



RDG100 / RDG110
RDG140 / RDG160



RDG100T



RDG100T/H

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, Economy 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 / RDG100T/H:

- **Infrared remote control receiver**
- **Auto Timer mode with 8 programmable timers**
- **Auto Timer can be switched off**

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:

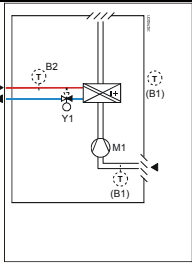
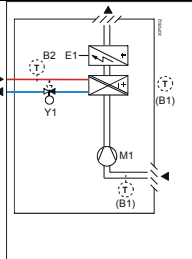
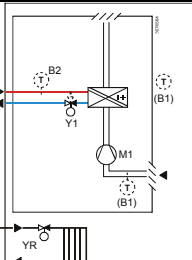
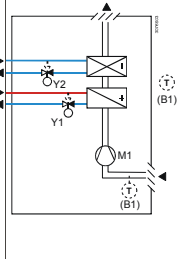
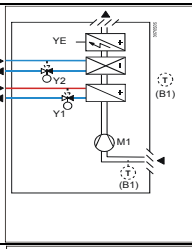
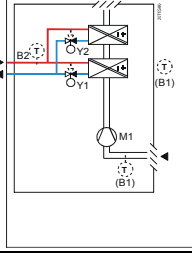
- stage compressor for heating or cooling
- stage compressor for heating or cooling with electrical heater
- stage compressor for heating or cooling and radiator / floor heating
- stage compressor for heating and cooling with reversing valve
- stage compressor for heating or cooling

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 Economy mode (RDG100T, RDG100T/H)
- Infrared remote control (RDG100T, RDG100T/H)

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 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 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 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 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 4-pipe fan coil unit with el. heater			ON/OFF, PWM, 3-position	RDG100...
2-stage heating or cooling 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⁾		✓ ⁵⁾	✓	✓	
RDG100T/H	AC 230 V	3 ³⁾	2 ³⁾	2 ³⁾		✓ ⁵⁾	✓	✓	
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)

5) Timer can be disabled via P02 (SW V7.2 and higher / device index E)

Equipment combinations

	Description		Product no.	Data Sheet
	Infrared remote control		IRA211	3059
	Cable temperature sensor		QAH11.1	1840
	Room temperature sensor		QAA32	1747
	Condensation detector / extension module		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
ON/OFF and PWM actuators *)	Thermal actuator (for radiator valves)		STA21...	4877
	Thermal actuator (for small valves 2.5 mm)		STP21...	4878
	Zone valve actuator (only available in AP, UAE, SA and IN)		SUA...	4830
3-position actuators	Electrical actuator, 3-position (for radiator valves)		SSA31...	4893
	Electrical actuator, 3-position (for small valves 2.5 mm)		SSP31...	4864
	Electrical actuator, 3-position (for small valves 5.5 mm)		SSB31...	4891
	Electromotoric actuator, 3-position (for valves 5.5 mm)		SQS35...	4573

*) Note: With PWM control, it is not possible to ensure exact parallel running of 2 or more thermal actuators.

If several fan coil systems are controlled by the same room thermostat, preference should be given to motorized actuators with ON/OFF or 3-position control

Electrical actuator, DC 0...10 V (for radiator valves)		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 valves 2.5 mm)		SSP61...	4864
Electrical actuator, DC 0...10 V (for small valves 5.5 mm)		SSB61...	4891
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	3009
Adapter plate 120 x 120 mm for 4" x 4" conduit boxes	ARG70	3009
Adapter plate 112 x 130 mm for surface wiring	ARG70.2	3009

Ordering

Product no.	Stock number	Designation
RDG100	S55770-T158	Room thermostat
RDG100T	S55770-T159	Room thermostat, with timer
RDG100T/H	S55770-T235	Room thermostat, with timer, landscape housing
RDG110	S55770-T160	Room thermostat
RDG140	S55770-T161	Room thermostat
RDG160	S55770-T162	Room thermostat

Order the **IRA211** infrared remote control separately (for RDG100T...).

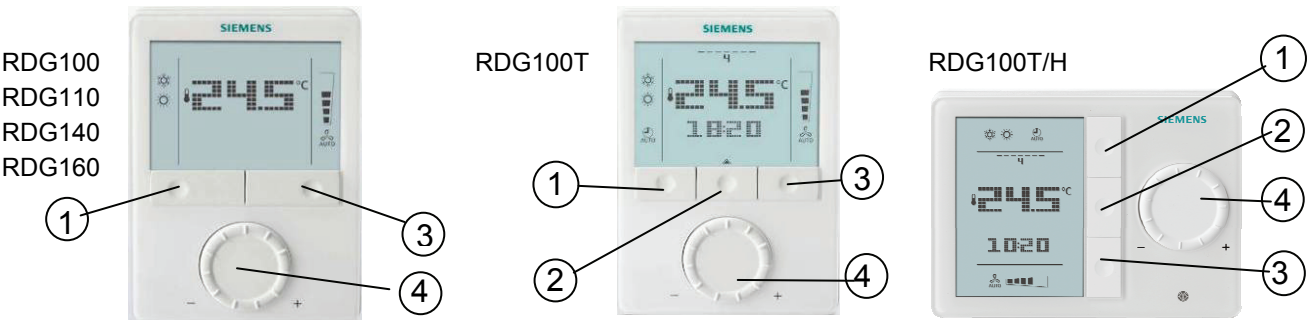
Order valve actuators separately.

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

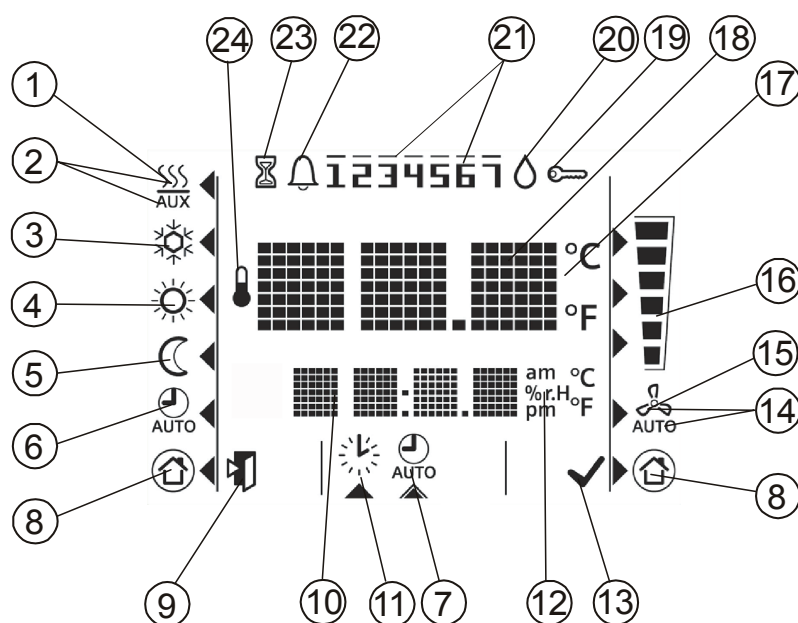
The housing engages in the mounting plate and is secured with 2 screws.

Operation and settings



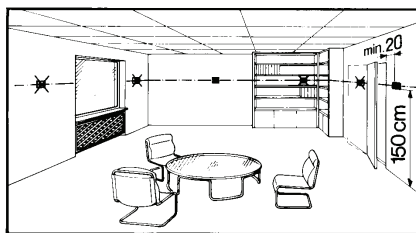
- 1 Operating mode selector / Esc
- 2 Button to enter the time and to set the timers
- 3 Fan mode selector / OK
- 4 Rotary knob for setpoint and parameter adjustment

Display



#	Symbol	Description	#	Symbol	Description
1		Heating mode	14		Automatic fan
2		Heating mode auxiliary heater on (2nd stage)	15		Manual fan
3		Cooling mode	16		Fan speed 1
4		Comfort mode			Fan speed 2
5		Economy 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

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

Adaptive temperature compensation for el. heating

- If an electrical heating is directly connected to output Y21, the load current of the electrical heating should be indicated in parameter P46. (RDG110 only, Index D and higher only). Default setting: 1 A for loads up to 1 A.

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

Rated voltage	AC 230 V
Frequency	50/60 Hz
Power consumption	Max. 18 VA
RDG100 / RDG100T / RDG100T/H / RDG110	2 W / 2 W / 1 W / 1.5 W

Outputs

Fan control Q1, Q2, Q3-N	AC 230 V
Rating	Max. 5(4) A

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

Inputs

Multifunctional inputs

X1-M / X2-M

Temperature sensor input

Type	QAH11.1 (NTC)
Temperature range	0...49 °C
Cable length	Max. 80 m

Digital input

Operating action	Selectable (NO/NC)
Contact sensing	DC 0...5 V, max. 5 mA
Parallel connection of several thermostats for one switch	Max. 20 thermostats per switch. Do not mix with D1!
Insulation against mains	N/A, mains potential

D1-GND

Operating action	Selectable (NO/NC)
Contact sensing	SELV DC 6...15 V, 3...6 mA
Parallel connection of several thermostats for one switch	Max. 20 thermostats per switch.
	Do not mix with X1 / X2!
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

Outputs

Inputs

Operational data, all types

Operating voltage	SELV AC 24 V ±20%
Frequency	50/60 Hz
Power consumption	Max. 2 VA
Fan control	
Q1, Q2, Q3-N (RDG140)	AC 230 V, max. 5(4) A
Y50-G0 (RDG160)	SELV DC 0...10 V
	Max. ± 1mA
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)
Temperature range	0...49 °C
Cable length	Max. 80 m
Digital input	
Operating action	Selectable (NO/NC)
Contact sensing	DC 0...5 V, max. 5 mA
Parallel connection of several thermostats for one switch	Max. 20 thermostats per switch. Do not mix with D1!
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
Parallel connection of several thermostats for one switch	Max. 20 thermostats per switch.
	Do not mix with X1 / X2!
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	
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)
 Economy 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	Selectable
Input X1	Ext. temperature sensor (P38=1)
Input X2	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
Standards and directives	Climatic conditions		Class 1K3
	Temperature		–25...60 °C
	Humidity		<95% r.h.
	 conformity		
	EMC directive		2004/108/EC
	Low-voltage directive		2006/95/EC
	 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
General	Special requirements for temperature-dependent controls		As per EN 60730–2-9
	Electronic control type		2.B (micro-disconnection on operation)
	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
	Note: For sensors on inputs X1, X2, or D1, the cable length is max. 80 m		
	Housing front color		RAL 9003 white
	Weight	RDG100... / RDG110 / RDG140	0.30 kg
		RDG160	0.25 kg

RDG100
RDG100T,
RDG100T/H

RDG110

RDG140

RDG160

Legend:

- 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

RDG100...

Application

- 2-pipe

YHC

- 2-pipe & radiator
- 4-pipe
- 2-stage

YHC YR
YH YC
1st 2nd

- 2-pipe & el. heater

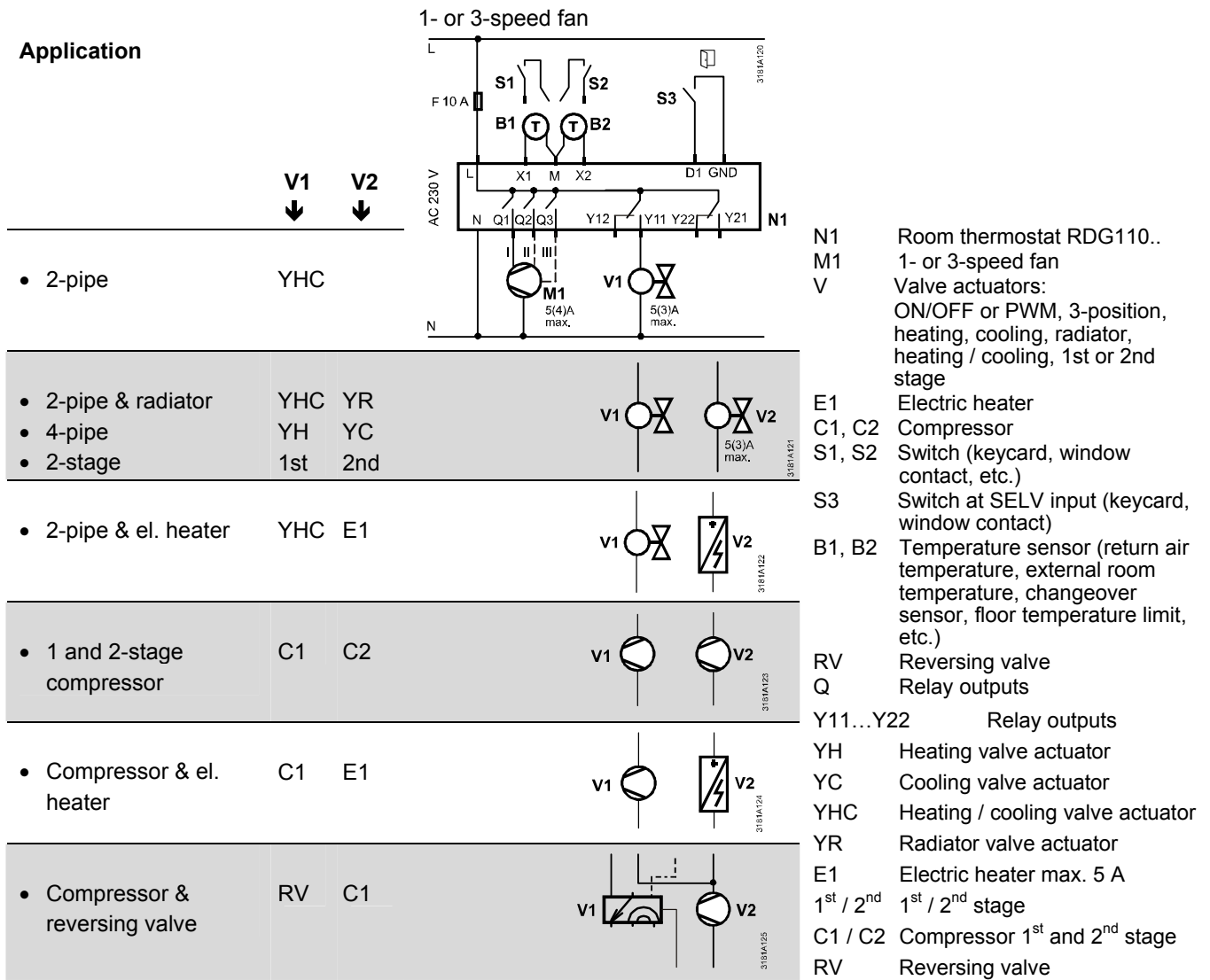
YHC E1

- 4-pipe & el. heater

YH YC
E1

N1 Room thermostat RDG100..
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 Electric heater
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.)
Q Relay outputs
Y1...Y4 Triac outputs
YH Heating valve actuator
YC Cooling valve actuator
YHC Heating / cooling valve
actuator
YR Radiator valve actuator
E1 Electric heater with relay /
contactor Y
1st / 2nd 1st / 2nd stage

Application



RDG140

Application

1- or 3-speed fan

V1
↓
V2
↓

- 2-pipe

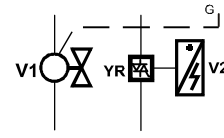
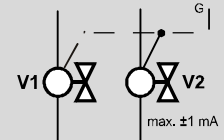
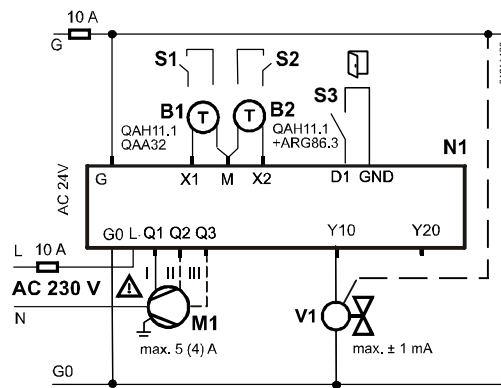
YHC

- 2-pipe & radiator
- 4-pipe
- 2-stage

YHC YR
YH YC
1st 2nd

- 2-pipe & el. heater

YHC E1



- N1 Room thermostat RDG140
M1 1- or 3-speed fan
V Valve actuators DC 0...10 V
Heating, cooling, radiator heating / cooling, 1st or 2nd stage
E1 Electric heater
YR DC 0...10 V controlled converter / current valve
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.)
Q Relay outputs
Y DC 0...10 V outputs
YH Heating valve actuator
YC Cooling valve actuator
YHC Heating / cooling valve actuator
YR Radiator valve actuator
E1 Electric heater with current valve YR
1st / 2nd 1st / 2nd stage

RDG160

Application

EMC fan DC 0...10 V

V1
↓
V2
↓

- 2-pipe

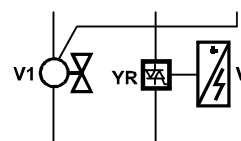
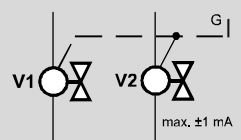
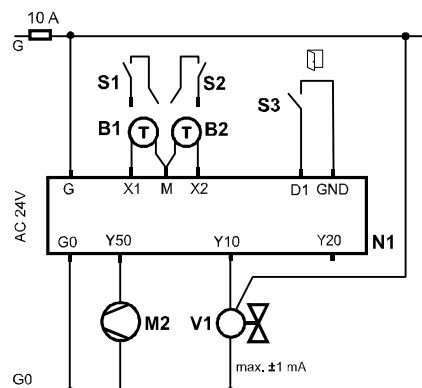
YHC

- 2-pipe & radiator
- 4-pipe
- 2-stage

YHC YR
YH YC
1st 2nd

- 2-pipe & el. heater

YHC E1



- N1 Room thermostat RDG160
M2 EMC fan DC 0...10 V
V Valve actuators DC 0...10 V
Heating, cooling, radiator heating / cooling, 1st or 2nd stage
E1 Electric heater
YR DC 0...10 V controlled converter / current valve
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.)
Y DC 0...10 V outputs
YH Heating valve actuator
YC Cooling valve actuator
YHC Heating / cooling valve actuator
YR Radiator valve actuator
YE Electric heater with current valve YR
1st / 2nd 1st / 2nd stage

Dimensions

All dimensions in mm

