SIEMENS

1 440

RDD310/EH

RDE410/EH

Semi flush-mount room thermostats

RDD310/EH
RDE410/EH

for control of electric floor heating systems

Key features of both types of thermostats:

- **Operating voltage AC 230 V**
- **2-position control with On/Off control output**
- **Maximum load 16 A**
- **Protection class IP31, suitable for installation in wet rooms**
- **Input for cable temperature sensor NTC 3k (QAP1030/UFH) for the floor**
- **Floor temperature limitation with cable temperature sensor**
- **Operating modes: Comfort, Economy and Frost Protection**
- **Minimum and maximum limitation of setpoint setting range**
- **Backlit white LCD**
- **Suitable for use with standard conduit boxes in Europe (CEE/VDE) and Asia-Pacific (Min. depth 40 mm)**

Additional feature of RDE410/EH:

- **Auto Timer with 8 programmable time switches**

Use

The RDD310/EH and RDE410/EH are used to control the room temperature in …

- single family and holiday houses,
- multi-family houses with individual heating systems.

For control of the following pieces of equipment:

- Specifically for electric floor heating systems, but also for …
  - thermal valves or zone valves,
  - gas or oil burners (boilers),
  - pumps,
  - radiators or convectors.

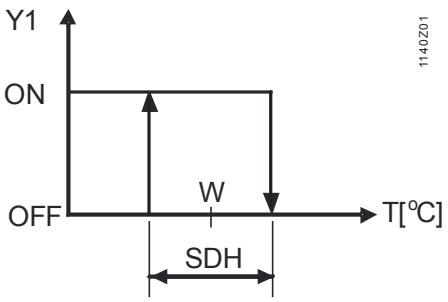
Functions

- Room temperature control in connection with built-in or external sensor
- Selection of operating mode via operating mode button on the thermostat
- Display of current room temperature or setpoint in °C
- Minimum and maximum limitation of setpoint setting range
- Button lock (automatic or manually)
- Floor temperature limitation with cable temperature sensor
- Backlit white LCD
- Reloading factory settings for commissioning and control parameters
- Auto Timer: 8 programmable 7-day time switches to switch between Comfort and Economy mode (RDE410/EH only)

Temperature control

The thermostat acquires the room temperature with its built-in sensor and maintains the setpoint by delivering control commands. The switching differential is 1 K.

Function diagram



T: Room temperature
SDH Switching differential heating
W: Room temperature setpoint
Y1: Output signal for heating

Floor heating application

The factory setting for this function is "Off" and must be set to "On" if floor heating is used. This function is activated via parameter P38.

The installer must select the capacity of the heating system (in kW) via parameter P45 during commissioning.

The cable temperature sensor is connected to input X1, M and acquires the floor temperature. If the floor temperature exceeds the parameterized limit xx ºC (P38 = 1, P51 = xx ºC), the heating system is turned off until the floor temperature returns to a level below the parameterized limit. A typical application are rooms (dry floor).

If the application does not require floor temperature limitation but instead uses the external sensor for room temperature display and control, the parameters will have to be set as follows: P38 = 1, P51 = Off. A typical application are bathrooms (wet floor) where a constant floor temperature is required.

It is not recommended to have **only** a built-in room sensor for floor heating since in that case there is a potential risk of overheating.

Operating modes

The operating mode is selected via operating mode button ⟳. The respective setpoint maintains the room temperature at the desired level. The following operating modes are available:

Comfort mode ☼

In Comfort mode, the thermostat maintains the setpoint which can be adjusted via the **+/–** buttons.

Economy mode ☾

Economy mode helps save energy. It is selected via operating mode button ⟳ if parameter P02 is set accordingly.

Frost Protection mode ⏻

In Frost Protection mode, the system is protected against frost (factory setting = 8 °C).

Auto Timer mode AUTO (only with RDE410/EH)

In Auto Timer mode AUTO, the thermostat switches automatically between Comfort and Economy mode according to the 8 programmed time switches. The display shows Auto Timer mode symbol AUTO along with the symbol for the current operating mode (Comfort ☼ or Economy ☾).

Setpoints

Comfort mode ☼

The Comfort setpoint is adjusted with the **+/–** buttons. Factory setting for the Comfort basic setpoint is 20 °C, which can be changed via parameter P08. The Comfort basic setpoint is used in conjunction with the "Temporary setpoint" function.

Setpoint limitation

The setpoint setting range can be limited to a minimum (parameter P09) and maximum (parameter P10).

Temporary setpoint

If "Temporary setpoint" is enabled via parameter P69, the setpoint adjusted via the **+/–** buttons is set back to the Comfort basic setpoint (parameter P08) when the operating mode changes.

Economy mode ☾

Control parameter P11 is used to adjust the Economy setpoint (factory setting = 16 °C).

Frost Protection mode ⏻

Control parameter P65 is used to adjust the setpoint for Frost Protection mode (factory setting = 8 °C).

Caution ⚠

If a setpoint is set to "Off", the thermostat does not maintain the setpoint in the respective operating mode, which means no protective heating function, resulting in risk of frost.

Type summary

Product No. (ASN)	Stock number	Features
RDD310/EH	**S55770-T296**	Mains-powered AC 230 V
RDE410/EH	**S55770-T333**	Mains-powered AC 230 V with Auto Timer
QAP1030/UFH	**S55770-S289**	Cable temperature sensor NTC 3k, cable length 4 m

Ordering

When ordering, please indicate product No., stock number and description.

Example:

Product No. (ASN)	Stock number	Description
RDD310/EH	**S55770-T296**	Room thermostat

Cable temperature sensor, electric floor mat, valves and actuators must be ordered separately.

Equipment combinations

	Description		Product No.	Data Sheet
Sensors	Cable temperature sensor, cable length 4 m		**QAP1030/UFH**	1854
On/off actuators	Electromotoric actuators with On/Off valve (only available in AP, UAE, SA and IN)		**MVI../MXI..**	4867
	Electromotoric On/Off actuators		**SFA21..**	4863
	Thermal actuators (for radiator valves)		**STA23..**	4884
	Thermal actuators (for small valves 2.5 mm)		**STP23..**	4884
	Zone valve actuators (only available in AP, UAE, SA and IN)		**SUA21..**	4830

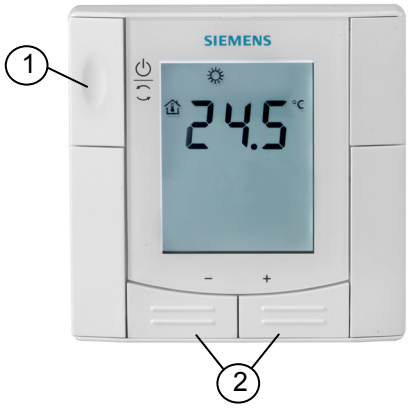
Mechanical design

The room thermostat consists of 2 sections:

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

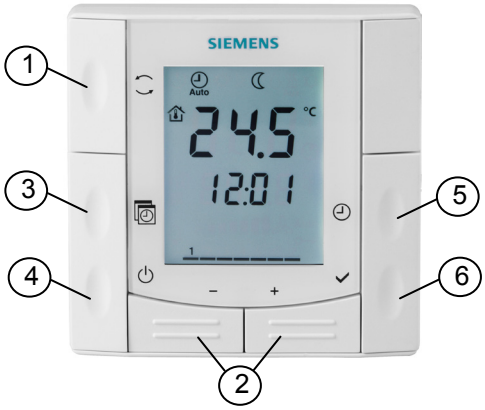
The base fits on the conduit box. The front panel slides in the mounting base and snaps on.

RDD310/EH



1. Operating mode button/Frost Protection
2. Button for adjustment of setpoint and control parameters

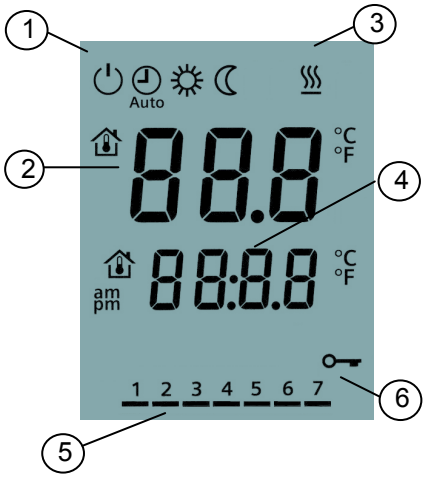
RDE410/EH



1. Operating mode button
2. Button for adjustment of setpoints, control parameters and time of day
3. Button for Auto Timer program
4. Button for Frost Protection
5. Button for setting the time of day and the weekday
6. Button for confirmation

Display

The digital display shows the acquired room temperature or the setpoint for the current operating mode, selectable via parameter P06. The factory setting displays the current room temperature.

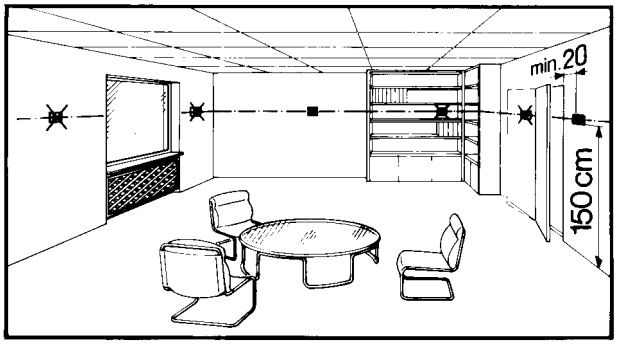


1. Operating mode:
   Frost Protection
   Auto Timer
   Comfort
   Economy
2. Room temperature, setpoints and control parameters
   Symbol for display of the current room temperature
3. Heating On
4. Current time of day*
5. Weekday 1...7*
   1 = Monday / 7 = Sunday
6. Button lock active

*) RDE410/EH only

Mounting and installation notes

Mount the room thermostat on a recessed rectangular conduit box. Do not mount it in niches or bookshelves, not behind curtains, not above or near heat sources, and not exposed to direct solar radiation. Mount it about 1.5 m above the floor.



Wiring

See Mounting Instructions CB1M1440xx enclosed with the thermostat.

⚠ • Ensure that wiring, fusing and earthing comply with local regulations
⚠ • Correctly size the cables to the thermostat and the floor heating system
⚠ • If the thermostat cannot accommodate all cables, power must be fed to the system via an external terminal block
⚠ • The AC 230 V mains supply line must have a circuit breaker with a rated current of no more than 16 A
⚠ • Disconnect from power supply before removing the unit from the wall
⚠ • External inputs X1, M may carry mains potential. The sensor cable must be carefully installed before applying power to the thermostat

Commissioning notes

Floor heating system

- It is mandatory to select the approximate load of the floor heating system via parameter P45 during commissioning. If not sure, the supplier of the floor heating system should be consulted

Floor temperature limitation

- For limitation of the floor temperature via parameter P51, contact the floor supplier. Be aware that the floor temperature is acquired where the sensor head is located

Sensor calibration

- If the temperature shown on the display does not agree with the room temperature effectively measured (after at least one hour of operation), the temperature sensor can be recalibrated. For that purpose, adjust parameter P05

Setpoint and setting range limitation

- We recommend to review the setpoints and the setpoint setting range (parameters P08…P11) and change them as needed to achieve maximum comfort and to save energy

Resetting parameters

- The factory setting for the control parameters can be reloaded via parameter P71 by changing the value to "On" and confirming by pressing buttons **+** and **–** simultaneously. The display shows "888" during reloading

Commissioning notes

After power is applied, the thermostat carries out a reset during which all LCD segments flash, indicating that the reset was correctly made. After the reset, which takes about 3 seconds, the thermostat is ready for commissioning by qualified HVAC personnel. The control parameters of the thermostat can be set to ensure optimum performance of the entire system (see below).

Control parameters

#	Parameter	Factory setting	Setting range
Service level			
P02	Selection of operating mode via operating mode button ↻	1 = Comfort – Frost Protection	**RDD310/EH:** 1 = Comfort - Frost Protection 2 = Comfort - Economy - Frost Protection **RDE410/EH:** 1 = Auto - Comfort - Frost Protection 2 = Auto - Comfort - Economy - Frost Protection
P05	Temperature sensor calibration	0.0 °C	–3…3 °C
P06	Standard temperature display	0 = Room temperature	0 = Room temperature 1 = Setpoint
P08	Comfort basic setpoint	20 °C	5…40 °C
P09	Min. setpoint limitation in Comfort mode ($Wmin_{Comf}$)	5 °C	5…40 °C
P10	Max. setpoint limitation in Comfort mode ($Wmax_{Comf}$)	35 °C	5…40 °C
P11	Heating setpoint in Economy mode	16 °C	Off, 5…18 °C
P14	Button lock (press operating mode button ↻ for 3 seconds to lock or unlock)	0 = Disabled	0 = Disabled 1 = Auto lock 2 = Manual lock
Expert level			
P30	Switching differential in heating mode	1 K	0.5…6 K
P38	External input	0	0 = No input 1 = External sensor input
P45	Heating system load in kW	2.8 kW	0…3.6 kW
P51	Floor heating temperature limit	Off	Off, 10...60 °C
P65	Setpoint of heating in Frost Protection mode ⏻ ($Wheat_{Stb}$)	8 °C	Off, 5…18 °C
P69	Temporary setpoint in Comfort mode	Off	Off = Disabled On = Enabled
P71	Reloading factory settings Set value to "On" and confirm by pressing buttons + and –	Off	Off = Idle On = Reset
Diagnostics and test			
d02	Status X1	Diagnostics	0…xx °C = Measured temperature
d07	Software version information	No adjustment	Ux.x

Parameter settings

Parameter settings at service and expert level:
The parameters are divided into "Service level" and "Expert level". The parameter setting mode can be entered as follows: Set the thermostat to "Off/Frost Protection" ⏻.

Service level only (P02…P14)

- Press buttons **+** and **–** simultaneously for 3 seconds. Release them and, within 2 seconds, press button **+** for 7 seconds. Parameters P02…P14 can now be adjusted (service level)

Expert level plus service level (all parameters P02…P71)

- Press buttons **+** and **–** simultaneously for 3 seconds. Release them and, within 2 seconds, press button **–** for 7 seconds. Parameters P02…P71 can now be adjusted (expert level)

In parameter setting mode, the parameters can be readjusted as follows:

1. Select the required parameter by repeatedly pressing button **+** or **–**.
2. When pressing buttons **+** and **–** simultaneously, the current value of the selected parameter starts to flash; change it by repeatedly pressing button **+** or **–**.
3. When you again press buttons **+** and **–** simultaneously, the next parameter is displayed.
4. Repeat steps 1 to 3 to display and change additional parameters.
5. At the service or expert level: 10 seconds after the last display or setting, all changes are stored and the thermostat will leave parameter setting mode.
   At the expert level: Press + or – until "End" is displayed. Then, press + and – simultaneously to save the change and exit parameter setting mode.

Disposal

The devices are considered electronics devices for disposal in term 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.

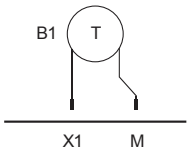
Technical data

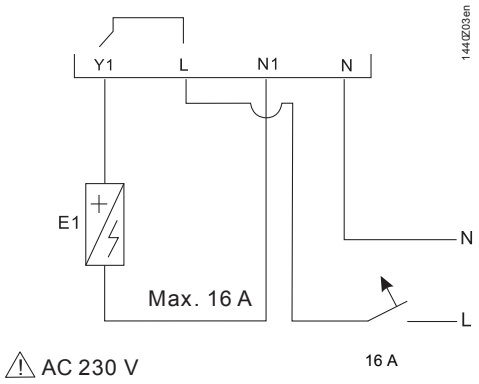
⚠ Power supply	Operating voltage	AC 230 V +10/-15%
	Frequency	50 Hz
	Power consumption	Max. 4 VA
Outputs	Control output Y1-N1 (NO)	AC 230 V
	Rating	Max. 16 A res.
	External protection for incoming cable	
	Circuit breaker	Max. 16 A
	Circuit breaker tripping characteristic	Type B, C or D to EN 60898 and EN 60947
Inputs	External sensor input (X1-M)	
	Type	NTC 3k
	Temperature range	0…70 °C
	Cable length	Max. 80 m

Operating data	Switching differential (adjustable)		
	Heating mode	(P30)	1 K (0.5...6 K)
	Setpoint setting and range		
	☼ Comfort mode	(P08)	20 °C (5...40 °C)
	☾ Economy mode	(P11)	16 °C (Off, 5...18 °C)
	⏻ Frost Protection	(P65)	8 °C (Off, 5...18 °C)
	Floor temperature limitation setting range	(P51)	Off and 10…60 °C
	Factory setting	(P38)	Off (limitation function not active)
	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)		CE1T1440xx *)
	RCM conformity to EMC emission standard		AS/NZS 4251.1:1999
	Protection class		II as per EN 60730-1
	Pollution class		II as per EN 60730-1
	Degree of protection of housing		IP31 as per EN 60529
Environmental compatibility	The product environmental declaration CE1E1440en contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).		
General	Connection terminals		Solid wires 1 x 2.5 mm^2
	Weight		0.149 kg
	Color of housing front		RAL 9003 white

*) The documents can be downloaded from http://siemens.com/bt/download.

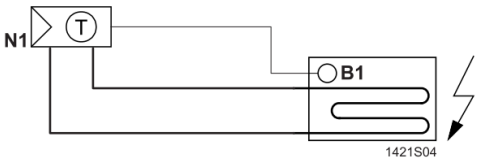
Connection diagrams





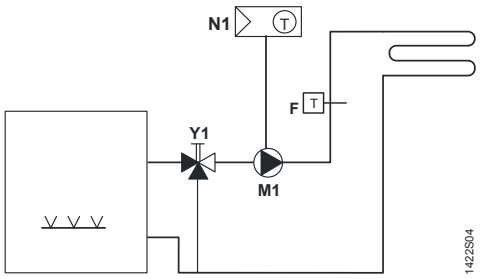
L Live conductor AC 230 V
N Neutral conductor
Y1, N1 Control output for "Electric heating system", AC 230 V, Max. 16 A
X1 External sensor input (floor sensor, etc.)
M Measuring neutral for external sensor
E1 Heating equipment (e.g. electric floor mat)
B1 External temperature or floor sensor

Application examples



Room thermostat for control of electric floor heating systems. Floor temperature limitation with cable temperature sensor

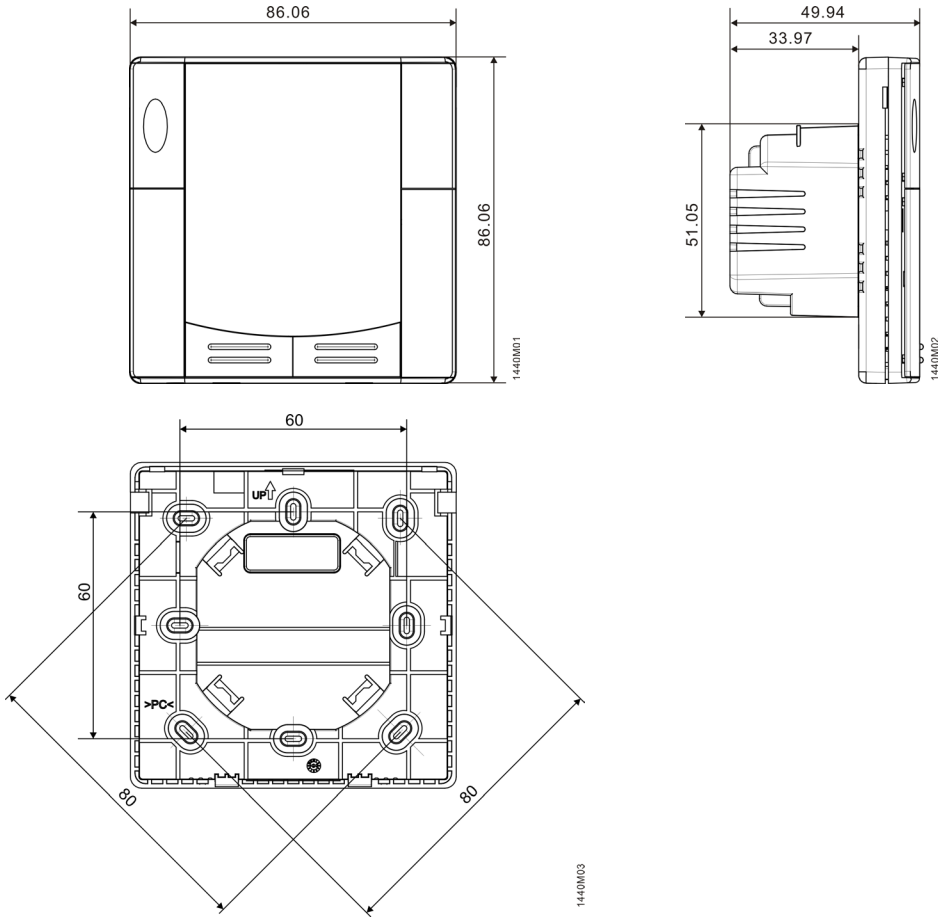
B1 Floor temperature sensor
M1 Circulating pump



Room thermostat with direct control of hydronic floor heating system

N1 Room thermostat RDD310/EH, RDE410/EH
Y1 3-port mixing valve with manual adjustment
F Thermal reset limit thermostat

Dimensions (mm)



Remarks

Heating:
Because of the unavoidable self heating effects of the electrical current, any loads of more than 10 Amperes connected to the unit can influence the control behavior and temperature accuracy in a negative way. So since this is an electric floor heating product, therefore it is always a must to use an external floor temperature sensor.

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