

T6861 Series Large LCD Digital Thermostat Two stage Cool Control

Product specification sheet



Features

- Super modern appearance design, suitable for office, hotel and residential building
- Horizontal and vertical model available for variant application
- Slim design, direct installation on 86 size box
- Stylish and elegant blue backlight with white color ring
- Big LCD display with English and icons
- Easy to install and set-up
- Time on/off function
- Selectable room temperature or set point display
- Manual or automatic fan speed selection
- Energy saving mode activation by button press or dry contact (key card)
- Cycle per Hour (CPH) function
- Adjustment of display room temperature
- Temperature unit either °C or °F
- User setting can be kept when power off
- Freezing protection function available
- Lock or unlock keys or part of keys in Installer Set-up
- Heat and cool set point limitation for energy saving

Application

T6861Series digital thermostats are designed for application of 3-speed fan and valves in fan coil system. Including:

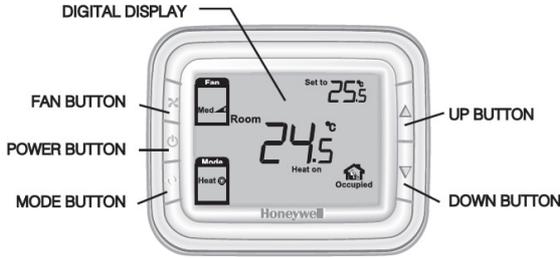
- 2-pipe cool only/heat only/manual changeover and 4-pipe manual or automatic changeover
- Ventilation mode, fan can only support manual speed control at this mode
- Manual or automatic 3-speed fan control
- Water valve control

Model Summary

Model	Horizontal/ Vertical	Backlight/ Color Ring	Time On/off	2-pipe/ 4-pipe	Power Supply (V)	Energy Saving	Ventilation	Manual/ Automatic Fan	Remote Sensor
T6861H2WB-2	Horizontal	Blue	Y	2/4	220	Y	Y	Y	Y
T6861V2WB-2	Vertical	Blue	Y	2/4	220	Y	Y	Y	Y

Mechanical design

Thermostat appearance

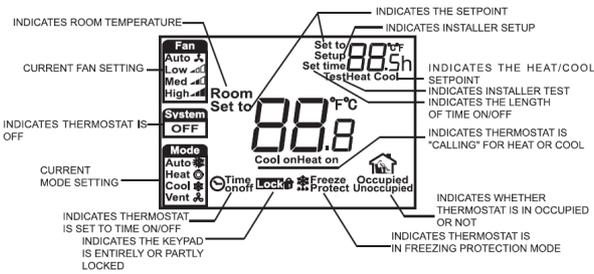


Fan Operation

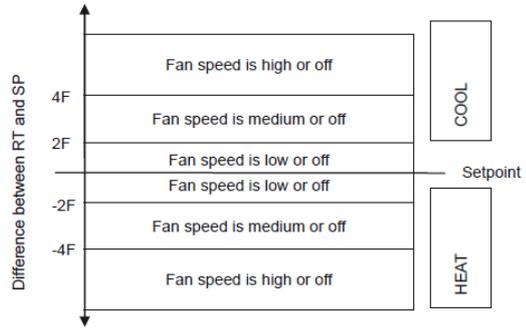


PRESS THE FAN BUTTON TO SELECT LOW, MED, HIGH OR AUTO

LCD display



Fan can be selected as manual or automatic 3-speed operation. In Manual mode, the fan is switched to the selected speed via control output Gh, Gm, Gl. While in automatic mode, fan speed depends on the difference between room temperature and set point. When room temperature reaches set point, valve will be closed and meanwhile, fan will be closed either.



Fan speed ramping control algorithm

Function

Valve control

Thermostat acquires the room temperature via its integrated sensor or external temperature sensor and maintains the set point by delivering on/off valve control commands output.



PRESS THE MODE BUTTON TO SELECT HEAT, COOL, AUTO OR VENT

Four-pipe application

For 4 pipes application, if the status is changed from auto change over to manual change over, the cooling setpoint and heating setpoint will keep current heat and cool setpoint. When changed from manual change over mode to auto change over, the user setpoint will be $((\text{cooling setpoint} + \text{heating setpoint})/2)$. The cooling setpoint will be $(\text{user setpoint} + 1/2 \text{ deadband})$ and heating setpoint will be $(\text{user setpoint} - 1/2 \text{ deadband})$. Deadband is adjustable with default value of 1.5°C.



Temperature display

The displayed temperature can be set to acquired room temperature or setpoint. The setting can be made during Installer Set-Up process. Room temperature and setpoint can be displayed simultaneously.

Cycle per hour (CPH)

In order to get a more accurate temperature control, CPH function may enable the thermostat to open the valve for several times per hour even the temperature is close to setpoint (difference less than $\frac{1}{2}$ P-band). The default value is 4 for heating and 3 for cooling and can be changed in Installer Set-Up process.

Time on/off

If the thermostat is off, hold power button for 3 seconds, system will be time on mode. If the thermostat is on, hold power button for 3 seconds, system will be time off mode. The setting range is from 0 to 12 hours. The step is 0.5 hour with the default time is 0.



Backlight

Any key press will activate the backlight. Backlights will timeout 8 seconds after last key press. When in Installer Set-up and Installer test mode, the backlight will timeout 60 seconds after last key press.

Remote temperature sensor

T6861 provides control either depending on the acquired room temperature or depends on the return air temperature. The model of remote temperature sensor is NTC20K

Keypad lock

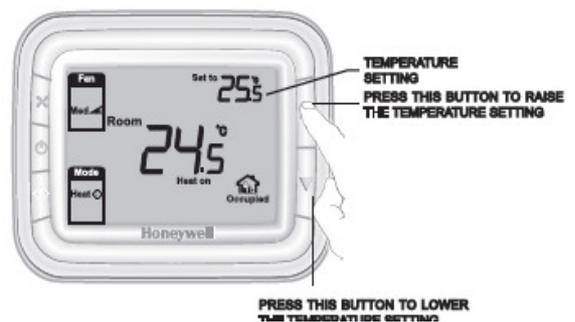
Keypad lock can be set in ISU with default status is all keys available. You may change into mode button locked out, Fan and mode buttons locked out and All buttons locked out by changing the ISU.

Operating modes

The following operating modes are available:

Comfort mode

In comfort mode, the setpoint can be changed by pressing up and down button. Different applications include cool only, heat only and manual heat/cool changeover.



Ventilation mode

Press mode button to enter ventilation mode. In ventilation mode, no output for valve while the fan will operate according to selected fan speed.

Energy saving mode

A potential-free dry contact (such as hotel key card) or button press (pressing mode button for continuous 3 seconds) can activate the energy saving mode with icon appearing on screen. The dry contact can be selected as normal open or normal close type in ISU. If activated by dry contact, all buttons will be locked except the multi-key for ISU. If energy saving is activated by button press, then any following button press will stop energy saving mode. For heating mode, if the energy saving function is enabled, the setpoint will change to remote setback heating setpoint. The range of remote setback heating setpoint is from 10°C to 21°C and default value is 18°C. The value may change in ISU with step of 0.5°C. For cooling mode, if the energy saving function is enabled, the setpoint will change to remote setback cooling setpoint. The range of remote setback cooling setpoint is from 22°C to 32°C and default value is 26°C. The value may change in ISU with step of 0.5°C.



Freezing protection mode

Freezing protection can be selected as disabled (default) or enabled. In freezing protection mode (no such mode in cool only application), when thermostat is in OFF mode while the acquired temperature is below 6°C, the thermostat will start heat mode until the temperature rises to 8°C or the thermostat is turned on.



On/off mode

Pressing power button can switch between on and off mode.



Technical specification

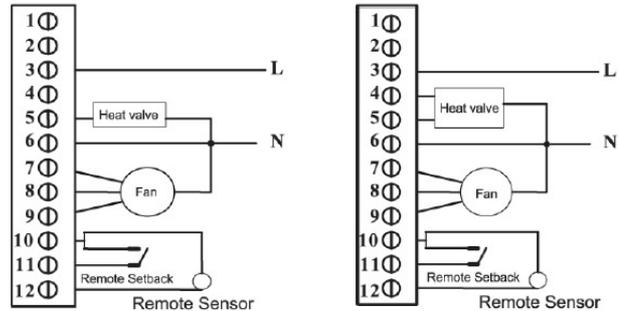
Power supply	220(+10%, -15%)VAC
Frequency	50/60Hz
Control algorithm	PI, On/off output
Accuracy	+/-1°C at 21°C
Rating capacity	220V power supply: 4(2) A for fan load, 2(1) A for zone valve
Cycle times	100,000
Setpoint range	10~32°C
Display range	0~37°C
Installation	Installed on 86×86mm junction box
Protection Class	IP20
Environmental Conditions	Operation temperature 18~49°C Shipping temperature 35~65°C Relative humidity 5~90%

Power Box Terminal Designations

Item	Terminal	Description
1	Cc	Cooling close
2	Y	Cooling open
3	L	AC Power
4	Ch/Cc	Heating close/Cooling close
5	W/Y	Heating open/Cooling open
6	N	AC Ground
7	Gh	High speed fan relay
8	Gm	Medium speed fan relay
9	Gl	Low speed fan relay
10	Sc	Ground for remote sensor and remote setback
11	RSB	Remote set back
12	Rs	Remote sensor

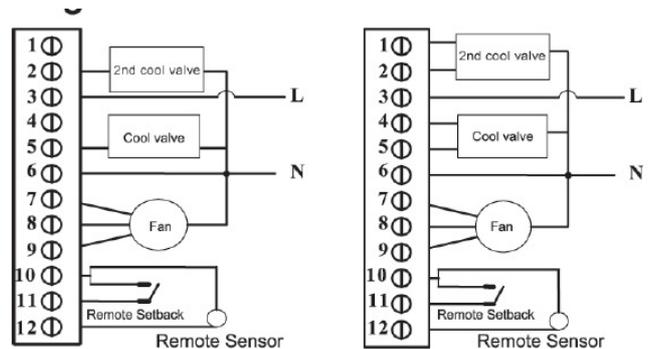
Wiring Diagrams

Application 1: 2 pipes heat only wiring diagram



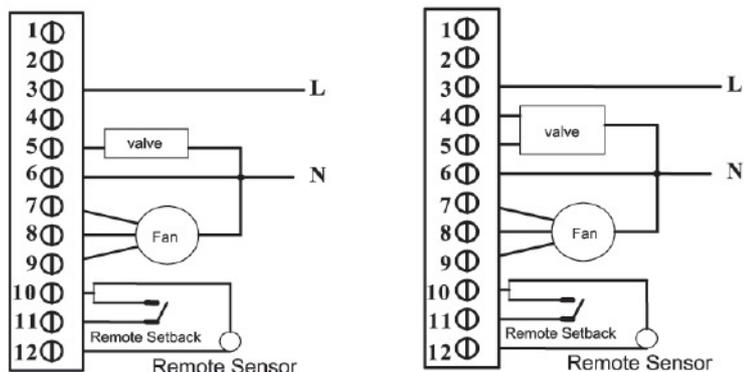
Typical wiring for ON/OFF control in 2 pipe heating only (VC4013) Typical wiring for ON/OFF control in 2 pipe heating only (VC6013)

Application 2: 2 pipes Cool only wiring diagram



Typical wiring for ON/OFF control in 2 pipe cooling only (VC4013) Typical wiring for ON/OFF control in 2 pipe cooling only (VC6013)

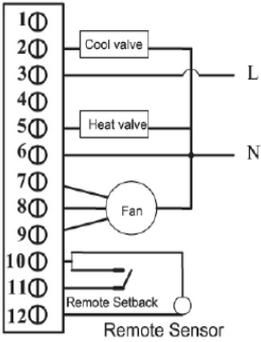
Application 3: 2 pipes 1 stage Heat or 1 stage Cool MCO wiring diagram



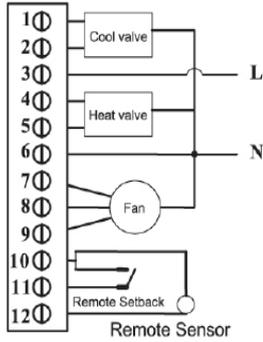
Typical wiring for ON/OFF control in 2 pipes 1H1C (VC4013)

Typical wiring for 3-wire control in 2 pipes 1H1C (VC6013)

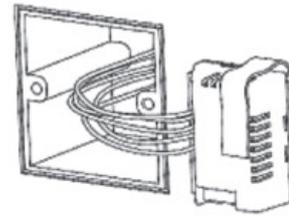
Application 4: 4 pipes 1 stage Heat and 1 stage Cool MCO/ACO wiring diagram



Typical wiring for ON/OFF control in 4 pipe 1H/1C Auto/ Manual Change over (VC4013)



Typical wiring for 3-wire control in 4 pipe 1H/1C Auto/ Manual Change over (VC6013)



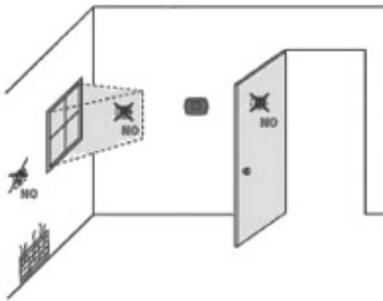
Push the Power box into the junction box



Place Back cover over junction box, insert and tighten mounting screws.

Installation Tips

Install the thermostat about 5 feet (1.5m) above the floor in an area with good air circulation at average temperature



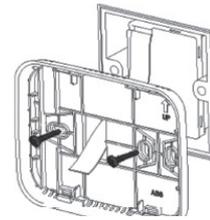
Do not install in locations where the thermostat can be affected by:

- Drafts or dead spots behind doors and in corners
- Hot or cold air from ducts
- Sunlight or radiant heat from appliances
- Concealed pipes or chimneys
- Unheated/uncooled areas such as an outside wall behind the thermostat

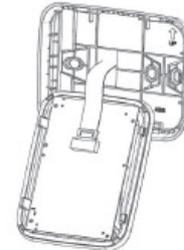
Wiring

Pull wires through wire hole.

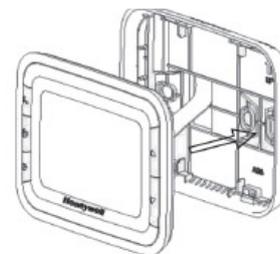
Loosen screw terminals, insert wires into terminal block, then retighten screws.



Insert the cable into connector on circuit board of thermostat



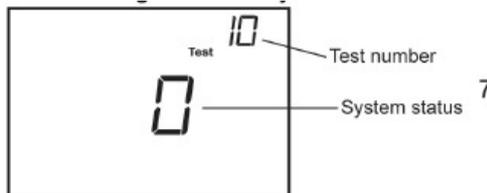
Align 4 tabs on the Back cover with corresponding slots on the back of the thermostat, and then push it until the thermostat snaps in place.



Installer system test

After completing the installer setup above, press the button again to begin a system test

Follow the procedure below to test the heating and cooling and fan system.



Press and hold ▲ and ▼ buttons 3 seconds to enter test mode.

Press ▲ or ▼ button to change system status.

Press ↻ button to advance to next test number.

Press ▲ and ▼ button hold to terminate system test at any time.

Setup Function Settings & Options

Number	Description	Possible Options
1	System type	0 Heat only
		1 Cool only(Default)
		2 two pipes manual(Default)
		4 four pipes manual
		5 four pipes auto
2	Output Type	0 NO 1 NC(Default)
5	Remote sensor	0 Onboard Sensor (Default) 1 Remote (NTC20K, T7770A100G)
9	Temperature scale	0 °F 1 °C(Default)
10	Fan control type	0 Cycle only 1 Constant only (3 speed: Low->Med->High->Low)
		2 User can choose Cycle or Constant(3 speed:Low->Med->High->Auto->Low) (Default)
12	Sequence Dead band for four pipes	1 °C (2 °F)
		1.5 °C (3 °F)(Default)
		2 °C (4 °F)
		3 °C (5 °F)

System Test System Status

- 10 Heat 0 Heat off
- 1 Heat on
- 30 Cool 0 Cool off
- 1 1st cool stage on
- 2 2nd cool stage on
- 40 Fan 0 Fan off
- 1 Low speed Fan on
- 2 Medium speed Fan on
- 3 High speed Fan on
- 70 Thermostat information(for reference only)
 - 71 Software revision number (major revisions)
 - 72 Software revision number (minor revisions)
 - 73 Configuration identification code (major)
 - 74 Configuration identification code (minor)
 - 75 Production configuration date code (week)
 - 76 Production configuration date code (year)

13	CPH value For Heat	1~12(Default: 4)
14	CPH value For Cool	1~6(Default: 3)
18	Display Temperature adjustment	-2 °C(-4 °F)
		-1.5 °C(-3 °F)
		-1 °C(-2 °F)
		-0.5 °C(-1 °F)
		0 °C(0 °F)(Default)
		0.5 °C(1 °F)
		1 °C(2 °F)
19	Temperature Display mode	0 display Room Temperature
		1 display Setpoint
		2 display both (Default)
20	Heating Range Stops	10-32 °C default 32 °C (50-90 °F default 90 °F)
21	Cooling Range Stops	10-32 °C default 10 °C (50-90 °F default 50 °F)

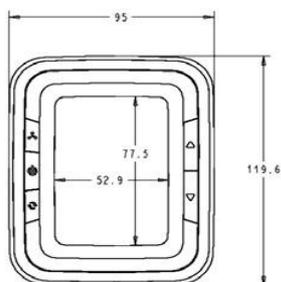
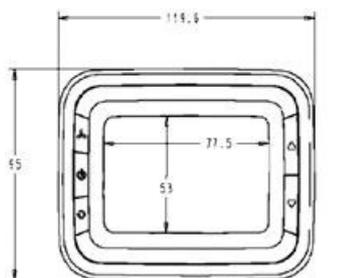
22	Keypad Lockout	0 All keys available(Default)
		1 System button Locked out
		2 Fan and System button Locked out
		3 All buttons locked out
23	Remote setback enable method	0 Hotel card NO
		1 Hotel Card NC
		2 Button (Default)
		3 All buttons locked out
24	Remote setback heating setpoint	Range 10-21°C Default : 18 °C (Range 50-70°F Default : 64°F)
25	Remote setback cooling setpoint	Range 22-32°C Default : 26 °C (Range 72-90 °F Default : 79 °F)
27	Freeze Protection	0 Disabled (Default)
		1 Enabled
29	Minimum Relay Off Time	Range 0-5 (Default:0) 0 disable minimum relay off time 1-5 minutes of minimum relay off time for 1st stage
30	GAP of 2nd stage ON	2°C (3°F)
		3°C (5°F)
		4°C (7°F) (Default)
		5°C (9°F)

The fan does not work	<ul style="list-style-type: none"> ➤ Wait five minutes for the cooling system to respond. ➤ Check whether the Fan mode is set to Auto ➤ Check whether the heating or cooling system works. ➤ Check whether the keypad is locked or not. ➤ Check whether the system is working in Energy Saving mode. ➤ Check whether the thermostat is off.
The Up or Down button doesn't work.	<ul style="list-style-type: none"> ➤ Check whether the thermostat is off. ➤ Check whether the keypad is locked or not. ➤ Check whether the system is working in Energy Saving mode. ➤ Check whether the thermostat is off.

Troubleshooting Tips

If	Then
Heating System does not turn on	<ul style="list-style-type: none"> ➤ Set the mode to Heat by pressing the Mode button. ➤ Check that the heat temperature setting is set above the room temperature and "Heat On" shows solidly in the display. ➤ Wait five minutes for the heating system to respond.
Cooling system does not turn on.	<ul style="list-style-type: none"> ➤ Set the mode to Cool by pressing the Mode button. ➤ Check that the cool temperature setting is set below the room temperature and "Cool On" shows solidly in the display. ➤ Wait five minutes for the cooling system to respond.

Dimension



vertical model

Automation and Control Solutions

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Subject to change without notice.