



## Skyport Troubleshooting

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## Firewall Requirements for Wi-Fi Skyport Connected Thermostats

- Skyport connected thermostats will constantly try to connect to the Skyport Cloud Services servers, if you successfully configured a Wi-Fi connection and the Skyport option is enabled. An unsuccessful connection attempt will cause your thermostat to schedule a retry a few minutes later.

Please use the following check points to eliminate any network issues preventing your thermostat connecting to the Skyport Cloud Services servers.

1. Check your internet service status by connecting your Wi-Fi enabled device (smart phone, tablet or a laptop) to your Wi-Fi access point and navigate to a known website like google.com using a browser.
2. Check the Skyport Cloud Services status by connecting your Wi-Fi enabled device (smart phone, tablet or a laptop) to your Wi-Fi access point and navigate to Skyport Cloud Services website from venstar.com using a browser.
3. For corporate networks, check your router's firewall settings. Certain firewall settings can prevent the thermostat from connecting to the Skyport Cloud Services servers. Skyport connected thermostats require that outbound TCP ports 9001, 9002, and 41414 not blocked to allow successful secure connection to the Skyport Cloud Services servers.

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## Sorry, an error has occurred

If you get the following message while updating your ColorTouch Assistant:

*"This application cannot be installed because this installer has been mis-configured. Please contact the application author for assistance."*

- Please go to the [ColorTouch Desktop App](#) web page and perform a manual install of the newest version.

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## Thermostat stuck at connecting to SkyPort

If your thermostat is successfully connected Wi-Fi but is stuck at Connecting to SkyPort

- Check to ensure that Wi-Fi status is connected

How to verify Wi-Fi connection

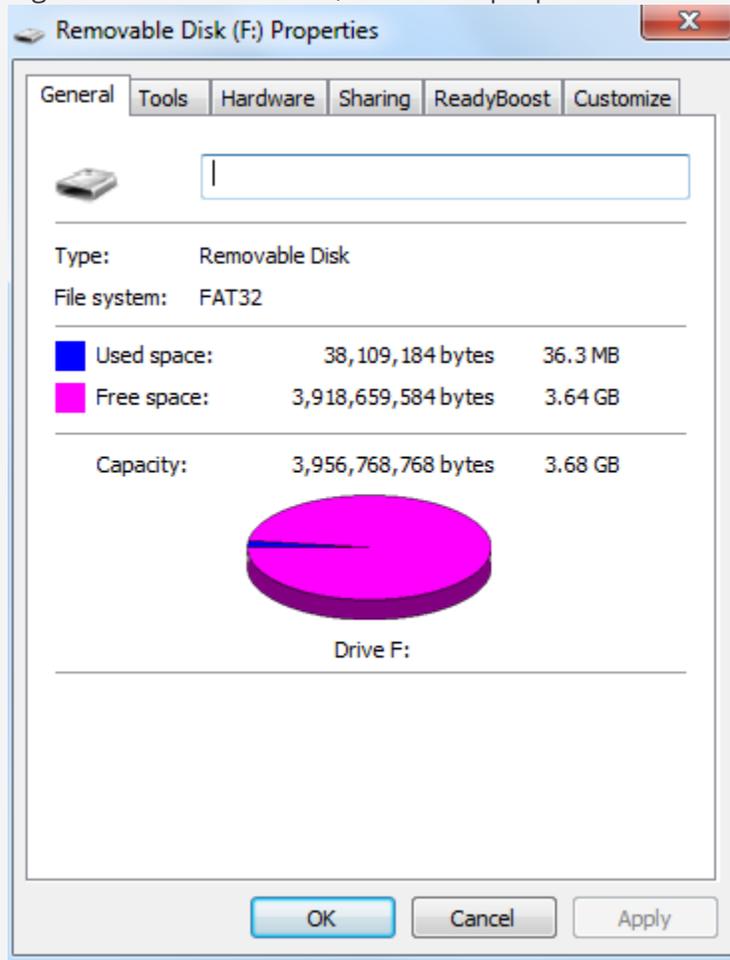
- Follow this video tutorial to ensure that you have connected to your Wi-Fi network <http://www.youtube.com/watch?v=qRUu3guthcM>
- To verify that you have an active connection, click the Menu button from the home screen
- Navigate down and select the Accessories icon
- Select Accessory Info
- The text next to Wi-Fi should say Connected, and then give a number indicating the length of time the Wi-Fi was successfully connected.
- Power Cycle your Thermostat
  - 
  - How to power cycle your thermostat
    - Grasp the faceplate with both hands
    - Place thumbs under plastic ridge on bottom of thermostat, and slowly pull the bottom of the faceplate upwards, without pulling the top.
    - The thermostat will hinge upwards, disconnecting the baseplate from the faceplate causing the screen to go blank, and powering off the thermostat.
    - Now push the faceplate back onto the baseplate, securing it once more.
    - The thermostat will load a white screen with a logo on it, and then begin starting up.
    - Once the thermostat finishes starting you have successfully power cycled the device
- If available
  - Try using a different Wi-Fi key
  - Try a different thermostat
- If you are thermostat is still stuck at SkyPort Connecting
  - You may have network configurations in place which prevents your thermostat from connecting to the SkyPort servers
  - You may need to contact your network administrator to set up or configure your network properly to allow your thermostat to connect to the SkyPort servers successfully

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## Thermostat does not recognize SD Card

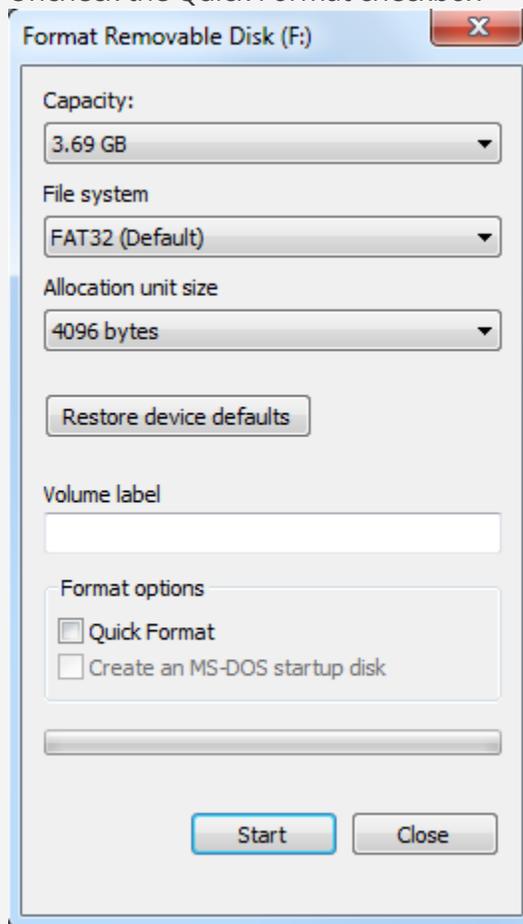
- The SD Card needs to be between 2GB and 8GB
- We recommend this [SD Card](#)
- The SD card needs to have the FAT32 file system
  - To check if it is FAT32 file system
    - Insert the SD card into the computer
    - Click the start orb, then select Computer

- Right-click on the SD card, and select properties



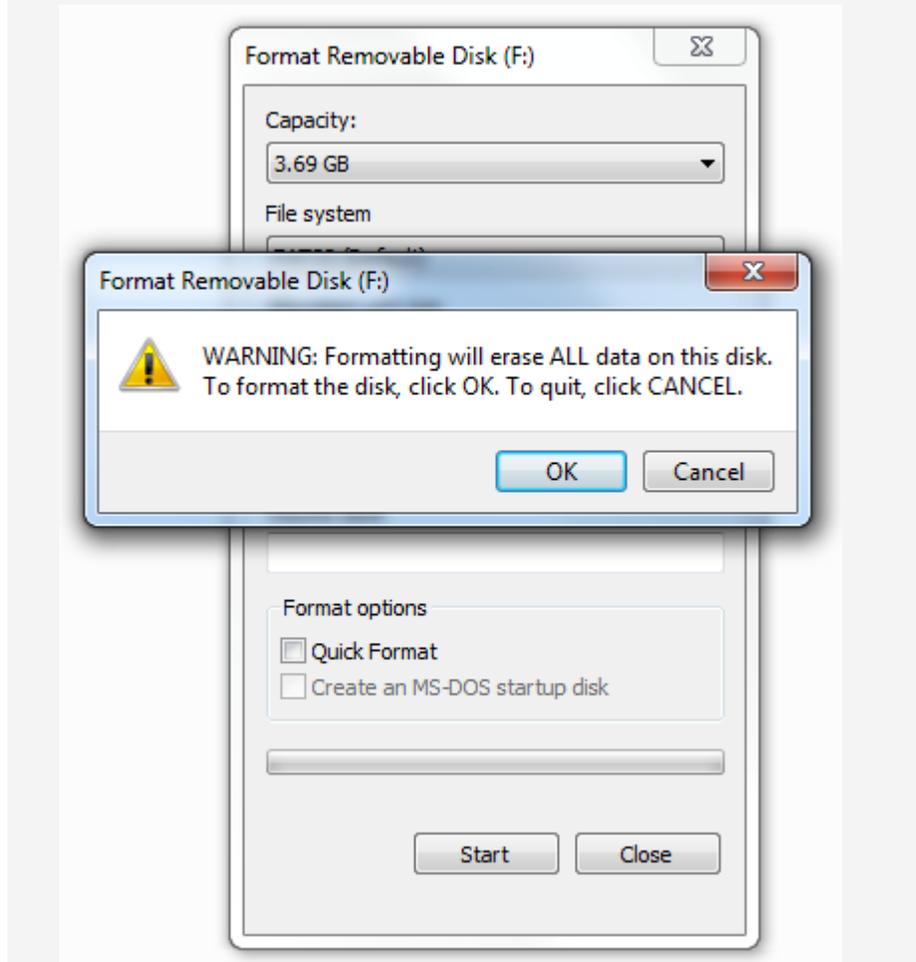
- The text next to File system should say FAT32 if that is the current file-system on your SD card. If you have anything other than FAT32 you must reformat the SD card
- How to format SD if not FAT32
  - If it is does not have the FAT32
    - On Windows 7
    - Insert the SD card into the computer
    - Click the Start Orb, and then select Computer
    - Right-click on the SD card and select Format...
    - Make sure that under File System it says FAT32(Default)

- Uncheck the Quick Format checkbox

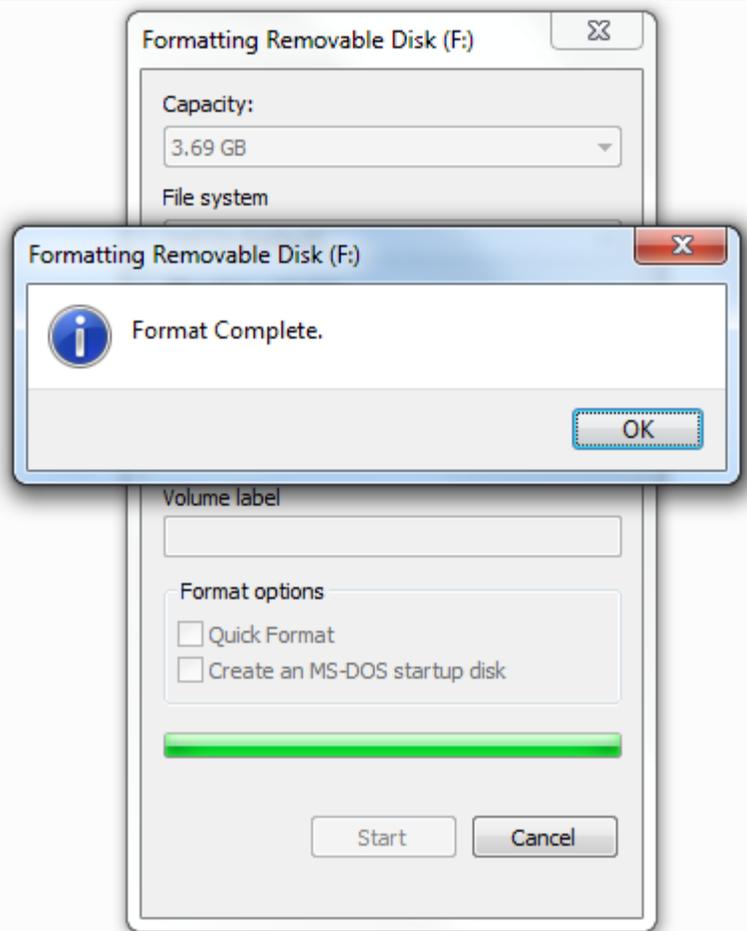


- Click start

- The Formatting utility will now warn you that formatting the SD card will remove all information on the SD card. Click Ok.

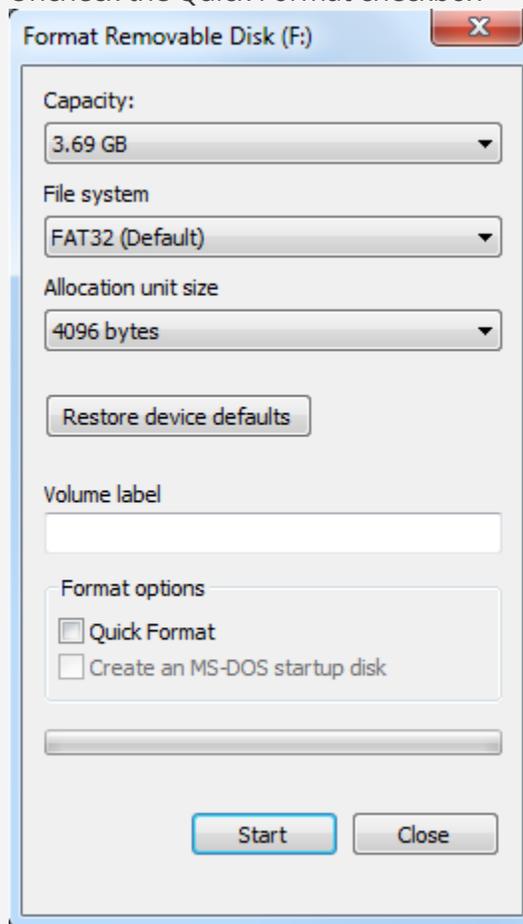


- The formatting will take a few minutes. When completed click OK and then Close



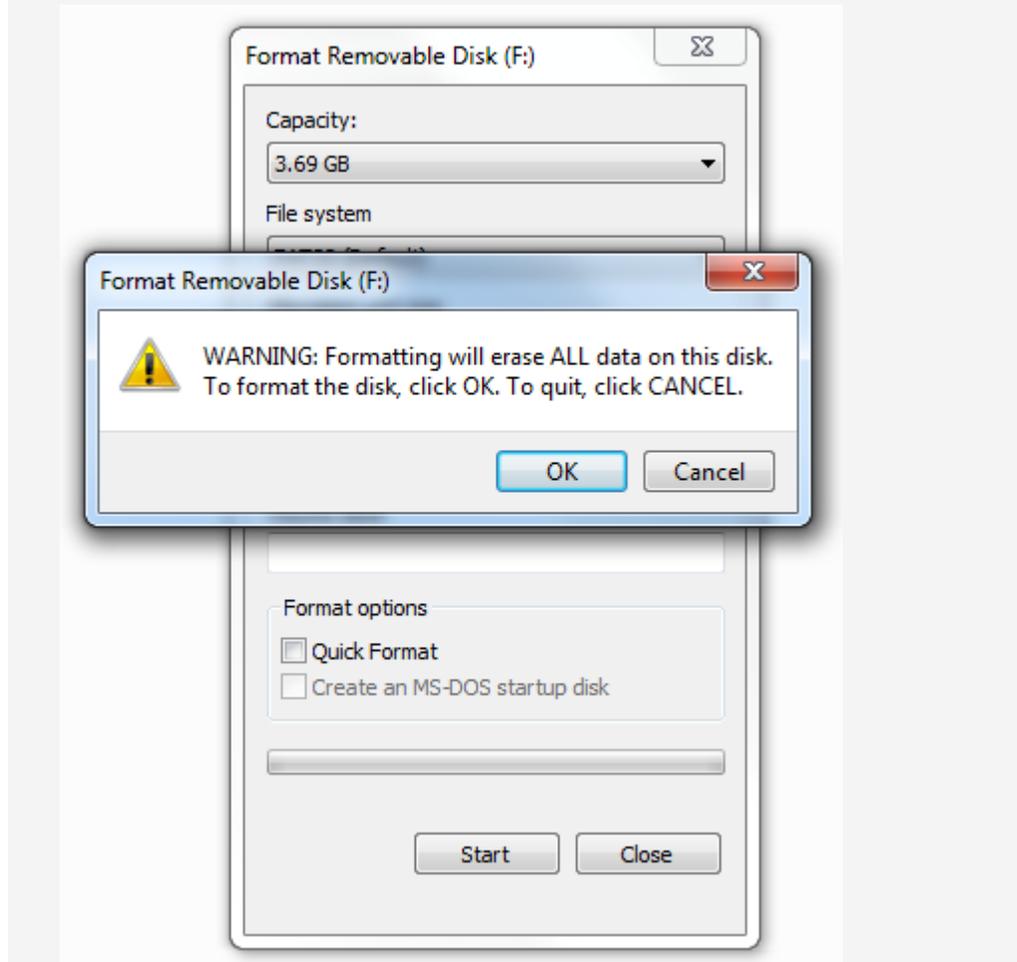
- Now try using the ColorTouch Desktop app to upload your settings/firmware to the SD card, and then using it once more in the thermostat
- If you have used your SD card in other devices (Camera, phone, etc.)
  - You need to format the card to FAT32 format.
  - How to format SD Card
    - On Windows 7
    - Insert the SD card into the computer
    - Click the Start Orb, and then select Computer
    - Right-click on the SD card and select Format...
    - Make sure that under File System it says FAT32 (Default)

- Uncheck the Quick Format checkbox

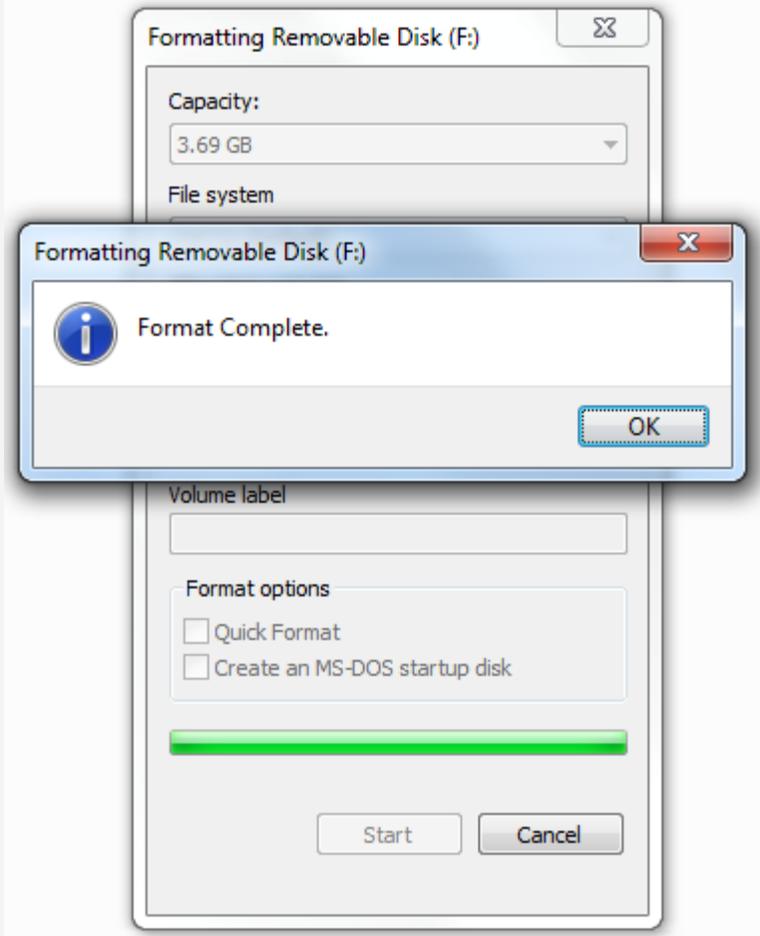


- Click start

- The Formatting utility will now warn you that formatting the SD card will remove all information on the SD card. Click Ok.



- The formatting will take a few minutes. When completed click OK and



then Close

- Now try using the ColorTouch Desktop app to upload your settings/firmware to the SD card, and then using it once more in the thermostat
- SD Card and SkyPort Key are not the same. The SkyPort Key does not work as an SD card and will not be recognized in a computer. You cannot download firmware or settings onto your SkyPort Key on a computer and transfer it to a thermostat.

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## SkyPort ID not valid

- You must make sure that your Wi-Fi was able to connect to your wireless network successfully
  - How to verify Wi-Fi connection
    - Follow this video tutorial to ensure that you have connected to your Wi-Fi network <http://www.youtube.com/watch?v=qRUu3guthcM>
    - To verify that you have an active connection, click the Menu button from the home screen

- Navigate down and select the Accessories icon
  - Select Accessory Info
  - The text next to Wi-Fi should say Connected, and then give a number indicating the length of time the Wi-Fi was successfully connected.
- If you are connected to Wi-Fi but unable still receive an error when entering the device ID
  - Make sure that you have the correct Device ID.
  - Confirm Device ID
    - Confirm that your Wi-Fi key is inserted and seated proper in the thermostat, with the notch on the key facing upwards
    - To retrieve your Device ID click the menu button on the home screen
    - Navigate down and select the Accessories Icon
    - Select Accessory Info
    - Your Device ID is the blue 16 digit line located at top right of this screen
  - You are only allowed to have a single thermostat registered with one SkyPort account
    - If you have used the same Device ID with any other SkyPort accounts, or the same thermostat added multiple times on the same account, the SkyPort system will give you the Device ID error.
- If none of the other scenarios apply, you may need to do a factory reset of your thermostat.
  - To do a factory reset
    - Select the Menu button from the home screen
    - Navigate down and select Settings
    - Navigate down again and select Installation settings
    - Navigate down and select Factory Defaults
    - Confirm by clicking Yes
    - The thermostat will now reboot.
    - When the thermostat fully loads once more, it will ask you to do the Wi-Fi Setup once more.
    - Follow our video tutorial for setting up your Wi-Fi connection <http://www.youtube.com/watch?v=qRUu3guthcM>
    - After the Wi-Fi card has been set up, pay special attention to the Device ID, because this will be a new and different Device ID than before.
    - Write your Device ID number down and follow our video tutorial on setting up your SkyPort account with this new Device ID <http://www.youtube.com/watch?v=U1Zc9zv7pPs>

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## Verification ID versus Device ID

- The Device ID is the unique ID number of your Wi-Fi Key

- Ensure that your Wi-Fi key is inserted and seated proper in the thermostat
- To retrieve your Device ID click the menu button on the home screen
- Navigate down and select the Accessories Icon
- Select Accessory Info
- Your Device ID is the blue 16 digit line located at top right of this screen

- Verification ID is different from the Device ID

- Verification ID is a number that will pop up on your thermostat when registering a thermostat with SkyPort.
  - When registering your thermostat with SkyPort you will be asked to enter your Device Id, and upon successful entry of the Device ID your thermostat will be sent a Verification ID
  - The Verification ID is 6 digits, with numbers only, and only displays when registering a thermostat with SkyPort
  - This Verification ID is to confirm and secure a connection to the SkyPort servers.

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## Wi-Fi Key Disappears

- If the Wi-Fi card is detected and then disappears please power cycle your thermostat
  - How to power cycle your thermostat
    - Grasp the faceplate with both hands
    - Place thumbs under plastic ridge on bottom of thermostat, and slowly pull the bottom of the faceplate upwards, without pulling the top.
    - The thermostat will hinge upwards, disconnecting the baseplate from the faceplate causing the screen to go blank, and powering off the thermostat.
    - Now push the faceplate back onto the baseplate, securing it once more.
    - The thermostat will load a white screen with a logo on it, and then begin starting up.
    - Once the thermostat finishes starting you have successfully power cycled the device
- Ensure that you have the newest firmware available for your thermostat
  - Tutorial available on main support page [firmware update](#).

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## Repeating "Scheduling Reconnect" Skyport Status

- Skyport connected thermostats will constantly try to connect to the Skyport Cloud Services servers, if you successfully configured a Wi-Fi connection and the Skyport

option is enabled. An unsuccessful connection attempt will cause your thermostat to schedule a retry a few minutes later.

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2. Check the Skyport Cloud Services status by connecting your Wi-Fi enabled device (smart phone, tablet or a laptop) to your Wi-Fi access point and navigate to Skyport Cloud Services website from venstar.com using a browser.
3. For corporate networks, check your router's firewall settings. Certain firewall settings can prevent the thermostat from connecting to the Skyport Cloud Services servers. Skyport connected thermostats require that outbound TCP ports 9001, 9002, and 41414 not blocked to allow successful secure connection to the Skyport Cloud Services servers.

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## The Clock Is Losing Time

**Symptom:** This is usually caused by a high temperature safety limit opening on the furnace. When the safety opens, the furnace shuts off the burners and disconnects the 24VAC to the thermostat causing the thermostat clock to stop. In order to cool down the heat exchanger, the furnace blower will remain energized for approximately 15 minutes before restoring power to the thermostat and, if there is still a call for heating, allowing the furnace to re-energize. In this situation homeowner may never notice a problem, except that the clock will be off by the number minutes power was disconnected.

**Correction:** Determine what is causing the high temperatures to occur - dirty filter, etc.

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## Display Loses Power during the Heating Cycle

If your thermostat wire length is less than 10 feet, install a longer run of thermostat wire (more than 30 feet). The extra length of wire can be coiled up.

**Symptom #1:** This may also be caused by a high temperature safety limit opening on the furnace. When the safety opens, the furnace shuts off the burners and disconnects the 24VAC to the thermostat causing the thermostat display to de-energize.

**Correction #1:** Find the cause of the high temperature – too many room registers closed, dirty filter, etc.

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# Display Loses Power Or Shows "PF" When Heating or Cooling Is Energized

**Symptom:** The "PF" error code applies only to our power-stealing line of thermostats\* and stands for Power Failure. This occurs when there is a significant drop in voltage to the thermostat.

**Correction:** you must install a common wire between the equipment and thermostat. Please refer to FAQ "How to Add a Common Wire".

If you have installed a common wire, check it for continuity and that it is connected at both ends.

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# EH Is Displayed In the Cool Setpoint and Only Heat and Off Are Accessible

**WARNING:** *Correction #2 will reset all Time Period and Advanced Programming to the default settings. Any information entered prior to this reset may be permanently lost.*

**Symptom #1:** Most of our heat pump compatible thermostats will allow Emergency Heat to be activated by pressing the FAN and the UP buttons. This will display 'EH' in the cool setpoint and lock out all modes except the OFF and HEAT modes.

**Correction #1:** Pressing the MODE and UP buttons should return the thermostat to normal operation.

**Symptom #2:** If your thermostat is not controlling a heat pump, but 'EH' is displayed in the cool setpoint, the thermostat has experienced a voltage spike or been subjected to 'dirty power' (brown out). This voltage condition has corrupted the memory of the thermostat micro-chip and the thermostat will need to be reset.

**Correction #2:** Perform the factory default procedure.

Four Button Models – press the MODE and DOWN buttons at the same time until all of the icons appear. Then press the FAN button until 'Fd' momentarily displays. Press the MODE button once to return to the normal display.

Eight Button Models (with a door) – press the MODE and FAN buttons at the same time until all of the icons appear. Then press the FAN button until 'Fd' momentarily displays. Press the MODE button one, two, or three times to return to the normal display.

Other Models – to perform the factory default procedure on our builder's models and battery thermostat models, please consult the Owner's Manual of the thermostat.

If you see a picture of a key lock on the display, you must first perform the button sequence in "FAQ Thermostat Buttons are Inoperable" before performing the factory default procedure

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## Thermostat Buttons Are Inoperable

**Symptom:** Many of our thermostats have the ability to, in addition to other security features\*, lock out the thermostat buttons entirely.

**Correction:** To lock or unlock the thermostat buttons, press and hold the MODE button. While you are holding the MODE button, press the UP and DOWN arrow buttons as well.

**\*NOTE:** Many of our commercial thermostats have advanced security features that also disable certain button functions. If some, but not all, of your buttons are locked out, then you will need to disable the security setting. Consult the Owner's Manual of the thermostat in order to disable the security setting of your thermostat.

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## Thermostat Will Not Allow Access Past Advanced Setup Step #2

**Symptom:** This security feature is only applicable to our non-battery, 4-button thermostat models. The first two setup steps deal with the time of day and day of the week. Any steps beyond these two, such as the equipment settings (heat pump or gas/electric) or compressor protection timers are locked out to protect the end-user from disabling or possibly damaging their equipment.

**Correction:** To access the rest of the advanced setup steps, press and hold the MODE and FAN or, on commercial models, MODE and OVERRIDE buttons. When the screen enters the advanced setup, you must *continue* to hold down the MODE and FAN or, on commercial models, MODE and OVERRIDE buttons for seven *additional* seconds (if you release the buttons before this time, you will be locked out of the rest of the advanced setup).

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## Thermostat Settings Change or Scramble When Supplemental Heat Comes On

**WARNING:** *Correction #1 will reset all Time Period and Advanced Programming to the default settings. Any information entered prior to this reset may be permanently lost.*

**Symptom:** Some heat pumps create a large voltage spike when the unit goes in to defrost and/or when the supplemental heat comes on. This large voltage spike can cause the microchip in the thermostat to reset, changing settings.

**Correction #1:** Perform the factory default procedure.

Four Button Models – press the MODE and DOWN buttons at the same time until all of the icons appear. Then press the FAN button until 'Fd' momentarily displays. Press the MODE button once to return to the normal display.

Eight Button Models (with a door) – press the MODE and FAN buttons at the same time until all of the icons appear. Then press the FAN button until 'Fd' momentarily displays. Press the MODE button one, two, or three times to return to the normal display.

Other Models – to perform the factory default procedure on our builder's models and battery thermostat models, please consult the Owner's Manual of the thermostat.

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## Erratic Operation, Partial Display, or Fluctuating Temperature

**Symptom:** This can be caused by a poor connection between the sub-base of the thermostat and the connection pins on the thermostat circuit board. Poor connection is usually caused by the sub-base being flexed against an uneven wall.

**Correction:** Loosen the screws that attach the sub-base to the wall, allowing it to flatten out, then snap thermostat back onto the sub-base.

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## Fan Does Not Energize On a Call for Heating

**Symptom:** Some types of heating systems require the thermostat to operate the indoor fan (like electric heat and, of course, heat pump systems).

**Correction:** Program the Electric Heat (EH) setting of your thermostat. This will entail changing the jumper settings on the thermostat circuit board or selecting electric heat (EH) operation in the advanced setup programming.

Jumper Setting – Pull your thermostat away from the sub-base. The jumpers will be located in the upper right hand corner of the circuit board. Locate the top jumper that can be set for EH or GAS operation. Place the jumper on the two pins closest to EH.

Advanced Setup – Press the MODE and PROGRAM or MODE and FAN buttons to enter advanced setup. Then press the MODE button repeatedly until EH appears in the middle of the screen. Press the UP button so that ON is displayed. Press PROGRAM or MODE and FAN to exit advanced setup.

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# Heating and Cooling Are Running At the Same Time

**Symptom:** This usually occurs when a heat pump thermostat is attempting to control a gas/electric system.

**Correction:** If your thermostat is gas/electric compatible, follow the instructions below to program the thermostat for gas/electric operation. This will entail changing the jumper settings on the thermostat circuit board or selecting gas/electric operation in the advanced setup programming.

**Jumper Setting** – Pull your thermostat away from the sub-base. The jumpers will be located in the upper right hand corner of the circuit board. Locate the bottom jumper that can be set for GAS or HP operation. Place the jumper on the two pins closest to the GAS.

**Advanced Setup** – Press the MODE and PROGRAM or MODE and FAN buttons to enter advanced setup. Then press the MODE button repeatedly until HP appears in the middle of the screen. Press the DOWN button so that OFF is displayed. Press PROGRAM or MODE and FAN buttons to exit advanced setup.

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# Remote Sensor Reading Is Incorrect (ACC0400, ACC0401, ACC0402)

**Symptom:** The temperature reading of thermostat may be incorrect due to the incorrect connection of the sensor, electrical interference on the remote sensor wiring, a wall location that receives very little airflow, and/or proximity to devices that emit heat.

**Correction #1:** Check to see if the degree symbol is flashing. If it is not flashing, the remote sensor reading is not being displayed.

**Correction #2:** Check your wiring. The Remote Sensor should be connected to the thermostat using solid conductor CAT 5, CAT 5e, or CAT 6 type network communication cable. This is an unshielded cable with four twisted pairs of 24 gauge solid wire; DO NOT use stranded cable. The cable length should not exceed 250 feet. If less than 75 feet of cable is required to connect the thermostat to the Remote Sensor, a three conductor thermostat cable (18-24 gauge) may be used; this cable is NOT suitable for any length greater than 75 feet.

**IMPORTANT:** Do not use shielded wire. Do not run sensor wiring in the same conduit as the 24VAC thermostat wiring. Electrical interference may cause the sensor to give incorrect temperature readings.

**WARNING:** *Under normal circumstances it will not be necessary to adjust the calibration of the remote sensor. If calibration is required, please contact a trained HVAC technician to correctly perform the following procedure.*

**Correction #3:** It is important to determine the exact reason why the remote sensor reading is incorrect *before* attempting this calibration procedure. Please note that not all thermostats support the remote sensor calibration feature. Place your temperature probe next to the remote sensor in order to determine the correct temperature. Once you have determined the correct temperature reading, follow the calibration steps below:

Four Button Models – press the MODE and DOWN buttons at the same time until all of the icons appear. Then press the MODE button one or two times until the current room temperature appears. Use the UP or DOWN button to adjust the temperature. Press the MODE button one or two times to exit calibration.

Eight Button Models (with a door) – press the MODE and FAN buttons at the same time until all of the icons appear. Then press the UP and DOWN buttons at the same time twice. When the current room temperature appears, press the MODE button once more to display the remote sensor calibration screen. Use the UP or DOWN button to adjust the temperature. If the thermostat does not have a remote sensor calibration screen, then calibrate the remote sensor in the normal temperature sensor screen. Press the MODE button one, two, or three times to exit calibration.

**NOTE: Do not use an ohmmeter to test the sensor - these are digital sensors, not thermistors, and they can be damaged by an ohmmeter.**

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## Temperature Reading Is Incorrect

**WARNING:** Under normal circumstances it will not be necessary to adjust the calibration of the temperature sensor. If calibration is required, please contact a trained HVAC technician to correctly perform the following procedure.

**Symptom:** The temperature reading of thermostat may be incorrect due to airflow from behind the wall, a wall location that receives very little airflow, and/or proximity to devices that emit heat. It is important to determine the exact reason why the thermostat temperature reading is incorrect before attempting calibration.

**Correction:** Place your temperature probe next to the thermostat's temperature sensor in order to determine the correct temperature. The thermostat's temperature sensor is located on the bottom portion of the thermostat. **DO NOT PLACE YOUR TEMPERATURE PROBE ON THE TOP OF THE THERMOSTAT.** This will give you an artificially high temperature reading. Once you have determined the correct temperature reading, follow the calibration steps below:

Four Button Models - press the MODE and DOWN buttons at the same time until all of the icons appear. Then press the MODE button one or two times until the current room temperature appears. Use the UP or DOWN button to adjust the temperature. Press the MODE button one or two times to exit calibration.

Eight Button Models (with a door) – press the MODE and FAN buttons at the same time until all of the icons appear. Then press the UP and DOWN buttons at the same time twice. When the

current room temperature appears, use the UP or DOWN button to adjust the temperature. Press the MODE button one, two, or three times to exit calibration.

Other Models - to access the calibration on our builder's models and battery thermostat models, please consult the Owner's Manual of the thermostat.

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## Thermostat Does Not Respond To Changes in Room Temperature

**Symptom:** When the thermostat is placed on a wall that has no insulation, air will often blow on the thermostat sensor from behind the wall. This air will remain the same temperature even though the space temperature is being heated or cooled.

**Correction:** Insulate the hole behind the thermostat with insulation, spray foam, or even duct tape - whatever will stop the airflow from behind the wall.

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## Unit Is Running Backwards - Cooling On Heat Demand, Heating On Cool Demand

**Symptom #1:** This usually occurs when a gas/electric thermostat is attempting to control a heat pump system.

**Correction #1:** If your thermostat is heat pump compatible, follow the instructions below to program the thermostat for heat pump operation. This will entail changing the jumper settings on the thermostat circuit board or selecting heat pump operation in the advanced setup programming.

**Jumper Setting** – Pull your thermostat away from the sub-base. The jumpers will be located in the upper right hand corner of the circuit board. Locate the middle jumper that can be set for GAS or HP operation. Place the jumper on the two pins closest to HP.

**Advanced Setup** – Press the MODE and PROGRAM or MODE and FAN buttons to enter advanced setup. Then press the MODE button repeatedly until HP appears in the middle of the screen. Press the UP button so that ON is displayed. Press PROGRAM or MODE and FAN to exit advanced setup.

**Symptom #2:** This may also occur when the reversing valve setting of a heat pump compatible thermostat has been programmed incorrectly.

**Correction #2:** Follow the instructions below to program the thermostat for the correct reversing valve setting. This will entail changing the jumper settings on the thermostat circuit board or selecting the operation in the advanced setup programming.

Jumper Setting – Pull your thermostat away from the sub-base. The jumpers will be located in the upper right hand corner of the circuit board. Locate the bottom jumper that can be set for O or B operation. Place the jumper on the two pins closest to the correct reversing valve setting.

Advanced Setup – Press the MODE and PROGRAM or MODE and FAN buttons to enter advanced setup. Then press the MODE button repeatedly until HP appears in the middle of the screen. Now press the MODE button once. 'O' or 'b' will appear on the display. Press the UP or DOWN button to display the correct reversing valve setting. Press PROGRAM or MODE and FAN to exit advanced setup.

**NOTE:** If your system is a commercial heat pump, then the thermostat may not need to be programmed for heat pump operation. Commercial heat pumps usually require gas/electric thermostats for proper operation. If the terminal connections in the equipment do not have an 'O' or 'b' terminal, but do have a 'W1' or 'W' terminal, then a gas/electric thermostat will most likely be required.

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## Wireless Thermostat Batteries Die Rapidly

**Symptom #1:** The wireless thermostat (Transmitter) must have Lithium batteries *only* to operate correctly. Alkaline batteries will die rapidly and result in erratic and/or non-operation.

**Correction #1:** Install AA Lithium batteries into the Transmitter.

**Symptom #2:** The wireless thermostat (Transmitter) is pre-programmed to have the backlight automatically deactivate eight seconds after a button press in order to conserve battery life. If this setting has been changed to have the backlight lit continuously, the batteries will die rapidly.

**Correction #2:** Program the Transmitter's backlight to the OFF position. Press the MODE button once and release. Now press and hold MODE. While you are holding MODE, press and hold the FAN or OVERRIDE button as well. When the time appears by itself and is blinking, continue to hold the MODE and FAN or OVERRIDE buttons for seven additional seconds. Now press the MODE button repeatedly until the letters L1 appear in the middle of the display. Press the DOWN button so that OFF is displayed. Press the MODE and FAN or OVERRIDE buttons to exit advanced setup.

**NOTE:** If the backlight is desired at all times, an RF power supply may be purchased from your dealer (part number ACC0800).

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# Wireless Thermostat Does Not Energize the Heating or Cooling System

**Symptom #1:** The wireless thermostat (Transmitter) communicates with the receiver on a specific house code. If the house code of the transmitter is different from that of the receiver, your system will not operate.

**Correction #1:** Program the Transmitter for the correct house code. Press the MODE button once and release. Now press and hold MODE. While you are holding MODE, press and hold the FAN or OVERRIDE button as well. When the time appears by itself and is blinking, continue to hold the MODE and FAN or OVERRIDE buttons for seven additional seconds. Now press the MODE button repeatedly until the letters HC appear in the upper left hand corner of the display. Press the UP or DOWN button to select your desired house code. Press the MODE and FAN or OVERRIDE buttons to exit advanced setup.

Also program the Receiver for the correct house code. Pull the Receiver away from the sub-base. The dip-switches will be located on the bottom center of the circuit board. Notice that the dip-switches of the Receiver have two sets of numbers. The first set of numbers are located on the dip-switches themselves and are numbered one through nine (1-9). Please disregard these numbers. The other set of numbers will be printed in white on the Receiver circuit board and are as follows: 1, 2, 4, 8, 16, 32, EH, HP, and O/B. Use these numbers when setting the correct house code. For example, if you have selected a house code of 11 in the Transmitter advanced setup, then you will turn dip-switches 1, 2, and 8 to the ON position. House code of 3, turn dip-switches 1 and 2 to the ON position (please consult the Installation Instructions for more details).

**Symptom #2:** The wireless thermostat (Transmitter) must have Lithium batteries *only* to operate correctly. Alkaline batteries will result in erratic and/or non-operation.

**Correction #2:** Install AA Lithium batteries into the Transmitter.

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## Eight Button Stats (Slimline Platinum)

**Set Clock & Day:** Set Clock button, use Up and Down to adjust time, add Fan/Override to adjust by hours, Mode to get to day set, Set Clock to exit.

**Program:** Program button

**Setup:** Mode + Program/Backlight buttons.

**Calibrate:** Mode + Fan for 5 sec, then Up + Down twice, then adjust temp with Up or Down button, then Mode one, two, or three times to exit.

**Outside Air Temp:** Outside button, if no Outside, then Mode for 2 sec (N/A on some models)

**Factory Reset:** Mode + Fan for 5 sec, then Fan for 2 sec until display either blinks or says Fd, then Mode to exit.

**50/60 Hz:** Mode + Fan (5 sec), Up + Down twice, then three bottom right buttons together (not

including Mode/Override), will say either 50 or 60, then Mode to exit.

**Emergency Heat:** Fan + Up for 2 sec or Emergency Heat button.

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## Four Button Stats (flat, vertical, star)

**Set Clock & Day:** Mode + Fan/Override for 2 sec, use Up and Down to adjust, add Fan/Override to adjust by hrs. Mode to get to day set (if applicable).

**Program:** Mode + Up for 2 sec

**Setup:** Mode + Fan/Override, when screen changes continue holding for 7 seconds.

**Calibrate:** Mode + Down for 2 sec, then Mode, then adjust temp with Up or Down button, then Mode to exit.

**Outside Air Temp:** Mode or Fan for 2 sec (not available on all models)

**Factory Reset:** Mode + Down for 2 sec, then Fan/Override for 2 sec until display either blinks or says Fd, then Mode to exit.

**50/60 Hz:** Mode + Down (2 sec), then Mode, then Fan/Override (5 sec), will say 50 or 60, Mode to exit.

**Emergency Heat:** Fan + Up for 2 sec

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## Special Features List

### Residential Models

T1050 - 5+2 program (weekday/weekend)

T1000FM - Single day program.

T1100FM - 7 day program, Programmable Fan, vacation, Energy Watch for cooling & heating (counts hours), adj. Service filter indicator

T1100RF - Wireless - 500 ft. range, 64 house codes, up to 4 stats per receiver, AA Lithium batteries

### Commercial Models

T2100 / T2700 - Non-programmable, dry contact input (NO or NC), soft start, 3 security levels, 4 hr. override

T2800 - 7 day programmable, Holiday, 3 sec levels w/ setpoint limiting

T2900 - T2800 features plus remote sensor capability, dry contact, soft start, pre-occupancy purge, economizer control

All programmable commercial stats have: 48 hr. clock protection, 4 hr. adj. override and smart fan.

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# Standard Features On All Stats (excluding builder's and battery stats)

Large display, dual setpoint, 1-for-all™ design - works on almost all types of equipment, no mercury, no batteries, non-volatile memory, continuously lit backlight, adjustable time guards, keypad lock

**Commercial Program:** always press Mode to go to the next step, **Up** or **Down** to change setting.

To enter program mode: 4 button stats press Mode + Up for 2 sec, 8 button stats press Program button

Note: If no buttons are pushed for one minute, thermostat will automatically return to normal operation.

- Occupied 1 - can set up to 3 occupied periods per day. Normally set to one.
- Occupied cool temperature setting
- Occupied heat temperature setting
- Unoccupied cool temperature setting
- Unoccupied heat temperature setting
- M - choose what day you are programming - normally start with M
- Start time for Occupied 1 for Monday
- Stop time for Occupied 1 for Monday
- On/Off - Does occupied 1 to run at all on Monday? No means unoccupied all day

- If you set more than one Occupied period in step 1, now you will repeat steps 2, 3, 7, 8, and 9 for Occupied 2 and 3

- Copy - Copy the program from the previous day, yes or no.

- If YES, Monday's schedule will be copied to Tuesday

- If NO, program different schedule for Tuesday (steps 7, 8, and 9)

Repeat step 10 until finished, then exit the program mode the same way you entered it.

**Residential Program:** always press Mode to go to the next step, Up or Down to adjust.

To enter program mode: 4 button stats press Mode + Up for 2 sec, 8 button stats press Program button

Note: If no buttons are pushed for one minute, thermostat will automatically return to normal operation.

Following program is for 7 day models. Single or 5-2 will have fewer steps.

- M - choose what day to program - normally M (Monday)
- Morning period start time

- Morning period cool temperature setting
- Morning period heat temperature setting
- Day period - repeat steps 2,3, and 4
- Evening period - repeat steps 2,3, and 4
- Night period - repeat steps 2,3 and 4
- Copy - Copy the program from the previous day, yes or no.

- If YES, Monday's schedule will be copied to Tuesday

- If NO, program different schedule for Tuesday (repeat steps 2-7)

Repeat step 8 until finished, then exit the program mode the same way you entered it.

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## Basic operation of input

### *Operation of the Thermostat Input*

The thermostat has two terminals, labeled CK1 and CK2, which are used to connect the thermostat to an external device. Whenever there is continuity between CK1 and CK2 the thermostat will be forced into Occupied mode. The CK1 and CK2 connection will be referred to in this section as the "input."

#### Programmable models - T2900 & T2900SCH

The thermostat will maintain Occupied 1 set temperatures for as long as CK1 and CK2 are activated. When the continuity between CK1 and CK2 is broken, the thermostat will then operate according to its regular program. The thermostat **MUST** be in Program On mode to use the input; if the thermostat is in Heat, Cool, Auto, or Off mode the input will be ignored. CK1 and CK2 will always force the thermostat into Occupied 1, even if the thermostat was already in an Occupied mode.

Non-programmable model - T2700. The non-programmable models work differently. They do not have a Program On mode, just Heat, Cool, Auto or Off. In any mode except Off, the thermostat will control to the displayed setpoints 24 hours a day, 7 days a week. When the input is activated, it forces the thermostat to an Unoccupied mode, with user-determined Unoccupied setpoints. If desired, the operation of the input can be reversed - this is done in the thermostat setup, where the input is set to normally open (NO) or Normally Closed (NC). The thermostat is factory programmed with the input set to Normally Open, which means the thermostat is normally in the Heat, Cool, or Auto mode, until the input forces the thermostat to unoccupied mode. If set to Normally Closed, the thermostat will be in the unoccupied mode until the input is activated to force it into the Heat, Cool, or Auto mode. Thinking of Normally Open (NO) as Normally Occupied may help you remember which is which!

**Note:** Hereafter these instructions will refer to the input as forcing the stat into occupied mode. For non-programmable models, that can always be reversed, forcing the stat in to unoccupied mode instead.

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## Nesting programs

A useful feature of the programmable thermostats is the hierarchy of programming which allows one occupied period to override another. This allows "nesting" of programs, greatly enhancing programming flexibility. Occupied 1 takes precedence over Occupied 2, which takes precedence over Occupied 3. Therefore, if the Occupied 1 period overlaps the Occupied 2 or 3 periods, Occupied 1 will override Occupied 2 or 3.

A good example of an application for nested programs is a health club. The owner wants the club to operate at 72 degrees from 6am to 9pm. From 10am to 11am there is an aerobics class, and the desired setpoint is 68 degrees. To program this scenario, set Occupied 2 to run from 6am to 9pm, at 72 degrees, and Occupied 1 to run from 10 am to 11am at 68 degrees. At 10 am Occupied 1 will override Occupied 2 and the setpoint will change to 68 degrees. At 11 am the thermostat will return to Occupied 2 at 72 degrees.

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## Auxiliary output / Economizer output

The T2900SCH thermostat features an Auxiliary output that can be used to turn on or off an external device. Most commonly this output is used to open an economizer damper, but it can also be used to turn on lights, exhaust fans, sprinklers, etc.

The auxiliary output is energized when the thermostat is in Occupied 1 or in a Pre-Occupancy Purge. The output is often used to control an economizer or outside air damper. Whenever the thermostat is in Occupied 1 or in a purge cycle, the damper is forced open, and whenever the thermostat is in Unoccupied (or Occupied 2 or 3), the damper will be closed. If the thermostat is forced in to Occupied 1 with the override button or through the dry contact input, the damper will also open. The output is used similarly for light and exhaust fans

The output can be used for other types of devices such as sprinklers or security lights, which may run on a much different schedule than the HVAC. In this case, use Occupied 1 only to control the output (set the heat / cool setpoints to setback temperatures), and use Occupied 2 or 3 to control the HVAC.

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## Connect to external timeclock

It is possible to control multiple thermostats using a single external timeclock. Simply connect two wires from the timeclock to each thermostat, or daisy chain them together (see installation section.) When the timeclock reaches the preset time, all connected thermostats will be forced into occupied mode. Our thermostats have a Soft Start (random start) feature that randomly assigns a delay value of up to 30 seconds before allowing the thermostat to energize the

equipment. Please see installation section for wiring diagrams, warnings, and Soft Start programming.

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## Existing Energy Management System

An Energy Management System (EMS) can be connected to the thermostat(s) using the CK1 and CK2 terminals. Connect the desired output relay from the EMS with two wires to CK1 and CK2 on the thermostat. Whenever the EMS relay is closed, the thermostat will use the occupied setpoints.

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## Light Sensor

Any light sensor with a dry contact type output can be connected to the thermostat(s). Whenever the lights are on, the thermostat will go to occupied mode. On programmable models the regular program can be used for morning warm-up, different occupied setpoints, etc. See installation section for programming details. Our T2900 and T4900 models have a built-in light sensor, which requires no extra wiring or configuration.

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## Motion Sensor

Many models of motion detectors are available with a dry contact type output. Any of these sensors can be connected to the thermostat at the CK1 and CK2 terminals. Whenever the motion detector senses motion, the thermostat will be forced into occupied mode. See Appendix A for a list of vendors and model numbers, and approximate prices.

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## Linai Sensor (open door or window)

A door or window sensor indicates when a door or window is open. This type of sensor can be used to turn off the air conditioning or heating if a window or door is opened. Just connect CK1 and CK2 on the thermostat to the two sensor wires. On thermostat models with a configurable input, the input should be set to normally closed, so that the thermostat goes to Unoccupied when the door or window is opened. For other thermostat models, a switch with a normally closed relay should be used. See installation instructions for details.

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# How to Add a Common Wire

This is a common problem when replacing a mechanical thermostat or a thermostat powered by batteries. These older thermostats require 4 wires, but newer more sophisticated thermostats require a 5th wire known as the Common wire to power the digital display. There are three ways to add the common wire to a **four wire** installation:

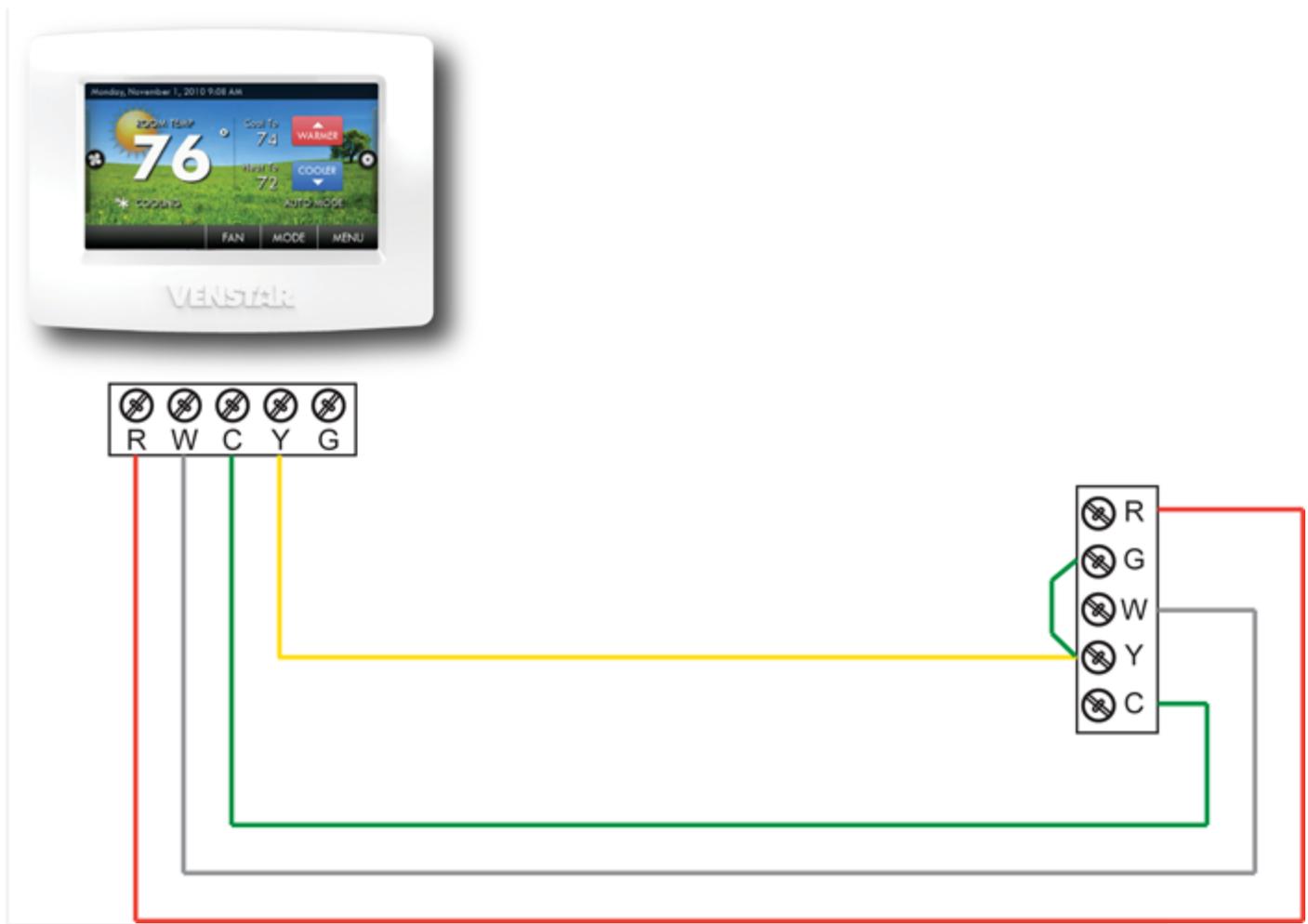
**Note:** Before starting, we recommend that you take a picture of the original wiring to the old thermostat as reference to help remember what terminal each thermostat wire was connected to.

**Option #1:** The easiest and least expensive option is to sacrifice independent control of your indoor fan.

- First, disconnect power from your heating and/or cooling system.

**Caution:** if your heating and cooling system is powered during the thermostat installation process and you accidentally touch the R (red) power wire to the C (blue or brown) common wire, then you will permanently damage either the equipment fuse or the transformer in the equipment.

- After disconnecting power from your heating and/or cooling system, move the wire connected to the G terminal (typically green) that controls your indoor fan to the C terminal (common) on the thermostat.
- At your heating and cooling equipment repeat the same step and move the G terminal wire to the C terminal.
- At your heating and cooling equipment place a jumper wire from the Y equipment terminal to the G equipment terminal. This will allow the fan to turn on when the thermostat is calling for cooling or heating but it will not give you independent fan control from the thermostat.
- See diagram below for wiring instructions.



**Option #2:** The second way to add a wire is to install the ACC0410 Add-A-Wire accessory. Add-A-Wire allows two thermostat signals to be controlled from one thermostat wire. As above move the green wire from the G terminal to the C terminal on the thermostat and at your heating and cooling equipment. Now use the Yellow wire to carry the Add-A-Wire

signal.



Separates the fan and compressor signals back to their individual terminals



Allows fan and compressor to be operated independently on the same wire

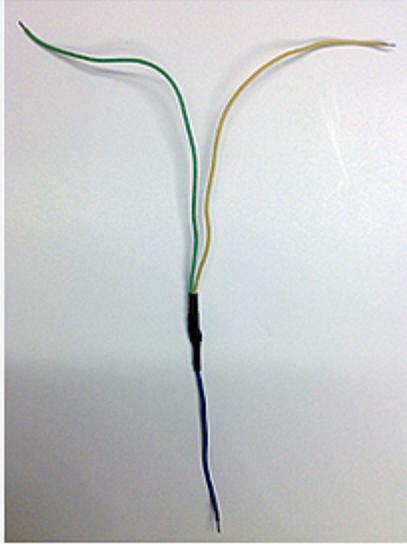


Existing thermostat wire



*Add-A-Wire, makes one thermostat wire work like two!*

Add-A-Wire Diode and Add-A-Wire Box:



**Add-A-Wire Model #ACC0410** In applications where additional wiring cannot be run, the Add-A-Wire accessory can be used to add a wire to the thermostat.

- Easy to install
- Easier than running new wire
- Allows 5 wire thermostats to use only 4 wires
- Also allows 5 wires to work like 6 wires

**Option #3:** The final way to add a wire is to contact a licensed HVAC contractor. This contractor will be able to run the necessary number of thermostat wires from your heating and cooling system to your thermostat. Please visit the [Distributors](#) section of our website to find the nearest HVAC wholesale distributor to your location. You may contact any of these distributors for an HVAC contractor referral in your area.

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## External Timeclock

To control thermostats using an external timeclock, simply connect the two wires from the relay output on the timeclock to CK1 and CK2 on the thermostat. Whenever the timeclock relay is energized, the thermostat will go to Occupied. In most cases an isolation relay should be used between the timeclock and the thermostat isolate their respective transformers.

**Note:** When using the auxiliary input (CK1 & CK2) or if attempting to control multiple HVAC units with a single thermostat, it is possible to encounter transformer phasing problems that will interfere with thermostat operation. Connecting transformers that are not phased properly may result in a direct short, which could damage the transformers and/or the thermostat. Phasing problems are more likely if the units share a common ground with grounded secondary transformers.

**Solution:** Isolation relays must be used to isolate the transformers. To isolate the auxiliary input, use a separate transformer for the auxiliary control device (usually a timeclock). Connect the control device to an isolation relay coil\*. Connect one set of isolated contacts to each thermostat at CK1 and CK2.

To prevent phasing problems when controlling multiple HVAC units with one thermostat, phase the HVAC units or use isolation relays\* to isolate the unit transformers. One unit will be connected directly to the thermostat, and it will power the stat. All other units will require one set of isolated contacts for each of the following: heat, cool, fan, and/or reversing valve, etc.

\* There is an optional accessory available that can be used instead of an isolation relay - it is an Opto-Isolator P/N ACC0900, which isolates voltage using an LED. It is wired exactly like a relay.

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## Energy Management System (EMS)

Most Energy Management systems will include some type of dry-contact or relay output. To control the thermostat, connect CK1 and CK2 from the thermostat to the desired relay output. Polarity of the wires does not matter. When the EMS relay is closed, the thermostat will control to the occupied setpoints. When the relay is open, the thermostat will revert to normal operation.

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## Light Sensor - External Sensor

Connect the two control wires from the light sensor to the CK1 and CK2 terminals on the thermostat.

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## Light Sensor - Internal sensor - (T2900)

The light sensor is built in to the thermostat. The light sensor is adjustable to accommodate different light levels. The sensor adjustment screw is located in the inner cover of the thermostat near the down arrow button. A small screwdriver is included with the thermostat.

Turning the screw clockwise increases the sensitivity, counterclockwise decreases the sensitivity. The light sensor responds to overhead light only, so it is not affected by side windows. The minimum light level that will put the thermostat into occupied mode is approx. 24 fcd at the highest sensitivity setting, and approx. 96 fcd at the lowest sensitivity setting. The easiest way to test light level is to use a flash meter from a camera store, such as the Minolta Flash Meter V. Make sure to test the light level right up against the wall where the thermostat will be mounted.

Whenever the thermostat senses light, it is forced into Occupied 1. The thermostat must be in Program On mode to use the light sensor, in all other modes the sensor is ignored. When the

lights are off, the thermostat reverts to its regular program, which allows programming of morning warm-up, different setpoints, etc.

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## Morning warm-up

It may be desirable to start the heating (or cooling) in the morning before the building is occupied in order to have the building comfortable by the time the occupants arrive. This is easy to do with the light activated thermostats, just use the regular program and set any of the occupied periods for the desired time and setpoint. When the occupants arrive and turn on the lights, the stat will be forced into Occupied 1. For example, if the desired normal occupied temperature is 72 degrees and the building is occupied at 8 am, set Occupied 1 to start at 7am and end at 8am with a setpoint of 72 degrees. This will provide one hour of morning warm-up. If the lights are not on at 8 am, the thermostat will go to Unoccupied. If the lights are on, the stat will go to Occupied 1 at 72 degrees and stay there as long as the lights remain on.

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## Different setpoints

It may be desirable to have two (or more) different setback temperatures, based on the time of day. For example, consider a building that is normally occupied from 8 am to 5 pm. The building owner wishes to save energy by using a light activated stat to set the temperature back when the offices are unoccupied (lights are off). The owner sets the cooling occupied setpoint to 72 and the cooling unoccupied setpoint to 85. Now, whenever the lights are off, the thermostat will go to Unoccupied at 85 degrees. But, if an office worker goes to lunch just for an hour (and the lights are off during that time), he/she may not want to return to a room that's 85 degrees! In this case, simply set Occupied 2 to run from 8 am to 5 pm at 75 degrees. Whenever the lights are on, the stat will go to Occupied 1 at 72 degrees, because Occupied 1 overrides Occupied 2. When the lights are off, if it is between 8 and 5 the stat will revert to Occupied 2 at 75 degrees, giving a 3 degree setback which will save energy without allowing the room to heat up too much.

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## Motion Sensors

To connect a motion sensor to the input of a thermostat, use a motion sensor with a relay or dry contact type output and a timer that will keep the sensor on for a length of time after motion is detected. The timer is necessary so that the sensor doesn't require constant motion, just occasional movements. Most motion detectors are infrared devices and require a 9 - 12 VDC power source. See Appendix A for model numbers and sources.

Connect the power source to the motion detector, then run two wires from the Normally Closed contacts on the sensor to the CK1 and CK2 terminals on the thermostat (polarity doesn't

matter.) Whenever the sensor detects motion it will close its relay, which will put the thermostat into occupied mode.

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