ROBUR
coscienza ecologica

Installation, use and programming manual

Comfort Control Panel

E³ systems control device

Revision: 12/2008

Code: D-LBR514

PREFACE

The present "Comfort Control Manual (Installation and Applications)" describes the parameters, their configuration and a number of example systems using Comfort Control equipment.

This manual assumes that the reader is familiar with Robur products and with the information given in the manuals for the products to which it refers.

This manual is specifically intended for:

- designers for the design of systems using Robur series E^3 modulating units controlled by Siemens Comfort Control equipment;
- electrical installation technicians for the correct installation of control and monitoring equipment and devices;
- installation technicians and Robur Technical Assistance Centres (TAC) for their correct configuration.

The descriptions given in this manual refer to:

- the RVS61 controller
- the Siemens AVS37 interface
- Robur series E^3 units
- the Comfort Control Interface (CCI).

Summary

The manual is divided into 9 sections and 5 annexes.

References

For requirements other than those illustrated in this manual, the user may have to configure the Comfort Control differently. Should this be necessary, refer to the following documentation:

Comfort Control Panel - User Manual (D-LBR 523)
(user's version);

Comfort Control Interface [CCI] (D-LBR 526)
(installation and service technician's version)

Installation, user and maintenance manuals for series E^3
(installation and service technician's version)

The icons present in the margins of the manual have the following meanings:

	Danger warning
	WARNING
	note
	Start operating procedure
	Reference to another part of the manual or other manual

Table 1 Descriptive icons

Summary

SECTION 1 GENERAL INFORMATION

In a system which includes series E^3 equipment, controlled by the Comfort Control system, a system such as that shown in Figure 1 is possible.

Comfort Control schematic

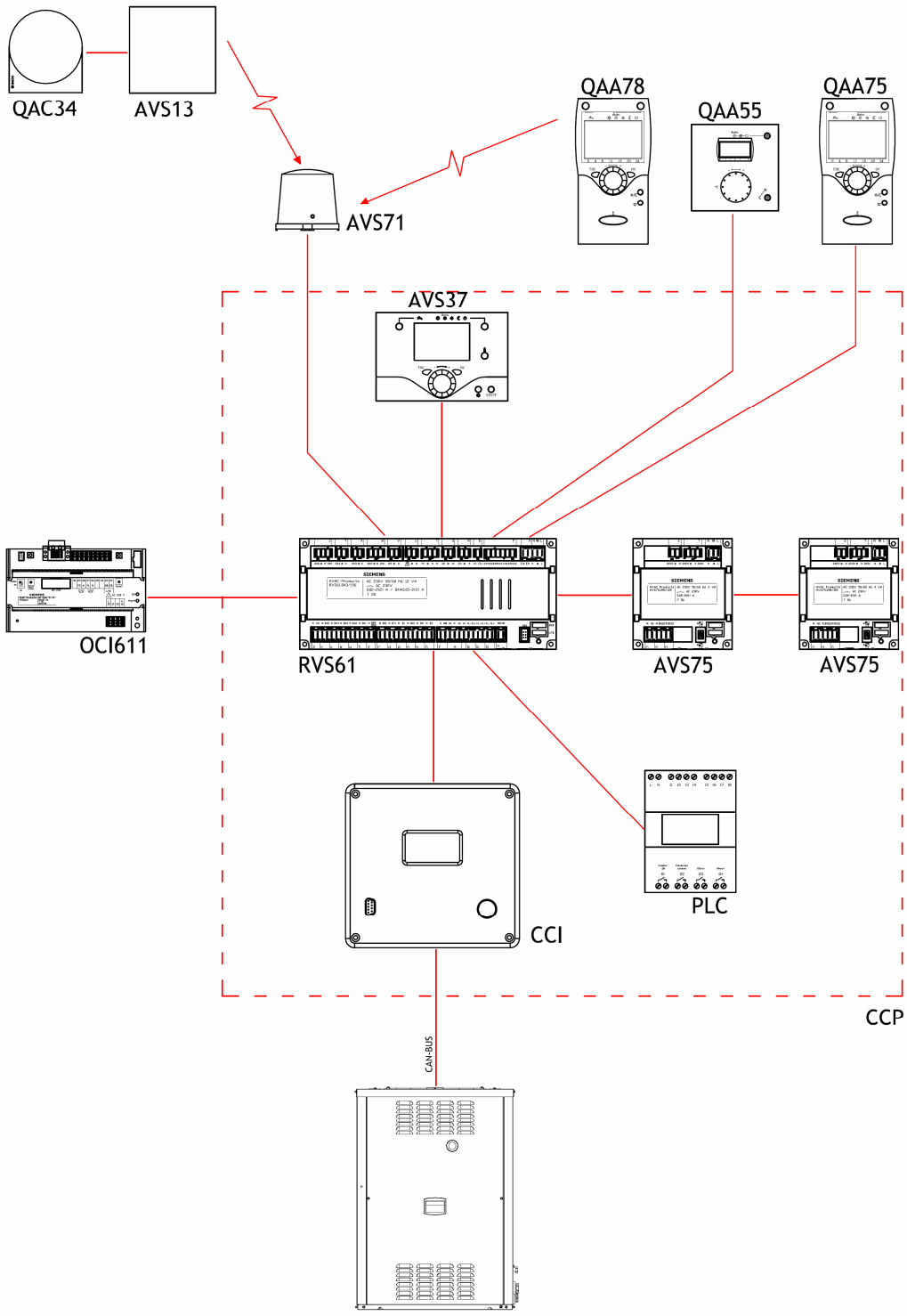


Figure 1 Comfort Control system components

Electrical panel

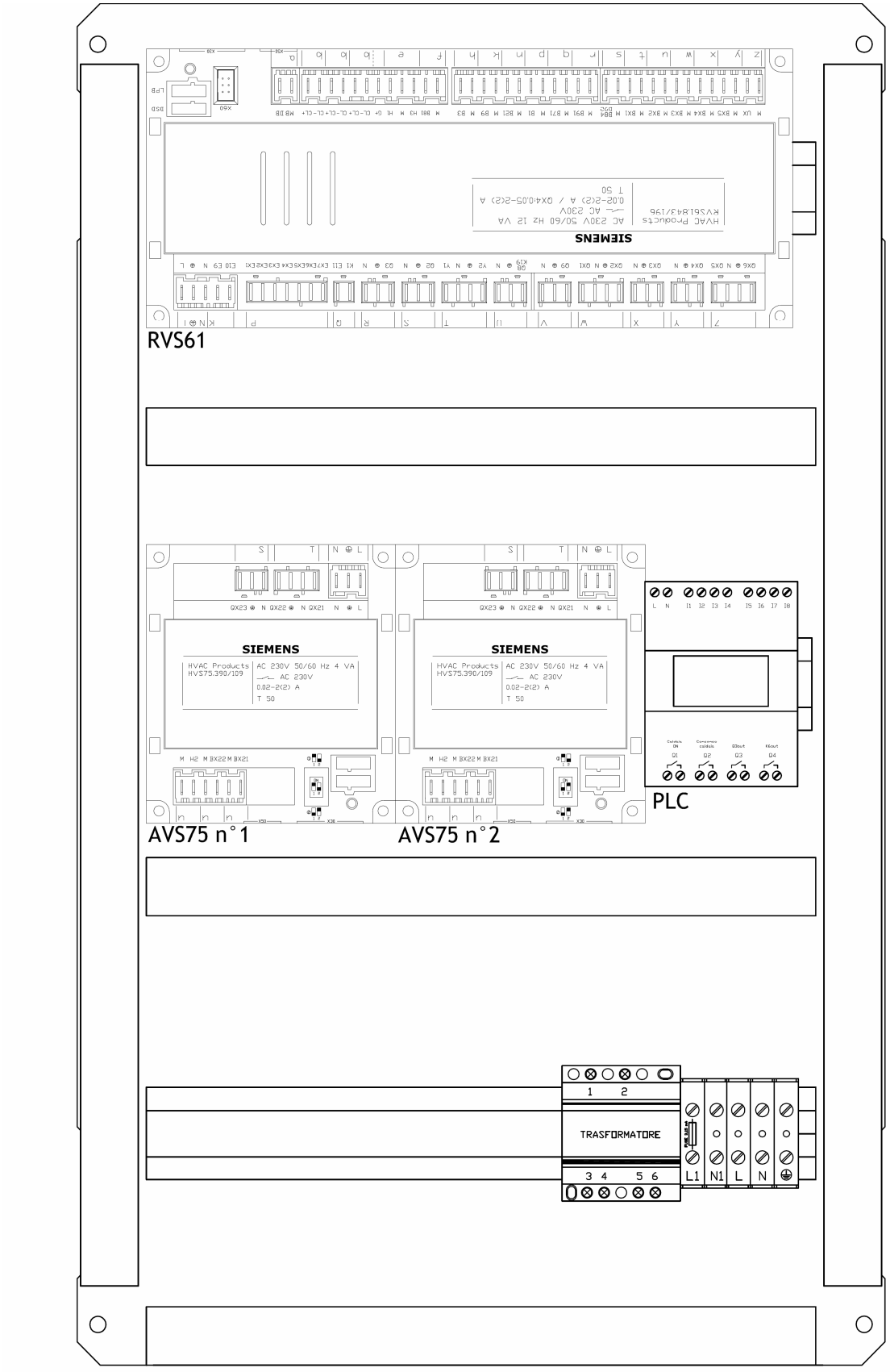


Figure 2 Comfort Control Panel (CCP) layout

CCP wiring diagram

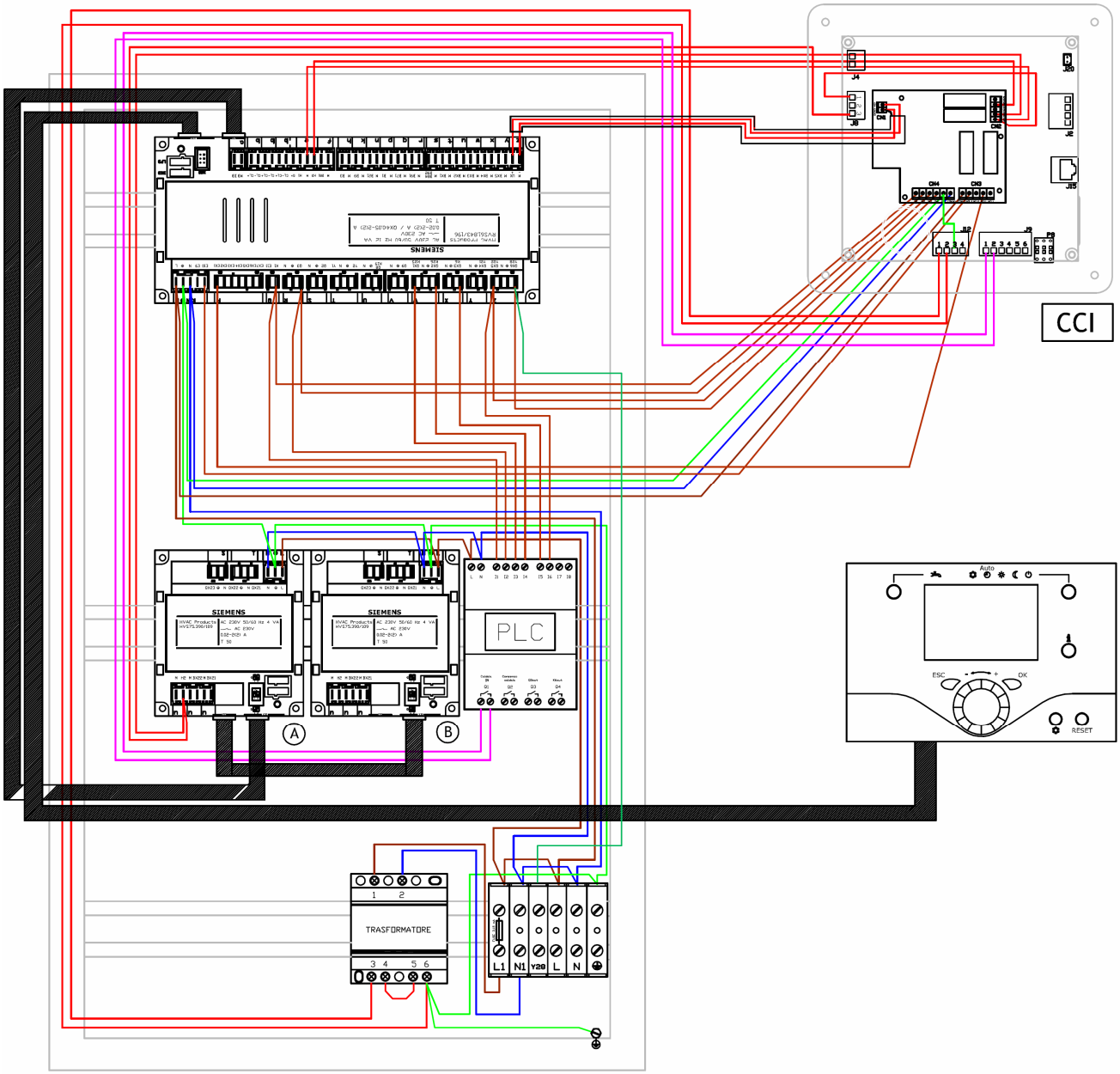


Figure 3 Comfort Control Panel (CCP) wiring diagram

SECTION 2 ASSEMBLY AND INSTALLATION

This section explains how the equipment is to be assembled and installed.

Before proceeding with the installation, make sure that the equipment is disconnected from the electrical power supply.

Electrical connections to the main power circuit and low voltage circuit must be separate (the Robur CCP has 2 different routings for the two separate circuits).

The cabling must be done in safety class II, so that the sensor and power cables may not be routed in the same duct.

A single sensor may not be used for more than one input.

The CCP and its accessory equipment may be powered up only on completion of the installation. Failure to observe this precaution can short circuit the equipment.

The CCP may not be exposed to water.

The ambient and operating temperature range is 0 to 50 °C

Connection to main power supply

Install_Tab_01

	Use	Terminal	Type of connector
L	230 V AC phase	**L**	AGP4S.03E/109
⏚	Ground	⏚	
N	Neutral	**N**	
E9	Low pressure Not used	**K**	AGP4S.02J/109
E10	High pressure (DHW with heat pump load interruption)		
EX1	EX1 multifunction input Not used	**P**	AGP8S.07A/109
EX2	EX2 multifunction input Not used		
EX3	EX3 multifunction input Not used		
EX4	EX4 multifunction input Not used		
EX5	EX5 multifunction input Not used		
EX6	EX6 multifunction input Not used		
EX7	EX7 multifunction input Not used		
E11	Overload protection 1 Not used	**Q**	AGP8S.02E/109
K1	Level 1 compressor (Heat pump ON)		
N	Neutral	**H**	AGP8S.03A/109
⏚	Ground		
Q3	DHW load pump / diverter valve		
N	Neutral	**S**	AGP8S.03B/109
⏚	Ground		
Q2	Heating circuit pump 1		
Y1	Heating circuit mixer valve 1 open	**T**	AGP8S.04B/109
N	Neutral		
⏚	Ground		
Y2	Heating circuit mixer valve 1 close		
N	Neutral	**U**	AGP8S.03C/109

	Use	Terminal	Type of connector
⏚	Ground		
Q8	Source pump (not used)		
K19	Fan (No used)		
N	Neutral		
⏚	Ground	**V**	AGP8S.03D/109
Q9	Condensing pump (not used)		
QX1	Multifunction output 1		
N	Neutral	**W**	AGP8S.04E/109
⏚	Ground		
QX2	Multifunction output 2		
N	Neutral		
⏚	Ground	**X**	AGP8S.03E/109
QX3	Multifunction output 3		
N	Neutral		
⏚	Ground	**Y**	AGP8S.03G/109
QX4	Multifunction output 4		
QX5	Multifunction output 5		
N	Neutral	**Z**	AGP8S.04C/109
⏚	Ground		
QX6	Multifunction output 6		

Table 2 RVS61 output connections

Safe low voltage (SELV/PELV) connections

Install_Tab_02

	Use	Terminal	Type of connector
	Service tool LPB	LPB	-
	Service tool BSB	BSB	-
	Radio module AVS71.390	X60	-
	Additional module AVS75.390	X50	AVS82.490/109
	Service unit (HMI)	X30	AVS82.491/109
DB	LPB data bus	a	AGP4S.02H/109
MB	LPB ground		
CL+	Room unit 3 data bus	b	AGP4S.02A/109
CL-	Room unit 3 ground		
CL+	Room unit 2 data bus	b	AGP4S.02 A /109
CL-	Room unit 2 ground		
CL+	Room unit 1 data bus	b	AGP4S.03D/109
CL-	Room unit 1 ground		
G+	Optional lighting power		
H1	Digital input H1 / 0...10 V	e	AGP4S.03G/109
M	Ground		
H3	Digital input H3 / 0...10 V		
B81	Hot gas temperature sensor 1 (not used)	f	AGP4S.02B/109
M	Ground		
B3	DHW temperature sensor	h	AGP4S.02C/109
M	Ground		
B9	External temperature sensor	k	AGP4S.02D/109
M	Ground		
B21	Heat pump delivery temperature sensor (not used)	n	AGP4S.02F/109
M	Ground		
B1	HC1 delivery temperature sensor	P	AGP4S.02G/109
M	Ground		
B71	Heat pump return temperature sensor	q	AGP4S.02K/109
M	Ground		
B91	Source delivery temperature sensor	r	AGP4S.02L/109
M	Ground		
B84	Evaporation temperature sensor	s	AGP4S.02S/109
B92	Source return temperature sensor		
M	Ground		
BX1	Multifunction input 1 sensor	t	AGP4S.02M/109
M	Ground		
BX2	Multifunction input 2 sensor	u	AGP4S.02N/109
M	Ground		
BX3	Multifunction input 3 sensor	w	AGP4S.02P/109
M	Ground		
BX4	Multifunction input 4 sensor	x	AGP4S.02R/109
M	Ground		
BX5	Multifunction input 5 sensor	y	AGP4S.02T/109
M	Ground		
UX	UX analogue multifunction output	z	AGP4S.02U/109
M	Ground		

Table 3 RVS61 input connections

2.1 AVS37 control unit

Installation

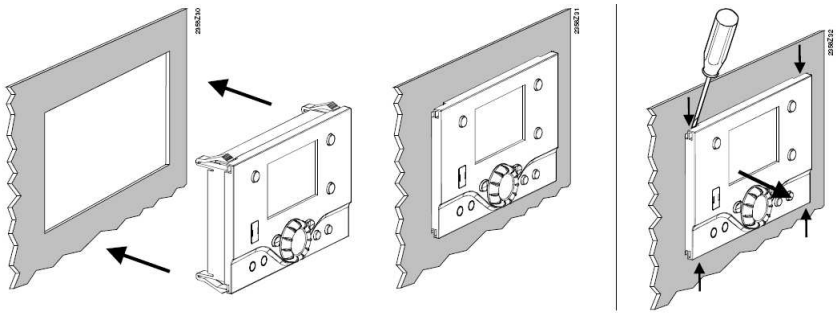


Figure 4 Installation method

The AVS37.294 controller is already installed in the Robur panel (CCP) and connected to terminal X30 of the base unit via cable AVS82.491/109 (code Robur E-CVO246).

As regards its use, refer to Comfort Control Panel - User Manual (D-LBR 523).

2.2 External ambient sensor QAC34

The external sensor is essential to the operation of the Comfort Control system. If this sensor is not connected to the RVS61 controller, the system does not operate.

The sensor is used to acquire the external temperature and, for small extensions, accounts for sunlight, wind chill and the temperature of the wall to which it is mounted.

Technical characteristics

Type reference	Sensing element	Measurement range ℃	Tolerance K*	Time constant (min)	Weight (g)	Packing size	Copper cable mm² /cable dia. Mm	Perm. cable length (m)
QAC34/101	NTC1000 Ω at 25 ℃	-50...70	± 1	12	73	48 pieces individually packed in multipacks	1.5 / 7.2	120

Table 4 QAC34/101 sensor characteristics
** QAC34/101 AT -10...+20 ℃*

Assembly and installation

Installation F-CC_0051

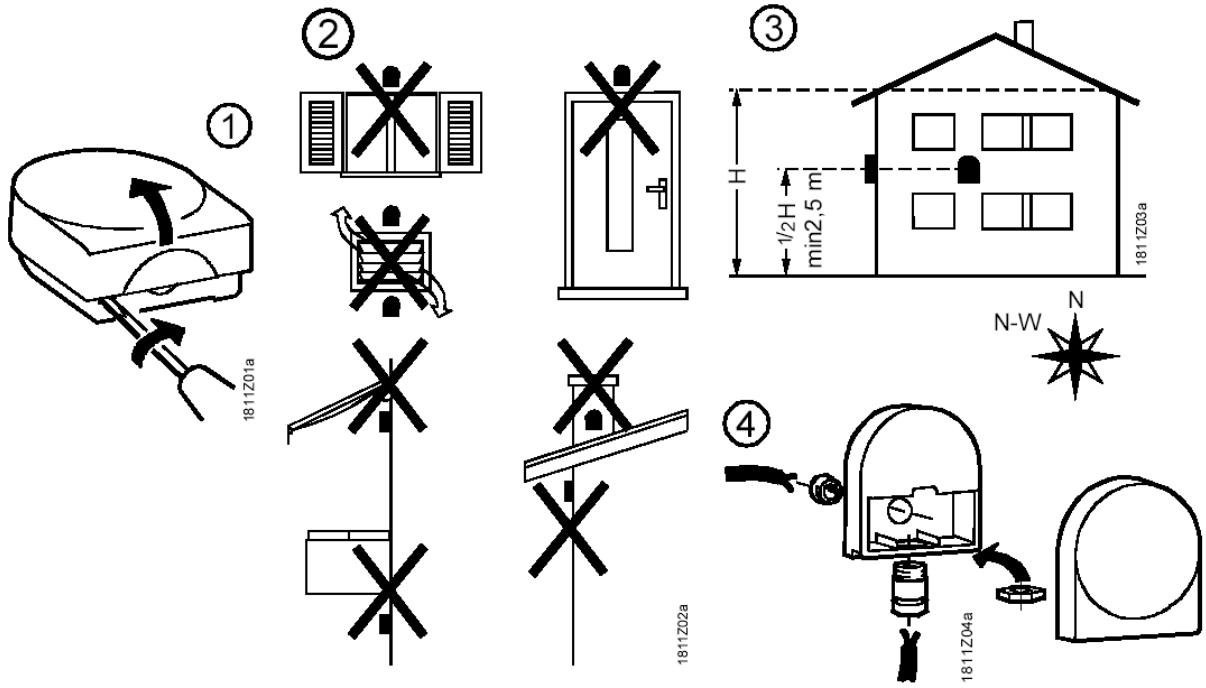


Figure 5 Installing the QAC.34 external sensor

Installation F-CC_0052

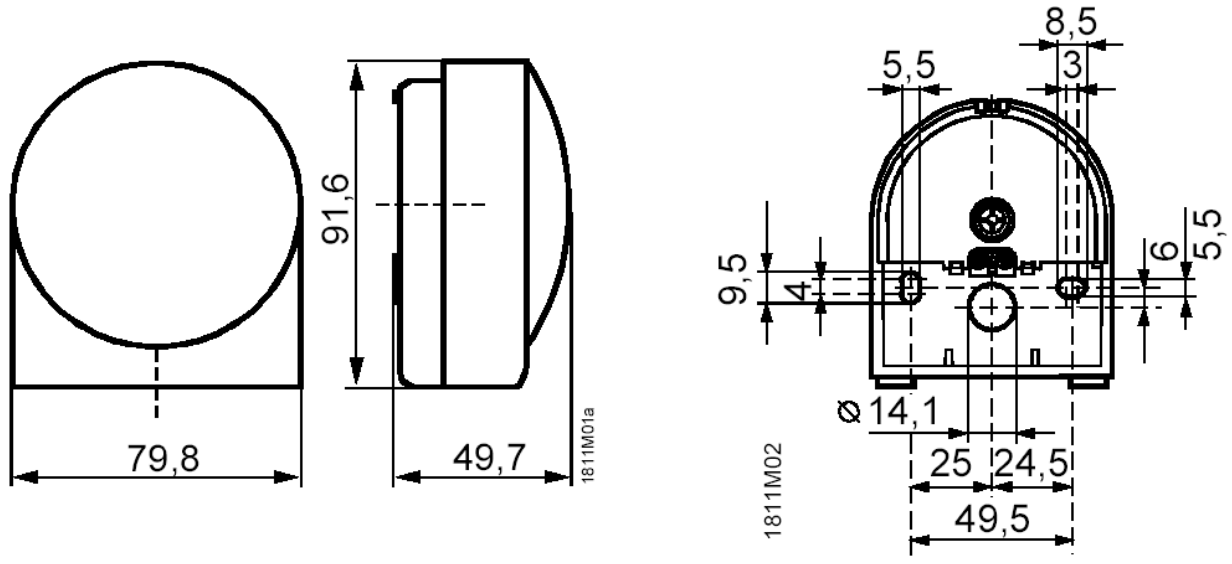


Figure 6 Dimensions of the QAC.34 external sensor

2.3 Room unit QAA55

Location

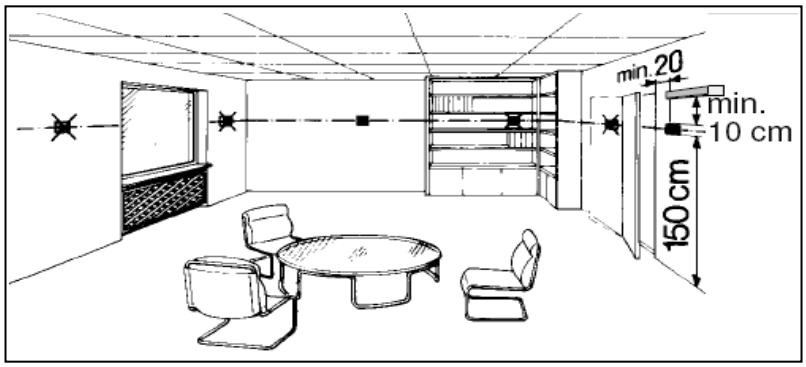


Figure 7 Installation position of the QAA55 room unit.

The room unit must be located in a reference room, generally the living room, bearing in mind the following factors:

- the room unit must be mounted 1.5 metres above the floor, in an area which enables the sensor to measure the ambient temperature as accurately as possible; hence, out of the way of draughts, direct sunlight and other heat sources.
- If wall mounted, sufficient space must be provided above the unit for installation and removal.

☞ The room unit, once removed from its base, is no longer powered up and hence is not operational.

Installation

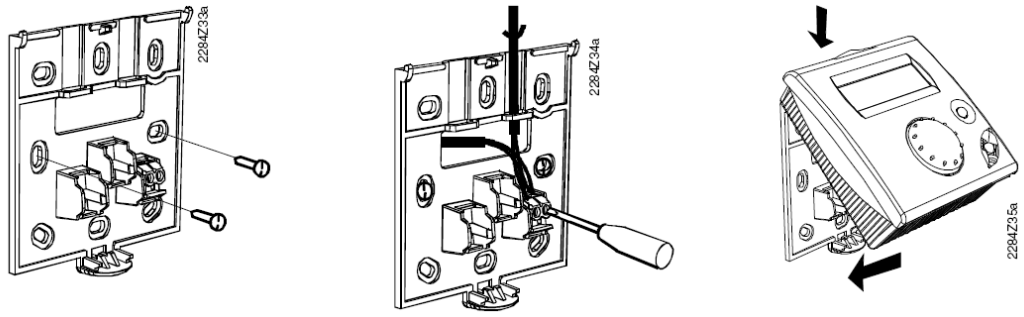


Figure 8 Installation of the QAA55 room unit.

☞ The room unit may not be installed in areas exposed to water and humidity.

Electrical connections

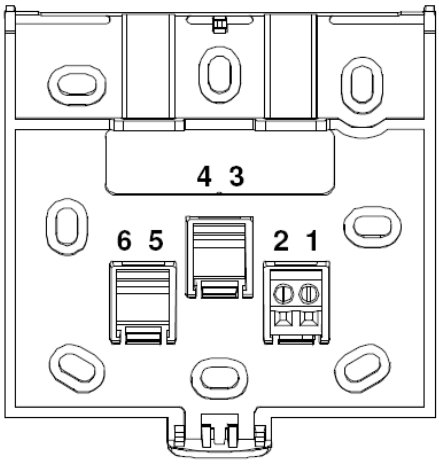


Figure 9 Connection of the QAA55 room unit.

T_CC_0024

Terminal	Name	QAA55
1	CL+	BSB data
2	CL-	BSB ground

Table 5 QAA55 room unit connections.

☞ Compare the connection diagram with paragraph 3.1 Room unit connection a pagina 27.

Dimensions and drilling template

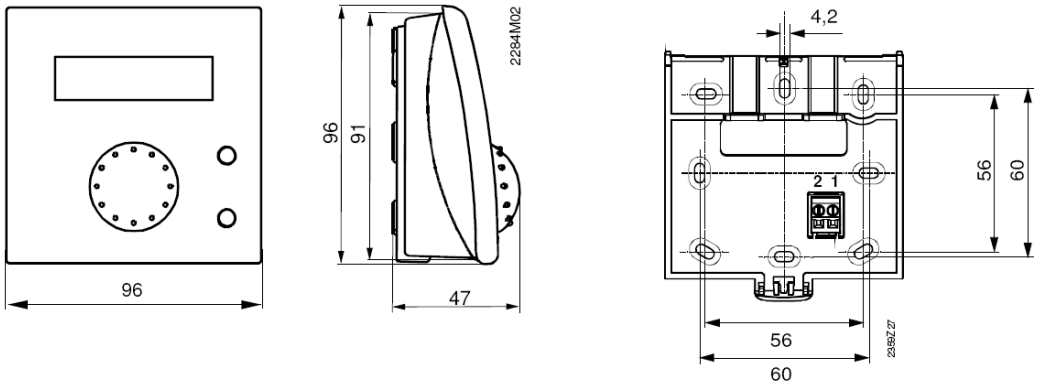


Figure 10 QAA55 room unit drilling holes.

As regards its use, refer to Comfort Control Panel - User Manual (D-LBR 523).

2.4 Room unit QAA75

Location

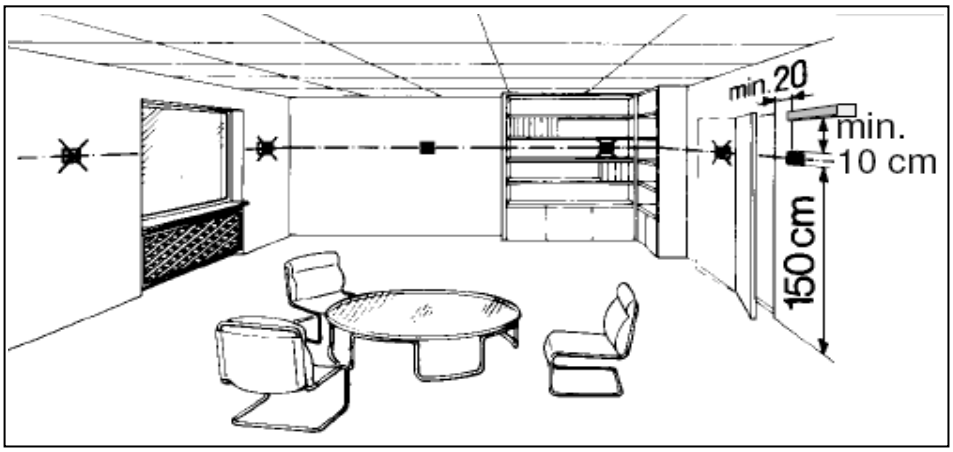


Figure 11 Installation position of the QAA75 room unit.

The room unit must be located in a reference room, generally the living room, bearing in mind the following factors:

- the room unit must be mounted 1.5 metres above the floor, in an area which enables the sensor to measure the ambient temperature as accurately as possible; hence, out of the way of draughts, direct sunlight and other heat sources.
- If wall mounted, sufficient space must be provided above the unit for installation and removal.

☞ The room unit, once removed from its base, is no longer powered up and hence is not operational.

Installation

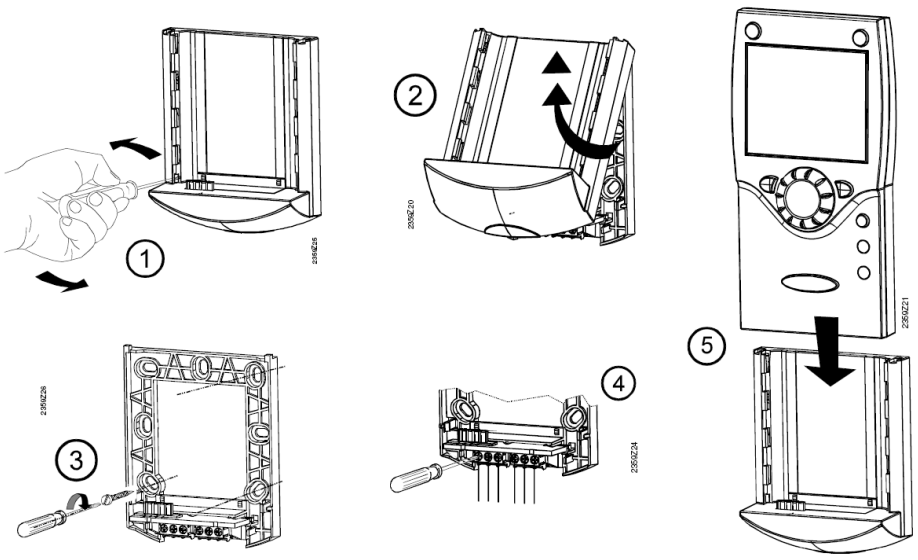


Figure 12 Installation of the QAA75 room unit.

☞ The room unit may not be installed in areas exposed to water and humidity.

Electrical connections

Terminal	Name	QAA75
1	CL+	BSB data
2	CL-	BSB ground
3	G+	Power 12 V AC

Table 6 QAA75/78 room unit connections.

☞ Compare the connection diagram with paragraph 3.1 Room unit connection a pagina 27

Dimensions and drilling template

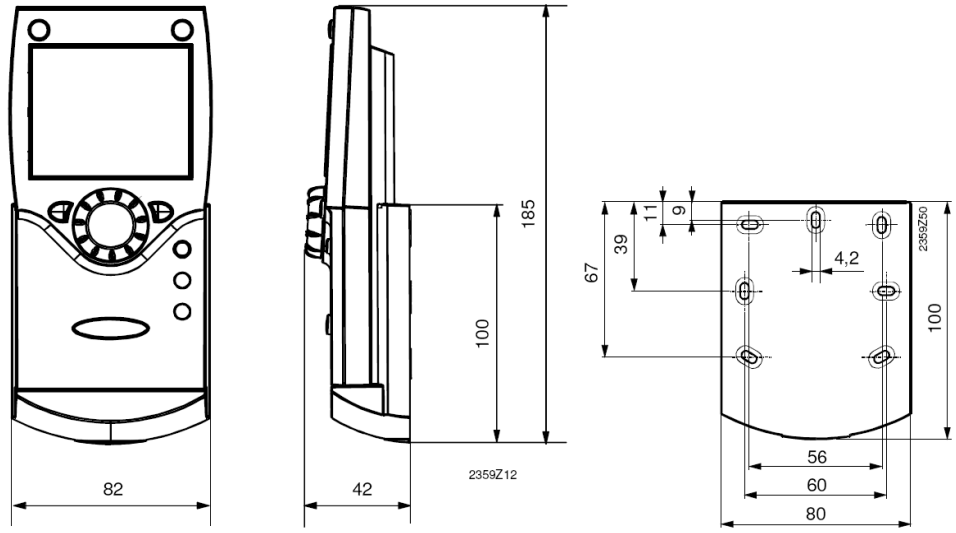


Figure 13 QAA75 room unit drilling holes.

As regards its use, refer to Comfort Control Panel - User Manual (D-LBR 523).

2.5 Radio components

The radio components must be installed so as to be as free as possible from interference, as follows:

- Away from electrical cabling, strong magnetic fields and equipment such as PC's, TV's, microwave ovens, etc.
- Away from large metal, glass and special concrete structures
- The distance from the transmitter may not exceed 30 metres or two storeys.

2.5.1 Radio module AVS71

The radio module expands our product range by offering the possibility of wireless communications.

With the radio module, system components such as the room unit can transmit their data wirelessly.

Installation

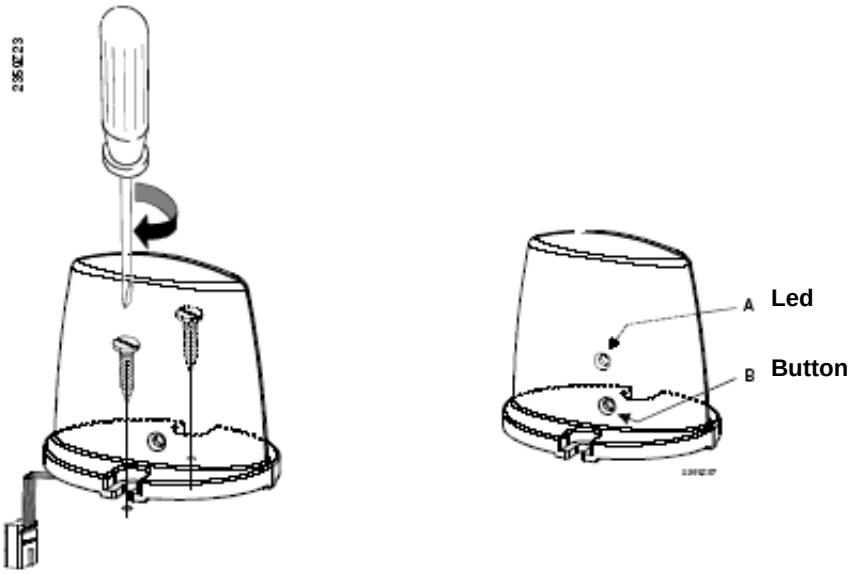


Figure 14 Installation of the AVS71 radio module.

☞ Do not install the radio module inside a metal housing (e.g., inside the heat pump enclosure).

Electrical connections

The cable must be connected to regulator terminal X60.

⚠ Before making the connection, make sure the base unit is not powered up.

Dimensions and drilling template

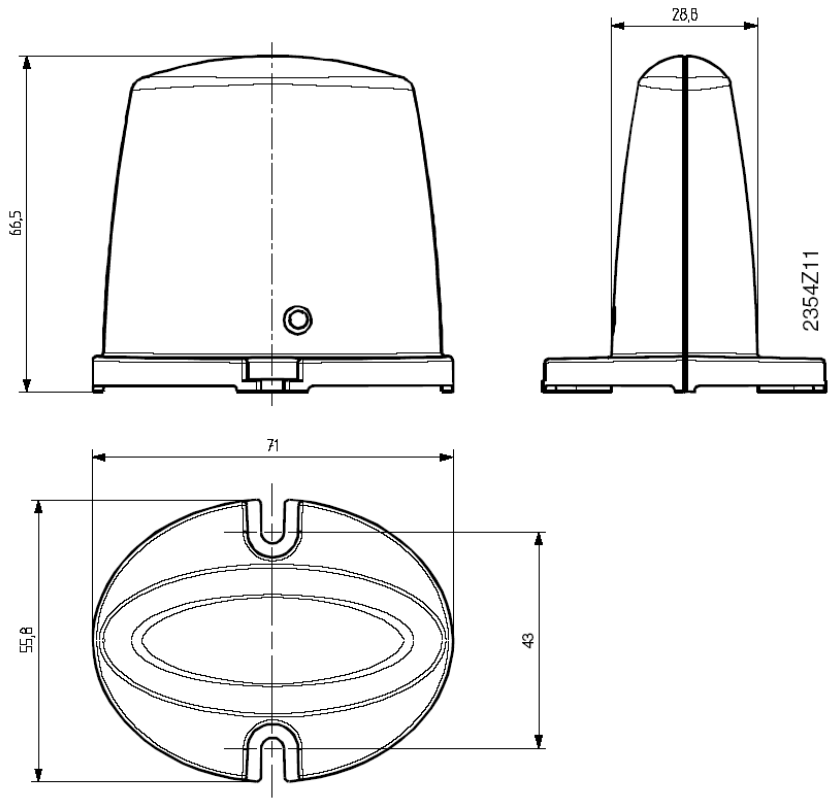


Figure 15 AVS71 radio module drilling holes.

2.5.2 Room unit QAA78

Location

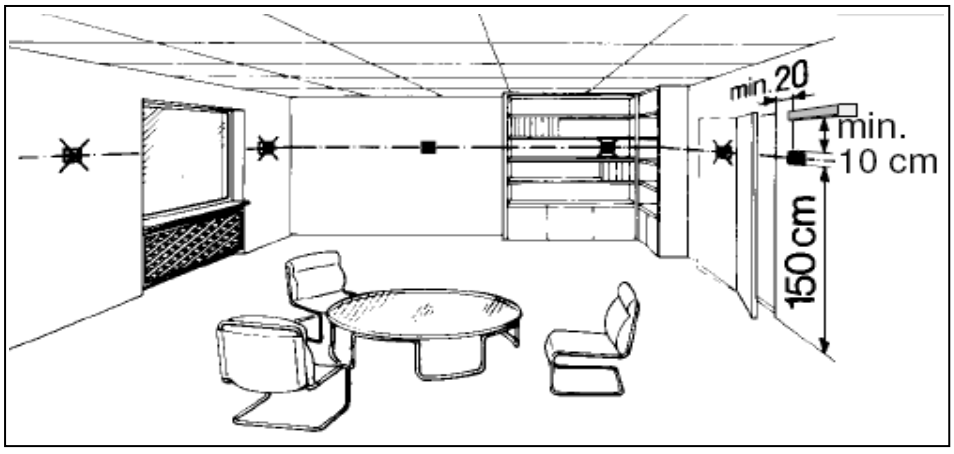


Figure 16 Installation position of the QAA78 room unit.

The room unit must be located in a reference room, generally the living room, bearing in mind the following factors:

- the room unit must be mounted 1.5 metres above the floor, in an area which enables the sensor to measure the ambient temperature as accurately as possible; hence, out of the way of draughts, direct sunlight and other heat sources.
- If wall mounted, sufficient space must be provided above the unit for installation and removal.

☞ The room unit, once removed from its base, is no longer powered up and hence is not operational.

Installation with base

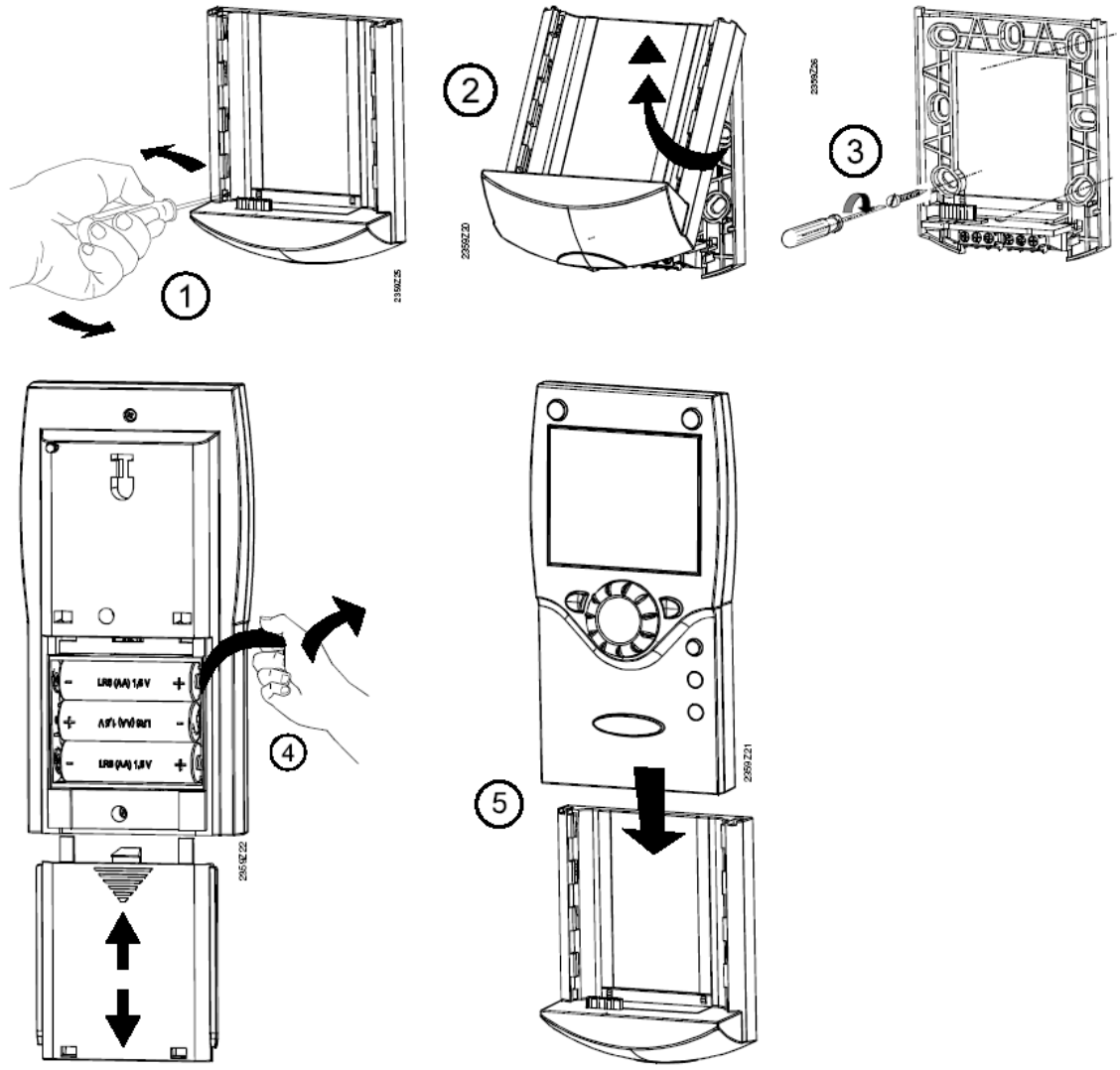


Figure 17 Installation of the QAA78 room unit.

Installation without base

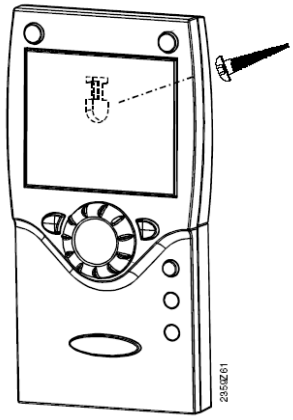


Figure 18 Installation of the QAA78 room unit.

☞ The room unit may not be installed in areas exposed to water and humidity.

☞ The room unit is powered by three 1.5 V AA batteries (LR06).

Dimensions and drilling template

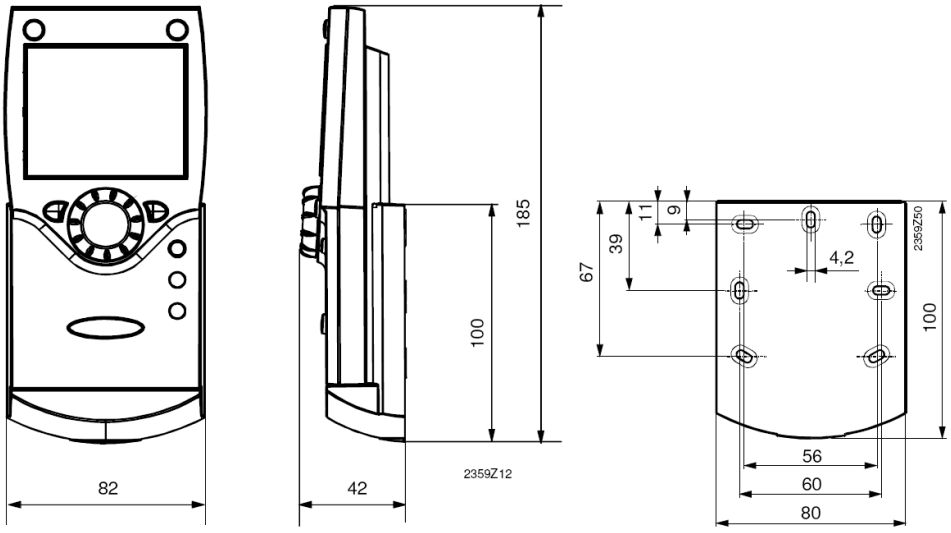


Figure 19 QAA78 room unit drilling holes.

2.5.3 Radio connection

Before proceeding with the installation, connect the components to the radio module, so that after assembly, all system components are easily traceable.

The essential condition for the wireless connection is that all components must receive the signal, in other words, the radio module must be correctly connected to the base unit and the batteries fitted in the room unit.

1. Press the radio module button for at least 8 seconds, until its led starts **flashing quickly**.
2. To enter the programming phase, press the OK button on the room unit.
3. Hold down the Info button for at least 3 seconds, then select “initial activation” with the programming knob and press OK.
4. Select the “Radio” menu and press OK.
5. Select “line 120”. Press OK to confirm.
6. Turn the knob to “YES” and press OK. The unit will now search for the wireless connection.
7. T The display shows the connection strength as a percentage. This can take from 2 to 120 seconds.
8. Once the connection has been established, the message “Unit ready” displays and the led stops flashing.

Radio connection test

Run the test to check the quality of the wireless connection.

The test can be interrupted at any time by pressing ESC.

While the radio connection can be initiated on the heat pump itself, the test must be run in the area in which the room unit is to be installed.

Select the page “Radio” on the room unit (as explained above in steps 2 to 4) and activate Test mode on the line “Test mode” (line 121).

During the test, the numbers on the left show the number of data packets sent, while those on the left show those received. The test stops after 24 packets and is considered passed if at least 50% of the packets have been sent and received successfully.

If the test fails, find another location for the room unit or use radio relay AVS14.390.

2.5.4 AVS13.399 external radio sensor

The transmitter must be installed inside the building

It must be installed to enable easy replacement of its batteries.

Installation

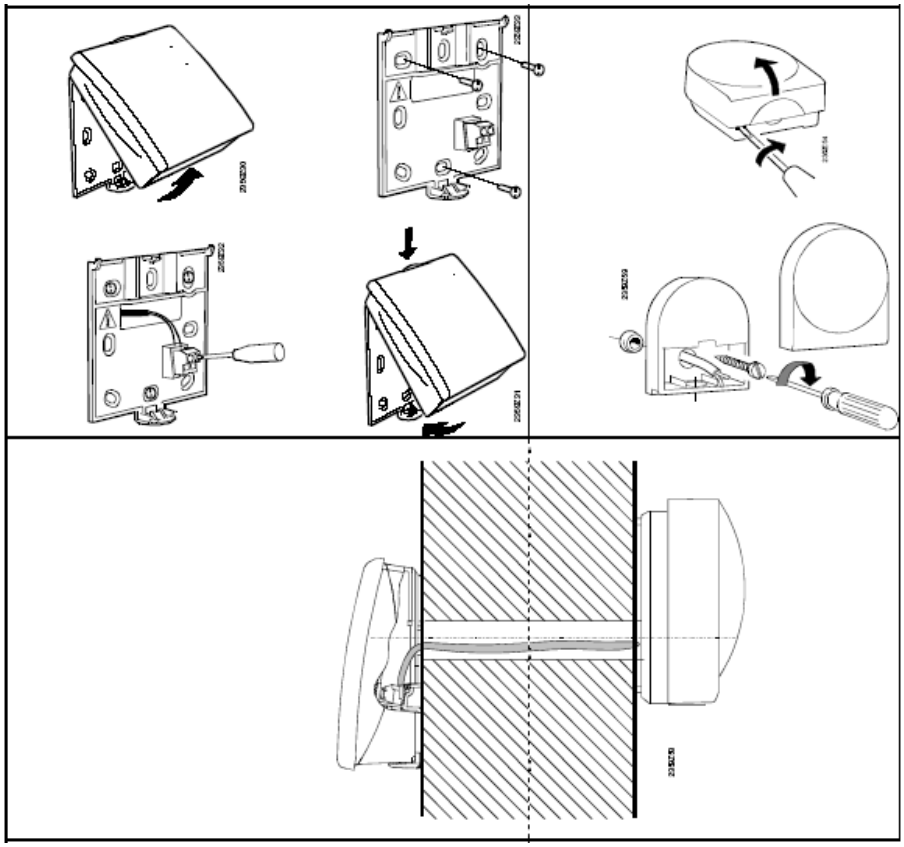
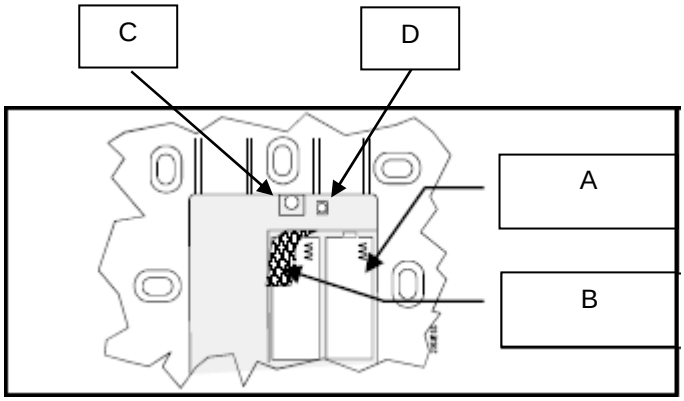


Figure 20 Installing the external radio sensor.

Connection



Legend:

A: Batteries
B: To remove the batteries
C: Button
D: Led

Figure 21 Installing the external radio sensor.

The units must be connected via a two wire (exchangeable) cable.

Power is supplied by two 1.5 V AAA batteries (LR03).

Radio connection

1. Press the radio module button for at least 8 seconds, until its led starts flashing quickly.
2. Press the external radio sensor transmitter button for at least 8 seconds, until its led starts **flashing quickly**.
3. The connection has been established when the radio module led stops flashing.
4. Now press the button on the external radio sensor transmitter button briefly until the led stops flashing.

Test:

Run the test to check the quality of the wireless connection.

The test can be interrupted at any time by pressing ESC.

While the radio connection can be initiated on the heat pump itself, the test must be run in the area in which the room unit is to be installed.

1. Press button “C” Figure 21 on the external radio sensor transmitter for at most 8 seconds, until the led starts flashing slowly.
2. If radio communications are active, the radio module led lashes briefly at 10 second intervals.
3. Now press the button on the external radio sensor transmitter button briefly until the led stops flashing.

Dimensions and drilling template

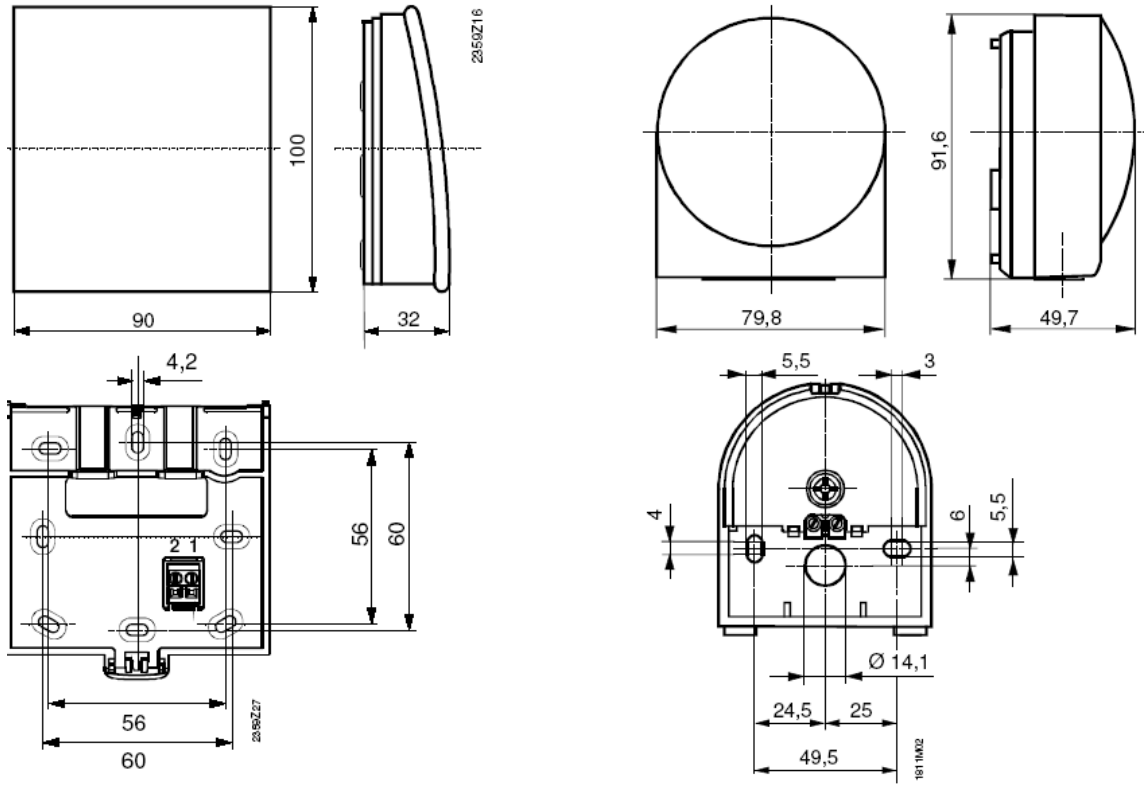


Figure 22 External radio sensor drilling holes.

2.5.5 Radio relay AVS14.390

To establish the radio connection, the device must be powered up temporarily before installation.

The relay must be installed inside the building.

Installation

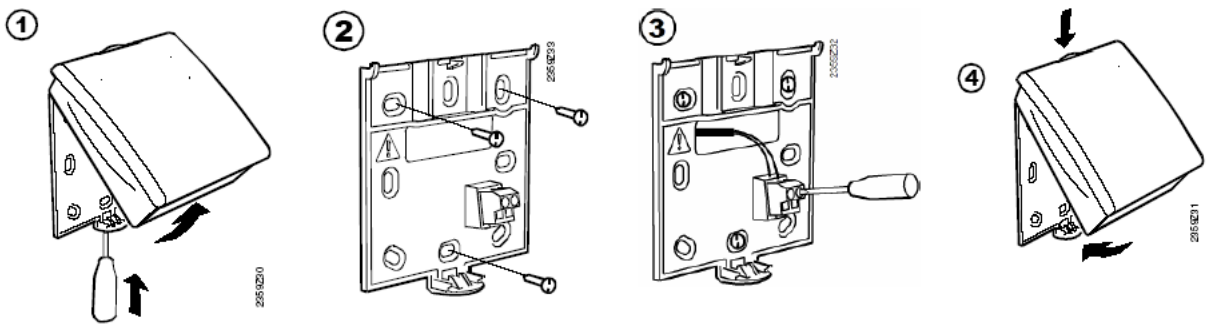


Figure 23 Installing the radio relay.

Connections

The consignment includes a power supply kit.
The wires are interchangeable.

Radio connections

See Radio connection a pagina 22.

Dimensions and drilling template

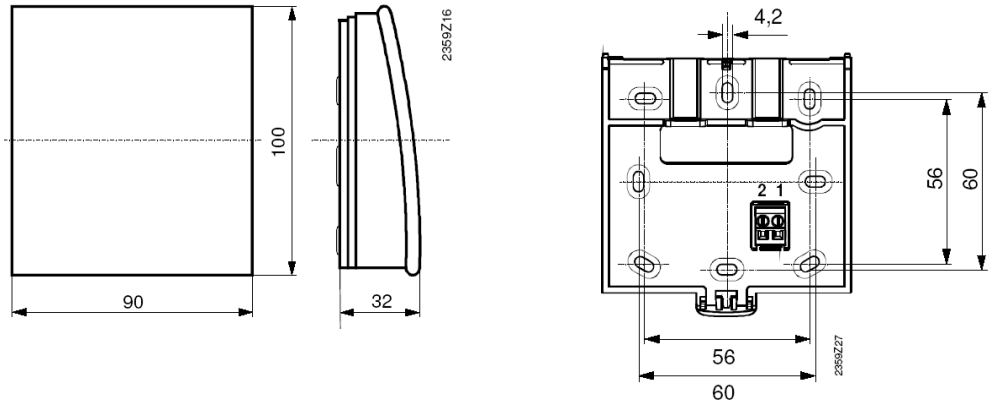


Figure 24 Radio relay drilling holes.

2.6 Expansion module

The system can handle up to 2 expansions, which configure and control 2 heating circuits as follows:

- Heating circuit 2 (HC2) configured on expansion n. 2.
- Pump heating circuit (HCP) configured on expansion n. 1.

☞ Refer to the dipswitch positions shown in Figure 25 for the settings of expansion modules 1 and 2.

Expansion module I/O

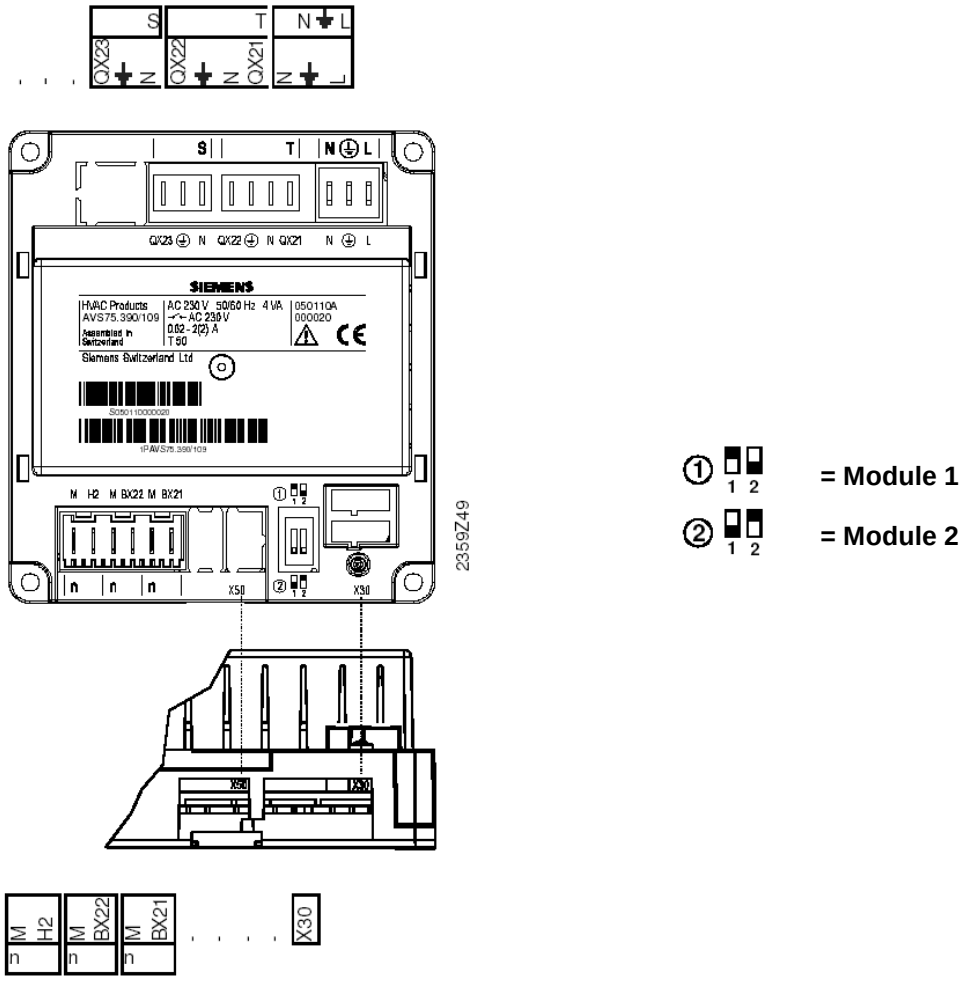


Figure 25 Identification of modules 1 and 2

Connection to main power supply

	Use	Terminal	Type of connector
L	230 V AC phase	**L**	AGP4S.03E/109
⏚	Ground	⏚	
N	Neutral	**N**	
QX21	Open mixer valve	**T**	AGP8S.04B/109
N	Neutral		
⏚	Ground		
QX22	Close mixer valve		
N	Neutral	**S**	AGP8S.03B/109
⏚	Ground		
QX23	Heating circuit pump		

Table 7 AVS75 expansion module output connections.

Safe very low voltage connections

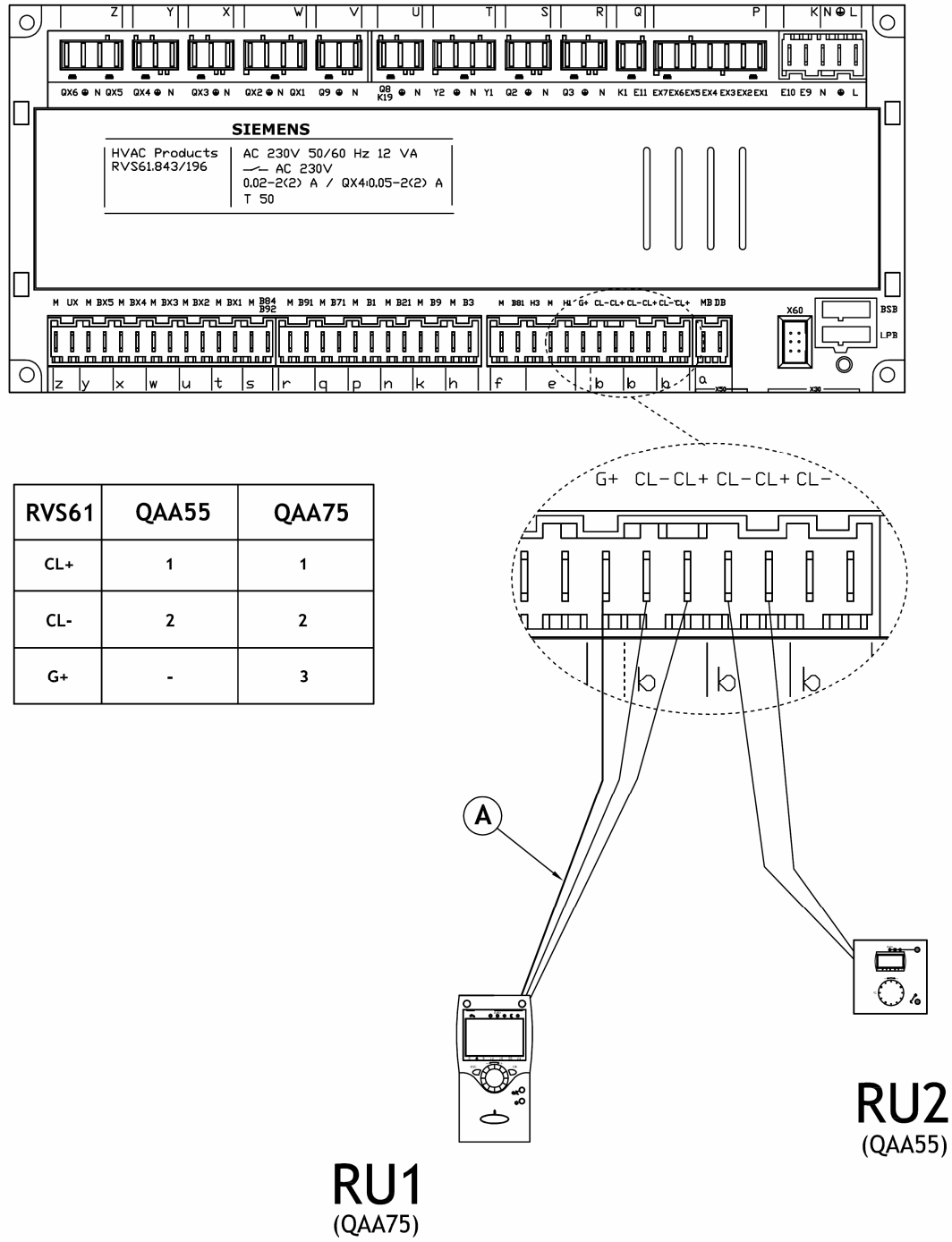
	Use	Terminal	Type of connector
X30	Controller / Heat pump control panel		AVS82.491/109
BX21	Open mixer valve	**n**	AGP4S.02F/109
M	Ground		
BX22	Open mixer valve	**n**	AGP4S.02F/109
M	Ground		
H2	DC digital input 0...10 V	**n**	AGP4S.02F/109
M	Ground		

Table 8 AVS75 expansion module input connections

SECTION 3 ELECTRICAL CONNECTIONS

3.1 Room unit connection

Room unit connection diagram



RVS61	QAA55	QAA75
CL+	1	1
CL-	2	2
G+	-	3

Figure 26 Example of backlighting connection on room unit (QAA75.. with backlighting)

Backlighting (detail A in Figure 26) is only available on QAA75 units.

3.2 Temperature sensor connection

Temperature sensor connection diagram

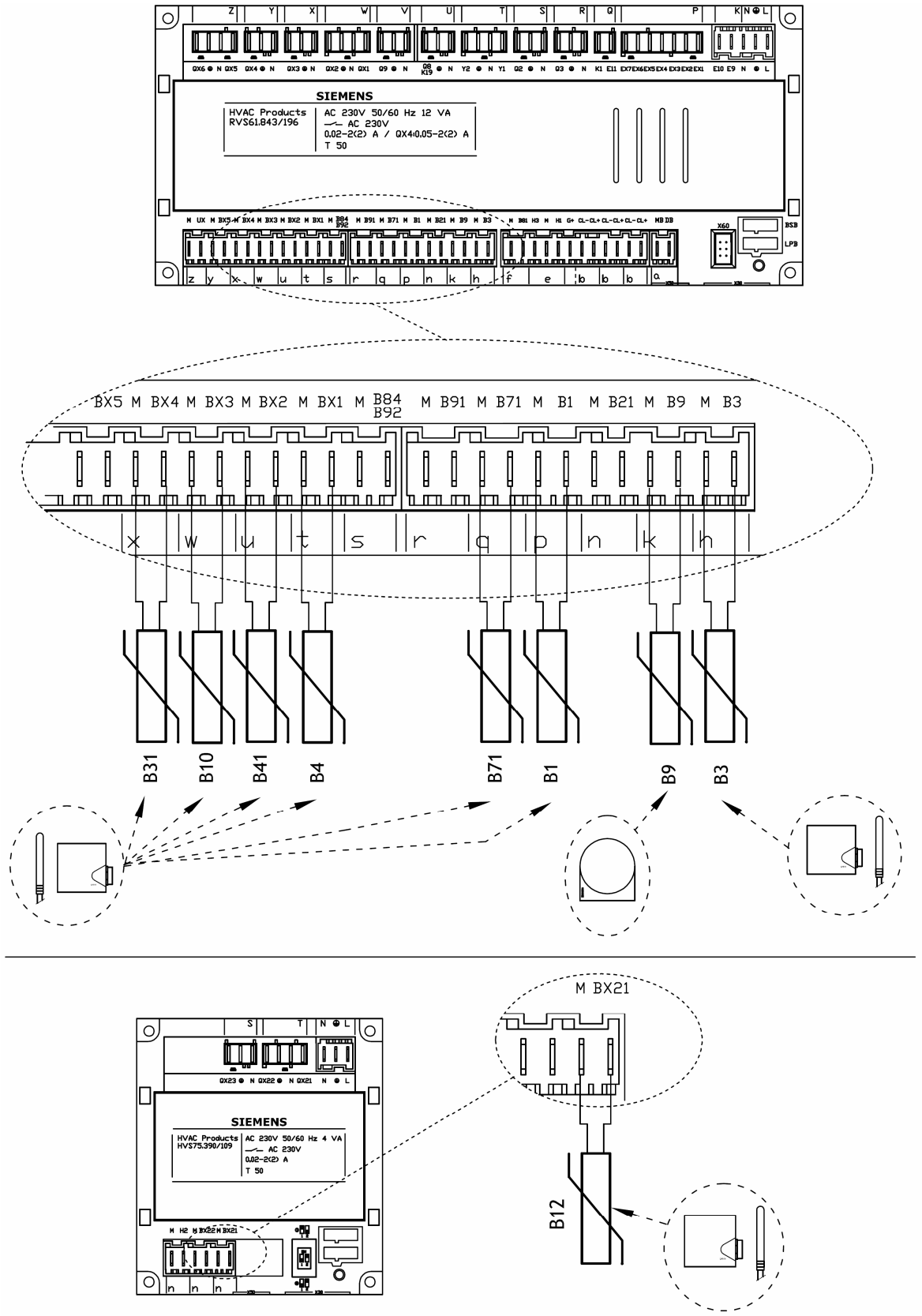


Figure 27 Example connection of temperature sensor connection to RVS 61 and expansion module AVS75.

3.3 Water circulation pump connection

3.3.1 Heating/conditioning circuit pump 1 connection diagram

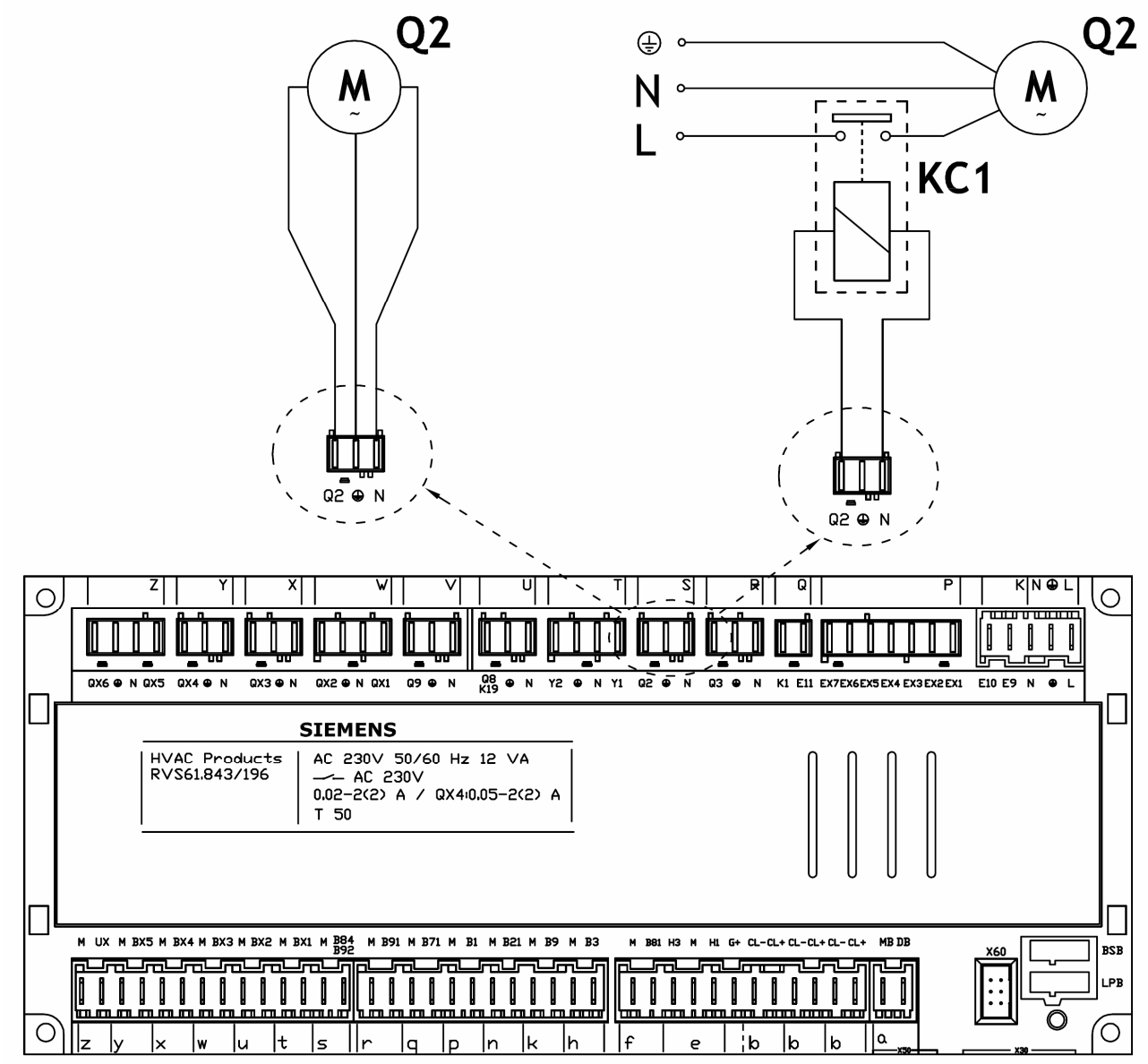


Figure 28 Direct or externally relayed connection to heating/conditioning circuit pump on RVS61.

3.3.2 Heating circuit pump 2 connection diagram

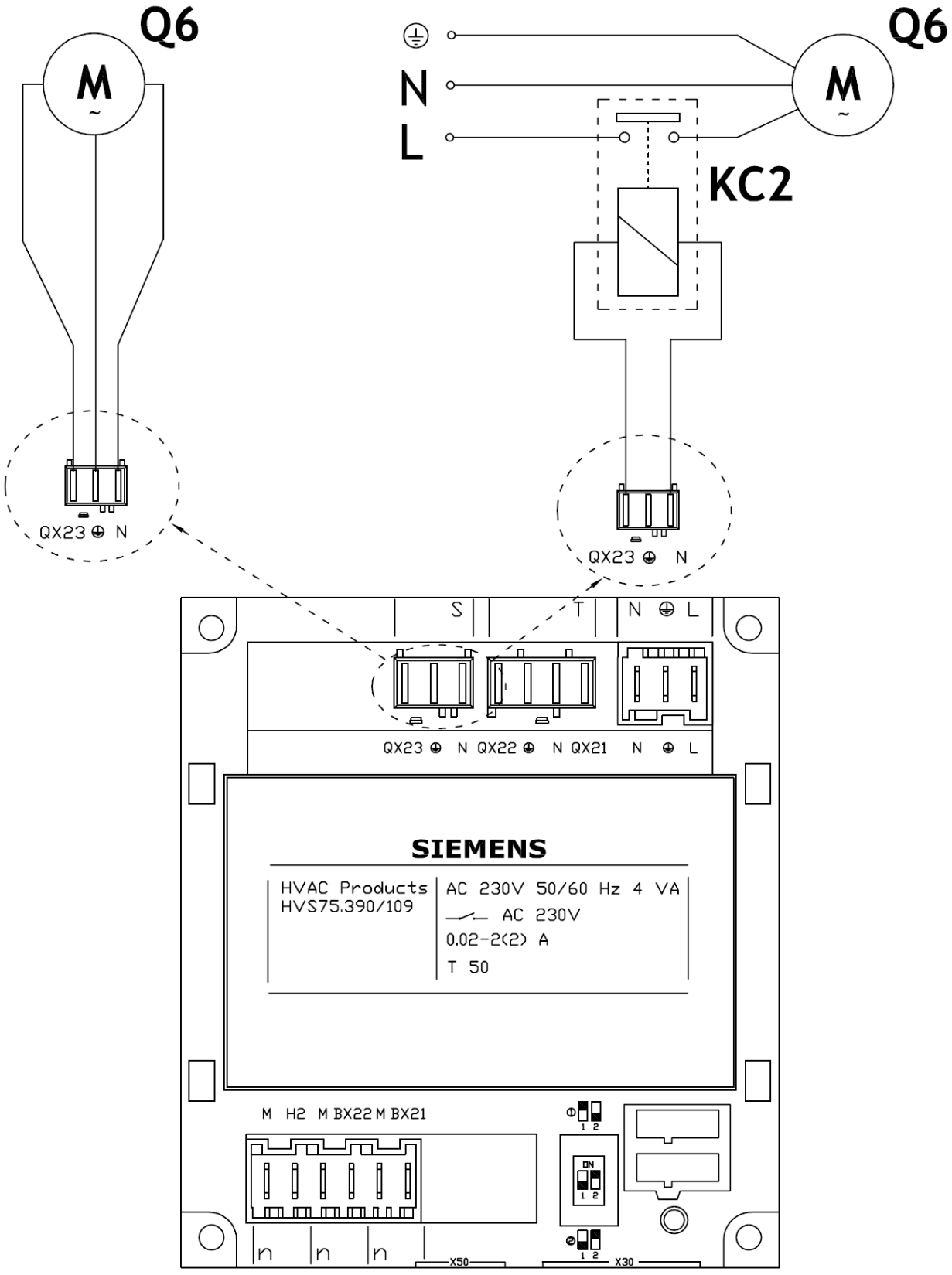


Figure 29 Direct or externally relayed connection to heating circuit 2 pump on expansion module n.2.

3.3.3 Heating circuit pump connection diagram Pump

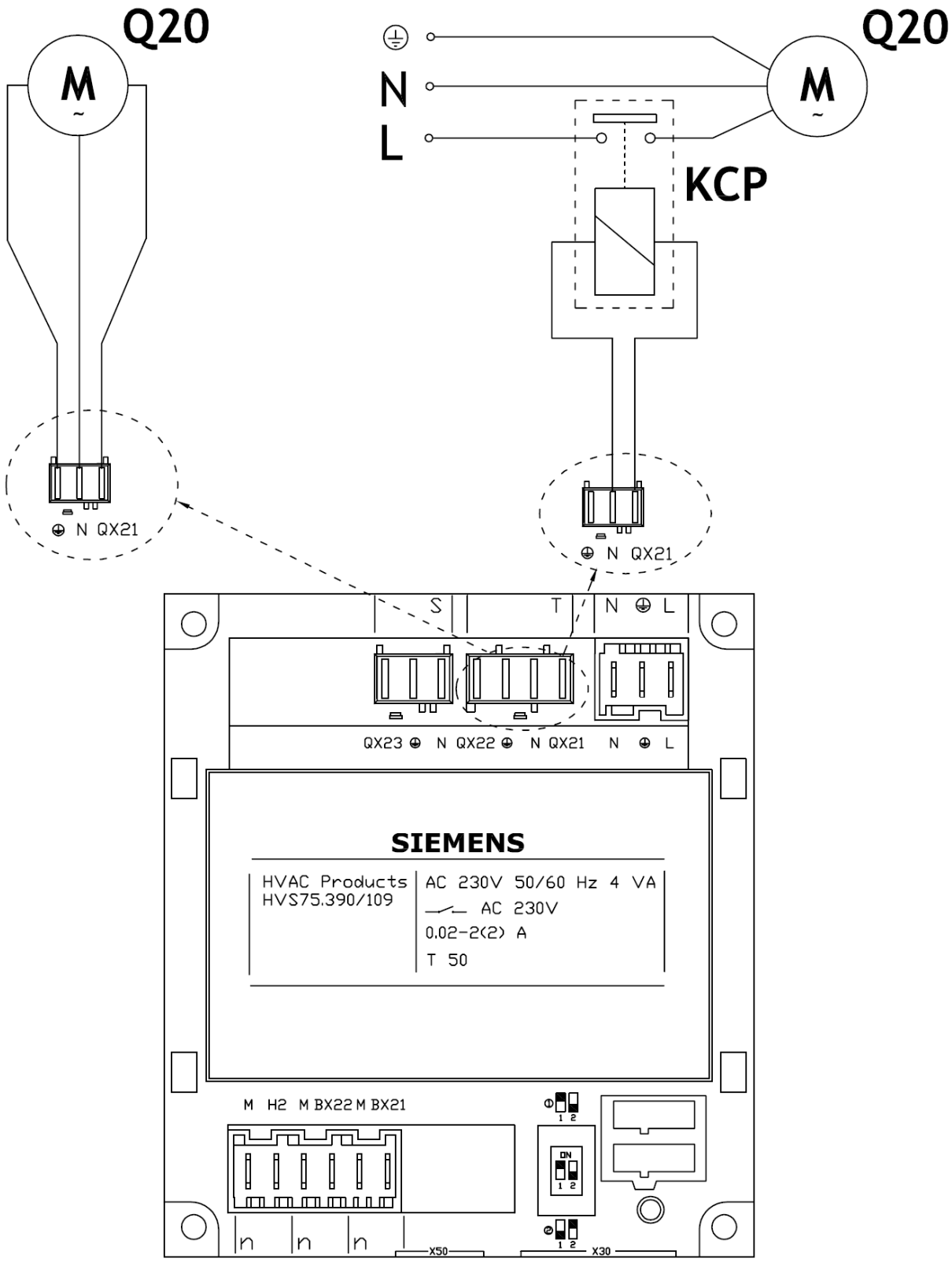


Figure 30 Direct or externally relayed connection to heating circuit P pump on expansion module n.1.

3.4 Mixer/diverter valve connection

3.4.1 Diverter valves Y28 and pump PY28 connection diagram

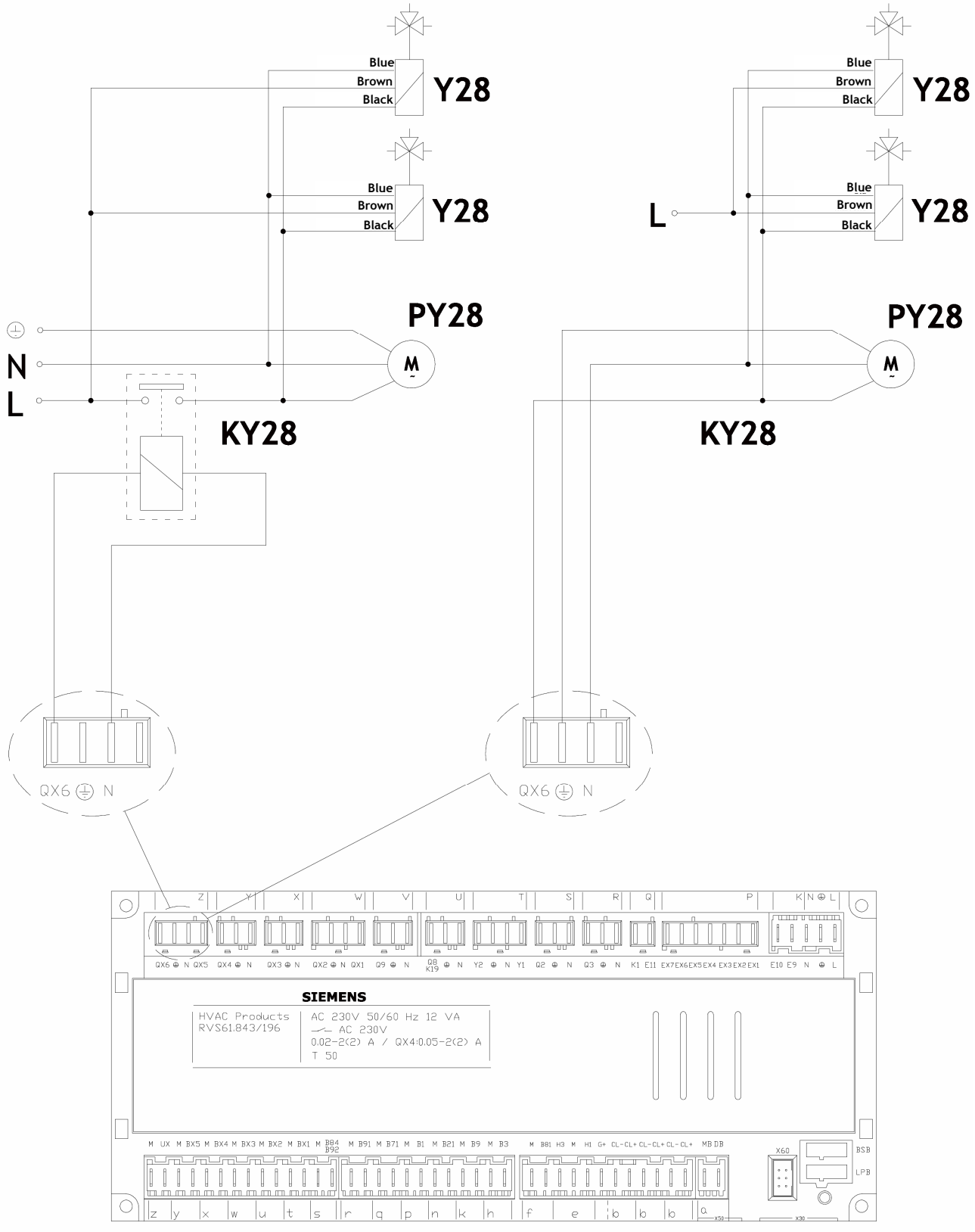


Figure 31 Direct and relayed connection of diverter valves Y28 and pump PY28

3.4.2 Diverter valves Q3 connection diagram$_{OUT}$ and K6$_{OUT}$

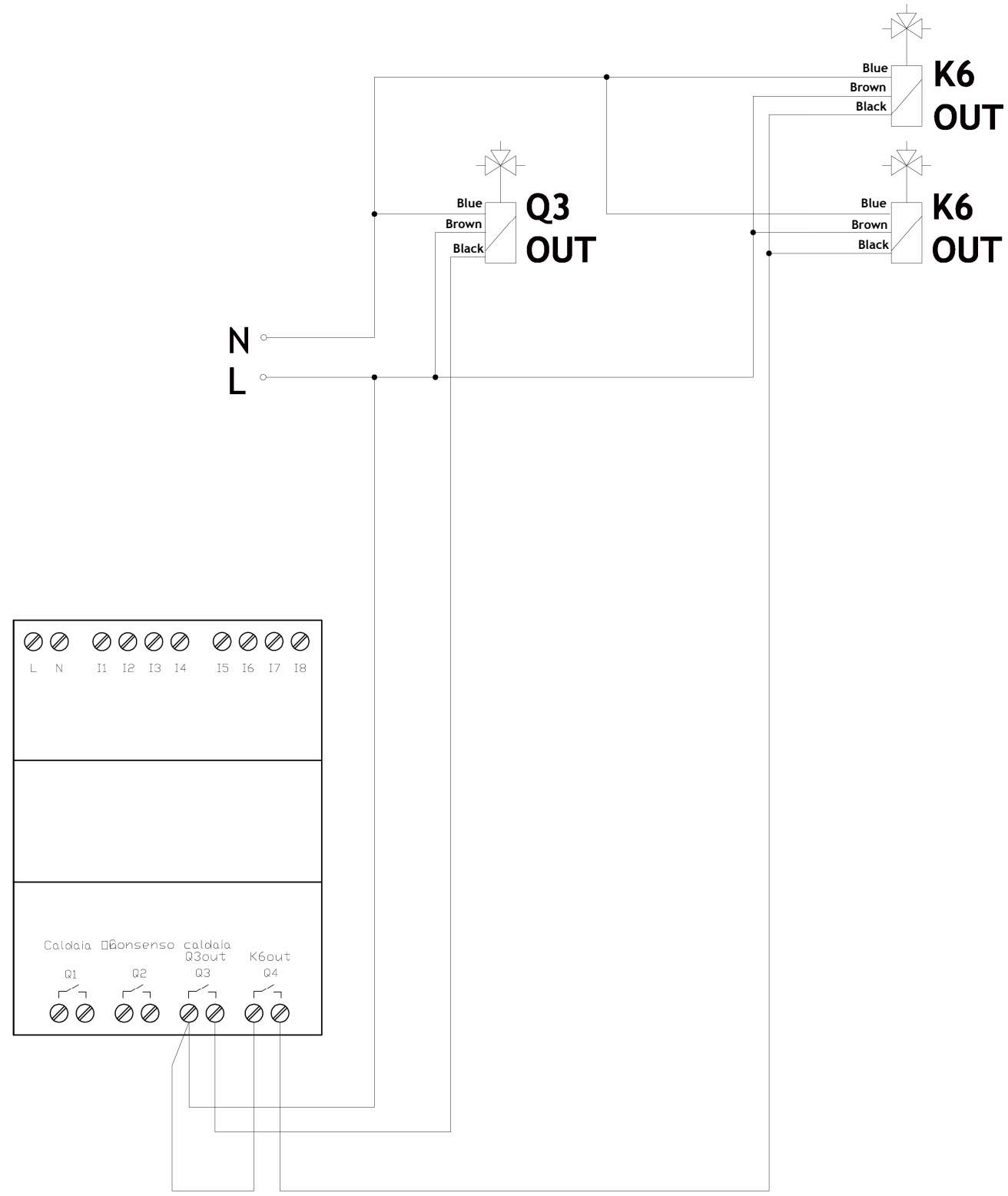


Figure 32 Diverter valves Q3 connection$_{OUT}$ and K6$_{OUT}$ directly from PLC

3.4.3 Mixer valves Y1/Y2 and Y5/Y6 connection diagram

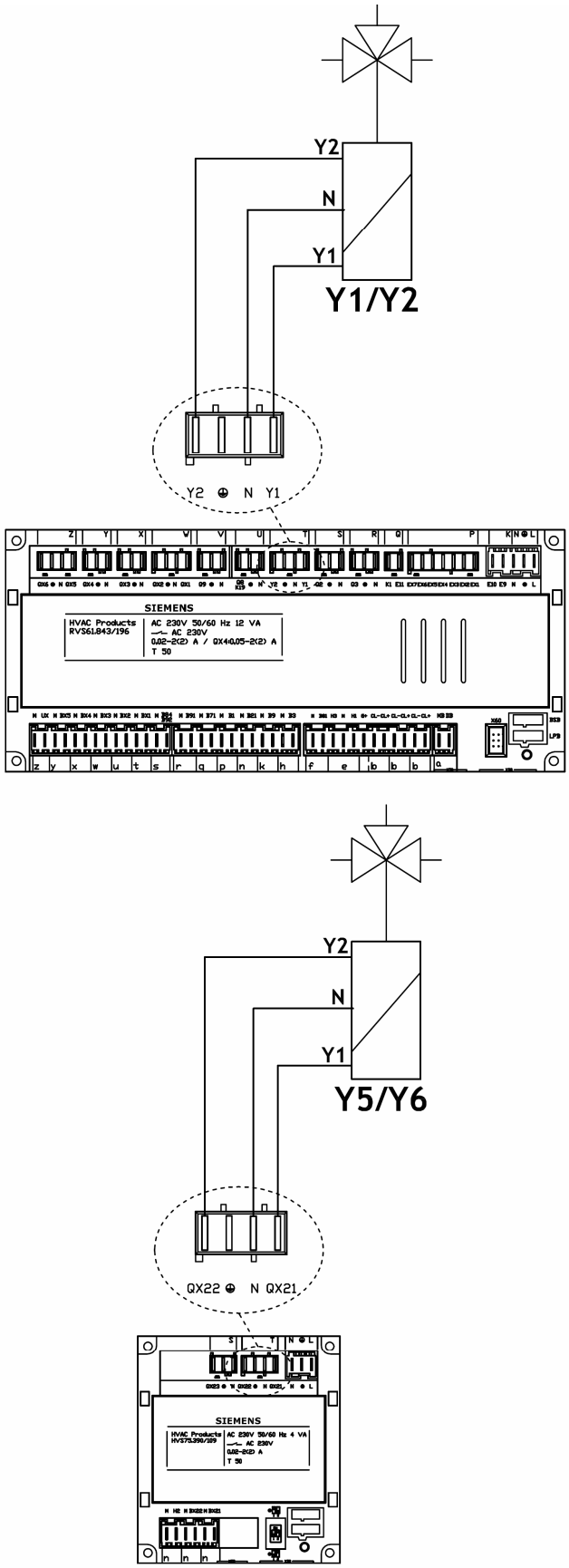


Figure 33 Mixer valves Y1/Y2 (circuit C1) and Y5/Y6 (circuit C2) connection

3.4.4 Robur boiler enable signal schematic

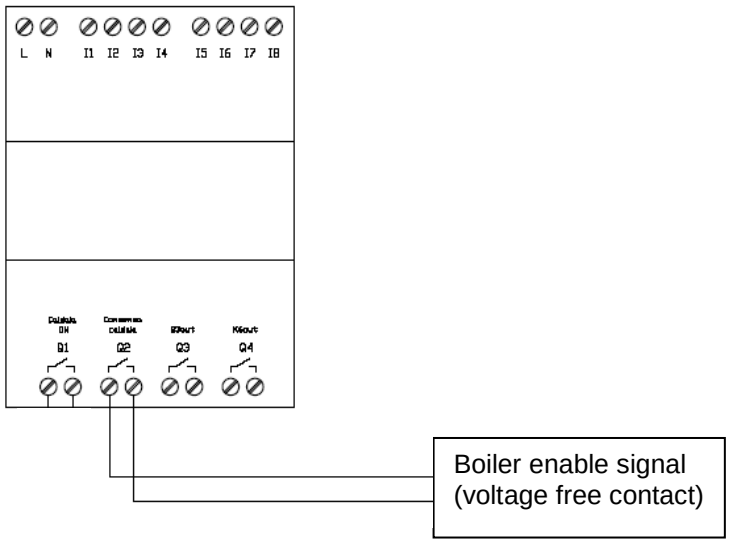


Figure 34 Heating/DHW supplementary boiler On/Off signal connection.

SECTION 4 VALVE CONNECTIONS

4.1 Siemens diverter valves connection

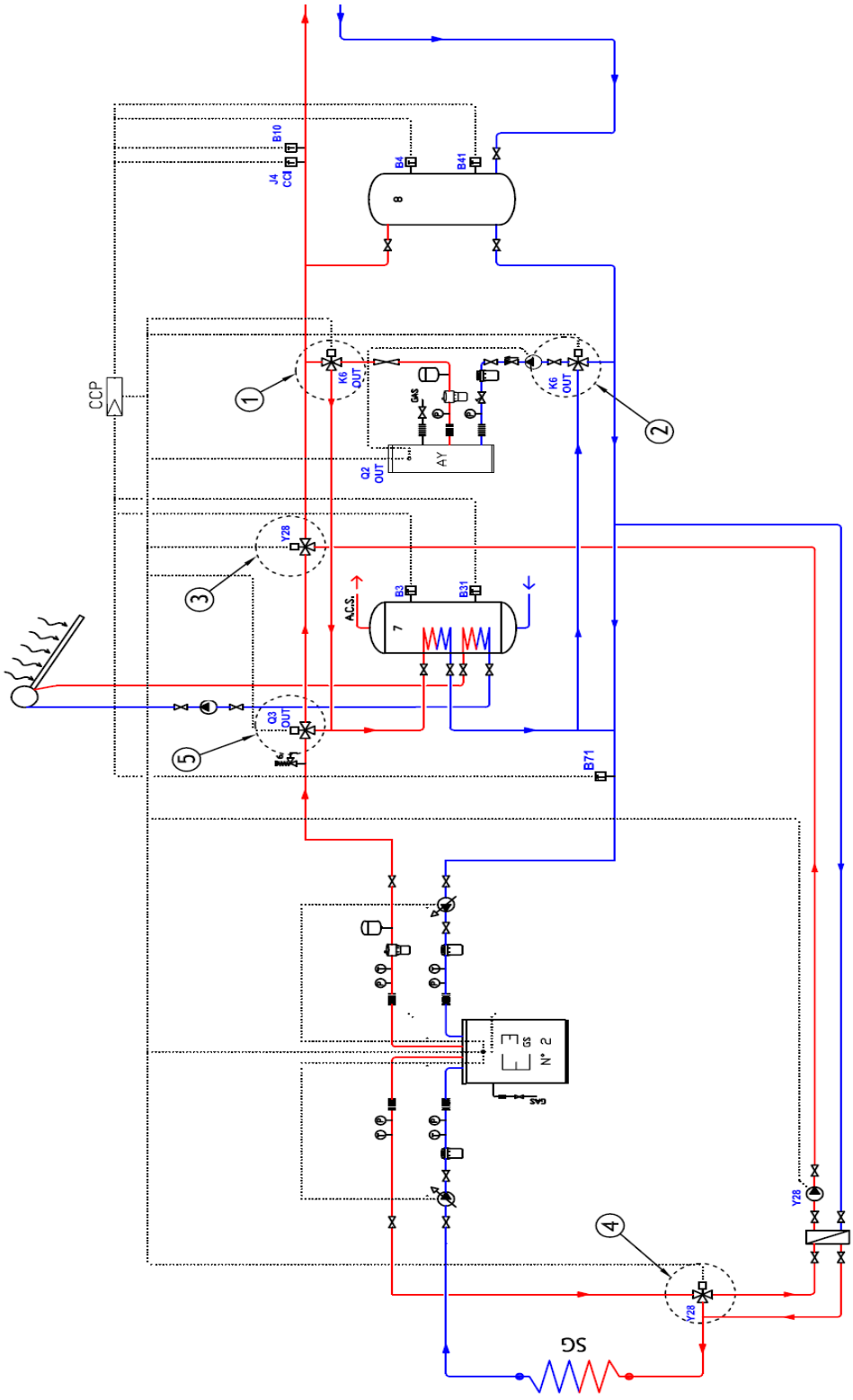


Figure 35 Location of diverter/mixer valves in system

☞ The Siemens diverter valve body is marked with B and AB reversed from the normal markings. Thus the common way is marked B, as shown in the schematics given below.

☞ When mounting the valve, make sure to mount it in the orientation shown in the figures given below.

☞ The following figures give the connections for each type of valve installed.

⚠ Failure to observe these indications can compromise the initial activation of the system. Contact Robur in case of doubt.

Diverter valve Q3 connection diagram$_{out}$ (if DHW block present)

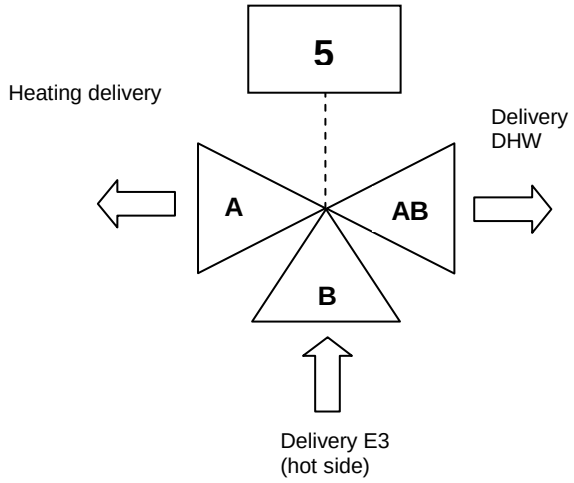


Figure 36 Description of direction of flow of valve n. 5 shown in Figure 35.

Diverter valves K6 connection diagram$_{out}$ (if B and DHW blocks present)

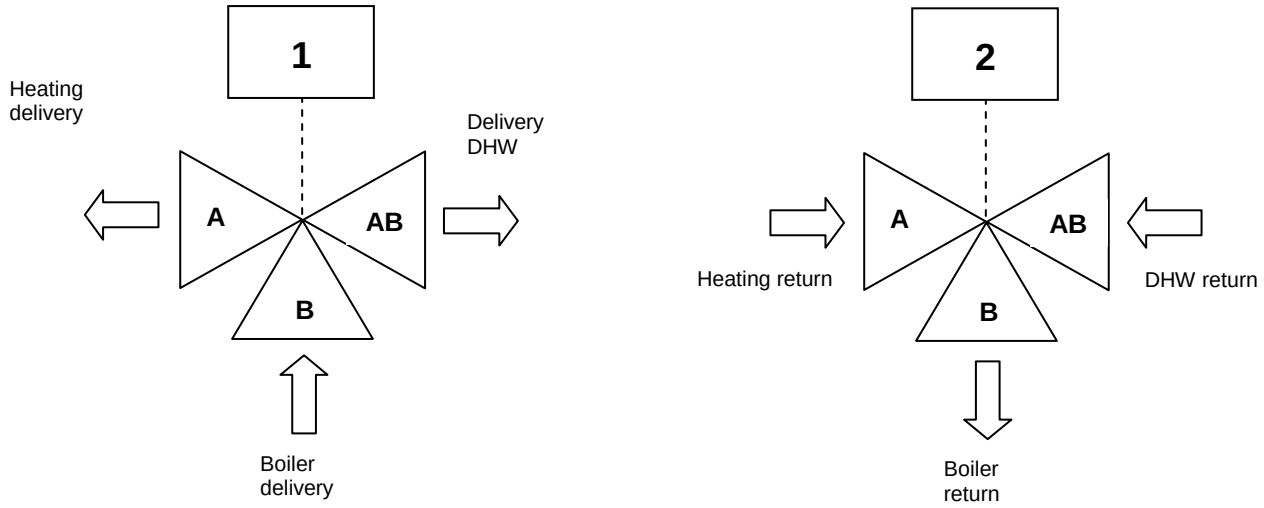


Figure 37 Description of direction of flow of valves n.1 and 2 shown in Figure 35.

Diverter valves Y28 connection diagram (if PC block is present)

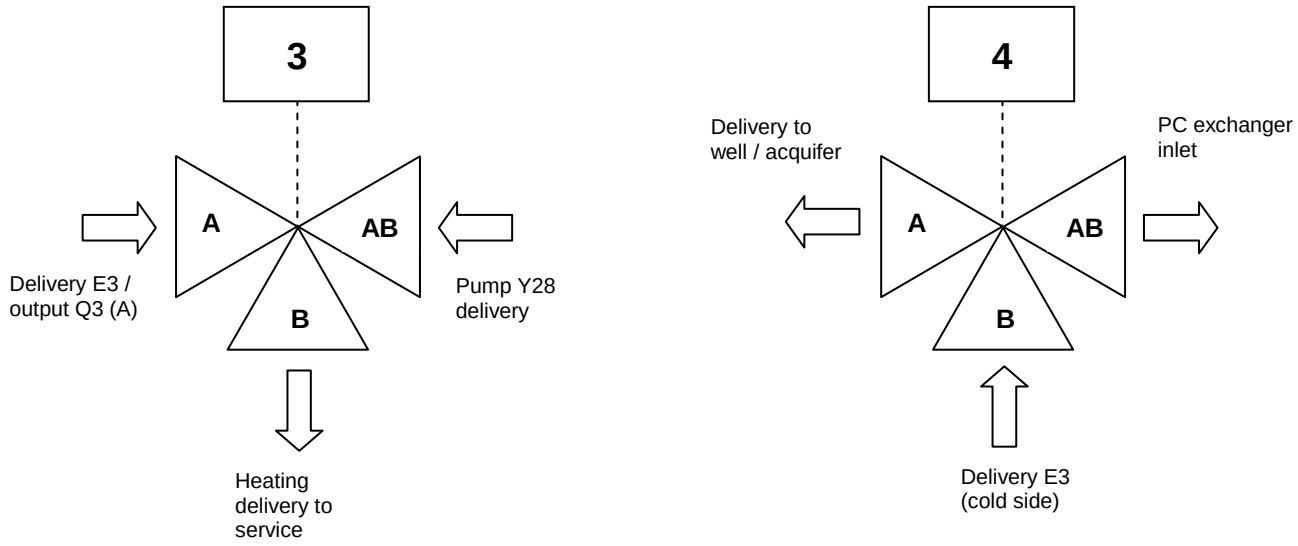


Figure 38 Description of direction of flow of valves n.3 and 4 shown in Figure 35.

Installing the Siemens I/SBC28.2 actuator

1. Rotate the valve rod (detail 1) so that the point of the arrow is opposite the side of the valve body (detail 3) marked with A, B and AB. (see Figure 39).
2. Remove the actuator bushing (I/SBSC28.2) and fit it to the rod (detail 1 of Figure 39).
3. Press the “release button” and set the actuator pointer to “Close” (see Figure 40).
4. Fit the actuator to the valve body (detail 3) and secure it to its bracket (detail 2) (see Figure 39).

If for any reason it is not possible to mount the actuator, rotate the bracket (detail 2 of Figure 39) through 90°.

I/SBC28.2 actuator installation diagram

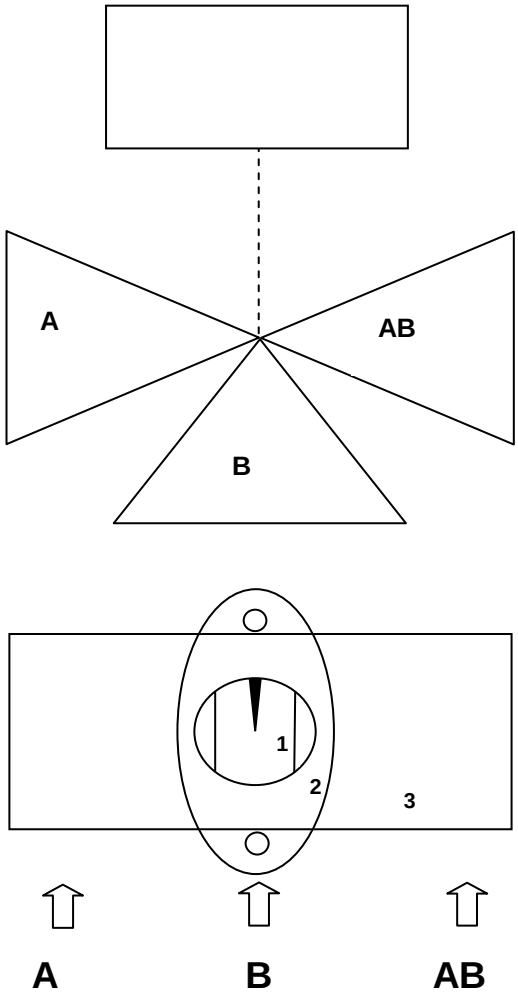


Figure 39 Actuator mounting diagram.
Detail 1: valve actuator control rod.
Detail 2: actuator bracket.
Detail 3: valve body (plane view).

I/SBC28.2 actuator

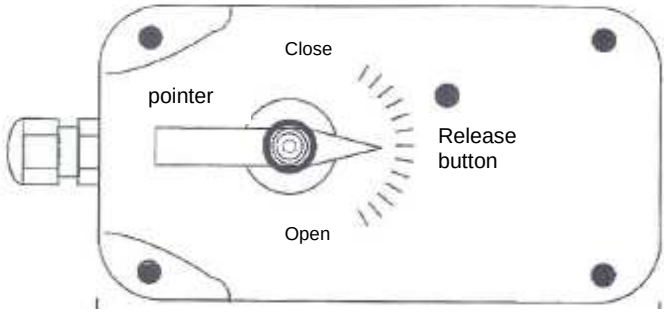
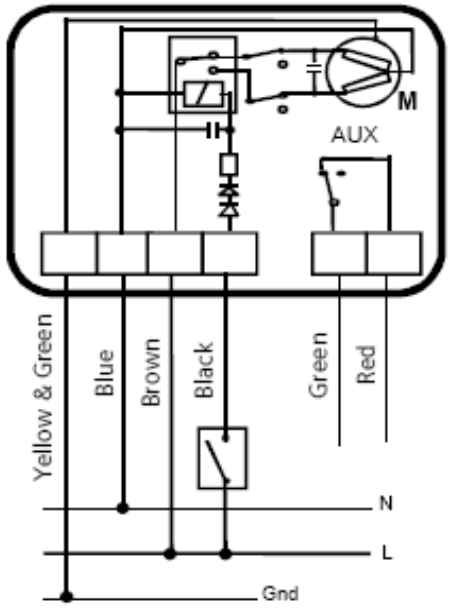


Figure 40 Description of actuator: The “pointer” indicates and controls the position of the actuator in Figure 39, the “release button” is used for moving the “pointer” by hand.

DIVERTER VALVE TECHNICAL DATA	
VALVE BODY	
Operating pressure	PN16 FOR HOT WATER AT 90℃. PN 2 0 FOR COLD WATER
Fluid temperature	WATER 0℃…90℃
Angle of rotation	90°
VALVE ACTUATOR	
Electrical power	I/SBC28.2.3 230V AC, + 10% - 15%
Frequency	50 HZ SUPPLY
Peak consumption	4 VA
Stroke time (open/close)	90‘‘ FOR 1¼’’ AND 180’’ FOR 1½‘‘ AND 2’’
Auxiliary contact rating	250V 3A (RESISTIVE)
Admitted ambient temperature	DURING OPERATION: 0…+ 50℃ SHIPPING AND STORAGE: -10…+80℃
Admitted ambient humidity	CLASS G, DIN40040
Degree of protection	IP 54
cable (with auxiliary contact)	6 x 1 mm^2, length 0.8 m
Weight	0.45 KG

Diverter valves internal electrical connection ($Q3_{out}$, $K6_{out}$, Y28)



Legend:

Brown: line
Black:
Connect to controller output terminal
powered: valve open
not powered: valve closed
Blue: neutral
Red-green:
limit switch contacts (not used)
3A - 250V AC
GYellow-green: Ground

Figure 41 Description of diverter valves actuator connections

☞ For the connection to the Comfort Control unit, refer to SECTION 3.

☞ During installation, follow the actuator installation instructions illustrated in Figure 44 on page 43.

4.2 Siemens mixer valve connection

Mixer valves Y1/Y2 and Y5/Y6 (heating circuits C1/C2) connection diagram

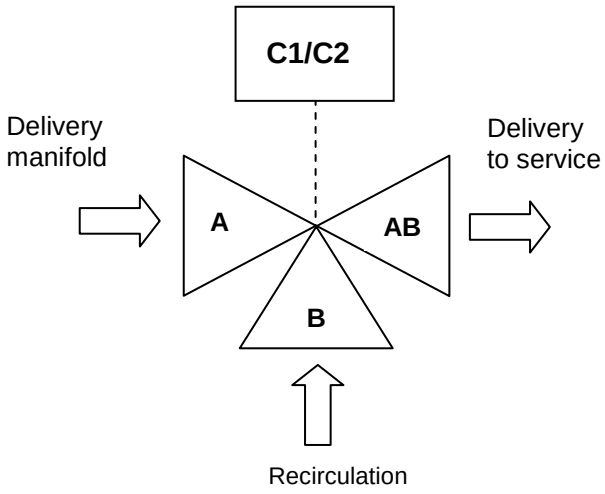


Figure 42 Description of direction of flow of mixer valves

Installing the Siemens actuator

1. Turn the actuator knob counterclockwise (the servomotor will resist this), until the indicator is on the position 0 notch
2. Fit the actuator to the valve body and secure it with the locknut.

MIXER VALVE TECHNICAL DATA	
VALVE BODY	
Operating pressure	REFERENCE DIN4747 / DIN3158 IN RANGE 1…120°C
Class PN	PN16 EN1333
Average temperature	WATER 1°C…120°C
VALVE ACTUATOR	
Electrical power	230V AC, ± 15%
Frequency	50/60 HZ
Peak consumption	2.5 VA
Stroke time (open/close)	150'' AT 50 HZ
Auxiliary contact rating	250V 6A (RESISTIVE); 2.5A (INDUCTIVE)
Admitted ambient temperature	DURING OPERATION AND STORAGE: -5…+ 50°C SHIPPING: -25…+70°C
Admitted ambient humidity	DURING OPERATION AND STORAGE: 5…95% SHIPPING: < 95%
Degree of protection	IP 54
Weight	0.5 KG

Mixer valves internal electrical connection (C1, C2)

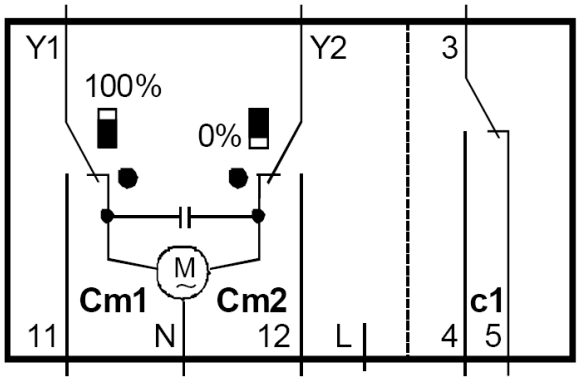


Figure 43 Description of mixer valves actuator connections

☞ For the connection to the Comfort Control unit, refer to SECTION 3 a pagina 27.

4.3 Valve actuator orientation diagram

The figure shown below indicates the orientation of the actuator for Siemens mixer and diverter valves.

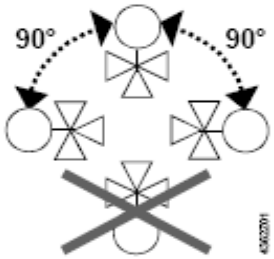


Figure 44 Description of orientation of Siemens valve actuator

SECTION 5 COMMISSIONING

This section explains how to quickly and easily program the RVS 61, expansion modules and room units.

These simple settings facilitate quick commissioning.

The various tunings depend on the user's level of access to the various menus.

5.1 Prerequisites

To commission the devices cited in this manual, observe the following instructions:

- correct installation, proper electrical hookup and, in case of radio connections, proper wireless connection between all auxiliary equipment.
- Set all parameters regarding the system, in line with the actual solution, as instructed in Section 7.

  To set the parameters, proceed as follows:

  1. Enter the AVS37 control unit programming mode by pressing OK.
  2. Hold down the Info button for at least 3 seconds, then select the operating level (Commissioning technician, installation technician, etc) "Installation technician" with the programming knob.
  3. Press the OK button.
  4. Rotate the knob and select the menu containing the parameter to be modified.
  5. Press the OK button.
  6. Select the desired parameter.
  7. Press the OK button.
  8. Modify the value of the parameter and confirm with OK.

At this point one may:

  9. Rotate the knob to modify other parameters in the same section
  10. Press ESC to return to the previous menu level; press ESC again to return to the main screen

- Run the operating test as described in paragraph 5.2 Operating test a pagina 46.
- Reset the attenuated external temperature: ("User diagnostics" menu, parameter "8703: Attenuated external temperature").

☞ If a parameter is selected by mistake, that should not actually be changed, press ESC to void the operation. In this way the changes made are not saved.

☞ If no interaction takes place for a period of 8 minutes, the device automatically returns to the main screen.

☞ Certain operating rows may be hidden and this may depend on the type of device used, its configuration and the user's access level (final user, first operation technician, installation technician etc.).

You will find below the instructions to set the language used to visualize the settings on the display.

1. Move into the Siemens interface: the display is as shown in Figure 45.

Display visualization

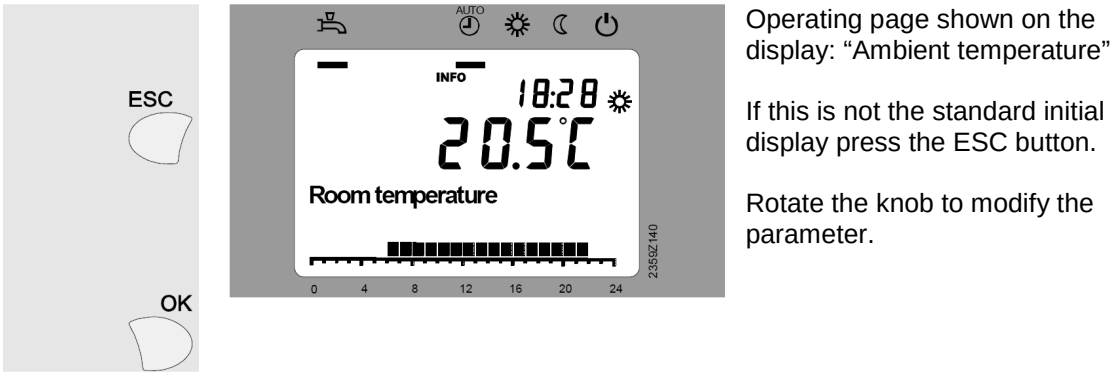


Figure 45 The display shows the temperature in the room

☞ If the display shows anything different, press the ESC key

2. Press the OK **button**.
3. use the knob to select the string **Control Unit**.
4. Press the OK **button**.
5. The row number appears in the top right hand corner, then rotate the knob and take position on the row corresponding to the parameter to be changed→ **No. 20 (Language)**.
6. Press the OK →button the parameter to be changed begins to flash (in the low right hand corner the possible options are shown)
7. Change the parameter by rotating the knob.
8. Press the OK key to confirm the selected language.
9. Press ESC to return to the main screen.

5.2 Operating test

To facilitate commissioning and the identification of any errors, the controller can test its own inputs and outputs.

Select the “Test input/output” menu and display all available parameters.

☞ Parameter 7700 is used to force the inputs and outputs, while the others in the “Test input/output” menu are read only.

☞ If errors are detected during the test, refer to APPENDIX d - TABLE OF ERROR CODES - on page 151.

☞ The parameter "**6820: Reset log**" deletes the last ten errors, along with the corresponding operational values and setpoints, as well as the status of the output relays.
Parameter "**8070: Delete log**" deletes the last ten status messages and status codes, along with the corresponding operational values and setpoints, as well as the status of the output relays.

☞ The "Status" menu can be used to check the operational status of the system.

5.3 RVS61 controller

The RVS 61.843 controller is equipped with a led (see Figure 46) to indicate its operational status

- LED off: No power
- LED on: Ready for operation
- LED flashing: Local faults

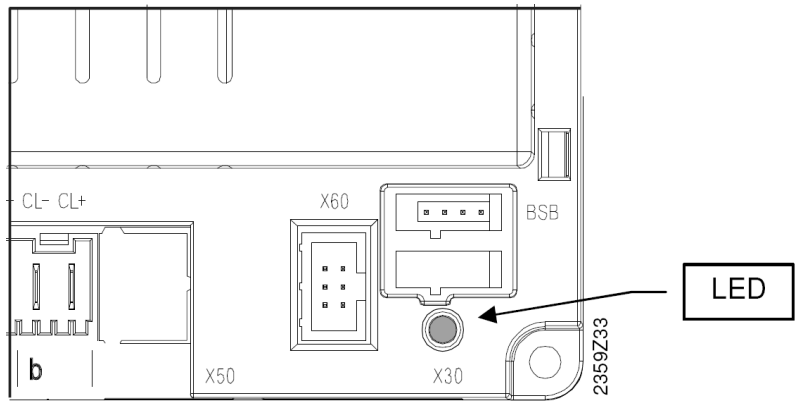


Figure 46 - Status LED.

SECTION 6 SYSTEM BLOCKS

This section, intended for designers, hydraulic and electrical installation technicians and Robur TAC, details the system components.

We show below a system including all its configurable blocks: BP, Robur E^3, PC, DHW, B, C1, C2, CP, RU.

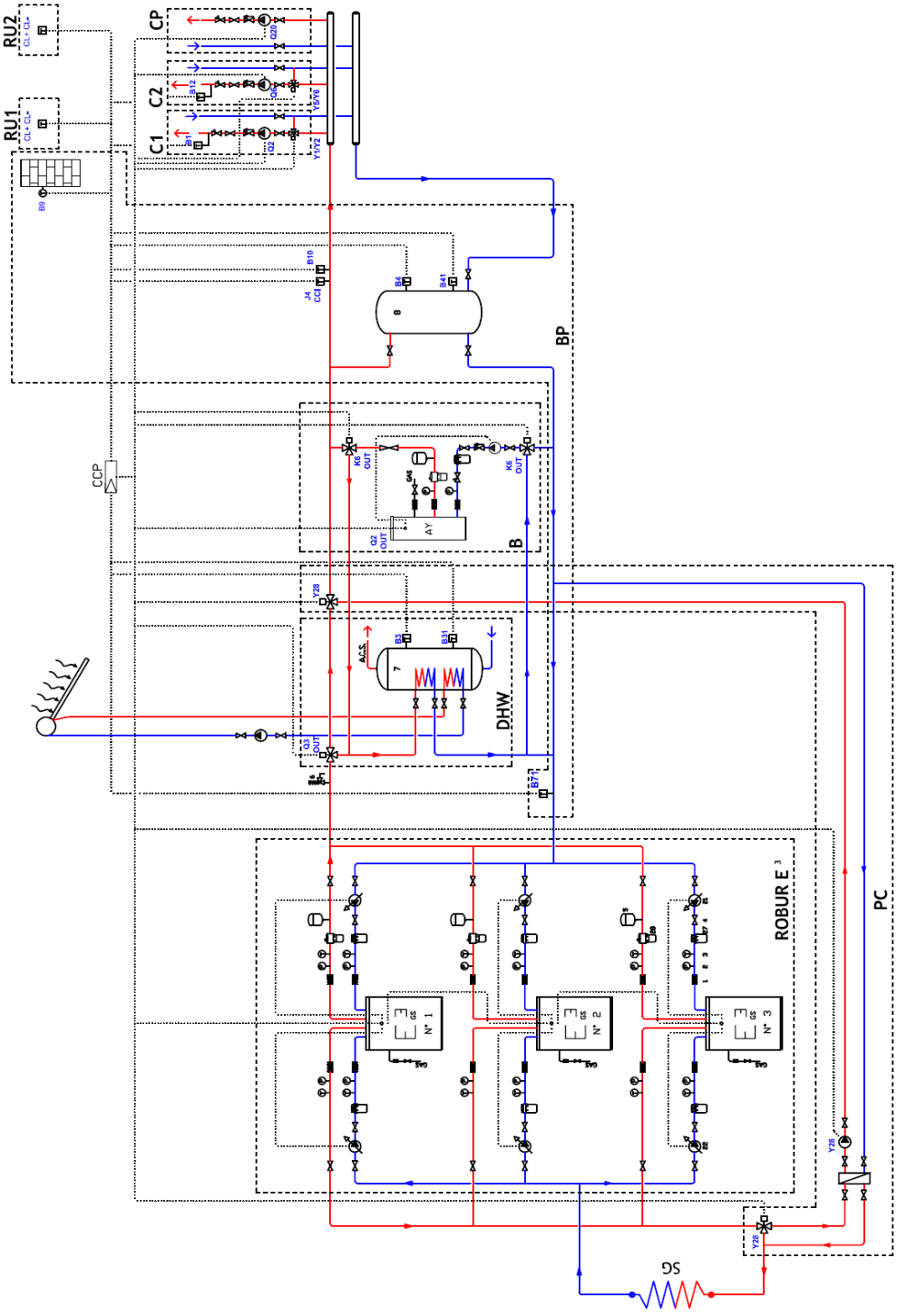


Figure 47 Example system block schematic

6.1 DESCRIPTION OF PARTS OF THE SYSTEM

To facilitate comprehension, each system which employs the Comfort Control system can be divided into blocks. The blocks are as follows:

6.1.1 Base block (BP)

the base block (BP) is composed of (see Figure 48):

- 8: storage tanks (buffers) for the primary heating/conditioning circuit water
- sensor B9: external ambient temperature. The external ambient temperature, with the climatic curves and internal ambient temperature (if the RU is present), determines the setpoint for E^3.
- sensor B4: storage tank top section temperature
- sensor B41: storage tank bottom section temperature
- sensor J4: delivery temperature for control of unit E^3
- sensor B10: delivery temperature for control of boiler
- sensor B71: heat pump return temperature

Base block schematic

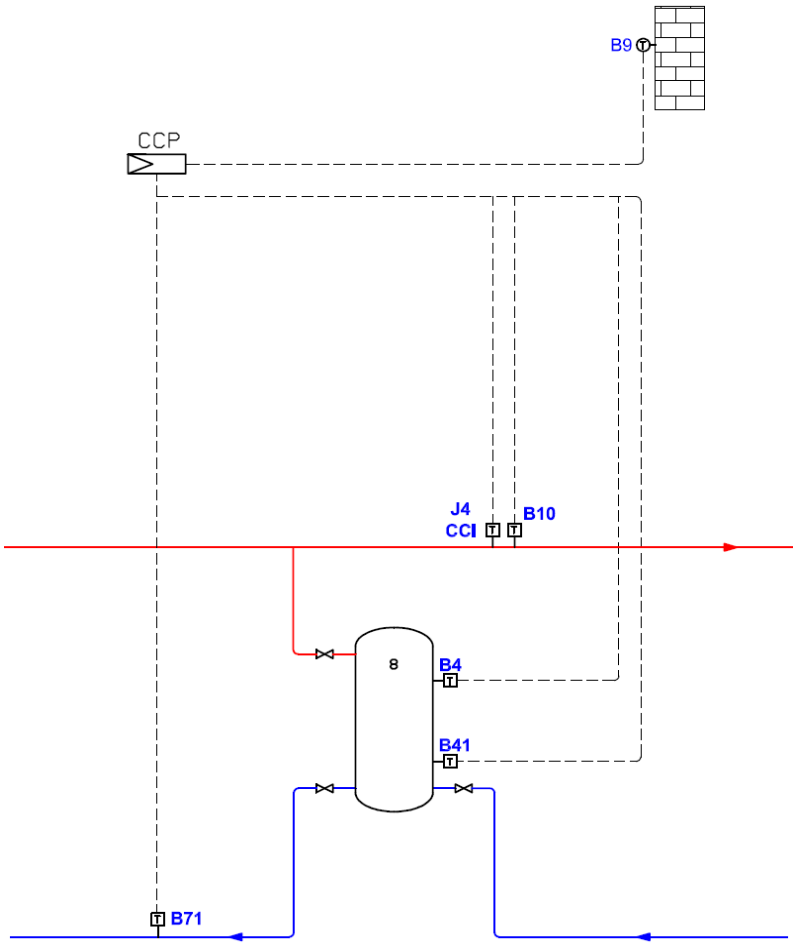


Figure 48 Basic system components

It is important that the temperature sensors not be influenced by external parameters, hence make sure to use dielectric paste in the sensor housings to isolate them and provide good weather protection (rain, condensate, etc.).

Compare Figure 47 to check the positions of the components of block BP in the system.

6.1.2 Robur block E^3

- E^3 A (see Figure 49 to the left): Robur air/water heat pump
- E^3 GS/WS (see Figure 49 to the right): Robur water/water heat pump
- 14, 19, 20: variable capacity pump (controlled by unit E^3)
- 17, 23: impurities filter
- 18, 24: deaerator
- sensor B91: source delivery temperature, substituted by fixed resistance (equal to 22kΩ)

Robur unit block diagram

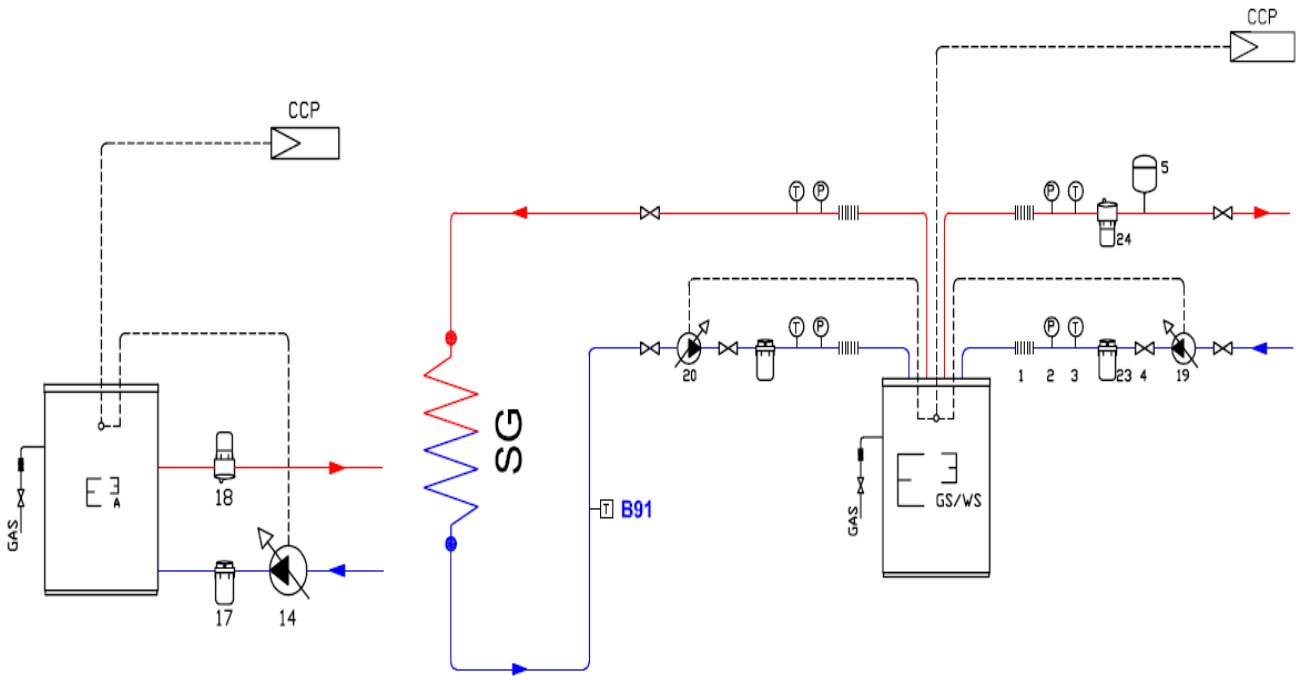


Figure 49 Components E^3

It is possible to have up to three E^3 units of the same type on a single system.

It is important that the temperature sensors not be influenced by external parameters, hence make sure to use dielectric paste in the sensor housings to isolate them and provide good weather protection (rain, condensate, etc.).

Compare Figure 47 to check the positions of the components of block Robur E^3 in the system.

6.1.3 Block PC (Passive cooling)

Passive cooling is provided by the water drawn from the geothermal probes/wells to cool the services (C1 only) with using the E^3 equipment.

Passive cooling components (see Figure 50)

- valves Y28: passive cooling diverter valves. Valves used with E^3 GS or E^3 WS.
- pump Y28: passive cooling pump. Pump used with E^3 GS or E^3 WS.

PC block schematic

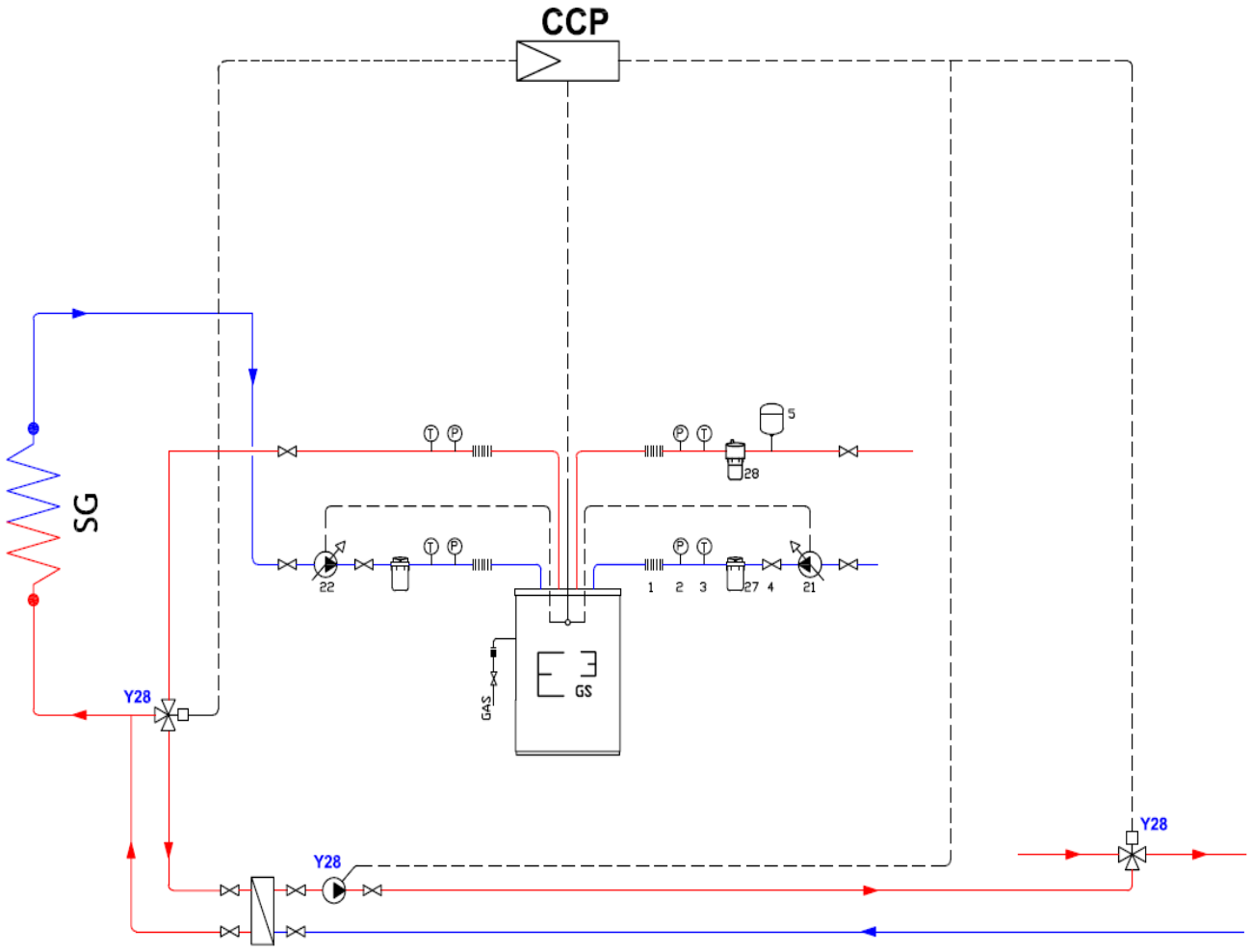


Figure 50 Passive Cooling components

Compare Figure 47 to check the positions of the components of block PC in the system.

6.1.4 Block DHW

The DHW block is composed of (see Figure 51):

- 7: DHW storage
- sensor B3: DHW tank temperature (upper)
- sensor B31: DHW tank temperature (lower)
- The temperatures (B3 and B31) determine the ON/OFF status of the E^3 units and the boiler (only during DHW charging). Sensor B31 is given in the Robur schematics but is optional, whereas B3 is obligatory if DHW service is required.
- valve $Q3_{OUT}$: DHW charging diverter valve (connected to PLC)

DHW block schematic

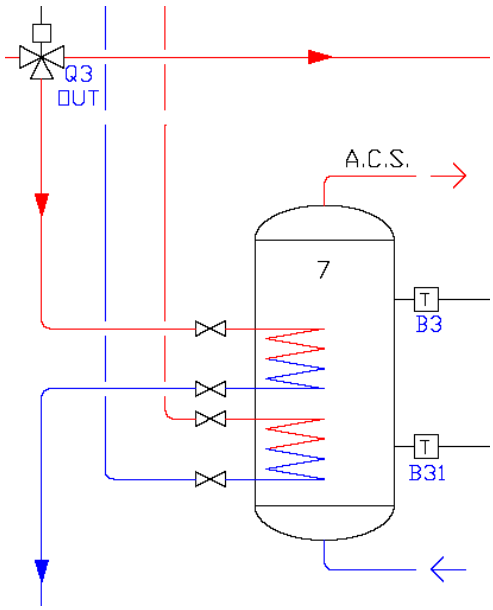


Figure 51 DHW components

It is important that the temperature sensors not be influenced by external parameters, hence make sure to use dielectric paste in the sensor housings to isolate them and provide good weather protection (rain, condensate, etc.).

Compare Figure 47 to check the positions of the components of block DHW in the system.

6.1.5 Block B

Block B is composed of (see Figure 52):

- AY: boiler
- valve $K6_{OUT}$: heating/DHW integration diverter valve (connected to PLC)
- Diverter valves "$K6_{OUT}$" are installed only if blocks B and DHW are present in the system
- $Q2_{OUT}$: boiler ON/OFF signal (connected to PLC)
- 27: impurities filter
- 28: deaerator

The water pump is a constant capacity unit (controlled by the boiler).

Block B schematic

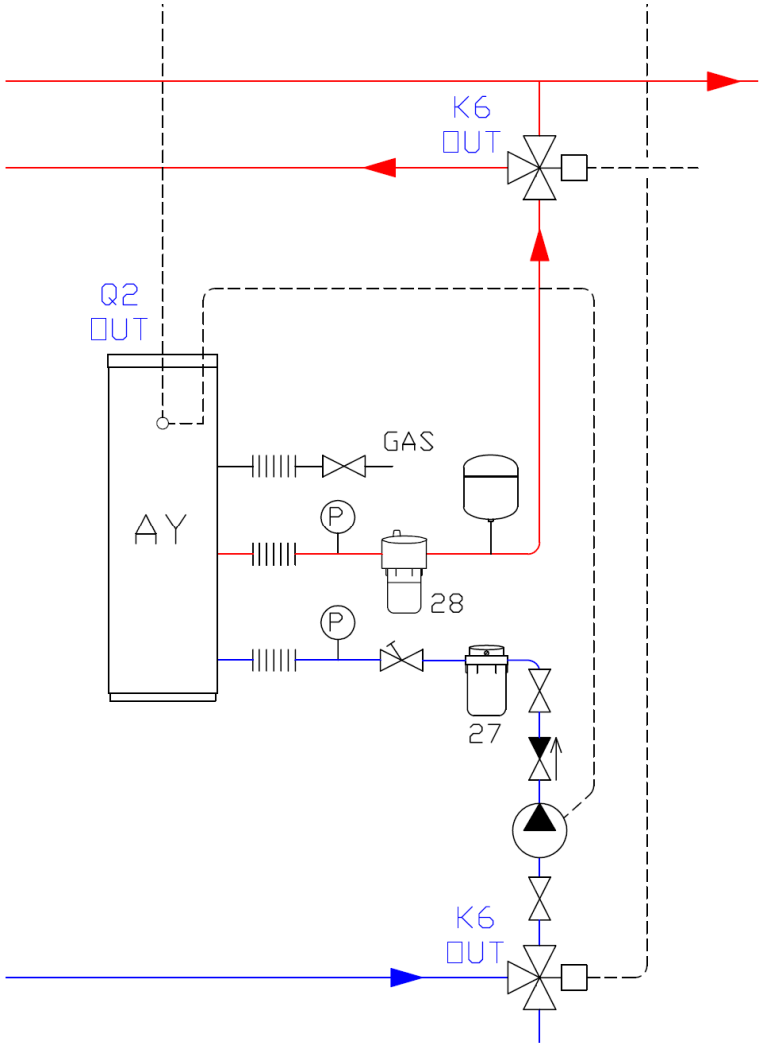


Figure 52 Heating/DHW supplementary boiler components.

Compare Figure 47 to check the positions of the components of block B in the system.

6.1.6 Block C1/C2 (mix1/mix2 circuit)

Block C1/C2 is composed of (see Figure 53):

- valve Y1/Y2: mix 1 circuit (C1) mixer valve
- valve Y5/Y6: mix 2 circuit (C2) mixer valve
- pump Q2: mix 1 circuit (C1) pump
- pump Q6: mix 2 circuit (C2) pump (expansion module 2)
- Sensor B1: heating/cooling mix circuit 1 delivery temperature sensor (controls mixer valve Y1/Y2)
- Sensor B12: heating mix circuit 2 delivery temperature sensor (controls mixer valve Y5/Y6)

Circuit C2 does not provide cooling service.

Block C1/C2 schematic

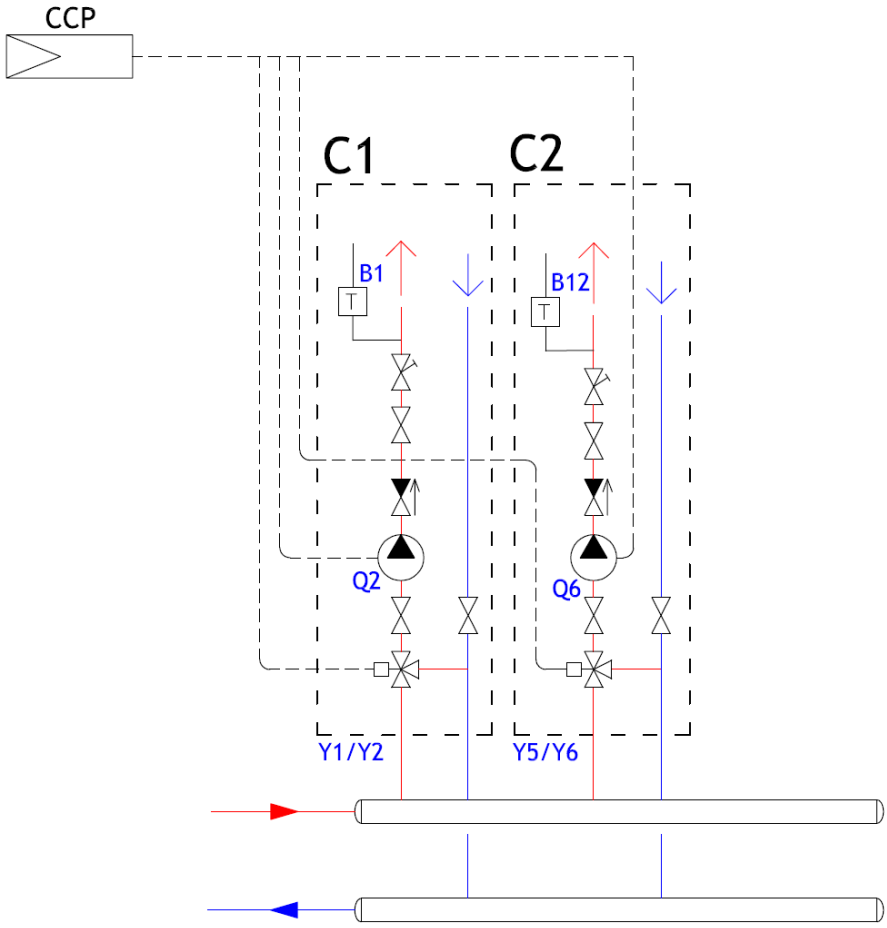


Figure 53 Mix 1 and 2 circuit components

It is important that the temperature sensors not be influenced by external parameters, hence make sure to use dielectric paste in the sensor housings to isolate them and provide good weather protection (rain, condensate, etc.).

Compare Figure 47 to check the positions of the components of block C1/C2 in the system.

6.1.7 Block CP (pump circuit)

Block CP is composed of (see Figure 54):

- pump Q20: pump only circuit pump (CP) (expansion module 1)

Circuit CP does not provide cooling service.

Pump Q20 can run intermittently (ON/OFF) to restore the correct heating water temperature, depending on the temperature measured by sensor B10.

Block CP schematic

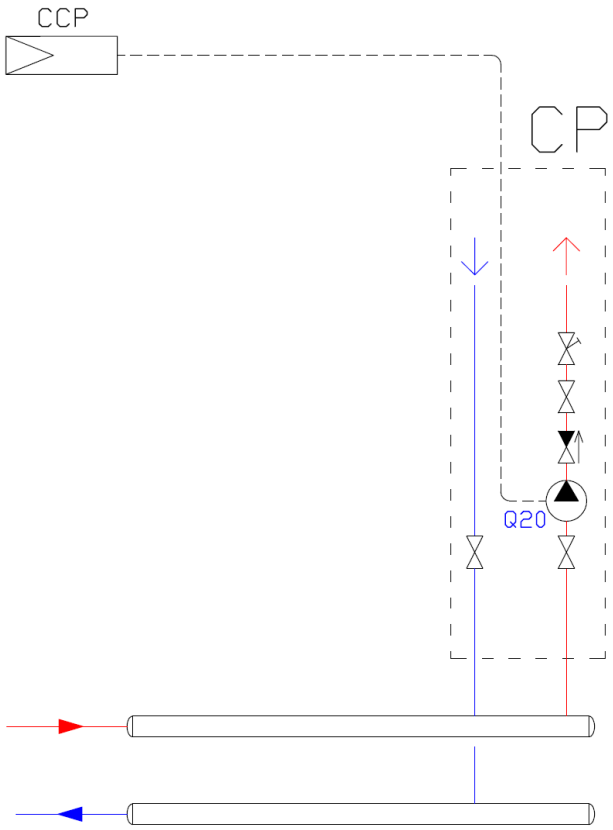


Figure 54 Pump circuit components

Compare Figure 47 to check the positions of the components of block CP in the system.

6.1.8 Block RU (room unit)

Block RU is composed of (see Figure 55):

- RU1: room unit 1
  If present, room unit RU1, located in a reference area served by heating circuit C1, provides information to the climatic curve of circuit C1 to determine the C1 water delivery temperature setpoint, which is maintained by mixer valve Y1/Y2. This setpoint is also required from the heat generator.
- RU2: room unit 2
  If present, room unit RU2, located in a reference area served by heating circuit C2, provides information to the climatic curve of circuit C2 to determine the C2 water delivery temperature setpoint, which is maintained by mixer valve Y5/Y6. This setpoint is also required from the heat generator.
- RUP: room unit P
  If present, room unit RUP, located in a reference area served by heating circuit CP, provides information to the climatic curve of circuit CP to determine the CP water delivery temperature setpoint.
- This setpoint is also required from the heat generator.

The room units are not necessary parts of the system; if a given circuit is not equipped with a room unit, its water temperature is controlled only by the external temperature and the climatic curve;

When several heating circuits require a setpoint for the heat generator, the RVS61 controller polls the E^3 units for the highest value among those requested.

Block RU schematic

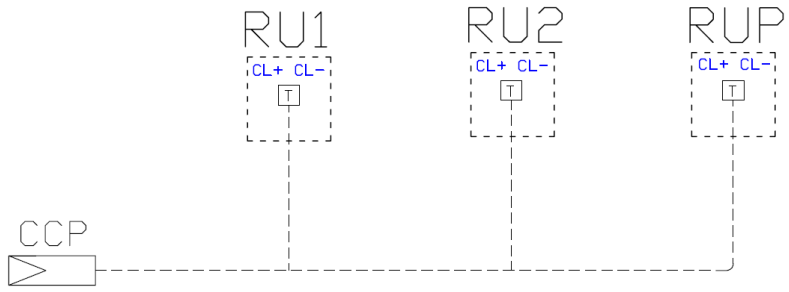


Figure 55 Room unit

Compare Figure 47 to check the positions of the components of block RU in the system.

All system solutions can be obtained by adding a number of the following modules to the basic BP system:

- "Robur block E^3": Robur units
- "Block DHW": Domestic Hot Water (DHW)
- "Block B": heating/DHW integration boiler
- "Block C1": heating/cooling circuit 1
- "Block C2": heating circuit 2
- "Block CP": heating circuit CP
- "Block RU1": heating/cooling circuit 1 room unit
- "Block RU2": heating circuit 2 room unit
- "Block RUP": heating circuit CP room unit

The complete configuration of each block described above is given in SECTION 7 Configuration a pagina 59.

SECTION 7 CONFIGURATION

This paragraph deals with modifications to the Robur default settings (see Table - 10 Robur basic configurations table - a pagina 155), to satisfy special installation requirements (should the type of machine and system make it necessary to modify the defaults).

All settings can be made on both the AVS37 controller and on the QAA75/QAA78 room units if present, except for the RU Block settings, which can only be done on the QAA75/QAA78 units.

All base block (BP) sensors must be connected to the RVS61 for the system to operate properly. Without these sensors the system will not operate.

The parameters given in this section are those used to implement the various system blocks and control them. For systems which use different configurations, consult the Siemens documentation (systems implemented otherwise than indicated by Robur are not supported).

Whenever the text makes reference to the boiler, note that the latter can be replaced by an electric heating element.

The configuration of the various blocks can be summarised as follows:

- Pre-setting (Robur default).
- Manual modification of individual parameters to satisfy special system requirements (specific inputs/outputs, etc.).
- Selection of supplementary functions and precise adjustment using the functions of the various individual parameters (setting heating circuit/s, timer, etc.).

IMPORTANT

Shut off and restore power (~230V) after modifying parameters.

The units are factory configured by Robur.

The installation and commissioning technicians have a number of parameters to configure to meet the system's specific requirements, which vary from case to case.

The configured system schematic is the result of the default settings and the connected sensors, as well as of the settings done on-site by the installation technician (activation of the various system blocks).

The sensors contained in the system schematic must be connected properly to ensure that the sensor auto-detect function does not detect a different system schematic.

A number of different functions are available for the heating circuit, some of which can be selected for each individual heating circuit.

The operating rows of the heating circuit pump are visible when a multi-function output is set as the heating circuit pump.

The parameters listed in this section must be changed from their factory settings. For each parameter we include a brief description which explains the value to be assigned for varying system requirements.

As for the electrical connections to the inputs and outputs of the devices and their settings (depending on the actual installation), refer to SECTION 3 Electrical connections a pagina 27.

7.1 BP - BASIC SYSTEM CONFIGURATION

- Inputs:

DEVICE:	POSITION:	NAME OF SENSOR:	TYPE OF SENSOR:
RVS61	B9 - M	B9	EXTERNAL SENSOR (NTC 1K)
RVS61	B71 - M	B71	WATER SENSOR (NTC 10K)
RVS61	B91 - M	B91	RESISTANCE (22 KΩ)
RVS61	B92/B84 - M	B92	RESISTANCE (22 KΩ)
RVS61	BX1 - M	B4	WATER SENSOR (NTC 10K)
RVS61	BX2 - M	B41	WATER SENSOR (NTC 10K)
RVS61	BX3 - M	B10	WATER SENSOR (NTC 10K)
RVS61	H3 - M*	H3	N.O. CONTACT
AVS75	H2 - M*	H2	N.O. CONTACT
RVS61	E10 - N*	E10	N.O. CONTACT
RVS61	EX1 - N*	EX1	N.C. CONTACT

** Input already cabled to Robur panel.*

- Outputs:

DEVICE:	POSITION:	NAME OF OUTPUT:	TYPE OF OUTPUT:
RVS61	K1 - N*	K1	N.O. RELAY ~230V
RVS61	UX(+) - M(-)*	UX	ANALOGUE MULTIFUNCTION OUTPUT

** Output already cabled to Robur panel.*

If you believe the Robur default settings to have been modified, check that the values in the Siemens RVS61 controller coincide with the values given in Table - 10 Robur basic configurations table - a pagina 155, which is the point of departure when adding new blocks.

The “base block” parameters given in Table - 10 Robur basic configurations table - a pagina 155 are the “**default settings**” in the **RVS61/196** unit, **if they have not been overwritten using parameter “6204”**.

If you wish to return to the “**default**” settings, use parameter “6205: Restore defaults”. This is ONLY possible if the parameters have not been overwritten using parameter “6204”.

- Parameter “6205: Restore defaults”, enables you to restore the default values of the parameters. The following menus are not affected by this function: Date and Time, Operator Chapter, RF, and all daily programs, as well as the number of hours of operation and the various counters.
- Parameter “6204: Store parameters”, the current settings can be stored as new defaults. The following menus are not affected by this function: Date and Time, Operator Chapter, RF, and all daily programs, as well as the number of hours of operation and the various counters.

  Parameter “6204” overwrites the defaults and they can no longer be restored!

Parameters useful for regulating the system “Base system configuration”:

The base configuration includes use of the storage tank and hence sensors B4 and B41 to turn the heat/cooling source ON/OFF (passive cooling is not provided in the base configuration; see paragraph 6.1.1 Base block (BP) on page 50).

Heating:

Parameters “4722: Temp diff buffer/HC” (default 2℃ , range -20℃ to +20℃) and “4721: Auto generation lock” (default 0℃, range 0℃ to +20℃), define in combination the means of activation/deactivation of the heat generator as a function of the temperatures measured by sensors B4 and B41 located in the buffer. When B4 and B41 > Setpoint_heat + “4722” + “4721”, that is when both temperature values exceed the heating setpoint requested plus the sum of the values of the two parameters, he heat generator is switched off; it is switched on when B4 and B41 < Setpoint_heat + “4722” - 1℃, in other words, when both temperature

values drop below the heating setpoint plus the value of parameter “4722” minus 1℃ (see Figure 56 a pagina 63).

It follows that:

- the sum of the values of parameters “4722” and “4721” defines the point at which the heat generator is switched off (see Figure 56 a pagina 63) and:
    - if increased, it makes it less likely that the heat pump will be switched off due to pressure drops; on the other hand, it enables the delivery temperature to exceed the requirements of the services, so that excessive increases must be avoided.
    - If decremented, the opposite considerations apply.

      As a point of departure, the sum of the values should be > 0 and equal to a few degrees only (2 - 3 ℃).
- The value of parameter “4721” + 1℃ defines the di fferential between switching on and off (see Figure 56 a pagina 63) and:
    - if increased, it results in longer heat pump activation/deactivation cycles, which means greater efficiency; on the other hand, it permits larger oscillations of the delivery temperature, which impacts the quality of the service provided.
    - If decremented, the opposite considerations apply.

      As a point of departure, the value of parameter 4721 should be 0 - 1 ℃.

Passive cooling:

Parameters “4723: Temp diff buffer/HC” (default 0℃ , range -20℃ to +20℃) and “4721: Auto generation lock” (default 0℃, range 0℃ to +2 0℃), define in combination the means of activation/deactivation of cold source water pumping as a function of the temperatures measured by sensors B4 and B41 located in the buffer. When B4 and B41 < Setpoint_cond + “4723” - “4721” (see Figure 57 a pagina 63), in other words, when both temperature values drop below the cooling setpoint plus the value of parameter “4723” minus the value of parameter “4721”, pumping is deactivated; it is reactivated when B4 and B41 > Setpoint_cond + “4723” + 1℃, in other words, when both temperature values rise above the cooling setpoint plus the value of parameter “4723” plus 1℃ (see Figure 57 a pagina 63).

It follows that:

- the difference (sum of the parameters 4732 < 0) between the values of parameters “4723” and “4721” defines the pumping deactivation point (see Figure 57 a pagina 63) and:
    - If increased, enables the delivery temperature to drop below the point required by the services; and excessive increase must be avoided to prevent formation of condensation. To prevent problems associated with the formation of condensation, compare also parameters 923, 924, 946, 947, 948 and 950.
    - If decremented, the opposite considerations apply.

      As a point of departure, the sum of the values should be = 0 or slightly negative (-2 - 0 ℃).
- The value of parameter “4721” + 1℃ defines the di fferential between switching on and off (see Figure 57 a pagina 63) and:
    - If increased, it results in longer pumping activation/deactivation cycles which reduces the number of activations (this is important for some types of pump); on the other hand, it permits larger oscillations of the delivery temperature, which impacts the quality of the service provided.

- If decremented, the opposite considerations apply.
  As a point of departure, the value of parameter 4721 should be 0 - 1 ℃.

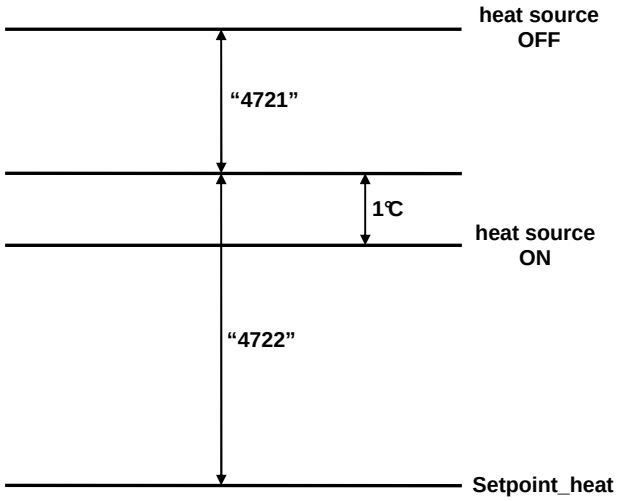


Figure 56 Use of sensors B4 and B41 to turn the heat source ON/OFF

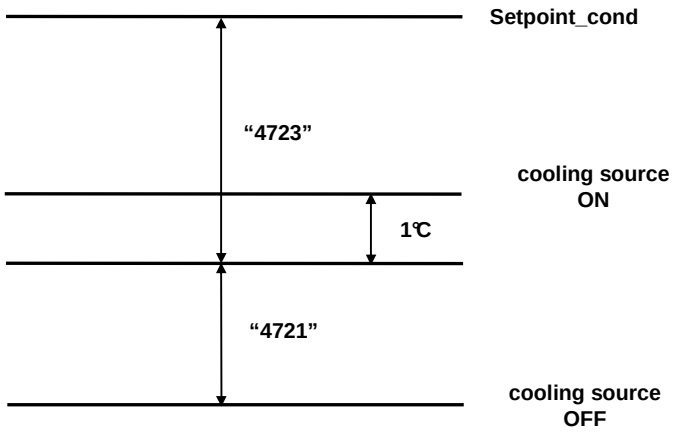


Figure 57 Use of sensors B4 and B41 to turn the cooling source ON/OFF

7.2 E^3 - ROBUR MACHINE CONFIGURATION

a) With **one** and **two** E^3 units in the system:

- Inputs for use in addition to those in Table - 10 Robur basic configurations table - a pagina 155:

  The E^3-A, E^3-WS without passive cooling and E^3-GS without passive cooling do not require other inputs than those used in Table - 10 Robur basic configurations table - a pagina 155.

  The E^3-WS, E^3-GS with passive cooling, require a hygrostat/hygrometer connection:

DEVICE:	POSITION:	NAME OF SENSOR:	TYPE OF SENSOR:
RVS61	**H1 - M**	**HYGROSTAT / HYGROMETER**	• **HYGROSTAT NC-NO** • **HYGROMETER 0-10V**

See parameters “946” to “950” in paragraph 7.6 - Heating and cooling circuit configuration - a pagina 81 for the use of the hygrostat and hygrometer.

- Outputs for use in addition to those in Table - 10 Robur basic configurations table - a pagina 155:

  The E^3-WS and E^3-GS do not require other outputs than those used in Table - 10 Robur basic configurations table - a pagina 155.

  The E^3-A require you to add Y22 among the outputs listed in Table - 10 Robur basic configurations table - a pagina 155.

DEVICE:	POSITION:	NAME OF OUTPUT:	TYPE OF OUTPUT:
RVS61	**QX5 - N***	**Y22**	**N.O. RELAY ~230V**

** Output already cabled to Robur panel.*

For all machines (E^3-WS, E^3-GS and E^3-A) configure the parameters as indicated in the table given below.

MENU:	PARAMETER:	VALUE:
CONFIGURATION	**5800:** **HEAT SOURCE/THERMAL SOURCE**	• **"AIR" IF E^3-A** • **"WATER" IF E^3-WS.** • **"GLYCOLATED WATER" IF E^3-GS.**
CONFIGURATION	**5807:** **COOLING SERVICE**	• **"OFF" IF E^3-A, E^3-WS WITHOUT PASSIVE COOLING OR E^3-GS WITHOUT PASSIVE COOLING.** • **"4-PIPE SYSTEM" IF E^3-WS OR E^3-GS WITH PASSIVE COOLING.**
CONFIGURATION	**5895:** **RELAY OUTPUT QX5**	• **"NONE" IF E^3-WS OR E^3-GS.** • **"Y22" IF E^3-A.**
CONFIGURATION	**5950*:** **FUNCTION INPUT H1**	• **"RELATIVE HUMIDITY 10V" IF E^3-A, E^3-WS OR E^3-GS WITH HYGROMETER**.** • **"DEWPOINT MONITOR" OR "FLOW TEMP SETP INCR HYGRO" IF E^3-WS OR E^3-GS WITH HYGROSTAT**.**

** Leave parameter "5950" set to its default: "Relative humidity 10V", if the hygrostat or hygrometer are not being used.*

*** See parameters "946" to "950" in the chapter "Heating and cooling circuit configuration" for the use of the hygrostat and hygrometer.*

On completion of the system block configuration procedure, shut off and restore the ~230V power supply.

b) With **three** E^3 units in the system:

- Inputs for use in addition to those in Table - 10 Robur basic configurations table - a pagina 155:

  The E^3-A, E^3-WS without passive cooling and E^3-GS without passive cooling, can use input H1 (for the hygrometer inTable - 10 Robur basic configurations table - a pagina 155) as an alarm input:

DEVICE:	POSITION:	NAME OF SENSOR:	TYPE OF SENSOR:
RVS61	**H1 - M***	**H1**	**N.O. CONTACT**

**Cabling to be installed in the Robur panel using an electrical cable from terminal H3 (of the RVS61) connected to terminal H1 (of the RVS61).*

The E^3-WS and E^3-GS with passive cooling, require a hygrostat/hygrometer connection:

DEVICE:	POSITION:	NAME OF SENSOR:	TYPE OF SENSOR:
RVS61	**H1 - M**	**HYGROSTAT / HYGROMETER**	• **HYGROSTAT NC-NO** • **HYGROMETER 0-10V**

See parameters “946” to “950” in paragraph 7.6 - Heating and cooling circuit configuration - a pagina 81 for the use of the hygrostat and hygrometer.

- Outputs for use in addition to those in Table - 10 Robur basic configurations table - a pagina 155:

  The E^3-WS and E^3-GS do not require other outputs than those used in Table - 10 Robur basic configurations table - a pagina 155.

  The E^3-A require you to add Y22 among the outputs listed in Table - 10 Robur basic configurations table - a pagina 155:

DEVICE:	POSITION:	NAME OF OUTPUT:	TYPE OF OUTPUT:
RVS61	**QX5 - N***	**Y22**	**N.O. RELAY ~230V**

** Output already cabled to Robur panel.*

For all machines (E^3-WS, E^3-GS and E^3-A) configure the parameters as indicated in the table given below.

MENU:	PARAMETER:	VALUE:
CONFIGURATION	**5800:** **HEAT SOURCE/THERMAL SOURCE**	• **"AIR" IF E³-A** • **"WATER" IF E³-WS.** • **"GLYCOLATED WATER" IF E³-GS.**
CONFIGURATION	**5807:** **COOLING SERVICE**	• **"OFF" IF E³-A, E³-WS WITHOUT PASSIVE COOLING OR E³-GS WITHOUT PASSIVE COOLING.** • **"4-PIPE SYSTEM" IF E³-WS OR E³-GS WITH PASSIVE COOLING.**
CONFIGURATION	**5895:** **RELAY OUTPUT QX5**	• **"NONE" IF E³-WS OR E³-GS.** • **"Y22" IF E³-A.**
CONFIGURATION	**5950:** **FUNCTION INPUT H1**	• **"ALARM/ERROR MESSAGE" IF E³-A, E³-WS WITHOUT COOLING OR E³-GS WITHOUT COOLING.** • **"RELATIVE HUMIDITY 10V" IF E³-WS OR E³-GS WITH HYGROMETER**.** • **"DEWPOINT MONITOR" OR "FLOW TEMP SETP INCR HYGRO" IF E³-WS OR E³-GS WITH HYGROSTAT**.**

*** See parameters "946" to "950" in the chapter "Heating and cooling circuit configuration" for the use of the hygrostat and hygrometer.*

On completion of the system block configuration procedure, shut off and restore the ~230V power supply.

Special functions when using ROBUR heat pumps

1. Parameter "7119: Economy" (default: "Locked"; possible values: "Locked" or "Released"), in intermediate seasons the need for heat can be provided by more ecological sources, such as the sun or wood. Conventional heat generators, such as heat pumps and boilers, can then be locked out.
    - "Locked" impedes activation of the "Economy" function.
    - "Released" enables activation of the "Economy" function.
2. Parameter (to be added to user manual) "7120: Economy Mode" (default: "Off"; possible values: "Off" or "On"), if "Economy mode" is active ("7119" = "Released") the user can activate/deactivate the heat pump or boiler.
3. Parameter (to be added to user manual) "7141: Emergency operation" (default: "Off"; possible values: "Off" or "On"), if the heat pump should not function correctly, emergency operation may be activated **manually**. "Emergency operation" runs the system with the boiler (normally used for supplementary heating service, or for recharging the DHW); while the heat pumps stay off.
    - When set to "Off", "emergency operation" is off.
    - When set to "On", "emergency operation" is on.
4. Parameter "7142: Type of functioning of emergency operation" (default: "Automatic"; possible values: "Manual" or "Automatic"), if the heat pump should not function

correctly, “Type of functioning of emergency operation” may be activated. “Type of functioning of emergency operation” runs the system with the boiler (normally used for supplementary heating service, or for recharging the DHW); while the heat pumps stay off.

- When set to “Manual”, the “Type of functioning of emergency operation” can be turned on and off only **manually**, using the parameter “Emergency operation” (“7141”).
- When set to “Automatic” the “Type of functioning of emergency operation” turns on **automatically** whenever all the heat pumps are malfunctioning. It turns off again once the problem has been resolved; if necessary, reset the system.

When all the heat pumps malfunction, error code “134: General HP malfunction” displays.

7.3 PC BLOCK SCHEMATIC

- Inputs for use in addition to those in Table - 10 Robur basic configurations table – a pagina 155:

  The E^3 do not require other inputs than those used in Table - 10 Robur basic configurations table - a pagina 155.

  The E^3-WS and E^3-GS with passive cooling require you to add Y28 among the outputs listed in Table - 10 Robur basic configurations table - a pagina 155:

DEVICE:	POSITION:	NAME OF OUTPUT:	TYPE OF OUTPUT:
RVS61	QX6 - N	Y28	N.O. RELAY ~230V

For all machines (E^3-WS, E^3-GS and E^3-A) configure the parameters as indicated in the table given below.

MENU:	PARAMETER:	VALUE:
CONFIGURATION	5896: RELAY OUTPUT QX6	• “NONE” IF E^3-A, E^3-WS WITHOUT PASSIVE COOLING, E^3-GS WITHOUT PASSIVE COOLING. • “Y28” IF E^3-WS, E^3-GS WITH PASSIVE COOLING.

On completion of the system block configuration procedure, shut off and restore the ~230V power supply.

7.4 DHW BLOCK CONFIGURATION

- Inputs for use in addition to those in Table - 10 Robur basic configurations table - a pagina 155:

DEVICE:	POSITION:	NAME OF SENSOR:	TYPE OF SENSOR:
RVS61	B3 - M	B3	WATER SENSOR (NTC 10K)
RVS61	BX4 - M	B31	• "B31" WATER SENSOR (NTC 10K) IF SENSOR B31 IS PRESENT. • "NONE" IF B31 SENSOR NOT PRESENT.

Sensor B31 is given in the Robur schematics but is optional, whereas B3 is obligatory if DHW service is required. ParagraphParameters useful for regulating the system "DHW block" a pagina 70 gives the effects of using sensor B31.

- Outputs Q3 and $Q3_{OUT}$ are to be used in addition to those listed in Table - 10 Robur basic configurations table - a pagina 155:

DEVICE:	POSITION:	NAME OF OUTPUT:	TYPE OF OUTPUT:
PLC	Q3	$Q3_{OUT}$	N.O. CONTACT
RVS61	Q3 - N*	Q3	N.O. RELAY ~230V

** Output already cabled to Robur panel.*

Add "5022" and "5933" among the parameters listed in Table - 10 Robur basic configurations table - a pagina 155:

MENU:	PARAMETER:	VALUE:
DHW STORAGE TANK	5022: TYPE OF FILLING.	• "WITH B3/B31" IF SENSORS B3 AND B31 ARE USED FOR FILLING DHW WITH THE HEAT PUMP. • "WITH B3" IF ONLY SENSOR B3 IS USED FOR FILLING DHW WITH THE HEAT PUMP.
CONFIGURATION	5933: SENSOR INPUT BX4	• "B31" IF SENSOR B31 IS PRESENT. • "NONE" IF B31 SENSOR NOT PRESENT.

On completion of the system block configuration procedure, shut off and restore the ~230V power supply.

Parameters useful for regulating the system “DHW block”:

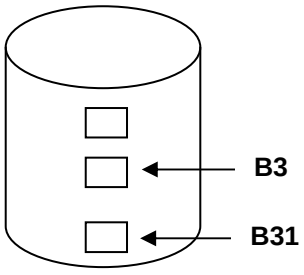
The configuration of the DHW block provides for the use of sensors B3 and B31* to switch the heat pump ON/OFF (for recharging DHW) and the legionella function (see point 1). Supplementation by the boiler (if configured) to recharge DHW and for the legionella function uses only sensor B3 (see point 1), and is activated after use of the heat pump. The integration boiler is used to provide higher temperatures than those available with the heat pump alone.

Since the nominal or reduced DHW service (see points below) has greater priority than heating and the heat source is used exclusively for DHW or heating (except for when recharging DHW with the boiler), when he heat source is requested for DHW the heat source is used exclusively for that service and not for heating (except for when charging DHW with the boiler).

** Sensor B31 is optional.*

1. Parameter “5022: Type of charging” (default: “With B3/B31”; possible values: “With B3”, “With B3/B31” and “With B3, legio B3/B31”), determines whether, for DHW charging and the legionella function of the heat pump, only sensor B3 or both sensors are to be used.
   - “With B3/B31” (default), enables using both the sensors B3 and B31 for charging DHW and for the legionella function with the heat pump. Supplementation by the boiler (if configured) to recharge DHW and for the legionella function uses only sensor B3 even when “5022” is set to “With B3/B31”. The above configuration can be used only if the legionella function is deactivated or is done only with the heat pump (see parameters “1640”, “1645”).

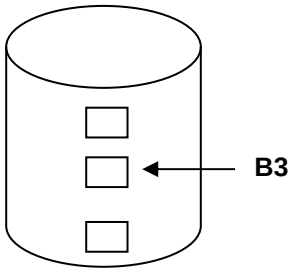
     If the tank has more than two sumps for housing the sensors B3 and B31, it is good practice to use those indicated in the figure below, so that B3 is not towards the upper part of the tank. This makes for more efficient DHW charging.

   - “With B3” enables using sensor B3 and for charging DHW and for the legionella function, with both the heat pump and the boiler.

     This configuration must be used if the legionella function is provided by the heat pump and boiler (see parameter “1640”).

     If the tank has more than two sumps for housing the sensors, it is good practice to avoid using the sump located towards the upper part of the tank. This makes for more efficient DHW charging.



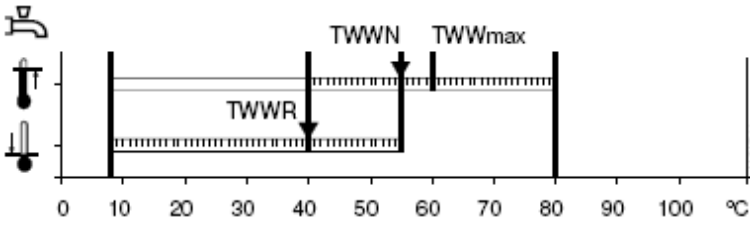
- "With B3, legio B3/B31"

  This configuration MAY NOT be used.

2. Parameter "1610: Nominal setpoint" (default 50℃ , range: from the value set in the parameter "Reduced setpoint" (parameter "1612") to the value set in the parameter "Maximum nominal setpoint TWWmax" (parameter "1614")). During operation in "Comfort" mode, DHW recharging with the heat pump terminates (OFF) when B3 and B31 > "1610". During operation in "Comfort" mode, boiler integration (if configured) for DHW recharging terminates (OFF) when B3 > "1610". (See point 1).

3. Parameter "1612: Reduced setpoint" (default 40℃ , range: from 8℃ to the value set in the parameter "Nominal setpoint" (parameter "1610"). During operation in "Reduced" mode, DHW recharging with the heat pump terminates (OFF) when B3 and B31 > "1612". During operation in "Reduced" mode, boiler integration (if configured) for DHW recharging terminates (OFF) when B3 > "1612". (See point 1).

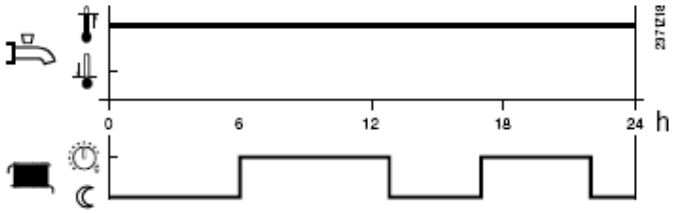
4. Parameter "1614: Maximum nominal setpoint TWWMax" (default 65℃, range: 8℃ to 80℃).



TWWR	DHW reduced setpoint
TWWN	DHW nominal setpoint
TWWmax	Maximum DHW nominal setpoint

5. Parameter "1620: Release" (default: "24h/day"; possible values: "24h/day", "time programs HCs", "time programs"), varies the DHW setpoint with the following parameters.

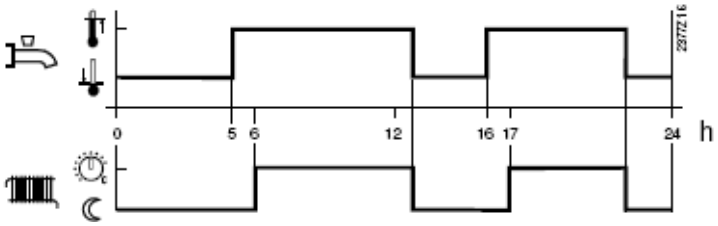
- “24h/day”: The temperature of the domestic hot water is controlled by the nominal setpoint (point 2), independently of the time program.



Set “1620: Release” to “24h/day” to ensure that the heat source can always be used for DHW at the “Nominal setpoint” (if requested by the service), but heating service may be compromised. To “balance” the use of the heat source for heating and DHW, use parameter “5030: Charging time limitation”.

- “Time programs HCs”: the DHW setpoint is switched according to the “Time programs” (see Comfort Control Panel - User Manual (D-LBR 523) and note below) between the “Nominal setpoint” (point 2) and the “Reduced setpoint” (point 3). The start of ignition for each phase is brought forward by one hour each time.

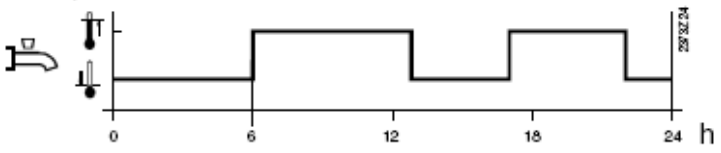
The “Time programs HCs” shown in the following figure is obtained by overlaying the time programs for heating circuits C1, C2 and C3 (if present).



Set “1620: Release” to “Time programs HCs” to ensure that, when operating with Comfort heating mode, the heat source can always be used for DHW at the “Nominal setpoint” (if requested by the service), but heating service may be compromised. To “balance” the use of the heat source for heating and DHW, use parameter “5030: Charging time limitation”.

Refer to “Comfort Control Panel - User Manual (D-LBR 523)” for how to set the heating time programs.

- “Time program 4 / DHW”: The DHW setpoint is switched according to “Time program 4” between the “Nominal setpoint” (point 2) and the “Reduced setpoint” (point 3).



Set “1620: Release” to “Time program 4 / DHW”, opposed to the heating time programs, to recharge the “DHW buffer” when the request for heating is “Reduced setpoint”, so that the stored DHW can then be used when the

requirement for heating is maximum (e.g.: “comfort” heating time program from 6:00 to 22:00, “nominal” DHW program from 0:00 to 5:00 and setpoint: “Nominal TWWN” = 65°C, “Reduced TWWR” = 30°C).

Refer to “Comfort Control Panel - User Manual (D-LBR 523)” for how to set the timings for Time program 4 / DHW.

6. Parameter “5030: Charging time limitation” (default 240 min, range: from deactivated (---) to 600 min), sets the maximum DHW charging time. If the nominal setpoint TWWN (point 2) or reduced setpoint TWWR (point 3) have not been reached within the time set in this parameter, DHW recharging with heat pump is suspended for a time equal to the value of parameter “5030”, and the heat pump is used only for heating the building. The time during which the heat pump is dedicated to recharging DHW or heating is equal to the value given in parameter “5030”.

   So long as the heating and DHW requests obtain, the heat source is dedicated to recharging DHW or heating service. These two services will alternate according to the time setting of parameter “5030”:

   - The time set in parameter “5030” depends on the building’s thermal inertia: it can be increased if the building has a high thermal inertia, since it has greater thermal autonomy, so that DHW can be used for a pronged period of time, without significantly affecting the ambient temperature.
     - The time set in parameter “5030” depends:
     - on how much energy can be stored in the “DHW buffer”, energy which must be released for heating service.
7. Parameter “5020”: Flow setpoint boost” (DHW charging boost) (default 0°C, range: 0°C to 30°C), increases the temperature of the wate r delivered by the heat pump (setpoint + “5020”) both in “Comfort” mode and in “Reduced” mode. The hot water produced by the heat source heats up the water contained in a heat exchanger coil (see Figure 51 a pagina 53), so to enable the water in the DHW buffer to reach the requested “setpoint” (see parameters “1610: Nominal setpoint TWWN” or “1612: Reduced setpoint TWWR”) the temperature in the exchanger coil must be increased.

   Parameter “5020” must be increased if the surface of the “DHW buffer coil” is small (e.g.: “DHW boiler buffer” is used instead of a “DHW heat pump buffer”), or gets dirty or its heat exchanger performance is degraded in any way (e.g.: scale, glycolated water, etc).

8. Parameter “5024: Switching differential” (default 0°C, range: 0°C to 20°C), introduces hysteresis into the heat pump activation conditions for DHW charging in both “Comfort” mode and in “Reduced” mode. The heat pump is activated (ON) for DHW charging:
   a. if B3 and B31 < “1610” - “5024” in “Comfort” mode with parameter “5022” = “With B3/B31” (default value, see point 1).
   b. if B3 and B31 < “1612” - “5024” in “Reduced” mode with parameter “5022” = “With B3/B31” (default value, see point 1).

9. Parameter “5060: El imm heater optg mode (DHW integration boiler)” (default: “Substitute”; possible values: “Substitute”, “DHW enable” and “Time program 4”). Parameter “5060” determines the use of the boiler for recharging DHW.

   - “Substitute”; The boiler is used only if the heat pump is not able to completely recharge the DHW.

     If the boiler cuts in to recharge DHW, the Siemens controller stores the top DHW temperature (sensor B3) at which the boiler has cut in. The boiler trip temperature is stored in parameter “7093: Curr DHW charg temp HP”. DHW charging with the boiler is interrupted and the heat pump restored if the top DHW temperature (sensor B3) drops below the value stored in “7093” minus the “Switching differential” (parameter “5024”).

     If the DHW boiler trips at a water temperature below that stored in parameter “7092: DHW charg temp HP min” the symbol displays along with the maintenance message “12: Insufficient HP charge temp” (this can occur when the value stored in “7093” is less than the value in “7092”).

     With “5060” = “Substitute”, parameter “1620” is used to control the boiler during DHW recharging, while

   - “Always”: During the course of the year the DHW is always charged only using the boiler.

     To control the boiler during DHW charging with “5060” = “Always”, only parameter “5061” is used if “5061” = “24h/day” or “5061” = “Time program 4”, while both parameters “1620” and “5061” are used if “5061” = “DHW release”.

   - “Summer”: When all connected heating circuits are switched to summer mode, the boiler provides DHW recharging from the next day onwards.

     The DHW is charged by the heat pump again when at least one of the heating circuits is switched to heating mode.

     With “5060” = “Summer”:

     - When all connected heating circuits are switched to summer mode, the system operates in a similar way to when “5060” = “Always”.
     - When at least one of the connected heating circuits is switched to heating mode, the system operates in a similar way to when “5060” = “Substitute”.

10. Parameter “5061: Electric immersion heater: release (DHW integration boiler)” (default: “24h/day”; possible values: “24h/day”, “DHW release” and “Time program 4“).

- 24h/Day: The boiler runs continuously, independently of the time programs (of DHW parameter “1620” or the heating circuit programs).

Example:

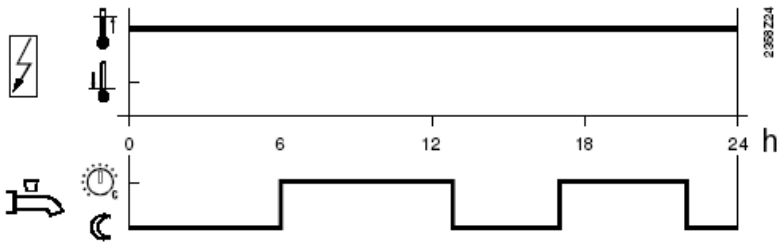


Figure 58 Release 24h/day. The symbol represents the boiler’s operation. The symbol represents the DHW program (parameter “1620”).

- DHW release: The boiler switches according to DHW activation (parameter “1620”).

Example:

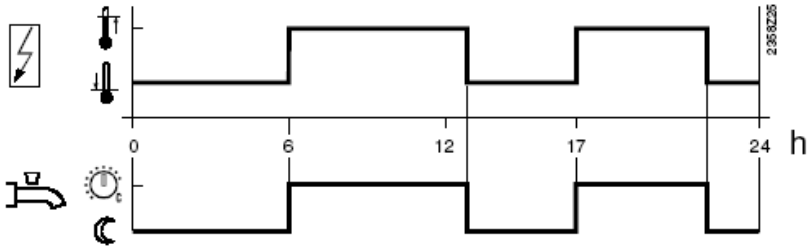


Figure 59 Time program DHW The symbol represents the boiler’s operation. The symbol represents the DHW program (parameter “1620”).

- Time program 4 / DHW: The reference program for boiler operation is time program 4/DHW of the local controller.

Example

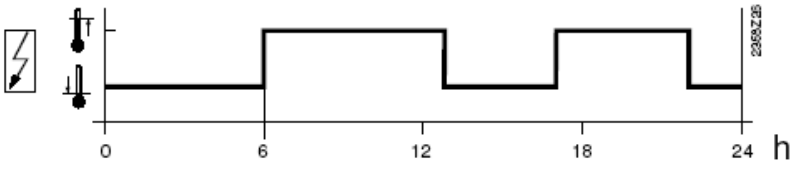


Figure 60 Time program 4/DHW. The symbol represents the boiler’s operation.

The boiler is only switched on if enabled by parameter “5060: El imm heater optg mode”.

11. Parameter “1630: Charging priority” (default: “Absolute”; possible values: “Absolute”, “Shifting”, “None”, “MC shifting, PC absolute”), when heat is required both for the rooms and for DHW, the DHW priority function ensures that heat pump power is prioritised for DHW.
    - **“**Absolute”: The direct and mixed circuits remain locked until DHW production has terminated.
    - “Shifting”: If the power of the heat generator is not sufficient, heating of the direct and mixed circuits is limited by complete heating of DHW.
    - “None”: Room and DHW heating occur at the same time. If the boiler is relatively small and the circuits are mixed, it may happen that the DHW setpoint is not reached, especially when the rooms are requiring a considerable amount of heating power.
    - “MC shifting, PC absolute”: The direct circuit remains locked until the DHW storage tank has reached the requested setpoint. If the heat pump power is in sufficient, the mixed circuit is also locked.

    Robur systems are set to “Absolute”.

12. Parameter “1640”: “Legionella function”. Parameter ““1640” serves to: deactivate the legionella function if set to “Off” (default), or activate it “Periodically” or on a “Fixed weekday”.
13. Parameter “1641”: “Legionella funct periodically”. If “1640” is set to “Periodically”, parameter “1641” determines the period in terms of days at which the legionella function is run. (see local legislation regarding legionella prevention).
14. Parameter “1642”: “Legionella funct weekday”. If “1640” is set to “Fixed weekday”, parameter “1642” determines which day of the week the legionella function is run. (see local legislation regarding legionella prevention).
15. Parameter “1644”: “Legionella funct time” sets the time of day at which the legionella function is run. This is usually set to a time of day during which the system is less used.
16. Parameter “1645”: “Legionella funct setpoint”; The heat pump legionella function is interrupted if B3 and B31 > “1645” when “5022” = “With B3/B31” (default). Boiler integration to the legionella function (if so configured) is interrupted when only B3 > “1645” (see point 1).

If the legionella function is run only by the heat pump (no boiler), use a “Legionella funct setpoint” compatible with the heat exchange properties of the DHW coil, so as to avoid a situation in which the setpoint specified in “1645” is never reached. In any case, even during the legionella cycle, the “Charging time limitation” setting (parameter 5030) applies.

17. Parameter “1646” = “Legionella funct duration”; the time that must expire uninterruptedly with:
    - B3 and B31 > “1645” to conclude the legionella cycle if parameter “5022” = “With B3/B31” (default, see point 1).

- B3 > “1645” to conclude the cycle if parameter “5022” = “With B3” (see point 1).

Connection pump Q4 acts as the DHW tank circulation pump. Circulation pump Q4 is programmed with parameter “1660: Circulating pump release”. The “circulating pump cycling” and “Circulation setpoint” can be set in parameters “1661” and “1663”.

18. Parameter “1660: Circulating pump release” (default: “DHW release”; possible values: “Time program 3/HCP”, “DHW release”, “Time program 4/DHW”, “Time program 5”). Pump Q4 is activated when:
    - parameter “1660” is set to “DHW release” and DHW charging is on.
    - Parameter “1660” is set as “Time program 3/HCP” and “Time program 3/HCP” is in an “ON period” (see parameters “540” to “556”).
    - Parameter “1660” is set as “Time program 4/DHW” and “Time program 4/DHW” is in an “ON period” (see parameters “560” to “576”).
    - Parameter “1660” is set as “Time program 5” and “Time program 5” is in an “ON period” (see parameters “600” to “616”).
19. Parameter “1661: Circulating pump cycling” (default: “Off”; possible values: “Off” or “On”). Pump Q4:
    - is off when parameter “1660” is set to “Off”.
    - is run for 10 minutes and stopped for twenty minutes when parameter “1660” is set to “On”.

      To use the circulating pump, set relay output QX23 of the AVS75 module1 as “Recirculating pump Q4” (or use another available output if necessary).
20. Parameter “1663: Circulation setpoint” (default: 45℃; range: 8 to 80℃), sets the activation temperature for pump Q4 when the legionella function is running. If sensor B39 is installed in the DHW pipe, the controller monitors its value throughout the duration of the legionella function and activates pump Q4 when the temperature measured by B39 exceeds the “Circulation setpoint”.

7.5 B - BOILER CONFIGURATION FOR HEATING/DHW INTEGRATION TO HEAT PUMP

- There is no need to configure inputs in addition to those in Table - 10 Robur basic configurations table - a pagina 155.
- The outputs to be used in addition to those in Table - 10 Robur basic configurations table - a pagina 155 are $Q2_{OUT}$, K25, K26 and $Q1_{PLC}$ (boiler ON signal from PLC to CCI). The remaining outputs $K6_{OUT}$ and K6 are used only if the system includes blocks B and DHW (the "$K6_{OUT}$" diverter valves deviate the boiler delivery towards the heating or DHW circuits):

DEVICE:	POSITION:	NAME OF SENSOR:	TYPE OF SENSOR:
PLC	Q2	$Q2_{PLC}$ (BOILER ENABLE)	N.O. CONTACT
PLC	Q4	$K6_{OUT}$	N.O. CONTACT
RVS61	QX1 - N*	K25	N.O. RELAY ~230V
RVS61	QX2 - N*	K26	N.O. RELAY ~230V
PLC	Q1*	$Q1_{PLC}$ (CCI BOILER ENABLE)	N.O. CONTACT
RVS61	QX3 - N*	K6	N.O. RELAY ~230V

** Output already cabled to Robur panel.*

Add the following parameters to those listed in Table - 10 Robur basic configurations table - a pagina 155.

MENU:	PARAMETER:	VALUE:
DHW STORAGE TANK	5060: EL IMM HEATER OPTG MODE	• "SUBSTITUTE" IF E^3-A, E^3-WS OR E^3-GS.
CONFIGURATION	5890: RELAY OUTPUT QX1	"K25"
CONFIGURATION	5891: RELAY OUTPUT QX2	"K26"
CONFIGURATION	5892: RELAY OUTPUT QX3	• "K6" IF DHW BLOCK PRESENT. • "NONE" IF DHW BLOCK NOT PRESENT.

On completion of the system block configuration procedure, shut off and restore the ~230V power supply.

Parameters useful for regulating the part of the system with “boiler for heating integration to heat pump”:

Sensor B10 is used to turn the boiler ON/OFF.

1. Parameter “2881: Locking time electric* flow” (default 30 min, range: 0 to 255 min.); specifies the boiler activation delay from the time the heat pump/s is/are switched on.

   Parameter “2881” determines the minimum time that must pass between starting the heat pump and running the boiler for supplementary DHW production. Parameter “2881” accounts for the heat pumps initial inertia, thus avoiding unnecessary boiler activation cycles. The counter for this delay is reset when the heat pump is switched off.

   - If the delay set in “2881” is too long, it may happen that the boiler is activated too late, thus compromising service (a lack of power delivery for a given period if time).
   - If it is too short, the boiler may be activated before the heat pump reaches full power, thus compromising the overall efficiency of the system.

2. Parameter “2882: Release integr electric* flow” (default 25 °C ·min., range: 0 to 500 °C ·min.); affects the activation (ON) point of the boiler on the heating function.

   Parameter “2882” balances activation of the boiler for supplementary heating to the heat pump, when the power requested by the services is greater than the overall power delivered by the heat pump. On expiry of the delay set in “2881”, if the temperature measured by sensor B10 is less than the setpoint_heat of the heat pump minus 1°C (B10 < setpoint_heat - 1°C), the controller calcula tes the integral of the difference between the temperature measured by sensor B10 and setpoint_heat of the heat pump minus 1°C (area between B10 and setpoint_heat - 1°C): when the integral reaches the value set in “2882” the boiler is used for supplementary heating.

   Parameter ““2882”:

   - the higher the value of the parameter the less likely the boiler is to be used.
   - If this value is too high, service is compromised since the manifold temperature drops too far (or for too long) before the boiler is switched on.
   - Reducing the value too far, on the other hand, increases the potential for undesirable activations of the boiler with E^3 loads less than 100% in the presence of load increases which result in a temporary drop in temperature.
     This also worsens the management of boiler activations, by reducing the cycle period and yielding over-frequent activations.

3. Parameter “2883: Reset integr electric* flow” (default 2 °C ·min., range: 0 to 500 °C ·min.); affects the deactivation (OFF) point of the boiler on the heating function.

It is advisable not to modify the default value.

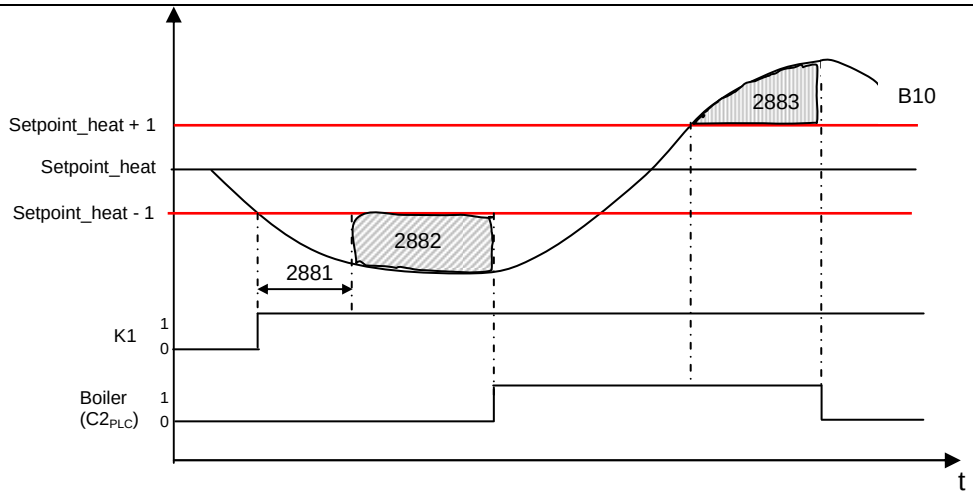


Figure 61 Supplementary heating boiler activation graph.

4. Parameter “2884: Release el* flow below OT” (default - - - ℃ (disabled), range: -30 to +30 ℃); the boiler (immersion heater*) is made ava ilable only when the external temperature is less than the temperature set in the parameter.

* *THE SIEMENS - ALBATROS CONTROLLER USES THE WORD “ELECTRIC” (“EL” FOR SHORT) BECAUSE IT ASSUMES THE USE OF ELECTRIC HEATERS FOR SUPPLEMENTARY HEATING SERVICES. THE ELECTRIC IMMERSION HEATERS ENVISAGED BY SIEMENS HAVE BEEN REPLACED BY GAS BOILERS.*

7.6 HEATING AND COOLING CIRCUIT CONFIGURATION

Circuits C1 and C2 are mixed by three way valves Y1/Y2 and Y5/Y6. The CP circuit, on the other hand, is direct.

Circuit C1 is the only one which provides both heating and passive cooling (using the water taken from the “cold” geothermal well to condition the services connected to C1 rather than the E^3 units).

Circuits C1 and C2 are normally used for low and medium temperature applications: floor heating and fan-coils.

The CP circuit, on the other hand, is normally used for high temperature applications: radiators.

a) Heating/cooling circuit 1 “C1”:

- Inputs to be used in addition to those in Table - 10 Robur basic configurations table - a pagina 155.

DEVICE:	POSITION:	NAME OF SENSOR:	TYPE OF SENSOR:
RVS61	B1 - M	B1	WATER SENSOR (NTC 10K)

- Outputs to be used in addition to those in Table - 10 Robur basic configurations table - a pagina 155.

DEVICE:	POSITION:	NAME OF OUTPUT:	TYPE OF OUTPUT:
RVS61	Y1 - N	Y1	MIXER VALVE ~230V C1
RVS61	Y2 - N	Y2	MIXER VALVE ~230V C1
RVS61	Q2 - N	Q2	CIRCUIT C1 PUMP

The connection diagrams are given in SECTION 3 Electrical connections a pagina 27.

Add the following parameters to those listed in Table - 10 Robur basic configurations table - a pagina 155.

MENU:	PARAMETER:	VALUE:
CONFIGURATION	5710: HEATING CIRCUIT 1	• "ON" TO ACTIVATE HEATING IN C1. • "OFF" TO DEACTIVATE HEATING IN C1.
CONFIGURATION	5711: COOLING CIRCUIT 1	• "OFF" IF E^3-A, IF E^3-WS WITHOUT PASSIVE COOLING, E^3-GS WITHOUT PASSIVE COOLING. • "2-PIPE SYSTEM" IF E^3-WS, E^3-GS WITH PASSIVE COOLING

On completion of the system block configuration procedure, shut off and restore the ~230V power supply.

b) Heating circuit 2 "C2":

- Inputs to be used in addition to those in Table - 10 Robur basic configurations table - a pagina 155.

DEVICE:	POSITION:	NAME OF SENSOR:	TYPE OF SENSOR:
AVS75 MODULE 2	BX21 - M	B12	WATER SENSOR (NTC 10K)

- Outputs to be used in addition to those in Table - 10 Robur basic configurations table - a pagina 155.

DEVICE:	POSITION:	NAME OF OUTPUT:	TYPE OF OUTPUT:
AVS75 MODULE 2	QX21 - N	Y5	MIXER VALVE ~230V C2
AVS75 MODULE 2	QX22 - N	Y6	MIXER VALVE ~230V C2
AVS75 MODULE 2	Q6 - N	Q6	CIRCUIT C2 PUMP

The connection diagrams are given in SECTION 3 Electrical connections a pagina 27.

Add the following parameters to those listed in Table - 10 Robur basic configurations table - a pagina 155.

MENU:	PARAMETER:	VALUE:
CONFIGURATION	6021: EXPANSION MODULE FUNCTION 2	HEATING CIRCUIT 2
CONFIGURATION	5715: HEATING CIRCUIT 2	ON

On completion of the system block configuration procedure, shut off and restore the ~230V power supply.

c) Heating circuit P “CP”:

- There is no need to configure inputs in addition to those in Table - 10 Robur basic configurations table - a pagina 155.
- Outputs to be used in addition to those in Table - 10 Robur basic configurations table - a pagina 155.

DEVICE:	POSITION:	NAME OF OUTPUT:	TYPE OF OUTPUT:
AVS75 MODULE 1	QX21 - N	Q20	CIRCUIT CP PUMP

Add the following parameters to those listed in Table - 10 Robur basic configurations table - a pagina 155:

MENU:	PARAMETER:	VALUE:
CONFIGURATION	6030: RELAY OUTPUT QX21	Q20

The connection diagrams are given in SECTION 3 Electrical connections a pagina 27.

On completion of the system block configuration procedure, shut off and restore the ~230V power supply.

Parameters useful for regulating the system “Heating circuits configuration”:

1. Parameters “700, 901, 1000 and 1300: Heating mode or Operating mode”: Set circuits C1, C2 and CP to operate in Automatic, Comfort, Reduced or Protection modes.

   Refer to “Comfort Control Panel - User Manual (D-LBR 523)” for these settings.
   - Parameter 700 sets the operating mode of circuit C1 in heating.
   - Parameter 901 sets the operating mode of circuit C1 in conditioning. In conditioning, circuit C1 can only operate in the Automatic or Off modes.
   - Parameter 1000 sets the operating mode of circuit C2 (heating only circuit).

- Parameter 1300 sets the operating mode of circuit CP (heating only circuit).

Parameters 700 and 1000 can be set only with the 

"Control unit" or "Room unit" keys (see paragraph 7.7 Configuration of Room Units (RU) and Control Units for heating and conditioning circuits a pagina 106).

Parameter 901 can be set via the menus or with the keys mentioned above, when the system is in cooling mode.

2. Parameters "710, 902, 1010 and 1310: Comfort setpoint (TRK)": Set the ambient temperature desired by the users served by circuits C1, C2 and CP in Comfort mode ☼

   Refer to "Comfort Control Panel - User Manual (D-LBR 523)" for these settings.

   - Parameter 710 sets the "Comfort setpoint" of circuit C1 in heating.
   - Parameter 902 sets the "Comfort setpoint" of circuit C1 in conditioning.
   - Parameter 1010 sets the "Comfort setpoint" of circuit C2 (heating only circuit).
   - Parameter 1310 sets the "Comfort setpoint" of circuit CP (heating only circuit).

   These parameters can also be set by turning the  "Control unit" or "Room unit" knobs (see paragraph 7.7 Configuration of Room Units (RU) and Control Units for heating and conditioning circuits a pagina 106).

3. Parameters "712, 1012 and 1312: Reduced setpoint (TRR)": Set the ambient temperature desired by the users served by circuits C1, C2 and CP in Reduced mode ☾

   Refer to "Comfort Control Panel - User Manual (D-LBR 523)" for these settings.

   - Parameter 712 sets the "Reduced setpoint" of circuit C1 in heating.
   - Parameter 1012 sets the "Reduced setpoint" of circuit C2.
   - Parameter 1312 sets the "Reduced setpoint" of circuit CP.

   There is no "Reduced setpoint" for cooling service.

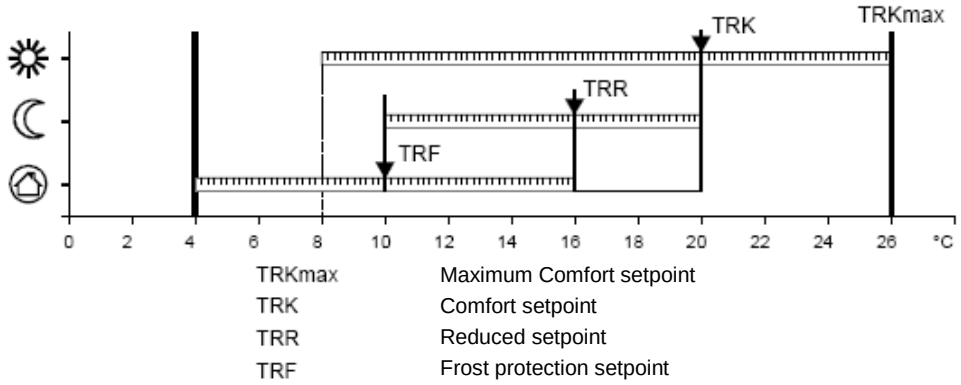
4. Parameters "714, 1014 and 1314: Frost protection setpoint (TRF)": Set the ambient temperature desired by the users served by circuits C1, C2 and CP in Protection mode ⏻

   Refer to "Comfort Control Panel - User Manual (D-LBR 523)" for these settings.

   - Parameter 714 sets the "Frost protection setpoint" of circuit C1 in heating.

- Parameter 1014 sets the “Frost protection setpoint” of circuit C2 (heating only circuit).
- Parameter 1314 sets the “Frost protection setpoint” of circuit CP (heating only circuit).

5. Parameters “716, 1016 and 1316: Comfort setpoint maximum (TRKmax)” (default 35℃, range: from the value set in “Comfort setpoin t” to 35℃), limit the value which can be set in parameter “Comfort setpoint (TRK)”.
    - “716” limits the value which can be set in parameter “710: Comfort setpoint” for circuit C1.
    - “1016” limits the value which can be set in parameter “1010: Comfort setpoint” for circuit C2.
    - “1316” limits the value which can be set in parameter “1310: Comfort setpoint” for circuit CP.



TRKmax	Maximum Comfort setpoint
TRK	Comfort setpoint
TRR	Reduced setpoint
TRF	Frost protection setpoint

6. Parameters “720, 1020 and 1320: heating curve slope”: Set the slope of the “Heating curve” for circuits C1, C2 and CP:
    - Parameter 720 sets the slope of the heating curve for circuit C1 in heating.
    - Parameter 1020 sets the slope of the heating curve for circuit C2 in heating.
    - Parameter 1320 sets the slope of the heating curve for circuit CP in heating.

    The heating curve of each circuit is a function of the external temperature (sensor B9) and “setpoint temperature” (see points 2, 3 and 4) of the heated rooms (circuits C1, C2 and CP), which determines the temperature requested of the water to satisfy the services in the respective circuits (see Figure 62 a pagina 86).

Heating curve

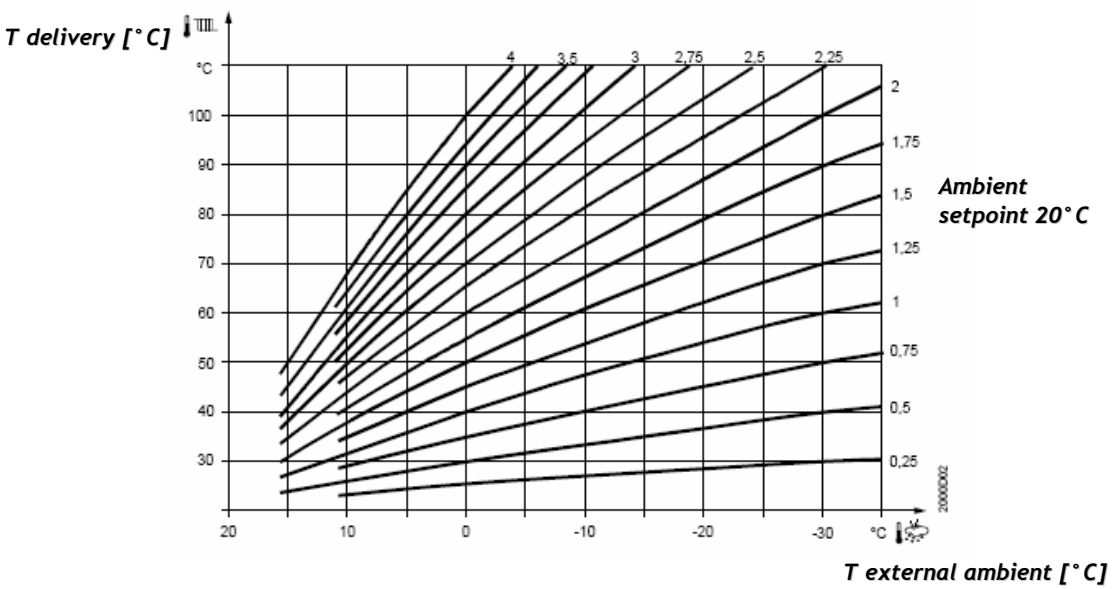


Figure 62 Heating curve graph. The figure shows a family of heating curves with various slopes (0.25 to 4). Each curve characterised by its slope, represents the delivery v. the external ambient temperature, when the required setpoint is 20℃.

- For each circuit used (C1 or C2 or CP), the characteristic slope to be set in the respective parameters (“720”, “1020”, “1320”) depends on the type of system connected:
  - For floor heating, use low slopes.
  - For fan-coil heating, use intermediate slopes.
  - For radiator heating, use high slopes.
- After entering the characteristic slopes in the parameters (“720”, “1020”, “1320”) you can fine tune the circuit in question:
  - Increase the slope (a higher value of the parameter) if in the rooms served by the circuit (C1, C2 or CP), the temperature is lower when the external temperature is lower.
  - Decrease the slope (a lower value of the parameter) if in the rooms served by the circuit (C1, C2 or CP), the temperature is higher when the external temperature is lower.

7. Parameters “721, 1021 and 1321: heating curve displacement”; this uniformly modifies the room temperature across the entire range of the external temperature. calibrate the “heating curve displacement” after having calibrated the slope (see point 5):
   - Move the heating curve to the left (a higher value of the parameter) if in the rooms served by the circuit the temperature is always lower than the setpoint.
   - Move the heating curve to the right (a lower value of the parameter) if in the rooms served by the circuit the temperature is always higher than the setpoint.

8. Parameters “741, 1041 and 1341: Flow temp setpoint max”: sets the maximum delivery setpoint (upper limit) required by heating circuits C1, C2 and CP:
    - Parameter 741 sets the “Flow temp setpoint max” of circuit C1 in heating.
    - Parameter 1041 sets the “Flow temp setpoint max” of circuit C2 in heating.
    - Parameter 1341 sets the “Flow temp setpoint max” of circuit CP in heating.

Setting these parameters prevents eh heating circuits overheating, by setting an upper limit to the heating curves. These parameters are especially important when there is a maximum temperature limit for the heating circuit in question, for example, with floor heating systems.

9. Parameters “740, 1040 and 1340: Flow temp setpoint min”: sets the minimum delivery setpoint (lower limit) required by heating circuits C1, C2 and CP:
    - Parameter 740 sets the “Flow temp setpoint min” of circuit C1 in heating.
    - Parameter 1040 sets the “Flow temp setpoint min” of circuit C2 in heating.
    - Parameter 1340 sets the “Flow temp setpoint min” of circuit CP in heating.

If the delivery temperature setpoint for the heating circuit reaches its limit and the power requirements increases or decreases, the maximum and minimum limits are not exceeded (see Figure 63 a pagina 88).

Delivery temperature limit diagram

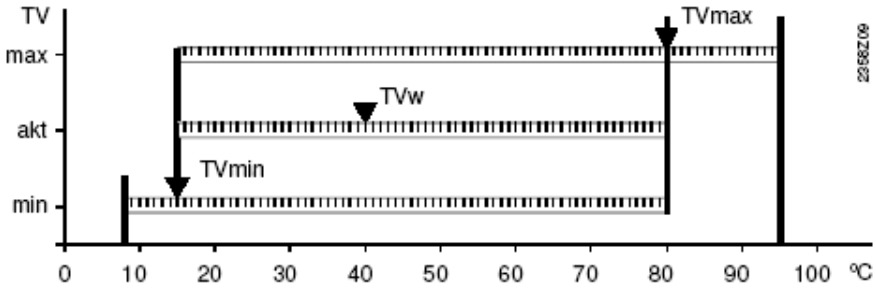


Figure 63 Description of delivery water temperature limits

10. Parameters “730, 1030 and 1330: Summer/winter switch limit” is used to turn the heating on and off during the course of the year, depending on the external temperature.

    The “Summer/winter switch limit” can be set with parameters:

    - “730” for C1.
    - “1030” for C2.
    - “1330” for CP.

    In “Automatic” mode the system comes on and goes off automatically, without any manual intervention on behalf of the user.

    By modifying the parameter the time period will be reduced or extended.

    Increase:

    The winter function is brought forward

    The Summer function is postponed

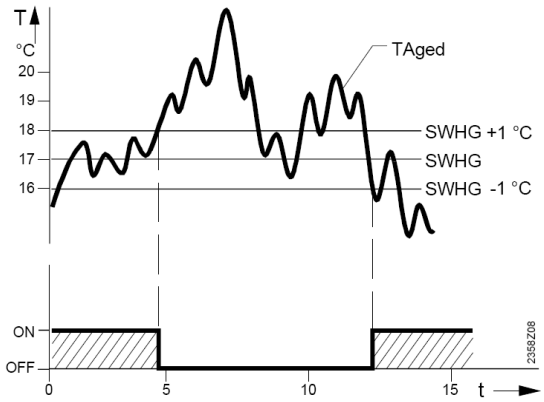
    Reduction:

    The winter function is postponed

    The Summer function is brought forward

The function is not operational in “Comfort ☼ ” mode.

Summer / winter switch diagram



SWHG - Summer / winter switch limit
TAged - Attenuated external temperature
T - Temperature
t - Days

Figure 64 Example of summer/winter switch

11. Parameters “732, 1032 and 1332: 24-hour heating limit”, activates/deactivates heating throughout the day, depending on the external temperature. This parameter is mainly used during the intermediate seasons (spring/autumn), to enable the system to respond more rapidly to temperature changes.

    The “24-hour heating limit” (differential) can be set with parameters:

    - “732” for C1.
    - “1032” for C2.
    - “1332” for CP.

    Example:

Row number	Value
Comfort setpoint (TRw)	22℃
24-hour heating limit (THG, Parameter 732/1032/1332)	-3℃
External temperature (TRw-THG) heating off	>= 19℃

Row number	Value
Switching differential (fixed)	-1℃
Heating activation temperature	<= 18℃

12. Parameters “760, 1060 and 1360: Room temperature limitation”, switches off the **pump** (Q2, Q6, Q20) of the heating circuit (C1, C2, CP):
    - Circuit C1 pump (Q2) is switched off if the room temperature (TRx) is greater than the room setpoint C1 (TRw) plus the differential (SRD) specified in parameter 760.
    - Circuit C2 pump (Q6) is switched off if the room temperature (TRx) is greater than the room setpoint C2 (TRw) plus the differential (SRD) specified in parameter 1060.

- Circuit CP pump (Q20) is switched off if the room temperature (TRx) is greater than the room setpoint CP (TRw) plus the differential (SRD) specified in parameter 1360.

The heating circuit pump is switched on again when the room temperature drops below the room setpoint once more.

Circuit pump operation diagram

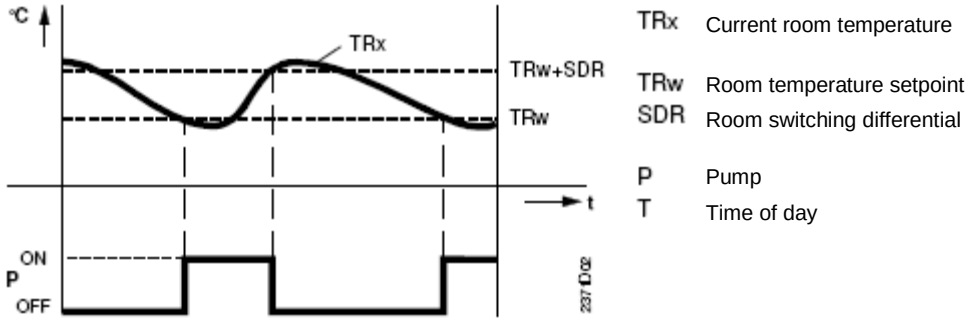


Figure 65 Example of pump operation depending on the internal room temperature setting

The room temperature limit is not considered if pure climate compensation is active, that is without room sensors or “ambient feedback” (750, 1050, 1350, see 7.7 Configuration of Room Units (RU) and Control Units for heating and conditioning circuits a pagina 106) deactivated (---).

13. Parameters “770, 1070 and 1370: boost heating”, are used to reach a new setpoint more quickly, when moving from the reduced to the comfort setpoint. This reduces the heating operation time. During “boost heating”:
    - room setpoint C1 is increased (DTRSA) by the value given in parameter 770.
    - room setpoint C2 is increased (DTRSA) by the value given in parameter 1070.
    - room setpoint CP is increased (DTRSA) by the value given in parameter 1370.

    The higher the value, the less time is required to reach the comfort setpoint.