



SmartZone-4™ & SmartZone-2™ Quick-Start Guide

UPDATED 2007-07-26

This guide is intended to give the installer a brief set of instructions about how to set up the XCI Controls SmartZone System. For more detailed information about the SmartZone Controller, refer to www.xcicontrols.com >products> zone controller> **SmartZone System Manual**. In this document, **SmartZone-4** and **SmartZone-2** will be referred to as **SmartZone**.

Mounting

1. Remove the clear lid from the SmartZone Enclosure.
2. Using pliers, break out the necessary “knock-outs” for wiring on the side of the gray base of the SmartZone Enclosure.
NOTE: If using the holes on the back of the enclosure for surface mount wiring this may not be necessary.
3. Using flat or pan-head screws (at least 2); mount the gray base of the SmartZone Enclosure on a flat surface.
4. After wiring is completed, replace the clear lid.

Power

The SmartZone System requires a separate 24VAC transformer for powering the SmartZone Controller Board, Zone Thermostats and Dampers. Connect 24VAC and 24VAC(c) to the POWER Connector on the bottom left of the SmartZone Controller Board.

SmartZone-4 TRANSFORMER SIZE = 22VA (for Controller and 4 Thermostats) + 10VA (per Damper) **OR** 3VA (per POC and RPOC damper).

[**Example 1:** A system with 4 SZD Dampers, the transformer needs to be greater than 62VA]

[**Example 2:** A system with 4 POC (or RPOC) Dampers, the transformer needs to be greater than 34VA]

SmartZone-4 (with 3 Zones) TRANSFORMER SIZE = 20VA (for Controller & 3 Stats) + 10VA (per SZD Damper) **OR** 3VA (per POC and RPOC damper).

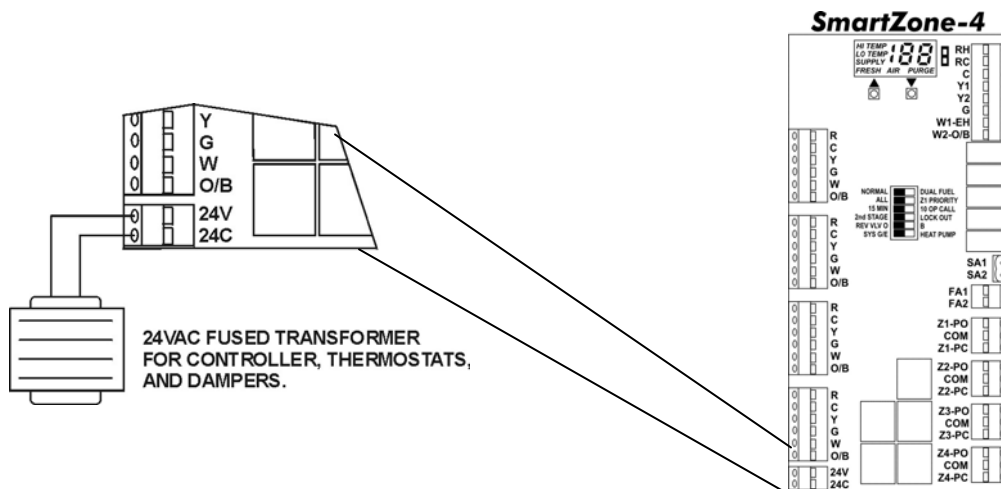
[**Example 1:** If the system has 3 SZD Dampers, the transformer needs to be greater than 50VA]

[**Example 2:** A system with 3 POC (or RPOC) Dampers, the transformer needs to be greater than 29VA]

SmartZone-2 TRANSFORMER SIZE = 18VA (for Controller and 2 Thermostats) + 10VA (per SZD Damper) **OR** 3VA (per POC and RPOC damper).

[**Example 1:** If the system has 2 SZD Dampers, the transformer needs to be greater than 38VA]

[**Example 2:** A system with 2 POC (or RPOC) Dampers, the transformer needs to be greater than 24VA]

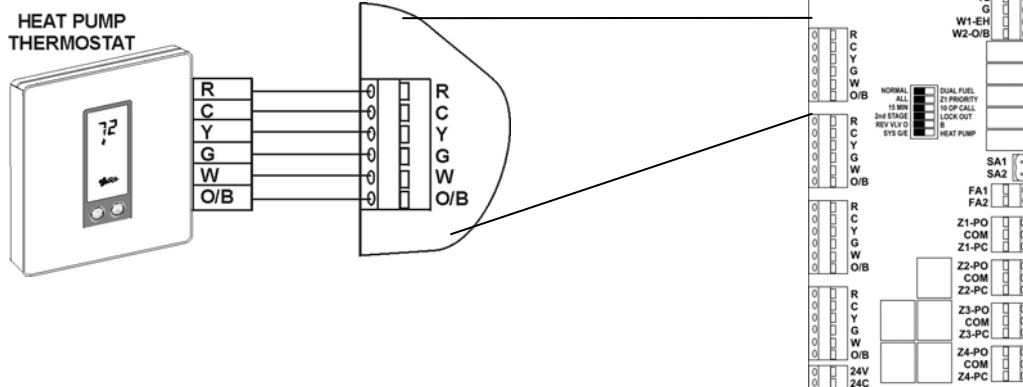
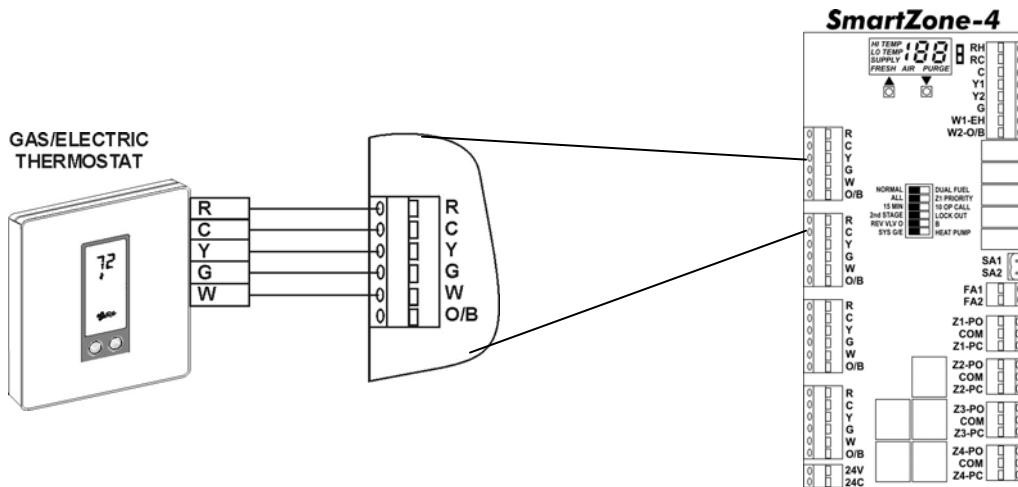


Wiring

Thermostats Wiring

SmartZone will operate using thermostats that have a common or are battery operated, follow the below steps to connect each of the thermostats to the SmartZone Controller Board.

1. Connect either single stage heat pump thermostats or gas/electric thermostats to each terminal block labeled THERMOSTAT 1 through 4.
2. The THERMOSTAT 1 will operate ZONE 1 damper, THERMOSTAT 2 will operate ZONE 2 damper and so on through THERMOSTAT 4.
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 and O/B (as applicable).
4. Connect the other end of the thermostat wire to the thermostat for the associated ZONE.



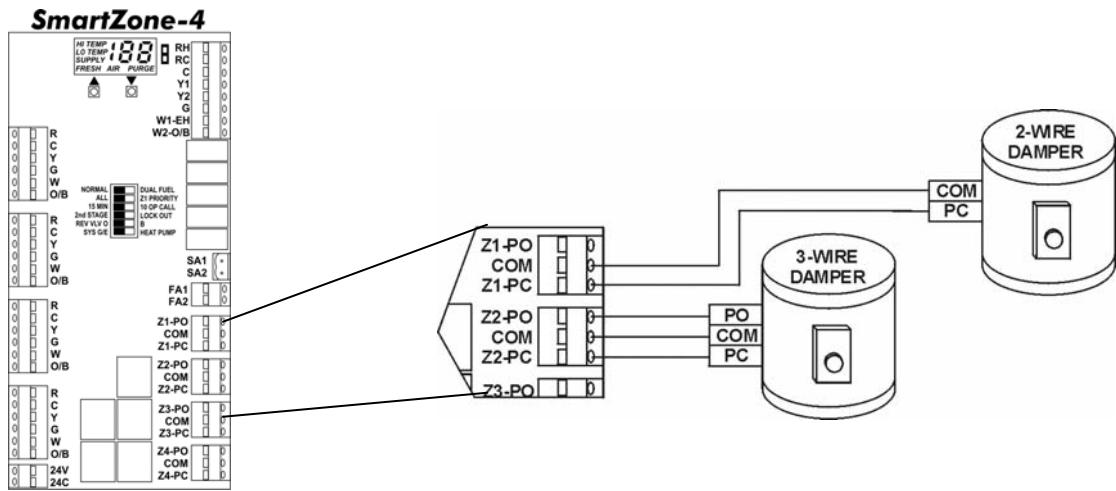
Damper Wiring

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

1. Use 18/2 or 18/3 solid core wire
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.

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

1. Use 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.



Supply Air Temperature Sensor [SA Sensor] Wiring

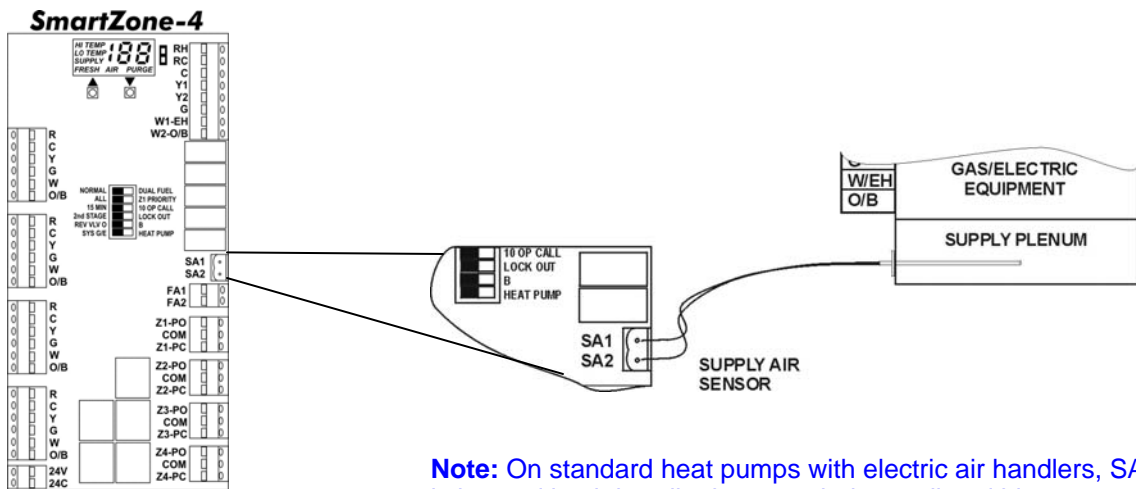
Sensor Placement (Location)

Gas/Electric and Dual Fuel – Sensor should be located in 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.

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 SmartZone Controller Board. **NOTE: WITHOUT THIS SENSOR, THE SmartZone CONTROLLER BOARD WILL NOT OPERATE.**



Note: On standard heat pumps with electric air handlers, SAS is located in air handler between indoor coil and blower.

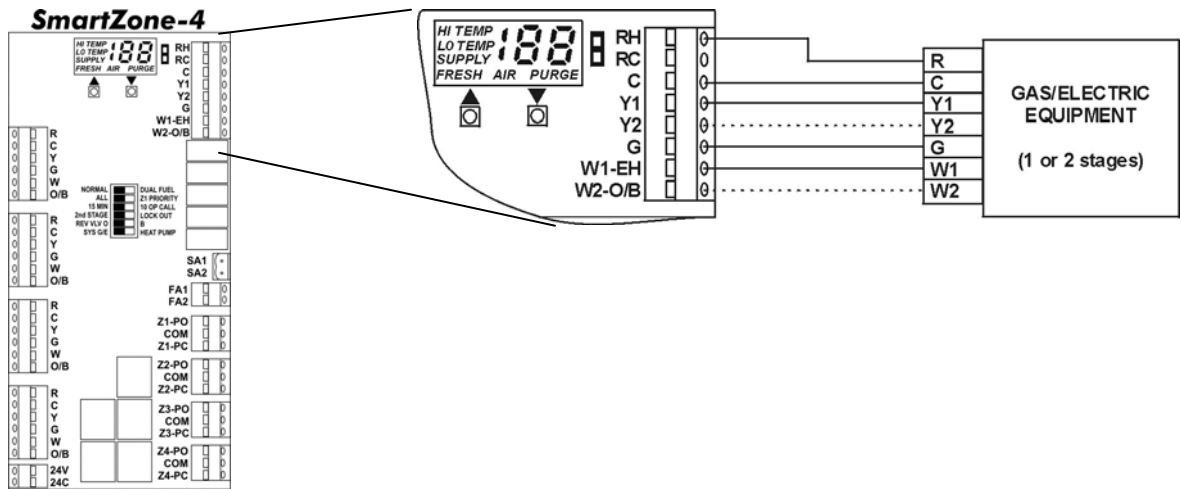
Equipment Wiring

Connect the Equipment Control Wires from the Unit to the EQUIPMENT Terminal Block on the Top Right of the SmartZone Controller Board. Use the terminal labeled “W1 EH” for 1st stage heat when using gas/electric equipment or 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.

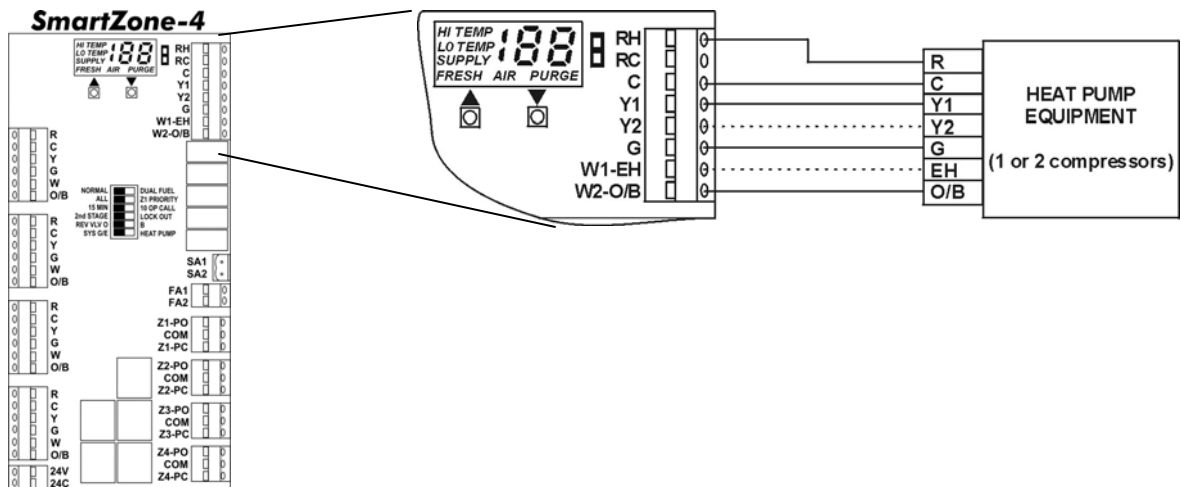
NOTE: THE ‘C’ TERMINAL MUST BE CONNECTED TO THE CONTROLLER AND EQUIPMENT IN ORDER FOR THE EQUIPMENT RELAYS TO ENERGIZE. POWER FROM THE EQUIPMENT TRANSFORMER WILL ILLUMINATE THE RC AND RH TERMINAL LEDs INDICATING THE EQUIPMENT TRANSFORMER IS CONNECTED.

*See next page for wiring diagrams.

GAS-ELECTRIC SYSTEM WIRING



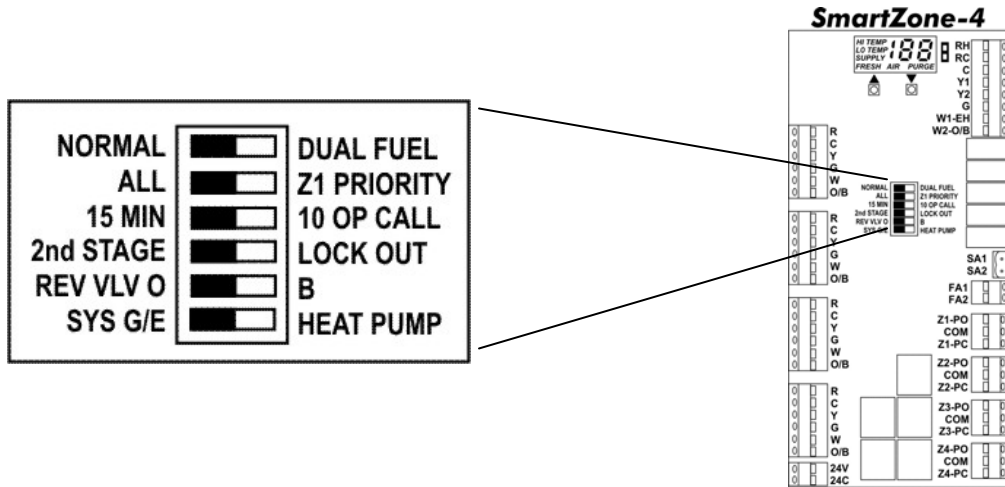
HEAT PUMP SYSTEM WIRING



Configuration

DIP Switches

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

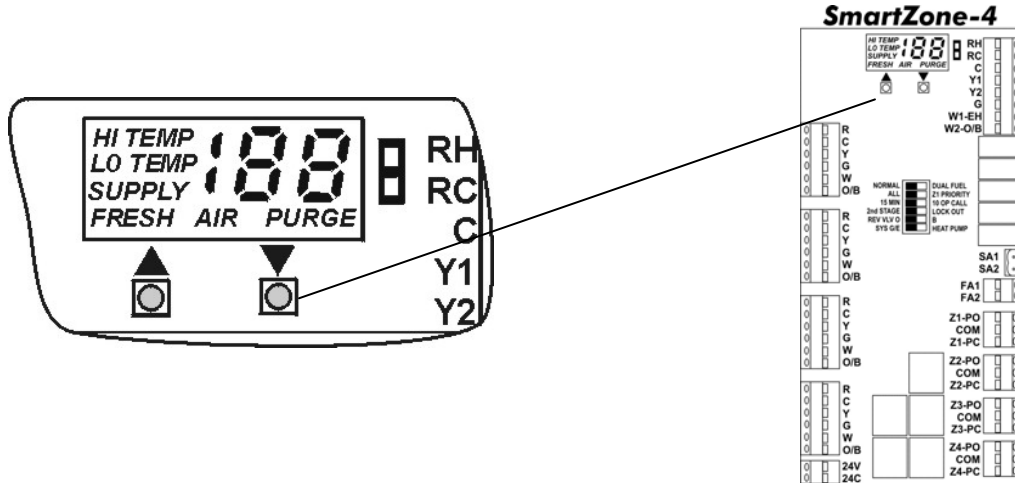


DIP #1	NORMAL	Operates electric auxiliary heat with compressor. (Factory Default)
	DUAL FUEL	Operates gas auxiliary heat with NO compressor HEAT PUMP ONLY.
DIP #2	ALL	Allows any thermostat to change equipment mode. (Factory Default)
	Z1 PRIORITY	Allows ZONE 1 to control equipment mode unless satisfied.
DIP #3	15 MIN	15 Minute delay between opposing calls. (Factory Default)
	10 OP CALL	10 Minute delay between opposing calls.
DIP #4	2 nd STAGE	Normal Operation – 2 nd Stage is always active. (Factory Default)
	LOCK OUT	Will not Allow 2 nd Stage if only one ZONE is calling.
DIP #5	REV VLV O	Reversing valve is energized in COOLING. (Factory Default)
	B	Reversing valve is energized in HEATING.
DIP #6	SYS G/E	Gas/Electric or Electric/Electric Equipment. (Factory Default)
	HEAT PUMP	Heat Pump Equipment ONLY.

Configuration (Continued)

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 SmartZone Controller settings.



Fresh-Air Damper Time

To set the Minutes-Per-Hour that the Fresh-Air Damper is OPEN follow the below steps:

1. While the SmartZone Controller Board is powered, press and quickly release BOTH the UP and DOWN Arrow buttons at the same time. The Green "FRESH AIR" indication will begin to flash.
2. Within 5 seconds press either the UP or the DOWN Arrow button to change the time. The time is indicated in Number of Minutes-Per-Hour that the Fresh-Air Damper will be OPEN.
3. After the desired time has been selected, wait 5 seconds and 'ST' will flash on the Display, indicating that the time has been set.

NOTE: If NO Fresh Air Damper is installed, '0' (Zero) Time must be set or the equipment fan will run unnecessarily.

Electronic Limit Control™ (ELC)

To set the High and Low Temperature Equipment Cut-Out SetPoints follow the below steps, before completing these steps, ensure that DIP #6 is set correctly choosing the proper equipment type.

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

1. While the SmartZone Controller Board is powered, press momentarily and release the UP arrow to set the HIGH Temperature Cut-Out. The Red "HI TEMP" indication will begin to flash.
2. Within 5 seconds press either the UP or the DOWN Arrow button to change the HIGH Temperature Cut-Out. The temperature indicated here represents the highest temperature allowed at the supply air sensor.
3. After the desired temperature has been selected, wait 5 seconds and 'ST' will flash on the Display, indicating that the HIGH Temperature Cut-Out has been set.

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

4. While the SmartZone Controller Board is powered, press momentarily and release the DOWN arrow to set the LOW Temperature Cut-Out. The Red "LO TEMP" indication will begin to flash.
5. Within 5 seconds press either the UP or the DOWN Arrow button to change the LOW Temperature Cut-Out. The temperature indicated here represents the lowest temperature allowed at the supply air sensor.
6. After the desired temperature has been selected, wait 5 seconds and 'ST' will flash on the Display, indicating that the LOW Temperature Cut-Out has been set.

Configuration (Continued)

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 ON #2, #3, AND #4 ZONES. Use Heat Pump stat in the #1 ZONE ONLY for EMERGENCY HEAT. When using the TSZ-1 thermostat, use the Wireless Outdoor Temperature Transmitter (Part #TOS) with the TSZ-1 thermostat to control emergency heat mode using outdoor temperature through the heat pump thermostat in the #1 position.

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 # 6 dipswitch is in the GAS FURNACE position.
2. The HIGH Temperature Cut-Out for the heat pump in a dual fuel application can only be identified and adjusted when the # 6 dipswitch is in the HEAT PUMP position.
3. The LOW Temperature Cut-Out for the HEAT PUMP in a dual fuel application is the same as described earlier on page 6 (LOW Temperature Cut-Out).

Thermostat Type

NOTE: THIS ONLY APPLIES TO HEAT-PUMP INSTALLATIONS

To set type of Thermostat being used on the system follow the below steps:

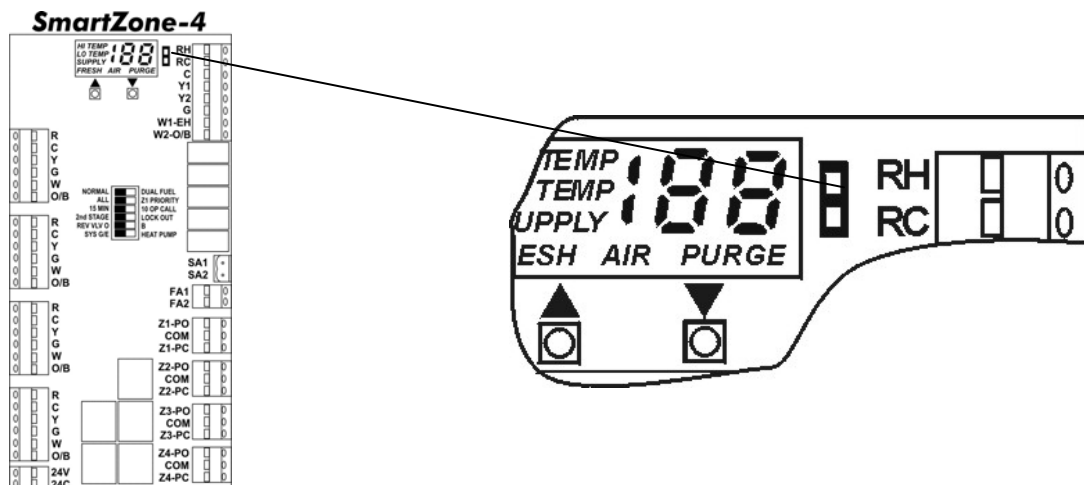
1. While the SmartZone Controller Board is powered, press AND HOLD both the UP and DOWN Arrow buttons until the Numeral "1" appears [this Numeral is an indication of the ZONE Thermostat number], then either "GE" or "HP" will appear on the display.
2. Within 5 seconds press the DOWN Arrow button to toggle between the thermostat types. "GE" = Gas/Electric Thermostat; "HP" = Heat Pump Thermostat
3. After the desired thermostat type has been selected for this ZONE, press the UP arrow (within 5 seconds) to select the next zone. The Numeral "2" will appear [this Numeral is an indication of the ZONE Thermostat number], then either "GE" or "HP" will appear on the display.
4. Repeat Steps 2 and 3 for each of the ZONES being used.
5. After all thermostat types have been selected for each ZONE, wait 5 seconds and 'ST' will flash on the Display indicating that the Thermostat Type has been set.

NOTE: For Emergency Heat to be utilized, Zone #1 MUST have a Heat Pump thermostat connected.

RC/RH Jumper

The RC/RH Jumper is Factory Installed on the SmartZone 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

Equipment LEDs

Diagnostic LEDs indicate which equipment circuits are energized with 24VAC. When no 'R' LED is on, check power from the HVAC unit.

Thermostat LEDs

Each LED indicates what mode is being powered through the thermostat.

- The Red LED adjacent to 'R' indicates SmartZone has power available for the thermostat.
- The Yellow LED adjacent to 'Y' indicates a compressor call from the thermostat.
- The Green LED adjacent to the 'G' indicates Fan call from thermostat.
- The Red LED adjacent to the 'W' indicates a Heat call from thermostat.
- The Red LED adjacent to the 'O/B' indicates Reversing Valve call from thermostat.

Damper LEDs

- Red LED indicates damper is powered closed.
- Green LED indicates damper is open.

Emergency Heat Lock

This feature has been implemented to ensure that once the system has been set to Emergency Heat (EH), the compressor will not be energized until the system has been taken out of EH mode.

- ONLY Zone#1 Thermostat can set the equipment into EH mode.
- Zone#1 Thermostat must be making a call for EH to set the SmartZone-2 or -4 into EH mode.
- Once the SmartZone-2 or -4 has been set into EH by Zone#1 Thermostat, it is "Locked" in EH mode and will not make any compressor calls until it has been "UN-Locked"
- Any cooling calls from thermostats other than Zone#1 thermostat will be **ignored** while in EH Lock mode. Any heating calls from thermostats other than Zone#1 will be treated as EH calls while in EH Lock mode.
- To "UN-Lock" EH mode, a call must be made from the Zone#1 thermostat for anything other than EH.
 - **NOTE:** Zone#1 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 Zone#1 Thermostat then the SmartZone-2 or -4 will remain in EH Lock until Zone#1 does make a call no matter what the other zones are calling for.

Time Delay

After all calls have been satisfied and the equipment is turned off, all dampers open and a 3-minute **Time Delay** will start during which the equipment cannot be energized. 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 SmartZone 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."

NOTE: There is NO visual indication of the Time Delay on the SmartZone Controller other than the fact that there will be no equipment calls regardless of what the thermostats call for during the 3-minute duration.

Purge

The Purge Mode is a three-minute time period that allows the blower to continue to operate during Opposing Call Changeover. During the Purge, no heating or cooling equipment will be energized. Purge mode is designed to prevent equipment from operating for three minutes so that HVAC system pressures and temperatures can equalize. During the three-minute Purge Mode, zones with calls for the opposite mode that was last being satisfied will have dampers closed. All other dampers (ones 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, 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.

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 and G are energized.
- 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.

Heat Pump Heating with Electric Backup

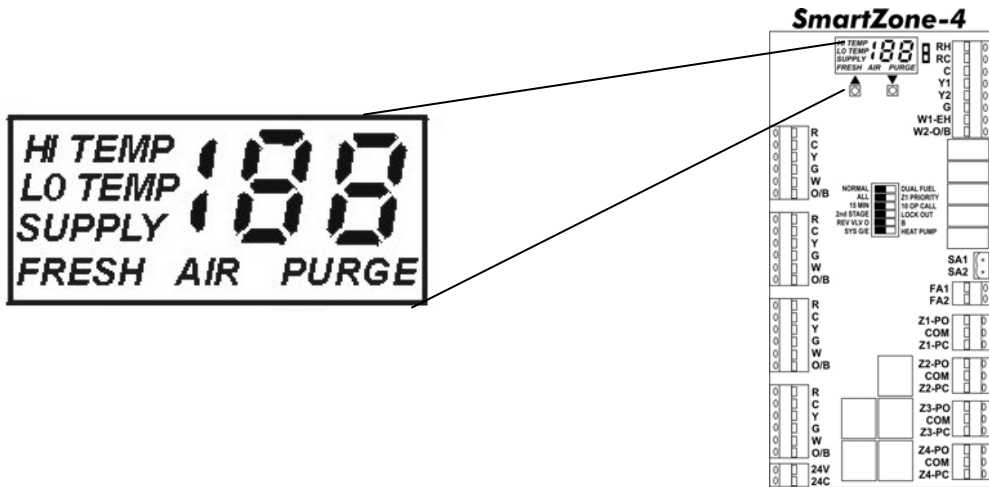
- First stage occurs anytime there is a call for heating or a changeover from cooling to heating. Y1 and G are energized. In heat pump heating mode OB may also be initiated.
- After 4 minutes of initial run time in first stage, the ELC will initiate Y2 if supply air temp has not risen above 15 degrees below the High Temp Cut-Out temperature.
- 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.
- 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.
- This scenario is repeated as dictated by the supply air temp.
- Emergency Heat - can only be initiated thru a heat pump stat in the # 1 position.
- If this stat is placed in Emer Heat, the **SmartZone™** board is latched into emergency heat. No compressor will run and only heating calls will be recognized.
- Remove the Emer Heat call at stat #1 and make a call for something other than Emer Heat from stat #1 in order to unlatch the board and take it out of emergency heat.

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 is energized. In heat pump heating mode OB may also be initiated.
- 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.
- 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 is operating.
- 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. W1/EH will initiate start up of the fossil fuel furnace.
- 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 in the # 1 position.
- If this stat is placed in Emer Heat, the **SmartZone™** board 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 stat #1 and make a call for something other than Emer Heat from stat #1 in order to unlatch the board and take it out of emergency heat.

Operation (Continued)

Display



Display Indicator	Status	Description
HI TEMP	Flashing	During adjustment of HIGH Temperature Cut-Out (described above)
	ON	Supply Air Temp has been above HIGH Temp Cut-Out in the last 3 minutes
	OFF	Normal Operation (Supply Air Temp is below HIGH Temp Cut-Out)
LO TEMP	Flashing	During adjustment of LOW Temperature Cut-Out (described above)
	ON	Supply Air Temp has been below LOW Temp Cut-Out in the last 3 minutes
	OFF	Normal Operation (Supply Air Temp is above LOW Temp Cut-Out)
SUPPLY	Flashing	Indicates that NO Supply Air Temp Sensor is Connected to SmartZone
	ON	Normal Operation (Indicates the Temp displayed is the Supply Air Temp)
	OFF	During adjustment of Thermostat Types (described above)
FRESH AIR	Flashing	During adjustment of Fresh-Air Damper Time (described above)
	ON	Indicates that the Fresh-Air Damper is OPEN
	OFF	Indicates that the Fresh-Air Damper is CLOSED
PURGE	ON	During System Purge and Opposing Call Changeover
	OFF	Indicates NO Purge condition

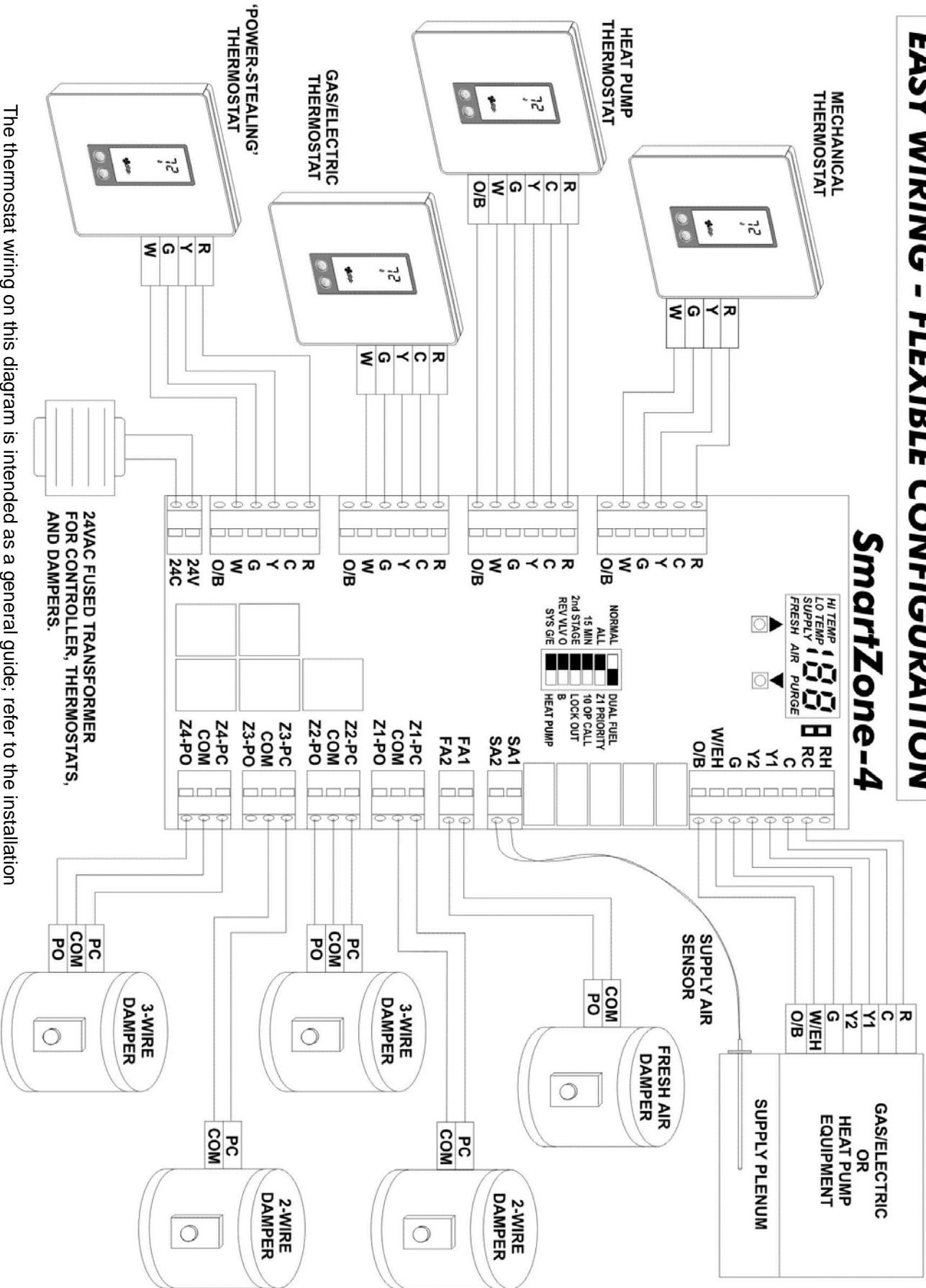
<http://www.xcicontrols.com>

1-866-XCI-HVAC

1-866-924-4822

EASY WIRING - FLEXIBLE CONFIGURATION

SmartZone-4



The thermostat wiring on this diagram is intended as a general guide; refer to the installation guide provided with the thermostat beina used for specific wiring information.

