SIEMENS

3041

RCU10

RCU10.1

Room Temperature Controllers

for heating and cooling systems

RCU10...

Choice of two-position or modulating PI control
ON / OFF or PWM outputs for heating and cooling
Operating modes: normal operation, energy saving and standby
Operating mode selector (RCU10.1)
Operating mode changeover input for remote control
Operating voltage AC 230 V

Use

Control of the room temperature in individual rooms of ventilation or air conditioning plants that are heated or cooled with radiators, chilled ceilings, etc.

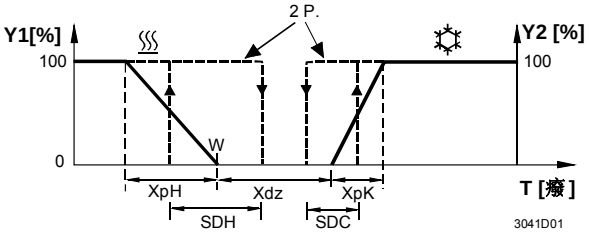
For the control of the following pieces of equipment:

- Thermic or electric valve actuators
- Damper actuators
- Electric heaters

The controller acquires the room temperature with its integrated sensor and maintains the setpoint by delivering control commands. It is possible to choose PI control with PWM actuating commands or two-position control with ON / OFF actuating commands.

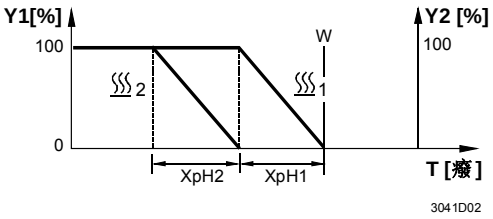
The proportional band or the switching differential can be 1 or 4 K in heating mode and 0.5 or 2 K in cooling mode (selectable). The integration time cannot be adjusted and is 10 minutes. The operating sequence “Heating – cooling or heating – heating” can be selected with DIP switch no. 7.

Function diagram “Heating-cooling”



T	Room temperature
Y1, Y2	output percentage
W	Room temperature setpoint
Xdz	Dead band
XpH	Proportional band heating
XpK	Proportional band cooling
SDH	Switching differential for heating
SDC	Switching differential for cooling
2 P.	2-position outputs

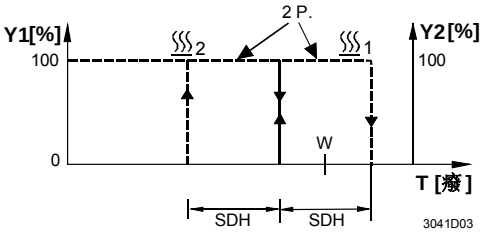
Function diagram “Heating-heating” with PWM output



T	Room temperature
Y1	Heating sequence output 1
Y2	Heating sequence output 2
W	Room temperature setpoint
XpH1	Proportional band heating 1
XpH2	Proportional band heating 2

When two heating sequences are selected, the two outputs cannot be switched ON at the same time. Two outputs are switched ON separately with at least 10 seconds delay. In case of set-point change, the two heaters are allowed to switch OFF together.

Function diagram “Heating-heating” with 2 position output



T	Room temperature
Y1	Heating sequence output 1
Y2	Heating sequence output 2
W	Room temperature setpoint
SDH	Switching differential for heating
2 P.	2-position outputs

Pulse width modulation

If actuating signal “Pulse width modulation“ (PWM) is selected with DIP switches no. 5 and no. 6, the output is activated and deactivated for a certain period of time, proportional to the calculated manipulated variable and following an interval.

The interval of the PWM actuating signal can be selected as follows:

Heating and cooling (DIP switch 7 on position ON)
Y1 interval can be selected with DIP switch 8 and is either 240 s or 90 s.
Y2 interval is 240 s and cannot be changed.

Heating 2-stage (DIP switch 7 on position OFF)
Y1 interval is 240 s and cannot be changed.
Y2 interval can be selected with DIP switch 8 and is either 240 s or 90 s.

Note

Output Y1 (heating): when used in connection with thermic actuators, the selected interval should be 240 seconds. When using electric heaters, it should be 90 seconds.

Caution

When used in connection with electric valve actuators, DIP switches no. 5 and no. 6 must be set to ON for two-position control.

PWM actuating signals may never be used for driving electric 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

Normal operation is activated when the operating mode selector is set to " ☼ " (RCU 10.1) and the external operating mode changeover switch is not activated. In normal operation, the controller maintains the adjusted setpoint.

Frost protection mode

Frost protection mode can be activated either

- by manually switching to standby ⏻ (RCU10.1)
- by activating the external operating mode changeover switch, provided DIP switch no. 1 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 room temperature is maintained at a setpoint of 8 °C. The setpoint adjusted by the user will be ignored.

Energy saving mode

Energy saving mode can be activated either

- by manually switching to energy saving mode " ☾ " (RCU10.1).
- by activating the external operating mode changeover switch, provided DIP switch no. 1 is set to ON

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.

Operating mode changeover switch

A changeover switch can be connected to status input D1–GND. When the switch activates (caused by an open window, for instance), the operating mode will change from normal operation or standby to energy saving mode (provided DIP switch no. 1 is set to ON), or from normal operation or energy saving mode to standby (provided DIP switch no. 1 is set to OFF).
The operating action of the switch (N.C. or N.O.) can be selected.

Type summary

Type reference	Features
RCU10	Without operating mode selector
RCU10.1 *)	With operating mode selector

*) Type is not orderable any more

Ordering

When ordering, please give name and type reference, e.g. room temperature controller RCU10.
Valve and air damper actuators are to be ordered as separate items.

Equipment combinations

Type of unit	Type reference	Data sheet*)
Motoric on/off actuator	**SFA21...**	4863
Thermal actuator (for radiator valve)	**STA21...**	4893
Thermal actuator (for small valve 2,5 mm)	**STP21...**	4878
Air damper actuators	**GCA32…1**	4613

*) The documents can be downloaded from http://siemens.com/bt/download.

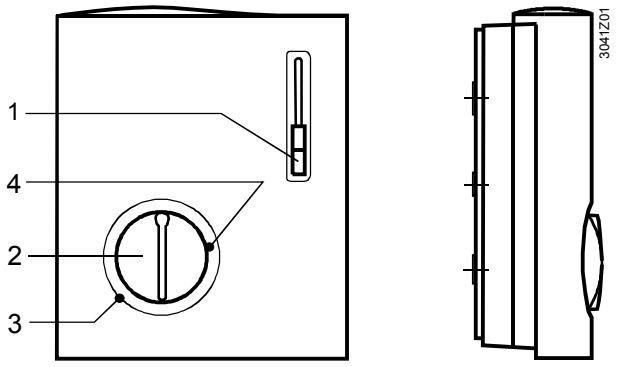
Mechanical design

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 unit.

Setting and operating elements



Legend

1 Operating mode selector (RCU10.1)
(normal operation, energy saving mode and standby)
2 Room temperature setpoint knob
3 Setting facility for minimum setpoint limitation
(in increments of 1 K)
4 Setting facility for maximum setpoint limitation
(in increments of 1 K)

Set of DIP switches

DIP switch no.	Meaning	Position ON	Position OFF
1	Operating mode changeover via external switch	Changeover from normal operation or standby to energy saving mode	Changeover from normal operation or energy saving to standby [1)]
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.)
3	Switching different or P-band	1 K in heating mode 0.5 K in cooling mode	4 K in heating mode[1)] 2 K in cooling mode[1)]
4	Dead zone in normal operation	2 K [1)]	5 K
5	Signal output Y1 (heating)	ON / OFF [1)]	PWM
6	Signal output Y2 (heating or	ON / OFF [1)]	PWM

	cooling)		
7	Operating action of output Y2	Cooling [1]	Heating
8	PWM signal interval for outputs heating and cooling (DIP switch 7 set on position ON)		
	Y1 (heating)	240 s[1]	90 s
	Y2 (cooling)	240 s (not selectable)	
	PWM signal interval for outputs heating 2-stage (DIP switch set on position OFF)		
	Y1 (heating)	240 s (not selectable)	
	Y2 (heating)	240 s [1]	90 s

1) Factory setting

Accessories

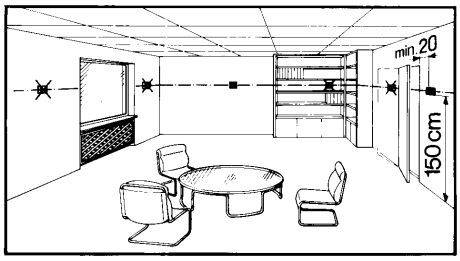
Description	Type reference
Adapter plate 120 x 120 mm for 4“ x 4“ conduit boxes	ARG70
Adapter plate 96 x 120 mm for 2“ x 4“ conduit boxes	ARG70.1
Adapter plate for surface wiring 112x130 mm	ARG70.2

Notes

Check the settings of DIP switches no. 1 through no. 8 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, which takes about 3 seconds. Then, it will be ready to operate.

The controller is supplied with Mounting Instructions.
Mounting location: on a wall of the room to be conditioned. Not in niches or book-shelves, 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.



⚠ Caution AC 230 V

Only authorized personnel may open the controller.

Mounting, installation and commissioning

When mounting the unit, fix the baseplate first. Then, make the electrical connections and fit and secure the cover.
The controller must be mounted on a flat wall and in compliance with local regulations.
If there are thermostatic radiator valves in the reference room, they must be set to their fully open position.

⚠ The cables used must satisfy the insulation requirements with regard to mains potential.

Warning!
No internal line protection for supply lines to external consumers (Y1, Y2)
Risk of fire and injury due to short-circuits!
- Adapt the line diameters as per local regulations to the rated value of the installed overcurrent protection device.

Maintenance

The room controller is maintenance-free.

Disposal

The device is considered an electronic device for disposal in terms of the European Directive 2012/19/EU and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

Power supply

Operating voltage	AC 230 V +10 %, -15 %
Frequency	50/60 Hz
Power consumption	max. 6 VA

No internal fuse
External preliminary protection with max. C 10 A circuit breaker in the supply line required under all circumstances

Functional data

Setpoint setting range	8...30 °C
Max. control deviation at 25 °C	max. ±0.7 K
Switching differential heating SDH or P-band (selectable)	1 K or 4 K
Switching differential cooling SDC or P-band (selectable)	0,5 K or 2 K
Dead zone X_{dz} in normal operation (selectable)	2 K or 5 K
Setpoint «Energy saving mode ☾», heating	16 °C
Setpoint « Energy saving mode ☾», cooling	28 °C
Setpoint «Standby ⏻»	8 °C
Integration time Tn	10 min
Control outputs Y1, Y2	PWM or ON / OFF
Voltage	AC 230 V +10 % - 15 %
Current	0.02…1 A
Cycle time PWM (selectable for Y1)	240 s or 90 s
Status input D1 and GND	
Contact sensing	SELV DC 6-15 V / 3-6 mA
Insulation against mains	4 kV
Perm. cable length with copper cable 1.5 mm^2 for status input D1	80 m

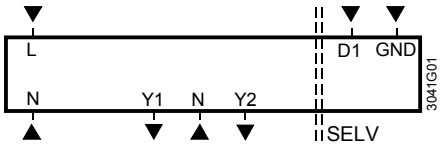
Environmental conditions

Operation	
Climatic conditions	to IEC 60721-3-3 class 3K5
Temperature	0...+50 °C
Humidity	<95 % r.h.
Transport	to IEC 60721-3-2
Climatic conditions	class 2K3
Temperature	−25...+70 °C
Humidity	<95 % r.h.
Mechanical conditions	class 2M2

Norms and standards	EU Conformity (CE)	CE1T3040xx *)
	RCM Conformity	CE1T3040en_C1 *)
	Degree of protection of housing	IP30 EN 60 529
	Safety class	II to EN 60 730-1
	Pollution class	normal
Environmental compatibility	The product environmental declaration CE1E3040*) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	
Eco design and labelling directives	Based on EU Regulation 813/2013 (Eco design directive) and 811/2013 (Labelling directive) concerning space heaters, combination heaters, the following classes apply:	
	- Application with On/Off operation of a heater	Class I value 1%
	- PWM (TPI) room thermostat, for use with On/Off output heaters	Class IV value 2%
General	Connection terminals for	Use solid wires or prepared stranded wires. 2 x 1.5 mm^2 or 1 x 2.5 mm^2
	Weight	
	RCU10	0.23 kg
	RCU10.1	0.25 kg
	Colour of housing front	white, NCSS0502-G (RAL 9003)

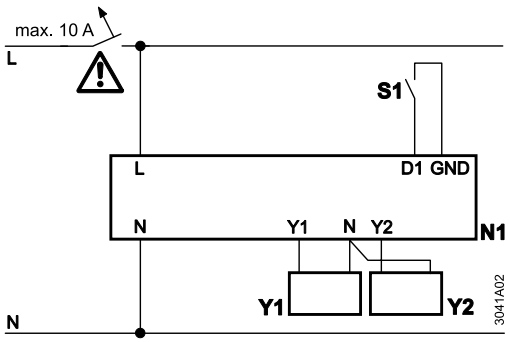
*) The documents can be downloaded from http://siemens.com/bt/download.

Connection terminals



L,N	Operating voltage AC 230 V
D1,GND	Status input for potential-free operating mode changeover switch
Y1	Control signal PWM / two-position AC 230 V
Y2	Control signal PWM / two-position AC 230 V

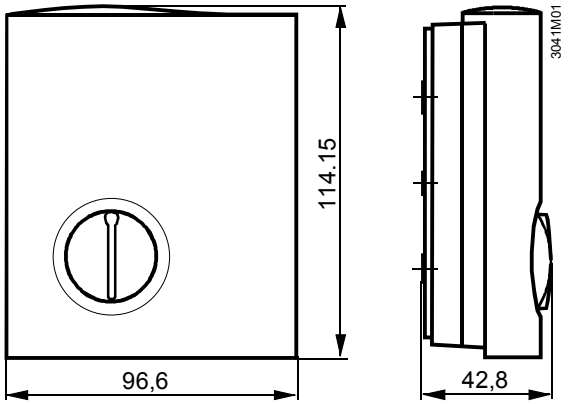
Connection diagram



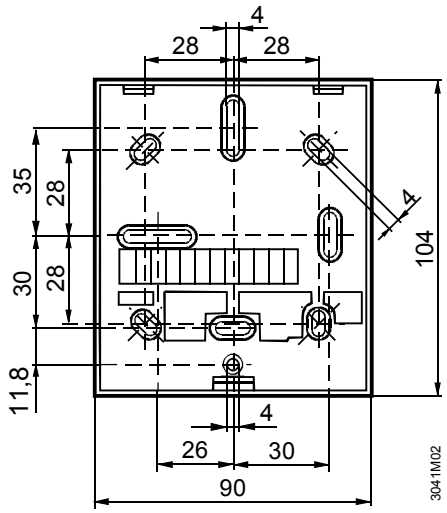
N1	Room temperature controller
S1	External operating mode changeover switch
Y1	Actuator
Y2	Actuator

Dimensions

Controller



Baseplate



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SIEMENS

3048

RCU15

Room Temperature Controllers

RCU15

for heating and cooling systems

Choice of two-position or modulating PI control
ON / OFF or PWM outputs for heating and cooling
Control depending on room- or return air temperature
Operating modes: normal operation, energy saving and standby
Operating mode changeover input for remote control
Operating voltage AC 24 V

Use

Control of the room temperature in individual rooms of ventilation or air conditioning plants that are heated or cooled with radiators, chilled ceilings, etc.

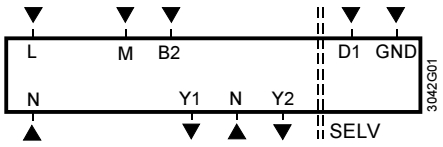
For the control of the following pieces of equipment:

- Thermic valve actuators
- Damper actuators

Functions

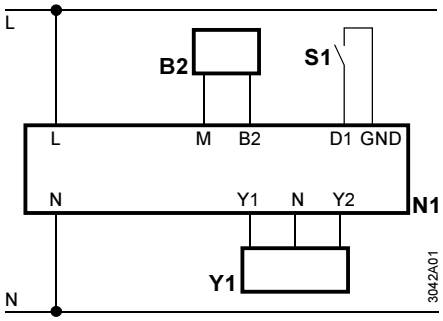
The controller acquires the room temperature with its integrated sensor or external room temperature sensor (QAA32) or return air temperature sensor (QAH11.1) - if used - and maintains the setpoint by delivering control commands. It is possible to choose PI control with PWM actuating commands or two-position control with ON / OFF actuating commands.

Connection terminals



L	Operating voltage AC 230 V
N	System neutral
B2	Signal input “Changeover sensor“
D1	Signal input for potential-free operating mode changeover switch (selectable operating action)
Y1	Control output “Open valve“, AC 230 V
Y2	Control output “Close valve“, AC 230 V

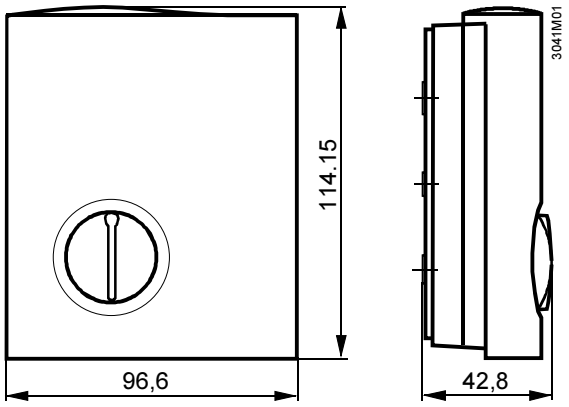
Connection diagram



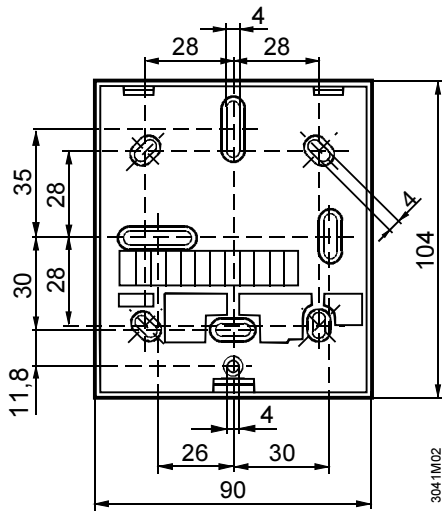
N1	Room temperature controller
S1	External operating mode changover switch (N.O.)
B2	Automatic heating/cooling changeover
Y1	3-point actuator

Dimensions

Controller

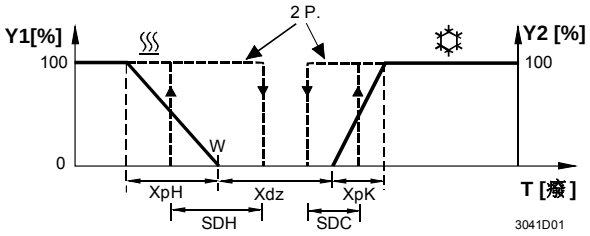


Baseplate



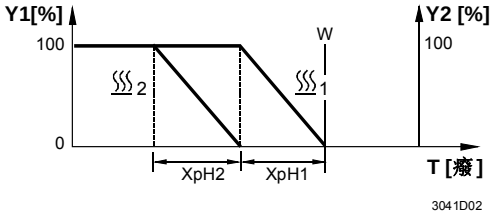
The proportional band or the switching differential can be 1 or 4 K in heating mode and 0.5 or 2 K in cooling mode (selectable). The integration time cannot be adjusted and is 10 minutes. The operating sequence “Heating – cooling or heating – heating” can be selected with DIP switch no. 7.

Function diagram “Heating-cooling”



T	Room temperature
Y1, Y2	output percentage
W	Room temperature setpoint
Xdz	Dead band
XpH	Proportional band heating
XpK	Proportional band cooling
SDH	Switching differential for heating
SDC	Switching differential for cooling
2 P.	2-position outputs

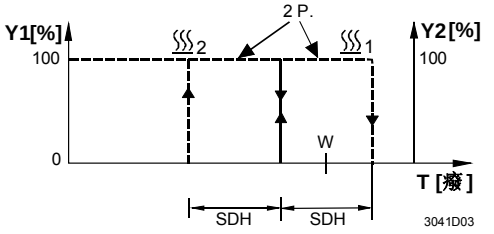
Function diagram “Heating-heating” with PWM output



T	Room temperature
Y1	Heating sequence output 1
Y2	Heating sequence output 2
W	Room temperature setpoint
XpH1	Proportional band heating 1
XpH2	Proportional band heating 2

When two heating sequences are selected, the two outputs cannot be switched ON at the same time. Two outputs are switched ON separately with at least 10 seconds delay. In case of set-point change, the two heaters are allowed to switch OFF together.

Function diagram “Heating-heating” with 2 position output



T	Room temperature
Y1	Heating sequence output 1
Y2	Heating sequence output 2
W	Room temperature setpoint
SDH	Switching differential for heating
2 P.	2-position outputs

Pulse width modulation

If actuating signal “Pulse width modulation“ (PWM) is selected with DIP switches no. 5 and no. 6, the output is activated and deactivated for a certain period of time, proportional to the calculated manipulated variable and following an interval.

The interval of the PWM actuating signal can be selected as follows:

Heating and cooling (DIP switch 7 on position ON)
Y1 interval can be selected with DIP switch 8 and is either 240 s or 90 s.
Y2 interval is 240 s and cannot be changed.

Heating 2-stage (DIP switch 7 on position OFF)
Y1 interval is 240 s and cannot be changed.
Y2 interval can be selected with DIP switch 8 and is either 240 s or 90 s.

Note

Output Y1 (heating): when used in connection with thermic actuators, the selected interval should be 240 seconds. When using electric heaters, it should be 90 seconds.

Caution

When used in connection with electric valve actuators, DIP switches no. 5 and no. 6 must be set to ON for two-position control.

PWM actuating signals may never be used for driving electric actuators!

Return air temperature or external room temperature

The RCU15 provides control depending on the temperature acquired either by its integrated sensor, external room sensor or return air temperature sensor in the fan coil unit. Changeover is automatic if a QAH11.1 cable temperature sensor or external room temperature sensor QAA32 is connected to the device.

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

Normal operation is activated when the external operating mode changeover switch is not activated. In normal operation, the controller maintains the adjusted setpoint.

Frost protection mode

Frost protection mode can be activated using the external operating mode changeover switch, provided DIP switch no. 1 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 room temperature is maintained at a setpoint of 8 °C. The setpoint adjusted by the user will be ignored.

Energy saving mode

Energy saving mode can be activated using the external operating mode changeover switch, provided DIP switch no. 1 is set to ON

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.

Operating mode changeover switch

A changeover switch can be connected to status input D1–GND. When the switch activates (caused by an open window, for instance), the operating mode will change from normal operation or standby to energy saving mode (provided DIP switch no. 1 is set to ON), or from normal operation or energy saving mode to standby (provided DIP switch no. 1 is set to OFF).
The operating action of the switch (N.C. or N.O.) can be selected.

Ordering

When ordering, please give name and type reference, e.g. room temperature controller RCU15.
Valve and air damper actuators 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
Motoric on/off actuator (not suitable for PWM mode)	**SFA71...**	4863
Thermal actuator (radiator valve)	**STA71...**	4877
Thermal actuator (small valve 2,5 mm)	**STP71...**	4878
Air damper actuators	**GCA12…1**	4613

*) The documents can be downloaded from http://siemens.com/bt/download.

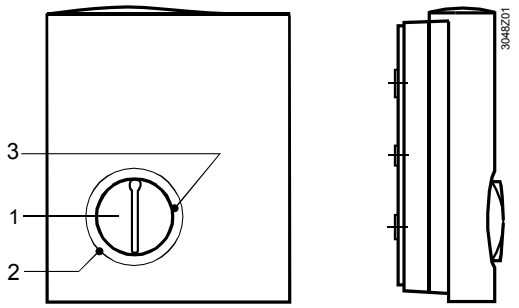
Mechanical design

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 Room temperature setpoint knob
2 Setting facility for minimum setpoint limitation (in increments of 1 K)
3 Setting facility for maximum setpoint limitation (in increments of 1 K)

Set of DIP switches

DIP switch no.	Meaning	Position ON	Position OFF
1	Operating mode changeover via external switch	Changeover from normal operation or standby to energy saving mode	Changeover from normal operation or energy saving to standby [1]
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.)
3	Switching different or P-band	1 K in heating mode 0.5 K in cooling mode	4 K in heating mode[1] 2 K in cooling mode[1]
4	Dead zone in normal operation	2 K [1]	5 K
5	Signal output Y1 (heating)	ON / OFF [1]	PWM
6	Signal output Y2 (heating or cooling)	ON / OFF [1]	PWM
7	Operating action of output Y2	Cooling [1]	Heating
8	PWM signal interval for outputs heating and cooling (DIP switch 7 set on position ON) Y1 (heating) Y2 (cooling) PWM signal interval for outputs heating 2 stage (DIP switch set on position OFF) Y1 (heating) Y2 (heating)	 240 s [1] 240 s (not selectable) 240 s (not selectable) 240 s [1]	 90 s 90 s

1) Factory setting

Accessories

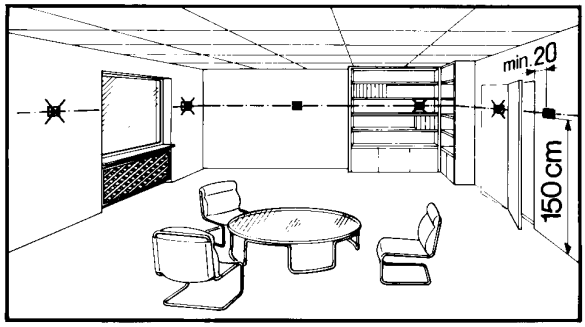
Description	Type reference
Adapter plate 120 x 120 mm for 4“ x 4“ conduit boxes	ARG70
Adapter plate 96 x 120 mm for 2“ x 4“ conduit boxes	ARG70.1
Adapter plate for surface wiring 112x130 mm	ARG70.2

Notes

Check the settings of DIP switches no. 1 through no. 8 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, which takes about 3 seconds. Then, it will be ready to operate.

The controller is supplied with Mounting Instructions.
Mounting location: on a wall of the room to be conditioned. Not in niches or book-shelves, 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.



Only authorized personnel may open the controller.

Mounting, installation and commissioning

When mounting the unit, fix the baseplate first. Then, make the electrical connections and fit and secure the cover.
The controller must be mounted on a flat wall and in compliance with local regulations.
If there are thermostatic radiator valves in the reference room, they must be set to their fully open position.

Warning!
No internal line protection for supply lines to external consumers (Y1, Y2)
Risk of fire and injury due to short-circuits!

- Adapt the line diameters as per local regulations to the rated value of the installed overcurrent protection device.

Maintenance

The room controller is maintenance-free.

Disposal

The device is considered an electronic device for disposal in terms of the European Directive 2012/19/EU and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

Technical data

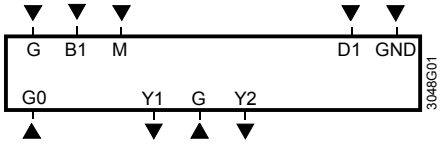
Power supply	Operating voltage	AC 24 V ± 20 %
	Frequency	50/60 Hz
	**No internal fuse** External preliminary protection with max. C 10 A circuit breaker in the supply line required under all circumstances	
Functional data	Power consumption	max. 6 VA
	Setpoint setting range	8...30 °C
	Max. control deviation at 25 °C	max. ±0.7 K
	Switching differential heating SDH or P-band (selectable)	1 K or 4 K
	Switching differential cooling SDC or P-band (selectable)	0,5 K or 2 K
	Dead zone X_{dz} in normal operation (selectable)	2 K or 5 K
	Setpoint «Energy saving mode ☾», heating	16 °C
	Setpoint « Energy saving mode ☾», cooling	28 °C
	Setpoint «Standby ⏻»	8 °C
	Integration time Tn	10 min
	Control outputs Y1, Y2	PWM or ON / OFF
	Voltage	AC 24 V ± 20 %
	Current	0.02…1 A
	Cycle time PWM (selectable for Y1)	240 s or 90 s
	Signal input B1 for return air sensor	QAH11.1, safety class II NTC resistor 3 kΩ at 25 °C
	Status input D1 and GND	
	Contact sensing	DC 6-15 V / 3-6 mA
	Perm. cable length with copper cable 1.5 mm^2 for connection to terminals B1 and D1	80 m
Environmental conditions	Operation	to IEC 60721-3-3
	Climatic conditions	class 3K5
	Temperature	0...+50 °C
	Humidity	<95 % r.h.
	Transport	to IEC 60721-3-2
	Climatic conditions	class 2K3
	Temperature	−25...+70 °C
	Humidity	<95 % r.h.
	Mechanical conditions	class 2M2
Norms and standards	EU Conformity (CE)	CE1T3040xx *)
	RCM Conformity	CE1T3040en_C1 *)
	Degree of protection of housing	IP30 EN 60 529
	Safety class	III to EN 60 730-1
	Pollution class	Normal
Environmental compatibility	The product environmental declaration CE1E3040*) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	
Eco design and labelling directives	Based on EU Regulation 813/2013 (Eco design directive) and 811/2013 (Labelling directive) concerning space heaters, combination heaters, the following classes apply:	
	- Application with On/Off operation of a heater	Class I value 1%
	- PWM (TPI) room thermostat, for use with On/Off output heaters	Class IV value 2%

General

Connection terminals for	Use solid wires or prepared stranded wires. 2 x 1.5 mm^2 or 1 x 2.5 mm^2
Weight RCU15	0.23 kg
Colour of housing front	white, NCSS0502-G (RAL 9003)

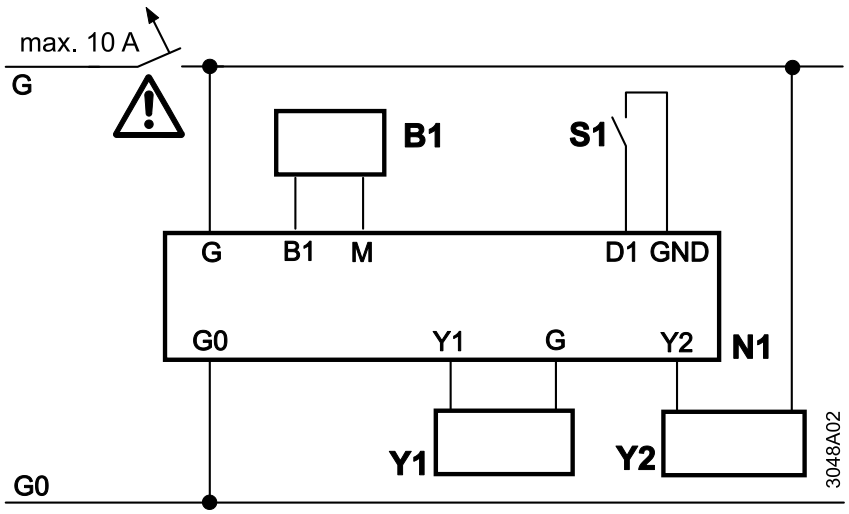
*) The documents can be downloaded from http://siemens.com/bt/download

Connection terminals



G,G0	Operating voltage AC 24 V
B1	Status input “external room temperature sensor or return air temperature sensor”
D1,GND	Status input for potential-free operating mode changeover switch
M	Measuring neutral “external room temperature sensor or return air temperature sensor”
Y1	Control signal PWM / two-position AC 24 V
Y2	Control signal PWM / two-position AC 24 V

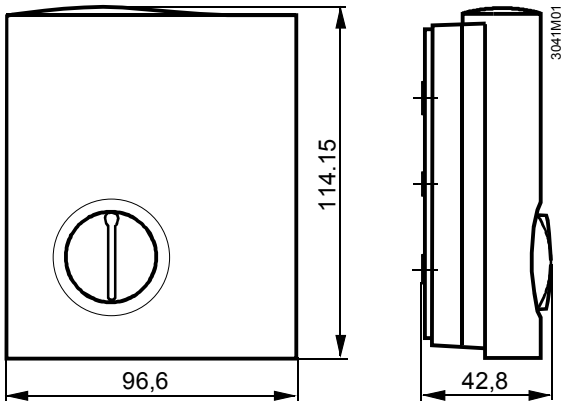
Connection diagram



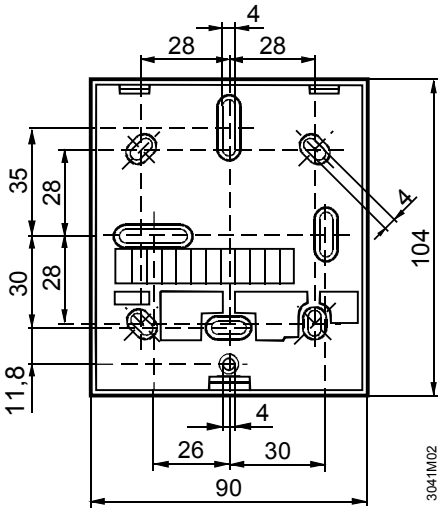
B1	External room temperature sensor (QAA32) or return air temperature sensor (QAH11.1)
N1	Room temperature controller
S1	External operating mode changeover switch
Y1	Actuator
Y2	Actuator

Dimensions

Controller



Baseplate



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SIEMENS

3042

RCU20

Room Temperature Controller

RCU20

for heating or cooling systems

Modulating PI control
Three-position output for heating or cooling
Operating modes: normal operation, energy saving or OFF
Automatic heating / cooling changeover
Operating mode changeover input for remote control
Operating voltage AC 230 V

Use

Control of the room temperature in individual rooms of ventilation or air conditioning plants that are heated or cooled.

For the control of the following pieces of equipment:

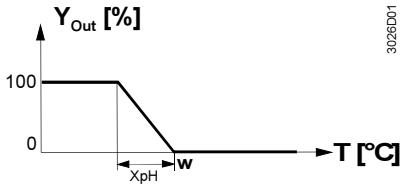
- Three-position valve actuators
- Three-position air damper actuators

Functions

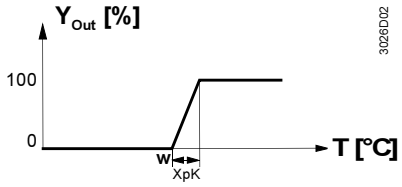
The controller acquires the room temperature with its integrated sensor and maintains the setpoint by delivering three-position control commands to the valve. The controller provides PI control. The proportional band in heating mode is 4 Kelvin and in cooling mode 2 Kelvin. The integration time is 5 minutes.

Function diagram

Heating



Cooling

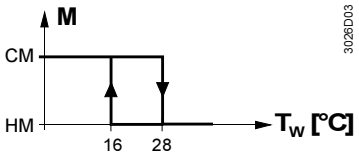


Note: the diagrams only show the proportional part of the PI controller

T	Room temperature
Y_{Out}	Manipulated variable
w	Room temperature setpoint
XpH	Proportional band heating
XpK	Proportional band cooling

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.



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

Three-position control signal

Outputs Y1 = opening, Y2 closing and N = neutral are used to drive three-position actuators with a maximum running time of 150 seconds from the fully closed to the fully open position.

When commissioning the controller, an opening signal of 200 seconds is delivered, followed by a closing signal of 200 seconds to ensure the actuator will be fully closed. When the actuator has reached the position calculated by the controller, a waiting time of 30 seconds is observed in order to stabilize the outputs.

The control outputs carry AC 230 V.

Energy saver

The room temperature setpoint can be limited in increments of 1 Kelvin 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

Normal operation is activated when the external operating mode changeover switch is not activated. In normal operation, the controller maintains the adjusted setpoint.

Energy saving mode

Energy saving mode can be activated with the external operating mode changeover switch, provided DIP switch no. 1 is set to ON.

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.

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. 1 is set to ON), or from normal operation to OFF (provided DIP switch no. 1 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 valve and air damper actuators 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
Motoric actuator (radiator valve)	**SSA31...**	4893
Motoric actuator (small valve 2,5 mm)	**SSP31…**	4864
Motoric actuator (small valve 5,5 mm)	**SSB31...**	4891
Motoric actuator (valve 5,5 mm)	**SSC31…**	4895
Motoric actuator (valve 5,5 mm)	**SQS35…**	4573
Air damper actuator	**GDB33… / GLB33…**	4634
Air damper actuator	**GBB33…**	4626
Air damper actuator	**GIB33…**	4626

Mechanical design

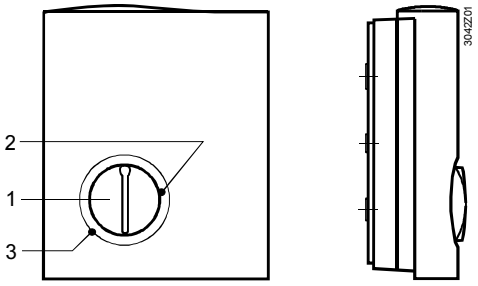
The unit consists of two parts:

- 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 unit.

Operating and setting elements



Legend

1 Room temperature setpoint knob
2 Setting facility for minimum setpoint limitation (in increments of 1 Kelvin)
3 Setting facility for maximum setpoint limitation (in increments of 1 Kelvin)

DIP switch

DIP switch no.	Meaning	Position ON	Position OFF
1	Operating mode changeover via external switch	Changeover between normal operation and energy saving mode[1)]	Changeover beween normal operation and OFF

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

Notes

In systems without 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.

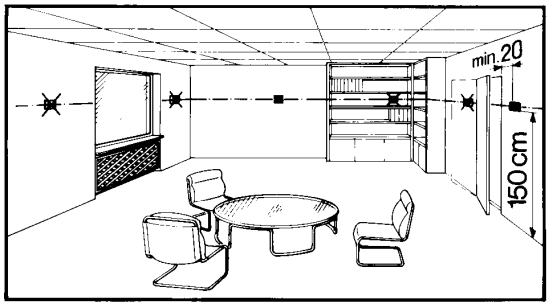
Check the position of DIP switch no. 1 and change it, if required. If setpoint limitation is required, use the minimum and maximum limitation facility (energy saver).

After applying power, the controller makes a reset, which takes about 3 seconds. Then, it will be ready to operate.

Before the controller starts its control action, it performs a three-position synchronization of the actuator. As a result, the actuator will be fully opened and then closed again. This process takes 400 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 carriers 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.
Mounting location: on a wall of the room to be heated or cooled. 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.



Caution: AC 230 V

Only authorized personnel may open the controller.

Mounting, installation and commissioning

When mounting the unit, fix the baseplate first. Then, make the electrical connections and fit and secure the cover.
The controller must be mounted on a flat wall and in compliance with local regulations.
If there are thermostatic radiator valves in the reference room, they must be set to their fully open position.

The cables used must satisfy the insulation requirements with regard to mains potential.

Maintenance

The room controller is maintenance-free.

Technical data

⚠ Power supply	Operating voltage	AC 230 V +10 %, -15 %
	Frequency	50/60 Hz
	Power consumption	max. 6 VA
Functional data	P-band X_P	4 K heating / 2 K cooling
	Setpoint setting range	8 ...30 °C
	Setpoint «Energy saving mode ☾», heating	16 °C
	Setpoint «Energy saving mode ☾», cooling	28 °C
	Integration time	5 min.
	Control outputs Y1, Y2	3-position
	Voltage	AC 230 V +10 % - 15 %
	Current	0.02…0.1 A
	Changeover - status input B2	QAH11.1, safety class II NTC resistor 3 kΩ 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	N.O.
	Perm. cable length with copper cable 1.5 mm^2	
	For signal input B2	80 m
	For signal input D1	80 m
Environmental conditions	Operation	
	Climatic conditions	to IEC 721-3-3 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
Norms and standards	CE 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
	Degree of protection of housing	IP30 EN 60 529
	Safety class	II to EN 60 730
	Pollution class	normal
Design	Connection terminals for	Use solid wires or prepared stranded wires. 2 x 1.5 mm^2 or 1 x 2.5 mm^2
	Weight	0.25 kg
	Colour of housing front	white, NCSS0502-G (RAL 9003)