IntelliZone2

Comfort Zoning System

Six Zone Capability

IntelliZone2 Specification Catalog and Design Guide

WaterFurnace® Smarter from the Ground Up™

SC1578EW 07/20

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IntelliZone2

The IntelliZone2 Comfort Zoning System is a residential and/or commercial zone control system which works with 5 and 7 Series units (up to 6 tons) to space condition up to six zones. Each zone is controlled by its own space thermostat and damper motor(s) using a maximum 1-inch W.G. inlet static pressure at zone dampers. The IntelliZone2 monitors the thermostats, puts the system in the proper mode of operation, and energizes the correct number of stages of heating or cooling and airflow.

The IntelliZone2 was designed to solve problems that are inherent with the concept of HVAC zoning by:

- Eliminating the bypass damper;
- Applying the ECM blower motor to zoning;
- Using “Multiple Level” zone calls (Heating 0-3, Cooling 0-2), allowing the controller to better estimate the demand of each zone and thus condition space most efficiently; and
- Designing a high value control which is both easy to install and service.
- Capable of full communication and control of the variable speed compressor bearing 7 Series

The IntelliZone2 System is a perfect match to 5 and 7 Series geothermal systems, extending comfort and energy savings farther than ever before. The IntelliZone2 is also compatible with our Symphony/AWL Wi-Fi Smart Comfort System.

WaterFurnace International’s corporate headquarters and manufacturing facility is located in Fort Wayne, IN. A scenic three-acre pond located in front of the building serves as our geothermal heating and cooling source to comfort-condition our 110,000 square feet of manufacturing and office space. As a pioneer, and now a leader in the industry, the team of WaterFurnace engineers, customer support staff and skilled assembly technicians is dedicated to providing the finest comfort systems available. With Factory ISO 9001 and engineering laboratory ISO 17025 certifications, you are assured of a quality designed and manufactured product.

By choosing or specifying WaterFurnace IntelliZone2™ Series products, you can be assured that your customer is investing in an exceptional comfort system and peace of mind for many years to come.

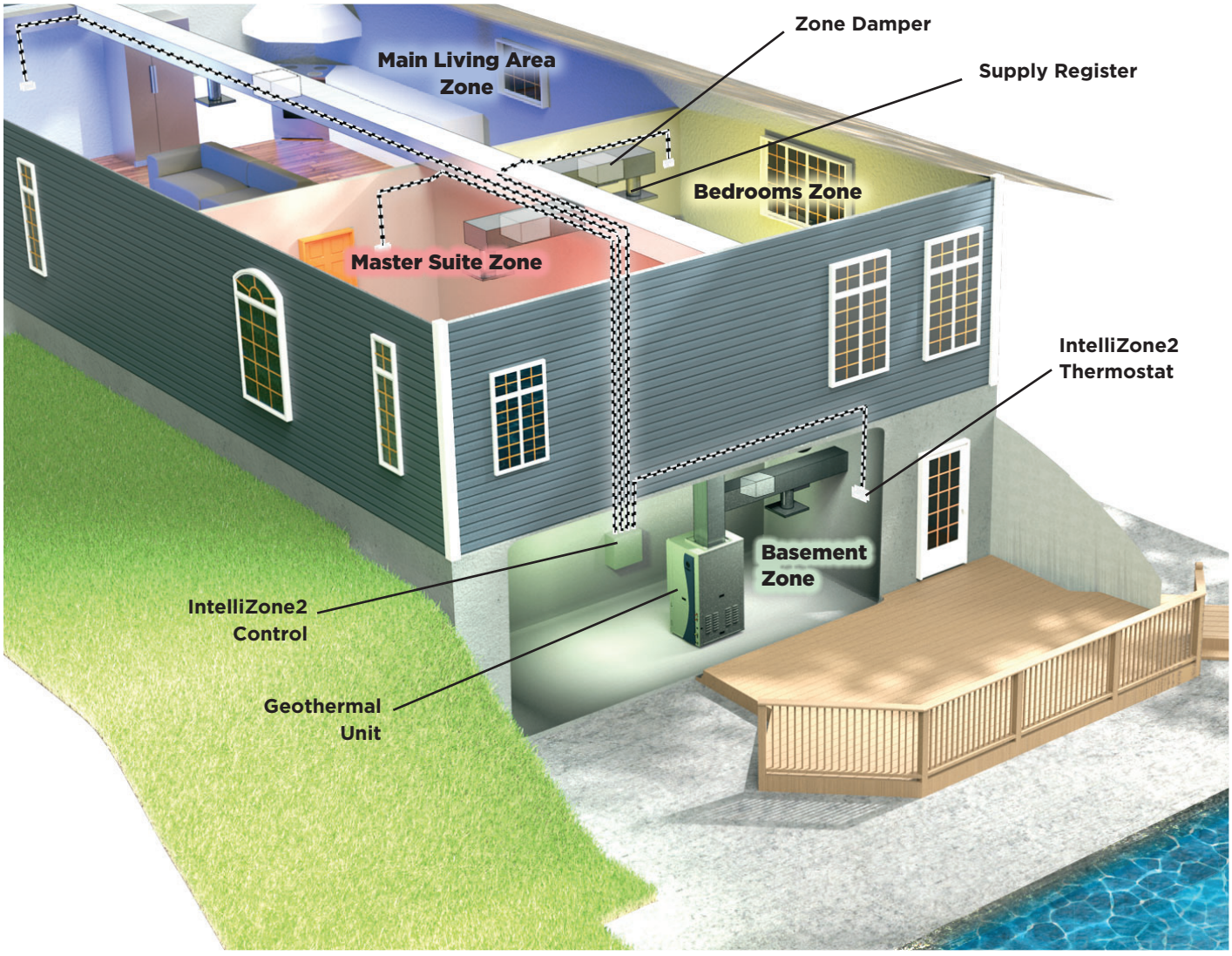
Introduction

The IntelliZone2 Comfort Zoning system is to be used only with heat pumps/air handlers equipped with Aurora AXB or AHB controls. A package unit must have ABC and AXB to be compatible with IntelliZone2. A split system with air handler must have ABC and either AXB or AHB (in air handler) to be compatible with the IntelliZone2. If the heat pump or air handler do not have Aurora AXB or AHB controls you must use IntelliZone2•24V Comfort Zoning system.

Zoning is a method of ensuring that all areas of a home or building receive the right amount of heating or cooling. Zoning allows the occupant to independently control the temperature in each area of the building. If desired, all areas can be adjusted for occupancy patterns and uses.

Zoning is particularly useful where normal heat distribution patterns result in uneven temperature control. For example, a building that is partly below grade can use zoning to eliminate uneven temperature control between the basement and the rest of the building. Large buildings that might have long, unequal length duct runs can use zoning to equalize the delivery of conditioned air. Buildings with many large windows can use zoning to compensate for solar heat gain and radiation losses at night.

Along with providing comfort, zoning can provide energy savings by keeping various zones at desired set points without over-cooling or overheating. In effect, zoning mandates that the heating/cooling system condition only the portions (or zones) of the building which need to be conditioned. This translates into shorter compressor run times and ultimately lower space conditioning bills.



The above illustration is representational and is not intended as a guide for IntelliZone2 system installation.

IntelliZone2 Features

IntelliZone2 Features

- Up to 6 zone possible in variable speed systems (maximum of 4 for dual capacity units and 2 for single speed units)
- 4.3 in. Color touchscreen master thermostat for ease of use
- TPCC32U01, ZoneStat, SensorStat or SensorStat Remote Kit options for zones 2-6
- Full communicating system for advanced features:
- Full text Faults/Alarms from IZ2 and 5 or 7 Series heat pump
- Adjust zone setpoints from Masterstat or Zonestat
- Full features of 5 and 7 Series heat pumps are communicated including faults, energy monitoring, superboost cooling mode and active dehumidification
    - Full zone setback programming from each zone.
    - Dealer configuration mode
    - Full color touchscreen troubleshooting display
- No bypass damper or dump zone needed.
- 2 (spring) or 3 wire damper options.
- Central Zone option operates all dampers open on temperature measurement from MasterStat for construction or service operation.
- Economy/comfort settings for each zone to reduce operating costs In less important rooms.
- Zones are 'sized' to provide more proper compressor and blower staging.
- Staging flexibility allows several up/down staging options for customization to your application.
- Full Aurora controls capability
- Compatible with Amazon Alexa if installed with Symphony.

Flexibility in Zone Comfort Control

The IntelliZone2 allows comfort or economy mode selections for each zone.

In ‘Comfort Mode’ a single zone call for conditioning will engage the compressor and allow a minimal set point variation, thus providing ultimate comfort. However in ‘Economy Mode’ a single zone call for conditioning will be ignored until either a next level call for that zone or a second zone call occurs. This will allow slightly greater temperature fluctuations in these zones allowing lower operating costs in areas such as rec rooms, unused bedrooms where slightly higher temperature variation would not be noticeable.

Flexibility in System Staging

(single or dual capacity equipment)

The IntelliZone2 System allows four different staging options for both heating and cooling. Once the compressor call has been initiated by a zone, the compressor will be upstaged using one of four staging options in single, dual, or variable capacity equipment. The modes are Normal, Quicker, Faster1 and Faster2. More detail is listed later in this document.

Eliminating Bypass Damper

By utilizing the full functionality of the ECM blower motor, the bypass damper can be eliminated from the zone system. In effect, the ECM replaces the bypass damper.

In conventional systems, the air handling device can deliver airflow only at one or two levels, which means a significant amount of excess air must be “bypassed” to the return. By looking at which zones are calling, the IntelliZone2 determines the most efficient compressor and blower speeds. Since the IntelliZone2, with its six/eight speeds on-line at all times, has the ability to deliver the correct amount of airflow that the structure is calling for, there is no need for bypass.

When utilized properly, the ECM motor will provide precise airflow control for a given space. The ECM will operate on up to six/eight pre-configured airflow levels depending on the load requirements of the house. All airflow is setup for the 5 or 7 Series in the AID Tool. If the IntelliZone2 is controlling:

- 5 Series single or dual-capacity unit, there will be 6 total airflow levels, two airflow levels for low-speed compressor operation and two airflow levels for high-speed compressor operation and one for continuous blower and one for auxiliary heat.
- 7 Series variable speed unit, there will be 8 total airflow levels, one airflow level continuous blower and auxiliary heat settings and six airflow levels for the variable speed compressor ranging from 25, 40, 55, 70, 85, and 100% airflow depending upon the zone call.

By varying the airflow level per the needed output capacity of the heat pump, bypass is eliminated and the correct amount of air is delivered to the house. Consult the 5 and 7 Series technical literature for more information on airflow setup.

Efficient Space Conditioning

Traditional zone control systems control single-speed compressors and single-speed blowers and typically use single heating and cooling calls to determine space conditioning needs. By operating at only one capacity level, these traditional systems are seriously handicapped in their ability to handle the varying load of the structure.

The IntelliZone2 control system controls the dual-capacity and variable speed compressor as well as the ECM variable-speed blower, coupling this variable capacity equipment with multiple level zone calls allows the IntelliZone2 to exactly match the demands of the space.

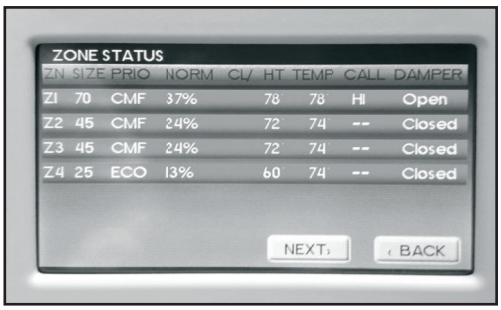
One of the goals of the IntelliZone2 system is to minimize compressor and blower operation by operating at the lowest, most efficient speed possible. The IntelliZone2 makes logic decisions which minimize compressor run-times and help decrease energy cost. For example: If one or more zones have Y1 demand calls, the thermostat has determined that the particular zones need conditioning, but the demand is at a low level. The IntelliZone2 control algorithm will take these low level calls and determine what compressor capacity with the proper airflow will satisfy the zone calls. Thus, the system operates in lower capacity most of the time and intelligently provides cost-efficient space conditioning control.

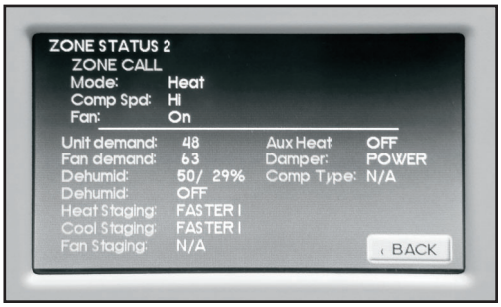
Many times, as in any structure, the space conditioning peak load for each zone can happen at a different time throughout the day. This may be due to sun, wind, or even the zone use. This diversity can sometimes allow slightly smaller capacity equipment to condition one zone during its morning peak and then condition another during its afternoon peak, whereas an unzoned structure would have to be sized with larger capacity equipment to condition both areas at once.

Design Features

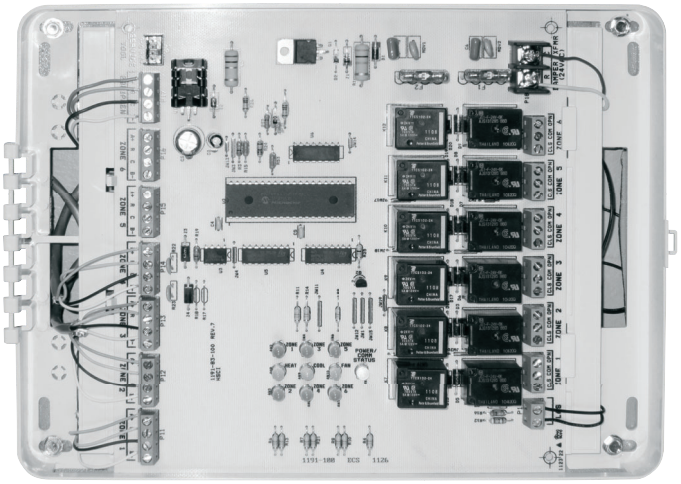
Full Color Touchscreen Display and Diagnostic LEDs

With traditional zone control systems, the installer typically has a difficult time determining the status of the inputs and outputs of the zone control board. The IntelliZone2 System employs an LED for each output and the MasterStat color display shows all inputs and outputs. With just a glance, the installer is able to quickly determine what inputs the IntelliZone2 is receiving and what outputs the IntelliZone2 is sending to the unit.





IntelliZone2's Sophisicated Microprocessor Control with LEDs to Display Inputs and Outputs



Application Flexibility

- Multiple level zone calls communicate exact zone load requirements for intelligent equipment control.
- Controls up to six zones with variable speed compressor (four with dual-capacity and two zones with single-speed compressor).
- Control of ECM blower motor to match needs of the space. Six/eight blower speeds are available at all times.
- Zone size as small as 15% of whole house with variable speed compressor (25% dual-capacity and 50% single speed).
- Individual zone-selectable economy or comfort modes.
- Four staging options (normal, quicker, faster1 and faster2) to allow a wide range of comfort and energy consumption solutions.
- Separate staging options for heating and cooling provides better comfort.
- Dehumidification mode lowers airflow in cooling for better dehumidification.
- Simple, reliable thermostat operation; simple programming for the homeowner.
- Individual zone-selectable continuous or intermittent blower.
- Smart algorithm serves simultaneous heating and cooling demands.
- Reduces blower power consumption.
- Installation and Service Advantages
- Bypass damper not needed (minimal oversizing of ductwork may be desired).
- All low voltage wiring (24VAC).
- Central mode control for temporary conditioning of the whole house using one thermostat.
- Low cost communicating zone thermostats.
- Three-wire or two-wire damper actuators for maximum performance and reliability.
- Transformer with integrally mounted circuit breaker.
- LED indicators (damper operation, mode, fault) and troubleshooting screens displayed on MasterStat for easy diagnostics.

IntelliZone2 Components

IntelliZone2 Relay Board (Firmware Version 2.01 or Later)

The IntelliZone2 relay board provides basic relay logic for the damper operation and serves as a common connection point for all IntelliZone2 thermostats and the heat pump.

IntelliZone2 MasterStat

The IntelliZone2 MasterStat is the master control for the system and has all of the programming for operation. It is a 4.3 in. communicating color touch screen device that also functions as a zone thermostat for Zone 1. Optional remote sensor capability is also available.

IntelliZone2 ZoneStat (Optional)

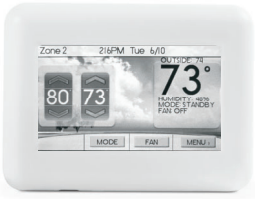
The IntelliZone2 ZoneStat is a zone thermostat option for any of Zones 2 through 6. It has full setback capability and communicates to the IntelliZone2 system.

IntelliZone2 SensorStat (Optional)

The IntelliZone2 SensorStat is a zone thermostat option for any of Zones 2 through 6. It has full setback capability (through the MasterStat interface only) and communicates to the IntelliZone2 system.

IntelliZone2 Outdoor Sensor

The IntelliZone2 Outdoor Sensor measures the outdoor temperature and communicates to the IntelliZone2 system. This temperature is displayed on the MasterStat, and also used to balance response as well as auxiliary electric heat use. The Outdoor Sensor is included in every IntelliZone2 kit.



TPCC32U01 (Optional) (Firmware Version 3.01 or Later)

The TPCC32U01 is a 4.3in communicating color touch screen device that can be used as a zone thermostat for zones 2 through 6. It has full set back capability and communicates to the IntelliZone2 System.

SensorStat-Remote-Kit (Optional)

The SensorStat-Remote-Kit is an option for an invisible thermostat installation and communicates with the IntelliZone2 relay panel. The kit will include the SensorStat Remote, TSU03 (mud in sensor) and wire nuts. This kit will monitor the zone temperature in zones 2 through 6. All set point adjustments are made at the MasterStat.

IntelliZone2 Configuration

Aurora System and Communication Configuration of IntelliZone2

Aurora Communication Basics

The Aurora Control functions around the concept of modularity and intercommunications between these boards. The communication is a 4 wire ModBus protocol. ModBus protocol is an open source protocol becoming more popular with equipment manufacturers for use in HVAC equipment. The Aurora has one 'bus' for the ABC, AXB, AHB, AWL, VS Drive, EEV, and thermostats. The AID Tool only plugs into the ABC AID Tool port, SAH or SVH Air Handler AID Tool port or the AWL (RJ style connector) and will not work at any other location. The AXB has 3 other independent ports for differing protocols; for IntelliZone2, ClimateTalk Components, and Communicating ECM blower motors. None of these ports comply with the ModBus protocol set up for the rest of the Aurora system.

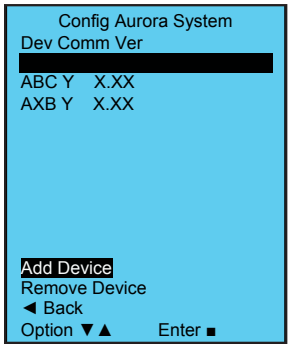
The ModBus communication is accomplished within the cabinet using shielded and ground cabling. This shield is most important in 7 Series applications where the VS Drive component, by its very nature, emits electro-magnetic interference and can interfere with ModBus communications. Round ferrite 'donuts' can be observed at various locations to aid in cleaning the communication lines. Each line is comprised of an R (+24VAC), C (common) and a '+' and '-' communication line. At times the 'R' and 'C' lines may not be connected or needed. The terminals marked '+' and '-' should not be switched, although damage may not occur to the boards, communication is not possible. The communication voltage and current are small therefore 24 awg wire is adequate for these communication lines and a shield is not required but recommended in high EMI environments.

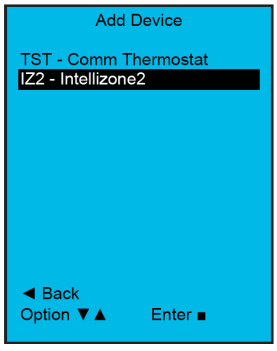
An extra 'expansion' connector is available for connecting other devices onto the main ABC ModBus.

A small LED is located next to each of the communication ports to aid in evaluating active communication at that specific port. This is true for each board. The blinking indicates transmission or receiving communication activity.

Configuring the Aurora for the IntelliZone2

'Adding' the IntelliZone2 to the Aurora system can be accomplished using the AID Tool via the 'Config Aurora' screen and scrolling to IntelliZone2 selecting and adding. As always a 'Y' in the communication column shows that communication is OK. This will initiate communication between the IntelliZone2 system and the Aurora AXB/ABC.





Software Versions

Software versions of the IntelliZone2 MasterStat can be found in the startup screen or in the AID Tool Aurora Config screen. Software can be uploaded to the MasterStat via the USB port on the thermostat. Consult your local WaterFurnace representative or tech service for details.

Wiring and Configuring the Thermostats/Sensors

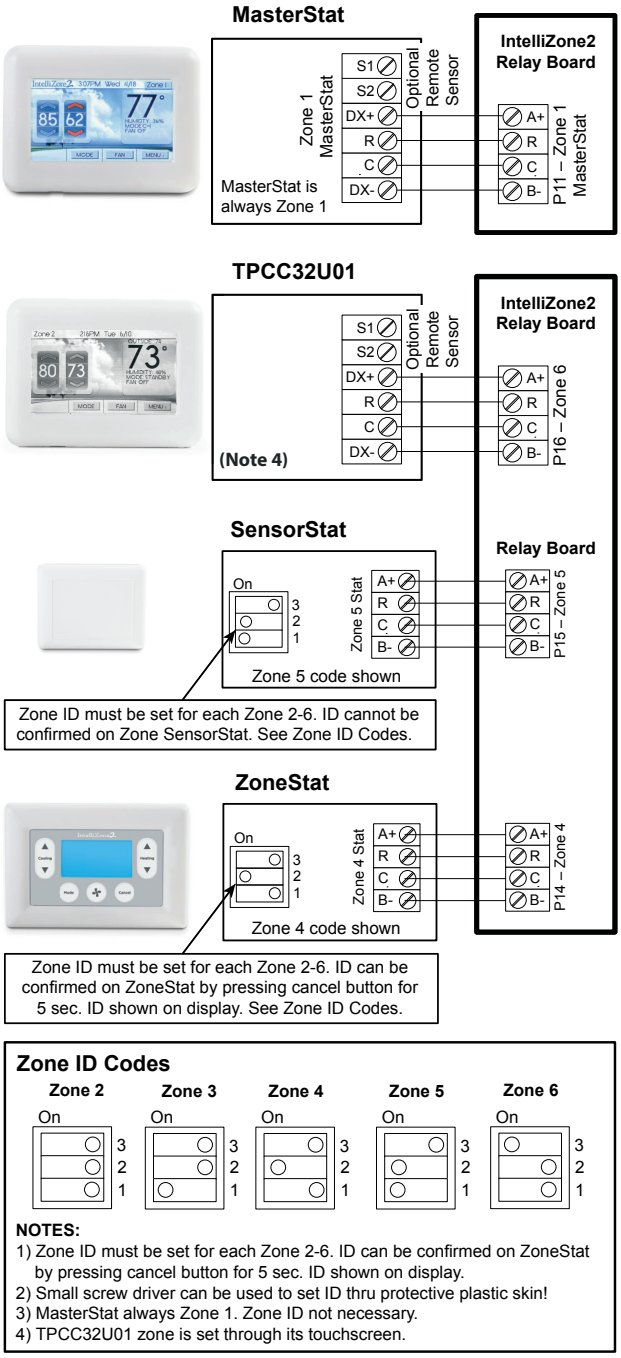
The MasterStat and Zone Sensors should be wired using standard 4-wire thermostat cable (if issues with EMI, shielded cable should be used and grounded at the '–' terminal on one end). The other zones should be added sequentially on the relay board until complete. The dip switch on the back of each ZoneStat or SensorStat should be selected for the appropriate zone number; for instance, Zone 2 stat should be selected using the DIP switch on the back for 'off, off, off'.

The TPCC32U01 will auto detect that it is attached to the IntelliZone2 relay panel and will display the screen below. Use the up/down arrows▲▼ to select the zone.

If more than one zone is assigned the same zone number an error will be displayed on the TPCC32U01 and MasterStat. After the initial configuration to change the zone numbers enter the configuration mode by a finger over the Zone number in the upper left hand corner for 5 sec. Select zone number and use the up/down arrow ▲▼ to adjust.

IntelliZone2 Configuration cont.

ZoneStats/SensorStats PCB



Zone ID Codes

NOTES:

1) Zone ID must be set for each Zone 2-6. ID can be confirmed on ZoneStat by pressing cancel button for 5 sec. ID shown on display.
2) Small screw driver can be used to set ID thru protective plastic skin!
3) MasterStat always Zone 1. Zone ID not necessary.
4) TPCC32U01 zone is set through its touchscreen.

Dual Fuel (Single Speed/Dual Capacity) - When Dual Fuel is selected for 'Thermostat Type' and a 'W' call is present operation will be as follows:

1. The temperature will be controlled by the MasterStat while other zones are ignored.
2. All zone dampers will open, Y1, Y2, G, W outputs shall run for 60 seconds. After 60 seconds Y1 and Y2 will be dropped and output only W and G (if Fan with Heat Option is selected otherwise G will be dropped).
3. There will be a two minute minimum run time once Dual Fuel operation has been entered, regardless if MasterStat heat call has been satisfied.
4. Once the two minute minimum run time expires and the 'W' call is satisfied at the MasterStat then Dual Fuel operation will be terminated. There will be no down staging.
5. Once Dual Fuel operation is terminated all zone dampers will close.
6. There will be a 4 minute time delay once Dual Fuel operation is terminated before compressor operation for cooling or heating may begin.

Dual Fuel (Variable Speed not applicable with the 7 Series Indoor Split) - When Dual Fuel is selected for 'Thermostat Type' and a 'W' call is present operation will be as follows.

1. The temperature will be controlled by the MasterStat while other zones are ignored.
2. All zone dampers will open, the current compressor speed, G and W outputs shall run for 60 seconds. After 60 seconds the compressor will be stopped and output only W and G (if Fan with Heat Option is selected otherwise G will be dropped).
3. There will be a two minute minimum run time once Dual Fuel operation has been entered, regardless if MasterStat heat call has been satisfied.
4. Once the two minute minimum run time expires and the 'W' call is satisfied at the MasterStat then Dual Fuel operation will be terminated. There will be no down staging.
5. Once Dual Fuel operation is terminated all zone dampers will close.
6. There will be a 4 minute time delay once Dual Fuel operation is terminated before compressor operation for cooling or heating may begin.

Fan with Heat Option (Dual Fuel Applications) - Options are ON or OFF. This selection determines whether G (fan) output is to be ON or OFF when W (auxiliary heat) output is ON.

IntelliZone2 Configuration cont.

Staging

The staging screen allows custom selection of staging for cooling and heating, independently.

The IntelliZone2 system allows separate staging options for cooling and heating. There are four options for each mode which are explained below. As an example, staging for cooling can be set for 'Normal' while staging for heating is set for 'Faster2'. Allowing heating and cooling staging to be independent of each other will provide better comfort all year long. Once the compressor call has been initiated by a zone, the compressor will be upstaged using one of the four staging options.

If there are zone(s) that are not keeping up with the thermostat set point look at changing the staging option from "Normal" to "Quicker" or "Faster1".

Single and Dual Staging

Normal - This "as shipped" mode will upstage the blower and compressor normally.

Quicker - This mode will upstage the blower, compressor and auxiliary electric heat more expediently than "normal" mode for increased comfort.

Faster1 - This mode allows for a timed element in compressor (heating and cooling) and electric heat (heating) upstaging in 45% and 70% zones for situations in which 'Quicker' upstaging is inadequate. If the heat pump is already operating in first stage and a 45% or 70% zone has had a heating or cooling demand for 30 continuous minutes then second stage will be activated. For heating, if after another continuous 30 minutes the H3 demand is still present from a 45% or 70% zone, third stage will be activated until the zone call is reduced to a H2. Airflow will increase with compressor staging/EH during this period. For heating, if the heat pump is already operating in second stage and a 45% or 70% zone has had a demand for 30 continuous minutes then third stage will be activated until the demand is reduced to H2. Airflow will be increased to EH selection during this period.

Faster2 - This mode allows for a timed element in compressor (heating and cooling) and electric heat (heating) upstaging in 45% and 70% zones for situations in which 'Faster 1' upstaging is inadequate. If the heat pump is already operating in first stage and a 45% or 70% zone has had a heating or cooling demand for 15 continuous minutes then second stage will be activated. For heating, if after another continuous 15 minutes the H3 demand is still present from a 45% or 70% zone, third stage will be activated until the zone call is reduced to a H2. Airflow will increase with compressor staging/EH during this period. For heating, if the heat pump is already operating in second stage and a 45% or 70% zone has had a demand for 15 continuous minutes then third stage will be activated until the demand is reduced to H2. Airflow will be increased to EH selection during this period.

Variable Speed Staging

For heating in all staging options below, the total of the zone demands will determine when auxiliary heat is energized which could be anywhere from compressor speed 9 to speed 12. If auxiliary heat is energized while on compressor speed 9-11 the compressor speed automatically increases to speed 12. Airflow will increase with compressor speed/EH during this period.

Normal - This "as shipped" mode will upstage the blower and variable speed compressor normally.

Quicker - This mode will upstage the blower, compressor and auxiliary electric heat more expediently than "normal" mode for increased comfort. Generally the compressor will be upstaged 1 extra speed more than normal.

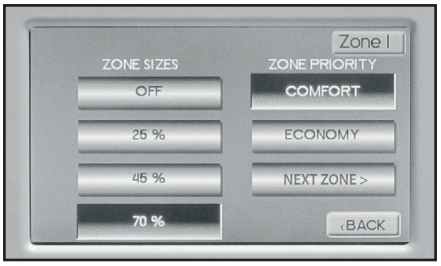
Faster1 - This mode allows for a timed element in compressor and electric heat upstaging in 45% and 70% zones for situations in which quicker staging is not meeting demand. When an H3 (heating) or C2 (cooling) demand is initially received the compressor will upstage two speeds more than normal. After 15 continuous minutes of an H3 or C2 demand the compressor will upstage one more compressor speed and will continue to upstage one compressor speed with every 15 minutes of a continuous H3 or C2 demand until auxiliary electric heat is energized for heating or C2 or maximum compressor speed for cooling.

Faster2 - This mode also allows for a timed element in compressor and electric heat upstaging in 45% and 70% zones for situations in which Faster1 is not meeting heating demand. When an H3 (heating) or C2 (cooling) demand is initially received the compressor will upstage two speeds more than normal. After 15 continuous minutes of an H3 or C2 demand the compressor will upstage two more compressor speeds and will continue to upstage two compressor speeds with every 15 minutes of a continuous H3 demand until auxiliary electric heat is energized or maximum compressor speed for cooling.

IntelliZone2 Configuration cont.

Zone Configuration

Zone configuration allows the selection of the zone size and the zone priority. The zone can be selected by touching the upper right screen text noting the zone. In this way you can cycle thru all of the active zones to view the configuration. You must select a zone percentage before you can configure the next zone. Select “Next Zone” for next zone configuration.



Zone Percentage

Selecting the zone percentage can also be calculated by using the IntelliZone2 Design software. This percentage represents an approximation of the maximum heating or cooling load percentage of the zone and thus to a certain extent volume of airflow. The IntelliZone2 allows 0, 25, 45, and 70% selections. Some general rules to follow in this selection procedure are as follows:

- Pick the larger percentage (45% or 70%) for major living areas such as family rooms, etc.
- Pick the smaller percentage for minor living areas such as dens or bedrooms.
- Pick a larger percentage if more branches are required than the load indicates due to large area per load (i.e. unfinished insulated basement).
- The IntelliZone2 Design software should be used to aid in the selection and calculation of design cfm.
- The IntelliZone2 determines modes as a proportion of the total demand. A simple example of this to begin with is a two-zone system in the cooling mode. If each zone is set at 70% we have the following scenario:

  Zone 1 = 50%
  Zone 2 = 50%

NOTE: All Zone % calculations are ‘normalized using the following process: We now must determine what percentage of the total load each zone represents. To perform this operation, add the two zones together 70 + 70 = 140. One zone would then be 70/140 or 50%.

The IntelliZone2 then reduces the total demand based upon thermostat demand. A “Y1” call in the above example will result in one half of the zone demand in this case 1/2 of 50% for a 25% system demand. A common complaint is insufficient cooling when only one zone is calling for cooling. The IntelliZone2 will not initiate a “Y2” output to the unit until it senses a 50% total system demand (This is when the IntelliZone2 is set for normal upstaging). If the IntelliZone2 is set for quicker upstaging it drops the total system demand required to 41% to initiate a Y2 output.

By this example, it will require a “Y2” call from one zone (50%) and a “Y1” call from the second zone (25%). This will give us a total system demand of 50% + 25% = 75%. System demand for three- and four-zone systems are computed in the same manner.

Heating demand is determined in the same manner, but we now have a third stage instead of two for cooling. The IntelliZone2 assigns values as follows:

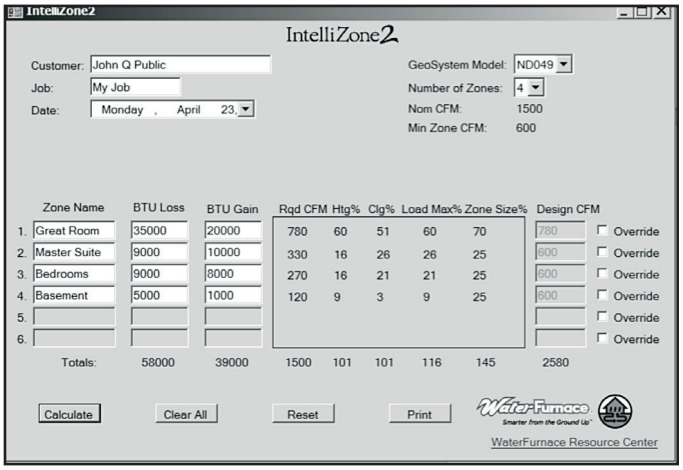
Y1 = 40%
Y2 = 80%
Y3 = 100%

We know from the previous example that the IntelliZone2 will initiate a “Y2” output to the compressor when it is set to normal upstaging and 50% of total demand is needed. It will issue a “W” call to the unit when there is a 90% total demand.

It is a common assumption that if you have a house with two zones equally divided each zone should be set at an equal amount, usually 70%. As can be seen in the above example, it will take a “Y3” call from one zone as well as a “Y2” call from the second zone to obtain auxiliary heat.

This is a simple example, but three- and four-zone systems are calculated in the same manner. Blower speeds are also assigned upon the percentage of system demand and a complete understanding of this process is not necessary for day-to-day decisions. As a serviceman, the temptation arises, in some instances, to influence the logic of the board by jumping “Y1” and “Y2”. While this will create a quicker response, the ductwork of that zone must be capable of handling the cfm delivered by the unit (i.e., if a “Y2” signal is given to the unit, can the ductwork handle the total cfm of the unit).

When setting up a new system remember that if you have unused zones they must be set to zero. If they are not, the setting that they have will be included in the total demand preventing the other zones from operating correctly, as there will be no inputs on those zones.



IntelliZone2 Configuration cont.

The IntelliZone2 allows the selection of either comfort or economy mode in each individual zone to provide maximum savings in areas that allow it (such as workshops and basements), while maintaining perfect comfort in the zones where accurate temperature is most desired (such as bedrooms and baths).

Zone Priority

Comfort Mode - A single zone call (Y1) for conditioning will engage the compressor and allow a minimal set point variation, thus providing ultimate comfort.

Economy Mode - A single zone call (Y1) for conditioning will be ignored by the IntelliZone2 until either a Y2 call is initiated from the same zone or another zone calls for conditioning (Y1). This allows a slightly greater set point variation than in comfort mode. This setting prevents less important zones from energizing the compressor unless it is really needed, thus saving money. As a bonus in this mode, upon a Y1 call, the IntelliZone2 may try to precondition the zone with return air from other zones already satisfied and, in some cases, can preclude the need for energizing the compressor.

Naming Zones With Masterstat

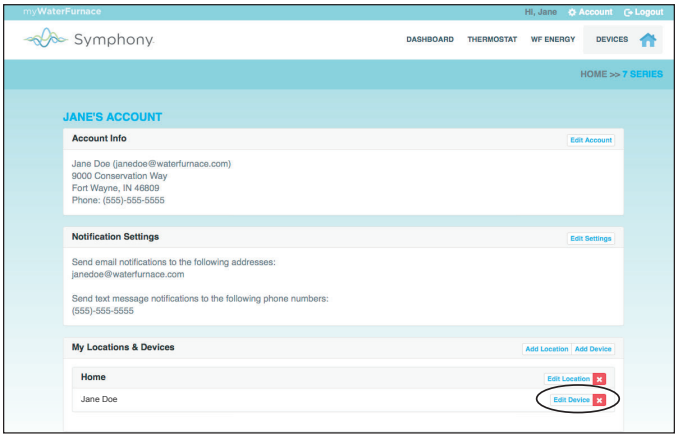
Press and hold the "Zone" button in the upper right hand corner to be able to name the zones. There is limited character size available for the naming. "Z" and the zone number (Z1-Z6) will always be displayed in the front of the zone name. Below are some recommended abbreviations.

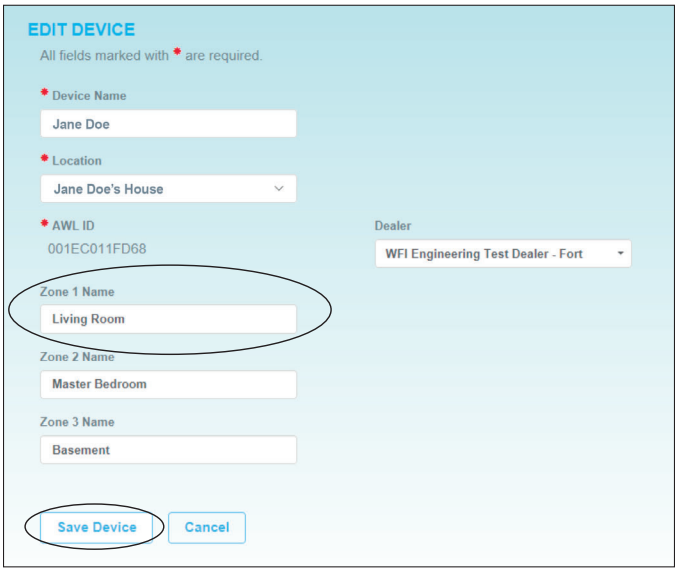
Abbreviation	Definition
bed	bedroom
dinrm	dining room
gbed	guest bedroom
ils	in-law suite
grge	garage
kit	kitchen
liv	living
mbed	master bedroom
famrm	family room
stry	story
upstrs	upstairs
sunrm	sun room
bsmnt	basement
lowlv	lower level
thrm	theater room
exrm	exercise room
grtrm	great room
recrm	recreation room
bonrm	bonus room
off	office

Zone names will only be displayed on the MasterStat.

Naming Zones Using Symphony

The zone names on the Symphony Dashboard and app can be added/changed using Symphony. When using Symphony to name the zones it does not populate or change the names shown on the MasterStat. To add zone names log into your Symphony Dashboard, click on "Account" at the top of the dashboard. Click on "Edit Device". The number of zones that the IntelliZone2 is configured for will be shown. Click on the zone and input the desired zone name. Repeat this for all the zones. Once completed click "Save Device"





Zones can also be named using the mobile Symphony app. Go to the Symphony app. Select the three dots " ⋮ " in the upper right-hand corner. Select "Edit Friendly Name", input the zone name and select save. To name the next zone select the next zone by swiping right to left. Repeat this process for all the zones.

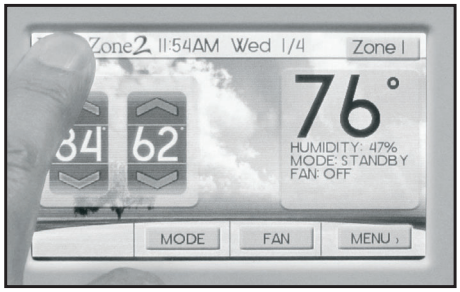
By naming the thermostat you can use Alexa to make changes to the thermostats. For more information on Alexa refer to the WaterFurnace Symphony for Alexa user guide.

IntelliZone2 Configuration cont.

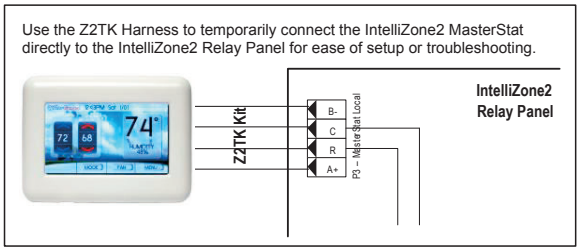
MasterStat Configuration

Once added to the Aurora system, the setup and configuration mode should be entered at the MasterStat by holding a finger over the IntelliZone2 logo for 5 sec. The Configuration and Setup mode will appear automatically.

NOTE: These options are intended to be used by the installer. End users are not advised to change or modify any of these settings. Doing so may make your equipment stop working properly and/or may void the warranty of the zoning system as well as the equipment connected to the thermostat.

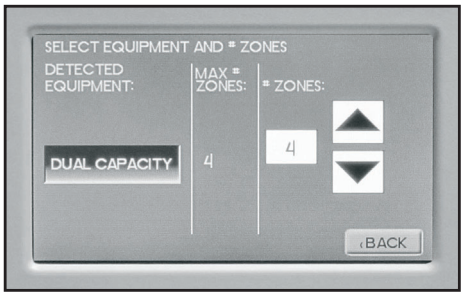


It should be noted that the MasterStat Z2TK troubleshooting harness can be useful during setup by allowing the temporary connection of the MasterStat directly at the IntelliZone2 relay board for ease of configuration or servicing.



Equipment and Number of Zones

The first screen is Equipment and # of Zones. Here the total number of desired zones and the type of equipment is selected. Equipment is automatically detected. Press the up and down arrows until the desired number of zones appears. **The zones should always be installed sequentially starting with the MasterStat always in Zone 1.**

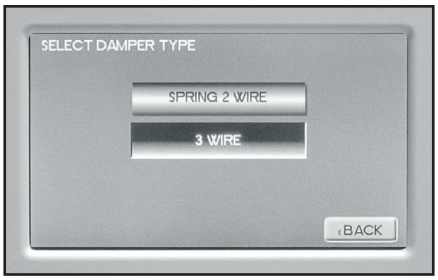


- Single speed equipment is limited to a maximum of 2 zones
- Dual Capacity equipment is limited to a maximum of 4 zones
- Variable speed equipment can have up to the maximum of 6 zones.

NOTE: If the number of zones selected is less than 6, the remaining zones will be disabled.

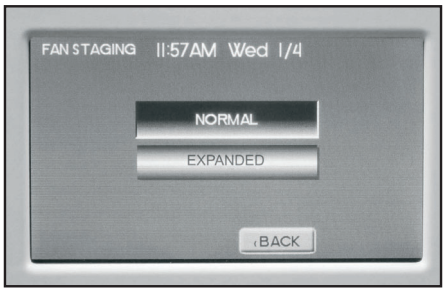
Damper

The Damper screen allows the selection of either 2 wire (spring open) or 3 wire (power open/power closed) type.

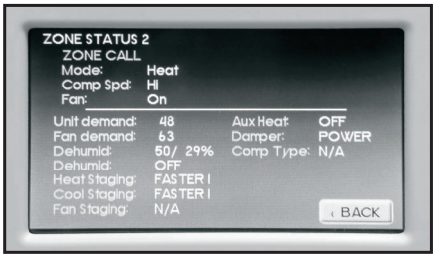


IntelliZone2 Configuration cont.

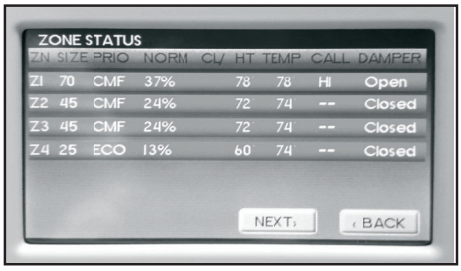
Variable Speed Fan Staging (Variable Speed only) - Variable Speed Fan Staging allows the ability to expand the blower levels. Options are Normal and Expanded. There are three airflow speeds assigned to a compressor speed and the airflow level is determined by the fan demand total zone %. Normal is the recommended airflow level. Selecting Expanded will increase the highest airflow level by one level and decrease the lowest airflow level by one level from Normal. Not available for single speed or dual capacity models.



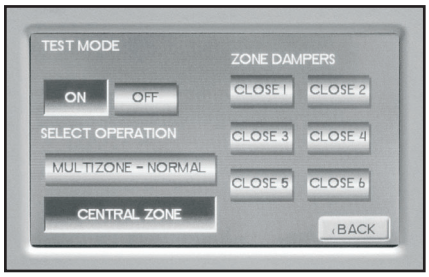
Status - Displays the outputs that the IntelliZone2 is sending to the equipment.



Zones - Displays the inputs that the Intellizone2 is receiving.

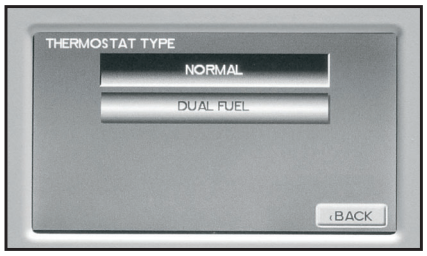


Test Mode - In Test mode 'Central Zone' mode can be selected. In Central mode all dampers are opened and thermostat readings are taken ONLY from the Zone 1 MasterStat. This will approximate operation without a zone system (all dampers open and IntelliZone2 MasterStat temperature control) and can be useful during initial construction of the home or during service etc.



Also in 'Central Zone' mode each damper can be individually cycled off/on to verify operation during Installation or service. It should be noted that the MasterStat Z2TK troubleshooting harness can be useful here by allowing the temporary connection of the MasterStat directly at the IntelliZone2 relay board for ease of configuration or servicing.

Thermostat Type

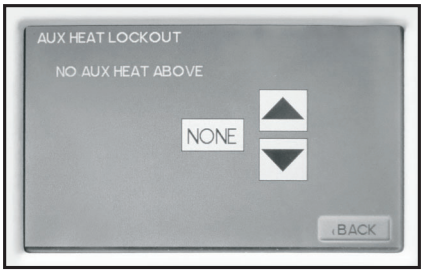


NORMAL/DUAL FUEL

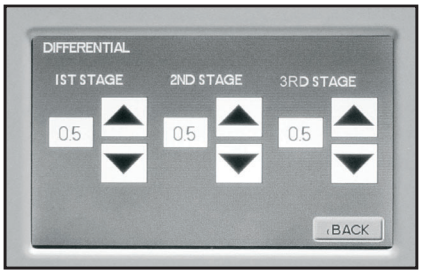
Normal - used for normal operation
Dual Fuel - used on dual fuel systems; needs outdoor sensor to lockout dual fuel

IntelliZone2 Configuration cont.

Aux Heat Lockout - Allows the configuration to lockout electric heat above a selected outdoor temperature. The outdoor sensor (OAT) must be installed on the IntelliZone2 Relay Board. This setting is adjustable in 5°F increments from NONE to 40°F. This will provide full heat pump capacity without electric heat above the selected temperature. When the outdoor temperature drops below the selected temperature, then electric heat will be energized when the demand is present.



Differential



This adjustment will vary the number of degrees, from the set point, before a call for heating or cooling is made. Adjustments can range between 0.2° and 4° differential. Default is 0.5° differential. (If your set point is 70° in heating, your thermostat will not call for heat until the room temperature is 69.5°, when using a 0.5° differential setting).

Offsets

Temperature Offsets – This option allows calibration (or deliberate miscalibration) of the room temperature sensor(s). The Offset function only works on the MasterStat. There are various reasons why the displayed temperature would be adjusted to a higher or lower value. NOTE: Do not adjust for 30 minutes after installation because board may be heated by handling. The selected number is the number of degrees, plus or minus, which will be added to actual temperature. The numbers can range between -5˚ and +5˚. Default values are set to 0˚ offset.

Indoor Offset (MasterStat internal sensor)
Remote Indoor Offset (if sensor is attached)
Outdoor Offset (if sensor is attached)

Humidity Offset – This option allows calibration of the humidity sensor. Adjustments can range between -10% and +10%. Default is 0% offset.

Humidity

Humidify - Turns on the H output when the room humidity is below the set point and there is an active heating call.

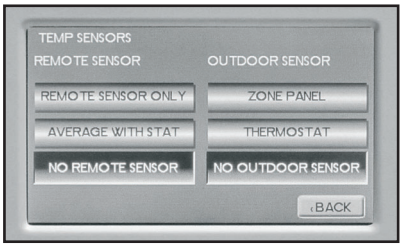
Dehumidify – Turns on the DH output when the room humidity is above the set point and the MODE is set to COOL or AUTO when Cool was the last mode run.
-Enables Active Dehumidification (VS systems)

Both – HUMIDIFY operates in the HEAT mode and DEHUMIDIFY operates in COOL mode.

NONE – Neither is active.

Humidity must be set to Dehumidify or Both for Active Dehumidification (variable speed heat pumps only) to operate. Refer to "Dehumidification - Active" section in this manual for more information on the operation.

Temperature Sensors - Allows the configuration of the remote sensor to be remote only, average of remote and



internal, or no remote sensor. Allows the configuration of the outdoor sensor to be zone panel, MasterStat, or no outdoor sensor. Because IntelliZone2 ships standard with an outdoor sensor this option needs to be selected.
NOTE: LAS on IntelliZone2 relay board = OAT

Accessories -

Each of these options has settings for Cumulative Run Time and Calendar Time. Messages will flash at the top of the Main screen when these events are met to alert the owner that it is time service these options.

Air Filter - Cumulative Run Time default is 1000 hours and Calendar Time is 3 months. Values can range from NONE-2500 hours for Cumulative Run Time (in 100 hour increments), or Calendar Time can be set to NONE to 12 months (in 3 month increments).

Humidifier - Cumulative Run Time default is NONE hours (OFF) and Calendar Time is NONE Values can range from NONE, 400-2500 hours for Cumulative Run Time (in 100 hour increments), or Calendar Time can be set to NONE, to 12 months (in 3 month increments).

UV Lamp - Cumulative Run Time default is NONE hours (OFF) and Calendar Time is NONE. Values can range from NONE, 400-3600 hours for Cumulative Run Time (in 100 hour increments), or Calendar Time can be set to NONE to 48 months (in 3 month increments).

IntelliZone2 Configuration cont.

Air Cleaner - Cumulative Run Time default is 0 hours (NONE) and Calendar Time is NONE. Values can range from NONE, 400-2500 hours for Cumulative Run Time (in 100 hour increments), or Calendar Time can be set to NONE to 12 months (in 3 month increments

Dealer Information - Allows the input of the dealer name, phone, address, e-mail and website. Simply press the screen segment where you want to enter information and a keypad will appear.

Fault Status - Shows the last 10 IntelliZone2 system Faults (heat pump fault history is displayed at the heat pump on the AID Tool). The faults can be cleared or refreshed from this screen.

Restore Defaults - This will allow you to revert to the factory default settings.

Restart Thermostat/Upgrade Software - This allows a convenient way to restart the thermostat or upload the latest software using the USB port without killing power to the whole system.

USB - Allows the import and export of data using the USB port.
Importation of: Installer settings, User Settings, Program, Dealer Details
Exportation of: Installer settings, User Settings, Program, Dealer Details

Data Logging - Allows the USB thumb drive to record the data from the zoning system every 5 seconds.

F°/C° - Allows selection of either Fahrenheit or Celsius temperature scale

Residential/Commercial - Future Use.

Energy Demo - These screens allow a dealer to show the end user an example of the information that will be displayed on daily and monthly screens once their system is operating. This is only an example and not actual data from their system.

Photo Upload - The Intellizone2 will allow personal photo upload to be displayed once the thermostat goes into sleep mode. The MasterStat can only accept photos that are TCI format. Common photo formats can be converted to the TCI format, which is used by the thermostat, by using our photo converter software. Once the photos have been converted and uploaded to the MasterStat they will be displayed as a slide show when the thermostat goes into sleep mode. Sleep mode occurs after 5 minutes of inactivity (no screen touches). The photo conversion software and instructions for uploading the photos can be found at www.auroracontrols.com.

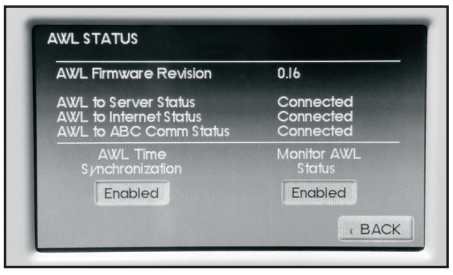
SuperBoost (Variable Speed Heat Pumps ONLY) - SuperBoost can be found under the main menu settings of the thermostat. The SuperBoost option temporarily enables a larger cooling capacity range. Normal cooling mode is limited to compressor speeds 1-9 and SuperBoost allows compressor speeds 10-12 if needed. This screen will allow the homeowner to turn the SuperBoost option ON or OFF. The SuperBoost option will be enabled, by default, for a 24-hour period of time then will automatically be disabled. **NOTE:** Continuous use of SuperBoost could result in overheating the ground loop.

Dehumidification – Active (Variable Speed Heat Pumps Only) - Humidity in the dealer installation screen must be set to Dehumidify or Both for Active Dehumidification to be enabled. Active Dehumidification will only activate during cooling operation, when cooling demand from the IntelliZone2 MasterStat is compressor speed 4 or lower and the humidity setpoint of the MasterStat is at least 5% below the actual relative humidity. The green status LED will flash code 2 when active. The compressor will ramp up and airflow will begin at a low level. Airflow is then reduced periodically until air coil temperature setpoint is reached. If coil temperature continues to drop, the airflow is increased until air coil setpoint is maintained. After 20 minutes of operation in the Active Dehumidification mode normal cooling operation will resume for 5 minutes. This cycle continues until the dehumidification setpoint is reached or the room temperature is more than 1.5°F below the cooling set point or IntelliZone2 MasterStat cooling demand requires greater than compressor speed 4 (normal cooling takes over). In IntelliZone2 systems, the main zone will remain open during active dehumidification.

AWL Status (If Installed)
This screen displays the AWL firmware revision and provides the current AWL communication status relating to an Aurora WebLink (AWL) device. This screen is available whether an AWL is installed on the system or not.

AWL Time Synchronization - When enabled the AWL will synchronize the thermostat's date and time with internet time servers. This option by default is disabled. **NOTE: setting the proper time zone in the Symphony Portal is necessary for correct operation.**

Monitor AWL Status - When enabled, the thermostat will monitor the AWL's RS485, INTERNET, and SERVER status. The thermostat will display "AWL Comm Err" when the AWL is not communicating properly with the Aurora Modbus Network, "AWL Internet Err" when the AWL is unable to communicate to the symphony Servers. This option by default is disabled.



Description of Operation - Package Unit

IntelliZone2 Operation

Upon a call (or calls) from the zones, the IntelliZone2 "weighs" each zone based upon two components: 1) the level of call (Y1, Y2, Y3) coming from the zone; and 2) the size of the zone (zone % selected). This gives a very accurate picture of not only overall heating or cooling requirements (as in other control methods), but also how much heating or cooling is really required for each separate zone.

This, in turn, defines how much compressor (1st or 2nd stage), blower (speeds 2 thru 5), and auxiliary heat should be engaged for each particular situation. The result is a system that utilizes lower compressor and blower speeds more often for improved comfort and energy savings, while relying upon auxiliary heat less often for more energy savings than non-zoned systems.

Heating, Unit 1st stage

(Single/Dual Capacity Compressor and Variable Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and W being translated into unit call 1st stage (Y1). Blower speed will be the 'L' setting of the ECM which is set up at the heat pump control.

Heating, Unit 1st stage

(Single/Dual Capacity Compressor and 5-Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and W being translated into unit call 1st stage (Y1). Blower speed will be the 'Y1' setting of the 5-Speed ECM which is set at the motor.

Heating, Unit 2nd stage

(Single/Dual Capacity Compressor and Variable Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and W being translated into unit call 2nd stage (Y1, Y2). Blower speed will be the 'H' setting of the ECM which is set up at the heat pump control.

Heating, Unit 2nd stage

(Single/Dual Capacity Compressor and 5-Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and W being translated into unit call 2nd stage (Y1, Y2). Blower speed will be the 'Y2' setting of the 5-Speed ECM which is set at the motor.

Heating, Unit 3rd Stage

(Single/Dual Capacity Compressor and Variable Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and W being translated into unit call 3rd stage (Y1, Y2, W). Blower speed will be the 'H' (Premier control) or 'Aux' (ABC control) setting of the ECM which is set up at the heat pump control.

Heating, Unit 3rd Stage

(Single/Dual Capacity Compressor and 5-Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and W being translated into unit call 3rd stage (Y1, Y2, W). Blower speed will be the 'W' setting of the 5-Speed ECM which is set at the motor.

Heating

(Variable Speed Compressor)

The unit will operate based upon demand as calculated by the IntelliZone2. The resulting compressor speed (1-12) will also select an appropriate blower speed for the selected compressor speed. Auxiliary heat will be available on compressor speeds 9-12, depending on the zone inputs. When auxiliary heat is engaged with compressor speed 9-11, the compressor speed automatically increases to speed 12 for maximum output.

Cooling, Unit 1st stage

(Single/Dual Capacity Compressor and Variable Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and O being translated into unit call 1st stage (Y1, O). Blower speed will be the 'L' setting of the ECM which is set up at the heat pump control.

Cooling, Unit 1st stage

(Single/Dual Capacity Compressor and 5-Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and O being translated into unit call 1st stage (Y1, O). Blower speed will be the 'Y1' setting of the 5-Speed ECM which is set at the motor.

Cooling, Unit 2nd stage

(Single/Dual Capacity Compressor and Variable Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and O being translated into unit call 2nd stage (Y1, Y2, O). Blower speed will be the 'H' setting of the ECM which is set up at the heat pump control.

Description of Operation - Package Unit cont.

Cooling, Unit 2nd stage
(Single/Dual Capacity Compressor and 5-Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and O being translated into unit call 2nd stage (Y1, Y2, O). Blower speed will be the 'Y2' setting of the 5-Speed ECM which is set at the motor.

Cooling
(Variable Speed Compressor)

The unit will operate based upon demand as calculated by the IntelliZone2. The resulting compressor speed, speeds 1-9, (speeds 10-12 are reserved for SuperBoost mode only) will also select an appropriate blower speed.

Emergency Heat

Emergency heat mode may be engaged by selecting at the MasterStat. All zone thermostat fault LED's begin to flash two quick flashes, followed by a pause, indicating that emergency heat mode has been activated. The temperature of the structure will be controlled by the zone 1 MasterStat while other zones are ignored. When a demand for heat occurs at the MasterStat all zone dampers are opened and emergency heat is energized. Emergency heat will continue to operate until the MasterStat demand is satisfied.

Emergency heat mode may be exited by selecting OFF (or one of the other mode selections) at the MasterStat, as well as all zone thermostat fault LED's stop flashing, indicating emergency heat mode has been deactivated and normal IntelliZone2 operation may resume.

Continuous Blower

The unit's blower will be operated on blower speed 1 (G-LED) while heating or cooling is suspended for any zone(s) selected for continuous blower operation at the zone thermostat. Upon any heating or cooling call to the unit, all continuous blower operation ceases.

Lockout Mode
(Single/Dual Speed Compressor)

During the unit lockout mode, the appropriate Fault code will be communicated to the IntelliZone2 MasterStat. The blower will continue to operate on blower speed 1. If the collective zones translate into a > 24% heating call, emergency heat operation will occur and all zone dampers will open. Blower speed will be Aux Heat speed setting.

Lockout Mode
(Variable Speed Compressor)

During lockout mode the appropriate Fault code will be communicated to the IntelliZone2 MasterStat. The blower will continue to operate on blower speed 'G'. If the collective zones translate into $\geq$ 40%, all zone dampers will open and emergency heat operation will occur until the demand is $\leq$ 24%.

Simultaneous Heating & Cooling Requests

Determine Whether To Operate In Heating Or Cooling

If the heat pump is not heating or cooling, then the first demand to be received will determine which mode will be used. If two conflicting demands are received simultaneously, then the higher demand level will determine priority.

If two conflicting demands are received simultaneously, and the demand levels are equal, then the mode wil be determined by the state of the 'O' output as set by the last mode. Preferably, the 'O' output will not be switched, so if the last mode was cooling, the heat pump will start operating in cooling.

Once a mode is started, then that mode will continue until the thermostat(s) is/are satisfied for that mode or 20 minutes run time. After running for 20 minutes, the conflicting zone (cooling during heating or heating during cooling) must have a demand of at least 10% higher in order to change from the current mode to the conflicting mode.

Switching Between Heating And Cooling

When changing between heating and cooling modes, the heat pump requests must be removed, the currently active damper(s) should remain open for the blower off delay. After the blower is turned off following the blower off delay, the dampers should be changed to the state required by the next active call while the zone control should wait for the remainder of the short cycle delay before switching the 'O' output and requesting heat pump operation again.

Blower Data - Package Unit

Airflow Selection (Single or Dual Capacity)

When equipped with a Variable Speed ECM airflow from the Intellizone2 is communicated to the Aurora via a 'Blower Level %'. These blower levels are 55, 70, 85, and 100%. The Aurora will dictate actual airflow based upon these percentages. Below is a graphic showing how the IntelliZone2 would signal for a 55-100% blower level percent and the resulting airflow based upon the ABC setpoints of speed 5 for med and speed 8 for high in the example AID Tool setting. Notice that a blower level of 85% would result in a blower speed of 7 with these settings. All airflows are rounded to the nearest 1-12 blower speeds. Continuous blower and aux heat blower speeds are set Independently of the compressor blower speeds.

Heating Airflow Selection (Single or Dual Capacity)

	From IZ2 Air Level %	Selected in AID Tool: Blower Speed	Cont Blower	Low	High	Aux Heat
		1				
		2				
		3				
		4				
Comp Stage Low	55%	5		--->		
Comp Stage Low	70%	6				
Comp Stage High	85%	7				
Comp Stage High	100%	8	--->		--->	
		9				
		10				
		11				--->
		12				

NOTES:
1) Continuous Blower activated by G only call from IntelliZone2 (selection can be anywhere)
2) Aux Heat Airflow activated by Aux or Emergency heat call (selection must be greater than high and allow proper airflow for the installed electric heat/heat pump model)

In cooling a similar procedure occurs with the exception that when dehumidification reduces airflow it is a reduction as shown below. Therefore in dehumidification mode, if blower speed 5 is selected the resulting airflow will be blower speed 5, less 15%. If cooling airflow is configured to be 15% less than heating airflow then there is no difference between cooling and dehumidification cooling airflow.

Cooling Airflow Selection (Single or Dual Capacity)

	From IZ2 Air Level %	Actual Blwr Spd*	Selected in AID Tool: Blwr Speed	Cont Blwr	Low	High	Aux Heat
			1				
			2				
			3				
			4				
Comp Stage Low	55%	Blwr Spd 5 - 15%	5		--->		
Comp Stage Low	70%	Blwr Spd 6 - 15%	6				
Comp Stage High	85%	Blwr Spd 7 - 15%	7				
Comp Stage High	100%	Blwr Spd 8 - 15%	8	--->		--->	
			9				
			10				
			11				--->
			12				

NOTES:
1) Continuous Blower activated by G only call from IntelliZone2 (selection can be anywhere)
2) Aux Heat Airflow activated by Aux or Emergency heat call (selection must be greater than high and allow proper airflow for the installed electric heat/heat pump model)

Airflow Selection (Variable Speed)

Airflow from the IntelliZone2 is communicated to the Aurora via a blower Level %. These blower levels are 25, 40, 55, 70, 85, and 100%. The Aurora will dictate actual airflow based upon these percentages. Below is a graphic showing how the IntelliZone2 would signal for a 25-100% blower level percent and the resulting airflow based upon the ABC setpoints of speed 3 for low and speed 8 for high in the example AID Tool setting. Notice that a Blower level of 85% would result in a blower speed of 7 with these settings.
All airflows are rounded to the nearest 1-12 blower speeds. Continuous blower and aux heat blower speeds are set Independently of the compressor blower speeds.

Heating Airflow Selection (Variable Speed)

		From IZ2 Air Level %	Selected in AID Tool: Blwr Speed	Cont Blwr	Low Comp	Hi Comp	Aux Heat
			1				
			2				
Comp Speeds 1 & 2	Low Selection	25%	3		--->		
Comp Speeds 3 & 4		40%	4				
Comp Speeds 5 & 6		55%	5				
Comp Speeds 7 & 8		70%	6				
Comp Speeds 9 & 10		85%	7				
Comp Speeds 11 & 12	High Selection	100%	8	--->		--->	
			9				
			10				
			11				--->
			12				

Continued on the next page.

Blower Data - Package Unit cont.

In cooling a similar procedure occurs with the exception that compressor speed is limited to a maximum of speed 9. However compressor speed 10-12 is available for a short period of time and the resulting airflow during the 'SuperBoost' mode is shown below. Another exception is when dehumidification reduces airflow; it is a reduction as shown below. Therefore, in dehumidification mode, if blower speed 3 is selected, the resulting airflow will be blower speed 3, less 15%.

Cooling Airflow Selection (Variable Speed)

		From IZ2 Air Level %	Actual Blower Speed*
Comp Speeds 1 & 2	Low Selection	25%	Blower Spd 3 - 15%
Comp Speeds 3 & 4		40%	Blower Spd 4 - 15%
Comp Speeds 5 & 6		55%	Blower Spd 5 - 15%
Comp Speeds 7 & 8		70%	Blower Spd 6 - 15%
Comp Speeds 9 &10	Cooling Max	85%	Blower Spd 7 - 15%
Comp Speeds 11 & 12	SuperBoost Only	100%	Blower Spd 8 - 15%

	Selected in AID Tool			
AID Reported Blower Speed	Cont Blower	Low Comp	Hi Comp	Aux Heat
1				
2				
3		--->		
4				
5				
6				
7				
8	--->		--->	
9				
10				
11				--->
12				

NOTE: * Denotes default cooling airflow setting of 15% less than heating mode airflow.

Dual or Single Capacity

Heating Unit Call	Blower Level Call (Norm)	Blower Level Call (Dehumid)
H1	55 or 70%	na
H2	85 or 100%	na
H2, W	Aux Blower	na
W	Aux Blower	na
G	G Only (cont Blower)	na
Cooling Unit Call	**Blower Level Call (Norm)**	**Blower Level Call (Dehumid)**
C1	55 or 70%	55 or 70% less 15% cfm
C2	85 or 100%	85 or 100% less 15% cfm
G	G Only (cont Blower)	G Only (cont Blower)

Variable Speed Capacity

Heating Unit Call	Blower Level Call (Normal Staging Shown)	Blower Level Call (Dehumid)
H1 or H2	25% or 40%	na
H3 or H4	25% or 40% or 55%	na
H5 or H6	40% or 55% or 70%	na
H7 or H8	55% or 70% or 85%	na
H9 or H10	70% or 85% or 100%	na
H11 or H12	85% or 100%	na
H9-H12, W	Aux Blower	na
W	Aux Blower	na
G	G Only (cont Blower)	na
Cooling Unit Call	**Blower Level Call (norm)**	**Blower Level Call (Dehumid)**
C1 or C2	25% or 40%	Norm less 15% cfm
C3 or C4	25% or 40% or 55%	Norm less 15% cfm
C5 or C6	40% or 55% or 70%	Norm less 15% cfm
C7 or C8	55% or 70% or 85%	Norm less 15% cfm
C9 or C10	70% or 85% or 100%	Norm less 15% cfm
C11 or C12	85% or 100%	Norm less 15% cfm
G	G Only (cont Blower)	G Only (cont Blower)

NOTE: C10-C12 are only available in SuperBoost mode.

Blower Data - Package Unit cont.

5 Series - Single Speed with Variable Speed ECM

Model	Max ESP	Blower Speed Settings with IntelliZone2 Blower Level Percentages											
		1	2	3	4	5	6	7	8	9	10	11	12
036	0.50	650	750	850 G	1000	**1100 L 55%**	**1200 70%-85%**	**1300 H 100%**	**1400**	**1500**	1550 Aux		
036 w/1hp*	0.75	800	1000 G	**1100 L 55%-70%**	**1300 H 85%-100%**	**1500**	**1600**	1800	1950	2100	2200 Aux		
042	0.50	650	800	900 G	1050	**1150 L 55%**	**1250 70%**	**1350 85%**	**1450 H 100%**	**1550**	1600 Aux		
042 w/1hp*	0.75	800	900 G	1000	**1200 L 55%-70%**	**1400 H 85%-100%**	**1600**	**1700**	**1850**	2000	2200 Aux	2300	2400
048	0.50	650	800	900	1050 G	1150	**1250**	**1350 L 55%**	**1450 70%-85%**	**1550 H 100%**	1600 Aux		
048 w/1hp*	0.75	800	900	1000 G	1200	**1400 L 55%-70%**	**1600 H 85%-100%**	**1700**	**1850**	2000	2200 Aux	2300	2400
060	0.75	800	950	1100 G	1300	**1500 L 55%**	**1750 70%-85%**	**1950 H 100%**	**2100**	**2300**	2325 Aux		
070	0.75	800	950	1100 G	1300	**1500**	**1750 L 55%**	**1950 70%-85%**	**2100 H 100%**	**2300**	2325 Aux		

Blower level percentages are shown with factory recommended blower speed settings 6/8/12
Factory settings are at recommended G-L-H-Aux speed settings
L-H settings MUST be located within boldface CFM range
"Aux" is factory setting for auxiliary heat and must be equal to or above the "H" setting as well as at least the minimum required for the auxiliary heat package
"G" may be located anywhere within the airflow table
CFM is controlled within 5% up to the maximum ESP
Max ESP includes allowance for wet coil and standard filter

5 Series - Dual Capacity with Variable Speed ECM

MODEL	MAX ESP	AIR FLOW SPEED SETTINGS											
		1	2	3	4	5	6	7	8	9	10	11	12
026	**0.50**		400 **G**	500	**600 L 55%**	**700 70%**	**800 85%**	**900 H 100%**	**1000**	1100	1200 **Aux**		
038	**0.50**	650	750 **G**	**850 L 55%**	**1000 70%**	**1100**	**1200 85%**	**1300 H 100%**	**1400**	**1500**	1550 **Aux**		
038 w/1hp*	**0.75**	**800 G L 55%**	**1000 70%**	**1100 85%**	**1300 H 100%**	**1500**	**1600**	1800	1875	1925	2000 **Aux**		
049	**0.50**	650	800 **G**	900	**1050 L 55%**	**1150**	**1250 70%**	**1350 85%**	**1450**	**1550 H 100%**	1575 **Aux**		
049 w/1hp*	**0.75**	800	900 **G**	**1000 L 55%**	**1200 70%**	**1400 85%**	**1600 H 100%**	**1700**	**1850**	2000	2200 **Aux**	2300	2400
064	**0.75**	800	950 **G**	**1100 L 55%**	**1300 70%**	**1500 85%**	**1750 H 100%**	**1950**	**2100**	**2300**	2325 **Aux**		
072	**0.75**	800	950	1100 **G**	**1300 L 55%**	**1500 70%**	**1750 85%**	**1950 H 100%**	**2100**	**2300**	2325 **Aux**		

Factory settings are at recommended G-L-H-Aux speed settings 10/5/12
L-H settings MUST be located within boldface CFM range
"Aux" is factory setting for auxiliary heat and must be equal to or above the "H" setting as well as at least the minimum required for the auxiliary heat package
"G" may be located anywhere within the airflow table
CFM is controlled within 35% up to the maximum ESP
Max ESP includes allowance for wet coil and standard filter

7 Series - Variable Speed with Variable Speed ECM

Model	Max ESP	7 Series Blower Speed Settings with IntelliZone2 Blower Level Percentages											
		Speed 1	Speed 2	Speed 3	Speed 4	Speed 5	Speed 6	Speed 7	Speed 8	Speed 9	Speed 10	Speed 11	Speed 12
036	0.50	**285**	**380 G**	**525 L 25%**	**675 40%**	**815**	**980 55%**	1100 70%	1220	1330 85%	1440 H 100%	1540 Aux	1575
036 w/1hp*	0.75	**480**	**565 G**	**665 L 25%**	**761 40%**	**870**	**1000 55%**	1100 70%	1200	1300 85%	1410 H 100%	1520 Aux	1630
048	0.75	**475**	**620 G**	**730 L 25%**	**850 40%**	**1020**	**1140 55%**	1270 70%	1400	1520 85%	1650 H 100%	1790 Aux	1925
060	0.75	**400**	**600 G**	**830 L 25%**	**1050 40%**	**1230**	**1400 55%**	1560 70%	1700	1870 85%	2010 H 100%	2140 Aux	2265
****VS Compressor Speed**				1-2	3-4		5-6	7-8		9-10	11-12		

Blower level percentages are shown with factory recommended blower speed settings 6/7/12
** VS Compressor speed is given for the factory default cfm settings. When the cfm default settings are changed it will change the relationship to the compressor speed that is shown in the table. In cooling mode compressor speeds 10-12 are only available when SuperBoost mode is selected at the thermostat.
* optional 1 HP ECM
Factory speed settings are at recommended G, L , H and Aux positions
"G" may be located anywhere within the airflow table
"L" setting should be located within the boldface CFM range
"H" setting MUST be located within the shaded CFM range
"Aux" setting MUST be equal to or greater than the minimum allowable CFM for the auxiliary heater kit (see auxiliary heat ratings table)
CFM is controlled within 5% up to the maximum ESP
Max ESP includes allowance for wet coil and standard filter

Blower Data - Package Unit cont.

5 Series - Single Speed with 5-Speed ECM Motor

Model	Motor Speed	Motor Tap	T'stat Cnct.	Blower Size	Motor HP	Airflow (cfm) at External Static Pressure (in. wg)															
						0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
	High	**5**	W			980	960	940	930	920	905	890	875	860	840	820	800	745	-	-	-
	Med High	**4**	Y1			890	878	865	845	825	813	800	785	770	753	735	710	665	-	-	-
022	Med	3		9 x 7	1/2	830	815	800	788	775	755	735	723	710	690	670	640	600	-	-	-
	Med Low	**2**	G			780	760	740	703	665	653	640	620	600	585	570	-	-	-	-	-
	Low	1				625	593	560	535	510	495	480	455	430	410	390	-	-	-	-	-
	High	5				1407	1381	1354	1327	1300	1267	1233	1201	1168	1131	1094	1009	-	-	-	-
	Med High	**4**	W			1146	1134	1122	1111	1099	1085	1071	1062	1052	1042	1031	966	-	-	-	-
030	**Med**	**3**	Y1	9 x 7	1/2	1023	1012	1001	985	969	959	949	937	925	913	901	-	-	-	-	-
	Med Low	2				978	962	946	934	922	907	891	882	872	858	843	-	-	-	-	-
	Low	**1**	G			795	777	759	748	737	718	698	686	673	650	626	-	-	-	-	-
	High	**5**	W			1530	1503	1476	1453	1429	1413	1397	1376	1355	1342	1329	1276	1231	1173	-	-
	Med High	**4**	Y1			1413	1388	1363	1342	1321	1303	1285	1263	1240	1226	1212	1173	1016	946	-	-
036	Med	3		11 x 10	1/2	1355	1325	1294	1276	1258	1235	1212	1188	1164	1144	1123	982	909	883	-	-
	Med Low	2				1336	1299	1261	1242	1222	1202	1181	1157	1132	1111	1090	937	874	830	-	-
	Low	**1**	G			1243	1182	1121	1061	1000	964	928	856	784	744	703	647	592		-	-
	High	5				1934	1910	1886	1871	1855	1827	1799	1780	1760	1747	1734	1700	1659	1617	-	-
	Med High	**4**	W			1799	1783	1767	1744	1720	1693	1666	1649	1631	1617	1603	1560	1530	1492	-	-
042	Med	3		11 x 10	1	1694	1680	1666	1642	1617	1592	1567	1552	1537	1519	1500	1453	1421	1372	-	-
	Med Low	2	Y1			1575	1560	1540	1520	1502	1487	1471	1448	1424	1409	1393	1351	1308	1266	-	-
	Low	1	G			1454	1406	1358	1333	1308	1285	1261	1239	1217	1198	1179	1072	1002	988	-	-
	High	5				1934	1910	1886	1871	1855	1827	1799	1780	1760	1747	1734	1700	1659	1617	-	-
	Med High	**4**	W			1799	1783	1767	1744	1720	1693	1666	1649	1631	1617	1603	1560	1530	1492	-	-
048	**Med**	**3**	Y1	11 x 10	1	1694	1680	1666	1642	1617	1592	1567	1552	1537	1519	1500	1453	1421	1372	-	-
	Med Low	2				1575	1560	1540	1520	1502	1487	1471	1448	1424	1409	1393	1351	1308	1266	-	-
	Low	**1**	G			1454	1406	1358	1333	1308	1285	1261	1239	1217	1198	1179	1072	1002	988	-	-
	High	**5**	W			2245	2230	2214	2194	2173	2155	2136	2120	2103	2087	2070	2032	1998	1957	1910	1825
	Med High	4				2092	2073	2054	2035	2015	1995	1975	1958	1940	1922	1904	1880	1843	1806	1767	1728
060	Med	3		11 x 10	1	1951	1931	1910	1889	1868	1850	1831	1812	1793	1774	1755	1722	1688	1654	1612	1562
	Med Low	**2**	Y1			1812	1796	1780	1761	1741	1718	1695	1682	1668	1651	1633	1591	1555	1518	1480	1433
	Low	**1**	G			1682	1661	1640	1616	1591	1573	1555	1533	1510	1495	1480	1441	1400	1351	1316	1263
	High	**5**	W			2472	2454	2435	2414	2393	2371	2349	2328	2306	2289	2271	2230	2189	2121	2033	1936
	Med High	**4**	Y1			2271	2248	2225	2205	2184	2166	2147	2129	2110	2094	2078	2039	2011	1977	1930	1846
070	Med	3		11 x 10	1	2133	2115	2096	2072	2047	2030	2013	1996	1979	1965	1950	1909	1873	1837	1793	1748
	Med Low	2				2008	1985	1962	1939	1915	1898	1880	1862	1843	1828	1812	1774	1742	1703	1669	1635
	Low	**1**	G			1806	1784	1761	1742	1722	1696	1669	1656	1642	1625	1607	1564	1527	1490	1443	1404

Factory speed settings are in Bold 6/14/12

Air flow values are with dry coil and standard filter

For wet coil performance first calculate the face velocity of the air coil (Face Velocity [fpm] = Airflow [cfm] / Face Area [sq ft]).

Then for velocities of 200 fpm reduce the static capability by 0.03 in. wg, 300 fpm by 0.08 in. wg, 400 fpm by 0.12in. wg., and 500 fpm by 0.16 in. wg.

Highest setting is for auxiliary heat (W) and lowest setting is for constant blower (G). The "Y1" and "Y2" settings must be between the "G" and "W" settings.

The gray wire is not factory wired to the motor and is tied to the wire harness. This wire can be field connected and can be used with 3ht/2cl thermostats or IntelliZone2 to deliver the required air flow for the Y2 signal.

5 Series - Dual Capacity with 5-Speed ECM

Model	Motor Speed	Motor Tap	T'stat Cnct.	Blower Size	Motor HP	Airflow (cfm) at External Static Pressure (in. wg)															
						0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
	High	**5**	W			1120	1109	1097	1082	1066	1055	1044	1028	1011	1001	991	932	839	-	-	-
	Med High	**4**	Y2			1020	1006	991	980	968	950	932	922	911	894	876	849	812	-	-	-
026	Med	3		9 x 7	1/2	917	906	895	884	872	854	836	824	812	792	772	754	719	-	-	-
	Med Low	**2**	Y1			836	824	812	794	776	765	754	735	715	703	691	653	631	-	-	-
	Low	**1**	G			735	721	707	687	666	653	640	622	603	589	574	533	-	-	-	-
	High	**5**	W			1530	1503	1476	1453	1429	1413	1397	1376	1355	1342	1329	1276	1231	1173	-	-
	Med High	**4**	Y2			1413	1388	1363	1342	1321	1303	1285	1263	1240	1226	1212	1173	1016	946	-	-
038	**Med**	**3**	Y1	11 x 10	1/2	1355	1325	1294	1276	1258	1235	1212	1188	1164	1144	1123	982	909	883	-	-
	Med Low	2				1336	1299	1261	1242	1222	1202	1181	1157	1132	1111	1090	937	874	830	-	-
	Low	**1**	G			1243	1182	1121	1061	1000	964	928	856	784	744	703	647	592		-	-
	High	**5**	W			1934	1910	1886	1871	1855	1827	1799	1780	1760	1747	1734	1700	1659	1617	-	-
	Med High	4				1799	1783	1767	1744	1720	1693	1666	1649	1631	1617	1603	1560	1530	1492	-	-
049	**Med**	**3**	Y2	11 x 10	1	1694	1680	1666	1642	1617	1592	1567	1552	1537	1519	1500	1453	1421	1372	-	-
	Med Low	**2**	Y1			1575	1560	1540	1520	1502	1487	1471	1448	1424	1409	1393	1351	1308	1266	-	-
	Low	**1**	G			1454	1406	1358	1333	1308	1285	1261	1239	1217	1198	1179	1072	1002	988	-	-
	High	**5**	W			2245	2230	2214	2194	2173	2155	2136	2120	2103	2087	2070	2032	1998	1957	1910	1825
	Med High	**4**	Y2			2092	2073	2054	2035	2015	1995	1975	1958	1940	1922	1904	1880	1843	1806	1767	1728
064	Med	3		11 x 10	1	1951	1931	1910	1889	1868	1850	1831	1812	1793	1774	1755	1722	1688	1654	1612	1562
	Med Low	**2**	Y1			1812	1796	1780	1761	1741	1718	1695	1682	1668	1651	1633	1591	1555	1518	1480	1433
	Low	**1**	G			1682	1661	1640	1616	1591	1573	1555	1533	1510	1495	1480	1441	1400	1351	1316	1263
	High	**5**	W			2472	2454	2435	2414	2393	2371	2349	2328	2306	2289	2271	2230	2189	2121	2033	1936
	Med High	**4**	Y2			2271	2248	2225	2205	2184	2166	2147	2129	2110	2094	2078	2039	2011	1977	1930	1846
072	Med	3		11 x 10	1	2133	2115	2096	2072	2047	2030	2013	1996	1979	1965	1950	1909	1873	1837	1793	1748
	Med Low	**2**	Y1			2008	1985	1962	1939	1915	1898	1880	1862	1843	1828	1812	1774	1742	1703	1669	1635
	Low	**1**	G			1806	1784	1761	1742	1722	1696	1669	1656	1642	1625	1607	1564	1527	1490	1443	1404

Factory speed settings are in Bold 6/14/12

Air flow values are with dry coil and standard filter

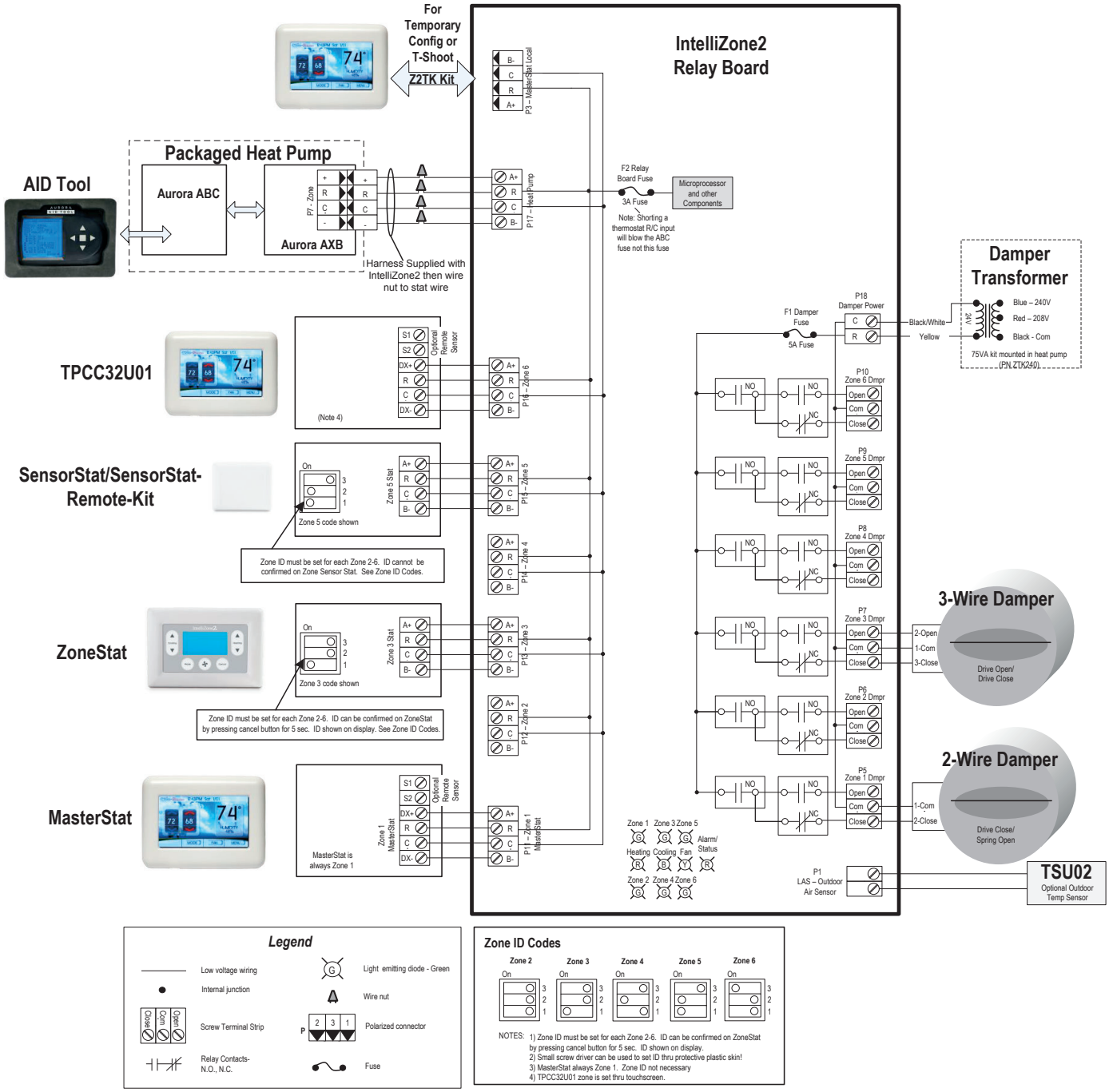
For wet coil performance first calculate the face velocity of the air coil (Face Velocity [fpm] = Airflow [cfm] / Face Area [sq ft]).

Then for velocities of 200 fpm reduce the static capability by 0.03 in. wg, 300 fpm by 0.08 in. wg, 400 fpm by 0.12in. wg., and 500 fpm by 0.16 in. wg.

Highest setting is for auxiliary heat (W) and lowest setting is for constant blower (G). The "Y1" and "Y2" settings must be between the "G" and "W" settings.

Wiring Schematic - Package Unit

IntelliZone2 System



NOTE: This drawing is for visual reference for wiring and configuring a zone. Do not skip zones as shown here. Zones MUST be wired in numerical sequence.

Damper Specifications

General

Model ZDRT3 and ZDCT3 are “3-wire” motorized rectangular and circular dampers utilizing a 24VAC actuator to power open and power close the damper in a period of 95 seconds or less. The ZDRT2 and ZDCT2 are “2-wire” motorized rectangular and circular dampers that use a 2-wire actuator to power close and spring open the damper. All dampers are constructed of heavy gauge G90 galvanized steel.

Damper/Actuator Features

The IntelliZone2 system utilizes a “3-wire” power open/ power close damper actuator featuring:

- Brushless DC Motor (3-wire only)
- Adjustable open position (3-wire only)
- Manual damper release lever (3-wire only)
- No-stall brushless motor for long life
- Up to 2 in. W.G. differential pressure capability
- Magnetic Clutch (3-wire only)
- Quick replacement
- Low power draw
- Capable of 45 in. lbs. of torque minimum (45 in. lbs. running or breakaway)
- 95 second opening (3-wire only)
- 95 second closing (3-wire only)

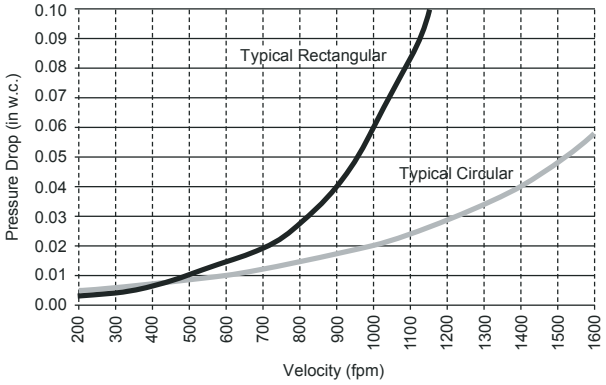
ZDR - Rectangular Damper Features

- 18-gauge G90 galvanized sheet steel using the “toggle lock” fastening system to increase corrosion resistance
- Damper position indicator
- Available in sizes 8” H x 8” W through 14-inch H x 30-inch W
- Air leakage less than 6% @ 2 in. W.G. (AMCA 500-75)
- Nylon bearing to prevent binding

ZDC - Circular Damper Features

- 18-gauge G90 galvanized sheet steel using the “toggle tab lock” fastening system to increase corrosion resistance.
- Double beading to maintain roundness and rigidity.
- One straight and one crimp end.
- Nylon end bearing to prevent binding.
- Damper blades which close against a 1” foam seal for air tightness.
- Damper position indicator.
- Available in 5-inch through 18-inch diameters.
- Air leakage less than 6% @ 2 in. W.G. (AMCA 500-75)

Damper Pressure Drop

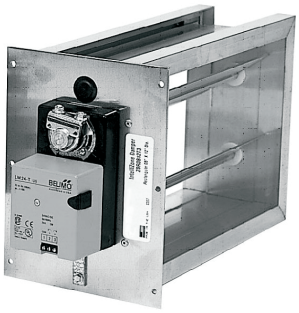


Model ZDR Rectangular Dampers

WIDTH IN INCHES	8" HIGH	10" HIGH	12" HIGH	14" HIGH
8	ZDR0808T2, T3	ZDR1008T2, T3	ZDR1208T2, T3	ZDR1408T2, T3
10	ZDR0810T2, T3	ZDR1010T2, T3	ZDR1210T2, T3	ZDR1410T2, T3
12	ZDR0812T2, T3	ZDR1012T2, T3	ZDR1212T2, T3	ZDR1412T2, T3
14	ZDR0814T2, T3	ZDR1014T2, T3	ZDR1214T2, T3	ZDR1414T2, T3
16	ZDR0816T2, T3	ZDR1016T2, T3	ZDR1216T2, T3	ZDR1416T2, T3
18	ZDR0818T2, T3	ZDR1018T2, T3	ZDR1218T2, T3	ZDR1418T2, T3
20	ZDR0820T2, T3	ZDR1020T2, T3	ZDR1220T2, T3	ZDR1420T2, T3
22	ZDR0822T2, T3	ZDR1022T2, T3	ZDR1222T2, T3	ZDR1422T2, T3
24	ZDR0824T2, T3	ZDR1024T2, T3	ZDR1224T2, T3	ZDR1424T2, T3
26	ZDR0826T2, T3	ZDR1026T2, T3	ZDR1226T2, T3	ZDR1426T2, T3
28	ZDR0828T2, T3	ZDR1028T2, T3	ZDR1228T2, T3	ZDR1428T2, T3
30	ZDR0830T2, T3	ZDR1030T2, T3	ZDR1230T2, T3	ZDR1430T2, T3

NOTES: Actuators mounted on “H” dimension.
*T2 indicates 2 wire (power close, spring open) dampers.
T3 indicates 3 wire (power close, power open) dampers.

Model ZDR Rectangular Damper



Model ZDC Circular Damper

Model ZDC Circular Dampers Selection*

Diameter	Part No.	Length
6" Round	ZDC06T2, T3	9"
8" Round	ZDC08T2, T3	10"
10" Round	ZDC10T2, T3	11"
12" Round	ZDC12T2, T3	12"
14" Round	ZDC14T2, T3	14"
16" Round	ZDC16T2, T3	16"
18" Round	ZDC18T2, T3	18"

NOTES: *T2 indicates 2 wire (power close, spring open) dampers. T3 indicates 3 wire (power close, power open) dampers.

Zone Selection

Selecting zoning areas of a home or office is the first step required for successful IntelliZone2 setup. IntelliZone2 allows four independent zones of operation on dual capacity equipment and two independent zones of operation on single-speed equipment. Clearly, most homes and offices have more than four rooms. What must be decided is, “Given a maximum of four or two different zones of operation, which rooms in the house or office will be best suited under the control of the same sensor?” There are two basic ways to accomplish this:

1. Zoning by Use and Occupancy, or
2. Zoning by Outside Exposure

Zoning by Use and Occupancy

For a typical residence, different rooms in the house are used or occupied at different times during the day. A typical single story home has three bedrooms, a kitchen, a living room , a dining area, bathroom(s), and a family room as shown below in Figure 1.

Never place more than one zone in a single room. Note that the type of use in each room or group of similarly used rooms determines the assigned zone. Figure 1 illustrates a four zone example of zoning by use.

The kitchen, dining, living, family, and utility rooms are excellent choices for a separate zone because they are commonly occupied during the same time of day and share common exposures. IntelliZone2 will provide more conditioned air to these areas when they are in use and less to other areas of the house when unoccupied.

It is doubtful that the living room, family room, kitchen, and bedrooms will all be occupied at the same time. For most of the year, the family room will be occupied at different times of the day than the living room and bedrooms.

The master suite and bedrooms should almost always be on separate zones than the main living areas because each area tends to be occupied at different times. Obviously, bedrooms are usually occupied during the night, not during the day when the living area of the house is occupied. With IntelliZone2, the bedrooms can be “setback” during the day and the main living areas “setback” at night. This allows the HVAC equipment to concentrate on the kitchen and living areas when occupied and on the bedrooms at night when the rest of the house may be unoccupied.

A feature in a residence which can dictate zoning is multiple stories or floors. In a two story structure, the upper and lower floors will have different heating or cooling demands. These differences can be attributed to heat migration (the tendency of heat to rise), types of use, occupancy, and the roof heat load.

Another example is a small doctor’s office. The zones to consider would be the waiting room, patient rooms, lab, and office areas. The waiting room is an excellent zone because the number of people will vary during the day; usually, an exterior door is opened frequently, and these rooms require large amounts of air for ventilation.

Patient rooms are another good choice for a zone; usually occupied by one to three people with tight requirements on temperature needed to ensure comfort. A lab or similar area could be a separate zone because of the different type of use as compared to the rest of the building.
Other good commercial candidates might include small to medium size dentist offices, retail stores with employee lounges and offices, general commercial offices with computer rooms or conference rooms, car dealerships with show rooms, general offices, and parts rooms.

Zoning by Outside Exposure

Zoning by the exterior exposure considers the time of day when the peak cooling and heating loads occur. Zoning by exterior exposure should be considered when the following two conditions exist:

1. There are distinctly different rooms or areas along the south and west exposures, and the building has a large area of glass on those exposures. An example is a room where over half of the cooling load is due to transmission through the glass alone.
2. There are a relatively small number of people in the building and a small number of people occupying offices or spaces along the south or west sides of the building. In short, the heat gain due to people and the ventilation required for the occupants is small when compared to the overall cooling requirements for the building.

Zoning by exposure is not the normal method of zoning for most residences. The exceptions to this rule are rooms along the south or west which have large amounts of glass. Generally bedrooms on the southwest exposure require similar levels of heating or cooling because the time of use precludes heat gain from the sun as a major factor in occupant comfort. Exceptions include large windows or other features.

Using the zoning by exposure method in an office can be more difficult than in a home. If the predominant load in the building is people, the IntelliZone2 should follow the major occupancies in the building as determined by the occupants. If there are few people in the building, then zoning by exposure becomes prevalent since the heat load applied to the individual offices or rooms is dominated by the exposure and time of day. In all cases, judgement is required due to variations in climate, floor plan, type and time of use, glass areas, and glass orientation.

If still unsure which areas or offices to place in a particular zone, the best method is to use load calculations such as ASHRAE or another reliable method. Once this is done, compare the hours to peak load (both heating and cooling) and group offices together that have approximately the same time of day for the peak loads.

Zone Selection cont.

General Zone Selection Rules

- Minimum of three branch runs per zone.
- Zone together areas of like uses, but separate areas based on differing uses
- Avoid grouping rooms of different levels or floors into the same zone.
- Avoid grouping rooms with opposite sun or weather exposures in the same zone.

NOTE: Ensure zone duct is designed to handle cfm required

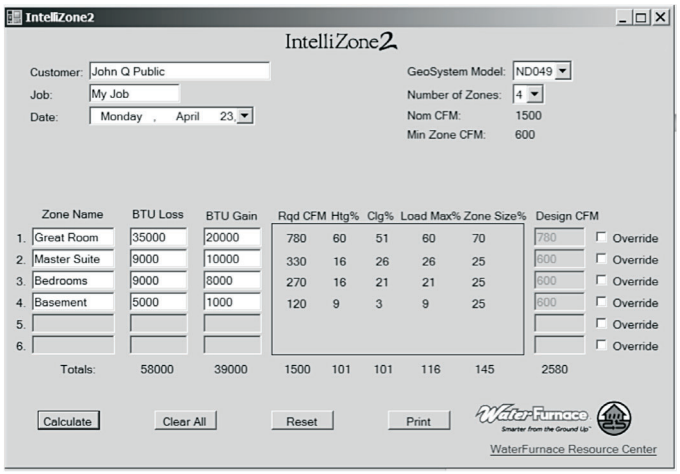
Locating the Thermostats

The thermostats must be located in the room or zone that each controls. Locate a thermostat about five feet above the floor. Do not locate a thermostat where it may be exposed to direct sunlight, drafts or direct supply air. Do not place a thermostat on an outside wall. Follow the same guidelines that apply with standard thermostat installation. If two or more rooms are on a single zone, locate the thermostat in a hallway or area where it can sense the return air from all rooms.

Sample Floor Plan with Four Zone Example

IntelliZone2 Design Software

The IntelliZone2 Design software provides many calculations required to properly design and configure the IntelliZone2 system. This software is available free of charge online at our secure site. Loads and equipment are input to properly assess minimum zone duct design and suggest zone %.



Special Zoning Applications

Residential

Unfinished Basement

- Return air ducts are required to all zones.
- Careful design of ductwork, including return air, for future finishing is crucial.
- Insulated basements, in general, require very little space conditioning. However, the floor space can be substantial. To provide adequate air movement, more air flow will be required than the space conditioning load would indicate.
- In the North, an unfinished basement can be difficult to raise above 65° F in the winter due to its large mass of exposed concrete and typically minimal supply and return ductwork. In the summer, damper leakage occurring from cooling calls in other zones, along with cool basement temperatures, can actually produce a heating call in the basement. Use a “cooling only” mode on the basement zone thermostat in the summer If this becomes an issue.
- Continuous blower selection on the zone thermostat can help circulate some of the cooler air to other zones in the summer and help dehumidify the basement area.

Open Entry/Stairwell in a Multi-Story Home

- Large open areas between two floors allow a tremendous volume of air to rise to the upper floor causing overheating in the winter and undercooling in the summer. Although running a continuous blower can help recirculate the air between floors, a zone system will provide the conditioning exactly to the zone that needs it. Be careful that the system doesn't cool the upper level while heating the lower level in the winter.

Garage, Unused or Unconditioned Zone

- Conditioned garages should be insulated and sealed as tightly as possible to avoid excessive energy use. Although a dedicated space conditioning unit installed specifically for the garage is the best choice, this is not always possible. If the garage zone is being conditioned by the main system, typically only the supply air is ducted. The thermostat setpoints, and thus the amount of supply air, should be limited to avoid increasing air infiltration to the home due to the negative pressure. Main unit return air ducts are not allowed by most building codes due to the chance of recirculating fumes from the garage throughout the home.
- Unused zones can include guest bedrooms. Unconditioned zones may include unfinished areas. Both of these represent areas in which reduced setpoints are desired to limit energy use. In these zones, a continuous blower speed should not be selected. Due to the common return system with other zones, the setpoint should be no more than 4° F off from other zone setpoints. If a larger setback is desired, a return duct damper system should be installed in the zone to more fully isolate the zone from the rest of the home. In combination with return air dampers in scenarios where large setbacks or unconditioned zones are desired that zone must also be isolated from the conditioned structure with doors, partitions, etc. to avoid air mixing.

Small Zone

- If a group of rooms is zoned but constitutes less than 15% of the total system load, the duct system needs to be designed to handle the minimum 15% of the system air flow (25% in dual and 50% in single-speed equipment). For example, an ND049 system (1500 cfm max and 600 cfm minimum) would have a minimum design zone of 375 cfm (25% x 1500 cfm = 375 cfm). When this zone calls, the unit will push 700 cfm through the ductwork designed for 375 cfm. Although higher velocity will be encountered here, the noise level and throw should not be objectionable or even noticeable. This also eliminates the need for a bypass damper. A minimum of three branch runs should be employed in any zone to limit the effects of one branch duct being blocked by shoes, furniture, etc.

Sun Room

- A sunroom can present a tremendous cooling load and will likely require a higher cooling setpoint. Such rooms represent areas in which reduced setpoints would be desired to limit energy use. In these zones, continuous blower should not be selected and, due to the common return system with other zones, the setpoint should be no more than 4° F off other zone setpoints. If a >4° F setback is desired, a return duct damper system should be installed in the zone to more fully isolate it from the rest of the home.

Commercial

Conference Room/Office

- Frequently, conference room(s) and office(s) are grouped together on the same zone due to the direction of exposure. However, when a closed-door conference is held with 12 people, it frequently becomes uncomfortable for either the conference room occupants or one of the office occupants (due to the tremendous difference in loads present within the zone). Here, zoning can solve the problem easily by providing the exact cooling where and when needed.

Peak Heating and Cooling Demands

Cooling-Dominated Structures

In cooling-dominated structures such as commercial buildings and southern residential homes (where electric heat is rarely needed as an auxiliary heat source), up to five load calculations need to be performed. Commercial hourly peak load calculations on all of the four zones under control of the IntelliZone2 System are required. This information sizes the supply air ductwork and the zone damper properly. The fifth load is the entire building (all four zones). Why perform this step? Because the different zones have different times of day when they need peak cooling or heating. The actual peak cooling or heating load is usually less than the sum of the peak loads for the four zones.

The load calculation for the entire structure is used to size the HVAC equipment only. Ductwork branches and zone dampers are sized using the peak zone conditions for each particular zone. The difference between the sum of the peak loads for the individual zones and the peak load for the entire building is called “diversity”.

Diversity is a measurement of the effective cooling or heating capacity added to the system due to zoning. The physical heating or cooling capacity is not increased, but because it is more effective, HVAC equipment can be sized smaller using zoning diversity. This represents the first cost savings of the IntelliZone2 Comfort Zoning System. Secondary savings are attributed to the lower operating costs.

Many popular software packages or HVAC residential loads now calculate peak zone loads; check your software package for its capability.

Heating-Dominated Structures

In heating-dominated structures, such as northern residential homes (where units are generally sized with a small amount of electric heat installed as an auxiliary heat source), diversity may be present in cooling; however, the unit size is dictated by the heating load and diversity is rarely present. In this application, a simple room-by-room or zone-by-zone analysis can be performed with the resultant sum of the rooms or zones taken as the whole house load. The table below lists the four zone loads of this example home.

NOTE: Dual Capacity 5 Series has a 70% low capacity output, therefore minimum cfm required per zone is 40% of nominal cfm.

Example Four Zone Load Summary

	Htg Btu/h	Htg cfm	Total Clg	Sens Clg	Clg cfm	Max cfm	Adjusted 100% cfm	Min cfm Req’d.	Design cfm	# of Branch	Actual cfm %	Actual Load %	Zone DIP %
Zone 1 Main Living													
Kitchen	2259	73	3128	2400	145	145			118	1			
Family	4264	138	6660	5128	311	311			252	2			
Utility	3002	97	1614	1243	75	97			78	1			
Living/Dining	6351	205	7158	5511	334	334			271	3			
Total	15876	512	18560	14282	866	887	718	600	718		29%	34%	45%
Zone 2 Bedrooms													
Bdrm 1	3224	104	1939	1752	106	106			240	2			
Main Bath	892	29	284	407	25	65			147	1			
Bdrm 2	2708	87	1692	1550	94	94			213	1			
Total	6824	220	3915	3709	225	265	215	600	600		24%	15%	45%
Zone 3 Master Suite													
Mstr Bdrm	2806	91	2294	1766	107	107			351	2			
Mstr Bath	2350	76	1504	1158	70	76			249	1			
Total	5156	166	3798	2924	177	183	148	600	600		24%	11%	45%
Zone 4 Basement													
Total	19123	617	5007	3967	240	517	419	600	600	4	24%	41%	45%
Total Zones	46979	1515	31280	24882	1508	1852	1500		2518				
Total House	46290	@ 70°F	32822	@ 20°F		123%	100%		168%				

Unit Data Model	Nom Hi cfm	Min Lo cfm	40% Nom cfm
ND*049	1500	1350	600

System Sizing

HVAC Equipment

The HVAC equipment size should always be determined by performing a load calculation on the entire building or the area of the building that will be serviced by the equipment. Most of the time, this peak load will be less than the sum of the peak loads from the four zones. Remember that each of the peak loads for the individual zones will usually occur during different times of the day. The building peak load or “block” load takes this into account and is the most accurate means of sizing the HVAC equipment. Performing load calculations helps eliminate much of the guesswork involved with equipment sizing.

Transformers

The heat pump transformer should never be used to power the zone dampers. Damage to the heat pump or dampers may occur. Providing adequate transformer power (VA) to supply the system is an important requirement. Each IntelliZone2 3-wire damper requires 3.0VA at nominal voltage and each 2-wire damper requires 7.0VA at nominal voltage. The standard available transformer is a 75VA with an integrated circuit breaker (Part # ZTK240). The Transformer 'VA' Calculation table shows a sample sizing procedure for both the 3-wire and 2-wire dampers that should be carried out for each installation. If the total VA is greater than 70VA, then a second 75VA transformer should be wired in parallel to provide a total power capability of 150VA. As the 'VA' Calculation table shows the 2-wire damper requires much more VA than the 3-wire damper.

Transformer ‘VA’ Calculation

Zone	Number of Dampers Powered in Zone	3-Wire Actuator	2-Wire Actuator
1	1	3.0	7.0
2	1	3.0	7.0
3	2	6.0	14.0
4	3	9.0	21.0
5	2	6.0	14.0
6	1	3.0	7.0
	Total VA Draw (10 Dampers)	**30.0**	**70.0**

Ductwork

If the installed ductwork is not large enough to handle the peak zone loads, the HVAC system will fail to maintain comfort in these zones. This will defeat the purpose of the IntelliZone2 System. An analogy to this is the water supply piping to a residence. In many cases, the pipe supplying the entire home is a one-inch diameter pipe. This pipe supplies all of the lavatories, showers, tubs, kitchen, spigots, and clothes washer. There may be three outdoor spigots and two showers in the house, but virtually never are the pipes to these devices found to be less than 1/2-inch diameter.

Once again, the reason is diversity. The HVAC ductwork must be sized properly so when any one of the IntelliZone2 System's zones demands capacity, the ductwork has the ability to supply it. Using the IntelliZone2 Design software can help limit the ductwork oversizing.

Supply Ductwork

When sizing the supply air system and the return air system (if applicable), the diversity used to size the HVAC equipment plays a role here as well. The supply air ductwork should be of sufficient size to handle the HVAC air handler cfm before any branching occurs. After branching the ductwork to one or more of the zones, the supply or return air ductwork cannot be reduced in size to the extent that normally would be expected in a HVAC system. The reason is the diversity and peak zone.

NOTE: Dual Capacity 5 Series has a 70% low capacity output, therefore minimum cfm required per zone is 40% of nominal cfm.

IntelliZone2 CFM Design

Model	Max CFM	Zone Design CFM	CFM Percentage
NS030	1000	700	50
NS036	1200	850	50
NS042	1300	900	50
NS048	1500	1000	50
NS060	1800	1100	50
NS070	2000	1100	50
ND026	800	600	40
ND038	1200	600	40
ND049	1500	800	40
ND064	1800	950	40
ND072	2000	1100	40
NV036/033	1500	300	20
NV048/042	1800	450	20
NV060/050	2100	450	20

Return Ductwork

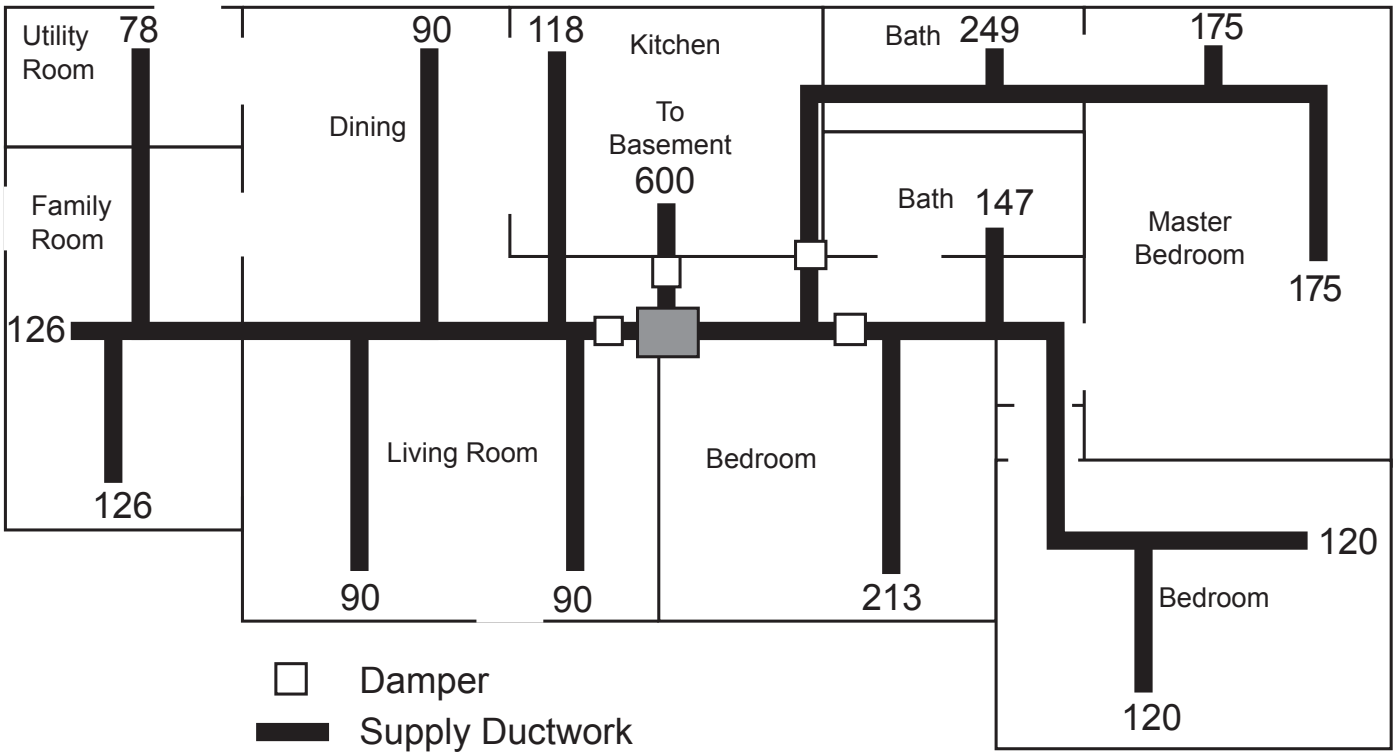
Return air ductwork should be adequate in each zone to return the same amount of air delivered to the zone. In certain rooms, returns are not allowed by code or not desirable (kitchens and baths, respectively). Returns in other rooms in that zone should be sized larger to compensate.

General Rules:

- Minimize the number of dampers and plan to install the dampers as close to the main trunk as possible to limit duct leakage.
- The IntelliZone2 Design software should be used to aid in the selection and calculation of design cfm.

System Sizing cont.

Four Zone Ductwork Example (Delivery cfm)



General Installation Guidelines

General rules to follow when installing a zone system:

CAUTION: When installing the IntelliZone2 in a structure with fossil fuel (oil, gas, propane) appliances, it is important that both supply and return dampers are used in each zone to avoid potential backdrafting of fossil-fueled appliances.

- Up to six zones with variable speed (four with dual capacity and two with single-speed units)
- All dampers should be located as close to the main trunk as possible to limit the amount of pressurized trunkline and thus limit air leakage.
- No less than three branch runs in a zone to prevent a single branch obstruction (curtains or clothes etc.) from affecting unit airfow.
- Insulate and seal around rectangular dampers to prevent leakage.
- All dampers must be wired with 18-gauge wire. (Note: Crimp connections should never be used on solid conductor wire.)
- Ensure that the transformer can handle the power requirements of the system.
- No more than three dampers per zone.
- Ductboard-mounted dampers should be supported within six inches of the damper due to the weight and stress on the ductboard.

IntelliZone2 with 5 Series SAH Air Handler

Description of Operation - Split System

IntelliZone2 Split Operation

For the split system to be compatible with IntelliZone2 there must be either an AXB in the compressor section or an AHB in the SAH Air Handler. As always an ABC board must be in the comressor section as well.

Upon a call (or calls) from the zones, the IntelliZone2 "weighs" each zone based upon two components: 1) the level of call (Y1, Y2, Y3) coming from the zone; and 2) the size of the zone (zone % selected). This gives a very accurate picture of not only overall heating or cooling requirements (as in other control methods), but also how much heating or cooling is really required for each separate zone.

This, in turn, defines how much compressor (1st or 2nd stage), blower and auxiliary heat should be engaged for each particular situation. The result is a system that utilizes lower compressor speed more often for improved comfort and energy savings, while relying upon auxiliary heat less often for more energy savings than non-zoned systems.

The variable speed ECM motor allows 6 air flow levels with IntelliZone2 while the 5 Speed ECM will allow 4 air flow levels. Althought the 5 speed ECM works with the IntelliZone2 the additional available air flow levels and air flow adjustability make the variable speed ECM the better option for zoning.

Heating, Unit 1st stage

(Single/Dual Capacity Compressor and Variable Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and W being translated into unit call 1st stage (Y1). Blower speed will be the 'L' setting of the ECM which is set up at the heat pump control.

Heating, Unit 1st stage

(Single/Dual Capacity Compressor and 5-Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and W being translated into unit call 1st stage (Y1). Blower speed will be the 'Y1' setting of the 5-Speed ECM which is set at the motor.

Heating, Unit 2nd stage

(Single/Dual Capacity Compressor and Variable Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and W being translated into unit call 2nd stage (Y1, Y2). Blower speed will be the 'H' setting of the ECM which is set up at the heat pump control.

Heating, Unit 2nd stage

(Single/Dual Capacity Compressor and 5-Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and W being translated into unit call 2nd stage (Y1, Y2). Blower speed will be the 'Y2' setting of the 5-Speed ECM which is set at the motor.

Heating, Unit 3rd Stage

(Single/Dual Capacity Compressor and Variable Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and W being translated into unit call 3rd stage (Y1, Y2, W). Blower speed will be the 'H' (Premier control) or 'Aux' (ABC control) setting of the ECM which is set up at the heat pump control.

Heating, Unit 3rd Stage

(Single/Dual Capacity Compressor and 5-Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and W being translated into unit call 3rd stage (Y1, Y2, W). Blower speed will be the 'W' setting of the 5-Speed ECM which is set at the motor.

Cooling, Unit 1st stage

(Single/Dual Capacity Compressor and Variable Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and O being translated into unit call 1st stage (Y1, O). Blower speed will be the 'L' setting of the ECM which is set up at the heat pump control.

Cooling, Unit 1st stage

(Single/Dual Capacity Compressor and 5-Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and O being translated into unit call 1st stage (Y1, O). Blower speed will be the 'Y1' setting of the 5-Speed ECM which is set at the motor.

Cooling, Unit 2nd stage

(Single/Dual Capacity Compressor and Variable Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and O being translated into unit call 2nd stage (Y1, Y2, O). Blower speed will be the 'H' setting of the ECM which is set up at the heat pump control.

Cooling, Unit 2nd stage

(Single/Dual Capacity Compressor and 5-Speed ECM)

Operation as stated above with separate zone call levels of YI, Y2, and O being translated into unit call 2nd stage (Y1, Y2, O). Blower speed will be the 'Y2' setting of the 5-Speed ECM which is set at the motor.

Dehumidification (Variable Speed ECM)

If dehumidification is desired it is set via the AID Tool on the ABC control by selecting -5% to -15% in the cooling airflow setup.

Description of Operation cont.

Emergency Heat

Emergency heat mode may be engaged by selecting at the MasterStat. All zone thermostat fault LED's begin to flash two quick flashes, followed by a pause, indicating that emergency heat mode has been activated. The temperature of the structure will be controlled by the zone 1 MasterStat while other zones are ignored. When a demand for heat occurs at the MasterStat all zone dampers are opened and emergency heat is energized. Emergency heat will continue to operate until the MasterStat demand is satisfied.

Emergency heat mode may be exited by selecting OFF (or one of the other mode selections) at the MasterStat, as well as all zone thermostat fault LED's stop flashing, indicating emergency heat mode has been deactivated and normal IntelliZone2 operation may resume.

Continuous Blower

All dampers are open and the unit's blower will be operated while heating or cooling is suspended for any zone(s) selected for continuous blower operation at the zone thermostat. Upon any heating or cooling call to the unit, all continuous blower operation ceases.

Lockout Mode

(Single/Dual Speed Compressor)

During the unit lockout mode, the appropriate Fault code will be communicated to the MasterStat and the blower will operate continuously. If the collective zones translate into a > 24% heating call, emergency heat operation will occur and all zone dampers will open. Blower speed will be highest selected speed setting at the heat pump.

Simultaneous Heating & Cooling Requests

Determine Whether To Operate In Heating Or Cooling

If the heat pump is not heating or cooling, then the first demand to be received will determine which mode will be used. If two conflicting demands are received simultaneously, then the higher demand level will determine priority.

If two conflicting demands are received simultaneously, and the demand levels are equal, then the mode wil be determined by the state of the 'O' output as set by the last mode. Preferably, the 'O' output will not be switched, so if the last mode was cooling, the heat pump will start operating in cooling.

Once a mode is started, then that mode will continue until the thermostat(s) is/are satisfied for that mode or 20 minutes run time. After running for 20 minutes, the conflicting zone (cooling during heating or heating during cooling) must have a demand of at least 10% higher in order to change from the current mode to the conflicting mode.

Switching Between Heating And Cooling

When changing between heating and cooling modes, the heat pump requests must be removed, the currently active damper(s) should remain open for the blower off delay. After the blower is turned off following the blower off delay, the dampers should be changed to the state required by the next active call while the zone control should wait for the remainder of the short cycle delay before switching the 'O' output and requesting heat pump operation again.

SAH 5 Speed ECM Blower Performance Data Option A

Blower Performance 5 Speed ECM Control Option A

Model	Motor Speed	Motor Tap	T'stat Connection	Blower Size	Motor HP	Airflow (cfm) at External Static Pressure (in. wg)															
						0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.60	0.70	0.80	0.90	1.00
022	**High**	**5**	W	9 x 7	1/2	1130	1115	1100	1090	1080	1065	1050	1040	1030	1015	1000	980	950	-	-	-
	Med High	**4**	Y2*			1040	1025	1010	1000	990	975	960	945	930	915	900	880	850	-	-	-
	Med	3				950	935	920	905	890	875	860	845	830	815	800	760	730	-	-	-
	Med Low	**2**	Y1			860	845	830	815	800	785	770	755	740	720	700	660	590	-	-	-
	Low	**1**	G			740	720	700	680	660	645	630	605	580	540	500	460	-	-	-	-
026	**High**	**5**	W	9 x 7	1/2	1130	1115	1100	1090	1080	1065	1050	1040	1030	1015	1000	980	950	-	-	-
	Med High	**4**	Y2*			1040	1025	1010	1000	990	975	960	945	930	915	900	880	850	-	-	-
	Med	3				950	935	920	905	890	875	860	845	830	815	800	760	730	-	-	-
	Med Low	**2**	Y1			860	845	830	815	800	785	770	755	740	720	700	660	590	-	-	-
	Low	**1**	G			740	720	700	680	660	645	630	605	580	540	500	460	-	-	-	-
030	**High**	**5**	W	9 x 7	1/2	1220	1205	1190	1180	1170	1160	1150	1140	1130	1115	1100	1050	930	-	-	-
	Med High	**4**	Y2*			1130	1115	1100	1090	1080	1070	1060	1045	1030	1015	1000	980	950	-	-	-
	Med	3				1040	1030	1020	1005	990	975	960	945	930	915	900	890	850	-	-	-
	Med Low	**2**	Y1			950	935	920	905	890	875	860	845	830	815	800	770	730	-	-	-
	Low	**1**	G			790	770	750	735	720	700	680	660	640	620	600	530	500	-	-	-
036	**High**	**5**	W	10 x 8	1/2	1450	1435	1420	1405	1390	1375	1360	1345	1330	1315	1300	1270	1250	1210	-	-
	Med High	**4**	Y2*			1350	1335	1320	1305	1290	1275	1260	1245	1230	1215	1200	1170	1140	1100	-	-
	Med	**3**	Y1			1170	1150	1130	1115	1100	1080	1060	1045	1030	1015	1000	960	920	880	-	-
	Med Low	2				1000	980	960	940	920	905	890	870	850	825	800	760	710	650	-	-
	Low	**1**	G			990	915	840	800	760	730	700	680	660	630	600	520	470	430	-	-
042	**High**	**5**	W	11 x 10	1	1960	1945	1930	1915	1900	1880	1860	1845	1830	1810	1790	1750	1700	1660	-	-
	Med High	**4**	Y2*			1790	1775	1760	1745	1730	1710	1690	1670	1650	1535	1420	1560	1500	1450	-	-
	Med	3				1700	1685	1670	1650	1630	1615	1600	1575	1550	1525	1500	1450	1400	1350	-	-
	Med Low	**2**	Y1			1630	1560	1600	1520	1560	1535	1510	1490	1470	1445	1420	1370	1300	1250	-	-
	Low	**1**	G			1490	1445	1400	1375	1350	1325	1300	1270	1240	1210	1180	1120	1000	930	-	-
048	**High**	**5**	W	11 x 10	1	1960	1945	1930	1915	1900	1880	1860	1845	1830	1810	1790	1750	1700	1660	1600	-
	Med High	**4**	Y2*			1790	1775	1760	1745	1730	1710	1690	1670	1650	1535	1420	1560	1500	1450	1450	-
	Med	3				1700	1685	1670	1650	1630	1615	1600	1575	1550	1525	1500	1450	1400	1350	1350	
	Med Low	**2**	Y1			1630	1560	1600	1520	1560	1535	1510	1490	1470	1445	1420	1370	1300	1250	1250	-
	Low	**1**	G			1490	1445	1400	1375	1350	1325	1300	1270	1240	1210	1180	1120	1000	930	930	-
060	**High**	**5**	W	11 x 10	1	2210	2230	2190	2194	2170	2155	2130	2120	2100	2087	2060	2020	2000	1960	1920	1890
	Med High	**4**	Y2*			2030	2073	2000	2035	1970	1995	1940	1958	1910	1922	1870	1840	1800	1760	1720	1680
	Med	3				1850	1931	1820	1889	1790	1850	1760	1812	1730	1774	1680	1640	1600	1560	1510	1450
	Med Low	**2**	Y1			1770	1796	1740	1761	1710	1718	1680	1682	1630	1651	1590	1560	1500	1450	1400	1340
	Low	**1**	G			1570	1661	1540	1616	1510	1573	1460	1533	1420	1495	1370	1320	1250	1200	1100	1020
066	**High**	**5**	W	11 x 10	1	2390	2454	2370	2414	2340	2371	2320	2328	2290	2289	2270	2230	2200	2170	2140	2100
	Med High	**4**	Y2*			2210	2248	2180	2205	2160	2166	2140	2129	2100	2094	2070	2040	2000	1960	1940	1890
	Med	**3**	Y1			2030	2115	2010	2072	1980	2030	1950	1996	1900	1965	1880	1840	1800	1760	1720	1680
	Med Low	2				1860	1985	1830	1939	1800	1898	1770	1862	1730	1828	1690	1640	1600	1570	1510	1460
	Low	**1**	G			1780	1784	1750	1742	1720	1696	1680	1656	1640	1625	1600	1550	1500	1460	1400	1380

Factory speed settings are in Bold 1/10/17

Air flow values are with dry coil and standard filter

For wet coil performance first calculate the face velocity of the air coil (Face Velocity [fpm] = Airflow [cfm] / Face Area [sq ft]).

Then for velocities of 200 fpm reduce the static capability by 0.03 in. wg, 300 fpm by 0.08 in. wg, 400 fpm by 0.12in. wg., and 500 fpm by 0.16 in. wg.

Highest setting is for auxiliary heat (W) and lowest setting is for constant blower (G). The "Y1" and "Y2" settings must be between the "G" and "W" settings.

***Single speed compressor section units will need to remove the TAN wire on the 5 speed motor and replace it with the RED wire. Tape end and secure the TAN wire.**

The SAH Air Handler blower is factory wired for dual speed compressor section operation.

SAH 5 Speed ECM Blower Performance Data Option A cont.

5-Speed ECM Constant Torque Motors

The 5-Speed ECM is a 'Constant Torque' ECM motor and delivers air flow similar to a PSC but operates as efficiently as an ECM Motor. Because it's an ECM Motor, the 5-Speed ECM can ramp slowly up to down like the ECM motor. There are 5 possible speed taps available on the 5-Speed ECM motor with #1 being the lowest airflow and #5 being the highest airflow. These speed selections are preset at the time of manufacture and are easily changed in the field if necessary.

If more than one tap are energized at the same time, built in logic gives precedence to the highest tap number and allows air flow to change with G, Y1, Y2 and W signals. Each of those 5 speeds has a specific 'Torque' value programmed into the motor for each speed selection. As static pressure increases, airflow decreases resulting in less torque on the rotor. The motor responds only to changes in torque and adjusts its speed accordingly.

The 5-Speed ECM motor is powered by line voltage but the motor speed is energized by 24 VAC.

5-Speed ECM Benefits:

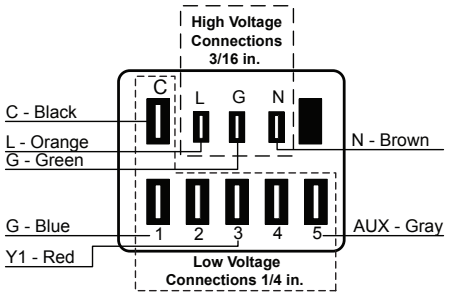
- High Efficiency
- Soft Start
- 5 speeds with up to 4 speeds on-line
- Built-in logic allows air flow to change with G, Y1, Y2 and W signals
- Super efficient low airflow continuous blower setting.

Setting Blower Speed - 5-Speed ECM

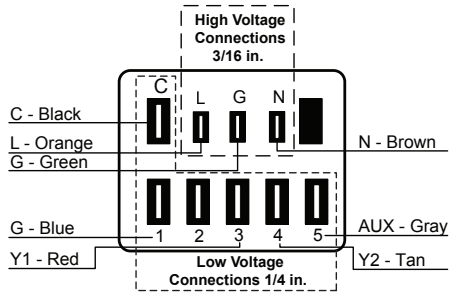
5-Speed ECM blower motors have five (5) speeds of which three (3) are selectable on single speed and four (4) are selectable on dual capacity.

Caution: Disconnect all power before performing this operation.

5-Speed ECM Motor Connections - Single Speed Splits



5-Speed ECM Motor Connections - Dual Capacity Splits



SAH Blower Performance Data Option C

5 Series - Single Speed Split with SAH Air Handler

Split Model	SAH Model	Motor HP	MAX ESP	Variable Speed ECM Settings with IntelliZone2 Blower Level Percentages											
				1	2	3	4	5	6	7	8	9	10	11	12
036	**036**	**1/2**	**0.50**	550	650	700	800 G	850	900	950	**1050 L 55%**	**1100 70%-85%**	**1200 H 100%**	1300 Aux	
042	**042**	**1**	**0.75**	650	750	800	900 G	1000	**1150 L 55%**	**1200 70%**	**1300 85%**	**1400 H 100%**	**1500**	1600	1700 Aux
048	**048**	**1**	**0.75**	650	750	800	900	1000 G	1150	1200	**1300 L 55%**	**1400 70%**	**1500 85%**	**1600 H 100%**	1700 Aux
060	**060**	**1**	**0.75**	950	1100 G	1200	1350	**1500 L 55%**	**1650 70%**	**1700**	**1800 85%**	**2000 H 100%**	2100 Aux	2200	
070	**066**	**1**	**0.75**	950	1100 G	1200	1350	1500	**1650 L 55%**	**1700 70%**	**1800**	**2000 85%**	**2100 H 100%**	2200 Aux	

Blower level percentages are shown with factory recommended blower speed settings 3/10/2017
L and H settings MUST be located within boldface CFM range
"Aux" is factory setting for auxiliary heat and must be equal to or above the "H" setting as well as at least the minimum required for the auxiliary heat package
"G" may be located anywhere within the airflow table
CFM is controlled within 5% up to the maximum ESP
Max ESP includes allowance for wet coil and standard filter
SAH Air Handler with control option "C"

5 Series - Dual Capacity Split with SAH Air Handler

Split Model	SAH Model	Motor HP	MAX ESP	Variable Speed ECM Settings with IntelliZone2 Blower Level Percentages											
				1	2	3	4	5	6	7	8	9	10	11	12
026	**026**	**1/2**	**0.50**		400 G	500	**600 L 55%**	**700 70%**	**800 85%**	**900 H 100%**	**1000**	1100	1200 Aux		
038	**036**	**1/2**	**0.50**	550	650	700 G	800	**850 L 55%**	**900**	**950 70%**	**1050 85%**	**1100**	**1200 H 100%**	1300 Aux	
049	**048**	**1**	**0.75**	650	750	800 G	900	**1000 L 55%**	**1150**	**1200 70%**	**1300**	**1400 85%**	**1500**	**1600 H 100%**	1700 Aux
064	**060**	**1**	**0.75**	950 G	**1100 L 55%**	**1200**	**1350 70%**	**1500**	**1650**	**1700 85%**	**1800**	**2000 H 100%**	2100 Aux	2200	
072	**066**	**1**	**0.75**	950	1100 G	1200	**1350 L 55%**	**1500**	**1650 70%**	**1700**	**1800 85%**	**2000**	**2100 H 100%**	2200 Aux	

Blower level percentages are shown with factory recommended blower speed settings 3/10/2017
L and H settings MUST be located within boldface CFM range
"Aux" is factory setting for auxiliary heat and must be equal to or above the "H" setting as well as at least the minimum required for the auxiliary heat package
"G" may be located anywhere within the airflow table
CFM is controlled within 5% up to the maximum ESP
Max ESP includes allowance for wet coil and standard filter
SAH Air Handler with control option "C"

Blower Performance Data Option C cont.

Setting Blower Speed - Variable Speed ECM

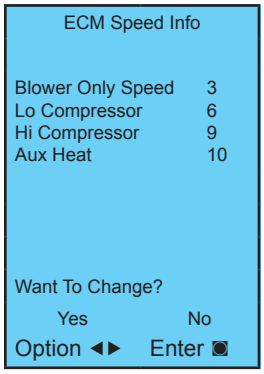
The ABC board's Yellow Config LED will flash the current ECM blower speed selections for "G", low, and high continuously with a short pause in between. The speeds can also be confirmed with the AID Tool under the Setup/ ECM Setup screen. The Aux will not be flashed but can be viewed in the AID Tool. The ECM blower motor speeds can be field adjusted with or without using an AID Tool.

ECM Setup without an AID Tool

The blower speeds for "G", Low (Y1), High (Y2), and Aux can be adjusted directly at the Aurora ABC board which utilizes the push button (SW1) on the ABC board. This procedure is outlined in the ECM Configuration Mode portion of the Aurora 'Base' Control System section. The Aux cannot be set manually without an AID Tool.

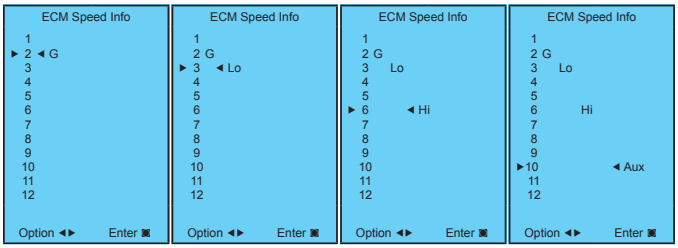
ECM Setup with an AID Tool

A much easier method utilizes the AID Tool to change the airflow using the procedure below. First navigate to the Setup screen and then select ECM Setup. This screen displays the current ECM settings. It allows the technician to enter the setup screens to change the ECM settings. Change the highlighted item using the ◄ and ► buttons and then press the ◙ button to select the item.



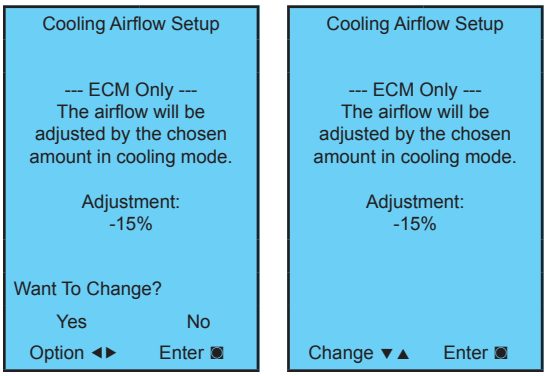
Selecting YES will enter ECM speed setup, while selecting NO will return to the previous screen.

ECM Speed Setup - These screens allow the technician to select the "G", low, high, and auxiliary heat blower speed for the ECM blower motor. Change the highlighted item using the ▲ and ▼ buttons. Press the ◙ button to select the speed.



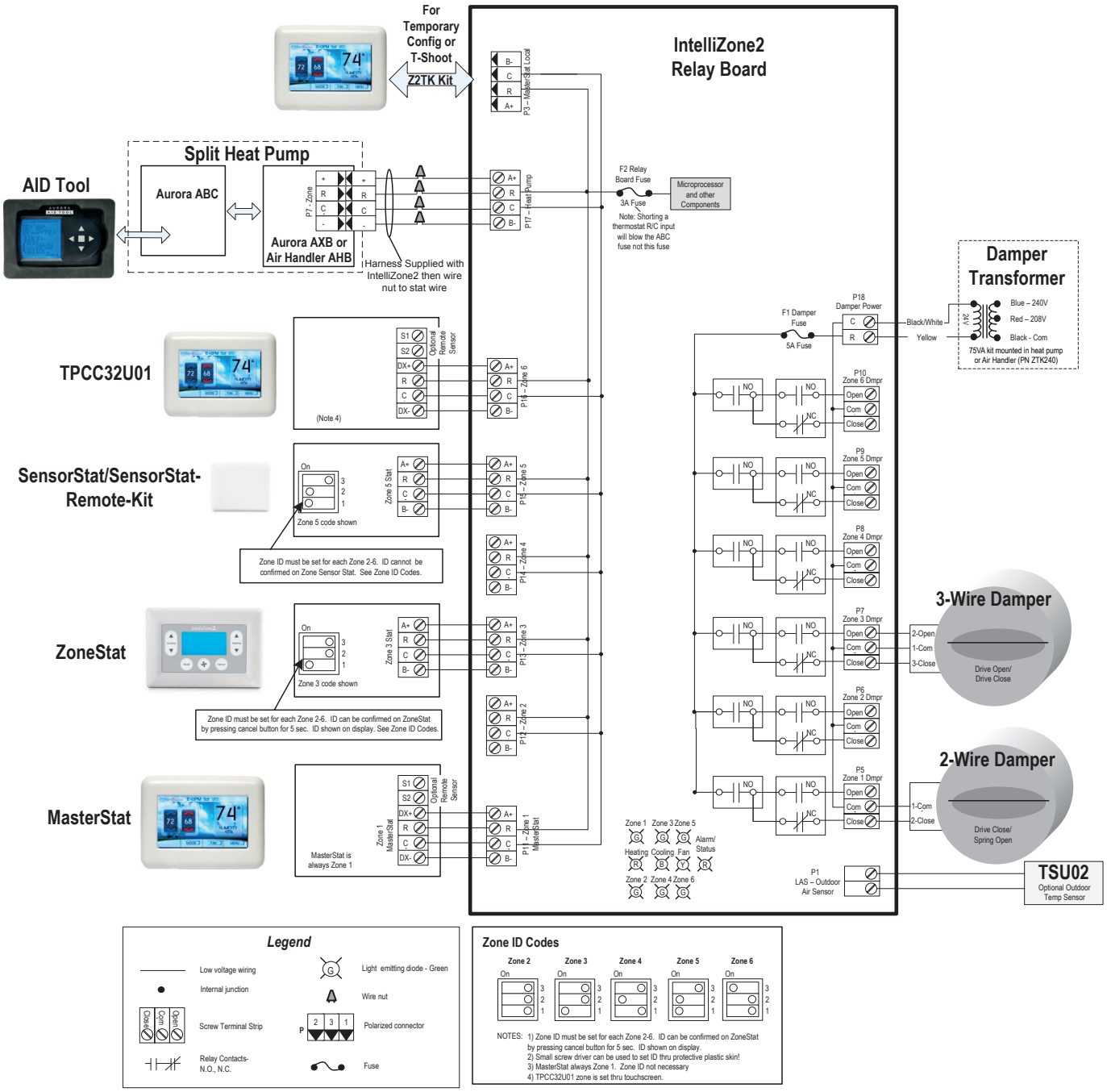
After the auxiliary heat speed setting is selected the AID Tool will automatically transfer back to the ECM Setup screen.

Cooling Airflow Setup - These screens allow the technician to select -15%, -10%, -5%, None or +5%. Change the adjustment percentage using the ▲ and ▼ buttons. Press the ◙ button to save the change.



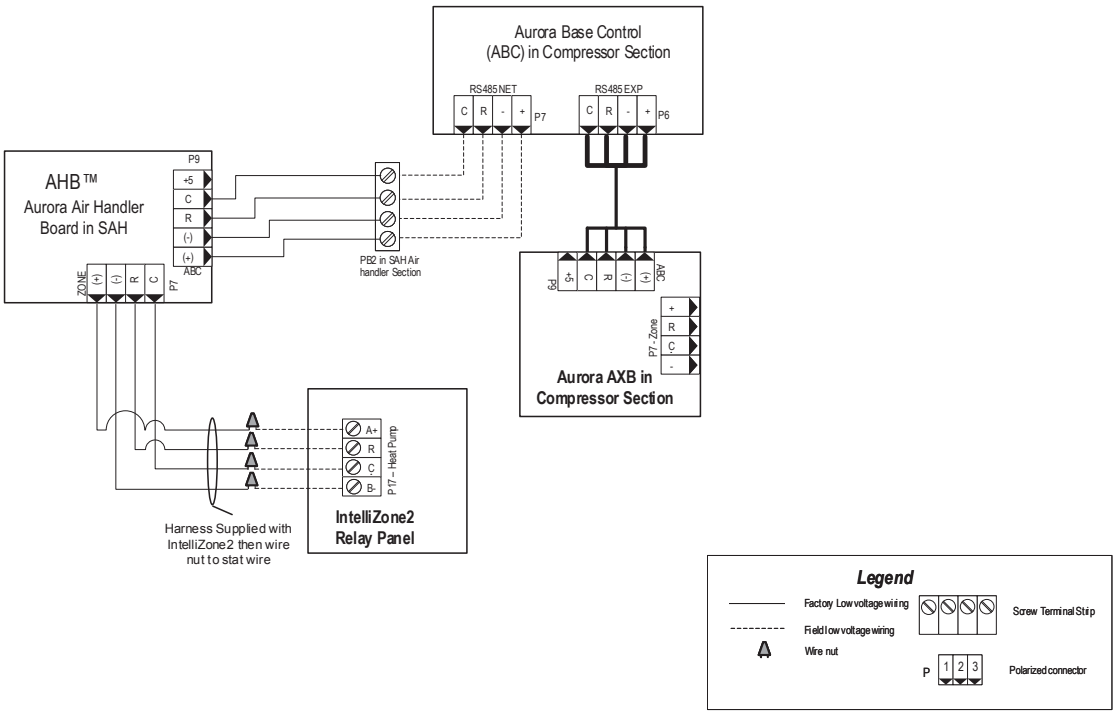
Wiring Schematic

Split Units

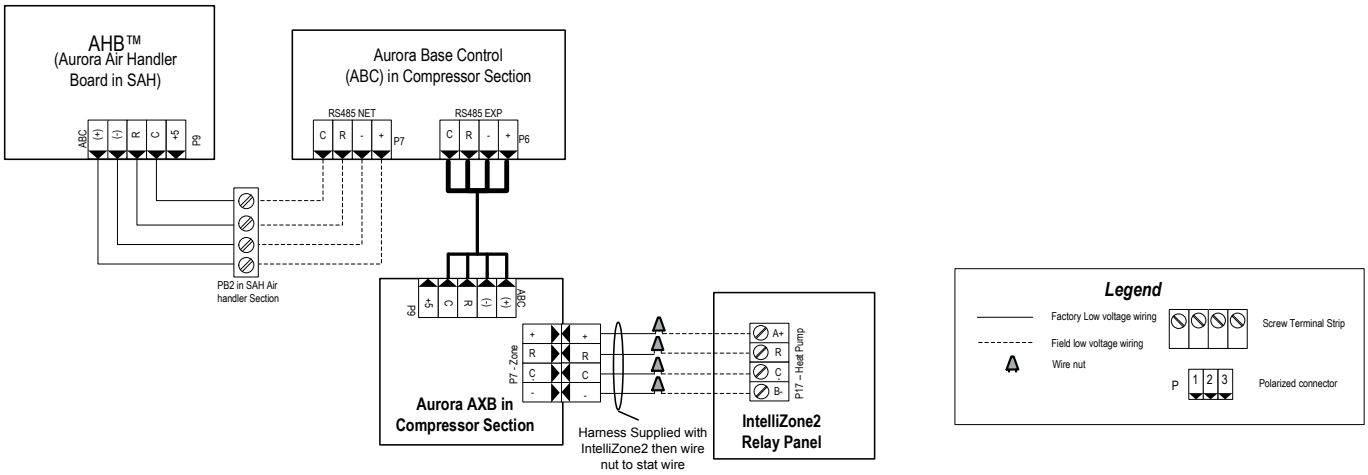


Wiring Schematic cont.

IntelliZone2 with Split ABC/AXB and SVH AHB and Variable Speed ECM (Preferred Way to Connect)

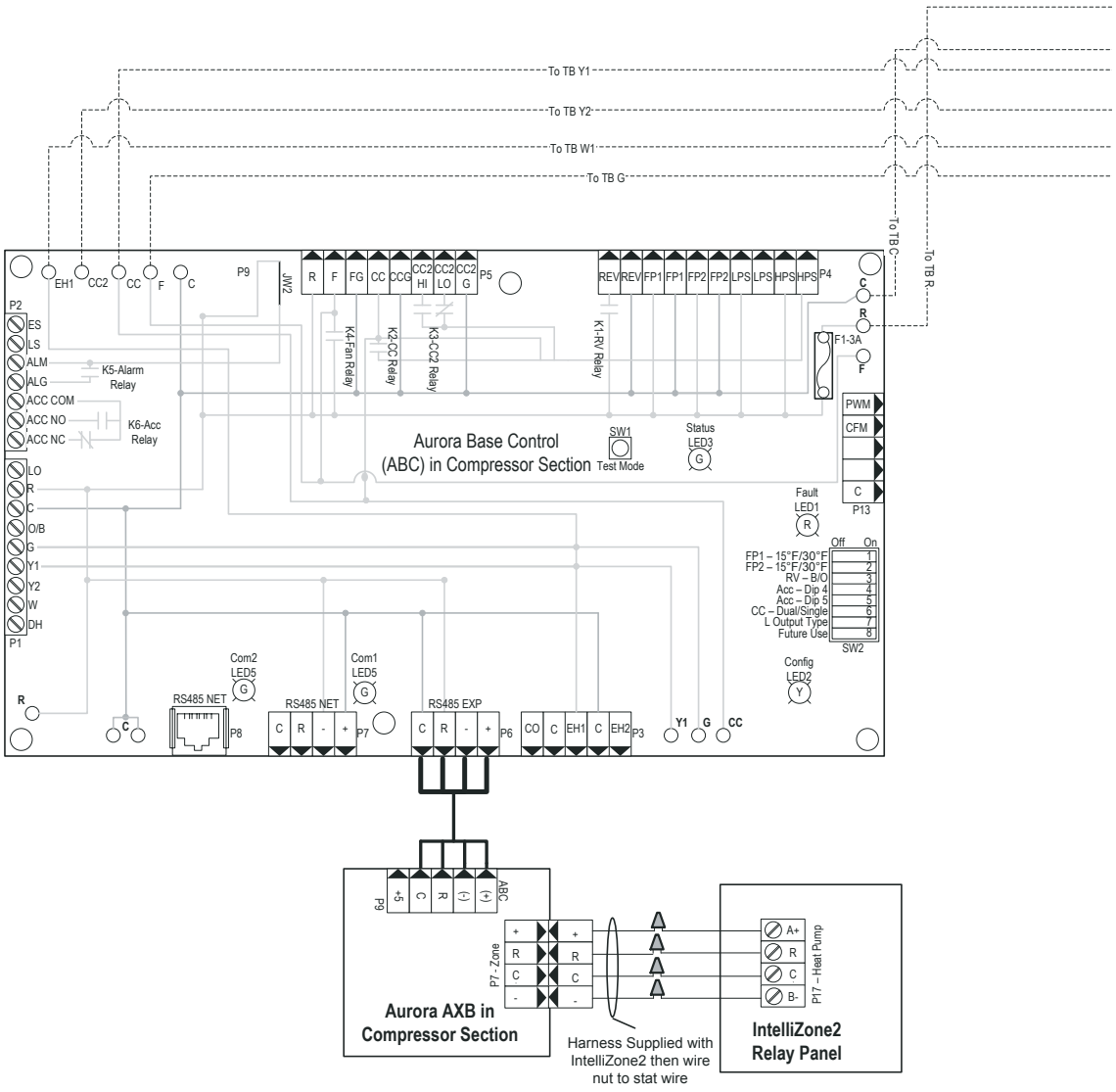


IntelliZone2 with Split ABC/AXB and SAH AHB and Variable Speed ECM (Optional Way to Connect)



Wiring Schematic cont.

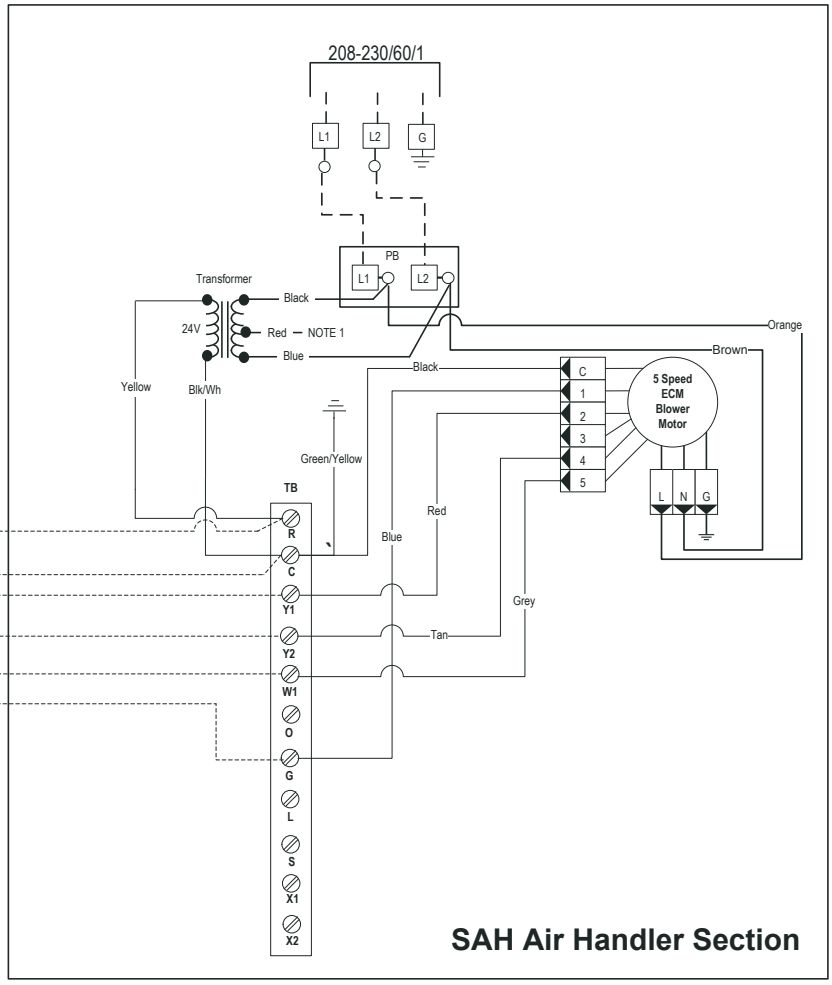
Split Units AXB and 5 Speed ECM

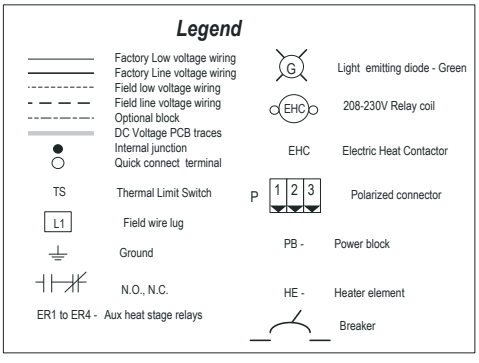


Wiring Schematic cont.

Split Units AXB and 5 Speed ECM

3/31/17





Notes:

1 – To operate in 208V mode replace the blue transformer wire connected to PB-L2 with red transformer wire.

2 – Low voltage wiring CLASS 2.

IntelliZone2 with 7 Series SVH Air Handler

Description of Operation - Split System

IntelliZone2 Split Operation

For the split system to be compatible with IntelliZone2 there must be either an AXB in the compressor section or an AHB in the SVH Air Handler. As always an ABC board must be in the comressor section as well.

Upon a call (or calls) from the zones, the IntelliZone2 “weighs” each zone based upon two components: 1) the level of call (Y1, Y2, Y3) coming from the zone; and 2) the size of the zone (zone % selected). This gives a very accurate picture of not only overall heating or cooling requirements (as in other control methods), but also how much heating or cooling is really required for each separate zone.

This, in turn, defines how much compressor (1st or 2nd stage), blower and auxiliary heat should be engaged for each particular situation. The result is a system that utilizes lower compressor speed more often for improved comfort and energy savings, while relying upon auxiliary heat less often for more energy savings than non-zoned systems.

The variable speed ECM motor allows 6 air flow levels with IntelliZone2.

Dehumidification (Variable Speed ECM)

If dehumidification is desired it is set via the AID Tool on the ABC control by selecting -5% to -15% in the cooling airflow setup.

Heating

(Variable Speed Compressor)

The unit will operate based upon demand as calculated by the IntelliZone2. The resulting compressor speed (1-12) will also select an appropriate blower speed for the selected compressor speed. Auxiliary heat will be available on compressor speeds 9-12, depending on the zone inputs. When auxiliary heat is engaged with compressor speed 9-11, the compressor speed automatically increases to speed 12 for maximum output.

Cooling

(Variable Speed Compressor)

The unit will operate based upon demand as calculated by the IntelliZone2. The resulting compressor speed, speeds 1-9, (speeds 10-12 are reserved for SuperBoost mode only) will also select an appropriate blower speed.

Emergency Heat

Emergency heat mode may be engaged by selecting at the MasterStat. All zone thermostat fault LED's begin to flash two quick flashes, followed by a pause, indicating that emergency heat mode has been activated. The temperature of the structure will be controlled by the zone 1 MasterStat while other zones are ignored. When a demand for heat occurs at the MasterStat all zone dampers are opened and emergency heat is energized. Emergency heat will continue to operate until the MasterStat demand is satisfied.

Emergency heat mode may be exited by selecting OFF (or one of the other mode selections) at the MasterStat, as well as all zone thermostat fault LED's stop flashing, indicating emergency heat mode has been deactivated and normal IntelliZone2 operation may resume.

Continuous Blower

All dampers are open and the unit's blower will be operated while heating or cooling is suspended for any zone(s) selected for continuous blower operation at the zone thermostat. Upon any heating or cooling call to the unit, all continuous blower operation ceases.

Lockout Mode

(Variable Speed Compressor)

During lockout mode the appropriate Fault code will be communicated to the IntelliZone2 MasterStat. The blower will continue to operate on blower speed 'G'. If the collective zones translate into $\geq$ 40%, all zone dampers will open and emergency heat operation will occur until the demand is $\leq$ 24%.

Simultaneous Heating & Cooling Requests

Determine Whether To Operate In Heating Or Cooling

If the heat pump is not heating or cooling, then the first demand to be received will determine which mode will be used. If two conflicting demands are received simultaneously, then the higher demand level will determine priority.

If two conflicting demands are received simultaneously, and the demand levels are equal, then the mode wil be determined by the state of the ‘O’ output as set by the last mode. Preferably, the ‘O’ output will not be switched, so if the last mode was cooling, the heat pump will start operating in cooling.

Once a mode is started, then that mode will continue until the thermostat(s) is/are satisfied for that mode or 20 minutes run time. After running for 20 minutes, the conflicting zone (cooling during heating or heating during cooling) must have a demand of at least 10% higher in order to change from the current mode to the conflicting mode.

Switching Between Heating And Cooling

When changing between heating and cooling modes, the heat pump requests must be removed, the currently active damper(s) should remain open for the blower off delay. After the blower is turned off following the blower off delay, the dampers should be changed to the state required by the next active call while the zone control should wait for the remainder of the short cycle delay before switching the ‘O’ output and requesting heat pump operation again.

SVH Blower Performance Data Option C

Variable Speed ECM

Model	Max ESP	Speed 1	Speed 2	Speed 3	Speed 4	Speed 5	Speed 6	Speed 7	Speed 8	Speed 9	Speed 10	Speed 11	Speed 12
033	0.75	**250**	**400 G**	**550 L 25%**	**650 40%**	**750**	**850 55%**	1000 70%	1150 85%	1250 H 100%	1350 Aux	1450	1600
042	0.75	**250**	**450 G**	**650 L 25%**	**800 40%**	**950**	**1050 55%**	1200 70%	1350	1450 85%	1600 H 100%	1750 Aux	1850
050	0.75	**300**	**550 G**	**800 L 25%**	**1000 40%**	**1150**	**1300 55%**	1450 70%	1600	1750 85%	1900 H 100%	2050 Aux	2200
**VS Compressor Speed				1-2	3-4		5-6	7-8		9-10	11-12		

** VS Compressor speed is given for the factory default cfm settings. When the cfm default settings are changed it will change the relationship to the compressor speed that is shown in the table. In cooling mode compressor speeds 10-12 are only available when SuperBoost mode is selected at the thermostat. 9/25/2020

Factory settings are at recommended G, L , H and Aux positions
"G" may be located anywhere within the airflow table.
"L" setting should be located within the boldface CFM range
"H" setting MUST be located within the shaded CFM range
"Aux" setting MUST be equal to or greater than "Aux" setting
CFM is controlled within 5% up to the maximum ESP

Blower Performance Data Option C cont.

Setting Blower Speed - Variable Speed ECM

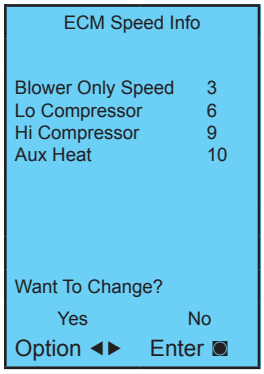
The ABC board's Yellow Config LED will flash the current ECM blower speed selections for "G", low, and high continuously with a short pause in between. The speeds can also be confirmed with the AID Tool under the Setup/ ECM Setup screen. The Aux will not be flashed but can be viewed in the AID Tool. The ECM blower motor speeds can be field adjusted with or without using an AID Tool.

ECM Setup without an AID Tool

The blower speeds for "G", Low (Y1), High (Y2), and Aux can be adjusted directly at the Aurora ABC board which utilizes the push button (SW1) on the ABC board. This procedure is outlined in the ECM Configuration Mode portion of the Aurora 'Base' Control System section. The Aux cannot be set manually without an AID Tool.

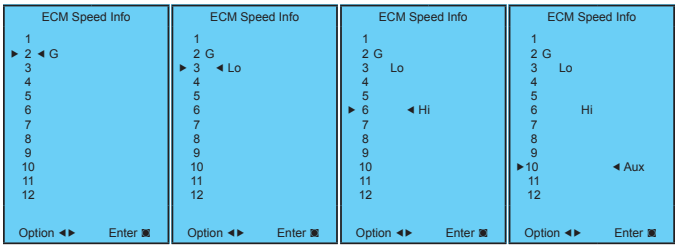
ECM Setup with an AID Tool

A much easier method utilizes the AID Tool to change the airflow using the procedure below. First navigate to the Setup screen and then select ECM Setup. This screen displays the current ECM settings. It allows the technician to enter the setup screens to change the ECM settings. Change the highlighted item using the ◄ and ► buttons and then press the ◙ button to select the item.



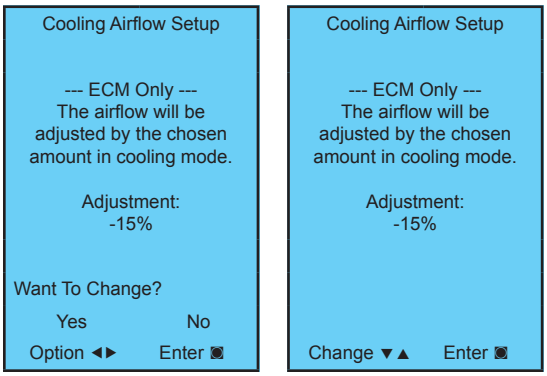
Selecting YES will enter ECM speed setup, while selecting NO will return to the previous screen.

ECM Speed Setup - These screens allow the technician to select the "G", low, high, and auxiliary heat blower speed for the ECM blower motor. Change the highlighted item using the ▲ and ▼ buttons. Press the ◙ button to select the speed.



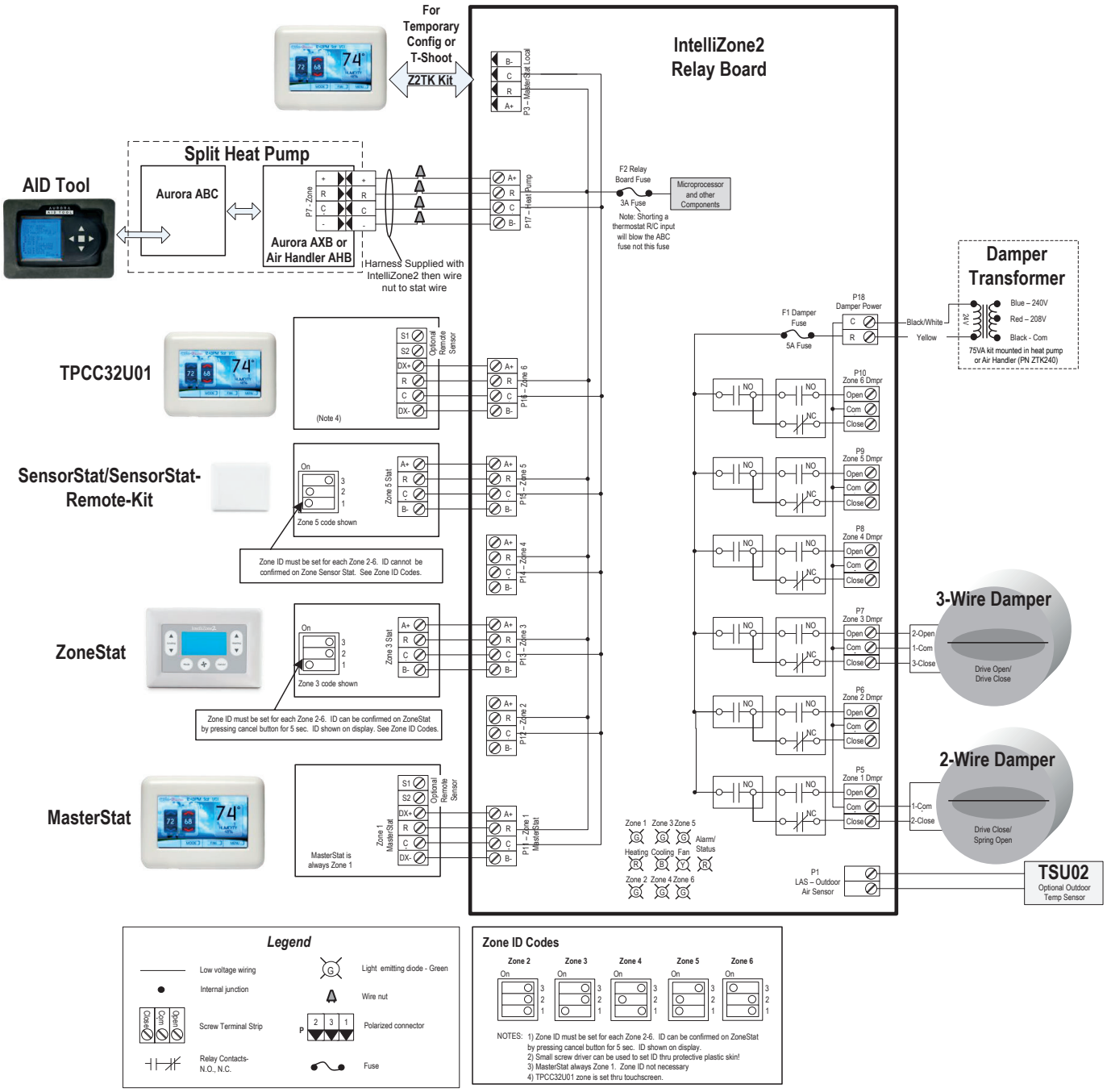
After the auxiliary heat speed setting is selected the AID Tool will automatically transfer back to the ECM Setup screen.

Cooling Airflow Setup - These screens allow the technician to select -15%, -10%, -5%, None or +5%. Change the adjustment percentage using the ▲ and ▼ buttons. Press the ◙ button to save the change.



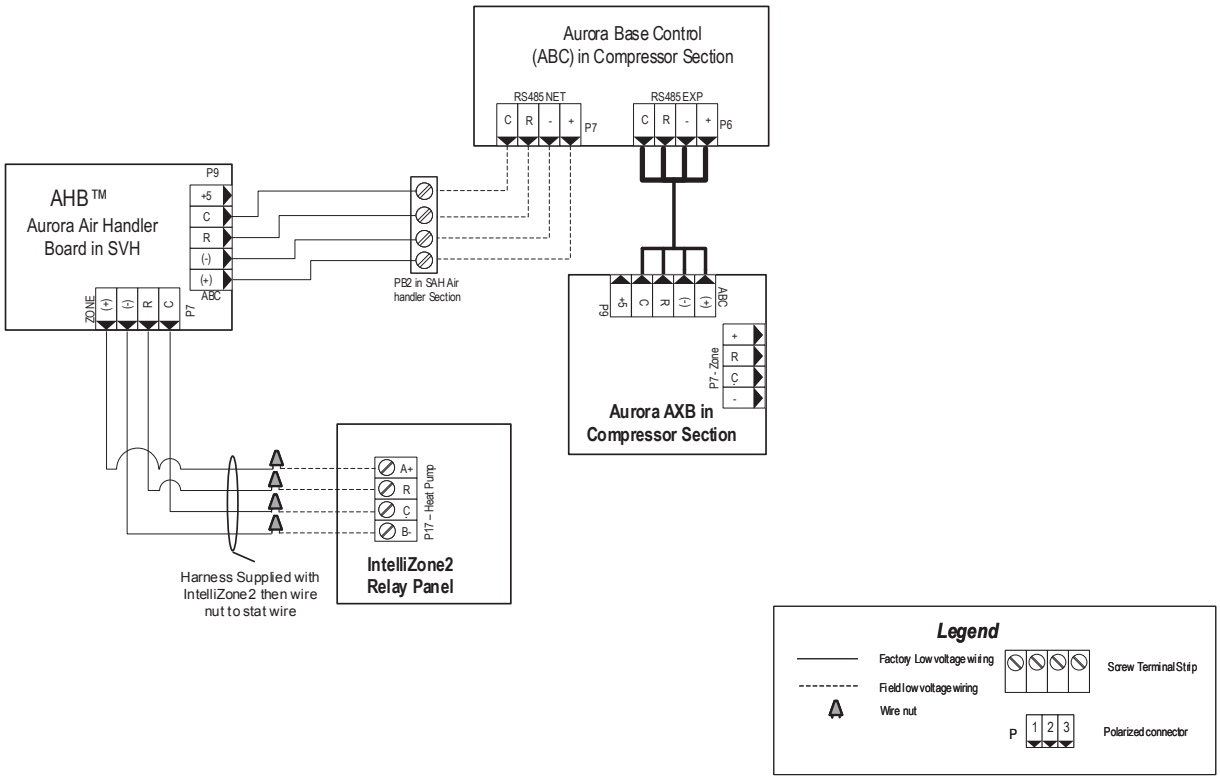
Wiring Schematic

Split Units

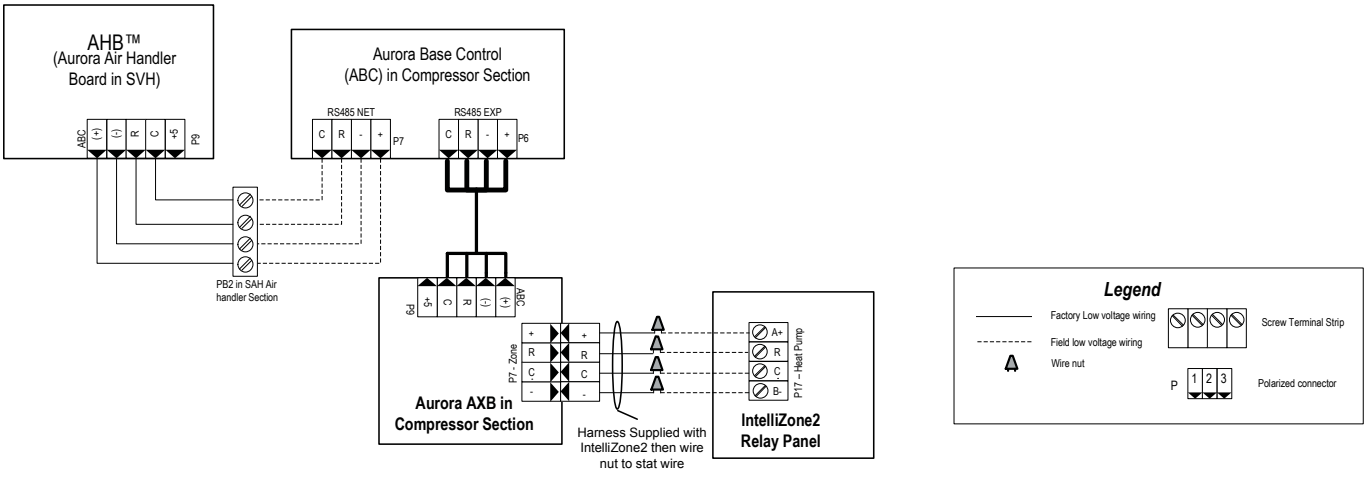


Wiring Schematic cont.

IntelliZone2 with Split ABC/AXB and SVH AHB and Variable Speed ECM (Preferred Way to Connect)



IntelliZone2 with Split ABC/AXB and SVH AHB and Variable Speed ECM(Optional Way to Connect)



Notes

Revision Guide

Pages:	Description:	Date:	By:
46	Updated Blower Table	25 Sept 2020	JM
Misc.	Added 7 Series Split and SVH Air Handler information	26 May 2020	MA
10, 18	Add Zone Naming	01 June 2019	JM
Misc.	Updated Schematics, Added new Air Handler information	10 Mar 2017	JM
Misc.	Minor Revisions & Added SensorState Remote Kit	24 May 2016	JM
Misc.	Minor Revisions to Configuration section	03 Nov 2015	MA
13-14	Added 'Dual Fuel' Description	07 April 2015	MA
All	Minor revisions, added AWL Information	12 Feb 2015	MA
All	Software Update	04 June 2014	MA
8	Added Outdoor Sensor to Components	29 Apr 2014	DS
10-11	Updated Staging Descriptions and Features	29 Apr 2014	DS
19	Updated Dual Capacity Blower Table	29 Apr 2014	DS
29	Revision Table Added	29 Apr 2014	DS

Manufactured by
WaterFurnace International, Inc.
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Product: **IntelliZone2**
Type: Comfort Zoning System
Size: Six Zone Capability
Document: Specification Catalog and Design Guide

PROUD MEMBER

SC1578EW 07/20