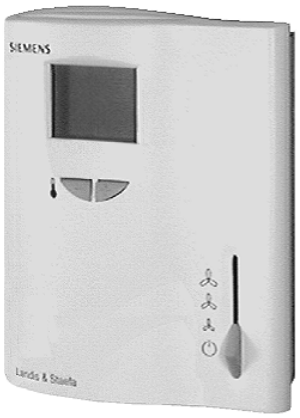
SIEMENS

3056



Room Temperature Controller with LCD

RDF60.1

for 2-pipe fan coil units

Modulating PI control
Output for a 3-position valve actuator
Outputs for a 3-speed fan
Automatic heating / cooling changeover
Operating modes: normal, energy saving and stand-by
Operating mode changeover input for remote control
Function for avoiding damage resulting from moisture
Selectable installation and control parameters
Operating voltage AC 230 V

Use

Typical use:

- For control of the room temperature in individual rooms that are heated or cooled with 2-pipe fan coil units
- For opening and closing a 3-position valve actuator operating on AC 230 V and for switching a 3-speed fan

Suited for use in systems with

- automatic heating / cooling changeover
- continuous heating or cooling mode

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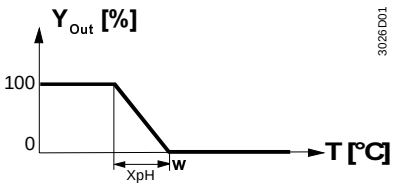
Siemens Building Technologies
Landis & Staefa Division

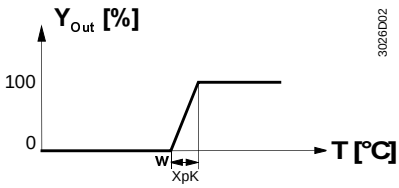
Functions

The controller acquires the room temperature with its integrated sensor and maintains the setpoint by delivering 3-position 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 (adjustable). The integral action time is 5 minutes.

Heating mode



Cooling mode

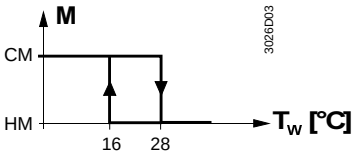


T	Room temperature
XpH	Proportional band “Heating”
XpK	Proportional band “Cooling”
w	Room temperature setpoint
Y_{Out}	Manipulated variable

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

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 one-minute intervals and the operational status updated.



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

Purging function

The task of the changeover sensor is to initiate the change from heating to cooling mode even if the 2-port valves are closed 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 function “Temperature-dependent fan control“ is activated (can be selected with DIP switch no. 1), the fan is switched depending on the temperature, that is, together with the valve.

It is switched off when

- leaving the heating or cooling sequence, provided function “Temperature-dependent fan control “ is activated
- manually changing to OFF ' ⏻ '
- activating an external operating mode changeover switch, provided plant conditions do not call for energy saving
- switching 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.

Energy saving mode

A changeover switch can be connected to status input D1-GND. When the switch closes (caused by an open window, for instance), the operating mode will change from normal operation to energy saving mode. In this operating mode, the setpoints of heating or cooling are maintained (setting of control parameters P01 and P02). The operating action of the switch is N.O.

Stand-by

The relevant setpoints of heating and cooling are maintained when in the stand-by ⏻ position, provided such setpoints have been adjusted (setting of control parameters P03 and P04).

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, the fan will not be switched off in energy saving mode when using function “Temperature-independent fan control” (DIP switch no. 1).

Setting the control parameters

A number of control parameters can be set to optimize the control performance. These parameters can also be set during operation without opening the unit.

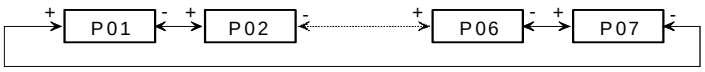
Settings

The parameters can be changed as follows:

1 Set the operating mode switch to the stand-by position ⏻.

2 Press buttons + and – simultaneously for 3 seconds. Release them and, within 2 seconds, press button + again for 3 seconds. Then, the display will show “P01“.

3 Select the required parameter by repeatedly pressing buttons + and – :



4 By pressing buttons + and – simultaneously, the current value of the selected parameter appears, which can be changed by repeatedly pressing buttons + and –.

5 5 seconds after the last press of a button, the last parameter will be displayed again.

6 If you wish to display and change additional parameters, repeat steps 3 through 5.

7 10 seconds after the last display or setting, all changes will be stored and the controller returns to normal operation.

Control parameters

Parameter	Meaning	Setting range	Factory setting
P01	Setpoint of heating in energy saving mode (operating mode changeover switch activated)	0: corresponding to OFF 5…18 °C (in increments of 0.5 K)	16 °C
P02	Setpoint of cooling in energy saving mode (operating mode changeover switch activated)	0: corresponding to OFF 24…35 °C (in increments of 0.5 K)	28 °C
P03	Setpoint of heating in stand-by position ⏻	0: corresponding to OFF 5…18 °C (in increments of 0.5 K)	8 °C
P04	Setpoint of cooling in stand-by position ⏻	0: corresponding to OFF 24…35 °C (in increments of 0.5 K)	OFF
P05	Sensor calibration	-3…+3 K (in increments of 0.5 K)	0 K
P06	Switching differential in heating mode	0.5…+4 K (in increments of 0.5 K)	2 K
P07	Switching differential in cooling mode	0.5…+4 K (in increments of 0.5 K)	1 K

Ordering

When ordering, please give name and type reference.
The temperature sensor QAH11.1 (used as a return air temperature sensor) and zone 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
Valve actuators	**SSB31…**	4891
Valve actuators	**SQS35...**	4573
Valve actuators	**SSA31...**	4893

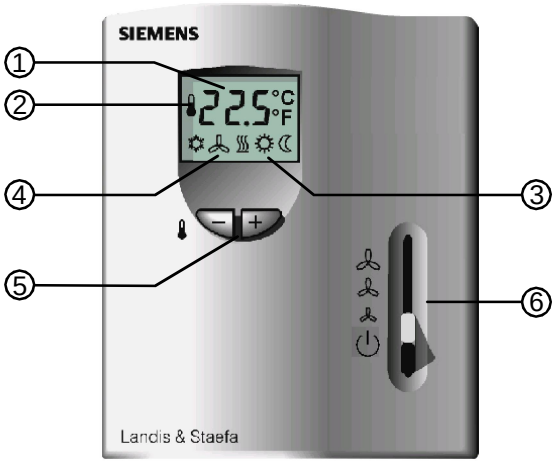
Mechanical design

The unit consists of 2 parts:

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

The housing engages in the baseplate and is secured with two screws.
The baseplate carries the screw terminals. The DIP switches are located at the rear of the housing.

Setting and operating elements



Legend

1 Display of the room temperature (in degrees Celsius or Fahrenheit), setpoints or control parameters

2 Symbol used when displaying the current room temperature

3 Normal operation
Energy saving mode

4 Cooling valve open
Fan on
Heating valve open

5 Buttons for adjusting the setpoints and the control parameters

6 Operating mode selector
(stand-by, heating or cooling mode with manual selection of fan speed)

Set of DIP switches

DIP switch no.	Meaning	Position ON	Position OFF
1	Fan control	Fan control is temperature-independent in normal operation	Fan control is temperature dependent in all operating modes
2	Temperature display	In degrees Celsius	In degrees Fahrenheit

Accessories

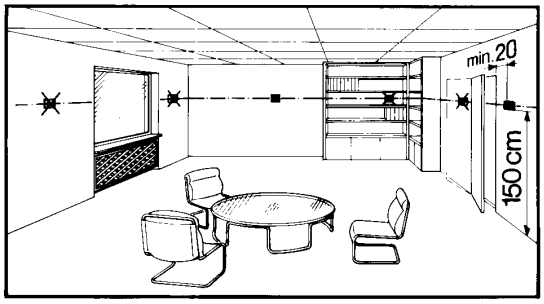
Description	Type reference
Adapter plate 120 x 120 mm for 4“ x 4“ conduit boxes	ARG70
Adapter plate 96 x 120 mm for 2“ x 4“ conduit boxes	ARG70.1

Engineering notes

In systems without automatic changeover, the temperature sensor can be replaced by an external switch (suited for mains voltage) for manual changeover.
In systems with continuous heating mode, no sensor will be connected to the controller’s input.
With continuous cooling mode, 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 DIP switches no. 1 and no. 2 and change them, if required. After applying power, the controller makes a reset during which all LCD segments flash, indicating that the reset has been made correctly. This takes about 3 seconds. Then, the controller is ready to operate.

Before the controller starts its control action, if performs a 3-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 carries mains potential. If the sensor’s cables must be extended, they must be suited for mains voltage

The controller is supplied with Mounting Instructions.

Calibrating the sensor

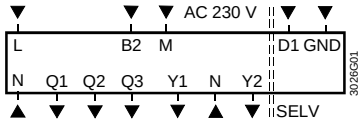
If the room temperature displayed by the controller does not agree with the room temperature effectively measured, the temperature sensor can be recalibrated. In that case, parameter P05 must be changed.

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 – N	AC 230 V
	Rating	max. 600 VA
	Control outputs Y1, Y2 – N	AC 230 V, max. 2 A
	Changeover – status input B2 – M	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, reinforced insulation
	Operating action	N.O.
	Perm. cable length with copper cable 1.5 mm^2	
	for connection to terminals B1, B2 and D1	80 m
Operational data	Setpoint setting range	5...35 °C
	Control deviation at 25 °C	max. ±0.5 K
	P-band in heating mode, adjustable	2 K
	P-band in cooling mode, adjustable	1 K
	Integral action time, fix	5 minutes
	Setpoint «Energy saving mode ☾», heating (adjustable)	16 °C
	Setpoint «Energy saving mode ☾», cooling (adjustable)	28 °C
	Setpoint «Stand-by ⏻», heating (adjustable)	8 °C
	Setpoint «Stand-by ⏻», cooling (adjustable)	OFF
Environmental conditions	Operation	to IEC 721-3-3
	Climatic conditions	class 3 K5
	Temperature	0...+50 °C
	Humidity	<95 % r.h.
	Transport	to IEC 721-3-2
	Climatic conditions	class 2 K3
	Temperature	–25...+70 °C
	Humidity	<95 % r.h.
	Mechanical conditions	class 2M2
	Storage	to IEC 721-3-1
	Climatic conditions	class 1 K3
	Temperature	–25...+70 °C
	Humidity	<95 % r.h
Norms and standards	CE conformity to	89/336/EEC
	EMC directive	73/23/EEC
	Low voltage directive	
	N474 **C-Tick** conformity to	AS/NSZ 4251.1:1994
	EMC emission standard	
	Product standards	
	Automatic electrical controls for household and similar use	EN 60 730 – 1
	Special requirements on temperature-dependent controls	EN 60 730 – 2 – 9
	Electromagnetic compatibility	
	Emissions	EN 50 081-1

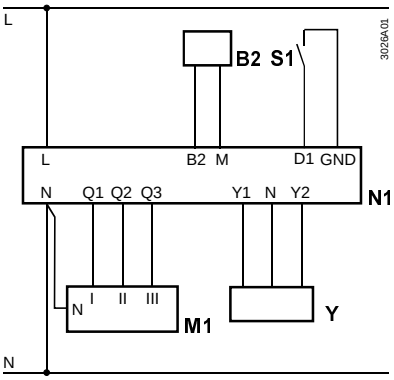
	Immunity	EN 50 082-1
	Devices of safety class	II to EN 60 730
	Pollution class	normal
	Degree of protection of housing	IP 30 to EN 60 529
General	Connection terminals	solid wires or prepared stranded wires 2 x 0.4-1.5 mm^2 or 1 x 2.5 mm^2
	Weight	0.225 kg
	Colour of housing front	white, NCS S 0502-G (RAL9003)

Connection terminals



L, N Operating voltage AC 230 V
B2 Status input «Return air temperature sensor»
M Measuring neutral “Changeover sensor”
D1, GND Status input for potential-free operating mode changeover switch
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
Y1 Control output “Open valve” AC 230 V
Y2 Control output “Close valve” AC 230 V

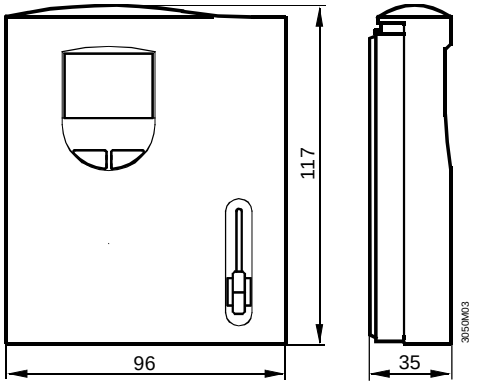
Connection diagram



B2 Changeover sensor (temperature sensor QAH11.1+ changeover mounting kit ARG86.3)
M1 3-speed fan
N1 Room temperature controller RDF60.1
S1 External operating mode changeover switch
Y 3-position valve actuator
Y1 Control output “Open valve”, AC 230 V
Y2 Control output “ Close valve”, AC 230 V

Dimensions

Controller



Baseplate