Alarm.com Smart Thermostat - Wiring and Configuration Guide

For an HVAC system to be compatible with the Smart Thermostat, the system must be wired to an existing compatible thermostat. This guide assists with wiring and configuration when swapping an existing thermostat with the ADC-T3000 or ADC-T2000.

Finding previous thermostat model and wiring

Before replacing a thermostat with a Smart Thermostat, take pictures of the existing thermostat's wiring. Search for the previous thermostat's manual, and look for descriptions of what their terminals are for. Usually, their descriptions will be the same as the Smart Thermostat. If a terminal that does not seem to have an equivalent on the Smart Thermostat, see Non-Standard Wiring.

Note: Some thermostats have two sets of labels, one for conventional/normal systems and one for heat pumps. Verify what type of system is being worked on.

While thermostat wire colors are not standardized, and cannot always be relied upon, they can provide clues to what the wire is for. While a conventional system could have an orange wire in its W terminal, it's far more common for the O/B wire of a Heat Pump system to be orange, and W or Aux to be white.

Another indication of wire purpose is verifying which terminals have jumpers. No conventional system has stage of heat and a stage of cooling to run at the same time, but auxiliary heat and emergency terminals are frequently connected with jumpers.

Wiring

Standard wires (ADC-T3000)

RC	Power from transformer on right side (C, Y, Y2, G, O/B)
RH	Power from transformer to terminals on left side (W, W2, Z)
W	First stage of heat on normal/conventional systems, first stage of auxiliary heat on heat pump systems.
W2	Second stage of heat on normal/conventional systems, second stage of auxiliary heat on heat pump systems.

C	Power from transformer that powers the thermostat itself, often referred to as the "common wire".
Y	First stage of air conditioning on normal/conventional systems, first stage of heat pump on heat pump systems.
Y2	Second stage of air conditioning on normal/conventional systems, second stage of heat pump on heat pump systems.
G	Fan control
O	Controls the reversing valve on heat pump systems. Also used in O/B zoning on conventional systems, though this is uncommon.
B	Controls the reversing valve on heat pump systems. Also used in O/B zoning on conventional systems, though this is uncommon.
Z1	Configurable terminal. Currently, this is used as a third stage of heat or auxiliary heat, humidification/ dehumidification, or ventilation.
Z2	Second configurable terminal. Currently, this is used as a third stage of heat or auxiliary heat, humidification/ dehumidification, or ventilation.

Standard wires (ADC-T2000)

RC	Power from transformer on right side (C, Y, Y2, G, O/B)
RH	Power from transformer to terminals on left side (W, W2, Z)
W	First stage of heat on normal/conventional systems, first stage of auxiliary heat on heat pump systems.
W2	Second stage of heat on normal/conventional systems, second stage of auxiliary heat on heat pump systems.
C	Power from transformer that powers the thermostat itself, often referred to as the "common wire".
Y	First stage of air conditioning on normal/conventional systems, first stage of heat pump on heat pump systems.

Y2	Second stage of air conditioning on normal/conventional systems, second stage of heat pump on heat pump systems.
G	Fan control
O/B	Controls the reversing valve on heat pump systems. Also used in o/b zoning and master-slave systems, though this is uncommon.
Z	Configurable terminal. Currently, this is used as a third stage of heat or auxiliary heat, and for O/B zoning.

Non-standard wires

If unsure of what a wiring terminal does, checking the thermostat's manual will likely help determine what the terminal does. Here are some common non-standard wires we have seen on old thermostats and what to do with them:

L	Outdoor Reset > Tape off; or Service indicator (or other) light > Tape off
S1	Outdoor Sensor > Tape off
S2	Other Sensor > Tape off
dh	Dehumidfier > See Smart Humidity Control - Quick Start Guide.
T	Outdoor reset or thermistor sensor (Used on GE/Trane/ American Standard and some Carrier Products) > Tape off
E	Emergency Heat > Could be the aux wire, unless there's already a wire in the aux terminal (W, W1, W2, AUX, etc.), in which case tape off E. If the old thermostat has a jumper between E and any of the W terminals, that E terminal is there to turn off the heat pump when E is energized. The Alarm.com thermostat's emergency mode does this automatically, so don't worry about jumping anything.
W/E	1st stage heat or AUX > Connect to W
U1	Honeywell configurable terminal.
K	Functions as a combination of Smart Thermostat terminals Y and G.

GND	Normally paired with 'ODT' below. This is for a 2 wire outdoor temp sensor > Tape off
ODT	Normally paired with 'GND' above. This is for a 2 wire outdoor temp sensor > Tape off
Data	These are proprietary wiring setups that are not compatible with Alarm.com. An HVAC professional would have to rewire the system to work with our thermostat. Often they'll appear as terminals A through D.
Lettered (A, B, C, D, etc.)	Usually the same as the data wire description above.
Numbered (1, 2, 3, 4, etc.)	Usually the same as the data wire description above.

Gas or electric wires

Important: Review the table below before wiring an Alarm.com Smart Thermostat to a gas or electric system.

Gas or Electric								
Old Thermostat	Wire Terminals							
All Brands	C X B	R RC	RH	W W1	W2	G F	Y Y1	Y2
Connect to Alarm.com Smart Thermostat:	C	RC (Use Thermostat jumper with R)	RH	W1	W2	G	Y1	Y2

Heat pump wires

Important: Review the table and notes below before wiring an Alarm.com Smart Thermostat to a heat pump.

*If there is an E or X2 as well as a W, W1, W2, or AUX, DO NOT USE THE E OR X2 (TAPE OFF)
**If you have a 'V' or a 'VR' connect that wire to RC on the new thermostat and the 'R' to O/B
^ Start with the lowest open terminal (i.e., if there is a W2 but no W1, plug W2 into W)

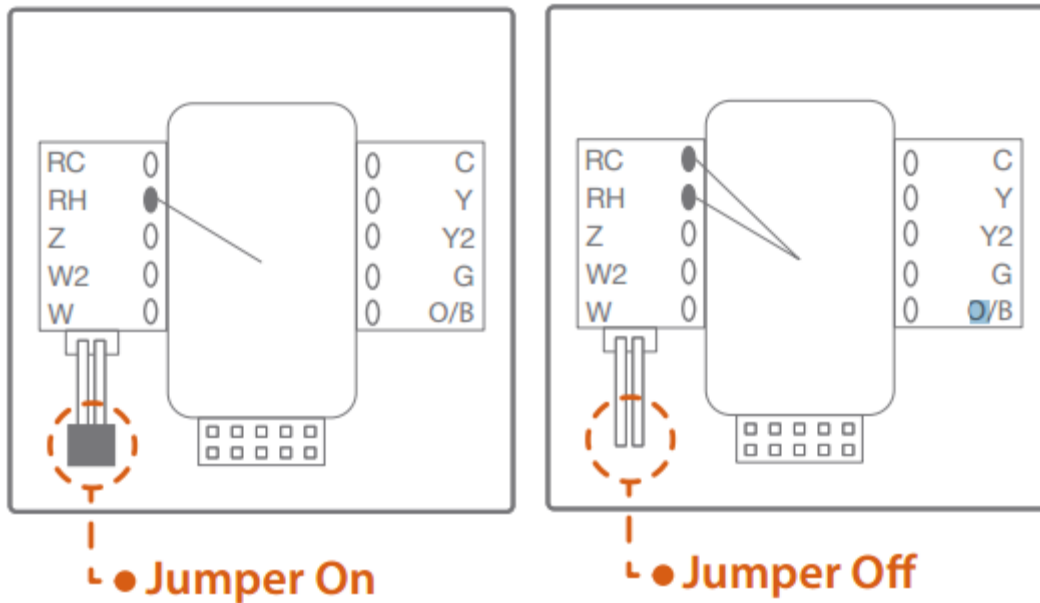| Heat Pump								
Old Thermostat	**Wire Terminals**							
Trane/American Standard/York	COM C B	R RC	RH	*E *X2	W W1 W2 AUX	O	G	Y Y1	Y2
Other Brands	COM C X	R RC	RH	*E *X2	W W1 W2 AUX	O B	G F	Y Y1	Y2
Lennox	C X X2	R RC **VR **V	RH	*E	W W1 W2 AUX	O **R	G F	Y Y1	Y2
Connect to Alarm.com Smart Thermostat:	C	RC	RH	*W	^W ^W2	O/B	G	Y	Y2

R, RH, and RC wires

ADC-T3000

If there is an R wire, connect it to either RC or RH and make the appropriate selection when asked which terminal is in use. This will create a digital jumper to the other R terminal that is not selected. If there are both RC and RH wires, a jumper is not needed. Select that both RC and RH are present during configuration.

Example: Selecting RC only creates a digital jumper to RH.

ADC-T2000

If there is an R wire, connect it to RH. If there are both RH and RC wires, remove the black jumper in the lower-left corner of the backplate terminal board with needlenose pliers, and attach wires to both RH and RC terminals.

RC 0 | 0 C
RH ● | 0 Y
Z 0 | 0 Y2
W2 0 | 0 G
W 0 | 0 O/B

Jumper On

RC ● | 0 C
RH ● | 0 Y
Z 0 | 0 Y2
W2 0 | 0 G
W 0 | 0 O/B

Jumper Off

Handling uncommon configurations

What if the W or W1 terminal and Y terminal are jumped?

Some less intelligent stats share (or jump) the W1 (or W) and Y terminal for running heat pumps. Our stat knows to use Y when configured for a heat pump, so we have an extra terminal (W1) for running another stage of aux heat. Always start your first stage of aux heat in W1 and use W2 and W3 if you've got a system with extra Aux stages.

What if there is a W2 but not a W1?

Move the wire to W.

What if there is both an O and a B wire?

First, check the old thermostat's manual. If unsure which wire the old thermostat used, the configuration should be set to O. On some Trane thermostats, the B terminal is not for a reversing valve, but actually its common wire terminal. If it is not a Trane, it is not a heat pump and there are multiple zones, it could be a master/slave setup. If this is the case, see the section on O/B Zoning below in Non-standard systems.

What do I do if W2 and Y2 terminals are jumpered together on a heat pump?

Our thermostat is smart enough to not need those terminals jumpered to operate a heat pump correctly, just translate the wires as normal and don't worry about the jumper.

The old thermostat is a Totaline with a BOW terminal.

The BOW1/2 terminals can function as O or B (reversing valve) if the system is a heat pump, or as W (heat stage) if it's a conventional system. Confirm with the dealer or customer what type of HVAC system they have.

Can the thermostat be powered by a standalone transformer (separate from the HVAC system)?

This is an option. However, it would require the system is either heat-only or cool-only, as the transformer would wire into one of the R terminals (Rc or Rh depending on what is open) and the C terminal with the jumper removed.

Heat Type and Configuration

Electric

Electric is used for heating systems that require the thermostat to turn on the fan.

Examples: Forced Air Heating Systems, generally any electric based heating sources, most Heat Pumps. Note that on heat pump, the fan will always run while the heat pump stage is engaged, and the heat type configuration only applies to the stages of auxiliary heat.

Fossil

Fossil (gas, oil) is used for heating systems that don't require the thermostat to turn on the fan. This is a little misleading, since this is not strictly for fossil fuel powered systems, but the terminology is industry standard.

Examples: Hydronic heating (radiators), baseboard heating, Dual Fuel heat pumps, any furnace that turns on the fan without relying on the thermostat (common with fossil fuel furnaces that have a heating delay built in so that the system doesn't blow around cold air at first).

Radiant floor heating

Radiant floor heating should only be used with professionally installed radiant floor heating system.

If the customer has a compatible radiant floor heating system, select *Fossil (gas, oil)* as the heat type in the Installer Settings for the Smart Thermostat.

Non-standard systems

- Dual Fuel systems: Heat Pump with a fossil fuel furnace auxiliary. This is still a "Heat Pump" HVAC type, with a "Fossil" heat type.
- Heat Only/Cool Only Systems: These are "Normal" HVAC types, even though they don't fit the typical heat and cool system description.
- O/B zoning systems (with ADC-T3000): These are "Normal" HVAC types. Connect the O wire to the O terminal and the B wire to the B terminal when using an ADC-T3000. These wires will be detected during automatic wiring detection, and the thermostat will automatically be configured for O/B zoning.

- O/B zoning systems (with ADC-T2000): These are "Normal" HVAC types. To access to the O/B terminal configuration option on the installer tab, the Z-terminal must be set to **O/B Zoning**. The O/B terminal will be automatically configured to O, and the Z terminal will be automatically configured to B.

Choosing a local thermostat configuration

Caution: The thermostat should be set to off mode before configuration changes are made. Confirm that the desired changes have been made before testing.

By default, the local configuration is set to a Normal, Electric system with two stages of heat and two stages of cool.

Important: If manually configured, the thermostat runs with this functionality without communication with Alarm.com.

ADC-T3000

The ADC-T3000 can automatically detect wires during the installation process. For more information, see Alarm.com Smart Thermostat (ADC-T3000) - Installation Guide.

ADC-T2000

Firmware versions 1.30+

1. Verify the Smart Thermostat is in off mode. To do this, press ⋯ on the thermostat until only the temperature display is lit. Neither the heat nor the cool icons should be lit on the thermostat.

2. Press and hold ⌃ for five seconds until the display shows a version number.

3. Press and hold ⌃ again for five seconds until the display shows the HVAC setup.

4. Press ⌃ or ⌄ to select the thermostat configuration from the following table.

5. Press ⋯ to confirm the selection.

Note: Once the configuration has been selected locally, it is recommended to run the **Get Current Values** command on the Partner Portal or MobileTech app. All other configurations for the Smart Thermostat must be performed using the Partner Portal or MobileTech app. For more information about these processes, see Enroll and configure the Alarm.com Smart Thermostat.

Firmware versions below 1.30

- C2H2 - Default setting to be used for all normal systems. This defaults heat type to electric, so the fan comes on automatically with the heat unless overriden by pushing configurations from the backend.
- P2A2 - To be used for all Heat Pump applications. This defaults the O/B terminal to O, so when this needs to be set to B, configurations must be pushed down from the backend.

Note: Regardless of firmware version, there is no way to manually configure the thermostat to O/B zoning. This must be done using the Partner Portal or MobileTech.

Z Terminal Wiring and Configuration

ADC-T3000

Z1 and Z2 are the "dynamic" terminals. If an auxiliary wire has been connected, please specify the function it will perform.

- W3: Third stage of heat or aux
- H: Humidifier
- DH: Dehumidifier
- V: Ventilation (HRV, VRV, air baffle)

To configure the Z Terminals:

1. Press the — button.
2. Select **SETTINGS**.
3. Select **INSTALLER**.
4. Select **CONTINUE**.
5. Select **Z1** or **Z2**.
6. Select the desired configuration type.

ADC-T2000

Firmware versions 1.30+

In addition to functioning as a W3, the Z terminal can be used for O/B Zoning. This allows for control of certain "Master/Accessory" zoning scenarios. Only the Master needs to use this configuration, and in this case, the O/B terminal is used as an O, and is activated when the Master allows for Cooling. The Z terminal is used as a B, and is activated when the Master allows for Heating. The Accessory thermostat is wired completely normally, and does not have Z terminal wire at all. The zone control board takes care of properly controlling the duct work and system interplay.

Firmware versions below 1.30

On pre-1.30 PIC FW, the only purpose Z can serve is functioning as a W3 terminal. On a normal system, this is a third stage of heat, on a heat pump it is a third stage of auxiliary heat.

Understanding HVAC System delays

There are a number of System Delays built into the Smart Thermostats to preserve the life of HVAC systems.

Compressor delay

The Compressor delay is the amount of time the compressor will remain off before turning back on again.

- Reason: Prevent excessive cycling which is dangerous to the HVAC system
- Default: 5 min
- Affects all AC and Heat Pumps

Staging delay

The Staging delay is the amount of time that a system will run before kicking on the next stage of heat/cool/pump if necessary to reach the setpoint.

- Reason: Balance energy efficiency with comfort
- Default: 10 min
- Affects all multi-stage systems
- Can be overridden by Heating/Cooling Differential

Fan Purge time

The Fan Purge time is the amount of time the fan will continue to run once the setpoint has been satisfied.

- Reason: HVAC system safety
- Default: 1 min
- Affects all systems with a fan

Heating/Cooling differential

The Heating/Cooling differential is the temperature differential necessary to kick on the next stage of heat/cool/pump prior to Staging Delay.

- Reason: Maximize comfort
- Default: 3 degrees
- Affects all multi-stage systems

Fan Circulation/Duty Cycle

The Fan Circulation/Duty Cycle are settings that govern the *Circulate* fan mode.

- Reason: Increase air quality without constantly running the fan
- Defaults: Fan Circulation Period - 10 min; Fan Duty Cycle - 25%

- Affects all systems with a fan

Additional resources

 Enroll in the following training courses today:

- [Alarm.com Smart Thermostat Installation 201](#)
- [Product Training – Smart Thermostat Installation](#)
- [Smart Thermostat Features & Benefits 101](#)

For more information on accessing Academy Training, see [How can I access the Training Center on the Partner Portal?](#)