



Room Temperature Controllers for two-pipe fan coil units

RCC10...

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- Output for on / off valve actuator
 - Outputs for three-speed fan
 - Control depending on the room or return air temperature (RCC10)
 - Automatic heating / cooling changeover
 - Operating modes of RCC10: normal, energy saving and frost protection mode or OFF
 - Operating modes of RCC10.1: normal and energy saving mode or OFF
 - Operating mode changeover input for remote control
 - Function for avoiding damage resulting from moisture (RCC10.1)
 - Selectable control parameters (RCC10)
 - Operating voltage AC 230 V

Use

Typical use:

- Control of the room temperature in individual rooms that are heated or cooled with two-pipe fan coil units.
- For opening or closing a valve and for switching a three-speed fan.

Suitable for use in systems with

- automatic heating / cooling changeover
- continuous heating or cooling operation.

Functions

The controller acquires the room temperature with its integrated sensor or external room temperature sensor (QAA32) or external return air temperature sensor (QAH11.1) – if used (optional with the RCC10) – and maintains the setpoint by delivering control commands to the 2-point-valve.

The switching differential with the

- RCC10 is adjustable; it can be 1 or 4 K in heating mode and 0.5 or 2 K in cooling mode
- RCC10.1 is fixed; it is 2 K in heating mode and 1 K in cooling mode

Fan operation

The fan is switched to the selected speed via control output Q1, Q2 or Q3.

When the function "Temperature-dependent fan control" is activated (can be selected with DIP switch no.1), the fan is switched on / off depending on the temperature, that is, together with the valve.

It is switched off by

- leaving the heating or cooling sequence, provided the function "Temperature-dependent fan control" is activated, or
- manually changing to standby \cup , provided plant conditions do not call for frost protection mode (only with the RCC10), or
- activating an external operating mode changeover switch, provided plant conditions do not call for energy saving or frost protection mode (only with the RCC10), or
- turning the controller's power supply off.

Heating and cooling mode

ON

The heating or cooling valve receives the **OPEN** command via control output Y11 when

1. the measured room temperature lies by half the switching differential below the setpoint (heating mode) or above the setpoint (cooling mode), and
2. the valve has been fully closed for more than one minute.

OFF

The heating or cooling valve receives the **CLOSE** command via control output Y11 when

1. the measured room temperature lies by half the switching differential above the setpoint (heating mode) or below the setpoint (cooling mode), and
2. the valve has been fully open for more than one minute.

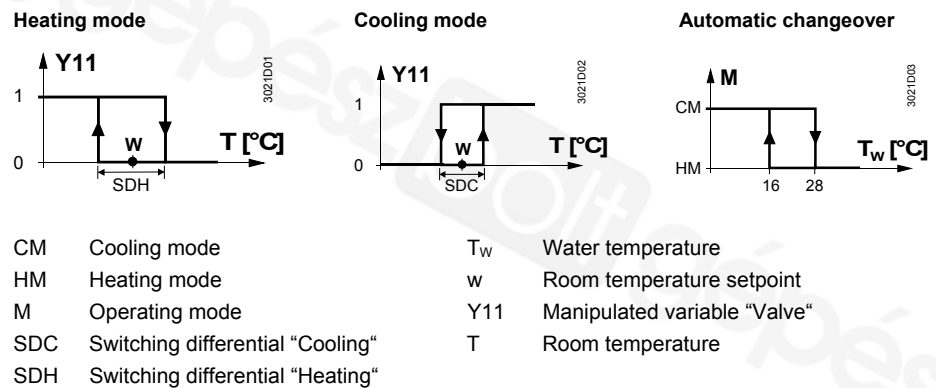
Note: control output Y12 delivers a control command which is inverted to the control command at output Y11 and can be used for normally open valves

Return air temperature

The RCC10 provides control either depending on the measured room temperature or depending on the fan coil unit's return air temperature. Changeover is automatic if a QAH11.1 cable temperature sensor is connected.

Automatic changeover

The water temperature acquired by the changeover sensor (QAH11.1 + ARG86.3) is used by the controller to switch from heating to cooling mode, or vice versa. When the water temperature lies above 28 °C, the controller switches to heating mode, below 16 °C it switches to cooling mode. If, immediately after switching on, the water temperature lies between the 2 changeover points, the controller will start in heating mode. The water temperature is measured at minute-intervals and the operational status updated.



Purging function

The task of the changeover sensor is to initiate the change from heating to cooling mode even if the two-port valves are shut down for a longer period of time. To ensure this function, the valves are opened for one minute at 2-hour intervals during off hours. (Note: this function is not effective when using thermal actuators)

Energy saver

The room temperature setpoint can be limited in increments of 1 K by making use of the minimum and maximum limitation facility. Arbitrary setpoint readjustments can thus be prevented.

Operating modes

The following operating modes are available:

Normal operation

Heating or cooling mode with automatic changeover and with manually selected fan speed III, II or I. In normal operation, the controller maintains the adjusted setpoint.

Frost protection mode (only with the RCC10)

The frost protection function is activated only when DIP switch no.4 is set to OFF. Frost protection mode can be activated either

- by manually switching to standby ☺.
- by activating the external operating mode changeover switch, provided DIP switch no.2 is set to OFF

If the room temperature falls below 8 °C, the controller will automatically switch to frost protection mode. In that case, the heating valve opens and the fan operates at the selected speed. If the operating mode selector is in position standby ☺, the fan will operate at speed I. The room temperature is maintained at a setpoint of 8 °C and the setpoint adjusted by the user will be ignored.

If frost protection mode is locked (DIP switch no.4 in position ON), standby is locked also, which means that the controller will not switch to standby but to OFF:

Energy saving mode

In energy saving mode, the setpoint of heating is 16 °C and the setpoint of cooling 28 °C, independent of the position of the setpoint knob. This operating mode will be activated when input D1 for operating mode changeover is active and DIP switch no.2 is set to ON.

Avoiding damage resulting from moisture
(only with the RCC10.1)
Operating mode changeover switch

To avoid damage due to moisture in very warm or humid climatic zones resulting from lack of air circulation in energy saving mode, the fan will not be switched off when selecting the function "Temperature-independent fan control" (with DIP switch no.1)

A changeover switch can be connected to status input D1-GND. When the switch closes its contact (caused by an open window, for instance), the operating mode will change from normal operation to energy saving mode (provided DIP switch no.2 is set to ON), or from normal operation to standby (provided DIP switch no.2 is set to OFF). If the room temperature falls below 8 °C and if DIP switch no.3 is set to OFF, frost protection mode will become active.

The operating action of the switch (N.C. or N.O.) can be selected.

Type summary

Type reference	Features
RCC10	With input for return air temperature sensor
RCC10.1	Without input for return air temperature sensor, without frost protection function

Ordering

When ordering, please give name and type reference.

The QAH11.1 temperature sensor (can be used as a return air temperature or changeover sensor), the changeover sensor mounting kit and the valves are to be ordered as separate items.

Equipment combinations

Type of unit	Type reference	Data sheet
Temperature sensor	QAH11.1	1840
Room sensor	QAA32	1747
Changeover mounting kit	ARG86.3	1840
Motoric on/off actuator	SFA21...	4863
Thermal actuator (for radiator valve)	STA21...	4893
Thermal actuator (for small valve 2,5 mm)	STP21...	4878

Mechanical design

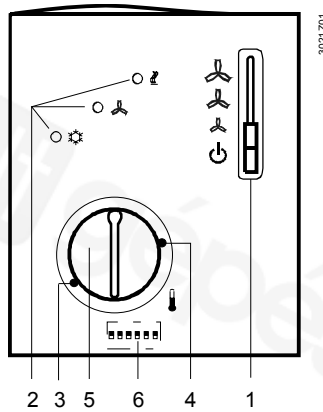
The unit consists of two parts:

- A plastic housing which accommodates the electronics, the operating elements and the built-in room temperature sensor
- A mounting base

The housing engages in the mounting base and snaps on.

The base carries the screw terminals. The DIP switches are located at the rear of the housing.

Setting and operating elements



Legend

1. Operating mode selector (standby , heating or cooling mode with manual selection of fan speed)
2. LEDs for indicating heating mode, cooling mode and fan operation
3. Setting facility for minimum setpoint limitation (in increments of 1 K)
4. Setting facility for maximum setpoint limitation (in increments of 1 K)
5. Room temperature setpoint knob

6 Set of DIP switches

DIP switch no.	Meaning	Position ON	Position OFF
1	Fan control	Fan control is temperature-dependent in all operating modes	Fan control in normal operation (and in energy saving mode with the RCC10.1) is temperature independent ¹⁾
2	Operating mode change-over via external switch	Changeover between normal operation and energy saving mode	Changeover between normal operation and standby ¹⁾
3 ²⁾	Operating action of switch for external operating mode changeover	Changeover activated when contact of switch is closed (N.O.) ¹⁾	Changeover activated when contact of switch is open (N.C.)
4 ²⁾	Standby	Frost protection function not enabled	Frost protection function enabled ¹⁾
5 ²⁾	Switching differential	1 K in heating mode ¹⁾ 0.5 K in cooling mode ¹⁾	4 K in heating mode 2 K in cooling mode

- 1) Factory setting
2) Only with the RCC10

The RCC10.1 comes with the following fixed settings:

- Switching differential in heating mode: 2 K
- Switching differential in cooling mode: 1 K
- Standby: OFF, no frost protection
- Operating action of switch for external operating mode changeover: N.O.

Accessories

Description	Type reference
Adapter plate 120 x 120 mm for 4" x 4" conduit boxes	ARG70
Adapter plate 96 x 120 mm for 2" x 4" conduit boxes	ARG70.1
Adapter plate for surface wiring 112x130 mm	ARG70.2

Engineering notes

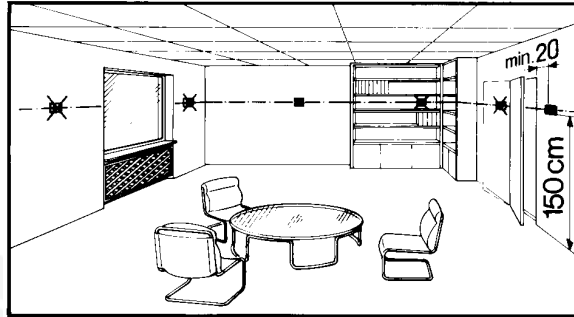
In systems with automatic changeover, the temperature sensor can be replaced by an external switch for manual changeover.

In systems with continuous heating operation, no sensor will be connected to the controller's input.

With continuous cooling operation, the controller input (B2–M) must be bridged.

Mounting, installation and commissioning notes

Mounting location: on a wall or inside the fan coil unit. Not in niches or bookshelves, not behind curtains, above or near heat sources and not exposed to direct solar radiation. Mounting height is about 1.5 m above the floor. The connecting wires can be run to the controller from a recessed conduit box.



Check the settings of the DIP switches no.1 through no.5 (with the RCC10) and of no.1 and no.2 (with the RCC10.1) and change them, if required. If setpoint limitation is required, use the minimum and maximum limitation facility (energy saver). After applying power, the controller makes a reset during which the fan LED flashes, indicating that the reset has been correctly made. This takes about 3 seconds. Then, the controller will be ready to operate.

- Prior to fitting the changeover sensor, thermal conductive paste must be applied to the location on the pipe where the sensor is placed
- The cables used must satisfy the insulation requirements with regard to mains potential
- Sensor inputs B1–M and B2–M carry mains potential. If the sensor's cables must be extended, the cables used must be suited for mains voltage



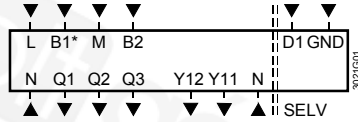
The controller is supplied with Mounting Instructions.

Technical data

⚠ Power supply	Operating voltage	AC 230 V + 10/-15 %
	Frequency	50/60 Hz
	Power consumption	max. 6 VA
	Control outputs Q1, Q2, Q3	AC 230 V
	Rating	max. 600 VA
	Control output Y11 (N.O. contact)	AC 230 V
	Rating	max. 300 VA
	Control output Y12 (N.C. contact)	AC 230 V
	Rating	max. 300 VA
	Signal input B1 for return air sensor	QAH11.1, Safety class II NTC resistor 3kΩ at 25°C
	Signal input B2 for changeover-sensor	QAH11.1, Safety class II NTC resistor 3kΩ at 25°C

Operational data	Status input D1 and GND	
	Contact sensing	SELV DC 6-15V / 3-6 mA
	Insulation against mains	4 kV, extra insulation
	Operating action	
	With the RCC10	selectable (N.O. / N.C.)
	With the RCC10.1	(N.O.)
	Perm. cable length with copper cable 1.5 mm ² for connection to terminals B1, B2 and D1	80 m
	Setpoint setting range	8...30 °C
	Max. control deviation at 25 °C	max. ±0.7 K
	Switching differential in heating mode SDH (selectable)	1 K or 4 K
Switching differential in cooling mode SDC (selectable)	0.5 K or 2 K	
Setpoint «Energy saving mode  », heating	16 °C	
Setpoint «Energy saving mode  », cooling	28 °C	
Setpoint «Standby  »	8 °C	
Environmental conditions	Operation	
	Climatic conditions	to IEC 721-3-3
	Temperature	class 3K5
	Humidity	0...+50 °C <95 % r.h.
	Transport	to IEC 721-3-2
	Climatic conditions	class 2K3
	Temperature	-25...+70 °C
	Humidity	<95 % r.h.
	Mechanical conditions	class 2M2
	Storage	to IEC 721-3-1
Climatic conditions	class 1K3	
Temperature	-25...+70 °C	
Humidity	<95 % r.h.	
Norms and standards	 conformity to	
	EMC directive	89/336/EEC
	Low voltage directive	73/23/EEC and 93/68/EEC
	 C-Tick conformity to	
	EMC emission standard	AS/NSZ 4251.1:1994
	Product standards	
	Automatic electrical controls for household and similar use	EN 60 730 – 1 and EN 60 730 – 2 - 9
	Electromagnetic compatibility	
	Emissions	EN 50 081-1
	Immunity	EN 50 082-1
Safety class	II to EN 60 730	
Pollution class	normal	
Degree of protection of housing	IP 30 to EN 60 529	
General	Connection terminals	Use solid wires or prepared stranded wires. 2 x 0.4-1.5 mm ² or 1 x 2.5 mm ²
	Weight	0.25 kg
	Colour of housing front	white, NCS S 0502-G (RAL9003)

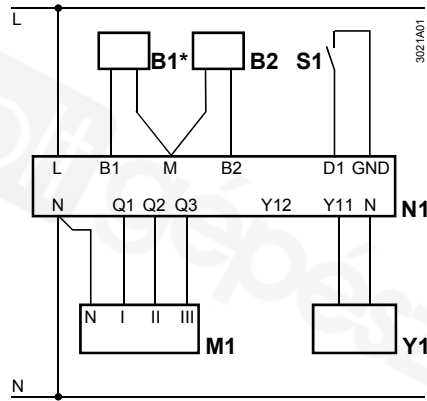
Connection terminals



- L, N Operating voltage AC 230 V
- B1* Status input "Return air temperature sensor"
- M Measuring neutral "Return air temperature sensor"
- B2 Status input "Changeover sensor"
- D1, GND Status input for potential-free operating mode changeover switch
(operating action can be selected)
- Q1 Control output "Fan speed I" AC 230 V
- Q2 Control output "Fan speed II" AC 230 V
- Q3 Control output "Fan speed III" AC 230 V
- Y11 Control output "Valve" AC 230 V
(N.O. contact, for N.C. valves)
- Y12 Control output "Valve" AC 230 V
(N.C. contact, for N.O. valves)

* Only with the RCC10

Connection diagrams



- B1* Return air temperature sensor (QAH11.1)
- B2 Changeover sensor
(QAH11.1 temperature sensor + ARG86.3 changeover mounting kit)
- M1 Three-speed fan
- N1 RCC10 / RCC10.1 room temperature controller
- S1 External operating mode changeover switch
- Y1 MVE... / MXE... zone valve

* Only with the RCC10

Dimensions

Unit/baseplate

