Room thermostat with Auto Timer, independent DHW

RDE100.1 DHW

for heating systems

- **Room temperature control**
- **2-position / TPI control with On/Off output for heating**
- **Optimum Start / Stop**
- **Comfort, Economy, Auto timer and Protection mode**
- **Independent On/Auto/Off control of DHW**
- **Auto time switch**
- **Adjustable commissioning and control parameters**
- **Battery-powered DC 3 V (2 x 1.5 V AAA)**

Use

The RDE100.1DHW is used to control the room temperature in heating systems with independent control of DHW.

Typical applications:

- Residential apartments

For the control of the following plant components and of DHW:

- Thermal valves or zone valves
- Gas or oil boilers
- Fans
- Pumps
- Heat exchanger
- Continuous-flow water heater
- Small water heating systems

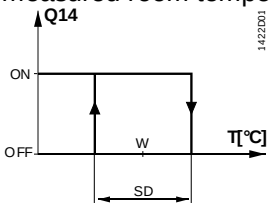
Functions

- Room temperature control via built-in sensor
- Selection of operating mode with operating mode touchkey
- Setting auto time switch (individual day, 7 day or 5-2 day)
- Display of current room temperature or setpoint in °C or °F
- Touchkey lock (manually)
- Setpoint lock
- Periodic pump run
- Optimum start / stop
- Comfort temperature limitation by Economy setpoint locked
- Reloading factory settings for commissioning and control parameters
- Independent DHW and its auto time switch (individual day, 7 day or 5-2 day)

Temperature control

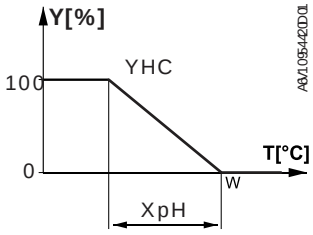
RDE100.. comprises of both 2-position and TPI temperature controls, which can be configured by parameter P78 (Control Behavior).

2-position control algorithm is to switch on and off the heating system within a switching differential according to comparison between setpoint setting and the measured room temperature.



T	Room temperature
SD	Switching differential
W	Room temperature setpoint
Q14	Output signal for heating

TPI (Time proportional Integral) control algorithm is to periodically switch on and off the heating system. The period time and pulse length of the control signal (PWM) are determined by the setpoint and the measured room temperature.



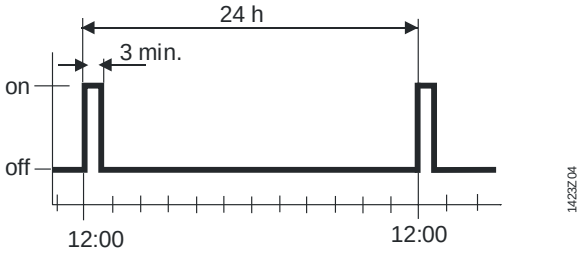
Heating mode

T	Room temperature
Y	Output signal for heating (PWM)
W	Room temperature setpoint
YHC	Control command “Valve”
XpH	Proportional band “Heating”

Periodic pump run function

Can only be used when circulating pump or valve is controlled!
This function protects the pump or valve against seizing during longer off periods.
Perodic pump run is activated for 3 minutes every 24 hours at 12:00.

Parameter	Pump status
P12 = 0 (Default)	Pump run off
P12 = 1	Pump run on



Optimum start control

The purpose of optimum start control is to reach a temperature level 0.25 K below the Comfort setpoint when occupancy according to the time program starts in Auto timer mode. For that purpose, the heating circuit must be switched on at an earlier point in time. The extent of forward shift depends primarily on the outside temperature.
The maximum forward shift on time can be adjusted by parameter P89. A Forward shift on maximum "0" means the function is disabled.

Parameter	Range	Factory setting
Forward shift on max (P89)	0, 0.5,…24 h	0

Optimum stop control

Optimum stop control switches off the heating circuit at the earliest possible point in time so that the room temperature will lay 0.5 K below the Comfort setpoint when the time switch changes from Comfort mode to Economy mode in Auto timer mode. The early shut down maximum time can be adjusted by parameter P90. Early shut down maximum "0" means the function is disabled.

Parameter	Range	Factory setting
Early shutdown max (P90)	0, 0.5,….6 h	0

Control behavior (P78)

2-position, 1 K

2-Position controller with 1 [K] switching hysteresis

2-position, 0.3 K

- 2-Position controller with 0.3 [K] switching hysteresis.
- For general control situations. Provides a better comfort than 1 [K] switching hysteresis.
- Can also be used for difficult control situations.

TPI slow

TPI control behavior for slow heating systems that require longer minimum On times and limited numbers of switching cycles per hour.
Typical applications:

- Floor heating systems, oil fired boilers
- Can also be used for all other types of heating applications. (Alternative setting)

Minimum switching on / off time	> 4 minutes
Average period time	Approximately 20 minutes

TPI medium

TPI control behavior for general heating applications such as radiator systems, thermal actuators, …

Minimum switching on / off time	> 1 minute
Average period time	Approximately 20-25 minutes

TPI fast

TPI control behavior for fast heating systems that tolerate a high number of switching cycles.
Typical applications: electric heaters, gas boilers, fast thermal actuators

Minimum switching on / off time	> 1 minute
Average period time	Approximately 10 minutes

⚠ Do not use TPI fast for oil boilers or electro mechanical actuators!

Type summary

Product No.	Stock No.	Features
RDE100.1DHW	**S55770-T280**	Battery-powered DC 3 V

Ordering

- When ordering, please indicate product No. / stock No. and description.
- Example:

Product No.	Stock No.	Description
RDE100.1DHW	**S55770-T280**	DHW room thermostat

Valve actuators must be ordered separately!

Equipment combinations

Description		Product No.	Data Sheet *)	Use with the type of Temperature Control
Electromotoric actuator		**SFA21..**	4863	2-Position & TPI slow
Electrothermal actuator (for radiator valves)		**STA23..**	4884	2-Position & All TPI
Electrothermal actuator (for small valves 2.5 mm)		**STP23..**	4884	2-Position & All TPI
Electromotoric actuator for zone valves VVI46..		**SUA21..**	4830	2-Position
Damper actuator		**GDB..**	4634	2-Position & TPI slow
Damper actuator		**GSD..**	4603	2-Position & TPI slow
Damper actuator		**GQD..**	4604	2-Position & TPI slow
Rotary damper actuator		**GXD..**	4622	2-Position & TPI slow

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

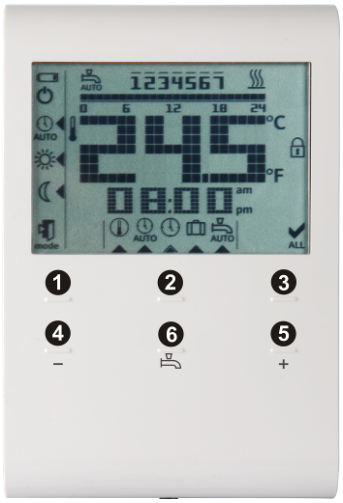
Mechanical design

The room thermostat consists of 2 parts:

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

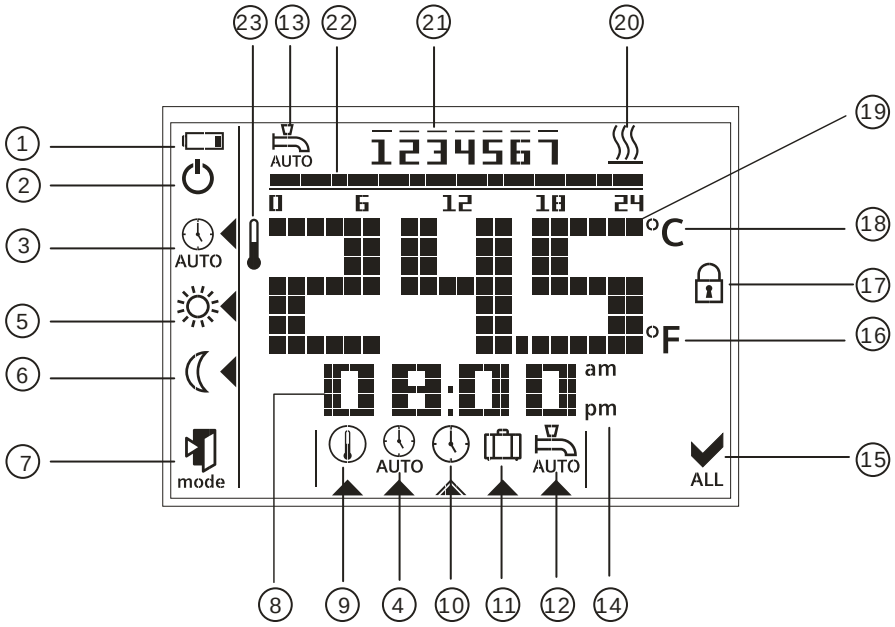
The housing engages in the mounting plate and is secured with a screw.

Operation and settings



1) Operating mode touchkey
2) Set
3) Ok
4) Touchkey for decreasing a value
5) Touchkey for increasing a value
6) DHW switch On/Auto/Off touchkey

Display

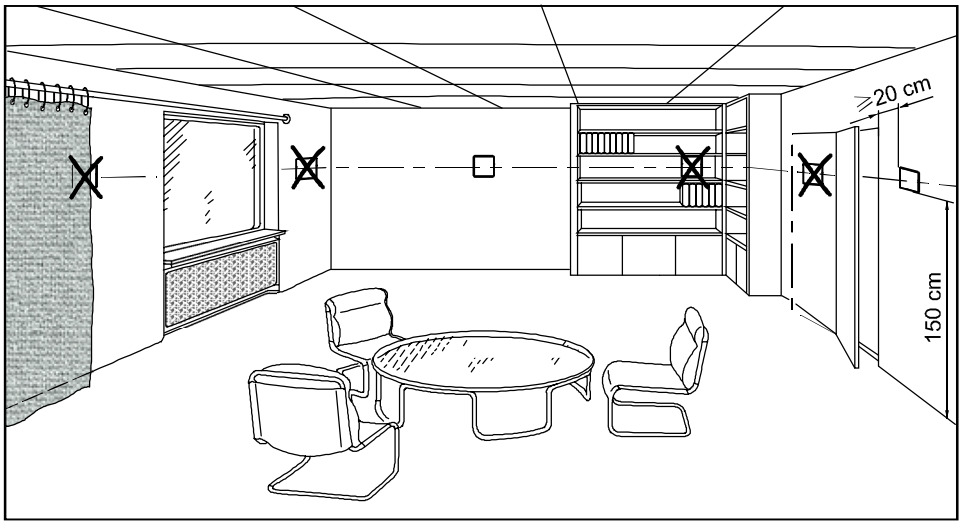


#	Symbol	Description	#	Symbol	Description
1		Indicating that batteries need to be replaced	12	AUTO	View and set DHW auto time switch
2		Protection mode (protection mode symbol can be enabled via parameter settings).	13		DHW auto time switch activated
3	AUTO	Auto timer mode	14	am pm	Morning: 12-hour format Afternoon: 12-hour format
4		View and set auto time switch	15	ALL	Confirmation
5		Comfort mode	16	°F	Room temperature in degrees Fahrenheit
6		Economy mode	17		Touchkey lock activated

#	Symbol	Description	#	Symbol	Description
7		Escape	18	°C	Room temperature in degrees Celsius
8		Display of time	19		Display of room temperature, setpoint, and etc.
9		Permanent setpoint setting	20		Heating On
10		Day and time setting	21		Weekday 1 = Monday 7 = Sunday
11		Holiday mode setting	22		Timer bar (Alternative use as DHW timer bar)
			23		Current room temperature

Mounting and installation notes

Do not mount the thermostat in niches or bookshelves, not behind curtains, not above or near heat sources, and not exposed to direct solar radiation. Mount about 1.5 m above the floor.



Mounting

- Mount the thermostat in a clean and dry location without direct air flow from a heating/cooling equipment, and not exposed to drip or splash water

Wiring

See the Mounting Instructions M1429 enclosed with the thermostat.

- Ensure that wiring, protection and earthing comply with local regulations
- Correctly size the cables to the thermostat and the valve actuators
- Use only valve actuators rated for AC 24…230 V

Warning!

No internal line protection for supply lines to external consumers.

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 must have a circuit breaker with a rated current of no more than 10 A
- Disconnect from power supply before removing the unit from its mounting plate

Commissioning notes

Commissioning

After power is applied, the thermostat carries out a reset during which all LCD segments flash, indicating that the reset was made correctly. After the reset, 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. Please refer to Operating Instructions CB1B1423, section "Do you want to change parameters?".

Sensor calibration

If the temperature on the display does not agree with the room temperature effectively measured, the temperature sensor can be recalibrated. For that purpose, adjust parameter P04.

Setpoint lock

We recommend reviewing the setpoint lock (for public areas) in parameters P06 and P08 and changing them as needed. If the Economy setpoint is locked then the Comfort temperature setpoint can not be set lower than the locked Economy setpoint.

Touchpad scanning rate

Since the thermostat uses touch technology and to minimize battery power consumption, a parameter P21 (adjustable from 0.25 to 1.5 seconds) is implemented for the user to adjust. This function is only valid for the battery-powered version and the default value is 1 second.

This means that when, for a certain time, the user does not touch the touchpad, the unit operates in power saving mode and the touchpad is running at a scanning rate of 1 second.

(From the calculation – assuming 4 operations per day on the thermostat, the estimated 1-second scanning rate results in a battery life of 1 year. If the user increases the scanning rate, the batteries' life is extended.)

Change of batteries

If the battery symbol appears, the batteries are almost exhausted and should be replaced. Use alkaline batteries type AAA.

Operating notes

The RDE100.1DHW provides Comfort, Economy, Auto timer and Protection mode. The difference between Comfort and Economy mode is only the room temperature setpoint. The changeover between Comfort, Economy and Protection mode is made either automatically by the auto time switch or by pressing touchkey **mode**.

Comfort mode

When Comfort mode is activated, symbol appears on the display. The setpoint (20 ºC) can be readjusted by pressing touchkeys **+** and **–**.

Economy mode

When Economy mode is activated, symbol appears on the display. The setpoint (16 ºC) can be readjusted by pressing touchkeys **+** and **–**.

Protection mode

If the temperature falls below 5 ºC, the unit automatically activates the heating output. The symbol appears only, if the icon is enabled via parameter settings.

Holiday mode

When holiday mode is activated, symbol appears on the display. The setpoint (12 ºC) and the number of days a user is away can be readjusted by pressing touchkeys **+** and **–**.

Time switch AUTO

When Auto timer mode is enabled, the changeover between the operating modes (Comfort and Economy mode) will take place automatically. There are three options for time switch setting: individual day, 7 day or 5-2 day. You can select Comfort or Economy mode in every 15 minutes interval of the day. The 0:00 to 24:00 hour time bar will allow you to set the mode throughout the selected day(s).

Factory default for 7-day Time switch

Default value	Day/s	Comfort mode	Economy mode
	Mo (1) – Fr (5)	6:00 – 8:00 hr 17:00 – 22:00 hr	22:00 – 6:00 hr 8:00 – 17:00 hr
	Sa (6) – Su (7)	7:00 – 22:00 hr	22:00 – 7:00 hr

Please refer to Operating Instructions CB1B1423, section "Do you want to enter your own Time switch?".

DHW and DHW auto timer function AUTO

Press to switch on DHW heating. Press this touchkey again, DHW will be in the auto status, this AUTO symbol will be shown. Press this touchkey one more time, DHW heating will be switched off and no symbol will be shown.

Please refer to Operating Instructions CB1B1423, section "Do you want to activate DHW control?".

During auto status, the DHW will switch according to the DHW time switch set. DHW can be selected on or off in every 15 minutes interval of the day. The 0:00 to 24:00 hour time bar will allow you to set DHW on or off throughout the selected day(s).

Factory default for 7-day Time switch for DHW

Default value	Day/s	DHW control ON	DHW control OFF
	Mo (1) – Fr (5)	6:00 – 8:00 hr 17:00 – 22:00 hr	22:00 – 6:00 hr 8:00 – 17:00 hr
	Sa (6) – Su (7)	7:00 – 22:00 hr	22:00 – 7:00 hr

Please refer to Operating Instructions CB1B1423, section "Do you want to enter your own Time switch for DHW control?".

Parameters

Changing the parameters by the following steps:

- Press **+** and **–** simultaneously for 5 seconds
- Release them and parameter "P01" is displayed on the bottom segment
- Press **+** or **–** to scroll to the parameter that needs to be adjusted
- Press **ok** to select this parameter
- Press **+** or **–** to adjust the value
- Press **ok** to confirm the adjusted value
- Press mode to exit the parameters without saving or wait for the program to exit automatically

Parameter list

Parameter no.	Description	Setting range (default)
P01	Time format	1 = 24:00 hours (default) 2 = 12:00 AM/PM
P02	Selection of °C or °F	1 = °C (default) 2 = °F
P03	Standard temperature display	1 = room temperature (default) 2 = setpoint

P04	Temperature sensor calibration	-3…3 °C Step 0.5 °C (-6…6 °F, step 1 °F) Default: 0 °C
P06	Comfort setpoint lock	0 = OFF (default) 1 = ON → locked according to setting in permanent temperature setpoint
P08	Economy setpoint lock	0 = OFF (default) 1 = ON → locked according to setting in permanent temperature setpoint
P09	Buzzer	0 = OFF 1 = ON (default)
P10	Show frost protection icon	0 = OFF (default) 1 = ON
P11	Time switch type for auto timer and DHW	0 = Individual Days (default) 1 = All 7 days 2 = 5/2 days
P12	Periodic pump run	0 = OFF (default) 1 = ON
P13	DHW timer bar timeout	0 = no DHW bar 1 = 1 minute (default) 2 = 2 minutes Adjustable range 0 to 15 minutes
P21	Button scanning rate for the capacitive buttons Note: a higher scanning rate means shorter battery life.	0.2 = 0.25 s 0.5 = 0.5 s 1.0 = 1.0 s (default) 1.5 = 1.5 s
P22	Reload factory settings	0 = OFF (default) 1 = reload
P23	Software version information	No adjustment possible
P78	Control behavior	0 = On/Off, 1.0 K 1 = On/Off, 0.3 K 2 = TPI fast 3 = TPI medium 4 = TPI slow (default)
P89	Forward shift on max	0, 0.5,…24 h Default: 0 h
P90	Early shutdown max	0, 0.5,…6 h Default: 0 h

Maintenance notes

The thermostats are maintenance-free.

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.
- Dispose of empty batteries at designated collection points.

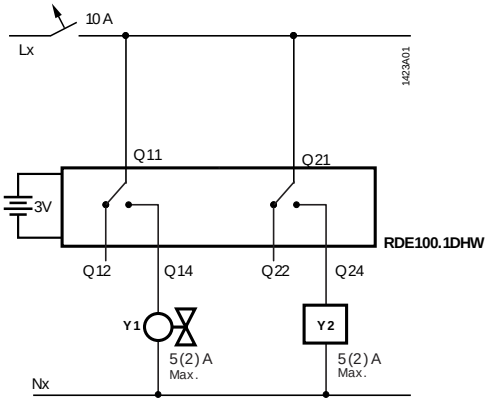
Technical data

⚠ Power supply	Operating voltage			
	• RDE100.1DHW	DC 3 V (2 x 1.5 V alkaline batteries AAA)		
	For battery life (RDE100.1DHW), see below (alkaline batteries type AAA). Battery life calculation is based on the touchpad scanning rate during idle time (assuming a user presses 4 touchkeys per day with default TPI Slow control):			
	Scanning rate 0.25 s	0.7 year battery life		
	Scanning rate 0.50 s	1.0 year battery life		
	Scanning rate 1.00 s	1.2 year battery life		
	Scanning rate 1.50 s	1.3 year battery life		
Control inputs	Control input Q11-Nx (Com)	(AC 24...230 V)	Max. 5(2) A	Min. 8 mA
	Control input Q21-Nx (Com)	(AC 24...230 V)	Max. 5(2) A	Min. 8 mA
Control outputs	Heating valve or wall-hung boiler			
	Control output Q12-Nx (NC contact)	(AC 24...230 V)	Max. 5(2) A	Min. 8 mA
	Control output Q14-Nx (NO contact)	(AC 24...230 V)	Max. 5(2) A	Min. 8 mA
	DHW heating equipment			
	Control output Q22-Nx (NC contact)	(AC 24...230 V)	Max. 5(2) A	Min. 8 mA
	Control output Q24-Nx (NO contact)	(AC 24...230 V)	Max. 5(2) A	Min. 8 mA
	**No internal fuse.** External preliminary protection with max. C 10 A circuit breaker in the supply lines required under all circumstances.			
	External protection for incoming cable			
	Circuit breaker	Max. 10 A		
	Circuit breaker tripping characteristic	Type B, C or D to EN 60898 and EN 60947		
Function data	Comfort mode	20 °C (5...35 °C)		
	Economy mode	16 °C (5...35 °C)		
	Holiday mode	12 °C (5...35 °C) (Standalone)		
	Built-in room temperature sensor			
	Setpoint setting range	5…35 °C (Comfort/Economy mode)		
	Accuracy at 25 °C	< ±0.5 K		
	Temperature calibration range	±3.0 K		
	Resolution of settings and displays			
	Setpoints	0.5 °C		
	Temperature value displays	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…65 °C		
	Humidity	<95% r.h.		
	Mechanical conditions	Class 2M2		
	Storage	As per IEC 60721-3-1		
	Climatic conditions	Class 1K3		
	Temperature	-25…65 °C		
	Humidity	<95% r.h.		

Norms and standards	EU Conformity (CE)	CE1T1420xx *)
	RCM conformity	CE1T1420en_C1*)
	Safety class	II as per EN 60730-1, EN 60730-2-9
	Pollution class	II as per EN 60730-1
	Degree of protection of housing	IP30 as per EN 60529
Environmental compatibility	The product environmental declaration CE1E1420xx *) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).	
Eco design and labelling directives	Based on EU Regulation 813/2013 (Eco design directive) and 811/2013 (Labelling directive) concerning space heaters, combination heaters, the following classes apply: - Application with On/Off operation of a heater — Class I — value 1% - TPI (PWM) room thermostat, for use with On/Off output heaters — Class IV — value 2%	
General	Connection terminals for	Solid wires or prepared stranded wires 2 x 1.5 mm^2 or 1 x 2.5 mm^2 (Min. 0.5 mm^2)
	Weight	0.167 kg
	Color of housing front	RAL9003

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

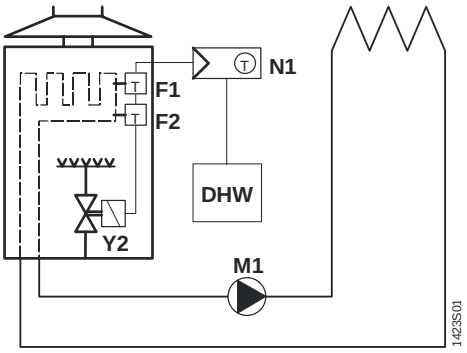
Connection diagrams



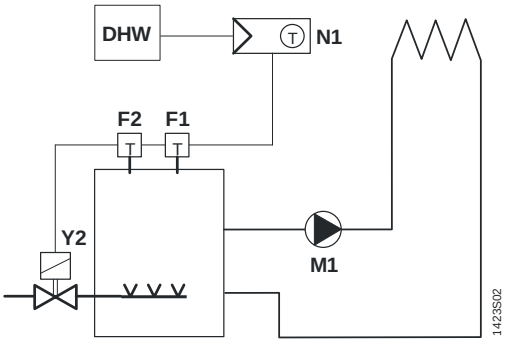
Legend

Lx	Live, AC 24...230 V
Nx	Neutral conductor, AC 24...230 V
Y1	Heating valve or wall-hung boiler
Y2	DHW heating equipment

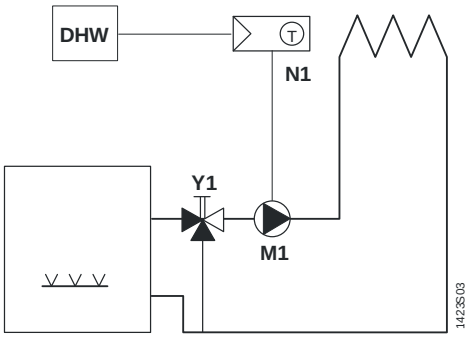
Application examples



Room thermostat with direct control of a gas-fired wall-hung boiler and independent control of DHW



Room thermostat with direct control of a gas-fired floor-standing boiler and independent control of DHW



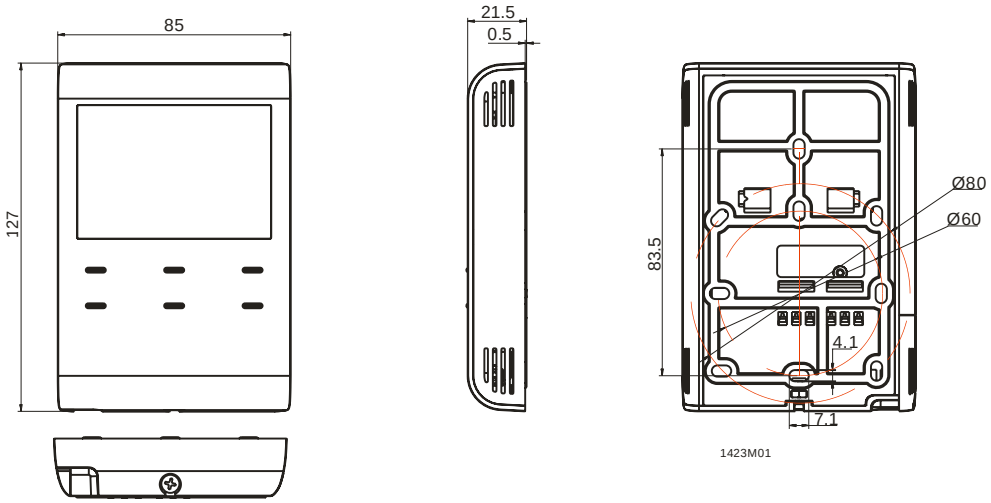
Room thermostat with direct control of a heating circuit pump (precontrol by manual mixing valve) and independent control of DHW

Legend

F1	Thermal reset limit thermostat
F2	Safety limit thermostat
M1	Circulating pump
N1	RDE100.1DHW room thermostat
Y1	Mixing 3-port valve with manual
Y2	adjustment
DHW	Magnetic valve
	DHW heating equipment

Dimensions

All dimensions in mm



Remarks

Heating:
Because of the unavoidable self heating effects of the electrical current, any loads of more than 3 Amperes connected to the unit can influence the control behavior and temperature accuracy in a negative way.

Issued by
Siemens Switzerland Ltd
Building Technologies Division
International Headquarters
Gubelstrasse 22
CH-6301 Zug
Tel. +41 41-724 24 24
www.siemens.com/buildingtechnologies