**❖ROBUR**®

caring for the environment

# Installation manual

# System controller

for modulating absorption methane condensing heat pump + renewable aerothermal energy K18

# INDEX OF CONTENTS

# I   INTRODUCTION

**ℹ** This "Installation manual" contains all the information required for installing and configuring the System controller for the K18 absorption heat pump, in line with one of the standard system configurations also described in the document.

**≡** Referring to this manual requires familiarity with the products Robur and assumes that certain information

included in the product manuals to which this document refers.

### Recipients

This Manual is intended for:
► for electrical installers for proper installation of the control equipment;
► for installers and authorised Technical Assistance Centres Robur (TAC) for configuration;

# II   SYMBOLS AND DEFINITIONS

## II.1   KEY TO SYMBOLS

**⚠** DANGER

**ℹ** WARNING

**≡** NOTE

**⚙** PROCEDURE

**⇨** REFERENCE (to other document)

## II.2   TERMS AND DEFINITIONS

**Siemens RVS21.826** = control unit (electronic board).
**CSK18** = System controller for K18 installed in the provided enclosure.
**Siemens QAA75.611** = main room unit.
**Siemens QAA55.110** = base room unit.
**KECSK18** = expansion kit, not described in this document.
**K18 unit / appliance** = equivalent terms, both used to designate the gas absorption heat pump (GAHP).
**Heat generator** = equipment (e.g. boiler, heat pump, etc..) producing heating and/or DHW.
**TAC** = authorised Technical Assistance Centre Robur.
**DHW** = domestic hot water.

# III   WARNINGS

## III.1   GENERAL AND SAFETY WARNINGS

**ℹ** **Installer's qualifications**
Installation must exclusively be performed by a Qualified Firm and by Skilled Personnel, with specific knowledge of electrical systems, in compliance with the laws in force in the Country of installation.

**ℹ** **Declaration of Conformity**
Upon completing installation, the installing firm shall issue to the owner/client the appliance's Workmanlike Conformity Declaration, according to national/local regulations in force and the manufacturer's instructions/provisions.

**⚠** **Misuse**
The appliance must only be used for the purposes for which it has been designed. Any other use is deemed hazardous. Incorrect use may affect operation, duration and safety of the appliance. Adhere to the manufacturer's instructions.

**⚠** **Electrocution hazard**

► Disconnect the electrical power supply before any intervention/work on appliance components.
► For electrical connections exclusively use compliant components and according to the specifications provided by the manufacturer.
► Ensure the appliance cannot be accidentally switched back on.

**⚠** **Earthing**
Electrical safety depends on effective earthing system, correctly connected to the appliance and installed according to the regulations in force.

**⚠** **In the event of failure**
Operations on internal components and repairs may exclusively be carried out by a TAC, only using original parts.
► In the event of fault of the appliance, do not attempt to repair and/or restore and immediately contact the TAC.

**ℹ** **Keep the Manual**

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This "Installation, Use and Maintenance Manual" must always accompany the appliance and must be handed to the new owner or installer in the event of sale or removal.

*i* The equipment must be installed indoors and out of the weather. For its positioning, refer to the protection rating given in par. 2 p. 8.

## III.2   CONFORMITY

For the technical data and conformity of the equipment, refer to Appendix A in  p. 37.

## III.3   EQUIPMENT

The standard equipment for the System controller (O-QLT017) includes:
► n.1 CSK18 electrical enclosure: contains the Siemens RVS21.826 electronic board, the relays and electrical terminal blocks.
► n.1 Siemens QAA75.611 main room unit
► n.1 Siemens QAC34 ambient temperature probe

Optional additional room units are available, of types QAA75.611 (optional code O-DSP005) and QAA55.110 (optional code O-DSP004).
The KECSK18 expansion kit is also available as an optional (optional code O-DSP030); this allows you to support additional types of circuit, as described in its installation manual (code

D-LBR760).

## III.4   EXCLUSIONS OF LIABILITY AND WARRANTY

*i* Any contractual or extra-contractual liability of the manufacturer for any damage caused by incorrect installation and/or improper use and/or failure to comply with regulations and with the manufacturer's directions/instructions shall be disclaimed.

*i* In particular, the warranty on the appliance may be rendered void by the following conditions:
► Incorrect installation/cabling.
► Misuse.
► Failure to comply with the manufacturer's indications on installation, use and maintenance.
► Alteration or modification of the product or any part thereof.
► Extreme operational conditions or however outside of the operational ranges set forth by the manufacturer.
► Abnormal actions transmitted by the plant or installation to the appliance (electric shock, overheating, power surges, etc.)
► Accidental damages or due to force majeure.

# 1   GENERAL INFORMATION AND SYSTEM DIAGRAMS

The System controller for modulating absorption methane condensing heat pump + renewable aerothermal energy K18 has the following basic functions:
► Controls ambient comfort by controlling the heating circuits or zone valves.
► Controls the production of domestic hot water (DHW), by controlling the components dedicated to fill the buffer tank.
► Controls the generation of heat, by controlling a K18 GAHP unit and optionally a supplementary heat generation appliance.

All this is possible for certain types of water circuit indicated in fig. 1.1 p. 6, 1.2 p. 7 and 1.3 p. 7.

📝 The System controller for the K18 unit is supplied pre-configured to facilitate the installation and startup of the types of system illustrated in fig. 1.1 p. 6, 1.2 p. 7 and 1.3 p. 7. However, it can also support other configurations. For applications other than those indicated in this manual, Robur provides custom consultancy service.

*i* For water circuits with a primary circuit only (fig. 1.1 p. 6 and 1.2 p. 7) water circulation must be guaranteed to handle the K18 unit's anti-icing cycle. In the diagram given in fig. 1.2 p. 7, this requires that a outlet/inlet bypass be installed, with overpressure valve set to open only when both zone valves are closed. For the diagram given in fig. 1.1 p. 6 it may be sufficient to ensure circulation in one branch of the distribution; for instance, by not installing the valve (thermostatic or

manual) on one of the radiators.

**Figure 1.1** – System with primary water circuit only and one zone, auxiliary boiler and DHW production optional
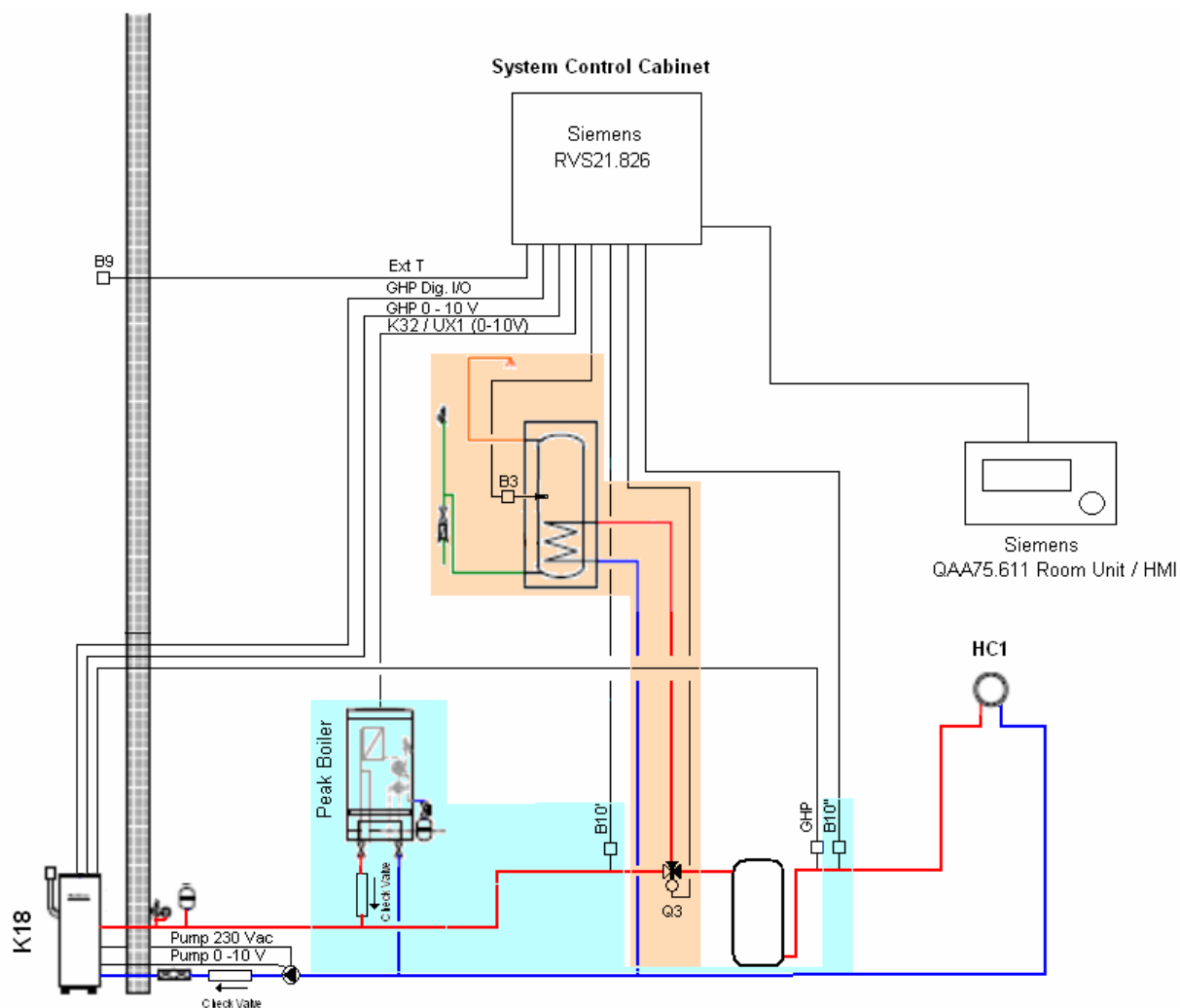
**Figure 1.2** – System with primary water circuit only and two zones, auxiliary boiler and DHW production optional
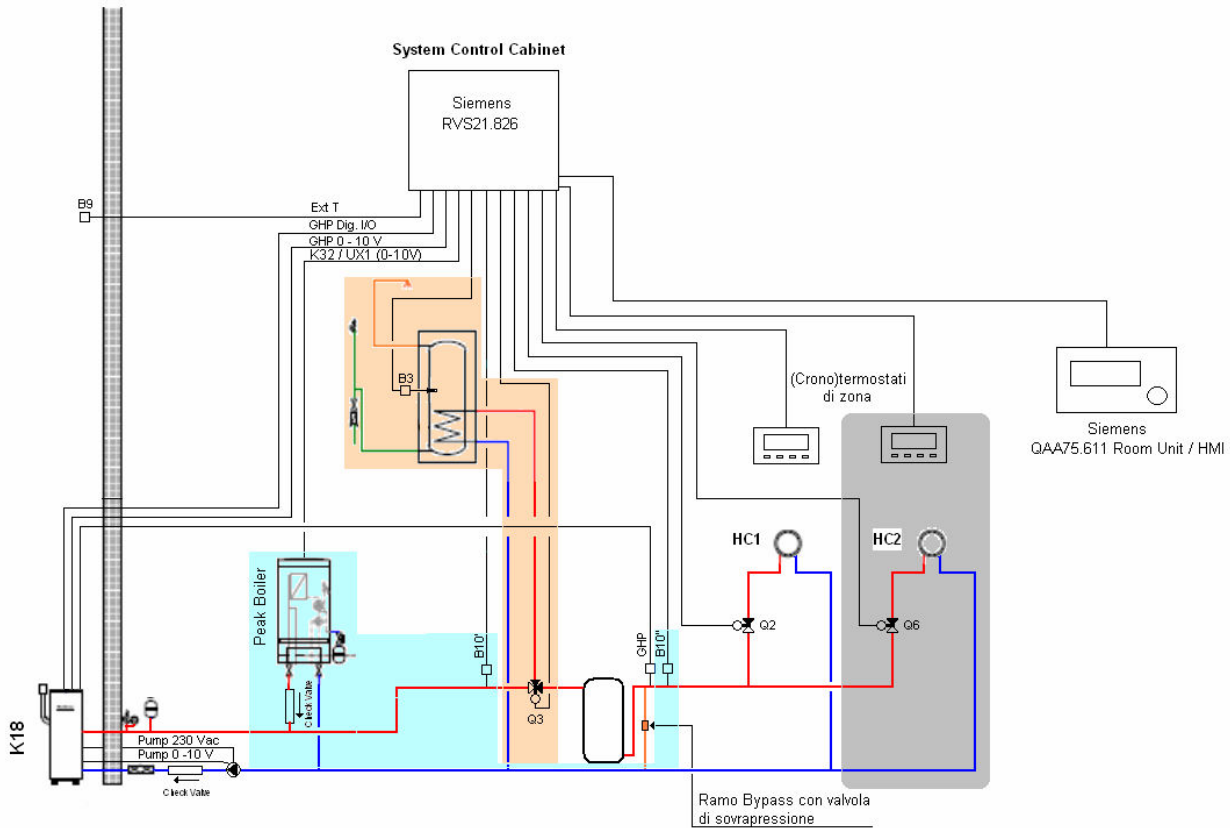


**Figure 1.3** – System with primary and secondary water circuits, up to two heating circuits, one of which is optionally mixed, auxiliary boiler and DHW production optional
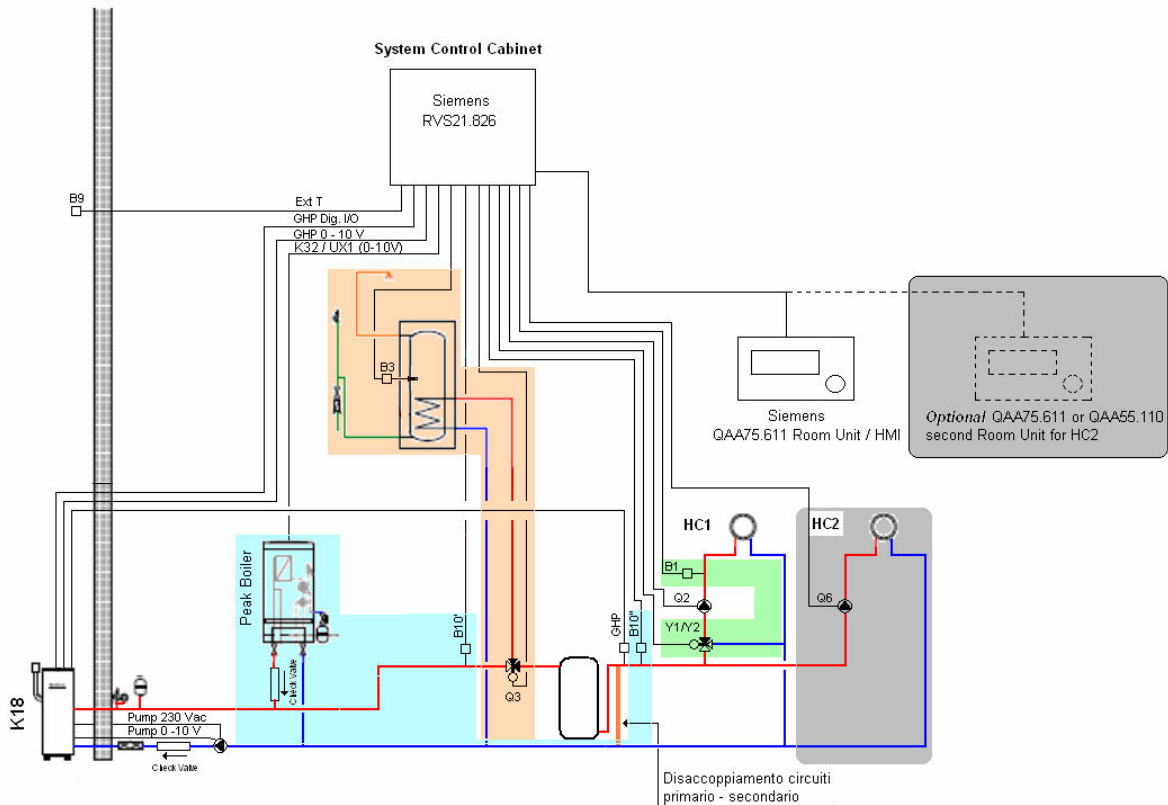
All temperature probes (GHP, B10′, B10″, B1, B3) must be placed and fixed in dedicated thermowells, with a length suitable to result immersed in water flow or in water mass, using thermal paste to ensure a good heat transfer.

In case one of the optional DHW preparation tanks is used (code OSRB012 or OSRB004), it is recommended to use the thermowell just above mid height for the probe B3.

Even in case other water tanks are used, place probe B3 in an intermediate position, possibly just above mid height.

# 2   ASSEMBLY AND INSTALLATION

The System controller for the K18 is supplied preassembled and precabled in an IP55 rated enclosure. The protection rating is reduced if the included cable gland caps are used. Use suitable cable glands (not included) to maintain the indicated protection rating, if necessary.

Before installing the unit, check that the equipment is not connected to its power supply.

The cabling must satisfy the requirements of safety class II, i.e. the mains power cables and the SELV cables must be ducted separately. A distance of at least 50 mm must be maintained between the ducts carrying the mains cables and the SELV cables.

The CSK18 and any other equipment and accessories must be powered up only when the installation is complete. Failure to observe this instruction incurs a risk of electrocution and short-circuit.

The CSK18 must not be exposed to water.

The unit's ambient operating temperature range is 0 - 50 °C.

## 2.1    CSK18 SYSTEM CONTROLLER ENCLOSURE

**Assembly and installation**

**Figure 2.1** – External overall dimensions and wall mounting diagram for CSK18 enclosure
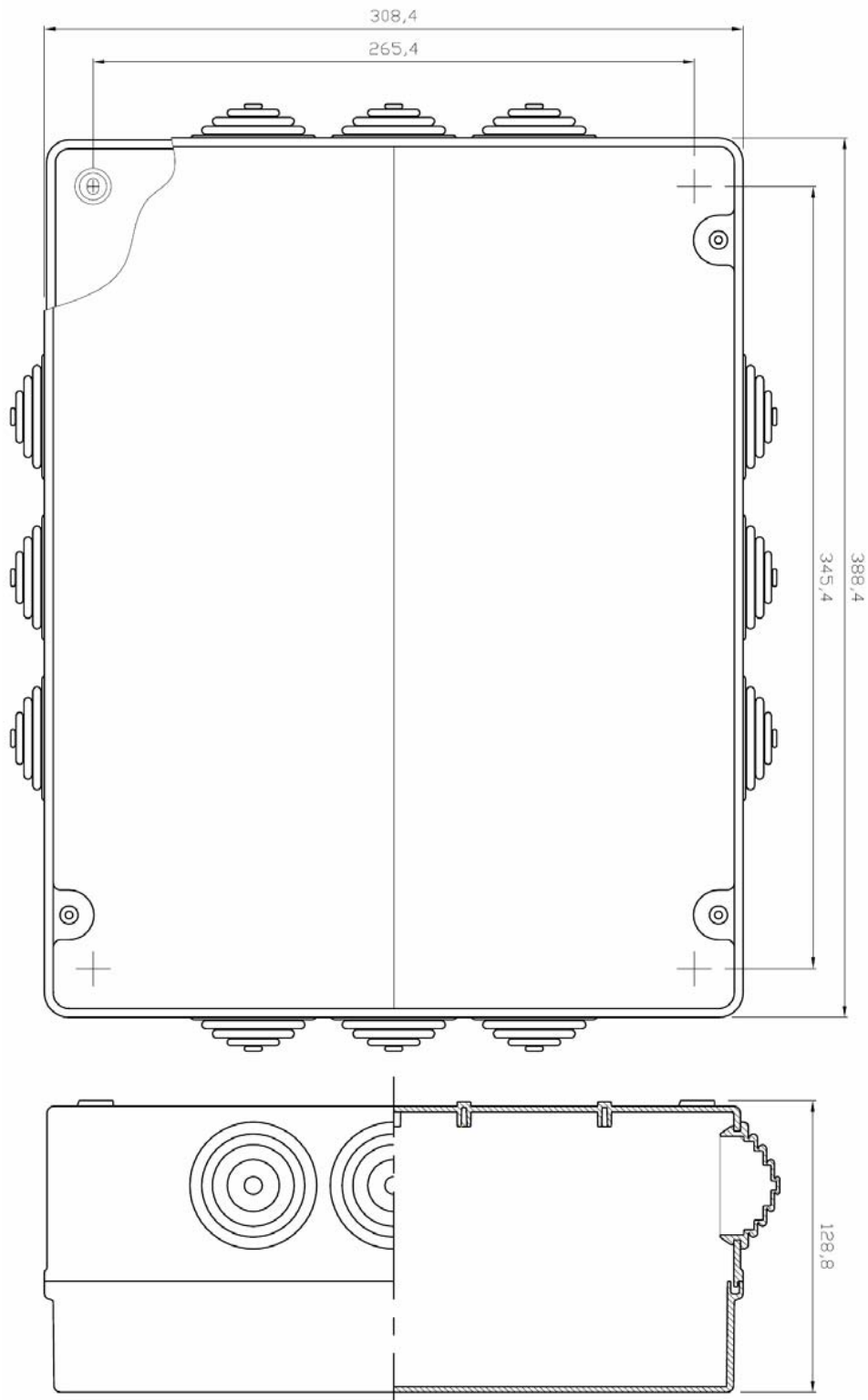
**Figure 2.2** – General layout of components and wiring diagram for K18 system controller
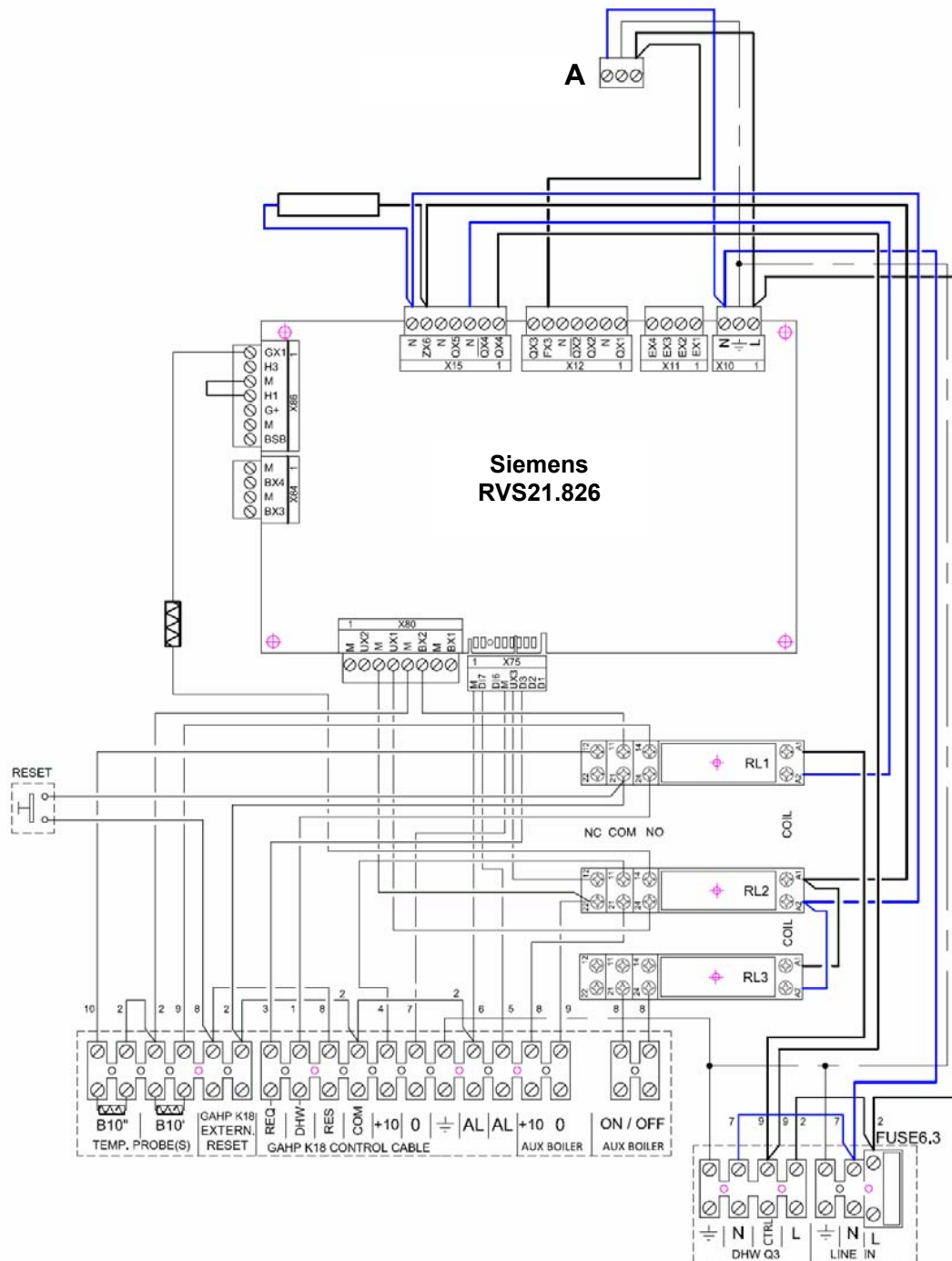
LEGEND
A          Optional expansion board power connector

The electrical connections are partly done with the terminal blocks inside the bottom of the enclosure, and partly with the included extractable connectors which fit directly onto the board.

Table 2.1 p. 11 lists the Line Voltage supply and signal connections on the extractable connectors at the top edge of the Siemens RVS21.826 board, while Table 2.2 p. 11 lists the Line Voltage supply and signal connections on the terminal block at the bottom right interior of the CSK18 enclosure.

To identify the position of the connectors and terminal blocks, refer to the wiring diagram given in fig. 2.2 p. 10.
To identify the plumbing system components and sensors corresponding to the Siemens function codes (e.g. Q2, Y1, Y2) refer to the plumbing system diagrams in fig. 1.1 p. 6, 1.2 p. 7 and 1.3 p. 7.

**Table 2.1** – Line Voltage connections to Siemens RVS21.826 board connectors

| Function (Siemens logo on water circuit diagrams and description) | | | Logo on connector Colour | Siemens connector code |
|---|---|---|---|---|
| L | 230 VAC phase input to RVS21.826 | **Pre-wired** | X10 Green | BPZ:AGP5S.03A/109 |
| ⏚ | Ground connection to RVS21.826 | **Pre-wired** | | |
| N | Neutral input to RVS21.826 | **Pre-wired** | | |
| EX1 | Not used | | X11 Green not supplied | BPZ:AGP5S.04D/109 |
| EX2 | Not used | | | |
| EX3 | Not used | | | |
| EX4 | Not used | | | |
| QX1 | **Y1 - heating circuit 1 mixer valve open phase output** | | X12 Green | BPZ:AGP5S.07H/109 |
| N | **Uscita Neutro Valvola Miscelatrice Circuito Riscaldamento 1** | | | |
| QX2 | **Y2 - heating circuit 1 mixer valve close phase output** | | | |
| $\overline{QX2}$ | Not used | | | |
| N | **Q6 - Heating circuit 2 water pump neutral output / Zone 2 valve (2)** | | | |
| FX3 | Phase input for output QX3 | **Pre-wired** | | |
| QX3 | **Q6 - Heating circuit 2 water pump phase output / Zone 2 valve (2)** | | | |
| QX4 | DHW diverter valve control phase output (3) | **Pre-wired** | X15 Orange | BPZ:AGP5S.07M/109 |
| $\overline{QX4}$ | **Q3 - DHW diverter valve phase inverse output (1)** | | | |
| N | Neutral output | **Pre-wired** | | |
| QX5 | **Q2 - Heating circuit 1 water pump phase output / Zone 1 valve** | | | |
| N | **Q2 - Heating circuit 1 water pump neutral output / Zone 1 valve** | | | |
| ZX6 | Auxiliary boiler ON/OFF request signal output | **Pre-wired** | | |
| N | Neutral output | **Pre-wired** | | |

(1)   Not normally used. It may be used:
    *     in place of Q3 (see Table 2.2 p. 11) if the DHW diverter valve is set to DHW when the phase is NOT present at the output
    *     in addition to Q3 if the valve has an actuator with two terminals which are excited alternately to set the valve to Heating or DHW.
(2)   If expansion kit KECSK18 is used, connect Q6 as shown in table 2.1 of the expansion kit's installation manual.
(3)   Connect the valve to the CTRL output (Table 2.2 p. 11).

**Table 2.2** – Line Voltage connections to bottom RH terminal block in CSK18 enclosure

| | Function (description) | Group of terminals |
|---|---|---|
| L | **230 VAC phase power input** | LINE IN |
| N | **Neutral power input** | |
| ⏚ | **Ground connection** | |
| L | **DHW diverter valve power fixed phase output** | DHW Q3 |
| CTRL | **Q3 - DHW diverter valve power control phase output (1)** | |
| N | **DHW diverter valve power neutral output** | |
| ⏚ | **DHW diverter valve power ground connection** | |

(1)   Output **Q3** is active (230VAC phase present) during DHW service and inactive during heating mode operation. See note (1) to Table 2.1 p. 11.

Table 2.3 p. 11 lists the SELV supply and signals connections on the extractable connector at the bottom and left edges of the Siemens RVS21.826 board, while Table 2.4 p. 12 lists the SELV signals connections on the terminal block at the bottom left interior of the CSK18 enclosure.

> 📝 The connections in Table 2.4 p. 12 include those which connect the System controller to the K18 unit.

**Table 2.3** – SELV signal connection to Siemens RVS21.826 board

| Function (Siemens logo on water circuit diagrams and description) | | | Logo on connector Colour | Siemens connector code |
|---|---|---|---|---|
| BX1 | **B9 - External temperature sensor input** | | X80 Grey | BPZ:AGP5S.08N/109 |
| M | **B9 - External temperature sensor input** | | | |
| BX2 | B10', B10" temperature sensor input | **Pre-wired** | | |
| M | B10', B10" temperature sensor input | **Pre-wired** | | |
| UX1 | Auxiliary boiler 0 - 10V setpoint output | **Pre-wired** | | |
| M | Auxiliary boiler 0 - 10V setpoint output ground | **Pre-wired** | | |
| UX2 | Not used | | | |
| M | Not used | | | |
| BX3 | **B3 - DHW buffer tank temperature sensor input** | | X84 Grey | BPZ:AGP5S.04E/109 |
| M | **B3 - DHW buffer tank temperature sensor input** | | | |
| BX4 | **B1 - Heating circuit 1 temperature sensor input (mixed only)** | | | |
| M | **B1 - Heating circuit 1 temperature sensor input (mixed only)** | | | |

| | Function (Siemens logo on water circuit diagrams and description) | | Logo on connector<br>Colour | Siemens connector code |
|---|---|---|---|---|
| BSB | **BSB+ - QAA75/QAA55 Room Unit data bus connection** | | | |
| M | **BSB-- - QAA75/QAA55 Room Unit data bus ground** | | | |
| G+ | **G+ - QAA75 Room Unit backlighting power output** | | | |
| H1 | **H1 - Heating circuit 1 normally open request signal input (1)** | | X86<br>Grey | BPZ:AGP5S.07K/109 |
| M | **H1/H3 - Heating circuit 1 and 2 request signal input return** | | | |
| H3 | **H3 - Heating circuit 2 normally open request signal input (2)** | | | |
| GX1 | GX1- 12 VDC power output | **Pre-wired** | | |

(1)     Input **H1** is prewired active with a jumper to terminal **H1/H3**; to insert an external request signal (**voltage free contact**), remove the jumper and cable it between terminals **H1** and **H1/H3**.

(2)     Input **H3** is open to keep heating circuit 2 inactive. If this heating circuit is present, fit a jumper between terminals **H3** and **H1/H3** or insert an external request signal between them (**voltage free contact**)

**Table 2.4** – SELV signal connection to bottom LH terminal block in CSK18 enclosure

| | Function (description) | Group of terminals |
|---|---|---|
| ON/OFF | **Auxiliary boiler ON/OFF request signal voltage free output (SELV or 230 VAC) (1)** | RH AUX BOILER |
| ON/OFF | **Auxiliary boiler ON/OFF request signal voltage free output (SELV or 230 VAC) (1)** | |
| 0 | **Auxiliary boiler 0 - 10V setpoint output ground** | LH AUX BOILER |
| +10 | **Auxiliary boiler 0 - 10V setpoint output** | |
| AL | **K18 unit alarm signal input** | GAHP K18 CONTROL CABLE |
| AL | **K18 unit alarm signal input** | |
| ⏚ | **K18 unit cable shielding braid ground connection** | |
| 0 | **K18 unit 0 – 10V setpoint output ground** | |
| +10 | **K18 unit 0 - 10V setpoint output** | |
| COM | **K18 unit digital output common ground** | |
| RES | **K18 unit alarm reset digital output** | |
| DHW | **Service type request digital output to K18 unit (heating/DHW)** | |
| REQ | **Service request (request) digital output to K18 unit** | |
| GAHP K18 | **K18 alarm reset external control input (NO voltage free contact)** | EXTERNAL RESET |
| GAHP K18 | **K18 alarm reset external control input (NO voltage free contact)** | |
| B10' | **B10' - DHW auxiliary boiler regulation temperature sensor input (3)** | TEMP. PROBE(S) |
| B10' | **B10' - DHW auxiliary boiler regulation temperature sensor input** | |
| B10" | **B10" - Heating auxiliary boiler regulation temperature sensor input (2)** | |
| B10" | **B10" - Heating auxiliary boiler regulation temperature sensor input** | |

(1)     This output can be connected to a SELV or Line Voltage input. The type of input depends on the type of auxiliary boiler

(2)     This input is fitted with a resistor; if an **auxiliary boiler** is present, remove the resistor and hook up the **B10"** temperature sensor

(3)     This input is fitted with a resistor; if an **auxiliary boiler and DHW service** are present, remove the resistor and hook up the **B10'** temperature sensor

All temperature sensors are NTC 10k (Beta 3977) except for external room sensor B9, which is NTC 1k (included, model Siemens QAC34).

## 2.2   SIEMENS QAC34 AMBIENT TEMPERATURE PROBE

The external sensor is essential to the operation of the CSK18 system. If this sensor is not connected to the Siemens RVS21.826 board, the system is not operational.

The sensor is used to acquire the external temperature and, in part, also the effects of the sunlight, the wind and the temperature of the wall to which it is mounted.

**Technical specifications**

**Table 2.5** – Characteristics of QAC34/101 external sensor

| Model | Sensor type | Measurement range (°C) | Tolerance (K) (1) | Time constant (min) | Weight (g) | Wire cross section (mm2) | Max. length (m) |
|---|---|---|---|---|---|---|---|
| QAC34/101 | NTC1000 Ω at 25 °C | -50 - 70 | ± 1 | 12 | 73 | 1.5 | 120 |

(1)     QAC34/101 over range –10 - +20 °C

*ROBUR*

**Assembly and installation**

**Figure 2.3** – Description of installation procedure for QAC34 external sensor
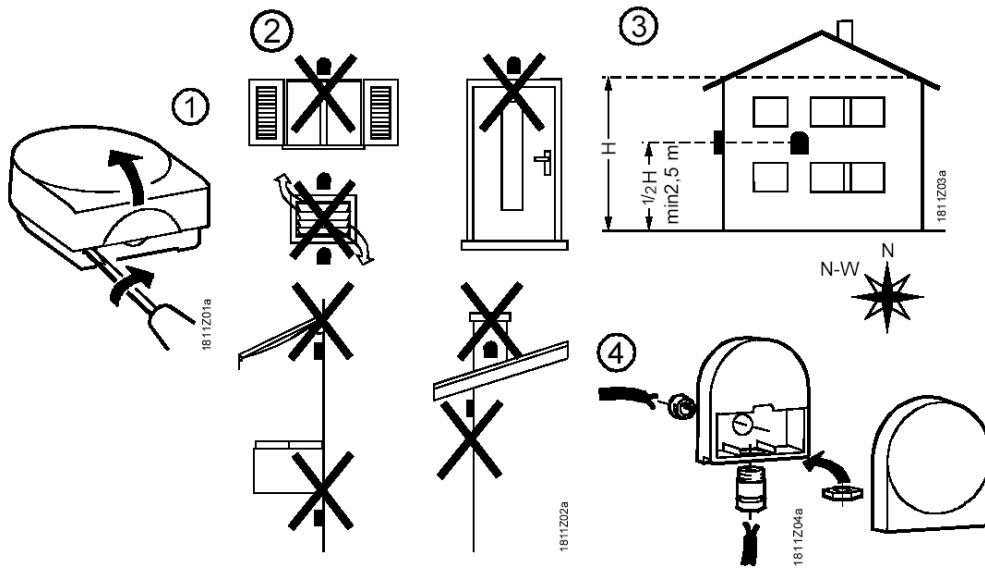


**Figure 2.4** – QAC34 external room sensor dimensions
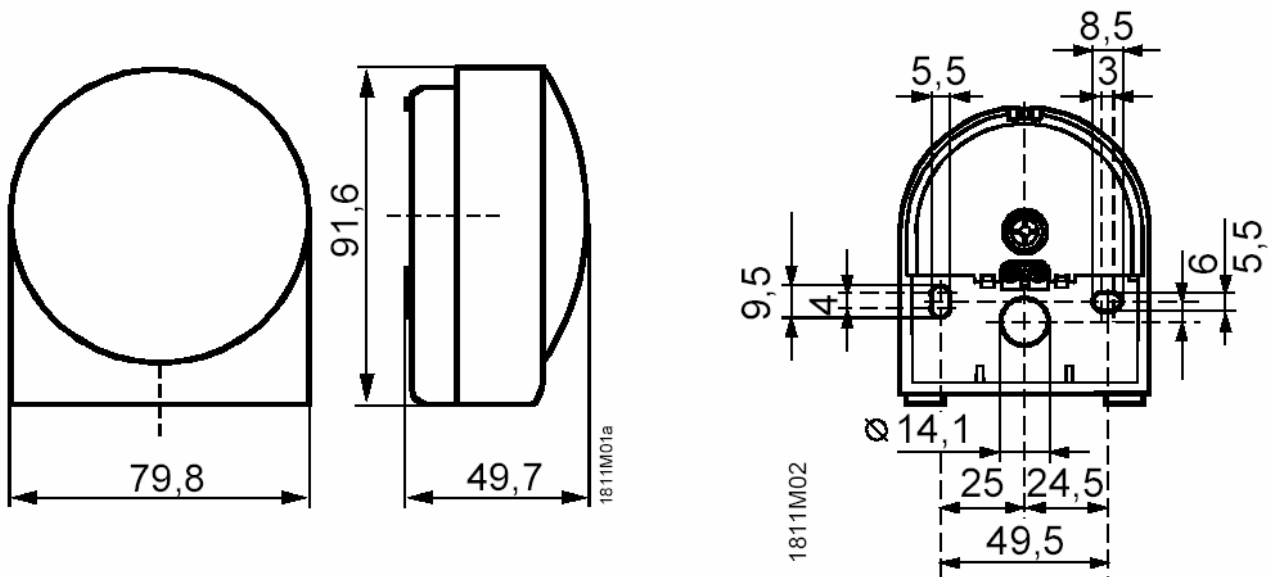
## 2.3 QAA55.110 BASIC ROOM UNIT (OPTIONAL)

**Location**

**Figure 2.5** – Description of installation position of room unit
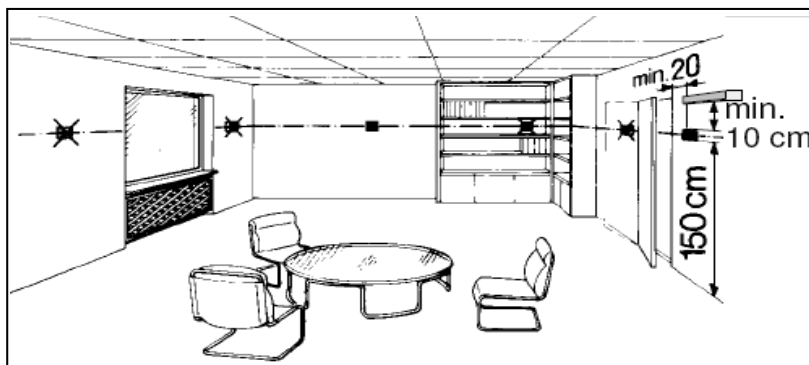


The room unit should be installed in a reference room, usually the living room, bearing the following in mind:

► the room unit must be installed about 1.5 m off the ground, in an area which allows the sensor to read the room temperature as accurately as possible

► it should therefore be out of the way of draughts, sunlight and other sources of heat

► if wall mounted, leave enough space above the unit for it to be installed and removed when necessary

🛈 Once removed from its base, the room unit is no longer powered and is thus inactive.

**Installation**

**Figure 2.6** – Description of installation procedure for room unit QAA55.110
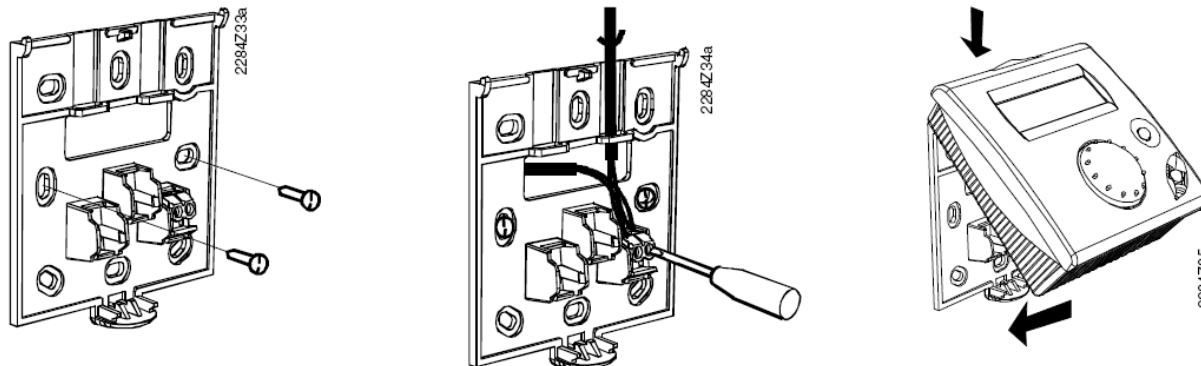


🛈 Do not install the room unit in rooms exposed to water or damp.

📝 For further details on the operation, installation and use of the room unit, refer to section 5 p. 29, in particular par. 5.1.5 p. 32 and 5.1.7 p. 32.

**Dimensions and installation template**

**Figure 2.7** – Description of mounting holes for room unit QAA55.110



**Electrical hookup**

**Figure 2.8** – Description of hookup procedure for room unit QAA55.110
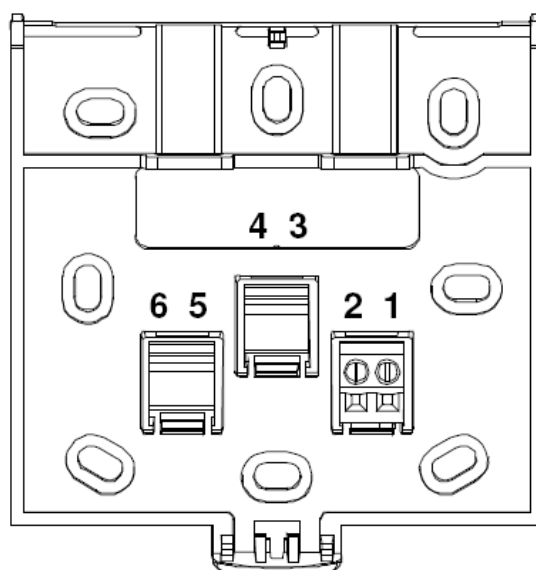


**Table 2.6** – Room unit QAA55.110 connections

| Terminal | Name | Description |
|---|---|---|
| 1 | BSB | Data bus BSB + |
| 2 | M | Data bus BSB - |

## 2.4   QAA75.611 MAIN ROOM UNIT

**Location**

**Figure 2.9** – Description of installation position of room unit
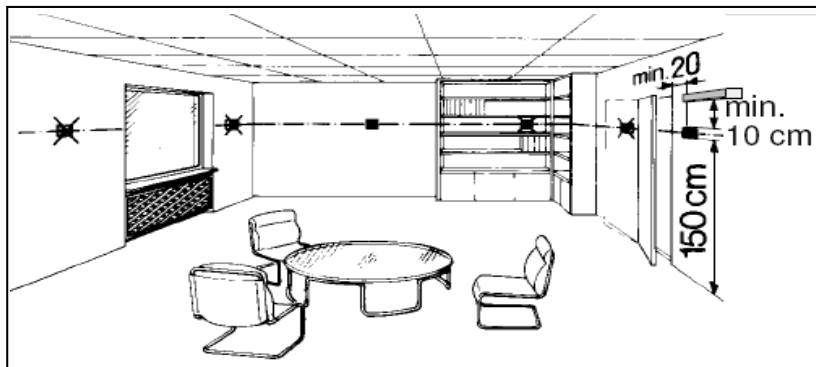


The room unit should be installed in a reference room, usually the living room, bearing the following in mind:

► the room unit must be installed about 1.5 m off the ground, in an area which allows the sensor to read the room temperature as accurately as possible

► it should therefore be out of the way of draughts, sunlight and other sources of heat

► if wall mounted, leave enough space above the unit for it to be installed and removed when necessary

ℹ️ Once removed from its base, the room unit is no longer powered and is thus inactive.

**Installation**

**Figure 2.10** – Description of installation procedure for room unit QAA75.611
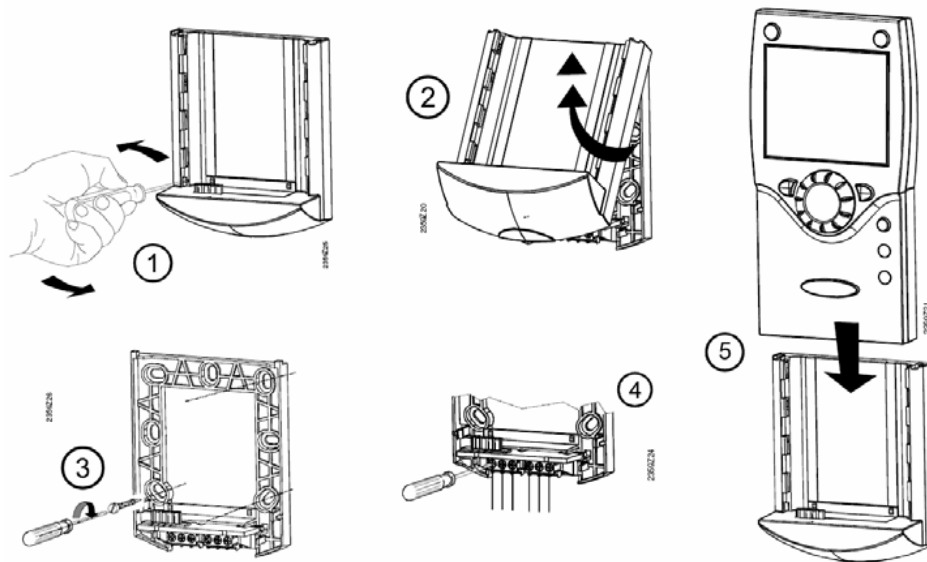


ℹ️ Do not install the room unit in rooms exposed to water or damp.

📝 For further details on the operation, installation and use of the room unit, refer to section 5 p. 29, in particular par. 5.1.5 p. 32 and 5.1.7 p. 32.

**Dimensions and installation template**

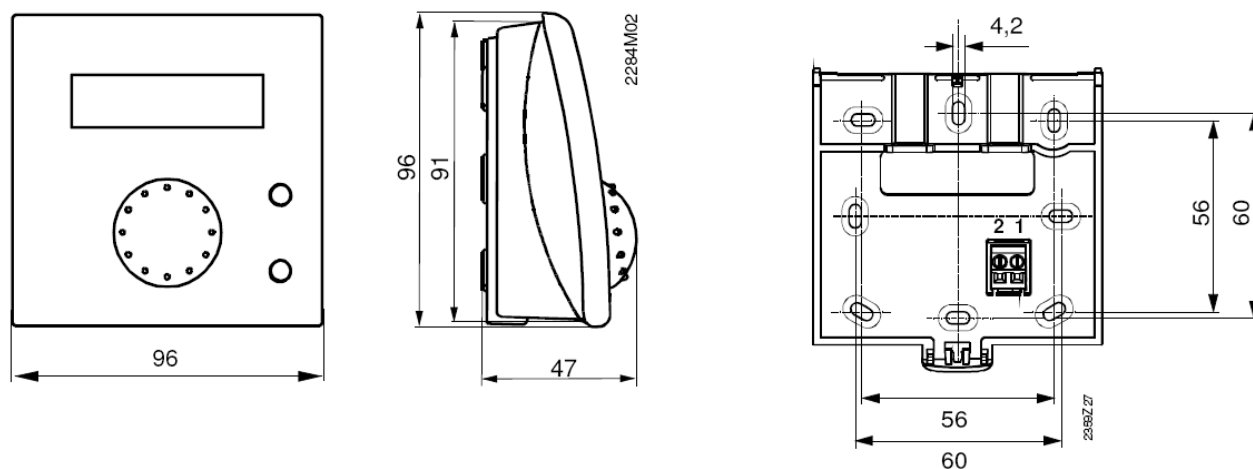**Figure 2.11** – Description of mounting holes for room unit QAA75.611
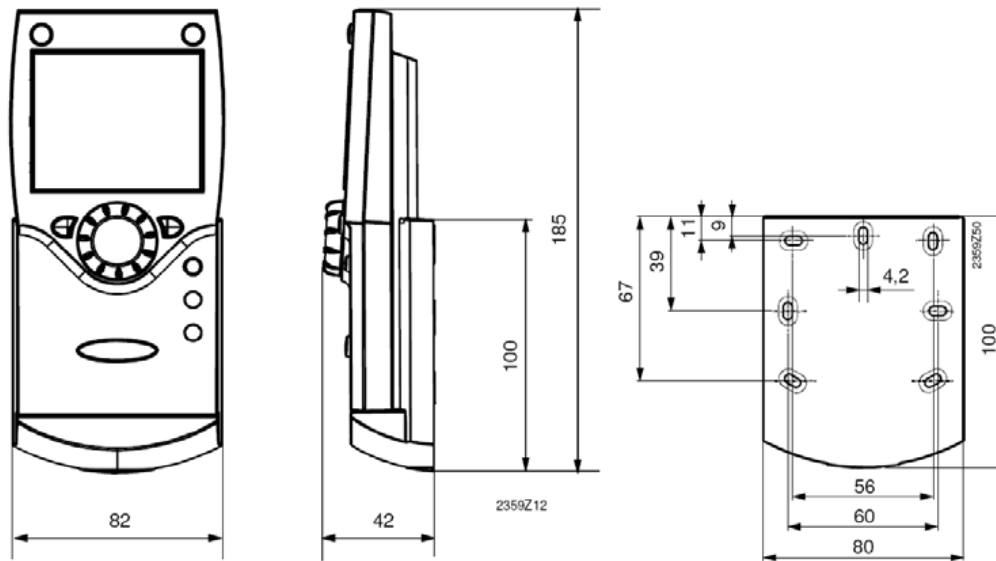


**Electrical hookup**

**Figure 2.12** – Description of hookup procedure for room unit QAA75.611
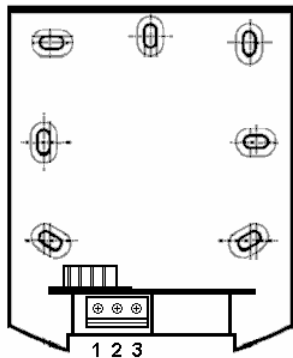


**Table 2.7** – Room unit QAA75.611 connections

| Terminal | Name | Description |
| --- | --- | --- |
| 1 | BSB | Data bus BSB + |
| 2 | M | Data bus BSB - |
| 3 | G+ | Power 12 V DC |

## 2.5   THE K18 UNIT

For installation considerations, refer to the K18's Installation, user and maintenance manual (D-LBR736).
For convenience we include the terminal block details for the electrical hookup here.

**Figure 2.13** – Terminal block for electrical connections of K18 unit
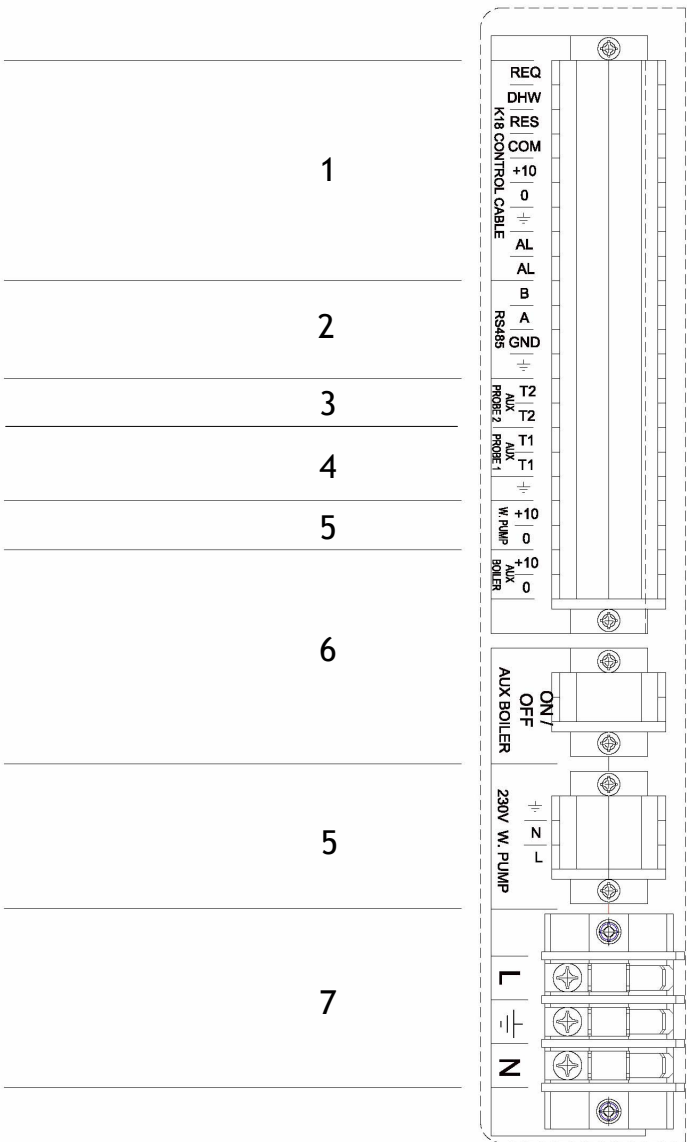


LEGEND

| | |
|---|---|
| 1 | Connection to CSK18 enclosure (see par. 3.6 p. 25) |
| 2 | Modbus connection to RS485 port for optional monitoring (see K18 unit manual) |
| 3 | Not used |
| 4 | GHP temperature sensor connection (see par. 3.7 p. 26) |
| 5 | Optional external water pump connection (see K18 unit manual) |
| 6 | Not used |
| 7 | Power connection (see K18 unit manual) |

# 3   ELECTRICAL HOOKUP

## 3.1   HOOKING UP THE ROOM UNIT

**Figure 3.1** – Example of connection of two room units, one type QAA75.611, the other (optional) type QAA55.110
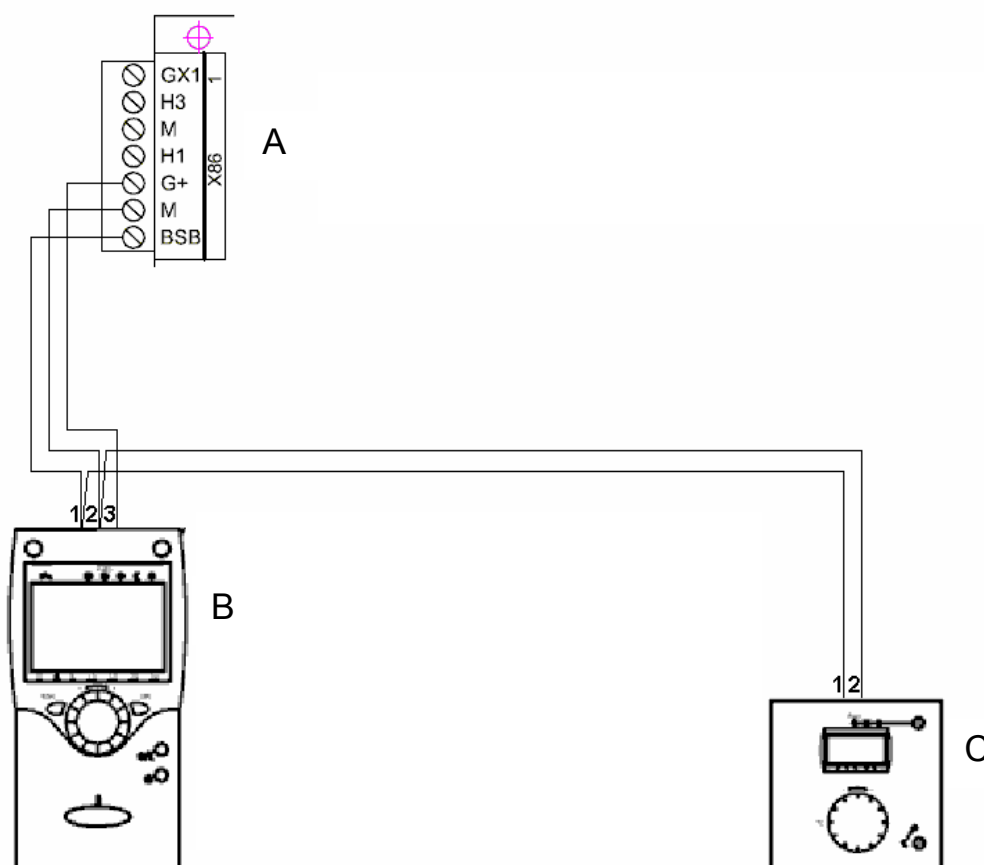


| RVS21.826 | QAA75.611 | QAA55 |
|:---:|:---:|:---:|
| BSB | 1 | 1 |
| M | 2 | 2 |
| G+ | 3 | - |

LEGEND
A          Grey connector X86 (left edge of RVS21.826 board)
B          Ambient unit 1 (QAA75.611)
C          Ambient unit 2 (QAA55.110) (optional code O-DSP004)

NOTE       Use shielded signal cable 3x0.75 mm$^2$ (2x0.75 mm$^2$ for QAA55.110).
           Maximum total length 400 m.
           Maximum length between controller and room unit 200 m.

           Both room units can also be connected to connector X86.

## 3.2 TEMPERATURE SENSOR CONNECTION

**Figure 3.2** – Temperature sensor connection diagram (NTC 10k - Beta 3977) to RVS21.826 and CSK18 enclosure terminal block
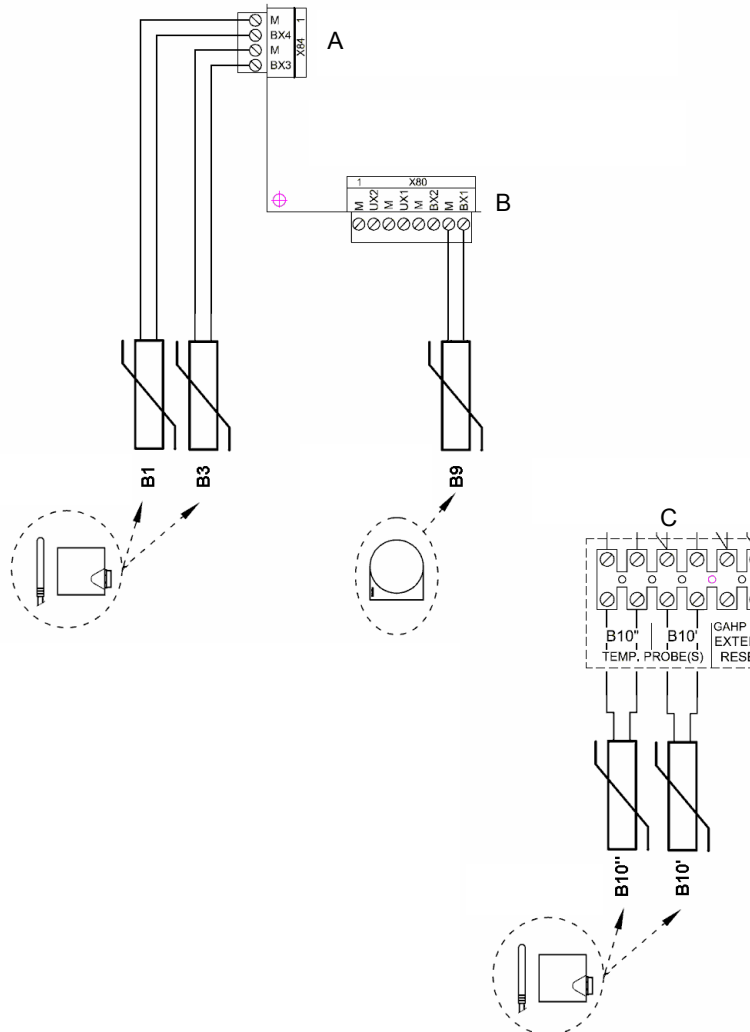


LEGEND

| | |
|---|---|
| A | Grey connector X84 (left edge of RVS21.826 board) |
| B | Grey connector X80 (bottom edge of RVS21.826 board) |
| B1 | NTC 10k Beta 3977 temperature sensor |
| B3 | NTC 10k Beta 3977 temperature sensor |
| B9 | NTC 1k temperatrue sensor - included |
| B10' | NTC 10k Beta 3977 temperature sensor |
| B10" | NTC 10k Beta 3977 temperature sensor |
| C | Detail of CSK18 enclosure terminal block |

**Use of temperature sensors**

| | |
|---|---|
| B9 | always |
| B1 | only if heating circuit 1 is mixed |
| B3 | Only if DHW service provided by K18 is present |
| B10" | only if auxiliary boiler present |
| B10' | only if auxiliary boiler and DHW service provided by K18 are present |
| NOTE | connect B10" and B10', if necessary, after removing the resistance/s on the respective terminals. |

**Use shielded cable**

$2 \times 0.5\ mm^2$ up to 40 m
$2 \times 0.75\ mm^2$ up to 60 m
$2 \times 1.0\ mm^2$ up to 80 m
$2 \times 1.5\ mm^2$ up to 120 m

## 3.3    WATER CIRCULATION PUMP CONNECTION

### 3.3.1    Heating circuit 1 pump hookup diagram

**Figure 3.3** – Direct or external relay connection of heating circuit 1 pump to RVS21.826



LEGEND
A              Orange connector X15 (top edge of RVS21.826 board)
Q2            Heating circuit 1 pump
KC1          Relay (not supplied)
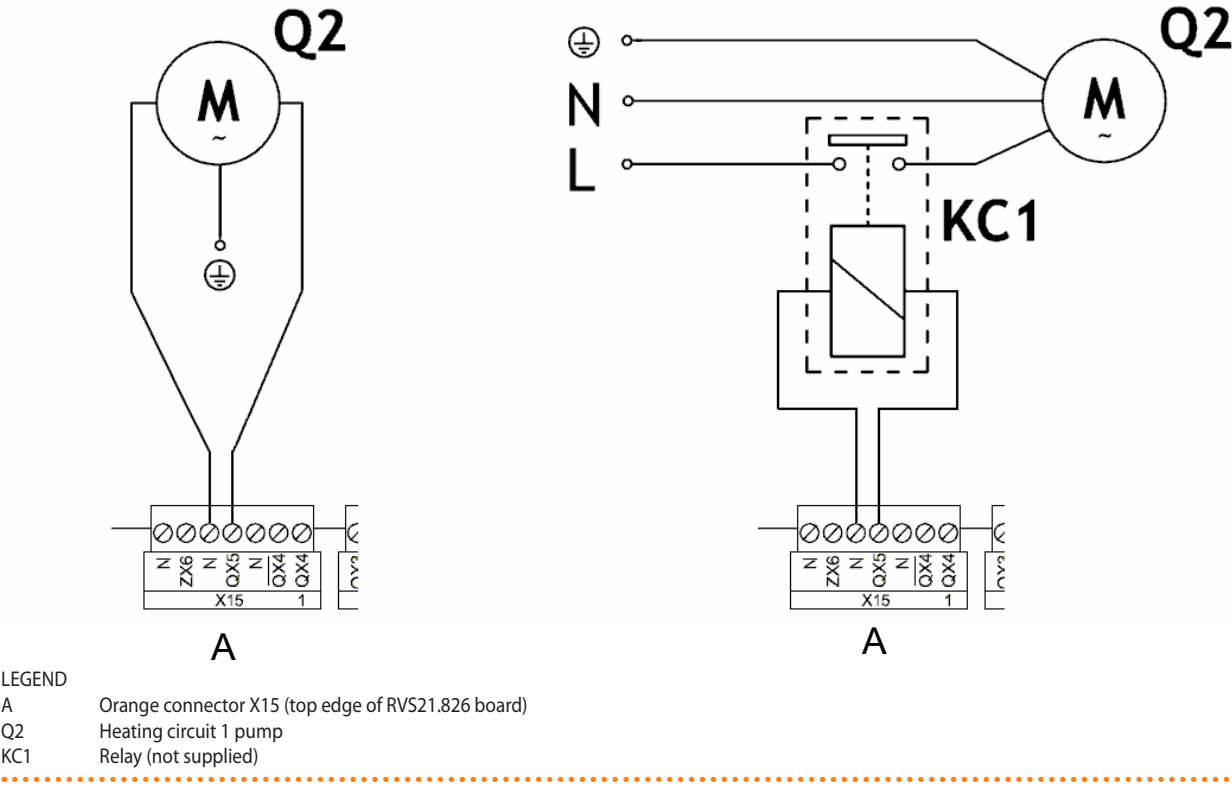
### 3.3.2 Heating circuit 2 pump connection diagram (if present)

**Figure 3.4** – Direct or external relay connection of heating circuit 2 pump to RVS21.826
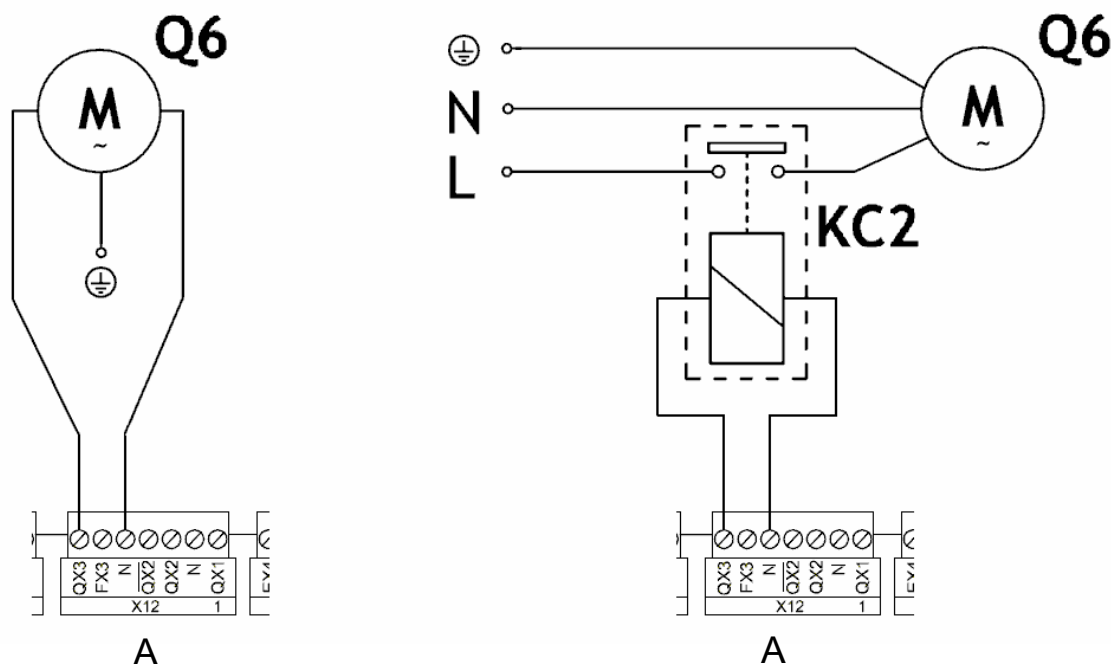


LEGEND
A          Green connector X12 (top edge of RVS21.826 board)
Q6         Heating circuit 2 pump
KC2        Relay (not supplied)
**NOTE**       If expansion kit KECSK18 is used, connect Q6 as shown in figure 3.3 of the expansion kit's installation manual.

## 3.4 MIXER/DIVERTER VALVE CONNECTION

### 3.4.1 Q3 diverter valve connection diagrams for DHW service (if present)

**Figure 3.5** – Q3 diverter valve connection to CSK18 enclosure terminal block – Case 1 (use of optional code O-VLV007 valve)
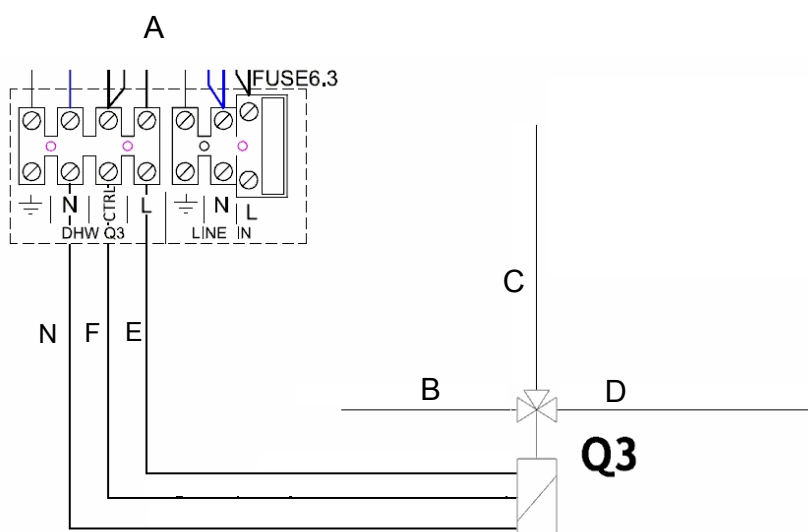


LEGEND
A          Detail of CSK18 enclosure terminal block
B          Flow from K18
C          DHW coil outlet
D          Heating outlet
E          Fixed phase power
F          Signal (phase present in DHW service)
N          Neutral
Q3         Diverter valve

**CASE 1**
Valve with power always present;
position controlled by signal (230VAC phase):
no phase: heating
phase: DHW

**Figure 3.6** – Q3 diverter valve connection to CSK18 enclosure terminal block and RVS21.826 – case 2
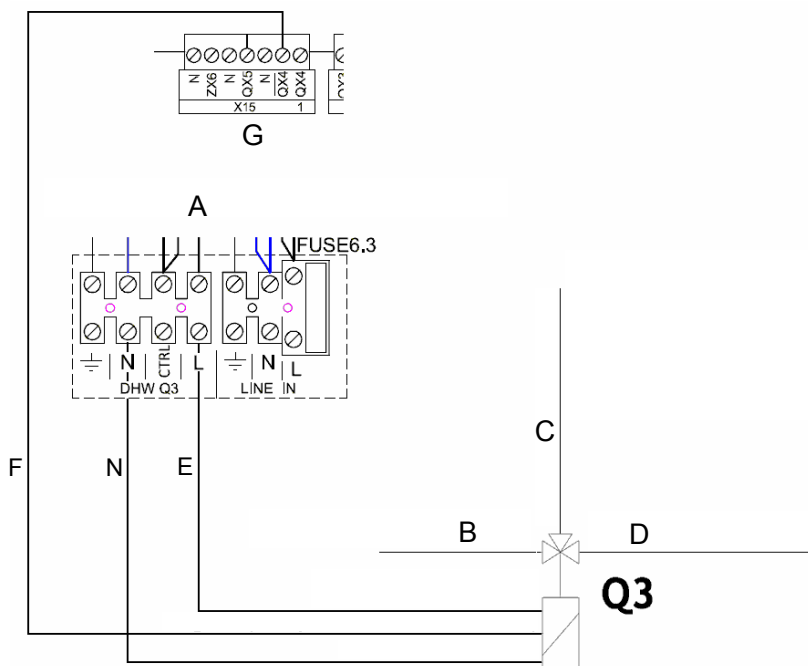


LEGEND

| | |
|---|---|
| A | Detail of CSK18 enclosure terminal block |
| B | Flow from K18 |
| C | DHW coil outlet |
| D | Heating outlet |
| E | Fixed phase power |
| F | Signal (phase present in heating service) |
| G | Connector X15 (top edge of RVS21.826 board) |
| N | Neutral |
| Q3 | Diverter valve |

**CASE 2**
Valve with power always present;
position controlled by signal (230VAC phase):
no phase: DHW
phase: heating

**Figure 3.7** – Q3 diverter valve connection to CSK18 enclosure terminal block and RVS21.826 – case 3
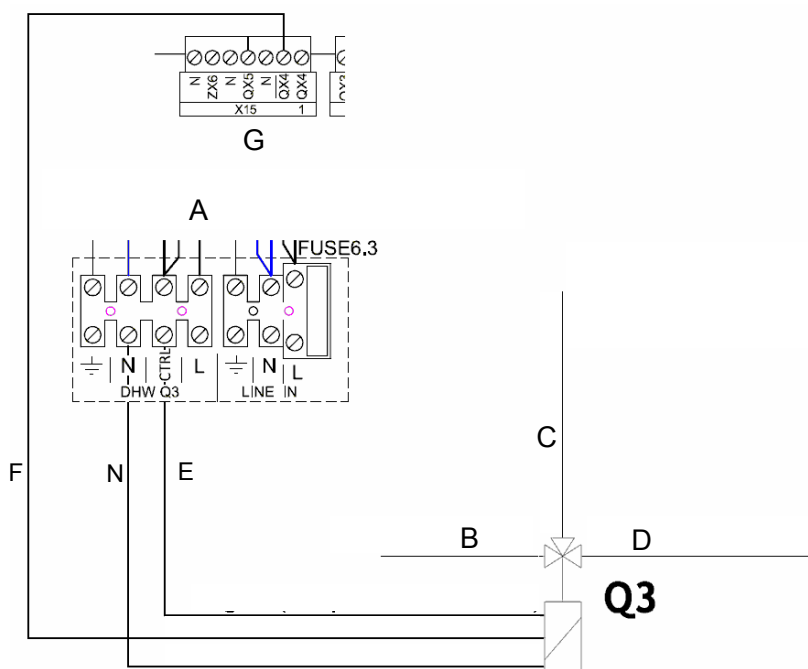


LEGEND

| | |
|---|---|
| A | Detail of CSK18 enclosure terminal block |
| B | Flow from K18 |
| C | DHW coil outlet |
| D | Heating outlet |
| E | Signal (phase present in DHW service) |
| F | Signal (phase present in heating service) |
| G | Connector X15 (top edge of RVS21.826 board) |
| N | Neutral |
| Q3 | Diverter valve |

**CASE 3**
Valve with two signals (230VAC phase) alternatively active for DHW and heating

### 3.4.2    Y1/Y2 mixer valve connection (if present)

**Figure 3.8** – Y1/Y2 mixer valve connection (for mixed heating circuit 1) to RVS21.826



LEGEND

| | |
|---|---|
| A | Connector X12 (top edge of RVS21.826 board) |
| B | Flow from system |
| C | Heating circuit 1 outlet |
| D | Heating circuit 1 inlet |
| E | Y2: close flow from system |
| F | Y1: open flow from system |
| Y1/Y2 | mixer valve |
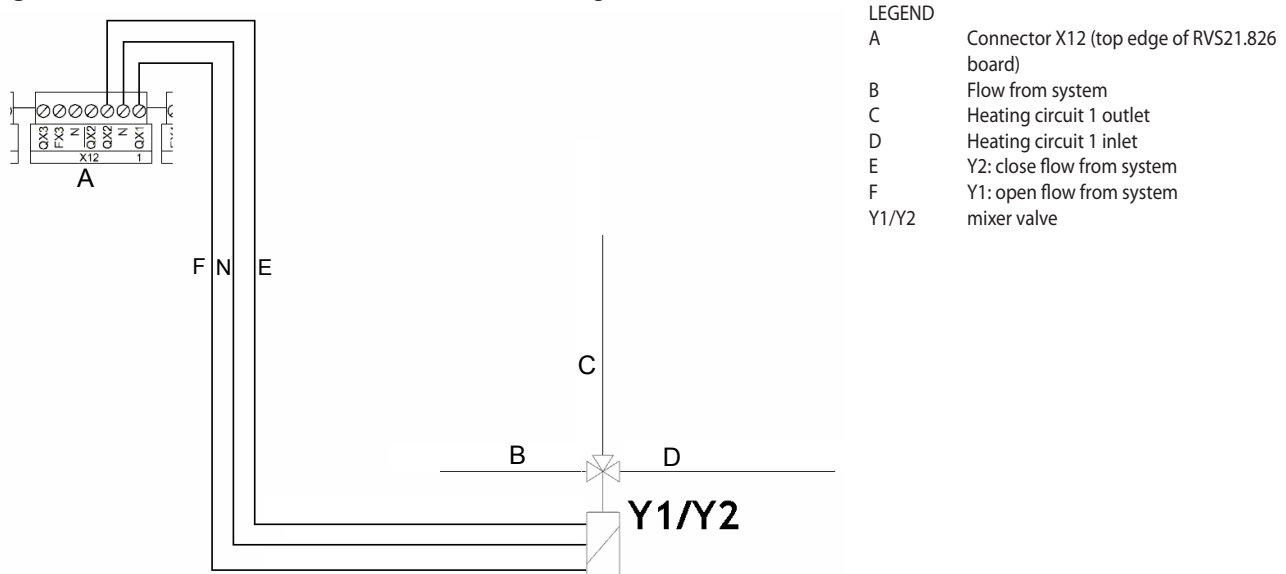
## 3.5    AUXILIARY BOILER REQUEST SIGNAL CONNECTION (IF PRESENT)

**Figure 3.9** – Connection of auxiliary boiler On/Off request input and optional 0-10V input (temperature setpoint) on CSK18 enclosure terminal block



LEGEND

| | |
|---|---|
| A | Detail of CSK18 enclosure terminal block |
| B | Auxiliary boiler |
| C | ON/OFF request input (cable 2x0.75 mm2) |
| D | 0-10V input for setpoint acquisition (optional); (shielded cable 2x0.75 mm$^2$) |
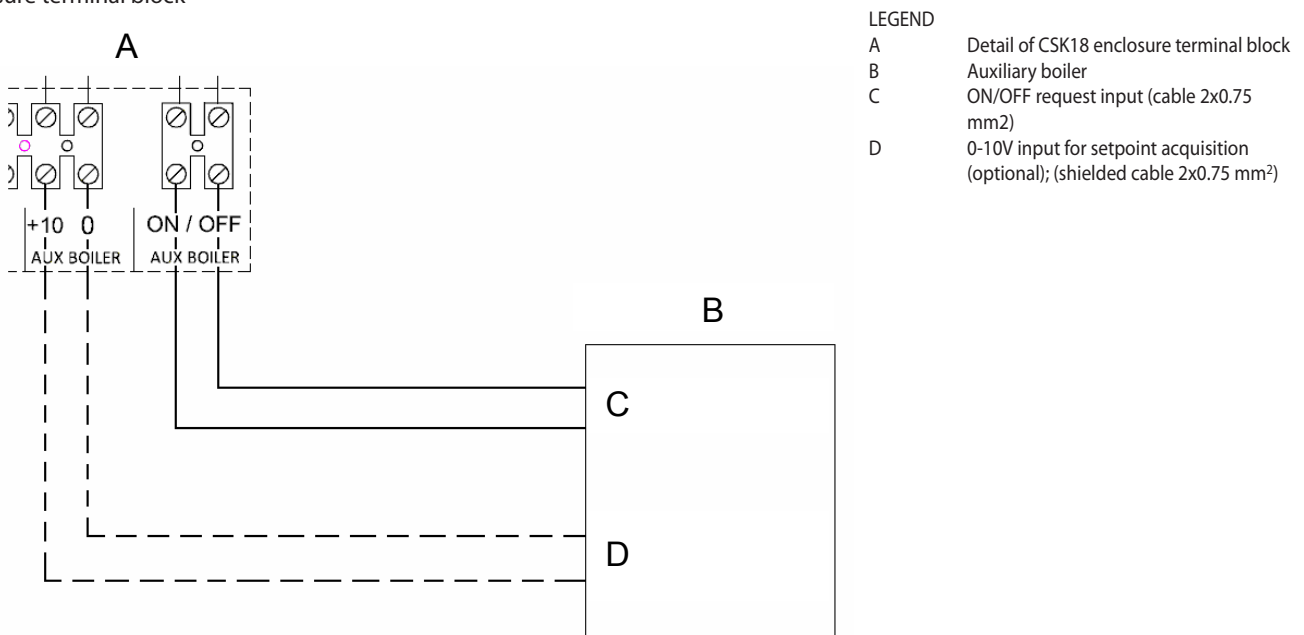
## 3.6   K18 UNIT CONNECTION TO CSK18 ENCLOSURE

**Figure 3.10** – K18 unit connection to CSK18 enclosure terminal block
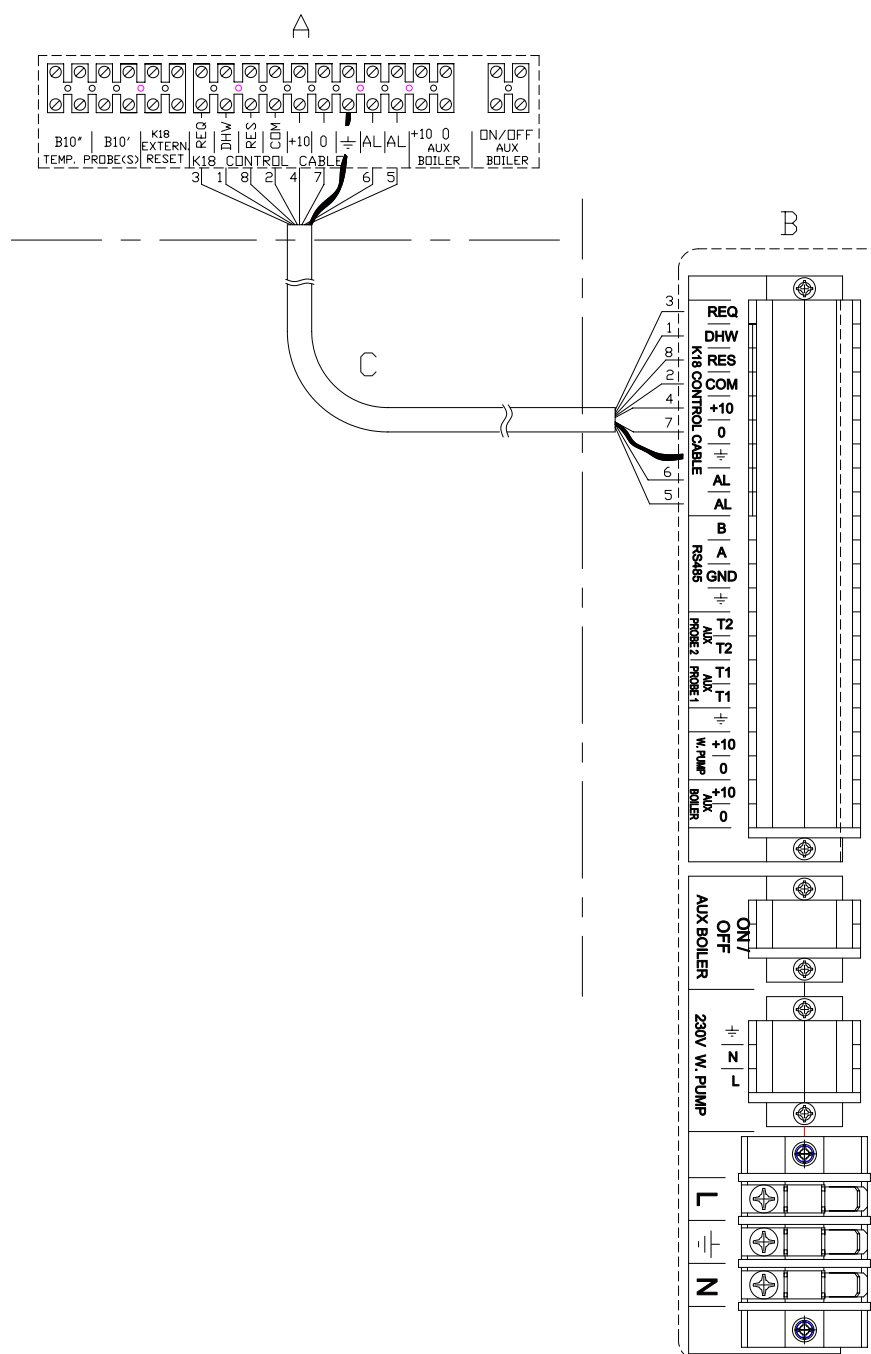


LEGEND
A        Detail of CSK18 enclosure terminal block
B        Detail of K18 enclosure terminal block
C        Shielded multi-wire cable, type Li - YcY 8x0.75 mm$^2$
              Maximum length 50 m.

**NOTE**
Connect the shield to the ground terminals at both ends.
Using DIN 47100 conforming cable (colour coded) simplifies the hookup (see Table 3.1 p. 25).

**Table 3.1** – Wire colours per DIN47100

| Wire n. | Wire colour |
|---------|-------------|
| 1 | White |
| 2 | Brown |
| 3 | Green |
| 4 | Yellow |
| 5 | Grey |

| Wire n. | Wire colour |
|---------|-------------|
| 6 | Pink |
| 7 | Blue |
| 8 | Red |
| 9 | Black |
| 10 | Purple |

## 3.7   GHP TEMPERATURE SENSOR CONNECTION TO K18 UNIT

**Figure 3.11** – GHP collector temperature sensor connection to K18
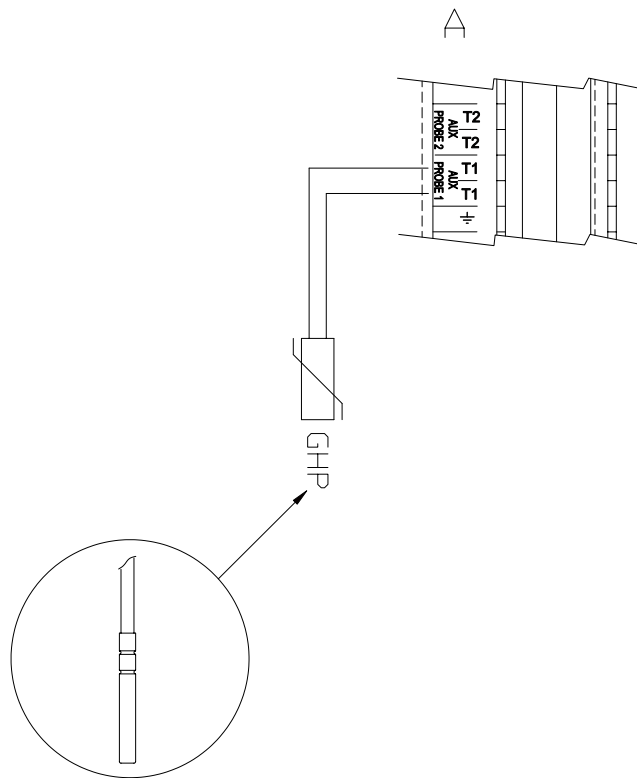


LEGEND

| | |
|---|---|
| A | Detail of K18 enclosure terminal block |
| GHP | NTC 10k Beta 3977 sensor (included with K18 unit) |

**NOTES**   Use shielded cable, type Li - YcY:
$2 \times 0.5$ mm$^2$ up to 40 m
$2 \times 0.75$ mm$^2$ up to 60 m
$2 \times 1.0$ mm$^2$ up to 80 m
$2 \times 1.5$ mm$^2$ up to 120 m

Connect the shield to a ground terminal on the K18 unit's terminal block

## 3.8   EXTERNAL REQUEST SIGNAL CONNECTION TO CSK18 ENCLOSURE

**Figure 3.12** – Connection of optional external request signals (thermostats, thermostat timers, timers) to CSK18 enclosure
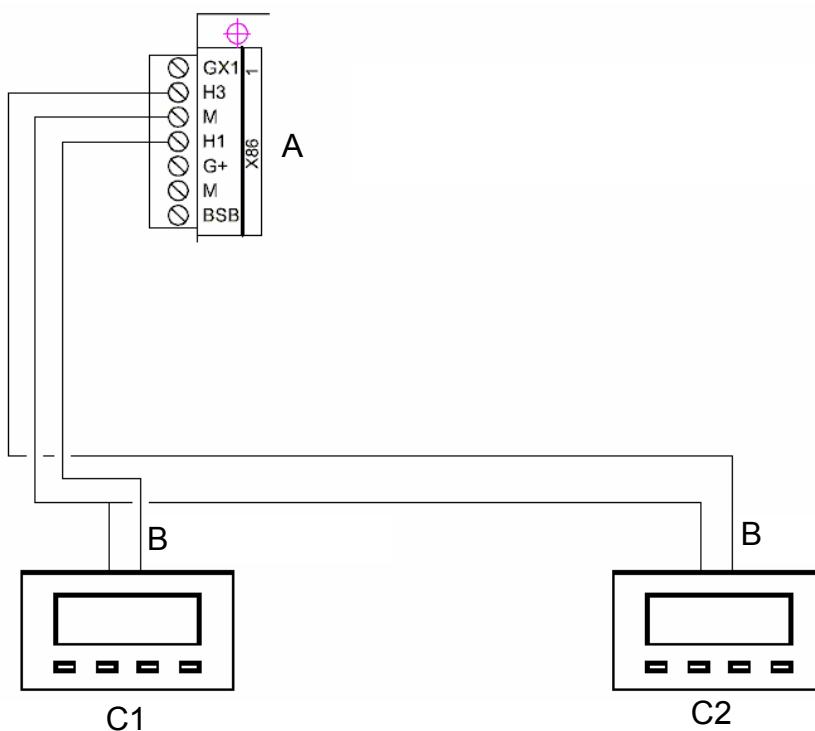


LEGEND

| | |
|---|---|
| A | Grey connector X86 (left edge of RVS21.826 board) |
| B | NO voltage free contact |
| C1 | Thermostat (with timer) for zone 1 (or circuit 1) |
| C2 | Thermostat (with timer) for zone 2 (or circuit 2) |

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# 4   COMMISSIONING

Before commissioning the system, check that the plumbing system and electrical installations are complete in relation to the information contained in sections 1 p. 5, 2 p. 8 and 3 p. 19 of this manual..

> **ℹ** The K18 and auxiliary boiler (if present) may start during and at the end of commissioning. **Make sure that the plumbing system is complete and filled with water.**

> **ℹ** **Commissioning must be done by a TAC.**

## 4.1   USING THE QAA75.611 ROOM UNIT'S INTERFACE

The QAA75.611 room unit is also used for configuring and adjusting the System controller for the K18. This paragraph briefly describes how to use the device's user interface; this allows you to make the settings described in the following paragraphs.

> **⚙** To display and modify the parameters of the System controller, proceed as follows:

1. Press **OK** on the room unit; this displays the **End user** menu options list.

2. If you want to access a higher level menu, press Info (ℹ) for at least 4 seconds, after which the display will show the menu level *(End user, Commissioning, Engineer, OEM)*
   - ► Turn the knob to select the menu level, then press **OK** to access it; you now have access to the menus **of that level**.

3. Turn the knob to select the menu, then press **OK** to display it.

4. Turn the knob to select the parameter you wish to view/modify; the display shows its current value.

5. To modify the value, press **OK**; the displayed value will start flashing:
   - ► turn the knob to select the desired value
   - ► press **OK** to confirm it, or
   - ► press **ESC** to abort the change.

6. If you want to view and modify other parameters in the same menu, turn the knob to display them; modify them as explained in point 5.

7. Once you have finished displaying and modifying the parameters in a given menu, press **ESC** to inlet to the menu level selected in point 2 (or *End user* if you did not execute point 2).

8. To access other menus, repeat steps 3 to 7 for each menu in question.

9. Once you have finished working with the menus, press **ESC** to return to the start screen.

> **ℹ** If you want to access a different menu level, inlet to the start screen (point 9) and then execute steps 1 and 2.

> **ℹ** If you do nothing for 8 minutes the device will automatically inlet to its main page.

> **ℹ** The menu levels *(End user, Commissioning, Engineer, OEM)* vary both in the number of their submenus and the number of parameters in each submenu. Work at the menu level indicated in the description of an

operation, and not at a higher level, to avoid involuntarily modifying parameters which may be critical to the system's operation.

As an example, we show how to modify the user interface language at the *End user* level.

1. Check that the display is showing the start screen, fig. 4.1 p. 27

> **ℹ** If it is showing a different screen, press **ESC**.

2. Press **OK**.
3. Turn the knob to select the **Operator section** menu.
4. Press **OK** to access the menu.
5. The first parameter in this menu displays, as follows:
   - ► the top right shows the number of the parameter, in this case **20**; the bottom left shows the name of the menu, in this case **Operator section**, and below that the parameter's description, in this case **Language**. Finally, the value of the parameter displays at the bottom right, in this case **English**.

**Figure 4.1** – Initial display screen.
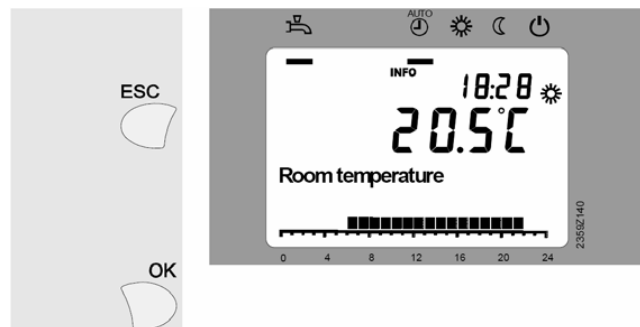


LEGEND
If the unit does not display this screen, press ESC until it does.

6. Press **OK**, the value will start flashing.
7. Turn the knob to select the new value, e.g. **English**.
8. Press **OK** to confirm the new value.
9. Press **ESC** once to return to the list of menus, and again to return to the start screen.

## 4.2   COMMISSIONING PROCEDURE

1. Remove the cover of the System controller CSK18 enclosure and the external housing panel of the K18 located under its fan. This panel has a transparent window.

2. Power up the System controller CSK18 enclosure, the K18 unit and, if present, the auxiliary boiler.

3. Check that all components are actually powered on:
   - ► System controller: the display of the QAA75.611 room unit is on and the green led in the bottom right corner of the RVS21.826 board is on (steady or flashing).
   - ► K18 unit: the control logic interface display on the black plastic cover is on.
   - ► Auxiliary boiler: refer to the manufacturer's manual.

> **ℹ** When the System controller for K18 is powered on for the first time, the display of the QAA75.611 room unit will indicate that the system is updating, and will display a percentage progress indication; this may take **several minutes** to complete. When the update completes,

the unit will display the start screen, as shown in fig. 4.1 p. 27. Updates during subsequent power on cycles will be much quicker.

4. On the **K18 unit's** user interface, proceed as follows, with reference to its *Installation, user and maintenance manual (D-LBR736)*:
   ▶ Access Menu **4**, with the password **1111**.
   ▶ Select parameter **47** and set it to **0**.
   ▶ Select parameter **210** and set it to **1**.

5. If necessary, change the System controller language on the QAA75.611 room unit, by accessing the **Operator section** menu in the *End user* level and selecting parameter **20 (Language)**.

6. Again, at the *End user* level, access the **Time of day and date** menu and set parameters **1 (Hours/minutes), 2 (Day/month) and 3 (Year)**.

7. Access the *Engineer* menu level, then the **Configuration** menu; select parameter **6200 (Save sensors)**, set it to **yes** and confirm.

---

📓 The value of parameter **6200** which displays at the end of the configuration procedure will still be **no**; this is normal (this setting executes an action, i.e. memorization of the actually installed sensors).

---

ℹ️ The green led on the RVS21.826 board should now be steady on.

8. Access the *Commissioning* level, **Diagnostics consumers** menu; select parameter **8703 (Outside temp attenuated / reset?)**, set it to **yes** and confirm.

---

📓 The value of parameter **8703** is only shown when it is being modified.

---

9. Press **ESC** twice to inlet to the start screen.

This completes commissioning; you can now run the functional tests to check that the installation and startup were successful.

## 4.3 FUNCTIONAL TESTS

These tests are not strictly necessary, however they allow you to quickly identify most problems with the electrical hookup and system anomalies; we **strongly** recommend running them.

### 4.3.1 Testing the inputs and outputs

1. Access the *Commissioning* menu level, select the **Input/output test** menu and select parameter **7700 (Relay test)**.

2. Set it to **QX5** (QX5 relay output, function Q2 -> Heating circuit 1 pump) and check that the heating circuit 1 pump runs (or the zone 1 valve opens).

3. If heating circuit 1 is of the mixed type:
   ▶ Set the parameter to **QX1** (QX1 relay output, function Y1 -> open mixer valve on system outlet line) and check that the mixer valve responds as desired.
   ▶ Set the parameter to **QX2** (QX2 relay output, function Y2 -> open mixer valve on heating circuit 1 inlet line) and check that the mixer valve responds as desired.

4. If heating circuit 2 (or zone 2) is present:
   ▶ Set the parameter to **QX3** (QX3 relay output, function Q6 -> Heating circuit 2 pump) and check that the heating circuit 2 pump runs (or the zone 2 valve opens).

5. If the DHW function is present:
   ▶ Set the parameter to **QX4** (QX4 relay output, function

Q3 -> set DHW diverter valve to DHW service) and check that the diverter valve responds as desired.

6. If the auxiliary boiler is present:
   ▶ Set the parameter to **QX6/ZX6** (ZX6 triac output, function K32 -> auxiliary boiler ON/OFF request signal) and check that the request signal is available at the auxiliary boiler (contact closed on boiler request input).

   **WARNING**: This operation may start the boiler.

   ▶ If the auxiliary boiler receives the water setpoint 0 -10 V signal:
   - Select parameter **7710 (Output test UX1)** and set it to **50%**

   **WARNING**: This operation may start the boiler.

   - Check that the **DC** voltage on the auxiliary boiler's 0 -10 V input is **5 V**.
   - Set parameter **7710** to - - - (test deactivated).

7. Now select parameter **7700** again and set it to **No test**.

8. Select parameter **7804 (Sensor temp BX1)** and check its value (sensor BX1, function B9 -> external temperature).

9. If the DHW function is present:
   ▶ Select parameter **7806 (Sensor temp BX3)** and check its value (sensor BX3, function B3 -> DHW tank temperature).

10. If the auxiliary boiler is present:
    ▶ Now select parameter **7700** and set it to **Everything off**.
    ▶ Select parameter **7805 (Sensor temp BX2)** and check its value (sensor BX2, function B10 -> outlet manifold temperature, **B10**" manifold sensor reading).
    ▶ If the DHW function is present:
    - Select parameter **7700** and set it to **QX4**.
    - Select parameter **7805 (Sensor temp BX2)** and check its value (sensor BX2, function B10 -> Flow manifold temperature, **B10**' manifold sensor reading).
    ▶ Select parameter **7700** and set it to **No test**.

11. If heating circuit 1 is of the mixed type:
    ▶ Select parameter **7807 (Sensor temp BX4)** and check its value (sensor BX4, function B1 -> Heating circuit 1 outlet temperature).

---

📓 To facilitate checking the connection of each temperature sensor to its input, you can take them out of their mounts one at a time and heat them up slightly; observe the variation of the readings on the display to check that they are hooked up to the right inputs.

Make sure you have restored each sensor to its own mounting afterwards!

---

12. If an external request signal is connected for heating circuit 1 (or zone 1), for example, with a thermostat or thermostat timer:
    ▶ Select parameter **7844 (Input signal H1)** and actuate the external signal's contact to check that it switches as expected from open (indicated by - - -) to closed (indicated by **o o o**) and back.

    **NOTE**: If no external request signal is present, this test must indicate closed (**o o o**), due to the jumper **installed at the factory**.

13. If heating circuit 2 (or zone 2) is present, and an external request is hooked up:
    ► Select parameter **7858 (Input signal H3)** and actuate the external signal's contact to check that it switches as expected from open (indicated by - - -) to closed (indicated by **o o o**) and back.

    **NOTE**: If no external request signal is present, this test must indicate closed (**o o o**), due to the jumper **added during installation**.

14. Now select parameter **7700 (Relay test)** and set it to **Everything off**.
15. Select parameter **7724 (Output test UX3)** and set it to **50%**
16. Access the K18 unit's terminal block (see fig. 3.10 p. 25):
    ► Check that the **DC** voltage between the **COM** and **DHW** terminals is around **17 V**.
    ► Check that the **DC** voltage between the **0** and **+10 terminals in fig. 3.9 p. 24 is 5 V**.
    ► Check that the **DC** voltage between the **COM** and **RES** terminals is around **8.5 V**.
17. Select parameter **7700** and set it to **QX4**.
18. Install a temporary jumper between the **EXTERN RESET** terminals on the CSK18 enclosure terminal block.
19. Access the K18 unit's terminal block (see fig. 3.10 p. 25):
    ► Check the voltage between the **COM** and **DHW** terminals again: it should now be around **0 V**.
    ► Check the voltage between the **COM** and **RES** terminals again: it should now be around **0 V**.
20. Set parameter **7700** to **No test**.
21. Select parameter **7724 (Output test UX3)** and set it to - - - (test deactivated)
22. Press **ESC** twice to inlet to the start screen.
23. Remove the temporary jumper between the **EXTERN RESET** terminals on the CSK18 enclosure terminal block.

### 4.3.2 Checking the start and stop commands on the K18 unit

The System controller for K18 is shipped preconfigured with heating circuit 1 and DHW production (if present) already activated.

The K18 unit may therefore start up from the first time the system is powered on and start and stop during the tests described in par. 4.3.1 p. 28.

1. Access the *Engineer* menu level and then the **Service/special operation** menu.
2. Select parameter **7223 (Disable heat pump)** and set it to **Active**.
3. Select parameter **7212 (Outp selection HP multistage)** and set it to **Compressor 1**.

4. Select parameter **7202 (Commissioning heat pump)** and set it to **Heating mode**.

⚠ This starts the K18 unit; steps 5 - 7 must now be completed **within a few minutes**.

5. Access the K18 unit's terminal block and check that the **DC** voltage between the **COM** and **REQ** terminals is around **0** V.
6. Also check the **DC** voltage between the **0** and **+10** terminals on the K18's terminal block, located directly under the **COM** terminal; it must be around **10.0** V.
7. Select parameter **7202 (Commissioning heat pump)** and set it to **Off**.

ℹ This inhibits the (operational) request to the K18 unit. Some of its components may continue to run for a few minutes, as it runs its shutdown cycle. The following steps can be run without waiting for the unit to shut down completely.

8. Access the K18 unit's terminal block and check that the **DC** voltage between the **COM** and **REQ** terminals is around **15** V.
9. Also check the **DC** voltage between the **0** and **+10** terminals on the K18's terminal block, located directly under the **COM** terminal; it must be around **0** V.
10. Select parameter **7223 (Disable heat pump)** and set it to **Inactive**.

## 4.4 SETTING THE SYSTEM TO STAND-BY

Once all checks have been completed, if you do not wish to operate the system but simply ensure anti-icing protection, proceed as follows:

1. On the QAA75.611 room unit, access the **Heating circuit 1** menu in the *End user* level, select parameter **700 (Operating mode)** and set it to **Protection**.
2. if a second heating circuit is present, access the **Heating circuit 2** menu, select parameter **1000 (Operating mode)** and set it to **Protection**.
3. Press **ESC** twice to inlet to the start screen.
4. If DHW production is present, press the QAA75.611 room unit's top left button to deactivate it; the hyphen shown at the top left corner of the display under the water tap symbol disappears.
5. Leave the system powered on and the gas line open.

If you do not wish to ensure anti-icing protection:

1. Run steps 1 - 4 above.
2. Make sure the K18 unit shuts down completely if the unit is running, wait (10 minutes) for it to stop.
3. Leave the system powered off and the gas line closed.

# 5 SETTINGS

The System controller for the K18 is supplied preconfigured with "moderate" settings, which enable **basic** heating and DHW service (if present) automatically after commissioning.

However, for best results, it is often necessary to adjust certain parameters to suit the characteristics of the building and the circuits, as well as the client's specific requirements.

This section contains instructions for satisfactory regulation.

Par. 5.1.7 p. 32 also gives information about the options regarding the installation and use of the QAA75.611 and QAA55.110 room units.

ℹ For further details, the full manual for the Siemens RVS21.826 controller may be obtained. However, due to the large number of possible controller adjustments, we do not recommend making settings other than those indicated in this document. For special requirements, please contact the Robur Technical Support Centre.

## 5.1 OPTIMISING HEATING SERVICE

### 5.1.1 Heating circuit 1 (or zone 1)

This circuit (or zone) is preconfigured active with the main settings given in Table 5.1 p. 30.

**Table 5.1** – Heating circuit 1 (or zone 1) preconfiguration

| | Preconfiguration | Dependency on parameter |
|---|---|---|
| Operating mode | Automatic (Comfort 6 – 22 Monday – Sunday) | 700 |
| Comfort setpoint | 21 °C | 710 |
| Reduced setpoint | 18 °C | 712 |
| Protection setpoint | 7 °C | 714 |
| Heating curve slope | 0.76 (water setpoint around 40 °C with external temperature -10 °C) | 720 |
| Summer/winter heating limit | 18 °C | 730 |
| Flow temp setpoint min | 8 °C | 740 |
| Flow temp setpoint max | 40 °C | 741 |
| Room influence | 20% | 750 |
| Room temperature limitation | 2.5 °C | 760 |

To change the settings of Table 5.1 p. 30, access the *Engineer* menu level, and then the **Heating circuit 1** menu; then select the parameters indicated in Table 5.1 p. 30 and modify them as desired.

> For information about choosing the operating mode and timer programming, refer to par. 5.1.3 p. 30 For information on setting the heating curve slope and the min/max water temperature setpoints, refer to par. 5.1.4 p. 31. For information on the room influence

and room temperature limitation settings, see par. 5.1.5 p. 32.

#### 5.1.2   Heating circuit 2 (or zone 2) (if present)

This circuit (or zone) is preconfigured to be inactive; if present, it must be activated by adding a jumper or external request signal (e.g. zone thermostat or thermostat timer), as described in figure 3.12 p. 26.
Once activated, the preconfigured settings are those given in Table 5.2 p. 30.

**Table 5.2** – Heating circuit 2 (or zone 2) preconfiguration (if present)

| | Preconfiguration | Dependency on parameter |
|---|---|---|
| Operating mode | Automatic (Comfort 6 – 22 Monday – Sunday) | 1000 |
| Comfort setpoint | 21 °C | 1010 |
| Reduced setpoint | 18 °C | 1012 |
| Protection setpoint | 7 °C | 1014 |
| Heating curve slope | 0.76 (water setpoint around 40 °C with external temperature -10 °C) | 1020 |
| Summer/winter heating limit | 18 °C | 1030 |
| Flow temp setpoint min | 8 °C | 1040 |
| Flow temp setpoint max | 40 °C | 1041 |
| Room influence | 20% | 1050 |
| Room temperature limitation | 2.5 °C | 1060 |

To change the settings of Table 5.2 p. 30, access the *Engineer* menu level, and then the **Heating circuit 2** menu; then select the parameters indicated in Table 5.2 p. 30 and modify them as desired.

> For information about the choice of operating mode and time programming, refer to par. 5.1.3 p. 30. For information on the heating curve settings and the min/max water temperature setpoint, see par. 5.1.4 p. 31. For information on the room influence and room temperature limitation settings, see par. 5.1.5 p. 32.

#### 5.1.3   Selecting the operating mode and time programming

The operating mode can be set separately for the heating circuits/zones as described in the two previous paragraphs. The following settings are available:
► **Automatic**: the circuit (or zone) works with the **Comfort** or **Reduced** room setpoint, depending on the time programming.
► **Comfort**: the circuit (or zone) works with the room setpoint set to **Comfort.**

> This setting forces the heating service to run even when

the system is in summer mode.
► **Reduced**: the circuit (or zone) works with the room setpoint set to **Reduced.**
► **Protection:** the circuit (or zone) works with the room setpoint set to **Protection** (anti-icing).

If you select **Automatic** mode, the preconfigured time programming includes a daily time period in which the **Comfort** setpoint applies, from **6:00** to **22:00**. Proceed as follows to change this setting.

#### For heating circuit 1

1. Access the *End user* menu level, then the **Time prog heating/cooling1** menu.
2. Select parameter **500 (Preselection)** and set it to the desired value. The value indicates the days of the week for which the following programming operations will apply; the available values are:
   ► **Mo – Su**          to set all days of the week to the same settings
   ► **Mo - Fr**  to set all working days to the same settings
   ► **Sa - Su**  to set the weekend days to the same settings
   ► **Mo, Tu, We, Th, Fr, Sa, Su)** to program the days individually

3. Set some or all of parameters **501 (1st period On), 502 (1st period Off), 503 (2nd period On), 504 (2nd period Off), 505 (3rd period On), 506 (3rd period Off)** to program up to three time periods to the **Comfort** setpoint.

> You can also copy all types of programming, excepting **Mo - Su**, to specific days of the week, using parameter **515 (Copy).**

**For heating circuit 2**

1. In the same way, use menu **Time prog heating/cooling 2**; in this case the parameters are **520 (Preselection), 521 – 526** (periods) and **535 (Copy).**

> The operating mode and the comfort setpoint can easily be modified at a later time by the end user, if he so wishes. See the User manual for details.

### 5.1.4 Setting the heating curve slope and min/max outlet water setpoints

To set the heating curve slope for a heating circuit, refer to fig. 5.1 p. 31 and select the curve that passes through the circuit's design point (water outlet setpoint required at the minimum outside design temperature, with reference to the room temperature setpoint **20 °C**).

For example, if the minimum outside design temperature is **– 5 °C** and the circuit requires a water outlet temperature in these conditions of **55 °C** to maintain a **20 °C** room temperature, set the slope to **1.5.**

**Figure 5.1** – Heating curve graph
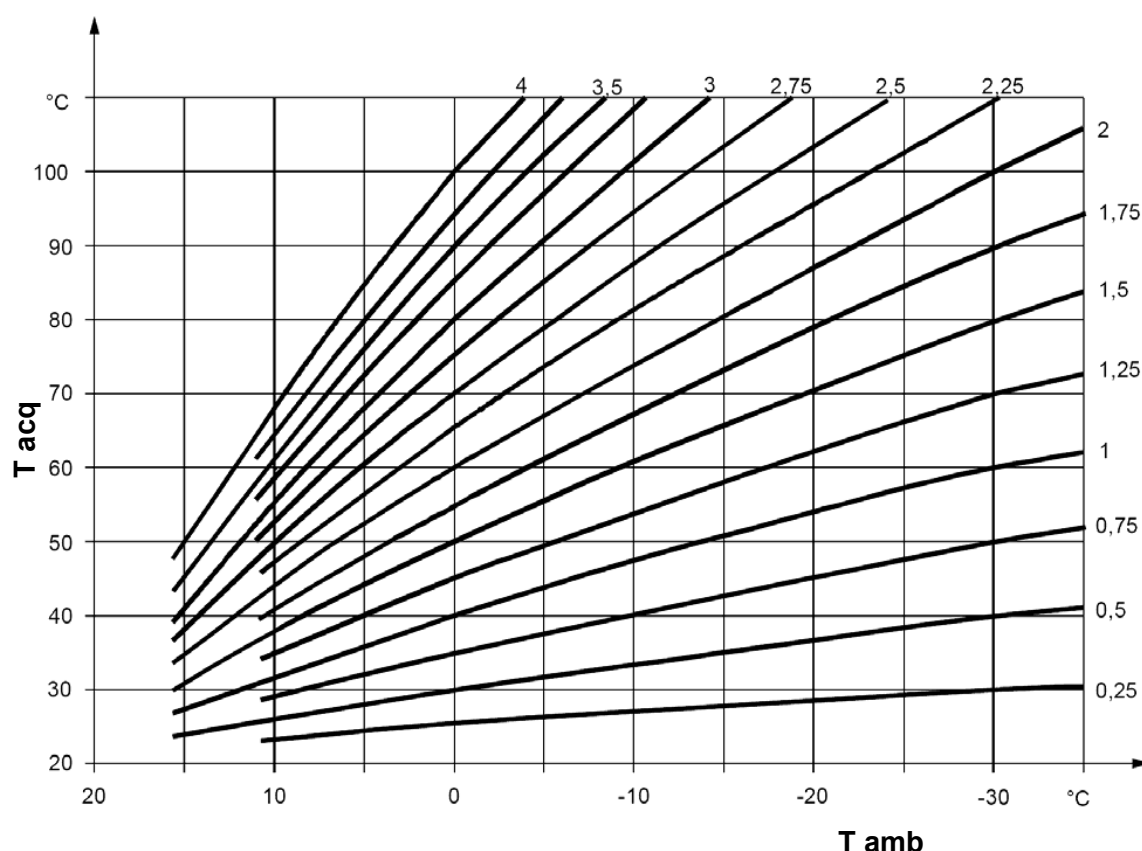


LEGEND
Tacq     water temperature
Tamb     external ambient temperature

Heating curve graph Each curve plots the outlet temperature against the external room temperature, when the room setpoint temperature is 20°C

To avoid reaching too high temperatures in unexpectedly harsh climate conditions, we recommend setting the **Flow temp setpoint max** to a suitable value. As a first general criterion, set these parameters to a value that ensures the system and building will not be damaged.

> Special care must be taken in the case of floor heating systems. It is best to ask the system installer and the flooring vendor for advice, especially for parquet floors. Moreover, for floor heating systems it is recommended that the heating be run off a mixed heating circuit.

Furthermore, except for cases in which the system will be operated exclusively with the auxiliary boiler at high thermal loads

(i.e. the system is intended to run at a higher water temperature setpoint than the operating limit of the K18 heat pump), we recommend setting these parameters to no more than **65 °C**.

To optimise the heating service with certain room heat exchangers (for example, ducted hot air or fan coil heating) it is often also worth setting the values of the **Flow temp setpoint min** parameters to ensure sufficient heat exchange in all room conditions.

> Since the efficiency of the K18 heat pump (GUE, Gas Utilization Efficiency) is greater the lower the water temperature, it is good to set these parameters to the lowest value compatible with the needs of distribution. This enables you get the most out of heating curve

operating mode, and boosts efficiency.

### 5.1.5   Setting the Room influence and Room temperature limitation parameters

When a room unit is installed in a heated room (reference room), it acquires the local temperature and interacts with the control system. In particular, it may:

1.  Modify the outlet water setpoint relative to the heating curve setpoint. If the reference room temperature stays below the requested value for too long or reaches it too slowly, the water setpoint is gradually increased. In the opposite case, the water setpoint is gradually decreased. This compensates for errors in selecting the heating curve or due to particular conditions (variations in the internal thermal load, strong winds, etc.). This compensating action can be made more or less effective, to the point of completely substituting the heating curve system, or it can be disabled entirely. Heating circuit 1 and, if present, heating circuit 2, are preconfigured to use this function in relation to the included room unit 1 temperature reading, with a mild compensating action (**20%**), which is suited to many installations. To modify the degree of influence, or disable the function entirely:

    ► Select parameter **750** or **1050** (heating circuit 1 or 2 respectively), as described in par. 5.1.1 p. 29 and 5.1.2 p. 30, and set the influence percentage (%), or **- - -** to disable the function entirely.

    **WARNING**: Setting a value of **100 %** disables the heating curve. It is best not to use this setting, or even very high influence percentages. For most applications, do not exceed a setting of **30 %**.

2.  It interrupts the heating service request when the reference room temperature exceeds the setpoint by a configurable amount. This action is similar to that of a normal room thermostat or thermostat timer. Heating circuit 1 and, if present, circuit 2 as well, are preconfigured to use this function in relation to the temperature read by room unit 1 (included), with a value of **2.5 K** (the service request is interrupted when room unit 1 reads a temperature **2.5** degrees higher than the setpoint. To change this setting or disable the function:

    ► Select parameter **760** or **1060** (heating circuit 1 or 2 respectively), as described in par. 5.1.1 p. 29 and 5.1.2 p. 30, and set the desired value, or **- - -** to disable the function entirely.

### 5.1.6   Setting the building time constant

Climate regulation does not directly use the external temperature acquired by the sensor, but a value which has passed an inertial filter. This accounts for the thermal inertia of the building, thus damping the variation of the outlet setpoint in relation to changes in the external temperature.
The filter is preconfigured to a value of **10** hours, which is suitable for a vast range of buildings with moderate thermal inertia. To modify this setting, proceed as follows:

1.  Access the *Engineer* menu level, then the **Configuration** menu.
2.  Select parameter **6110 (Time constant building)** and set it to the desired value:

    ► **0 h**     Filter disabled (not recommended)
    ► **< 10 h**   Building with low thermal inertia
    ► **10 - 20 h** Building with moderate thermal inertia
    ► **> 20 h**   Building with high thermal inertia

### 5.1.7   Choice of installation and use of room units

The system is supplied with a QAA75.611 room unit. The room unit is preconfigured as **Room unit 1** to acquire the room

temperature in a reference heated room served by heating circuit 1, and to influence the regulation of the circuit accordingly and, if present, **also that of heating circuit 2** (see par. 5.1.5 p. 32). This setting is suited to the following type of installation:

**Case 1**

► the included room unit is actually installed in a reference heated room
► heating circuit 2 is not present or if so, no dedicated room unit will be installed
► if both heating circuits are present: the reference room, serviced by heating circuit 1, is at least partly also representative of the rooms served by circuit 2.

You can adjust the parameters described in par. 5.1.5 p. 32 to differentiate the settings for the two circuits, to the point even of disabling one or both of the room unit influence functions for heating circuit 2, which does not directly serve the reference room.

If, on the other hand, the situation is as follows:

**Case 2**

► the included room unit is not installed in a reference heated room, for example, it is in the machine room

In this case, one must configure the room unit so as not to provide the room temperature signal to the system. Proceed as follows:

1.  Access the *Engineer* menu level, then the **Operator section** menu.
2.  Select parameter **40 (Used as)** and set it to **Operator unit 1**.
3.  Still from the *Engineer* menu level, access the **Configuration** menu.
4.  Select parameter **6200 (Save sensors)**, set it to **yes** and confirm.

The value of parameter **6200** which displays at the end of the configuration procedure will still be **no**; this is normal (this setting executes an action, i.e. memorization of the actually installed sensors).

Finally, in the following situation:

**Case 3**

► both heating circuits are present
► a second room unit dedicated to heating circuit 2 is present

In this case, you must configure the first room unit, installed in a reference room served by circuit 1, so that it is dedicated to that circuit. Proceed as follows, **working on the first room unit**:

1.  Access the *Engineer* menu level, then the **Operator section** menu.
2.  Select parameter **40 (Used as)** and set it to **Room unit 1**.
3.  Select parameter **47 (Room temperature device 1)** and set it to **Heating circuit 1 only**.
4.  Select parameter **48 (Occupancy button device 1)** and set it to **Heating circuit 1 only**.

You must now configure the second room unit, installed in a reference room served by heating circuit 2. Proceed as follows, depending on the type of room unit:

**Second room unit type QAA75.611**

Proceed as follows, **working on the second room unit**:

► Access the *Engineer* menu level, then the **Operator section** menu.
► Select parameter **40 (Used as)** and set it to **Room unit 2**.

**Second room unit type QAA55.110**

Proceed as follows, **working on the second room unit**:

► Press the occupancy button ☀/☾ ◯ for at least 3 seconds, until the display reads ru = 1, ru = 2, or ru = 3.

► Turn the knob to set the parameter to ru = 2.

► Wait for the text ru = 2 to clear from the display.

Now, **on the first room unit**, proceed as follows:

5. Access the *Engineer* menu level, then the **Configuration** menu.

6. Select parameter **6200 (Save sensors)**, set it to **yes** and confirm.

The value of parameter **6200** which displays at the end of the configuration procedure will still be **no**; this is normal (this setting executes an *action*, i.e. memorization of the actually installed sensors).

## 5.2 OPTIMISING DHW PRODUCTION

### 5.2.1 Main preconfigured settings

The DHW service (if present) is preconfigured active with the main settings given in table 5.3 p. 33.

**Table 5.3** – DHW service preconfiguration (if present)

|  | Preconfiguration | Dependency on parameter |
|---|---|---|
| Operating mode | On | 1600 |
| Nominal setpoint | 55 ℃ | 1610 |
| Reduced setpoint | 45 ℃ | 1612 |
| Release | 24h/day | 1620 |
| Legionella function | off | 1640 |
| Legionella function week day | Thursday | 1642 |
| Legionella function time | 02:00 | 1644 |
| Legionella function setpoint | 60 ℃ | 1645 |
| Legionella function duration | 45 min | 1646 |

To change these settings, access the *Engineer* menu level, and then the **DHW** menu; then select and modify the parameters given in Table 5.3 p. 33 as desired.

For information about the choice of operating mode and time programming, refer to par. 5.2.2 p. 33. For information about the legionella function settings, refer to par. 5.2.3 p. 33.

### 5.2.2 Selecting the operating mode and time programming

The operating mode for DHW production can be set to the following values:

► **Off**: DHW service is inactive.

► **On**: DHW production with the K18 unit and (if present) the auxiliary boiler is active with the nominal or reduced setpoint, depending on the value of the parameter **Release** and its time programming, if any.

The **Release** parameter is preconfigured to handle DHW production 24 hours a day at nominal level. If you wish to reduce the setpoint for certain times of the day (e.g. at night) or days of the week, the parameter can be set to the following values:

► **24h/day**: production at the nominal setpoint 24 hours a day, 7 days a week.

► **All time programs HC/CC**: production at the nominal setpoint at all times in which at least one of the time programs **of the heating circuits** is set to the comfort setpoint; production at the reduced setpoint otherwise.

The system switches from reduced to nominal setpoint one hour ahead of switching from reduced room to comfort setpoint in the heating circuits time programs.

► **Time program 4/DHW**: production at nominal or reduced setpoint depending on time program 4 (specifically for DHW). This provides an additional time program for DHW which is independent of the heating circuit time programs. If this mode is chosen, the preconfigured time programming includes a first daily time period at the **nominal** setpoint

from **00:00** to **05:00**, followed by a second time period from **17:00** to **21:00**. To change this setting:

1. Access the *End user* menu level, then the **Time program 4/DHW** menu.

2. Select parameter **560 (Preselection)** and set it to the desired value. The value indicates the days of the week for which the following programming operations will apply; the available values are:

   - **Mo - Su** to set all days of the week to the same settings

   - **Mo - Fr** to set all working days to the same settings

   - **Sa - Su** to set the weekend days to the same settings

   - **Mo, Tu, We, Th, Fr, Sa, Su** to program each day separately

3. Set some or all of parameters **561 (1st period On)**, **562 (1st period Off)**, **563 (2nd period On)**, **564 (2nd period Off)**, **565 (3rd period On)**, **566 (3rd period Off)** to program up to three time periods to the **Nominal** setpoint.

You can also copy all types of programming, excepting **Mo - Su**, to specific days of the week, using parameter **575 (Copy)**.

### 5.2.3 Setting the legionella function

To activate the legionella function, use the **Legionella function** parameter, which takes the following values:

► **Off**: Legionella function inactive

► **On**: Legionella function active

The legionella function is preconfigured as **inactive**.

If the legionella function is activated, it is preconfigured to run **Thursday** nights from **02:00** with a DHW

setpoint of **60 °C**, which must be maintained for **45** minutes. This can be changed with the parameters listed in par. **5.2.1 p. 33.**

**Before modifying the default settings, get in contact with Robur Technical Support Centre.**

Do not set too high a DHW setpoint for the legionella function. If there is no auxiliary boiler, in particular, do not exceed a value of **62 - 63 °C**.

If the legionella function is activated, it is important that the settings allow it to execute completely. If the system determines that it has not completed (e.g., the setpoint was not reached), it will restart it repeatedly. In the winter, this can impact the system's heating service.

For this reason, if the function is activated, make sure to run a test cycle to check that the system can complete the function as programmed.

# 6   ERRORS

## 6.1   LIST OF ERRORS AND TROUBLESHOOTING INSTRUCTIONS

Table 6.1 p. 34 lists the error codes, their descriptions and priorities, which may be generated by the System controller for the K18 when configured to support the circuits envisaged in this manual. The last column of the table lists measures for resolving the problem.

Errors are shown on the QAA75.611 room unit's display with the symbol ⌂. If you press (𝕀) when this symbol is displayed, the unit will display the code and description of the highest priority error. No other errors will be displayed until this error is resolved. Errors are usually reset automatically when the problem in question is resolved; only if the display also shows the wording **Reset ?** at the bottom left and **Yes** at the bottom right need the error be explicitly reset; to do so, press **OK** twice (after having resolved the problem in question, otherwise the error will simply repeat).

**Table 6.1** – List of system controller errors for K18

| Code | Description | Priority | Action |
|------|-------------|----------|--------|
| 10 | Outside sensor B9 | 6 | A |
| 26 | Common flow sensor B10 | 6 | A |
| 30 | Flow  sensor 1 [1] | 6 | A |
| 50 | DHW sensor 1 [2] | 6 | A |
| 60 | Room sensor 1 [3] | 6 | B |
| 65 | Room sensor 2 [4] | 6 | B |
| 83 | BSB, short-circuit [5] | 8 | C |
| 84 | BSB, address collision | 3 | D |
| 103 | Communication failure | 3 | C |
| 127 | Legionella temp | 6 | E |
| 324 | BX same sensors | 3 | F |
| 330 | BX1 no function | 3 | G |
| 331 | BX2 no function | 3 | G |
| 332 | BX3 no function | 3 | G |
| 333 | BX4 no function | 3 | G |
| 370 | Thermodynamic source | 9 | H |

(1)     Probe B1
(2)     Probe B3
(3)     Room unit 1
(4)     Room unit 2
(5)     Shown in this form in the error log (see par. 6.2 p. 36). The information screen displays the text "**No connection**" without error code.

**Troubleshooting measures**

**A        Codes 10, 26, 30, 50**

1.   Memorize the sensors:
     ► Access the *Engineer* menu level, then the **Configuration** menu; select parameter **6200 (Save sensors)**, set it to **yes** and confirm.

**NOTE**: The value of parameter **6200** which displays at the end of the configuration procedure will still be **no**; this is normal (this setting executes an action, i.e. memorization of the actually installed sensors).

     ► Wait for a minute.
2.   If step 1 does not resolve the problem:
     ► Check the connection of the sensor in question, correct it and memorize the sensor again as indicated in step 1.
3.   If step 2 does not resolve the problem:
     ► Disconnect the sensor from the RVS21.826 controller and measure the resistance between the cable's two wires. If the measurement indicates a short or open circuit, identify and resolve the problem, which may be due to the sensor itself or its wiring. Once the problem has been resolved, reconnect the sensor and memorize it again as indicated in step 1.
4.   If step 3 does not resolve the problem:
     ► Access the *Engineer* menu level, then the **Configuration** menu, and select parameter:

       -    Error code 10: **5930 (Sensor input BX1)**; check that it is set to **Outside sensor B9**; if not, set it to this value.

       -    Error code 26: **5931 (Sensor input BX2)**; check that it is set to **Common outlet sensor B10**; if not, set it to this value.

       -    Error code 30: **5933 (Sensor input BX4)**; check that it is set to the value **used by parameter 6014**; if not, remaining in the *Engineer* menu level, menu **Configuration**, select parameter **6014 (Function mixing group 1)** and set it to **Heating circuit 1**.

     **WARNING**: This sensor is used only if heating circuit 1 is mixed, otherwise no sensor should be connected to input **BX4**. If a sensor is connected to the input by mistake, remove it, then run sensor memorization again as indicated in step 1

       -    Error code 50: **5932 (Sensor input BX3)**; check that it is set to **DHW sensor B3**; if not, set it to this value.

     **WARNING**: This sensor is used only if DHW production is performed by the K18 unit, otherwise no sensor should be connected to input **BX3**. If a sensor is connected to the input by mistake, remove it,

then run sensor memorization again as indicated in step 1
►  Run sensor memorization again as indicated in step 1.
5.  If step 4 does not resolve the problem:
    ►  Power the System controller off and on again; if the problem persists, contact the Robur Technical Support Centre.

**B**      **Codes 60, 65**

1.  Memorize the sensors:
    ►  Access the *Engineer* menu level, then the **Configuration** menu; select parameter **6200 (Save sensors)**, set it to **yes** and confirm.

        **NOTE**: The value of parameter **6200** which displays at the end of the configuration procedure will still be **no**; this is normal (this setting executes an action, i.e. memorization of the actually installed sensors).
    ►  Wait for a minute.
2.  If step 1 does not resolve the problem:
    ►  Check the communications between the controller and the room unit/s and their configuration (see par. 5.1.7 p. 32). Resolve the problem, then run sensor memorization again as indicated in step 1.
3.  If step 2 does not resolve the problem:
    ►  Power the System controller off and on again; if the problem persists, contact the Robur Technical Support Centre.

**C**      **Codes 83, 103**

1.  Check the cables connecting the room unit/s to the RVS21.826 controller:
    ►  No short circuits between the wires
    ►  No broken wires
    ►  Correct wire polarity on controller and room unit/s
    ►  Stable, secure connection of all cables to all controller and room unit terminals

    Correct any problems.
2.  If step 1 does not resolve the problem:
    ►  Power the System controller off and on again; if the problem persists, contact the Robur Technical Support Centre.

**D**      **Code 84**

This problem occurs when two room units are connected and they are both configured as the same type of device (e.g., both as room unit 1).
1.  Resolve the problem as indicated in par. 5.1.7 p. 32, **Case 3**, to configure the two room units correctly.
2.  If step 1 does not resolve the problem:
    ►  Power the System controller off and on again; if the problem persists, contact the Robur Technical Support Centre.

**E**      **Code 127**

This problem is caused by fault to reach and maintain the legionella function setpoint while the function is executing.
1.  Check sensor B3:
    ►  Check the position and thermal contact of probe **B3** in its mounting on the DHW tank. Correct the problem.
2.  If step 1 does not resolve the problem:

►  Check the setpoint setting (parameter **1645**, see also par. 5.2.1 p. 33 and 5.2.3 p. 33) and set a lower value if necessary, especially if no auxiliary boiler is present.
3.  If step 2 does not resolve the problem, check the installation's water circuits:
    ►  Water outlet during DHW charging.
    ►  Proper sizing of the coil exchanger in the DHW tank (exchange surface area).
4.  If step 3 does not resolve the problem, contact the Robur Technical Support Centre.

**F**      **Code 324**

This error is generated if two or more **BX** temperature sensors have been configured to a single function.
1.  Check the configuration:
    ►  Access the *Engineer* menu level, then the **Configuration** menu, and select parameters:
        -  **6014 ( Function mixing group 1)**; set it to **Multifunctional**;
        -  **5930 (Sensor input BX1)**; check that it is set to **Outside sensor B9**; if not, set it to that value;
        -  **5931 (Sensor input BX2)**; check that it is set to **Common outlet sensor B10**; if not, set it to this value.
        -  **5932 (Sensor input BX3)**; check that it is set to **DHW sensor B3**; if not, set it to this value.
        -  **5933 (Sensor input BX4)**; set it to **none**;
        -  **6014 ( Function mixing group 1)**; set it to **Heating circuit 1**.
    ►  Run sensor memorization: access the *Engineer* menu level, thent the **Configuration** menu; select parameter **6200 (Save sensors)**, set it to **yes** and confirm.

        **NOTE**: The value of parameter **6200** which displays at the end of the configuration procedure will still be **no**; this is normal (this setting executes an action, i.e. memorization of the actually installed sensors).
    ►  Wait for a minute.
2.  If step 1 does not resolve the problem:
    ►  Power the System controller off and on again; if the problem persists, contact the Robur Technical Support Centre.

**G**      **Codes 330, 331, 332, 333**

This problem is due to the physical presence of a sensor connected to one of inputs **BX1, BX2, BX3, BX4**, to which no function is assigned.
1.  Check the configuration:
    ►  Access the *Engineer* menu level, then the **Configuration** menu, and select parameter:
        -  Error code 330: **5930 (Sensor input BX1)**; check that it is set to **Outside sensor B9**; if not, set it to this value.
        -  Error code 331: **5931 (Sensor input BX2)**; check that it is set to **Common outlet sensor B10**; if not, set it to this value.
        -  Error code 332: **5932 (Sensor input BX3)**; check that it is set to **DHW sensor B3**; if not, set it to this value.

- Error code 333: **5933 (Sensor input BX4)**; check that it is set to the value **used by parameter 6014**; if not, remaining in the *Engineer* menu level, menu **Configuration**, select parameter **6014 (Function mixing group 1)** and set it to **Heating circuit 1**.

  ▶ Run sensor memorization: access the *Engineer* menu level, thent the **Configuration** menu; select parameter **6200 (Save sensors)**, set it to **yes** and confirm.

  **NOTE**: The value of parameter **6200** which displays at the end of the configuration procedure will still be **no**; this is normal (this setting executes an action, i.e. memorization of the actually installed sensors).

  ▶ Wait for a minute.

2. If step 1 does not resolve the problem:
  ▶ Power the System controller off and on again; if the problem persists, contact the Robur Technical Support Centre.

**H       Code 370**

This error is generated when the K18 unit trips its alarm output.

This is therefore a K18 error, not a System controller error.

1. The K18 error code/s can be viewed through the transparent window in its housing.

  **NOTE**: If there are multiple errors, the K18's display will cycle through their codes. For further details and an explanation of the meanings of the error codes, refer to the K18 unit's Installation, user and maintenance manual.

2. The K18's errors can be reset by pressing the button on the bottom of the CSK18 enclosure.

3. If step 2 does not resolve the problem, or if it repeats after a while, contact the TAC authorised to service the K18.

## 6.2   ERROR LOG

The controller keeps the 10 most recent errors in memory; new errors overwrite the oldest ones as they occur. To access the log:

▶ Access the *Engineer* menu level, then the **Fault** menu; select parameters **6800 (History 1)** , **6802 (History 2)**, etc., up to , **6818 (History 10)**.

  **NOTE**: The data are kept in chronological order, from the most recent to the oldest (**History 1** contains the most recent error, **History 10** the oldest).

# 7   SPECIAL OPERATIONS AND CONFIGURATIONS

## 7.1   RESTORING FACTORY SETTINGS

If you wish to restore the controller's factory setting, proceed as follows:

1. Access the *Engineer* menu level, select the **Configuration** menu; select parameter **6205 (Reset to default parameters)**, and set it to **yes**.

The value of parameter **6205** which displays at the end of the configuration procedure will still be **no**; this is normal (this setting executes an *action*, i.e. restoration of the factory settings).

The factory settings can only be restored if any previous settings have not already been saved, using parameter **6204 (Save parameters)**. If so, using parameter **6205** will simply recall the settings saved to memory.

Since saving a configuration overwrites the factory defaults, we recommend **not doing so**; this means you can always recall the factory settings if you think your custom configurations are mistaken.

Alternatively, you can save the controller's final configuration, **but only after being absolutely sure that the system is working as desired**.

## 7.2   LOCKING THE ROOM UNITS

### 7.2.1   Locking programming of type QAA75.611 room units

Programming can be inhibited on the QAA75.611 room unit; the menus can then only be used in read mode.

1. Access the *Engineer* menu level **from the room unit you wish to lock**, then access the **Operator section** menu.
2. Select parameter **27 (Programming lock)** and set it to **On**.

To unlock programming temporarily:

1. Access the desired menu level, then hold down the **OK** and **ESC** keys together for more than three seconds, after which the display will read **Programming temporarily unlocked**.
2. Do the programming as desired.
3. The program lock is restored once you inlet to the start screen.

To unlock programming permanently:

1. Access the *Engineer* menu level.
2. Unlock programming temporarily as described above.
3. Access the **Operator section** menu.
4. Select parameter **27 (Programming lock)** and set it to **Off**.

### 7.2.2   Locking room unit controls

You can exclude the quick setting commands normally available on the QAA75.611 and QAA55.110 room units.

These commands are detailed in the **User manual of the System controller for the K18**.

**QAA75.611 room unit**

▶ Access the *Engineer* menu level **from the room unit you wish to lock**, then access the **Operator section** menu.

▶ Select parameter **26 (Operation lock)** and set it to **On**.

To unlock the commands, set parameter **26** to **Off** in the same way.

**QAA55.110 room unit**

▶ **On the room unit you wish to lock**, hold down the occupancy key  for at least 3 seconds, until the display reads ru...

▶ Press the occupancy key again, the display will read P2.

▶ Turn the knob to set P2 = 1.

▶ Wait for the display to inlet to its normal screen.

To unlock the commands, set P2 = 0 in the same way.

# APPENDIX A: TECHNICAL DATA

**Table 1** – RVS21.826 technical data

| | | |
|---|---|---|
| **Power supply** | Supply voltage | AC 230 V (+10%/-15%) |
| | Frequency | 50 / 60 Hz |
| | Consumption | max. 9.5 VA |
| | Power supply protection | Thermal-magnetic circuit breaker: max. 13 A (EN60898-1)<br>or<br>fuse: max. 10 AT |
| **Cabling** | 230 VAC supply and outputs; bars or braided cables (with/without terminals) | 1 cable: 0.5 - 2.5 mm2<br>2 cables: 0.5 - 1.5 mm$^2$ |
| **Function** | Software class | A |
| | Operation per EN 60730 | 1.B (automatic operation) |
| **Inputs** | 230 VAC inputs EX1 - EX4<br>• Functional range<br>• Low state voltage<br>• High state voltage<br>• Internal resistance | max. 230 VAC<br>0 - 253 VAC<br>< 170 VAC<br>190 VAC<br>> 100 kΩ |
| | Digital inputs H1, H3<br>Open contact voltage<br>Closed contact current | Safety Extra Low Voltage (SELV) for voltage free contacts<br>DC 12 V<br>DC 3 mA |
| | Analogue inputs H1, H3<br>• Functional range<br>• Internal resistance | Safety Extra Low Voltage (SELV)<br>DC 0 - 10 V<br>> 100 kΩ |
| | Pulse count inputs H1, H3<br>• Open contact voltage<br>• Closed contact current<br>• Pulse duration | Safety Extra Low Voltage (SELV) for voltage free contacts<br>DC 12V<br>DC 3 mA<br>min. 20 ms |
| | Frequency measurement inputs H1, H3<br>• Functional range<br>• Low state voltage<br>• High state voltage<br>• Internal resistance<br>• Frequency | Safety Extra Low Voltage (SELV)<br>DC 0 - 12 V<br>< 1.7 V<br>2.7 - 12 V<br>> 100 kΩ<br>max. 500 Hz |
| | Digital inputs DI6, DI7<br>(on connector X75)<br>• Open contact voltage<br>• Closed contact current | Safety Extra Low Voltage (SELV)<br>for voltage free contacts<br>DC 12 V<br>DC 3 mA |
| | Sensor inputs BX1 - BX4 | NTC 1k (QAC34, external sensor),<br>NTC 10k (QAZ36, QAD36),<br>Pt1000 (optional for solar collector and exhaust gas sensor)<br>5053…9671 Ω (room setpoint modification function) |
| | Sensor cables (copper)<br>• Cross section<br>• Max. length | 0.25    0.5    0.75    1.0    1.5 (mm2)<br>20    40    60    80    120 (m) |
| **Outputs** | Relay outputs QX1 - QX5<br>• Current range<br>• Switching ON current<br>• Total current<br>• Voltage range | AC 0.02 - 2 (2) A<br>max. 15 A for ≤1 s<br>max. AC 10 A (total, all 230 VAC outputs)<br>AC 24 - 230 V (for voltage free contact outputs) |
| | Triac output ZX6<br>• Current range<br>• Switching ON current<br>• Total current | AC 0.02...2 (2) A (On/Off); AC 0.02...1.2 (1.2) A (speed control)<br>max. 4 A for ≤1 s<br>max. AC 10 A (total, all 230 VAC outputs) |
| | Analogue outputs UX1, UX2, UX3<br>(UX3 on connector X75)<br>• Output voltage<br>• Current<br>• Ripple<br>• Zero level accuracy<br>• Error over rest of range | Safety Extra Low Voltage (SELV),<br>outputs with short-circuit protection<br>Uout = 0 ... 10.0 V<br>max. ±2 mA RMS; ±2.7 mA peak<br>≤ 50 mVpp<br>< ± 80 mV<br>≤ 130 mV |
| | Outputs PWM UX1, UX2, UX3<br>(UX3 on connector X75)<br>• Output voltage<br>• Current<br>• Frequency | Safety Extra Low Voltage (SELV),<br>outputs with short-circuit protection<br>High level 10 VDC, low 0 VDC<br>Ux = min. 6 V @ 5 mA<br>3 kHz |
| | Digital outputs D1, D2, D3 (on connector X75)<br>• Output voltage<br>• Current | Internal pull-up<br>High level 12 VDC, low 0 VDC<br>max. 2.5 mA |
| | Power G+<br>• Output voltage<br>• Current | Safety Extra Low Voltage (SELV), outputs with short-circuit protection<br>11.3 - 13.2 V<br>max. 88 mA |
| | Power GX1 (configurable)<br>• Output voltage 5 V<br>• Output voltage 12 V<br>• Current | Safety Extra Low Voltage (SELV), outputs with short-circuit protection<br>4.75 - 5.25 V<br>11.3 - 13.2 V<br>max. 20 mA |

| Interfaces | BSB<br>Base unit/peripheral cable length<br>Total cable length<br>Cross section | Two-wire connection (not invertible)<br>max. 200 m<br>max. 400 m (max. cable capacity: 60 nF)<br>min. 0.5 mm² |
| | LPB (optional with LPB<br>OCI345.06/101 adapter connected to X70)<br>Cable length:<br>• with power from controllers on bus (per controller)<br>• with central power on bus<br>• Bus load number | copper cable 1.5 mm²,<br>two-wire connection (not invertible)<br><br><br>max. 250 m<br>max. 460 m<br>E = 3 |
| | Modbus (optional with OCI350.01 Modbus adapter on X60) | for details, see the OCI350.01 Modbus adapter technical data |
| | Connection cable X100 to<br>AVS55.19x expansion module<br>• Cable length | ribbon cable (18 pole)<br><br>max. 1000 mm |
| **Protection rating and safety class** | Enclosure protection rating per EN60529 | IP 00 (without enclosure) |
| | Safety class per EN60730 | safety class II for LV parts, if correctly installed |
| | Degree of contamination per EN60730 | degree of contamination normal |
| **Standards, safety, EMC, etc.** | CE conformity (EU) | CE1T2355xx04 |
| **Climatic conditions** | Storage, per EN60721-3-1<br>Transport, per EN60721-3-2<br>Operation, per EN60721-3-3 | class 1K3, -20 - 65 °C<br>class 2K3, -20 - 70 °C<br>class 3K5, -20 - 50 °C (non condensing) |
| **Weight** | Packaging excluded | 193 g |

**Table 2** – QAA75.611 / QAA55.110 technical data

| **Power supply** | Bus powered | BSB |
|---|---|---|
| **Room temperature measurement** | Measurement range | 0 - 50 °C |
| | Per EN12098:<br>• Range 15 - 25 °C<br>• Range 0 - 15 °C or 25 - 50 °C<br>• Resolution | <br>tolerance 0.8 K<br>tolerance 1.0 K<br>1/10 K |
| **Interfaces** | BSB<br>Base unit/peripheral cable length<br>Cross section | Two-wire connection (not invertible)<br>max. 200 m<br>min. 0.5 mm² |
| **Protection rating and safety class** | Enclosure protection rating per EN60529 | IP20 |
| | Safety class per EN60730 | safety class II for LV parts, if correctly installed |
| | Degree of contamination per EN60730 | degree of contamination normal |
| **Standards, safety, EMC, etc.** | CE conformity (EU)<br>• EM directive<br>• Immunity<br>• Emissions<br>• Low voltage<br>• Electrical safety | <br>2004/108/EC<br>EN61000-6-2<br>EN61000-6-3<br>2006/95/EC<br>EN 60730-1, EN50090-2-2 |
| **Climatic conditions** | Storage, per EN60721-3-1<br>Transport, per EN60721-3-2<br>Operation, per EN60721-3-3 | class 1K3, -20 - 65°C<br>class 2K3, -25 - 70°C<br>class 3K5, -20 - 50°C (non condensing) |
| **Weight** | Packaging excluded | QAA75.611: 170 g<br>QAA55.110: 115 g |

# Robur mission

Robur is dedicated to dynamic progression
in research, development and promotion
of safe, environmentally-friendly, energy-efficiency products,
through the commitment and caring
of its employees and partners.

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AFAQ

ISO 9001
2000 VERSION
ISO 14001