SIEMENS

2728

Temperature Controller RRV817

Multizone Floor Heating Systems

Multizone model with up to 7 zone outputs by combining 2 RRV817 controllers. Used for central control of underfloor heating systems in combination with the QAX810 master room unit and QAW810 zone room units.

Use

Comfort control of underfloor heating systems via zone valve output control:

- Apartments
- Detached houses
- Light commercial applications
- In conjunction with district heating schemes or local heat sources

Functions

The RRV817 temperature controller is designed for central distributed water heating systems that require easy operation by the building occupant. Up to 5 zones can be controlled by 1 RRV817 or up to 7 zones using 1 RRV817 in master mode and 1 RRV817 in slave mode. The MMI required to be connected to the controller is the QAX810 master room unit. Heat source output combined with a maximum of 7 zone valve outputs control the temperature within each zone of the building. The RRV817 can be configured for various types of heating systems. These include:

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

Type summary

Type reference	*Description*	*Compatible with**
RRV817	Temperature controller	• QAX810 Master room unit • QAW810 Zone room unit • SUA21 Thermal actuator • STA21Thermal actuator

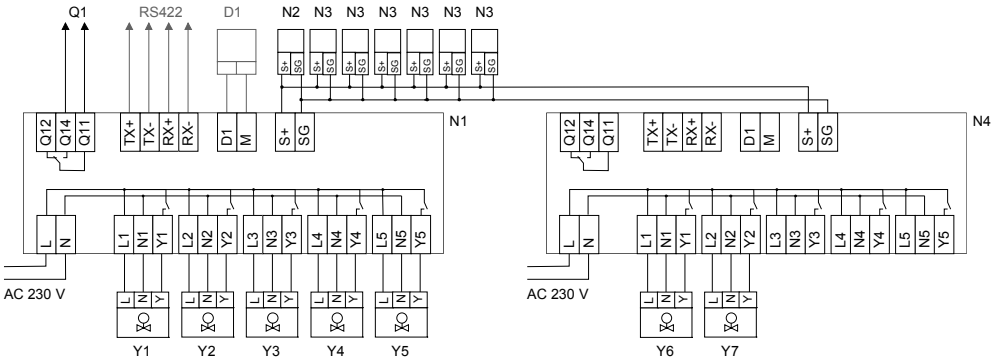
* These units must be ordered separately

Product documentation

Document	*Document number*
Data sheet	N2728
Installation instructions	G2728
Declaration of conformity	T2723

Technical design

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



Example application – master / slave

F1, F2 External supply line fusing, max. 10 A
N1 RRV817 temperature 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, AC 230 V

Mechanical design

Type of unit

The RRV817 is a temperature controller with connection facilities 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.

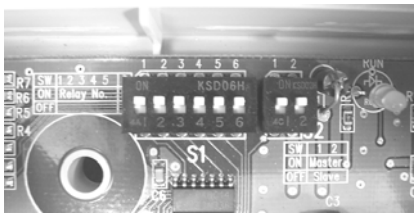
The unit consists of 2 sections:

- Cover (clip-on)
- Lower housing section containing:
  - PCB and built-in transformer
  - Control input / output terminals
  - Room unit / slave controller bus terminals
  - RS-422 terminals
  - LED for power supply and communication indication
  - Configuration DIP switches

DIP switches

Initial application setup of the RRV817 controller to match the connected field components is made by the selection of DIP switch positions. DIP switches are located at the top of the RRV817 controller. In addition, the QAW810 room units feature DIP switches for setting zone addresses 2…7.

DIP switch settings examples



DIP Switch 1

Example 1:	*Master*			*Slave*		
7 zones. Zone valves 6 and 7 remote from master controller (slave controller required). No individual heat source (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 zones, with zone 2 and 3 remote from master controller (slave controller required). Initiating an individual heat source 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

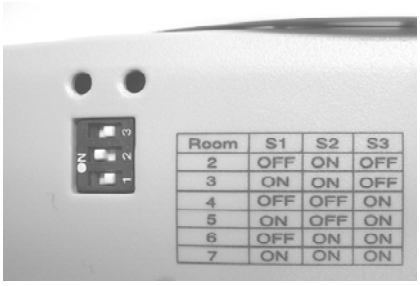
Example 3:	*Master*			*Slave*
4 Zone, with Master controller only required. No individual heat source (district heating)	Room 1 (zone 1)	S1–1	ON	Not present
	Room 2 (zone 2)	S1–2	ON	
	Room 3 (zone 3)	S1–3	ON	
	Room 4 (zone 4)	S1–4	ON	
	Room 5 (not used)	S1–5	OFF	
	Heat demand	S1–6	D	

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 features DIP switches for zone addressing. In addition to QAX810 zone 1, up to another 6 zones can be connected to the RRV817 controller.



DIP switches at the rear of the QAW810

They allow setting the address in cases where several room units are connected to 1 RRV817 controller.
The room units are delivered with default positions = zone 2.

DIP no.	*Function*	*Room*	*Pos. 1*	*Pos. 2*	*Pos. 3*
1…3	Zone identity	**2**	**OFF**	**ON**	**OFF**
		3	ON	ON	OFF
		4	OFF	OFF	ON
		5	ON	OFF	ON
		6	OFF	ON	ON
		7	ON	ON	ON

Engineering notes

Connection terminals

Terminal	*Designation*	*Function, input or output*
S+, SG	RCS BUS	Low-voltage power supply (DC 12 V) and communication transfer is supplied via 2 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 more than 5 seconds.
TX+, TX–, RX+, RX–	RS-422	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.
D1, M	Digital input	A potential-free contact closed across terminals D1–M will activate the system when it has otherwise been set to standby mode at the QAX810.
Q11, Q12, Q14	Digital output	A local boiler can be switched on when there is demand for heat according to the time / temperature program set at the QAX810.
L, N, Y	Heating outputs	The SUA21 zone valve is supplied with AC 230 V line and neutral permanently and AC 230 V control (Y) when there is demand for heat in the relevant zone. The STA21 does not require the permanent AC 230 V (L) connection as it closes automatically (thermal action). A maximum of 3 valve actuators per zone can be operated in parallel with 3(1) A max. rating.

Terminal	*Designation*	*Function, input or output*
		As a minimum requirement, the connecting cables must comply to H05.
L, N	Power supply	Permanent AC 230 V power supply for the RRV817 controller.

Commissioning notes

Response on start-up

When powering up, the QAX810/QAW810 will display all LCD icons for approximately 2 seconds. The LCD will then revert to normal display. The time segments will be flashing if time of day needs to be set. Set time of day 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 included in the RRV817 packaging box (CE1B2728en).

Sensor calibration

Generally there is no need to calibrate the sensor. However the room temperature displayed on the QAX810 and QAW810 LCD can be calibrated if there is a deviation 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 readjusted via the same buttons in increments of 0.5 K. The readjustment range is ±2 K.

Commissioning

The RRV817 controller should be operational after the DIP switch settings have been made and power is connected. Refer to the Installation Instructions (CE1G2728en) included in the RRV817 packaging.

Mounting and installation notes

The RRV817 controller is designed for wall mounting in any orientation:

Remove the cover and affix the unit 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.
- Use only mounting screws provided and must not tighten conjunction with metallic washer on Printed Circuit Board.
- Ensure adequate air circulation to dissipate heat generated during operation.
- Easy access is required for service staff
- Local regulations for installation must be observed.

Mounting Instructions are included in the RRV817 controller packaging.
The RRV817 temperature controller must be mounted by an electrician (preferably in an electrical control panel). Adequate measures must be taken to ensure degree of protection IP30! Other mounting locations are possible provided the relevant standards are observed (including IP30).

Note!

As a minimum requirement, the connecting cables must conform to H05.
If not mounted inside a control panel, cable strain relief 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)	Rated voltage	AC 230 V, +10 %, –15 %
	Requirement for transformers for switch mode power supplies	EN 61 558-2-17
	Frequency	50 / 60 Hz
	Power consumption (excl. external modules)	10 VA
	Supply line fusing	max. 10 A
Digital input (D1, M)	Contact sensing	
	Voltage	max. DC 5 V
	Current	typically 8 mA
	Requirements for status and impulse contacts	
	Signal coupling	Potential-free
	Type of contact	Maintained or impulse contacts
	Insulating strength against main potential	AC 3750 V to EN 60 730
Switching outputs	External supply line fusing	
Zone valves (Lx, N, Yx)	Non-renewable fuse (slow)	max. 10 A
⚠	Automatic line cutout	max. 13 A
	Release characteristic	B, C, D to EN 60 898
	Permanent power supply (Lx, Nx)	
	For zone valve	AC 230 V (follow power supply)
	Power consumption	max. 10 VA
	Number of zone valve actuator(s) in parallel	max. 3
	Relay contacts (Yx)	
	Switching voltage	AC 230 V (follow power supply)
	AC current	max. 3 A res., 1 A ind. (cos φ= 0.6) min. 5 mA
	Switch-on current	max. 5 A (1 s)
	Contact life	1 × 10^5cycles
Boiler (Q1x)	Relay contacts	
	Relay output	potential-free
	Switching voltage	max. AC 250 V min. AC 19 V
	AC current	max. 3 A res., 1 A ind. (cos φ= 0.6)
	At 250 V	min. 5 mA
	At 19 V	min. 20 ma
	Switch-on current	max. 5 A (1 s)
	Contact life	1 × 10^5cycles
	Insulating strength	
	Between relay contacts and system electronics (reinforced insulation)	AC 3750 V, to EN 60 730-1
	Between neighboring relay contacts (operational insulation) Y1⇔Y2⇔Y3⇔Y4⇔Y5	AC 1250 V, to EN 60 730-1
	Between relay groups (reinforced insulation) (Y1, Y2, Y3, Y4, Y5) ⇔ (Q11, Q12, Q14)	AC 3750 V, to EN 60 730-1
Interfaces (S+, SG)	HCC FL bus	proprietary protocol
	Bus power supply voltage	DC 12 V, +10, –15% (supply to room unit QAX810, QAW810)
	Baud rate	9.6 kbit/s
Permissible cable lengths	For bus communication	

	A ≥0.5 mm²	max. 60 m
	A ≥1 mm²	max. 100 m
	Type of cable	2-wire standard installation cable (unshielded)

Note:
Twisted pair (unshielded) is recommended for enhanced immunity to external electromagnetic interference, e.g. in the vicinity of radio transmitters or variable speed drives

Electrical connections	L, N Connection terminals	PCB barrier terminals
	For wires	0.6 mm dia....2.5 mm^2
	Lx, Nx, Yx Connection terminals	screw terminals
	For wires	0.6 mm dia....2.5 mm^2
	Qx Connection terminals	screw terminals
	For wires	0.5 mm dia....1.5 mm^2
	S+, SG Connection terminals	screw terminals
	For wires	0.5 mm dia....1.5 mm^2
	TX+, TX–, RX+, RX– Connection terminals	screw terminals
	For wires	0.5 mm dia....1.5 mm^2
	D1, M Connection terminals	screw terminals
	For wires	0.5 mm dia....1.5 mm^2
Degrees of protection	Degree of protection of housing to IEC 60 529	IP 10
	Safety class to EN 60 730	device suited for use with equipment of safety class II
Environmental conditions	Operation to	IEC 721-3-3
	Climate conditions	class 3K5
	Temperature (housing and electronics)	0…50 °C
	Humidity	5…95 % r. h. (non-condensing)
	Mechanical conditions	class 3M2
	Transport to	IEC 721-3-2
	Climate conditions	class 2K3
	Temperature	–25…+70 °C
	Humidity	<95 % r. h.
	Mechanical condition	class 2M2
Classification to EN 60 730	Mode of operation, automatic controls	type 1B
	Degree of contamination, controls Environment	2
	Rated surge voltage	4000 V
	Software class	A
Materials and colors	Controller housing	Polycarbonate, RAL 7035 (lightgrey)
	Packaging	corrugated cardboard
Norms and standards	Product safety	
	Automatic electrical controls for household and similar use	EN 60 730-1
	Special requirements for temperature sensing controls	EN 60 730-2-9
	Electromagnetic compatibility	
	Immunity domestic section, light industry	EN 61 000-6-1
	Emissions domestic section, light industry	EN 61 000-6-3
	CE-conformity	
	EMC directive	89/336/EEC

	Low-voltage directive	73/23/EEC
	N474 conformity to	
	Australian EMC framework	Radio Communication Act 1992
	Radio interference emission Standard	AS/NZS 4251.1
Weight	Excluding packaging	approx. 0.39 kg

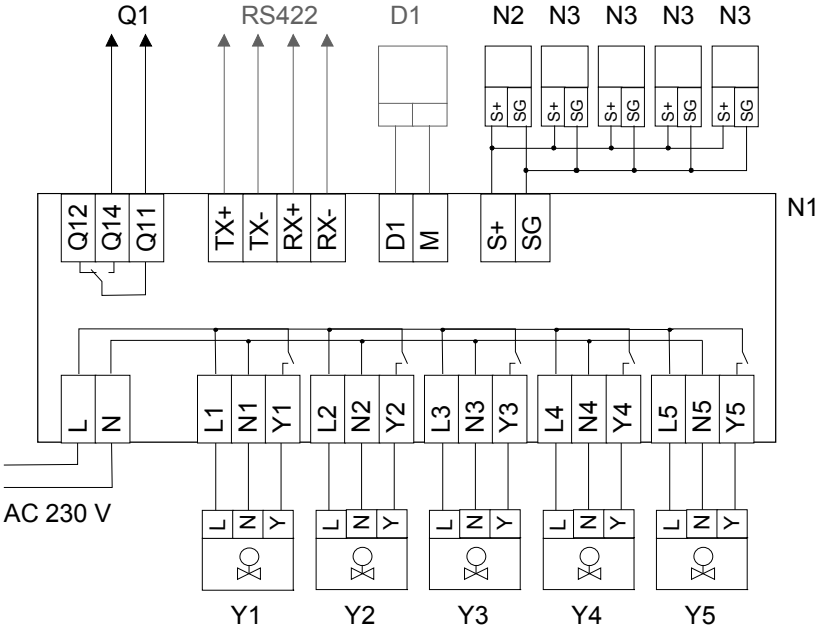
Connection terminals

RRV817 terminals

L	AC 230 V line	M	Digital ground
N	AC 230 V neutral	S+	Communication bus +ve
TX+	RS-422 Transmit +ve	SG	Communication bus ground
TX–	RS-422 Transmit –ve	L…	AC 230 V, zone valve power supply
RX+	RS-422 Receive +ve	N…	AC 230 V neutral
RX–	RS-422 Receive –ve	Q…	Digital outputs, AC 230 V, 3(1) A
D1	Digital input	Y…	Digital outputs, AC 230 V, 3(1) A

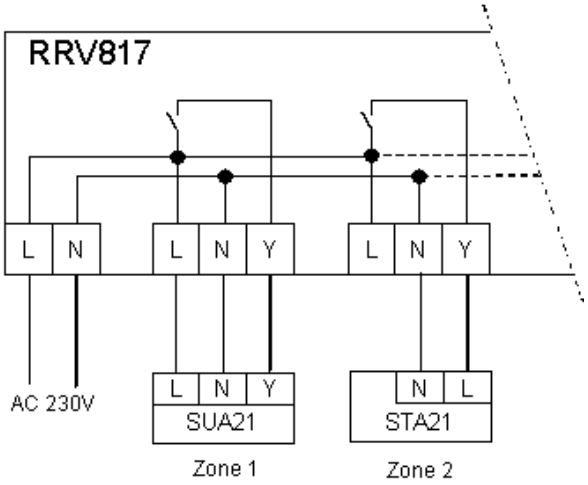
Connection diagrams

Typical connection



N1	RRV817 temperature controller	D1	Remote system off release signal
N2	QAX810 master room unit	F1, F2	External supply line fusing, max. 10 A
N3	QAW810 zone room unit	Q1	Boiler output
N4	RRV817 temperature controller (slave mode)	Y…	Valve actuator SUA21, AC 230 V

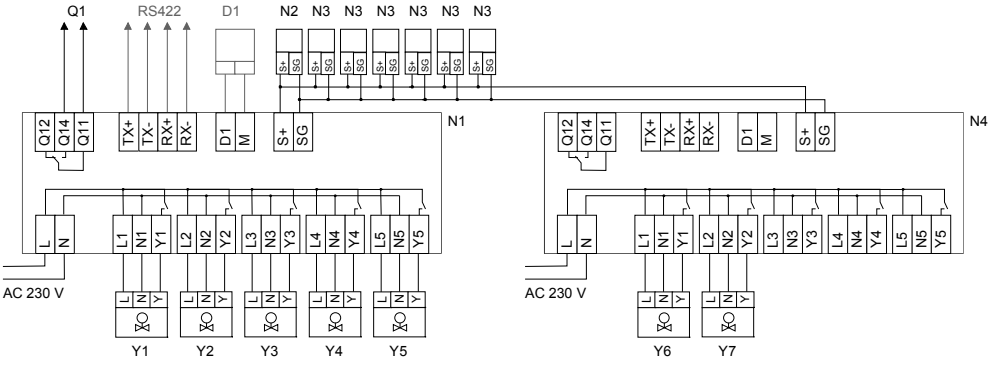
Zone valve connections



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

- The SUA21 requires a 3-wire connection comprising AC 230 V permanent power supply (line and neutral) for closing when there is no demand for heat and a switched AC 230 V connection (Y) for opening when there is demand.
- The STA21 thermal actuator closes automatically when power is removed; therefore, only a 2-wire connection – neutral and control (Y) – is required.

Master and slave connection



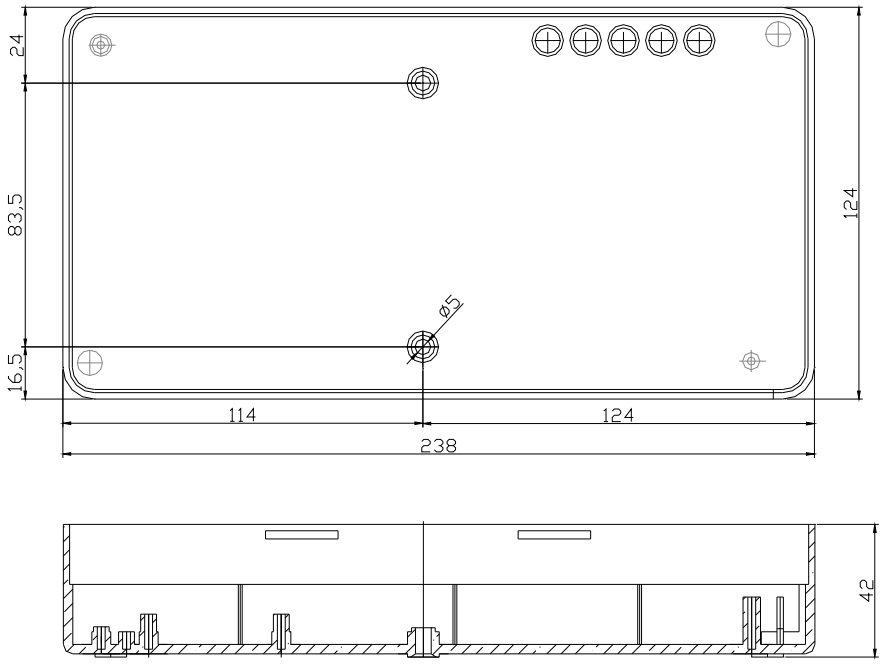
Caution!

- **To avoid electric shock, the main live AC 230 V must be disconnected before installing any wires, servicing or changing DIP switch position.**
- **Use only mounting screws provided. Do not allow metallic objects such as washers to touch printed circuit board.**
- **External supply line fusing must be used.**
- **The HCC bus and RS-422 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. As a minimum requirement, the connecting cables must conform to H05.**
- **Care should be taken when cables are routed through sharp metal openings, conduits or ducts.**
- **Double insulation on output cables is recommended.**
- **Local regulations for installations must be observed.**

Note on 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.

Dimensions



Dimensions in mm