Semi flush-mount room thermostat with KNX communications   RDU341

For VAV heating and cooling systems

- KNX bus communications (S-mode and LTE mode)
- Backlit display
- PI / P control
- Outputs for DC 0…10 V actuator and AC 230V electric heater (on/off)
- Output signal inversion as an option (DC 0...10 V $\rightarrow$ DC 10...0 V)
- 2 multifunctional inputs for keycard contact, external sensor, etc.
- Operating modes: Comfort, Economy and Protection
- Control depending on the room or the return air temperature
- Automatic or manual heating/cooling changeover
- Minimum and maximum limitation of room temperature setpoint
- Adjustable minimum and maximum limitation for air flow signal DC 0..10V
- Adjustable commissioning and control parameters
- Commissioning with Synco ACS700, ETS or via local HMI
- Integration into Synco
- Integration into DESIGO and Apogee via group addressing (ETS) or via individual addressing
- Integration into third-party system via group addressing (ETS)
- Mounting on recessed square conduit box, 60.3 mm fixed centers
- AC 24 V operating voltage

Use

Room temperature control (heating or cooling) in individual rooms and zones by means of:

- Heated or cooled by single duct system
- Heated or cooled by single duct system with electric heater.

The RDU341 is suitable for use with VAV systems in connection with the VAV compact controllers, e.g. types G…B181.1E/3.

The RDU341 controls

- One DC 0…10 V actuator
- One DC 0…10 V actuator and AC 230V 1-stage electric heater

Used in systems with:

- Heating or cooling mode
- Automatic heating/cooling changeover
- Manual heating/cooling changeover
- Heating and cooling single duct (single duct with electric heater)

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:
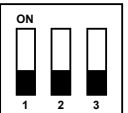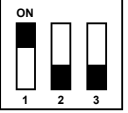
- Synco ACS
- ETS
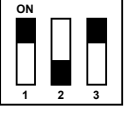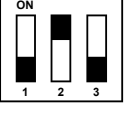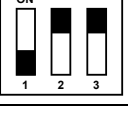- Local DIP switch and HMI

Functions

- Maintain room temperature 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)
- Select application via DIP switches or commissioning tool (ACS700, ETS)
- Select operating mode via operating mode button on the thermostat
- Temporary Comfort mode extension
- Display current room temperature or setpoint in °C and/or °F
- Minimum and maximum limitation of room temperature setpoint
- Minimum and maximum limitation of air flow signal DC 0...10 V
- Button lock (automatic and manual)
- Two multifunctional inputs, freely selectable for:
  – Operating mode switchover contact (keycard)
  – Automatic heating/cooling changeover sensor
  – External room temperature sensor or return air temperature sensor
  – Dewpoint sensor
  – Electric heater enable
  – Fault input
  – Monitor input for temperature sensor or switch status
- Reload factory settings for commissioning and control parameters
- KNX bus (terminals CE+ and CE-) for communication with Synco or KNX compatible devices
- Display of outdoor temperature or time of day via KNX bus
- Time scheduling and central control of setpoints via KNX bus

- With a Synco RMB7xx or RMUxx controller, the air demand signal of the thermostat is used to optimize supply air temperature.

Applications

The thermostat supports the following applications, which can be configured using the DIP-switches on the inner side of the thermostat's front panel or a commissioning tool.

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

	Applications and control output	DIP-switches
	Remote configuration via commissioning tool (factory setting) • Synco ACS • ETS	
Single duct	Single duct heating or cooling DC 0...10 V output signal normal	
	Single duct heating or cooling *DC 10...0 V output signal inverted*	
Single duct with electric heater	Single duct heating and cooling, with electric heater DC 0...10 V output signal normal	
	Single duct heating and cooling, with electric heater *DC 10...0 V output signal inverted*	

Type summary

Product number	Stock number	Operating voltage	Control outputs			Housing color
			3 pt	on/off	DC 0..10 V	
RDU341	S55770-T106	AC 24 V	--	✓	✓	white

Ordering

- When ordering, indicate both product number / stock number and name:
- E.g. **RDU341 / S55770-T106 room temperature thermostat**
- Order valve actuators separately.

Equipment combinations

	Type of unit		Product no.	Data sheet
	Cable temperature sensor, cable length 2.5 m NTC (3 kΩ at 25 °C)		**QAH11.1**	1840
	Room temperature sensor NTC (3 kΩ at 25 °C)		**QAA32**	1747
	Condensation detector / Supply unit		**QXA2000 / QXA2001 / AQX2000**	1542
DC 0…10 V actuators	Electrical actuator, DC 0..10V (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..10V (for small valve 2,5 mm)		**SSP61…**	4864
	Electrical actuator, DC 0..10V (for small valves 5.5 mm)		**SSB61...**	4891
	Electrical actuator, DC 0..10 V (for Combi-valve VPI45)		**SSD61...**	4861
	Electromotoric actuator, DC 0..10V (for valves 5.5 mm)		**SQS65…**	4573
	Thermal actuator, DC 0..10V (for small valves and radiator valves)		**STS61**	4880
	DC 0…10 V damper actuator		**GQD161…**	4605
			GDB161…	4634
			GLB161…	
			GMA161…	4614
			GEB161…	4621
			GCA161…	4613
			GBB161…	4626
			GIB161…	
	VAV compact controller		**GDB181.1E/3**	3544
			GLB181.1E/3	

Accessories

Type of unit	Product number Stock number	Data sheet
Changeover mounting kit (50 pcs/package)	**ARG86.3**	N3009
Plastic mounting bracket for semi-flush-mount thermostats for increasing the headroom in the conduit box by 10 mm	**ARG70.3**	N3009
Conduit box for semi-flush-mount thermostat	**ARG71 / S55770-T137**	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 thermostat consists of 2 parts:

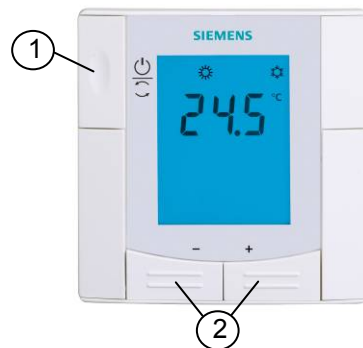- Front panel with electronics, operating elements and built-in room temperature sensor.
- Mounting base with the power electronics.

The rear of the mounting base contains the screw terminals.
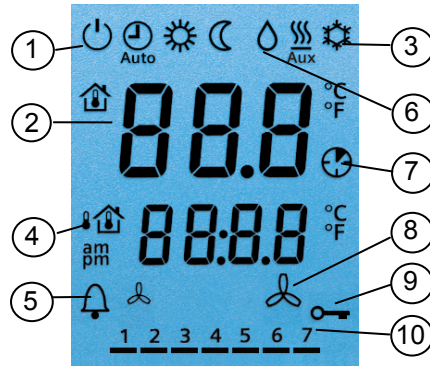The base fits on a square conduit box with 60.3 mm fixed centers.
Slide the front panel in the mounting base and snap on.

Operation and settings

1 Operating mode selector / Protection
2 Adjust setpoint and control parameters

Display

1 Operating mode
  ◯ Protection
  ☼ Comfort
  ☾ Economy
  🕐 Auto Timer according to schedule
  Auto (via KNX)

2 Displays room temperature, setpoints
  and control parameters.
  🏠 Symbol indicates the current room
  temperature

3 Heating/cooling mode
  ✿ Cooling
  〽 Heating,
  〽 Electric heater active
  Aux

4 Additional user information, like outdoor
  temperature 🏠 or time of day from
  KNX bus

5 🔔 Indicates fault or reminder

6 ⬥ Condensation in room
  (dewpoint sensor active)

7 🕐 Temporary comfort prolong active

8 ⚘ ⚘ Primary fan is active (only sup-
  ported with Synco700 primary controller)

9 ⊶ Button lock active

10 1 2 3 4 5 6 7
  Weekday 1…7 from KNX bus
  (1 = Monday / 7 = Sunday)

Engineering notes

See "Reference documentation" on page 11 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

Mount the room thermostat on a recessed square conduit box with 60.3mm fixed centers. 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.
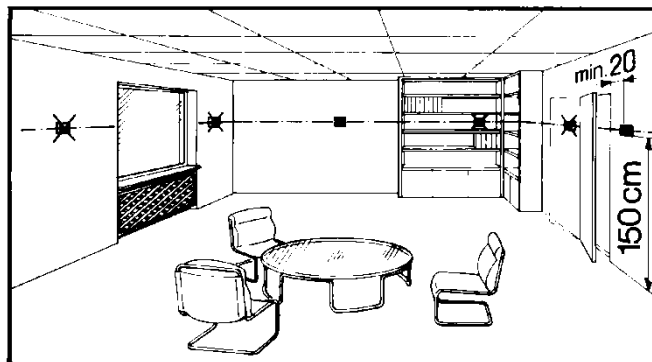
Mounting ⚠

- 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.
- In case of limited space in the conduit box use the mounting bracket ARG70.3 to increase the headroom by 10mm

Wiring	See the mounting instructions M3172 enclosed with the thermostat.

⚠
⚡

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

Warning!

No internal line protection for supply lines to external consumers (Y10, Y21)

Risk of fire and injury due to short-circuits!

- Adapt the line diameters as per local regulations to the rated value of the installed overcurrent protection device.

⚠

- The AC 230 V mains supply line and the AC 24 V supply line must have an external circuit breaker with a rated current of no more than 10 A. For US installations use Class 2 rated power supplies.

⚠

- Isolate the cables of SELV inputs X1-M/X2-M for 230 V if the conduit box carries AC 230 V mains voltage.
- Inputs X1-M or X2-M 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.

⚠

- Isolate the cables of KNX communication input CE+ / CE- for 230 V if the conduit box carries AC 230 V mains voltage.
- Disconnect from supply before opening the cover.

Commissioning notes

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

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

– Local DIP switch and HMI
– Synco ACS
– ETS

Set the DIP switches before snapping the front panel 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 "NONE" to show that an application needs to be set via tool.

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 ETS tools to the KNX bus cable at any point for commissioning:
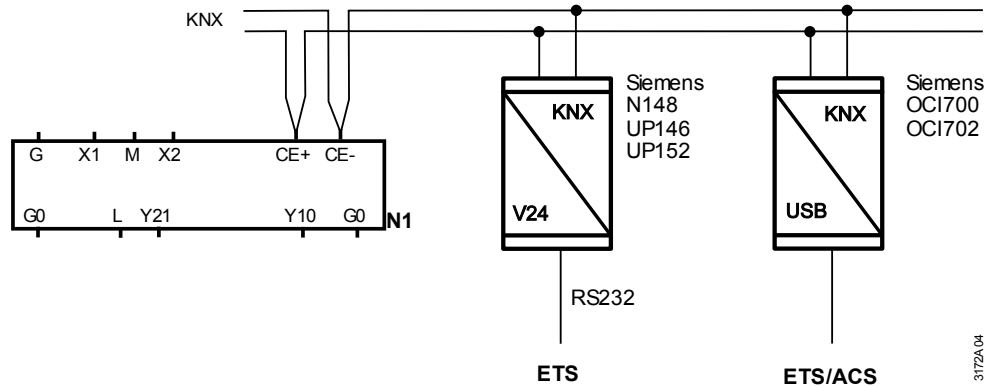
ACS and ETS tools require an interface:

– RS232 KNX interface (e.g. Siemens N148 / UP146 / UP152)
– OCI700, OCI702 USB- KNX interface

Note   An external KNX bus power supply is required if an RDU341 is connected directly to a tool (ACS or ETS) via KNX interface.

Control parameters

The thermostat's control parameters can be set to ensure optimum performance of the entire system (see basic documentation P3172).
The parameters can be adjusted using
– Local HMI
– Synco ACS
– ETS

Control sequence

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

Calibrate sensor

- Recalibrate the temperature sensor if the room temperature displayed on the thermostat does not match the room temperature measured (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 buttons "operating mode" ⏻ and "+" 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 ETS tool to assign the KNX group addresses of the RDU communication objects.

KNX serial number

Each device has a unique KNX serial number inside the front panel. 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

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

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

Technical data

⚠ Power supply	Operating voltage	SELV AC 24 V / DC 24 V
		or
	DC 24 V: connect G to + and G0 to -	AC 24 V / DC 24 V class 2 (US)
	Rated voltage	AC 24 V
	Frequency	50/60 Hz
	Power consumption	Max. 2.5 VA / 0.9 W
	External supply line protection (EU)	Circuit breaker max. 10 A Characteristic B, C, D according to EN 60898
		or
		Power source with current limitation of max. 10 A
⚡	**No internal fuse.** External preliminary protection with max. C 10 A circuit breaker in the supply lines required under all circumstances.	
	Input voltage L for Y21	AC 230 V +10/-15%
	Frequency	50/60 Hz
Outputs	Control output Y21-N (N.O.)	AC 230 V
	Rating	Max. 5(2) A
	Control output Y10-G0	SELV DC 0…10 V
	Resolution	39 mV
	Current	Max. ±1 mA
Inputs	Multifunctional input X1-M/X2-M	
	Temperature sensor input:	
	Type	QAH11.1 (NTC)
	Digital input:	
	Operating action	Selectable (N.O./N.C.)
	Contact sensing	SELV DC 0...5 V/max 5 mA
	Insulation against mains voltage (SELV)	4 kV, reinforced insulation
	Function input:	Selectable
	External temperature sensor, heating/cooling changeover sensor, operating mode switchover contact, dewpoint monitor contact, enable electric heater contact, fault contact, monitor input	X1: P38 X2: P40
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...6K)
	Cooling mode	(P31)	1 K (0.5...6K)
	Setpoint setting and range		
	☀ Comfort	(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 input X1/X2		Selectable 0...8
	Input X1 default value	(P38)	3 (Operating mode switchover)
	Input X2 default value	(P40)	1 (External temperature sensor)
	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 60721-3-3
	Climatic conditions		Class 3K5
	Temperature		0...+50 °C
	Humidity		<95 % r.h.
	Transport		As per IEC 60721-3-2
	Climatic conditions		Class 2K3
	Temperature		−25...+60 °C
	Humidity		<95 % r.h.
	Mechanical conditions		Class 2M2
	Storage		As per IEC 60721-3-1
	Climatic conditions		Class 1K3
	Temperature		−25...+60 °C
	Humidity		<95 % r.h.
Standards and directives	EU Conformity (CE)		CE1T3171xx [*]
	⬙ RCM conformity		CE1T3171en_C1 [*]
	Electronic control type		2.B (micro-disconnection on operation)
	Safety class		II as per EN 60730-1
	Pollution class		II as per EN 60730-1
	Degree of protection of housing		IP 30 as per EN 60529
General	Connection terminals		Solid wires or prepared stranded wires $1 \times 0.4…2.5 \text{ mm}^2$ or $2 \times 0.4…1.5 \text{ mm}^2$
	Housing front color		RAL 9003 white
	Weight without / with packaging		0.163 kg / 0.233 kg

[*] The documents can be downloaded from http://siemens.com/bt/download.
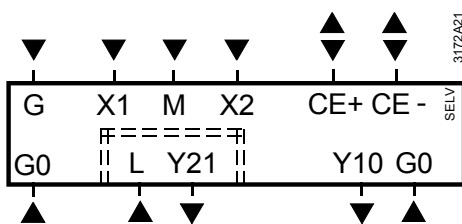
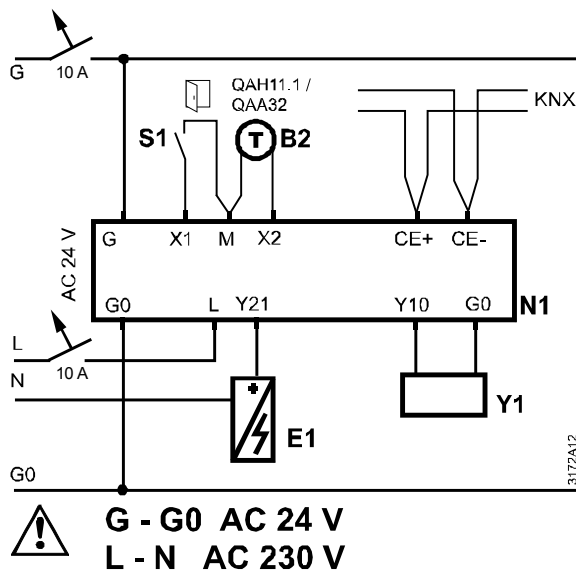| Reference documentation | Handbook for Home and Building Control - Basic Principles |
	(http://www.knx.org/knx-en/training/books-documentation/knx-association-books/index.php)
Synco	CE1P3127 Communication via the KNX bus for Synco 700, 900 and RXB/RXL Basic documentation
DESIGO	CM1Y9775 DESIGO RXB integration – S-mode
	CM1Y9776 DESIGO RXB / RXL integration – individual addressing
	CM1Y9777 Third-party integration
	CM1Y9778 Synco integration
	CM1Y9779 Working with ETS
Apogee	Installation Instruction: KNX Driver for PXC Modular; Document No. 565-132
	Technical Spec Sheet: KNX Driver for PXC Modular; Document No. 127-1676
	Technical Reference for KNX Driver; Document No. 140-0804
	Application 6205 Point Map for RDU

Connection terminals

G, G0	Operating voltage SELV AC 24 V
L	Supply for electric heater AC 230 V
X10, G0	Output for damper, VAV compact controller
Y21	Output for electric heater
X1, X2	Multifunctional input for temperature sensor (e.g. QAH11.1) or potential-free switch
	Factory setting:
	– X1 = Operating mode switchover contact
	– X2 = External sensor
	(function can be selected via parameter P38 / P40).
M	Measuring neutral for sensor and switch
CE+	KNX data +
CE-	KNX data -

Connection diagram

N1	Room thermostat RDU341
V1	Damper actuator, VAV compact controller
E1	Electric heater
S1, S2	Switch (keycard, window contact, etc.)
B1, B2	Temperature sensor (return air temperature, external room temperature, changeover sensor, etc.)
CE+	KNX data +
CE-	KNX data -

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

Dimensions

Dimensions in mm

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Subject to change

Siemens
Building Technologies

RDU341   Semi flush-mount room thermostat with KNX communications

CE1N3172en
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