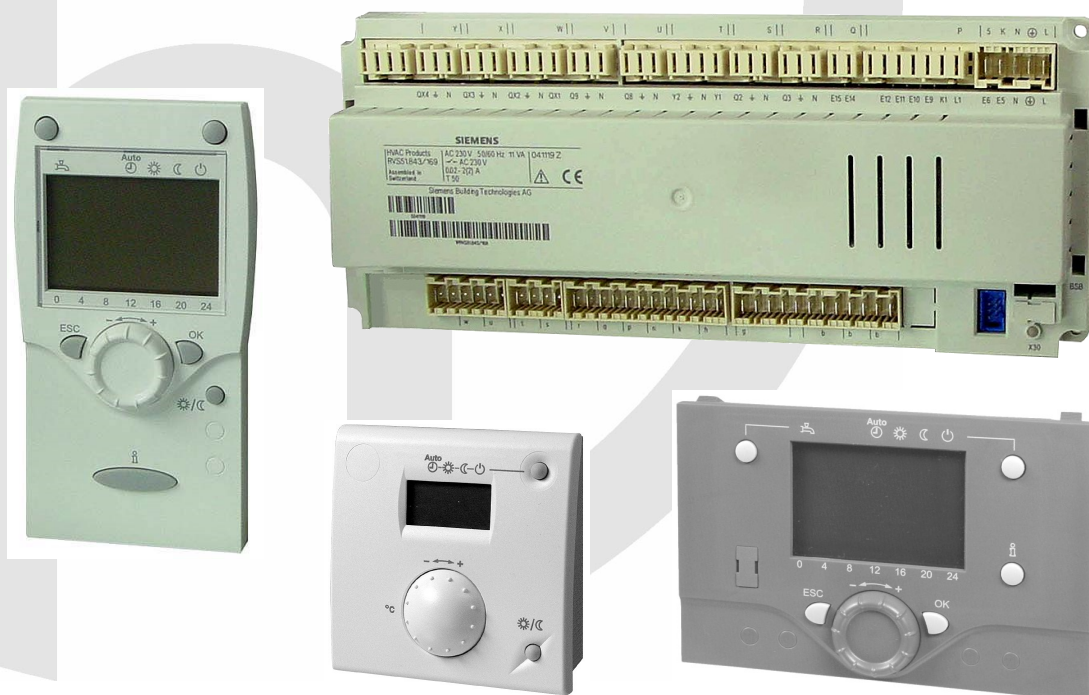


# MERLEY BOILER SEQUENCE CONTROLLER

For Modular Boiler Installations

Installation, Commissioning  
and Operating Instructions



## **IMPORTANT NOTE**

**THESE INSTRUCTIONS MUST BE READ AND UNDERSTOOD BEFORE  
INSTALLING, COMMISSIONING, OPERATING OR SERVICING EQUIPMENT**

# Customer After Sales Services

Telephone: **01202 662555** E-mail: **service@hamworthy-heating.com** Fax: **01202 662522**

## **Technical Enquiries**

To supplement the detailed technical brochures, technical advice on the application and use of products in the Hamworthy Heating range is available from our technical team in Poole and our accredited agents.

## **Site Assembly**

Hamworthy offer a service of site assembly for many of our products where plant room access is restricted. Using our trained staff we offer a higher quality of build and assurance of a boiler built and tested by the manufacturer.

## **Commissioning**

Commissioning of equipment by our own engineers, accredited agents or specialist sub-contractors will ensure the equipment is operating safely and efficiently.

## **Service Contracts**

Regular routine servicing of equipment by Hamworthy service engineers inspects the safety and integrity of the plant, reducing the risk of failure and improving performance and efficiency. Service contracts enable you to plan and budget more efficiently.

## **Breakdown service, repair, replacement**

Hamworthy provide a rapid response breakdown, repair or replacement service through head office at Poole and accredited agents throughout the UK.

## **Spare Parts**

We offer a comprehensive range of spare parts, providing replacement parts for both current and discontinued products. Delivery options are available to suit you. Please refer to our website for more details.

# **MERLEY BOILER SEQUENCE CONTROLLER**

**For Modular Boiler Installations**

**Installation, Commissioning  
and Operating Instructions**

**NOTE: THESE INSTRUCTIONS SHOULD BE READ AND UNDERSTOOD BEFORE  
ATTEMPTING TO INSTALL, COMMISSION OR OPERATE THIS UNIT**

**PUBLICATION NO. 500001210  
ISSUE 'D'  
June 2022**

# CONTENTS

	PAGE
<b>1.0 General Overview .....</b>	<b>3</b>
1.1 Description	
1.2 Abbreviations	
1.3 Product Range	
1.4 System Configurations	
<b>2.0 Mounting and Installation.....</b>	<b>7</b>
2.1 Electrical Installation	
2.2 General Requirements	
2.3 Mounting Location	
2.4 Electrical Connections	
2.5 Pre-Assembled Wall Mounted Panel	
2.6 Operator Unit	
2.7 Room Unit	
2.8 Outside Sensor	
2.9 Programmable Room Unit	
2.10 Wireless Components	
2.11 Programmable Room Unit (wireless)	
2.12 Outside Sensor (wireless)	
2.13 Radio Repeater	
<b>3.0 Commissioning.....</b>	<b>22</b>
<b>4.0 Operation.....</b>	<b>23</b>
4.1 Function	
4.2 Display	
<b>5.0 Programming .....</b>	<b>30</b>
5.1 User Levels	
5.2 Overview of Settings	
5.3 QAA55	
<b>6.0 Settings in Detail .....</b>	<b>46</b>
6.1 Time of Day & Date	
6.2 Operator Unit	
6.3 List of Wireless Devices	
6.4 Time Programs	
6.5 Holidays	
6.6 Heating Circuits	
6.7 DHW	
6.8 Primary Controller / System Pump	
6.9 Cascade	
6.10 DHW Storage Tank	
6.11 Configuration	
6.12 LPB	
6.13 Faults	
6.14 Maintenance / Special Modes	
6.15 Input / Output Tests	
6.16 State	
6.17 Diagnostics heat generation	
6.18 Diagnostics consumer	
6.19 List of Displays	
<b>7.0 Plant Diagrams .....</b>	<b>84</b>
7.1 Basic Diagrams	
7.2 Extra Functions - DHW	
- Low Loss Header	

<b>8.0 Technical Data .....</b>	<b>88</b>
8.1 RVS	
8.2 Operator & Room Units	
8.3 Power Supply	
8.4 Radio Module	
8.5 Wireless Outside Sensor	
8.6 Radio Repeater	
8.7 Sensor Characteristics	
<b>Appendix A: .....</b>	<b>97</b>
Figure A1 <b>Cascade with primary circuit pump</b>	
Figure A2 <b>Cascade with primary circuit pump</b>	
<b>Appendix B: Wiring Schematics .....</b>	<b>99</b>
Figure B1 RVS Wiring	
Figure B2 Wireless Configuration	
<b>Appendix C: Programming Parameters .....</b>	<b>101</b>
<b>Appendix D: Wiring for Primary Pump when using Cascade Controller .....</b>	<b>104</b>

# **1.0 General Overview:**

## **1.1 Merley Boiler Sequence Controller**

### **Brief Description**

Controls up to 16 boilers using Siemens LMU controls. May be independently enabled by a 0-10v signal from a BMS or start/stop signal from a time clock. It also has a built in clock & uses an LPB Bus to communicate with the boilers. Each boiler control requires an extra module to communicate with the cascade controller. Operating from a BMS temperature signal or with the dedicated flow temperature sensor, cascade systems can be designed to operate up to 90°C. Dependant on application the control can offer additional features as detailed below.

**Note:** the control offers system functionality which is not detailed in this manual. For more complex systems refer to HHL Technical.

### **Boiler**

- Optimum start control with minimum limitation of the boiler temperature
- Minimum and maximum limitation of the boiler temperature
- Protective boiler startup
- Protection against boiler over temperatures (pump overrun)
- Burner cycling protection by observing a minimum burner running time
- Frost protection boiler

### **Heating Circuit Control**

- Pure weather compensation
- Weather compensation with room influence
- Pure room temperature compensation
- 1st mixing / pump heating circuit with 7-day program
- The building's thermal dynamics are taken into consideration (building time constant)
- Automatic adaptation of heating curve
- Automatic summer / winter changeover
- Automatic 24-hour heating limit
- Holiday program
- Quick setback and boost heating
- Optimum start / stop control
- Raising the reduced temperature level depending on the outside temperature
- Frost protection flow, building and plant
- Primary controller

### **DHW Control**

- DHW storage tank charging with 7-day program
- DHW charging with charging pump or diverting valve
- DHW charging with sensor
- DHW charging with a thermostat
- Selectable priority (absolute / shifting / none)
- Selectable DHW program (according to DHW program, according to heating programs, 24 hours)
- DHW push, manually or automatically
- Legionella function
- DHW discharging protection
- Control of DHW circulating pump
- electric immersion heater for DHW
- Overtemperature protection DHW storage tank
- Frost protection DHW

### **General**

- Automatic summertime/wintertime changeover
- Automatic identification of sensors
- Input and output test
- Service and error messages
- Status display for partial plant diagram
- Parameter reset
- Read/write parameters with operator units
- Multifunctional inputs and outputs
- Connection facility radio receiver
- Connection facility service tool (via OCI700)
- Connection facility for remote monitoring (via OCI611)

Hamworthy offer a pre-assembled wall mounted panel version incorporating the sequence control and user display, mounted in a robust painted steel cabinet, complete with lockable hinged door, mounting brackets, DIN rail, cable trunking and cable glands.

Alternatively, the Merley is suitable for incorporating into a local control panel (not HHL supply), requiring a Din rail to mount the plc logic control and a cutout in the panel door to accommodate the user display screen.

## 1.2 Abbreviations

The following list contains the abbreviations used in this document, including their meaning;

BX - Sensor X	Tagem - Composite Outside Temperature
QX - Relay X	TAged - Attenuated Outside Temperature
BR - Burner	TK - Boiler Temperature
Comp - Compressor	TRL - Return Temperature
dT - Temperature Differential	TVL - Flow Temperature
SD - Switching Differential	
SP - Switching Point (on/off)	DHW - DHW Temperature
St - Stage	TR - Temperature Regulator
T - Temperature	TW - Temperature Limiter
t - time of day	x - Actual Value
TA - Outside Temperature	w - Nominal Value

## 1.3 Product Range

The following Merley Boiler Sequence Controller kits and accessories are designed for use with the Hamworthy Range of boilers using Siemens LMU controls

HHL Reference	Description	Option
563605 603	RVS63.243 Cascade Control kit - pre-assembled panel	
** 563605 602	RVS63.243 Cascade Control kit - loose	
533901589	QAA55.110 Adjustable Offset room temperature sensor - hard wired	✓
533901587	QAA75.611 Multifunctional programmable room thermostat - hard wired	✓
533901588	QAA78.611 Multifunctional programmable room thermostat - wireless	✓
533901457	QAC34 Outside sensor - hard wired	✓
533901592	AVS13.399 Outside sensor - wireless	✓
533901590	AVS71.390 Radio Module - wireless	✓
533901591	AVS14.390 Radio repeater - wireless	✓
** 533901594	QAD36 Strap on flow sensor	✓

**Note:**

This kit is designed to install the RVS control into an existing local panel (not HHL supply).

**Hamworthy strongly recommend the use of an outside sensor to optimise the performance of the equipment. The use of wireless or wired configuration will determine the outside sensor supplied with the product as standard.**

The options provide suitability for hard wired or wireless applications.

Wireless applications must be subject to a site survey by a competent person to establish site suitability.

Care must be taken in ordering the correct options suitable for hard wired or wireless applications.

The kits include the cascade control (incl wiring connectors), an insertion flow sensor & immersion pocket & 2 OCI LPB relays.

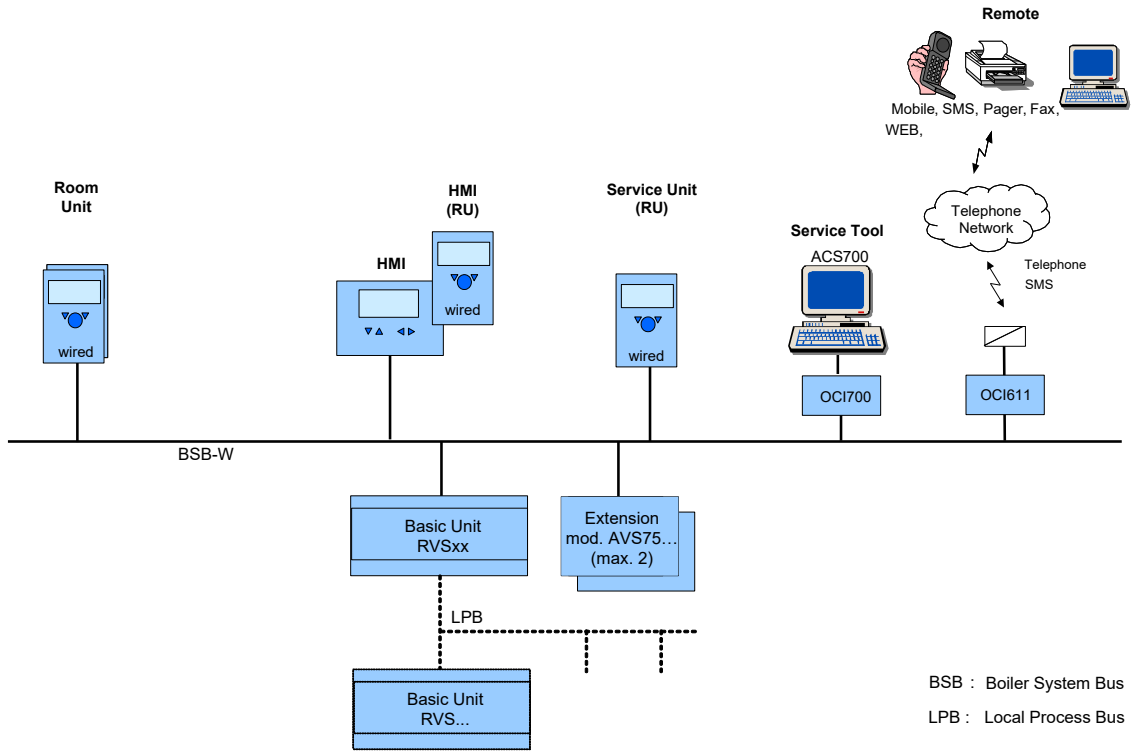
Additional sensors (room or external) must be specified, at the point of ordering.

## 1.4 Product liability

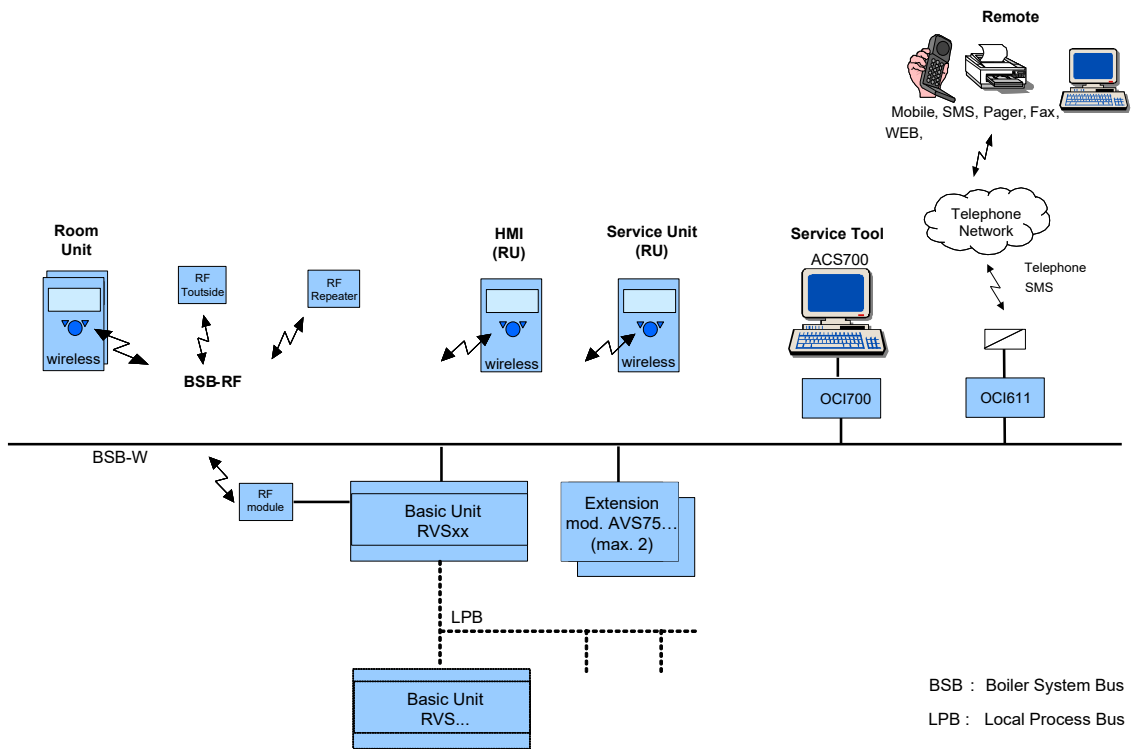
- The products may only be used in building services plant and applications as described above
- All requirements specified in chapters "Handling" and "Technical data" must be satisfied
- The local regulations for installation must be complied with.

## 1.4 System Configurations

### 1.4.1 Wired

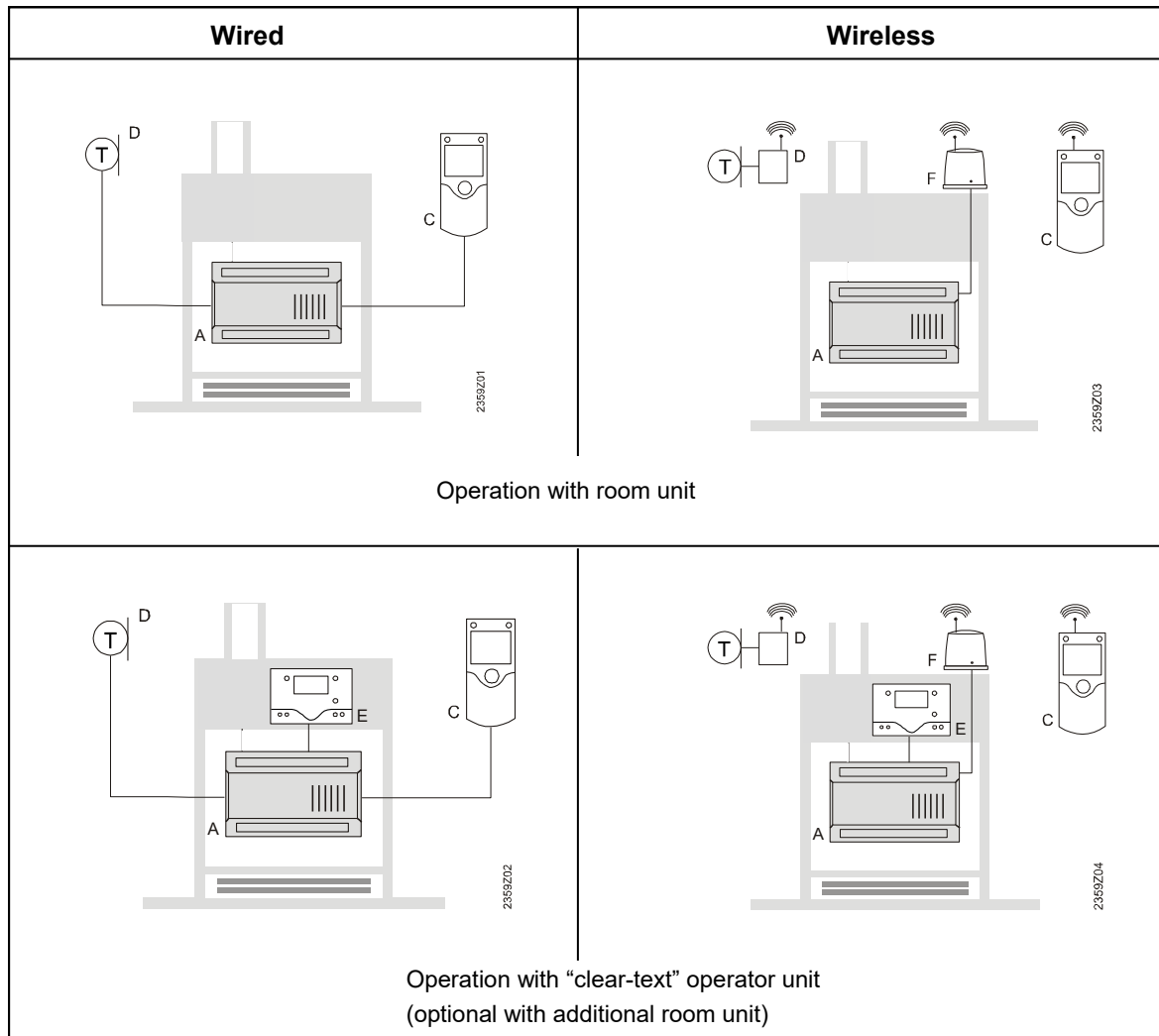


### 1.4.2 Wireless





### 1.4.3 - Operating Options



- |   |                                      |
|---|--------------------------------------|
| A | Basic unit RVS...                    |
| C | Room unit QAA75... / 78... / QAA55.. |
| D | Outside sensor AVS13...              |
| E | Operator unit AVS37.294 (clear-text) |
| F | Radio module AVS71...                |

## 2.0 Mounting and Installation

### 2.1 Electrical installation

- Prior to installing the Merley Boiler Sequence Controller, the power supply **must** be turned off
- The connections for mains and low-voltage **must** be separated
- The wiring must be made in compliance with the requirements of safety class II. This means that **sensor and mains cables must not be run in the same duct**
- The panel must be earthed in accordance with IEE regulations
- Wiring must be completed in heat resistant cable size 1.0mm<sup>2</sup> csa.
- The electrical isolator must have a contact separation of minimum 3mm in all poles
- The electrical isolator must be installed in a readily accessible location
- Any pump must be powered through a suitably rated contactor

## 2.2 General requirements

- Air circulation around the controller must be ensured, allowing the unit to emit the heat produced by it. A clearance of at least 10 mm must be provided for the controller's cooling slots which are situated on the top and bottom of the housing.

The space should not be accessible and no objects should be placed there. If the controller is enclosed in another (insulated) casing, a clearance of up to 100 mm must be observed around the cooling slots

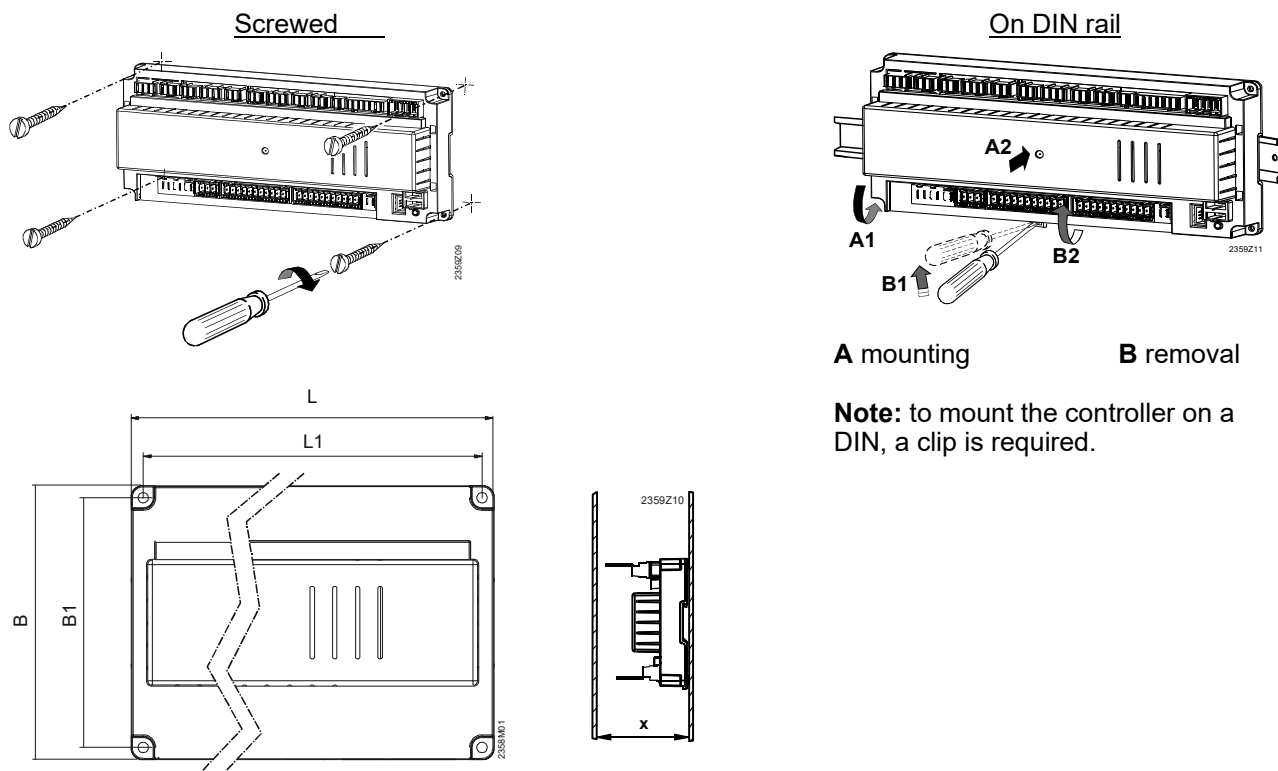
The controller is designed conforming to the directives for safety class II mounted in compliance with these regulations.

- Electrical supply to the controller may only be switched on when the installation is completed. If this is not observed, there is a risk of electric shock hazard near the terminals and through the cooling slots.
- The controller may not be exposed to dripping water.
- Permissible ambient temperature range when mounted 0.. - 50°C.
- Power cables must be clearly segregated from low-voltage cables (sensors) observing a distance of at least 100 mm

## 2.3 Mounting Location

It is recommended that the control is mounted in a dedicated control panel capable of providing the necessary power supply, electrical connections and electrical safety.

The control may be screw mounted to the electrical panel or alternatively (and preferred for convenience) onto a suitable DIN rail.



A mounting

B removal

**Note:** to mount the controller on a DIN, a clip is required.

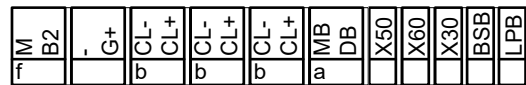
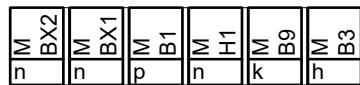
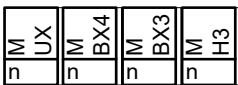
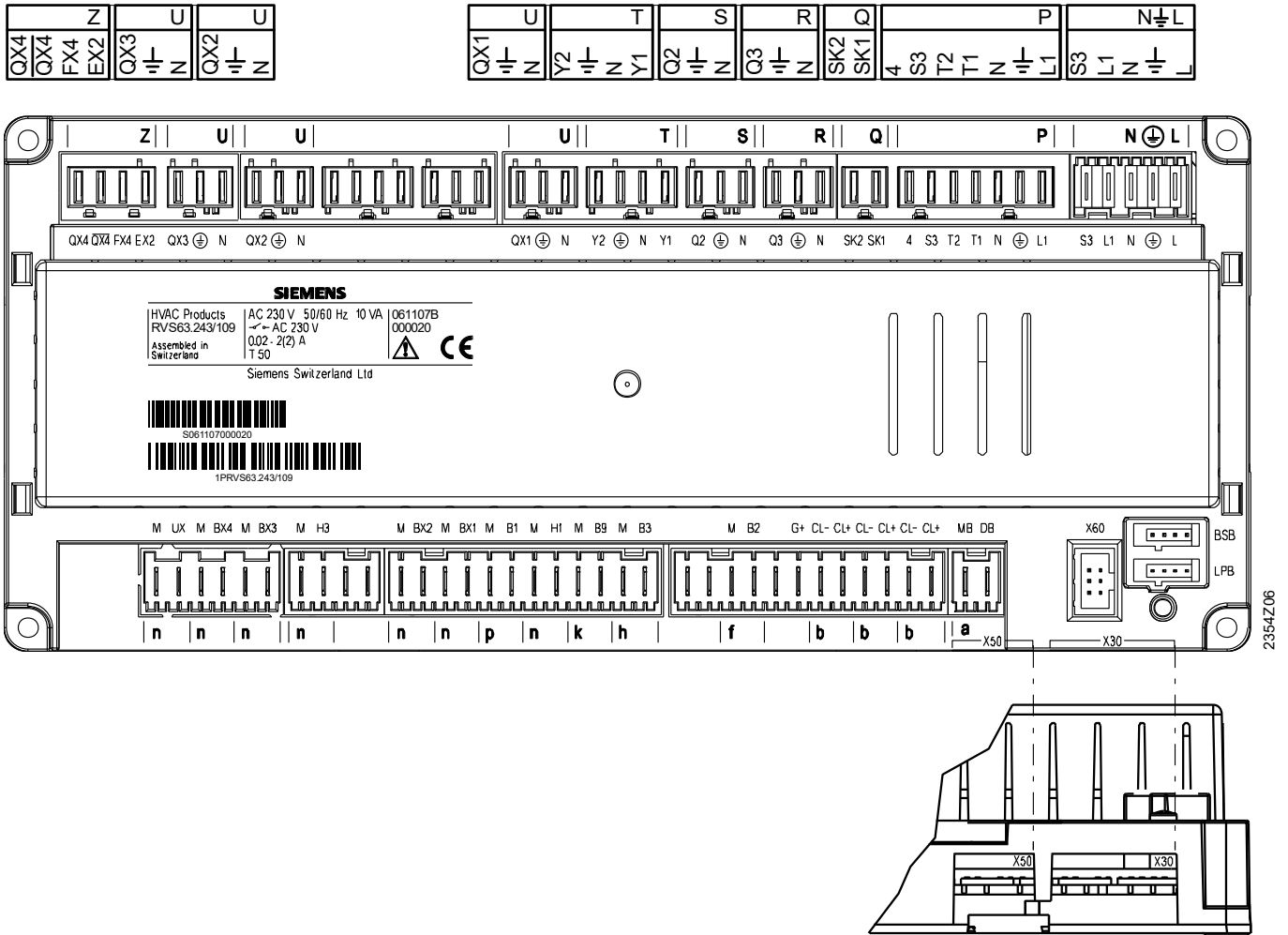
(dimensions in mm)	L	B	X	L1	B1
<b>RVS63...</b>	281	121	70	270	110

### 2.3.1 Pre-assembled wall mounted panel

Should the Merley be supplied in the pre-assembled HHL panel, the panel should be located in a readily accessible position and the following requirements observed;

- External fuses should be rated for 10A
- The panel must have individual means of isolation to provide complete electrical isolation
- Power cables must be clearly segregated from low-voltage cables (sensors) observing a distance of at least 100 mm, using the cable 20mm glands supplied in the kit.

## 2.4 Electrical Connections



### IMPORTANT !

Please ensure that the mains voltage and low voltage cables are run in separate ducts/trunking, both within the panel and outside of the panel.

Failure to observe this requirement will compromise the operation of the control.

- Air circulation around the controller must be ensured, allowing the unit to emit the heat produced by it.
- A clearance of at least 10 mm must be provided for the controller's cooling slots which are situated at the top and bottom of the housing.
- The space should not be accessible and no objects should be placed there. If the controller is enclosed in another (insulating) casing, a clearance of up to 100 mm must be observed around the cooling slots.
- The controller is designed conforming to the directives for safety class II mounted in compliance with these regulations.
- Power to the controller may only be supplied when completely fitted. If this is not observed, there is a risk of electric shock hazard near the terminals and through the cooling slots.
- The controller may not be exposed to dripping water.
- Permissible ambient temperature when mounted and when ready to operate: 0..50°C.
- Power cables must be clearly segregated from low-voltage cables (sensors) observing a distance of at least 100 mm.

## 2.4.1 Terminal Markings - Mains Voltage

The Merley control is supplied with screw type Rast 5 connectors for all electrical connections. The following connectors are provided

<i>Use</i>		<i>Slot</i>	<i>Connector type</i>
L	Live AC 230 V basic unit	N $\perp$ L	533511609
$\perp$	Protective earth		
N	Neutral conductor		
L1	Live AC 230 V burner		
S3	Output burner fault		
N	Neutral conductor	R	533901610
$\perp$	Protective earth		
Q3	DHW charging pump / diverting valve		
N	Neutral conductor	S	533901611
$\perp$	Protective earth		
Q2	1st heating circuit pump		
Y1	1st heating circuit mixing valve opening	T	533901612
N	Neutral conductor		
$\perp$	Protective earth		
Y2	1st heating circuit mixing valve closing		
N	Neutral conductor	U	533901613
$\perp$	Protective earth		
QX1	Multifunctional output 1		
N	Neutral conductor	U	533901613
$\perp$	Protective earth		
QX2	Multifunctional output 2		
N	Neutral conductor	U	533901613
$\perp$	Protective earth		
QX3	Multifunctional output 3		

## 2.4.2 Terminal Markings - Low Voltage

<i>Use</i>		<i>Slot</i>	<i>Connector type</i>
BSB	Service tool OCI700	-	-
LPB	Service tool OCI700	-	-
X60	Radio module AVS71.390	-	-
X30	Operator unit / boiler control panel	-	AVS82.491/109
DB	LPB data		533901614
MB	LPB ground		
CL+	Room unit 1 data		533901615
CL-	Room unit 1 ground	b	533901616
G+	Room unit power supply 12 V		
B3	DHW sensor top		533901617
M	Ground	h	
B9	Outside sensor		533901618
M	Ground	k	
H1	Digital / DC 0...10 V input		533901619
M	Ground	n	
B1	Flow temperature sensor HK1		533901620
M	Ground	p	
BX1	Multifunctional sensor input 1		533901619
M	Ground	n	

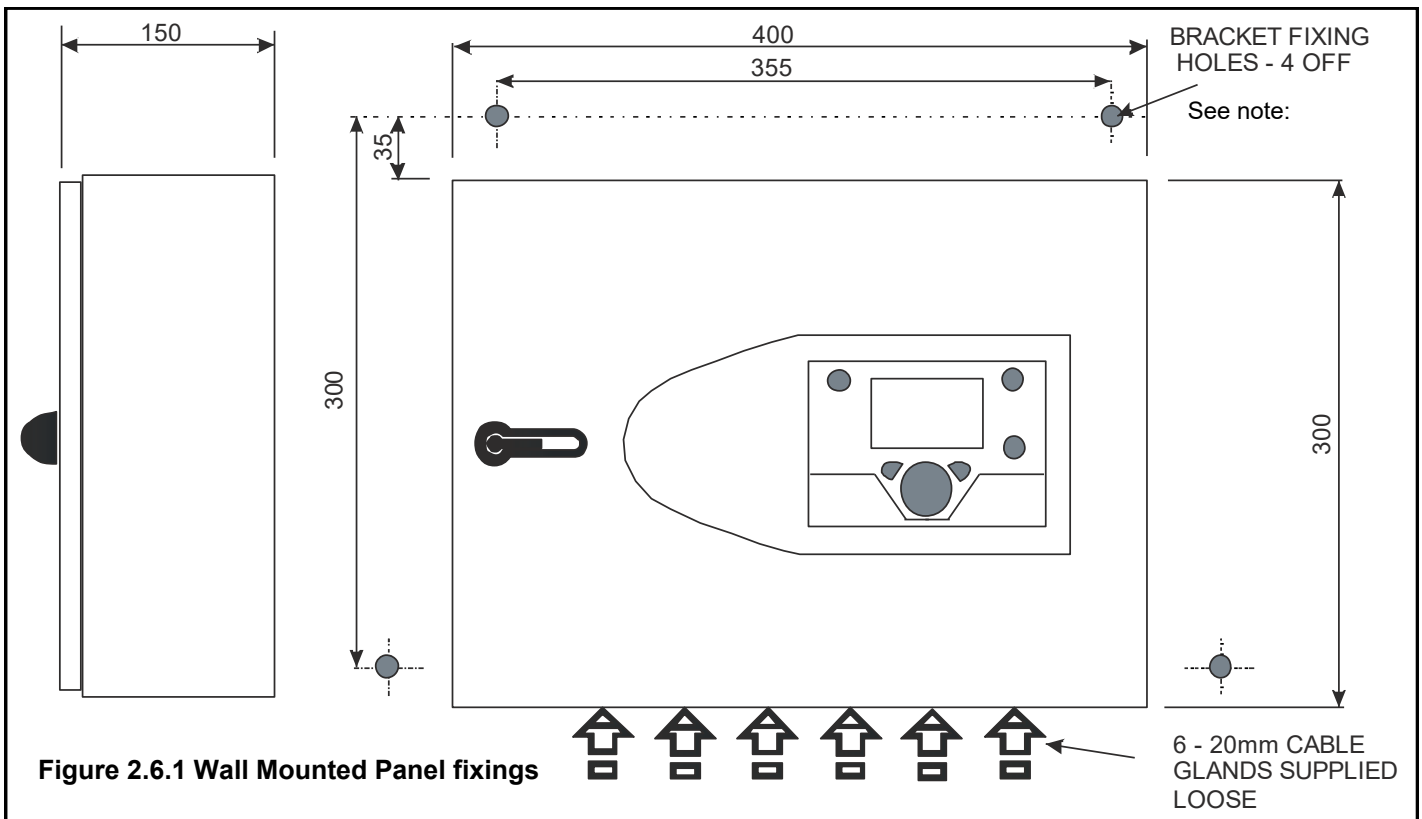
## 2.5 Pre-assembled Wall Mounted Panel

**Note: the panel is supplied with 4 wall fixing brackets, which can be adapted to provide various fixing options, of which the detail shown in Figure 2.6.1 is representative.**

### IMPORTANT !

In connecting the cables to the RVS logic control (see 2.5 electrical connections and associated tables), please ensure that the mains voltage and low voltage cables are run in separate ducts/trunking, both within the panel and outside of the panel.

Failure to observe this requirement will compromise the operation of the control.

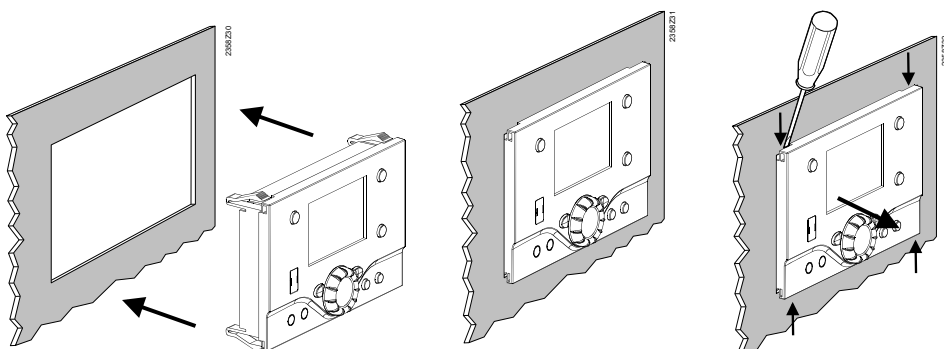


## 2.6 Operator Unit - Fitting into panel door

The display panel providing the user interface, **MUST** be panel mounted and connected to terminal X50 on the RVS63.243 with the 1m ribbon cable supplied.

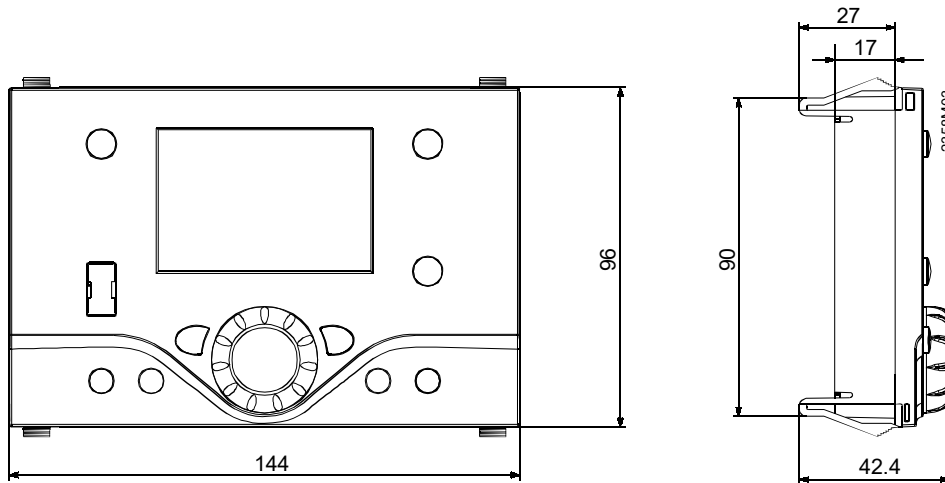
Please ensure that the location of the display in the panel door allows the door to hinge open.

With the aperture cut into the door panel, carefully fit the 'MERLEY' label to the panel before fitting the display.

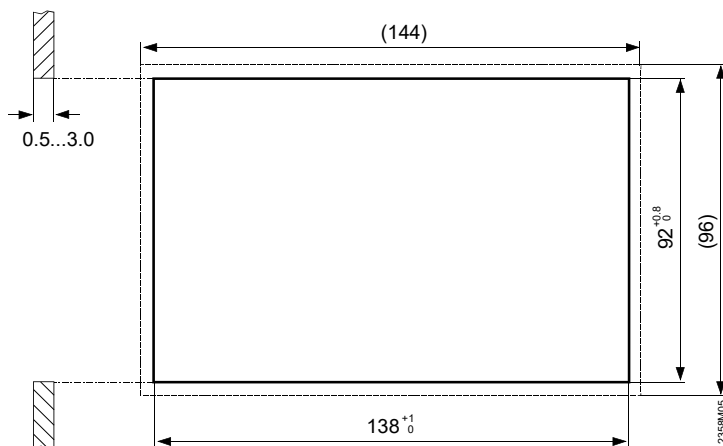


Removal

## Dimensions

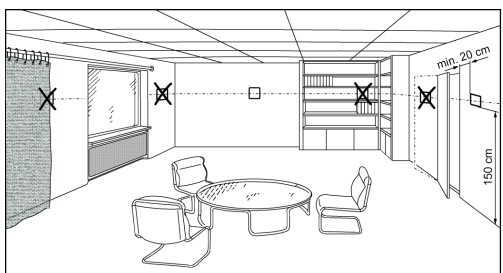


## Panel cutout



## 2.7 Room Unit - QAA 55

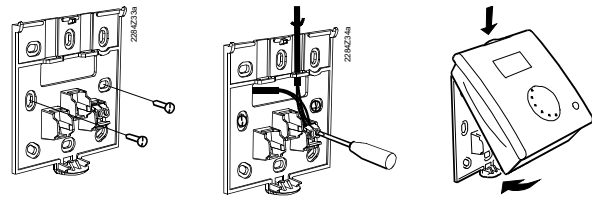
- The room unit should be located in the main living room while giving consideration to the following points:
- The place of installation should be chosen so that the sensor can capture the room temperature as accurately as possible without getting adversely affected by direct solar radiation or other heat or refrigeration sources (about 1.5 meters above the floor)
- In the case of wall mounting, there must be sufficient clearance above the unit, enabling it to be fitted and removed



**i** When the unit is removed from its base, power is cut off so that the unit is out of operation.

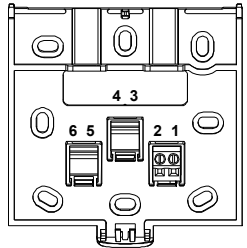
### 2.7.1 Mounting Location

- The controller must not be exposed to dripping water

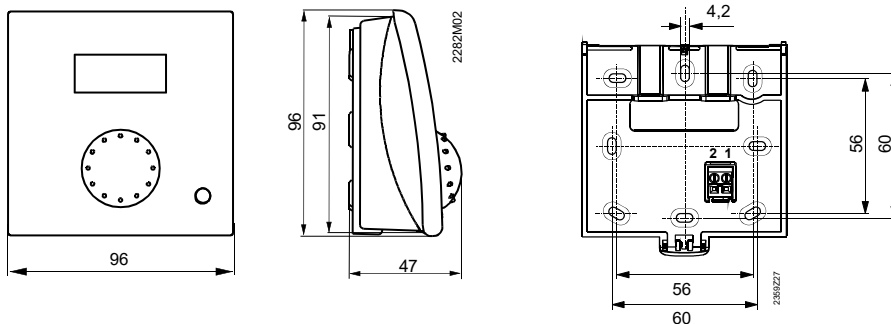


### 2.7.2 Electrical Connections

1	CL+	BSB data
2	CL-	BSB ground



### 2.7.3 Dimensions and Drilling

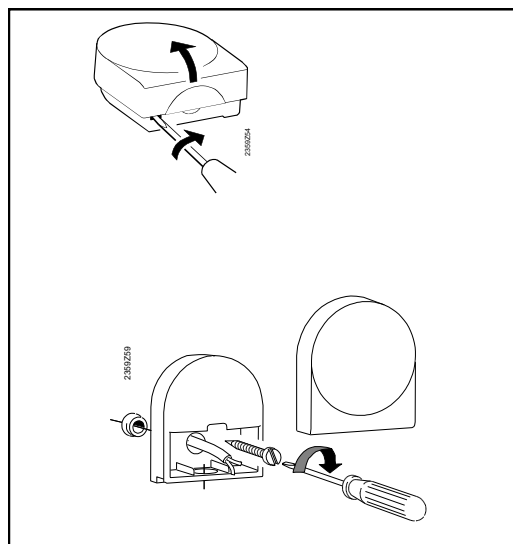


### 2.8 Outside sensor - QAC34

The sensor must be installed on an outside, north facing wall, away from any air vents, pipes, illuminated signs or any other device that could affect the ambient temperature local the sensor.

**Note!** Exposure of the sensor to direct sunlight at any time during the day will severely affect the performance of the compensation and optimum start functions.

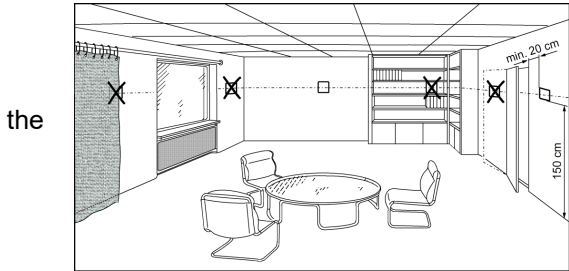
#### Outside Sensor





## 2.9 Programmable Room Unit - QAA 75.611

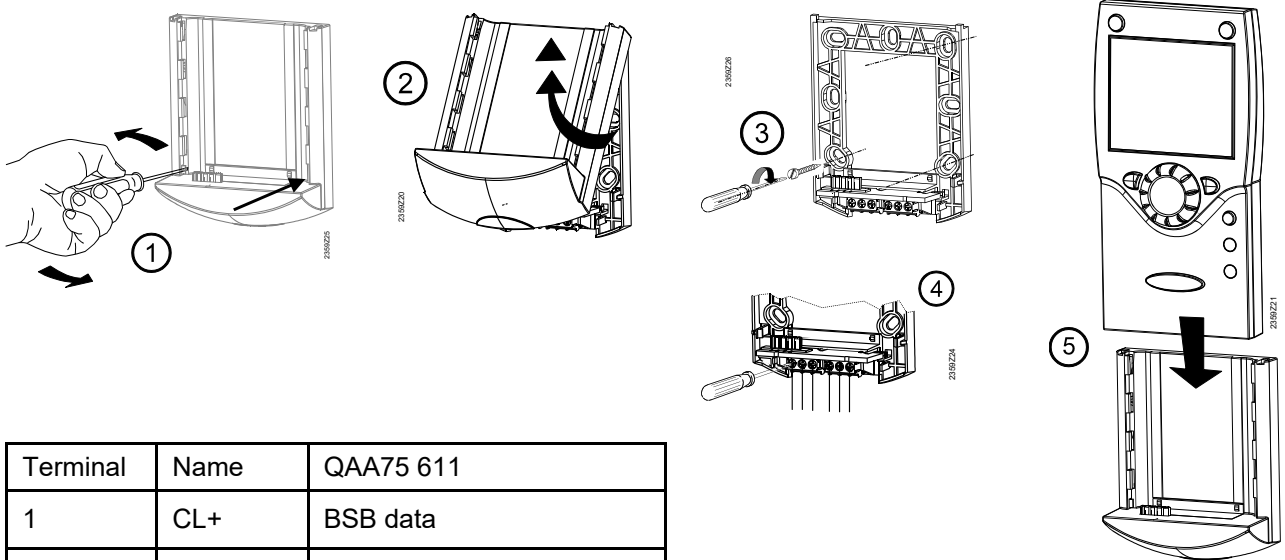
- The room unit should be located in the main living room while giving consideration to the following points:
- The place of installation should be chosen so that the sensor can capture the room temperature as accurately as possible without getting adversely affected by direct solar radiation or other heat or refrigeration sources (about 1.5 meters above the floor)
- In the case of wall mounting, there must be sufficient clearance above the unit, enabling it to be fitted and removed



- i** When the unit is removed from its base, power is cut off so that the unit is out of operation.  
**Note:** the device takes a 12V power supply from RVS to operate the back-lit lcd function.

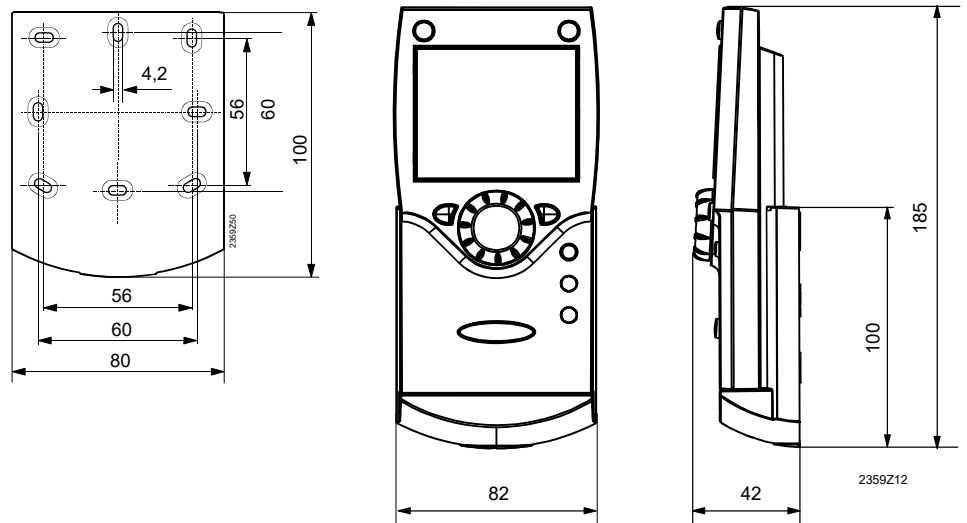
### 2.9.1 Mounting Location

- The controller must not be exposed to dripping water



Terminal	Name	QAA75 611
1	CL+	BSB data
2	CL-	BSB ground
3	G+	Power supply DC 12 V

### 2.9.2 Electrical Connections



### 2.9.3 Dimensions and Drilling

## 2.10 Wireless Components

The wireless components should be located such that transmission will be as interference-free as possible. The following criteria must be observed:

Not in the vicinity of electrical cables, strong magnetic fields or equipment like PCs, TV sets, microwave ovens, etc.

Not near larger metal structures or constructional elements with fine metal meshes such as special glass or special concrete

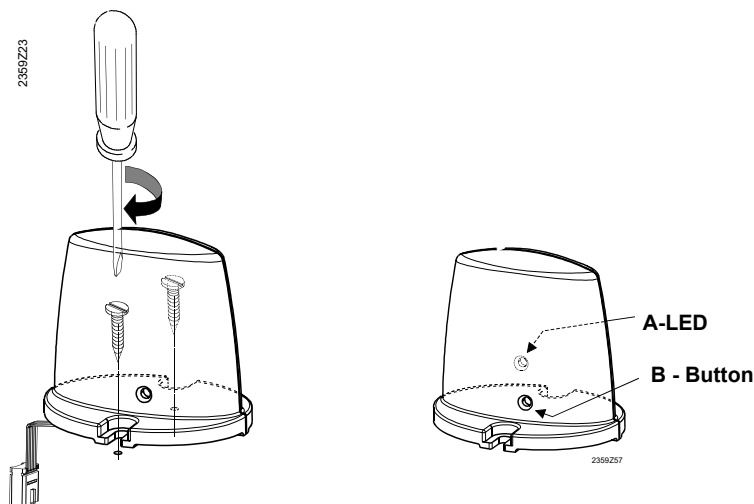
The distance to the transmitter should not exceed 30 meters or 2 floors

### 2.10.1 Radio Module AVS71.390

The radio module extends the product range by introducing wireless communication. With this type of device, the system components, such as room units, transmit data with no need for laying cables.


### 2.10.2 Mounting Location

Do not install the radio module inside metal casings (e.g. inside a boiler).



### 2.10.3 Electrical Connections

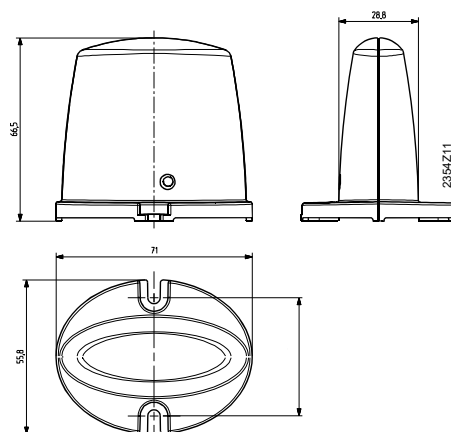
The prefabricated cable is to be connected to terminal X60 of the controller.

 Prior to connecting the module, the basic unit must be disconnected from power!

### 2.10.4 Radio Connection

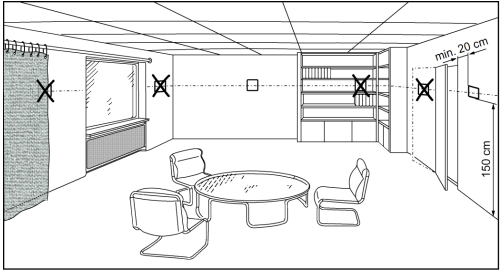
Establishment of the wireless connection is described in the following sections which cover the relevant radio-controlled units.

### 2.10.5 Dimensions and Drilling

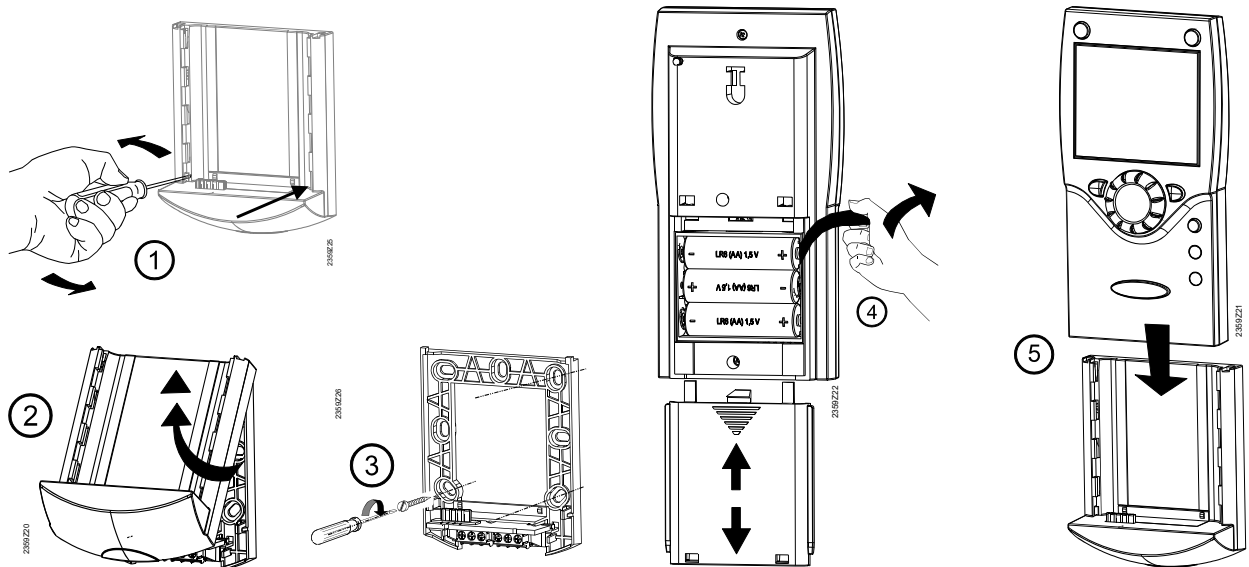


## 2.11 Programmable Room Unit (Wireless) - QAA 78.611

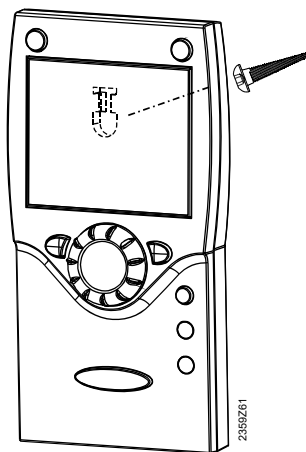
- The room unit should be located in the main living room while giving consideration to the following points:
- The place of installation should be chosen so that the sensor can capture the room temperature as accurately as possible without getting adversely affected by direct solar radiation or other heat or refrigeration sources (about 1.5 meters above the floor)
- In the case of wall mounting, there must be sufficient clearance above the unit, enabling it to be fitted and removed.



### 2.11.1 Mounting - with base



### 2.11.2 Mounting - without base



### 2.11.3 Power Supply

The room unit is powered by 3 off - 1.5 V alkaline batteries type AA (LR06).

### 2.11.4 Radio Connection

- i** Make the radio connection in the vicinity of the radio module prior to mounting so that all system are within easy reach.

A prerequisite for the radio connection is that all components receive power, which means that the radio module must be correctly connected to the basic unit and the batteries must be correctly installed in the room unit & outside sensor.

#### Establishing the link

- 1 Press the button on the installed radio module for at least 8 seconds until the LED on the radio module starts flashing at high frequency.
- 2 Press OK on the room unit to switch to programming.
- 3 Press the info button for at least 3 seconds and select operating level "Commissioning" with the setting knob. Then, press OK.
- 4 Select operating page "Operator section" and press OK.
- 5 Select operating section "Used as" (operating line 40) and make the appropriate selection. Then, press OK. & Esc.
- 6 Select operating page "Wireless" and press OK.
- 7 Select setting line "Wireless Binding Trigger" (line 120). Then, press OK.
- 8 Set the setting knob to "YES" and press OK. Connection establishment is started.
- 9 The display shows the progress of connection establishment in %. This process can take 2 to 120 seconds.
- 10 The connection is established when "Device ready" appears and the LED on the radio module extinguishes

Testing - The test is made to check the quality of the radio link.

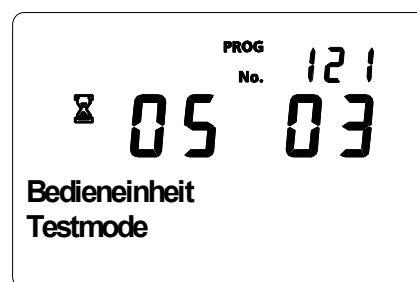
- i** The test can be aborted by pressing the ESC button.

While the radio link can be opened on the controller, the test should be made at the location where the room unit will be installed.

On the room unit, as described above (points 2 through 4), select operating page "Radio" and activate the test mode on setting line "Test mode" (line 121).

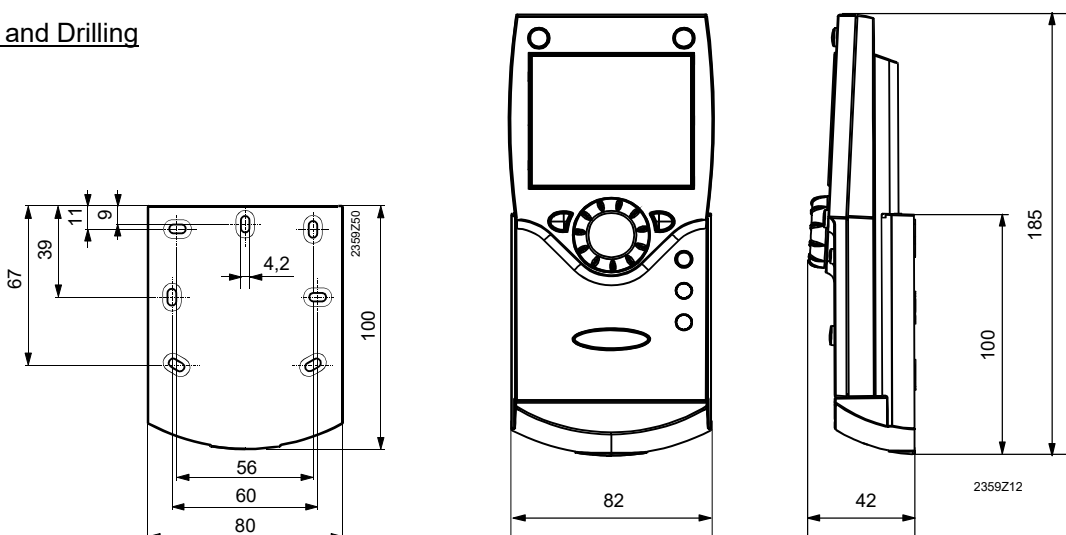
Example of a display during the test:

The digits on the left shows telegrams that have been sent, the digits on the right telegrams that have been received. The test will be ended after 24 telegrams. The test is considered successful when at least 50 % of the telegrams sent have been received.



If the test was not successful, some other mounting location is to be selected or the AVS14.390 radio repeater can be used.

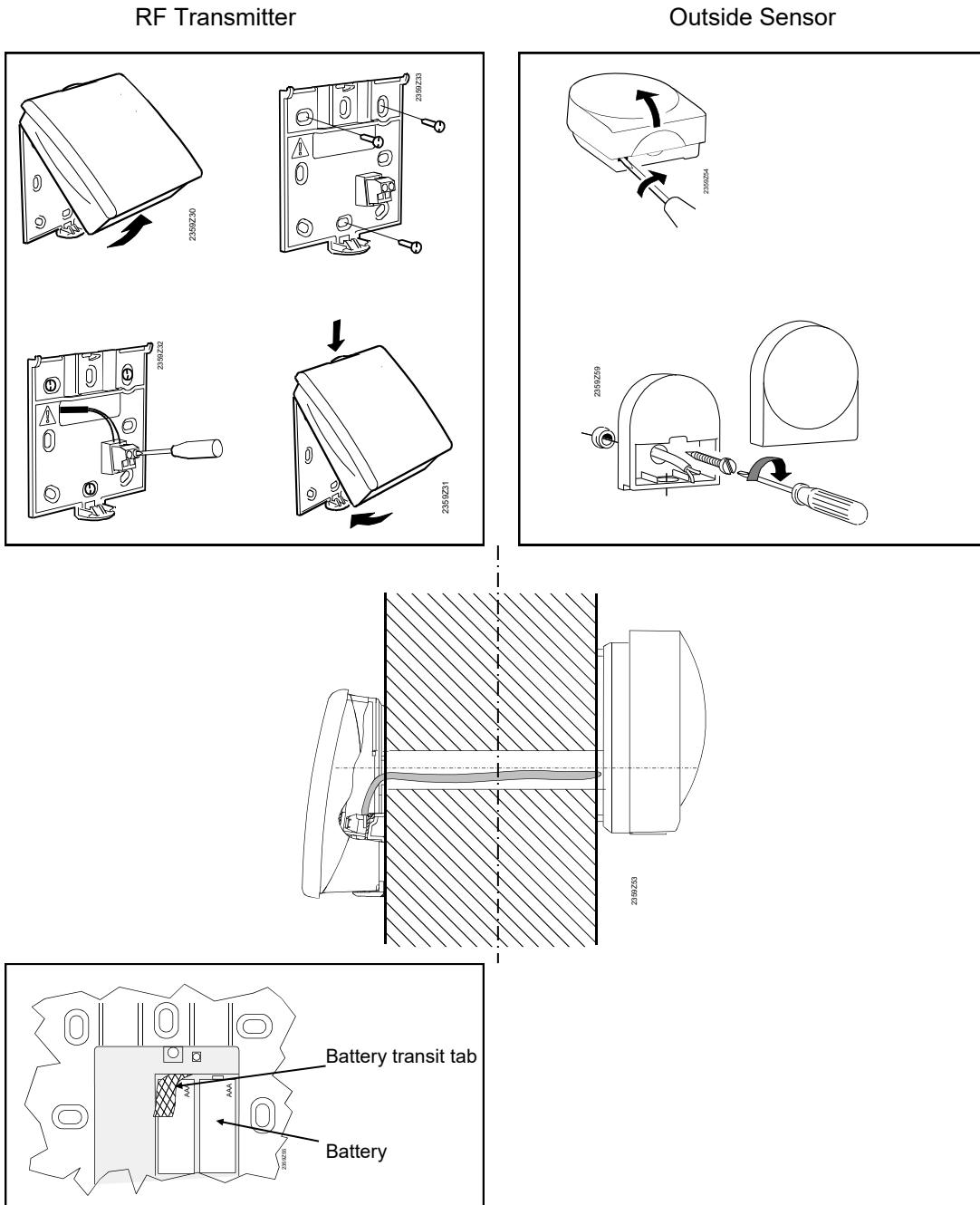
### 2.11.5 Dimensions and Drilling



## 2.12 Wireless Outside Sensor - AVS13.399

- The radio transmitter must be installed inside the building.
- The radio transmitter's mounting location should be chosen such that batteries can be easily changed.

### 2.12.1 Mounting



### 2.12.2 Connections

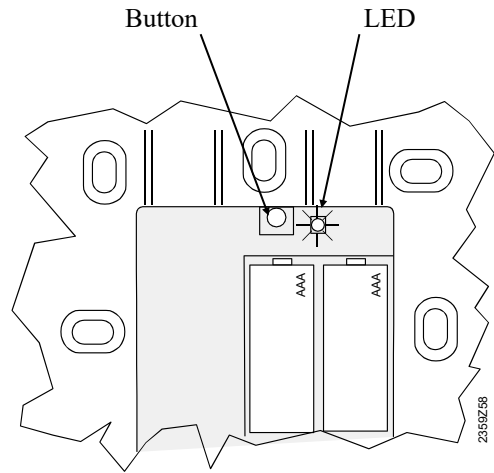
The outside sensor is to be connected to the radio transmitter via a 2-core cable, the connections are interchangeable.

The room unit is powered by two 1.5 V alkaline batteries type AAA (LR03).

### 2.12.3 Radio Connection

- i** Make the radio connection in the vicinity of the radio module prior to mounting so that all system are within easy reach.

A prerequisite for the radio connection is that all components receive power, which means that the radio module must be correctly connected to the basic unit and the batteries must be correctly installed in the room unit.



#### Establishing the link

- 1 Press the button on the radio module for at least 8 seconds until the LED on the radio module starts flashing at **high frequency**.
- 2 Press the button on the transmitter of the wireless outside sensor for at least 8 seconds until that LED also starts flashing at **high frequency**.
- 3 The connection is established when the LED on the radio module extinguishes.
- 4 Press the button on the transmitter of the wireless outside sensor briefly again until the LED extinguishes.

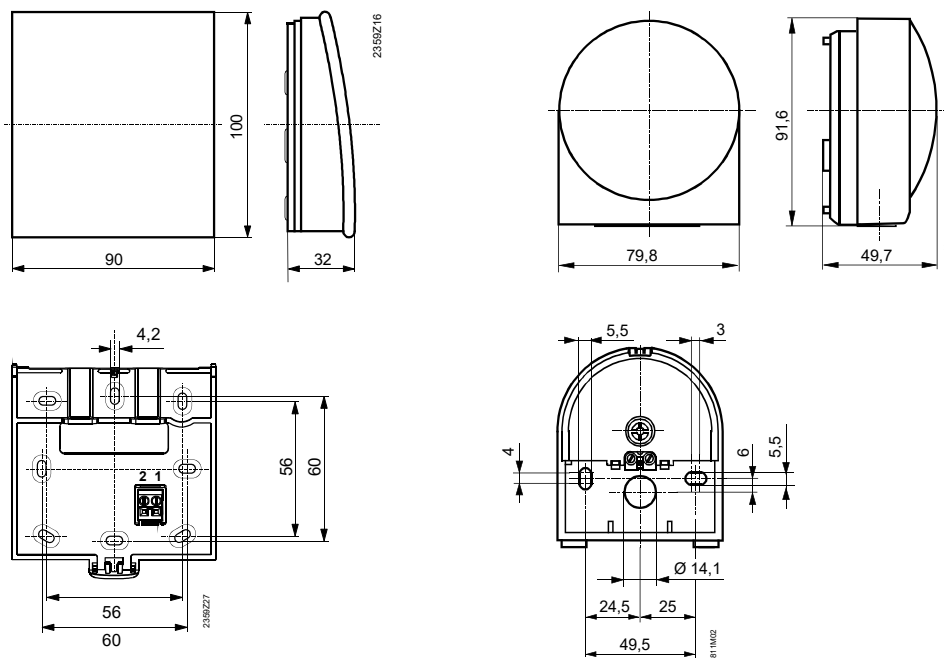
Testing - The test is made to check the quality of the radio link.

- i** The test can be aborted by pressing the ESC button.

While the radio link can be opened on the controller, the test should be made at the location where the room unit will be installed

- 1 Press button 3 on the transmitter of the wireless outside sensor for a maximum of 8 seconds until the LED start flashing at **low frequency**.
- 2 When radio communication works, the LED on the radio module flashes briefly at 10-second intervals.
- 3 After the test, press the button on the transmitter of the wireless outside sensor again briefly until the LED extinguishes.

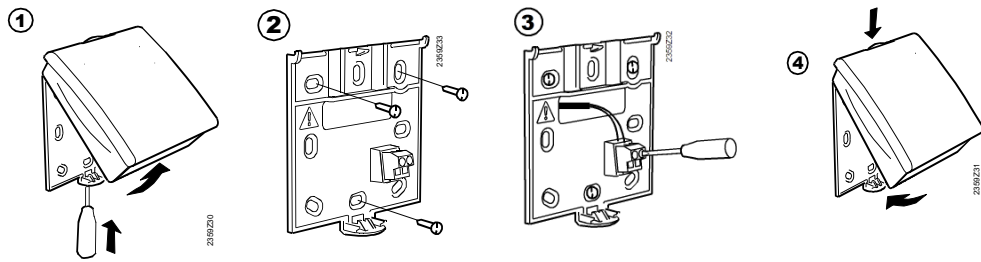
### 2.12.4 Dimension and Drilling



## 2.13 Radio Repeater - AVS14.390

- ⚠ To establish the radio connection, the device must be provisionally connected to power prior to mounting, enabling the radio connection to be opened and tested. The radio repeater must be fitted inside the building.

### 2.13.1 Mounting



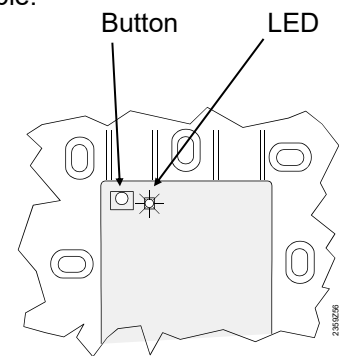
### 2.13.2 Electrical connections

Power is supplied via the enclosed power pack. The wires are interchangeable.

### 2.13.3 Radio Connection

- ⓘ Make the radio connection in the vicinity of the radio module prior to mounting so that all system are within easy reach.

A prerequisite for the radio connection is that all components receive power, which means that the radio module must be correctly connected to the basic unit and the batteries must be correctly installed in the room unit.



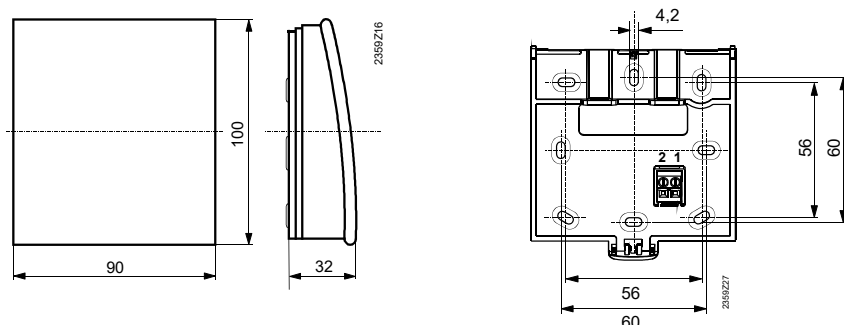
Establishing the link

- 1 Press the button on the radio module for at least 8 seconds until the LED on the radio module starts flashing at **high frequency**.
- 2 Press the button on the installed radio repeater until the LED start flashing at **high frequency**.
- 3 The connection is established when the LED on the radio module extinguishes.

Testing - The test is made to check the quality of the radio link.

- ⓘ The test can be aborted by pressing the ESC button.
- While the radio link can be opened on the controller, the test should be made at the location where the room unit will be installed
- 1 Press button 3 on the radio repeater for a maximum of 8 seconds until the LED starts flashing at **low frequency**.
  - 2 When radio communication works, the LED on the radio module flashes briefly at 10-second intervals.
  - 3 After the test, press the button on the radio repeater again briefly until the LED extinguishes.

### 2.13.4 Dimension and Drilling



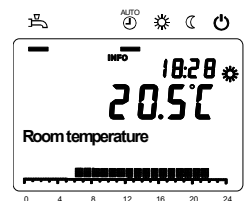
## 3.0 Commissioning

### Language

The RVS has a default language 'German' which should be configured for 'English'. The following procedure should be used to configure the control for the English language - refer to fig 4.1.2;

- 1 Switch on the control, the hour glass symbol will appear on the display, followed by 'Daten Aktualisieren'
- 2 Push OK and 'Uhrzeit und Datum' will appear.
- 3 Rotate the dial ( $\pm$ ) to select 'Bedienhelt Sprache'
- 4 Push OK then turn the dial to English
- 5 Push OK, then esc then esc.

You should now be back to the basic display screen



To commission the units, the following working steps must be carried out:

- Prerequisite is the correct mounting and correct electrical installation and, in the case of wireless solutions, correctly working radio connections to all required auxiliary units.
- Make all plant-specific settings. Special attention must be paid to operating page "Configuration". For that purpose, the relevant operating level is to be selected as follows:  
If the programmable room unit is used, press OK on the room unit to switch to programming.  
Press the info button for at least 3 seconds and select operating level "Commissioning" with the setting knob. Then, press OK.
- Make the functional check as described below.
- Reset the attenuated outside temperature  
(operating page "Diagnostics of consumers", operating line "Outside temp attenuated" (operating line 8703))

### Functional Check

To facilitate commissioning and fault tracing, the controller allows output and input tests to be made. With these tests, the controller's inputs and outputs can be checked. To make the tests, switch to operating page "Input / output test" and go through all available setting lines.

### Operating State

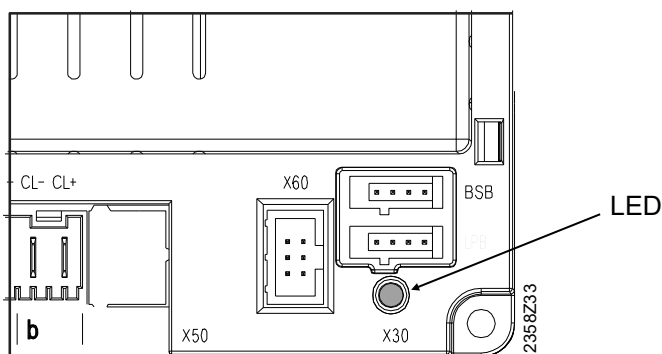
The current operating state can be checked on operating page "State".

### Diagnosis

For detailed diagnostics of the plant, check operating pages "diagnostics heat source" and "diagnostics consumer".

### 3.1 Basic Unit

Checking the LED -



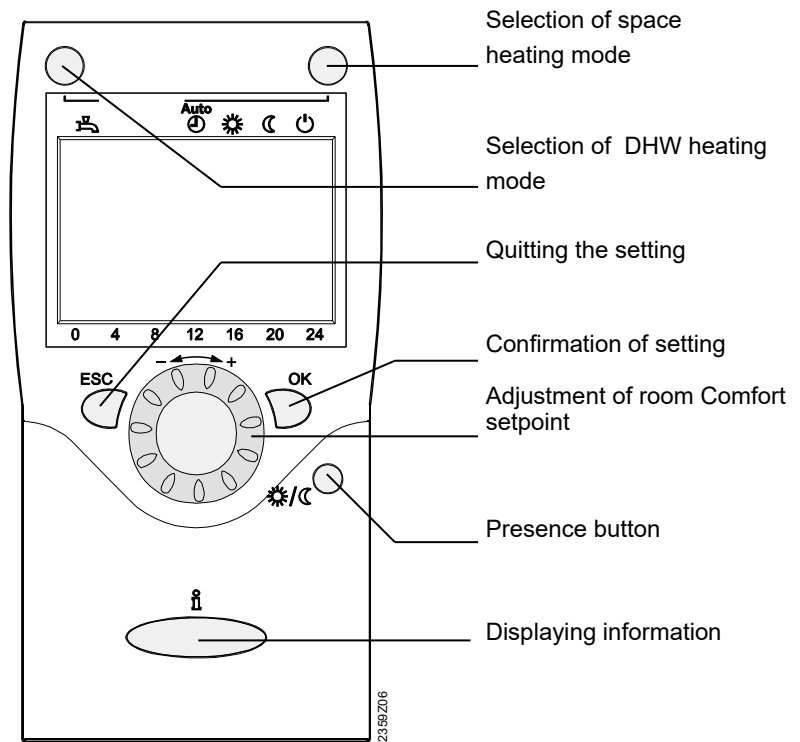
- LED off: No power supply
- LED on Ready
- LED flashes Local fault



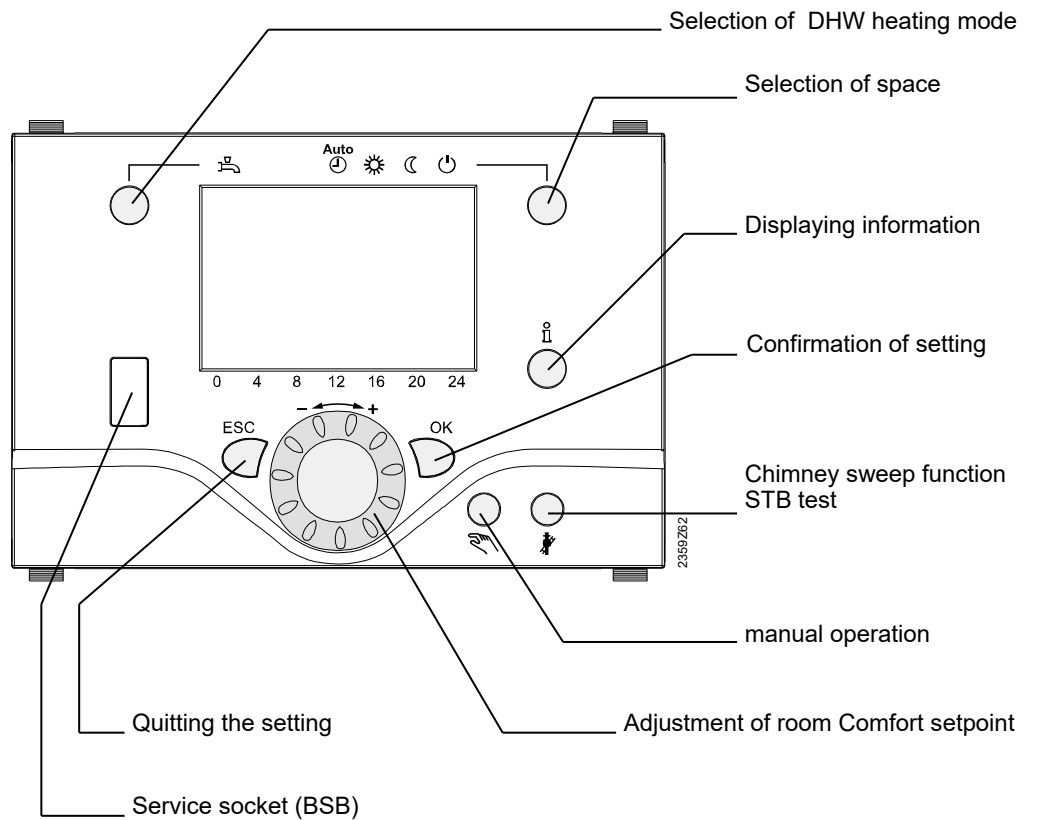
## 4.0 Operation

### 4.1 QAA75.. / QAA78... / AVS37..

#### 4.1.1 Room Unit



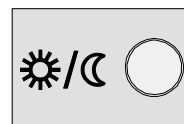
#### 4.1.2 Operator unit



## Presence button

If you do not use the rooms for a certain period of time, you can press the presence button to reduce the room temperature, thus saving heating energy.

When the rooms are occupied again, press again the presence button to resume heating operation.

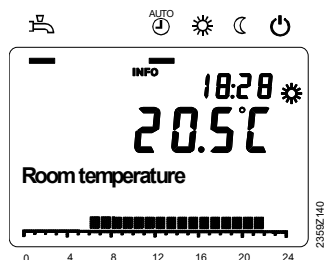


- ☀ Heating to Comfort setpoint
- ☾ Heating to Reduced setpoint

- i**
  - The presence button is only active in automatic operation
  - The current selection is active until the next switching action according to the heating program takes place

## Displaying information

Various data can be displayed by pressing the info button.



## Possible displays

Depending on the type of unit, configuration and operating state, some of the info lines listed below may not appear.

Display:

- Possible error messages from the error code list on page 88/89
- Possible service messages from the maintenance code list on page 90
- Possible special mode messages from page 90
- 

Other displays:

Room temperature.	DHW temp 1
Room temperature minimum	State of heating circuit 1
Room temperature maximum	State of DHW
Boiler temp / Mixed flow temp	State of boiler
Outside temperature	Date and time of day
Outside temp min	Telephone customer service
Outside temp max	

**Used as**

<i>Line no.</i>	<i>Operating line</i>
40	Used as;  Room unit 1  Operator unit 1  Service unit

This operating line is used to select the use of the operator unit. Depending on use, additional settings will then be required under "Heating circuit assignment". When using several operator units, it is thus possible to match individual units to specific requirements.



- - In the case several operator units are used, each application may only be used once.
- - The AVS37.294 operator unit is supplied as operator unit 1 (operating line 40) acting on all heating circuits (operating line 42) and can only be readjusted on operating lines 44, 46 and 48

Depending on the selected use of the unit (operating line 40), the following settings (marked with X) can be made when assigning the heating circuit.

<i>Operating line</i>					
40	42	44	46	48	54
Room unit 1	Heating circuit 1				X
Operator unit 1	Heating circuit 1				
Service unit					

**Room unit 1**

The operator unit supports the heating circuits released on operating line 42 "Assignment room unit 1" and activated in the basic unit.

**Operator unit / service unit**

The operator unit supports the heating circuits activated in the basic unit.



When using this setting, the operator unit does not acquire and deliver the room temperature.

## Heating circuit assignment

<i>Line no.</i>	<i>Operating line</i>
42	Assignment device 1 Heating circuit 1
48	Action of presence button <i>None</i> <i>Heating circuit 1</i>

**Assignment device 1** As room unit 1 (setting 40), the action of the relevant operator unit on heating circuit 1 circuits can be assigned. and only 1 room unit.

**Action presence button** The action of the presence button on the operator unit can be assigned to the relevant heating circuits.  
If only 1 heating circuit is assigned, the presence button always acts on that heating circuit.

### Room sensor

<i>Line no.</i>	<i>Operating line</i>
<b>54</b>	<b>Readjustment room sensor</b>

The temperature display can be readjusted.

### Device data

<i>Line no.</i>	<i>Operating line</i>
<b>70</b>	<b>Software version</b>

The display shows the current version of the room unit.

## 4.1.3 Radio

### Binding


<i>Line no.</i>	<i>Operating line</i>
<b>120</b>	<b>Binding</b>
<b>121</b>	<b>Test mode</b>

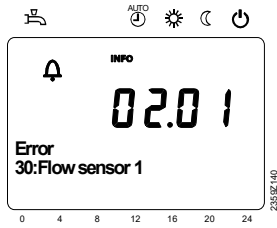
For more detailed information, refer to the descriptions of the wireless components in section 3.8.


**Binding** When commissioning the system, the wireless peripheral devices (room unit) are assigned to the basic unit.

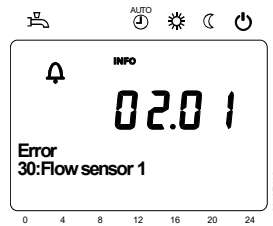
**Test mode** The test mode is used for checking the wireless communication. The test should be made when the installation is fully completed.


Exception - In exceptional cases, the basic display shows one of the following symbols:

 **Error messages**  
 If this symbol appears, an error in the plant has occurred. Press the info button and read further information.



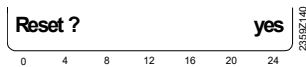
 **Maintenance or special operation**  
 If this symbol appears, a maintenance alarm is delivered or the plant has changed to special mode. Press the info button and read further information.



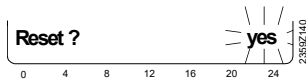
 A list of possible displays is given on pages 88/89 - error code table

### Reset function

The reset function for meters and the resettable parameters appears on the bottom line of the display, provided a reset is permitted on the current operating line (end user / commissioning / heating engineer).



After activation with the OK button, the display will show a flashing "Yes".



After confirmation with the OK button, the relevant parameter or counter will be reset.


### Manual operation

When manual operation is active, the relays are no longer energized and de-energized according to the control state, but are set to a predefined manual operation state depending on their function.

The burner relay energized in manual control can be de-energized by the electronic temperature controller (TR).

### Setpoint adjustment in manual control

After manual control has been activated, a change to the basic display must be made.

There, the maintenance / special mode symbol  appears.

Press the info button to switch to info display "Manual mode", where the setpoint can be adjusted.

### Chimney sweep function

The chimney sweep function is activated by a short press (maximum 3 seconds) on the chimney sweep button.











This function produces the operating state required to make emission measurements (flue gas).

SLT test - The SLT test (SLT = safety limit thermostat) is activated by a long press (longer than 3 seconds) on the chimney sweep button. The button must be kept depressed during the entire test. If released, the test will be aborted. The SLT test is shown on the display.



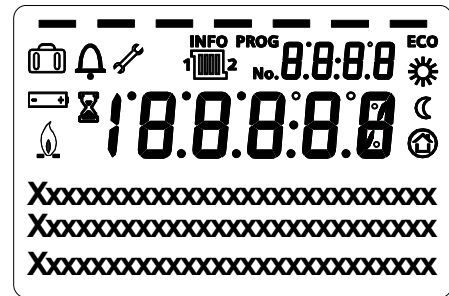
The test may only be made by qualified staff since the boiler temperature will be raised above the maximum limits.

## 4.2 Display Options

	Heating to Comfort setpoint	<b>INFO</b>	Info level activated
	Heating to Reduced setpoint	<b>PROG</b>	Programming activated
	Heating to frost protection setpoint	<b>ECO</b>	Heating temporarily switched off ECO function active
	Process running – please wait		Holiday function active
	Change battery		Reference to heating circuit
	Burner operating (only oil / gas boiler)		Maintenance / special operation
			Error messages

### 4.2.1 Display

Display of all symbols and segments.





### 4.2.2 Selection of Space Heating Mode

This setting is used to switch between the different operating modes. The selection made is indicated by a bar which appears below the respective symbol.





#### Automatic mode **AUTO**

Automatic mode controls the room temperature according to the time program. Characteristics of automatic mode:

- Heating mode according to the time program
- Temperature setpoints according to the heating program "Comfort setpoint"  or "Reduced setpoint" 
- Protective functions active
- Automatic summer / winter changeover (ECO functions)

#### Continuous operation or

Continuous operation maintains the room temperature at the selected operating level.

-  Heating to Comfort setpoint
-  Heating to Reduced setpoint

Characteristics of continuous operation:

- Heating mode with no time program
- Protective functions active

Automatic summer / winter changeover (ECO functions) and 24-hour heating limit inactive in the case of continuous operation with Comfort setpoint

**Protection** 


When using Protection mode, the heating system is off, but it remains protected against frost (frost protection temperature) provided there is no power failure.

Characteristics of Protection:

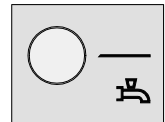
- Heating off
- Temperature according to frost protection
- Protective functions active
- Automatic summer / winter changeover (ECO functions) and automatic 24-hour heating limit active

**4.2.3 Selecting the DHW heating mode**

The button is used to switch DHW heating mode on and off. The selection made is indicated by a bar which appears below the respective symbol.

**DHW heating mode** 

- On  
The DHW is heated according to the selected switching program.
- Off  
No DHW heating, but the protective function is active.




**DHW push**

Triggering is effected by keeping the DHW operating mode button on the operator or room unit depressed for at least 3 seconds.

It can also be started when:

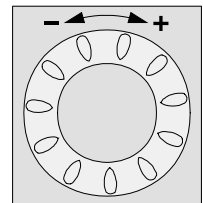
- The operating mode is "Off"
- Operating mode changeover acts via H1 or centrally (LPB)
- All heating circuits use the holiday function

**4.2.4 Adjusting the room temperature setpoint**

Turn the setting knob to increase or decrease the Comfort setpoint 

For the **Reduced setpoint** 

- Press OK
- Select operating page "Heating circuit" and
- adjust the "Reduced setpoint"



After each readjustment, wait at least 2 hours, allowing the room temperature to adapt.

# 5.0 Programming

## Setting principle

Settings that cannot be made directly with the operating elements require programming. For this purpose, the individual settings are structured in the form of operating pages and operating lines, thus forming practical groups of settings.

The following example shows how to set the time of day and the date.

### Example: "Setting the time of day"



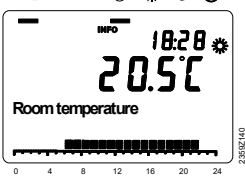


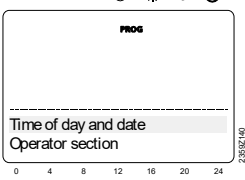


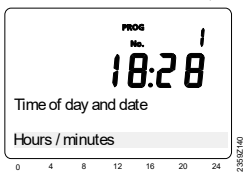


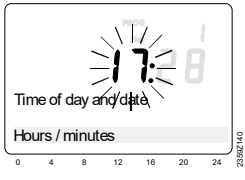


Press *ESC* to go one step back at a time, readjusted values are not be adopted

If no setting is made for 8 minutes, the display returns automatically to the basic display

Operating lines may be hidden, depending on the type of controller, the configuration made and the user level

made and the

Operation	Display example	Description
<p>1</p>  		<p>Basic display. If the basic display is not shown, press the ESC button to return to it.</p> <p>Press OK.</p>
<p>2</p>  		<p>The bottom section of the display shows a number of operating pages. Turn the setting knob until operating page <i>Time of day and date</i> appears.</p> <p>Press OK to confirm.</p>
<p>3</p>  		<p>In the bottom section of the display, the first operating line of operating page <i>Time of day and date</i> appears. Turn the setting knob until operating line <i>Hours / minutes</i> appears.</p> <p>To confirm, press OK.</p>
<p>4</p>  		<p>The display shows the hours flashing. Turn the setting knob until the hours of the time of day are correct.</p> <p>To confirm, press OK.</p>



**ECO functions**

Line no.	Operating line
HC1	
730	Summer/winter heating limit
732	24-hour heating limit

Summer/winter heating limit

The summer / winter heating limit is used to switch the heating on and off in the course of the year, depending on temperature conditions. In Automatic mode, switching on / off takes place automatically, so there is no need for the user to do this manually. By changing the setting, the respective periods of time will be shortened or extended.

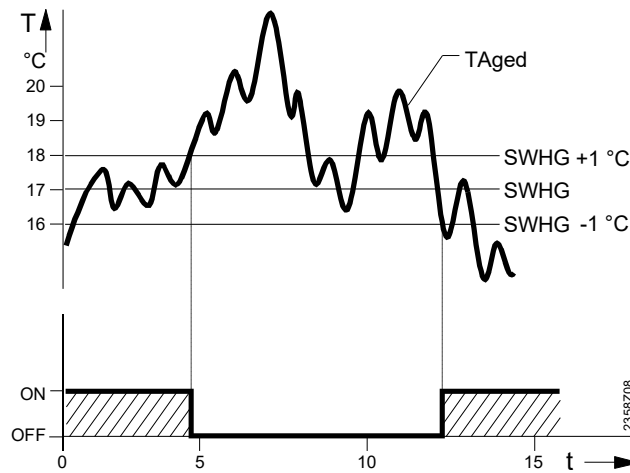
Increase: Winter operation will start *earlier*  
 Summer operation will start *later*

Decrease: Winter operation will start *later*  
 Summer operation will start *earlier*



- The function is not active in operating mode "Continuously Comfort temperature" ☀
- The display shows ECO
- To incorporate the building's thermal dynamics, the outside temperature is attenuated

Example:



SWHG Summer/winter heating limit  
 TAged The attenuated outside temperature  
 T Temperature  
 t Days

## 24-hour heating limit

The 24-hour heating limit is used to switch the heating on and off in the course of the day, depending on the outside temperature. This function is used primarily during spring and autumn to respond to short-term temperature variations.

Example:

<i>Setting line</i>	<i>e.g.</i>
Comfort setpoint (TRw)	22°C
24-hour heating limit (THG)	-3°C
Changeover temperature (TRw-THG) heating off	= 19°C


Switching differential (fixed)	-1°C
Changeover temperature heating on	= 18°C

By changing the value entered, the respective heating periods will be shortened or extended.

Increase: Heating mode will start *earlier*,  
changeover to ECO *later*.

Decrease: Heating mode will start *later*,  
changeover to ECO *earlier*.

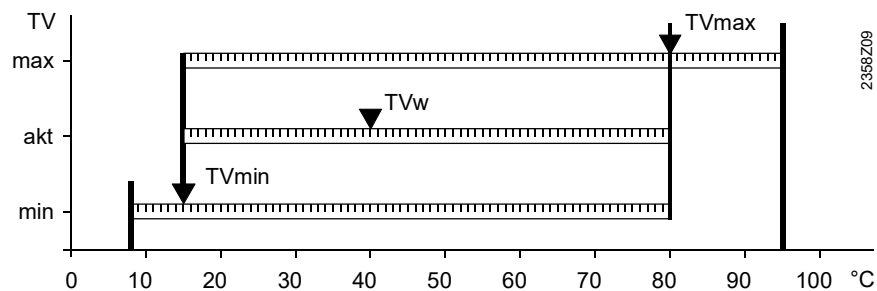


- The function is not active in operating mode "Continuously Comfort temperature" 
- The display shows ECO
- To give consideration to the building's thermal dynamics, the outside temperature will be attenuated

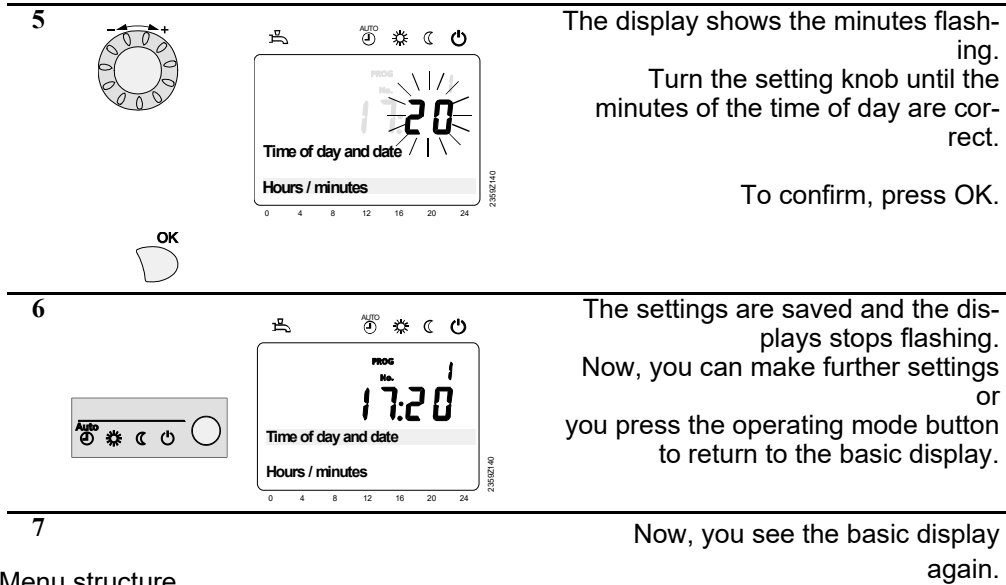
## Flow temperature setpoint limits

<i>Line no.</i>	<i>Operating line</i>
<b>HC1</b>	
740	Flow temp setpoint min
741	Flow temp setpoint max

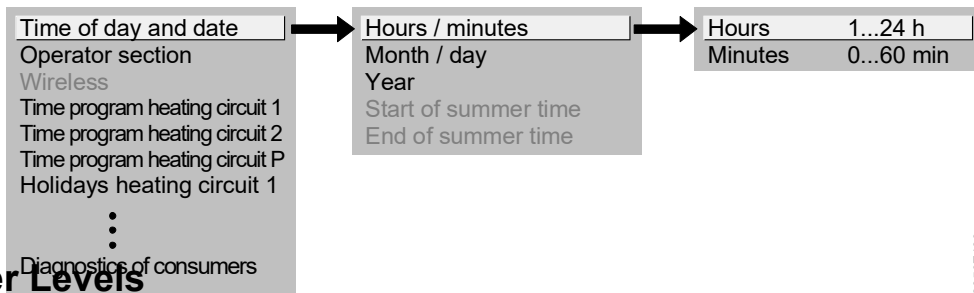
Using this limitation, a temperature range for the flow temperature setpoint can be defined. If the flow temperature setpoint demanded by the heating circuit reaches the relevant limit and the heat request increases or decreases, the flow temperature setpoint will be maintained at the maximum or minimum limit.



**TVw** Current flow temperature setpoint  
**TVmax** Flow temperature setpoint maximum  
**TVmin** Flow temp setpoint minimum



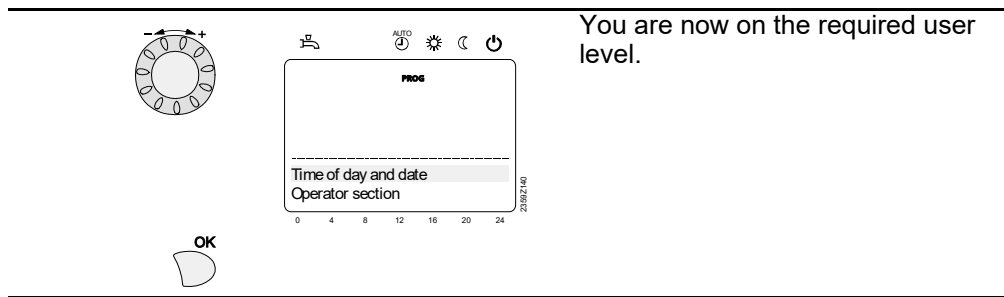
Example of Menu structure



### 5.1 User Levels

The user levels only allow authorized user groups to make settings. To reach the required user level, proceed as follows:

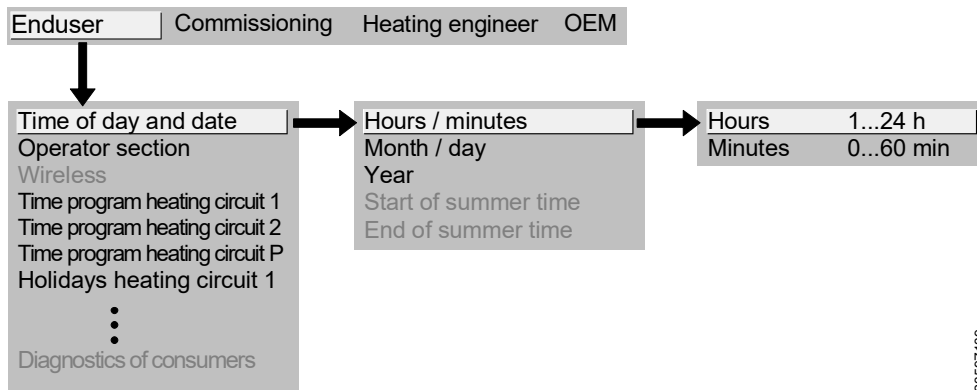
Operation	Display example	Description
<p><b>1</b></p>		<p>Basic display. If the basic display is not shown, press the ESC button to return to it.</p> <p>Press OK.</p>
<p><b>2</b></p>		<p>You are on the user level <i>End user</i>.</p> <p>Press INFO for 3 seconds.</p>
<p><b>3</b></p>		<p>You are now given a choice of user levels. Turn the setting knob until the required user level is reached.</p> <p>Press OK.</p>



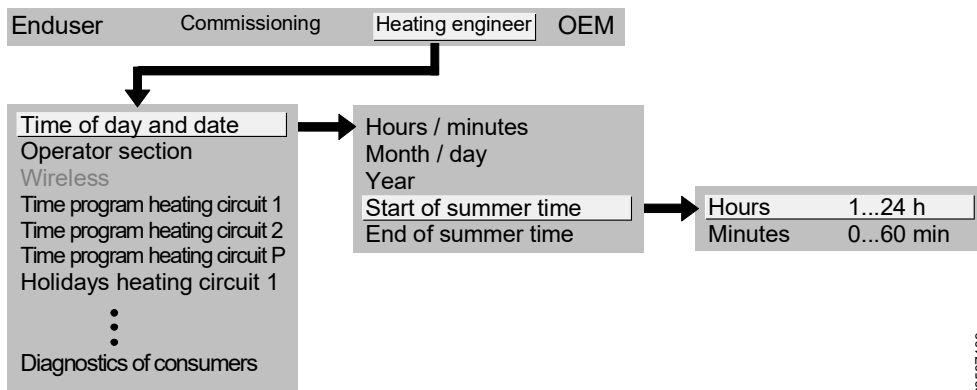
To reach the OEM level, the relevant code must be entered.

### Setting the structure "End user"

The example given here shows that certain user levels do not allow certain settings to be made. The example shows them highlighted. On the unit, they are hidden.



### Setting the structure "Heating engineer"



## 5.2 Overview of Settings

The table shows all available settings up to the heating engineer level. However, certain operating lines may be hidden, depending on the type of unit.

**Legend**      E = End user      I = Commissioning      F = Heating engineer      BZ = Operating line  
<sup>1)</sup> QAA75../78.. only  
<sup>6)</sup> RVS63.. only

Operating Line	User Level	Function	Default Value	Minimum	Maximum	Unit
<b>Time of day and date</b>						
1	E	Hours/minutes	-	00:00	23:59	hh:mm
2	E	Day/month	-	01.01	31.12	dd.MM
3	E	Year	-	2004	2099	yyyy
5	F	Start of summertime	25.03	01.01	31.12	dd.MM
6	F	End of summertime	25.10	01.01	31.12	dd.MM
<b>Operator unit</b>						
20	E	Language German   ...	German			-
22	F	Info Temporarily   Permanently	Temporarily			-
26	F	Operation lock Off   On	Off			-
27	F	Programming lock Off   On	Off			-
28	I	Direct adjustment Automatic storage   Save with acknowledgment	Save with acknowledgment			
40 <sup>1)</sup>	I	Used as Room unit 1   Operator unit 1   Service unit	Room unit 1			-
42 <sup>1)</sup>	I	Assignment device 1 Heating circuit 1	Heating circuit 1			-
48 <sup>1)</sup>	I	Action occupancy button None   Heating circuit 1   Commonly	Heating circuit 1			-
54 <sup>1)</sup>	F	Readjustment room sensor	0.0	-3	3	°C
70	F	Software version	-	0	99.9	-
<b>Radio</b>						
120	I	Binding No   Yes	No			
121	I	Test mode Off   On	Off			
130	I	Room unit 1 Missing   Ready   No reception   Change battery	-		-	
133	I	Outside Sensor Missing   Ready   No reception   Change battery	-	-		
134	I	RF repeaters Missing   Ready   No reception   Change battery	-	-		
135	I	Operator unit 1 Missing   Ready   No reception   Change battery	-	-		
138	I	Service unit Missing   Ready   No reception   Change battery	-			
140	I	Delete all devices No   Yes	No			

Operating Line	User Level	Function	Default Value	Minimum	Maximum	Unit
<b>Time program heating circuit 1</b>						
500	E	Preselection Mo - Su   Mo - Fr   Sa - Su   Mo   Tu   We   Th   Fr   Sa   Su	Mo - Su			-
501	E	1st phase on	6:00	0.00	24:00	hh:mm
502	E	1st phase off	22:00	0.00	24:00	hh:mm
503	E	2nd phase on	24:00	0.00	24:00	hh:mm
504	E	2nd phase off	24:00	0.00	24:00	hh:mm
505	E	3rd phase on	24:00	0.00	24:00	hh:mm
506	E	3rd phase off	24:00	0.00	24:00	hh:mm
516	E	Standard values No   Yes	No			-
<b>Time program 4 / DHW</b>						
560	E	Preselection Mo - Su   Mo - Fr   Sa - Su   Mo   Tu   We   Th   Fr   Sa   Su	Mo - Su			-
561	E	1st phase on	6:00	00:00	24:00	hh:mm
562	E	1st phase off	22:00	00:00	24:00	hh:mm
563	E	2nd phase on	24:00	00:00	24:00	hh:mm
564	E	2nd phase off	24:00	00:00	24:00	hh:mm
565	E	3rd phase on	24:00	00:00	24:00	hh:mm
566	E	3rd phase off	24:00	00:00	24:00	hh:mm
576	E	Standard values No   Yes	No			-
<b>Holidays heating circuit 1</b>						
641	E	Preselection Period 1   Period 2   Period 3   Period 4   Period 5   Period 6   Period 7   Period 8	Period 1			-
642	E	Start	--:--	01.01	31.12	dd.mm
643	E	End	--:--	01.01	31.12	dd.mm
648	E	operating level Frost protection   Reduced	frost protection			-
<b>Heating Circuit 1</b>						
710	E	Comfort cooling setpoint	20.0	Operating line 712	Operating line 716	°C
712	E	Reduced setpoint	16	Operating line 714	Operating line 710	°C
714	E	Frost protection setpoint	10.0	4	Operating line 712	°C
716	F	Comfort setpoint maximum	35.0	Operating line 710	35.0	°C
720	E	Heating curve slope	1.50	0.1	4.00	-
721	F	Heating curve displacement	0.0	-4.5	4.5	°C
726	F	Heating curve adaption Off   On	Off			-
730	E	Summer/winter heating limit	18	---/8	30	°C
732	F	24-hour heating limit	-3	---/-10	10	°C
740	I	Flow temperature setpoint minimum	8	8	Operating line 741	°C
741	I	Flow temperature setpoint maximum	80	Operating line 740	95	°C
750	F	Room influence	20	---/1	100	%
760	F	Room temperature limitation	1	--- / 0.5	4	°C
770	F	Boost heating	5	--- / 0	20	°C
780	F	Quick setback Off   Down to reduced setpoint   Down to frost protection setpoint	Down to reduced setpoint			-

Operating Line	User Level	Function	Default Value	Minimum	Maximum	Unit
<b>Heating Circuit 1</b>						
790	F	Optimum start control maximum	0	0	360	min
791	F	Optimum top control maximum	0	0	360	min
800	F	Reduced setpoint increase start	---	---/-30	10	°C
801	F	Reduced setpoint increase end	-15	-30	Operating line 800	°C
820	F	Over temperature protection pump circuit Off   On	On			-
830	F	Mixing valve boost	5	0	50	°C
832	F	Actuator type 2position   3 position	3-position			-
833	F	Switching differential 2-position	2	0	20	°C
834	F	Actuator running time	120	30	873	s
861	F	Excess heat draw Off   Heating mode   Always	Always			
872	F	With primary controller / system pump No   Yes	Yes			
882 <sup>b)</sup>	F	Pump speed minimum	100	0	100	%
883 <sup>b)</sup>	F	Pump speed maximum	100	0	100	%
900	F	Changeover of operating mode None   Protection   Reduced   Comfort   Automatic	Protection mode			
<b>DHW</b>						
1610	E	Nominal setpoint	55	Op line 1612	BZ 1614 OEM	°C
1612	F	Reduced setpoint	40	8	Operating line 1610	°C
1620	I	Release 24h/day   Time programs HCs   Time program 4/DHW	Time programs HCs			-
1630	I	charging priority Absolute   Shifting   None   MC shifting, PC absolute	MC shifting, PC absolute			-
1640	F	Legionella function Off   Periodically   Fixed weekday	Fixed weekday			-
1641	F	Legionella function periodically	3	1	7	Days
1642	F	Legionella function weekday Monday   Tuesday   Wednesday   Thursday   Friday   Saturday   Sunday	Monday			
1644	F	Legionella function time	---	--- / 00:00	23:50	hh:mm
1645	F	Setpoint of legionella function	65	55	95	°C
1646	F	Legionella function dwelling time	30	--- / 10	360	min
1647	F	Legionella function circulating pump Off   On	On			-
1660	F	Release of circulating pump Time program 3/HCP   DHW release   Time program 4/ DHW   Time program 5	DHW release			-
1661	F	Circulating pump cycling Off   On	On			-
1663	F	Circulation setpoint	45	8	80	°C
<b>Cascade</b>						
3532	F	Restart lock	300	0	1800	s
3533	F	Switch-on delay	5	0	120	min
3540	F	Auto source sequence changeover	500	--- / 10	990	h
3541	F	Auto source seq exclusion None   First   Last   First and last	None	None		-
3544	F	Leading source Source 1   Source 2   ...   Source 16	Source 1	Source 1		

Operating Line	User Level	Function	Default Value	Minimum	Maximum	Unit
<b>DHW storage tank</b>						
5020	F	Flow setpoint boost	16	0	30	°C
5021	F	Increase of transfer boost	8	0	30	°C
5022	F	Type of charging with B3   With B3 and B31   Legionella B3 and B31	With B3 and B31			
5050	F	Charging temperature maximum	80	8	BZ 5051 OEM	°C
5060	F	Electric immersion heater operating mode Substitute   Summer   Always	Substitute			-
5061	F	Electric immersion heater release 24h/day   DHW release   Time program4/ DHW	DHW release			-
5062	F	Electric immersion heater control External thermostat   DHW sensor	DHW sensor			-
5085	F	Excess heat draw Off   On	On			-
5092	F	With primary controller / system pump No   Yes	No			
5101 <sup>b)</sup>	F	Pump speed minimum	40	0	100	%
5102 <sup>b)</sup>	F	Pump speed maximum	100	0	100	%
<b>Configuration</b>						
5710	I	Heating circuit 1 Off   On	On		-	
5730	I	DHW sensor B3 Sensor   Thermostat	Sensor		-	
5731	I	DHW control element Q3 None   Charging pump   Diverting valve	charging pump		-	
5736	I	Separate DHW circuit Off   On	Off		-	
5890	I	Relay output QX1 None   Circulating pump Q4   Electric immersion heater DHW K6   H1 pump Q15   Boiler pump Q1   Alarm output K10   2nd pump speed HC1 Q21   H pump Q18   System pump Q14   Heat generator shutoff valve Y4   Time program 5 K13   H3 pump Q19   Flue gas relay K17   Assisted firing fan K30   Cascade pump Q25   DHW mixing pump Q35   DHW internal circulating pump Q33   Heat request K27	None		-	°C
5891 <sup>b)</sup>	I	Relay output QX2 None   Circulating pump Q4   Electric immersion heater DHW K6   Collector pump Q5   H1 pump Q15   Boiler pump Q1   Alarm output K10   2nd pump speed HC1 Q21   H pump Q18   System pump Q14   Heat generator shutoff valve Y4   Time program 5 K13   H3 pump Q19   Cascade pump Q25   DHW mixing pump Q35   DHW internal circulating pump Q33   Heat request K27	None		-	95
5930	I	Sensor input BX1 None   DHW sensor B31   Return sensor B7   DHW circulation sensor B39   Common flow sensor B10   DHW charging sensor B36   Common return sensor B73   Cascade return sensor B70	None		-	°C
5950	I	Function of input H1 Operating mode changeover HCs + DHW   Operating mode changeover HCs   Operating mode changeover HC1   Heat generation lock   Error/alarm message   Minimum flow temperature setpoint   Heat request 10V   Room temperature 10V	Operating mode changeover HCs+DHW		-	-
5951	I	Operating action of contact H1 NC   NO	NO		-	
5952	I	Minimum flow temperature setpoint H1	70	8	120	°C
5954	I	Temperature value 10V H1	100	5	130	°C



Operating Line	User Level	Function	Default Value	Minimum	Maximum	Unit
<b>Configuration</b>						
6014	I	Function mixing group 1 Heating circuit 1 ; Return temperature controller ; Primary control/system pump ; DHW primary controller ; Instantaneous DHW heater ; Return controller cascade ; Heating circuit ;	Heating circuit		-	°C
6030	I	Relay output QX21 None ; Circulating pump Q4 ; Electric immersion heater DHW K6 ; H1 pump Q15 ; Boiler pump Q1 ; Alarm output K10 ; 2nd pump speed HC1 Q21 ; H2 pump Q18 ; System pump Q14 ; Heat generator shutoff valve Y4 ; Time program 5 K13 ; H3 pump Q19 <sup>6)</sup> ; Cascade pump Q25 ; DHW mixing pump Q35 ; DHW internal circulating pump Q33 ; Heat request K27 ;	None			
6031	I	Relay output QX22 None ; Circulating pump Q4 ; Electric immersion heater DHW K6 ; H1 pump Q15 ; Boiler pump Q1 ; Alarm output K10 ; 2nd pump speed HC1 Q21 ; H2 pump Q18 ; System pump Q14 ; Heat generator shutoff valve Y4 ; Time program 5 K13 ; H3 pump Q19 <sup>6)</sup> ; Cascade pump Q25 ; DHW mixing pump Q35 ; DHW internal circulating pump Q33 ; Heat request K27 ;	None			
6032	I	Relay output QX23 None ; Circulating pump Q4 ; Electric immersion heater DHW K6 ; H1 pump Q15 ; Boiler pump Q1 ; Bypass pump Q12 ; Alarm output K10 ; 2nd pump speed HC1 Q21 ; H2 pump Q18 ; System pump Q14 ; Heat generator shutoff valve Y4 ; Time program 5 K13 ; H3 pump Q19 <sup>6)</sup> ; Flue gas relay K17 ; Assisted firing fan K30 ; Cascade pump Q25 ; DHW mixing pump Q35 ; DHW interm circ pump Q33 ;	None			
6100	F	Readjust outside sensor	0	-3.0	3.0	°C
6110	F	time constant building	15	0	50	h
6120	F	Frost protection for the plant Off ; On	Off			
6128	F	Heat request below OT	--- /	--- / -50	50	°C
6129	F	Heat request above OT	--- /	--- / -50	50	°C
6131	F	Heat required in economy mode Off ; On DHW ; On	Off			
6200	I	Save sensors No ; Yes	No			
6205	F	Reset to default parameters No ; Yes	No			
6212	I	Check-No. heat source 1	-	0	199999	
6213	I	Check-No. heat source 2	-	0	199999	
6217	I	Check-No. heating circuits	-	0	199999	
6220	F	Software version	-	0	99.9	
<b>LPB system</b>						
6600	I	Device address	1	0	16	
6601	F	Segment address	0	0	14	
6604	F	Bus power supply function Off ; Automatically	Automatically			
6605	F	Bus power supply state Off ; On	On			
6620	F	Action changeover functions Segment ; System	System			
6621	F	Summer changeover Locally ; Centrally	Locally			
6623	F	Changeover of operating mode Locally ; Centrally	Centrally			

Operating Line	User Level	Function	Default Value	Minimum	Maximum	Unit
<b>LPB</b>						
6621	F	Summer changeover Locally   Centrally	Locally			
6623	F	Changeover of operating mode Locally   Centrally	Centrally			
6624	F	Manual source lock Locally   Segment	Locally			
6625	F	Assignment of DHW heating Local HCs   All HCs in segment   All HCs in system	All HCs in system			
6631	F	Ext source with eco mode Off   On DHW   On	Off			
6640	I	Clock mode Autonomously   Slave without remote   Slave with remote setting   Master	Autonomously			
6650	F	Outside temperature source	Outside temp source		0	0
<b>Fault</b>						
6710	I	Reset alarm relay No   Yes	No			-
6740	F	Flow temperature 1 alarm	---	--- / 10	240	min
6741	F	Flow temperature 2 alarm	---	--- / 10	240	min
6743	F	Boiler temperature alarm	---	--- / 10	240	min
6745	F	DHW charging alarm	---	--- / 1	48	h
6800	F	History 1	-			
6801	F	Error code 1	-	0	255	-
6802	F	History 2	-			
6803	F	Error code 2	-	0	255	-
6804	F	History 3	-			
6805	F	Error code 3	-	0	255	-
6806	F	History 4	-			
6807	F	Error code 4	-	0	255	-
6808	F	History 5	-			
6809	F	Error code 5	-	0	255	-
6810	F	History 6	-			
6811	F	Error code 6	-	0	255	-
6812	F	History 7	-			
6813	F	Error code 7	-	0	255	-
6814	F	History 8	-			
6815	F	Error code 8	-	0	255	-
6816	F	History 9	-			
6817	F	Error code 9	-	0	255	-
6818	F	History 10	-			
6819	F	Error code 10	-	0	255	-
<b>Maintenance/special operation</b>						
7040	F	Burner hours interval	---		10000	h
7041	F	Burner hours since maintenance	0		10000	h
7042	F	Burner start interval	---		65535	-
7043	F	Burner starts since maintenance	0		65535	-
7044	F	Maintenance interval	---		240	months
7045	F	Time since maintenance	0		240	months
7119	F	Economy function Locked   released	Locked			-
7120	E	Economy mode Off   On	Off			-
7130	E	Chimney sweep function Off   On	Off			-

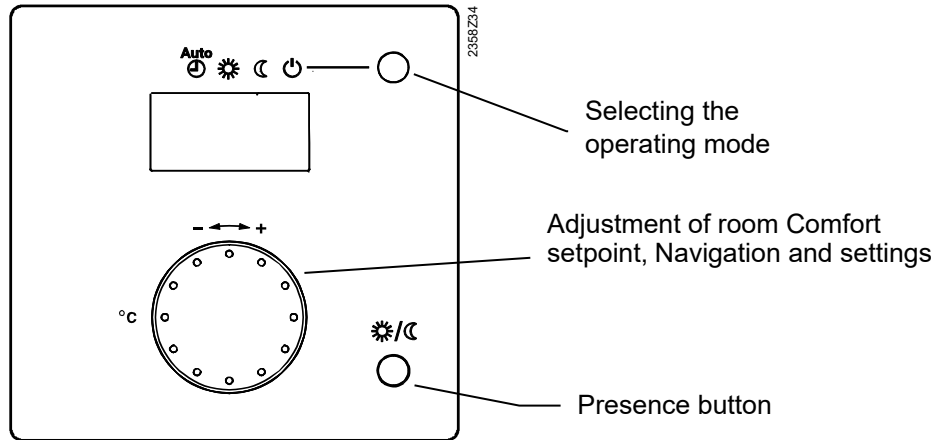
Operating Line	User Level	Function	Default Value	Minimum	Maximum	Unit
<b>Maintenance/special operation</b>						
7140	E	Manual operation Off   On	Off			-
7150	I	Simulation outside temperature	-	-50.0	50	°C
7170	I	Telephone, customer service				-
<b>Input/Output test</b>						
7700	I	Relay test No test   Everything off    DHW pump Q3   Heating circuit pump Q2   Heat circ mix valve op Y1   Heat circ mix valve cl Y2   Heating circuit pump Q6 <sup>6)</sup>   Heat circ mix valve op Y5 <sup>6)</sup>   Heat circ mix valve cl Y6 <sup>6)</sup>   Relay output QX1   Relay output QX2 <sup>6)</sup>   Relay output QX3 <sup>6)</sup>   Relay output QX4 <sup>6)</sup>   Relay output QX21 module 1   Relay output QX22 module 1   Relay output QX23 module 1   Relay output QX21 module 2   Relay output QX22 module 2   Relay output QX23 module 2	No test		-	-
7730	I	Outside temp B9	-	-50.0	50	°C
7732	I	Flow temp B1	-	0	140	°C
7734 <sup>6)</sup>	I	Flow temp B12	-	0	140	°C
7750	I	DHW temp B3	-	0	140	°C
7760	I	Boiler temp B2	-	0	140	°C
7820	I	Sensor temp BX1	-	-28	350	°C
7840	I	Voltage signal H1	-	0	10	Volt
7841	I	Contact state H1 Open   Closed	-	open		-
<b>State</b>						
8000	I	State of heating circuit 1	-			-
8003	I	State of DHW	-			-
8005	I	State of boiler	-			-
<b>Diagnostics cascade</b>						
8100 to.. 8130	I	Priority source 1...16				
8101 to.. 8131	I	State source 1...16 Missing   Faulty   Manual control active   Heat generation lock active   Chimney sweep function active   Separate DHW circuit active   Outside temp limit active   Not released   Released				
8138	I	Cascade flow temperature	0	0	140	°C
8139	I	Cascade flow temperature setpoint	0	0	140	°C
8140	I	Cascade return temperature	0	0	140	°C
8141	I	Cascade return temperature setpoint	0	0	140	°C
8150	I	Source sequence changeover current	0	0	990	h
<b>Diagnostics heat generation</b>						
8310	I	Boiler temperature	-	0	140.0	°C
8311	I	Boiler setpoint	-	0	140.0	°C
8312	I	Boiler switching point	0	0	140	°C
8314	I	Return temperature	-	0	140.0	°C
8315	I	Boiler return temperature setpoint	0	0	140	°C

Operating Line	User Level	Function	Default Value	Minimum	Maximum	Unit
<b>Diagnostics consumers</b>						
8700	I	Outside temperature	-	-50.0	50.0	°C
8703	I	Outside temp attenuated	-	-50.0	50.0	°C
8704	I	Outside temperature composite	-	-50.0	50.0	°C
8730	I	Heating circuit pump Q2 Off   On	-			-
8731	I	Heating circ mix valve op Y1 Off   On	-			-
8732	I	Heating circ mix valve cl Y2 Off   On	-			
8735 <sup>6)</sup>	F	Speed heating circuit pump 1	0	0	100	%
8740	I	Room temp 1	-	0	50.0	°C
8741	I	Room setpoint 1	-	4.0	35.0	°C
8743	I	Flow temperature 1	-	0	140.0	°C
8744	I	Flow temp setpoint 1	-	0	140.0	°C
8820	I	DHW pump Q3 Off   On	-			-
8825 <sup>6)</sup>	F	Speed DHW pump	0	0	100	%
8826 <sup>6)</sup>	F	Speed DHW internal circulating pump	0	0	100	%
8830	I	DHW temp 1	-	0	140	°C
8831	I	DHW temp setpoint	-	8	80	°C
8832	I	DHW temp 2	-	0	140	°C
8835	I	DHW circulation temp	-	0	140	°C
8836	I	DHW charging temp	0	0	140	°C
8850	I	DHW primary controller temperature	0	0	140	°C
8851	I	DHW primary controller setpoint	0	0	140	°C
8852	I	Instant DHW heater temperature	0	0	140	°C
8853	I	Instant DHW heater setpoint	0	0	140	°C
8930	I	Primary controller temperature	-	0	140	°C
8831	I	Primary controller setpoint	-	0	140.0	°C
8950	I	Common flow temperature	-	0	140.0	°C
8951	I	Common flow temp setpoint	-	0	140.0	°C
8952	I	Common return temperature	0	0	140	°C
8962	I	Common output setpoint	0	0	100	%
9000	I	Flow temperature setpoint H1	-	5	130.0	°C
9005	I	Water pressure H1	-	0	10.0	bar
9031	I	Relay output QX1 Off   On	-			-
9032 <sup>6)</sup>	I	Relay output QX2 Off   On	-			-
9033 <sup>6)</sup>	I	Relay output QX3 Off   On	-			-
9034 <sup>6)</sup>	I	Relay output QX4 Off   On	-			

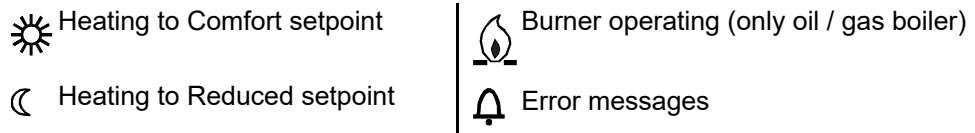
## 5. 3 QAA55...

### 5.3.1 Operation

#### Operating elements



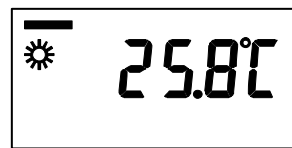
#### Display options



#### Display

Display of all displayable symbols and segments.

Example of basic display:



#### Selection of space heating mode

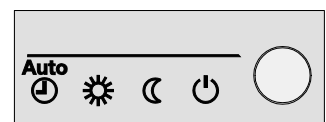
This setting is used to switch between the different operating modes. The selection made is indicated by a bar which appears below the respective symbol.

#### **Automatic mode** AUTO

Automatic mode controls the room temperature according to the time program.



Characteristics of automatic mode:

- Heating mode according to the time program
- Temperature setpoints according to the heating program "Comfort setpoint" or "Reduced setpoint"
- Protective functions active
- Automatic summer / winter changeover (ECO functions)



## Continuous operation or

Continuous operation maintains the room temperature at the selected operating level.

-  Heating to Comfort setpoint
-  Heating to Reduced setpoint

Characteristics of continuous operation:

- Heating mode with no time program
- Protective functions active
- Automatic summer / winter changeover (ECO functions) and 24-hour heating limit inactive in the case of continuous operation with Comfort setpoint

## Protection

When using Protection, the heating system is off. However, it remains protected against frost (frost protection temperature) provided there is no power failure.


Characteristics of Protection:

- Heating off
- Temperature according to frost protection
- Protective functions active
- Automatic summer / winter changeover (ECO functions) and automatic 24-hour heating limit active

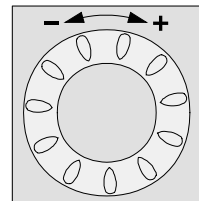
## Adjusting the room temperature setpoint

Turn the setting knob to increase or decrease the

**Comfort setpoint** .

For the **Reduced setpoint** .

- Press OK
- Select operating page "Heating circuit" and
- adjust the "Reduced setpoint"

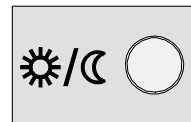




After each readjustment, wait at least 2 hours, allowing the room temperature to adapt.

## Presence button

If you do not use the rooms for a certain period of time, you can press the presence button to reduce the room temperature, thus saving heating energy.

When the rooms are occupied again, press again the presence button to resume heating operation.



-  Heating to Comfort setpoint
-  Heating to Reduced setpoint



- The presence button is only active in automatic operation
- The current selection is active until the next switching action according to the heating program take place

### 5.3.2 Programming

<b>Configuration</b>	A long press on the presence button enables the service level to be accessed.	
Settings		
Used as	ru = 1 (factory setting)	The room unit is addressed as room unit 1
Direct adjustment	P1 = 1 (factory setting)	Automatic storage: A setpoint readjustment with the knob is adopted either by pressing the operating mode button or without any further confirmation (timeout).
	P1 = 2	Storage with confirmation: A setpoint readjustment with the knob is adopted only after pressing the operating mode button.

## **6 The settings in detail**

### **6.1 Time of day and date**

The controller has a yearly clock with time of day, weekday and date. To ensure the controller's functionality, both the time of day and the date must be correctly set.

<i>Line no.</i>	<i>Operating line</i>
1	Hours/minutes
2	Day/month
3	Year
5	Start of summertime
6	End of summertime

Summer- / wintertime  
changeover

The dates set for the changeover from wintertime to summertime - , and vice versa, - ensure that on the first Sunday after the set date the time of day will change from 02:00 (wintertime) to 03:00 (summertime), and from 03:00 (summertime) to 02:00 (wintertime).

### **6.2 Operator unit**

Operation and display

<i>Line no.</i>	<i>Operating line</i>
20	Language
22	Info Temporary Permanently
26	Operation lock
27	Programming lock
28	Direct adjustment Automatic storage Save with acknowledgment

Info

- Temporarily: After pressing the info button, a change to the "predefined" basic display is made after a maximum of 8 minutes or by pressing the operating mode button (with the QAA78... only 2 minutes) .
- Continuously: After pressing the info button, a change back to the "new" basic display is made after a maximum of 8 minutes. The info value selected last will be adopted by the new basic display. This setting is not possible with the QAA78...

Operation lock

When operation lock is activated, the following operating elements can no longer be adjusted:  
Heating circuit operating mode, DHW operating mode, room Comfort setpoint (setting knob), and presence button.

Programming lock

- When programming lock is activated, parameter values can still be displayed, but can no longer be changed.
- Temporary deactivation of the programming lock.  
Within the programming level, the programming lock can temporarily be overridden. To do this, press the OK and ESC buttons simultaneously for 3 seconds. Temporary deactivation of the programming lock is maintained until programming is quit.
  - Constant deactivation of programming lock.  
First, make the temporary deactivation, then go to operating line "Programming lock" (operating line 27) and deactivate the programming lock



### **6.3 List of wireless devices**

<i>Line no.</i>	<i>Operating line</i>
130	Room unit 1 <i>Missing</i> <i>Ready</i> <i>No reception</i> <i>Change battery</i>
133	Outside sensor <i>Missing</i> <i>Ready</i> <i>No reception</i> <i>Change battery</i>
134	RF repeaters <i>Missing</i> <i>Ready</i> <i>No reception</i> <i>Change battery</i>
135	Operator unit 1 <i>Missing</i> <i>Ready</i> <i>No reception</i> <i>Change battery</i>
138	Service unit <i>Missing</i> <i>Ready</i> <i>No reception</i> <i>Change battery</i>
140	<i>Delete all devices</i>

Delete all devices

The wireless connection to all devices will be cancelled. If radio communication is required again, a new binding must be established.

### **6.4 Time programs**

For the heating circuits and DHW heating, a number of switching programs are available. They are activated in "Automatic" operation and control the change of the temperature levels (and the associated setpoints) via the selected switching times.

Entering the switching times

The switching times can be set in a combined way, that is, either commonly for several days or in the form of separate times for individual days. When preselecting groups of days like for instance Mo...Fr and Sa...Su that use the same switching times, setting of the switching programs is simplified.

## Switching points

<i>Line no.</i>		<i>Operating line</i>
<b>HC1</b>	<b>4/DHW</b>	
500	560	<b>Preselection</b> Mon - Sun Mon - Fri Sat - Sun Mon - Sun
501	561	1st phase on
502	562	1st phase off
503	563	2nd phase on
504	564	2nd phase off
505	565	3rd phase on
506	566	3rd phase off

## Standard program

<i>Line no.</i>	<i>Operating line</i>
<b>516, 536, 556, 576, 616</b>	Default values

All time programs can be reset to their default settings. Each time program has its own operating line to make this reset.



In that case, individual settings will be lost!

## 6.5 Holidays

<i>Line no.</i>	<i>Operating line</i>
<b>HC1</b>	
641	Preselection
642	Start
643	End
648	Operating level Frost protection Reduced

The holiday program is used to switch the heating circuits to a selectable operating level according to calendar dates.



The holiday program can only be used in "Automatic" mode.

## 6.6 Heating circuits

For heating circuits, there are various functions available which can be individually set for each heating circuit.

Operating mode

<i>Line no.</i>	<i>Operating line</i>
1300	<b>Operating Mode</b> Protection mode Automatically Reduced Comfort

The operating mode of heating circuit 1 is selected directly with the operating mode button .

This setting is used to switch between the different operating modes. The functionality corresponds to operating mode selection with the operating mode button. For details, refer to section "Operation".

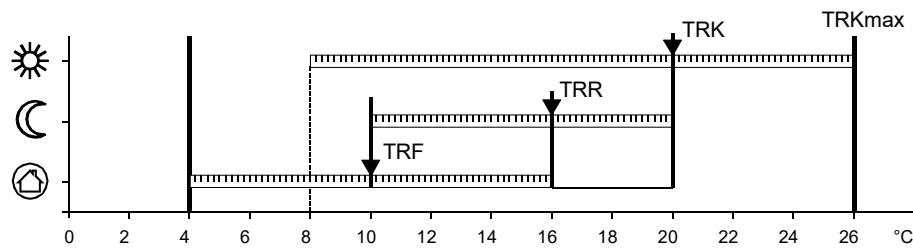
Setpoints

<i>Line no.</i>	<i>Operating line</i>
HC1	
710	Comfort setpoint
712	Reduced setpoint
714	Frost protection setpoint
716	Comfort setpoint max

Room temperature.

The room temperature can be shifted according to different setpoints. These setpoints become active depending on the selected operating mode, thus producing different temperature levels in the rooms.

The ranges of adjustable setpoints result from the interdependencies, as this is shown in the following diagram.



2358Z01

- TRKmax    Comfort setpoint max
- TRK        Comfort cooling setpoint
- TRR        Reduced setpoint
- TRF        Frost protection setpoint

Frost protection

In Protection mode, the room temperature is prevented from falling below a certain level. This means that the frost protection setpoint of the room temperature will be maintained.

Comfort setpoint max

The room temperature can be shifted according to different setpoints. These setpoints become active depending on the selected operating mode, thus producing different temperature levels in the rooms.

The ranges of adjustable setpoints result from the interdependencies, as this is shown in the following diagram.

## Heating curve

Line no.	Operating line
<b>HC1</b>	
720	Heating curve slope
721	Heating curve displacement
726	Heating curve adaption

The heating curve is used to generate the flow temperature setpoint, which is used to maintain a certain flow temperature level depending on the prevailing weather conditions. The heating curve can be adjusted with a number of settings, thus matching heat output and room temperature to individual needs.

### Heating curve slope

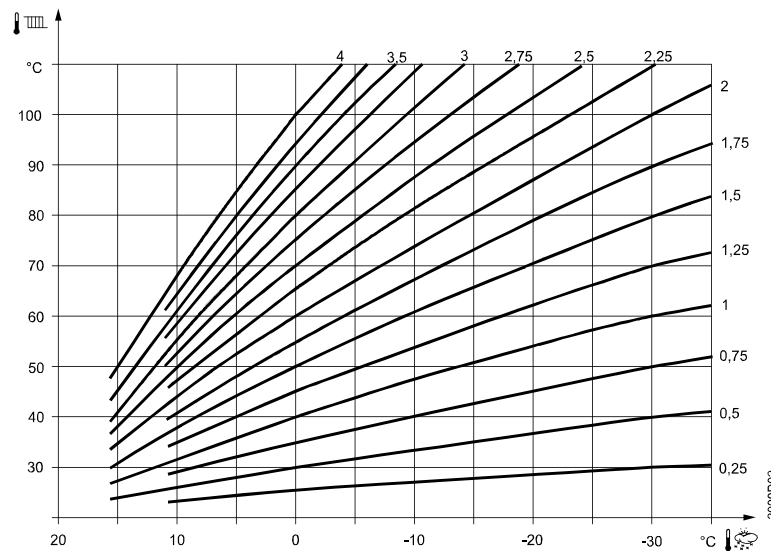
As the heating curve slope is raised, the flow temperature increases the quicker the lower the outside temperature or, in other words, if the room temperature is not correct at low outside temperatures but correct at higher outside temperatures, the heating curve slope requires readjustment.

Increase adjustment: Raises the flow temperature, especially when outside temperatures are low.

Decrease adjustment: Lowers the flow temperature, especially when outside temperatures are low.



The programmed heating curve is based on a room setpoint of 20°C. If the room setpoint is adjusted, the heating curve automatically adapts to the new value.



### Heating curve displacement

Parallel displacement of the heating curve is used to change the flow temperature evenly across the entire outside temperature range or, in other words, if the room temperature is always too high or too low, a readjustment must be made with the help of the parallel displacement.

### Heating curve adaption

Adaptation of the heating curve is used by the controller to automatically adapt the heating curve to the prevailing conditions. In that case, a readjustment of heating curve slope and parallel displacement is not required. It can only be switched on or off.



To assure this function, following must be observed:

- A room sensor must be connected.
- The "Room influence" setting must be selected between 1 and 99
- There should be no thermostatic radiator valves in the reference room (mounting location of room sensor) (if such valves are present, they must be set to their fully open position).

### Input sensor BX

<i>Line no.</i>	<i>Operating line</i>
5930	Sensor output BX1, 2, 3, 4
5931	None
5932	DHW sensor B31
5933	Return sensor B7
	DHW circulation sensor B39
	Common flow sensor B10
	DHW charging sensor B36
	Common return sensor B73
	Cascade return sensor B70

Depending on the selection made, setting of the sensor input assigns appropriate extra functions to the basic diagrams. For detailed information, refer to section "Application diagrams".

### **Input H1 and H3**

The following settings for input H1 apply specifically ..

### Input H..

<i>Line no.</i>	<i>Operating line</i>
5950	Function input H1 Operating mode changeover HCs + DHW Operating mode changeover HC1 Heat generation lock Error / Alarm message Min flow temperature setpoint Excess heat discharge Heat request 10v
5951	Contact type input H1 NC NO
5952	Minimum flow temperature setpoint H1
5954	Temperature value 10v H1

Function of input H...

#### **Changeover of operating mode**

Heating circuit

The operating modes of the heating circuits are switched to Protection mode via the H... terminals (e.g. using a remote telephone switch).

DHW

DHW heating is locked only when using setting 1: HCs+DHW.

#### **Heat generation lock**

The heat source is be locked via the H... terminals. All temperature requests from the heating circuits and DHW are ignored. Frost protection for the boiler is maintained.



The chimney sweep function can be activated although the heat generation lock is switched on.

### Error / alarm message

Input H1 generates a controller-internal error message.

If the "Alarm output" (relay outputs QX2-4, operating lines 5891 – 5894) is appropriately configured, the error message will be forwarded or displayed by an additional contact (e.g. an external lamp or horn).

### Minimum flow temperature setpoint TVHw

The adjusted minimum flow temperature setpoint will be activated via terminals H1/2 (e.g. an air heater function for a warm air curtain) closes its contact.

### Excess heat discharge

Active dissipation of excessive heat enables an external heat source to force consumers (heating circuit, DHW storage tank, Hx pump) to draw excessive heat by delivering a forced signal.

The parameter "Excessive heat draw" can be used to determine for every consumer whether or not it should take account of the "forced" signal, and hence whether or not that consumer should participate in the dissipation of heat.

### Local effect

When using LPB device address 0 or >1, excessive heat dissipation only acts on the local consumers connected to the controller.

### Central effect (LPB)

When using LPB device address = 1, excessive heat dissipation also acts on the consumers connected to the other controllers in the same segment.

The distribution of excessive heat from segment 0 across other segments of the system is not possible.

### Heating demand 10V

Heat generation receives heat requests in the form of voltage signals (DC 0...10V).

The flow temperature setpoint corresponding to the voltage level of 10 V can be adjusted via parameter "Temperature value 10V H...".

Contact type, input H...

### N/C contact

The contact is normally closed and must be opened to activate the selected function.

### N/O contact

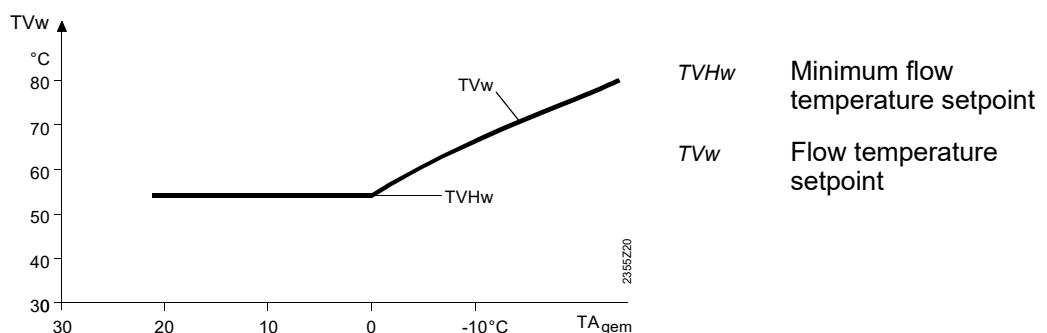
The contact is normally open and must be closed to activate the selected function.

Min flow temperature setpoint H..

The function "Minimum flow setpoint" set on operating line 5950, 5960 or 6046 is activated via contact H... The boiler is controlled constantly at the temperature level set here either until contact H... opens again or until a higher heat request is delivered.

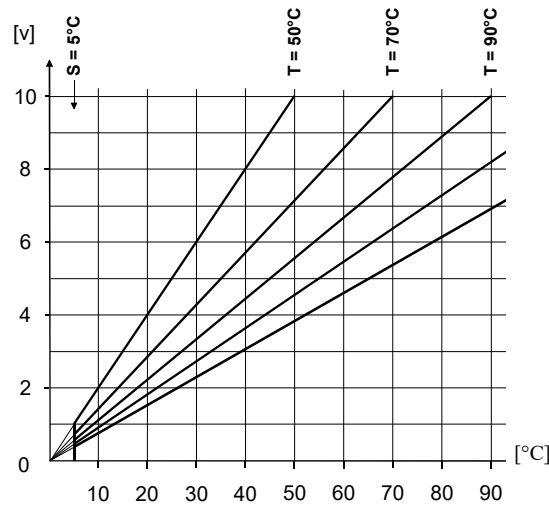


If several heat requests are received at the same time (LPB, contact H.. contact, DHW, or from the controller itself), the highest of them will automatically be selected.



Temp value 10V H..

The voltage signal present at input H.. is converted to a linearized temperature value and then forwarded as the flow temperature setpoint.  
The flow temperature setpoint corresponding to the voltage level of 10 V can be adjusted via parameter “Temperature value 10V H...“.



T = maximum value of heat demand

S = minimum limitation of heat demand = 5 °C

**Mixing valve groups basic unit**

Line no.	Operating line
6014 6015	Function mixing group 1 Heating circuit 1 Return temperature controller Primary controller system pump DHW primary controller Return controller cascade

The mixing valve groups are assigned to the following connections:

<b>Mixing valve group 1</b>
Q2, Y1, Y2, B1

**Heating circuit 1**

For this application, the respective settings of operating page “Heating circuit 1” can be adapted.

**Return temp controller**

For this application, the respective settings of operating page “Boiler” can be adapted.

**Primary controller / system pump**

For this application, the respective settings of operating page “Primary controller / system pump” can be adapted.

**DHW primary controller**

For this application, the respective settings of operating page “DHW storage tank” can be adapted.

**Return controller cascade**

For this application, the respective settings of operating page “Cascade” can be adapted.

## Room influence

Line no.	Operating line
HC1	
750	Room influence

### Types of compensation:

When a room temperature sensor is used, there is a choice of 3 different types of compensation.

Setting	Type of compensation
- - - %	Pure weather compensation *
1...99 %	Weather compensation with room influence *
100 %	Pure room compensation

\* Outside sensor required.

Weather compensation only

The flow temperature is calculated via the heating curve, depending on the composite outside temperature. This type of compensation calls for a correct adjustment of the heating curve since in that case the control gives no consideration to the room temperature.

Weather compensation with room influence

Deviations of the actual room temperature from the setpoint are acquired and taken into account when controlling the temperature. Heat gains can thus be considered, facilitating more accurate room temperature control. The authority of deviation is set as a percentage figure. The better the reference room (correct room temperature, correct mounting location, etc.) the higher the value can be set.

Example:

Approx. 60 % Good reference room conditions

Approx. 20 % Unfavourable reference room



To activate the function, following must be considered:

- A room sensor must be connected.
- "Room influence" must be set to a value between 1 and 99 %.
- There should be no thermostatic radiator valves in the reference room (mounting location of the room sensor). (if such valves are present, they must be set to their fully open position).

Room compensation only

The flow temperature is controlled depending on the room temperature setpoint, the current room temperature and the progression of the room temperature. For example, a slight increase of the room temperature causes an immediate drop of the following temperature.



To activate the function, following must be considered:

- A room sensor must be connected.
- "Room influence" must be set to 100 %.
- There should be no thermostatic radiator valves in the reference room (mounting location of the room sensor). (if such valves are present, they must be set to their fully open position).



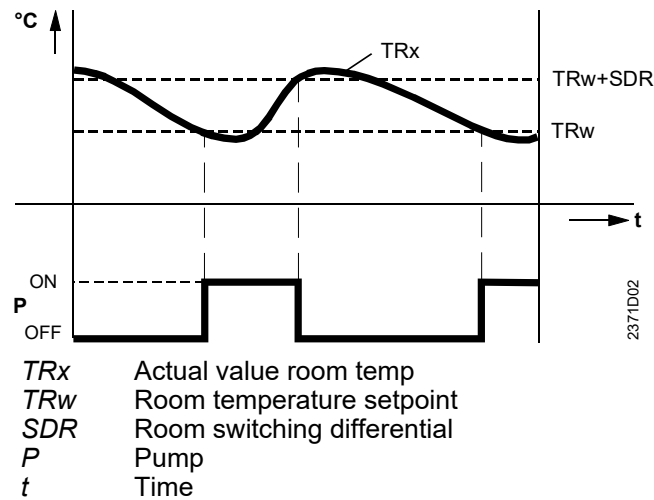
**Room temp limitation**

Line no.	Operating line
HC1	
760	Room temp limitation

With the "Room temperature limitation" function, the heating circuit pump can be disabled if the room temperature exceeds the current room temperature setpoint by more than the preset differential. The heating circuit pump is re-enabled when the room temperature returns to a level below the current room temperature setpoint. While the "Room temperature limitation" function is active, no demand signals are sent to the heat source.



Room temperature limitation does not work in the case of pure weather compensation.



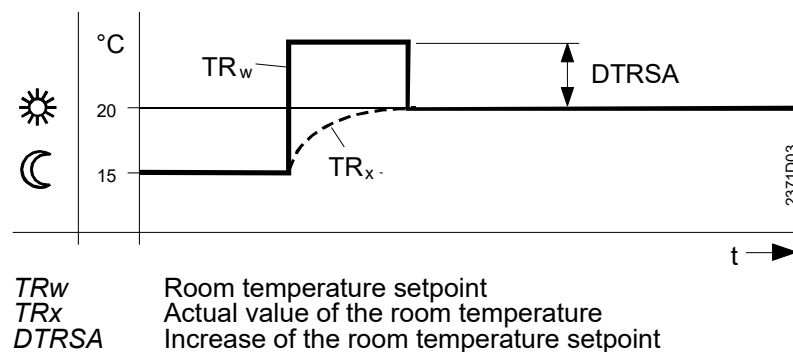
**Boost heating**

Line no.	Operating line
HC1	
770	Boost heating

Boost heating is used to reach the new setpoint more quickly when switching from the Reduced setpoint to the Comfort setpoint, thus reducing the heat-up time. During boost heating, the room temperature setpoint is raised by the value set here. A higher setting leads to shorter heat-up times, a lower setting to longer heat-times.



Boost heating is possible with or without room sensor.



## Quick setback

<i>Line no.</i>	<i>Operating line</i>
<b>HC1</b>	
780	Quick setback Off Down to reduced setpoint Down to frost protection setpoint

During quick setback, the heating circuit pump is deactivated and, in the case of mixing valve circuits, the mixing valve is fully closed.

Function with room sensor:

When using the room sensor, the function keeps the heating switched off until the room temperature has dropped to the level of the Reduced setpoint or the frost level.

When the room temperature has fallen to the Reduced level or the frost level, the heating circuit pump will be activated and the mixing valve will be released.

Function without room sensor:

Quick setback switches the heating off for a certain period of time, depending on the outside temperature and the building time constant.

## Example

Duration of quick setback when Comfort setpoint minus Reduced setpoint = 2°C  
(e.g. Comfort setpoint = 20°C and Reduced setpoint = 18°C)

Outside temperature composite:	Building time constant:						
	0	2	5	10	15	20	50
15 °C	0	3.1	7.7	15.3	23	30.6	76.6
10 °C	0	1.3	3.3	6.7	10	13.4	33.5
5 °C	0	0.9	2.1	4.3	6.4	8.6	21.5
0 °C	0	0.6	1.6	3.2	4.7	6.3	15.8
-5 °C	0	0.5	1.3	2.5	3.8	5.0	12.5
-10 °C	0	0.4	1.0	2.1	3.1	4.1	10.3
-15 °C	0	0.4	0.9	1.8	2.6	3.5	8.8
-20 °C	0	0.3	0.8	1.5	2.3	3.1	7.7
Duration of quick setback in hours							



Quick setback is possible with or without a room sensor

## Optimum start / stop control

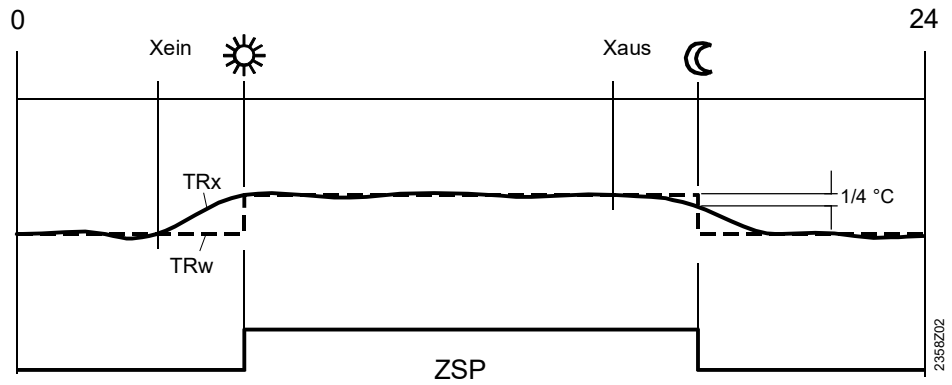
<i>Line no.</i>	<i>Operating line</i>
<b>HC1</b>	
790	Optimum start control max
791	Optimum stop control max

Optimum start control max    The change from one temperature level to the other is optimized in a way that the Comfort setpoint is reached at the relevant switching time.

Optimum stop control max    The change from one temperature level to the other is optimized in a way that the Comfort setpoint minus 1/4 °C is reached at the relevant switching time



Optimum start / stop control is possible with or without room sensor.

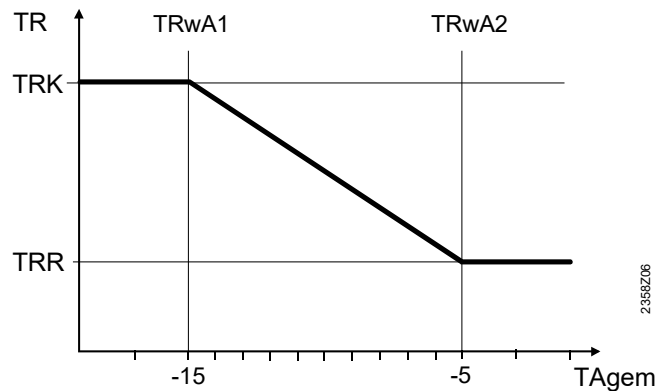


- Xein* Switch-on time shifted forward in time
- Xaus* Switch-off time shifted forward in time
- ZSP* Time switch program
- TRx* Actual value room temp
- TRw* Room temperature setpoint

### Raising the reduced setpoint

Line no.	Operating line
<i>HC1</i>	
800	Red setpoint increase start
801	Red setpoint increase end

The function is used primarily in connection with heating systems with **only** little spare capacity (e.g. low-energy houses). In such cases, the heating up time would be too long at low outside temperatures. When the Reduced setpoint is raised, the rooms are prevented from cooling down to too low levels, thus shortening the heating up time when changing to the Comfort setpoint.



- TRwA1* Reduced setp increase start
- TRwA2* Reduced setp increase end
- TRK* Comfort cooling setpoint
- TRR* Reduced room temperature setpoint
- TAgen* Composite outside temperature

### Over-temperature protection pump circuit

Line no.	Operating line
<i>HC1</i>	
820	Over-temperature protection pump circuit

In the case of heating plant with pump heating circuits, the flow temperature of the heating circuit can be higher than the flow temperature demanded by the heating curve, due to requests from other heat consumers (mixing heating circuit, DHW charging, external heat demand), or a parameterized minimum boiler temperature. As a result of this too high flow temperature, the pump heating circuit would assume excessive temperatures. The function "Over-temperature protection for pump heating circuits" ensures that the energy supply for pump heating circuits corresponds to the demand from the heating curve by activating / deactivating the pump.

**Mixing valve control**

<i>Line no.</i>	<i>Operating line</i>
<b>HC1</b>	
830	Mixing valve boost
832	Actuator type :- 2-position   3-position
833	Switching differential :- 2-pos
834	Actuator running time

Actuator type

The selection of the type of actuator determines the control behavior for the type of mixing valve actuator used.

Switching differential  
2-pos

For the 2-position actuator, the 2-position switching differential must also be adapted. This is not required when using a 3-position actuator.

Mixing valve boost

To ensure proper mixing valve flow temperature control, the flow temperature must be higher than the demanded setpoint of the mixing valve flow temperature. The value set here is added to the request.

Actuator running time

Setting the running time of the actuator used with the mixing valve.

<i>Line no.</i>	<i>Operating line</i>
<b>HC1</b>	
850	<b>Floor curing function</b> Off Functional heating (Fh) Curing heating (Bh) Functional / curing heating Curing heating / functional heating
831	Floor curing setup manually

The floor curing function ensures controlled drying of the floor. It controls the flow temperature according to a temperature profile. Drying of the floor is ensured via the floor heating system and the mixing or pump heating circuit.

### Primary controller

<i>Line no.</i>	<i>Operating line</i>
<b>HC1</b>	
872	With primary controller / system pump

With primary controller / system pump

Specify whether the heating circuit receives its heat via the primary controller or with the help of the system pump (depending on the type of plant).

### Speed-controlled pump

<i>Line no.</i>	<i>Operating line</i>
<b>HC1</b>	
882	Pump speed min
883	Pump speed max

Pump speed min

The minimum speed of the heating circuit pump can be defined

Pump speed max

The maximum speed of the heating circuit pump can be defined.

### Remote control

<i>Line no.</i>	<i>Operating line</i>
<b>HC1</b>	
900	Operating mode changeover None   Protection   Reduced   Comfort   Automatic

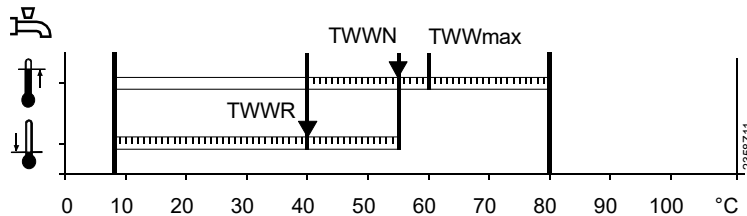
In the case of external changeover via inputs H1 / H2 / H3, the operating mode to be used can be selected.

## 6.7 DHW

### Setpoints

Line no.	Operating line
1610	Nominal setpoint
1612	reduced setpoint

The DHW can be heated up according to different setpoints. These setpoints are activated depending on the selected operating mode, thus leading to different temperature levels in the DHW storage tank.



*TWWR* DHW reduced setpoint  
*TWWN* DHW nominal setpoint  
*TWWmax* DHW nominal setpoint maximum

### Priority

Line no.	Operating line
1630	<b>Charging priority</b> Absolute Shifting None MC shifting, PC absolute

When both space heating and DHW heating call for heat, the “DHW priority” function ensures that while DHW charging is in progress, the capacity of the boiler is used primarily for DHW.

#### Absolute priority

The mixing and pump heating circuit stay locked until DHW heating is finished.

#### Shifting priority

If the capacity of the heat source is not sufficient, the mixing and pump heating circuit will be restricted until DHW is heated up.

#### No priority

DHW heating and space heating take place at the same time.

In the case of tightly sized boilers and mixing heating circuits, it can happen that the DHW setpoint will not be reached if space heating demands considerable amounts of heat.

#### Mixing heating circuit shifting, pump heating circuit absolute

The pump heating circuits stay locked until the DHW storage tank is heated up. If the capacity of the heat source is not sufficient, the mixing heating circuits will also be restricted.

## Legionella function

<i>Line no.</i>	<i>Operating line</i>
1640	<b>Legionella function</b> Off Periodically Fixed weekday
1641	Legionella function periodically
1642	Legionella function weekday Mon .... Sun
1644	Legionella function time
1645	Legionella function setpoint
1646	Legionella function duration
1647	Legionella function circulation pump

Legionella function

Periodically

The legionella function is repeated according to the period of time set (operating line 1641). The legionella setpoint is attained via a solar plant, independent of the period of time set, the period of time will be newly started.

Fixed weekday

The legionella function can be activated on a fixed weekday (operating line 1642). When using this setting, heating up to the legionella setpoint takes place on the selected weekday, independent of previous storage tank temperatures.

Legionella function  
circulation pump

During the time the legionella function is performed, the DHW circulating pump can be activated.



During the time the legionella function is carried out, there is a risk of scalding when opening the taps.

## Circulating pump

<i>Line no.</i>	<i>Operating line</i>
1660	<b>Circulating pump release</b> DHW release Time program 4 /DHW
1661	Circulating pump cycling
1663	Circulating pump setpoint

Circulating pump cycling

When the function is activated, the circulating pump is switched on for 10 minutes within the release time and then switched off again for 20 minutes.

Circulation setpoint

If a sensor is installed in the DHW distribution pipe, the controller will monitor its actual value during the time the legionella function is performed. The adjusted setpoint must be maintained at the sensor during the adjusted "Dwelling time".

## 6.8 Primary controller / system pump

### Primary controller / system

<i>Line no.</i>	<i>Operating line</i>
2150	Primary controller / system pump Before low loss header After low loss header

If the plant uses a buffer storage tank, it is to be set here whether, hydraulically, the primary controller or the system pump is installed upstream from the buffer storage tank.

## 6.9 Cascade

### Control

<i>Line no.</i>	<i>Operating line</i>
3532	Restart lock
3533	Switch-on delay

Restart lock

The restart lock prevents a deactivated heat source from being switched on again. It is released again only after the set time has elapsed. This prevents too frequent switching actions of the heat sources and ensures stable plant operating states.

Switch-on delay

Correct adjustment of the switch-on delay ensures that plant operating conditions will be stable. This prevents too frequent switching actions of the boilers (cycling). In the case of a DHW request, the delay time is fixed at 1 minute.

### Boiler sequence

<i>Line no.</i>	<i>Operating line</i>
3540	Auto source sequence changeover
3541	Auto source sequence exclusion None First Last First & last
3544	Leading source Device 1 ..... Device 16

Auto source sequence changeover

With automatic source sequence changeover, the boiler loads in a cascade can be influenced by defining the order of lead and lag boiler.

#### **Fixed order**

Setting - - - defines a fixed order. In that case, the lead boiler can be selected on operating line 3544; the other boilers are then switched on and off in the same order as the LPB device addresses.

#### **Order according to the number of operating hours**

On completion of the number of hours set, the boiler sequence in the cascade changes. It is always the boiler with the next higher device address which assumes the role of the lead boiler.



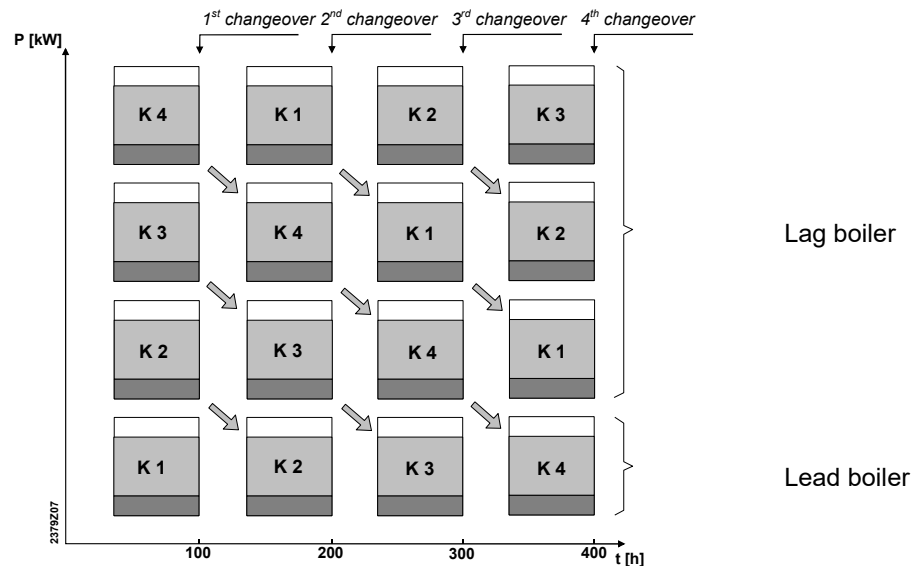
## Cascade Strategy

The default cascade strategy is the Optimum number of boilers firing to reduce ON/OFF cycling..

Alternative strategies are available, but MUST be implemented by an HHL engineer - contact 01202 662555

Options are:

- Maximum number of boilers firing to meet the demand
- Minimum number of boilers firing to meet the demand



t = Total number of operating hours of all lead boilers [h]  
P = Total output of cascade [kW]

Auto source sequence exclusion

Setting automatic source sequence exclusion is only used in connection with the activated heat source sequence (operating line 3540). Using automatic source sequence exclusion, the first and / or the last boiler can be exempted from automatic changeover.

### None.

The order of switching on the boilers changes when the number of hours set is reached (operating line 3540).

### First

The first boiler in terms of addressing will always be the lead boiler. With the other boilers, the order of switching on changes when the set number of hours is reached (operating line 3540).

### Last

The last boiler in terms of addressing will always be the last. The other boilers change when the set number of hours is reached (operating line 3540).

### First and last

The first boiler in terms of addressing will always be the lead boiler. The last boiler in terms of addressing will always be the last. The boilers in between change when the set number of hours is reached (operating line 3540).

Leading source

The leading source is only selected in connection with the fixed order of the heat source sequence (operating line 3540).

The boiler selected as the lead boiler is always the first to be switched on, or the last to be switched off. The other boilers are switched on and off in the order of their device addresses.

### Minimum limitation of the return temperature

<i>Line no.</i>	<i>Operating line</i>
3560	Return setpoint min

Return setpoint min      If the return temperature drops below the adjusted return setpoint, maintained boiler return temperature becomes active..  
Maintained boiler return temperature allows consumers to be influenced or a return temperature controller to be used.

### 6.10 DHW storage tank

#### Charging control

<i>Line no.</i>	<i>Operating line</i>
5020	Flow setpoint boost
5022	Type of charging With B3 With B3 & B31 With B3, legionella B3 & B31

Increase of the flow temperature setpoint      The DHW request to the boiler is made up of the current DHW setpoint plus the adjustable charging boost.

Type of charging      The storage tank can be charged using up to 2 sensors.  
It is also possible to combine partial charging with 1 sensor and the legionella function with 2 sensors (setting 3).

#### Electric immersion heater

<i>Line no.</i>	<i>Operating line</i>
5060	Immersion heater operating mode Substitute Summer Always
5061	Immersion heater release 24/day DHW release Time program 4 / DHW
5062	Immersion heater control External thermostat 2nd DHW sensor

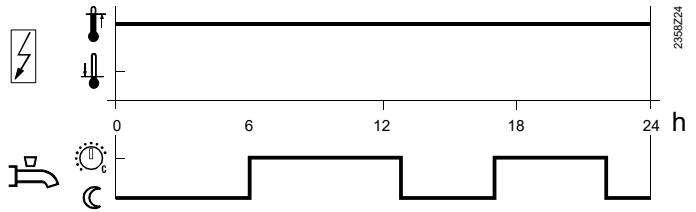
Electric immersion heater operating mode      **Substitute**  
The electric immersion heater is only used if the boiler delivers a fault status message or has been shut down via boiler lock. This means that in normal situations the DHW is always heated by the boiler.

**Summer**  
The electric immersion heater is used as soon as all connected heating circuits have switched to summer operation. The DHW is again heated by the boiler as soon as at least one of the heating circuits has switched back to heating operation. But the electric immersion heater is also used if the boiler delivers a fault status message or has been shut down via boiler lock.

**Always**  
DHW is heated with the electric immersion heater throughout the year. This means that when using this application, the boiler is never required for DHW heating.

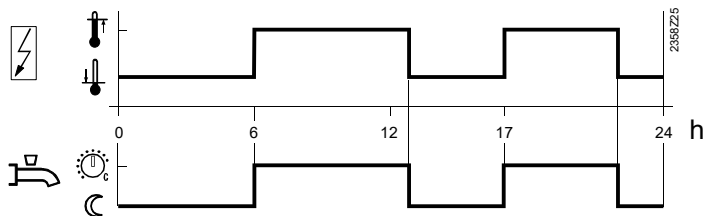
Electric immersion heater  
release

**24h/day**  
The electric immersion heater is always released, independent of time programs.  
Example:



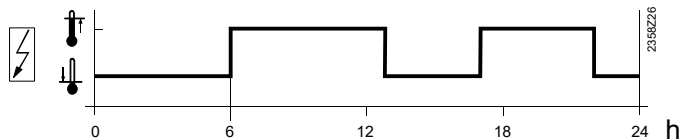
**DHW release**

The electric immersion heater is switched on and off according to DHW release.  
Example:



**Time program 4 / DHW**

For the electric immersion heater, time program 4 / DHW of the local controller is taken into account.  
Example:



Electric immersion heater  
control

**External thermostat**

The storage tank is charged with an external thermostat without setpoint compensation of the controller.

**DHW sensor**

The storage tank is charged with an electric immersion heater, with setpoint compensation from the controller.



To ensure that setpoint compensation operates as required, the external control thermostat must be set to the minimum storage temperature.

Plant hydraulics

Line no.	Operating line
5092	With primary controller/system pump

With primary controller /  
system pump

It is to be set whether the DHW storage tank receives its heat via the primary controller or with the help of the system pump (depending on the type of plant).

## Speed-controlled pump

<i>Line no.</i>	<i>Operating line</i>
5101	Pump speed min
5102	Pump speed max

Charging pump speed control

The charging pump motor speed is limited by a minimum and maximum permitted speed.

To ensure that the pump operates reliably on start-up, it is operated at maximum speed for the first 10 seconds.

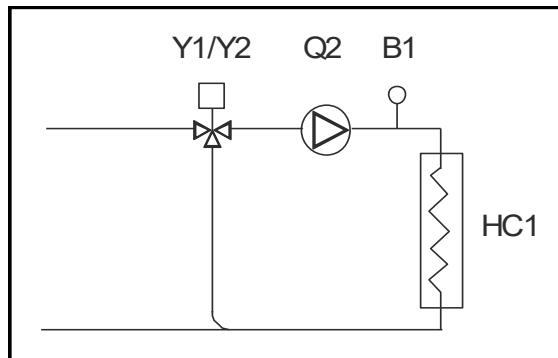
## **6.11 Configuration**

### Heating circuits

<i>Line no.</i>	<i>Operating line</i>
<i>HC1</i>	
5710	Heating circuit 1

Using this setting, the heating circuit can be switched on and off.

Use of mixing valve 1



### DHW sensor B3

<i>Line no.</i>	<i>Operating line</i>
5730	DHW sensor B3 Sensor Thermostat

#### **Sensor**

The collector calculates the switching points including the switching differential from the DHW setpoint and the acquired DHW storage tank temperature.

#### **Control thermostat**

The DHW temperature is controlled based on the switching state of a thermostat connected to B3.



When using a DHW thermostat, Reduced mode is not possible. This means that when Reduced mode is active, DHW heating with the thermostat is locked.



The adjustment of the nominal DHW temperature setpoint must be equal to or higher than the setpoint adjustment on the thermostat (thermostat calibrated at switch-off point)

The flow temperature setpoint for DHW must be set to a minimum of 10 °C (has an impact on the charging time).

In that case, the DHW is not protected against frost.

### DHW control element Q3

<i>Line no.</i>	<i>Operating line</i>
5731	DHW actuating device Q3 None Charging pump Diverting valve

#### **None**

No DHW charging via Q3.

#### **Charging pump**

The DHW is charged with a pump connected to terminal Q3/Y3.

### Separate DHW circuit

<i>Line no.</i>	<i>Operating line</i>
5736	Separate DHW circuit

The separate circuit can only be employed if a boiler cascade is used.

#### **OFF:**

The separate circuit is switched off. Every boiler in use can charge the DHW storage tank

#### **ON:**

The separate circuit is switched on. DHW charging takes place exclusively via the boiler defined for that purpose.



For the separate circuit, DHW controlling element Q3 must be set to "Diverting valve"!

### Output relay QX

<i>Line no.</i>	<i>Operating line</i>
5890	Relay output QX1, 2, 3, 4
5891	None
5892	Circulating pump Q4
5894	Electric immersion heater DHW K6
	H1 pump Q15
	Boiler pump Q1
	Alarm output K10
	2nd pump speed HC1 Q21
	H2 pump Q18
	System pump Q14
	Heat generator shut off valve Y4
	Time program 5 K13
	H3 pump Q19
	Cascade pump Q25
	DHW mixing pump Q35
	DHW intermediate circulating pump Q33
	Heat request K27

Depending on the selection made, setting the relay outputs assigns appropriate extra functions to the basic diagrams. For detailed information, refer to the section "Application diagrams".



Multifunctional output QX4 can be used only if the operating line "Source type" (operating line 5770) is set to "1-stage", "Modulating UX" or "Without boiler sensor".

#### **DHW circulating pump Q4**

The connected pump serves as a DHW circulating pump.

Operation of the pump can be scheduled as required on operating page "DHW", operating line "Release circulating pump".

#### **DHW electric immersion heater K6**

Using the connected electric immersion heater, the DHW can be heated up according to operating page "DHW storage tank", operating line "electric immersion heater".



The electric immersion heater must be fitted with a safety limit thermostat!



Operating line 5060 of the electric immersion heater's operating mode must be appropriately set.

#### **Pump H1 Q15**

Pump H1 can be used for an additional consumer. Together with an external request for heat at input H1, it is possible to operate an air heater or similar.

#### **Boiler pump Q1**

The connected pump is used for circulating the boiler water.

#### **Alarm output K10**

The alarm relay signals faults, should they occur.

Switching on takes place with a delay of two minutes.

When the fault is corrected, that is, when the fault status is no longer present, the relay will be de-energized with no delay.



If the fault cannot immediately be corrected, it is still possible to reset the alarm relay. This is made on operating page "Faults".

#### **2nd pump speed**

This function facilitates the control of a 2-speed heating circuit pump, allowing the pump's capacity to be lowered in reduced mode (e.g. during night setback). In that case, multifunctional relay QX is used to activate the 2nd pump speed in the following manner:

1st speed output Q2/Q6/Q20	2nd speed Output Q21/Q22/Q23	Pump state
Off	Off	Off
On	Off	Part load
On	On	Full load

### System pump Q14

The connected pump can be used as a system pump for supplying heat to other consumers.

The system pump is put into operation as soon as one of consumers calls for heat. If there is no demand for heat, the pump will be deactivated followed by overrun.

### Cascade pump Q25

Common boiler pump for all boilers in a cascade.

### DHW mixing pump Q35

Separate pump for storage tank circulation during the time the legionella function is active.

### Heat request K27

As soon as there is demand for heat, output K27 is activated.

## Building and room model

Line no.	Operating line
6110	Time constant building

When the outside temperature varies, the room temperature changes at different rates, depending on the building's thermal storage capacity.

The above setting is used to adjust the response of the flow temperature setpoint when the outside temperature varies.

#### Example:

##### - 20 hours

The room temperature responds more slowly to outside temperature variations.

10 - 20 hours

This setting can be used for most types of buildings.

##### - 10 hours

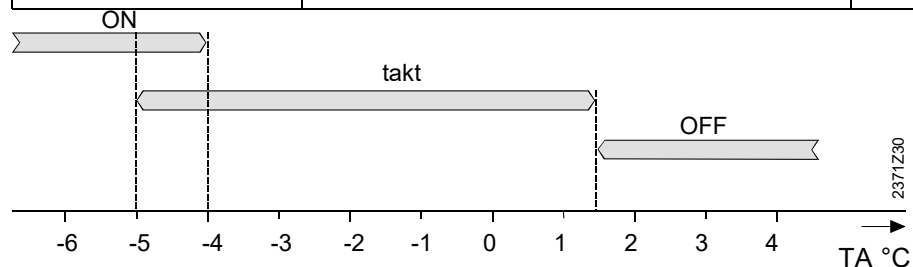
The room temperature responds more quickly to outside temperature variations.

## Frost protection for the plant

Line no.	Operating line
6120	Frost protection plant

The pumps are activated depending on the **current** outside temperature, even if there is no heat request.

Outside temperature	Pump	Diagram
...-4 °C	Continuously on	ON
-5...1.5 °C	On for 10 minutes at 6-hour intervals	Cycle (takt)
1.5 °C...	Continuously OFF	OFF



**External requirements**

<i>Line no.</i>	<i>Operating line</i>
6128	Heat request below OT
6129	Heat request above OT
6131	Heat request in economy mode Off   On DHW   On

Heat request below outside temperature

The heat source (K27 with QX... or output UX) is put into operation only if the outside temperature lies below / above the threshold.

Heat required in economy mode

Economy mode can be selected from menu "Special operation / service" (operating line 7139).  
In Economy mode, the heat source (K27 with QX.. or output UX) operates as follows:  
Off: Remains locked  
Only DHW: Released for DHW charging  
On: Always released.

**Sensor state**

<i>Line no.</i>	<i>Operating line</i>
6200	Save sensors

At midnight, the basic unit stores the states at the sensor terminals.  
If, after storage, a sensor fails, the basic unit generates an error message.  
This setting is used to ensure immediate saving of the sensors. This becomes a requirement when, for instance, a sensor is removed because it is no longer needed.



### Parameter reset

<i>Line no.</i>	<i>Operating line</i>
6205	Reset to default parameters

All parameters can be reset to their default values. Exempted from this are the following operating pages: Time of day and date, operator section, radio communication and all time programs.

### Device data

<i>Line no.</i>	<i>Operating line</i>
6220	Software version The software version indicated here represents the current version of the basic unit.

## **6.12 LPB**

### Address / power supply

<i>Line no.</i>	<i>Operating line</i>
6600	Device address
6601	Segment address
6604	Bus power supply function Off Automatically
6605	Bus power supply state Off On

Device address and segment address

The controller LPB address is divided into 2 parts each consisting of two 2-digit numerals. Example:

14	.	16
Segment number		Device number

Bus power supply

The bus power supply enables the bus system to be powered directly by the individual controllers (no central bus power supply). The type of bus power supply can be selected.

Off: No bus power supply via the controller.

Automatically: The bus power supply (LPB) via the controller is automatically switched on and off depending on the requirements of the LPB.

Bus power supply state

The display shows whether the controller currently supplies power to the bus:

Off: The bus power supply via controller is currently inactive.

On: The bus power supply via controller is currently active. At the moment, the controller supplies some of the power required by the bus.

**Central functions**

<i>Line no.</i>	<i>Operating line</i>
6620	Action changeover functions Segment System
6621	Summer changeover Local Centrally
6623	Changeover operating mode
6624	Manual source lock
6625	DHW assignment Local HC's All heating circuits in the segment All HC's in system
6631	External source with Eco mode Off -!- On DHW-!-On



These settings are only relevant for device address 1.

Range of action of  
changeover

The range of action of central changeover can be defined.  
This applies to the following types of limitation:  
Summer changeover (when selecting "Central" on line 6623)  
Summer changeover (with "Central" setting on operating line 6621)  
Entries:  
Segment: Changeover takes place with all controllers in the same segment.  
System: Changeover takes place with all controllers in the entire system (in all segments). The controller must be located in segment 0!

Summer changeover

The scope of summer changeover is as follows:  
Local entry:  
Local action; the local heating circuit is switched based on operating lines 730, 1030 and 1330.  
Central entry:  
Central action; depending on the setting made on operating line "Action changeover functions", " either the heating circuits in the segment or those of the entire system are switched based on operating line 730.

Changeover of operating  
mode

The scope of the operating mode changeover via input H is as follows:  
Local entry:  
Local action; the local heating circuit is switched on and off.  
Central entry:  
Central action; depending on the setting made on operating line "Action changeover functions", either the heating circuits in the segment or those of the entire system are switched based on operating line 730.

Manual source lock

The range of action of summer changeover is as follows:  
Local entry:  
Local action; the local source is locked.  
Entry segment:  
Central action; all sources of the cascade are locked.

Assignment of DHW heating

Assignment of DHW heating is required only if it is controlled by a heating circuit program (refer to operating lines 1620 and 5061).  
 Settings:  
 Local heating circuits:  
     DHW is only heated for the local heating circuit  
 All heating circuits in the segment:  
     DHW is heated for all heating circuits in the segment  
 All heating circuits in the system:  
     DHW is heated for all heating circuits in the system.  
 With all settings, controllers in holiday mode are also considered for DHW heating.

Ext source with eco mode

Economy mode can be selected from menu "Special operation / service" (operating line 7139).  
 In Economy mode, external heat sources on the LPB are operated as follows:  
 Off: Remains locked  
 Only DHW: Released for DHW charging  
 On: Always released.

**Clock**

<i>Line no.</i>	<i>Operating line</i>
6640	Clock mode Autonomously Slave without remote Slave with remote setting Master
6650	Outside temp source

Clock mode


This setting defines the impact of the system time on the controller's time setting. The impact is as follows :

- Autonomously: The time of day on the controller can be readjusted  
     The controller's time of day is not matched to the system time
- Slave without remote adjustment: The time of day on the controller cannot be readjusted  
     The controller's time of day is constantly and automatically matched to the system time
- Slave with remote adjustment: The time of day on the controller can be readjusted; at the same time, the system time is readjusted since the change is adopted from the master.  
     The controller's time of day is still automatically and constantly matched to the system time
- Master: The time of day on the controller can be readjusted  
     The time of day on the controller is used for the system. The system time will be readjusted

outside temperature source

Only 1 outside temperature sensor is required in the LPB plant. This sensor is connected to a freely selectable controller and delivers via LPB the signal to the controllers without sensor.  
 The first numeral to appear on the display is the segment no. followed by the device no.

## 6.13 Faults

When a fault  is pending, an error message can be displayed on the info level by pressing the Info button. The display describes the cause of the fault.

### Acknowledgements

<i>Line no.</i>	<i>Operating line</i>
6710	Reset alarm relay

When a fault is pending, an alarm can be triggered via relay QX... The QX... relay must be appropriately configured.

This setting can be used to reset the alarm relay.

### Temperature alarms

<i>Line no.</i>	<i>Operating line</i>
6740	Flow temp 1 alarm
6741	Flow temp 2 alarm
6743	Boiler temp alarm
6745	DHW charging alarm

The difference of setpoint and actual temperature is monitored. A control offset beyond the set period of time triggers an error message.

### Error history

<i>Line no.</i>	<i>Operating line</i>
6800...6819	History ...

The basic unit stores the last 10 faults in non-volatile memory. Any additional entry deletes the oldest in the memory. For each error entry, error code and time of occurrence is saved.

## 6.14 Maintenance/special mode

### Maintenance functions

<i>Line no.</i>	<i>Operating line</i>
7040	Burner hours interval
7041	Burner hours since maintenance
7042	Burner start interval
7043	Burn starts since maintenance
7044	Maintenance interval
7045	Time since maintenance
7053	Flue gas temp limit
7054	Delay flue gas message
7119	Economy function Locked   released
7120	Economy mode Off   On

Burner hours run interval, burner start interval	As soon as the selected number of burner operating hours or the selected number of burner starts has elapsed, a service message will be displayed. Counted for the message are the number of operating hours and the number of starts of the first burner stage (input E1).
Burner hours run, burner starts since service	The current value is summated and displayed. On this operating line, the value can be
Flue gas temp limit	Shows a maintenance message on the display and, if configured, activates flue gas relay K17.
Delay flue gas message	Delays display of the maintenance message and activation of the flue gas relay (K17).
Economy function	<b>Locked</b> Economy mode is not possible. <b>Released</b> Economy mode can be activated.
Economy mode	Switches economy mode on or off

## Chimney sweep

<i>Line no.</i>	<i>Operating line</i>
7130	Chimney sweep function

The burner will be switched on. To ensure continuous burner operation, the only switch-off point used is the boiler temperature's maximum limitation (TKmax).

First, all connected loads will be locked to ensure the boiler temperature will reach the setpoint of 64 °C as quickly as possible.

When the minimum temperature of 64 °C is attained, the available heating circuits are switched on one by one, using a dummy load, to make sure the heat generated by the boiler is drawn off so that the burner will remain in operation.

For safety reasons, maximum limitation of the boiler temperature (TKmax) remains active as long as the chimney sweep function is active.



The function is deactivated by setting -- on this operating line, or automatically after a timeout of 1 hour.

## Manual operation

<i>Line no.</i>	<i>Operating line</i>
7140	Manual control


When manual control is activated, the relay outputs are no longer energized and de-energized according to the control state but are set to a predefined manual control state in accordance with their functions (see table below).

The burner relay energized in manual control can be de-energized by the electronic temperature controller (TR).

Name		relay	State
DHW	Charging pump	Q3	On
	Diverting valve	Q3	Off
	Mixing pump	Q32	Off
	Intermediate circuit pump	Q33	On
	Mixing valve opening / closing	Y31/Y32	Off
	Circulating pump	Q4	On
	Electric immersion heater	K6	On
Heating circuit 1.	2nd heating circuit pump	Q2 Q6 Q20	On
	Heating circuit mixing valve opening / closing	Y1 / Y2 Y5 / Y6	Off
	Heating circuit pump 2nd speed	Q21 Q22 Q23	On
Primary controller	System pump	Q14	On
	Mixing valve opening / closing	Y19/Y20	Off
Hx group	Pump H1	Q15	On
Auxiliary functions	Alarm output	K10	Off
	Heat demand	K27	On

Setpoint adjustment in manual control

After manual control has been activated, a change to the basic display must be made.

There, the maintenance / special mode symbol  appears.

Press the info button to switch to info display "Manual mode", where the setpoint can be adjusted.

### **Simulations**

<i>Line no.</i>	<i>Operating line</i>
7150	Simulation outside temp

To facilitate commissioning and fault tracing, outside temperatures in the range from – 50 to +50°C can be simulated. During simulation, the actual, the composite and the attenuated outside temperature will be overridden by the set simulated temperature. During simulation, calculation of the 3 mentioned outside temperatures continues and the temperatures are available again when simulation is completed.



The function is deactivated by setting -- on this operating line, or automatically after a timeout of 1 hour.

### **Telephone customer service**

<i>Line no.</i>	<i>Operating line</i>
7170	Telephone customer service

Setting of phone number that appears on the info display.

### **6.15 Input / Output test**

<i>Line no.</i>	<i>Operating line</i>
7700... 7999	

The input / output test is used to check the correct functioning of the connected components.

When selecting a setting from the relay test, the relevant relay is energized, thus putting the connected component into operation. The correct functioning of the relays and wiring can thus be tested.



Important:

During the relay test, limitation of the boiler temperature by the electronic control thermostat (TR) remains activated. Other limits are deactivated.

Selector sensor values are updated within a maximum of 5 seconds.

The display is made with no measured value correction.

## 6.16 State

The current operating state of the plant is visualized by means of status displays.

### Messages

<i>Line no.</i>	<i>Operating line</i>
8000	State of heating circuit 1
8003	State of DHW
8005	State of boiler

### State heating circuit

End user (info level)	Commissioning, heating engineer	
Limit thermostat has cut out	Limit thermostat has cut out	3
Manual control active	Manual control active	4
Heating mode restricted	Forced discharging DHW	106
	Forced heat release	108
	Forced heat release	110
	Overrun active	17
Forced heat release	Forced heat release	110
	Opt start control + boost heating	111
	Optimum start control	112
	Boost heating	113
Heating mode Comfort	Heating mode Comfort	114
	Optimum stop control	115
Heating mode Reduced	Heating mode Reduced	116
	Frost protection room active	101
	Frost protection flow active	117
	Frost protection plant active	23
Frost protection active		24
Summer operation	Summer operation	118
	24-hour Eco active	119
	Setback Reduced	120
	Setback frost protection	121
	Room temperature limit	122
	Off	Off



State of DHW

End user (info level)	Commissioning, heating engineer	
Limit thermostat has cut out	Limit thermostat has cut out	3
Manual control active	Manual control active	4
Draw-off mode	Draw-off mode	199
	Discharging protection active	79
	Charging time limitation active	80
	DHW charging locked	81
Charging lock active		82
	Forced, max stor tank temp	83
	Forced, max charging temp	84
	Forced, legionella setpoint	85
	Forced, nominal setpoint	86
Forced charging active		67
	Charging electric, legionella setpoint	87
	Charging electric, nominal setpoint	88
	Charging electric, Red setpoint	89
	Charging electric, frost setpoint	90
	Electric immersion heater released	91
Charging electric immersion heater		66
	Push, legionella setpoint	92
	Push, nominal setpoint	93
Push active		94
	Charging, legionella setpoint	95
	Charging, nominal setpoint	96
	Charging, reduced setpoint	97
Charging active		69
Frost protection active	Frost protection active	24
Overrun active	Overrun active	17
Stand-by charging	Stand-by charging	201
	Charged, max storage temperature	70
	Charged, max charging temperature	71
	Forced, legionella temperature	98
	Charged, nominal temperature	99
	Forced, Reduced temperature	100
Charged		75
Off	Off	25
Ready	Ready	200

State of boiler

<i>End user (info level)</i>	<i>Commissioning, heating engineer</i>	
SLT has cut out	SLT has cut out	1
SLT test active	SLT test active	123
Fault.	Fault.	2
Limit thermostat has cut out	Limit thermostat has cut out	3
Manual control active	Manual control active	4
Chimney sweep function active	Chimney sweep function, high-fire	5
	Chimney sweep function, low-fire	6
		7
Locked	Locked, manually	8
	Locked, automatically	9
	Locked, outside temperature	176
	Locked, Economy mode	198
		10
Minimum limitation active	Minimum limitation	20
	Minimum limitation, low-fire	21
	Minimum limitation active	22
In operation	Protective start-up	11
	Protective startup, low-fire	12
	Return limitation	13
	Return temperature limitation, low-fire	14
		18
In operation for HC, DHW	In operation for HC, DHW	170
In partial load operation for HC, DHW	In partial load operation for HC, DHW	171
Released for HC, DHW	Released for HC, DHW	173
In operation for DHW	In operation for DHW	168
In partial load operation for DHW	In partial load operation for DHW	169
Released for DHW	Released for DHW	174
In operation for heating circuit	In operation for heating circuit	166
In partial load operation for HC	In partial load operation for HC	167
Released for HC	Released for HC	175
Overrun active	Overrun active	17
Released	Released	19
	Frost protection plant active	23
Frost protection active		24
Off	Off	25

## **6.17 Diagnostics, heat generation**

For diagnostic purposes, the various setpoints, actual values, relay switching states and meter readings can be displayed.

<i>Line no.</i>	<i>Operating line</i>
8610...8699	

## **6.18 Diagnostics, consumers**

For diagnostic purposes, the various setpoints, actual values, relay switching states and meter readings can be displayed.

<i>Line no.</i>	<i>Operating line</i>
8700...9099	

## **6.19 List of displays**

Priorities are assigned to pending errors. From priority 6, alarm messages are delivered, which are used by remote supervision (OCI). In addition, the alarm relay will be set.

### **6.19.1 Error code**

<b>Error code</b>	<b>Description of error</b>	<b>Priority</b>
0	No error	
10	Outside temperature sensor error	6
20	Boiler temperature 1 sensor error	9
26	Common flow temperature sensor error	6
28	Flue gas temperature sensor error	6
30	Flow temperature 1 sensor error	6
31	Flow temperature 1 cooling, sensor error	6
38	Flow temperature primary controller sensor error	6
40	Return temperature 1 sensor error	6
46	Return temperature cascade sensor error	6
47	Common return temperature sensor error	6
50	DHW temperature 1 sensor error	9
52	DHW temperature 2 sensor error	9
54	DHW primary controller sensor error	6
57	DHW circulation temperature sensor error	6
60	Room temperature 1 sensor error	6
81	Short-circuit LPB	6
82	LPB address collision	3

Error code	Description of error	Priority
83	BSB wire short-circuit	6
84	BSB address collision	3
85	BSB radio communication fault	6
100	2 clock time masters (LPB)	3
102	Clock time master without backup (LPB)	3
105	Maintenance message	5
109	Boiler temperature supervision	9
110	Lockout by SLT	9
121	Flow temperature 1 (HC1) supervision	6
126	DHW charging supervision	6
127	Legionella temperature not reached	6
131	Burner fault	9
146	Configuration error common message	3
127	Legionella temperature not reached	6
131	Burner fault	9
146	Configuration error common message	3
171	Alarm contact 1 (H1) active	6
172	Alarm contact 2 (H2) active	6
173	Alarm contact 3 (EX2/230VAC) active	6
174	Alarm contact 4 (H3) active	6
178	Temperature limiter heating circuit 1	3
217	Sensor error common message	6
217	Sensor error common message	6
320	DHW charging temperature sensor error	6
324	BX same sensors	3
325	BX/extension module same sensors	3
326	BX/mixing valve group same sensors	3
328	Mixing valve group same function	3
330	Sensor BX1 no function	3
331	Sensor BX2 no function	3
332	Sensor BX3 no function	3
333	Sensor BX4 no function	3
334	Sensor BX5 no function	3
335	Sensor BX21 no function	3
336	Sensor BX22 no function	3
337	Sensor BX1 no function	3
338	Sensor BX12 no function	3
351	Primary controller / system pump address error	3
352	Pressureless header address error	3
353	Cascade sensor B10 missing	3

### **6.19.2 Maintenance code**

<b>Maintenance code</b>	<b>Description of maintenance</b>	<b>Priority</b>
1	Burner hours run exceeded	6
2	Burner starts exceeded	6
3	Maintenance interval exceeded	6
10	Replace battery of outside sensor	6
21	Maximum flue gas temperature exceeded	6
22	Water pressure 3 heating circuit too low (dropped below lower pressure limit 3)	9

### **6.19.3 Special operation code**

<b>Special operation code</b>	<b>Description</b>
301	Manual operation
302	SLT test
303	Chimney sweep function
309	Simulation outside temperature
310	Alternative energy operation
314	Economy mode

## 7 Plant diagrams

The various applications are shown in the form of basic diagrams and extra functions. The basic diagrams show possible applications that can be implemented without the use of multifunctional outputs.

### 7.1 Basic diagrams

The basic diagrams are examples of plant that can be implemented with standard outputs requiring only a few settings.

#### Legend mains voltage

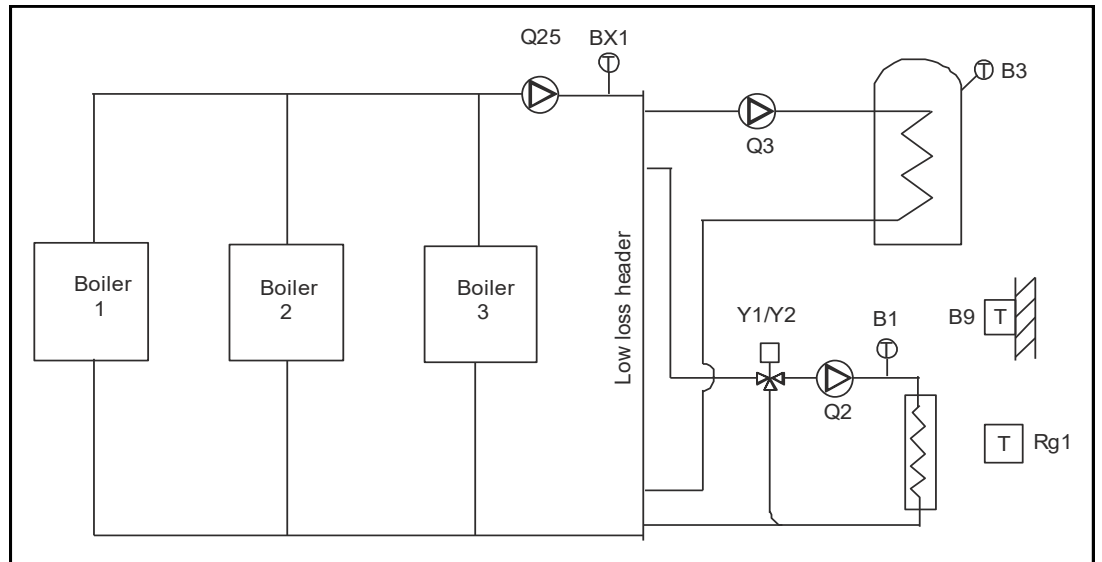
<b>Diagram</b>	<b>Function</b>
Q1	Boiler pump
Q2	1st heating circuit pump
Q3	DHW charging pump / diverting valve
Q4	circulating pump
Q14	System pump
Q15	H1 pump
Q25	Cascade pump
Q33	DHW intermediate circuit pump
Y1	1st Heating circuit mixing valve
Y4	Heat source shutoff valve
Y7	Maintained boiler return temperature
Y19	Primary controller
Y31	DHW primary controller mixing valve opening
Y32	DHW primary controller mixing valve closing
K6	Electric immersion heater

#### Legend low-voltage

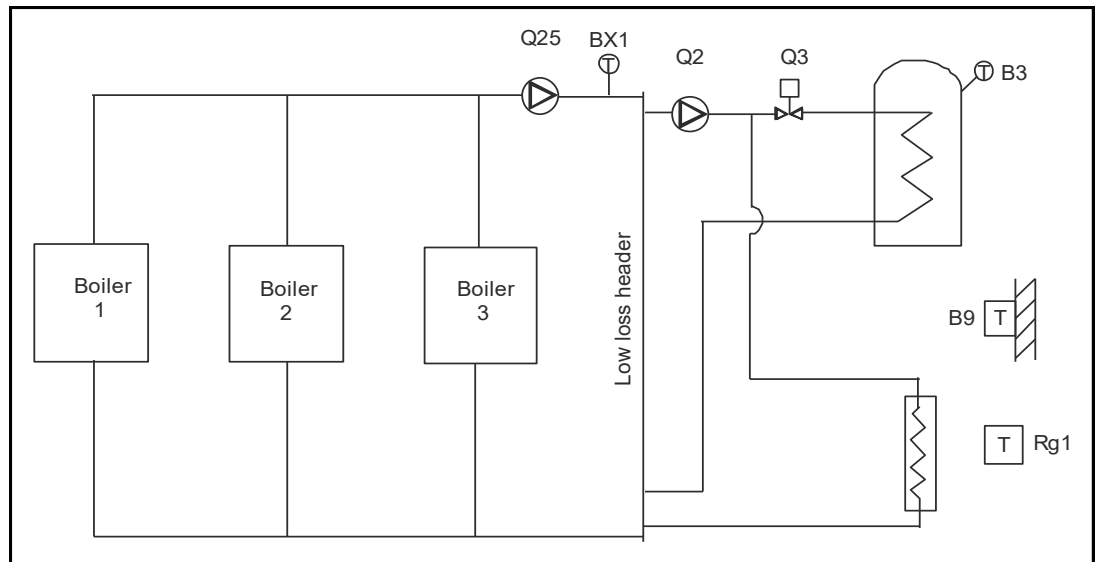
B1	Flow temperature sensor HK1
B12	Flow temperature sensor HK2
B2	Boiler temperature sensor TK1
B3	DHW sensor top
B31	2nd DHW sensor bottom
B35	DHW flow temperature sensor
B36	DHW charging sensor
B38	DHW temperature outlet sensor
B15	Flow sensor primary controller
B39	DHW circulation sensor B39
B7	Return sensor
B70	Cascade return sensor
B73	Primary circuit return sensor
B9	Outside sensor.
B10	Common flow sensor
RG1	Room unit 1
FS	Flow switch

### 7.1.1 Basic diagram RVS63.243

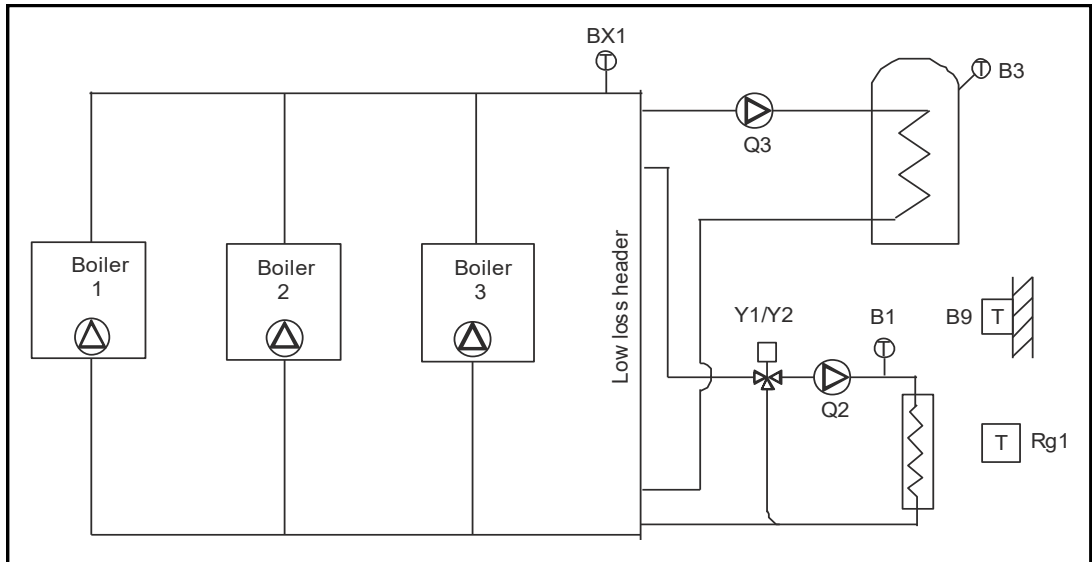
#### Standard diagram - cascade pump



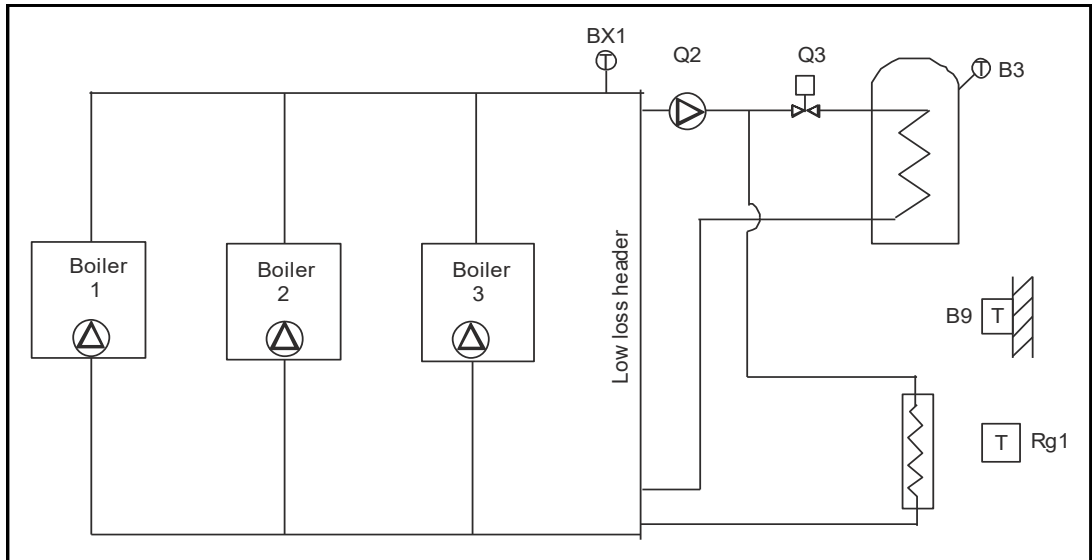
#### Combined DHW + heating with pump & valve - cascade pump



## Standard diagram



## Combined DHW + heating with pump & valve



## 7.2 Extra functions in general

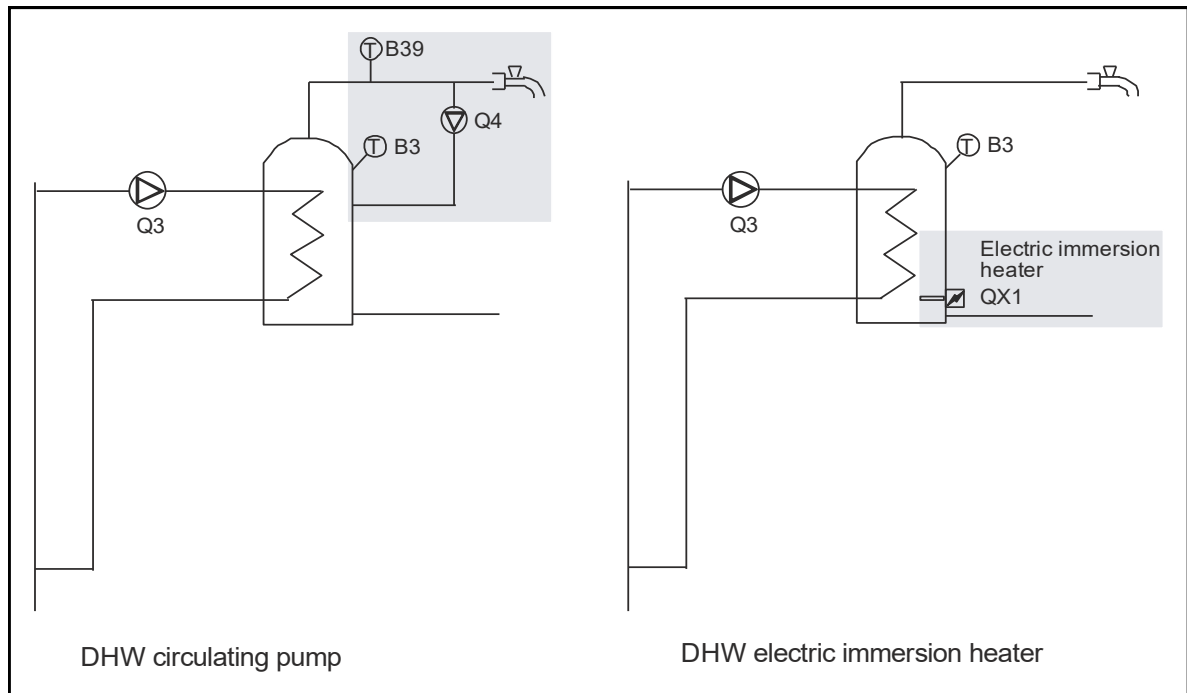
The extra functions can be selected via operating page "Configuration" and complement the basic diagrams of the respective controllers.

The type and number of extra functions that can be applied depend on the multifunctional outputs and inputs QX... or BX...

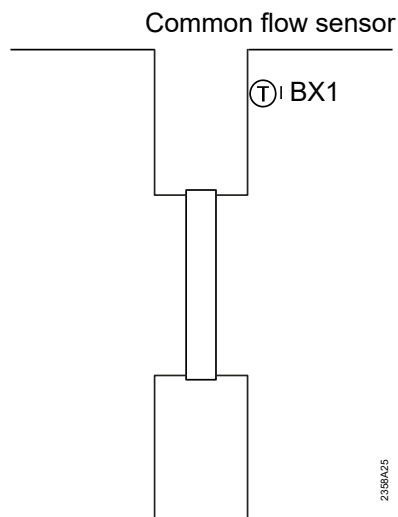
Depending on the type of application, the use of extra functions necessitates a number of appropriate operating line settings.



### 7.2.1 DHW storage tank (DHW)



### 7.2.2 Low Loss Header



## 8 Technical data

### 8.1 Basic unit RVS...

#### Power supply

Rated voltage	AC 230 V (±10%)
Rated frequency	50/60 Hz
Power consumption	RVS63.243: 10 VA
Fusing of supply lines	max. 10 AT

#### Wiring of terminals

Power supply and outputs	solid wire or stranded wire (twisted or with ferrule): 1 core: 0.5...2.5 mm <sup>2</sup> 2 cores: 0.5. mm <sup>2</sup> ..1.5 mm <sup>2</sup> 3 cores: Not permitted
--------------------------	--

#### Functional data

Software class	A
Mode of operation to EN 60 730	1.B (automatic)

#### Inputs

Digital inputs H1 and H2	safety extra low-voltage for potential free low-voltage contacts: voltage with contact open: DC 12 V current with contact closed: DC 3 mA						
Analog input H1, H2	protective extra low-voltage operating range: DC (0...10) V internal resistance: > 100 kW						
Mains voltage S3, 4 and EX2	AC 230 V (±10 %) internal resistance: > 100 kW						
Sensor input B9	NTC1k (QAC34)						
Sensor inputs B1, B2, B3, B12, BX1, BX2, BX3, BX4	NTC10k (QAZ36, QAD36) PT1000 (optionally for collector and flue gas sensor)						
Perm. sensor cables (copper) with cross-sectional area:	<table border="1"> <tr> <td>0.25</td> <td>0.5</td> <td>0.75</td> <td>1.0</td> <td>1.5</td> <td>mm<sup>2</sup></td> </tr> </table>	0.25	0.5	0.75	1.0	1.5	mm <sup>2</sup>
0.25	0.5	0.75	1.0	1.5	mm <sup>2</sup>		
Max. length:	<table border="1"> <tr> <td>20</td> <td>40</td> <td>60</td> <td>80</td> <td>120</td> <td>m</td> </tr> </table>	20	40	60	80	120	m
20	40	60	80	120	m		

**Outputs**

Relay outputs Rated current range Max. switch-on current Max. total current (of all relays) Rated voltage range	AC 0.02...2 (2) A 15 A während $\leq 1$ s AC 10 A AC (24...230) V (for potential-free outputs)
Triac output QX3 (custom solution only) Rated current range On / off operation Speed control Max. switch-on current	AC 0.05...2 (2) A AC 0.05...0.4 (1) A 4 A for $\leq 1$ s
Analogous to output U1 Output voltage Current rating Ripple Accuracy at zero point Error remaining range	output is short-circuit-proof $U_{out} = 0 \dots 10.0$ V $\pm 2$ mA RMS; $\pm 2.7$ mA peak $\leq 50$ mVpp $< \pm 80$ mV $\leq 130$ mV

**Interfaces, cable lengths**

BSB Max. cable length Basic unit – peripheral device Max. total length Min. cross-sectional area	2-wire connection, not interchangeable 200 m 400 m (max. cable capacitance) 60 nF $0.5 \text{ mm}^2$
LPB with bus power supply via controller (per controller) With central bus power supply Bus loading number	(copper cable $1.5 \text{ mm}^2$ , 2-wire <b>not</b> interchangeable) 250 m 460 m E = 3

**Degree of protection and safety class**

Degree of protection of housing to EN 60 529	IP 00
Safety class to EN 60 730	low-voltage-carrying parts meet the requirements of safety class II, if correctly installed
Degree of pollution to EN 60 730	Normal pollution

**Standards, safety, EMC, etc.**

CE conformity to EMC directive - Immunity - Emissions  Low-voltage directive - Electrical safety	89/336/EEC - EN 61000-6-2 - EN 61000-6-3  73/23/EEC - EN 60730-1, EN 60730-2-9
--	---

**Climatic conditions**

Storage to IEC721-3-1 class 1K3	temp. $-20 \dots 65$ °C
Transport to IEC721-3-2 class 2K3	temp. $-25 \dots 70$ °C
Operation to IEC721-3-3 class 3K5	temp. $0 \dots 50$ °C (non-condensing)

**Weight**

Without packaging	RVS63.243: 614 g
-------------------	------------------

## 8.2 Operator unit and room units AVS37... / QAA7x... / QAA55..

<b>Power supply</b>	Degree of protection of housing to EN 60 - 529	IP 00
	Safety class to EN 60 - 730	low-voltage-carrying parts meet the requirements of safety class II, if correctly installed
	Degree of pollution to EN 60 - 730	Normal pollution
<b>Room temperature measurement (only with QAA7x... / QAA55...)</b>	Measuring range	0...50 °C
	According to EN12098: Range 15...25 °C range 0...15 °C or 25...50 °C resolution	within tolerance of 0.8 K within tolerance of 1.0 K 1/10 K
<b>Interfaces</b>	AVS37../QAA75../QAA55.. Max. cable length basic unit – peripheral device	BSB-W, 2-wire connection, not interchangeable QAA75../QAA55.. = 200 m AVS37.. = 3 m
	QAA78...	BSB-RF frequency band 868 MHz
<b>Degree of protection and safety class</b>	Degree of protection of housing to EN 60 - 529	IP20 for QAA7../ QAA55.. IP40 for AVS37... IP20 (when mounted) Normal pollution
	Safety class to EN 60 - 730	low-voltage-carrying parts meet the requirements of safety class III, if correctly installed
	Degree of pollution to EN 60 - 730	Normal pollution
<b>Standards, safety, EMC, etc.</b>	CE conformity to	
	EMC directive - Immunity - Emissions  Low-voltage directive - Electrical safety - Radio	89/336/EEC - EN 61000-6-2 - EN 61000-6-3  73/23/EEC - EN 60730-1, EN 50090-2-2 - EN 300 220-1 (25-1000MHz)
<b>Climatic conditions</b>	For devices without batteries:	
	Storage to IEC721-3-1 class 1K3	temperature -20...65 °C
	Transport to IEC721-3-2 class 2K3	temperature -20...70 °C
	Operation to IEC721-3-3 class 3K5	temperature 0...50 °C (non-condensing)
	For devices with batteries:	
	Storage to IEC721-3-1 class 1K3	temperature -20...30 °C
	Transport to IEC721-3-2 class 2K3	temperature -20...70 °C
Operation to IEC721-3-3 class 3K5	temperature 0...50 °C (non-condensing)	
<b>Weight</b>	Without packaging	AVS37.294: 160 g QAA75.61x: 170 g QAA78.610: 312 g QAA55.110: 115 g

### 8.3 Power supply AVS16.290

<b>Power supply</b>	Nominal voltage	AC 230 V ( $\pm 10\%$ )
	Nominal frequency	50 Hz
	Fuse	6.3 AT (5 x 20 mm)
	Power consumption	0.4 VA
	Fusing of supply lines	Max 10 A
<b>Functional data</b>	Switching capacity SLT	16 (12) A, AC 230V (+-10%), 50Hz
<b>Degree of protection and safety class</b>	Degree of protection of housing to EN 60 529	IP 40 (when mounted) corresponding to safety class II if adequately mounted
	Safety class to EN 60 730	Normal pollution
	Degree of pollution to EN 60 730	
<b>Standards, safety</b>	CE conformity to low-voltage directive electrical safety	73/23/EEC EN 60 730-1, EN 60 730-2-9
<b>Climatic conditions</b>	Storage to IEC721-3-1 class 1K3	temp. -20...65 °C
	Transport to IEC721-3-2 class 2K3	temp. -25...70°C
	Operation to IEC721-3-3 class 3K5	temp. 0...50 °C (non-condensing)
<b>Weight</b>	Without packaging	310 g

### 8.4 Radio module AVS71.390

<b>Power supply</b>	Via RVS... basic unit	DC 5.5 V
	Power consumption	max. 0.11 VA
<b>Interfaces</b>	Connection to RVS... basic units (power supply, communication)	6-pole prefabricated ribbon cable, ready fitted, 1.5 m 1.5m
	RF transmitter	BSB-RF frequency band 868 MHz
<b>Degree of protection and safety class</b>	Degree of protection of housing to EN 60 529	IP40
	Safety class to EN 60 730	low-voltage-carrying parts meet the requirements of safety class III, if correctly installed
	Degree of pollution to EN 60 730	Normal pollution
<b>Standards, safety, EMC, etc.</b>	CE conformity to EMC directive - Immunity - Emissions Low-voltage directive - Electrical safety Radio	89/336/EEC - EN 61000-6-1, EN 61000-6-2 - EN 61000-6-3, EN 61000-6-4 73/23/EEC - EN 60730, EN 50090-2-2 EN 300 220-1 , -3 (25-1000MHz) EN 301 489-1 , -3

## Climatic conditions

Storage to EN 60721-3-1	class 1K3, temp. -20...65 °C
Transport to EN 60721-3-2	class 2K3, temp. -25...70°C
Operation to EN 60721-3-3	class 3K5, temp. 0...50°C (non-condensing)

## Weight

Without packaging	54 g
-------------------	------

## 8.5 Wireless outside sensor AVS13.399

## Power supply

Batteries	2 pcs
Type of batteries	1.5 V alkaline, size AAA (LR03)
Battery life	approx. 2 years

## Interfaces

RF transmitter	BSB-RF frequency band 868 MHz
----------------	----------------------------------

## Degree of protection and safety class

Degree of protection of housing to EN 60 529	IP20
Safety class to EN 60 730	low-voltage-carrying parts meet the requirements of safety class III, if correctly installed
Degree of pollution to EN 60 730	Normal pollution

## Standards, safety, EMC, etc.

CE conformity to EMC directive - Immunity - Emissions Low-voltage directive - Electrical safety Radio	89/336/EEC - EN 61000-6-2 - EN 61000-6-3 73/23/EEC - EN 60730-1, EN 50090-2-2 EN 300 220-1 (25-1000MHz)
---	--

## Climatic conditions

For devices without batteries:	
Storage to IEC721-3-1 class 1K3	temperature -20...65 °C
Transport to IEC721-3-2 class 2K3	temperature -20...70 °C
Operation to IEC721-3-3 class 3K5	temperature 0...50 °C (non-condensing)
For devices with batteries:	
Storage to IEC721-3-1 class 1K3	temperature -20...30 °C
Transport to IEC721-3-2 class 2K3	temperature -20...70 °C
Operation to IEC721-3-3 class 3K5	temperature 0...50 °C (non-condensing)

## Outside temperature acquisition

Outside Sensor	QAC34/101
Measuring range	-50...70 °C
cable length	max. 5 m

## Weight

Without packaging	Radio transmitter 160 g Outside sensor QAC34 73 g Cable 70 g
-------------------	--

## 8.6 Radio repeater AVS14.390

## Power supply

Nominal voltage	AC 230 V $\pm$ 10 % (primary side AC/AC adapter)
Nominal frequency	50 Hz $\pm$ 6 %
Power consumption	max. 0.5 VA

## Interfaces

RF transmitter	BSB-RF frequency band 868 MHz
----------------	----------------------------------

## Degree of protection and safety class

Degree of protection of housing to EN 60 529	IP20
Safety class to EN 60 730	low-voltage-carrying parts meet the requirements of safety class III, if correctly installed
Degree of pollution to EN 60 730	Normal pollution

**Standards, safety, EMC,  
etc.**

CE conformity to EMC directive - Immunity - Emissions Low-voltage directive - Electrical safety Radio	89/336/EEC - EN 61000-6-2 - EN 61000-6-3 73/23/EEC - EN 60730-1, EN 50090-2-2 EN 300 220-1 (25-1000MHz)
---	--

**Climatic conditions**

Storage to IEC721-3-1 class 1K3	temp. -20...65 °C
Transport to IEC721-3-2 class 2K3	temp. -25...70°C
Operation to IEC721-3-3 class 3K5	temp. 0...50 °C (non-condensing)

**Weight**

Without packaging	Radio repeater 112 g Power supply 195 g
-------------------	--



## 8.7 Sensor characteristics

### 8.7.1 NTC 1 k

T [°C]	R[Ohm]	T [°C]	R[Ohm]	T [°C]	R[Ohm]
-30.0	13,034	0.0	2,857	30.0	827
-29.0	12,324	1.0	2,730	31.0	796
-28.0	11,657	2.0	2,610	32.0	767
-27.0	11,031	3.0	2,496	33.0	740
-26.0	10,442	4.0	2,387	34.0	713
-25.0	9,889	5.0	2,284	35.0	687
-24.0	9,369	6.0	2,186	36.0	663
-23.0	8,880	7.0	2,093	37.0	640
-22.0	8,420	8.0	2,004	38.0	617
-21.0	7,986	9.0	1,920	39.0	595
-20.0	7,578	10.0	1,840	40.0	575
-19.0	7,193	11.0	1,763	41.0	555
-18.0	6,831	12.0	1,690	42.0	536
-17.0	6,489	13.0	1,621	43.0	517
-16.0	6,166	14.0	1,555	44.0	500
-15.0	5,861	15.0	1,492	45.0	483
-14.0	5,574	16.0	1,433	46.0	466
-13.0	5,303	17.0	1,375	47.0	451
-12.0	5,046	18.0	1,320	48.0	436
-11.0	4,804	19.0	1,268	49.0	421
-10.0	4,574	20.0	1,218	50.0	407
-9.0	4,358	21.0	1,170		
-8.0	4,152	22.0	1,125		
-7.0	3,958	23.0	1,081		
-6.0	3,774	24.0	1,040		
-5.0	3,600	25.0	1,000		
-4.0	3,435	26.0	962		
-3.0	3,279	27.0	926		
-2.0	3,131	28.0	892		
-1.0	2,990	29.0	859		

8.7.2 NTC 10 k

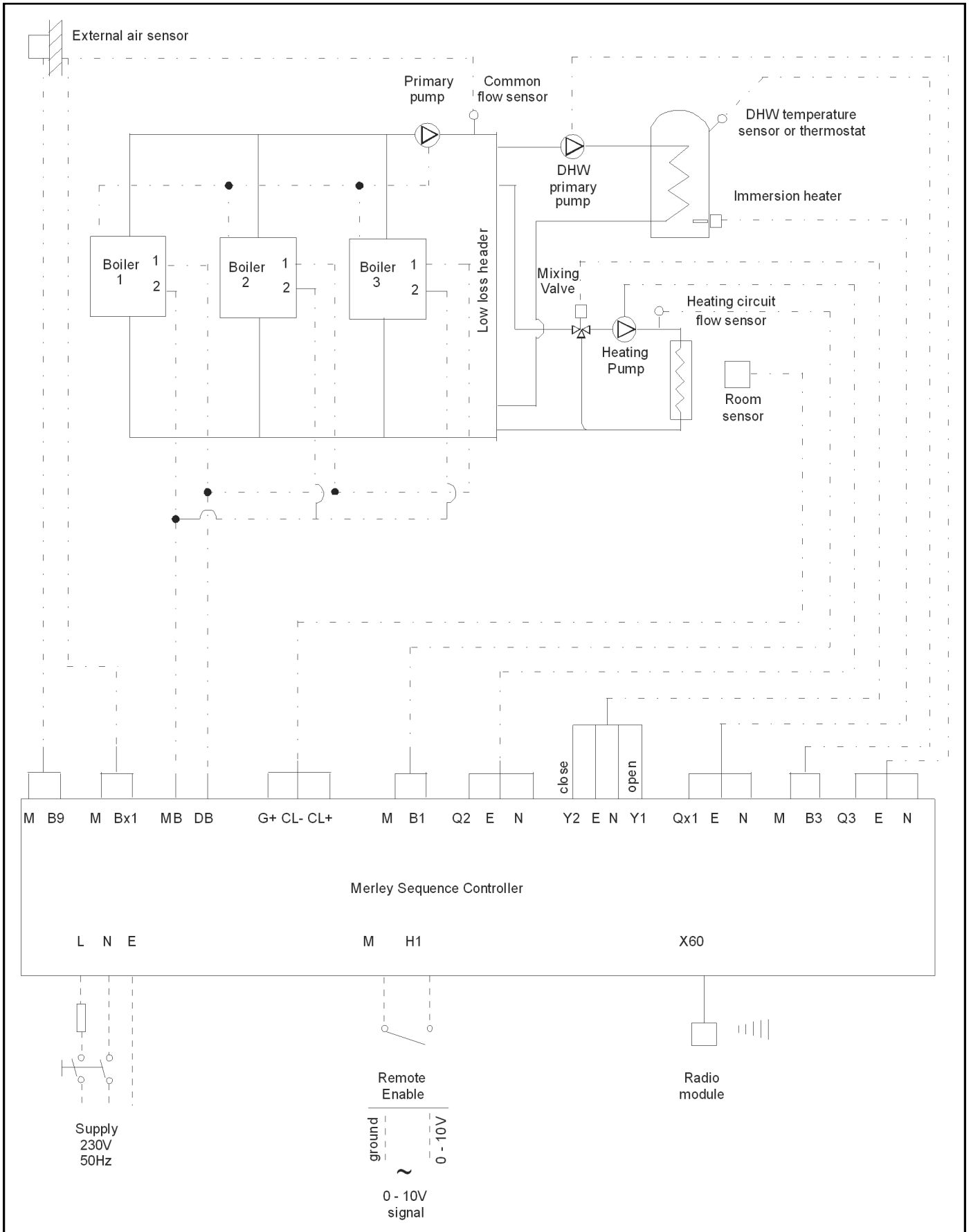
T [°C]	R[Ohm]	T [°C]	R[Ohm]	T [°C]	R[Ohm]
-30.0	175203	50.0	3605	130.0	298
-25.0	129289	55.0	2989	135.0	262
-20.0	96360	60.0	2490	140.0	232
-15.0	72502	65.0	2084	145.0	206
-10.0	55047	70.0	1753	150.0	183
-5.0	42158	75.0	1481	155.0	163
0.0	32555	80.0	1256	160.0	145
5.0	25339	85.0	1070	165.0	130
10.0	19873	90.0	915	170.0	117
15.0	15699	95.0	786	175.0	105
20.0	12488	100.0	677	180.0	95
25.0	10000	105.0	586	185.0	85
30.0	8059	110.0	508	190.0	77
35.0	6535	115.0	443	195.0	70
40.0	5330	120.0	387	200.0	64
45.0	4372	125.0	339		

8.7.3 PT1000

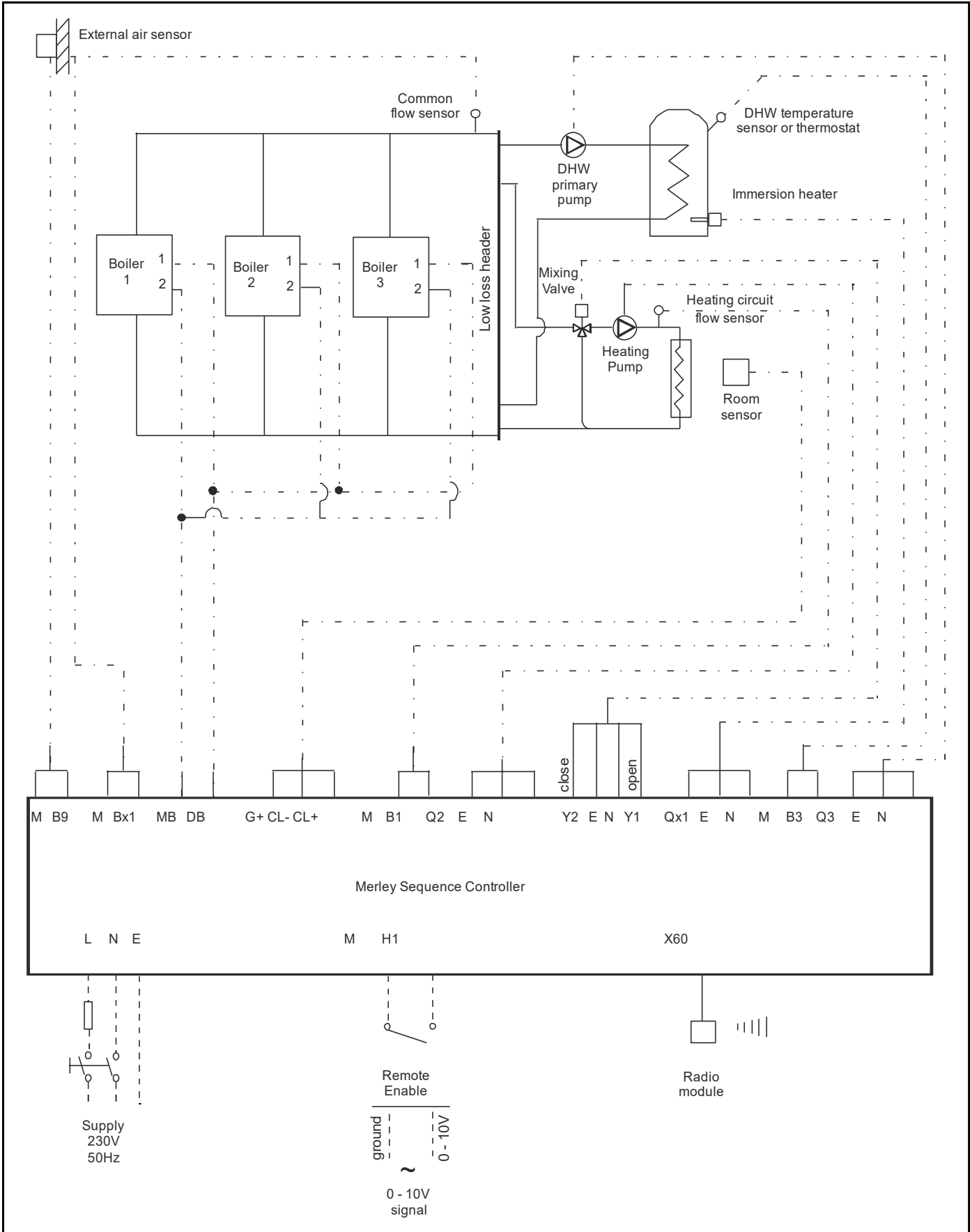
T [°C]	R[Ohm]	T [°C]	R[Ohm]	T [°C]	R[Ohm]
-30	882.2	50	1194.0	130	1498.3
-25	901.9	55	1213.2	135	1517.1
-20	921.6	60	1232.4	140	1535.8
-15	941.2	65	1251.6	145	1554.6
-10	960.9	70	1270.8	150	1573.3
-5	980.4	75	1289.9	155	1591.9
0	1000.0	80	1309.0	160	1610.5
5	1019.5	85	1328.0	165	1629.1
10	1039.0	90	1347.1	170	1647.7
15	1058.5	95	1366.1	175	1666.3
20	1077.9	100	1385.1	180	1684.8
25	1097.3	105	1404.0	185	1703.3
30	1116.7	110	1422.9	190	1721.7
35	1136.1	115	1441.8	195	1740.2
40	1155.4	120	1460.7	200	1758.6
45	1174.7	125	1479.5		

**APPENDIX A - System Schematics**

**Figure A1 - Cascade with primary circuit pump**



**Figure A2 - Cascade with integral boiler pump**



**APPENDIX B - Wiring Schematics**

**Figure B1 - RVS wiring**

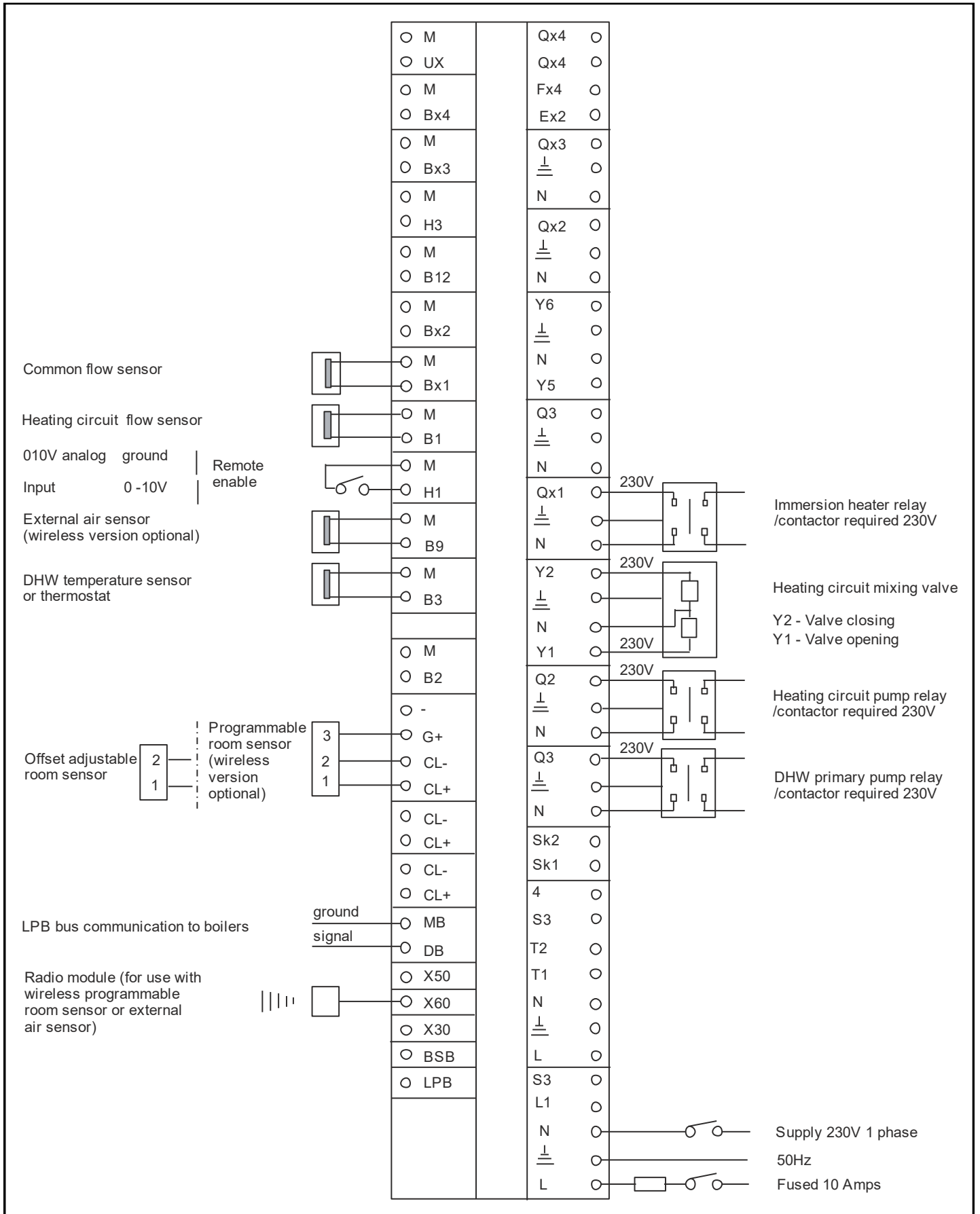
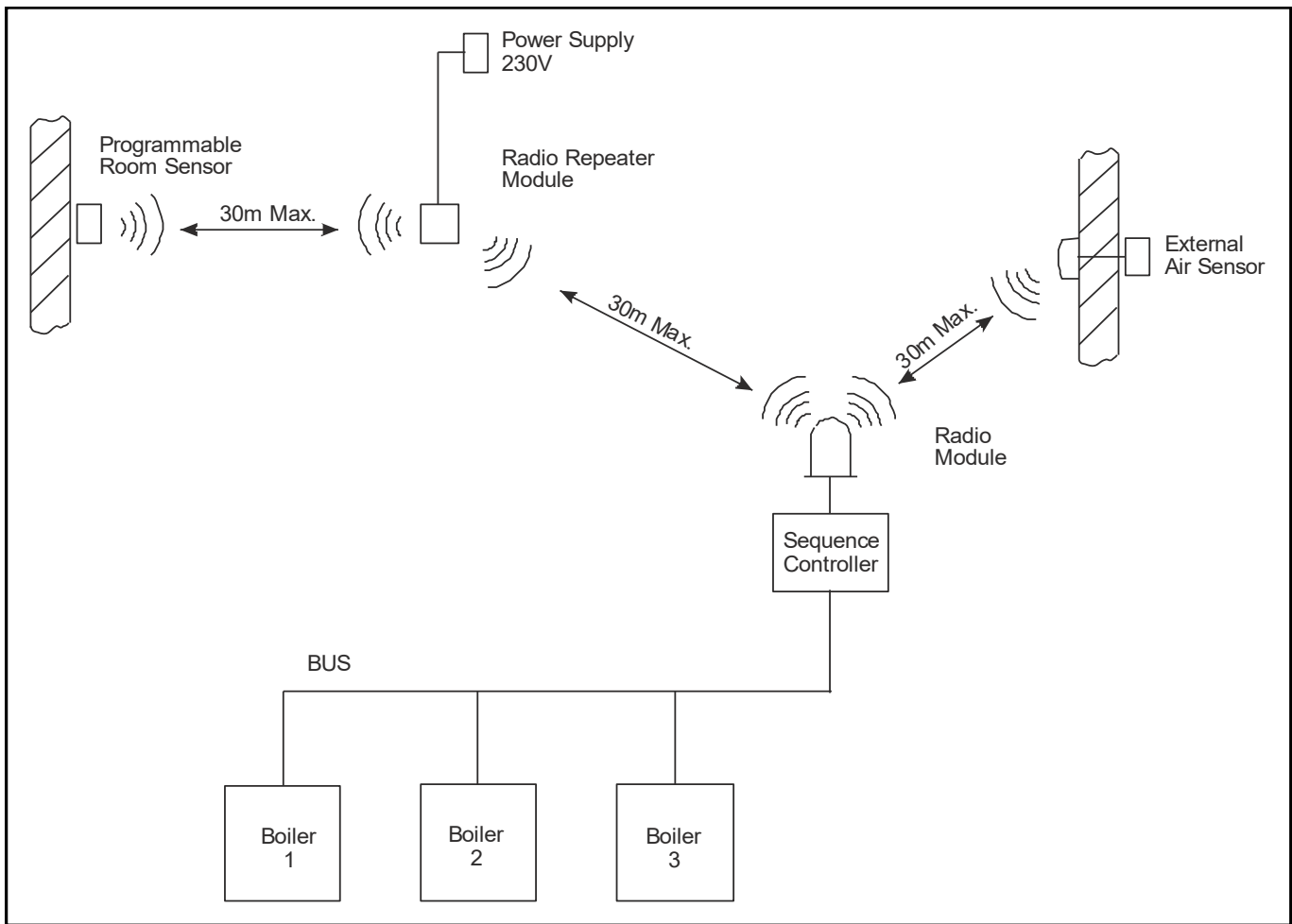


Figure B2 - Wireless configuration



## **APPENDIX C - Programming Parameters**

Refer to Section 5.2 page 35, for itemisation of parameters covering the Merley functionality.

The following parameters will require setting to the appropriate or suggested values to enable the Merley control to function. Any parameter not referred to should be left at the default setting.

### 1 General settings for all operations:

**5930 input BX1** set to common flow sensor B10

**5950 input H1** see individual control types below for best options for this

**6117 central setpoint compensation** this is added to the Merley setpoint to give a boiler setpoint, default is 20 but recommend reducing this in most cases. As a guide the Merley setpoint plus this parameter setting should not be above the boilers max temp (default 85c)

**6630 cascade master** set to always to ensure the controller is always seen as a multiple boiler sequencer

**3540 Auto source sequencer changeover** default is 500hrs set to 170hrs for approx weekly lead boiler shift

Outside sensor re-adjust - Parameter **6100** as required,

Building Time Constant - Parameter **6110** as required,

Heat required in Economy mode - Parameter **6131** set to  on DHW ,

Save Sensors - Parameter **6200** set to  yes ,

#### **LPB check**

Parameter **6600** check that the device address setting is 1

Parameter **6601** check that the segment address setting is 0

### 2 **Time of day & date** - Regardless of the use of the internal clock or external demand, it is a requirement that the internal clock time of day & date are set as required - lines 1 - 6.

**6640 clock mode** setting this to master then changing **604 on the boiler** from b0 0 to b0 1 allows the Merley time to be given to the boiler. *This is good practice as if the boilers are ever powered down it automatically resets the time and you don't end up with it constantly flashing on the display*

#### **Internal Clock sensors required : common flow sensor and outside temperature sensor**

**5950 input H1** leave on the default -operating mode changeover HC's+DHW

**720 heating curve slope** a setting of 3 here will give 80c at 0c outside when the comfort setpoint is at its default of 20.

**730 summer/winter heating limit** switches off the heating when the outside temperature gets to this level, function can be switched off (set to ---) if required.

**732 24-hour heating limit** this can turn off heating within normal operating hours and can also extend it outside of normal operating hours which can result if problems especially if the Merley is not controlling the pump run times. In general turn this function off ( set to ---).

**740/741 flow temp min/max** these two parameters set the range within which the slope will operate. For fixed temp systems then set both these to the required fixed temp. *Remember on non-condensing boilers the min flow temp setting should be set high enough to ensure that the boilers do NOT run in condensing temperature ranges.*

**750 room influence** default is 20% set to 0 on systems with no internal sensor. Otherwise the higher the figure in here the more the heating will be influenced by the internal sensor instead of the external temp compensation.

### 3 **Radio** - if a wireless application has been selected, ensure that all wireless components are switched on prior to setting up the wireless network - lines 120 - 140

### 4 **Time Program Heating Circuit** - set as required - lines 500 - 516

**Note:** - if an **External** time clock is to be used set parameters 501 - 506 to  \_\_  0

### 5 **Time Program DHW Circuit** - set as required - lines 560 - 576

### 6 **Holidays Heating Circuit** - set as required - lines 641 - 648

### 7 **External enable fixed temp sensors required: common flow sensor and outside temperature sensor (optional)**

**5950 input H1** use -min flow temp setpoint

**5952 min flow temp setpoint H1** default is 70c, change to the required temp *if higher temp is required then use the variable temp setup below and set 740/741 to the required setting.*

**5710 heating circuit 1** This can be set to off to stop the need for an external sensor being required.

**External enable variable temp sensors required: common flow sensor and outside temperature sensor**

**5950 input H1** use default- operating mode changeover HC's+DHW

**900 optg mode changeover** option 1 set to comfort and zero all internal time programs. *Note summer/winter heating limit will not operate with this option.*

Option 2 set to Automatic and set internal heating program to 24/7 *this option will allow the summer/winter heating limit to remain active.*

\*Option 1 can also be used when an internal clock setup is used but an additional external switching is required such as a time extension countdown clock commonly used in schools. However, in this case the internal time programs will simply be left at whatever the site has requested for their normal operational time switching.

**720 heating curve slope** a setting of 3 here will give 80c at 0c outside when the comfort setpoint is at its default of 20.

**732 24-hour heating limit** this can turn off heating within normal operating hours and can also extend it outside of normal operating hours which can result if problems especially if the Merley is not controlling the pump run times. In general turn this function off.(set to ---)

**740/741 flow temp min/max** these two parameters set the range within which the slope will operate. For fixed temp systems then set both these to the required fixed temp. *Remember on non-condensing boilers the min flow temp setting should be set high enough to ensure that the boilers do NOT run in condensing temperature ranges.*

**750 room influence** default is 20% set to 0 on systems with no internal sensor. Otherwise the higher the figure in here the more the heating will be influenced by the internal sensor instead of the external temp compensation.

**730 summer/winter heating limit** switches off the heating when the outside temperature gets to this level, function can be switched off (set to ---) if required.

## 8 DHW

- **note:** if the dhw time program is to be the same as for heating circuit, leave parameter 1620 at the default setting. If the dhw time program is to be different to the heating circuit, set parameter 1620 to | time program 4/DHW or 24hr/day | as required.

**Charging Priority** - parameter 1630 set to | none |

**Legionaella function** - so as to comply with the requirements of L8, set parameter 1640 to | Periodically | parameter 1641 to | 1 |, parameter 1644 as required & parameter 1646 to | 60 |.

**DHW Storage Tank** - in controlling a DHW tank, set parameter 5022 to | with B3 |, parameter 5050 to | 65°C |, parameter 5062 as required.

**Configuration** - if the device is controlling DHW, parameter 5731 defines if a sensor or thermostat is being used. Set as required.

If the tank heat source is to be supplemented by an **Electric Immersion Heater**, set parameter 5890 to | Electric Immersion Heater |.

## 9 Cascade

**3510 lead strategy** late on/early off (cascade) late on/late off (default) early on/late off (unison type setting) *setting late on/late off then setting 3511 to 0% and 3512 to 100% will disable the strategy completely*

**3530 Release integral source** default is 50 but essentially decreasing this figure switches the next boiler on quicker

**3531 Reset integral source** default is 20 decreasing this figure switches the boilers off at a faster rate

**3532 Restart lock** default is 300 seconds prevents a deactivated boiler from being released again until this time has been reached

**3533 Switch on delay** default is 5 mins prevents too frequent switching actions of boilers (anti-cycling) (3510, 3530 and 3531 are all OEM level settings, password required)

The default setting for the auto changeover of lead boiler parameter 3540, should be set to 50.

## 10 0-10v control sensors required: common flow sensor

**5950 input H1** set to heat request 0-10v

**5954 temperature value 10v H1** default is 100c set to whatever you require as the temp when external control gives 10v. As the bottom end cannot be moved adjusting this to above 100 is sometimes required but in these cases the external signal tends to be used as a mid-range signal 4-6v for example.

**5710 heating circuit 1** this can be set to off to stop the need for an external sensor being required.



External controls can transmit a demand for heat in the form of a analog signal of 0 – 10V DC. The RVS63.243 converts this signal to a temperature setting for the cascade set-point. The set-point for 10V can be set using parameter 5952 in the range 0 - 90°C.

\*\* The maximum setting of 90°C is a result of the application with the boiler LMU control which has a maximum setting of 90°C and will override any request for higher operating temperatures.

Refer to the boiler Instruction Manual for boiler parameter setting procedure.

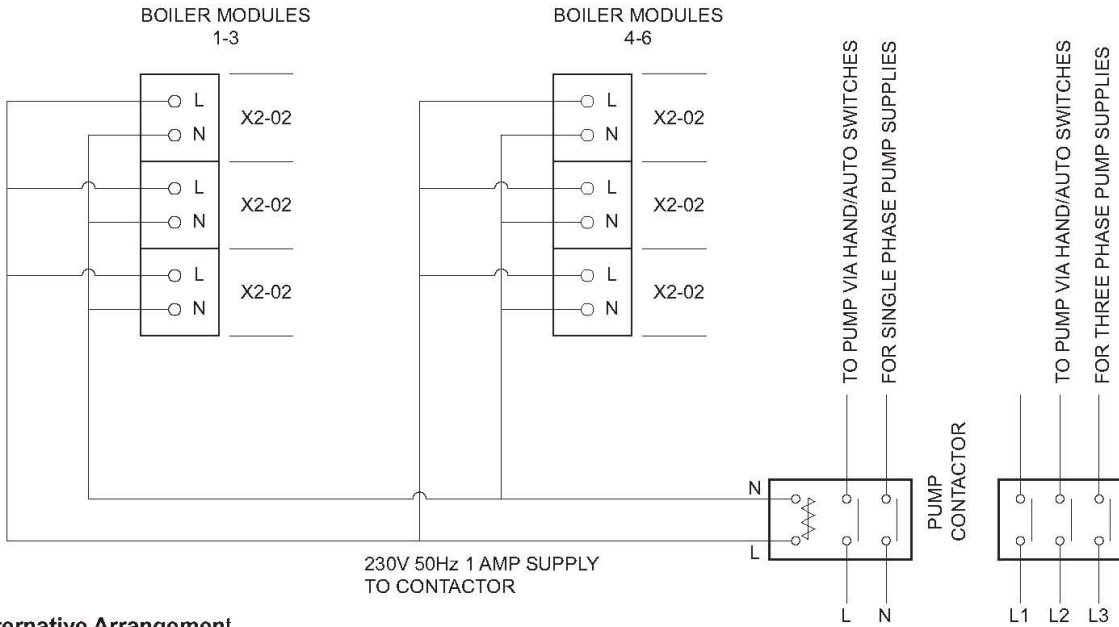
Additionally each boiler LMU controller must also be configured for cascade by setting parameter 552 to 80.

**APPENDIX D - Wiring for Primary Pump when using Cascade Controller**

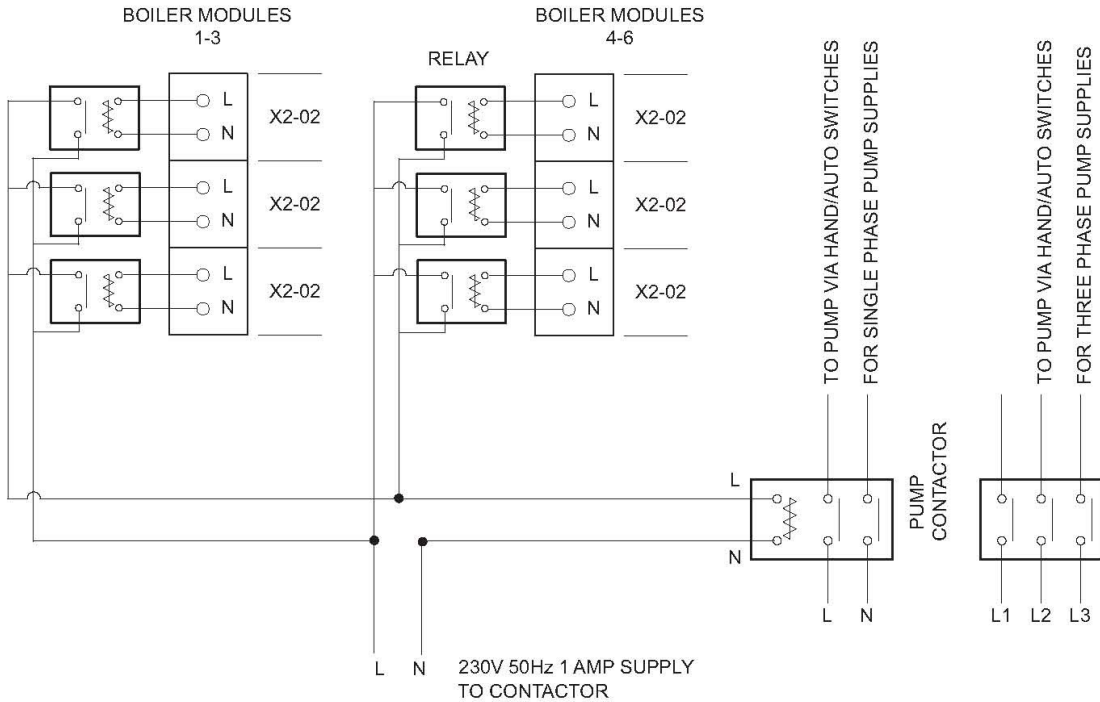
**PUMP OUTPUT CONNECTION DIAGRAM - MULTIPLE MODULES**

ELECTRICAL OUTPUT FROM X2-02 - 230V-50Hz - 1 AMP MAX

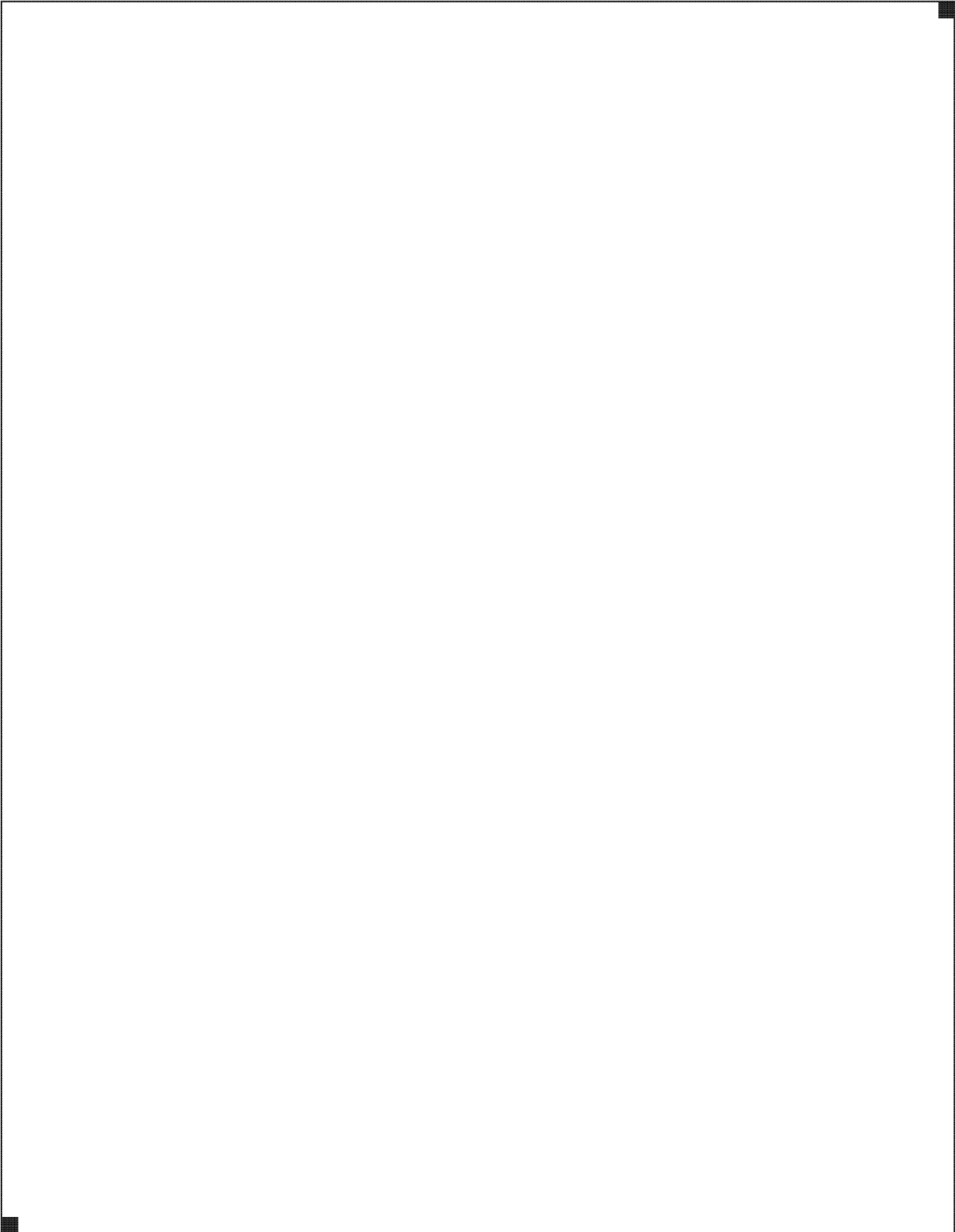
NOTE: ALL BOILER MODULES MUST BE CONNECTED TO THE SAME SUPPLY PHASE.  
FAILURE TO OBSERVE THIS CRITERIA WILL RESULT IN DAMAGE TO THE BOILER CONTROLS AND PUMP CONTACTOR.



**Alternative Arrangement**



# Notes



# Hamworthy Heating Accredited Agents

## **Southern Ireland (Sales & Service)**

HEVAC Limited  
Naas Road, Dublin 12, Ireland  
tel: **00 353 141 91919** fax: **00 353 145 84806**  
email: [info@hevac.ie](mailto:info@hevac.ie)

## **Scotland (Sales & Service)**

McDowall Modular Services  
2 Penson Road, Queenslie Industrial Estate, Glasgow, G33 4AG  
tel: **0141 336 8795** fax: **0141 336 8954**  
email:  
[MMS.McDowallModularServices@hamworthy-heating.com](mailto:MMS.McDowallModularServices@hamworthy-heating.com)

# Hamworthy Heating Customer Service Centre

## **Sales**

tel: **01202 662552**  
email: [sales@hamworthy-heating.com](mailto:sales@hamworthy-heating.com)

## **Technical Enquiries**

tel: **01202 662505**  
email: [technical@hamworthy-heating.com](mailto:technical@hamworthy-heating.com)

## **Servicing**

tel: **01202 662555**  
email: [service@hamworthy-heating.com](mailto:service@hamworthy-heating.com)

## **Spares**

tel: **01202 662525**  
email: [spares@hamworthy-heating.com](mailto:spares@hamworthy-heating.com)

British engineering excellence from Hamworthy Heating;  
the commercial heating and hot water specialists.



## **Customer Service Centre**

Hamworthy Heating Limited,  
Wessex House,  
New Fields Business Park,  
Stinsford Road,  
Poole,  
Dorset,  
BH17 0NF

Telephone: **01202 662500**  
Fax: **01202 662522**  
Email: [service@hamworthy-heating.com](mailto:service@hamworthy-heating.com)  
Website: [www.hamworthy-heating.com](http://www.hamworthy-heating.com)