# RT226-F9 Modulating Digital Thermostat

## Installation and operation instructions

**3 Speed, Heat/Cool, Proportional-Integral control**

RT226-F9 modulating digital thermostats are designed to provide Proportional-Integral (PI) modulating control in 2-pipe or 4-pipe fan coil units, zoned commercial heating, Ventilating and various heating and cooling applications. This thermostat can provide modulating analog 0-10V or 0-20mA control signal.

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## Technical Data

Power……..24V AC 50HZ/60Hz
Temperature setting range……..5℃-45℃
Temperature display range……..0℃-60℃
Accuracy…… 0.5℃
Ambient temperature-operation……0℃~+50℃（32℉~122℉）
Ambient temperature-transport……..-10℃~+60℃（14℉~140℉）
Terminal output:
On/off Output load……220V,3A
Modulating output……0-10V; 0-20mA
Temperature input: thermostat built-in sensor and external sensor

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## Features

- New vertical design, crosswise installation or vertical installation
- Optional temperature display of Celsius or Fahrenheit scale
- Optional 3 kinds of heating mode
- 3-speed fan control
- Display shows both set points and room temperature simultaneously
- Separately heating and cooling temperature setting
- Permanent user setting retention during power loss, no batteries are required

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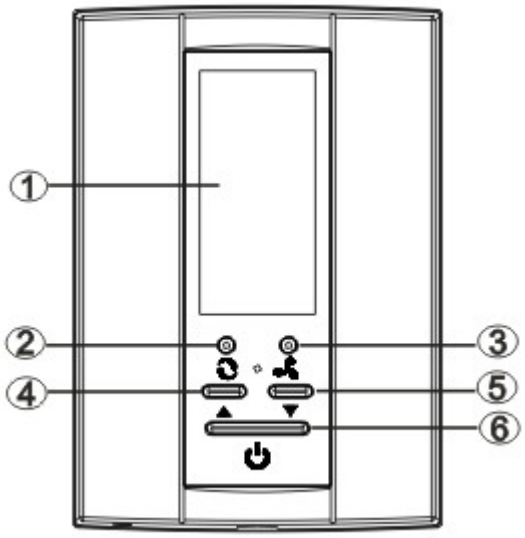
**IMPORTANT SAFETY INFORMATION:**

- Always turn off power at the main power source by unscrewing fuse or switching circuit breaker to the off position before installing, removing, cleaning, or servicing this thermostat.
- Read all of the information in this manual before installing this thermostat.
- Only a professional contractor should install this thermostat.
- All wiring must conform to local and national building and electrical codes and ordinances.
- Use this thermostat only as described in this manual.

## Button and Display

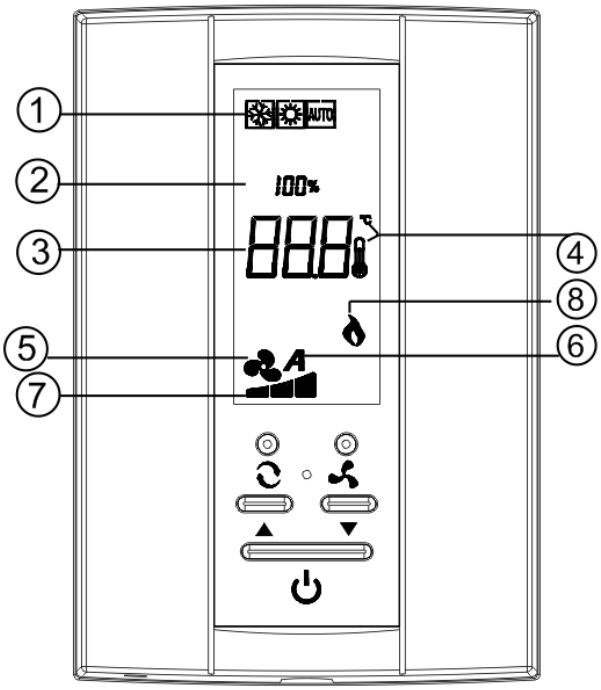
**Thermostat Buttons and Switches**

① Display area
② System button (COOL, HEAT , AUTO mode)
③ Fan speed option button (HI MED LOW AUTO)
④ Raise button
⑤ Lower button
⑥ Power button




The Display

① Shows thermostat system mode
② Shows thermostat proportional-Integral output percentage or setting temperature
③ Shows measure room temperature or setting temperature
④ Shows temperature unit and temperature mark
⑤ Fan mark
⑥ Auto fan mark
⑦ Shows fan speed option
⑧ Heating output mark

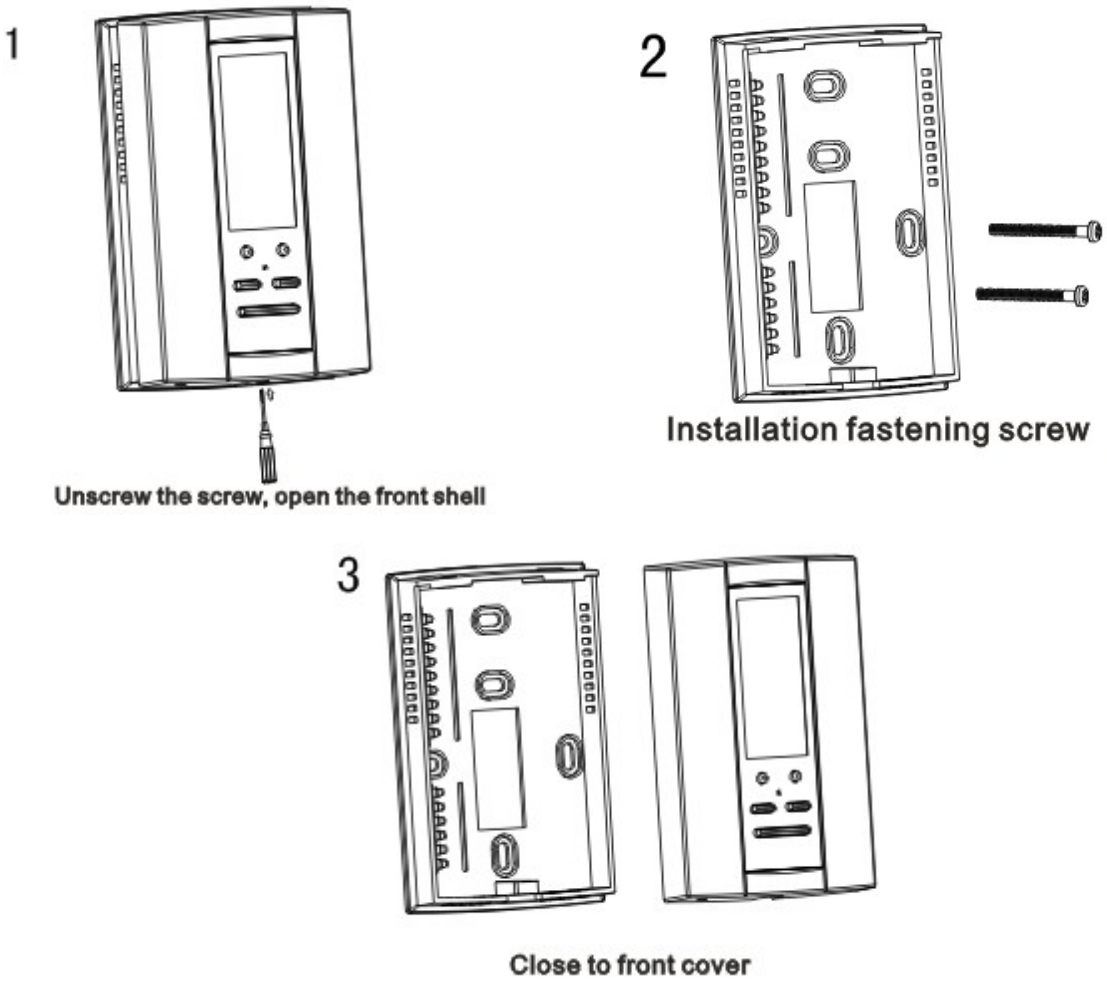



## INSTALL THE THERMOSTAT

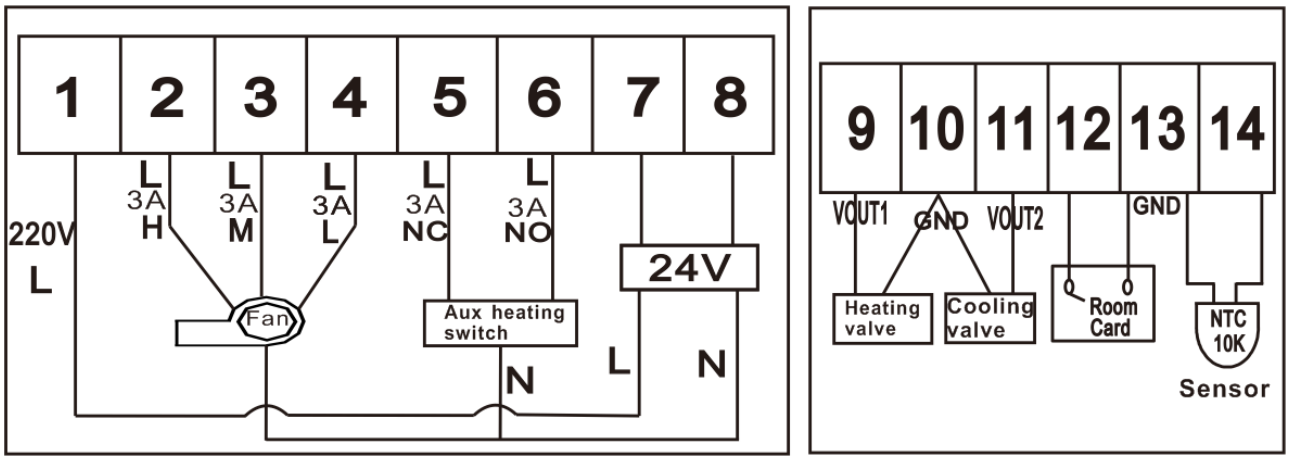
### ATTACH THERMOSTAT BASE TO WALL

***WARNING:** ELECTRICAL SHOCK HAZARD*

- ***Turn off power at the main service panel by removing the fuse or switching the appropriate circuit breaker to the OFF position before removing the existing thermostat.***




## WIRING DIAGRAM




**About wiring terminal description**

Terminal 1: connect fan and aux heating switch power

Terminal 2 3 4: Fan output terminal

Terminal 5 6: Aux heating switch terminal, NO connect open, NC connect close

Terminal 7 8: thermostat power 24VAC

Terminal 9 10: Analog VOUT1 0-10V/0-20mA, output terminal, heating valve
Terminal 10 11: Analog VOUT1 0-10V/0-20mA, output terminal, cooling valve; terminal 10 is COM terminal
Terminal 12 13:Room card, 0-5V
Terminal 13 14: External sensor, NTC10K
Terminal 13 is COM terminal

**4 pipe system: VOUT1, control heat pipe, connect the heating valve**
**VOUT2, control cool pipe, connect the cooling valve**
**2pipe system: VOUT1 terminal is common, control the water valve**

## Configuration Menu operation

The configuration menu allows you to set certain thermostat operating characteristics to your system or personal requirements. Switch off the thermostat, long press button ↻ more than 3 seconds to enter the configuration menu, The display will show the first item in the configuration menu 1. Press ↻ button to shift to the next menu item, use ▲ or ▼to select. To exit the menu , pressing power button to switch off the thermostat. Thermostat will exit the configuration menu if no buttons are pressed within 20 seconds. The configuration menu chart summarizes the configuration options. An explanation of each option as follows:

| Item | Press buttons | Displayed （factory default） | Press▲、▼to select | Description |
|---|---|---|---|---|
| 1 | ↻ For 3 seconds | CL (0) | -3 --- +3 | Select temperature display adjustment higher or lower |
| 2 | ↻ | AH (35℃) | 20℃—45℃ | Select maximum temperature limitation |
| 3 | ↻ | AL (5℃) | 5℃—20℃ | Select minimum temperature limitation |
| 4 | ↻ | FC(℃) | ℃/℉ | Select temperature unit |
| 5 | ↻ | bL （2） | 1/2/3 | Select display backlight mode<br>1: without backlight<br>2:without any button, backlight will light on after 15 seconds<br>3: backlight will keep on always |
| 6 | ↻ | dE (rE) | rE/rd | Memorize option before power loss<br>rE: With memorize option before power loss<br>rd: without memorize option before power loss |
| 7 | ↻ | d3 (ON) | ON/OFF | Fan stop option<br>ON: Fan will not stop if there is no call for heat or cool<br>OFF: Fan will stop with the valve if there is no call for heat or cool |
| 8 | ↻ | CH (4) | 4/2 | Control system option<br>4: 4 pipe system<br>2: 2 pipe system |
| 9 | ↻ | CA(18℃) | 10℃- 18℃ | Select energy-saving temperature for heating |
| 10 | ↻ | CC (25℃) | (25℃-30℃) | Select energy-saving temperature for cooling |
| 11 | ↻ | LE （SC） | SC/OC/OO | Activate energy saving mode option<br>SC: with room card, activate the energy mode by open circuit<br>OC: with room card, activate the energy mode by close circuit<br>OO: without room card function |
| 12 | ↻ | AI (0) | 0/1/2 | Temperature display option<br>0: Show setting temperature and room temperature<br>1: only show room temperature<br>2: only show setting temperature |
| 13 | ↻ | dO(5℃) | 1℃- 10℃ | Select Proportional band |
| 14 | ↻ | dI (5) | 0min — 10min | Select integral action time |
| 15 | ↻ | d2 (2) | 1/2/3 | Aux heating mode<br>1: Proportional-Integral heating<br>2:Proportional-Integral and Aux heating simultaneously<br>3: Aux heating |
| 16 | ↻ | d3(2) | 0/1/2 | Temperature sensor control option<br>0: Return air temperature sensor active<br>1:Room temperature sensor active<br>2: Mix temperature sensor active |

**Note: 1. Only when you select 3 for item 15, item 12 is valid**

**2. Only when you connect the external sensor, the system mode can be changed to heating, cooling, and AUTO mode. In AUTO mode, if the temperature differential is 5℃ between inlet air temperature and room temperature, the thermostat will switch system mode automatically. When the inlet air temperature is higher 5℃ than the room temperature, will switch to heating mode, conversely will switch to cooling mode. If in AUTO mode and break off the external sensor, the system will switch according to the temperature differential.**

**3.System mode**

**Cooling mode: Proportional-Integral control cooling**

**Heating mode: Proportional-Integral control heating, Aux heating, Proportional-Integral and Aux heating simultaneously(two stage heating)**

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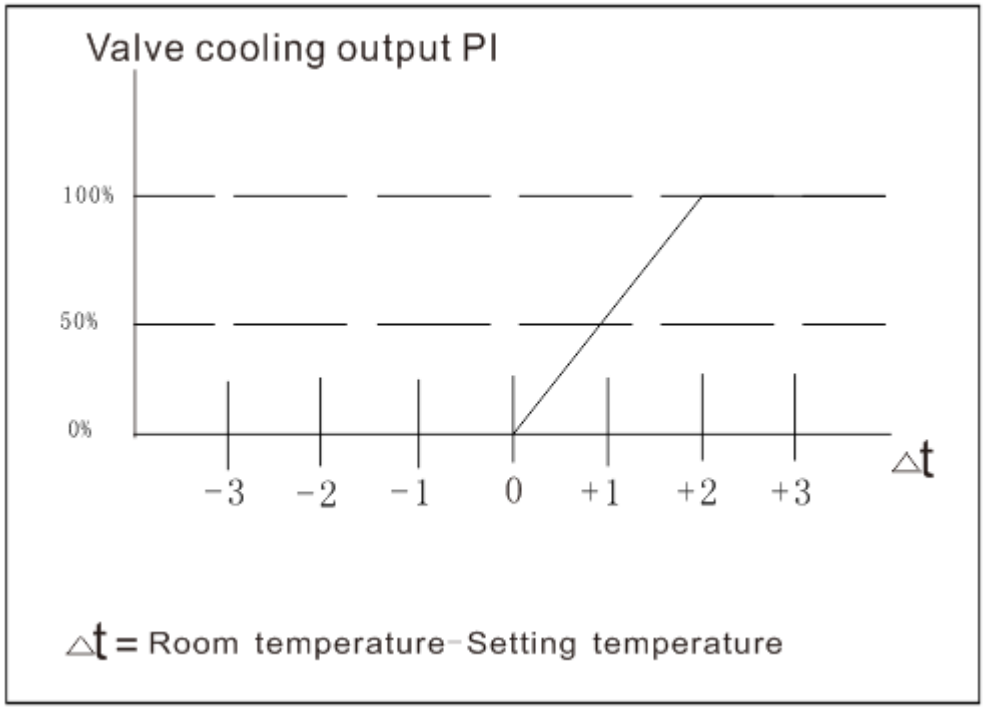
# Thermostat Function Description

## Cooling mode（Proportional-Integral（PI） control cooling）

**Example: P-band is 2℃**

The valve cooling output PI and the temperature differential(room temperature and setting temperature) as following picture,



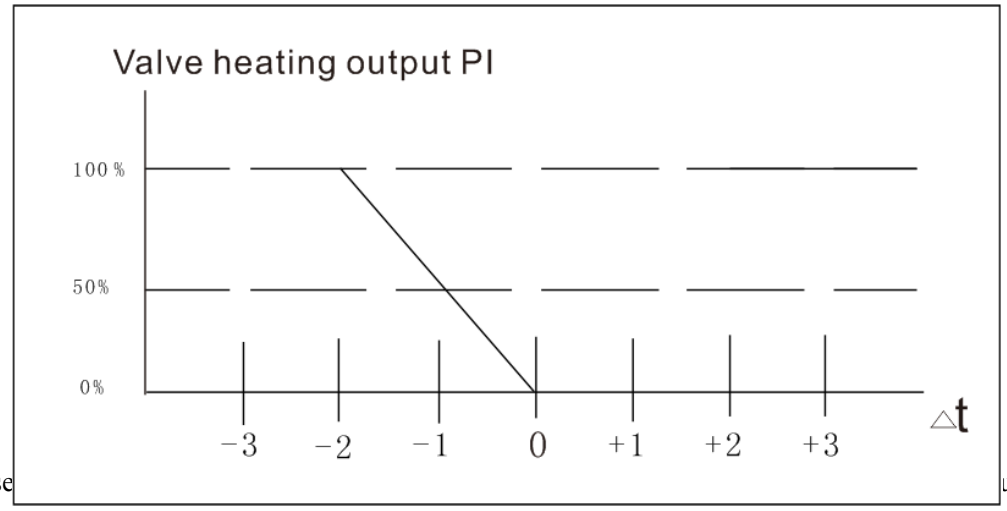

If we set the P-band is 2℃, when the room temperature is higher 2℃ than the setting temperature, the terminal 11 will 100% output, the cooling equipment actuator will 100% open; when the room temperature is equal or lower than setting temperature, the terminal 11 will stop output(0% output), the cooling equipment actuator will fully close. The LCD will display the current output PI value.

※ PI value =△t/P-band

## Heating Mode

Proportional-Integral（PI）control heating

**Example: P-band is 2℃**




If we se ure, the terminal 9 will 100% output, the heating equipment actuator will 100% open; when the room temperature is equal or higher than setting temperature, the terminal 9 will stop output(0% output), the cooling equipment actuator will fully close. The LCD will display the current output PI value. In this mode, the aux heating terminal 6 will not output, means without aux heating.

**Switch control heating(Aux heating)**

This is an aux heating function, when the room temperature is lower over 1℃ than the setting temperature, terminal 6 will have output, will open the aux heating; when the room temperature is higher 1℃ than the setting temperature, terminal 6 will stop output, will close the aux heating.

**Proportional-Integral and switch (aux heating) control heating simultaneously**

When the room temperature is lower below 3℃(P-band plus 1℃) than the setting temperature, the terminal 9 will start output according to the PI valve and control the valve; when the room temperature is lower 3℃（P-band plus 1℃）, the terminal 6(aux heating terminal) will start output, and the aux heating mode open; When the room temperature is only lower 2℃(P-band) than the setting temperature, the aux heating terminal close, the valve still is control by the PI value.

## Fan speed instruction

Continuously press button, you can select HI speed, MED speed, LOW speed and AUTO speed, the LCD will display corresponding marks. If you select the AUTO speed:

**Cooling mode:** if the room temperature is higher or equal 3℃than the setting temperature, the fan will run HI speed; if the room temperature is higher or equal 2℃ and lower or equal 3℃ than the setting temperature, the fan will run MED speed. Other will run LOW speed.

**Heating mode:** if the setting temperature is higher 3℃ than the room temperature, the fan will run HI speed; if the setting temperature is higher or equal 2℃ and lower or equal 3℃ than the room temperature, the fan will run MED speed. Other will run LOW speed.