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### WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life.

Installation and service must be performed by a licensed professional HVAC installer (or equivalent) or service agency.

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Installation and service must be performed by a licensed professional HVAC installer (or equivalent) or a service agency.

## Shipping and Packing List

- 1 - Damper control module with housing (1.851399)
- 1 - Discharge air temperature sensor (88K38)

Manufactured By  
**Allied Air Enterprises LLC**  
**A Lennox International, Inc. Company**  
215 Metropolitan Drive  
West Columbia, SC 29170

## INSTALLATION INSTRUCTIONS

### Damper Control Module for Comfort Sync™ Zoning System

#### Controls Kits and Accessories

507376-01

8/2018

#### General

The damper control module is compatible with the Comfort Sync™ thermostat (1.841197):

- Comfort Sync™-enabled variable speed or variable capacity (modulating) indoor and two-stage or variable capacity (modulating) outdoor units.
- Comfort Sync™-enabled variable speed indoor unit and communicating or non-communicating (conventional) single-stage outdoor unit (two zones maximum supported).
- Comfort Sync™-enabled variable speed indoor unit and communicating or non-communicating (conventional) two-stage outdoor unit (four zones maximum supported).

**NOTE:** See Table 10 for a list of Comfort Sync variable speed indoor units.

#### Other Required Items Sold Separately

The following items are also required for the Comfort Sync™ Zoning System to operate:

1. In-zone thermostats (catalog number 10C17) — are required for zones 2 through 4. Zone 1 is controlled by the Allied Air communicating thermostat.
2. Zone damper transformer, see Table 1 for correct size.
3. Zone dampers — recommended zone dampers are spring-open and power-close but you may also use power-open and spring-close, or power-open and power-close. Modulating dampers are not supported.



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Save these instructions for future reference

- Optional freezestat, see Table 3 for available freezestats based on tubing sizes.
- Fasteners to install the damper control module.
- Heat Pump Applications Only:** HFC-410A pressure switch (27W13) and valve depressor tee (87071) are required.


**IMPORTANT**

Heat Pump Systems Only: Do not use jumper for pressure switch terminals at the damper control module. System will not function properly without pressure switch installed.

### Zone Damper Transformer

The zone dampers are powered by a field-provided 24VAC transformer. Zone dampers require 6 to 12VA each depending on zone damper used. The zone damper transformer must have an adequate VA rating to serve all components (see recommendations in Table 1).

The damper control module and three in-zone thermostats require a total of 6VA to operate.

Catalog Number	Size	Description	VA LOAD =
10P17	40VA	120 / 208 240VAC, 24VAC	Damper VA x number of dampers + 6VA (damper control module + 3 in-zone thermostats) = damper transformer VA requirement.
10P87	50VA		
12P61	75VA		
83P74	-	Electrical Box (4-in. square)	

Table 1. Zone Damper Transformer Selection Chart

Zoning Components

### Transformer Phasing

The indoor unit and zone damper transformers must be in-phase since both are connected to the damper control module. Follow the instructions below for phasing both transformers.

- Connect the damper control module indoor R and C to the indoor unit R and C.
- Connect the external 24VAC transformer to the damper control module DMPR XFMR R and C terminals.
- Measure voltage between the damper control module indoor R and DPMR XFMR R terminals.
  - In-phase voltage will be less than 10VAC.
  - Out-of-phase voltage will be greater than 40VAC. If voltage is greater than 40VAC, swap external 24VAC transformer (DMPR XFMR R and C) wires.

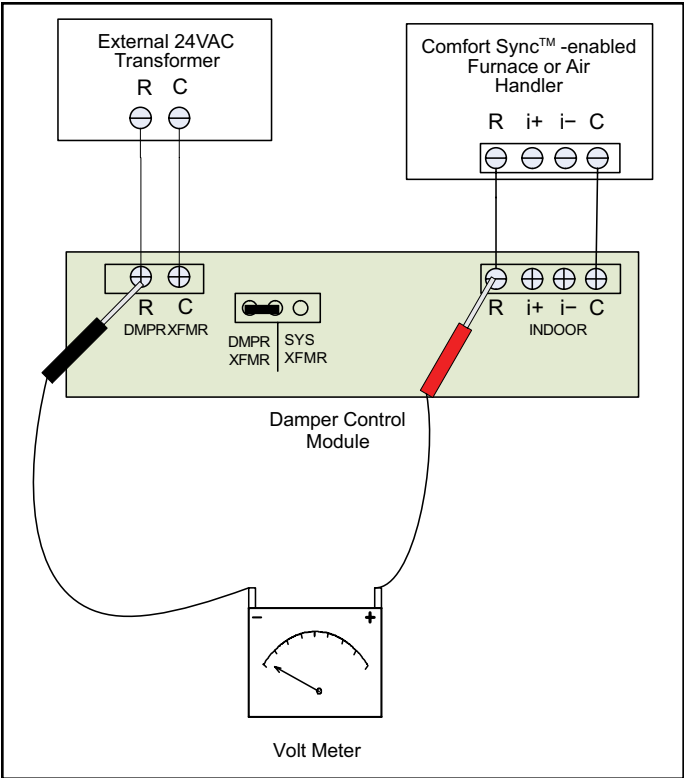


Figure 1. Confirming Correct Transformer Phasing (Polarity)

### Dampers

See Table 1 to determine the minimum damper transformer VA requirements based on the number of zones being installed. If extended zone dampers are used then see Figure 3 for damper, transformer and zone relay wiring requirements.

Refer to the Comfort Sync™ Zoning System Product Specification for ordering dampers and other various components.

Once the damper control module has been installed and the system energized, the damper control module will automatically populate the thermostat commissioning screens. All zone CFM settings will be selected from commissioning screens for continuous blower and both heating / cooling blower operations. Testing CFMs for each or all zones may also be performed.

- The extended damper transformer will only supply power to extended dampers and relay contacts.
- The system transformer powers the relay coils (0.4VA each).
- Combined load of damper transformer (see Table 1) and add 0.4VA per zone relay to determine the minimum damper transformer VA requirements. Total VA requirements should not exceed 60VA.

**NOTE:** Connections illustrated here are for the Allied Air recommended spring-open/power-close dampers. The connections would be different for other dampers.

**NOTE:** Use Allied Air Part 56L68 for zone relays 1 through 4.

### Discharge Air Temperature Sensor - DATS

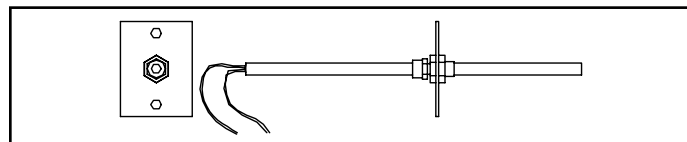
The included discharge air temperature sensor (88K38) monitors the supply air. Figure 2 shows the discharge air temperature sensor. This electronic sensor's probe is inserted into the discharge air plenum (see Figure 4) to gather air temperature data for the zone control module.

- When possible, position the sensor some distance away from the coil rather than in the immediate coil area.
- The DATS should be located at least 19 inches above the air handler unit and 10 inches above cooling coil with a furnace.
- Locate the tip of the sensor 1/2 the depth of the plenum, and centered over the discharge airflow, side-to-side in the discharge plenum.
- Fasten the sensor bracket to the plenum with two self-tapping sheet metal screws.
- Connect wires to DATS on damper control module, NOT on the Allied Air communicating indoor unit control.

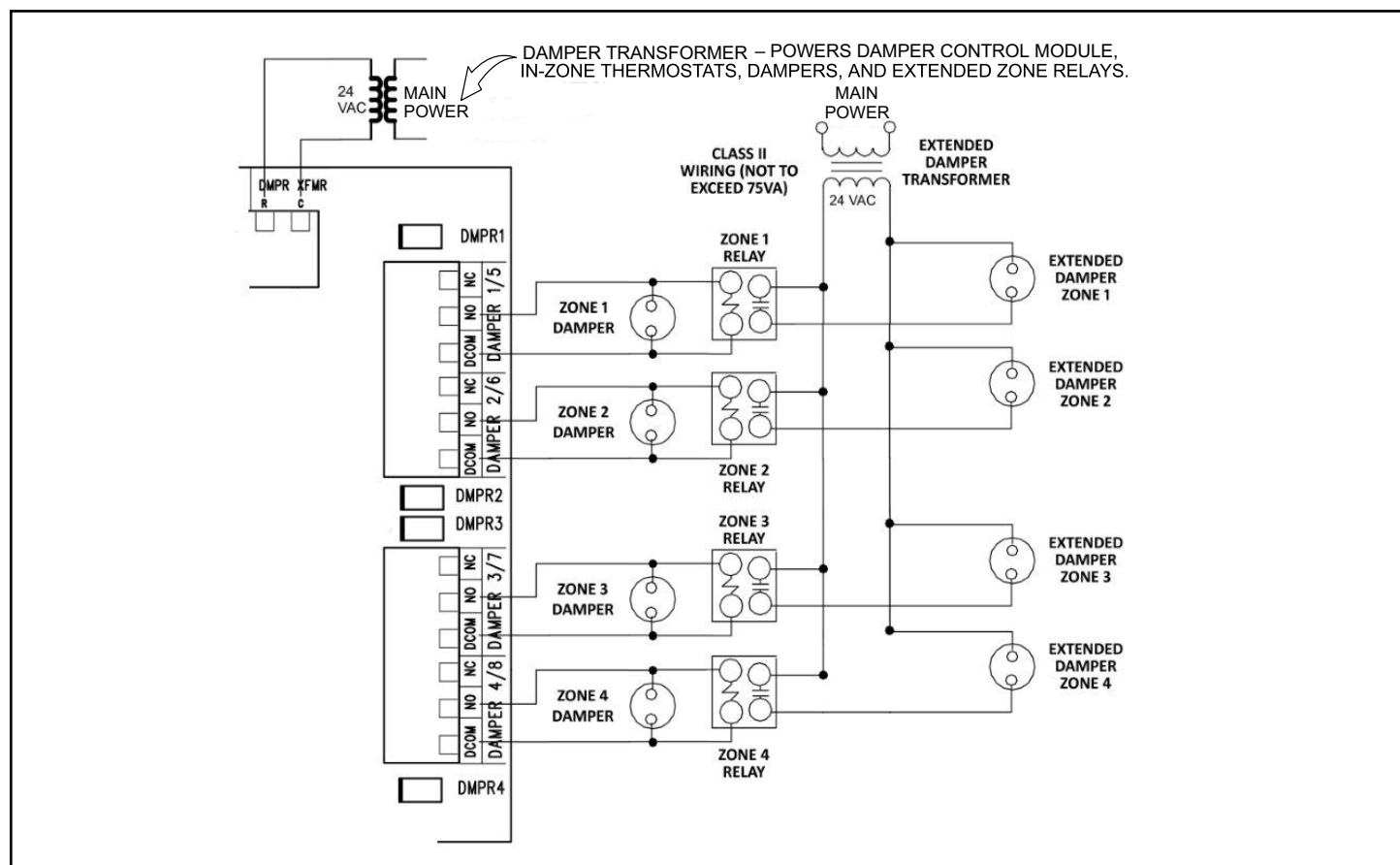
**NOTE:** FOR UNITS WITH HUMIDITROL—Discharge air sensor temperature (DATS) **MUST** be located on the output side of the EDA (if used; see Humiditrol Zoning Accessory Installation 505,337M).

### **⚠ IMPORTANT**

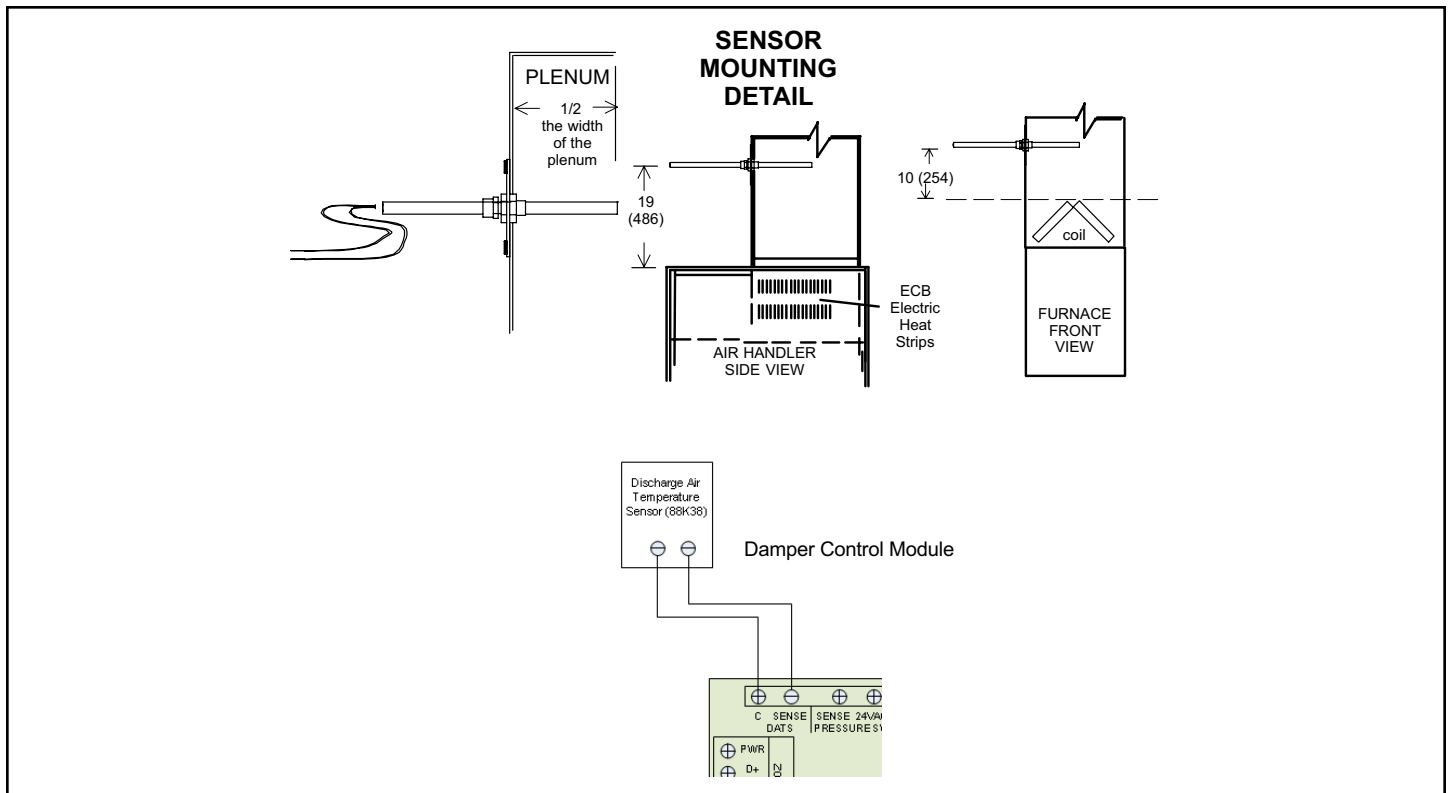
If the DAT sensor has failed, shorted or not installed, Comfort Sync will only operate in central mode. This mode is also indicated by the DCM central mode LED being on. There is no notification by the thermostat for this issue.



**Figure 2. Discharge Air Temperature Sensor - DATS**



**Figure 3. Damper and Extended Damper Wiring Diagram**



**Figure 4. Discharge Air Temperature Sensor Installation (Typical Upflow Furnace)**

Sensor				Sensor			
°C	°F	(ohm)	VDC (Volts)	°C	°F	(ohm)	VDC (Volts)
-6.6	20	46,134	1.513	46.2	115	4,169	0.304
-3.9	25	39,869	1.425	49	120	3,749	0.277
-1.1	30	34,520	1.335	51.8	125	3,368	0.252
1.7	35	29,936	1.247	54.5	130	3,037	0.229
4.4	40	26,104	1.161	57.3	135	2,750	0.209
7.2	45	22,764	1.077	60	140	2,489	0.191
10.1	50	19,842	0.993	62.8	145	2,250	0.174
12.8	55	17,406	0.916	65.7	150	2,033	0.158
15.6	60	15,294	0.842	68.5	155	1,847	0.145
18.4	65	13,442	0.772	71.3	160	1,678	0.132
21.2	70	11,849	0.706	73.9	165	1,536	0.121
23.9	75	10,501	0.647	76.8	170	1,397	0.111
26.7	80	9,282	0.589	79.7	175	1,272	0.101
29.5	85	8,233	0.537	82.2	180	1,170	0.094
32.3	90	7,322	0.489	85.1	185	1,070	0.086
35	95	6,523	0.445	87.8	190	982	0.079
37.8	100	5,819	0.405	90.8	195	895	0.072
40.6	105	5,193	0.368	93.4	200	829	0.067
43.4	110	4,654	0.335				

**Table 2. DATS Temperature / Resistance Chart**

## Pressure Switch

(Required for heat pump applications)

**NOTE:** Outdoor unit (heat pump) will not operate if pressure switch is not installed).

A field-provided HFC-410A pressure switch (catalog number 27W13) is required for applications with an Allied Air heat pump. This switch protects the system in the event a high pressure condition occurs in the outdoor unit during heating mode. The switch operates in tandem with the factory installed high pressure switch, but connects to the Comfort Sync control instead. The switch is an auto-reset type that opens at 550 psig and closes at 425 psig.

**NOTE:** If a pressure switch is factory installed in the outdoor unit, do not remove the switch or switch wires.

The damper control module pressure switch may also be fastened directly to the vapor valve service port using a field-provided tee adapter. This line becomes the discharge line in heat pump heating mode. Recommend using pressure switch valve tee adapter (catalog number 87071).

Other conditions:

- Pressure switch status is used only for the heat pump heating and does not have any affect on non-zone demands.
- Heat pump will stop after the pressure switch status remains open for 60 seconds.

## ⚠ CAUTION

High Pressure Switch must be installed on open side of tee first to prevent refrigerant loss.

The heat pump is used again on the next call provided the pressure switch has closed; otherwise backup heat is used on subsequent heating calls until the pressure switch closes.

### Staged Heat Pump Units

Should the pressure switch open during heat pump heating second stage operation:

- Allied Air communicating thermostat will downstage the heat pump from second-stage to first-stage heating operation in order to bring the system pressure down to a point where the switch closes again.
- If the unit is already running in first-stage when the pressure switch opens, the unit will shut off.
- If the switch closes within 60 seconds, then the Allied Air communicating series thermostat may send a demand for second-stage heat pump if needed.
- If the switch does not close within 60 seconds, the Allied Air communicating thermostat stops heat pump heating and satisfies the heating demand with backup heat (backup heat is either electric or gas) regardless of the ambient temperature being above the high balance point.

The heat pump is used again on the next call provided the pressure switch has closed; otherwise backup heat is used on subsequent heating calls until the pressure switch closes.

### Freezestat (Optional)

This optional component is only required if there is a small zone with little airflow which is causing the indoor coil to freeze up. However, normal return air temperature should prevent this from occurring. The addition of the freezestat will provide for added protection.

**NOTE:** The damper control module comes from the factory with a insertion bridge installed on the freezestat terminals (see Figure 7). Do not remove unless a freezestat is connected. Outdoor unit will not operate if insertion bridge is removed (missing) and no freezestat is installed.

Table 3 lists available freezestats for use with the damper control module.

Catalog Number	Piping Size	Description
93G35	3/8"	Opens at 29°F, and closes at 58°F
50A93	5/8"	Opens at 36°F, and closes at 58°F

Table 3. Available Freezestats

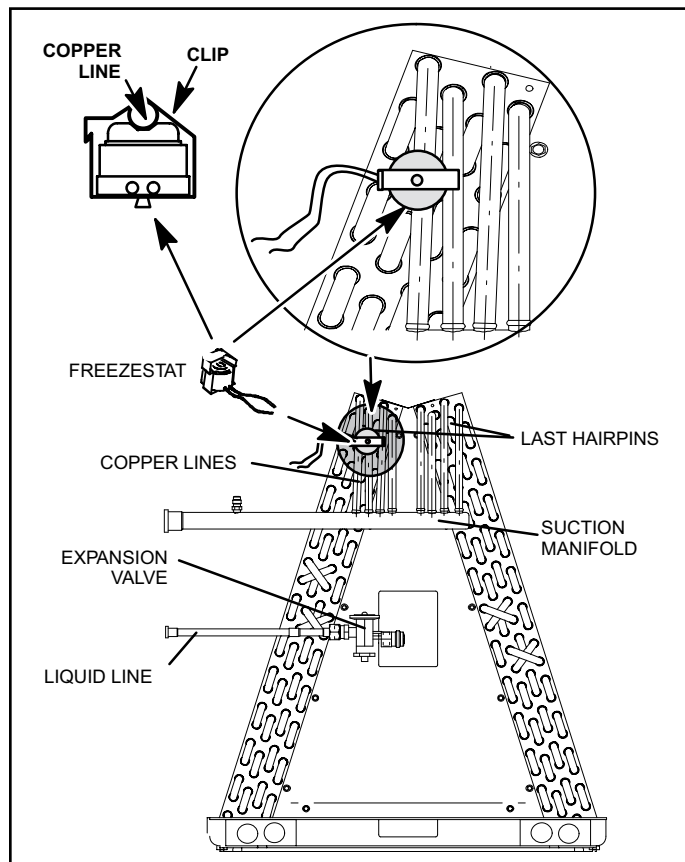


Figure 5. Typical Freezestat Installation (Indoor Coil)

### Suggested Freezestat Installation Method

The following is the recommended method for installation of the freezestat for connection to the damper control module.

1. A freezestat, sized per Table 3 and ordered separately, can be installed. Install the freezestat on one of the copper lines between the last hairpins and the suction manifold (see Figure 5) of the indoor coil.
2. The freezestat senses the line temperature and cycles the compressor off when the line temperature falls below its setpoint. The freezestat will open and close as listed in Table 3.
3. Connect freezestat wires to the freezestat terminals on the damper control module after removing the factory installed bridge (see Figure 7).

## Installation and Setup

### Damper Control Module

Use the following procedure to install the damper control module. For information concerning connections see Table 5.

1. Remove the module cover.
2. Install the damper control module near the indoor unit using provided fasteners.

**NOTE:** DO NOT install damper control module assembly to indoor unit or equipment that could induce vibration to the module. Install assembly on flat surface away from indoor unit to minimize vibration. Securing assembly to a wall stud is desirable.

**NOTE:** By relocating the jumper to system terminals you can shift the VA load from the damper transformer to the system transformer if needed.

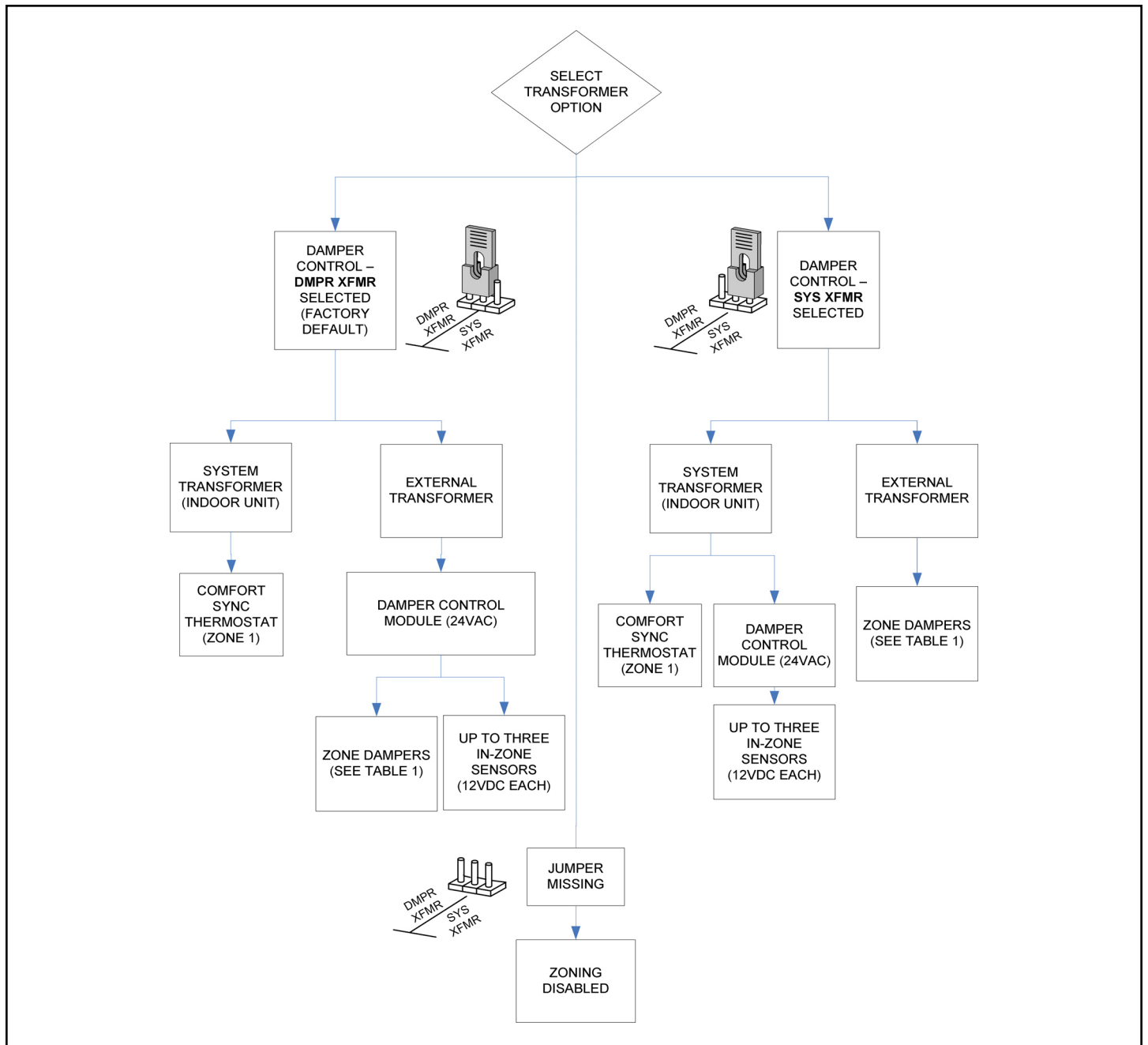
3. Use the default jumper setting for using an external 24VAC transformer (DMPR XFMR). Connect the external 24VAC transformer wires to terminals DMPR XFMR R and C (see Figure 7).
4. Verify that the ZONE ID jumper is set to Zone 1-4 only.

**NOTE:** In-zone thermostats control zones 2, 3 and 4. The Allied Air communicating series thermostat will always control zone 1.

5. Connect wiring from the Allied Air communicating indoor unit to damper control module RSBUS terminals marked INDOOR, R, I+, I- and C (see Figure 7).
6. Connect in-zone thermostats from zones 2, 3 and 4 as needed to terminals PWR, D+, D- and C (see Figure 7).
7. In-zone thermostats are 12VDC devices that are powered by the damper control module.
8. Connect zone dampers to proper terminals. Dampers can be power-open / spring-close, power-close / spring-open, or power-open / power-close type. Connect to NC or NO and DCOM, depending on type of damper being employed. Power-closed / spring-open is the recommend damper and would be connected to NO and DCOM.
9. See Table 5 for required and optional device connections to various terminals.
10. LEDs — See Table 4 for complete descriptions for various LED functions.
11. Fuse — The control has a 3 amp fuse.
12. Error Codes — The damper control module stores NO error codes; all codes are sent directly to thermostat. For a list of errors that are sent to the thermostat, see Table 6.

LED Indicator Label / Name	Color	Description
DMPR1, 2, 3, 4		Damper position LED. Illuminated when damper is power-closed. LED will remain ON as long as the damper is power-closed.
CNTRL	Red	Illuminated when system zoning is OFF.
STATUS	Green	This green LED should blink at 1Hz, 50% duty cycle as a "heartbeat" indicating that the device is operating normally. During device soft disable state, this LED will blink 3 seconds ON and 1 second OFF.
RSBUS COMM	Green	RSBUS activity. Active communications with external device (Allied Air communicating external device).
IN-ZONE THERMOSTAT COMM	Green	Active communication with in-zone thermostats.
PS	Red	Illuminate when pressure switch is open (high pressure detected).

**Table 4. LEDs**



**Figure 6. Transformer Configuration**







Damper Control Label		Description
<b>TSTAT</b>		Connection to Allied Air communicating thermostat (Thermostat controls Zone 1 operation)
<b>C, i+, I-, R</b>		Do not use these terminals. Connect the Allied Air communicating series thermostat directly to the indoor unit terminals. See Figure 7 for wiring.
<b>INDOOR</b>		Connection to Comfort Sync furnace or air handler
<b>C</b>		RSBus 24VAC common
<b>i+</b>		RSBus data positive
<b>I-</b>		RSBus data negative
<b>R</b>		RSBus 24VAC power
<b>DMPR XFMR / SYS XFMR</b>		Use factory default position
<b>DMPR XFMR</b>		Connect zone damper 24VAC transformer wires to terminals DMPR R and XFMR C (see Figure 7). Factory default is DMPR XFMR.
<b>G</b>	<b>SENSE</b>	Connect the IAQ device requiring blower operation to the indoor unit control G terminal as illustrated in the wiring diagrams located in the applicable Comfort Sync Series Thermostat Installer Guide. Place a wire jumper between the indoor unit G and damper control module G sense terminals. This will allow the damper control module to adjust the indoor blower CFM from continuous blower speed to the correct zone heating or cooling blower speed when any zone has a demand for heating or cooling.
	<b>24VAC</b>	24VAC power (NOT USED)
<b>FREEZESTAT</b>	<b>SENSE</b>	From the factory, an insertion bridge is installed between these two terminals. If a freezestat is to be used, remove insertion bridge and replace with connections to freezestat. See Table 3 for ordering freezestat. NOTE: If jumper is missing and no freezestat is installed the outdoor unit will not operate.
	<b>24VAC</b>	
<b>PRESSURE S/W</b>	<b>SENSE</b>	A HFC-410A pressure switch (catalog number 27W13) is required for applications with an Allied Air heat pump. This switch acts as a guard in case of high head pressures during first- and second-stage heating. The switch opens at 550 psig (3965 kPa) and closes (resets) at 425 psig (3102 kPa).
	<b>24VAC</b>	
<b>DATS</b>	<b>SENSE</b>	Terminals for the included discharge air temperature sensor (DATS). See Figure 4 for installation requirements.
	<b>24VAC</b>	
<b>ZONE 5 (not used), ZONE 2/6, ZONE 3/7 and ZONE 4/8 (NOTE: ONLY ZONES 2, 3 and 4) are used.)</b>	<b>PWR</b>	In-Zone Thermostat 12VDC power
	<b>D+</b>	In-Zone Thermostat data positive
	<b>D-</b>	In-Zone Thermostat data negative
	<b>C</b>	In-Zone Thermostat 12VDC common
<b>DAMPER 1/5, DAMPER 2/6, DAMPER 3/7 and DAMPER 4/8</b>	<b>NC</b>	Normally closed
	<b>NO</b>	Normally opened
	<b>DCOM</b>	Common
<b>ZONE 1 - 4 / 5 - 8</b>		The factory default for this jumper is 1-4. Do not set jumper to 5-8, which is not in use at this time.

**Table 5. Damper Control Connections, Insertion Bridge and Jumpers**

Initial notification of critical alerts will pop up on the home screen and will be listed under notification menu. Minor and moderate alerts are found only under the notification menu.

Code	Priority	Actual Displayed Alert Text	Component or System Operational State and Troubleshooting Tip	How to Clear Code
105	Critical	Communication Problem	<p>A system component has lost communication with the system. System component (device) is unable to communicate.</p> <ul style="list-style-type: none"> <li>• This may indicate the existence of other active alert codes.</li> <li>• In most cases errors are related to electrical noise. Verify that high voltage power is separated from the low voltage communication wires.</li> <li>• Check for incorrectly wired or loose connections between system components (devices).</li> <li>• Check for a high voltage source of noise close to the system.</li> </ul>	Automatically clears when the system detects the issue no longer exists.
114	Moderate / Critical	AC Line Frequency / Distortion Prob	<p>There is a frequency / distortion problem with the power to a specific system component. There is a frequency / distortion problem with the power to a specific system component.</p> <ul style="list-style-type: none"> <li>• This alert code may indicate transformer overloading.</li> <li>• Check the voltage and line power frequency.</li> <li>• Check the generator operating frequency, if the system is running on back-up power.</li> <li>• Correct voltage and frequency problems.</li> <li>• System will resume normal operation five seconds after fault recovered.</li> <li>• All applicable system component outputs are disabled – moderate condition.</li> <li>• After 10 minutes, the priority condition is escalated – critical condition.</li> <li>• Damper control module will operate in central mode only until proper voltage is restored or frequency distortion is resolved – moderate condition.</li> </ul>	Automatically clears when the system detects the issue no longer exists.
115	Critical	Low Secondary (24VAC) Voltage	<p>24VAC power to a system component control is lower than the required range of 18 to 30VAC.</p> <ul style="list-style-type: none"> <li>• Check and correct voltage.</li> <li>• Check for additional power-robbing system components (devices) connected to system.</li> <li>• This alert code may require the installation of an additional or larger VA transformer.</li> <li>• Damper control module will operate in non-zone mode until proper voltage is restored.</li> </ul>	Automatically clears when the system detects the issue no longer exists.
124	Critical	Active Subnet Controller Missing	<p>The thermostat has lost communication with a system component for more than three minutes. System component has lost communication with the thermostat.</p> <ul style="list-style-type: none"> <li>• Check the wiring connections.</li> <li>• Ohm wires.</li> <li>• Cycle power.</li> <li>• Check voltage at component.</li> </ul> <p>This alert code stops all associated system operations and waits for a heartbeat message from the system component that is not communicating.</p>	Automatically clears after communication is re-established with applicable system component (device).

**Table 6. Alert Codes and Troubleshooting**

Initial notification of critical alerts will pop up on the home screen and will be listed under notification menu. Minor and moderate alerts are found only under the notification menu.

Code	Priority	Actual Displayed Alert Text	Component or System Operational State and Troubleshooting Tip	How to Clear Code
125	Critical	Control Hardware Problem	<p>There is a hardware problem on a system component control. There is a control hardware problem.</p> <ul style="list-style-type: none"> <li>Replace the control if the problem prevents operation and is persistent.</li> <li>Damper control module will remain in non-zone mode (all dampers open) for five minutes after priority condition no longer exist.</li> <li>Remove jumper if present on indoor unit between R and W2 if equipment interface module is in use.</li> </ul>	Automatically clears five minutes after the issue no longer exists.
131	Critical	Corrupted Control Parameters	<p>System component control parameters are corrupted.</p> <ul style="list-style-type: none"> <li>Replace the system component control if heating or cooling is not available.</li> <li>Go to <b>menu &gt; advance settings &gt; view dealer control center &gt; equipment</b> and press <b>reset all equipment</b>. This will allow the system to auto-detect any Comfort Sync components attached.</li> </ul>	Will automatically clear when system component (device) passes memory self-test or system component control is replaced.
132	Critical	Failed Flash CRC Check	<p>System component control software is corrupted.</p> <ul style="list-style-type: none"> <li>Recycle power.</li> <li>If failure re-occurs, replace the system component control.</li> </ul>	Manual system power reset is required to recover from this alert code.
310	Moderate	Discharge Air Temp Sensor Problem	<p>There is a discharge air temperature sensor issue.</p> <ul style="list-style-type: none"> <li>Compare discharge temperature sensor (DATS) resistance to temperature / resistance charts in system component installation instruction.</li> <li>Replace discharge air sensor if necessary.</li> </ul> <p><i>NOTE: Confirm there is no short or open circuits in the Comfort Sync thermostat connections to any of the other components in the communication system.</i></p> <p><i>NOTE: Issues with a DATS connected to a damper control module or equipment interface model will not generate an alert code.</i></p>	Automatically clears 30 seconds after condition is detected as recovered or after system restart.
530	Moderate / Critical	Low Damper 24VAC Voltage	<p>Low Damper 24VAC Voltage</p> <ul style="list-style-type: none"> <li>Damper supply voltage is less than 18VAC.</li> <li>Maintain non-zone mode for five minutes after alarm clears.</li> </ul>	Automatically clears when the condition no longer exists.
532	Moderate	Zoning Pressure Switch Opened (High Pressure)	<p>Zoning Pressure Switch Opened (high pressure)</p> <ul style="list-style-type: none"> <li>Compressor pressure is above the specified limit.</li> <li>Compressor is turned off.</li> <li>Zoning will be restored once the high pressure switch closes.</li> </ul>	Automatically clears after compressor pressure is within limits.
542	Moderate/ Critical	Zone 1 Temperature Sensor Problem	<ul style="list-style-type: none"> <li>Zone temperature sensor reading out of range.</li> <li>Open or short zone temperature sensor detected for more than five second.</li> <li>Damper control module will operate in non-zone mode (all dampers open) – moderate condition.</li> <li>If after 10 minutes the condition does not change, the priority code is change to critical. System will continue to operate in non-zone mode.</li> </ul>	Automatically clears 30 seconds after condition no longer exist.
543	Moderate/ Critical	Zone 2 Temperature Sensor Problem		
544	Moderate/ Critical	Zone 3 Temperature Sensor Problem		
545	Moderate/ Critical	Zone 4 Temperature Sensor Problem		

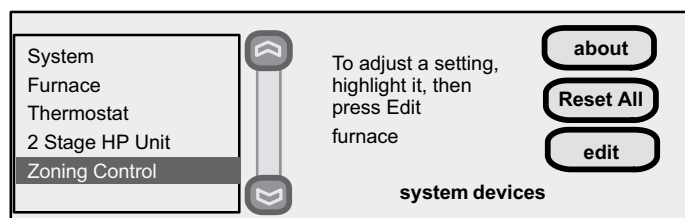
**Table 6. Alert Codes and Troubleshooting**

## Comfort Sync Wi-Fi Thermostat - Installer Zoning Control Settings

### Zoning Control Parameters

Refer to the Comfort Sync Wi-Fi® Thermostat Installer's System Setup Guide to navigate to the system devices list. Use the following procedure to configure available parameters for the damper control module primary parameters.

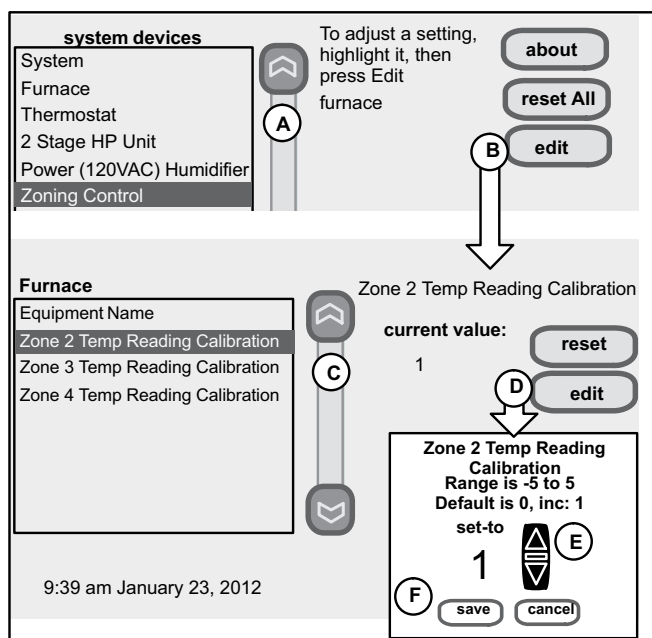
Use arrows (see following figures) to select a device from the "system devices" list; then use the about button to view information about communicating devices (information about other devices is not available).



**Figure 8. Select Zoning Control A**

Use back to return to the previous screen or next to go on. A complete list of parameters, their defaults and setting ranges is listed in figures above and below.

1. In the "system devices" screen, use the arrows (A) to highlight Zoning Control and press edit (B).
2. Touch one of the listed options (C) to select for example "Zone 2 Temp Reading Calibration". Press edit (D) to continue.
3. Use up or down arrows (E) to change the value.
4. Press save (F). Change other red settings (if present) using a similar process.



**Figure 9. Adjusting Zoning Control A Parameters**

After completing the settings press the back button to continue. On the "system devices" screen, continue by pressing the next button.

Parameter Name	Default	Min.	Max.	Incr.	Parameter Description
Zone 2 through 4 Temp Reading Calibration	0°F	-5°F	5°F	1°F	Recalibrating the in-zone thermostat temperature reading.

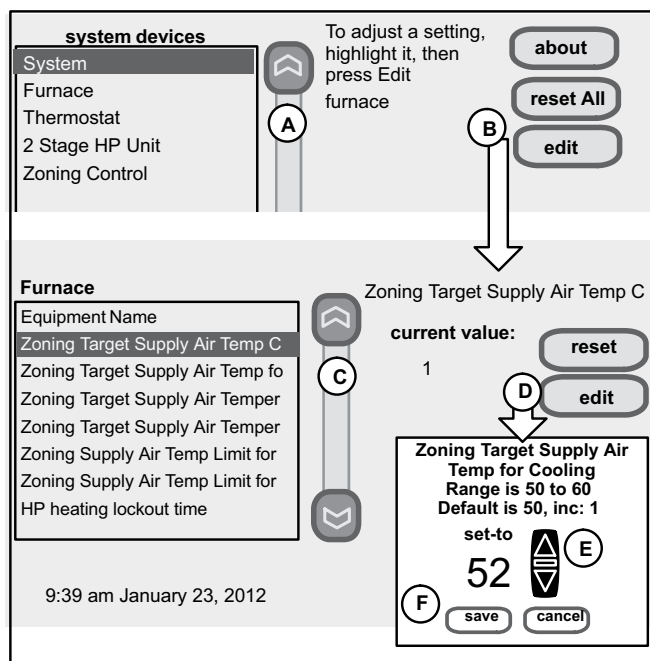
**Table 7. Adjustable Parameters for Zoning System**

### Zoning System Parameters

Refer to the Comfort Sync Wi-Fi® Installer's System Setup Guide to navigate to the system devices list.

Use arrows (see Figure 10) to select a device from the "system devices" list; then use the about button to view information about communicating devices (information about other devices is not available).

1. In the system devices screen, use the arrows to highlight System and press edit.
2. Touch one of the options to select for example Zoning Target Supply Air Temp for Cooling. Press edit to continue.
3. Use up or down arrows to change the value.
4. Press save. Change other red settings (if present) using a similar process.



**Figure 10. Adjusting System Parameters for Zoning**

After completing the settings press the back button to continue. On the system devices screen, continue by pressing the next button.

Parameter Name	Default	Min.	Max.	Incr.	Dependency	Parameter Description
Zoning Gas Heating DAT Cool Down Target	100°F	80°F	110°F	1°F	Damper control module, Furnace	At the end of a gas heat cycle, the Heat Blower Off Delay may not be long enough to completely cool the heat exchanger. This may result in a primary limit trip then, or at the beginning of the next heat demand. This parameter allows the blower to run after a gas heat call ends until the discharge air temperature sensor (DATS) cools to the temperature set in the parameter. If the temperature is set too low this will cause the temperature in the room to overshoot.
Zoning Anticipated Discharge Air Temperature Adjustment	60 secs	0 secs	120 secs	10 secs	Damper control module, DATS	This parameter setting compensates for a rapid change of the discharge air temperature due to fast changing conditions. It examines the change in the discharge air temperature for the previous 2 minutes and extrapolates or looks forward by the number of seconds set in the parameter and uses this as the DATS value for staging. This parameter setting helps prevent limit trips/frozen coils from occurring.
Zoning Target Supply Air Temp for Cooling	50°F	50°F	60°F	1°F	Damper control module	In cooling mode, this setting sets the target discharge air temperature.
Zoning Target Supply Air Temp for Gas/Electric Heating	100°F	100°F	130°F	5°F	Damper control module, Furnace or air handler electric heat section	In heating mode, this setting sets the target discharge air temperature.
Zoning Target Supply Air Temp for HP Heating	90°F	85°F	110°F	1°F	Damper control module, heat pump	In heat pump heating mode, this setting sets the target discharge air temperature.
Zoning Supply Air Temp Limit for Cooling	40°F	35°F	45°F	2°F	Damper control module and compressor cooling operation	In cooling mode, this setting sets the discharge air temperature low limit. Below this temperature, the cooling is turned off.
Zoning Supply Air Temp Limit for Gas/Electric Heating	140°F	140°F	160°F	5°F	Damper control module, Furnace or air handler electric heat section	In heating mode, this setting sets the discharge air temperature high limit. Above this temperature the heating is turned off.
Zone 1 First Stage Differential	1.0°F	0.5°F	3.0°F	0.5°F	Damper control module	Differential is the temperature difference between when first stage will cycle ON and cycle OFF. (Example: Zone 1 thermostat is set at 70°F with a 1.0°F differential. Cooling Demand Cooling will cycle ON when the room temperature reaches 70.5°F and cycle OFF when the room temperature is 69.5°F.)
Zone 2 First Stage Differential	1.0°F	0.5°F	3.0°F	0.5°F		
Zone 3 First Stage Differential	1.0°F	0.5°F	3.0°F	0.5°F		
Zone 4 First Stage Differential	1.0°F	0.5°F	3.0°F	0.5°F		

**Table 8. Adjustable System Parameters for Comfort Sync™ Zoning System**

Parameter Name	Default	Min.	Max.	Incr.	Dependency	Parameter Description
Zone 1 Continuous Blower CFM	Dependent on hardware configuration	Minimum and maximum CFM will be dependent on system component configurations. These parameter values are automatically adjusted to the specific hardware configuration (see Table 10 for minimum CFMs for specific indoor units).	5 CFM	Damper control module	Zones requesting the fan on are only allowed while no other zone demand is present. The thermostat will sum all the zone continuous blower CFM requirements and send the command only after positioning the dampers and waiting for the damper close delay period to expire. Continuous blower demands are the lowest priority demands, all other conditioning demands will override the continuous blower demand.	
Zone 2 Continuous Blower CFM						
Zone 3 Continuous Blower CFM						
Zone 4 Continuous Blower CFM						
Zone 1 Cooling CFM					Target cooling CFM for a specific zone.	
Zone 2 Cooling CFM						
Zone 3 Cooling CFM						
Zone 4 Cooling CFM						
Zone 1 Heating CFM					Target heating CFM for a specific zone.	
Zone 2 Heating CFM						
Zone 3 Heating CFM						
Zone 4 Heating CFM						

**Table 9. Adjustable System Parameters for Comfort Sync™ Zoning System (Configuration Dependent)**

### Minimum CFM for Comfort Sync™ Zoning System with Variable Speed Blower Motors

Table 10 lists minimum indoor unit CFMs for use with the damper control module.

Unit Model Number	CFM (minimum)	Unit Model Number	CFM (minimum)
A80US2V070A12	250	A97USMV090C12S	250
A80US2V090B12	250	A97USMV090C16S	250
A80US2V090B16	380	A97USMV090C20S	450
A80US2V090C20	450	A97USMV110C20S	450
A80US2V110C20	450	A97USMV135D20S	450
A80US2V135D20	450	A97DSMV070B12S	250
A80US2V070A12L	250	A97DSMV090C16S	380
A80US2V090B16L	380	A97DSMV090C20S	450
A80US2V110C20L	450	A97DSMV110C20S	450
A80DS2V070A12	250	BCS2M24	250
A80DS2V090B16	380	BCS2M36	380
A80US2V110C20L	450	BCS2M42	450
A96US2V045B12S	250	BCS2M48	450
A96US2V070B12S	250	BCS2M60	450
A96US2V090C12S	250	BCE4M24	250
A96US2V090C16S	380	BCE4M30	250
A96US2V090C20S	450	BCE4M36	250
A96US2V110C16S	380	BCE4M48	450
A96US2V110C20S	450	BCE4M60	450
A96US2V135D20S	450	BCE7S24M	250
A96DS2V045B12S	250	BCE7S30M	250
A96DS2V070B16S	380	BCE7S36M	250
A96DS2V090C20S	450	BCE7S42M	250
A96DS2V110C20S	450	BCE7S48M	250
A97USMV070B12S	250	BCE7S60M	250

**Table 10. Minimum CFM**

**To Edit and Test Airflow Per Zone**

Use the following procedure to edit and begin test procedure airflow per each zone.

The three values listed in Figure 11 were set in the previous section. However, adjustments can be made on the Edit and Test Air Flow per Zone screen also.

**NOTE:** If the total CFM from calling zones is less than the minimum CFM that the unit will deliver (see Table 10), the minimum system CFM will be delivered, not the design CFM.

System Devices > System Parameter Names	Edit and Test Airflow Screen Parameter Names
Zones 1 - 4 Continuous Blower CFM	Blower Circulation Airflow
Zones 1 - 4 Cooling CFM	Cooling Airflow
Zones 1 - 4 Heating CFM	Heating Airflow

Table 11. Air Flow

- 1. Select the desired radio button option - Blower Circulation Airflow, Cooling Airflow or Heating Airflow (A).
- 2. Adjust airflow for a specific zone by pressing on the desired zone (B). Total maximum airflow for all zones in this example is a combined 1250 CFM. Minimum CFM per zone is 50 and maximum is 1250.

- 3. Adjust airflow by using the up or down arrow to change the CFM (C).
- 4. Press start (D) to begin operation for that specific zone.
- 5. Repeat procedure to configure all applicable zones.
- 6. Press save (E).

After setting zoning CFMs the next button will appear and let you proceed to the system testing screen.

Refer to the Comfort Sync Wi-Fi® Thermostat Installer's System Setup Guide to proceed with system tests.

**Recording Airflow Information**

Use Table 12 to record each zone's airflow value:

Parameter	Zone 1	Zone 2	Zone 3	Zone 4
Continuous Circulation Airflow				
Cooling Airflow				
Heating Airflow				

Table 12. Recording Airflow Values

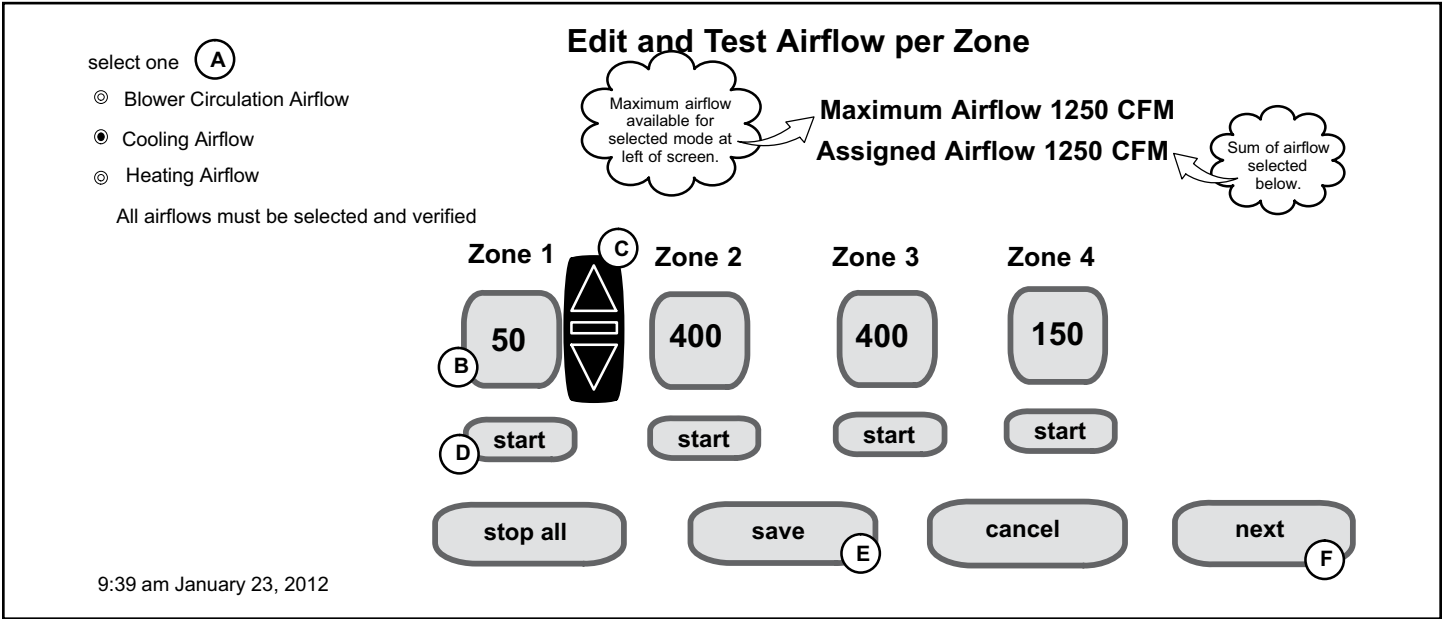


Figure 11. Editing Zone CFMs



## Sequence of Operation

When power is first applied, the green Status LED will flash, indicating that the damper control is functioning normally. When the control is first powered on, there is a 5 minute minimum time delay during which only the fan output will respond.

### Heating / Cooling Changeover

The following is an example of how the system operates during a heating / cooling changeover.

When the system is satisfying a call from zone 1 for heating and receives a call for cooling from zone 2, the following will occur:

- Then system will continue to fulfill the demand from zone 1 until satisfied, or a maximum time of 20 minutes has occurred.
- If after 20 minutes the system is still operating based on satisfying the heating demand from zone 1, the system will terminate that demand.
- The system will then shut system down for five (5) minutes. This will allow for system temperatures and operating pressures to stabilize.
- After a five 5 minute delay the system will begin operations to satisfied the cooling demand from zone 2.

The system will continue to operate in this matter each time it receives a zone call that is opposite of the current mode of operation (heating or cooling).

### Damper Operation

#### **Cooling Operation Conventional Heat/Cool and Heat Pump Systems**

When a zone thermostat makes a demand for cooling, the zone damper opens and the cooling equipment begins operating.

Cooling demand is terminated when:

1. All zone demands for cooling are terminated.
2. The demand has exceeded the heat/cool changeover time limit (20 minutes) while a heat demand exists.

When cooling demand is terminated, a 5 minute minimum off time delay is initiated.

Second stage cooling is energized when the discharge air temperature is 7°F higher than the set point of the cooling staging temperature settings.

#### **Heating Operation Conventional Heat/Cool and Heat Pump Systems**

When a zone thermostat makes a demand for heating, the zone damper opens and heating equipment begins operating. Heating demand is terminated when:

1. All zone demands for heating are terminated.
2. The demand has exceeded the heat/cool changeover time limit (20 minutes) while a cooling demand exists.

When heating demand is terminated, a 5 minute minimum off time delay is initiated.

Second-stage heating is energized if the discharge air temperature is lower than the set point of the heating staging temperature set point.

### Dual-Fuel Operation

**NOTE:** *Only Comfort Sync™ enabled communicating heat pump outdoor units may be used with a dual-fuel system.*

When both a gas furnace and a heat pump are present on the system, the thermostat uses the balance points to determine which source to use for heating.

When the outdoor temperature is above the low balance point, the heat pump is always attempted first before using the gas furnace.

In order to use the gas furnace as a primary heating source (not defrost tempering) when the outdoor temperature is between the high and low balance points, the following conditions must occur:

- Heat pump must be used for a minimum of 30 minutes
- Temperature in the zone not increase by more than 0.5°F
- Heat pump has not gone into defrost in the 30 minute period

If any single-zone satisfies the specified conditions, the heat pump will stop and the gas furnace is used to satisfy all heat calls for the next duration of the parameter heat pump lockout time. After the heat pump lock out has expired, the heat pump is again used as the primary heat source on the next call after the equipment has stopped.

### Emergency Heat Operation - Heat Pump Systems

When the Allied Air communicating thermostat emergency heat is enabled the unit will satisfy all heating demand with either gas or electric backup heat. When the Emergency Heat setting is OFF, the heat pump is used to satisfy heating demands.

# Whole Home Dehumidification Operation

Humiditrol Whole Home Dehumidification System can be used with the Comfort Sync™ Zoned System. Humiditrol can be installed through the Comfort Sync thermostat under System Devices > Add or Remove Non-communicating equipment?, select Yes. From the non-communicating device list, select Dehumidifier. Press edit, and select Humiditrol to enable. The default setting is max over cool.

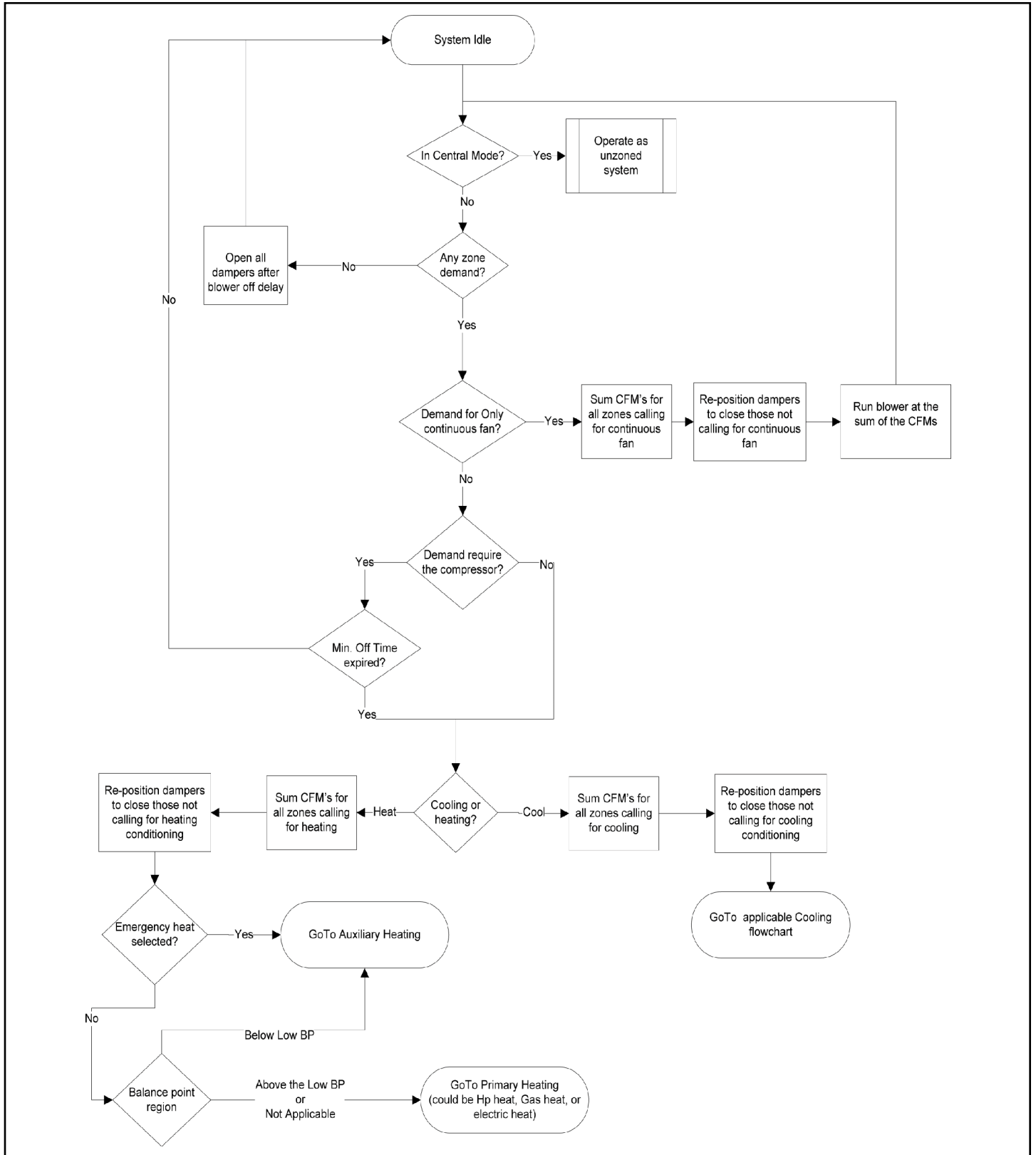
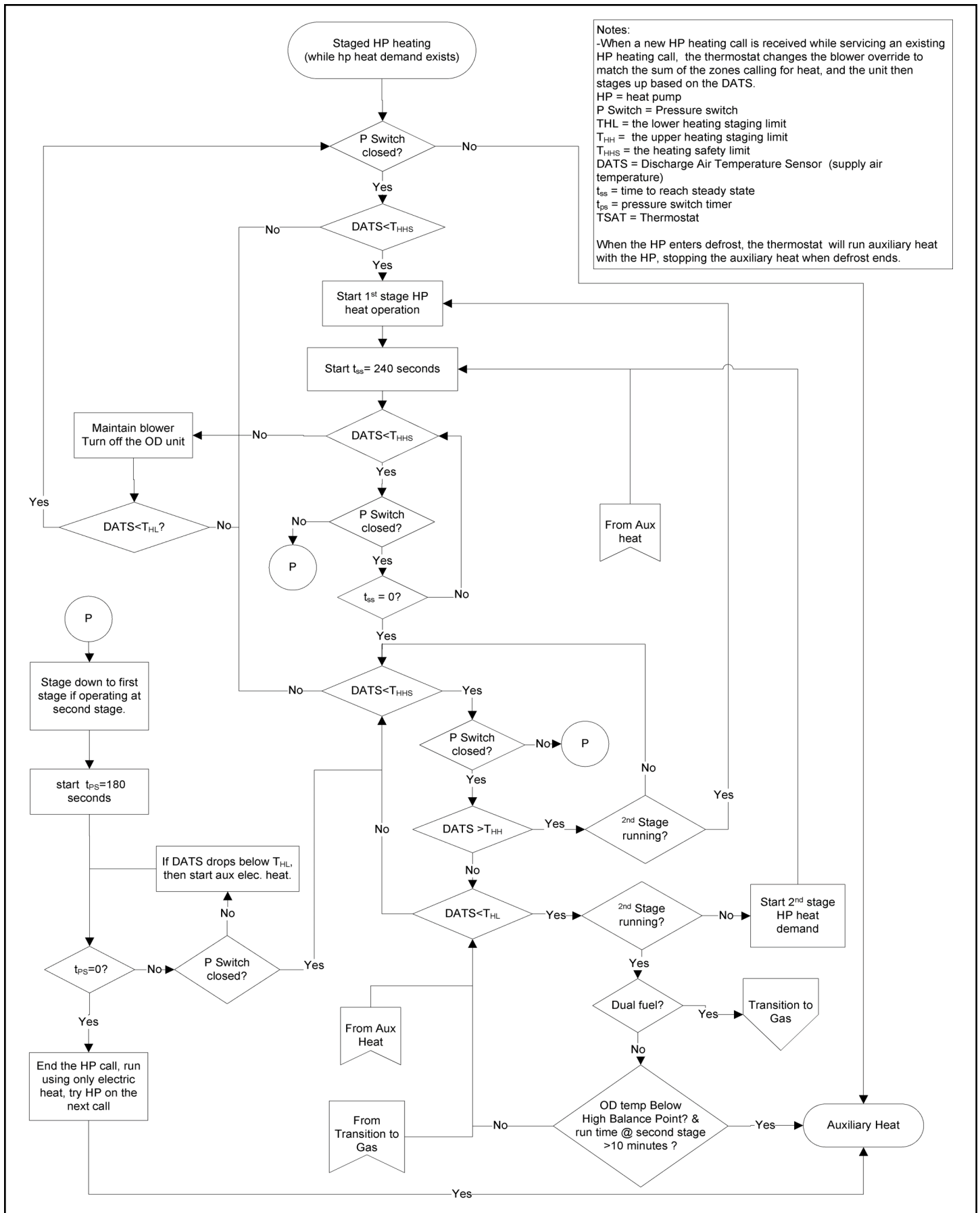


Figure 12. System Idle



**Figure 13. Staged Heat Pump Heating**

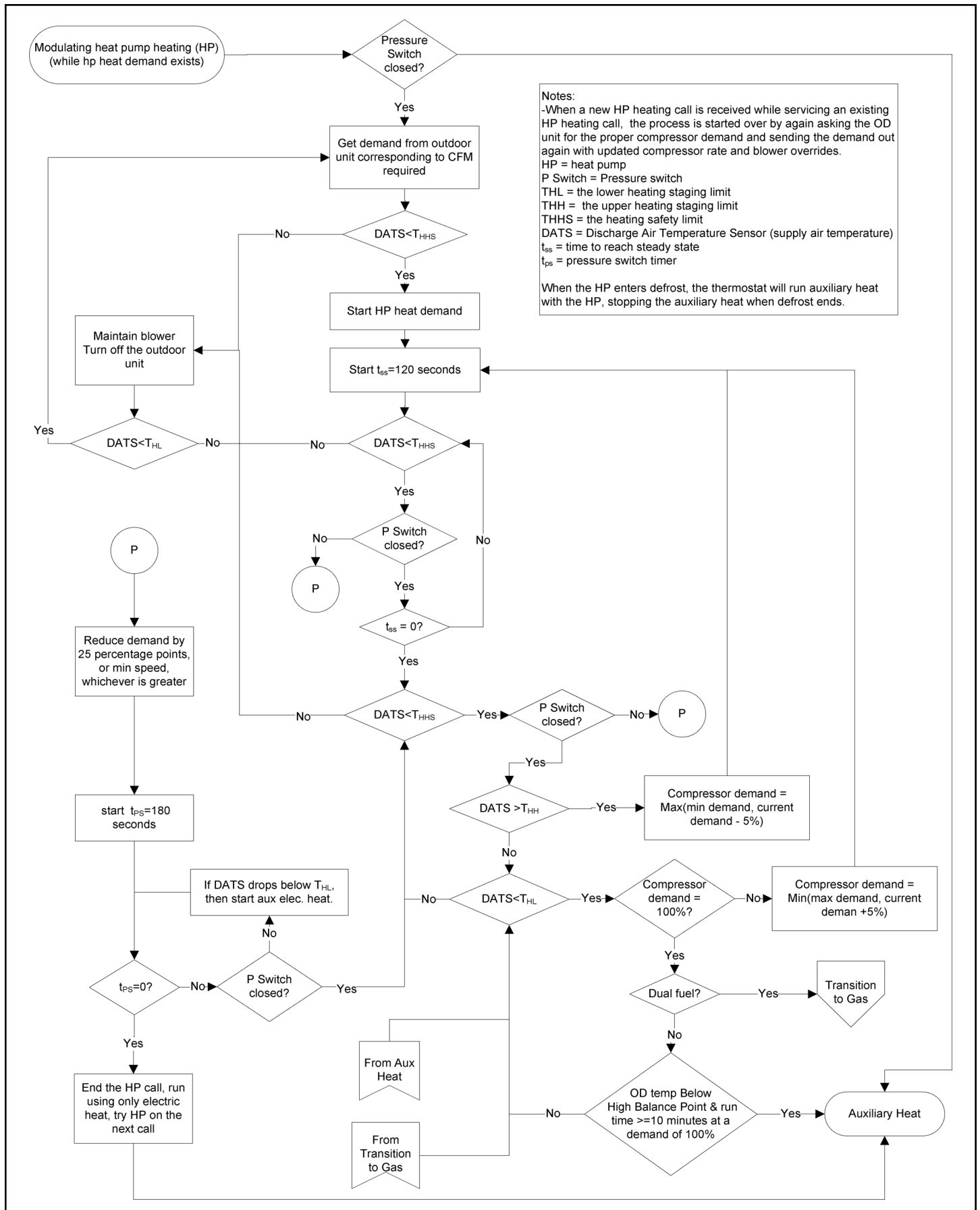


Figure 14. Modulating (Variable Capacity) Heat Pump Heating

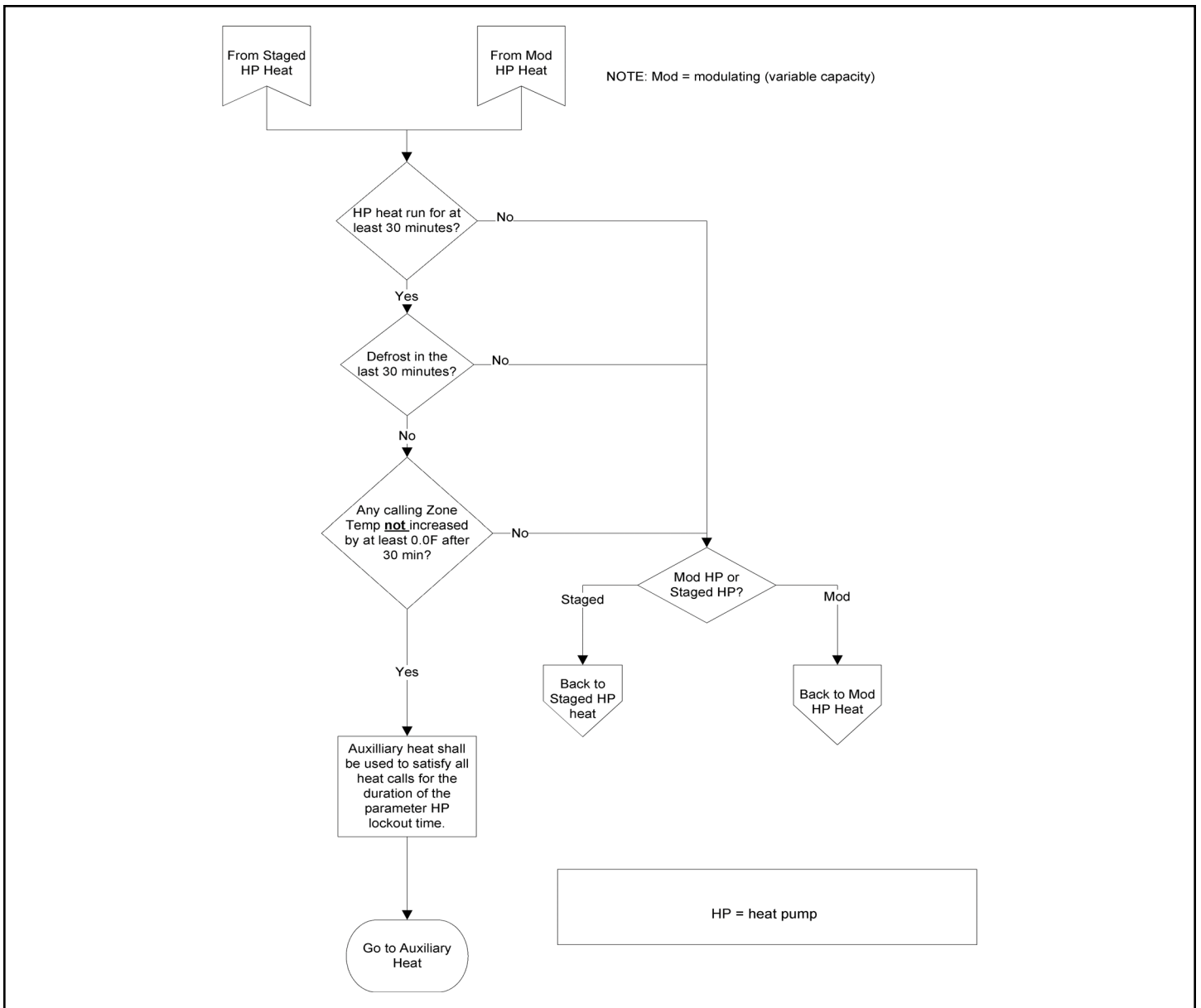


Figure 15. Transition to Gas

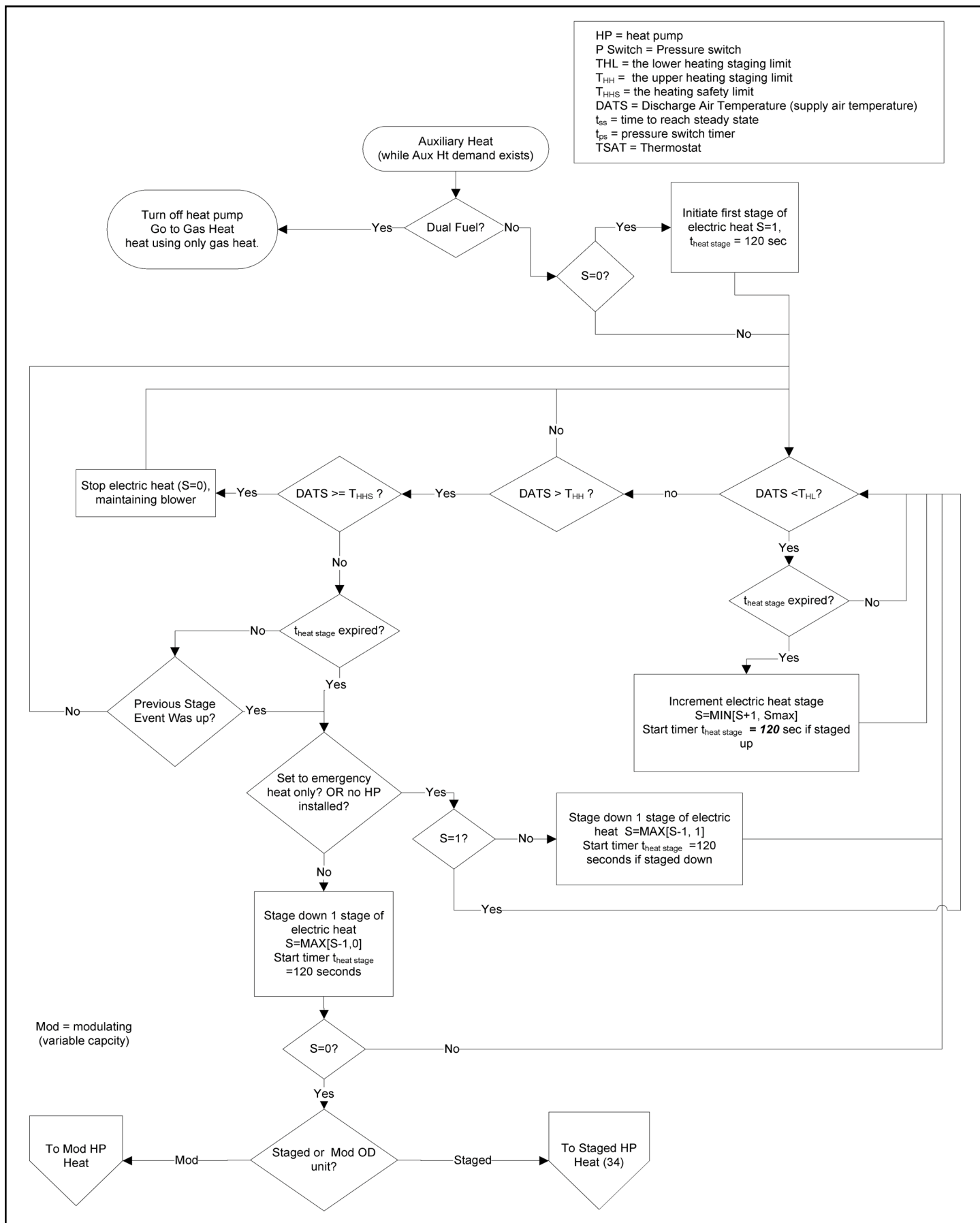
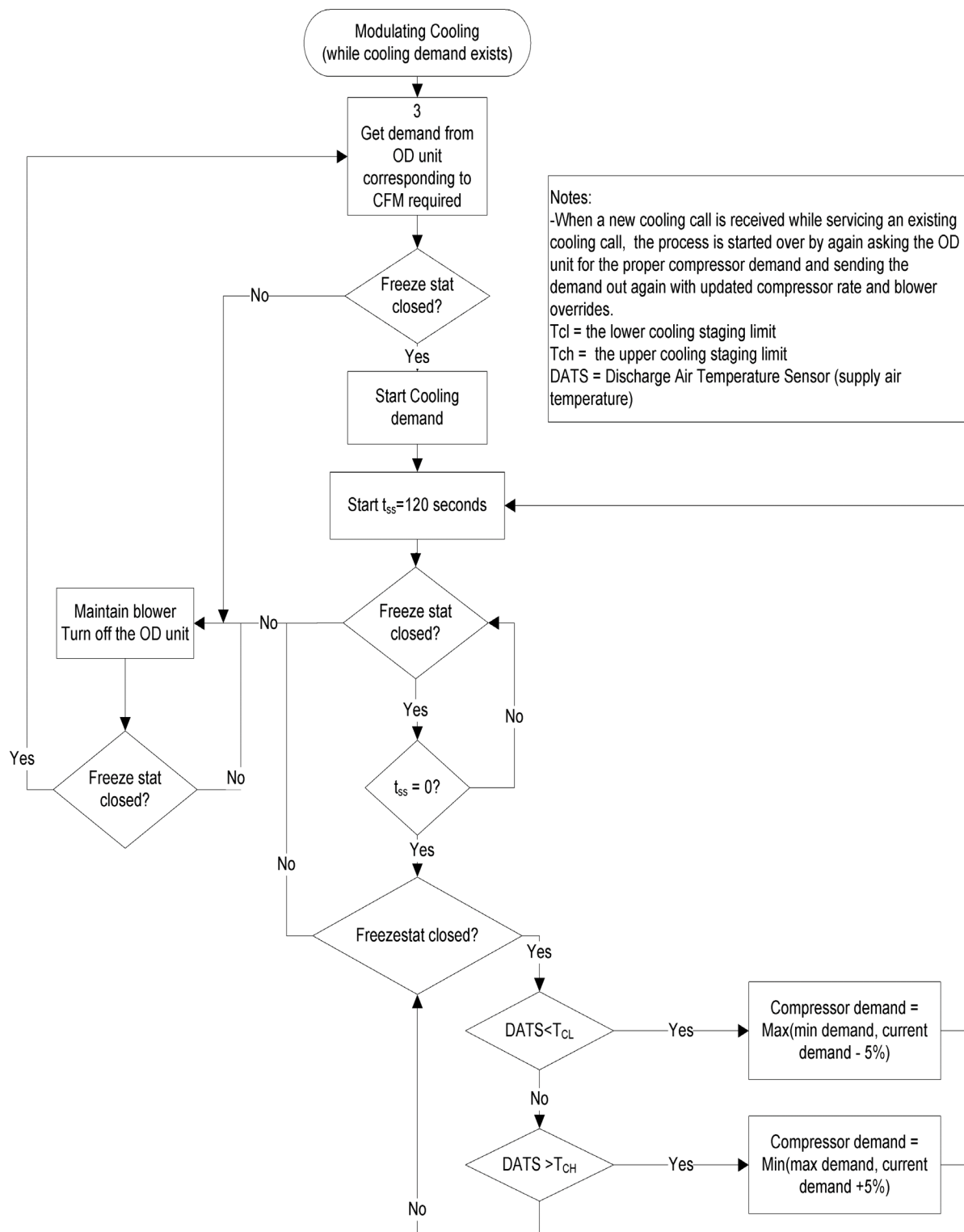


Figure 16. Auxiliary Heat





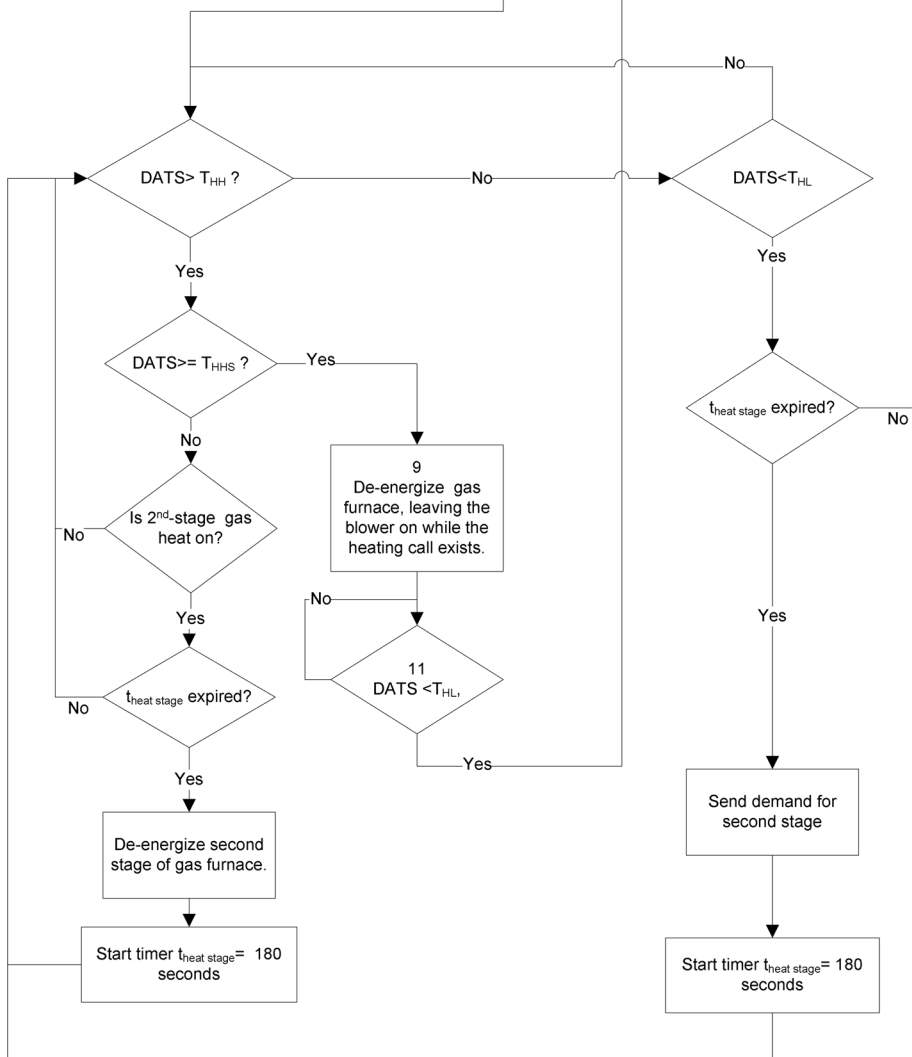


**Figure 18. Modulating (Variable Capacity) Cooling**

Staged Gas Heat  
(while heat demand exists)

Send first stage  
demand to furnace  
with blower override

Start timer  $t_{\text{heat stage}}=180$   
seconds after IFC  
indicates the blower is  
running



#### Notes:

When a new heating call is received while servicing an existing heating call, without ending the conditioning demand, the asc sends the current demand (without changing the conditioning stage) with the updated blower override value calculated as the sum of the calling zones CFMs. From this point on the unit will stage up and down normally.

$T_{HL}$  = the lower gas heat staging limit

$T_{HH}$  = the upper gas heat staging limit

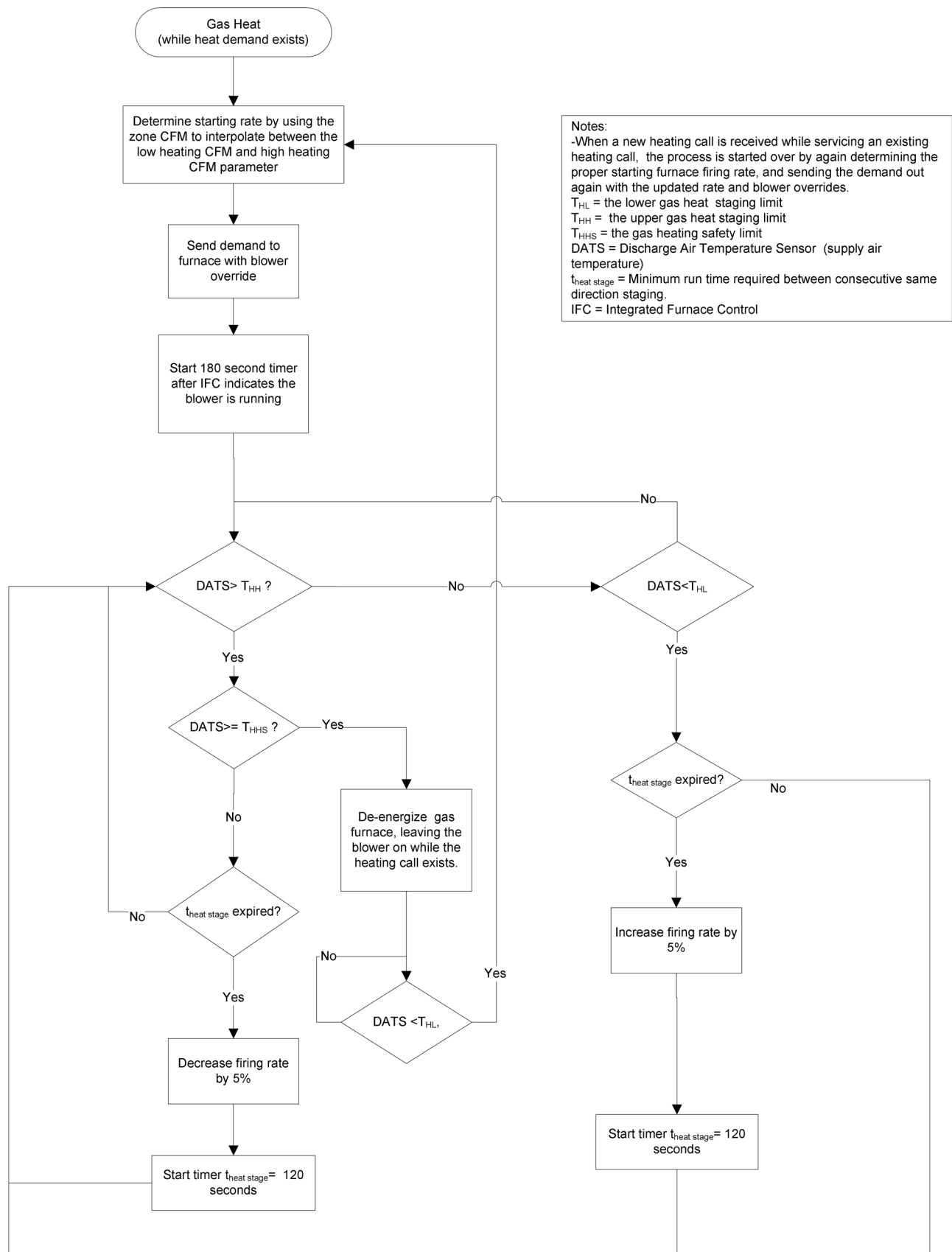
$T_{HHS}$  = the gas heating safety limit

DATS = Discharge Air Temperature Sensor (supply air temperature)

$t_{\text{heat stage}}$  = Minimum run time required between consecutive same direction staging.

IFC = Integrated Furnace Control

Figure 19. Staged Gas Heat



**Figure 20. Modulating (Variable Capacity) Gas Heat**

## Comfort Sync Thermostat User Zoning Control Settings

When a zone control system has been installed and enabled by the installer, the homeowner has the option to control temperature or set away mode for each enabled zone. Touch the zone location button as shown below to display the **AVAILABLE ZONES** screen.

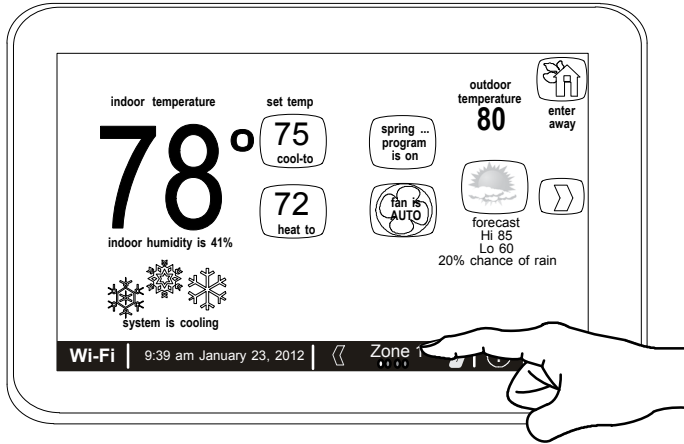


Figure 21.

Figure 22 shows the **AVAILABLE ZONES** screen. This screen displays the current temperature, as well as the heating / cooling settings for each zone.

### Renaming Zones

Touch the zone number of the zone you wish to rename. An on-screen keyboard will appear to allow you to rename a specific zone. Touch the save button when you are through.

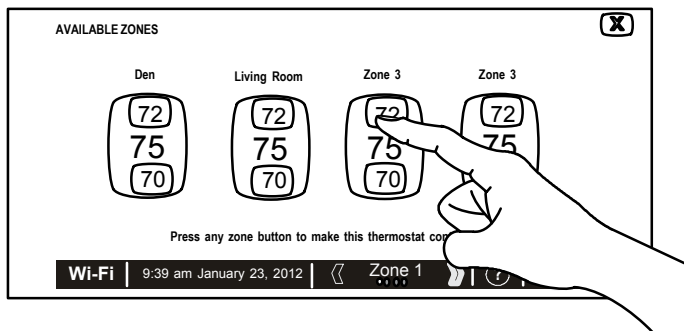


Figure 22. Home Screen - Selecting Available Zones Screen

### Adjusting Zone Temperatures

Touch the current temperature reading of any zone that you wish to adjust. This will trigger the appearance of the temperature adjustment screen. Make desired adjustments for the particular zone.

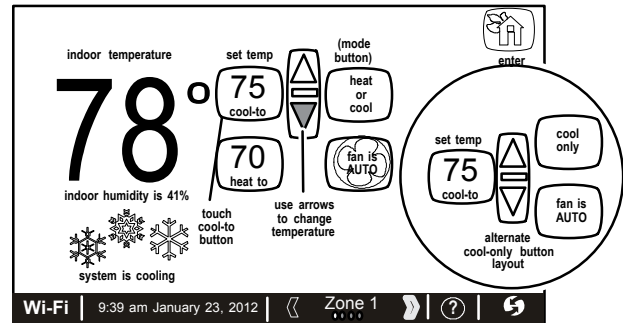


Figure 23. Adjusting Temperature

### Using Unique Individual Zone Programming Temperatures

If you wish to use preset temperature programming for individual zones then use the following procedure:

1. Give each active zone a unique name as exemplified in **RENAMING ZONES** (kitchen, living, bedroom, etc.).
2. From the Home Screen, select the System Mode button.

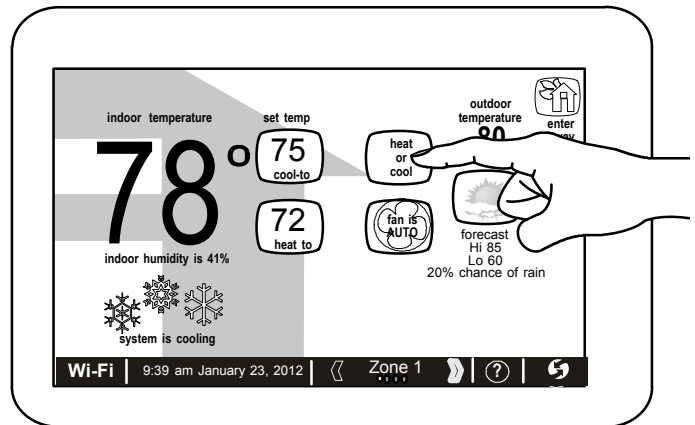


Figure 24. Selecting System Mode

3. Touch programs and touch edit programs.

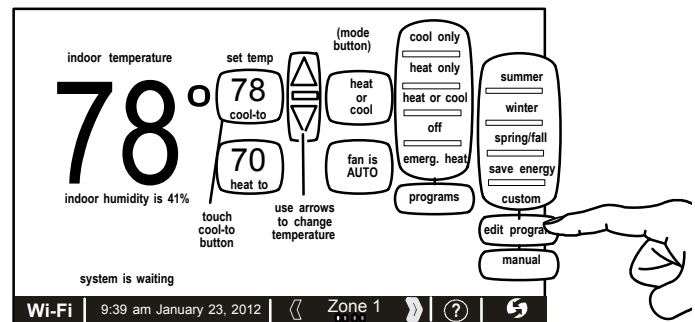
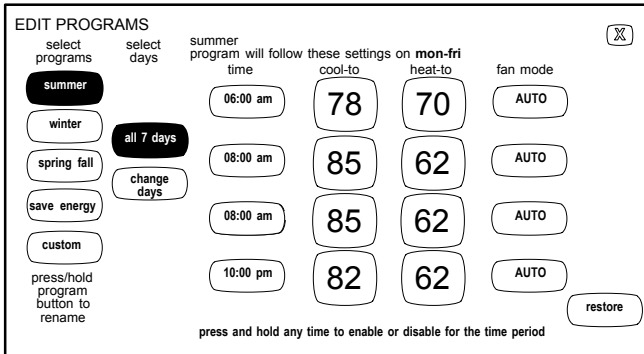


Figure 25. Turning on the Program

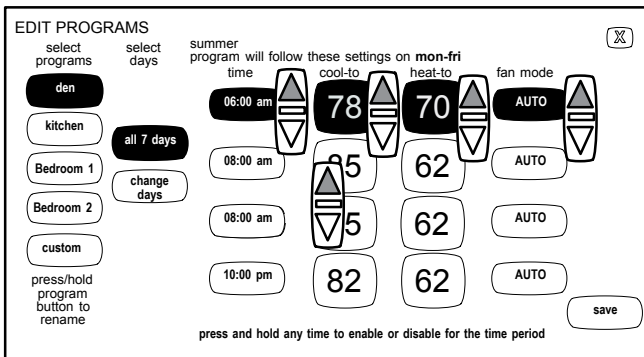
- From the **EDIT PROGRAMS** screen, press and hold each program list under the select programs column and rename that program to match the zone names used in step 1 using the on-screen keyboard. Repeat this step for each active zone in the system.

**NOTE:** In a four zone system, only four unique programs can be used.



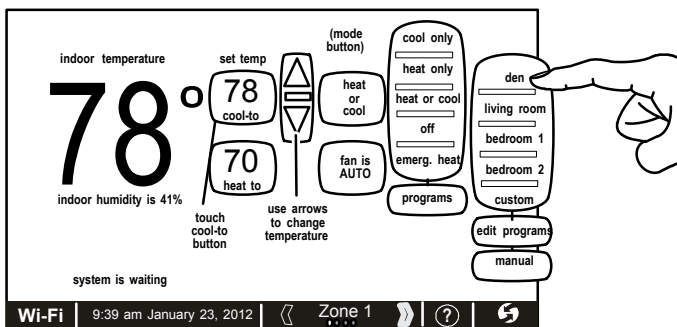
**Figure 26. EDIT PROGRAMS Screen**

- Adjust individual program time and cool-to, heat-to and fan mode as desired. When done, touch the save button.



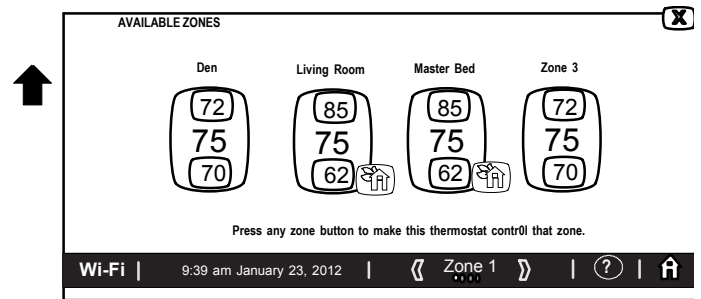
**Figure 27. Adjusting PROGRAM Settings**

- From the Home Screen, select the desire zone, and then touch the System mode. Example: If the zone selected is called Den, then select program Den.



**Figure 28. Selecting System Mode**

## Setting Away Mode Per Zone



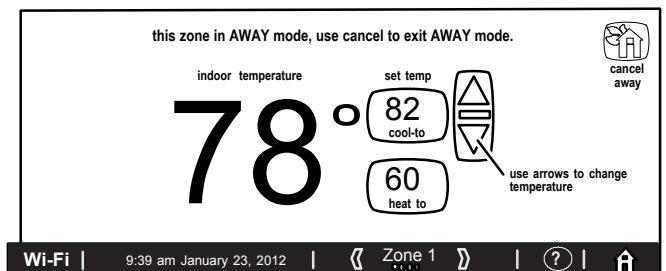
**Figure 29. Home Screen - Selecting Away Mode for Individual Zones**

The Zone 1 thermostat becomes the system master thermostat. If the Zone 1 thermostat is set for Away Mode (on the Home Screen), the away mode is enabled for the whole system (all zones) until canceled.

If zones 2, 3, or 4 are set for Away Mode on the Home Screen, the Away Mode icon appears at the lower-right of each zone button on the **AVAILABLE ZONES** screen.

## Adjusting Away Mode Temperature or Cancel Away Mode Per Zone

To adjust the Away Mode zone temperature setting or to cancel Away Mode for a specific zone, enter the Home Screen, select the desired zone and touch the Cancel Away icon located in the upper right-hand corner of the screen.



**Figure 30. Adjusting Temperature or Canceling Away Mode with Program Running (Away Mode)**

## How to Disable Zoning

From the Home screen, select the right arrow to proceed to the **FEATURES** screen. Select zone settings and then select zoning is ON. This will toggle zoning to OFF. Once disabled, zoning information disappears from the status bar along the bottom of the home screen. When zoning has been disabled, the master thermostat controls the entire system in single comfort mode.

**NOTE:** When Zoning is disabled, the In-Zone Sensors are also disabled; however, each of the In-Zone Sensors continues to display the current temperature for that zone. The Comfort Sync logo is also displayed to indicate that zoning is off.

## Humidification and Dehumidification

### Humidification - With Zoning

Humidification with zoning is handled based on the zone 1 demand using the indoor units 24VAC H terminal.

#### 1. Basic Mode operates as follows:

- Zone 1 (Comfort Sync thermostat) humidity sensor controls all zone humidification.
- Zoning humidification can only be activated during a heating demand.
- Humidification for all zones is determined by the Humidification Setpoint setting (Comfort Sync).
- Once Humidification Setpoint is satisfied then humidification is terminated even if heating demand is present.

#### 2. Precision Mode operates as follows:

- Zone 1 (Comfort Sync thermostat) humidity sensor controls all zone humidification.
- Zoning humidification can be activated without a heating demand. However If there is a call for heating during humidification, then humidification will continue to operate until the Humidification Setpoint is satisfied.
- Humidification for all zones is determined by the Humidification Setpoint setting (Comfort Sync).
- Once Humidification Setpoint is satisfied then humidification only is terminated even if heating demand is present.

### Dehumidification Modes - With Zoning

See Table 13 and Table 14 to determine zoning and dehumidification information based on the Comfort Sync thermostat software version.

	Comfort Sync Software Version 2.1 and later (Auxiliary and Humiditrol® Dehumidification)	Comfort Sync Software Version 2.1 and later (if compressor operation is altered or not). (Allied Air Communicating Outdoor Units configured for moderate or humid mode)
	Dry = Off	
Zoning system - Dehumidification by EDA Accessory Control	Moderate and Humid = On (There is no difference between moderate and humid mode setting. Auxiliary or Humiditrol® will work if no other calls for heating or cooling are active for any zone.)	Moderate and humid modes will only be allowed when zoning is set to OFF. System must be manually set to zoning off mode from the thermostat home screen. When the zoning function is set to OFF, the system will operate as if no zoning equipment is connected.

**Table 13. Comfort Sync™ Outdoor Units Only**

Comfort Sync Software Version 2.02 (if compressor operation is altered or not).	Comfort Sync Software Version 2.1 and later (if compressor operation is altered or not).	
Original Parameter Label	New Parameter Label	Resulting Operation
Off	Off	Off
Basic	Medium	Standard blower speed
Precision	High	Low blower speed

**Table 14. Comfort Sync™ and Other Brands of Non-Communicating Outdoor Units**