



Room Temperature Controller

RCC50.1

for two-pipe fan coil units

Modulating PI control
Output for DC 0...10 V valve actuator
Outputs for three-speed fan
Automatic heating / cooling changeover
Operating modes: normal and energy saving or OFF
Operating mode changeover input for remote control
Function for avoiding damage resulting from moisture
Operating voltage AC 24 V

Use

Typical use:

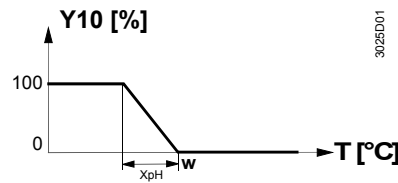
- Control of the room temperature in individual rooms that are heated or cooled with two-pipe fan coil units.
- For opening or closing a DC 0...10 V valve actuator
- For switching a three-speed fan.

Suited for use in systems with

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

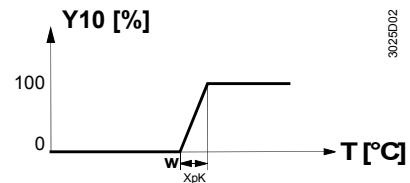
The controller acquires the room temperature with its integrated sensor and maintains the setpoint by delivering DC 0...10 V control commands to the valve. The controller provides PI control. The proportional band in heating mode is 4 K and in cooling mode 2 K. The integration time is 5 minutes.

Heating mode



T Room temperature
 XpH Proportional band heating
 XpK Proportional band cooling

Cooling mode



w Room temperature setpoint
 Y10 Manipulated variable «Actuator»

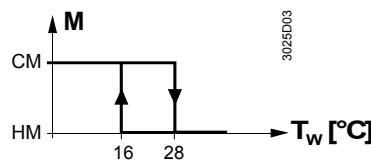
Note: the diagrams only show the proportional part of the PI controller.

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.

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.



CM Cooling mode
 HM Heating mode
 M Operating mode
 Tw Water temperature

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.

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 ⓪ , or
- activating an external operating mode changeover switch, provided plant conditions do not call for energy saving, or
- turning the controller's power supply off.

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. In operating mode selector position \cup , the controller is switched 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

To avoid damage due to moisture in very warm or humid climatic zones resulting from lack of air circulation in energy saving mode, DIP switch no. 1 must be set to OFF. With this configuration, the fan in energy saving mode operates at the speed manually selected or, if the operating mode selector is set to OFF \cup , at speed I.

Operating mode changeover switch

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).

Ordering

When ordering, please give name and type reference. The QAH11.1 temperature sensor (can be used as a changeover sensor), the changeover 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 |
| Changeover mounting kit | ARG86.3 | 1840 |
| Motric actuator (radiator valve) | SSA61... | 4893 |
| Motric actuator (small valve 2,5 mm) | SSP61... | 4864 |
| Motric actuator (small valve 5,5 mm) | SSB61... | 4891 |
| Motric actuator (valve 5,5 mm) | SSC61... | 4895 |
| Motric actuator (valve 5,5 mm) | SQS65... | 4573 |

Mechanical design

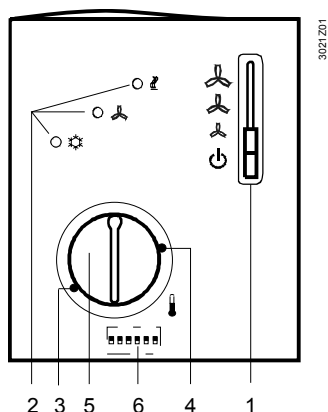
The unit consists of two parts:


- 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



1. Operating mode selector
(OFF , 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 normal operation and energy saving mode | Fan control in normal operation and in energy saving mode 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 OFF ¹⁾ |

1) Factory setting

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 |

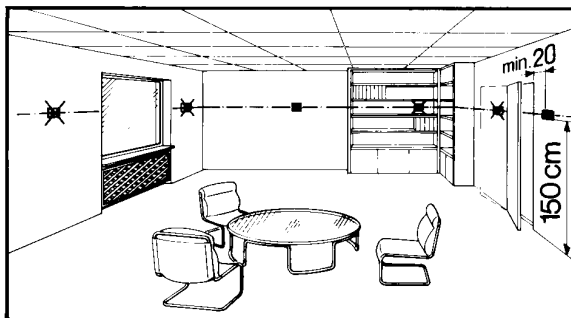
In systems with automatic changeover, the temperature sensor can be replaced by an external switch for manual changeover.

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

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 and no. 2 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 input B2-M carries mains potential. If the sensor's cable must be extended, the cables used must be suited for mains voltage

The controller is supplied with Mounting Instructions.



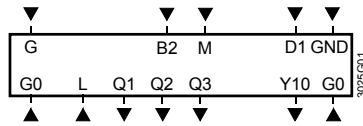
Technical data

| | | | |
|---------------------------------|---|--|----------------|
| Power supply | Operating voltage | AC 24 V \pm 20 % | |
| | Frequency | 50/60 Hz | |
| | Power consumption | max. 6 VA | |
| | Control outputs Q1, Q2, Q3 | AC 230 V | |
| | Rating | max. 600 VA | |
| | Control output Y10 | DC 0...10 V | |
| | Resolution | 39 mV | |
| | Current | max. \pm 1 mA | |
| | Signal input B2 for changeover-sensor | QAH11.1, Safety class II NTC resistor 3k Ω at 25°C | |
| | Status input D1 and GND | | |
| | Contact sensing | SELV DC 6-15 V / 3-6 mA | |
| | Insulation against mains | 4 kV | |
| Operating action | normally open (NO) | | |
| Operational data | 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. \pm 0.7 K | |
| | Switching differential in heating mode SDH (selectable) | 4 K | |
| | Switching differential in cooling mode SDC (selectable) | 2 K | |
| | Integration time | 5 min | |
| | Setpoint «Energy saving mode  », heating | 16 °C | |
| | Setpoint «Energy saving mode  », cooling | 28 °C | |
| | Environmental conditions | Operation | to IEC 721-3-3 |
| | | Climatic conditions | class 3K5 |
| Temperature | | 0...+50 °C | |
| Humidity | | <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 | |
| |  ^{N474} 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 | IP30 to EN 60 529 | | |

General

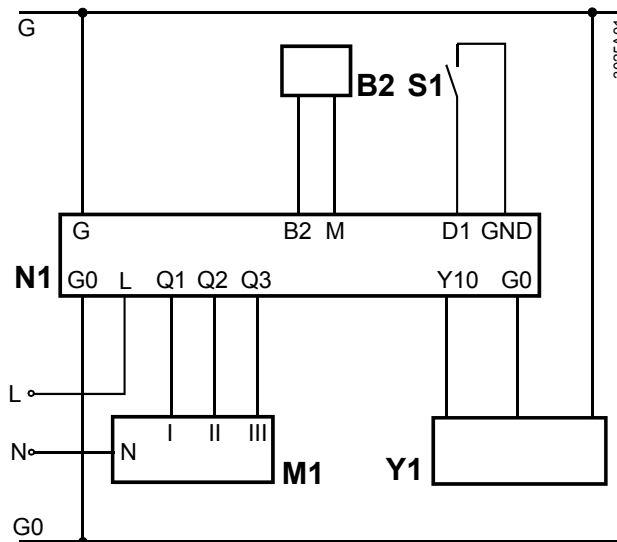
| | |
|-------------------------|---|
| Connection terminals | Use solid wires or prepared stranded wires. 2 x 0.4-1.5 mm ² or 1 x 2.5 mm ² |
| Weight | 0.23 kg |
| Colour of housing front | white, NCS S 0502-G (RAL9003) |

Connection diagram



- G, G0 Operating voltage AC 24 V for room temperature controller
- L Operating voltage AC 230 V for fan control
- B2 Status input "Changeover sensor"
- M Measuring neutral "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
- Y10 Control output DC 0 - 10 V

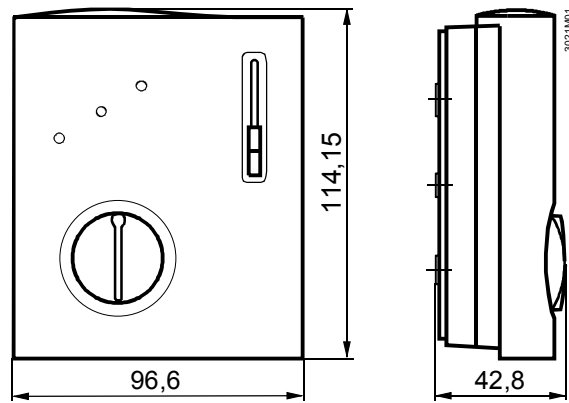
Connection diagram



- B2** Changeover sensor (QAH11.1 temperature sensor)
- M1** Three-speed fan
- N1** RCC50.1 room temperature controller
- S1** External operating mode changeover switch
- Y1** Valve actuator DC 0-10 V for heating or cooling

Dimensions

unit



baseplate

