SIEMENS

3079

RDF302

Semi flush-mount room thermostats with RS485 Modbus communications

RDF302

For 2-pipe, 2-pipe with electrical heater, and 4-pipe fan coil units
For use with compressors in DX type equipment

- **RS485 communicative interface in Modbus RTU slave mode**
- **Backlit display**
- **2P / PI / P control**
- **Outputs for on/off or 3-position control**
- **Outputs for 3-speed or 1-speed fan**
- **2 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 via local HMI or RS485 Modbus**
- **Mounting on recessed rectangular conduit box, 60.3 mm fixing centers**
- **AC 230 V operating voltage**

Use

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

- 2-pipe fan coil units
- 2-pipe fan coil units with electrical heater
- 4-pipe fan coil units
- Compressors in DX-type equipment
- Compressors in DX-type equipment with electrical heater

The RDF302 controls:

- One single or 3-speed fan
- One or two on/off valve actuators
- One on/off valve actuator and one 1-stage electrical heater
- One 3-position valve actuator
- One 1-stage compressor in DX-type equipment, or one 1-stage compressor with electrical heater

Used in systems with:

- Heating or cooling mode
- Automatic heating/cooling changeover
- Manual heating/cooling changeover
- Heating and cooling mode (e.g. 4-pipe system)

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:

- Local DIP switch and HMI
- Modbus commissioning tools

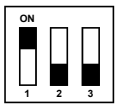
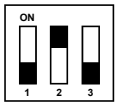
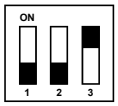
Functions

- Maintain room temperature via built-in temperature sensor or external room temperature/return air temperature sensor
- Changeover between heating and cooling mode (automatic changeover via local sensor/bus or manual changeover)
- Select application via DIP switches or commissioning tools
- Select operating mode via operating mode button on the thermostat
- Single speed or 3-speed fan control (automatic or manual)
- Display current room temperature or setpoint in °C and/or °F
- Minimum and maximum limitation of room temperature setpoint
- Button lock (automatic, manual or via bus)
- 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
  - Dew point sensor
  - Electrical heater enabled
  - 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 filters

- Floor heating temperature limit
- Reload factory settings for commissioning and control parameters
- RS 485 Modbus (terminals +, - and REF) for communication with Modbus compatible devices
- Display of outdoor temperature or time of day via Modbus

Applications

The thermostats support 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 tools.

	Applications and control outputs	DIP-switches
	Remote configuration via commissioning tools (factory setting)	
2-pipe fan coil unit heating or cooling	2-pipe on/off 1-stage compressor on/off	
	2-pipe, modulating, 3-position	
2-pipe fan coil unit with electrical heater heating or cooling	2-pipe with electrical heater on/off 1-stage compressor with electrical heater on/off	
4-pipe fan coil unit heating and cooling	4-pipe on/off Compressor on/off	

Ordering

Product number	Stock number	Designation
RDF302	S55770-T238	Room thermostat

Only standard white color (RAL 9003) is available.

Order valve actuators separately.

Equipment combinations

	Type of unit	Product no.	Data sheet
	Cable temperature sensor 	**QAH11.1**	1840
	Room temperature sensor 	**QAA32**	1747
	Condensation detector / Supply unit 	**QXA2000 / QXA2001 / 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...**	4893
	Thermal actuator (for small valves 2.5 mm) 	**STP21...**	4878
	Zone valve actuators (only available in AP, UAE, SA and IN) 	**SUA…**	4830
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 small valve 5,5 mm) 	**SSD31...**	4861
	Electromotoric actuator, 3-position (for valves 5.5 mm) 	**SQS35…**	4573

Accessories

Type of unit	Product no./SSN	Data sheet
Changeover mounting kit (50 pieces/package)	**ARG86.3**	N3009
Plastic mounting bracket for semi-flush-mount thermostats for increasing the headroom in the conduit box by 10mm	**ARG70.3**	N3009
Conduit box for semi-flush mounted thermostat	**ARG71/S55770-T137**	N3009

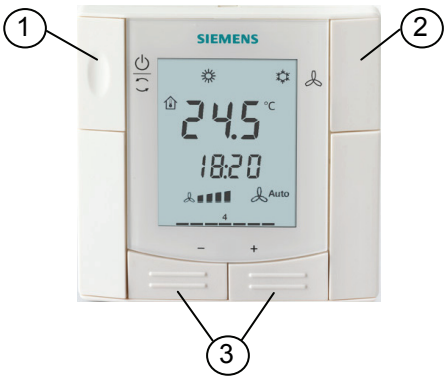
Mechanical design

The thermostats consist of 2 parts:

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

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

Operation and settings



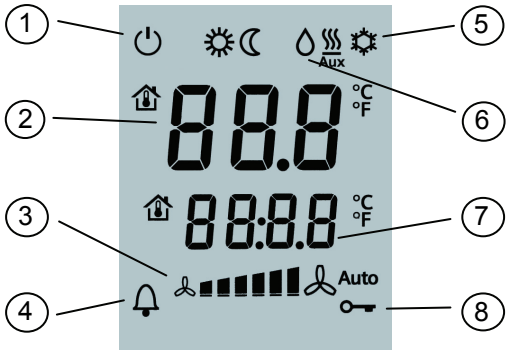
RDF302

1 Operating mode selector

2 Change fan operation

3 Adjust setpoints and control parameters

Display



1 Operating mode
- Protection
- Comfort
- Economy

2 Displays room temperature, setpoints and control parameters
- Symbol indicates current room temperature

3 Fan mode
- Auto — Auto fan active
- Fan speed low, medium, high

4 Indicates fault or reminder

5 Heating/cooling mode
- Cooling
- Heating
- Electrical heater active

6 Condensation in room (dew point sensor active)

7 Additional user information, like outdoor temperature ( ) or time from Modbus (selectable via parameters)

8 Button lock active

Engineering notes

Device address

The device address of each RDF302 was defaultly assigned to “1“. If necessary, engineer/installer can change the address value through the parameter P81.

Baud rate

The Baud rate is selectable. Four options, 4800 bps, 9600 bps, 19200 bps and 38400 bps, are available for the RDF302 adapting into the Modbus network (19200 bps is default).

Parity

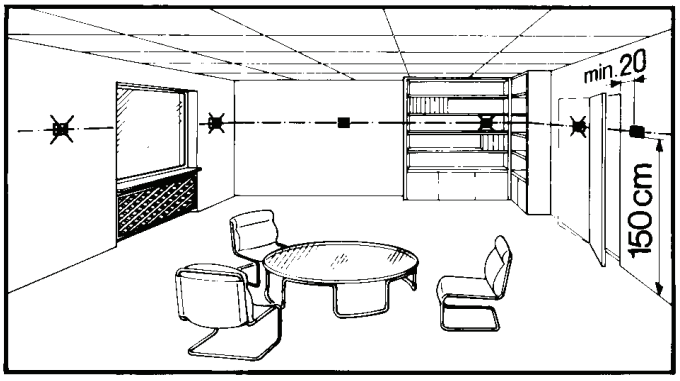
The parity can be set to none, odd or even (even is default).

Note:

Once you made any changes on the baud rate or parity, you must reset the power before the changes become effective. To reset the power, you can consider by opening the front panel out of the mounting plate and snap it back.

Mounting and installation

Mount the room thermostat on a recessed rectangular conduit box with 60.3 mm fixing 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 the room thermostat 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 10 mm.

Wiring

⚠ See the mounting instructions M3079 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 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 Modbus communication input +, - and REF for 230 V.
- No metal conduits.
- No cables provided with a metal sheath.
- 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 during commissioning using one of the following tools:
- Local DIP switch and HMI
- Modbus commissioning tools

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 tools**.
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.

Display “NONE”

If the “NONE” displays on the LCD, it means that the DIP switches was set to OFF-OFF for remote configuration, but the application had not yet assigned to the device. The application can be set by commissioning tools via the RS485 Modbus.

Note

Each time the application is changed, the thermostat reloads the factory setting for all control parameters, except for baud rate (P68), parity (P70) and zone addresses (P81)!

Control parameters

The thermostat's control parameters can be set to ensure optimum performance of the entire system.
The parameters can be adjusted using
- Local HMI
- Modbus commissioning tools

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 with a compressor, adjust the minimum output on-time (parameter P48) and off-time (parameter P49) for Y11/Y21 to avoid damaging the compressor or shortening its life due to frequent switching.

Calibrate sensor

Recalibrate the temperature sensor if the room temperature displayed on the thermostat does not match the room temperature measured (after minimum 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.

Disposal

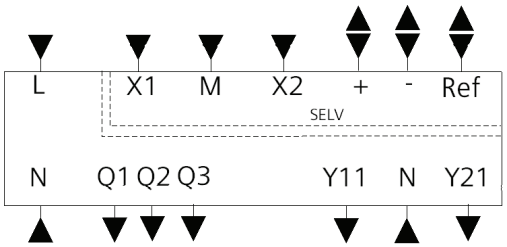
This device is classified as waste electronic equipment under European Directive 2002/96/EC (WEEE) and may not be disposed of as unsorted municipal waste.
Adhere to all relevant national laws.
Regarding disposal, use the systems setup for collecting electronic waste.
Observe all local and applicable laws.

Technical data

Power supply	Rated voltage	AC 230 V
⚠	Frequency	50/60 Hz
	Power consumption	Max. 7VA / 3.7 W
Outputs	Fan control Q1, Q2, Q3-N	AC 230 V
	Rating	Max. 5(2) A
	Control output Y11-N / Y21-N (N.O.)	AC 230 V
	Rating	Max. 5(2) A
Inputs	Multifunctional input 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	SELV DC 0...5 V / max 5 mA
	Parallel connection of several thermostats for one switch	Max. 20 thermostats per switch
	Insulation against mains voltage (SELV)	4 kV, reinforced insulation
	Function of inputs:	Selectable
	External temperature sensor, heating/cooling changeover sensor, operating mode switch-over contact, dew point monitor contact, enable electrical heater contact, fault contact, monitoring input	X1: P38 X2: P40
Modbus	Interface type	RS485 Modbus RTU, Wire (ref.): 16 AWG, 1 pair, shielded serial line with 1.5 mm^2 and length < 1200 m
	Bus current	Max. 50 mA
	Modbus topology:	
	See Modbus manual (MODBUS over serial line specification and implementation guide from http://www.modbus.org).	
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 range	
	☼ Comfort (P08)	21 °C (5...40 °C)
	☾ Economy (P11-P12)	15 °C/30 °C (OFF, 5...40 °C)
	⏻ Protection (P11-P12)	8 °C/OFF (OFF, 5...40 °C)
	Multifunctional input X1/X2	Selectable 0...8
	Input X1 default value (P38)	3 (Op. Mode switchover)
	Input X2 default value (P40)	1 (External temp. 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

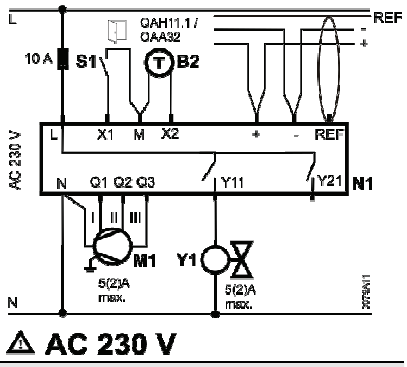
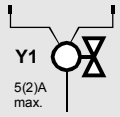
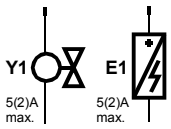
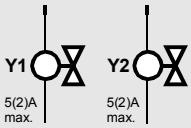
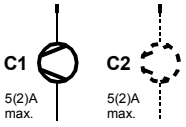
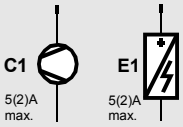
Environmental conditions	Operation	As per IEC 60721-3-3
	Climatic conditions	Class 3K5
	Temperature	0...50 °C
	Humidity	<95 % r.h.
	Transport	As per IEC 60721-3-2
	Climatic conditions	Class 2K3
	Temperature	–25...60 °C
	Humidity	<95 % r.h.
	Mechanical conditions	Class 2M2
	Storage	As per IEC 60721-3-1
	Climatic conditions	Class 1K3
	Temperature	–25...60 °C
	Humidity	<95 % r.h.
Standards and directives	CE conformity	
	EMC directive	2004/108/EC
	Low-voltage directive	2006/95/EC
	RoHS ☑ 2002/95/EC 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
	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	IP 30 as per EN 60529
General	Connection terminals	Solid wires or prepared stranded wires 1 x 0.4…1.5 mm^2 (Note: For sensors on inputs X1 and X2, the cable length is max. 80 m.)
	Housing front color	RAL 9003 white
	Weight without / with packaging	0.174 kg/0.261 kg

Connection terminals



L, N	Operating voltage AC 230 V
Q1	Control output “Fan speed 1 AC 230 V”
Q2	Control output “Fan speed 2 AC 230 V”
Q3	Control output “Fan speed 3 AC 230 V”
Y11,Y21	Control output “Valve” AC 230 V (N.O., for normally closed valves), output for compressor or output for electrical 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
+	RS485 Modbus connection
–	RS485 Modbus connection
REF	RS485 signal / common ground (Differential common)

Connection diagrams

Application	
2-pipe, 2-position	
2-pipe, 3-position	
2-pipe & electric heater	
4-pipe	
1-stage compressor (heating and/or cooling)	
1-stage compressor & electric heater	

N1	Room thermostat RDF302
M1	1-speed or 3-speed fan
Y1	Valve actuator, 2-pos or 3-pos
Y1, Y2	Valve actuator, 2-pos
E1	Electric heater
C1	1-stage compressor
F	External fuse
S1, S2	Switch (keycard, window contact, presence detector, etc.)
B1, B2	Temperature sensor (return air temp., external room temp., changeover sensor, etc.)
+	RS485 Modbus connection
–	RS485 Modbus connection
REF	RS485 signal / common ground (Differential common)

Dimensions (mm)