SIEMENS

Room thermostat with BACnet MS/TP communication

RDB160BN

For fan coil and universal applications

- For 2-pipe, 2-pipe with electric heater, and 4-pipe applications
- BACnet MS/TP bus communication
- Built-in temperature sensor
- Outputs for On/Off, PWM, 3-position or DC 0…10 V control
- Outputs for 3-speed, 2-speed, 1-speed or DC 0…10 V fan
- Three multifunctional inputs for keycard contact, external sensor, etc.
- Operating modes: Comfort, Standby (Economy) and Off
- Automatic or manual fan speed control
- Automatic heating/cooling changeover
- On/Off button
- Control based on room or return air temperature
- Minimum and maximum limitation of room temperature setpoint
- Operating voltage: AC 230 V

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)

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

The relevant application is selected and activated during commissioning using the local HMI.

Control applications

- Fan coil units, e.g. 2-pipe fan coils
- Universal applications, e.g. chilled ceiling

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

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

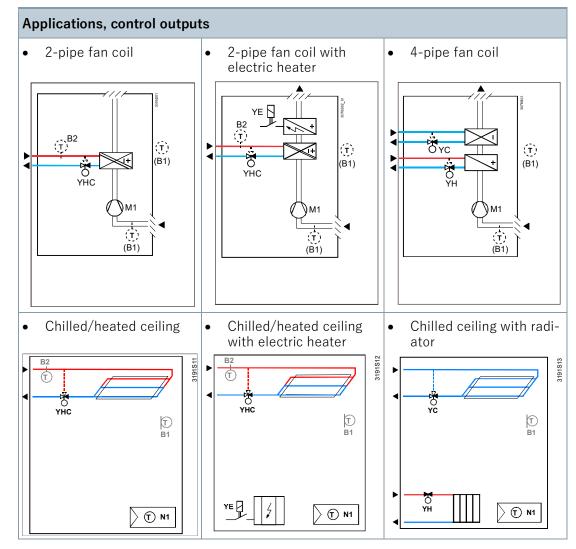The BACnet MS/TP MAC address can be set from 0 to 127.

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.

Applications

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.

Applications, control outputs

- 2-pipe fan coil
- 2-pipe fan coil with electric heater
- 4-pipe fan coil

- Chilled/heated ceiling
- Chilled/heated ceiling with electric heater
- Chilled ceiling with radiator

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

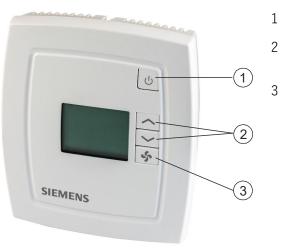|	2-pipe		2-pipe with electric heater		4-pipe		
Fan	1/2/3-speed	DC 0···10 V	1/2/3-speed	DC 0···10 V	1/2/3-speed	DC 0···10 V	
Output #1	On/Off, PWM, 3-position, DC 0···10 V		On/Off, PWM, DC 0···10 V		On/Off, PWM, DC 0···10 V	On/Off, PWM	DC 0···10 V
Output #2	n.a.		On/Off			On/Off, PWM	

Mechanical design

The RDB160BN BACnet MS/TP room thermostats consist of two parts:
- Mounting plate with screw terminals
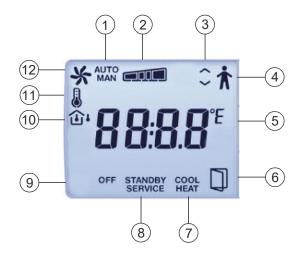- Plastic housing with electronics, operating elements and room temperature sensor

Operation

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

Display

The display has the following indications:

	1 'AUTO/MAN': Automatic or manual mode indication for the fan
	2 Current fan speed (Low, Medium, High)
	3 Up/Down buttons to adjust setpoints and parameters
	4 Occupancy indication
	5 Current room temperature or setpoint in ° C to one decimal point
	6 Open window
	7 'COOL/HEAT': Shows the current control mode of the thermostat.
	8 'STANDBY': Economy mode indication. 'SERVICE': Setting parameters
	9 'OFF': OFF mode (only the temperature is shown)
	10 Indoor / outdoor temperature
	11 Setpoint
	12 Fan status

Type summary

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

Equipment combinations

Type of unit		Product no.	Datasheet*)
Cable temperature or changeover sensor, cable length 1.5 m PT1000		QAP2012.150	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..	A6V11251892
Zone valve actuator (only available in AP, UAE, SA and IN)		SUA	N4832

On/Off and PWM actuators[1]

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
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

Type of unit		Product no.	Datasheet[*]
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.

Product documentation

The following product documentation is available

Topic	Document ID:
Mounting instructions	A6V11904646
Basic documentation	A6V11917618
CE declaration	A5W00090598A
Environmental declaration	A5W00088543A

The mounting instructions are included with the product.

Languages

The mounting instructions are available in English.

Related documents such as environmental declarations, CE declarations, etc., can be downloaded at the following Internet address:

http://siemens.com/bt/download

Notes

Mounting and installation
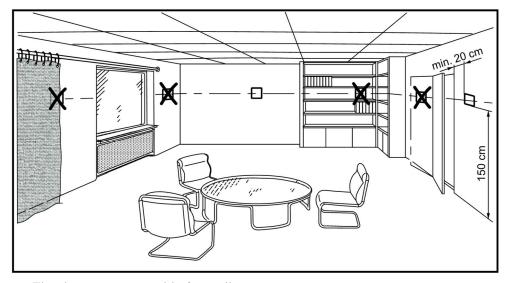
⚠	⚠ **CAUTION**
	Noncompliance with the following safety regulations
	Risk of injury to persons and damage to property
	• Compliance with the following regulations is required.

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.

Applications and settings

The BACnet MS/TP room thermostats are delivered with a fixed set of applications and related parameters. The factory settings can be changed by using the display and buttons on the controller. The INCREASE and DECREASE buttons change the parameter values: the changes are confirmed with the On/Off button.

Wizard setting

The first time the RDB160BN is powered on, a wizard is available to easily set the device.

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.

Disposal

	The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage.
	• Dispose of the device through channels provided for this purpose.
	• Comply with all local and currently applicable laws and regulations.

Warranty

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

General	
Operating voltage	AC 230 V ±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.	

Outputs	
Do NOT connect fans in parallel! Connect one fan directly, for additional fans, one relay for each speed.	
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 KOhm	
Measuring range	0···50°C
Accuracy	±1.5°C at 15···30°C
Temperature calibration range (P33)	±10 K

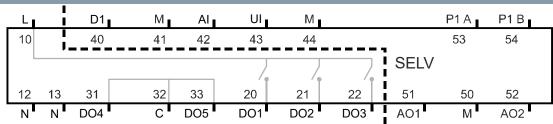| **Standards and directives**	
EU conformity (CE)	A5W00090598A [*]
Electronic control type	2.B (micro-disconnection on operation)
RCM conformity	A5W00090592A [*]
Safety class	II as per EN 60730
Pollution class	Normal
Degree of protection of housing	IP20 as per EN 60529
Environmental compatibility	The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

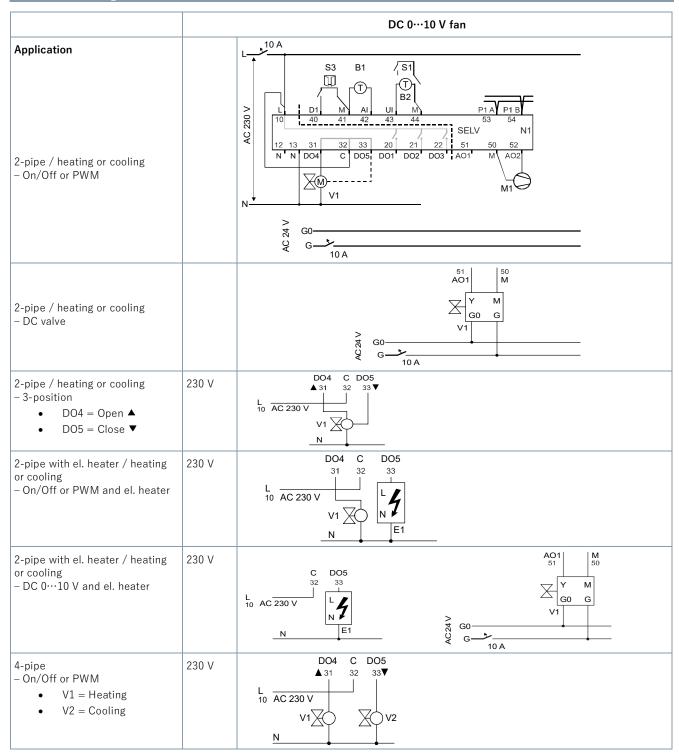| General	
Connection terminals	Solid wires or stranded wires with wire end sleeves 1x 0.4⋯2.5 mm^2 or 2x 0.4⋯1.5 mm^2
Minimal wiring cross section on terminals	Min. 1.5 mm^2
Housing front color	White RAL 9010
Weight without packaging	0.18 kg

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

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

Connection diagrams

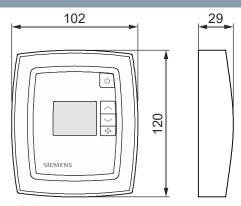|		DC 0···10 V fan
Application		
2-pipe / heating or cooling – On/Off or PWM		
2-pipe / heating or cooling – DC valve		
2-pipe / heating or cooling – 3-position • DO4 = Open ▲ • DO5 = Close ▼	230 V	
2-pipe with el. heater / heating or cooling – On/Off or PWM and el. heater	230 V	
2-pipe with el. heater / 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-postion or DC 0···10 V	P1 A	BACnet MS/TP -
E1	Electric heater	P1 B	BACnet MS/TP +

		3-speed fan
Application		
2-pipe / heating or cooling – On/Off or PWM		
2-pipe / heating or cooling – DC valve		
2-pipe / heating or cooling – 3-position • DO4 = Open ▲ • DO5 = Close ▼	230 V	
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	
4-pipe DC 0···10 V • 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-postion or DC 0···10 V	P1 A	BACnet MS/TP -
E1	Electric heater	P1 B	BACnet MS/TP +

Dimensions

102

29

120

All dimensions in mm

Document ID   A6V11913047_en--_c

Edition   2021-02-26