

## T6865 Series Large LCD Digital Thermostat

24 VAC  
2-pipe fan coil control

Data sheet



### Application

T6865 digital thermostats are designed for application of 3-speed fan and modulating valves in fan coil system.

#### Including:

- 2-pipe cool only/heat only/manual changeover
  - Ventilation mode
  - Manual or automatic 3-speed fan control
  - modulating valve control
- Fan speed can be selected to automatic or manual 3-speed control mode.
- In ventilation mode, fan only support manual speed control.
- \*Energy saving mode activation by button press or dry contact (key card)
- \*Remote sensor
- 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 ( ISU )
- Heat and cool setpoint limitation for energy saving
- 24VAC power supply
- 230VAC fan load, 4A resistive and 2A inductive switch rating

### Features

- Super modern appearance design, suitable for office, hotel and residential building
- Slim design, direct installation on 86x86mm box or 3x3inch box
- Stylish and elegant green/blue backlight with white colour ring
- 2-pipe integrated into one unit with easy configuration
- Big LCD display with English and icons
- Easy to install and set-up
- Time on/off function
- Selectable room temperature or setpoint temperature display
- Manual or automatic fan speed selection

### Model summary

Model	Horizontal/ Vertical	Backlight	Time on/off	2- pipe/ 4-pipe	Power supply (VAC)	Energy Saving	Ventilation	Manual/ Automatic Fan	Remote Setback	Remote Sensor
T6865H2WB	Horizontal	Blue	Y	2	24	Y	Y	Y	Y	
T6865H2WG	Horizontal	Green	Y	2	24	Y	Y	Y	Y	
T6865H2WB-R	Horizontal	Blue	Y	2	24	Y	Y	Y		Y
T6865H2WG-R	Horizontal	Green	Y	2	24	Y	Y	Y		Y

## Mechanical design

### Thermostat appearance

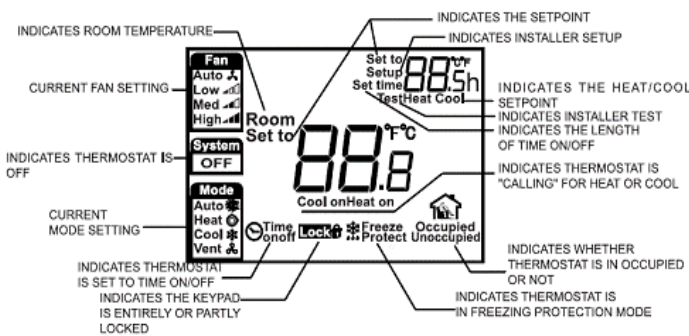


## Fan Operation



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. In automatic mode, fan speed depends on the difference between room temperature and setpoint. When room temperature reaches setpoint, valve will be closed and meanwhile, fan will be closed either.

### Temperature display

The displayed temperature can be set to display room temperature or setpoint. The setting can be made during ISU process.

### Time on/off

When the thermostat is off, holding power button for 3 seconds, system will enter 'time on' mode. When the thermostat is on, holding power button for 3 seconds, system will enter 'time off' mode. The range of 'time on' or 'time off' is from 0 to 12 hours. The step is 0.5 hour and the default time is 0.

## Function

### Modulating Valve control

Thermostat acquires the room temperature via its integrated sensor and maintains the setpoint by delivering modulating output.

### Heat/Cool/Vent

Pressing the mode button to select heat, cool or vent mode.



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



INDICATES THERMOSTAT HAS BEEN SET TIME OFF

### Backlight

Pressing any key will activate the backlight. Backlight will turn off after 8 seconds. When in ISU mode or 'Installer test' mode, the backlight will turn off after 60 seconds without operation.

## Keypad lock

The default status of 'Keypad Lock' is all keys available and it can be changed in ISU mode.

Keypad lock has the following settings:

- All keys are available (Default)
- System button is locked out
- Fan and System button are locked out
- All buttons are locked

## Operating modes


The following operating modes are available:

### Comfort mode

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

### Energy saving mode

A potential-free dry contact (such as hotel key card) or button press (pressing mode button for 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, pressing any button will stop energy saving mode.

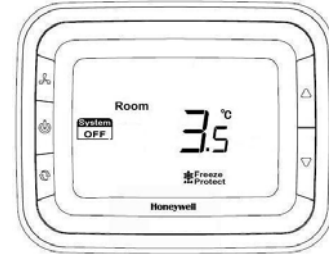
For heating mode, if the energy saving function is enabled, the setpoint will change to remote setback heating setpoint. The range of remote setback heating setpoint is from 10°C to 21°C and default value is 18°C. The value may change in ISU with step of 0.5°C.

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 disabled (default) or enabled. If freezing protection is enabled (It is not available in cool only application) and thermostat is in OFF mode while the room temperature is below 6 °C, the thermostat will open heating device before the temperature rises to 8°C.



## On/off mode

Pressing power button can turn on/ turn off the thermostat.

## Technical specification

### Electrical:

Power supply	24 (+/-10%) VAC
Frequency	50Hz
Modulating output	DC 0.....10V, Support VC7900 series actuators
Fan load rating	230(+/-10%)VAC, 4(2)A
Relay life	100,000 times
Wiring	Max 16AWG
<b>Temperature Control:</b>	
Sensing element	NTC10K@25°C (Onboard) NTC20K@25°C (Remote)
Control algorithm	PI, Modulating output
Accuracy	+/-1°C at 21°C
Setpoint range	10~32°C
Display range	0~37°C

### Environmental:

Protection Class	IP20
Operation temperature	-18~49°C
Shipping temperature	-35~65°C
Relative humidity	5~90%

### Installation:

Installed on 86×86mm box or 3×3inch box

## Terminal Designations

No	Terminal	Description
1	R	24VAC power
2	C	Common 24VAC / Common for control output
3	W/Y	Control Output DC 0.....10V
4	L	230VAC operating voltage for the fan
5	Gh	High speed fan
6	Gm	Medium speed fan
7	Gl	Low speed fan
8	SB	Remote setback / Remote sensor
9	Sc	Common for remote setback/ sensor

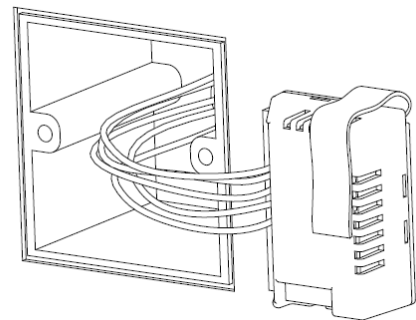
- Drafts or dead spots behind doors and in corners
- Hot or cold air from ducts
- Sunlight or radiant heat from appliances
- Concealed pipes or chimneys
- Unheated/uncooled areas such as an outside wall

### Installation Step:

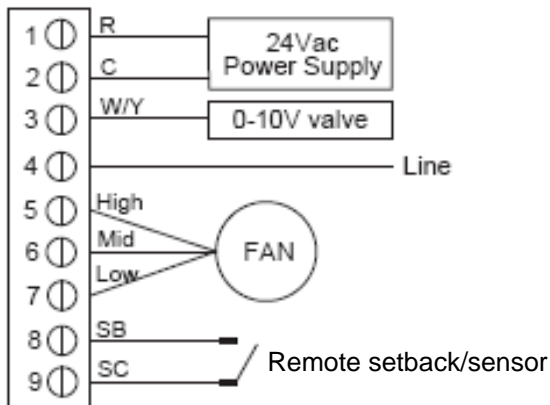
#### Step 1

**Pull wires through wire hole**

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

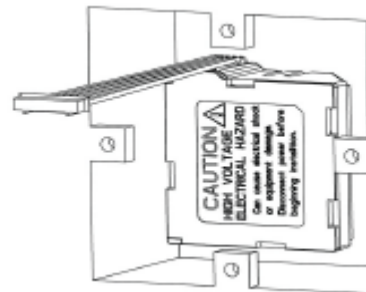


## Wiring diagrams



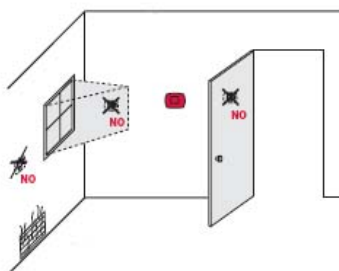
#### Step 2

**Push the Power box into the junction box.**



## Installation & Commissioning

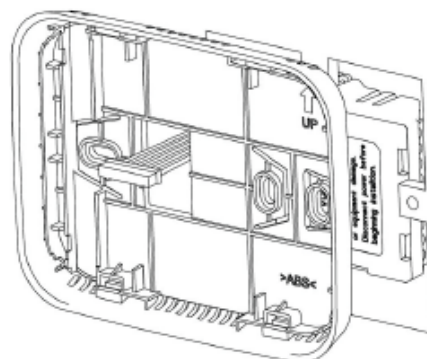
Install the thermostat about 5 feet (1.5m) above the floor in an area with good air circulation at average temperature.



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

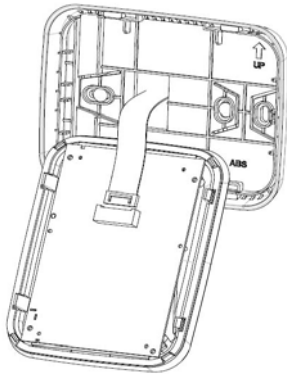
#### Step 3

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



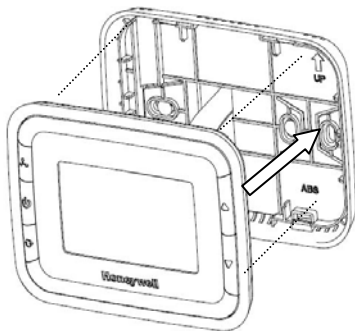
## Step 4

Insert the cable into connector on circuit board of thermostat.



## Step 5

Align the 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.



## System Test System Status

Installer Test Number	Description
10-0	Enter Heat Mode Modulating Test ( PWM 0V output )
10-1	Heat Mode Modulating Test ( PWM 5V output )
10-2	Heat Mode Modulating Test ( PWM 10V output )
30-0	Enter Cool Mode Modulating Test ( PWM 0V output )
30-1	Cool Mode Modulating Test ( PWM 5V output )
30-2	Cool Mode Modulating Test ( PWM 10V output )
40-0	Fan Mode – fan off
40-1	Fan Mode – fan low on
40-2	Fan Mode – fan Med on
40-3	Fan Mode – fan High on
70	Software version
71	Software version Number(major version)
72	Software version Number(minor version)
73	Identification code for production

## Installer set up

Press and simultaneously for 3 seconds to enter ISU as below:

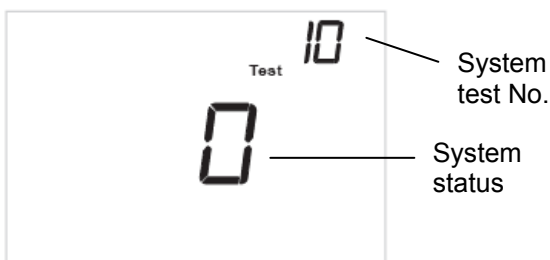
Press or to change settings

Press to advance to next function

Press and hold and buttons 3 seconds to exit and save settings

## Installer test

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

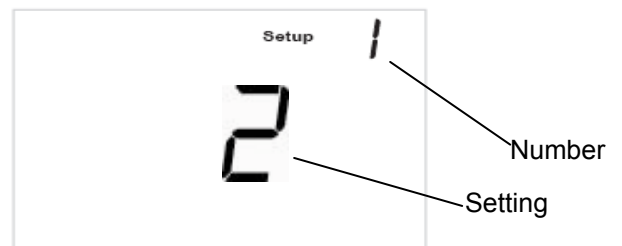


Press and hold and buttons 3 seconds to enter test mode.

Press or button to change system status.

Press button into next test number.

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



## Setup Function Settings & Options

ISU Code	Description	Possible Options
1	System Type	0 Heat only
		1 Cool only
		<b>2 Two pipes 1H1C manual(Default)</b>
5	Sensor Selection	0 Onboard Sensor (Default)
		<b>1 Remote Sensor</b>
9	Temperature scale	0 °F
		<b>1 °C(Default)</b>
10	Fan Control Type	0 Auto only
		1 Constant only
		<b>2 Both(Default)</b>
18	Display Temperature Adjustment	- 2 °C (-4 °F)
		-1.5 °C (-3 °F)
		-1 °C (-2 °F)
		-0.5 °C (-1 °F)
		<b>0 °C (0 °F) (Default)</b>
		0.5 °C (1 °F)
		1 °C (2 °F)
		2 °C (4 °F)
19	Temperature Display Mode	0 Display room temperature
		1 Display set point
		<b>2 Display both (Default)</b>
20	Heating Range Stop	10-32 °C <b>Default 32 °C</b> (50-90 °F <b>Default 90 °F</b> )
21	Cooling Range Stop	10-32 °C <b>Default 10 °C</b> (50-90 °F <b>Default 50 °F</b> )
22	Keypad Lock out	<b>0 All keys are available(Default)</b>
		1 System button is locked out
		2 Fan and System button are locked out
		3 All buttons are locked
23	Remote setback enable method	0 Hotel card NO
		1 Hotel Card NC
		<b>2 Button (Default)</b>
24	Remote setback heating setpoint	Range 10-21°C Default : 18 °C (Range 50-70°F Default : 64)
25	Remote setback cooling setpoint	Range 22-32°C Default : 26 °C (Range 72-90 °F Default : 79 °F)
27	Freeze Protection	<b>0 Disabled (Default)</b>
		1 Enabled

## Troubleshooting Tips

If...	Then...
Heating system does not turn on.	<ul style="list-style-type: none"> <li>◆Set the mode to Heat by pressing the Mode button.</li> <li>◆Wait five minutes for the heating system to respond.</li> </ul>
Cooling system does not turn on.	<ul style="list-style-type: none"> <li>◆Set the mode to Cool by pressing the Mode button.</li> <li>◆Wait five minutes for the cooling system to respond.</li> </ul>
The fan doesn't work.	<ul style="list-style-type: none"> <li>◆ Check whether the Fan mode is set to Auto</li> <li>◆ Check whether the heating or cooling system works well.</li> </ul>
The Mode button doesn't work.	<ul style="list-style-type: none"> <li>◆Check whether the keypad is locked or not.</li> <li>◆ Check whether the system is working in Energy saving mode.</li> <li>◆Check whether the thermostat is off.</li> </ul>
The Fan button doesn't work.	<ul style="list-style-type: none"> <li>◆Check whether the keypad is locked or not.</li> <li>◆ Check whether the system is working in Energy saving mode.</li> <li>◆Check whether the thermostat is off.</li> </ul>
The Up or Down button doesn't work.	<ul style="list-style-type: none"> <li>◆Check whether the keypad is locked or not.</li> <li>◆ Check whether the system is working in Energy saving mode.</li> <li>◆Check whether the thermostat is off.</li> </ul>

## Dimension (mm)

