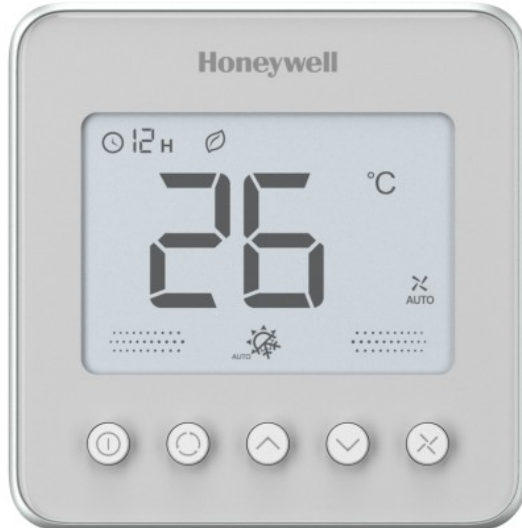# TF428/TF418 Series Digital Thermostat

Fan Coil Unit Control

SPECIFICATION DATA

Features

- **Memorized time off**
- **Cycle Per Hour (CPH)**
- **Random startup**
- **Remote temperature sensor optional**
- **Energy saving mode optional**
- **LCD display with simple user interface**
- **Room temperature or setpoint temperature display selectable**
- **Manual or automatic fan speed selectable**
- **Temperature units in either °C or °F**
- **User setting can be stored with power loss**
- **Freeze protection available**
- **Four keypad lock options**
- **Heating and cooling setpoint limitation**

Specifications

Power supply	220/230VAC, 50/60Hz
	110VAC, 60Hz
Control	PI, On/off output
Accuracy	±1°C at 21°C
Auto Cycle times	100,000 times
Manual Cycle times	10,000 times
Protection class	IP20
Set point range	10 ~ 32°C
Display range	0 ~ 37°C
Ambient operating limits	0~ +49°C
Ambient storage limits	-30 ~ +60°C
Humidity limits	5~90% RH, non-condensing
Remote temperature sensor	NTC20K
Action Type:	1
Pollution Degree	2
Protection against electric shock class	Class II
Electronic control software class	Class A
Rated Impulse Voltage:	2500V
Maximum Temperature	155°C

Relay wiring
Wire Sectional area (Recommendation)   1.0~1.5mm^2
Applied altitude up to 2000m above sea level
Rating Capacity
Working current for the whole product : 4(3)A
4A: When the load of the thermostat is resistance
3A: When the load of the thermostat is inductance
For Fan load 4(2)A
4A:when the load is resistance; 2A:When the load is inductance
For Valve load 2(1)A
2A: when the load is resistance;1A: when the load is inductance
The valve need have overtravel-limit organ to turn off the load.

General

The TF428 series digital thermostat is designed for 3-speed fan and valve control in a fan coil system, including:

- 2-pipe cool only/heat only/manual changeover
- 4-pipe cool/heat manual /automatic changeover
- Ventilation mode
- Manual or automatic 3-speed fan control
- Water valve control

Besides the basic controls, TF428 series featuring **CPH (Cycle Per Hour)** better maintains the room temperature to the setpoint and **Random Start-up Function** would help to maintain power grid stability.

In addition, Honeywell **Memorized Time Off Function** can automatically turn off the thermostat to save energy.

Model Selection

| Product Type	Thermostat for Fan Coil Control	TF							
Application	2/4 pipes fan coil with 3-speed fan		4						
Power supply	220/230 Vac, 50/60Hz			2					
	110 Vac, 50/60Hz			1					
Valve control type	On-Off				8				
Housing color	white					W			
	Black					D			
	Sliver					S			
	Rose Gold					G			
	Copper					C			
	Sliver hairline					L			
	Gold hairline					K			
Backlight color	Default						N		
Special code	N/A								
	Customized color							-···X	
Packing Type	Unit Packing								/U
	Bulk Packing								
	Single Package (thermostat with wall plate)								/S

E.g.
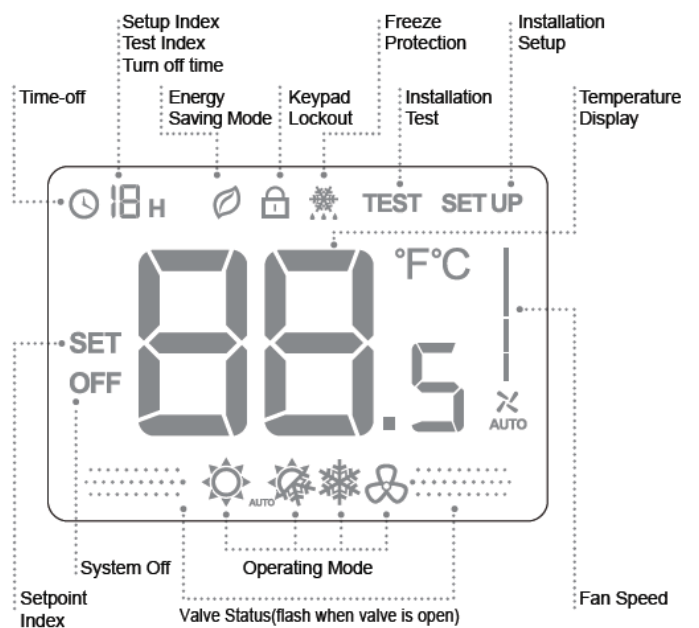**TF428WN/U**: 220/230 Vac, on-off valve control, white housing, unit packing
TF428DN: 220/230 Vac, on-off valve control, black housing, bulk packing, 40 units/ package
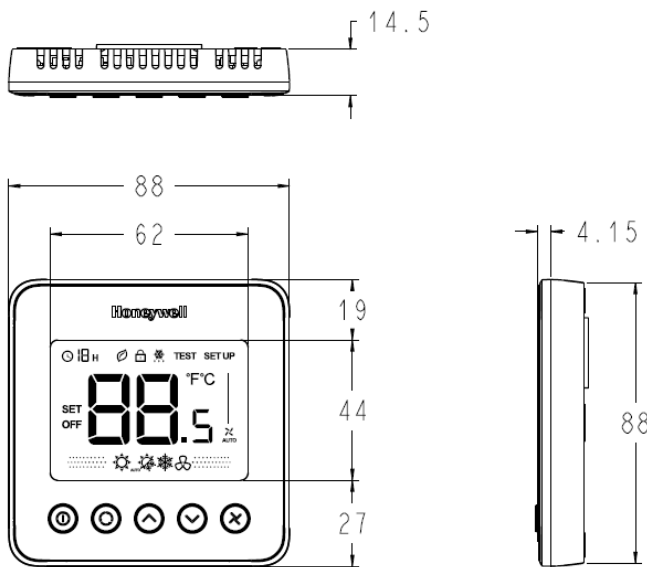
Product Design

Thermostat appearance
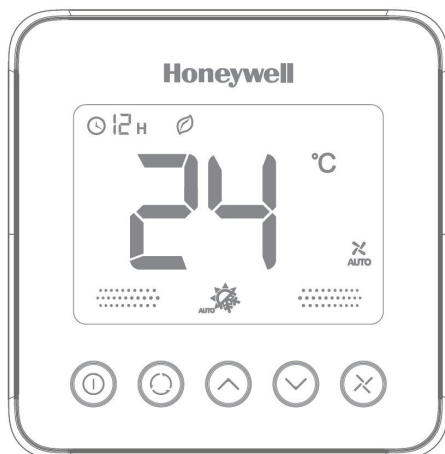
LCD display

Dimensions (mm)

Function

Valve Control

Thermostat measures the room temperature via integrated sensor or remote temperature sensor and maintains the set-point by delivering on/off valve control command outputs.

The fan setting can be selected as manual or automatic 3-speed operation. When in "manual" mode, the fan is switched to the selected speed via control output FH (high), FM (Medium) , FL (Low).

While in "automatic" mode, fan speed depends on the difference between room temperature and setpoint. When room
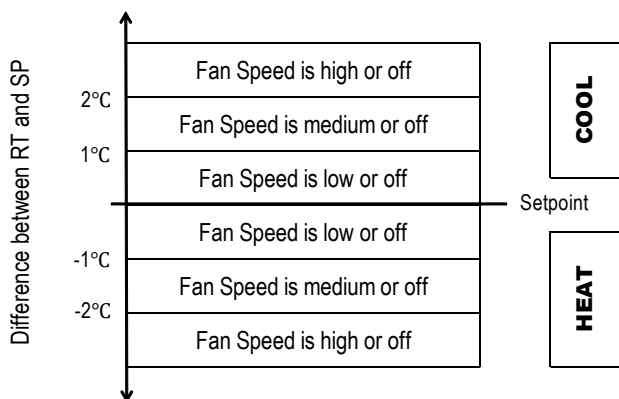

Fig. 1. Fan Speed Ramping Control Algorithm

temperature reaches the setpoint, the valve will be closed, and the fan will be closed in the meanwhile.

Memorized Time Off

The time off feature will automatically turn off the thermostat after a selectable amount of time. To change the time setting, press and hold the power button for more than 3 seconds and press "up" and "down" button to change the value when the thermostat is working .

NOTE: The setting range is from 0 to 12 hours. The step is 1 hour and the default value is 0.
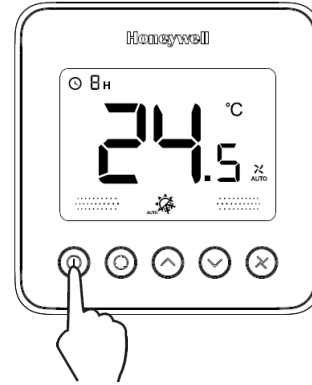
Backlight

To turn on the backlight, press any key. The backlight will time-out 8 seconds after the last key is pressed. When in ISU and Installation test mode, the backlight will timeout 60 seconds after the last key is pressed.

Keypad Lockout

Keypad lockout can be set in ISU and the default status is "all keys available". Keypad lock can be optioned to "mode button locked", "Fan and mode buttons locked", "all buttons (except power button) locked" and "all buttons locked".

Temperature Display

The displayed temperature can be set to room temperature or setpoint. The setting can be changed during ISU (Installation Set Up) process.

Cycle Per Hour (CPH)

In order to achieve more accurate temperature control, the CPH function enables the thermostat to open the valve several times per hour as the room temperature gets close to the sepoint.

The value can be changed in the ISU, the default values are 4 for heating and 3 for cooling.

Operating Mode

Comfort Mode

In comfort mode, the setpoint and fan speed can be changed by pressing corresponding buttons. Comfort mode including 2-pipe cool only/heat only/manual changeover and 4-pipe manual /automatic changeover.

Energy Saving Mode

A dry contact (such as hotel card) or button press (press and hold the "mode" button for more than 3 seconds) can activate the energy saving mode. The dry contact can be selected as normal open or normal close in ISU.

If activated by dry contact, all buttons will be locked except the multi-key for ISU. If activated by button press, any button press can stop energy saving mode.

The setpoint will change to the remote setback heating/cooling setpoint when the energy saving mode is enabled. The heating setpoint range is 10ºC to 21ºC and the default is 18ºC. The cooling setpoint range is 22ºC to 32ºC and the default is 26ºC.
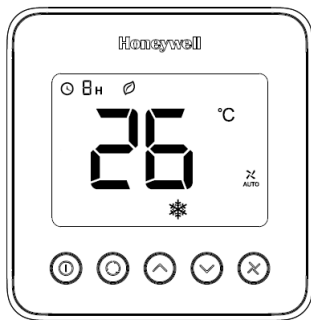

Ventilation Mode

Press "mode" button to enter "ventilation" mode. In "ventilation" mode, no output for valve while the fan will operate at selected fan speed.
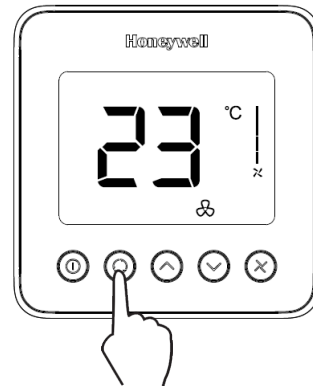
Freeze Protection Mode

Freeze protection can be selected as disabled or enabled (default) in the ISU. In freeze protection mode (only in heating applications), when thermostat is off and the temperature is below 6°C , the thermostat will activate heating mode until the temperature rises to 8°C .
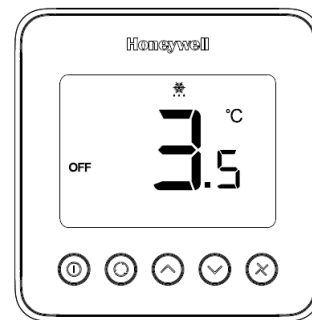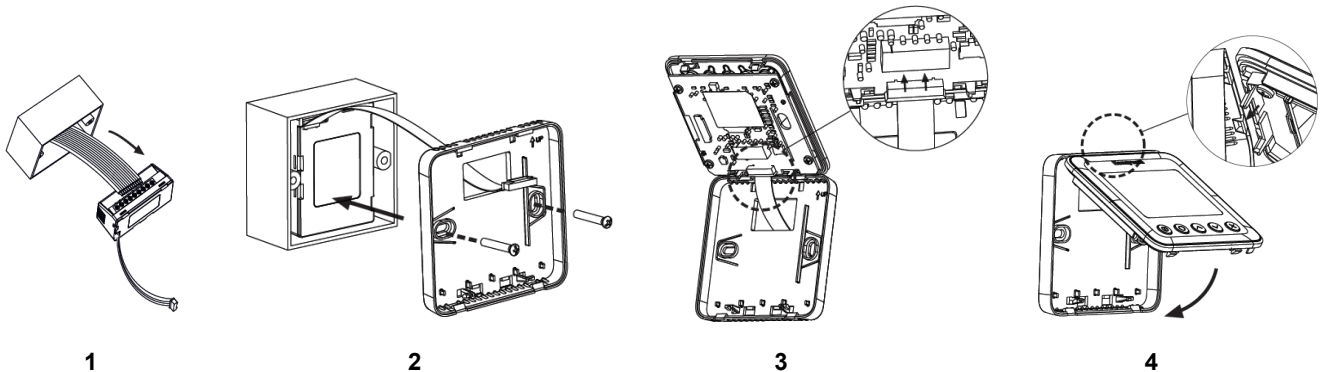

Installation and Wiring

TF428 Series can be installed in standard 86 size junction box directly.

⚠ The screws must be locked tightly to avoid wire break off from the terminals.
The temperature of mounting box and wall should be in the operating temperature range.

| 1 | 2 | 3 | 4 |

Wiring Diagram

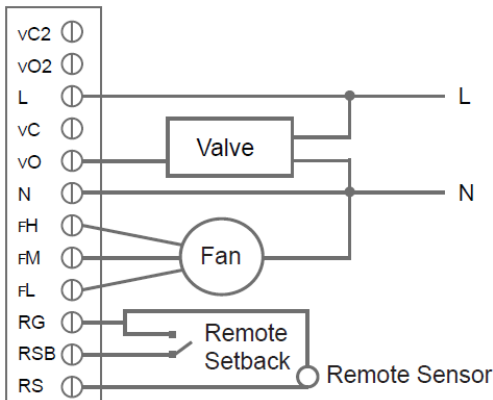## 2 pipes application

Fig. 2. Honeywell VC4013/VN4013/VS4016 Wiring
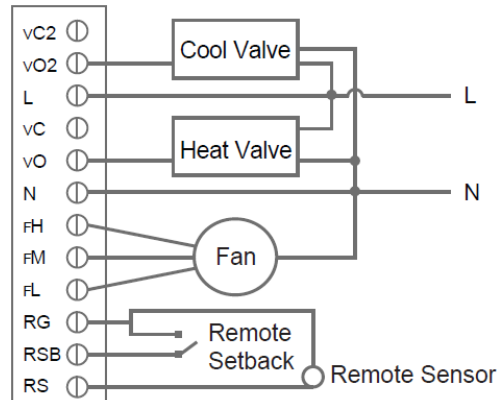
4 pipes application
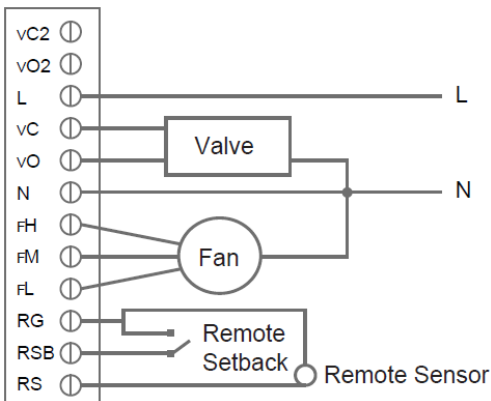

Fig. 4. Honeywell VC4013/VN4013/VS4016 Wiring
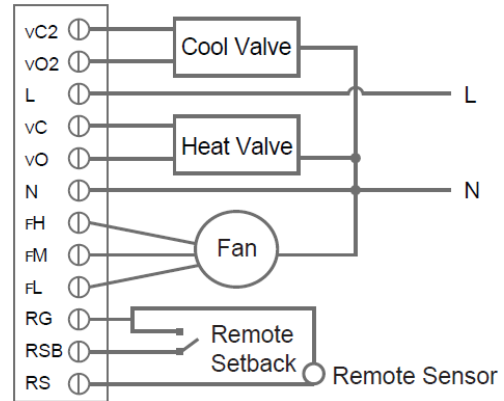

Fig. 3. Honeywell VC6013/VN6013 Wiring

Fig. 5. Honeywell VC6013/VN6013 Wiring

Terminal Designations

Item	Terminal	Description
1	L	live wire
2	N	neutral wire
3	vC	Heating / Cooling valve close
4	vO	Heating / Cooling valve open
5	vC2	Cooling valve close, 4 pipes only
6	vO2	Cooling valve open, 4 pipes only
7	FH	High speed fan
8	FM	Medium speed fan
9	FL	Low speed fan
10	RG	Ground for remote sensor and setback
11	RSB	Remote setback
12	RS	Remote sensor

ISU (Installation Setup)

Press and hold the "mode" and "up" buttons together for more than 3 seconds to enter or exit ISU. Change the ISU code by pressing the "mode" button and then change the option setting by pressing the "up" and "down" button refer to the following introduction.

ISU Code	Description	Options
1	System Type	0 Heat only
		1 Cool only
		2 Two pipes heating/cooling manual (Default)
		4 Four pipes manual
		5 Four pipes auto
2	Remote Sensor	**0 Onboard sensor (Default)**
		1 Remote sensor (NTC20K)
3	Temp. Scale	0 °F
		1 °C (Default)
4	Fan control Type	0 Auto only
		1 manual only (3 speed: Low→Med→High→Low)
		2 users can choose auto or manual (Default)
5	Switching differential for 4 pipes auto changeover with single setpoint	1°C (2°F)
		1.5°C (3°F) (Default)
		2°C (4°F)
		3°C (6°F)
6	CPH value (heat)	1-12 **4 (Default)**
7	CPH value (cool)	1-6 **3 (Default)**
8	Display Temp. adjustment	-2~2°C, 0.5°C. **Default 0°C** (-4~4°F, 1°F. **Default 0°F**)
9	Temp. Display	**0 room temp. (Default)**
		1 set point
10	Heating Range Stops	10~32°C. **Default 32°C** (50~90°F. **Default 90°F**)
11	Cooling Range stops	10~32°C **Default 10°C** (50~90°F. **Default 50°F**)

ISU Code	Description	Options
12	Keypad lockout	**0 All keys are available (Default)**
		1 system button locked out
		2 Fan and system button locked out
		3 All button locked out except power button
		4 All button are locked
13	Remote Setback enable method	0 Hotel card NO
		1 Hotel card NC
		2 Button (Default)
14	Remote Setback Heating Setpoint	10~21°C. **Default 18°C** (50~70°F. **Default 64°F**)
15	Remote Setback Cooling Setpoint	22~32°C. **Default 26°C** (72~90°F. **Default 79°F**)
16	Freeze Protection	0 Disabled
		1 Enabled (Default)
17	Power Recovery status	0 OFF
		1 Previous status (Default)
18	Wallplate Option	**0 without wallplate (Default)**
		1 with wallplate
19	Fan mode in ES Mode	**0 Run as Auto when ISU_4=2 (Default)**
		1 Run as low when ISU_4=2

Honeywell