



Temperature controller Multi-zone floor heating systems

RRV817

Multi-zone model with up to seven zone outputs by combining two RRV817 controllers

Multifunctional controller used for central control of under-floor heating systems in combination with QAX810 master room unit and QAW810 zone room units.

Use

Use

Comfort control of under-floor heating systems via zone valve output control:

- Residential apartments
- Residential single house
- Light commercial applications
- In conjunction with district-heating scheme or local heat generator

Applications

The RRV817 controller is designed for central distributed water heating systems that require easy operation by the building occupant. Up to five zones may be controlled via one RRV817 or up to seven zones using one RRV817 in Master mode and one RRV817 in Slave mode. The MMI required to be connected to the controller is the QAX810 master room unit. Heat generator output combined with a maximum of seven zone valve outputs, control the temperature within each zone of the building. The RRV817 controller can be configured for various types of heating system.. These include:

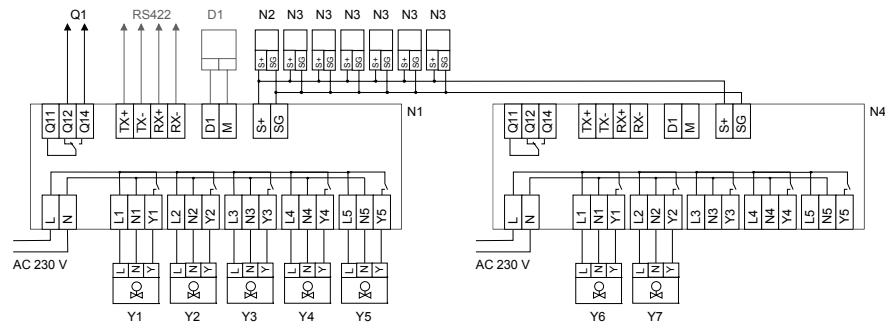
- Multi-zone floor heating system supplied by district heating scheme
- Multi-zone floor heating system supplied by local boiler
- Remote activation from external switch or home automation system

Functions

Controller functionality is determined by the setting of Dip switches. Parameter settings such as time/temperature programming and mode selection via the QAX810 master room unit.

Example application – Master/Slave

- N1 RRV817 controller
- N2 QAX810 master room unit
- N3 QAW810 zone room unit
- N4 RRV817 controller (slave mode)
- D1 Remote system off release signal
- Q1 Boiler output
- Y... Valve actuator SUA21, AC230 V



Type summary

ASN	Type reference	Compatible with
RRV817	Temperature controller	QAX810, QAW810, SUA21, STA21

Note The QAX810, QAW810, SUA21 or STA21 for the RRV817 must be ordered separately.

Mechanical design

Type of unit

The RRV817 is a temperature controller providing connection facility for AC 230 V power supply, AC 230 V zone valve outputs, boiler control output (not required for district heating based heat supply), remote initiation input and communication interfaces for QAX810/QAW810.



The unit is two-part, consisting of:

- Top cover (clip-on)
- A lower housing containing:
 - PCB and internal transformer
 - Control input/output terminals
 - Room unit/slave controller bus terminals
 - RS422 terminals
 - LED for power supply and communication indication
 - Configuration Dip switches

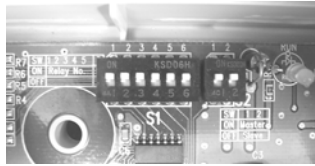
Connection terminals

RCS BUS (S+, SG)	Low voltage power supply (DC 12 V) and communication transfer is supplied via two wires to the RRV817 Slave controller, QAX810 and QAW810 room units from terminals S+ and SG. The LED on the QAX810 and/or QAW810 will flash if a communication error exists between devices for longer than 5 seconds.
RS422 (TX+, TX-, RX+, RX-)	High level integration into a home automation system is not a standard feature of the RRV817. For protocol and integration details please contact your Siemens Building Technologies representative.
Digital input (D1, M)	A potential free contact closed across the D1 and M terminals will activate the system when it has otherwise been set to Standby mode at the QAX810.
Digital output (Q11, Q12, Q14)	A local boiler may be activated when there is demand for heating according to the time/temperature program as set at the QAX810.
Heating outputs (L, N, Y)	The zone valve type SUA21 is supplied with AC 230 V Line and Neutral permanently and a AC 230 V control – Y – when there is demand for heat in the applicable zone. The STA21 does not require the permanent AC 230 V – L – connection as it is auto-closing (thermic). Max. up to 3 valve actuators per zone can be operated in parallel with 3(1)A max. rating.
Power supply (L, N)	AC 230 V RRV817 permanent power supply.

Configuration

Dip switches	Initial application set-up of RRV817 controller to match the connected field components is made by the selection of dip switch positions. Dip switches are located on the top of the RRV controllers. Additionally, the QAW810 room units include dip switches for setting of zone 2...7 addresses.
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Dip settings examples



Dip Switch 1

Example 1:	Master			Slave		
7 Zone. Zone valves 6 and 7 remote from Master controller (Slave controller required). No Individual heat generator (district heating).	Room 1 (Zone 1)	S1-1	ON	Room 1 (Zone 6)	S1-1	ON
	Room 2 (Zone 2)	S1-2	ON	Room 2 (Zone 7)	S1-2	ON
	Room 3 (Zone 3)	S1-3	ON	Room 3 (not used)	S1-3	OFF
	Room 4 (Zone 4)	S1-4	ON	Room 4 (not used)	S1-4	OFF
	Room 5 (Zone 5)	S1-5	ON	Room 5 (not used)	S1-5	OFF
	Heat Demand	S1-6	D	Heat Demand	S1-6	D

Example 2:	Master			Slave		
4 Zone, with zone 2 and 3 remote from Master controller (Slave controller required). Initiating an Individual heat generator is required (no district heating).	Room 1 (Zone 1)	S1-1	ON	Room 1 (Zone 3)	S1-1	ON
	Room 2 (Zone 2)	S1-2	ON	Room 2 (Zone 4)	S1-2	ON
	Room 3 (not used)	S1-3	OFF	Room 3 (not used)	S1-3	OFF
	Room 4 (not used)	S1-4	OFF	Room 4 (not used)	S1-4	OFF
	Room 5 (not used)	S1-5	OFF	Room 5 (not used)	S1-5	OFF
	Heat Demand	S1-6	I	Heat Demand	S1-6	I

Example 3:	Master			Slave
4 Zone, with Master controller only required. No Individual heat generator (district heating)	Room 1 (Zone 1)	S1-1	ON	Not present
	Room 2 (Zone 2)	S1-2	ON	
	Room 3 (Zone 3)	S1-3	ON	
	Room 4 (Zone 4)	S1-4	ON	
	Room 5 (not used)	S1-5	OFF	
	Heat Demand	S1-6	D	

Dip Switch 2

RRV817 Mode	Functionality	S2-1	S2-2
Master	Full	ON	ON
Slave	RCS bus and control of up to 5 Zones	OFF	OFF

QAW810 Dip Switches

The QAW810 includes dip switches for zone addressing. Additional to the QAX810 zone1, up to a further 6 zones can be connected to the RRV817 controller.

Dip switches on the back of QAW810.



They allow setting the address in cases where several room units are connected to one RRV817 controller.

The room units are delivered with default positions = zone 2.

Dip No.	Function	Pos.3	Pos. 2	Pos. 1	Room
1-3	Zone Identity	OFF	ON	OFF	2
		OFF	ON	ON	3
		ON	OFF	OFF	4
		ON	OFF	ON	5
		ON	ON	OFF	6
		ON	ON	ON	7

Commissioning notes

Response on start-up

When powering up, the QAX810/QAW810 will display all LCD icons for approximately 2 seconds. It will then revert to normal display. The time segments will be blinking if time needs to be set. Set time as per operation instructions. There will be a delay before operation commences due to polling of all values.

User operation

The user should not have access to dip switch setting. The user operation is via the QAX810 master room unit and the QAW810 zone room unit. For user operation details refer to the operating instructions booklet included in the RRV817 packaging box, document AP1B2728en.

Sensor calibration

Generally there is no need to calibrate the sensor; however the displayed room temperature on the QAX810 and QAW810 LCD can be calibrated if there is any

discrepancy from the actual temperature measured with a certified thermometer. The calibration function can be accessed by pressing the ▲ and ▼ buttons simultaneously for 2 seconds. The displayed value can then be adjusted via the same buttons in 0.5K steps. The adjustment range is +/- 2K.

Commissioning

The RRV817 controller should be operational after dip switch settings have been made and power is connected. Refer to the Installation and Commissioning instructions, AP1G2728en, included in the RRV817 packaging.

Mounting and installation notes

The RRV817 controller can be mounted in any orientation by surface mounting:



Remove top cover and affix using screws in the holes provided through the PCB and back-plane

When mounting, note the following:

- The controller should not be freely accessible after mounting.
- Ensure adequate air circulation to dissipate heat generated during operation.
- Easy access is required for service personnel
- Local installation regulations must be observed.

The mounting instructions are included in the RRV817 controller packaging.



When not mounting within a panel, cable restraints must be used for all wiring connected to AC 230 V terminals. The conductors must be secured with cable ties.

Technical data

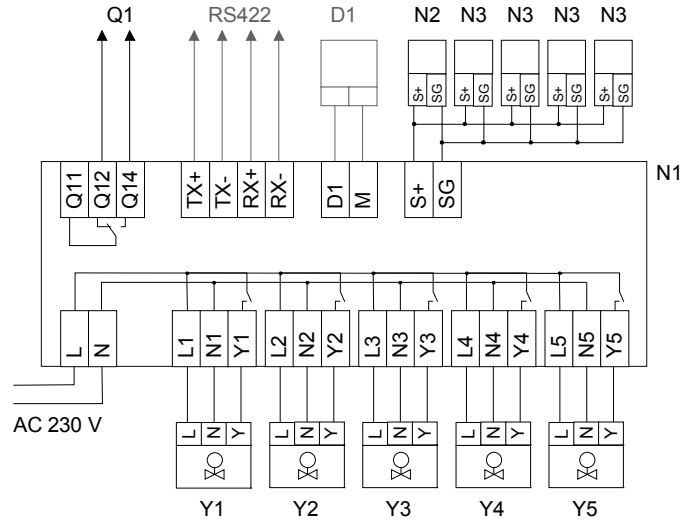
Power supply L, N	Working voltage	AC 230 V, +10%, -15%
	Frequency	50 / 60 Hz
	Power consumption	10 VA
Digital input, D1/M (voltage free contacts)	Contact sensing	
	Voltage	DC 5 V max.
	Current	Typically 8 mA
Interface HCC Bus	Protocol	Proprietary
	Baud rate	9.6 kbit/s
	Permissible cable length	Max. 60m where A ≥ 1.0mm ²
		Max. 100m where A ≥ 1.5mm ²
	Cable type	2-wire standard installation cable (unshielded)
Note: Twisted pair (unshielded) is recommended for enhanced immunity to external electromagnetic interference, for example, in the vicinity of radio transmitters or frequency inverters		
Output Q (boiler)	Relay contacts (potential free)	
	Switching voltage	Max. 250 V, 3(1) A
Outputs L, N (zone valve)	Permanent AC 230 V power supply	
	Power capacity	Max. 10 VA
Outputs Y (zone valve)	Relay contacts	
	Switching voltage	Max. 250 V, 3(1) A (Max. up to 3 valve actuators per zone in parallel)
Protection	Protection standard to EN 60529	IP10
	Operation	IEC721-3-3 Class 3K5
Environmental conditions	Temperature	0...+50°C
	Humidity	<85% r.h. (non condensing)
	Transport	IEC721-3-2 Class 2K3
	Temperature	-25...+65°C
	Humidity	<95% r.h. (non condensing)
	Storage	IEC721-3-1 Class 1K3
Standards	Temperature	-25...+65°C
	Humidity	<95% r.h. (non condensing)
	CE-conformity	
	EMC directive	89/336/EEC
	Immunity and Emissions	EN 60730-1, EN 50081-1, EN61000-6-2
	Low voltage directive	73/23/EEC
	Electrical safety	EN 60730-1, EN 60730-2-9
	Conformity to	
	Australian EMC Framework	Radio communication act 1992
	Radio Interference Emission Standard	AS/NZS 4251.1
Others features	Software class	A to EN 60730
	Weight (excluding packaging)	0.39 kg

Connection diagrams

RRV817 terminals

L	AC 230 V Line	M	Digital ground
N	AC 230 V Neutral	S+	Communication bus +ve
TX+	RS422 Transmit +ve	SG	Communication bus ground
TX-	RS422 Transmit -ve	L...	AC 230 V, zone valve power supply
RX+	RS422 Receive +ve	N...	AC 230 V neutral
RX-	RS422 Receive -ve	Q...	Digital outputs, AC 230 V, 3(1) A
D1	Digital input	Y...	Digital outputs, AC 230 V, 3(1) A

RRV817 – typical connection

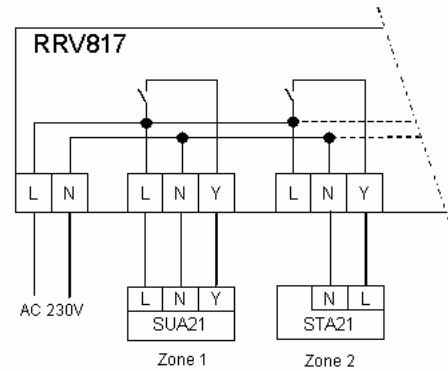


N1	RRV817 controller	D1	Remote system off release signal
N2	QAX810 master room unit	Q1	Boiler output
N3	QAW810 zone room unit	Y...	Valve actuator SUA21, AC230 V
N4	RRV817 controller (slave mode)		

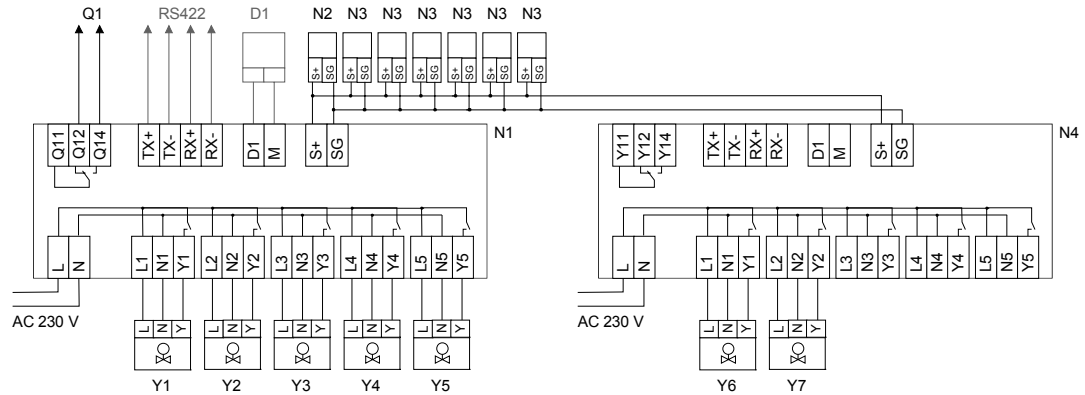
Zone Valve Connections

The SUA21 (motor open / motor close) or STA21 (thermic) actuators may be connected to the RRV817 zone outputs:

- The SUA21 requires a 3-wire connection comprising AC 230 V permanent power supply (Line & Neutral) for closing when there is no heating demand and a switched AC 230 V 'Y' connection for opening when there is heating demand.
- The STA21 thermic actuator closes automatically when power is removed therefore only a 2-wire connection - neutral and control 'Y' - is required.



RRV817 – Master & slave connection



Attention!

- The HCC Bus and RS422 terminals are not protected against connection to AC 230 V.
- Observe the technical data for relay outputs: Max. AC 250 V, 3(1) A.
- All output cables used must satisfy the insulation requirements with regard to mains potential.
- Care should be taken when cables pass through sharp metal openings, conduits or ducts.
- Double insulation on output cables is recommended.
- Local installation regulations must be observed.

Notes

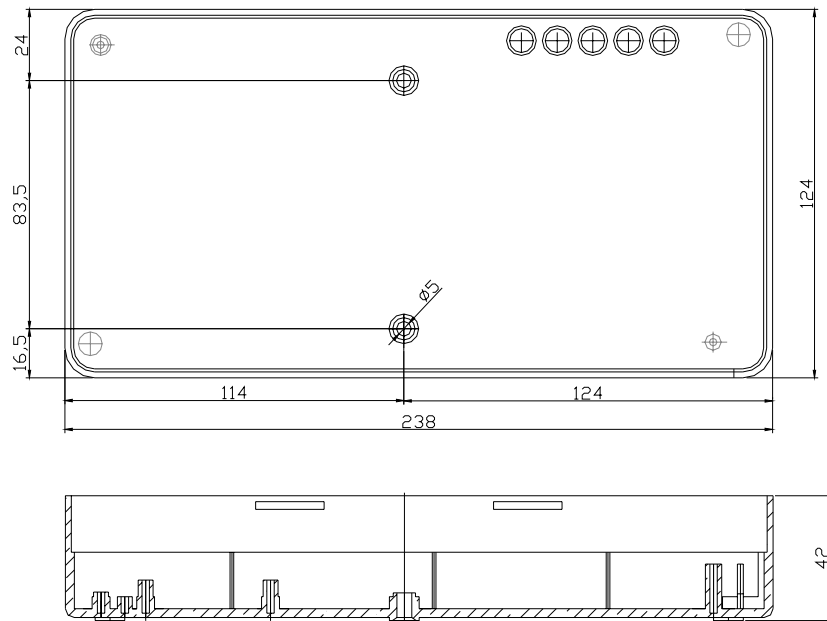
Product liability

The products may only be used in building services plant and applications as described above. When using the products, all requirements specified under "Technical data" must be observed.

Supporting documentation

- QAX810 technical data, document number AP1N2723en
- QAW810 technical data, document number AP1N2724en
- QAX810 and QAW810 mounting instructions, document number AP1M2723en
- QAX810 and QAW810 operating instructions, document number AP1B2723en
- RRV817 Installation/Commissioning guide, document number AP1G2728en

Dimensions



Dimensions in mm.