



## Wall-mounted room thermostat with LCD

### RDG400

for VAV heating and cooling systems

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- **Modulating PI control**
- **Control depending on the room or the return air temperature**
- **Output for DC 0...10 V actuator and auxiliary output On/Off, PWM or 3-position**
- **Automatic or manual heating/cooling changeover**
- **Operating modes: Comfort, Economy and Protection**
- **3 multifunctional inputs for keycard contact, external sensor, etc.**
- **Adjustable commissioning and control parameters**
- **Minimum and maximum setpoint limitation**
- **Minimum and maximum limitation of air flow signal DC 0...10 V**
- **Output signal inversion as an option**
- **Operating voltage AC 24 V**
- **Backlit display**

#### Use

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The room thermostat is designed for the following types of system:

VAV systems via On/Off or modulating control outputs:

- Single-duct system
- Single-duct system with electric heater
- Single-duct system and radiator/floor heating
- Single-duct system with heating/cooling coil

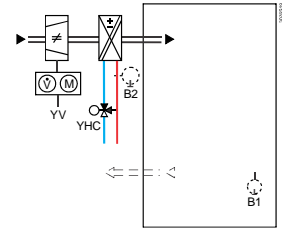

## Functions

- Room temperature control via built-in temperature sensor or external room temperature/return air temperature sensor
- Automatic or manual changeover between heating and cooling mode
- Selection of applications via DIP switches
- Selection of operating mode with operating mode button on the thermostat
- Display of current room temperature or setpoint in °C and/or °F
- Minimum and maximum setpoint limitation
- Button lock (automatic or manual)
- 3 multifunctional inputs, freely selectable for:
  - Operating mode switchover contact (keycard, window contact, etc.)
  - Changeover sensor for automatic heating/cooling mode
  - External room temperature or return air temperature
  - Dewpoint sensor
  - Electric heater enable
  - Faults
- Minimum and maximum limitation of air flow signal DC 0...10 V
- Floor heating temperature limit
- Reload factory settings for commissioning and control parameters
- Wizard function to select working temperature unit °C or °F

## Applications

The thermostat supports the following applications, which can be configured via DIP switches at the rear of the unit. The control output for the damper actuator is either DC 0...10 V (factory setting) or 3-position (see parameter P47), and for the auxiliary heating/cooling output On/Off, PWM, 3-position or DC 0...10 V.

| Application  |  | DIP switches | Control output            |
|--|--|--------------|---------------------------|
| <b>Single-duct</b> <ul style="list-style-type: none"> <li>• DC 0...10 V damper actuator</li> <li>• 3-position damper actuator</li> </ul>   |  |              | DC 0...10 V               |
|  |  |              | 3-position                |
| <b>Single-duct with auxiliary heater</b> <ul style="list-style-type: none"> <li>• DC 0...10 V damper actuator and On/Off, PWM or 3-position auxiliary heater</li> <li>• 3-position damper actuator and DC 0...10 V auxiliary heater</li> </ul> |  |              | DC 0...10 V               |
|  |  |              | On/Off, PWM or 3-position |
| <b>Single-duct and radiator/floor heating</b> <ul style="list-style-type: none"> <li>• DC 0...10 V damper actuator and On/Off, PWM or 3-position radiator</li> <li>• 3-position damper actuator and DC 0...10 V radiator</li> </ul>            |  |              | DC 0...10 V               |
|  |  |              | On/Off, PWM or 3-position |

| Application   |   | DIP switches  | Control output            |
|---|---|---|---------------------------|
| <b>Single-duct heating and cooling coil</b> <ul style="list-style-type: none"> <li>DC 0...10 V damper actuator and On/Off, PWM or 3-position heating and cooling</li> <li>3-position damper actuator and DC 0...10 V heating and cooling</li> </ul> |  |  | DC 0...10 V               |
|   |   |   | On/Off, PWM or 3-position |











## Type summary















| Product no. | Operating voltage | Number of control outputs |                 |                 |             |
|-------------|-------------------|---------------------------|-----------------|-----------------|-------------|
|             |                   | On/Off                    | PWM             | 3-pos           | DC 0...10 V |
| RDG400      | AC 24 V           | 1 <sup>1)</sup>           | 1 <sup>1)</sup> | 1 <sup>1)</sup> | 1           |

<sup>1)</sup> On/Off, 3-position or PWM

## Equipment combinations

DC 0...10 V actuator

| Type of unit   |  | Type reference             | Data Sheet <sup>1)</sup> |
|--|--|----------------------------|--------------------------|
| Cable temperature sensor, cable length 2.5 m (8 feet)<br>NTC (3 kΩ at 25 °C (77 °F)) |    | <b>QAH11.1</b>             | 1840                     |
| Room temperature sensor<br>NTC (3 kΩ at 25 °C (77 °F))                               |  | <b>QAA32</b>               | 1747                     |
| Cable temperature sensor, cable length 4 m (13 feet)<br>NTC (3 kΩ at 25 °C (77 °F))  |  | <b>QAP1030/UFH</b>         | 1854                     |
| Condensation detector/supply unit  |  | <b>QXA2000/<br/>QX2000</b> | 1542                     |
| Electrical actuator, DC 0...10 V<br>(for radiator valve)                             |  | <b>SSA61..</b>             | 4893                     |
| Electrical actuator, DC 0...10 V<br>(for 2 and 3 port valves/V..P45)                 |  | <b>SSC61..</b>             | 4895                     |
| Electrical actuator, DC 0...10 V<br>(for small valve 2.5 mm (0.1"))                  |  | <b>SSP61..</b>             | 4864                     |
| Electrical actuator, DC 0...10 V<br>(for small valves 5.5 mm (0.2"))                 |  | <b>SSB61..</b>             | 4891                     |
| Electrical actuator, DC 0...10 V<br>(for Combi-valve VPI45)                          |  | <b>SSD61..</b>             | 4861                     |
| Electromotoric actuator, DC 0...10 V<br>(for valves 5.5 mm (0.2"))                   |  | <b>SQS65..</b>             | 4573                     |

|  |  |   |  |                |
|--|--|---|--|----------------|
|  |  | <b>GQD161..</b>   | 4605   |                |
|  |  | <b>GDB161..</b>   | 4634   |                |
|  |  | <b>GLB161..</b>   |  |                |
| DC 0...10 V damper actuator  |  | <b>GMA161..</b>   | 4614   |                |
|  |  | <b>GEB161..</b>   | 4621   |                |
|  |  | <b>GCA161..</b>   | 4613   |                |
|  |  | <b>GBB161..</b>   | 4626   |                |
|  |  | <b>GIB161..</b>   |  |                |
| VAV compact controller   |  | <b>GDB181.1E/3</b>  | 3544   |                |
|  |  | <b>GLB181.1E/3</b>  |  |                |
| On/Off actuators<br>AC 24 V  | Electromotoric On/Off valve and actuator<br>(only available in AP, UAE, SA and IN) | <br><b>MVI./MXI..</b> | 4867   |                |
|  | Electromotoric On/Off actuator   |                       | <b>SFA71..</b>   | 4863           |
|  | Thermal actuator (for radiator valve)  |                       | <b>STA71..</b>   | 4877           |
|  | Thermal actuator<br>(for small valves 2.5 mm (0.1"))                               |                      | <b>STP71..</b>   | 4878           |
|  | 3-position actuators<br>AC 24 V  | Electrical actuator, 3-position<br>(for radiator valve)   |  | <b>SSA81..</b> |
| Electrical actuator, 3-position<br>(for small valve 2.5 mm (0.1")) |  |                      | <b>SSP81..</b>   | 4864           |
| Electrical actuator, 3-position<br>(for small valve 5.5 mm (0.2")) |  |                     | <b>SSB81..</b>   | 4891           |
| Electrical actuator, 3-position<br>(for Combi-valve VPI45)         |  |                      | <b>SSD81..</b>   | 4861           |
| Electromotoric actuator, 3-position<br>(for valves 5.5 mm (0.2"))  |  |                     | <b>SQS85..</b>   | 4573           |

<sup>1)</sup> The documents can be downloaded from <http://siemens.com/bt/download>.

## Accessories

| Description  | Product no. | Data Sheet <sup>1)</sup> |
|--|-------------|--------------------------|
| Changeover mounting kit (50 pcs/package)             | ARG86.3     | 1840                     |
| Adapter plate 120 x 120 mm for 4" x 4" conduit boxes | ARG70       |                          |
| Adapter plate 112 x 130 mm for surface wiring        | ARG70.2     |                          |

<sup>1)</sup> The documents can be downloaded from <http://siemens.com/bt/download>.

## Ordering

When ordering, please indicate product no. and description:

For example: **RDG400 room thermostat**

Order valve actuators separately.

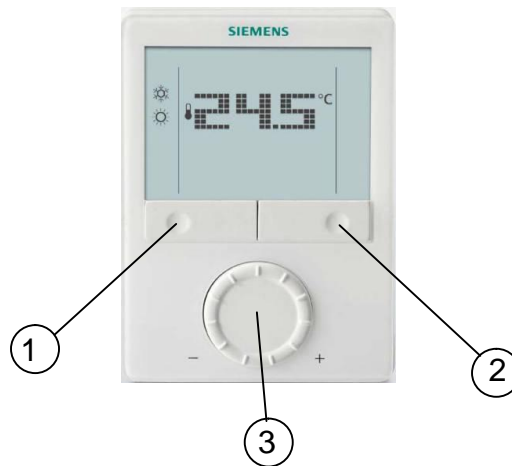
## Mechanical design

The room thermostat consists of two parts:

- Plastic housing which accommodates the electronics, the operating elements and the room temperature sensor
- Mounting plate with the screw terminals

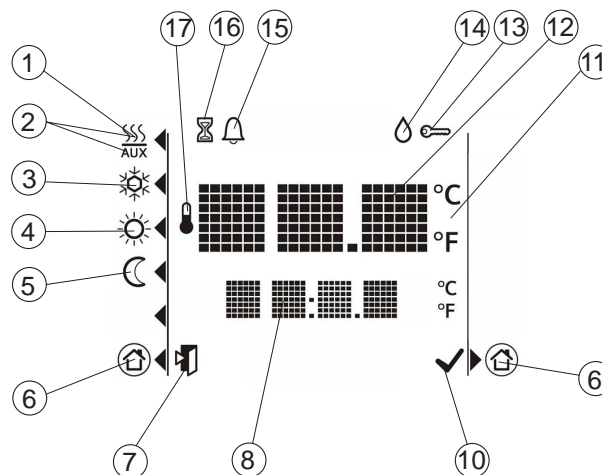
The housing engages in the mounting plate and is secured with 2 screws.

## Operation and settings



1. Operating mode selector/Esc
2. Protection and Ok
3. Rotary knob for setpoint and parameter adjustment

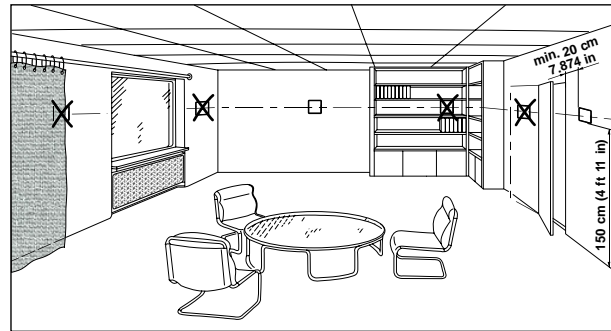
## Display



| # | Symbol | Description  | #  | Symbol | Description   |
|---|--------|--|----|--------|---|
| 1 |        | Heating mode   | 10 |        | Confirmation of parameters  |
| 2 |        | Heating mode auxiliary heater on (2 <sup>nd</sup> stage) | 11 |        | Degrees Celsius<br>Degrees Fahrenheit   |
| 3 |        | Cooling mode   | 12 |        | Digits for room temperature and setpoint  |
| 4 |        | Comfort mode   | 13 |        | Button lock active  |
| 5 |        | Economy mode   | 14 |        | Condensation in room (dew point sensor active)  |
| 6 |        | Protection   | 15 |        | Fault   |
| 7 |        | Escape   | 16 |        | Temporary timer function (visible when operating mode is temporarily extended due to prolonged presence or absence) |
| 8 |        | Digits for room temperature, setpoint, etc.              | 17 |        | Indicates that room temperature is displayed  |

## Mounting and installation

Do not mount on a wall in niches or bookshelves, behind curtains, above or near heat sources, or exposed to direct solar radiation. Mount about 1.5 m (5 feet) above the floor.



### Mounting



- The room thermostat must be mounted in a clean, dry indoor place and must not be exposed to drip or splash water.

### Wiring



See Mounting Instructions (M3182) enclosed with the thermostat.

- Comply with local regulations to wire, protect and earth the thermostat.

#### 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.
- The power supply line must have a circuit breaker with a rated current of no more than 10 A. For US installations use Class 2 rated power supplies.
- Inputs X1-M, X2-M or D1-GND of different units (e.g. summer/winter switch) may be connected in parallel with an external switch. Consider overall maximum contact sensing current for switch rating.
- Disconnect power supply before removing the thermostat from the mounting plate!



### Commissioning

1. Select the application via the DIP switches at the rear of thermostat before fitting the front housing to the mounting plate.
2. Power up the thermostat after successfully connecting the line power. The thermostat starts to reset and all LCD segments flash, indicating that the reset is correct.

After the reset, which takes about 3 seconds, the thermostat is ready for commissioning by qualified HVAC staff. The control parameters of the thermostat can be adjusted to ensure optimum performance of the entire system (see Basic Documentation P3182).

### Temperature unit selection wizard

The temperature unit selection wizard enables to select the preferable temperature unit display on thermostat between °C and °F.

1. Rotate rotary knob to select the preferable temperature unit.
2. Press the button ✓ (OK) to confirm the selection, and the thermostat goes to normal operating page.

### Notes

- Pressing button ↵ (Esc) does not confirm the temperature unit selection.
- If the temperature unit is not selected, °C is used by default.

### Control sequence

- The control sequence may need to be set via parameter P01 depending on the application. The factory setting for the single-duct application is "Cooling only".

### Calibrate sensor

- Recalibrate the temperature sensor if the room temperature displayed on the thermostat does not match the room temperature measured. To do this, change parameter P05.

Setpoint and setpoint range limitation

- We recommend to review the setpoints and setpoint ranges (parameters P08...P12) and change them as needed to achieve maximum comfort and save energy.

## Disposal






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The devices are considered electronics devices for disposal in term of European Directive 2012/19/EU and may not be disposed of as domestic waste.

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

## Technical data

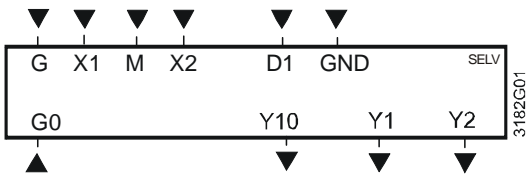
|   |  |   |  |
|---|--|---|--|
|  | Power supply   | Operating voltage   | SELV AC 24 V/DC 24 V<br>or<br>DC 24 V: connect G to + and G0 to -  |
|   |  | Frequency   | 50/60 Hz   |
|   |  | Power consumption   | Max. 2 VA  |
|   |  | External supply line protection (EU)  | Circuit breaker max. 10 A<br>Characteristic B, C, D<br>according to EN 60898<br>or<br>Power source with current<br>limitation of max. 10 A |
|   |  | <b>No internal fuse.</b><br>External preliminary protection with max. C 10 A circuit breaker in the supply line<br>required under all circumstances.                |  |
|  | Outputs  | Control output Y10-G0   | DC 0...10 V  |
|   |  | Resolution  | 39 mV  |
|   |  | Current   | Max. ±1 mA   |
|   |  | Control output Y1, Y2-G   | AC 24 V  |
| Inputs  | Multifunctional inputs<br>X1-M/X2-M  | Temperature sensor input  |  |
|   |  | Type  | NTC (3 kΩ at 25 °C (77 °F))  |
|   |  | Digital input   |  |
|   |  | Operating action  | Selectable (NO/NC)   |
|   |  | Contact sensing   | DC 0...5 V, max. 5 mA  |
|   |  | D1-GND  |  |
|   |  | Operating action  | Selectable (NO/NC)   |
|   |  | Contact sensing   | SELV DC 6...15 V, 3...6 mA   |
|   |  | Function input  | Selectable   |
|   |  | External temperature sensor, changeover<br>sensor, operating mode switchover contact,<br>dewpoint monitor contact, enable electric<br>heater contact, fault contact |  |
| Operational data  | Switching differential, adjustable   | Heating mode  | (P30) 2 K (0.5...6 K)<br>4 °F (1...12 °F)  |
|   |  | Cooling mode  | (P31) 1 K (0.5...6 K)<br>2 °F (1...12 °F)  |
|   |  | Setpoint setting and range  |  |
|   |  |  Comfort mode  | (P08) 21 °C (5...40 °C)<br>70 °F (41...104 °F)   |
|   |  Economy mode | (P11-P12) 15 °C (59 °F)/30 °C (86 °F)<br>OFF, 5...40 °C (41...104 °F)   |  |
|   |  Protection   | (P65-P66) 8 °C (46 °F)/OFF<br>OFF, 5...40 °C (41...104 °F)  |  |
|   | Multifunctional inputs X1/X2/D1  | Input X1  | Selectable   |
|   |  | Input X2  | Ext. temperature sensor (P38=1)<br>Changeover sensor (P40=2)   |
|   |  | Input D1  | Operating mode switchover<br>(P42=3)   |



|                                     |  |   |
|-------------------------------------|--|---|
|                                     | Built-in room temperature sensor   |   |
|                                     | Measuring range  | 0...49 °C (32...120 °F)   |
|                                     | Accuracy at 25 °C (77 °F)  | < ± 0.5 K (± 1 °F)  |
|                                     | Temperature calibration range  | ± 3.0 K (± 6 °F)  |
|                                     | Settings and display resolution  |   |
|                                     | Setpoints  | 0.5 °C (1 °F)   |
|                                     | Current temperature value displayed  | 0.5 °C (1 °F)   |
| Environmental conditions            | Operation  | As per IEC 60721-3-3  |
|                                     | Climatic conditions  | Class 3K5   |
|                                     | Temperature  | 0...50 °C (32...120 °F)   |
|                                     | Humidity   | <95% r.h.   |
| Standards                           | Transport  | As per IEC 60721-3-2  |
|                                     | Climatic conditions  | Class 2K3   |
|                                     | Temperature  | -25... 60 °C (-13...140 °F)   |
|                                     | Humidity   | <95% r.h.   |
| Standards                           | Storage  | As per IEC 60721-3-1  |
|                                     | Climatic conditions  | Class 1K3   |
|                                     | Temperature  | -25... 60 °C (-13...140 °F)   |
|                                     | Humidity   | <95% r.h.   |
| Standards                           | EU Conformity (CE)   | CE1T3181xx <sup>*)</sup>  |
|                                     | RCM Conformity   | CE1T3181en_C1 <sup>*)</sup>   |
|                                     |  UL  | UL 916 PAZX<br>CSA-C22.2 No. 205 PAZX7<br><a href="http://database.ul.com">http://database.ul.com</a>                             |
|                                     | Safety class   | III as per EN 60730-1   |
| Environmental compatibility         | Pollution class  | Normal  |
|                                     | Degree of protection of housing  | IP30 as per EN 60529  |
|                                     | The product environmental declaration CE1E3181 <sup>*)</sup> 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:  |   |
|                                     | <ul style="list-style-type: none"> <li>- Application with On / Off operation of a heater      Class I      value 1.0%</li> <li>- Modulating room thermostat, for use with modulating heaters      Class V      value 3.0%</li> </ul> |   |
| General                             | Connection terminals   | Solid wires or prepared stranded wires<br>1 x 0.4...2.5 mm <sup>2</sup> (14 gauge)<br>or 2 x 0.4...1.5 mm <sup>2</sup> (16 gauge) |
|                                     | Housing front color  | RAL 9003 white  |
|                                     | Weight   | 0.350 kg  |

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

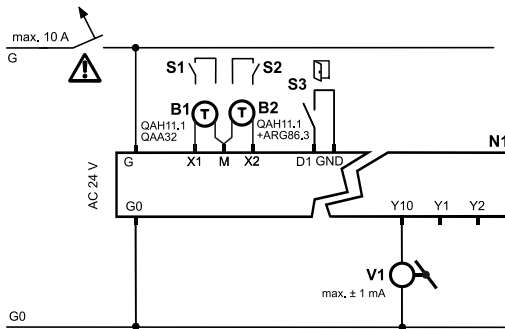
## Connection terminals



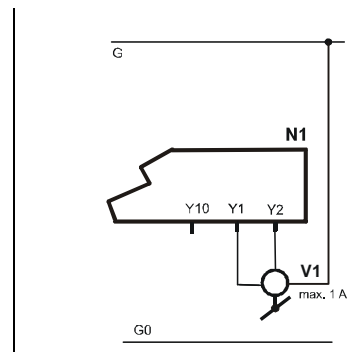
|            |   |
|------------|---|
| G, G0      | Operating voltage AC 24 V   |
| Y10/G0     | Control output for DC 0...10 V actuator   |
| Y1/G, Y2/G | Control output for On/Off, PWM or 3-position actuators  |
| X1, X2     | Multifunctional input for temperature sensor (e.g. QAH11.1) or potential-free switch<br>Factory setting:<br>- X1 = external room temperature sensor<br>- X2 = sensor or switch for automatic heating/cooling changeover |
| M          | Measuring neutral for sensor and switch   |
| D1, GND    | Multifunctional input for potential-free switch.<br>Factory setting: Operating mode switchover contact  |

## Connection diagrams

### Application: Single-duct

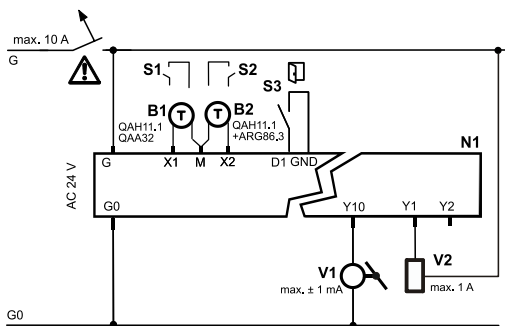


- V1 DC 0...10 V damper actuator
- N1 Room thermostat RDG400
- S1..S3 Switch (keycard, window contact, etc.)
- B1, B2 Temperature sensor (return air temperature, external room temperature, changeover sensor, etc.)

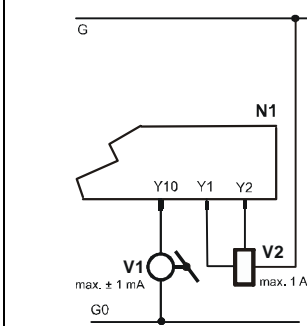


- V1 3-position damper actuator

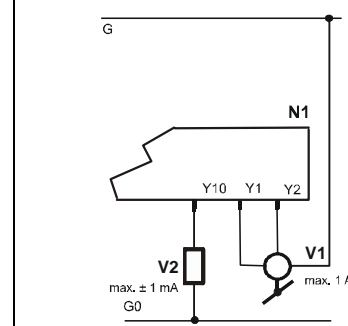
### Application: Single-duct with electric heater, radiator or heating/cooling valve



- V1 DC 0...10 V damper actuator
- V2 On/Off or PWM electric heater, radiator or heating/cooling valve
- N1 Room thermostat RDG400
- S1..S3 Switch (keycard, window contact, etc.)
- B1, B2 Temperature sensor (return air temperature, external room temperature, changeover sensor, etc.)



- V1 DC 0...10 V damper actuator
- V2 3-position electric heater, radiator or heating/cooling valve



- V1 3-position damper actuator
- V2 DC 0...10 V electric heater, radiator or heating/cooling valve



For US installations, use Class 2 rated power supplies.  
For other installations, use circuit breakers with rated current of no more than 10 A.

## Dimensions

