



Room thermostat with KNX communications

RDG100KN

For fan coil unit applications

For universal applications

-
- **KNX bus communication (S-mode and LTE mode)**
 - **Backlit display**
 - **2P / PI / P control**
 - **Outputs for on/off, PWM or 3-position control**
 - **Outputs for 3-speed or 1-speed fan**
 - **3 multifunctional inputs for keycard contact, external sensor, etc.**
 - **Operating modes: Comfort, Economy and Protection**
 - **Automatic or manual fan speed control**
 - **Automatic or manual heating / cooling changeover**
 - **Minimum and maximum limitation of room temperature setpoint**
 - **Control depending on the room or the return air temperature**
 - **Adjustable commissioning and control parameters**
 - **Commissioning with Synco ACS700, ETS3 Professional or via local HMI**
 - **Integration into Synco**
 - **Integration into DESIGO via group addressing (ETS3) or via individual addressing**
 - **Integration into third-party system via group addressing (ETS3)**
 - **AC 230 V Operating voltage**

The RDG100KN room thermostat is 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 electric heater
- 2-pipe system and radiator / floor heating
- 4-pipe system
- 4-pipe system with electric 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 electric heater
- Chilled / heated ceiling and radiator / floor heating
- Chilled / heated ceiling, 2-stage cooling or heating

The room thermostats are delivered with a fixed set of applications.

The relevant application is selected and activated during commissioning using one of the following tools:

- Synco ACS
- ETS3 Professional (planned)
- Local DIP switch and HMI

Functions

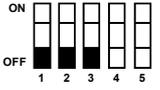
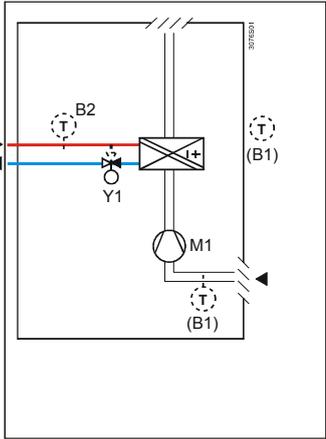
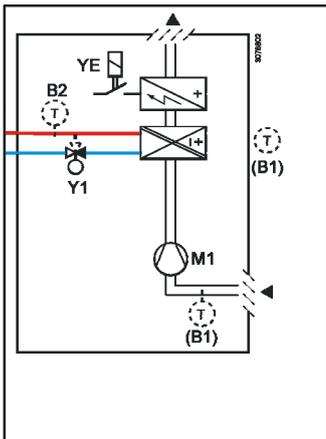
- Room temperature control via built-in temperature sensor or external room temperature / return air temperature sensor
- Changeover between heating and cooling mode (automatic via local sensor or bus, or manual)
- Selection of applications via DIP switches or commissioning tool (ACS700, ETS3 Professional)
- Select operating mode via operating mode button on the thermostat
- Temporary Comfort mode extension
- Single speed or 3-speed fan control (automatic or manual)
- Display of current room temperature or setpoint in °C and/or °F
- Minimum and maximum limitation of room temperature setpoint
- Button lock (automatic or manual)
- 3 multifunctional inputs, freely selectable for:
 - Operating mode switchover contact (keycard, window contact, etc.)
 - Sensor for automatic heating / cooling changeover
 - External room temperature or return air temperature sensor
 - Dewpoint sensor
 - Electric heater enable
 - Fault input
 - Monitor input for temperature sensor or switch status
- Advanced fan control function, e.g. fan kick, fan start, selectable fan operation (enable, disable or depending on heating or cooling mode)
- Purge function together with 2-port valve in a 2-pipe changeover system
- Reminder to clean fan filters
- Floor heating temperature limitation
- Reload factory settings for commissioning and control parameters

- KNX bus (terminals CE+ and CE-) for communication with Synco or KNX compatible devices
- Display of outside temperature or time of day via KNX bus
- Time scheduling and central control of setpoints via KNX bus
- With a Synco RMB7xx controller, the energy demand signal of the thermostat is used to optimize energy supply.

Applications

The thermostats support the following applications, which can be configured using the DIP-switches at the rear of the unit or a commissioning tool.

All DIP switches need to be set to OFF (remote configuration, factory setting) to select an application via commissioning tool.

Application	DIP switches
Remote configuration via commissioning tool (factory setting) <ul style="list-style-type: none"> • Synco ACS • ETS3 professional (planned) 	ON  OFF
Heating or cooling <ul style="list-style-type: none"> • 2-pipe fan coil unit • Chilled / heated ceiling 	ON  OFF
Heating or cooling with electric heater <ul style="list-style-type: none"> • 2-pipe fan coil unit and electric heater • Chilled / heated ceiling and el. heater 	ON  OFF

Note Use P46 / P47 to change output from ON/OFF (factory setting) to PWM
 Use DIP switches 4 and 5 to change output from ON/OFF to 3-position

<p>Heating or cooling and radiator / floor heating</p> <ul style="list-style-type: none"> • 2-pipe fan coil unit and radiator • Chilled / heated ceiling and radiator 		<table border="0"> <tr> <td>ON</td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>OFF</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> </table>	ON	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OFF	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		1	2	3	4	5
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<p>Heating and cooling</p> <ul style="list-style-type: none"> • 4-pipe fan coil unit • Chilled ceiling and radiator 		<table border="0"> <tr> <td>ON</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>OFF</td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> </table>	ON	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OFF	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		1	2	3	4	5
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<p>Heating and cooling and electric heater</p> <ul style="list-style-type: none"> • 4-pipe fan coil unit and electric heater 		<table border="0"> <tr> <td>ON</td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>OFF</td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> </table>	ON	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OFF	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		1	2	3	4	5
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<p>2-stage heating or cooling</p> <ul style="list-style-type: none"> • 2-stage fan coil unit • 2-stage chilled / heated ceiling 		<table border="0"> <tr> <td>ON</td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td>OFF</td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td></td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> </table>	ON	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OFF	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		1	2	3	4	5
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Note Use P46 / P47 to change output from ON/OFF (factory setting) to PWM
Use DIP switches 4 and 5 to change output from ON/OFF to 3-position

Type summary

Product no.	Stock no.	Features				
		Operating voltage	Number of control outputs			Backlit LCD
			ON/OFF	PWM	3-pos.	
RDG100KN	S55770-T163	AC 230 V	3 ¹⁾	2 ¹⁾	2 ¹⁾	✓

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

Ordering

- When ordering, indicate both product number / stock number and name:
- E.g. **RDG100KN / S55770-T163 room thermostat**
- Order valve actuators separately.

Equipment combinations

	Description		Product no.	Data sheet
	Cable temperature sensor		QAH11.1	1840
	Room temperature sensor		QAA32	1747
	Condensation detector / extension module		QXA2000 / QXA2001 / AQX2000	1542
On / off actuators	Electromotoric ON/OFF actuator		SFA21...	4863
	Electromotoric ON/OFF valve and actuator (only available in AP, UAE, SA and IN)		MVI... / MXI...	4867
	Zone valve actuator (only available in AP, UAE, SA and IN)		SUA...	4830
On / off and PWM actuators *)	Thermal actuator (for radiator valves)		STA21...	4893
	Thermal actuator (for small valves 2.5 mm)		STP21...	4878
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
	Electrical actuator, 3-position (for small valve 5,5 mm)		SSD31...	4861

*) With PWM control, it is not possible to ensure exact parallel running of more than one thermal actuator. 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.

Accessories

Description	Product no. / stock no.	Data sheet
Changeover mounting kit (50 pcs / package)	ARG86.3	N3009
Adapter plate 120 x 120 mm for 4" x 4" conduit boxes	ARG70	N3009
Adapter plate 112 x 130 mm for surface wiring	ARG70.2	N3009
KNX Power supply 160 mA (Siemens BT LV)	5WG1 125-1AB01	--
KNX Power supply 320 mA (Siemens BT LV)	5WG1 125-1AB11	--
KNX Power supply 640 mA (Siemens BT LV)	5WG1 125-1AB21	--

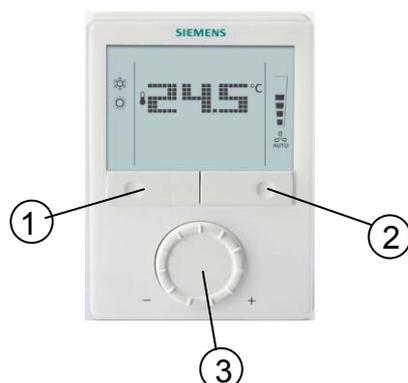
Mechanical design

The room thermostat consists of 2 parts:

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

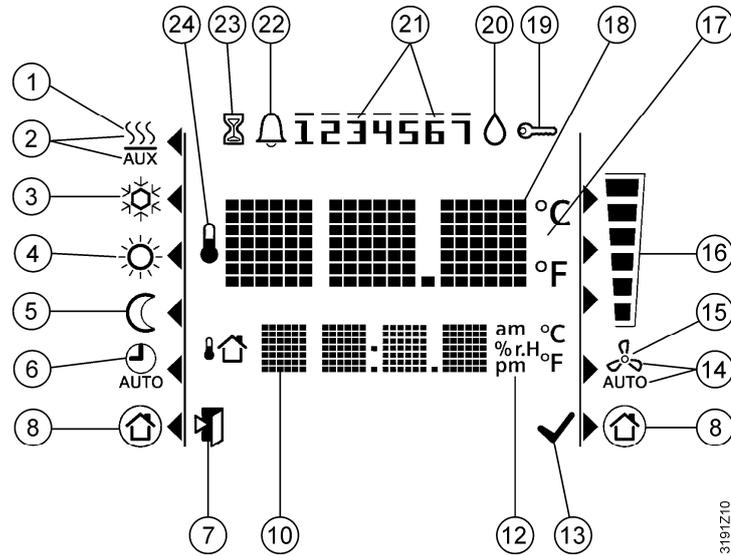
The housing engages in the mounting plate and is secured with 2 screws.

Operation and settings



- 1) Operating mode button / Esc
- 2) Fan mode button / Ok
- 3) Rotary knob to adjust setpoints and parameters

Display



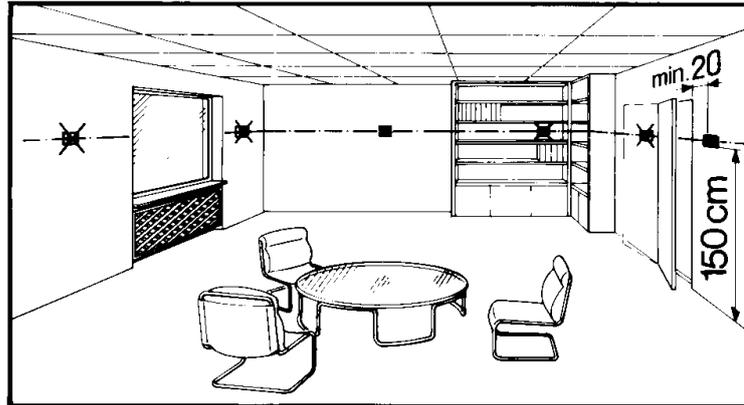
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#	Symbol	Description	#	Symbol	Description	
1		Heating mode	14		Automatic fan	
2		Heating mode, electric heater active	15		Manual fan	
3		Cooling mode	16			Fan speed 1
4		Comfort				Fan speed 2
5		Economy				Fan speed 3
6		Auto Timer mode according to schedule (via KNX)	17		Degrees Celsius Degrees Fahrenheit	
8		Protection mode	18		Digits for room temperature and setpoint display	
9		Escape	19		Button lock	
10		Additional user information, like outdoor temperature or time of day from KNX bus. Selectable via parameters	20		Condensation in room (dewpoint sensor active)	
12		Morning: 12-hour format Afternoon: 12-hour format	21		Weekday 1...7 from KNX bus 1 = Monday / 7 = Sunday	
13		Confirmation of parameters	22		Fault	
			23		Temporary timer function; visible when operating mode is temporarily extended (extended presence or absence)	
			24		Indicates that room temperature is displayed	

See the "Reference documentation", page 12 for information on how to engineer the KNX bus (topology, bus repeaters, etc.) and how to select and dimension connecting cables for supply voltage and field devices.

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



- Mount the room thermostat on a clean, dry indoor place without direct airflow from a heating / cooling device, and not exposed to drips or splash water.

Wiring

See the mounting instructions M3191 enclosed with the thermostat.



- Comply with local regulations to wire, fuse and earth the thermostat.
- Properly size the cables to the thermostat, fan and valve actuators for AC 230 V mains voltage.
- Use only valve actuators rated for AC 230 V.
- The AC 230 V mains supply line must have an external fuse or circuit breaker with a rated current of no more than 10 A.
- Isolate the cables of input D1-GND for 230 V if the conduit box carries AC 230 V mains voltage.
- X1-M, X2-M or D1-GND: several switches (e.g. summer/winter switch) may be connected in parallel. Consider overall maximum contact sensing current for switch rating.
- Inputs X1-M and X2-M carry mains potential.
Sensor cables must be suited for AC 230 V mains voltage
- Isolate the cables of KNX communication input CE+ / CE- for 230 V if the conduit box carries AC 230 V mains voltage.
- No cables provided with a metal sheath.
- Disconnect from supply before removing from the mounting plate.

Applications

The room thermostats are delivered with a fixed set of applications.

Select and activate the relevant application during commissioning using one of the following tools:

- Local DIP switch and HMI
- Synco ACS
- ETS3 Professional (planned)

Set the DIP switches before snapping the thermostat to the mounting plate, if you want to select an application via **DIP switches**.

All DIP switches need to be set to “OFF” (“remote configuration”), if you want to select an application via **commissioning tool**.

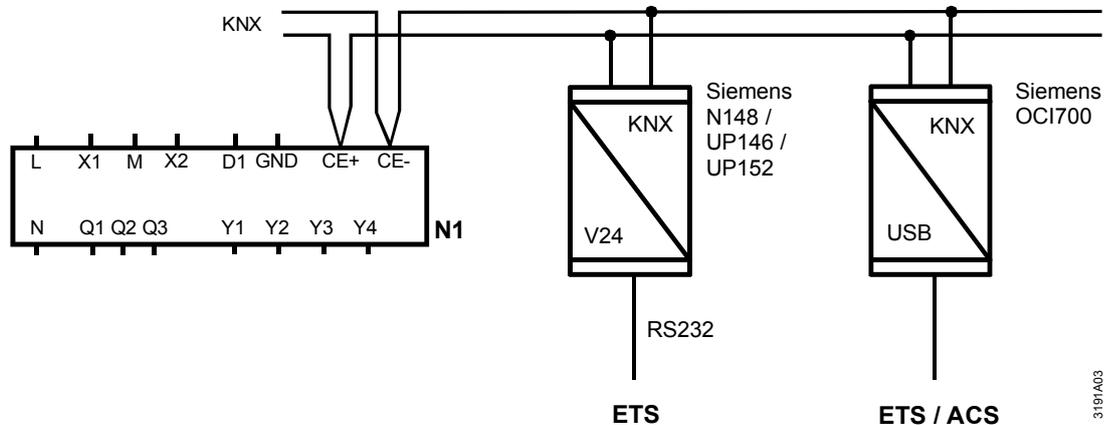
After power is applied, the thermostat resets and all LCD segments flash, indicating that the reset was correct. After the reset, which takes about 3 seconds, the thermostat is ready for commissioning by qualified HVAC staff.

If all DIP switches are OFF, the display reads "NO APPL" to indicate that application commissioning via a tool is required.

Note Each time the application is changed, the thermostat reloads the factory setting for all control parameters, except for KNX device and zone addresses!

Connect tool

Connect the Synco ACS or ETS3 Professional tools to the KNX bus cable at any point for commissioning:



ACS and ETS3 require an interface:

- RS232 KNX interface (e.g. Siemens N148 / UP146 / UP152)
- OCI700 USB- KNX interface

Note An external KNX bus power supply is required if an RDG100KN is connected directly to a tool (ACS or ETS3) via KNX interface.

Control parameters

The thermostat's control parameters can be set to ensure optimum performance of the entire system (see basic documentation P3191).

The parameters can be adjusted using

- Local HMI
- Synco ACS
- ETS3 Professional (planned)

Control sequence

- The control sequence may need to be set via parameter P01 depending on the application. The factory setting is as follows:

Application	Factory setting P01
2-pipe and chilled / heated ceiling, and 2-stage	1 = Cooling only
4-pipe, chilled ceiling and radiator	4 = Heating and cooling

Calibrate sensor

- Recalibrate the temperature sensor if the room temperature displayed on the thermostat does not match the room temperature measured (after min. 1 hour of operation). To do this, change parameter P05.

Setpoint and 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.

Programming mode

The programming mode helps identify the thermostat in the KNX network during commissioning.

Press the left and right buttons simultaneously for 6 sec to activate programming mode, which is indicated on the display with "PrO9".

Programming mode remains active until thermostat identification is complete.

Assign KNX group addresses

Use ETS3 Professional to assign the KNX group addresses of the RDG communication objects.

KNX serial number

Each device has a unique KNX serial number inside the plastic housing.

An additional sticker with the same KNX serial number is enclosed in the packaging box. This sticker is intended for installers for documentation purposes.

Disposal



This device is classified as waste electronic equipment under European Directive 2002/96/EC (WEEE) and may not be disposed of as unsorted municipal waste.

Adhere to all relevant national laws.

Regarding disposal, use the systems setup for collecting electronic waste.

Observe all local and applicable laws.

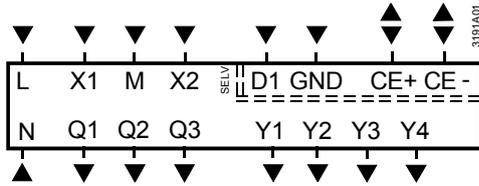
Technical data

⚠ Power supply	Operating voltage	AC 230 V + 10/-15%
	Frequency	50/60 Hz
	Power consumption	Max. 15 VA / 2 W
Outputs	Fan control Q1, Q2, Q3-N	AC 230 V
	Rating	Max. 5(4) A
	Control outputs Y1, Y2, Y3, Y4-N	Solid state (Triac) AC 230 V, max. 1 A
Inputs	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 of inputs	Selectable
	External temperature sensor, heating/cooling changeover sensor, operating mode switchover contact, dewpoint monitor contact, enable electric heater contact, fault contact, monitoring input	X1: P38 X2: P40 D1: P42
KNX bus	Interface type	KNX, TP1-64 (electrically isolated)
	Bus current	20 mA
	Bus topology:	See KNX manual (reference documentation, see below)
Operational data	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	(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 (0...8)
	Input X1 default value	(P38) 1 (Ext. temperature sensor, room or return air)
	Input X2 default value	(P40) 0 (no function)
	Input D1 default value	(P42) 3 (Operating mode switchover)
	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	IEC 721-3-3	
	Climatic conditions	Class 3K5	
	Temperature	0...50 °C	
	Humidity	<95% r.h.	
	Transport	IEC 721-3-2	
	Climatic conditions	Class 2K3	
	Temperature	-25...60 °C	
	Humidity	<95% r.h.	
	Mechanical conditions	Class 2M2	
	Storage	IEC 721-3-1	
	Climatic conditions	Class 1K3	
	Temperature	-25...60 °C	
	Humidity	<95% r.h.	
	Standards and directives	 CE conformity	
		EMC directive	2004/108/EC
Low-voltage directive		2006/95/EC	
 C-tick conformity to EMC emission standard		AS/NZS 61000.6.3: 2007	
 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 (micro-disconnection on operation)	
Home and Building Electronic Systems		EN 50090-2-2	
General	Electromagnetic compatibility		
	Emissions (residential)	IEC/EN 61000-6-3	
	Immunity (industrial and residential)	IEC/EN 61000-6-2	
	Safety class	II as per EN 60730	
	Pollution class	Normal	
	Degree of protection of housing	IP30 as per EN 60529	
	Connection terminals	Solid wires or stranded wires with wire end sleeves 1 x 0.4...2.5 mm ² or 2 x 0.4...1.5 mm ²	
	Housing front color	RAL 9003 white	
	Weight without / with packaging	0.377 kg / 0.4 00kg	

Reference documentation	Handbook for Home and Building Control - Basic Principles (www.knx.org/uk/news-press/publications/publications/)
	Synco CE1P3127 Communication via the KNX bus for Synco 700, 900 and RXB/RXL Basic documentation
DESIGO	CM1Y9775 DESIGO RXB integration – S-mode CM1Y9776 DESIGO RXB / RXL integration – individual addressing CM1Y9777 Third-party integration CM1Y9778 Synco integration CM1Y9779 Working with ETS

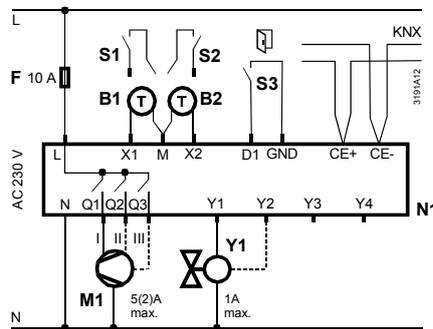
Connection terminals



L, N	Operating voltage AC 230 V
X1, X2	Multifunctional input for temperature sensor (e.g. QAH11.1) or potential-free switch Factory setting: – X1 = External temperature sensor – X2 = No function (function can be selected via parameters P38 / P40).
M	Measuring neutral for sensors and switches
D1, GND	Multifunctional input for potential-free switch Factory setting: Operating mode switchover contact (function can be selected via parameter P42).
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
Y1...Y4	Control output “Valve” AC 230 V (NO contact, for normally closed valves), output for electric heater via external relay
CE+	KNX data +
CE-	KNX data –

Connection diagrams

Application

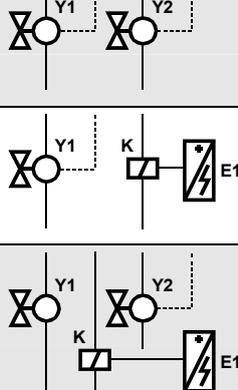


- 2-pipe

- 2-pipe and radiator
- 4-pipe
- 2-stage

- 2-pipe and electric heater

- 4-pipe and electric heater



N1	Room thermostat RDG100KN
M1	1- or 3-speed fan
V1, V2	Valve actuators: ON/OFF or PWM, 3-position, heating, cooling, radiator, heating / cooling, 1st or 2nd stage
E1	Electric heater
K	Relay
F	External fuse
S1, S2	Switch (keycard, window contact, presence detector, etc.)
S3	Switch at SELV input (keycard, window contact)
B1, B2	Temperature sensor (return air temperature, external room temperature, changeover sensor, etc.)
CE+	KNX data +
CE-	KNX data –

