Installation Guide

Other Installation Guides may be necessary, based on system configuration. A complete list of other optional components is shown below.

1	**Control** (required) *ZONE950AC52ZA
2	Relay Panel For use with 24V indoor systems (optional)
3	**Zone Panel**
4	Zone Sensor with Display (optional)
5	Zone Sensor (optional)
6	Zone Dampers (optional)

Zone Panel

ZZONEPNLAC52ZB (Kit)
ZZONEEXPAC52ZB (Zone Panel)

ALL phases of this installation must comply with NATIONAL, STATE AND LOCAL CODES

IMPORTANT — Proper application is critical when installing zoning systems. Not done correctly, the HVAC and zoning systems will not provide the expected comfort. Reference application bulletins CNT-APG003-EN/Trane and CNT-APG004-EN/AS for detailed information on Zoning Application

IMPORTANT — This Document is customer property and is to remain with this unit. Please return to service information pack upon completion of work.

These instructions do not cover all variations in systems or provide for every possible contingency to be met in connection with the installation. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to your installing dealer or local distributor.

Section 1. Safety

⚠ WARNING

This information is intended for use by individuals possessing adequate backgrounds of electrical and mechanical experience. Any attempt to repair a central air conditioning product may result in personal injury and/or property damage. The manufacture or seller cannot be responsible for the interpretation of this information, nor can it assume any liability in connection with its use.

⚠ WARNING

LIVE ELECTRICAL COMPONENTS!
During installation, testing, servicing, and troubleshooting of this product, it may be necessary to work with live electrical components. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.

Table of Contents

Section 2. General Information

2.1 Overview

The Zone Panel is a wall mounted low voltage panel that enables the control to connect to and manage zoning components.

2.2 Contents in Zone Panel Kit (ZZONEPNLAC52ZB)

Open and inspect contents for damaged or missing items. Each kit will contain:

Item	Qty	Description
1	1	Zone Panel cover
2	1	Zone Panel base
3	1	Discharge Air Temperature Sensor
4	1	Static Pressure Transducer
5	1	Transducer Enclosure
6	2	Static Pressure Probe
7	1	Clear Flexible Tubing (8 ft.)
8	4	Mounting screws/anchors
9	4	Wire Ties
10	4	Tubing Clamps
11	3	Clamp-style Connectors
12	1	Installer's Guide (not pictured)
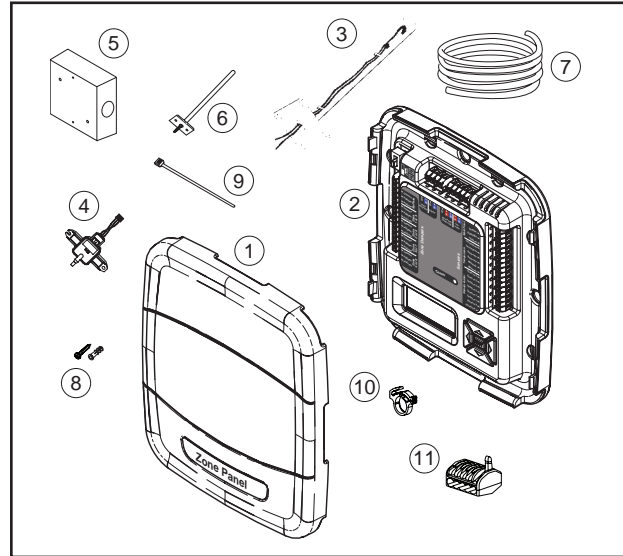
2.3 Optional Accessories

Product Model	Description
*ZONE940AC52ZA	Communicating Zone Sensor with Display
ZZSENSAL0400AA	Non-Communicating Zone Sensor
SEN 00462	Return Air/Mixed Air Sensor
ZZONEEXPAC52ZB	Additonal Zone Panel for zones 5-8
120/240VAC Transformer	Field-Supplied, sizing dependent on VA requirements of Zone Panel and installed components

2.4 Specifications

| Specification	Description
Product Model:	ZZONEEXPAC52ZB
Product:	Zone Panel
Size:	8.0" width x 9.3" height x 1.9" depth
Storage Temperature:	-40° to 175°F, 5% to 95% RH non-condensing
Operating Temperature:	-40° to 150°F, 5% to 95% RH non-condensing
Input Power:	24 VAC from external transformer (Range: 18-32 VAC)
Power Consumption:	2 VA for each Zone Panel (damper VA not included)
Wire usage:	Minimum 18 gauge NEC approved control wiring
HVAC System Type Compatible:	Standard (gas/oil/electric/hydronic), Heat Pump, Dual Fuel
Multistage System Compatible:	Standard HVAC Systems: Up to 3 stages of heating and 2 stages of cooling (including modulating heating)
	Heat Pump Systems: Up to 5 stages of heating (2 compressor, 3 aux heat—including modulating heating) and 2 stages of cooling
Communications:	~12 VDC

2.4 System Connections

Communicating
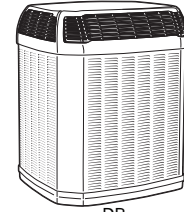Communicating Indoor Unit
Communicating Outdoor Unit

Control

R ———— R
B ———— B
D ———— D
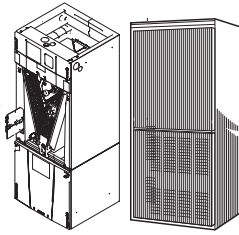
Communicating
Indoor Unit

Communicating
Outdoor Unit

DB

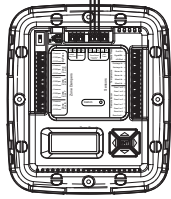Clamp-style Connectors
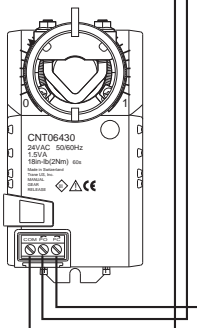
D

R

B

Field-Supplied 24V
Transformer

TRANS.

Static Pressure
Transducer
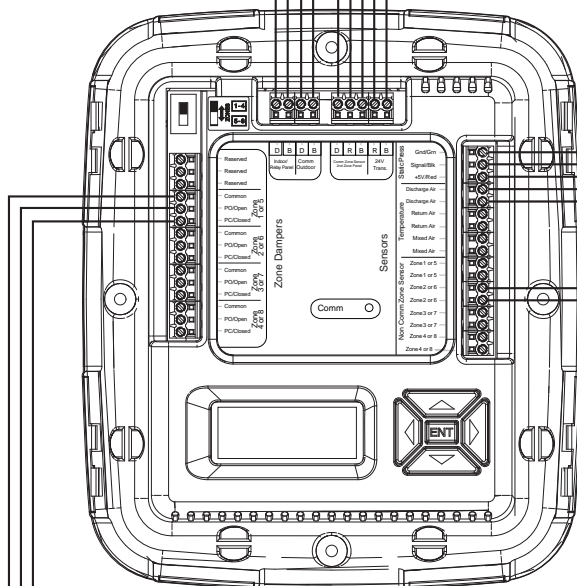(OPTIONAL)

Temperature
Sensor(s)

Discharge
(REQUIRED)

Return
(OPTIONAL)

Mixed
(OPTIONAL)

Zone Panel
(Zones 5-8)

Reserved
Reserved
Reserved
Common
PO/Open
PC/Closed
Common
PO/Open
PC/Closed
Common
PO/Open
PC/Closed
Common
PO/Open
PC/Closed

Zone Dampers

Zone
1 or 5
Zone
2 or 6
Zone
3 or 7
Zone
4 or 8

Indoor
Relay Panel
Comm
Outdoor
Comm Zone Sensor
2nd Zone Panel
24V
Trans.

Comm

Sensors

Grd/Grn
Signal/Blk
+5V/Red
Discharge Air
Return Air
Return Air
Mixed Air
Mixed Air
Zone 1 or 5
Zone 1 or 5
Zone 2 or 6
Zone 2 or 6
Zone 3 or 7
Zone 3 or 7
Zone 4 or 8
Zone 4 or 8

Static Press
Temperature
Non Comm Zone Sensor

ENT

BRD

Indoor Temperature

69°

70°

5:00

Communicating Zone Sensor(s)
*ZONE940AC52ZA

CNT06430
24VAC 50/60Hz
1.5VA
18in-lb(2Nm) 60s
Made in Switzerland
Honeywell, Inc.
MANUAL
GEAR
RELEASE
◇ △ CE

COM PO

Damper(s)

Zone Panel
(Zones 1-4)

Non-Communicating Zone Sensor(s)
(ZZSENSAL0400A)

24V System
Non-Communicating Indoor Unit
Non-Communicating Outdoor Unit

Control

B
R
D

D
B

To Zone Panel
See Page 5 for
Zone Panel
Connections

NORM DUAL

Dual Fuel
Switch

D R B
Data Hot Com

Thermostat
and Indoor Unit

0   SOV
Y1   Stg1
Y2   Stg2

W1   Stg1
W2   Stg2
W3   Stg3

G   Fan
BK   PWM
Hum
Hum
Aux1
Aux1
Aux2
Aux2

24 Vac Only
24 Vac Only
24 Vac Only

HVAC System

Sensors

Remote Indoor   RS
                RS

Outdoor   ODT
          ODT

Comm

Bit Master
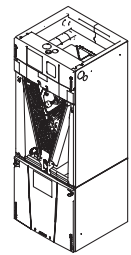
Non-Communicating
Outdoor Unit

See Relay Panel
Installer's Guide
for specific
wiring instructions.

Non-Communicating
Indoor Unit

Wired Remote
Outdoor Sensor
BAYSEN01ATEMPA
(may be wired to Control)

Relay Panel

Hybrid System
Communicating Indoor Unit
Non-Communicating Outdoor Unit

Control

B
R
D

B
R
D

D
B

To Zone Panel
See Page 5 for
Zone Panel
Connections

NORM DUAL

Dual Fuel
Switch

D R B
Data Hot Com

Thermostat
and Indoor Unit

0   SOV
Y1   Stg1
Y2   Stg2

W1   Stg1
W2   Stg2
W3   Stg3

G   Fan
BK   PWM
Hum
Hum
Aux1
Aux1
Aux2
Aux2

24 Vac Only
24 Vac Only
24 Vac Only

HVAC System

Sensors

Remote Indoor   RS
                RS

Outdoor   ODT
          ODT

Comm

Bit Master

See Relay Panel
Installer's Guide
for specific
wiring instructions.

Non-Communicating
Outdoor Unit

Wired Remote
Outdoor Sensor
BAYSEN01ATEMPA
(may be wired to Control)

Relay Panel

18-HD66D1-3

Zone Panel Connections

From Communicating
Indoor Unit
or Relay Panel

B

D

Clamp-style Connectors

D

R

B

Zone Panel
(Zones 5-8)

Field-Supplied 24V
Transformer

TRANS.

Static Pressure
Transducer
(OPTIONAL)

Temperature
Sensor(s)

Discharge
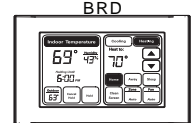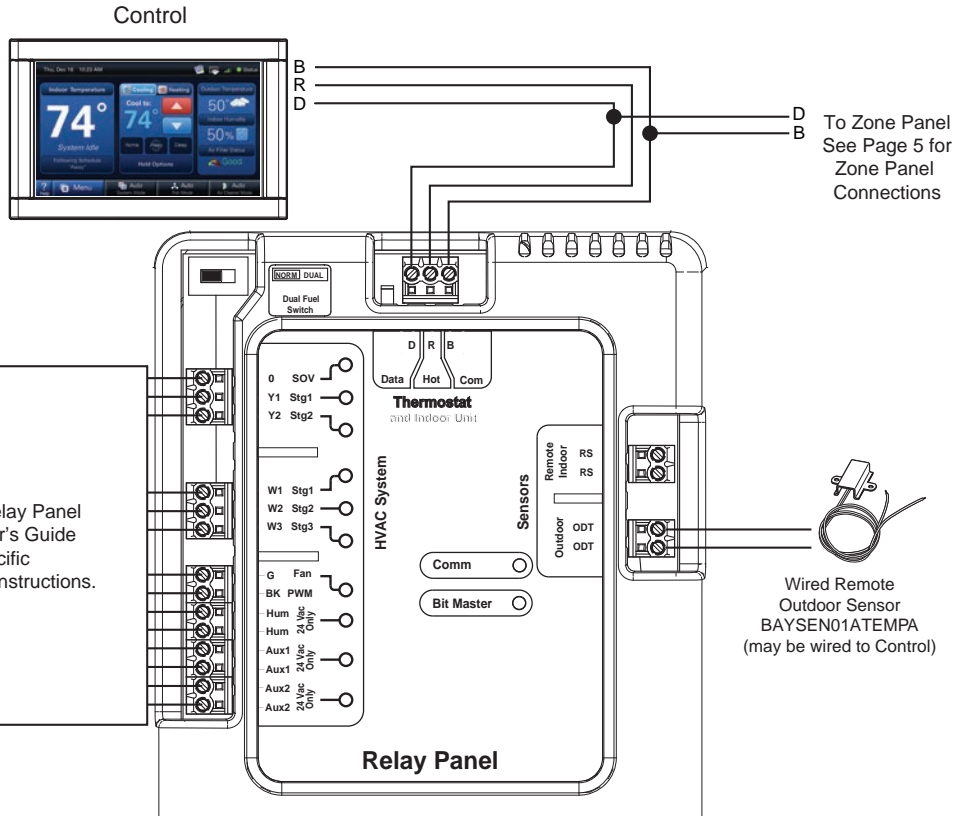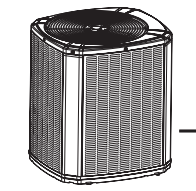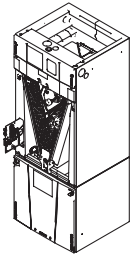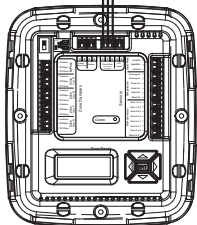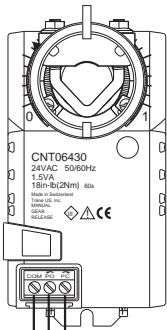(REQUIRED)

Return
(OPTIONAL)

Mixed
(OPTIONAL)

Zones
1-4
5-8

Reserved				Gnd/Grn
Reserved				Signal/Blk
Reserved				+5V/Red
Common				Discharge Air
PO/Open				Discharge Air
PC/Closed				Return Air
Common				Return Air
PO/Open				Mixed Air
PC/Closed				Mixed Air
Common				Zone 1 or 5
PO/Open				Zone 1 or 5
PC/Closed				Zone 2 or 6
Common				Zone 2 or 6
PO/Open				Zone 3 or 7
PC/Closed				Zone 3 or 7
				Zone 4 or 8
				Zone 4 or 8

Indoor/Relay Panel — Comm Outdoor — Comm Zone Sensor/3rd Zone Panel — 24V Trans. — Static/Press

Zone Dampers — Sensors — Temperature — Non Comm Zone Sensor

Zone 1 or 5, Zone 2 or 6, Zone 3 or 7, Zone 4 or 8

D B D B — D R B R B

Comm

ENT

CNT06430
24VAC 50/60Hz
1.5VA
18in-lb(2Nm) 60s
Made in Switzerland
Trane US, Inc.
MANUAL
GEAR
RELEASE

COM

Damper(s)

Zone Panel
(Zones 1-4)

Non-Communicating Zone Sensor(s)
(ZZSENSAL0400A)

B R D

Indoor Temperature

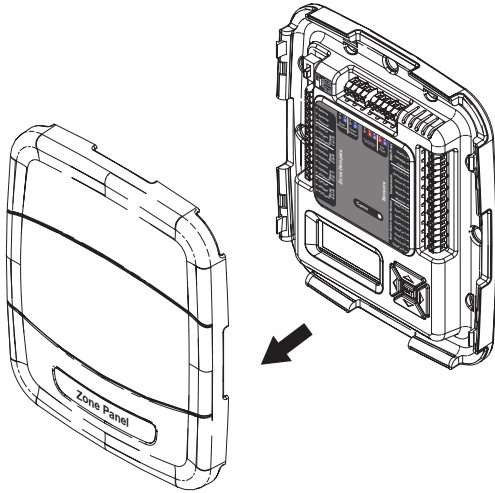69°

6:00 PM

Cooling   Heating

Heat to:

70°

43°

63

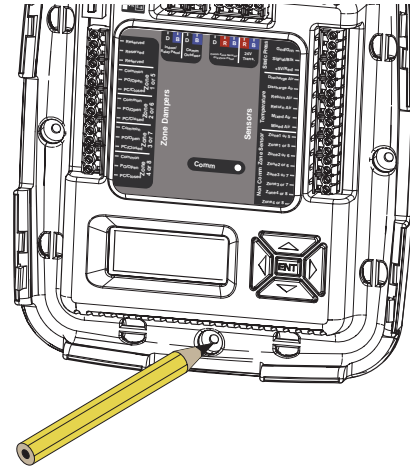Communicating Zone Sensor(s)
*ZONE940AC52ZA

5

Section 3. Installation

1A Preparation

The unit's rugged design allows installation in closet, attic or other non-condensing locations free from obstructions or other hazards.
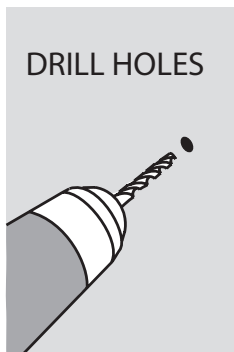
Remove cover by grasping at edges and gently pulling the cover straight towards you. It should release without much effort.

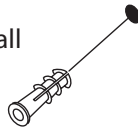Mark four holes on the wall using the base as a template. A level may be used to ensure accuracy.

1B Mount Panel

DRILL HOLES

1/8" for screws into studs
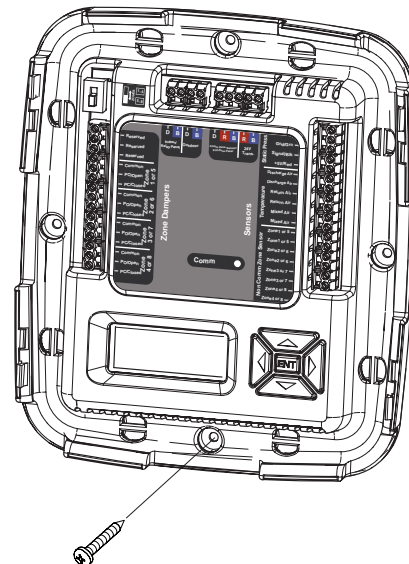
3/16" for drywall anchors

Mounting to studs: Drill 1/8" pilot holes in the four locations marked above.

Mounting to drywall:
If mounting to drywall with no studs behind it, enlarge pilot holes to 3/16" for anchors (included with the control).

Gently tap anchors into the holes.

Attach base to wall using four screws provided. Do not overtighten.

3.1 General Wiring Considerations

Wires may enter at any of 8 locations

Wires may enter the Zone Panel through openings on each corner and at the center of each side.

Necessary wire lengths should be considered when determining entry points.
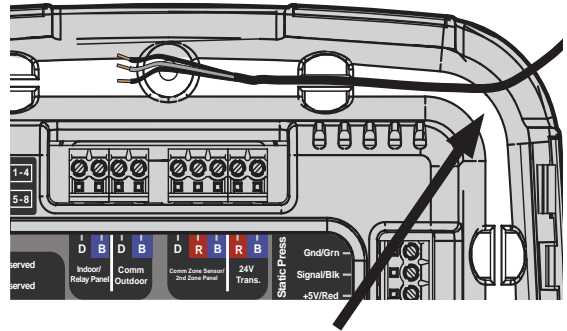
Route wires into "Raceways"

Run wires within the recessed wire "raceway". Be sure there is ample length to reach the connectors.
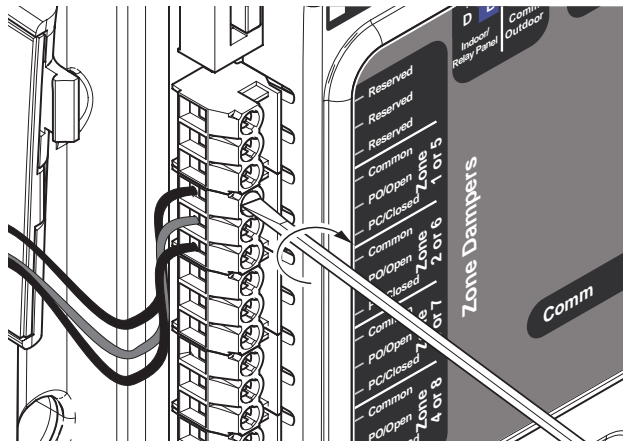
Using 1/8" blade screwdriver, attach all wires securely to the proper terminals on the Zone Panel. (See the Field Wiring Diagrams in the following section.)

NOTE: The wire terminal blocks may be removed for convenience in wiring. Ensure the terminal block properly aligns with the pins when resetting.

Secure all wires with the supplied wire ties.
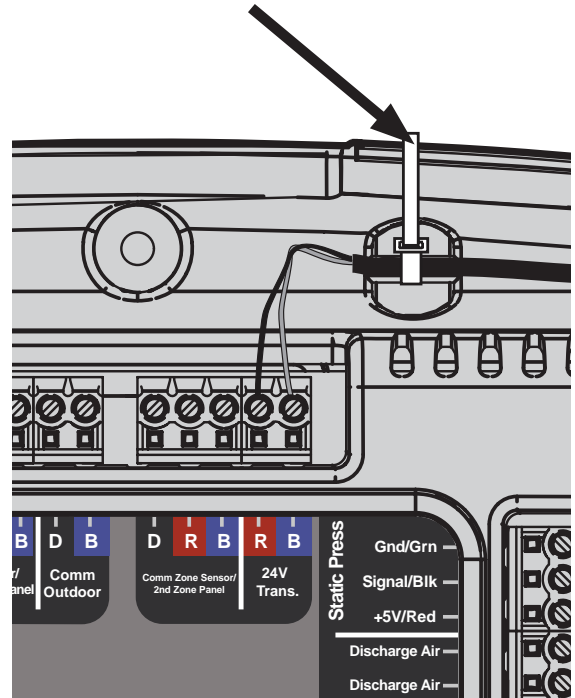
2 Observe Terminal Locations

KEY	Identification
A	Zone Dampers
B	Reserved
C	Primary Panel or Secondary Panel
D	From Indoor Unit or Relay Panel
E	To Communicating Outdoor Unit

KEY	Identification
F	Communicating Zone Sensors / 2nd Zone Panel
G	Dedicated 24V Transformer
H	Static Pressure Sensors
I	Temperature Sensors
J	Non-Communicating Zone Sensors
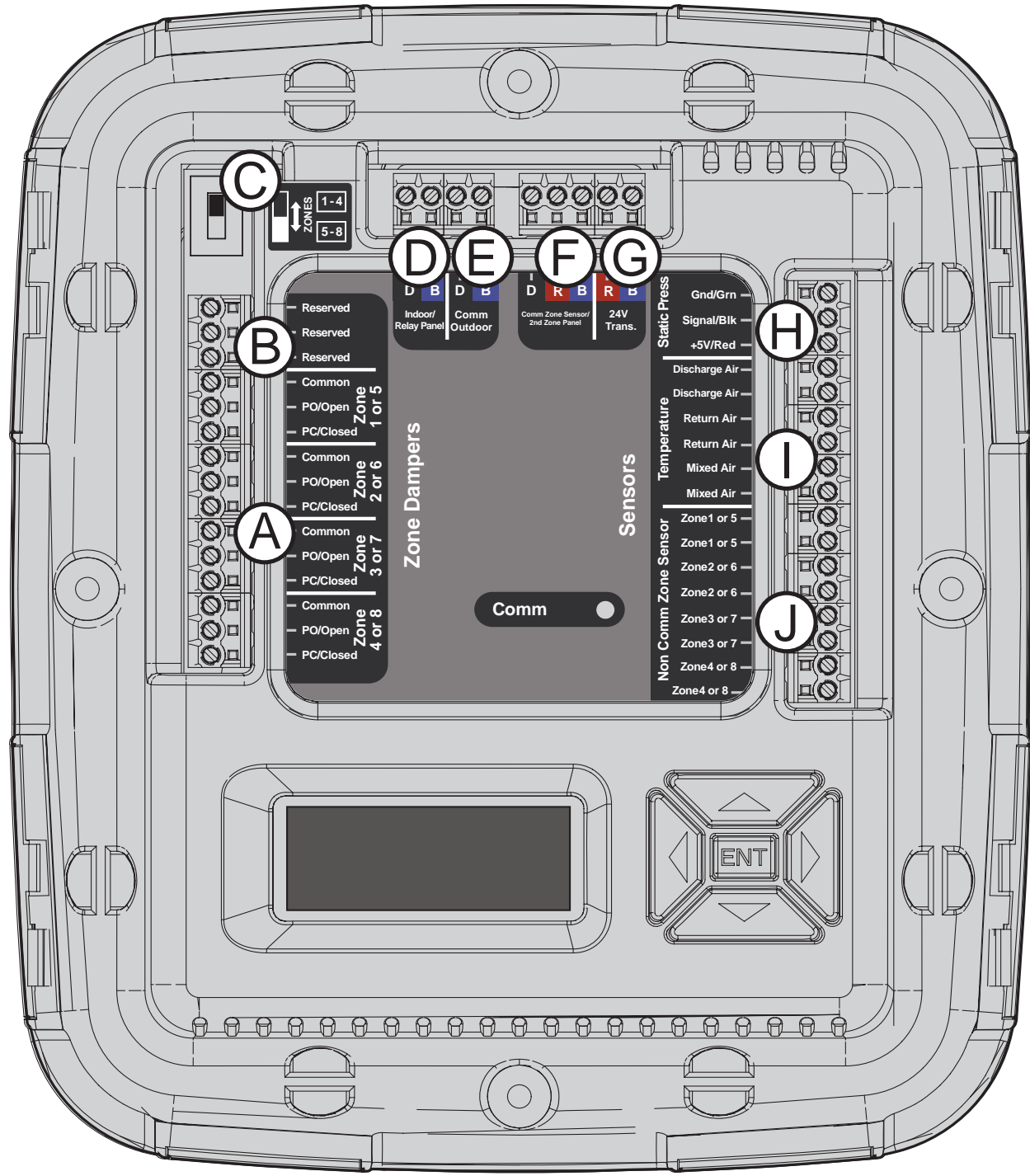
3   Mount Discharge Temperature Sensor

REQUIRED: A Discharge Temperature Sensor is required.

The Discharge Temperature Sensor (DTS) must be mounted a minimum of 8" above the edge of the supply duct (additional distance is preferred when possible). In addition, the DTS must be 2" above the Static Pressure Probe if used. Locate the DTS in an area of the discharge air duct where less air turbulence is expected. Avoid dead air areas where representative discharge air temperatures may not exist.

OPTIONAL: A return air sensor (SEN 00462) may be installed to monitor the return air temperature at the indoor unit. The mixed air sensor (SEN 00462) is used to monitor mix air when using bypass (future use).
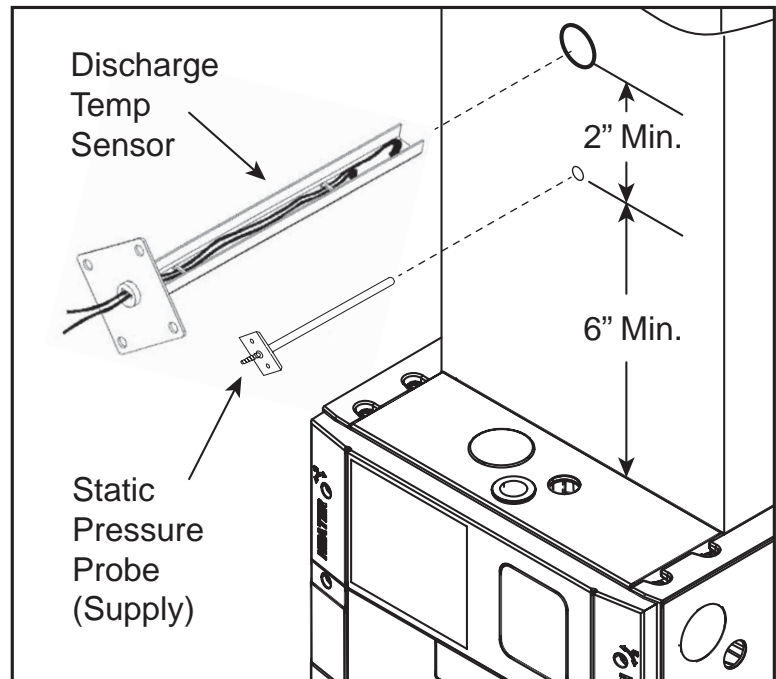
Determine the proper positioning of the DTS as follows:

- If a radiant heat source such as an electric heater is in line of sight from the thermistor, position the sensor so that the black thermistor faces away from the radiant heat source. (This will prevent a false reading due to the radiant effect on the thermistor.)

Drill a hole for mounting the DTS. A minimum hole size of 7/8" will be required.

The mounting plate can be used as a template to locate the four screw holes.
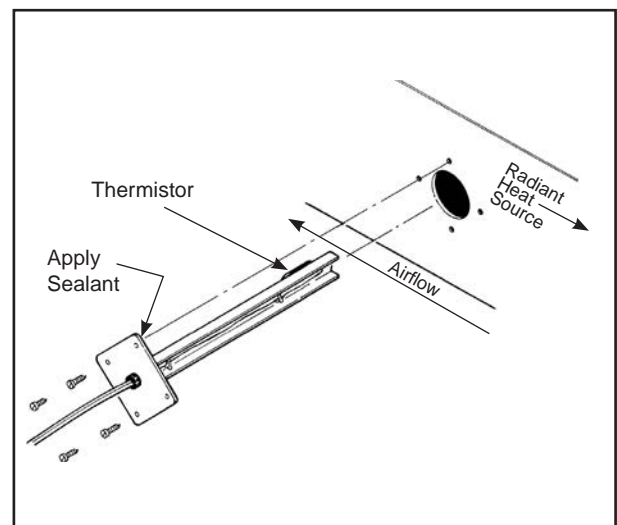
4 | Mount Supply Air and Return Air Static Pressure Probes

OPTIONAL: Static Pressure probes are only required when using Auto Zone Sizing.

The supply static pressure sensor must be mounted a minimum of 6" above the unit cabinet and the return probe must be mounted a minimum of 6" below the unit cabinet. Additional distance from the cabinet is preferred when possible. Mount the probes in a central area of duct away from turns, transitions, take offs or other areas of potential turbulence.

Drill a hole of 1/4" minimum to accept the Static Pressure probes.

Insert and mount the sensor as shown. Insulate the sensor to prevent condensation.

NOTE: The static probes are used for Automatic Zone Sizing and are placed outside the Coil and Electronic Air Cleaner (if used). The static pressure reading references external duct static; not the overall system static imposed upon the blower motor.

Discharge Temp Sensor

2" Min.

6" Min.

Static Pressure Probe (Supply)

Static Pressure Probe (Return)

6" Min.

18-HD66D1-3
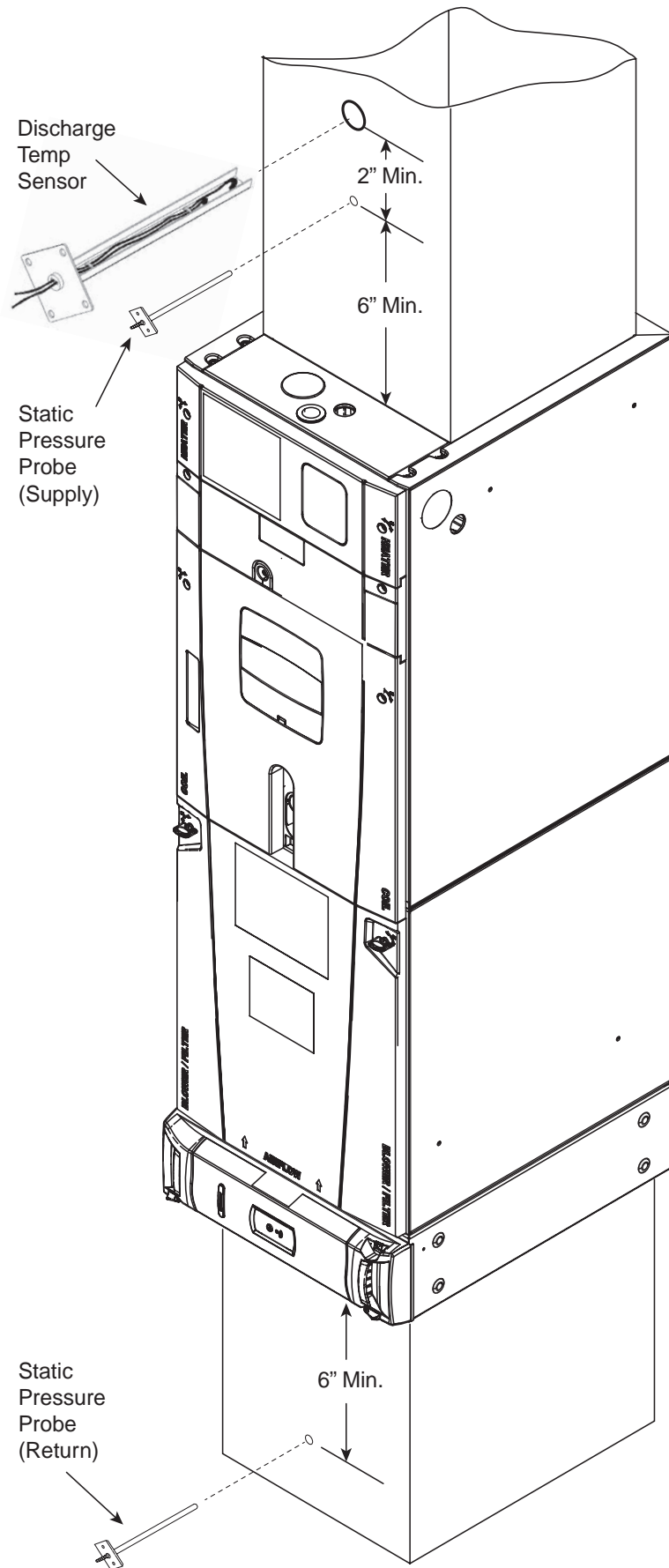
5 Mount Static Pressure Transducer Enclosure

Mount the Static Pressure Transducer Enclosure in an area between the two static probes. The location should be easily accessible, and in a position where the tubing can reach both static pressure probes.
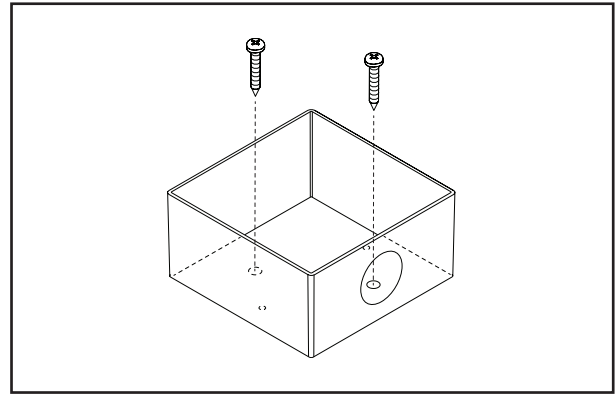
6 Connect Static Pressure Tubing

NOTE: Cut tubing to the proper length for the supply and return static pressure probes.

Attach the tubing to each of the static pressure probes and route the tubing back to the enclosure. Support the tubing to eliminate any kinks. Slide the return & supply tubing through the hole in the enclosure.

Attach the tubing to the Pressure Transducer. The tube from the supply duct will go on the bottom barb of the transducer.

The tube from the return duct will go on the top barb of the transducer (the top barb is marked with a "–" sign).

Install a tubing clamp on each of the Static Pressure Transducer tubing connectors.

Mount the Pressure Transducer inside the enclosure using the two screws as shown.

Ensure the tubing is properly supported and not kinked in any location.

Route wiring through hole in enclosure.

Attach the tubing to the static pressure probes using the remaining tube clamps.

return tubing

supply tubing

Note: Tubing must be connected as shown for proper operation

tubing clamp

11
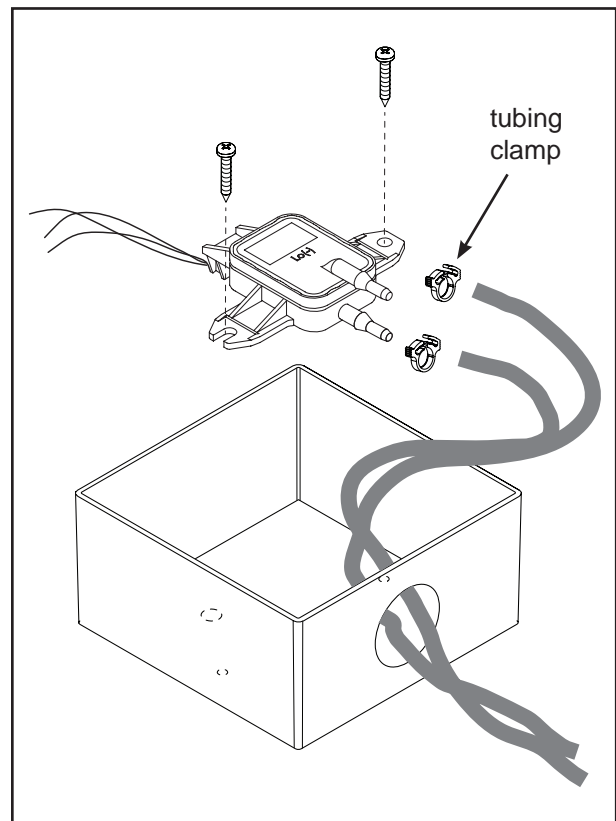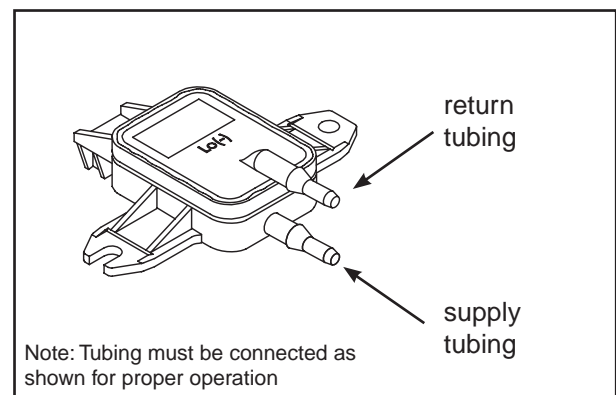
7   Connect Temperature Sensor Wires

Connect the required **Discharge Air** Temperature Sensor wires to the terminals marked "Discharge Air" as shown at right. Use a dedicated wire bundle.

Temperature Sensors		
Terminal Name	Description	Color Used:
Discharge Air	Discharge Air Sensor	
Discharge Air	Discharge Air Sensor	
Return Air	Optional Return Air Sensor	
Return Air	Optional Return Air Sensor	
Mixed Air	Optional Mixed Air Sensor	
Mixed Air	Optional Mixed Air Sensor	
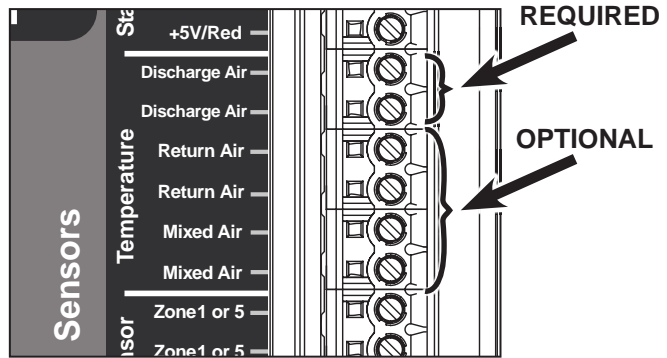
OPTIONAL: If using **Return Air** or **Mixed Air** temperature sensors, connect their wires to "Return Air" or "Mixed Air" respectively.

NOTE: Wiring for all temperature sensors must be run in bundles separate from other 24 VAC circuits.

8   Connect Static Pressure Transducer Wires

Connect the Green wire from the Static Pressure transducer to the terminal labeled "Gnd/Grn."

Connect the Black wire from the Static Pressure transducer to the terminal labeled "Signal/Blk."

Connect the Red wire from the Static Pressure transducer to the terminal labeled "+5V/Red."

Place the cover on the Pressure Transducer Enclosure once the tubing is attached and wiring is complete.

Static Pressure Sensor		
Terminal Name	Description	Color Used:
Gnd/Grn	Ground	
Signal/Blk	Output Signal (5VDC)	
+5V/Red	Power (5VDC)	
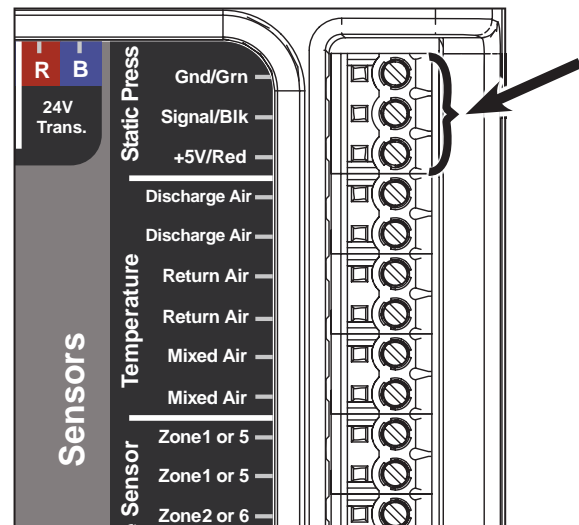
NOTE: Wiring for the pressure sensor must be run in bundles separate from other 24 VAC circuits.

9   Connect Communicating Indoor Unit/Relay Panel

Connect the Indoor Unit or Relay Panel B and D low voltage wiring to the Zone Panel's "Indoor/Relay Panel" B and D terminals.

Indoor Unit or Relay Panel Connections		
Terminal Name	Description	Color Used:
D	Data	
B	Common	
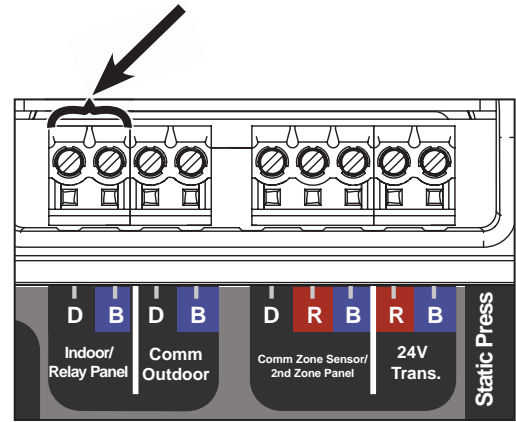
NOTE: R from the Indoor Unit/Relay Panel is not connected because power is provided from a field supplied 24VAC transformer.

10   Connect Wiring to Communicating Outdoor Unit

The Zone Panel provides an optional low voltage connection point for a communicating outdoor unit. The communicating outdoor requires B and D from one location; this can either be from the indoor unit or the Zone Panel.

NOTE: If a non-communicating outdoor unit is installed, these connections will not be used.

Outdoor Unit Connections		
Terminal Name	Description	Color Used:
D	Data	
B	Common	
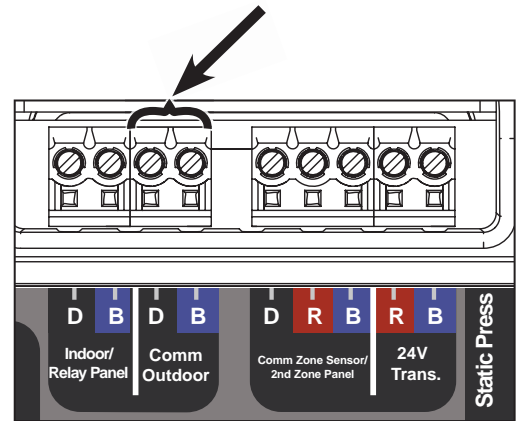
11   Connect Wiring to Communicating Zone Sensors and 2nd Zone Panel (if used)

Connect wiring (D, R, B) between each Communicating Zone Sensor using the provided clamp-style wire connectors. If required, a 2nd Zone Panel can also be connected.

Power Supply Connections		
Terminal Name	Description	Color Used:
D	Data	
R	24V Hot	
B	Common	

See Communicating Zone Sensor Installer's Guide for setup information
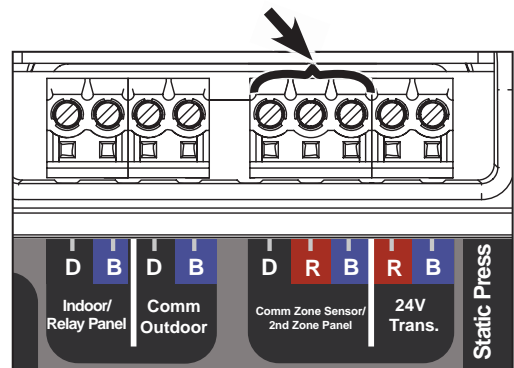
12   Mount the Zone Panel 24V Power Supply

A separate, field-supplied 24 volt transformer is required to power the Zone Panel, communicating sensors and dampers. VA sizing of the transformer will be dependant on the total VA of all installed zone panels, communicating sensors and zone dampers. Connect this dedicated 24 volt source to the R and B terminals.

NOTE: To prevent possible communication errors, connect the B/common of the field-supplied Zone Panel transformer to the indoor unit B/common or equipment ground.

Power Supply Connections		
Terminal Name	**Description**	**Color Used:**
R	24V Hot	
B	Common	

EXAMPLE:

Transformer Sizing Example (8 Zone System, 1 Damper per Zone)			
Component	**Qty**	**VA (ea)**	**Total VA**
Zone Panel	2	2	4
Zone Dampers*	8	1.5	12
Communicating Sensor	4	2	8
Minimum Transformer VA Required			**24**

*Add the VA of each communicating sensor
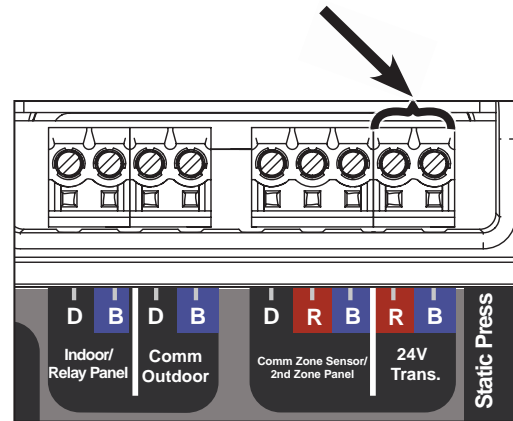
13   Connect the Dampers

The dampers will have the same terminal designation as the Zone Panel.

For each damper:
- Connect Common from the damper to Common on the Zone Panel.
- Connect PO/Open from the damper to PO/Open on the Zone Panel.
- Connect PC/Close from the damper to PC/Close on the Zone panel.

Repeat this for each damper installed (see the damper installer's guide).
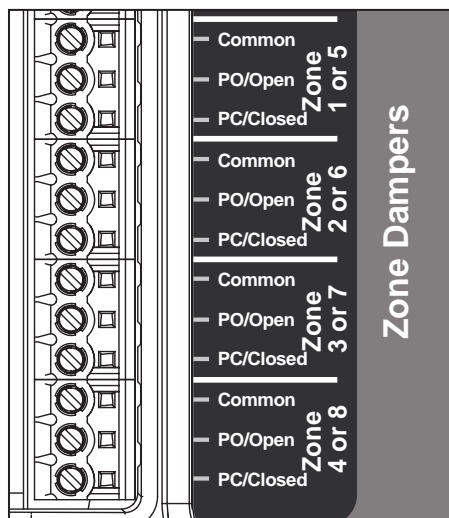
Zone Dampers			
Terminal Name		**Description**	**Color Used:**
	Reserved	Common	
	Reserved	Power Open	
	Reserved	Power Close	
Zone 1 or 5*	Common	Common	
	PO/Open	Power Open	
	PC/Close	Power Close	
Zone 2 or 6*	Common	Common	
	PO/Open	Power Open	
	PC/Close	Power Close	
Zone 3 or 7*	Common	Common	
	PO/Open	Power Open	
	PC/Close	Power Close	
Zone 4 of 8*	Common	Common	
	PO/Open	Power Open	
	PC/Close	Power Close	

* Zones 5–8 are only when a second zone panel is used.

NOTES:
- 60 second drive dampers are the default. 15-60 second dampers can be used, timing must be set at the 950 Control.
- Up to 4 dampers may be used per zone (6 VA Max.).
- Mixing dampers from multiple manufacturers in the same zone is not permitted.

14 Connect Non-Communicating Zone Temperature Sensors

If using non-communicating zone temperature sensors, connect them to the non-communicating zone terminal block. These are two wire sensors and are not polarity sensitive. Attach each sensor to its respective zone.

NOTE: When using communicating zone sensors, the non-communicating indoor terminal block will not be used.

IMPORTANT: If using the 950 Control as Zone 1, do not connect a non-communicating zone sensor to Zone 1 slot.
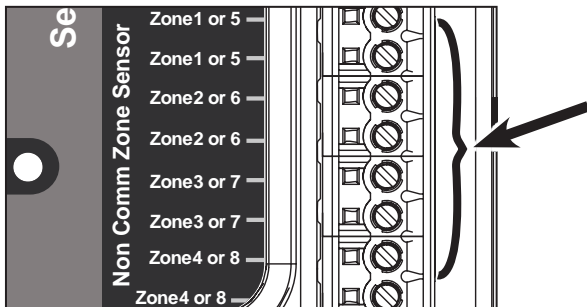
Non-Communicating Indoor Temperature Sensors		
Terminal Name	**Description**	**Color Used:**
Zone 1	Non-Communicating Zone Temp Sensor	
Zone 1	Non-Communicating Zone Temp Sensor	
Zone 2	Non-Communicating Zone Temp Sensor	
Zone 2	Non-Communicating Zone Temp Sensor	
Zone 3	Non-Communicating Zone Temp Sensor	
Zone 3	Non-Communicating Zone Temp Sensor	
Zone 4	Non-Communicating Zone Temp Sensor	
Zone 4	Non-Communicating Zone Temp Sensor	

15 Zone Switch Position

Set the Zone Switch to the up position if only one zone panel is used (4 zones or less).

If two panels are used (5 or more zones), the zone switch must be moved down on the second zone panel (the panel that is controlling zones 5 through 8).

NOTE: If the Zone Switch position is changed after power has been applied, an additional Zone Panel will be created. Use the Summary Screen in the 950 Control to remove the offline device.
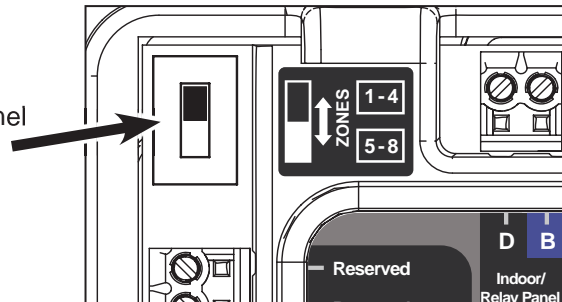
Section 4. Zoning Setup

Required Steps before enabling zoning:
1) Zone Panel must be powered (24VAC transformer)
2) Zone Panel must be connected to communicating bus (D, B)
3) All non-communicating zone temperature sensors must be connected to corresponding zone slots
4) All communicating zone temperature sensors must be addressed to corresponding zone number
5) All dampers should be installed and connected to corresponding zone slot
6) Discharge Temperature Sensor must be connected
7) Install and wire Differential Static Pressure Sensor and probes (only required for Auto Zone Sizing)

STEP 1 - Enable Zoning
Enter the Standard Installer Setup section on the 950 Control:

Home screen --> Menu --> Service --> Technician Access* --> Proceed --> Installer Setup --> Standard

Move through the Standard Installation Set Up options and Enable Zoning on the last screen.

Important: Must use a Trane/American Standard manufactured indoor unit with a variable speed blower. If a TAM8 air handler is being used, verify the Airflow Mode selected on the air handler CDA is set to Constant CFM.

STEP 2 - Damper Travel Time
Select the travel time that matches the dampers.

NOTE: Trane and American Standard dampers use a 60-second travel time.

NOTE: The zone control can handle many types of dampers, but all dampers in the system must have the same drive time (15 to 60 seconds) and must be power open/power close. Spring controlled dampers are not allowed. See the damper installation guide for additional information.

STEP 3 - Auto Detect Dampers
The zone control will send out a signal to open and close the dampers when "Yes" is selected. The control will see the load on each damper slot and automatically configure the number of zones with dampers detected.

STEP 4 - Manually Detect Dampers
The dampers will be automatically checked if auto damper detection was selected.

The technician will need to manually select the appropriate dampers if auto damper detection is not used.
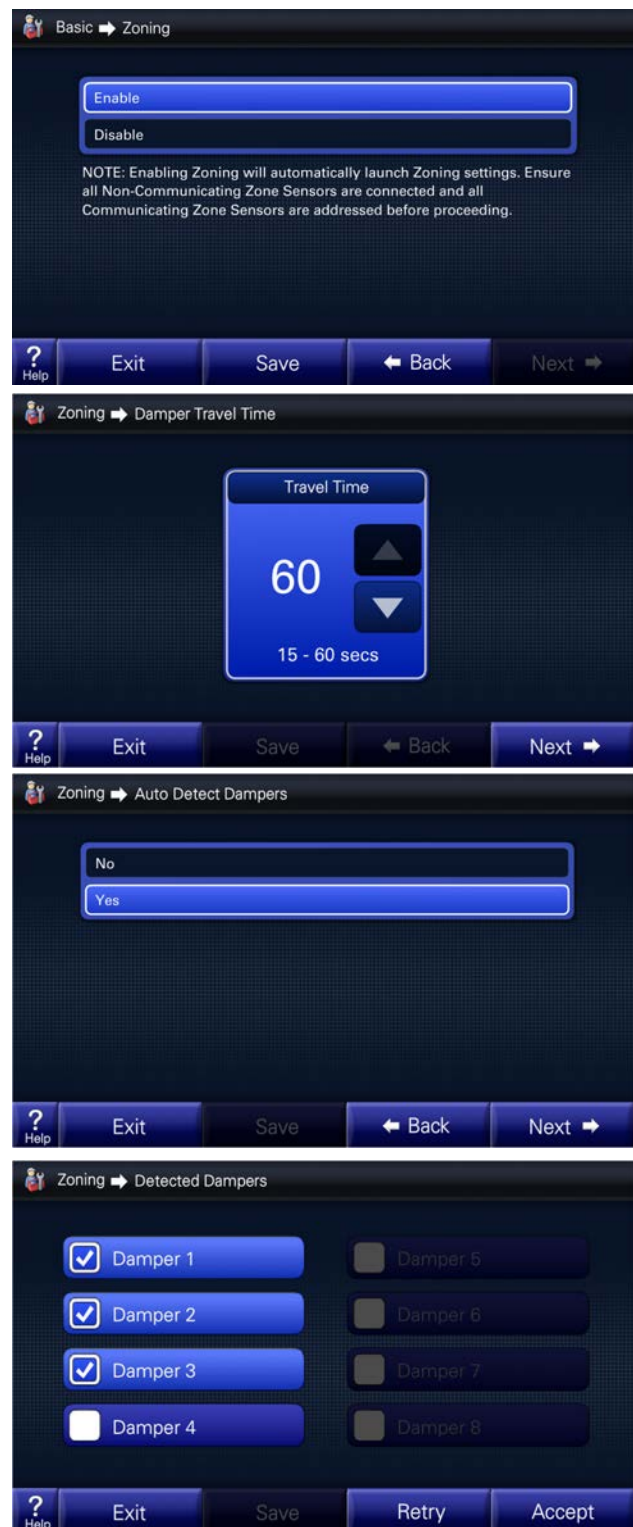
STEP 5 - Auto Zone Sizing
The zone control has the ability to energize the blower and modulate dampers to determine how much air each zone can handle.   The Static Pressure kit is required to use Auto Zone Sizing.

NOTE: All zones less than 25% cannot be a voting zone (See STEP 7). Press "Yes" to accept or press "No" to change the size of the zone.
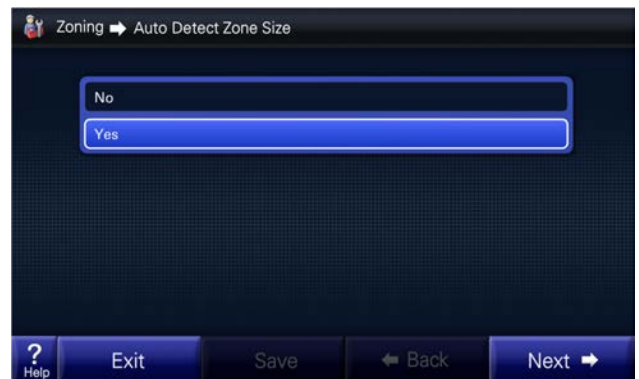
STEP 6 - Zone Size Adjustment

Auto zone sizing will calculate the amount of air that the ductwork for each zone can handle. There are three available options:

•   The **Normal** mode calculates zone sizes based on an average external duct static
•   The **Less Aggressive** option calculates on a lower external duct static and will deliver a reduced amount of air into each calling zone. This strategy provides a quieter air flow system, but increases the amount of excess air that must be managed. This may increase the amount of excess air that is relieved into other zones.
•   The **More Aggressive** option calculates on a higher external duct static and will deliver an increased amount of air into each calling zone. This strategy may produce a noisier air flow system, but reduces the amount of excess air that must be managed.   This may reduce the amount of excess air that is relieved into other zones.

It is recommended to begin with the **Normal** mode.   You can re-run auto zone sizing with **Less Aggressive** if a customer is concerned about air noise, or at **More Aggressive** if a customer is concerned about relief air or simply desires higher velocity air flow rates.

NOTE: Auto Zone Sizing typically takes 10 to 15 minutes for 2 – 4 zone systems and up to 30 minutes for 5 – 8 zone systems.

If Auto Zone Sizing returns an error, follow the on-screen prompts for diagnosing the failure.

The auto zone sizing process calculates and displays the size of each zone. The technician can select and modify any zone setting to satisfy the homeowners air flow desires.

MANUAL ZONE SIZING

Auto Zone Sizing is the optimal way to determine the amount of air flow into each zone, but this process is not mandatory. Zone sizes can be set manually using the following guidelines.

EXAMPLE (highlighted below): A 2-zone, 3-ton AC system is configured to move 1200 CFM. Zone 1 has a 12" zone damper and Zone 2 has a 16" zone damper.

The Normal sizing strategy would set Zone 1 at 43% and Zone 2 at 81%. If Zone 1 had two dampers (6" and 10") the zone size % should be added together (11% & 33%) and set to 44%.

Damper Diameter	500 CFM Less Aggressive	Normal	More Aggressive
4"	9%	12%	16%
6"	19%	27%	35%
7"	26%	36%	46%
8"	34%	48%	62%
9"	44%	61%	79%
10"	54%	78%	98%
12"	79%	100%	100%
14"	100%	100%	100%
16"	100%	100%	100%
18"	100%	100%	100%

Damper Diameter	600 CFM Less Aggressive	Normal	More Aggressive
4"	7%	10%	13%
6"	16%	23%	29%
7"	22%	30%	38%
8"	29%	40%	52%
9"	36%	51%	66%
10"	45%	65%	82%
12"	66%	87%	117%
14"	87%	100%	100%
16"	100%	100%	100%
18"	100%	100%	100%

Damper Diameter	700 CFM Less Aggressive	Normal	More Aggressive
4"	6%	9%	11%
6"	14%	19%	25%
7"	19%	26%	33%
8"	25%	34%	44%
9"	31%	44%	56%
10"	39%	56%	70%
12"	56%	74%	100%
14"	74%	100%	100%
16"	99%	100%	100%
18"	100%	100%	100%

Damper Diameter	800 CFM Less Aggressive	Normal	More Aggressive
4"	6%	8%	10%
6"	12%	17%	22%
7"	16%	23%	29%
8"	22%	30%	39%
9"	27%	38%	49%
10"	34%	49%	61%
12"	49%	65%	88%
14"	65%	94%	100%
16"	86%	100%	100%
18"	100%	100%	100%

Damper Diameter	900 CFM Less Aggressive	Normal	More Aggressive
4"	5%	7%	9%
6"	11%	15%	19%
7"	14%	20%	26%
8"	19%	27%	34%
9"	24%	34%	44%
10"	30%	43%	54%
12"	44%	58%	78%
14"	58%	84%	100%
16"	77%	100%	100%
18"	100%	100%	100%

Damper Diameter	1000 CFM Less Aggressive	Normal	More Aggressive
4"	4%	6%	8%
6"	10%	14%	18%
7"	13%	18%	23%
8"	17%	24%	31%
9"	22%	31%	40%
10"	27%	39%	49%
12"	40%	52%	70%
14"	52%	76%	96%
16"	69%	98%	100%
18"	90%	100%	100%

Damper Diameter	1100 CFM Less Aggressive	Normal	More Aggressive
4"	4%	5%	7%
6"	9%	12%	16%
7"	12%	16%	21%
8"	16%	22%	28%
9"	20%	28%	36%
10"	25%	35%	45%
12"	36%	47%	64%
14"	47%	69%	87%
16"	63%	89%	100%
18"	82%	100%	100%

Damper Diameter	1200 CFM Less Aggressive	Normal	More Aggressive
4"	4%	5%	7%
6"	8%	11%	15%
7"	11%	15%	19%
8"	14%	20%	26%
9"	18%	25%	33%
10"	23%	33%	41%
12"	33%	43%	58%
14"	43%	63%	80%
16"	58%	81%	100%
18"	75%	100%	100%

Damper Diameter	1300 CFM Less Aggressive	Normal	More Aggressive
4"	3%	5%	6%
6"	7%	10%	13%
7"	10%	14%	18%
8"	13%	18%	24%
9"	17%	23%	30%
10"	21%	30%	38%
12"	30%	40%	54%
14"	40%	58%	73%
16"	53%	75%	96%
18"	69%	96%	100%

Damper Diameter	1400 CFM Less Aggressive	Normal	More Aggressive
4"	3%	4%	6%
6"	7%	10%	13%
7"	9%	13%	16%
8"	12%	17%	22%
9"	16%	22%	28%
10"	19%	28%	35%
12"	28%	37%	50%
14"	37%	54%	68%
16"	49%	70%	89%
18"	64%	89%	100%

Damper Diameter	1500 CFM Less Aggressive	Normal	More Aggressive
4"	3%	4%	5%
6"	6%	9%	12%
7"	9%	12%	15%
8"	11%	16%	21%
9"	15%	20%	26%
10"	18%	26%	33%
12"	26%	35%	47%
14"	35%	50%	64%
16"	46%	65%	83%
18"	60%	83%	100%

Damper Diameter	1600 CFM Less Aggressive	Normal	More Aggressive
4"	3%	4%	5%
6"	6%	8%	11%
7"	8%	11%	14%
8"	11%	15%	19%
9"	14%	19%	25%
10"	17%	24%	31%
12"	25%	33%	44%
14"	33%	47%	60%
16"	43%	61%	78%
18"	56%	78%	100%

Damper Diameter	1800 CFM Less Aggressive	Normal	More Aggressive
4"	2%	3%	4%
6"	5%	8%	10%
7"	7%	10%	13%
8"	10%	13%	17%
9"	12%	17%	22%
10"	15%	22%	27%
12"	22%	29%	39%
14"	29%	42%	53%
16"	38%	54%	69%
18"	50%	69%	89%

Damper Diameter	1900 CFM Less Aggressive	Normal	More Aggressive
4"	2%	3%	4%
6"	5%	7%	9%
7"	7%	9%	12%
8"	9%	13%	16%
9"	11%	16%	21%
10"	14%	21%	26%
12"	21%	27%	37%
14"	27%	40%	50%
16"	36%	51%	66%
18"	47%	66%	84%

Damper Diameter	2000 CFM Less Aggressive	Normal	More Aggressive
4"	2%	3%	4%
6"	5%	7%	9%
7"	7%	9%	12%
8"	9%	12%	16%
9"	11%	15%	20%
10"	14%	20%	25%
12"	20%	26%	35%
14"	26%	38%	48%
16"	35%	49%	63%
18"	45%	63%	80%

Damper Diameter	2200 cfm Less Aggressive	Normal	More Aggressive
4"	2%	3%	4%
6"	4%	6%	8%
7"	6%	8%	10%
8"	8%	11%	14%
9"	10%	14%	18%
10"	12%	18%	22%
12"	18%	24%	32%
14"	24%	34%	43%
16"	31%	44%	57%
18"	41%	57%	73%

ZONE SIZING EXAMPLE:

The zone size has a direct impact on system operation and homeowner comfort. The system uses zone sizes to determine the air handling capability of each zone and determines the amount of excess air that has to be managed. Incorrect zone sizes will undermine the performance and comfort levels within the space.

NOTE:
For zoning, the duct system should be sized to handle the peak load of each zone. Therefore, the duct system is typically sized larger than a conventional non-zoned application.

EXAMPLE:
A 4-zone system is installed on a two compressor system. Each zone can handle 40% of the system air flow.

All zones are set to off at the . The homeowner now turns one zone to cool and lowers the setting to 5 degrees below the current temperature. Since this zone can handle a maximum of 40% of the system capacity, the zone control will lock the system in first stage operation. There is no reason to move to second stage operation since all the additional air flow and capacity would be forced into non-calling zones.

The system would be allowed to energize second stage if another zone is calling. The total zone size would now be 80% and first stage operation may not be enough to satisfy this demand.

- On a two compressor system, the sum of the calling zone sizes must be at least 51% to enable second stage operation.
- On a single compressor, two stage system, the sum of the calling zone sizes must be at least 68% to enable second stage operation.
- On a two stage furnace, the sum of the calling zone sizes must be at least 66% to enable second stage operation.
- On a three stage furnace, the sum of the calling zone sizes must be at least 41% to enable second stage operation. Third stage is not inhibited.

STEP 7 - Voting Zones
A voting zone has the ability to turn on the HVAC system.

A non-voting zone has the ability to control the damper, but does not have the ability to turn on the system. A non-voting zone cannot keep the system running if all voting zones are satisfied.
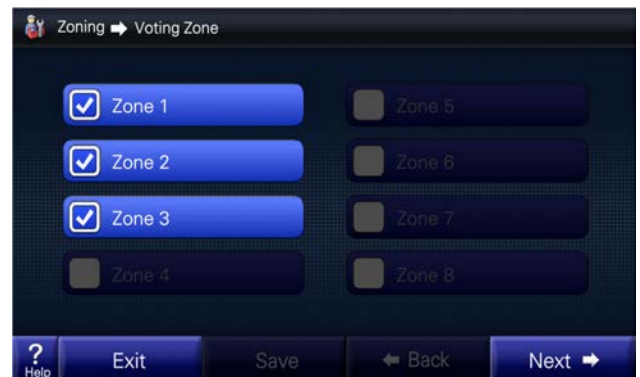
EXAMPLE:
A home has a 5-ton single stage AC system with 3 zones. Zone #1 is a 6 inch duct that feeds the laundry room. Since this zone is sized less than 25%, the zone is forced to non-voting and should not be allowed to energize the equipment. However, it should be allowed to control the temperature in the zone when another voting zone brings on the equipment.

All zones less than 25% cannot be a voting zone. Press "Yes" to accept or press "No" to change the size of the zone.

Zone 1 has been removed as a voting zone since it was sized less than 25%.
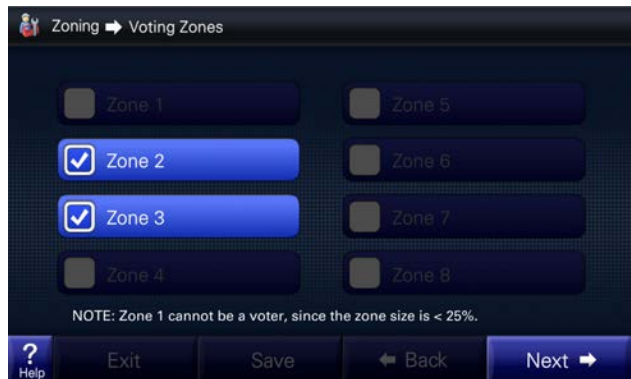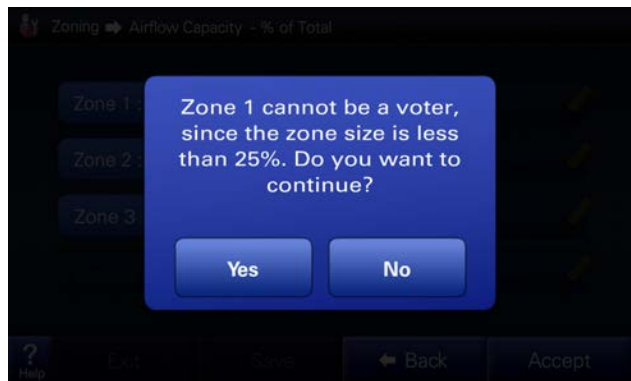
STEP 8 - Indoor Heating Airflow Offset%

The air flow offset is the difference between cooling and indoor heating (fossil/electric) air flow. The control uses this offset to calculate and manage excess air.

EXAMPLE:
The system is a 3-ton AC configured at 1200 CFM. The furnace is configured to move 960 CFM.

The heating air flow offset is 960 / 1200 or a reduction of 20%. Configure the control at -20%.

STEP 9 - Discharge Temperature Limit

If the discharge temperature exceeds the max/min limits the following occurs:

- Heating/cooling operation is defeated
- Indoor blower is cycled ON (VS blower runs at continuous fan speed)
- All supply dampers are driven full open

NOTE: Discharge Temperature Limit trips will create an alert (SOP.004.56) and heating/cooling operation is temporarily defeated. Once the discharge temperature is within max/min limits and the minimum off times has elapsed, zoning operation will resume and the alert will clear.

Discharge Temperature Limit Table			
Mode	**Normal**	**Extended**	**Min OFF Time**
Cooling	38	34	5
Compressor Heating Only	116	128	5
Compressor Heating w/ Electric Heat or Electric Heat Only	160	170	5
Compressor Heating w/ Hydronic Heat	135	145	5
Gas Furnance Heating	135	145	3
Oil Furnace Heating	160	170	3

STEP 10 - Exiting Zoning Setup

After saving the zoning settings a pop-up message will appear prompting the technician to associate temperature sensors to all zones before proceeding. If "Yes" is selected, the Zone Sensors screen will appear. If "No" is selected, the pop-up message will disappear and the technician can continue configuring the settings.

NOTE: All zones must have a temperature sensor assigned before exiting the Service Menu.
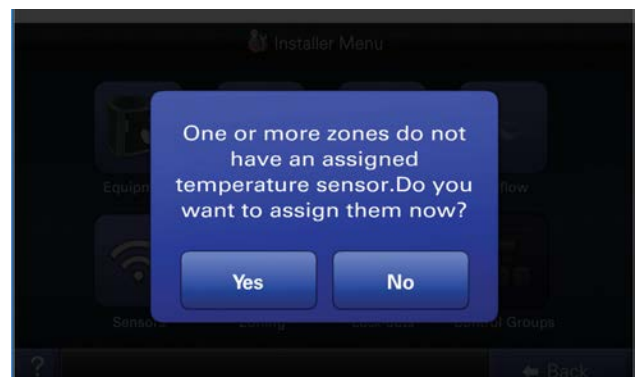
Section 5. Zone Sensor Setup

The Zone Sensors Screen is used to associate temperature sensors with zones. The Zone Sensor Setup Screen is compromised of two sections: Select Zone/Damper and Available Sensors.

STEP 1 - Select Zone/Damper
All enabled zones will be displayed in the left column of the Zone Sensor Setup. Select the zone to which a sensor will be assigned by touching it on the display screen.

Note: The onboard sensor of the 950 control is automatically assigned to Zone 1. All other zones sensors must be manually assigned.

STEP 2: Select an Available Sensor
Available zone sensors are displayed in the right column. Select a sensor by touching the white box. A check mark will indicate the sensor has been selected.

Note:
Communicating Sensors are displayed only if they are addressed the same as the selected zone. Non-Communicating Sensors are displayed only if they are wired to the corresponding zone slot.

STEP 3 - Confirm the Assisngment
Confirm the assignment of the selected sensor to the selected zone by pressing the "Assign" button.

STEP 4 - Assign Remaining Sensors
Repeat Steps 1-3 until all zones have been assigned a sensor.

STEP 5 - Exit Sensor Setup
When all zones have been assigned a sensor, press "Done."

Note: All zones must be assigned a temperature sensor before exiting the Service Menu.

Unassigning Sensors
STEP 1 - Select Zone
To unassign sensor, select the appropriate zone from the choices in the left column.

STEP 2 - Confirm Unassignment
Press the "Unassign" button to confirm that you are unassigning the sensor from the selected zone.

Section 6. Damper Test Mode

Damper Test Mode gives the user the ability to open specific dampers to verify the dampers are performing properly. Each damper can be driven independently or in any combination. The blower will operate during an active damper test. The blower speed is determined by the sum of the Zone Size's of each damper selected to be tested. Damper Test Mode will automatically timeout after 30 minutes or immediately if "Stop" is pressed.

Upon entering Damper Test Mode, all system operation will stop and each damper will be driven full open. Once a damper(s) is selected for test, the non-selected dampers will be driven fully closed.

Example (testing Zones 1 and 4):

- 4 Zone System
- Zone 1 = 25%, Zone 2 = 40%, Zone 3 = 25%, Zone 4 = 50%

Select Zone 1 and Zone 4. Press "Test" and confirm you want to run the test by pressing "Yes".

The dampers for Zone 1 and Zone 4 will remain full open and dampers for Zone 2 and Zone 3 will drive closed. The indoor blower speed will be 75%.

Zone 1 (25%) + Zone 4 (50%) = 75%

Pressing "Stop" will shut down the blower and the dampers will drive open.

A message will be displayed at the bottom of the screen indicating the dampers are being reset. During this reset period (half the damper travel time) no additional tests can be run.
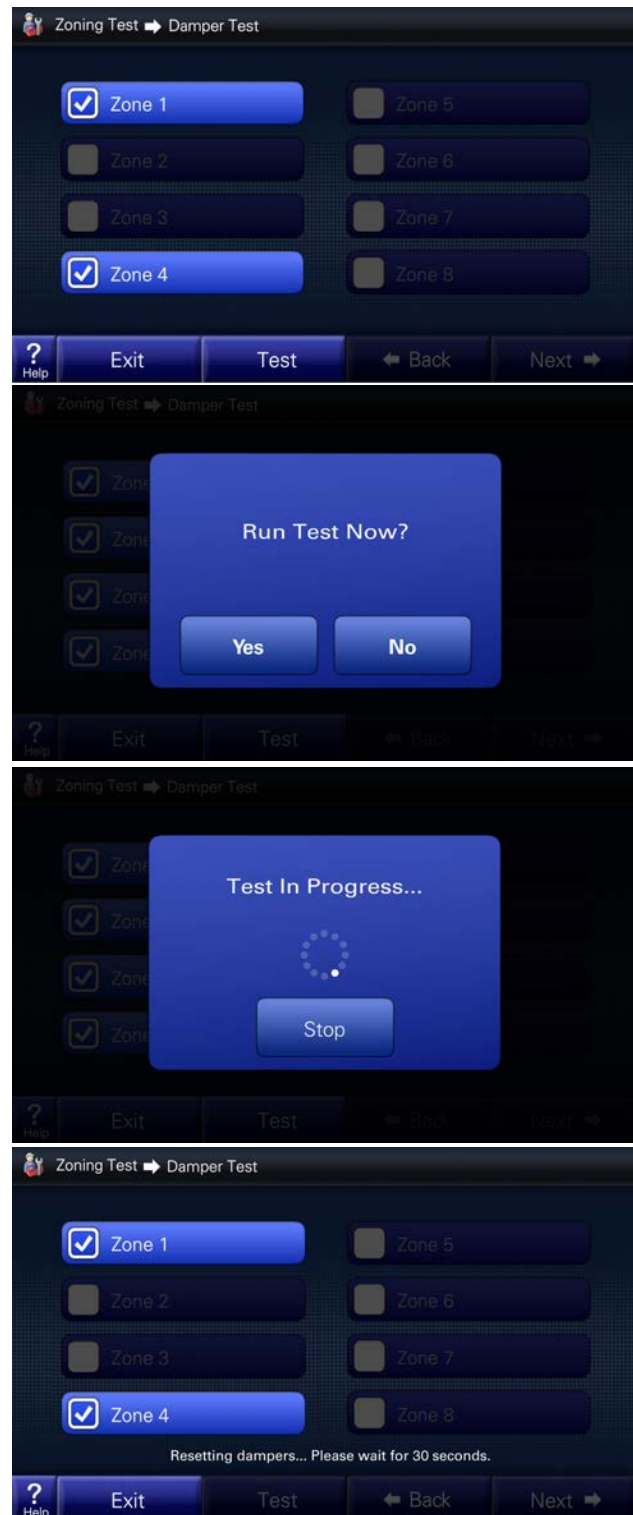
**Standard Menu Tree
(Zoning Enabled)**

Initial Power Up

```
****************
    ACQUIRING
      DATA
****************
```

```
ENT
```

```
SYSTEM STATUS  ↓
HEATING STG=NONE
CFM=000%
DSP=0.30
```

```
SYSTEM STATUS  ↕
CFM=000%
DSP=0.30
SUPPLY AIR=063*
```

Before Zoning Enabled

```
ZONING DISABLED
----------------
SEE MAIN CONTROL
FOR DETAILS
```

```
SYSTEM STATUS  ↕
DSP=0.30
SUPPLY AIR=063*
RETURN AIR=OPN
```

```
SYSTEM STATUS  ↕
SUPPLY AIR=063*
RETURN AIR=OPN
DELTA(SA-RA)OPN
```

```
SYSTEM STATUS  ↕
RETURN AIR=OPN
DELTA(SA-RA)OPN
MIXED AIR=OPN
```

```
SYSTEM STATUS  ↑
DELTA(SA-RA)OPN
MIXED AIR=OPN
BYPASS=000%
```

```
‹ ZONES ›

[▲more menus▼]
```

```
ZONE STATUS  ↓
ZONE=1 SIZE=051%
MODE=OFF
ACTIVE CALL=NO
```

```
ZONE STATUS  ↓
ZONE=8 SIZE=051%
MODE=OFF
ACTIVE CALL=NO
```

```
ZONE STATUS  ↕
MODE=OFF
ACTIVE CALL=NO
DAMPER=100%
```

```
ZONE STATUS  ↕
MODE=OFF
ACTIVE CALL=NO
DAMPER=100%
```

8 ZONES

```
ZONE STATUS  ↑
ACTIVE CALL=NO
DAMPER=100%
RELIEVING=NO
```

```
ZONE STATUS  ↑
ACTIVE CALL=NO
DAMPER=100%
RELIEVING=NO
```

```
‹ INFORMATION ›

[▲more menus▼]
```

```
MODEL NUMBER
ZZONEPNLAC52ZAA
SERIAL NUMBER
1000WE0001
```

```
SOFTWARE INFO

VERSION=001
BUILD=1234567890
```

Section 8. Control Board Test Points

SEE
TABLE 2

SEE
TABLE 3

SEE
TABLE 4

SEE
TABLE 1

SEE
TABLE 6

SEE TABLE 5

* See Note
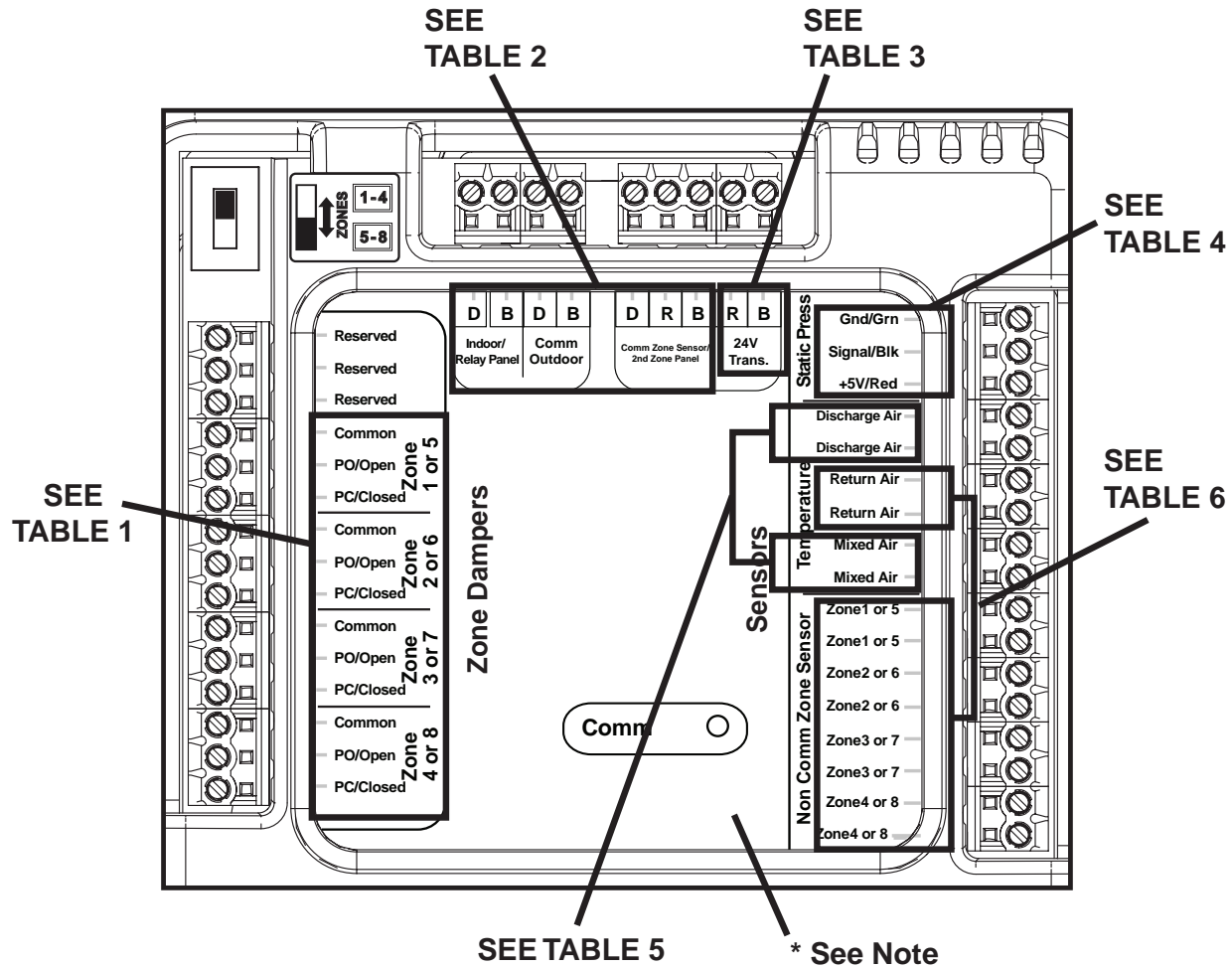
TABLE 1		
Zone Dampers		
Terminals	**Volts (AC)**	**Status**
Common & PO/Open	24	Damper drive open
Common & PO/Open	0	Damper not being driven
Common & PC/Close	24	Damper drive closed
Common & PC/Close	0	Damper not being driven

TABLE 2		
System Connections		
Terminals	**Volts (DC)**	**Communication Status**
D & B	12	Good Communication
D & B	16	No Communication
D & B	0	Grounded or no power

TABLE 3		
Power from Transformer		
Terminals	**Volts (AC)**	**Status**
R & B	18 – 30	Good
R & B	< 18	Low voltage
R & B	0	No voltage

* **Status** LED (non-functional) may be present on early production models.

TABLE 4	
Static Pressure Sensors	
Pressure (In WC)	**Volts (DC)** *Measured G to Blk*
0.08	0.4
0.11	0.45
0.16	0.55
0.21	0.65
0.27	0.75
0.32	0.85
0.37	0.95
0.43	1.05
0.48	1.15
0.53	1.25
0.59	1.35
0.64	1.45
0.69	1.55
0.75	1.65
0.80	1.75
0.85	1.85
0.91	1.95
0.96	2.05
1.01	2.15
1.07	2.25
1.12	2.35
1.17	2.45
1.25	2.6

TABLE 5			
Discharge/Mixed Air Temperature Sensors			
TEMP (deg. F)	**TEMP (deg. C)**	**Sensor Resistance (Ohms)**	**Volts (DC)**
200	93.4	829	0.41
195	90.8	895	0.44
190	87.8	982	0.48
185	85.1	1070	0.52
180	82.2	1170	0.56
175	79.7	1272	0.60
170	76.8	1397	0.65
165	73.9	1536	0.71
160	71.3	1678	0.76
155	68.5	1847	0.83
150	65.7	2033	0.90
145	62.8	2250	0.97
140	60.0	2489	1.05
135	57.3	2750	1.14
130	54.5	3037	1.23
125	51.8	3368	1.33
120	49.0	3749	1.44
115	46.2	4169	1.55
110	43.4	4654	1.67
105	40.6	5193	1.79
100	37.8	5819	1.92
95	35.0	6523	2.06
90	32.3	7322	2.20
85	29.5	8233	2.35
80	26.7	9282	2.50
75	23.9	10501	2.65
70	21.2	11849	2.80
65	18.4	13442	2.95
60	15.6	15294	3.11
55	12.8	17408	3.26
50	10.1	19842	3.40
45	7.2	22764	3.55
40	4.4	26104	3.69
35	1.7	29936	3.81
30	-1.1	34520	3.94
25	-3.9	39869	4.05
20	-6.6	46134	4.16

TABLE 6			
Non-Communicating & Return Air Sensors			
TEMP (deg. F)	**TEMP (deg. C)**	**Sensor Resistance (Ohms)**	**Volts (DC)**
100	37.8	5815	2.07
95	35.0	6527	2.21
90	32.2	7331	2.35
85	29.5	8248	2.50
80	26.7	9279	2.65
75	23.9	10497	2.80
70	21.1	11868	2.95
65	18.4	13455	3.10
60	15.6	15276	3.25
55	12.8	17430	3.39
50	10.1	19851	3.53
45	7.3	22710	3.67
40	4.5	26051	3.80
35	1.7	29994	3.92
30	-1.0	34446	4.03
25	-3.9	39909	4.14
20	-6.6	46134	4.24

Section 9. Troubleshooting

	Troubleshooting	
Symptom	**Possible Cause**	**Action**
COMM LED is not flashing the appropriate number of devices	Loss of 24VAC between power (R) and common (B)	Check for proper incoming 24VAC power at Zone Panel 24v Trans terminals
	One or more communicating devices is not communicating • ~12VDC between D & B = Proper communication • ~16VDC between D & B = Loss of communication • Less than ~12VDC between D & B = grounded or no power Note: Voltage may fluctuate while devices are transmitting on the communication bus	Access the Summary Table on the 950 Control to view the communication status of all discovered communicating devices. Troubleshoot the offline device utilizing the units service facts
COMM LED is flashing rapidly	One or more communicating devices has corrupted the communication traffic • ~12VDC between D & B = Proper communication • ~16VDC between D & B = Loss of communication	Fix/replace the communicating device which is causing the excessive communication traffic
COMM LED is steady "ON"	Zone Panel is not communicating • ~16VDC between D & B = Loss of communication	Check for open or grounded field wiring An Err 126 may be displayed on comfort control
Zoning Disabled is dispayed on the Zone Panel user interface	Zoning has not been enabled on the Comfort Control	On the control, enable zoning in the Installer Setup > Standard settings
	Zoning has been disabled due to a system fault	On the control, check for critical/major alerts in Diagnostic > Current Alerts
	Primary Zone Panel dip switch is set to Zones 5-8	Set dip switch of primary Zone Panel to Zones 1-4
Damper is open when damper should be closed	Damper not wired correctly	Verify damper wiring is connected and has not been reversed
	Damper actuator has failed	Replace damper actuator
	Damper blade is stuck/broke	Replace the damper assembly
Damper is closed when damper should be open	Damper not wired correctly	Verify damper wiring is connected and has not been reversed
	Damper actuator has failed	Replace damper actuator
	Damper blade is stuck/broke	Replace the damper assembly