WS3 SERIES WALL MODULE
FOR USE WITH FAN COIL UNITS

- Extra large LCD and operating interface
- Temperature display selection (room temperature or set tem perature)
- Manual or automatic fan speed selection
- Anti-freeze protection
- Operating buttons lock / unlock
- Temperature range setting
- Standard 86 wall-mount installation box
- Modulating valve control
- Support remote temperature senso
- Support energy saving activation by dry contact (key card)

SCOPE OF APPLICATION

The WS3 Series wall modules are designed for application with 3- speed fan and modulating valve for indoor temperature control in fan coil system.
With temperature set, WS3 Series wall modules will provide modulating signal for valve control to regulate chilled or heated water flow to the occupant desired comfort. The WS3 Series wall modules have selectable automatic or manual control of fan speeds.
The WS3 Series wall module has a large LCD display providing real time display of room temperature or set temperature.
The WS3 Series wall modules support energy saving features through key card (dry contact) input

Technical Specification	
Operating Voltages	100VAC~240VAC 50/60HZ 24VAC50 /60HZ
Control Signal	Modulating
Load Capacity	Fan:Resistive Load 3A & Inductice Load 1A Valve: Resistive Load 2A
Protection rating	IP20
Temperature Setting Range	0~37°C
Emperature Display Range	10~50°C
Operating Temperature	0 ~ 49°C
Relative Humidity	5~ 90% RH NONCONDENSATING

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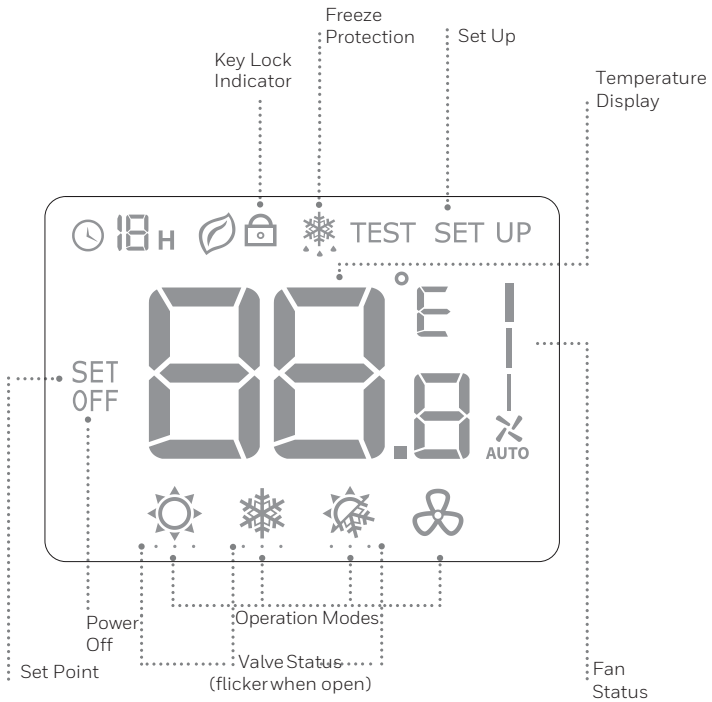
Ordering Part Numbers

Model Number	Backlight	Application	Ventilation Mode	Operating Voltages
WS3B2WB/U	White	2-pipe	Yes	100-240VAC
WS3B4WB/U	White	2/4-pipe	Yes	100-240VAC
WS3E2WB/U	White	2-pipe	Yes	24VAC
WS3E4WB/U	White	2/4-pipe	Yes	24VAC

Product Design

Outlook Design

LCD Display



Function

Valve And Fan Control
The wall module obtains room temperature through the built in sensor or remote sensor and regulate to the set temperature by controlling the valve opening.
There are three fan speeds which can be set manually and automatically. Under manual mode, fan speed is adjusted by FH, FM and FL outputs. Under automatic mode, the fan speed will depend on the difference between the room temperature and set temperature.
The fan will shut down when the valve is not operating

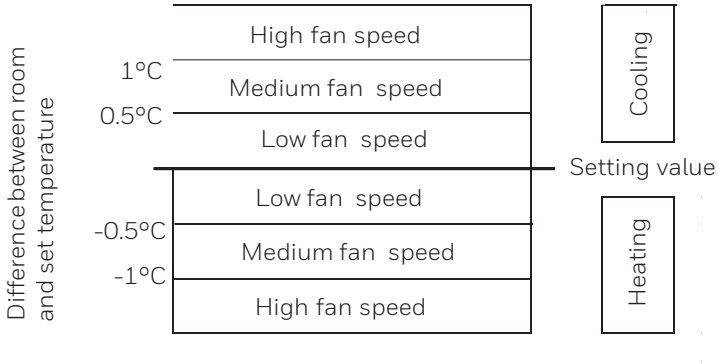


Figure 1. Automatic Fan Speed Control Algorithm

Temperature Display

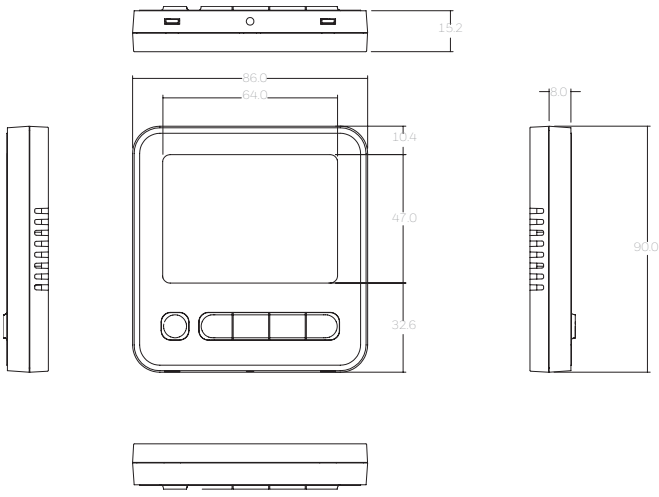
Either room temperature or set temperature can be displayed. This is to be set up during the installation and set up process of the wall module.

Backlight
The Backlight will be activated when any button is pressed and will last for 8 seconds upon the last button pressed. In setting mode, the backlight will remain turn on for 60 seconds upon the last button pressed.

Keypad Lockout
It is possible to lock or unlock the keypad while the device is not in setting mode. When in lock mode, the keypad will be inactive when pressing any button.

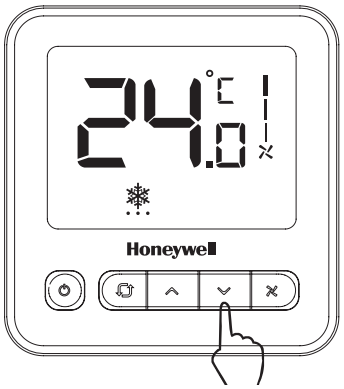
Energy Saving mode
ergy-Saving mode can be activated by pressing the power on button for 3 seconds or by the dry contact which can be connected with normally closed or normally open device.
In the Energy-Saving mode activated by the dry contact, all buttons will be locked (except the Set Up buttons).
In the Energy-Saving mode activated by the power key, pressing any button will exit the mode.
In the Energy-Saving mode, the set temperature of the room will be automatically adjus ted to the specified temperature under the mode, which means the default temperature in heating mode is 18°C and adjustable from 10°C to 21°C, while the default temperature in cooling mode is 26°C and adjustable from 22°C to 30°C.

Product Size(mm)



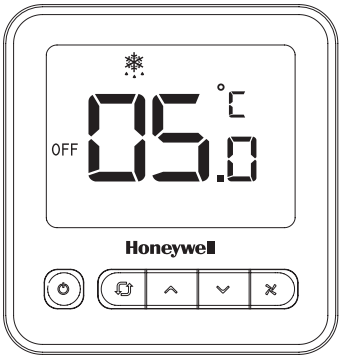
Operating Mode

Comfort Mode
In the comfort mode, press the Up or Down button to set the temperature. The comfort mode is included in cooling, heating and automatic



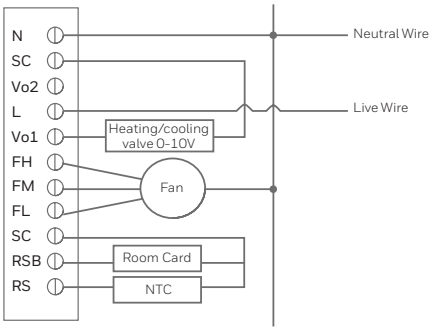
Ventilation Mode
Press the mode key to enter the ventilation mode. In ventilation mode, the fan speed will run as manually set with the valve st

Freeze Protection Mode
The anti-freeze mode is an option under the heating mode. If selected, when the room temperature falls below 6°C, the wall module (in its off status) will be activated in heating mode automatically until the room temperature reaches 8°C.



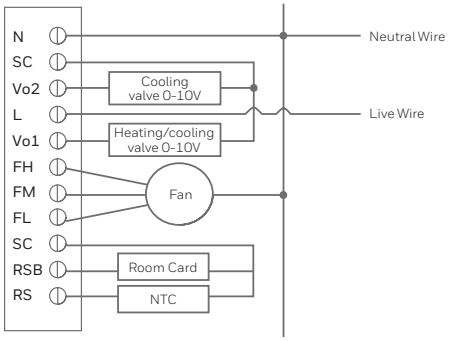
PRODUCT WIRING DIAGRAM

Part number: WS3B2WB/U
Two-Pipe Application
220Vac, motorized valve wiring diagram



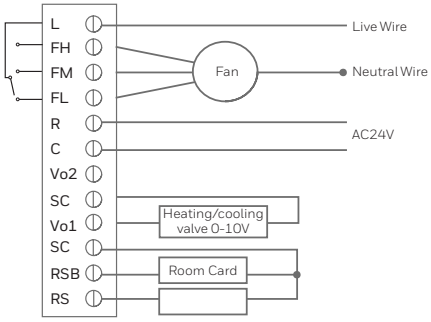
Part number: WS3B4WB/U

Four-Pipe Application
220Vac, motorized valve wiring diagram



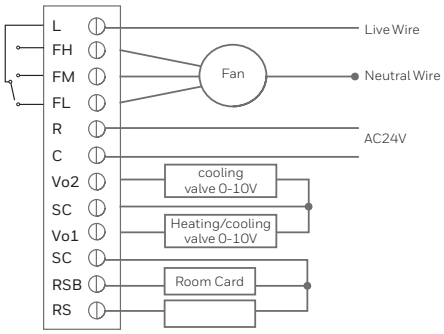
Part number: WS3E2WB/U

Two-Pipe Application
24Vac, motorized valve wiring diagram



Part number: WS3E4WB/U

Two-Pipe Application
24Vac, motorized valve wiring diagram



Terminal Designations

SYMBOL	Description
vC2	2Cooling valve is closed (four-pipe only)
vO2	Cooling valve is opened (four-pipe only)
N	Power neutral wire
vC1	Heating/cooling valve is closed
vO1	Heating/cooling valve is opened
FH	High fan speed
FM	Medium fan speed
L	Power live wire
FL	Low fan speed

Troubleshooting

Symtoms	Solution
Fails To Activate	• Pressing to set the operation mode to (heating mode). • Check whether the setting temperature is igher than the room temperature. • Check whether the valve status ind icator is flickering. • Wait for 5 minutes, check whether the heating system starts.
Fails To Activate	• Pressing to set the operating mode to (cooling mode). • C heck whether the setting temperature is lower than the room temperature. Check • whether the valve status ind icator is flickering. • Wait for 5 minutes, check whether the cooling system starts.
Not Web	• Check whether the buttons are locked. • Check whether the module is in the OFF state.
NOt Work	• Check whether the buttons are locked. • Check whether is in mode • Check whether is in the OFF state.

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T6865 SERIES
2-PIPE FAN COIL CONTROL

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WS8SERIES WALL MODULE FOR USE WITH FAN COIL UNITS

- Extra-large LCD display and operating interface
- Temperature display selection (room temperature or set temperature)
- Manual or automatic fan speed selection
- Anti-freeze protection
- Operating buttons lock / unlock
- Temperature range setting
- Standard 86 wall-mount installation box
-

SCOPE OF APPLICATION

WS8 Series wall modules are designed for indoor temperature control. It has large LCD display providing real time display of room temperature or set temperature. With temperature set, it will provide on/off control signal to the fan coil valve for temperature regulation to the occupant's desired comfort. WS8 Series wall modules provide selectable automatic or manual control of fan speeds. It also provides anti-freeze function.

Technical Specification	
Operating Voltages	100VAC-240VAC 50-60Hz
Load Capacity	Resistive – Fan unit 3A; valve 2A Inductive – Fan unit 1A; valve 0.6A
Temperature Setting Range	10~30°C 50~86°F
Emperature Display Range	-10~50°C 14~99°F
Operating Temperature	-30~60°C -22~140°F
Relative Humidity	5-90%RH, non condensating
Protection rating	IP20

Ordering Part Numbers

Model Number	Backlight	Application	Ventilation Mode	Operating Voltages
WS8B2WB/U	White	2-pipe	Yes	100-240Vac
WS8B4WB/U	White	2/4-pipe	Yes	100-240Vac

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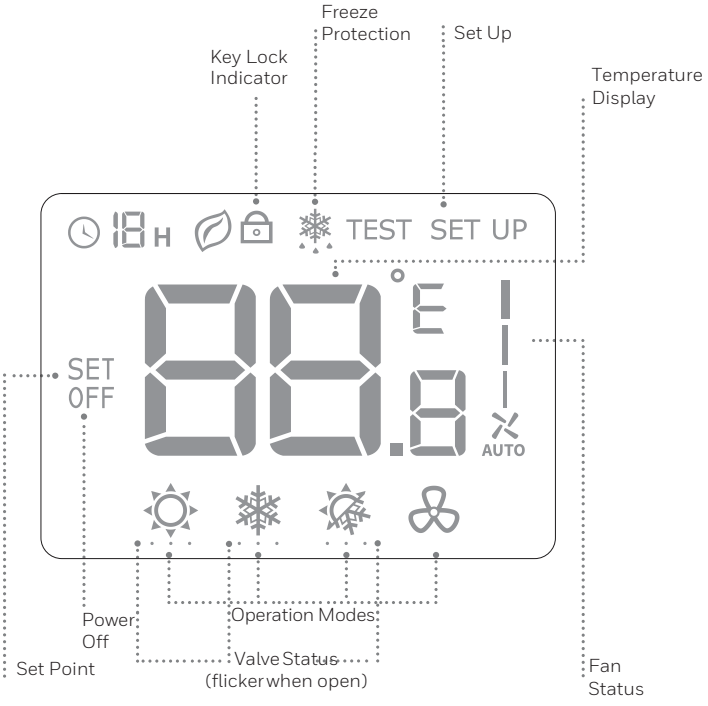
Product Design

Outlook Design

LCD Display



Function

Valve And Fan Control
The wall module reads indoor temperature through integrated temperature sensor and command valve to be opened or closed to achieve set temperature. There are three fan speeds which can be set manually or automatically. Under manual mode, fan speed is adjusted by FH, FM and FL outputs. Under automatic mode, the fan speed will depend on the difference between the room temperature and set temperature. The fan will shut down when the valve is not operating.

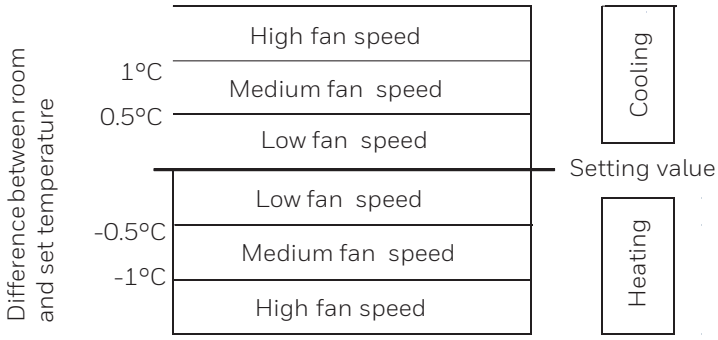


Figure 1. Automatic Fan Speed Control Algorithm

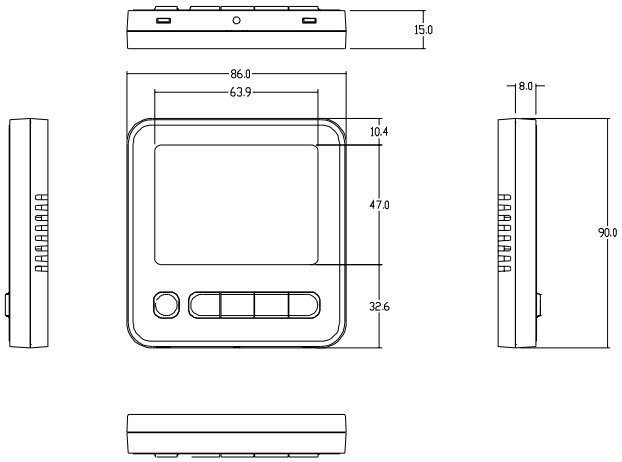
Temperature Display

Room temperature or set temperature can be set to be displayed during the installation of the wall module.

Backlight
The Backlight will be activated when any button is pressed and will last for 8 seconds upon the last button pressed. In setting mode, the backlight will remain turn on for 60 seconds upon the last button pressed.

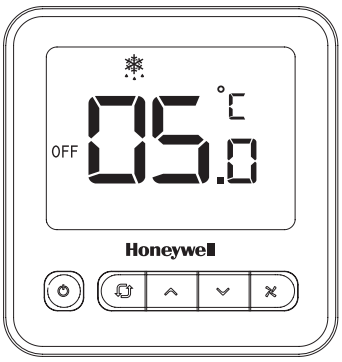
Keypad Lockout
It is possible to lock or unlock the keypad while the device is not in setting mode. When in lock mode, the keypad will be inactive when pressing any button.

Dimensions (mm)



Anti-freeze mode

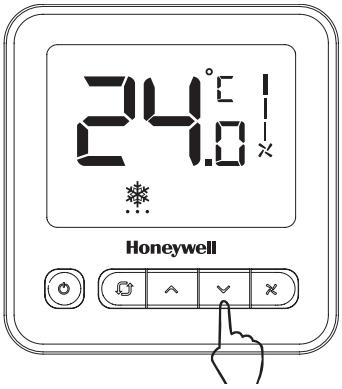
Anti-freeze mode is an option under the heating mode. When selected, if room temperature falls below 6C, the wall module (in off status) will be activated in heating mode until it reaches 8C.



Operating Mode

Comfort Mode

In the comfort mode, press the Up or Down button to set the temperature. The comfort mode is included in cooling, heating and automatic



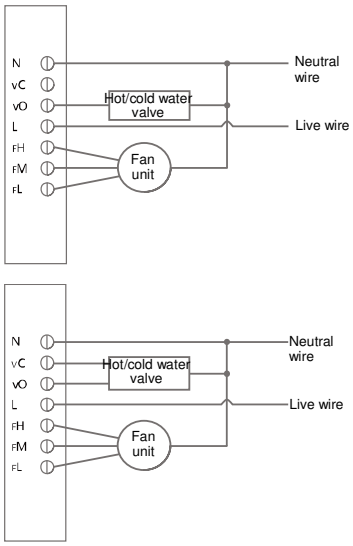
Ventilation Mode

Press the mode key to enter the ventilation mode. In ventilation mode, the fan speed will run as manually set with the valve st

PRODUCT WIRING DIAGRAM

Part number: WS3B2WB/U
Two-Pipe Application

220Vac, motorized valve wiring diagram



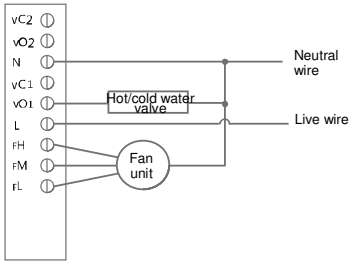
Wiring diagram 2

3-wire motorized valve

Part number: WS8B4WB/U 2-pipe Application

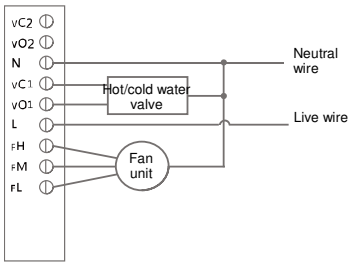
Wiring diagram 1

2-wire motorized valve



Wiring diagram 2

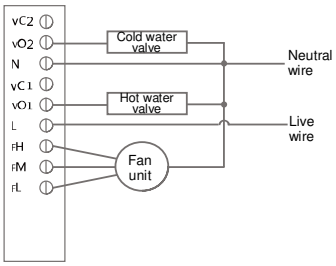
3-wire motorized valve



4-pipe Application

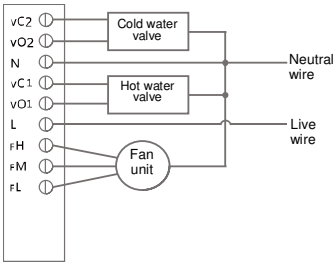
Wiring diagram 1

2-wire motorized valve



Wiring diagram 2

3-wire motorized valve



Terminal Designations

SYMBOL	Description
vC2	Cooling valve is closed (for quadruple-pipe only)
vO2	Cooling valve is open (for quadruple-pipe only)
N	Power source neutral wire
vC1	Heating/cooling valve is closed
vO1	Heating/cooling valve is open
FH	High fan speed
FM	Medium fan speed
L	Power source live wire
FL	Low fan speed

Troubleshooting

Symtoms	Solution
Fails To Activate	• Pressing to set the operation mode to (heating mode). • Check whether the setting temperature is igher than the room temperature. • Check whether the valve status ind icator is flickering. • Wait for 5 minutes, check whether the heating system starts.
Fails To Activate	• Pressing to set the operating mode to (cooling mode). • C heck whether the setting temperature is lower than the room temperature. Check • whether the valve status ind icator is flickering. • Wait for 5 minutes, check whether the cooling system starts.
Fails to work	• Check if the button is locked. • Check if the device is in OFF mode
Fails to work	• Check whether the buttons is locked. • Check whether is in mode • Check whether is in the OFF state.

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T6865 SERIES
2-PIPE FAN COIL CONTROL

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WS9 SERIES WALL MODULE
FOR USE WITH FAN COIL UNITS

PRODUCT INFORMATION

PERFORMANCE HIGHLIGHTS

- Extra large LCD and operating interface
- Temperature display selection (room temperature or set temperature)
- Manual or automatic fan speed selection
- Anti-freeze protection
- Operating buttons lock/unlock
- Temperature range setting
- Standard 86 wall-mount installation box
- Modbus communication
- Timer OFF
- Energy-saving mode (activated by remote sensor/room card)

SCOPE OF APPLICATION

The WS9 Series wall module is a temperature control device with an LCD display designed on the basis of the standard 86 wall-mount installation box. The units feature Modbus communications, monitor the actual room temperature and the set temperature in real time to control the opening/closing of the valves in the fan coil units to regulate the room temperature. The WS9 Series wall modules provide anti-freeze protection, as well as manual and automatic fan speed control.

The WS9 Series wall modules work with fan coil units and regulate the room temperature by controlling the fan speed and the opening/closing of the valves. The modules usually work with the fan coil unit control valves.

TECHNICAL PARAMETERS

Communication protocol:	RS485 Modbus
Baud rate:	4800/9600 (default)
OPERATING VOLTAGES:	100–240VAC 50/60HZ 24VAC±10% 50/60HZ
CONTROL ACCURACY:	±1°C
CONTROL SIGNAL:	ON/OFF OUTPUT
LOAD CAPACITY	
FAN:	RESISTIVE LOAD 3A INDUCTIVE LOAD 1A
VALVE:	RESISTIVE LOAD 2A INDUCTIVE LOAD 0.6A
PROTECTION RATING:	IP20
TEMPERATURE SETTING RANGE:	10–32°C
TEMPERATURE DISPLAY RANGE:	0–37°C
OPERATING TEMPERATURE:	-10 to 49°C
SHIPPING TEMPERATURE:	-30 to 60°C
RELATIVE HUMIDITY:	5–90% RH NON-CON DENSATING
REMOTE SENSOR TYPE:	NTC20K

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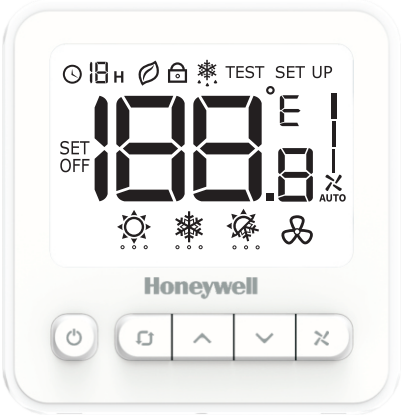
ORDERING PART NUMBERS

PART NUMBER	OPERATING VOLTAGES	APPLICATIONS	BACKLIGHT	VENTILATION MODE
WS9B2WB	100–240VAC	2-pipe	White	Yes
WS9B4WB	100–240VAC	4-pipe	White	Yes
WS9E2WB	24VAC±10%	2-pipe	White	Yes
WS9E4WB	24VAC±10%	4-pipe	White	Yes

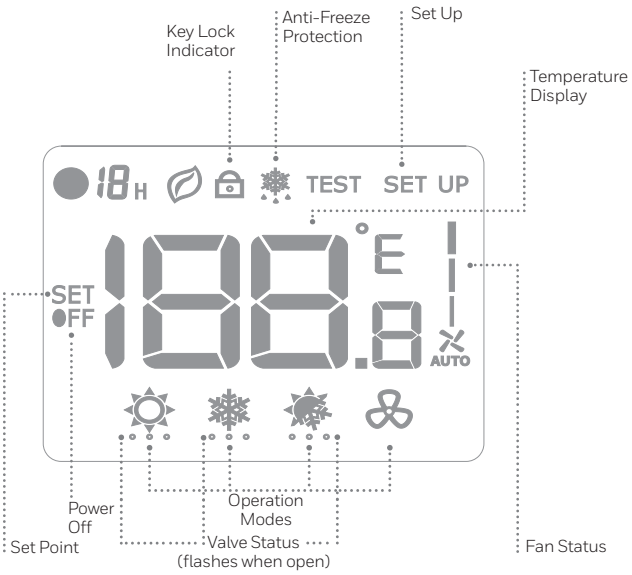
Note: The default Baud rate is 9,600 bit/s. If you require units with a Baud rate of 38,400 bit/s, please contact the marketing department.

PRODUCT DETAILS

OUTLOOK DESIGN



LCD



FUNCTION

VALVE AND FAN CONTROL

The wall module reads the room temperature from the built-in sensor and maintains the set temperature by sending on/off commands to the valve. There are three fan speeds which can be set manually or automatically. In manual mode, the fan speed is adjusted by FH, FM and FL outputs. In automatic mode , the fan speed will will be decided by the difference between the room temperature and the set value. The fan will shut down when the valve is not operating.

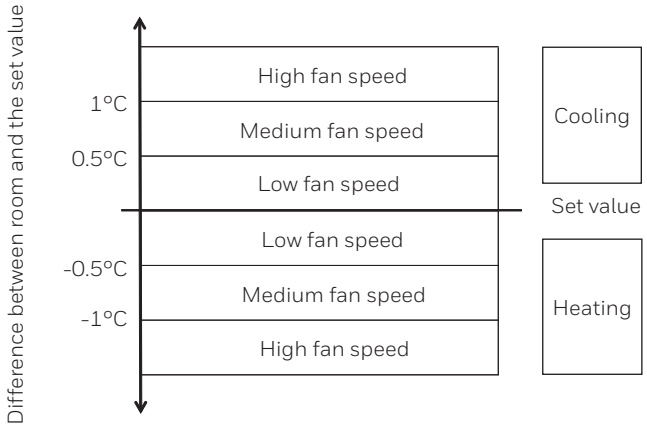


Figure 1. Automatic Fan Speed Control Algorithm

TEMPERATURE DISPLAY

Either the room temperature or the set temperature can be displayed. This can be done when installing and setting up the wall module.

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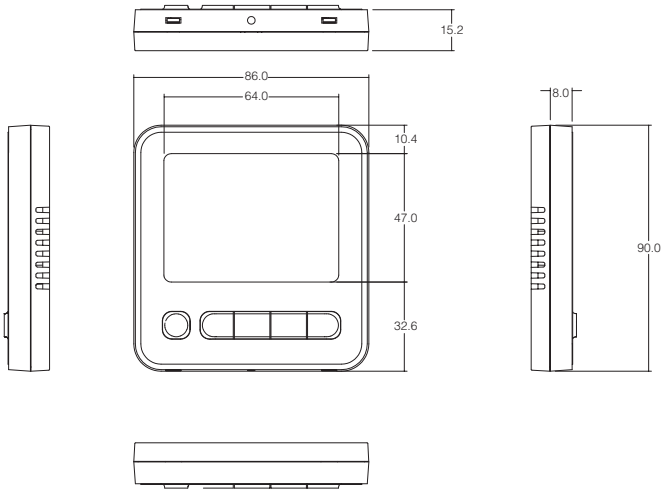
BACKLIGHT

The backlight is activated when any button is pressed. It remains on for 8 seconds after the last button pressed. In setup mode, the backlight remains on for 60 seconds after the last button pressed.

KEYPAD LOCKOUT

It is possible to lock or unlock the keypad while the device is not in setting mode. When locked out, the keypad will be not respond when any of the buttons are pressed.

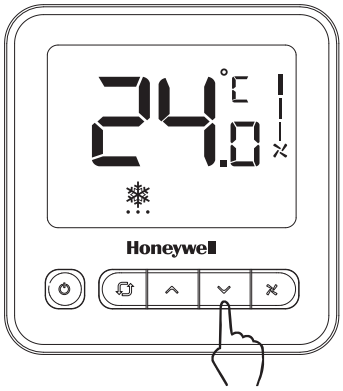
PRODUCT SIZE (mm)



OPERATION MODES

COMFORT MODE

In Comfort Mode, press the Up or Down button to set the temperature. Comfort Mode includes cooling, heating and automatic functions.

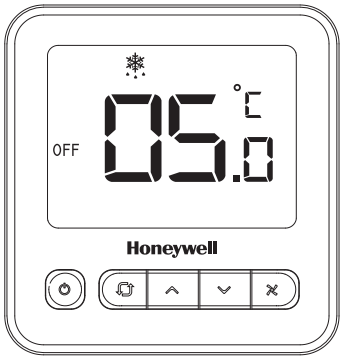


VENTILATION MODE

Press the mode key to enter Ventilation Mode.
In Ventilation Mode, the fan will run at the manually set speed, with the valves shut down.

ANTI-FREEZE MODE

Anti-Freeze Mode is an option when heating. In Anti-Freeze Mode, when the room temperature falls below 6°C, the wall module (in OFF status) will begin heating automatically until the room temperature reaches 8°C.



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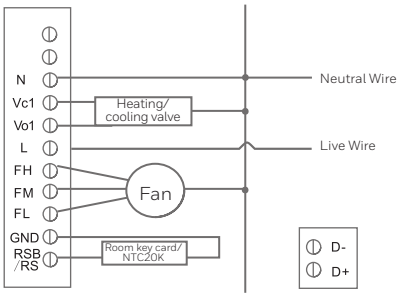
PRODUCT WIRING DIAGRAM

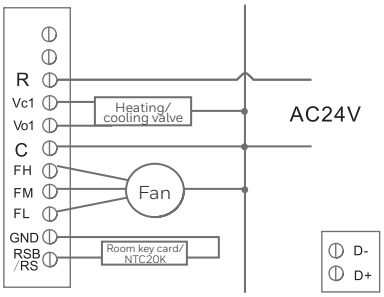
Part number: WS9B2WB/U
Two-Pipe Application

WIRING DIAGRAM
220V 2-wired
Motorized valve wiring diagram



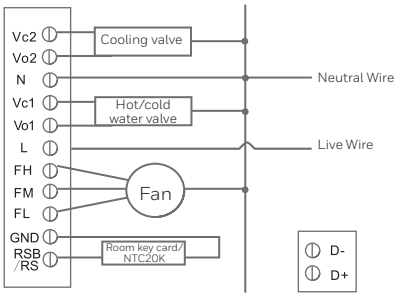
Part number: WS9E2WB/U
Two-Pipe Application

WIRING DIAGRAM
24V 2-wired
Motorized valve wiring diagram



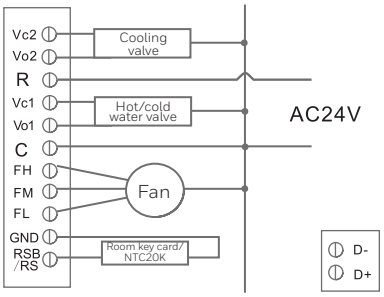
Part number: WS9B4WB/U
Four-Pipe Application

WIRING DIAGRAM
220V 4-wired
Motorized valve wiring diagram



Part number: WS9E4WB/U
Four-Pipe Application

WIRING DIAGRAM
24V 4-wired
Motorized valve wiring diagram



TERMINAL DEFINITION

SYMBOL	DESCRIPTION
vC2	Cooling valve is closed (four-pipe only)
vO2	Cooling valve is open (four-pipe only)
N	Power neutral wire
vC1	Heating/cooling valve is closed
vO1	Heating/cooling valve is open
L	Power live wire
FH	High fan speed
FM	Medium fan speed
FL	Low fan speed
GND	
RSB/RS	Room key card/NTC20K
D+	Modbus 485+
D-	Modbus 485-

TROUBLESHOOTING

SYMPTOM	SOLUTION
☼ FAILS TO ACTIVATE	• Press ↻ to set the operation mode to ☼ (Heating Mode). • Check whether the set temperature is higher than the room temperature. • Check whether the valve status indicator is flashing. • Wait for 5 minutes and check whether the heating system starts.
❄ FAILS TO ACTIVATE	• Press ↻ to set the operation mode to ❄ (Cooling Mode). • Check whether the set temperature is lower than the room temperature. • Check whether the valve status indicator is flashing. • Wait for 5 minutes and check whether the cooling system starts.
↻ DOES NOT WORK	• Check whether the buttons are locked. • Check whether the unit is OFF.
∧∨ DOES NOT WORK	• Check whether the buttons are locked. • Check whether it is in ✣ mode. • Check whether the unit is OFF.

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