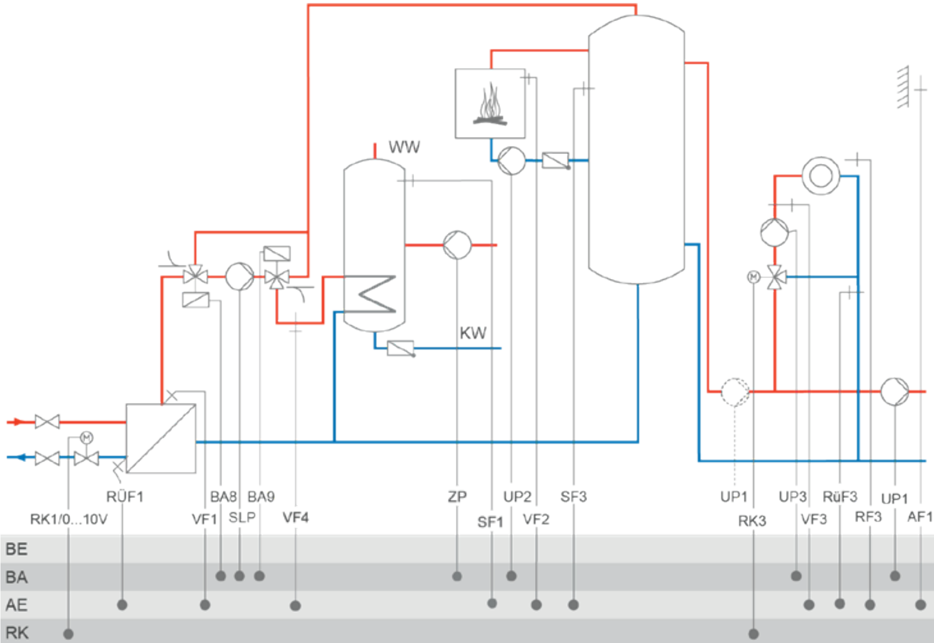
Annex A (configuration instructions)

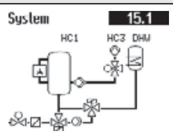
System Anl 15.0



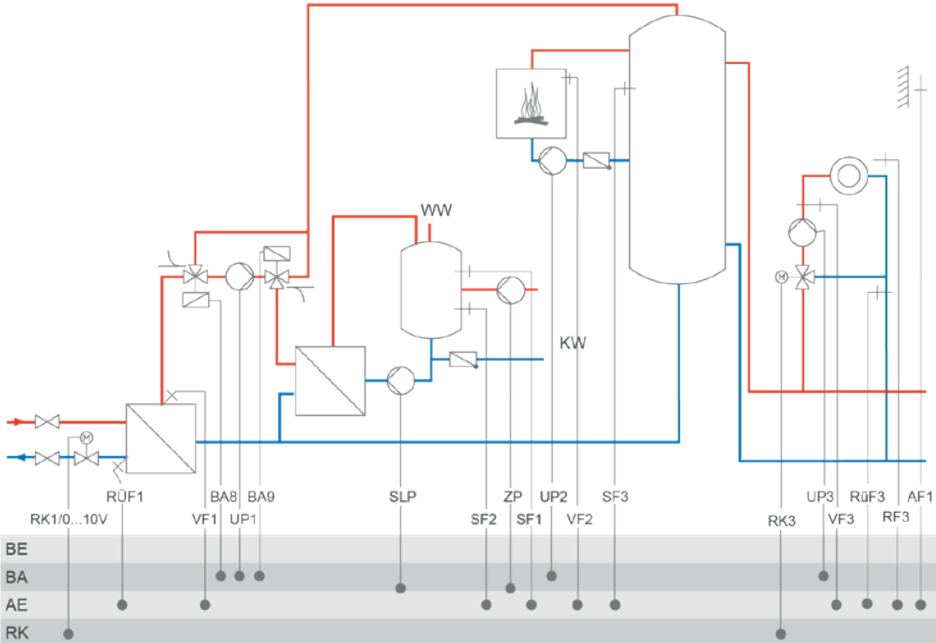
System	15.0
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO5 -> F07	- 0 (without error message at terminal 43)

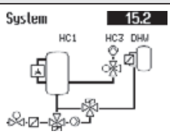
System Anl 15.1



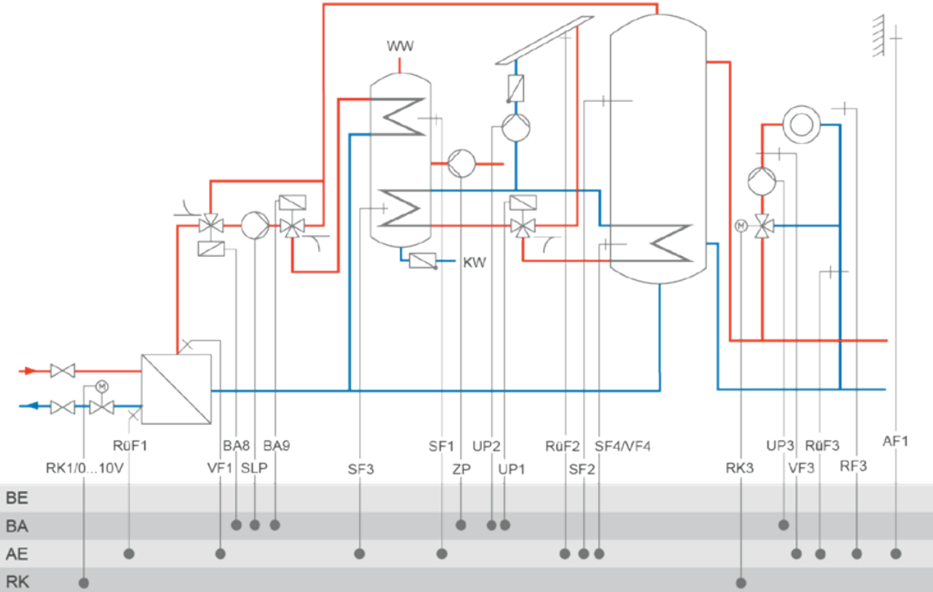
System	15.1
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO5 -> F14	- 0 (UP1 only active during the processing for an external demand)

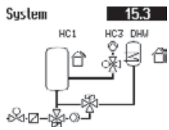
System Anl 15.2



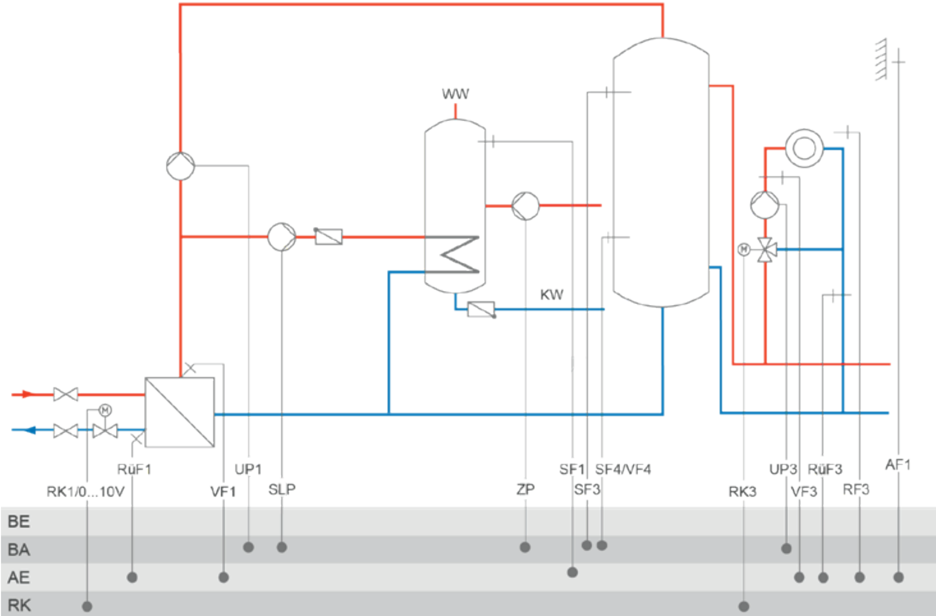
System	15.2
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)

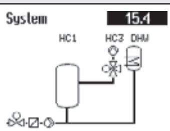
System Anl 15.3



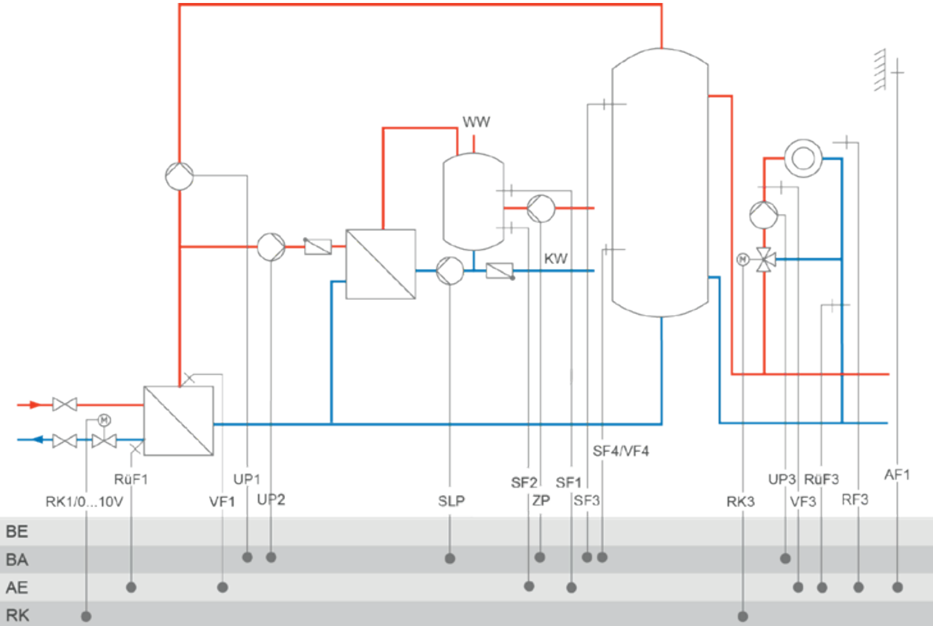
System	15.3
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)

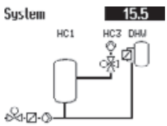
System Anl 15.4



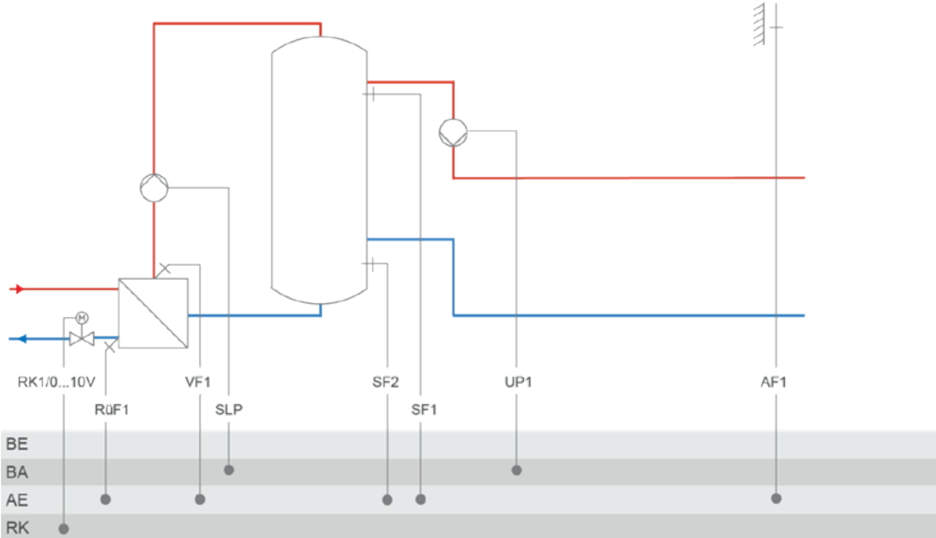
System	15.4
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO5 -> F07	- 0 (without error message at terminal 43)

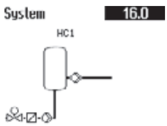
System Anl 15.5



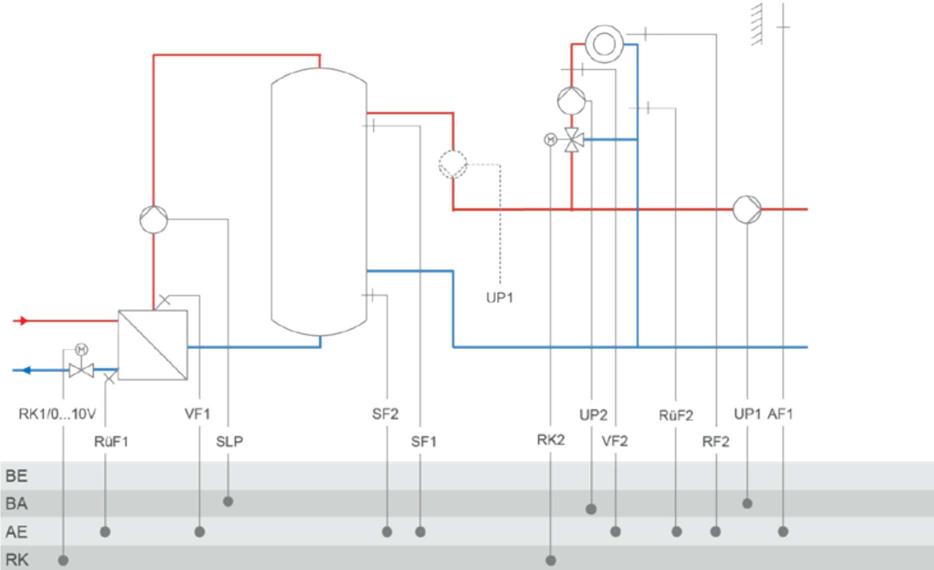
System	**15.5**
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO5 -> F07	- 0 (without error message at terminal 43)

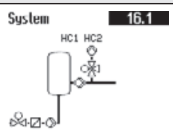
System Anl 16.0



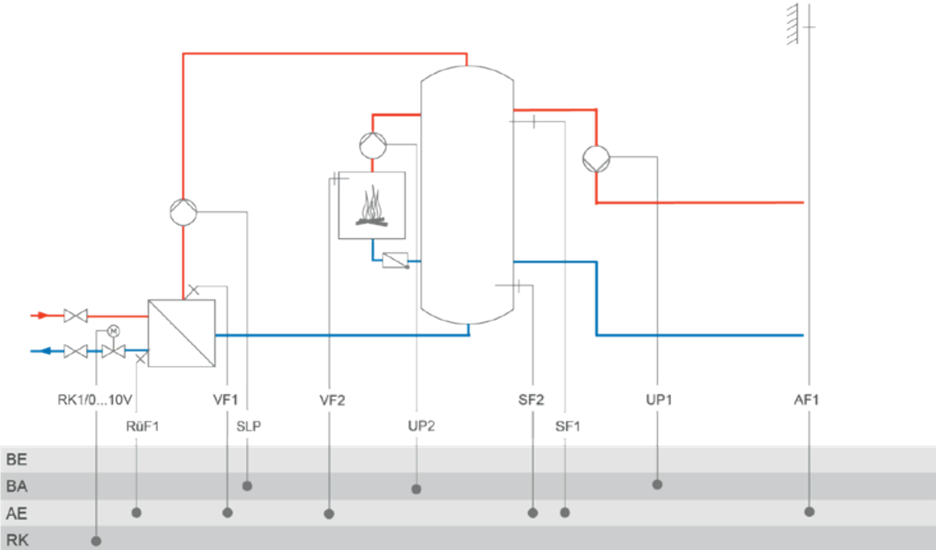
System	16.0
	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO1 -> F06	- 1 (with SF2)
CO5 -> F07	- 0 (without error message at terminal 43)

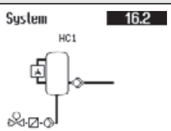
System Anl 16.1



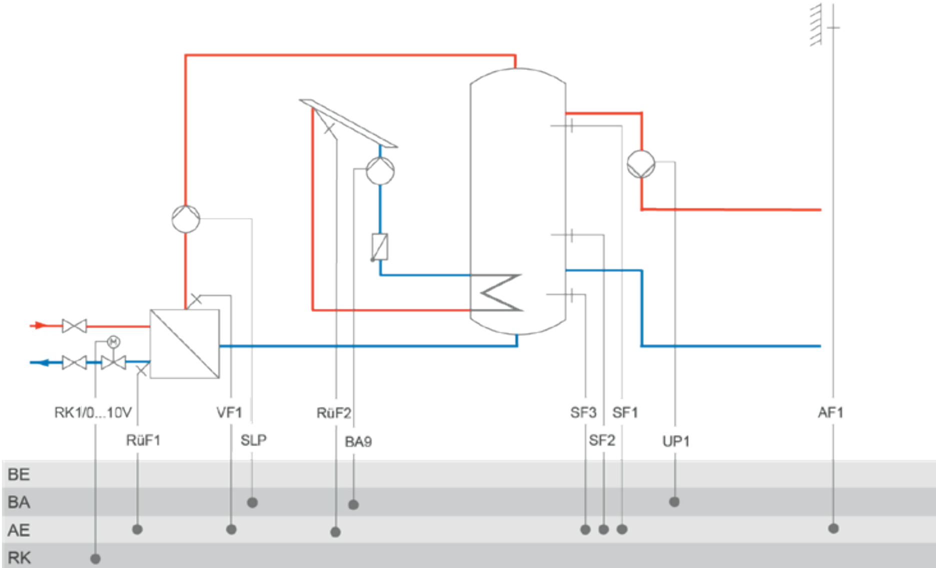
System	16.1
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO1 -> F06	- 1 (with SF2)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO5 -> F07	- 0 (without error message at terminal 38)
CO5 -> F14	- 0 (UP1 according to the ZP schedule or only active during the processing for an external demand)

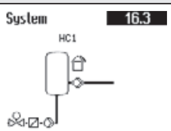
System Anl 16.2



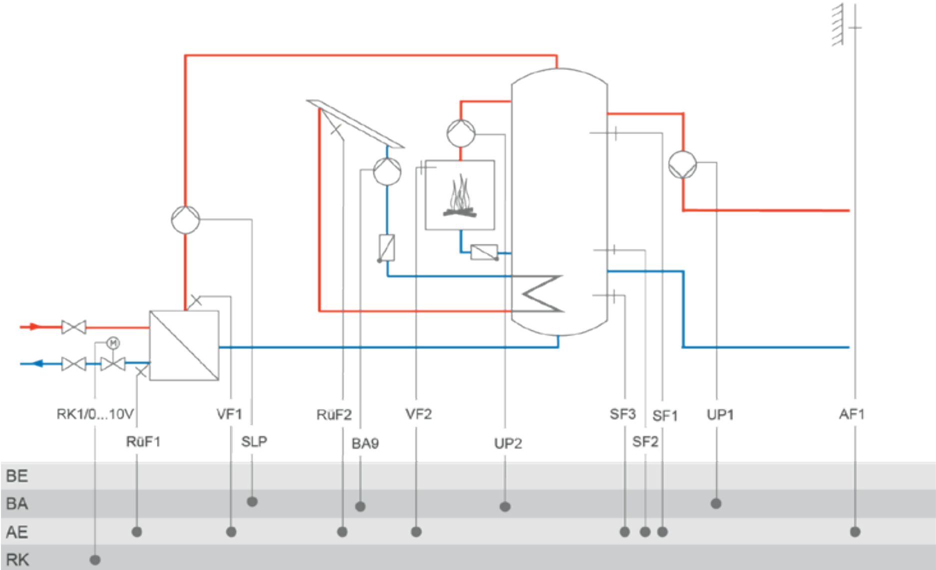
System	16.2
	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO1 -> F06	- 1 (with SF2)
CO5 -> F07	- 0 (without error message at terminal 43)

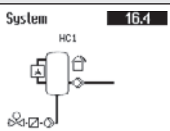
System Anl 16.3



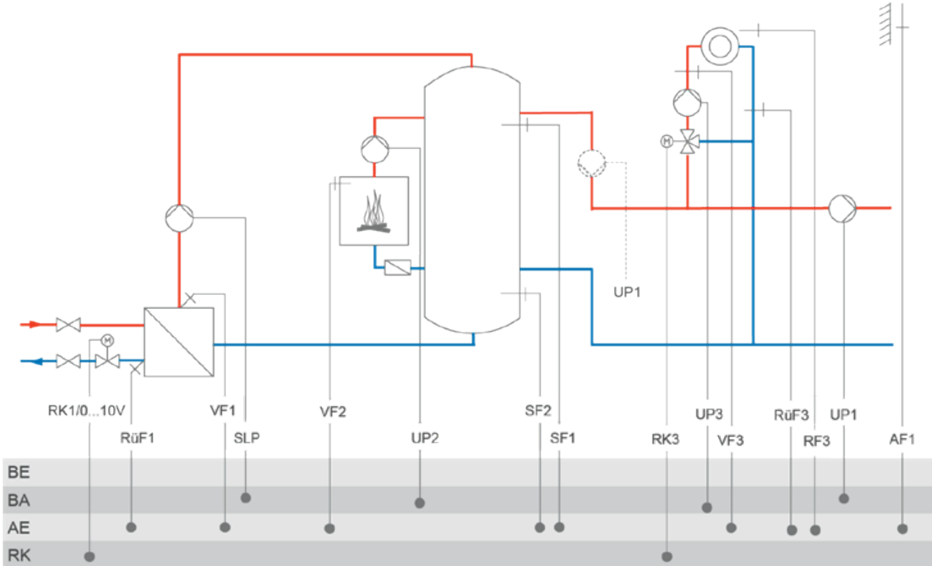
System	16.3
	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO1 -> F06	- 1 (with SF2)
CO5 -> F07	- 0 (without error message at terminal 43)

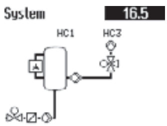
System Anl 16.4



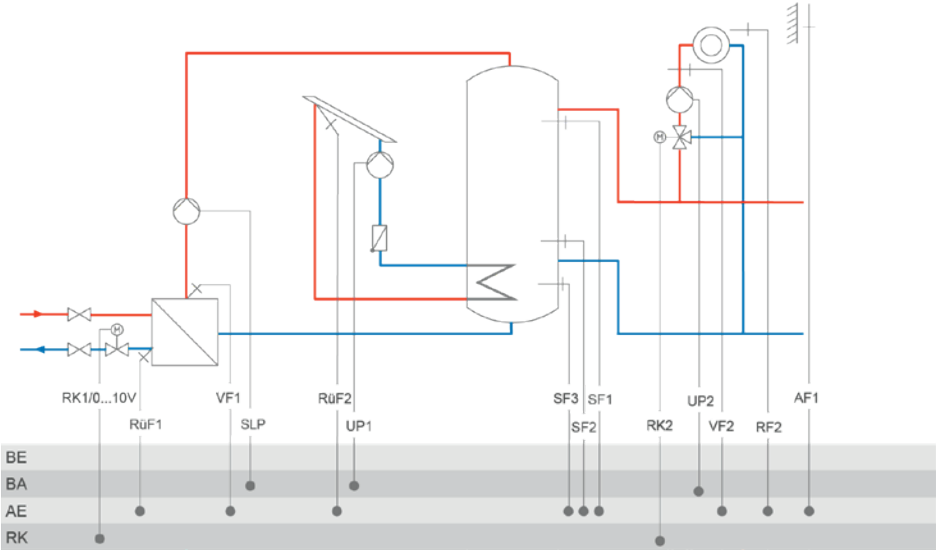
System	16.4
	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO1 -> F06	- 1 (with SF2)
CO5 -> F07	- 0 (without error message at terminal 43)

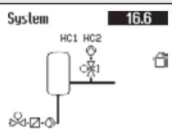
System Anl 16.8



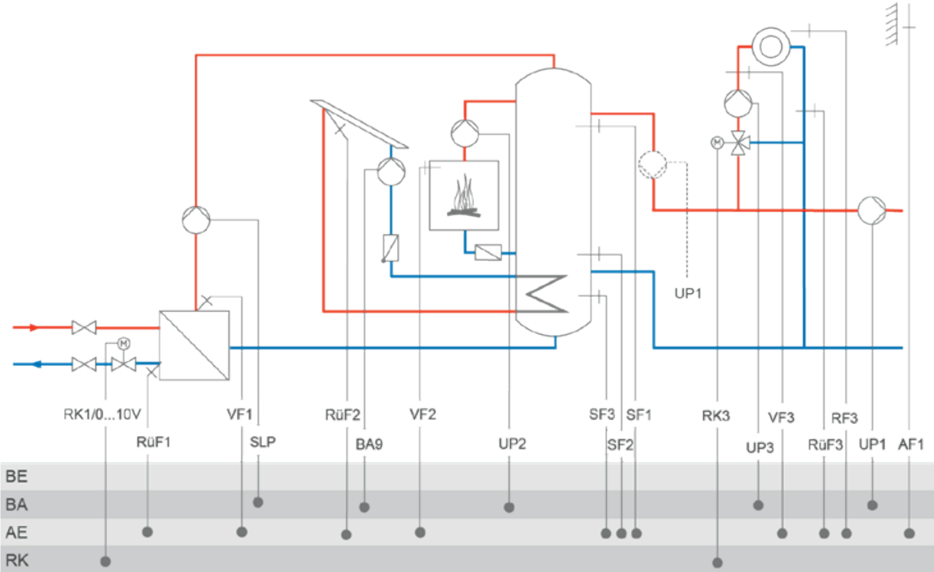
System	16.5
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO1 -> F06	- 1 (with SF2)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO5 -> F07	- 0 (without error message at terminal 38)
CO5 -> F14	- 0 (UP1 according to the ZP schedule or only active during the processing for an external demand)

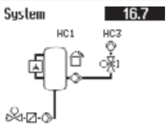
System Anl 16.6



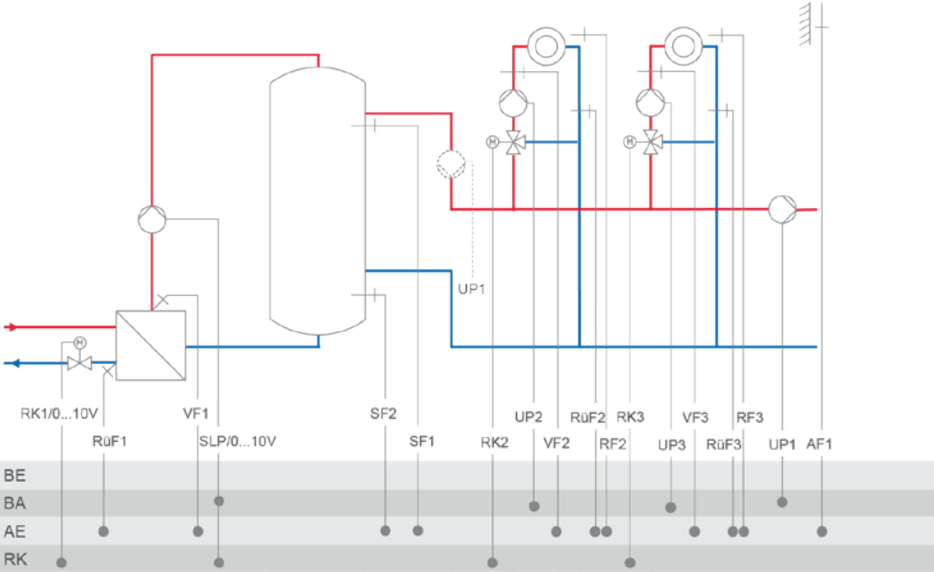
System	16.6
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO1 -> F06	- 1 (with SF2)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO5 -> F07	- 0 (without error message at terminal 38)

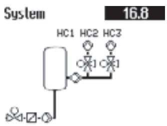
System Anl 16.7



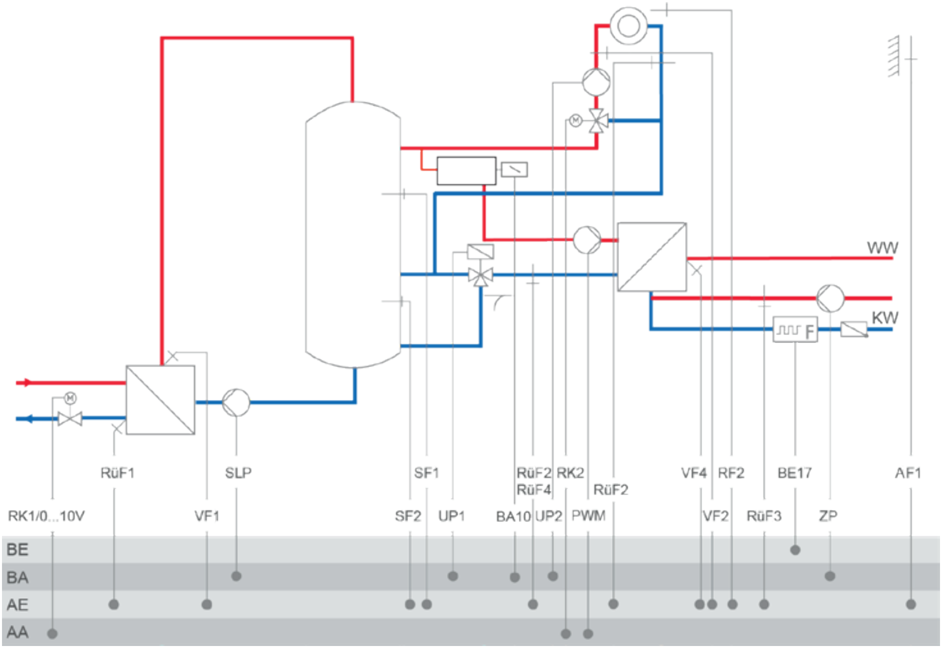
System	**16.7**
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO1 -> F06	- 1 (with SF2)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO5 -> F07	- 0 (without error message at terminal 43)
CO5 -> F14	- 0 (UP1 according to the ZP schedule or only active during the processing for an external demand)

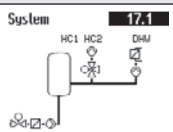
System Anl 16.8



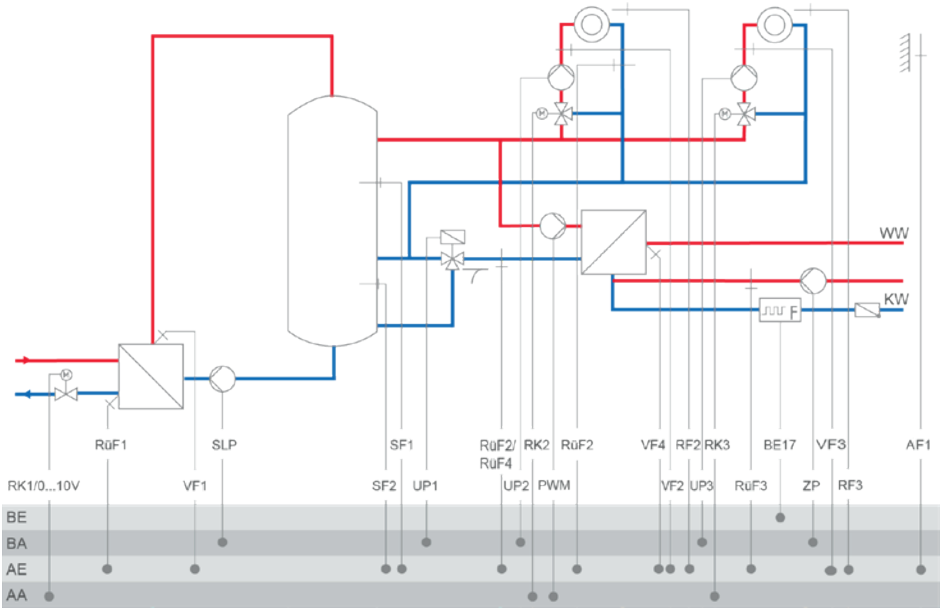
System	16.8
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2 RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO1 -> F06	- 1 (with SF2)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO5 -> F07	- 0 (without error message at terminal 38)
CO5 -> F14	- 0 (UP1 acc. to the ZP schedule or only active during the processing for an external demand)

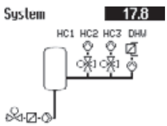
System Anl 17.1



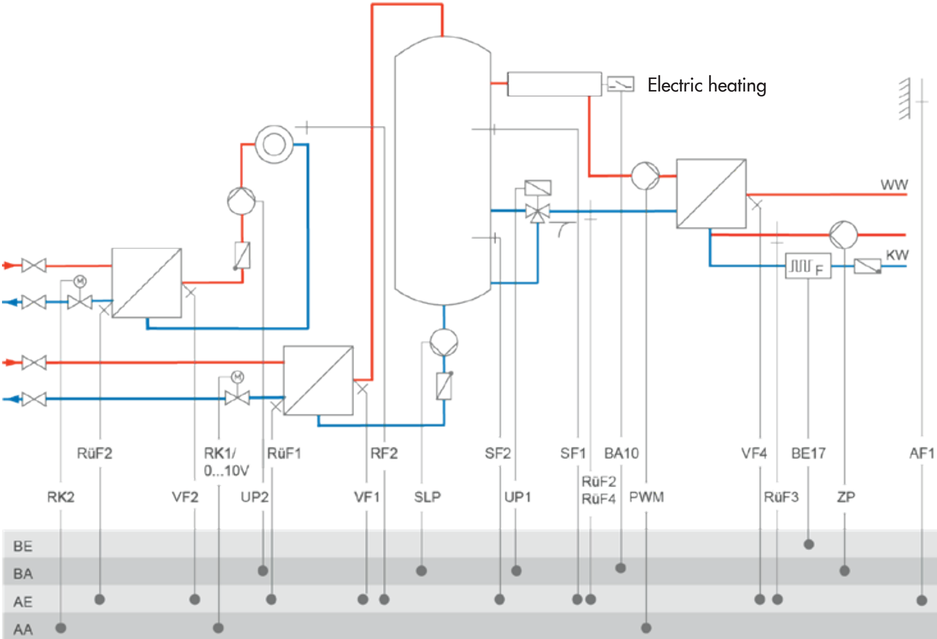
System	17.1
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO1 -> F06	- 1 (with SF2)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2 in RK2)
CO4 -> F03	- 0 (without RüF2/RüF4)
CO4 -> F04	- 0 (without flow switch)
CO4 -> F14	- 0 (without RüF3)
CO4 -> F07	- 0 (without error message at terminal 46)

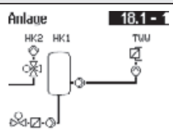
System Anl 17.8



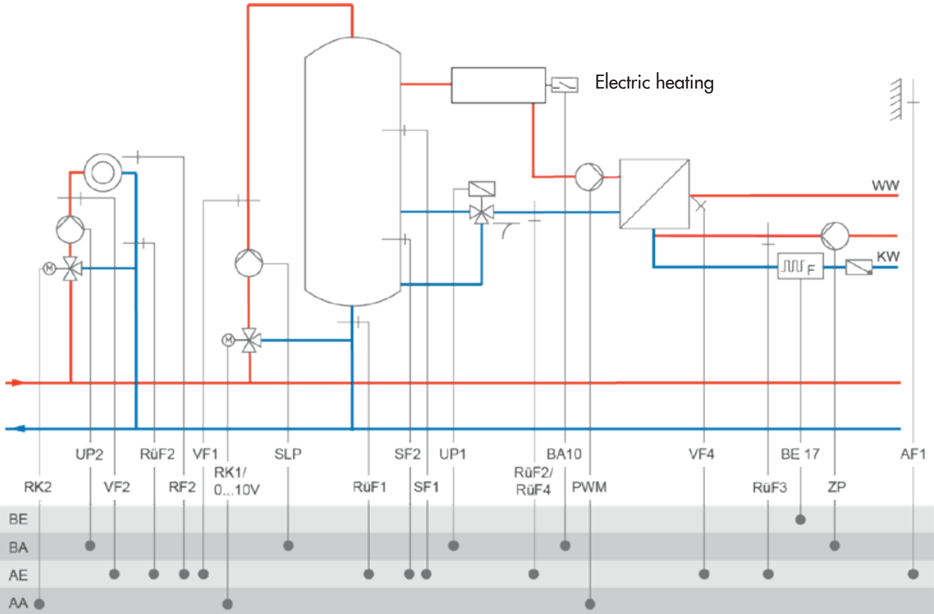
System	17.8
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2 RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO1 -> F06	- 1 (with SF2)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 0 (without RüF2 in RK2)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO4 -> F03	- 0 (without RüF2/RüF4)
CO4 -> F04	- 0 (without flow switch)
CO4 -> F14	- 0 (without RüF3)

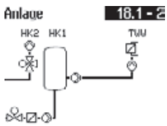
System Anl 18.1-1



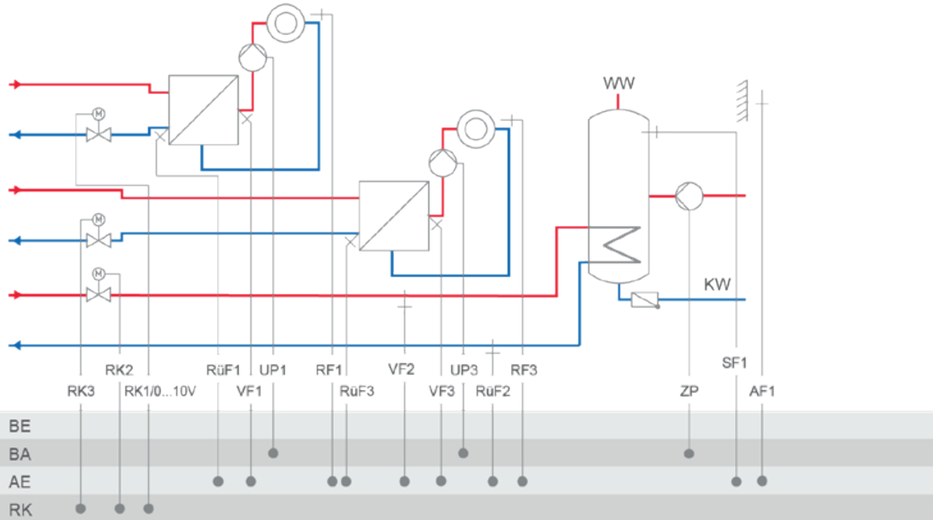
System	18.1-1
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO1 -> F06	- 1 (with SF2)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 1 (with RüF2 in RK2)
CO4 -> F03	- 0 (without RüF2/RüF4)
CO4 -> F04	- 0 (without flow switch)
CO4 -> F14	- 0 (without RüF3)
CO4 -> F07	- 0 (without error message at terminal 46)

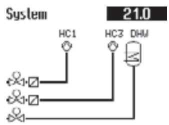
System Anl 18.1-2



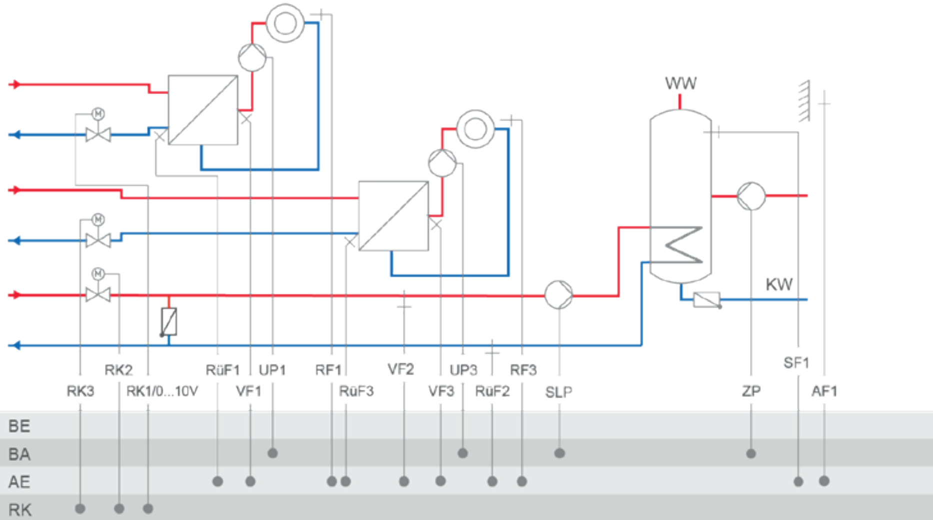
System	18.1-2
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO1 -> F06	- 1 (with SF2)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 1 (with RüF2 in RK2)
CO4 -> F03	- 0 (without RüF2/RüF4)
CO4 -> F04	- 0 (without flow switch)
CO4 -> F14	- 0 (without RüF3)
CO4 -> F07	- 0 (without error message at terminal 46)

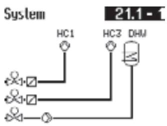
System Anl 21.0



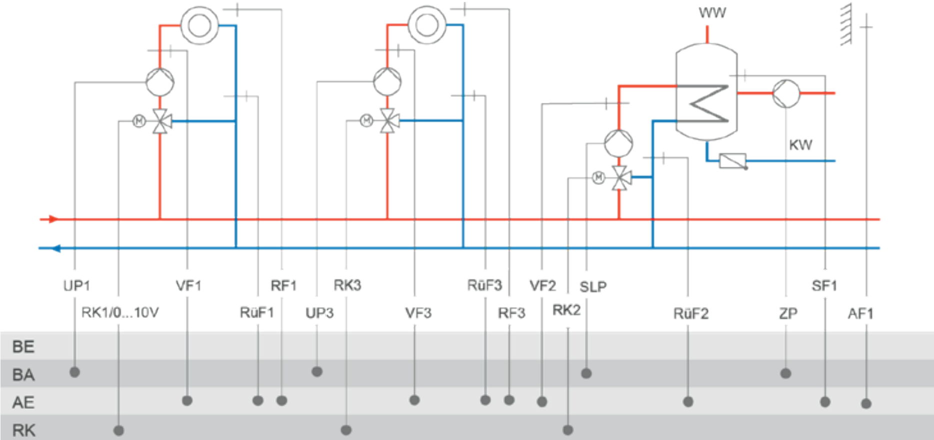
System	21.0
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 1 (with RüF3)
CO4 -> F03	- 0 (without RüF2)
CO5 -> F07	- 0 (without error message at terminal 37)

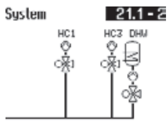
System Anl 21.1-1



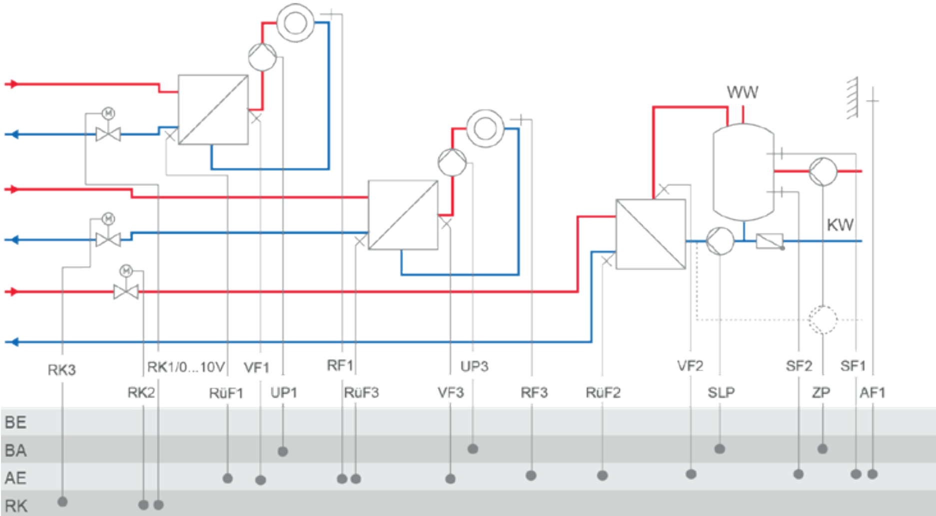
System	21.1-1
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 0 (without RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F03	- 0 (without RüF2)

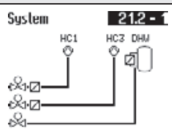
System Anl 21.1-2



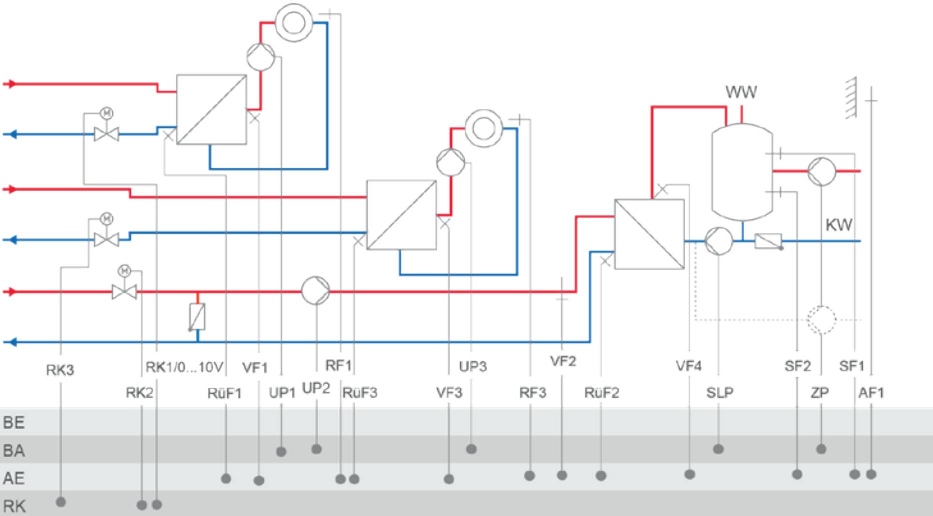
System	21.1-2
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 0 (without RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 0 (without RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 0 (without SF2)
CO4 -> F03	- 0 (without RüF2)

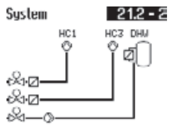
System Anl 21.2-1



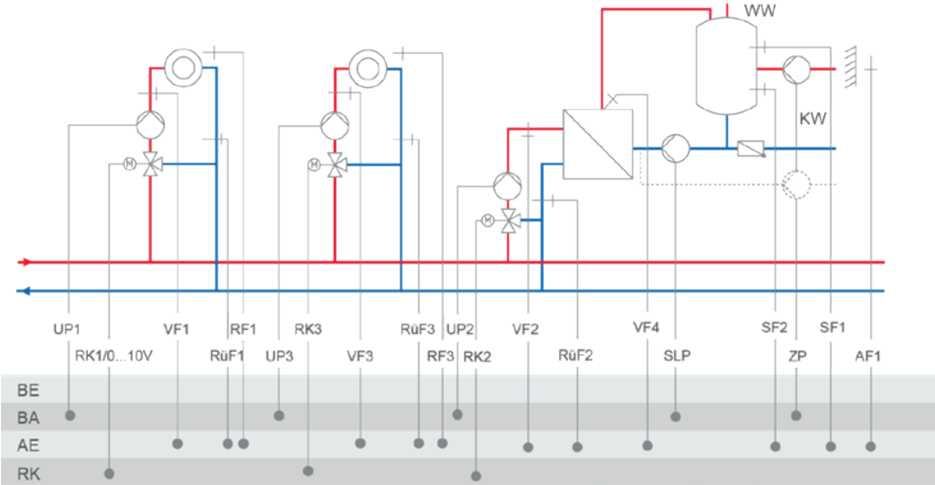
System	**21.2-1**
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 1 (with RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)

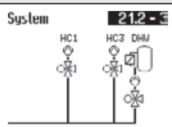
System Anl 21.2-2



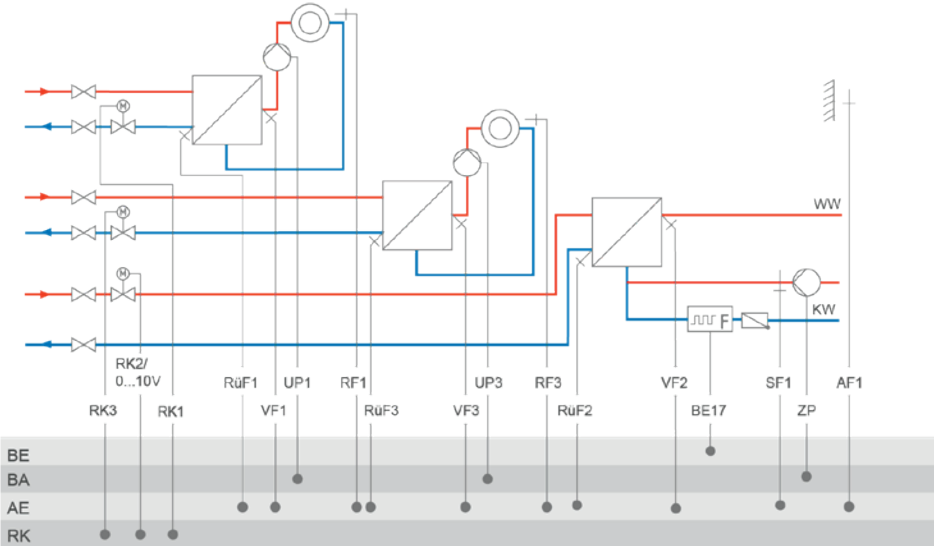
System	21.2-2
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 1 (with RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F05	- 0 (without VF4; in this case, VF2 usually installed at the point of measurement of VF4)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)

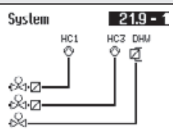
System Anl 21.2-3



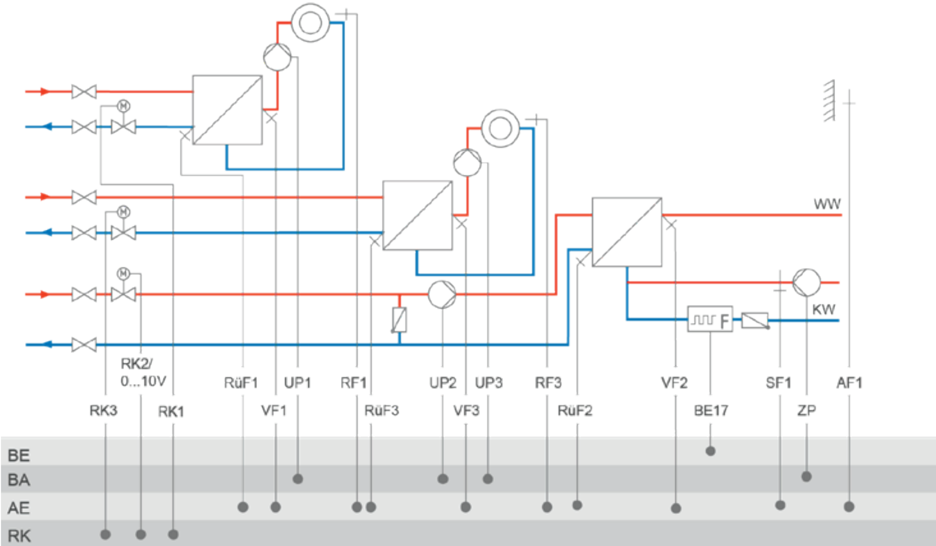
System	**21.2-3**
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 1 (with RüF3)
CO4 -> F01	- 1 (with SF1)
CO4 -> F02	- 1 (with SF2)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F05	- 0 (without VF4; in this case, VF2 usually installed at the point of measurement of VF4)
CO4 -> F10	- 0 (DHW circulation return flow in storage tank)

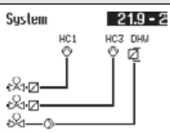
System Anl 21.9-1



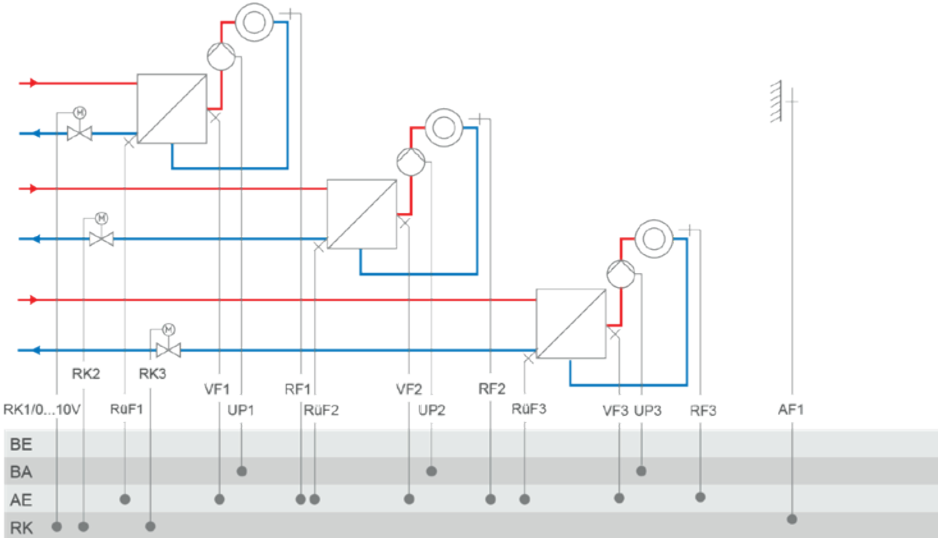
System	21.9-1
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 1 (with RüF3)
CO4 -> F01	- 0 (without SF1)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F04	- 0 (without flow rate sensor)
CO5 -> F07	- 0 (without error message at terminal 37)

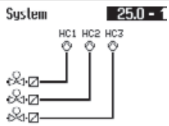
System Anl 21.9-2



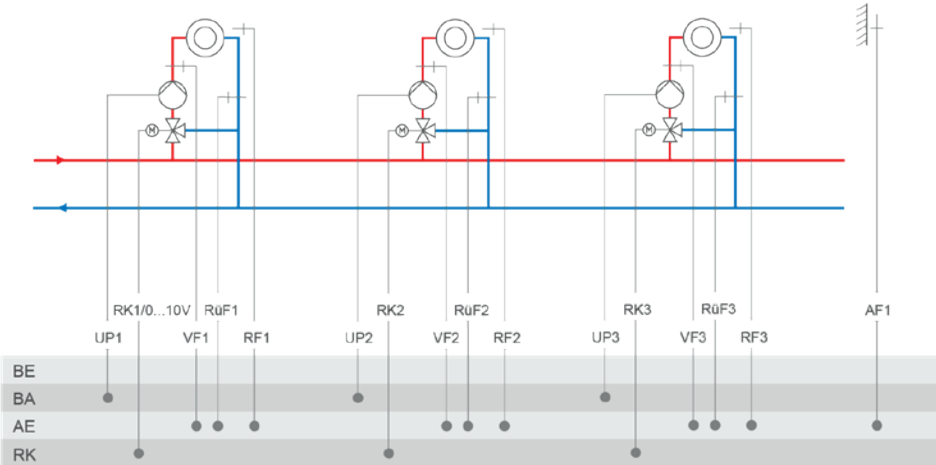
System	21.9-2
	
RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 1 (with RüF3)
CO4 -> F01	- 0 (without SF1)
CO4 -> F03	- 0 (without RüF2)
CO4 -> F04	- 0 (without flow rate sensor)
CO5 -> F07	- 0 (without error message at terminal 37)

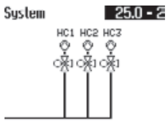
System Anl 25.0-1



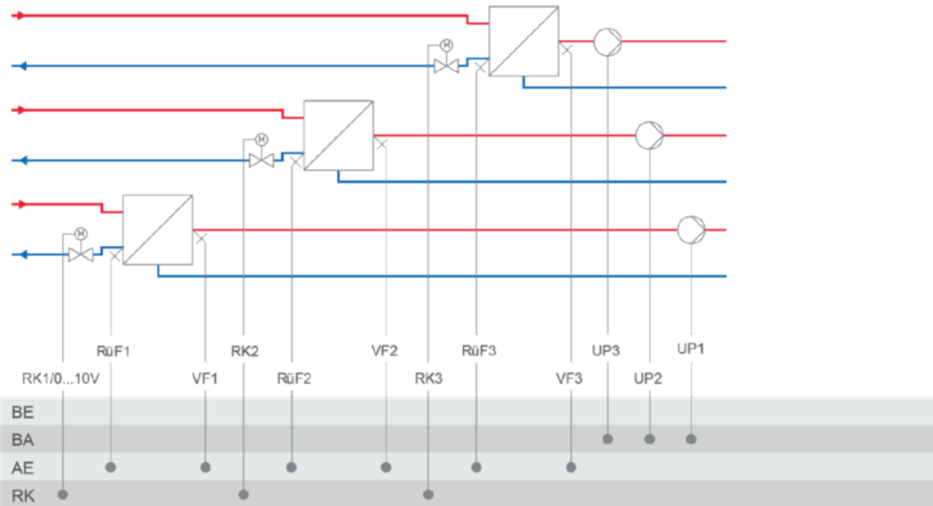
System	**25.0-1**
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2 RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 1 (with RüF2)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 1 (with RüF3)
CO5 -> F07	- 0 (without error message at terminal 37)

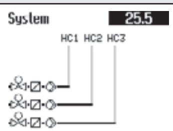
System Anl 25.0-2



System	25.0-2
	
RK2: CO2 -> F02 - 0 = Fixed set point control; CO2 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO2 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2 RK3: CO3 -> F02 - 0 = Fixed set point control; CO3 -> F02 - 1, select AF1 = Outdoor-temperature-compensated control with AF1; CO3 -> F02 - 1, select AF2 = Outdoor-temperature-compensated control with AF2	
Default setting	
CO1 -> F01	- 0 (without RF1)
CO1 -> F02	- 1 (with AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F01	- 0 (without RF2)
CO2 -> F02	- 1 (with AF1)
CO2 -> F03	- 1 (with RüF2)
CO3 -> F01	- 0 (without RF3)
CO3 -> F02	- 1 (with AF1)
CO3 -> F03	- 1 (with RüF3)
CO5 -> F07	- 0 (without error message at terminal 37)

System Anl 25.5



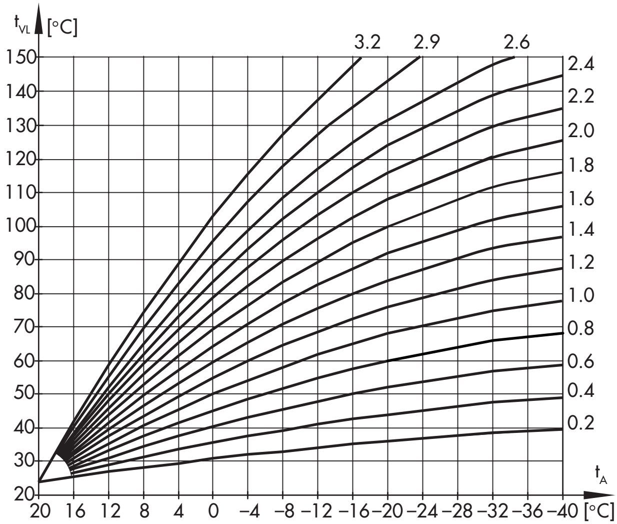
System	25.5
	
Default setting	
CO1 -> F02	- 0 (without AF1)
CO1 -> F03	- 1 (with RüF1)
CO2 -> F02	- 0 (without AF1)
CO2 -> F03	- 1 (with RüF2)
CO3 -> F02	- 0 (without AF1)
CO3 -> F03	- 1 (with RüF3)
CO5 -> F07	- 0 (without error message at terminal 37)

16.2 Functions of the heating circuit

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

16.2.1 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. 16-2). 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.



t_{VL} Flow temperature
t_A Outdoor temperature

Fig. 16-2: *Gradient characteristics*

16.2.1.1 Outdoor temperature received or sent as 0 to 10 V signal

The outdoor temperature can be received at terminals 19 and 23 over the 0 to 10 V input. Alternatively, the temperature measured by the outdoor sensor can be issued at terminals 20 and 21 as a 0 to 10 V signal for further processing.

Functions	WE	Configuration
Outdoor sensor AF1, 2	1	CO1, 2, 3, 11, 12, 13 -> F02 - 1 CO2, 3: select AF1, AF2
Outdoor temperature received or sent as 0 to 10 V signal	0	CO5 -> F23 - 1
	AE	Direction: input (receive), output (send)
	–20 °C	Lower transmission range: –50 to +100 °C
	50 °C	Upper transmission range: –50 to +100 °C
0 to 10 V output reverse	0 0 %	CO5 -> F25 - 0 Zero: 0 to 50 %
PWM reverse	0 5 %	CO5 -> F33 - 1 Zero: 5 to 20 %

16.2.1.2 Outdoor temperature received or sent over the device bus

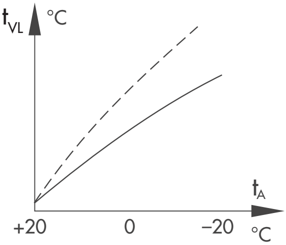
The measured outdoor temperature can be provided to other controllers over the device bus.

Functions	WE	Configuration
Outdoor sensor AF1, 2		CO1, 2, 3 -> F02 - 1
Device bus	0	CO7 -> F01 - 1, device bus address
Receive value AF1	0	CO7 -> F07 - 1, register number
Send value AF1 [1)]	0	CO7 -> F06 - 1, register number
Receive value AF2	0	CO7 -> F09 - 1, register number
Send value AF2 [1)]	0	CO7 -> F08 - 1, register number

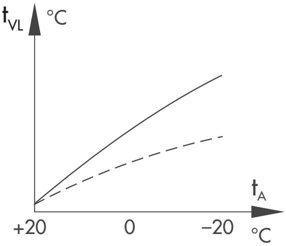
1) Send received outdoor temperature as 0 to 10 V signal by device bus with CO5 -> F23 - 1 setting and AE

16.2.1.3 Gradient characteristic

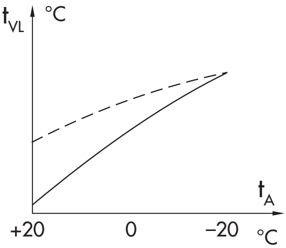
Basically, the following rule applies: a decrease in the outdoor temperature causes the flow temperature to increase in order to keep the room temperature constant. By varying the 'Gradient' and 'Level' parameters, you can adapt the characteristic to your individual requirements:



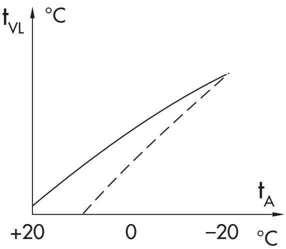
The gradient needs to be increased if the room temperature drops when it is cold outside.



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.

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

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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.

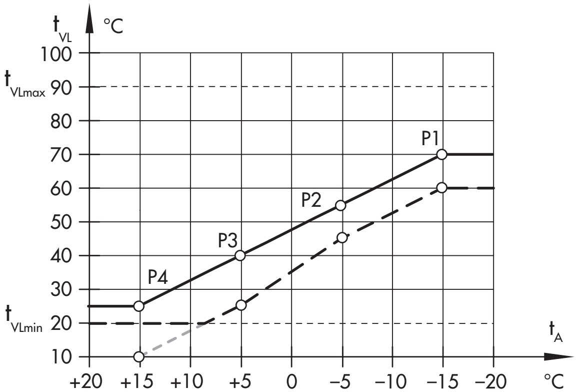
Functions	WE	Configuration
Four-point characteristic	0	CO1, 2, 3, 11, 12, 13 -> F11 - 1

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

Parameters	WE	Parameters: value range
Flow gradient	1.2 [1)]	PA1, 2, 3, 11, 12, 13 -> P01: 0.2 to 3.2
Level (parallel shift)	0.0 °C	PA1, 2, 3, 11, 12, 13 -> P02: –30.0 to 30.0 °C
Min. flow temperature	20.0 °C	PA1, 2, 3, 11, 12, 13 -> P06: –5.0 to 150.0 °C
Max. flow temperature	70.0 °C [1)]	PA1, 2, 3, 11, 12, 13 -> P07: 5.0 to 150.0 °C
1) With CO1, 2, 3, 11, 12, 13 -> F05 - 1 the following applies:	Gradient: 0.2 to 1.0 (0.5) Max. flow temperature: 5.0 to 50.0 °C (50.0 °C)	

16.2.1.4 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.



P1 to P4 Points 1 to 4
t_{VL} Flow temperature
t_A Outdoor temperature
- - - min Min. flow temperature
- - - max Max. flow temperature
——— Four-point characteristic
– – – – – – Reduced four-point characteristic

Fig. 16-3: *Four-point characteristic*

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, 3, 11, 12, 13 -> F08 - 0).*

Functions	WE	Configuration
Adaptation	0	CO1, 2, 3, 11, 12, 13 -> F08 - 0
Four-point characteristic	0	CO1, 2, 3, 11, 12, 13 -> F11 - 1

Parameters		WE	Parameters: value range
Outdoor temperature	Point 1	–15.0 °C	PA1, 2, 3, 11, 12, 13 -> P05: –50.0 to +50.0 °C
	Point 2	–5.0 °C	
	Point 3	5.0 °C	
	Point 4	15.0 °C	
Flow temperature	Point 1	70.0 °C	PA1, 2, 3, 11, 12, 13 -> P05: –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, 3, 11, 12, 13 -> P05: –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, 3, 11, 12, 13 -> P05: 5.0 to 90.0 °C
Min. flow temperature		20.0 °C	PA1, 2, 3, 11, 12, 13 -> P06: –5.0 to +150.0 °C
Max. flow temperature		70.0 °C [1)]	PA1, 2, 3, 11, 12, 13 -> P07: 5.0 to 150.0 °C
1) With CO1, 2, 3, 11, 12, 13 -> F05 - 1 the following applies:		Max. flow temperature: 5.0 to 50.0 °C (50.0 °C)	

16.2.2 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	1	CO1, 2, 3, 11, 12, 13 -> 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	Parameters: value range
Min. flow temperature	20.0 °C	PA1, 2, 3, 11, 12, 13 -> P06: –5.0 to +150.0 °C
Max. flow temperature	70.0 °C	PA1, 2, 3, 11, 12, 13 -> P07: 5.0 to 150.0 °C

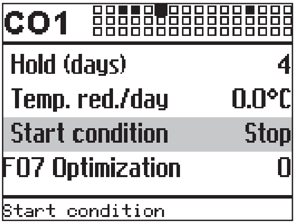
16.2.3 Underfloor heating/drying of jointless floors

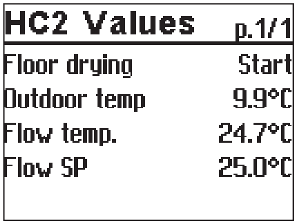
Using function block setting CO1, 2, 3, 11, 12, 13 -> F05 - 1, the respective heating circuit is configured as an underfloor heating circuit. In doing so, the controller at first only limits the value ranges of the heating characteristic gradient and the maximum flow temperature in PA1, 2, 3, 11, 12, 13 parameter levels:

– Value range of the gradient: 0.2 to 1.0
– Value range of the maximum flow temperature: 5 to 50 °C

Furthermore, it is possible to set a **Boost** between 0.0 to 50.0 °C, which is additionally taken into account when there is a heat demand for the underfloor heating circuit of an upstream control circuit.
The **Drying of jointless floors** function can be activated afterwards. The function block parameters (starting with the 'Start temperature') 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 constantly regulated 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 'Hold (days)'. 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 using the adjusted 'Start temperature' by changing the setting 'Stop' to 'Start'. 'Start' is displayed when the drying function starts. The restarting stages 'Raise', 'Hold' (holding the maximum temperature) and 'Reduction' can be be selected to continue an interrupted drying process. The course of the drying process can be monitored in the operating level by reading the measured data of the associated heating circuit.

'Done' is displayed after the last phase is completed. This disappears from the display after resetting the display to Stop in CO1, 2, 3 -> F05 or after interrupting the power supply. If a power failure occurs while the drying process is in progress, the drying process continues afterwards exactly at the point at which it was interrupted. In systems in which the drying function is interrupted due to DHW heating (e.g. system Anl 2.1), storage tank charging does not occur while the drying function is active, provided it is not used for frost protection of the storage tank.





Note

The function block parameter can only be accessed after starting the function by resetting to 'Stop' in CO1, 2, 3, 11, 12, 13 -> F05.

Functions	WE	Configuration
Underfloor heating/drying of jointless floors	0 0.0 °C 25.0 °C 0 5.0 °C 45.0 °C 4 0.0 °C Stop	CO1, 2, 3, 11, 12, 13 -> F05 - 1 Boost: 0.0 to 50.0 °C Start temperature: 20.0 to 60.0 °C Hold (days): 0 to 10 days Temp. rise/day: 0.0 to 20.0 °C Maximum temperature: 25.0 to 60.0 °C Hold (days): 0 to 30 days Temp. reduction/day: 0.0 to 20.0 °C Start condition: Stop, Start, Raise, Hold, Reduction

16.2.4 Outdoor temperature for continuous day mode

If a heating circuit is in night mode (automatic mode, ◴), this circuit is switched to day mode whenever the outdoor temperature falls below 'Outdoor temperature for continuous day mode'. 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	Parameters: value range
Outdoor temperature for continuous day mode	–15.0 °C	PA1, 2, 3, 11, 12, 13 -> P09: –50.0 to +5.0 °C

16.2.5 Buffer tank systems

A heating characteristic based on a gradient or four entered points can be set in PA1 for the buffer tanks in systems Anl 3.9, 5.9, 14.1 to 14.3, 15.1 to 15.5, 16.x, 17.x and 18.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 (by 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 (except for systems Anl 3.9, 5.9 and 18.x). In these systems, the buffer tank set point is only determined by the DHW circuit.

In systems Anl 14.1 to 14.3 and 15.1 to 15.5, the set point of the charging temperature is always 6 °C higher than the buffer tank set point. Each charging of the buffer tank finishes as soon as the temperature at the top buffer tank sensor is +3 °C higher than the buffer tank set point (bottom buffer tank sensor in systems Anl 15.4 and 15.5). If charging of the DHW storage tank is demanded in systems Anl 14.1 to 14.3 and 15.1 to 15.3, it is first checked whether there is enough heat in the buffer tank to charge the DHW storage tank. The DHW storage tank is charged by the district heating system if the temperature in the buffer tank is insufficient for charging. The charging of the DHW storage tank has priority over a charging demand of the buffer tank. The buffer tank is charged once the DHW storage tank charging has been completed. In systems Anl 14.3 and 15.3, a solar circuit with reroutable heat exchanger flow is integrated. If the temperature difference between the collector circuit sensor RüF2 and one of the storage tank sensors SF3 or SF4 is greater than the value of 'Solar circuit pump ON', the solar circuit pump UP2 is activated and the corresponding storage tank is charged. If both storage tanks can be charged, the DHW storage tank charging has priority. If the temperature difference falls below the value of 'Solar circuit pump OFF' in both storage tank circuits, the solar circuit pump UP2 is deactivated again. Basically, the solar circuit pump is deactivated when the measured temperatures of both storage tank sensors SF3 and SF4 have reached the 'Max. storage tank temperature' or 'Maximum buffer tank temperature' or when the solar collector temperature rises above 120 °C.

In systems Anl 3.9, 5.9, 16.x, 17.x and 18.x, 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 ('AUTO' 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. An already active charging is immediately stopped (discharging protection) in case the charging temperature does not reach its set point even though the valve is fully open.
In systems Anl 3.9 and 5.9 this function only applies when the heating circuits RK2 and RK3 are not running. The 'Stop charging of the buffer tank' parameter (PA1 -> P17, default = AUTO) determines under which conditions the charging of the buffer tank is stopped. The automatic adaptation ('AUTO' 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 RK1 multiplied by 'Lag time of charging pump') has elapsed. The operation of the feeder pump UP1 in systems Anl 16.0 to 16.5, 16.7 and 16.8 is either determined by the ZP time schedule or prompted by 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.
The pump UP2 of the solid fuel boiler circuit in systems Anl 14.1, 14.2, 15.1, 15.2, 16.2, 16.4, 16.5 and 16.7 starts to run when the temperature reaches 'Start temperature for boiler pump' at VF2. The boiler pump is switched off again when the temperature at VF2 falls below the temperature T = 'Start temperature for boiler pump' – 'Boiler pump hysteresis'.
In systems Anl 14.3, 15.3, 16.3, 16.4, 16.6 and 16.7, a solar circuit is integrated, which uses storage tank sensor SF3 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 SF3 by the value entered in 'Solar circuit 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 SF3 reaches 'Max. storage tank temperature' or when the collector temperature rises above 120 °C.

The PWM output for the heat exchanger charging pump is used to control the DHW temperature in systems Anl 3.9, 5.9, 17.x and 18.x. Its output signal can be reversed with the

CO5 -> F26 - 1 setting. For operation of the heat exchanger charging pump, the minimum delivery rate and the control parameters to control the DHW temperature can adjusted with CO4 -> F12 - 1. The 0 to 10 V output is used for adapting the delivery rate of the charging pump SLP based on the temperature. A flow switch can be activated with the CO4 -> F04 - 1 setting. The output UP1 for the changeover valve is activated by configuring the return flow temperature sensor RüF2. The changeover valve is controlled based on the 'Return flow temperature limit, layering at top' parameter: If the temperature measured at RüF2/RüF4 exceeds the adjusted switching point, the output UP1 remains deactivated and the return flow water is layered at the top. After the temperature measured at RüF2 has fallen below the switching point, the output UP1 is activated and the return flow water is layered at the bottom.

The CO4 -> F14 - 1 setting activates the **Thermal disinfection** function and the input RüF3 required for this function. It may be necessary for the controller to initially ensure at the start of every thermal disinfection that a sufficiently high temperature exists in the buffer tank. Therefore, enough time for the thermal disinfection process must be available.

Alternatively, in systems Anl 3.9, 17.x and 18.x, an electric heating cartridge can be used for the thermal disinfection process. With the CO4 -> F23 - 1 setting the increased heat demand by the DHW circuit during an active thermal disinfection is not passed on to the buffer tank circuit RK1. The measured temperature at SF1 is decisive for the demand for electric heating at the start of a thermal disinfection process and during the entire process: when the temperature at SF1 is the same or greater than 'Disinfection temperature' (function block parameter in CO4 -> F14) + 'Set point boost' (function block parameter in CO4 -> F14), there is no demand for electric heating. When the temperature at SF1 is below this limit, the binary output BA10 is activated to demand electric heating.

i Note

The buffer tank control circuit is deactivated as described in section 16.2.4. When predefined gradients of heating characteristic (CO1 -> F11 - 0) are used, night mode is not possible in the buffer tank control circuit. In contrast to an active four-point characteristic (CO1 -> F11 - 1): in this case, a four-point characteristic exists for day and night modes.

Functions	WE	Configuration
Storage tank sensor SF2	1	CO1 -> F06 - 1
SLP depending on return flow temperature	0	CO1 -> F22 - 1
Return flow sensor RüF2	0	CO4 -> F03 - 1
Three-step control mode	1	CO4 -> F12 - 1
	20 %	Minimum speed: 5 to 50 %
	2.0	KP: 0.1 to 50.0
	120 s/30 s	TN: 1 to 999 s
	0 s	TV: 0 to 999 s
Electric heating cartridge	0	CO4 -> F23 - 1
PWM reverse	0	CO5 -> F26 - 1

Parameters	WE	Parameters: value range
Minimum set point to charge buffer tank	AUTO	PA1 -> P16: AUTO to 90.0 °C
Stop charging of the buffer tank	AUTO	PA1 -> P17: AUTO to 90.0 °C
Charging temperature boost	6.0 °C	PA1 -> P18: 0.0 to 50.0 °C
Lag time of charging pump	1.0	PA1 -> P19: 0.0 to 10.0
Solar circuit pump ON	10.0 °C	PA4 -> P10: 1.0 to 30.0 °C
Solar circuit pump OFF	3.0 °C	PA4 -> P11: 0.0 to 30.0 °C
Max. storage tank temperature	80.0 °C	PA4 -> P12: 20.0 to 90.0 °C
Maximum buffer tank temperature	80.0 °C	PA4 -> P13: 20.0 to 90.0 °C
Return flow temperature limit, layering at top	25.0 °C	PA4 -> P21: 5.0 to 90.0 °C
Start temperature for boiler pump	60.0 °C	PA5 -> P01: 20.0 to 90.0 °C
Boiler pump hysteresis	5.0 °C	PA5 -> P02: 0.0 to 30.0 °C

16.2.6 Summer mode

Summer mode is activated depending on the mean daytime temperature (measured between 7.00 h and 22.00 h) during the adjusted summer time period. If the mean daytime temperature exceeds the 'Boost' on the number of successive days set in 'No. days until activation', 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 'Limit' on the number of successive days set in 'No. days until deactivation', summer mode is deactivated on the following day.

Functions	WE	Configuration
Summer mode	0 01.06 - 30.09 2 1 18.0 °C	CO5 -> F04 - 1 Time: Adjustable as required No. days until activation: 1 to 3 No. days until deactivation: 1 to 3 Limit: 0.0 to 30.0 °C

Note

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

16.2.7 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 using a delay of 3 °C/h over a time period of $t = \frac{12\ °C}{3\ °C/h} = 4\ h$.

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 operating level, the outdoor temperature blinks on the display while delayed outdoor temperature adaptation is active. A small hour glass appears next to the thermometer on the display when this function is active. The calculated outdoor temperature is displayed.

Functions	WE	Configuration
Delayed outdoor temperature adaptation (decreasing)	0	CO5 -> F05 - 1 Delay/h: 0.2 to 6.0 °C
Delayed outdoor temperature adaptation (increasing)	0 3.0 °C	CO5 -> F06 - 1 Delay/h: 0.2 to 6.0 °C

16.2.8 Remote operation

Apart from measuring the room temperature, the Types 5257-5 [1)] and Type 5257-51 Room Panels (Pt 1000 sensor) as well as Type 5244 [1)] 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.

Alternatively, the TROVIS 5570 [1)] Room Panel can be connected over meter bus (see section 16.4.14).

1) No longer available

Functions	WE	Configuration
Room sensor	0	CO1, 2, 3 -> F01 - 1
The following must be configured if a TROVIS 5570 Room Panel is used:		
Device bus	0	CO7 -> F01 - 1, device bus address
TROVIS 5570 Room Panel in RK1	0	CO7 -> F03 - 1, device bus address
TROVIS 5570 Room Panel in RK2	0	CO7 -> F04 - 1, device bus address
TROVIS 5570 Room Panel in RK3	0	CO7 -> F05 - 1, device bus address

i Note

Room panels cannot be used for the heating circuits RK11, RK12 and RK13.

16.2.9 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 blinks 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.

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	0	CO1, 2, 3, 11, 12, 13 -> F01 - 1
Outdoor sensor	1	CO1, 2, 3, 11, 12, 13 -> F02 - 1
Optimization	0	CO1, 2, 3, 11, 12, 13 -> 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

16.2.10 Flash adaptation

To ensure that the controller reacts immediately to room temperature deviations during rated and reduced operation, the function block setting CO1, 2, 3, 11, 12, 13 -> 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 'KP (gain)' 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 'KP (gain)' 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. A 'KP (gain)' setting of 10.0 is recommended.

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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	0	CO1, 2, 3, 11, 12, 13 -> F01 - 1
Outdoor sensor	1	CO1, 2, 3, 11, 12, 13 -> F02 - 1
Flash adaptation	0 20 min 0.0	CO1, 2, 3, 11, 12, 13 -> F09 - 1 Cycle time: 0 to 100 min 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

16.2.10.1 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 'KP (gain)' 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. A 'KP (gain)' setting of 10.0 is recommended.

Functions	WE	Configuration
Room sensor	0	CO1, 2, 3, 11, 12, 13 -> F01 - 1
Outdoor sensor	1	CO1, 2, 3, 11, 12, 13 -> F02 - 0
Flash adaptation	0 20 min 0.0	CO1, 2, 3, 11, 12, 13 -> F09 - 1 Cycle time: 1 to 100 min 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	Parameters: value range
Flow set point (day)	50.0 °C	PA1, 2, 3, 11, 12, 13 -> P03: 5.0 to 150.0 °C
Flow set point (night)	30.0 °C	PA1, 2, 3, 11, 12, 13 -> P04: 5.0 to 150.0 °C

16.2.11 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, 3, 11, 12, 13 -> 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, 3, 11, 12, 13 -> P01 (Gradient, flow).

Functions	WE	Configuration
Room sensor	0	CO1, 2, 3, 11, 12, 13 -> F01 - 1
Outdoor sensor		CO1, 2, 3, 11, 12, 13 -> F02 - 1
Adaptation	0	CO1, 2, 3, 11, 12, 13 -> F08 - 1
Four-point characteristic	0	CO1, 2, 3, 11, 12, 13 -> 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

Note

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

16.2.12 Cooling control

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, PA2 and/or PA3 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
Outdoor sensor		CO1, 2, 3 -> F02 - 1
Cooling control	0	CO1, 2, 3 -> F04 - 1
Four-point characteristic	0	CO1, 2, 3 -> F11 - 1

Parameters		WE	Parameters: value range
Outdoor temperature	Point 1	5.0 °C	PA1, 2, 3 -> P05: –50.0 to +50.0 °C
	Point 2	15.0 °C	
	Point 3	25.0 °C	
	Point 4	35.0 °C	
Flow temperature	Point 1	20.0 °C	PA1, 2, 3 -> P05: –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, 3 -> P05: –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, 3 -> P13: 5.0 to 90.0 °C

i Note

The limiting factors KP of the ***Return flow sensor*** *(CO1, 2, 3 -> 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		CO1, 2, 3 -> F02 - 0
Cooling control	0	CO1, 2, 3 -> F04 - 1

Parameters	WE	Switch position: value range
Flow set point (day)	20.0 °C	🌡☼: –5.0 to +150.0 °C
Flow set point (night)	30.0 °C	🌡☾: –5.0 to +150.0 °C

Parameters	WE	Parameters: value range
Min. flow temperature	20.0 °C	PA1, 2, 3 -> P06: –5.0 to +150.0 °C
Max. flow temperature	90.0 °C	PA1, 2, 3 -> P07: 5.0 to 150.0 °C
Base point for return flow temperature:	65.0 °C	PA1, 2, 3 -> P13: 5.0 to 90.0 °C

i Note

- *The limiting factors KP of the* ***Return flow sensor*** *(CO1, 2, 3 -> 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 5.0) or controllers connected over a device bus 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.*

16.2.13 Differential temperature control

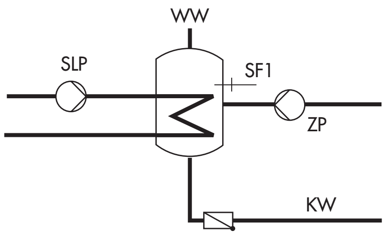
In systems Anl 1.0 and 16.0, the differential temperature control causes the delivery rate of pump UP1 to be adapted through the 0 to 10 V or PWM output depending on the difference between the secondary flow temperature and the secondary return flow temperature. In system Anl 1.0 the sensor input RüF2 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	CO1 -> F23 - 1
	20.0 °C	Set point of differential temperature control: 0.0 to 50.0 °C
	1.0	KP (influence factor): 0.1 to 10.0
	20 %	Minimum speed: 0 to 100 %

16.3 Functions of the DHW circuit

16.3.1 DHW heating in the storage tank system

Start storage tank charging



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

Fig. 16-4: *Schematics of a storage tank system*

The controller begins charging the storage tank when the water temperature measured at storage tank 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. An already active charging is immediately stopped (discharging protection) in case the charging temperature does not reach its set point even though the valve is fully open.

Note

The 'DHW temperature set point' is to be regarded in relation to the charging temperature if 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 points' for day and night differ from one another.

Stop storage tank charging

The controller stops charging the storage tank when the water temperature measured at storage tank 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 65 °C when the storage tank temperature falls below 60 °C. The charging temperature is calculated from the DHW temperature (60 °C) plus the 'Charging temperature boost' (10 °C), which equals 70 °C. When the storage tank has been charged, the heating valve is closed and the charging pump continues to run for the time t = P06 x Valve transit time. Outside the times-of-use, the storage tank is only charged when the temperature falls below 40 °C ('Night set point for DHW temperature'). 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		CO4 -> F01 - 1
Storage tank sensor SF2		CO4 -> F02 (-1 when CO4 -> F19 - 1)
SLP depending on return flow temperature	0	CO4 -> F15
Switchover	0	CO4 -> F19 (-1 only when CO4 -> F02 - 1)

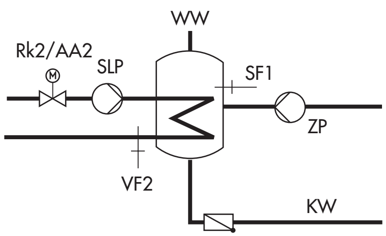
Parameters	WE	Switch position: value range
Day set point for DHW temperature or charging temperature when CO4 -> F01 - 0	60.0 °C	🌡☼: Min. to max. adjustable DHW set point
Night set point for DHW temperature	40.0 °C	🌡☾: Min. to max. adjustable DHW set point

Parameters	WE	Parameters: value range
Min. adjustable DHW set point [1]	40.0 °C	PA4 -> P01: 5.0 to 90.0 °C
Max. adjustable DHW set point [1]	60.0 °C	PA4 -> P02: 5.0 to 90.0 °C
Hysteresis [2]	5.0 °C	PA4 -> P03: 0.0 to 30.0 °C
Charging temperature boost [3]	10.0 °C	PA4 -> P04: 1.0 to 50.0 °C
Lag time for storage tank charging pump	1.0	PA4 -> P19 x Valve transit time: 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'

16.3.1.1 DHW circuit additionally controlled by a globe valve

In systems Anl 7.1, 8.1, 9.1, 9.5, 11.1, 12.1, 13.1 and 21.1, the following versions 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
VF2 Flow sensor
ZP Circulation pump (DHW)
WW Hot water
KW Cold water

Fig. 16-5: *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.

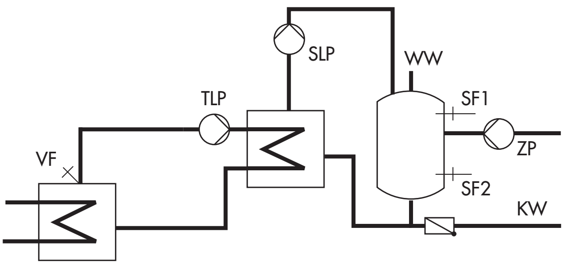
The functions and parameters of the DHW heating in the storage tank system are upgraded by the following settings:

Functions	WE	Configuration
Return flow control	0	CO4 -> F20 - 1

Parameters	WE	Parameters: value range
Max. return flow temperature	65.0 °C	PA4 -> P07: 20.0 to 90.0 °C

16.3.2 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
SF2 Storage tank sensor
ZP Circulation pump (DHW)
WW Hot water
KW Cold water

Fig. 16-6: *Schematics of a storage tank charging system*

The controller begins charging the storage tank when the water temperature measured at storage tank 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. If the temperature currently measured at storage tank sensor SF1 is reached at the flow sensor VF, the storage tank charging pump is switched on. An already active charging is immediately stopped (discharging protection) in case the charging temperature does not reach its set point even though the valve is open.

If a storage tank thermostat is used, the storage tank charging pump is switched on as soon as the temperature T = Charging temperature – 5 °C is reached at the flow sensor VF. 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 flow sensor VF.

i Note

The 'DHW temperature set point' is to be regarded in relation to the charging temperature if a storage tank thermostat is used.

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 error message (Max. charging temp.) is generated.

i 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 night set point for DHW temperature is used. This 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 points' for day and night differ from one another.

Stop storage tank charging

The controller stops charging the storage tank when the water temperature measured at storage tank 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 the time has elapsed t = P06 x valve transit time.

Functions	WE	Configuration
Storage tank sensor SF1		CO4 -> F01 - 1
Storage tank sensor SF2		CO4 -> F02 - 1
Flow sensor	0	CO4 -> F05
Switchover	0	CO4 -> F19

Parameters	WE	Switch position: value range
Day set point for DHW temperature or charging temperature when CO4 -> F01 - 0	60.0 °C	🌡☼: Min. to max. adjustable DHW set point
Night set point for DHW temperature	40.0 °C	🌡☾: Min. to max. adjustable DHW set point
Min. adjustable DHW set point [1)]	40.0 °C	PA4 -> P01: 5.0 to 90.0 °C
Max. adjustable DHW set point [1)]	60.0 °C	PA4 -> P02: 5.0 to 90.0 °C
Hysteresis [2)]	5.0 °C	PA4 -> P03: 1.0 to 30.0 °C
Charging temperature boost [3)]	10.0 °C	PA4 -> P04: 0.0 to 50.0 °C
Max. charging temperature	80.0 °C	PA4 -> P05: 20.0 to 150.0 °C (only with VF4)
Lag time for storage tank charging pump	1.0	PA4 -> P06: 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'

16.3.2.1 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 FG2 input 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 10 %	CO4 -> F22 - 1 Valve position: 1 to 100 %
Parallel pump operation	0 10 min 40.0 °C	CO4 -> F06 - 1 Stop: 0 to 10 min Temperature limit: 20.0 to 90.0 °C

16.3.3 DHW heating in instantaneous heating system

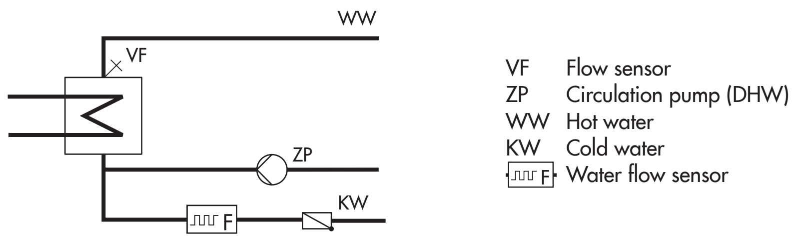


Fig. 16-7: *Schematics of an instantaneous heating system*

Without a water rate sensor or flow switch, the control of the required DHW temperature at the flow sensor VF is only active during times-of-use of the circulation pump ZP. The water flow sensor or flow switch allows the controller to recognize when DHW tapping starts and stops. Control of the required DHW temperature can made to be active only during DHW tapping by deleting all times-of-use of the circulation pump. If the control with flow rate sensor is configured, the attenuation in the DHW circuit (CO4 -> F13 - 1) is automatically activated and the temperature set to 8 °C.

The control of the required DHW temperature at the flow sensor VF is only active during times-of-use of the circulation pump ZP.

i Note

After entering the key number 1999, the status information, e.g. operating point, valve controller (influence of the PI component on the valve position) and valve sensor (influence of the manipulated variable on the valve position), is displayed in the extended operating level as a percent after the sectional display of the DHW circuit.

Functions	WE	Configuration
Flow rate sensor	0 Analog	CO4 -> F04 - 1 Select: Analog (flow rate sensor), Binary (flow switch)

Parameters	WE	Switch position: value range
Day set point for DHW temperature	60.0 °C	🌡☼: Min. to max. adjustable DHW set point
Night set point for DHW temperature	40.0 °C	🌡☾: Min. to max. adjustable DHW set point

Parameters	WE	Parameters: value range
Min. adjustable DHW set point	40.0 °C	PA4 -> P01: 5.0 to 90.0 °C
Max. adjustable DHW set point	60.0 °C	PA4 -> P02: 5.0 to 90.0 °C

16.3.4 Domestic hot water heating with solar system

The systems Anl 1.3, 1.4, 1.7, 1.8, 2.3, 2.4, 3.3, 3.4, 4.3, 10.3, 11.3 and 11.4 are fitted with a solar system for DHW heating. In these systems, the difference between the temperatures measured at the storage tank sensor SF3 and the sensor VF3 at the solar collector is determined. The 'Solar circuit pump ON' parameter determines the minimum temperature difference between sensors VF3 and SF3 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 SF3 has reached the 'Max. storage tank temperature' or when the solar collector temperature rises above 120 °C.

i 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 operating level (see the 'Operation' section).

Parameters	WE	Parameters: value range
Solar circuit pump ON	10.0 °C	PA4 -> P10: 1.0 to 30.0 °C
Solar circuit pump OFF	3.0 °C	PA4 -> P11: 0.0 to 30.0 °C
Max. storage tank temperature	80.0 °C	PA4 -> P12: 20.0 to 90.0 °C

16.3.5 Intermediate heating

This function can only be activated in systems Anl 2.x, 4.1 to 4.5, 8.x, 9.5 and 9.6.

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

16.3.6 Parallel pump operation

This function can only be activated in systems Anl 1.1-1, 2.x, 4.1 to 4.5, 6.1, 8.x, 9.5 and 9.6.

When 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 'Temperature limit'. 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' 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' to 0 min leads to a parallel operation once initiated remaining regardless of a deviation.

Functions	WE	Configuration
Parallel pump operation	0 10 min 40.0 °C	CO4 -> F06 - 1 Stop: 0 to 10 min Temperature limit: 20.0 to 90.0 °C

16.3.7 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
Operation of circulation pump (DHW) during storage tank charging	0	CO4 -> F11

16.3.8 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.

16.3.8.1 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. systems Anl 4.5, 11.0, 12.0, 13.0 and 21.0), the temperature is monitored directly at storage tank sensor SF1. If system deviations still occur after the time set in 'Start' 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 'KP' (influence factor).

When 'Start' is set to 0, the priority operation is started regardless of the time and temperature in the system. The control valves of the corresponding heating circuits are closed.

Functions	WE	Configuration
Priority (reverse)	0 2 min 1.0	CO4 -> F08 - 1 Start: 0 to 10 min KP (influence factor): 0.1 to 10.0 Control circuit: HC1, HC2, HC3, HC1+HC2, HC1+HC3
Priority (set-back)	0	CO4 -> F09 - 0

16.3.8.2 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. systems Anl 4.5, 11.0, 12.0, 13.0 and 21.0), the temperature is monitored directly at storage tank sensor SF1. If system deviations still occur after the time set in Start has elapsed, the selected heating circuits with the control valve are set to reduced operation.

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

Functions	WE	Configuration
Priority (reverse)	0	CO4 -> F08 - 0
Priority (set-back)	0 2 min	CO4 -> F09 - 1 Start: 0 to 10 min Control circuit: HC1, HC2, HC3, HC1+HC2, HC1+HC3

16.3.9 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).

i *Note*

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

16.3.10 Thermal disinfection of DHW storage tank

In all systems with DHW heating, a thermal disinfection is performed on a 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. Disinfection takes place within the adjusted time period ('Time').
– In systems with DHW heating in instantaneous heating system, the function remains active taking into account the 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 at the end of the adjusted time period (Time).

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

When the 'Disinfection temperature' has not been reached before the end of the thermal disinfection cycle, it is indicated correspondingly on the display. This error message can also be generated prematurely if the remaining time until the disinfection temperature is reached is shorter than the adjusted 'Duration'. The indication is automatically reset when the disinfection temperature is properly reached during the following thermal disinfection cycle.

Thermal disinfection for preventing legionella infection causes:

– Excessively high return flow temperatures during the disinfection cycle (return flow temperature limitation suspended)
– Excessively 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.
The return flow temperature limitation in the primary control circuit is deactivated also while thermal disinfection is active in a secondary controller in controllers linked with each other over a device bus.

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i Note

The forced operation of the circulation pump (DHW) starts while thermal disinfection is active.

Functions	WE	Configuration
Storage tank sensor SF1	1	CO4 -> F01 - 1
Thermal disinfection	0 Wednesday 00:00 04:00 70.0 °C 10.0 °C 0 min ON	CO4 -> F14 - 1 Monday, Tuesday, ..., daily Start: adjustable as required in steps of 15 minutes End: adjustable as required in steps of 15 minutes Disinfection temperature: 60.0 to 90.0 °C Set point boost: 0.0 to 50.0 °C [1)] Duration: 0 to 255 min Active when BI = ON, OFF (start of disinfection with terminal BI17) [2)]

1) Systems Anl 1.9, 3.9, 5.9, 11.0, 11.3, 11.5, 11.9, 12.0, 12.9, 13.0, 13.9, 17.x, 18.x, 21.0 and 21.9 only

2) B117 only functions when the time is set to 00:00 - 00:00 h

16.4 System-wide functions

16.4.1 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

Note

The automatic summer/standard time switchover can also be programmed in the Time/date menu (see the 'Operation' section).

16.4.2 Frost protection

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

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 with highest priority: 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		CO5 -> F09 - 0: Restricted frost protection
		CO5 -> F09 - 1: Highest priority for frost protection
	3.0 °C	Limit: –15.0 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.

! NOTICE

System damage caused by frost.

In the stand-by mode (⏻) fixed set point control without outdoor temperature sensor does not include frost protection.

➔ *Do not switch off closed-loop operation for a long time during cold weather.*

16.4.3 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.

16.4.4 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 RÜF 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 temperature measured at return flow sensor RüF exceeds the current 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, 3.1 to 3.4, 4.1 to 4.4, 5.1, 5.2, 7.x, 8.x and 9.x, 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 KP (limiting factor) 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.

i 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, 3, 11, 12, 13 -> P13 and P14) parameters.

Functions	WE	Configuration
Return flow sensor RüF1/2/3		CO1, 2, 3, 4, 11, 12, 13 -> F03 - 1
	1.0	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	Parameters: value range
Return flow gradient	1.2	PA1, 2, 3, 11, 12, 13 -> P11: 0.2 to 3.2
Return flow level	0.0 °C	PA1, 2, 3, 11, 12, 13 -> P12: –30.0 to +30.0 °C
Base point for return flow temperature:	65.0 °C	PA1, 2, 3, 11, 12, 13 -> P13: 5.0 to 90.0 °C
Max. return flow temperature	65.0 °C	PA1, 2, 3, 11, 12, 13 -> P14: 5.0 to 90.0 °C
Max. return flow temperature	65.0 °C	PA4 -> P07: 5.0 to 90.0 °C

or:

Parameters	WE	Parameters: value range
Return flow temperature, points 1 to 4	65.0 °C	PA1, 2, 3, 11, 12, 13 -> P05: 5.0 to 90.0 °C

i *Note*

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

16.4.5 Condensate accumulation control

Activate the **damping** 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, 3, 4, 11, 12, 13 -> F12 - 1
Damping	0 3.0 °C	CO1, 2, 3, 4, 11, 12, 13 -> F13 - 1 Max. system deviation: 3.0 to 10.0 °C

16.4.6 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 'KP (gain)' (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 'Tn (reset time)' (the pause length increases as TN increases). The 'TY (valve transit time)' 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, 3, 4, 11, 12, 13 -> F12 - 1 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, 20, 25, ... , 240 s

16.4.7 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 5.0 °C 2 min 2 min	CO1, 2, 3, 4, 11, 12, 13 -> F12 - 0 Hysteresis: 1.0 to 30.0 °C Min. ON time: 0 to 10 min Min. OFF time: 0 to 10 min

16.4.8 Continuous control in control circuit HC1

The flow temperature in the control circuit HC1 can be controlled using a PID algorithm. The valve in RK1 control circuit receives an analog 0 to 10 V signal from the controller. When a system deviation occurs, 'KP (gain)' 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: 'Tn (reset time)' 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 TV is, the stronger the change will be).

Functions	WE	Configuration
Control mode	1 2.0 120 s 0 s 35 s	CO1, 2, 3, 11, 12, 13 -> F12 - 1 KP (gain): 0.1 to 50.0 Tn (reset time): 1 to 999 s TV (derivative-action time): 0 to 999 s TY (valve transit time): 15, 20, 25, … , 240 s

16.4.9 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. It 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 ('Active when BI' = OFF) or a break contact ('Active when BI' = ON).

i Note

- *In systems with downstream heating circuit without a valve (system Anl 2.x, 4.x), BI1 only influences the operation of this heating circuit when **Release control circuit** is configured, while the operation of the entire controller (including the control circuits of the connected TROVIS I/O expansion modules; excluding the processing of external demand) is influenced when **Release controller** is configured.*
- *In system Anl 3.0, BI15 influences the operation of the entire controller (except for processing an external demand) when **Release control circuit** is configured.*
- *In buffer tank systems Anl 15.x and 16.x, BI15 influences only the operation of the buffer tank charging circuit when **Release control circuit** is configured.*

Functions	WE	Configuration
Release	0	CO1, 2, 3 -> F14 - 1 [1]
Release controller	0	CO5 -> F15 - 1 [1]
	ON	[1] Active when BI = ON, OFF

16.4.10 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 Minimum speed: 0 to 50 %
0 to 10 V output reverse	0 0 %	CO5 -> F25 - 1 Zero: 0 to 50 %
PWM reverse	0 0 %	CO5 -> F26 - 1 Zero: 0 to 50 %

16.4.11 Requesting and processing an external demand

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 SF3 or FG3 is not assigned. Processing of external demand by device bus can also be configured.

Note

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. If the **Priority for external demand** function is activated, the external demand is also processed during storage tank charging. The heating circuits can be configured in such a way that they only process external demand. The possible settings for each heating circuit do not apply with this configuration as only the external demand is processed with associated UP as feeder pump.

Functions	WE	Configuration
Priority for external demand	0	CO4 -> F16 - 1
Demand only	0 0 0	CO1 -> F24 - 1 CO2 -> F24 - 1 CO3 -> F24 - 1

Binary demand processing

Regardless of the operating mode set for control circuit, except for manual mode, the controller regulates the flow temperature in the heating circuit concerned when either the binary input (terminals 17/18) is a make contact ('Active when BI' = OFF) or a break contact ('Active when BI' = ON) in control circuit HC1 to at least the adjusted flow temperature adjusted in PA1 -> P10 ('Minimum flow temperature set point HC for binary demand processing').

Functions	WE	Configuration
Demand processing, 0 to 10 V	0	CO1, 2, 3 -> F16 - 0
Binary demand processing	0 ON	CO1 -> F17 - 1 Active when BI = ON, OFF

Parameters	WE	Parameters: value range
Minimum flow temperature set point HC for binary demand processing	40.0 °C	PA1 -> P10: 5.0 to 150.0 °C

Demand processing, 0 to 10 V

Regardless of the operating mode set for the control circuit affected (except for manual mode), the controller regulates the flow temperature at least to the temperature corresponding with the 0 to 10 V signal at the 0 to 10 V input.

Functions	WE	Configuration
Demand processing, 0 to 10 V	0	CO1, 2, 3 -> F16 - 1
AE Zero shift	0	CO5 -> F31 - 0
	0 °C	Lower transmission range: 0 to 150 °C
	120 °C	Upper transmission range: 0 to 150 °C
	0	CO5 -> F31 - 1
	5 %	Zero shift: 5 to 20 %
	0 °C	Lower transmission range: 0 to 150 °C
	120 °C	Upper transmission range: 0 to 150 °C
Binary demand processing	0	CO1 -> F17 - 0

Parameters	WE	Parameter level: value range
Set point boost (primary exchanger control)	5 °C	PA1, 2, 3: 0 to 50 °C

External demand using 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, binary signals or requests processed over the device bus can be integrated into the analog request for an external demand.

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

16.4.12 Capacity limitation in RK1

The capacity can be limited based on a pulse signal to 800 pulse/h at terminals 17/18. This only applies to systems which do not use input SF3/FG3. Three different operating situations exist:

– A system with simultaneous room and DHW heating requires maximum energy.
– A system with a fully charged storage tank that is only used for room heating requires less energy.
– A system that suspends room heating during DHW heating requires less energy.

As a result, three different maximum limit values can be adjusted:

– Max. limit value to determine the absolute upper limit
– 'Max. limit (heating)' to operate room heating only
– Max. limit (DHW) to operate DHW heating only

In all systems without DHW heating or without heating circuit, only the Max. limit value for the capacity can be specified. If the 'Max. limit' or 'Max. limit (heating)' parameter is set to 'OT', a four-point characteristic configured in CO1 -> F11 - 1 allows the input of four capacity limits for outdoor-temperature-compensated capacity limitation in addition to the outdoor, flow and return flow temperature values.

All limits are adjusted as pulses per hour (pulses/h). As the reading for the current pulse rate P in pulse/h (–> extended operating level, key number 1999) is calculated based on the time interval between incoming pulses, the controller naturally cannot react immediately to every sudden capacity change in the system.
The flow set point of the control circuit RK1 is reduced when the pulse rate reaches the currently valid maximum limit. The Limiting factor determines how strongly the controller responds.

Example to determine the limit:

If a capacity of 30 kW is to be limited, the following limit must be set in a heat meter, which issues one pulse per kilowatt hour:

$$P = \frac{30\ \text{kW}}{1\ \text{kWh/pulse}} = 30\ \text{pulses/h}$$

Note

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

Functions	WE	Configuration
Capacity limitation in RK1 [1]	0 15 pulses/h 15 pulses/h 15 pulses/h 1.0	CO5 -> F10 - 1 Maximum limit: OT to 800 m^3/h Max. limit (heating) [2]: OT to 800 pulses/h Max. limit (DHW) [2]: 1 to 800 pulses/h Limiting factor: 0.1 to 10.0
Capacity limitation in RK1 by meter bus	0	CO6 -> F12 - 0

1) Not in system Anl 1.9
2) Not in systems Anl 1.0, 1.5-1.8, 3.0, 3.5, 3.9, 4.0, 5.9, 7.x, 10.x, 11.x, 12.x, 13.x, 14.x, 15.x, 16.x, 17.x, 18.x, 21.x and 25.x

16.4.13 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 at the input BI13 or to RüF1. Either the open ('Active when BI =' Off) or closed binary input BI13 ('Active when BI =' ON) can be configured 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 RK1. 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 [1]	0 Binary ON	CO5 -> F12 - 1 Switching mode: Binary (terminals 13/19), analog (RüF1) Active when BI = ON, OFF

1) Not in system Anl 1.9

16.4.14 Device bus

The device bus allows the connection of up to 32 participants (Series 55xx Controllers). Terminals 29/30 is used in the TROVIS 5578 Controller for this purpose. No attention must be paid to the polarity of the device bus wiring.

Activate the device bus and specify a valid device bus address between 1 and 32 for each device. Note that the device bus address 1 is to be set for just one controller in the system and that all device bus addresses must be unique. The controller with device bus address 1 implements the required bus bias voltage for the system. Once the controllers have been connected and set accordingly, additional functions can be configured. These partly application-specific functions include:

- Requesting and processing an external demand (see section 16.4.14.1)
- Sending and receiving outdoor temperatures (see section 16.4.14.2)
- Synchronizing the clock (see section 16.4.14.3)
- Priority over all controllers (see section 16.4.14.4)
- Display error messages issued by the device bus (see section 16.4.14.5)

16.4.14.1 Requesting and processing an external demand

In general, the controller which controls the primary valve or boiler (= primary controller) in a system of linked controllers will process the demand of all subsequent controllers (= secondary controllers). As a result, the primary controller must be configured to receive this demand. Usually, the secondary controllers are configured such that they send their maximum flow set point to the primary controller.
In special cases, however, it might happen that only the set point of one control circuit is to be sent. The appropriate function blocks to do so are also available for selection. After the selected function blocks have been activated, you must specify a register number. The following applies: in a system of linked controllers which are hydraulically supplied by a primary controller, all controllers (primary and secondary controllers) must have the same register number setting for the 'Demand register'.
A controller which is configured to receive a demand in register no. 5 will not process a demand sent to register no. 6. The primary controller compares the received requested demands and its own requested demand and supplies the system with the required flow temperature (if necessary, increased by the 'Set point boost (pre-control circuit)'.

Note

Overheating may occur in the heating circuits of the primary controller without control valve.

Primary controller:

Functions	WE	Configuration
Device bus	0	CO7 -> F01 - 1, device bus address
Receive external demand in RK1	0	CO7 -> F15 - 1 [1)]
Receive external demand in RK2	0	CO7 -> F17 - 1 [1)]
Receive external demand in RK3	0	CO7 -> F18 - 1 [1)]
Demand only	0 0 0	CO1 -> F24 - 1 CO2 -> F24 - 1 CO3 -> F24 - 1
	5	1) Register number/5 to 64

Parameters	WE	Parameters: value range
Set point boost (pre-control circuit)	5.0 °C	PA1, 2, 3 -> P15: 0.0 to 50.0 °C

Secondary controller:

Functions	WE	Configuration
Device bus	0	CO7 -> F01 - 1, device bus address
Send demand RK1	0	CO7 -> F10 - 1 [1)]
Send demand RK2	0	CO7 -> F11 - 1 [1)]
Send demand RK3	0	CO7 -> F12 - 1 [1)]
Send demand DHW	0	CO7 -> F13 - 1 [1)]
Send max. demand	0	CO7 -> F14 - 1 [1)]
	5	1) Register number/5 to 64

Note

The register number specifies the location where the flow set points are saved in the primary controller. As a result, the register number set in the secondary controller in CO7 -> F10 to F14 must be the same as the register number set in CO7 -> F15 in the primary controller.

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

16.4.14.2 Sending and receiving outdoor temperatures

Controllers equipped with one (two) outdoor sensor(s) can be configured to supply other controllers with the measured outdoor temperature(s) over the device bus. This enables outdoor-temperature-compensated control even in systems which do not have their own outdoor sensor.

Functions	WE	Configuration
Device bus	0	CO7 -> F01 - 1, device bus address
Send AF1	0	CO7 -> F06 - 1 [1)]
Receive AF1	0	CO7 -> F07 - 1 [1)]
Send AF2	0	CO7 -> F08 - 1 [2)]
Receive AF2	0	CO7 -> F09 - 1 [2)]
	1	1) Register number/1 to 4
	2	2) Register number/1 to 4

i Note

The register number for the outdoor temperature AF1 or AF2 must be the same for the sending and the receiving controller.

16.4.14.3 Synchronizing the clock

One controller in a system of linked controllers should perform the 'Clock synchronization' function. This controller sends its system time once every 24 hours to all other controllers over the device bus.
Regardless of this function, the system time of all controllers is adapted immediately when the time setting of one controller is changed.

Functions	WE	Configuration
Device bus	0	CO7 -> F01 - 1, device bus address
Clock synchronization	0	CO7 -> F02 - 1

16.4.14.4 Priority over all controllers

When controllers are linked with each other over a device bus, the heating circuits of other controllers can be shut down while DHW heating is active. It is also possible to configure the return flow temperature limitation in the primary circuit so that it is raised to the value adjusted for the maximum return flow temperature (or for point 1 of the return flow temperature in a four-point characteristic). Controllers configured to trigger this function must generate the 'DHW heating active' message. 'Receive release RK_' must be configured for the heating circuits concerned in the controllers whose heating circuit(s) are to be shut down when this DHW heating is active. The same register number must be specified if only one DHW circuit is to affect one or more heating circuits. If several DHW circuits exist in the system, it is possible to select the heating circuits that are only to react to one or other active DHW heating by assigning different register numbers. If a secondary heating circuit with valve is to be shut down, the valve of this circuit is closed while its circulation pump remains activated.
If a secondary heating circuit without valve is to shut down, just its circulation pump and not the primary circuit (RK1) is shut down, for example in systems Anl 2.x by configuring 'Receive release RK1'.

Functions	WE	Configuration
Device bus	0	CO7 -> F01 - 1, device bus address
Send 'DHW heating active'	0	CO7 -> F20 - 1 [1)]
Receive release RK1	0	CO7 -> F21 - 1 [1)]
Receive release RK2	0	CO7 -> F22 - 1 [1)]
Receive release RK3	0	CO7 -> F23 - 1 [1)]
	32	[1)] Register number/5 to 64

16.4.14.5 Display error messages issued by the device bus

The setting CO7 -> F16 - 1 causes the controller to react to the error messages from the device bus by generating the 'External err' error message as long as the faults of the other device bus participants exist.

Functions	WE	Configuration
Receive errors	0	CO7 -> F16 - 1

16.4.15 Activating TROVIS I/O expansion modules

The function blocks F31 to F33 allows one additional heating circuit to be added to a system. One TROVIS I/O expansion module is required per heating circuit. The CO7 -> F31 - 1 setting activates the expansion module for heating circuit 11, CO7 -> F32 - 1 activates the expansion module for heating circuit 12 and CO7 -> F33 activates the expansion module for heating circuit 13 as well as all the associated levels and settings in the controller. Depending on which kind of communication is used, the additionally configured heating circuit works either in the primary circuit, i.e. parallel to the control circuit 1 of the configured main system, or linked to the control circuit 1 (HC1) of the configured main system. As a result, two new plant schemes can be configured per TROVIS I/O module for each main system. Heating circuits connected to HC1 automatically send their flow temperature demand to HC1.

Functions	WE	Configuration
Ext-HC11	0 11 To HC1	CO7 -> F31 - 1: TROVIS I/O for heating circuit 11 active Device bus address: 11 to 15 Connected/primary circuit, to HC1
Ext-HC12	0 12 To HC1	CO7 -> F32 - 1: TROVIS I/O for heating circuit 12 active Device bus address: 11 to 15 Connected/primary circuit, to HC1
Ext-HC13	0 13 To HC1	CO7 -> F33 - 1: TROVIS I/O for heating circuit 13 active Device bus address: 11 to 15 Connected/primary circuit, to HC1

i Note

The default setting for the device bus address (33) must be changed in C07 -> F01 - 1 when an extension module is used (see section 16.4.14).

16.4.16 Connecting potentiometers for valve position input

The FG1 to FG3 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 use of TROVIS 5570 Room Panel is possible. The measured values (in the measuring ranges from 0 to 2000 Ω) are displayed as measured value 13 (FG1), 14 (FG2) and 15 (FG3). They are also available as Modbus data points.

Functions	WE	Configuration
Room sensor RF1, 2, 3		CO1, 2, 3 -> F01 - 0
		Exceptions:
		CO1 ->F01 - 1 and CO7 ->F03 - 1
		CO2 ->F01 - 1 and CO7 ->F04 - 1
	0	CO3 ->F01 - 1 and CO7 ->F05 - 1

16.4.17 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

16.4.18 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 rotary switch	0	CO5 -> F22 - 1

16.4.19 Feeder pump operation

In system Anl 3.0, 5.0, 7.x, 9.1, 9.2, 12.x, 15.1, 16.1, 16.5, 16.7 and 16.8, 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 controller's own secondary circuit requires heat.

Functions	WE	Configuration
Operation UP1	0	CO5 -> F14 - 1

16.4.20 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 RK1 greater than 10 °C lasts longer than 30 minutes, a voltage signal corresponding to the actual demand is issued. At the same time, the RK1 valve is forced to close. After 30 minutes, the external demand for heat is canceled and the control signal output in RK1 is enabled again.

Functions	WE	Configuration
Demand for external heat	0	CO1 -> F20 - 1

16.5 Communication

16.5.1 RS-485 communication module

When looking onto the controller front, the connection for the optional communication module RS-485 (order no. 8812-2002) is located on the left side of the controller housing (RJ-45 port). 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 ▶ 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.

❗ *NOTICE*

Risk of fatal injury due to electric shock.

➔ *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	WE	Parameters: value range
Modbus station address (8 bit)	255	PA6 -> P01: 1 to 246 with CO6 -> F02 - 1: 1 to 32000

Communication parameter settings

– Modbus station address (8 bit)
  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.

16.5.2 Meter bus

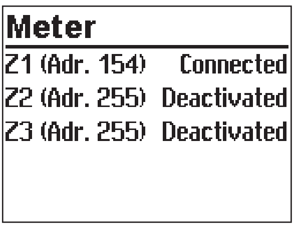
The TROVIS 5578 Controller is fitted with an M-Bus interface for max. three M-Bus units. For systems with three control circuits, a flow rate and/or capacity limitation can be be configured in every control circuit based on the measured data of the heat meters HM 1 to HM 3.

Note

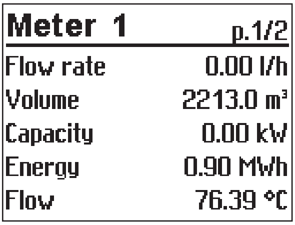
Details on the use of the different heat or water meters can be found in the technical documentation TV-SK 4000179038.

16.5.2.1 Activating the meter bus

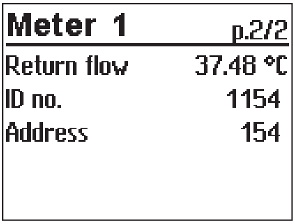
To successfully transfer data from the heat meter, the heat meter must use a standardized protocol in accordance with EN 1434-3. It is not possible to make a general statement about which specific data can be accessed in each meter. For details on the different meter makes refer to the technical documentation TV-SK 6311. All necessary function block parameters to set up the communication with heat meters are available in CO6 -> F10. The meter bus address, model code and reading mode must be specified for the heat meters HM 1 to HM 3. A meter bus address must be unique and correspond with the address set in the heat meter. If the preset meter bus address is unknown, a single heat meter connected to the controller can be assigned the meter bus address 254. The address 255 deactivates the communication with the respective heat meter. The model code to be set for the heat meter can be found in TV-SK 4000179038. In general, the default setting of 1434 can be used for most devices. The meters can be read either automatically every 24 hours (approx.), continuously or when the coils (= Modbus data points) assigned to the heat meters 1 to 3 are overwritten with the value 1 over the system bus interface.



The additional "meter" page is displayed with connection status for meters 1 to 3 in the "extended operating level" mode when the meter bus is activated. When 'Connected' status is displayed, the following data for each meter can be read by pressing the rotary pushbutton:



- Flow rate
- Volume
- Capacity
- Energy
- Flow temperature (Flow)



- Return flow temperature (Return flow)
- Meter ID (ID no.)
- Meter bus address (Address, sent by meter)

Functions	WE	Configuration
Meter bus	0	CO6 -> F10 - 1
	255	HM 1...3 address: 0 to 255
	1434	HM1...3 model: 1434, Multical3, Apator, SLS/WSF
	Continuous	HM1...3 mode: 24 h, Continuous, Coil
	Tar-A	Tariff: Tar-A, Tar-E (tariff schedule ON, OFF; only for HM1 with '1434' und 'Continuous' settings) Tar-E: the consumption data are assigned to a high tariff or a low tariff depending on the time schedule programmed in the customer level. Three time periods can be entered per day of the week (not vacations or public holidays): 1–7 daily, 1 = Monday, 2 = Tuesday, …, 7 = Sunday

16.5.2.2 Flow rate and/or capacity limitation with meter bus

The refreshing rate of the measured variable (flow rate and/or capacity) must be less than fives seconds to ensure that the limitation can be performed properly. The technical documentation TV-SK 6311 lists the heat meters which comply with this criterion and, therefore can be used for limitation. Note that some makes, particularly battery-operated heat meters, respond with communication pauses when they are read too frequently. Others might run out of energy early. For details refer to the above mentioned TV-SK document.

– A system with simultaneous room and DHW heating requires maximum energy.
– A system with a fully charged storage tank that is only used for room heating requires less energy.
– A system that suspends room heating during DHW heating requires less energy.

As a result, three different maximum limit values for RK1 can be adjusted in all systems with only one control valve and DHW heating on the secondary side:

– Max. limit value to determine the absolute upper limit
– Max. limit value for heating to operate room heating only
– Max. limit value for DHW to operate DHW heating only

If the 'Max. limit' or 'Max. limit (heating)' parameter for HC1 is set to 'OT', a four-point characteristic configured in CO1 -> F11 - 1 allows the input of four flow rate or capacity limits for outdoor-temperature-compensated flow rate or capacity limitation in addition to the outdoor, flow and return flow temperature values.

In all systems with two or three control valves, separate maximum limits can be adjusted for the flow rate and capacity.

Flow limitation

All necessary function block parameters to set up the flow rate limitation are available in CO6 -> F11 or CO6 -> F13 and CO6 -> F15 for the second and third control circuit. One after the other, the system's max. limit or max. limit for heating and the max. limit for DHW for systems with only one primary control valve and secondary DHW heating have to be set. The 'Limiting factor' determines how strongly the controller responds when the limit values are exceeded in either direction.

When the flow rate limitation is activated, the respective measuring and limit values are displayed in the extended operating level after confirming the plant scheme.

Note

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

Functions	WE	Configuration
Meter bus	0	CO6 -> F10 - 1
	255	HM 1...3 address: 0 to 255
	1434	HM 1...3 model: 1434, CAL3, APAtO, SLS
	Continuous	HM1...3 mode: 24 h, Continuous, CoiL
Flow rate limitation in RK1	0	CO6 -> F11 - 1
	1.5 m^3/h	Max. limit: OT to 650 m^3/h
	1.5 m^3/h	Max. limit (heating): OT to 650 m^3/h
	1.5 m^3/h	Max. limit (DHW): 0.01 to 650 m^3/h
	1.0	Limiting factor: 0.1 to 10.0
Flow rate limitation in RK2	0	CO6 -> F13 - 1
	1.5	Max. limit: 0.01 to 650 m^3/h
	1.0	Limiting factor: 0.1 to 10.0
Flow rate limitation in RK3	0	CO6 -> F15- 1
	1.5	Max. limit: 0.01 to 650 m^3/h
	1.0	Limiting factor: 0.1 to 10.0

Capacity limitation

All necessary function block parameters to set up the capacity limitation are available in CO6 -> F12, CO6 -> F14 and CO6 -> F16 for the second and third control circuit. One after the other, the system's max. limit or max. limit for heating and the max. limit for DHW for systems with only one primary control valve and secondary DHW heating have to be set. The 'Limiting factor' determines how strongly the controller responds when the limit values are exceeded in either direction.

When the capacity limitation is activated, the respective measuring and limit values are displayed in the extended operating level after confirming the plant scheme.

Note

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

Functions	WE	Configuration
Meter bus	0 255 1434 24h	CO6 -> F10 - 1 HM 1...3 address: 0 to 255 HM 1...3 model: 1434, CAL3, APAtO, SLS HM1...3 mode: 24 h, Continuous, CoiL
Capacity limitation in RK1	0	CO6 -> F12 - 1
	1.5 kW	Max. limit: OT to 6500 kW
	1.5 kW	Max. limit (heating): OT to 6500 kW
	1.5 kW	Max. limit (DHW): 0.1 to 6500 kW
	1.0	Limiting factor: 0.1 to 10.0
Capacity limitation in RK2	0	CO6 -> F14 - 1
	1.5 kW	Max. limit: 0.1 to 6500 kW
	1.0	Limiting factor: 0.1 to 10.0
Capacity limitation in RK3	0	CO6 -> F16 - 1
	1.5 kW	Max. limit: 0.1 to 6500 kW
	1.0	Limiting factor: 0.1 to 10.0

16.5.3 Return flow temperature limitation based on capacity

A capacity limit can be determined for control circuit based on the measured capacity value of the heat meter 1 (HM1). The return flow temperature in control circuit 1 is limited according the settings entered in PA1 as long as the measured capacity value is below the determined capacity limit. When the measured capacity value exceeds the capacity limit, a return flow temperature limit adjustable separately for control circuit 1 takes effect.

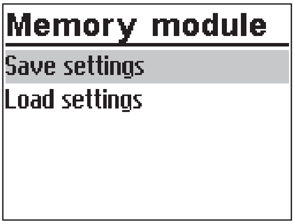
Functions	WE	Configuration
RK1 Return flow temperature limitation based on capacity	0	CO6 -> F17 - 1: new maximum return flow limit at a capacity higher than the max. limit (only when CO6 -> F10 - 1 and activeated HM1)
	1.5 kW	Max. limit: 0.1 to 6500 kW
	55 °C	Max. return flow temperature: 5.0 to 90.0 °C

16.5.4 Memory module/mini module

The use of a memory module (order no. 1400-9379) or mini module (order no. 1400-7436) is particularly useful to transfer all data from one TROVIS 5578 Controller to several other TROVIS 5578 Controllers.

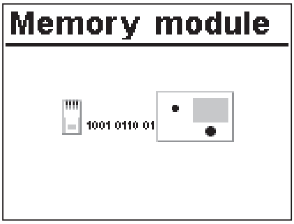
Note

In contrast to the memory module, the mini module is not suitable for transferring the programmed vacations to the individual control circuits or a data logging configuration programmed in TROVIS-VIEW.

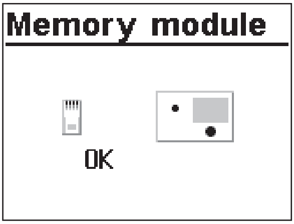


The memory module/mini module is plugged into the RJ-45 connector socket located at the side of the controller. Once the module has been connected, 'Save settings' appears on the controller display. If the memory module already contains data from a different TROVIS 5578 Controller, turn the rotary pushbutton until 'Load settings' is displayed.

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



During data transfer, the zeros and ones run across the display. When the transfer was successful, 'OK' is displayed. After that, the connection between controller and memory module can be terminated.

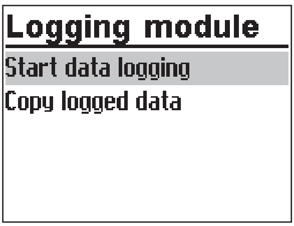


Using TROVIS-VIEW (order no. 6661-1014), it is possible to configure all controller settings on a convenient user interface at the computer and to document these settings.

16.5.5 Data logging

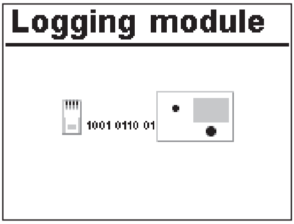
A data logging module (order no. 1400-9378) saves the following controller data every two minutes:

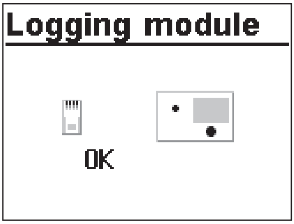
– Temperatures measured by the sensors
– Control signals in %
– Switching states of the pump outputs



The data logging module is plugged into the RJ-45 connector socket located at the side of the controller. Once the module has been connected, 'Start data logging' and 'Copy logging data' appear on the controller display.

– Pressing the rotary pushbutton to confirm 'Start data logging' causes the above listed operating values to be saved cyclically to the inserted data logging module. The controller display returns to the reading indicated when the data logging module was connected.





– Pressing the rotary pushbutton to confirm 'Copy logging data' causes already logged data to be transferred from the memory controller to the data logging module. During data transfer, the zeros and ones run across the display. When the transfer was successful, 'OK' is displayed. After that, the connection between controller and data logging module can be terminated.

i ***Note***

– 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 operating level under 'Logging memory' 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 oldest data in the internal memory of the controller are overwritten after approx. 14 days. The cycle time is one minute.

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.

16.6 Function block lists

CO1: RK1 · Heating circuit 1 (not system Anl 1.9) 1)

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
01	Room sensor	0	Not systems Anl 1.5–1.8, 3.x, 5.x, 7.x, 9.x, 12.x, 14.x, 15.x, 16.x, 17.x, 18.x	CO1 -> F01 - 1: Room sensor RF1, temperature reading and FG1 input for Types 5244, 5257-5 and 5257-51 Room Panels active
02	Outdoor sensor	0	1.5–1.8, 3.5, 7.x, 10.5, 25.5	CO1 -> F02 - 1: Outdoor sensor AF1, outdoor-temperature-compensated control active
		1	1.0–1.3, 2.x, 3.0–3.4, 3.9, 4.x–9.x, 10.0–10.3, 11.x–16.x, 17.x, 18.x, 21.x, 25.0	
03	Return flow sensor	0	1.1–1.4, 10.1–10.3, 21.1	CO1 -> F03 - 1: Return flow sensor RüF1; limitation function active **Function block parameters:** KP (limiting factor): 0.1 to 10.0 (1.0)
		1	1.0, 1.5, 1.6–1.8, 2.x–9.x, 10.0, 10.5, 11.x– 16.x, 17.x, 18.x, 21.0, 21.2, 21.9, 25.x	
04	Cooling control	0	Not systems Anl 1.9, 3.9, 5.9, 16.x, 17.x, 18.x	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 RK1.

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
05	Underfloor heating	0	Not systems Anl 1.5–1.8, 3.x, 5.0–5.2, 7.x, 9.x, 12.x, 14.x, 15.x, 16.x, 17.x, 18.x	CO1 -> F05 - 1: Underfloor heating/drying of jointless floors **Function block parameters:** Boost: 0.0 to 50.0 °C (0.0 °C) Start temperature: 20.0 to 60.0 °C (25 °C) Hold (days): 0 to 10 days (0 days) Temp. rise/day: 0.0 to 20.0 °C (5.0 °C) Maximum temperature: 25.0 to 60.0 °C (45.0 °C) Hold (days): 0 to 30 days (4 days) Temp. reduction/day: 0.0 to 20.0 °C (0.0 °C) Start condition: Stop, Start, Hold, Reduction
06	Storage tank sensor SF2	1	Systems Anl 3.9, 5.9, 16.x, 17.x, 18.x only	CO1 -> F06 - 1: Activate SF2 to switch off charging of the buffer tank
07	Optimization	0	Not systems Anl 1.5–1.8, 3.x, 5.x, 7.x, 9.x, 12.x, 14.x, 15.x, 16.x, 17.x, 18.x	CO1 -> F07 - 1: Optimization of heating times (only when CO1 > F01 - 1 and CO1 -> F02 - 1)
08	Adaptation	0		CO1 -> F08 - 1: Heating characteristic adaptation (only when CO1 -> F01 - 1, CO1 -> F02 - 1 and CO1 -> F11 - 0)
09	Flash adaptation	0		CO1 -> F09 - 1: Flash adaptation of flow temperature (only when 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)
11	Four-point characteristic	0	Not Anl 1.5–1.8, 7.x	CO1 -> F11 - 1: Four-point characteristic (only when CO1 -> F08 - 0) CO1 -> F11 - 0: Gradient characteristic
12	Three-step control mode	1	All [1)]	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, 20, 25, …, 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)

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
13	Damping	0	All 1)	CO1 -> F13 - 1: OPEN signal damping (only when CO1 -> F12 - 1) **Function block parameters:** Max. system deviation: 3.0 to 10.0 °C (3.0 °C)
14	Release	0	All 1)	CO1 -> F14 - 1: Release RK1 at BI15; FG1 has no function **Function block parameters:** Active when BI = ON, OFF (ON)
16	Demand processing, 0 to 10 V Input Terminals 19/23	0	All 1)	CO1 -> F16 - 1: Demand processing, 0 to 10 V
17	Binary demand processing	0	Not for systems with SF3	CO1 -> F17 - 1: Binary demand processing at input terminals 17/18 **Function block parameters:** Active when BI = OFF, ON (ON)
18	External demand	0	All 1)	CO1 -> F18 - 1: External demand 0 to 10 V The standardized signal output (terminals 20/21) 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: 0.0 to 30.0 °C (0.0 °C)
20	Demand for external heat	0	All 1)	CO1 -> F20 - 1: External demand for heat due to insufficient heat supply
21	Speed control of the charging pump	0	Systems Anl 3.9, 5.9, 16.x, 17.x, 18.x only	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	Systems Anl 3.9, 5.9, 16.x, 17.x, 18.x only	CO1 -> F22 - 1: Storage tank charging pump not ON unless return flow hot

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
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 %)
24	Demand only	0	All [1)]	CO1 -> F24 - 1: RK1 works as a feeder circuit. RK1 only processes external demand for heating; UP1 runs depending on demand.

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

CO2: RK2 · Heating circuit 2 (systems Anl 3.1–3.4, 3.9, 4.x, 5.x, 6.0, 10.x, 16.1, 16.6, 16.8, 17.x, 18.x, 25.0, 25.5) [1)]

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
01	Room sensor	0	All [1)]	CO2 -> F01 - 1: Room sensor RF2, temperature reading and FG2 input for Types 5244, 5257-5 and 5257-51 Room Panels active
02	Outdoor sensor	0	All [1)]	CO2 -> F02 - 1: with outdoor sensor, outdoor-temperature-compensated control active **Function block parameters:** Select AF1, AF2
03	Return flow sensor	0	4.x–5.2, 6.x, 10.1–10.3, 16.x	CO2 -> F03 - 1: Return flow sensor RüF2; limitation function active **Function block parameters:** KP (limiting factor): 0.1 to 10.0 (1.0)
		1	3.0–3.5, 10.0, 10.5, 25.x	
04	Cooling control	0	Not systems Anl 3.9, 5.9, 16.x, 17.x, 18.x	CO2 -> F04 - 1: Cooling control The cooling control function causes a reversal of the operating direction and a minimum limitation of the return flow temperature in RK2.

F	Function	WE	Anl	**Comments** **Function block parameters: value range (default setting)**
05	Underfloor heating	0	All 1)	CO2 -> F05 - 1: Underfloor heating/drying of jointless floors **Function block parameters:** Boost: 0.0 to 50.0 °C (0.0 °C) Start temperature: 20 to 60 °C (25 °C) Hold (days): 0 to 10 days (0 days) Temp. rise/day: 0.0 to 20.0 °C (5.0 °C) Maximum temperature: 25.0 to 60.0 °C (45.0 °C) Hold (days): 0 to 30 days (4 days) Temp. reduction/day: 0.0 to 20.0 °C (0.0 °C) Start condition: Stop, Start, Hold, Reduction
07	Optimization	0	All 1)	CO2 -> F07 - 1: Optimization of heating times (only when CO2 > F01 - 1 and CO1(2) -> F02 - 1)
08	Adaptation	0	All 1)	CO2 -> F08 - 1: Heating characteristic adaptation (only when CO2 -> F01 - 1, CO1(2) -> F02 - 1 and CO2 -> F11 - 0)
09	Flash adaptation	0	All 1)	CO2 -> F09 - 1: Flash adaptation of flow temperature (only when 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 1)	CO2 -> F11 - 1: Four-point characteristic (only when CO2 -> F08 - 0) CO2 -> F11 - 0: Gradient characteristic
12	Three-step control mode	1	All 1)	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 to 999 s (0 s) TY (valve transit time): 15, 20, 25, …, 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	Damping	0	All 1)	CO2 -> F13 - 1: OPEN signal damping (only when 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	0	All [1]	CO2 -> F14 - 1: Release RK2 at BI16; FG2 has no function **Function block parameters:** Active when BI = ON, OFF (ON)
16	Demand processing, 0 to 10 V Input Terminals 19/23	0	All [1]	CO2 -> F16 - 1: Demand processing in RK2
24	Demand only	0	All [1]	CO2 -> F24 - 1: RK2 works as a feeder circuit. RK2 only processes external demand for heating; UP2 runs depending on demand.

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

CO3: RK3 · Heating circuit 3 (systems Anl 3.9, 5.x, 6.x, 9.x, 12.x, 13.x, 15.x, 16.5, 16.7, 16.8, 17.x, 21.x, 25.x) [1]

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
01	Room sensor	0	All [1]	CO3 -> F01 - 1: Room sensor RF3, temperature reading and FG3 input for Types 5244, 5257-5 and 5257-51 Room Panels active
02	Outdoor sensor	1	All [1]	CO3 -> F02 - 1: with outdoor sensor, outdoor-temperature-compensated control active **Function block parameters:** Select AF1, AF2
03	Return flow sensor	0	5.0–5.2, 6.x, 9.x, 12.x, 13.x, 15.x, 16.5, 16.7, 16.8, 21.1, 21.9	CO3 -> F03 - 1: Return flow sensor RüF2; limitation function active **Function block parameters:** KP (limiting factor): 0.1 to 10.0 (1.0)
		1	21.2, 25.x	
04	Cooling control	0	Not systems Anl 5.9, 15.x, 16.x, 17.x	CO3 -> F04 - 1: Cooling control The cooling control function causes a reversal of the operating direction and a minimum limitation of the return flow temperature in RK3.

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
05	Underfloor heating	0	All 1)	CO3 -> F05 - 1: Underfloor heating/drying of jointless floors **Function block parameters:** Boost: 0.0 to 50.0 °C (0.0 °C) Start temperature: 20 to 60 °C (25 °C) Hold (days): 0 to 10 days (0 days) Temp. rise/day: 0.0 to 20.0 °C (5.0 °C) Maximum temperature: 25.0 to 60.0 °C (45.0 °C) Hold (days): 0 to 30 days (4 days) Temp. reduction/day: 0.0 to 20.0 °C (0.0 °C) Start condition: Stop, Start, Hold, Reduction
07	Optimization	0	All 1)	CO3 -> F07 - 1: Optimization of heating times (only when CO3 > F01 - 1 and CO1(3) -> F02 - 1)
08	Adaptation	0	All 1)	CO3 -> F08 - 1: Heating characteristic adaptation (only when CO3 -> F01 - 1, CO1(3) -> F02 - 1 and CO3 -> F11 - 0)
09	Flash adaptation	0	All 1)	CO3 -> F09 - 1: Flash adaptation of flow temperature (only when CO3 -> 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 1)	CO3 -> F11 - 1: Four-point characteristic (only when CO3 -> F08 - 0) CO3 -> F11 - 0: Gradient characteristic
12	Three-step control mode	1	All 1)	CO3 -> 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, 20, 25, …, 240 s (35 s) CO3 -> 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	Damping	0	All 1)	CO3 -> F13 - 1: OPEN signal damping (only when CO3 -> 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	0	Not for systems with SF3	CO3 -> F14 - 1: Release RK3 at BI17; FG3 has no function **Function block parameters:** Active when BI = ON, OFF (ON)
16	Demand processing, 0 to 10 V Input Terminals 19/23	0	All [1]	CO3 -> F16 - 1: Demand processing in RK3
24	Demand only	0	All [1]	CO3 -> F24 - 1: RK3 works as a feeder circuit. RK3 only processes external demand for heating; UP3 runs depending on demand.

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

CO4: DHW circuit (systems Anl 1.1–1.9, 2.x, 3.1–3.4, 3.9, 4.1–4.5, 5.1, 5.2, 7.x, 8.x, 9.x, 10.1–10.3, 11.x, 12.x, 13.x, 14.x, 15.x, 17.x, 18.x, 21.x) [1]

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
01	Storage tank sensor SF1 Not systems Anl 3.9, 5.9, 11.0, 11.3, 11.5, 12.0, 13.0, 17.x, 18.x, 21.0	1 0	[1] [2]	CO4 -> F01 - 1: Storage tank sensor SF1 CO4 -> F01 - 0: Storage tank thermostat (only when CO4 -> F02 - 0) [1] WE = 1: Systems Anl 1.1–1.8, 2.x, 3.1–3.4, 4.1–4.5, 5.1, 5.2, 7.x–9.x, 10.1–10.3, 11.1, 11.2, 11.4, 11.6, 12.1, 13.1, 13.2, 14.x, 15.x, 21.1, 21.2 [2] WE = 0: Systems Anl 1.9, 11.9, 12.9, 13.9, 21.9
02	Storage tank sensor SF2 Not Anl 1.9, 11.0, 11.3, 11.9, 12.0, 12.9, 13.0, 13.9, 14.3, 15.3, 21.0, 21.9	0 1	[1] [2]	CO4 -> F02 - 1: Storage tank sensor SF2 (only when CO4 -> F01 - 1) [1] WE = 1: 1.1, 1.3, 1.4, 1.5, 1.7, 1.8-2, 2.0, 2.1, 3.1, 3.3, 3.4, 4.1, 4.3, 4.5, 5.1, 7.1, 8.1, 9.1, 9.5, 10.1, 10.3, 11.1, 11.4, 11.5, 11.9, 12.1, 13.1, 14.1, 15.0, 15.1, 21.1 [2] WE = 0: 1.2, 1.6, 1.8-1, 1.8-3, 1.9, 2.2, 2.3, 2.4, 3.2, 4.2, 5.2, 7.2, 8.2, 9.2, 9.6, 10.2, 11.0, 11.2, 11.3, 11.6, 12.0, 12.2, 12.9, 13.0, 13.2, 13.9, 14.2, 14.3, 15.2, 15.3, 21.0, 21.2, 21.9

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
03	Return flow sensor RüF2	0	1.9, 7.x, 8.x, 11.x, 12.x, 13.x, 21.x	CO4 -> F03 - 1: Return flow sensor RüF2; limitation function active **Function block parameter:** KP (limiting factor): 0.1 to 10.0 (1.0)
			3.9, 5.9, 17.x, 18.x	CO4 -> F03 - 1: return flow sensor RüF2 or RüF4 when RüF2 is activated for HK2; output UP1 to layer the return flow depending on the temperature active
04	Flow rate sensor	0	1.9, 11.9, 12.9, 13.9, 21.9	CO4 -> F04 - 1: Flow rate sensor at BI17 **Function block parameter:** Select: Analog/Binary (Analog) 1) 1) Analog = flow rate sensor (1400-9246) Binary = flow switch at terminals 17/18 In systems Anl 3.9, 5.9, 17.x and 18.x, only a flow switch can be configured.
05	Flow sensor	0	1.1–1.4, 1.6, 1.8, 1.9, 2.2, 2.4, 3.2, 3.4, 4.2, 5.2, 7.2, 8.2, 9.2, 9.6, 10.1–10.3, 11.2, 11.9, 12.2, 12.9, 13.2, 13.9, 21.2, 21.9	CO4 -> F05 - 1: Flow sensor VF4 (to measure storage tank charging temperature)
06	Parallel pump operation	1	8.x, 9.5, 9.6	CO4 -> F06 - 1: Parallel pump operation **Function block parameters:** Stop: 0 to 10 min (10 min) Temperature limit: 20.0 to 90.0 °C (40.0 °C) CO4 -> F06 - 0: UP1 switched off during DHW heating
		0	2.1–2.4, 4.1–4.5	
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
		0	8.x, 9.5, 9.6	CO4 -> F07 - 0: storage tank charging is given unlimited priority concerning UP1 circuit

<table>
<tr><th>F</th><th>Function</th><th>WE</th><th>Anl</th><th>Comments
Function block parameters: value range (default setting)</th></tr>
<tr><td>08</td><td>Priority (reverse)</td><td>0</td><td rowspan="2">1.1–1.4, 3.1–3.4, 4.1–4.5, 5.1, 5.2, 9.x, 10.1–10.3, 11.x, 12.x, 13.x, 15.0, 15.4, 15.5, 21.x</td><td>CO4 -> F08 - 1: Priority by reverse control
(only when CO4 -> F09 - 0)
Function block parameters:
Start: 0 to 10 min (2 min)
KP (influence factor): 0.1 to 10.0 (1.0)
Control circuit: HC1, HC2, HC3, HC1+HC2, HC1+HC3</td></tr>
<tr><td>09</td><td>Priority (set-back)</td><td>0</td><td>CO4 -> F09 - 1: Priority through set-back operation
(only when CO4 -> F08 - 0)
Function block parameters:
Start: 0 to 10 min (2 min)
Control circuit: HC1, HC2, HC3, HC1+HC2, HC1+HC3</td></tr>
<tr><td rowspan="2">10</td><td rowspan="2">Circulation pump (DHW) integrated into heat exchanger</td><td>0</td><td>1.6, 1.8, 3.2, 3.4, 5.2, 7.2, 9.2, 11.2, 11.4, 12.2, 13.2, 21.2</td><td rowspan="2">CO4 -> F10 - 1: Control of DHW circuit active while circulation pump (ZP) is running</td></tr>
<tr><td>1</td><td>11.6, 13.6</td></tr>
<tr><td>11</td><td>Operation of circulation pump (DHW) during storage tank charging</td><td>0</td><td>Not Anl 1.9, 11.0, 11.3, 11.9, 12.0, 12.9, 13.0, 13.9, 21.0, 21.9</td><td>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</td></tr>
</table>

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
12	Control mode	1	1.9, 3.9, 5.9, 7.x, 8.x, 9.x, 11.x, 12.x, 13.x, 17.x, 18.x, 21.	CO4 -> F12 - 1: Three-step control **Function block parameters:** Minimum speed: 5 to 50 % (20 %) (systems Anl 3.9, 5.9, 17.x, 18.x only) KP (gain): 0.1 to 50.0 (2.0; systems Anl 1.9, 11.9, 12.9, 13.9, 21.9: 0.6) Tn (reset time): 1 to 999 s (120 s, systems Anl 3.9, 5.9, 17.x 18.x: 30 s; systems Anl 1.9, 11.9, 12.9, 13.9, 21.9: 12 s) TV (derivative-action time): 0 to 999 s (0 s) TY (valve transit time): 15 to 240 s (35 s; systems Anl 1.9, 11.9, 12.9, 13.9, 21.9: 20 s, not systems Anl 3.9, 5.9, 17.x, 18.x) CO4 -> F12 - 0: On/off control (not systems Anl 3.9, 5.9, 17.x, 18.x); in this case, F12 -0 = F12 - 1 applies **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	Damping	0	All 1)	CO4 -> F13 - 1: OPEN signal damping (only when CO4 -> F12 - 1) **Function block parameters:** Max. system deviation: 3.0 to 10.0 °C (3.0 °C)
		1		CO4 -> F13 - 1: OPEN signal damping (only when CO4 -> F04 - 1, analog setting) **Function block parameters:** Max. system deviation: 3.0 to 10.0 °C (8.0 °C)

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
14	Thermal disinfection	0	Not systems Anl 3.9, 5.9, 17.x, 18.x	CO4 -> F14 - 1: Thermal disinfection (only when CO4 -> F01 - 1) **Function block parameters:** Day of week: Monday, Tuesday, ..., daily (Wednesday) Time: Adjustable as required in steps of 15 minutes (00:00 – 04:00) Disinfection temperature: 60.0 to 90.0 °C (70.0 °C) Set point boost: 0.0 to 50.0 °C (10.0 °C) (systems Anl 1.9, 3.9, 5.9, 11.0, 11.3, 11.5, 11.9, 12.0, 12.9, 13.0, 13.9, 17.x, 18.x, 21.0, 21.9 only) Duration: 0 to 255 min (0 min) When Start time = Stop time Select: Active when BI = OFF, ON (ON)
			3.9, 5.9, 17.x, 18.x	CO4 -> F13 - 1: OPEN signal damping (only when CO4 -> F04 - 1, analog setting) **Function block parameters:** Max. system deviation: 3.0 to 10.0 °C (8.0 °C)
15	SLP depending on return flow temperature	0	1.5, 1.7, 2.0, 2.1, 2.3, 3.1, 3.3, 4.1, 4.3, 5.1, 11.1	CO4 -> F15 - 1: storage tank charging pump not ON unless return flow hot (for systems Anl 1.5, 1.7, 2.0, 2.1, 2.3, 4.1, 4.3, 5.1 only when CO1 -> F03 - 1; for system Anl 11.1 only when CO4 -> F03 - 1)
16	Priority for external demand	0	1.5–1.8, 2.x, 3.1–3.4, 4.1–4.3, 5.x, 15.0, 15.4, 15.5	CO4 -> F16 - 1: Priority for external demand **Note:** a high external demand causes excessive charging temperatures in DHW circuits without control valve. The default setting cannot be changed in systems Anl 7.x to 9.x.
		1	7.x–9.x	
19	Switchover	0	Not systems Anl 1.9, 3.9, 5.9, 11.0, 11.3, 11.5, 11.9, 12.0, 12.9, 13.0, 13.9, 17.x, 18.x, 21.0, 21.9	CO4 -> F19 - 1: Switchover SF1, SF2 according to a time schedule. SF1 applies for day mode and SF2 for night mode (only when CO4 -> F02 - 1)
20	Return flow control	0	7.1, 8.1, 9.1, 9.5, 11.1, 12.1, 13.1, 21.1	CO4 -> F20 - 1: DHW circuit additionally controlled by a globe valve

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
21	Speed control of the charging pump	0	1.5–1.8, 2.x, 3.1–3.4, 4.1–4.3, 5.1, 5.2, 7.x, 8.x, 9.x, 10.1–10.3, 11.1–11.4, 12.1, 12.2, 13.1, 13,2, 21.1, 21.2	CO4 -> 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) Min. speed 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 **Function block parameters:** Valve position: 1 to 100 %
23	Electric heating cartridge	0	Systems Anl 3.9, 17.1, 18.1	CO4 -> F23 - 1: The output BO10 to release the electric heating is activated based on the temperature at SF1 for thermal disinfection (only when CO4 -> F14 - 1)

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 type	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, 10.5, 25.5	CO5 -> F04 - 1: Summer mode **Function block parameters:** Date: Adjustable as required (01.06. - 30.09.) No. days until activation: 1 to 3 (2) No. days until deactivation: 1 to 3 (1) Limit: 0.0 to 30.0 °C (18.0 °C)
05	Delayed outdoor temperature adaptation (decreasing)	0	Not Anl 1.9	CO5 -> F05 - 1: Delayed outdoor temperature adaptation as the temperature falls **Function block parameters:** Delay/h: 0.2 to 6.0 °C (3.0 °C)

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
06	Delayed outdoor temperature adaptation (increasing)	0	Not Anl 1.9	CO5 -> F06 - 1: Delayed outdoor temperature adaptation as the temperature rises **Function block parameters:** Delay/h: 0.2 to 6.0 °C (3.0 °C)
07	Error message	0	Not systems Anl 5.1, 5.2, 5.9, 6.1, 9.x, 12.1, 12.2-x, 13.1, 13.2, 13.6, 15.1, 15.2, 15.3, 17.8, 21.1, 21.2	CO5 -> F07 - 1: Terminal for error message: see plant scheme table **Function block parameters:** Relay contact = NO contact, NC contact (NO contact)
08	Summer time	0	All	CO5 -> F08 - 1: Summer/standard time switchover
09	Frost protection	1	Not systems Anl 1.5, 1.6, 1.9, 3.5, 10.5, 25.5	CO5 -> F09 - 1: Highest priority for frost protection **Function block parameters:** Limit: –15.0 to +3.0 °C (+3.0 °C) CO5 -> F09 - 0: Restricted frost protection **Function block parameters:** Limit: –15.0 to +3.0 °C (+3.0 °C)
		0	1.5, 1.6, 1.9, 3.5, 10.5, 25.5	
10	Capacity limitation at terminals 17/18	0	Not for systems with SF3, not system Anl 1.9	CO5 -> F10 - 1: Capacity limitation in RK1 with pulses (only when CO6 -> F12 - 0) **Function block parameters:** Max. limit: OT to 800 pulses/h (15 pulses/h) Max. limit (heating) [1]: OT to 800 pulses/h (15 pulses/h) Max. limit (DHW) [1]: 1 to 800 pulses/h (15 pulses/h) Limiting factor: 0.1 to 10.0 (1.0) [1] Not systems Anl 1.0, 1.5-1.8, 3.0, 3.5, 3.9, 4.0, 5.9, 7.x, 10.x, 11.x, 12.x, 13.x, 14.x, 15.x, 16.x, 17.x, 18.x, 21.x, 25.x
12	Creep feed rate limitation	0	Not Anl 1.9	CO5 -> F12 - 1: Creep feed rate limitation **Function block parameters:** Switching mode: Binary at terminals 13/19, analog at input RüF1 (binary) Active when BI = ON, OFF (ON)

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
14	Operation UP1	0	3.0, 5.0, 7.x, 9.1, 9.2, 12.x, 15.1, 16.1, 16.5, 16.7, 16.8	CO5 -> F14 - 1: Feeder pump UP1 operation to cover own demand **Note:** the feeder pump UP1 also starts to operate to cover the demand of RK2/RK3
15	Release	0	All	CO5 -> F15 - 1: Release controller at BI15, FG1 has no function **Function block parameters:** Active when BI = ON, OFF (ON)
16	Rtn flow temp. limitation (prop. controller)	0	All	CO5 -> F16 - 1: Return flow temperature limitation with P algorithm
19	Monitoring	0	All	CO5 -> F19 - 1: Temperature monitoring
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: Lock rotary switch In switch position, the controller runs in automatic mode
22	Lock rotary switch	0	All	CO5 -> F22 - 1: Lock rotary switch Key number input is still possible.
23	OT with 0-10 V	0	All	CO5 -> F23 - 1: Outdoor temperature received as 0 to 10 V signal (terminals 19/23) or sent (terminals 20/21) **Function block parameters:** Direction: Input, Output (Input) Lower transmission range: –50.0 to +100.0 °C (–20.0 °C) Upper transmission range: –50.0 to +100.0 °C (+50.0 °C)
24	0-10 V input	0	All	CO5 -> F24 - 1: The measured value at 0 to 10 V input is displayed as a special value.
25	0 to 10 V output reverse	0	All	CO5 -> F25 - 0: 0 V/0 % = Valve CLOSED/pump OFF CO5 -> F25 - 1: 0 V/0 % = Valve OPEN/pump with max. delivery rate **Function block parameters:** Zero: 0 to 50 % (0 %)
26	PWM reverse	0	All	CO5 -> F26 - 0: 0 V/0 % = Valve CLOSED/pump OFF CO5 -> F26 - 1: 0 V/0 % = Valve OPEN/pump with max. delivery rate **Function block parameters:** Zero: 0 to 50 % (0 %)

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
31	0-10 V input Zero shift	0	All	CO5 -> F31 - 1: **Function block parameters:** Zero: 5 to 20 % (5 %) 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

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: Modbus 8-bit addressing
03	Modem	0	All	CO6 -> F03 to F06 is required to configure the error message transfer to a connected Modbus/GPRS gateway (1402-0701).
04	Automatic configuration	0	All	
05	Lock dial-up to building automation system	0	All	
06	Dial-up also upon corrected error	0	All	
07	Monitoring	0	All	CO6 -> F07 - 1: Control system monitoring > Resets all level 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).
10	Meter bus	0	All	CO6 -> F10 - 1: Meter bus active **Function block parameters:** HM 1...3 address: 0 to 255 (255) HM1...3 model: 1434, Multical3, Apator, SLS/WSF (1434) HM1...3 mode: 24 h, Continuous, CoiL For HM1 with '1434' und 'Continuous' settings, additionally: Additionally: Select: Tariff: Tar-A, Tar-E (Tar-A, tariff schedule OFF)

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
11	Flow rate limitation in RK1	0	Not Anl 1.9	CO6 -> F11 - 1: Flow rate limitation (only when CO6 -> F10 - 1 and HM1 is activated) **Function block parameters:** Max. limit: OT to 650 m³/h (1.5 m³/h) Max. limit (heating) [1]: OT to 650 m³/h (1.5 m³/h) Max. limit (DHW) [1]: 0.01 to 650 m³/h (1.5 m³/h) Limiting factor: 0.1 to 10 (1)
12	Capacity limitation in RK1	0	Not Anl 1.9	CO6 -> F12 - 1: Capacity limitation (only when CO6 -> F10 - 1 and HM1 is activated) **Function block parameters:** Max. limit: OT to 6500 kW (1.5 kW) Max. limit (heating) [1]: OT to 6500 kW (1.5 kW) Max. limit (DHW) [1]: 0.1 to 6500 kW (1.5 kW) Limiting factor: 0.1 to 10 (1)
13	Flow rate limitation in RK2	0	3.0–3.4, 3.9, 4.x, 5.9, 7.x, 8.x, 10.x, 11.x, 12.x, 13.x, 15.x, 16.1, 16.6, 16.8, 17.x, 18.x, 21.x, 25.x	CO6 -> F13 - 1: Flow rate limitation (only when CO6 -> F10 - 1 and HM2 is activated) **Function block parameters:** Max. limit: 0.01 to 650 m³/h (1.5 m³/h) Limiting factor: 0.1 to 10 (1)
14	Capacity limitation in RK2	0		CO6 -> F14 - 1: Capacity limitation (only when CO6 -> F10 - 1 and HM2 is activated) **Function block parameters:** Max. limit: 0.1 to 6500 kW (1.5 kW) Limiting factor: 0.1 to 10 (1)
15	Flow rate limitation in RK3	0	5.9, 12.x, 13.x, 15.x, 16.5, 16.7, 16.8, 17.8, 21.x, 25.x	CO6 -> F15 - 1: Flow rate limitation (only when CO6 -> F10 - 1 and HM3 is activated) **Function block parameters:** Max. limit: 0.01 to 650 m³/h (1.5 m³/h) Limiting factor: 0.1 to 10 (1)
16	Capacity limitation in RK3	0		CO6 -> F16 - 1: Capacity limitation (only when CO6 -> F10 - 1 and HM3 is activated) **Function block parameters:** Max. limit: 0.1 to 6500 kW (1.5 kW) Limiting factor: 0.1 to 10 (1)
17	Return flow temperature limitation based on capacity	0	All	CO6 -> F17 - 1: new maximum return flow limit at a capacity higher than the max. limit (only when CO6 -> F10 - 1 and activeated HM1) **Function block parameters:** Max. limit: 0.1 to 6500 kW (1.5 kW) Max. return flow temperature: 5.0 to 90 °C (55 °C)

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
	1) Not systems Anl 1.0, 1.5-1.8, 3.0, 3.5, 4.0, 7.x, 10.x, 11.x, 12.x, 13.x, 14.x, 15.x, 16.x, 17.x, 21.x, 25.x			

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

CO7: Device bus (all systems)

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
01	Device bus	0	All	CO7 -> F01 - 1: Device bus active **Function block parameters:** Device bus address/Auto [1], 1 to 32 (32) 1) Auto = Automatic search for a free device bus address in the system
02	Clock synchronization	0	All	CO7 -> F02 - 1: controller sends its system time to all device bus participants once every 24 hours
03	Room panel RK1	0	1.0–1.4, 2.x, 4.x, 6.0, 9.5, 9.6, 10.x, 11.x, 13.x, 21.x, 25.x	CO7 -> F03 - 1: communication with TROVIS 5570 for RK1 active, CO1 -> F01 - 1 automatically set **Function block parameters:** Device bus address/Auto [1], 1 to 32 (32) 1) Auto = Automatic search for a room panel set to detection mode
04	Room panel RK2	0	3.0–3.4, 4.x, 5.x, 6.0, 10.x, 16.1, 16.6, 16.8, 25.x	CO7 -> F04 - 1: communication with TROVIS 5570 for RK2 active, CO2 -> F01 - 1 automatically set **Function block parameters:** Device bus address/Auto [1], 1 to 32 (32) 1) Auto = Automatic search for a room panel set to detection mode
05	Room panel RK3	0	5.x, 6.0, 9.x, 12.x, 13.x, 15.x, 16.5, 16.7, 16.8, 21.x, 25.x	CO7 -> F05 - 1: communication with TROVIS 5570 for RK3 active, CO3 -> F01 - 1 automatically set **Function block parameters:** Device bus address/Auto [1], 1 to 32 (32) 1) Auto = Automatic search for a room panel set to detection mode

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
06	Send AF1	0	All	CO7 -> F06 - 1: **Function block parameters:** Register number/1 to 4 (1)
07	Receive AF1	0	All	CO7 -> F07 - 1: **Function block parameters:** Register number/1 to 4 (1)
08	Send AF2	0	All	CO7 -> F08 - 1: Analysis active **Function block parameters:** Register number/1 to 4 (2)
09	Receive AF2	0	Not Anl 1.9	CO7 -> F09 - 1: **Function block parameters:** Register number/1 to 4 (2)
10	Send demand RK1	0	All	CO7 -> F10 - 1: Send demand **Function block parameters:** Register number/5 to 64 (5)
11	Send demand RK2	0	All	CO7 -> F11 - 1: **Function block parameters:** Register number/5 to 64 (5)
12	Send demand RK3	0	All	CO7 -> F12 - 1: **Function block parameters:** Register number/5 to 64 (5)
13	Send demand DHW	0	All	CO7 -> F13 - 1: 'Charging temperature boost' (P04) is generated in the PA4 level **Function block parameters:** Register number/5 to 64 (5)
14	Send max. demand	0	All	CO7 -> F14 - 1: the controller already determines internally the maximum flow set point of its circuit and sends it this value to the primary controllers
15	Receive external demand in RK1	0	All	CO7 -> F15 - 1: External demand processing in RK1 **Function block parameters:** Register number/5 to 64 (5)
16	Receive errors	0	All	CO7 -> F16 - 1: the controller generates the 'External' message as long as the faults of the other device bus participants exist.
17	Receive external demand in RK2	0	All	CO7 -> F17 - 1: External demand processing in RK2 **Function block parameters:** Register number/5 to 64 (5)

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
18	Receive external demand in RK3	0	All	CO7 -> F18 - 1: External demand processing in RK3 **Function block parameters:** Register number/5 to 64 (5)
19	Raise return flow temperature	0	All	CO7 -> F19 - 1: Return flow temperature limit in RK1 raised when 'DHW heating active' message is received over the device bus **Function block parameters:** Register number/5 to 64 (32)
20	Send 'DHW heating active'	0	All	CO7 -> F20 - 1: **Function block parameters:** Register number/5 to 64 (32)
21	Receive release RK1	0	All	CO7 -> F21 - 1: **Function block parameters:** Register number/5 to 64 (32)
22	Receive release RK2	0	3.1–3.4, 4.x, 5.x, 6.x, 10.x, 16.1, 16.6, 16.8, 25.x	CO7 -> F22 - 1: **Function block parameters:** Register number/5 to 64 (32)
23	Receive release RK3	0	5.x, 6.x, 9.x, 12.x, 13.x, 15.x, 16.5, 16.7, 16.8, 21.x, 25.x	CO7 -> F23 - 1: **Function block parameters:** Register number/5 to 64 (32)
31	Ext-HC11	0	All	CO7 -> F31 - 1: TROVIS I/O for heating circuit 11 active **Function block parameters:** Device bus address: 11 to 15 (11) Connected/primary circuit, to HC1 (to HC1)
32	Ext-HC12	0	All	CO7 -> F32 - 1: TROVIS I/O for heating circuit 12 active **Function block parameters:** Device bus address: 11 to 15 (12) Connected/primary circuit, to HC1 (to HC1)
33	Ext-HC13	0	All	CO7 -> F33 - 1: TROVIS I/O for heating circuit 13 active **Function block parameters:** Device bus address: 11 to 15 (13) Connected/primary circuit, to HC1 (to HC1)

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 parameter:** 1)
02	Analysis of BI2	0	All	CO8 -> F02 - 1: Analysis active **Function block parameter:** 1)
03	Analysis of BI3	0	All	CO8 -> F03 - 1: Analysis active **Function block parameter:** 1)
04	Analysis of BI4	0	All	CO8 -> F04 - 1: Analysis active **Function block parameter:** 1)
05	Analysis of BI5	0	All	CO8 -> F05 - 1: Analysis active **Function block parameter:** 1)
06	Analysis of BI6	0	All	CO8 -> F06 - 1: Analysis active **Function block parameter:** 1)
09	Analysis of BI9	0	All	CO8 -> F09 - 1: Analysis active **Function block parameter:** 1)
10	Analysis of BI10	0	All	CO8 -> F10 - 1: Analysis active **Function block parameter:** 1)
11	Analysis of BI11	0	All	CO8 -> F11 - 1: Analysis active **Function block parameter:** 1)
12	Analysis of BI12	0	All	CO8 -> F12 - 1: Analysis active **Function block parameter:** 1)
13	Analysis of BI13	0	All	CO8 -> F13 - 1: Analysis active **Function block parameter:** 1)
15	Analysis of BI15	0	All	CO8 -> F15 - 1: Analysis active **Function block parameter:** 1)
16	Analysis of BI16	0	All	CO8 -> F16 - 1: Analysis active **Function block parameter:** 1)
17	Analysis of BI17	0	All	CO8 -> F17 - 1: Analysis active **Function block parameter:** 1)
	1) Error message when BI = 0, BI = 1, none (1)			

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

CO11: RK11 · Heating circuit 11

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
01	Room sensor	0	All	CO11 -> F01 - 1: Room sensor RF11; temperature reading active
02	Outdoor sensor	0	All	CO11 -> F02 - 1: Use of measured value AF1; outdoor-temperature-compensated control active
03	Return flow sensor	1	All	CO11 -> F03 - 1: Rücklaufsensor RüF11; Begrenzungsfunktion aktiv **Function block parameters:** KP (limiting factor): 0.1 to 10.0 (1.0)
05	Underfloor heating	0	All	CO11 -> F05 - 1: Underfloor heating/drying of jointless floors **Function block parameters:** Boost: 0.0 to 50.0 °C (0.0 °C) Start temperature: 20 to 60 °C (25 °C) Hold (days): 0 to 10 days (0 days) Temp. rise/day: 0.0 to 20.0 °C (5.0 °C) Maximum temperature: 25.0 to 60.0 °C (45.0 °C) Hold (days): 0 to 30 days (4 days) Temp. reduction/day: 0.0 to 20.0 °C (0.0 °C) Start condition: Stop, Start, Hold, Reduction
07	Optimization	0	All	CO11 -> F07 - 1: Optimization of heating times (only when CO11 > F01 - 1 and CO11 -> F02 - 1)
08	Adaptation	0	All	CO11 -> F08 - 1: Heating characteristic adaptation (only when CO11 -> F01 - 1, CO11 -> F02 - 1 and CO11 -> F11 - 0)
09	Flash adaptation	0	All	CO11 -> F09 - 1: Flash adaptation of flow temperature (only when CO11 -> 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	CO11 -> F11 - 1: Four-point characteristic (only when CO11 -> F08 - 0) CO11 -> F11 - 0: Gradient characteristic

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
12	Three-step control mode	1	All	CO11 -> 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, 20, 25, …, 240 s (35 s) CO11 -> 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	Damping	0	All	CO11 -> F13 - 1: OPEN signal damping (only when CO11 -> F12 - 1) **Function block parameters:** Max. system deviation: 3.0 to 10.0 °C (3.0 °C)

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

CO12: RK12 · Heating circuit 12

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
01	Room sensor	0	All	CO12 -> F01 - 1: Room sensor RF12; temperature reading active
02	Outdoor sensor	0	All	CO12 -> F02 - 1: Use of measured value AF1; outdoor-temperature-compensated control active
03	Return flow sensor	1	All	CO12 -> F03 - 1: Return flow sensor RüF12; limitation function active **Function block parameters:** KP (limiting factor): 0.1 to 10.0 (1.0)
05	Underfloor heating	0	All	CO12 -> F05 - 1: Underfloor heating/drying of jointless floors **Function block parameters:** Boost: 0.0 to 50.0 °C (0.0 °C) Start temperature: 20 to 60 °C (25 °C) Hold (days): 0 to 10 days (0 days) Temp. rise/day: 0.0 to 20.0 °C (5.0 °C) Maximum temperature: 25.0 to 60.0 °C (45.0 °C) Hold (days): 0 to 30 days (4 days) Temp. reduction/day: 0.0 to 20.0 °C (0.0 °C) Start condition: Stop, Start, Hold, Reduction

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
07	Optimization	0	All	CO12 -> F07 - 1: Optimization of heating times (only when CO12 > F01 - 1 and CO12 -> F02 - 1)
08	Adaptation	0	All	CO12 -> F08 - 1: Heating characteristic adaptation (only when CO12 -> F01 - 1, CO12 -> F02 - 1 and CO12 -> F11 - 0)
09	Flash adaptation	0	All	CO12 -> F09 - 1: Flash adaptation of flow temperature (only when CO12 -> 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	CO12 -> F11 - 1: Four-point characteristic (only when CO11 -> F08 - 0) CO12 -> F11 - 0: Gradient characteristic
12	Three-step control mode	1	All	CO12 -> 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, 20, 25, …, 240 s (35 s) CO12 -> 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	Damping	0	All	CO12 -> F13 - 1: OPEN signal damping (only when CO11 -> F12 - 1) **Function block parameters:** Max. system deviation: 3.0 to 10.0 °C (3.0 °C)

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

CO13: RK13 · Heating circuit 13

F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
01	Room sensor	0	All	CO13 -> F01 - 1: Room sensor RF13; temperature reading active
02	Outdoor sensor	0	All	CO13 -> F02 - 1: Use of measured value AF1; outdoor-temperature-compensated control active
03	Return flow sensor	1	All	CO13 -> F03 - 1: Return flow sensor RüF13; limitation function active **Function block parameters:** KP (limiting factor): 0.1 to 10.0 (1.0)
05	Underfloor heating	0	All	CO13 -> F05 - 1: Underfloor heating/drying of jointless floors **Function block parameters:** Boost: 0.0 to 50.0 °C (0.0 °C) Start temperature: 20 to 60 °C (25 °C) Hold (days): 0 to 10 days (0 days) Temp. rise/day: 0.0 to 20.0 °C (5.0 °C) Maximum temperature: 25.0 to 60.0 °C (45.0 °C) Hold (days): 0 to 30 days (4 days) Temp. reduction/day: 0.0 to 20.0 °C (0.0 °C) Start condition: Stop, Start, Hold, Reduction
07	Optimization	0	All	CO13 -> F07 - 1: Optimization of heating times (only when CO13 > F01 - 1 and CO13 -> F02 - 1)
08	Adaptation	0	All	CO13 -> F08 - 1: Heating characteristic adaptation (only when CO13 -> F01 - 1, CO13 -> F02 - 1 and CO13 -> F11 - 0)
09	Flash adaptation	0	All	CO13 -> F09 - 1: Flash adaptation of flow temperature (only when CO13 -> 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	CO13 -> F11 - 1: Four-point characteristic (only when CO13 -> F08 - 0) CO13 -> F11 - 0: Gradient characteristic

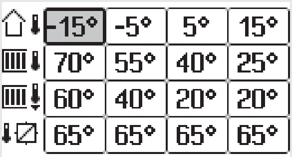
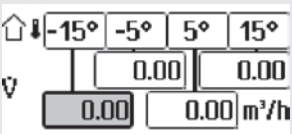
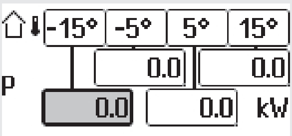
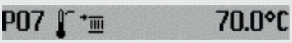
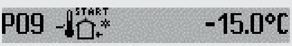
F	Function	WE	Anl	Comments Function block parameters: value range (default setting)
12	Three-step control mode	1	All	CO13 -> F12 - 1: Three-step control **Function block parameters:** KP (gain): 0.1 to 50.0 (2.0) Tn (reset time): 1 to 999 s (120 s) TV (derivative-action time): 0 to 999 s (0 s) TY (valve transit time): 15, 20, 25, …, 240 s (35 s) CO13 -> 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	Damping	0	All	CO13 -> F13 - 1: OPEN signal damping (only when CO11 -> F12 - 1) **Function block parameters:** Max. system deviation: 3.0 to 10.0 °C (3.0 °C)

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

16.7 Parameter lists

PA1: Heating circuit HC1

P	Reading	Parameter: Value range (default setting)
01	P01 1.2	Flow gradient: 0.2 to 3.2 (1.2) 0.2 to 1.0 (0.5) with CO1 -> F05 - 1
02	P02 0.0°C	Level (parallel shift): –30.0 to 30.0 °C (0.0 °C)
03	P03 50.0°C	Flow set point (day) (only when CO1 -> F02 - 0 and CO1 -> F09 - 1): –5.0 to 150.0 °C (50.0 °C)
04	P04 30.0°C	Flow set point (night) (only when CO1 -> F02 - 0 and CO1 -> F09 - 1): –5.0 to 150.0 °C (30.0 °C)

P	Reading	Parameter: Value range (default setting)
05	 	Four-point characteristic Outdoor temperature: –50.0 to 50.0 °C (–15.0 °C, –5.0 °C, 5.0 °C, 15.0 °C) –50.0 to 50.0 °C (5.0 °C, 15.0 °C, 25.0 °C, 35.0 °C) 1) Flow temperature: –5.0 to 150.0 °C (70.0 °C, 55.0 °C, 40.0 °C, 25.0 °C) –5.0 to 150.0 °C (20.0 °C, 15.0 °C, 10.0 °C, 5.0 °C) 1) Reduced flow temperature: –5.0 to 150.0 °C (60.0 °C, 40.0 °C, 20.0 °C, 20.0 °C) –5.0 to 150.0 °C (30.0 °C, 25.0 °C, 20.0 °C, 15.0 °C) 1) Return flow temperature: 5.0 to 90.0 °C (65.0 °C, 65.0 °C, 65.0 °C, 65.0 °C)
		Flow rate: 0.01 to 650 m^3/h (0.00 m^3/h, 0.00 m^3/h, 0.00 m^3/h, 0.00 m^3/h)
		Capacity: 0.1 to 6500 kW (with CO6 -> F12 - 1) or 1 to 800 pulse/h (with CO5 -> F10 - 1) (0.0 kW, 0.0 kW, 0.0 kW, 0.0 kW) or (0.0 pulse/h, 0.0 pulse/h, 0.0 pulse/h, 0.0 pulse/h)
06		Min. flow temperature: –5.0 to 150.0 °C (20.0 °C)
07		Max. flow temperature: 5.0 to 150.0 °C (70.0 °C) 5.0 to 50.0 °C (50.0 °C) when CO1 -> F05 - 1
09		Outdoor temperature for continuous day mode: –50.0 to 5.0 °C (–15 °C)

P	Reading	Parameter: Value range (default setting)
10	P10 40.0°C	Minimum flow temperature set point HC for binary demand processing: 5.0 to 150.0 °C (40.0 °C)
11	P11 1.2	Return flow gradient (only when CO1 -> F03 - 1): 0.2 to 3.2 (1.2)
12	P12 0.0°C	Return flow level (only when CO1 -> F03 - 1): –30.0 to 30.0 °C (0.0 °C)
13	P13 65.0°C	Base point for return flow temperature (only when CO1 -> F03 - 1): 5.0 to 90.0 °C (65.0 °C)
14	P14 65.0°C	Max. return flow temperature (only when CO1 -> F03 - 1): 5.0 to 90.0 °C (65.0 °C)
15	P15 5.0°C	Set point boost (pre-control circuit): 0.0 to 50.0 °C (5.0 °C)
16	P16 AUTO	Minimum set point to charge buffer tank: AUTO to 90.0 °C (AUTO)
17	P17 STOP AUTO	Stop charging of the buffer tank: AUTO to 90.0 °C (AUTO)
18	P18 6.0°C	Charging temperature boost: 0.0 to 50.0 °C (6.0 °C)
19	P19 STOP 1.0	Lag time of charging pump 0.0 to 10.0 (1.0)

[1] With cooling control with or without outdoor sensor

PA2: Heating circuit HC2

P	Reading	Parameter: Value range (default setting)
01	P01 1.2	Flow gradient: 0.2 to 3.2 (1.2) 0.2 to 1.0 (0.5) with CO2 -> F05 - 1
02	P02 0.0°C	Level (parallel shift): –30.0 to 30.0 °C (0.0 °C)
03	P03 50.0°C	Flow set point (day) (only when CO1, CO2 -> F02 - 0 and CO2 -> F09 - 1): –5.0 to 150.0 °C (50.0 °C)
04	P04 30.0°C	Flow set point (night) (only with CO1, CO2 -> F02 - 0 and CO2 > F09 - 1): –5.0 to 150.0 °C (30.0 °C)

P	Reading	Parameter: Value range (default setting)
05	P05 -15° -5° 5° 15° 70° 55° 40° 25° 60° 40° 20° 20° 65° 65° 65° 65°	Four-point characteristic Outdoor temperature: –50.0 to 50.0 °C (–15.0 °C, –5.0 °C, 5.0 °C, 15.0 °C) –50.0 to 50.0 °C (5.0 °C, 15.0 °C, 25.0 °C, 35.0 °C) [1)] Flow temperature: –5.0 to 150.0 °C (70.0 °C, 55.0 °C, 40.0 °C, 25.0 °C) –5.0 to 150.0 °C (20.0 °C, 15.0 °C, 10.0 °C, 5.0 °C) [1)] Reduced flow temperature: –5.0 to 150.0 °C (60.0 °C, 40.0 °C, 20.0 °C, 20.0 °C) –5.0 to 150.0 °C (30.0 °C, 25.0 °C, 20.0 °C, 15.0 °C) [1)] Return flow temperature: 5.0 to 90.0 °C (65.0 °C, 65.0 °C, 65.0 °C, 65.0 °C)
06	P06 20.0°C	Min. flow temperature: –5.0 to 150.0 °C (20.0 °C)
07	P07 70.0°C	Max. flow temperature: 5.0 to 150.0 °C (70.0 °C) 5.0 to 50.0 °C (50.0 °C) when CO2 -> F05 - 1
09	P09 START -15.0°C	Outdoor temperature for continuous day mode: –50.0 to 5.0 °C (–15 °C)
11	P11 1.2	Return flow gradient (only when CO2 -> F03 - 1): 0.2 to 3.2 (1.2)
12	P12 0.0°C	Return flow level (only when CO2 -> F03 - 1): –30.0 to 30.0 °C (0.0 °C)
13	P13 65.0°C	Base point for return flow temperature (only when CO2 -> F03 - 1): 5.0 to 90.0 °C (65.0 °C)
14	P14 65.0°C	Max. return flow temperature: 5.0 to 90.0 °C (65.0 °C)
15	P15 5.0°C	Set point boost (pre-control circuit): 0.0 to 50.0 °C (5.0 °C)

1) With cooling control with or without outdoor sensor

PA3: Heating circuit HC3

P	Reading	Parameter: Value range (default setting)
01	P01 1.2	Flow gradient: 0.2 to 3.2 (1.2) 0.2 to 1.0 (0.5) with CO3 -> F05 - 1
02	P02 0.0°C	Level (parallel shift): –30.0 to 30.0 °C (0.0 °C)
03	P03 50.0°C	Flow set point (day) (only when CO1, CO3 -> F02 - 0 and CO3 -> F09 - 1): –5.0 to 150.0 °C (50.0 °C)
04	P04 30.0°C	Flow set point (night) (only with CO1, CO3 -> F02 - 0 and CO3 > F09 - 1): –5.0 to 150.0 °C (30.0 °C)
05	P05 -15° -5° 5° 15° 70° 55° 40° 25° 60° 40° 20° 20° 65° 65° 65° 65°	Four-point characteristic Outdoor temperature: –50.0 to 50.0 °C (–15.0 °C, –5.0 °C, 5.0 °C, 15.0 °C) –50.0 to 50.0 °C (5.0 °C, 15.0 °C, 25.0 °C, 35.0 °C) [1)] Flow temperature: –5.0 to 150.0 °C (70.0 °C, 55.0 °C, 40.0 °C, 25.0 °C) –5.0 to 150.0 °C (20.0 °C, 15.0 °C, 10.0 °C, 5.0 °C) [1)] Reduced flow temperature: –5.0 to 150.0 °C (60.0 °C, 40.0 °C, 20.0 °C, 20.0 °C) –5.0 to 150.0 °C (30.0 °C, 25.0 °C, 20.0 °C, 15.0 °C) [1)] Return flow temperature: 5.0 to 90.0 °C (65.0 °C, 65.0 °C, 65.0 °C, 65.0 °C)
06	P06 20.0°C	Min. flow temperature: –5.0 to 150.0 °C (20.0 °C)
07	P07 70.0°C	Max. flow temperature: 5.0 to 150.0 °C (70.0 °C) 5.0 to 50.0 °C (50.0 °C) when CO3 -> F05 - 1
09	P09 START -15.0°C	Outdoor temperature for continuous day mode: –50.0 to 5.0 °C (–15 °C)
11	P11 1.2	Return flow gradient (only when CO3 -> F03 - 1): 0.2 to 3.2 (1.2)
12	P12 0.0°C	Return flow level (only when CO3 -> F03 - 1): –30.0 to 30.0 °C (0.0 °C)
13	P13 65.0°C	Base point for return flow temperature (only when CO3 -> F03 - 1): 5.0 to 90.0 °C (65.0 °C)

P	Reading	Parameter: Value range (default setting)
14	P14 65.0°C	Max. return flow temperature: 5.0 to 90.0 °C (65.0 °C)
15	P15 5.0°C	Set point boost (pre-control circuit): 0.0 to 50.0 °C (5.0 °C)

[1] With cooling control with or without outdoor sensor

PA4: Domestic hot water heating (DHW)

P	Reading	Parameter: Value range (default setting)
01	P01 40.0°C	Min. adjustable DHW set point: 5.0 to 90.0 °C (40.0 °C)
02	P02 60.0°C	Max. adjustable DHW set point: 5.0 to 90.0 °C (90.0 °C)
03	P03 5.0°C	Hysteresis: 1.0 to 30.0 °C (5.0 °C)
04	P04 10.0°C	Charging temperature boost: 0.0 to 50.0 °C (10.0 °C)
05	P05 80.0°C	Max. charging temperature (only when CO4 -> F05 - 1): 20.0 to 150.0 °C (80.0 °C)
07	P07 65.0°C	Max. return flow temperature: 5.0 to 90.0 °C (65.0 °C)
10	P10 10.0°C	Solar circuit pump ON: 1.0 to 30.0 °C (10.0 °C)
11	P11 3.0°C	Solar circuit pump OFF: 0.0 to 30.0 °C (3.0 °C)

P	Reading	Parameter: Value range (default setting)
12	P12 80.0°C	Max. storage tank temperature: 20.0 to 90.0 °C (80.0 °C)
13	P13 STOP 80.0°C	Maximum buffer tank temperature: 20.0 to 90.0 °C (80.0 °C)
14	P14 100%	Control signal DHW for storage tank charging: 5 to 100 % (100 %)
19	P19 STOP 1.0	Lag time for storage tank charging pump (= Valve transit time x P19): 0.0 to 10.0 (1.0)
21	P21 25.0°C	Return flow temperature limit, layering at top: 5.0 to 90.0 °C (25.0 °C)

PA5: System-wide parameters

P	Reading	Parameter: Value range (default setting)
01	P01 60.0°C	Start temperature for boiler pump (only systems Anl 14.1, 14.2, 15.1, 15.2, 16.2, 16.4, 16.5, 16.7): 20.0 to 90.0 °C (60.0 °C)
02	P02 5.0°C	Boiler pump hysteresis (only system Anl 14.1, 14.2, 15.1, 15.2, 16.2, 16.4, 16.5, 16.7): 0.0 to 30.0 °C (5.0 °C)

PA6: Modbus

P	Reading	Parameter: Value range (default setting)
01	P01 ADR 1	Modbus station address (8 bit): 1 to 246 (255) 1 to 3200 (255) with CO6 > F02 - 1

PA11: Heating circuit HC11

P	Reading	Parameter: Value range (default setting)
01	P01 1.2	Flow gradient: 0.2 to 3.2 (1.2) 0.2 to 1.0 (0.5) with CO11 -> F05 - 1
02	P02 0.0°C	Level (parallel shift): –30.0 to 30.0 °C (0.0 °C)

P	Reading	Parameter: Value range (default setting)
03	P03 50.0°C	Flow set point (day) (only when CO11 -> F02 - 0 and CO11 -> F09 - 1): –5.0 to 150.0 °C (50.0 °C)
04	P04 30.0°C	Flow set point (night) (only with CO11 -> F02 - 0 and CO11 > F09 - 1): –5.0 to 150.0 °C (30.0 °C)
05	P05 -15° -5° 5° 15° 70° 55° 40° 25° 60° 40° 20° 20° 65° 65° 65° 65°	Four-point characteristic Outdoor temperature: –50.0 to 50.0 °C (–15.0 °C, –5.0 °C, 5.0 °C, 15.0 °C) Flow temperature: –5.0 to 150.0 °C (70.0 °C, 55.0 °C, 40.0 °C, 25.0 °C) Reduced flow temperature: –5.0 to 150.0 °C (60.0 °C, 40.0 °C, 20.0 °C, 20.0 °C) Return flow temperature: 5.0 to 90.0 °C (65.0 °C, 65.0 °C, 65.0 °C, 65.0 °C)
06	P06 20.0°C	Min. flow temperature: –5.0 to 150.0 °C (20.0 °C)
07	P07 70.0°C	Max. flow temperature: 5.0 to 150.0 °C (70.0 °C) 5.0 to 50.0 °C (50.0 °C) when CO11 -> F05 - 1
09	P09 START -15.0°C	Outdoor temperature for continuous day mode: –50.0 to 5.0 °C (–15 °C)
11	P11 1.2	Return flow gradient (only when CO11 -> F03 - 1): 0.2 to 3.2 (1.2)
12	P12 0.0°C	Return flow level (only when CO11 -> F03 - 1): –30.0 to 30.0 °C (0.0 °C)
13	P13 65.0°C	Base point for return flow temperature (only when CO11 -> F03 - 1): 5.0 to 90.0 °C (65.0 °C)
14	P14 65.0°C	Max. return flow temperature: 5.0 to 90.0 °C (65.0 °C)

PA12: Heating circuit HC12

P	Reading	Parameter: Value range (default setting)
01	P01 1.2	Flow gradient: 0.2 to 3.2 (1.2) 0.2 to 1.0 (0.5) with CO12 -> F05 - 1

P	Reading	Parameter: Value range (default setting)
02	P02 0.0°C	Level (parallel shift): –30.0 to 30.0 °C (0.0 °C)
03	P03 50.0°C	Flow set point (day) (only when CO12 -> F02 - 0 and CO12 -> F09 - 1): –5.0 to 150.0 °C (50.0 °C)
04	P04 30.0°C	Flow set point (night) (only with CO12 -> F02 - 0 and CO12 > F09 - 1): –5.0 to 150.0 °C (30.0 °C)
05	P05 -15° -5° 5° 15° 70° 55° 40° 25° 60° 40° 20° 20° 65° 65° 65° 65°	Four-point characteristic Outdoor temperature: –50.0 to 50.0 °C (–15.0 °C, –5.0 °C, 5.0 °C, 15.0 °C) Flow temperature: –5.0 to 150.0 °C (70.0 °C, 55.0 °C, 40.0 °C, 25.0 °C) Reduced flow temperature: –5.0 to 150.0 °C (60.0 °C, 40.0 °C, 20.0 °C, 20.0 °C) Return flow temperature: 5.0 to 90.0 °C (65.0 °C, 65.0 °C, 65.0 °C, 65.0 °C)
06	P06 20.0°C	Min. flow temperature: –5.0 to 150.0 °C (20.0 °C)
07	P07 70.0°C	Max. flow temperature: 5.0 to 150.0 °C (70.0 °C) 5.0 to 50.0 °C (50.0 °C) when CO12 -> F05 - 1
09	P09 START -15.0°C	Outdoor temperature for continuous day mode: –50.0 to 5.0 °C (–15 °C)
11	P11 1.2	Return flow gradient (only when CO12 -> F03 - 1): 0.2 to 3.2 (1.2)
12	P12 0.0°C	Return flow level (only when CO12 -> F03 - 1): –30.0 to 30.0 °C (0.0 °C)
13	P13 65.0°C	Base point for return flow temperature (only when CO12 -> F03 - 1): 5.0 to 90.0 °C (65.0 °C)
14	P14 65.0°C	Max. return flow temperature: 5.0 to 90.0 °C (65.0 °C)

PA13: Heating circuit HC13

P	Reading	Parameter: Value range (default setting)
01	P01 1.2	Flow gradient: 0.2 to 3.2 (1.2) 0.2 to 1.0 (0.5) with CO13 -> F05 - 1
02	P02 0.0°C	Level (parallel shift): –30.0 to 30.0 °C (0.0 °C)
03	P03 50.0°C	Flow set point (day) (only when CO13 -> F02 - 0 and CO13 -> F09 - 1): –5.0 to 150.0 °C (50.0 °C)
04	P04 30.0°C	Flow set point (night) (only with CO13 -> F02 - 0 and CO13 > F09 - 1): –5.0 to 150.0 °C (30.0 °C)
05	P05 -15° -5° 5° 15° 70° 55° 40° 25° 60° 40° 20° 20° 65° 65° 65° 65°	Four-point characteristic Outdoor temperature: –50.0 to 50.0 °C (–15.0 °C, –5.0 °C, 5.0 °C, 15.0 °C) Flow temperature: –5.0 to 150.0 °C (70.0 °C, 55.0 °C, 40.0 °C, 25.0 °C) Reduced flow temperature: –5.0 to 150.0 °C (60.0 °C, 40.0 °C, 20.0 °C, 20.0 °C) Return flow temperature: 5.0 to 90.0 °C (65.0 °C, 65.0 °C, 65.0 °C, 65.0 °C)
06	P06 20.0°C	Min. flow temperature: –5.0 to 150.0 °C (20.0 °C)
07	P07 70.0°C	Max. flow temperature: 5.0 to 150.0 °C (70.0 °C) 5.0 to 50.0 °C (50.0 °C) when CO13 -> F05 - 1
09	P09 START -15.0°C	Outdoor temperature for continuous day mode: –50.0 to 5.0 °C (–15 °C)
11	P11 1.2	Return flow gradient (only when CO13 -> F03 - 1): 0.2 to 3.2 (1.2)
12	P12 0.0°C	Return flow level (only when CO13 -> F03 - 1): –30.0 to 30.0 °C (0.0 °C)
13	P13 65.0°C	Base point for return flow temperature (only when CO13 -> F03 - 1): 5.0 to 90.0 °C (65.0 °C)
14	P14 65.0°C	Max. return flow temperature: 5.0 to 90.0 °C (65.0 °C)

16.8 Customer-specific data

Station	
Operator	
SAMSON office	
System code number	

Function block settings in configuration levels

	CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8	CO11	CO12	CO13
F01											
F02											
F03											
F04											
F05											
F06											
F07											
F08											
F09											
F10											
F11											
F12											
F13											
F14											
F15											
F16											
F17											
F18											
F19											
F20											
F21											
F22											
F23											
F24											
F25											
F26											
F31											
F32											
F33											

Settings at the rotary switch · Set points

Parameters	Switch position 🌡☼	Value range
HC1 room temperature		0.0 to 40.0 °C
HC2 room temperature		
HC3 room temperature		
HC11 room temperature		
HC12 room temperature		
HC13 room temperature		
DHW temperature		Min. to max. DHW temperature
HC1 OT deactivation value		−50.0 to +50.0 °C
HC2 OT deactivation value		
HC3 OT deactivation value		
HC11 OT deactivation value		
HC12 OT deactivation value		
HC13 OT deactivation value		

Parameters	Switch position 🌡☾	Value range
HC1 room temperature		0.0 to 40.0 °C
HC2 room temperature		
HC3 room temperature		
HC11 room temperature		
HC12 room temperature		
HC13 room temperature		
DHW temperature		Min. to max. DHW temperature
HC1 OT deactivation value		−50.0 to +50.0 °C
HC2 OT deactivation value		
HC3 OT deactivation value		
HC11 OT deactivation value		
HC12 OT deactivation value		
HC13 OT deactivation value		

Settings at the rotary switch · Times-of-use · Switch position

Times-of-use HC1	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Value range
Start first time-of-use								00:00 to 24:00 h
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 HC2	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Value range
Start first time-of-use								00:00 to 24:00 h
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 HC3	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Value range
Start first time-of-use								00:00 to 24:00 h
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 HC11	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Value range
Start first time-of-use								00:00 to 24:00 h
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 HC12	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Value range
Start first time-of-use								00:00 to 24:00 h
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 HC13	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Value range
Start first time-of-use								00:00 to 24:00 h
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 DHW	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Value range
Start first time-of-use								00:00 to 24:00 h
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 ZP	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Value range
Start first time-of-use								00:00 to 24:00 h
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								

PA1 parameters (heating circuit HC1), PA2 parameters (heating circuit HC2) and PA3 parameters (heating circuit HC3)

P	Parameters	PA1 (HC1)	PA2 (HC2)	PA3 (HC3)	Value range
01	Flow gradient				0.2 to 3.2
02	Level (parallel shift)				–30.0 to +30.0 °C
03	Flow set point (day)				–5.0 to +150.0 °C
04	Flow set point (night)				–5.0 to +150.0 °C
05	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
05	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
	Flow rate, point 1		–	–	0.01 to 650 m^3/h
	Flow rate, point 2		–	–	0.01 to 650 m^3/h
	Flow rate, point 3		–	–	0.01 to 650 m^3/h
	Flow rate, point 4		–	–	0.01 to 650 m^3/h
	Capacity, point 1		–	–	0.1 to 6500 kW or 1 to 800 pulses/h
	Capacity, point 2		–	–	
	Capacity, point 3		–	–	
	Capacity, point 4		–	–	
06	Min. flow temperature				–5.0 to +150.0 °C
07	Max. flow temperature				–5.0 to +150.0 °C
09	Outdoor temperature for continuous day mode				–50.0 to +5.0 °C

P	Parameters	PA1 (HC1)	PA2 (HC2)	PA3 (HC3)	Value range
10	Minimum flow temperature set point HC for binary demand processing				5.0 to 150.0 °C
11	Return flow gradient				0.2 to 3.2
12	Return flow level				–30.0 to +30.0 °C
13	Base point for return flow temperature:				5.0 to 90.0 °C
14	Max. return flow temperature				5.0 to 90.0 °C
15	Set point boost (pre-control circuit)				0.0 to 50.0 °C
16	Minimum set point to charge buffer tank		–	–	OT to 90.0 °C
17	Stop charging of the buffer tank		–	–	OT to 90.0 °C
18	Charging temperature boost		–	–	0.0 to 50.0 °C
19	Lag time of charging pump		–	–	0.0 to 10.0

PA11 parameters (heating circuit HC11), PA12 parameters (heating circuit HC12) and PA13 parameters (heating circuit HC13)

P	Parameters	PA11 (HC11)	PA12 (HC12)	PA13 (HC13)	Value range
01	Flow gradient				0.2 to 3.2
02	Level (parallel shift)				–30.0 to 30.0 °C
03	Flow set point (day)				–5.0 to 150.0 °C
04	Flow set point (night)				–5.0 to 150.0 °C

P	Parameters	PA11 (HC11)	PA12 (HC12)	PA13 (HC13)	Value range
05	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
06	Min. flow temperature				–5.0 to 150.0 °C
07	Max. flow temperature				–5.0 to 150.0 °C
09	Outdoor temperature for continuous day mode				–50.0 to 5.0 °C
11	Return flow gradient				0.2 to 3.2
12	Return flow level				–30.0 to 30.0 °C
13	Base point for return flow temperature:				5.0 to 90.0 °C
14	Max. return flow temperature				5.0 to 90.0 °C

CO1 function block parameters (heating circuit HC1), CO2 function block parameters (heating circuit HC2) and CO3 function block parameters (heating circuit HC3)

F	Function block parameters	CO1 (HC1)	CO2 (HC2)	CO3 (HC3)	Value range
03	KP (limiting factor)				0.1 to 10.0
05	Start temperature				20.0 to 60.0 °C
	Hold (days)				0 to 10 days
	Temp. rise/day				0.0 to 10.0 °C
	Maximum temperature				25.0 to 60.0 °C
	Hold (days)				0 to 10 days
	Temp. reduction/day				0.0 to 10.0 °C
	Start condition				Stop, Start, Hold, Reduction
09	Cycle time				0 to 100 min
	KP (gain)				0.0 to 25.0
12	KP (gain)				0.1 to 50.0
	Tn (reset time)				1 to 999 s
	TV (derivative-action time)				0 to 999 s
	TY (valve transit time)				15 to 240 s
	Hysteresis				1.0 to 30.0 °C
	Min. ON time				0 to 10 min
	Min. OFF time				0 to 10 min
13	Max. system deviation				3.0 to 10.0 °C
14	Active when BI =				ON, OFF
17	Active when BI =		–	–	ON, OFF
18	Lower transmission range		–	–	0.0 to 150.0 °C
	Upper transmission range		–	–	0.0 to 150.0 °C
	Boost		–	–	0.0 to 30.0 °C
21	Start speed reduction - SF2 limit		–	–	5.0 to 90.0 °C
	Stop speed reduction - SF2 limit		–	–	5.0 to 90.0 °C
	Minimum speed		–	–	0 to 50 %0 to 50 %
23	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 %

CO11 function block parameters (heating circuit HC11), CO12 function block parameters (heating circuit HC12) and CO13 function block parameters (heating circuit HC13)

F	Function block parameters	CO11 (HC11)	CO12 (HC12)	CO13 (HC13)	Value range
03	KP (limiting factor)				0.1 to 10.0
05	Boost				0.0 to 50.0 °C
	Start temperature				20.0 to 60.0 °C
	Hold (days)				0 to 10 days
	Temp. rise/day				0.0 to 10.0 °C
	Maximum temperature				25.0 to 60.0 °C
	Hold (days)				0 to 30 days
	Temp. reduction/day				0.0 to 10.0 °C
	Start condition				Stop, Start, Hold, Reduction
09	Cycle time				0 to 100 min
	KP (gain)				0.0 to 25.0
12	KP (gain)				0.1 to 50.0
	Tn (reset time)				1 to 999 s
	TV (derivative-action time)				0 to 999 s
	TY (valve transit time)				15 to 240 s
	Hysteresis				1.0 to 30.0 °C
	Min. ON time				0 to 10 min
	Min. OFF time				0 to 10 min
13	Max. system deviation				3.0 to 10.0 °C

PA4 parameters (domestic hot water heating)

P	Parameters	PA4 (DHW)	Value range
01	Min. adjustable DHW set point		5.0 to 90.0 °C
02	Max. adjustable DHW set point		5.0 to 90.0 °C
03	Hysteresis		1.0 to 30.0 °C
04	Charging temperature boost		0.0 to 50.0 °C
05	Max. charging temperature		20.0 to 150.0 °C
06	Lag time for storage tank charging pump		0.0 to 10.0 x valve transit time
07	Max. return flow temperature		5.0 to 90.0 °C
10	Solar circuit pump ON		1.0 to 30.0 °C
11	Solar circuit pump OFF		0.0 to 90.0 °C

P	Parameters	PA4 (DHW)	Value range
12	Max. storage tank temperature		20.0 to 90.0 °C
19	Lag time for storage tank charging pump		0.0 to 10

CO4 function block parameters (domestic hot water heating)

F	Function block parameters	CO4 (DHW)	Value range
03	KP (limiting factor)		0.1 to 10.0
04	Select		Analog, binary
06	Cancel		0 to 10 min
	Temperature limit		20.0 to 90.0 °C
08	Start		0 to 10 min
	KP (influence factor)		0.1 to 10.0
	Control circuit		HC1, HC2, HC3, HC1+HC2, HC1+HC3
09	Start		0 to 10 min
	Control circuit		HC1, HC2, HC3, HC1+HC2, HC1+HC3
12	Minimum speed		5 to 50 %
	KP (gain)		0.1 to 50.0
	Tn (reset time)		1 to 999 s
	TV (derivative-action time)		0 to 999 s
	TY (valve transit time)		15 to 240 s
	Hysteresis		1.0 to 30.0 °C
	Min. ON time		0 to 10 min
	Min. OFF time		0 to 10 min
13	Max. system deviation		3.0 to 10.0 °C
14	Day of the week		Monday to Sunday, daily
	Time		Adjustable as required
	Disinfection temperature		60.0 to 90.0 °C
	Set point boost		0.0 to 50.0 °C
	Duration		0 to 255 min
	Active when BI =		ON, OFF
21	Start speed reduction		5.0 to 90.0 °C
	Stop speed reduction		5.0 to 90.0 °C
	Minimum speed		0 to 50 %0 to 50 %
22	Valve position when cold charging protection is active		1 to 100 %

PA5 parameters (system-wide parameters)

P	Parameters	PA5	Value range
01	Start temperature for boiler pump		20.0 to 90.0 °C
02	Boiler pump hysteresis		0.0 to 30.0 °C

CO5 function block parameters (system-wide functions)

F	Function block parameters	CO5	Value range
04	Date		Adjustable as required
	No. days until activation		1 to 3
04	No. days until deactivation		1 to 3
	Limit		0.0 to 30.0 °C
05	Delay/h		1.0 to 6.0 °C
06	Delay/h		1.0 to 6.0 °C
07	Relay contact		NC contact, NO contact
09	Limit		–15.0 to +3.0 °C
10	Max. limit		OT to 800 pulses/h
	Max. limit (heating)		OT to 800 pulses/h
	Max. limit (DHW)		1 to 800 pulses/h
	Limiting factor		0.1 to 10.0
12	Switching mode		Binary, analog
	Active when BI =		ON, OFF
13	Maximum buffer tank temperature		20.0 to 90.0 °C
15	Active when BI =		ON, OFF
21	Return flow temperature limit, layering at top		5.0 to 90.0 °C
23	Direction		Input, Output
	Lower transmission range		–50.0 to +100.0 °C
	Upper transmission range		–50.0 to +100.0 °C
25	Zero point		0 to 50 %0 to 50 %
26	Zero point		0 to 50 %0 to 50 %
31	Zero point		5 to 20 %
	Lower transmission range		0 to 150 °C
	Upper transmission range		0 to 150 °C

PA6 parameters (Modbus)

P	Parameters	PA6	Value range
01	Modbus station address (8 bit)		1 to 246

CO6 function block parameters (Modbus)

F	Function block parameters	CO6	Value range
10	Heat meter 1 address		0 to 255
	HM 1 model		1434, CAL3, APAtO, SLS
	Heat meter 1 mode		24 h, Continuous, CoiL
	Heat meter 2 address		0 to 255
	HM 2 model		1434, CAL3, APAtO, SLS
	Heat meter 3 mode		24 h, Continuous, CoiL
	Heat meter 3 address		0 to 255
	HM 3 model		1434, CAL3, APAtO, SLS
	Heat meter 3 mode		24 h, Continuous, CoiL
11	Max. limit		OT to 650 m³/h
	Max. limit (heating)		OT to 650 m³/h
	Max. limit (DHW)		0.01 to 650 m³/h
	Limiting factor		0.1 to 10
12	Max. limit		OT to 6500 kW
	Max. limit (heating)		OT to 6500 kW
	Max. limit (DHW)		0.1 to 6500 kW
	Limiting factor		0.1 to 10
13	Max. limit		0.01 to 650 m³/h
	Limiting factor		0.1 to 10
14	Max. limit		0.1 to 6500 kW
	Limiting factor		0.1 to 10
15	Max. limit		0.01 to 650 m³/h
	Limiting factor		0.1 to 10
16	Max. limit		0.1 to 6500 kW
	Limiting factor		0.1 to 10

CO7 function block parameters (device bus)

F	Function block parameters	CO7	Value range
1	Device bus address		Auto, 1 to 32
3	Device bus address		Auto, 1 to 32
4	Device bus address		Auto, 1 to 32
5	Device bus address		Auto, 1 to 32
6	Register number		1 to 4
7	Register number		1 to 4
8	Register number		1 to 4
9	Register number		1 to 4
10	Register number		5 to 65
11	Register number		5 to 65
12	Register number		5 to 65
13	Register number		5 to 65
15	Register number		5 to 65
17	Register number		5 to 65
18	Register number		5 to 65
19	Register number		5 to 65
20	Register number		5 to 65
21	Register number		5 to 65
22	Register number		5 to 65
23	Register number		5 to 65

CO8 function block parameters (initialization of BI1 and BI2)

F	Function block parameters	CO8	Value range
1	Error message when		BI = 0, BI = 1, none (1)
2	Error message when		BI = 0, BI = 1, none (1)
3	Error message when		BI = 0, BI = 1, none (1)
4	Error message when		BI = 0, BI = 1, none (1)
5	Error message when		BI = 0, BI = 1, none (1)
6	Error message when		BI = 0, BI = 1, none (1)
9	Error message when		BI = 0, BI = 1, none (1)
10	Error message when		BI = 0, BI = 1, none (1)
11	Error message when		BI = 0, BI = 1, none (1)
12	Error message when		BI = 0, BI = 1, none (1)
13	Error message when		BI = 0, BI = 1, none (1)
15	Error message when		BI = 0, BI = 1, none (1)
16	Error message when		BI = 0, BI = 1, none (1)
17	Error message when		BI = 0, BI = 1, none (1)

17 Annex B

17.1 Accessories

TROVIS I/O (expansion module)	Order no. 1000062999
Memory module	Order no. 1400-9379
Mini module	Order no. 1400-7436
Data logging module	Order no. 1400-9378
USB converter 3	Order no. 1400-9377
TROVIS-VIEW software (free of charge)	► www.samsongroup.com > SERVICE & SUPPORT > Downloads > TROVIS-VIEW
RS-485 communication module	Order no. 8812-2002
Surge arrester SA 5000	Order no. 1400-9868
SAM HOME Gateway	Type 5660
SAM MOBILE Gateway	Type 5655
SAM LAN Gateway	Type 5650

17.2 After-sales service

After-sales service

Contact our after-sales service for support concerning service or repair work or when malfunctions or defects arise.

You can reach our after-sales service at aftersalesservice@samsongroup.com .

Addresses of SAMSON AG and its subsidiaries

The addresses of SAMSON AG, its subsidiaries, representatives and service facilities worldwide can be found on our website (www.samsongroup.com) or in all SAMSON product catalogs.

Required specifications

Please submit the following details:

- Model number
- Firmware version
- Serial number

Key number	1732

EB 5578 EN

SAMSON AKTIENGESELLSCHAFT
Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507
samson@samsongroup.com · www.samsongroup.com

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