

Application guide

RDG160 Remote control

- Providing indoor climate comfort





RDG100/RDG110
RDG140/RDG160

RDG100T

Wall-mounted Room Thermostats with Display RDG1...

for fan coil units application

for universal applications

for use with compressors in DX type equipment

-
- RDG100.. AC 230 V operating voltage, ON/OFF, 3-pos. or PWM control outputs
 - RDG110 AC 230 V operating voltage, ON/OFF relay (SPDT) outputs
 - RDG140/RDG160 AC 24 V operating voltage, DC 0...10 V control outputs
 - Operating modes: Comfort, Energy Saving and Protection
 - Automatic or manual fan speed
 - Output for 3-speed, 1-speed fan or ECM fan DC 0..10 V (RDG160)
 - Three 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 RDG100T features

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

The room thermostats are suitable for following systems

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 mod. 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 in DX type equipment:

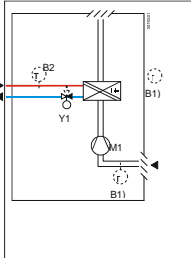

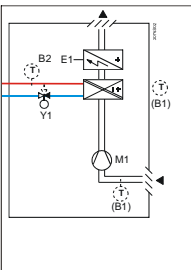

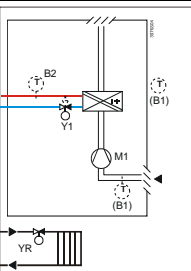

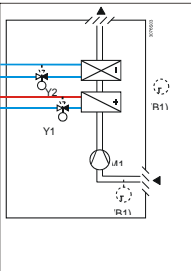

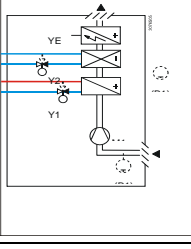

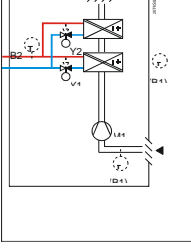

- 1-stage compressor for heating or cooling
- 1-stage compressor for heating or cooling with electrical heater
- 1-stage compressor for heating or cooling and radiator / floor heating
- 1-stage compressor for heating and cooling with reversing valve
- 2-stage compressor for heating or cooling

Functions

- Maintain room temperature via built-in temperature sensor or external room temperature / return air temperature sensor
- Automatic or manual changeover between heating and cooling mode
- Select applications via DIP switches
- Select operating mode via the operating mode button on the thermostat
- Single or 3-speed or DC 0...10 V fan control (automatic or manual)
- Display current room temperature or setpoint in °C and/or °F
- Minimum and maximum setpoint limitation
- Keypad lock (automatic and manual)
- Three multifunctional inputs, freely selectable for:
 - Operating mode switchover contact (key card, window contact etc)
 - Automatic heating/cooling changeover sensor
 - External room temperature or return air temperature
 - Dewpoint sensor
 - Electrical heater enable
 - Fault input
- Advanced fan control function, i.e. fan kick, fan start, selectable fan operation depending on heating / cooling mode, fan start delay in system with ON / OFF control
- Purge function in conjunction with 2-port valve in system with automatic h/c changeover
- Reminder to clean fan filters
- Floor heating temperature limitation
- Reload factory settings for commissioning and control parameters
- Weekly time program: 8 programmable timers to switch over between Comfort and Energy saving mode (RDG100T)
- Infrared remote control in RDG100T

Applications

The thermostat supports following applications, which can be configured by DIP-switch on the rear side of the thermostat. Depending on the thermostat type, ON/OFF or modulating control outputs are available.

Application	DIP-switch	Control output	Type reference
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-pos	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-pos	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-pos	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 reverse valve ¹⁾ 		ON/OFF, PWM, 3-pos	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-pos	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-pos	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

Type reference	Features								
	Operating Voltage	Number of control outputs				Time program	LCD Backlight	Infrared receiver ¹⁾	ECM FAN ²⁾
		ON/OFF	PWM	3-pos	DC 0..10 V				
RDG100	AC 230 V	3³⁾	2³⁾	2³⁾			✓		
RDG100T	AC 230 V	3³⁾	2³⁾	2³⁾		✓	✓	✓	
RDG110	AC 230 V	2⁴⁾					✓		
RDG140	AC 24 V				2		✓		
RDG160	AC 24 V				2		✓		✓

1) Infrared remote control is to be ordered as separate item

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

3) Either ON/OFF, PWM or 3-pos (Triac outputs)

4) Relay output (SPDT)

Accessories

Type of unit	Type reference	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 for surface wiring 112 x 130 mm	ARG70.2	

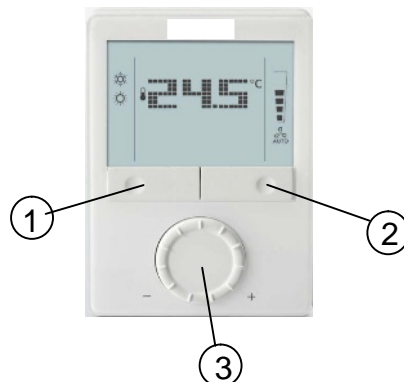
Mechanical design

The thermostat consists of 2 parts:

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

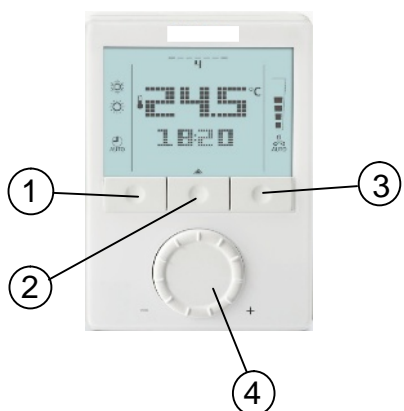
The housing engages on to the mounting plate and is secured with 2 screws.

Operation and settings RDG...



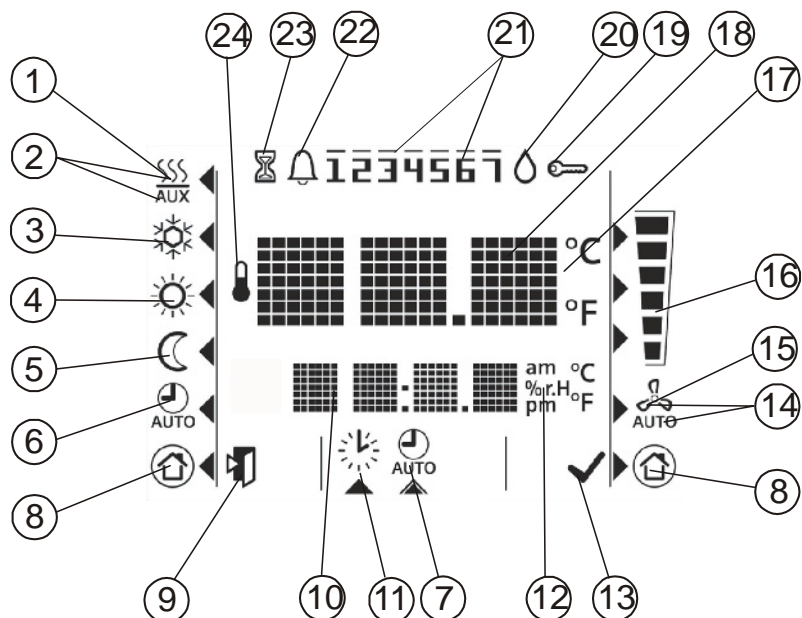
1. Operating mode selector / Esc
2. Fan mode selector / Ok
3. Rotary knob for setpoint and parameter adjustment

RDG100T



1. Operating mode selector / Esc
2. Selector to enter in time and schedule mode
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		Operating mode Comfort			Fan speed 2
5		Operating mode Energy Saving			Fan speed 3
6		Operating mode Auto Timer	17		Degrees Celsius Degrees Fahrenheit
7		View and set Auto Timer program			
8		Operating mode Protected	18		Digits for temperature and setpoint display
9		Escape	19		Keypad lock
10		Digits for time, temperature, setpoint etc	20		Condensation in room (dewpoint sensor active)
11		Set Time of the day and weekday	21		Weekday 1...7: 1 = Monday/7 = Sunday
12		Morning, 12-hour system Afternoon, 12-hour system	22		Fault
			23		Temporary timer function (visible when Comfort prolong, or absence function is active)
13		Confirmation of parameters	24		Indicates Room temperature is displayed

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 Rating	AC 230V, Max. 5(4) A
	Control outputs Rating	
Inputs	Y1, Y2, Y3, Y4-N (RDG100)	AC 230 V, max. 1 A
	Y11-N / Y21-N (N.O.) (RDG110)	AC 230 V, max. 5(3) A
	Multifunctional input X1-M/X2-M	
	Temperature sensor input:	
	Type	QAH11.1 (NTC)
	Digital input:	
	Operating action	Selectable (N.O./N.C.)
	Contact sensing	DC 0...5 V / max 5 mA
Insulation against mains	N/A, mains potential ⚠	
D1-GND	Operating action	Selectable (N.O. / N.C.)
	Contact sensing	SELV DC 6...15 V / 3...6 mA
	Insulation against mains	3.75 kV, reinforced insulation
	Function input:	Selectable
External temperature sensor, heating/cooling changeover sensor, operating mode switchover contact, dewpoint monitor contact, enable electrical heater contact, fault contact		

RDG140 / RDG160

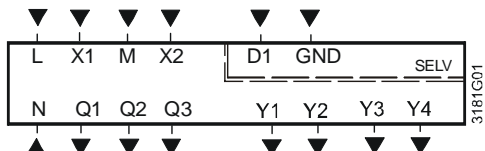
⚠ Power supply	Operating voltage	SELV AC 24 V ± 20 %
	Frequency	50/60 Hz
	Power consumption	Max 2 VA
Outputs	Fan control rating	
	Q1, Q2, Q3-N (RDG140) Y50 – G0 (RDG160)	AC 230 V, max. 5(4) A SELV DC 0...10 V, max. ± 1mA
Inputs	Control outputs Y10-G0 / Y20-G0	SELV DC 0...10 V
	Resolution	39 mV
	Current	Max. ±1 mA
	Multifunctional input X1-M/X2-M	
Temperature sensor input:		
Type	QAH11.1 (NTC)	
Digital input:		
Operating action	Selectable (N.O./N.C.)	
Contact sensing	DC 0...5 V / max 5 mA	
Insulation against mains	3.75 kV, reinforced insulation	
D1-GND	Operating action	Selectable (N.O. / N.C.)
	Contact sensing	SELV DC 6...15 V / 3...6 mA
	Insulation against mains	3.75 kV, reinforced insulation

	Function input:	Selectable
	External temperature sensor, heating/cooling changeover sensor, operating mode switchover contact, dewpoint monitor contact, enable electrical heater contact, fault contact	
Operational data for all the same	Switching differential, adjustable	
	Heating mode	(P30) 2 K (0.5...6 K)
	Cooling mode	(P31) 1 K (0.5...6 K)
	Setpoint setting and 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 input X1/X2/D1	Selectable
	Input X1	Ext. temperature sensor (P38=1)
	Input X2	Heat/cool changeover sensor (P40=2)
Input D1	Operating mode switchover (P42=3)	
	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
Environmental conditions	Operation	As per IEC 721-3-3
	Climatic conditions	Class 3K5
	Temperature	0...+50 °C
	Humidity	<95 % r.h.
	Transport	As per IEC 721-3-2
	Climatic conditions	Class 2K3
	Temperature	-25...+60 °C
	Humidity	<95 % r.h.
	Mechanical conditions	Class 2M2
	Storage	As per IEC 721-3-1
	Climatic conditions	Class 1K3
	Temperature	-25...+60 °C
	Humidity	<95 % r.h.
Standards	 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	EN 60730-1
	Special requirements for temperature-dependent controls	EN 60730-2-9
	Electronic control type	2.B (microdisconnection on operation)

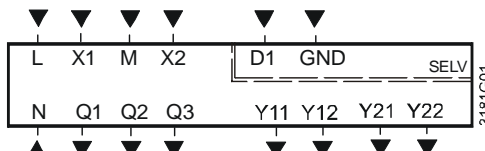
General	Electromagnetic compatibility	
	Emissions	IEC/EN 61000-6-3
	Immunity	IEC/EN 61000-6-2
	Protective class	
	RDG100... / RDG110, RDG140	II as per EN 60730
	RDG160	III as per EN 60730
	Pollution class	
	Normal	
	Degree of protection of housing	
	IP 30 to EN 60529	
Connection terminals		
Solid wires 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		
0.30 kg		
RDG160		
0.25 kg		

Connection terminals

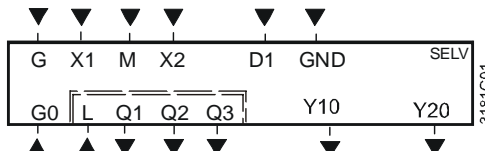
RDG100..



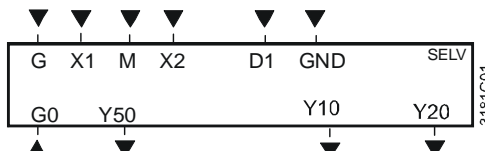
RDG110



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 temp. sensor
- X2:= automatic heat/cool changeover/switch

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 (N.O., for normally closed valves), output for electrical heater via external relay

Y11, Y21 Control output "Valve" AC 230 V (N.O., for normally closed valves), output for compressor or output for electrical heater

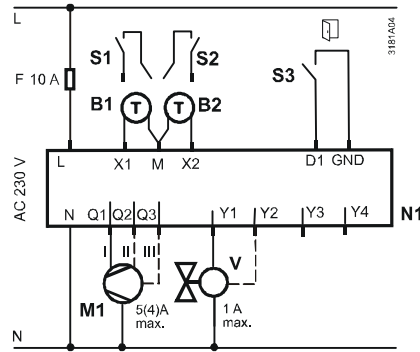
Y12, Y22 Control output "Valve" AC 230 V (N.C., for normally open valves)

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

Connection diagrams

RDG100...

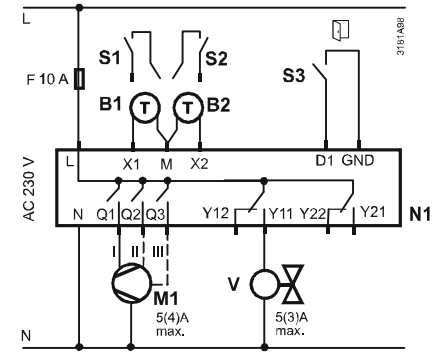
1-speed or 3-speed fan



2-pipe

RDG110

3-speed or 1-speed fan

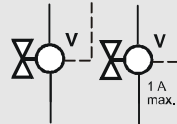


2-pipe

2-pipe & radiator

4-pipe

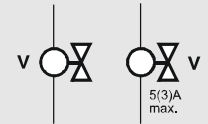
2-stage



2-pipe & radiator

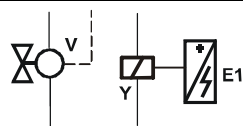
4-pipe

2-stage



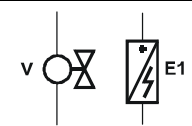
2-pipe

& el. heater



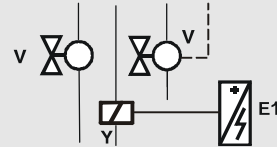
2-pipe

& el. heater



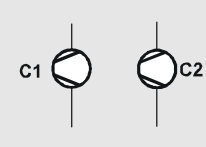
4-pipe

& el. heater



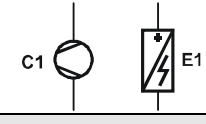
1 and 2-stage

compressor

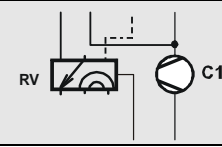


Compressor

& el. heater



Compressor
& reverse valve



N1 Room temperature thermostat RDG1...

M1 1-speed or 3-speed fan

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

E1 Electrical heater

C1, C2 Compressor

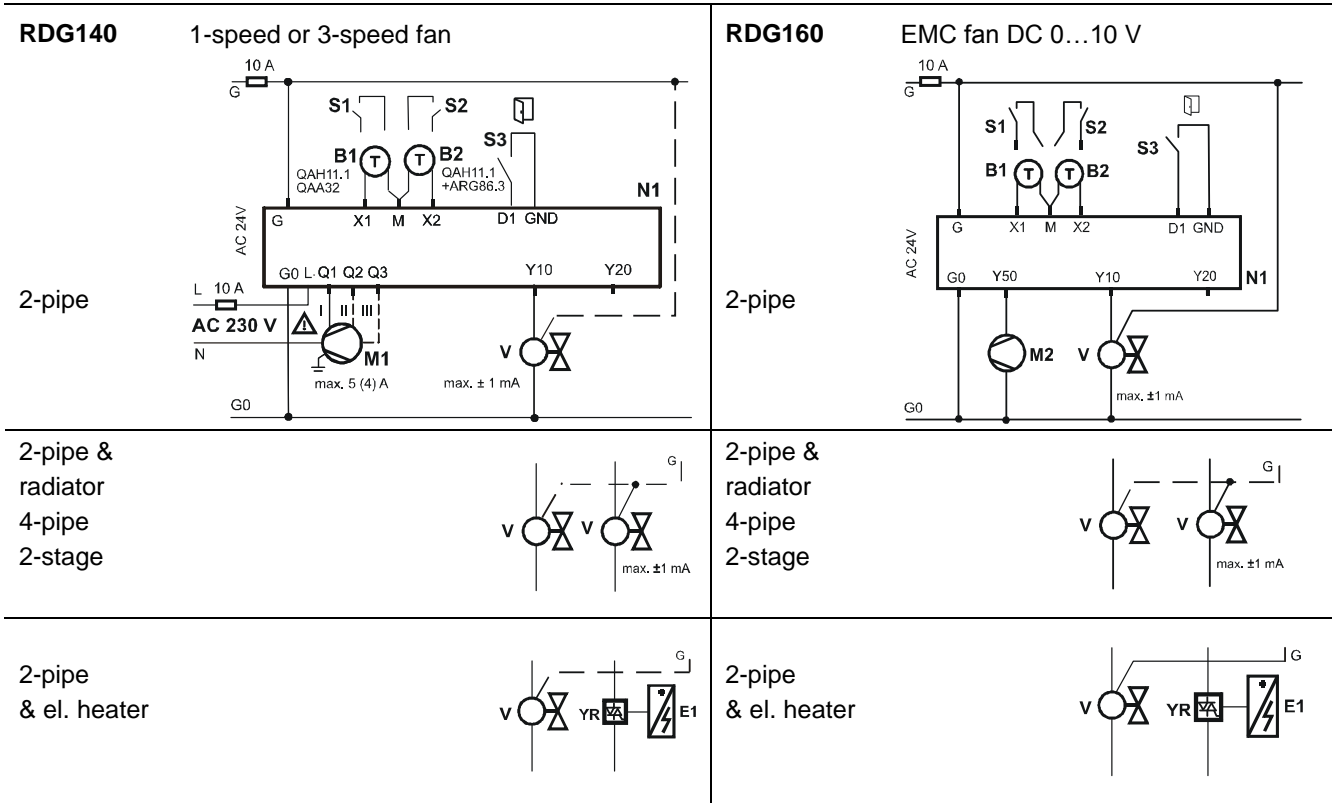
S1, S2 Switch (keycard, window contact, etc.)

S3 Switch on SELV input (keycard, window contact)

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

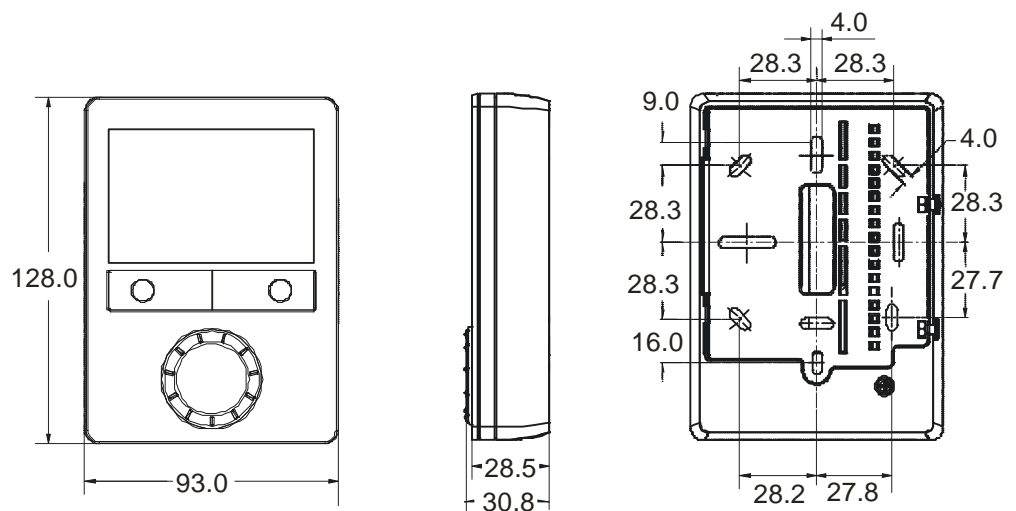
RV Reverse valve

Y Relay



- | | | | |
|----|---|--------|---|
| N1 | Room temperature thermostat RDG1... | S1, S2 | Switch (keycard, window contact, etc.) |
| M1 | 1-speed or 3-speed fan | S3 | Switch on SELV input (keycard, window contact) |
| M2 | EMC 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





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Improper installation, adjustment, alteration, service or maintenance can cause property damage or personal injury.

Installation and service must be performed by a qualified installer and servicing agency