# Installation Guide
## Model T100R

# Z-Wave Thermostat

This thermostat is compatible with most HVAC systems, including the following:

- 24VAC systems  Note: requires both the 24R and 24C (common) wires
- Standard gas/oil/electric heating systems
    - 1 stage heating and cooling
    - 2 stage heating and cooling
- Heat Pump systems:
    - 1 stage heating and cooling
    - 2 stage heating and cooling
    - 2nd or 3rd stage Auxiliary heating (heat strips)
- Do NOT use for line voltage controls (120/240VAC)

Stop! Before removing your existing thermostat, be sure to label the wires with the terminal markings on the old thermostat and record them below.

Standard HVAC System Wiring

| Terminal Marking | Meaning | Typical Wire Color | Record the old thermostat wire connections and terminal marking here |
|---|---|---|---|
| C | 24VAC Common | Blue | |
| R | 24VAC Return | Red | |
| G | Fan | Green | |
| W or W1 | Heat stage 1 | White | |
| Y or Y1 | Cool stage 1 | Yellow | |
| W2 | Heat stage 2 | Orange | |
| Y2 | Cool stage 2 | Black | |

Heat Pump HVAC System Wiring

| Terminal Marking | Meaning | Typical Wire Color | Record the old thermostat wire connections and terminal marking here |
|---|---|---|---|
| C | 24VAC Common | Blue | |
| R | 24VAC Return | Red | |
| G | Fan | Green | |
| W or W1 | Aux Heat | White | |
| Y or Y1 | Compressor stage 1 | Yellow | |
| O  (or B*) | Change Over Valve | Orange (brown*) | |
| Y2 | Compressor stage 2 | Black | |

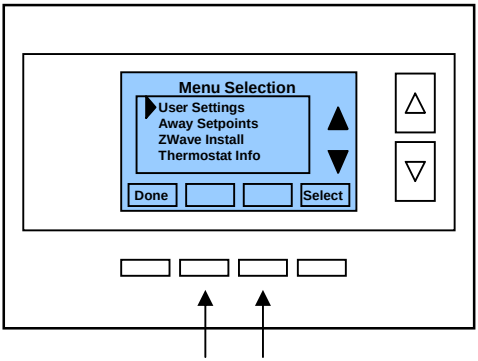
* if you have a terminal marked “B” with a brown wire attached to it, that means you have a changeover (C/O) with heating type heat pump system.  Be sure to set the change over type in the ***Installer Settings*** menu to **C/O Type:  w/Heat.**  Otherwise leave it set to **w/Cool**.

# INSTALLATION

## HVAC System Setup

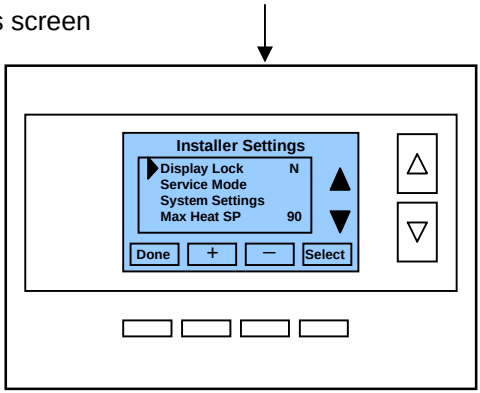
The thermostat requires that you setup the type and configuration of your HVAC system for proper operation. This is done in the *Thermostat Info* screen **Setup** button or the *Installer Settings* screen on the thermostat. The *Installer Settings* is a hidden screen. To access it, press the main menu button and when the main menu screen appears, press and hold the middle two buttons for 5 seconds.

### Thermostat Main Menu




Press and hold two middle buttons to enter the Installer Settings screen

### Installer Settings screen




### Installer Settings

Before operating the system, you must configure the thermostat for the correct HVAC system type. You will need to know the following information to correctly configure the thermostat. The HVAC setup is in the *Mechanical Settings* menu screen.

**HVAC system type:** What type HVAC system do you have? Standard or Heat pump

**For Standard systems:** Fan Type: Do you have Gas heat or Electric heat?

**For Heat Pump systems:** Change over valve (or reversing valve) type: Does your system change over with cooling operation or with heating operation? Check your existing

thermostat connects to help determine this. If the original system had an orange wire connected to an “O” terminal, then you have a “changeover with cool” system. If you have a brown wire connected to the “B” terminal, then you have a “change over with heat” system.

## Installer Settings Menu items

**Display Lock** Range: Y or N Default: N
Y = Display LOCKED
N = Display unlocked
Allows you to lock or unlock the thermostat buttons. When the buttons are locked, you can still access the main menu, but you will not be allowed to select any menu options. The Installer Settings hidden button operation is always operational, allowing you to return to this screen and turn Display Lock off.

**Service Mode**
**Test Mode** Range: Y or N Default: N
Y= Test mode on. Reduces all delays to 10 sec for quicker system testing
N= Test mode off. Normal system delays

**CAUTION: in test mode all system safety delays are shorten. Do not operate the system compressor in test mode. Disconnect Y1 or Y2 outputs if using test mode on a live system.**

**System Settings** Submenu: Sets the HVAC operational settings below

**Mechanical Settings** Submenu: Sets HVAC system type and configuration

**Type** Range: Gas/Elec or Heat pump Default: Gas/Elec
Selects HVAC type, Gas/Electric or Heat pump

**Fan Type** Range: Gas or Elec Default: Gas
Selects the Fan type if system is Gas or Electric

**C/O Type** Range: w/Cool or w/Heat Default: w/Cool
Selects the Heat Pump Changeover Valve type

**2nd Stage Heat** Range: Y or N Default: N
Enables the 2nd Stage Heat operation

**Aux Heat (HP)** Range: Y or N Default: Y
Enables the Auxiliary Heat operation. Typically the Aux Heat will be heat-strips in a Heat Pump system

**2nd Stage Cool** Range: Y or N Default: N
Enables the 2nd Stage Cool operation

**Schedule Enable Range: Y or N** Default: N
When enabled, the local thermostats scheduler function is enabled.

**Recovery enable Range: Y or N** Default: N
For Heat Pump Systems. Intelligent setback recovery is an automatic advance start of heating to allow the system to be at setpoint by the schedule time, without the use of Aux heating.

**Delta Settings** : The Delta T Setting is the delta, or difference between, the setpoint and current temp for determining when a heat or cool call comes on. The “delta” is the number of degrees away from setpoint.

**H/C Delta** Range: 3 - 15 degrees. Default: 3F (1C)
Sets the minimum separation between heating and cooling setpoints. Attempts to lower the cooling below the heating setpoint by this amount will PUSH the heating setpoint down to maintain this separation. Same for setting the heating setpoint above the cooling setpoint, it will PUSH the cooling setpoint up to maintain this separation.

**Heating Delta Stage 1 ON** Range: 1 to 8 degrees Default: 1
Sets the delta from setpoint that stage 1 heating starts.

**Heating Delta Stage 1 OFF** Range: 0 to 8 degrees Default: 0
Sets the delta from setpoint that stage 1 heating stops. Stage 1 turns off at setpoint + Delta Stage 1.

**Heating Delta Stage 2 ON** Range: 1 to 8 degrees Default: 2
Sets the delta from setpoint that stage 2 heating starts.

**Heating Delta Stage 2 OFF** Range: 0 to 8 degrees Default: 0
Sets the delta from setpoint that stage 2 heating stops. Stage 2 turns off at setpoint + Delta Stage 2.

**Heating Delta Stage 3 ON** Range: 1 to 8 degrees Default: 3
Sets the delta from setpoint that stage 3 heating starts.

**Heating Delta Stage 3 OFF** Range: 0 to 8 degrees Default: 0
Sets the delta from setpoint that stage 3 heating stops. Stage 3 turns off at setpoint + Delta Stage 3.

**Cooling Delta Stage 1 ON** Range: 1 to 8 degrees Default: 1
Sets the delta from setpoint that stage 1 cooling starts.

**Cooling Delta Stage 1 OFF** Range: 0 to 8 degrees Default: 0
Sets the delta from setpoint that stage 1 Cooling stops. Stage 1 turns off at setpoint - Delta Stage 1

**Cooling Delta Stage 2 ON** Range: 1 to 8 degrees Default: 2
Sets the delta from setpoint that stage 2 cooling starts.

**Cooling Delta Stage 2 OFF** Range: 0 to 8 degrees Default: 0
Sets the delta from setpoint that stage 2 Cooling stops. Stage 2 turns off at setpoint -Delta Stage 2.

**Max Heat SP** Range: 40F to 109F (4C-43C) Default: 90F (32C)
Sets the maximum heating setpoint value. Will not ramp or accept setpoints higher that this maximum.

**Min Cool SP** Range: 44F to 113F (6C-45C) Default: 60F (15C)
Sets the minimum cooling setpoint value. Will not ramp or accept setpoints lower than this minimum.

**Minimum Run Time (MRT)** Range: 1- 9 Minutes Default: 3
Sets the minimum run time before a heating/cooling cycle can turn off.
Sets heating/cooling cycle time. Prevents rapid cycling.

**Minimum Off Time (MOT)** Range: 5-9 Minutes Default: 5

Sets the minimum off time before another heating/cooling cycle can begin. Provides compressor short cycle protection.

**Temp Response** Range: 1-6 Default: 2

Adjust the temperature sensor sensitivity. Sets how fast the sensor responds to change.

**Fan Cycler**

The fan cycler function cycles the HVAC system fan for an ON period followed by an Off period continuously. Used to provide minimum air ventilation requirements. When the Fan ON time is set to a value greater than 0, an additional "Cycler" FAN mode is present when pressing the FAN button.

| | | |
|---|---|---|
| **Fan ON Time** | Range: 0-120 minutes | Default: 0 (=OFF) |
| **Fan OFF Time** | Range: 10-120 minutes | Default: 10 |

**Restore Defaults** Range: Yes, No Default: No

Restores all settings to factory defaults.

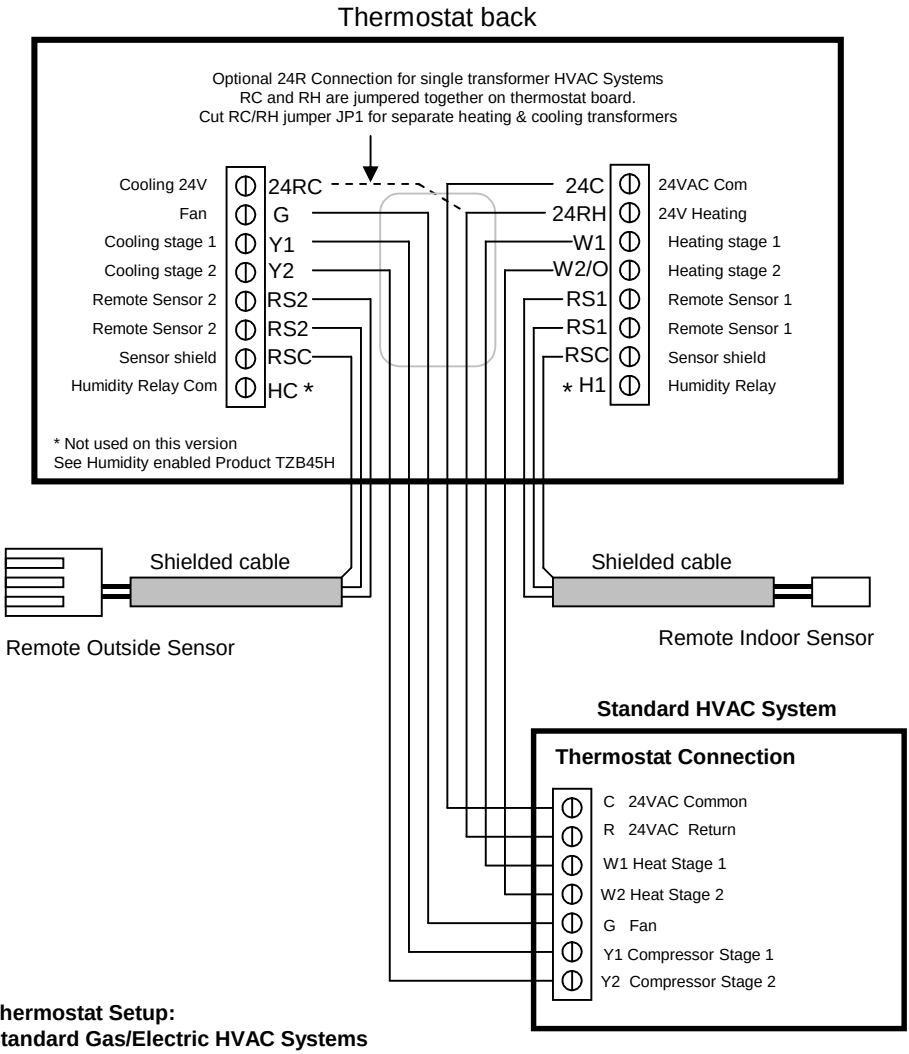
Press Yes to restore defaults,
Press No to exit and not restore defaults

**Relay Status** Display the status (on/off) of the thermostat output relays

## Installer Settings Summary

| Setting | Range | Default | |
|---|---|---|---|
| Display Lock | Y or N | N | Locks out front buttons |
| Service Mode Submenu | | | |
| Test Mode | Y or N | N | Reduces delays for testing |
| System Settings Submenu | | | |
| Mechanical Settings Submenu | | | |
| Sys Type | Std or HP | Std | |
| Fan Type | Gas or Elec | Gas | |
| C/O Type | w/Heat or w/Cool | w/Cool | |
| 2nd Stage Heat | Y or N | N | |
| Aux Heat | Y or N | Y | |
| 2nd Stage Cool | Y or N | N | |
| H/C Delta | 3 – 15 deg | 3 | |
| Heat Delta Stage 1 On | 1 – 8 | 1 | |
| Heat Delta Stage 1 Off | 0 – 8 | 0 | |
| Heat Delta Stage 2 On | 1 – 8 | 2 | |
| Heat Delta Stage 2 Off | 0 – 8 | 0 | |
| Heat Delta Stage 3 On | 1 – 8 | 3 | |
| Heat Delta Stage 3 Off | 0 – 8 | 0 | |
| Cool Delta Stage 1 On | 1 – 8 | 1 | |
| Cool Delta Stage 1 Off | 0 – 8 | 0 | |
| Cool Delta Stage 2 On | 1 – 8 | 2 | |
| Cool Delta Stage 2 Off | 0 – 8 | 0 | |
| Max Heat SP | 40-109F (4-42C) | 90F | |
| Min Cool SP | 44-113F (6-45C) | 60F | |
| Min Run Time | 1-9 min | 3 | |
| Min Off Time | 1-9 min | 5 | |
| Temp Response | 1-6 | 2 | |
| Fan Cycler Submenu | | | |
| Fan Cycler ON time | 0 – 120 min | 0 | 0 = Fan Cycler OFF |
| Fan Cycler Off Time | 10 – 120 min | 10 | |
| Restore Defaults | Yes or No | No | Exit = no |
| | | | |
| **USER SETTINGS** | | | |
| Filter Service Submenu | | | |
| Service Interval | Disabled, 100-4000 hrs | 300 | |
| Maint Service Submenu | | | |
| Maint Interval | Disabled, 100-4000 hrs | 3000 | |
| Screen Timeout (to minimized screen) | 0, 20-120 sec | 0 | 0 = off , will not timeout |
| F/C Mode | F or C | F | |
| Sensor Calibration Submenu | Internal -7 to +7 | 0 | |
| Backlite/Display Submenu | | | |
| Backlight Timeout | 0, 20-120 | 0 | 0 = backlite off |
| Backlight On Brightness | 0-100% | 100% | |
| Backlight Off Brightness | 0-100% | 0% | |
| Contrast | 0-20 | 14 | |
| | | | |
| | | | |

# Standard Gas/Electric HVAC System Wiring




## Thermostat Setup:
## Standard Gas/Electric HVAC Systems

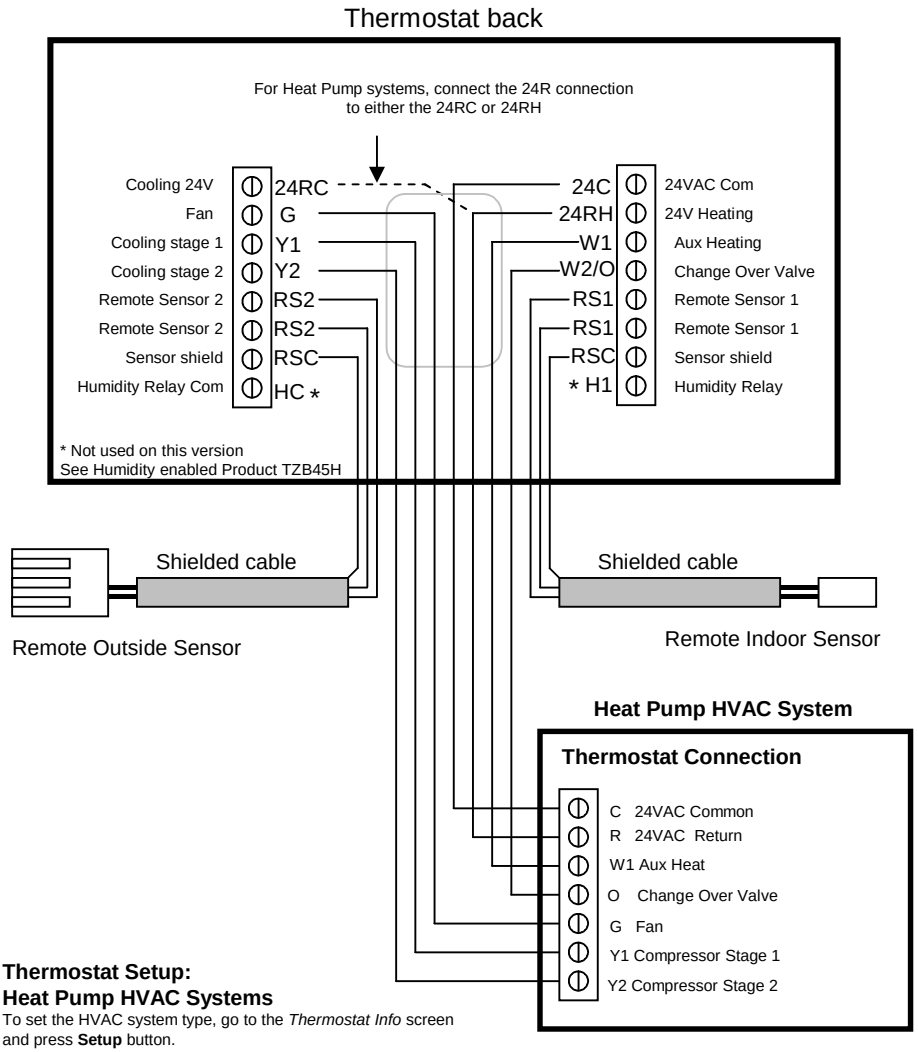
To set the HVAC system type, go to the *Thermostat Info* screen and press **Setup** button

1. **Type.** Set the HVAC System Type: set to **Gas/Elec**
2. **Fan Type**. Set the HVAC Fan Type:
   Set to **Gas** for typical gas furnace (fan is controlled by the furnace)
   Set to **Elec** for electric heat (fan call with heat call)
3. **C/O type**. Not used for standard systems. Ignore this setting.
4. **2nd Stage Heat**. Enable second stage heating outputs
   If you have a single stage heating system, leave this set to **N**
   If you have a 2 stage heating system, set to **Y** to enable.
5. **Aux Heat (HP).** Not used for standard systems. Ignore this setting
6. **2nd Stage Cool**. Enable second stage cooling outputs
   If you have a single stage cooling system, leave this set to **N**.
   If you have a two stage cooling system, set to **Y** to enable.

Default Setup:
- Gas/Elec
- Gas Heat
- 1 Stage heating
- 1 Stage cooling

No setup required for this configuration

# Heat Pump HVAC System Wiring




**Thermostat Setup:**
**Heat Pump HVAC Systems**

To set the HVAC system type, go to the *Thermostat Info* screen and press **Setup** button.

1. **Type.** Set the HVAC System Type: set to **Heat Pump**
2. **Fan Type**. Automatically set for heat pump systems. Ignore this setting.
3. **C/O type**. Change Over (reversing) Valve Type. Heat pumps change from heating to cooling by reversing operation. You must configure the thermostat's changeover valve setting to work correctly with your HVAC system. Check your system information to be sure and note the color of original thermostat wire and the terminal it was connected to. No matter what the old stat connection was (O or B), connect the wire to the thermostats W2/O terminal. The setting of the C/O Type will set the correct system operation.
   For change over with cool systems (Orange wire, O terminal): set **C/O type** to w/cool (most common and default setting)
   For change over with heat systems (Brown wire, B terminal): set **C/O type** to w/heat
4. **2nd Stage Heat**. Enable second stage heating outputs
   If you have a single stage heating system, leave this set to **N**
   If you have a 2 stage heating system, set to **Y** to enable.
5. **Aux Heat (HP).** If you have auxiliary heat strips, set this to **Y** to enable.
6. **2nd Stage Cool**. Enable second stage cooling outputs
   If you have a single stage cooling system, leave this set to **N**.
   If you have a two stage cooling system, set to **Y** to enable.

***Note!*** If you get heating when you expected cooling, change the C/O type to the opposite setting.