



RDG100 / RDG110
RDG140 / RDG160



RDG100T

Room thermostats with LCD for wall mounting

RDG1...

for fan coil unit applications

for universal applications

for use with compressors in dx type equipment

- **RDG100...: Operating voltage AC 230 V, ON/OFF, 3-position or PWM control outputs**
- **RDG110: Operating voltage AC 230 V, ON/OFF relay (SPDT) outputs**
- **RDG140 / RDG160: Operating voltage AC 24 V, DC 0...10 V control outputs**
- **Operating modes: Comfort, Energy Saving and Protection**
- **Automatic or manual fan speed**
- **Output for 1-speed, 3-speed or ECM fan DC 0...10 V (RDG160)**
- **3 multifunctional inputs for keycard contact, external sensor, etc.**
- **Automatic or manual heating / cooling changeover**
- **Adjustable commissioning and control parameters**
- **Minimum and maximum setpoint limitation**
- **Backlit display**

Additional features of RDG100T:

- **Infrared remote control receiver**
- **Auto Timer mode with 8 programmable timers**

The RDG1... room thermostats are designed for use with the following types of system:

Fan coil units via ON/OFF or modulating control outputs:

- 2-pipe system
- 2-pipe system with electrical heater
- 2-pipe system and radiator / floor heating
- 4-pipe system
- 4-pipe system with electrical heater
- 2-stage heating or cooling system

Chilled / heated ceilings (or radiators) via ON/OFF or modulating control outputs:

- Chilled / heated ceiling
- Chilled / heated ceiling with electrical heater
- Chilled / heated ceiling and radiator / floor heating
- Chilled / heated ceiling, 2-stage cooling or heating

Heat pumps with dx type equipment:

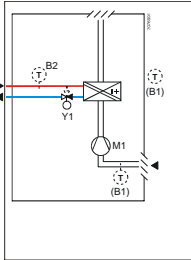

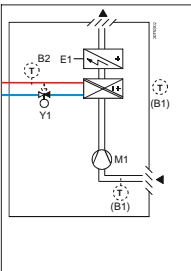

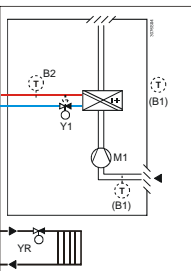

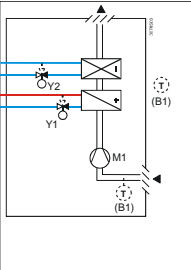

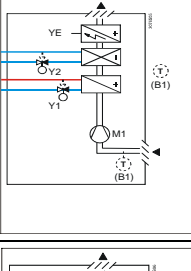

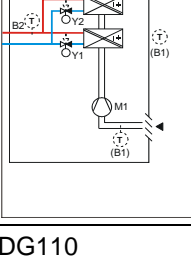

- 1-stage compressor for heating or cooling
- 1-stage compressor for heating or cooling with electrical heater
- 1-stage compressor for heating or cooling and radiator / floor heating
- 1-stage compressor for heating and cooling with reversing valve
- 2-stage compressor for heating or cooling

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 via operating mode button on the thermostat
- 1- or 3-speed or DC 0...10 V fan control (automatic or manual)
- 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
 - Electrical heater enable
 - Faults
- Advanced fan control function, i.e. fan kick, fan start, selectable fan operation depending on heating / cooling mode, fan start delay in systems with ON/OFF control
- Purge function in conjunction with 2-port valve in systems with automatic heating / cooling changeover
- Reminder to clean fan filters
- Floor heating temperature limitation
- Reload factory settings for commissioning and control parameters
- 7-day time program: 8 programmable timers to switch over between Comfort and Energy Saving mode (RDG100T)
- Infrared remote control (RDG100T)

Applications

The room thermostats support the following applications, which can be configured via DIP switches at the rear of the unit. Depending on the thermostat type, ON/OFF or modulating control outputs are available.

| Application | DIP switch | Control output | Product no. |
|--|---|---|-------------|
| Heating or cooling <ul style="list-style-type: none"> 2-pipe fan coil unit Chilled / heated ceiling 1-stage compressor ¹⁾  |  | ON/OFF, PWM, 3-position | RDG100... |
| | | ON/OFF (SPDT) | RDG110 |
| | | DC 0...10 V | RDG140 |
| | | DC 0...10 V ²⁾ | RDG160 |
| Heating or cooling with auxiliary heater <ul style="list-style-type: none"> 2-pipe fan coil unit with el. heater Chilled / heated ceiling and el. heater 1-stage compressor and el. heater ¹⁾  |  | ON/OFF, PWM, 3-position | RDG100.. |
| | | ON/OFF (SPDT) | RDG110 |
| | | DC 0...10 V Note: Modulating el. heater | RDG140 |
| | | DC 0...10 V ²⁾ Note: Modulating el. heater | RDG160 |
| Heating or cooling and radiator / floor heating <ul style="list-style-type: none"> 2-pipe fan coil unit and radiator Chilled / heated ceiling and radiator  |  | ON/OFF, PWM, 3-position | RDG100... |
| | | ON/OFF (SPDT) | RDG110 |
| | | DC 0...10 V | RDG140 |
| | | DC 0...10 V ²⁾ | RDG160 |
| Heating and cooling <ul style="list-style-type: none"> 4-pipe fan coil unit Chilled ceiling and radiator 1-stage compressor ¹⁾ 1-stage compressor with reversing valve ¹⁾  |  | ON/OFF, PWM, 3-position | RDG100... |
| | | ON/OFF (SPDT) | RDG110 |
| | | DC 0...10 V | RDG140 |
| | | DC 0...10 V ²⁾ | RDG160 |
| Heating and cooling with auxiliary heater <ul style="list-style-type: none"> 4-pipe fan coil unit with el. heater  |  | ON/OFF, PWM, 3-position | RDG100... |
| 2-stage heating or cooling <ul style="list-style-type: none"> 2-stage fan coil unit 2-stage chilled / heated ceiling 2-stage compressor ¹⁾  |  | ON/OFF, PWM, 3-position | RDG100... |
| | | ON/OFF (SPDT) | RDG110 |
| | | DC 0...10 V | RDG140 |
| | | DC 0...10 V ²⁾ | RDG160 |

1) Heat pump application covered by RDG110

2) With ECM fan control DC 0...10 V

Type summary

| Product no. | Features | | | | | | | | |
|----------------|-------------------|---------------------------|-----------------|-----------------|------------|--------------|-------------|---------------------------------|-----------------------|
| | Operating voltage | Number of control outputs | | | | Time program | Backlit LCD | Infrared receiver ¹⁾ | ECM fan ²⁾ |
| | | ON/OFF | PWM | 3-pos. | DC 0..10 V | | | | |
| RDG100 | AC 230 V | 3 ³⁾ | 2 ³⁾ | 2 ³⁾ | | | ✓ | | |
| RDG100T | AC 230 V | 3 ³⁾ | 2 ³⁾ | 2 ³⁾ | | ✓ | ✓ | ✓ | |
| RDG110 | AC 230 V | 2 ⁴⁾ | | | | | ✓ | | |
| RDG140 | AC 24 V | | | | 2 | | ✓ | | |
| RDG160 | AC 24 V | | | | 2 | | ✓ | ✓ | |


















1) Infrared remote control must be ordered as a separate item




2) ECM fan output DC 0...10 V

3) ON/OFF, PWM or 3-position (triac outputs)

4) Relay output (SPDT)

Equipment combinations

| | Type of unit | | Type reference | Data Sheet |
|-----------------------|--|--|--------------------------|------------|
| | Cable temperature sensor |  | QAH11.1 | 1840 |
| | Room temperature sensor |  | QAA32 | 1747 |
| | Condensation detector / Supply unit |  | QXA2000 / AQX2000 | 1542 |
| ON / OFF actuators | Electromotoric ON/OFF valve and actuator (only available in AP, UAE, SA and IN) |  | MVI.../MXI... | 4867 |
| | Electromotoric ON/OFF actuator |  | SFA21... | 4863 |
| | Thermal actuator (for radiator valve) |  | STA21... | 4877 |
| | Thermal actuator (for small valves 2.5 mm) |  | STP21... | 4878 |
| | Zone valve actuators (only available in AP, UAE, SA and IN) |  | SUA... | 4832 |
| 3-position actuators | Electrical actuator, 3-position (for radiator valve) |  | SSA31... | 4893 |
| | Electrical actuator, 3-position (for small valve 2,5 mm) |  | SSP31... | 4864 |
| | Electrical actuator, 3-position (for small valve 5,5 mm) |  | SSB31... | 4891 |
| | Electrical actuator, 3-position (for Combi-valve VPI45) |  | SSD31... | 4861 |
| | Electromotoric actuator, 3-position (for valves 5.5 mm) |  | SQS35... | 4573 |
| DC 0...10 V actuators | Electrical actuator, DC 0..10 V (for radiator valve) |  | SSA61... | 4893 |
| | Electrical actuator, DC 0..10 V (for 2 and 3 port valves / V...P45) |  | SSC61... | 4895 |
| | Electrical actuator, DC 0..10 V (for small valve 2,5 mm) |  | SSP61... | 4864 |
| | Electrical actuator, DC 0..10 V (for small valves 5.5 mm) |  | SSB61... | 4891 |

| | | | |
|--|---|-----------------|------|
| Electrical actuator, DC 0..10 V (for Combi-valve VPI45) |  | SSD61... | 4861 |
| Electromotoric actuator, DC 0..10 V (for valves 5.5 mm) |  | SQS65... | 4573 |
| Thermal actuator, DC 0..10 V (for small valves and radiator valves) |  | STS61 | 4880 |

Accessories

| Description | Product no. | Data Sheet |
|--|-------------|------------|
| 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 | |

Ordering

When ordering, please indicate product no. and description:

E.g. **RDG100 room thermostat**

Order the **IRA211** infrared remote control separately.

Order valve actuators separately.

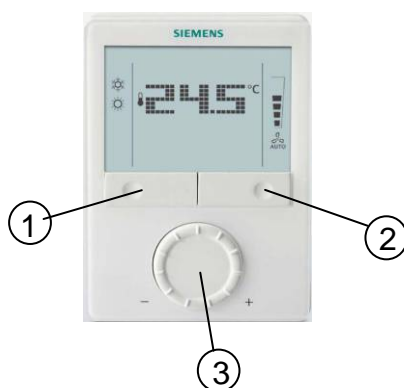
Mechanical design

The room thermostat consists of 2 parts:

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

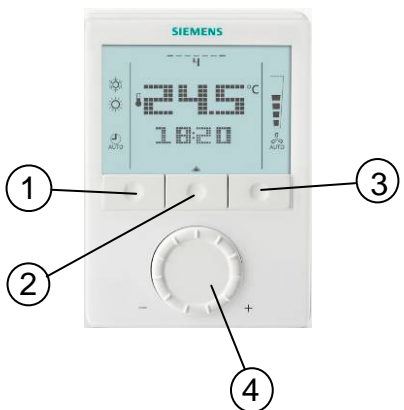
The housing engages in the mounting plate and is secured with 2 screws.

Operation and settings RDG...



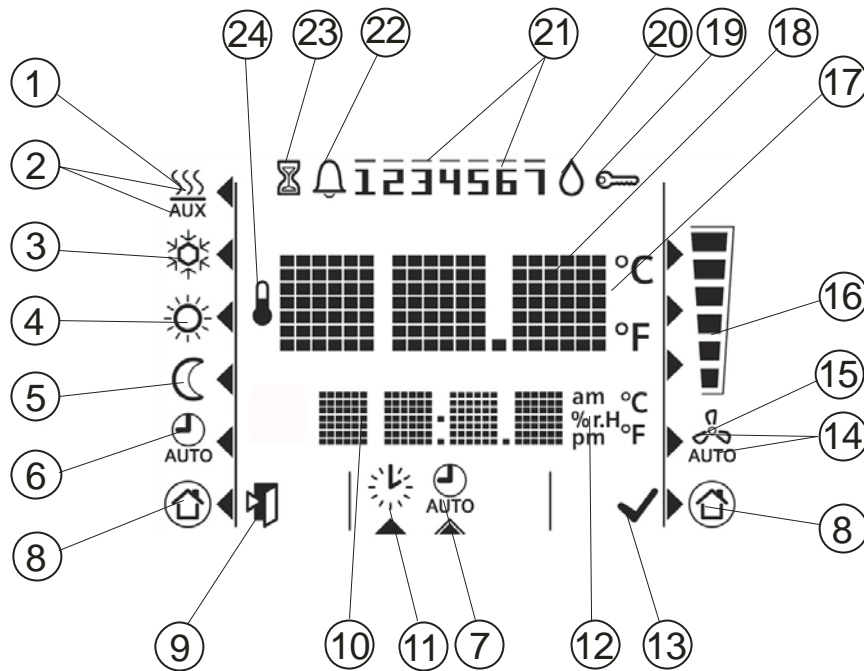
1. Operating mode selector / Esc
2. Fan mode selector / Ok
3. Rotary knob for setpoint and parameter adjustment

RDG100T



1. Operating mode selector / Esc
2. Button to enter the time and to set the timers
3. Fan mode selector / Ok
4. Rotary knob for setpoint and parameter adjustment

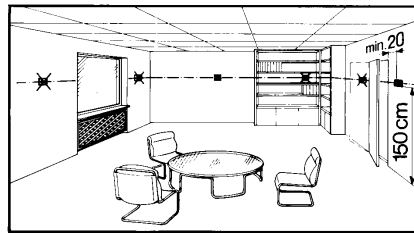
Display



| # | Symbol | Description | # | Symbol | Description | |
|----|--------|--|----|--------|---|-------------|
| 1 | | Heating mode | 14 | | Automatic fan | |
| 2 | | Heating mode auxiliary heater on (2 nd stage) | 15 | | Manual fan | |
| 3 | | Cooling mode | 16 | | | Fan speed 1 |
| 4 | | Comfort mode | | | | Fan speed 2 |
| 5 | | Energy Saving mode | | | | Fan speed 3 |
| 6 | | Auto Timer mode | 17 | | Degrees Celsius Degrees Fahrenheit | |
| 7 | | View and set Auto Timer program | | | | |
| 8 | | Protection | 18 | | Digits for room temperature and setpoint display | |
| 9 | | Escape | 19 | | Button lock | |
| 10 | | Digits for time, room temperature, setpoint, etc. | 20 | | Condensation in room (dewpoint sensor active) | |
| 11 | | Setting the time of day and the weekday | 21 | | Weekday 1...7: 1 = Monday / 7 = Sunday | |
| 12 | | Morning: 12-hour format Afternoon: 12-hour format | 22 | | Fault | |
| | | | 23 | | Temporary timer function (visible when operating mode is temporarily extended due to prolonged presence or absence) | |
| 13 | | Confirmation of parameters | 24 | | 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 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 (M3181) enclosed with the thermostat.

- Comply with local regulations to wire, fuse and earth the thermostat
- Size correctly the cables to the thermostat, fan and valve actuators for AC 230 V mains voltage
- Use only valve actuators rated for AC 230 V on RDG100... / RDG110
- The power supply line must have an external fuse or circuit breaker with a rated current of no more than 10 A
- Isolate the cables of inputs X1-M / X2-M and D1-GND if the conduit box carries AC 230 V mains voltage
- On the RDG100.. and RDG110, inputs X1-M and X2-M carry mains potential. If the sensor's cables are extended, they must be suited for mains voltage
- 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

Select the application and the type of control output via the DIP switches before fitting the thermostat to the mounting plate.

After power is applied, the thermostat carries out a reset during which all LCD segments flash, indicating that the reset was 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 set to ensure optimum performance of the entire system (see Basic Documentation P3181).

Control sequence

- The control sequence may need to be set via parameter P01 depending on the application. The factory setting for the 2-pipe application is "Cooling only"; and "Heating and cooling" for the 4-pipe application

Compressor-based application

- When the thermostat is used in connection with a compressor, the minimum output on-time (parameter P48) and off-time (parameter P49) for Y11/Y21 must be adjusted to avoid damage to the compressor and shortening its life

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



The device is classified as waste electronic equipment in terms of the European Directive 2002/96/EC (WEEE) and should not be disposed of as unsorted municipal waste. The relevant national legal rules are to be adhered to. Regarding disposal, use the systems setup for collecting electronic waste. Observe all local and applicable laws.







Technical data

RDG100... / RDG110

| | | |
|--|--------------------------------|-----------------------|
| ⚠ Power supply | Operating voltage | AC 230 V + 10/-15% |
| | Frequency | 50/60 Hz |
| | Power consumption | Max. 18 VA |
| Outputs | Fan control Q1, Q2, Q3-N | AC 230 V |
| | Rating | Max. 5(4) A |
| Inputs | Control outputs | |
| | Y1, Y2, Y3, Y4-N (RDG100) | AC 230 V, max. 1 A |
| | Y11-N / Y21-N (NO) (RDG110) | AC 230 V, max. 5(3) A |
| | Multifunctional inputs | |
| | X1-M / X2-M | |
| | Temperature sensor input | |
| | Type | QAH11.1 (NTC) |
| | Digital input | |
| | Operating action | Selectable (NO/NC) |
| | Contact sensing | DC 0...5 V, max. 5 mA |
| Insulation against mains | N/A, mains potential ⚠ | |
| D1-GND | | |
| Operating action | Selectable (NO/NC) | |
| Contact sensing | SELV DC 6...15 V, 3...6 mA | |
| Insulation against mains | 3.75 kV, reinforced insulation | |
| Function input | Selectable | |
| External temperature sensor, changeover sensor, operating mode switchover contact, dewpoint monitor contact, enable electrical heater contact, fault contact | | |

RDG140 / RDG160

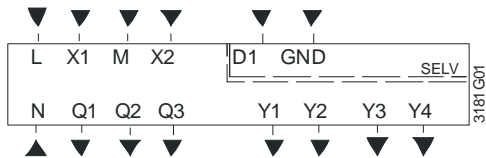
| | | |
|--------------------------|---------------------------------|-----------------------|
| ⚠ Power supply | Operating voltage | SELV AC 24 V ±20% |
| | Frequency | 50/60 Hz |
| | Power consumption | Max. 2 VA |
| Outputs | Fan control | |
| | Q1, Q2, Q3-N (RDG140) | AC 230 V, max. 5(4) A |
| | Y50-G0 (RDG160) | SELV DC 0...10 V |
| | | Max. ± 1mA |
| Inputs | Control outputs Y10-G0 / Y20-G0 | SELV DC 0...10 V |
| | Resolution | 39 mV |
| | Current | Max. ±1 mA |
| | Multifunctional inputs | |
| | X1-M / X2-M | |
| | Temperature sensor input | |
| Type | QAH11.1 (NTC) | |
| Digital input | | |
| Operating action | Selectable (NO/NC) | |
| Contact sensing | DC 0...5 V, max. 5 mA | |
| Insulation against mains | 3.75 kV, reinforced insulation | |
| D1-GND | | |
| Operating action | Selectable (NO/NC) | |
| Contact sensing | SELV DC 6...15 V, 3...6 mA | |
| Insulation against mains | 3.75 kV, reinforced insulation | |
| Function input: | Selectable | |

| | | | |
|---|--|--|---|
| | External temperature sensor, changeover sensor, operating mode switchover contact, dewpoint monitor contact, enable electrical heater contact, fault contact | | |
| Operational data, all types | Switching differential, adjustable | | |
| | Heating mode | (P30) | 2 K (0.5...6 K) |
| | Cooling mode | (P31) | 1 K (0.5...6 K) |
| | Setpoint setting and setpoint range | | |
| |  Comfort mode | (P08) | 21 °C (5...40 °C) |
| |  Energy Saving mode | (P11-P12) | 15 °C/30 °C (OFF, 5...40 °C) |
| |  Protection | (P65-P66) | 8 °C/OFF (OFF, 5...40 °C) |
| | Multifunctional inputs X1 / X2 / D1 | | |
| | Input X1 | | Selectable Ext. temperature sensor (P38=1) |
| | Input X2 | | Changeover sensor (P40=2) |
| Input D1 | | Operating mode switchover (P42=3) | |
| Environmental conditions | Built-in room temperature sensor | | |
| | Measuring range | | 0...49 °C |
| | Accuracy at 25 °C | | < ± 0.5 K |
| | Temperature calibration range | | ± 3.0 K |
| | Settings and display resolution | | |
| | Setpoints | | 0.5 °C |
| | Current temperature value displayed | | 0.5 °C |
| | Operation | | |
| | Climatic conditions | | As per IEC 721-3-3 Class 3K5 |
| | Temperature | | 0...50 °C |
| Humidity | | <95% r.h. | |
| Standards | Transport | | |
| | Climatic conditions | | As per IEC 721-3-2 Class 2K3 |
| | Temperature | | -25...60 °C |
| | Humidity | | <95% r.h. |
| | Mechanical conditions | | Class 2M2 |
| | Storage | | |
| | Climatic conditions | | As per IEC 721-3-1 Class 1K3 |
| | Temperature | | -25...60 °C |
| | Humidity | | <95% r.h. |
| |  conformity | | |
| EMC directive | | 2004/108/EC | |
| Low-voltage directive | | 2006/95/EC | |
|  N474 C-tick conformity to | | | |
| EMC emission standard | | AS/NSZ 4251.1:1999 | |
|  | Reduction of hazardous substances | 2002/95/EC | |
| Product standards | | | |
| Automatic electrical controls for household and similar use | | As per EN 60730-1 | |
| Special requirements for temperature-dependent controls | | As per EN 60730-2-9 | |
| Electronic control type | | 2.B (micro-disconnection on operation) | |

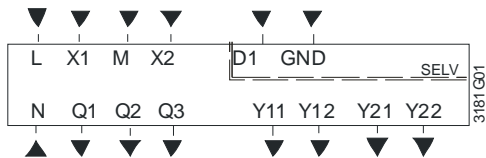
| | | |
|---------|---------------------------------------|---|
| General | Electromagnetic compatibility | |
| | Emissions | As per IEC/EN 61000-6-3 |
| | Immunity | As per IEC/EN 61000-6-2 |
| | Safety class | |
| | RDG100... / RDG110, RDG140 | II as per EN 60730 |
| | RDG160 | III as per EN 60730 |
| | Pollution class | Normal |
| | Degree of protection of housing | IP30 to EN 60529 |
| | Connection terminals | Solid wires or prepared stranded wires 1 x 0.4...2.5 mm ² or 2 x 0.4...1.5 mm ² |
| | Housing front color | RAL 9003 white |
| Weight | RDG100... / RDG110 / RDG140 RDG160 | 0.30 kg 0.25 kg |

Connection terminals

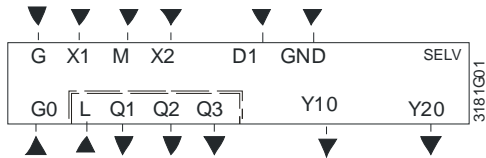
RDG100..



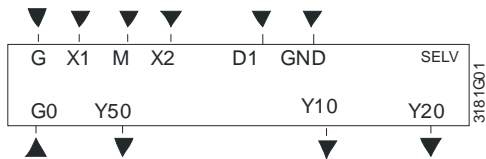
RDG110



RDG140



RDG160



L, N Operating voltage AC 230 V
G, G0 Operating voltage AC 24 V

X1, X2 Multifunctional input for temperature sensor (e.g. QAH11.1) or potential-free switch
Factory setting:
- X1 = external room temperature sensor
- X2 = sensor or switch for automatic heating / cooling changeover.

M Measuring neutral for sensor and switch
D1, GND Multifunctional input for potential-free switch
Factory setting: Operating mode switchover contact

Q1 Control output fan speed "low" AC 230 V
Q2 Control output fan speed "medium" AC 230 V
Q3 Control output fan speed "high" AC 230 V
Y50 Control output fan speed DC 0...10 V

Y1...Y4 Control output "Valve" AC 230 V (NO, for normally closed valves), output for electrical heater via external relay

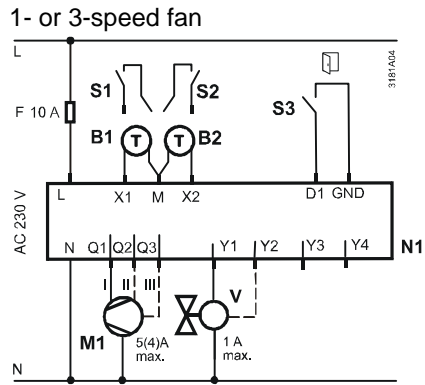
Y11, Y21 Control output "Valve" AC 230 V (NO, for normally closed valves), output for compressor or electrical heater

Y12, Y22 Control output "Valve" AC 230 V (NC, for normally open valves)

Y10, Y20 Control output for DC 0...10 V actuator

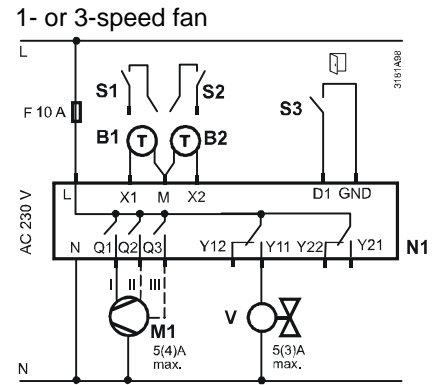
Connection diagrams

RDG100...



2-pipe

RDG110

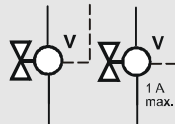


2-pipe

2-pipe & radiator

4-pipe

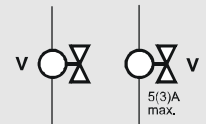
2-stage



2-pipe & radiator

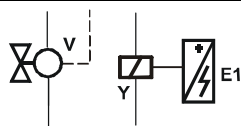
4-pipe

2-stage



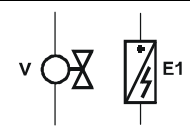
2-pipe

& el. heater



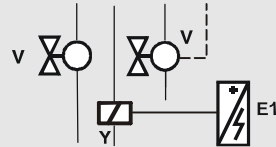
2-pipe

& el. heater



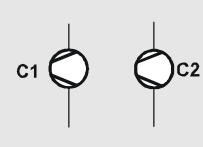
4-pipe

& el. heater



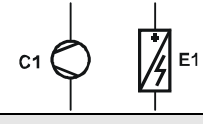
1- and 2-stage

compressor



Compressor

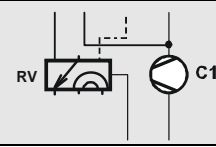
& el. heater



Compressor

& reversing

valve



N1 Room thermostat RDG1...

M1 1- or 3-speed fan

V Valve actuators:
ON/OFF or PWM, 3-position, heating, cooling,
radiator, heating / cooling, 1st or 2nd stage

E1 Electrical heater

C1, C2 Compressor

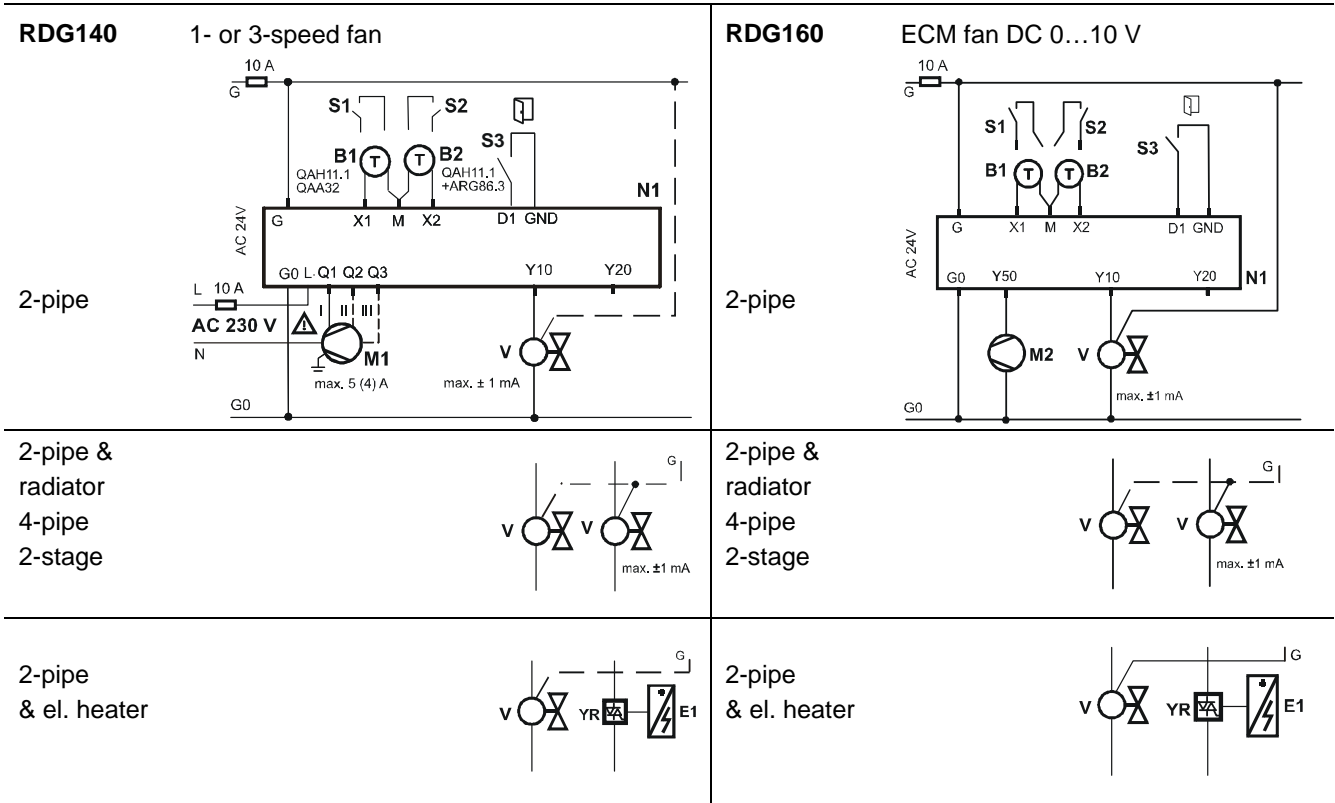
S1, S2 Switch (keycard, window contact, etc.)

S3 Switch at SELV input (keycard, window contact)

B1, B2 Temperature sensor (return air temperature,
external room temperature, changeover sensor,
floor temperature limit, etc.)

RV Reversing valve

Y Relay



- | | | | |
|----|--|--------|--|
| N1 | Room thermostat RDG1... | S1, S2 | Switch (keycard, window contact, etc.) |
| M1 | 1- or 3-speed fan | S3 | Switch at SELV input (keycard, window contact) |
| M2 | ECM fan DC 0...10 V | B1, B2 | Temperature sensor (return air temperature, external room temperature, changeover sensor, floor temperature limit, etc.) |
| V | Valve actuators DC 0...10 V: Heating, cooling, radiator, heating / cooling, 1 st or 2 nd stage | YR | DC 0...10 V signal converter / current valve |
| E1 | Electrical heater | | |

Dimensions

