



SmartZonePLUS™ Quick-Start Guide

November 15, 2008

This guide is intended to give the installer a brief set of instructions about how to set up the XCI Controls **SmartZonePLUS™** System. For more detailed information about the **SmartZonePLUS™** Controller, contact our Technical Support line if you need an emailed electronic or snail mailed hardcopy of the System Manual.

This document applies to the following product models and versions:

SmartZonePLUS™ EC1 – Equipment Controller	hardware v1.3, firmware r1
SmartZonePLUS™ RZ4 – Remote Zone 4 Controller	hardware v1.3, firmware r1
SmartZonePLUS™ RZ1 – Remote Zone 1 Controller	hardware v1.3, firmware r1

To contact XCI Controls Technical Support call 866-XCI-CTRL (866-924-2875)

Mounting

1. Remove the clear lid from the **SmartZonePLUS™** EC1 Enclosure.
2. Using flat or pan-head screws (at least 2); mount the gray base of the **SmartZonePLUS™** Enclosure on a flat surface.
3. Using pliers, break out the necessary “knock-outs” for wiring on the side of the gray base of the **SmartZonePLUS™** Enclosure.
NOTE: If using the holes on the back of the enclosure for surface mount wiring this may not be necessary.
4. Repeat steps 1, 2, and 3 for each **SmartZonePLUS™** RZ1 and/or RZ4 remote zone boards.
5. After wiring is completed, replace the clear lids for each board.
6. All **SmartZone™** Control boards can be placed in temperatures between 20°F and 160°F. Humidity must be less than 90% with NO direct moisture.

Power & Power Wiring

The **SmartZonePLUS™** System requires a separate 24VAC transformer for powering the **SmartZonePLUS™** Controller Board(s), Zone Thermostats and Dampers.

IMPORTANT: Maintain polarity on both primary and secondary sides of each transformer. Always fuse and ground each transformer.

Since the system is expandable in 1 or 4 zone expander boards up to a total of 33 zones, carefully calculate the total power required for the entire system. Multiple transformers may be used for convenience of installation. RZ1 and RZ4 remote zone expansion boards do not have to be located in the same place as the EC1; they can be spread out across the facility and be up to a total of 4000 feet away from the EC1 equipment controller. Connect 24VAC and 24VAC(c) to the POWER Connector on the bottom left of each **SmartZonePLUS™** Controller Board.

Device	Power Requirement
EC1 Equipment Controller	16VA (including thermostats)
RZ1 1-Zone Expander	12VA (including thermostat)
RZ4 4-Zone Expander	22VA (including thermostats)
SZD Spring Return Damper	10VA
FAD Fresh Air Damper	10VA
POC Round POC Damper	3VA
RPOC Rectangular POC Damper	3VA

SmartZonePLUS™ EC1 (with 1 Zone) TRANSFORMER SIZE = 16VA (14VA for the EC1 and 2VA for the Thermostat) + 10VA (per FAD and SZD Damper) **OR** 3VA (per POC and RPOC damper).

SmartZonePLUS™ RZ1 (with 1 Zone) TRANSFORMER SIZE = 12VA (10VA for the RZ1 and 2VA for each of the Thermostats) + 10VA (per SZD Damper) **OR** 3VA (per POC and RPOC damper).

SmartZonePLUS™ RZ4 (with 4 Zones) TRANSFORMER SIZE = 22VA (14VA for the RZ4 and 2VA for each of the Thermostats) + 10VA (per SZD Damper) **OR** 3VA (per POC and RPOC damper).

POWER SIZING EXAMPLES:

[Example 1:]

The system has 11 zones, with all electronics mounted in a single location, using all POC dampers and a FAD fresh air damper:

EC1, 1 FAD damper, 1 POC damper = 16 + 10 + 3 = 29VA

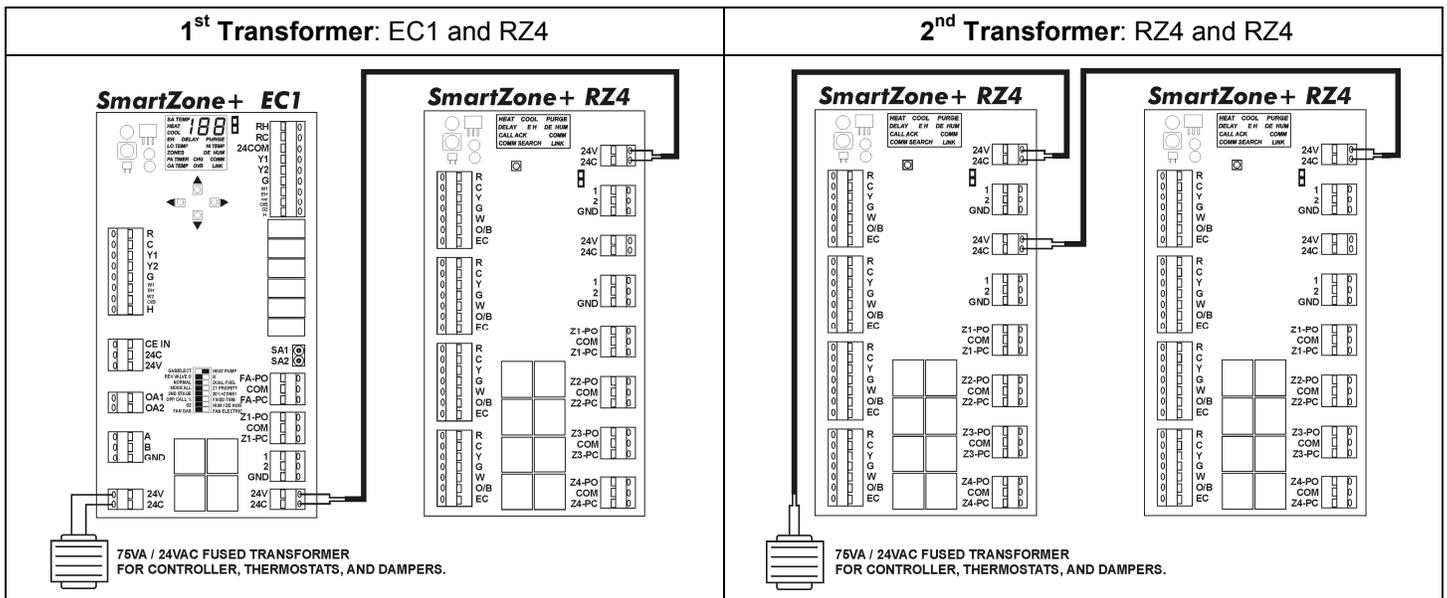
RZ4, 4 POC dampers = 22 + (4 x 3) = 34VA

RZ4, 4 POC dampers = 22 + (4 x 3) = 34VA

RZ4, 2 POC dampers = 22 + (2 x 3) = 28VA

29VA + 34VA + 34VA + 28VA = **125VA minimum required for the total system**

125VA should be divided into two (2) 75VA transformers as shown below.



[Example 2:]

The system has 16 zones, with five (5) zones mounted in a central location, eight (8) zones mounted in a second location, and three (3) zones mounted in a third location, using all POC dampers and a FAD fresh air damper:

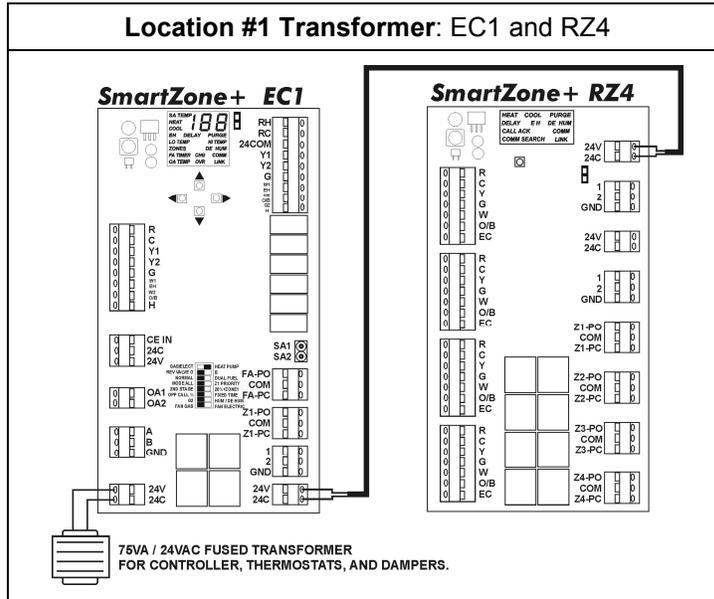
LOCATION #1: 5 Zones

EC1, 1 FAD damper, 1 POC damper = 16 + 10 + 3 = 29VA

RZ4, 4 POC dampers = 22 + (4 x 3) = 34VA

29VA + 34VA = **63VA minimum required for location #1**

Use one (1) 75VA transformers for location #1



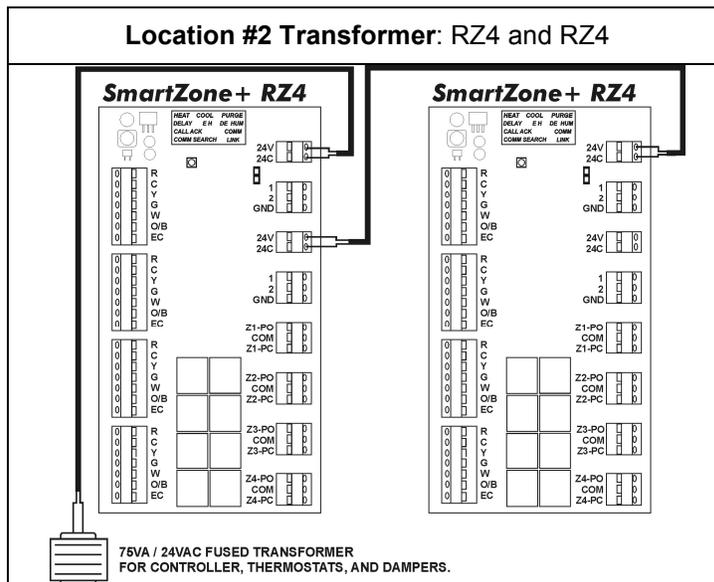
LOCATION #2: 8 Zones

RZ4, 4 POC dampers = 22 + (4 x 3) = 34VA

RZ4, 4 POC dampers = 22 + (4 x 3) = 34VA

34VA + 34VA = **68VA minimum required for location #2**

Use one (1) 75VA transformers for location #2

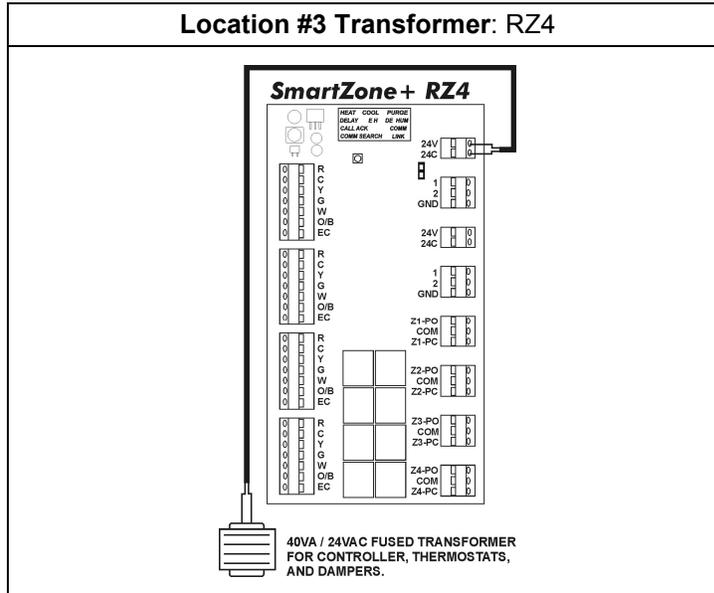


LOCATION #3: 3 Zones

RZ4, 3 POC dampers = $22 + (3 \times 3) = 31VA$

31VA minimum required for location #3

Use one (1) 40VA transformers for location #3



Thermostats and Thermostat Wiring

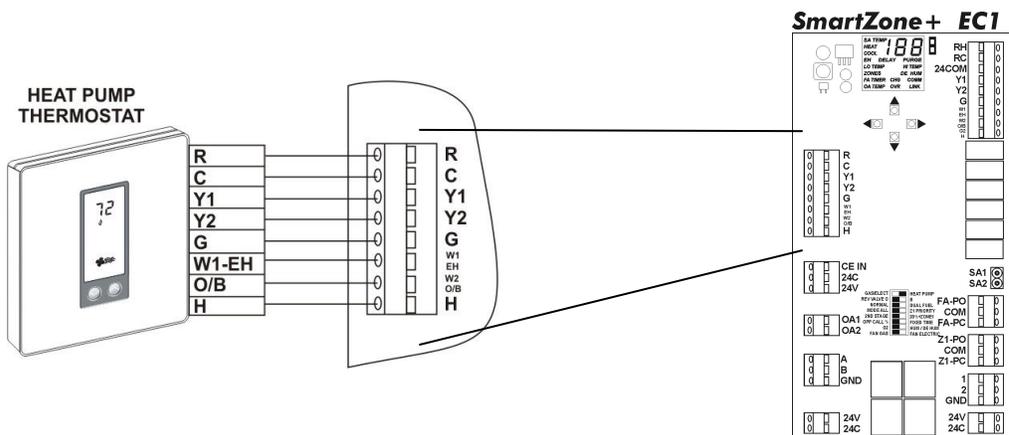
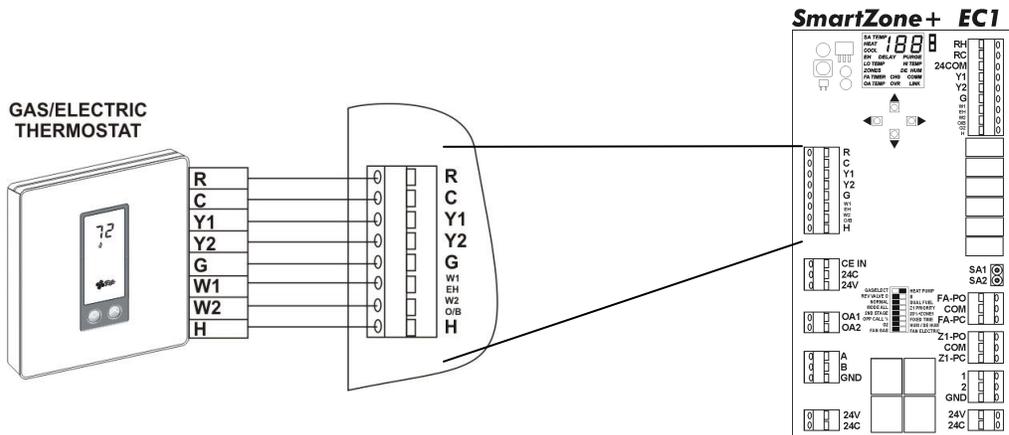
Thermostats

SmartZonePLUS™ will operate using thermostats that have a common or are battery operated, follow the below steps to connect each of the thermostats to each of the **SmartZonePLUS™** Controller Boards.

EC1 Thermostat Wiring

The **SmartZonePLUS™** EC1 Equipment Controller is 'Zone 1' of the system, and is unique from the other RZ-x expansion boards. The EC1 allows thermostat connection for 1 or 2 stage cooling, 1 or 2 stage heating, Gas/Electric or Heat Pump (with or without Emergency Heat), and Humidification or Dehumidification.

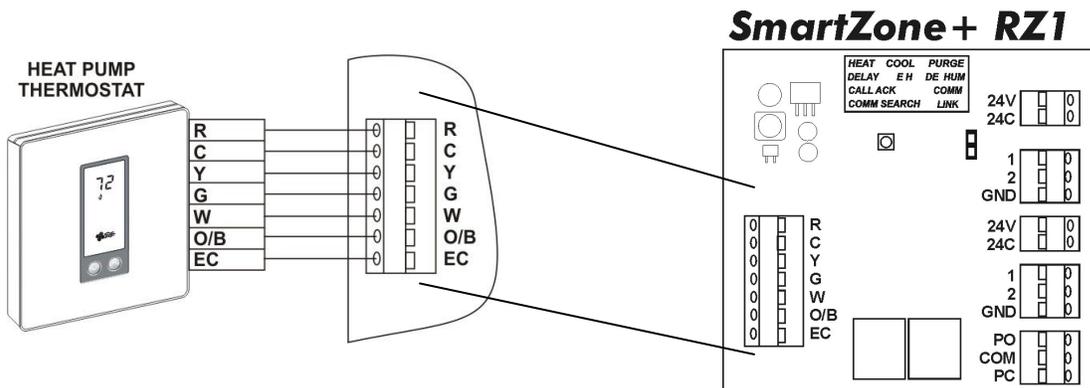
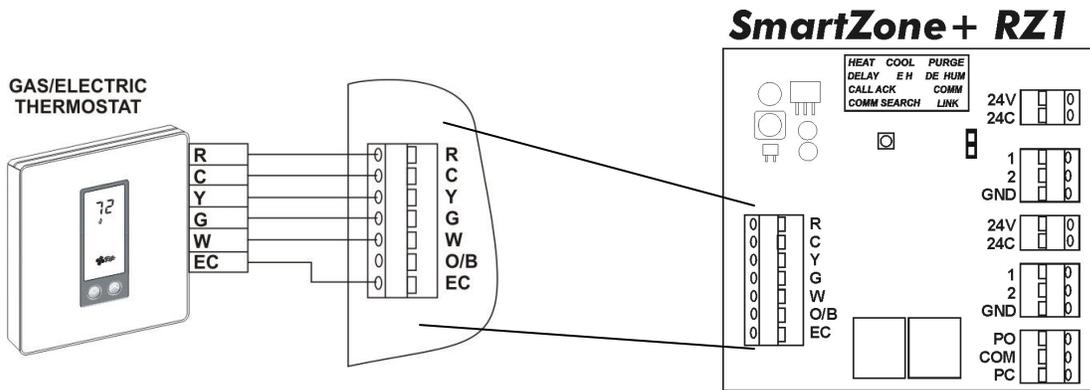
1. Connect either a heat pump thermostat (for heat pump application only) or gas/electric thermostat to the terminal block labeled ZONE 1 THERMOSTAT.
2. If a 2-Stage thermostat is used, the 2nd Stage (heat and/or cool) can be used for energizing the EQUIPMENT output 2nd Stage, in addition to the Electronic Limit Control staging algorithm described later in this manual.
3. The ZONE 1 THERMOSTAT will operate ZONE 1 damper.
4. Hold down the orange button adjacent to the terminal openings and push the thermostat wires into SCREWLESS terminals labeled R,C,Y1,Y2,G,W1-EH, W2-O/B,H (as applicable).
5. Connect the other end of the thermostat wire to the thermostat for ZONE 1.



RZ1 Thermostat Wiring

The **SmartZonePLUS™** RZ1 Remote Zone Expansion Board is used to add additional zones in single zone increments. A system can have a total of thirty-two (32) RZ1 boards, up to a total of 33 zones. If there are also RZ4 expansion boards connected on the system, the total number of RZ1 boards will be less, reduced accordingly. The RZ1 allows for 1 stage cooling, and 1 stage heating, Gas/Electric or Heat Pump, and Comfort or Economy operation.

1. Connect either a heat pump thermostat (in a heat pump application) or gas/electric thermostat to each terminal block labeled ZONE 1 THERMOSTAT.
2. The ZONE 1 THERMOSTAT will operate ZONE 1 damper, ZONE 2 THERMOSTAT will operate ZONE 2 damper, etc.
3. Hold down the orange button adjacent to the terminal openings and push the thermostat wires into SCREWLESS terminals labeled R,C,Y,G,W,O/B,EC (as applicable).
4. Connect the other end of the thermostat wire to the thermostat for the appropriate zone to be controlled.
5. On POWER UP of heat pump application, press the STAT TYPE SELECT button to set the thermostat type to either G/E or HP.



Supply Damper Wiring

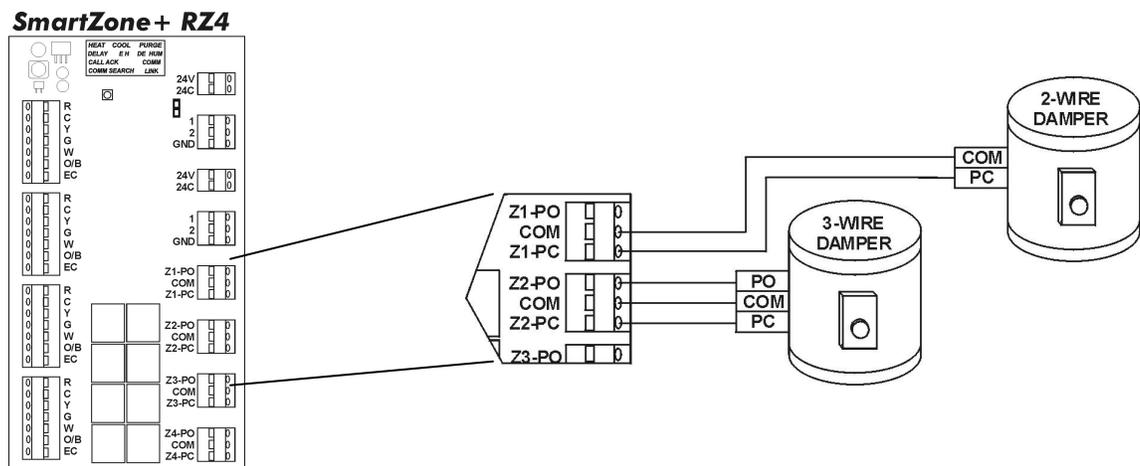
Damper installation is the same for all boards in the **SmartZonePLUS™** family, including the EC1, RZ4 and RZ1.

When using **Power Close/Spring Open** dampers follow the steps below to connect each of the dampers to the **SmartZonePLUS™** Controller Board:

1. Use minimum 18/2 solid core wire for SZD and FAD dampers or 18/3 solid core wire for POC and RPOC dampers.
2. Hold down the orange button adjacent to the terminal block openings labeled Z1-PC and COM and push wires for the ZONE damper into the SCREWLESS terminals.
3. Connect the other end of the wire to the SCREWLESS terminals on the ZONE damper.

When using a **Power Open/Power Close** damper follow the steps below to connect each of the dampers to the **SmartZonePLUS™** Controller Board:

1. Use minimum 18/3 solid core wire
2. Hold down the orange button adjacent to the terminal block openings labeled Z1-PC, COM and Z1-PO and push wires for the ZONE damper into the SCREWLESS terminals.
3. Connect the other end of the wire to the SCREWLESS terminals on the ZONE damper.



Fresh-Air Damper Wiring

The Fresh-Air Damper for the system is connected to the EC1.

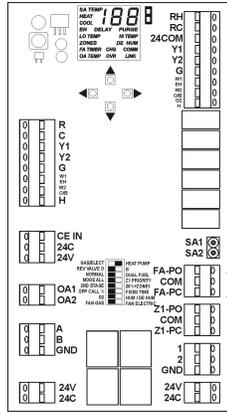
When using a **Power Open/Spring Close** fresh air damper, follow the steps below to connect the damper to the **SmartZonePLUS™** EC1 Equipment Controller Board:

1. Use minimum 18/2 or 18/3 solid core wire
2. Hold down the orange button adjacent to the terminal block openings labeled NO and COM and push wires for the Fresh Air damper into the SCREWLESS terminals.
3. Connect the other end of the wire to the SCREWLESS terminals on the Fresh Air damper.

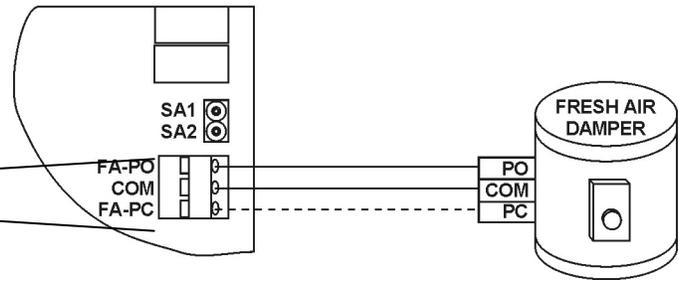
When using a **Power Open/Power Close** fresh air damper, follow the steps below to connect the damper to the **SmartZonePLUS™** EC1 Equipment Controller Board:

1. Use minimum 18/3 solid core wire
2. Hold down the orange button adjacent to the terminal block openings labeled NO, COM and NC and push wires for the Fresh Air damper into the SCREWLESS terminals.
3. Connect the other end of the wire to the SCREWLESS terminals on the Fresh Air damper.

SmartZone+ EC1



EC1



Supply Air Temperature Sensor [SA Sensor] Wiring

Sensor Placement (Location)

Gas/Electric – Sensor should be located in the Supply Air Plenum where it will sense AVERAGE air temperature within the plenum. The most ideal placement for the Sensor will be 2 to 4 feet beyond the evaporator. Make sure the sensor is in the air stream and secured properly.

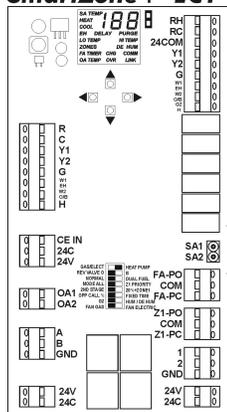
Dual Fuel – Sensor should be located same as Gas/Electric as described above.

Heat Pump – The sensor is placed inside the cabinet of the air handler after the coil but before the blower. Make sure the sensor is in the air stream and secured properly.

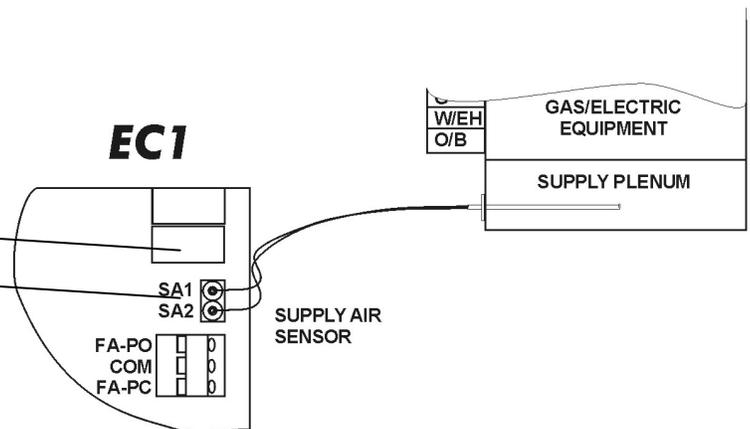
Sensor Wiring

Using the provided **GREEN** connector (Factory Connected to Sensor Wire) plug the SA Sensor wire into the **SmartZonePLUS™** Controller Board. **NOTE: WITHOUT THIS SENSOR, THE SmartZonePLUS™ CONTROLLER BOARD WILL NOT OPERATE. SmartZonePLUS™**

SmartZone+ EC1



EC1



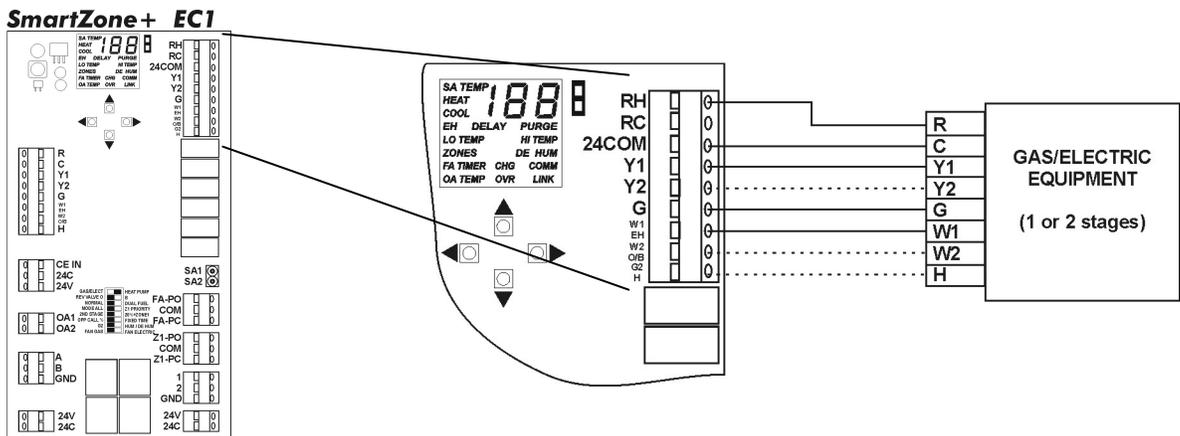
Note: On heat pumps, SAS is located in air handler between indoor coil and blower except on Dual Fuel applications where SAS should be located in the supply plenum, just like Gas/Electric applications.

HVAC Equipment Wiring

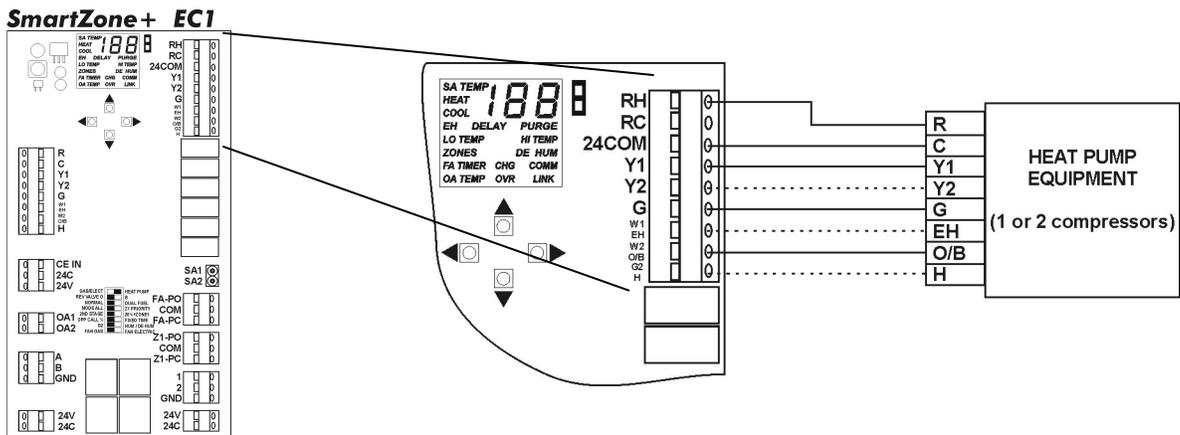
Connect the Equipment Control Wires from the Unit to the EQUIPMENT Terminal Block on the Top Right of the **SmartZonePLUS™** EC1 Equipment Controller Board. Use the terminal labeled “W1 EH” for 1st stage heat when using gas/electric equipment or auxiliary/emergency heat on heat pump. Use the terminal labeled “W2 O/B” on 2nd stage heat on gas/electric equipment. Use the terminal labeled “W2 O/B” for reversing valve when using heat pump.

NOTE: THE ‘C’ TERMINAL MUST BE CONNECTED TO THE CONTROLLER AND EQUIPMENT IN ORDER FOR THE EQUIPMENT LEDs TO ENERGIZE. POWER FROM THE EQUIPMENT TRANSFORMER WILL ILLUMINATE THE RC AND RH TERMINAL LEDs INDICATING THE EQUIPMENT TRANSFORMER IS CONNECTED.

GAS-ELECTRIC SYSTEM WIRING



HEAT PUMP SYSTEM WIRING



RZ1 and RZ4 Communications Connections

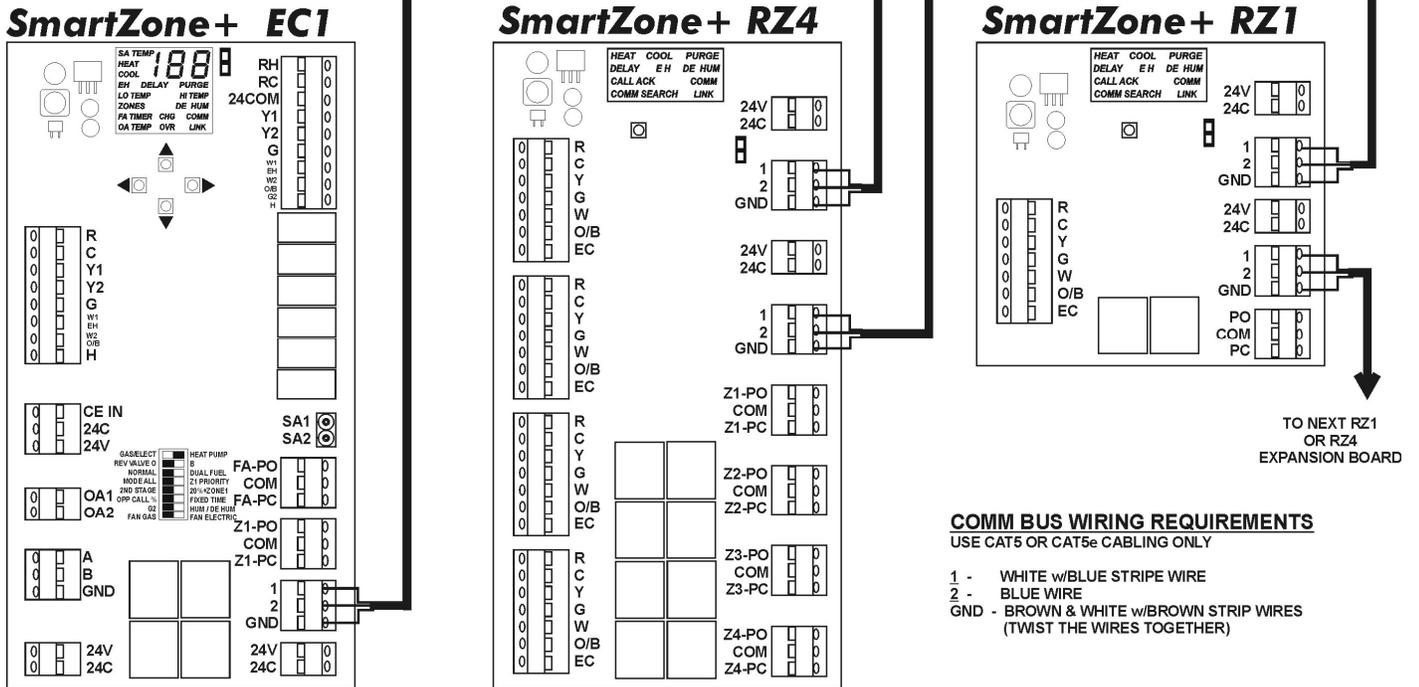
Using a CAT5 communications cable, connect the **SmartZonePLUS™** EC1 Equipment Controller Board to each of the RZ1 and/or RZ4 expansion modules. These modules may be located anywhere within the facility, with up to 1,000 feet of CAT5 cable connecting them. SEE **COMM BUS WIRING REQUIREMENTS** in the diagram below.

On the EC1, use the COMM terminals labeled '1 2 GND', and connect them to the first RZ1 or RZ4 zone expansion board, using the COMM IN terminals labeled 'A B GND'.

Then, from the first RZ1 or RZ4 board, use the COMM OUT terminals labeled '1 2 GND', and connect them to the next RZ1 or RZ4 zone expansion board, using the COMM IN terminals labeled '1 2 GND'.

Continue to connect the RZ1 and RZ4 boards until all expansion boards are connected.

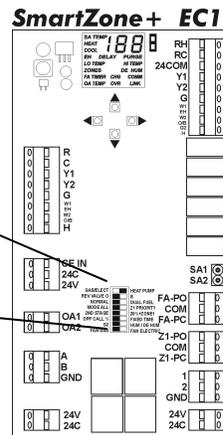
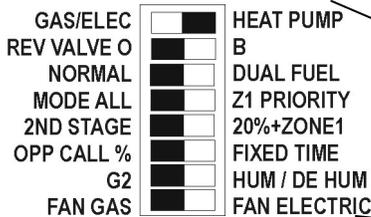
SmartZonePLUS™ COMMUNICATIONS WIRING



Configuration

DIP Switches

ALL of the DIP Switches MUST BE SET according to the equipment type, thermostats being used as well as the desired functionality of the **SmartZonePLUS™** System. If not, unpredictable and undesirable results may occur. See the table below for DIP Switch descriptions.



DIP #1	GAS/ELECT	Gas/Electric or Electric/Electric Equipment. (Default)
	HEAT PUMP	Heat Pump Equipment ONLY.
DIP #2	REV VALVE O	Reversing valve is energized in COOLING. (Default)
	B	Reversing valve is energized in HEATING.
DIP #3	NORMAL	Operates electric auxiliary heat with compressor. (Default)
	DUAL FUEL	Operates gas auxiliary heat with NO compressor. USE IN HEAT PUMP MODE ONLY.
DIP #4	MODE ALL	Normal Opposing Call Changeover is active. (Default)
	Z1 PRIORITY	Opposing Call is Locked Out until Zone 1 is satisfied.
DIP #5	2ND STAGE	2 nd Stage energized using ELC, or Zone 1 can initiate 2 nd Stage. (Default)
	20% + ZONE1	2 nd Stage energized using ELC with Minimum of 20% of zones calling, or Zone 1 can initiate 2 nd Stage.
DIP #6	OPP CALL %	Dynamic Opposing Call Time. (Default) (SEE TABLE BELOW)
	FIXED TIME	Opposing Call time is fixed at 15 minutes.
DIP #7	HUMIDIFY	Energizes the H Output when Zone 1 Thermostat has energized the H input terminal and the system is operating as a Heating Call. (Default)
	DEHUMIDIFY	Energize the H Output unless there are NO calls from any zone and Zone 1 thermostat has de-energized the H Input.
DIP #8	FAN GAS	90 Second Delay before fan start on any Heat call. (Default)
	FAN ELECTRIC	Fan energized immediately with any Heat call.

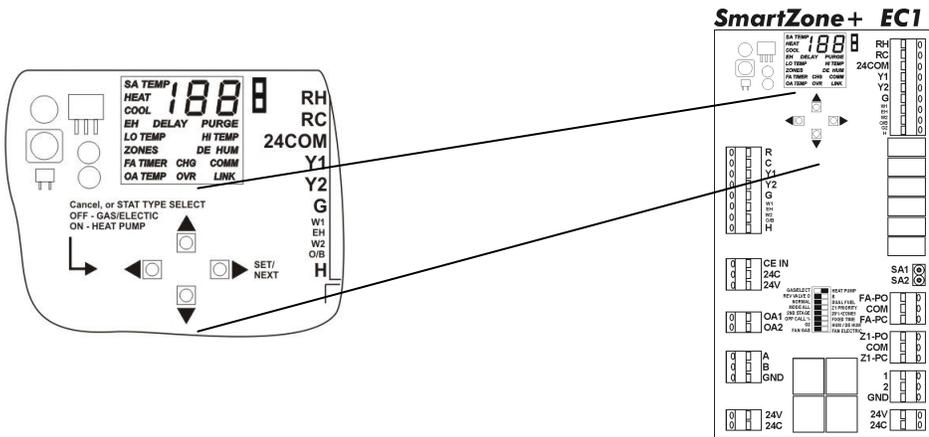
Dynamic Opposing Call % Table

The Dynamic Opposing Call % is feature which automatically adjusts the amount of time before equipment changeover to an opposing heat/cool call is initiated. The amount of time is dynamically adjusted based on the percentage of opposing call zones.

Opposing Call Time	% of Active Opposing Call Zones
25 min.	less than 20%
20 min.	20% to 39%
15 min.	40% to 60%
10 min.	61% to 79%
5 min.	80% or more

Push Buttons

The push buttons are used for several different functions. See descriptions below for information on how to use the buttons to setup and view **SmartZonePLUS™** Controller settings.



Using the push buttons to set up desired options of the EC1 is very simple. Pressing the SET/NEXT (right) button starts the process, the UP and DOWN buttons allow adjustments of the options, and the CANCEL (left) button cancels the set up process and is used to select either G/E or HP thermostat for Zone 1. Below is an ordered list of each set up option.

1st Press: COOL ZONES CALLING (INFORMATIONAL ONLY)

Press the SET/NEXT button and the display will change to a solid green COOL and a solid yellow ZONES, indicating the number of zones in the system currently calling for COOL. This number represents only the zones capable of initiating an equipment call (no zones in the 'ECONOMY MODE').

2nd Press: HEAT ZONES CALLING (INFORMATIONAL ONLY)

Press the SET/NEXT button and the display will change to a solid red HEAT and a solid yellow ZONES, indicating the number of zones in the system currently calling for HEAT. This number represents only the zones capable of initiating an equipment call (no zones in the 'ECONOMY MODE').

3rd Press: TOTAL ZONES (INFORMATIONAL ONLY)

Press the SET/NEXT button and ZONES will display indicating the total number of zones for the system. This number represents all zones in the system based on the number of thermostat connectors on all connected **SmartZonePLUS™** boards.

4th Press: EQUIPMENT MODE CHANGEOVER TIMER (INFORMATIONAL ONLY)

Press the SET/NEXT button and the display will change to a solid yellow CHG OVR indicating the minutes remaining before the equipment is to switch modes.

5th Press: Electronic Limit Control™ (ELC) – LO TEMP CUTOUT

Before setting the High and Low Temperature Equipment cutout Set Points, ensure that the DIP switches are set correctly choosing the proper equipment type. See ELC below for a full description.

Press the SET/NEXT button and the LO TEMP cutout value will be displayed in Fahrenheit. A flashing green "LO TEMP" will also display.

LOW Temperature Cut-Out (Factory Default - GAS/ELECTRIC = 48°F; HEAT PUMP = 48°F)

1. While the green "LO TEMP" indicator is flashing, within 15 seconds press either the UP or the DOWN arrow button to change the LOW Temperature cutout. The temperature indicated here represents the lowest temperature allowed at the supply air sensor.
2. **Within 15 seconds after setting the LO TEMP cutout, press the SET/NEXT button to save the new setting and the display will proceed to the HI TEMP function.**

6th Press: Electronic Limit Control™ (ELC) – HI TEMP CUTOUT

If the LO TEMP setting was not reset in the previous paragraph, press the SET/NEXT button and the HI TEMP cutout value will be displayed in Fahrenheit. A flashing red "HI TEMP" will also display.

HIGH Temperature cutout (Factory Default - GAS/ELECTRIC = 135°F; HEAT PUMP = 120°F)

1. While the red "HI TEMP" indicator is flashing, within 15 seconds press either the UP or the DOWN arrow button to change the HIGH Temperature cutout. The temperature indicated here represents the highest temperature allowed at the supply air sensor.
2. **Within 15 seconds after setting the HI TEMP cutout, press the SET/NEXT button to save the new setting and the display will proceed to the DE HUM function.**

7th Press: DEHUMIDIFY/HUMIDIFY (dipswitch #7 must be set to DE/HUM to display this function)

If the HI TEMP setting was not reset in the previous paragraph, press the SET/NEXT button and a solid orange DE HUM will display. The DE HUM setting will display as a solid green 'dH' (dehumidify) or 'H' (humidify).

DEHUMIDIFY/HUMIDIFY settings (Factory Default – 'dH')

1. Change settings by pressing the UP or the DOWN arrow button to select DEHUMIDIFY (dH) or HUMIDIFY (H).
2. **Within 15 seconds after selecting the settings required, press the SET/NEXT button to save the new setting and the display will proceed to the FA TIMER function.**

8th Press: FRESH AIR TIMER

1. Press the SET/NEXT button and the display will change to a flashing green FA TIMER. The time is indicated in Number of Minutes-Per-Hour that the Fresh-Air Damper will be OPEN.
2. While the green "FA TIMER" indicator is flashing, within 15 seconds press either the UP or the DOWN arrow button to change to the timer to the desired value.
NOTE: If NO Fresh Air Damper is installed, '0' (Zero) Time must be set or the equipment fan will run unnecessarily.
3. **After the desired FA TIMER time has been selected, press the SET/NEXT button to save the new FA TIMER setting and proceed to the FA LO TEMP function.**

9th Press: FRESH AIR – LO TEMP CUTOUT (dipswitch #1 must be set to HEAT PUMP to display this function)

NOTE: An outdoor temperature sensor must be connected to the EC1 Controller for this function to operate.

To set the High and Low Temperature Equipment cutout settings follow the steps below, before completing these steps, ensure that an outdoor temperature sensor is connected to the EC1 Controller. Failure to install an outdoor temperature sensor will cause the Fresh Air temperature cutout settings to be ignored.

Press the SET/NEXT button and flashing green FA LO TEMP will display including the current setting in Fahrenheit if changed previously. On initial startup factory default will be OFF and ' - - ' will be displayed.

FA LO TEMP cutout (Factory Default – ' - - ' indicates FA temperature control is OFF)

1. While the green "FA LO TEMP" indicator is flashing, within 15 seconds press either the UP or the DOWN arrow button to change the FRESH AIR LOW Temperature cutout. The temperature indicated here represents the lowest outdoor temperature at which the fresh air damper will open to mix outside air into the return air plenum.
2. **Within 15 seconds after setting the LO TEMP cutout, press the SET/NEXT button to save the new setting and the display will proceed to the FA HI TEMP function.**

10th Press: FRESH AIR – HI TEMP CUTOUT (dipswitch #1 must be set to HEAT PUMP to display this function)

NOTE: An outdoor temperature sensor must be connected to the EC1 Controller for this function to operate.

Press the SET/NEXT button and flashing green FA HI TEMP will display including the current setting in Fahrenheit if changed previously. On initial startup factory default will be OFF and ' - - ' will be displayed.

FA HI TEMP cutout (Factory Default – ' - - ' indicates FA temperature control is OFF)

1. While the red "FA HI TEMP" indicator is flashing, within 15 seconds press either the UP or the DOWN arrow button to change the FRESH AIR HIGH Temperature cutout. The temperature indicated here represents the highest outdoor temperature at which the fresh air damper will mix outside air into the supply air plenum.
2. **Within 15 seconds after setting the HI TEMP cutout, press the SET/NEXT button to save the new setting and the display will proceed to the LO TEMP balance point setting for heat pump.**

11th Press: HEAT PUMP BALANCE POINT – LO TEMP CUTOUT (dipswitch #1 must be set to HEAT PUMP to display this function)

NOTE: An outdoor temperature sensor must be connected to the EC1 Controller for this function to operate.

1. While the "LO TEMP" and "OA TEMP" indicator is on, within 15 seconds press either the UP or the DOWN arrow button to change the low temperature at which the compressor will not operate in the heat pump heating mode. Only Auxiliary Heat (W1-EH) will be allowed to energize on a call for heat pump heating when the Outdoor Air temperature is below the cutout temperature.
2. **Within 15 seconds after setting the LO TEMP cutout, press the SET/NEXT button to save the new setting and the display will proceed to the HI TEMP balance point setting for heat pump.**

12th Press: HEAT PUMP BALANCE POINT – HI TEMP CUTOUT (dipswitch #1 must be set to HEAT PUMP to display this function)

NOTE: An outdoor temperature sensor must be connected to the EC1 Controller for this function to operate.

1. While the "HI TEMP" and "OA TEMP" indicator is on, within 15 seconds press either the UP or the DOWN arrow button to change the high temperature at which the Auxiliary Heat (W1-EH) will not operate in the heat pump heating mode. Only the compressor will furnish heat in the heat pump heating mode when the Outdoor Air temperature is above the cutout temperature.
2. **Within 15 seconds after setting the HI TEMP cutout, press the SET/NEXT button to save the new setting and the display will go the the normal operation.**

13th Press: NORMAL DISPLAY (INFORMATIONAL ONLY)

Press the SET/NEXT button and display will return to normal operation.

Dual Fuel (Gas Furnace add on to heat pump) Applications

Note 1: A DUAL FUEL KIT IS NOT REQUIRED and HEAT PUMP THERMOSTATS ARE NOT REQUIRED. However, use a Heat Pump stat in the #1 ZONE only to control EMERGENCY HEAT.

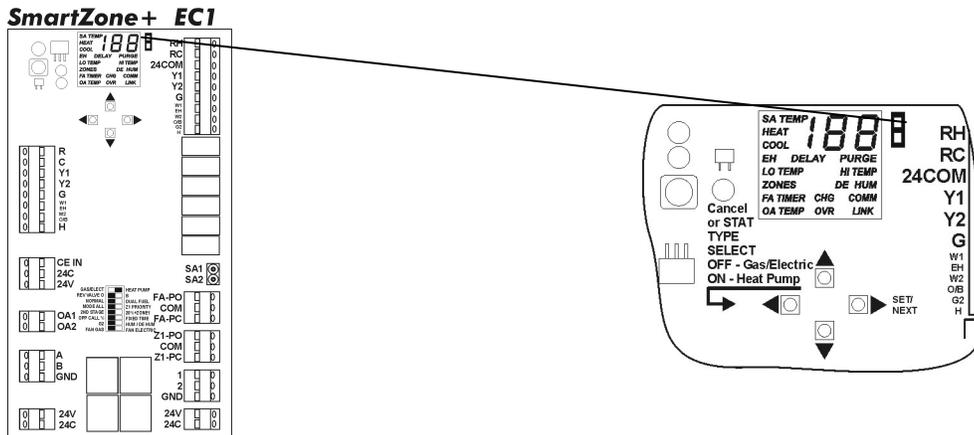
Note 2: Always install the heat pump evaporator downstream of the furnace. This prevents condensation in the heat exchanger during the cooling mode.

1. The HIGH Temperature Cut-Out for the gas furnace in a dual fuel application can only be identified and adjusted when the **# 8 dipswitch is in the FAN GAS** position.
2. The HIGH Temperature Cut-Out for the heat pump in a dual fuel application can only be identified and adjusted when the **# 8 dipswitch is in the FAN GAS** position.
3. The LOW Temperature Cut-Out for the **HEAT PUMP** in a dual fuel application is the same as described earlier (LOW Temperature Cut-Out).

RC/RH Jumper

The *RC/RH Jumper* is Factory Installed on the **SmartZonePLUS™** EC1 Equipment Controller Board. If the system being used requires separate Heat and Cool Transformers, REMOVE this jumper [JP2] at the top right of the board.

Note: In the case of a Heat-Pump System, this Jumper ALWAYS needs to be installed.



Operation

Indicators on the Left Side of the Board (EC1)

Thermostat LEDs

Each LED indicates what call is being requested by the thermostat.

- The Red LED adjacent to 'R' indicates **SmartZonePLUS™** has power available for the thermostat.
- The Yellow LED adjacent to 'Y1' indicates a 1st stage Cool call from the thermostat.
- The Yellow LED adjacent to 'Y2' indicates a 2nd stage Cool call from the thermostat.
- The Green LED adjacent to the 'G' indicates Fan call from thermostat.
- The Red LED adjacent to the 'W1-EH' indicates a 1st stage Heat call from thermostat in Gas/Electric applications. In heat pump applications, the 'W1-EH' indicates a call for emergency heat or auxiliary heat.
- The Orange LED adjacent to the 'W2-O/B' indicates a 2nd stage Heat call from thermostat or a reversing valve being energized (HP only).
- The Green LED adjacent to the 'H' indicates a Humidification or a Dehumidification call from thermostat.

ECON LED

- Green LED indicates Economy Mode is selected from an external device. This might be a switch that closes when the zone is unoccupied. The Economy Mode will not allow a call from any other thermostat than the EC1 thermostat to energize equipment, however, the other calling zone damper(s)

will operate when the equipment is in the appropriate mode. This allows a clock or some other switching device to operate the equipment from a single thermostat using unoccupied set points.

RS485 LED

- Blue LED indicates External Communications is active.

PWR(IN) LED

- Green LED indicates 24VAC power is connected to the board.

Indicators on the Right Side of Board (EC1)

Equipment LEDs

Diagnostic LEDs indicate which equipment circuits are energized with 24VAC. When no 'R' LED is on make certain the C (common wire to equipment) is connected, then check power from the HVAC unit.

Fresh Air Damper LEDs

- Red LED indicates damper is powered close.
- Green LED indicates damper is open or powered open.

Supply Damper LEDs

- Red LED indicates damper is powered close.
- Green LED indicates damper is open or powered open.

COMM LED

- Blue LED indicates communications with RZ4 and/or RZ1 expansion boards is active.

PWR(OUT) LED

- Green LED indicates 24VAC power is available to the board.

Emergency Heat Lock

When the EC1 thermostat has been set to Emergency Heat (EH), the compressor will not be energized until the system has been taken out of EH mode.

- ONLY the EC1 thermostat can set the equipment into Emergency Heat mode.
- The EC1 thermostat must be making a call for EH to set the heat pump equipment into EH mode.
- Once the EC1 has been set into EH by the EC1 thermostat, it is "Latched" in EH mode and will not allow any compressor calls until it has been "UN-Latched"
- Any cooling calls from thermostats other than the EC1 thermostat will be **ignored** while in EH Latch mode. Any heating calls from thermostats other than the EC1 will be treated as EH calls while in EH Latch mode.
- To "UN-Latch" EH mode, a call must be made from the EC1 thermostat for COOL or HEAT.
***NOTE:** EC1 Thermostat must not only be switched out of EH mode but ALSO must MAKE a call for another mode (either Heat-Pump Heat or Cool). If no call is made from the EC1 thermostat then the EC1 will remain in EH Latch until EC1 thermostat does make a call no matter what the other zones are calling for.*

Time Delay (shown on the display as a solid yellow DELAY)

After all calls have been satisfied and the equipment is de-energized, all dampers open and a 3-minute **Time Delay** will be completed before new thermostat calls will be processed. This is designed to protect the equipment from re-starting for 3-minutes after it has stopped running. During the 3-minute **Time Delay**, the **SmartZonePLUS™** EC1 Equipment Controller will not energize the fan. However, the fan may continue to run if the equipment being used has a built in "off-time-delay."

Purge

The Purge Mode is a three-minute time period that allows the blower to continue to operate ('G' is energized) during Opposing Call Changeover. During the Purge, no heating or cooling equipment will be energized. Purge mode is designed to prevent cooling or heating from operating for three minutes so that HVAC system pressures and temperatures can equalize. During the three-minute Purge Mode, zone(s) calling for the opposite mode will have damper(s) closed. All other dampers (associated with non-calling zone(s) and last zone(s) being satisfied) will remain open during Purge Mode.

Equipment Staging

Cooling – Air Conditioning and Heat Pump:

- First stage occurs any time there is a call for cooling or a changeover from heating to cooling. Y1 and G are energized. In heat pump cooling mode OB may also be initiated.
- After 8 minutes of initial run time in first stage, the ELC (Electronic Limit Control) will initiate Y2 if the supply air temp has not dropped below 10 degrees above the Low Temp Cut-Out temperature.
- Once second stage is initiated and after a 3 minute minimum run time, if the supply air temp goes below 4 degrees above the Low Temp Cut-Out, Y2 is de-energized and only Y1 and G are energized.
- This scenario is repeated as dictated by the supply air temp.

Special Case: DIP switch #5 in the '2nd STAGE' position and EC1 thermostat with Y2 Connected:

- The EC1 thermostat with a 2ND stage call will force 2nd stage operation by energizing Y2 on the equipment terminal, ignoring the time and temperature strategy described above.
- During an EC1 thermostat 2nd stage call, the ELC's second stage cut-in and cut-out are ignored.

Special Case: DIP switch #5 in the '20%+Zone1' position and EC1 thermostat with Y2 Connected:

- Unless a minimum of 20% of all zones in the system are calling, the ELC's second stage cut-in and cut-out will be ignored.
- An EC1 thermostat with a 2ND stage call will force the equipment to go to 2nd stage operation, ignoring the timing described above.
- During an EC1 thermostat 2nd stage call, the ELC's second stage cut-in and cut-out are ignored.

Heating – Gas, Electric and Fuel Oil Heating

- First stage occurs anytime there is a call for heating or a changeover from cooling to heating. W1/EH is energized. 45 seconds later, G will be energized to insure fan operation.
- After 8 minutes of initial run time in first stage, the ELC will initiate W2/OB if the supply air temp has not risen above 25 degrees below the High Temp Cut-Out temperature.
- Once second stage is initiated, if the supply air temp rises above 10 degrees below the High Temp Cut-Out, W2/OB is de-energized and only W1 and G are energized.
- This scenario is repeated as dictated by the supply air temp.

Special Case: DIP switch #5 in the '2nd STAGE' position and EC1 thermostat with W2 Connected:

- An EC1 thermostat with a 2ND stage call will force the equipment to go to 2nd stage operation, ignoring the timing described above.
- During an EC1 thermostat 2nd stage call, the ELC's second stage cut-in and cut-out are ignored.

Special Case: DIP switch #5 in the '20%+Zone1' position and EC1 thermostat with W2 Connected:

- Unless a minimum of 20% of all zones in the system are calling, the ELC's second stage cut-in and cut-out will be ignored.
- An EC1 thermostat with a 2ND stage call will force the equipment to go to 2nd stage operation, ignoring the timing described above.
- During an EC1 thermostat 2nd stage call, the ELC's second stage cut-in and cut-out are ignored.

Heat Pump Heating with Electric Backup

- First stage occurs anytime there is a call for heating or a changeover from cooling to heating. Y1 and G are energized. If the DIP switch set to B, then B will also be energized.
- After 4 minutes of initial run time in first stage, the ELC will initiate Y2 if supply air temp has not risen above 15 degrees below the High Temp Cut-Out temperature. 105 Deg F (Default)
- Once second stage is initiated, if the supply air temp rises above 5 degrees below the High Temp Cut-Out, Y2 is de-energized and only Y1 and G are energized. 115 Deg F (Default)
- Auxiliary Heat - After 6 minutes of initial run time, if the supply air temp drops below 90 degrees, W1/EH will be energized.
- If the supply air temp rises above 100 degrees W1/EH will be de-energized and only Y1, Y2 and G will be energized. (See Note 1, Note 2 and Note 3 below)
- This scenario is repeated as dictated by the supply air temp.
- Emergency Heat - can only be initiated thru a heat pump stat in the EC1 stat.
- If this thermostat is placed in Emer Heat, the **SmartZonePLUS™** system is latched into emergency heat. No compressor will run and only heating calls will be recognized.

- Remove the Emer Heat call at EC1 stat and make a call for something other than Emer Heat from EC1 stat in order to unlatch the board and take system out of emergency heat.

Note 1: When the Outdoor Air Temperature Sensor is installed, the Heat Pump Compressor will not energize in the heating mode if the Outdoor Air temperature is below the OA LO TEMP Balance Point Cutout. (See Configuration Section, Pushbuttons, 11th Press for adjustment instructions)

Note 2: When the Outdoor Air Temperature Sensor is installed, the Auxiliary Heat will not energize if the Outdoor Air temperature is above the OA HI TEMP Balance Point Cutout. (See Configuration Section, Pushbuttons, 12th Press for adjustment instructions)

Note 3: Failure to install an outdoor temperature sensor will cause the Fresh Air temperature cutout settings and the Heat Pump Balance Point cutout settings to be not settable and ignored.

Heat Pump Heating with Fossil Fuel Backup (Dual Fuel)

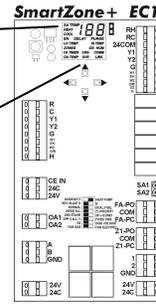
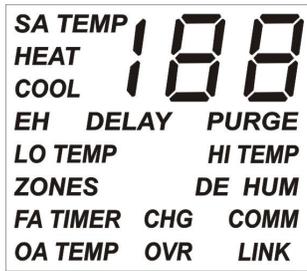
- First stage occurs anytime there is a call for heating or a changeover from cooling to heating. Y1 and G are energized. If the DIP switch set to B, then OB will also be energized.
- After 4 minutes of initial run time in first stage, the ELC will initiate Y2 if supply air temp has not risen above 15 degrees below the High Temp Cut-Out temperature. 105 Deg F (Default)
- Once second stage is initiated, if the supply air temp rises above 5 degrees below the High Temp Cut-Out, Y2 is de-energized and only Y1 and G are operating. 115 Deg F (Default)
- This scenario is repeated as dictated by the supply air temp.
- Auxiliary Heat - After 6 minutes of initial run time, if the supply air temp drops below 90 degrees, W1/EH will be energized. This will remove Y1 and Y2 and energize W1/EH only. G will be initiated 45 seconds later to insure starting an indoor blower. W1/EH will initiate start up of the fossil fuel furnace. (See Note 1, Note 2 and Note 3 below).
- Only the W1/EH and G will remain energized for the remainder of the heating cycle.
- Emergency Heat - can only be initiated thru a heat pump stat on the EC1 thermostat.
- If this thermostat is placed in Emer Heat, the **SmartZonePLUS™** system is latched into emergency heat. No compressor will run and only heating calls will be recognized.
- Only the W1/EH and G will remain energized for the remainder of the heating cycle.
- Remove the Emer Heat call at EC1 stat and make a call for something other than Emer Heat from EC1 stat in order to unlatch the system from emergency heat.

Note 1: When the Outdoor Air Temperature Sensor is installed, the Heat Pump Compressor will not energize in the heating mode if the Outdoor Air temperature is below the OA TEMP LO TEMP Balance Point Cutout. (See Configuration Section, Pushbuttons, 11th Press for adjustment instructions)

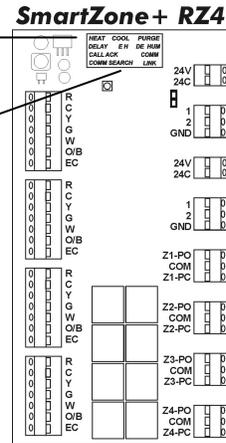
Note 2: When the Outdoor Air Temperature Sensor is installed, the Auxiliary Heat will not energize if the Outdoor Air temperature is above the OA HI TEMP Balance Point Cutout. (See Configuration Section, Pushbuttons, 12th Press for adjustment instructions)

Note 3: Failure to install an outdoor temperature sensor will cause the Fresh Air temperature cutout settings and the Heat Pump Balance Point cutout settings to be not settable and ignored.

EC1 DISPLAY:



RZ1 & RZ4 DISPLAY:



Display Indicator	Status	Description
HEAT	ON	Indicates the Equipment is in Heat Mode
	OFF	During other display modes
COOL	ON	Indicates the Equipment is in Cool Mode
	OFF	During other display modes
COMM SEARCH	ON	Indicates the RZ1 or RZ4 is searching for comm with the EC1 controller
	OFF	During other adjustments and displays
COMM LINK	ON	Indication of that the RZ1 or RZ4 has a defined link with EC1 controller
	OFF	No link with the EC1 controller
EH	ON	Indicates the Equipment is in Emergency Heat Mode
	OFF	Indicates the Equipment is NOT in Emergency Heat Mode
DELAY	ON	Indicates the Equipment is in an equipment protection delay
	OFF	During other adjustments and displays
CALL ACK	BLINK	Indicates that the RZ1 or RZ4's request for a heat/cool call has been acknowledged by the EC1 controller
	OFF	No call or a call has not been seen by the EC1 Controller
DE/HUM	ON	Indication of a call for DE/HUMIDIFICATION for the Equipment
	OFF	During other adjustments and displays
PURGE	ON	During System Changeover where only fan is enabled
	OFF	Indicates NO Purge condition

To contact XCI Controls Technical Support call 866-XCI-CTRL (866-924-2875)

For information or to comment on the products or procedures in this manual go to <http://www.xcicontrols.com> or email support@xcicontrols.com.

To contact XCI Controls by voice phone call 866-XCI-HVAC (866-924-4822).

To contact XCI Controls sales department call 817-937-9740.