ComfortLink™ II Installation Guide

TZONE950AC52ZA

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

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

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

IMPORTANT — This Document is customer property and is to remain with this unit.

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 manufacturer 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 1. Safety 1
Section 2. General Information 2
Section 3. Physical Installation 4
Section 4. Wiring 6
Section 5. System Setup 9
Section 6. Advanced Features 15
Section 7. Troubleshooting 19

NOTE: See the User's Guide for wireless setup information.

Section 2. General Information

2.1 Overview

The ComfortLink II Control is a communicating 7-inch color touch screen that provides an easy-to-use interface to the end user.

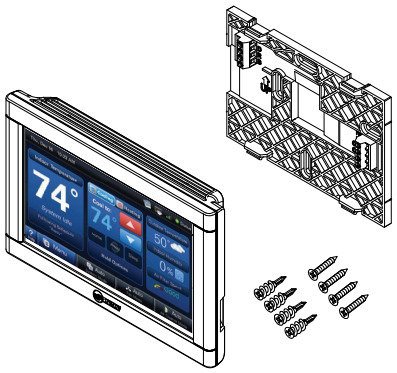
The Control is a communicating wall mounted control that allows a user to manage an HVAC and zoning system.

With the addition of the 24VAC Relay Panel, conventional HVAC systems can also be controlled.

2.2 Contents in Box

The following parts are included with this product:

1 - Control
1 - Sub-Base
4 - SnapSkru® Wall Anchors
4 - 1" Screws
1 - Installer's Guide
1 - User's Guide



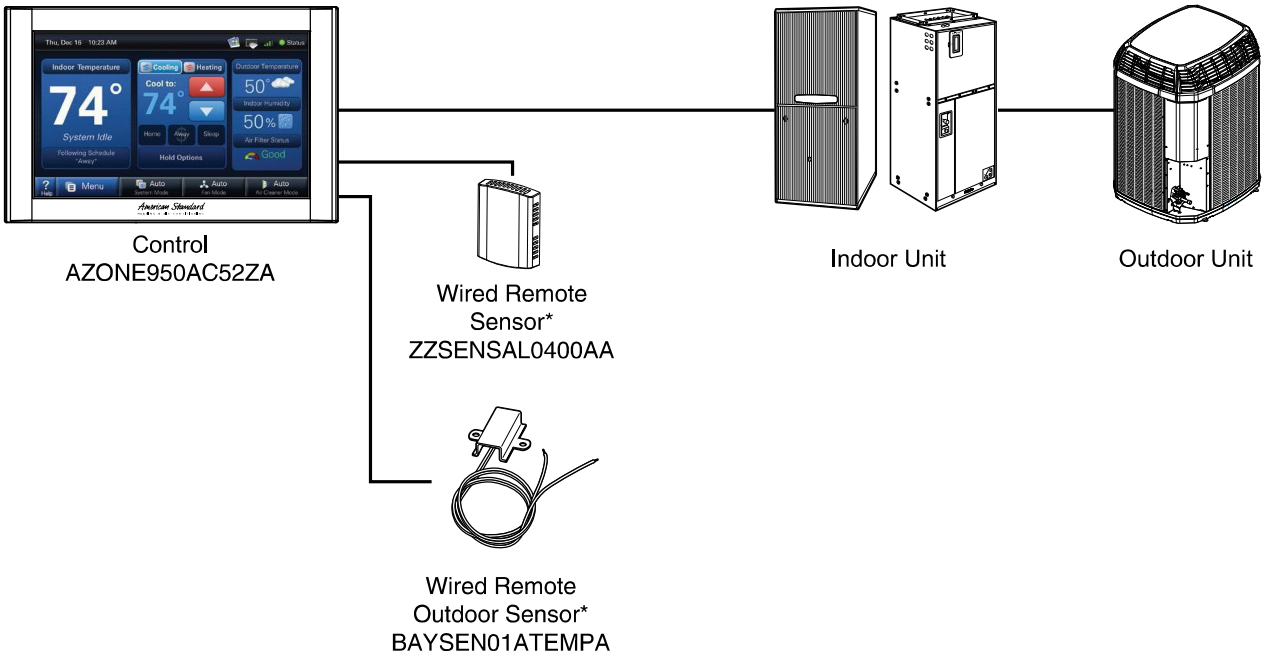
2.3 Specifications

Specification	Description
Product Model:	TZONE950AC52ZA
Product:	ComfortLink II Control
Size:	7.3" width x 4.3" height x 1.2" depth
Storage Temperature	-40°F to 175°F, 5% to 95% RH non-condensing
Operating Temperature:	25°F to 126°F, 5% to 90% RH non-condensing
Input Power:	24 VAC from HVAC System (Range: 18-32 VAC)
Power Consumption:	7 VA*
Wire usage:	Minimum 18 gauge NEC approved control wiring
Wireless Connectivity Range (802.11 b/g):	Varies with router model and placement
Communications:	ComfortLink II - 3 wire connection
System Modes:	Heat, Cool, Auto, Emergency Heat
Fan Modes:	On, Auto, Circulate
Cooling Setpoint Temperature Range:	60°F to 99°F, 1°F resolution
Heating Setpoint Temperature Range:	55°F to 90°F, 1°F resolution
Indoor Temperature Display Range:	20°F to 119°F
Outdoor Temperature Display Range:	-31°F to 119°F
Indoor Humidity Display Range:	0% to 99%, 1% resolution
Minimum Cycle Off Time Delay:	Compressor: 5 minutes, Indoor Heat: 1 minute

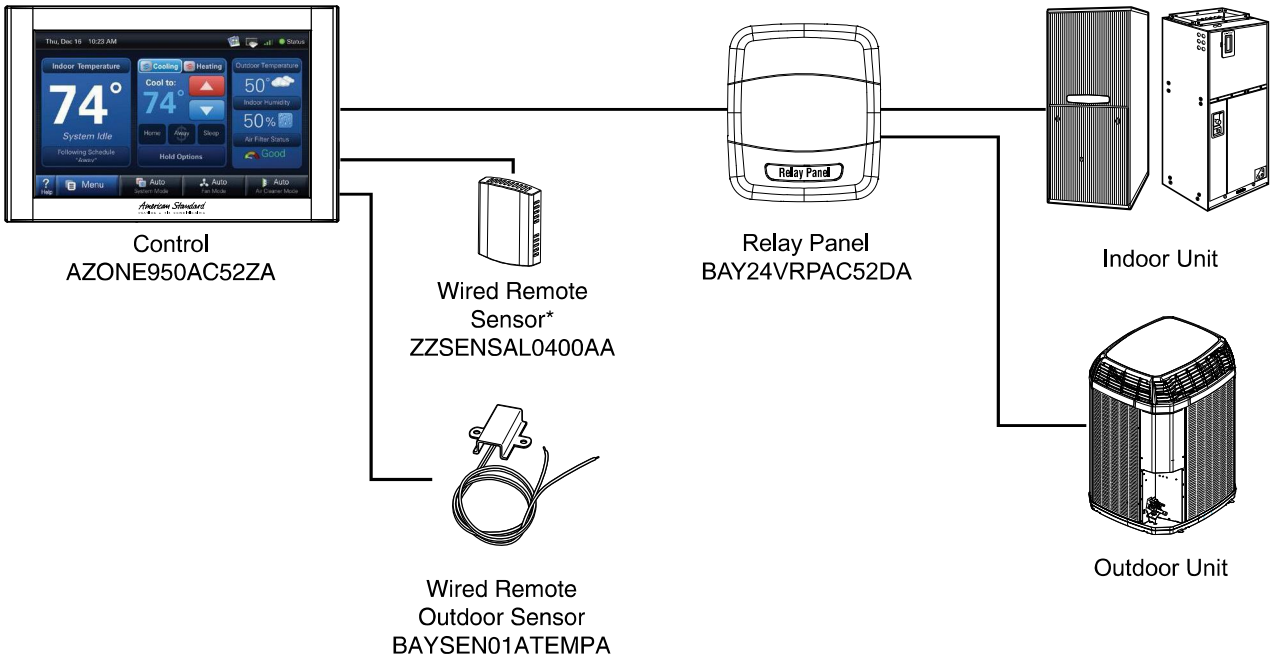
* On every application, 24VAC loads should be reviewed to be sure the indoor unit control power transformer is adequately sized. See the Relay Panel Installer's Guide for guidelines.

2.4 ComfortLink II System Connections

2.4.1 Communicating System



2.4.2 24V System

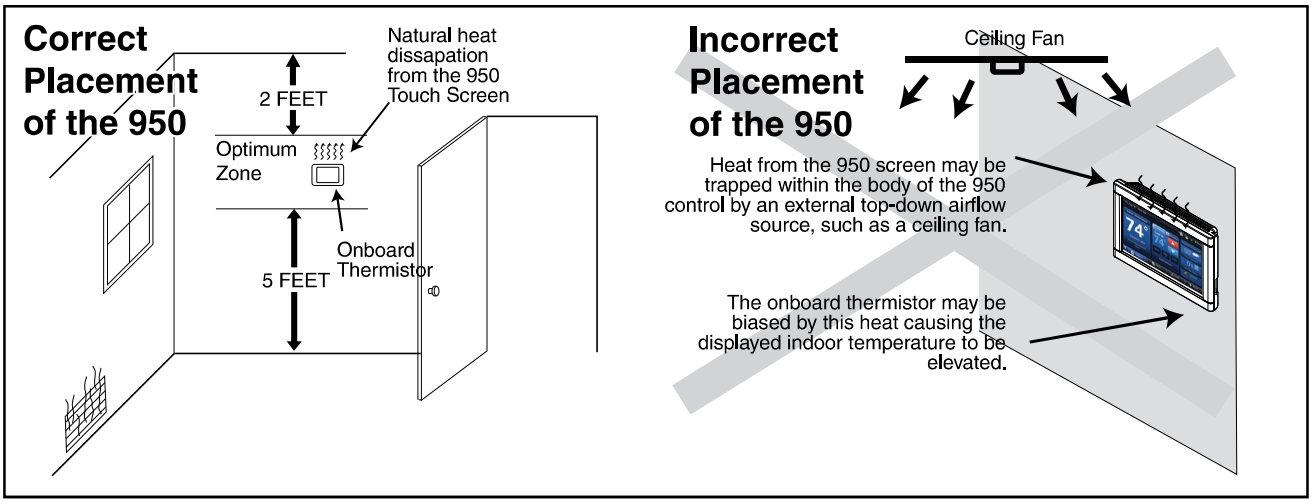


Section 3. Physical Installation

3.1 Locational Considerations

3.1.1 Temperature Sensing Considerations

The 950 Control is designed for installation in climate controlled living spaces. It is recommended to place the unit in central locations with good circulation. Avoid exterior walls and areas near windows, doors, vents or concealed pipes or chimneys. Important: The 950 Control utilizes a large 7" touch screen. This screen generates heat which is vented out the top of the Control utilizing natural convection. If an air source is directed at or from above, heat from the screen can be trapped within the Control body and can cause the indoor temperature to be biased.



3.1.2 Wireless Reception Considerations

If enabling wireless, choose a mounting location that ensures adequate signal strength.

A wireless device may have significantly different signal strengths if its position changes relative to other wireless devices. If the control shows poor signal strength, you may be able to improve the signal strength by moving the control a short distance in any direction.

Considerations to Maximize Signal Strength:

- Do not mount the control **more than 30 feet from the wireless router** (through no more than three interior walls).
- Do not mount the control in areas where **electromagnetic emissions** from other devices, appliances or wiring can interfere with the control's communication. (i.e. wireless phones, security systems, wireless internet cameras)
- Do not mount the control in **recessed areas**, near metal objects, or near structures. (i.e. doors, appliances, entertainment centers or shelving units)
- Do not mount the control closer than **2 inches to any pipes, duct work, or other metal obstructions.**
- Do not have **metal obstructions, concrete or brick walls** between the control and the wireless router it will be connected to.

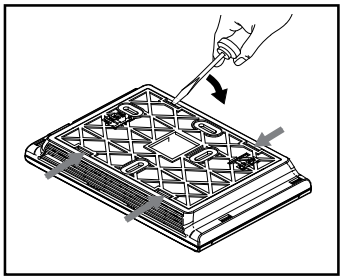
NOTE: See the User's Guide for wireless setup information.

3.2 Removing Sub-Base Wall Plate

Remove sub-base plate from the Control by inserting a small flat blade screwdriver into the notch at each of the four tabs as shown.

Gently pry the sub-base away from the Control.

NOTE: This tight fit is normal and ensures that the Control is held securely to the sub-base when mounted on the wall.



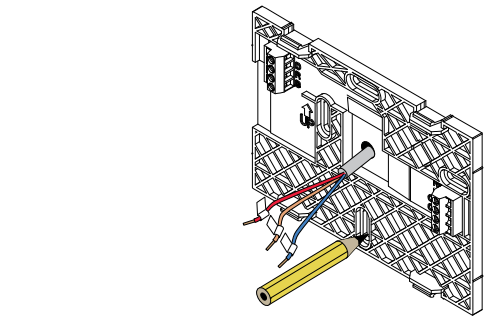
3.3 Mounting Sub-Base to Wall

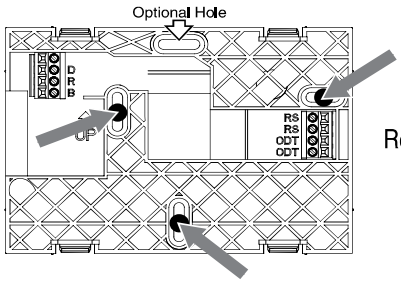
Be sure wires are routed through the center of the base plate and are long enough to connect to terminals.

Select and mark three holes.

NOTE: The three hole locations indicated at right are recommended. The top location is an optional mounting screw location.

A level may be used to ensure professional appearance.





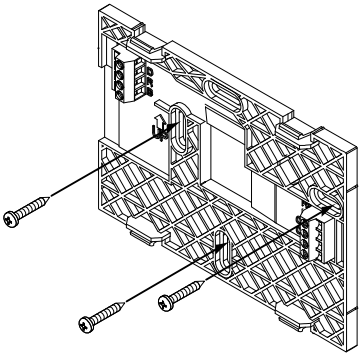
Three (3) Recommended Screw Locations

3.4 Mounting to Studs

Attach base to wall using 3 screws provided. The locations indicated provide the most secure mounting and are recommended.

NOTE: Since moderate force is required when removing the Control from the sub-base, the sub-base must be securely attached to the wall.

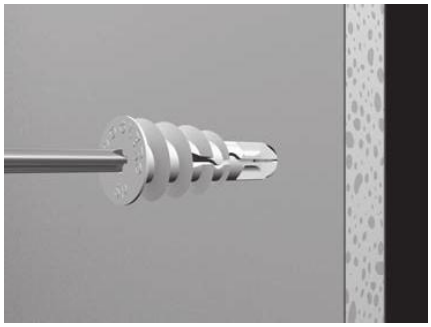
Do not overtighten screws to avoid damaging the sub-base.



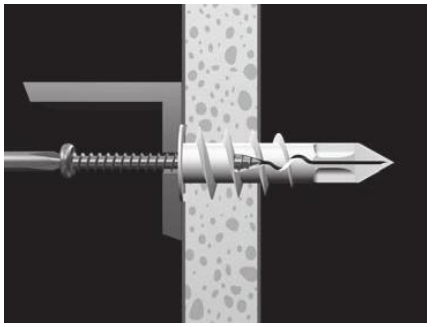
3.5 Mounting to Drywall

If mounting to drywall, supplied SnapSkru® anchors **must** be used to mount the Control sub-base to the wall. These anchors will ensure that the Control is adequately supported.

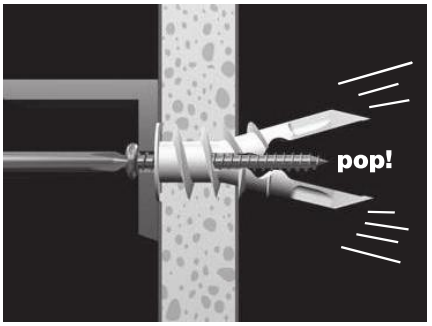
NOTE: Since moderate force is required when removing the Control from the sub-base, a firmly mounted sub-base is essential.



1) Press tip of SnapSkru® anchor into drywall using #2 Phillips screwdriver or screw gun. Drive anchor clockwise into drywall until anchor stops flush with wall.



2) Place sub-base over anchor and insert screw.



3) Tighten screw flush with sub-base. Screw "pops" open anchor, locking anchor on wall.

Do not overtighten screws to avoid damaging the sub-base.

Section 4. Wiring

4.1 Warnings

⚠ 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.

⚠ CAUTION

CAUTION: EQUIPMENT DAMAGE HAZARD - Improper wiring can lead to equipment damage. Follow the terminal connection information carefully to ensure the control is wired properly. After wires are secure, bare wires MUST NOT touch each other. See the Field Wiring Diagrams for specific system applications.

NOTE: The maximum total cable length for the entire communicating system is 500 feet (18 AWG). The maximum distance of any single cable from a transformer is 250 feet (18 AWG).

NOTE:

- Use 18-gauge color-coded thermostat cable for proper wiring. Shielded cable is not typically required.
- Keep this wiring at least one foot away from large inductive loads such as Electronic Air Cleaners, motors, line starters, lighting ballasts and large distribution panels.
- Failure to follow these wiring practices may introduce electrical interference (noise) which can cause erratic system operation.
- All unused thermostat wire to be grounded at indoor unit chassis ground only. Shielded cable may be required if the above wiring guidelines cannot be met. Ground only one end of the shield to the system chassis.

4.2 Power Connections

The Control is powered via 24 VAC from the indoor unit. On every application, 24VAC loads should be reviewed to be sure the indoor unit power transformer is adequately sized. The ComfortLink II Control draws approximately 4VA more than the typical communicating Control.

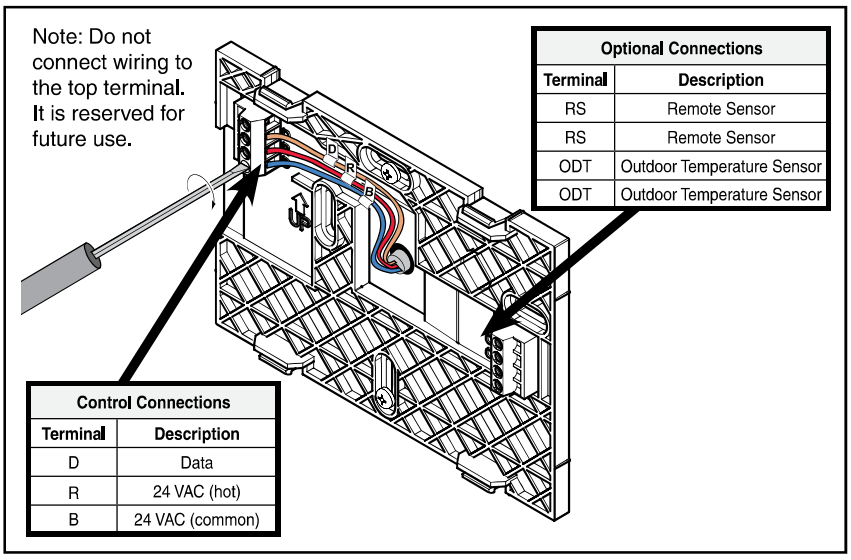
4.3 Connect Wiring

Connect wiring to terminals as shown.

Route wiring within the plastic channel as shown so that it does not interfere with Control when reinstalling. Do not overlap wires.

Plug the opening with non-flammable insulation to prevent drafts from affecting the Control.

Note: Do not pull unused conductors through the opening due to the minimal clearance between the sub-base and Control.



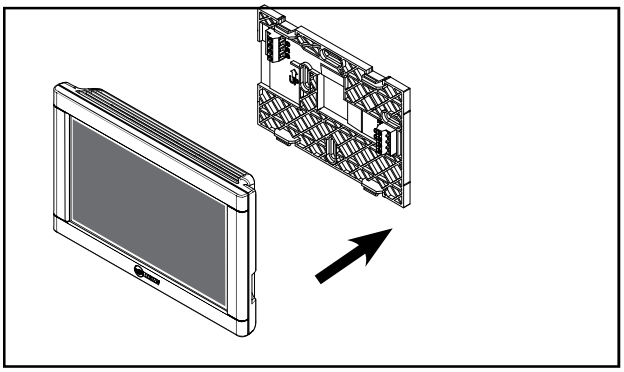
Optional Connections	
Terminal	Description
RS	Remote Sensor
RS	Remote Sensor
ODT	Outdoor Temperature Sensor
ODT	Outdoor Temperature Sensor

Control Connections	
Terminal	Description
D	Data
R	24 VAC (hot)
B	24 VAC (common)

4.4 Replace Control

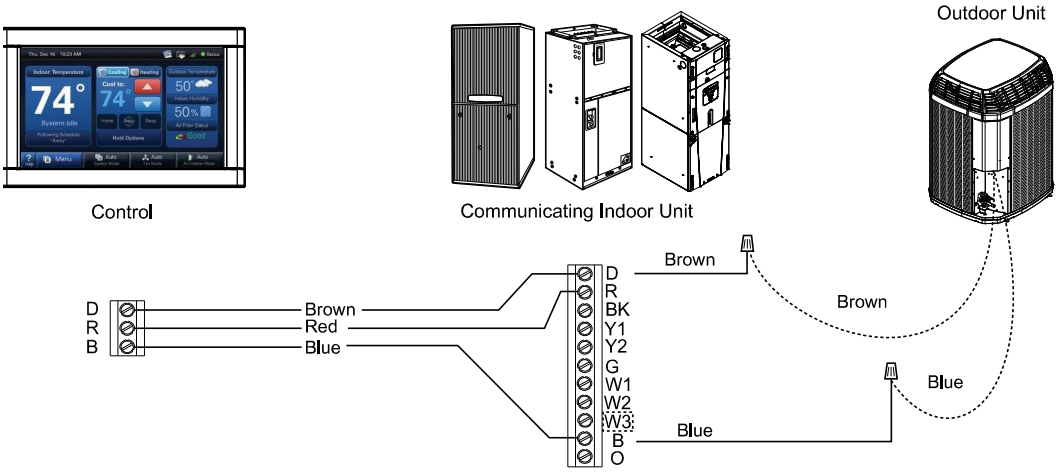
Replace unit flat onto sub-base being careful to align unit correctly with the sub-base before applying force.

Control should fit snug and not “rock” when properly installed. Check wire routing if Control is unstable.

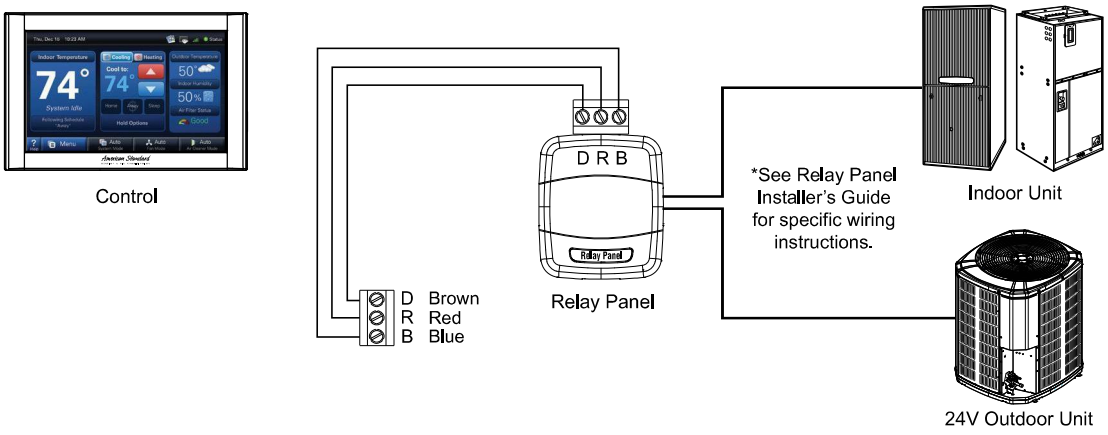


4.5 Field Wiring

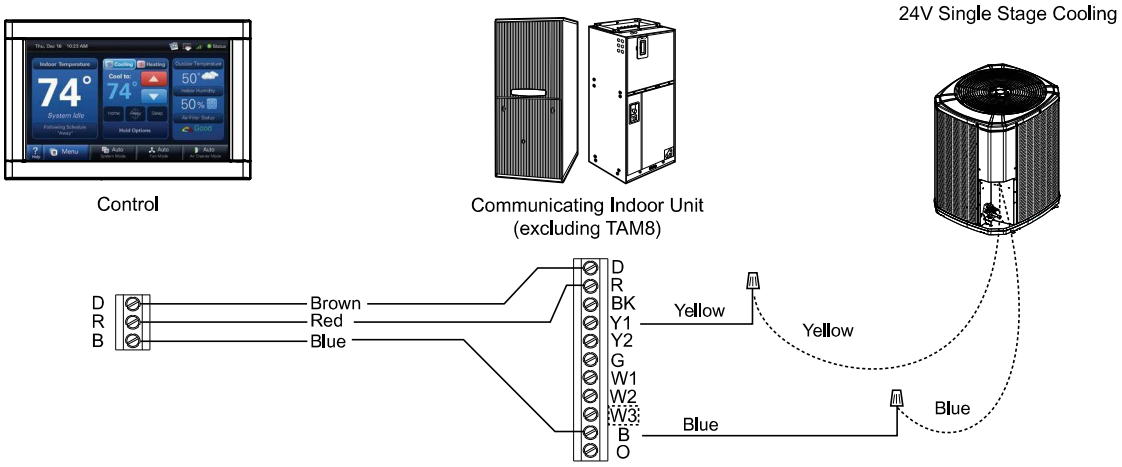
4.5.1 Communicating Indoor and Outdoor



4.5.2 24V System

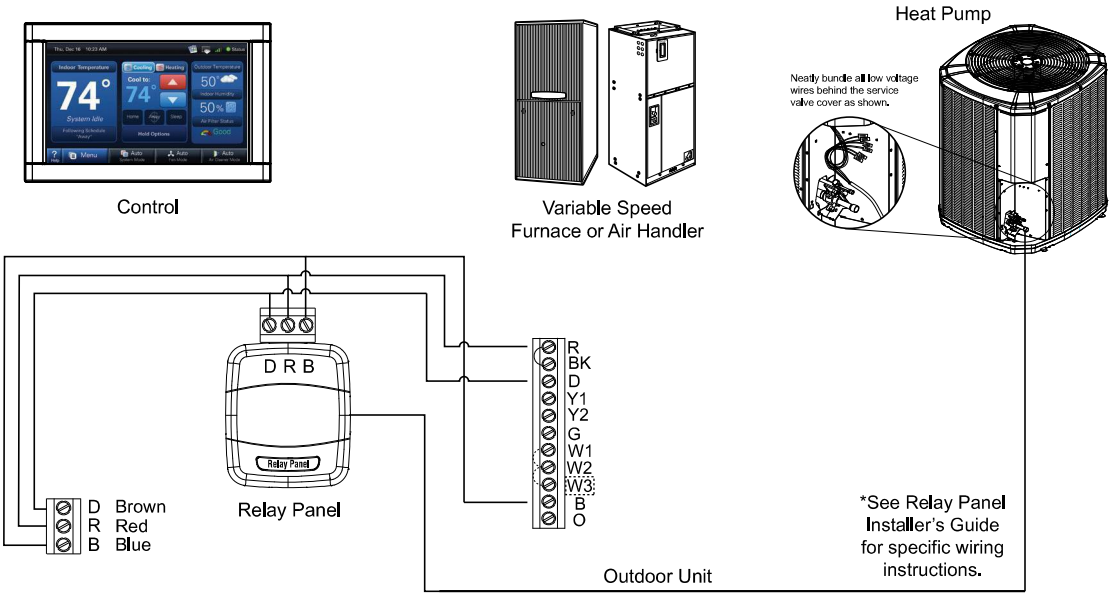


4.5.3 Communicating Indoor (excluding TAM8) with Non-Communicating Single Stage Cooling

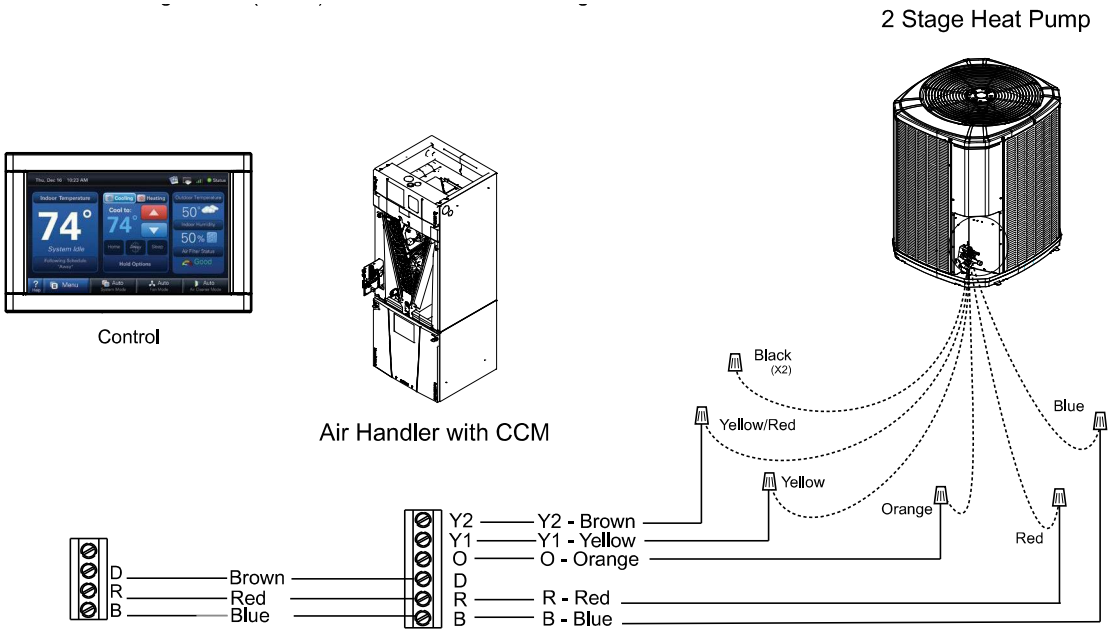


Field Wiring (continued)

4.5.4 Communicating Indoor (excluding TAM8) with Non-Communicating Outdoor Heat Pump or Multi-Stage AC and Relay Panel



4.5.5 Communicating Indoor (TAM8) with Non-Communicating Outdoor and CCM



Section 5. System Setup

5.1 Power-Up

Communicating Equipment

Discovery mode begins when the Control is first installed and power is connected. For communicating equipment, the Control automatically configures standard equipment parameters.

24V Equipment (Using a Relay Panel)

Equipment will need to be configured manually through the Installer's Setup menu in the Control. See the following section for more details.

Power-Up Sequence

When the 950 Control is connected to the Sub Base, the Control will initiate a 90-120 second power-up sequence. During the power-up sequence, the Screen Calibration option is available for five seconds. If the screen is not pressed within five seconds, the 950 Control will default to previously stored Screen Calibration settings.

Note: The 950 Control is factory calibrated and can be recalibrated at any time by rebooting the Control and selecting Screen Calibration option within the five seconds following power-up.

5.2 Installer Setup Menus and Options

Pressing the “Standard” button allows manual selection and configuration of basic equipment components.
NOTE: In a communicating system, components will be discovered automatically, manual setup is not required.

Menu	Setting	Available Options
5.2.1 STANDARD ▶	▼ Outdoor Unit Type	None Cooling Only Heat Pump
	▼ Outdoor Unit Stages	1 2 Variable
	▼ Compressor Type	Single Compressor Two Stage Two Compressor Two Stage
	▼ Indoor Unit Type	Electric Gas/Oil Hydronic
	▼ Indoor Unit Heat Stages	None 1 2 3 Modulating
	▼ Indoor Unit Blower Type	Variable Speed Non-Variable Speed
	Zoning	Enable Disable

The “Advanced” settings are used to fine-tune the operation of the 950 Control. Installed accessories can also be configured in “Advanced” Settings.

5.2.2 ADVANCED ▶
EQUIPMENT ▶

▼ Compressor Cooling Cycles Per Hour	2, 3, 4, 5 or 6
▼ 1st Stage Compressor Heating Cycles Per Hour	2, 3, 4, 5 or 6
▼ 2nd Stage Compressor Heating Cycles Per Hour	2, 3, 4, 5 or 6
▼ Compressor Heating Cycles Per Hour	2, 3, 4, 5 or 6
▼ 1st Stage Compressor Cooling Cycles Per Hour	2, 3, 4, 5 or 6
▼ 2nd Stage Compressor Cooling Cycles Per Hour	2, 3, 4, 5 or 6
▼ Compressor Minimum On Time - Min	3
▼ 1st Stage Compressor Minimum On Time - Min	3
▼ 2nd Stage Compressor Minimum On Time - Min	3
▼ Indoor Heater Cycles Per Hour	2, 3, 4, 5 or 6
▼ 1st Stage Indoor Heater Cycles Per Hour	2, 3, 4, 5 or 6
▼ 2nd Stage Indoor Heater Cycles Per Hour	2, 3, 4, 5 or 6
▼ 3rd Stage Indoor Heater Cycles Per Hour	2, 3, 4, 5 or 6
▼ Indoor Heater Minimum On Time - Min	1
▼ 1st Stage Indoor Heater Minimum On Time - Min	1
▼ 2nd Stage Indoor Heater Minimum On Time - Min	1
3rd Stage Indoor Heater Minimum On Time - Min	1

Installer Setup Menus and Options (continued)

Menu	Setting	Available Options
5.2.3 ADVANCED ▶		
ACCESSORIES ▶		
	▼ Filtration Type Installed	Comm Air Cleaner Air Cleaner Media Filter
	▼ Number of Air Cleaners Installed	1, 2
	▼ Air Cleaner Power Level	Low, Medium, High
	▼ Humidifier Installed	Yes, No
	▼ Airflow During Humidifier Only Mode	35% - 100%
	▼ Humidifier Type	Powered/Bypass Steam
	▼ Humidifier Control	RH Control Frost Control
	▼ Humidifier Fan Action	Humidify without Active Heat Call Humidify with Active Heat Call Only
	▼ Dehumidifier Installed	No, Yes
	▼ Dehumidifier - Select Relay Panel Aux Contacts	Aux 1 Aux 2
	▼ Dehumidifier Control Options	Stand Alone Operation Dehumidifier Operation with Active Call for Cooling Only
	▼ Dehumidifier - Run System Fan with Dehumidifier Request	No, Yes
	▼ UV Light Installed	None, Yes
	▼ Ventilation Installed	Yes, No
	▼ Ventilation - Select Relay Panel Aux Contacts	Aux 1 Aux 2
	▼ Outdoor Temperature Ventilation Override	Disable Enable
	▼ Ventilation - Minimum Outdoor Temperature Allowed	-10F - 50F
	▼ Ventilation - Maximum Outdoor Temperature Allowed	80F - 110F
	▼ Minimum Ventilation Run Time Per Hour	0 - 60 minutes
	▼ Accumulate Overridden Runtime	No, Yes
	▼ Accumulate Period	• 4 hours - recover only when outdoor conditions are favorable, • 24 hours - recover only when outdoor conditions are favorable, • 4 hours - recover as need to meet minimum, • 24 hours - recover as needed to meet minimum
5.2.4 ADVANCED ▶		
COMFORT ▶		
	▼ Enable Dehumidification	Disable Enable
	▼ Dehumidification Overcooling Limit - Degrees	0, 1, 2, 3
	▼ Control Response Rate	Normal Fast
	▼ Aggressive Recovery > 2° Setpoint Change	Disable Enable
	▼ Heating Aggressive Recovery	Disable Enable
	▼ Heating Aggressive Recovery - Outdoor Temperature	0 to 70
	Warm Air Discharge	Disable Enable

Installer Setup Menus and Options (continued)

Menu	Setting	Available Options
5.2.5 ADVANCED ▶		
AIRFLOW ▶		
	▼ VS Blower On Delay - Cooling	No Delay 1 Minute @ 50%, 7.5 Minutes @ 80% 1 Minute @ 50%, 4 Minutes @ 80% 7.5 Minutes @ 80% 4 Minutes @ 80% 1 Minute @ 50% 30 Seconds
	▼ VS Blower Off Delay - Cooling	No Delay 1.5 Minutes @ 100% 45 Seconds @ 100% 30 Seconds @ 50% 1.5 Minutes @ 50% 3 Minutes @ 50% 30 seconds @ 35%
	▼ VS Blower On Delay - Compressor Heating	No Delay 1 Minute @ 50%, 7.5 Minutes @ 80% 1 Minute @ 50%, 4 Minutes @ 80% 7.5 Minutes @ 80% 4 Minutes @ 80% 1 Minute @ 50% 30 Seconds
	▼ VS Blower Off Delay - Compressor Heating	No Delay 1.5 Minutes @ 100% 45 Seconds @ 100% 30 Seconds @ 50% 1.5 Minutes @ 50% 3 Minutes @ 50% 30 seconds @ 35%
	▼ Non VS Blower On Delay - Cooling	No Delay 15 Seconds 30 Seconds 90 Seconds
	▼ Non VS Blower Off Delay - Cooling	No Delay 30 Seconds 60 Seconds 90 Seconds
	▼ Non VS Blower On Delay - Compressor Heating	No Delay 15 Seconds 30 Seconds
	▼ Non VS Blower Off Delay - Compressor Heating	No Delay 30 Seconds 60 Seconds 90 Seconds
	▼ Hydronic Heat Blower On Delay	No Delay 30 Seconds 60 Seconds
	▼ Hydronic Heat Blower Off Delay	No Delay 30 Seconds 60 Seconds 90 Seconds
	▼ Compressor Low Stage Air Flow % - Cooling	35% - 60% 55% - 80%
	Compressor Low Stage Air Flow % - Compressor Heating	35% - 60% 55% - 80%

Installer Setup Menus and Options (continued)

Menu	Setting	Available Options
5.2.6 ADVANCED ▶ SENSORS ▶		
	▼ Select Outdoor Temperature Sensor	No ODT Sensor Thermostat ODT Sensor CLII/AccuLink Outdoor Sensor Relay Panel ODT Sensor
	▼ Calibrate Outdoor Temperature Sensor - Degrees	+/- in 5° Increments
	▼ Calibrate Indoor Temperature Sensor - Degrees	Zone X in +/- 5° Increments
	▼ Thermostat Humidity Sensor	Disable Enable
	▼ Calibrate RH Sensor	Zone X in +/- 5° Increments
	▼ Humidity Controlling Zone	Zone Number
5.2.7 ADVANCED ▶ ZONING ▶		
	▼ Damper Travel Time	15 - 60 Seconds
	▼ Auto Detect Damper	No, Yes
	▼ Detected Dampers	2 - 8
	▼ Run Auto Zone Airflow Capacity	No, Yes
	▼ Auto Zone Airflow Capacity Adjustment	Normal More Aggressive Less Aggressive
	▼ Airflow Capacity - % of Total	25% - 100%
	▼ Voting Zones	No, Yes
	▼ Clamp LV for Auxiliary Heat	Disable, Enable
	▼ Auxiliary Heat Threshold	25% - 99%
	▼ Indoor Heating Airflow Offset % (above and below cooling airflow)	-50 - +50, 0
	▼ Discharge Temperature Limit - Cooling	Normal (38), Extended (34)
	▼ Discharge Temperature Limit - Compressor Heating Only	Normal (116), Extended (128)
	▼ Discharge Temperature Limit - Compressor Heating w/Aux Heat	Normal (160), Extended (170)
	▼ Heating Fuel Type	Gas Oil
	▼ Discharge Temperature Limit - Gas Furnace Heating	Normal (135), Extended (145)
	▼ Discharge Temperature Limit - Oil Furnace Heating	Normal (160), Extended (170)
	▼ Discharge Temperature Limit - Hydronic Heating	Normal (135), Extended (145)
5.2.8 ADVANCED ▶ LOCKOUTS ▶		
	▼ Compressor Heating Lockout	Disable, Enable
	▼ Compressor Lockout - Outdoor Temperature	5 - 70
	▼ Auxiliary Heat Lockout	Disable, Enable
	▼ Auxiliary Heat Lockout - Outdoor Temperature	32 -70
	▼ Defrost Heater Balance Point (W1)	Disable, Enable
	▼ Defrost Heater Balance Point (W1) - Outdoor Temperature	40 - 55
	▼ Defrost Heater Balance Point (W2)	Disable, Enable
	▼ Defrost Heater Balance Point (W2) - Outdoor Temperature	5 - 55
	▼ Defrost Heater Balance Point (W3)	Disable, Enable
	▼ Defrost Heater Balance Point (W3) - Outdoor Temperature	5 - 55
	▼ Compressor Cooling 1st Stage Lockout	Disable, Enable
	▼ Compressor Cooling 1st Stage Lockout - Outdoor Temperature	80 - 120
	▼ Compressor Heating 1st Stage Lockout	Disable, Enable
	▼ Compressor Heating 1st Stage Lockout - Outdoor Temperature	0 - 50
	▼ Furnace Heating 1st Stage Lockout	Disable, Enable
	▼ Furnace Heating 1st Stage Lockout - Outdoor Temperature	0 - 50

5.3 Zone Sensor Setup

The Zone Sensor setup screen allows the technician to assign the correct temperature sensor to each zone.

This screen can also be used to view and edit the existing zone temperature assignments. The screen is made up of two parts:

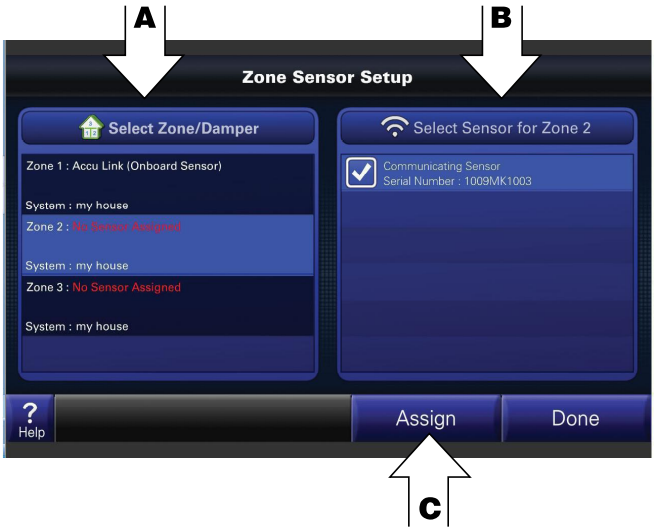
1. **Select Zone/Damper –** Displays a list of Zones/ Dampers and the sensors assigned
2. **Available Sensors –** Displays a list of available sensors which have not been assigned

The onboard temperature sensor of the 950 Control is automatically enabled and assigned to Zone 1 for zoning applications. All other temperature sensors must be manually assigned.

Assigning Sensors:

1. Go to the 950 Control
2. Navigate to:
   MENU > SERVICE > TECHNICIAN ACCESS > PROCEED > ZONE SENSORS.
3. Select the corresponding damper on the left side of the screen (A).
4. Select the appropriate sensor on the right side of the screen (B).
5. Press ASSIGN (C).

Repeat these steps until all zones have a temperature sensor assigned.



Unassigning/Reassigning Sensors:

To change the temperature sensor assigned to a zone, follow the steps below:

Unassigning Sensors
1. Select the appropriate zone
2. Select the UNASSIGN button

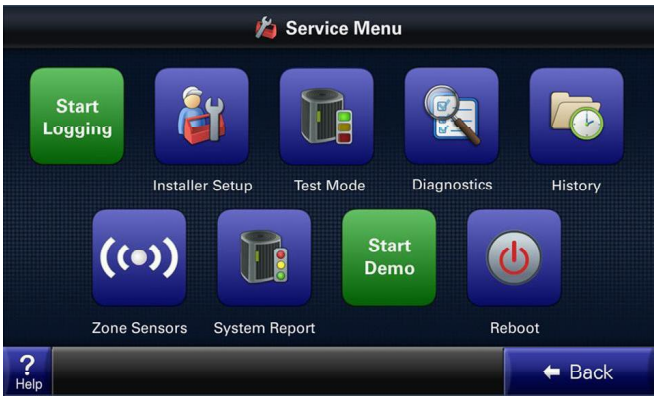
Reassigning Sensors
1. Select the zone
2. Select the sensor
3. Press the ASSIGN button

Important: All zones must have a temperature sensor assigned before exiting the Service Menu.

Section 6. Diagnostic Tools

6.1 Service Menu

The Service Menu contains useful functions for setup, troubleshooting and monitoring system function.



6.1.1 Data Logging

The 950 control has the ability to log data on SD cards. Insert an SD card and press the “Start Logging” button. Once logging is started, the “Start Logging” button is replaced with “Stop Logging”. To end logging, press the “Stop Logging” button before removing the SD card. The amount of data logged will be dependent on the number of days logged and the storage capability of the SD card.

6.1.2 Installer Setup

See the Section 5 for detailed Installer Setup menus and information.

6.1.3 Test Mode

The 950 control has three Test Modes available depending on the applied system, System Test, Damper Test and Variable Speed Tests.

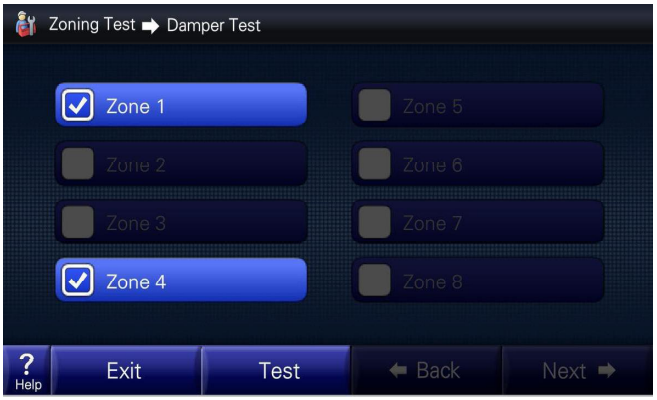
System Test Mode

System Test Mode allows the user to select the mode of operation to test the individual stage. Each test will run for a maximum of 30 minutes or until manually terminated. All control-imposed minimum ON/OFF times are defeated during System Test Mode. In zoned applications, all dampers are driven 100% open during test mode operation.

The options available are listed below:

System Test Mode		
Mode	**Settings**	**Description**
Test Blower	50%, 100%	Energize indoor blower at the selected speed
Test Cool	Stage 1, Stage 2	Energize the selected stage of cooling operation. The indoor blower will also operate at the speed required for the selected stage
Test Compressor Heat	Stage 1, Stage 2	Energize the selected stage of compressor heating operation. The indoor blower will also operate at the speed required for the selected stage
Test Indoor Heat	Stage 1, Stage 2, Stage 3, Modulating	Energize the selected stage of indoor heating operation. The blower operation will be dependent on the indoor heat type: • Electric - blower energized during test mode but the blower speed is controlled by the indoor unit • Fossil - blower is controlled independently by the indoor unit during test mode • Hydronic - blower is energized during test mode
Test Compressor and Indoor Heat	Stage 1 Indoor Heat, Stage 2, Indoor Heat, Stage 3 Indoor Heat	Energize all stages of compressor heat and selected stage of indoor electric heat/hydronic heat. The blower is energized and runs at the higher of the compressor heat air flow versus indoor heat air flow
More	Test Humidifier, Test Aux Contact	Closes the normally open Humidifier/AUX contacts. The blower is not energized during this test mode

Damper Test Mode



Damper Test Mode gives the user the ability to test specific dampers to verify the dampers are opening/ closing properly. Each damper can be driven independently or in any combination with other installed dampers.

Once Damper test Mode is selected, all dampers are driven fully open. When a zone or zones is selected all other zone dampers are driven fully closed. The indoor blower will operate during this test mode. The speed of the blower is dependent on the number of zone dampers being tested and the sum of their zone sizes. The test will run for a maximum of 30 minutes or until manually terminated.

The options available are listed below:

Damper Test Mode		
Mode	**Settings**	**Description**
Zone 1	Select damper or dampers to be tested	In all selected zones the damper shall remain open and all non-selected zone dampers will be driven fully closed
Zone 2		
Zone 3		
Zone 4		
Zone 5		
Zone 6		
Zone 7		
Zone 8		

Variable Speed Test Mode

Variable Speed Test Mode allows the user to select vararious variable speed specific tests. Each test will run for 120 minutes or until manually terminated. Additional time can be added by pressing “Add Time”. All control-imposed minimum ON/OFF times are defeated during Variable Speed Test Mode. In zoned applications, all dampers are driven 100% open during test mode operation.

The options available are listed below:

System Test Mode		
Mode	**Settings**	**Description**
Charging Mode - Cooling	Test	Energizes outdoor unit at the correct compressor speed and associated indoor blower speed to set/verify sytem charge. Use sub-cooling tables in the outdoor unit Service Facts to determine correct charge levels. Outdoor temperature must be within 55F - 120F and indoor temperature must be between 70F - 80F. **This is the only approved method for charging/verifying system charge on variable speed systems.
Check Charge Mode - Heating		Energizes outdoor unit at the correct compressor speed and associated indoor blower speed to compare actual performance to typical performance. Use the pressure curves in the outdoor unit Service Facts for comparison. **This method is not an approved method for verifiying the charge on variable speed systems
Checkout Mode - Cooling	0-100%	This test mode allows the user to adjust the cooling compressor speed in selected increments from minimum to maximum. The single arrows represent a 1% change and double arrows a 5% change. This test mode allows the user to troubleshoot noise/ harmonics which may occur at various compressor speeds.
Checkout Mode - Heating	1-100%	This test mode allows the user to adjust the heating compressor speed in selected increments from minimum to maximum. The single arrows represent a 1% change and double arrows a 5% change. The user can also initiate a forced defrost cycle from the test mode screen. This test mode allows the user to troubleshoot noise/harmonics which may occur at various compressor speeds.
Pump Down Mode - Cooling	Test	This test mode will pulse the latching switchover valve to cooling position and run at full compressor speed. The outdoor EEV will remain open and the indoor EEV (if installed) will continue to control superheat
Pump Down Mode - Heating		This test mode will pulse the latching switchover valve to heating position and run at full compressor speed. The outdoor EEV will control superheat and the indoor EEV (if installed) will remain open

6.1.4 Diagnostics

Within the Diagnostic screen are two items related to alerts:

- **Current Alerts –** Alerts which are currently active
- **Alert History –** Alerts which have been cleared (last 30 days)

NOTE: Each alert will have a date/timestamp of when the alert was negated.

From both screens the user can select an alert code and get additional information on the alert as well as a list of possible causes, similar to the Interactive Troubleshooting Guide located on ComfortSite/ ASDealernet

All alerts are categorized by severity:

- **Critical**
  - Loss of heating/cooling operation
  - Service call is required
  - Alert messages are displayed on the home screen and when closed, a flashing red icon is used to indicate alert condition.
- **Major**
  - Reduced functionality but basic/minimum operation is possible
  - Service call is not immediately required
  - Alert messages are not displayed on the home screen but a yellow icon is used to indicate alert condition.

  NOTE: Critical and Major alerts can be displayed on the home screen by pressing the alert icon on the shortcut toolbar (top right of home screen).

- **Normal**
  - Functionality may be lost but should recover or information used for diagnostic purposes / performance monitoring
  - Service call is not required
  - Normal alerts are only displayed in the Diagnostic screen

Summary Table

The 950 control has a Summary Table which lists all the communicating devices that have been discovered. The screen is made up of four fields:

- Select
  - Allows user to select devices that have a Status of “Offline” to remove from persistent storage. Online devices cannot be removed without being disconnected from the communicating bus.
- Device Information
  - Lists the device name and model/serial number
- Enabled
  - Identifies whether the device has been enabled
- Status
  - Identifies whether the device is currently reporting on the bus (Only “Offline” devices can be removed)

The Enabled and Status field can be used to troubleshooting/informational purposes:

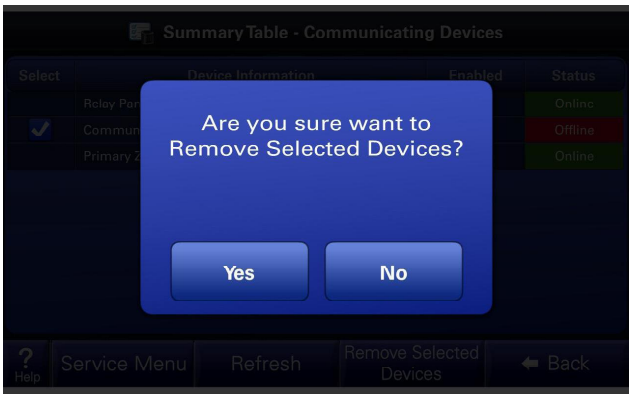
- Enabled + Online
  - Device has been enabled and is currently reporting on bus
- Enable + Offline
  - Device has been enabled but is not reporting (Err.126.00 will typically be triggered during this condition).
- Disabled + Online
  - Device has not been enabled but is reporting (verify device has been configured in the installer settings).
- Disabled + Offline
  - Device has not been enabled and is currently not reporting.

Example showing three devices Enabled and Online.

Example showing the removal of an Offline device.

Device is Enabled but Offline.

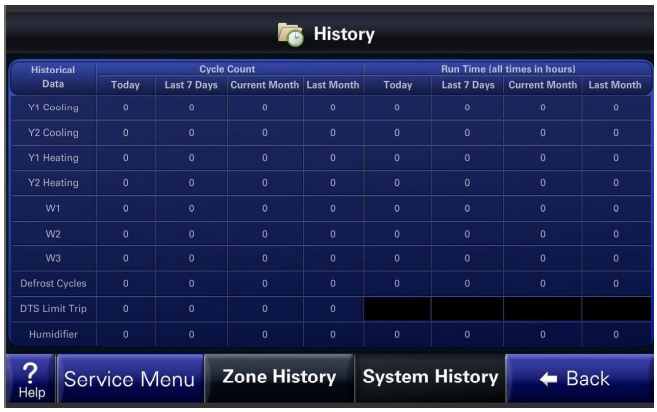
Selecting the Offline device and "Remove Selected Devices"displays the confirmation screen.



Pressing "Yes" will remove the selected device(s) from the current configuration.

6.1.5 History

The History screen allows the technician to view cycle count and run time data for each mode and stage of operation. This data provides a snap-shot in to how the system is operating. The technician can also compare the current month versus the previous month.



6.1.6 System Report

The System Report screen allows the technician to view important system/zone operational data, all on one screen. The data provided is in real-time and updates as the data changes. Examples of each are shown below.

Example of System Report Screens - Standard

- Operating State/Stage
- Load Value
- Fan Operating Mode
- Air Flow
- Indoor/Outdoor Temperatures
- Heating/Cooling Setpoints
- Indoor Relative Humidity (RH)
- Heating/Cooling RH Setpoints
- Balance Point
- Humidifier Status
- Ventilation Status

Example of System Report Screens - Variable Speed

- Operating State/Stage
- Requested Capacity
- Delivered Compressor Speed %
- Load Value
- Fan Mode/Air Flow %
- Indoor/Outdoor Temperatures
- Heating/Cooling Set Points
- Indoor RH %
- Heating/Cooling RH Set Points

Example of System Report Screens - Zoned

- System Load Value
- Operating State/Stage
- Requested Capacity (VSPD Only)
- Delivered Compressor Speed % (VSPD Only)
- Air Flow
- Excess Air %
- Indoor/Outdoor Temperatures
- Discharge/Return Air Temperatures
- Static Pressure
- Humidifier Status
- Ventilation Status
- Zone Mode, Size, & Load Value
- Heating/Cooling Set Points
- Relative Humidity
- Damper Position
- Sensor Type

6.1.7 Start Demo

Demo Mode allows the user to demonstrate all the screens and features of the 950 control without connecting to a communicating device.

To enable, simply apply 24 volts to control sub-base (R, B) then enable Demo Mode (Home > Menu > Service > Technician Access > Proceed > Demo Mode). During Demo Mode all screens and functionality are active except the ability to call for heating or cooling operation.

NOTE: Demo Mode is not available when connected to a communicating device.

NOTE: Before installing a 950 control which has been used in Demo Mode, press “Restore Factory Defaults” to clear all previously stored settings.

6.1.8 Reboot

This function reboots the software system of the control. Power cycling requires removing the control from the base.

Section 7. Advanced Features

Feature	Description
1-Touch Presets	The 1-Touch Presets allows for an immediate change to the setpoint status. Set the desired temperature for the three status modes (Home, Away & Sleep). The control will remain in the selected mode until another mode is selected or the program reaches a new schedule period.
Aggressive Recovery	**Aggressive Recovery**: This option disables the 10 minute inhibit anytime the control sees more than a 2° change (such as moving from one program time frame to another). This applies to heating & cooling modes. **Heating Aggressive Recovery**: This option disables the 10 minute inhibit based on outdoor temperature in heating mode only. The value for outdoor temperature can be set from 0°–70°. **Heating Aggressive Recovery can only be enabled if Aggressive Recovery is disabled**. There is a 10 minute "inhibit" period between first and second stage compressor as well as compressor heating & auxiliary heating. This 10 minute inhibit period minimizes the cycling of higher capacity when the existing capacity is sufficient to meet the demand.
Air Cleaner Mode	There are three options when setting the Air Cleaner Mode: Auto--the air cleaner will run whenever the blower is running. Quick Clean--the control will energize the air cleaner at 100% output and blower at 100% air flow for a 3-hour run cycle. Allergy Clean--the control will energize the air cleaner at 100% output and blower at 100% air flow for a 24-hour cycle.
Alert Indication	System alerts will be indicated on the home screen of the control with two options: "Close" or "Dealer Contact Information". • Selecting "Dealer Contact Information" will display the dealer screen. • Selecting the "Close" option will move the alert to the top right corner of the home screen. Pressing the icon button in the top right corner of the screen will recall the alert to the home screen. All alerts will remain until resolved. **Critical Alert –** indicates the loss of heating or cooling operation. Only critical alerts will be displayed on the home screen. These alerts will flash red when "closed" and moved to the top right corner of the control. **Major Alerts** – indicates the loss of system functionality, but the system is still operational. Major alerts will be displayed as a solid yellow icon in the upper right corner of the control.
Blower On / Off Delays	Blower on / off profiles can be set independently for heating and cooling modes. There are blower delays specific for variable speed, non variable speed and hydronic heat applications.
Calibration	The sensors (indoor, remote and outdoor) can be individually calibrated for temperature and humidity. The **indoor** sensors may be calibrated to plus or minus 5° or 5% in increments of 1 . The **outdoor** sensor may be calibrated to plus or minus 10° in 1° increments.
Control Response Rate	This feature changes the response rate of the control. Selecting a "faster" response rate will maintain a tighter tolerance of indoor temperatures, but increases the cycling of the system.
Cycle Rate	The cycle rate affects the cycle time of the system. With a 50% load value, a cycle rate of 3 will allow the system to run for 10 minutes and be off for 10 minutes; completing 3 cycles in one hour. A cycle rate of 5 would allow the system to cycle on and off at 6 minute intervals. The higher the cycle rate, the more often the system turns on and off. The actual amount of time the system will be "on" or "off" will be reflective in the load value of the home. Higher load value demands will increase system run time and decrease system off time. Lower load value demands will decrease system run time and increase system off time.
Dealer Information	Dealer contact information, including name, address, website and multiple phone numbers may be entered. In addition, a dealer logo (which must be named dealer.jpg) can be uploaded through the use of an SD card. File size should not exceed 3 MB. With software version 2.1 and above, a Dealer Code has been added. By simply typing in the dealer's main phone number, all required fields will be auto-populated.
Duty Cycle	When the control is requesting less capacity than the system can deliver, the control will duty cycle to meet the required demand. The length and frequency of each duty cycle is based on the cycle rate and current load value.

Feature	Description
Dehumidification	**There are two requirements before dehumidification is enabled:** • Dehumidification must be enabled through the Installer Setup. • The indoor relative humidity must be above the desired setpoint. **The system will take the following actions once this condition is met:** • The blower will reduce air flow proportional to the amount of RH error. The control evaluates the percentage of humidity error and how long the error has existed to determine the amount of air flow reduction, up to 30% reduction. • If overcooling is enabled, the control will engage a 1 degree of overcooling for each 10% of RH error. A maximum amount of overcooling can be configured to 1, 2 or 3 degrees. • Fan off delays will be eliminated. **Smart Continuous Fan** Continuous fan operation will be interrupted when indoor relative humidity exceeds desired humidity setpoint. A humidity icon will be displayed along with the fan icon to indicate that blower on options have been disabled due to high humidity conditions. Smart Continuous Fan will not interrupt the fan circulate mode.
Alert Code Diagnostics	Diagnostics are displayed as current alerts (what is currently happening in the system) and alert history (what has occurred in the past, but are no longer present). The alert screen describes the alert, when the alert happened, the severity level of the alert as well as a problem description and possible causes to assist with troubleshooting. Up to the last 30 days are displayed.
Dual Fuel Options	The change over from heat pump to furnace can be set based on three options: • **Comfort**–This is strictly based on indoor temperature demand. The furnace will take over when the heat pump can no longer maintain the indoor heating demand. • **Operating Cost–**The HSPF of the heat pump and AFUE of the furnace must be entered along with cost of electricity and fuel. The control calculates an economic balance point for system change over. • **Outdoor Temperature**–The changeover from heat pump to furnace is based on outdoor temperature which can be set from 0–70° (thermal balance point). **The furnace will take over anytime the HP is unable to maintain indoor temperature, regardless of the dual fuel option chosen.**
Emergency Heat	The heat pump will be disabled and the furnace / heat strips are enabled any time the control is set to Emergency Heat.
Equipment List	This lists the model and serial number for all communicating components. The model and serial numbers for non communicating components can be manually entered.
Fan Options	There are three options available for blower operation: • **Auto**–the blower runs when there is a call for cooling or heating. • **On–**the blower will run continually with a fan only call. The continuous fan speed for variable speed motors can be adjusted from 35%–100%. A call for heating or cooling will supersede a fan only call and the blower will run at a speed that matches the staging of the equipment. • **Circulate**–this provides all the features of “fan on”, but the blower will only run a percentage of the time when there is no call for heating or cooling. The blower can be set to circulate from 10–55 minutes of every hour.
Help Screens	The bottom left corner of all screens has a Help icon with a question mark. This icon provides assistance for the screen that is currently being displayed. Screens that are self explanatory will not list additional help. Pressing the Help icon on these screens will display “No additional help available”.
History Screen	The History Screen provides system cycle information. Cycle counts and run time can be viewed for first stage and second stage compressor operation, W1, W2 & W3 heating and defrost cycles. This information can be viewed in a 24 hour, 1 week or 1 month period.

Feature	Description
Humidification	There are two options available for humidification: • **Indoor RH setpoint**—this controls the humidifier based on the desired indoor humidity setpoint (options from 10%–45%). • **Frost Control setpoint--**The control references the outdoor temperature and indoor environment to calculate the risk of frost or condensation on interior walls and windows. A scale of 0 to 10 allows for customized settings based on the insulation properties of the home. A higher number may be selected for well insulated homes, whereas a lower number should be selected on poorly insulated homes. A lower number should be utilized if condensation is observed. There are two control options for enabling humidification: • Humidification with an active call for heat. • Humidification without an active call for heat (control energizes blower and humidifier). • Blower speed can be adjusted when there is no active call for heat but a call for humidification is present **Humidification is only available when in the heating mode (or in the auto mode when the last call was for heating). A 60 second minimum blower off delay is enforced if "steam" humidification is selected.**
Installer Setup	There are two categories for Installer Setup. • **Standard—**this is the basic system settings such as heat pump or cooling only, single or multi stage, compressor type, etc. This is the basic system set up that is self discovered in communicating mode, but requires manual input when using a Relay Panel for 24 volt configurations. • **Advanced—**this provides advanced configuration of the system such as cycles per hour, minimum run times, humidification and dehumidification setpoints, blower delays and temperature lockouts to name a few of the customizable features in this set up.
Load Value	Load Value is a numerical representation of the needed capacity to satisfy the setpoint. Proportional (distance from setpoint) error plus integral (time away from setpoint) error is used to calculate load value.
Lockouts	System lockouts will disable a certain function of the system under specific outdoor temperatures: • **Compressor Heating Lockout –** will lockout all compressor operation below a set outdoor temperature (from 5°–70°). There is a minimum 10° separation between the Compressor Heating Lockout setting and the Auxiliary Heating Lockout setting. • **Auxiliary Heating Lockout** – will lock out auxiliary heat stages above a set outdoor temperature (from 32°–70°). This value must be set higher than the compressor heating lockout. • **Defrost Heater Balance Point** for W1, W2 & W3 **–** will lock out specific auxiliary heat stages when above a set outdoor temperature. (W1 setpoint is from 40°–55°, W2 & W3 setpoints are from 5°–55°). This feature does not apply to dual fuel systems. • **Compressor Cooling First Stage Lockout** – will lock out the first stage compressor above a set outdoor temperature. (from 80°–120°) • **Compressor Heating First Stage Lockout –** will lock out the first stage compressor below a set outdoor temperature. (from 0°–50°) • **Furnace First Stage Heating Lockout –** will lock out first stage furnace operation below a set outdoor temperature. (from 15°–50°) First stage lockouts are not available with zoning.
Reminder Screens	Reminders can be set for filters, UV lamps, humidifier pads, and various other service reminders.
Restore	There are three levels of restore: • **Restore from the Setting Screen –** this restores all personal configurations, such as program schedules and home screen customization to their default setting. • **Reset Advanced Options from the Install Set Up screen** – this restores all the advanced set up selections such as system lockouts, accessories, air flow and comfort options to their default setting. • **Restore Factory Defaults –** this restores the control to its "out of the box" condition. All settings will be set to their factory default condition.
SD Card Logging	The control has the ability to log all information to a SD Card. A typical 24 hour log will consist of 12 to 20 megabytes of information. The control will overwrite the oldest data once the card becomes full.
Security	Security initiates a keypad lockout. The control can only be accessed by a four digit pass code which can be configured in two different formats: Pin Lock: When the Pin Lock is selected, the control is completely locked. The user will need to enter a four digit password to change any setting (the default is "1234"). Guest mode: The enabling of this mode allows a guest to change the temperature up to 5° in either direction from setpoint and access to the weather, but cannot change the mode or any customized settings. Note: The back door password is 9467.
Network Diagnostics	Screen gives the user the ability to view the wireless connectivity of the 950 Control. Save Diagnostic Logs is used to record wireless data for troubleshooting purposes

Feature	Description
Summary Table	This screen allows the technician to view the communication status of all communicating devices. Any device which is “offline” can be removed from this screen.
Setpoint Dead Band	This sets the temperature band between heating and cooling setpoints while in the auto mode.
Software Updates	The control is field software upgradable. The software can be upgraded by two methods: **SD Card upgrade -** Insert SD Card with new software loaded and use the software upgrade screen to complete the upgrade process. **Internet upgrade -** Insert SD Card and use the software upgrade screen to complete the upgrade process Note: Following the installation of software version 2.2 or later, an SD card is no longer required for future Internet software upgrades.
System Report	The System Report Screen provides a real time in depth look at operating conditions. While similar to the System Status screen, the system report adds additional information for service technicians.
Test Mode	There are three Test Modes in the control: **System Test -** Ability to test heating/cooling/blower/humidifier and aux contacts for up to 30 minutes. **Damper Test -** Ability to test damper operation (see Zone Panel IG for more information). **Variable Speed Test -**
Technician Access Screens	The “Technician Access” icon has a 5 second hold delay to enter the technician service screens. After this 5 second hold delay, the technician will see a “Caution!” screen noting that only a trained HVAC technician should proceed into this area.
Ventilation	The 950 control has the ability to control a ventilation system through the AUX contacts of a Relay Panel (Model BAY24VRPAC52DB* or newer). This function is enabled in the Installer Setup > Advanced > Accessories > Ventilation Installed. Once enabled the minimum ventilation can be set for each hour. Ventilation can be overridden during extreme temperature conditions by setting a maximum and minimum outdoor temperature for ventilation operation (wired outdoor sensor must be connected and enabled). Additional options are available to accumulate overridden runtime. All options are available for selection in Installer Setup > Advanced > Accessories section. **Note**: Currently there is no option to interlock the blower with a call for ventilation.
Warm Air Discharge	Enabling Warm Air Discharge will reduce the variable speed blower air flow by 20% when in compressor heating operation. Warm air discharge only applies to compressor heating and is disabled when hydronic, fossil fuel or electrical heat (including supplement heat) modes are activated.
Whole House Dehumidifier	The 950 control has the ability to control a whole-house dehumidifier through the AUX contacts of a Relay Panel (Model BAY24VRPAC52DB* or newer). This function is enabled in the Installer Setup > Advanced > Accessories > Dehumidifier Installed. The dehumidifier can be setup for stand-alone operation or only when the system is actively cooling. The user can also select whether the blower will be energized with a call for dehumidifier operation. Dehumidifier operation is only allowed in Cooling Mode or in Auto Mode when the last call for operation was cooling.

Section 8. Troubleshooting

Symptom	Possible Causes	Action
Control displays an alert code on the screen.	A critical or major alert is present.	Navigate to the Diagnostic screen on the 950 Control for a Problem Description and Possible Cause.
Display will not come on	Loss of 24VAC between R & B at the Control.	1) Check wiring between R & B to see if R & D, or B & D have been reversed. 2) Check transformer for 24VAC output. 3) Check for broken or shorted thermostat wire.
Indoor temperature display is incorrect.	1) Indoor temperature display needs calibration. 2) Heat from touch screen is being trapped within the thermostat body. See section 3.1 for mounting location guidelines.	1) Calibrate temperature sensor from Control menu. 2) Move thermostat away from competing air stream or use a remote temperature sensor
Indoor humidity display is incorrect.	Indoor humidity display needs calibration.	Calibrate humidity sensor from the Control menu.
Room temperature overshoots when the Heat/Cool setting is changed more than 2°.	1) Oversized heating/cooling equipment under current conditions. Control cannot respond fast enough to prevent overshooting. 2) Improper location of Control.	1) Compare heat load calculation to equipment chosen. 2) Relocate Control (or use remote sensor) if Control is in “dead” spot (poor or no air circulation).
Heating will not come on.	1) System mode is not set to Heat/Auto or setpoint is set too low. 2) Minimum off time delay is being enforced. 3) Heating system may require service.	1) Set mode to heat and raise the setpoint above the room temperature. 2) Wait for 5 minutes and recheck heating equipment. 3) Check/repair system.
Cooling will not come on.	1) System mode is not set to Cool/Auto or the setpoint is too high. 2) Minimum off time delay is being enforced. 3) Cooling system may require service.	1) Set mode to cool and lower the setpoint below the room temperature. 2) Wait for 5 minutes and recheck cooling equipment. 3) Check/repair system.
Heating or Cooling is displayed, but no warm or cool air is coming from the registers.	1) There is a fan delay as the heating or cooling equipment turns on. 2) Equipment is not working properly.	1) Wait a minute for blower delays and recheck registers. 2) Check/repair system.
Fan runs all the time	1) Fan mode is set to On, Circulate or Clean mode 2) There is a failure in the indoor unit	1) Check Control settings to see if fan is set to On, Circulate or Clean mode. 2) Check indoor unit for failures (such as tripped heating limit).
Fan is set to ON but not running.	1) Humidity Control is engaged. 2) Blower motor is not functioning.	1) If indoor humidity is higher than desired setpoint, the blower will cycle off with the equipment. A humidity icon will be displayed on the Fan Mode button when the blower operation is being inhibited due too high humidity. 2) Check/repair system.
Cooling or Heating cycles too fast or too slow (narrow or wide temperature swings).	1) Check the location of the Control for drafts. 2) Cycles per hour or aggressive recovery is improperly set.	1) Seal air leaks behind Control. Relocate Control or apply remote indoor temperature sensor. 2) Adjust cycle rates and aggressive recovery features in the advanced installer set up.
Heat pump is not turning on; only furnace or electric heat strips are running.	1) Outdoor temperature is below compressor lockout temperature setting. 2) Compressor heating lockout is enabled and outdoor temp sensor is out of calibration or failed. 3) The outdoor unit is not reporting (Err.126.00)	1) Adjust the compressor lockout temperature setting if desired. 2) Check/repair outdoor sensor or wiring. 3) Check communication status of outdoor unit.
Cannot change system mode to desired setting.	Equipment is not configured properly.	Check the standard installer set up screen to ensure equipment is properly configured.
Screen does not respond properly to a button press	1) Screen is out of calibration. 2) Internal Control fault	1) Remove Control from sub base and reset. Follow the calibration instructions when the Control reboots. 2) Remove Control from sub base and reset.
“No System Found” displayed on the Control	Internal error	Reboot the Control via onscreen button.

TRANE®

6200 Troup Highway
Tyler, TX 75707
© 2014 Trane

The manufacturer has a policy of continuous product and product data improvement and it reserves the right to change design and specifications without notice.

Representative-only illustrations included in this document.