

SIEMENS



RDB160BN

**Room thermostat with BACnet MS/TP
communication**

Basic Documentation

Imprint

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1 About this document

1.1 Purpose of this document

This document provides detailed information on the functions of the RDB160BN BACnet MS/TP room thermostat as well as on mounting and installing, commissioning and operating the RDB160BN.

For further information, please refer to chapter 'Reference documentation [→ 5]'.

1.2 Revision history

Edition	Date	Changes	Sections	Pages
1.0	2020-03-10	First Edition		
1.1	2020-03-18	Proofread version: Phrasal changes		
1.2	2021-01-28	Update wiring diagrams		

1.3 Reference documentation

Ref.	Doc No.	Description
[1]	A6V11904646	Mounting instructions RDB160BN
[2]	A6V11913047	Data sheet RDB160BN

1.4 Before you start

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1.5 Target audience, prerequisites

Product and sales managers, distributors, re-sellers and OEM customers who use RDB160BN room thermostats in the BACnet MS/TP network.

2 Overview

Use

The RDB160BN BACnet MS/TP room thermostats are used for the following types of system:

- Fan coils with On/Off, modulating or DC control outputs (electric heater only with On/Off output):
 - 2-pipe system
 - 2-pipe system with electric heater
 - 4-pipe system
- Chilled/heated ceilings (or radiators) with On/Off, modulating or DC control outputs (electric heater only with On/Off output):
 - Chilled/heated ceiling
 - Chilled/heated ceiling with electric heater
 - Chilled ceiling with radiator

The RDB160BN controls:

- One 1-speed, 2-speed, 3-speed or DC fan
- Up to two On/Off, PWM, DC 0...10 V or one 3-position valve actuators

The RDB160BN is used in systems with:

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

General functions

- Room temperature control with built-in temperature sensor, external room temperature or return air temperature sensor
- Changeover between heating and cooling mode (automatic with local sensor or BACnet object)
- Backlight LCD
- Supply air limitation
- Automatic valve exercise
- Mold protection
- Operating modes selectable via On/Off button: Comfort, Standby (Economy) and OFF
- Advanced fan control function, e.g. selectable fan operation (enable, disable or based on heating or cooling mode)

Setpoints and display

- Minimum and maximum limitation of room temperature setpoint
- Display of temperature or setpoint
- Button lock

Fan

- 1-speed, 2-speed, 3-speed or DC 0...10 V fan control (automatically or manually)

Inputs

- One analog input for:
 - External room temperature or return air temperature sensor
 - Supply air temperature limitation sensor
- One universal input for:
 - Changeover digital
 - Changeover analog
 - Window contact
- One digital input
 - Presence input
 - Window contact

BACnet MS/TP communication

Device address

The BACnet MS/TP MAC address can be set from 0 to 127.

Factory setting is from 0 to 99.

Baud rate

The baud rate is selectable. Four options are available for the RDB160BN: 9600, 19200, 38400 and 76800 (default setting) bps.

The RDB160BN BACnet MS/TP room thermostats are delivered with a fixed set of applications and related parameters.

The relevant application is selected and activated during commissioning using the local HMI or the BACnet MS/TP commissioning tools.

For detailed information about the applications, please refer to chapter 'Applications'.

3 Functions

3.1 Temperature control

The RDB160BN BACnet MS/TP room thermostat controls the room temperature with a built-in temperature sensor, an external room temperature sensor (QAA2012) or an external return air temperature sensor (QAP2012.150). It maintains the setpoint temperature by sending actuator control commands to the heating and/or cooling equipment.

The following control outputs are available:

- On/Off control (2-position)
- Modulating PI/P control with PWM output
- Modulating PI/P control with DC 0...10 V control output
- Modulating PI/P control with 3-position control output (only for 2-pipe applications)

The switching differential or proportional band is 10 K for heating and cooling mode, and it is set via parameter P08. The integral action time for modulating PI control is 300 seconds. It is set via parameter P09.

Display

The display shows the current room temperature or the Comfort setpoint temperature. Both are selectable via parameter P24. Factory setting is the display of the current room temperature.

Heating / cooling changeover

Changeover between heating and cooling mode is automatically controlled with a local sensor or a BACnet object.

The HEAT / COOL symbols indicate that the system currently heats or cools. Either heating or cooling output is activated.


For detailed information about setting the control parameters refer to chapter 'Control parameters [[→ 32](#)]'

3.2 Operating modes

The RDB160BN BACnet MS/TP room thermostats have different operating modes. The operating modes can be changed via On/Off button, switch over contact or BACnet. Specific heating and cooling setpoints are assigned to each operating mode.

Room operating mode: Preselection

The Preselection operating mode can be selected via BACnet. In Preselection operating mode, Comfort, Standby (Economy) or OFF mode can be selected.

- If a bus command is received via BACnet for either Comfort or Standby (Economy) mode, the symbol of the selected operating mode is displayed (either  or 'STANDBY').
- If a bus command is received for OFF mode, only 'OFF' is displayed, and all key buttons are deactivated, except for the On/Off button.

Comfort mode

In Comfort mode, the thermostat maintains the Comfort setpoint temperature. The setpoint can be defined via parameter P64, locally adjusted via the Up/Down buttons or remotely selected via BACnet. Factory setting is 22 °C.

The Comfort mode change can be delayed, typically used in combination with a presence detector:

- Delay from Comfort to Standby (Economy) mode is defined via parameter P11.
- Delay from Standby (Economy) to Comfort mode is defined via parameter P12.
- In Comfort mode, the fan can be set to automatic or manual fan speed: Low, medium or high.

Standby (Economy)

In Standby (Economy) mode, a preset setpoint can be defined via parameters P06 and P07. Factory setting is 15 °C for heating and 30 °C for cooling.

The thermostat switches to Standby (Economy) mode

- If Standby (Economy) is sent via BACnet
- If the thermostat gets an operating mode switchover contact (e.g. keycard contact or presence detector).

OFF mode

The thermostat and the fan are switched off, and the thermostat gets no heating or cooling output. Mold protection function can overrun the fan speed.

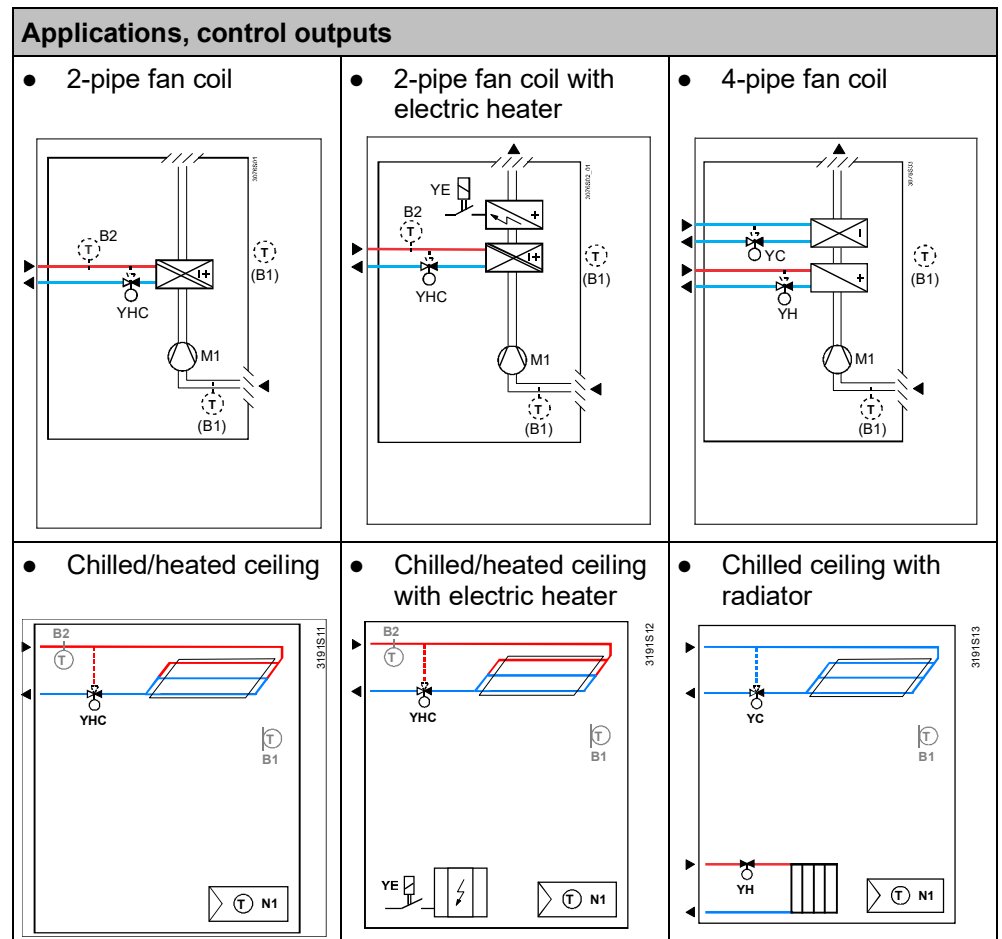
!	<i>NOTICE</i>
	No protecting heating or cooling control in OFF mode Risk of frost or risk of over temperature

For more information about the thermostat functions refer to chapter 'Additional functions [[→ 12](#)]'

4 Applications

4.1 Overview

The RDB160BN BACnet MS/TP room thermostats support the following applications. The applications can be configured using the local parameter setting or via the system.



YHC	Heating/cooling valve actuator	M1	1-speed, 2-speed or 3-speed fan
YH	Heating valve actuator	B1	Return air temperature sensor or external room temperature sensor (optional)
YC	Cooling valve actuator	B2	Changeover sensor (optional)
YE	Electric heater		

Possible output combinations

	2-pipe		2-pipe with electric heater		4-pipe	
Fan	1/2/3-speed	DC 0...10 V	1/2/3-speed	DC 0...10 V	1/2/3-speed	DC 0...10 V
Output #1	On/Off, PWM, 3-position, DC 0...10 V		On/Off, PWM, DC 0...10 V		On/Off, PWM, DC 0...10 V	On/Off, PWM
Output #2	n.a.		On/Off			On/Off, PWM

4.2 Additional functions

Heating / cooling changeover via BACnet

Heating / cooling changeover is a function that enables 2-pipe systems to use the same pipe for both heating and cooling control. Heating control is normally required in winter when the outside temperatures are low, while cooling control is normally required in summer.

The heating / cooling changeover signal can be received via BACnet.

In case there is no changeover signal, e.g. due to problems with data communication or power failure, the thermostat operates in the last valid operating mode (heating or cooling).

Automatic heating / cooling changeover via changeover sensor

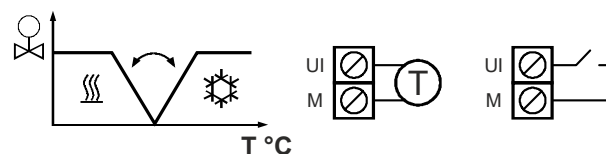
If a cable temperature sensor (QAP2012.150) is connected to the input terminal UI, and if parameter P14 is set to 2, the thermostat changes between heating and cooling mode according to the water temperature measured by the changeover sensor:

- If the water temperature is above 28 °C, the thermostat changes over to heating mode and stays in heating mode until the temperature falls below 16 °C.
- If the water temperature is below 16 °C, the thermostat changes over to cooling mode and stays in cooling mode until the temperature rises above 28 °C.

The water temperature is defined via BACnet object.

Changeover switch

The sensor QAP2012.150 or any other PT1000 cable temperature sensor for automatic heating / cooling changeover can be replaced by an external switch for manual, remote changeover by setting P14 to 1.



- Contact open: Heating mode
- Contact closed: Cooling mode

The sensor or switch can be connected to input terminal U1. See also chapter 'Multifunctional input, digital input [→ 24]'.

External / return air temperature sensor

The thermostat measures the room temperature with a built-in sensor, an external room temperature sensor (QAA2012) or an external return air temperature sensor (QAP2012.150) connected to a multifunctional input AI.

Input AI must be commissioned accordingly.

For detailed information about the input settings refer to chapter 'Multifunctional input, digital input [→ 24]'

Mold protection

Mold protection helps to avoid damage from moisture due to a lack of air circulation. In very warm and humid climates, the fan can be operated continuously at a low speed in all operating modes. Mold protection can be activated via parameter P04.

Chilled / heated ceiling

Both heating and cooling sequences can also be used for chilled / heated ceiling.

Fan coil unit heating / cooling sequences for ceiling application can be used by disabling the fan via parameter P25 and locking the fan button via parameter P66.

Dew point monitoring

Dew point monitoring is essential to avoid condensation on the chilled ceiling. It helps to avoid damage to the building. Cooling with a disabled fan can be set via parameter P25. An external dew point monitoring must be installed.

A contact can be used on the digital input (DI) to switch off all outputs and prevent condensation.

Key lock

A combination of keys can be defined via parameter P65 or via BACnet object to lock or unlock to users.

Configuration options P65	Fan button / On/Off button Active	Setpoint Up/Down buttons Active	Fan button Active
0			
1	X		
2		X	
3	X	X	
4			X
5	X		X
6		X	X
7 (Factory setting)	X	X	X

Lock setting access

Access to parameter settings can be blocked while all buttons are active for standard operation. This function must be activated via BACnet.

Blocking a device during fire alarms

The RDB160BN thermostat can be completely blocked during fire alarms. This function can only be activated via BACnet (Binary value, 9).

If the current value has not been previously set to 0, the function forces the unit to OFF mode and prevents it from being reactivated. In this case, the device cannot be started via the On/Off button while this function is active.

Supply air temperature limitation function and cascade control

The analog input AI can be configured for use with a supply air temperature limitation sensor. The thermostat automatically switches to cascade control. There are four values for minimum and maximum air temperature limitation. The setting range is 10 °C...50 °C and the default settings are as follows:

Heating mode		Cooling mode	
Min. (P71)	24 °C (default)	Min. (P73)	12 °C (default)
Max. (P70)	35 °C (default)	Max. (P72)	24 °C (default)

In cascade mode, the room thermostat works together with the supply air temperature limitation controller using cascade control. In cascade control, the supply of air temperature is calculated to maintain the room temperature setpoint.

The Cascade factor consists of the supply air controller being faster than the room thermostat. The Cascade factor (P74) acts as a divisor which affects both the proportional band (P08) and Integration time (P09).

Example: If the Cascade factor is 3 (default) and the room thermostat has a proportional band of 10 K and an integration time of 300 seconds, the supply air controller receives a proportional band of 3 K and an integration time of 100 seconds. In other words, the supply air controller is three times faster than the room thermostat.

Window state

The thermostat stops heating and cooling control. The fan turns off unless mold protection or cooling of an electric heater has been selected. The potential-free window contact is connected to inputs DI or U1 and must be configured via parameters P03 and P14.

Window state mode is sent via BACnet.

Setpoint limitation

For energy saving purposes, the setpoint setting offset can be limited via parameter P34 (upward) and parameter P35 (downward).

4.3 Control sequences

4.3.1 Overview

The main control sequence (e.g. the water coil sequence of the fan coil unit) can be set via parameter P02.

The following sequences can be activated in the thermostats. The available sequences depend on the application, which is selected via parameter P01.

For detailed information about the applications refer to chapter 'Applications [→ 11]'.
[→ 11]'

Parameter	P02 = 0	P02 = 1	P02 = 2
Sequence			
Available for basic application ¹	Heating	Cooling / = heating sequence for el. heater	Automatic heating / cooling changeover via external water temperature sensor or remote switch
2-pipe 2-pipe & el. heater 4-pipe	✓	✓	✓

Notes:

¹ For chilled ceiling with radiator applications refer to chapter 'Chilled ceiling with radiator [→ 17]'.
For the relation between setpoints and sequences refer to chapter 'Setpoint and sequences [→ 18]'.

4.3.2 2-pipe fan coil unit

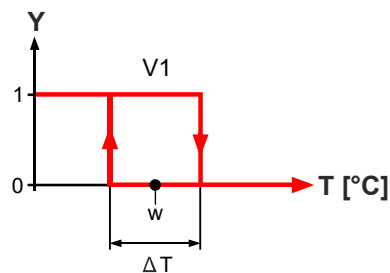
In 2-pipe applications, the thermostat controls a valve in heating / cooling mode with automatic changeover (heating only or cooling only). Factory setting is heating / cooling automatic changeover (P02 = 1).

On/Off control

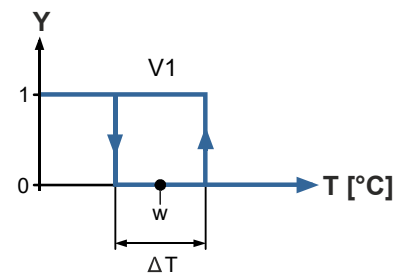
Control sequence On/Off output:

The diagrams below show the control sequence for 2-position control.

Heating mode



Cooling mode



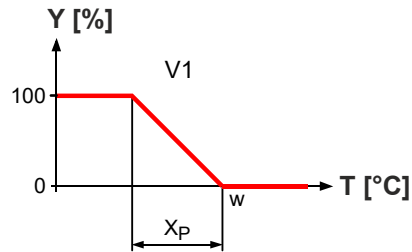
T[°C] Room temperature
W Room temperature setpoint

V1 Control command 'Valve'
ΔT Hysteresis (P10)

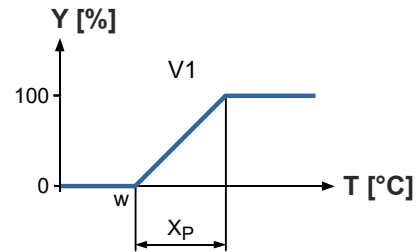
Modulating control

Control sequence modulating output, PWM, DC 0...10 V or 3-position:
The diagrams below show the control sequence for modulating PI control.

Heating and cooling mode



Cooling mode



T[°C] Room temperature

W Room temperature setpoint

V1 Control command 'Valve'

Xp Proportional band (P08)



NOTICE

The diagrams only show the PI proportional part of the thermostat.

For detailed information about setting the sequence and the control outputs refer to chapters 'Applications [→ 11]', 'Setpoint and sequences [→ 18]' and 'Control outputs [→ 20]'.

4.3.3 2-pipe fan coil unit with electric heater

Heating or cooling with auxiliary heater

In 2-pipe applications with an electric heater, the thermostat controls a valve in heating or cooling mode based on the changeover: Heating only or cooling only with electric heater. Parameter P01 is set to 4.

The electric heater can only be controlled with output DO5 (Triac) with an On/Off control logic. An external relay is used if the Triac power rating is insufficient.

Electric heating, active in cooling mode

In cooling mode, the valve receives an 'Open' command if the measured temperature is above the setpoint temperature.

The electric heater receives an 'On' command if the measured room temperature drops below the setpoint temperature minus dead zone (parameter P05) and hysteresis (parameter P10).

Electric heating in heating mode

In heating mode, the valve receives an 'Open' command if the measured temperature is below the setpoint temperature. The electric heater is used as an additional heating source when the heating energy controlled by the valve is insufficient.

The electric heater receives an 'On' command if the temperature is below the setpoint temperature minus hysteresis (parameter P10) and the first heating sequence has reached 100 %.



⚠ WARNING

An electric heater must always be protected by a safety limit thermostat!

4.3.4 4-pipe fan coil unit

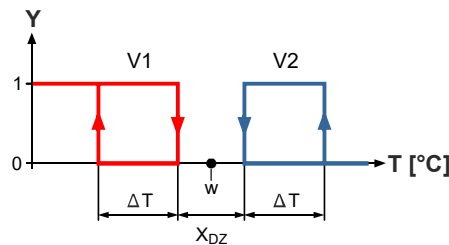
Heating and cooling

In 4-pipe applications, the thermostat controls two valves in heating and cooling mode. 4-pipe application is the default setting for parameter P01 (P01 = 03).

The diagrams below show the control sequence for 2-position control.

On/Off control

Heating and cooling mode

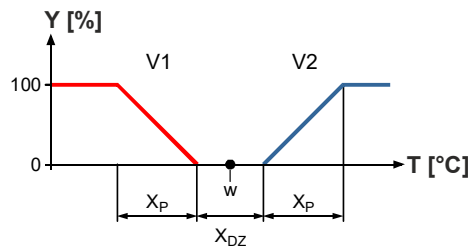


- T[°C] Room temperature
- W Room temperature setpoint
- V1 Control command 'Valve' (H)
- V2 Control command 'Valve' (C)
- ΔT Hysteresis (P10)
- X_d Dead zone (dead band) (P08)

Modulating control

PWM, DC 0...10 V or 3-position

Heating and cooling mode



- T[°C] Room temperature
- W Room temperature setpoint
- V1 Control command 'Valve' (H)
- V2 Control command 'Valve' (C)
- ΔT Hysteresis (P10)
- X_d Dead zone (dead band) (P08)



NOTICE

The diagrams only show the PI proportional part of the thermostat.

For detailed information about setting the sequence and the control outputs refer to chapters 'Applications [→ 11]', 'Setpoint and sequences [→ 18]' and 'Control outputs [→ 20]'.

4.3.5 Chilled ceiling with radiator

For chilled ceiling with radiator, set the corresponding basic application and disable the fan via parameter P25.

The following applications are available:

Application for chilled / heated ceiling, radiator	Set basic application	Refer to chapter	Sequences
Chilled / heated ceiling with changeover	2-pip	2-pipe fan coil unit [→ 15]	H (\) C (/)
Chilled / heated ceiling & el heater	2-pipe with electric heater	2-pipe fan coil unit with electric heater [→ 16]	EI H + H (\ \) EI H + C (⚡ \ /)
Chilled ceiling with radiator	4-pipe	4-pipe fan coil unit [→ 17]	H + C (⚡ \ /)

4.3.6 Setpoint and sequences

2-pipe applications

In changeover applications, the Comfort setpoints (W) for the heating and cooling sequence are the same.

In 2-pipe applications with electric heater, the Comfort setpoint is either in the first heating sequence (in heating mode) or in the cooling sequence (in cooling mode).

The setpoints for Standby (Economy) mode and Protection mode are below the Comfort setpoint for heating and above the Comfort setpoint for cooling.

The heating and cooling setpoints for Standby (Economy) mode can be set via parameters P06 and P07.

Application	Comfort mode		Standby (Economy) mode	
	Heating	Cooling	Heating	Cooling
2-pipe				
2-pipe & electric heater				

W Setpoint for Comfort mode P64

$W_{HeatEco}$ Heating setpoint for Standby (Economy) mode, P06

$W_{CoolEco}$ Cooling setpoint for Standby (Economy) mode, P07

E1 Electric heater sequence

4-pipe applications

In 4-pipe applications, the Comfort setpoint (W) is in the middle of the dead zone, between the heating and cooling sequence.

The dead zone can be defined via parameter P05.

Application	Comfort mode	Standby (Economy) mode
	Heating and cooling	Heating and/or cooling
4-pipe		

- W Setpoint for Comfort mode, P64
- $W_{HeatEco/}$ Heating setpoint for Standby (Economy) mode, P06
- $W_{CoolEco/}$ Cooling setpoint for Standby (Economy) mode, P07
- E1 Electric heater sequence

5 Control outputs

Different control output signals are available; they are defined during commissioning (see below).

Product no. / Control output	2-position (PWN or On/Off)	DC 0...10 V	3-position
RDB160BN	DO4, DO5 (2x Triac)	AO1, AO2 ¹⁾	DO4, DO5 ²⁾ (1x ▲ / ▼)

¹⁾ AO2 is shared with DC 0...10 V fan and can be used for valve actuators only with 1-, 2- or 3-speed fan application.

²⁾ Only available for 2-pipe applications

On/Off and PWM control signal (2-position)

If the measured room temperature is below the setpoint (heating mode) or above the setpoint (cooling mode), the valve receives the 'Open' or 'On' command via control output DO4 or DO5. The valve receives the 'Off' command if the measured room temperature is above the setpoint (heating mode) or below the setpoint (cooling mode).

The control hysteresis of On/Off control output can be set via parameter P10. The factory setting is 1 K.

The pulse degree of the PWM output can be set for heating (DO4) and cooling (DO5) valve independently via parameters P18 and P19. The factory setting is 60 seconds.

Electric heater control signal (2-position)

The electric heater receives the 'On' command via the DO5 output with On/Off logic only if the measured room temperature is below the setpoint for the electric heater.

It receives the 'Off' command if the measured room temperature is above the setpoint for electric heater.



⚠ CAUTION

Overtemperature

To avoid overtemperature, a safety limit thermostat must be provided externally.

3-position control signal

Output AO4 provides the 'Open' command, and AO5 the 'Close' command to the 3-position actuator.

The factory setting for the actuator's running time is 120 seconds. It can be defined via parameter P20.

Valve exercising feature

The valves are operated from time to time to prevent them from seizing after long periods of inactivity. For example, in winter, only heating valves are used and thus, cooling valves must also be operated from time to time so that they do not get stuck in one position.

The time between two exercises is set via parameter P22 for the heating actuator and P23 for the cooling actuator. The default setting is 23 hours.

No exercises occur for electric heaters. In other words, the function does not impact an electric heater.

DC 0...10 V signal

AO1 and AO2 can be set as outputs, providing DC 0...10 V signal for modulating valves.

Both outputs can be set via parameters P16 and P17 with different ranges:

- 0...10 V
- 2...10 V
- 10...2 V (inverse signal)
- 10...0 V (inverse signal)



NOTICE

AO2 is used as a DC fan output when the fan is set to DC. Parameter P17 is not active.

5.1 Fan control

The thermostat controls either 1-speed, 2-speed, 3-speed or DC 0...10 V fan.

The fan operates in automatic mode or in manual mode with the selected speed. The fan mode and speed can be changed and monitored via BACnet.

In automatic mode, the fan speed depends on the setpoint and the current room temperature. When the room temperature reaches the setpoint, the control valve closes, and the fan switches off or stays at minimum fan speed.

1-speed, 2-speed, 3-speed fan

The thermostat can control one 1-, 2- or 3-speed fans selected via control parameter P30. The 1-speed fan is connected to terminal DO1, the 2-speed fan is connected to terminals DO1 and DO2, and the 3-speed fan is connected to terminals DO1, DO2 and DO3.

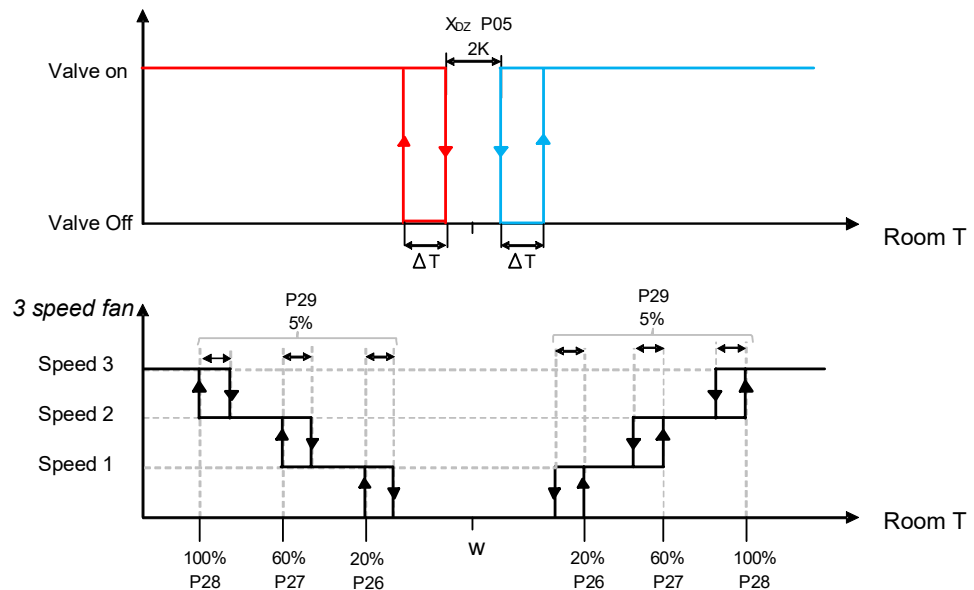
On 2- or 3-speed fans, only one fan output can be on at the same time, either DO1, DO2 or DO3.

3-speed fan control with modulating heating / cooling control

The individual switching points for 'On' for each fan stage is defined via control parameters P26 to P28. The fan speed hysteresis is set via parameter P29. The factory setting is 5 %.

3-speed fan control with On/Off heating / cooling control

In applications with 2-position control, the switching point for the fan speeds can be defined via control parameters P26, P27 and P28.



Selection of fan output

Different fan output signals are available based on the setting:

Product	On/Off 1-/2-/3-speed fan	Modulating fan DC 0...10 V	Control type selected via
RDB160BN	DO1, DO2, DO3	AO2	P77, P30

The type of fan output (DC 0...10 V, 1-, 2- or 3-speed) can be selected via local HMI using parameters P77 and P30 or via BACnet objects.

- P77 is used to select the fan type (1-, 2- or 3-speed fan or DC fan).
- P30 is used to select the number of fan speeds.

5.2 Fan operation


Fan operation for heating / cooling mode, or disabled

The thermostat can be used on universal applications such as chilled / heated ceilings and radiator.

Fan operation can be limited to active for cooling only or heating only, or even to disabled via control parameter P25 ('Fan control in auto mode').

The manual fan operation is locked with parameter P66.

- If P66 is set to 0, the fan is disabled in auto mode as per parameter P25. The user can still manually set the speed.
- If P66 is set to 1, the fan is disabled in auto mode as per parameter P25. The user cannot manually set the fan speed. Fan operation is locked.

	NOTICE
	Fan operation in the dead zone (fan kick) must be changed to disable the fan operation.

For detailed information about chilled / heated ceilings refer to chapter 'Chilled ceiling with radiator [→ 17]'.
 For detailed information about chilled / heated ceilings refer to chapter 'Chilled ceiling with radiator [→ 17]'.



Fan operation in dead zone (fan kick)

In automatic fan mode and a room temperature within the dead zone, the control valve is normally closed, and the fan is at minimum speed.

The fan can be switched off when the room temperature is within the dead zone via parameter P31. The factory setting for P31 is 1 (Lower speed).

Fan overrun for electric heater

When the electric heater is switched off, the fan overruns for 120 seconds (fixed value) to avoid overtemperature of the electric heater or to prevent the thermal cutout from responding.

	 CAUTION
	<p>Fan failure</p> <p>In case of fan failure, the thermostat cannot protect the electric heater against overtemperature. For this reason, the electric heater must feature a separate safety device (thermal cutout).</p>

6 Multifunctional input, digital input

The thermostat has the following three multifunctional inputs:



- Analog input (AI) for:
 - External room temperature or return air temperature sensor
 - Supply air temperature limitation sensor
- Universal input (UI) for:
 - Changeover digital
 - Changeover analog
 - Window contact
- Digital input (DI) for:
 - Presence input
 - Window contact

Input	Setting	Description
AI (P13)	0 = no function	Device works with internal temperature sensor
	1 = Room temp ext. sensor	Device works with the room / return air temperature sensor wired on AI (PT1000 sensor)
	11= Supply air temperature limitation sensor	Activate supply air limitation function
UI (P14)	0 = no function	Device works with internal temperature sensor
	1 = Change-over digital	Potential free changeover input. Can be set to Normally Open (default) or Normally Closed via parameter P37.
	2 = Change-over analog	PT1000 sensor input for 'Automatic heating / cooling changeover' function. Below 16 °C, the thermostat works in cooling mode. Above 28 °C thermostat works in heating mode. Those values can be changed via BACnet.
	3 = OFF mode (open window)	Turns the thermostat into OFF mode when the window is open. Can be set to Normally Open (default) or Normally Closed via parameter P37.
DI	Fixed setting	Floating window contact or occupancy contact. Configurable for Normally Open / Normally Closed via parameter P36.




7 Type summary

Type	Order number	Designation
RDB160BN	S55770-T426	RDB160BN BACnet Room Temp Controller


7.1 Equipment combinations

Type of unit		Product no.	Datasheet ^{*)}
Cable temperature or changeover sensor, cable length 1.5 m PT1000		QAP2012.15 0	N1831
Room temperature sensor PT1000		QAA2012	N1745




On/Off actuators





Type of unit		Product no.	Datasheet ^{*)}
Electromotive On/Off actuator		SFA21..	N4863
Electromotive On/Off valve and actuator (only available in AP, UAE, SA and IN)		MVI../MXI..	A6V112518 92
Zone valve actuator (only available in AP, UAE, SA and IN)		SUA	N4832

On/Off and PWM actuators¹⁾









Type of unit		Product no.	Datasheet ^{*)}
Thermal actuator AC 230 V (for small valves 2.5 mm), NC		STP23.. ¹⁾	N4884

3-position actuators

Type of unit		Product no.	Datasheet ^{*)}
Electromotive actuator, 3-position (for radiator valves)		SSA31..	N4893
Electromotive actuator, 3-position (for 2- and 3-port valves/V..P45)		SSC31	N4895
Electromotive actuator, 3-position (for small valves 2.5 mm)		SSP31..	N4864

Type of unit		Product no.	Datasheet ^{*)}
Electromotive actuator, 3-position (for small valves 5.5 mm)		SSB31..	N4891
Electromotive actuator, 3-position (for small valve 5 mm)		SSD31..	N4861
Electromotive actuator, 3-position (for valves 5.5 mm)		SAS31..	N4581
Rotary actuators for ball valves 3-position		GDB331.9E	N4657

DC 0...10 V actuators

Type of unit		Product no.	Datasheet ^{*)}
Electromotive actuator, DC 0...10 V (for radiator valves)		SSA61..	N4893
Electromotive actuator, DC 0...10 V (for 2- and 3-port valves/V..P45)		SSC61..	N4895
Electromotive actuator, DC 0...10 V (for small valves 2.5 mm)		SSP61..	N4864
Electromotive actuator, DC 0...10 V (for small valves 5.5 mm)		SSB61..	N4891
Electromotive actuator, DC 0...10 V (for valves 5.5 mm)		SAS61..	N4581
Electrothermal actuator, AC 24 V, NC, DC 0...10 V, 1 m		STA63..	N4884
Electrothermal actuator, AC 24 V, NO, DC 0...10 V, 1 m		STP63..	N4884
Rotary actuators for ball valves AC 24 V, DC 0...10 V		GDB161.9E	N4657

^{*)} The documents can be downloaded at <http://siemens.com/bt/download>

¹⁾ With PWM control, it is not possible to ensure exact parallel running of two or more thermal actuators. If several fan coil systems are controlled by the same room thermostat, use motorized actuators with On/Off or 3-position control.

8 Communication

8.1 BACnet MS/TP

The RDB160BN thermostat supports the BACnet MS/TP communication protocol and is listed as a BTL device.

The BTL certificate of the thermostat can be found at <https://www.bacnetlabs.org/>.

Device address

The BACnet thermostat has a preset device ID. The MAC address is part of the device ID and consists of the last two digits.

The device ID, e.g. '174130', is shown on the product label.



For the BACnet device ID = '174130',

- The 4 lowest digits (P59) are '4130'.
- The 3 highest digits (P60) are '17'.
- The MS/TP MAC address (P58) is '30'.



The MAC address must be unique within an MS/TP network.

Baud rate

The baud rate is selectable via parameter P62.

Four options are available for the RDB160BN : 9600, 19200, 38400 and 76800 (default setting) bps.

MS/TP Master

The maximum number of master units can be set from 0 to 127.

The maximum number of master units can be changed via parameter P61 (factory setting = 127).



NOTICE

Any change, e.g. change of device address, baud rate and parity, will become effective only after turning the power supply off and then on again.

8.2 Communication objects

Analog inputs

Object name	Object ID	Description	Unit	Writeable
TR	Analog input, 0	Room temperature	°C	No
TChover	Analog input, 1	Change over temperature	°C	No
AI1	Analog input, 2	Analog input	°C	No
UI1	Analog input, 3	-	V	No
Tsu	Analog input, 4	Supply air temperature	°C	No

Analog values

Object name	Object ID	Description	Unit	Writeable
AO1	Analog value, 0	Analog output	V	No
AO2	Analog value, 1	Analog output	V	No
SpTRShft	Analog value, 2	Setpoint shift value	°C	No
SpTR	Analog value, 3	Controller setpoint	°C	No
LoopOut	Analog value, 4	Control output	%	No
HclVlvPos	Analog value, 5	Heating coil valve position	%	No
CclVlvPos	Analog value, 6	Cooling coil valve position	%	No
Not used	Analog value, 7, 8	-	-	No
SpHEco	Analog value, 9	Heating setpoint for Standby (Economy)	°C	Yes
SpCEco	Analog value, 10	Cooling setpoint for Standby (Economy)	°C	Yes
Not used	Analog value, 11	-	-	-
PrSpShft	Analog value, 12	Setpoint displacement during presence	°C	Yes
HclVlvPosMan	Analog value, 13	Manual value heating output	%	Yes
CclVlvPosMan	Analog value, 14	Manual value cooling output	%	Yes
TRRemote	Analog value, 15	Remote control of room temperature	°C	Yes
StbyDBand	Analog value, 16	Dead band for Standby mode	°C	Yes
Not used	Analog value, 17-26	-	-	-
FanVarSpdMin	Analog value, 27	Lowest possible speed for the DC fan	%	Yes
FanVarSpdMax	Analog value, 28	Highest possible speed for the DC fan	%	Yes

TChoverCool	Analog value, 29	Cooling if lower changeover temperature	°C	Yes
TChoverHeat	Analog value, 30	Heating if higher changeover temperature	°C	Yes
RTHyst	Analog value, 31	Room temperature hysteresis	°C	Yes
CmfDBand	Analog value, 32	Dead band for comfort mode	°C	Yes
CmfSp	Analog value, 33	Basic setpoint for the controller	°C	Yes
TSuSpCalc	Analog value, 34	Calculated supply air setpoint	°C	No

Binary inputs

Object name	Object ID	Description	Values	Writeable
RWndSta	Binary input, 0	Room window state	Active / inactive	No
Not used	Binary input, 1	-	-	No
RPscDet	Binary input, 2	Room presence detection	Active / inactive	No
HCChover	Binary input, 3	Indicates changeover from digital input	Active / inactive	No
Not used	Binary input, 4-6	-	-	No

Binary values

Object name	Object ID	Description	Values	Writeable
Not used	Binary value, 0	-	-	No
Outputtype	Binary value, 1	Indicates pulse prop. heating	Active / inactive	No
Outputtype	Binary value, 2	Indicates pulse prop. cooling	Active / inactive	No
3-posInc	Binary value, 3	Indicates heating increase	Active / inactive	No
3-posDec	Binary value, 4	Indicates heating decrease	Active / inactive	No
FanType	Binary value, 5	Select fan type: Inactive = 3-speed fan Active = DC fan	Active / inactive	Yes
Not used	Binary value, 6	-	-	-
ChoverStatus	Binary value, 7	Indicates changeover status from both digital and analog input	Active / inactive	No
Not used	Binary value, 8	-	-	-

Object name	Object ID	Description	Values	Writeable
ShdownState	Binary value, 9	Places the unit in 'OFF' mode and prevents it from being activated again, unless this value is first set to '0'.	Active / inactive	Yes
ShdownSet	Binary value, 10	Places the unit in 'OFF' mode	Active / inactive	Yes
-	Binary value, 11	-	-	-
LockSettings	Binary value, 12	Prevents parameter menu access via display	Active / inactive	Yes

Loop

Object name	Object ID	Description
Controller	Loop, 0	Controller PI information

Multistate inputs

Object name	Object ID	Description	Values	Writeable
Not used	Multistate input, 0	-	-	No
ROpMode	Multistate input, 1	Current running mode	1 = Off 2 = Economy/Standby 3 = Not used 4 = Not used 5 = Comfort	No
HCSta	Multistate input, 2	Current control mode	1 = Off 2 = Heating 3 = Cooling	No
Fan3Spd	Multistate input, 3	Current fan speed	1 = Off 2 = Fan speed 1 3 = Fan speed 2 4 = Fan speed 3	No

Multistate values

Object name	Object ID	Description	Values	Writeable
CcVlvPosMod	Multistate value, 1	Manual/Auto cool output	1 = Off 2 = Manual output 3 = Automatic output	Yes
FanSpdMod	Multistate value, 2	Fan mode select	1 = Off 2 = Manual speed 1 3 = Manual speed 2 4 = Manual speed 3 5 = Auto	Yes
AppNr	Multistate value, 3	Control application	2 = 2-pipe system 3 = 4-pipe system 4 = 2-pipe system with electric heater	Yes
ChoverMod	Multistate value, 4	Manual/Auto change-over	1 = Heating 2 = Cooling 3 = Auto	Yes

Object name	Object ID	Description	Values	Writeable
ROpMod	Multistate value, 5	Room operating mode	1 = Off 2 = Economy/Standby 3 = Not used 4 = Not used 5 = Comfort 6 = No remote control	Yes
BtnCnf	Multistate value, 6	Buttons active	1 = No active buttons 2 = Only On/Off button active 3 = Only Up/Down buttons active 4 = On/Off and Up/Down buttons active 5 = Only fan button active 6 = On/Off and fan button active 7 = Up/Down and fan button active 8 = All buttons active	Yes
Valve 1 setting	Multistate value, 7	Set valve 1 type	1 = DC valve 2 = PWM 3 = On/Off 4 = 3-position valve	Yes
Valve 2 setting	Multistate value, 8	Set valve 2 type	1 = DC valve 2 = PWM 3 = On/Off 4 = 3-position valve	Yes

8.3 Control parameters

A number of control parameters can be readjusted to optimize control performance. This can be done on the thermostat via HMI or via commissioning / operating tool. These parameters can also be set during operation without opening the unit.

All control parameter settings are retained in the event of a power failure.

8.3.1 Parameter setting via local HMI

Access parameter settings

Press Up/Down buttons simultaneously for 5 seconds until 'Service' is displayed on the screen.

Release and press Up button twice. Parameter P01 is displayed.

Define parameters

You can navigate through the parameter list using the Up/Down buttons.

- To change a parameter setting, select the right parameter with Up/Down buttons and confirm by pressing the On/Off button.
- Press the Up/Down buttons to change the setting value.
- Press the On/Off button to save and go back to the parameter list.

To exit the parameter setting, either

- Go to EXIT parameter and press the On/Off button.
- Press the Up/Down buttons simultaneously.

Lock settings access

It is possible to lock the setting access via the BACnet object 'LockSettings'.

Users cannot access the parameters via the local HMI while the settings are locked.

8.3.2 Parameter list

Parameter	Name	Factory setting	Range
P01	Application	3 = 4-pipe system	2 = 2-pipe system 3 = 4-pipe system 4 = 2-pipe system with electric heater
P02	Control sequence	2 = Automatic change-over	0 = Heating control 1 = Cooling control 2 = Automatic change-over based on analog temperature sensor or digital input
P03	Operating mode when activating digital input 1 DI1	0 = Economy mode	0 = Economy mode (presence) 1 = OFF mode (windows)
P04	Mold protection	0 = Not active	0 = Not active 1 = Active (the fan never stops, even when in controller OFF mode)
P05	Dead zone Comfort mode	2 K	0...10 K
P06	Economy heating setpoint	15 °C	10...40 °C

Parameter	Name	Factory setting	Range
P07	Economy cooling setpoint	30 °C	10...50 °C
P08	P-band Xp/switching diff	10 K	-
P09	Integral action time Tn	300 s	-
P10	Hysteresis (ΔT)	1 K	Controller hysteresis
P11	Delay from Comfort to Standby	0 min	-
P12	Delay from Standby to Comfort	0 min	-
P13	Input AI	0 = no function	0 = no function 1 = Room temp ext. sensor 11 = Supply air temperature limitation sensor
P14	Input UI	0 = no function	0 = no function 1 = Changeover digital 2 = Changeover analog 3 = OFF mode (open window)
P15	Type of digital actuator	-	Not in use
P16	Output AO1	0 = 0...10 V	0 = 0...10 V 1 = 2...10 V 2 = 10...2 V 3 = 10...0 V
P17	Output AO2	0 = 0...10 V	0 = 0...10 V 1 = 2...10 V 2 = 10...2 V 3 = 10...0 V
P18	PWM algorithm cycle heating	60 s	-
P19	PWM algorithm cycle cooling	60 s	-
P20	Actuator running time (3-position) heating	120 s	-
P21	Actuator running time (3-position) cooling	120 s	-
P22	Time (in hours) between exercise of heating actuator	23 h	-
P23	Time (in hours) between exercise of cooling actuator	23 h	-
P24	Standard display	2 = Absolute setpoint	0 = Room temperature and absolute setpoint 1 = Room temperature and

Parameter	Name	Factory setting	Range
			relative setpoint 2 = Absolute setpoint 3 = Relative setpoint
P25	Fan control in auto mode	3 = Heating and cooling	0 = Disabled 1 = Heating only 2 = Cooling only 3 = Heating and cooling
P26	Fan speed switching point low	20 % When using electric heater: 5 %	0...100 %
P27	Fan speed switching point medium	60 %	0...100 %
P28	Fan speed switching point high	100 %	0...100 %
P29	Hysteresis for start/stop of fans in % of controller output.	5 %	0...20 %
P30	Fan speeds	3	1 = 1-speed fan 2 = 2-speed fan 3 = 3-speed fan
P31	Fan stage in dead zone	1 = Lower speed	0 = Fan turned off 1 = Lower speed
P32	Measured value correction on AI input	0 K	-
P33	Measured value correction on internal temperature sensor	0 K	-
P34	Maximum permitted upward setpoint offset.	13 K	0...13 K
P35	Maximum permitted downward setpoint offset.	17 K	0...17 K
P36	Normal position for DI	0 = Normally Open	0 = Normally Open 1 = Normally Closed
P37	Normal position for UI	0 = Normally Open	0 = Normally Open 1 = Normally Closed
P38	Normal position for DO4	1 = Normally Closed	0 = Normally Open 1 = Normally Closed
P39	Normal position for DO5	1 = Normally Closed	0 = Normally Open 1 = Normally Closed
P40	Manual/Auto heating output signal	2 = Auto	0 = Off 1 = Manual

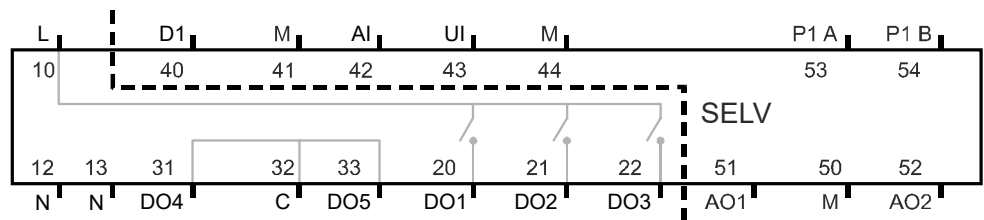
Parameter	Name	Factory setting	Range
			2 = Auto
P41	Manual/Auto cooling output signal	2 = Auto	0 = Off 1 = Manual 2 = Auto
P42	Heating output signal in manual mode	0	-
P43	Cooling output signal in manual mode	0	-
P44	Not used	-	Display of thermostat model
P45	Not used	-	Display of thermostat model
P46	Not used	-	Display of thermostat model
P47	Not used	-	Display of thermostat model
P48	Not used	-	Display of thermostat model
P49	Display backlit low	10	0...100 %
P50	Display backlit high	30	0...100 %
P51	Not used	-	-
P52	Not used	-	-
P53	Not used	-	-
P54	Not used	-	-
P55	Not used	-	-
P56	Not used	-	-
P57	Communication protocol	1 = BACnet	0 = No communication 1 = BACnet
P58	BACnet MS/TP MAC address	0-99, as per device label	Must be unique within an MS/TP network
P59	BACnet MS/TP, device id, the 4 lowest digits	Lowest 4 digits of device ID, as per device label	-
P60	BACnet MS/TP, device id, the 3 highest digits	Highest 3 digits of device ID, as per device label	-
P61	BACnet MS/TP, maximum number of master units	127	0...127
P62	Baud rate	3 = 76800 bps	0 = 9600 bps 1 = 19200 bps 2 = 38400 bps

Parameter	Name	Factory setting	Range
			3 = 76800 bps
P63	Reset communication parameters to factory settings	0	1 = reset com. parameters
P64	Basic comfort setpoint	22 °C	5... 50 °C
P65	Lock buttons	7 = all active	0 = No active buttons 1 = Only On/Off button active 2 = Only Up/Down buttons active 3 = On/Off and Up/Down buttons active 4 = Only fan button active 5 = On/Off and fan button active 6 = Up/Down and fan button active 7 = all active
P66	Lock manual fan speed setting according to P25	0 = Disable	0 = Disable 1 = Enable
P67	DC fan: Switching point fan	10 %	0...100 %
P68	Maximum DC fan speed	100 %	0...100 %
P69	Fan start kick time	0 = OFF	0 (Off)...10 seconds
P70	Supply air max. limitation for cascade control and heating control	35 °C	30...50 °C
P71	Supply air min. limitation for cascade control and heating control	24 °C	20...30 °C
P72	Supply air max. limitation for cascade control and cooling control	24 °C	15...30 °C
P73	Supply air min. limitation for cascade control and cooling control	12 °C	5...20 °C
P74	Cascade factor between room controller and supply air controller	3 °C	1...5 °C
P75	Frost protection temperature for supply air when supply air temperature limitation is active	8 °C	Heat valve open if the supply air temperature drops below this setpoint.

Parameter	Name	Factory setting	Range
P76	Activate supply air temperature limitation for	1 = Cooling control	0 = Heating control 1 = Cooling control 2 = Both heating and cooling control
P77	Fan output type	0 = 1- /2- / 3-speed fan	0 = 1- /2- /3-speed fan 1 = DC fan
P78	Valve 1 output type	0 = DC valve	0 = DC valve 1 = PWM 2 = On/Off 3 = 3-position valve
P79	Valve 2 output type *)	0 = DC valve	0 = DC valve 1 = PWM 2 = On/Off 3 = 3-position valve

*) Locked to On/Off when thermostat is set to 2-pipe with electric heater application.

9 Connection terminals



10, 12, 13	L, N	Operating voltage AC 230 V	40	DI	Digital input
			41	M	Ground
20	DO1	Control output fan speed I AC 230 V	42	AI	Analog input
21	DO2	Control output fan speed II AC 230 V	43	UI	Universal input
22	DO3	Control output fan speed III AC 230 V	44	M	Ground for SELV
31	DO4	Control outputs 'Valve' AC 230 V	51	AO1	Control outputs DC 0...10 V
32	C	Common	50	M	Ground
33	DO5	Control outputs Valve' AC 230 V	52	AO2	Control outputs DC 0...10 V
			53	P1 A	BACnet MS/TP
			54	P1 B	BACnet MS/TP

10 Connection diagrams

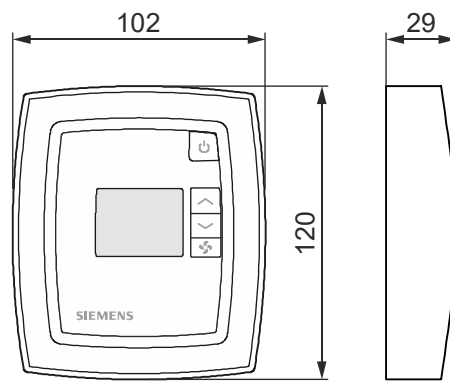
		DC 0...10 V fan	
Application			
2-pipe / heating or cooling – On/Off or PWM			
2-pipe / heating or cooling – DC valve			
2-pipe with el. heater / heating or cooling – On/Off or PWM and el. heater	230 V		
2-pipe with el. heater / heating or cooling – DC 0...10 V and el. heater	230 V		
4-pipe – On/Off or PWM • V1 = Heating • V2 = Cooling	230 V		

N1	Room thermostat RDB160BN	S1, S3	Switch (keycard, window contact, presence detector)
M1	Fan (1-/ 2-/ 3- speed or DC 0...10 V)	B1, B2	Temperature sensor (return air temperature, external room temperature, changeover sensor, etc.)
V1, V2	Valve actuator, 2-position, 3-position or DC 0...10 V	P1 A	BACnet MS/TP -
E1	Electric heater	P1 B	BACnet MS/TP +

3-speed fan		
<p>Application</p> <p>2-pipe / heating or cooling – On/Off or PWM</p>		
<p>2-pipe / heating or cooling – DC valve</p>		
<p>2-pipe / heating or cooling – 3-position</p> <ul style="list-style-type: none"> • DO4 = Open ▲ • DO5 = Close ▼ 	<p>230 V</p>	
<p>2-pipe with el. heater / heating or cooling – On/Off or PWM and el. heater</p>	<p>230 V</p>	
<p>2-pipe with el. heater / heating or cooling – DC 0...10 V and el. heater</p>	<p>230 V</p>	
<p>4-pipe On/Off or PWM</p> <ul style="list-style-type: none"> • V1 = Heating • V2 = Cooling 	<p>230 V</p>	
<p>4-pipe DC 0...10 V</p> <ul style="list-style-type: none"> • V1 = Heating • V2 = Cooling 		

N1	Room thermostat RDB160BN	S1, S3	Switch (keycard, window contact, presence detector)
M1	Fan (1-/2-/3- speed or DC 0...10 V)	B1, B2	Temperature sensor (return air temperature, external room temperature, changeover sensor, etc.)
V1, V2	Valve actuator, 2-position, 3-position or DC 0...10 V	P1 A	BACnet MS/TP -
E1	Electric heater	P1 B	BACnet MS/TP +

11 Dimensions



All dimensions in mm

12 Mounting and installation



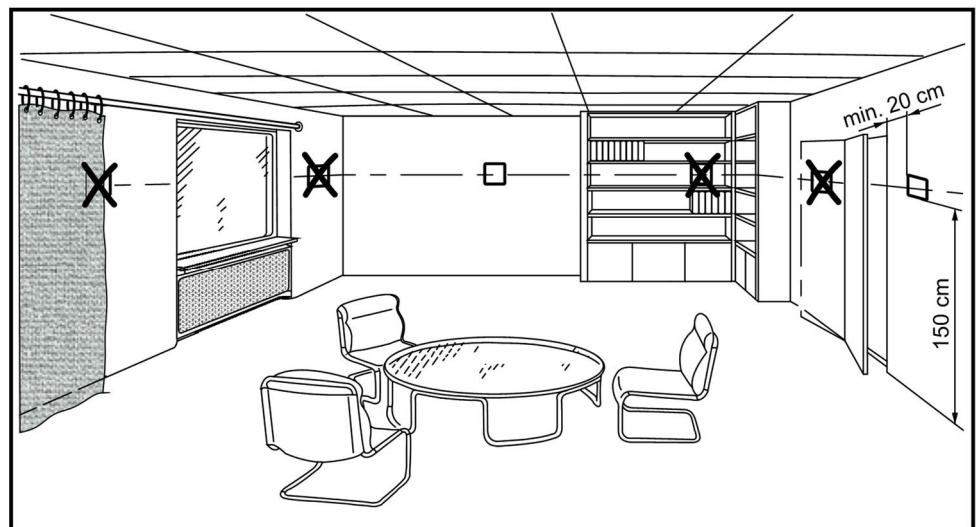
⚠ CAUTION

Noncompliance with the following safety regulations

Risk of injury to persons and damage to property

- Compliance with the following regulations is required.

Mounting



- The devices are suitable for wall mounting.
- Recommended height: 1.5 m above the floor.
- Do not mount the devices in recesses, shelves, behind curtains or doors, or above or near heat sources.
- Avoid direct solar radiation and drafts.
- Seal the conduit box or the installation tube if any, as air currents can affect sensor readings.
- Adhere to allowed ambient conditions.

Wiring

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



⚠ WARNING

Supply lines to external consumers (DO1, DO2, DO3, Yx or Yxx) have no internal line protection!

Short-circuits, risk of fire and injury

- Adapt the line diameters as per local regulations to the rated value of the installed over current protection device.
- The AC 230 V mains supply line must have an external circuit breaker with a rated current of no more than 10 A.
- 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.
- Disconnect the thermostat from the power supply before removing it from the mounting plate.

13 Commissioning

Applications

The BACnet MS/TP room thermostats are delivered with a fixed set of applications and related parameters. The relevant application is selected and activated during commissioning using the local HMI or commissioning tools for BACnet MS/TP.

The factory settings can be changed by using the display and buttons on the controller. The Up/Down buttons change the parameter values; the changes are confirmed with the On/Off button.

Wizard setting

The first time the thermostat is powered on, a setup wizard is available to help with the first settings.

This wizard is a list of parameters that help define the major functions of the product in order to facilitate commissioning.

Parameter	Name	Range	Factory setting
P01	Application	2 = 2-pipe system 3 = 4-pipe system 4 = 2-pipe system with electric heater	3 = 4-pipe system
P77	Fan output type	0 = 1-, 2- or 3-speed fan 1 = DC fan	0 = 1-, 2- or 3-speed fan
P78	Valve 1 output type	0 = DC valve 1 = PWM (Thermal valve) 2 = On/Off (Thermostat function) 3 = 3-position valve	0 = DC valve
P79	Valve 2 type *)	0 = DC valve 1 = PWM (Thermal valve) 2 = On/Off (Thermostat function) 3 = 3-position valve	0 = DC valve
P58	BACnet MS/TP MAC address	Must be unique within an MS/TP network	0-99, as per device label
P59	BACnet MS/TP, device id, the 4 lowest digits.	-	Lowest 4 digits of device ID, as per device label
P60	BACnet MS/TP, device id, the 3 highest digits	-	Highest 3 digits of device ID, as per device label
P62	Baud rate	0 = 9600 bps 1 = 19200 bps 2 = 38400 bps 3 = 76800 bps	3 = 76800 bps

*) Locked to On/Off when thermostat is set to 2-pipe with electric heater application.

The device goes to Comfort mode once all parameters are set.

If you exit the wizard before it has finished setup, parameters are still accessible via standard access. For detailed information about parameters refer to chapter 'Control parameters [[→ 32](#)]'

Setpoint and range limitation

We recommend reviewing the setpoints and setpoint ranges (parameters P06, P07, P64) and changing them as needed to achieve maximum comfort and save energy.

14 Operation

General

The room thermostat consists of two parts:

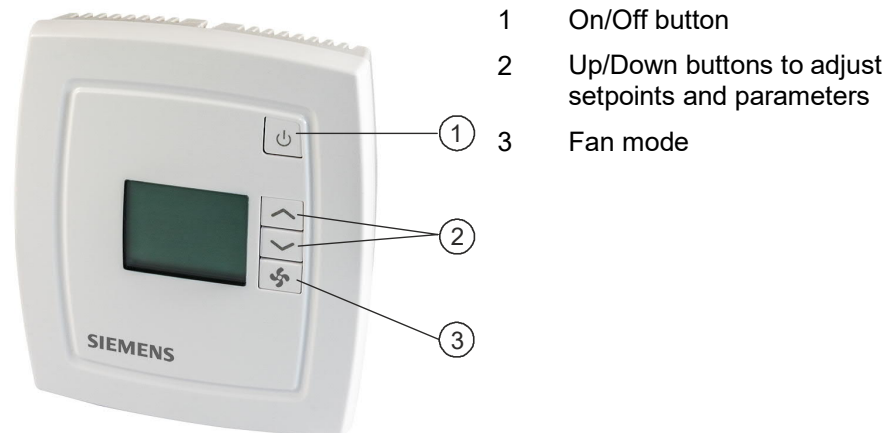
- Plastic housing with electronics, operating elements, room temperature, sensor and the screw terminals
- Mounting plate

The two parts are separated in the box.

No screws are needed to fix the housing on the mounting plate.

Layout

The display is operated using the buttons on the controller.



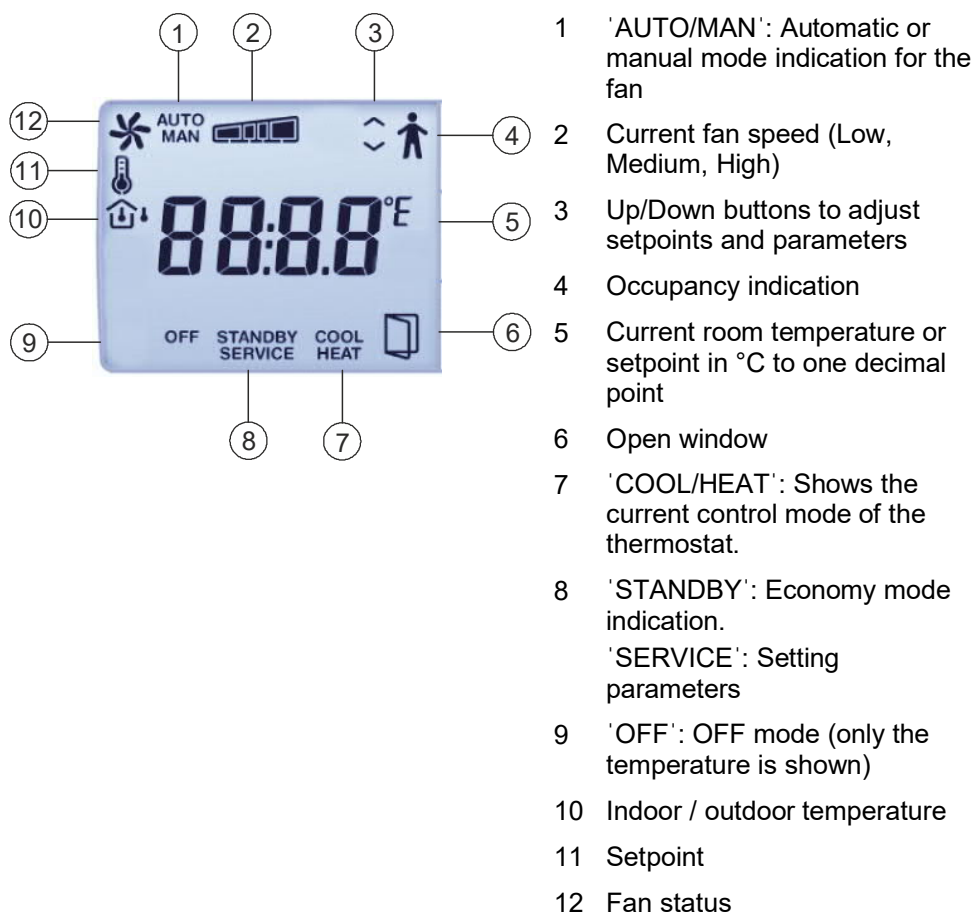
- 1 On/Off button
- 2 Up/Down buttons to adjust setpoints and parameters
- 3 Fan mode

Button operation



User action	Effect description
Normal operation	Current operating mode and state are indicated by symbols. Backlight LCD is on low level set by P49.
Press any button (thermostat in normal operation)	Backlight LCD turns to high level set by P50 (see below for further action). If no further action, backlight LCD turns to low after 2 min.
Press Off button	Changes operating mode to 'OFF'. Backlight LCD turns off.
Press Fan button	Changes the fan mode.
Press Up/Down buttons	Adjusts the Comfort room temperature setpoint.
Press Up/Down buttons until 'Service' is displayed. Then press Up button.	Goes to parameter setting mode, P01 is displayed.

Display

The display has the following indications:



15 Disposal

 	<p>The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage.</p> <ul style="list-style-type: none">• Dispose of the device through channels provided for this purpose.• Comply with all local and currently applicable laws and regulations.
--	---

16 Technical data

General	
Operating voltage	AC 230 V \pm 10 %
Frequency	50/60 Hz
Power consumption	3 W, class II construction
Built-in temperature sensor	NTC type, measuring range 0...50 °C
Terminal blocks	Lift type for max. cable area 2.1 mm ²
No internal fuse! External preliminary protection with max. C 10 circuit breaker required in all cases.	
Ambient conditions, environmental conditions	
Ambient temperature	0...50 °C
Storage temperature	-20...+70 °C
Ambient humidity	Max. 90% r.h.
Safety class and degree of protection	
Protection class	IP20
Pollution degree	2
Overvoltage category	3
Communication	
Communication	BACnet MS/TP
Communication speed	9600, 19200, 38400 or 76800 bps
Inputs	
External sensor, AI	PT1000-sensor
Universal input, UI	Change-over, potential-free contact or PT1000-sensor
Presence/window contact, D1	Potential free contact
Outputs	
Fan control, DO1, DO2, DO3	3 outputs for speed I, II and III, AC 230 V
DOx rating min., max. inductive	5 mA...2 A
No internal fuse! Always use external preliminary protection with max. C 10 A circuit breaker in the supply line.	
Do NOT connect fans in parallel! Connect one fan directly, for additional fans, one relay for each speed.	

Outputs	
DC 0...10 V; AO1, AO2	SELV DC 0...10 V, max. ± 5 mA
Control outputs	Solid state (triacs)
DO4-N, DO5-N	AC 230 V
DOx power limitation	8...300 mA 3 A fast microfuse, cannot be exchanged

Operational data	
Switching differential, adjustable	
Heating/cooling mode (P10)	1 K (0.5...50 K)
Setpoint setting and setpoint range	
Comfort mode (P64)	22 °C (5...50 °C)
Economy mode (P6-7)	15 °C/30 C (OFF, 5...40 °C)
Input AI default value (P13)	0 (no function)
Input U1 default value (P14)	0 (no function)
Input D1 default setting (P36)	0, Normally Open
Built-in room temperature sensor NTC 10 K Ω m	
Measuring range	0...50 °C
Accuracy	± 1.5 °C at 15...30 °C
Temperature calibration range (P33)	± 10 K

Standards and directives	
EU conformity (CE)	A5W00090598A *)
Electronic control type	2.B (micro-disconnection on operation)
RCM conformity	A5W00090592A *)
Safety class	II as per EN 60730
Pollution class	Normal
Degree of protection of housing	IP20 as per EN 60529
Environmental compatibility	The product environmental declaration A5W00088543A *) contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal)

General	
Connection terminals	Solid wires or stranded wires with wire end sleeves 1x 0.4...2.5 mm ² or 2x 0.4...1.5 mm ²
Minimal wiring cross section on terminals	Min. 1.5 mm ²
Housing front color	White RAL 9010
Weight without packaging	0.18 kg

*) The documents can be downloaded at <http://siemens.com/bt/download>



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