

Honeywell

Installation Guide



TH8320ZW

Touch-screen Thermostat

This manual covers the TH8320ZW.

System Types

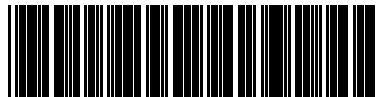
- Gas, oil, or electric heat with air conditioning
- Warm air, hot water, high efficiency furnaces, heat pumps, steam, gravity
- Heat only — including power to open and close zone valves (Series 20), and normally open zone valves
- Heat only with fan
- Cool only
- 750 mV heating systems

This thermostat contains a Lithium battery which may contain Perchlorate material. Perchlorate Material—special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate

Need Help?

For assistance with this product please visit <http://customer.honeywell.com>
or call Honeywell Customer Care toll-free at **1-800-468-1502**

© U.S. Registered Trademark.
US Patent No. 6,574,581, 6,975,958, 7,114,554,
7,346,467, 7,636,604, 7,693,582, 7,788,936,
7,845,576, and other patents pending.
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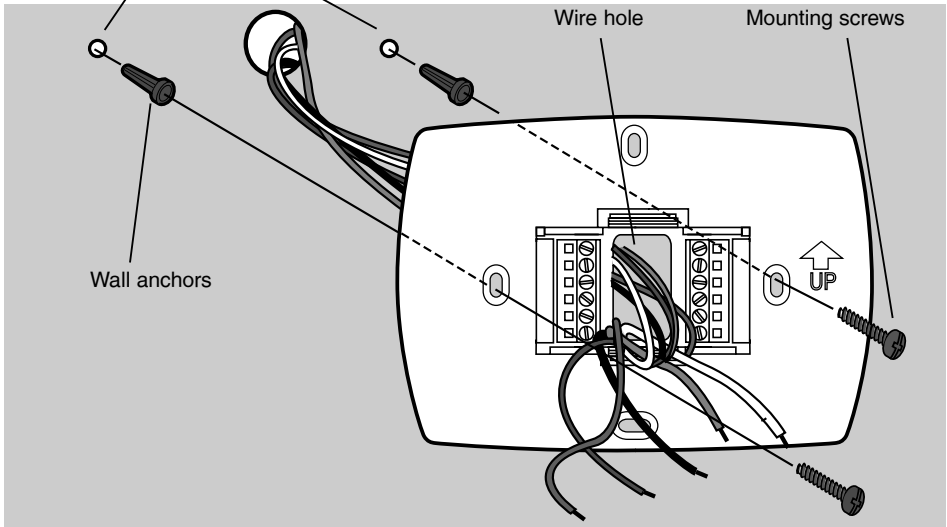
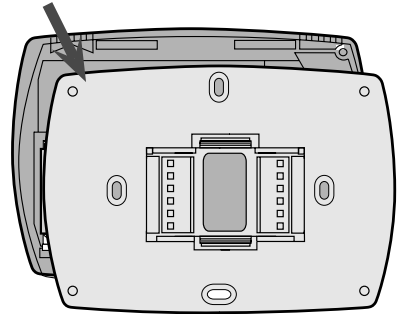
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Wallplate installation

1. Separate wallplate from thermostat.
2. Mount wallplate as shown below.

Grasp top and bottom of wallplate and pull to remove from thermostat.

Drill 3/16" holes for drywall.
Drill 7/32" holes for plaster.



Must be installed by a trained, experienced technician

- Read these instructions carefully. Failure to follow these instructions can damage the product or cause a hazardous condition.



CAUTION: ELECTRICAL HAZARD

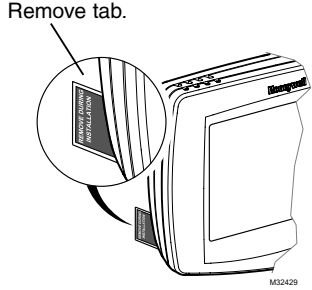
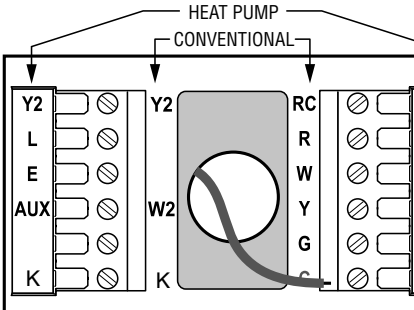
Can cause electrical shock or equipment damage. Disconnect power before beginning installation.



MERCURY NOTICE

If this product is replacing a control that contains mercury in a sealed tube, do not place the old control in the trash. Contact your local waste management authority for instructions regarding recycling and proper disposal.

Power Requirements

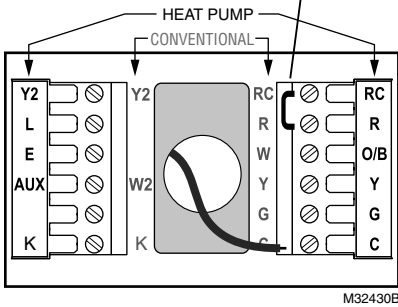


Connect the common side of the transformer to “C” terminal. This connection is mandatory.

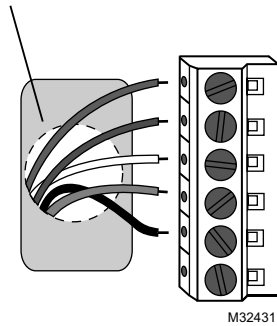
The thermostat is shipped from the factory with the coin cell installed. To keep the battery from discharging during shipment and storage, the thermostat is shipped with a plastic tab inserted in the battery holder. This tab must be removed during installation. Simply pull the plastic tab out of the battery tray. Make sure that the battery tray is fully inserted into the thermostat.

Wiring

Remove factory-installed jumper only for two-transformer systems.



Push excess wire back into the wall opening. Plug wall opening with non-flammable insulation.



Wiring

Terminal Designations

Conventional Terminal Letters:

R	Heating power. Connect to secondary side of heating system transformer.
Rc	Cooling power. Connect to secondary side of cooling system transformer.
C	Common wire from secondary side of cooling transformer (if 2 transformers).
W	1st stage heat relay.
W2	2nd stage heat relay
Y	1st stage compressor contactor.
Y2	2nd stage compressor contactor.
G	Fan relay.
K	Optional THP9045 Wiring Module Terminal [9]

Heat Pump Terminal Letters:

R	Heating power. Connect to secondary side of heating system transformer.
Rc	Cooling power. Connect to secondary side of cooling system transformer.
C	Common wire from secondary side of cooling system transformer.
Y	1st stage compressor contactor.
Y2	2nd stage compressor contactor.
Aux	Auxiliary heat relay.
G	Fan relay.
E	Emergency heat relay.
L	Heat pump reset (powered continuously when System is set to Em Heat; system monitor when set to Heat, Cool or Off).
O/B	Changeover valve for heat pumps.
K	Optional THP9045 Wiring Module Terminal [9]

Wiring guide—conventional systems

1H/1C System (1 transformer)

Rc	Power [1]
R	[R+Rc joined by jumper]
W	Heat relay
Y	Compressor contactor
G	Fan relay
C	24VAC common [3]
K	Optional THP9045 Wiring Module Terminal [9]

Heat Only System

Rc	Power [1]
R	[R+Rc joined by jumper]
W	Heat relay
C	24VAC common [3]

Heat Only System (Series 20)

Rc	[R+Rc joined by jumper]
R	Series 20 valve terminal "R" [1]
W	Series 20 valve terminal "B"
Y	Series 20 valve terminal "W"
C	24VAC common [3]

2H/2C System (1 transformer)

Y2	Cool relay 2
W2	Heat relay 2
Rc	Power [1]
R	[R+Rc joined by jumper]
W	Heat relay 1
Y	Cool relay 1
G	Fan relay
C	24VAC common [3]
K	Optional THP9045 Wiring Module Terminal [9]

See [notes] below

[1] Power supply. Provide disconnect means and overload protection as required.

[3] Connection to 24VAC common at the transformer is required.

[9] See "Optional THP9045 Wiring Module" on page 14 for more details.

Wiring

Wiring guide—heat pump systems

1H/1C Heat Pump (no auxiliary heat)

Rc	Power [1]
R	[R+Rc joined by jumper]
O/B	Changeover valve [5]
Y	Compressor relay
G	Fan relay
C	24VAC common [3]
K	Optional THP9045 Wiring Module Terminal [9]

2H/1C Heat Pump (with auxiliary heat)

L	Equipment monitor [6, 7]
E	Emergency heat relay [8]
Aux	Auxiliary heat relay (Heat 2) [8]
Rc	Power [1]
R	[R+Rc joined by jumper]
O/B	Changeover valve [5]
Y	Compressor relay
G	Fan relay
C	24VAC common [3]
K	Optional THP9045 Wiring Module Terminal [9]

2H/2C Heat Pump (no auxiliary heat)

Y2	Compressor 2 relay
Rc	Power [1]
R	[R+Rc joined by jumper]
O/B	Changeover valve [5]
Y	Compressor 1 relay
G	Fan relay
C	24VAC common [3]
K	Optional THP9045 Wiring Module Terminal [9]

1H/1C System (2 transformers)

Rc	Power (cooling transformer) [1, 2]
R	Power (heating transformer) [1, 2]
W	Heat relay
Y	Compressor contactor
G	Fan relay
C	24VAC common [3, 4]
K	Optional THP9045 Wiring Module Terminal [9]

Heat Only System With Fan

Rc	Power [1]
R	[R+Rc joined by jumper]
W	Heat relay
G	Fan relay
C	24VAC common [3]

Cool Only System

Rc	Power [1]
R	[R+Rc joined by jumper]
Y	Compressor contactor
G	Fan relay
C	24VAC common [3]
K	Optional THP9045 Wiring Module Terminal [9]

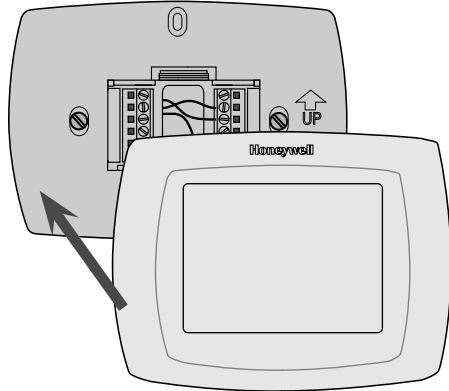
2H/2C System (2 transformers)

Y2	Cool relay 2
W2	Heat relay 2
Rc	Power (cooling transformer) [1, 2]
R	Power (heating transformer) [1, 2]
W	Heat relay 1
Y	Cool relay 1
G	Fan relay
C	24VAC common [3, 4]
K	Optional THP9045 Wiring Module Terminal [9]

See [notes] below

- [1] Power supply. Provide disconnect means and overload protection as required.
- [2] Remove jumper for 2 transformer systems.
- [3] Connection to 24VAC common at the transformer is required.
- [4] Common connection must come from cooling transformer.
- [5] **O/B** set to control as either **O** or **B** in installer setup.
- [6] If **L** terminal is used, 24VAC common (terminal **C**) must be connected.
- [7] Heat pump reset (powered continuously when thermostat is set to Em. Heat; system monitor when set to Heat, Cool, or Off).
- [8] Install field jumper between **Aux** and **E** terminals if there is no emergency heat relay.
- [9] See "Optional THP9045 Wiring Module" on page 14 for more details.

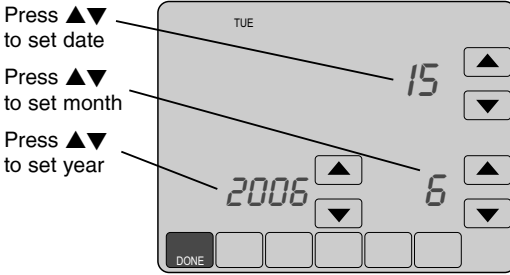
Mount thermostat



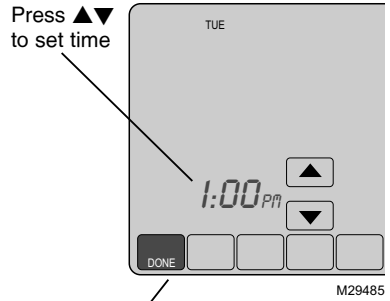
Align pins on back of thermostat with slots in wallplate, then push gently until thermostat snaps into place.

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Set date and time



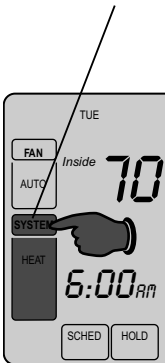
Press **DONE** to save changes.



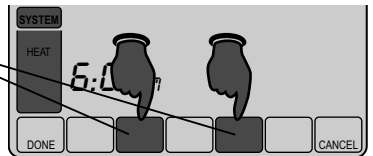
Press **DONE** to save and exit.

Installer setup

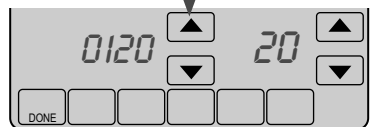
1. Press **SYSTEM**.



2. Press and hold these two buttons until the display changes.

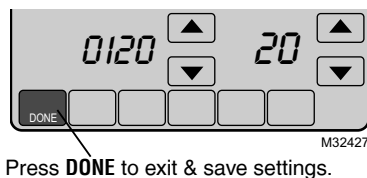
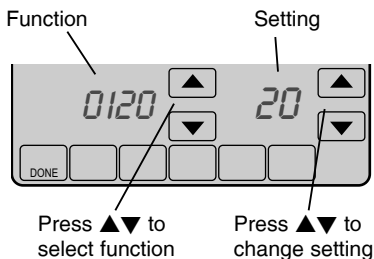


3. Change settings as required (see pages 7-9).



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Installer setup



Setup functions

Settings & Options (factory default in bold)

0120	Year (first two digits)	20 (2000-2078) 21 (2101-2178)
0130	Year (second two digits)	10 (2010) [Other options: 00-99]
0140	Month	6 [Other options: 1-12]
0150	Date	15 [Other options: 1-31]
0160	Schedule format	0 Nonprogrammable 4 Programmable
0165	Restore Energy Saving Schedule	0 No 1 Yes
0170	System type	1 1 heat/1 cool conventional 2 1 heat/1 cool heat pump (no aux. heat) 3 Heat only (2-wire systems) 4 Heat only with fan 5 Hot water Series 20 system (power to open & close zone valves/normally open zone valves) 6 Cool only 7 2 heat/1 cool heat pump (with aux. heat) 8 2 heat/2 cool multistage conventional 9 2 heat/1 cool multistage conventional 10 1 heat/2 cool multistage conventional 11 2 heat/2 cool heat pump (no aux. heat) 12 3 heat/2 cool heat pump (with aux. heat)
0180	Fan control (heating)	0 Gas/Oil heat (equipment controls heating fan) 1 Electric furnace (thermostat controls heating fan)
0190	Changeover valve (O/B terminal)	0 O terminal controls valve in cooling 1 B terminal controls valve in heating
0220	1st stage compressor cycle rate	3 Recommended for most compressors [Other options: 1, 2, 4, 5 or 6 CPH]
0230	2nd stage compressor cycle rate	3 Recommended for most compressors [Other options: 1, 2, 4, 5 or 6 CPH]
0240	1st stage heat cycle rate (CPH = cycles per hour)	5 Gas or oil furnaces of less than 90% efficiency 1 Steam or gravity systems 3 Hot water systems & furnaces of 90%+ efficiency 9 Electric furnaces [Other options: 2, 4, 6, 7, 8, 10, 11, 12 CPH]

Continued on next page

Installer setup

Setup functions

Settings & Options (factory default in bold)

0250	2nd stage heat cycle rate (CPH)	9	Electric furnaces
		1	Steam or gravity systems
		3	Hot water systems & furnaces of 90%+ efficiency
		5	Gas or oil furnaces of less than 90% efficiency [Other options: 2, 4, 6, 7, 8, 10, 11, 12 CPH]
0260	3rd stage heat cycle rate (CPH)	9	Electric furnaces
		1	Steam or gravity systems
		3	Hot water systems & furnaces of 90%+ efficiency
		5	Gas or oil furnaces of less than 90% efficiency [Other options: 2, 4, 6, 7, 8, 10, 11, 12 CPH]
0270	Emergency heat cycle rate (CPH)	9	Electric emergency heat
		1	Steam or gravity systems
		3	Hot water systems & furnaces of 90%+ efficiency
		5	Gas or oil furnaces of less than 90% efficiency [Other options: 2, 4, 6, 7, 8, 10, 11, 12 CPH]
0280	Continuous Backlight	0	Backlight on for approx. 45 seconds after keypress
		1	Backlight always on low intensity, full bright after keypress (requires 24VAC connection)
0300	Manual/Auto changeover	0	Manual changeover (Heat/Cool/Off)
		1	Automatic changeover (Heat/Cool/Auto/Off)
0310	Auto changeover deadband	3	Heat/cool temperature 3°F apart (1.5°C) [Other options: 2-9 (2°F to 9°F/1°C to 5°C)]
0320	Temperature display	0	Fahrenheit
		1	Celsius
0330	Daylight savings	1	Auto-change to daylight savings time (through 2007, and for areas that <u>do not</u> use the new 2008 DST calendar)
		0	Daylight savings time is turned off
0500	Furnace filter change reminder	0	Off
		1	10-day run time (about 1 month)
		2	30-day run time (about 3 months)
		3	60-day run time (about 6 months)
		4	90-day run time (about 9 months)
		5	120-day run time (about 1 year)
		6	180-day run time (about 1.5 years)
		7	270-day run time (about 2 years)
		8	365-day run time (about 3 years)
		9	30 calendar days
		10	60 calendar days
		11	90 calendar days
		12	120 calendar days
		13	180 calendar days
14	365 calendar days		
0502	Furnace filter for Run time	0	Counts both heat and cool
		1	Counts cool only
0520	UV Lamp Replacement Reminder	0	Disabled
		1	365 days
		2	730 days
0530	Adaptive Intelligent Recovery™	1	On
		0	Off

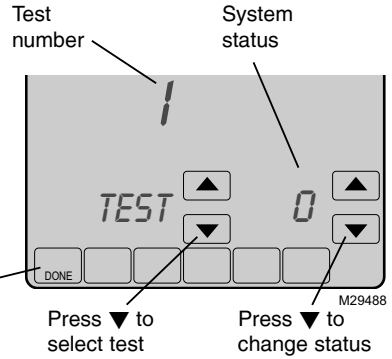
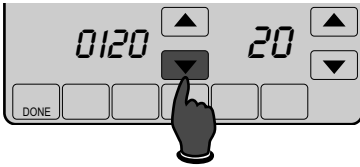
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Installer setup

Setup functions	Settings & Options (factory default in bold)
0540 Program periods	4 4 program periods (Wake, Leave, Return, Sleep) 2 2 program periods (Wake, Sleep)
0580 Compressor protection	5 5 minute compressor off time [Other options: 0, 1, 2, 3 or 4-minute off time]
0600 Heat temperature range stop	90 Max. heat temperature setting is 90°F (32°C) [Other options: 40-89°F (4°C to 32°C)]
0610 Cool temperature range stop	50 Min. cool temperature setting is 50°F (10°C) [Other options: 51-99°F (11°C to 37°C)]
0615 Energy Saving Heat Setpoint	65 65°F (18.5°C) 40-90°F (4.5°C to 32°C)
0616 Energy Saving Cooling Setpoint	78 78°F (25.5°C) 50-99°F (10°C to 37°C)
0640 Clock format	12 12-hour time (i.e., “3:30 pm”) 24 24-hour time (i.e., “15:30”)
0650 Extended fan timer (heat)	0 Off 90 Fan runs for 90 seconds after call for heat ends [Other options: 30, 60, 120]
0660 Extended fan timer (cool)	0 Off 90 Fan runs for 90 seconds after call for cooling ends [Other options: 30, 60, 120]
0670 Keypad lock	0 Keypad unlocked (fully functional) 1 Partially locked (access to temperature settings only) 2 Fully locked
0680 Heat temperature control	2 Standard temperature control (recommended) 1 Choose if room is warmer than set temperature 3 Choose if room does not reach set temperature
0690 Cool temperature control	2 Standard temperature control (recommended) 1 Choose if room is cooler than set temperature 3 Choose if room does not reach set temperature
0700 Temperature display offset	0 Thermostat displays actual room temperature [Other options: -3, -2, -1, 1, 2, 3°F offset (-1.5°C to 1.5°C)]
0710 Reset	0 No reset 1 Reset installer options, the Z-Wave Radio module, & programming schedule to factory default (only date and time settings are retained)
rf10 Z-Wave Network Connection	0 Remove 1 Add
rf20 Z-Wave Node Connection	0 Idle 1 Send Node

Installer system test

During installer setup, press ▼ repeatedly until “Test” appears.



Press **DONE** to terminate testing.

Press ▼ to select test

Press ▼ to change status

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System test

- 1 **Cooling system**
- 2 **Fan system**
- 3 **Heating system**
- 4 **Emergency heating system**

System status

- 0 Compressor and fan turn off
- 1 Compressor and fan turn on
- 2 Second stage compressor turns on
- 0 Fan turns off
- 1 Fan turns on
- 0 Heat and fan turn off
- 1 Heat turns on (fan on if Function 0170 is set for heat pump, or if Function 0180 is set to “1”)
- 2 Second stage heat turns on
- 0 Em Heat and fan turn off
- 1 Em Heat and fan turn on
- 2 Second stage heat turns on (Auxiliary heat)

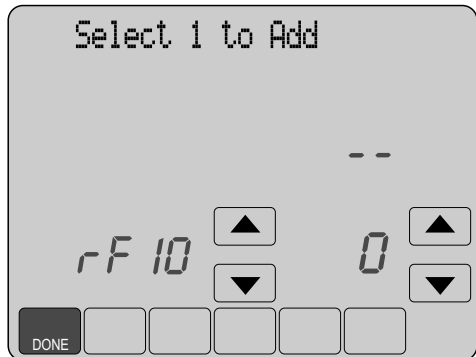


CAUTION: EQUIPMENT DAMAGE HAZARD. Compressor protection is bypassed during testing. To prevent equipment damage, avoid cycling the compressor quickly.

Z-Wave enrollment

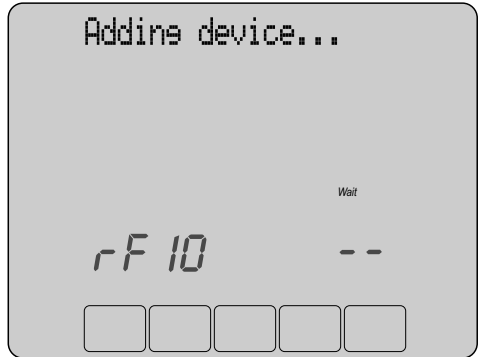
The TH8320ZW is powered by Z-Wave technology so it is compatible with Z-Wave enabled devices from other manufacturers.

1. To join a Z-Wave network, set the Z-Wave controller to INCLUDE mode.
2. Select 1 to add thermostat to Z-Wave network.



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Z-Wave enrollment



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- To remove the thermostat from the Z-Wave network select 0.



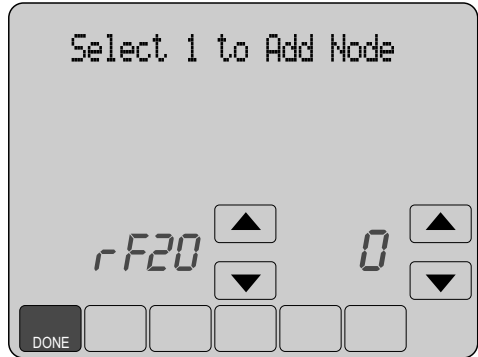
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Z-Wave enrollment

4. To share the thermostat Node information with additional Z-Wave devices select 1.



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Z-Wave messages

Add/ Remove

The thermostat can be included or excluded from the Z-Wave network. This action requires the controller set in inclusion mode. The device is included to the Z-Wave network after sending the node information to the controller. The controller is responsible for assigning the home ID and device ID to the included device. The thermostat can also act as a repeater to forward messages to other devices in the Z-Wave network. Repeating messages allows communication of devices that are not in the direct reach of Z-wave protocol.

Association

The thermostat can be associated with other devices in the system. Being associated means that the thermostat is able to send messages directly to any other device. During the association process the return route is acquired from the primary controller. The thermostat then uses this return route to access the distant node. The association is a connection between primary and secondary devices. It is used to determine the relationship of devices in the network. Both primary and secondary controllers can set up associations.

The thermostat supports one association grouping and five nodes can be associated with this grouping. Following messages are sent to associated nodes for grouping #1:

- Basic
- Multilevel Sensor
- Thermostat Mode
- Thermostat Setpoint
- Thermostat Fan Mode
- Thermostat Operating State
- Thermostat Fan State

Enter/leave Power Saving Mode

When requested from the Z-Wave controller, the thermostat adjusts its setpoint in order to decrease the power consumption of the HVAC equipment.

In addition, using an Internet gateway enables the person to control the thermostat remotely through the Internet.

Thermostat Fan Mode Change

The thermostat can send the message containing the actual fan mode position.

Thermostat Fan Mode

The other devices are able to change the fan mode of the thermostat. After the message is

Z-Wave messages

received, the fan mode is changed to the desired value (if this value is possible). For the thermostat the possible values are On, Auto and Circ.

Indoor Temperature

The thermostat sends the indoor temperature using the Multilevel Sensor command class.

Report upon GET request

Upon request (GET command) the thermostat sends the corresponding report.

Setpoint Value

The thermostat can send the message containing the actual setpoint value based on setpoint change.

Setpoint Change

Other Z-Wave devices are able to modify the setpoint of the thermostat. The absolute value can be sent by the controller and thermostat will change the setpoint to this value.

Thermostat Mode Change

The thermostat can send the message containing the actual thermostat mode based on thermostat mode change.

Thermostat Mode

Other devices (controllers) are able to change the thermostat mode change of the thermostat. After the message is received by the thermostat, the thermostat mode change is changed to desired value (if this value is possible).

Seven possible modes are available for the thermostat: Heat / Cool / Off / Auto / Energy Saving Heat / Energy Saving Cool / Em Heat. The number of allowed selections depends on the actual configuration of the thermostat. The thermostat uses "Thermostat Mode Supported" report command class to tell other devices the actually supported thermostat modes.

Thermostat Operating State

The thermostat can send the message containing the actual state of the HVAC equipment based on equipment state change.

The thermostat provides the following operating states:

- Idle - no equipment on
- Heating - heating equipment on
- Cooling - cooling equipment on
- Pending Heat - minimum off time applied to protect the heat pump compressor
- Pending Cool - minimum off time applied to protect the heat pump compressor

Unsolicited Report Message

Sending the message is possible only if the thermostat is associated with any other node. The thermostat will send the message using assigned node ID and return route.

Special functions

Auto Changeover (Setup Function 0300): When set to Auto, the thermostat automatically selects heating or cooling depending on the indoor temperature. Heat and cool settings must be at least 2 degrees apart.

Adaptive Intelligent Recovery (Setup Function 0530): Allows the thermostat to “learn” how long the furnace and air conditioner take to reach programmed temperature settings, so the temperature is reached at the scheduled time.

Compressor Protection (Setup Function 0580): Forces the compressor to wait a few minutes before restarting, to prevent damage. During this time, the message “Wait” is on the display.

Accessories & replacement parts

Please contact your distributor to order replacement parts.

Cover plate* Part Number 32003796-001

*(Use to cover marks left by old thermostats.)

Specifications

Temperature Ranges

- Heat: 40° to 90°F (4.5° to 32°C)
- Cool: 50° to 99°F (10° to 37°C)

Operating Ambient Temperature

- 0° to 120°F (-18° to 48.9°C)

Shipping Temperature

- -30° to 150°F (-34° to 66°C)

Operating Relative Humidity

- 5% to 90% (non-condensing)

Physical Dimensions

- 4-23/25" H x 6-2/5" W x 1-19/46" D
- 125 mm H x 166 mm W x 36 mm D

Electrical Ratings

Terminal	Voltage (50/60Hz)	Running Current
W Heating	20-30 Vac	0.02-1.0 A
(Powerpile)	750 mV DC	100 mA DC
W2 Heating	20-30 Vac	0.02-0.6 A
Y Cooling	20-30 Vac	0.02-1.0 A
Y2 Cooling	20-30 Vac	0.02-0.6 A
Aux Auxiliary heat	20-30 Vac	0.02-1.0 A
O/B Changeover	20-30 Vac	0.02-0.6 A
E Emergency heat	20-30 Vac	0.02-1.0 A
L Heat pump reset	20-30 Vac	0.02-0.6 A

Optional THP9045 Wiring Module

The THP9045 Wiring Module is designed to be used with applicable thermostats in 1 Heat/1 Cool retrofit applications where only 4 wires are available. The K terminal on the thermostat can be used to operate both the fan and compressor on a single wire, and the module is designed to receive the signal from the K terminal, split that signal and reroute it to operate the compressor, and/or fan for normal operation. See the THP9045 manual for further details.

Regulatory information

FCC Compliance Statement (Part 15.19) (USA only)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1) This device may not cause harmful interference, and
- 2) This device must accept any interference received, including interference that may cause undesired operation.

FCC Warning (Part 15.21) (USA only)

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement (Part 15.105 (b)) (USA only)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Section 7.1.2 of RSS-GEN

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Section 7.1.3 of RSS-GEN

This Device complies with Industry Canada License-exempt RSS standard(s). Operation is subject to the following two conditions: 1) this device may not cause interference, and 2) this device must accept any interference, including interference that may cause undesired operation of the device.

Z-Wave is a registered trademark of Zensys, Inc. and/or its subsidiaries.

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