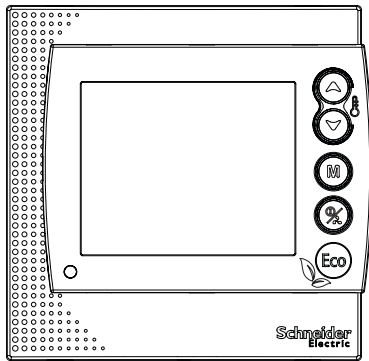


# TC300 Series Modulating Fan Coil Thermostat



## Product Description

The TC300 Series fan coil thermostats are optimised for office building, hotel and residential applications. The TC300 Series can be used for 2-pipe or 4-pipe applications. Their simple design makes them suitable for any contemporary building. They are both easy to operate and install.

The TC300 features microprocessor-based control and a large backlit LCD screen. The LCD display modes include operation status (cooling, heating, and ventilation), fan speed, room temperature, and set-point.

## Available Products

Part Number	Description	Application	Comm.	Real Time
TC303-3A2DPMS	FCU Thermostat for Modulating Actuator	2-pipe	Modbus	Yes
TC303-3A4DPMS	FCU Thermostat for Modulating Actuator	4-pipe	Modbus	Yes
IR-300	TC3xx Infrared Remote Control			
RS-03	10 kΩ NTC Remote Sensor - 3 m (10 pcs)			

## Specifications

Sensing element	10 kΩ NTC (3950)
Accuracy	±1 °C
Set-point range	5 ... 35 °C
Display range	0 ... 50 °C (shown in 0.5 °C increments)
Operating temperature	0 ... 45 °C
Operating humidity	5 ... 95 %RH (non-condensing)
Power requirement	< 1 W
Power supply	85 ... 260 Vac, 50/60 Hz
Terminals	Can be connected to 2 x 1.5 mm <sup>2</sup> or 1 x 2.5 mm <sup>2</sup> conductors
Switch current rating	5 A resistive, 3 A inductive @ 230 Vac
Switch power rating	Max. inrush 1385 VA / 150 W
Control signal output	0 ... 10 Vdc
Protection class	IP30
Housing	Flame-retardant PC
Dimensions	88.5 x 86 x 16 mm (3.48" x 3.38" x 0.63")
Hole pitch	60 mm (standard)

## Features

- Modern appearance
- Large, blue backlit, LCD screen
- Eco button for energy saving
- Button lockout function controls unauthorised operation
- Non-volatile memory (EEPROM) retains user settings during power loss
- Low temperature protection
- Standard 86 x 86 mm box for installation
- Alert function facilitates temperature sensor maintenance
- Modbus communication
- Sleep mode for energy savings
- Occupancy/card key input
- Real-time display
- Optional remote temperature sensor

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 doors, covers and protective devices before powering the equipment.

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

Control system design must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and over-travel stop.

**WARNING**

**LOSS OF CONTROL**

- Assure that the system will reach a safe state during and after a control path failure.
- Separate or redundant control paths must be provided for critical control functions.
- Test the effect of transmission delays or failures of communication links.<sup>1</sup>
- Each implementation of equipment using communication links must be individually and thoroughly tested for proper operation before placing it in service.

**Failure to follow these instructions may cause injury, death or equipment damage.**

<sup>1</sup>For additional information about anticipated transmission delays or failures of the link, refer to NEMA ICS 1.1 (latest edition). Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Controls or its equivalent in your specific country, language, and/or location.

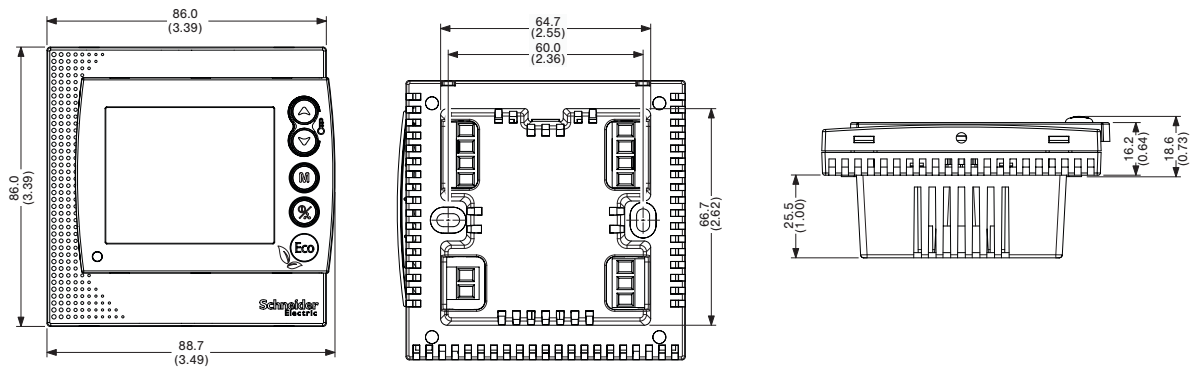
Note: Loss of control warning applies to Modbus models only.

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. NEC Article 100

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.

## Dimensions mm (in.)

TC3003-3A2DPMS / TC3003-3A4DPMS



## Functions

**Set-point Adjustment** – The set-point buttons allows users to adjust the set-point (in 0.5 °C increments) for the space.

**Fan Speed** – Users can select fan speed (High, Medium, Low and Automatic) by pressing the Power/Fan button.

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

**Eco Saving Mode** – Pressing the Eco button starts the energy savings mode. 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. The user can exit the energy saving by pressing the Eco button.

**Button Lockout Function** – Allows the buttons to be deactivated to prevent thermostat operation by others.

**Low Temperature Protection** – If the room temperature drops below 5 °C, the thermostat 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 four diagnostic messages.

**Remote Sensor/Key Card** – User defined parameter to select whether input terminals are utilised for remote temperature sensor or occupancy key card, not both simultaneously.

## 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:** Press and hold button for two seconds to turn the power on. Press and hold button again for two seconds to turn off the power as well as the fan coil and motorised valve.
- **Temperature setting:** With the power on, press to decrease the temperature setting and to increase in steps of 0.5 °C.
- **Mode selection:** With the power on, press M button to switch the operation mode. The LCD indicates cooling with heating with and ventilation with .

- **Air speed selection:** With the power on, press button to select fan speed: (high), (medium), (low) or (automatic) shift.
- **In automatic mode,** the air speed shift changes automatically: With a 1 °C, 2 °C and 3 °C difference between room temperature and the temperature setting, the low, medium and high air speed shift will be automatically selected respectively.

**Modulating valve control (A2DPMS):** In cooling (heating) mode, when the room temperature is higher than (lower than) the temperature setting by 1 °C, the modulating control valve will be opened according to the 0 ... 10 Vdc analog output control signal. When the room temperature reaches or is lower than (higher than) the temperature setting, the modulating control valve is closed, according to the 0 ... 10 Vdc analog output control signal.

**Modulating valve control (A4DPMS):** In cooling mode, when the room temperature is higher than the temperature setting by 1 °C, the modulating cooling control valve will be opened, according to the 0 ... 10 Vdc analog output control signal. Once the room temperature reaches or is lower than the temperature setting, the modulating cooling control valve will be closed according to the 0 ... 10 Vdc analog output control signal. The modulating heating control valve remains closed. In heating mode, when the room temperature is lower than the temperature setting by 1 °C, the modulating heating control valve is opened according to the 0 ... 10 Vdc analog output control signal. Once the room temperature reaches or is higher than the room temperature setting, the modulating heating control valve will be closed according to the 0 ... 10 Vdc analog output control signal. The modulating cooling control valve remains closed.

## Energy Saving Mode

Press Eco button to start the energy saving mode. If the thermostat runs in cooling mode the temperature will be set to 26 °C automatically and the fan will operate at low speed. If the thermostat runs in heating mode the temperature will be set to 18 °C automatically and the fan will operate at low speed. To exit the energy saving mode, press Eco again or press or .

**Energy-saving mode of hotel room key:** This can be switched to energy-saving mode by a room card (parameter 07 must be set to 01). For example, after a room key is removed, if the thermostat is in cooling mode, the temperature will be automatically set at 28 °C with the fan on low speed; if the thermostat is on heating mode, 16 °C will be set automatically with the fan operating at low speed; the mode that the guest has previously chosen will be switched back after the room key is plugged in.

**Sleeping energy-saving mode:** Under this mode, thermostat will set temperature from 12 p.m. with 1 °C up or down every one hour and

mode is ended at 3 a.m., with a total change of 3 °C. Under cooling mode, the temperature for sleeping mode will not exceed 26 °C; under heating mode, no less than 18 °C will be set on. Thermostat will set temperature from 4 a.m. with 1 °C down or up every one hour, until it comes back to the degree that guest has previously chosen at 7 a.m.


### Timing Setting Function

During power-on, press and hold M button for 3 seconds to enter the display screen. Press M button again to select hour, minute, week, working day timing on, working day timing off parameters. Press ▲ and ▼ to adjust this parameter.


### Button Lockout Function

Pressing and holding ▲ and ▼ at the same time for five seconds will activate keypad lockup function to prevent thermostat operation by others. Once this function is activated, press and hold ▲ and ▼ at the same time for five seconds to unlock the buttons.

### 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 electronic control valve will be opened (hot water valve will be opened for 4-pipe model). When the room temperature rises to 7 °C, the low temperature protection function is cancelled and the thermostat will stop automatically, returning to its previously switched off state.

### Alert Function

In the event of an operating exception, the thermostat will attempt to command the valve to close, place the device in an inoperative state and display  and E1 or E2.

- 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.

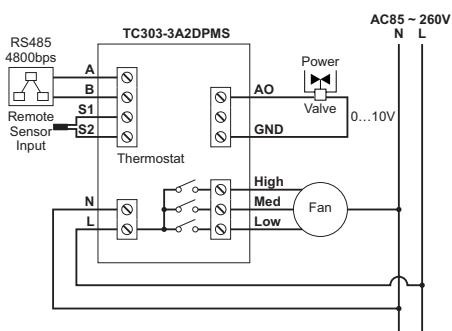
## Parameter Settings

During power off, press and hold M button for 5 seconds to enter the display screen. Press M button again to select parameters as shown in the table below. Press ▲ and ▼ to adjust this parameter.

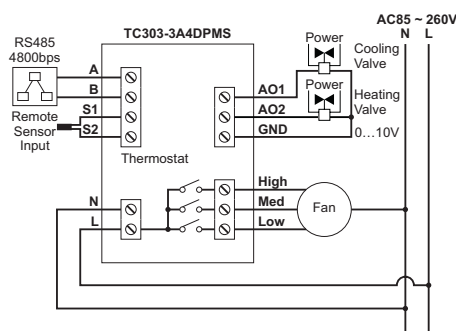
No.	Parameter	Factory Default	Function Description
01	Low temperature protection	OF	OF: Low temperature protection deactivated On: Low temperature protection activated
02	Fan operation status after temperature setting is reached	01	00: Fan off 01: Fan on
04	Address setting	01	01 ... 32 Address selection range
05	Sleeping mode	On	On: Sleeping mode activated OF: Sleeping mode deactivated
06	12/24-hour timing setting	24	24: 24-hour 12: 12-hour
07	Mode selection	00	00: Remote sensor 01: Key card

## Wiring

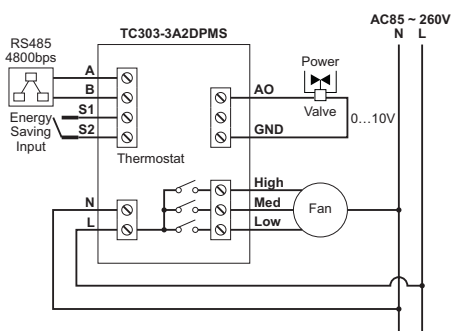
Provide an approved disconnecting means and overcurrent protection to supply conductors. The disconnecting device(s) shall meet the relevant requirements of IEC 60947-1 and IEC 60947-3 and shall be suitable for the application. Locate and mark per local requirements.



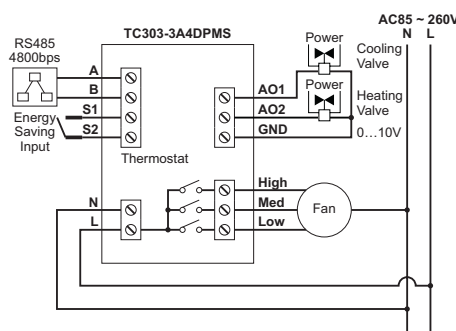
Two-pipe system with electric control valve  
(parameter 07 = 00)



Four-pipe system with electric control valve  
(parameter 07 = 00)

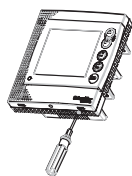


Two-pipe system with electric control valve  
(parameter 07 = 01)



Four-pipe system with electric control valve  
(parameter 07 = 01)

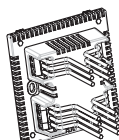
## Mounting



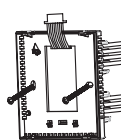
1. Remove the main control board and insert a 3.5 mm wide flatheaded screwdriver along the bevel into the slot for 4 mm. Pry it upwards with a slight force to release the hook.



2. Completely remove the wires from the unit.



3. Connect the wires in accordance with the connection diagram shown above.



4. Use the two screws supplied in the package box to secure the wired thermostat base plate to the wall.



5. Put the two upper hooks in place at 30 degrees. Then, press the two lower corners of the thermostat with a slight force to lock the upper cover. The installation is now finished.

Notice: Please connect the wires in strict accordance with the connection diagram. Avoid the ingress of foreign matter such as water or debris into the thermostat, otherwise it can be damaged.

## Modbus Transport Protocols

The TC303 thermostats come with the option of Modbus communication for both 2- and 4-pipe configurations. Modbus is an open, widespread and well established serial communication protocol used within building automation. The support of Modbus communication allows simple integration of the TC303 thermostats to a building management system, using standard Modbus serial communications. The following models provide support for Modbus connectivity:

- TC303-3A2DPMS
- TC303-3A4DPMS

The TC303 thermostats communicate as a Modbus RTU slave device over a serial RS-485 connection, allowing for the transfer of real time data. The RS-485 communication parameters cannot be adjusted and are fixed as follows:

- 4800 bps Baud Rate
- 8 Data Bits
- Odd Parity
- 1 Stop Bit

The actual Modbus address of the thermostat can be set for each individual device on the RS-485 network. The address is defined via the parameter menu on the thermostat itself. The address range available is from 01 to 32 and is defined under menu item 04 of the parameter settings. For full details on this and other parameter setting options available, please refer to the relevant section of this installation guide.

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:

Function Code	Register Type	Data Type	Data Format
01	Read Coils	Boolean	Binary/Digital
02	Read Discrete Inputs	Boolean	Binary/Digital
03	Read Holding Registers	Word	16-Bit Unsigned Integer
04	Read Input Registers	Word	16-Bit Unsigned Integer
06	Write Single Register	Word	16-Bit Unsigned Integer

### Function Code 01

Reg. Address	Register Description	Value Definition
5	Fan Speed Status - High	0 = Off, 1 = On
6	Fan Speed Status - Medium	0 = Off, 1 = On
7	Fan Speed Status - Low	0 = Off, 1 = On

### Function Code 02

Reg. Address	Register Description	Value Definition
3	Embedded Temperature Sensor Status	0 = OK, 1 = Fault
4	Remote Temperature Sensor Status	0 = OK, 1 = Fault

### Function Codes 03 and 06

Reg. Address	Register Description	Definition
3	Thermostat Mode	0 = Off 1 = On 2 = Frost Protection <sup>1</sup>
4	Operating Mode	1 = Cool 2 = Heat 3 = Ventilation
5	Room Temperature Set-point	Temperature (5 to 35 °C)
6	Fan Mode	0 = High 1 = Medium 2 = Low 3 = Auto
7	Unoccupied Room Temperature Set-point (Cooling Mode)	Temperature (22 to 32 °C)
8	Unoccupied Room Temperature Set-point (Heating Mode)	Temperature (10 to 21 °C)
9	Sleep Mode	0 = Disable 1 = Enable
10	Eco Mode	0 = Disable 1 = Enable
11 <sup>1</sup>	Occupancy Status	0 = Unoccupied 1 = Occupied
12	Unoccupied Fan Speed Mode	0 = High 1 = Medium 2 = Low
13	Keypad Status	0 = Unlocked 1 = Locked
19 <sup>1</sup>	Heating Control Signal	Output Voltage 0 ... 10 Vdc
20 <sup>1</sup>	Cooling Control Signal	Output Voltage 0 ... 10 Vdc

1. Read only.

### Function Code 04

Reg. Address	Register Description	Definition
1	Actual Room Temperature	Temperature (0 to 50 °C)