

SpaceLogic Thermostat

TC900 Protocol Series for Fan Coil Applications



TC907 Protocol Series



TC903 Protocol Series

Product Description

The TC900 Protocol Series fan coil thermostats are optimized for office building, hotel, hospital and residential applications.

These devices can be used for 2-pipe or 4-pipe applications and can communicate with Building Management Systems over BACnet or Modbus protocol.

Available in two housing finishes: optimum (black glass display with capacitive buttons on a black base) or medium (white glass display with mechanical buttons on a white base).

The TC900 Protocol Series is both easy to operate and install. The devices feature microprocessor-based control and large backlit LCD screens which display operation status (cooling, heating, auto and ventilation), fan speed, room temperature and set-point.

Features

- Two housing options:
 - Optimum black glass on black housing with capacitive buttons
 - Medium white glass housing with mechanical buttons
- Large back-lit LCD screen
- Eco button for energy saving
- Button lockout function prevents unauthorized operation
- Selectable BACnet MSTP or Modbus outputs via RS-485
- Non-volatile memory (EEPROM) retains user settings during power loss
- Low temperature protection
- Standard BS wall box for installation
- Alert function facilitates temperature sensor maintenance
- Temperature display unit selection (°C / °F)
- Deluxe models include:
 - Sleep mode for energy savings
 - Occupancy/card key input*
 - Real time display
 - Optional remote temperature sensor*

Available Products

TC907 Protocol Series

Part Number	Application	Actuator Control	Deluxe Model	Fan Control	Input Voltage	Comm.	Housing
TC907-3A4LXPXAB	4-pipe*	2-Position, on/off	No	3-Speed, Auto	90-240Vac	Modbus/BACnet	Optimum, Black
TC907-3A4LDPSAB	4-pipe*	2-Position, on/off	Deluxe	3-Speed, Auto	90-240Vac	Modbus/BACnet	Optimum, Black
TC907-EF4LDPSAB	4-pipe*	2-Position, on/off	Deluxe	ECM Fan 0-10V	90-240Vac	Modbus/BACnet	Optimum, Black
TC907-3A4PDPSAB	4-pipe*	Proportional	Deluxe	3-Speed, Auto	90-240Vac	Modbus/BACnet	Optimum, Black
TC907-3A4PDPSA-24B	4-pipe*	Proportional	Deluxe	3-Speed, Auto	24Vac	Modbus/BACnet	Optimum, Black
RS-03	10K Ohm NTC Type 3 Remote Sensor - 3m (10 Pcs)**						

* Can be changed from 4-pipe system with 2-wire motorized valve, to 2-pipe system with 3-wire motorized valve.

** RS-03 works with all models with an 'S' included in the model number ('3A4LDPSA', '3A4PDPSA', 'EF4LDPSA', etc.).

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Available Products, cont.

TC903 Protocol Series

Part Number	Application	Actuator Control	Deluxe Model	Fan Control	Input Voltage	Comm.	Housing
TC903-3A4LXPXA	4-pipe*	2-Position, on/off	No	3-Speed, Auto	90-240Vac	Modbus/BACnet	Medium, White
TC903-3A4LDPSA	4-pipe*	2-Position, on/off	Deluxe	3-Speed, Auto	90-240Vac	Modbus/BACnet	Medium, White
TC903-EF4LDPSA	4-pipe*	2-Position, on/off	Deluxe	ECM Fan 0-10V	90-240Vac	Modbus/BACnet	Medium, White
TC903-3A4PDPSA	4-pipe*	Proportional	Deluxe	3-Speed, Auto	90-240Vac	Modbus/BACnet	Medium, White
TC903-3A4PDPSA-24	4-pipe*	Proportional	Deluxe	3-Speed, Auto	24Vac	Modbus/BACnet	Medium, White

* Can be changed from 4-pipe system with 2-wire motorized valve, to 2-pipe system with 3-wire motorized valve.

Specifications

Built-in sensing element	100 kΩ NTC
Accuracy	±1 °C / ±2 °F
Set-point range	5 to 35 °C / 41 to 95 °F
Display range	0 to 50 °C / 32 to 99 °F* (shown in 0.5 °C / 1°F increments)
Operating temp.	0 to 50 °C / 32 to 99 °F*
Operating humidity	5 to 95 %RH (non-condensing)
ECM fan control	SELV DC 0 to 10V Max. ±5 mA
Actuator control	SELV DC 0 to 10V Max. ±1 mA
Power consumption	< 2 W
Power supply	90 to 240 Vac, 50/60Hz 24 Vac (models with suffix '-24')
Relay & load	Relay rating 5A Load rating 5A resistive, 3A inductive @ cosφ=0.5 (power factor)
Protection class	IP20
Housing	Flame-retardant PC
Dimensions	86 x 86 x 14.5 mm (3.40" x 3.40" x 0.57")
Wall box	BS wall box, min. 35 mm depth
Hole pitch	60 mm (standard)
Control Pollution Degree	Pollution Degree 2
Type of operation	Type 1.B
Terminal sizing	Max: 2 x 1.5 mm ² or 1 x 2.5 mm ² conductors
Screw terminals max. torque**	044 N.m

Regulatory Information

Agency approvals	European conformance CE:
	IEC/EN 60730-1
	IEC/EN 60730-2-9
	UKCA (UK)
	RoHS: 2011/65/EU, 2015/863/EU
	REACH:1907/2006/EC

*Temperatures between 99°F and 122°F are shown as 99°F on the display.

**Terminal screw torque should not exceed the maximum torque specification to avoid plastic cracks. Over-tightening the terminal screw may lead to plastic cracks.

Precautions

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Follow safe electrical work practices. See NFPA 70E in the USA, CSA Z462 in Canada, or applicable local codes.
- Read and understand the instructions before installing the product. Follow the instructions during installation.
- Installation, wiring, testing or service must be performed only by qualified persons in accordance with all applicable codes and regulations.
- Do not use the product for life or safety applications.
- Do not install the product in hazardous or classified locations.
- Do not exceed the product's ratings or maximum limits.
- The product may use multiple voltage/power sources.
- Turn off ALL power supplying equipment before working on or inside the equipment.
- Use a properly rated voltage sensing device to confirm that all power is off.
- Do NOT depend on the product for voltage indication.
- Products rated only for basic insulation must be installed on insulated conductors.
- Current transformer secondaries (current mode) must be shorted or connected to a burden at all times.
- Remove all wire scraps and tools, replace all covers and protective devices before powering the equipment.

Failure to follow these instructions will result in death or serious injury.

A qualified person is one who has skills and knowledge related to the construction and operation of this electrical equipment and installations, and has received safety training to recognize and avoid the hazards involved.

If this product is used in a manner not specified by the manufacturer, the protection provided by the product may be impaired. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

External housing may be cleaned with a damp cloth if it becomes dirty. Do not use any cleaning agent, especially alcohol.

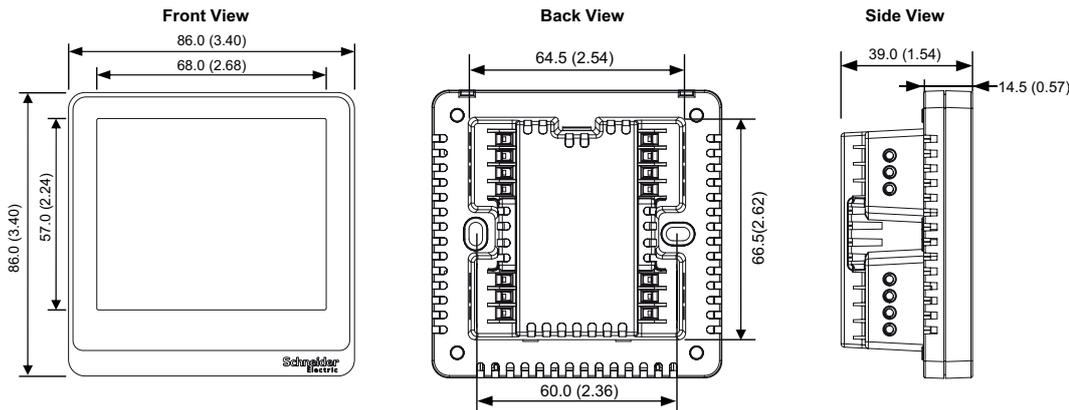
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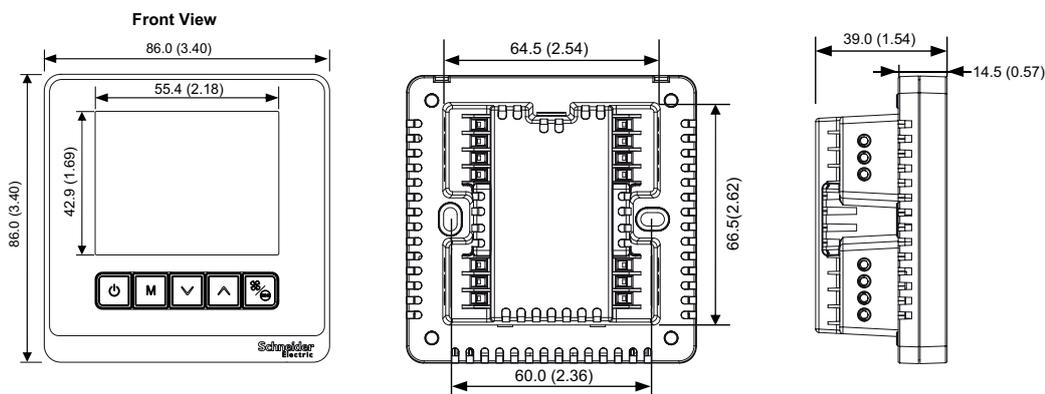
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Dimensions mm (in.)

TC907 Protocol Series



TC903 Protocol Series



Functions

Set-point Adjustment

The set-point buttons allow users to adjust the set-point in 0.5°C/1°F increments) for the space.

Fan Speed

Users can select a fan speed (High, Medium, Low or Automatic) by a short press of the FAN/ECO button (TC903) or the FAN button (TC907).

Mode Control

Users can switch operating modes (Heating, Cooling, Auto or Ventilation) by pressing the Mode button.

Eco Mode

To begin Eco mode, do a short press of the FAN/ECO button (TC903) or the ECO button (TC907) until the ECO icon appears in the lower right corner of the LCD display. In Cooling mode, the set-point is automatically adjusted to 26°C and the fan speed is set to Low. In Heating mode, the set-point is automatically adjusted to 18 °C and the fan speed is set to Low. To exit Eco mode, do a short press of the FAN/ECO button (TC903) to choose any other fan speed, as desired, or do a short press of the ECO button (TC907) to cancel Eco mode.

Button Lockout Function

This function allows the buttons to be deactivated to prevent thermostat operation by others.

Low Temperature Protection

If the room temperature drops below 5 °C, Heating mode will start automatically and the fan speed will be set to High. Once the temperature reaches 7 °C, the thermostat will switch off the output.

Alert

In the event of an operating exception, the thermostat will attempt to command the valve to close and place the device in an inoperative state. The display will indicate the current status with one of five diagnostic messages:

- EEPROM: 'EE'
- Temperature sensor short-circuit: 'E1'
- Temperature sensor open-circuit: 'E2'
- Ambient temperature is higher than 50°C: 'HI'
- Ambient temperature is lower than 0°C: 'LO'

Remote Sensor/Key Card

This user-defined parameter selects whether input terminals are utilized for a remote temperature sensor and occupancy

Functions (cont.)

key card (except for 24V models which only support one, but not both, simultaneously). Note: This function is only available on models with an 'S' in the model number: 'DPSA', 'DPSAB', etc.

Installation Guidelines

- Install the thermostat about 1.5 m (59") above the floor
- Make sure the device is powered off prior to installation/service
- Do not install in locations that can be affected by radiant heat or in places with high levels of sunlight
- Do not install thermostats behind doors or in corners
- Protect from water/debris to avoid damaging the thermostat

Operation Instructions

Power On/Off

A short/long press of the ON/OFF button  will turn the power on. Another short/long press of the ON/OFF button  will turn off the power, fan coil and motorized valve. If no buttons are pressed for 10 seconds, the thermostat backlight turns off. Press any button to turn the backlight back on.

Temperature Setting

With the power on, press  to decrease the temperature setting and  to increase temperature in steps of 0.5°C. The  will appear on the display. If no buttons are pressed for six seconds,  is displayed, indicating the setpoint is confirmed.

Mode Selection

With the power on, press M to switch the operation mode. The display indicates cooling with , heating with  and ventilation with . Auto mode can be selected in the parameter settings and is indicated on the display with .

Fan Speed Selection

With the power on, press  on TC903 or  on TC907 to select a fan wind/air speed of high , medium , low  or automatic . In automatic mode, the fan speed changes automatically. For a difference of 1 °C, the fan will automatically switch to low fan speed. For a difference of 2 °C, the fan will automatically switch to medium fan speed. For a difference of 3 °C or more, the fan will automatically switch to high wind speed.

Motorized Valve Control (2-Pipe Models)

In cooling (or heating) mode, the motorized valve will be switched on when the room temperature is higher than (or lower than) the temperature setting by 1 °C. It will switch off when the room temperature reaches the temperature setting.

Motorized Valve Control (4-Pipe Models)

In Cooling mode, the cold water valve will be opened when the room temperature is 1 °C higher than the temperature setting or closed when the room temperature drops to the setting. The hot water valve will remain closed.

In Heating mode, the hot water valve will open when the room temperature is 1 °C lower than the temperature setting and will close when the room temperature rises to the setting. The cold water valve will remain closed.

Energy Saving Functions

Eco Mode

Press the FAN/ECO  button on TC903 or the ECO  button on TC907 to turn on Eco mode. The display will show the  and  icons. If the thermostat is in Cooling mode, the temperature is automatically set to 26 °C with the fan running at low speed. If the thermostat is in Heating mode, the temperature is automatically set to 18 °C with the fan running at low speed. To turn Eco mode off, press the up  or down  buttons to change the temperature setting or press the FAN/ECO  or ECO  buttons.

Unoccupied Energy Saving Mode

Unoccupied Energy Saving mode can be entered via a hotel room key card or bioprobe. Example: after a hotel room key card is removed from the reader  and  are displayed. If the thermostat is in cooling mode, the temperature is automatically set to 28 °C with the fan running at low speed. If the thermostat is in heating mode, the temperature is automatically set to 16 °C with the fan running at low speed. When the key card is returned to the reader, the indoor  display and ECO  icon turn off and the thermostat returns to the previously set mode.

Sleep Energy Saving Mode

At 12:00 a.m., Sleep Energy Saving mode turns on and  displays at 1:00 a.m. The temperature setpoint increases or decreases automatically every hour by 1 °C until 3:00 a.m. Example: if the thermostat is in cooling mode, the setpoint will increase 1 °C per hour until 3:00 a.m. then decreases 1 °C per hour until the original setpoint is reached at 7:00 a.m. and  turns off. If the thermostat is in heating mode, the setpoint will decrease 1°C per hour until 3:00 a.m. and then increases 1°C per hour until the original setpoint is reached at 7:00 a.m. and  turns off. The cooling setpoint will not rise above 26°C and the heating setpoint will not drop below 18°C in Sleep Energy Saving mode.

Time Setting Function

During power-on, press and hold M for six seconds to enter the Time Setting mode. Press the mode M button again to select the hour, minute and week. Press the up  and down  buttons to adjust this parameter. Time Setting mode is exited automatically if no button is pushed for six seconds.

Button Lockout Function

Press and hold the up  and down  buttons at the same time for six seconds to activate the keypad lockup function to prevent thermostat operation by others. While lockout is active, the lock icon  will be displayed on the screen. To deactivate the lockout function, press and hold the up  and down  buttons at the same time for six seconds to unlock the system.

Energy Saving Functions (cont.)

Low Temperature Protection Function

If the thermostat is switched off and the room temperature drops below 5 °C, the thermostat will start automatically for heating and display the  symbol. The fan will run at high speed automatically and the motorized valve will be opened (hot water valve will be opened for 4-pipe models). When the room temperature rises to 7 °C, the low temperature protection function is canceled and the thermostat will stop automatically, returning to its previously switched off state.

Alert Function

In the event of an operating exception with the temperature sensor (either built-in or external, depending on which is selected), the thermostat will attempt to command the fan and

valve to close, place the device in an inoperative state and display the  icon and an 'E1' or 'E2' alert.

E1: Sensor short-circuit alert

E2: Sensor open-circuit alert

'HI' will be displayed if the temperature is higher than 50 °C.

'Lo' will be displayed if the temperature is lower than 0 °C.

Parameter Settings

During power off, press and hold the mode button **M** for six seconds to enter the display screen. Press the mode button **M** or **Fan** button to move forward or backward between the parameters shown in the table below. Press the up  and down  buttons to adjust these parameters.

Parameter Settings

Number	Parameter	Default	Description
01	Low temperature protection	On	OF: Disabled, On: Enabled
02	Fan operation status after temperature setting is reached	DA	Db: Fan off, DA: Fan on
03	Power-on state	00	00: Power-down memory, 01: power-down do not remember, 02: power-up power-on
04	Differential	1 °C (2 °F)	1 to 3 °C (2 to 5 °F)
05	ECO mode differential	2 °C (4 °F)	1 to 5 °C (2 to 9 °F)
06	Heating set-point upper limit	35 °C (95 °F)	5 to 35 °C (41 to 95 °F)
07	Cooling set-point lower limit	5 °C (41 °F)	5 to 35 °C (41 to 95 °F)
08	Auto deadband	1 °C (2 °F)	1 to 3 °C (2 to 5 °F), for 4-pipe Auto mode only
09	Mode button selection (4-pipe)	02	00: Heating only (heating, ventilation), 01: Cooling only (cooling, ventilation), 02: Heating and cooling (heating, cooling, ventilation), 03: Auto, 04: 2-pipe mode with 3-wire valve*
10	Auto fan setting	On	OF: Fan Auto disabled - Fan mode setting can be High, Medium or Low, On: Fan Auto enabled - Fan mode setting can be High, Medium, Low or Auto. No Fan Auto in Ventilation mode.
11	Show temperature selection	00	00: Room temperature, 01: Set-point
12	°C/°F selection	01	00: Degrees Fahrenheit (°F), 01: Degrees Celsius (°C)
13	Communication protocol selection	00	00: BACnet Enabled (Modbus Disabled), 01: Modbus Enabled (BACnet Disabled)
14	Modbus address setting	01	01 to 64
15	BACnet address setting	01	00 to 127
16	Baud rate	00	00: 76800 bps, 01: 9600 bps, 02: 19200 bps, 03: 38400 bps
17	Modbus parity check	00	00: Odd check, 01: Even check, 02: No check
18	Clock display	On	OF: Disabled, On: Enabled
19	12/24 hour clock	24	12: 12-hour clock, 24: 24-hour clock
20	Sleep Energy Saving mode	On	OF: Disabled, On: Enabled
21	Cooling temperature, Unoccupied Energy Saving mode	28°C (82°F)	22 to 32°C (72 to 90 °F)
22	Heating temperature, Unoccupied Energy Saving mode	16°C (61°F)	10 to 21°C (50 to 70 °F)
23	Fan speed, Unoccupied Energy Saving mode	02	00: High speed, 01: Medium speed, 02: Low speed
24	Temperature sensor selection	00	00: Built-in, 01: External
25	Low-speed fan output voltage	3.3V	Range: 0V to medium-speed setting
26	Medium-speed fan output voltage	6.6V	Range: Low-speed setting to high-speed setting

Parameter Savings (cont.)

Number	Parameter	Default	Description
27	High-speed fan output voltage	10V	Range: Medium-speed setting to 10V
28	External temp sensor/key card switch selection	00	00: External temp sensor, 01: Key card switch
29	Backlight standby brightness	05	00 = 0% brightness to 05 = 5% brightness

*For a 2-pipe system with 3-wire motorized valve, the thermostat supports either Heating mode or Cooling mode, but not both simultaneously.

Notes:

Parameters 01 to 17 apply to all models.

Parameters 18 to 24 only apply to models with 'S' in the part number (real-time clock and external sensors connection).

Parameters 25 to 27 only apply to models with 'F' in the part number (DC brushless fan).

Parameter 28 only applies to models with '-24' in the part number (24V models).

Parameter 29 only applies to TC907 models.

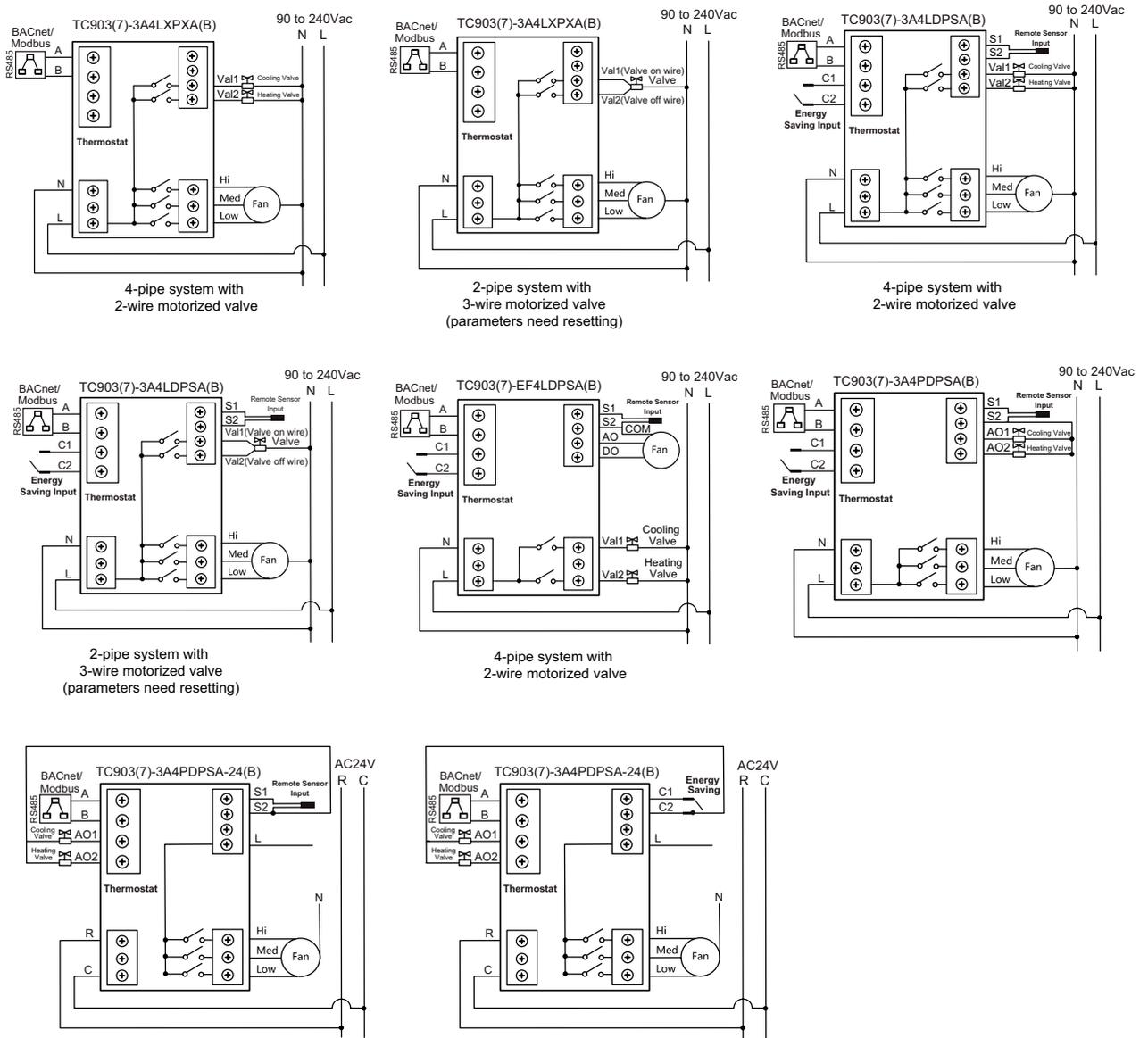
For models without one of the specific functions mentioned above, skip the parameters entirely.

This parameter table must be set by specialized installation personnel authorized by Schneider Electric. Any inconvenience or damage caused by unauthorized operation will not be covered by warranty.

Wiring

Provide an approved disconnecting means and overcurrent protection to supply conductors. The disconnecting device(s)

shall meet the relevant requirements of IEC 60947-1 and IEC 60947-3 and shall be suitable for the application. Locate and mark per local requirements.

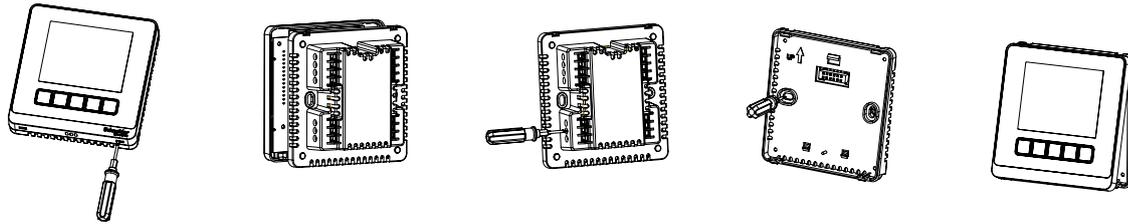


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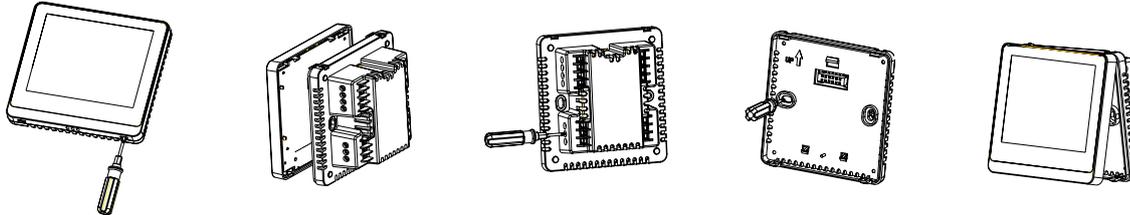


Mounting

TC903 Series



TC907 Series



1. Insert a 3.5 mm flat head screwdriver along the bevel into the slot. Pry upwards with appropriate force to release the two hooks.
2. Remove the display from the base module. Carefully remove the wire connections, if required.
3. Connect the wires according to the appropriate wiring diagram shown above. Ensure the polarity of the mains supply is correct.
4. Mount the base module onto the wall box using the two screws supplied.
5. Fit the display module onto the base module. Align upper hooks between the two modules. Carefully replace the wiring connection if it has been removed. Click display module onto base module using the two lower hooks.

Modbus Transport Protocols

The TC900 Series thermostats come with the option of Modbus communication. The support of Modbus communication allows simple integration of the TC900 Series thermostats with a building management system using standard Modbus serial communication.

The TC900 Series thermostats communicate as a Modbus RTU slave device over a serial (not isolated) RS-485 connection, allowing for the transfer of real-time data. RS-485 communication parameters such as baud rate, parity check Modbus address and protocol selection can be adjusted.

These parameters are defined for each thermostat in the Parameter Settings Table. If required, adjust the settings to disable the Modbus connection. All of these settings can be completed under menu items 13,14,16 and 17. Connection to the RS-485 network is made via dedicated terminals on the back of the thermostat and marked A (+) and B (-). The following Modbus register types and formats are supported:

Code	Register Type	Data	Format
01	Read coils	Boolean	Binary/digital
02	Read discrete inputs	Boolean	Binary/digital
03	Read holding registers	Word	16-bit integer
04	Read input registers	Word	16-bit integer
06	Write single register	Word	16-bit integer

Function Code 01

Register	Description	Definition
0	Cooling valve (4-pipe)	0 = Off, 1 = On
4	Fan speed status high	0 = Off, 1 = On
5	Fan speed status medium	0 = Off, 1 = On
6	Fan speed status low	0 = Off, 1 = On
7	Heating valve (4-pipe)	0 = Off, 1 = On

Function Code 02

Register	Description	Definition
2	Temp sensor, short circuit	0 = OK, 1 = Fault
3	Temp sensor, open circuit	0 = OK, 1 = Fault

Function Code 03/06

Register	Description	Definition
2	Thermostat mode	0 = Off 1 = On 02 = Frost protection*
3	Operation mode	1 = Cool 2 = Heat 3 = Ventilation 4 = Auto
4	Set-point	5 to 35 °C (41 to 95 °F)
5	Fan mode	00 = High, 01 = Medium, 02 = Low, 03 = Auto

SpaceLogic Thermostat TC900 Series Installation Instructions

Modbus Transport Protocols (cont.)

Function Code 03/06 (cont.)

Register	Description	Definition
6	Heating set-point, upper limit	5 to 35 °C (41 to 95 °F)
7	Cooling set-point, lower limit	5 to 35 °C (41 to 95 °F)
8	ECO mode	0 = Disable 1 = Enable
9	ECO mode, cooling set-point	22 to 32 °C (72 to 90 °F)
10	ECO mode, heating set-point	10 to 21 °C (50 to 70 °F)
11	Temperature compensation	-5 to 5 °C (-9 to 9 °F)
12	Setpoint, upper limit	2 to 49.5 °C (36 to 121 °F)
13	Setpoint, lower limit	0 to 47.5 °C (32 to 118 °F)
14	Sleep mode	0 = Disable 1 = Enable
15	Low temperature protection	0 = Disable 1 = Enable
16	Fan operation after setting temperature is reached	0 = Fan off 1 = Fan on
17	Power-on state	00 = Power-down memory 01 = No power-down memory 02 = Display on when powered
18	Differential	1 to 3 °C (2 to 5 °F)
19	ECO mode differential	1 to 5 °C (2 to 9 °F)
20	Auto deadband	1 to 3 °C (2 to 5 °F)
21	Operation mode configuration	0 = Heat only (heat & vent) 1 = Cool only (cool & vent) 2 = Heat and cool (heat, cool & vent) 3 = Auto 4 = 2-pipe mode
22	Auto fan	0 = Disable 1 = Enable
23	Display temperature	00 = Room temp. 01 = Set-point
24	Temperature sensor	00 = Built-in sensor 01 = External sensor
25	Communication protocol selection	00 = BACnet 01 = Modbus
26	Modbus address setting	1 to 64
27	Baud rate	00 = 76800 bps 01 = 9600 bps 02 = 19200 bps 03 = 38400 bps
28	Modbus parity check	00 = Odd check 01 = Even check 02 = None
29	RTC clock display	0 = Disable 1 = Enable
30	12/24-hour clock	12 = 12-hour clock 24 = 24-hour clock

Register	Description	Definition
31	Occupancy/Auxiliary input close/open	00 = Occupied when short-circuit, unoccupied when open-circuit 01 = Unoccupied when short-circuit, occupied when open-circuit
32	Unoccupied mode, cooling setpoint	22 to 32 °C (72 to 90 °F)
33	Unoccupied mode, heating setpoint	10 to 21 °C (50 to 70 °F)
34	Unoccupied mode, fan speed	00 = High 01 = Medium 02 = Low
35	Temp. value from connection	00 = Local device 01 = Modbus connection
36	Temp. input	0 to 500 (e.g., '500' is 50 °C)
37	Heating mode KP	1 to 99
38	Cooling mode KP	1 to 99
39	PID sampling time	1 to 99 s
40	KI	0 to 99
41	Span	1 to 99
42*	Heating valve 2, output voltage	10x voltage (e.g., if voltage is 5.7V, '57' is displayed)
43*	Cooling valve 1, output voltage	10x voltage (e.g., if voltage is 5.7V, '57' is displayed)
44	Low-speed fan output voltage	Range: 0V to medium-speed setting
45	Medium-speed fan output voltage	Range: Low-speed setting to high-speed setting
46	High-speed fan output voltage	Range: Medium-speed setting to 10V
47	Keypad status	0 = Unlocked 1 = Locked
48*	Occupancy status	0 = Unoccupied 1 = Occupied
49	Occupancy override	0 = No 1 = Occupied 2 = Unoccupied
50*	Keypad status	0 = Not present 1 = Present
51	Backlight brightness (TC907 only)	00 = 0% brightness to 05 = 5% brightness, in 01 = 1% increments.
52	°F/°C selection	0: Degrees Fahrenheit (°F), 1: Degrees Celsius (°C)
53	BACnet address setting	0 to 127

*Read only.

Function Code 04

Register	Description	Definition
0	Actual room temperature	0 to 50 °C (32 to 122°F)

Note: For all Celsius and Fahrenheit values, the Modbus transfer data is the Celsius value multiplied by 10.

BACnet Transport Protocols

TC900 Series thermostats offer a selectable BACnet communication option. This allows simple integration with a Building Management System using standard BACnet MS/TP communication.

The TC900 Series communicates as a BACnet MS/TP master device over a serial (not isolated) RS-485 connection, allowing for the transfer of real-time data. RS-485 communication parameters such as baud rate, BACnet address and protocol selection can be adjusted as follows:

Communication Protocol*: BACnet/Modbus
 - Baud rate: 9600, 19200, 38400 and 76800 bps
 - BACnet address: 00 to 127

*If BACnet is selected, Modbus communication will be disabled. If Modbus is selected, BACnet communication will be disabled.

These parameters are defined for each thermostat in the Parameter Settings Table. If required, adjust the settings to disable the BACnet connection. All of these settings can be completed under menu items 13, 15 and 16. Connection to the RS-485 network is made via dedicated terminals on the back of the thermostat marked A (+) and B (-).

BACnet Protocol Implementation Conformance Statement

Vendor Name: Schneider Electric

Product Name: SpaceLogic Thermostat - TC900 Series

Product Models: TC903-EF4LDPSA, TC903-3A4LXPXA, TC903-3A4PDPSA, TC903-3A4LDPSA, TC903-3A4PDPSA-24, TC907-EF4LDPSAB, TC907-3A4LXPXAB, TC907-3A4PDPSAB, TC907-3A4LDPSAB, TC907-3A4PDP-SA-24B

BACnet Protocol Version: 1

BACnet Protocol Revision: 19

Base ASHRAE standard: 135-2019

BACnet Standardized Device Profile: BACnet Application Specific Controller (B-ASC)

List All BACnet Interoperability Building Blocks Supported: DS-RP-B, DS-RPM-B, DS-WP-B, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-RD-B, DM-TS-B, DM-UTC-B

Data Link Layer Options: MS/TP Master, baud rates 9600, 19200, 38400, 76800

Networking Options: Static Device binding supported.

Character Sets Supported: ISO 10646 (UTF-8)

BACnet Descriptions

The following BACnet objects and formats are supported. Note: In the tables below, all properties are read-only unless otherwise noted.

Standard Object Types Supported

Object Type	Supported Optional Properties	Writable Properties
Analog Input - AI	Description Resolution Max_Pres_Value Min_Pres_Value	None
Analog Output - AO	Description Resolution Max_Pres_Value Min_Pres_Value	Present_Value
Binary Input - BI	Description Inactive_Text Active_Text	None
Analog Output - AO	Description Inactive_Text Active_Text	Present Value
Multistate Input - MSI	Description State_Text	None
Multistate Output - MSO	Description State_Text	Present Value
Device - DEV	Description Max_Master Max_Info_Frames Local_Time Local_Date UTC_Offset Daylight_Savings Status	Object_Identifier Object_Name Location APDU_Timeout Max_Master Max_Info_Frames UTC_Offset Number_Of_APDU_Retries
Network Port	Description MAC_Address Max_Master Max_Info_Frames	Max_Master Max_Info_Frames

Restrictions on Object Properties

The following table lists the valid ranges of the writable object properties.

Object Property	Min. Value	Max. Value
Device_Instance	0	4,194,302
DEV_Location	1 character	32 characters
DEV_Name	1 character	32 characters
APDU_Timeout	0	65,535
Max_Master	0	127
Max_Info_Frames	1	2
UTC_Offset	-1,440*	1,440*
Number_Of_APDU_Retries	0	255

*Must be a multiple of 15.

BACnet Object Table 1

Object Name	Object ID	Default Value	Min. Value	Max. Value	Object Property	Units
Heating valve 2, output voltage	AI 0	0	0	10	Voltage (e.g., if voltage is 5.7V, '5.7' is displayed,0~10V)	V
Cooling valve 1, output voltage	AI 1	0	0	10	Voltage (e.g., if voltage is 5.7V, '5.7' is displayed,0~10V)	V
Actual room temperature	AI 2	—	0	50	Value: 0 to 50°C, if °C is selected	°C
		—	32	122	Value: 32°F to 122°F, if °F is selected	°F
Set-point	AO 0	25	5	35	Value: 5 to 35°C in 0.5°C increments	°C
		77	41	95	Value: 41 to 95°F in 1°F increments, if °F is selected	°F
Heating set-point, upper limit	AO 1	35	5	35	Value: 5 to 35°C, in 0.5°C increments	°C
		95	41	95	Value: 41 to 95°F in 1°F increments, if °F is selected	°F
Cooling set-point, lower limit	AO 2	5	5	35	Value: 5 to 35°C in 0.5°C increments	°C
		41	41	95	Value: 41 to 95°F in 1°F increments, if °F is selected	°F
ECO mode, cooling set-point	AO 3	26	22	32	Value: 22 to 32°C in 0.5°C increments	°C
		79	72	90	Value: 72 to 90°F,1°F increments, if °F is selected	°F
ECO mode, heating set-point	AO 4	18	10	21	Value: 10 to 21°C in 0.5°C increments	°C
		64	50	70	Value: 50 to 70°F in 1°F increments, if °F is selected	°F
Temperature compensation	AO 5	0	-5	5	Value: -5 to 5°C in 0.5°C increments, if °C is selected	ΔK
		0	-9	9	Value: -9 to 9°F in 1°F increments, if °F is selected	Δ°F
Setpoint, upper limit	AO 6	35	7	49.5	Value: 7 to 49.5°C in 0.5°C increments	°C
		95	45	121	Value: 45 to 121°F in 1°F increments, if °F is selected	°F
Setpoint, lower limit	AO 7	5	0	33	Value: 0 to 33°C in 0.5°C increments	°C
		41	32	91	Value: 32 to 91°F in 1°F increments, if °F is selected	°F
Differential	AO 8	1	1	3	Value: 1 to 3°C in 0.5°C increments, if °C is selected	ΔK
		2	2	5	Value: 2 to 5°F in 1°F increments, if °F is selected	Δ°F
ECO mode differential	AO 9	2	1	5	Value: 1 to 5°C in 0.5°C increments, if °C is selected	ΔK
		4	2	9	Value: 2 to 9°F in 1°F increments, if °F is selected	Δ°F
Auto deadband	AO 10	1	1	3	Value: 1 to 3°C in 1°C increments, if °C is selected	ΔK
		2	2	5	Value: 2 to 5°F in 1°F increments, if °F is selected	Δ°F
Modbus address setting	AO 11	1	1	64	1 to 64	—
Unoccupied mode, cooling setpoint	AO 12	28	22	32	Value: 22 to 32°C in 0.5°C increments	°C
		82	72	90	Value: 72 to 90°F in 1°F increments, if °F is selected	°F
Unoccupied mode, heating setpoint	AO 13	16	10	21	Value: 10 to 21°C in 0.5°C increments	°C
		61	50	70	Value: 50 to 70°F in 1°F increments, if °F is selected	°F
Temp. input	AO 14	0	0	50	Value: 0 to 50°C, if °C is selected	°C
		32	32	122	Value: 32 to 122°F, if °F is selected	°F
Heating mode KP	AO 15	10	1	99	1 to 99	—
Cooling mode KP	AO 16	10	1	99	1 to 99	—
PID sampling time	AO 17	20	1	99	1 to 99 S	S
KI	AO 18	1	0	99	0 to 99	—
Span	AO 19	5	1	99	1 to 99	—
Low-speed fan output voltage	AO 20	3.3	0	Medium-speed voltage - 0.1	Voltage Range: 0V to medium-speed fan output voltage - 0.1	V
Medium-speed fan output voltage	AO 21	6.6	Low-speed voltage + 0.1	High-speed voltage - 0.1	Voltage Range: Low-speed fan output voltage + 0.1 to high-speed fan output voltage - 0.1	V

BACnet Object Table 1 (cont.)

Object Name	Object ID	Default Value	Min. Value	Max. Value	Object Property	Units
High-speed fan output voltage	AO 22	10	Medium-speed voltage + 0.1	10	Voltage Range: Medium-speed fan output voltage + 0.1 to 10V	V
BACnet address setting	AO 23	1	0	127	0 to 127	—
Backlight Brightness (TC907 only)	AO 24	5	0	5	0 = 0% brightness to 5 =5 % brightness, in 1 = 1% increments	%
Thermostat mode	MSI 0	1	1	3	1 = Off 2 = On 3 = Frost protection (Read only)	—
Operation mode	MSO 0	2	1	4	1 = Cool 2 = Heat 3 = Ventilation 4 = Auto	—
Fan mode	MSO 1	3	1	4	1 = High 2 = Medium 3 = Low 4 = Auto	—
Power-on state	MSO 2	1	1	3	1 = Power-down memory 2 = No power-down memory, 3 = Display on when powered	—
Operation mode configuration	MSO 3	3	1	5	1 = Heat only (heat & vent) 2 = Cool only (cool & vent), 3 = Heat and cool (heat, cool and vent) 4 = Auto, 5 = 2-pipe mode	—
Baud rate	MSO 4	1	1	4	1 = 76800 bps 2 = 9600 bps 3 = 19200 bps 4 = 38400 bps	—
Modbus parity check	MSO 5	1	1	3	1 = Odd check 2 = Even check 3 = None	—
Unoccupied mode, fan speed	MSO 6	3	1	3	1 = High 2 = Medium 3 = Low	—
Occupancy override	MSO 7	1	1	3	1 = None 2 = Occupied 3 = Unoccupied	—

BACnet Object Table 2

Object Name	Object ID	Default Value	Inactive	Active	Object Property
Cooling valve (4-pipe)	BI 0	0	0	1	0 = Off, 1 = On
Fan speed status high	BI 1	0	0	1	0 = Off, 1 = On
Fan speed status medium	BI 2	0	0	1	0 = Off, 1 = On
Fan speed status low	BI 3	0	0	1	0 = Off, 1 = On
Heating valve (4-pipe)	BI 4	0	0	1	0 = Off, 1 = On
Temp sensor, short circuit	BI 5	0	0	1	0 = OK, 1 = Fault
Temp sensor, open circuit	BI 6	0	0	1	0 = OK, 1 = Fault
Occupancy status	BI 7	0	0	1	0 = Unoccupied, 1 = Occupied
Keycard status	BI 8	0	0	1	0 = Not present, 1 = Present
Thermostat on or off	BO 0	0	0	1	0 = Off, 1 = On
ECO mode	BO 1	0	0	1	0 = Disable, 1 = Enable
Sleep mode	BO 2	1	0	1	0 = Disable, 1 = Enable
Low temperature protection	BO 3	1	0	1	0 = Disable, 1 = Enable
Fan operation after setting temperature is reached	BO 4	1	0	1	0 = Fan off, 1 = Fan on
Auto fan	BO 5	1	0	1	0 = Disable, 1 = Enable
Display temperature	BO 6	0	0	1	0 = Room temp, 1 = Set-point
Temperature sensor	BO 7	0	0	1	0 = Built-in sensor, 1 = External sensor
Communication Protocol selection	BO 8	0	0	1	0 = BACnet, 1 = Modbus
RTC clock display	BO 9	1	0	1	0 = Disable, 1 = Enable
12 or 24-hour clock	BO 10	1	0	1	0 = 12-hour clock, 1 = 24-hour clock
Occupancy or Auxiliary input close or open	BO 11	1	0	1	0 = Occupied if closed, unoccupied if open 1 = Unoccupied if closed, occupied if open
Temp. value from connection	BO 12	0	0	1	0 = Local device, 1 = BACnet input
Keypad status	BO 13	0	0	1	0 = Unlocked, 1 = Locked
F or C degree	BO 14	1	0	1	0 = F degree, 1 = C degree

Notes:

- For all temperature-related parameters, the transfer data is the same value. For example, for °C, transfer data is the same Celsius value and for °F, transfer data is the same Fahrenheit value.
- The "Set-point" object can be adjusted by "Heating set-point, upper limit", "Cooling set-point, lower limit", "Setpoint, upper limit", "Setpoint, lower limit" and "Operation mode".
- The "Heating set-point, upper limit" and "Cooling set-point, lower limit" objects can be adjusted with "Setpoint, upper limit" and "Setpoint, lower limit".
- The "Cooling set-point, lower limit" maximum value can be adjusted automatically by the "Heating set-point, upper limit" default value. For example:
If the "Heating set-point, upper limit" default value is 35 °C (95 °F), then the "Cooling set-point, lower limit" maximum value will be adjusted automatically to 33 °C (91 °F).
If the "Heating set-point, upper limit" default value is 49.5 °C (121 °F), then the "Cooling set-point, lower limit" maximum value will be adjusted automatically to 47.5 °C (118 °F).
- The "Heating set-point, upper limit" minimum value can be adjusted automatically by the "Cooling set-point, lower limit" default value. For example:
If the "Cooling set-point, lower limit" default value is 5 °C (41 °F), then the "Heating set-point, upper limit" minimum value will be adjusted automatically to 7 °C (45 °F).
If the "Cooling set-point, lower limit" default value is 0 °C (32 °F), then the "Heating set-point, upper limit" minimum value will be adjusted automatically to 2 °C (36 °F).
- The "Operation mode" object can be adjusted with "Operation mode configuration".
- The "Fan mode" object can be adjusted by "Auto fan".
- For models without one of the specific functions mentioned above, skip the parameters entirely.
- The parameters in this table must be set by specialized installation personnel authorized by Schneider Electric.

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