


The ZCDC 2-Zone Plug&Play Comfort Control works with any thermostat to solve the comfort problem found in two-story homes, where the upstairs is too warm during the summer and the downstairs is too cold during the winter.

While the thermostat controls the temperature in the home, the ZCDC controls the airflow to the zones by monitoring the equipment for heating and cooling calls as well as the temperatures in the upstairs and downstairs zones. If the temperatures differ by 2 degrees or more, the ZCDC automatically directs more heating or cooling to the zone that needs it to provide a uniformly comfortable home. Or, you can manually direct more heating or cooling to the upstairs or downstairs zone as desired.

The ZCDC includes a Nighttime Comfort option, Auto Sleep, that automatically directs more heating or cooling to the upstairs sleeping zone and less to the unoccupied downstairs zone and is ideal for homes where all of the bedrooms are located upstairs.

 Look for this symbol throughout the manual to see how the ZCDC can save energy as well as reduce wasted energy.



HOMEOWNER

Things to Know.....Page 1
 Understanding Your 2-Zone Comfort Control.....Page 2

COMFORT CONTROL (COMFORT Key)
 Automatic Whole Home Comfort.....Page 2
 Downstairs Comfort Focus.....Page 2
 Upstairs Comfort Focus.....Page 2

NIGHTTIME COMFORT OPTION
 Set the Nightly Start TimePage 3
 Quick Tips About Auto Sleep.....Page 3

HOMEOWNER OPTIONS
 Auto Sleep (On or Off).....Page 3
 Auto Sleep Timer (only shown if Auto Sleep is set to On)....Page 3
 Auto Sleep Airflow (only shown if Auto Sleep is set to On)..Page 3
 Calibrate Zone 1 Temperature.....Page 3
 Calibrate Zone 2 TemperaturePage 3
 Turn Backlight Off.....Page 4

Smart Thermostats w/ Remote Sensor.....Page 4
 Troubleshooting.....Page 4

Things to Know

AIRFLOW COMFORT SELECTION

- Automatic Whole Home Comfort - Factory Default**
 Automatically adjusts the amount of heating or cooling directed to the upstairs or downstairs zone to keep the zones within 2 degrees of each other and provide whole home comfort.
- Upstairs Comfort Focus**
 More heating or cooling is directed upstairs and less to the unoccupied downstairs.
- Downstairs Comfort Focus**
 More heating or cooling is directed downstairs and less to the unoccupied upstairs.

NIGHTTIME COMFORT OPTION - Factory Set to Off

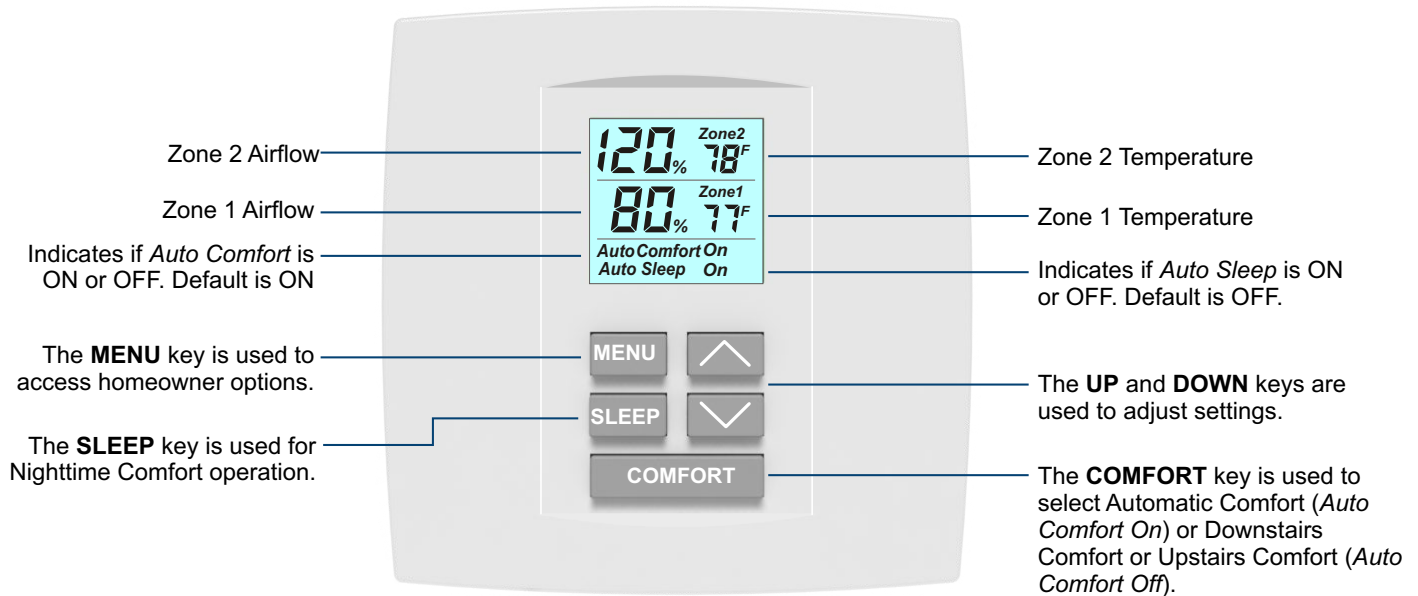
Automatically directs 30% more heating or cooling to the upstairs sleeping zone each night and 30% less to the unoccupied downstairs living zone. Saves 30% in energy at night.

Saving Changes

Changes are saved and communicated when the backlight turns off. Trying to make too many changes at once may not get the result you're looking for. Be sure to allow the ZCDC to save your change by observing the backlight turning off.

Understanding Your 2-Zone Comfort Control

The ZCDC 2-Zone Comfort Control is typically installed in the downstairs zone (living space), a wired temperature sensor is installed in the upstairs zone (sleeping space), a damper control is installed near the equipment and two modulating dampers are installed in the duct work to control the distribution of heating and cooling to the downstairs and upstairs zones.



Comfort Control

The ZCDC includes three different comfort options - **Automatic Whole Home Comfort** (factory default), **Downstairs Comfort Focus** and **Upstairs Comfort Focus** that are designed to maximize your comfort and energy savings.

▶ Press the **COMFORT** key to cycle through the comfort options.

Automatic Whole Home Comfort

In Auto Comfort, the ZCDC monitors the upstairs and downstairs temperatures during heating and cooling calls and automatically directs more heating or cooling to the zone that needs it every 2 minutes to keep the temperatures within 2 degrees to provide whole home comfort.



When *Auto Comfort On* is displayed, the UP and DOWN keys are disabled.

Reduces the wasted energy caused by overcooling your downstairs zone in the summer to make your upstairs zone more comfortable or overheating your upstairs zone in the winter to make your downstairs zone more comfortable.

Downstairs Comfort Focus

In Downstairs Comfort, the ZCDC directs more heating or cooling to the downstairs zone and less to the upstairs zone, and is ideal for homes where the upstairs is rarely used.



Airflow can be adjusted at any time by Pressing the **UP** or **DOWN** key.

Reduces the wasted energy used to heat or cool the unoccupied upstairs zone and saves energy by satisfying the heating and cooling calls sooner.

Upstairs Comfort Focus

In Upstairs Comfort, the ZCDC directs more heating or cooling to the upstairs zone and less to the downstairs zone, and is ideal for homes with an upstairs home office or theater room.



Airflow can be adjusted at any time by Pressing the **UP** or **DOWN** key.


Reduces the wasted energy used to heat or cool the unoccupied downstairs zone and saves energy by enabling you to adjust your heating and cooling set to temperatures to more energy saving settings without sacrificing comfort.

Nighttime Comfort Option - Auto Sleep

The nighttime comfort option, Auto Sleep, saves energy and improves comfort at night and is ideal for homes where all of the bedrooms are located upstairs. Each night, the ZCDC automatically directs 30% more heating or cooling to the upstairs zone and 30% less to the unoccupied downstairs zone. In the morning, the ZCDC returns to the Comfort option previously selected.

Default settings for Auto Sleep:

- Defaults to Off. Access the Menu options to turn the option On.
- 8 Hour Timer Operation - Access the Menu options to adjust.
- 130% Airflow to Zone2 - Can be changed anytime during Auto Sleep operation or by accessing the Menu options.

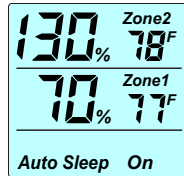
 Auto Sleep reduces the wasted energy used to heat or cool the unoccupied downstairs zone at night and saves energy by enabling you to adjust your heating and cooling set to temperatures to more energy saving settings without sacrificing comfort.

Set Nightly Start Time (First Operation)

For the first operation only, the nightly start time needs to be set.

At your desired nightly start time:

- ▶ **Press and Hold** the **SLEEP** key until the Auto Sleep airflow settings are displayed. Each night at this time, the ZCDC will automatically switch to Nighttime Comfort operation.



If desired, adjust the airflow:

- ▶ **Press and Hold** the **UP** or **DOWN** key. The setting is saved and becomes your default airflow at night.

END OF AUTO SLEEP OPERATION

In the morning when the Auto Sleep timer ends, the ZCDC automatically returns to the previous Comfort selection.

To end Auto Sleep at any time:

- ▶ **Press and Hold** the **COMFORT** key to return to the previous Comfort selection.



If Automatic Comfort was previously selected, the airflow returns to 100% in both Zone1 and Zone2, but within 2 minutes an appropriate adjustment to airflow will automatically be made.



Quick Tips For Auto Sleep Operation

- To set a new nightly start time, simply **Press** the **SLEEP** key at the desired start time.
- To end Auto Sleep operation and return to the previous Comfort selection, **Press and Hold** the **COMFORT** key.
- Following a power outage, the nightly start time for Auto Sleep needs to be reset. Simply **Press** the **SLEEP** key at the desired start time.
- To turn the Auto Sleep option Off, **Press** the **MENU** key to display AutoSleep then **Press** the **DOWN** key to display AutoSleep Off.

MENU OPTIONS

OPTION - Auto Sleep On or Off

This option turns the Auto Sleep option ON or OFF.

- ▶ **Press** the **MENU** key until *Auto Sleep Off* is displayed.
- ▶ **Press** the **UP** key to turn Auto Sleep ON or the **DOWN** key to turn Auto Sleep OFF. The setting is saved when the backlight turns off.

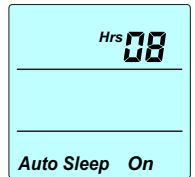


OPTION - Auto Sleep Timer Hours

Only displayed if Auto Sleep is set to On.

This option enables you to adjust the timer hours for Auto Sleep operation.

- ▶ **Press** the **MENU** key until *Auto Sleep On Hrs 08* is displayed.
- ▶ **Press and Hold** the **UP** or **DOWN** key to adjust the timer hours for Auto Sleep operation. The setting is saved when the backlight turns off.

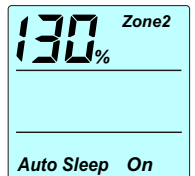


OPTION - Auto Sleep Airflow Setting

Only displayed if Auto Sleep is set to On.

This option enables you to adjust the amount of airflow directed to the upstairs sleeping zone during Auto Sleep operation.

- ▶ **Press** the **MENU** key until *Auto Sleep On 130% Zone2* is displayed.
- ▶ **Press and Hold** the **UP** or **DOWN** key to adjust the amount of airflow directed to Zone 2 during Auto Sleep operation. The setting is saved when the backlight turns off.



OPTION - Calibrate Zone 1 Temperature

This option enables you to calibrate the Zone 1 temperature to a temperature that you feel is more correct or to align with the temperature displayed on your thermostat.

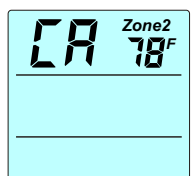
- ▶ **Press** the **MENU** key until *CA Zone1* is displayed.
- ▶ **Press and Hold** the **UP** or **DOWN** key to adjust the temperature. The setting is saved when the backlight turns off.



OPTION - Calibrate Zone 2 Temperature

This option enables you to calibrate the Zone 2 temperature to a temperature that you feel is more correct or to align with your thermostat's remote sensor (if installed).

- ▶ **Press** the **MENU** key until *CA Zone2* is displayed.
- ▶ **Press and Hold** the **UP** or **DOWN** key to adjust the temperature. The setting is saved when the backlight turns off.

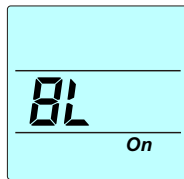


OPTION - Turn Backlight Off

This option enables you to turn the low-level backlight off.


Press the **MENU** key until BL On is displayed.


Press the **DOWN** key to turn the backlight off. The setting is saved when the backlight turns off.



Smart Thermostats w/ Remote Sensor

The ZCDC 2-Zone Comfort Control optimizes the comfort features in smart thermostats with remote sensors while adding valuable energy savings.

 At night, use the thermostat's remote sensor located upstairs in the bedroom space to control the heating and cooling calls. The Nighttime Comfort option directs more heating and cooling upstairs and satisfies the heating or cooling call sooner, saving energy and optimizing comfort.

 When Upstairs Comfort is selected, use the thermostat's remote sensor located upstairs to control the heating and cooling calls. More heating and cooling is directed upstairs, satisfying the heating or cooling call sooner, saving energy and optimizing comfort.

Troubleshooting

Sensor Error

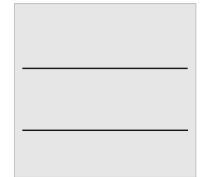
When there is an error with the temperature sensor, the ZCDC displays the temperature as dashes. A technician should check for open wires or shorts.



Until the error is corrected, the ZCDC will open both dampers and disable Automatic Uniform Comfort. Upstairs Comfort and Downstairs Comfort will function normally.

Blank Screen

The ZCDC is powered by the DC3C Damper Control. A blank display indicates that the ZCDC is not receiving power from the DC3C. A technician should verify that the DC3C and equipment are powered, as well as check for open wires or shorts.



INSTALLATION

WIRING DIAGRAM.....Page 5

INSTALLATION STEPS

- STEP 1. Rough-In Wiring.....Page 5
- STEP 2. Install Dampers.....Page 6
- STEP 3. Install DC3C Damper Control.....Page 6
- STEP 4. Connect Dampers to DC3C.....Page 6
- STEP 5. Wire DC3C to Equipment.....Page 6
- STEP 6. Connect ZCDC Cable to DC3C.....Page 6

- STEP 7. Connect TS4B Sensor Wires to DC3C.....Page 6
- STEP 8. Install & Wire TS4B Sensor.....Page 7
- STEP 9. Install & Connect ZCDC Control.....Page 7
- STEP 10. Power Control Controls & Dampers.....Page 7
- STEP 11. Set Installer Options.....Page 7
- STEP 12. Test Airflow.....Page 8

Troubleshooting.....Page 8

CAUTIONS

- Before installing the ZCDC system, turn off all power to the HVAC system.
- Read and follow all instructions carefully.
- Read entire manual before installing products.
- Follow all local electrical codes during installation. All wiring must conform to local and national electrical codes.
- Use cautions when mounting components to surfaces that may have concealed wiring beneath the surface.
- When servicing products or accessing products, turn off all power to these items.

INSTALLATION

Wiring Diagram

TS4B 2-Wire Temperature Sensor
Monitors the Upstairs Temp.



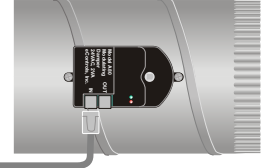
Installed in Zone2

DC3C Damper Control
Powered by Equipment 24VAC.
Monitors equipment terminal for Heating or Cooling Calls. Controls the distribution of Airflow using Modulating Dampers

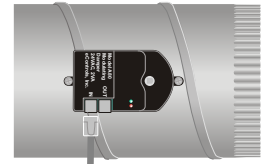


Installed near HVAC Equipment

R80CJ-XX Modulating Plug&Play Damper
Installed in Zone2 trunk



R80CJ-XX Modulating Plug&Play Damper
Installed in Zone1 trunk



Plug&Play cables provided with dampers.

ZCDC Plug&Play Comfort Control
Monitors downstairs Temp and selects Comfort Mode



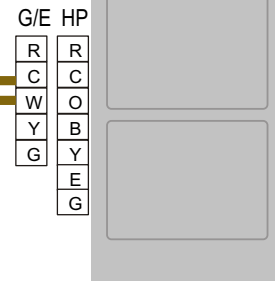
Installed in Zone1

50' Plug&Play cable provided with Damper Control and installed at rough-in.

Use Smart, OEM Communicating or simple 24VAC thermostat



HVAC Equipment Indoor Unit



STEP 1 Determine Control Locations

Before starting rough-in wiring determine if one or two temperature sensors are being used upstairs in Zone2 and the location of the sensor(s). Determine the location of the DC3C Damper Control module and the ZCDC Control.

When a single temperature sensor is used upstairs in Zone2, it should be located about 5-feet off the floor so it best senses the upstairs temperature. When two sensors (both TS4B2) are used one sensor can be used in the sleeping area hallway and the second sensor in the primary bedroom. Use 2-conductor thermostat cable to wire the sensor(s) to the DC3C at the equipment leaving about 6 inches sticking out of the wall for connection to the sensor.

The ZCDC Control should be installed downstairs near the thermostat. The DC3C Damper Control should be installed near the equipment on a non-metallic surface and away from line voltage wiring.

STEP 2 Rough-In Wiring

TS4B Single Temperature Sensor Wiring

Run a 2-conductor thermostat cable from where the DC3C Damper Control will be installed near the equipment to the sensor location. Leave about 6 inches of wire sticking out of the wall to connect to the sensor.

TS4B2 Two Temperature Sensor Wiring

Run a 2-conductor thermostat cable from where the first sensor is to be located to where the second sensor is to be located. Run a second 2-conductor thermostat cable from the second sensor to where the DC3C Damper Control will be installed near the equipment. Leave about 6 inches of wire sticking out of the wall for both cables to connect to the second sensor.

ZCDC to DC3C Wiring

The ZCDC connects to the DC3C using a 50-foot Plug&Play cable supplied with the product. The cable connectors are protected by a rubber cap that protects them from being damaged by paint or plaster. The cable can be run with the thermostat cable and routed through the access holes in the studs.

INSTALLATION

STEP 3 Install the Dampers

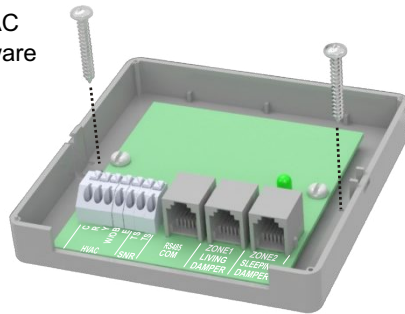
Install an R80CJ round dampers or RT80CJ rectangular damper in the trunk supplying air to Zone 1. Install a second damper in the trunk supplying air to Zone 2. The dampers can be installed at the equipment using a flange collar or in the duct line. Be sure to seal the dampers to prevent air leakage.

STEP 4 Install DC3C Damper Control

Remove cover of the DC3C Damper Control by pressing the tabs in the area indicated to release the cover.

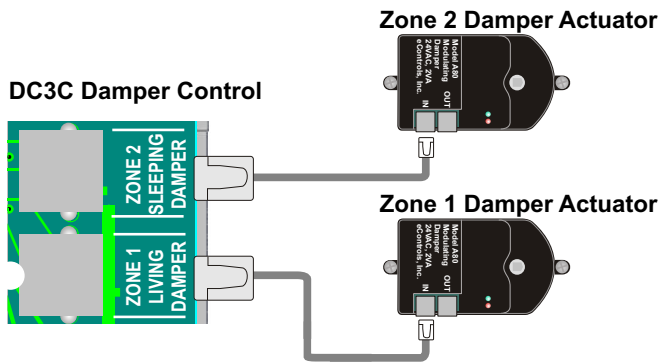


Mount DC3C near the HVAC equipment using the hardware provided.



STEP 5 Connect Dampers to DC3C

Remove the protective rubber cap and plug one end of the cable provided with the damper into the "IN" connector on the Zone 1 damper actuator then plug the other end into the Zone 1 connector on the DC3C Damper Control. Using the other cable, plug one end of the cable into the "IN" connector on the Zone 2 damper actuator then plug the other end into the Zone 2 connector on the DC3C Damper Control.



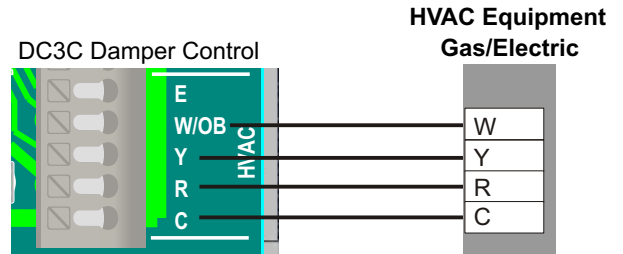
If more than one damper is required to define a zone, additional dampers can be connected by plugging one end of cable into the "OUT" connector on the first damper actuator and plugging the other end into the "IN" connector on the second damper actuator.

STEP 6 Wire DC3C to Equipment

The DC3C Damper Control is wired to the equipment for 24VAC power and to monitor the status of heating and cooling calls.

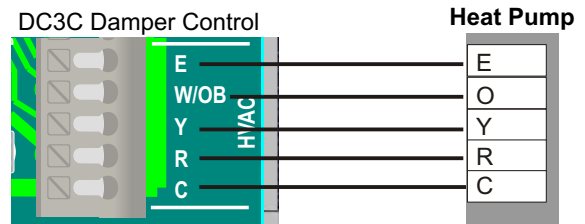
Gas/Electric Equipment

Use 4-conductor, 18 or 20 gage thermostat cable to connect the DC3C Control terminals C, R, Y and W/OB to the equipment terminals C, R, Y and W.



Heat Pump Equipment

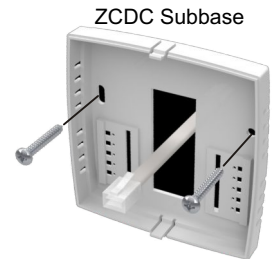
Use 5-conductor, 18 or 20 gage thermostat cable to connect the DC3C Control terminals C, R, Y, W/OB and E to the equipment terminals C, R, Y, O or B and E.



STEP 7 Install the ZCDC and Connect to DC3C



Remove the cover of the ZCDC by rotating it as shown.

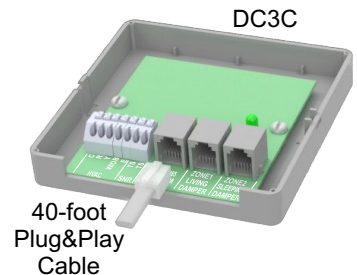


Remove the black rubber cap on the cable connector and feed the plug&play cable through the back of the ZCDC subbase. Attach the ZCDC subbase to the wall using the hardware provided.



Plug the cable into the connector on the back of the ZCDC and attach the front case to the subbase on the wall.

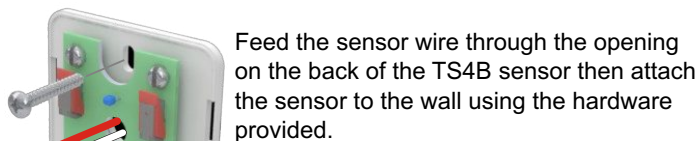
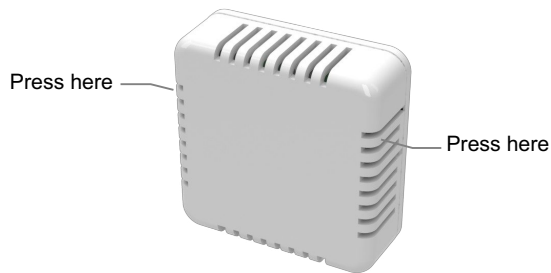
Plug the other end of cable into the connector marked "RS485 Com" on the DC3C.



INSTALLATION

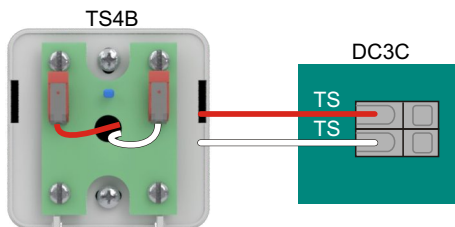
STEP 8 Connect TS4B to DC3C

Open the TS4B case by pressing on the tabs on the sides.



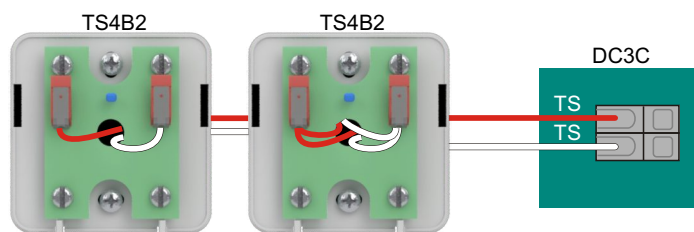
Feed the sensor wire through the opening on the back of the TS4B sensor then attach the sensor to the wall using the hardware provided.

At the TS4B insert the two wires in the press-in terminals. At the DC3C connect the two wires to the terminals marked "TS". The sensor wires are not polarized.



When Two Sensors are used

Connect the first sensor to the second sensor and connect both to the DC3C "TS" terminals as shown below. Be sure to use the TS4B2 sensor.



STEP 9 Power Controls and Dampers

Apply power to the equipment. The ZCDC Control, DC3C Damper Control and Dampers should all be powered.

Both dampers will go to the 100% open position and the green LED on both dampers will be on.

DC3C Damper Control will display a green LED. You should observe the LED blinking red about every 10 seconds when the ZCDC communicates with the DC3C.

ZCDC Comfort Control LCD display will be on and the Zone1 and Zone2 airflow percentages and temperatures will be updated in about 10 seconds..

Step 10 Set Installer Options

Installer Options ONLY need to be changed if the installation is different than the default settings shown below.

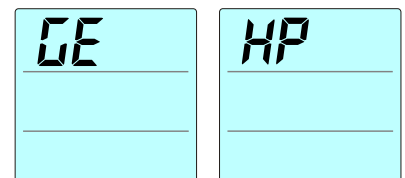
Option	Default	Range
Equipment Type	Gas/Electric	Gas/Electric or Heat Pump
Heat Pump Reversing Valve	Type O	Type O or Type B
ZCDC Location	Zone 1 Downstairs	Zone 1 Downstairs or Zone 2 Upstairs

▶ Press the **MENU** and **COMFORT** key at the same time to display the first Installer option.

OPTION 1 - Equipment Type

Defaults to GE (Gas/Electric).

Press the **DOWN** key to select HP (Heat Pump) or Press the **UP** key to select GE (Gas/Electric) equipment.

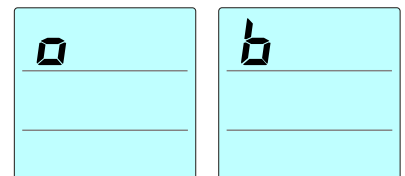


Press the **MENU** key to go to the next option.

OPTION 2 - Heat Pump Reversing Valve Type

Only displayed if HP was selected. Defaults to Type O.

Press the **UP** key to select B type or Press the **DOWN** key to select an O type reversing valve.

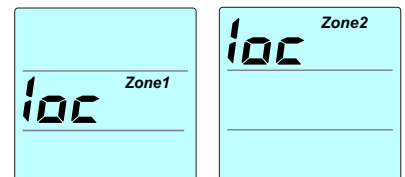


Press the **MENU** key to go to the next option.

OPTION 3 - ZCDC and Sensor Location

Defaults to Zone1 Downstairs location. Use this option to change the ZCDC location if the ZCDC is installed in Zone2 (Upstairs) and the sensor is installed in Zone1 (Downstairs).

Press the **UP** key to select Zone2 Upstairs location or Press the **DOWN** key to select the downstairs location.



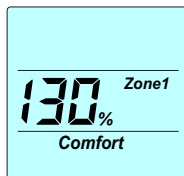
Press the **MENU** key to exit the Installer settings and return to normal operation or the control will automatically exit in a few seconds.

INSTALLATION

STEP 12 TEST AIRFLOW

This test can be used to verify the dampers are connected to the correct connectors on the DC3C. At the thermostat set the fan for continuous operation.

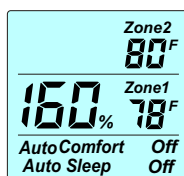
Press the **COMFORT** key to select Zone1 Comfort.



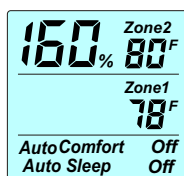
Press the **DOWN** key to set the airflow to 100% in Zone1. This is the baseline airflow with both dampers fully open. Feel the upstairs and downstairs airflow.



Press the **UP** key to increase airflow to 160% in Zone1. You should see a significant increase in the downstairs Zone1 airflow and a significant decrease in the upstairs Zone2 airflow.

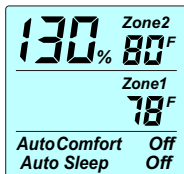


Press the **COMFORT** key to select Zone2 comfort and Press the **UP** key to set the airflow to 160%. Observe there is significantly more airflow going to the upstairs Zone2 and less going to the downstairs Zone1.



Reset the Zone1 and Zone2 Airflow

Press the **DOWN** key to return the Zone2 airflow to 130%.



Press the **COMFORT** key to select Zone1 Comfort and Press the **DOWN** key to return the Zone1 airflow to 130%.



Press the **COMFORT** key to select *Auto Comfort On*.

The ZCDC is now ready for the homeowner to use and enjoy.



TROUBLESHOOTING

Airflow appears to be reversed or not changing.

Make sure the connections for the upstairs and downstairs dampers are not reversed. Make sure the DC3C is powered and communicating by observing a green LED then about every 10 seconds a red blink, indicating communication. Make sure the dampers are powered by observing a green LED on the actuators when the dampers are in a 100% open position.

Understanding Damper LEDs and Airflow

Airflow Displayed	Zone 1 Damper	Zone 2 Damper
100% Zone 2 100% Zone 1	Open Green LED	Open Green LED
More Airflow to Zone 1	Open Green LED	Partially Closed No LED
More Airflow to Zone 2	Partially Closed No LED	Open Green LED

No Display on ZCDC

The ZCDC is powered by the DC3C using the cable. Make sure the cable is plugged into the connector on the back of the ZCDC and the connector marked RS485 on the DC3C. Make sure the equipment is powered. Check the wiring to the R and C terminals on the DC3C.

Sensor Error

- - displayed where the Zone 2 temperature should be displayed, indicates a sensor error. Check the sensor wiring.

nC Communication Error

nC indicates a loss of communication with the DC3C Damper Control. This can be caused by damage to the plug&play cable.

Limited 5-Year Warranty

The 5-year warranty is limited to the repair or replacement of defective product due to parts failure or defective workmanship.

eControls

26072 Merit Circle #110 / Laguna Hills, CA 92653
949-916-0945 Fax 949-458-8502 www.eControlsUSA.com