Alarm.com Smart Thermostat - Troubleshooting Guide

Understanding reported behavior

Common problems with heating:

- Heat does not turn on
- Heat turns on, but the system is not heating
- Heat pump is not running
- AUX heat is not working
- Problem with the fan

Common problems with cooling:

- Air Conditioner is not turning on
- The A/C turns on, but the system is not cooling
- Heat pump is not running
- Problem with the fan

Common problem with fan:

- The fan is not running
- The fan is turning on too early
- The fan is turning on when the heat comes on
- The fan is not turning on when heat comes on

Identifying system type

Is it a Heat Pump or Conventional (Normal) system?

A heat pump is a standalone unit typically located outside of a home or on the rooftop of a business. Locations may vary. What makes a heat pump unique is that it can provide both heat and cool based on the position of its reversing valve. What makes it difficult to identify is that it looks exactly like an AC unit. Below are some ways to determine if the

outdoor unit is a Heat Pump or an AC Unit.

Expected wires for a Conventional (Normal) system

- R or RH/RC - relay to close electrical circuit to control board
- Y and Y2 - operates condenser for air conditioning stages
- W, W2 - Heating stages
- G - operates fan

Conventional (normal) systems include: furnace, boiler, steam or hot water radiator, radiant in floor heat.

Expected wires for a heat pump

- R or RH/RC - relay to close electrical circuit to control board
- Y and Y2 - operates condenser of Heat Pump systems
- W, W2, Aux, E - auxiliary and emergency heating stages
- O or B - One required to operate reversing valve (most commonly O). The largest manufacturer of Heat pumps with B wire is Ruud and Rheem, and they are rarely used.
- G - operates fan

Heat pump systems include: air source, geothermal.

Pre-troubleshooting steps

1. Check the thermostat locally to eliminate communication between the thermostat and panel or the panel and Alarm.com as variables.
2. Check that the mode is correct and that the target temperature (setpoint) is above the ambient temperature when testing heating and below the ambient temperature when testing cool. Verify that the difference between the temperatures is greater than the swing setting by at least one degree.
3. If the system had worked previously, determine what has changed.
4. Verify the thermostat and HVAC system have power.

Basic troubleshooting

Thermostat does not appear on the Customer Website or app

If the Alarm.com Smart Thermostat does not appear on the Customer Website or app after enrolling it, see Enrolled Z-Wave device is not on the Customer Website or app.

Listening for clicks

When the Alarm.com Smart Thermostat turns a component on or off, a relay closes or opens, and an audible click can be heard. The click can be faint or hard to hear in loud environments.

To properly listen for clicks, change the thermostat to *off* mode. Change the thermostat to *heat* or *cool* mode and increase (for heat) or decrease (for cool) the target temperature until it is well above (for heat) or below (for cool) the ambient temperature of the room. Verify that you are far enough past that the swing setting is not a factor (i.e., swing is set to .5-degrees by default, so go at least three degrees above the ambient temperature). Shortly after, you should hear the clicks.

A thermostat clicking means that it is opening or closing relays. If you turn the thermostat to heat or cool modes and set the temperature high or low enough (respectively), and it clicks, it means it is trying to activate the heating or cooling system.

Compressor delays

Compressor delays will affect when components are energized, so the clicks won't happen until the delay has expired. Any call for cool, and calls for heat with a heat pump system, will be subject to a compressor delay (default five minutes).

Important: After turning the system to off mode, don't change it to cool or heat mode until the full five-minute delay has expired.

Jumper

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.

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

If there are both RC and RH wires, a jumper is not needed. Select that both RC and RH are present during configuration.

ADC-T2000

The thermostat jumper is located on the bottom left side of the terminal board. This jumper bridges a connection between RH and RC. RC is used to power the right side terminals (C, Y, Y2, G, O/B) and RH powers the left terminals (Z, W2, W). Most systems today only have a single R (power) wire, so we plug the R wire into either RH or RC and bridge the connection between them, so that all terminals will receive power from this single wire. Without the jumper, only the RH or RC side will receive power. Some older systems have two different R wires - one for RC, and on for RH. In this case, we need to remove the jumper so that the left and right terminals are independently powered.

Caution: Failing to remove the jumper will short out the system after some period of time.

Available wires	Where to put them	Remove jumper?
R	Either RC or RH	No
RC	Either RC or RH	No
RH	Either RC or RH	No
RC and RH	RC > RC, RH > RH	Yes

Possible ADC-T3000 failure scenarios

Heating or cooling does not turn on when the set point is above or below the room temperature

To prevent damaging the compressor, the thermostat inserts a delay when cycling the compressor. If the system should be on and it's not, then change the set point to be 2 degrees beyond the current set point and wait 5 minutes to see if the system turns on. If not, contact a local HVAC professional.

Heat pump is "cooling when it should be heating" or "heating when it should be cooling"

Some heat pumps use the O terminal, while others use the B terminal. If there is a wire in the O terminal of the ADC-T3000, move it to the B terminal. If the B terminal in the ADC-T3000 has been wired, move it to the O terminal. Contact a local HVAC professional for further help with this issue.

Thermostat buttons flash amber and screen does not illuminate

The batteries in the thermostat are extremely low. Install fresh batteries immediately.

Automatic wiring detection feature is not correctly identifying wires

If the automatic wire detection feature is not correctly identifying the wires, please proceed to bypass the automatic wire detection.

1. On the wiring detection screen, select **NO**. The thermostat will display Check Wiring and Reinstall.
2. Select **BYPASS** and continue through the remaining prompts to manually configure the thermostat.

   Note: You will need to know the system type, heat type, and number of stages to complete the installation.

Thermostat displays "Safety Delay" on the screen

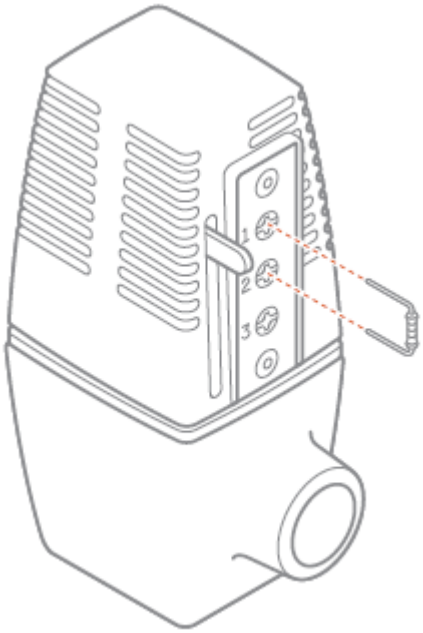
The thermostat will protect your compressor from short cycling and display "Safety Delay" with a timer on the screen. When the timer expires, the thermostat will automatically resume heating or cooling.

Thermostat screen does not continuously light up

The thermostat display cannot be lit up indefinitely. See Enabling motion-detected wake to have the screen light up when a person walks up to the thermostat.

Thermostat displays "Power Resistor Required" on the screen

The customer's system requires the included power resistor to be installed on the zone valves on their HVAC equipment. See the diagram below for where to install the power resistor between terminals 1 and 2 on Taco valves.



Thermostat displays "Isolation relay required" on the screen

The HVAC system requires an isolation relay due to overcurrent on the W and Y terminals. Alarm.com recommends the Emerson 90 380 Fan Relay 24 Volt Coil, 1. Contact an HVAC technician if unsure of how to install an insolation relay.

The thermostat is not acting as a repeater in the Z-Wave network despite having a common wire

The thermostat is only a repeater when it has been added into the network while it has a common wire connected and powered. If the thermostat receives a common wire after being added to the network, the thermostat will need to be removed and re-added to enable the repeater functionality.

Possible ADC-T2000 failure scenarios

The A/C is not working

The R wire could be plugged into RH, and the jumper was removed, so Y and G are not getting power.

The heat is not working

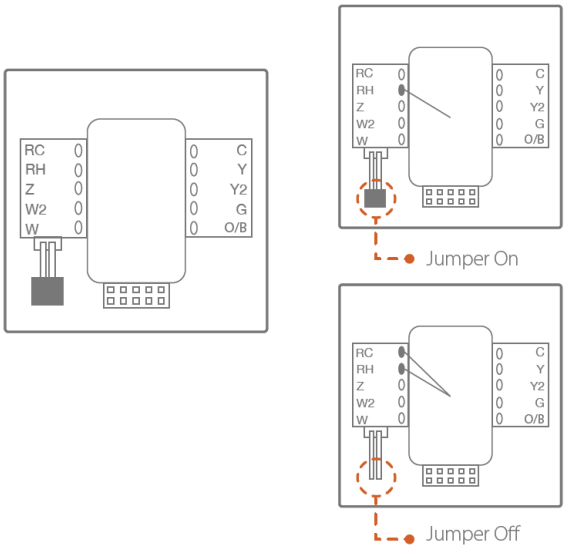
The R wire could be plugged into RC, and the jumper was removed, so W is not getting power.

The heat works, but I cannot control the fan

The R wire could be plugged into RH, and the jumper was removed, so G is not getting power.

Both RC and RH were present, and the jumper was not removed, now the system does not work

An HVAC technician will be needed to fix the blown fuse or transformer.



Advanced troubleshooting

If heat is not working:

1. Verify the setpoint and ambient temp at the thermostat (remembering the swing setting).
2. Understand the system. Where should the heat be coming from (forced air vents, or radiators/floor/baseboard)?
3. Check the jumper. For more information, see Jumper.
4. Check connections. For more information, see Wiring troubleshooting.
5. Verify you are not in *Compressor Delay* timeout.
6. If it is a forced air system, try setting the thermostat's Heat Type to *Electric* to Verify the fan is getting switched on.
7. Listen for clicks. For more information, see Listening for clicks.

Is it cooling or just running the fan without heating or cooling?

Type of system	If cooling:	If running the fan without heat or cool:
Heat pumps	1. Verify the configuration of the reversing valve (O/B terminal), as it could be backward (heating when calling for cool, cooling when calling for heat). 2. Verify the Y wire is not loose/ wrong terminal.	1. Verify that the Y terminal is activated/wired properly with a digital multi-meter, listening to clicks, or manual test. 2. Check for no power to the terminal because of a missing jumper on the ADC-T2000.
Normal systems	1. Verify the HVAC system configuration, as it could be improperly set up as a Heat Pump, which would call the Y terminal, thus cooling instead of heating. 2. Verify the W wire is not loose/ wrong terminal.	1. Verify that the W terminal is activated/wired properly with a digital multi-meter, listening to clicks. 2. Check for no power to the terminal because of a missing jumper on the ADC-T2000.

If auxiliary heat is not working:

1. Verify the setpoint and ambient temp at the thermostat (remembering the swing setting).
2. Verify that this system has an Auxiliary heating stage.
3. Verify thermostat configuration, especially for heat mode, and verify it is configured for auxiliary heat.
4. Check the jumper. For more information, see Jumper.
5. Check W-wire connection, especially that it is not wired in W2 (i.e., that is for second stage of Aux, if present).
6. Verify you are not in a staging delay and that you have exceeded the heating differential
7. Listen for clicks. For more information, see Listening for clicks.

If cool is not working:

1. Verify the setpoint and ambient temp at the thermostat (remembering the swing setting).
2. Verify that this is not a Heat Only system.
3. Check the jumper. For more information, see Jumper.
4. Check connections. For more information, see Wiring troubleshooting.
5. Verify you are not in a *Compressor Delay* timeout.

6. Listen for clicks. For more information, see Listening for clicks.

Is it heating or just running the fan without heating or cooling?

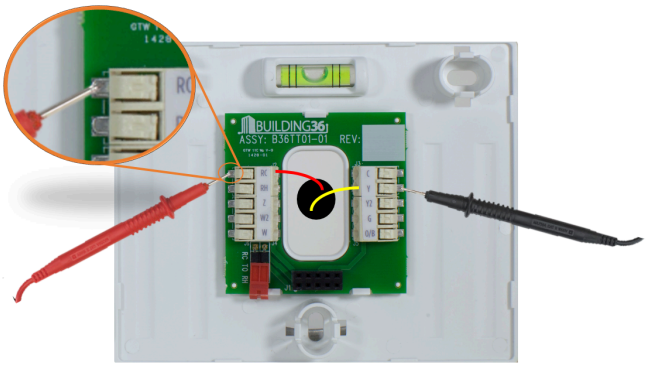
Type of system	If heating:	If running the fan without heat or cool:
Heat pumps	1. Verify the configuration of the reversing valve (O/B terminal), as it could be backward (heating when calling for cool, cooling when calling for heat). 2. Verify the Y wire is not loose/ wrong terminal.	1. Verify that the Y terminal is activated/wired properly with a digital multi-meter, listening to clicks, or manual test. 2. Check for no power to the terminal because of a missing jumper on the ADC-T2000.
Normal systems	1. Verify that the Y terminal is activated/wired properly with a digital multi-meter, listening to clicks. 2. Check for no power to the terminal because of a missing jumper on the ADC-T2000.	

Wiring troubleshooting

Basic wire checking

1. Verify the wires are stripped to the correct length and are inserted correctly, making good contact with the terminal. If a multi-meter is available, skip to Verify wiring with a multi-meter below.
2. Tug on the affected wire to see if it is loose in its terminal.
3. Try removing the wire, check if it is stripped correctly and straight, then re-insert.
4. Sometimes is easier to depress the terminal release button lightly as you insert the wire.
5. If the issue is not resolved check out, continue to the section below on checking wires with a multi-meter.

Verify wiring with a multi-meter on an ADC-T2000



When checking the C, Y, Y2, G, and O/B wires:

1. Using the red probe, touch the metal pad behind RC (or RH if that's the connected terminal).
2. Using the black probe, touch the metal pad behind the corresponding terminal you are testing (see Y in the diagram above).
3. Verify that you are getting between 18-30 VAC on the multi-meter.
4. If you are getting 0 V, the RC wire is likely not connected, or the thermostat wires are not active.
5. If you are getting something slightly greater than 0 V, the terminal you are testing is not connected properly.
6. Remove the problem wire, re-strip, re-insert, and test again.

When checking the Z, W2, and W wires:

1. Using the red probe, touch the metal pad behind RH.
2. Using the black probe, touch the metal pad behind the corresponding terminal you are testing (see Y in the diagram above).
3. Verify that you are getting between 18-30 VAC on the multi-meter.
    - If you are getting 0 V, the RH wire is likely not connected, or the thermostat wires are not active.
    - If you are getting something slightly greater than 0 V, the terminal you are testing is not connected properly.
    - Remove the problem wire, re-strip, re-insert, and test again.

Fan troubleshooting

Basic troubleshooting

1. Verify the setpoint and ambient temp at the thermostat (remembering the swing setting).
2. Verify that this is not a Heat Only system and that it does have a fan.
3. Check thermostat configuration, especially for heat mode.

4. Check the jumper. For more information, see Jumper.
5. Check G-wire connection.
6. Verify you are not in a *Compressor Delay* timeout or downtime Fan Duty Cycle.
7. Listen for clicks. For more information, see Listening for clicks.

The fan is turning on too early

This is likely due to an improper thermostat configuration. Some heating systems will turn on the fan without the help of the thermostat, and build in a delay to allow the furnace to heat up.

Fan turns on when the heat turns on but is not supposed to do so

This is also due to improper configuration. Switch the heat type configuration from fossil to electric.

The fan is not turning on with my heat when expected

1. Verify that the system is forced air and not radiator heating (even though the A/C is forced air) to see if the fan should even be running during heat. Determine if the site has radiators or baseboard heating.
2. Please verify that the G wire is connected properly.
3. Check the jumper. For more information, see Jumper.
4. Verify the setting Heat Type is set to *Electric* and verify the setting is synced correctly with an updated timestamp.